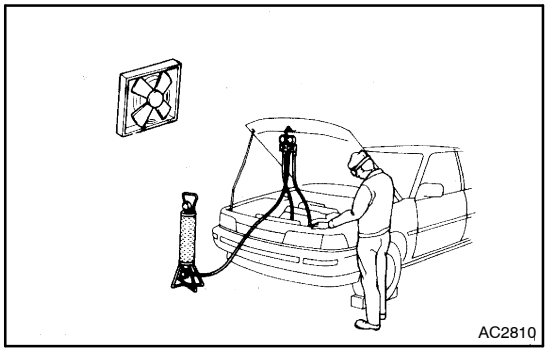


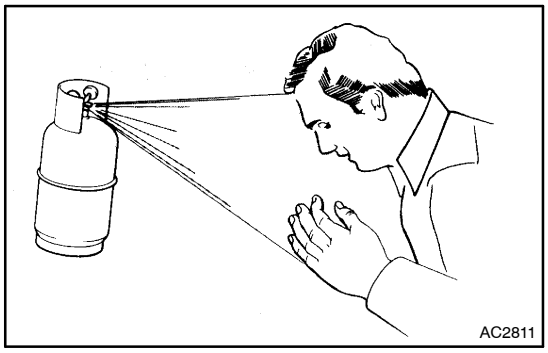
AIR CONDITIONING SYSTEM

AC15I–02

PRECAUTION

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

2. ALWAYS WEAR EYE PROTECTION



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:

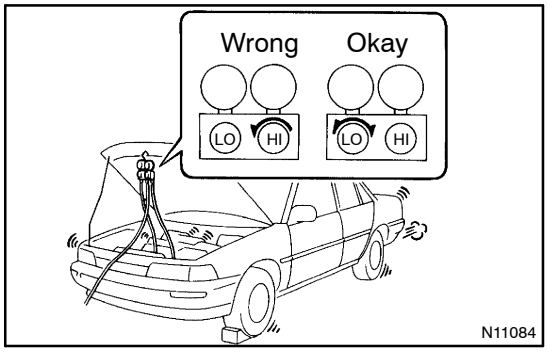
Do not rub your eyes or skin.

(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 APPLY PHYSICAL SHOCKS TO IT



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

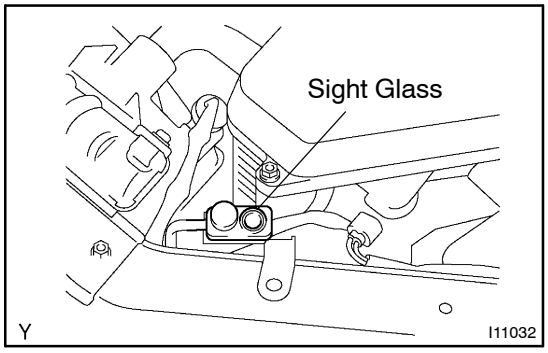
8. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

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

9. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Lexus IS 200 is equipped with an SRS (Supplemental Restraint System) such as the driver and 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. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

AC15J–02



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 at ”HI” position
- A/C switch ON
- Temperature control dial at ”COOL” position
- Fully open the 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 in sight glass	None, sufficient or too much	Refer 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 conditioner is turned off, refrigerant in sight glass stays clear	Too much	(1) Discharge refrigerant (2) Evacuate air and charge proper amount of purified refrigerant
6	When air conditioner is turned off, refrigerant foams and then stays clear	Correct	–

*: 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

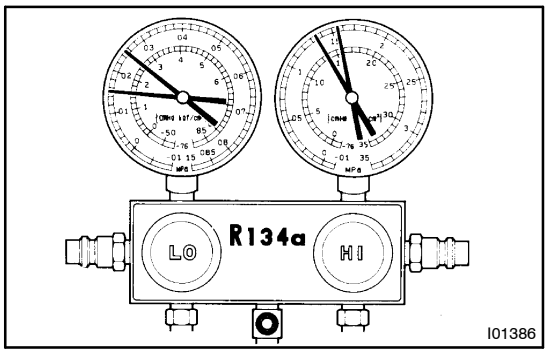
This is a method in which the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when these conditions are established.

Test conditions:

- Temperature at the air inlet with the switch set at RECIRC is 30 – 35 °C (86 – 95 °F)
- Engine running at 2,000 rpm
- Blower speed control switch at "HI" position
- Temperature control dial on "COOL" position

HINT:

It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.



(1) Normally functioning refrigeration system.

Gauge reading:

Low pressure side:

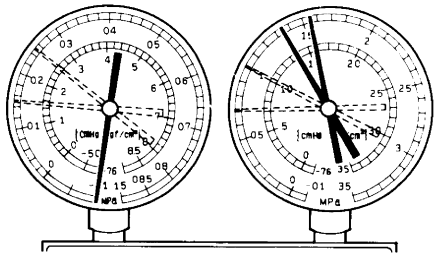
0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm^2)

High pressure side:

1.37 – 1.57 MPa (14 – 15 kgf/cm^2)

(2) Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

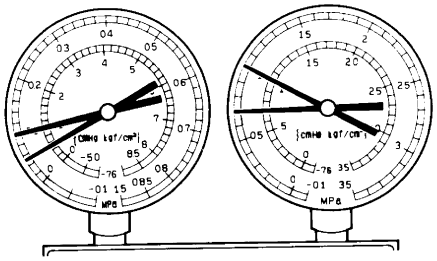


I01387

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 dryer (2) Remove moisture in cycle through repeatedly evacuating air (3) Charge proper amount of new refrigerant

(3) Insufficient cooling

Condition: Insufficient cooling

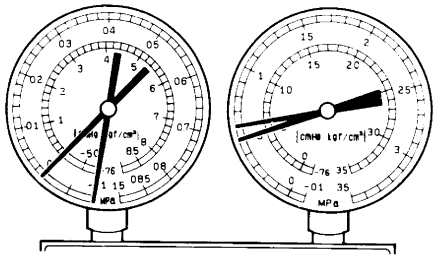


I01388

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

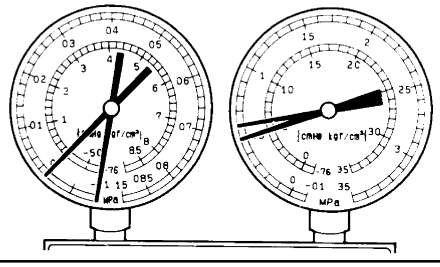


I01389

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

(5) Refrigerant does not circulate

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

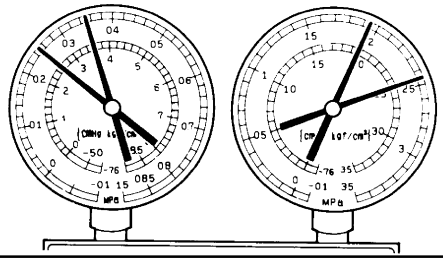


I01449

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 condenser/ 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 dryer (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

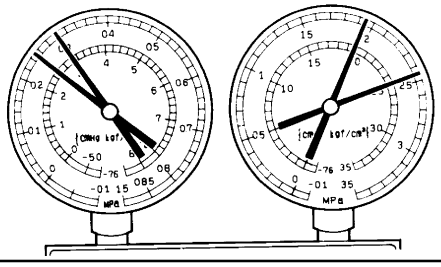


I01390

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



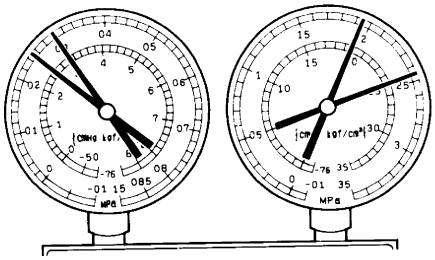
NOTE : These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

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

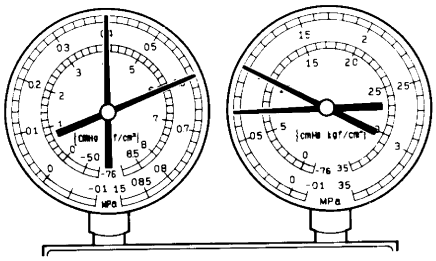


I01450

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 switch at ”HI” position
- Temperature control dial at ”COOL” position
- A/C switch ON
- Put gear shift in neutral

Magnetic clutch condition	Idle speed
Magnetic clutch not engaged	650 ± 50 rpm
Magnetic clutch engaged	650 ± 50 rpm

If idle speed is not as specified, check the idle control system.

4. INSPECT FOR LEAKAGE OF REFRIGERANT

(a) Perform in these conditions.

- Stop engine
- Secure good ventilation (If the gas leak detector may not react volatile gases which are not refrigerant, such as evaporated gasoline and 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 has stopped, leave the cooling for more than 15 minutes.
- Expose the gas leak detector sensor under the drain hose.
- When bring the gas leak detector close to the drain hose, make sure that the gas leak detector does not react to the volatile gases.

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

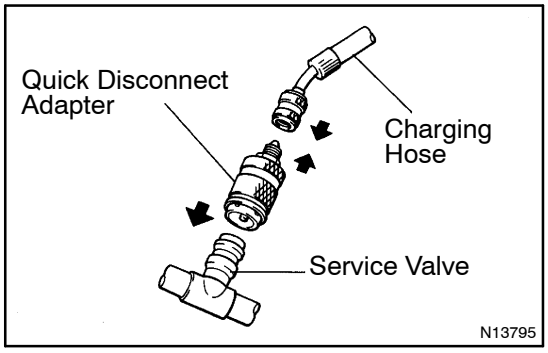
(c) If gas leak is not detected on the drain hose, remove the blower resistor from the cooling unit. Then insert the gas leak detector sensor into the unit and perform the test.

(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.

AC15K–03

EVACUATING



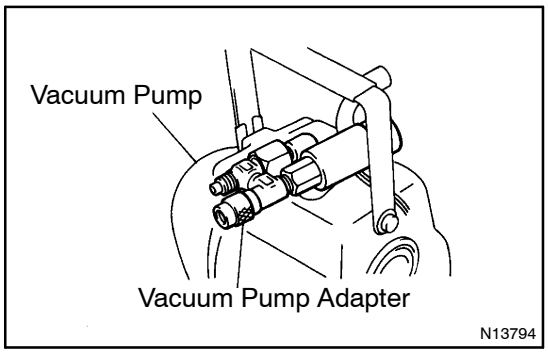
1. CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES

2. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES

3. SET ON MANIFOLD GAUGE SET

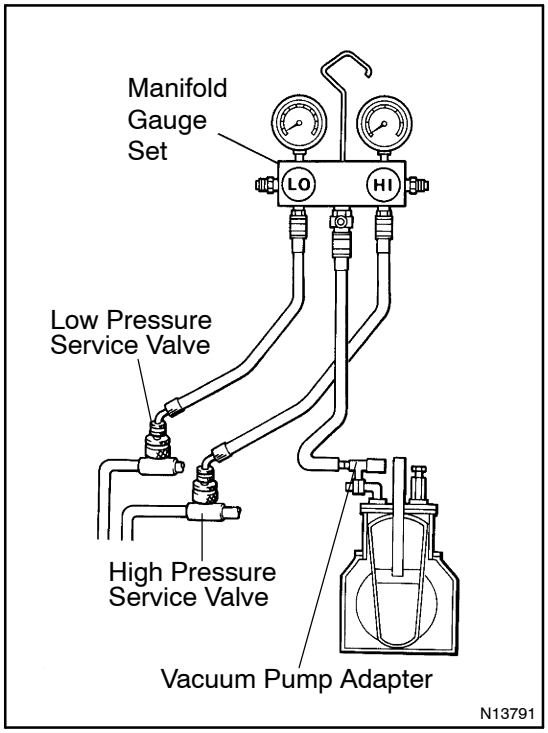
(a) Close both hand valves of manifold gauge set.

(b) Connect the quick disconnect adapters 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 750 mmHg (30 in. Hg) or more, close both hand valves of manifold gauge set and stop the vacuum pump.

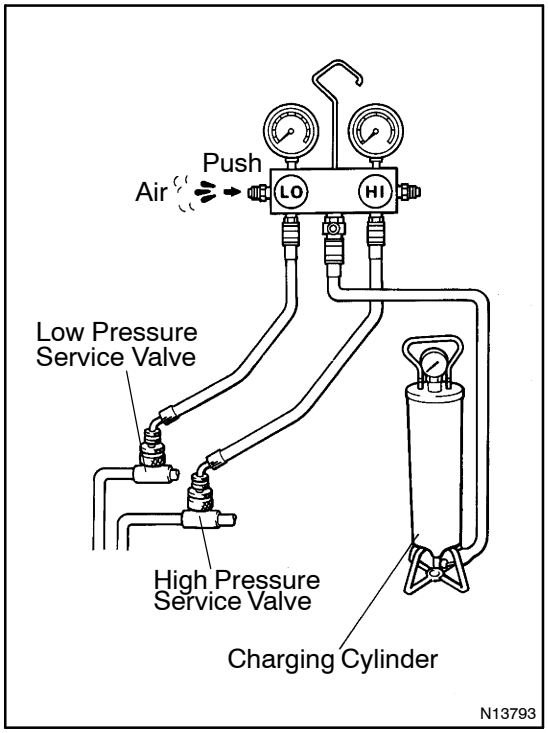
Check the system for leaks and repair if necessary.

(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.

AC25K–01

CHARGING



1. INSTALL CHARGING CYLINDER

HINT:

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

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

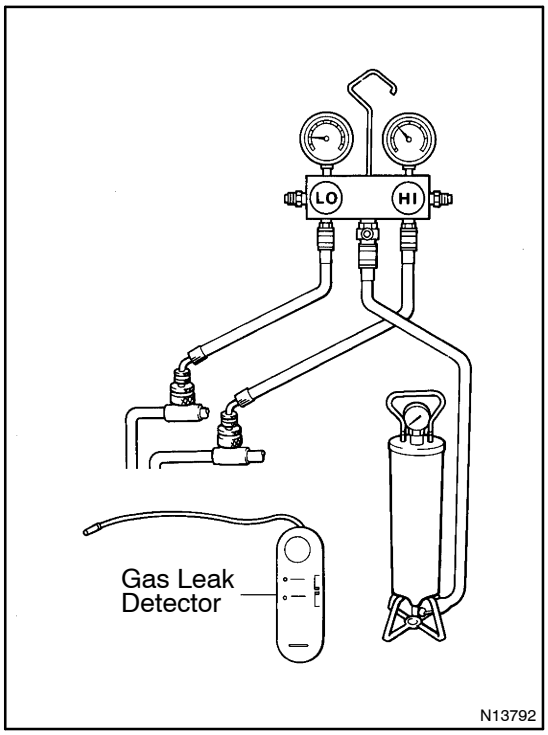
(b) Connect the center hose to the charging cylinder.

CAUTION:

Do not open both high and low 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.

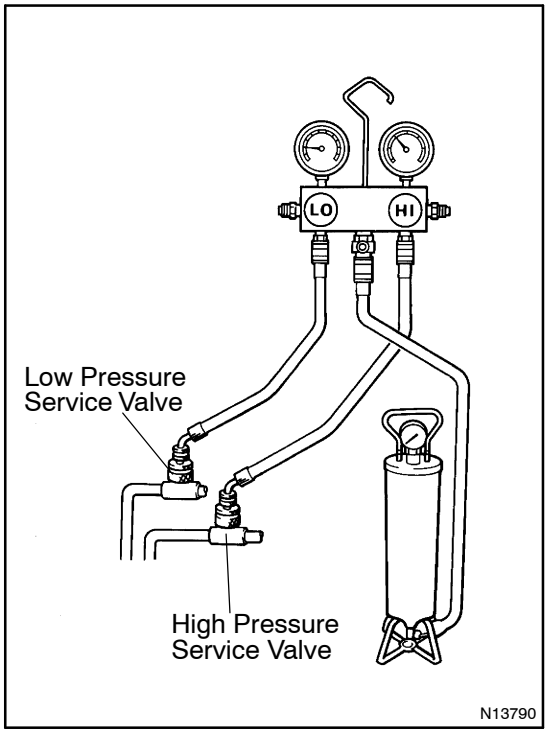
(b) When the low pressure gauge indicates 98 kPa (1 kgf/cm^2, 14 psi) close the high pressure hand valve.

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

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 REFRIGERATION SYSTEM

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

CAUTION:

- **Never run the engine when charging the 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 he high pressure hand 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.

(c) Charge partially refrigeration system with refrigerant.

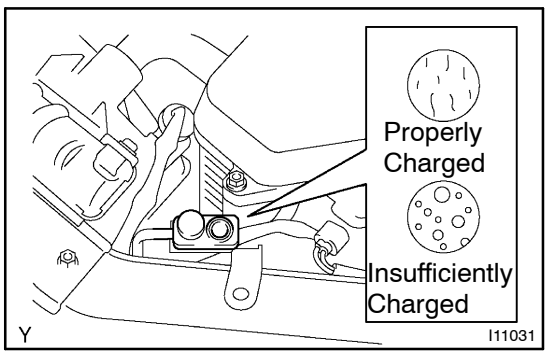
(1) Set vehicle in these conditions:

- Running engine at 1,500 rpm
- Blower speed control set at ”HI”
- Temperature control set at ”MAX. COOL” position
- Air inlet control set at ”RECIRC”
- Fully open doors (Sliding roof : closed)

(2) Open the low pressure hand valve.

CAUTION:

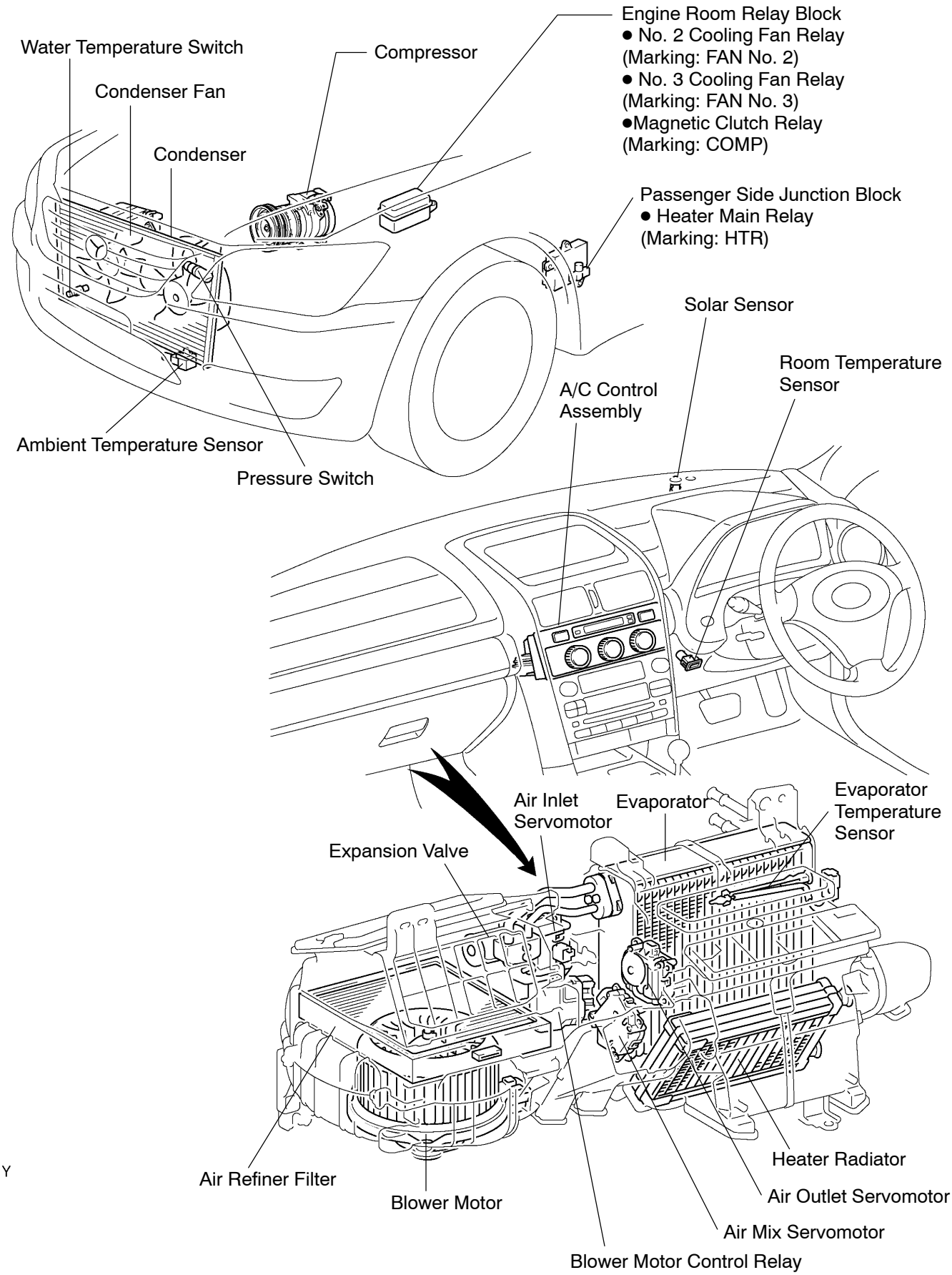
Do not open the high pressure hand valve.



(3) Charge refrigerant until bubbles disappear and check the pressure on the gauge through the sight glass.

AC15M–02

LOCATION



Y

I11742

TROUBLESHOOTING

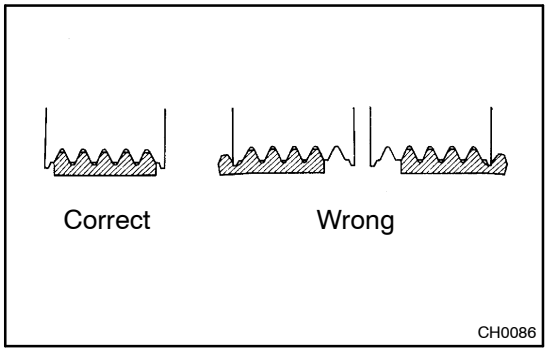
PROBLEM SYMPTOMS TABLE

AC20D–02

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
Whole functions of A/C system do not operate	1. A.C Fuse	–
	2. A/C control assembly	AC–82
No blower operation	1. Heater main relay	AC–73
	2. Blower motor	AC–57
	3. Blower motor control relay	AC–58
	4. A/C control assembly	AC–82
	5. Wire harness	–
No blower control	1. Blower motor	AC–57
	2. Blower motor control relay	AC–58
	3. A/C control assembly	AC–82
	4. Wire harness	–
Insufficient air out	1. Blower motor	AC–57
No cool air comes out	1. Refrigerant volume	AC–3
	2. Drive belt	AC–16
	3. Refrigerant pressure	AC–3
	4. Compressor	AC–40
	5. Pressure switch	AC–70
	6. Igniter circuit	–
	7. Air mix servomotor	AC–61
	8. Room temp. sensor	AC–66
	9. Ambient temp. sensor	AC–67
	10.A/C control assembly	AC–82
	11.Wire harness	–
No warm air comes out	1. Engine coolant volume	–
	2. Air mix servomotor	AC–61
	3. Ambient temp. sensor	AC–67
	4. Room temp. sensor	AC–66
	5. A/C control assembly	AC–82
	6. Heater radiator	AC–32
Out put air is warmer or cooler than the set temperature or response is slow	1. Refrigerant volume	AC–3
	2. Engine coolant volume	–
	3. Drive belt	AC–16
	4. Refrigerant pressure	AC–3
	5. Condenser fan	AC–76
	6. Ambient temp. sensor	AC–67
	7. Evaporator temp. sensor	AC–68
	8. Solar sensor	AC–65
	9. Air mix servomotor	AC–61
	10.Compressor	AC–40
	11.Condenser	AC–48
	12.Evaporator	AC–32
	13.Heater radiator	AC–32
	14.Expansion valve	AC–53
	15.A/C control assembly	AC–82
	16.Wire harness	–
No temperature control	1. Air mix servomotor	AC–61
	2. A/C control assembly	AC–82

No air inlet control	1. Air inlet servomotor 2. A/C control assembly 3. Wire harness	AC–59 AC–82 –
No mode control	1. Air outlet servomotor 2. A/C control assembly 3. Wire harness	AC–63 AC–82 –
No engine idle–up when A/C switch ON	1. A/C control assembly 2. Idle control system 3. Wire harness	AC–82 DI–96 –
Set temperature value does not match up with operation of temperature control switch	1. A/C control assembly	
Brightness does not change when light control switch is turned	1. Headlight and taillight system 2. A/C control assembly	BE–30 AC–82



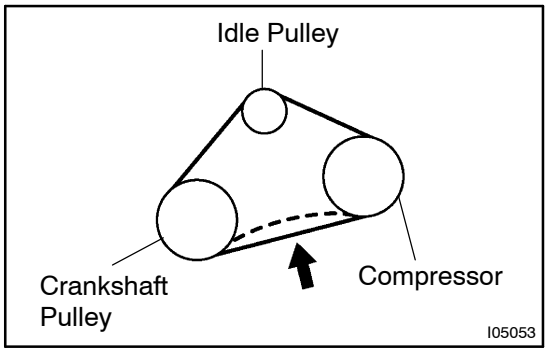
DRIVE BELT

AC25L–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 DEFLECTION

(a) Using a belt tension gauge, apply load of 98 N (10 kgf, 22 lbf).

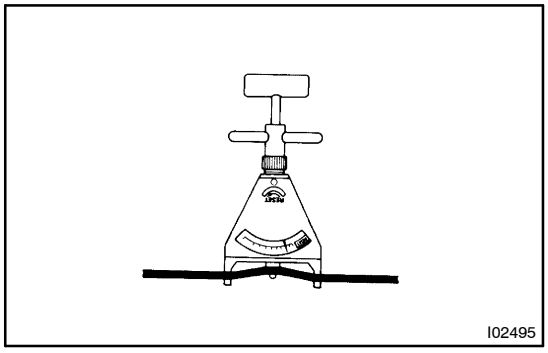
(b) Measure drive belt deflection.

New belt: 7.0 – 8.0 mm (0.28 – 0.31 in.)

Used belt: 9.0 – 10 mm (0.35 – 0.39 in.)

HINT:

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



3. INSPECT DRIVE BELT TENSION

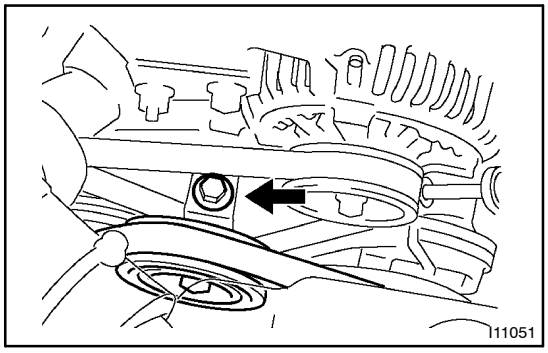
Using a belt tension gauge, check the drive belt tension.

Drive belt tension:

New belt: 520 – 755 N (53 – 77 kgf)

Used belt: 294 – 392 N (30 – 40 kgf)

AC17Z–02



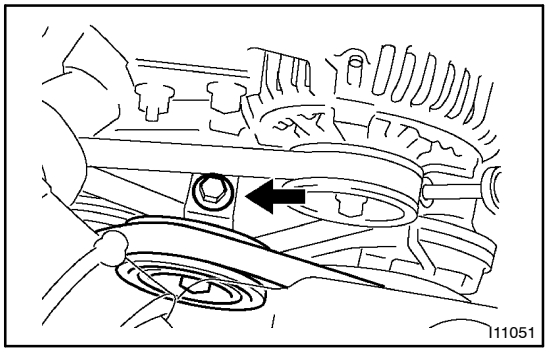
REMOVAL

REMOVE DRIVE BELT

(a) Loosen the idle pulley lock nut.

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

AC180–02



INSTALLATION

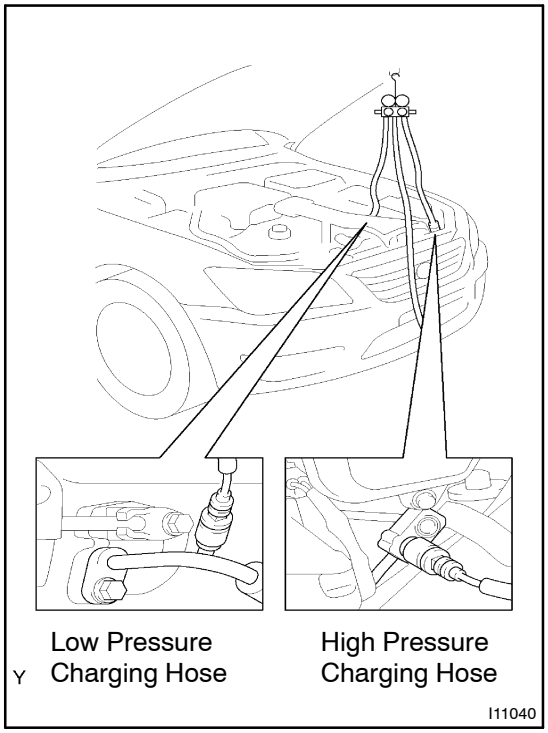
INSTALL DRIVE BELT

(a) Tighten the idle pulley lock nut temporally.
Torque: 2.5 N·m (25 kgf·cm, 22 in.·lbf)

(b) Install the drive belt.

(c) Using a adjusting bolt, adjust drive belt tension.
Drive belt tension:
New belt: 520 – 755 N (53 – 77 kgf)
Used belt: 294 – 392 N (30 – 40 kgf)

(d) Tighten the idle pulley lock nut at regular torque.
Torque: 44 N·m (440 kgf·cm, 32 ft·lbf)



MANIFOLD GAUGE SET

AC15Q–02

SET ON

1. CONNECT CHARGING HOSES TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

CAUTION:

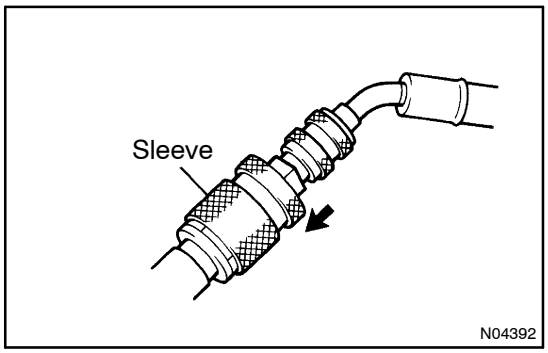
Do not connect the wrong hoses.

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 VALVE ON REFRIGERANT LINES

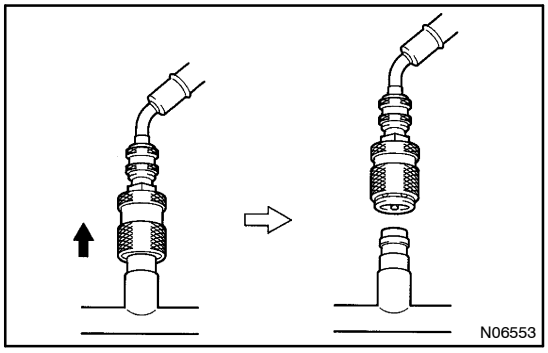


5. CONNECT QUICK DISCONNECT ADAPTERS TO SERVICE VALVES

HINT:

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

AC15R–02



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 LINES**

REFRIGERANT LINE

AC15S–01

ON–VEHICLE INSPECTION

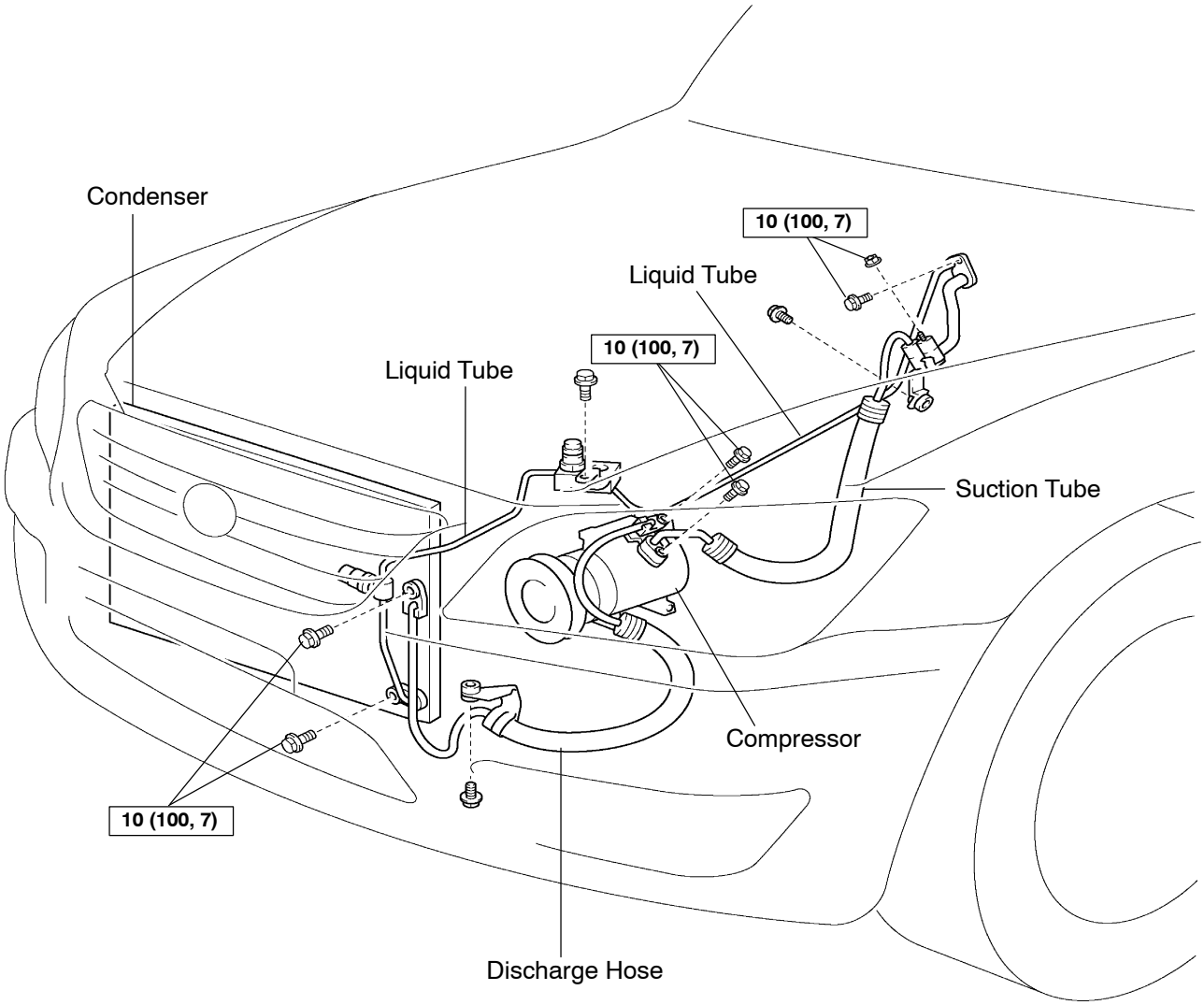
1. INSPECT HOSE AND TUBE CONNECTIONS FOR LOOSENESS

2. INSPECT HOSES AND TUBES FOR LEAKAGE

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

AC15T–02

COMPONENTS



Y

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

I11034

AC15U–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
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	10	100	7
A/C unit x Liquid and Suction tubes	10	100	7
Suction line (Block joint)	10	100	7

4. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT
Specified amount: 600 ± 50 g (21.16 ± 1.76 oz.)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

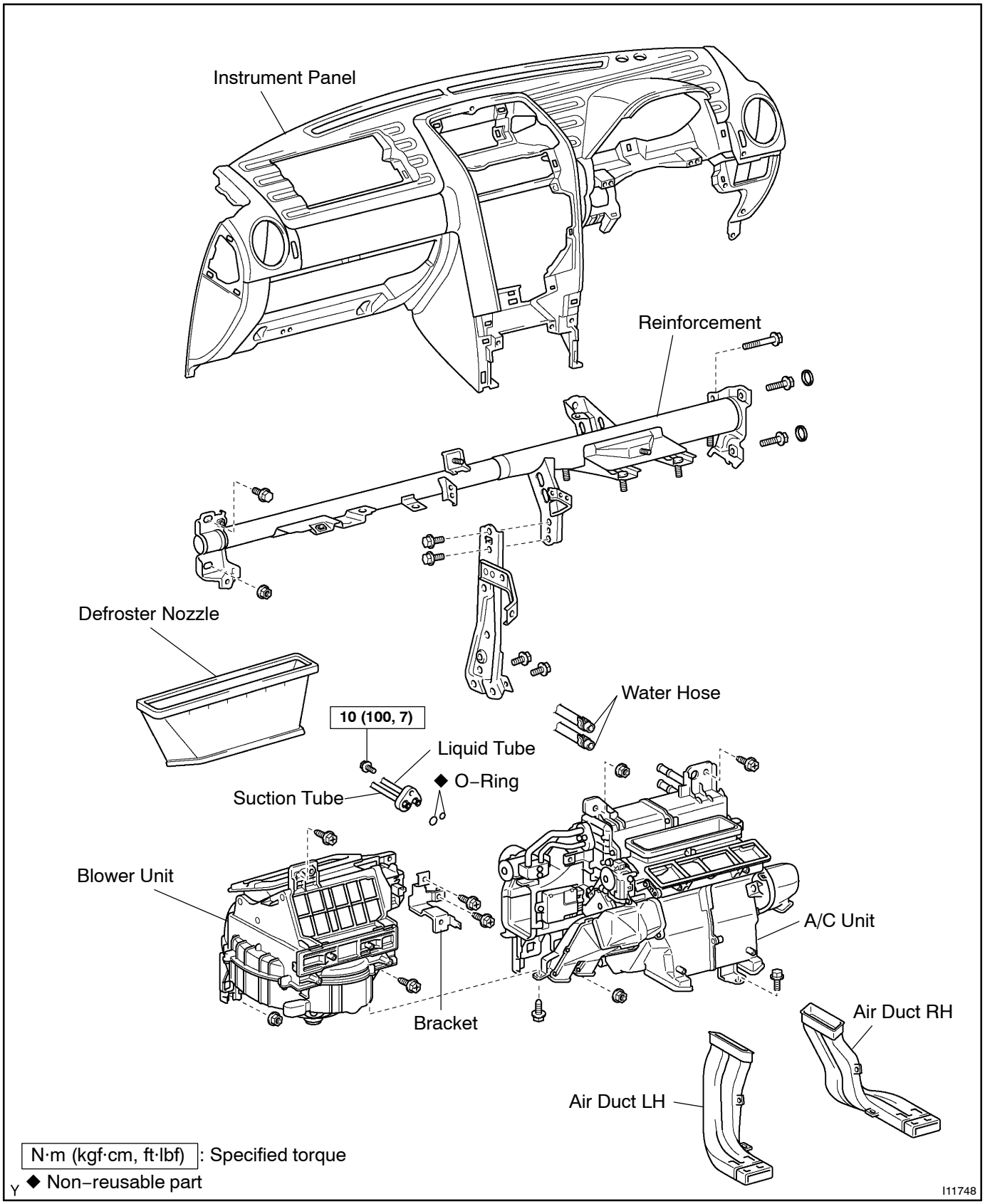
Using a gas leak detector, check for leakage of refrigerant.

6. INSPECT AIR CONDITIONING OPERATION

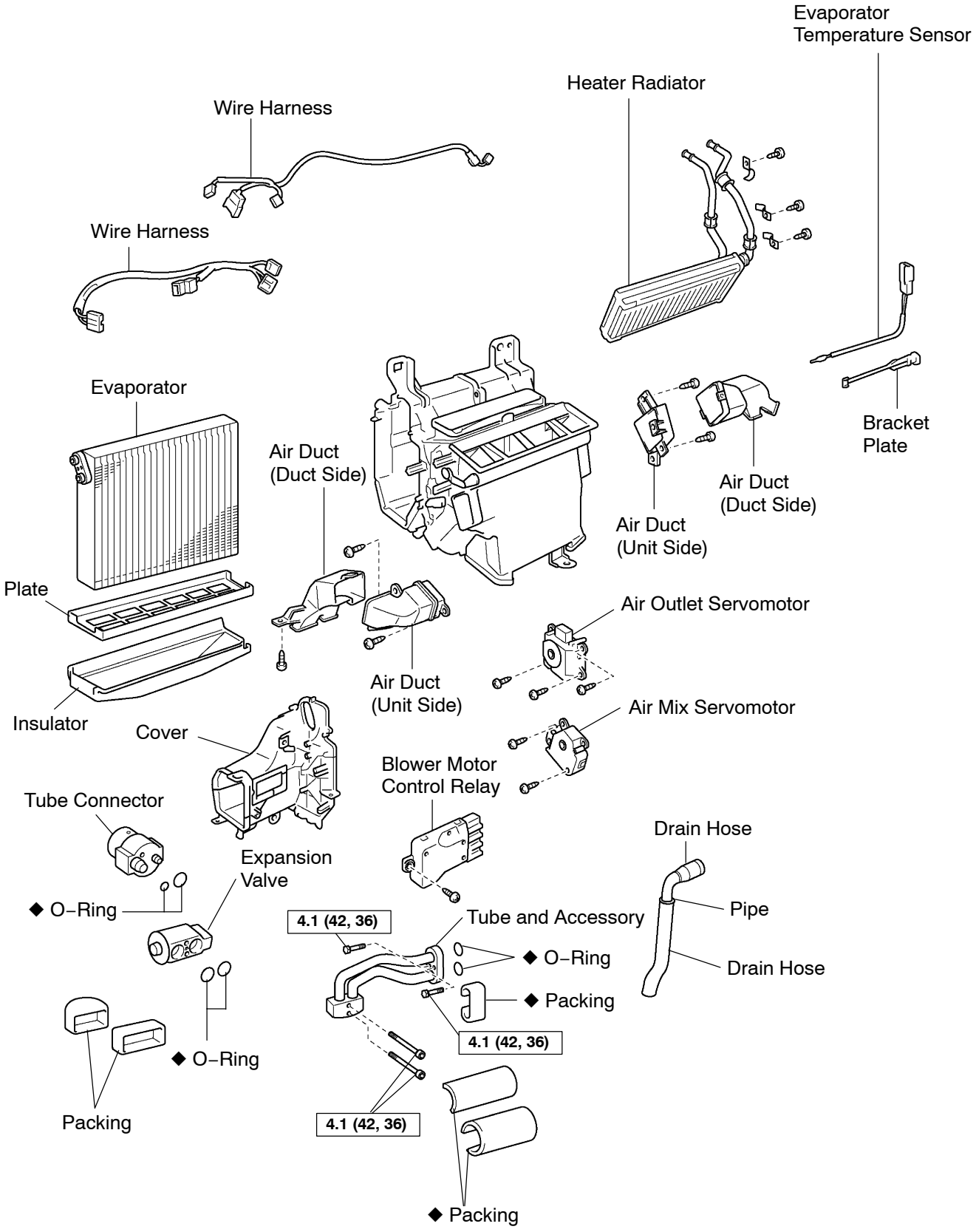
AIR CONDITIONER UNIT

COMPONENTS

AC15V–02



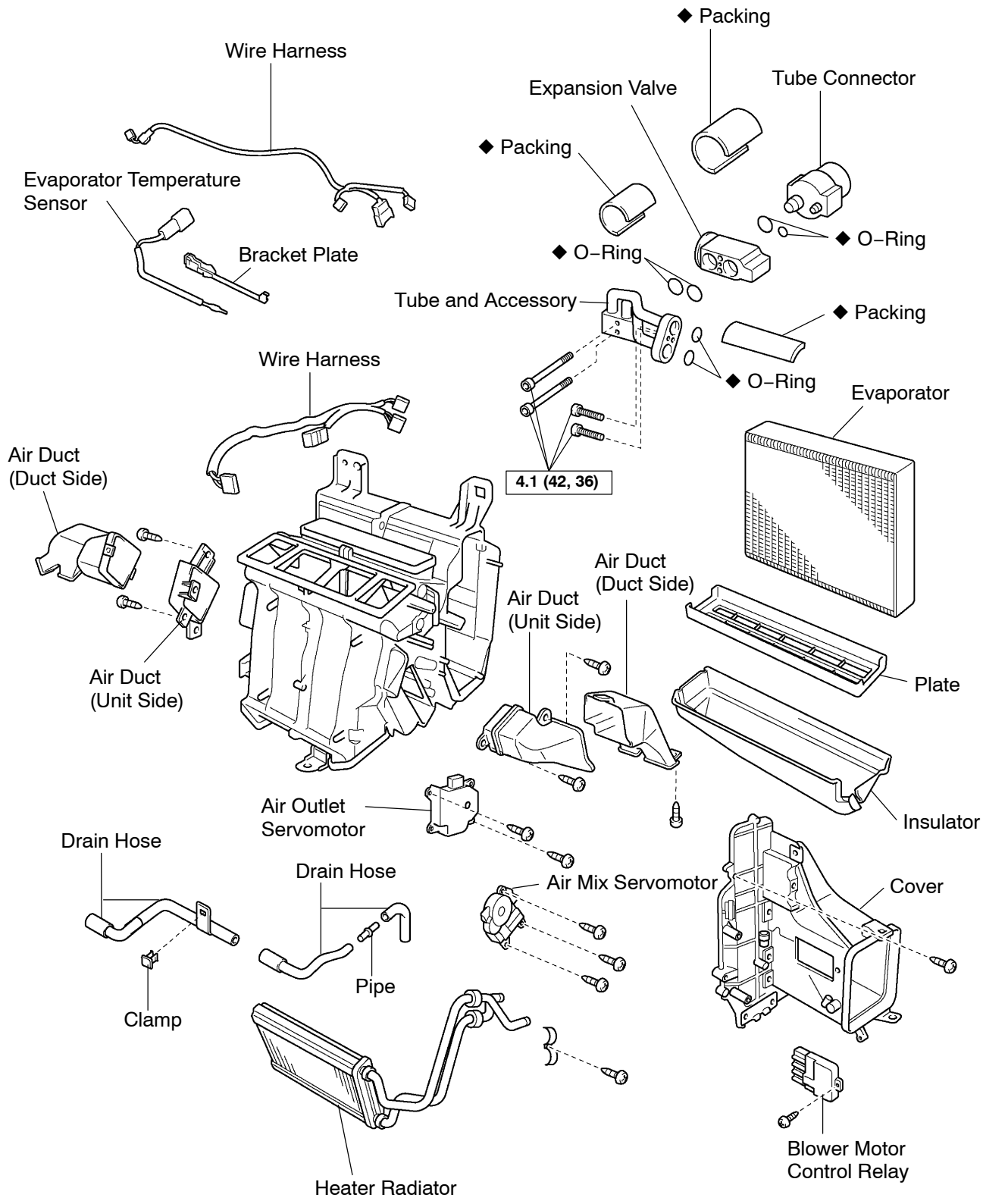
RHD models:



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

I12413

LHD models:



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

◆ Non–reusable part

I12414

AC15W–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.

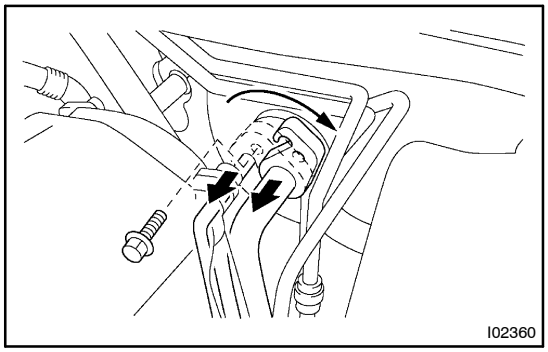
Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 600 ± 50 g (21.16 ± 1.76 oz.)

2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.



3. DISCONNECT LIQUID TUBE AND SUCTION HOSE FROM A/C UNIT

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

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

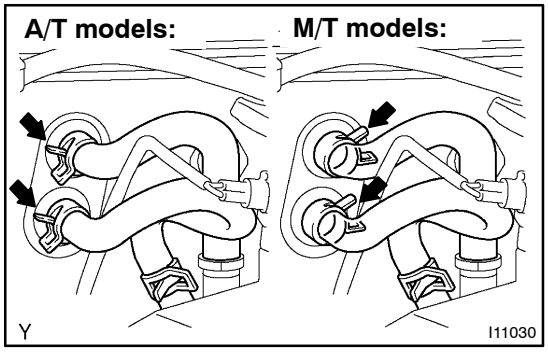
NOTICE:

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 them to the tubes.

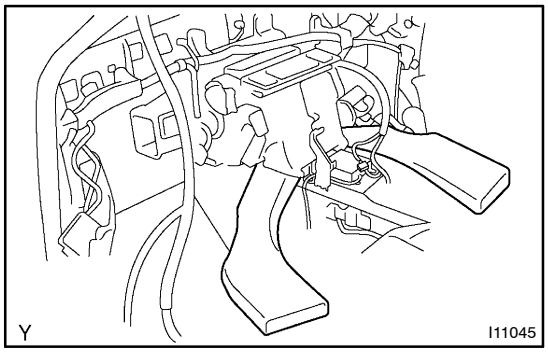


4. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

(a) Grip the claws of the hose clip and slide the hose clip along the hose.

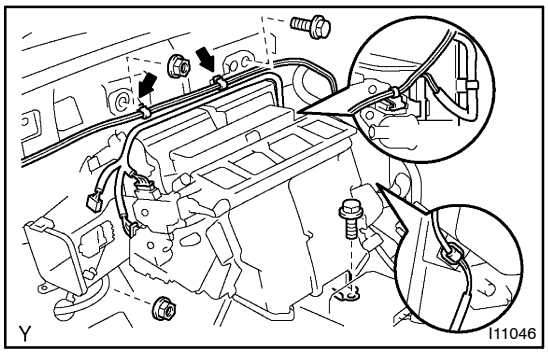
(b) Disconnect the water hose.

5. REMOVE COOLER NO.1 GROMMET
6. REMOVE HEATER PIPE GROMMET
7. REMOVE DRAIN HOSE GROMMET
8. REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See page BO–96)
9. REMOVE BLOWER UNIT (See page AC–36)



10. REMOVE 2 AIR DUCTS

(a) Slide the floor carpet backward.
(b) Remove the air ducts LH, RH.



11. REMOVE A/C UNIT

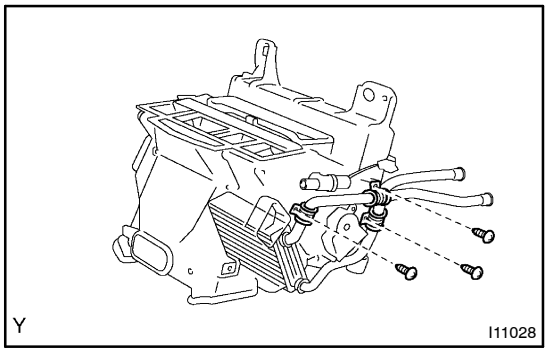
(a) Disconnect the connectors.
(b) Disconnect the wire harness clamps.
(c) Remove the 2 nuts, 2 bolt and A/C unit.

AC25M–01

DISASSEMBLY

1. REMOVE WIRE HARNESS

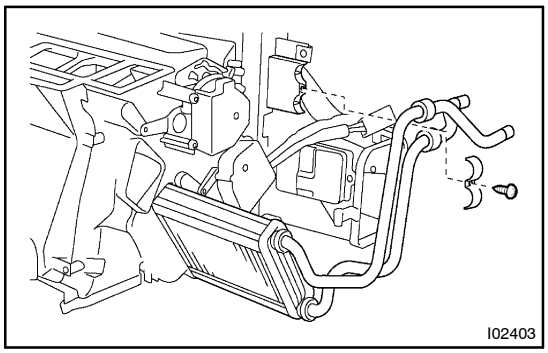
2. REMOVE DRAIN HOSE



3. RHD models:
REMOVE HEATER RADIATOR

(a) Remove the 3 screws and 3 clamps.

(b) Pull out the heater radiator.



4. LHD models:
REMOVE HEATER RADIATOR

(a) Remove the screw and clamp.

(b) Pull out the heater radiator.

5. REMOVE BLOWER MOTOR CONTROL RELAY

Remove the screw and blower motor control relay.

6. REMOVE AIR MIX SERVOMOTOR

Remove the 3 screws and servomotor.

7. REMOVE AIR OUTLET SERVOMOTOR

Remove the 2 screws and servomotor.

8. REMOVE EXPANSION VALVE

(a) Pry out the packing.

HINT:

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

Do not reuse the packing.

(b) Using SST, remove the 2 bolts, then separate the expansion valve, and tube connector.

SST 07110–61050

Torque: 4.1 N·m (42 kgf·cm, 36 in.·lbf)

HINT:

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

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

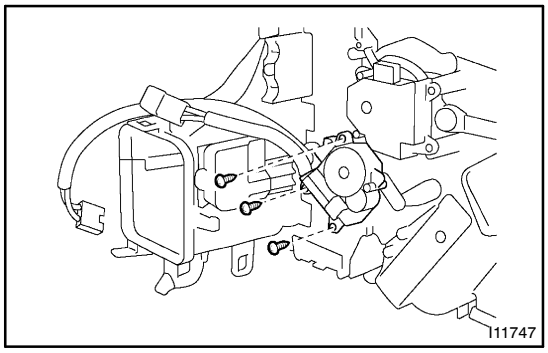
9. REMOVE EVAPORATOR TEMPERATURE SENSOR

(a) Using a screwdriver, pull out the sensor with bracket plate.

HINT:

Tape the screwdriver tip before use.

(b) Release the 2 claws and sensor from bracket plate.

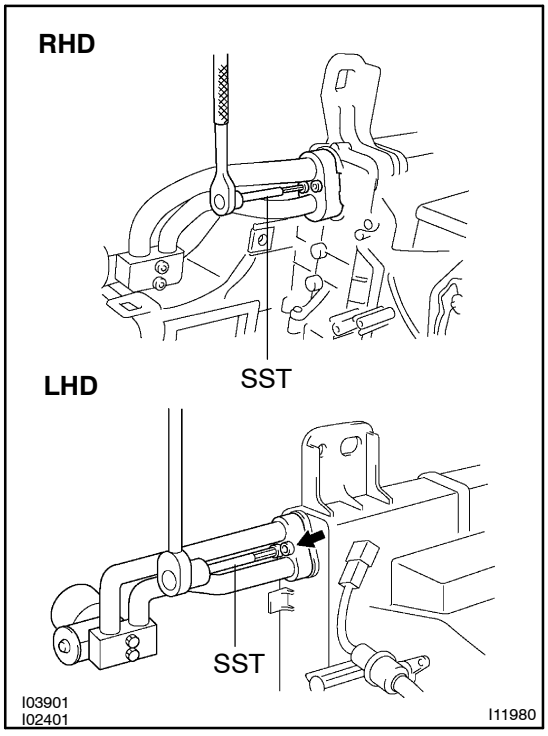


10. REMOVE EVAPORATOR

(a) Remove air mix servomotor.

(1) Disconnect the connector.

(2) Remove the 3 screws and servomotor.



(b) Remove tube and accessory.

(1) Pry out packing.

HINT:

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

Do not reuse the packing.

(2) Using SST, remove the 2 bolts and the tube and accessory.

SST 07110–61050

Torque: 4.1 N·m (42 kgf·cm, 36 in.·lbf)

NOTICE:

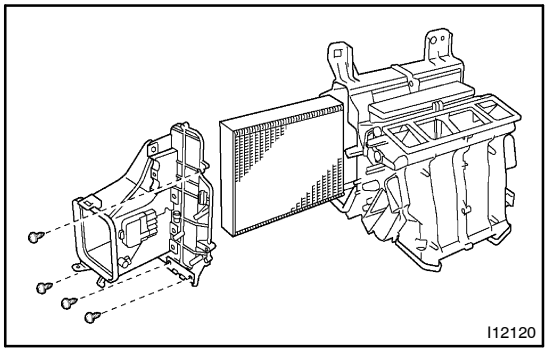
Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

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

Lubricate 2 new O–rings with compressor oil and install them to the tube.

(3) Remove screw and drain pipe.



(c) Remove evaporator.
  (1) Remove the screw and drain hose.
  (2) Remove the 4 screws and cover.
  (3) 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

11. REMOVE INSULATOR FROM HEATER CASE

12. REMOVE AIR DUCT

AC25N–01

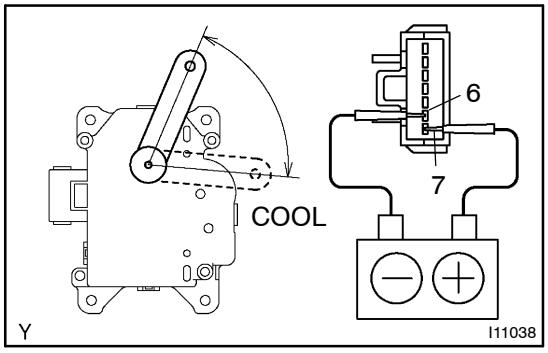
INSPECTION

1. LHD models:

INSPECT AIR MIX SERVOMOTOR

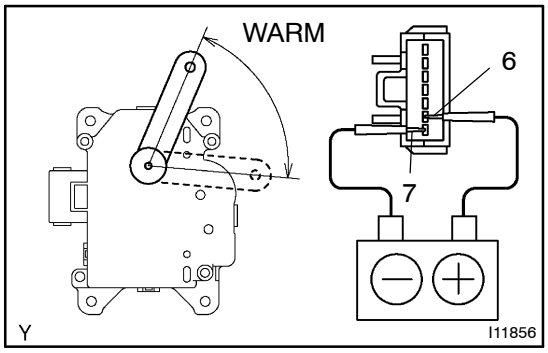
(a) Inspect the air mix servomotor operation.

(1) Connect the positive (+) lead from the battery to terminal 7 and negative (–) lead to terminal 6, then check that the arm turns to ”COOL” side smoothly.



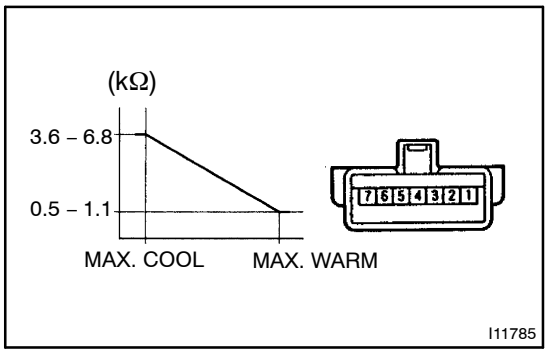
(2) Connect the positive (+) lead from the battery to terminal 6 and negative (–) lead to terminal 7, then check that the arm turns to ”WARM” side smoothly.

If operations are not as specified, replace the servomotor.



(b) Inspect position sensor resistance.

Measure resistance between terminals at servomotor arm each position as shown in the chart.



Tester connection	Condition	Specified condition
1 – 3	Constant	4.2 – 7.8 kΩ
1 – 5	Max. cool	3.6 – 6.8 kΩ
1 – 5	Max. warm	0.5 – 1.1 kΩ

If resistance is not as specified, replace the servomotor.

2. INSPECT EVAPORATOR

(a) Check evaporator fins for blockage.

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

NOTICE:

Never use water to clean the evaporator.

(b) Check fitting for cracks or scratches.

If necessary, repair or replace.

3. INSPECT HEATER RADIATOR

Inspect fins for blockage.

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

AC15Y–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–29).

AC15Z–01

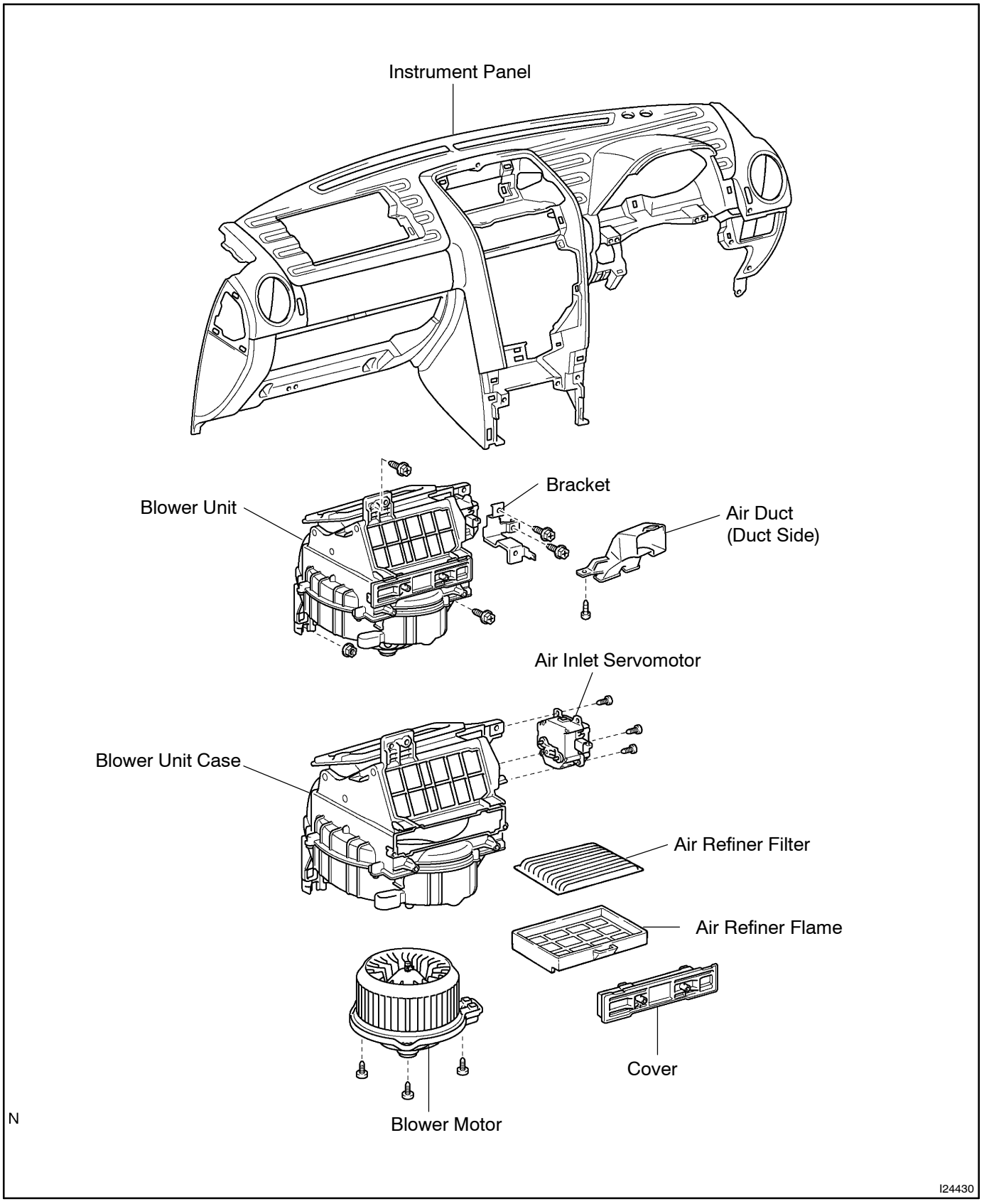
INSTALLATION

Installation is in the reverse order of removal (See page AC–27).

BLOWER UNIT

COMPONENTS

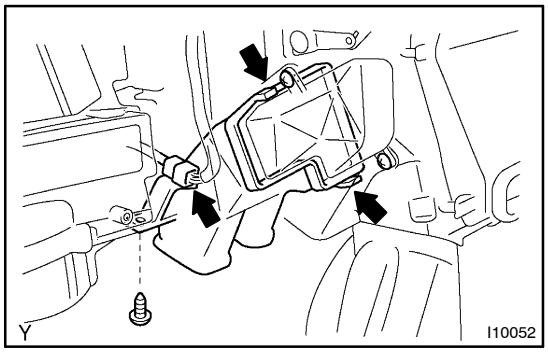
AC160–07



AC25O–01

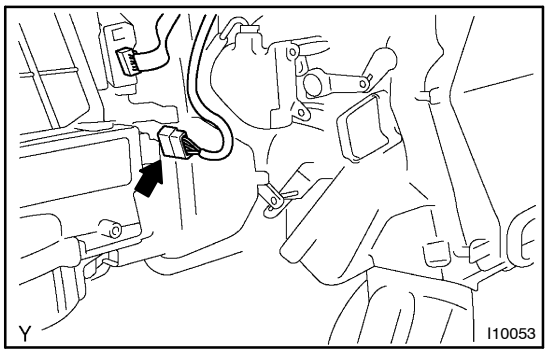
REMOVAL

1. REMOVE INSTRUMENT PANEL (See page BO–96)



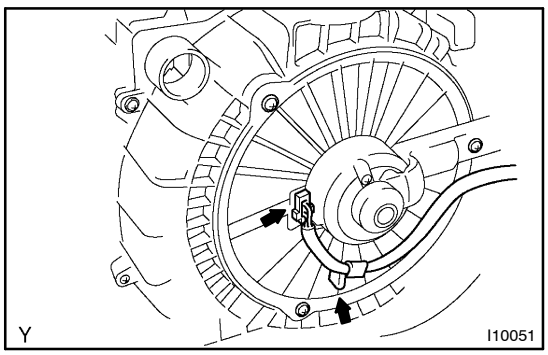
2. REMOVE AIR DUCT (DUCT SIDE)

(a) Disconnect the connector and connector clamp.
(b) Remove the screw.
(c) Release the 2 claws and pull out the air duct.

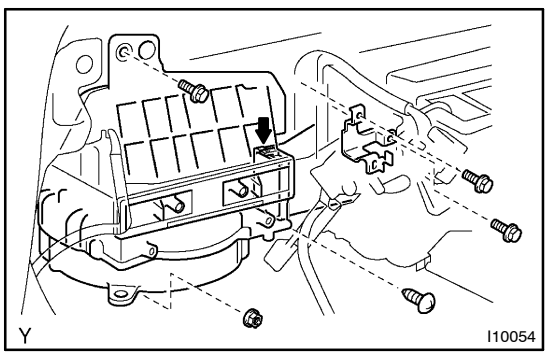


3. DISCONNECT WIRE HARNESS

(a) Disconnect the connector and connector clamp.



(b) Remove the wire harness clamp and disconnect the connector.



4. REMOVE BLOWER UNIT

(a) Remove the 2 bolts and bracket.
(b) Remove the bolt, screw and nut.
(c) Release the claw and remove the blower unit.

AC162-02

DISASSEMBLY

1. REMOVE AIR REFINER FILTER

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

(b) Pull out the air refiner filter.

2. REMOVE AIR INLET SERVOMOTOR

Remove the 3 screws and servomotor.

3. REMOVE BLOWER MOTOR

Remove the 3 screws and blower motor.

AC163–01

REASSEMBLY

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

AC164–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–36).

COMPRESSOR AND MAGNETIC CLUTCH

AC25P–01

ON–VEHICLE INSPECTION

1. INSPECT COMPRESSOR FOR METALLIC SOUND

Check if there is abnormal metallic sound from the compressor when the A/C switch is ON.

If abnormal metallic sound is heard, replace the compressor assembly.

2. INSPECT REFRIGERANT PRESSURE

(See page AC–3)

3. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT

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

If there is any leakage, replace the compressor assembly.

4. CHECK FOR LEAKAGE OF GREASE FROM CLUTCH BEARING

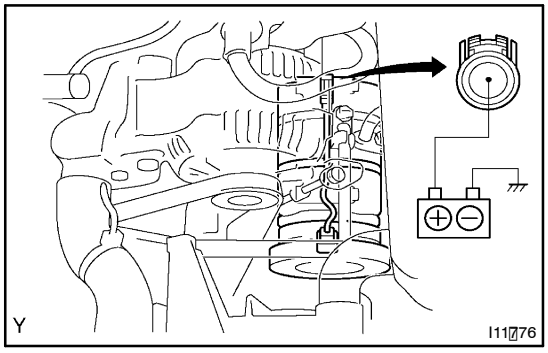
5. CHECK SIGNS OF OIL ON PRESSURE PLATE OR ROTOR

6. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

(a) Start engine.

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

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



7. INSPECT MAGNETIC CLUTCH OPERATION

(a) Disconnect the connector.

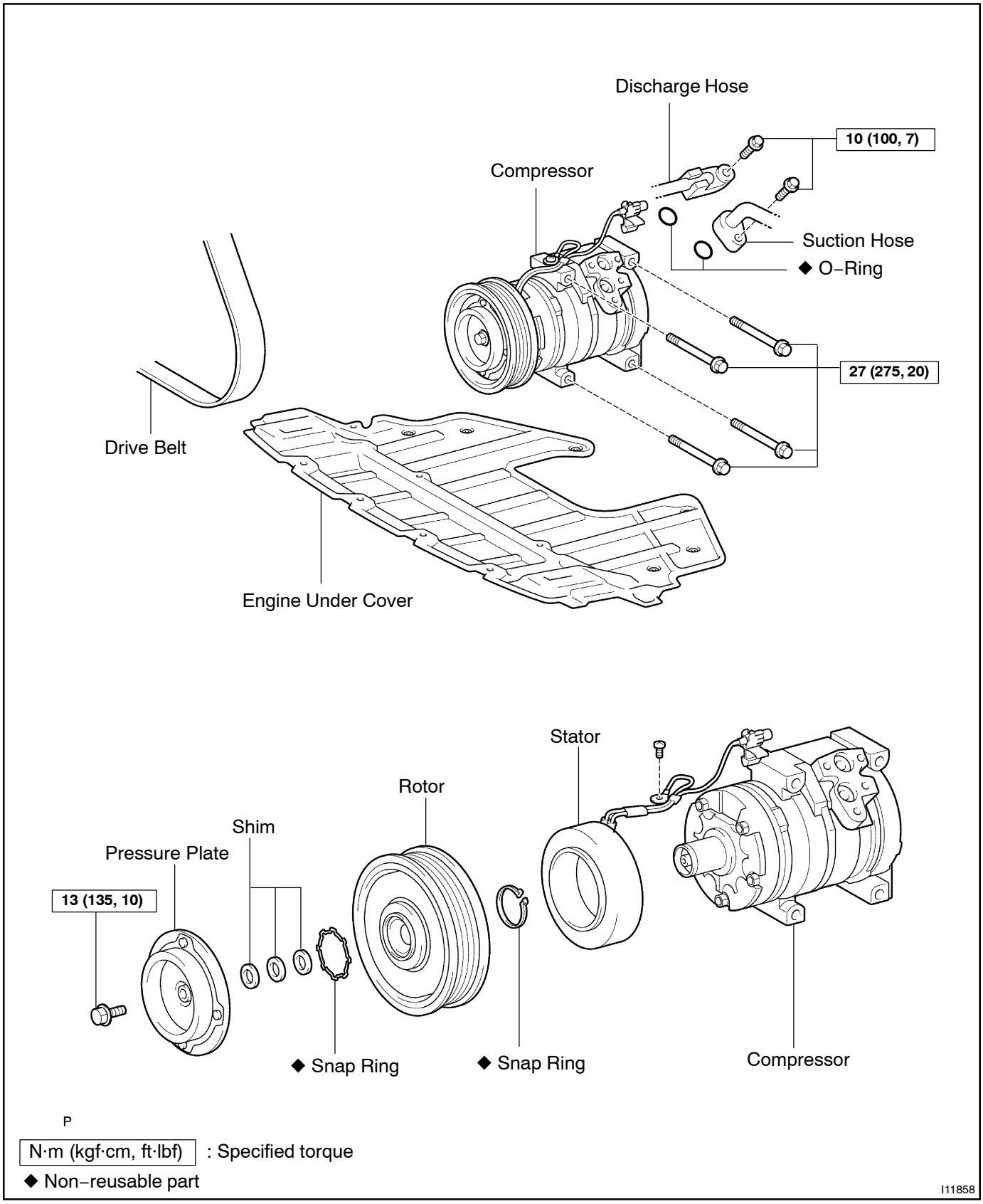
(b) Connect the positive (+) lead from the battery to terminal on the magnetic clutch connector and the negative (–) lead to the body ground.

(c) Check that the magnetic clutch is energized.

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

AC0YY–03

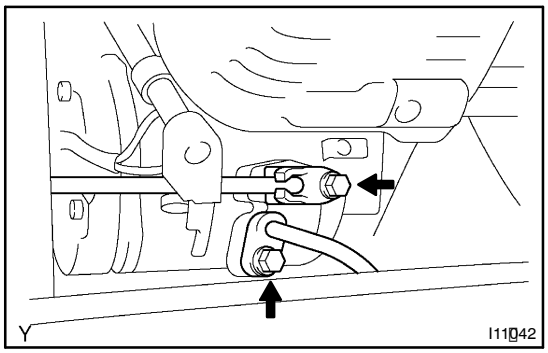
COMPONENTS



AC25Q–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 ENGINE UNDER COVER
6. REMOVE DRIVE BELT (See page AC–17)

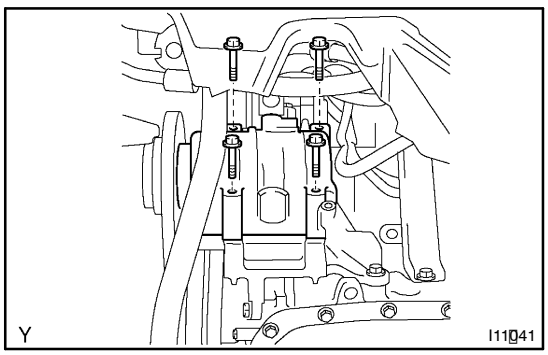


7. DISCONNECT DISCHARGE AND SUCTION HOSES

Remove the 2 bolts and disconnect the both hoses.

NOTICE:

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



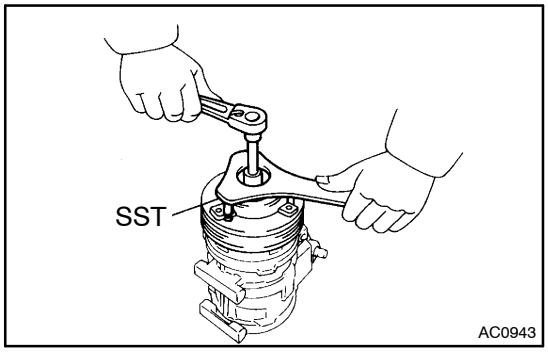
8. REMOVE COMPRESSOR

(a) Disconnect the connector.

(b) Remove the 4 bolts and compressor.

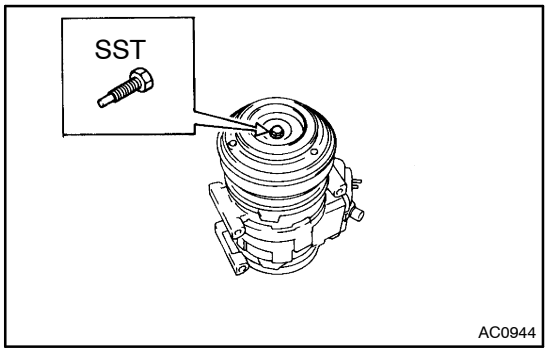
AC0Z0–03

DISASSEMBLY

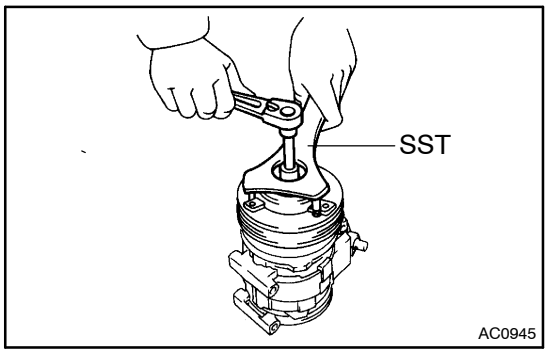


1. REMOVE PRESSURE PLATE

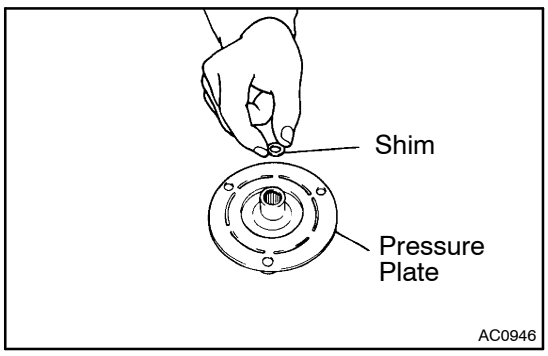
(a) Using SST and a socket wrench, remove the shaft bolt.
Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)
SST 07112–76060



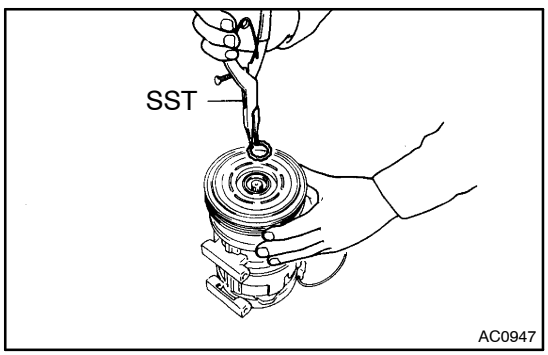
(b) Install SST on the pressure palate.
SST 07112–66040



(c) Using SST and socket wrench, remove the pressure plate.
SST 07112–66040, 07112–76060

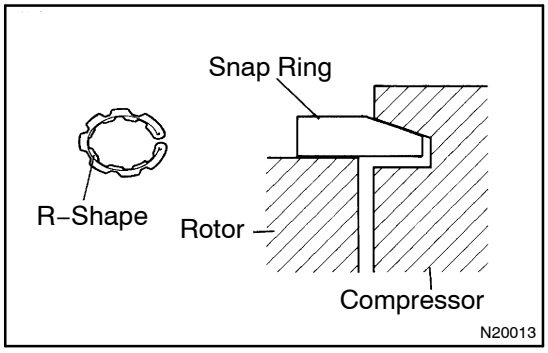


(d) Remove the shims from the pressure palate.

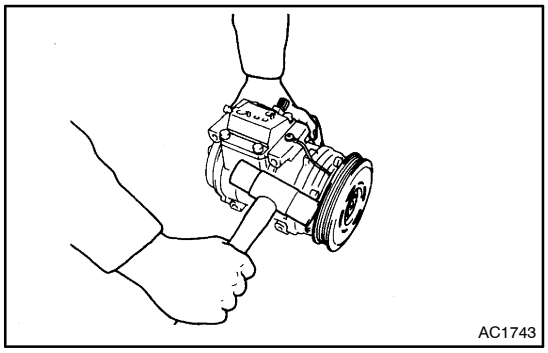


2. REMOVE ROTOR

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

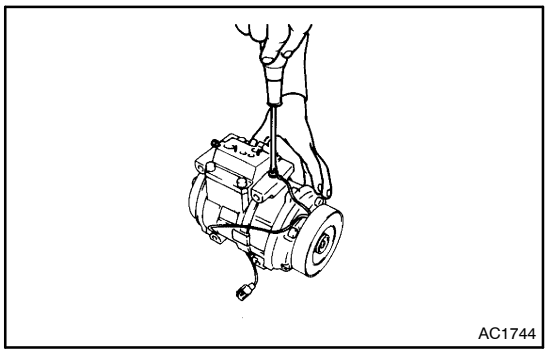


NOTICE:
At the time of reassembly, please refer to the following item.
The snap ring should be installed so that beveled side faces up.



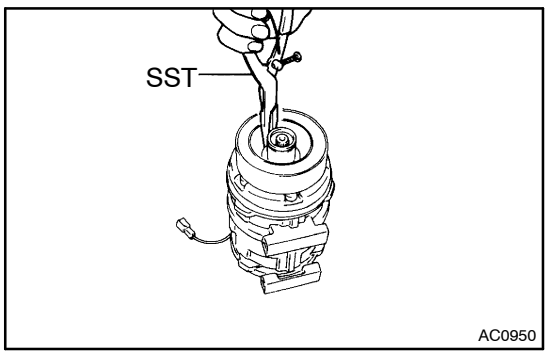
(b) Using a plastic hammer, tap the rotor off the shaft.

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

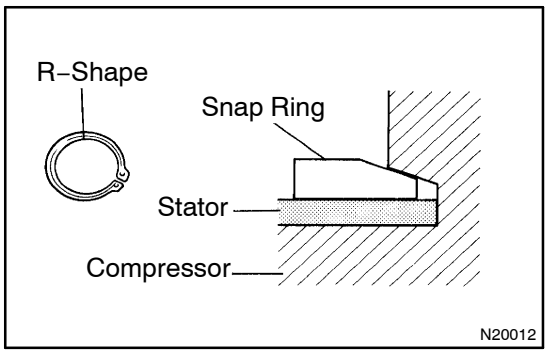


3. REMOVE STATOR

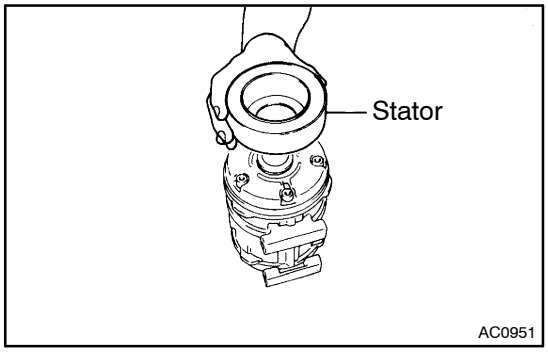
(a) Disconnect the stator lead wire from the compressor housing.



(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.

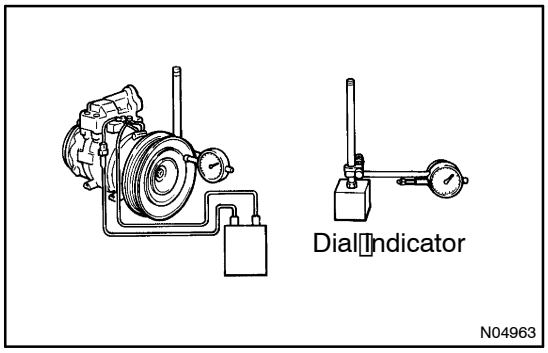


(c) Remove the stator.

AC0Z1–03

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–43).



AFTER REASSEMBLY, INSPECT 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 to the 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.)

AC16A–02

INSTALLATION

1. INSTALL COMPRESSOR

(a) Install the compressor with the 4 bolts.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

(b) Connect the connector.

2. CONNECT DISCHARGE AND SUCTION HOSES

Connect the both hoses with the 2 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:

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

HINT:

Lubricate 2 new O–rings with compressor oil and install them to the hoses.

3. INSTALL DRIVE BELT

(See page AC–18)

4. INSPECT DRIVE BELT TENSION

(See page AC–16)

5. INSTALL ENGINE UNDER COVER

6. CONNECT NEGATIVE (–) TERMINAL CABLE TO BATTER

7. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT

Specified amount: 600 ± 50 g (21.16 ± 1.76 oz.)

8. 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.

9. INSPECT A/C OPERATION

CONDENSER

AC16B–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.

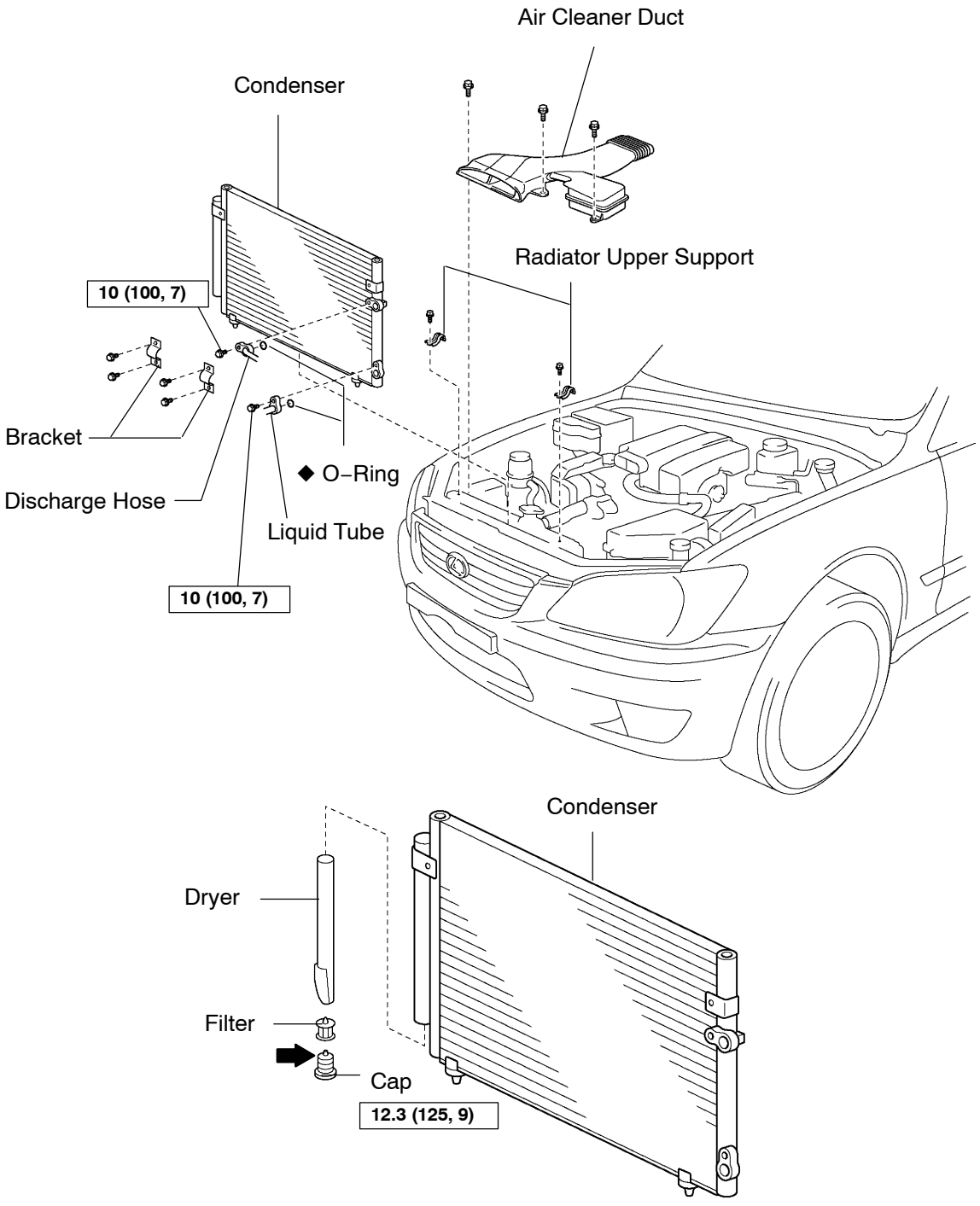
2. INSPECT CONDENSER AND FITTINGS FOR LEAKAGE OF REFRIGERANT

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

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

AC25R–01

COMPONENTS



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

◆ Non–reusable part

⬅ Compressor oil ND–OIL 8 or equivalent

I11789

AC16C–02

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

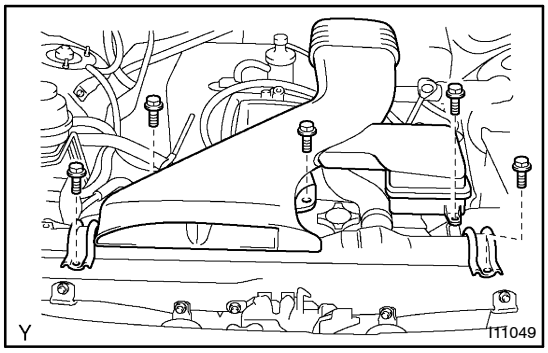
HINT:

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 : 600 ± 50 g (21.16 ± 1.76 oz.)



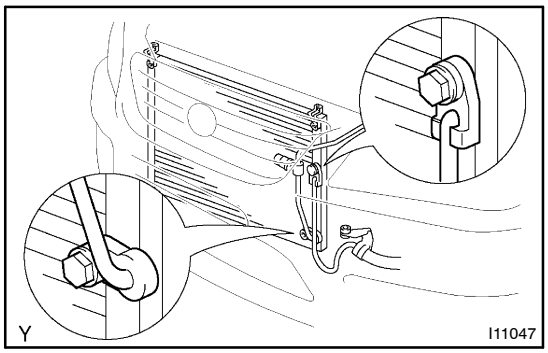
2. REMOVE AIR CLEANER DUCT

Remove the 2 bolts and air cleaner duct.

3. REMOVE ECU OUTLET DUCT

4. REMOVE 2 RADIATOR UPPER SUPPORTS

Remove the 2 bolts and upper supports.



5. DISCONNECT DISCHARGE HOSE AND LIQUID TUBE

Remove the 2 bolts and disconnect the hose and tube.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

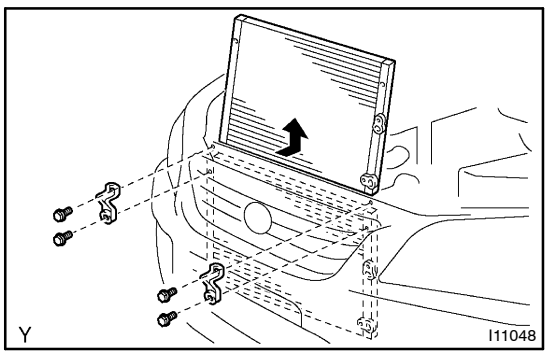
NOTICE:

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 them to the hose and tube.



6. REMOVE CONDENSER

(a) Remove the 4 bolts and 2 brackets.

(b) Push the radiator toward engine.

(c) Push the condenser toward 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 condenser.

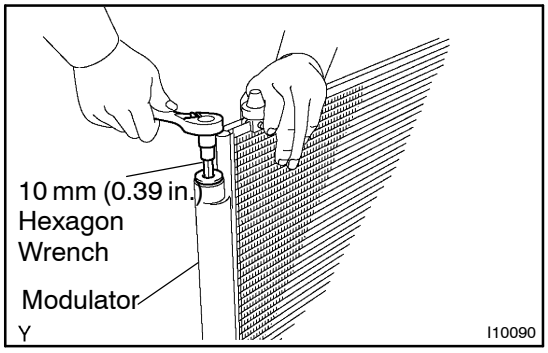
Add 40 cc (1.4 fl. oz)

Compressor oil: ND – OIL 8 or equivalent

AC22C–03

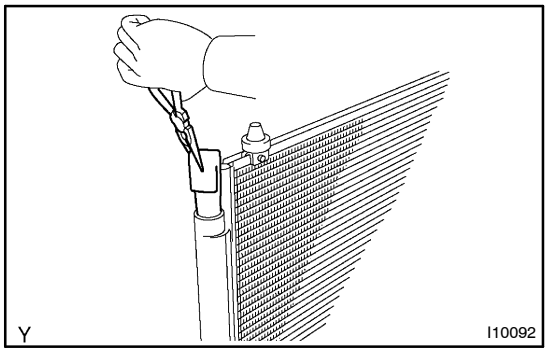
REPLACEMENT

REPLACE DRYER FROM MODULATOR

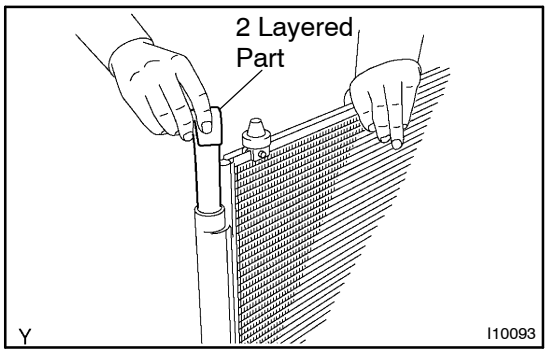


(a) Using a hexagon wrench (10 mm, 0.39 in.), remove the cap from the modulator.

(b) Remove the filter from the modulator.



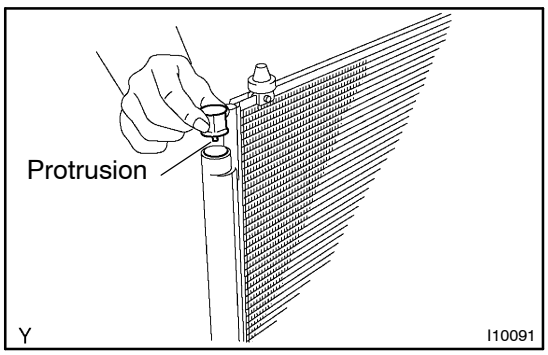
(c) Using pliers, remove the dryer.



(d) Insert a new dryer into the modulator.

NOTICE:

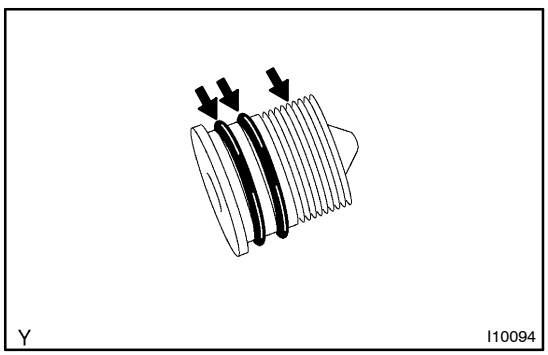
- **Do not remove the dryer from a vinyl bag until inserting it into the modulator.**
- **Install the dryer with its 2 layered part faced upward to the modulator.**



(e) Insert the filter into the modulator.

NOTICE:

Install the filter with its protrusion faced downward to the modulator.



(f) Install the cap to the modulator.

(1) Apply compressor oil to the O–rings and screw part of the cap.

Compressor oil: ND–OIL 8 or equivalent

(2) Using a hexagon wrench (10 mm, 0.39 in.), install the caps.

Torque: 12.3 N·m (125 kgf·cm, 9 ft·lbf)

AC16D–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–50).

EXPANSION VALVE

AC16K–01

ON–VEHICLE INSPECTION

1. CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE

2. SET ON MANIFOLD GAUGE SET

(See page AC–19)

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).

AC25S–01

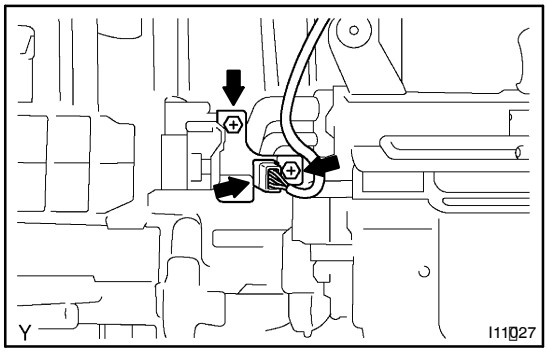
REMOVAL

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: 600 ± 50 g (21.16 ± 1.76 oz.)

2. REMOVE INSTRUMENT PANEL (See page BO–96)

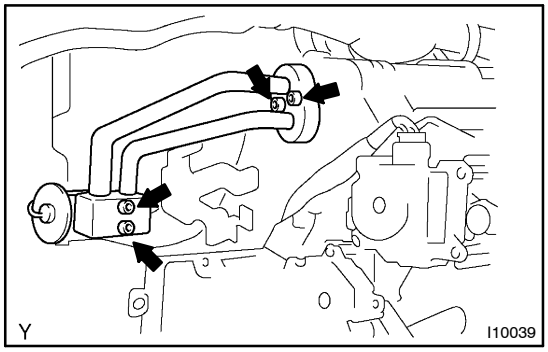


3. RHD models:
REMOVE EXPANSION VALVE

(a) Remove the bracket.
(1) Disconnect the wire harness clamp.
(2) Remove the 2 bolts and bracket.

(b) Pry out the packings.

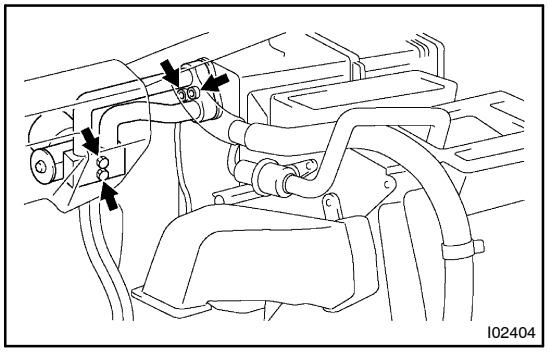
HINT:
At the time of installation, please refer to the following item.
Do not reuse the packing.



(c) Using SST, remove the 4 bolts and separate the expansion valve and tube and accessory.
SST 07110–61050
Torque: 4.1 N·m (42 kgf·cm, 36 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 6 new O–rings with compressor oil and install them to the tube and valve.



4. LHD models:
REMOVE EXPANSION VALVE

(a) Pry out the packings.

HINT:

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

Do not reuse the packing.

(b) Using SST, remove the 4 bolts and separate the expansion valve and tube and accessory.

SST 07110–61050

Torque: 4.1 N·m (42 kgf·cm, 36 in.·lbf)

NOTICE:

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

HINT:

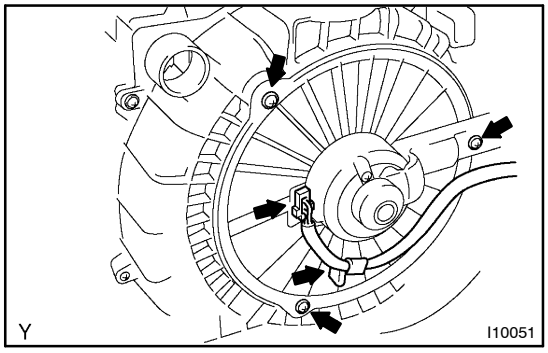
At the time of installation, please refer to the following item.

Lubricate 6 new O–rings with compressor oil and install them to the tube and valve.

AC16M–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–54).



BLOWER MOTOR

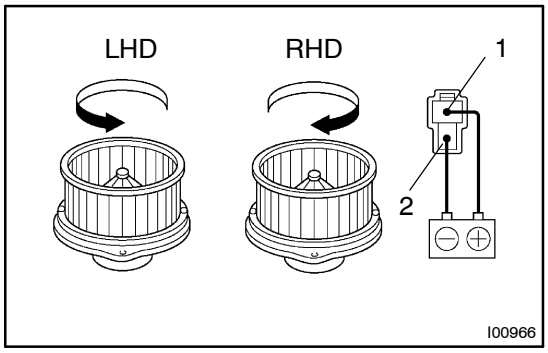
AC20I–02

INSPECTION

1. REMOVE BLOWER MOTOR

(a) Remove the wire harness clamp and disconnect the connector.

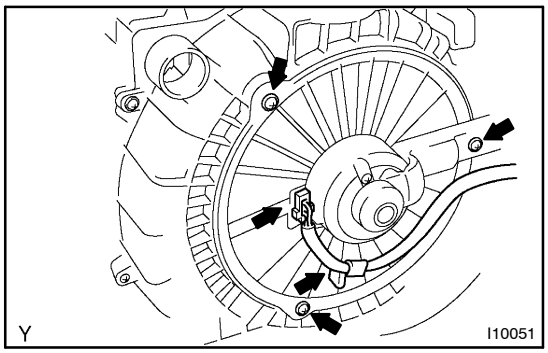
(b) Remove the 3 screws and blower motor.



2. INSPECT BLOWER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 1, then check that the motor operations smoothly.

If operation is not as specified, replace the blower motor.



3. INSTALL BLOWER MOTOR

(a) Install the blower motor with the 3 screws.

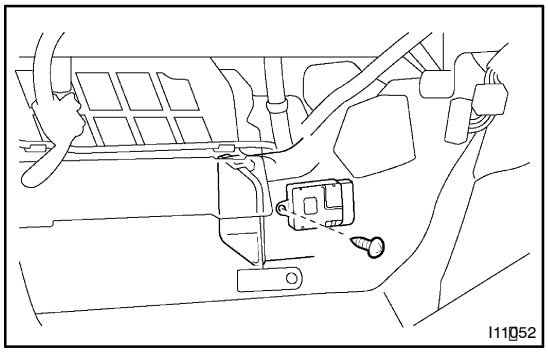
(b) Connect the connector and wire harness clamp.

BLOWER MOTOR CONTROL RELAY

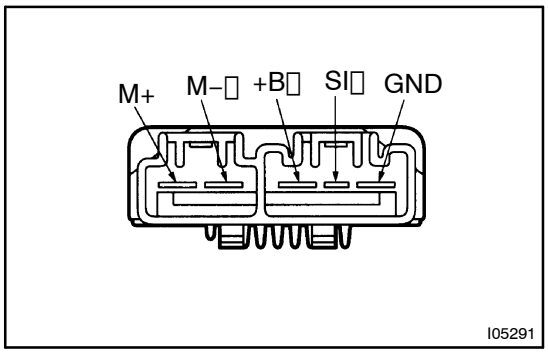
AC25T–01

INSPECTION

1. REMOVE GLOVE COMPARTMENT DOOR
(See page BO–96)



2. REMOVE BLOWER MOTOR CONTROL RELAY
(a) Disconnect the connectors.
(b) Remove the screw and blower motor control relay.



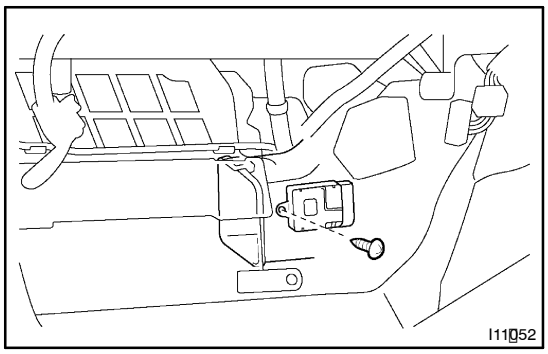
3. INSPECT BLOWER MOTOR CONTROL CIRCUIT
Inspect the wire harness side connector from the back side, as shown in the chart.

Test conditions:

- Turn ignition switch to ON
- Operate blower motor (High blower speed)

Terminals	Standard Value
GND ↔ Body Ground	Continuity
+B ↔ Body Ground	Battery voltage
+M ↔ Body Ground	Battery voltage
M+ ↔ M–	Battery voltage
SI ↔ Body Ground	1 – 3 V

If resistance is not as specified, replace the blower motor control relay.



4. INSTALL BLOWER MOTOR CONTROL RELAY
(a) Install the blower motor control relay with the screw.
(b) Connect the connectors.

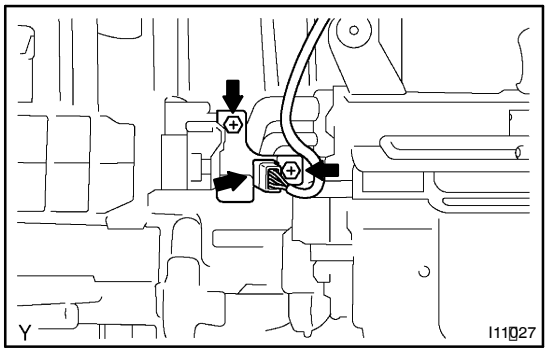
5. INSTALL GLOVE COMPARTMENT DOOR
(See page BO–104)

AIR INLET SERVOMOTOR

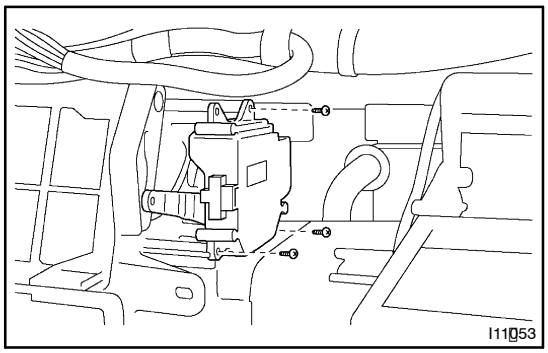
AC25U–01

INSPECTION

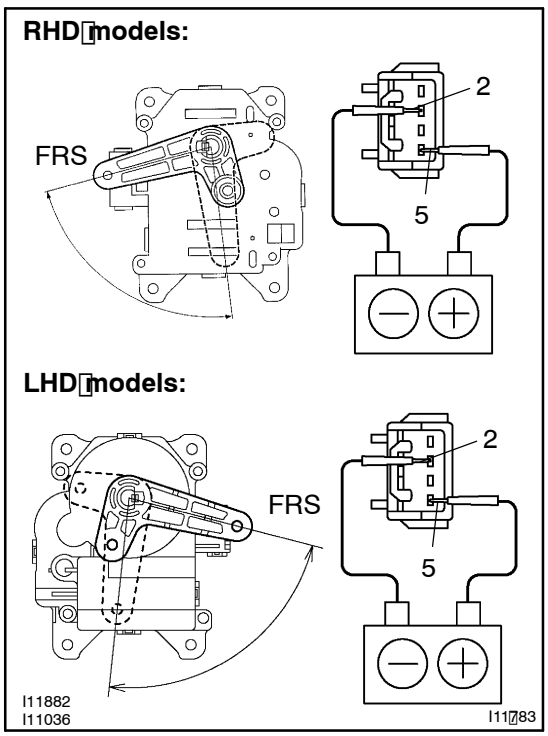
1. REMOVE GLOVE COMPARTMENT DOOR
(See page BO–96)



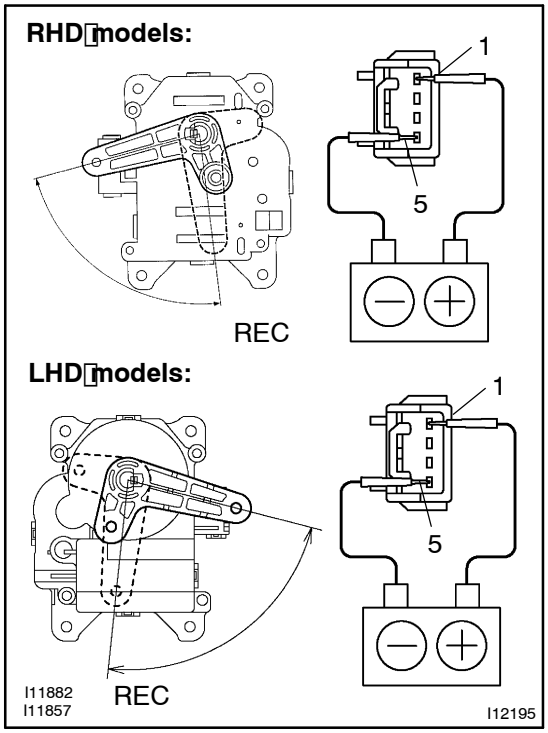
2. REMOVE BRACKET
(a) Disconnect the wire harness clamp.
(b) Remove the 2 bolts and bracket.



3. REMOVE AIR INLET SERVOMOTOR
(a) Disconnect the connector.
(b) Remove the 3 screws and servomotor.

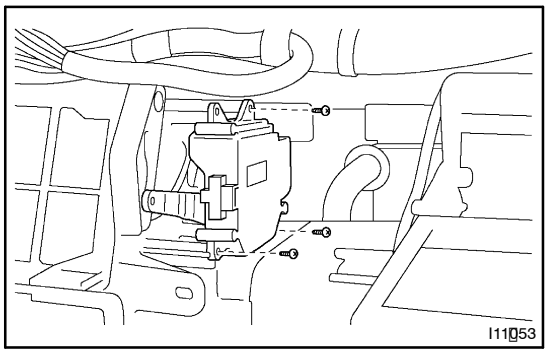


4. INSPECT AIR INLET SERVOMOTOR OPERATION
(a) Connect the positive (+) lead from the battery to terminal 5 and negative (–) lead to terminal 2, then check that the arm turns to "FRESH" side smoothly.



(b) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 5, then check that the arm turns to "RECIRC" side smoothly.

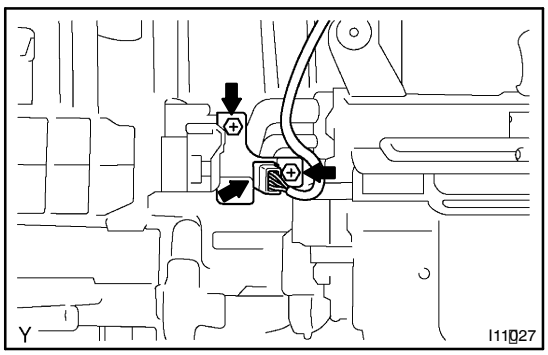
If operations are not as specified, replace the servomotor.



5. INSTALL AIR INLET SERVOMOTOR

(a) Install the servomotor with the 3 screws.

(b) Connect the connector.



6. INSTALL BRACKET

(a) Install the bracket with 2 bolts.

(b) Connect the wire harness clamp.

7. INSTALL GLOVE COMPARTMENT DOOR
(See page BO–104)

AIR MIX SERVOMOTOR

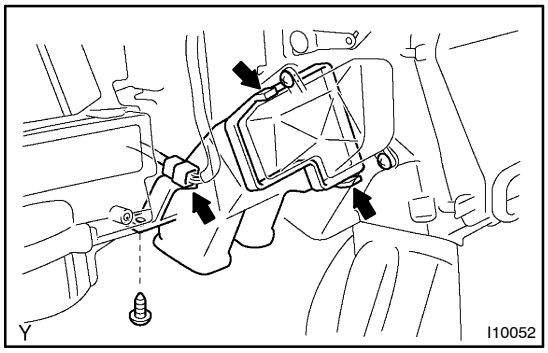
AC25V–01

INSPECTION

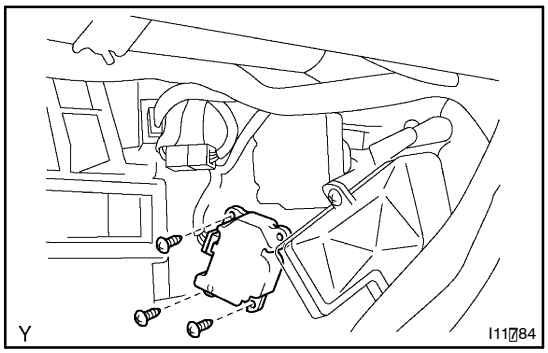
RHD models:

INSPECT AIR MIX SERVOMOTOR

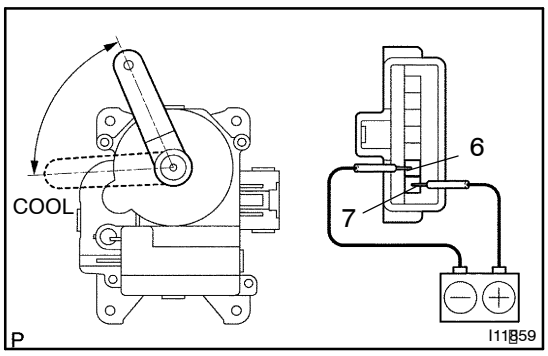
(a) Remove the glove compartment door (See page BO–96).



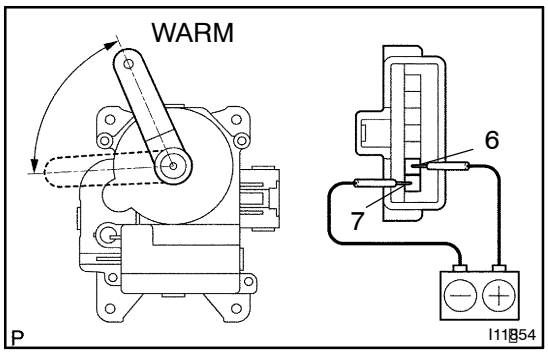
(b) Remove the air duct (duct side).
(1) Disconnect the connector clamp.
(2) Remove the screw.
(3) Release the 2 claws and pull out the air duct.



(c) Remove the air mix servomotor.
(1) Disconnect the connector.
(2) Remove the 3 screws and servomotor.

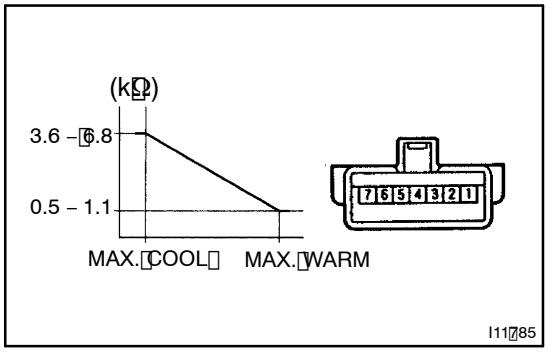


(d) Inspect the air mix servomotor operation.
(1) Connect the positive (+) lead from the battery to terminal 7 and negative (–) lead to terminal 6, then check that the arm turns to "COOL" side smoothly.



(2) Connect the positive (+) lead from the battery to terminal 6 and negative (–) lead to terminal 7, then check that the arm turns to "WARM" side smoothly.

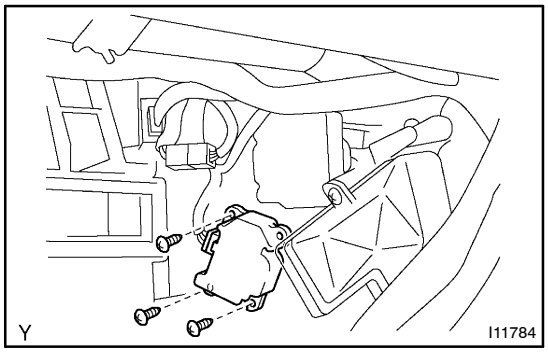
If operations are not as specified, replace the servomotor.



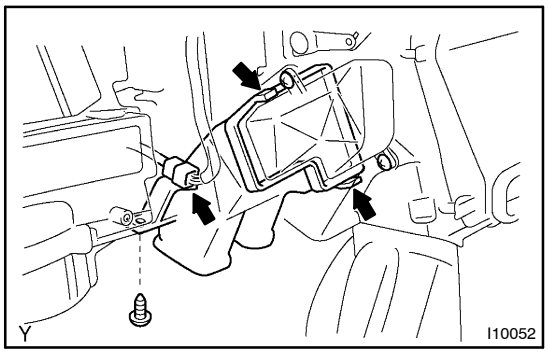
(e) Inspect the position sensor resistance.
Measure resistance between terminals at servomotor arm each position as shown in the chart.

Tester	Condition	Specified condition
1 – 3	Constant	4.2 – 7.8 kΩ
1 – 5	Max. cool	3.6 – 6.8 kΩ
1 – 5	Max. warm	0.5 – 1.1 kΩ

If resistance is not as specified, replace the servomotor.



(f) Install the air mix servomotor.
(1) Install the servomotor with the 3 screws.
(2) Connect the connector.



(g) Install the air duct (duct side).
(1) Install the air duct and fit the 2 claws.
(2) Install the screw.
(3) Connect the connector clamp.

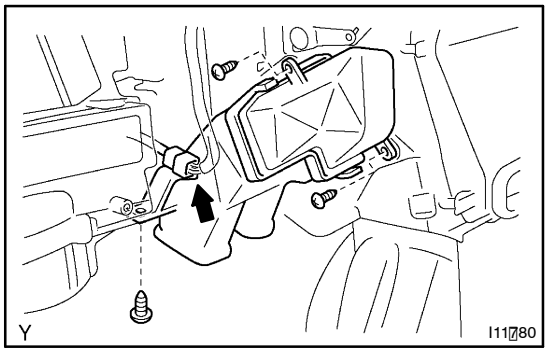
(h) Install the glove compartment door (See page BO–104).

AIR OUTLET SERVOMOTOR

AC25W–01

INSPECTION

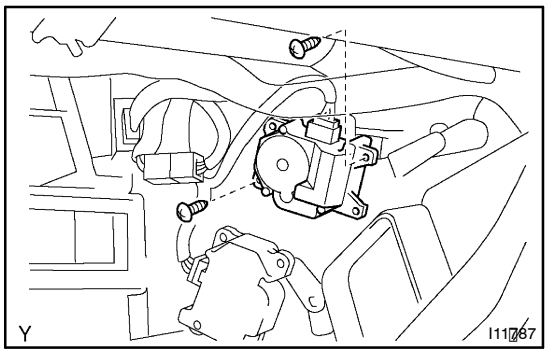
1. REMOVE INSTRUMENT PANEL (See page BO–96)



2. REMOVE AIR DUCT

(a) Disconnect the connector clamp.

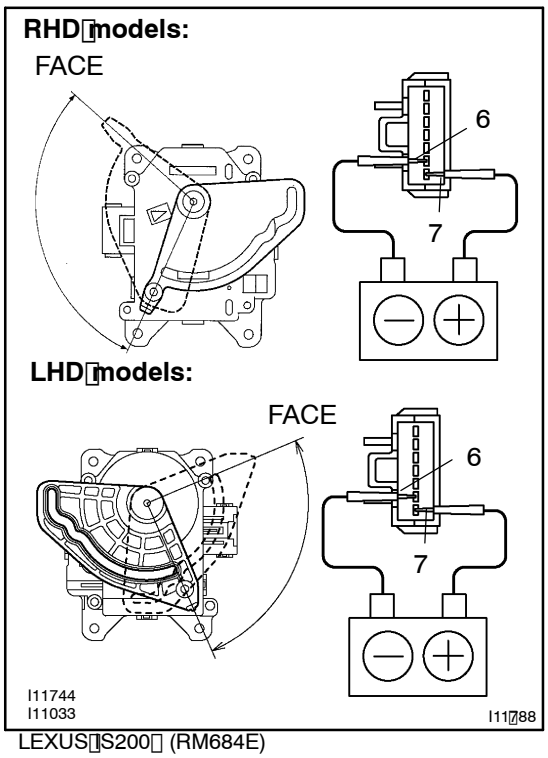
(b) Remove the 3 screws and air duct.



3. REMOVE AIR OUTLET SERVOMOTOR

(a) Disconnect the connector.

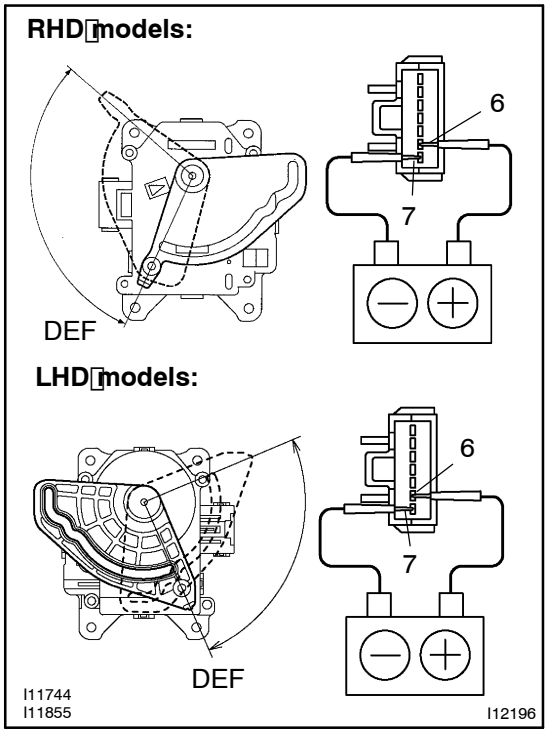
(b) Remove the 2 screws and servomotor.



4. INSPECT AIR OUTLET SERVOMOTOR OPERATION

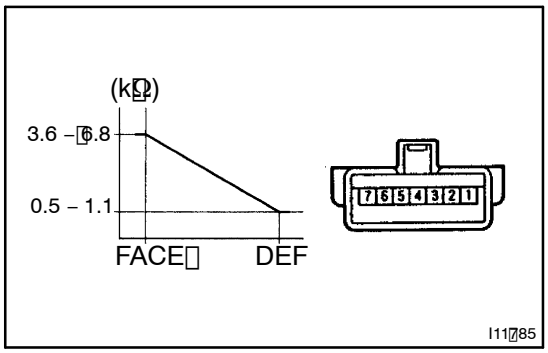
(a) Connect the positive (+) lead from the battery to terminal 7 and negative (–) lead to terminal 6, then check that the arm turns to ”FACE” side smoothly.

LEXUS LS200 (RM684E)



(b) Connect the positive (+) lead from the battery to terminal 6 and negative (–) lead to terminal 7, then check that the arm turns to "DEF" side smoothly.

If operations are not as specified, replace the servomotor.

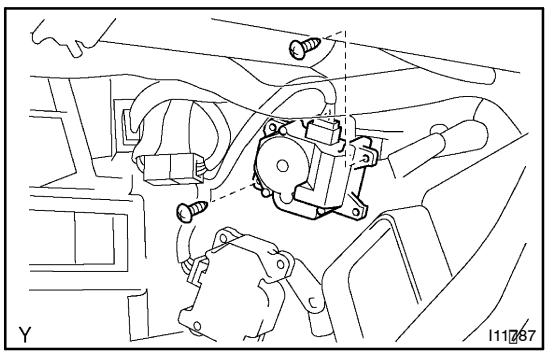


5. INSPECT POSITION SENSOR RESISTANCE

Measure resistance between terminals at servomotor arm each position as shown in the chart.

Tester connection	Condition	Specified condition
1 – 3	Constant	4.2 – 7.8 kΩ
3 – 5	FACE	3.6 – 6.8 kΩ
3 – 5	DEF	0.5 – 1.1 kΩ

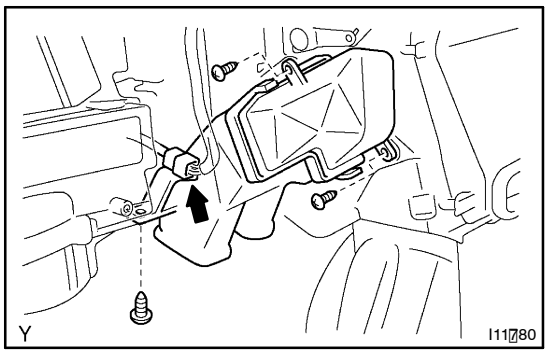
If resistance is not as specified, replace the servomotor.



6. INSTALL AIR OUTLET SERVOMOTOR

(a) Install the servomotor with the 2 screws.

(b) Connect the connector.

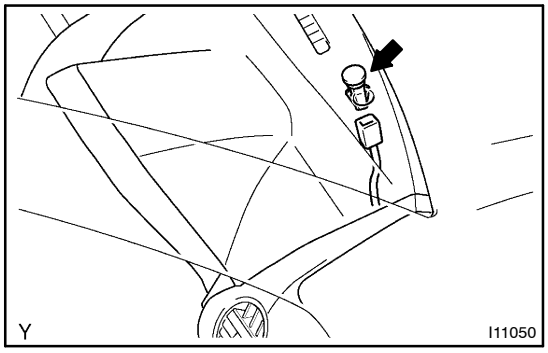


7. INSTALL AIR DUCT

(a) Install the air duct with the 3 screws.

(b) Connect the connector clamp.

8. INSTALL INSTRUMENT PANEL (See page BO–104)



SOLAR SENSOR

AC25X–01

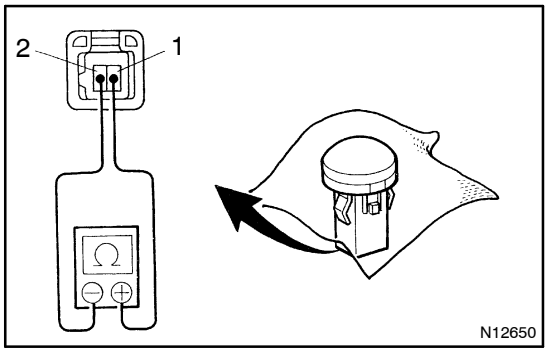
INSPECTION

1. REMOVE SOLAR SENSOR

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

HINT:

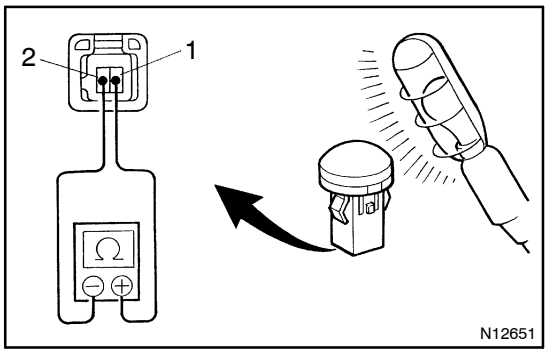
Tape the screwdriver tip before use.



2. INSPECT SOLAR SENSOR CONTINUITY

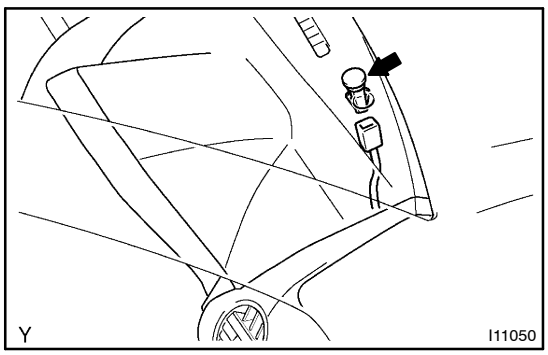
(a) Cover the sensor with a cloth, check that the no continuity exists between terminals.

If continuity exists, replace the sensor.



(b) Remove the cloth from the sensor and subject the sensor to electric light, check that continuity exists between terminals.

If no continuity exists, replace the sensor.



3. INSTALL SOLAR SENSOR

Connect the connector and install the solar sensor.

ROOM TEMPERATURE SENSOR

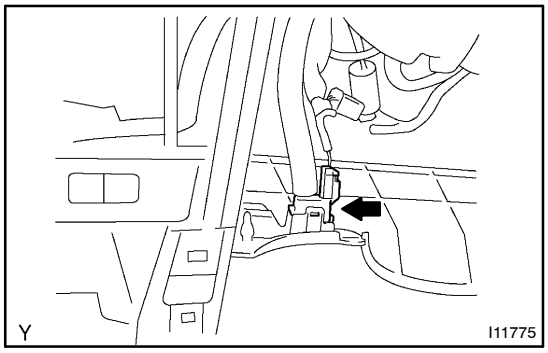
AC20Q–02

INSPECTION

1. REMOVE LOWER FINISH PANEL

(a) Remove the 3 screws.

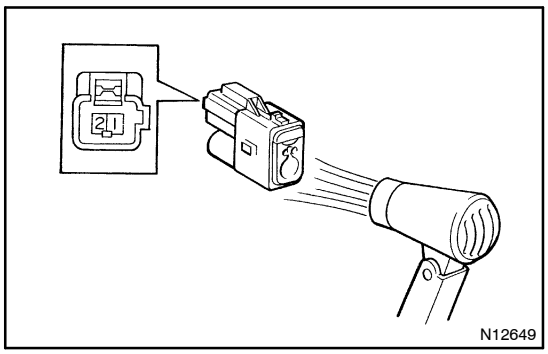
(b) Release the 3 claws and pull out the lower finish panel.



2. REMOVE ROOM TEMPERATURE SENSOR

(a) Disconnect the connector and aspirator hose.

(b) Release the 2 claws and pull out the sensor.

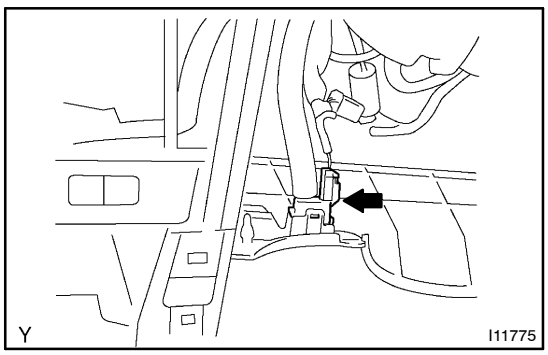


3. INSPECT ROOM TEMPERATURE SENSOR RESISTANCE

Measure resistance between terminals at each temperature as shown in the chart.

Temperature	Specified condition
25 °C (77 °F)	1.6 – 1.8 kΩ
50 °C (122 °F)	0.6 – 0.8 kΩ

If resistance is not as specified, replace the sensor.



4. INSTALL ROOM TEMPERATURE SENSOR

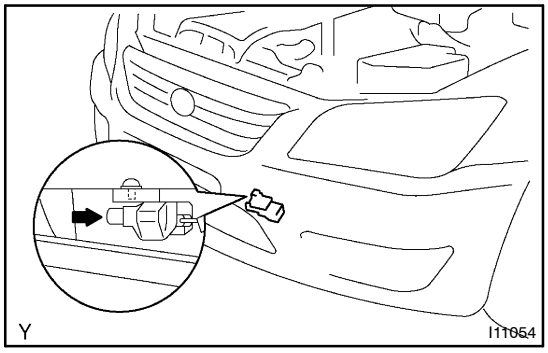
(a) Install the sensor and fit the 2 claws.

(b) Connect the aspirator hose and connector.

5. INSTALL LOWER FINISH PANEL

(a) Install the lower finish panel and fit the 3 claws.

(b) Install the 3 screws.



AMBIENT TEMPERATURE SENSOR

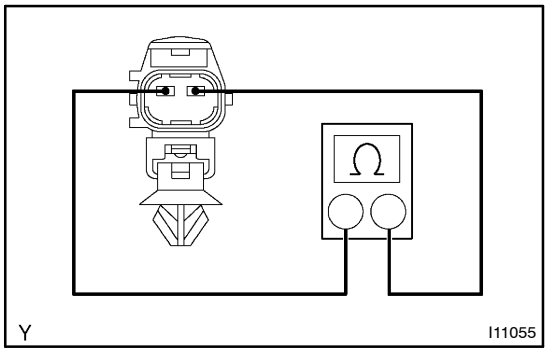
INSPECTION

AC20R–02

1. REMOVE AMBIENT TEMPERATURE SENSOR

(a) Disconnect the connector.

(b) Using a clip remover, pull out the sensor from bumper reinforcement.

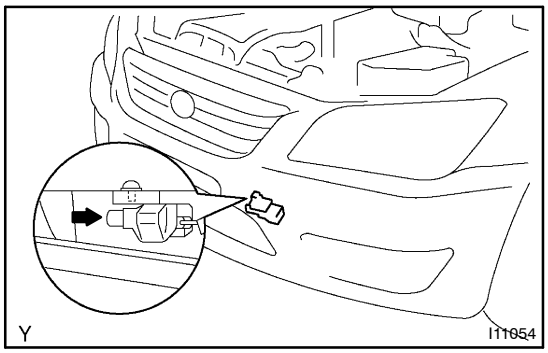


2. INSPECT AMBIENT TEMPERATURE SENSOR RESISTANCE

Measure resistance between terminals at each temperature as shown in the chart.

Temperature	Specified condition
25 °C (77 °F)	1.6 – 1.8 kΩ
50 °C (122 °F)	0.5 – 0.7 kΩ

If resistance is not as specified, replace the sensor.



3. INSTALL AMBIENT TEMPERATURE SENSOR

(a) Push the sensor in bumper reinforcement.

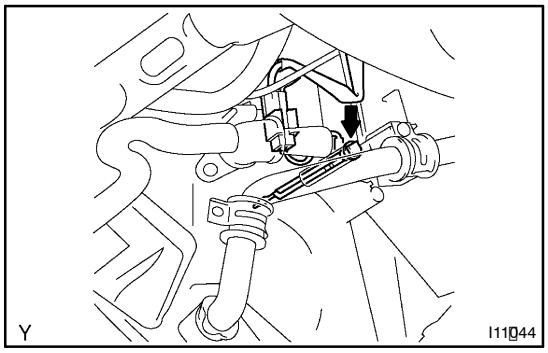
(b) Connect the connector.

EVAPORATOR TEMPERATURE SENSOR

INSPECTION

AC25Y–01

1. REMOVE LOWER FINISH PANEL (See page BO–96)



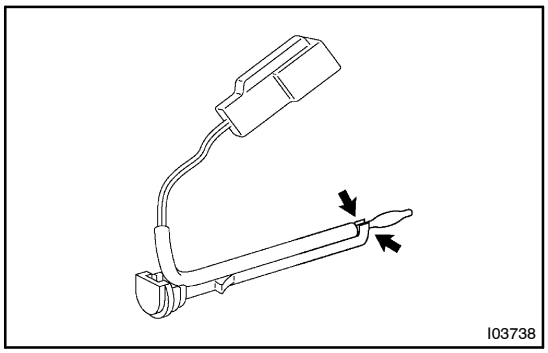
2. REMOVE EVAPORATOR TEMPERATURE SENSOR

(a) Disconnect the connector.

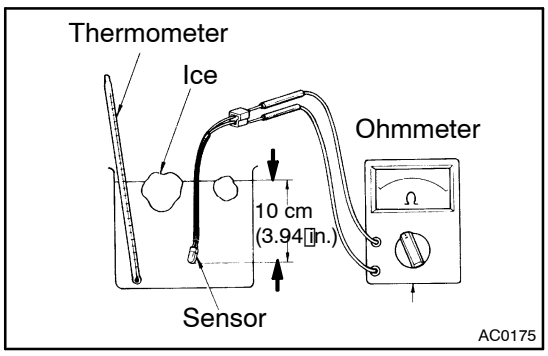
(b) Using a screwdriver, pull out the sensor with bracket plate.

HINT:

Tape the screwdriver tip before use.

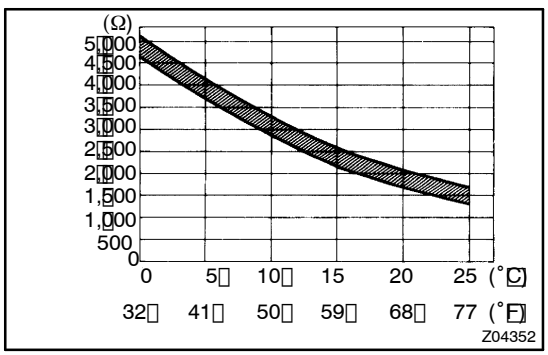


(c) Release the 2 claws and remove the sensor from bracket plate.



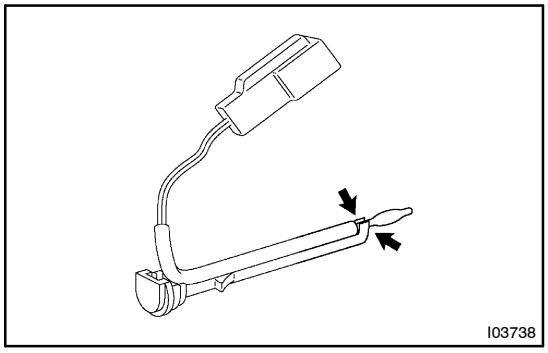
3. INSPECT EVAPORATOR TEMPERATURE SENSOR RESISTANCE

(a) Place the sensor in cold water, and while changing the temperature of the water, measure resistance at the connector and at the same time, measure temperature of the water with a thermometer.



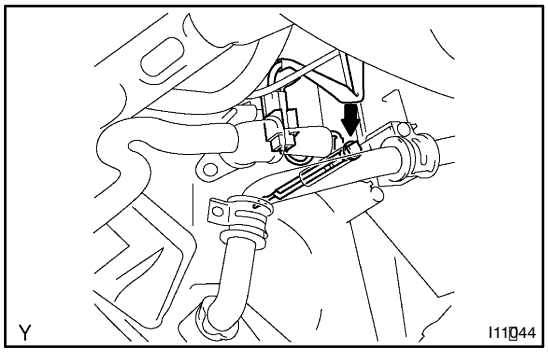
(b) Compare the 2 readings on the chart.

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



4. INSTALL EVAPORATOR TEMPERATURE SENSOR

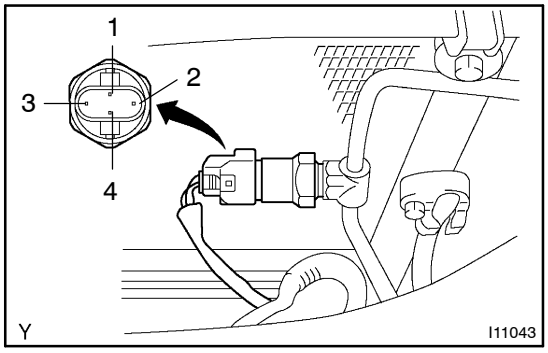
(a) Install the sensor in bracket plate and 2 claws.



(b) Push in the sensor with the bracket plate.

(c) Connect the connector.

5. INSTALL LOWER FINISH PANEL (See page BO–104)

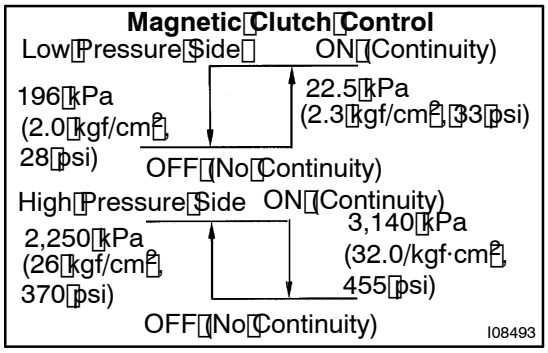


PRESSURE SWITCH

AC16Z–02

ON–VEHICLE INSPECTION

1. SET ON MANIFOLD GAUGE SET (See page AC–19)
2. DISCONNECT CONNECTOR FROM PRESSURE SWITCH
3. RUN ENGINE AT APPROX. 1,500 RPM

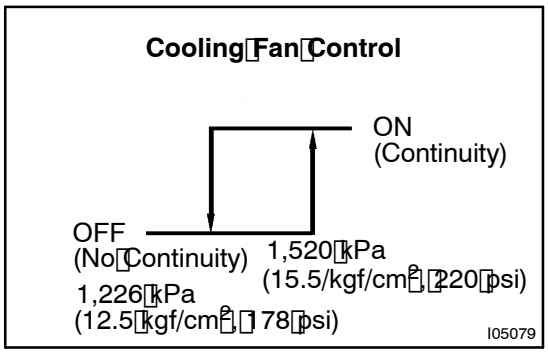


4. **Magnetic clutch control:**
   INSPECT PRESSURE SWITCH OPERATION

(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

AC170–02

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

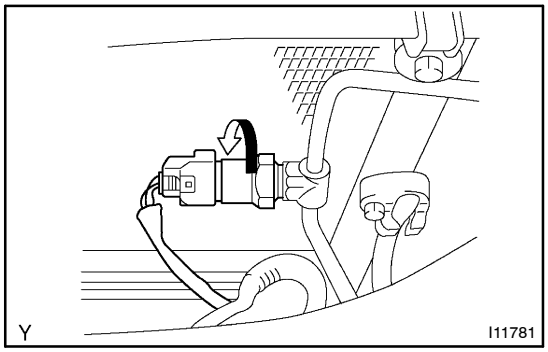
At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 600 ± 50 g (21.16 ± 1.76 oz.)

2. REMOVE RADIATOR GRILLE (See page BO–4)



3. 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.

AC171–01

INSTALLATION

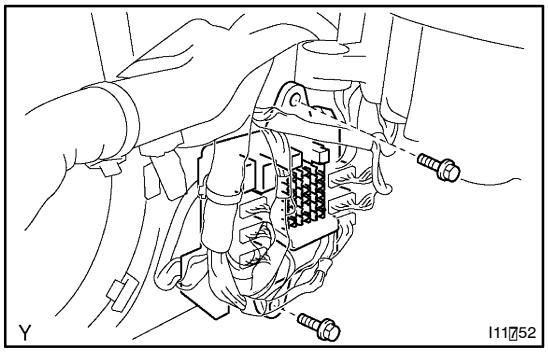
Installation is in the reverse order of removal (See page AC–71).

HEATER MAIN RELAY

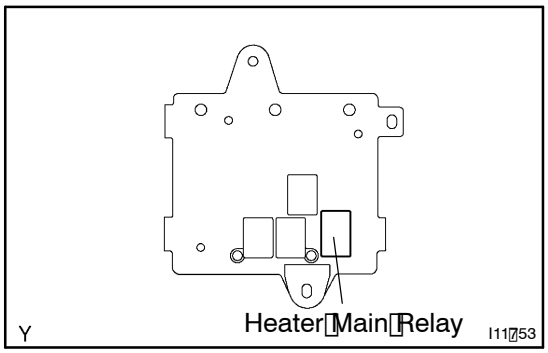
AC25Z–01

INSPECTION

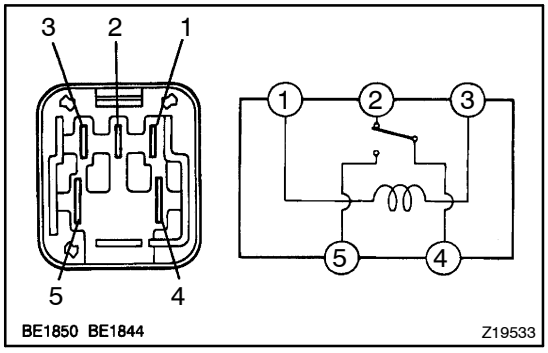
1. REMOVE FRONT DOOR SCUFF PLATE LH
(See page BO–96)
2. REMOVE COWL SIDE TRIM BOARD LH
(See page BO–96)



3. REMOVE HEATER MAIN RELAY
(a) Disconnect the connectors.
(b) Remove the 2 passenger side junction block set nuts.



(c) Remove the heater main relay from passenger side junction block.

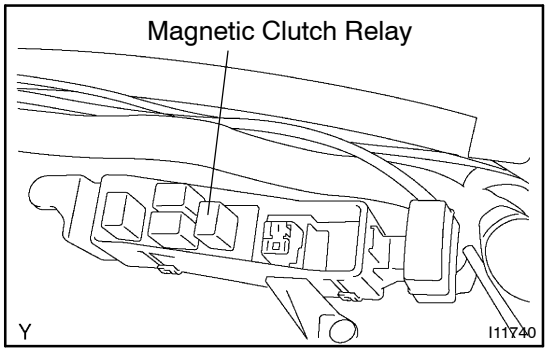


4. INSPECT HEATER MAIN RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

5. INSTALL HEATER MAIN RELAY
(a) Install the heater main relay to passenger side junction block.
(b) Install the passenger side junction block set nuts.
(c) Connect the connectors.
6. INSTALL COWL SIDE TRIM BOARD LH
(See page BO–104)
7. INSTALL FRONT DOOR SCUFF PLATE LH
(See page BO–104)

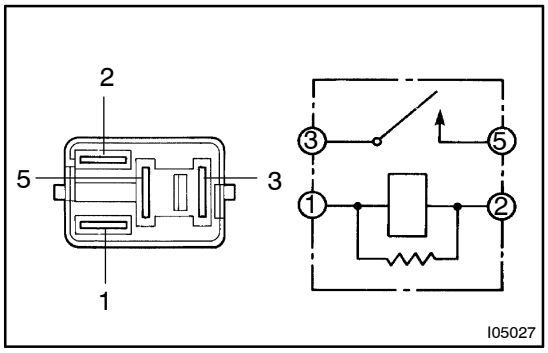


MAGNETIC CLUTCH RELAY

AC20U–02

INSPECTION

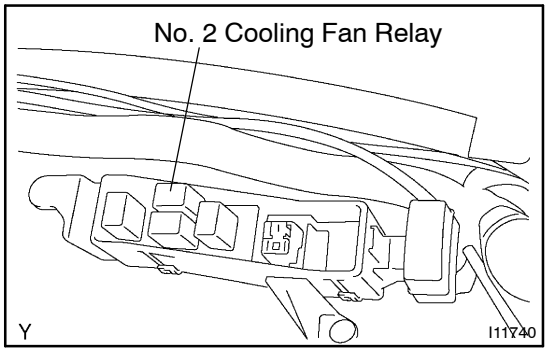
1. REMOVE MAGNETIC CLUTCH RELAY FROM RELAY BLOCK NO.3



2. INSPECT MAGNETIC CLUTCH RELAY (Marking: A.C COMP) 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.

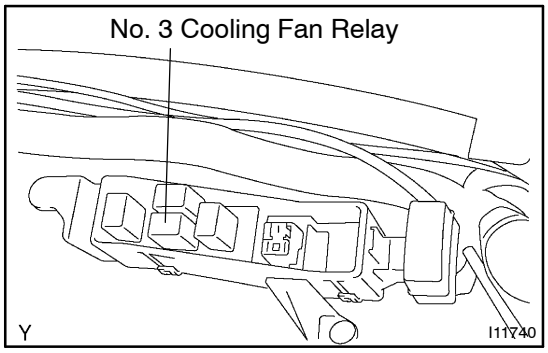


COOLING FAN RELAY

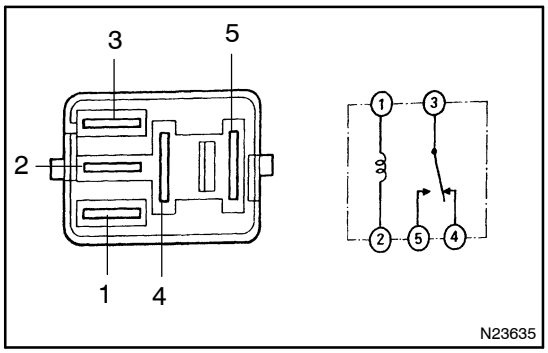
AC260-01

INSPECTION

1. REMOVE NO.2 COOLING FAN RELAY FROM RELAY BLOCK NO.3



2. REMOVE NO.3 COOLING FAN RELAY FROM RELAY BLOCK NO.3



3. INSPECT NO.2 COOLING FAN RELAY (Marking: FAN 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.

4. INSPECT NO.3 COOLING FAN RELAY (Marking: FAN NO.3) CONTINUITY

Check the relay in the same way as for ”MAGNETIC CLUTCH RELAY”.

CONDENSER FAN

AC173–02

ON–VEHICLE INSPECTION

1. INSPECT CONDENSER FAN OPERATION

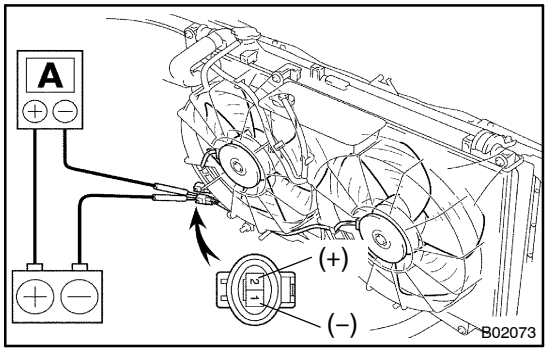
Inspect the fan operation, as shown in the chart below.

Test conditions:

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

Condition	Fan operation (Fan speed)
Engine coolant temperature 91˚C (196 ˚F) or below	Rotate (Low speed)
Engine coolant temperature 100˚C (212 ˚F) or above	Rotate (High speed)
Refrigerant pressure is less than 1,520 kPa (15.5 kgf·cm^2, 220 psi)	Rotate (Low speed)
Refrigerant pressure is 1,520 kPa (15.5 kgf·cm^2, 220 psi) or above	Rotate (High speed)

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.

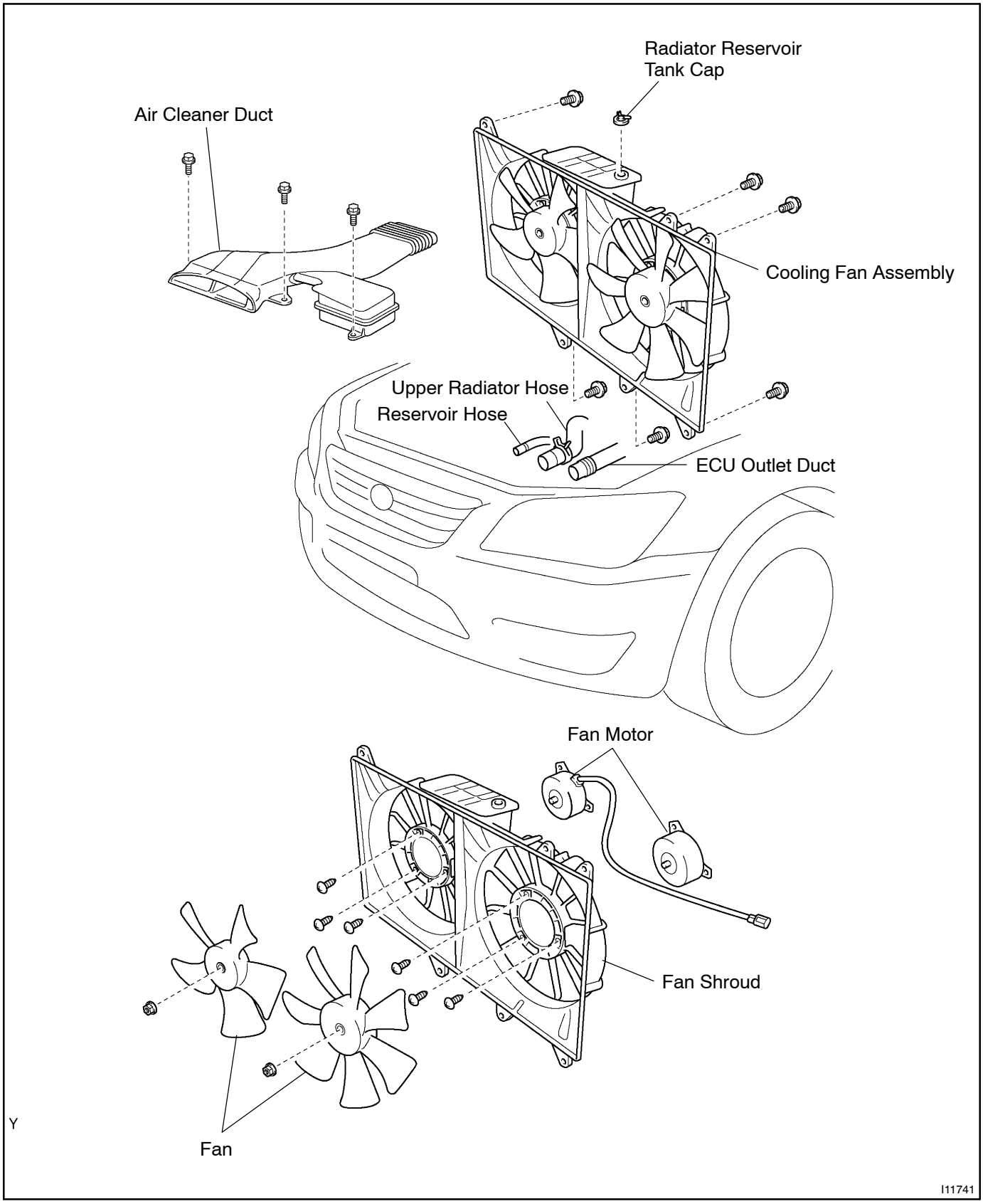
(c) Check that the fan rotates smoothly, and then check the reading on the ammeter.

Specified amperage: 8.5 – 11.5 A ar 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.

AC0Y3–03

COMPONENTS



AC174–02

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.

2. REMOVE AIR CLEANER DUCT

Remove the 2 bolts and air cleaner duct.

3. REMOVE RADIATOR CAP

4. REMOVE RADIATOR RESERVOIR TANK CAP

5. DISCONNECT ECU OUTLET DUCT

6. DISCONNECT UPPER RADIATOR HOSE

7. DISCONNECT RESERVOIR HOSE

8. REMOVE COOLING FAN ASSEMBLY

(a) Disconnect the connectors.

(b) Remove the 6 bolts cooling fan assembly.

AC175–01

DISASSEMBLY

1. REMOVE COOLING FANS

Remove the 2 nuts and both fans.

2. REMOVE COOLING FAN MOTORS

(a) Disconnect wire harness clamps.

(b) Remove the 6 screws and both motors.

AC176–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–79).

AC177–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–78).

AIR CONDITIONER CONTROL ASSEMBLY

AC261-01

ON–VEHICLE INSPECTION

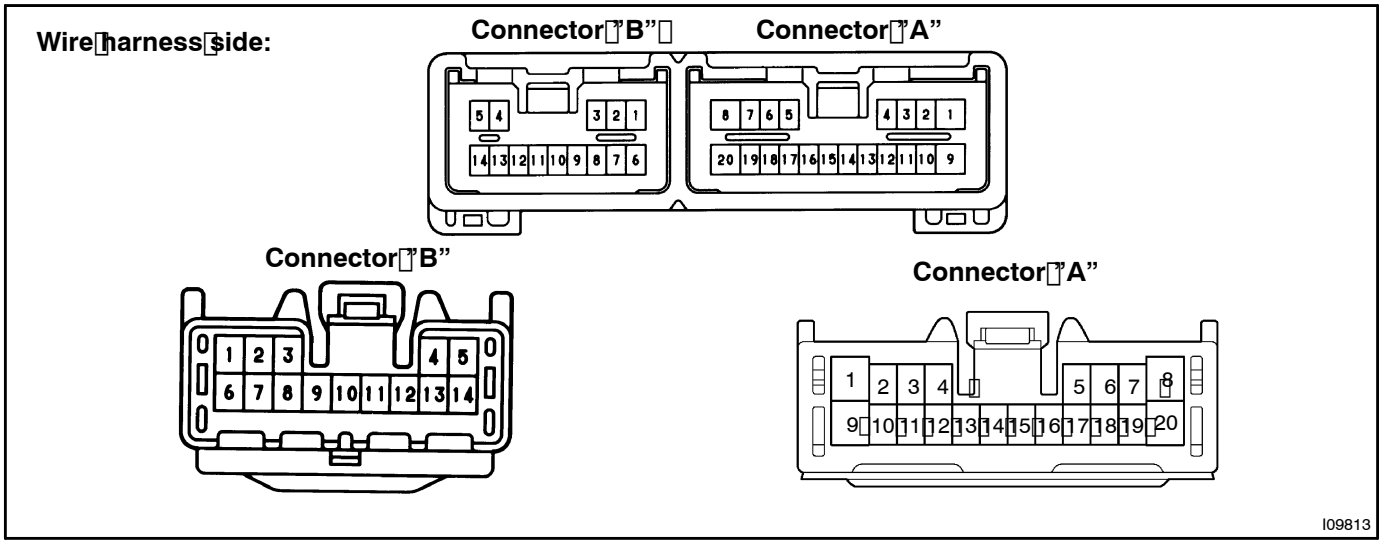
1. REMOVE A/C CONTROL ASSEMBLY
(See page AC–87)

2. INSPECT A/C CONTROL ASSEMBLY CIRCUIT

(a) Disconnect the connector from the A/C control assembly and inspect the connector on the wire harness side, as shown in the chart below.

Test condition:

Turn ignition switch ON



Tester connection	Condition	Specified condition
A13 – A6	Cover solar sensor with a cloth	No continuity
	Solar sensor subject to electric light	Continuity
B14 – Ground	Constant	Continuity
A17 – A18	Cabin temperature at 25°C (77°F)	Approx. 1.7 kΩ
A5 – A18	Evaporator temperature at 25°C (77°F)	Approx. 1.5 kΩ
B4 – Ground	Turn ignition switch to ACC	Battery voltage
B13 – Ground	Turn ignition switch to ON	Battery voltage
	Turn ignition switch to LOCK or ACC	No voltage
B12 – Ground	Turn light control switch to "TAIL"	Battery voltage
B5 – Ground	Constant	Battery voltage

- If the circuit is not as specified, inspect the circuit connected to other parts.
- If the circuit is as specified, proceed to "INSPECTION" on page AC–91.

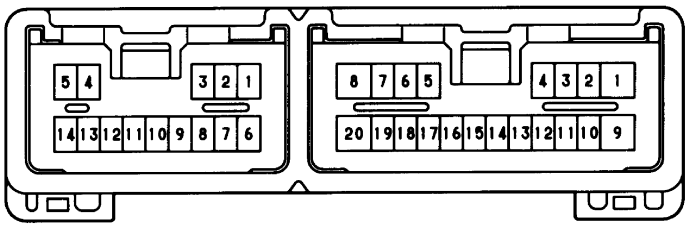
(b) Connect the connector to amplifier and inspect the wire harness side connector from the back side, as shown in the chart.

Test conditions:

- Running engine at idle speed
- Blower speed control dial at ”HI” position
- Temperature control dial at ”MAX. COOL” position
- A/C switch ON

From back side:

Connector ”B” **Connector ”A”**



I07266

Tester connection	Condition	Specified condition
A18 – Ground	Constant	Continuity
A1 – Ground	Hazard switch: OFF	No continuity
	Hazard switch: ON	Continuity
A2 – Ground	R/F switch: FRESH	Below 1.0 V
	R/F switch: RECIRC	No voltage
A3 – A11	Mode control dial: FACE	Below 1.0 V
	Mode control dial: DEF	Battery voltage
A4 – A12	Temperature control dial: MAX COOL	Below 1.0 V
	Temperature control dial: MAX HOT	Battery voltage
A6 – A18	Constant	5.0 ± 0.5 V
A9 – Ground	R/F switch: FRESH	Battery voltage
	R/F switch: RECIRC	Below 1.0 V
A10 – Ground	R/F switch: FRESH	No voltage
	R/F switch: RECIRC	Battery voltage
A11 – A3	Mode control dial: DEF	Below 1.0 V
	Mode control dial: FACE	Battery voltage
A12 – A4	Temperature control dial: MAX HOT	Below 1.0 V
	Temperature control dial: MAX COOL	Battery voltage
A14 – A18	Temperature control dial: MAX HOT	Approx. 1.0 V
	Temperature control dial: MAX COOL	Approx. 4.0 V
A15 – A18	Mode control dial: DEF	Approx. 1.0 V
	Mode control dial: FACE	Approx. 4.0 V
B2 – Ground	Parking drake lever: Release	Battery voltage
	Parking drake lever: Operate	Below 1.0 V
B3 – Ground	Pattern select switch: Except PWR	Battery voltage
	Pattern select switch: PWR	Below 1.0 V

B6 – Ground	Ignition switch: ON	Below 1.0 V
	Ignition switch: OFF	Battery voltage
B7 – Ground	Blower motor: ON	Pulse generation
	Blower motor: OFF	Approx. 5.0 V
B8 – Ground	Pattern select switch: Except SNOW	Battery voltage
	Pattern select switch: SNOW	Below 1.0 V
B10 – Ground	Passenger seat belt: unfastened	Below 1.0 V
	Passenger seat belt: fasted	Battery voltage

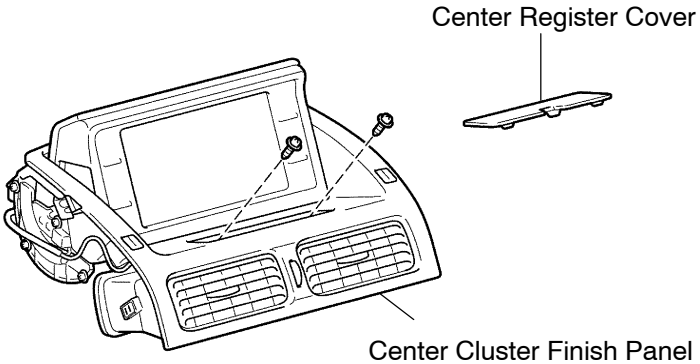
If the circuit is not as specified, proceed to "INSPECTION" on page AC–91.

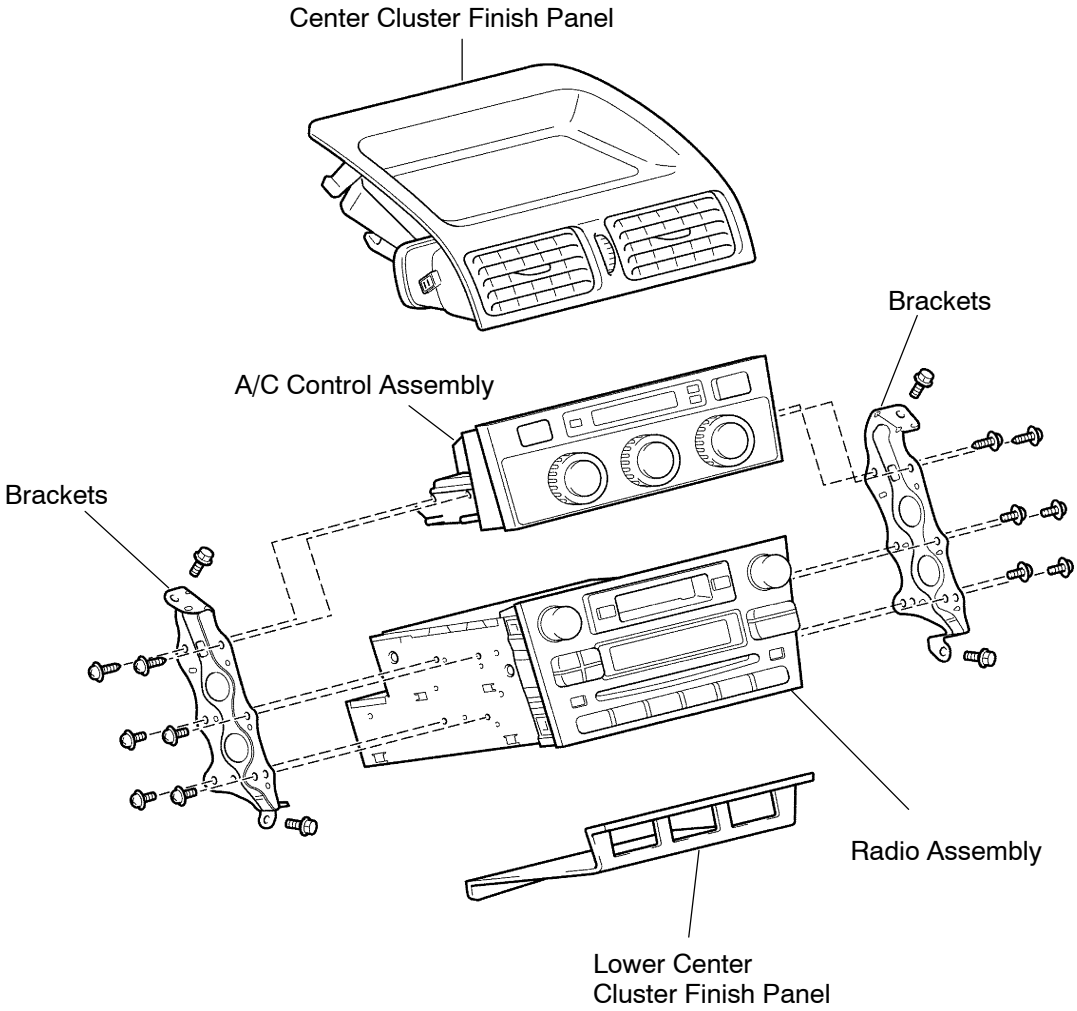
3. INSTALL A/C CONTROL ASSEMBLY
(See page AC–94)

AC262-01

COMPONENTS

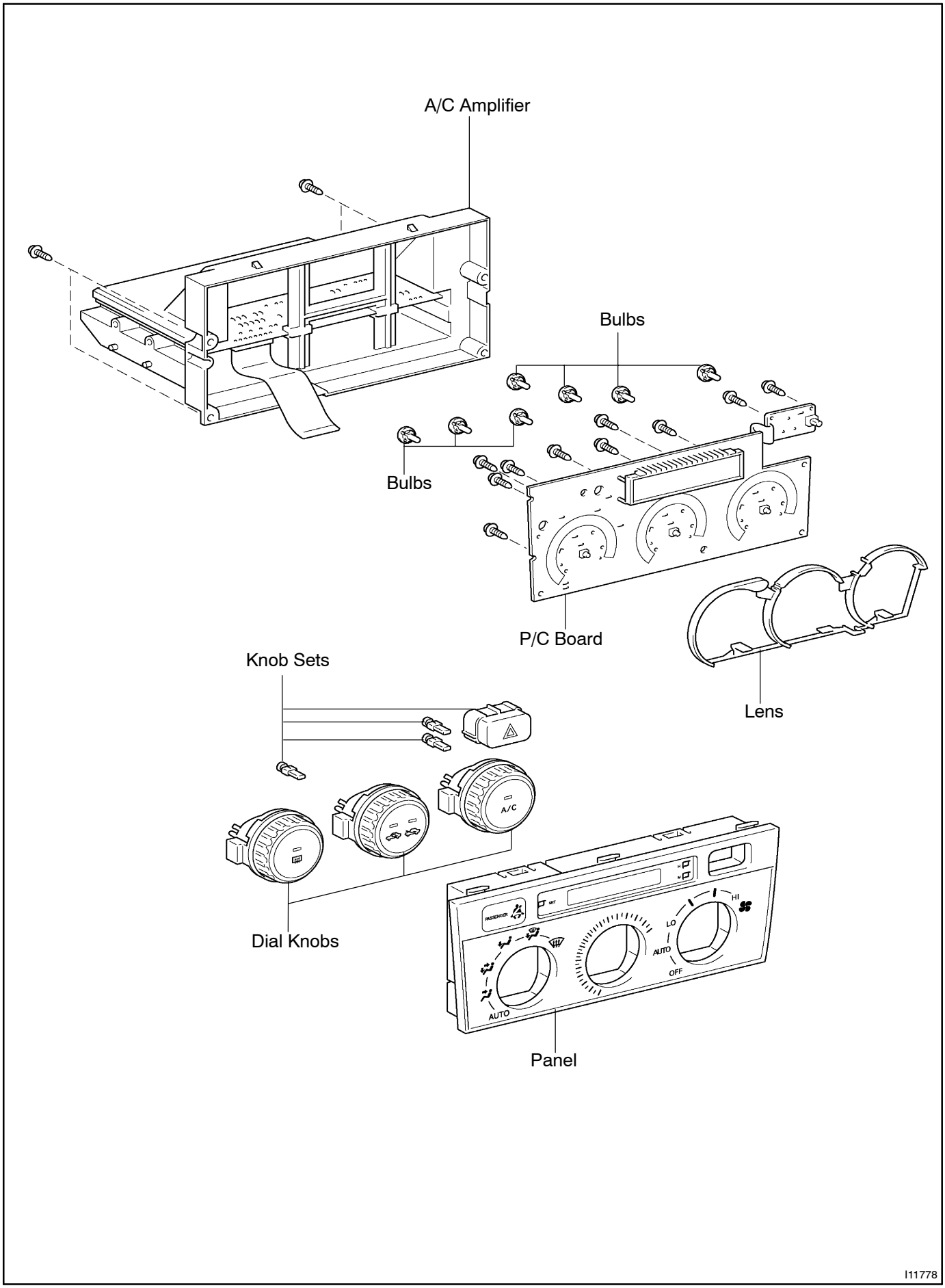
w/ LEXUS Navigation System:





P

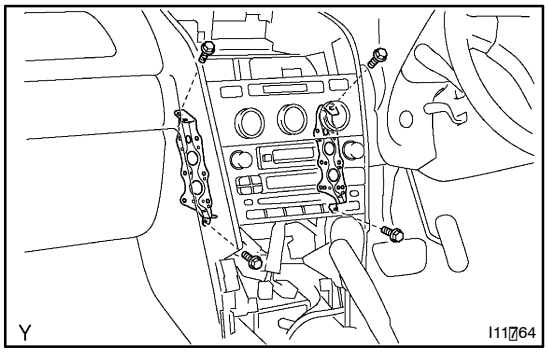
I11755


A/C Amplifier
Bulbs
Bulbs
P/C Board
Lens
Knob Sets
Dial Knobs
Panel
I11778

AC263-01

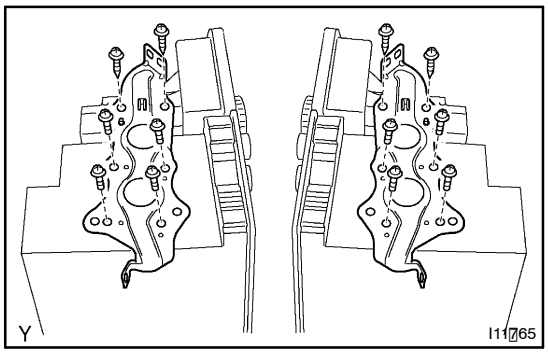
REMOVAL

1. REMOVE CENTER CLUSTER FINISH PANEL (See page BO–96)
2. REMOVE LOWER CENTER CLUSTER FINISH PANEL (See page BO–96)



3. REMOVE A/C CONTROL ASSEMBLY

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

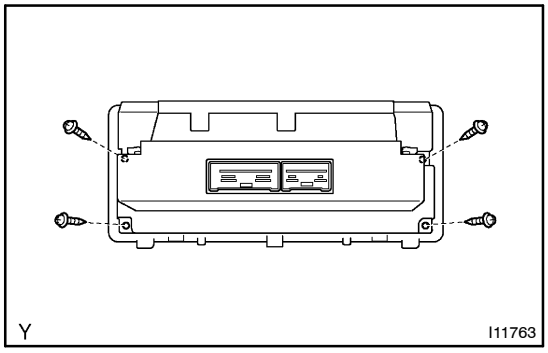


(b) Remove the 12 screws and 2 brackets.

(c) Separate the A/C control assembly and radio assembly.

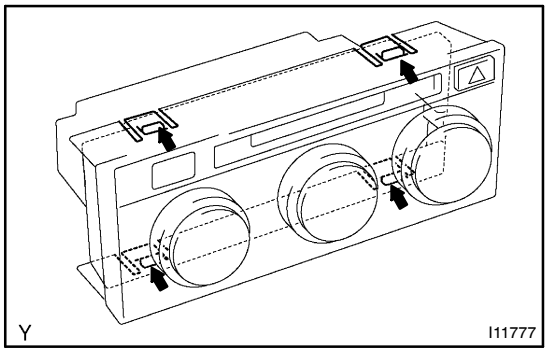
AC264–01

DISASSEMBLY



1. REMOVE A/C AMPLIFIER

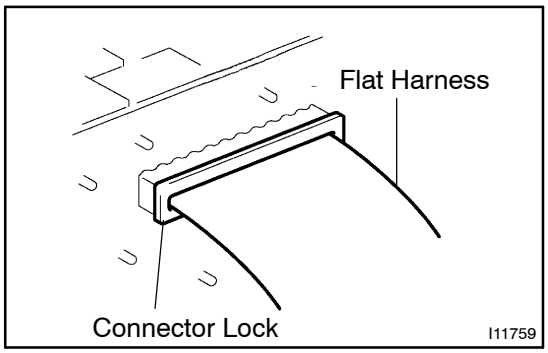
(a) Remove the 4 screws.



(b) Using a screwdriver, release the 4 claws and pull out the A/C amplifier.

HINT:

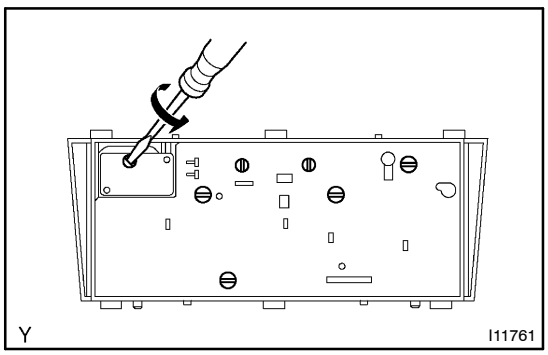
Tape the screwdriver tip before use.



(c) Release the connector lock and pull out the flat harness.

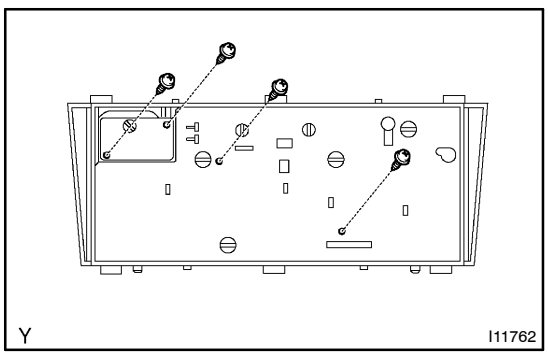
NOTICE:

Pull the lock of the connector securely toward you and pull off the flexible flat cable.



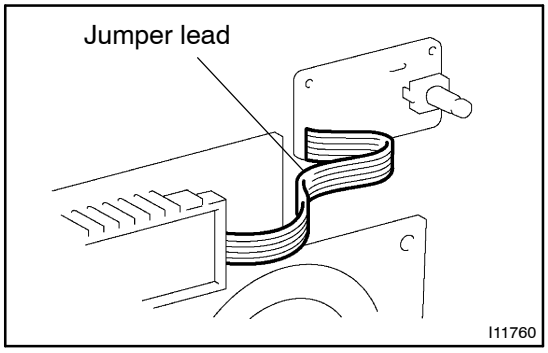
2. REMOVE BULBS

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



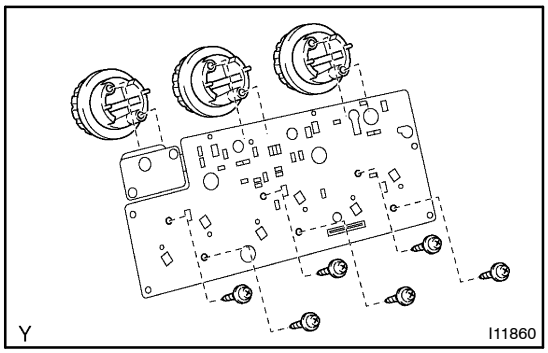
3. REMOVE P/C BOARD

Remove the 4 screws and P/C board.



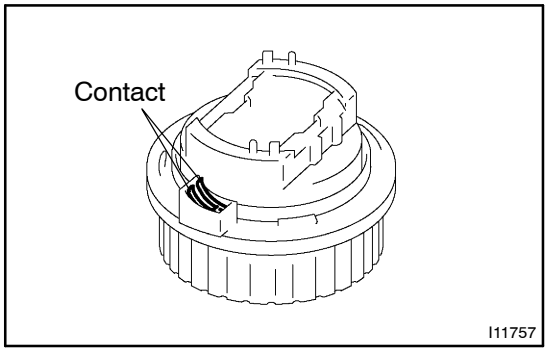
NOTICE:

- **Do not let any oil, dirt or foreign object on the connecting part of the P/C board.**
- **When holding the P/C board by hand, hold it at the edge and do not touch the soldered part and connecting part.**
- **Do not apply unnecessary force to the jumper lead.**
- **Do not let the accumulated static electricity in an operator apply to the electronic components.**
- **Do not tumble the LED as this soldered to the P/C board at right angles.**



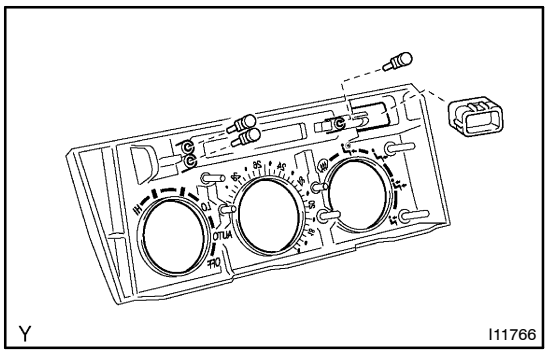
4. REMOVE DIAL KNOBS

Remove the 6 screws and dial knobs.



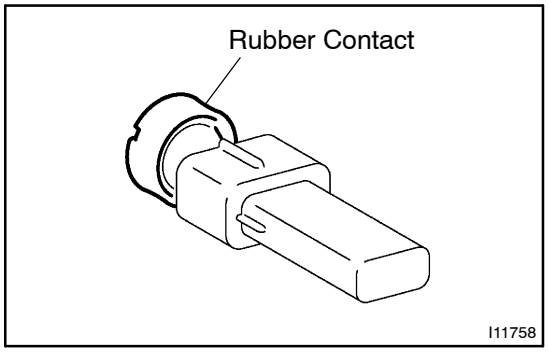
NOTICE:

- **Do not let any oil, dirt or foreign object attach on the connecting part of the connector.**
- **Do not deform the contact.**
- **Be careful not to drop the contact.**

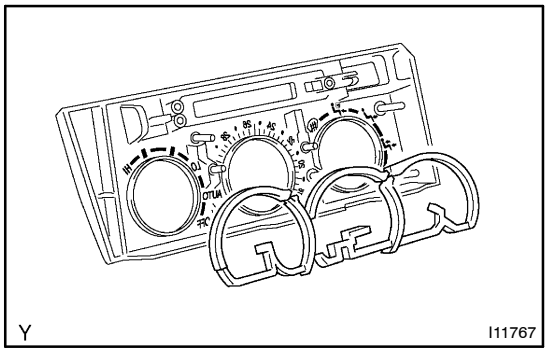


5. REMOVE KNOB SETS

Pull out the knob sets.



NOTICE:
Do not let any oil, dirt or foreign object attach on the rubber contact part.



6. REMOVE LENS

AC265–01

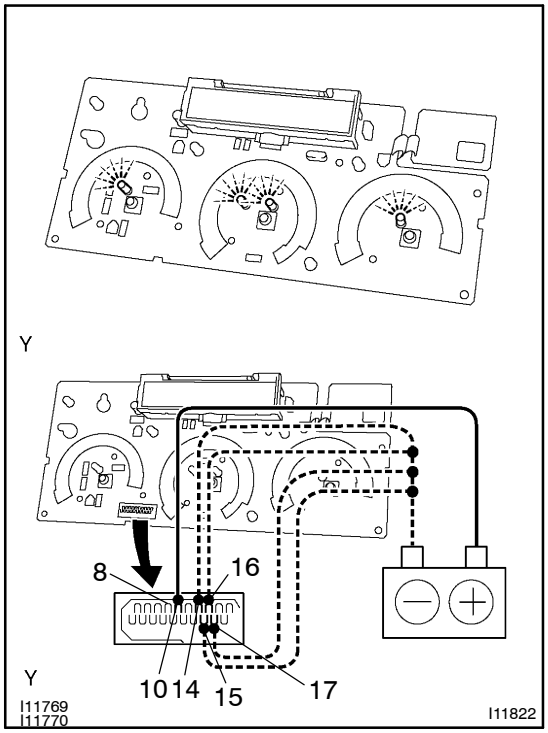
INSPECTION

1. INSPECT INDICTOR OPERATION

Connect the positive (+) lead from the battery to terminal 10 and negative (–) lead to each terminal, then check that the indicator lights up as shown in the chart.

Switch	Tester connection
DEF	14
FRESH	15
RECIRC	16
A/C	17

If operation is not as specified, replace the P/C board.



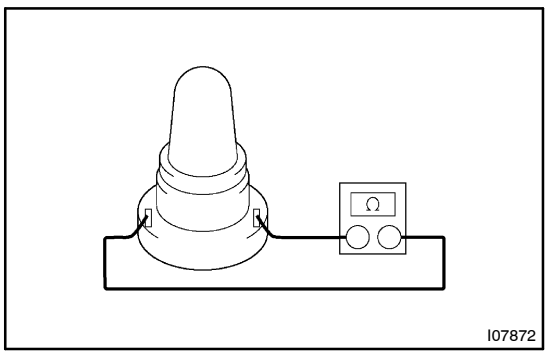
2. INSPECT INDICATOR DIMMING OPERATION

(a) Perform each indicator light up (See step 1).

(b) Connect the positive (+) lead from the battery to terminal 8 and check that the each indicator dims.

If the operation is not as specified, replace the P/C board.

If the operation is as specified, replace the A/C amplifier.

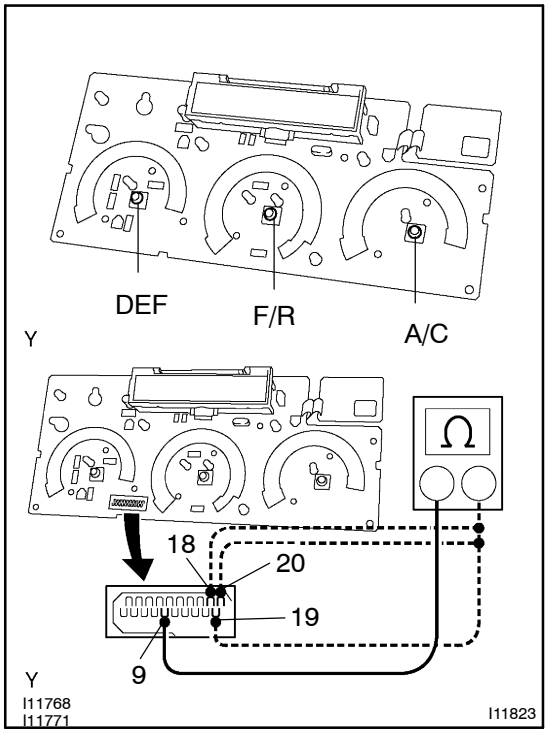


3. INSPECT BULB OPERATION

Apply the tester as shown in the illustration to the test for continuity.

If continuity exists, replace the P/C board.

If on continuity exists, replace the bulb.



4. INSPECT SWITCH OPERATION

Check the continuity exists between terminals while the switch is pressed.

Switch	Tester connection	Specified condition
A/C	9 – 18	Continuity
DEF	9 – 19	Continuity
F/R	9 – 20	Continuity

If operations is not as specified, replace the P/C board.
If operations is as specified, check the wire harness or replace the A/C amplifier.

AC266–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–88).

AC267–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–87).

WATER TEMPERATURE SWITCH

AC268–01

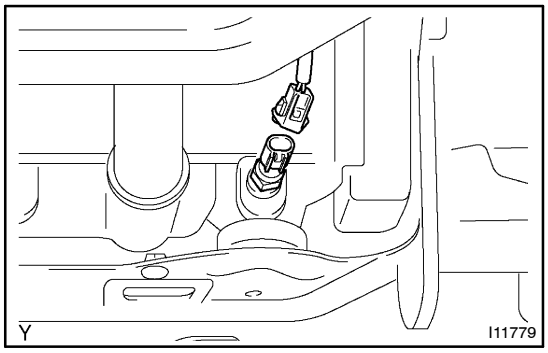
INSPECTION

1. REMOVE ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant

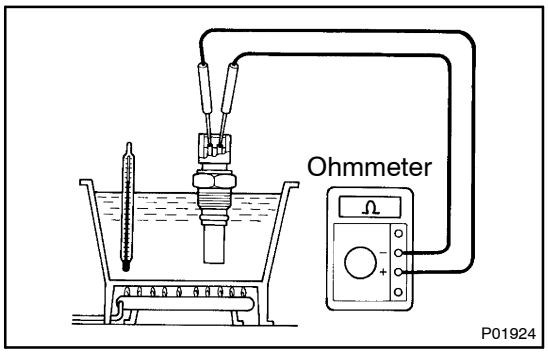


3. REMOVE WATER TEMPERATURE SWITCH

(a) Disconnect the connector.

(b) Remove the water temperature switch.

(c) Remove the O–ring from the switch.



4. INSPECT WATER TEMPERATURE SWITCH

(a) Using an ohmmeter, check that no continuity exists between the terminals when the coolant temperature is above 100 °C (212 °F).

If continuity exists, replace the switch.

(b) Using an ohmmeter, check that continuity exists between the terminals when the coolant temperature is below 91 °C (196 °F).

If there no continuity exists, replace the switch.

5. INSTALL WATER TEMPERATURE SWITCH

(a) Install the new O–ring to the switch.

(b) Install the water temperature switch.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

6. FILL WITH ENGINE COOLANT TO RADIATOR

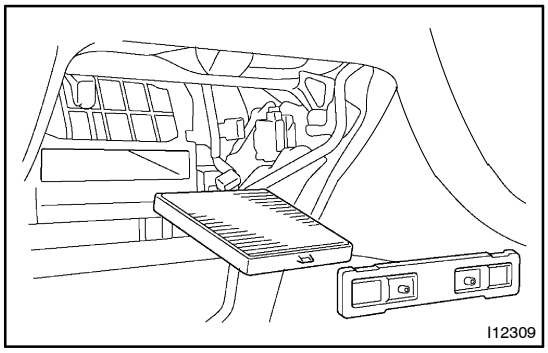
7. INSTALL ENGINE UNDER COVER

AIR REFINER FILTER

AC3NW–01

REMOVAL

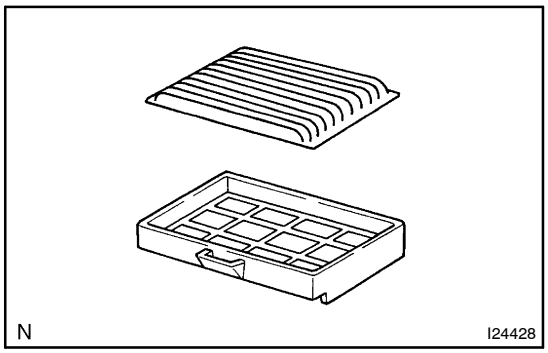
1. **REMOVE GLOVE COMPARTMENT DOOR**
(See page BO–96)



2. **REMOVE AIR REFINER FILTER**

(a) Remove the cover.

(b) Pull out the air refiner filter.



(c) Remove the filter from the flame.

AC0Y1–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–96).

AUTOMATIC TRANSMISSION SYSTEM

PRECAUTION

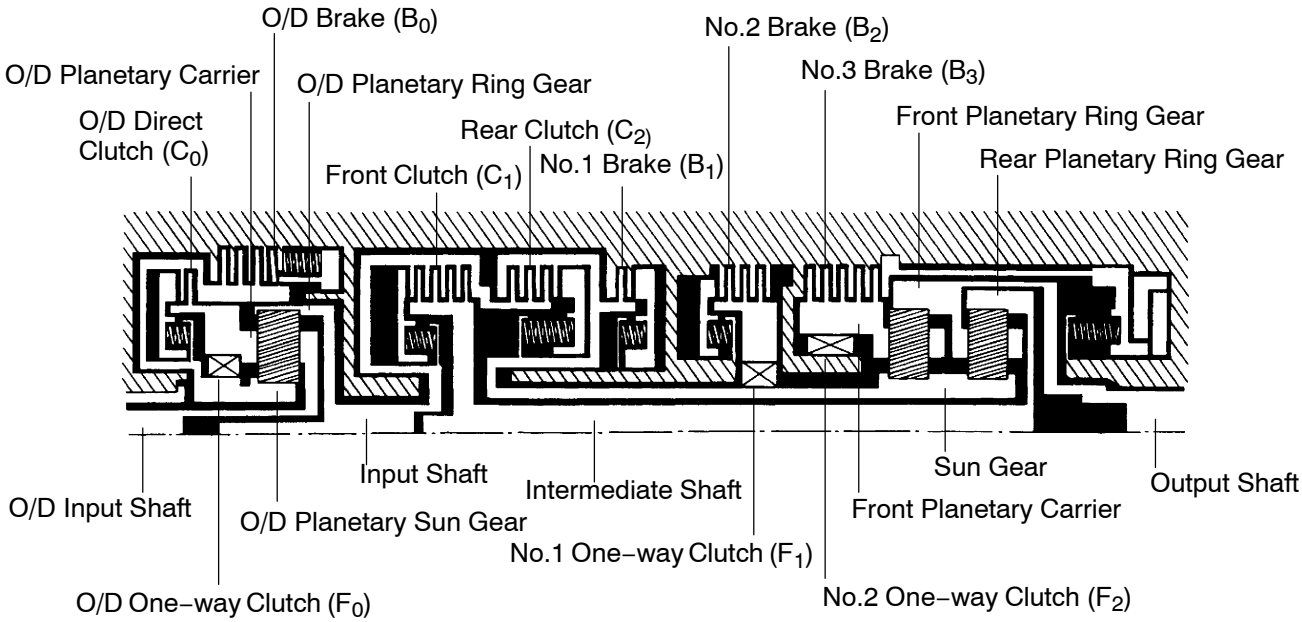
AT0HC–01

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

AUTOMATIC TRANSMISSION SYSTEM

OPERATION

AT0HD–01



○..... Operating

Shift lever range	Gear position	C_0	C_1	C_2		B_0	B_1	B_2	B_3		F_0	F_1	F_2
				I.P.	O.P.				I.P.	O.P.			
P	Parking	○											
R	Reverse	○		○	○				○	○	○		
N	Neutral	○											
D	1st	○	○								○		○
	2nd	○	○					○			○	○	
	3rd	○	○	○				○			○		
	4th		○	○		○		○					
2	1st	○	○								○		○
	2nd	○	○				○	○			○	○	
L	1st	○	○						○	○	○		○

I.P.: Inner Piston
O.P.: Outer Piston

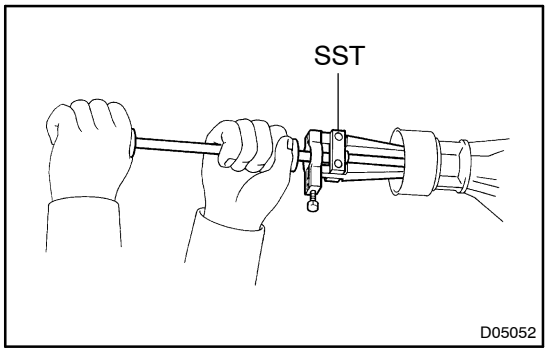
D00790

EXTENSION HOUSING OIL SEAL

AT0HE–01

ON–VEHICLE REPAIR

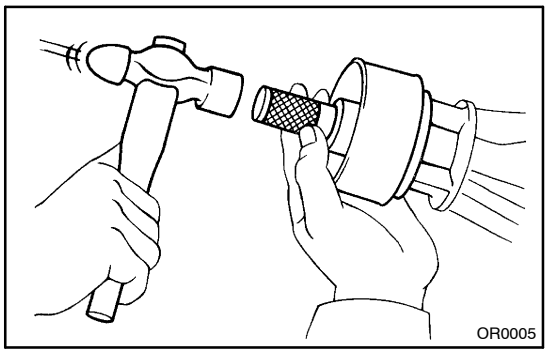
1. **REMOVE NO. 1 REAR FLOOR BOARD**
2. **REMOVE EXHAUST PIPE ASSEMBLY**
   (See page PR–4)
3. **REMOVE PROPELLER SHAFT (See page PR–4)**



4. **REMOVE REAR OIL SEAL**

Using SST, remove the oil seal.

SST 09308–00010



5. **INSTALL NEW OIL SEAL**

(a) Using SST and a hammer, carefully drive a new oil seal in as far as it will go.

SST 09325–20010

NOTICE:

Clean the extension housing before removing the oil seal.

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

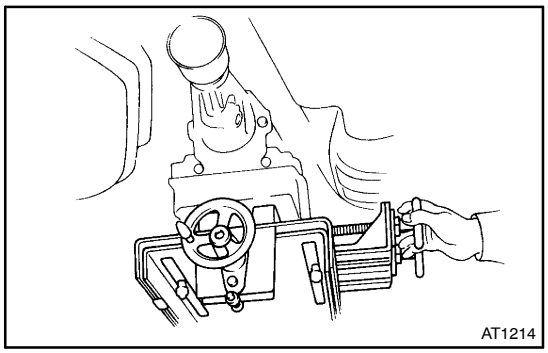
6. **INSTALL PROPELLER SHAFT (See page PR–10)**
7. **INSTALL EXAUST PIPE ASSEMBLY**
   (See page PR–10)
8. **INSTALL NO. 1 REAR FLOOR BOARD**
9. **FILL ATF AND CHECK FLUID LEVEL**
   (See page DI–156)

SENSOR ROTOR

AT0HF–01

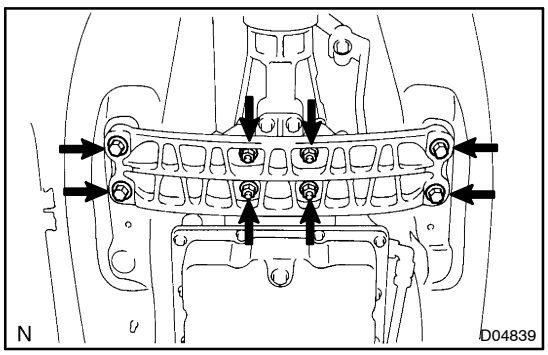
ON–VEHICLE REPAIR

1. RAISE VEHICLE AND POSITION PAN TO CATCH ANY FLUID THAT MAY DRIP
2. REMOVE LH FRONT FLOOR CENTER COVER
3. REMOVE NO. 1 REAR FLOOR BOAD
4. REMOVE EXHAUST PIPE (See page PR–4)
5. REMOVE PROPELLER SHAFT (See page PR–4)
6. REMOVE TRANSMISSION OUTPUT SPEED SENSOR (See page AT–8)



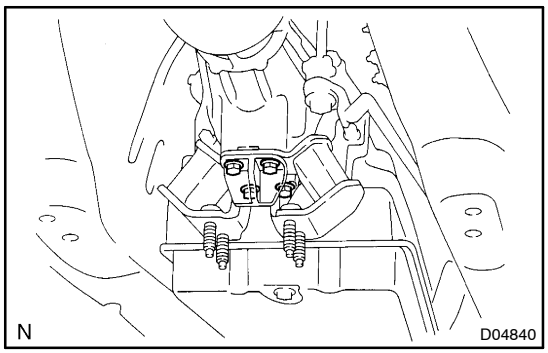
7. JACK UP TRANSMISSION SLIGHTLY

Securely support the transmission on a transmission jack.
Lift the transmission slightly from the rear support member.



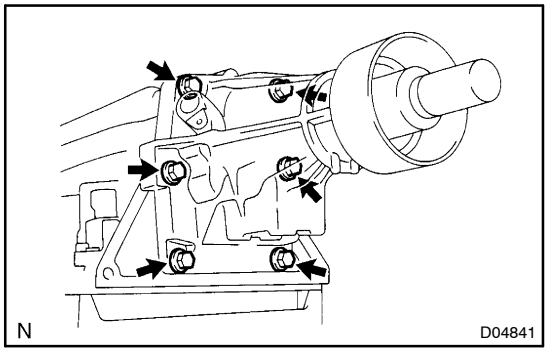
8. REMOVE ENGINE REAR SUPPORT MEMBER

(a) Remove the 4 nuts.
(b) Remove the 4 bolts and rear support member.



9. REMOVE TRANSMISSION MOUNTING BRACKET

Remove the 4 bolts and the transmission mounting bracket from the transmission.



10. REMOVE EXTENSION HOUSING

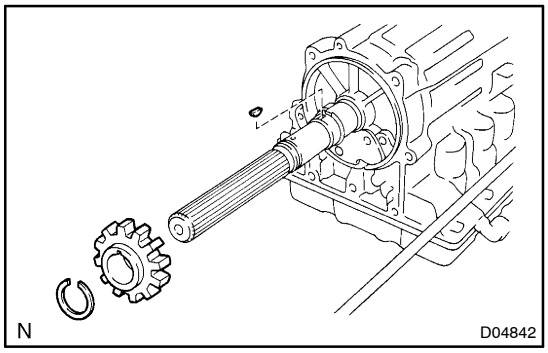
(a) Remove the 6 bolts.

(b) Remove the extension housing.

HINT:

If necessary, tap the extension housing with a plastic hammer.

(c) Remove the extension housing gasket.



11. REMOVE SENSOR ROTOR AND KEY

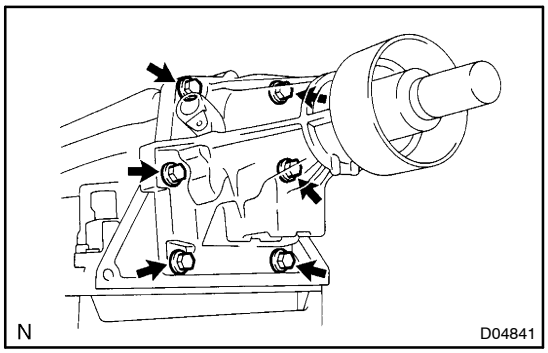
(a) Using a snap ring expander, remove the snap ring.

(b) Remove the sensor rotor and key.

12. INSTALL KEY AND SENSOR ROTOR

(a) Install the key and sensor rotor.

(b) Using a snap ring expander, install a new snap ring.



13. INSTALL EXTENSION HOUSING

(a) Install a new extension housing gasket.

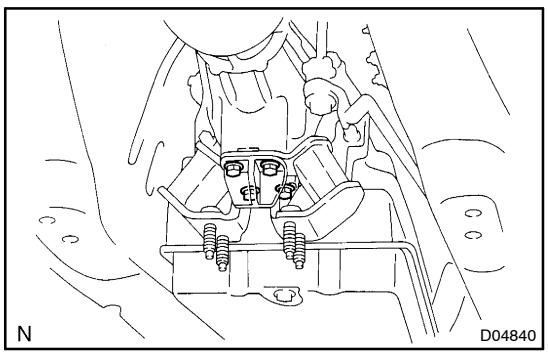
(b) Install the extension housing with the 6 bolts.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

HINT:

Coat the thread of the all bolts with sealant.

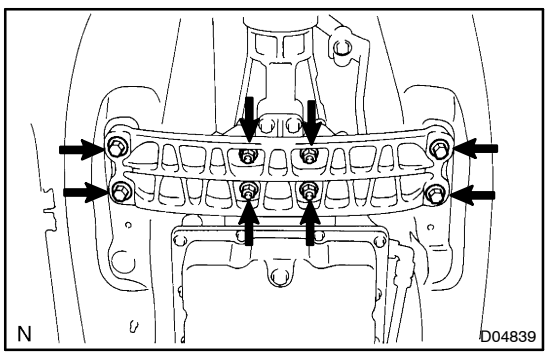
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent



14. INSTALL TRANSMISSION MOUNTING BRACKET

Install the transmission mounting bracket with the 4 bolts to the transmission.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



15. INSTALL ENGINE REAR SUPPORT MEMBER

(a) Install the rear support member with the 4 bolts.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

(b) Install the 4 nuts.

Torque: 14 N·m (135 kgf·cm, 10 ft·lbf)

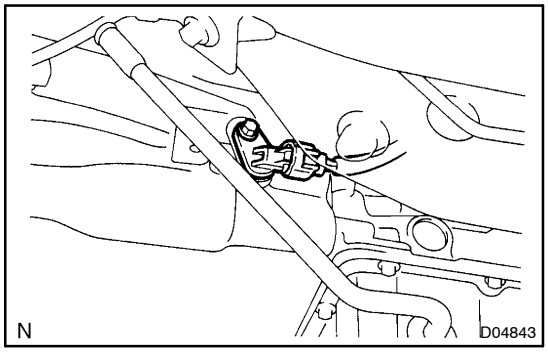
16. REMOVE JACK

17. INSTALL TRANSMISSION OUTPUT SPEED SENSOR (See page AT–8)

18. INSTALL PROPELLER SHAFT (See page PR–10)

19. INSTALL EXHAUST PIPE (See page PR–10)

20. INSTALL NO. 1 REAR FLOOR BOARD
21. FILL ATF AND CHECK FLUID LEVEL
(See page DI–156)



TRANSMISSION INPUT SPEED SENSOR

AT0HG–01

ON–VEHICLE REPAIR

1. DISCONNECT TRANSMISSION INPUT SPEED SENSOR CONNECTOR

2. REMOVE TRANSMISSION INPUT SPEED SENSOR

(a) Remove the bolt and transmission input speed sensor.

(b) Remove the O–ring from transmission input speed sensor.

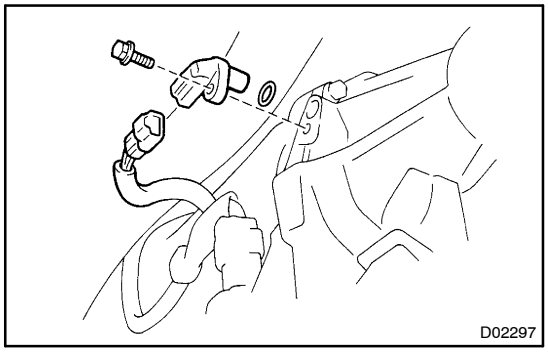
3. INSTALL TRANSMISSION INPUT SPEED SENSOR

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

(b) Install the transmission input speed sensor to the transmission case and torque the bolt.

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

4. CONNECT TRANSMISSION INPUT SPEED SENSOR CONNECTOR



TRANSMISSION OUTPUT SPEED SENSOR

AT0HH–01

ON–VEHICLE REPAIR

1. DISCONNECT TRANSMISSION OUTPUT SPEED SENSOR CONNECTOR

2. REMOVE TRANSMISSION OUTPUT SPEED SENSOR

(a) Remove the bolt and transmission output speed sensor.

(b) Remove the O–ring from the transmission output speed sensor.

3. INSTALL TRANSMISSION OUTPUT SPEED SENSOR

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

(b) Install the transmission output speed sensor to the extension housing and torque the bolt.

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

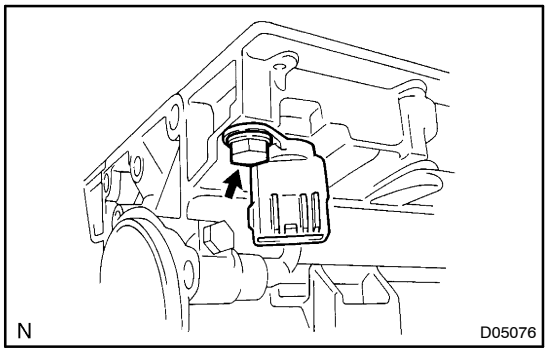
4. CONNECT TRANSMISSION OUTPUT SPEED SENSOR CONNECTOR

ATF TEMPERATURE SENSOR

AT0HI–01

ON–VEHICLE REPAIR

1. REMOVE DRAIN PLUG WITH GASKET AND DRAIN ATF
2. REMOVE OIL PAN AND OIL STRAINER (See page AT–11)
3. REMOVE SOLENOID WIRING WITH ATF TEMPERATURE SENSOR (See page AT–11)



4. REMOVE SOLENOID CONNECTOR

Remove the bolt and pull out the solenoid connector.

5. INSTALL SOLENOID CONNECTOR

Pull in the solenoid connector with the bolt.

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

6. INSTALL SOLENOID WIRING WITH ATF TEMPERATURE SENSOR (See page AT–11)
7. INSTALL OIL STRAINER AND OIL PAN (See page AT–11)
8. INSTALL DRAIN PLUG WITH NEW GASKET

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

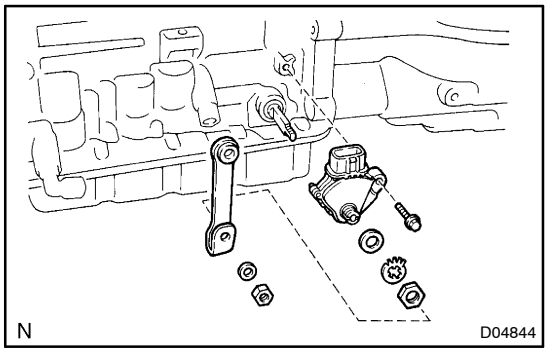
9. FILL ATF AND CHECK FLUID LEVEL (See page DI–156)

NEUTRAL START SWITCH

AT0HJ–01

ON–VEHICLE REPAIR

1. REMOVE EXAUST PIPE (See page PR–4)
2. DISCONNECT NEUTRAL START SWITCH CONNECTOR



3. REMOVE NEUTRAL START SWITCH

(a) Remove the nut and disconnect the control shaft lever.
(b) Pry off the nut stopper.
(c) Remove the nut and lock washer.
(d) Remove the bolt and neutral start switch.

4. INSTALL NEUTRAL START SWITCH

(a) Install the neutral start switch and bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(b) Install a new lock washer and the nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
(c) Stake the nut with the lock washer.
(d) Install the control shaft lever and nut.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)
(e) Connect the control shaft lever.

5. CONNECT NEUTRAL START SWITCH CONNECTOR
6. CHECK NEUTRAL START SWITCH OPERATION

Check that the engine can be started with the shift lever only in the N or P position, but not in the other position.
If not as started above, carry out the adjustment procedure (See page DI–156).

7. INSTALL EXHAUST PIPE (See page PR–10)
8. TEST DRIVE VEHICLE

VALVE BODY ASSEMBLY

AT0HK–01

ON–VEHICLE REPAIR

1. REMOVE DRAIN PLUG AND DRAIN ATF

2. REMOVE OIL PAN

NOTICE:

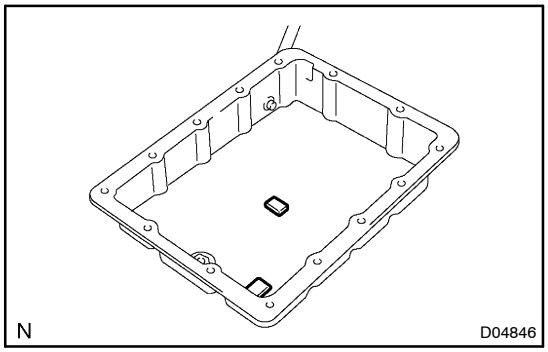
Some fluid will remove in the oil pan.

(a) Remove the 14 bolts.

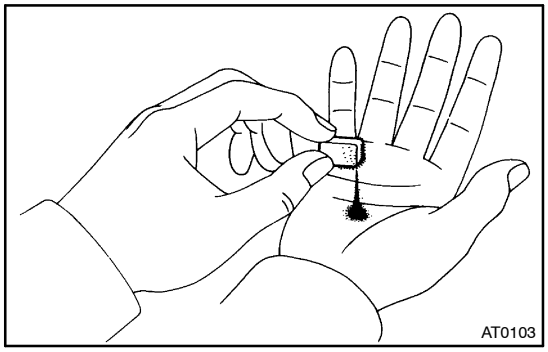
(b) Remove the oil pan and gasket.

NOTICE:

When removing the oil pan, be careful not to damage the oil pan flange.



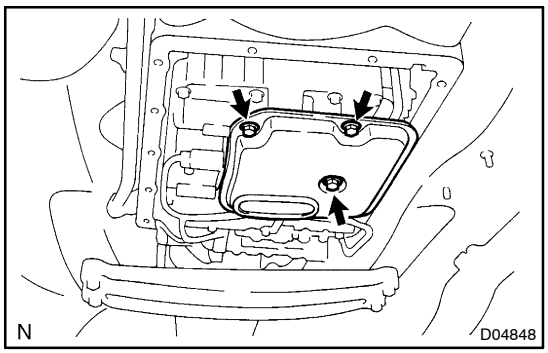
3. REMOVE 2 MAGNETS FROM OIL PAN



4. EXAMINE PARTICLES IN PAN

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

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



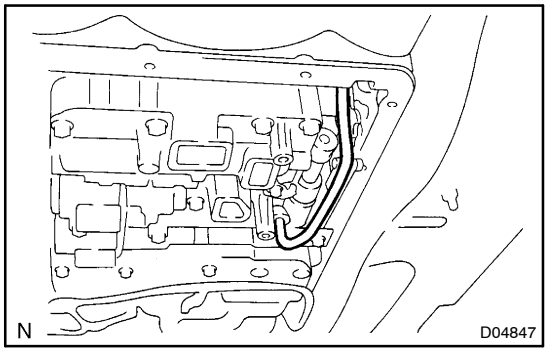
5. REMOVE OIL STRAINER

NOTICE:

Be careful as some fluid will come out of the oil strainer.

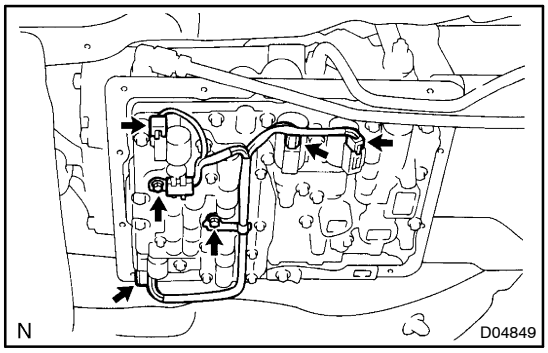
(a) Remove the 3 bolts and oil strainer from the valve body.

(b) Remove the gasket.



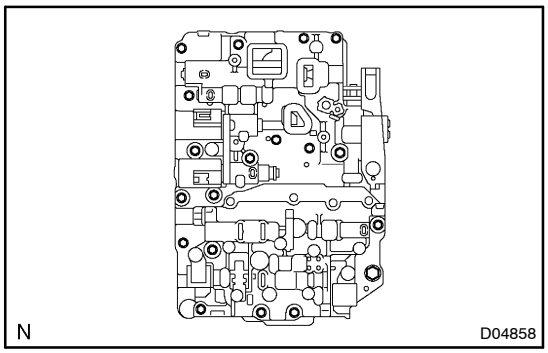
6. REMOVE OIL PIPE

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



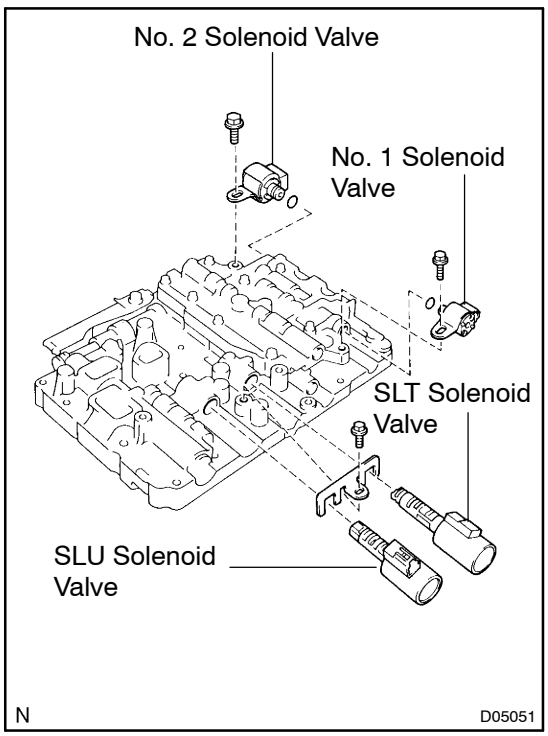
7. REMOVE SOLENOID WIRING WITH ATF TEMPERATURE SENSOR

(a) Remove the bolt and disconnect the ATF temperature sensor.
(b) Remove the bolt and clamp.
(c) Disconnect the 4 connectors from the solenoid.



8. REMOVE VALVE BODY

(a) Remove the 17 bolts.
(b) Remove the valve body.

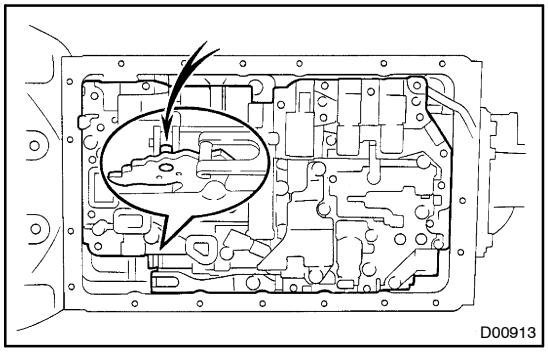


9. REMOVE SOLENOID VALVE

(a) Remove the 2 bolts and No. 1 solenoid valve and No. 2.
(b) Remove the 2 O–rings from each solenoid valve.
(c) Remove the bolt, lock plate and SLU solenoid valve and SLT.

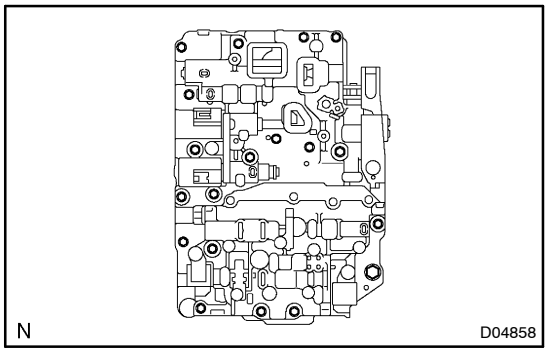
10. INSTALL SOLENOID VALVE

(a) Install the SLU solenoid valve and SLT and lock plate with the bolt.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
(b) Coat 2 new O–rings with ATF.
(c) Install the 2 O–rings to the each solenoid valve.
(d) Install the No. 1 solenoid valve and No. 2 with the 2 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

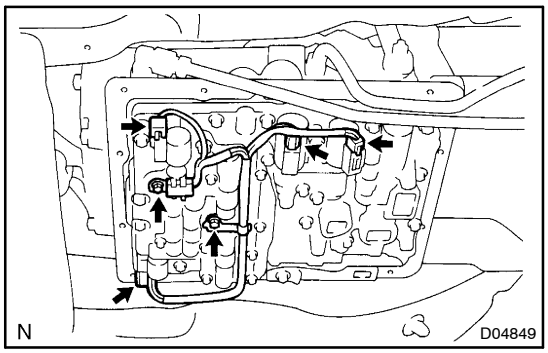


11. INSTALL VALVE BODY

(a) Align the groove of the manual valve to pin of the lever.

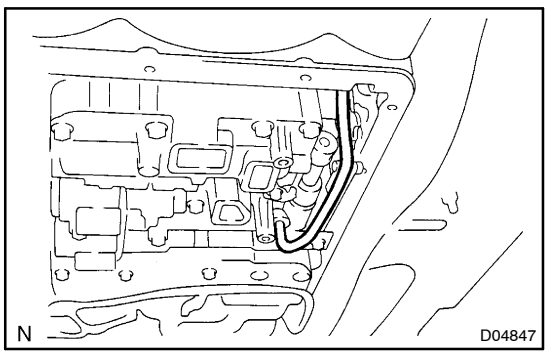


(b) Install the valve body with the 17 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

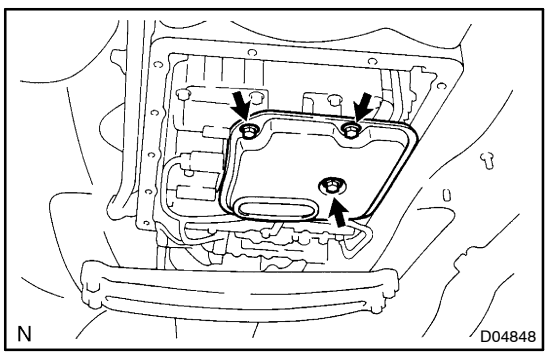


12. INSTALL SOLENOID WIRING WITH ATF TEMPERATURE SENSOR

(a) Connect the 4 connectors to the solenoid.
(b) Install the clamp and bolt.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
(c) Install the TAF temperature sensor with the bolt.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

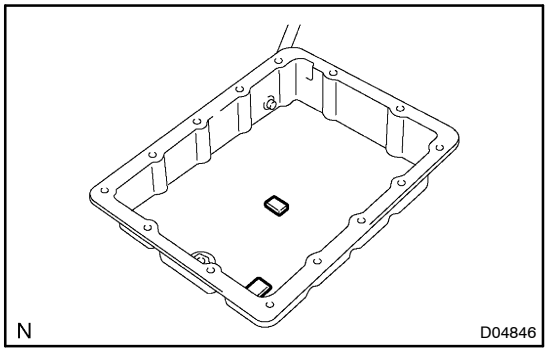


13. INSTALL OIL PIPE



14. INSTALL OIL STRAINER

(a) Install the gasket.
(b) Install the oil strainer with the 3 bolts to the valve body.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



15. INSTALL 2 MAGNETS TO OIL PAN

16. INSTALL OIL PAN

Install the new gasket and oil pan with the 14 bolts.

Torque: 4.4 N·m (45 kgf·cm, 39 in.·lbf)

17. INSTALL DRAIN PLUG WITH NEW GASKET

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

18. FILL ATF AND CHECK FLUID LEVEL

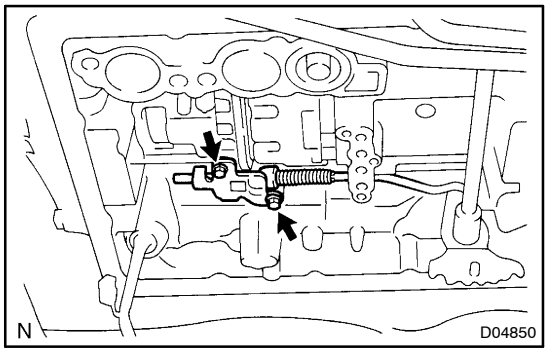
(See page DI–156)

PARKING LOCK PAWL

AT0HL–01

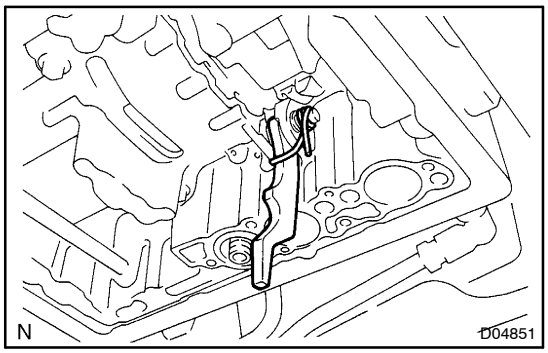
ON–VEHICLE REPAIR

1. **REMOVE VALVE BODY (See page AT–11)**



2. **REMOVE PARKING LOCK PAWL BRACKET**

Remove the 2 bolts and parking lock pawl bracket.



3. **REMOVE SPRING FROM PARKING LOCK PAWL SHAFT**
4. **REMOVE PARKING LOCK PAWL SHAFT AND PARKING LOCK PAWL**
5. **INSTALL PARKING LOCK PAWL AND PARKING LOCK PAWL SHAFT**
6. **INSTALL SPRING TO PARKING LOCK PAWL SHAFT**
7. **INSTALL PARKING LOCK PAWL BRACKET**

Install the parking lock pawl bracket with the 2 bolts.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

HINT:

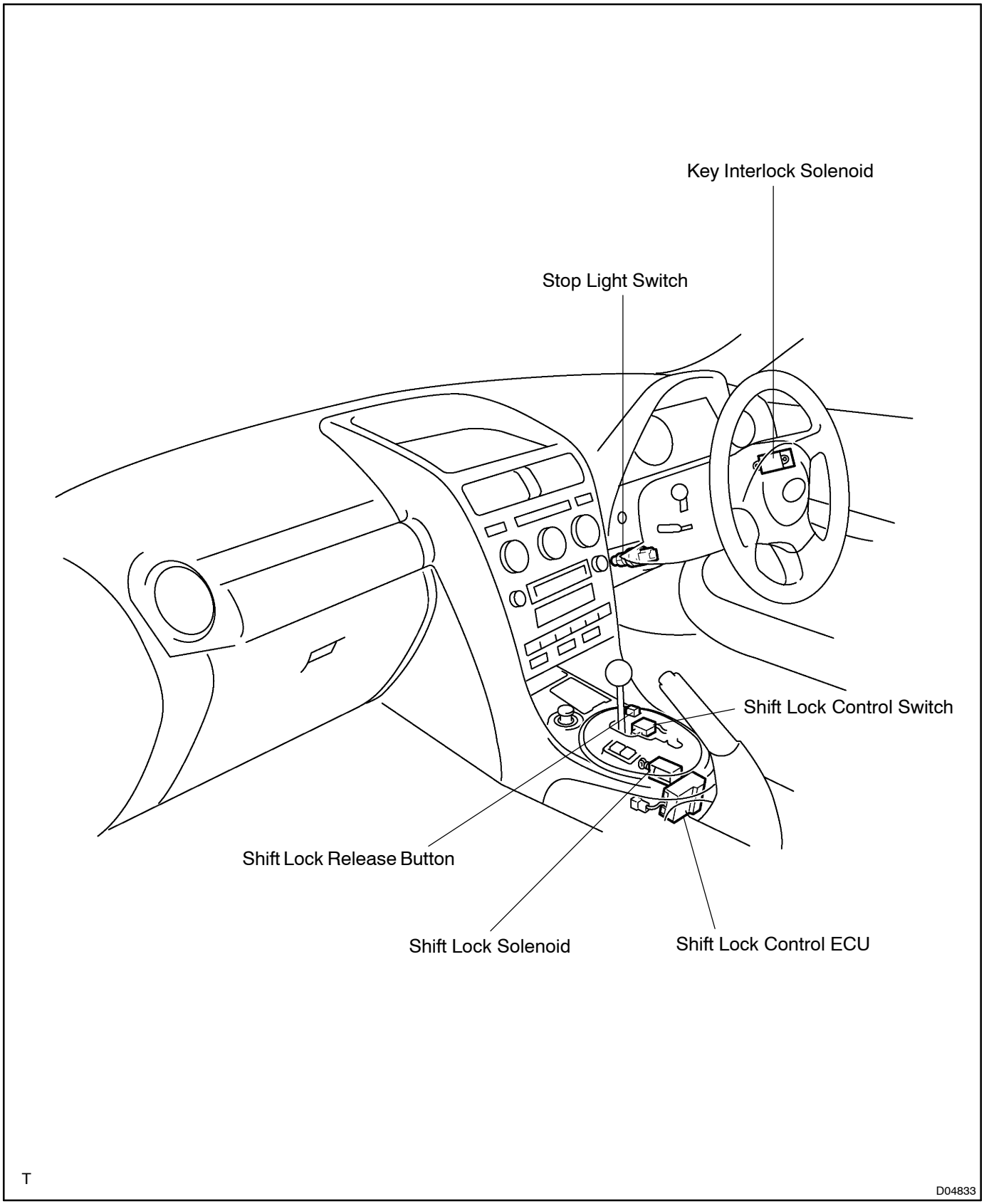
- Push the lock rod fully forward.
- Check that the parking lock pawl operates smoothly.

8. **INSTALL VALVE BODY (See page AT–11)**

SHIFT LOCK SYSTEM

LOCATION

AT0HM–01



AT0HN–01

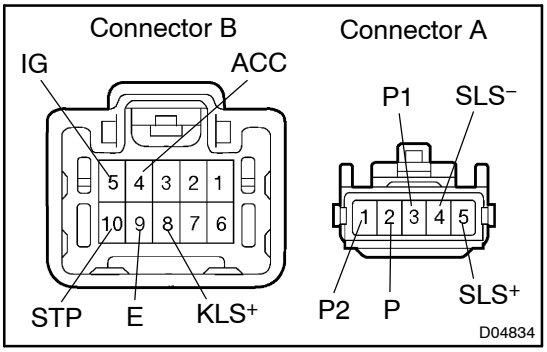
INSPECTION

1. INSPECT SHIFT LOCK CONTROL ECU

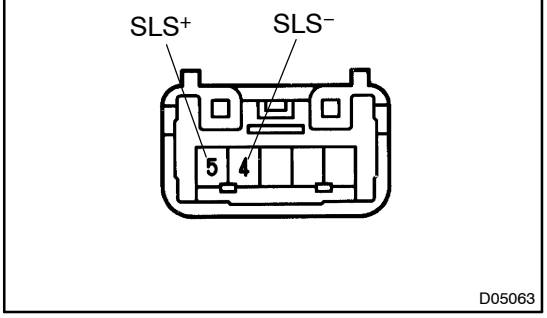
Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the shift lock control ECU connector.



Terminal	Measuring condition	Voltage (V)
B4 – B9 (ACC – E)	Ignition switch ACC	10 – 14
B5 – B9 (IG – E)	Ignition switch ON	10 – 14
B8 – B9 (KLS+ – E)	1. Ignition switch ACC and P range 2. Ignition switch ACC and except P range 3. Ignition switch ACC and except P range (After approx. 1 second)	0 7.5 – 11.5 6 – 9
B10 – B9 (STP – E)	Depressing brake pedal	10 – 14
A5 – A4 (SLS+ – SLS–)	1. Ignition switch ON and P range 2. Depress brake pedal 3. Depress brake pedal (After approx. 1 second) 4. Shift between P and N range under conditions above 5. Shift D range under conditions above	0 8 – 15 6 – 11 6 – 11 0
A3 – A2 (P1 – P)	1. Ignition switch ON, P range and depress brake pedal 2. Shift except P range under condition above	0 12
A1 – A2 (P2 – P)	1. Ignition switch ON, P range and depress brake pedal 2. Shift except P range under conditions above	12 0



2. INSPECT SHIFT LOCK SOLENOID

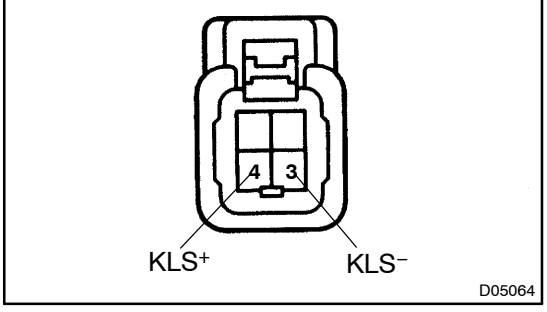
(a) Disconnect the solenoid connector.

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

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

(c) Check the solenoid operating sound when connecting the battery positive terminal to 5 (SLS+) and battery negative terminal to 4 (SLS–).

If the solenoid does not operate, replace the solenoid.



3. INSPECT KEY INTERLOCK SOLENOID

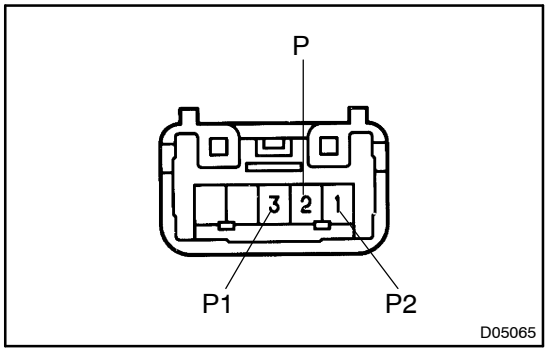
(a) Disconnect the solenoid connector.

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

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

(c) Check the solenoid operating sound when connecting the battery positive terminal to 4 (KLS+) and battery negative terminal to 3 (KLS–).

If the solenoid does not operate, replace the solenoid.



4. INSPACT SHIFT LOCK CONTROL SWITCH

(a) Disconnect the shift lock control switch.

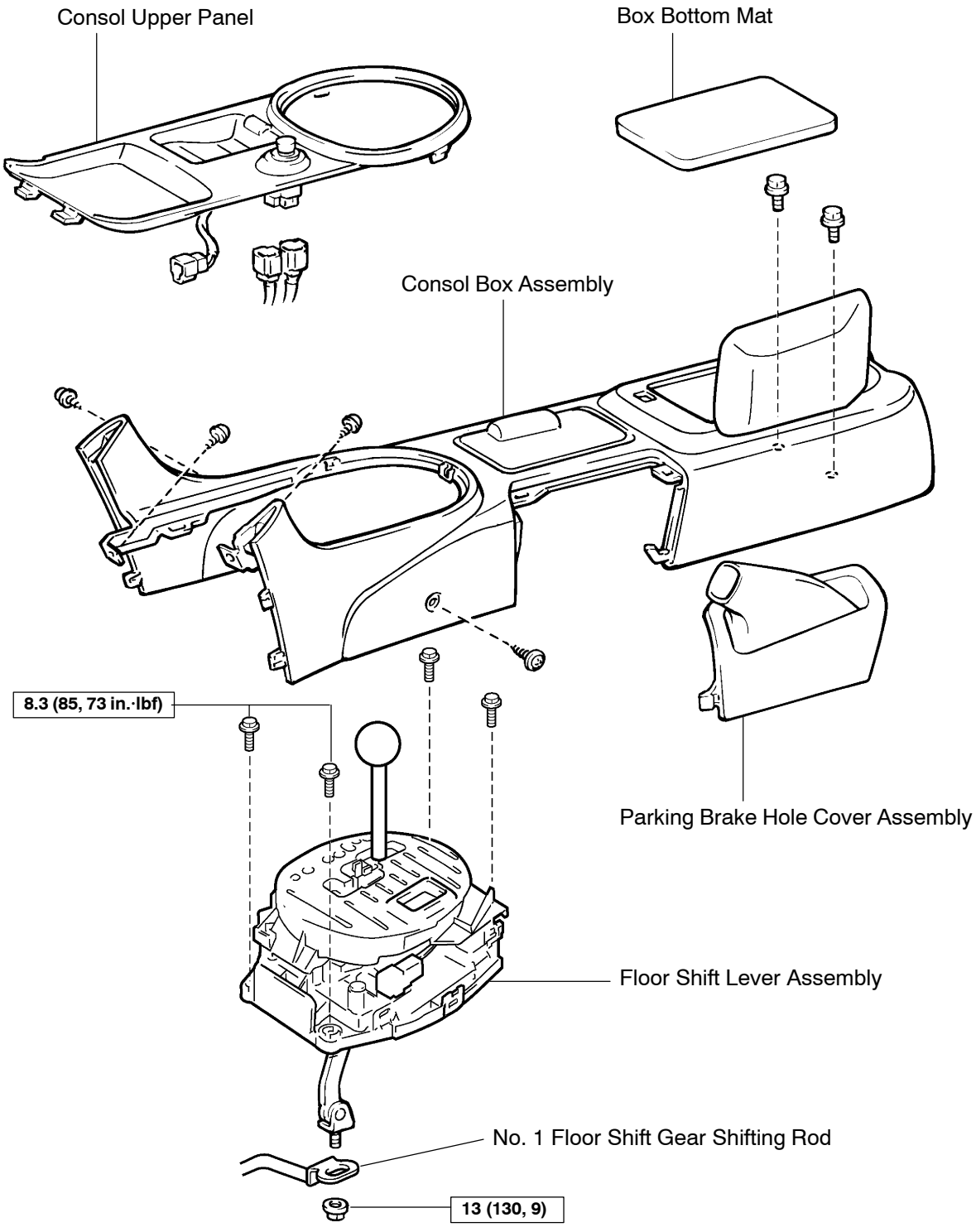
(b) Inspect that continuity exists between each terminal.

Shift range	Terminal condition to terminal number	Specified value
P range (Release button is not pushed)	P – P1	Continuity
P range (Release button is pushed)	P – P1 P – P2	Continuity
Except P range	P – P2	Continuity

FLOOR SHIFT ASSEMBLY

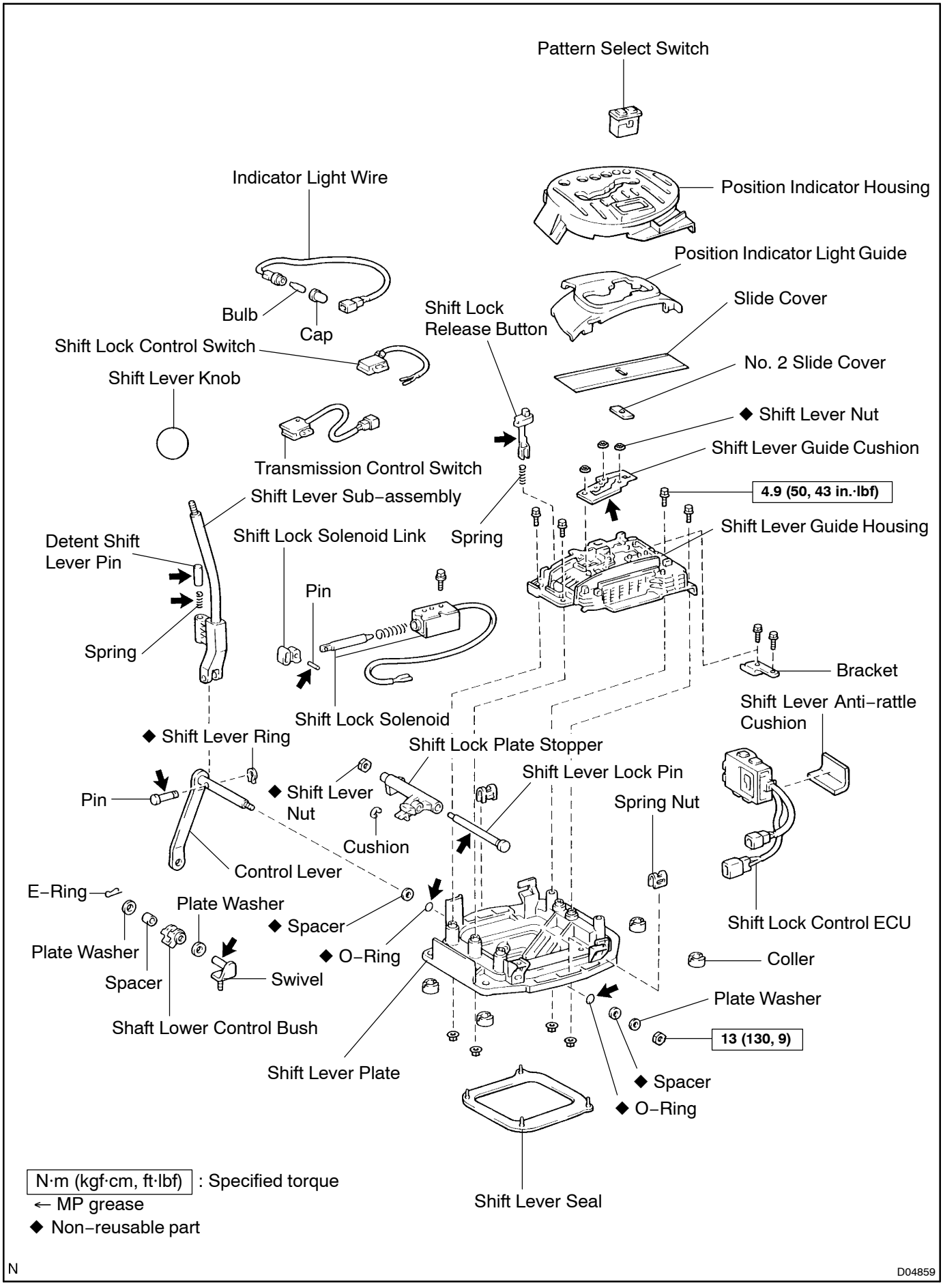
COMPONENTS

AT0HO–01



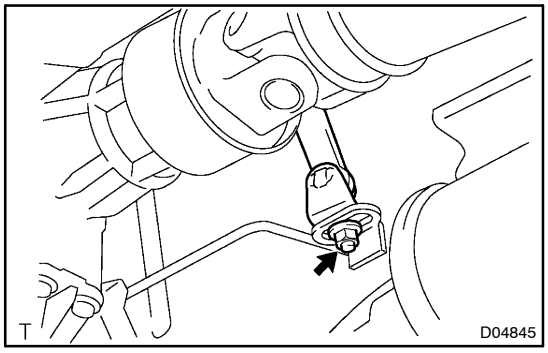
N·m (kgf·cm, ft·lbf) : Specified torque
T

D04835


Pattern Select Switch
Indicator Light Wire
Position Indicator Housing
Position Indicator Light Guide
Bulb
Cap
Shift Lock Release Button
Slide Cover
Shift Lock Control Switch
No. 2 Slide Cover
Shift Lever Knob
◆ Shift Lever Nut
Transmission Control Switch
Shift Lever Guide Cushion
4.9 (50, 43 in.·lbf)
Shift Lever Sub–assembly
Spring
Shift Lever Guide Housing
Detent Shift Lever Pin
Shift Lock Solenoid Link
Pin
Spring
Bracket
Shift Lock Solenoid
Shift Lever Anti–rattle Cushion
◆ Shift Lever Ring
Shift Lock Plate Stopper
Shift Lever Lock Pin
Pin
◆ Shift Lever Nut
Spring Nut
Cushion
Control Lever
E–Ring
Plate Washer
◆ Spacer
Shift Lock Control ECU
Plate Washer
◆ O–Ring
Coller
Spacer
Swivel
Plate Washer
Shaft Lower Control Bush
13 (130, 9)
Shift Lever Plate
◆ Spacer
◆ O–Ring
Shift Lever Seal
N·m (kgf·cm, ft·lbf) : Specified torque
← MP grease
◆ Non–reusable part
N
D04859

AT0HP-01

REMOVAL



1. SEPARATE NO. 1 FLOOR SHIFT GEAR SHIFTING ROD

(a) Shift into the N range.

(b) Remove the nut and separate the No. 1 floor shift gear shifting rod from the connecting rod swivel.

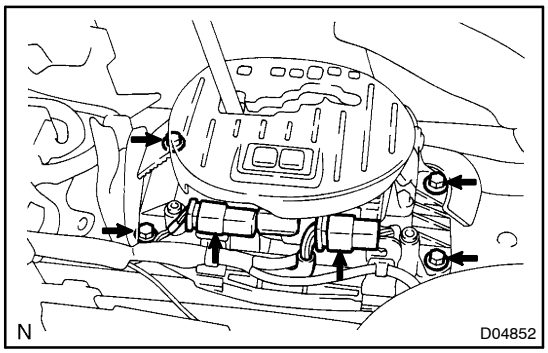
2. REMOVE CONSOLE BOX ASSEMBLY
(See page BO–96)

(a) Remove the console upper panel.

(b) Remove the box bottom mat.

(c) Remove the parking brake hole cover assembly.

(d) Remove the console box assembly.



3. REMOVE FLOOR SHIFT LEVER ASSEMBLY

(a) Remove the 4 bolts.

(b) Disconnect the 2 connectors.

(c) Remove the floor shift lever assembly.

AT0HQ–01

DISASSEMBLY

1. REMOVE SHIFT LEVER KNOB

2. REMOVE POSITION INDICATOR HOUSING

(a) Disconnect the pattern select switch connector.

(b) Remove the position indicator housing assembly.

(c) Remove the pattern select switch from the position indicator housing.

3. REMOVE POSITION INDICATOR LIGHT GUIDE

(a) Disconnect the indicator light wire from the position indicator light guide.

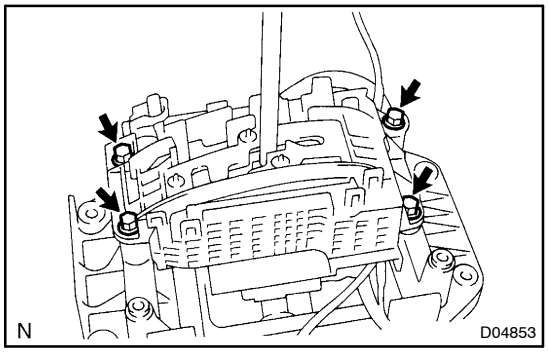
(b) Remove the position indicator light guide.

4. REMOVE SLIDE COVER AND NO. 2 SLIDE COVER

5. REMOVE SHIFT LEVER GUIDE HOUSING

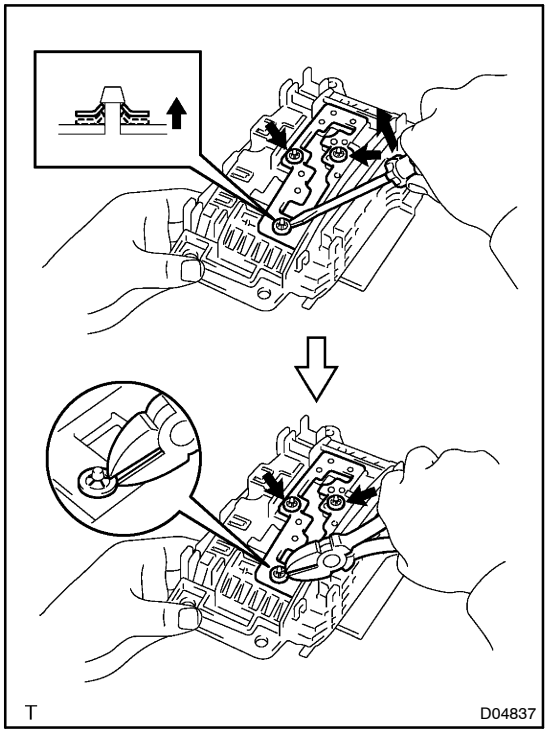
(a) Disconnect the shift lock control ECU connector and indicator light wire from the shift lever plate.

(b) Remove the transmission control switch and shift lock control switch from the shift lever guide housing.



(c) Remove the 4 bolts, nuts and shift lever guide housing assembly.

(d) Remove the bulb and cap and from the indicator light wire.



6. DISASSEMBLE SHIFT LEVER GUIDE HOUSING

(a) Using a screwdriver, ply and push up 3 shift lever nuts.

(b) Using nippers, cut the 3 shift lever nuts off then.

HINT:

Remove the shift lever lock pin of shift lever nut in the same way.

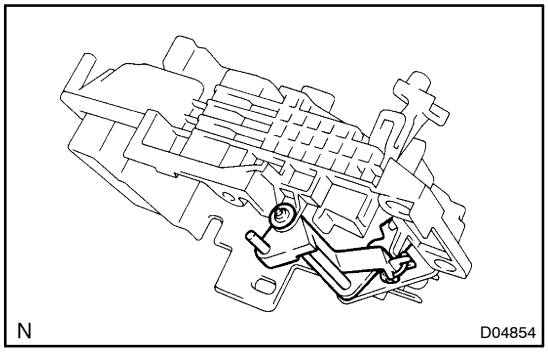
(c) Remove the shift lever guide cushion.

(d) Remove the 3 screws, shift lock control ECU and shift lock solenoid.

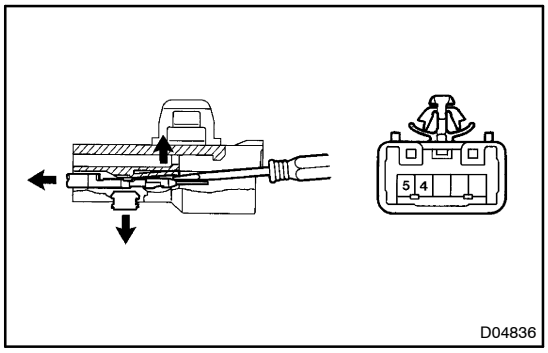
(e) Remove the shift lock control ECU bracket and shift lever anti–rattle cushion from the shift lock control ECU.

(f) Disconnect the transmission control switch connector from the shift lever guide housing.

(g) Remove the shift lock release button and spring.



(h) Remove the shift lever lock pin, shift lock plate stopper and cushion.



7. DISCONNECT SHIFT LOCK CONTROL ECU, SHIFT LOCK SOLENOID, SHIFT LOCK CONTROL SWITCH AND TRANSMISSION CONTROL SWITCH

(a) Disengage the secondary locking device of shift lock solenoid.

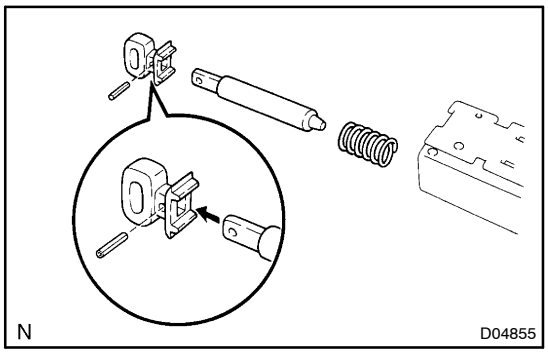
(b) Release the locking lug of the terminals 4 and 5, and pull the terminals out from the rear.

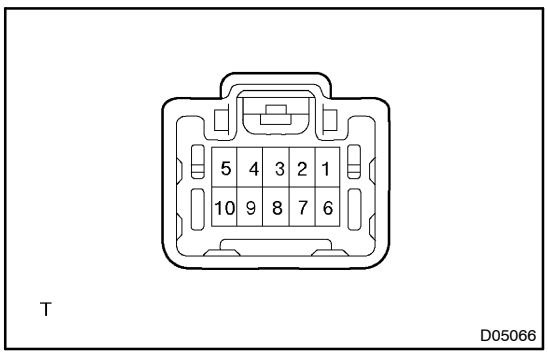
HINT:

Remove the transmission control switch in the same way.

(c) Remove the shift lock solenoid.

(d) Using 2 mm dia. steel wire, remove the pin the remove the shift lock solenoid linkfrom the shift lock solenoid plunger.

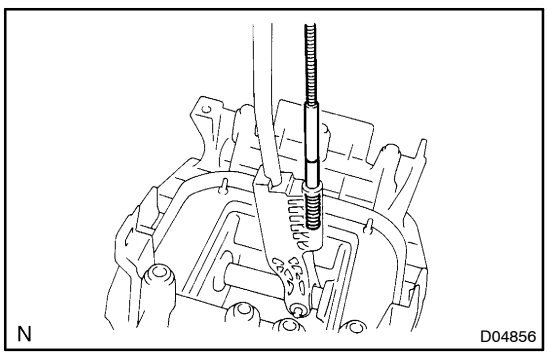




(e) Disengage the secondary locking device of shift lock solenoid.

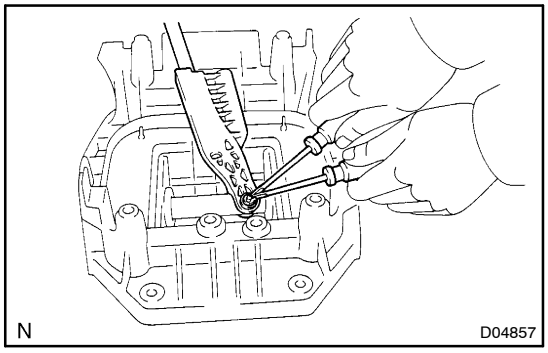
(f) Release the locking lag of the terminals 1 and 6, and pull the terminals out from the rear.

(g) Remove the transmission control switch.

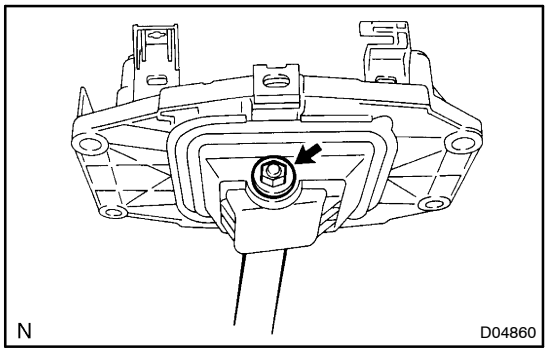


8. REMOVE SHIFT LEVER SUB–ASSEMBLY

(a) Using a magnetic finger, remove the detent shift lever pin and spring.

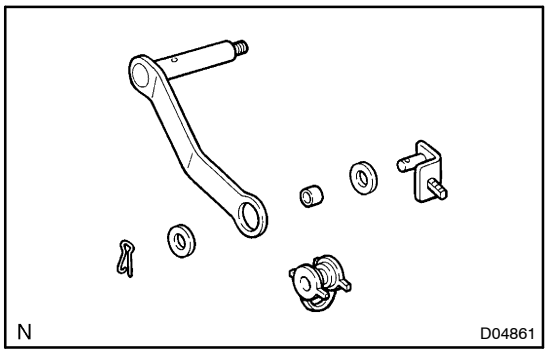


(b) Using 2 screwdrivers, remove the shift lever ring.
(c) Remove the pin and shift lever sub–assembly.



9. DISASSEMBLE SHIFT LEVER PLATE

(a) Remove the nut, control lever, plate washer, 2 spacers and 2 O–ring.



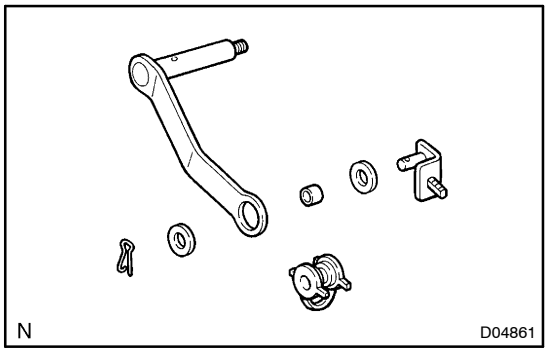
(b) Using pliers, remove the E–ring.
(c) Remove the swivel, 2 plate washer, shaft lower control bush and spacer.
(d) Remove the shift lever seal.
(e) Remove the 4 collars.
(f) Remove the 2 spring nuts.

AT0HR–01

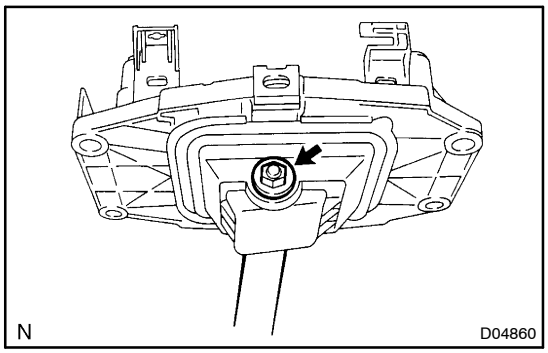
REASSEMBLY

1. REASSEMBLE SHIFT LEVER PLATE

(a) Install the 2 spring nuts.
(b) Install the 4 collars.
(c) Install the shift lever seal.



(d) Install the shaft lower control bush, spacer, 2 plate washers and swivel.
(e) Using pliers, install the E–ring.

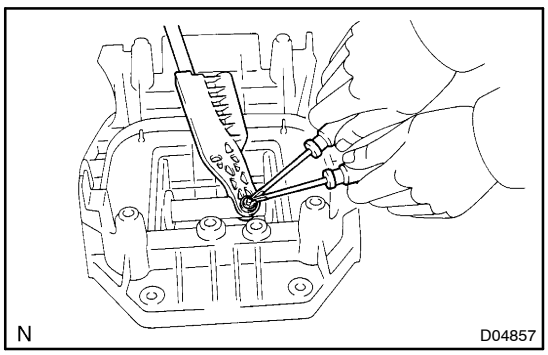


(f) Apply MP grease to the new 2 O–rings.
(g) Install the 2 O–rings, 2 new spacers, plate washer, control lever and nut.

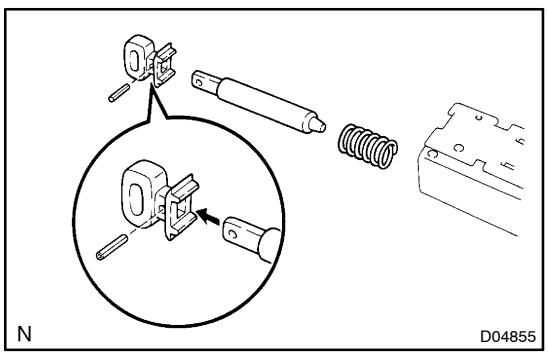
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

2. INSTALL SHIFT LEVER SUB–ASSEMBLY

(a) Apply MP grease to the pin.
(b) Install the shift lever sub–assembly and pin.



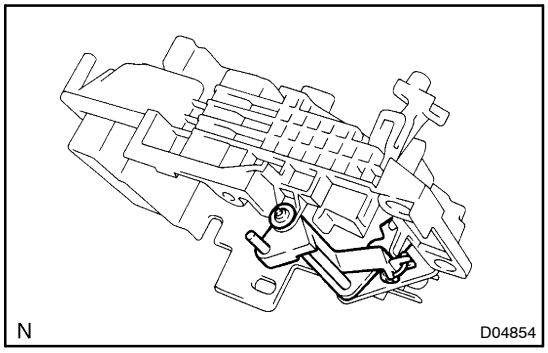
(c) Using 2 screwdriver, install the shift lever ring.
(d) Apply MP grease to the detent shift lever pin and spring.
(e) Install the detent shift lever pin and spring.



3. REASSEMBLE SHIFT LOCK SOLENOID

(a) Apply MP grease to the shift lock solenoid link.
(b) Install the shift lock solenoid link and pin to the shift lock solenoid plunger.
(c) Install the shift lock solenoid link with shift lock solenoid plunger and spring to the shift lock solenoid.

4. CONNECT SHIFT LOCK CONTROL ECU, SHIFT LOCK SOLENOID, SHIFT LOCK CONTROL SWITCH AND TRNSMISSION CONTROL SWITCH



5. RASSEMBLE SHIFT LEVER GUIDE HOUSING

(a) Apply MP grease to the shift lever lock pin.

(b) Install the shift lever lock pin, shift lock plate stopper and cushion to the shift lever guide housing.

(c) Install the new shift lever nut to the shift lever lock pin by knocking them lightly ria the 10 mm seated nut.

HINT:

Install the shift lever guide cushion of the shift lever nut in the same way.

(d) Apply MP grease to the shift lock release button.

(e) Install the spring and shift lock release button.

(f) Connect the transmission control switch connector to the shift lever guide housing.

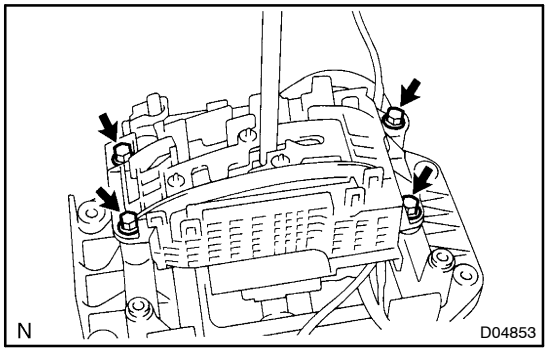
(g) Install the shift lock control ECU bracket and shift lever anti–rattle cushion to the shift lock control ECU.

(h) Install the shift lock control ECU and shift lock solenoid with the 3 screws to the shift lever guide housing.

(i) Install the shift lever guide cushion with new 3 shift lever nuts.

6. INSTALL SHIFT LEVER GUIDE HOUSING

(a) Install the bulb and cap to the indicator light wire.



(b) Install the shift lever guide housing assembly with the 4 bolts and nuts to the shift lever plate.

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

(c) Install the transmission control switch and shift lock control switch to the shift lever guide housing.

(d) Connect the shift lock control ECU and indicator light wire connector to the shift lever plate.

7. INSTALL SLIDE COVER AND NO. 2 SLIDE COVER

8. INSTALL POSITION INDICATOR LIGHT GUIDE

(a) Install the position indicator light guide.

(b) Connect the indicator light wire to the position indicator light guide.

9. INSTALL POSITION INDICATOR HOUSING

(a) Install the pattern select switch to the position indicator housing.

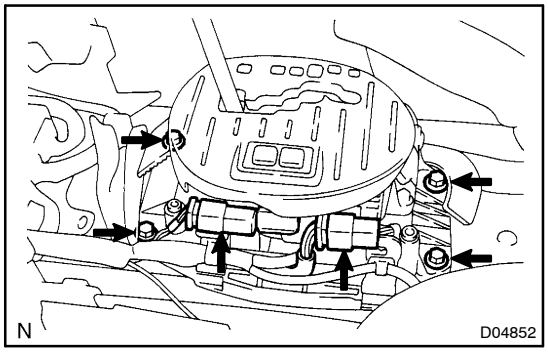
(b) Install the position indicator housing.

(c) Connect the pattern select switch connector.

10. INSTALL SHIFT LEVER KNOB

AT0HS–01

INSTALLATION



1. INSTALL FLOOR SHIFT LEVER ASSEMBLY

(a) Connect the 2 connectors to the floor shift lever assembly.

(b) Install the floor shift lever assembly with the 4 bolts.

Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

2. INSTALL CONSOLE BOX ASSEMBLY

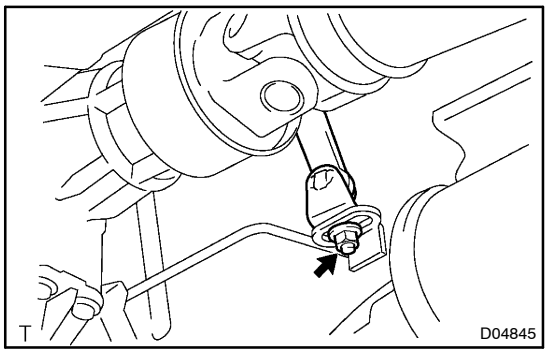
(See page BO–104)

(a) Install the console box assembly.

(b) Install the parking brake hole cover assembly.

(c) Install the box bottom mat.

(d) Install the console upper panel.



3. INSTALL NO. 1 FLOOR SHIFT GEAR SHIFTING ROD

(a) Shift into the N range.

(b) Connect the No. 1 floor shift gear shifting rod and connecting rod swivel with the nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

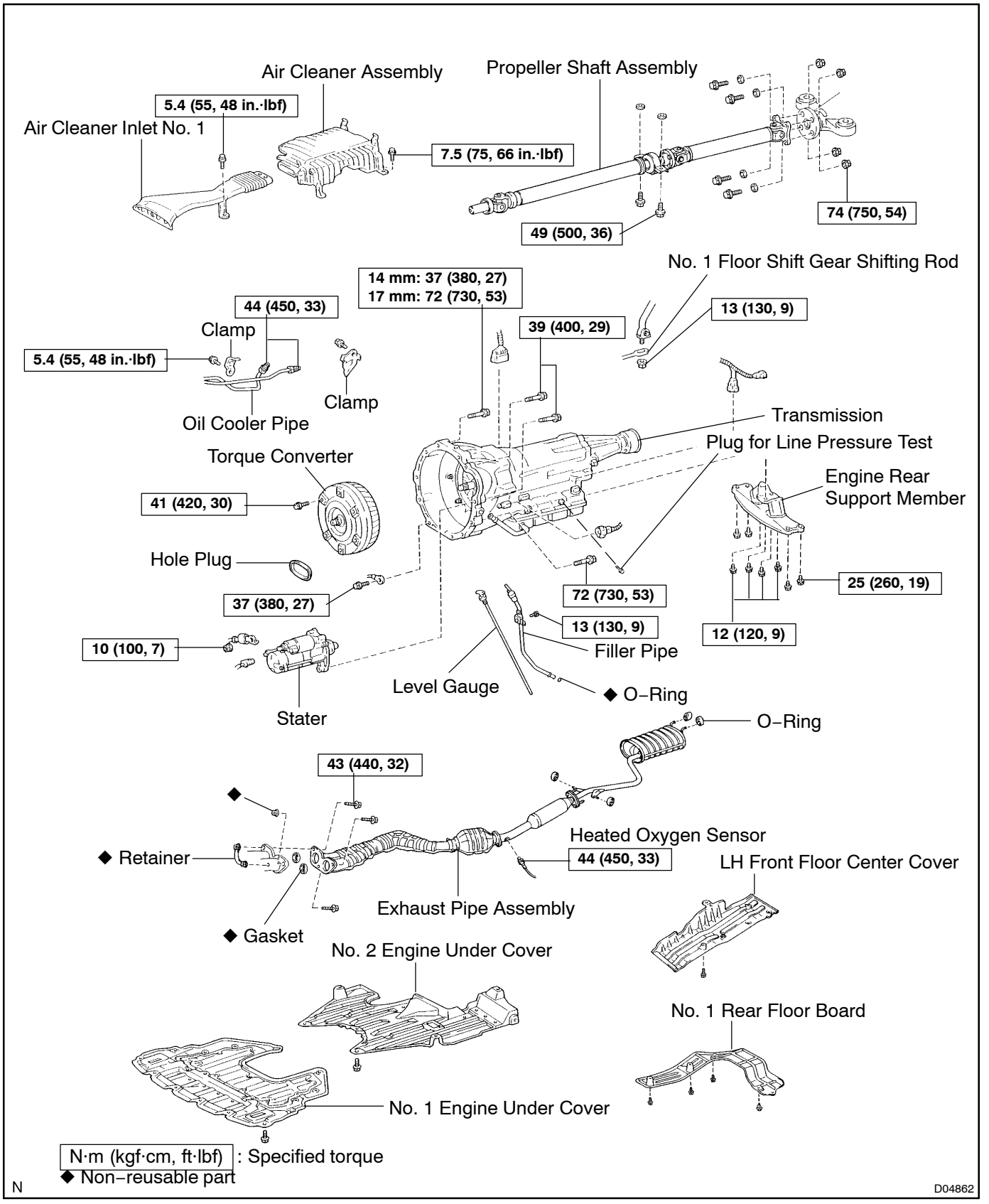
4. CHECK SHIFTING LEVER POSITION

(See page DI–156)

AUTOMATIC TRANSMISSION UNIT

COMPONENTS

AT0HT–01



AT0HU–01

REMOVAL

1. REMOVE AIR CLEANER INLET NO. 1
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

2. REMOVE AIR CLEANER ASSEMBLY
Torque: 7.5 N·m (75 kgf·cm, 66 in.·lbf)

3. REMOVE NO. 1, NO. 2 ENGINE UNDER COVERS

4. REMOVE LH FRONT FLOOR CENTER COVER

5. REMOVE NO. 1 REAR FLOOR BOARD

6. REMOVE LEVEL GAUGE

7. REMOVE FILLER PIPE

Remove the bolt and filler pipe.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

8. REMOVE EXHAUST PIPE ASSEMBLY
(See page PR–4)

9. REMOVE PROPELLER SHAFT ASSEMBLY
(See page PR–4)

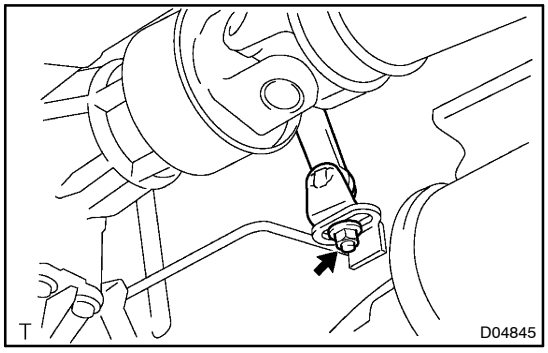
10. DISCONNECT OIL COOLER PIPE

(a) Loosen the 2 union nuts.
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

NOTICE:
Be careful not to damage the oil cooler pipe.

(b) Remove the bolt and clamp.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) Disconnect the 2 oil cooler pipes from the transmission.

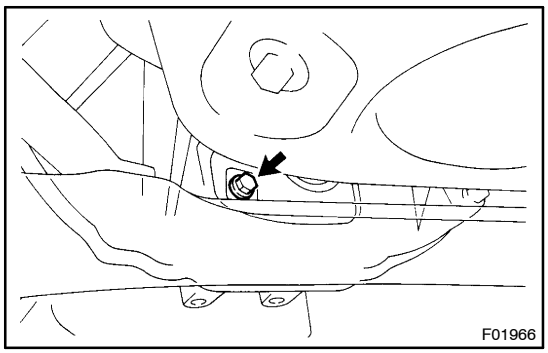


11. SEPARATE NO. 1 FLOOR SHIFT GEAR SHIFTING ROD

Remove the nut and separate the No. 1 floor shift gear shifting rod.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

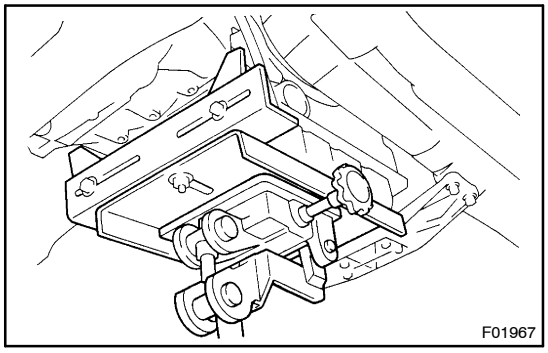
12. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT

(a) Remove the hole flug.

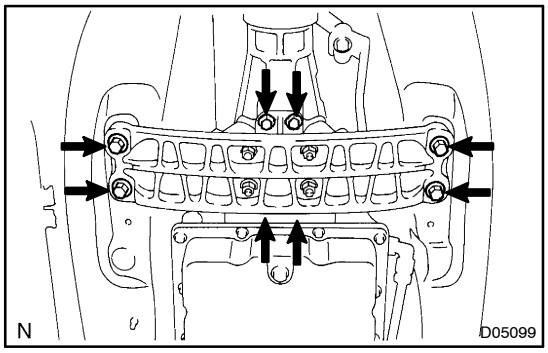


(b) Turn the crankshaft to gain access and remove the 6 bolts with holding the crankshaft pulley set bolt with a wrench.
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

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

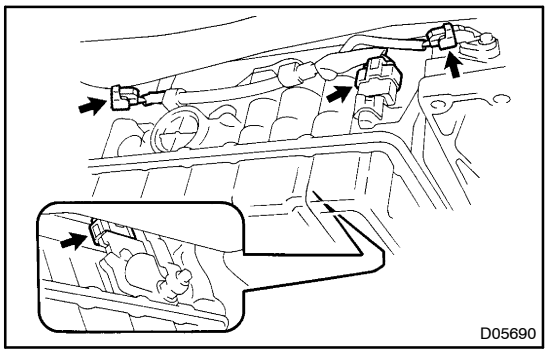


13. SUPPORT TRANSMISSION WITH JACK

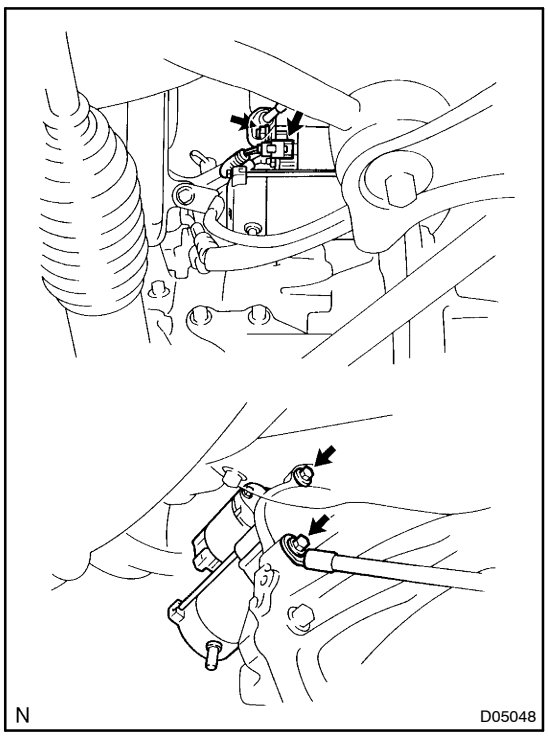


14. REMOVE 4 ENGINE REAR SUPPORT MEMBER BOLTS
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

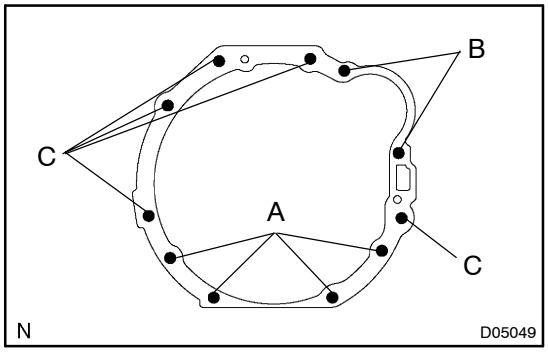
15. REMOVE 4 TRANSMISSION MOUNTING BRACKET BOLTS
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



16. DISCONNECT CONNECTORS AND CLAMPS
(a) Tilt down the transmission.
(b) Disconnect the O/D direct clutch speed sensor connector.
(c) Disconnect the speed sensor connector.
(d) Disconnect the neutral start switch connector.
(e) Disconnect the solenoid connector.
(f) Disconnect the wire harness clamp from the bracket on transmission.



17. REMOVE STARTER
(a) Disconnect the connector and remove the nut.
(b) Remove the 2 bolts and starter.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



18. REMOVE TRANSMISSION

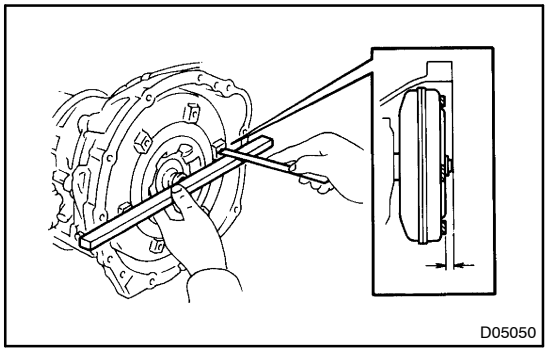
Remove the 11 bolts and transmission.

Torque:

Bolt A: 37 N·m (380 kgf·cm, 27 ft·lbf)

Bolt B: 39 N·m (400 kgf·cm, 29 ft·lbf)

Bolt C: 72 N·m (730 kgf·cm, 53 ft·lbf)



AT0HV–01

INSTALLATION

1. CHECK TORQUE CONVERTER INSTALLATION

Using calipers and a straight edge, measure the distance from the installation surface of the transmission housing to the installation surface of the torque converter.

Correct distance: More than 26.05 mm (1.0256 in.)

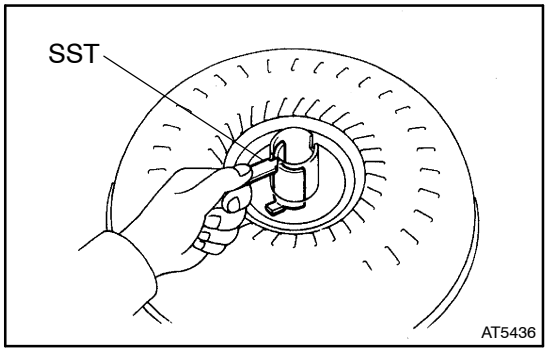
2. INSTALL TRANSMISSION

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

HINT:

After installation, check, inspect and adjust the following items.

- Shift lever position and neutral start switch (See page DI–1556)
- Fluid level (See page DI–1556)
- Conduct the road test of the vehicle



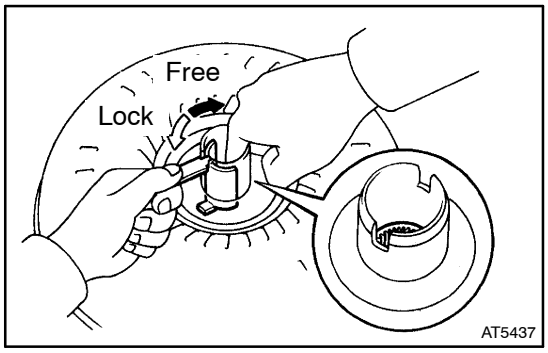
TORQUE CONVERTER AND DRIVE PLATE

AT0HW–01

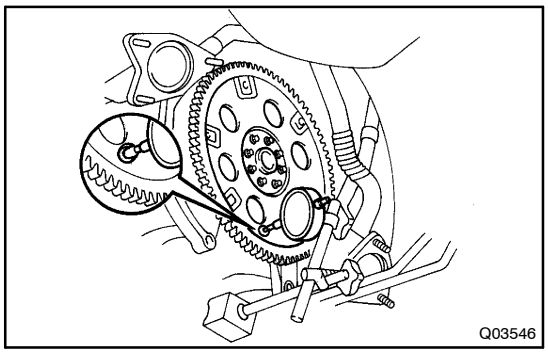
INSPECTION

1. INSPECT ONE–WAY CLUTCH

(a) Install SST so that it fits in the notch of the converter hub and outer race of the one–way clutch.
SST 09350–30020 (09350–32020)



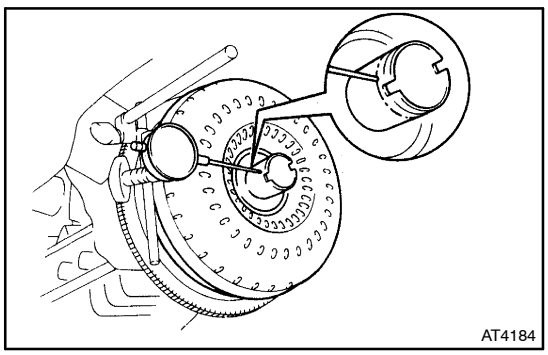
(b) Press on the serrations of stator with a finger and rotate it.
Check if it rotates smoothly when turned clockwise and locks up when turned counterclockwise.



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 the specification or ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tighten the bolts.
Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



3. MEASURE TORQUE CONVERTER SLEEVE RUNOUT

(a) Temporarily mount the torque converter to the drive plate. Set up a dial indicator and measure the torque converter 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 torque converter.
If excessive runout cannot be corrected, replace the torque converter.
HINT:
Mark the position of the torque converter to ensure correct installation.
(b) Remove the torque converter.

BODY ELECTRICAL SYSTEM

PRECAUTION

BE01I–08

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 IS200 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.

TROUBLESHOOTING

BE16S–01

PROBLEM SYMPTOMS TABLE

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Ignition Switch:

Symptom	Suspect Area	See page
Ignition switch is not set to each position.	1. Ignition switch 2. Power source circuit	BE–23 –

Key Unlock Warning Switch:

Symptom	Suspect Area	See page
Key unlock warning system does not operate. (The buzzer sounds when the ignition key is ACC or ON)	1. Ignition Switch 2. Key Unlock Warning Switch 3. Wire Harness 4. Body ECU 5. Combination Meter	BE–23 BE–23 – – –

HEADLIGHT AND TAILLIGHT SYSTEM:

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
”Automatic light control system” does not operate.	1. Automatic Light Control Sensor 2. Light Control Switch 3. Door Courtesy Switch 4. Wire Harness 5. Theft Deterrent ECU 6. Body ECU	BE–30 DI–630 BE–30 BE–57 – DI–428 DI–549
Auto turn–off system does not operate when the driver’s door is opened.	1. Drivers Door Courtesy Switch 2. Body ECU	BE–57 DI–549
Auto turn–off system: Headlight and taillight do not come on.	1. Body ECU 2. Wire Harness	DI–549 –
Auto turn–off system: Headlight and taillight stay on.	1. Body ECU 2. Wire Harness	DI–549 –

w/o Daytime Running Light System:

Symptom	Suspect Area	See page
Only one headlight comes on.	1. Bulb 2. Wire Harness	– –
”LO–Beam” does not light (All).	1. Headlight Control Relay 2. Wire Harness	BE–30 –
”LO–Beam” does not light (One side).	1. Bulb 2. H–LP L–LWR Fuse 3. H–LP R–LWR Fuse 4. Wire Harness	– BE–14 BE–14 –
”HI–Beam” does not light (All).	1. Headlight Dimmer Switch 2. Wire Harness	BE–30 –
”HI–Beam” does not light (One side).	1. Bulb 2. H–LP L–UPR Fuse 3. H–LP R–UPR Fuse 4. Wire Harness	– BE–14 BE–14 –

”Flash” does not light.	1. H–LP L–UPR Fuse 2. H–LP R–UPR Fuse 3. Headlight Dimmer Switch 4. Wire Harness	BE–14 BE–14 BE–30 –
”Flash” does not light.	1. Bulb 2. Wire Harness	– –
Headlight does not come on.	1. Headlight Control Relay 2. Light Control Switch 3. Wire Harness	BE–30 BE–30 –
Headlight does not come on.	1. Bulb 2. Wire Harness	– –
Headlight flickers.	1. Bulb 2. Wire Harness	– –
Headlight is dark.	1. Bulb 2. Wire Harness	– –
Only one taillight comes on.	1. Bulb 2. Wire Harness	– –
Taillight does not come on. (Headlight is normal)	1. TAIL Fuse 2. GAUGE Fuse 3. Taillight Control Relay 4. Light Failure Relay 5. Light Control Switch 6. Wire Harness	BE–14 BE–14 BE–83 BE–83 BE–30 –
Taillight does not come on. (Headlight does not light)	1. Light Control Switch 2. Wire Harness	BE–30 –
Rear combination light does not come on.	1. Light Failure Relay 2. Wire Harness 3. Bulb	BE–83 – –

w/ Daytime Running Light System:

Symptom	Suspect Area	See page
Only one headlight comes on.	1. Daytime Running Light No.2 Relay 2. Daytime Running Light Main Relay 3. Bulb 4. Wire Harness 5. Combination Meter	BE–30 BE–30 – – –
”LO–Beam” does not light (All).	1. Headlight Control Relay 2. Wire Harness	BE–30 –
”LO–Beam” does not light (One side).	1. Bulb 2. H–LP L–LWR Fuse 3. H–LP R–LWR Fuse 4. Wire Harness	– BE–14 BE–14 –
”HI–Beam” does not light (All).	1. Headlight Dimmer Switch 2. Daytime Running Light Main Relay 3. Wire Harness 4. Combination Meter	BE–30 BE–30 – –
”HI–Beam” does not light (One side).	1. Bulb 2. H–LP L–UPR Fuse 3. H–LP R–UPR Fuse 4. Daytime Running Light No.2 Relay 5. Wire Harness	– BE–14 BE–14 BE–30 –

”Flash” does not light.	1. Headlight Dimmer Switch 2. Daytime Running Light Main Relay 3. Wire Harness 4. Combination Meter	BE–30 BE–30 – –
Headlight does not come on.	1. Headlight Control Relay 2. Daytime Running Light Main Relay 3. Daytime Running Light No.2 Relay 4. Headlight Dimmer Switch 5. Light Control Switch 6. Wire Harness 7. Bulb 8. Combination Meter	BE–30 BE–30 BE–30 BE–30 BE–30 – – –
Headlight does not come on with light control switch in HEAD.	1. Light Control Switch 2. Wire Harness	BE–30 –
Headlight does not go out with light control switch in OFF.	1. Headlight Control Relay 2. Wire Harness	BE–30 –
Headlight flickers.	1. Bulb 2. Wire Harness	– –
Headlight is dark.	1. Bulb 2. Wire Harness	– –
Taillight does not come on with light control switch in TAIL.	1. Taillight Control Relay 2. Light Control Switch 3. Wire Harness	BE–30 – –
Taillight does not go out with light control switch in OFF.	1. Taillight Control Relay 2. Light Control Switch 3. Wire Harness	BE–30 BE–30 –
Headlight does not come on with engine running and light control switch in OFF.	1. ECU–B Fuse 2. GAUGE Fuse 3. Daytime Running Light Main Relay 4. Daytime Running Light No.2 Relay 5. Alternator L Terminal 6. Parking Brake Switch 7. Wire Harness 8. Combination Meter	BE–14 BE–14 BE–30 BE–30 CH–9 BE–83 – –

HEADLIGHT BEAM LEVEL CONTROL SYSTEM

Symptom	Suspect Area	See page
Headlight beam level control system does not operate. (All)	1. H–LP LVL Fuse 2. Headlight Beam Level Control Switch 3. Headlight Beam Level Control Actuator 4. Wire Harness	BE–14 BE–42 BE–42 –
Headlight beam level control system does not operate. (One side)	1. Headlight Beam Level Control Switch 2. Headlight Beam Level Control Actuator 3. Wire Harness	BE–42 BE–42 –
Abnormal operation (All)	1. Headlight Beam Level Control Switch 2. Headlight Beam Level Control Actuator 3. Wire Harness	BE–42 BE–42 –
Abnormal operation (One side)	1. Headlight Beam Level Control Switch 2. Headlight Beam Level Control Actuator 3. Wire Harness	BE–42 BE–42 –

FOG LIGHT SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Front fog light does not light up with light control SW TAIL or HEAD. (Headlight is normal.)	1. Bulbs 2. FR FOG Fuse 3. Front Fog Light Relay 4. Front Fog Light Switch 5. Wire Harness	– BE–14 BE–45 BE–45 –
Front fog light does not light up with light control SW TAIL or HEAD. (Headlight does not light.)	1. Inspect Headlight and Taillight System 2. Wire Harness	BE–2 –
Only one light does not light.	1. Bulbs 2. Wire Harness	– –
Rear fog light does not light with light control SW HEAD. (Headlight is normal.)	1. Bulbs 2. ECU–B2 Fuse 3. Rear Fog Light Switch 4. Wire Harness	– BE–14 BE–45 –
Rear fog light does not light with light control SW HEAD. (Headlight does not light.)	1. Inspect Headlight and Taillight System 2. Wire Harness	BE–2 –
Only one light does not light.	1. Bulbs 2. Wire Harness	– –

TURN SIGNAL AND HAZARD WARNING SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
”Hazard” and ”Turn” do not light up.	1. GAUGE Fuse 2. TURN HAZ Fuse 3. Ignition Switch 4. Turn Signal Flasher Relay 5. Wire Harness	BE–14 BE–14 BE–23 BE–51 –
Hazard warning light does not light up. (Turn is normal)	1. A/C Control Panel 2. Wire Harness	AC–91 –
Turn signal does not light up. (Hazard is normal)	1. Turn Signal Switch 2. Wire Harness	BE–51 –
Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE–51 –
Only one bulb does not light up.	1. Bulb 2. Wire Harness	– –

INTERIOR LIGHT SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the lights do not come ON.	DOME Fuse	BE–14
The driver door courtesy light does not come ON when the driver's door is opened.	1. Driver's Door Courtesy Switch 2. Wire Harness 3. Body ECU	BE–57 – –
The passenger door courtesy light does not come ON when the passenger's door is opened.	1. Passenger's Door Courtesy Switch 2. Wire Harness 3. Body ECU	BE–57 – –
The room light does not come on when the rear–right door is opened.	1. Rear–Right Door Courtesy Switch 2. Wire Harness 3. Body ECU 4. Room Light	BE–57 – – –
The room light does not come on when the rear–left door is opened.	1. Rear–Left Door Courtesy Switch 2. Wire Harness 3. Body ECU 4. Room Light	BE–57 – – –
Only one of the bulbs comes ON.	Bulb	–
The illumination does not fade out when all the doors are closed.	1. Courtesy Switch 2. Wire Harness 3. Body ECU	BE–57 – –
The illumination does not fade out immediately when the ignition switch is turned to ACC or ON within 15 seconds after all the doors are closed.	1. Ignition Switch 2. RADIO NO.2 Fuse 3. GAUGE Fuse 4. Wire Harness 5. Body ECU	BE–23 BE–14 BE–14 – –
The illumination does not fade out immediately when all the doors are locked within 15 seconds after they are closed.	1. Door Unlock Detection Switch 2. Wire Harness 3. Body ECU	BE–114 – –
Interior light does not light up. (in front personal light)	1. Bulb 2. Front Personal Light 3. Wire Harness	– BE–57 –
Front personal light does not light up.	1. Bulb 2. Front Personal Light 3. Wire Harness	– BE–57 –
Rear personal light does not light up.	1. Bulb 2. Rear Personal Light 3. Wire Harness	– BE–57 –
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	– BE–57 –
Luggage compartment light does not light up.	1. Bulb 2. Luggage Compartment Door Courtesy Switch 3. Wire Harness	– BE–57 –
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness 4. Body ECU	– BE–57 – –

BACK–UP LIGHT SYSTEM

Symptom	Suspect Area	See page
Back–Up Light does not light up.	1. GAUGE Fuse 2. Ignition Switch 3. Wire Harness 4. Bulb	BE–14 BE–23 – –
Back–Up Light remains always on.	1. Neutral Start Switch 2. Wire Harness	DI–204 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse 2. Stop Light Switch 3. Light Failure Relay 4. Wire Harness	BE–14 BE–65 BE–83 –
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	BE–65 –
Only one light always lights up.	Wire Harness	–
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

HEADLIGHT CLEANER SYSTEM

Symptom	Suspect Area	See page
”Headlight Cleaner System” does not operate (All)	1. H–LP CLN Fuse 2. WASHER Fuse 3. Ignition Switch 4. Headlight Cleaner Switch 5. Headlight Cleaner Relay 6. Headlight Cleaner Motor 7. Headlight Cleaner Nozzle and Hose 8. Wire Harness	BE–14 BE–14 BE–23 BE–67 BE–67 BE–67 – –
Washer fluid does not spray.	Headlight Cleaner Nozzle and Hose	–

WIPER AND WASHER SYSTEM

Symptom	Suspect Area	See page
Wipers and washer do not operate.	1. WIP Fuse 2. Wiper Switch 3. Wiper Motor 4. Wire Harness	BE–14 BE–71 BE–71 –
Wipers do not operate in LO, HI or MIST.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–71 BE–71 –
Wipers do not operate in INT.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–71 BE–71 –
Washer motor does not operate.	1. WASHER Fuse 2. Washer Switch 3. Washer Motor 4. Wire Harness	BE–14 BE–71 BE–71 –
Wipers do not operate when washer switch ON.	1. WASHER Fuse 2. Washer Switch 3. Wiper Motor 4. Wire Harness	BE–14 BE–71 BE–71 –

Washer fluid does not operate.	Washer Hose and Nozzle	–
● When wiper switch is in 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 Motor *1 2. Wire harness *1	BE–71 –

*1: Inspect wiper arm and blade set positions.

COMBINATION METER

- This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.
- Refer to DI section for warning light or indicator light not described in the table below.

Symptom	Suspect Area	See page
Driver seat belt warning light does not light up.	1. Bulb 2. Driver Buckle Switch CIrcuit 3. Meter Circuit Plate 4. Wire Harness 5. Body ECU	– BE–83 BE–83 – DI–549
Passenger seat belt warning light does not light up. (in A/C control panel)	1. Passenger Buckle Switch CIrcuit 2. Occupant Detection Sensor 3. A/C Control Panel 4. Wire Harness 5. A/C ECU	BE–83 BE–83 DI–667 – DI–667
SRS warning light does not light up.	1. MPX–B Fuse 2. SRS–B Fuse 3. Bulb 4. Meter Circuit Plate 5. Wire Harness 6. Airbag Sensor Assembly	BE–14 BE–14 – BE–83 – DI–285
Hi–beam indicator light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Headlight System	– BE–83 – BE–30
Turn indicator light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Turn Signal and Hazard Warning System	– BE–83 – BE–30
ABS warning light does not light up.	1. GAUGE Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. ABS ECU	BE–14 – BE–83 – DI–221
TRC warning light does not light up.	1. GAUGE Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. ABS ECU	BE–14 – BE–83 – DI–221
Check engine warning light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Engine and ECT ECU	– BE–83 – DI–1
Fuel level warning light does not light up.	1. Bulb 2. Fuel Level Warning Switch 3. Meter Circuit Plate 4. Wire Harness	– BE–83 BE–83 –

DEFOGGER SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Rear window defogger does not operate.	1. HTR Fuse	BE–14
	2. DEF M–Fuse	BE–14
	3. Defogger Relay Circuit	DI–605
	4. Defogger Switch (in A/C Panel Switch)	DI–667
	5. Defogger Wire	BE–96
	6. Wire Harness	–
	7. Body ECU	DI–549
	8. Noise Filter	–
	9. A/C ECU	DI–667
Mirror heater does not operate.	1. MIR–HTR Fuse (Passenger SIde J/B)	BE–14
	2. Mirror Heater Relay	BE–96
	3. Mirror Heater	BE–96
	4. Wire Harness	–

POWER WINDOW CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the power windows do not operate. (Power Door Lock System is normal.)	1. Power Window Master Switch	BE–109
	2. Wire Harness	–
	3. Body ECU	DI–549
Only the driver's window does not operate.	1. Power Window Master Switch	BE–109
	2. Power Window Switch	BE–109
	3. Power Window Motor	BE–109
	4. Wire Harness	–
"Window lock function" does not operate.	1. Power Window Master Switch	BE–109
Power window control system abnormal operation.	TROUBLESHOOTINGS	BE–99

POWER DOOR LOCK CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the doors cannot be locked or unlocked. (Power Window Control System is normal.)	1. Door Lock Control Switch 2. Wire Harness 3. Body ECU	BE–114 – DI–549
Only one side door lock control does not operate.	1. Door Lock Motor 2. Wire Harness	BE–114 –
Door key related function does not operate.	1. Door Key Lock and Unlock Switch 2. Wire Harness 3. Body ECU	BE–114 – DI–549
Key confinement prevention function does not operate.	1. Key Unlock Warning Switch 2. Door Courtesy Switch 3. Wire Harness 4. Body ECU	BE–23 BE–57 – DI–549
Luggage compartment door opener function does not operate.	1. Luggage Compartment Door Opener Switch 2. Luggage Compartment Door Opener Motor 3. Wire Harness 4. Body ECU	BE–114 BE–114 – DI–549

DEAD LOCK SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the doors dead lock system does not operate.	1. MPX–B Fuse 2. DOOR DL Fuse 3. ECU–B Fuse 4. Wire Harness * 5. Double Locking ECU 6. Body ECU	BE–14 BE–14 BE–114 – BE–121 –
Only one side dead lock system does not operate (or abnormal).	1. Dead Lock Motor 2. Double Locking Switch 3. Wire Harness 4. Double Locking ECU	BE–121 BE–121 – BE–121

*: Body ECU sends a dead lock set/release signal to the dead lock ECU after it has received the wireless lock/unlock signal from the wireless receiver.

Check continuity in wire harness (communication line) between the theft deterret ECU and dead lock ECU, dead lock ECU and body ECU after checking there is no communication stop diagnosis code between Body ECU and any other ECU.

THEFT DETERRENT SYSTEM

- This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.
- Refer to DI section for warning light or indicator light not described in the table below.

Symptom	Suspect Area	See page
The system cannot be set.	1. Indicator Light 2. Key Unlock Warning Switch 3. Door Unlock Detection Switch 4. Engine Hood Courtesy Switch 5. Luggage Compartment Door Courtesy Switch 6. Wire Harness 7. Theft Deterrent ECU	BE–124 BE–23 BE–114 BE–124 BE–57 – DI–428
The system cannot be canceled when the ignition switch is turned to ON with key.	1. Key Unlock Warning Switch 2. Ignition Switch 3. RAD NO.2 Fuse 4. Wire Harness 5. Theft Deterrent ECU	BE–23 BE–23 BE–14 – DI–428
The system cannot be canceled when the luggage compartment door is unlocked with key.	1. Luggage Compartment Door Courtesy Switch 2. Wire Harness 3. Theft Deterrent ECU	BE–57 – DI–428
The system does not operate when the engine hood is opened.	1. Engine Hood Courtesy Switch 2. Wire Harness 3. Theft Deterrent ECU	BE–124 – DI–428
The system does not operate when the ignition switch is turned to ACC without using a key or transmitter.	1. Ignition Switch 2. Key Unlock Warning Switch 3. Transmitter 4. Wire Harness 5. Theft Deterrent ECU	BE–23 BE–23 BE–132 – DI–428
Some of the system does not operate. (Headlight does not light up.)	1. Headlight System 2. Wire Harness 3. Theft Deterrent ECU	BE–2 – DI–428
Some of the system does not operate. (Taillight does not light up.)	1. Taillight System 2. Wire Harness 3. Theft Deterrent ECU	BE–2 – DI–428
Some of the system does not operate. (Self power siren or Horn does not sound.)	1. HORN Fuse 2. Self Power Siren 3. Horn 4. Horn Relay 5. Wire Harness 6. Theft Deterrent ECU	BE–14 BE–124 BE–203 BE–203 – DI–428
While the warning is given, the system cannot be canceled by unlocking the door with key or transmitter.	1. Door Key Lock and Unlock Switch 2. Wire Harness 3. Theft Deterrent ECU	BE–114 – DI–428
While the warning is given, the system cannot be canceled by turning the ignition switch to ACC or ON with key.	1. Ignition Switch 2. Key Unlock Warning Switch 3. RAD NO.2 Fuse 4. ECU–IG Fuse 5. Wire Harness 6. Theft Deterrent ECU	BE–23 BE–23 BE–14 BE–14 – DI–428
The system operates for more than 30 seconds.	Theft Deterrent ECU	DI–428

WIRELESS DOOR LOCK CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you 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.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check and replace the Wireless Door Lock Control Receiver as the last step.

Symptom	Suspect Area	See page
All functions of wireless door lock control system do not operate.	1. Transmitter 2. Wireless Door Lock Control Receiver 3. Wire Harness 4. Body ECU	BE–132 BE–132 – DI–549

POWER SEAT CONTROL SYSTEM

Symptom	Suspect Area	See page
Driver's seat does not operate.	1. P/SEAT Fuse 2. Power Seat Switch 3. Wire Harness	BE–14 BE–146 –
"Slide operation" does not operate.	1. Power Seat Switch 2. Wire Harness 3. Slide Motor	BE–146 – BE–146
"Front Vertical Operation" does not operate.	1. Power Seat Switch 2. Wire Harness 3. Front Vertical Motor	BE–146 – BE–146
"Lifter Operation" does not operate.	1. Power Seat Switch 2. Wire Harness 3. Lifter Motor	BE–146 – BE–146
"Reclining Operation" does not operate.	1. Power Seat Switch 2. Wire Harness 3. Reclining Motor	BE–146 – BE–146

(D): Driver's Seat

(P): Passenger's Seat

POWER MIRROR CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Both right and left mirrors do not operate.	1. Mirror Switch 2. Wire Harness	BE–152 –
Only one side of mirror does not operate.	1. Mirror Motor 2. Wire Harness	BE–152 –

SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Driver's seat heater does not operate.	1. SEAT HTR Fuse 2. Seat Heater Switch (D, P) 3. Seat Heater 4. Wire Harness	BE–14 BE–156 BE–156 –
Passenger's seat heater does not operate.	1. SEAT HTR Fuse 2. Seat Heater Switch (D, P) 3. Seat Heater 4. Wire Harness	BE–14 BE–156 BE–156 –
Seat heater temperature is too hot.	Seat Heater	BE–156

AUDIO SYSTEM

Symptom	Suspect Area	See page
Audio system abnormal operation.	TROUBLESHOOTINGS	BE–165

CLOCK SYSTEM (in A/C Control Panel)

Symptom	Suspect Area	See page
Passenger seat belt warning system does not light up.	TROUBLESHOOTING NO.1	BE–196
Clock will not operate.	TROUBLESHOOTING NO.1	BE–196
Clock loses or gains time.	TROUBLESHOOTING NO.2	BE–196

ENGINE IMMOBILIZER SYSTEM

Symptom	Suspect Area	See page
Engine immobilizer system does not operate.	See DIAGNOSIS SYSTEM	DI–504

HORN SYSTEM

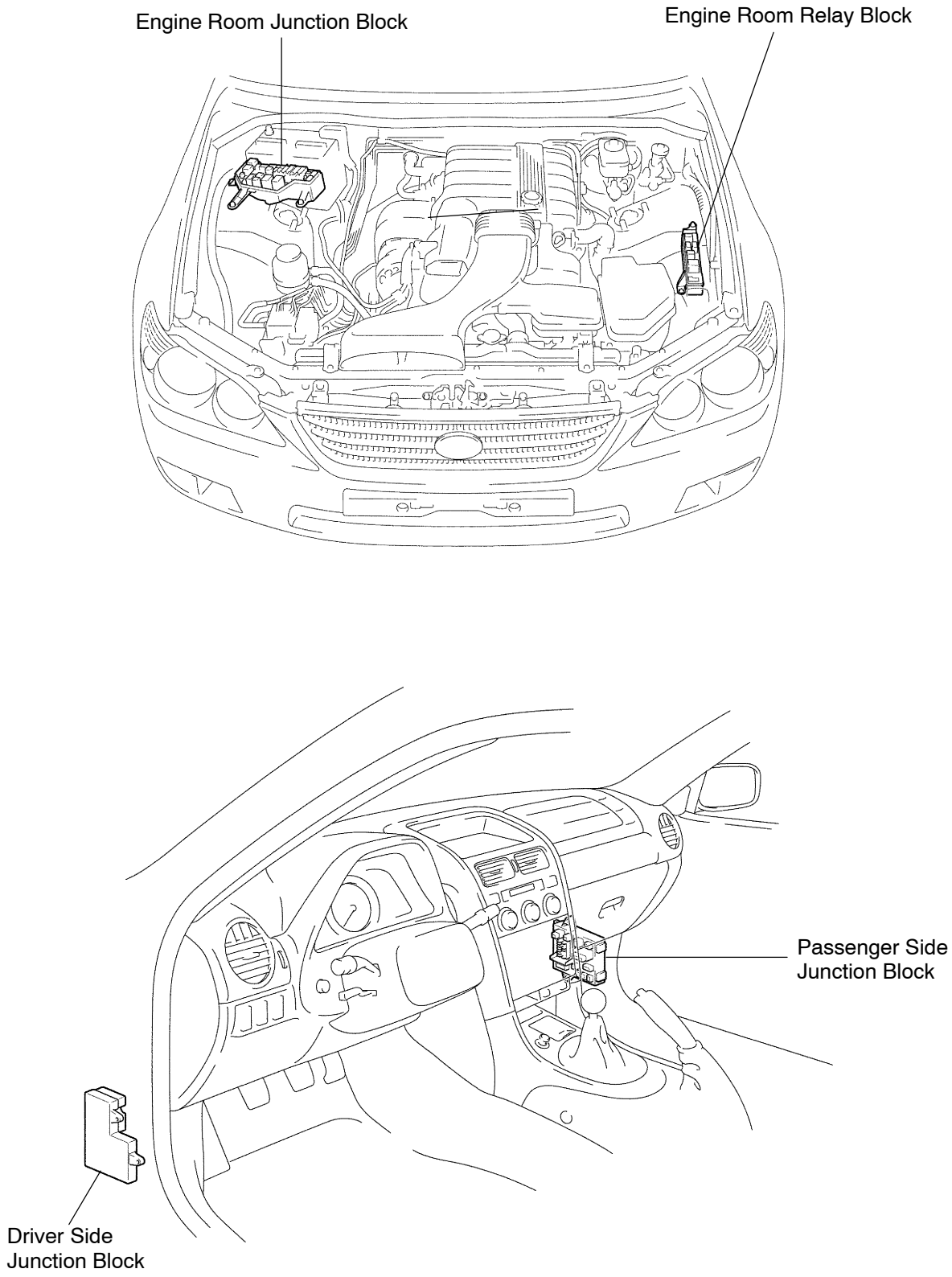
Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse 2. Horn Relay 3. Horn Switch 4. Horn 5. Wire Harness	BE–14 BE–203 BE–203 BE–203 –
Horns blow all the time.	1. Horn Relay 2. Horn Switch 3. Wire Harness	BE–203 BE–203 –
One horn operates but the other horn does not operate.	1. Horn 2. Wire Harness	BE–203 –
Horns operate abnormally.	1. Horn Relay 2. Horn 3. Wire Harness	BE–203 BE–203 –

POWER SOURCE

LOCATION

BE15V–01

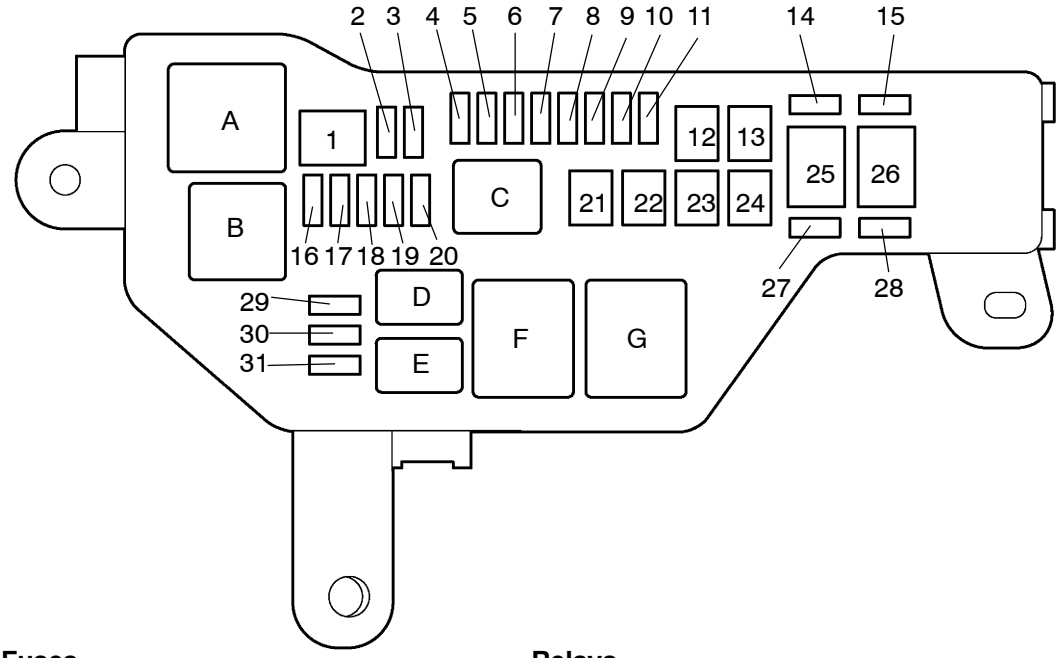
Power Source



P

I10836

● **Engine Room Junction Block**
LHD Models



Fuses

1. MAIN FL 40A
2. TEL 7.5A

N 3. –

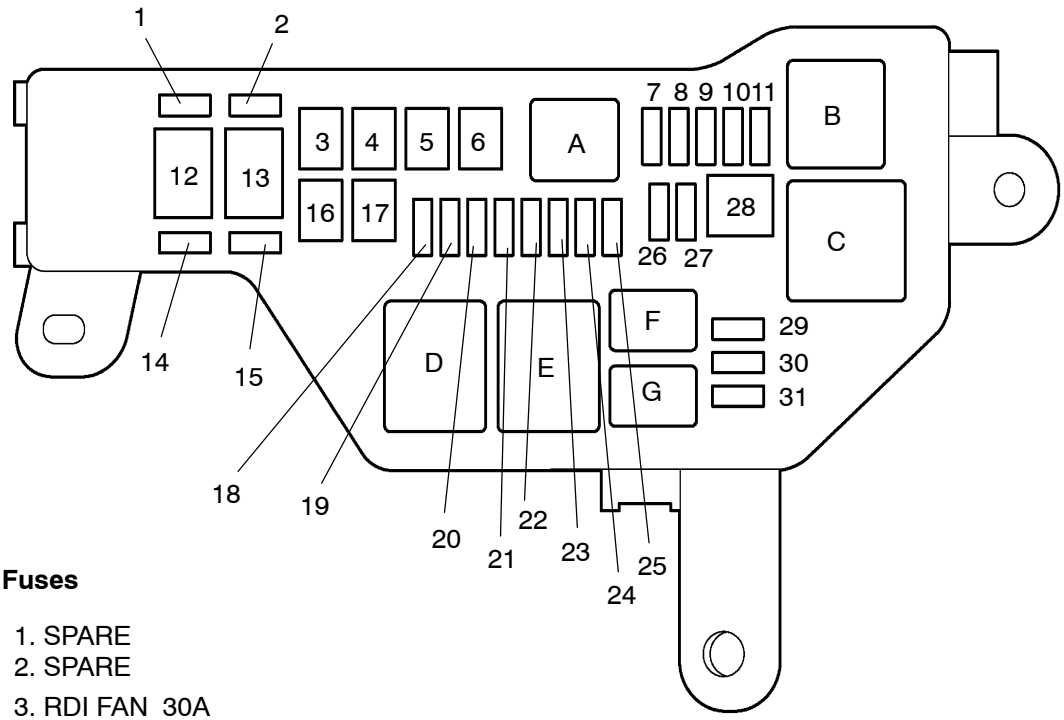
4. ECU–B1 20A
5. ETCS 15A
6. HORN 10A
7. RADIO1 20A
8. EFI 15A
9. AM2 20A
10. TURN 10A
11. ALT–S 5A
12. –
13. HEAD CLNER 30A
14. SPARE
15. SPARE
16. –
17. HEAD LVL 10A
18. HEAD LH–LWR 10A
19. HEAD RH–LWR 10A
20. –
21. –
22. –
23. CDS FAN 30A
24. RDI FAN 30A
25. ALT 120A
26. ABS 60A
27. SPARE
28. SPARE
29. HEAD LH–UPR 10A
30. HEAD RH–UPR 10A
31. DRL 7.5A

Relays

A. Headlight Control Relay
B. Starter relay
C. EFI Main Relay
D. Circuit Opening Relay
E. Horn Relay
F. ABS MTR Relay
G. ABS SOL Relay

I11570

● **Engine Room Junction Block**
RHD Models



Fuses

1. SPARE
2. SPARE
3. RDI FAN 30A
4. CDS FAN 30A
5. –
6. –
7. –
8. H–LP R LWR 10A (Europe RHD models)
   H–LP RH 15A (Australia models)
9. H–LP L LWR 10A (Europe RHD models)
   H–LP LH 15A (Australia models)
10. H–LP LVL 10A
11. –
12. ABS 60A
13. ALT 120A
14. –
15. SPARE
16. H–LP CLN 30A (Europe RHD models)
17. –
18. EFI 20A
19. TURN–HAZ 10A
20. RADIO NO.1 20A
21. TEL 7.5A
22. HORN 10A
23. AM2 20A
24. ETCS 15A
25. ALT–S 7.5A
26. –
27. ECU–B1 20A
28. MAIN 40A
29. –
30. H–LP R UPR 10A (Europe RHD models)
31 H–LP L UPR 10A (Europe RHD models)

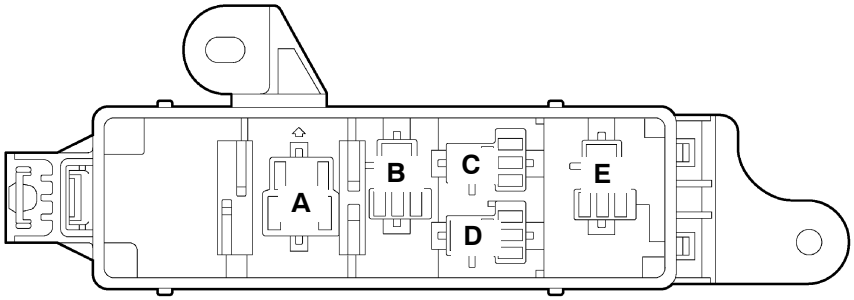
Relays

A. Circuit Opening Relay
B. Starter Relay
C. Headlight Control Relay
D. ABS SOL Relay
E. ABS MTR Relay
F. Horn Relay
G. EFI Relay

N

I11474

● **Engine Room Relay Block**



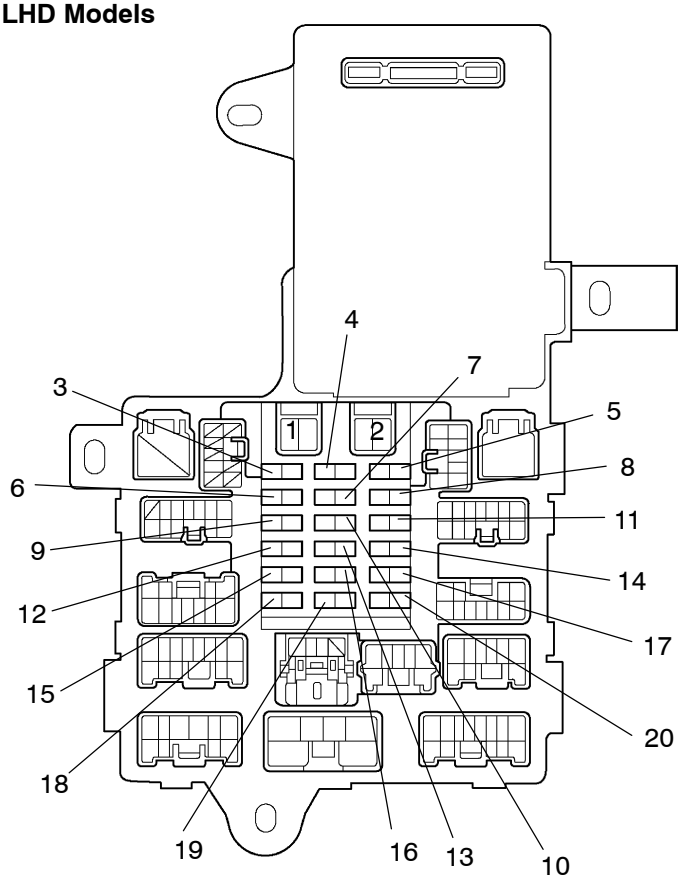
Relays

A. Headlight Dimmer Relay
B. A/C Compressor Relay
C. FAN NO.3 Relay
D. FAN NO.2 Relay
E. FAN NO.1 Relay

N

I11524

● **Driver Side Junction Block**
LHD Models

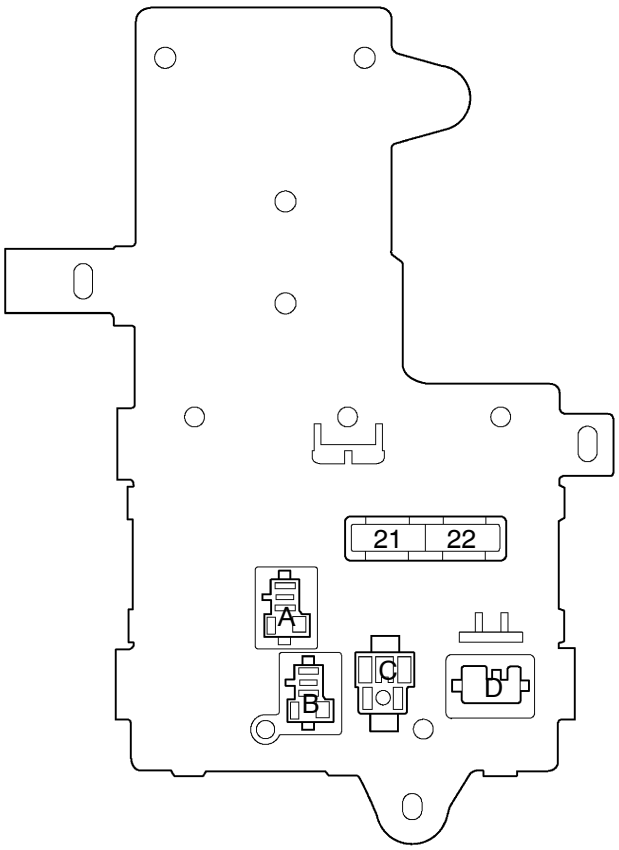


Fuses

1. DEF 30A
2. AM1 40A
3. P/W 20A
4. TAIL 10A
5. GAUGE 10A
6. D/L 20A
7. PANEL 7.5A
8. WSH 15A
9. ST 7.5A
10. FR DEF 20A
11. A/C 10A
12. S/HTR 15A
13. CIG 15A
14. S/R 30A
15. ECU–IG 10A
16. SRS–ACC 10A
17. STOP 15A
18. WIP 25A
19 RADIO2 10A
20. D P/SEAT 30A

Condenser

21. DEF CDS
22. DEF CDS



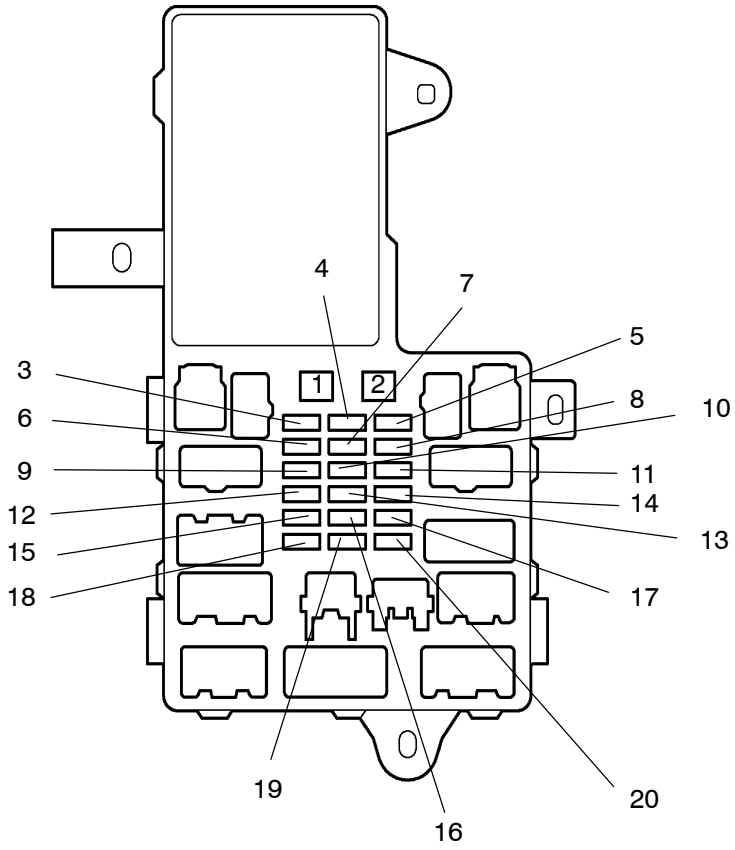
Relays

A. Deicer Relay
B. Taillight Control Relay
C. Rear Window Defogger Relay
D. Turn Signal Flasher Relay

N

I11547

● **Driver Side Junction Block**
RHD Models

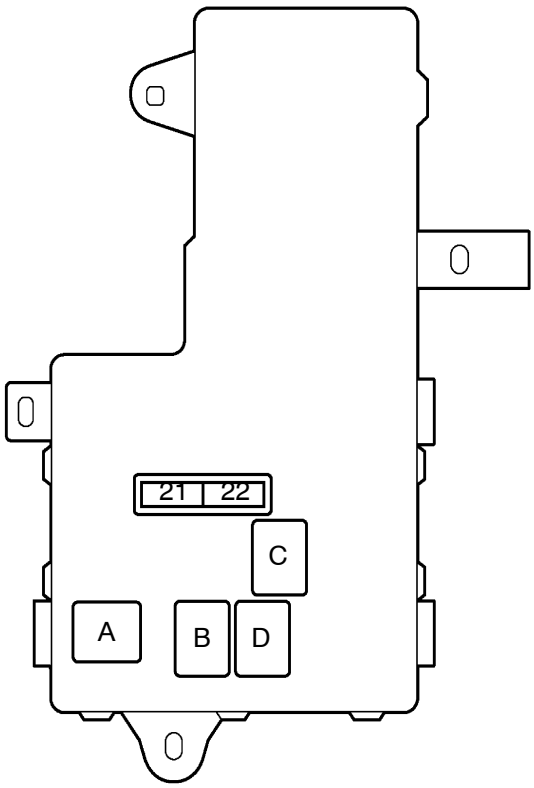


Fuses

1. AM1	40A
2. DEF	30A
3. PANEL	7.5A
4. D/L	20A
5. ECU–IG	10A
6. TAIL	10A
7. FR DEF	20A
8. GAUGE	10A
9. S/R	30A
10. P/W	20A
11. WIP	25A
12. STOP	15A
13. WSH	15A
14. A/C	10A
15. D P/SEAT	30A
16. CIG	15A
17. RADIO2	10A
18. ST	7.5A
19. SRS ACC	10A
20. S/HTR	15A

Condenser

21. DEF CDS
22. DEF CDS



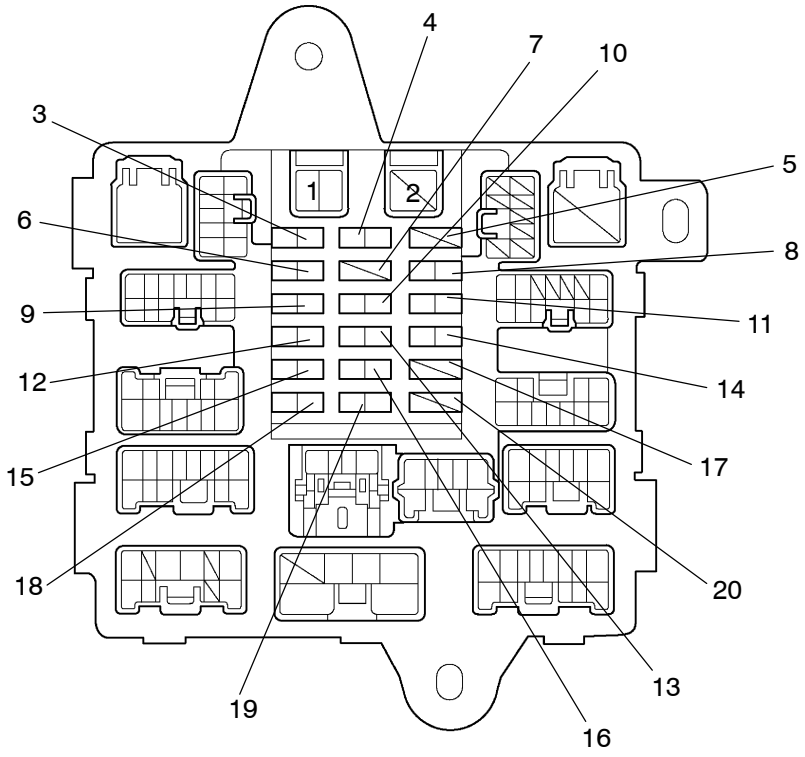
Relays

A. Turn Signal Flasher Relay
B. Rear Window Defogger Relay
C. Taillight Control Relay
D. Deicer Relay

N

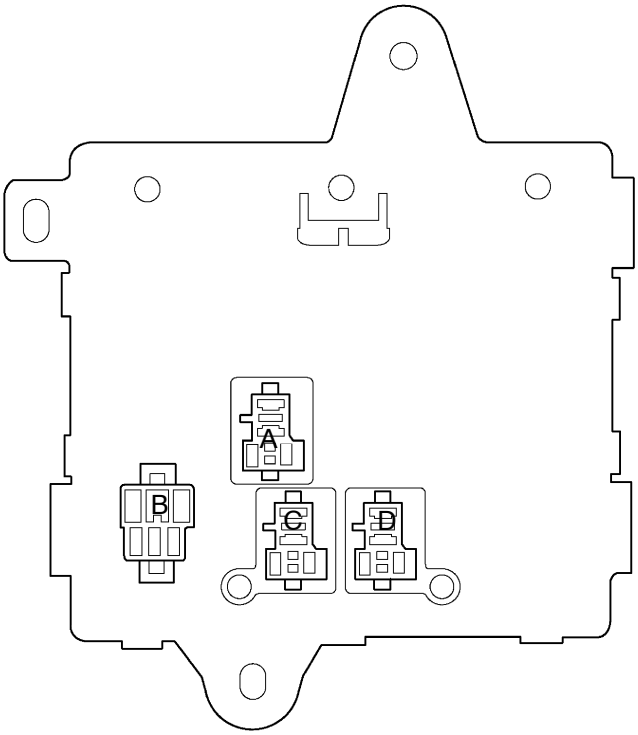
I11476

● **Passenger Side Junction Block**
LHD Models



Fuses

1. FL HTR 40A
2. –
3. –
4. DOME 7.5A
5. –
6. FR FOG 15A
7. –
8. P/W2 20A
9. TV 7.5A
10. ECU–B2 7.5A
11. P/W3 20A
12. MIR HIR 15A
13. MPX–B 10A
14. P/W4 20A
15. SRS–B 7.5A
16. –
17. –
18. OBD2 7.5A
19. IGN 7.5A
20. –



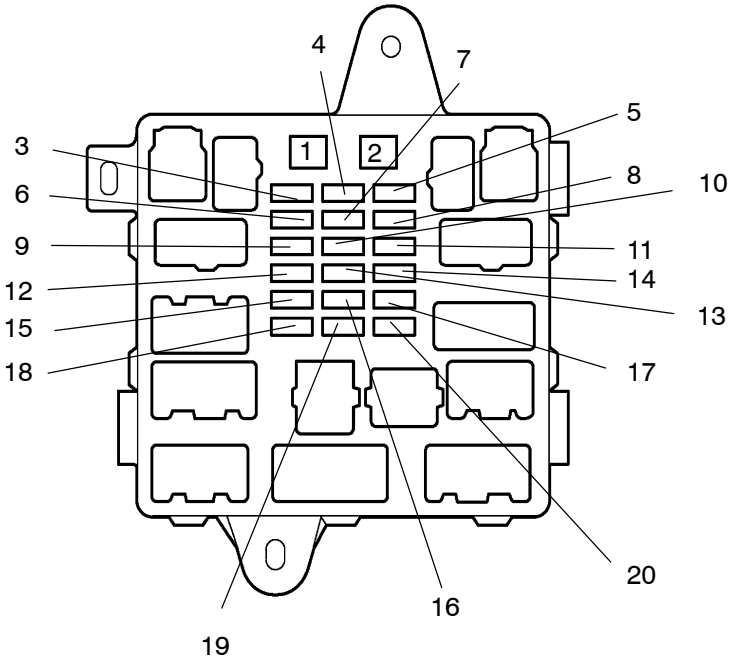
Relays

A. Front Fog Light Relay
B. Heater Main Relay
C. Mirror Heater Relay
D. Power Window Main Relay

N

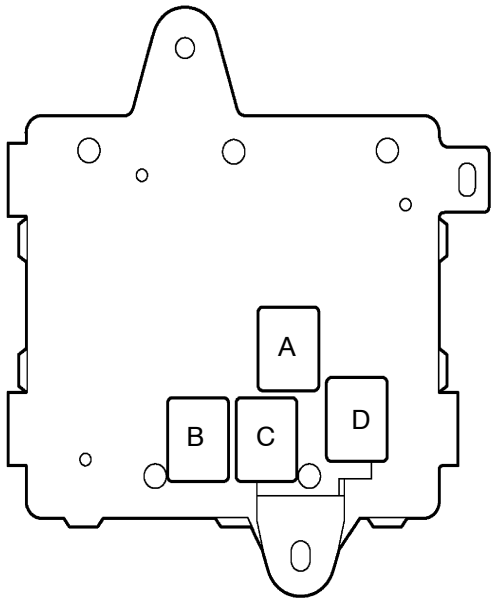
I11548

● **Passenger Side Junction Block**
RHD Models



Fuses

1. –	
2. FL HTR	40A
3. P/W2	20A
4. IGN	7.5A
5. DOOR DL	15A
6. P/W3	20A
7. –	
8. TV	7.5A
9. –	
10. DOME	7.5A
11. FR FOG	15A
12. P/W4	20A
13. –	
14. MIR HTR	15A
15. –	
16. MPX–B	10A
17. SRS–B	7.5A
18. –	
19. ECU–B2	7.5A
20. OBD2	7.5A



Relays

A. Front Fog Light Relay
B. Power Window Main Relay
C. Mirror Heater Relay
D. Heater Main Relay

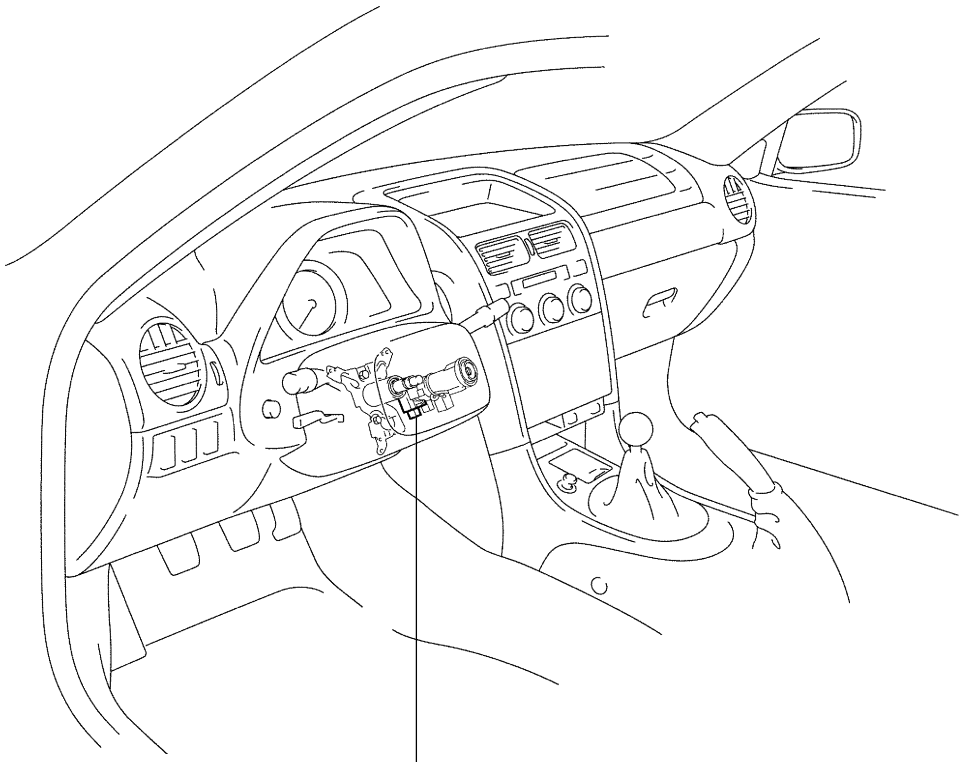
N

I11475

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

BE01L–10

LOCATION

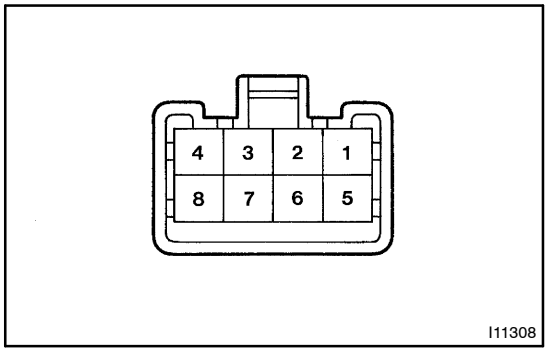


Ignition Switch and
Key Unlock Warning Switch

P

I10837

BE15W–01

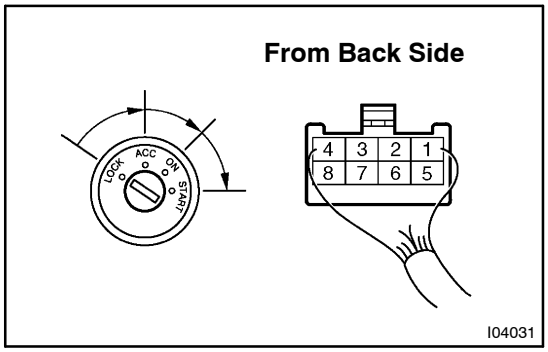


INSPECTION

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.

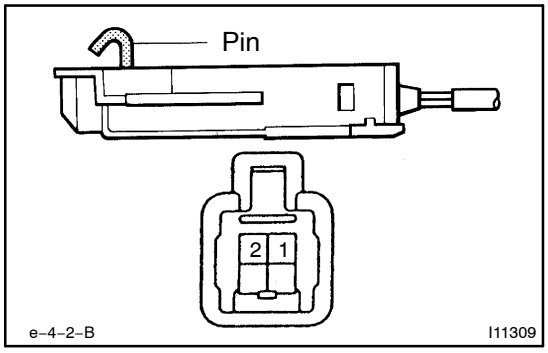


2. INSPECT IGNITION SWITCH CIRCUIT

Connect the switch connector and inspect the connector on wire harness side from the back side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery voltage
3 – Ground	Ignition switch ACC or ON	Battery voltage
4 – Ground	Ignition switch ON	Battery voltage
6 – Ground	Ignition switch ON or START	Battery voltage
7 – Ground	Constant	Battery voltage
8 – Ground	Ignition switch START	Battery voltage

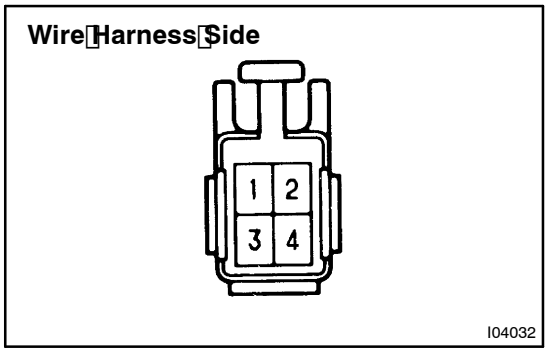
If circuit is not as specified, inspect the circuits connected to other parts.



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 (See page DI–575)

Connect the switch connector and inspect the connector on wire harness side from the back side, as shown.

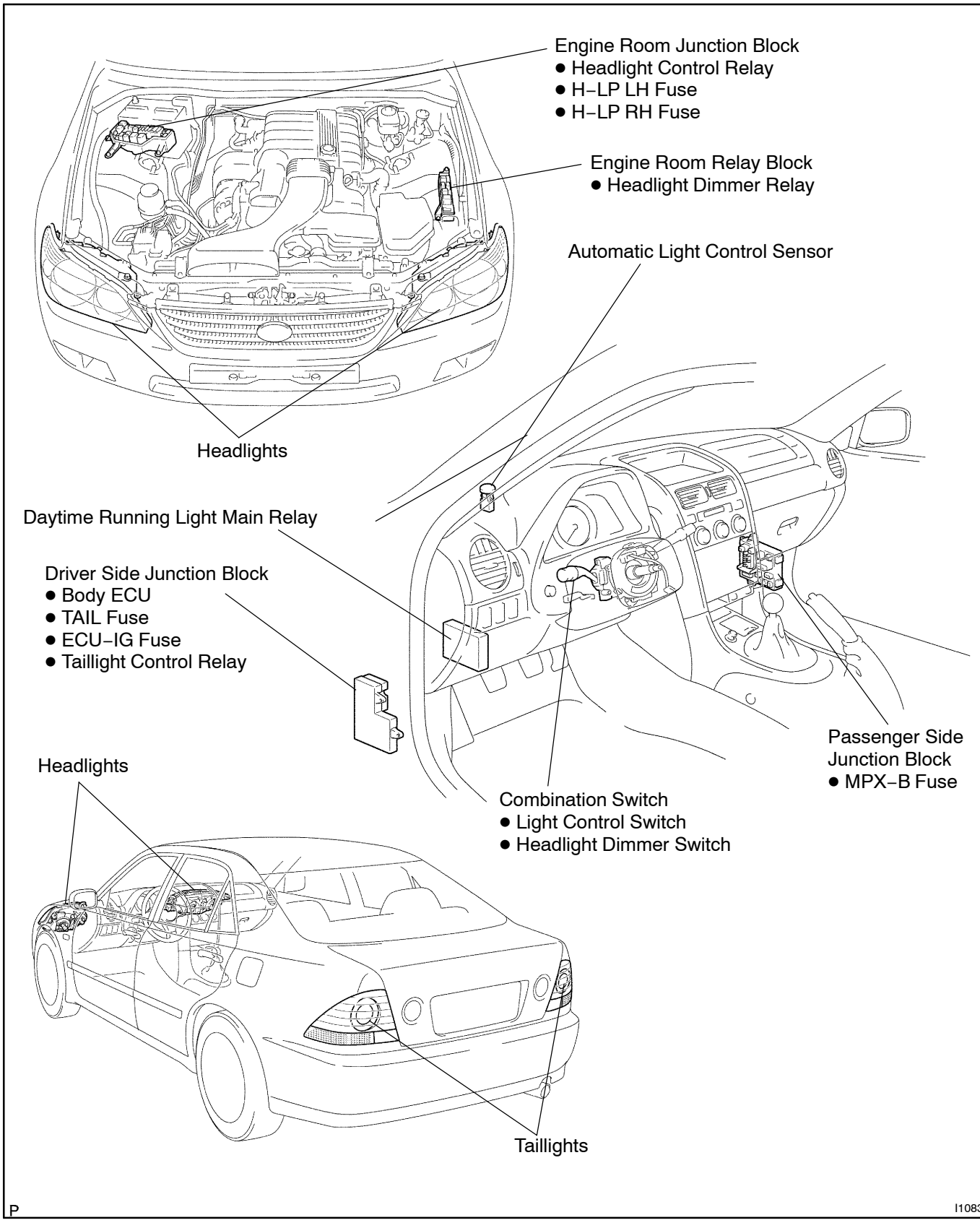
Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity

If circuit is not as specified, inspect the circuits connected to other parts.

HEADLIGHT AND TAILLIGHT SYSTEM

LOCATION

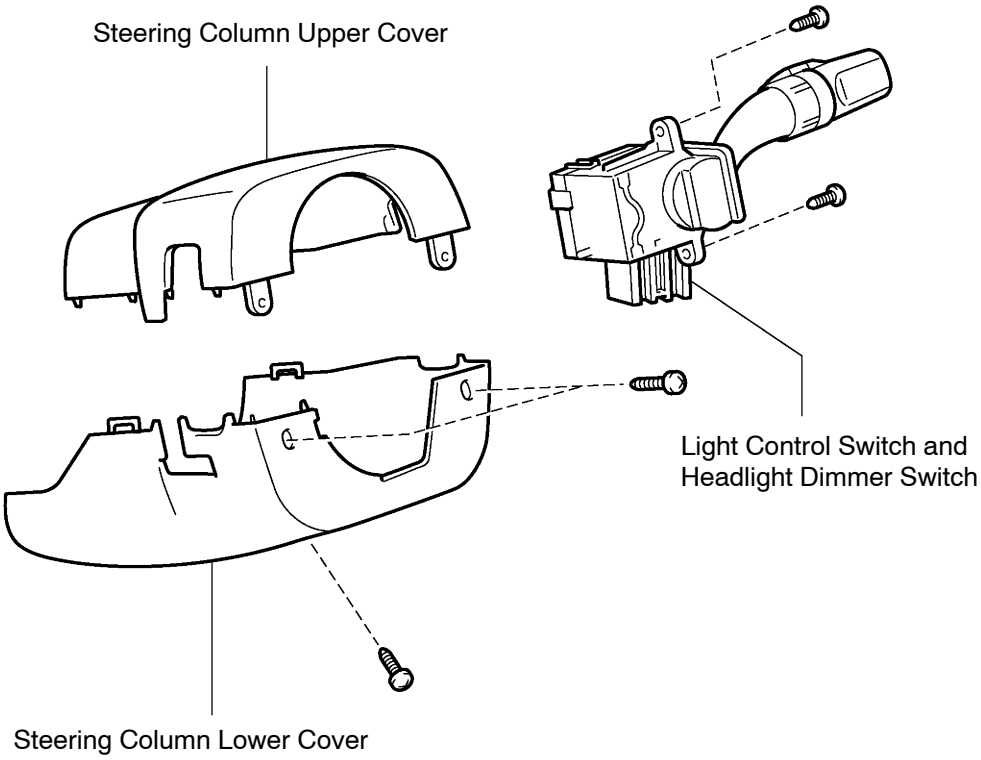
BE0H8–06



BE15X–01

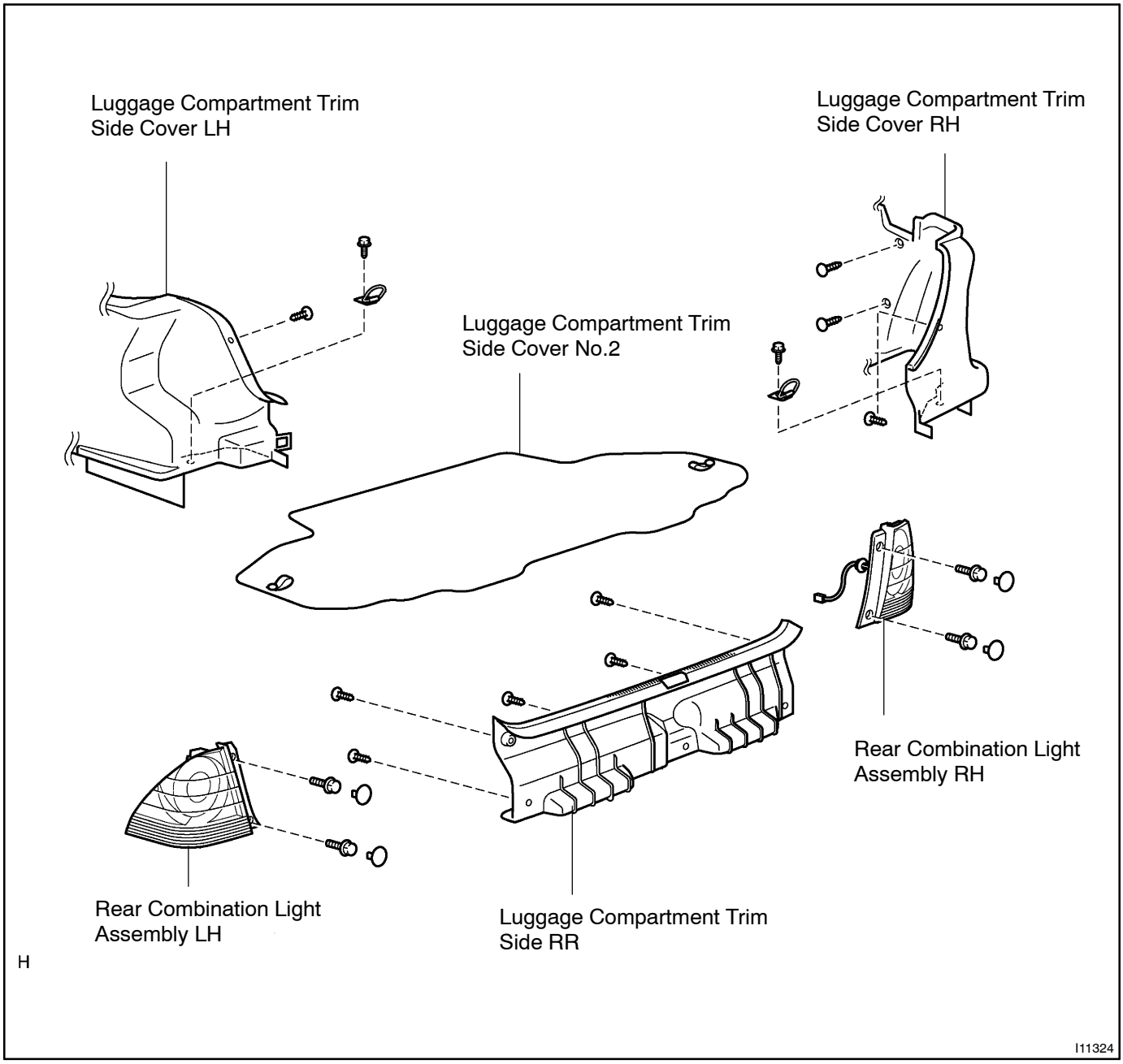
COMPONENTS

Reference RHD models



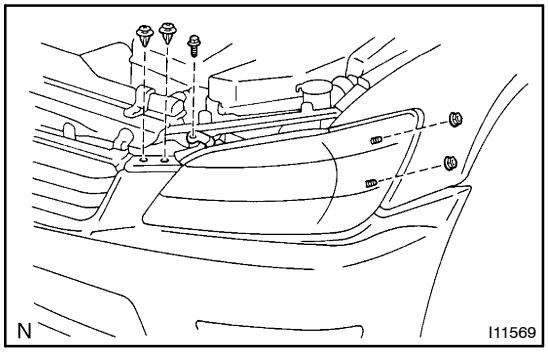
H

I11336


Luggage Compartment Trim
Side Cover LH
Luggage Compartment Trim
Side Cover RH
Luggage Compartment Trim
Side Cover No.2
Rear Combination Light
Assembly RH
Rear Combination Light
Assembly LH
Luggage Compartment Trim
Side RR
H
I11324

BE15Y–01

REMOVAL

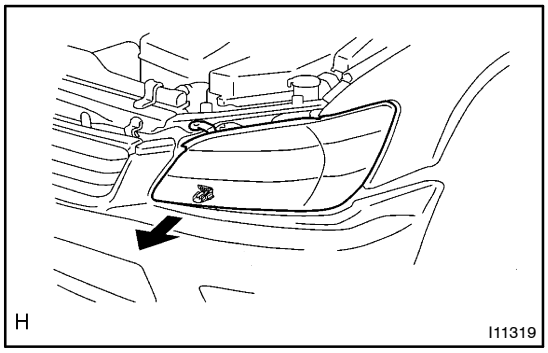


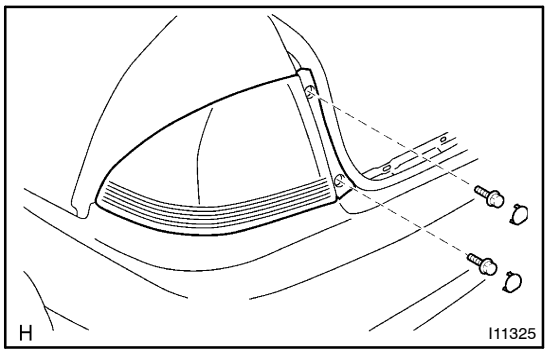
1. REMOVE HEADLIGHT

HINT:

Follow the same procedure for RH as for LH.

(a) Remove a part of LH front fender liner.
(b) Remove a part of front bumper cover (See page BO–4).
(c) Remove the bolt, 2 nuts and 2 clips.
(d) Lift up the front bumper and pull the headlight assembly towards the front of the vehicle, and disconnect the engagement of the headlight assembly.
(e) Install LH headlight assembly.
(f) Install a part of front bumper cover.
(g) Install a part of front fender liner.
(h) Inspect and adjust optical axis of headlight (See page BE–39).



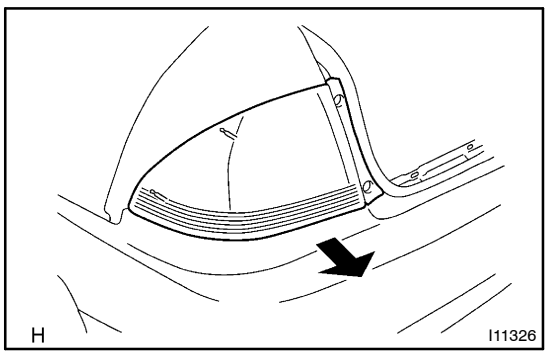


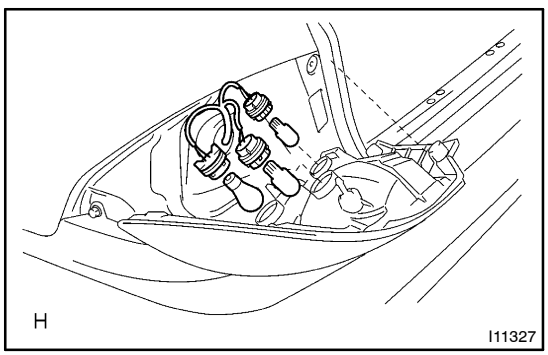
2. REMOVE REAR COMBINATION LIGHT

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove luggage compartment trim cover No.2 (See page BO–40).
(b) Remove luggage compartment trim cover RR.
(c) Remove a part of LH luggage compartment trim side cover.
(d) Remove the 2 rear light covers and 2 bolts.
(e) Pull the pin toward the rear of the vehicle, and disconnect the engagement of 2 pins.
(f) From the inside of the luggage room, separate the connector and disconnect the LH rear combination light assembly.





3. REMOVE REAR COMBINATION BULB

HINT:

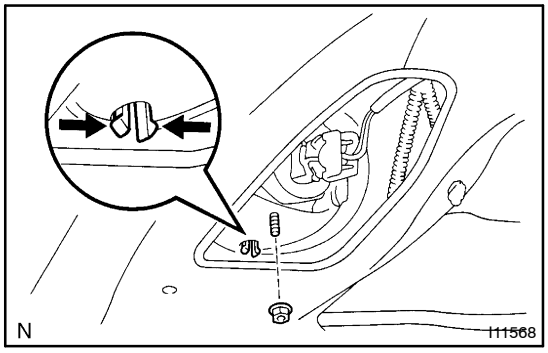
- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove a part of LH combination light assembly.

HINT:

Remove the light unit from only the outside of the vehicle.

(b) Remove the bulb sockets and remove the bulbs.

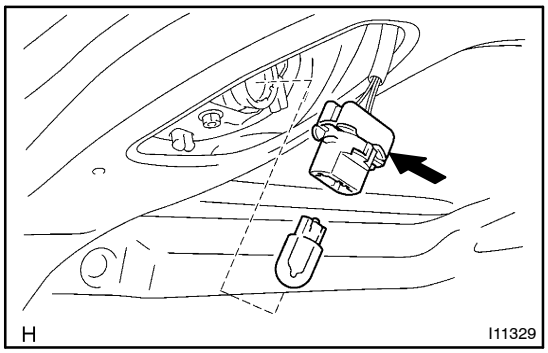


4. REMOVE REAR LAMP ASSEMBLY

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove a part of luggage compartment door trim.
(b) Remove the nut.
(c) Compress the claw to disconnect the engagement as shown in the illustration.
(d) Separate the connector and remove the rear light assembly.



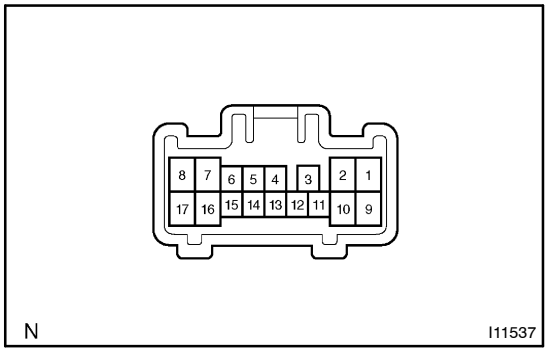
5. REMOVE REAR LAMP BULB

HINT:

Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

(a) Remove a part of luggage compartment door trim.
(b) Remove the bulb socket and bulb.

BE15Z–01



INSPECTION

1. LHD models:
INSPECT LIGHT CONTROL SWITCH CONTINUITY

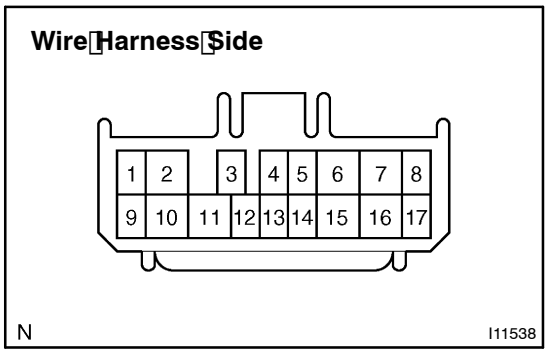
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	14 – 16	Continuity
HEAD	13 – 14 – 16	Continuity
AUTO	13 – 16	Continuity

If continuity is not as specified, replace the switch.

2. LHD models:
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.

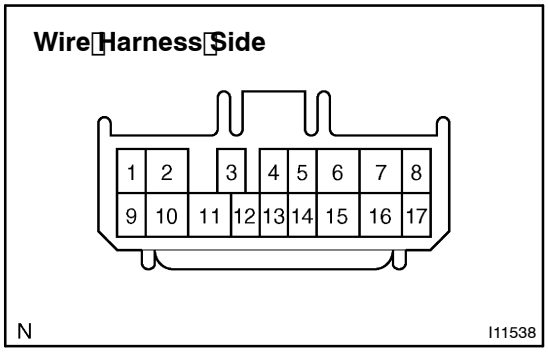


3. LHD models:
INSPECT LIGHT CONTROL SWITCH CIRCUIT
Connector disconnected:
(See page DI–453)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity

If circuit is not as specified, inspect the wire harness.

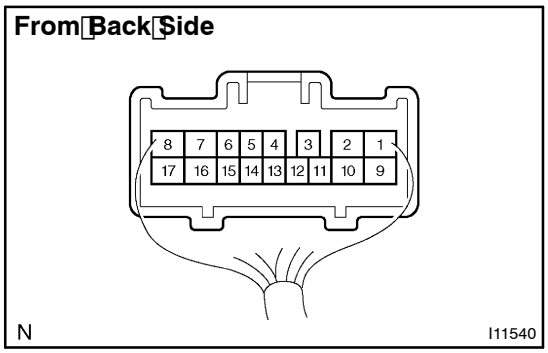


4. LHD models:
INSPECT HEADLIGHT DIMMER SWITCH CIRCUIT
Connector disconnected:
(See page DI–453)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity
13 – Ground	Light control switch HEAD	Battery voltage

If circuit is not as specified, inspect the wire harness.

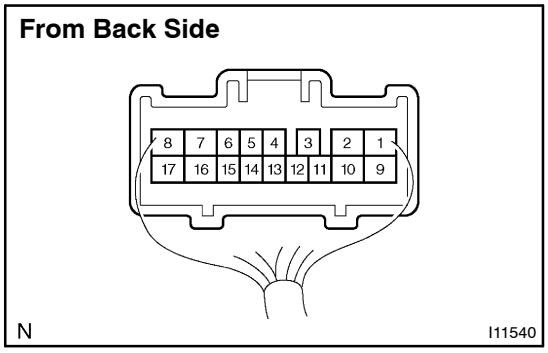


5. LHD models:
INSPECT LIGHT CONTROL SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the light control and dimmer switch and inspect the connector from the back side, as shown.

Tester connection	Condition	Specified condition
12 – Ground	Light control switch OFF, TAIL or HEAD	Battery voltage
12 – Ground	Light control switch AUTO	No voltage
13 – Ground	Light control switch OFF or TAIL	Battery voltage
13 – Ground	Light control switch HEAD	No voltage
14 – Ground	Light control switch OFF	Battery voltage
14 – Ground	Light control switch TAIL or HEAD	No voltage

If circuit is not as specified, inspect the wire harness.

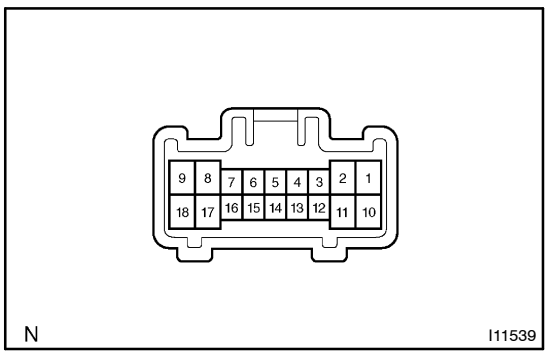


6. LHD models:
INSPECT HEADLIGHT DIMMER SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the light control and dimmer switch and inspect the connector from the back side, as shown.

Tester connection	Condition	Specified condition
7 – Ground	Headlight dimmer switch FLASH Light control switch HEAD and dimmer switch HIGH	No voltage
7 – Ground	Light control switch HEAD and dimmer switch LOW	Battery voltage
17 – Ground	Light control switch HEAD and dimmer switch LOW and fog light switch ON	No voltage
17 – Ground	Light control switch HEAD and dimmer switch HIGH or FLASH and fog light switch ON	Battery voltage

If circuit is not as specified, inspect the wire harness.



7. Europe RHD Models:
INSPECT LIGHT CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	14 – 16	Continuity
HEAD	13 – 14 – 16	Continuity
AUTO	13 – 16	Continuity

If continuity is not as specified, replace the switch.

8. Europe RHD Models:
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.

9. Australia RHD Models:
INSPECT LIGHT CONTROL SWITCH CONTINUITY

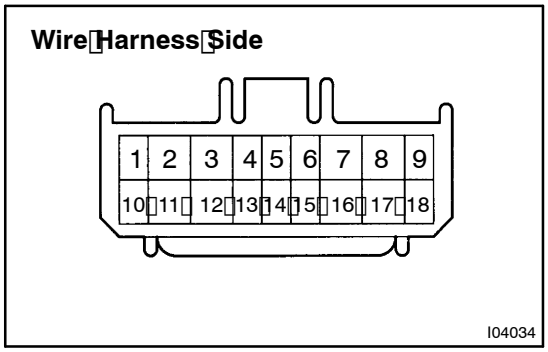
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	16 – 17	Continuity
HEAD	15 – 16 – 17	Continuity
AUTO	14 – 17	Continuity

If continuity is not as specified, replace the switch.

10. Australia RHD Models:
INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	10 – 11	Continuity
High beam	2 – 10	Continuity
Flash	1 – 2 – 10	Continuity

If continuity is not as specified, replace the switch.

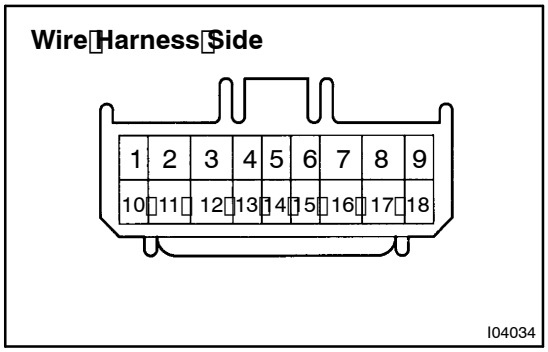


11. RHD Models:
INSPECT LIGHT CONTROL SWITCH CIRCUIT
Connector disconnected:
(See page DI–453)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
17 – Ground (Australia) 16 – Ground (Europe)	Constant	Continuity

If circuit is not as specified, inspect the wire harness.

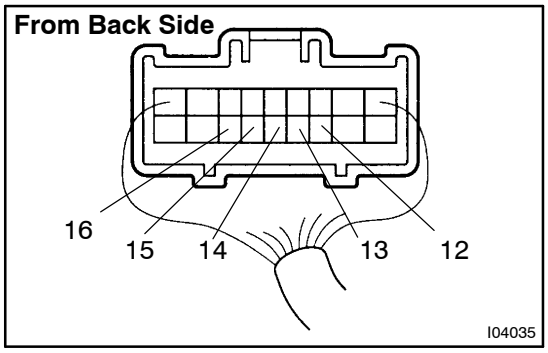


12. RHD Models:
INSPECT HEADLIGHT DIMMER SWITCH CIRCUIT
Connector disconnected:
(See page DI–453)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
17 Ground (Australia) 16 Ground (Europe)	Constant	Continuity
15 Ground (Australia) 13 Ground (Europe)	Light control switch HEAD	Battery voltage

If circuit is not as specified, inspect the wire harness.

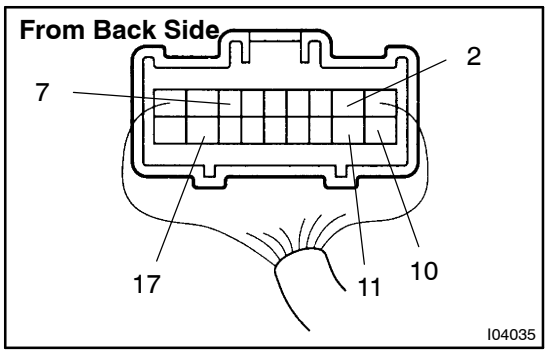


13. RHD Models:
INSPECT LIGHT CONTROL SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the light control and dimmer switch and inspect the connector from the back side, as shown.

Tester connection	Condition	Specified condition
14 – Ground (Australia) 12 – Ground (Europe)	Light control switch OFF, TAIL or HEAD	Battery voltage
14 – Ground (Australia) 12 – Ground (Europe)	Light control switch AUTO	No voltage
15 – Ground (Australia) 13 – Ground (Europe)	Light control switch OFF or TAIL	Battery voltage
15 – Ground (Australia) 13 – Ground (Europe)	Light control switch HEAD	No voltage
16 – Ground (Australia) 14 – Ground (Europe)	Light control switch OFF	Battery voltage
16 – Ground (Australia) 14 – Ground (Europe)	Light control switch TAIL or HEAD	No voltage

If circuit is not as specified, inspect the wire harness.

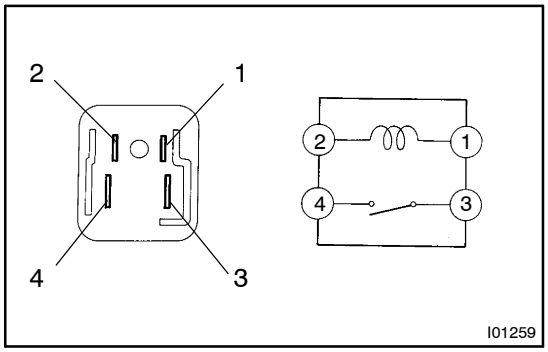


14. RHD Models:
INSPECT HEADLIGHT DIMMER SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the light control and dimmer switch and inspect the connector from the back side, as shown.

Tester connection	Condition	Specified condition
2 – Ground (Australia) 7 – Ground (Europe)	Headlight dimmer switch FLASH Light control switch HEAD and dimmer switch HIGH	No voltage
2 – Ground (Australia) 7 – Ground (Europe)	Light control switch HEAD and dimmer switch LOW	Battery voltage
11 – Ground (Australia) 17 – Ground (Europe)	Light control switch HEAD and dimmer switch LOW and fog light switch ON	No voltage
11 – Ground (Australia) 17 – Ground (Europe)	Light control switch HEAD and dimmer switch HIGH or FLASH and fog light switch ON	Battery voltage

If circuit is not as specified, inspect the wire harness.

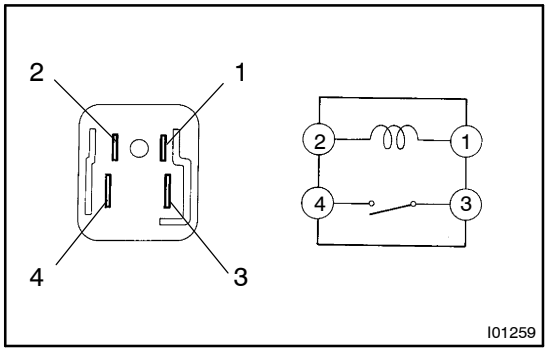


15. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

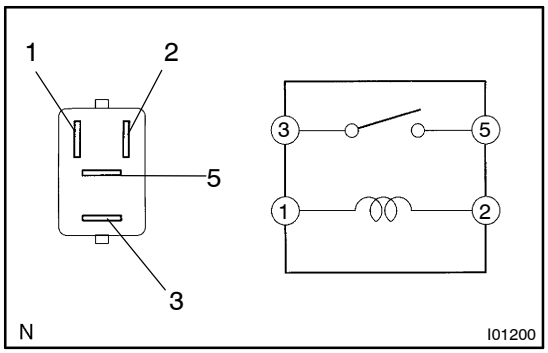
16. INSPECT HEADLIGHT CONTROL RELAY CIRCUIT (See page DI–459)



17. INSPECT HEADLIGHT DIMMER (DAYTIME RUNNING LIGHT NO.2) RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

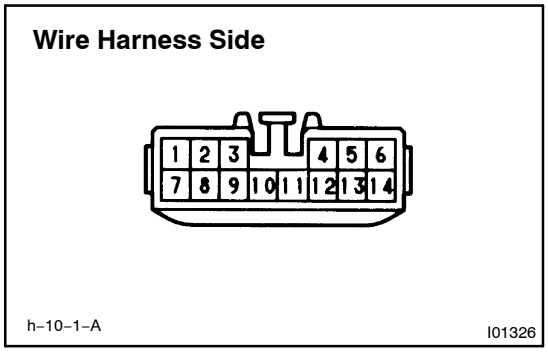


18. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

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.

19. INSPECT TAILLIGHT CONTROL RELAY CIRCUIT (See page DI–572)

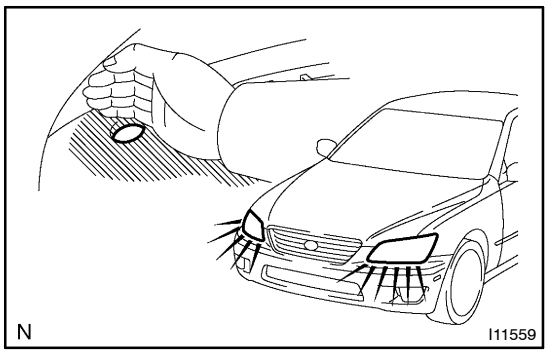


20. LHD models:
INSPECT DAYTIME RUNNING LIGHT MAIN RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

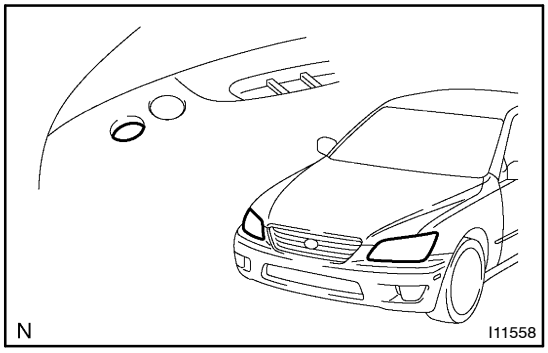
Tester connection	Condition	Specified condition
2 – Ground	Light control switch OFF	No continuity
2 – Ground	Light control switch TAIL or HEAD	Continuity
4 – Ground	Light control switch OFF or TAIL	No continuity
4 – Ground	Light control switch HEAD	Continuity
6 – Ground	Headlight dimmer switch FLASH	Continuity
8 – Ground	Engine running	Battery voltage
7 – Ground	Constant	Continuity
10 – Ground	Constant	Continuity
13 – Ground	Headlight dimmer switch FLASH or HI	Continuity
12 – Ground	Constant	Battery voltage
1 – Ground	Ignition switch OFF	No voltage
1 – Ground	Ignition switch ON	Battery voltage
9 – Ground	Terminal 3 ground	Battery voltage
11 – Ground	Rear fog light switch ON, terminal 3 ground	Battery voltage
5 – Ground	Constant	Battery voltage
14 – Ground	Terminal 5 ground	Battery voltage

If circuit is specified, try replacing the relay with a new one.
If circuit is not as specified, inspect the circuits connected to other parts.



21. INSPECT AUTOMATIC LIGHT CONTROL SYSTEM
Auto on function:

(a) Turn the ignition switch ON.
(b) Turn the light control switch to AUTO.
(c) Gradually cover the top of the sensor.
(d) Check the accessory lights and the headlights should turn ON.



22. INSPECT AUTOMATIC LIGHT CONTROL SYSTEM

Auto off function:

(a) Gradually expose the sensor.

(b) Check the headlights and the accessory lights should turn OFF.

23. INSPECT LIGHT–OFF CONDITION

(a) Turn the ignition switch ON.

(b) Gradually cover the top of the sensor.

Lights auto ON:

(c) Check that the lights go off under the following conditions.

(1) Light control switch is OFF.

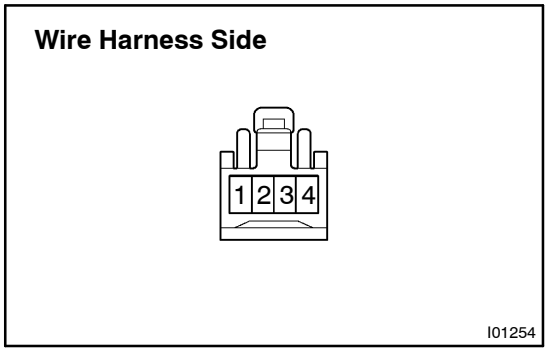
(2) The area surrounding the sensor gets bright.

(3) The driver's door is opened with the ignition switch OFF.

24. 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.



25. INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT

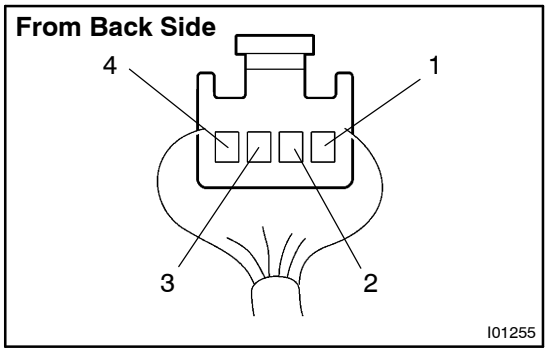
Connector disconnected:

Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the table.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery voltage
4 – Ground	Ignition switch LOCK or ACC	No voltage
4 – Ground	Ignition switch ON	5.2 – 9.0 V

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.



26. INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT

Connector connected

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side, as shown.

HINT:

- Ignition switch ON.
- Light control switch AUTO.
- Vehicle's surroundings are bright.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	9.5 V or more
Vehicle is under the direct sun light. (Sensor is not covered)		Taillight and Headlight are ON.

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.

BE160-01

ADJUSTMENT

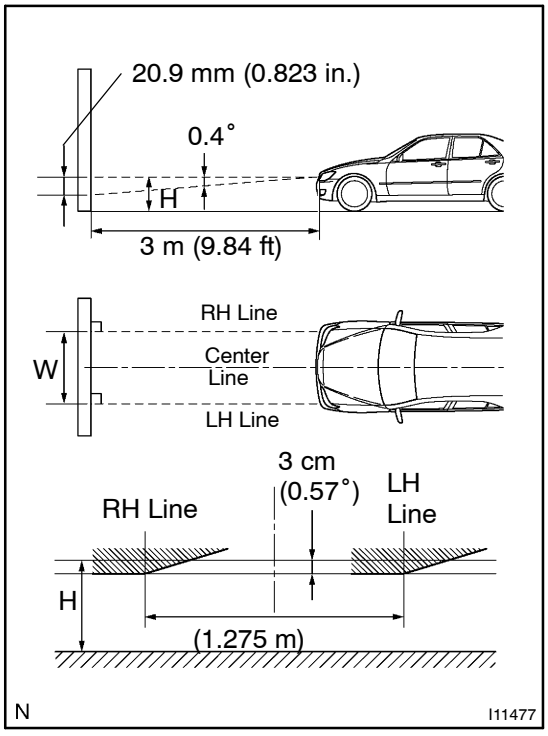
1. REPLACE HEADLIGHT

(a) Replace the headlight.

(b) Inspect the headlight aimming.

Do the following items before inspection.

- 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) Check the headlight aimming.

(1) Prepare the thick white colored paper.

(2) Stand the paper perpendicularly and ensure the distance from it to the head lights is 9.84 ft.

(3) Ensure that the center line of vehicle and the paper are at a 90 degree angle as shown in the illustration.

(4) Engine running.

(5) Draw a horizontal line on the paper where the head lights of the vehicle are to be.

(6) Draw a vertical line on the paper where the center line of the vehicle is to be. (V line)

(7) Take an appropriate measure to avoid affecting the other light.

NOTICE:

- **Disconnect the connector of the other light to avoid heat affection from the light because the outer lens of the head light assembly is made of synthetic resin. When connecting the connector again take care not to wake the aiming out of adjustment.**
- **When covering the headlight, finish it within 3 minutes.**

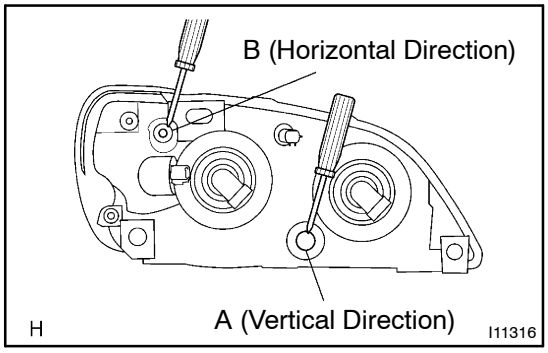
(8) Turn the head lights ON.

(9) Check that the head lights light up the paper as shown in the illustration.

(10) When the paper is not lighted up properly, adjust the lights in the vertical or horizontal direction.

HINT:

As shown in the illustration, adjust aiming of the LH and RH lights along each vertical line respectively.



(d) Vertical Alignment:
Adjust the headlight aimming.
Using adjustment bolt A, adjust the headlight aiming to within the specifiactions.

(e) Horizontal Alignment:
Adjust the headlight aimming.
Using adjustment bolt B, adjust the headlight aiming to within the specifiactions.

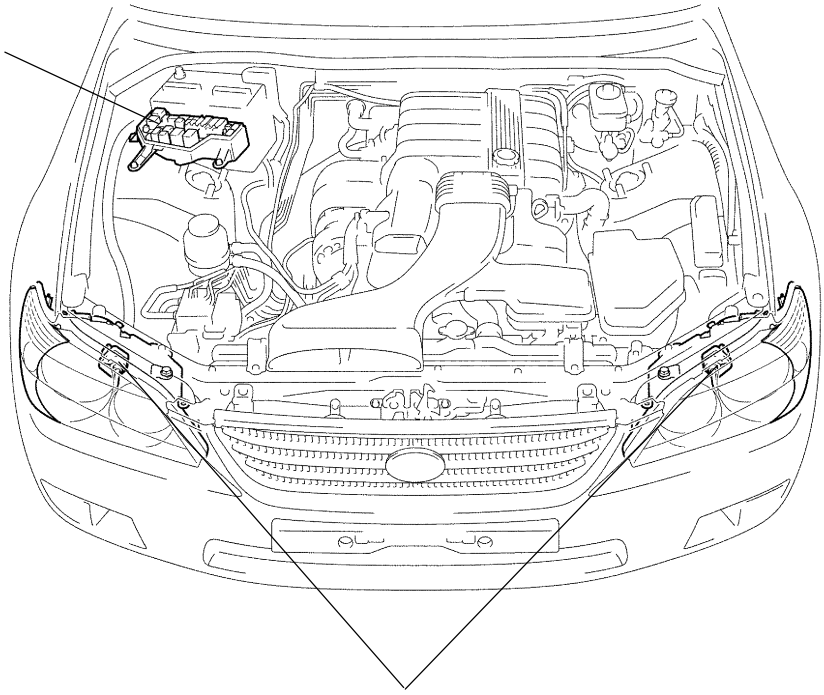
HINT:
After adjusting the headlight in vertical direction, check that the light has been shifted from the adjusted position in the horizontal direction.

HEADLIGHT BEAM LEVEL CONTROL SYSTEM

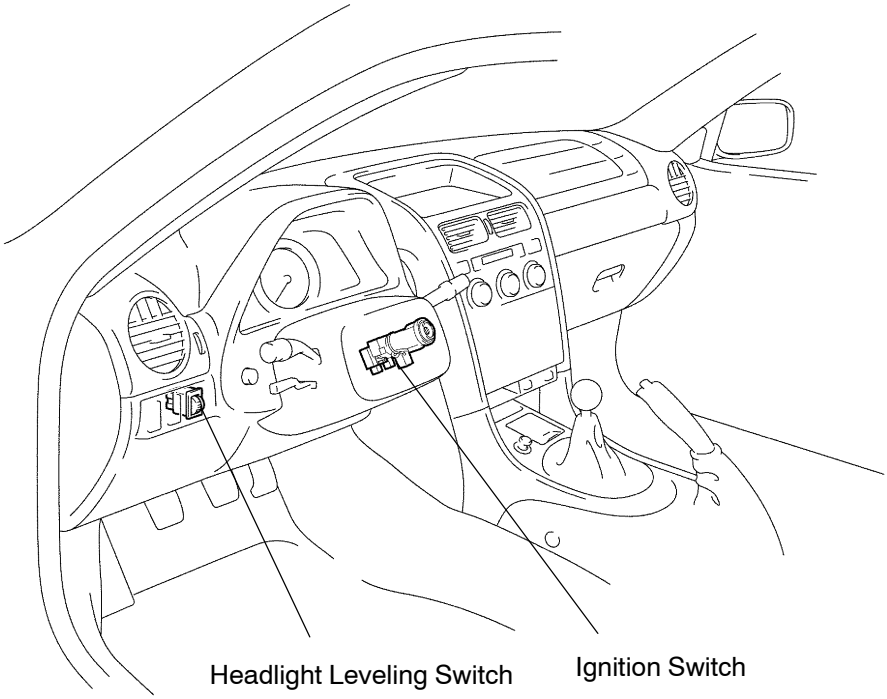
BE01R–05

LOCATION

Engine Room J/B
● H–LP LVL Fuse



Headlight Leveling Actuator



Headlight Leveling Switch

Ignition Switch

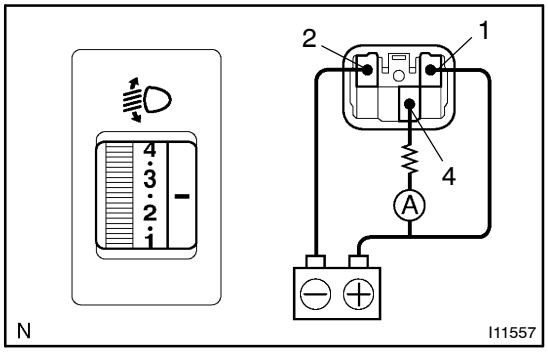
P

I10862

BE161–01

INSPECTION

1. INSPECT HEADLIGHT BEAM LEVEL CONTROL SWITCH

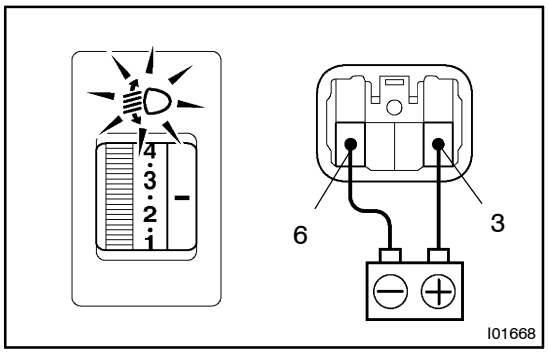


(a) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2.

(b) Measure the ammpere terminal 4.

Switch position	Ammpere (A)
0	8
1	7.2
2	6.39
3	5.59
4	4.78
5	3.98

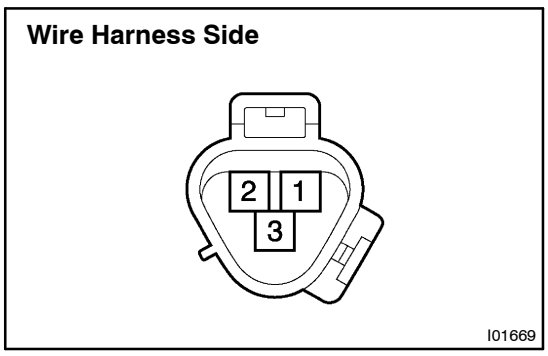
If current value is not as specified, replace the switch.



2. INSPECT HEADLIGHT BEAM LEVEL CONTROL SWITCH ILLUMINATION

Connect the positive (+) lead from the battery to terminal 3 and negative (–) lead to terminal 6, and check that the illumination light light up.

If operation is not as specified, replace the switch.



3. INSPECT HEADLIGHT BEAM LEVEL CONTROL ACTUATOR CIRCUIT

Disconnect the connector from the actuator and inspect the connector on wire harness side, as shown in the chart.

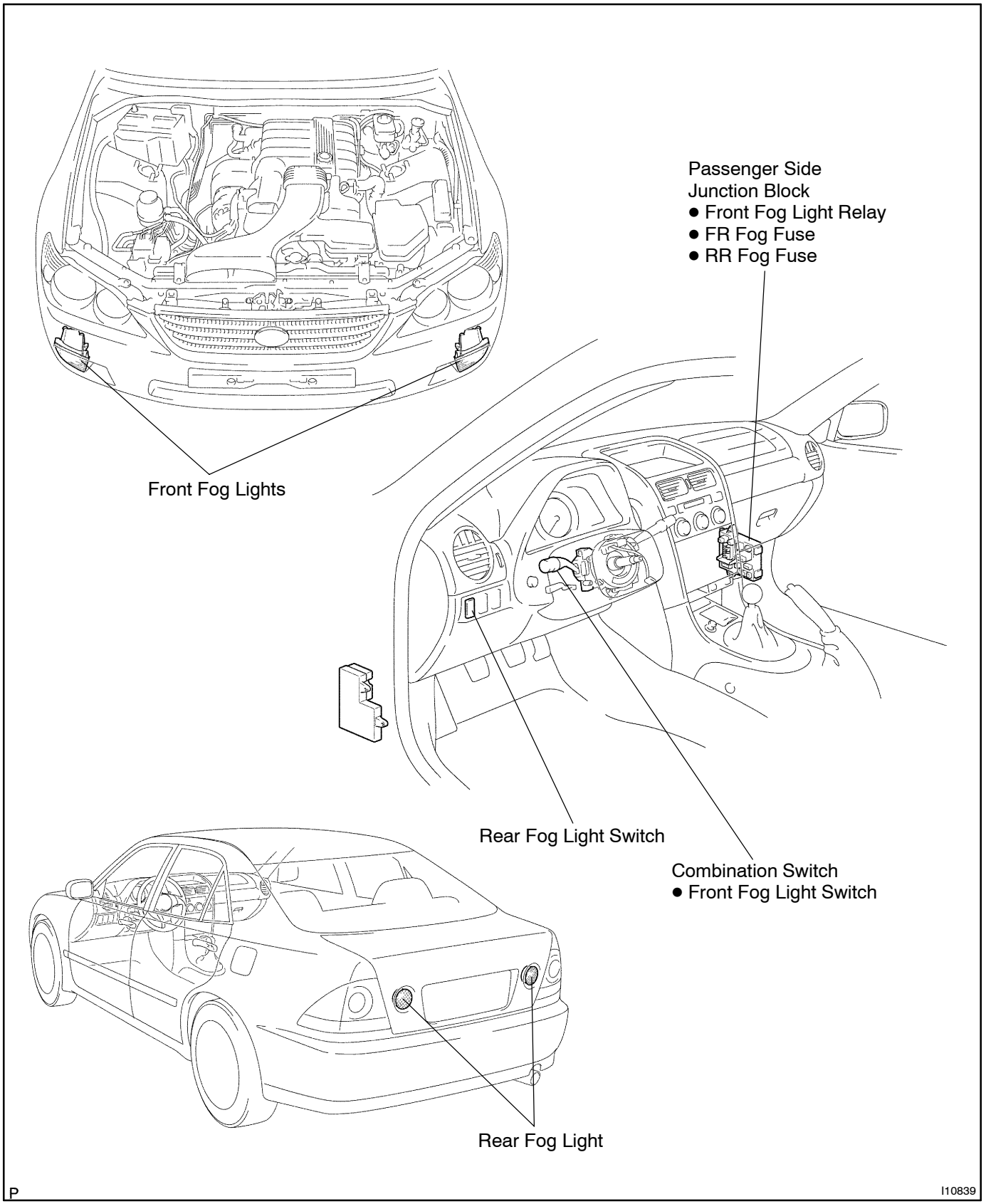
Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
3 – Ground	Constant	Battery voltage

If circuit is not as specified, replace the actuator.

FOG LIGHT SYSTEM

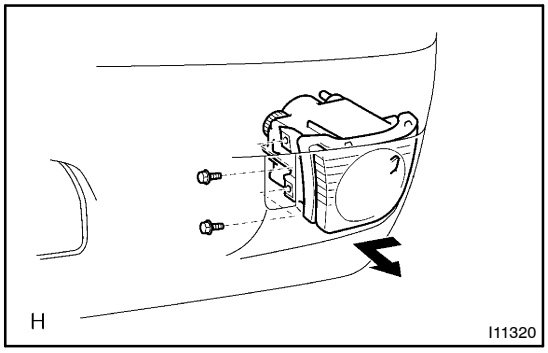
LOCATION

BE0H2–06



BE162-01

REMOVAL



1. REMOVE FOG LIGHT ASSEMBLY

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

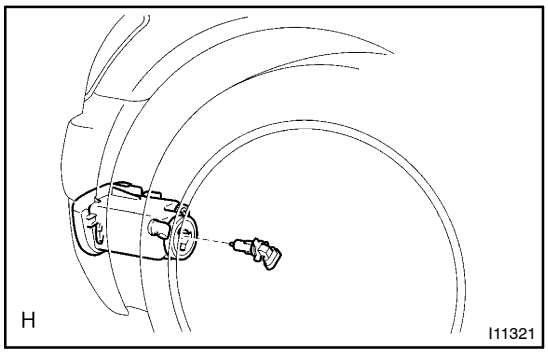
(a) As shown in the illustration, remove the LH fog light assembly.

(b) Move the claw as shown in the illustration, and disconnect the engagement of claws.

(c) Separate the connector. Remove the 2 bolts.

(d) Install LH fog light assembly.

(e) Adjust optical axis of fog light (See page BE–48).



2. REMOVE FOG LIGHT BULB

HINT:

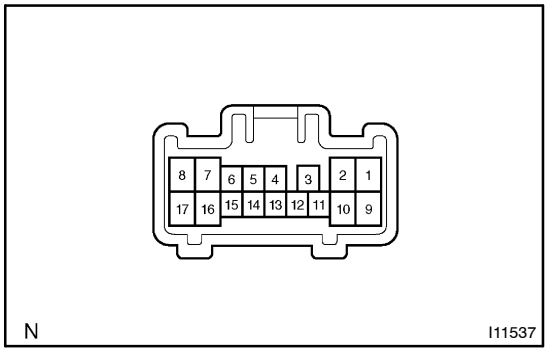
Follow the same procedure for RH as for LH.

(a) Remove a part of LH front fender liner.

(b) Separate the connector and remove the bulb.

BE163-01

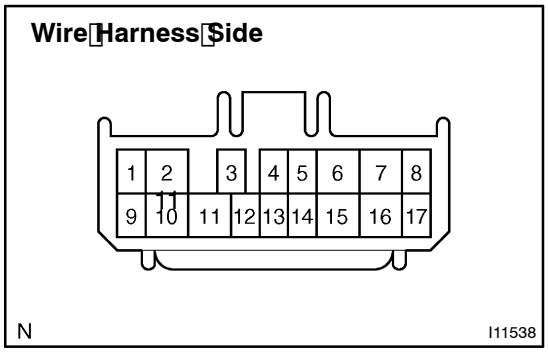
INSPECTION



1. LHD models:
INSPECT FOG LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	11 – 12	Continuity

If continuity is not as specified, replace the switch.

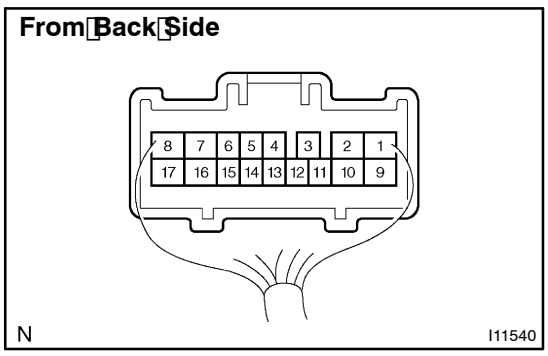


2. LHD models:
INSPECT FOG LIGHT SWITCH CIRCUIT
Connector disconnected:
(See page DI–456)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
11 – Ground	Light control switch TAIL or HEAD and dimmer switch LOW or HI	Continuity

If circuit is not as specified, inspect the wire harness.

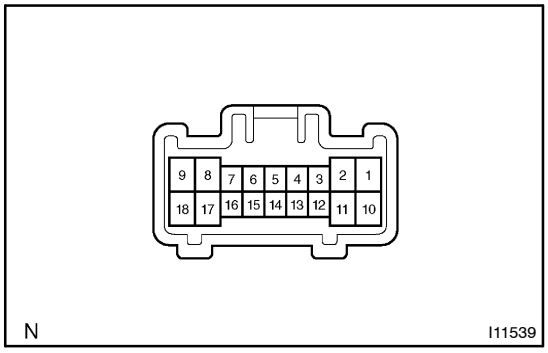


3. LHD models:
INSPECT FOG LIGHT SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the light control and dimmer switch and inspect the connector from the back side, as shown.

Tester connection	Condition	Specified condition
11 – Ground	Light control switch HEAD and headlight dimmer switch LO and fog light switch ON	No voltage
11 – Ground	Light control switch HEAD and headlight dimmer switch LO and fog light switch OFF	Battery voltage

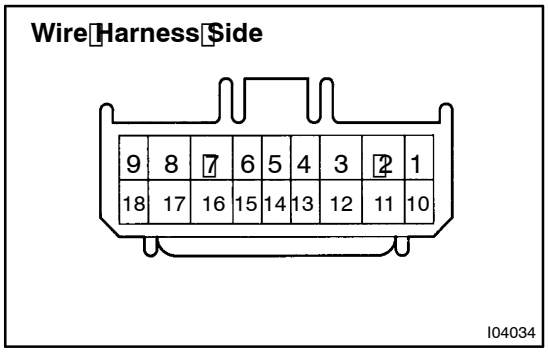
If circuit is not as specified, inspect the wire harness.



4. RHD Models:
INSPECT FRONT FOG LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	12 – 13 (Australia) 10 – 11 (Europe)	Continuity

If continuity is not as specified, replace the switch.

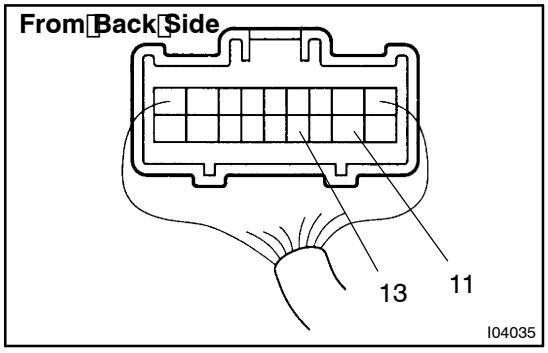


5. RHD Models:
INSPECT FRONT FOG LIGHT SWITCH CIRCUIT
Connector disconnected:
(See page DI–456)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
12 – Ground (Australia) 10 – Ground (Europe)	Light control switch TAIL or HEAD and dimmer switch LOW or HI	Continuity

If circuit is not as specified, inspect the wire harness.



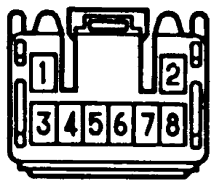
6. RHD Models:
INSPECT FRONT FOG LIGHT SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the light control and dimmer switch and inspect the connector from the back side, as shown.

Tester connection	Condition	Specified condition
13 – Ground (Australia) 11 – Ground (Europe)	Light control switch HEAD and headlight dimmer switch LO and fog light switch ON	No voltage
13 – Ground (Australia) 11 – Ground (Europe)	Light control switch HEAD and headlight dimmer switch LO and fog light switch OFF	Battery voltage

If circuit is not as specified, inspect the wire harness.

Wire Harness Side



I11315

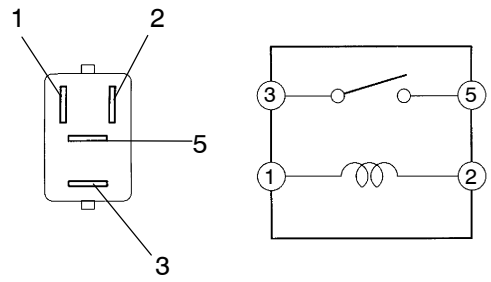
7. INSPECT REAR FOG LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*Continuity
2 – Ground	Light control switch TAIL or HEAD	Continuity
4 – Ground	Constant	Battery voltage
5 – Ground	Light control switch HEAD	Continuity
6 – Ground	Front fog light switch ON	Continuity
7 – Ground	Constant	Continuity
8 – Ground	Constant	Continuity
3 – Ground	Constant	Battery voltage

*: There is resistance because this circuit is ground through the bulb.

If the circuit is not as specified, replace the wire harness.



N

I01200

8. INSPECT FRONT FOG LIGHT RELAY CONTINUITY

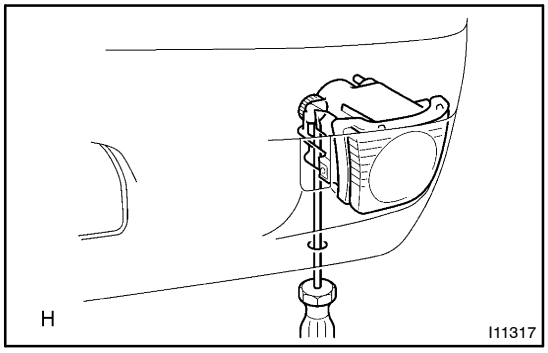
Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

9. INSPECT FRONT FOG LIGHT RELAY CIRCUIT

(See page DI–456)

BE164–01



ADJUSTMENT

ADJUST FOG LIGHT AIM

A–bolt: Vertical Direction

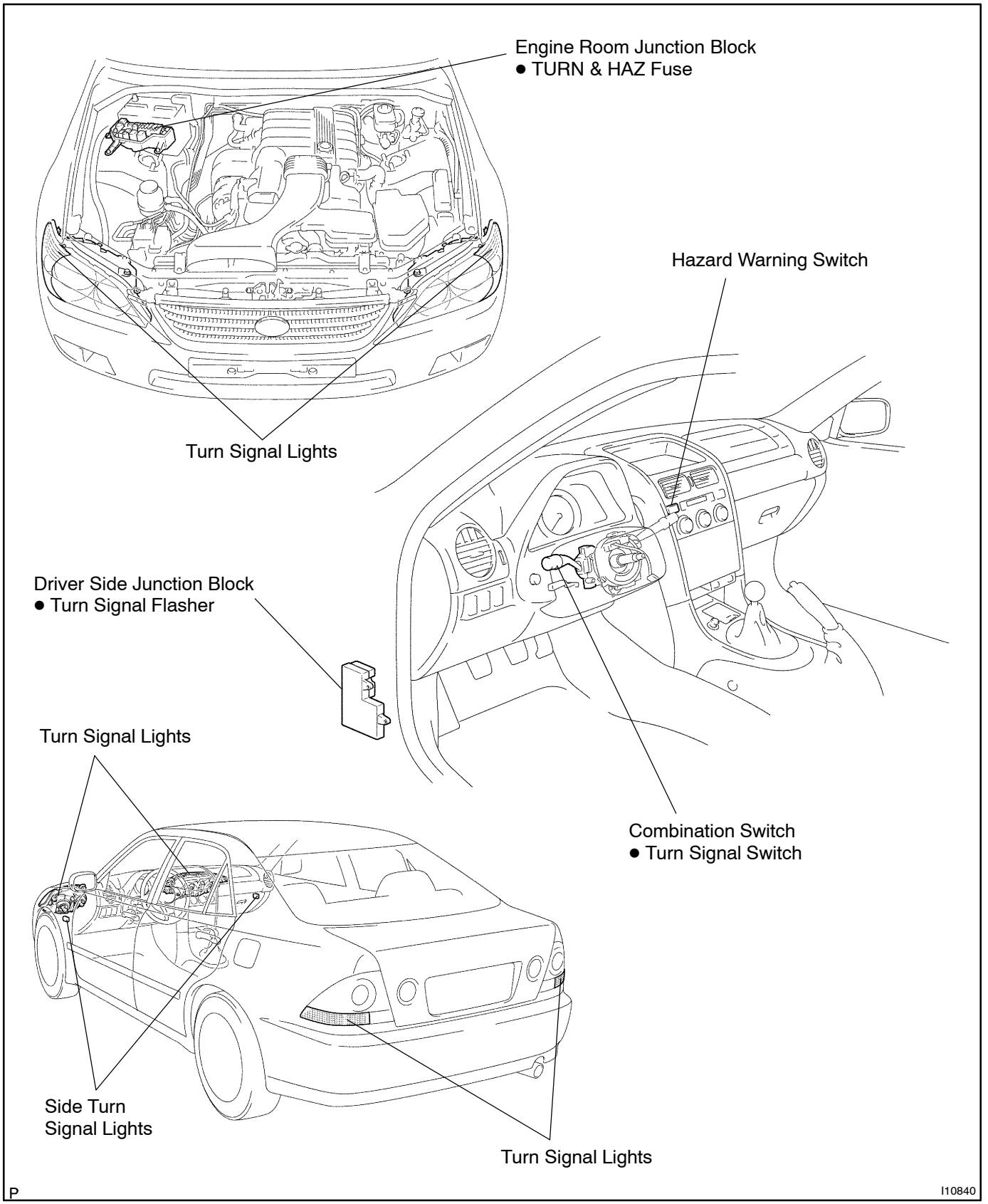
HINT:

Insert a driver into the hole for aiming in the fender liner to perform aiming.

TURN SIGNAL AND HAZARD WARNING SYSTEM

BE0H0-05

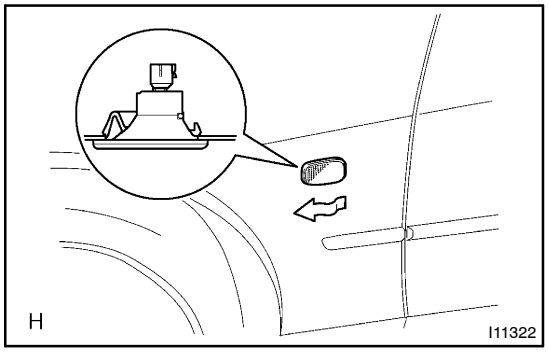
LOCATION

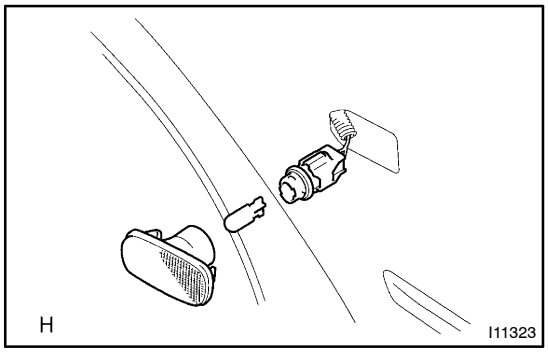


P

I10840

BE165–01





REMOVAL

1. REMOVE SIDE TURN SIGNAL LIGHT ASSEMBLY

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Pull off the LH side turn signal light assembly as shown in the illustration, and remove it.

(b) Separate the connector.

2. REMOVE SIDE TURN SIGNAL LIGHT BULB

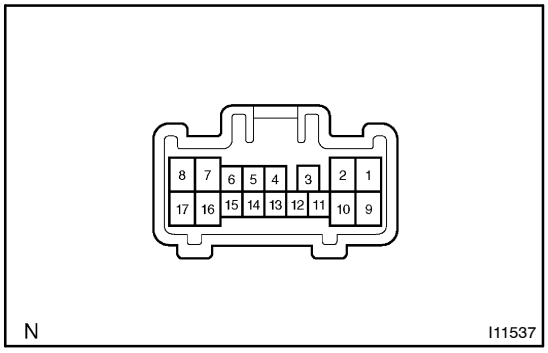
HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove side turn signal light assembly

(b) Remove the bulb socket and bulb.

BE166-01

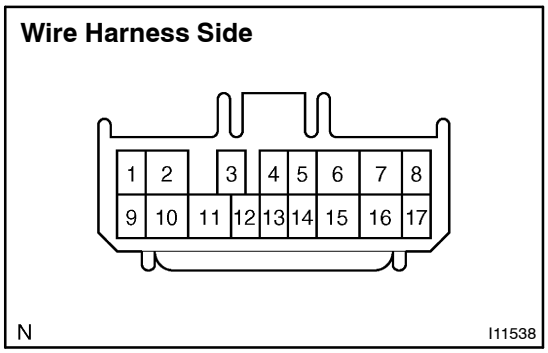


INSPECTION

1. LHD models:
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.

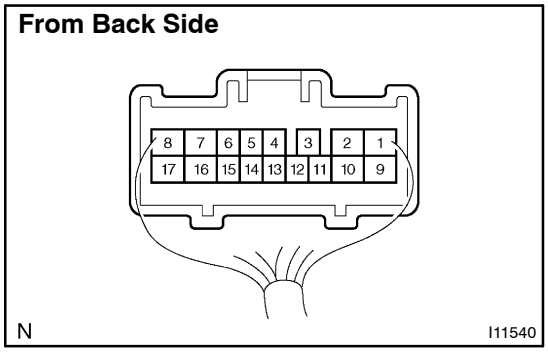


2. LHD models:
INSPECT TURN SIGNAL SWITCH CIRCUIT
Connector disconnected:

Disconnect the connector from the combination switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If circuit is not as specified, inspect the wire harness.

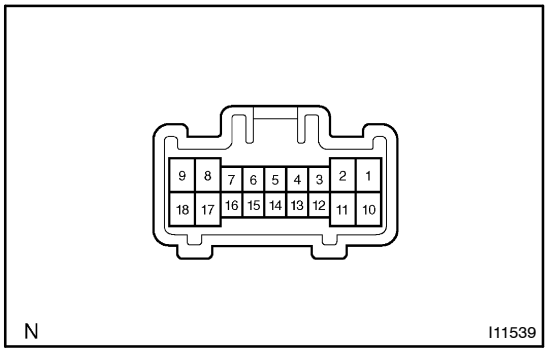


3. LHD models:
INSPECT TURN SIGNAL SWITCH CIRCUIT
Connector connected:

Connect the wire harness side connector to the combination switch and inspect the connector form the back side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Ignition switch ON and turn signal switch Neutral	No voltage
1 – Ground	Ignition switch ON and turn signal switch Left	Battery voltage ↔ 0 V
3 – Ground	Ignition switch ON and turn signal switch Right	Battery voltage ↔ 0 V

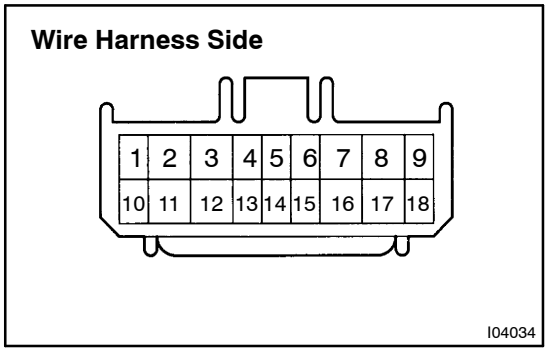
If circuit is not as specified, inspect the circuits connected to other parts.



4. RHD models:
INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	7 – 8 (Australia) 1 – 2 (Europe)	Continuity
Neutral	–	No continuity
Right turn	8 – 9 (Australia) 2 – 3 (Europe)	Continuity

If continuity is not as specified, replace the switch.

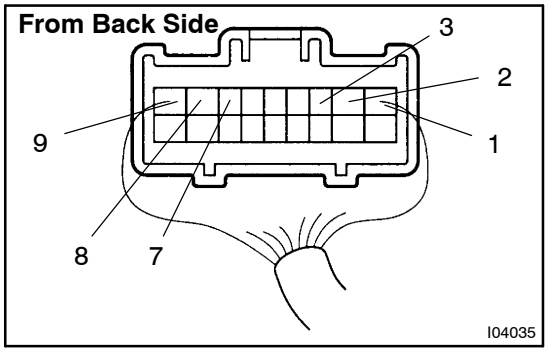


5. RHD models:
INSPECT TURN SIGNAL SWITCH CIRCUIT
Connector disconnected:

Disconnect the connector from the combination switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
8 – Ground(Australia) 2– Ground (Europe)	Constant	Continuity

If circuit is not as specified, inspect the wire harness.



6. RHD models:
INSPECT TURN SIGNAL SWITCH CIRCUIT
Connector connected:

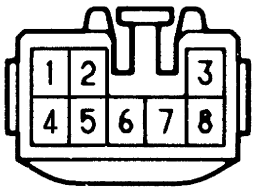
Connect the wire harness side connector to the combination switch and inspect the connector form the back side, as shown.

Tester connection	Condition	Specified condition
8 – Ground (Australia) 2 – Ground (Europe)	Ignition switch ON and turn signal switch Neutral	No voltage
7 – Ground (Australia) 1 – Ground (Europe)	Ignition switch ON and turn signal switch Left	Battery voltage ↔ 0 V
9 – Ground (Australia) 3 – Ground (Europe)	Ignition switch ON and turn signal switch Right	Battery voltage ↔ 0 V

If circuit is not as specified, inspect the circuits connected to other parts.

7. INSPECT HAZARD WARNING SWITCH
(See page DI–568, AC–91)

Wire Harness Side



I04046

8. INSPECT TURN SIGNAL FLASHER CIRCUIT

Disconnect the connector from the combination switch and inspect the connector on the wire harness side, as shown.

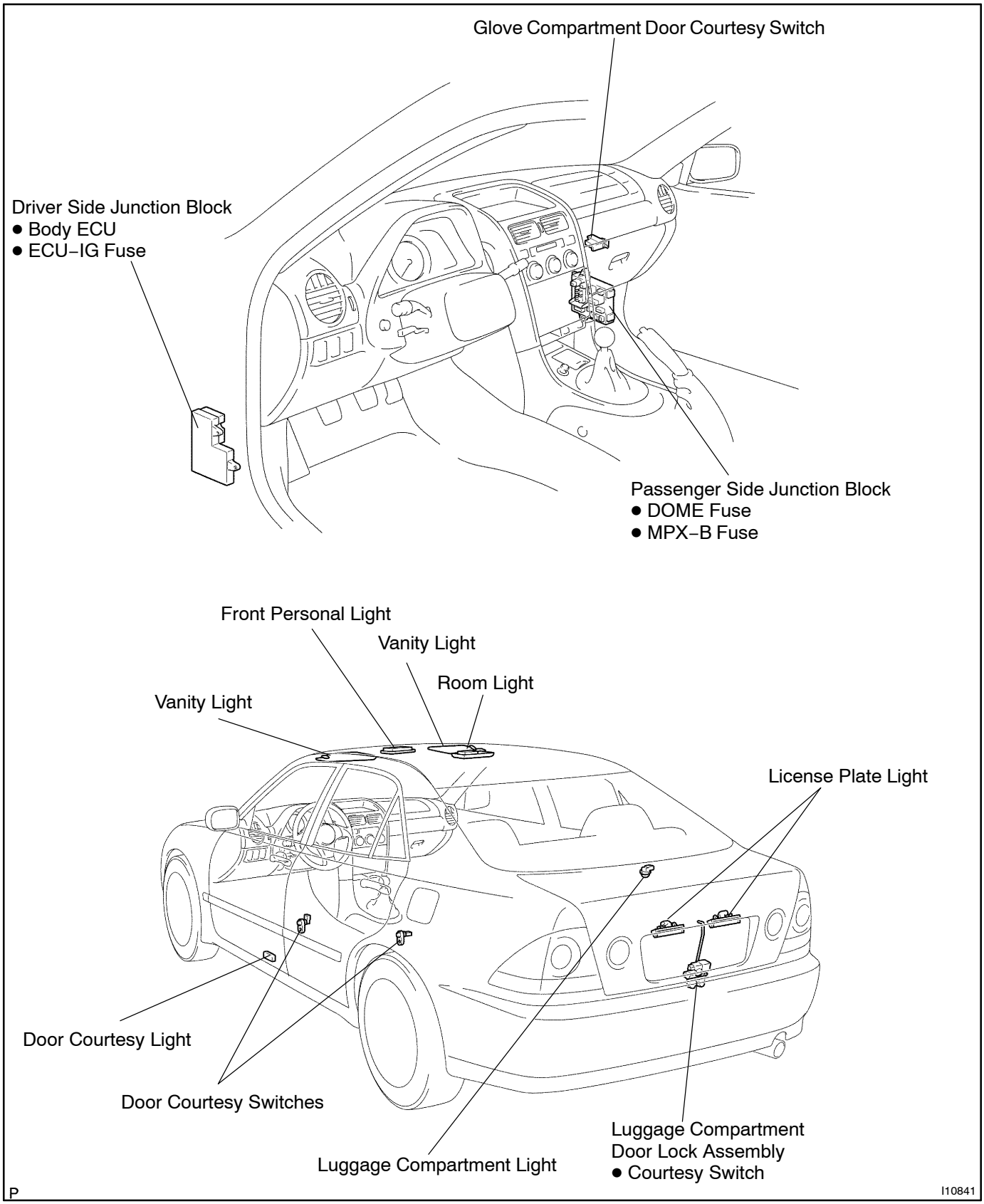
Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
3 – Ground	Constant	Continuity
5 – Ground	Turn signal switch RIGHT or OFF	No continuity
5 – Ground	Turn signal switch LEFT	Continuity
6 – Ground	Turn signal switch LEFT or OFF	No continuity
6 – Ground	Turn signal switch RIGHT	Continuity
7 – Ground	Constant	Continuity
8 – Ground	Hazard warning switch OFF	No continuity
8 – Ground	Hazard warning switch ON	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery voltage
4 – Ground	Constant	Battery voltage

If circuit is as specified, replace the relay.
If circuit is not as specified, inspect the circuits connected to other parts.

INTERIOR LIGHT SYSTEM

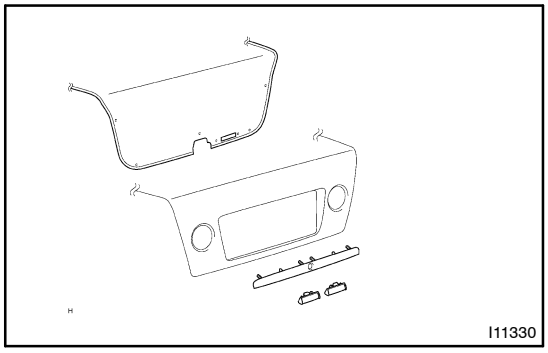
LOCATION

BE0GY–04



BE167–01

REMOVAL

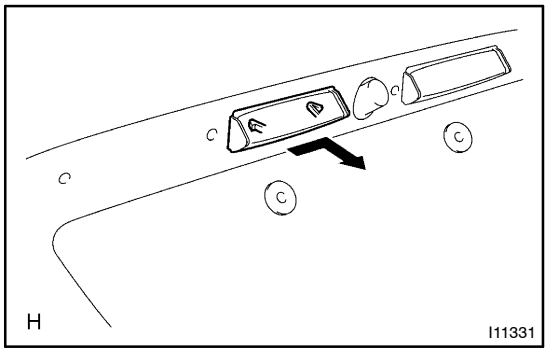


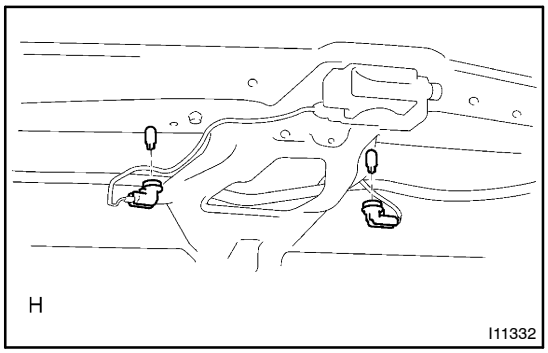
1. REMOVE LICENSE PLATE LIGHT

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove a part of luggage compartment door trim.
(b) Remove the 4 nuts.
(c) Remove luggage compartment door outer garnish (See page BO–40).
(d) Disconnect the connector.
(e) Pull the claw towards the inside of the vehicle as shown in the illustration, disconnect the engagement of 2 claws, and remove the license plate light assembly.





2. REMOVE LICENSE PLATE BULB

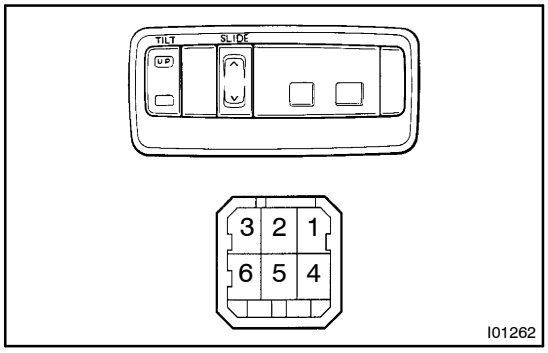
HINT:

Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

(a) Remove a part of luggage compartment door trim.
(b) Disconnect the bulb sockets and remove the bulbs.

BE168-01

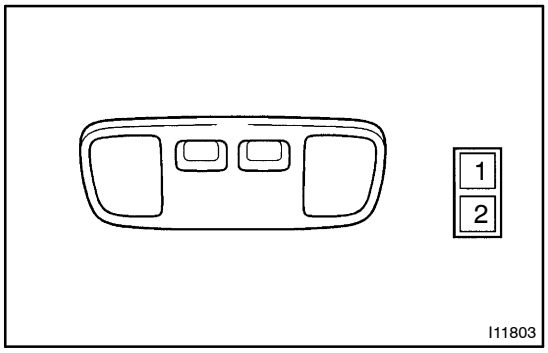
INSPECTION



1. w/ Sliding Roof: INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 4	Continuity

If continuity is not as specified, replace the light assembly or bulb.

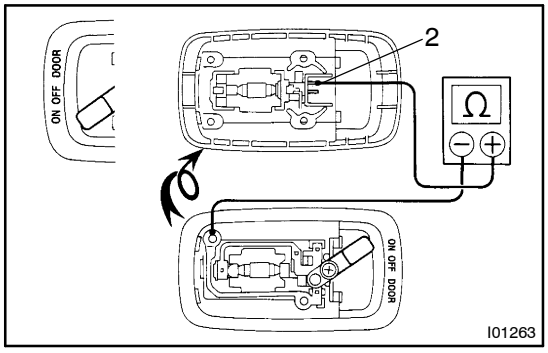


2. w/o Sliding Roof: INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY

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.

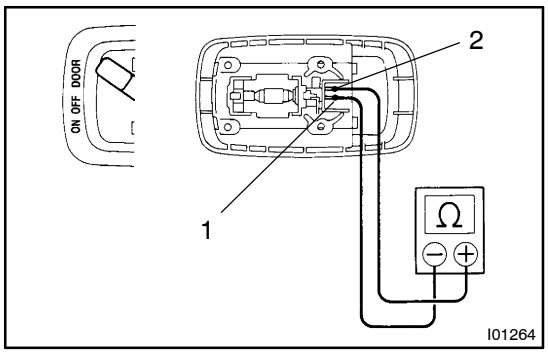
3. INSPECT FRONT PERSONAL LIGHT SWITCH CIRCUIT (See page DI–564)



4. INSPECT ROOM LIGHT CONTINUITY

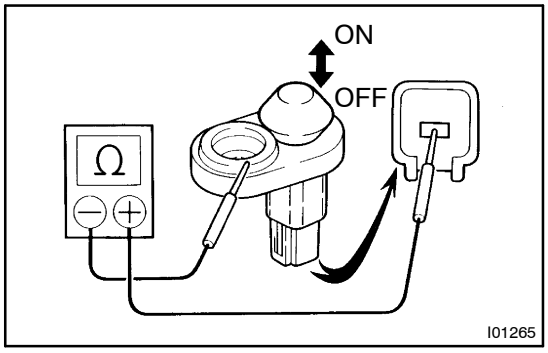
(a) Disconnect the connector from the room light.

(b) Turn the room light switch ON, check that continuity exists between terminal 2 and body ground.



(c) Turn the room light switch DOOR, check that continuity exists between terminals 1 and 2.

If continuity is not as specified, replace the light assembly or bulb.

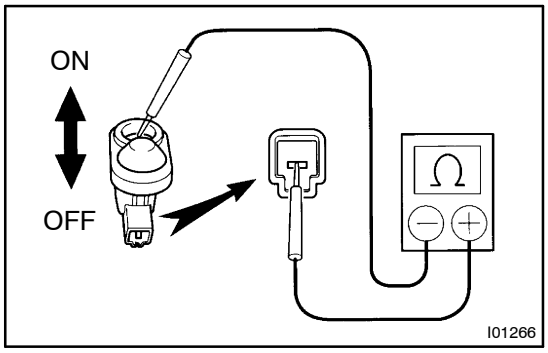


5. INSPECT FRONT DOOR COURTESY SWITCH CONTINUITY

(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.

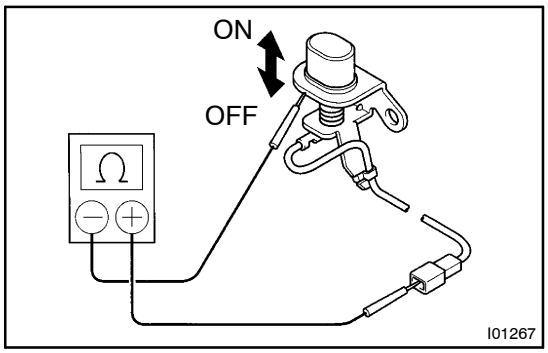


6. INSPECT REAR DOOR COURTESY SWITCH CONTINUITY

(a) Check that there is continuity between terminals and the switch body with the switch ON (switch pin released: opened door).

(b) Check that there is no continuity between terminals and the switch body with the switch OFF (switch pin pushed in: closed door).

If operation is not as specified, replace the switch.

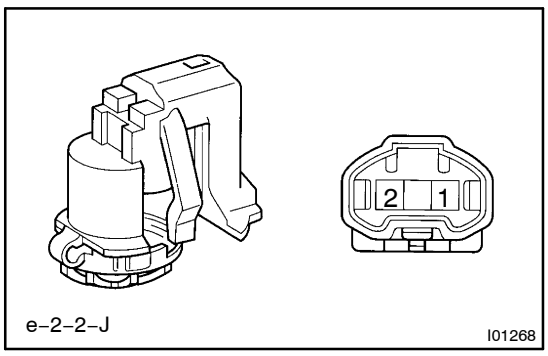


7. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

(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).

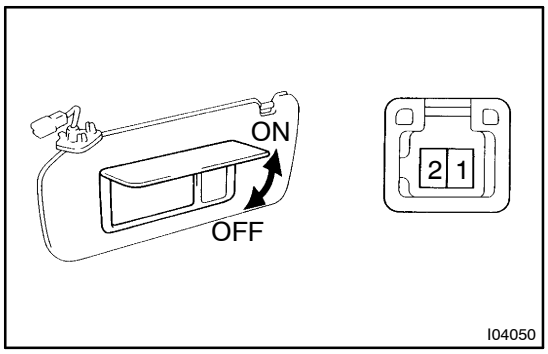
If operation is not as specified, replace the switch.



8. INSPECT LUGGAGE COMPARTMENT LIGHT CONTINUITY

Using the ohmmeter, check that continuity exists between terminals.

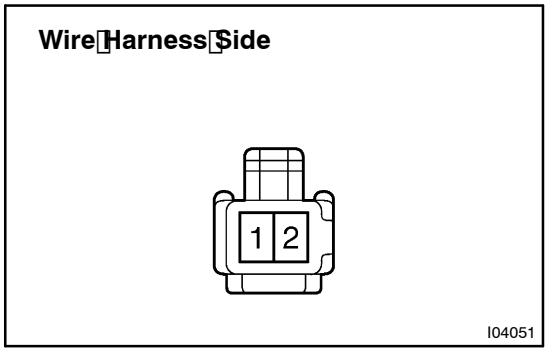
If continuity is not as specified, replace the light assembly or bulb.



9. 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 vanity light assembly or bulb.

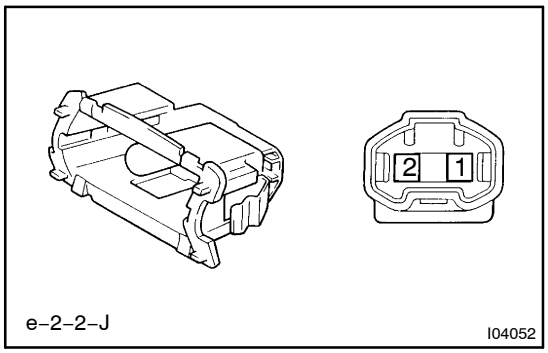


10. INSPECT VANITY LIGHT CIRCUIT
(See page DI–564)

Disconnect the connector from the light and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery voltage

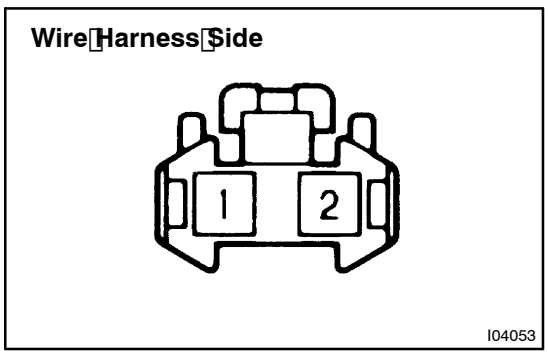
If circuit is not as specified, inspect power source or wire harness.



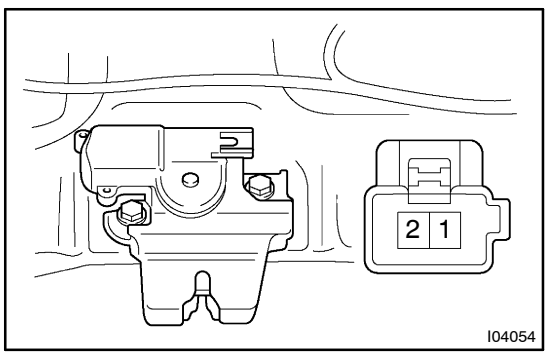
11. INSPECT DOOR COURTESY LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the light assembly or bulb.



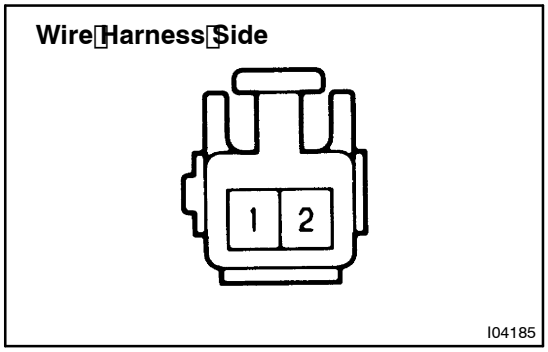
12. INSPECT DOOR COURTESY LIGHT CIRCUIT
(See page DI–564)



13. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (closed)	–	No continuity
ON (opened)	2 – Switch body	Continuity

If continuity is not as specified, replace the switch.

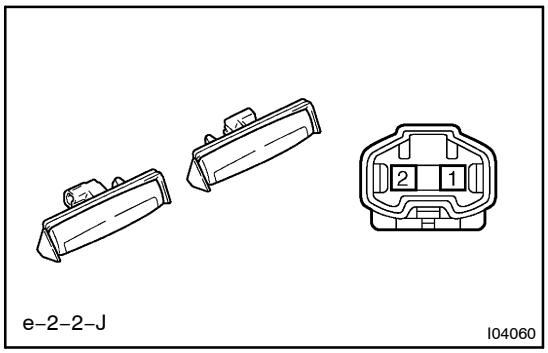


14. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CIRCUIT
(See page DI–586)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Body ground	Luggage compartment door courtesy switch ON (door opened)	Continuity

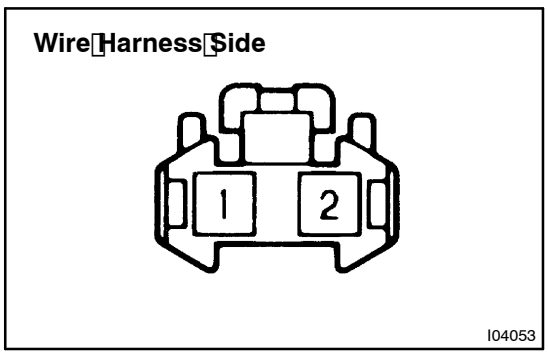
If circuit is not as specified, inspect power source or wire harness.



15. INSPECT LICENSE PLATE LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the light assembly or bulb.



16. INSPECT LICENSE PLATE LIGHT CIRCUIT

Disconnect the connector from the light and inspect the connector on the wire harness side, as shown.

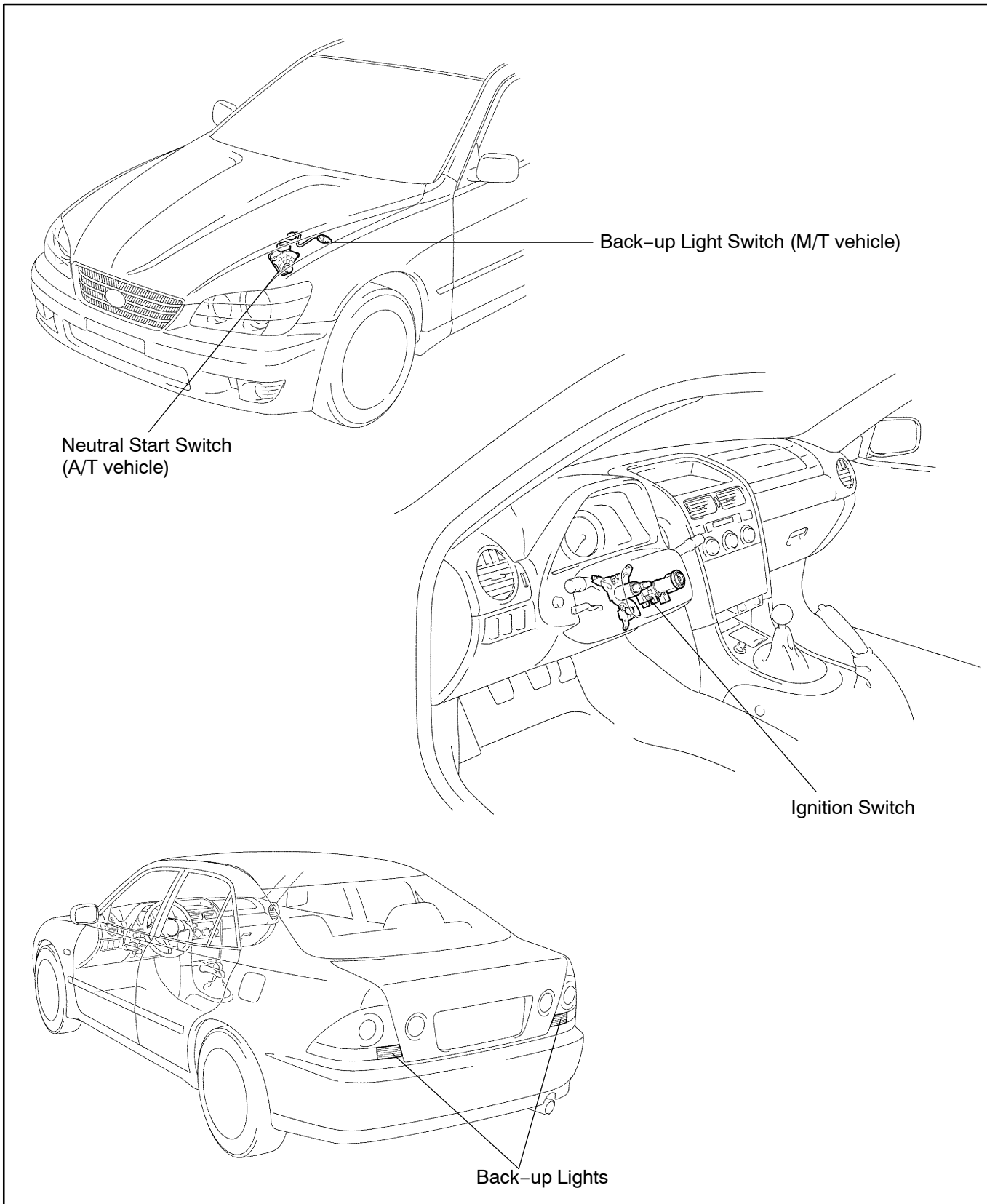
Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
2 – Ground	Light control switch TAIL or HEAD	Battery voltage

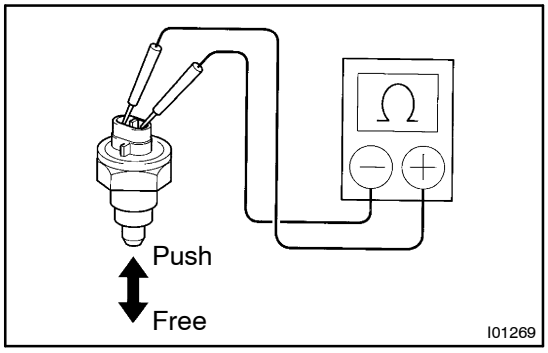
If circuit is not as specified, inspect power source or wire harness.

BACK–UP LIGHT SYSTEM

LOCATION

BE0GW–07





BE169–01

INSPECTION

1. INSPECT BACK–UP LIGHT SWITCH CONTINUITY

Switch position	Specified condition
Push	Continuity
Free	No continuity

If continuity is not as specified, replace the switch.

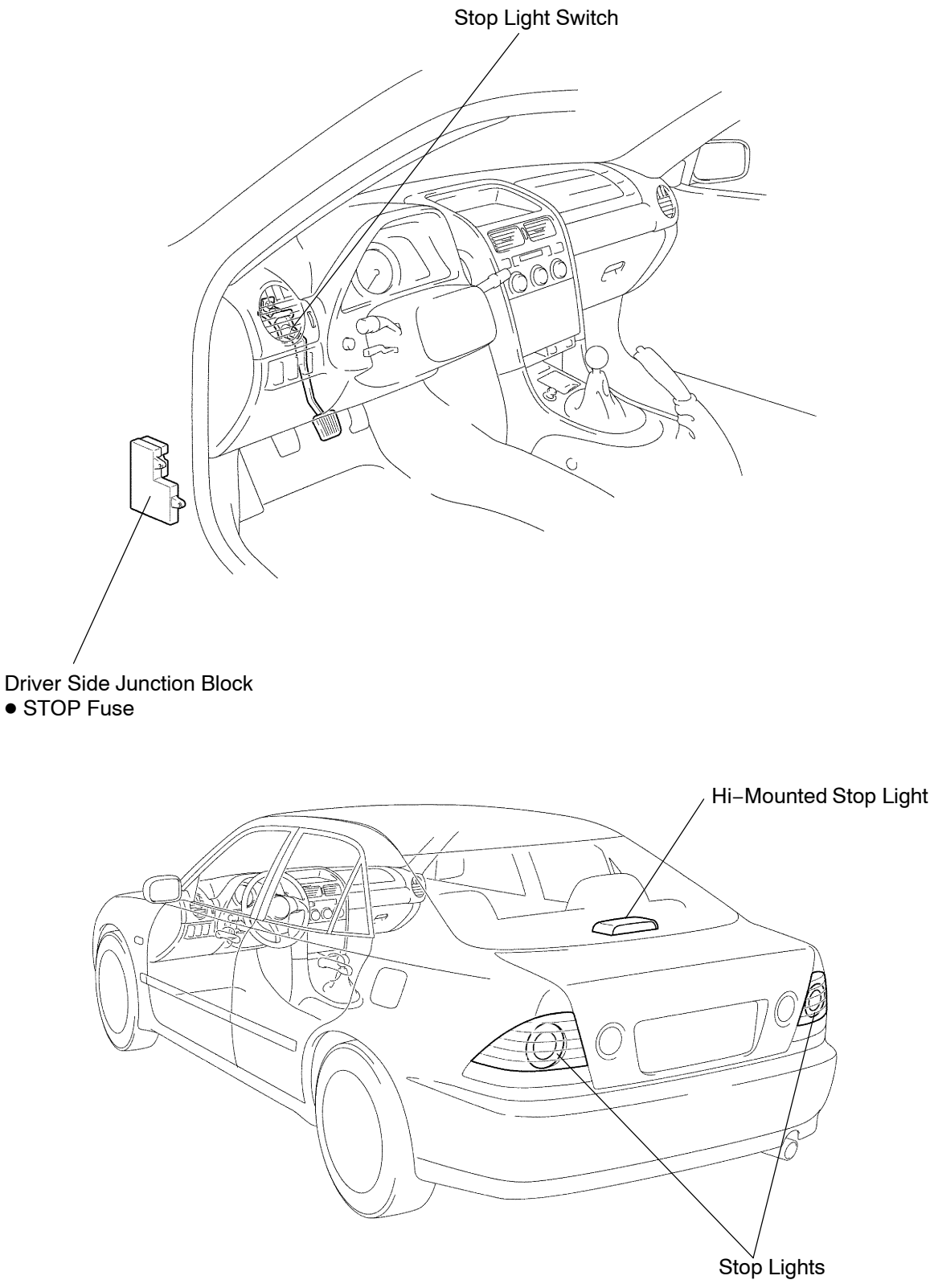
2. INSPECT NEUTRAL START SWITCH CONTINUITY

(See page DI–204)

STOP LIGHT SYSTEM

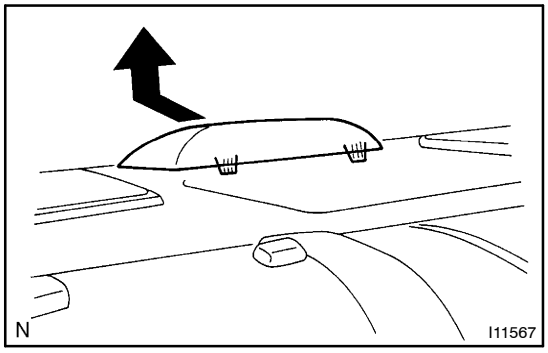
LOCATION

BE0H6–07



BE16A–01

REMOVAL



1. REMOVE CENTER STOP LIGHT ASSEMBLY

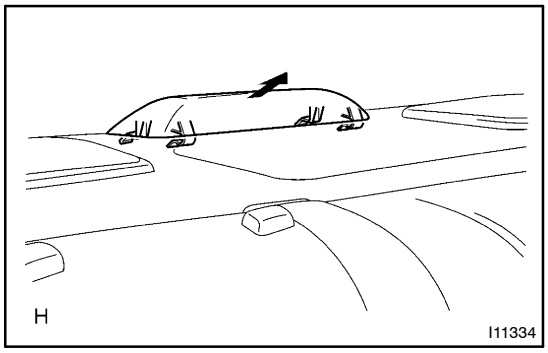
HINT:

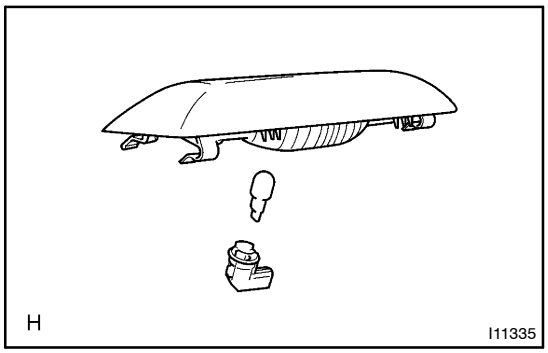
Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

(a) Insert the clip remover in the position as shown in the illustration, pull it upwards, and disconnect the engagement of the 2 front claws.

(b) Pull the center stop light assembly in the direction as shown in the illustration, and disconnect the engagement of 4 claws.

(c) Separate the connector, and remove the center stop light assembly.





2. REMOVE CENTER STOP LIGHT BULB

HINT:

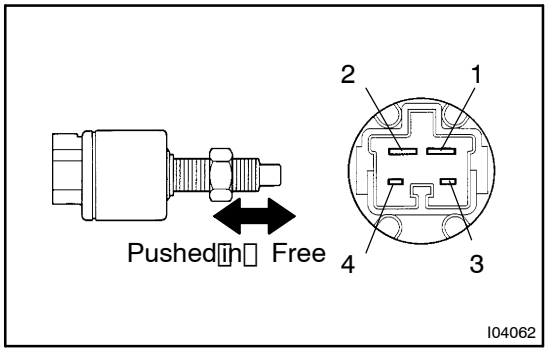
Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

(a) Remove center stop light assembly.

(b) Remove the bulb sockets and bulbs.

BE16B–01

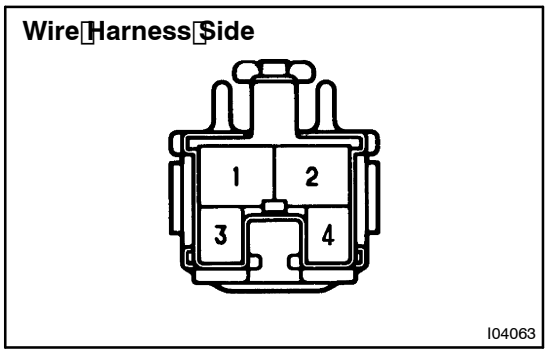
INSPECTION



1. INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch pin free (Pedal depressed)	–	No continuity
Switch pin pushed in (Pedal released)	1 – 2	Continuity
Switch pin free (Pedal depressed)	–	No continuity
Switch pin pushed in (Pedal released)	3 – 4	Continuity

If continuity is not as specified, replace the switch.



2. INSPECT STOP LIGHT SWITCH CIRCUIT

(See page DI–488)

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

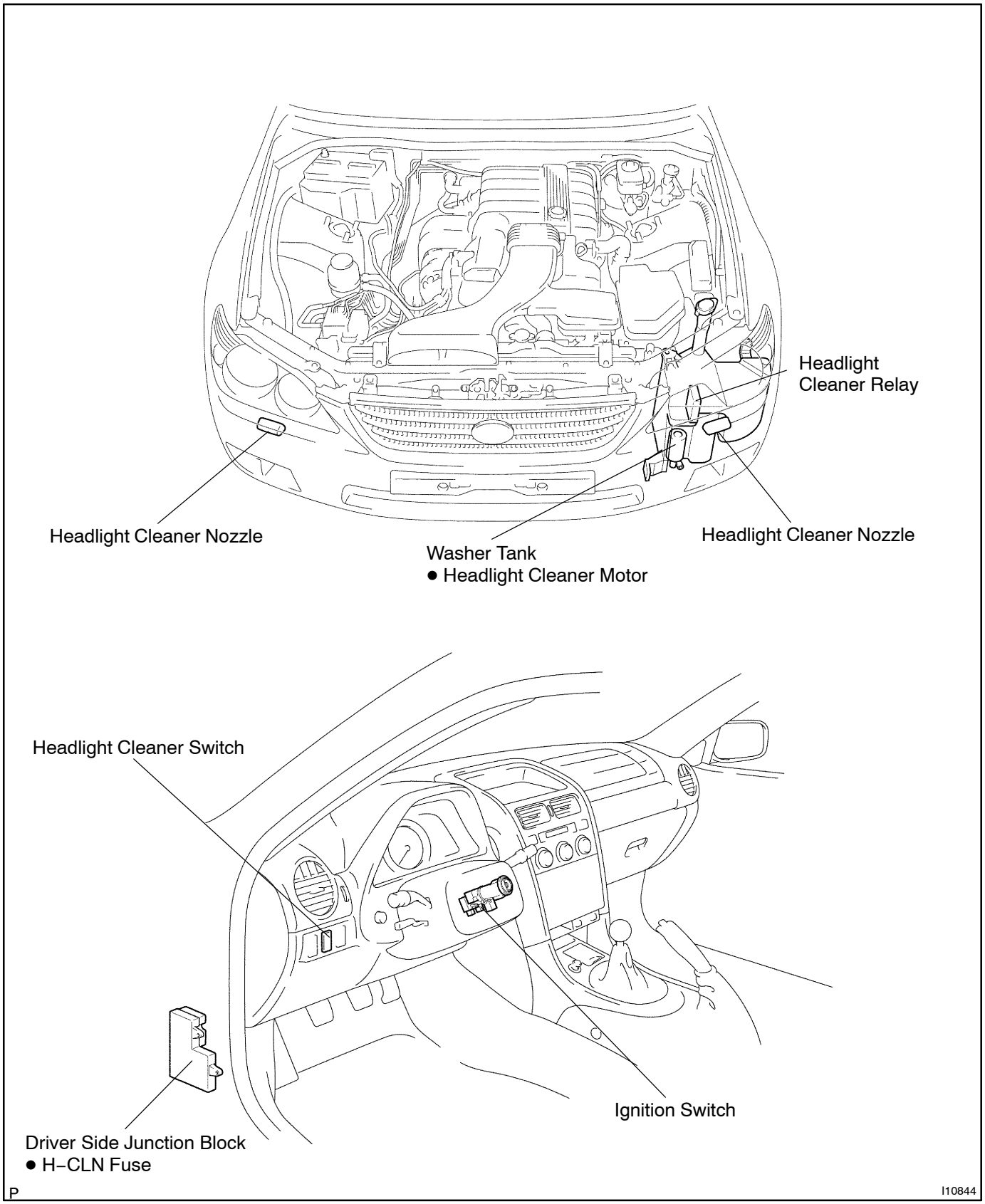
Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery voltage

If circuit is not as specified, inspect the power source or wire harness.

HEADLIGHT CLEANER SYSTEM

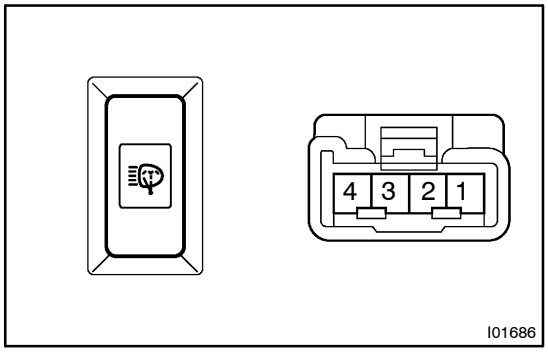
LOCATION

BE023–06



BE0HM–02

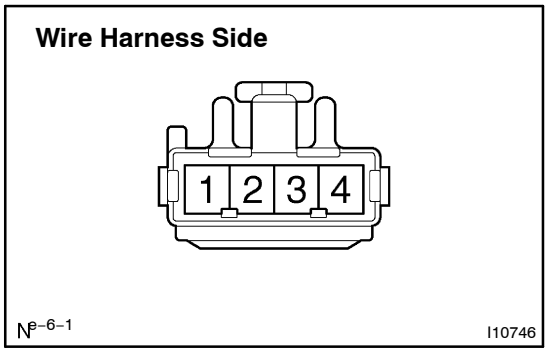
INSPECTION



1. INSPECT HEADLIGHT CLEANER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 4	Continuity
Illumination circuit	2 – 3	Continuity

If continuity is not as specified, replace the switch.

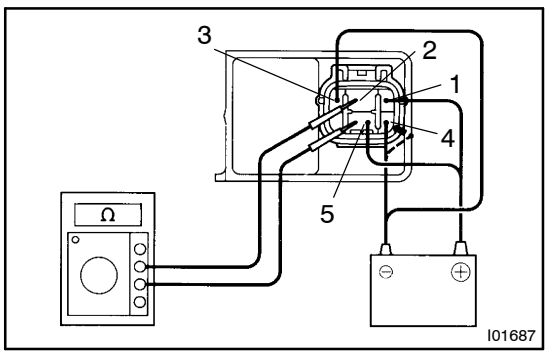


2. INSPECT HEADLIGHT CLEANER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Headlight ON	Continuity
1 – Ground	Headlight OFF	No continuity

If circuit is not as specified, inspect the circuits connected to other parts.



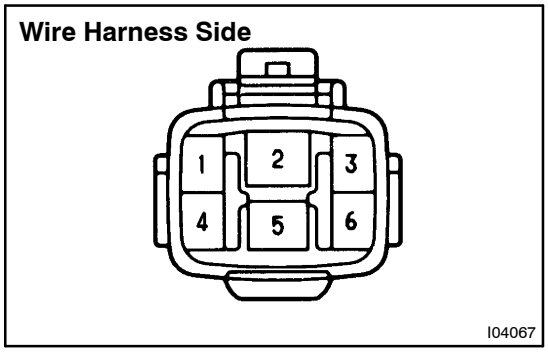
3. INSPECT HEADLIGHT CLEANER RELAY OPERATION

(a) Check that no continuity exists between terminals 2 and 5.

(b) Connect the positive (+) lead from the battery to terminals 1 and 5, and the negative (–) lead to terminal 3.

(c) Connect the negative (–) lead from the battery to terminal 4, and check that continuity exists between terminals 2 and 5 for 0.9 – 1.1 seconds, then no continuity exists.

If operation is not as specified, replace the motor.

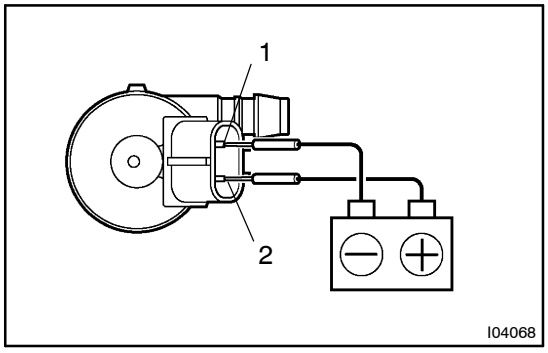


4. INSPECT HEADLIGHT CLEANER RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground 3 – Ground	Constant	Continuity
4 – Ground	Ignition switch ON, light control switch in HEAD and cleaner switch OFF	No continuity
4 – Ground	Ignition switch ON, light control switch in HEAD and cleaner switch ON or daytime running light system operating	Continuity
1 – Ground	Ignition switch OFF or ACC	No voltage
1 – Ground	Ignition switch ON	Battery voltage
5 – Ground	Constant	Battery voltage

If circuit is not as specified, inspect the circuits connected to other parts.



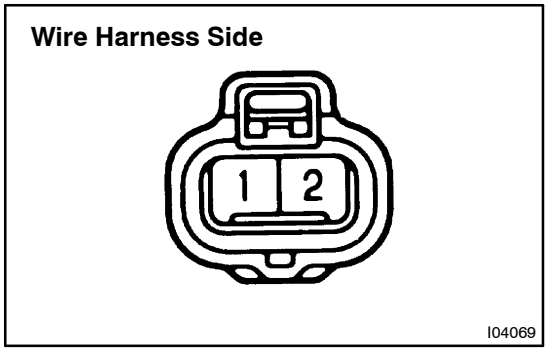
5. INSPECT HEADLIGHT CLEANER MOTOR OPERATION

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.



6. INSPECT HEADLIGHT CLEANER MOTOR CIRCUIT

Disconnect the connector from the cleaner motor and inspect the connector on wire harness side, as shown.

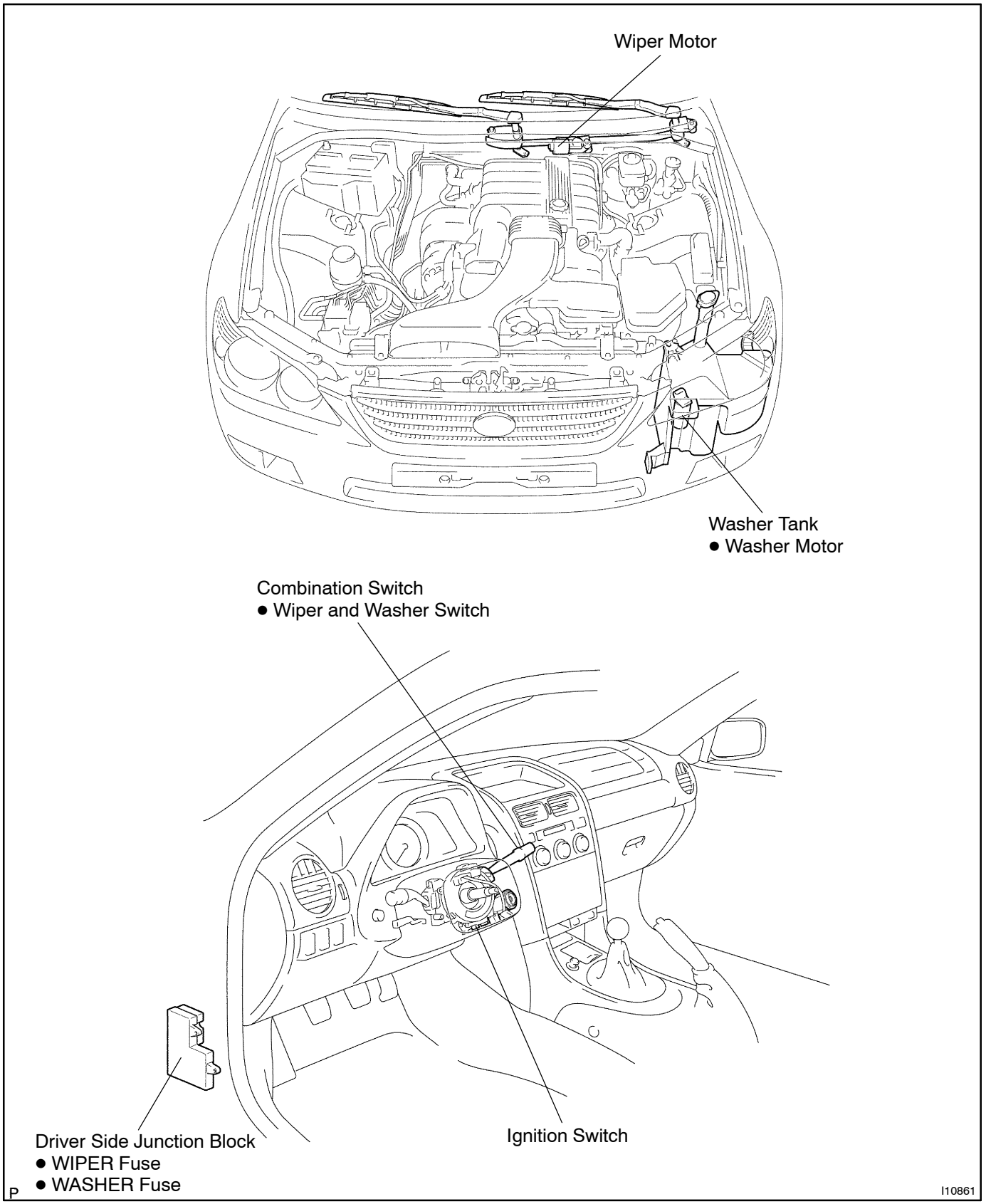
Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If circuit is not as specified, inspect the circuits connected to other parts.

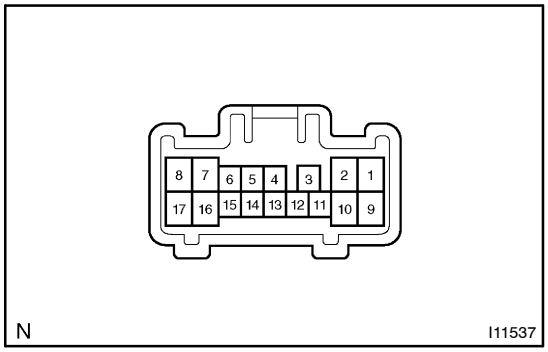
WIPER AND WASHER SYSTEM

BE0HN–06

LOCATION



BE0HO–03

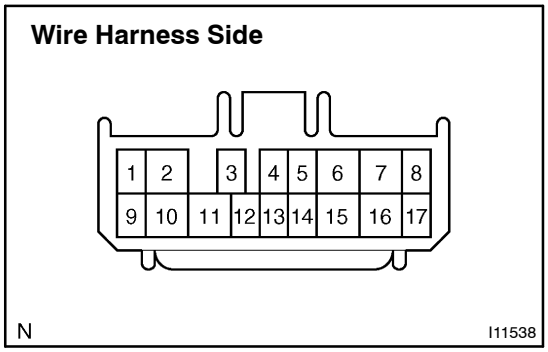


INSPECTION

1. LHD models:
INSPECT 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 OFF	–	No continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.

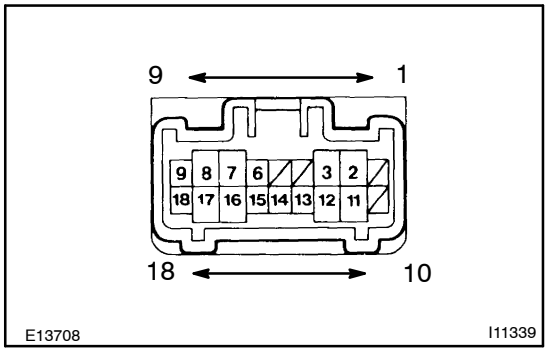


2. LHD models:
INSPECT WIPER AND WASHER SWITCH CIRCUIT
Connector disconnected:

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
17 – Ground	Ignition switch LOCK or ACC	No voltage
17 – Ground	Ignition switch ON	Battery voltage

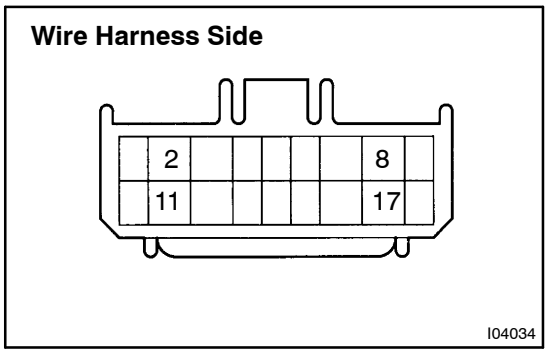
If circuit is not as specified, inspect the circuits connected to other parts.



3. RHD models:
INSPECT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	3 – 12 (Australia) 7 – 16 (Europe)	Continuity
INT	3 – 12 (Australia) 7 – 16 (Europe)	Continuity
LO	3 – 11 (Australia) 7 – 17 (Europe)	Continuity
HI	2 – 11 (Australia) 8 – 17 (Europe)	Continuity
Washer OFF	–	No continuity
Washer ON	8 – 17 (Australia) 2 – 11 (Europe)	Continuity

If continuity is not as specified, replace the switch.

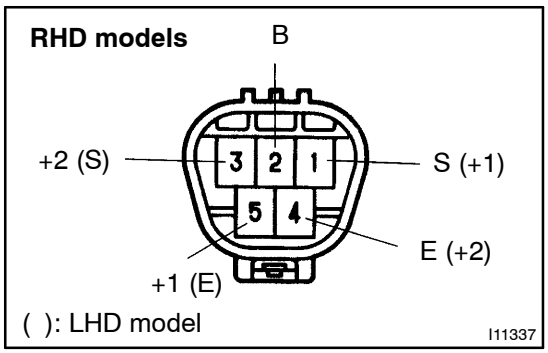


4. RHD models:
INSPECT WIPER AND WASHER SWITCH CIRCUIT
Connector disconnected:

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
8 – Ground (Australia) 2 – Ground (Europe)	Constant	Continuity
11 – Ground (Australia) 17 – Ground (Europe)	Ignition switch LOCK or ACC	No voltage
11 – Ground (Australia) 17 – Ground (Europe)	Ignition switch ON	Battery voltage

If circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT WIPER MOTOR OPERATION
Low speed:
( ): LHD models

Connect the positive (+) lead from the battery to terminal 5 (1) and the negative (–) lead to terminal 4 (5), check that the motor operates at low speed.
If operation is not as specified, replace the motor.

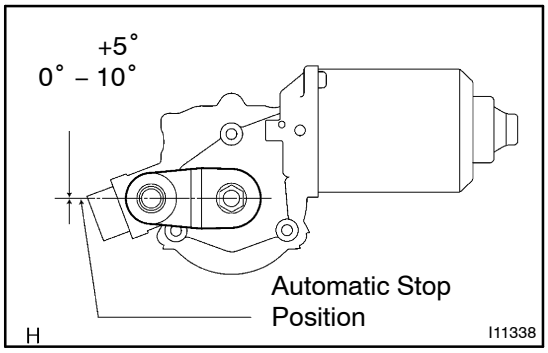
6. INSPECT WIPER MOTOR OPERATION

High speed:

( ): LHD models

Connect the positive (+) lead from the battery to terminal 3 (4) and the negative (–) lead to terminal 4 (5), check that the motor operates at high speed.

If operation is not as specified, replace the motor.



7. INSPECT WIPER MOTOR OPERATION

Stopping at stop position:

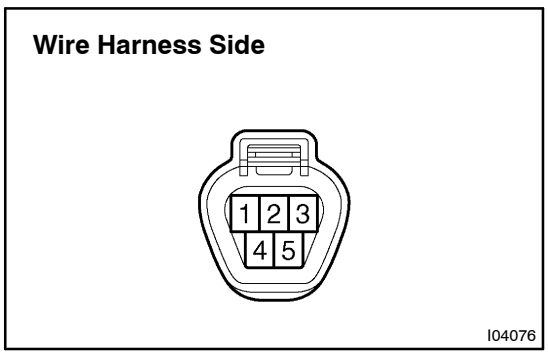
( ): LHD models

(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 5 (1).

(b) Connect terminals 1 and 5 (3).

(c) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 4 (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.



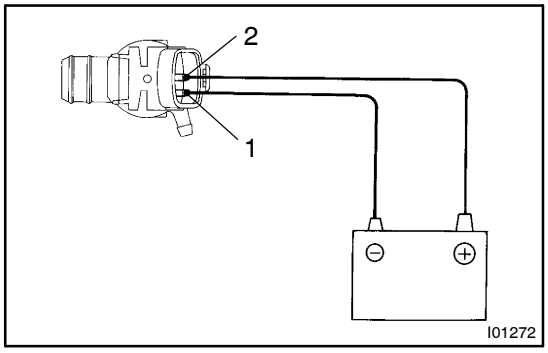
8. INSPECT WIPER MOTOR CIRCUIT

Connector disconnected:

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery voltage

If circuit is not as specified, inspect the circuits connected to other parts.



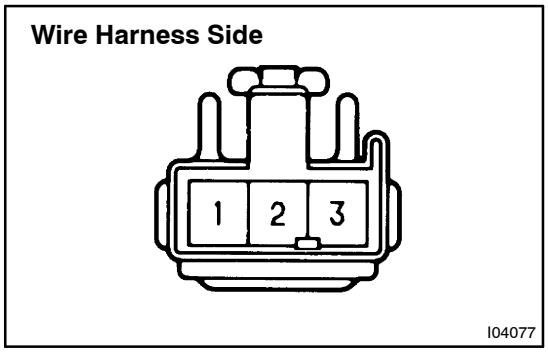
9. INSPECT WASHER MOTOR OPERATION

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

Connector disconnected:

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

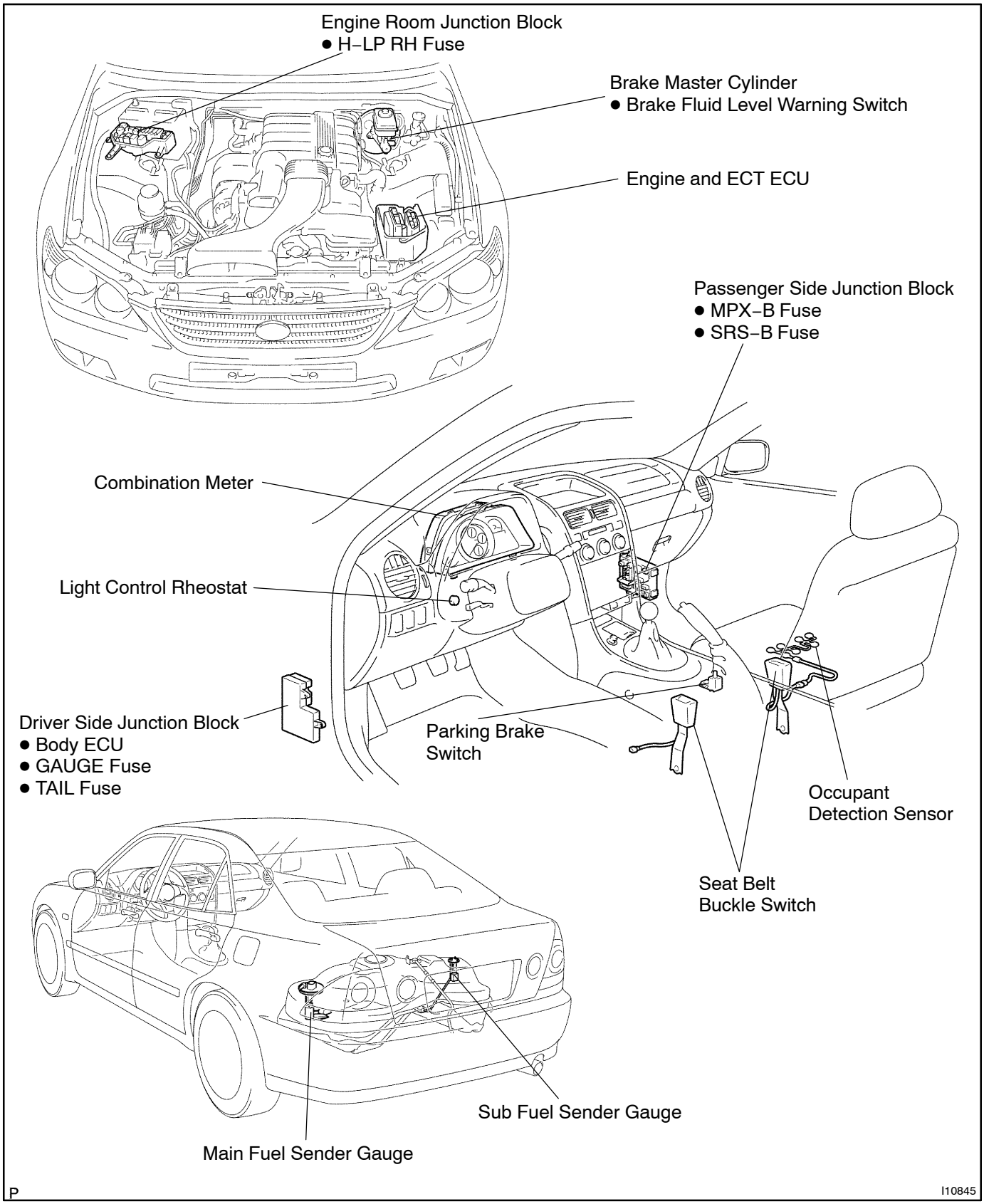
Tester connection	Condition	Specified condition
2 – Ground	Ignition switch ON	Battery voltage

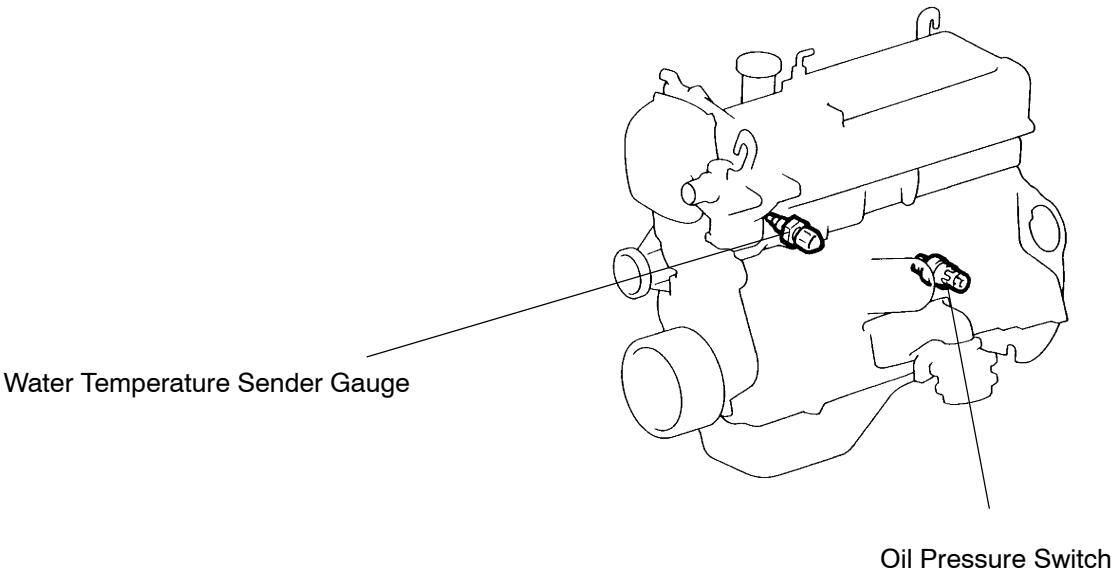
If circuit is not as specified, inspect the power source, wire harness and wiper switch.

COMBINATION METER

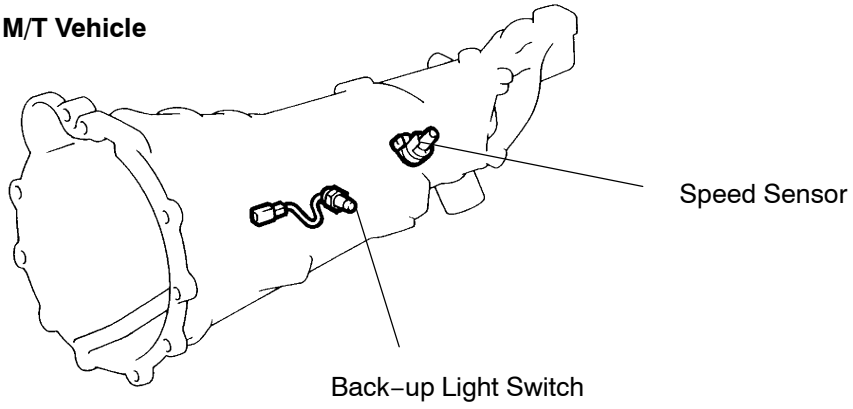
BE0HH–06

LOCATION

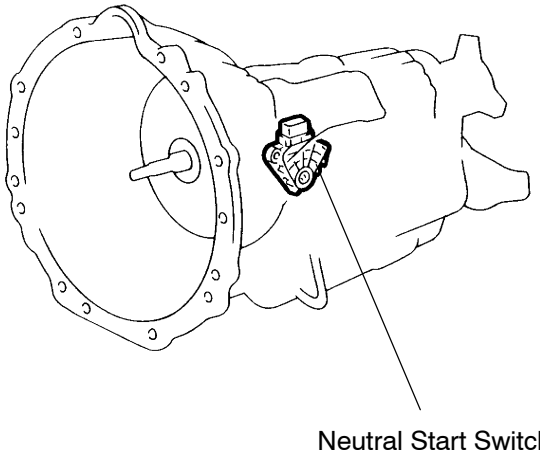




M/T Vehicle



A/T Vehicle

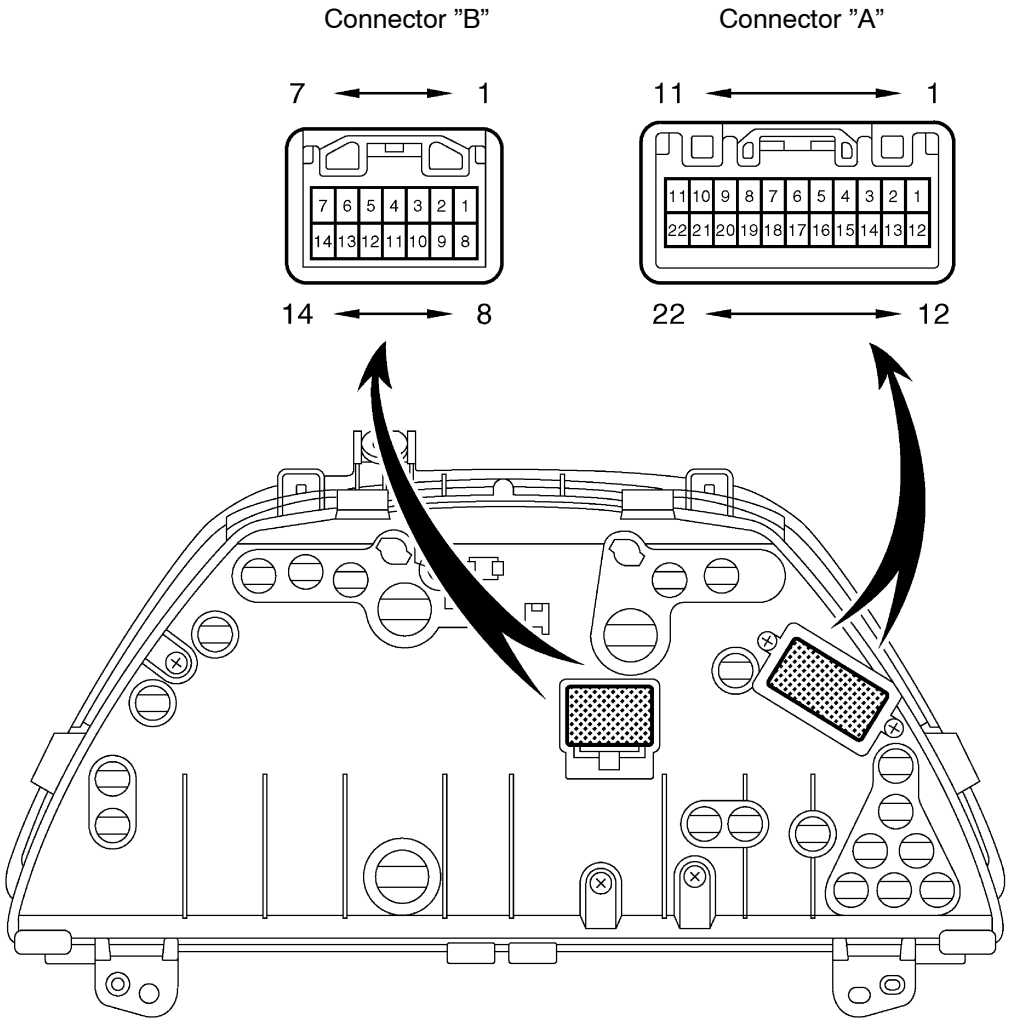


N

I11340

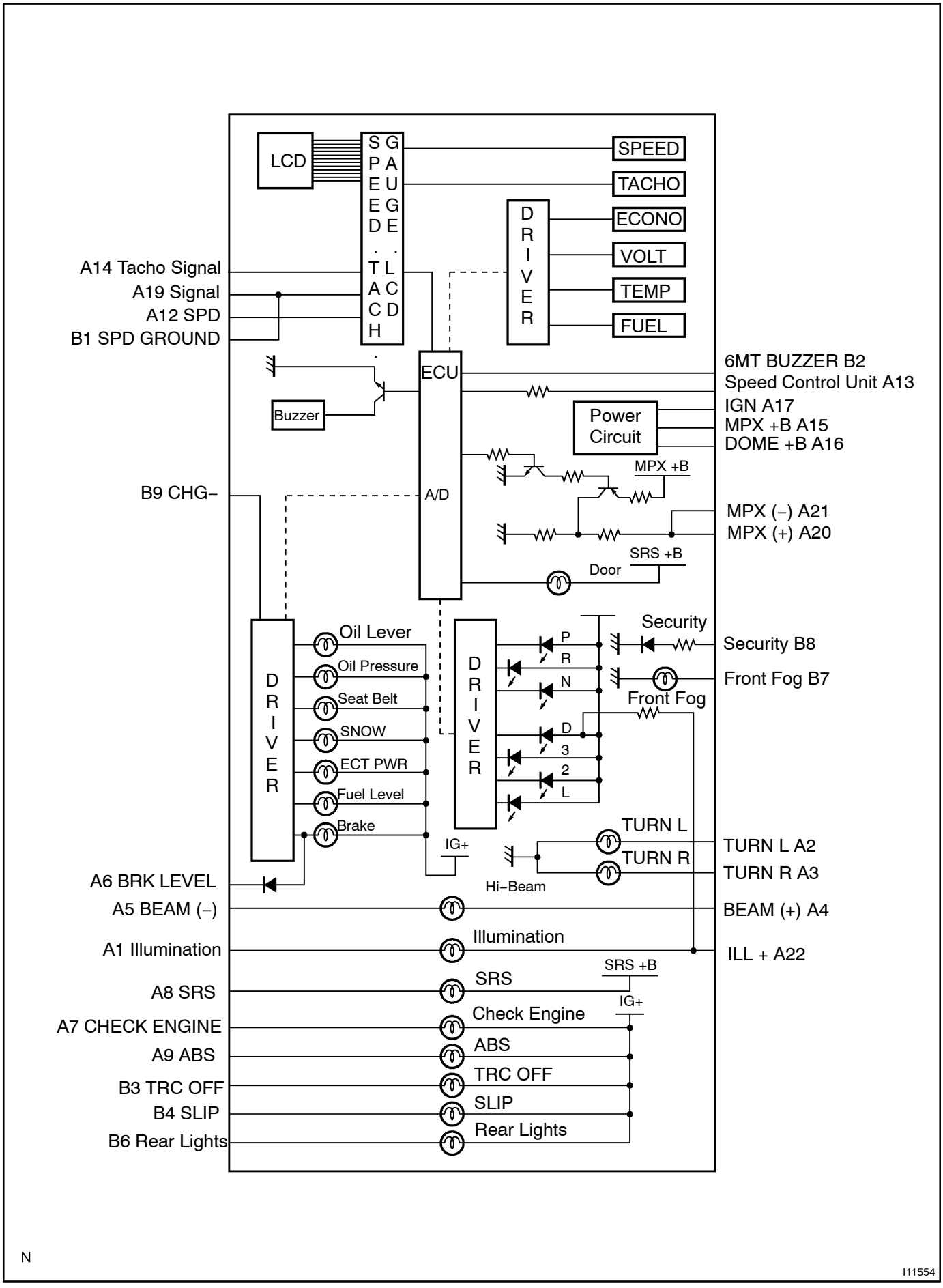
BE16C–01

CIRCUIT



N

I11556


LCD
SPEED. TACH
GAUGE. LCD
SPEED
TACHO
ECONO
VOLT
TEMP
FUEL
DRIVER
A14 Tacho Signal
A19 Signal
A12 SPD
B1 SPD GROUND
ECU
Buzzer
6MT BUZZER B2
Speed Control Unit A13
IGN A17
MPX +B A15
DOME +B A16
Power Circuit
MPX +B
B9 CHG–
A/D
MPX (–) A21
MPX (+) A20
SRS +B
Door
Security
Security B8
Front Fog B7
Front Fog
Oil Lever
Oil Pressure
Seat Belt
SNOW
ECT PWR
Fuel Level
Brake
P
R
N
D
3
2
L
TURN L
TURN R
TURN L A2
TURN R A3
IG+
Hi–Beam
A6 BRK LEVEL
A5 BEAM (–)
BEAM (+) A4
Illumination
A1 Illumination
ILL + A22
SRS +B
SRS
A8 SRS
IG+
Check Engine
A7 CHECK ENGINE
ABS
A9 ABS
TRC OFF
B3 TRC OFF
SLIP
B4 SLIP
Rear Lights
B6 Rear Lights

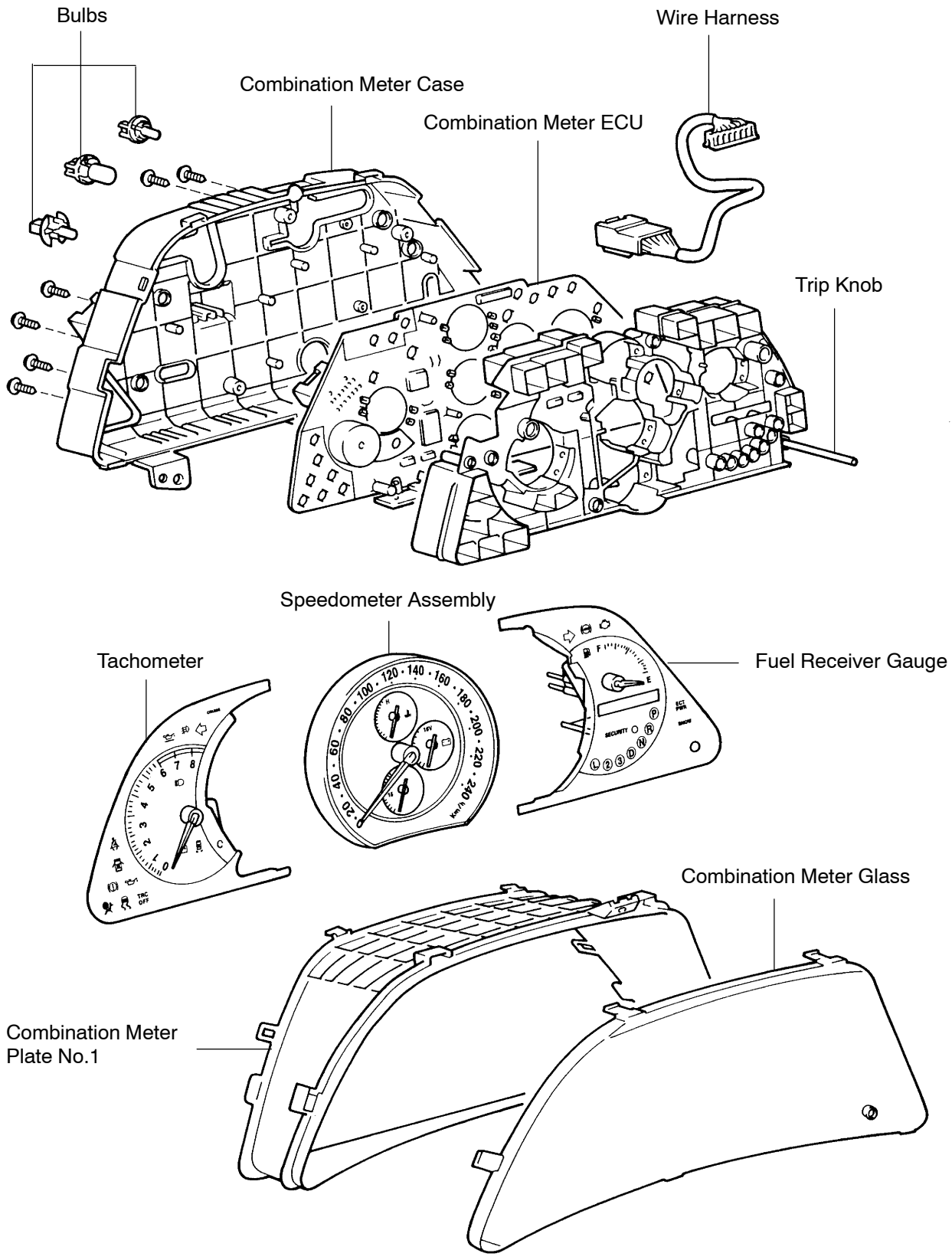
N

I11554

No.		Wiring connector side
A	1	Rheostat light control volume
	2	Turn signal light switch (Left)
	3	Turn signal light switch (Right)
	4	HEAD Fuse
	5	Headlight dimmer switch
	6	Brake fluid level warning switch
	7	Engine and ECT ECU
	8	Airbag sensor assembly
	9	ABS ECU
	12	Speed sensor (M/T) or ABS ECU (A/T)
	13	Speed control unit
	14	Engine and ECT ECU
	15	MPX+B Fuse
	16	DOME Fuse
	17	GAUGE Fuse
	18	Power ground
	19	Signal ground
	20	Multiplex communication circuit (MPX+)
	21	Multiplex communication circuit (MPX–)
	22	TAIL Fuse
B	1	Speed signal ground (M/T vehicle only)
	2	6M/T reverse buzzer (M/T vehicle only)
	3	ABS and TRC ECU
	4	ABS and TRC ECU
	5	Light failure relay
	6	Light failure relay
	7	Front fog light switch
	8	Transponder key ECU
	9	Daytime running light relay

BE0HJ–07

COMPONENTS



N

I11565

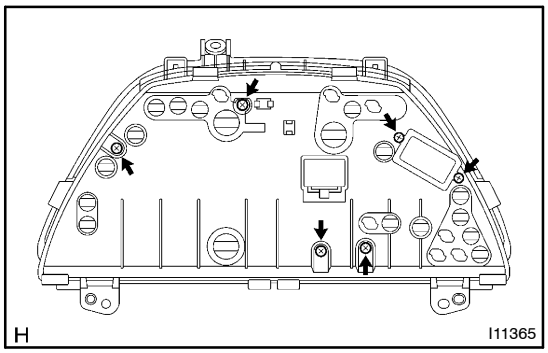
BE16D–01

DISASSEMBLY

HINT:

Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

1. **REMOVE INSTRUMENT PANEL LWR** (See page BO–93)
2. **REMOVE INSTRUMENT CLUSTER FINISH PANEL**
3. **REMOVE COMBINATION METER ASSEMBLY**
4. **REMOVE COMBINATION METER GLASS**
5. **REMOVE COMBINATION METER PLATE NO.1**

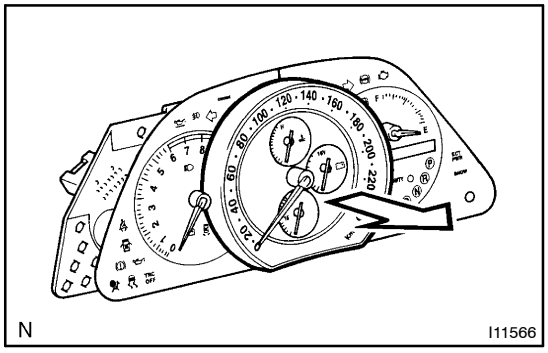


6. **REMOVE COMBINATION METER CASE**

(a) Separate the wire harness connector at the upper side of the combination meter assembly from the combination meter computer.

(b) Remove the 6 screws as shown in the illustration, and remove the combination meter.

7. **REMOVE THE WIRE HARNESS**



8. **REMOVE SPEEDOMETER ASSEMBLY**

Pull the speed meter assembly in the direction indicated by the arrow in the illustration and disconnect the engagement of the combination meter computer assembly to remove the speed meter assembly.

NOTICE:

Use gloves so as not to scratch or stain the panel surface.
Do not apply unnatural force.

9. **REMOVE ENGINE TACHO METER ASSEMBLY**

HINT:

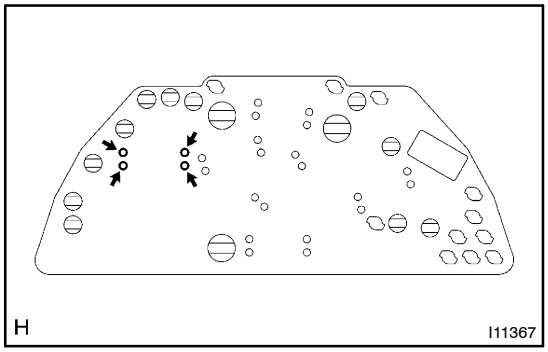
Remove it in the same procedure as for the speed meter assembly.

10. **REMOVE FUEL RECEIVER GAUGE.**

HINT:

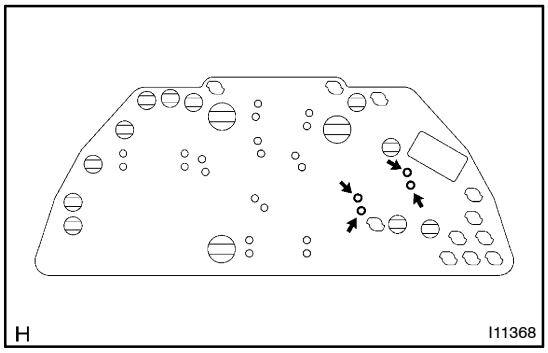
Remove it in the same procedure as for the speed meter assembly.

11. **REMOVE TRIP KNOB**
12. **REMOVE COMBINATION METER COMPUTER ASSEMBLY**



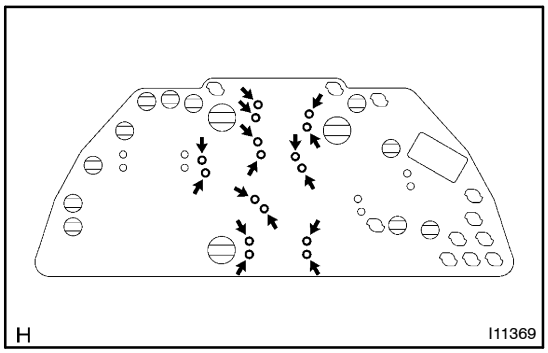
13. INSTALL FUEL RECEIVER GAUGE

Install the fuel receiver gauge to the combination computer assembly, and check that the gauge terminal shown in the illustration are fitted in securely.



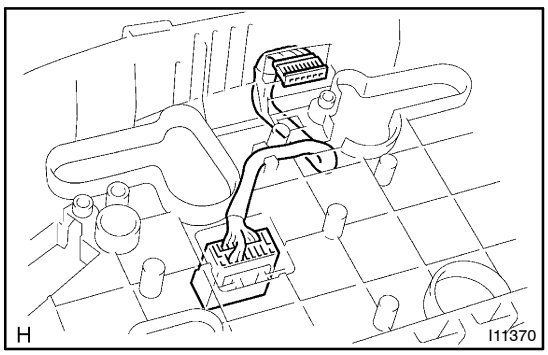
14. INSTALL ENGINE TACHO METER ASSEMBLY

Install the engine tacho meter assembly to the combination meter assembly, and check that the gauge terminals shown in the illustration are fitted in securely.



15. INSTALL SPEEDOMETER ASSEMBLY

Install the speedometer assembly to the combination meter computer assembly, and check that the gauge terminals shown in the illustration are fitted in securely.



16. INSTALL WIRE HARNESS

Route the wire harness as shown in the illustration and install it to the combination meter case.

BE0HL–02

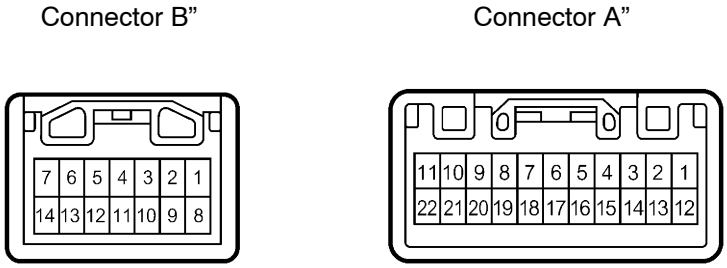
INSPECTION

1. INSPECT COMBINATION METER CIRCUIT

Connector connected:

Connect connector ”A” and ”B” from the combination meter and inspect the connectors on the wire harness side as shown in the table.

Connector connected



I11995

Tester connection	Condition	Specified condition
A1 – Ground (ILL–)	Light control switch TAIL or HEAD	Continuity
A2 – Ground (Turn L)	Ignition switch ON and turn signal switch Left	Battery voltage
A3 – Ground (Turn R)	Ignition switch ON and turn signal switch Right	Battery voltage
A4 – Ground (Beam +)	Constant	Battery voltage
A5 – Ground (Beam –)	Headlight dimmer switch HI	Battery voltage
A6 – Ground (BRK level)	Ignition switch ON and Brake fluid level warning switch LO	Battery voltage
A7 – Ground (Check engine)	Ignition switch ON and engine running	Battery voltage
A8 – Ground (SRS)	SRS warning light does not light up	Battery voltage
A9 – Ground (ABS)	Ignition switch ON and ABS warning does not lights up	Battery voltage
A12 – Ground (Speed signal input)	Ignition switch ON and turn propeller shaft slowly	Battery voltage
A13 – Ground (Speed signal output)	Ignition switch ON and turn propeller shaft slowly	1 V to 4.5 – 5.5 V
A14 – Ground (Tachometer signal)	Engine running	Pulse generation *1
A15 – Ground (MPX +B)	Constant	Battery voltage
A16 – Ground (DOME +B)	Constant	Battery voltage

A17 – Ground (IGN)	Ignition switch ON	Battery voltage
A18 – Ground (Power ground)	Constant	Continuity
A19 – Ground (Signal ground)	Constant	Continuity
A20 – Ground (MPX+)	Ignition switch ON	Pulse generation
A21 – Ground (MPX–)	Ignition switch ON	Pulse generation
A22 – Ground (ILL+)	Light control switch TAIL or HEAD	Battery voltage
B1 – Ground (SP ground)	Constant	Continuity
B2 – Ground (6M/T R buzzer)	Ignition switch ON and shift lever except R range	Battery voltage
B3 – Ground (TRC OFF)	Ignition switch ON and TRC OFF indicator does not light up.	Battery voltage
B4 – Ground (SLIP)	Ignition switch ON and SLIP indicator does not light up	Battery voltage
B5 – Ground (BRAKE LIGHT LAILURE)	Ignition switch ON and Brake Fluid Level Warning Switch ON (Master Cylinder Float down)	Battery voltage
B6 – Ground (Rear Lights)	Ignition Switch ON and rear lights bulb is blown.	Battery voltage
B7 – Ground (Front Fog)	Light control switch TAIL and Front fog light Switch ON.	Battery voltage
B8 – Ground (Security)	Theft deterrent system is operating	Battery voltage
B9 – Ground (Alternator L terminal)	Engine running	Battery voltage

If circuit is not as specified, wiring diagram and inspect the circuits 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.

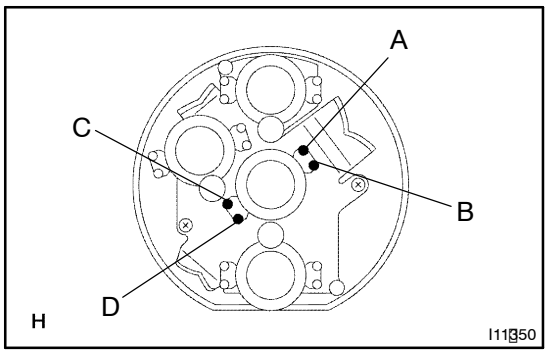
Europe Models

(mph)		(km/h)	
Standard Indication	Allowable Range	Standard Indication	Allowable Range
20	20 – 24.5	20	20 – 26
40	40 – 46.5	40	40 – 48
60	60 – 68.5	60	60 – 70
80	80 – 90.5	80	80 – 92
100	100 – 112.5	100	100 – 114
–	–	120	120 – 136
–	–	140	140 – 158
–	–	160	160 – 180

Australia

(mph)		(km/h)	
Standard Indication	Allowable Range	Standard Indication	Allowable Range
–	–	40	36 – 44
–	–	60	54 – 66
–	–	80	72 – 88
–	–	100	90 – 110
–	–	120	108 – 132
–	–	140	126 – 154
–	–	160	144 – 176

If error is excessive, replace the speedometer.

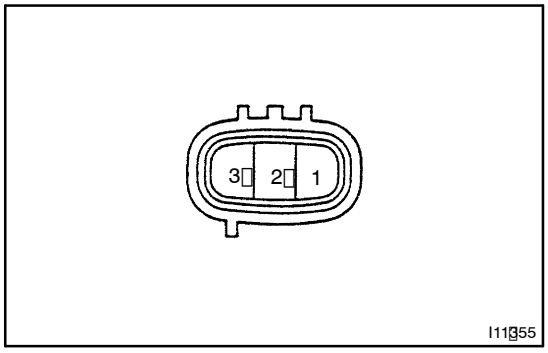


3. INSPECT SPEEDOMETER RESISTANCE (See page DI–533)

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	160
C – D	160

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



4. M/T vehicle:
INSPECT VEHICLE SPEED SENSOR OPERATION
(See page DI–541)

(a) Connect the positive (+) lead from battery to terminal 1 and negative (–) lead to terminal 2.
(b) Connect the positive (+) lead from tester to terminal 3 and negative (–) lead to terminal 2.
(c) Rotate shaft.
(d) Check that there is a voltage change from approx. 0 V to 11 V or more between terminals 2 and 3.

HINT:
The voltage change should be 4 times for every revolution of the speed sensor shaft.
If operation is not as specified, replace the sensor.

5. INSPECT TACHOMETER/
ON–VEHICLE

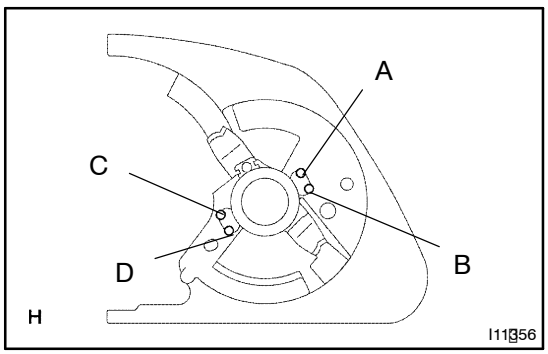
(a) Connect a tune–up test tachometer, and start the engine.

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 indications.

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

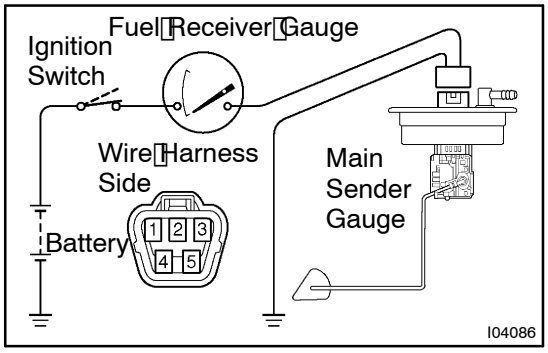


6. INSPECT TACHOMETER RESISTANCE
(See page DI–534)

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	160
C – D	160

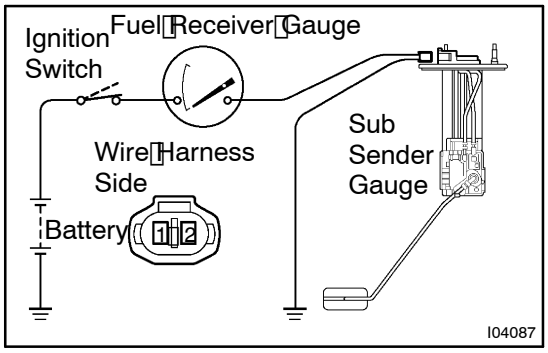
If resistance value is not as specified, replace the meter.



7. INSPECT FUEL RECEIVER GAUGE OPERATION (See page DI–581)

(a) Disconnect the connector from the main sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.



(c) Connect the main sender gauge.

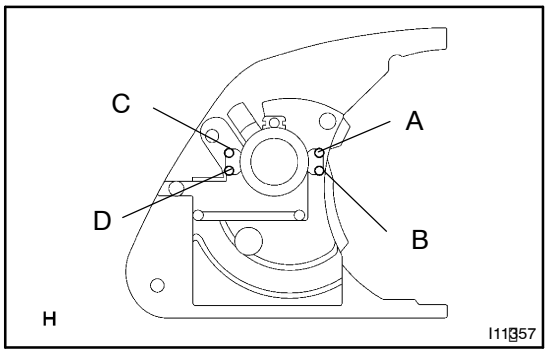
(d) Disconnect the connector from the sub sender gauge.

(e) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.

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.

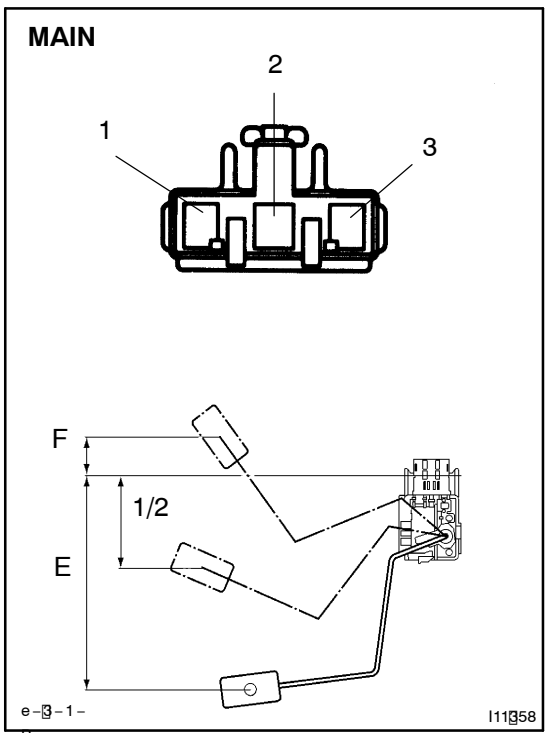


8. INSPECT FUEL RECEIVER GAUGE RESISTANCE (See page DI–535)

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	160
C – D	160

If resistance value is not as specified, replace the receiver gauge.

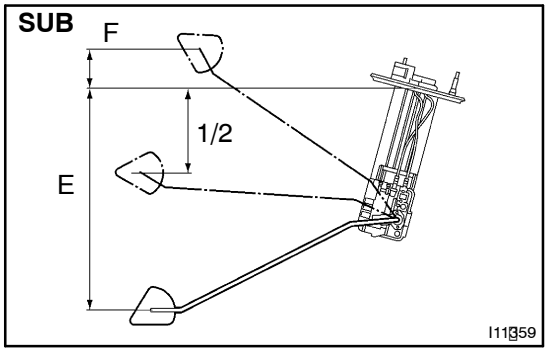


9. INSPECT FUEL MAIN SENDER GAUGE RESISTANCE

Measure the resistance between terminals 1 and 2 for each float position.

Float position mm (in.)	Resistance (Ω)
F: Approx. 22.9 (0.90) ± 3 (0.12)	Approx. 2.0 ± 1.0
1/2: Approx. 58.3 (2.30) ± 3 (0.12)	Approx. 30.3 ± 3.0
E: Approx. 133.6 (5.26) ± 3 (0.12)	Approx. 55.0 ± 1.0

If resistance value is not as specified, replace the main sender gauge.



10. INSPECT FUEL SUB SENDER GAUGE RESISTANCE

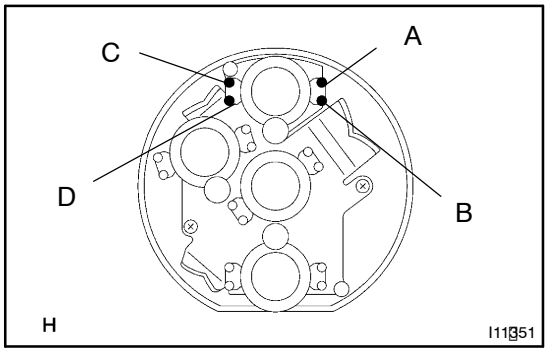
Measure the resistance between terminals 1 and 2 for each float position.

Float position mm (in.)	Resistance (Ω)
F: Approx. 29.1 (1.15) ± 3 (0.12)	Approx. 2.0 ± 1.0
1/2: Approx. 65.8 (2.59) ± 3 (0.12)	Approx. 29.7 ± 3.0
E: Approx. 169.5 (6.67) ± 3 (0.12)	Approx. 55 ± 1.0

If resistance value is not as specified, replace the sub sender gauge.

11. INSPECT WATER TEMPERATURE RECEIVER GAUGE OPERATION

(See page DI–537)



12. INSPECT WATER TEMPERATURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals with fixing pointer to the stopper.

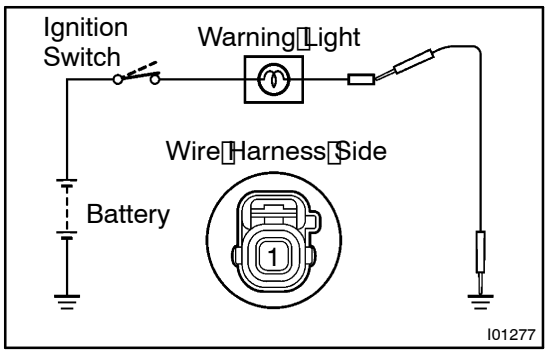
Tester connection	Resistance (Ω)
A – B	160
C – D	160

If resistance value is not as specified, replace the receiver gauge.

HINT:

This circuit includes the diode.

If resistance value is not as specified, replace the receiver gauge.

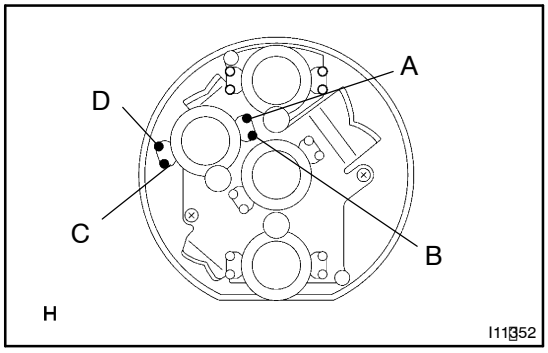


13. INSPECT LOW OIL PRESSURE WARNING LIGHT

(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.

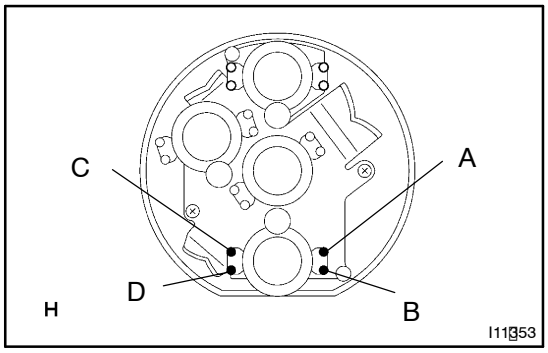


14. INSPECT VOLTAGE GAUGE RESISTANCE
(See page DI–539)

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	160
C – D	160

If resistance value is not as specified, replace the receiver gauge.

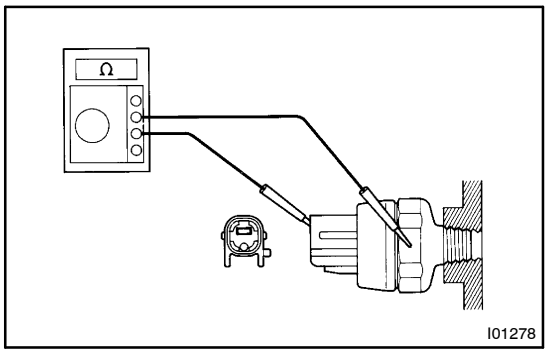


15. INSPECT SPECIFIC FUEL CONSUMPTION GAUGE RESISTANCE
(See page DI–540)

Measure the resistance between terminals with fixing pointer to the stopper.

Tester connection	Resistance (Ω)
A – B	160
C – D	160

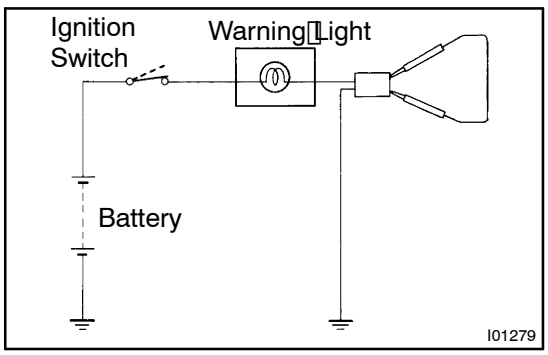
If resistance value is not as specified, replace the meter.



16. INSPECT OIL PRESSURE SENDER CONTINUITY

(a) Disconnect the connector from the oil pressure sender.
(b) Check that no continuity exists between terminal and ground with the engine stopped.
(c) Check that continuity exists between terminal and ground with the engine running.

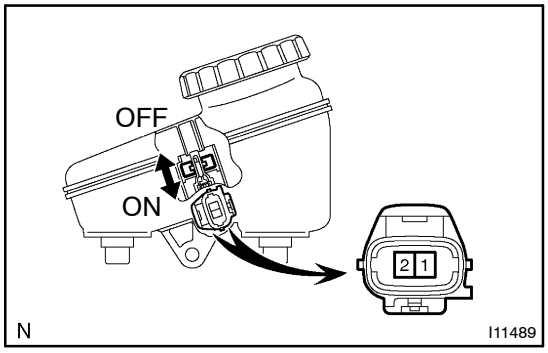
HINT:
Oil pressure should be over 24.5 kPa (0.25 kgf/cm^2, 3.55 psi).
If operation is not as specified, replace the oil pressure sender.



17. INSPECT BRAKE 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.

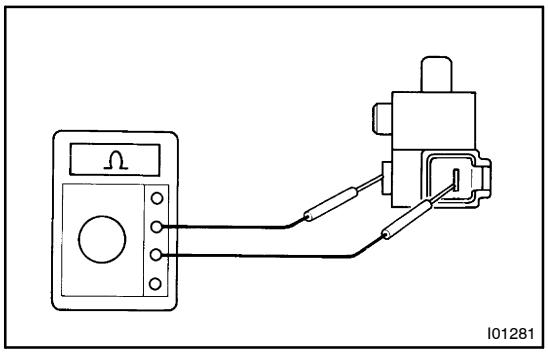
If the warning light does not light up, test the bulb or wire harness.



18. INSPECT BRAKE FLUID LEVEL WARNING SWITCH CONTINUITY

(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 siphon, 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.

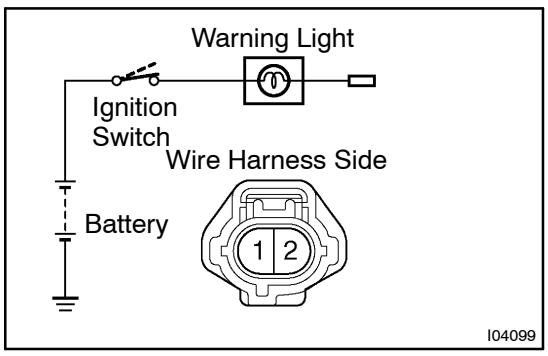
If operation is not as specified, replace the switch.



19. INSPECT PARKING BRAKE SWITCH CONTINUITY

(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).

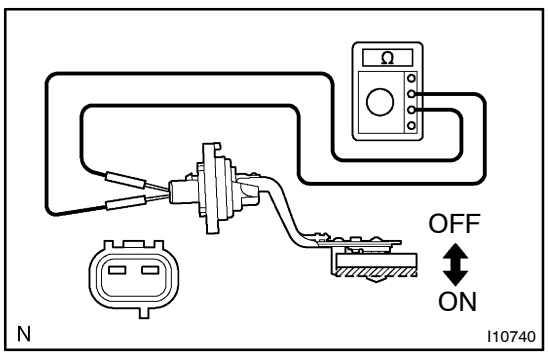
If operation is not as specified, replace the switch or inspect ground point.



20. INSPECT ENGINE OIL LEVEL WARNING LIGHT

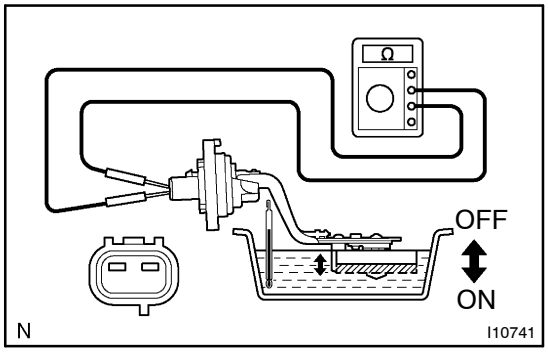
(a) Disconnect the connector from the switch.
(b) Run the engine.
(c) Turn the ignition switch ON, check that the warning light lights up approximately 40 seconds later.

If the warning light does not light up, inspect bulb or wire harness.



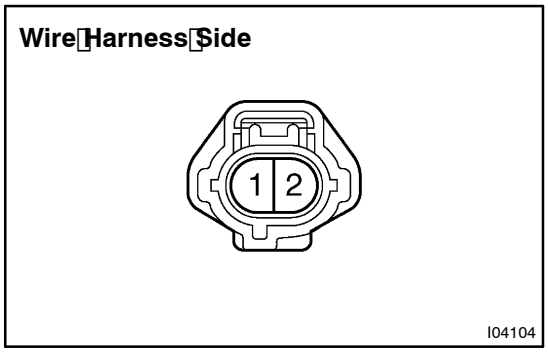
21. INSPECT ENGINE OIL LEVEL WARNING SENSOR

(a) Check that continuity exists between terminals with the switch to below 40 °C (104 °F). (Warning switch ON)
(b) Heat the switch to above 60 °C (140 °F) in an oil bath.



(c) Check that there is continuity between terminals with the switch ON (float down).
(d) Check that there is no continuity between terminals with the switch OFF (float up).

If operation is not as specified, replace the switch.

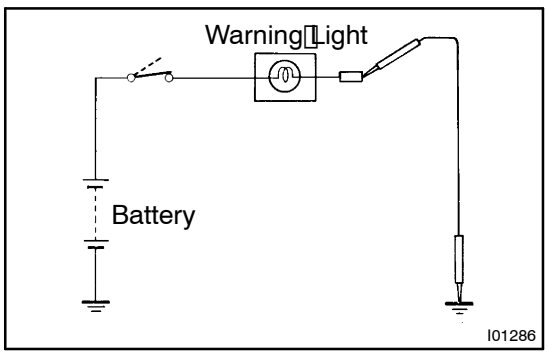


22. INSPECT ENGINE OIL LEVEL WARNING SENSOR CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If continuity is not as specified, inspect the wire harness or ground point.



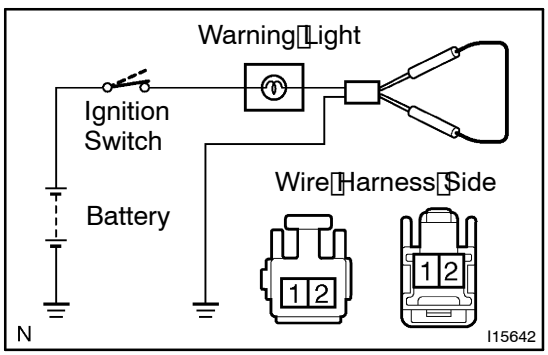
23. INSPECT OPEN DOOR WARNING LIGHT

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.

24. INSPECT DOOR COURTESY SWITCH CONTINUITY AND CIRCUIT

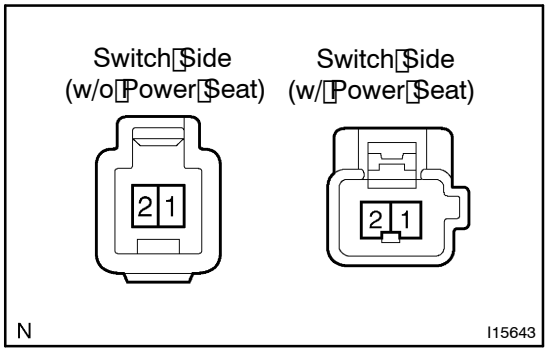
(See page DI–583)



25. INSPECT SEAT BELT WARNING LIGHT

(a) Disconnect the connector from the buckle switch.
(b) Connect terminal on the wire harness side of the buckle switch connector.
(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 SEAT BELT BUCKLE SWITCH CONTINUITY

(a) Check that continuity exists between the terminals 1 and 2 on the switch side connector with the switch ON (belt fastened).

(b) Check that continuity exists between the terminals 1 and 2 on the switch side connector with the switch OFF (belt unfastened).

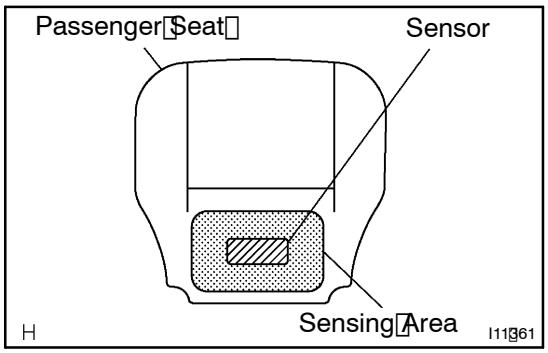
If operation is not as specified, replace the switch.

27. INSPECT SEAT BELT BUCKLE SWITCH CIRCUIT
(See page DI–578)

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

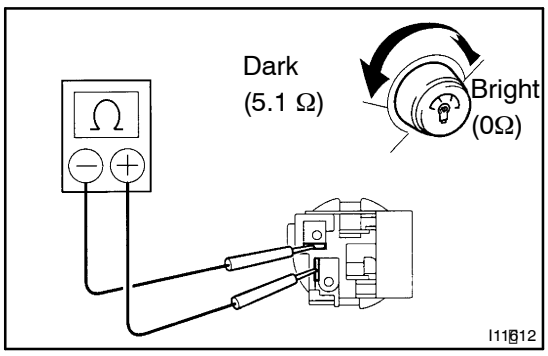
If continuity is not as specified, inspect the circuits connected to other parts.



28. Passenger seat only:
INSPECT SEAT BELT WARNING OCCUPANT DETECTION SENSOR CONTINUITY

Check that continuity exists between the terminals 1 and 2 when pressing the sensing part.

If operation is not as specified, replace the sensor.

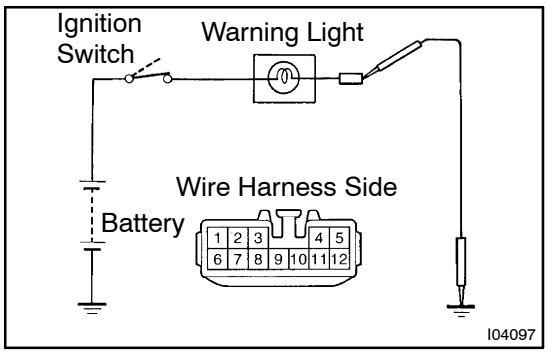


29. INSPECT LIGHT CONTROL RHEOSTAT OPERATION

(a) Turn the rheostat knob max. dark side and check that the resistance 5.1 Ω. (Rheostat knob turned to fully counterclockwise)

(b) Gradually, turn the rheostat knob from the dark side to bright side and check that the resistance decreases from 5.1 to 0 Ω. (Rheostat knob turned to clockwise)

If operation is not as specified, replace the rheostat light control.

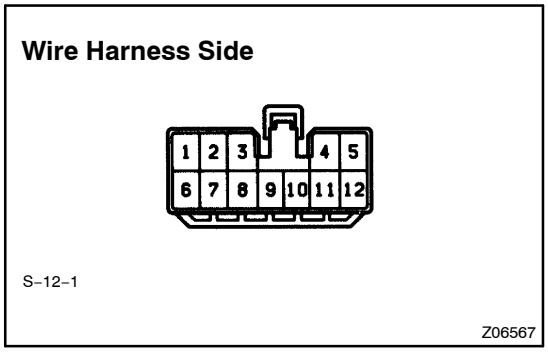


30. INSPECT REAR LIGHTS WARNING LIGHT

(a) Disconnect the connector from the light failure sensor and ground terminal 4, 5 or 9 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, inspect the bulb or wire harness.



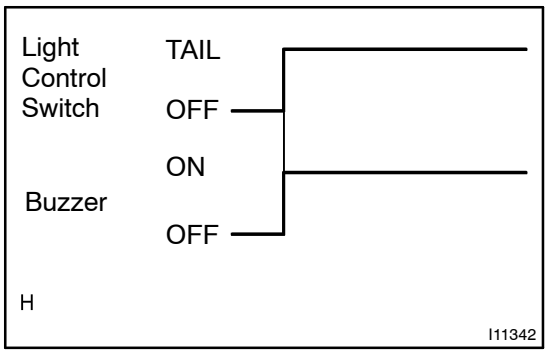
31. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Constant	* Continuity
2 – Ground	Constant	* Continuity
3 – Ground	Taillight ON	Battery voltage
5 – Ground (Europe)	Ignition switch ON	Battery voltage
9 – Ground	Constant	* Continuity
11 – Ground	Constant	Continuity
3 – Ground	Taillight or Headlight OFF	No voltage
3 – Ground	Taillight or Headlight ON	Battery voltage
4 – Ground	Ignition switch LOCK or ACC	No voltage
4 – Ground	Ignition switch ON	Battery voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery voltage
8 – Ground	Ignition switch LOCK or ACC	No voltage
8 – Ground	Ignition switch ON	Battery voltage

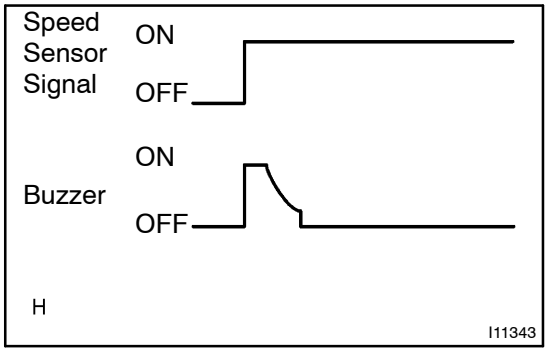
*: There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuits connected to other parts.



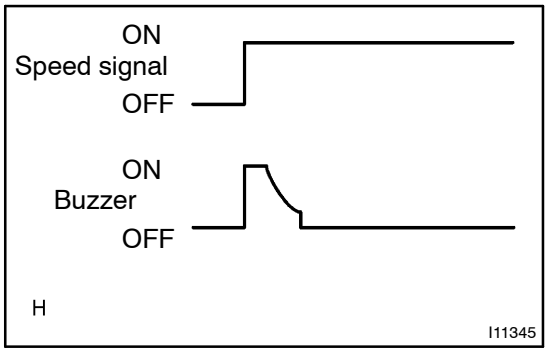
32. Europe models: INSPECT LIGHT AUTO TURN OFF BUZZER

Check that the buzzer sound when driver's door is opened and turn light control switch position TAIL.



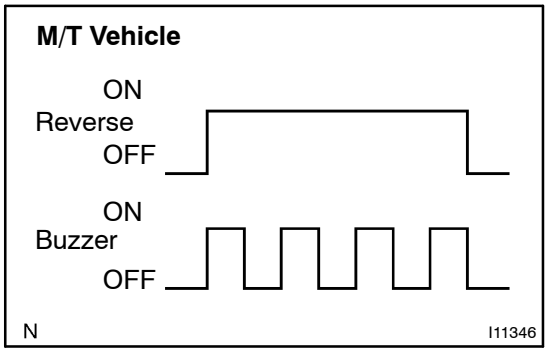
33. INSPECT OPEN DOOR WARNING BUZZER

Check that the buzzer sound when any door is opened and vehicle speed 5 km/h or more.



34. INSPECT PARKING BRAKE WARNING BUZZER

Check that the buzzer sound when parking brake lever released and vehicle speed 5 km/h or more.



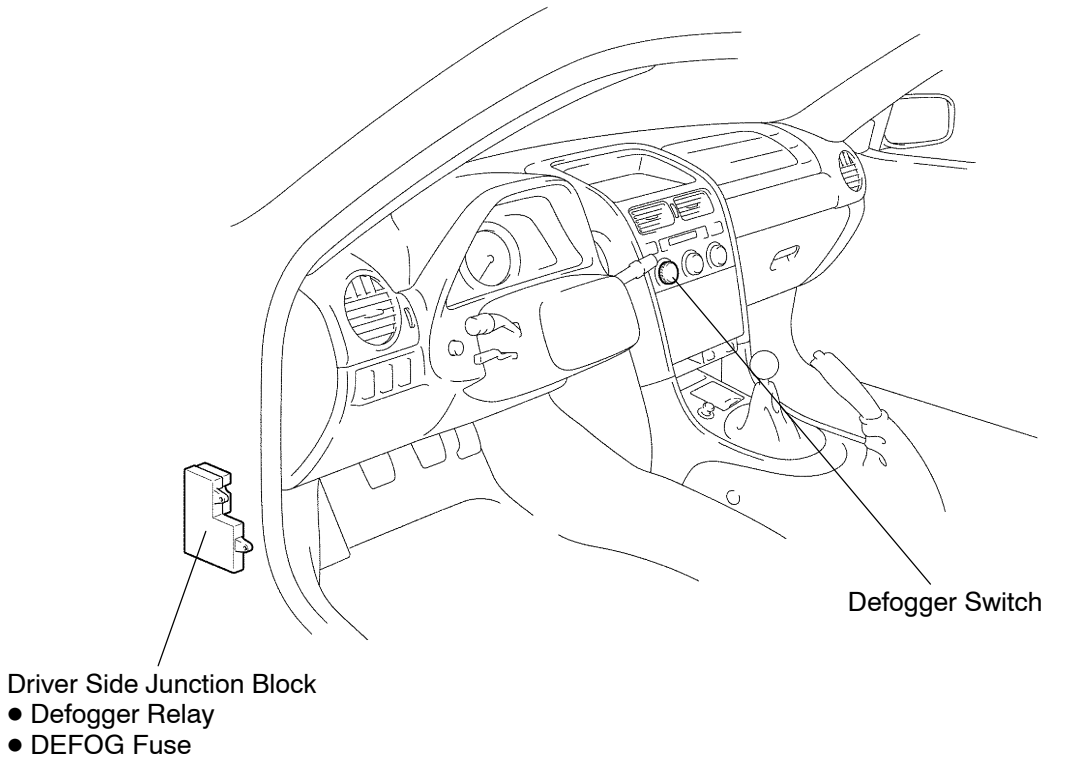
35. INSPECT REVERSE WARNING BUZZER

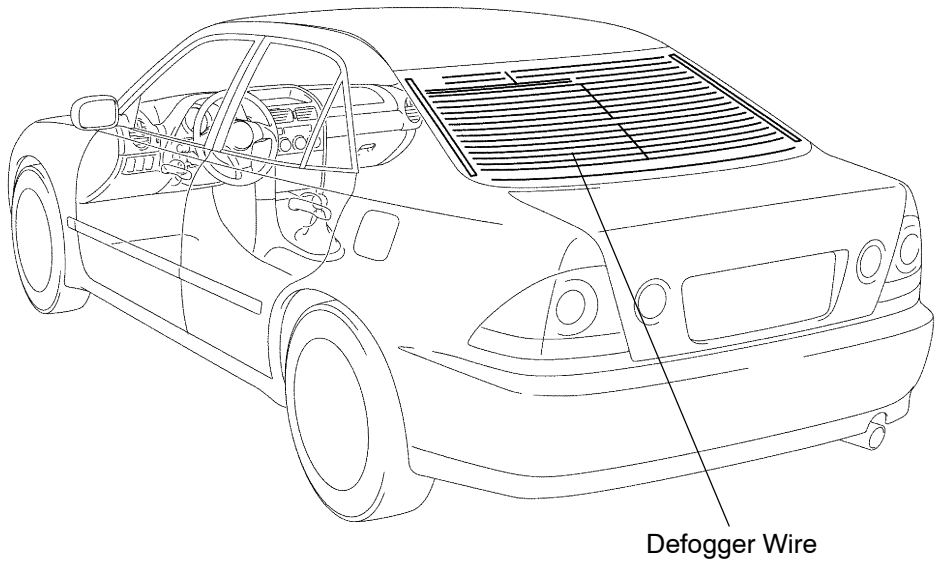
Check that the buzzer sound when ignition switch position ON and shift lever position R.

DEFOGGER SYSTEM

LOCATION

BE0GS–09





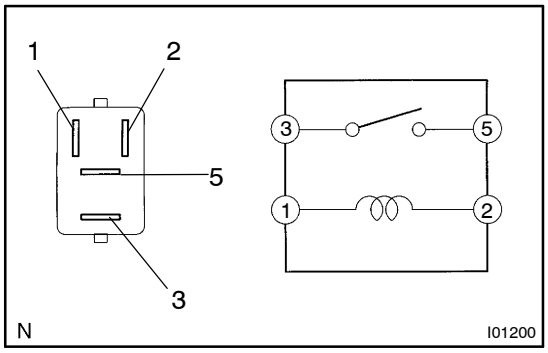
P

I10846

BE16E–01

INSPECTION

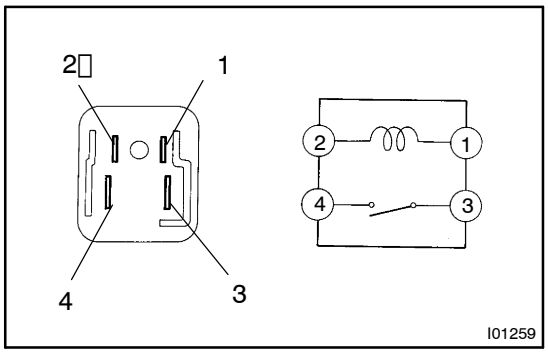
1. INSPECT DEFOGGER SWITCH (See page AC–91)



2. RHD models:
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.

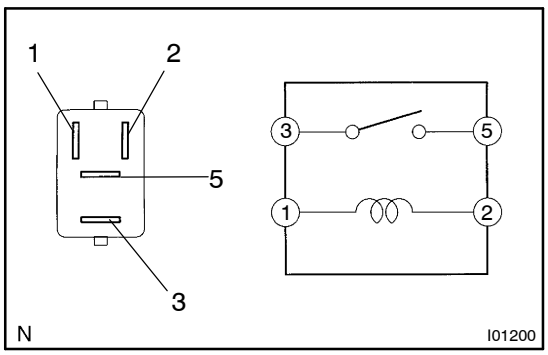


3. LHD models:
INSPECT DEFOGGER RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

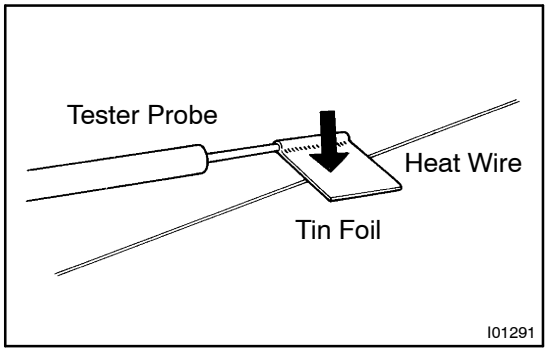
4. INSPECT DEFOGGER RELAY CIRCUIT (See page DI–605)

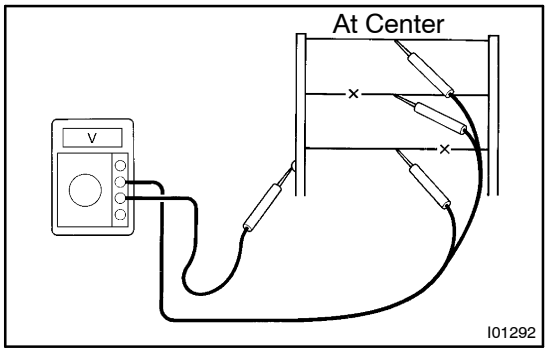


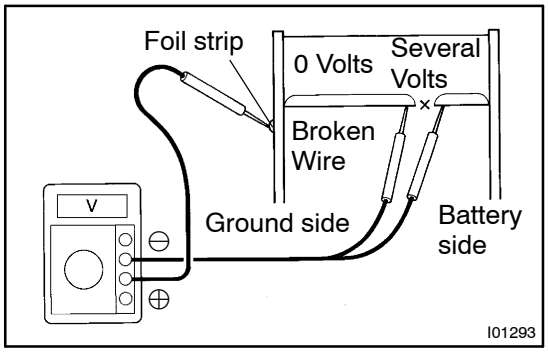
5. INSPECT MIRROR DEFOGGER RELAY CONTINUITY

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.







6. INSPECT DEFOGGER WIRE

NOTICE:

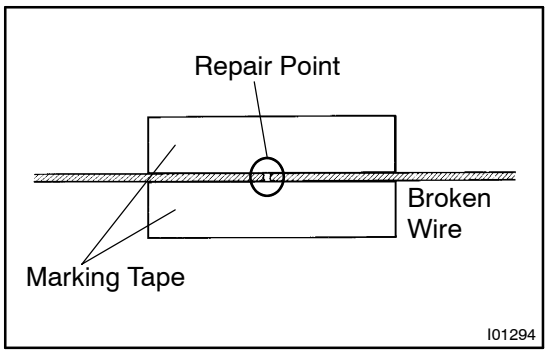
- **When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wrap a piece of tin foil around the tip of the negative probe 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, as shown.

Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire

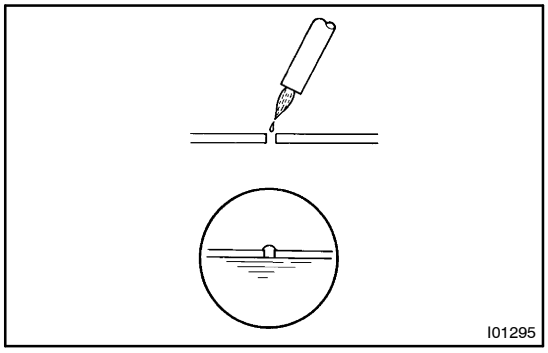
HINT:
If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.
(d) Place the voltmeter positive (+) lead against the defogger wire on the battery side.
(e) Place the voltmeter negative (–) lead with the foil strip against the wire on the ground side.
(f) Slide the positive (+) lead from battery to ground side.
(g) The point where the voltmeter deflects from several V to zero V is the place where the defogger 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 increases to about 12 V as the meter probe moves to the other end.

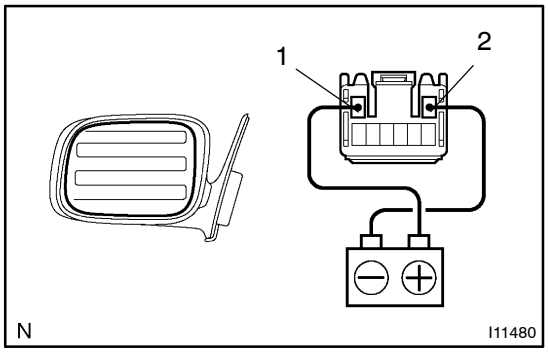


7. IF NECESSARY, REPAIR DEFOGGER WIRE

(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.



8. w/ Mirror heater:
INSPECT MIRROR DEFOGGER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
(b) Check that the mirror becomes warm.

HINT:
It will take a short time for the mirror to become warm.

POWER WINDOW CONTROL SYSTEM

TROUBLESHOOTING

BE02C–10

Malfunction symptoms	Applicable chart
Driver's door does not operate.	1
Passenger's and all rear doors do not operate by using the switches at each seat.	2
Any of passenger's and rear doos does not operate by using the switches of each seat.	3
Passenger's and all rear doors are not controlled remotely by using the master switch. (Switches of each door can be operated.)	4
AUTO UP and AUTO DOWN does not operate. (Prepare a normal master switch.)	5
DOWN operation operates during door glass AUTO UP operation.	6
Even though a foreign object is caught, DOWN operation does not function.	7
After ignition switch has been turned to OFF by using a key, power window function does not operate.	8

1	**Driver's door does not operate.**

Remove the power window regulator master switch and disconnect the connector.

Check there is voltage of 10 of 14 V between terminal 1 of vehicle side connector of master switch and body ground.

No → Wire harness defective (between power fuse terminal 1 of master switch.)

Yes

With ignition switch ON, is there voltage of 10 to 14 V between the terminal 3 of vehicle side connector of the master switch and body ground.)

Yes → Wire harness (3 terminal of the power main relay and 3 terminal of the master switch.)

No

Does continuity exist between 9 terminal of vehicle side connector of the master switch and body ground?

No → Wire harness defective (between 9 terminal of the master switch and body ground.)

Yes

When battery voltage is supplied to the vehicle side connector of the master switch, check if the door glass operate.

Connection	Glass operation
Battery positive – 20 terminal Battery negative – 8 terminal	UP
Battery positive – 8 terminal Battery negative – 20 terminal	DOWN

Yes → Power window regulator master switch defective.

No

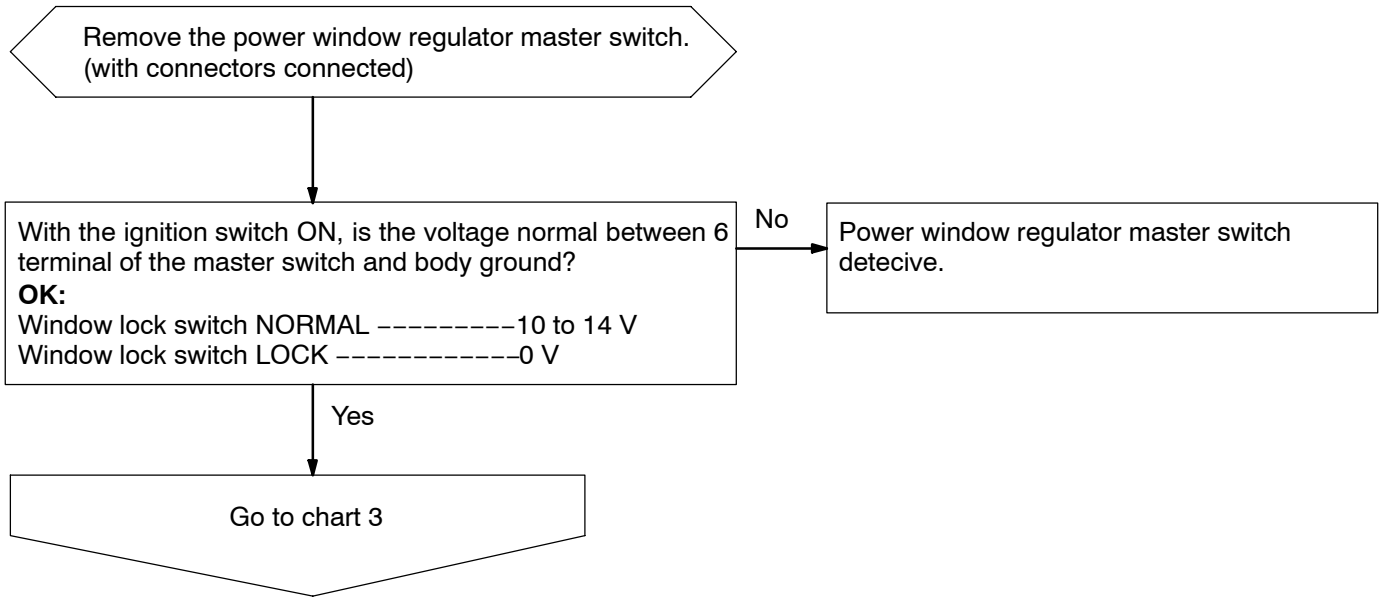
Is the power motor normal?

No → Power window motor defective.

Yes

Wire harness (between 20 terminal of the master switch and 2 terminal of the power window motor or 8 terminal of the master switch and 1 terminal of the power window).

2	**Passenger's and all rear doors do not operate by using the switches of each seat.**



3	**Any of passenger's and all rear doors does not operate by using the switches at each seat.**

Remove the power window regulator switch at the seat where the operation is unavailable and disconnect the connector.

With the ignition switch ON and window lock switch NORMAL, is there voltage of 10 to 14 V between 11 terminal of the vehicle side connector of the regulator switch and body ground?

No → Wire harness defective (between 6 terminal of master switch and 11 terminal of regulator.)

Yes

Is there the voltage of 10 to 14 V between 7 terminal of vehicle side connector of the regulator switch and body ground?

Yes → Wire harness defective (betwen POWER fuse and 7 terminal of the regulator.)

No

Is there continuity between 7 terminal of the vehicle side connector of the regulator switch and body ground.

No → Wire harness defective (between 12 terminal of the regulator and body ground.)

Yes

When battery voltage is supplied to the vehicle side connector of the regulator switch, check if the door glass operate.

Connection	Glass operation
Battery positive – 6 terminal Battery negative – 1 terminal	UP
Battery positive – 1 terminal Battery negative – 6 terminal	DOWN

Yes → Power window regulator master switch defective.

No

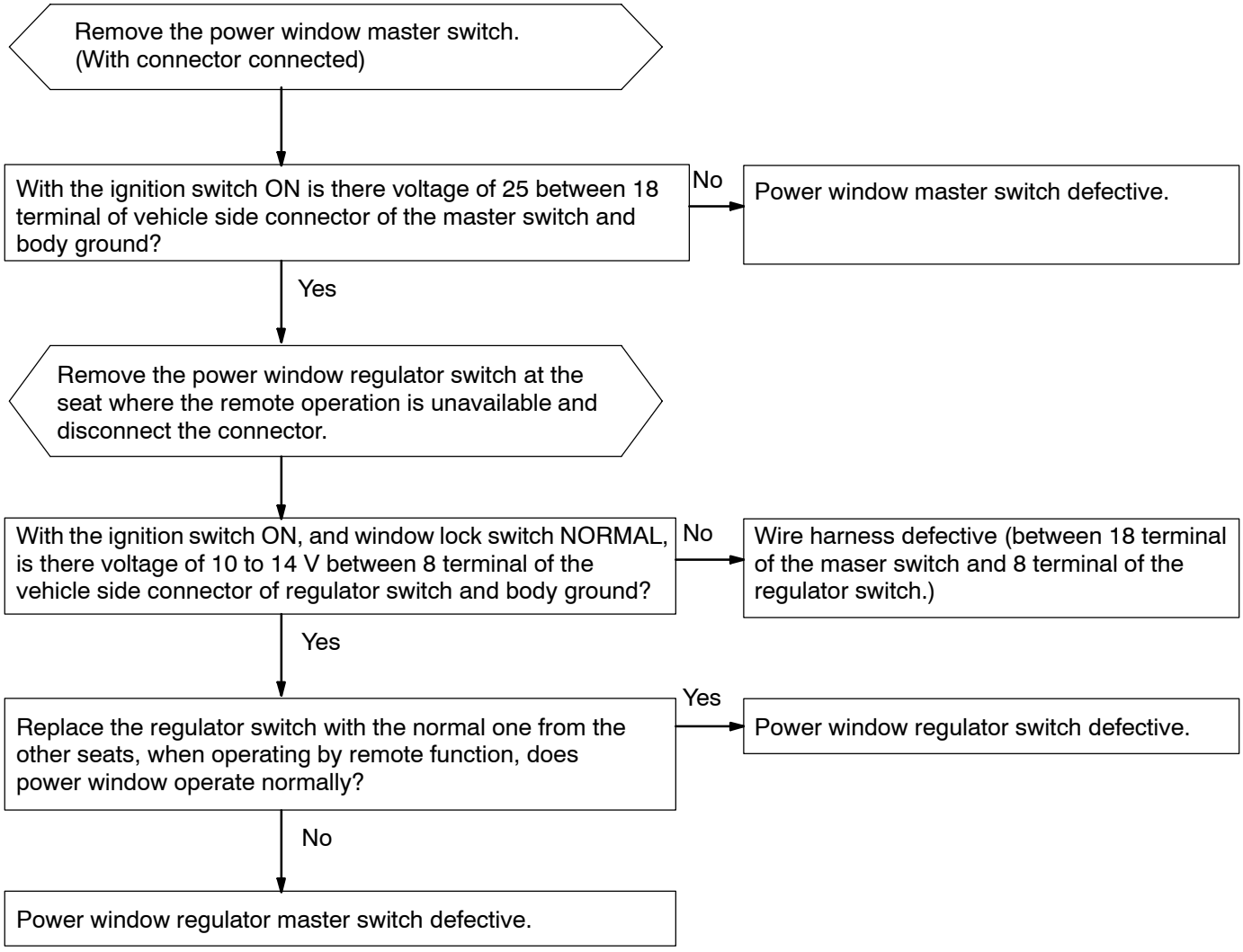
Is the power motor normal?

No → Power window motor defective.

Yes

Wire harness (between 6 terminal of the regulator switch and 4 terminal of the power window motor or 1 terminal of the regulator switch and 1 terminal of the power window motor).

4	**Passenger's and all rear doors are not controlled remotely by using the master switch. (Switches at each door can be operated.)**



5	AUTO UP and AUTO DOWN do not operate. (Prepare a normal master switch.)

Remove the master switch or regulator switch at the seat where AUTO UP and AUTO DOWN is unavailable. (With connectors connected)

Master of regulator switch inspection:
Are the voltage and continuity of the connectors connected to the master switch or regulator switch normal?

OK:

Terminal No.		Item	Inspection condition	Standard
13	3	Voltage	Fully open by manual operation → fully close → switch OFF	Less than 1 → 10 V to 14 → 0 V
12	4	Voltage	During power window operation	Approx. 5.5 V
10	2	Continuity	Constant	Continuity

No

Yes → Master or regulator switch defective.

Disconnect the connectors of the master switch or regulator switch and power window motor.

Does continuity exist between connectors of the following vehicle side connectors?
Switch side ↔ Motor side
13 (3) terminal ↔ 3 terminal
12 (4) terminal ↔ 4 terminal
10 (2) terminal ↔ 2 terminal
The number in parenthesis shows the terminal No.

No → Wire harness defective (Open circuit in each terminal)

Yes

Does continuity exist between 13 (3), 12 (4) and 10 (2) terminals on the switch side or 3, 4, 2 terminals and body ground?

No → Wire harness defective (Short circuit).

Yes

Connect the connector of power window motor.

Connect the normal master switch or regulator switch and check if AUTO UP and DOWN operates.

Yes → Master switch or regulator switch.

No

Power window motor defective.

6	**DOWN operates during door glass AUTO UP operation.**

When UP operates by AUTO UP operation or starting up by key OFF operation, is there any factor to increase the sliding resistance of door glass around the reverse position?

Yes → Disassemble the door and repair or replace the malfunction part.

No

Remove the window regulator assembly.

After assembling and raising the door glass manually, does it slide smoothly without being caught?

No → Inspect and replace the door glass run and window guide.

Yes

Remove the power window motor from the power window regulator assembly?

When the power window regulator is slide manually, does it silde smoothly without being caught or is there any damage to the gear parts?

No → Power window regulator defective.

Yes

Does the power window motor rotate smoothly?

No → Power window motor defective.

Yes

Reset the power window motor (Initial position setting of limit switch), assemble the power window regulator to the vehicle.

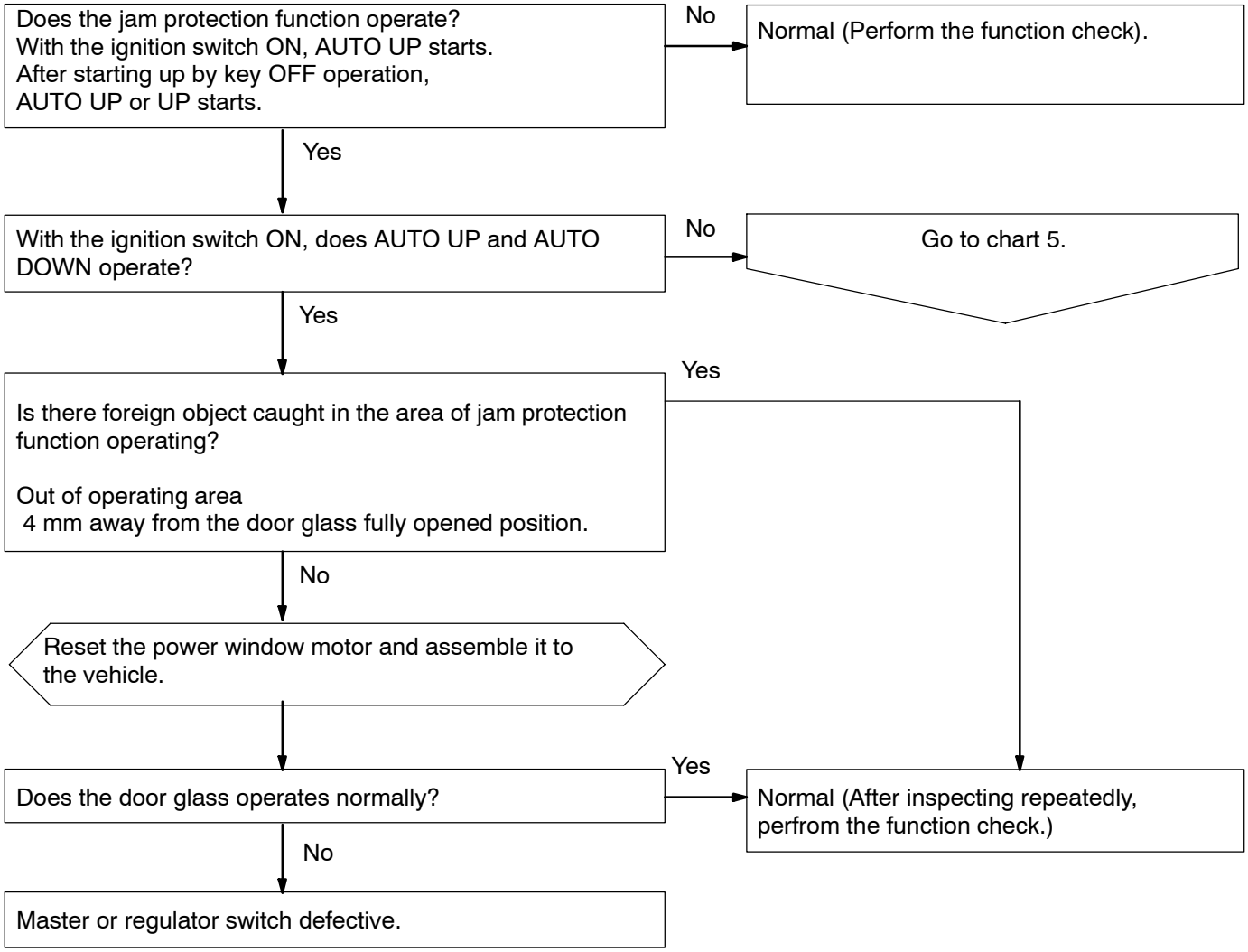
Does the door glass operates normally?

Yes → Normal (Perform the function check.)

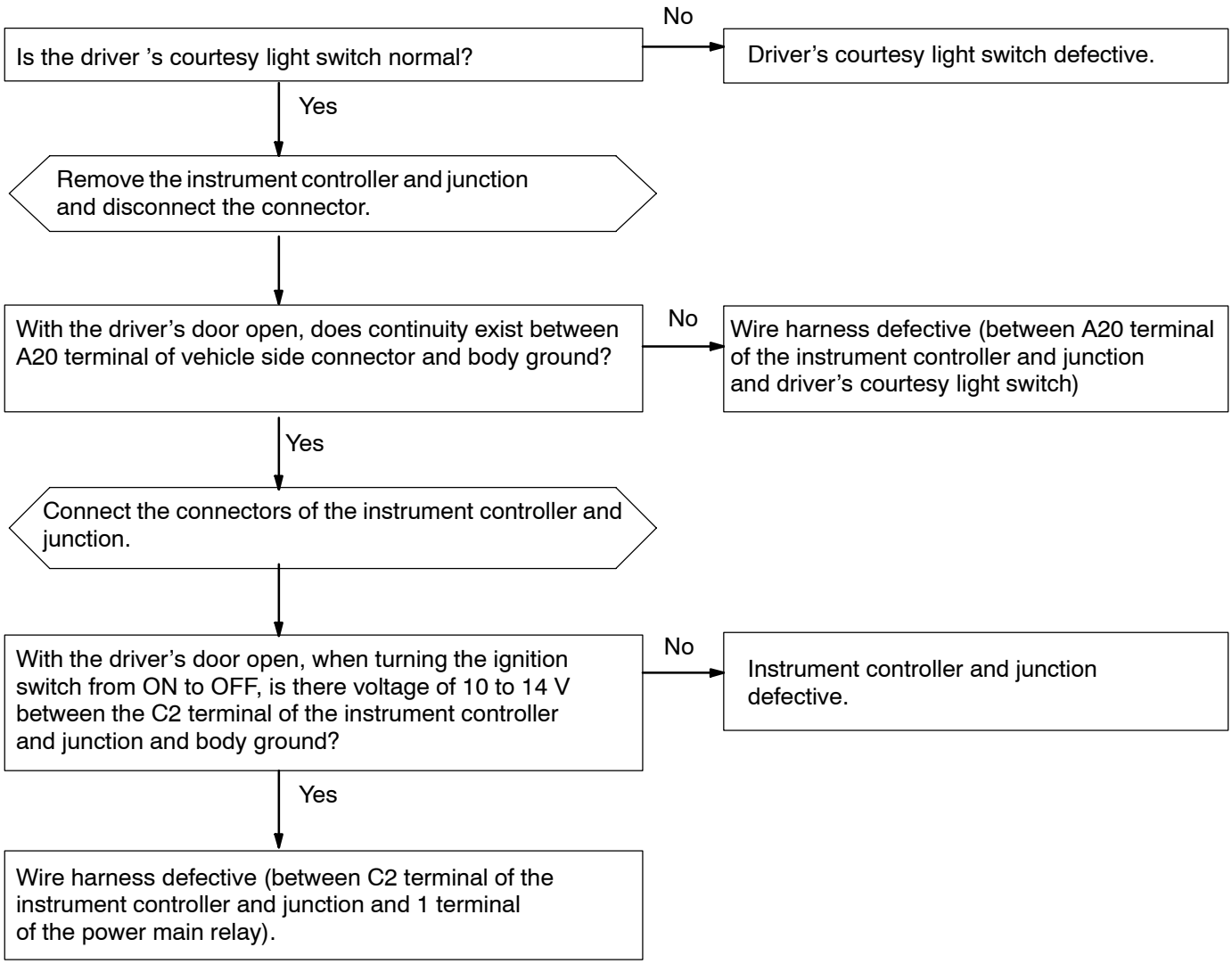
No

Master or regulator switch defective.

7	**Even through a foreign object is caught, DOWN operation does not function.**

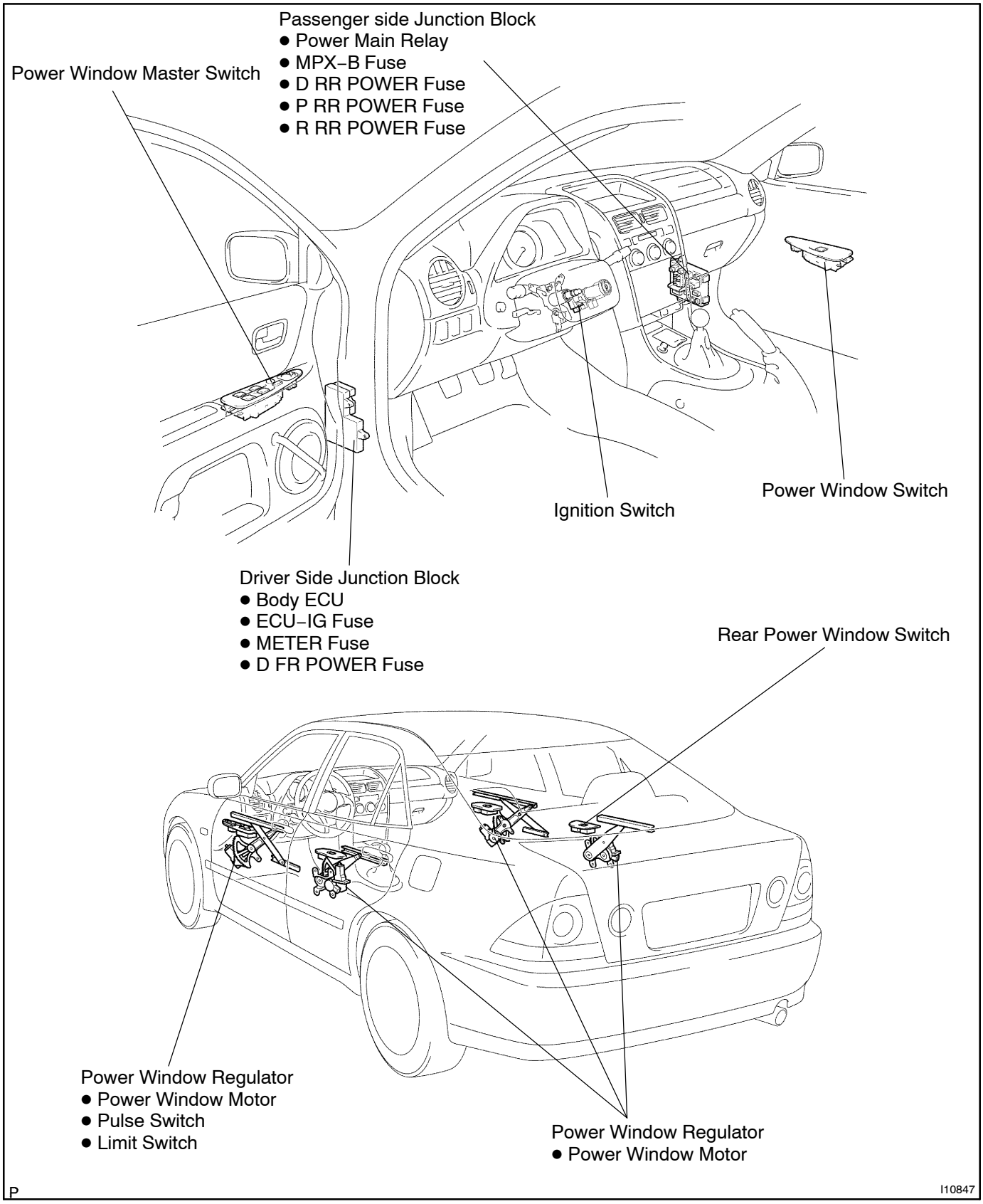


8	**After ignition switch has been turned OFF by using a key, power window function does not operate.**



BE0HE–09

LOCATION



P

I10847

BE16F–01

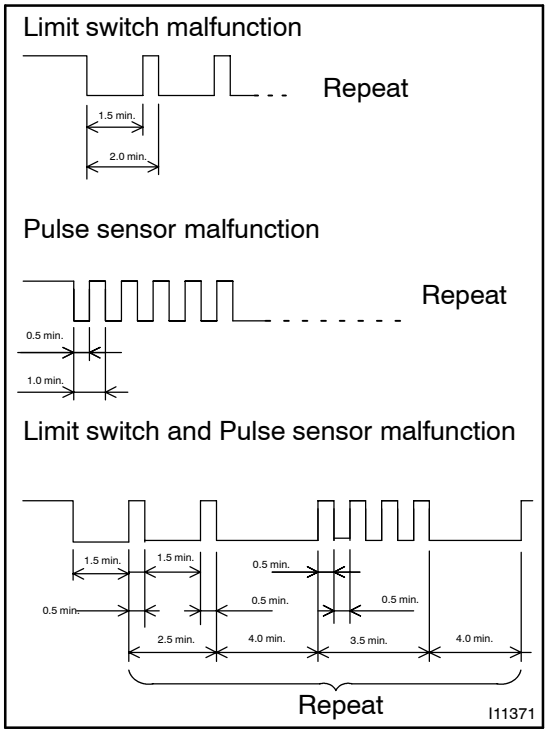
INSPECTION

1. INSPECT DIAGNOSIS CODE IS OUTPUT

Check that the master switch assembly automatic light flash under the condition of KEY off operation (for 45 secs. after the starter switch has been turned from ON to OFF with the driver's door open.)

HINT:

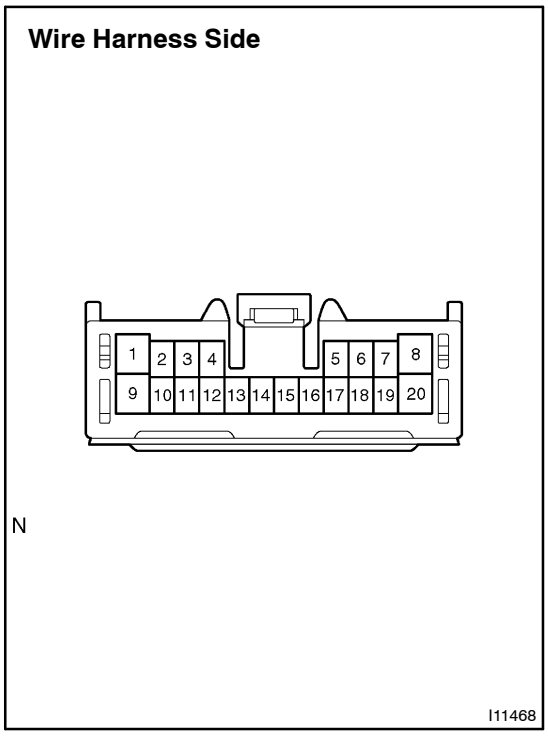
- Limit switch malfunction:
  Even though the glass goes down from the fully closed position, the power window regulator switch assembly does not detect a change in limit switch signal within 2.0 secs. after the operation has started.
- Pulse sensor malfunction:
  Even though the glass goes down from the fully closed position, the power window regulator switch assembly does not detect a change in pulse switch signal within 2.0 secs. after the operation has started.



2. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Connector disconnected:

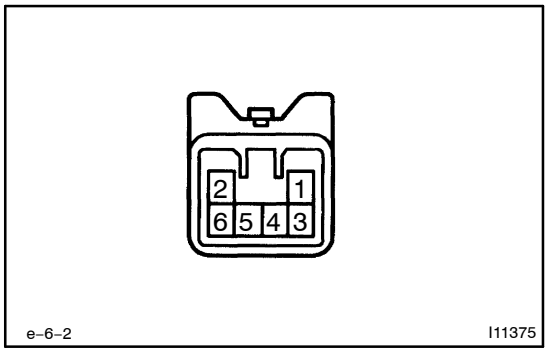
Disconnect the connectors from the switch and inspect connector on the wire harness side.



Tester connection	Condition	Specified condition
9 – Ground	Constant	Continuity
1, 5 – Ground	Constant	Battery voltage
2, 4 – Ground	Ignition switch LOCK	No voltage
2, 4 – Ground	Ignition switch ACC or ON	Battery voltage

If circuit is not as specified, replace the switch.

3. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT (See page DI–598)



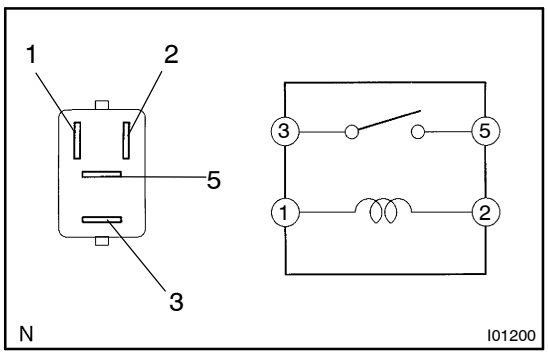
4. INSPECT POWER WINDOW SWITCH CONTINUITY

Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 6.

Switch position	Tester connection	Specified condition
UP	2 – 3 4 – 5	Continuity
OFF	–	No continuity
DOWN	2 – 4 3 – 5	Continuity

If continuity is not as specified, replace the switch.

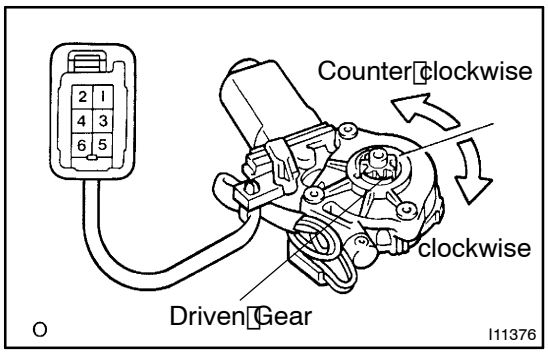
5. INSPECT POWER WINDOW SWITCH CIRCUIT (See page DI–602)



6. 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.

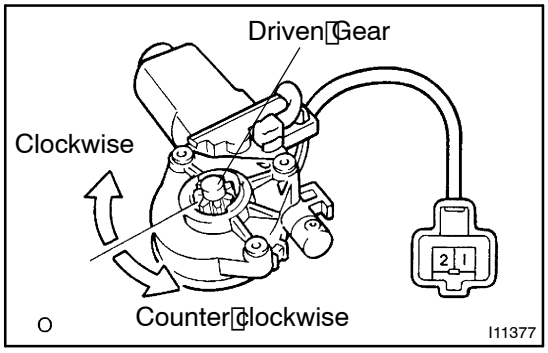


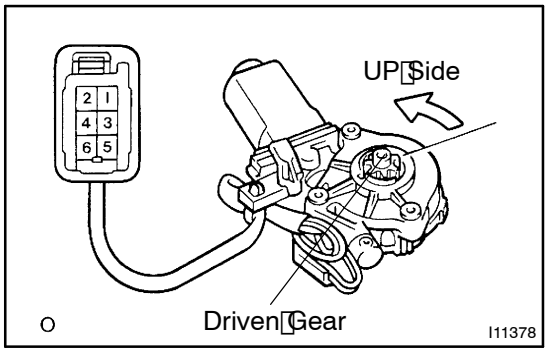
7. Driver's door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.





8. Front passenger's door and rear door: INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.

9. INSPECT POWER WINDOW MOTOR CIRCUIT
(See page DI–598)

10. INSPECT POWER WINDOW MOTOR PTC OPERATION
( ): LHD models

(a) Disconnect the connector from the master switch.

(b) Connect the positive (+) lead from the battery to terminal 2 (1) and the negative (–) lead to terminal 1 (2) on the wire harness side connector and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a PTC operation noise within approximately 4 to 90 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.

11. INSPECT JAM PROTECTION FUNCTION

NOTICE:

Never, ever be caught any part of your body when checking.

HINT:

In case of performing resetting of the limit switch, do checking after repeating up and down of the glass with automatic operation.

(a) Confirmation of AUTO up operation:
Confirm that the window will be fully close with AUTO up operation.

(b) Checking of the operation of the jam protection function:

(1) Move up the window with AUTO up operation and check that the window will go down when it touches the handle of the hammer stetted.

(2) Confirm that the window will then stop going down about 200 mm.

HINT:

In case of removing the glass, glass guide, regulator and etc. be sure to perform checking of the jam protection function.

If the jam protection is not functioned properly, adjust power window motor reset wwitc and pluse switch.

BE0HG–20

ADJUSTMENT

HOW TO RESET POWER WINDOW MOTOR (RESET SWITCH AND PULSE SWITCH)

If the jamprotection is not functioned properly, perform the following procedure.

HINT:

It is necessary to reset the power window motor (in initial position for the limit switch) when separating the window regulator from the power window motor or operating the window regulator with the door glass not installed.

(a) Remove the power window motor.

HINT:

Place the matchmarks on the power window motor and window regulator gear.

(b) Connect the power window motor and power window switch to wire harness of the vehicle.

(c) Turn the ignition switch ON and operate the power window switch to idle the power window motor in UP side direction for more than 6 rotations or less than 10 rotates (4 seconds or more).

(d) Assemble the power window motor and regulator.

HINT:

- Install the motor when the regulator arm is below the middle point.
- Align the matchmarks on the power window motor and window regulator gear.

(e) Assemble the power window regulator and door glass.

HINT:

Never rotate the motor to the down direction until the completion of the window glass installation.

(f) Connect power window switch to wire harness and turn the ignition switch ON.

(g) Repeat UP and DOWN operation several times manually.

(h) Check if AUTO UP → AUTO DOWN operates in automatic operation.

HINT:

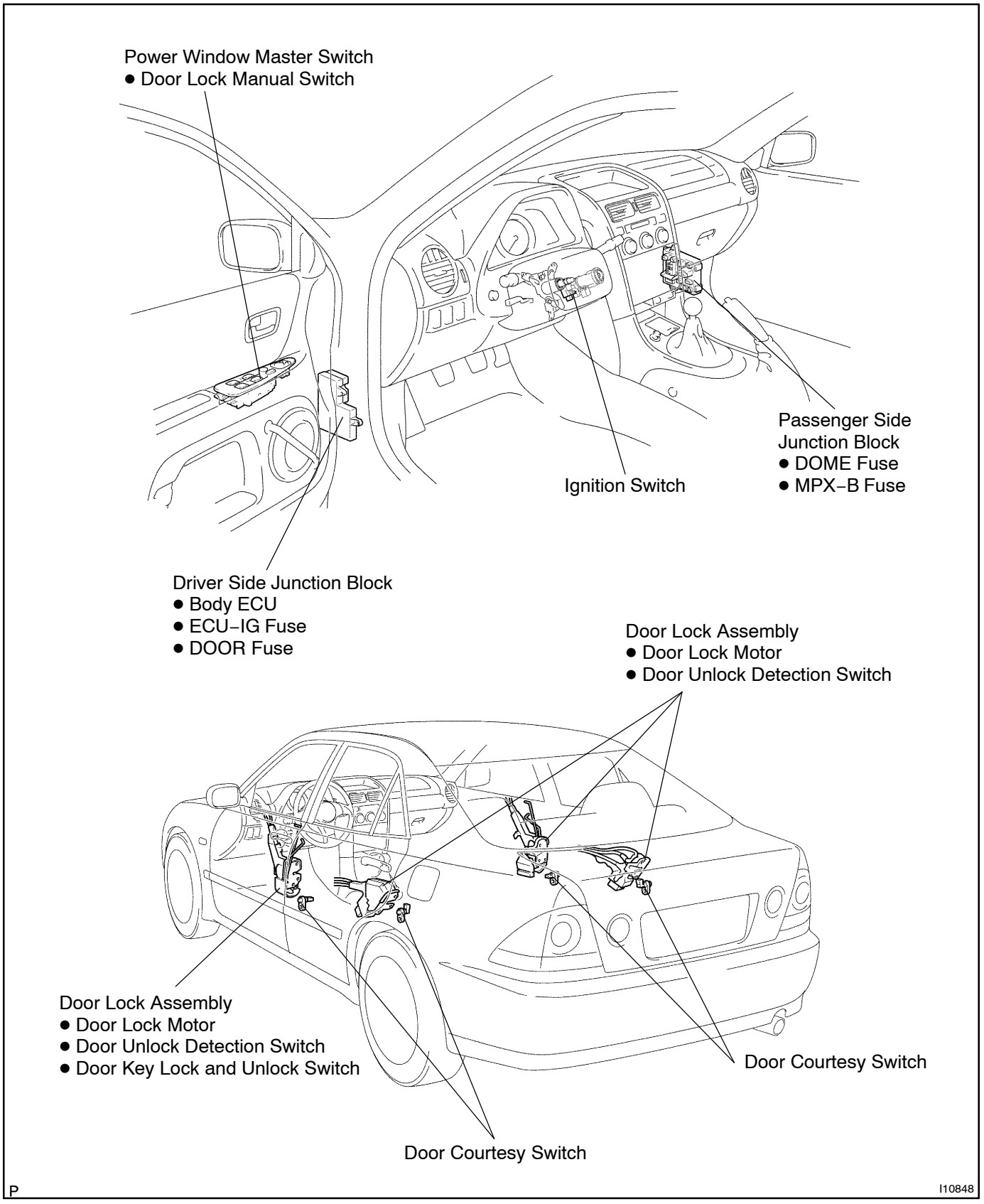
- Take care that the jam protection function does not operate just after resetting.
- Reset the regulator again when performing the reverse operating after closing the window fully by AUTO UP operation.

(i) Check the power window function.

POWER DOOR LOCK CONTROL SYSTEM

LOCATION

BE0HQ–10



BE16G–01

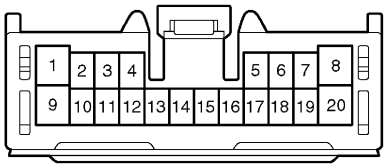
INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Connector disconnected:

Disconnect the connectors from the switch and inspect connector on the wire harness side.

Wire Harness Side



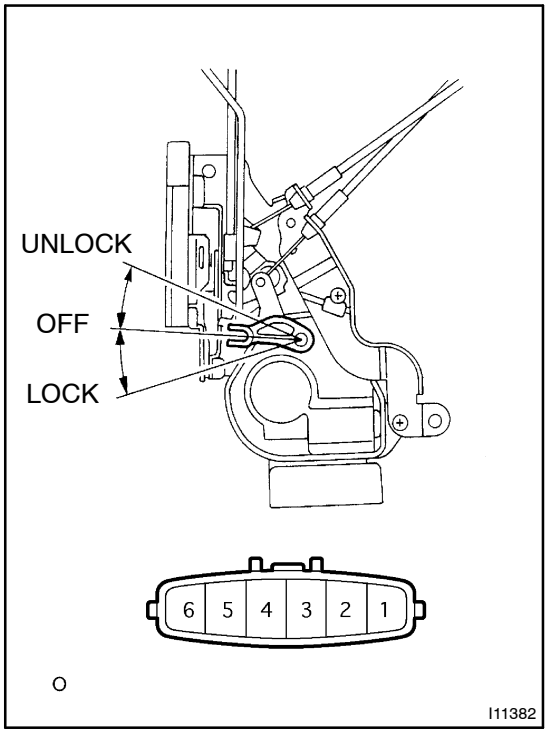
N

I11468

Tester connection	Condition	Specified condition
9 – Ground	Constant	Continuity
1, 5 – Ground	Constant	Battery voltage
2, 4 – Ground	Ignition switch LOCK	No voltage
2, 4 – Ground	Ignition switch ACC or ON	Battery voltage
15 – Ground (LHD)	Driver's door key lock and unlock switch LOCK	No Continuity
15 – Ground (LHD)	Driver's door key lock and unlock UNLOCK	Continuity
16 – Ground	Each door courtesy switch ON (door opened)	No Continuity
16 – Ground	Each door courtesy switch OFF (door closed)	Continuity
6 – Ground (RHD)	Driver's door key lock and unlock switch LOCK	No Continuity
6 – Ground (RHD)	Driver's door lock and unlock switch UNLOCK	Continuity

If circuit is not as specified, replace the switch.

2. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT (See page DI–598)

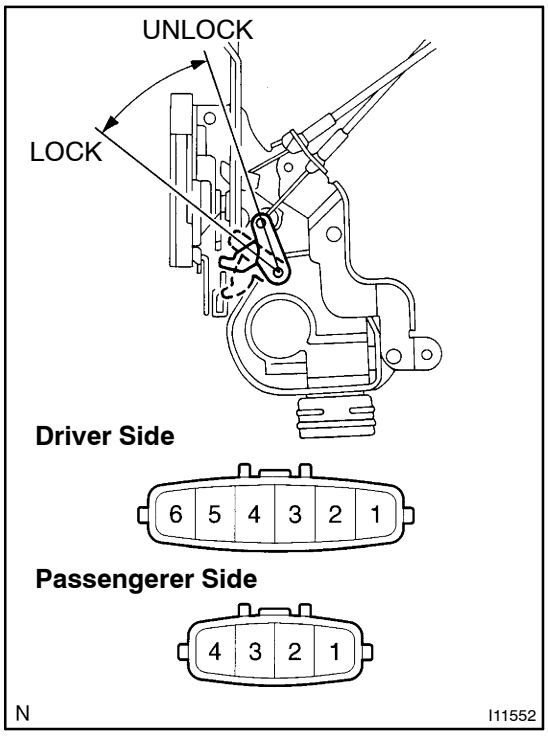


3. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

( ): LHD models

Switch position	Tester connection	Specified condition
LOCK	3 – 5 (2 – 4)	Continuity
OFF	–	No continuity
UNLOCK	4 – 5 (2 – 3)	Continuity

If continuity is not as specified, replace the door lock assembly.



4. w/o Double locking system: INSPECT DRIVER SIDE DOOR UNLOCK DETECTION SWITCH CONTINUITY

( ): LHD models

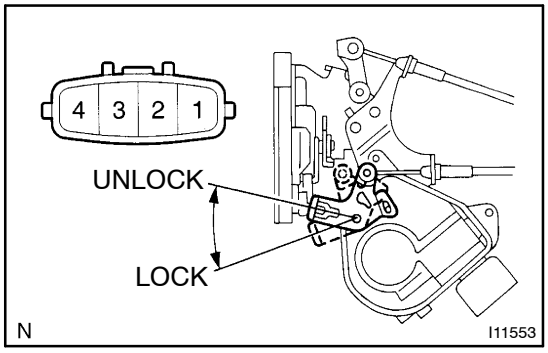
Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	5 – 6 (3 – 4)	Continuity

If continuity is not as specified, replace the door lock assembly.

5. w/o Double locking system: INSPECT PASSENGER 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 – 2	Continuity

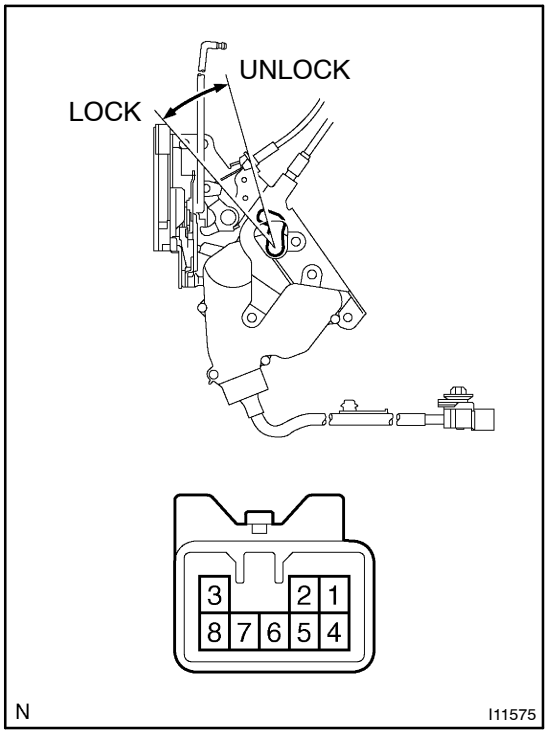
If continuity is not as specified, replace the door lock assembly.



6. w/o Double locking system:
INSPECT REAR DOOR DOOR UNLOCK DETECTION SWITCH CONTINUITY
( ): LHD side

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	3 – 4 (1 – 2)	Continuity

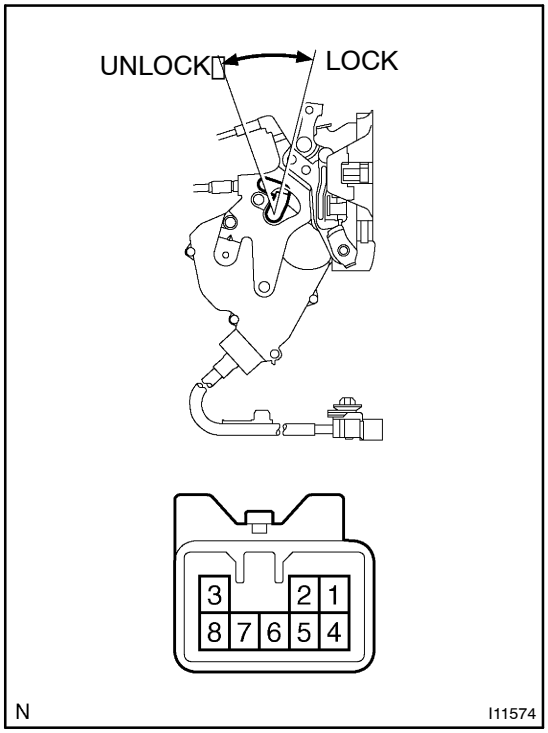
If continuity is not as specified, replace the door lock assembly.



7. w/ Double locking system:
INSPECT FRONT 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 – 5	Continuity

If continuity is not as specified, replace the door lock assembly.

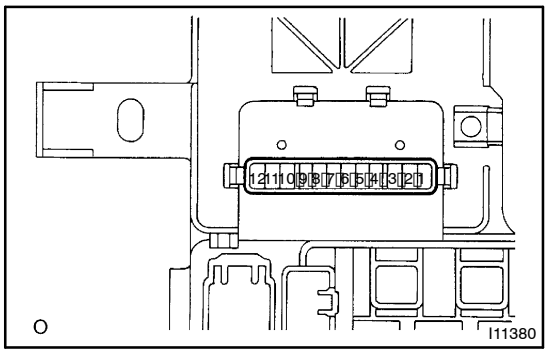


8. w/ Double locking system: INSPECT REAR DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	1 – 5	Continuity

If continuity is not as specified, replace the door lock assembly.

9. INSPECT DOOR UNLOCK DETECTION SWITCH CIRCUIT (See page DI–595)



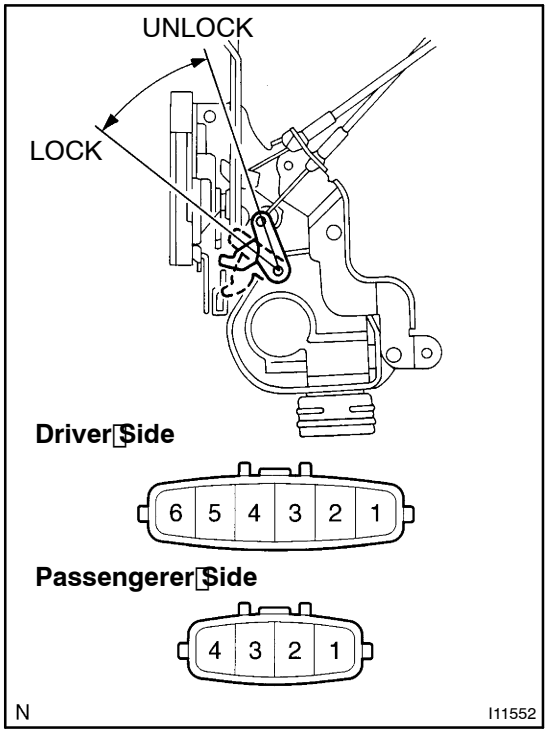
10. INSPECT DOOR LOCK MOTOR AND J/B CIRCUIT

(a) Remove the body ECU from the driver's side junction block.

(b) Connect the positive (+) lead from the battery to J/B terminal 9 and the negative (–) lead to J/B terminal 10, and check that the door lock link moves to LOCK position.

(c) Reverse the polarity and check that the door link moves to UNLOCK position.

If operation is not as specified, inspect door lock motor.



11. w/o Double locking system: INSPECT FRONT LEFT SIDE DOOR LOCK MOTOR OPERATION

( ): LHD models

(a) Connect the positive (+) lead from the battery to terminal 3 (5) and the negative (–) lead to terminal 4 (6), and check that the door lock link moves to LOCK position.

(b) Reverse the polarity and check that the door lock link moves to UNLOCK position.

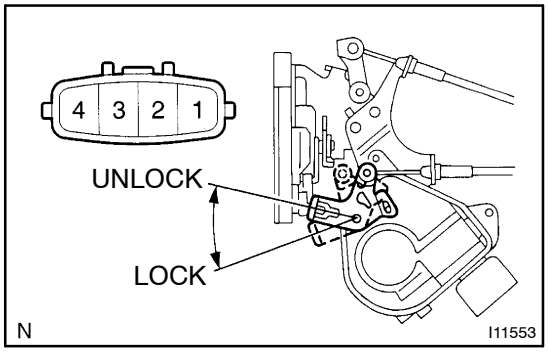
If operation is not as specified, replace the door lock assembly.

12. w/o Double locking system: INSPECT FRONT RIGHT SIDE DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the door lock link moves to LOCK position.

(b) Reverse the polarity and check that the door lock link moves to UNLOCK position.

If operation is not as specified, replace the door lock assembly.



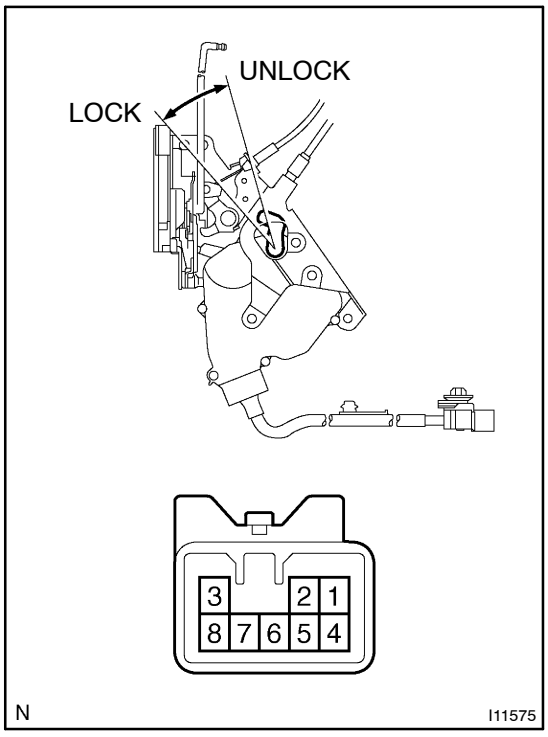
13. w/o Double locking system:
INSPECT REAR DOOR LOCK MOTOR OPERATION
( ): LHD models

(a) Connect the positive (+) lead from the battery to terminal 1 (3) and the negative (–) lead to terminal 2 (4), and check that the door lock link moves to LOCK position.

(b) Reverse the polarity and check that the door lock link moves to UNLOCK position.

If operation is not as specified, replace the door lock assembly.

14. INSPECT DOOR LOCK MOTOR CIRCUIT
(See page DI–592)

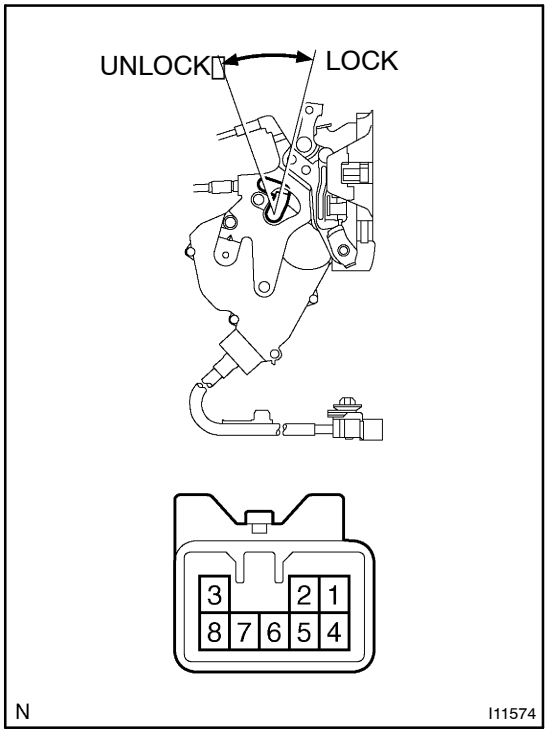


15. w/ Double locking system:
INSPECT FRONT DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, and check that the door lock link moves to LOCK position.

(b) Reverse the polarity and check that the door lock link moves to UNLOCK position.

If operation is not as specified, replace the door lock assembly.



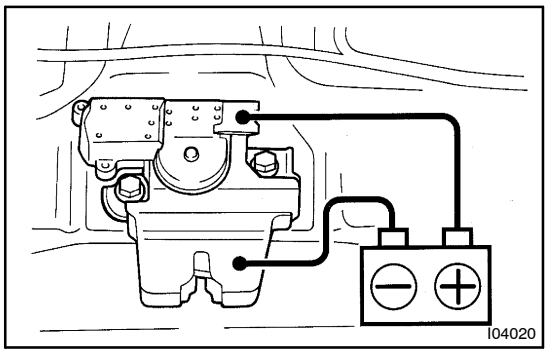
16. w/ Double locking system: INSPECT REAR DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, and check that the door lock link moves to LOCK position.

(b) Reverse the polarity and check that the door lock link moves to UNLOCK position.

If operation is not as specified, replace the door lock assembly.

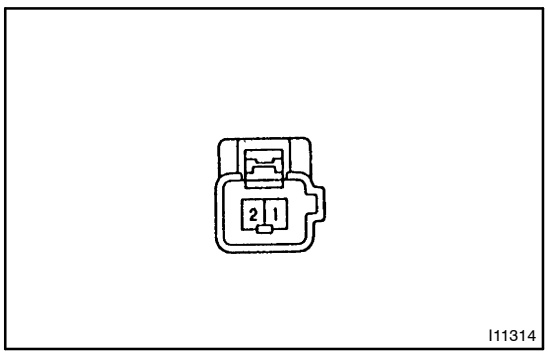
17. INSPECT DOOR LOCK MOTOR CIRCUIT
(See page DI–592)



18. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR OPERATION

Connect positive (+) lead to the terminal 1 and negative (–) lead to the opener motor body, and check that the motor operates.

If operation is not as specified, replace the motor assembly.

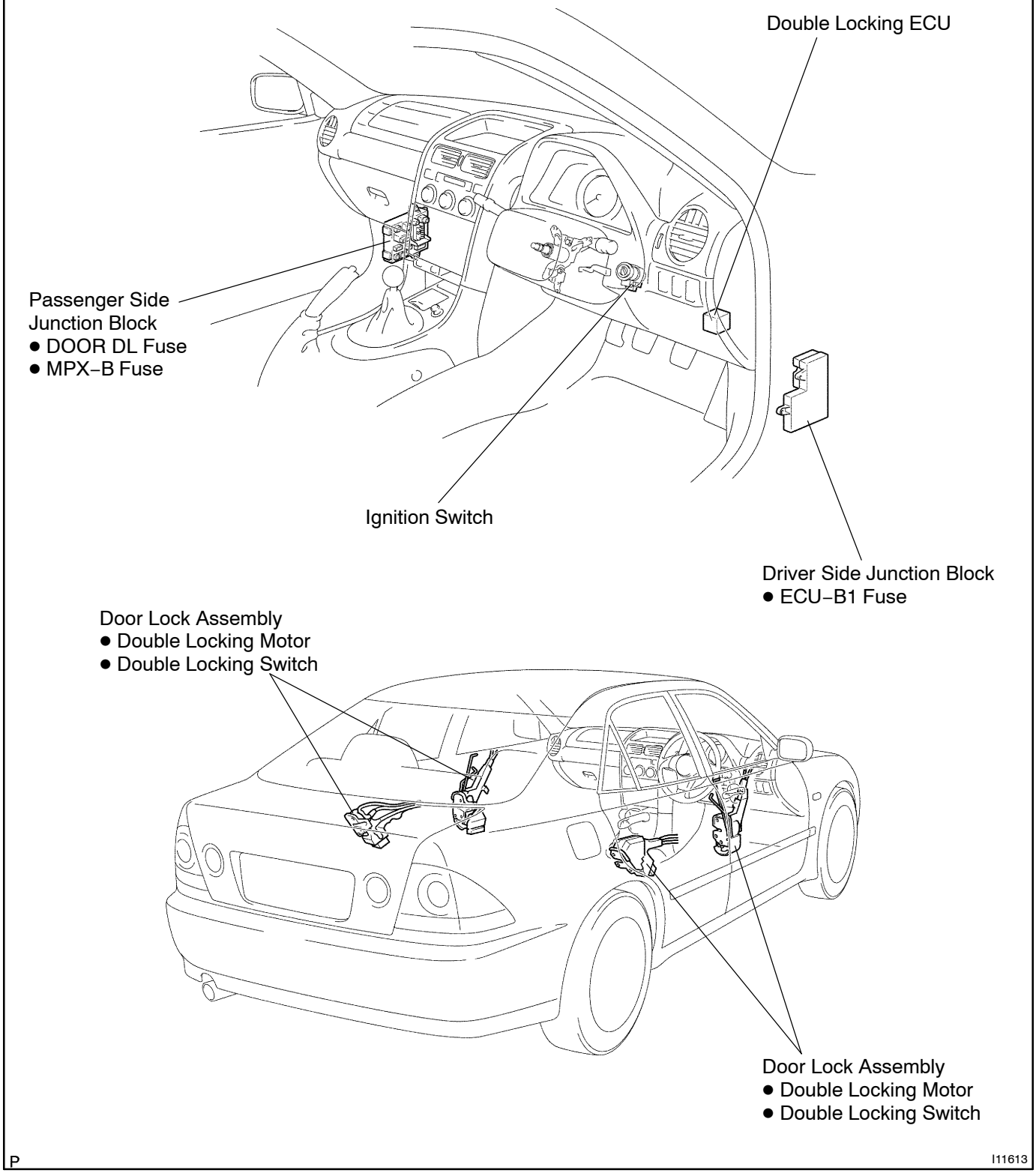


19. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR CIRCUIT
(See page DI–589)

DOUBLE LOCKING SYSTEM

LOCATION

BE16H–01



BE16I–01

INSPECTION

1. INSPECT DOUBLE LOCKING SYSTEM FUNCTION

HINT:

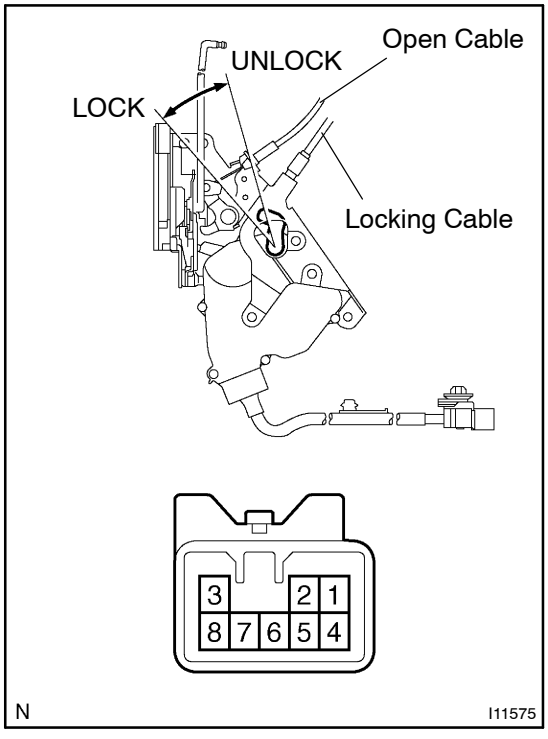
- In case of doing the following inspection, must open one of the windows of the doors.
- In order to set the double locking, turn the ignition switch ON to OFF, open the driver's door and close it, then lock the door with the transmitter.
- In case of doing the following inspection, for preventing the wrong warning, turn OFF the radar sensor. The method to turn off the radar sensor is to press the lock button of the transmitter to lock, then press the lock button again. (When the radar sensor turns OFF, "all turn signal light" flashes 5 times.)
  In order to turn ON the radar sensor again, press the lock button of the transmitter again. (When the radar sensor turns ON again, "all turn signal light" flashes once.)
  Switching from ON to OFF can be done only within 30 seconds after setting the Theft Deterrent System (locking with the transmitter).

(a) Check that the double locking is set.
  (1) Lock with the wireless transmitter from the inside of the vehicle.
  (2) Check that the doors won't open from the inside of the vehicle even operating the door lock knob and inside door handle

(b) Check that the double locking is released (Case 1).
  (1) Unlock with the wireless transmitter from the inside of the vehicle.
  (2) Check that the doors will open from the inside of the vehicle by operating the door knob and inside door handle.

(c) Check that the double locking is released (Case 2).
  (1) Lock with the wireless transmitter from the inside of the vehicle.
  (2) Under this condition, insert the key into the ignition key cylinder, turn the ignition switch to ON and check that the doors will open.

If you find any abnormal symptom in the check items of (a), (b) and (c), troubleshoot according to the Problem Symptom Table.



2. INSPECT FRONT DOUBLE LOCKING SWITCH CONTINUITY

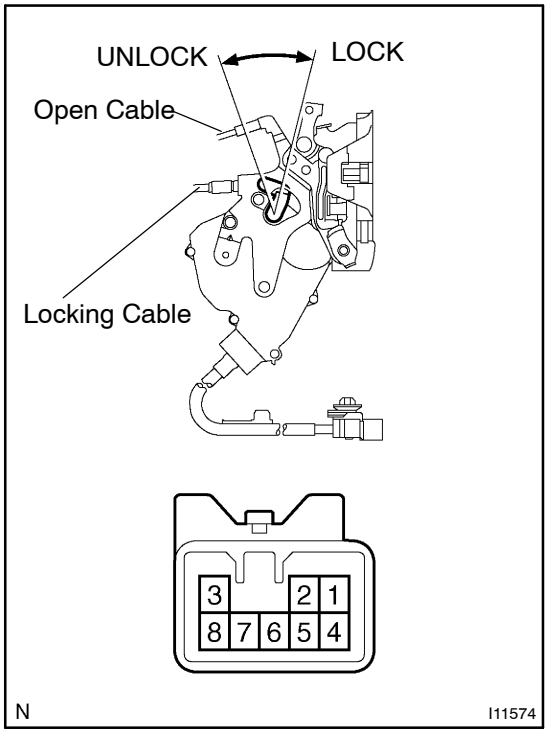
Switch position	Tester connection	Specified condition
OFF (Double Locking is released)	–	No continuity
ON (Double Locking is set)	4 – 6	Continuity

If continuity is not as specified, replace the door lock assembly.

3. INSPECT FRONT DOUBLE LOCKING MOTOR OPERATION

(a) Set the Door Lock to LOCK position by the locking cable.
(b) Connect the positive (+) lead from the battery to terminal 8 and negative (–) lead to terminal 7, and check that the Door Lock will not unlock by pulling the locking cable. (Locking cable must return to LOCK position by the force of spring when pulling the locking cable.)
(c) Reverse the polarity and check that the Door Lock will unlock by pulling the locking cable.

If operation is not as specified, replace the door lock assembly.



4. INSPECT REAR DOUBLE LOCKING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Double Locking is released)	–	No continuity
ON (Double Locking is set)	4 – 6	Continuity

If continuity is not as specified, replace the door lock assembly.

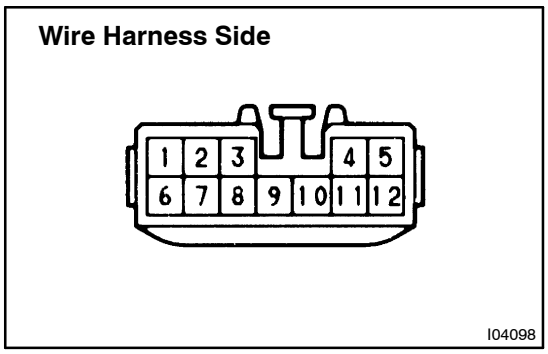
5. INSPECT REAR DEAD LOCK MOTOR OPERATION

(a) Set the Door Lock to LOCK position by the locking cable.

(b) Connect the positive (+) lead from the battery to terminal 8 and negative (–) lead to terminal 7, and check that the Door Lock will not unlock by pulling the locking cable. (Locking cable must return to LOCK position by the force of spring when pulling the locking cable.)

(c) Reverse the polarity and check that the Door Lock will unlock by pulling the locking cable.

If operation is not as specified, replace the door lock assembly.



6. INSPECT DOUBLE LOCKING ECU CIRCUIT

Disconnect connector from the ECU and inspect the connectors on the wire harness side as follows.

Tester connection	Condition	Specified condition
12 – Ground	Constant	Continuity
1 – Ground	Constant	Battery voltage
6 – Ground	Constant	Battery voltage

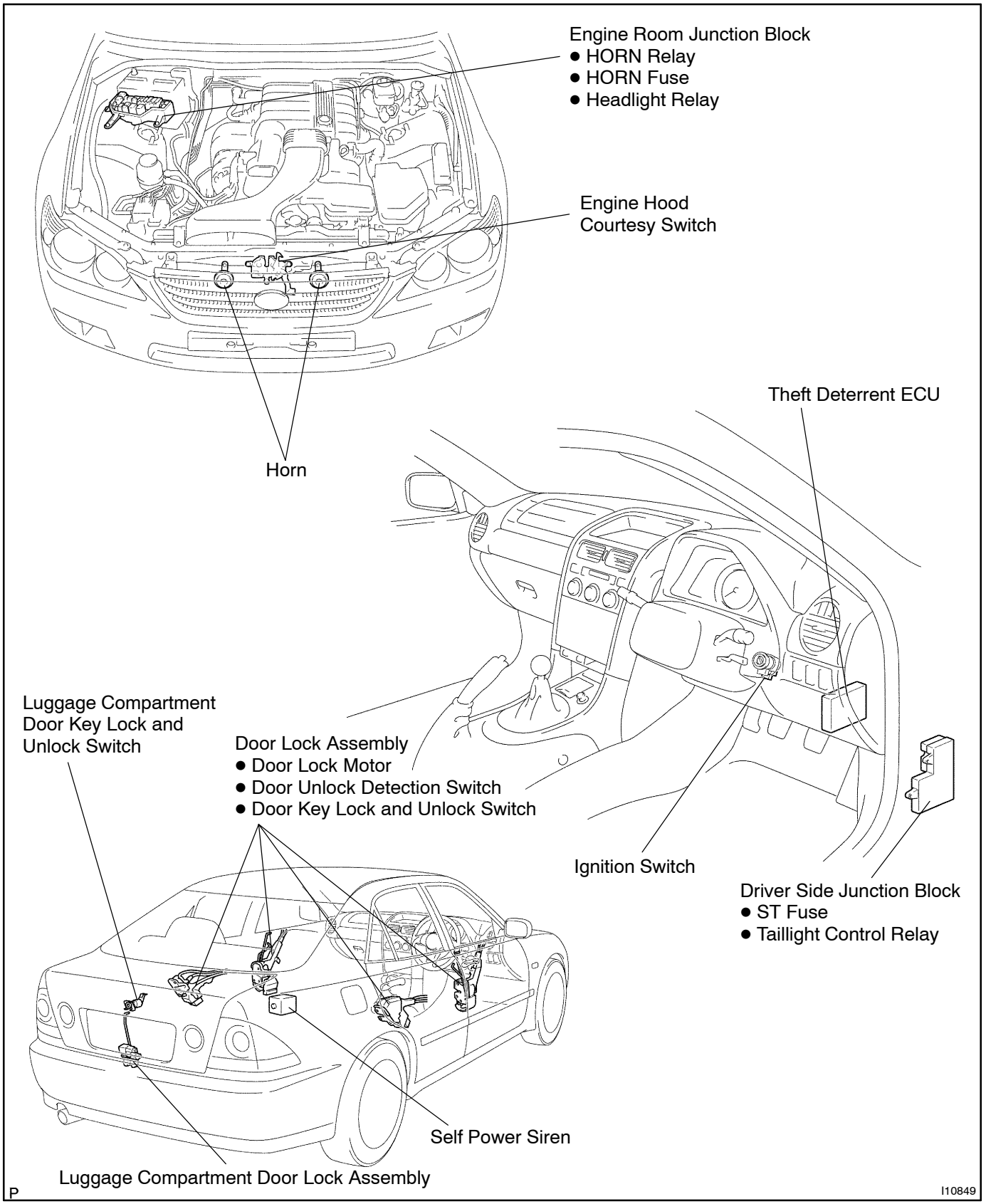
If circuit is as specified, replace the ECU.

If circuit is not as specified, wiring diagram and inspect the circuits connected to other parts.

THEFT DETERRENT SYSTEM

LOCATION

BE16Q–01



BE16R–01

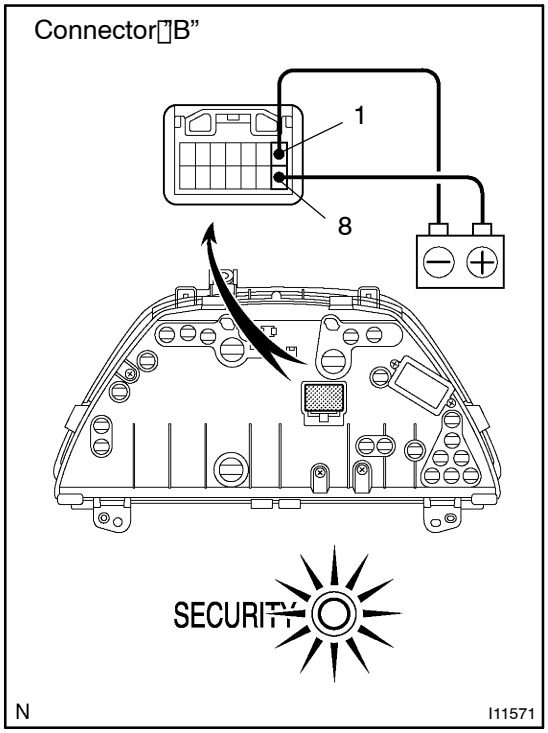
INSPECTION

1. INSPECT THEFT DETERRENT INDICATOR LIGHT OPERATION

(a) Remove the combination meter.

(b) Disconnect the combination meter connector.

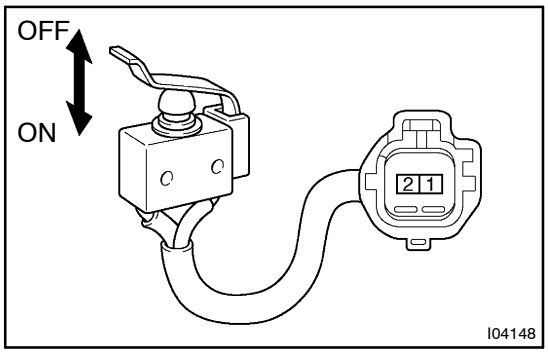
(c) Check indicator light lights up when connect the positive (+) lead from the battery to terminal B8 and the negative (–) lead to terminal B1 of combination meter connector.



If operation is not as specified, replace the indicator light.

2. INSPECT THEFT DETERRENT INDICATOR LIGHT CIRCUIT

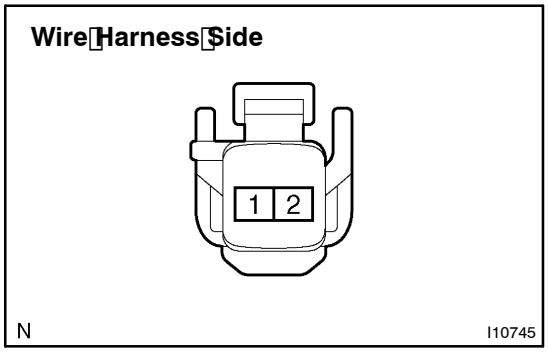
(See page DI–444)



3. INSPECT ENGINE HOOD COURTESY 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 switch.



4. INSPECT ENGINE HOOD COURTESY SWITCH CIRCUIT

(See page DI–475)

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

If circuit is not as specified, inspect power source or wire harness.

5. INSPECT THEFT DETERRENT SIREN BATTERY

(a) The internal battery is fully discharged.

(b) Set the system inside the vehicle.

(c) Disconnect the connector of theft deterrent ECU in this condition, and sounds the siren for open detection.

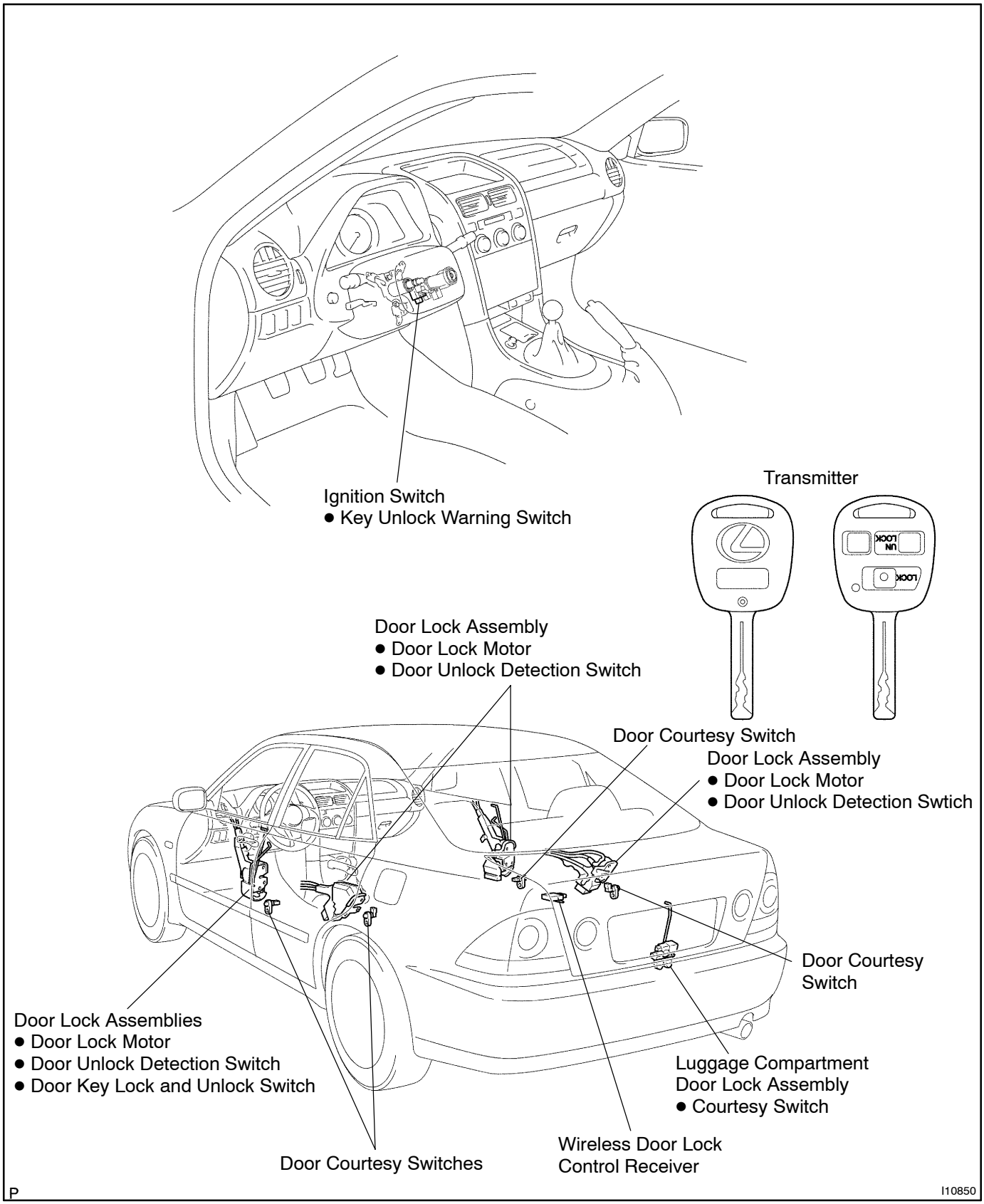
(d) The siren battery is normal when the siren sounds for 30 seconds, stops, then after 5 seconds, seconds again.

(e) Replace the siren battery when the siren stops sounding before 30 seconds elapse the battery because the battery life has run out

WIRELESS DOOR LOCK CONTROL SYSTEM

LOCATION

BE0GM–06



BE0GN–05

PRE–CHECK

Only wireless function (Remote control) will not operate.
(If a new transmitter or a transmitter of the same type that works properly with the vehicle is not available.)

Make the vehicle in the initialized condition:
The 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.

Basic function check:

Under the standard operation, when repeating UNLOCK and LOCK switch 3 times or more alternately, check the UNLOCK–LOCK operation from 3rd time onward.
● Following procedures are standard operation.
(1) Keep about 1 M away to the right direction from the outside handle of a driver's seat.
(2) Face the transmitter toward the vehicle and press one of transmitter switches 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

Transmitter LED inspection:

Check when pressing UNLOCK switch and LOCK switch under standard operation, that the transmitter LED lights up once more.

No

Yes

Normal
<Reference>
● Operative distance may differ according to an operator, the way of holding the transmitter or position.
● Because weak electric wave is used, when there is strong wave or noise in the used frequency ,operation distance might be shortened.

Transmitter battery check:

Replace the transmitter battery with a new or normal one and check UNLOCK–LOCK function works under the standard operation.

<Reference>

- The battery should be replaced by only the shops with sufficient skill as new or normal battery is necessary.
- Battery quality can be judged by checking the remnant volume of the battery.

Yes → Battery faulty.

No

Make the vehicle be in the initialized condition.

Inspection start by using self diagnostic mode:

Enter into the self diagnostic mode.

If operating door control receiver in the order of 1 through 2, the mode turns to diagnostic mode.

(1) Insert the key plate in the ignition key cylinder and pull out, then insert it again and turn ignition switch OFF → ON → OFF once within 5 seconds after pulling out.

(2) After completing the procedure within 30 seconds, turn the ignition switch OFF → ON → OFF 9 times.

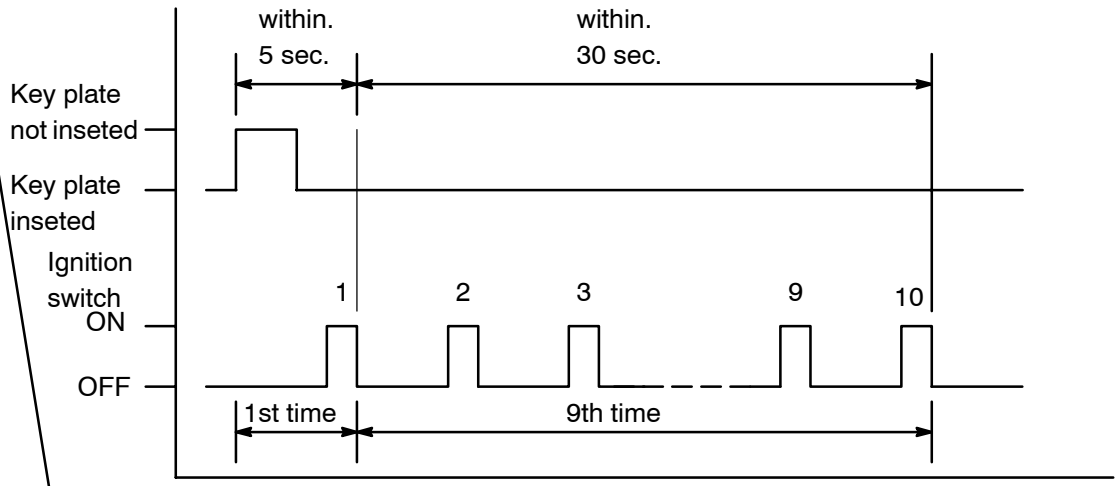
HINT:

In the case that either (1) or (2) condition is not satisfied, transfer to normal mode.

<Reference>

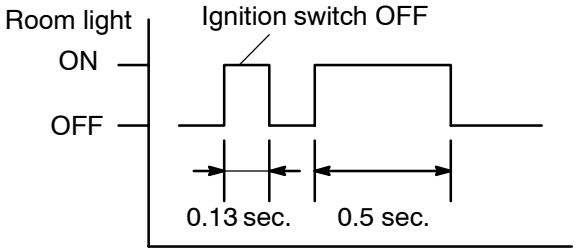
When completing self diagnostic mode, turn the ignition switch ON.

LOCK and UNLOCK operation and output of luggage door opener signal are not performed under the self diagnostic mode.



Self diagnostic mode operation check:

After the self diagnostic mode input operation has been performed, check that the room light



No
(Not entered in self diagnostic mode)

Is the method to enter into the diagnostic mode correct?

No

Yes

Is the chirping function of operation confirmation room light normal?

No

Check door control room light

Yes

Yes
(Entered in self diagnostic mode)

Key unlock warning switch inspection:

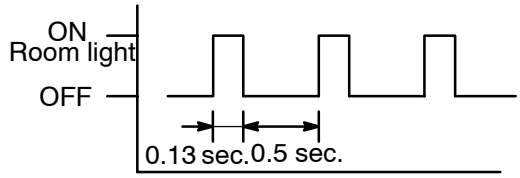
Check that continuity exists between connector terminal A3 of MPX body ECU on the vehicle side and ground by inserting the key plate into the ignition key cylinder.

Check key unlock warning switch.

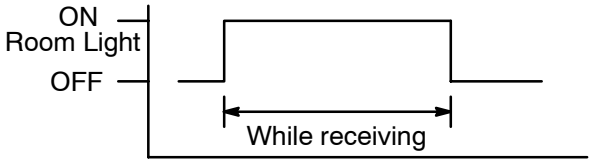
Self diagnostic mode check:

Check that how the room light when pressing each transmitter switch.

(1) Receiver normal wave of LOCK, UNLOCK or TRUCK switch.



(2) Incompatibility of the recognition code or out from synchronization of rolling code.



<Reference>:
While turning the ignition switch ON in the self diagnostic mode, the mode returns to normal mode.

(2) is output.
(All room light response is same.)

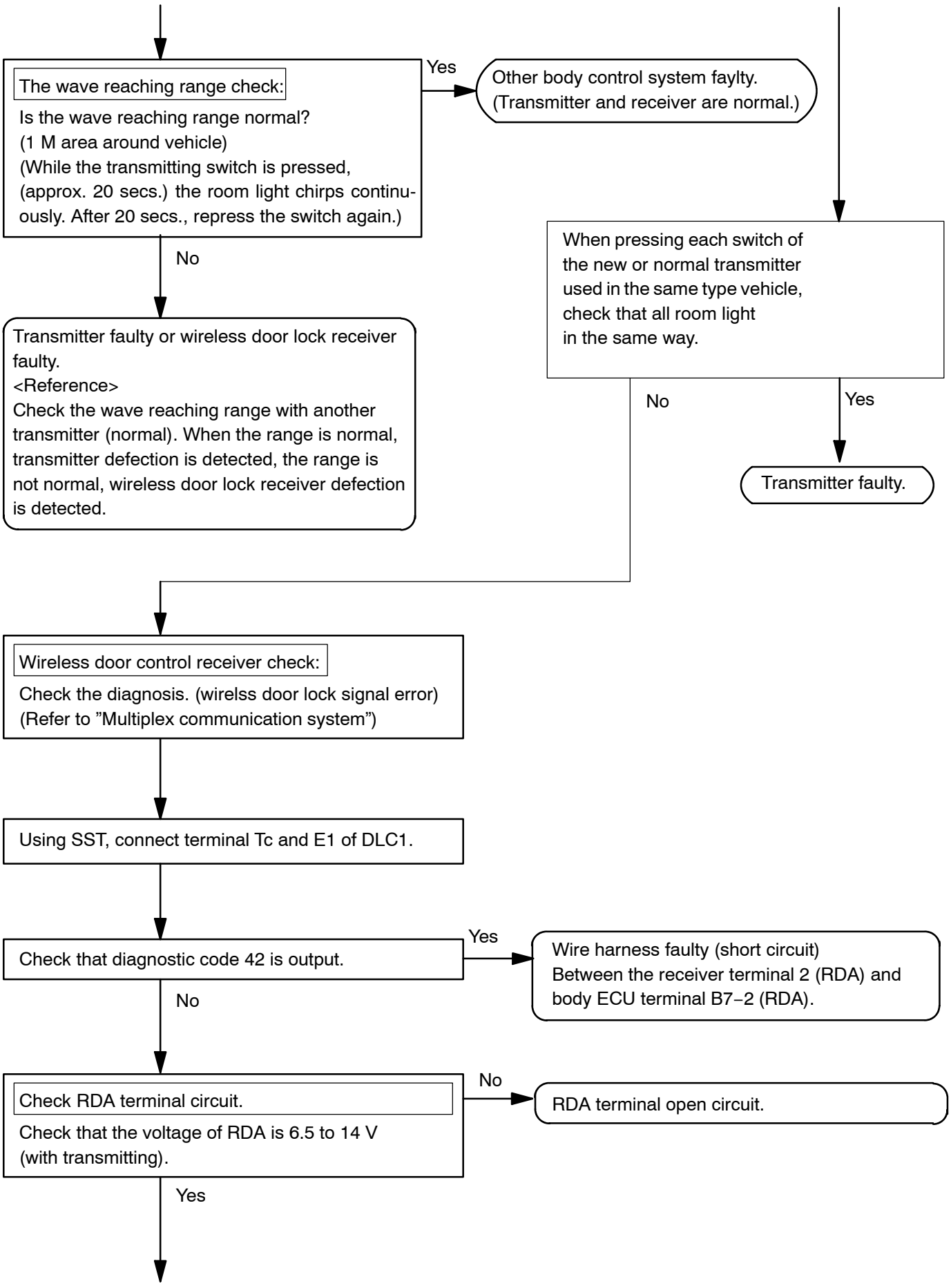
Recognition code registration function check:

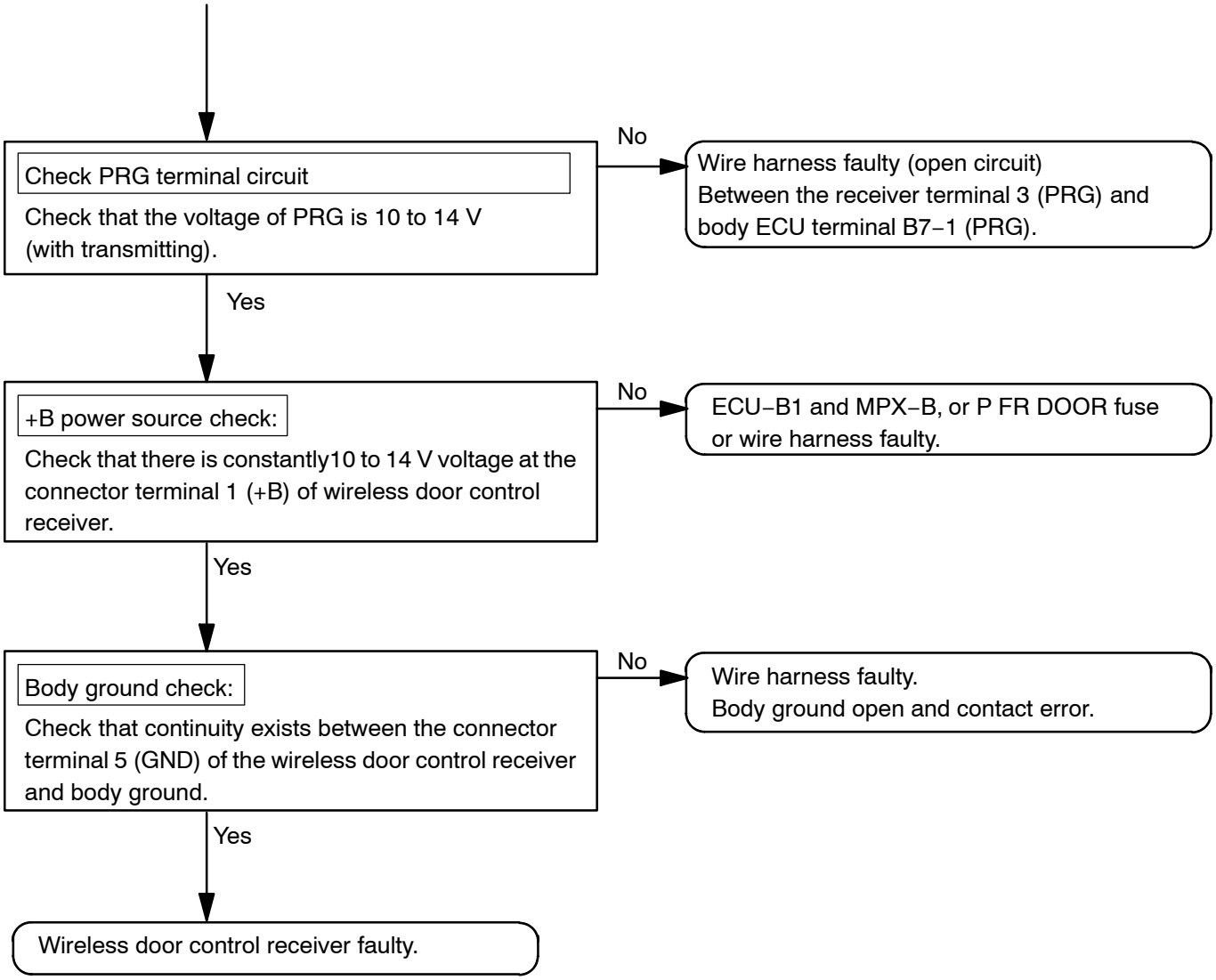
Check that it is possible to enter into rewrite mode or add mode.
(Refer to "Wireless door lock receiver and transmitter" – "Recognition code registration".)

Wireless door lock operates normally when recognition code is registered.

No response from room light

(1) is output.


The wave reaching range check:
Is the wave reaching range normal?
(1 M area around vehicle)
(While the transmitting switch is pressed, (approx. 20 secs.) the room light chirps continuously. After 20 secs., repress the switch again.)
Yes
Other body control system faylty.
(Transmitter and receiver are normal.)
No
Transmitter faulty or wireless door lock receiver faulty.
<Reference>
Check the wave reaching range with another transmitter (normal). When the range is normal, transmitter defection is detected, the range is not normal, wireless door lock receiver defection is detected.
When pressing each switch of the new or normal transmitter used in the same type vehicle, check that all room light in the same way.
No
Yes
Transmitter faulty.
Wireless door control receiver check:
Check the diagnosis. (wirelss door lock signal error)
(Refer to ”Multiplex communication system”)
Using SST, connect terminal Tc and E1 of DLC1.
Check that diagnostic code 42 is output.
Yes
Wire harness faulty (short circuit)
Between the receiver terminal 2 (RDA) and body ECU terminal B7–2 (RDA).
No
Check RDA terminal circuit.
Check that the voltage of RDA is 6.5 to 14 V (with transmitting).
No
RDA terminal open circuit.
Yes


Check PRG terminal circuit
Check that the voltage of PRG is 10 to 14 V (with transmitting).
No
Wire harness faulty (open circuit)
Between the receiver terminal 3 (PRG) and body ECU terminal B7–1 (PRG).
Yes
+B power source check:
Check that there is constantly10 to 14 V voltage at the connector terminal 1 (+B) of wireless door control receiver.
No
ECU–B1 and MPX–B, or P FR DOOR fuse or wire harness faulty.
Yes
Body ground check:
Check that continuity exists between the connector terminal 5 (GND) of the wireless door control receiver and body ground.
No
Wire harness faulty.
Body ground open and contact error.
Yes
Wireless door control receiver faulty.

BE16J–01

INSPECTION

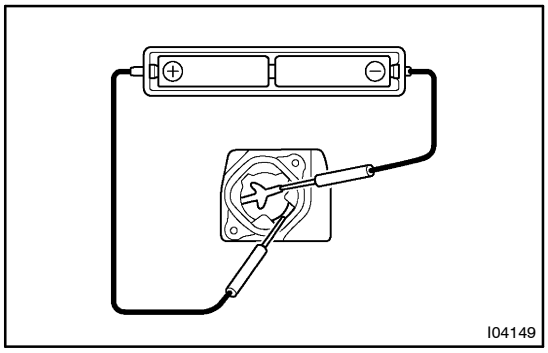
1. INSPECT WIRELESS DOOR LOCK TRANSMITTER OPERATION

HINT:

Refer to "Wireless door lock control transmitter battery replacement" on page BE–136.

(a) Using a screwdriver, remove the screw and cover.

(b) Remove the battery (lithium battery).


I04149

(c) Install a new or normal battery (lithium battery).

HINT:

When a new or normal battery can not be obtained, connect 2 new 1.5 V batteries in series, connect the battery (+) to the battery receptacle side terminal and battery (–) to the bottom terminal, then apply 3 V voltage to the transmitter.

(d) In the location where is approx. 1 M away from driver's outside handle in the right direction, face the key plate of the transmitter to the vehicle, and check the transmitter operation when pressing transmission switch on the side of the transmitter body.

Standard:

- **Remote control of vehicle door lock can be operated.**
- **LED lights up more than once.**

HINT:

- The minimum operation distance differs according to operator, the way of holding the transmitter, and location.
- As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.

(e) Install the battery (lithium battery).

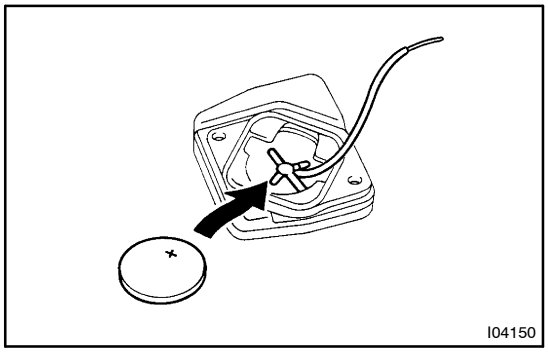
(f) Install a cover so that O–ring is not distorted or slipped off.

(g) Using a screwdriver, tighten the screw.

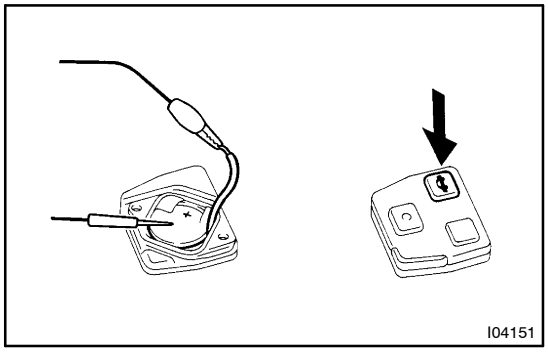
2. CHECK BATTERY CAPACITY

HINT:

- Make sure to use the TOYOTA electrical tester.
- With the battery unloaded, judge can not be made whether the battery is available or not on the test.
- When the transmitter is faulty, the energy amount left in the battery might not be checked correctly.
- On the lithium battery used for the transmitter, the voltage more than 2.5 V with the battery unloaded is shown on the tester until the energy is completely consumed. Accordingly when inspecting the energy amount left in the battery, it is necessary to measure the voltage when the battery is loaded. (1.2 kΩ).



(a) Remove the screws and cover using a (–) driver.
(b) Remove the battery (lithium battery) from the transmitter.
(c) Connect the lead to the (–) terminal of the transmitter and install the battery.



(d) Connect the (+) tester to the (+) battery (lithium battery), and (–) tester to the lead respectively.
(e) Press one of the transmitting switches on the transmitter for approx. 1 second.
(f) Press the transmitting switch on the transmitter again to check the voltage.
Standard: 2.1 V or more

HINT:

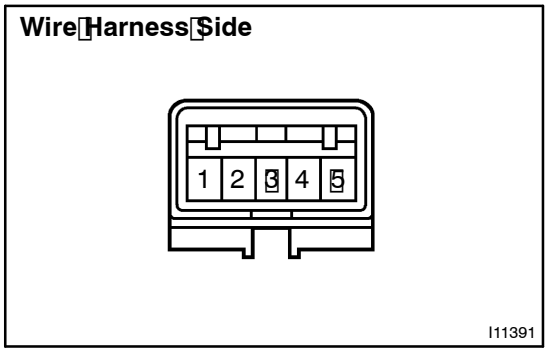
- When the temperature of the battery is low, the judge cannot be made correctly.
  When the outcome of the test is less than 2.1 V, conduct the test again after leaving the battery in the place at 18 °C for more than 30 minutes.
- By auto power off function, the voltage becomes no load voltage (more than 2.5 V) condition 0.8 seconds after the switch was pressed.
  Make sure to read the voltage before off it.
- High voltage might be shown 1 to 2 times after leaving the battery, judge should be made with the voltage shown at the 3rd time or later.

(g) Disconnect the lead.

(h) Set the battery (lithium battery) in the transmitter.

(i) Install the cover, so that the O–ring is not distorted or slipped off.

(j) Using a screwdriver, tighten the screws.



3. INSPECT WIRELESS DOOR LOCK CONTROL RECEIVER CIRCUIT

(See page DI–561)

Connector disconnected:

Disconnect the connector from the receiver and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
5 – Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

4. INSPECT WIRELESS DOOR LOCK CONTROL RECEIVER CIRCUIT

Connector connected:

Connect the wire harness side connector to the receiver and inspect the wire harness side connector from the back side, as shown.

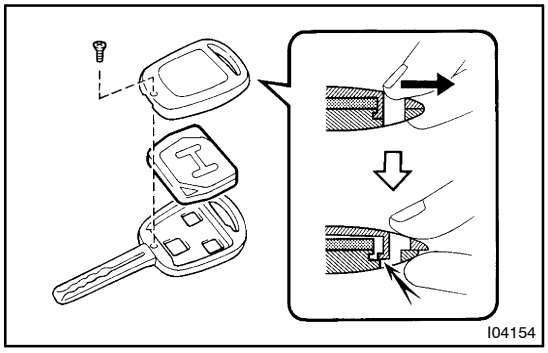
Tester connection	Condition	Specified condition
3 – Ground	Constant	Battery voltage
2 – Ground	All door closed Transmitter OFF → ON	0 V – 6 V → 0 V

If circuit is as specified, replace the receiver.

If the circuit is not as specified, inspect the circuits connected to other parts.

BE0GP–06

REPLACEMENT



1. REPLACE TRANSMITTER (LITHIUM) BATTERY

NOTICE:

Special caution should be taken for handling each component as they are precision electronic components.

(a) Using a screwdriver, remove the screw and cover.

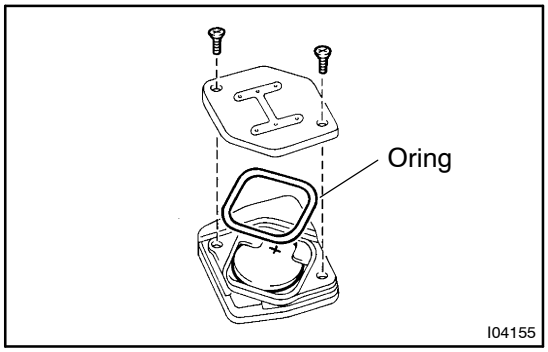
NOTICE:

Do not pry out the cover forcibly.

HINT:

Push the cover with a finger as shown in the illustration, so that there becomes clearance, then pry out the cover from that clearance.

(b) Remove the transmitter.

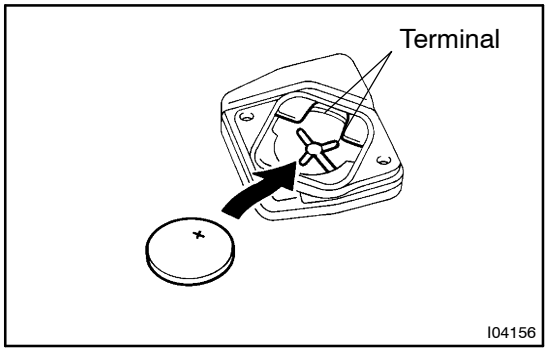


(c) Using a screwdriver, remove the 2 screws and cover.

(d) Remove the battery (lithium battery).

NOTICE:

- **Do not push the terminals with a finger.**
- **If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.**



(e) Install a battery (lithium battery) as shown in the illustration.

NOTICE:

Face the battery upward. Take care not to deform the terminals.

(f) Check that O–ring is not distorted or slipped off, and install the cover.

(g) Using a screwdriver, tighten the 2 screws.

NOTICE:

When the shrews are tightened loosely, it might cause faulty contact of battery (lithium battery) and terminals.

(h) Assemble the transmitter to the key plate and the cover.

(i) Using a screwdriver, tighten the screw.

2. REPLACE DOOR CONTROL RECEIVER AND TRANSMITTER

NOTICE:

When replacing the door control receiver and transmitter, registration of recongnition code is necessary because they are provided as single components.

(a) Select which operation mode should be performed from the following modes.
- Add mode
- Rewrite mode
- Prohibition mode
- Confirmation mode

HINT:
- The add mode is used to retain codes already registered while you register new recongnition codes. This mode is used when adding a transmitter. However, if the number of registered codes exceeds 4 codes, previously registered codes are correspondingly erased in order, starting from the first registered code.
- The rewrite mode is used to erase all previously registered codes and register only new recognition codes.
- The prohibition mode is used to erase all registered codes and cancels the wireless door lock function. Use this mode when the transmitter is lost.
- The confirmation mode is for confirming how many recongnition codes are already registered before you register additional recognition codes.

(b) Follow the chart on the following pages to register the transmitter recongnition code at the wireless door lock conrol receiver.

HINT:
- When procedure is out of the specified, the operation returns to normal operation.
- Maximum 4 recognition codes can be registered.

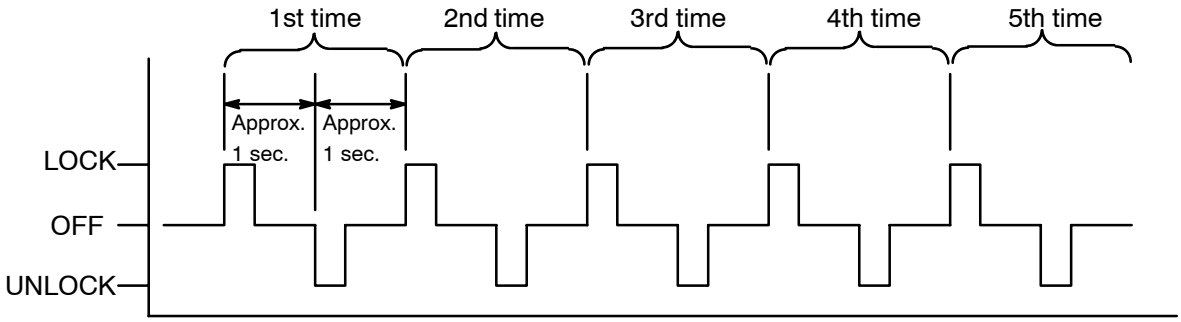
Start registration of recognition code

The vehicle should be in the following conditions.
- 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 pull it out.

Within 40 secs.

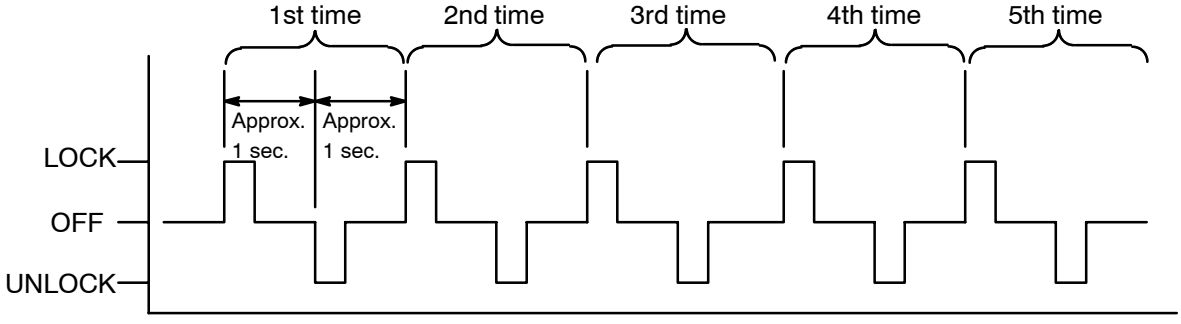
Press the door lock control switch (for manual operation) 5 times to LOCK/UNLOCK at approx. 1 sec. interval.



Close the driver's door, then open it.

Within 40 secs.

Again press the door lock control switch (for manual operation) 5 times to LOCK/UNLOCK at approx. 1 sec. interval.

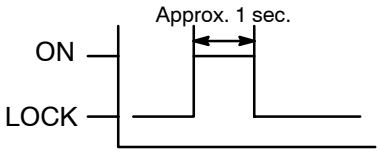


Insert the key into the ignition key cylinder.

Turn the ignition switch from ON to LOCK at approx. 1 sec. interval 1 to 5 times to select the mode.

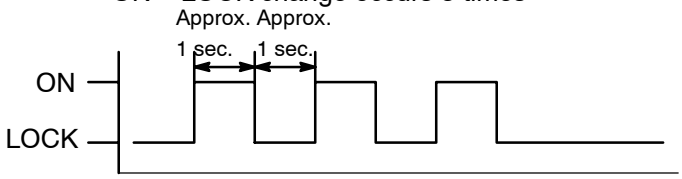
Add mode

ON – LOCK change occurs 1 time



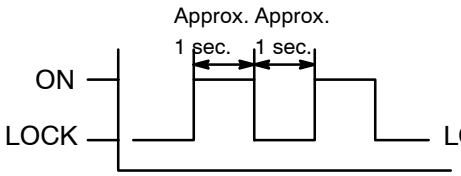
Confirmation mode

ON – LOCK change occurs 3 times



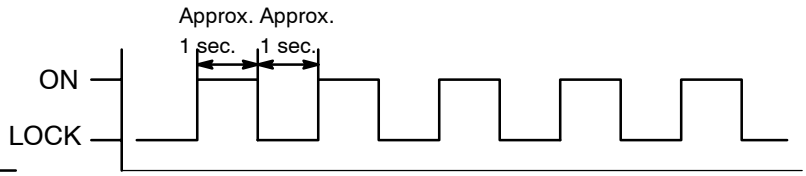
Rewrite mode

ON – LOCK change occurs 2 times



Prohibition mode

ON – LOCK change occurs 5 times



Pull out the key plate from the ignition key cylinder.

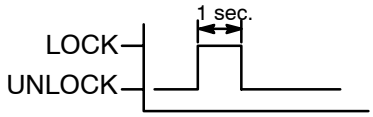
Within 3 secs.

When add mode or rewrite mode is selected.

MPX body ECU automatically performs the LOCK–UNLOCK operation once or twice at 1 sec. interval to iniform the operator that either the add mode or rewrite mode has been selected.

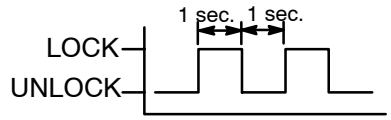
LOCK–UNLOCK occurs once

Indicates that add mode has been selected.



LOCK–UNLOCK occurs twice

Indicates that rewrite mode has been selected.

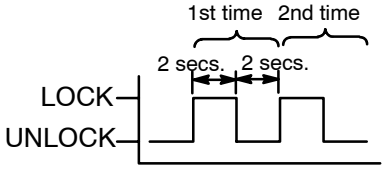


When prohibition mode is selected.

When confirmation mode is selected.

MPX body ECU automatically performs the LOCK–UNLOCK operation 1 to 4 times at 2 sec. interval to inform the operator of the number of the registered codes.
HINT:
When the number of the registered code is 0, the operation is automatically performed 5 times.

Example:
When the operation is performed twice, it directs that 2 types of recognition code have been registered.

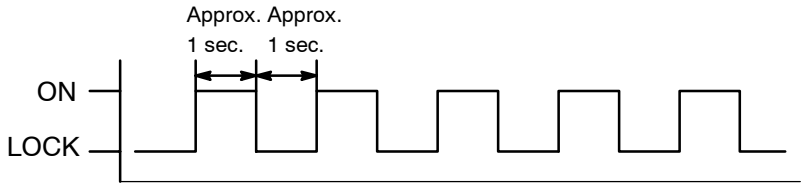


Registration of recognition code (Confirmation mode and prohibition mode) is completed.

When prohibition mode is selected.

Within 40 secs.

MPX body performs LOCK–UNLOCK operation 5 times at a 1 sec. interval to inform the operator that prohibition mode has been selected.



Press the lock and unlock switches on the transmitter simultaneously within. 1.5 sec.

Within 3 secs.

Press again either one of 3 switches on the transmitter for more than 1 sec.

Within 3 secs.

MPX body ECU automatically performs LOCK–UNLOCK operation once or twice at a 1 sec. interval to inform the operator that the receiver 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.

If LOCK–UNLOCK operation can not be performed at all, the mode returns to the normal mode, then start with ”Start registration of recognition code”.

Proceed to finish registration

Proceed to continue registration

Within 40 secs.

If even one of the following conditions is satisfied, registration of recognition codes is completed.

- 40 secs. elapses since the MPX body ECU response.
- The driver’s door is closed.
- The key plate is inserted in the ignition key cylinder.
- 4 type recognition codes are registration at one time.

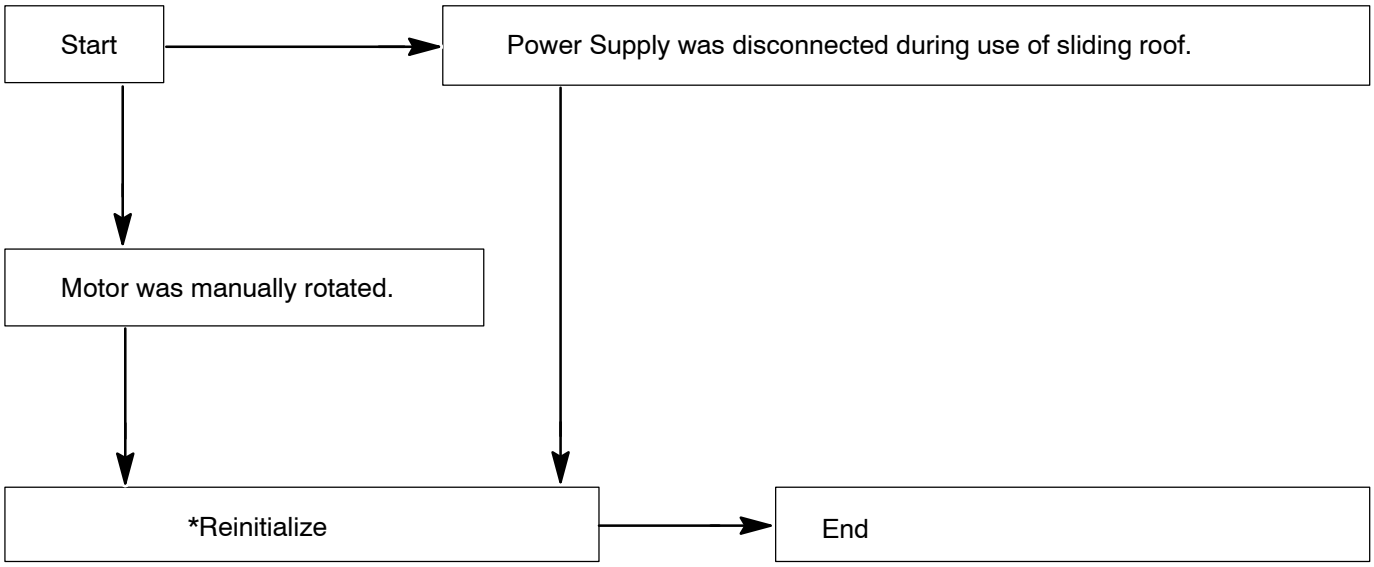
Registration of recognition codes (add mode or rewrite mode) is completed.

SLIDING ROOF SYSTEM

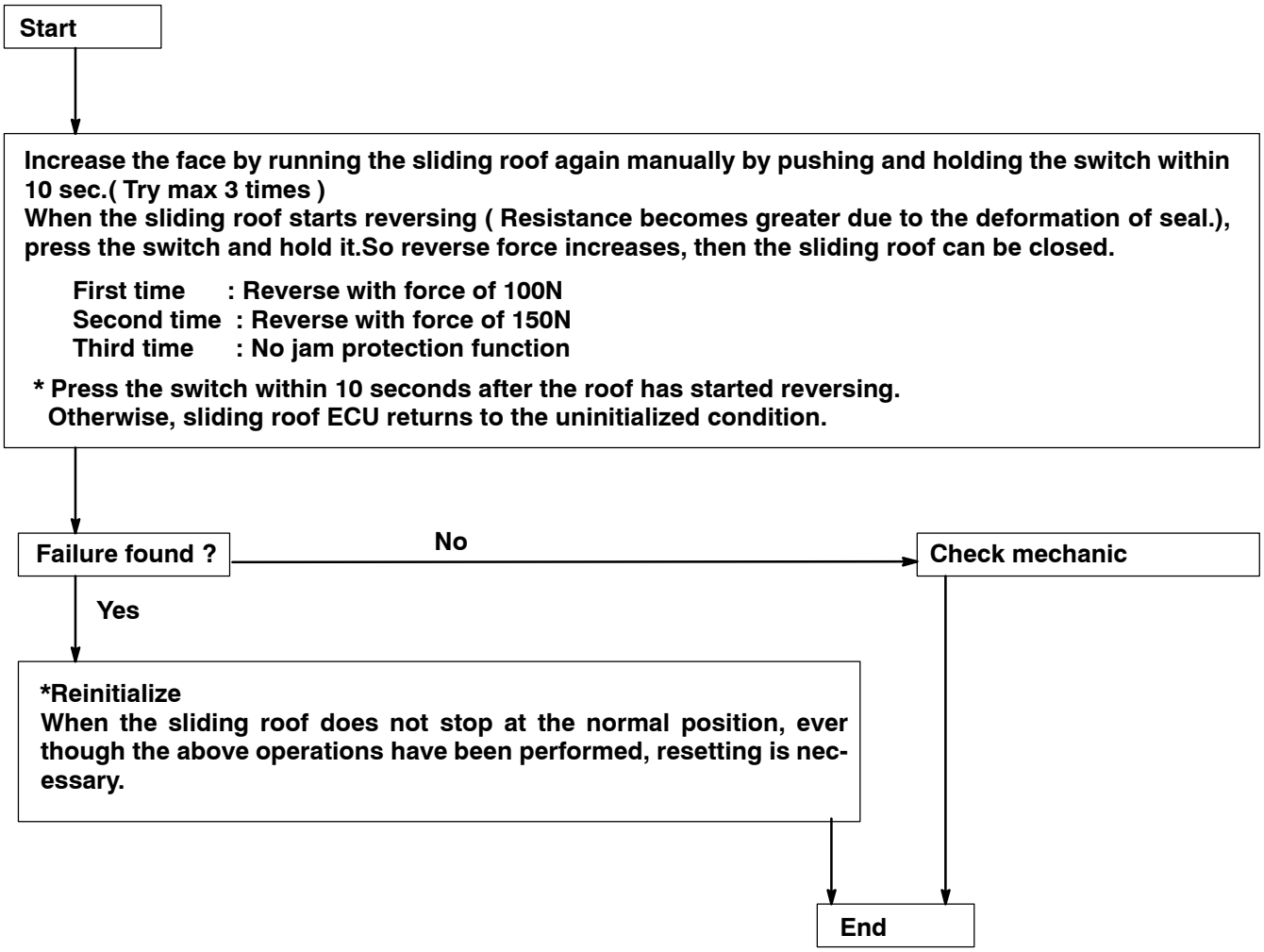
TROUBLESHOOTING

BE0O9–04

1	**Sliding Roof does not stop at correct position.**



2	Sliding Roof always reopens (anti trap function).

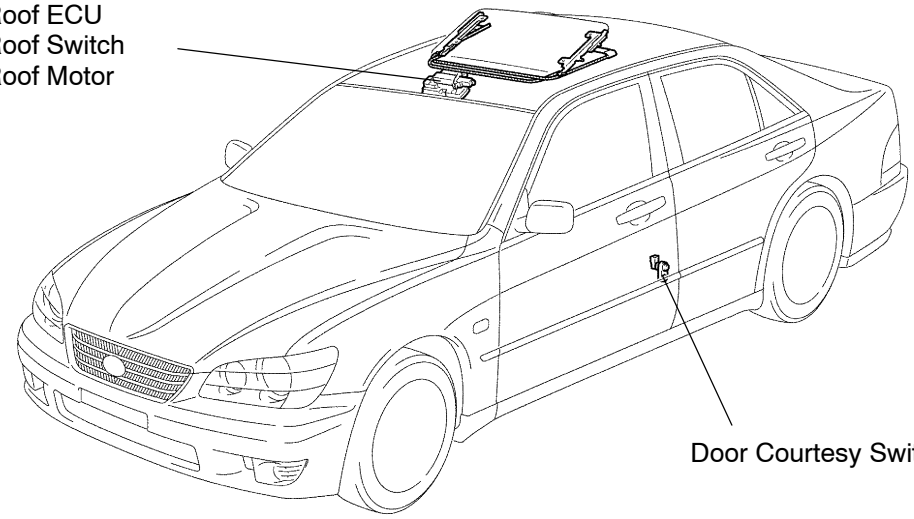


*Reinitializing method
(a) Move the sliding roof to the maximum tilted position.
(b) Release the switch, press the switch again and hold it for 10 secs.
(c) The sliding roof operates in a cycle of TILT DOWN → SLIDE OPEN → SLIDE CLOSE → TILT UP.
THis completes reinitializing.

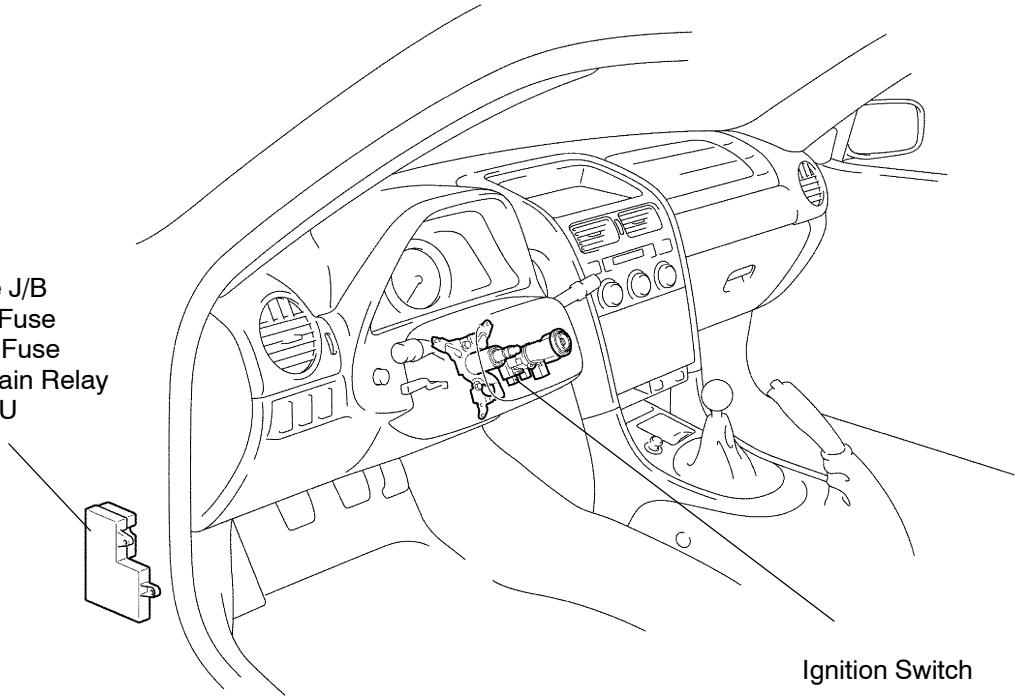
BE05Q–03

LOCATION

Sliding Roof Asembly
- Sliding Roof ECU
- Sliding Roof Switch
- Sliding Roof Motor



Door Courtesy Switch



Driver Side J/B
- GAUGE Fuse
- POWER Fuse
- Power Main Relay
- Body ECU

Ignition Switch

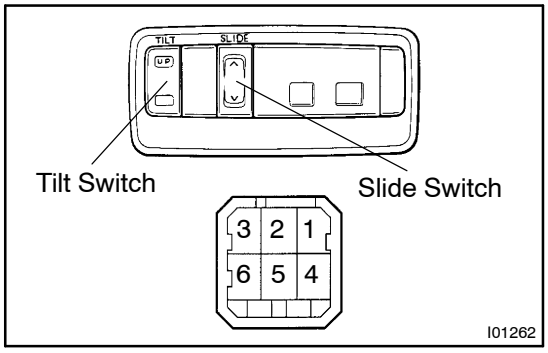
P

I10868

BE10K–02

INSPECTION

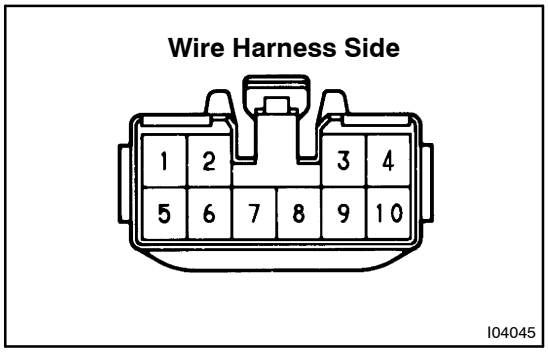
1. INSPECT SLIDING ROOF SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
SLIDE OPEN	1 – 6	Continuity
SLIDE OFF	–	No continuity
SLIDE CLOSE	2 – 6	Continuity
TILT DOWN	3 – 6	Continuity
TILT OFF	–	No continuity
TILT UP	4 – 6	Continuity

If continuity is not as specified, replace the switch.

2. INSPECT SLIDING ROOF CONTROL ASSEMBLY CIRCUIT



Disconnect the connector from the ECU and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
5 – Ground	Sliding roof control switch (TILT) UP	Continuity
6 – Ground	Sliding roof control switch (TILT) DOWN	Continuity
1 – Ground	Sliding roof control switch (SLIDE) CLOSE	Continuity
2 – Ground	Sliding roof control switch (SLIDE) OPEN	Continuity
8, 7 – Ground	Constant	Continuity
10 – Ground	Front door is opened	Continuity
3 – Ground	Ignition switch LOCK or ACC	* No voltage
3 – Ground	Ignition switch ON	Battery voltage
4 – Ground	Constant	Battery voltage

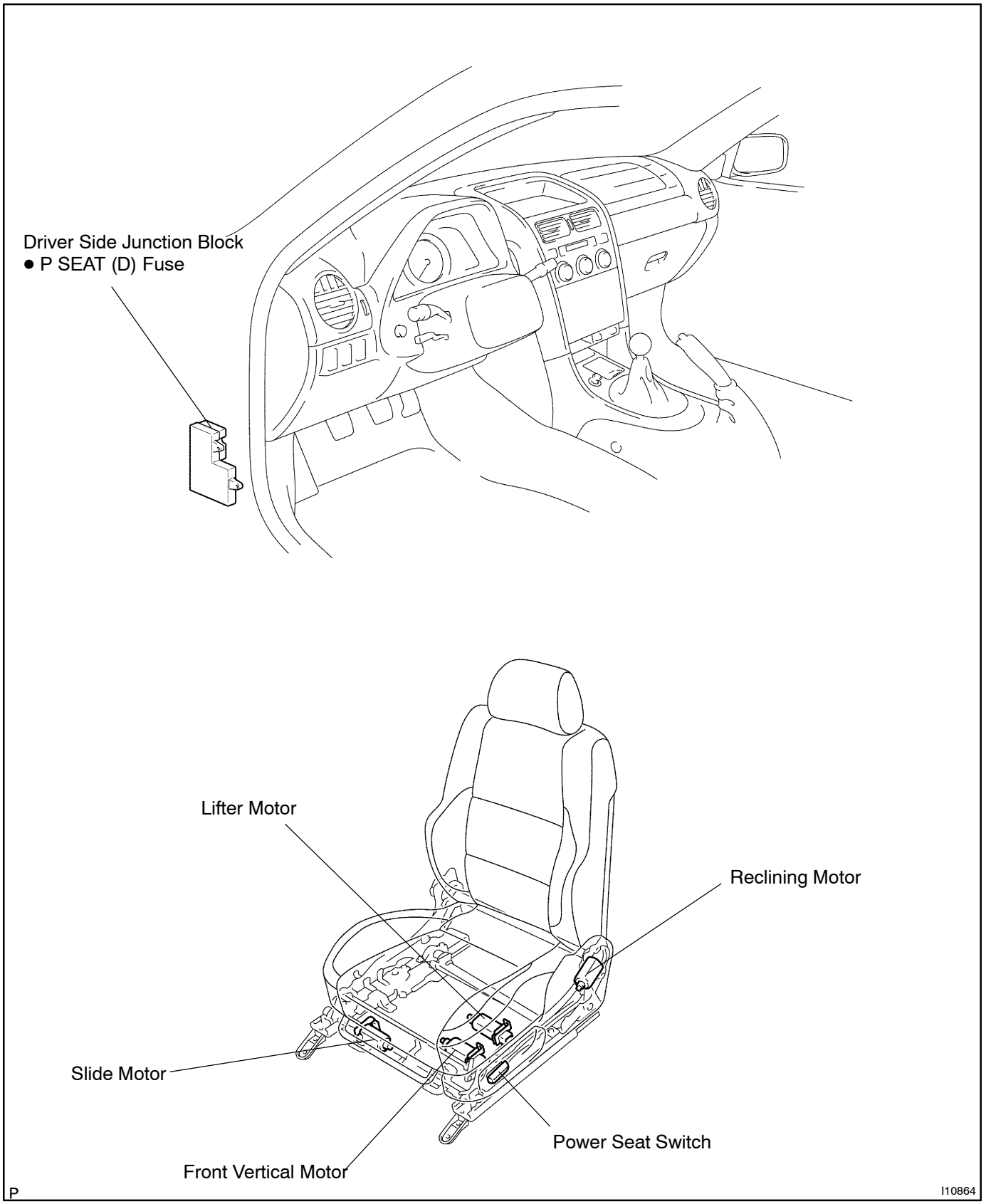
*: Exceptions: During 60 second period after ignition switch ON → OFF (ACC) or until driver of passenger door in opened after ignition switch ON → OFF (ACC).

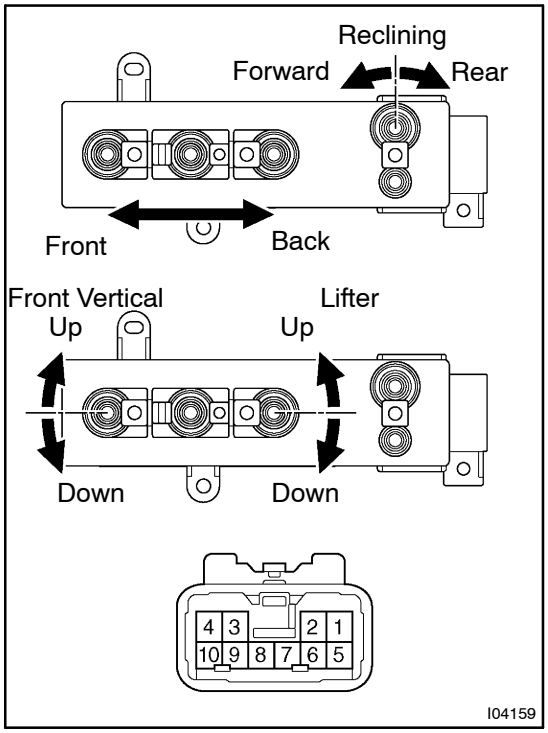
If circuit is as specified, replace the relay.

POWER SEAT CONTROL SYSTEM

LOCATION

BE0GK–05





BE16K–01

INSPECTION

1. LHD models:
INSPECT POWER SEAT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 – 9 4 – 6	Continuity
OFF	4 – 6 4 – 9	Continuity
BACK	1 – 6 4 – 9	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 – 10 4 – 5	Continuity
OFF	4 – 5 4 – 10	Continuity
DOWN	1 – 5 4 – 10	Continuity

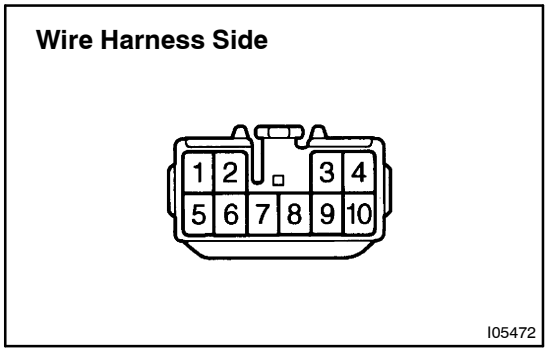
Lifter switch:

Switch position	Tester connection	Specified condition
UP	1 – 7 4 – 8	Continuity
OFF	4 – 7 4 – 8	Continuity
DOWN	1 – 8 4 – 7	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 3 2 – 4	Continuity
OFF	2 – 4 3 – 4	Continuity
REAR	1 – 2 3 – 4	Continuity

If continuity is not as specified, replace the switch.



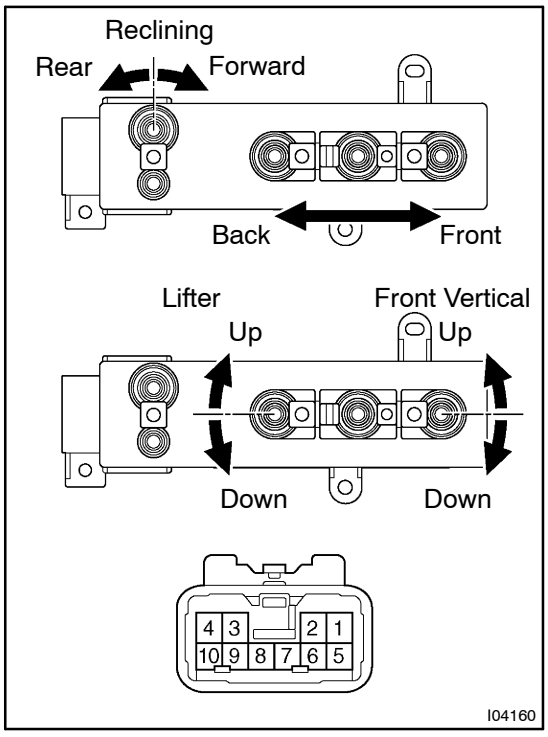
2. LHD models:
INSPECT POWER SEAT SWITCH CIRCUIT

(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
4 – Ground	Constant	Continuity
1 – Ground	Constant	Battery voltage

If circuit is not as specified, inspect the circuits connected to other parts.



3. RHD models:
INSPECT POWER SEAT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 – 9 4 – 6	Continuity
OFF	4 – 6 4 – 9	Continuity
BACK	1 – 6 4 – 9	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 – 5 4 – 10	Continuity
OFF	4 – 5 4 – 10	Continuity
DOWN	1 – 10 4 – 5	Continuity

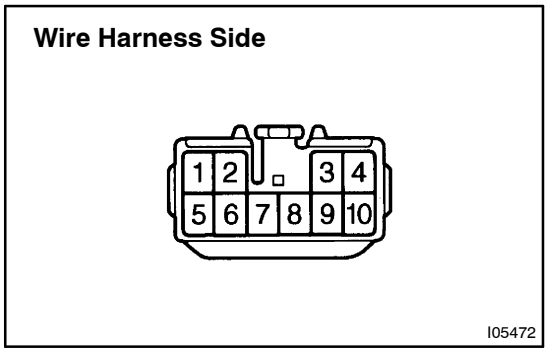
Lifter switch:

Switch position	Tester connection	Specified condition
UP	1 – 8 4 – 7	Continuity
OFF	4 – 7 4 – 8	Continuity
DOWN	1 – 7 4 – 8	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 3 2 – 4	Continuity
OFF	2 – 4 3 – 4	Continuity
REAR	1 – 2 3 – 4	Continuity

If continuity is not as specified, replace the switch.



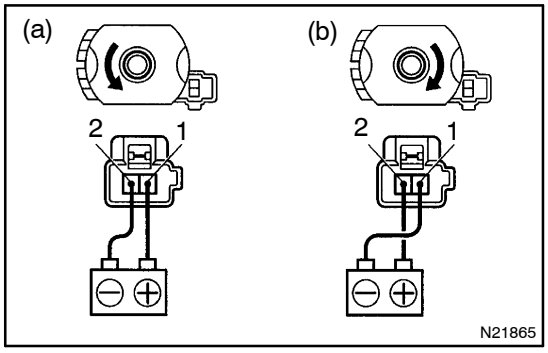
4. RHD models:
INSPECT POWER SEAT SWITCH CIRCUIT

(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
4 – Ground	Constant	Continuity
1 – Ground	Constant	Battery voltage

If circuit is not as specified, inspect the circuits connected to other parts.

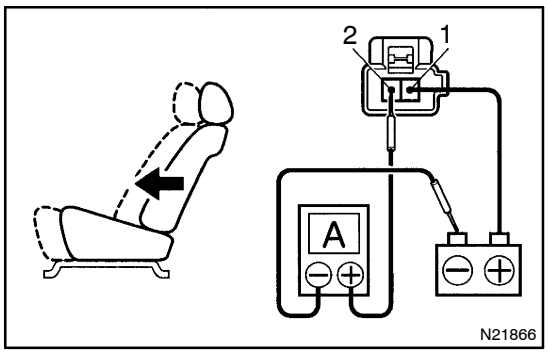


5. INSPECT SLIDE MOTOR OPERATION

(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.

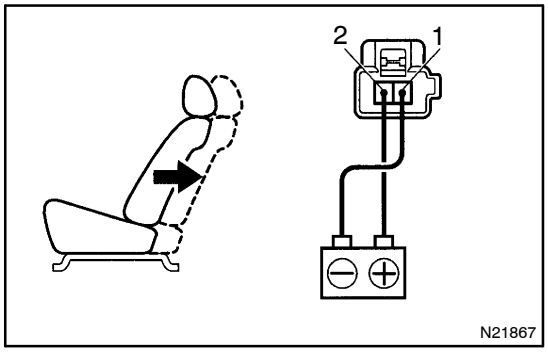
If operation is not as specified, replace the seat adjuster.



6. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION

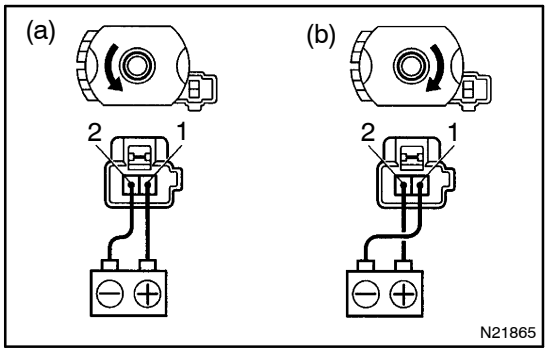
(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the front position.

(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.

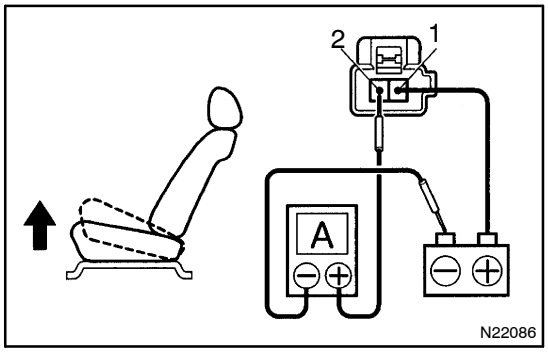
If operation is not as specified, replace the seat adjuster.



7. INSPECT FRONT VERTICAL MOTOR OPERATION

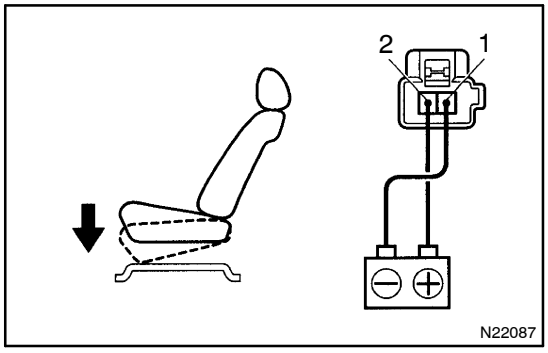
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.



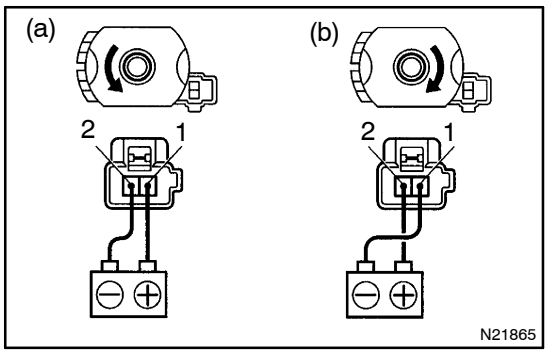
8. INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION

(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.

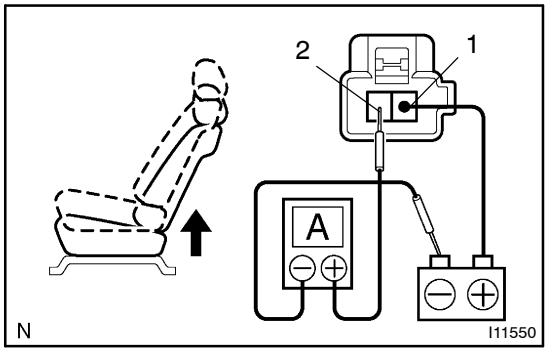
If operation is not as specified, replace the seat adjuster.



9. INSPECT LIFTER 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.

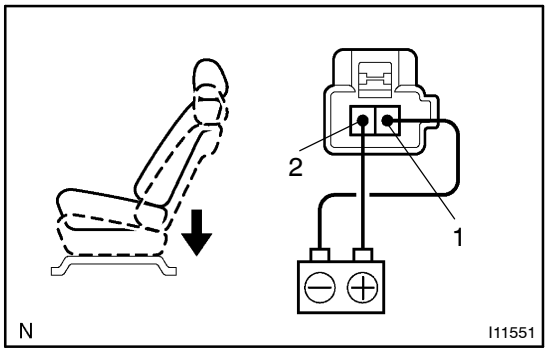
If operation is not as specified, replace the seat adjuster.



10. INSPECT LIFTER 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.

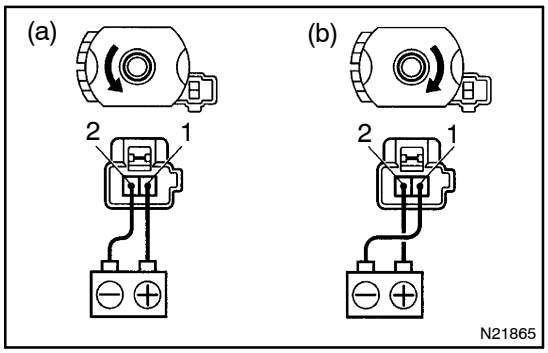
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(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.

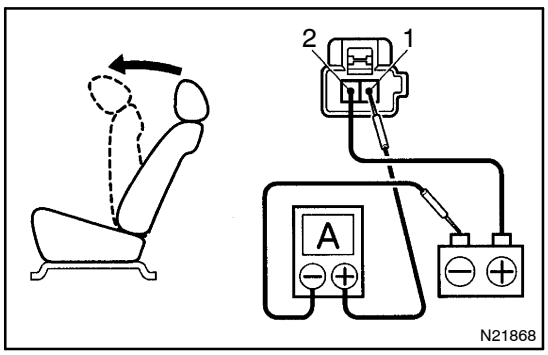


11. INSPECT RECLINING MOTOR OPERATION

(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.

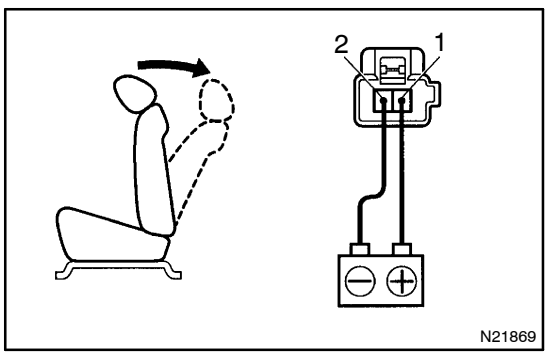
If operation is not as specified, replace the seat adjuster.



12. 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.

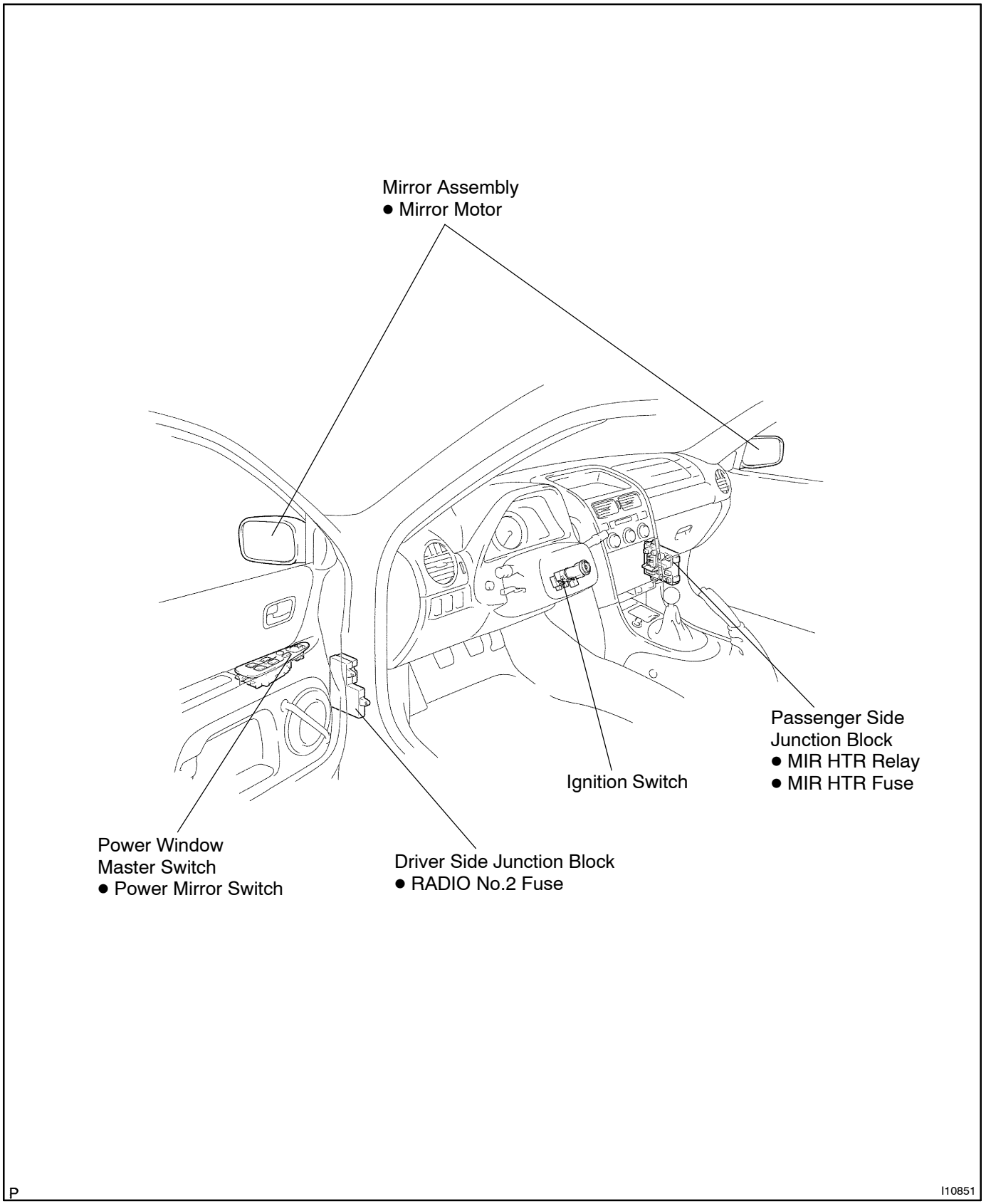
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the seat back begins to fall backward.

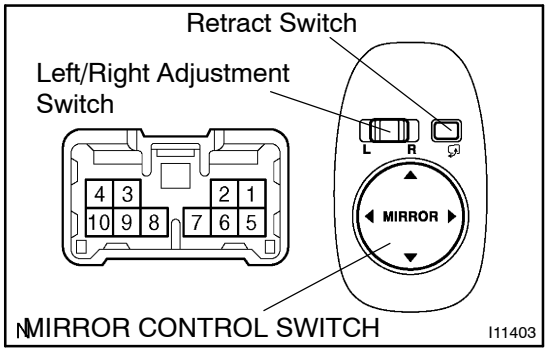
If operation is not as specified, replace the seat adjuster.

POWER MIRROR CONTROL SYSTEM

BE02J–09

LOCATION





BE16L–01

INSPECTION

1. Left/right adjustment switch:

Left side:

INSPECT MIRROR SWITCH CONTINUITY

Switch position	Specified condition
UP	1 – 9 6 – 10
RIGHT	6 – 9 5 – 10
DOWN	6 – 9 1 – 10
LEFT	5 – 9 6 – 10

If continuity is not as specified, replace the switch.

2. Left/right adjustment switch:

Right side:

INSPECT MIRROR SWITCH CONTINUITY

Switch position	Specified condition
UP	7 – 9 6 – 10
RIGHT	6 – 9 8 – 10
DOWN	6 – 9 7 – 10
LEFT	8 – 9 6 – 10

If continuity is not as specified, replace the switch.

3. Left/right adjustment switch OFF

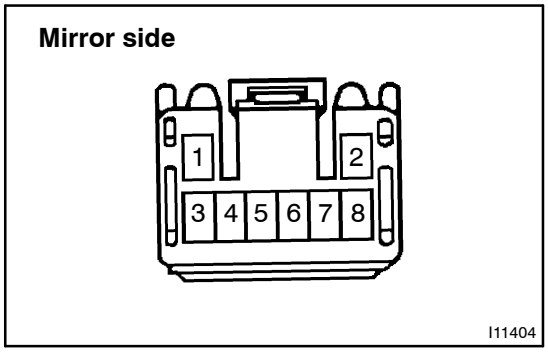
Switch position	Tester connection	Specified condition
UP	6 – 10	Continuity
DOWN	6 – 9	Continuity
LEFT	6 – 10	Continuity
RIGHT	6 – 9	Continuity

If continuity is not as specified, replace the switch.

4. INSPECT RETRACT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
RETURN	3 – 10 4 – 9	No Continuity
RETRACT	3 – 10 4 – 9	Continuity

If continuity is not as specified, replace the switch.



5. INSPECT MIRROR MOTOR OPERATION

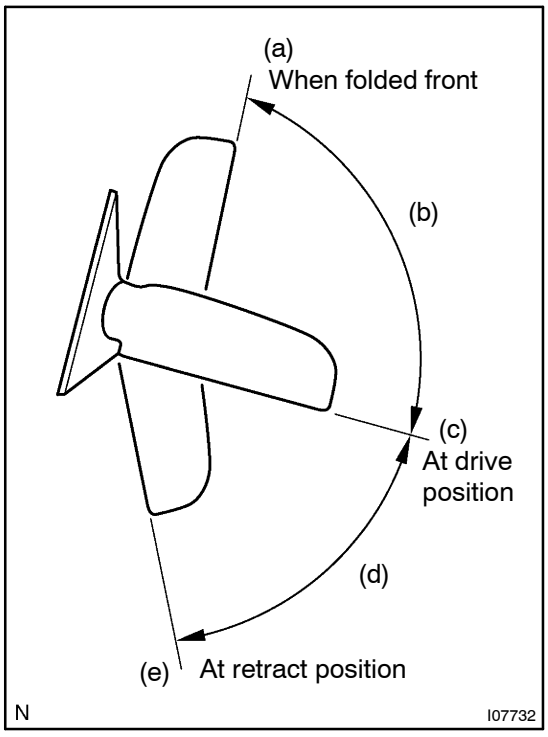
(a) Connect the positive (+) lead from the battery to terminal 8 and the negative (–) lead to terminal 7, and check that the mirror turns to the upward.

(b) Reverse the polarity, and check that the mirror turns to the downward.

(c) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 7, and check that the mirror turns to the inside.

(d) Reverse the polarity, and check that the mirror turns outside.

If operation is not as specified, replace the mirror assembly.



6. INSPECT ELECTRICAL RETRACT MOTOR OPERATION

(a) When folded front position:

(1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.

(2) Reverse the polarity, check that the mirror does not operate.

If operation is not as specified, replace the mirror assembly.

(b) Between folded front position and driving position:

(1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.

(2) Reverse the polarity, check that the mirror operate at folded front position.

If operation is not as specified, replace the mirror assembly.

(c) When driving position:

(1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.

(2) Reverse the polarity, check that the mirror does not operate.

If operation is not as specified, replace the mirror assembly.

(d) Between driving position and retract position:

(1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.

(2) Reverse the polarity, check that the mirror operate at return position (Stopping at driving position).

If operation is not as specified, replace the mirror assembly.

(e) When retract position:

(1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror does not operates.

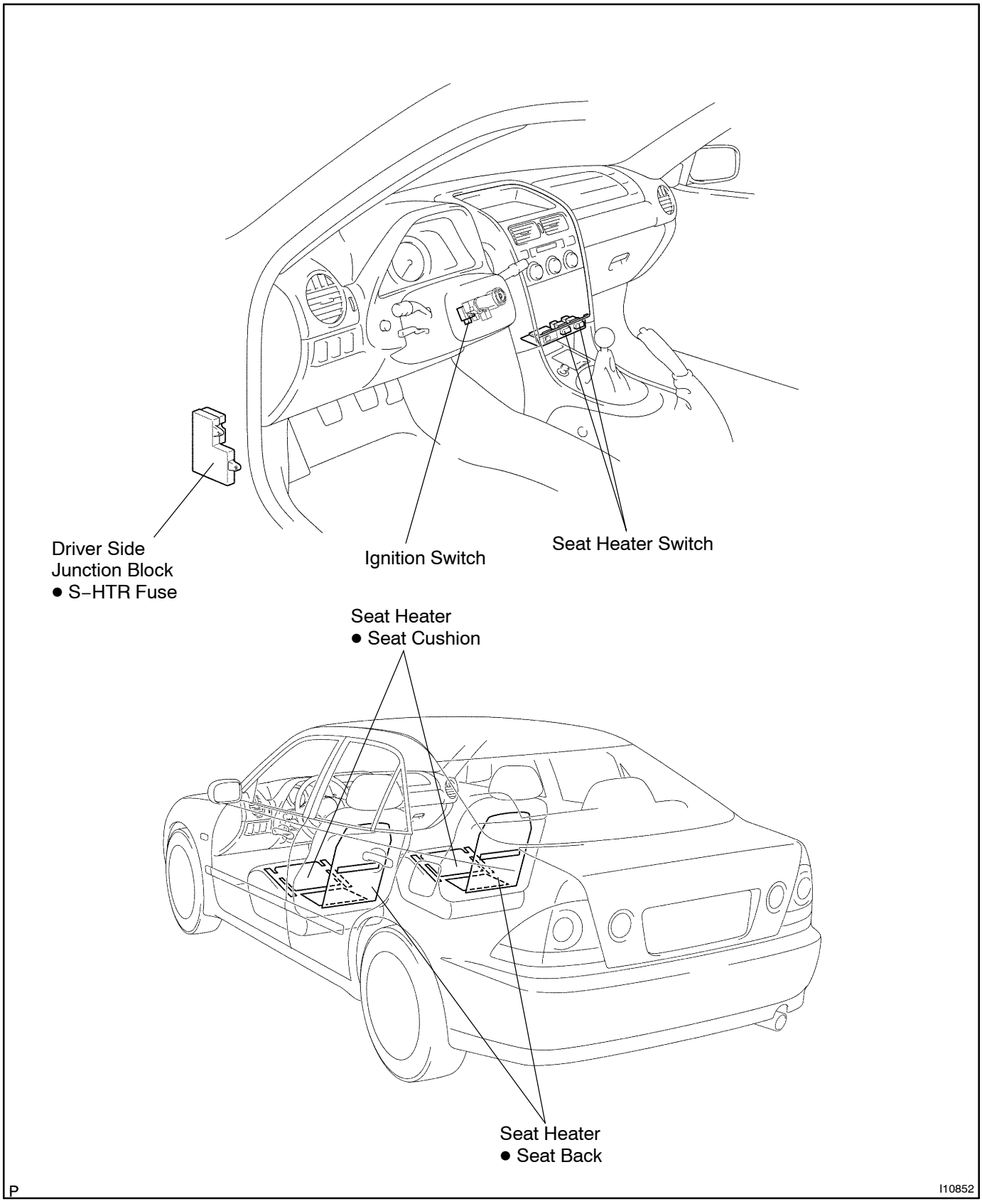
(2) Reverse the polarity, check that the mirror operate at return position (Stopping at driving position).

If operation is not as specified, replace the mirror assembly.

SEAT HEATER SYSTEM

LOCATION

BE0GH–09



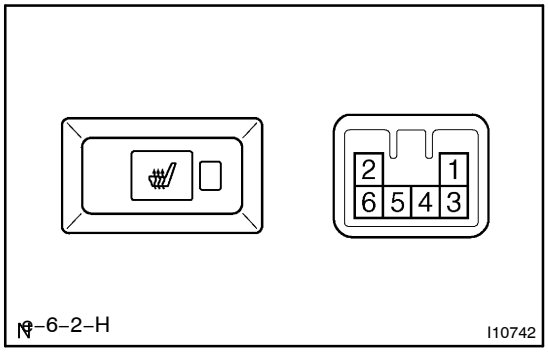
BE0GI–06

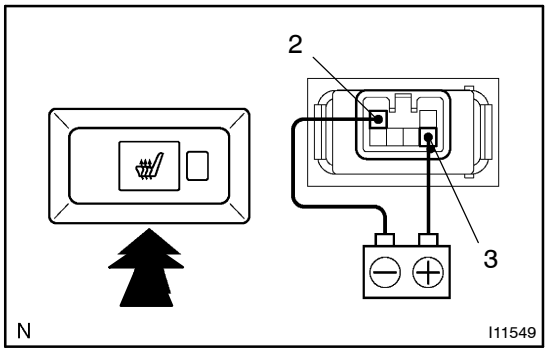
INSPECTION

1. INSPECT SEAT HEATER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
ON	2 – 4 – 6	Continuity
OFF	–	No continuity
Illumination circuit	1 – 3	Continuity

If continuity is not as specified, replace the switch.



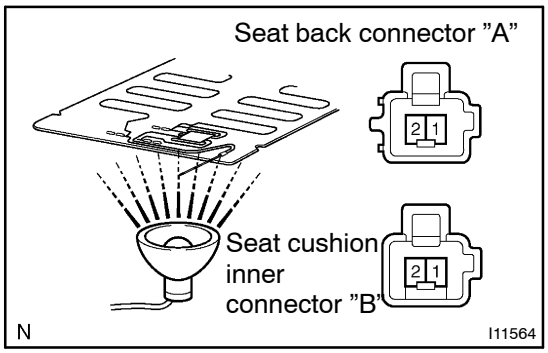


2. INSPECT SEAT HEATER INDICATOR LIGHT OPERATION

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

(b) Push the seat heater switch ON that the indicator light lights up.

If operation is not as specified, replace the switch and inspect the circuits connected to other parts.



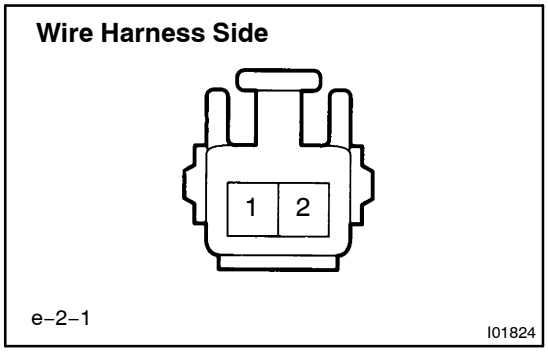
3. INSPECT SEAT HEATER CUSHION CONTINUITY

(a) Heat the thermostat with a light.

(b) Inspect the seat heater cushion continuity between terminals, as shown.

Tester connection	Condition	Specified condition
A2 – B1	Constant	Continuity
A1 – A2	Seat heater temperature below 25 °C (77 °F)	Continuity
B1 – B2	Seat heater temperature above 45 °C (113 °F)	No continuity

If continuity is not as specified, replace the seat cushion pad.

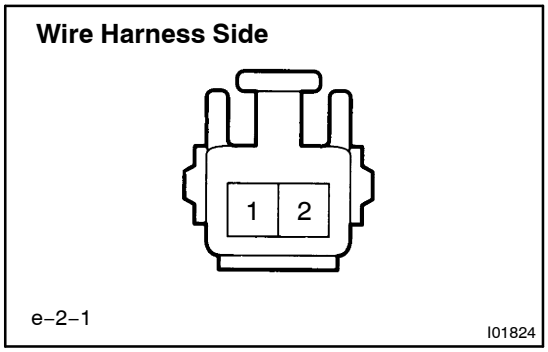


4. INSPECT SEAT HEATER CUSHION CONTINUITY

Inspect the seat heater inner cushion and front cushion continuity between terminals, as shown.

Tester connection	Condition	Specified condition
1 – Body ground	Seat heater switch ON	Battery voltage

If continuity is not as specified, replace the seat back pad.



5. INSPECT SEAT BACK CONTINUITY

Inspect the seat back continuity between terminals, as shown.

Tester connection	Condition	Specified condition
2 – Body ground	Constant	Continuity

If continuity is not as specified, replace the seat back pad.

AUDIO SYSTEM

DESCRIPTION

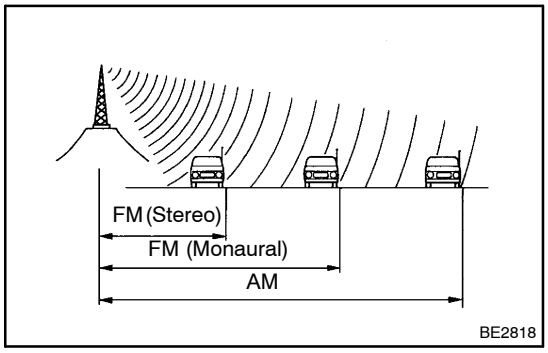
BE10X–02

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	LW ⟷	AM (MW) ⟷	SW ⟷	FM (UKW) ⟷	
Modulation	Amplitube modulation			Frequency modulation	

LF: Low Frequency
MF: Medium Frequency
HF: High Frequency
VHF: Very High Frequency

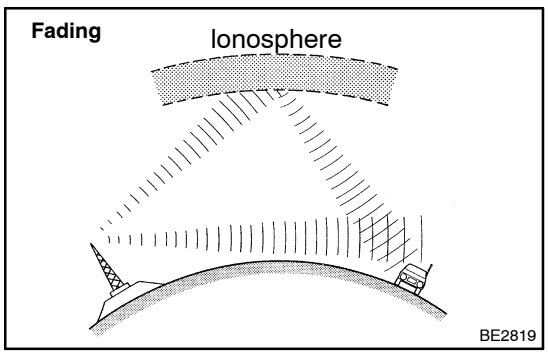


2. SERVICE AREA

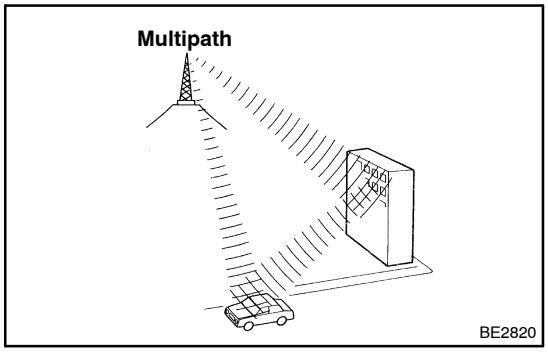
There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even through AM can be received in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference (”noise”) easily.

3. RECEPTION PROBLEMS

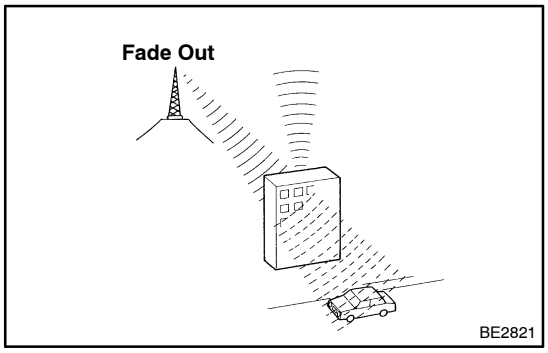
Besides the problem of static, there are also the problems called ”fading”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



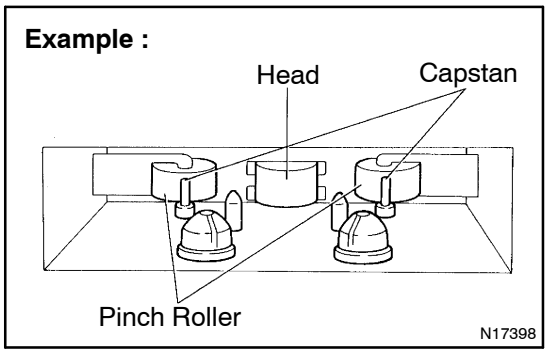
- Fading
  Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle’s antenna directly. This type of interference is called ”fading”.



- 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.



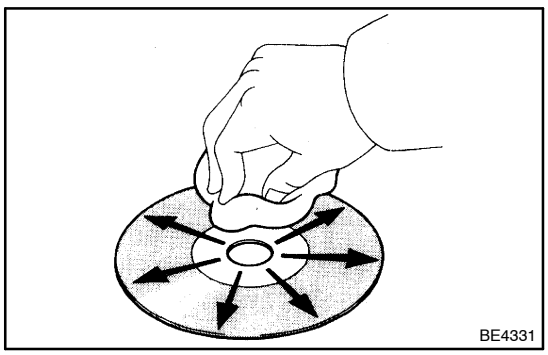
- Fade Out
  Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called ”fade out”.



4. 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.



5. 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:

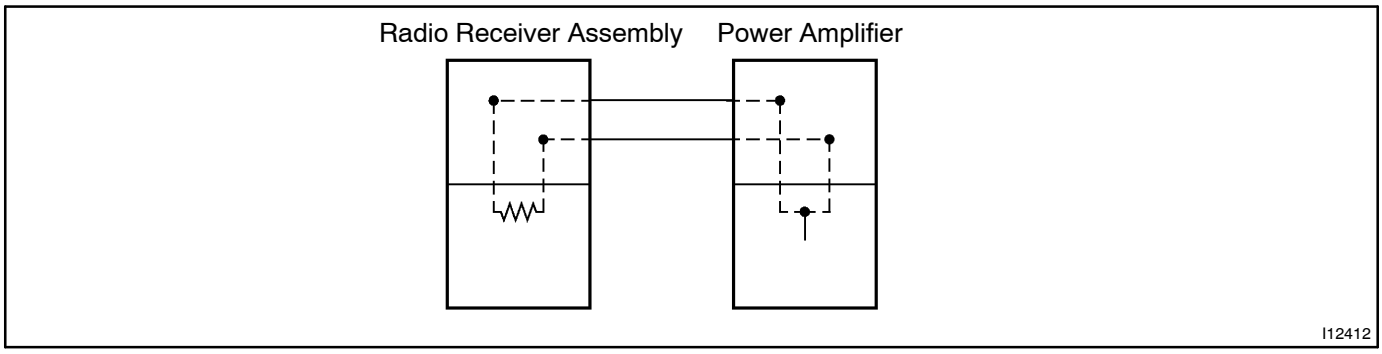
Do not use a conventional record cleaner or anti–static preservative.

6. OUTLINE OF AVC–LAN

(a) What is AVC–LAN?

AVC–LAN is the abbreviation, which stands for Audio Visual Communication–Local Area Network. This is a unified standard co–developed by 6 audio manufactures associated with Toyota Motor Corporation.

The Unified standard covers signals, such as audio signal, visual signal, signal for switch indication and communication signal.



(b) Objectives

Recently the car audio system has been rapidly developed and functions have been changed drastically. The conventional system has been switched to the multi–media type such as a navigation system. At the same time the level of customers needs to audio system has been upgraded. This lies behind this standardization.

The concrete objectives are explained below.

(1) When products by different manufactures were combined together, there used to be a case that malfunction occurred such as sound did not come out. This problem has been resolved by standardization of signals.

(2) Various types of after market products have been able to add or replace freely.

(3) Because of the above (2), each manufacture has become able to concentrate on developing products in their strongest field. This has enabled many types of products provided inexpensively.

(4) Conventionally, a new product developed by a manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy compatible products provided for them timely.

The above descriptions are the objectives to introduce AVC–LAN. By this standardization, development of new products will no longer cause systematic errors. Thus, this is very effective standard for a product in the future.

HINT:

- When +B short or GND short is detected in AVC–LAN circuit, communication stops. Accordingly the audio system does not function normally.
- When audio system is not equipped with a navigation system, audio head unit is the master unit. (When audio system is equipped with a navigation system, navigation ECU is the master unit.)
- The car audio system using AVC–LAN circuit has a diagnosis function.
- Each product has its own specified numbers called physical address. Numbers are also allotted to each function in one product, which are called logical address.

7. DIAGNOSIS FUNCTION

Error codes over tuner and connected equipment are displayed on the screen of tuner.

(a) Diagnosis start–up

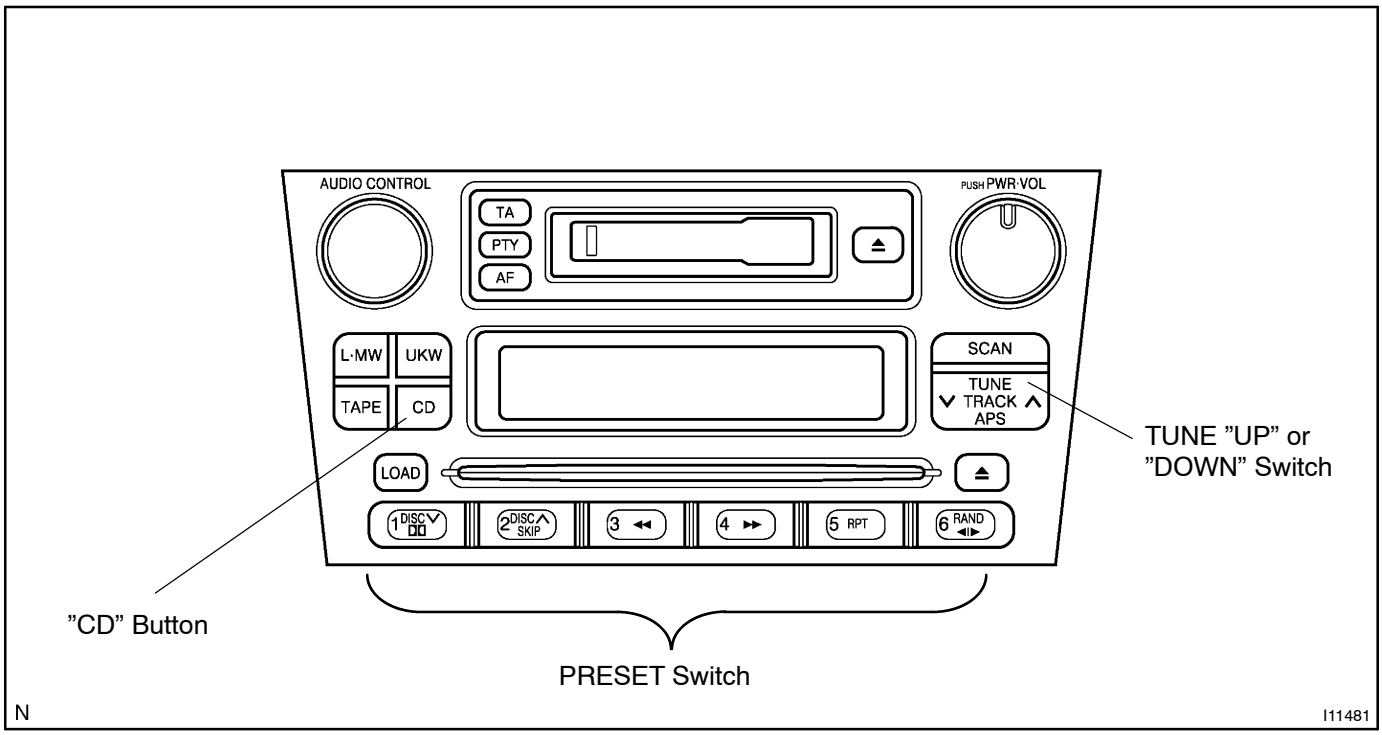
For shifting to diagnosis mode, push ”CD” switch 3 times with pressing ”1” and ”6” of PRESET switch at the same time while the audio power is OFF and ACC is ON.

To exit from diagnosis mode, press ”CD” switch for 2 seconds or turn the ignition key OFF.

(When ”1–190” is displayed, the mode is transferred to LAN check mode.)

(b) LAN check

When starting up the diagnosis mode, the mode turns to LAN check mode, the screen displays the code numbers (physical address) of tuner and connected equipment. Smaller codes are displayed in order, displayed code numbers are switched by operating TUNE ”UP” or ”DOWN” switch. In LAN check mode, by pressing ”5” of PRESET switch for more than 2 secs., diagnosis memory of each equipment can be deleted, when deletion is completed, the mode returns to LAN check mode.



Code No. (physical address) List

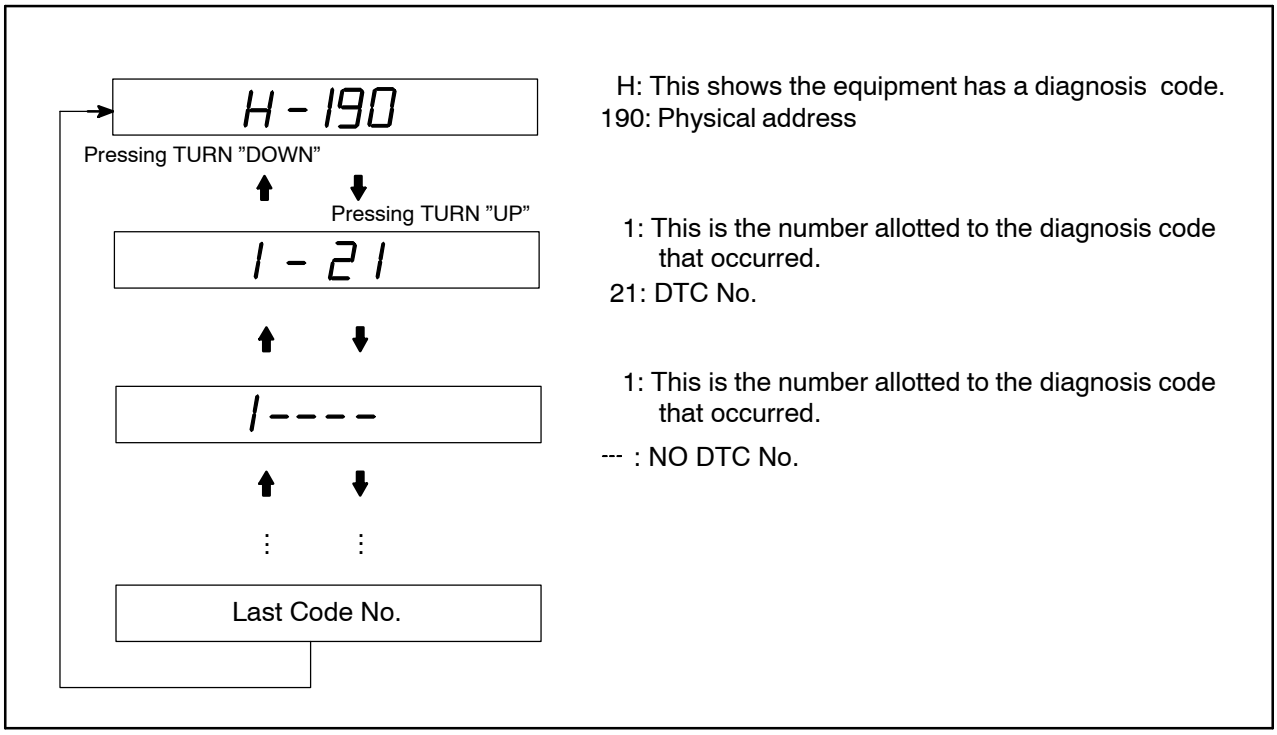
Code No. (physical address)	Equipment name
190	Radio receiver assembly (Audio head unit)
440	Power amplifier

(c) System check

- When pressing ”1” of PRESET switch in LAN check mode, the mode turns to the system check mode, the system performs self diagnosis of connected equipment and displays the results.(”SYS” (showing the system is under detection) is displayed.)
- Perform the operation shown in the following illustration, then read the result of the inspection.

HINT:

- It sometimes takes approx. 40 secs. till the system inspection is completed.
- The chart below is an example of when diagnosis code ”21” appears on the physical address (190) equipment. (ROM error occurs on the radio receiver.)
- The smaller code numbers (physical address) are displayed in order (code No., diagnosis code, support code of diagnosis code (object equipment)).
- When no error is detected in the system, ”00” is displayed.
- When an error code is detected, up to 6 codes per one system are displayed. Pressing TUNE ”UP” or ”DOWN” switches the display.
- In the system check mode, when pressing ”6” of PRESET switch the mode returns to LAN check mode.



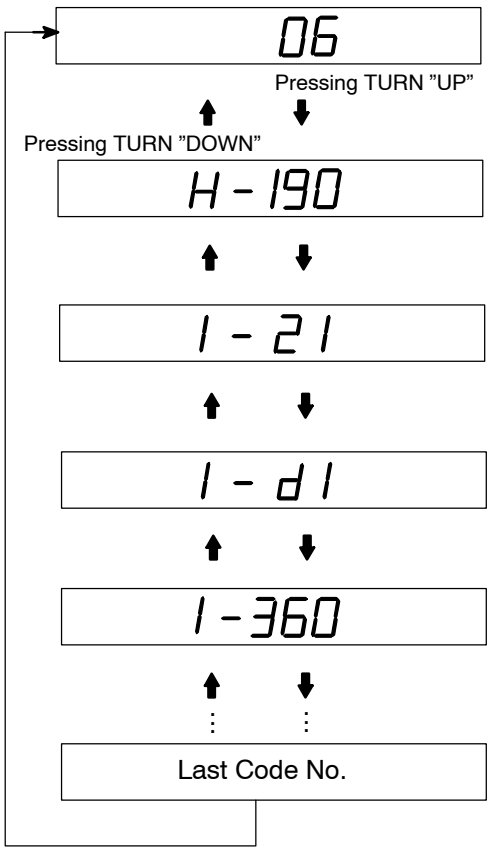
(d) Diagnosis memory

(1) In LAN check mode, when pressing ”2” of PRESET switch the mode turns to the diagnosis memory mode. (”CODE” is displayed.)
The results of self diagnosis performed over tuner and connected equipment are memorized and displayed.

(2) Perform the operation shown in the following illustration, then read the result of the inspection.

HINT:

- The smaller code numbers (physical address) are displayed in order (code No. , periodic communication number when error occurs, diagnosis code, and support code of diagnosis code (object equipment)).
- When no error is detected in the system, ”00” is displayed. When an error code is detected, up to 6 codes per one system are displayed. Pressing TUNE ”UP” or ”DOWN” switches the display. Each diagnosis code is same as code in the system check mode.
- When pressing ”6” of PRESET switch, the mode returns to LAN check mode.
- The following illustration below is an example of when diagnosis code ”D1” appears on the code (190) and (240 or 360) equipment. (Communication error occurs between the radio receiver and CD changer.)



06: Periodic communication number of when occurring in the diagnosis memory code.

H: This shows the equipment has a diagnosis code.
190: Physical address

1: This is the number allotted to the diagnosis code that occurred.
21: Periodic communication number of when occurring in the diagnosis memory code.

1: This is the number allotted to the diagnosis code that occurred.
d1: DTC No.

1: This is the number allotted to the diagnosis code that occurred.
360: Physical address
(Equipment that is communicating code)

(e) Diagnosis memory clear
(1) After error is fixed, start up the diagnosis mode.
(2) Continue pressing preset switch "5" for 2 secs. (CLr is displayed.)
(3) Press the preset switch "2" and transfer to the diagnosis memory mode and check that the normal code (00) is output.

8. DIAGNOSIS CODE LIST

- If there is ”O” in the column of system check, an error can be detected when the mode is switched to the system check mode.
- If there is ”O” in the column of diagnosis mode, each unit is monitoring whether or not it has failure. In case of detecting failure, it memorizes DTC.

Parts Name	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
Head Unit (190)	42	FM tuner error	There is an error in FM tuner.	Radio receiver check.	X	○
	50	Cassette error	There is an error in cassette deck.		X	○
	51	Cassette eject error	Cassette can not be ejected from Head Unit.		X	○
	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.	Radio receiver check. Wire harness and connecter check.	○	○
	D2	Periodic communication no response	Error in periodic communication.	● Wire harness and connector	X	○
	FF	Diagnosis no response	Result of diagnosis is not issued from start to finish.	Radio receiver check.	○	X
AMP (440)	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.	Stereo component amplifier check.	○	○
	D4	Periodic communication error	Connection confirmation has not come from the equipment that is communicating	● Radio receiver check. ● Wire harness check.	X	○

BE0GC–04

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.).

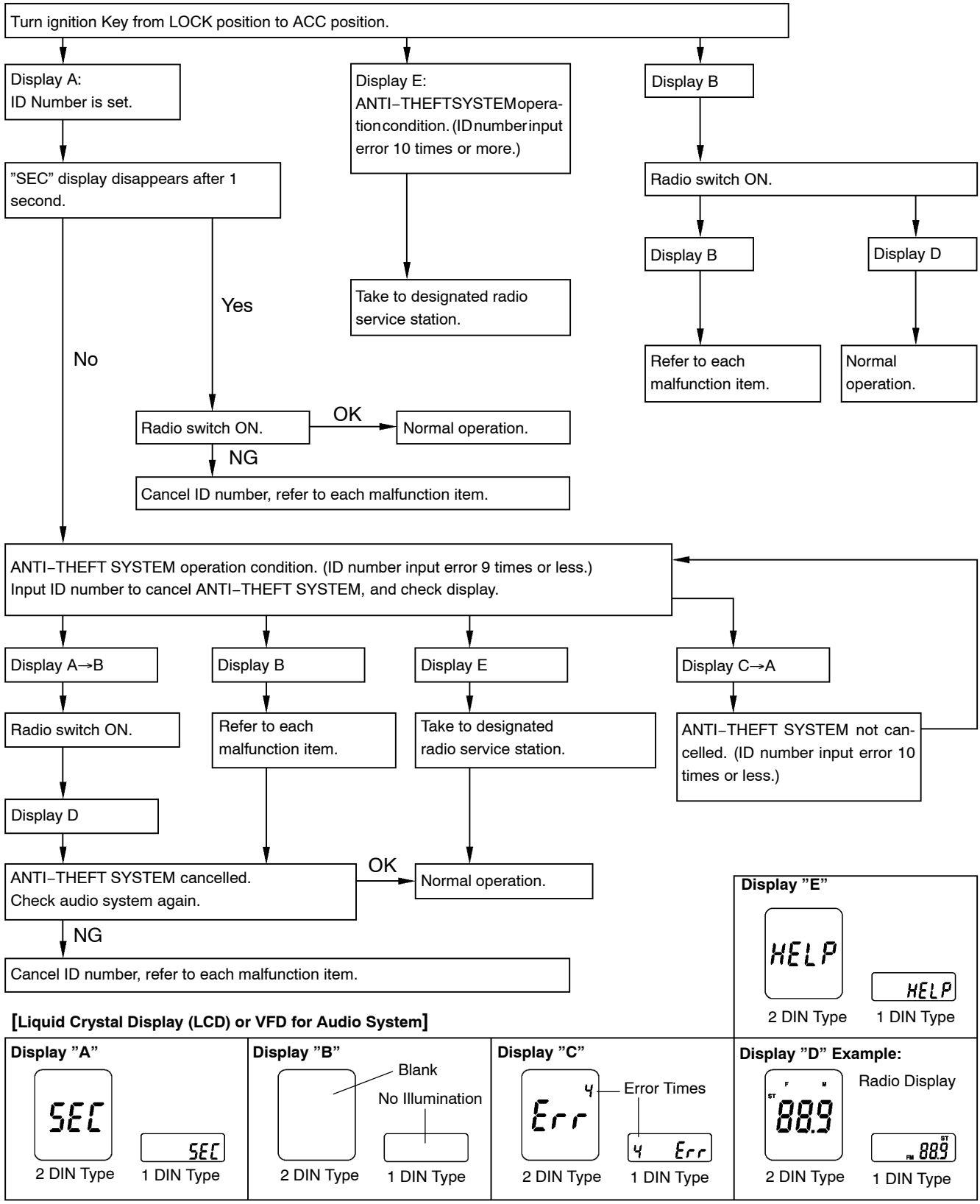
Always inspect the trouble taking the following items into consideration.

- 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
	Any 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 inserted, 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
Power Amplifier	No power coming in.	23
	Power coming in, but power amplifier not operating.	24
	Any speaker does not work.	25
Noise	Noise occurs	26
	Noise produced by vibration or shock while driving.	27
	Noise produced when engine starts.	28

The term ”AM” includes LW,MW and SW, and the term ”FW” includes UKW.

Troubleshooting for ANTI–THEFT SYSTEM

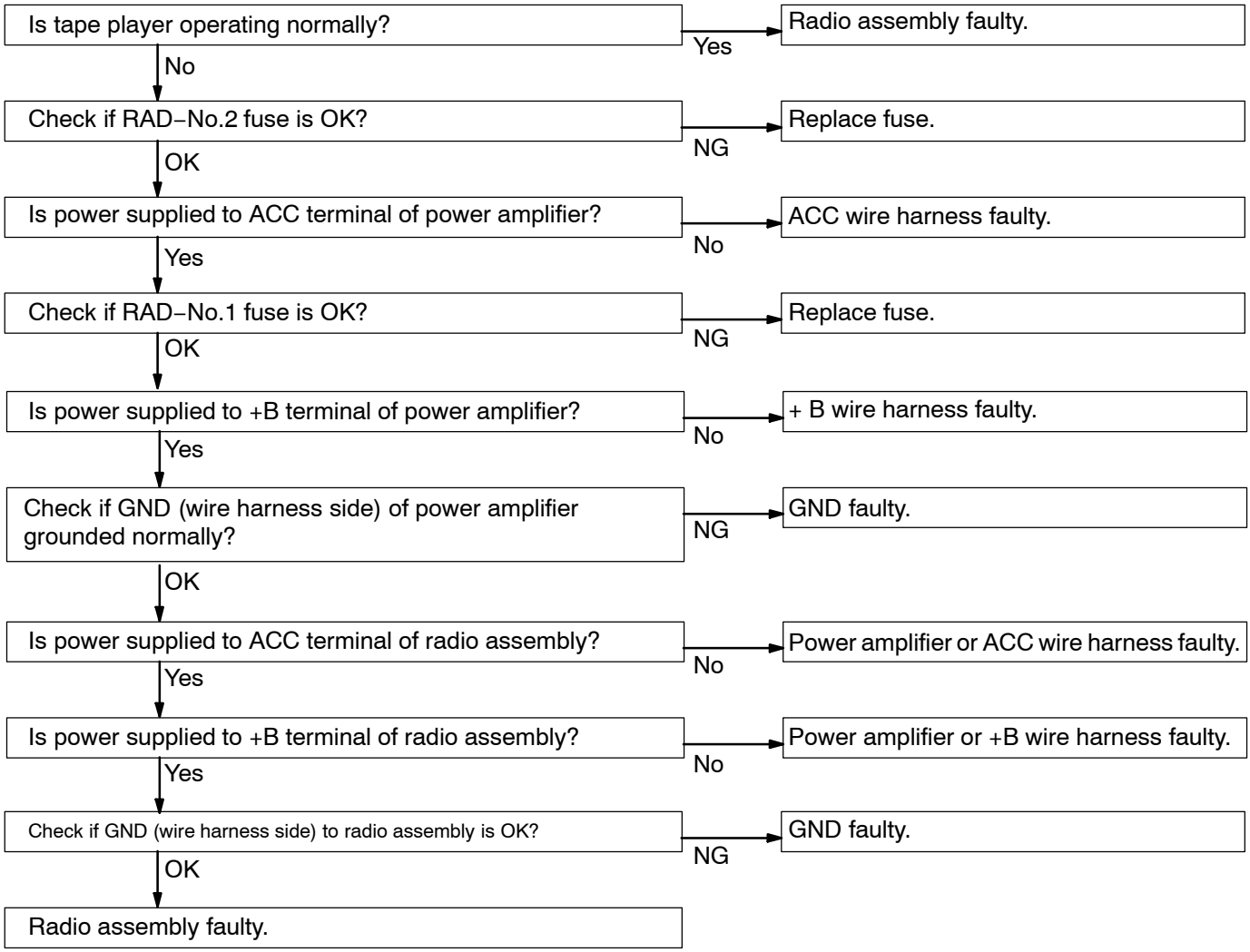


HINT:

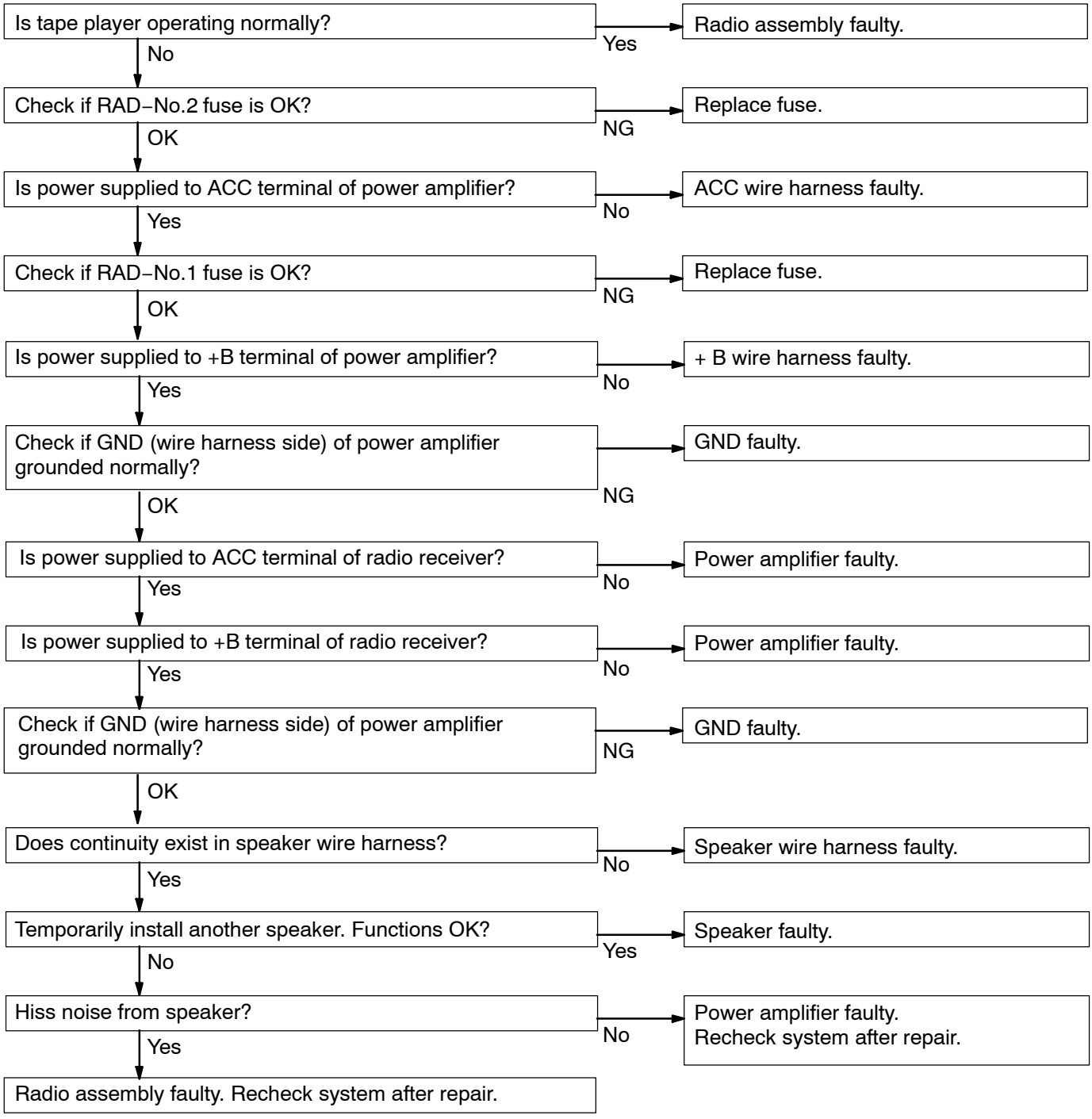
- Refer to Owner's Manual for operation details of ANTI–THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

V08418

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO ”ON”



2	Radio	DISPLAY INDICATES WHEN POWER SWITCH TURNED TO "ON", BUT NO SOUND (INCLUDING "NOISE") IS PRODUCED

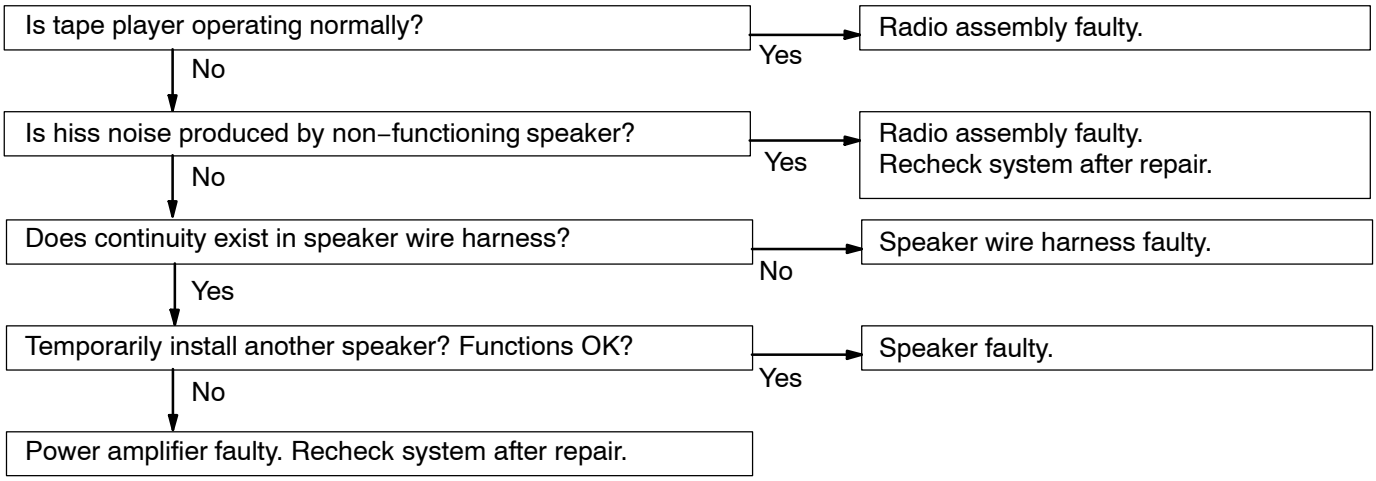


3	Radio	NOISE PRESENT, BUT AM–FM NOT OPERATING

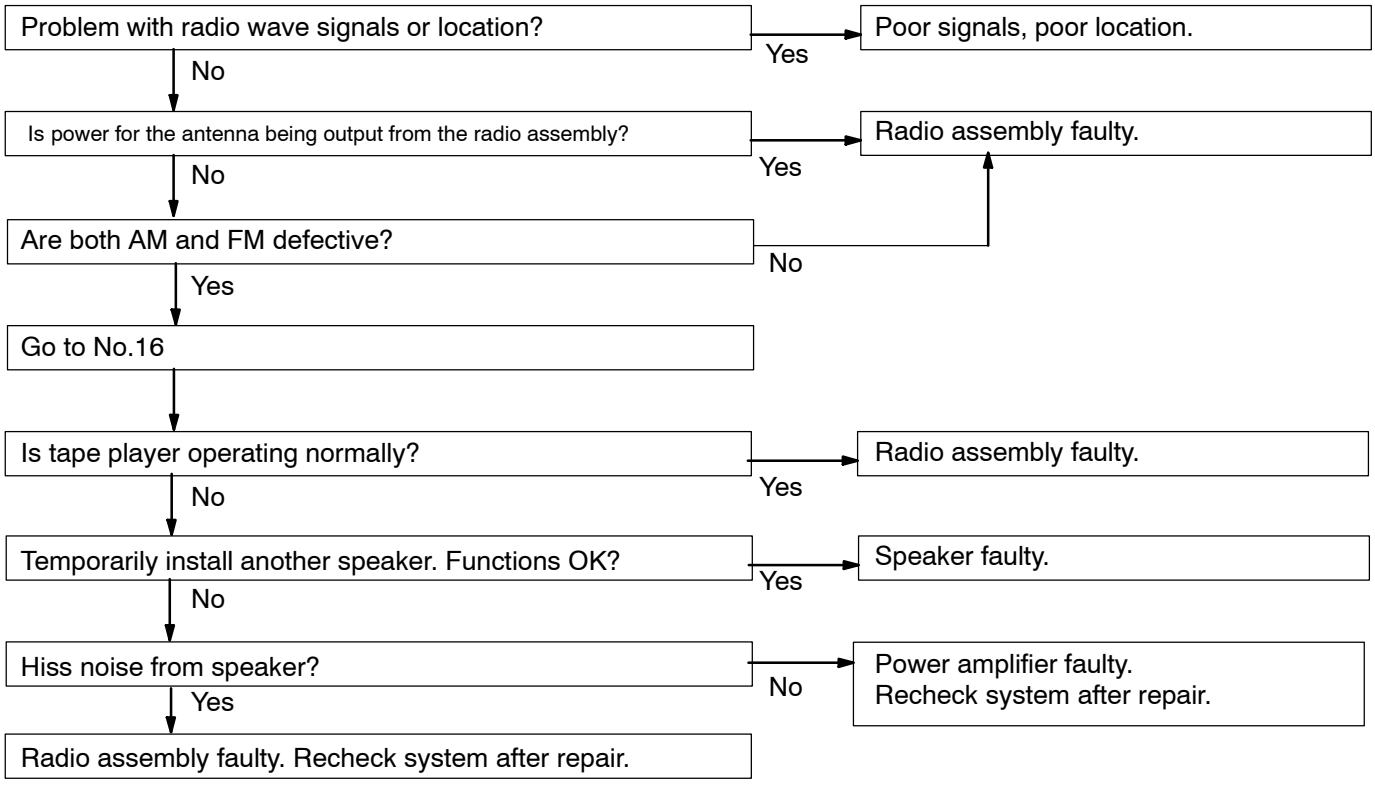
Go to No.25

If radio side faulty. → Radio faulty.

4	Radio	ANY SPEAKER DOSE NOT WORK



5	Radio	ANY AM OR FM DOES NOR WORK FEW PRESET TUNING BANDS



6	Radio	POOR RECEPTION

Is the condition bad in comparison with other vehicles?
- Yes → An electric wave environment is bad.
- No ↓

Are there any additional installation parts? (Sun shade film, telephone antenna, etc.)
- Yes → Does the condition get better if removing them?
  - Yes → Influence of additional installation parts.
- No ↓

Check if there is any scratch and breaking of a wire on the glass antenna and the defogger pattern. (visual check. tester) (See page BE–158)
- Yes → Repair. (See page BE–96)
- No ↓

Is the contact of the plug jack of the radio OK?
- No → Take a measure for contact.
- Yes ↓

Does the condition get better by using the outer antenna (such as pillar antenna)?
- No → Check the radio.
- Yes ↓

Is the contact of the antenna terminal on the glass surface and the defogger terminal?
- No → Take a measure for contact.
- Yes ↓

Is the continuity of the antenna cord OK?
- No → Replace the antenna cord.
- Yes ↓

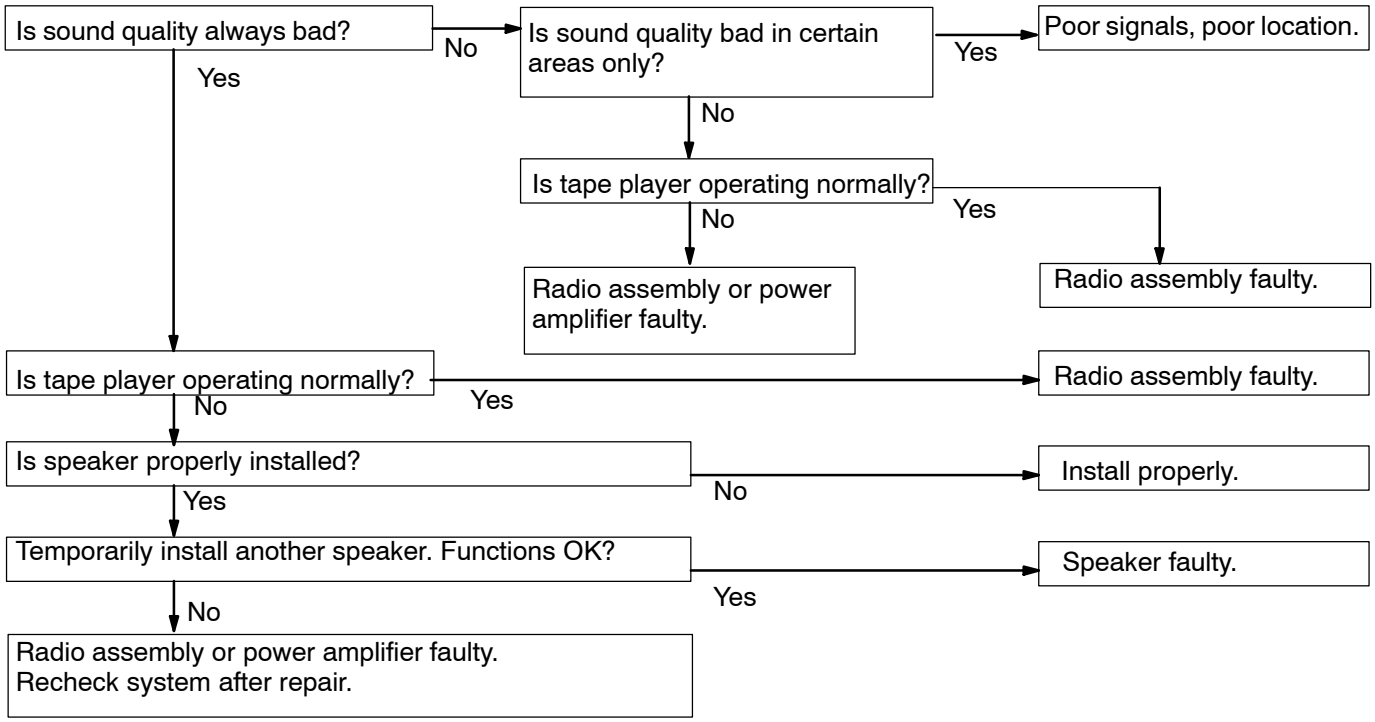
Check the grounding of the antenna, antenna cord, choke coil, and noise filter. (See page BE–158)
- NG → Grounding failure.
- OK ↓

Does the condition get better by replacing the choke coil?
- Yes → Replace the choke coil.
- No ↓

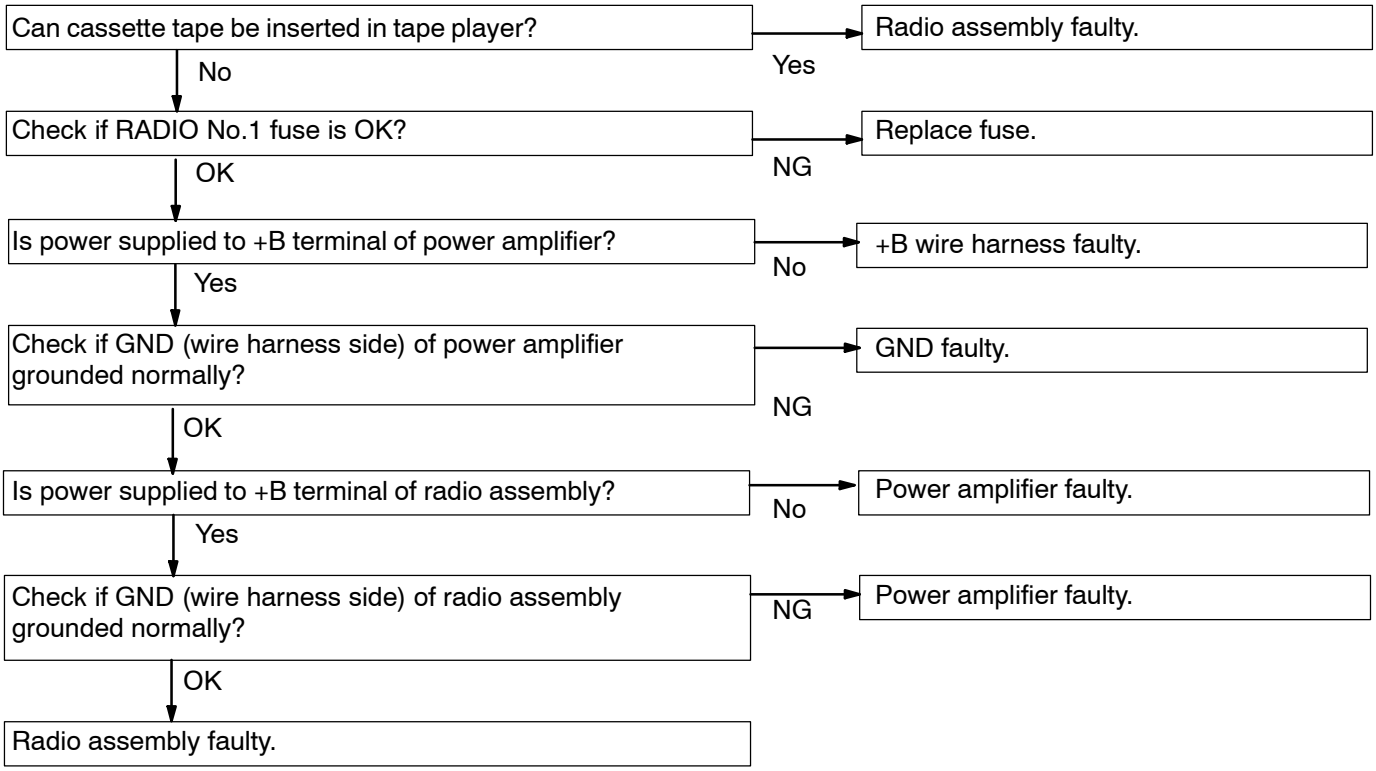
Does the condition get better by replacing the antenna cord?
- Yes → Replace the antenna cord.
- No ↓

Exchange the glass.

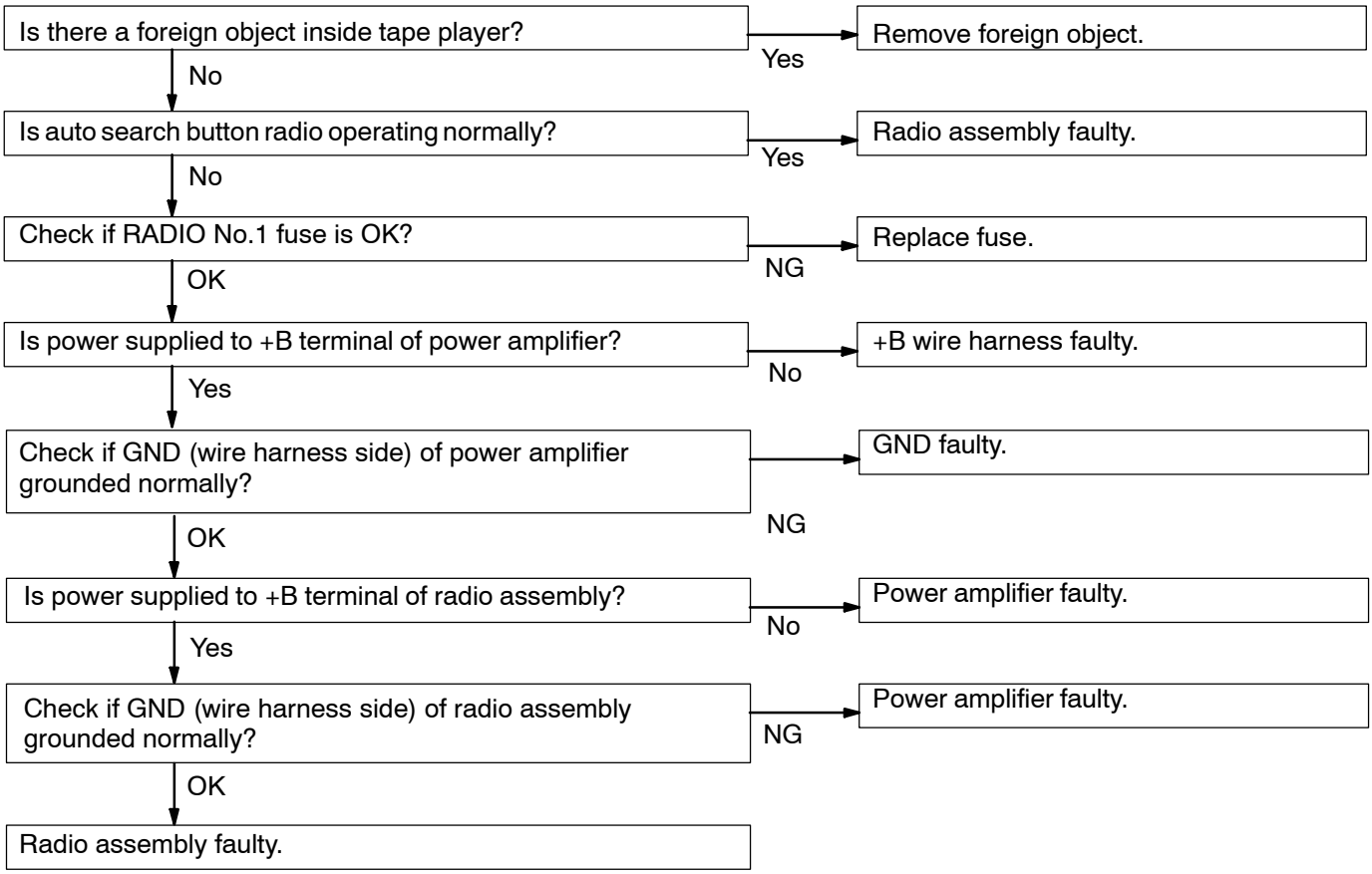
7	Radio	SOUND QUALITY POOR



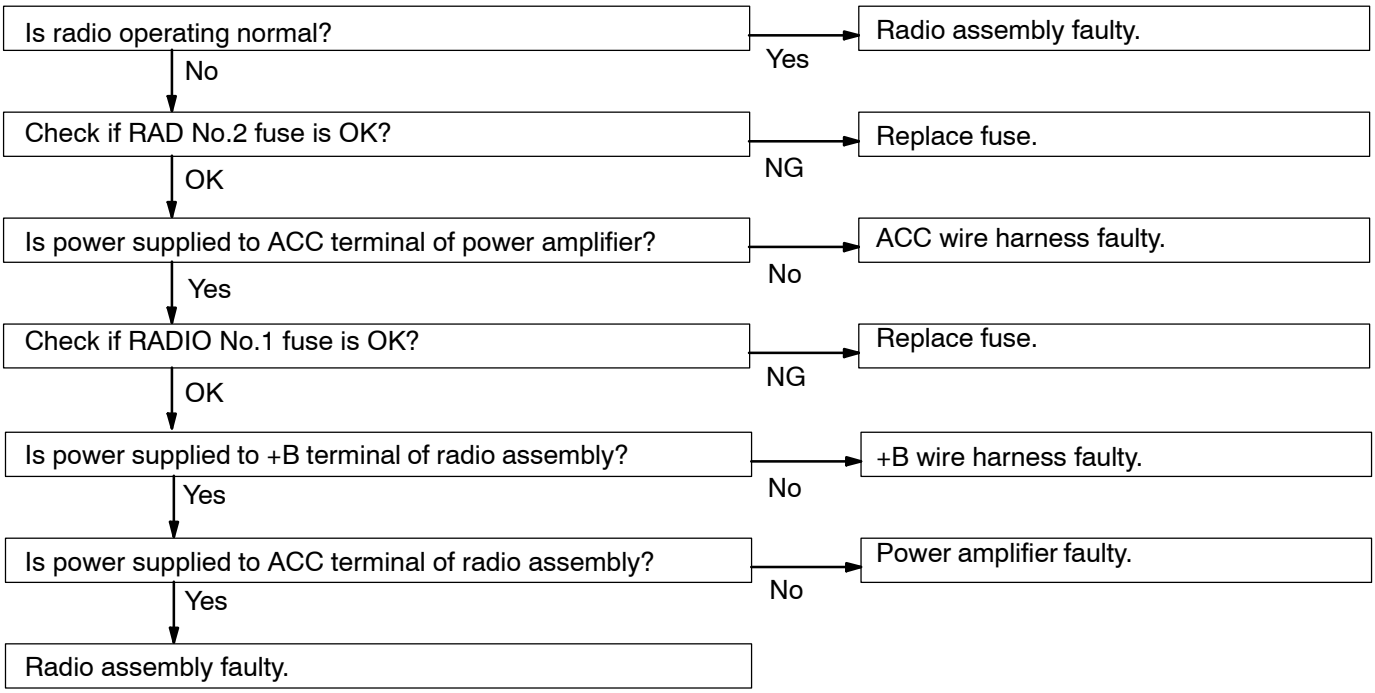
8	Radio	PRESET MEMORY DISAPPEARS



9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED



10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER



11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING

Function OK if different cassette tape inserted?
- Yes → Cassette tape faulty.
- No ↓

Is radio operating normally?
- Yes → Radio assembly faulty.
- No ↓

Does continuity exist in speaker wire harness?
- No → Speaker wire harness faulty.
- Yes ↓

Temporarily install another speaker.
Function 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.

12	Tape Player	ANY SPEAKER DOES NOT WORK

Is radio operating normally?
- Yes → Radio assembly faulty.
- No ↓

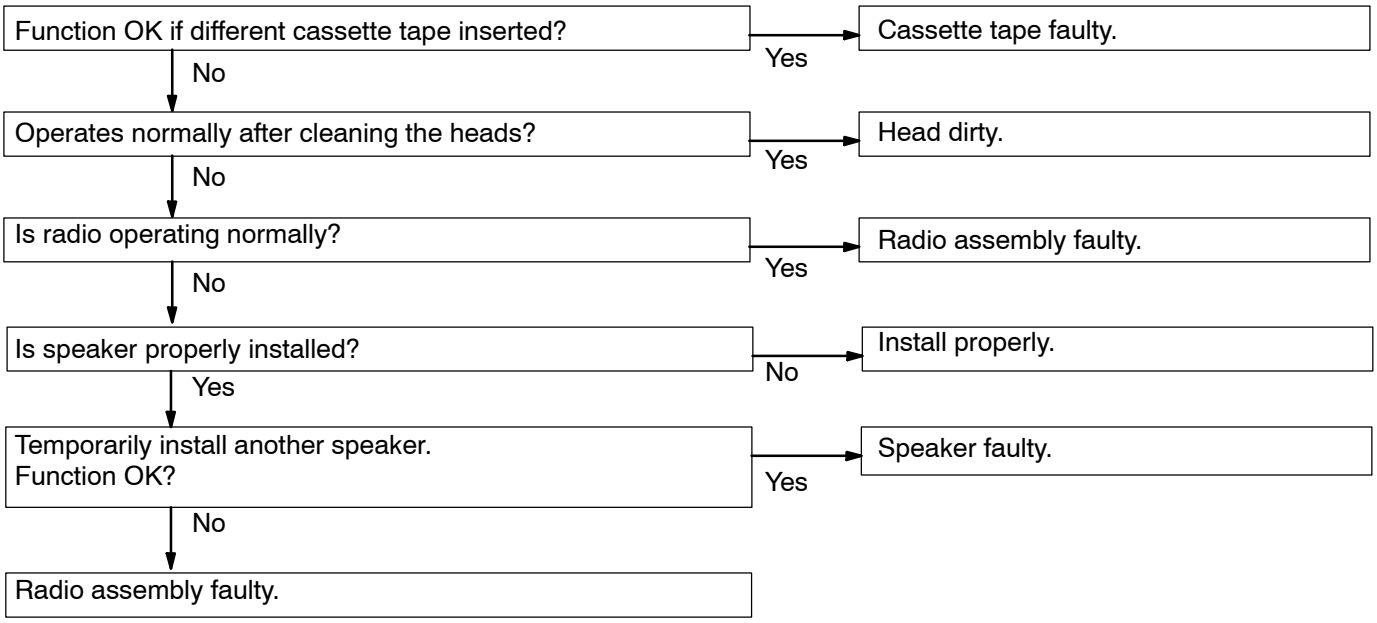
Is hiss noise produced by non–functioning speaker.
- Yes → Radio assembly faulty.
  Recheck system after repair.
- No ↓

Does continuity exist in speaker wire harness?
- No → Speaker wire harness faulty.
- Yes ↓

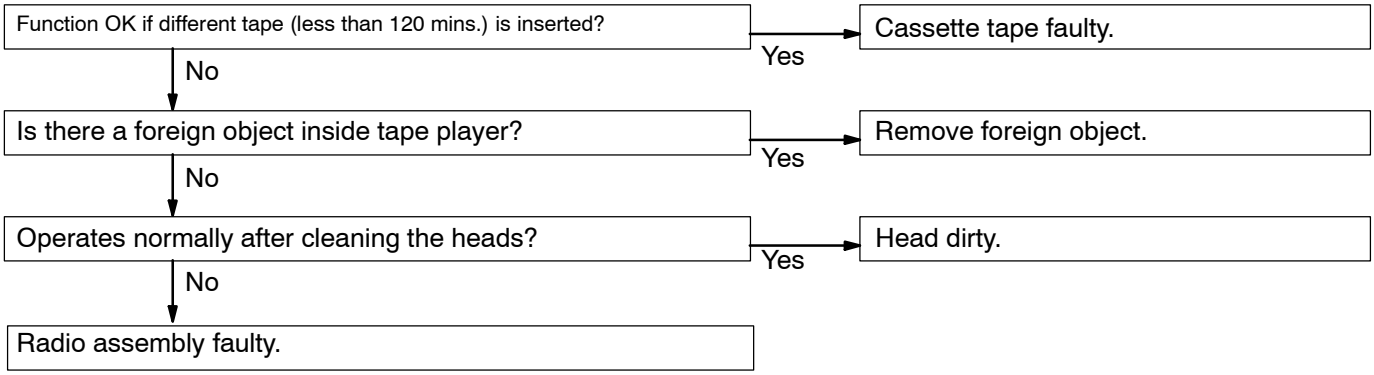
Temporarily install another speaker.
Function OK?
- Yes → Speaker faulty.
- No ↓

Radio assembly or power amplifier faulty.

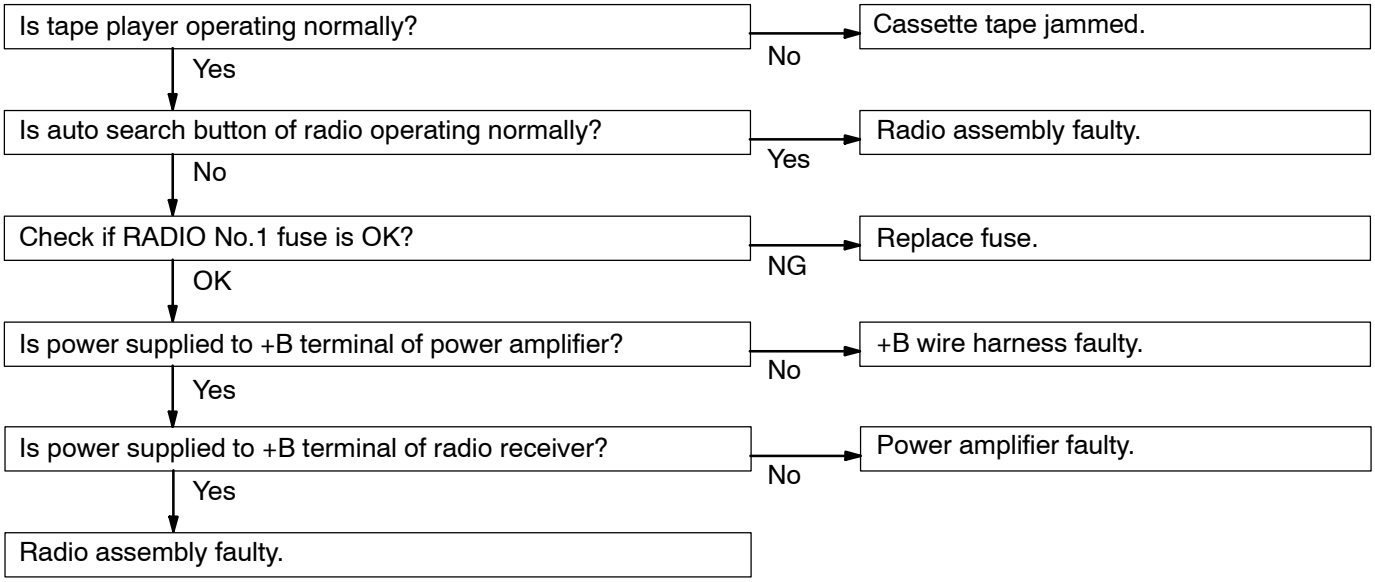
13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)



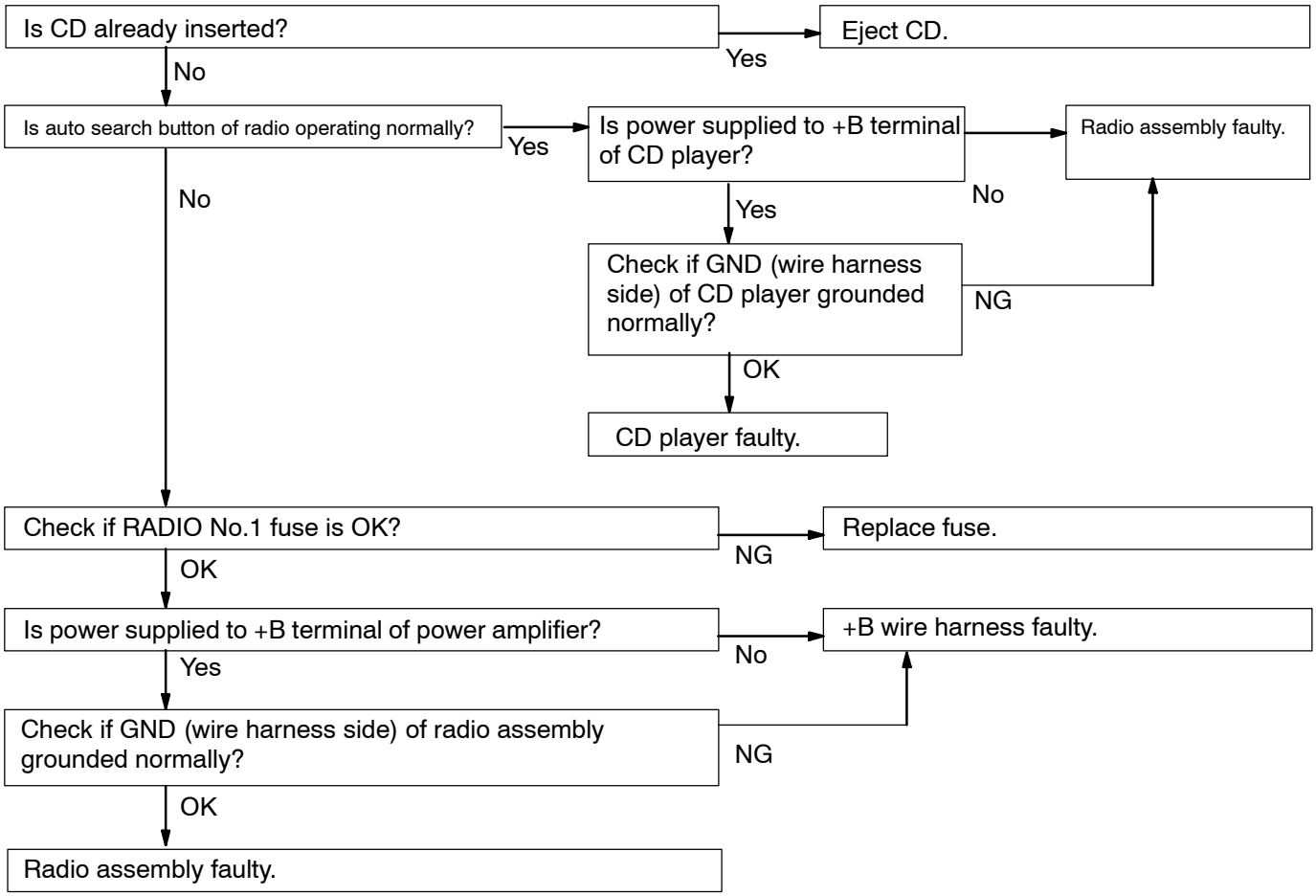
14	Tape Player	TAPE JAMMED MALFUNCTION WITH TAPE SPEED OR AUTO–REVERSE



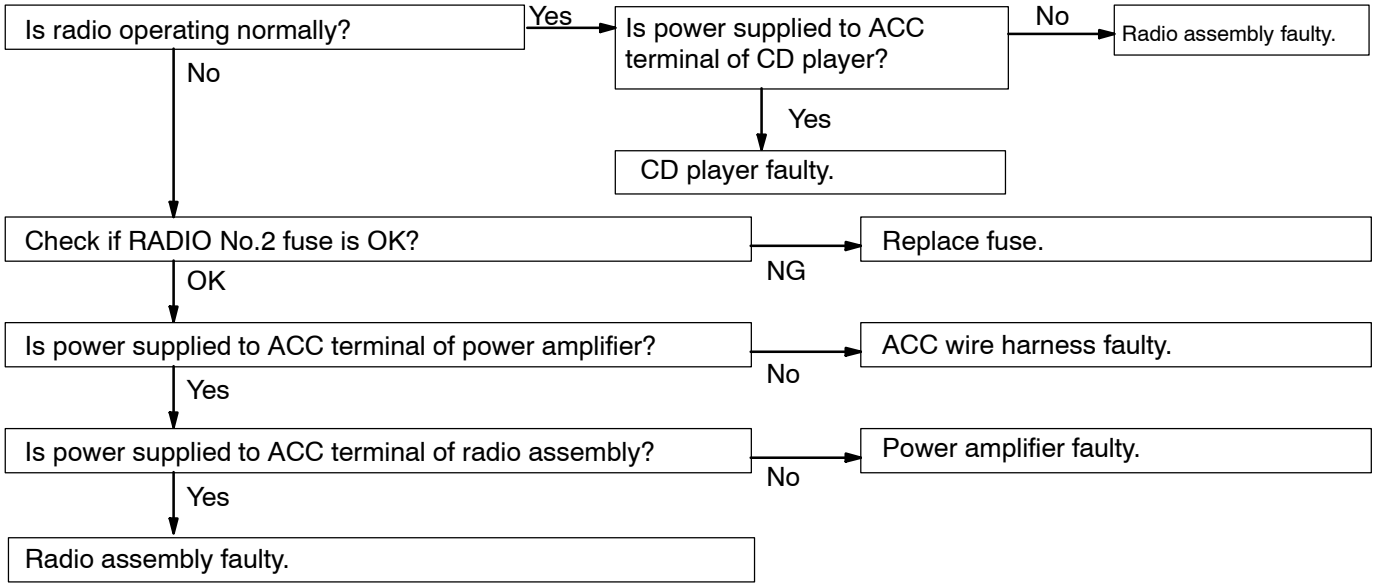
15	Tape Player	CASSETTE TAPE WILL NOT BE EJECTED



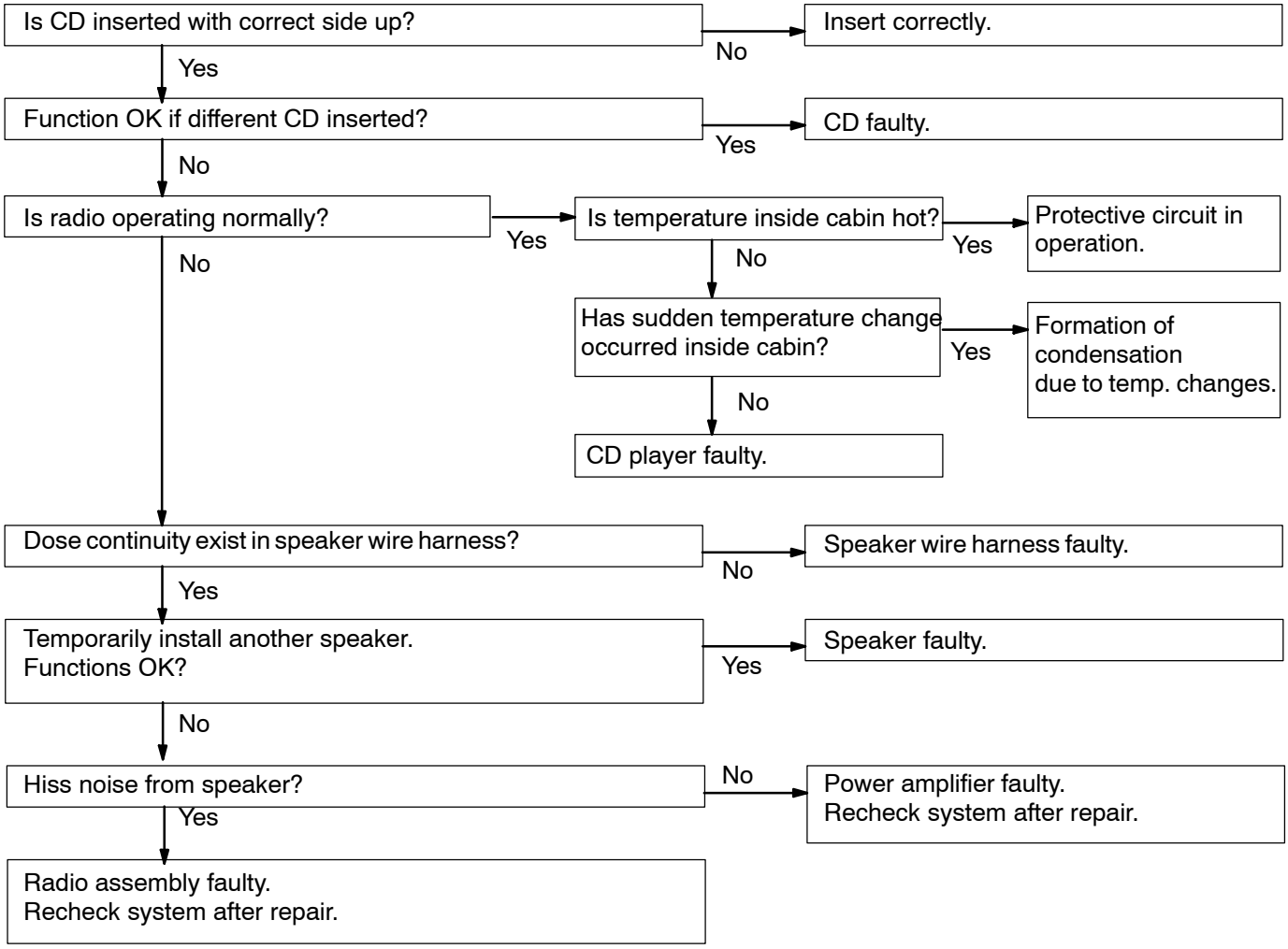
16	CD Player	CD CANNOT BE INSERTED



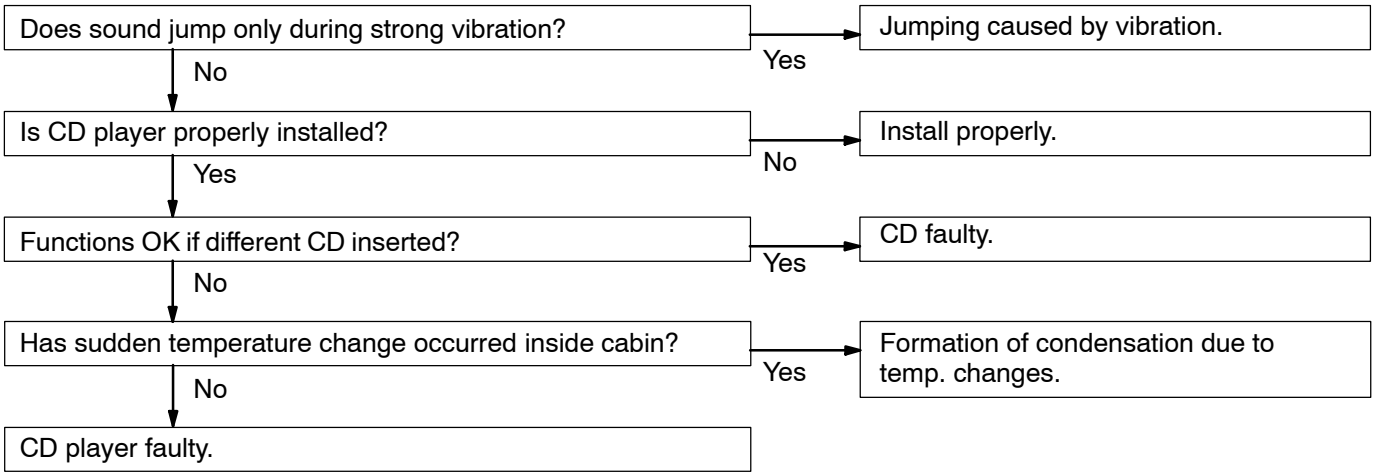
17	CD Player	CD INSERTED, BUT NO POWER



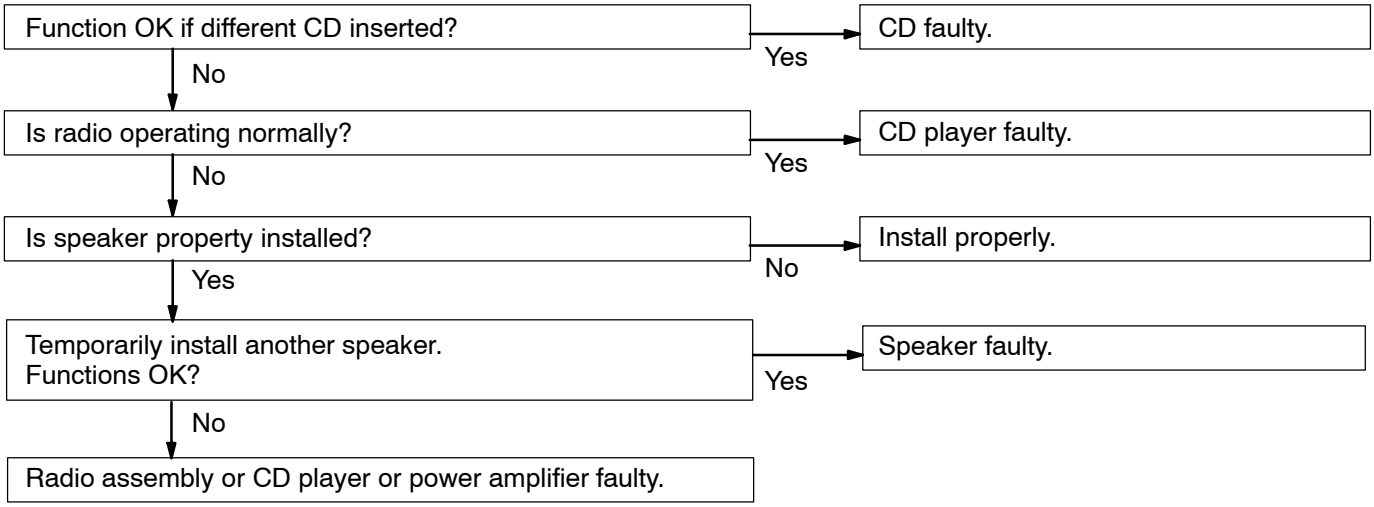
18	CD Player	POWER COMING IN, BUT CD PLAYER NOT OPERATING



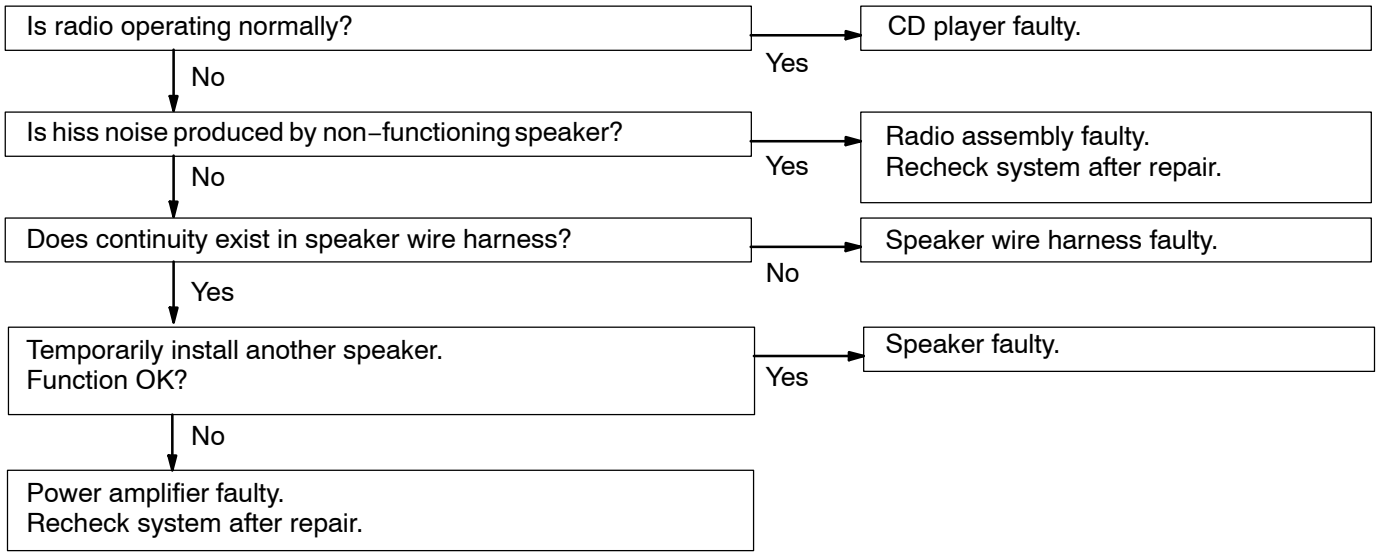
19	CD Player	SOUND JUMPS



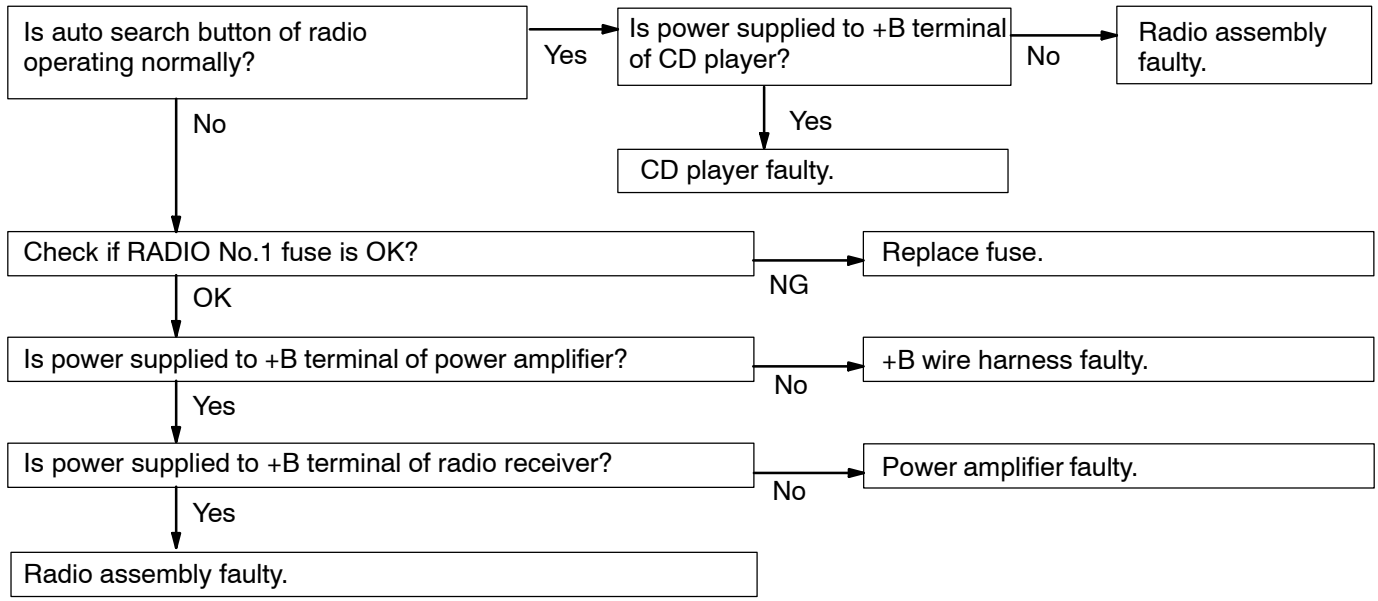
20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)



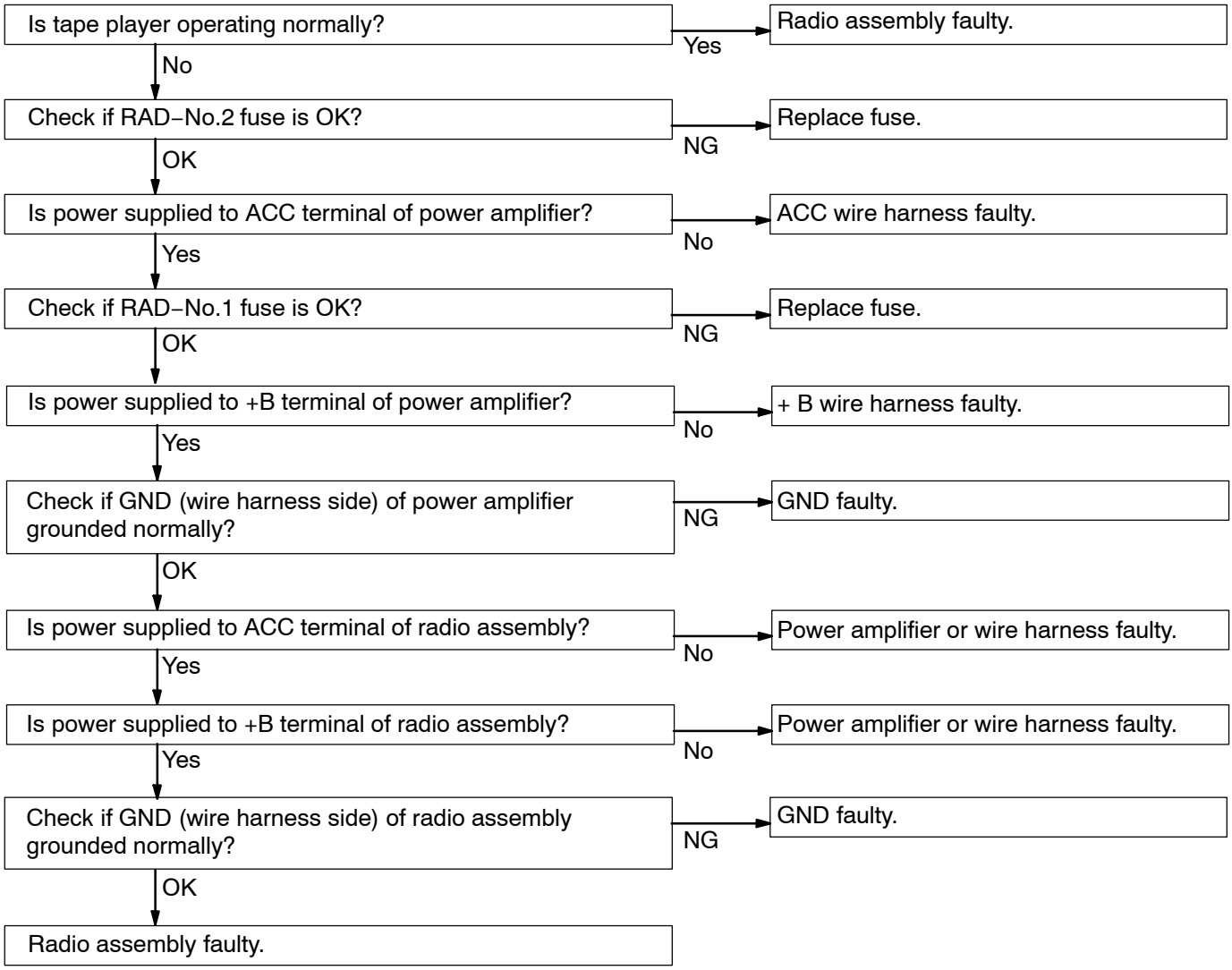
21	CD Player	ANY SPEAKER DOES NOT WORK



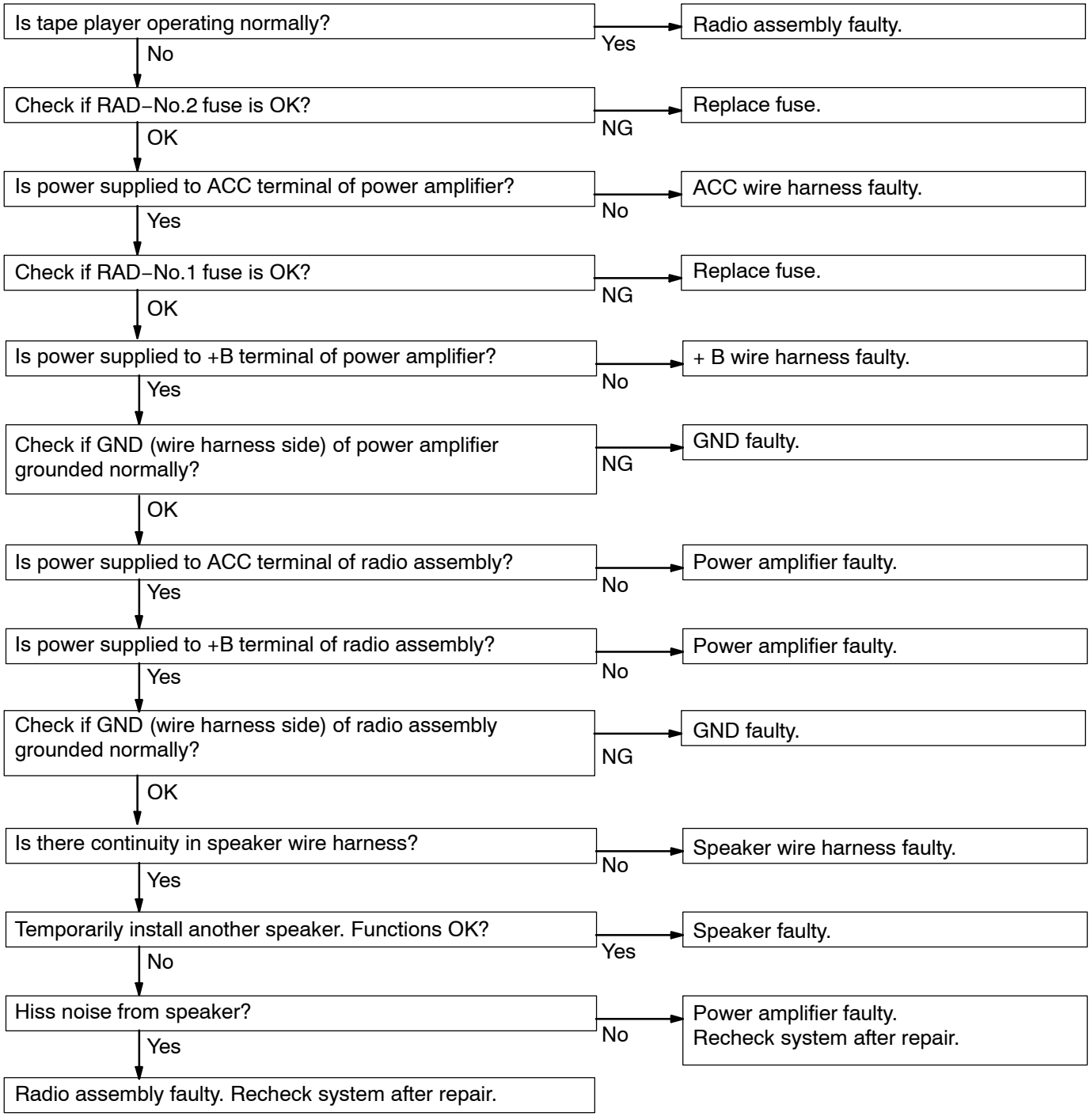
22	CD Player	CD WILL NOT BE EJECTED



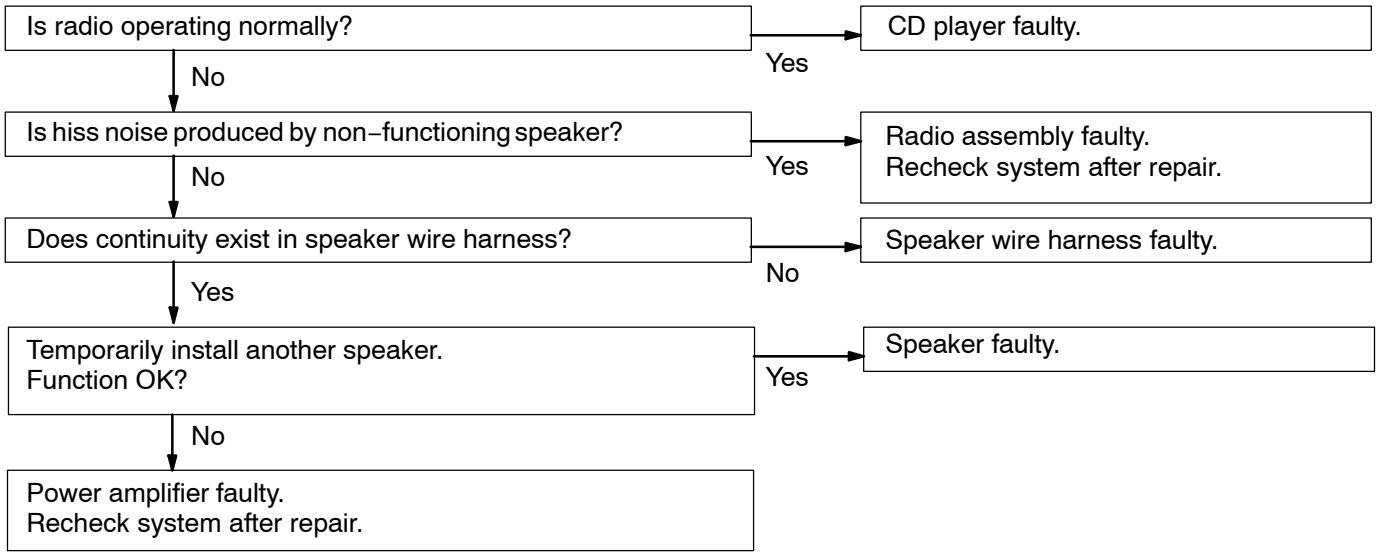
23	Power Amplifier	NO POWER COMING IN



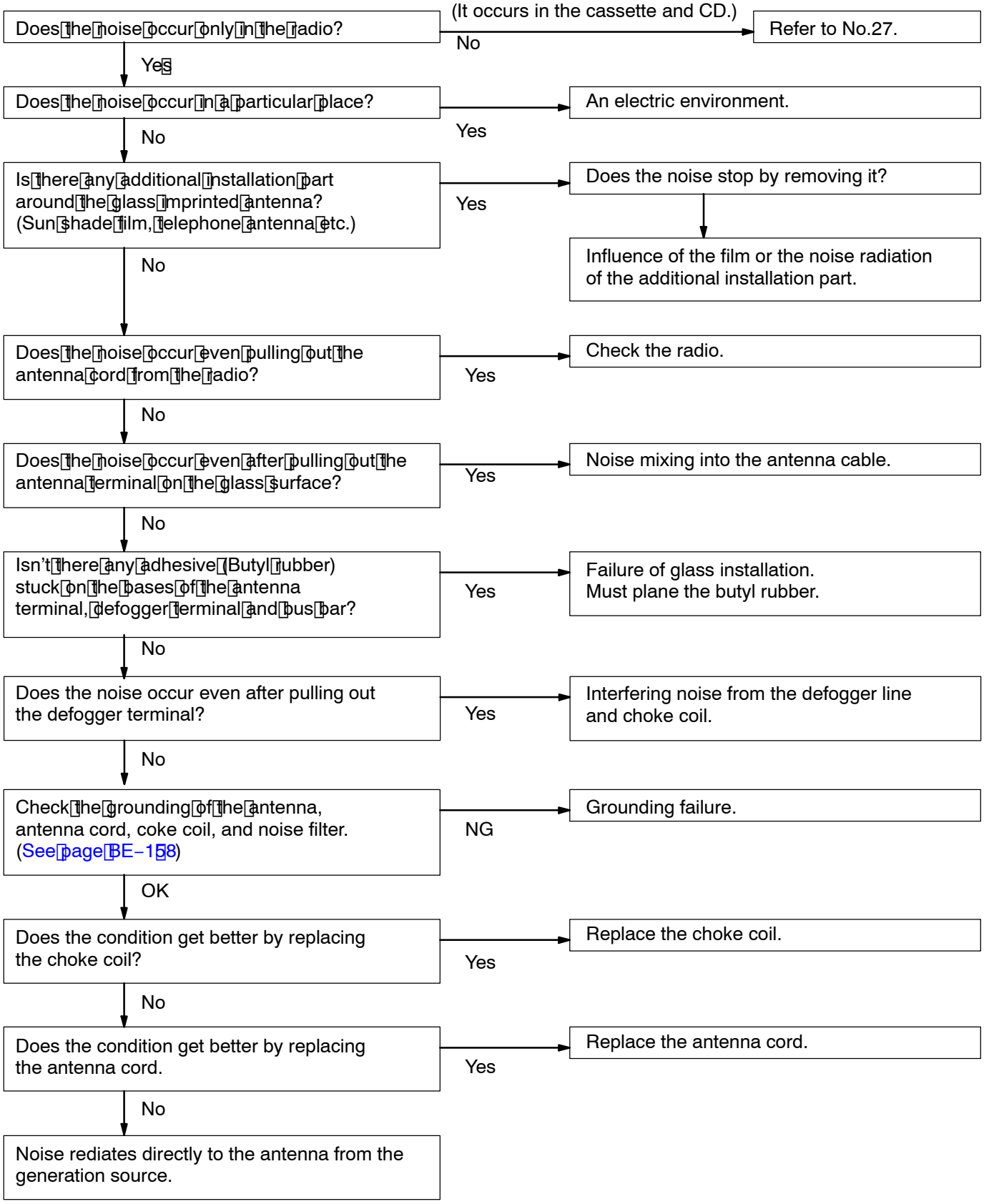
24	Power Amplifier	POWER COMIMG IN, BUT WOOFER (POWER) AMPLIFIER NOT OPERATING



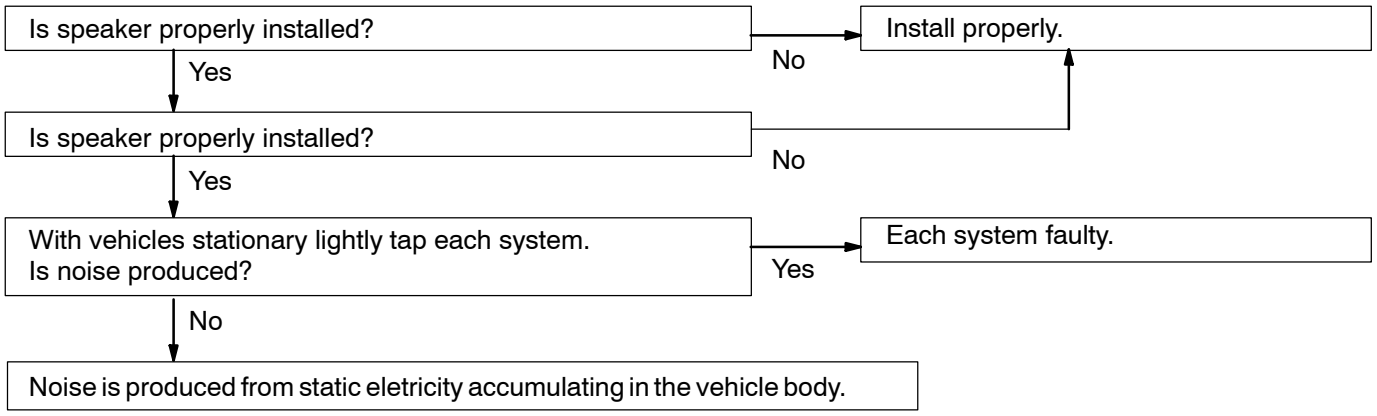
25	Power Amplifier	ANY SPEAKER DOES NOT WORK



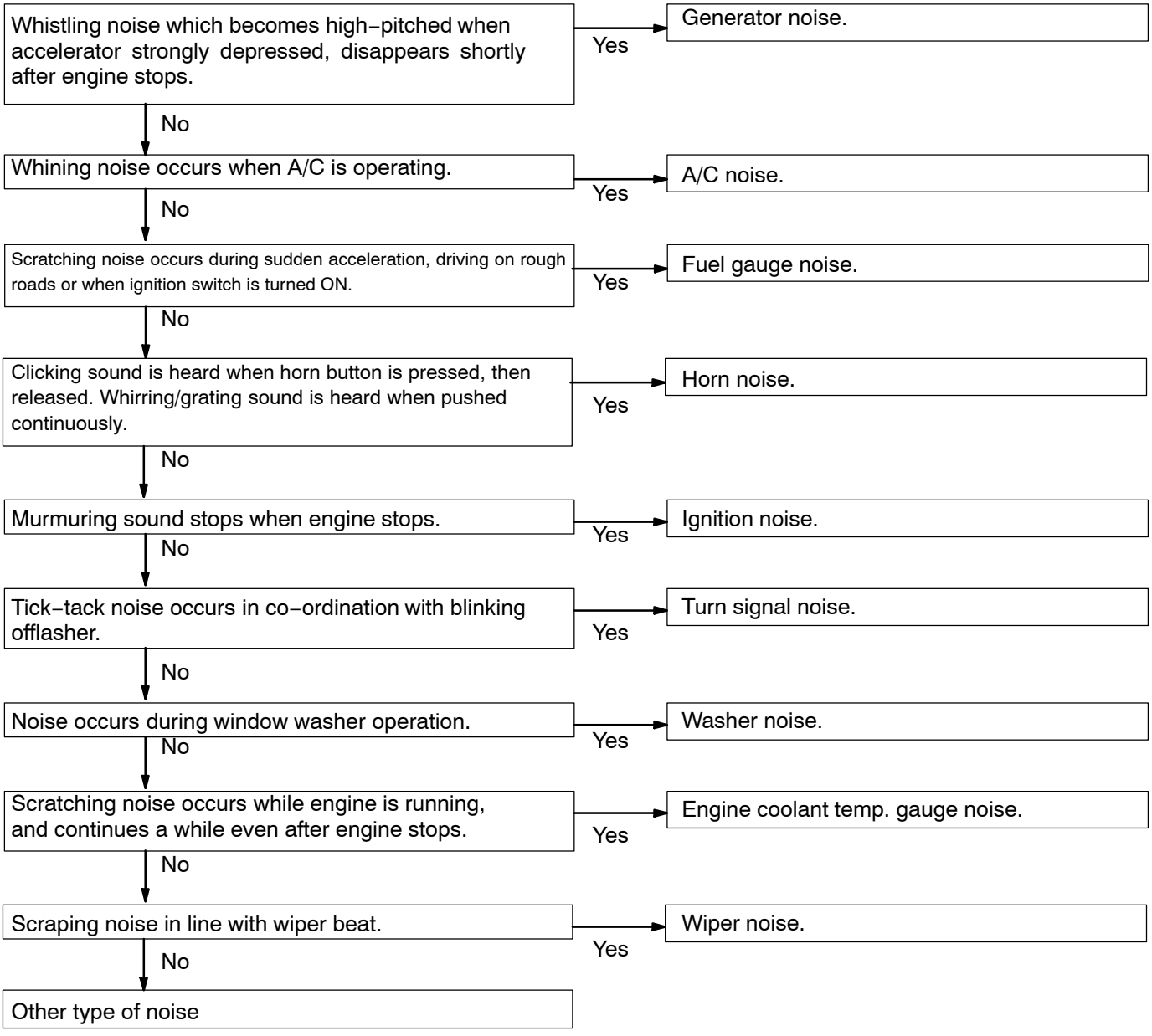
26	Noise	NOISE OCCURS



27	Noise	NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING

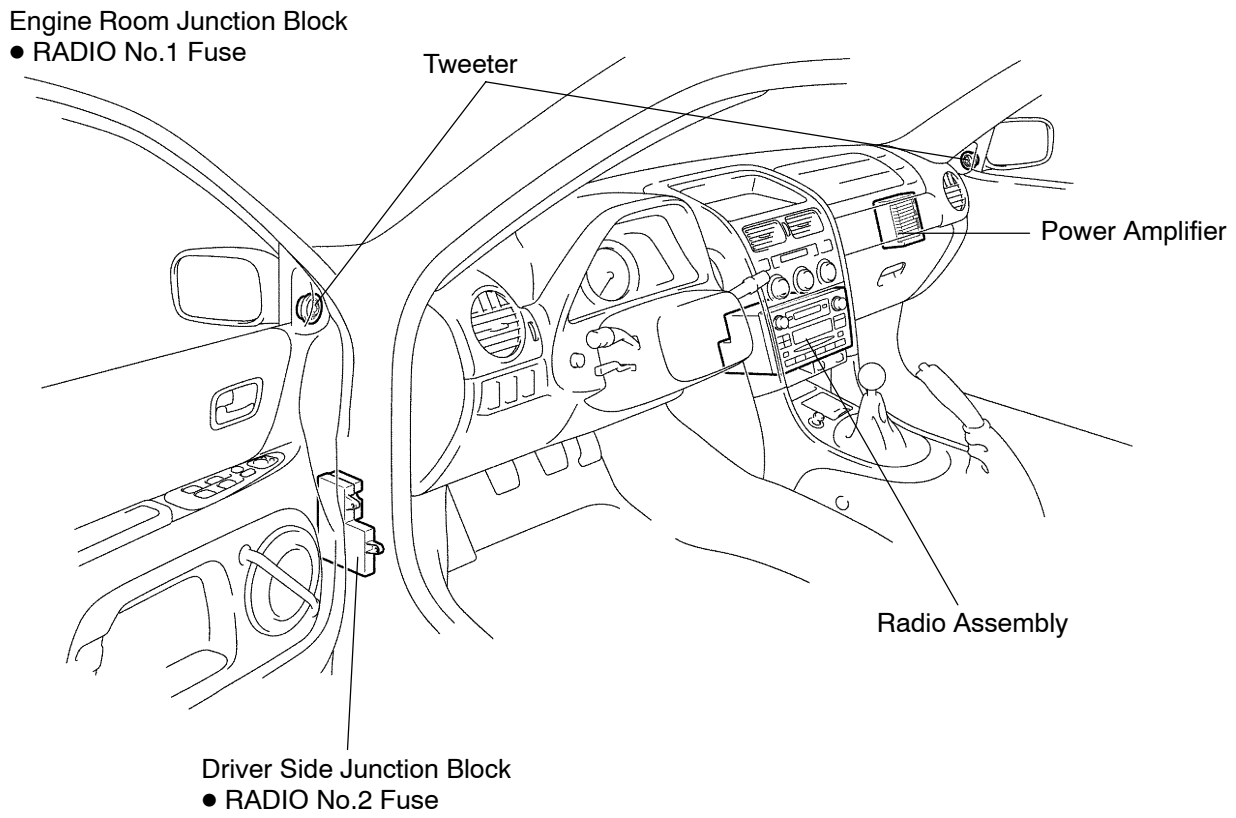


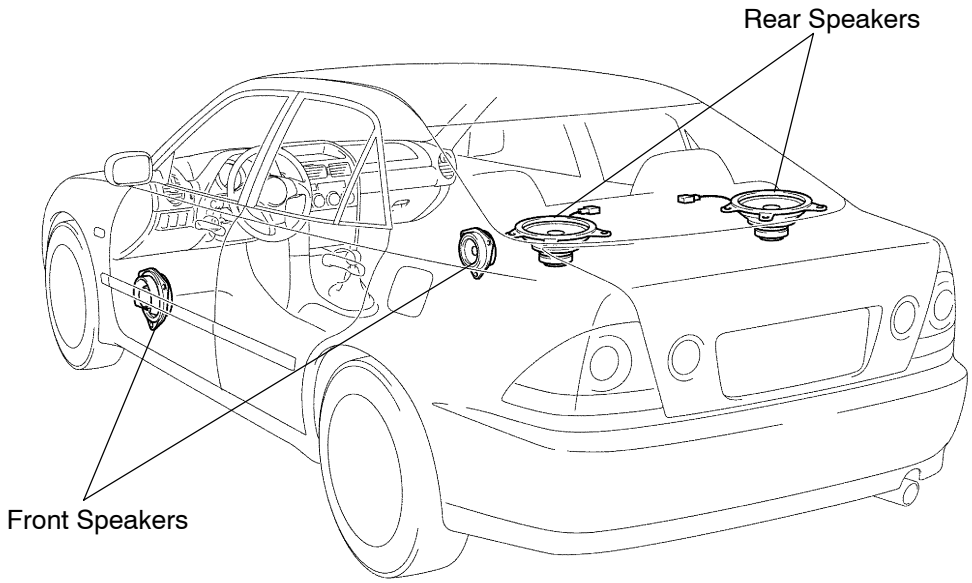
28	Noise	NOISE PRODUCED WHEN ENGINE STARTS



BE0GD–08

LOCATION





P

I10853

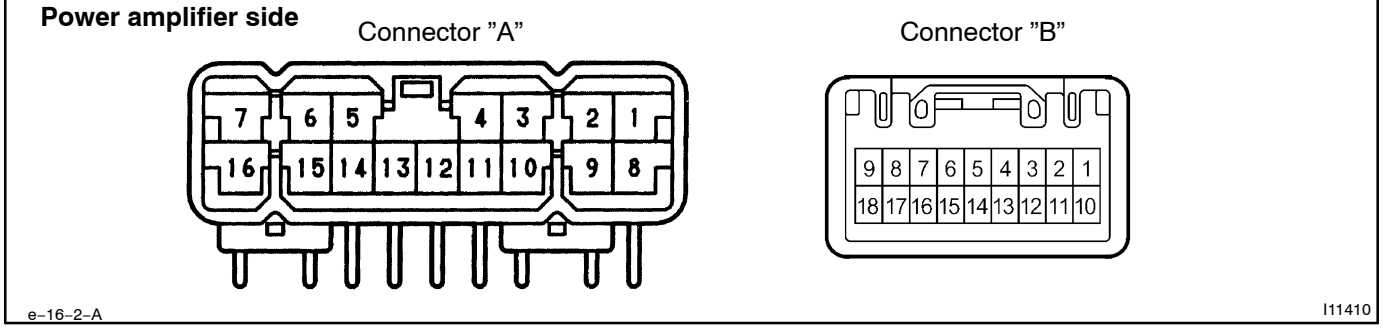
BE16M–01

INSPECTION

1. INSPECT POWER AMPLIFIER CIRCUIT

Connect the connector from power amplifier and inspect the connector on the wire harness side.

Power amplifier side



Tester connection	Condition	Specified condition
A1 – Ground (FL+)	Audio sounding	5 – 7 V
A2 – Ground (FR+)	Audio sounding	5 – 7 V
A3 – Ground (RL+)	Audio sounding	5 – 7 V
A4 – Ground (WL+)	Audio sounding	5 – 7 V
A5 – Ground (RR+)	Audio sounding	5 – 7 V
A6 – Ground (WR+)	Audio sounding	5 – 7 V
A7 – Ground (BU+)	Audio sounding	Battery voltage
A8 – Ground (FL–)	Audio sounding	5 – 7 V
A9 – Ground (FR–)	Audio sounding	5 – 7 V
A10 – Ground (RL–)	Audio sounding	5 – 7 V
A11 – Ground (WL–)	Audio sounding	5 – 7 V
A12 – Ground (GND)	Constant	Continuity
A13 – Ground (N–MUTE)	Audio sounding	Battery voltage
A14 – Ground (RR–)	Audio sounding	5 – 7 V
A15 – Ground (WR–)	Audio sounding	5 – 7 V
A16 – Ground (ACC)	Ignition switch ACC	Battery voltage
B1 – Ground (+B)	Constant	Battery voltage

B3 – Ground (AMP+)	Radio power switch ON	Battery voltage
B5 – Ground (GND)	Constant	Continuity
B7 – Ground (MUTE)	Audio sounding	1 V or below
B8 – Ground (FL)	Audio sounding	1 V or below
B9 – Ground (FR)	Audio sounding	1 V or below
B10 – Ground (ACC)	Ignition switch ACC	Battery voltage
B14 – Ground (GND)	Constant	Continuity
B16 – Ground (BEEP)	Audio sounding	–
B17 – Ground (RL)	Audio sounding	1 V or below
B18 – Ground (RR)	Audio sounding	1 V or below

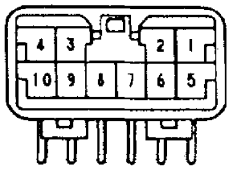
If the circuit is not as specified, inspect the circuits connected to other parts.

2. INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

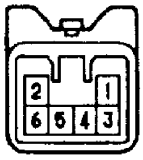
Connect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Radio Receiver Side

Connector ”A”



Connector ”B”



I12416

Tester connection	Condition	Specified condition
A1 – Ground (FR+)	Audio sounding	5 – 7 V
A2 – Ground (FL+)	Audio sounding	5 – 7 V
A3 – Ground (ACC, +B)	Ignition switch ACC	Battery voltage
A4 – Ground (BU +B)	Constant	Battery voltage
A5 – Ground (FR–)	Audio sounding	5 – 7 V
A6 – Ground (FL–)	Audio sounding	5 – 7 V
A7 – Ground (GND)	Constant	Continuity
A8 – Ground (ANT +B)	Radio power switch ON	Battery voltage
A10 – Ground (ILL+)	Headlight dimmer switch ON	Battery voltage
B1 – Ground (RR+)	Audio sounding	5 – 7 V
B2 – Ground (RL+)	Audio sounding	5 – 7 V
B3 – Ground (RR–)	Audio sounding	5 – 7 V
B4 – Ground (RL–)	Audio sounding	5 – 7 V

*: w/ LEXUS navigation system

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.

3. INSPECT GLASS IMPRINTED ANTENNA

Use same procedure as for "INSPECT DEFOGGER WIRES" on page BE–96.

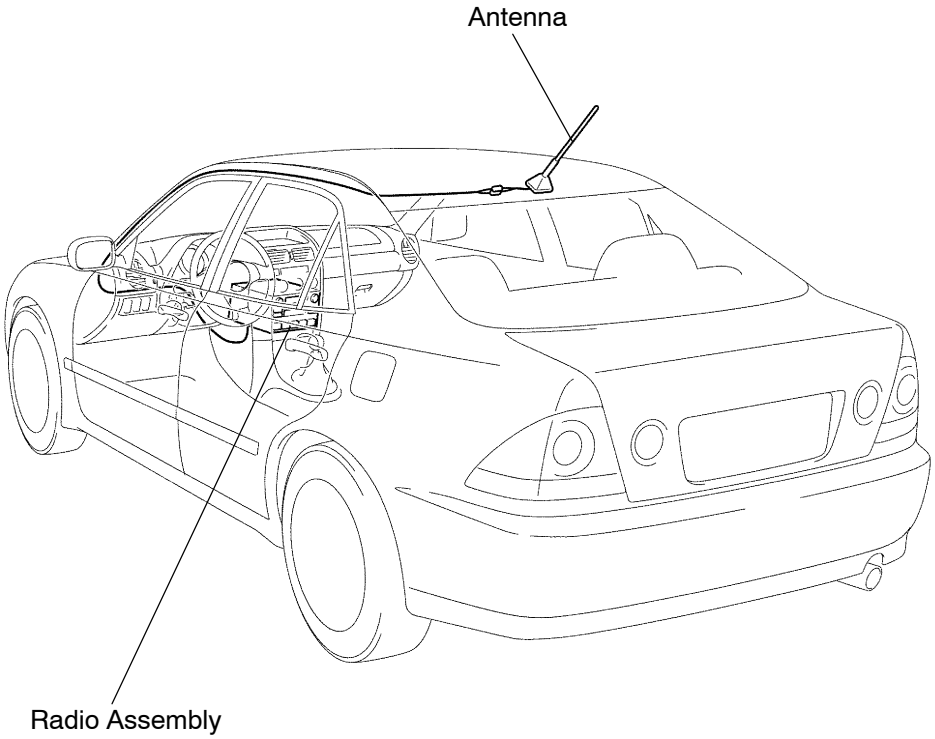
4. REPAIR GLASS IMPRINTED ANTENNA

Use same procedure as for "REPAIR DEFOGGER WIRES" on page BE–96.

ANTENNA

LOCATION

BE16N–01

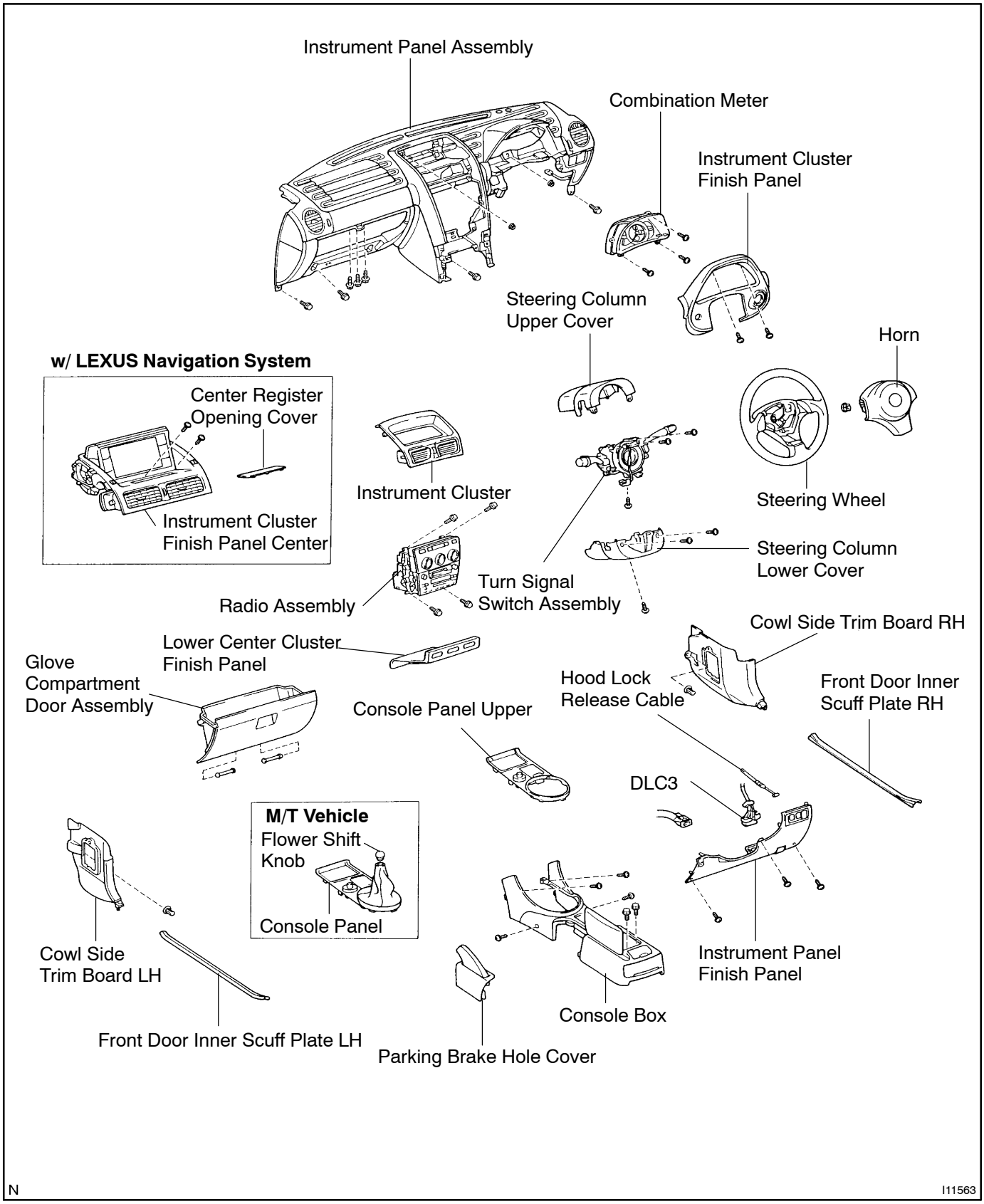


P

I10854

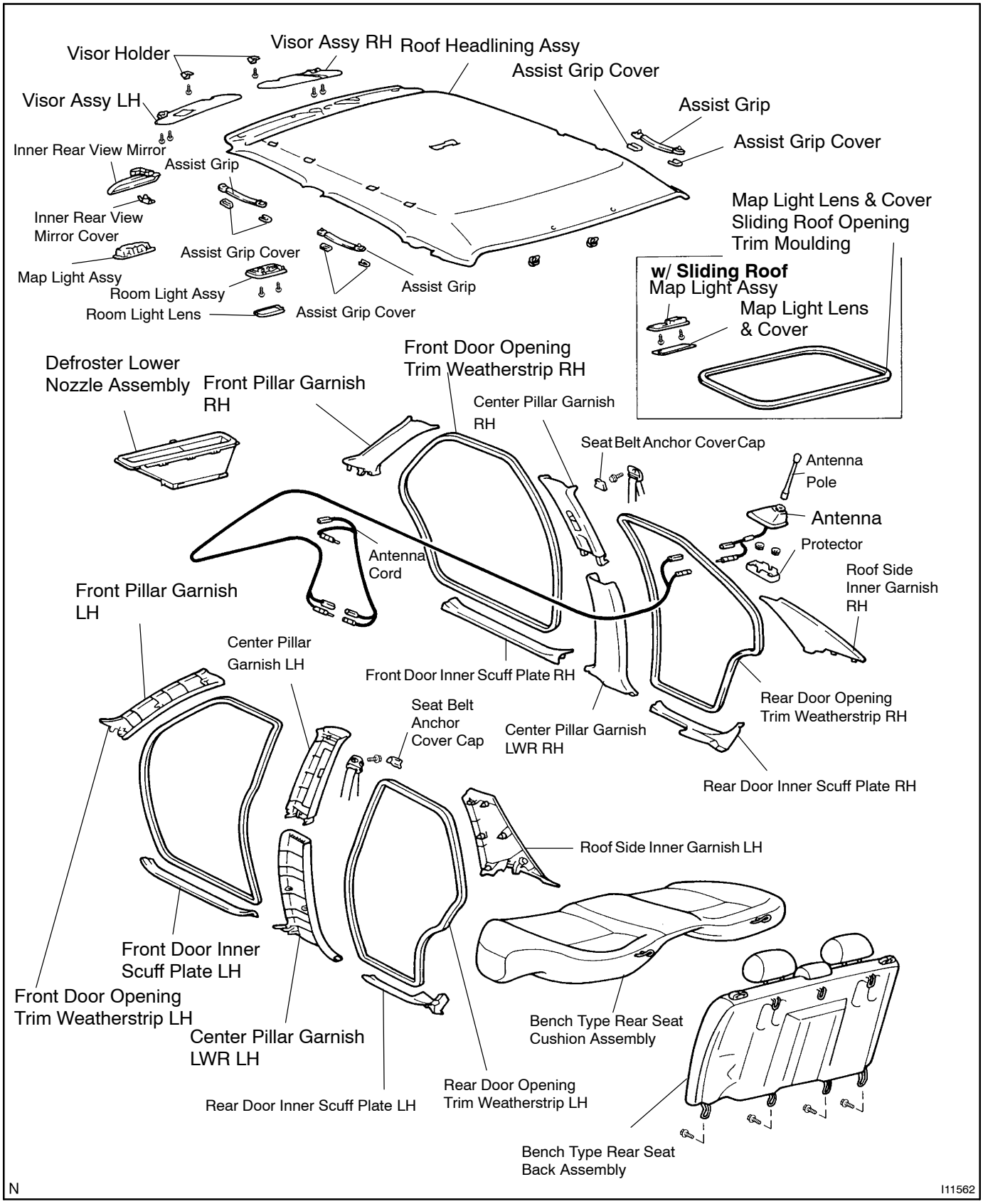
BE16O–01

COMPONENTS



N

I11563


Visor Holder
Visor Assy RH
Roof Headlining Assy
Assist Grip Cover
Visor Assy LH
Assist Grip
Assist Grip Cover
Inner Rear View Mirror
Assist Grip
Inner Rear View Mirror Cover
Assist Grip Cover
Map Light Assy
Room Light Assy
Room Light Lens
Assist Grip
Assist Grip Cover
Map Light Lens & Cover
Sliding Roof Opening Trim Moulding
w/ Sliding Roof
Map Light Assy
Map Light Lens & Cover
Defroster Lower Nozzle Assembly
Front Pillar Garnish RH
Front Door Opening Trim Weatherstrip RH
Center Pillar Garnish RH
Seat Belt Anchor Cover Cap
Antenna Pole
Antenna
Protector
Antenna Cord
Roof Side Inner Garnish RH
Front Pillar Garnish LH
Center Pillar Garnish LH
Front Door Inner Scuff Plate RH
Rear Door Opening Trim Weatherstrip RH
Seat Belt Anchor Cover Cap
Center Pillar Garnish LWR RH
Rear Door Inner Scuff Plate RH
Roof Side Inner Garnish LH
Front Door Inner Scuff Plate LH
Front Door Opening Trim Weatherstrip LH
Center Pillar Garnish LWR LH
Bench Type Rear Seat Cushion Assembly
Rear Door Inner Scuff Plate LH
Rear Door Opening Trim Weatherstrip LH
Bench Type Rear Seat Back Assembly
N
I11562

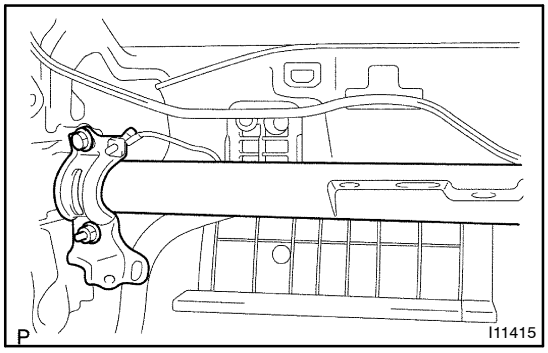
BE16P–01

REMOVAL

HINT:

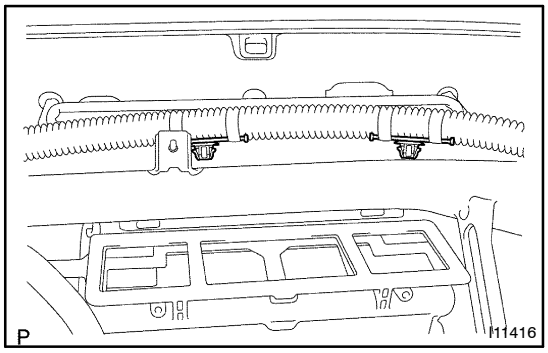
Installation is in the reverse order of removal.

1. **w/o LEXUS Navigation System:**
   REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER
2. **w/ LEXUS Navigation System:**
   REMOVE CENTER CLUSTER OPENING COVER
3. **w/ LEXUS Navigation System:**
   REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER
4. **REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER**
5. **REMOVE AIR CONDITIONER ASSEMBLY**
6. **M/T Vehicle:**
   REMOVE FLOWER SHIFT LEVER KNOB
7. **REMOVE CONSOLE PANEL UPPER**
8. **REMOVE PARKING BRAKE HOLE COVER**
9. **REMOVE CONSOLE BOX**
10. **REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY**
11. **REMOVE HORN BUTTON**
12. **REMOVE STEERING WHEEL**
13. **REMOVE STEERING COLUMN LOWER COVER**
14. **REMOVE STEERING COLUMN UPPER COVER**
15. **REMOVE TURN SIGNAL SWITCH ASSEMBLY**
16. **REMOVE INSTRUMENT PANEL FINISH PANEL LOWER**
17. **REMOVE INSTRUMENT CLUSTER FINISH PANEL**
18. **REMOVE COMBINATION METER**
19. **REMOVE FRONT DOOR INNER SCUFF PLATE RH**
20. **REMOVE FRONT DOOR INNER SCUFF PLATE LH**
21. **REMOVE COWL SIDE TRIM BOARD RH**
22. **REMOVE COWL SIDE TRIM BOARD LH**
23. **REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH**
24. **REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH**
25. **REMOVE FRONT PILLAR GARNISH RH**
26. **REMOVE FRONT PILLAR GARNISH LH**
27. **DISCONNECT PASSENGER AIRBAG CONNECTOR**
28. **REMOVE INSTRUMENT PANEL ASSEMBLY**



29. REMOVE INSTRUMENT PANEL REINFORCEMENT BRACKET

Remove the bolt and nut and pull instrument panel reinforcement.



30. REMOVE A PART OF INSTRUMENT PANEL WIRE

Remove the 2 clips and a part of instrument panel wire.

31. REMOVE DEFROSTER LOWER NOZZLE

32. REMOVE BENCH TYPE REAR SEAT CUSHION ASSEMBLY

33. REMOVE BENCH TYPE REAR SEAT BACK ASSEMBLY

34. REMOVE REAR DOOR INNER SCUFF PLATE RH

35. REMOVE REAR DOOR INNER SCUFF PLATE LH

36. REMOVE REAR DOOR OPENING TRIM WEATHER STRIP RH

37. REMOVE REAR DOOR OPENING TRIM WEATHER STRIP LH

38. REMOVE CENTER PILLAR GARNISH LOWER RH

39. REMOVE CENTER PILLAR GARNISH LOWER LH

40. REMOVE SEAT BELT ANCHOR COVER CAP

41. REMOVE FRONT SEAT OUTER BELT ASSEMBLY RH

42. REMOVE FRONT SEAT OUTER BELT ASSEMBLY LH

43. REMOVE CENTER PILLAR GARNISH RH

44. REMOVE CENTER PILLAR GARNISH LH

45. REMOVE ROOF SIDE INNER GARNISH RH

46. REMOVE ROOF SIDE INNER GARNISH LH

47. REMOVE ASSIST GRIP COVER

48. REMOVE ASSIST GRIP

49. REMOVE VISOR ASSEMBLY RH

50. REMOVE VISOR ASSEMBLY LH

51. REMOVE INNER REAR VIEW MIRROR STAY HOLDER COVER

52. REMOVE INNER REAR VIEW MIRROR

53. REMOVE MAP LIGHT ASSEMBLY

54. REMOVE ROOM LIGHT ASSEMBLY

55. w/ Sliding Roof:
REMOVE SLIDING ROOF OPENING TRIM MOULDING

56. REMOVE VISOR HOLDER

57. REMOVE ROOF HEADLINING ASSEMBLY

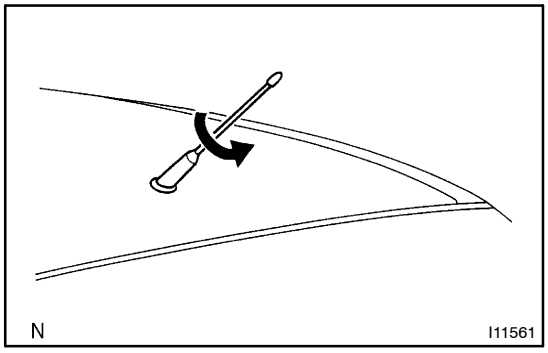
58. REMOVE ANTENNA ASSEMBLY

(a) Remove the 2 nuts and disconnect the connector.

(b) Remove the antenna assembly.

59. REMOVE ANTENNA COED

Remove the clamp and the antenna cord.



60. REMOVE ANTENNA POLE

Turn the antenna pole counterclockwise to remove.

CLOCK

TROUBLESHOOTING

BE0G0–04

HINT:

Troubleshoot the clock according to the table below.

Troubleshooting	No.
Passenger's seat belt warning light does not light up.	1
Clock will not operate	1
Clock loses or gains time	2

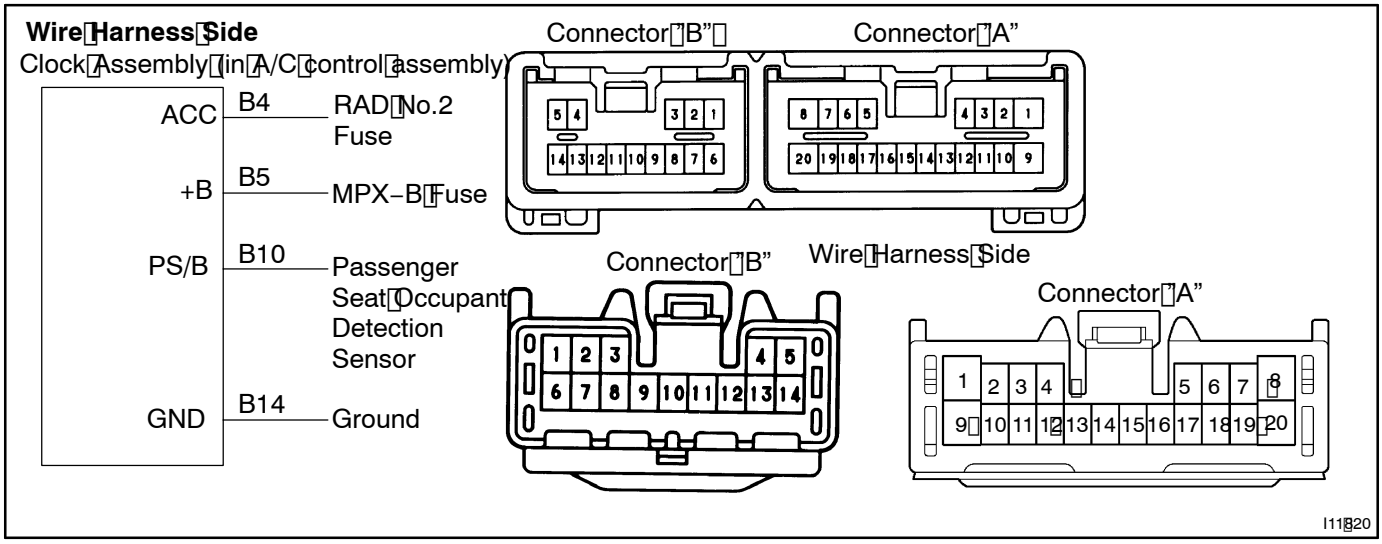
± 1.5 seconds / day

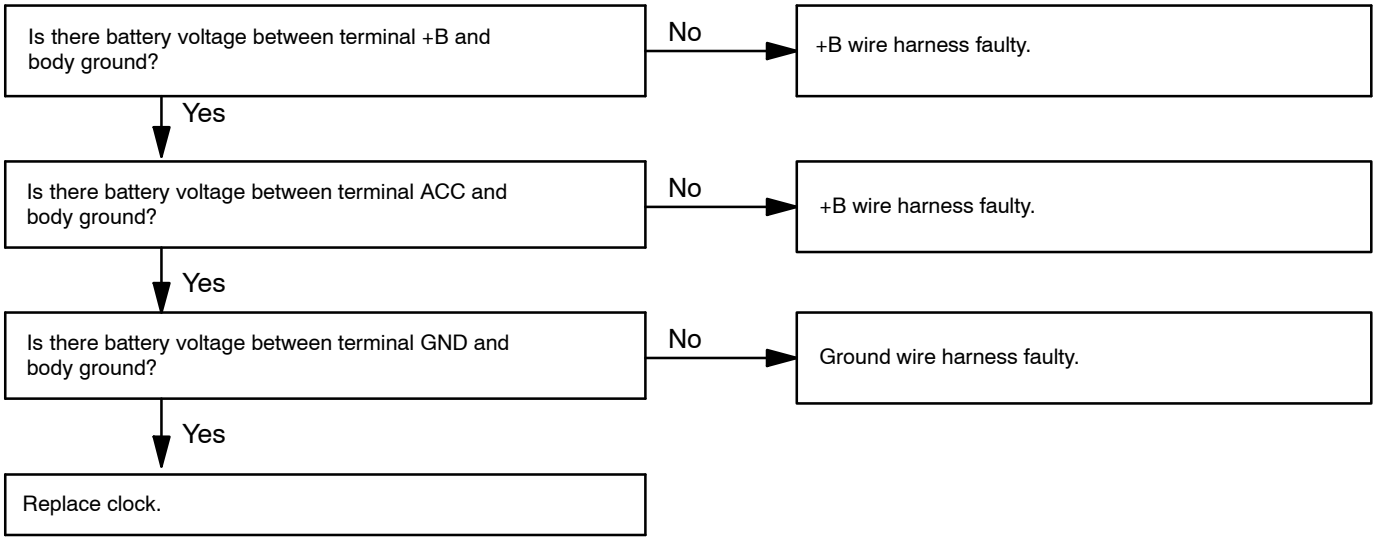
INSPECT CLOCK CIRCUIT
(See page DI–667)

TROUBLESHOOTING NO.1

1	**PASSENGER'S SEAT BELT WARNING LIGHT DOES NOT OPERATE**
	CLOCK WILL NOT OPERATE

(a) Check that the battery voltage is 10 – 16 V.
If voltage is not as specified, replace the battery.
(b) Check that the MPX–B and RAD No.2 fuses are not blown.
If the fuse is blown, replace the fuse and check for short.
(c) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.





TROUBLESHOOTING NO.2

2	**CLOCK LOSES OR GAINS TIME**

(a) Check that the battery 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 seconds

If the error exceeds the allowable error, replace the clock.

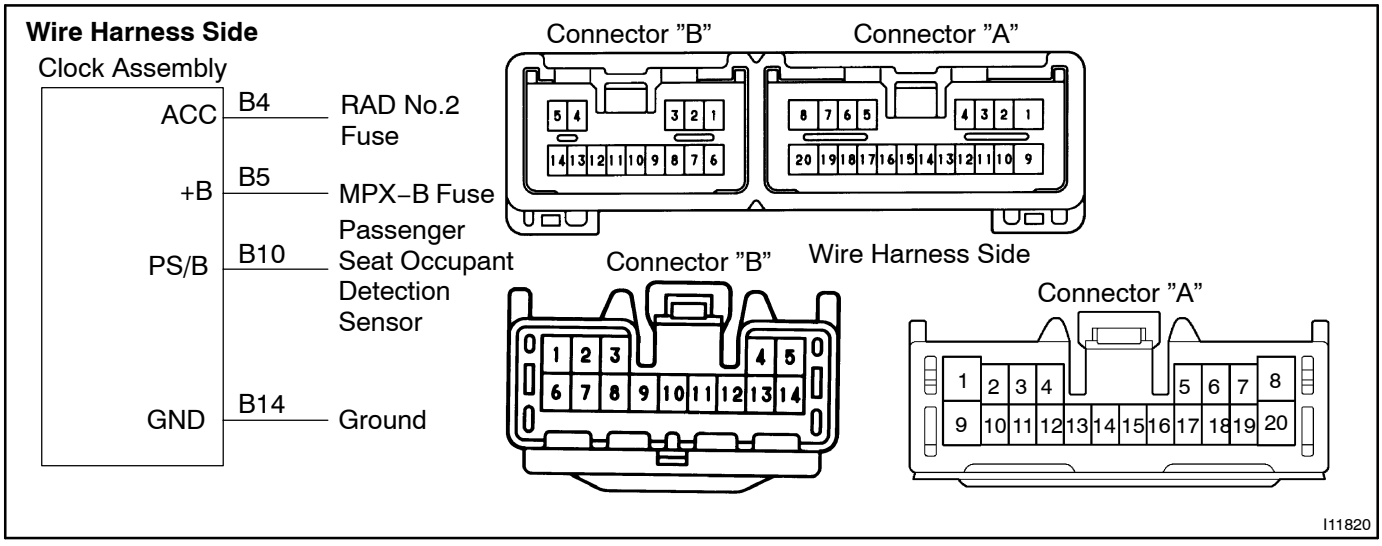
(c) Check that the clock adjusting button is sticking in position and has failed to return.

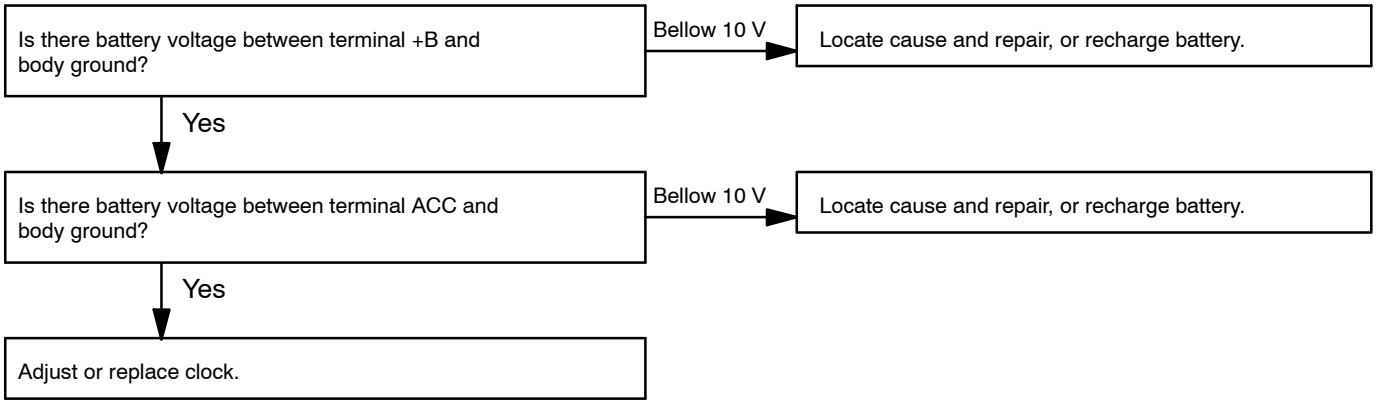
If the error exceeds the allowable error, replace the clock.

(d) Troubleshoot the clock as follows.

HINT:

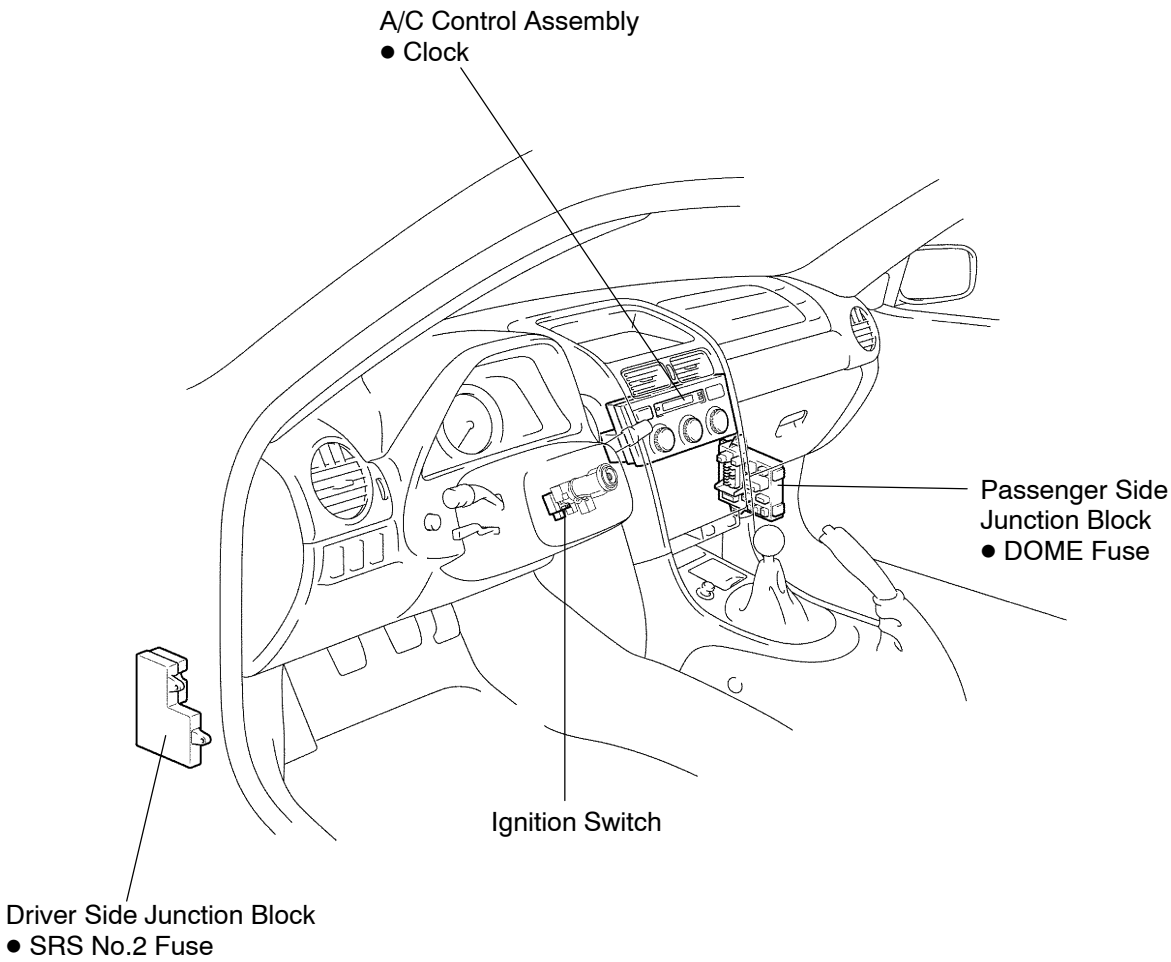
Inspect the connector on the wire harness side.




Is there battery voltage between terminal +B and body ground?
Bellow 10 V
Locate cause and repair, or recharge battery.
Yes
Is there battery voltage between terminal ACC and body ground?
Bellow 10 V
Locate cause and repair, or recharge battery.
Yes
Adjust or replace clock.

BE0G1–07

LOCATION



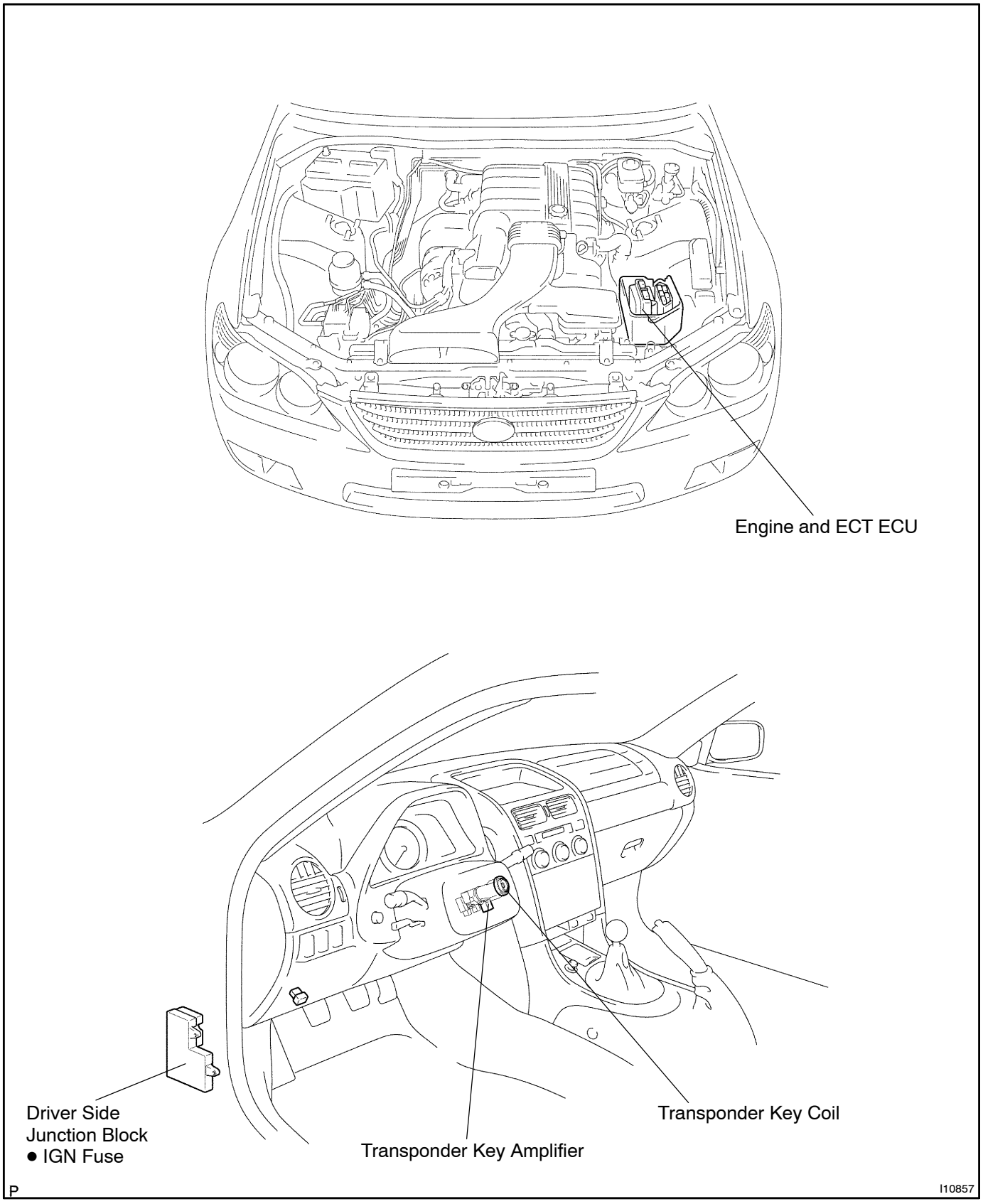
P

I10855

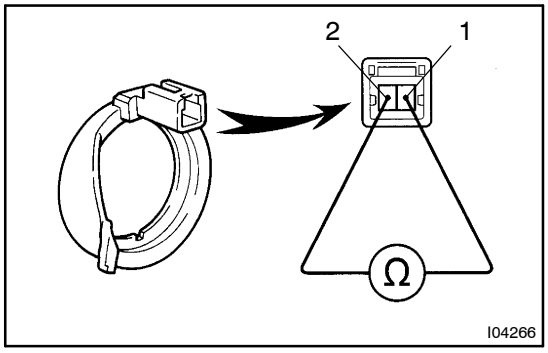
ENGINE IMMOBILISER SYSTEM

BE02Q–14

LOCATION



BE0G8–08



INSPECTION

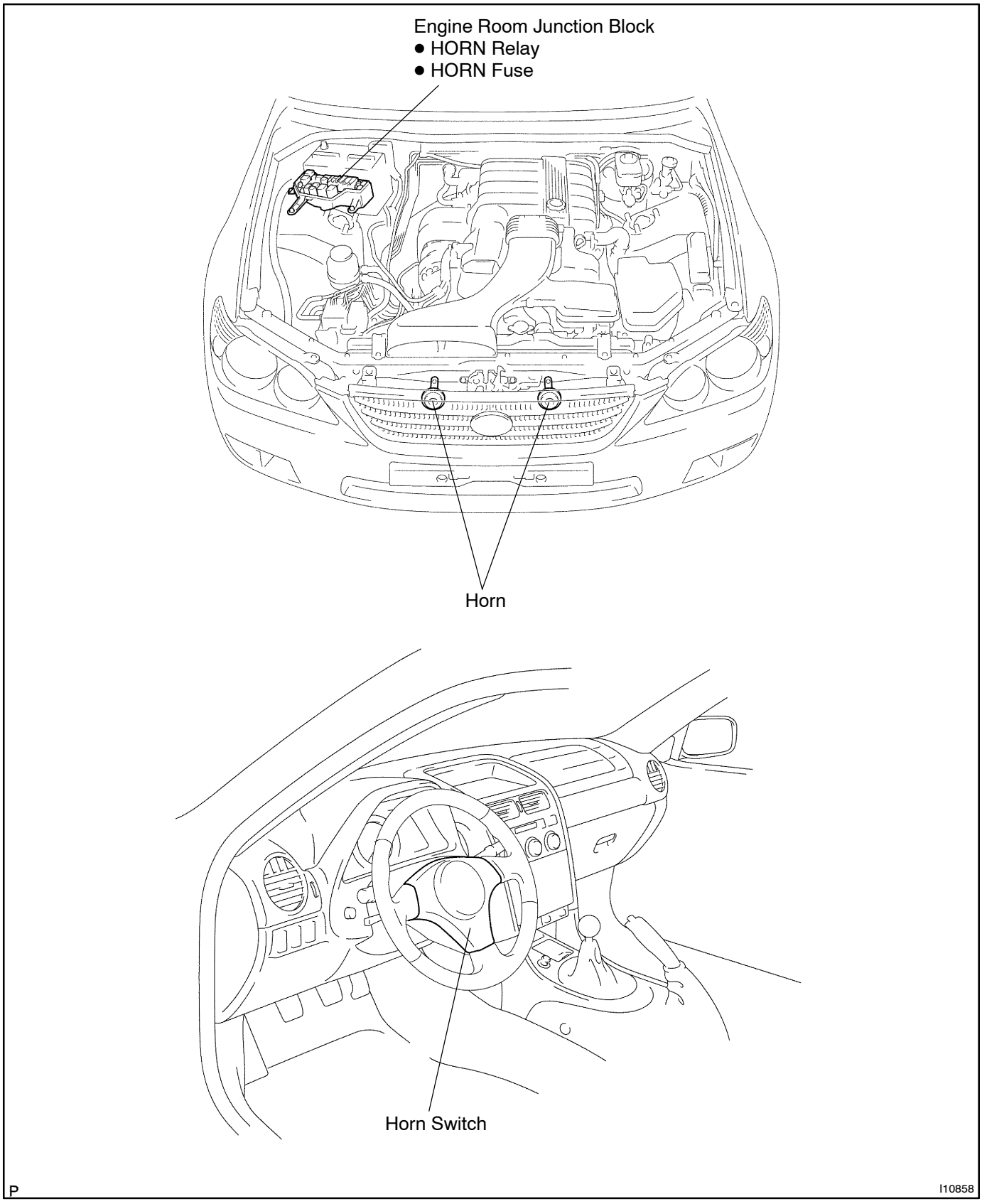
INSPECTION TRANSPONDER KEY COIL CONTINUITY

Check that continuity exists between terminals 1 and 2.
If continuity is not as specified, replace the coil.

HORN SYSTEM

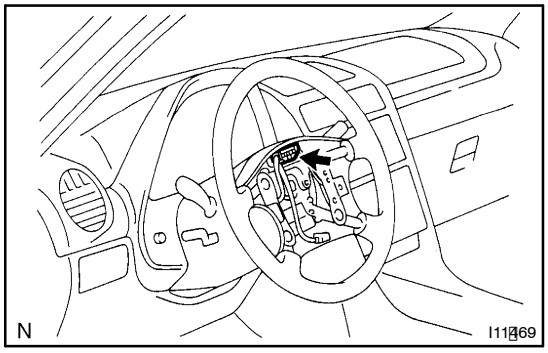
LOCATION

BE0FY–08



BE0FZ-07

INSPECTION



1. INSPECT HORN SWITCH

(a) Disconnect the negative (–) terminal from the battery.

(b) Remove the left and right covers from the steering wheel.

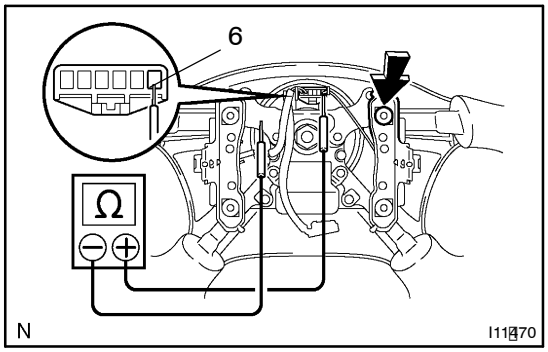
(c) Using a Torx socket wrench, loosen the 2 bolts.

(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.



(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.

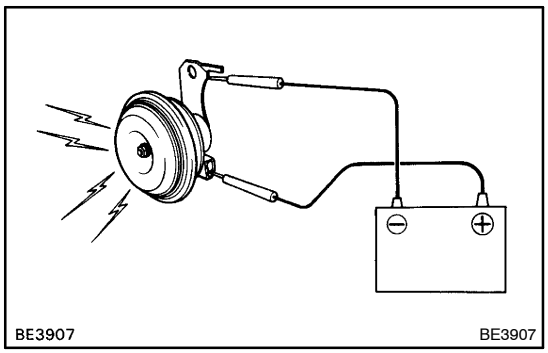
If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

(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.



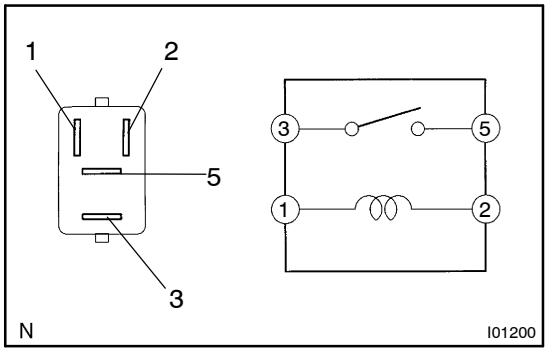
2. INSPECT HORN OPERATION

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 SWITCH CIRCUIT

(See page DI–451)



4. 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.

5. INSPECT HORN RELAY CIRCUIT

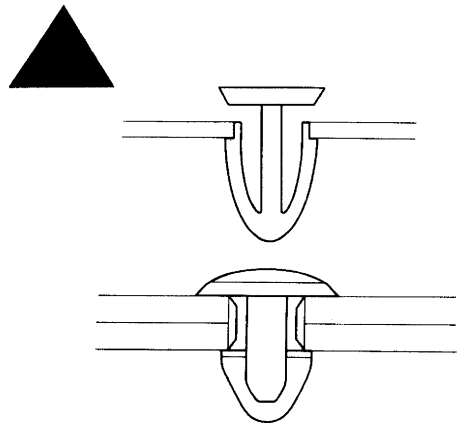
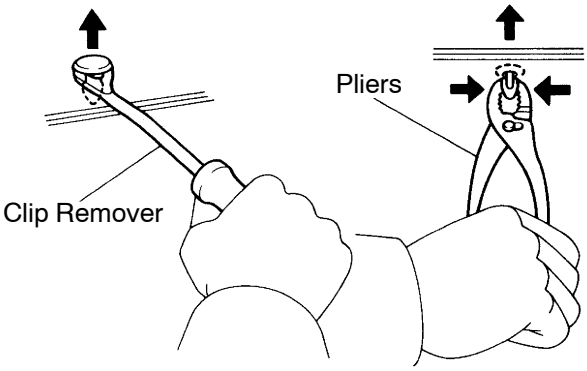
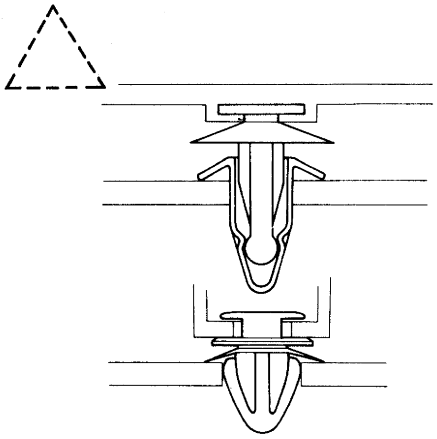
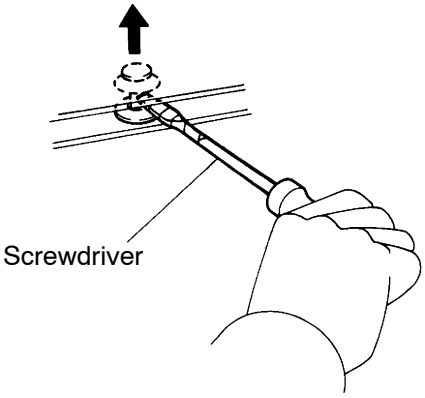
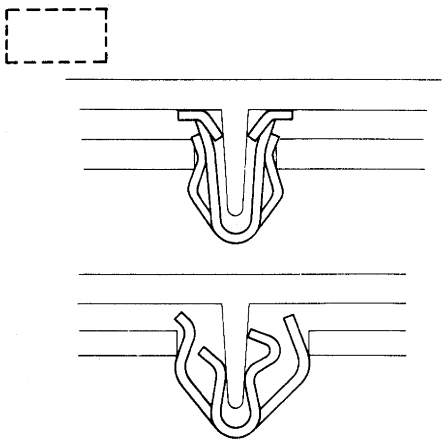
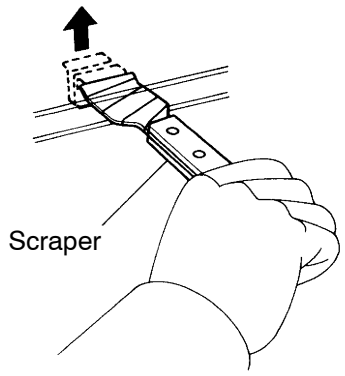
(See page DI–451)

CLIP

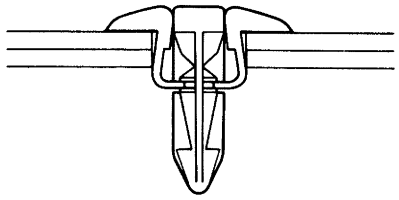
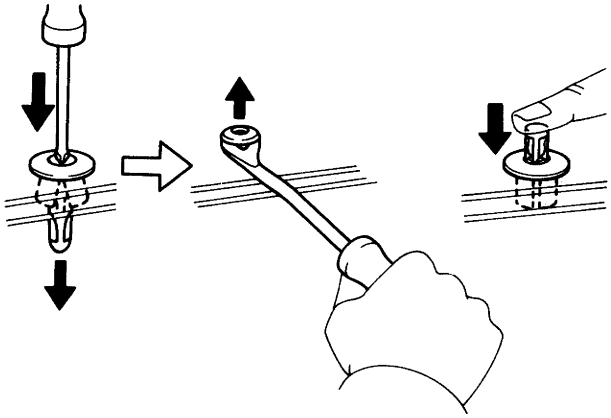
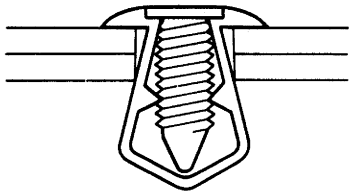
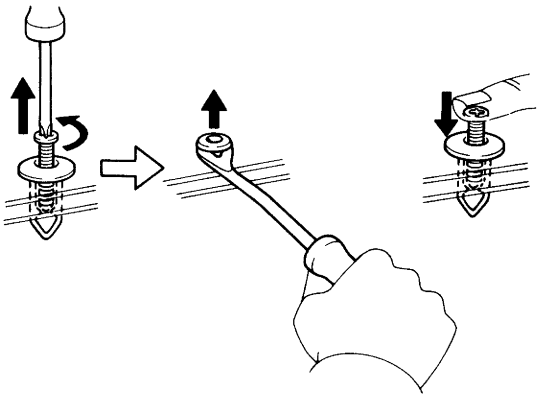
BO0VU–06

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
	Removal Installation 
	Removal Installation 

V00012

SRS AIRBAG

PRECAUTION

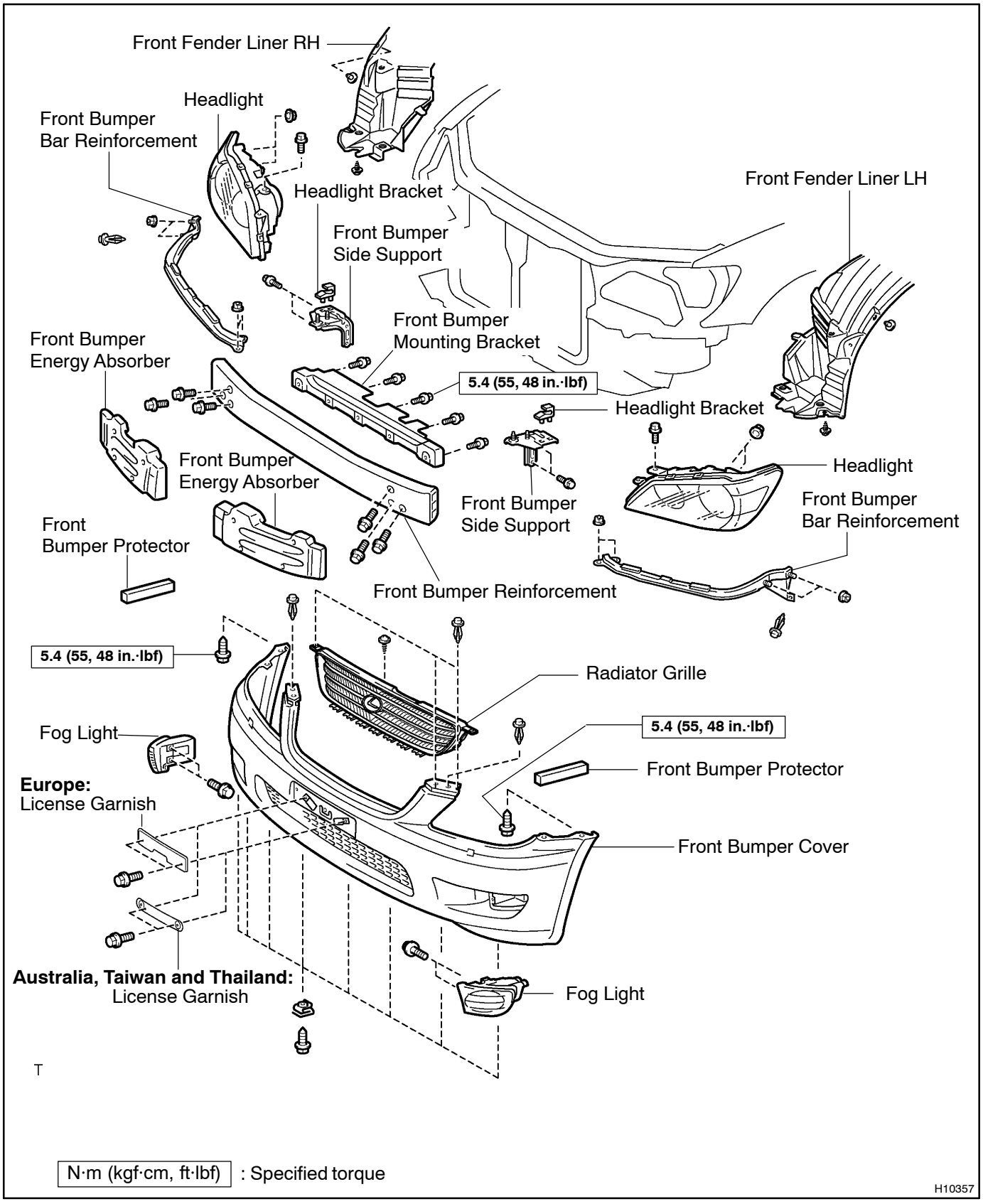
BO0VV–06

The LEXUS IS200 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag, front passenger airbag and side 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

COMPONENTS

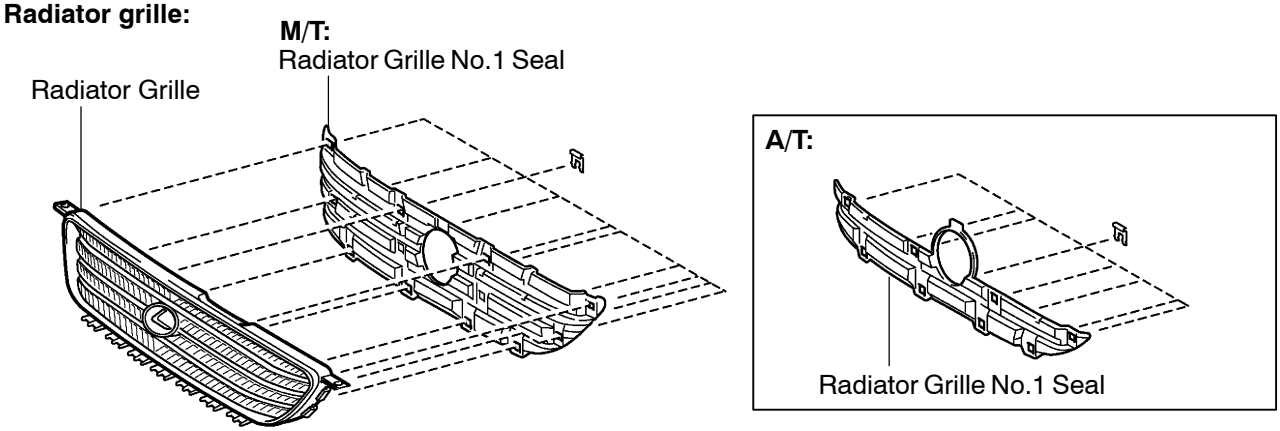
BO2DK–01



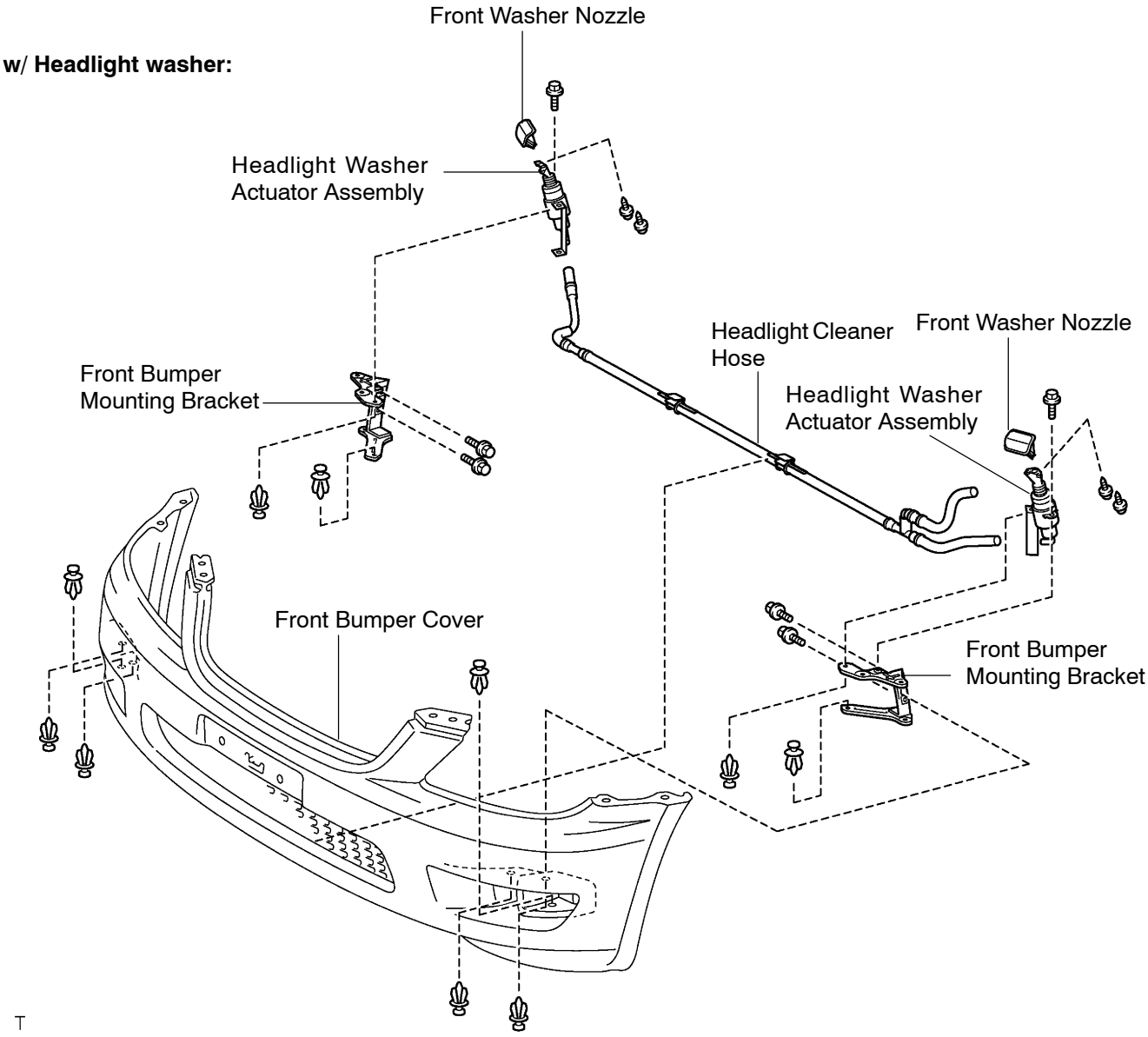
N·m (kgf·cm, ft·lbf) : Specified torque

H10357

Radiator grille:



w/ Headlight washer:



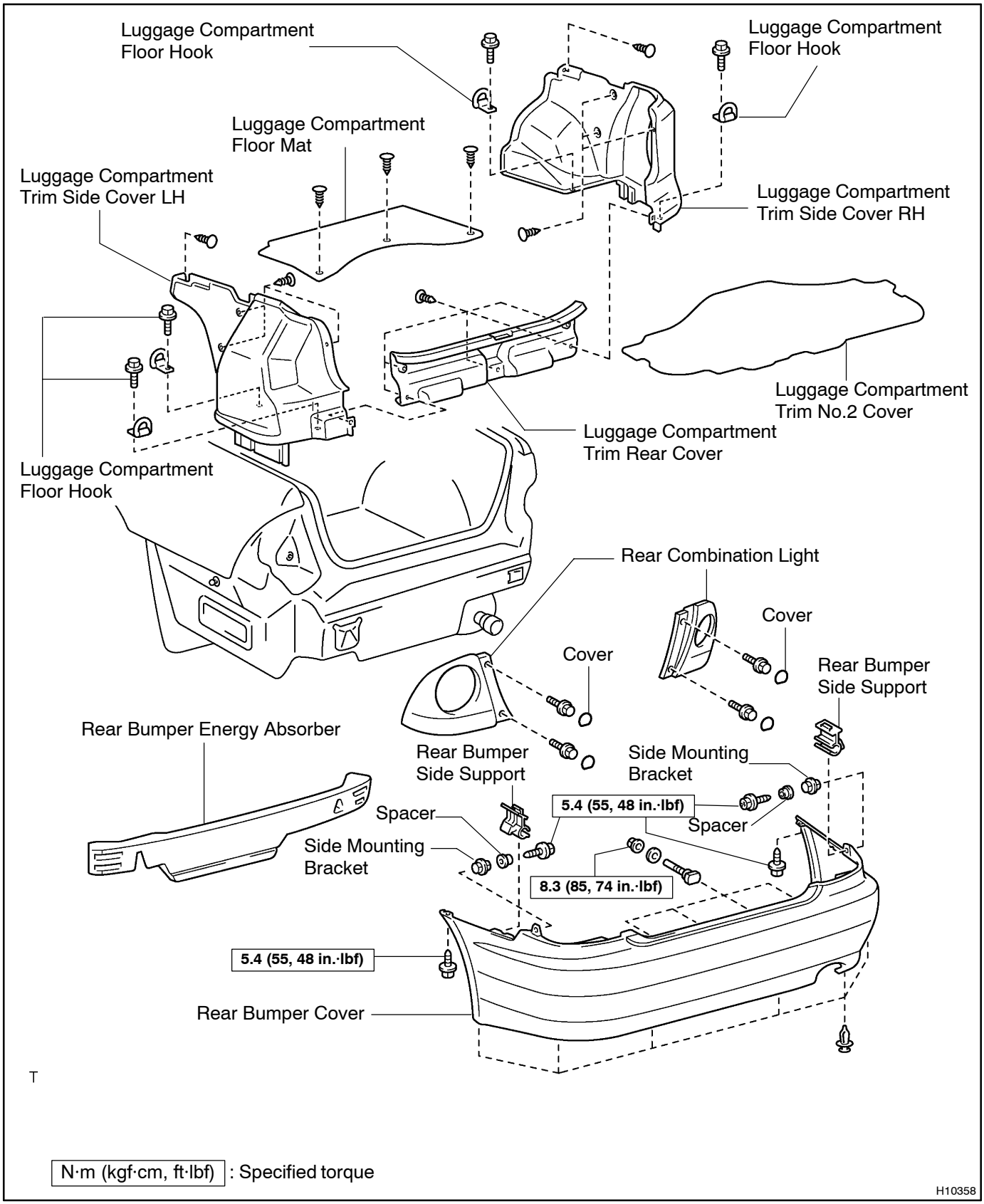
T

H10991

REAR BUMPER

COMPONENTS

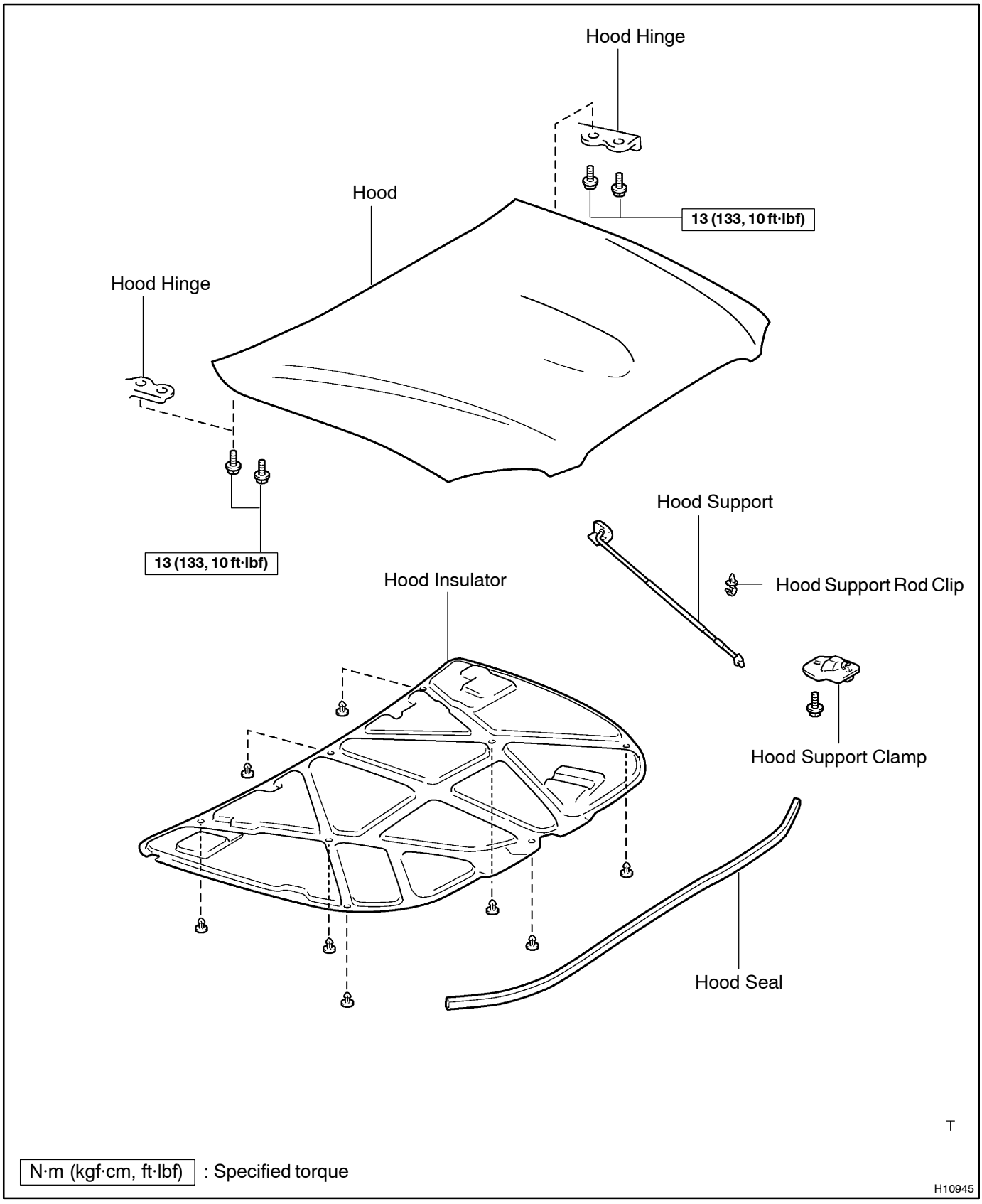
BO2C1–01



HOOD

COMPONENTS

BO0VZ–05

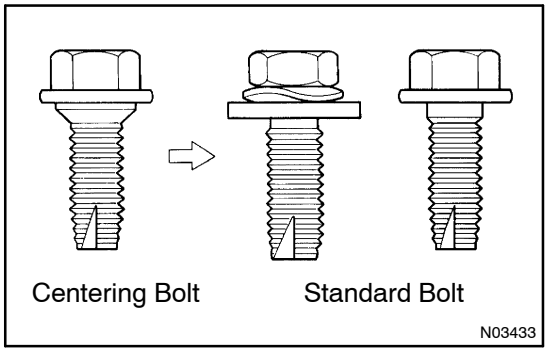


N·m (kgf·cm, ft·lbf) : Specified torque

H10945

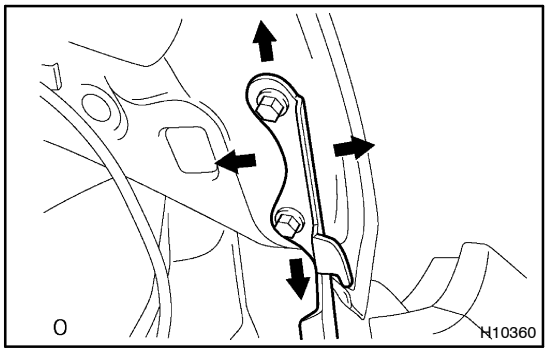
BO0W0–04

ADJUSTMENT



HINT:

Since the centering bolt is used as a hood hinge and hood lock set bolt, the hood and hood lock cannot be adjusted with it on. Substitute the bolt with a washer for the centering bolt.



1. ADJUST HOOD IN FORWARD/REARWARD

Adjust the hood by loosening the hood side hinge bolts.

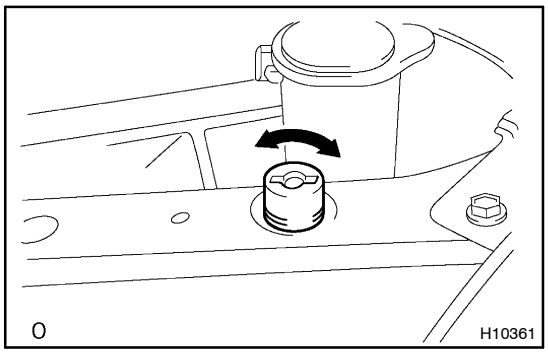
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

2. ADJUST HOOD IN VERTICAL DIRECTIONS

(a) Remove the bolts and increase or decrease the number of washers between the hinge and hood.

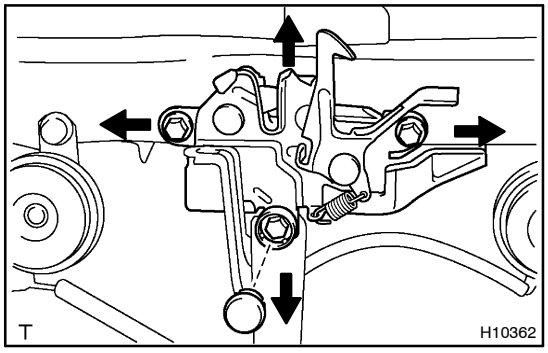
(b) Install the bolts again.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)



3. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



4. ADJUST HOOD LOCK

(a) Remove the screw, 2 clips and radiator grille.

(b) Using a screwdriver, remove the hood lock bolt cap.

HINT:

Tape the screwdriver tip before use.

(c) Adjust the hood lock by loosening the bolts.

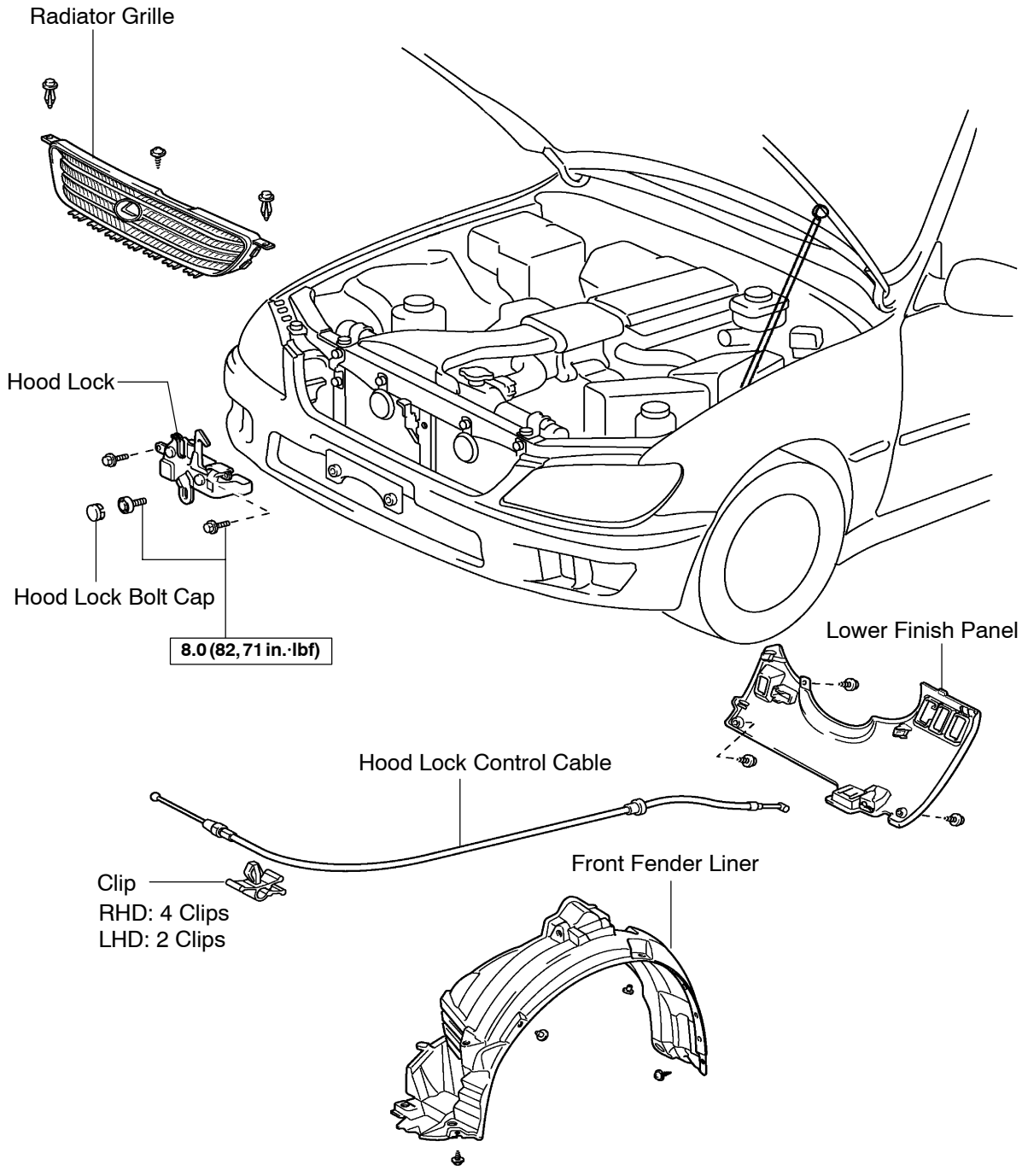
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

HOOD LOCK CONTROL

COMPONENTS

BO0VW–04

LHD:



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

H10470

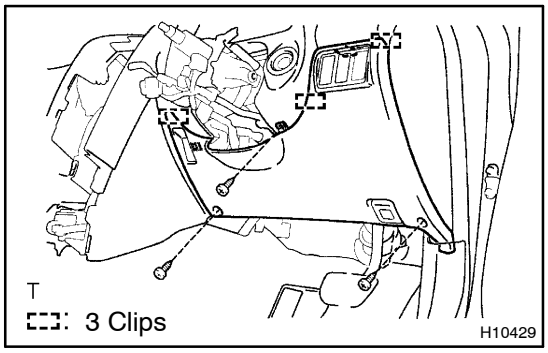
BO0VX–04

REMOVAL

1. REMOVE FRONT FENDER LINER

HINT:

For LHD vehicle, remove the front fender liner on the LH side, for RHD vehicle, remove the front fender liner on the RH side respectively.



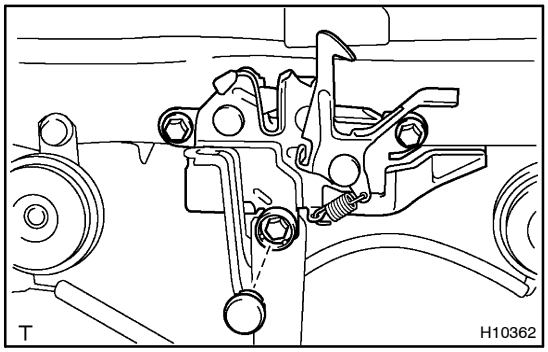
2. REMOVE LOWER FINISH PANEL

(a) Remove the 3 screws and lower finish panel.

(b) Disconnect the connectors and hood lock control cable.

3. REMOVE RADIATOR GRILLE

Remove the screw, 2 clips and radiator grille.



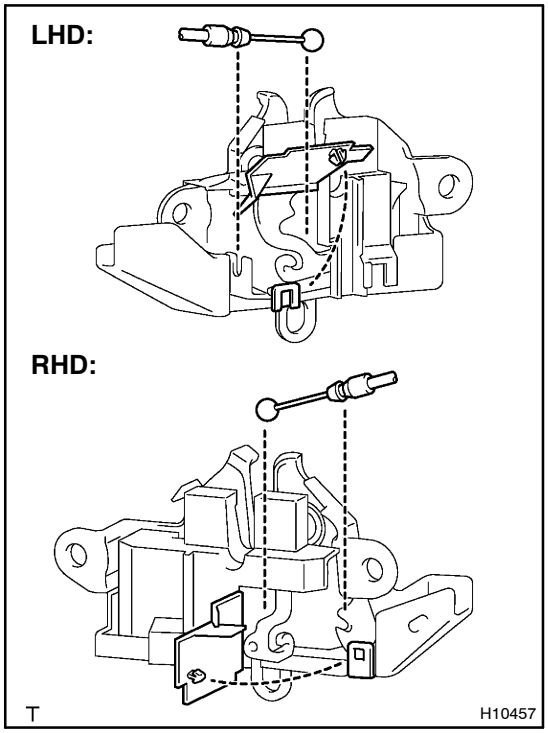
4. REMOVE HOOD LOCK

(a) Using a screwdriver, remove the hood lock bolt cap.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 3 bolts and hood lock.



(c) Using a screwdriver, open the cover, then disconnect the hood lock control cable.

HINT:

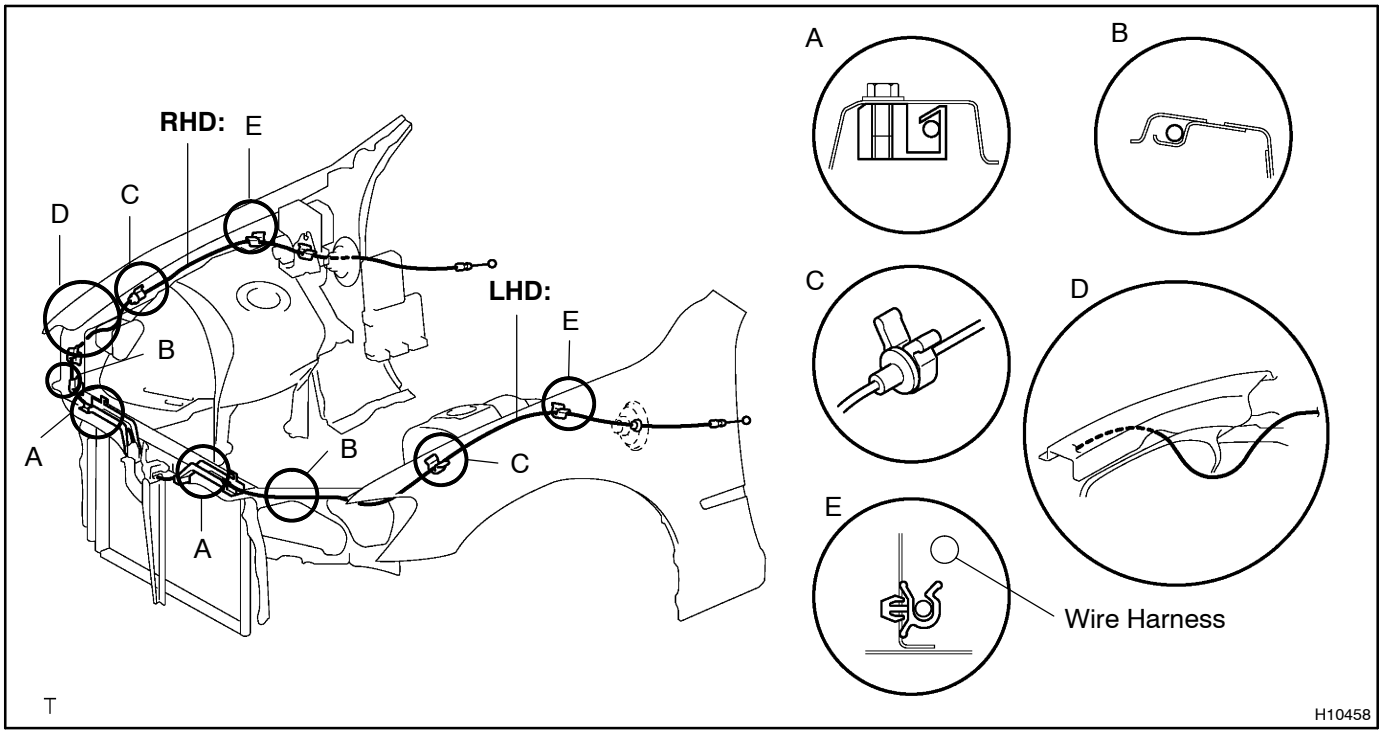
Tape the screwdriver tip before use.

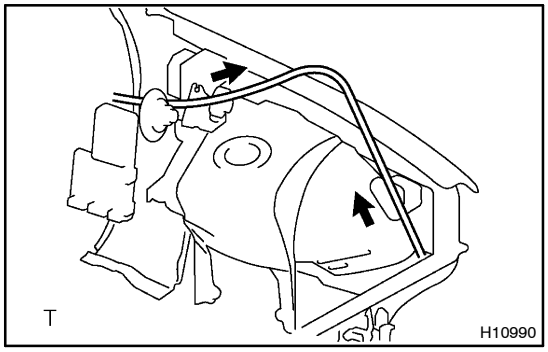
5. REMOVE HOOD LOCK CONTROL CABLE

(a) Using a screwdriver, disconnect the cable from the clamps.

HINT:

Tape the screwdriver tip before use.

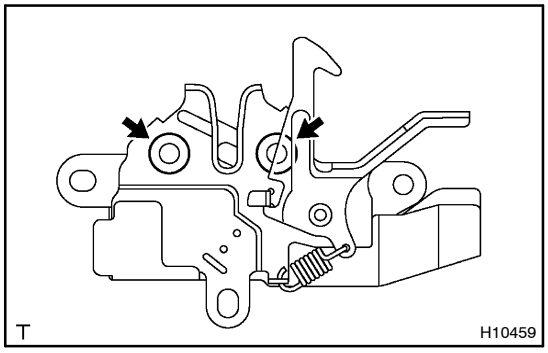




(b) Pull the cable from the engine room to remove it.

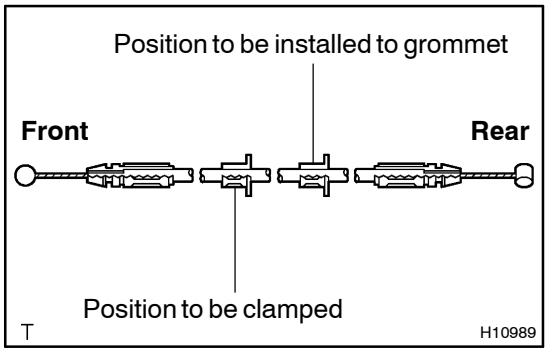
BO2C2–01

INSTALLATION



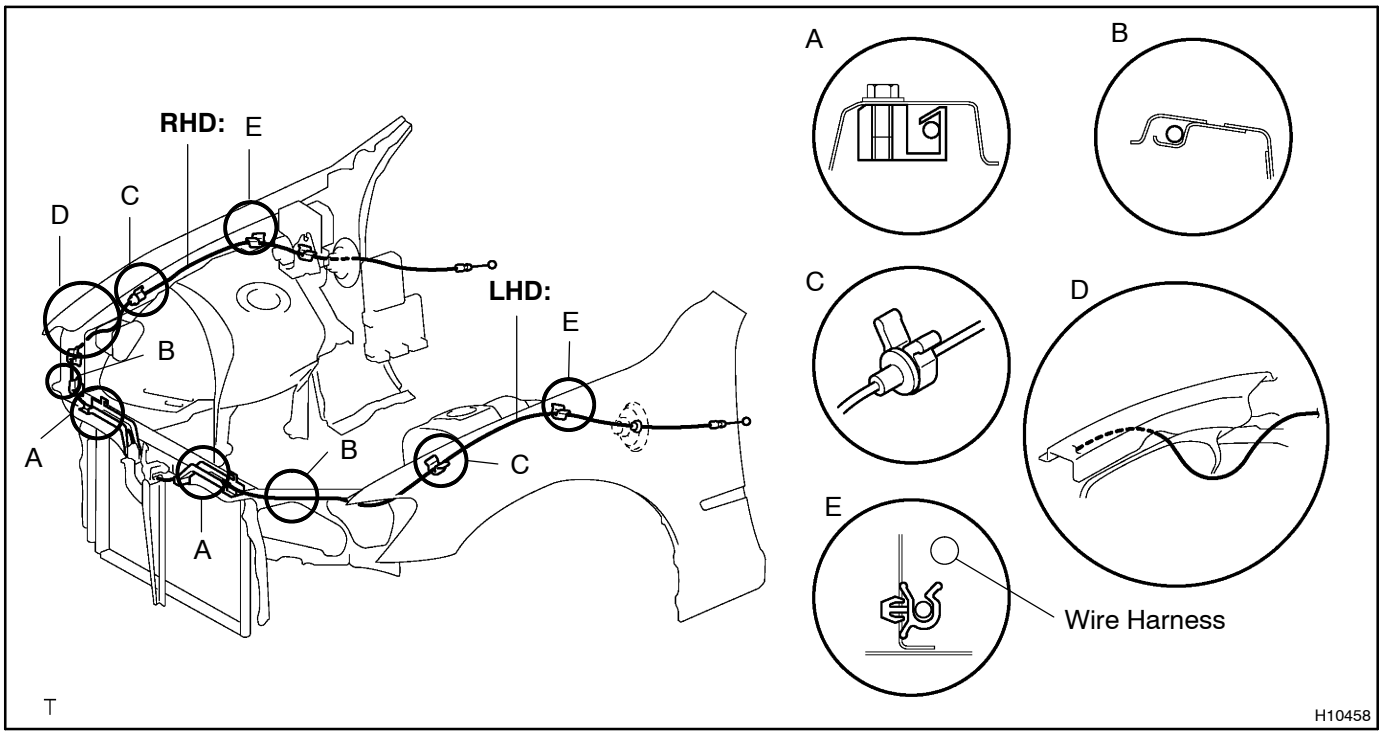
1. BEFORE INSTALLING PARTS, COAT LOCK WITH MP GREASE

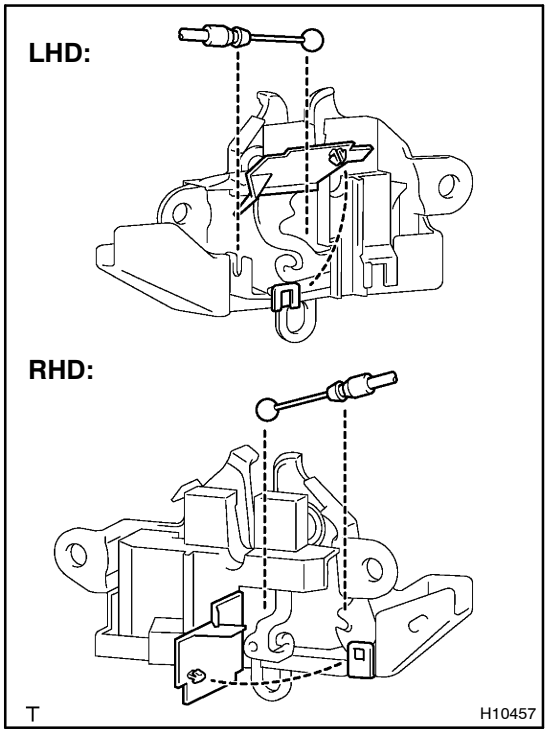
Apply MP grease to the sliding surface of the lock.



2. INSTALL HOOD LOCK CONTROL CABLE

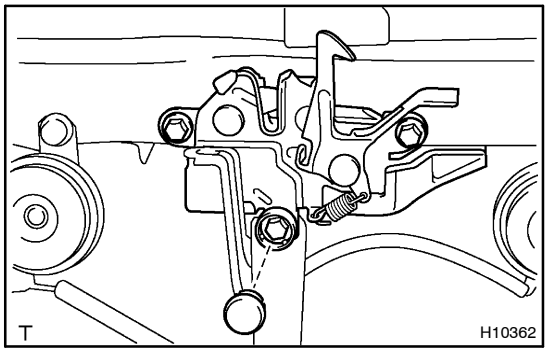
(a) Push the rear side cable through the grommet.
(b) Push the cable stopper to the grommet.
(c) Pass the front side cable through the upper radiator support.
(d) Install the cable with clamps.
(e) Push the cable stopper to the clamp.





3. INSTALL HOOD LOCK

(a) Connect the hood lock control cable to the hood lock, then close the cover.



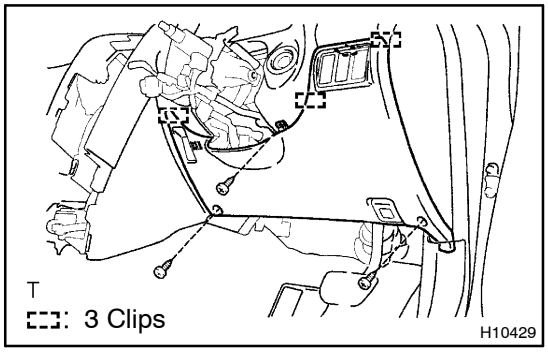
(b) Install the hood lock with the 3 bolts.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(c) Install the hood lock bolt cap.

4. INSTALL RADIATOR GRILLE

Install the radiator grille with the screw and 2 clips.



5. INSTALL LOWER FINISH PANEL

(a) Connect the connectors and hood lock control cable to the lower finish panel.

(b) Install the lower finish panel with the 3 screws.

6. CHECK HOOD LOCK CONTROL FOR PROPER OPERATION

After checking for proper operation, tighten the 3 bolts to install the lock.

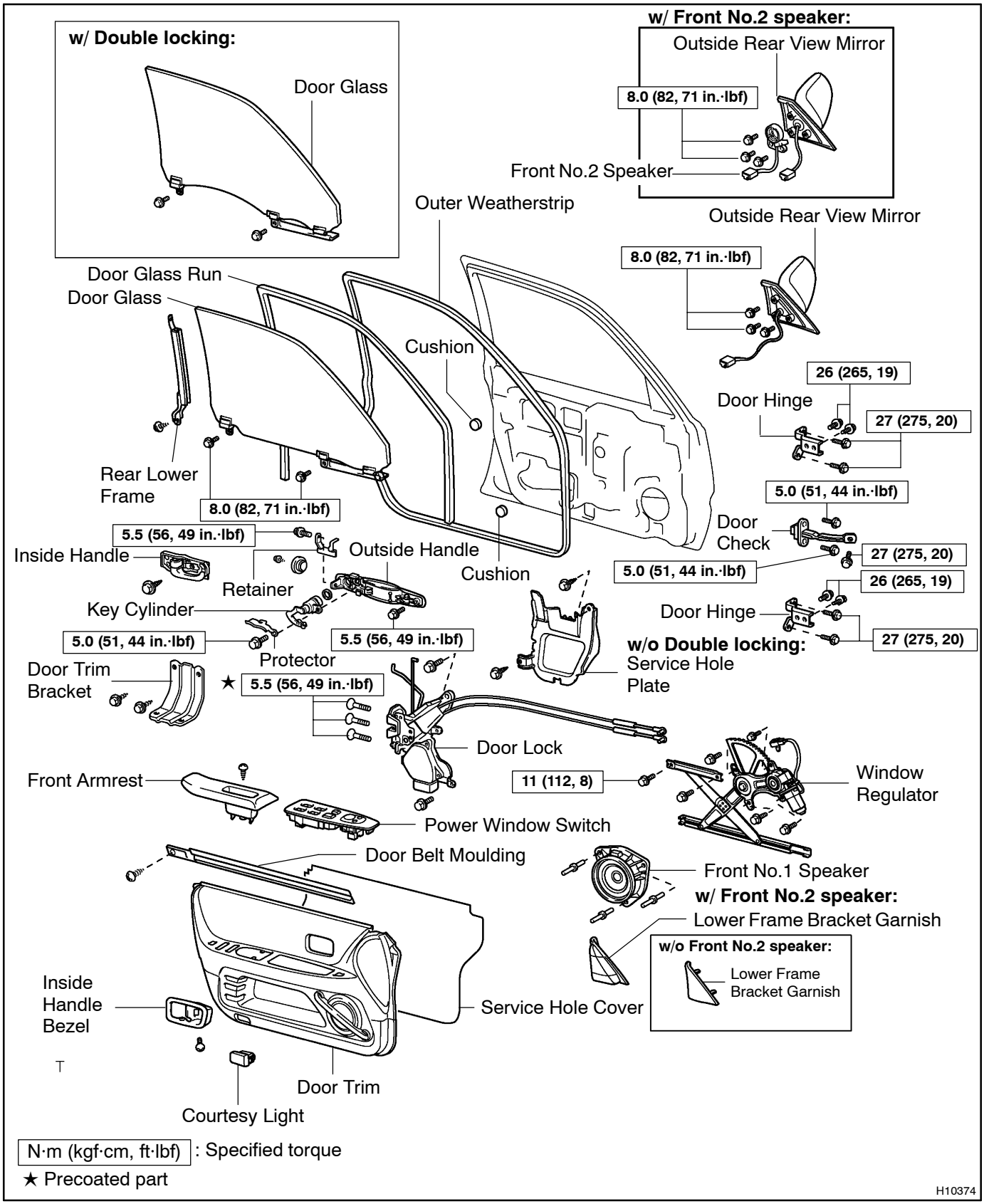
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

7. INSTALL FRONT FENDER LINER

FRONT DOOR

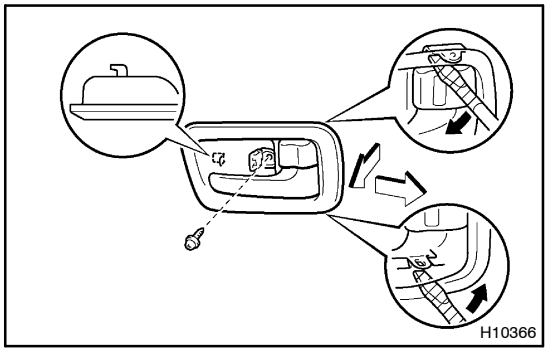
COMPONENTS

BO2C3–01



BO2C6–01

DISASSEMBLY



1. REMOVE INSIDE HANDLE BEZEL

(a) Using a screwdriver, open the screw cap.

HINT:

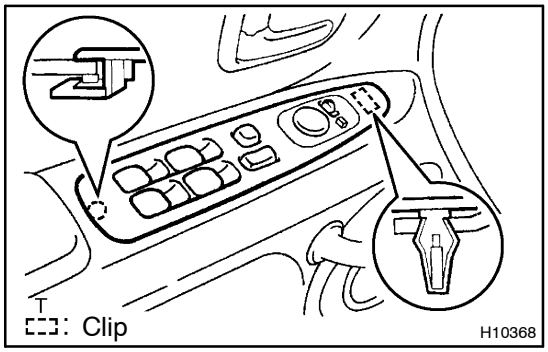
Tape the screwdriver tip before use.

(b) Remove the screw.

(c) Using a screwdriver, remove the inside handle bezel as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



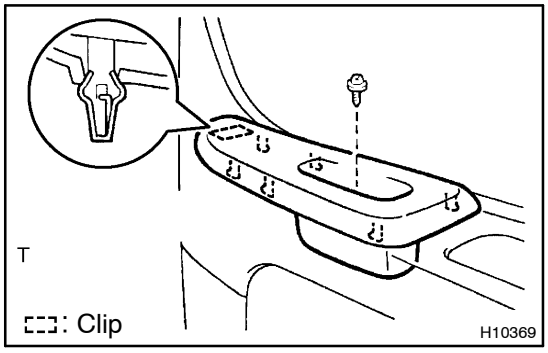
2. REMOVE POWER WINDOW SWITCH

(a) Using a screwdriver, remove the power window switch.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connectors.



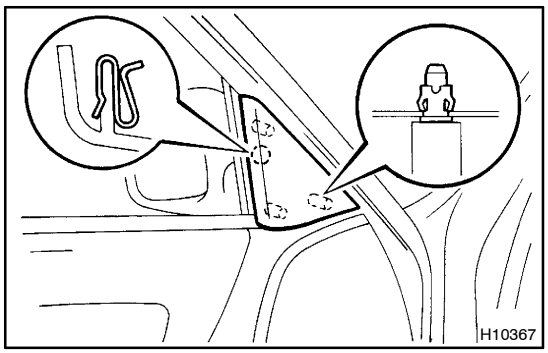
3. REMOVE FRONT ARMREST

(a) Remove the screw.

(b) Using a screwdriver, remove the front armrest as shown in the illustration.

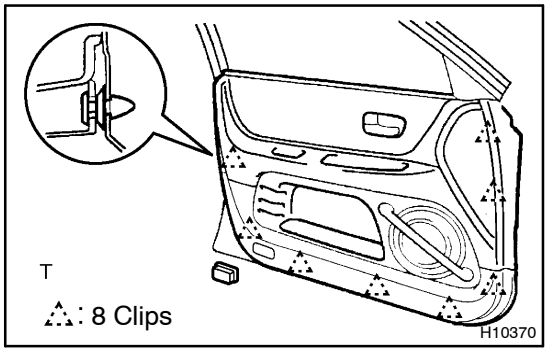
HINT:

Tape the screwdriver tip before use.



4. REMOVE LOWER FRAME BRACKET GARNISH

Remove the lower frame bracket garnish.



5. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the courtesy light, then disconnect the connector.

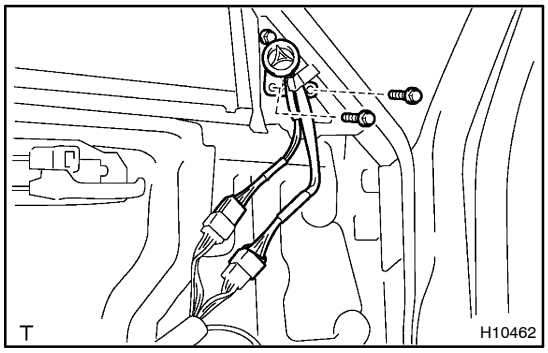
HINT:

Tape the screwdriver tip before use.

(b) Using a screwdriver, disengage the clips, then pull the trim upward to remove it.

HINT:

Tape the screwdriver tip before use.



6. w/ Front No.2 speaker:
REMOVE FRONT NO.2 SPEAKER

(a) Disconnect the 2 connectors.

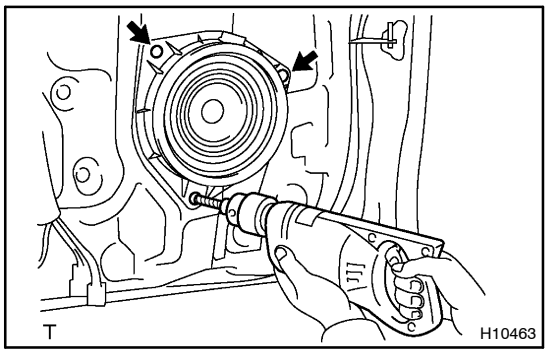
(b) Remove the 2 bolts and front No.2 speaker.

7. REMOVE OUTSIDE REAR VIEW MIRROR

(a) Disconnect the connector.

(b) w/ Front No.2 speaker:
Remove the bolt and outside rear view mirror.

(c) w/o Front No.2 speaker:
Remove the 3 bolts and outside rear view mirror.



8. REMOVE FRONT NO.1 SPEAKER

(a) Disconnect the connector.

(b) Using a drill of less then ø 4 mm (0.16 in.), drill out the rivet heads and remove the speaker.

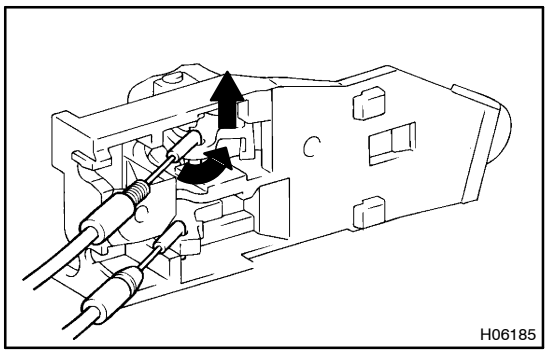
(c) Gently and vertically put the drill to the rivet, and cut the rivet flanges.

NOTICE:

- **Prizing the hole with a drill can lead to damage to the rivet hole or breaking the drill.**
- **Take cafe as the cut rivet is hot.**

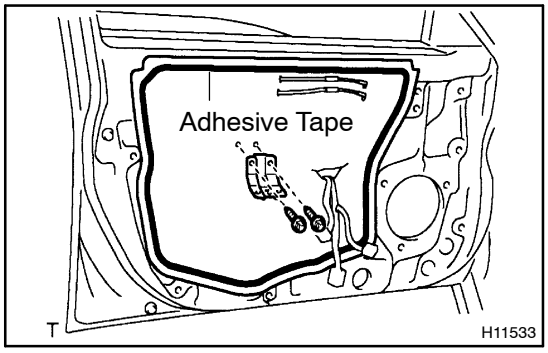
(d) Even if flange is taken off, continue drilling and push out remaining fragments with the drill.

(e) Using a vacuum cleaner, remove the drilled rivet and their dust from the inside of the door.



9. REMOVE INSIDE HANDLE

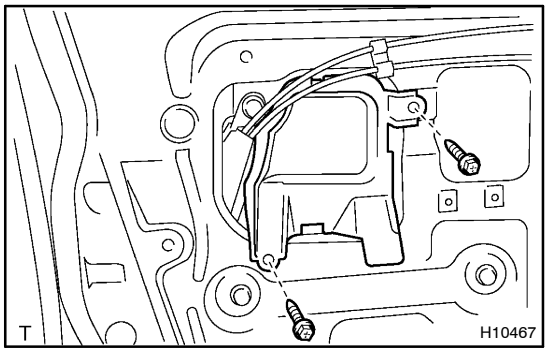
Remove the screw and inside handle, disconnect the 2 cables from the inside handle.



10. REMOVE SERVICE HOLE COVER

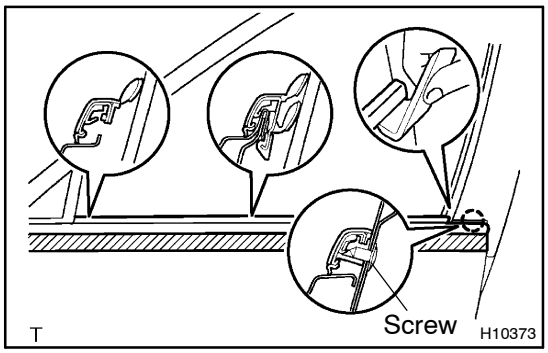
(a) Remove the 2 screws and door trim bracket.

(b) Remove the service hole cover.



11. w/o Double locking:
REMOVE NO.2 SERVICE HOLE COVER

Remove the 2 screws and No.2 service hole cover.

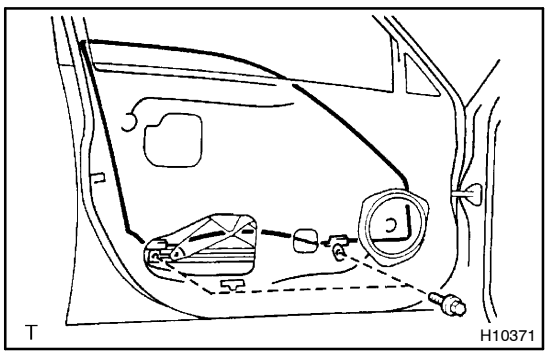


12. REMOVE FRONT DOOR BELT MOULDING

(a) Remove a screw.

(b) Apply protective tape to the outer surface as shown in the illustration, to keep the surface from being scratched.

(c) Using a moulding remover, remove the front door belt moulding as shown in the illustration.



13. REMOVE DOOR GLASS

HINT:

Insert a shop rag inside the door panel to prevent scratching the glass.

(a) Open the door glass until the bolts appear in the service hole.

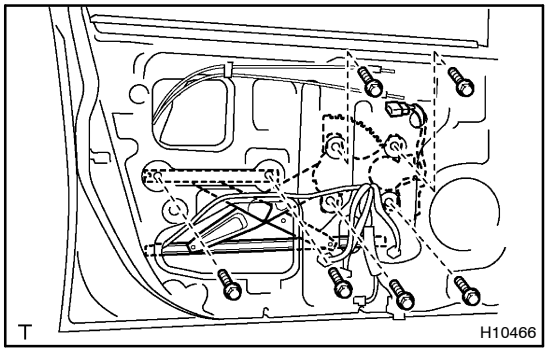
(b) Remove the 2 bolts and door glass.

NOTICE:

Do not damage the door glass.

HINT:

Pull the glass upward to remove it.



14. REMOVE WINDOW REGULATOR

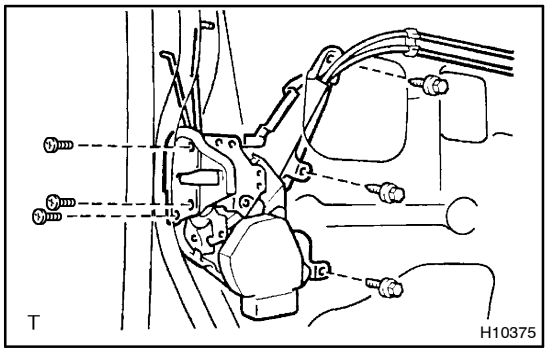
(a) Disconnect the connector and disengage the clamps.

(b) Remove the 6 bolts and window regulator.

15. REMOVE DOOR GLASS RUN

16. REMOVE REAR LOWER FRAME

Remove the bolt and rear lower frame.



17. REMOVE DOOR LOCK

(a) Disconnect the 2 links from the outside handle and key cylinder.

(b) Remove the bolt and 2 screws.

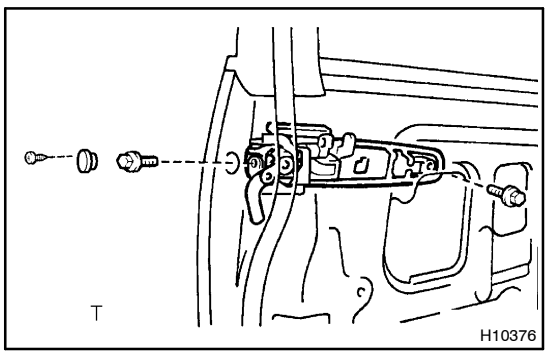
(c) Using a torx socket wrench, remove the 3 torx screws and door lock.

Torx socket wrench: T30 (Part No. 09042–00010 or locally manufactured tool)

(d) Disconnect the connector.

HINT:

Remove the door lock through the service hole.



18. REMOVE OUTSIDE HANDLE AND KEY CYLINDER

(a) Remove the screw and hole cover.

(b) Remove the 2 bolts and outside handle with the key cylinder.

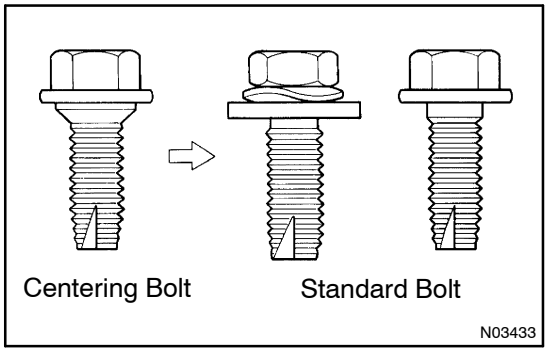
(c) Remove the retainer from the outside handle.

(d) Remove the bolt, key cylinder and protector from the outside handle.

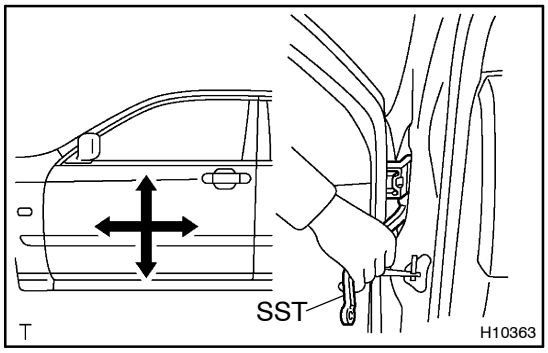
19. REMOVE CUSHIONS

BO2C4–01

ADJUSTMENT



HINT:
Since the centering bolt is used as a door side hinge bolt, the door hinge cannot be adjusted with it on. Substitute the bolt with a washer for the centering bolt.

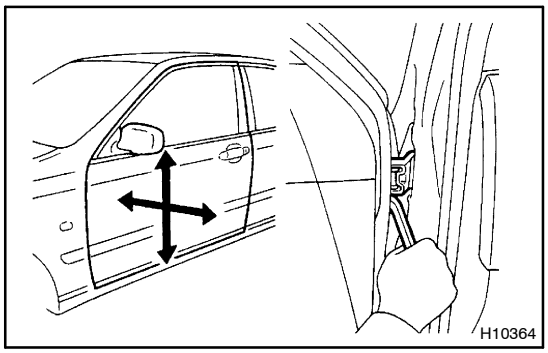


1. ADJUST FRONT DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Using SST, adjust the door by loosening the body side hinge bolts.

SST 09812–00010

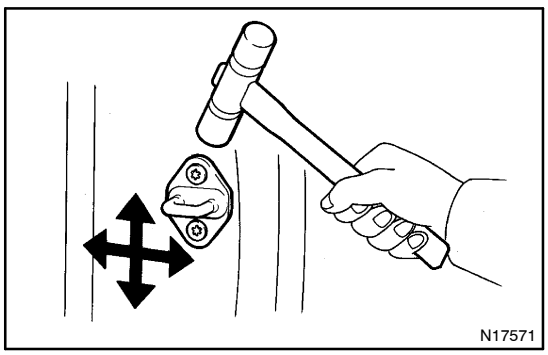
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)



2. ADJUST FRONT DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Adjust the door by loosening the door side hinge bolts.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



3. ADJUST FRONT DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkages are adjusted correctly.

HINT:
Tape the screwdriver tip before use.

(b) Adjust the striker position by slightly loosening the striker mounting screws, and hitting the striker with a hammer.

(c) Tighten the striker mounting screws again.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

BO2C5–01

REASSEMBLY

1. INSTALL OUTER WEATHERSTRIP

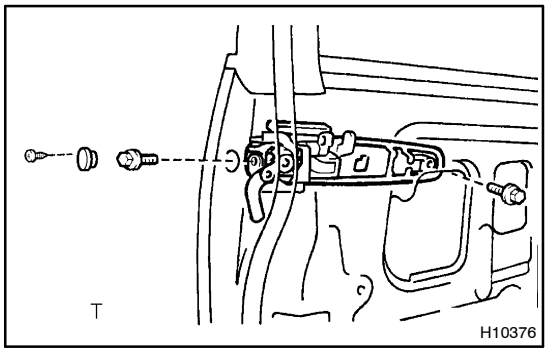
2. INSTALL CUSHIONS

3. INSTALL OUTSIDE HANDLE AND KEY CYLINDER

(a) Install the key cylinder and protector with the bolt to the outside handle.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

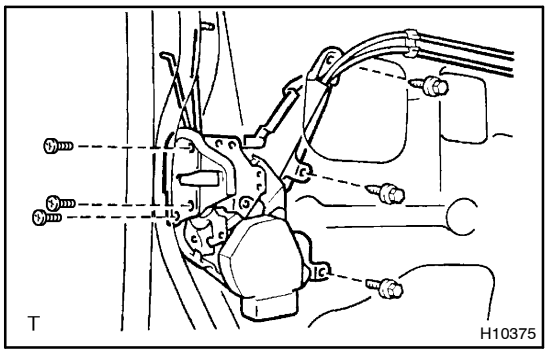
(b) Install the retainer to the outside handle.



(c) Install the outside handle with the key cylinder to the door panel with the 2 bolts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(d) Install the hole cover with the screw.



4. INSTALL DOOR LOCK

(a) Connect the connector.

(b) Using a torx socket wrench, install the door lock with the 3 torx screws.

Torx socket wrench: T30 (Part No. 09042–00010 or locally manufactured tool)

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

HINT:

Apply adhesive to the 3 torx screws.

Part No. 08833–00070, THREE BOND 1324 or equivalent

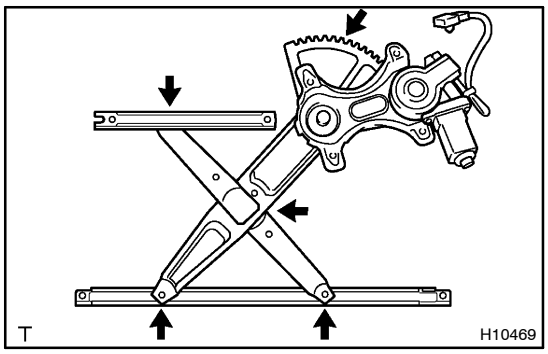
(c) Install the bolt and 2 screws.

(d) Connect the 2 links to the outside handle and key cylinder.

5. INSTALL REAR LOWER FRAME

Install the rear lower frame with the bolt.

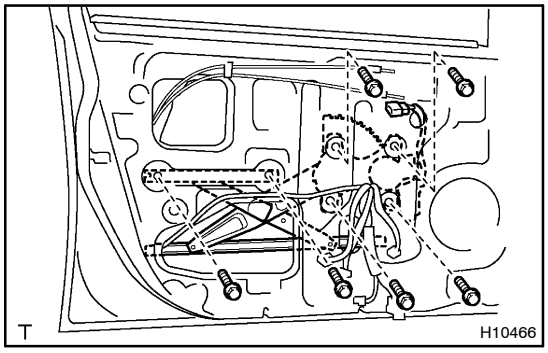
6. INSTALL DOOR GLASS RUN



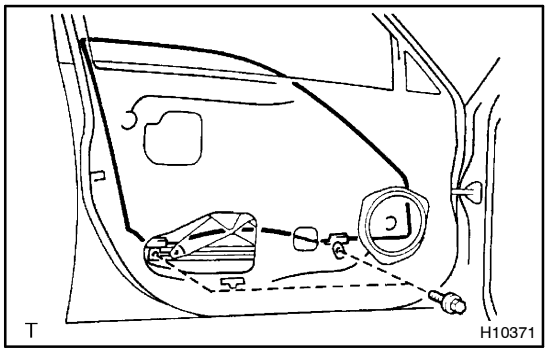
7. INSTALL WINDOW REGULATOR

HINT:

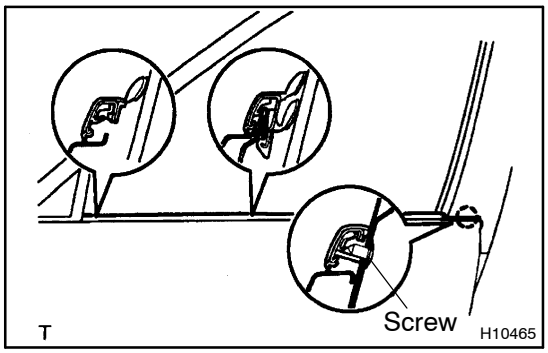
Apply MP grease to the sliding and rotating parts of the window regulator.



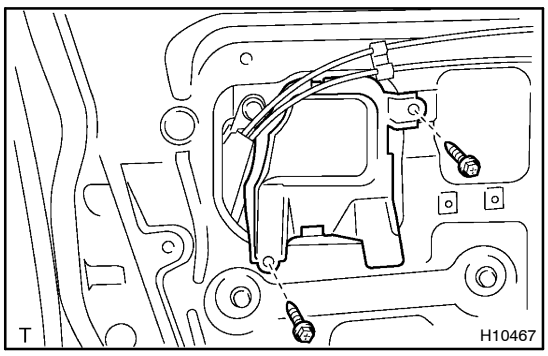
(a) Install the window regulator with the 6 bolts.
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)
(b) Connect the connector and attach the clamps.
HINT:
After installing the window regulator, window regulator need to be re–initialized.
Refer to BE–112.



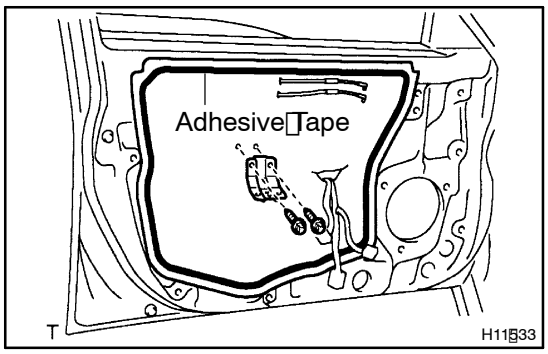
8. INSTALL DOOR GLASS
NOTICE:
Do not damage the door glass.
(a) Put the door glass in the door panel carefully.
(b) Install the door glass with the 2 bolts to the window regulator.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



9. INSTALL FRONT DOOR BELT MOULDING
Install the front door belt moulding with the screw.

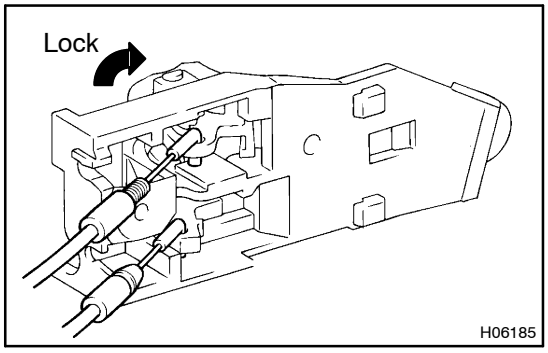


10. w/o Double locking:
INSTALL NO.2 SERVICE HOLE COVER
Install the No.2 service hole cover with the 2 screws.



11. INSTALL SERVICE HOLE COVER
(a) Install the service hole cover to the door panel.
HINT:
- When installing the service hole cover, pull out the links and connectors through the service hole cover.
- There should be no wrinkles or folds after attaching the service hole cover.
- After attaching the service hole cover, sealing condition shall be confirmed.

(b) Install the door trim bracket with the 2 screws.



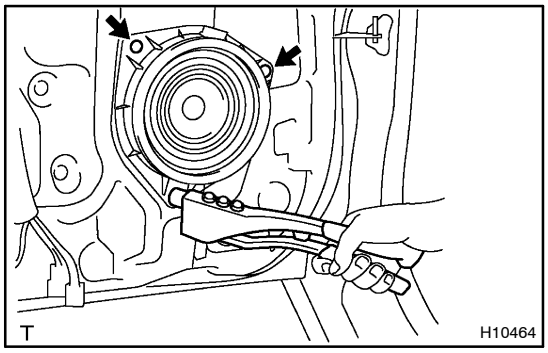
12. INSTALL INSIDE HANDLE

Connect the 2 cables to the inside handle, then install the inside handle with the screw.

NOTICE:

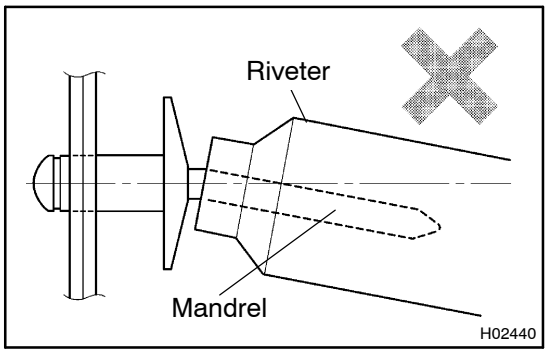
At the time of locking cable reassembly, please observe to the following items.

- **Set the door lock assembly to the LOCK position.**
- **Hold the lock knob to the LOCK position by hand and do not pull the cable, while connecting the locking cable.**



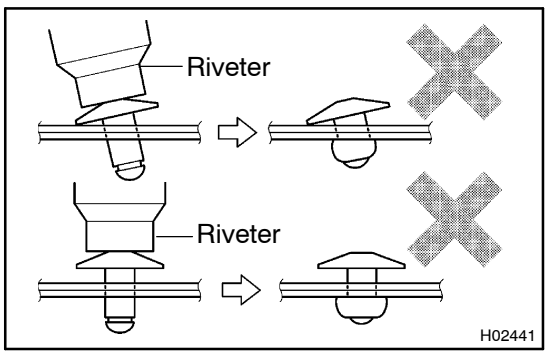
13. INSTALL FRONT NO.1 SPEAKER

(a) Using an air riveter or hand riveter, install the front No.1 speaker.

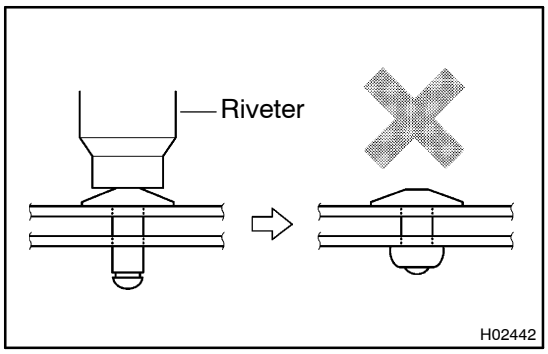


NOTICE:

- **Do not prize a riveter, as riveter is damaged, it is not tightened and the mandrel is bent.**



- **Do not tilt the riveter and disconnect the rivet from the material while handling a riveter, as the materials are not tightened firmly.**



- **Install the rivet while attaching materials, as they are not tightened firmly.**

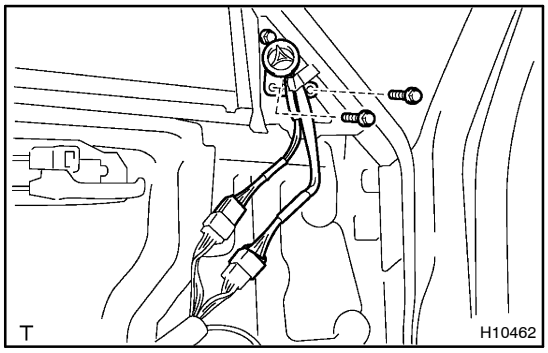
(b) Connect the connector.

14. INSTALL OUTSIDE REAR VIEW MIRROR

(a) w/ Front No.2 speaker:
Install the outside rear view mirror with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(b) w/o Front No.2 speaker:
Install the outside rear view mirror with the 3 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

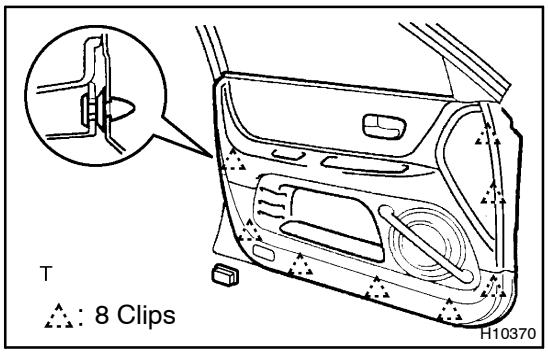
(c) Connect the connector.



15. w/ Front No.2 speaker:
INSTALL FRONT NO.2 SPEAKER

(a) Install the front No.2 speaker with the 2 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

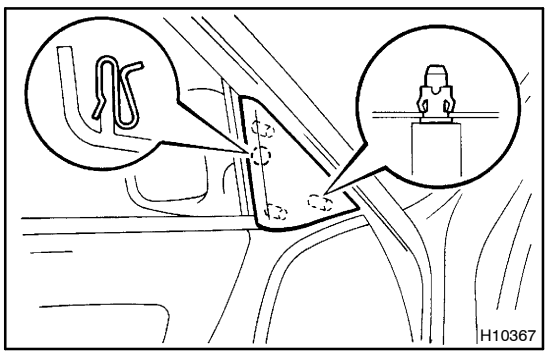
(b) Connect the 2 connectors.



16. INSTALL DOOR TRIM

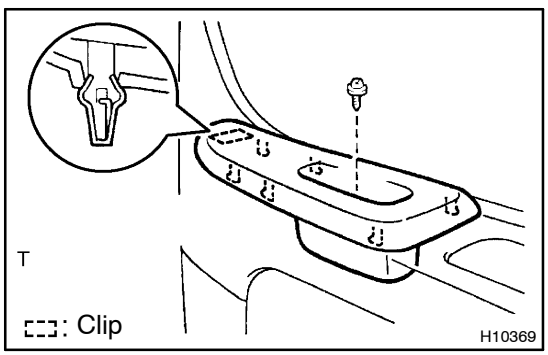
(a) Install the door trim to the door panel.

(b) Connect the connector, then install the courtesy light.



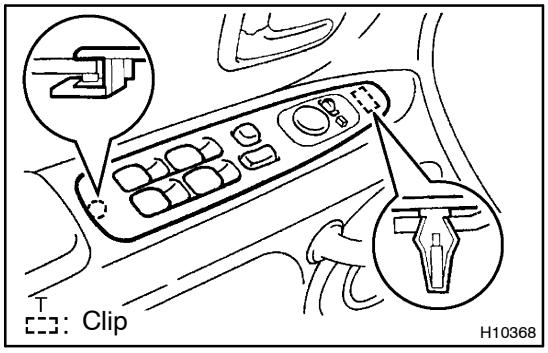
17. INSTALL LOWER FRAME BRACKET GARNISH

Install the lower frame bracket garnish to the door panel.



18. INSTALL FRONT ARMREST

Install the front armrest with the screw.



19. INSTALL POWER WINDOW SWITCH

(a) Disconnect the connectors.

(b) Install the power window switch.

20. INSTALL INSIDE HANDLE BEZEL

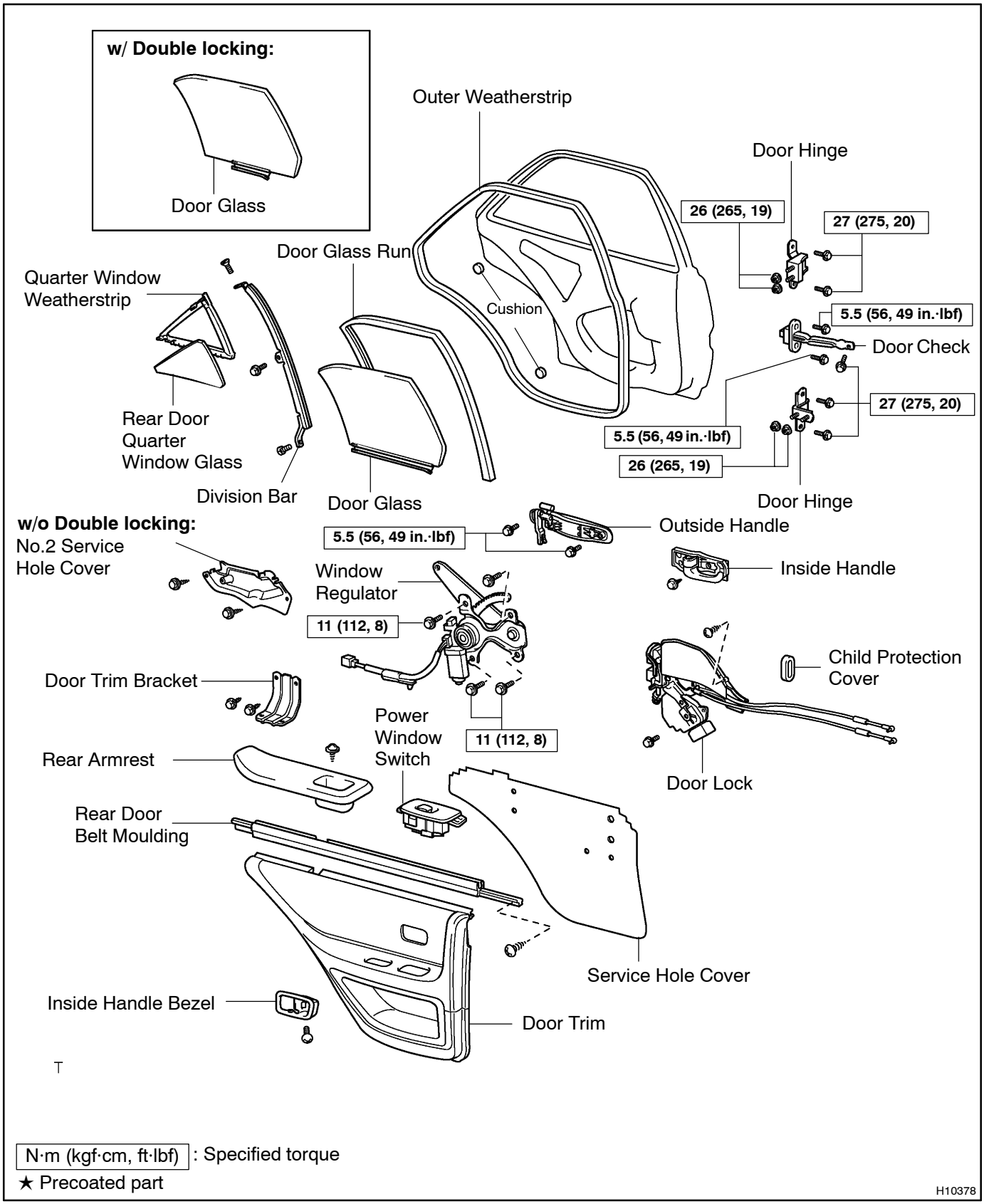
(a) Install the inside handle bezel with the screw.

(b) Close the screw cap.

REAR DOOR

COMPONENTS

BO2C7–01



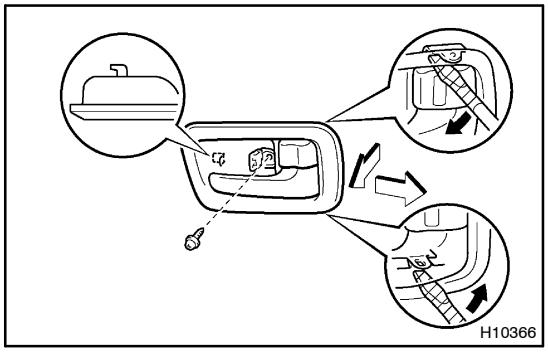
N·m (kgf·cm, ft·lbf) : Specified torque

★ Precoated part

H10378

BO2C8–01

DISASSEMBLY



1. REMOVE INSIDE HANDLE BEZEL

(a) Using a screwdriver, open the screw cap.

HINT:

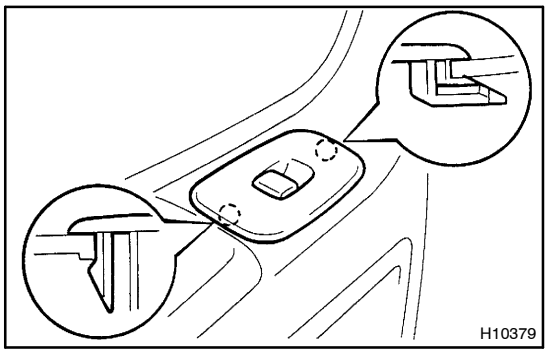
Tape the screwdriver tip before use.

(b) Remove the screw.

(c) Using a screwdriver, remove the inside handle bezel as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



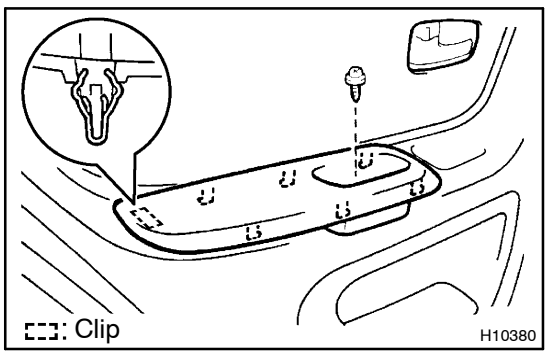
2. REMOVE POWER WINDOW SWITCH

(a) Using a screwdriver, remove the power window switch.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connector.



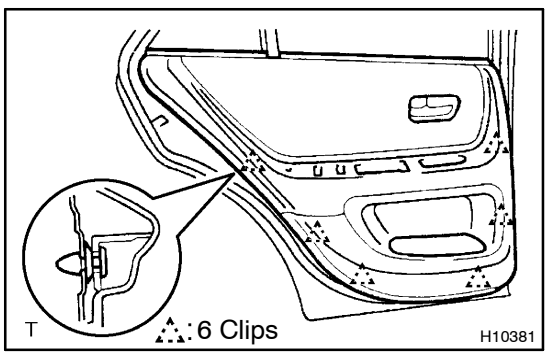
3. REMOVE REAR ARMREST

(a) Remove the screw.

(b) Using a screwdriver, remove the rear armrest.

HINT:

Tape the screwdriver tip before use.

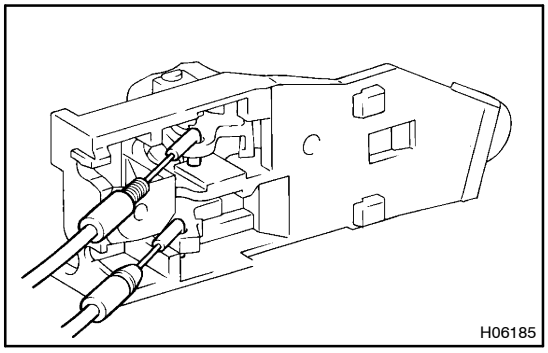


4. REMOVE DOOR TRIM

Using a screwdriver, disengage the clips, then pull the trim upward to remove it.

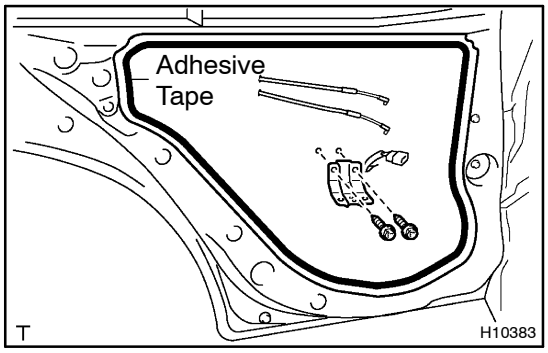
HINT:

Tape the screwdriver tip before use.



5. REMOVE INSIDE HANDLE

Remove the screw and inside handle, disconnect the 2 cables from the inside handle.



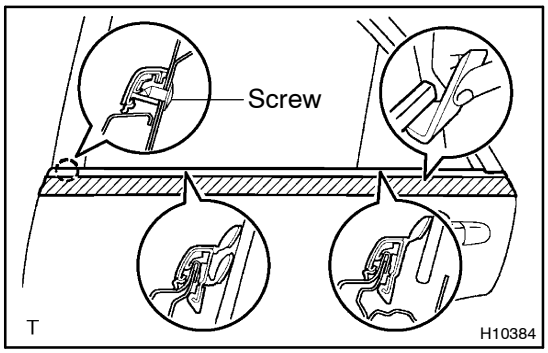
6. REMOVE SERVICE HOLE COVER

(a) Disconnect the connector.
(b) Remove the 2 screws and door trim bracket.
(c) Remove the service hole cover.

7. w/o Double locking:
REMOVE SERVICE HOLE PLATE

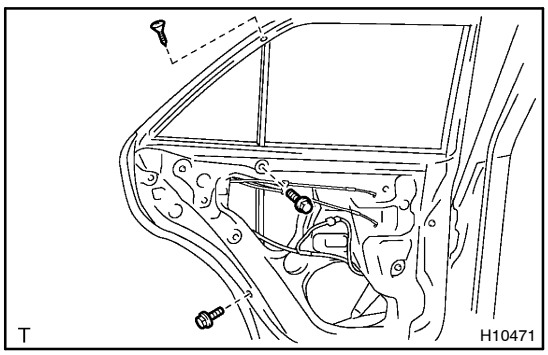
Remove the 2 screws and service hole plate.

8. REMOVE DOOR GLASS RUN



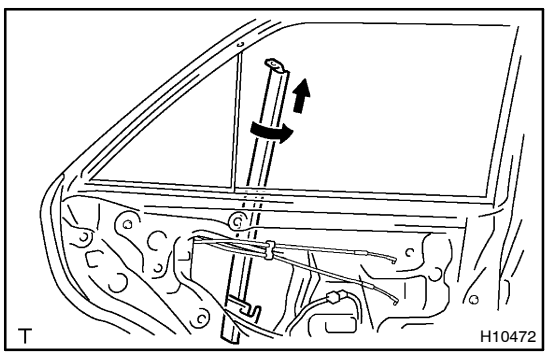
9. REMOVE REAR DOOR BELT MOULDING

(a) Remove a screw.
(b) Apply protective tape to the outer surface as shown in the illustration to keep the surface from being scratched.
(c) Using a moulding remover, remove the rear door belt moulding as shown in the illustration.

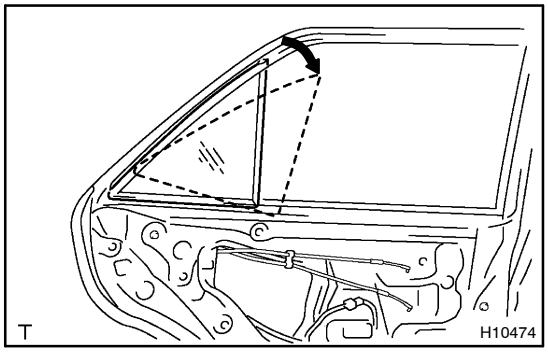


10. REMOVE DIVISION BAR

(a) Remove the 2 bolts and screw.
(b) Pull the division bar forward.



(c) Rotate the division bar 90° and pull it upward as shown in the illustration.



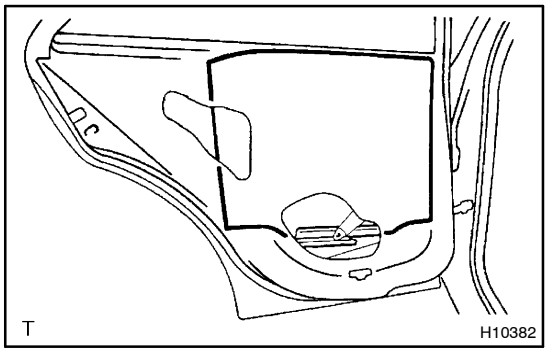
11. REMOVE REAR DOOR QUARTER WINDOW GLASS

(a) Remove the rear door quarter window glass as shown in the illustration.

NOTICE:

Do not damage the glass.

(b) Remove the quarter window weatherstrip from the glass.



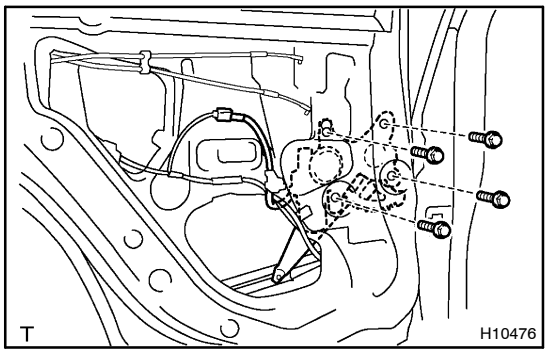
12. REMOVE DOOR GLASS

HINT:

Insert a shop rag inside the door panel to prevent scratching the glass.

(a) Open the door glass.

(b) Tilt the door glass and disconnect the roller of the regulator from the glass channel to remove the door glass.



13. REMOVE WINDOW REGULATOR

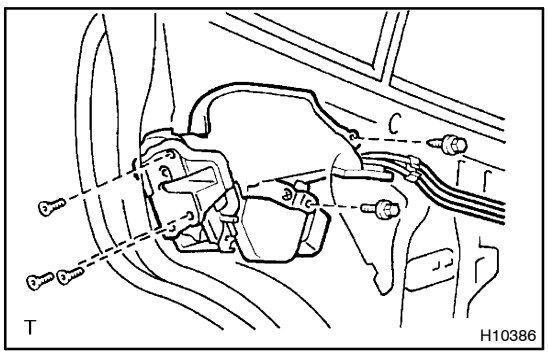
(a) Disconnect the connector.

(b) Remove the 4 bolts and window regulator.

14. REMOVE DOOR LOCK

(a) Remove the child protection cover.

(b) Disconnect the 2 links from the outside handle and key cylinder.



(c) Remove the bolt and screw.

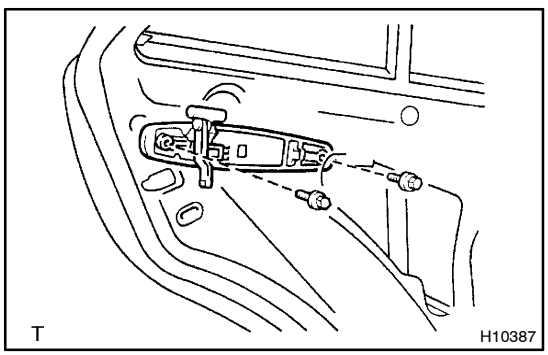
(d) Using a torx socket wrench, remove the 3 torx screws and door lock.

Torx socket wrench: T30 (Part No. 09042–00010 or locally manufactured tool)

HINT:

Remove the door lock through the service hole.

(e) Disconnect the connector.



15. REMOVE OUTSIDE HANDLE

Remove the 2 bolts and outside handle.

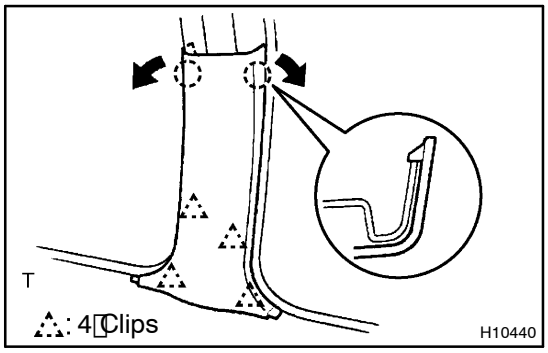
16. REMOVE CUSHIONS

BO2C9–01

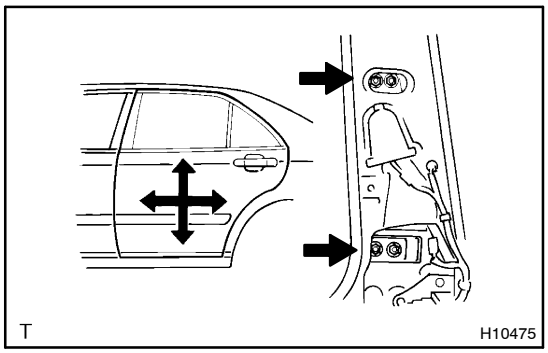
ADJUSTMENT

1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

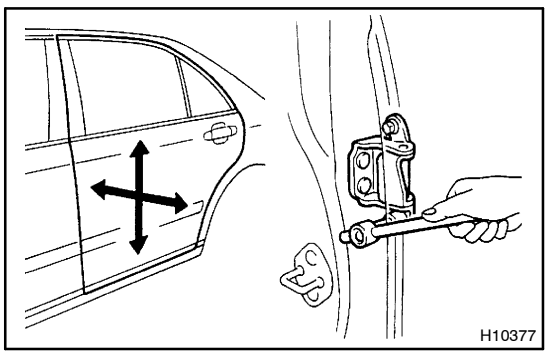
(a) Remove the front door inside scuff plate.
(b) Remove the rear door inside scuff plate.



(c) Remove the center pillar lower garnish.
(d) Remove the seat belt pretensioner (See page BO–150).

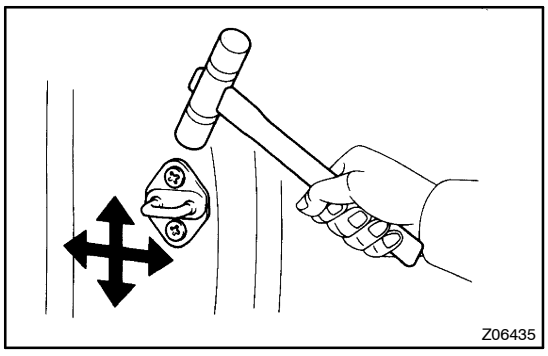


(e) Adjust the door by loosening the body side hinge nuts.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)
(f) Install the seat belt pretensioner (See page BO–159).
(g) Install the lower center pillar garnish.
(h) Install the rear door inside scuff plate.
(i) Install the front door inside scuff plate.



2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Adjust the door by loosening the door side hinge bolts.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



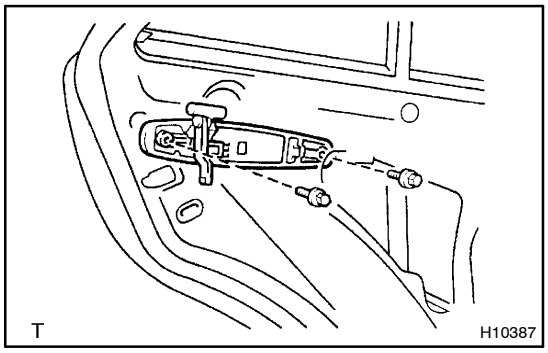
3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkages are adjusted correctly.
(b) Adjust the striker position by slightly loosening the striker mounting screws, and hitting the striker with a hammer.
(c) Tighten the striker mounting screws again.
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

BO2CA–01

REASSEMBLY

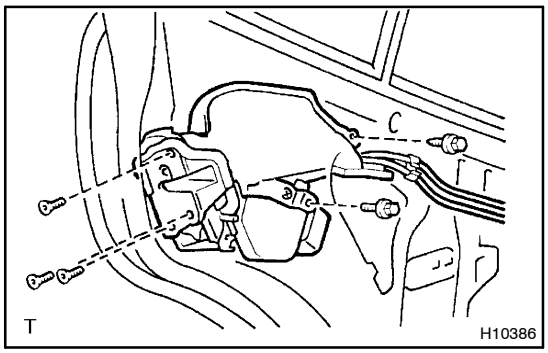
1. INSTALL CUSHIONS



2. INSTALL OUTSIDE HANDLE

Install the outside handle with the 2 bolts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)



3. INSTALL DOOR LOCK

(a) Connect the connector.

(b) Using a torx socket wrench, install the door lock with the 3 torx screws.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

Torx socket wrench: T30 (Part No. 09042–00010 or locally manufactured tool)

HINT:

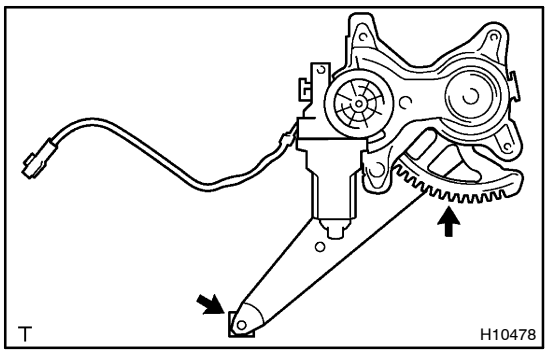
Apply adhesive to the 3 torx screws.

Part No. 08833–00070, THREE BOND 1324 or equivalent

(c) Install the bolt and screw.

(d) Connect the 2 links to the outside handle and key cylinder.

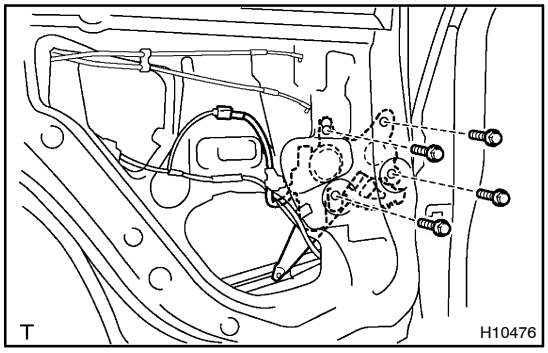
(e) Install the child protection cover.



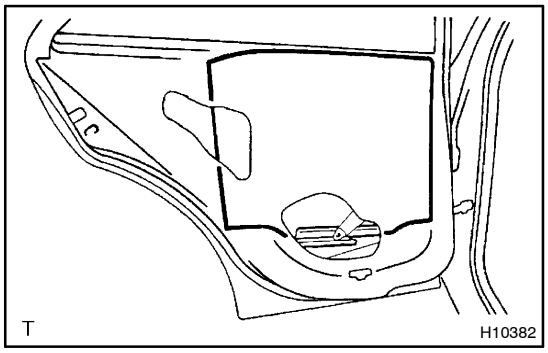
4. INSTALL WINDOW REGULATOR

HINT:

Apply MP grease to the sliding and rotating parts of the window regulator.

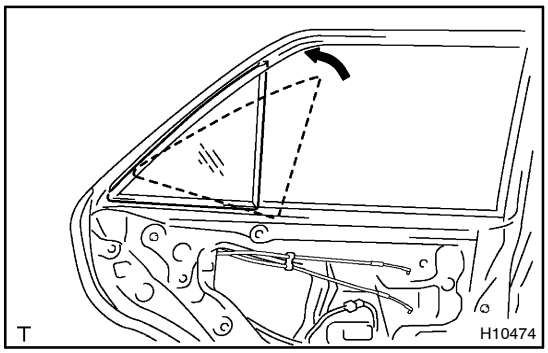


(a) Install the window regulator with the 4 bolts.
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)
(b) Connect the connector.



5. INSTALL DOOR GLASS

HINT:
Insert a shop rag inside the door panel to prevent scratching the glass.
Tilt the door glass and connect the roller of the regulator to the glass channel to install the door glass.

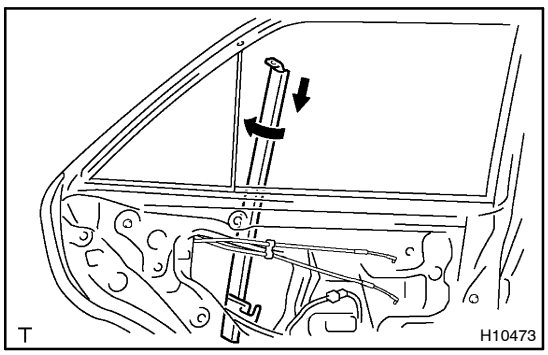


6. INSTALL QUARTER WINDOW GLASS

(a) Install the quarter window weatherstrip to the glass.

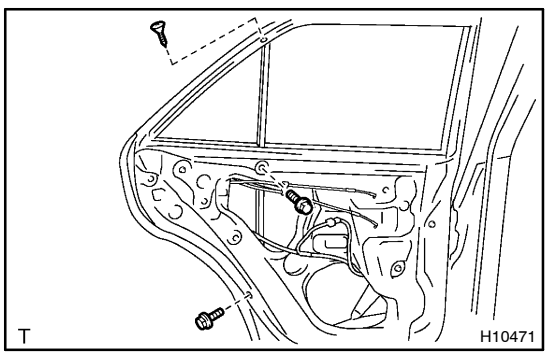
NOTICE:
Do not damage the glass.

(b) Install the rear door quarter window glass as shown in the illustration.



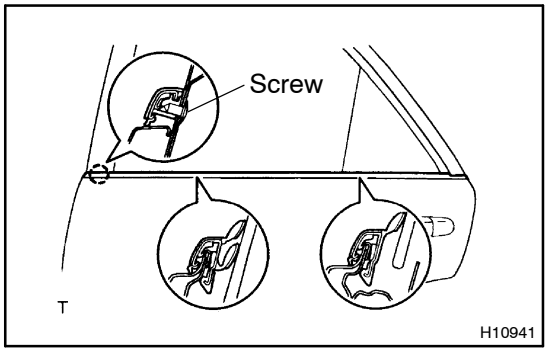
7. INSTALL DIVISION BAR

(a) Insert the division bar to the door panel, then rotate it 90°.



(b) Install the 2 bolts and screw.

8. INSTALL DOOR GLASS RUN

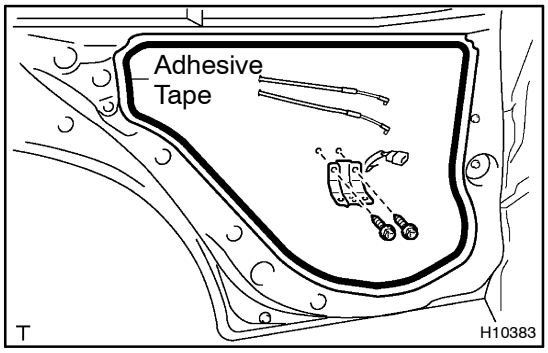


9. INSTALL REAR DOOR BELT MOULDING

Install the rear door belt moulding with the screw.

10. INSTALL SERVICE HOLE PLATE

Install the service hole plate with the 2 screws.



11. INSTALL SERVICE HOLE COVER

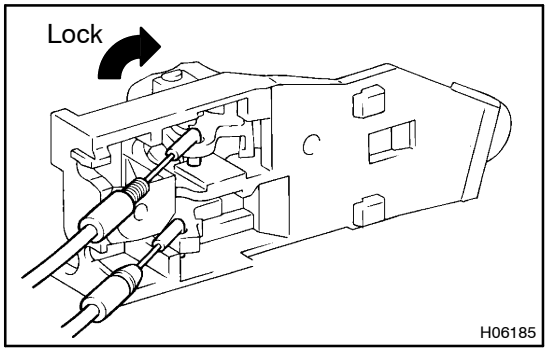
(a) Install the service hole cover to the door panel.

HINT:

- When installing the service hole cover, pull out the links and connectors through the service hole cover.
- There should be no wrinkles or folds after attaching the service hole cover.
- After attaching the service hole cover, sealing condition shall be confirmed.

(b) Install the door trim bracket with the 2 screws.

(c) Connect the connector.



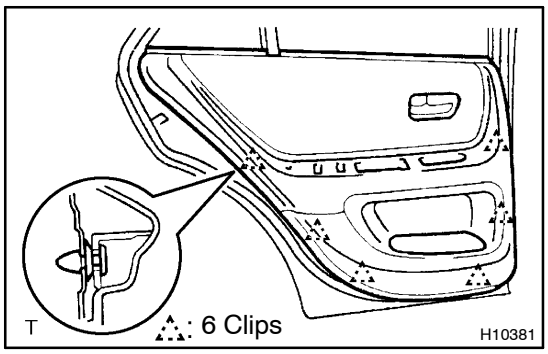
12. INSTALL INSIDE HANDLE

Connect the 2 cables to the inside handle, then install the inside handle with the screw.

NOTICE:

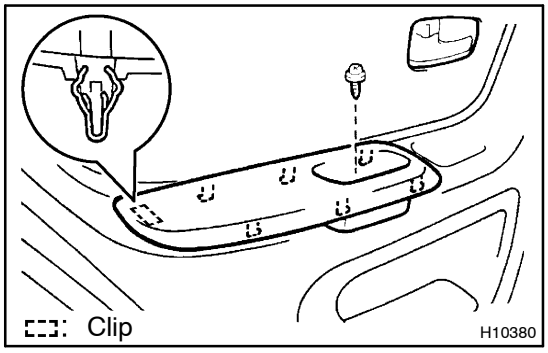
At the time of locking cable reassembly, please observe to the following items.

- **Set the door lock assembly to the LOCK position.**
- **Hold the lock knob to the LOCK position by hand and do not pull the cable, while connecting the locking cable.**



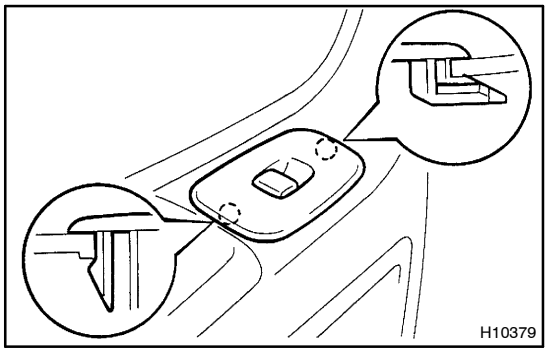
13. INSTALL DOOR TRIM

Install the door trim to the door panel.



14. INSTALL REAR ARMREST

Install the rear armrest with the screw.



15. INSTALL POWER WINDOW SWITCH

(a) Connect the connector.

(b) Install the power window switch to the door trim.

16. INSTALL DOOR INSIDE HANDLE BEZEL

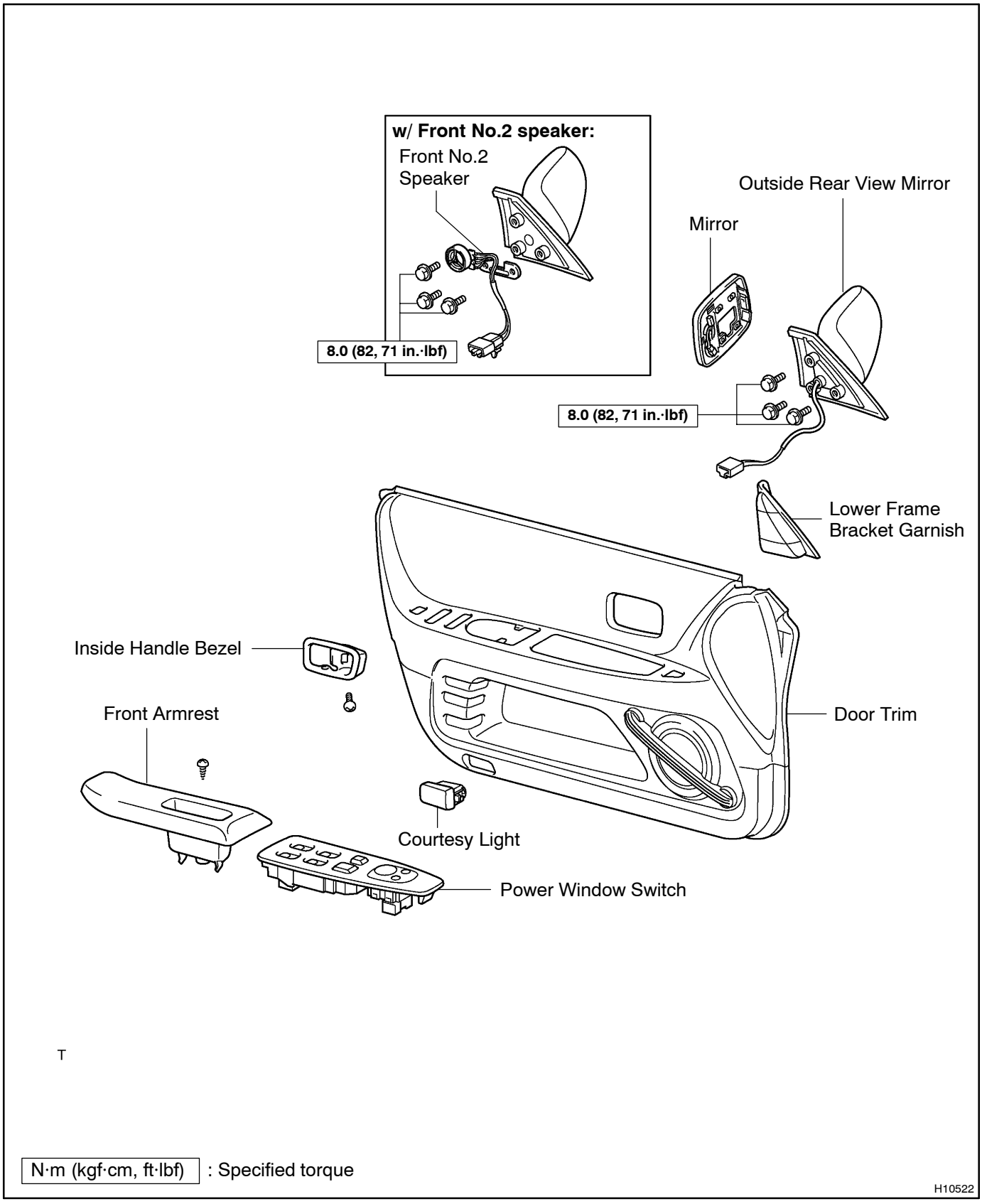
(a) Install the door inside handle bezel with the screw.

(b) Close the cap.

OUTSIDE REAR VIEW MIRROR

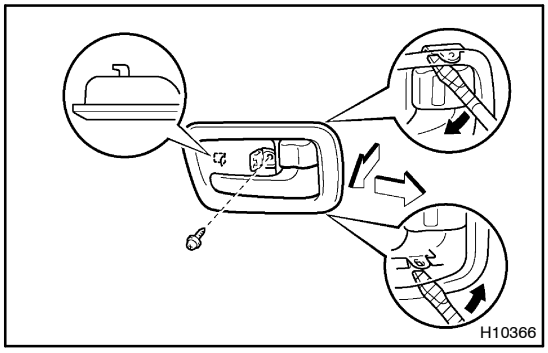
COMPONENTS

BO0UO–04



BO2CB–01

REMOVAL



1. REMOVE INSIDE HANDLE BEZEL

(a) Using a screwdriver, open the screw cap.

HINT:

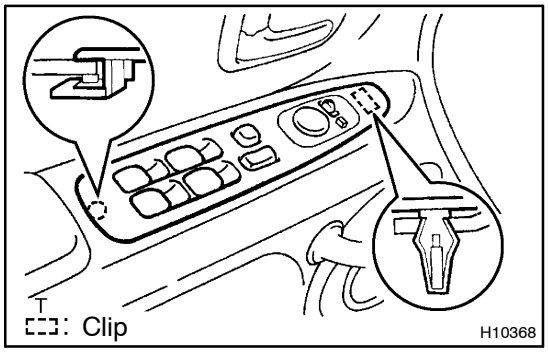
Tape the screwdriver tip before use.

(b) Remove the screw.

(c) Using a screwdriver, remove the inside handle bezel as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



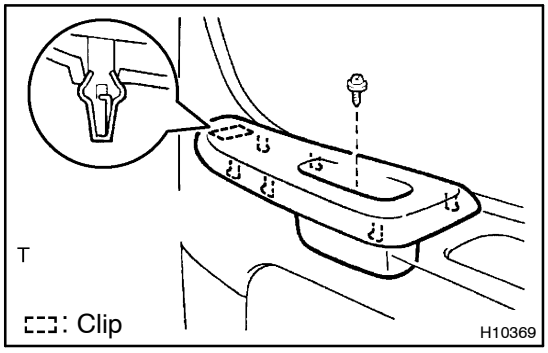
2. REMOVE POWER WINDOW SWITCH

(a) Using a screwdriver, remove the power window switch.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connectors.



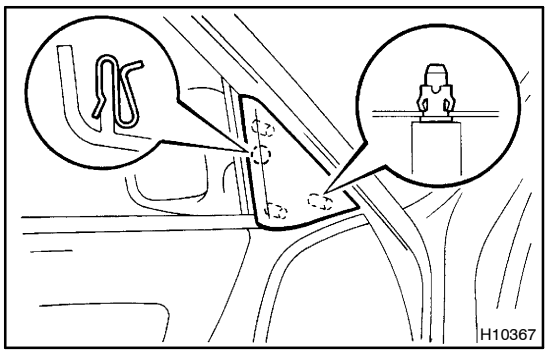
3. REMOVE FRONT ARMREST

(a) Remove the screw.

(b) Using a screwdriver, remove the front armrest as shown in the illustration.

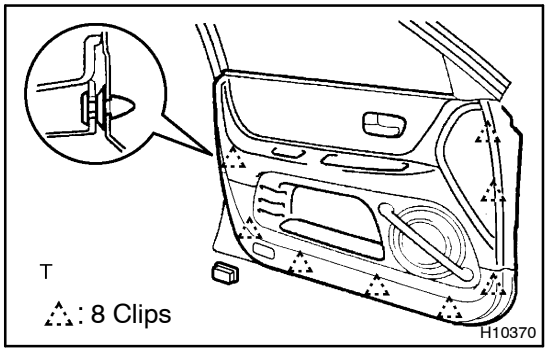
HINT:

Tape the screwdriver tip before use.



4. REMOVE LOWER FRAME BRACKET GARNISH

Remove the lower frame bracket garnish.



5. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the courtesy light, then disconnect the connector.

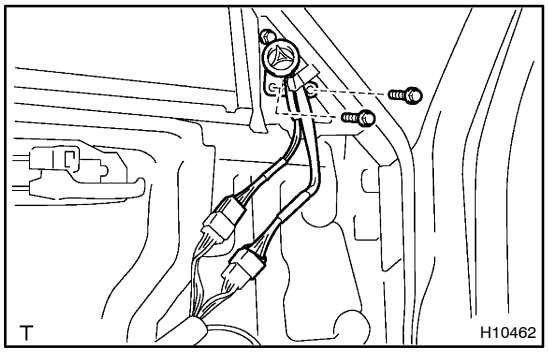
HINT:

Tape the screwdriver tip before use.

(b) Using a screwdriver, disengage the clips, then pull the trim upward to remove it.

HINT:

Tape the screwdriver tip before use.



6. w/ Front No.2 speaker:
REMOVE FRONT NO.2 SPEAKER

(a) Disconnect the connector.

(b) Remove the 2 bolts and front No.2 speaker.

7. REMOVE OUTSIDE REAR VIEW MIRROR

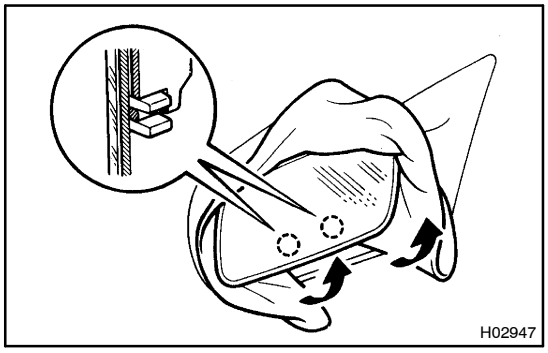
(a) Disconnect the connector.

(b) w/ Front No.2 speaker:
Remove the bolt and outside rear view mirror.

(c) w/o Front No.2 speaker:
Remove the 3 bolts and outside rear view mirror.

BO0UQ–04

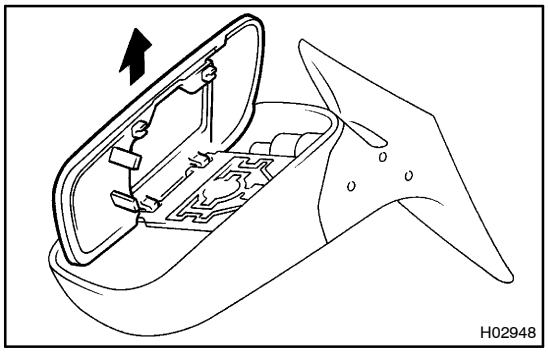
REPLACEMENT



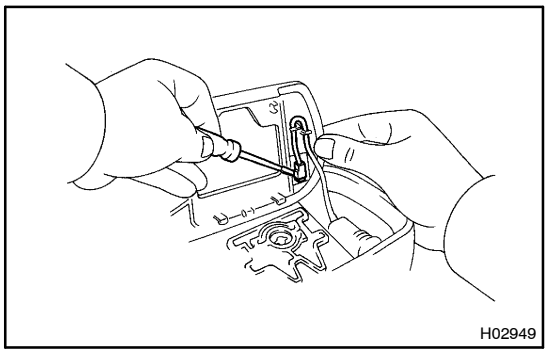
1. IF NECESSARY, DISCONNECT MIRROR

(a) Insert a shop rag between the mirror and the mirror body.

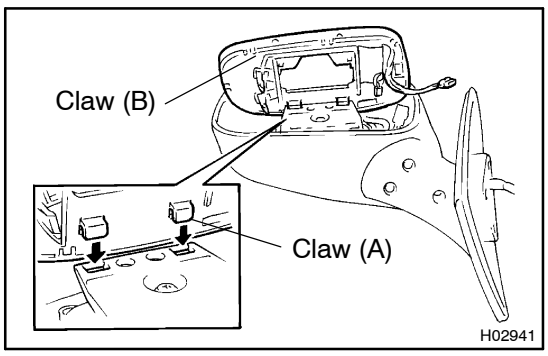
(b) Pull up the lower side of the shop rag to disconnect the mirror joint.



(c) Pull up the mirror and disconnect it.



(d) Disconnect the connectors.



2. CONNECT MIRROR

(a) Connect the connectors.

(b) Connect the claws (A) and set the mirror to the mirror body.

(c) Push the mirror to connect the claws (B) and set it.

BO2CC–01

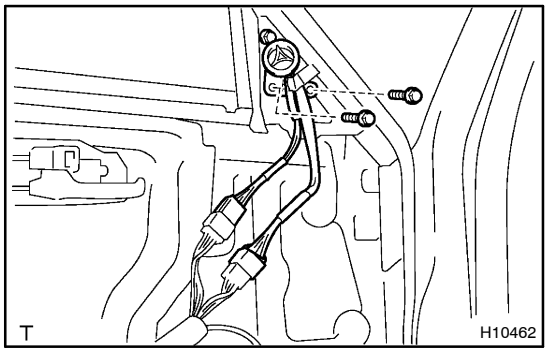
INSTALLATION

1. INSTALL OUTSIDE REAR VIEW MIRROR

(a) w/ Front No.2 speaker:
Install the outside rear view mirror with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(b) w/o Front No.2 speaker:
Install the outside rear view mirror with the 3 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

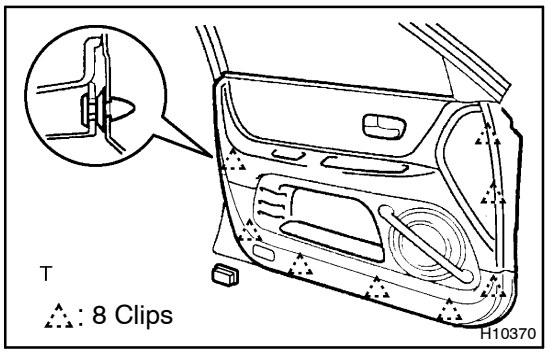
(c) Connect the connector.



2. w/ Front No.2 speaker:
INSTALL FRONT NO.2 SPEAKER

(a) Install the front No.2 speaker with the 2 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

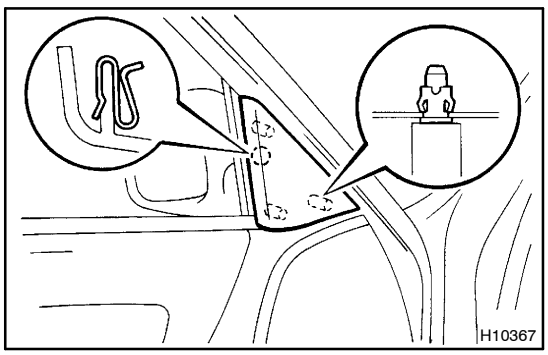
(b) Connect the connector.



3. INSTALL DOOR TRIM

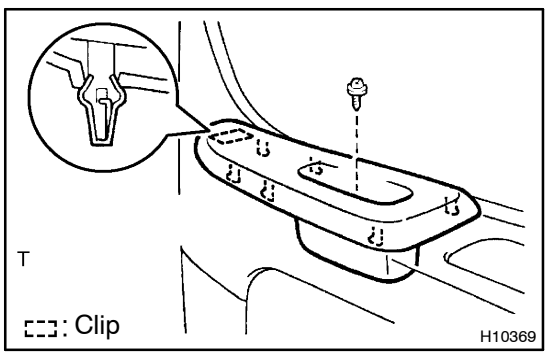
(a) Install the door trim to the door panel.

(b) Connect the connector, then install the courtesy light.



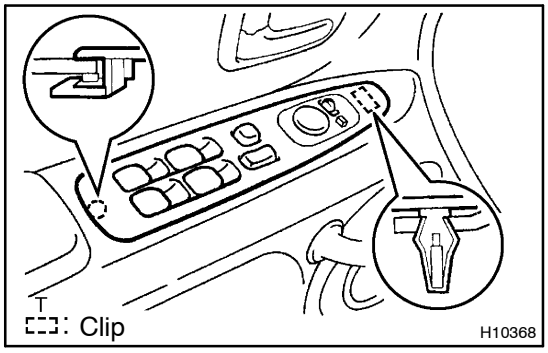
4. INSTALL LOWER FRAME BRACKET GARNISH

Install the lower frame bracket garnish to the door panel.



5. INSTALL FRONT ARMREST

Install the front armrest with the screw.



6. INSTALL POWER WINDOW SWITCH

(a) Connect the connectors.

(b) Install the power window switch.

7. INSTALL INSIDE HANDLE BEZEL

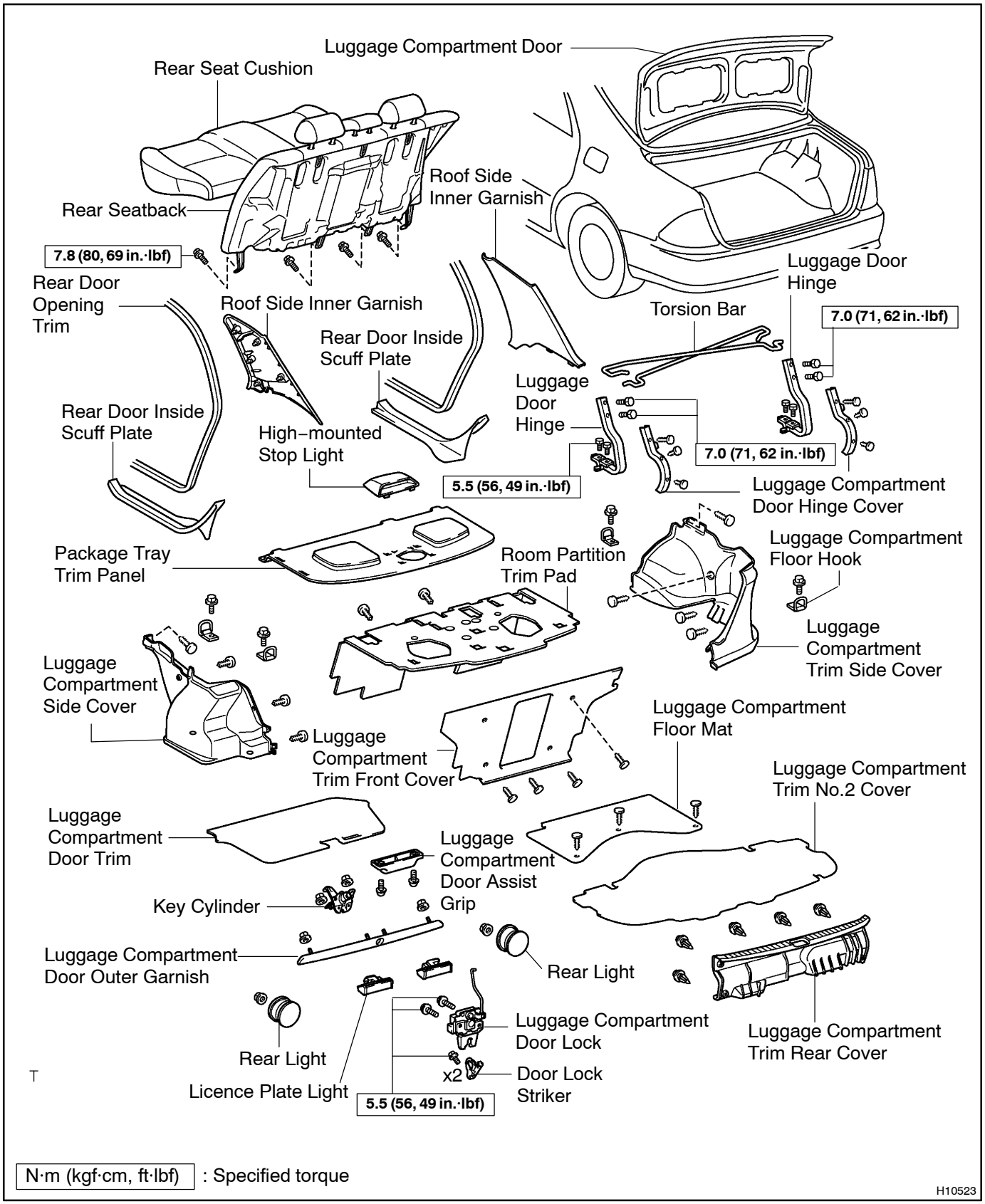
(a) Install the inside handle bezel with the screws.

(b) Close the screw cap.

LUGGAGE COMPARTMENT DOOR AND HINGE

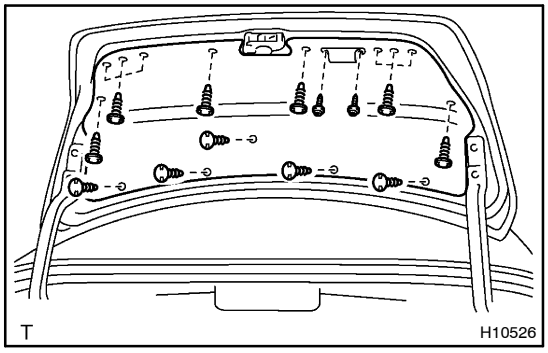
COMPONENTS

BO0XB–04



BO2CD–01

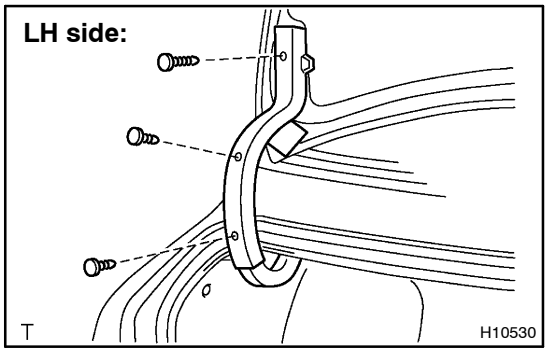
REMOVAL



1. REMOVE LUGGAGE COMPARTMENT DOOR TRIM

(a) Remove the 2 screws and luggage compartment door assist grip.

(b) Remove the 15 clips and luggage compartment door trim.



2. REMOVE LUGGAGE COMPARTMENT DOOR HINGE COVERS

(a) Remove the 3 clips.

(b) Open the cover and remove the hinge cover.

(c) Employ the same manner described above to the other side.

3. REMOVE LUGGAGE COMPARTMENT DOOR

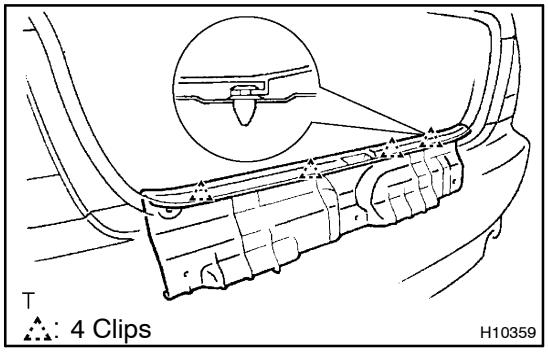
(a) Disconnect the connector.

(b) Disengage the clamps.

(c) Remove the 4 bolts and door.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

4. REMOVE LUGGAGE COMPARTMENT TRIM NO.2 COVER



5. REMOVE LUGGAGE COMPARTMENT TRIM REAR COVER

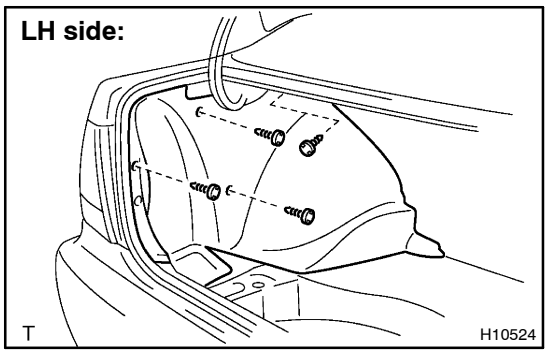
(a) Using a clip remover, remove the 5 clips.

(b) Using a screwdriver, remove the luggage compartment trim rear cover.

HINT:

Tape the screwdriver tip before use.

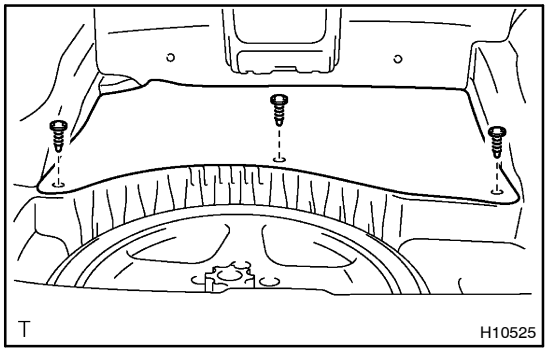
6. REMOVE LUGGAGE COMPARTMENT FLOOR HOOKS



7. REMOVE LUGGAGE COMPARTMENT TRIM SIDE COVER LH AND RH

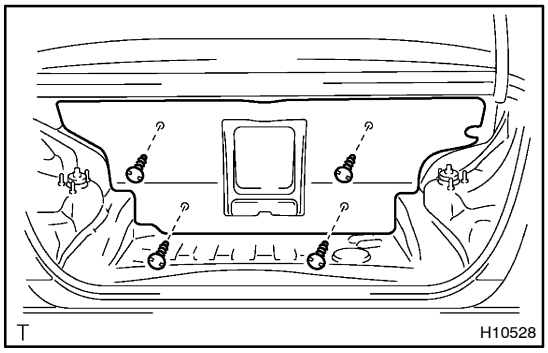
(a) Remove the 4 clips and luggage compartment trim side cover.

(b) Employ the same manner described above to the other side.



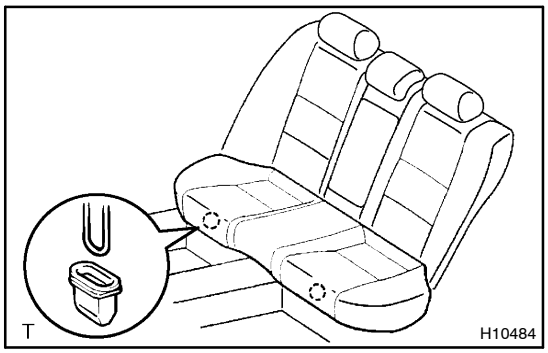
8. REMOVE LUGGAGE COMPARTMENT FLOOR MAT

Remove the 3 clips and luggage compartment floor mat.



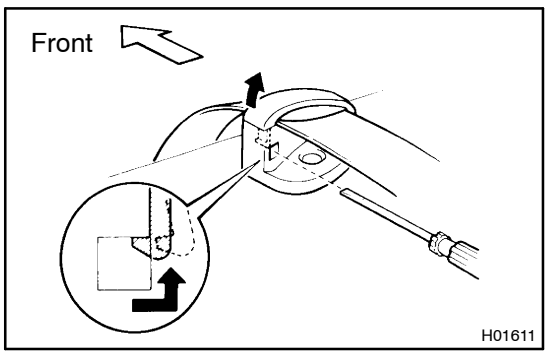
9. REMOVE LUGGAGE COMPARTMENT TRIM FRONT COVER

Remove the 4 clips and luggage compartment trim front cover.



10. REMOVE REAR SEAT CUSHION

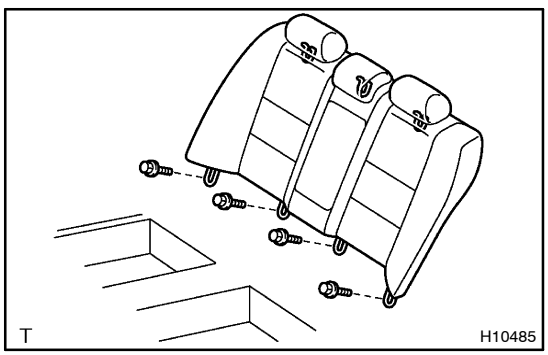
Pull up the front portion of the seat cushion, then remove it.



11. REMOVE REAR SEATBACK

(a) Using a screwdriver, remove the rear seat belt from the belt guide as shown in the illustration.

(b) Employ the same manner described above to the other side.

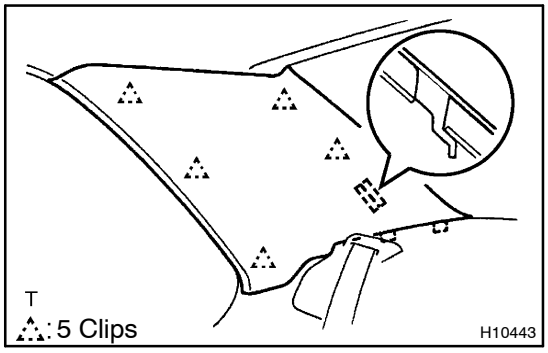


(c) Remove the 4 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(d) Pull up the seatback to remove it.

NOTICE:

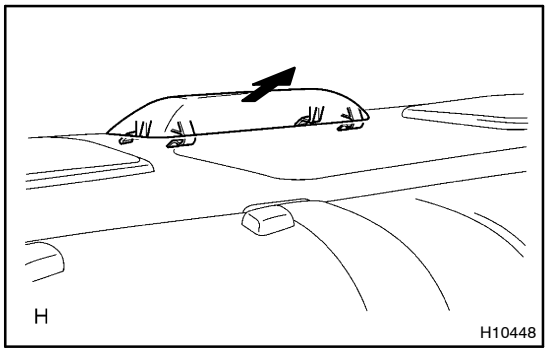
Be careful not to damage the body.



12. REMOVE ROOF SIDE INNER GARNISH

(a) Using a screwdriver, remove the roof side inner garnish.

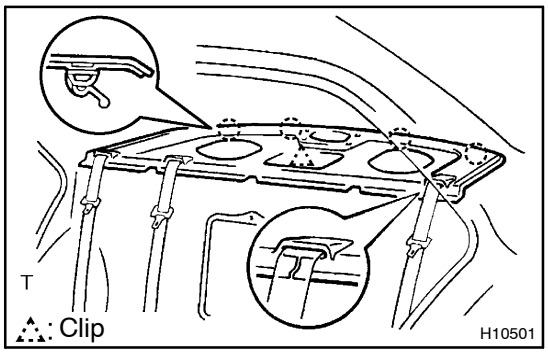
(b) Employ the same manner described above to the other side.



13. REMOVE HIGH–MOUNTED STOP LIGHT

(a) Remove the high–mounted stop light as shown in the illustration.

(b) Disconnect the connector.



14. REMOVE PACKAGE TRAY TRIM PANEL

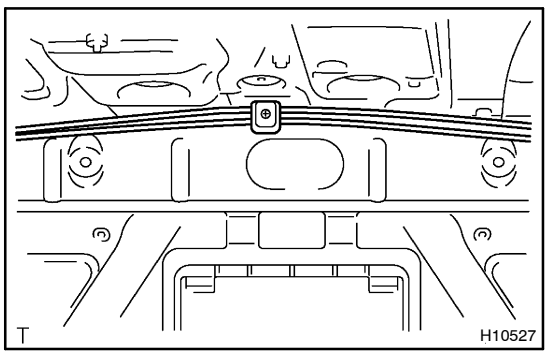
(a) Pull the package tray trim panel upward to disengage the clips.

(b) Remove the rear seat outer belts through the cutout on the package tray trim.

(c) Pull the package tray trim panel forward to remove it.

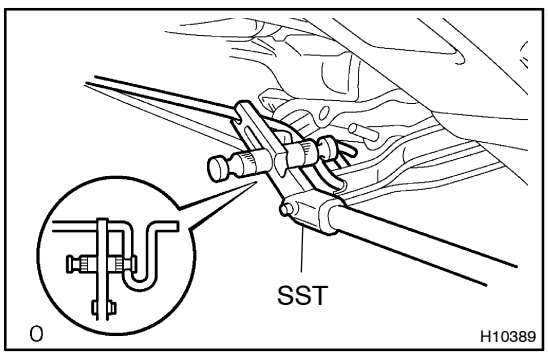
15. REMOVE ROOM PARTITION TRIM PAD

Remove the 2 clips and room partition trim pad.

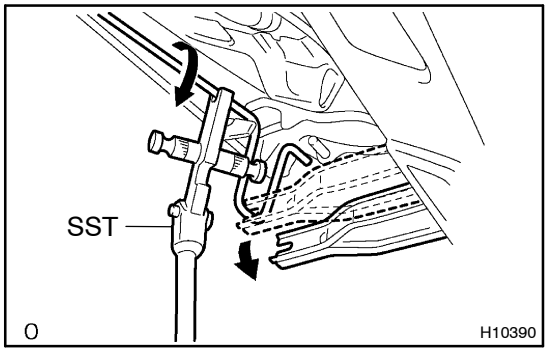


16. REMOVE TORSION BAR

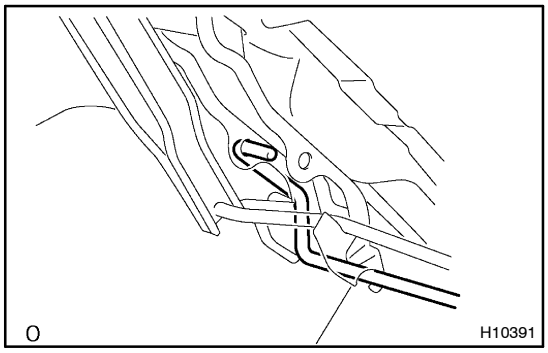
(a) Remove the torsion bars from the center bracket.



(b) Install SST to the torsion bar on the hinge side.
SST 09804–24010



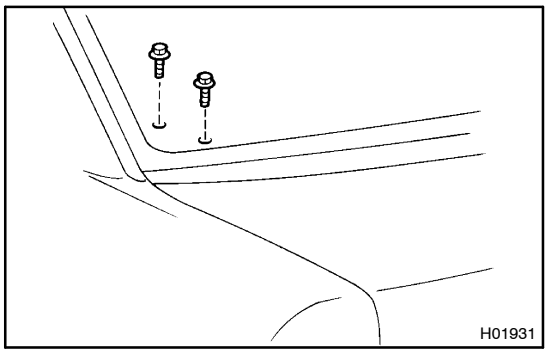
(c) Push down on SST, and pull the luggage compartment door hinge from the torsion bar.
(d) Slowly lift SST, and remove the torsion bar from the torsion bar bracket with SST.



(e) Disconnect the torsion bar from the bracket.
(f) Employ the same manner described above to the other side.

HINT:
Check the color of marks on the torsion bar when replacing or installing the torsion bar.

Side	Color
RH	Yellow
LH	Pink

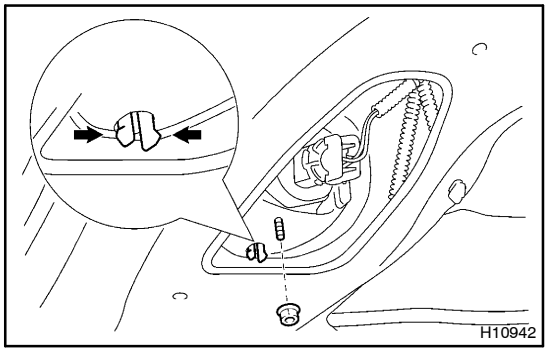


17. REMOVE LUGGAGE COMPARTMENT DOOR HINGE

(a) Remove the 2 bolts.
(b) Remove the hinge.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)
(c) Employ the same manner described above to the other side.

BO2CE–01

DISASSEMBLY

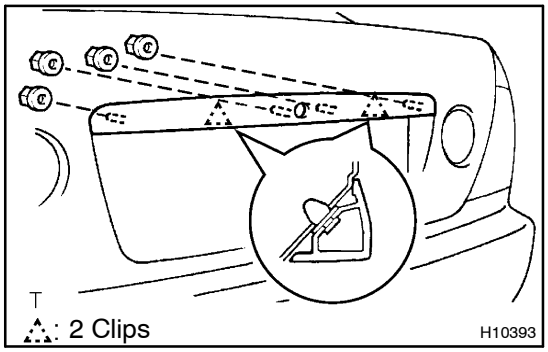


1. REMOVE REAR LIGHT

(a) Remove the nut.
(b) Disengage the clip.
(c) Disconnect the connector, then remove the rear light.
(d) Employ the same manner described above to the other side.

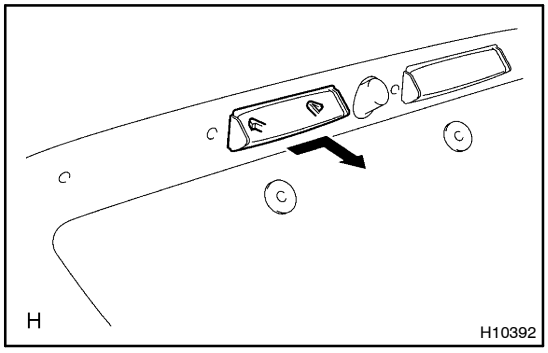
2. REMOVE LUGGAGE COMPARTMENT DOOR OUTER GARNISH

(a) Disconnect the cable and link from the key cylinder.



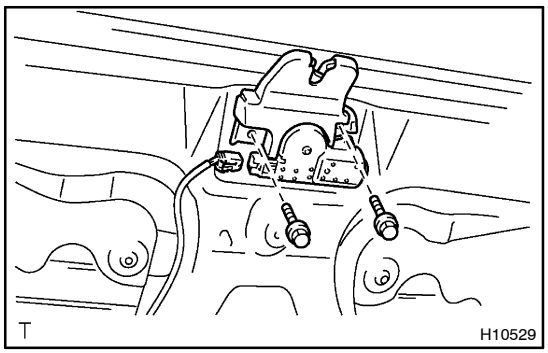
(b) Remove the 4 nuts and key cylinder.
(c) Using a screwdriver, remove the luggage compartment door outer garnish.

HINT:
Tape the screwdriver tip before use.



3. REMOVE LICENCE PLATE LIGHT

(a) Disconnect the connector.
(b) Remove the licence plate light as shown in the illustration.
(c) Employ the same manner described above to the other side.

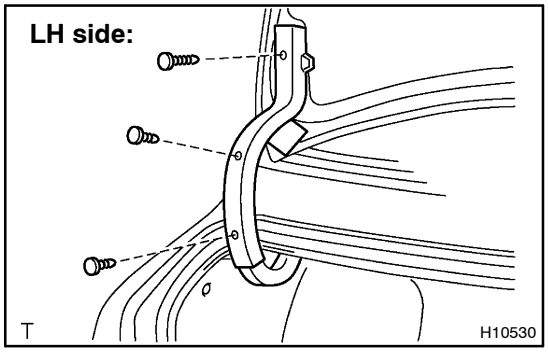


4. REMOVE LUGGAGE COMPARTMENT DOOR LOCK

(a) Disconnect the connector.
(b) Remove the 2 bolts and luggage compartment door lock.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

BO2CF–01

ADJUSTMENT

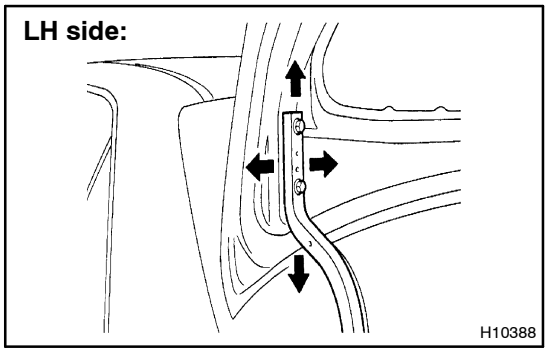


1. ADJUST LUGGAGE COMPARTMENT DOOR

(a) Remove the 3 clips.

(b) Open the cover and remove the hinge cover.

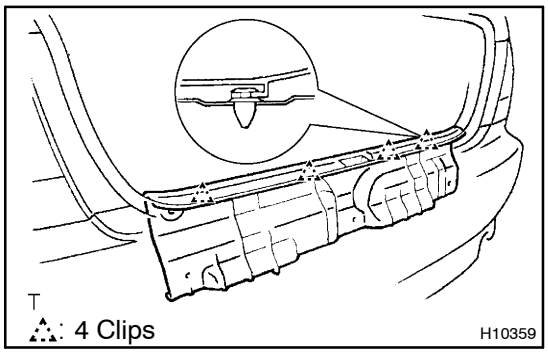
(c) Employ the same manner described above to the other side.



(d) For forward / rearward and left / right adjustments loosen the bolts.

(e) For vertical adjustment of front end of the door, increase or decrease the number of washers between the hinge and the door.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)



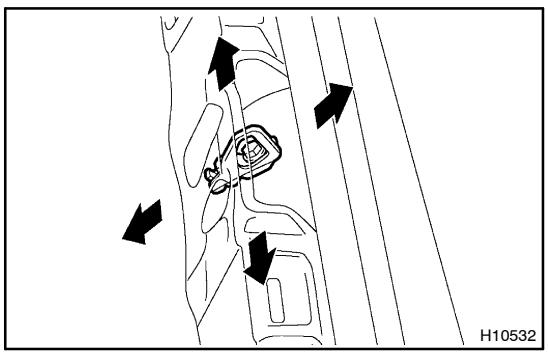
2. ADJUST DOOR LOCK STRIKER

(a) Using a clip remover, remove the 5 clips.

(b) Using a screwdriver, remove the rear floor finish plate.

HINT:

Tape the screwdriver tip before use.



(c) Using a hammer and brass bar, tap the striker to adjust it.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

BO0XF–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–45).

BO0XG–01

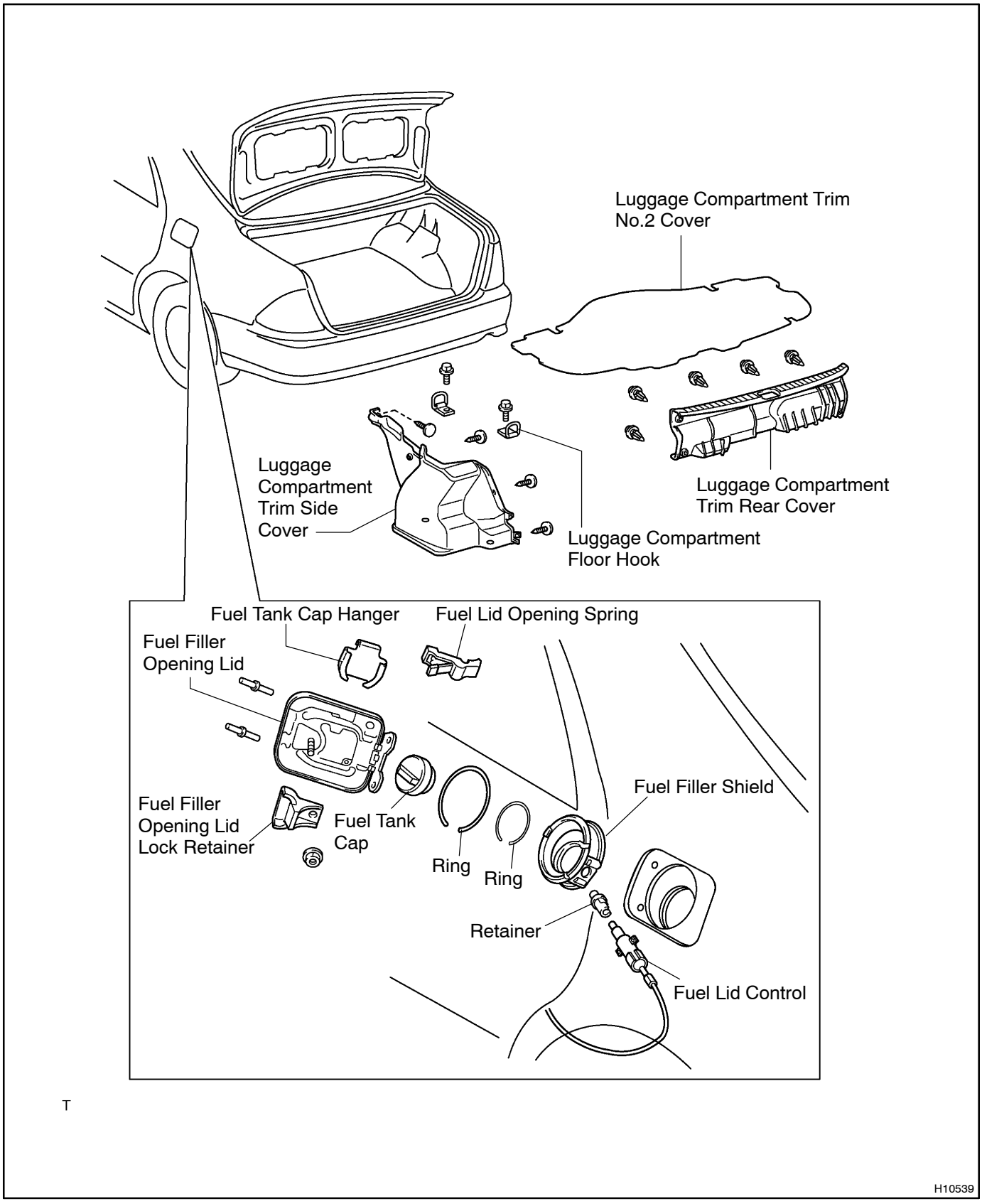
INSTALLATION

Installation is in the reverse order of removal (See page BO–41).

FUEL LID

COMPONENTS

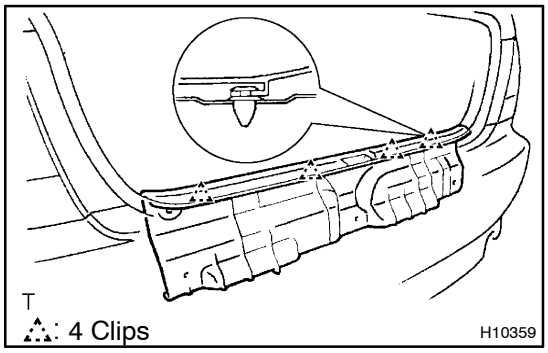
BO0UU–04



BO2CG–01

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT TRIM NO.2 COVER



2. REMOVE LUGGAGE COMPARTMENT TRIM REAR COVER

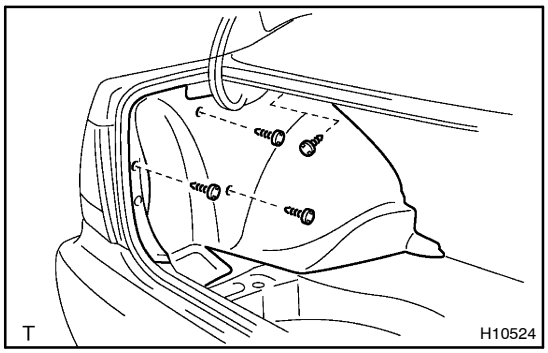
(a) Using a clip remover, remove the 5 clips.

(b) Using a screw driver, remove the luggage compartment trim rear cover.

HINT:

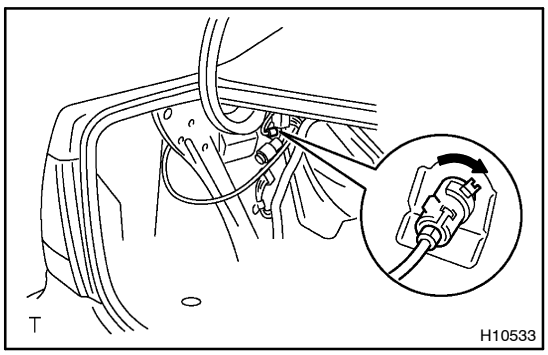
Tape the screwdriver tip before use.

3. REMOVE LUGGAGE COMPARTMENT FLOOR HOOKS



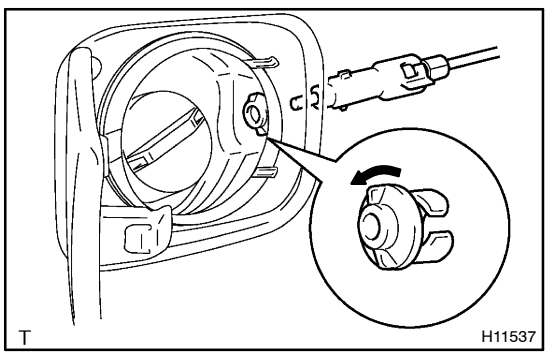
4. REMOVE LUGGAGE COMPARTMENT TRIM SIDE COVER LH

Remove the 4 clips and luggage compartment trim side cover LH.

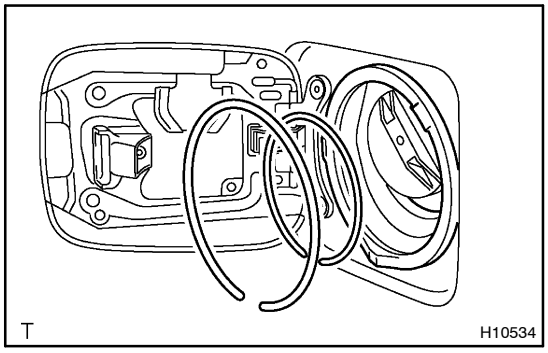


5. REMOVE FUEL LID LOCK CONTROL

(a) Rotate the fuel lid lock right to disengage the lock, then pull it out.



(b) Rotate the retainer left to disengage the lock, then pull it out.



6. REMOVE FUEL FILLER SHIELD

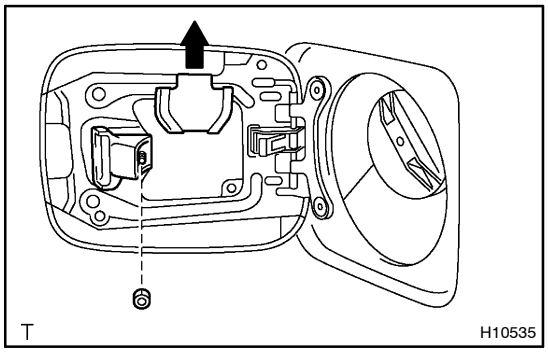
(a) Remove the 2 rings from the fuel filler shield.

(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 fuel tank cap quickly.

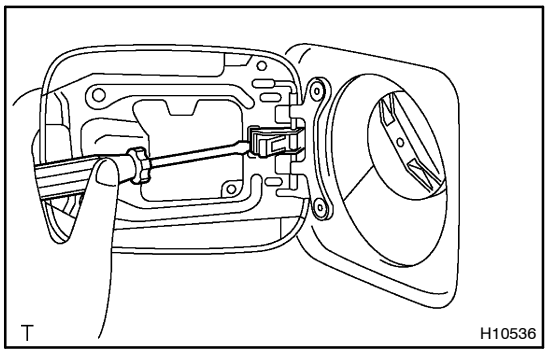


7. REMOVE FUEL TANK CAP HANGER

Pull up the fuel tank cap hanger to remove it.

8. REMOVE FUEL FILLER OPENING LID LOCK RETAINER

Remove the nut and fuel filler opening lid lock retainer.

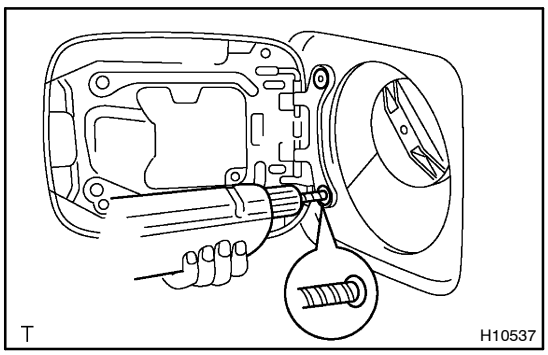


9. REMOVE FUEL LID OPENING SPRING

Insert a screwdriver between the spring and fuel filler opening lid to remove the spring as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



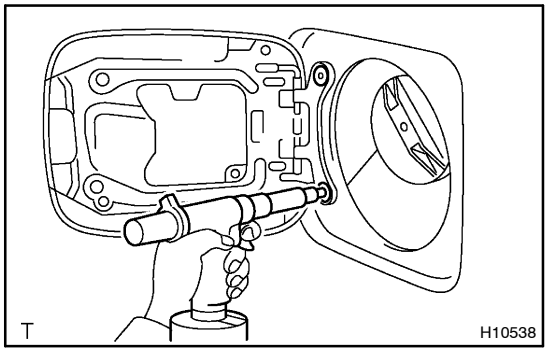
10. REMOVE FUEL FILLER OPENING LID

(a) Using a drill, drill out the rivet heads.

(b) Remove the fuel filler opening lid.

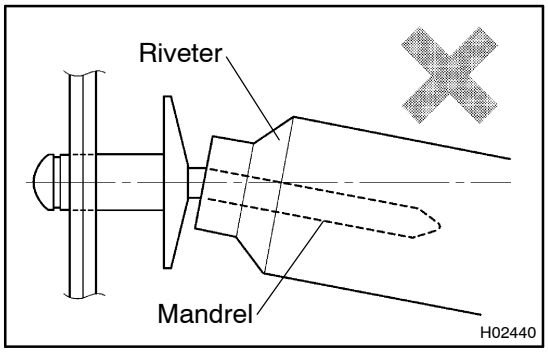
BO2CH–01

INSTALLATION



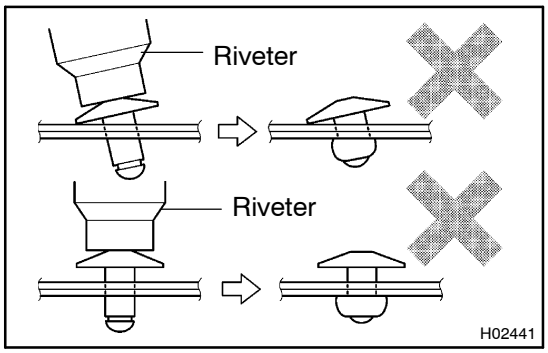
1. INSTALL FUEL FILLER OPENING LID

Using a riveter, install the fuel filler opening lid with the 2 rivets to the body.

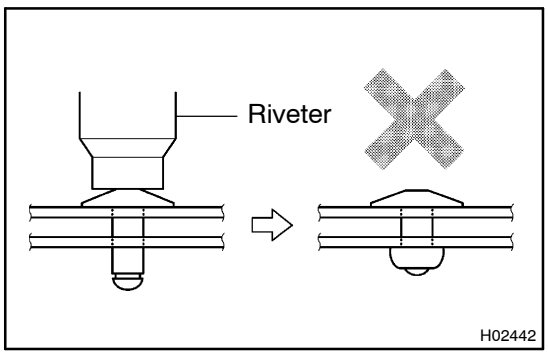


NOTICE:

- **Do not prize a riveter, as riveter is damaged, it it not tightened and the mandrel is bent.**

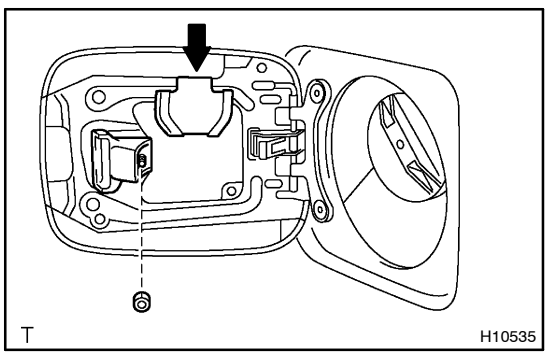


- **Do not tilt the riveter and disconnect the rivet from the material while handling a riveter, as the materials are not tightened firmly.**



- **Install the rivet while attaching materials, as they are not tightened firmly.**

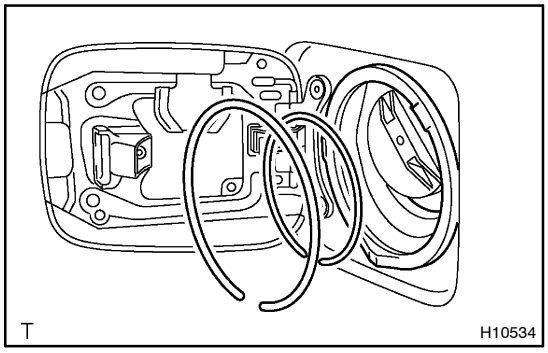
2. INSTALL FUEL FILLER OPENING SPRING



3. INSTALL FUEL FILLER OPENING LID LOCK RETAINER

Install the fuel filler opening lid lock retainer with the nut.

4. INSTALL FUEL TANK CAP HANGER



5. INSTALL FUEL FILLER SHIELD

(a) Remove the fuel tank cap.

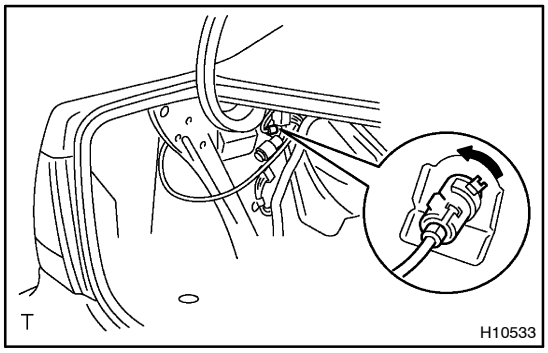
(b) Install the fuel filler shield to the body.

(c) Install the fuel tank cap quickly.

CAUTION:

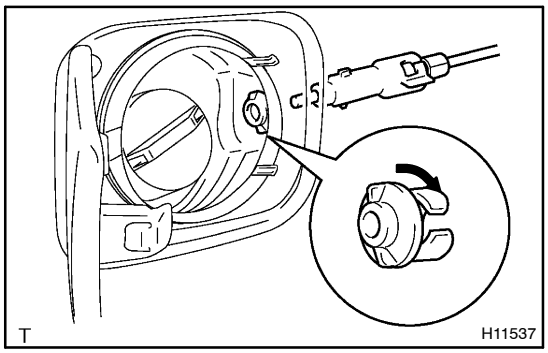
Always keep the tank cap closed when it is not required to be open. Keep all fire away during the operation.

(d) Install the 2 rings to the fuel filler shield as shown in the illustration.

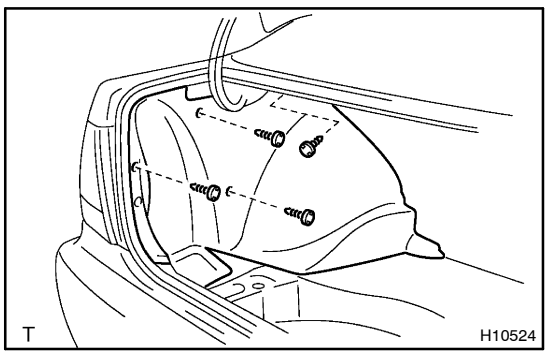


6. INSTALL FUEL LID LOCK CONTROL

(a) Install the retainer to the body from the outside of the vehicle and rotate it right to lock.



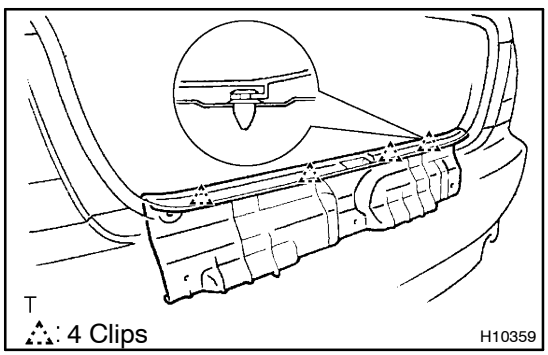
(b) Insert the fuel lid lock control to the retainer and rotate it left to lock.



7. INSTALL LUGGAGE COMPARTMENT TRIM SIDE COVER LH

Install the luggage compartment trim side cover LH with the 3 clips.

8. INSTALL LUGGAGE COMPARTMENT FLOOR HOOKS



9. INSTALL LUGGAGE COMPARTMENT TRIM REAR COVER

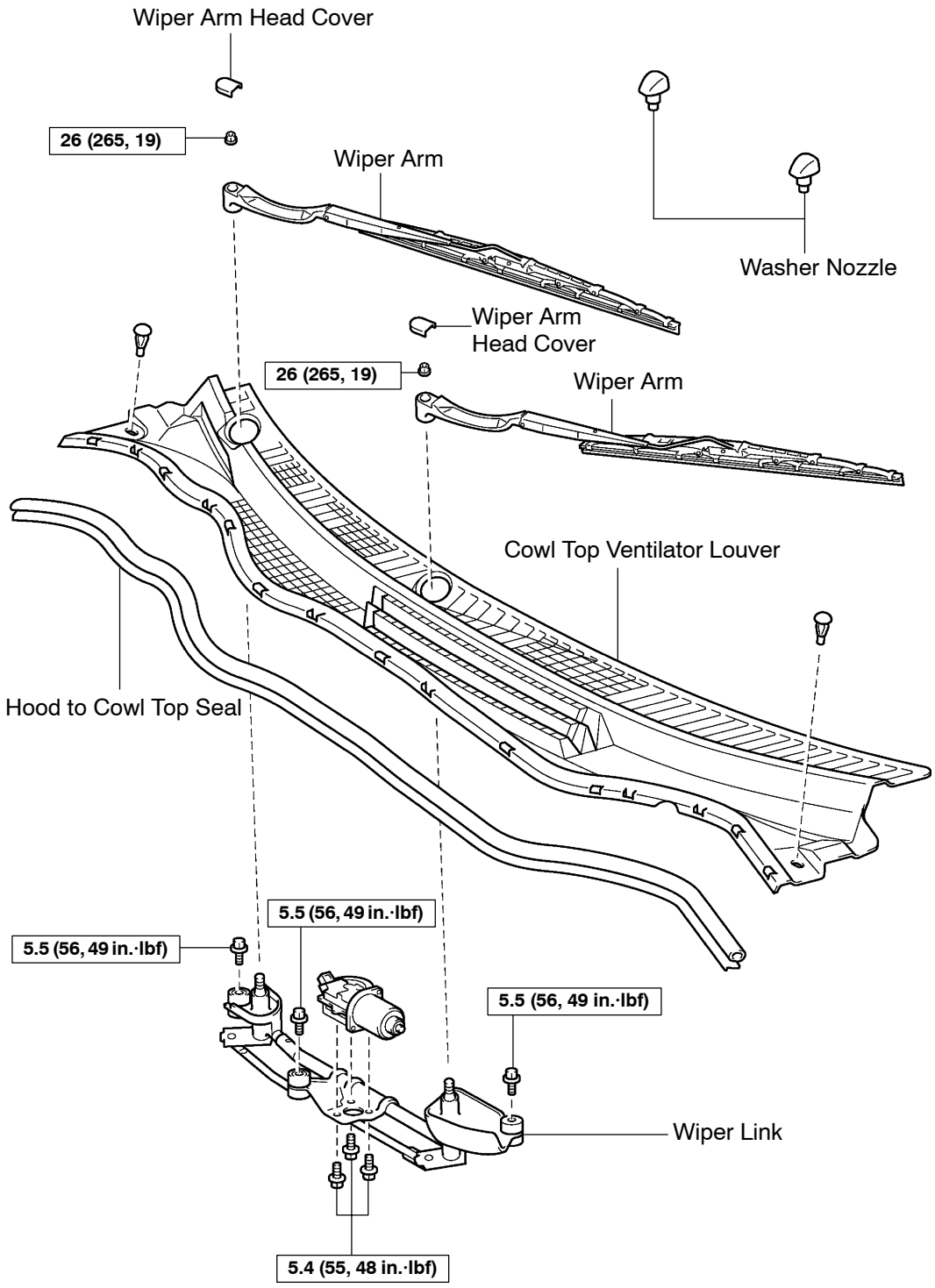
Install the luggage compartment trim rear cover with the 5 clips.

10. INSTALL LUGGAGE COMPARTMENT TRIM NO.2 COVER

FRONT WIPER AND WASHER

BO0UX–04

COMPONENTS



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

H10396

BO2CI–01

REMOVAL

1. REMOVE WIPER ARMS

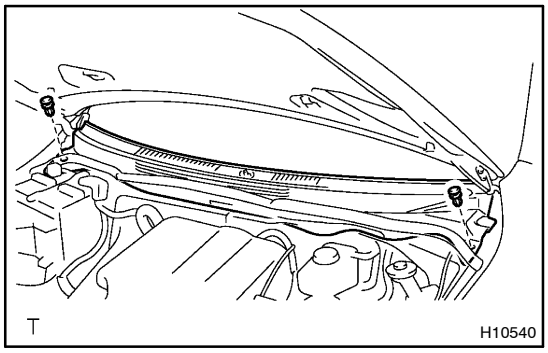
(a) Using a screwdriver, remove the wiper arm head covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 nuts and 2 wiper arms.

2. REMOVE HOOD TO COWL TOP SEAL



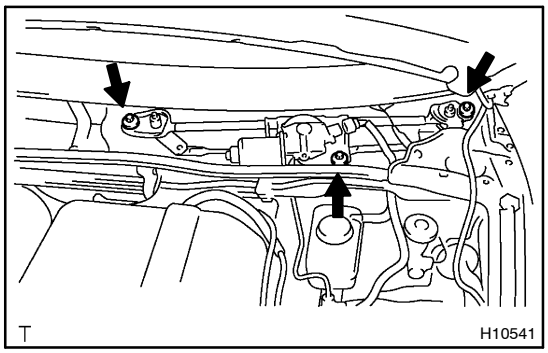
3. REMOVE COWL TOP VENTILATOR LOUVER

(a) Remove the 2 clips

(b) Using a screwdriver, remove the cowl top ventilator louver.

HINT:

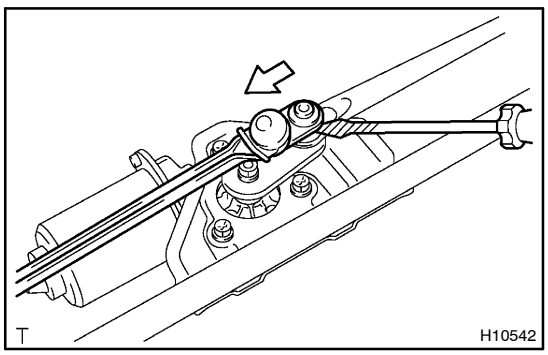
Tape the screwdriver tip before use.



4. REMOVE WIPER LINK ASSEMBLY

(a) Disconnect the connector.

(b) Remove the 3 bolts and wiper link assembly.

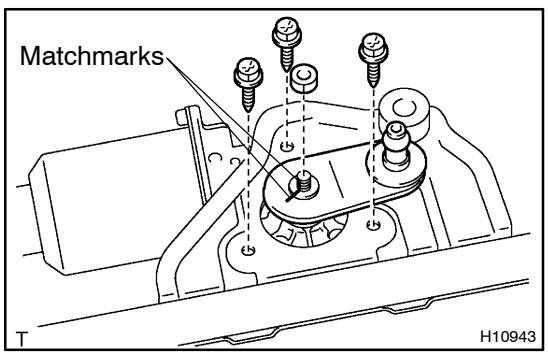


5. REMOVE WIPER MOTOR

(a) Using a screwdriver, disconnect the wiper link from the motor.

HINT:

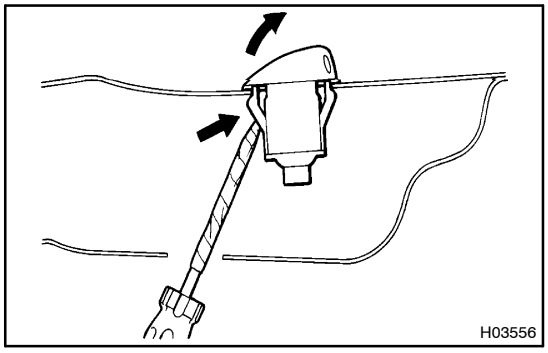
Tape the screwdriver tip before use.



(b) Remove the nut.

(c) Place the matchmarks on the wiper link and motor.

(d) Remove the 3 screws and wiper motor from the wiper link.



6. REMOVE WASHER NOZZLE

(a) Remove the hood insulator.

(b) Disconnect the washer hose.

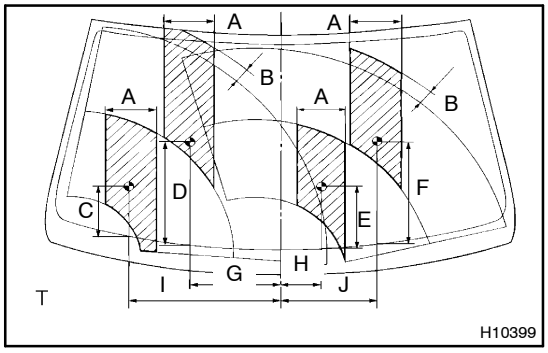
(c) Using a screwdriver, remove the washer nozzle.

HINT:

Tape the screwdriver tip before use.

(d) Employ the same manner described above to the other side.

BO0UZ–04



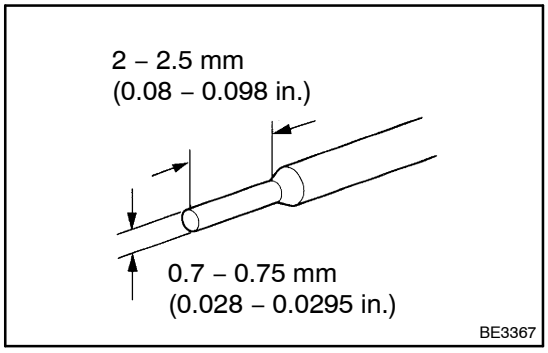
INSPECTION

INSPECT WASHER NOZZLE

While operating the washer check whether the point where the washer fluid hits the windshield and the surge area are within the range indicated by the hatched line.

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.97 in.)
C: Approx. 178 mm (7.01 in.)
D: Approx. 318 mm (12.52 in.)
E: Approx. 175 mm (6.89 in.)
F: Approx. 319 mm (12.56 in.)
G: Approx. 270 mm (10.63 in.)
H: Approx. 122 mm (4.80 in.)
I: Approx. 441 mm (17.36 in.)
J: Approx. 277 mm (10.91 in.)

BO0V0–04



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 hits the windshield.

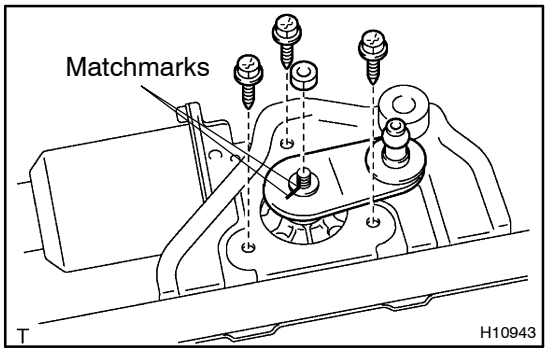
BO2CJ–01

INSTALLATION

1. INSTALL WASHER NOZZLES

(a) Install the washer nozzles, then connect the washer hoses.

(b) Install the hood insulator.

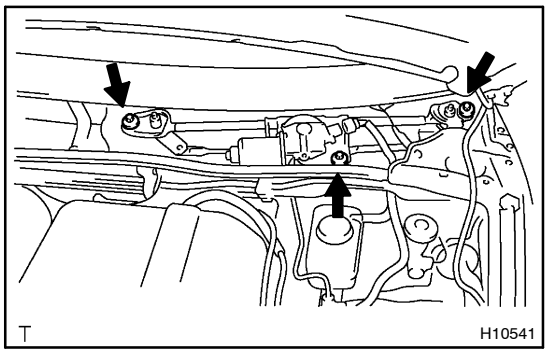


2. INSTALL WIPER MOTOR

(a) Install the wiper motor with the 3 bolts to the wiper link.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Align the matchmakers on the wiper link and wiper motor, then install the nut.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

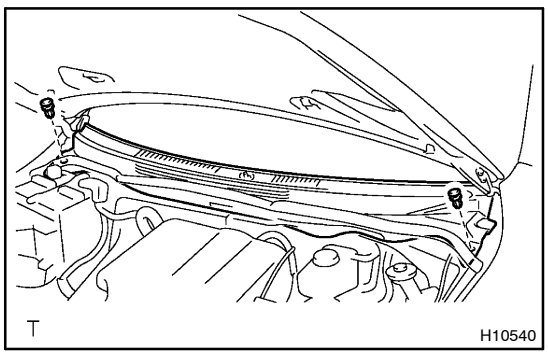
(c) Connect the wiper link to the wiper motor.



3. INSTALL WIPER LINK ASSEMBLY

(a) Install the wiper link assembly and fasten the 5 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(b) Connect the connector.



4. INSTALL COWL TOP VENTILATOR LOUVER

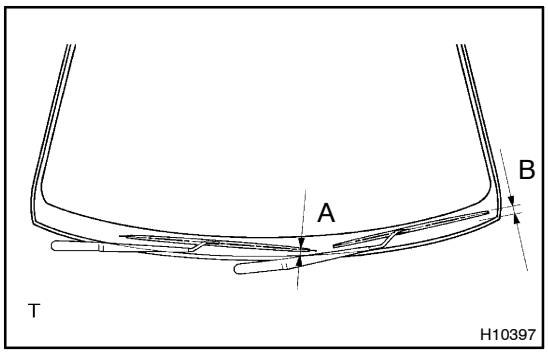
Install the cowl top ventilator louver with the 2 clips.

5. INSTALL HOOD TO COWL TOP SEAL

6. INSTALL WIPER ARMS

(a) Operate the wipers once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the nuts by hand.



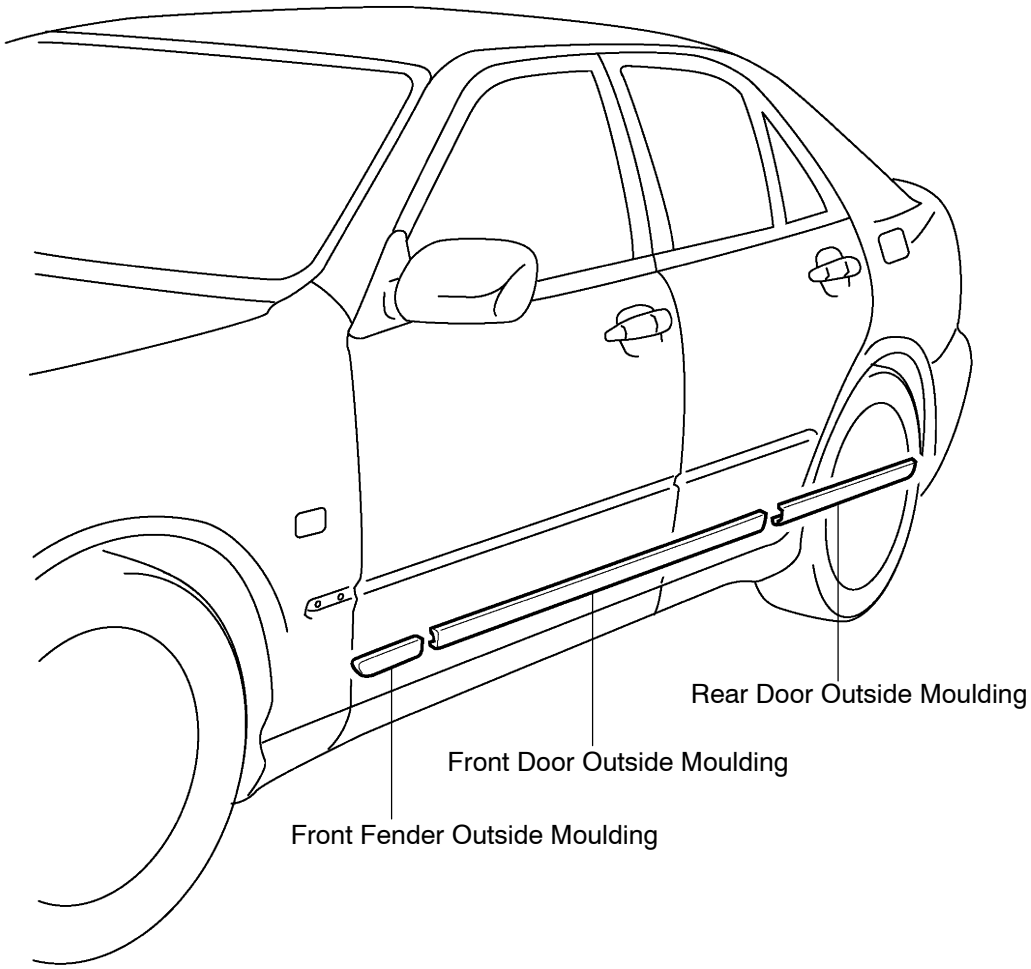
(c) Adjust the installation positions of the wiper arms to the positions as shown in the illustration.
A: 20.0 mm (0.787 in.)
B: Europe: 25.0 mm (0.984 in.)
Australia: 28.0 mm (1.102 in.)

(d) Torque the nuts.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

BODY OUTSIDE MOULDING

COMPONENTS

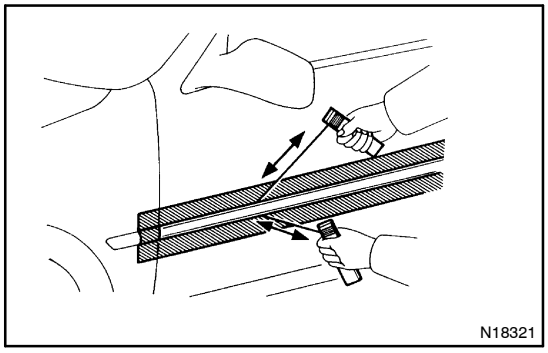
BO229–02



T

H10543

BO22A–02



REMOVAL

1. HEAT MOULDING

Using a heat light, heat the moulding to 20 – 30 °C (68 – 86 °F).

NOTICE:

Do not heat the moulding excessively.

2. REMOVE MOULDING

(a) Tie both piano wire ends to wooden blocks or similar objects.

(b) Cut the adhesive tape by pulling the piano wire as shown in the illustration.

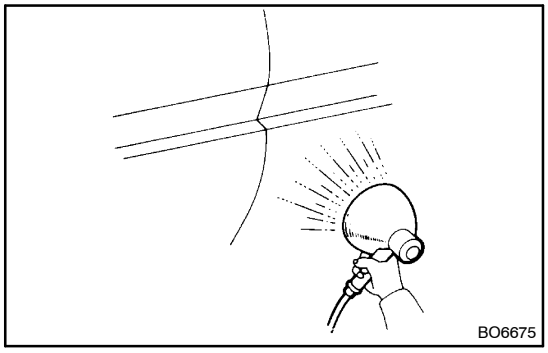
NOTICE:

- **If reusing the moulding, take care not to damage the moulding.**
- **Do not damage the body.**

(c) Remove the moulding.

BO2CK–01

INSTALLATION



1. CLEAN BODY MOUNTING SURFACE

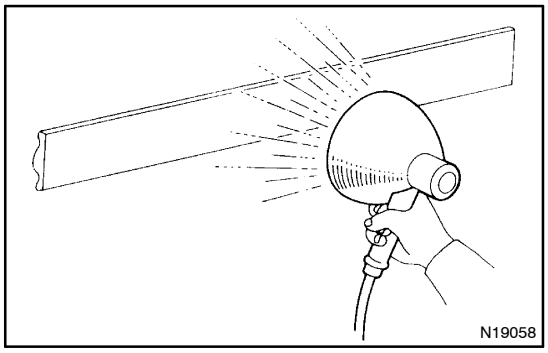
(a) Using a heat light, heat the body mounting surface to 40 – 60 °C (104 – 140 °F).

NOTICE:

Do not heat the body excessively.

(b) Remove the adhesive tape from the body.

(c) Wipe off stains with cleaner.



2. If reusing the moulding:
CLEAN MOULDING

(a) Using a heat light, heat the moulding to 20 – 30 °C (68 – 86 °F).

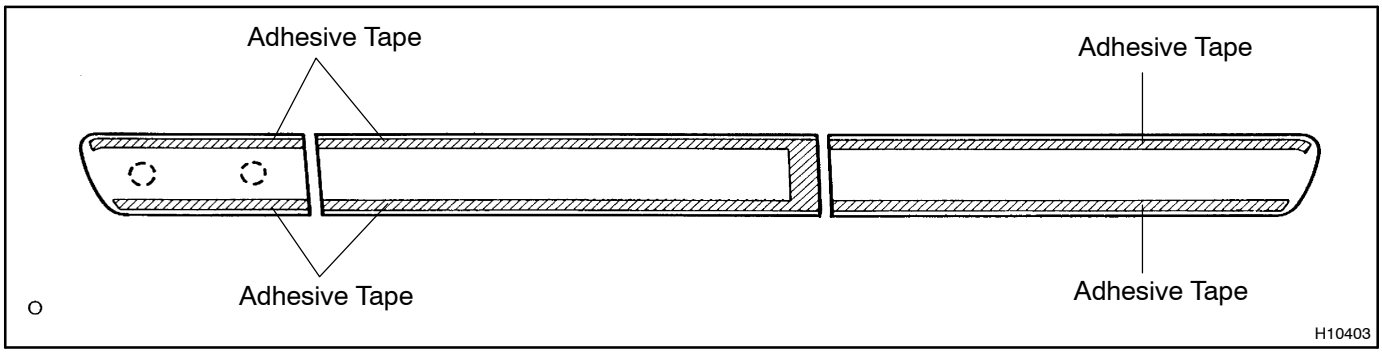
NOTICE:

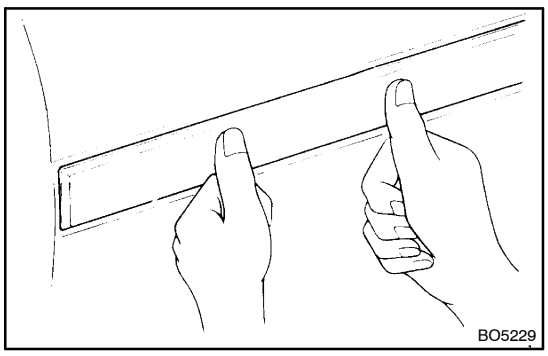
Do not heat the moulding excessively.

(b) Remove the adhesive tape from the moulding.

(c) Wipe off stains with cleaner.

(d) Apply a 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) Lift the moulding release sheet from face of the moulding.

NOTICE:

When the moulding release sheet is removed, make sure that no dirt or dust can get onto the uncoated area.

(c) Front fender outside moulding:
Align the bosses with their corresponding holes in the body, and press firmly on the moulding.

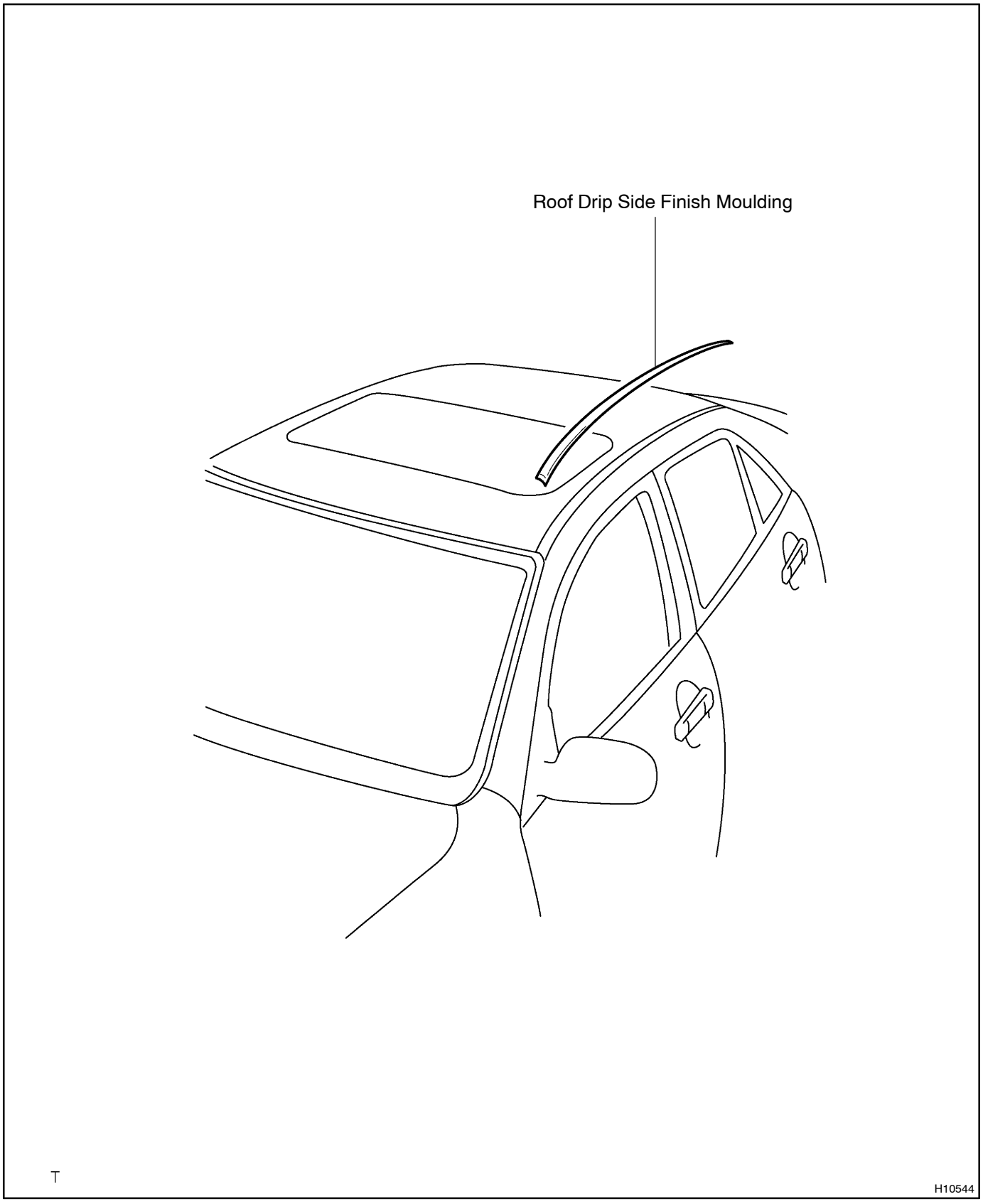
NOTICE:

Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

ROOF DRIP SIDE FINISH MOULDING

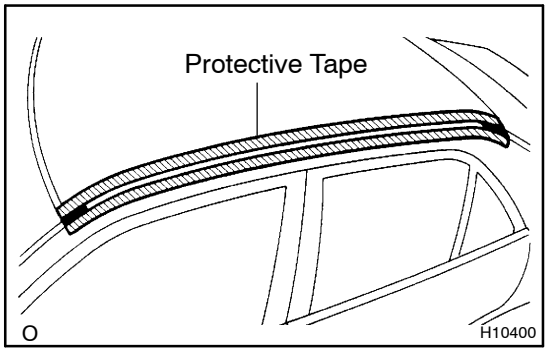
COMPONENTS

BO2CL–01



BO2CM–01

REMOVAL



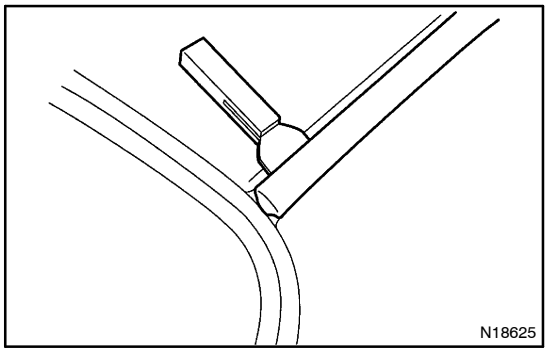
1. REMOVE ENDS OF MOULDING

(a) Apply protective tape to the outer surface as shown in the illustration to keep the surface from being scratched.

(b) Using a heat light heat the moulding to 20 – 30 ˚C (68 – 86 ˚F).

NOTICE:

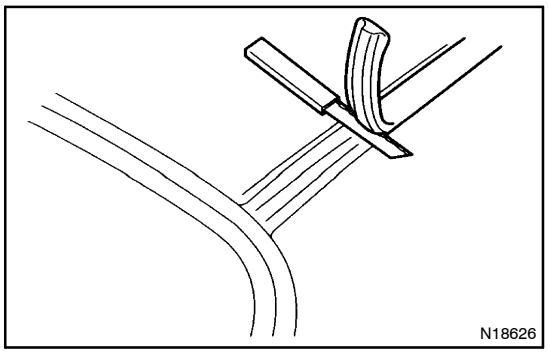
Do not heat the moulding excessively.



(c) Using a scraper, pull off the roof drip side finish moulding from the front end and rear end.

HINT:

Tape the scraper tip before use.



2. REMOVE MOULDING AND ADHESIVE

(a) Pull off the moulding by cutting the adhesive with a knife at the front and rear ends.

(b) Remove the moulding.

NOTICE:

Do not damage the body with the knife.

BO2CN–01

INSTALLATION

1. CLEAN CONTRACT SURFACE OF BODY

(a) Using a heat light, heat the moulding surface to 40 – 60 °C (104 – 140 °F).

NOTICE:

Do not heat the body excessively.

(b) Using a knife, cut away any rough areas on the body.

NOTICE:

Be careful not to damage the body.

(c) Wipe off stains with cleaner.

2. If reusing the moulding:
CLEAN MOULDING

(a) Using a heat light, heat the moulding surface to 20 – 30 °C (68 – 86 °F).

NOTICE:

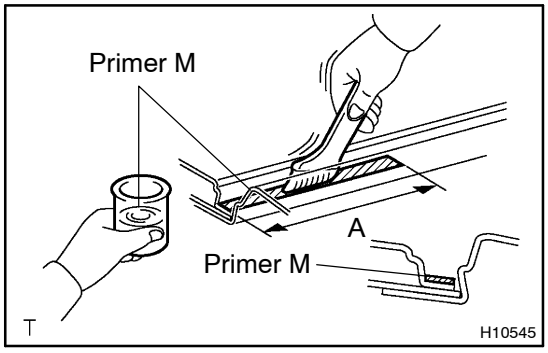
Do not heat the moulding excessively.

(b) Using a knife, cut the remaining adhesive from the moulding.

NOTICE:

Be careful not to damage the moulding.

(c) Wipe off stains with cleaner.



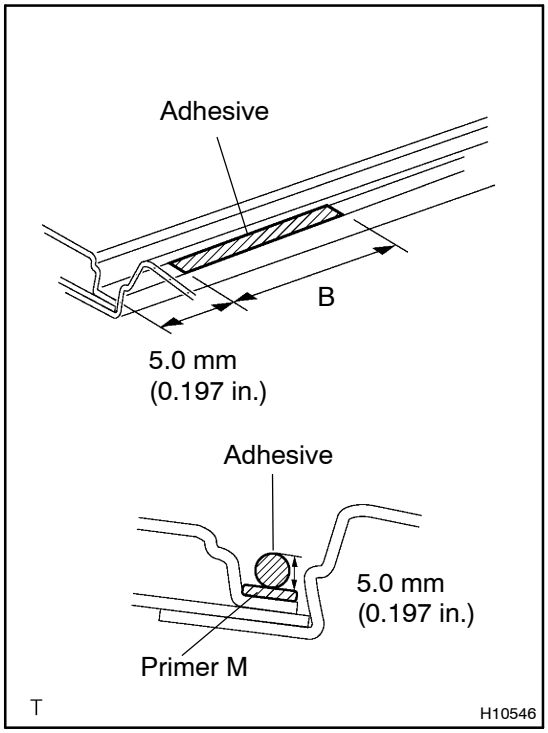
3. COAT CONTRACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat the contact surface on the body with Primer M as shown in the illustration.

Front end:
A: 40 mm (1.57 in.)
Rear end:
A: 35 mm (1.38 in.)

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



4. 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 minutes
20 °C (68 °F)	100 minutes
5 °C (41 °F)	8 hours

(b) Load the cartridge into the sealer gun.

(c) Apply adhesive to the hatched area in the illustration for both front and rear of the vehicle.

Front end:

B: 30 mm (1.18 in.)

Rear end:

B: 25 mm (0.98 in.)

HINT:

When removing the moulding, apply adhesive well to the part where the body sealer is removed.

5. INSTALL MOULDING

Push the moulding to the body.

NOTICE:

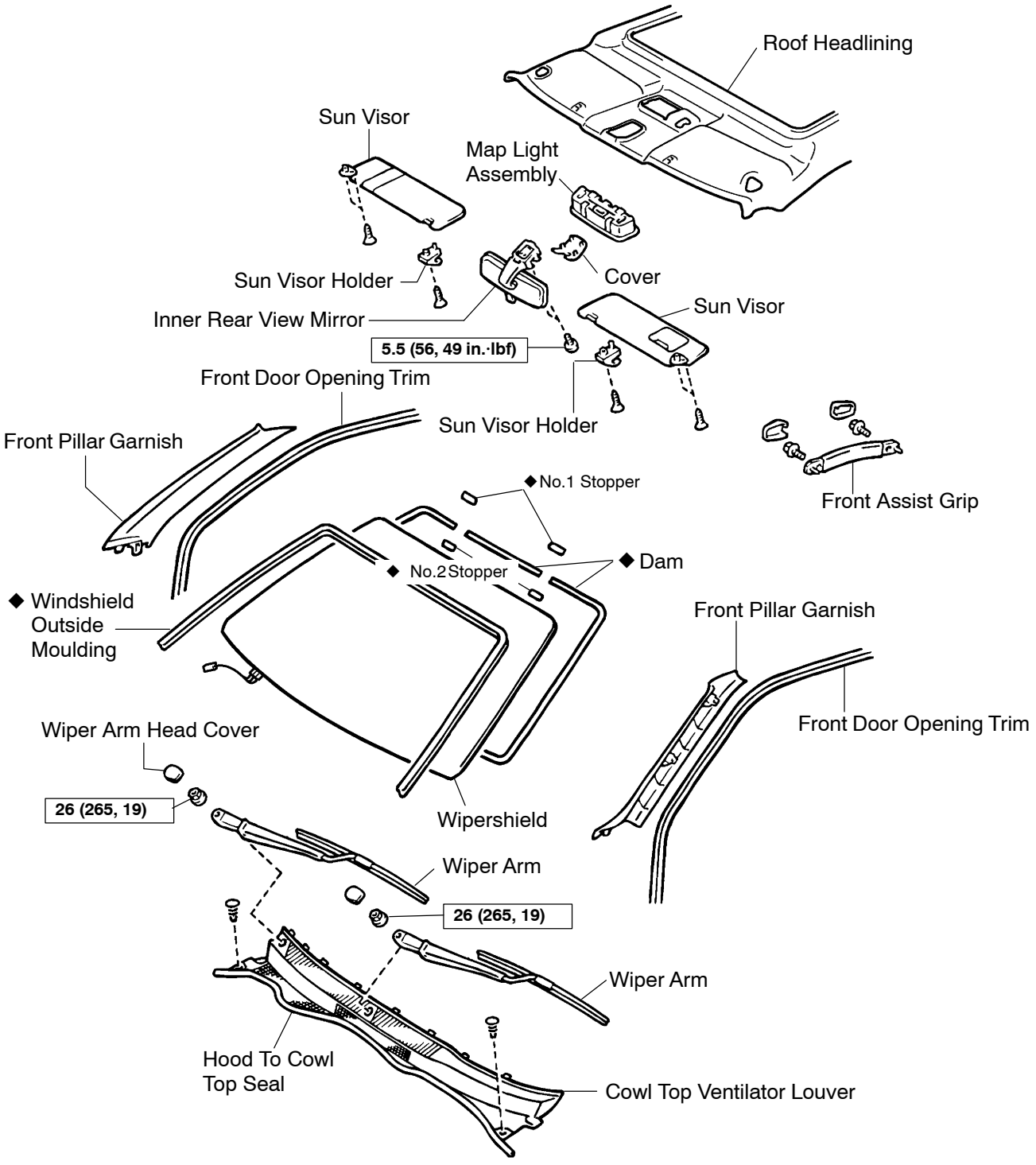
- **Make sure that the body and moulding are heated to the proper temperature.**
- **Do not depress the adhesive coated parrs excessively but just hold them down with your thumb.**
- **Scrape off any overflowing adhesive with a plastic spatula and clean the surface with a dry rag.**
- **Take care not to drive the vehicle during the time described in the chart below.**

Temperature	Minimum time prior to driving the vehicle
35 °C (95 °F)	1.5 hours
20 °C (68 °F)	5 hours
5 °C (41 °F)	24 hours

WINDSHIELD

COMPONENTS

BO22F–02



T

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

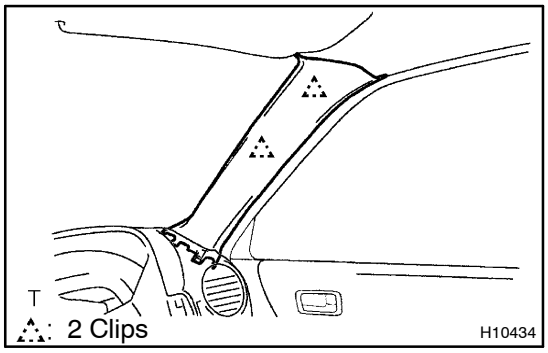
◆ Non–reusable part

H10405

BO2CO–01

REMOVAL

1. REMOVE FRONT PART OF FRONT DOOR OPENING TRIMS



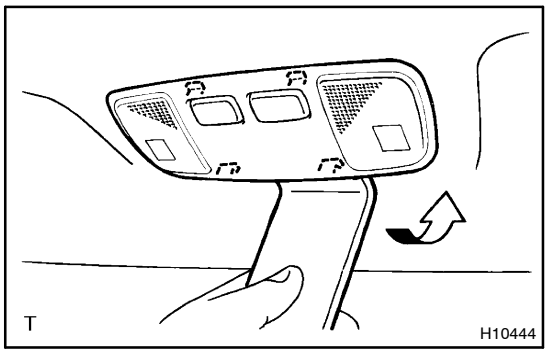
2. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

HINT:

Tape the screwdriver tip before use.

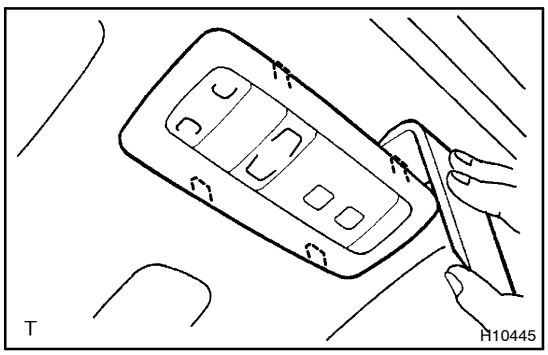
(b) Employ the same manner described above to the other side.



3. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the lens.

(b) Remove the 2 screws and map light assembly, then disconnect the connectors.



4. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the cover.

(b) Remove the 2 screws and map light assembly.

(c) Disconnect the connectors.

5. REMOVE SUN VISORS

(a) Remove the 2 screws and sun visor, then disconnect the connector.

(b) Employ the same manner described above to the other side.

6. REMOVE SUN VISOR HOLDERS

Remove the 2 screws and 2 sun visor holders.

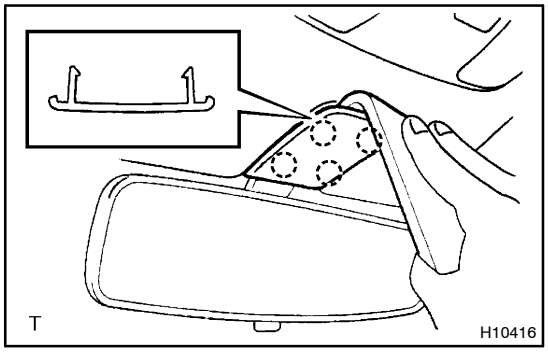
7. REMOVE FRONT ASSIST GRIP

(a) Using a screwdriver, remove the caps.

HINT:

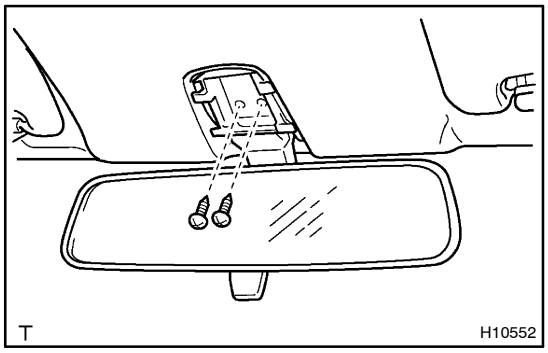
Tape the screwdriver tip before use.

(b) Remove the 2 bolts and assist grip.



8. REMOVE INNER REAR VIEW MIRROR

(a) Using a moulding remover, remove the cover as shown in the illustration.



(b) Remove the 2 screws and inner rear view mirror.

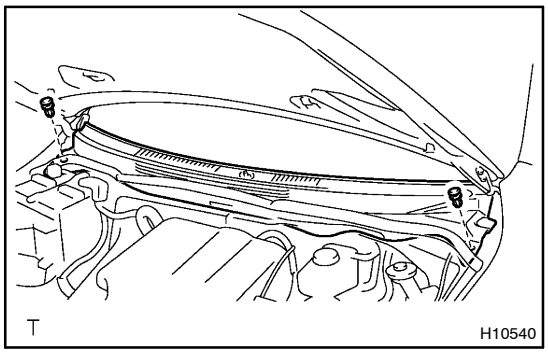
9. REMOVE WIPER ARMS

(a) Using a screwdriver, remove the 2 wiper arm head covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 nuts and 2 wiper arms.

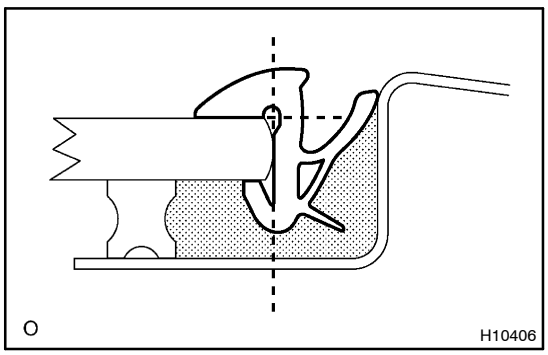


10. REMOVE COWL TOP VENTILATOR LOUVER

(a) Remove the hood to cowl top seal.

(b) Remove the 2 clips and cowl top ventilator louver.

11. PULL DOWN FRONT PART OF ROOF HEADLINING



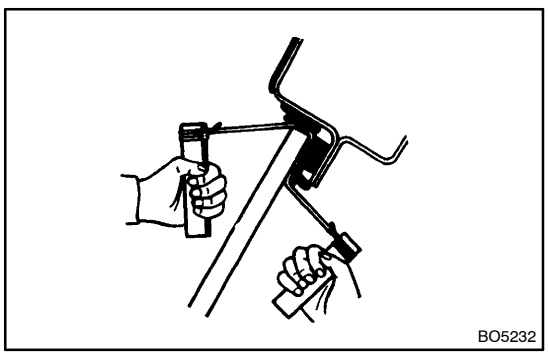
12. REMOVE WINDSHIELD OUTSIDE MOULDING

(a) Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

(b) Remove the remaining moulding.



13. REMOVE WINDSHIELD GLASS

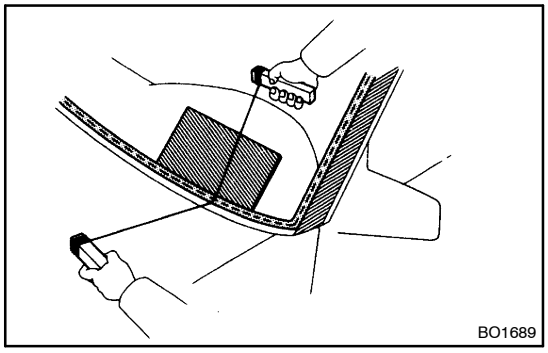
(a) Push piano wire through between the body and glass from the interior.

(b) Tie both wire ends to wooden blocks or similar objects.

(c) w/ Front window defogger:
Disconnect the connector.

NOTICE:

Be careful not to damage the wire harness.



(d) Cut the adhesive by pulling the piano wire around it.

NOTICE:

When separating the glass, take care not to damage the paint and exterior ornaments. To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

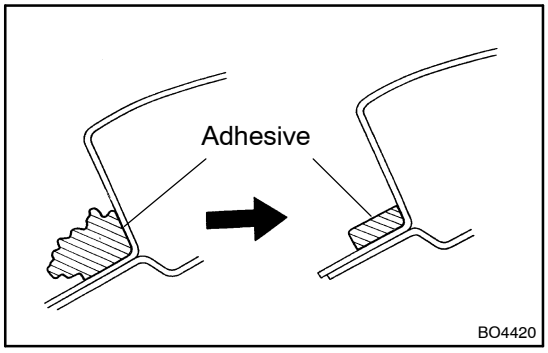
(e) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO2CP–01

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

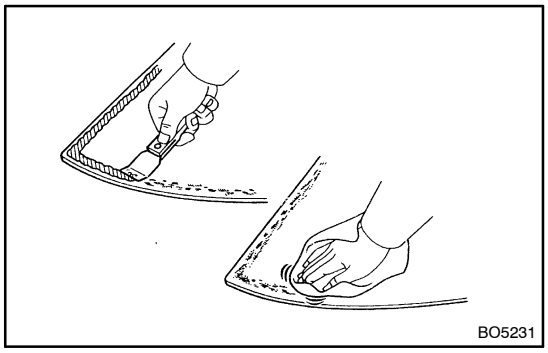
HINT:

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 cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. CLEAN REMOVED GLASS

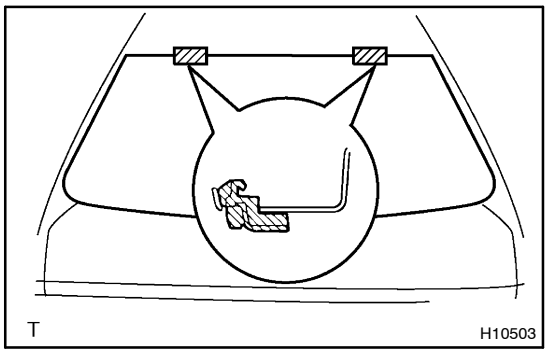
(a) Remove the damaged No.2 stoppers and dams.

(b) Using a scraper, remove the adhesive sticking to the glass.

(c) Clean the glass with cleaner.

NOTICE:

- **Be careful not to damage the glass.**
- **Do not touch the glass face after cleaning it.**



3. REPLACE NO.1 STOPPERS

(a) Remove the damaged stoppers.

(b) Cut off the old adhesive around the stoppers installation area.

NOTICE:

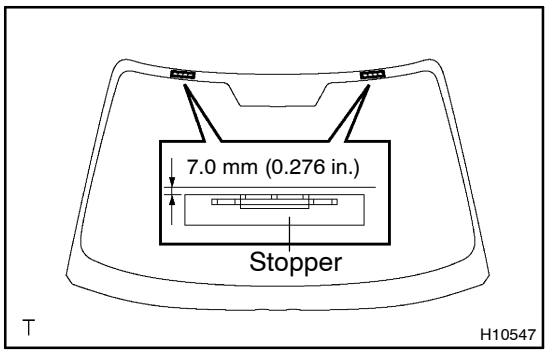
Be careful not to damage the body.

(c) Clean the installation area.

(d) Attach new stoppers to the body with the notches on the body aligned with the stoppers as shown in the illustration.

HINT:

Make sure that the stoppers are installed facing in the correct direction.

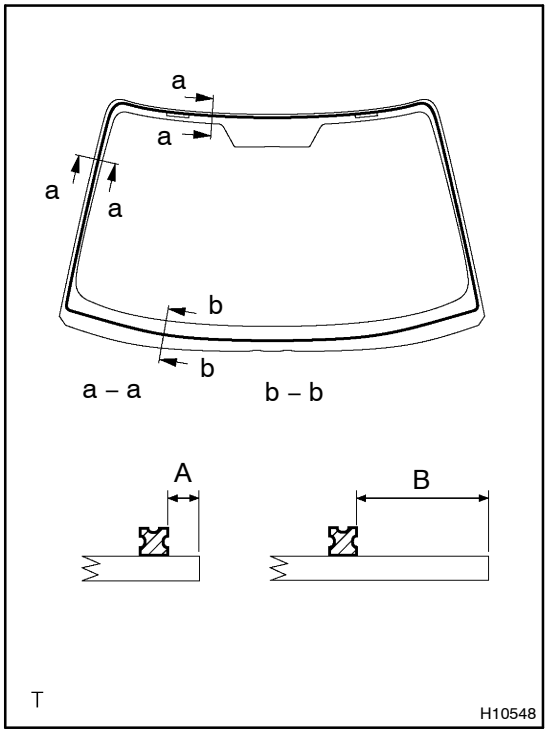


4. INSTALL NEW NO.2 STOPPERS

Attach new stoppers to the glass with the ceramic notches on the glass aligned with the stoppers as shown in the illustration.

HINT:

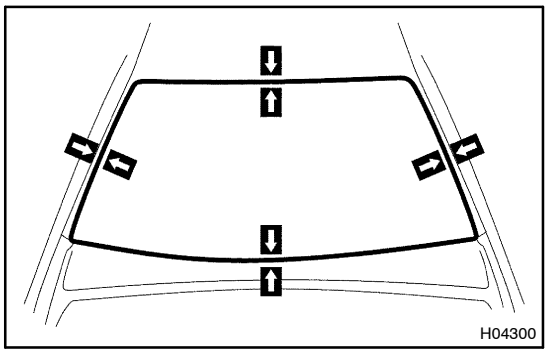
Make sure that the stoppers are installed facing in the correct direction.



5. INSTALL NEW DAMS

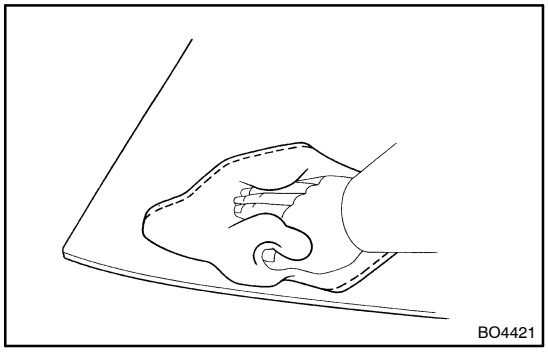
Install new dams with double–stick tape as shown in the illustration.

A: 7.0 mm (0.276 in.)
B: 35.9 mm (1.413 in.)



6. POSITION GLASS

(a) Place the 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.

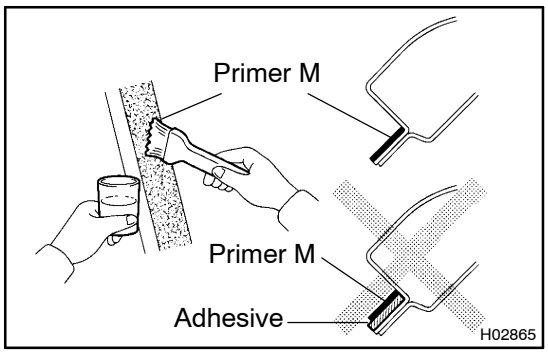


7. CLEAN CONTACT SURFACE OF GLASS

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.

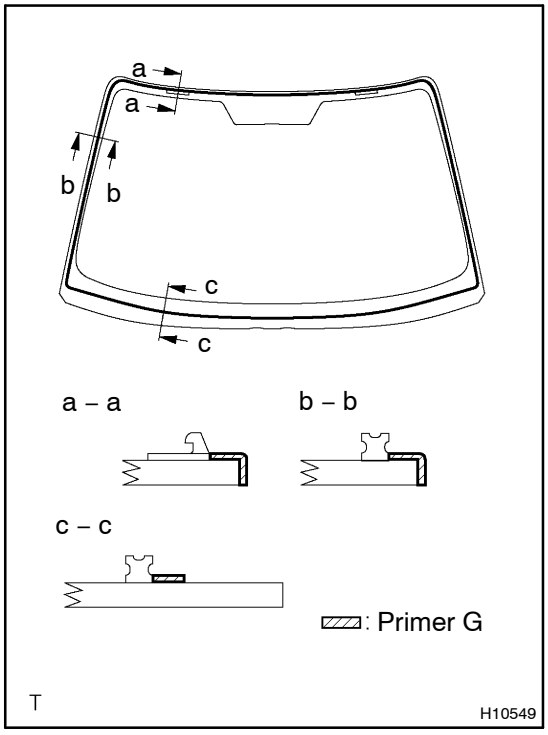


8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

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.**



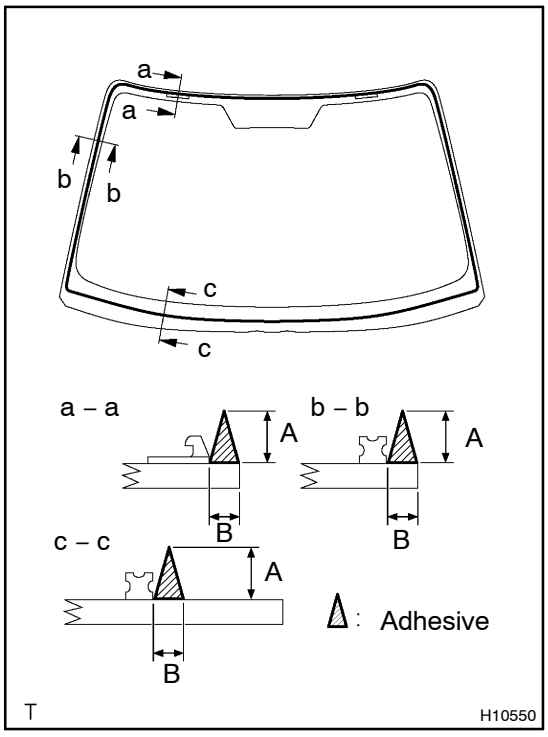
9. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

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

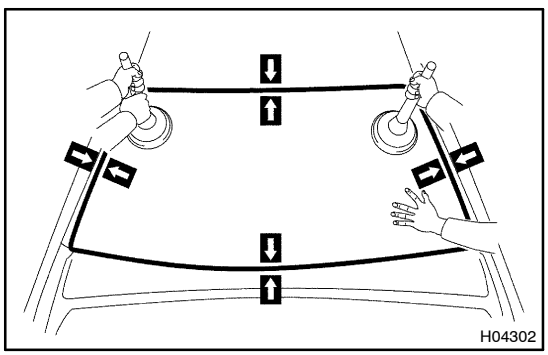
(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent

HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35 ˚C (95 ˚F)	15 minutes
20 ˚C (68 ˚F)	100 minutes
5 ˚C (41 ˚F)	8 hours

(b) Load the cartridge into the sealer gun.

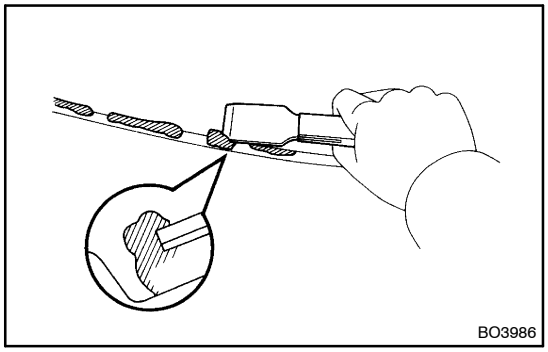
(c) Coat the glass with adhesive as shown in the illustration.
A: 12.5 mm (0.492 in.)
B: 8.0 mm (0.315 in.)



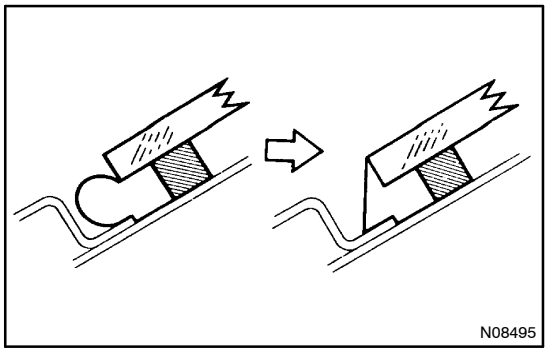
11. INSTALL GLASS

(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.


BO3986

(c) Use a scraper to remove any excess or protruding adhesive.

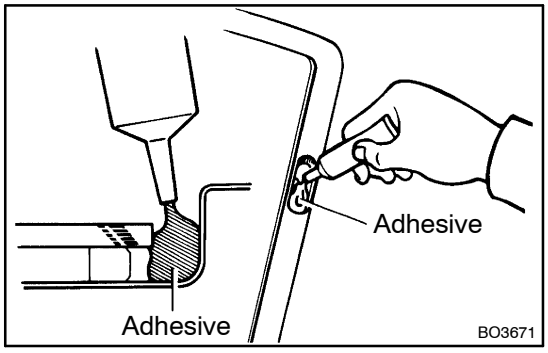

N08495

HINT:
Confirm that the dam is attached to the body panel as shown in the illustration.

(d) Hold the windshield glass in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:
Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35 ˚C (95 ˚F)	1.5 hours
20 ˚C (68 ˚F)	5 hours
5 ˚C (41 ˚F)	24 hours

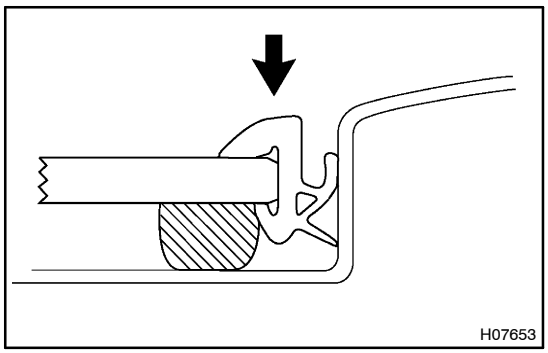


BO3671

12. APPLY ADHESIVE TO MOULDING INSTALLATION AREA

Apply adhesive to the moulding installation area between the glass and the body.

Part No. 08833–00030 or equivalent


H07653

13. INSTALL WINDSHIELD OUTSIDE MOULDING

Place new moulding onto the body and tap it by hand.

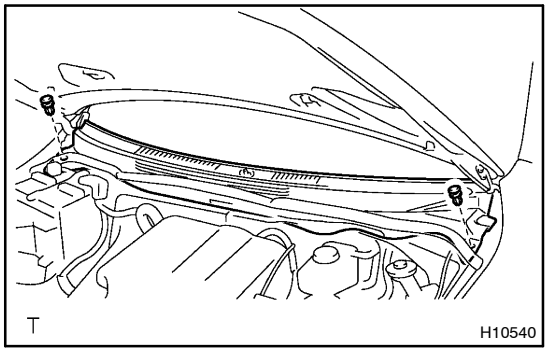
14. INSPECT FOR LEAK AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.

Part No. 08833–00030 or equivalent

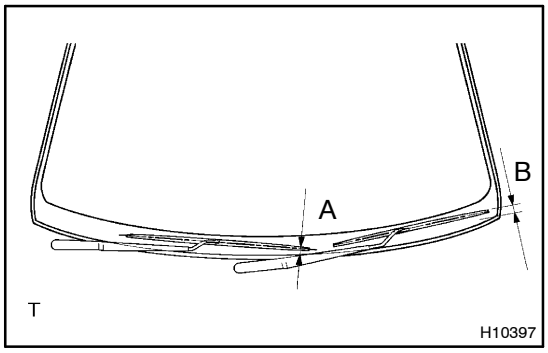
15. INSTALL FRONT PART OF ROOF HEADLINING



16. INSTALL COWL LOUVER

(a) Install the cowl louver with the 2 clips.

(b) Install the hood to cowl top seal.



17. INSTALL WIPER ARMS

(a) Operate the wipers once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the nuts by hand.

(c) Adjust the installation positions of the wiper arms to the positions as shown in the illustration.

A: 20.0 mm (0.787 in.)

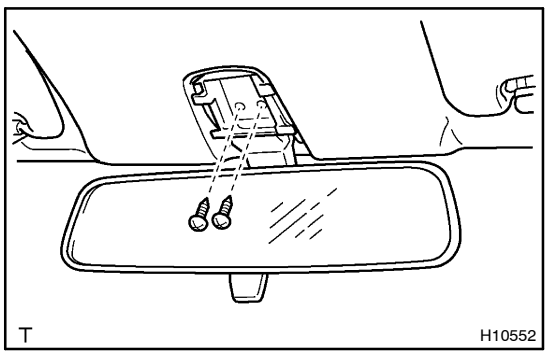
B: Europe: 25.0 mm (0.984 in.)

Australia: 28.0 mm (1.102 in.)

(d) Install the 2 wiper arms with the 2 nuts.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

(e) Install the 2 wiper arm head covers.



18. INSTALL INNER REAR VIEW MIRROR

(a) Install the inner rear view mirror with the 2 screws.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(b) Install the cover.

19. INSTALL FRONT ASSIST GRIP

(a) Install the assist grip with the 2 screws.

(b) Install the caps.

20. INSTALL SUN VISOR HOLDERS

Install the sun visor holders with the 2 screws.

21. INSTALL SUN VISORS

Connect the connectors, then install the sun visors with the 4 screws.

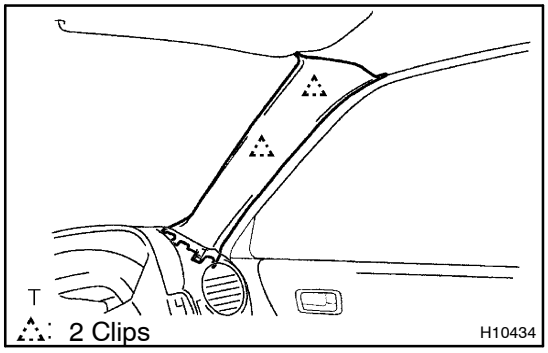
22. INSTALL MAP LIGHT ASSEMBLY

(a) Connect the connectors.

(b) Install the map light assembly with the 2 screws.

(c) w/o Sliding roof:
Install the lens.

(d) w/ Sliding roof:
Install the cover.



23. INSTALL FRONT PILLAR GARNISH

(a) Install the front pillar garnish to the body.

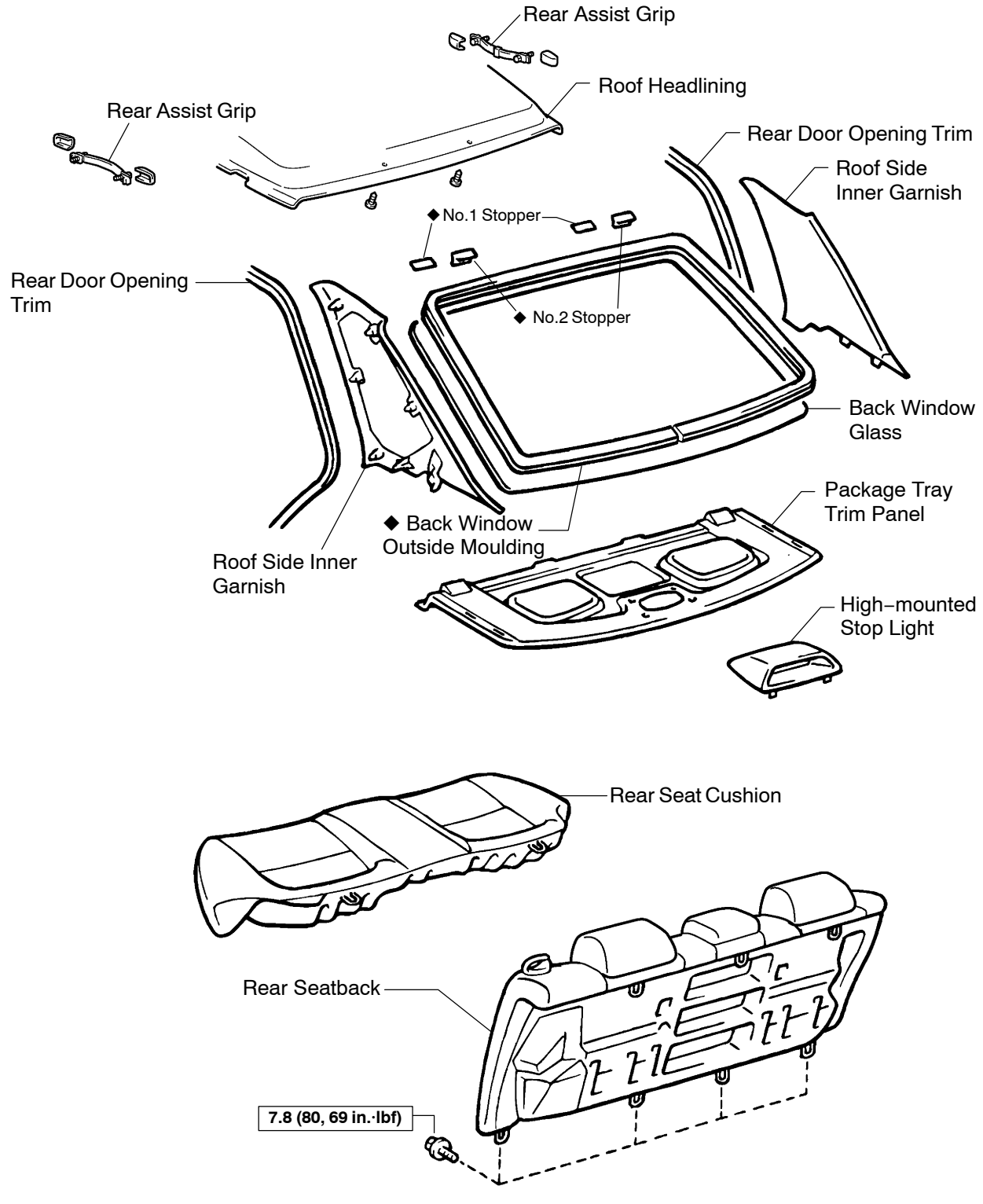
(b) Employ the same manner described above to the other side.

24. INSTALL FRONT PART OF FRONT DOOR OPENING TRIMS

BACK WINDOW GLASS

COMPONENTS

BO22L–02



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

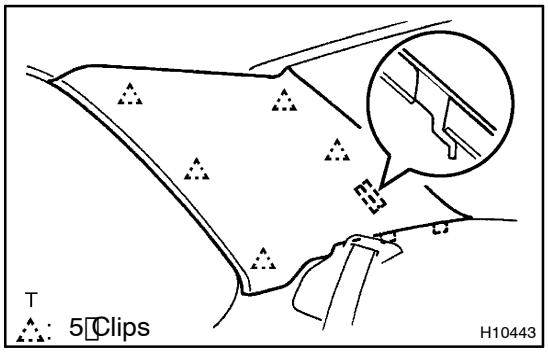
◆ Non–reusable part

H10411

BO2CQ–01

REMOVAL

1. REMOVE REAR SEAT CUSHION (See page BO–142)
2. REMOVE REAR SEATBACK (See page BO–142)
3. **REMOVE UPPER PART OF REAR DOOR OPENING TRIMS**



4. **REMOVE ROOF SIDE INNER GARNISH**

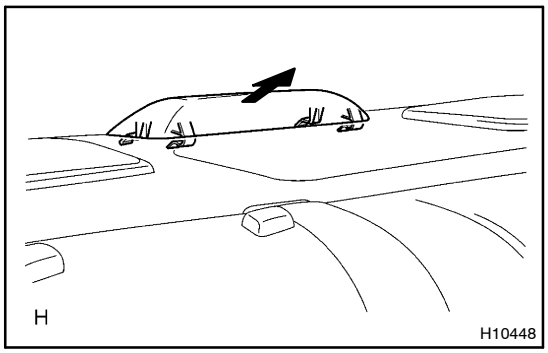
(a) Using a screwdriver, disengage the clips.

HINT:

Tape the screwdriver tip before use.

(b) Pull the garnish upward to remove it.

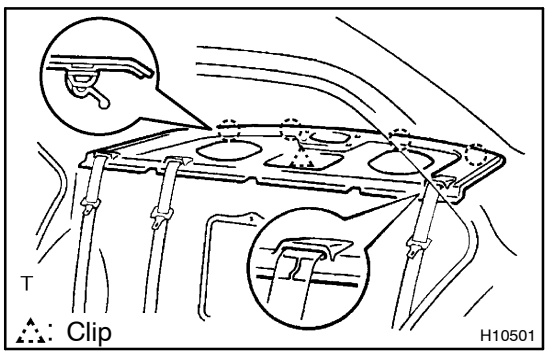
(c) Employ the same manner described above to the other side.



5. **REMOVE HIGH–MOUNTED STOP LIGHT**

(a) Remove the high–mounted stop light as shown in the illustration.

(b) Disconnect the connector.



6. **REMOVE PACKAGE TRAY TRIM PANEL**

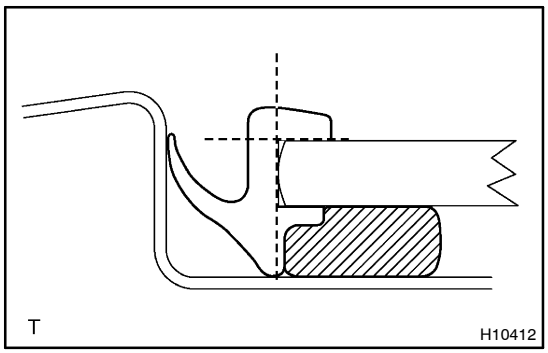
(a) Pull the package tray trim panel upward to disengage the clips.

(b) Remove the rear seat outer belts through the cutout on the package tray trim.

(c) Pull the package tray trim panel forward to remove it.

7. **REMOVE REAR ASSIST GRIPS**
8. **REMOVE REAR PART OF ROOF HEADLINING**

Remove the 2 clips.



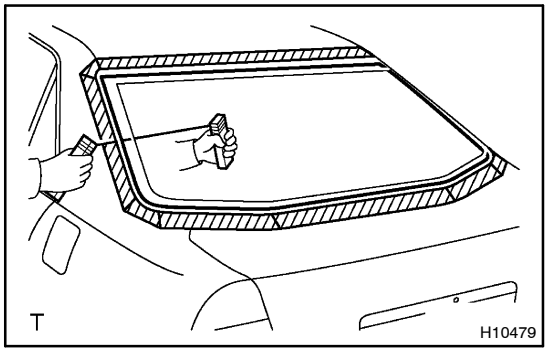
9. **REMOVE BACK WINDOW OUTSIDE MOULDING**

(a) Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

(b) Remove the remaining moulding.



10. REMOVE BACK WINDOW GLASS

(a) Disconnect the connector.

(b) Push piano wire through from the interior.

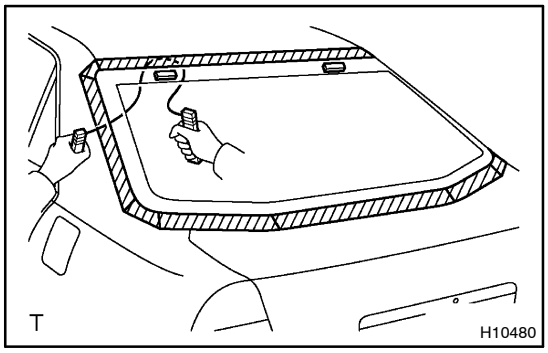
(c) Tie both wire ends to wooden blocks or similar objects.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

NOTICE:

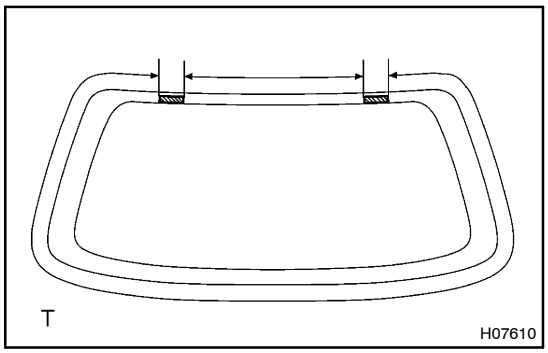
When separating the glass, take care not to damage the paint and exterior.



(d) Cut the adhesive by pulling the piano wire around it.

HINT:

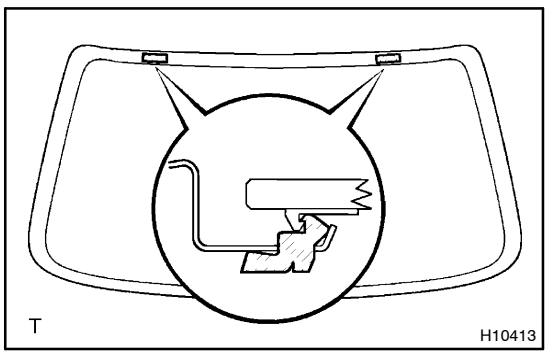
Cut the adhesive areas as shown in the illustration, leaving the adhesive where the stoppers are.



(e) Let the piano wire pass as shown in the illustration, cut off the adhesive sticking to the stoppers.

NOTICE:

Do not damage the glass stoppers.



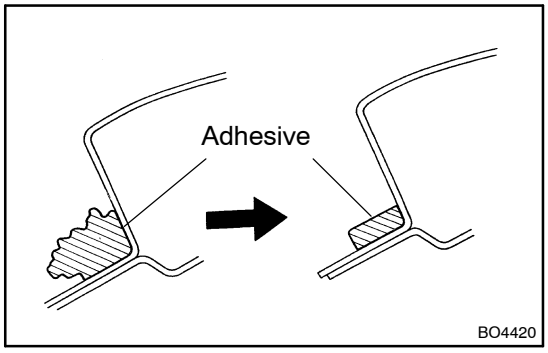
(f) Disengage the stoppers, then remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO2CR–01

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

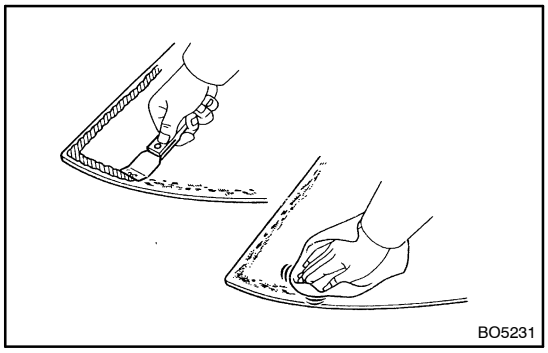
HINT:

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 cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. CLEAN REMOVED GLASS

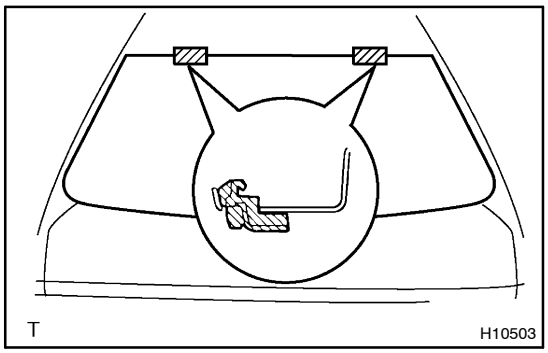
(a) Remove the damaged No.2 stoppers.

(b) Using a scraper, remove the adhesive sticking to the glass.

(c) Clean the glass with cleaner.

NOTICE:

- **Be careful not to damage the glass.**
- **Do not touch the glass face after cleaning it.**



3. REPLACE NO.1 STOPPERS

(a) Remove the damaged stoppers.

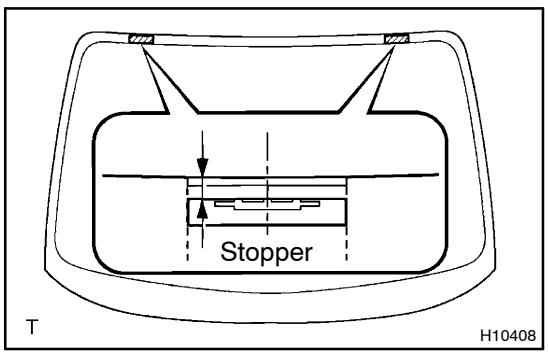
(b) Cut off the old adhesive around the stoppers installation area.

NOTICE:

Be careful not to damage the body.

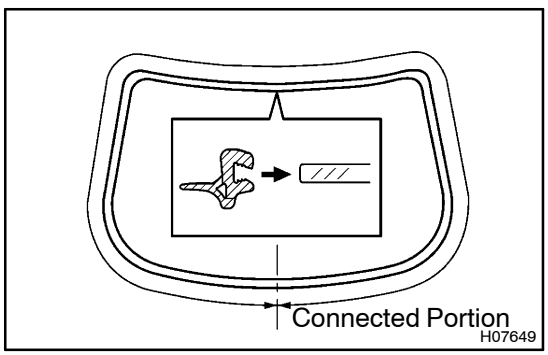
(c) Clean the installation area.

(d) Attach new stoppers to the body with the notches on the body aligned with the stoppers as shown in the illustration.



4. INSTALL NEW NO.2 STOPPERS

Attach new stoppers to the glass with the ceramic notches on the glass aligned with the stoppers as shown in the illustration.

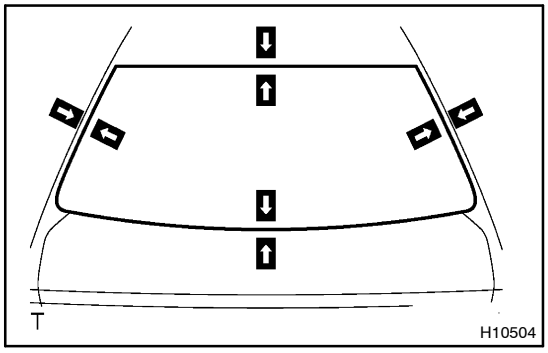


5. INSTALL NEW BACK WINDOW OUTSIDE MOULDING

Install new back window outside moulding to the back window glass as shown in the illustration.

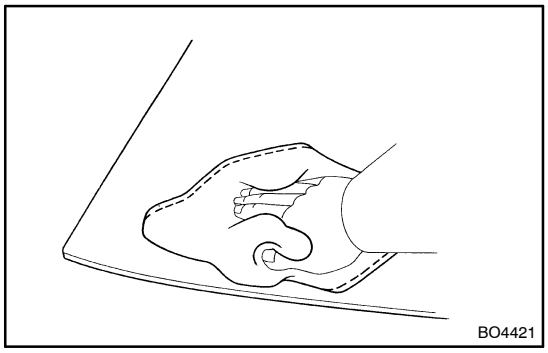
HINT:

- Install the back window outside moulding from the center of the glass at the lower side of the vehicle.
- When installing the back window outside moulding, do not stretch it.



6. POSITION GLASS

(a) Place the 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.

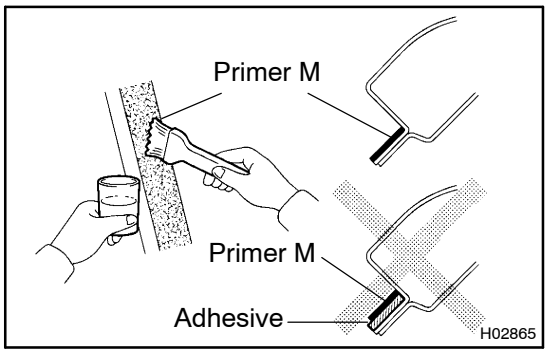


7. CLEAN CONTACT SURFACE OF GLASS

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.

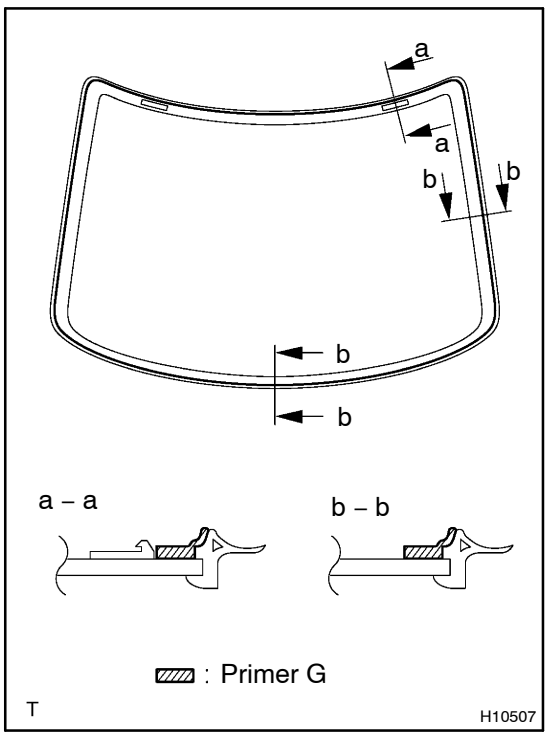


8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

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.**

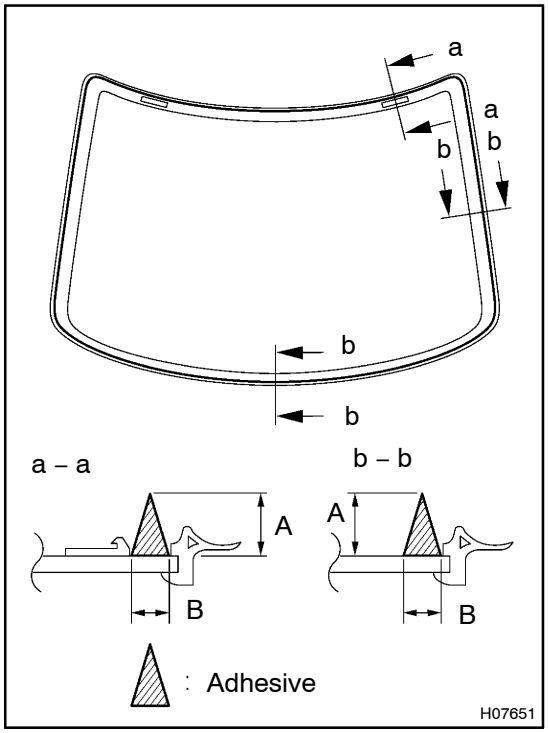


9. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.
(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**



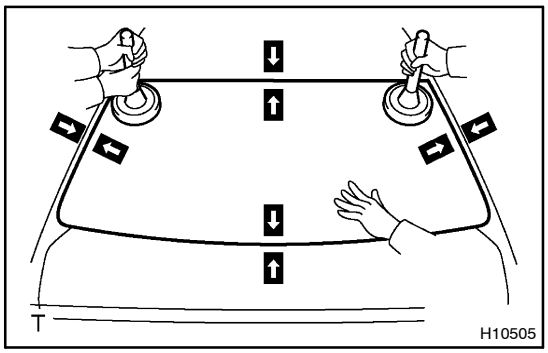
10. APPLY ADHESIVE

(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 table below.

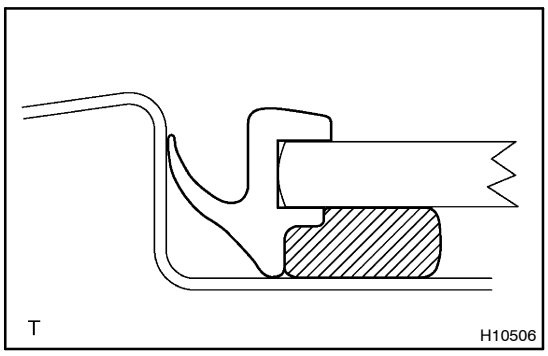
Temperature	Tackfree time
35 °C (95 °F)	15 minutes
20 °C (68 °F)	100 minutes
5 °C (41 °F)	8 hours

(b) Load the cartridge into the sealer gun.
(c) Coat the glass with adhesive as shown in the illustration.
A: 12.5 mm (0.492 in.)
B: 8.0 mm (0.315 in.)



11. INSTALL GLASS

(a) Position the glass so that the reference marks are lined up, and press in gently along the rim.



HINT:
Confirm that the moulding is attached to the body panel as shown in the illustration.

(b) Hold the back window glass in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:
Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35 °C (95 °F)	1.5 hours
20 °C (68 °F)	5 hours
5 °C (41 °F)	24 hours

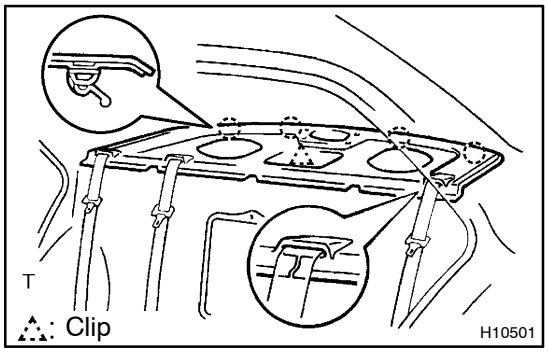
12. INSPECT FOR LEAK AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.
(b) Seal any leak with sealant.
Part No. 08833–00030 or equivalent

13. INSTALL REAR PART OF ROOF HEADLINING

Install the 2 clips.

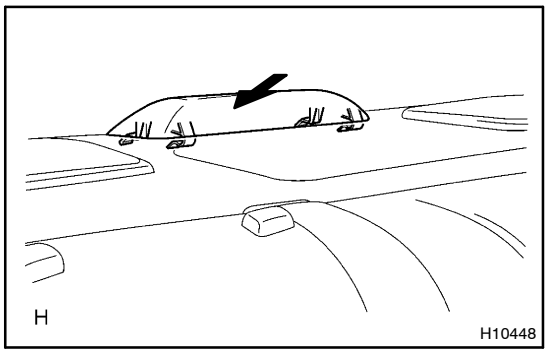
14. INSTALL REAR ASSIST GRIPS



15. INSTALL PACKAGE TRAY TRIM PANEL

(a) Install the seat belt through the cutout of the package tray trim.

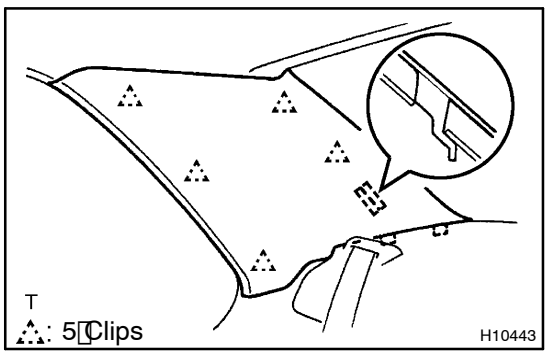
(b) Install the package tray trim as shown in the illustration.



16. INSTALL HIGH–MOUNTED STOP LIGHT

(a) Connect the connector.

(b) Install the high–mounted stop light as shown in the illustration.



17. INSTALL ROOF SIDE INNER GARNISH

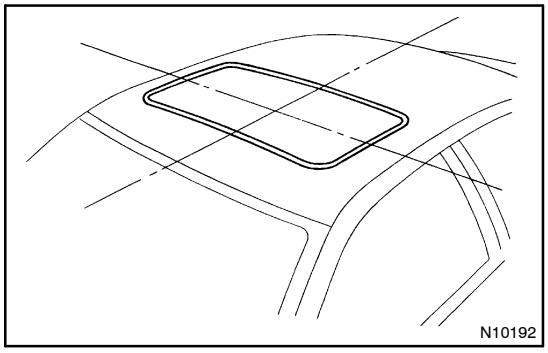
(a) Install the roof side inner garnish as shown in the illustration.

(b) Employ the same manner described above to the other side.

18. INSTALL UPPER PART OF REAR DOOR OPENING TRIMS

19. INSTALL REAR SEATBACK (See page BO–146)

20. INSTALL REAR SEAT CUSHION (See page BO–146)



SLIDING ROOF

BO0M1–03

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.

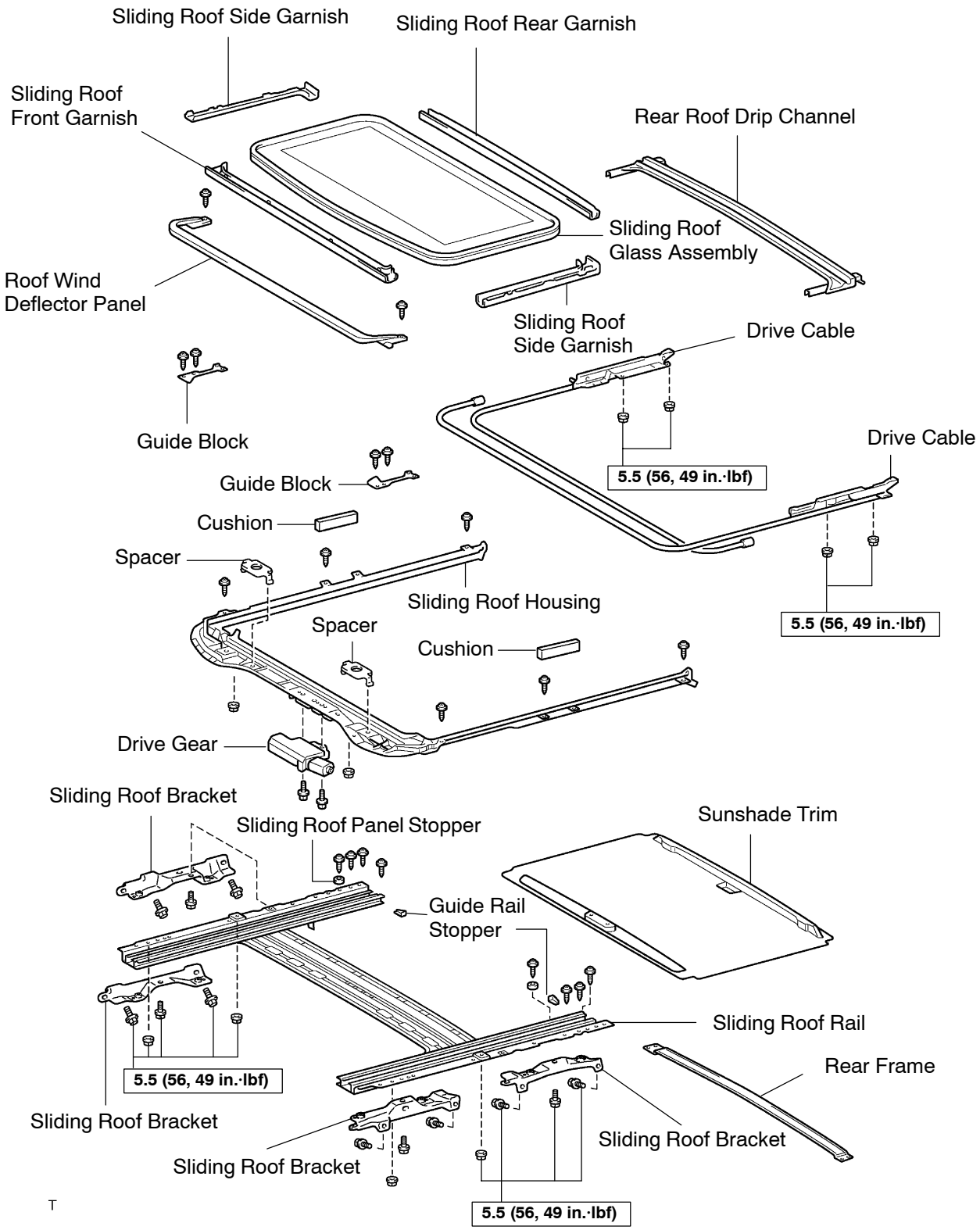
(b) Check for abnormal noise or binding during operation.

(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.
Front end:
0 − 2.0 mm (0 – 0.079 in.)
0 + 1.0 mm (0 + 0.039 in.)
Side end:
0 ± 1.5 mm (0 ± 0.059 in.)
Rear end:
0 – 1.0 mm (0 – 0.039 in.)
0 + 2.0 mm (0 + 0.079 in.)

BO0M2–03

COMPONENTS



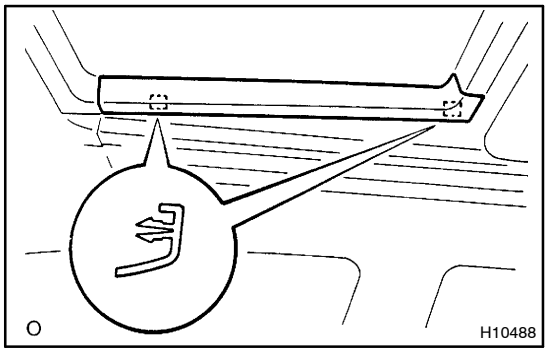
N·m (kgf·cm, ft·lbf) : Specified torque

H10510

BO2CS–01

REMOVAL

1. REMOVE ROOF HEADLINING
(See page BO–112)



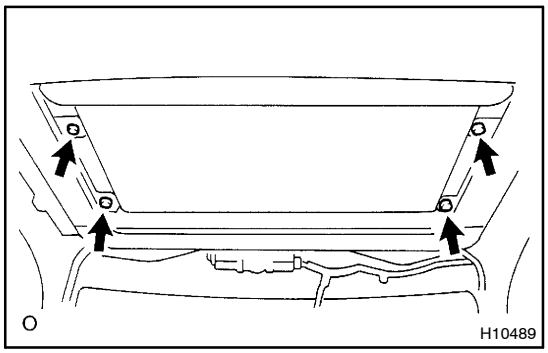
2. REMOVE SLIDING ROOF SIDE GARNISH

(a) Using a screwdriver, remove the garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



3. REMOVE SLIDING ROOF GLASS ASSEMBLY

(a) Using a torx wrench, remove the 4 nuts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

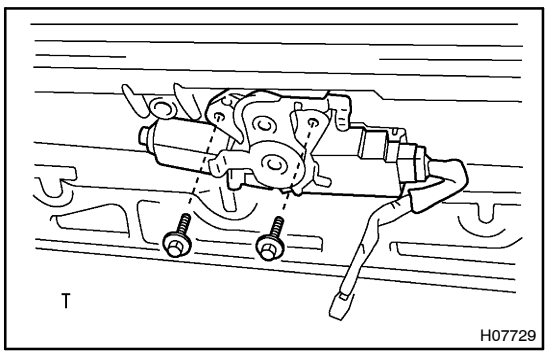
(b) Pull the glass upward to remove it.

4. REMOVE SLIDING ROOF FRONT AND REAR GARNISHES

Using a screwdriver, remove the front and rear garnishes.

HINT:

Tape the screwdriver tip before use.



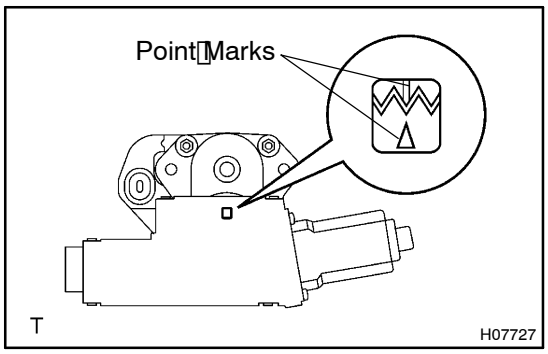
5. REMOVE DRIVE GEAR

NOTICE:

Remove the drive gear with the sliding roof fully closed.

(a) Disconnect the connector.

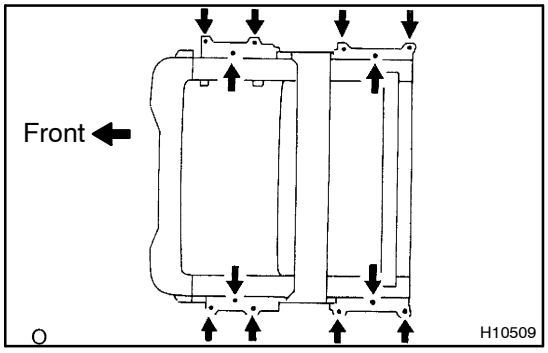
(b) Remove the 2 bolts and drive gear.



(c) Turn the drive gear to align the point marks as shown in the illustration.

NOTICE:

At the time of installation, please refer to the following item. If the sliding roof position and drive gear fully closed position are not matched, the sliding roof does not operate normally.



6. REMOVE SLIDING ROOF BRACKET

(a) Remove the 3 bolts and sliding roof bracket.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

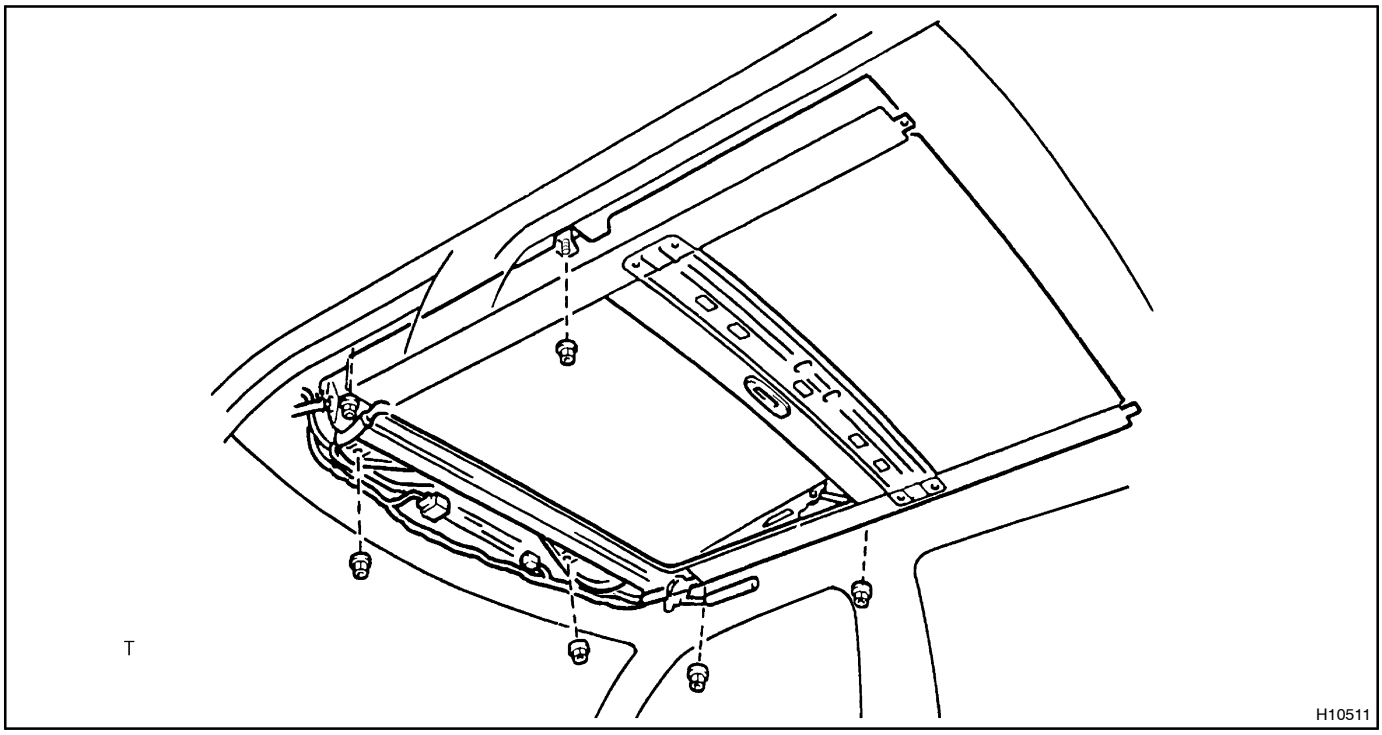
(b) Employ the same manner described above to the other sides.

7. REMOVE SLIDING ROOF HOUSING

(a) Disconnect the 4 drain hoses from the housing.

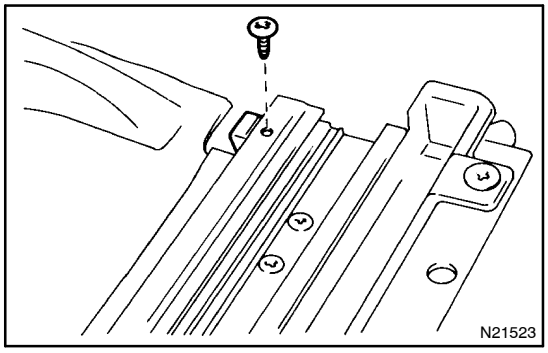
(b) Disengage the wire harness clamps.

(c) Remove the 6 nuts, then remove the housing as shown in the illustration.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)



BO0M4–03

DISASSEMBLY

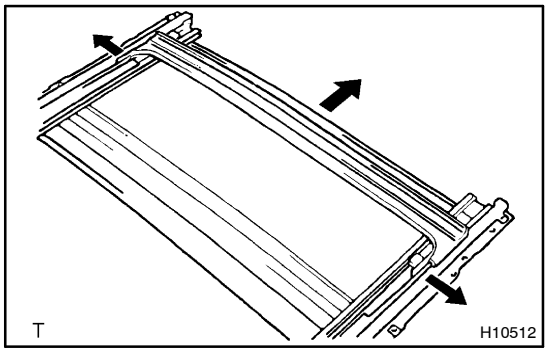


1. REMOVE GUIDE RAIL STOPPER

(a) Remove the screw and stopper.

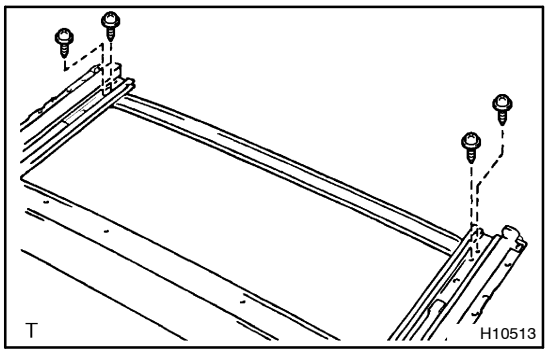
(b) Employ the same manner described above to the other side.

2. REMOVE SUNSHADE TRIM



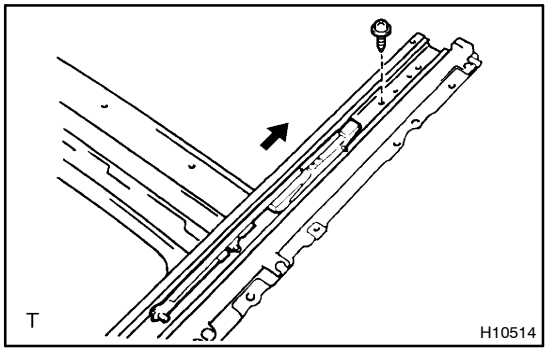
3. REMOVE REAR ROOF DRIP CHANNEL

Remove the rear roof drip channel as shown in the illustration.



4. REMOVE REAR FRAME

Remove the 4 screws and rear frame.

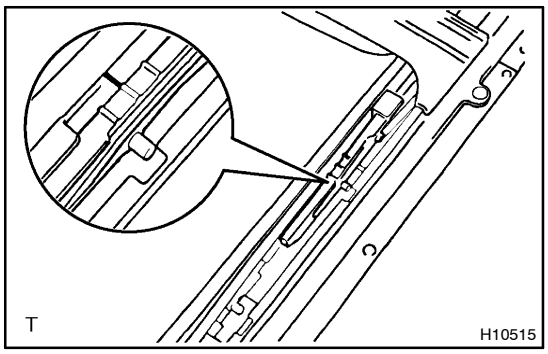


5. REMOVE DRIVE CABLE

(a) Remove the screw and sliding roof panel stopper.

(b) Slide the drive cable rearward, then remove it.

(c) Employ the same manner described above to the other side.

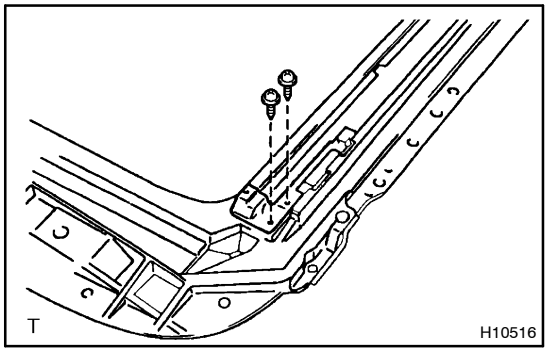


HINT:

At the time of reassembly, 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 in the illustration.
- Slide the cable to the forefront with your hand.

6. REMOVE ROOF WIND DEFLECTOR PANEL

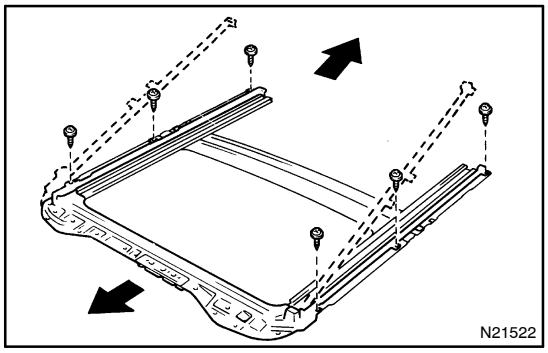


7. REMOVE GUIDE BLOCK

(a) Remove the 2 screws and guide block.

(b) Employ the same manner described above to the other side.

8. REMOVE 2 CUSHIONS

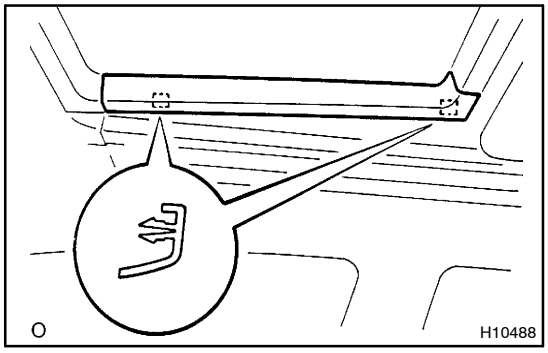


9. REMOVE SLIDING ROOF HOUSING

Remove the 6 screws and sliding roof housing.

BO0M5–03

ADJUSTMENT



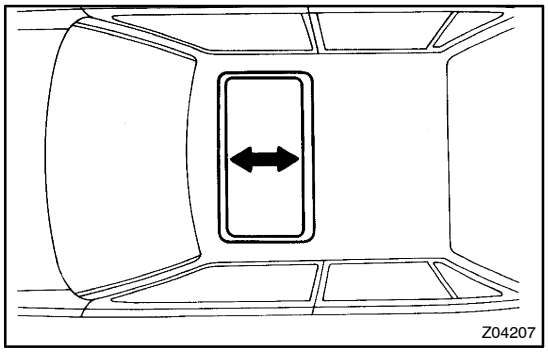
1. REMOVE SIDE GARNISH

HINT:

- Tape the screwdriver tip before use.
- After adjustment, reinstall the side garnishes.

(a) Before making adjustments, using a screwdriver, remove the side garnish.

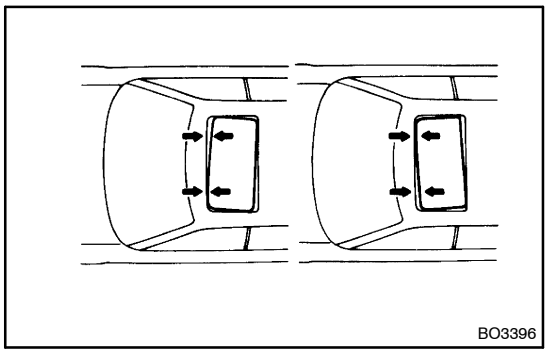
(b) Employ the same manner described above to the other side.



2. TO ADJUST FORWARD OR REARWARD

(a) Loosen the sliding roof glass installation nuts.

(b) Adjust the sliding roof glass forward and rearward.

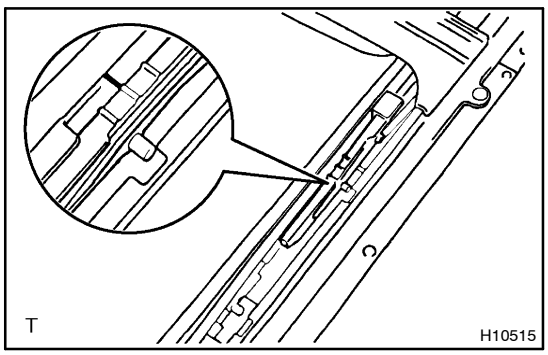


3. TO ADJUST CLEARANCE
(Difference in left and right clearance)

(a) When the front or rear alignment is not correct, remove the drive gear and sliding roof glass, then adjust the drive rail.

NOTICE:

Remove the drive gear with sliding roof fully closed.



(b) Adjust by sliding the cable forward or rearward to align the 2 marks as shown in the illustration.

(c) Install the drive gear and sliding roof glass.

BO22O–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–88).

BO0M7–02

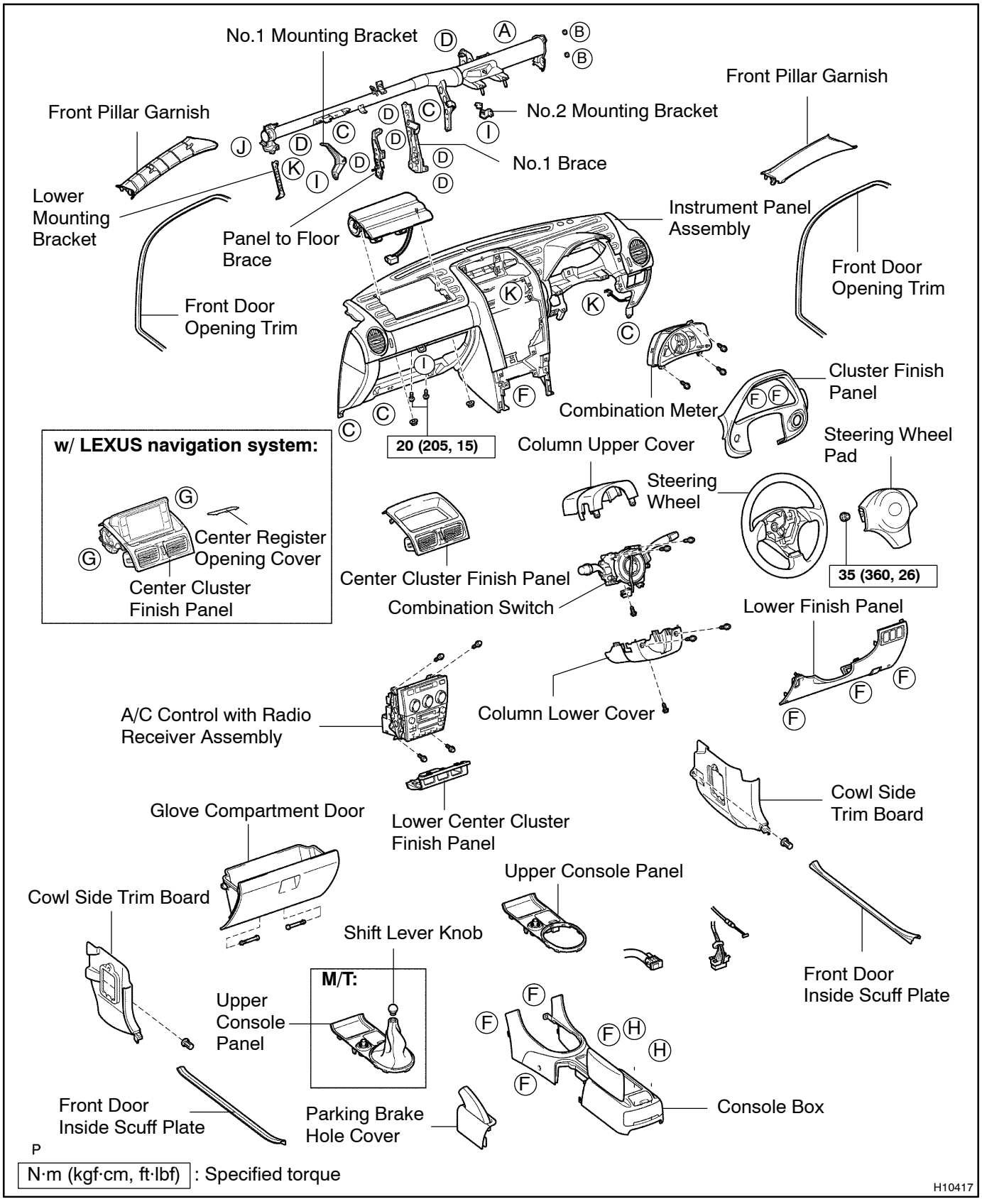
INSTALLATION

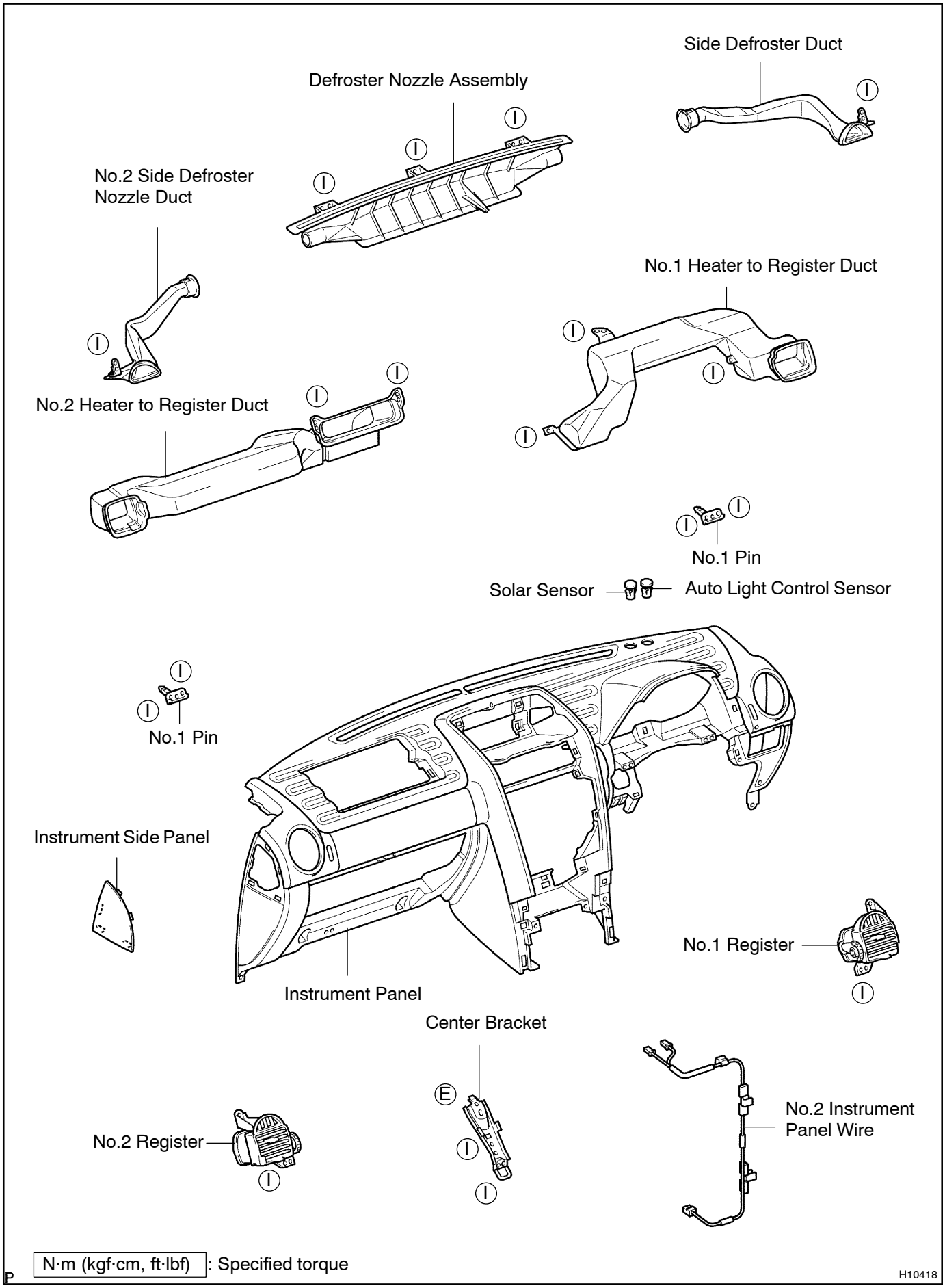
Installation is in the reverse order of removal (See page BO–86).

INSTRUMENT PANEL

COMPONENTS

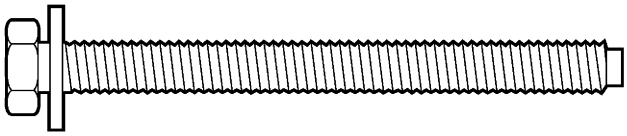
BO2CT–01

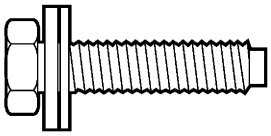
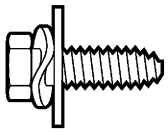


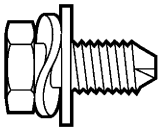
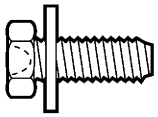
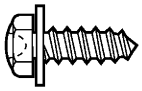
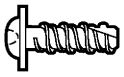
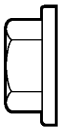
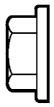

Side Defroster Duct
Defroster Nozzle Assembly
No.2 Side Defroster Nozzle Duct
No.1 Heater to Register Duct
No.2 Heater to Register Duct
No.1 Pin
Solar Sensor
Auto Light Control Sensor
No.1 Pin
Instrument Side Panel
Instrument Panel
No.1 Register
Center Bracket
No.2 Register
No.2 Instrument Panel Wire
N·m (kgf·cm, ft·lbf) : Specified torque
H10418

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.)

code	Shape	Size
Ⓐ		ø = 8 (0.31) L = 90 (3.54)

code	Shape	Size	code	Shape	Size
Ⓑ		ø = 8 (0.31) L = 35 (1.38)	Ⓒ		ø = 6 (0.24) L = 20 (0.79)

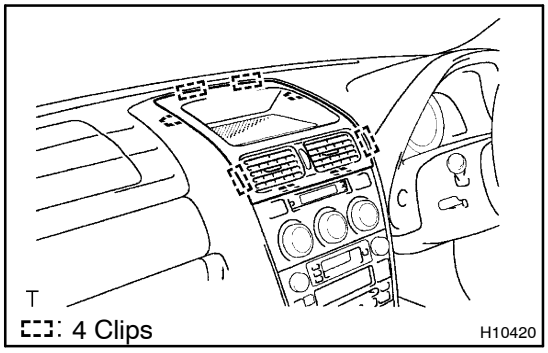
code	Shape	Size	code	Shape	Size	code	Shape	Size
Ⓓ		ø = 8 (0.31) L = 18 (0.71)	Ⓔ		ø = 6 (0.24) L = 18 (0.71)	Ⓕ		ø = 5.22 (0.2055) L = 16 (0.63)
Ⓖ		ø = 5 (0.20) L = 16 (0.63)	Ⓗ		ø = 5 (0.20) L = 16 (0.63)	Ⓘ		ø = 5 (0.20) L = 14 (0.55)
Ⓙ		ø = 8 (0.31)	Ⓚ		ø = 6 (0.24)			

T

H11337

BO2CU–01

REMOVAL



1. REMOVE CENTER CLUSTER FINISH PANEL

(a) w/ LEXUS navigation system:
Using a screwdriver, remove center register opening cover.

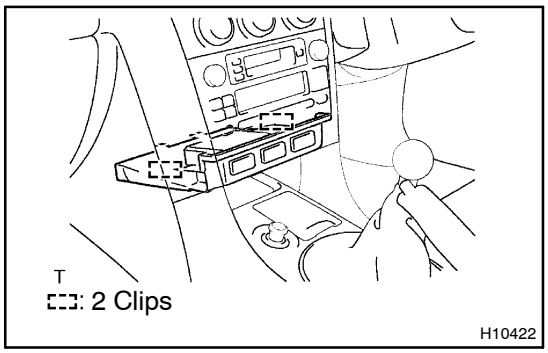
HINT:
Tape the screwdriver tip before use.

(b) w/ LEXUS navigation system:
Remove the 2 screws.

(c) Using a screwdriver, remove center cluster finish panel.

HINT:
Tape the screwdriver tip before use.

(d) w/ LEXUS navigation system:
Disconnect the connectors.

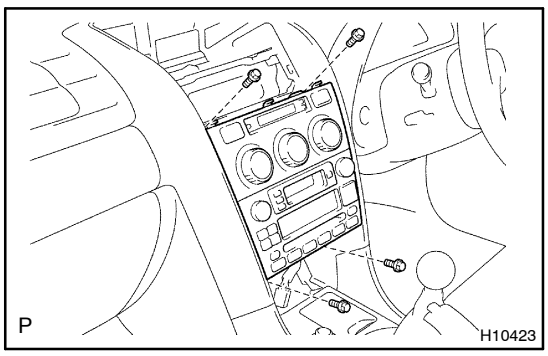


2. REMOVE LOWER CENTER CLUSTER FINISH PANEL

(a) Using a screwdriver, remove the lower center cluster finish panel.

HINT:
Tape the screwdriver tip before use.

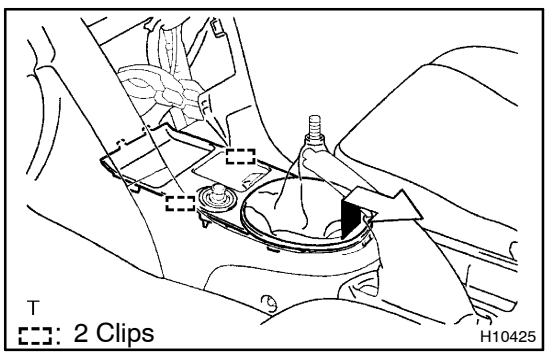
(b) Disconnect the connectors.



3. REMOVE A/C CONTROL WITH RADIO RECEIVER ASSEMBLY

(a) Remove the 4 bolts and A/C control with radio receiver assembly.

(b) Disconnect the connectors.



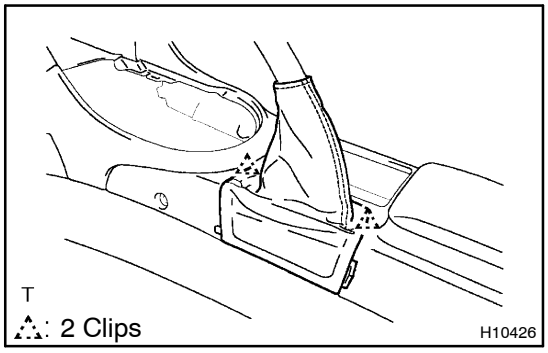
4. REMOVE UPPER CONSOLE PANEL

(a) M/T:
Remove the shift lever knob.

(b) Using a screwdriver, remove the upper console panel as shown in the illustration.

HINT:
Tape the screwdriver tip before use.

(c) Disconnect the connector.

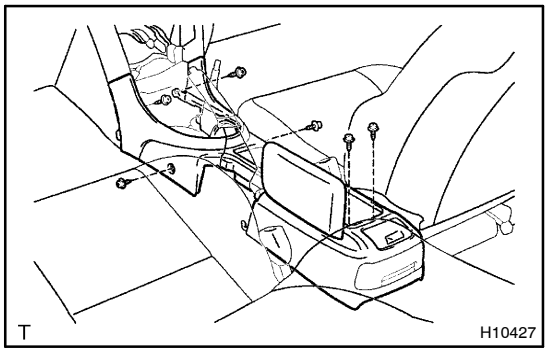


5. REMOVE PARKING BRAKE HOLE COVER

Using a screwdriver, remove the parking brake hole cover.

HINT:

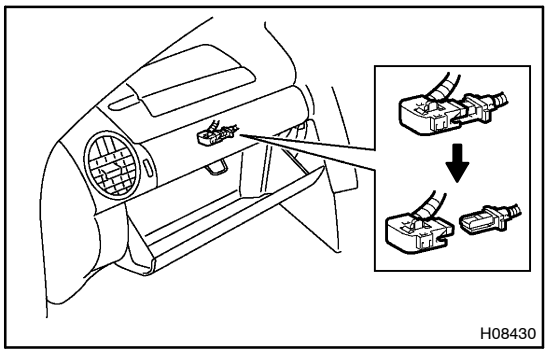
Tape the screwdriver tip before use.



6. REMOVE CONSOLE BOX

(a) Remove the 6 screws.

(b) Pull the console box rearward to remove it.



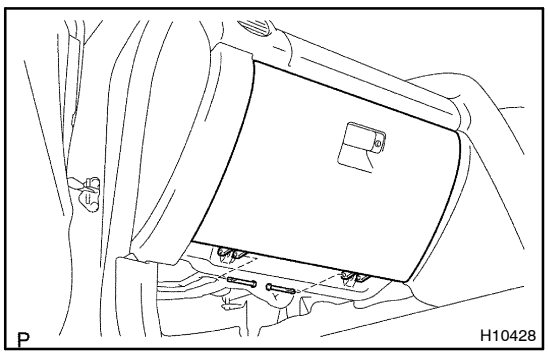
7. DISCONNECT PASSENGER AIRBAG CONNECTOR

(a) Using a clip remover, disengage the connector clamp.

(b) Disconnect the passenger airbag connector.

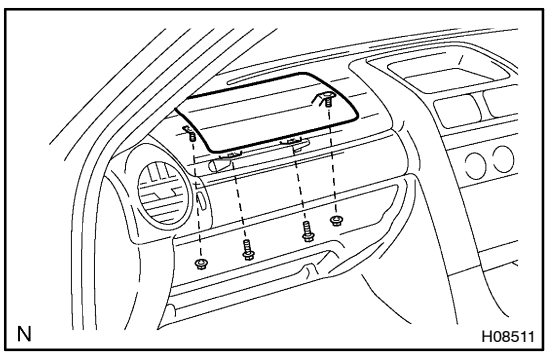
NOTICE:

When disconnecting the airbag connector, take care not to damage the airbag wire harness.



8. REMOVE GLOVE COMPARTMENT DOOR

Disconnect the hinge shaft and remove the glove compartment door.



9. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

Remove the 2 bolts, 2 nuts and from passenger airbag assembly from the instrument panel.

Torque:

Bolt: 20 N·m (205 kgf·cm, 15 ft·lbf.)

Nut: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

CAUTION:

- **Do not store the front passenger airbag assembly with the airbag deployment side facing downward.**
- **Never disassemble the front passenger airbag assembly.**

10. REMOVE STEERING WHEEL PAD (See page SR–12)

11. REMOVE STEERING WHEEL (See page SR–12)

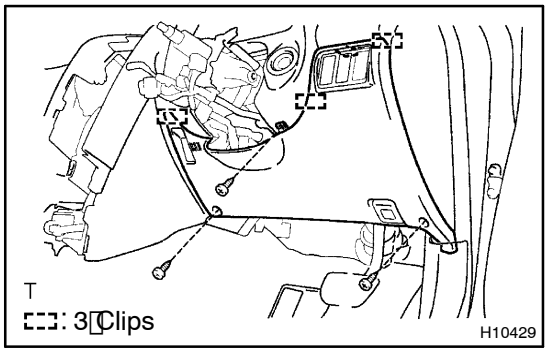
12. REMOVE COLUMN UPPER AND LOWER COVERS (See page SR–12)

13. REMOVE SPIRAL CABLE (See page SR–12)

14. REMOVE LOWER FINISH PANEL

(a) Remove the 3 screws and lower finish panel.

(b) Disconnect the connectors and hood lock control cable.



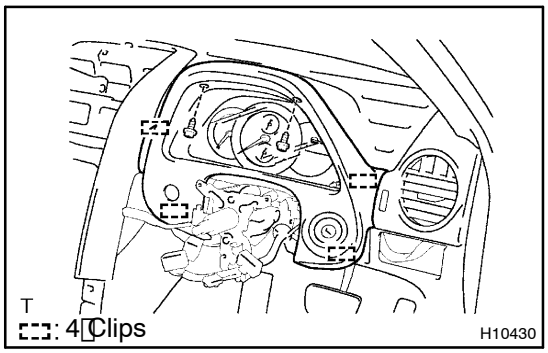
15. REMOVE CLUSTER FINISH PANEL

(a) Remove the 2 screws.

(b) Using a screwdriver, remove the cluster finish panel.

HINT:

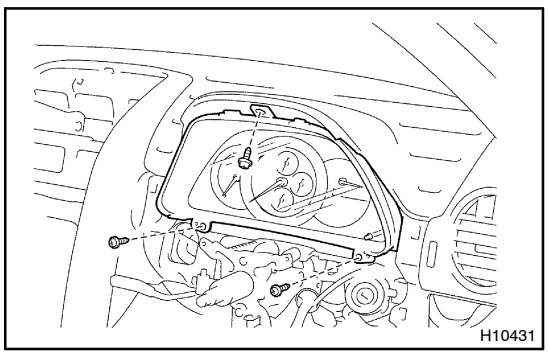
Tape the screwdriver tip before use.



16. REMOVE COMBINATION METER

(a) Remove the 3 screws and combination meter.

(b) Disconnect the connector.



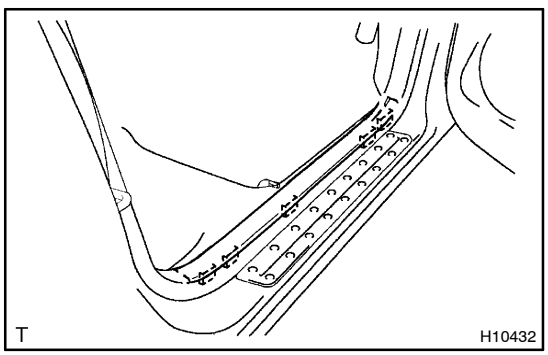
17. REMOVE FRONT DOOR INSIDE SCUFF PLATE

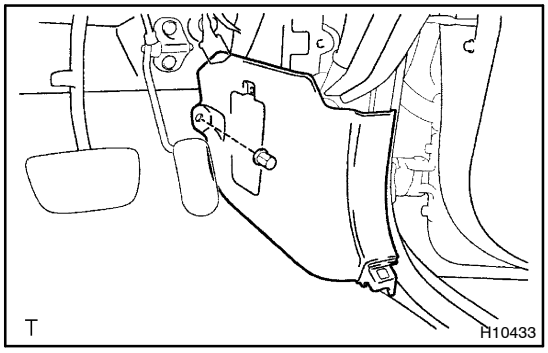
(a) Using a screwdriver, remove the front door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.





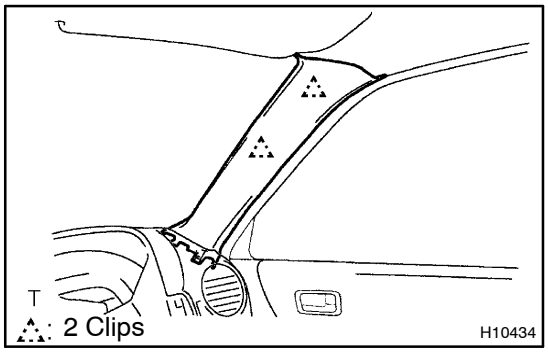
18. REMOVE COWL SIDE TRIM BOARD

(a) Remove the clip.

(b) Pull the cowl side trim board rearward to remove it.

(c) Employ the same manner described above to the other side.

19. REMOVE FRONT PART OF FRONT DOOR OPENING TRIMS



20. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove front pillar garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

21. REMOVE INSTRUMENT PANEL

(a) Disconnect the connectors.

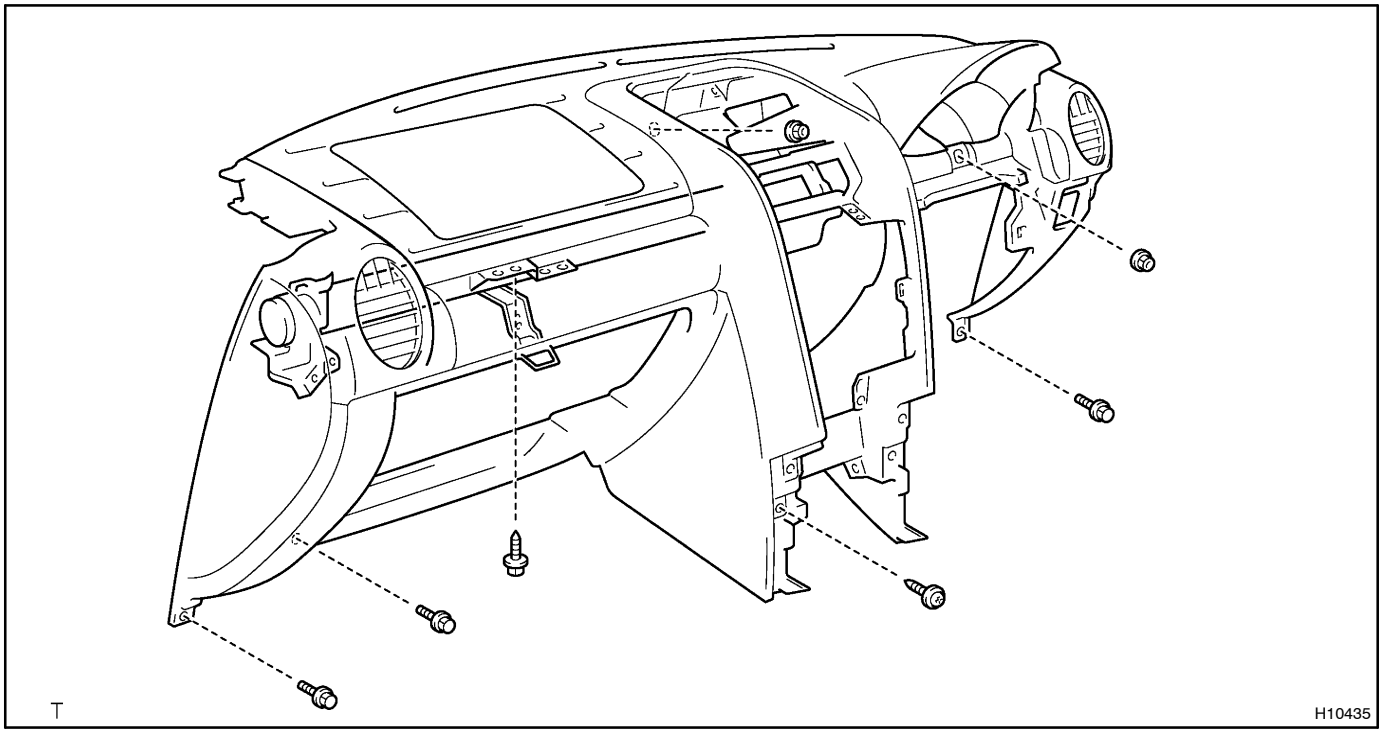
(b) Disengage the wire harness clamps.

(c) Remove the 3 bolts, 2 screws and 2 nuts.

(d) Pull the instrument panel rearward to remove it.

NOTICE:

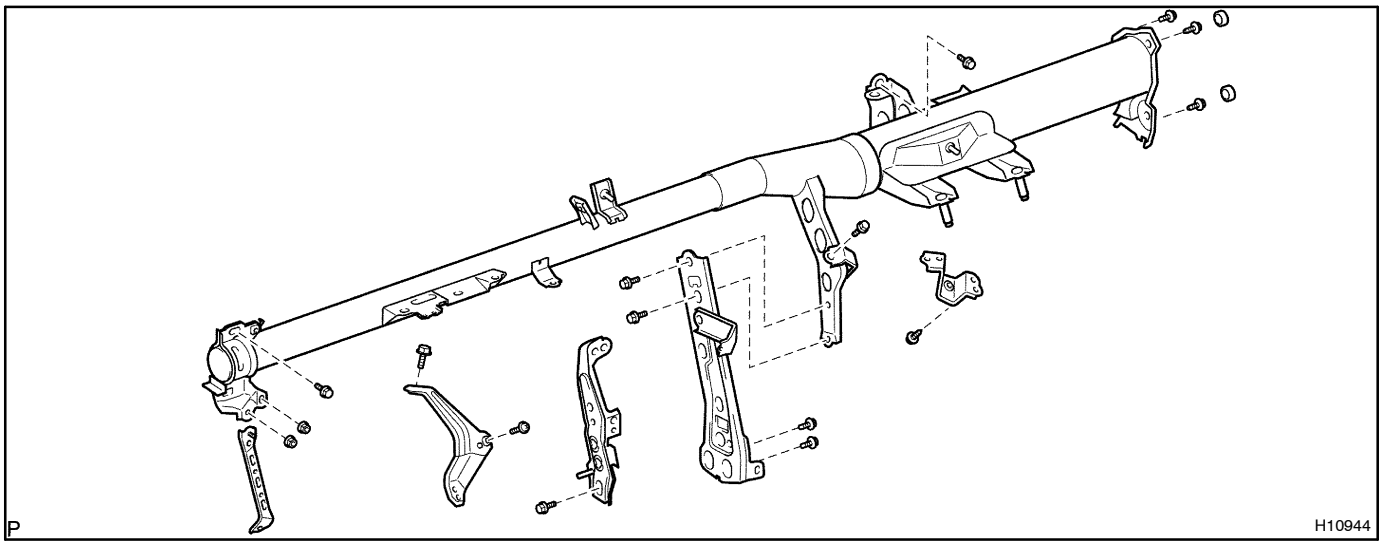
Be careful not to damage the instrument panel and wire harness.



22. REMOVE INSTRUMENT PANEL REINFORCEMENT

(a) Disengage the wire harness clamps.
(b) Remove the 2 nuts and wire harness from the reinforcement.
(c) Remove the bolt and ground cable.
(d) Remove the bolt, screw and No.1 mounting bracket.
(e) Remove the bolt and panel to floor brace LH.
(f) Remove the bolt and No.2 mounting bracket.
(g) Remove the 4 bolts and No.1 brace.
(h) Remove the 5 bolts, 2 nuts, instrument panel reinforcement and lower mounting bracket.

NOTICE:
Be careful not to damage the body and wire harness.



BO2CV–01

DISASSEMBLY

1. REMOVE SIDE DEFROSTER DUCT

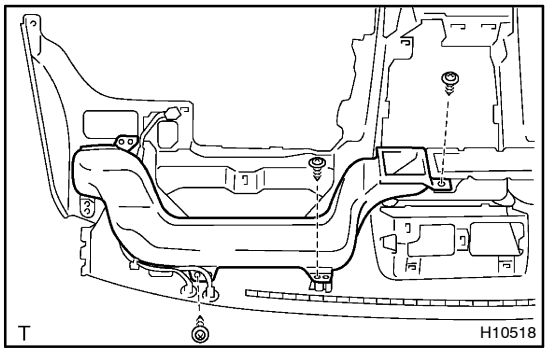
Remove the screw, then disconnect the side defroster duct as shown in the illustration.

2. REMOVE NO.2 SIDE DEFROSTER NOZZLE DUCT

Employ the same manner described in the above step.

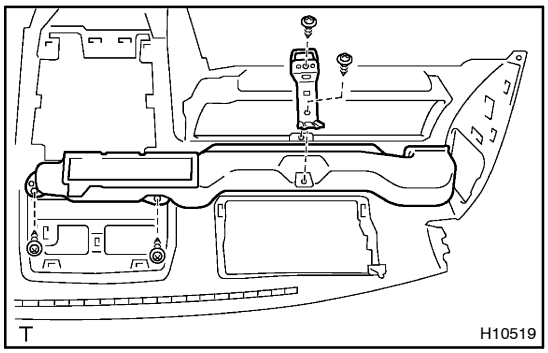
3. REMOVE DEFROSTER NOZZLE ASSEMBLY

Remove the 3 screws and defroster nozzle assembly.



4. REMOVE NO.1 HEATER TO REGISTER DUCT

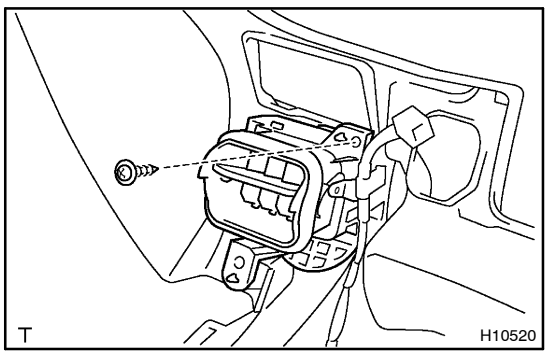
Remove the 3 screws and No.1 heater to register duct.



5. REMOVE NO.2 HEATER TO REGISTER DUCT

(a) Remove the 2 screws and center bracket.

(b) Remove the 2 screws and No.2 heater to register duct.

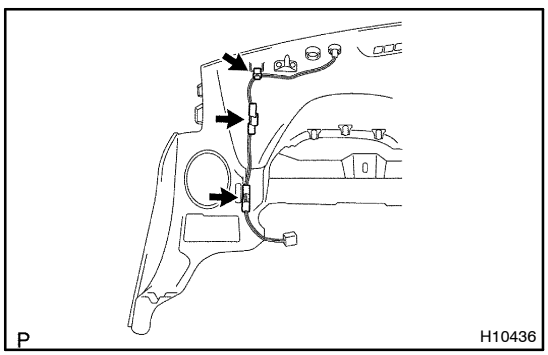


6. REMOVE NO.1 REGISTER

Remove the screw and No.1 register as shown in the illustration.

7. REMOVE NO.2 REGISTER

Employ the same manner described in the above step.



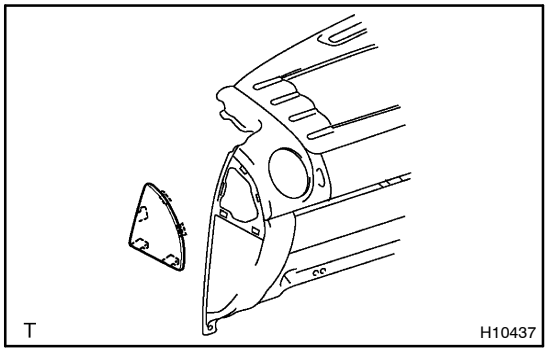
8. REMOVE NO.2 INSTRUMENT PANEL WIRE

(a) Disconnect the connectors.

(b) Disengage the wire harness clamps and remove the No.2 instrument panel wire.

9. REMOVE SOLAR SENSOR

10. REMOVE AUTO LIGHT CONTROL SENSOR



11. REMOVE INSTRUMENT SIDE PANEL

Using a screwdriver, remove the instrument side panel.

HINT:

Tape the screwdriver tip before use.

12. REMOVE NO.1 PINS

Remove the 4 screws and No.1 pins.

BO2CW–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–101).

BO2CX–01

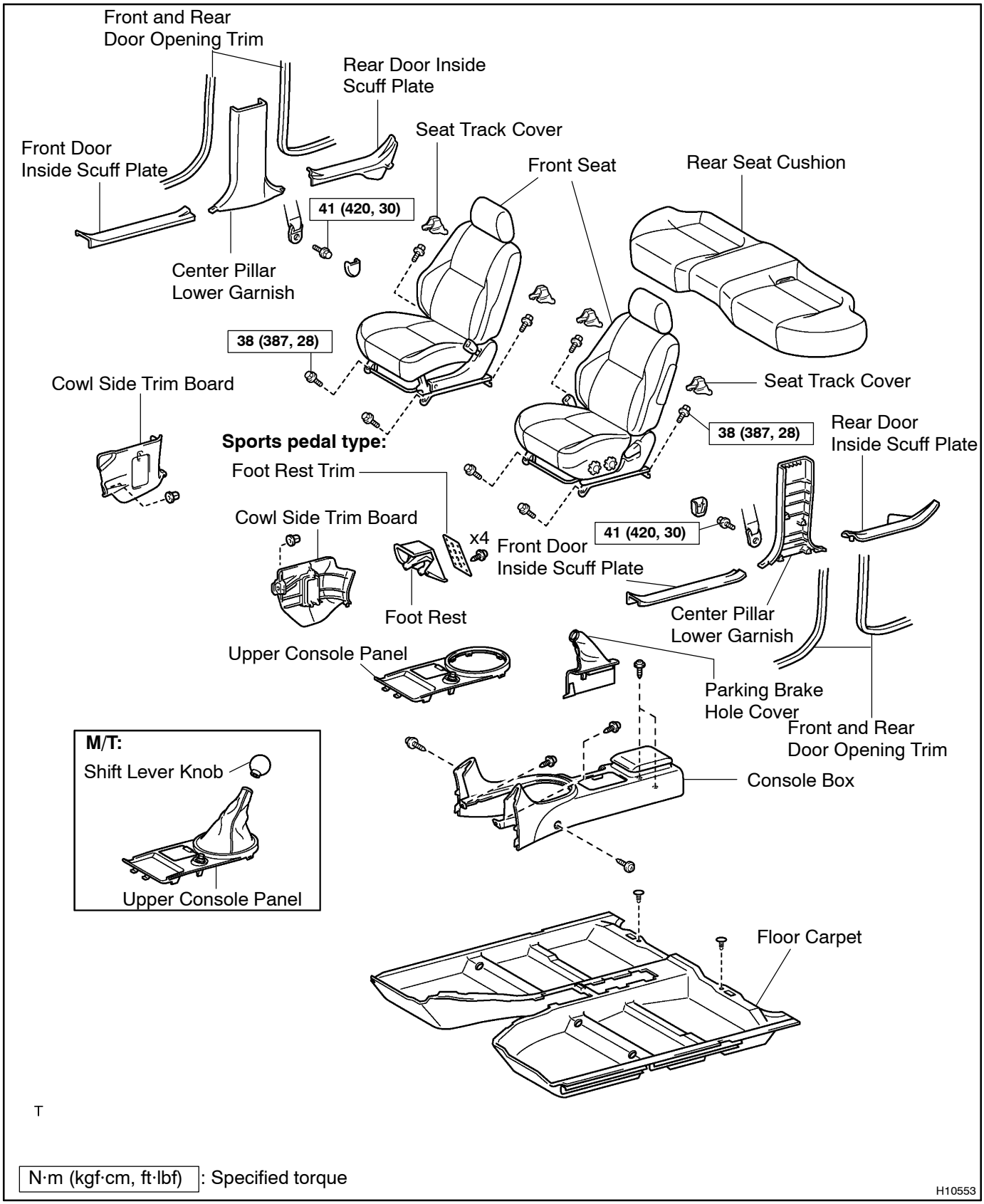
INSTALLATION

Installation is in the reverse order of removal (See page BO–96).

FLOOR CARPET

COMPONENTS

BO0WI–04



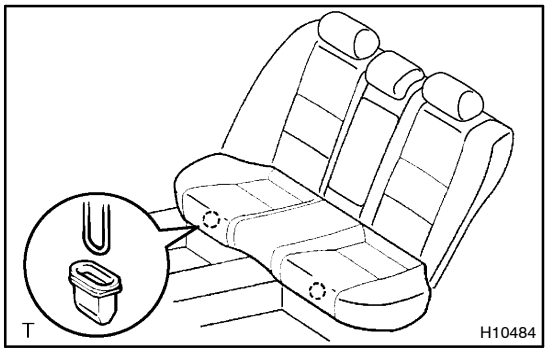
N·m (kgf·cm, ft·lbf) : Specified torque

H10553

BO2CY–01

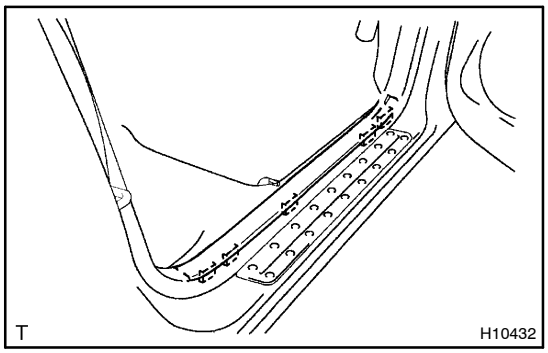
REMOVAL

1. REMOVE FRONT SEAT
(See page BO–119 and BO–130)



2. REMOVE REAR SEAT CUSHION

Pull up the front portion of the seat cushion, then remove it.



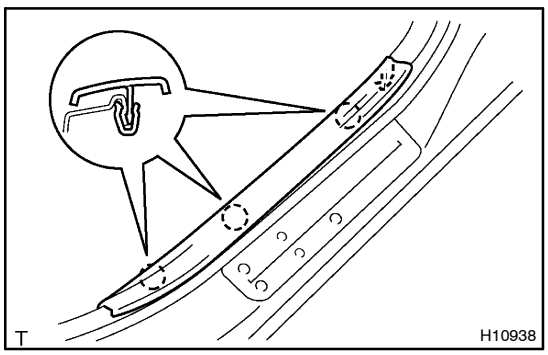
3. REMOVE FRONT DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the front door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



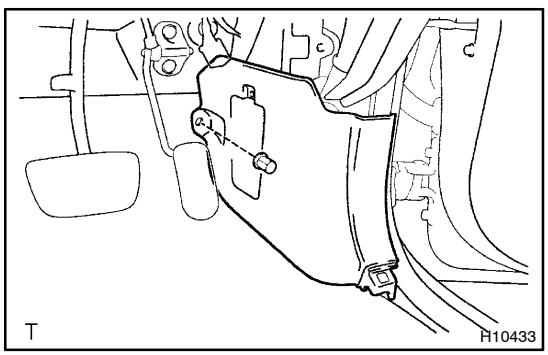
4. REMOVE REAR DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the rear door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



5. REMOVE COWL SIDE TRIM BOARD

(a) Remove the clip and cowl side trim board.

(b) Employ the same manner described above to the other side.

6. REMOVE FRONT DOOR OPENING TRIMS

7. REMOVE REAR DOOR OPENING TRIMS

8. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHORS

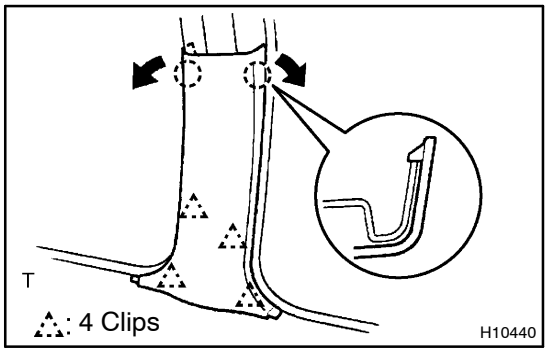
(a) Using a screwdriver, remove the floor anchor cover caps.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 bolts and floor anchors.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

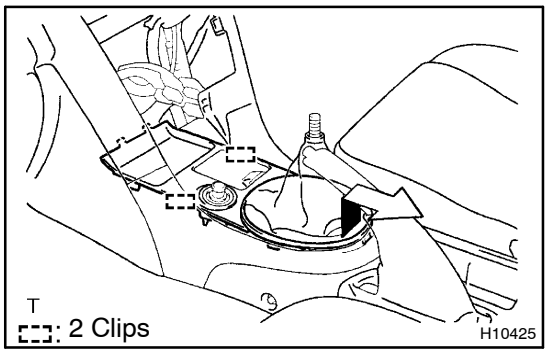


9. REMOVE CENTER PILLAR LOWER GARNISH

(a) Remove the center pillar lower garnish as shown in the illustration.

(b) Employ the same manner described above to the other side.

10. M/T:
REMOVE SHIFT LEVER KNOB



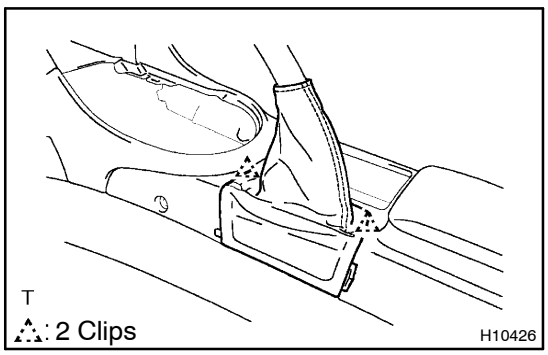
11. REMOVE UPPER CONSOLE PANEL

(a) Using a screwdriver, remove the upper console panel.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connector.

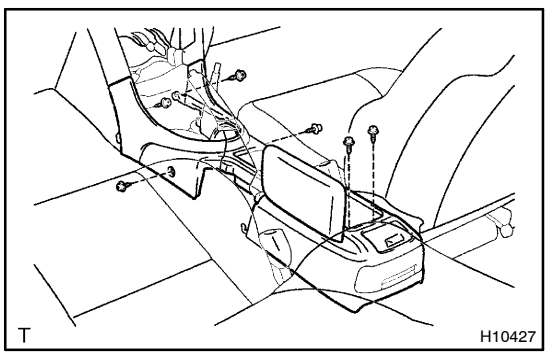


12. REMOVE PARKING BRAKE HOLE COVER

Using a screwdriver, remove the parking brake hole cover.

HINT:

Tape the screwdriver tip before use.



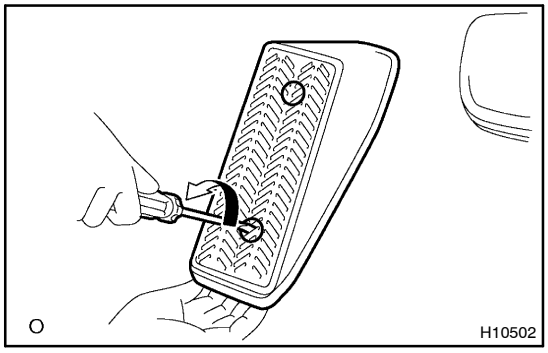
13. REMOVE CONSOLE BOX

(a) Remove the 6 screws.

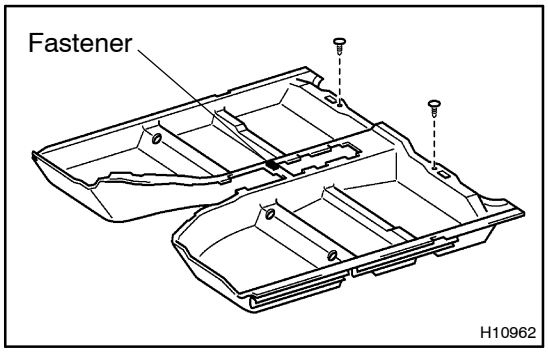
(b) Pull the console box rearward to remove it.

14. REMOVE FOOT REST

(a) Sport pedal type:
Remove the 4 screws and foot rest trim.



(b) Using a screwdriver, remove the foot rest as shown in the illustration.



15. REMOVE FLOOR CARPET

(a) Peel off the fastener.
(b) Remove the 2 clips.
(c) Disengage the hooks and remove the floor carpet.

NOTICE:

Be careful not to pull the wire harness.

HINT:

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

- When installing the floor mat, pull out the wire harness and levers through the cutout of the floor carpet.
- There should be no wrinkles or folds after attaching the floor carpet.

BO0WK–01

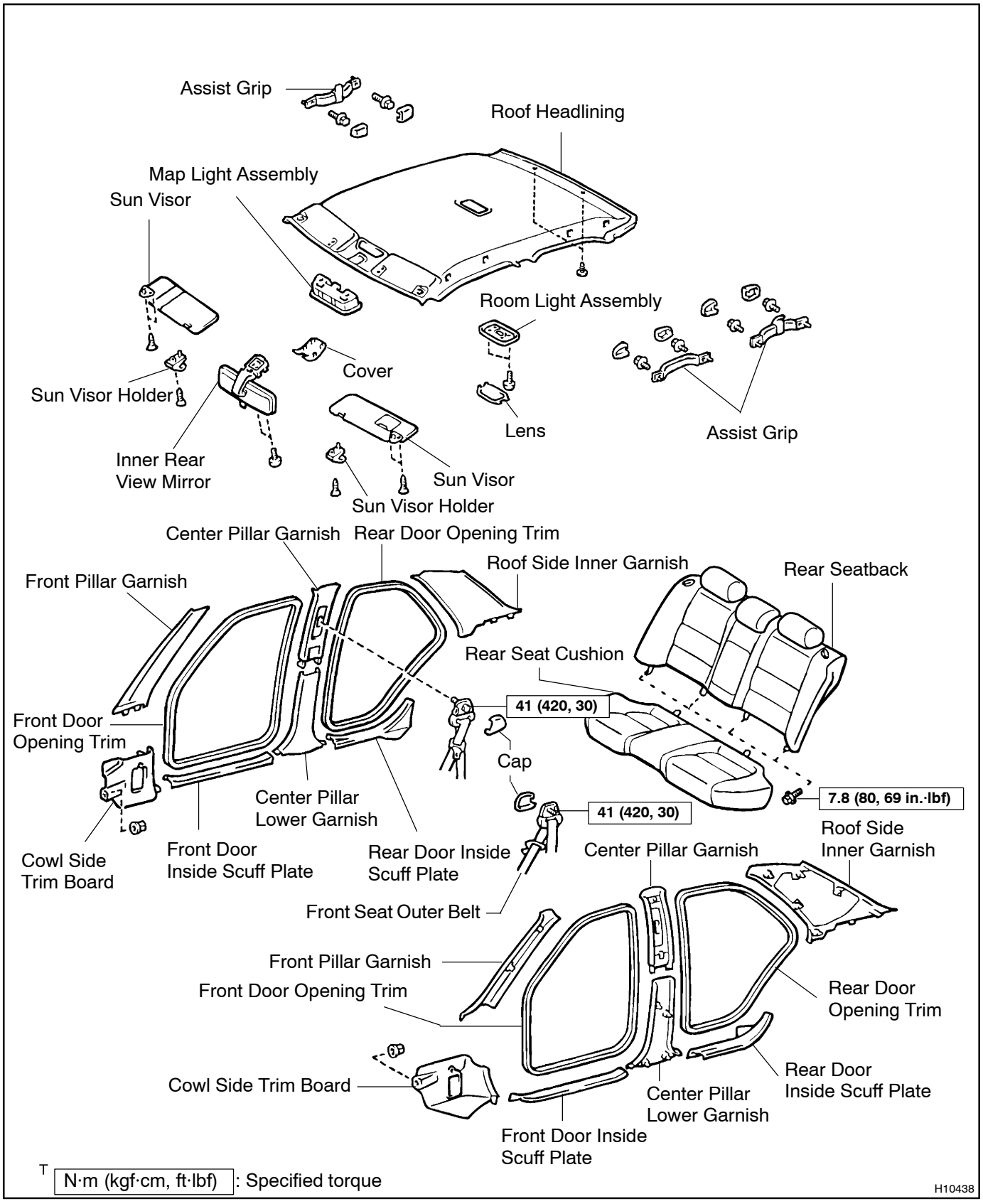
INSTALLATION

Installation is in the reverse order of removal (See page BO–106).

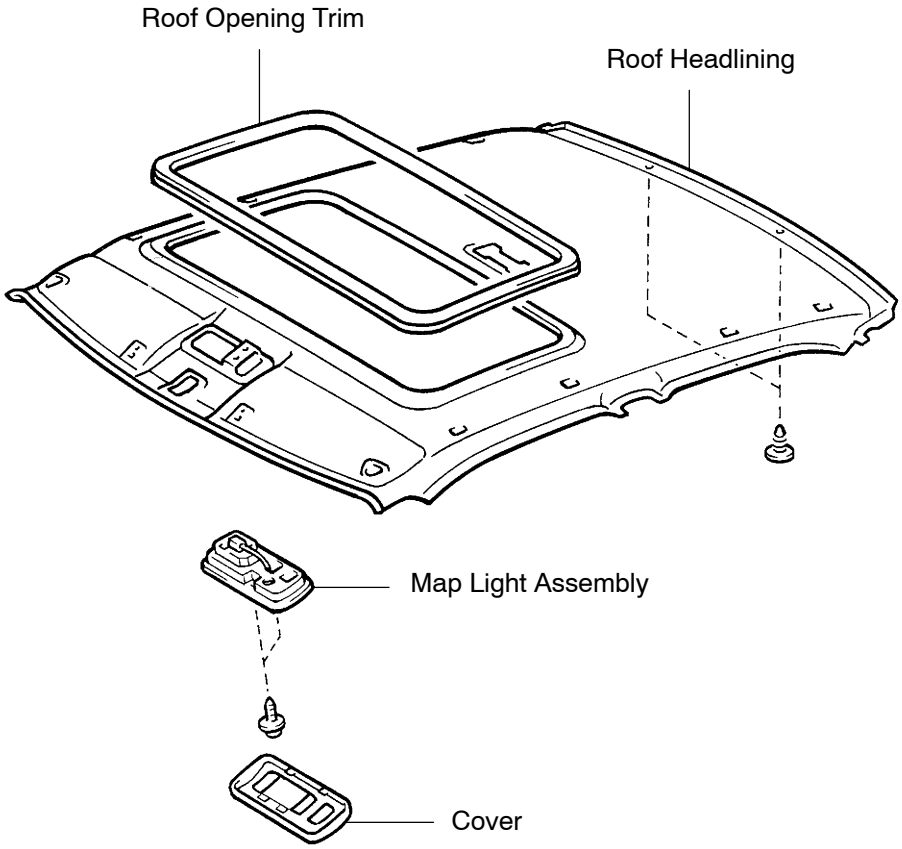
ROOF HEADLINING

COMPONENTS

BO2CZ–01



w/ Sliding roof:



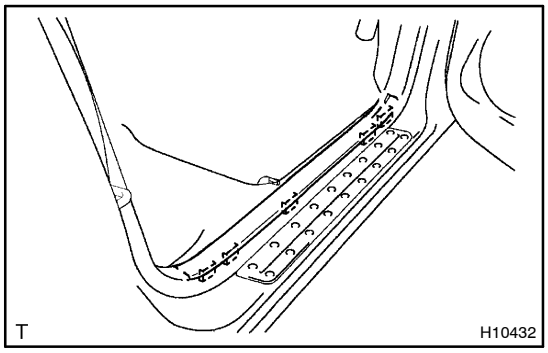
O

H10439

BO2D0–01

REMOVAL

1. REMOVE REAR SEAT CUSHION (See page BO–142)
2. REMOVE REAR SEATBACK (See page BO–142)



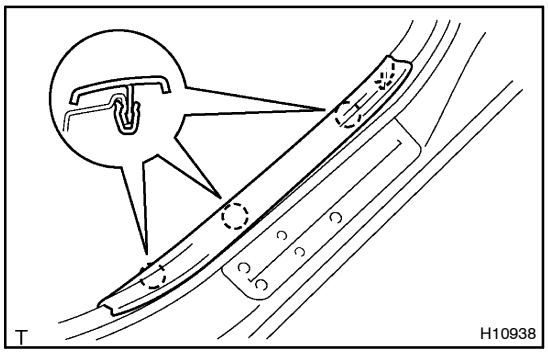
3. REMOVE FRONT DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the front door inside scuff plate as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



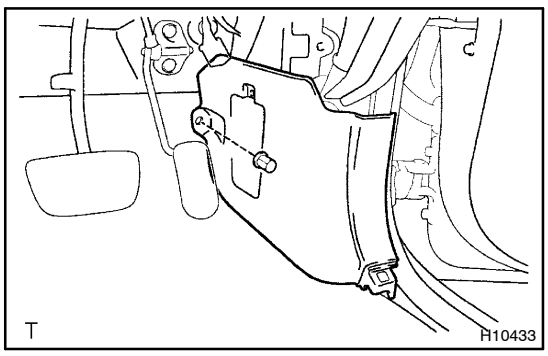
4. REMOVE REAR DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the rear door inside scuff plate as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

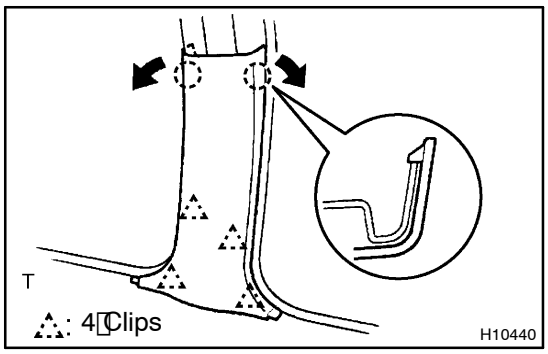


5. REMOVE COWL SIDE TRIM BOARD

(a) Remove the clip and cowl side trim board.

(b) Employ the same manner described above to the other side.

6. REMOVE FRONT DOOR OPENING TRIMS
7. REMOVE REAR DOOR OPENING TRIMS



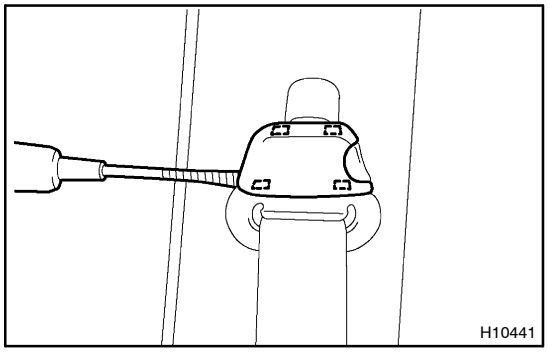
8. REMOVE CENTER PILLAR LOWER GARNISH

(a) Using a screwdriver, remove the center pillar lower garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



9. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR

(a) Using a screwdriver, remove the anchor cap.

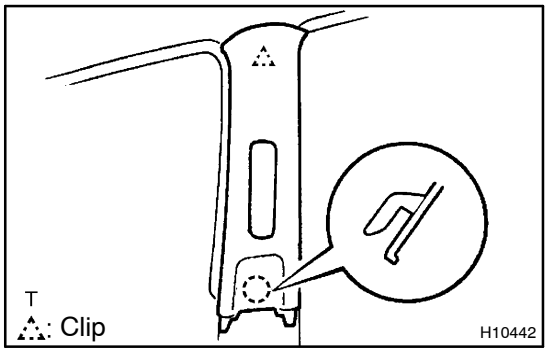
HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt and front seat outer belt shoulder anchor.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

(c) Employ the same manner described above to the other side.



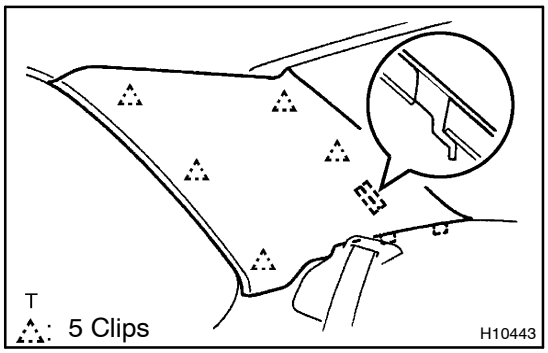
10. REMOVE CENTER PILLAR GARNISH

(a) Using a screwdriver, remove the center pillar garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



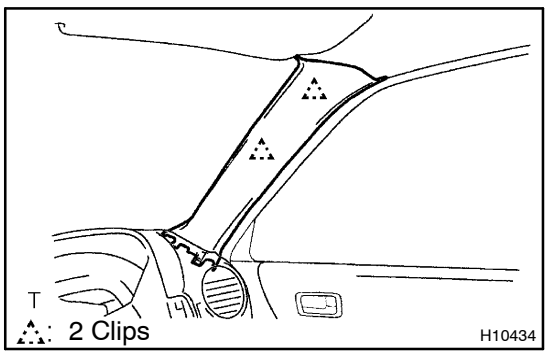
11. REMOVE ROOF SIDE INNER GARNISH

(a) Using a screwdriver, remove the roof side inner garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



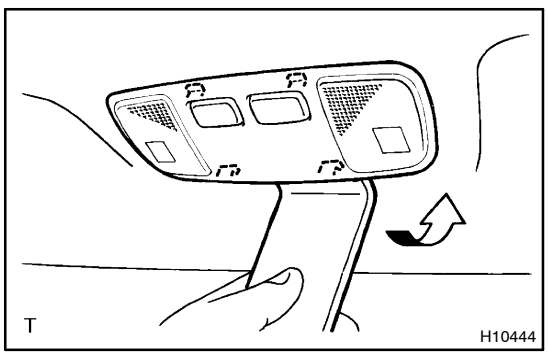
12. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

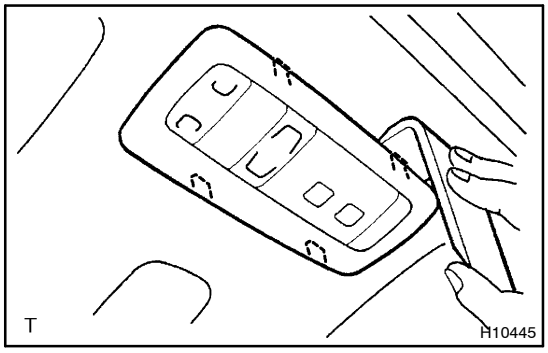


13. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the lens.

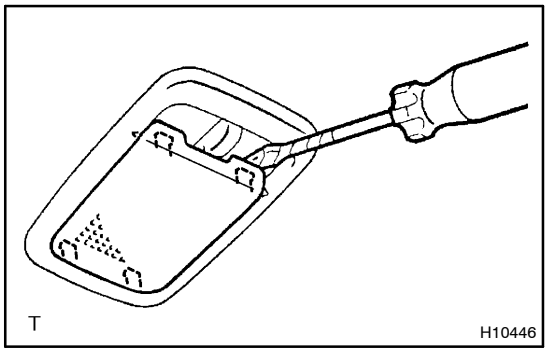
(b) Remove the 2 screws and map light assembly.

(c) Disconnect the connector.



14. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the cover.
(b) Remove the 2 screws and map light assembly.
(c) Disconnect the connector.



15. REMOVE ROOM LIGHT ASSEMBLY

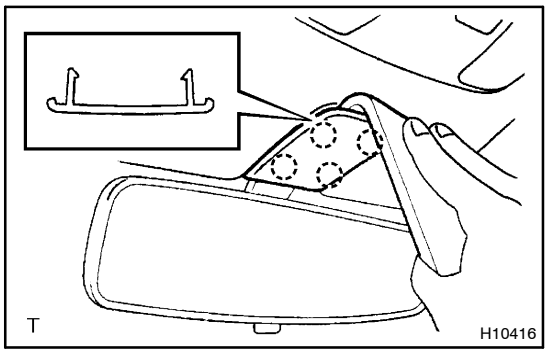
(a) Using a screwdriver, remove the lens.

HINT:

Tape the screwdriver tip before use.

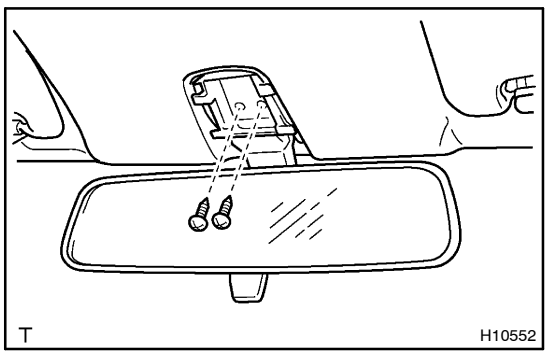
(b) Remove the 2 screws and room light assembly.
(c) Disconnect the connector.

16. w/ Sliding roof:
REMOVE ROOF OPENING TRIM



17. REMOVE INNER REAR VIEW MIRROR

(a) Using a moulding remover, remove the cover as shown in the illustration.



(b) Remove the 2 screws and inner rear view mirror.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

18. REMOVE ASSIST GRIPS

(a) Using a screwdriver, remove the caps.

HINT:

Tape the screwdriver tip before use.

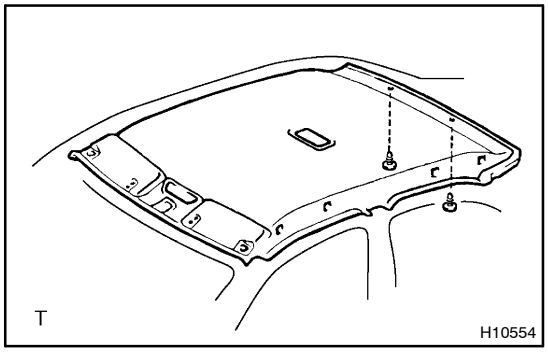
(b) Remove the 6 bolts and 3 assist grips.

19. REMOVE SUN VISORS

(a) Remove the 4 screws and pull the sun visors downward.
(b) Disconnect the connectors.

20. REMOVE SUN VISOR HOLDERS

Remove the 2 screws and 2 holders.



21. REMOVE ROOF HEADLINING

(a) Remove the 2 clips.

(b) Pull the roof headlining downward to remove it.

BO2D1–01

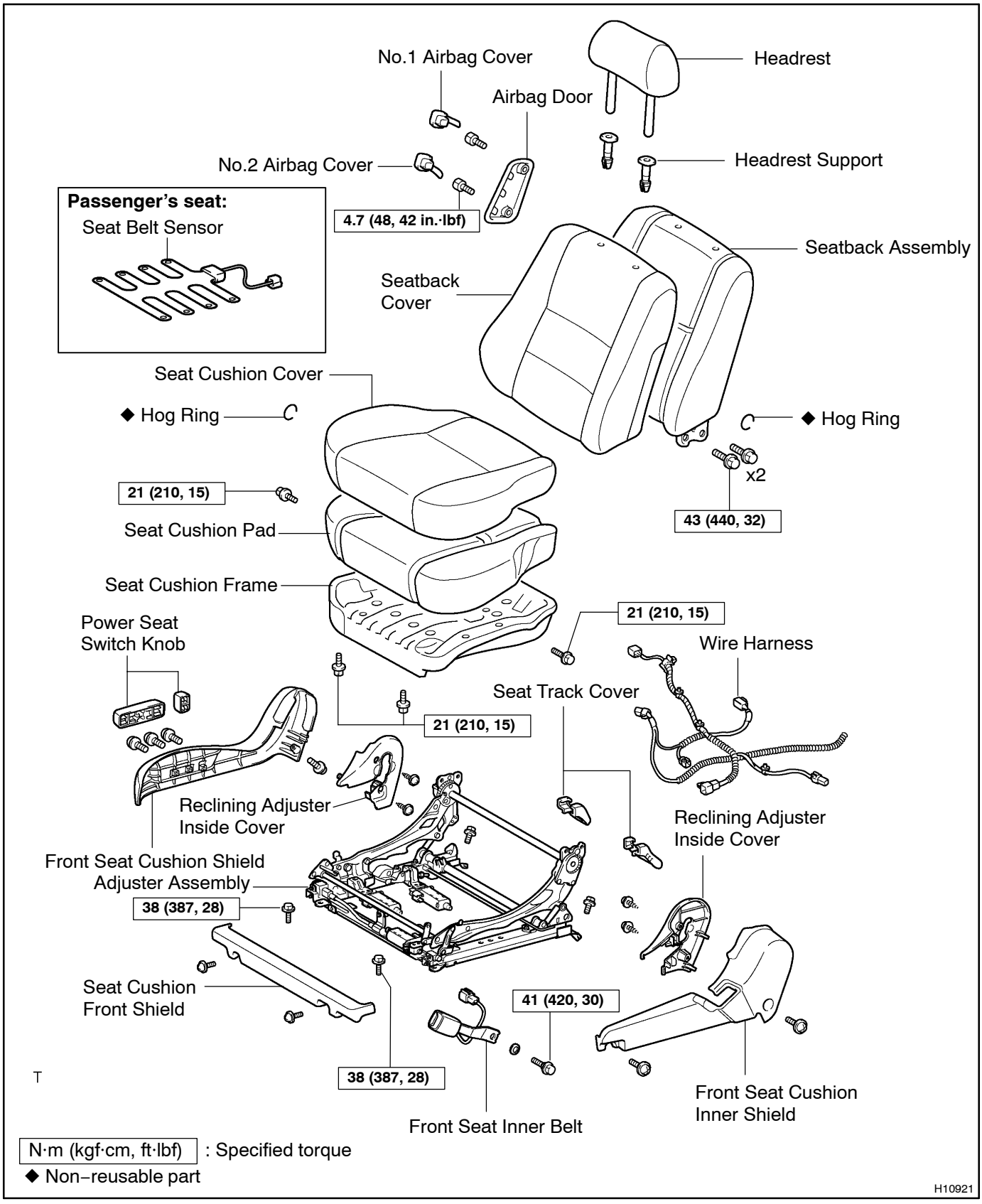
INSTALLATION

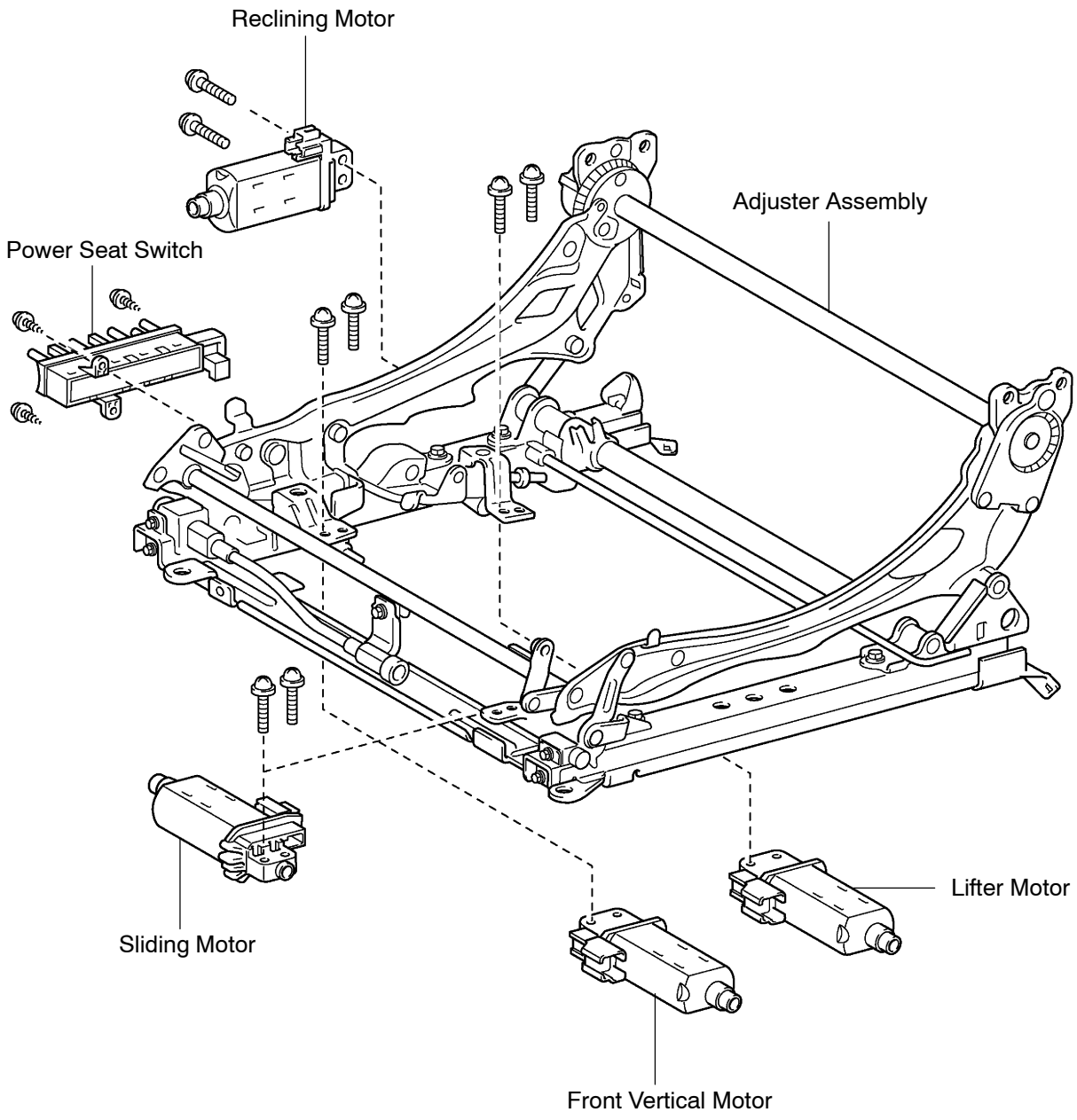
Installation is in the reverse order of removal (See page BO–112).

FRONT SEAT (Power Adjuster Type)

BO2D2–01

COMPONENTS

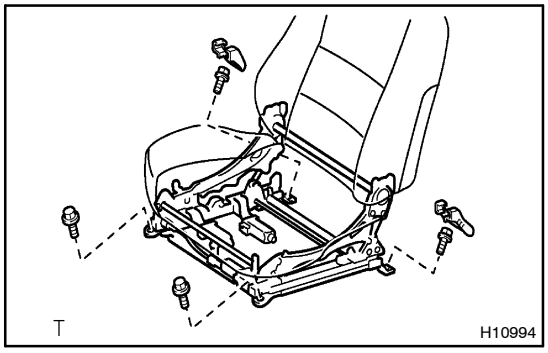



Reclining Motor
Adjuster Assembly
Power Seat Switch
Lifter Motor
Sliding Motor
Front Vertical Motor

T

H10922

BO2D3–01



REMOVAL

1. REMOVE SEAT TRACK COVERS

Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdriver tip before use.

2. REMOVE FRONT SEAT

(a) Remove the 4 bolts.

(b) Disconnect the connectors.

(c) Remove the front seat.

NOTICE:

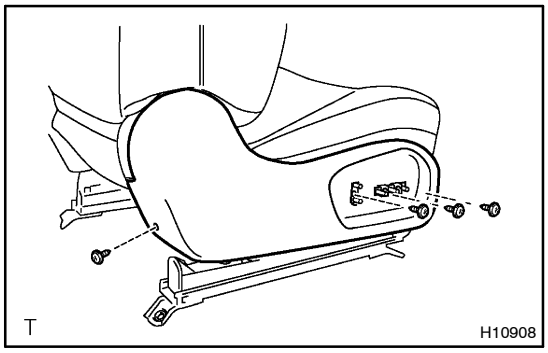
Be careful not to damage the body.

BO2D4–01

DISASSEMBLY

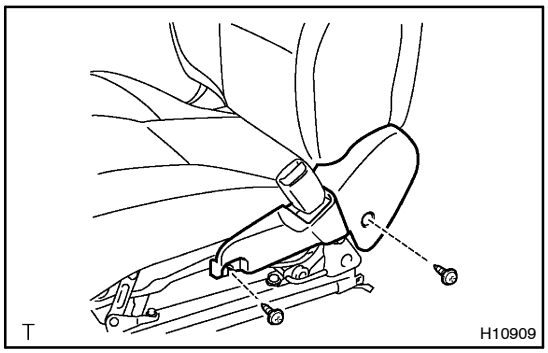
1. REMOVE HEADREST

2. REMOVE POWER SEAT SWITCH KNOB



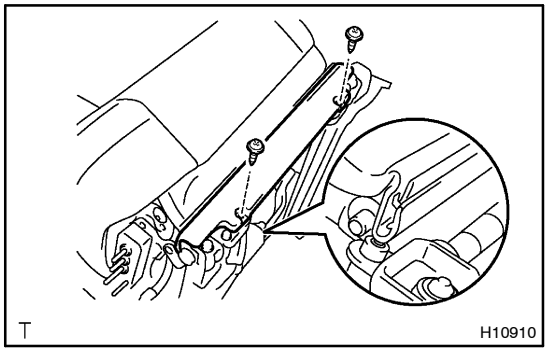
3. REMOVE FRONT SEAT CUSHION SHIELD

Remove the 4 screws and front seat cushion shield.



4. REMOVE FRONT SEAT CUSHION INNER SHIELD

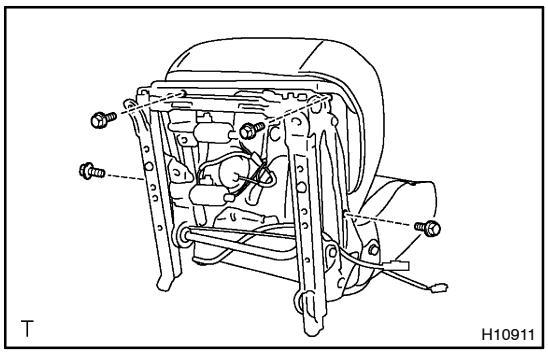
Remove the 2 screws and front seat cushion inner shield.



5. REMOVE SEAT CUSHION FRONT SHIELD

(a) Remove the 2 screws.

(b) Unlatch the seat cushion cover hook, then remove the seat cushion front shield.

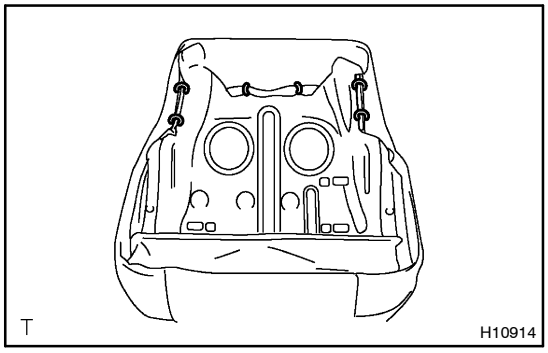


6. REMOVE SEAT CUSHION ASSEMBLY

(a) Disconnect the connectors and unlatch the wire harness clamps.

(b) Remove the 4 bolts and seat cushion assembly with wire harness.

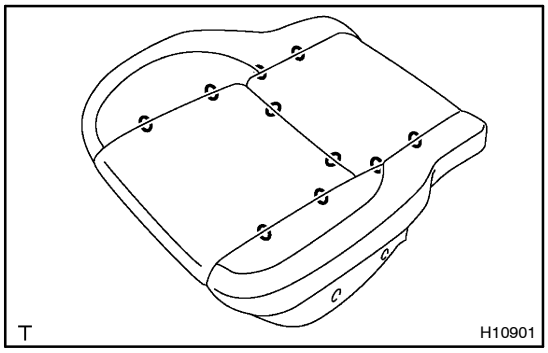
(c) Unlatch the wire harness clamps to remove the wire harness from seat cushion assembly.



7. REMOVE SEAT CUSHION COVER

(a) Remove the 6 hog rings.

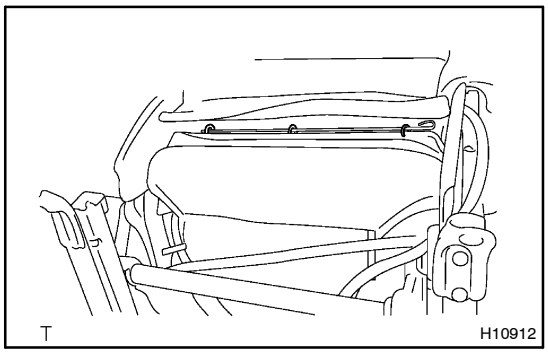
(b) Unlatch the seat cushion cover hooks and remove the seat cushion frame from the seat cushion cover with pad.



(c) Remove the hog rings and seat cushion cover from the seat cushion pad.

8. Passenger's seat:
REMOVE SEAT BELT SENSOR

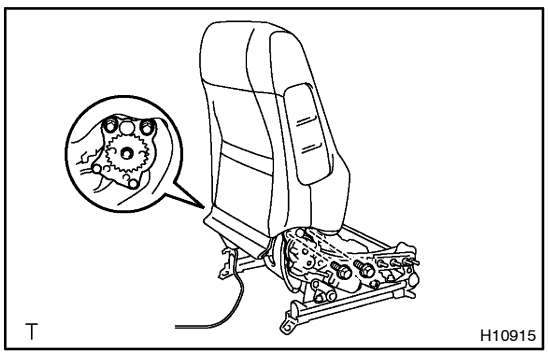
Remove the seat belt sensor from the seat cushion pad.



9. REMOVE SEATBACK ASSEMBLY

(a) Remove the 3 hog rings.

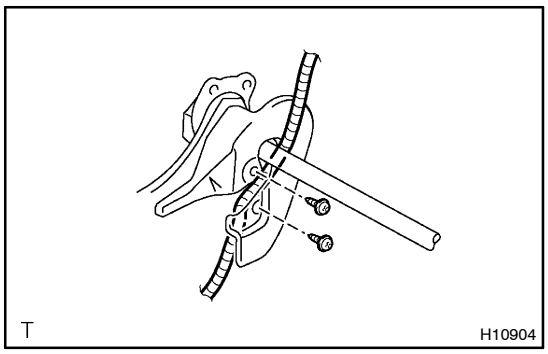
(b) Turn the seatback cover over, then remove the 6 hog rings.



(c) Remove the 4 seatback assembly set bolts.

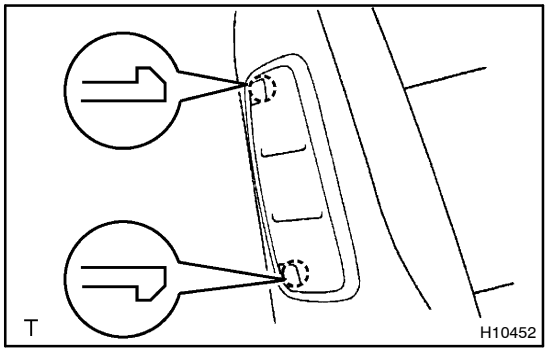
NOTICE:

Be careful not to pull the side airbag assembly wire harness.



(d) Remove the 2 screws and reclining adjuster inside cover and employ the same manner described above to the other side.

(e) Disengage the side airbag assembly wire harness from the reclining adjuster inside cover, then remove the seatback assembly.

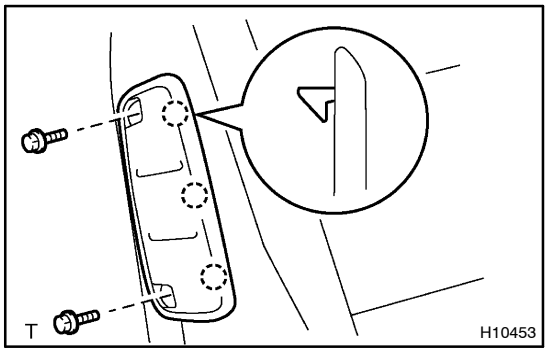


10. REMOVE SEATBACK COVER

(a) Using a screwdriver, remove the No.1 and No.2 airbag covers.

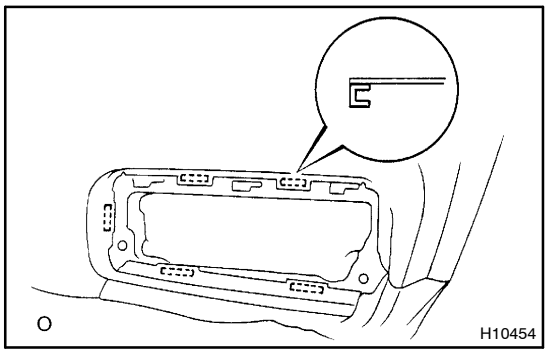
HINT:

Tape the screwdriver tip before use.

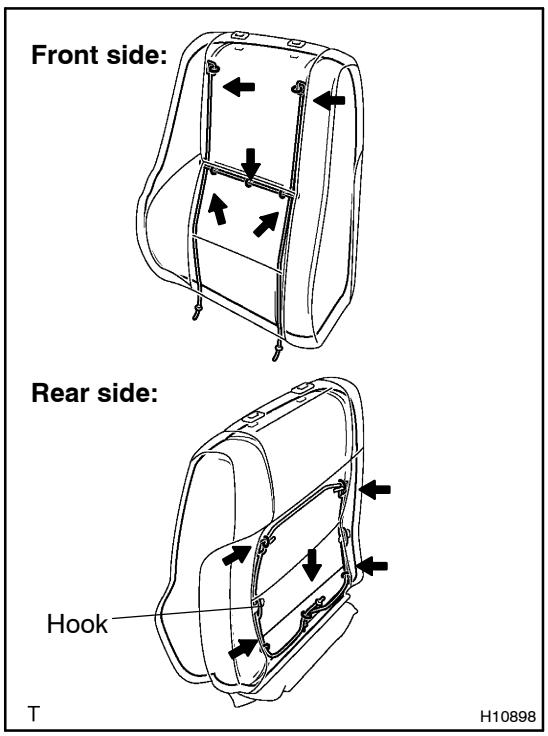


(b) Remove the 2 bolts.

(c) Side the airbag door upward to remove it.



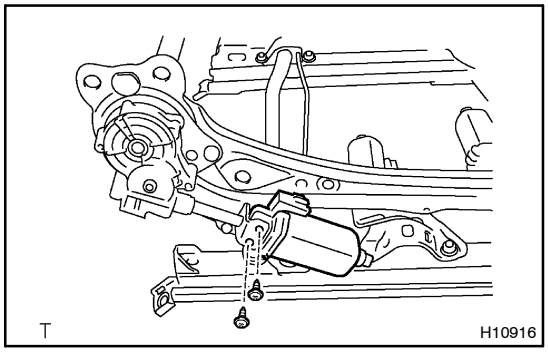
(d) Disengage the seatback cover hooks circumference of the side airbag assembly.



(e) Remove the 10 hog rings, headrest supports and seatback cover as shown in the illustration.

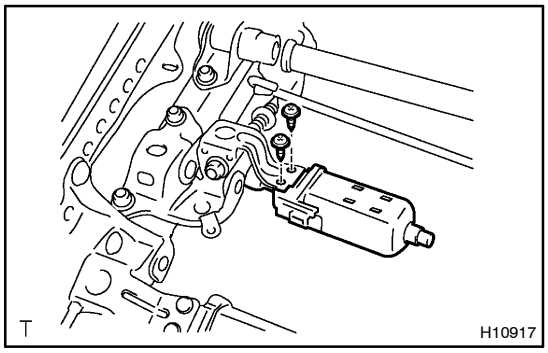
11. REMOVE FRONT SEAT INNER BELT

Remove the bolt, washer and front seat inner belt.



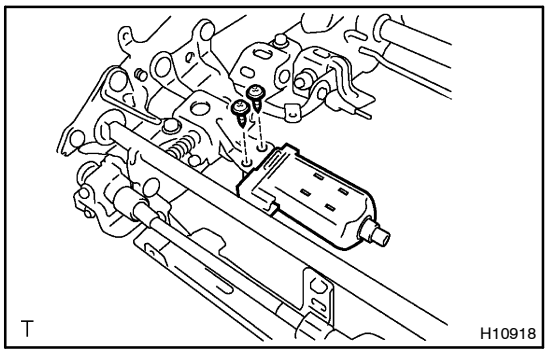
12. REMOVE RECLINING MOTOR

Remove the 2 screws, then disconnect the reclining motor.



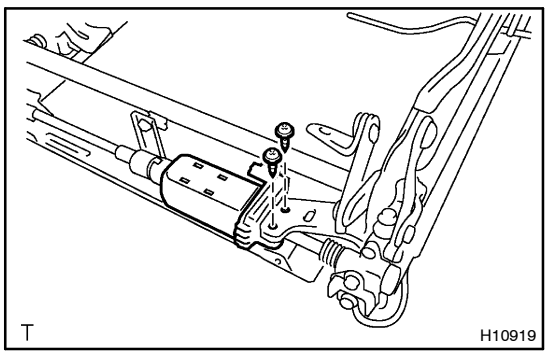
13. REMOVE LIFTER MOTOR

Remove the 2 screws, then disconnect the lifter motor.



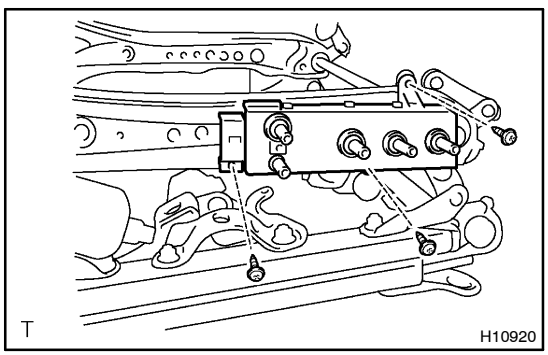
14. REMOVE FRONT VERTICAL MOTOR

Remove the 2 screws, then disconnect the front vertical motor.



15. REMOVE SLIDING MOTOR

Remove the 2 screws, then disconnect the sliding motor.

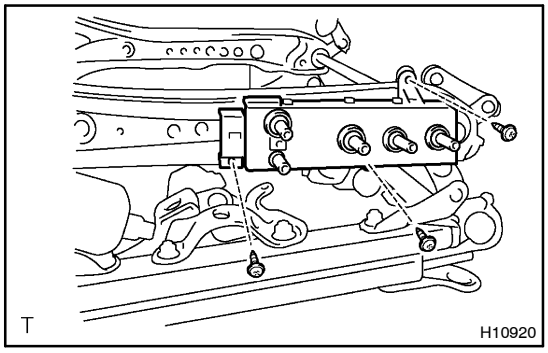


16. REMOVE POWER SEAT SWITCH

Remove the 3 screws and power seat switch.

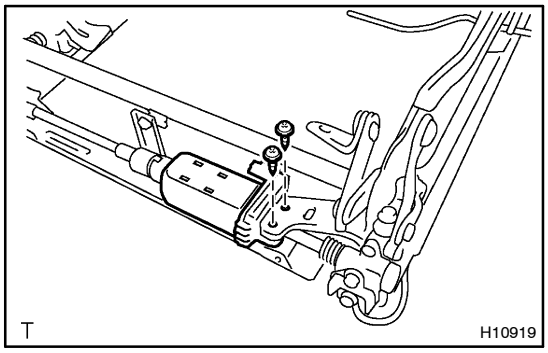
BO2D5–01

REASSEMBLY



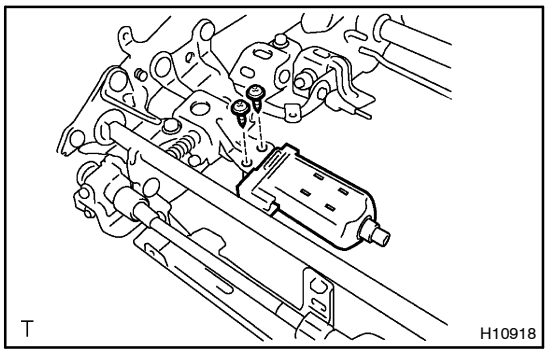
1. INSTALL POWER SEAT SWITCH

Install the power seat switch with the 3 screws.



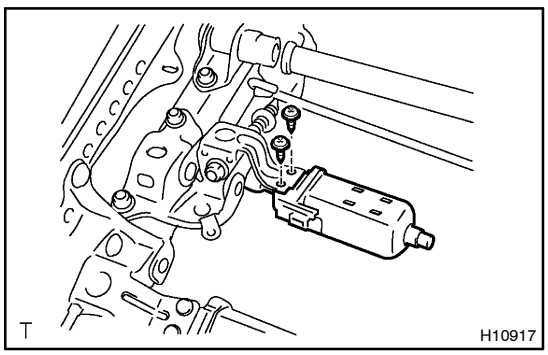
2. INSTALL SLIDING MOTOR

Connect the slide motor to the shaft, then install the 2 screws.



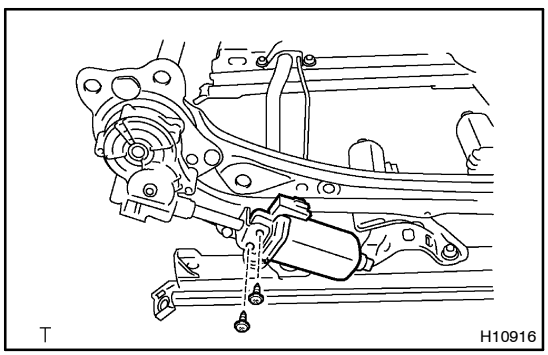
3. INSTALL FRONT VERTICAL MOTOR

Connect the front vertical motor, then install the 2 screws.



4. INSTALL LIFTER MOTOR

Connect the lifter motor, then install the 2 screws.



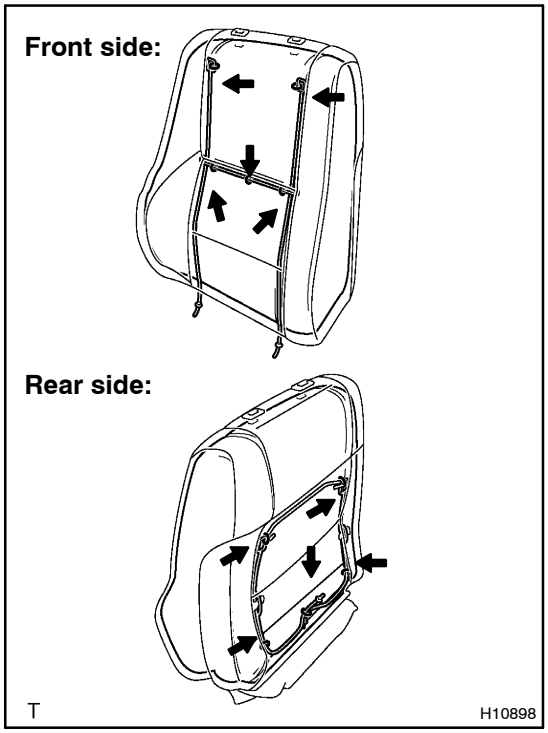
5. INSTALL RECLINING MOTOR

Connect the reclining motor, then install the 2 screws.

6. INSTALL FRONT SEAT INNER BELT

Install the front seat inner belt with the bolt and washer.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)



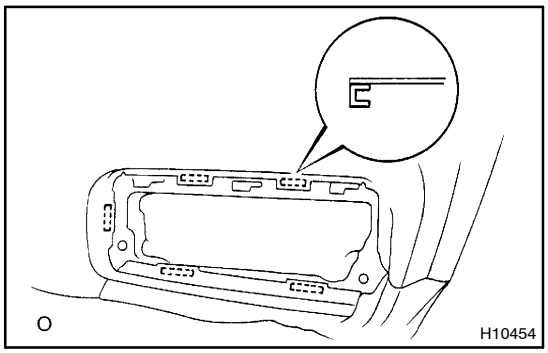
7. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog rings.

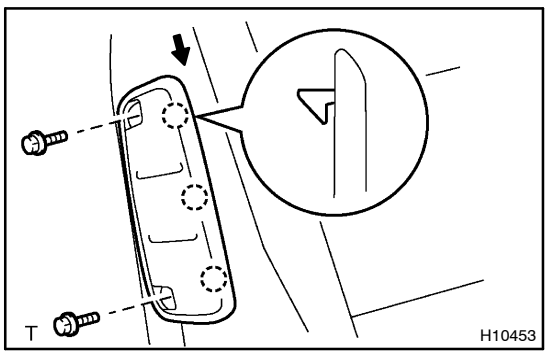
HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install the headrest supports.



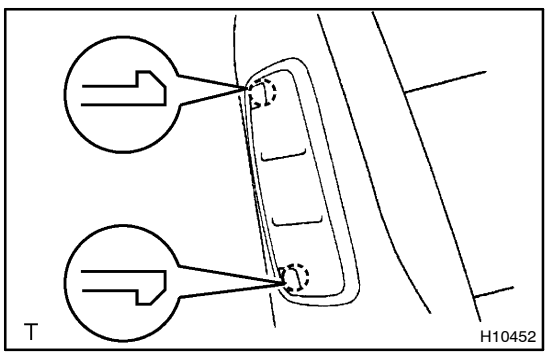
(c) Hook the seatback cover hooks through the holes in the circumference of the side airbag assembly.



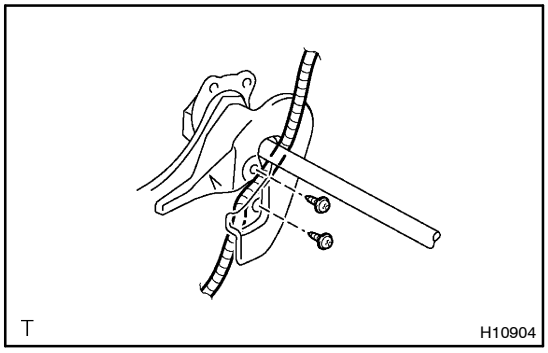
(d) Slide the airbag door downward to install it.

(e) Install the 2 bolts.

Torque: 4.7 N·m (48 kgf·cm, 42 in.·lbf)



(f) Install the No.1 and No.2 airbag covers.



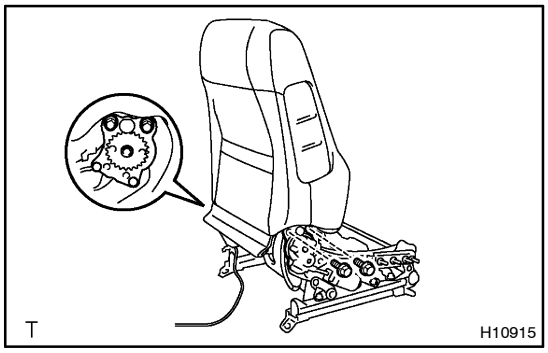
8. INSTALL SEATBACK ASSEMBLY

NOTICE:

Never use the seatback assembly from another vehicle. When replacing parts, replace them with new parts.

(a) Set the side airbag assembly wire harness to the reclining adjuster inside cover.

(b) Install the 2 screws and reclining adjuster inside cover and employ the same manner described above to the other side.

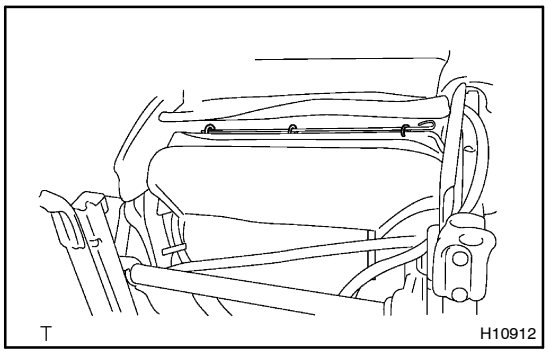


(c) Install the seatback assembly with the 4 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(d) Turn the seatback cover over, then install 6 new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.



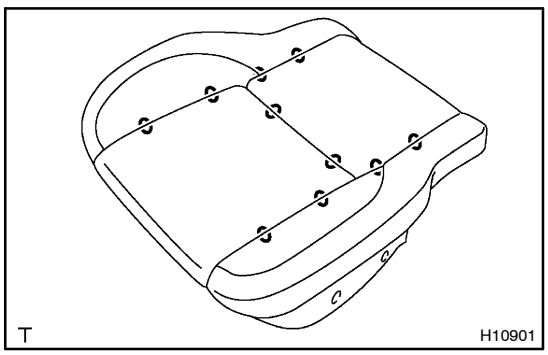
(e) Install 3 new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

9. Passenger's side:
INSTALL SEAT BELT SENSOR

Install the seat belt sensor to the seat cushion pad.

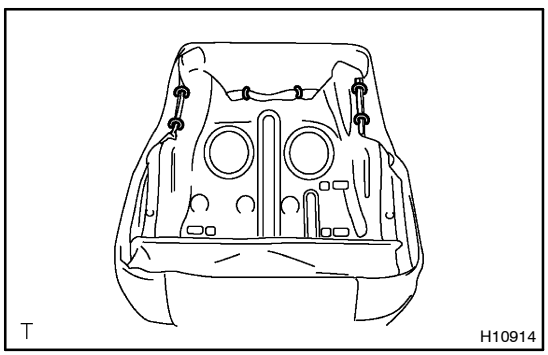


10. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to the seat cushion pad.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

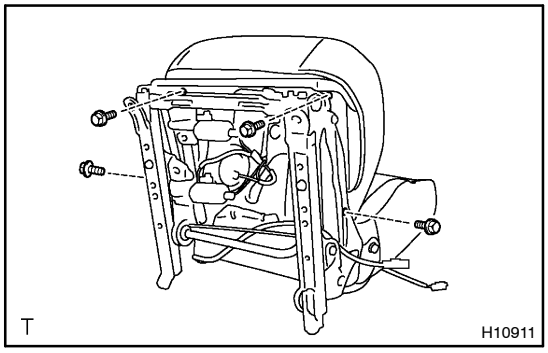


(b) Latch the seat cushion cover hooks to install the seat cushion cover with pad to the seat cushion pad.

(c) Install 6 new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

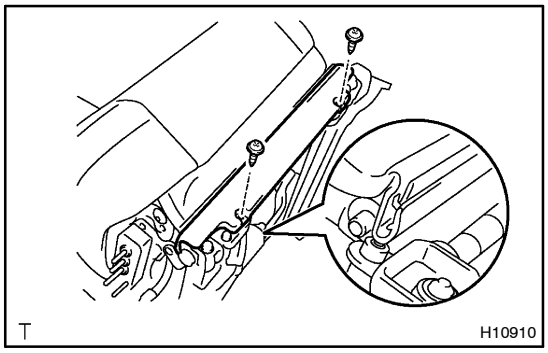


11. INSTALL SEAT CUSHION ASSEMBLY

(a) Install the seat cushion assembly with the 4 bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(b) Attach the wire harness clamps.

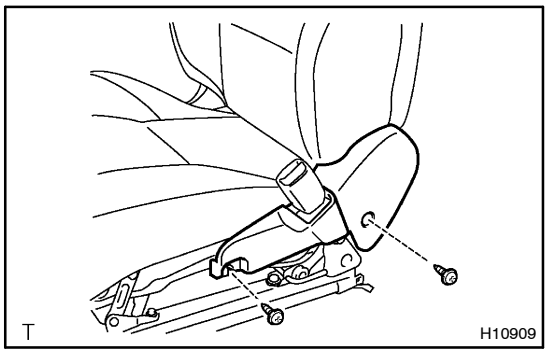
(c) Attach the side airbag assembly wire harness clamps.



12. INSTALL SEAT CUSHION FRONT SHIELD

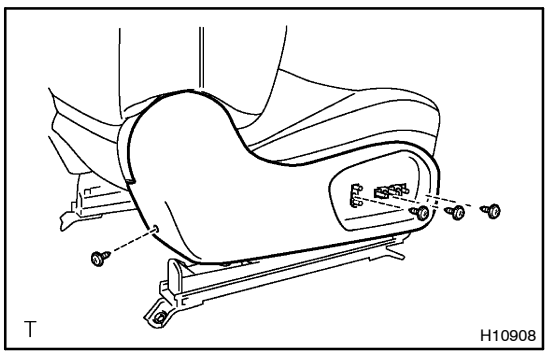
(a) Latch the seat cushion cover hook to the seat cushion front shield.

(b) Install the seat cushion front shield with the 2 screws.



13. INSTALL FRONT SEAT CUSHION INNER SHIELD

Install the front seat cushion inner shield with the 2 screws.



14. INSTALL FRONT SEAT CUSHION SHIELD

Install the front seat cushion shield with the 4 screws.

15. INSTALL POWER SEAT SWITCH KNOBS

16. INSTALL HEADREST

BO2D6–01

INSTALLATION

1. INSTALL FRONT SEAT

(a) Mount the front seat to the vehicle.

NOTICE:

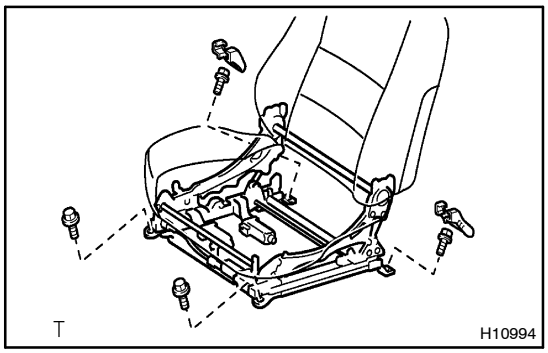
Be careful not to damage the body.

(b) Connect the connectors.

NOTICE:

When the wiring connector of the side airbag assembly is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded. To clear DTCs, see page DI–287.

(c) Slide the front seat to the rearmost position.



(d) Tighten the bolts on the front side temporarily, starting from the bolt on the inner side tighten them completely.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(e) Slide the front seat to the most front position.

(f) Tighten the bolts on the rear side temporarily, staring from the bolt on the inner side tighten them completely.

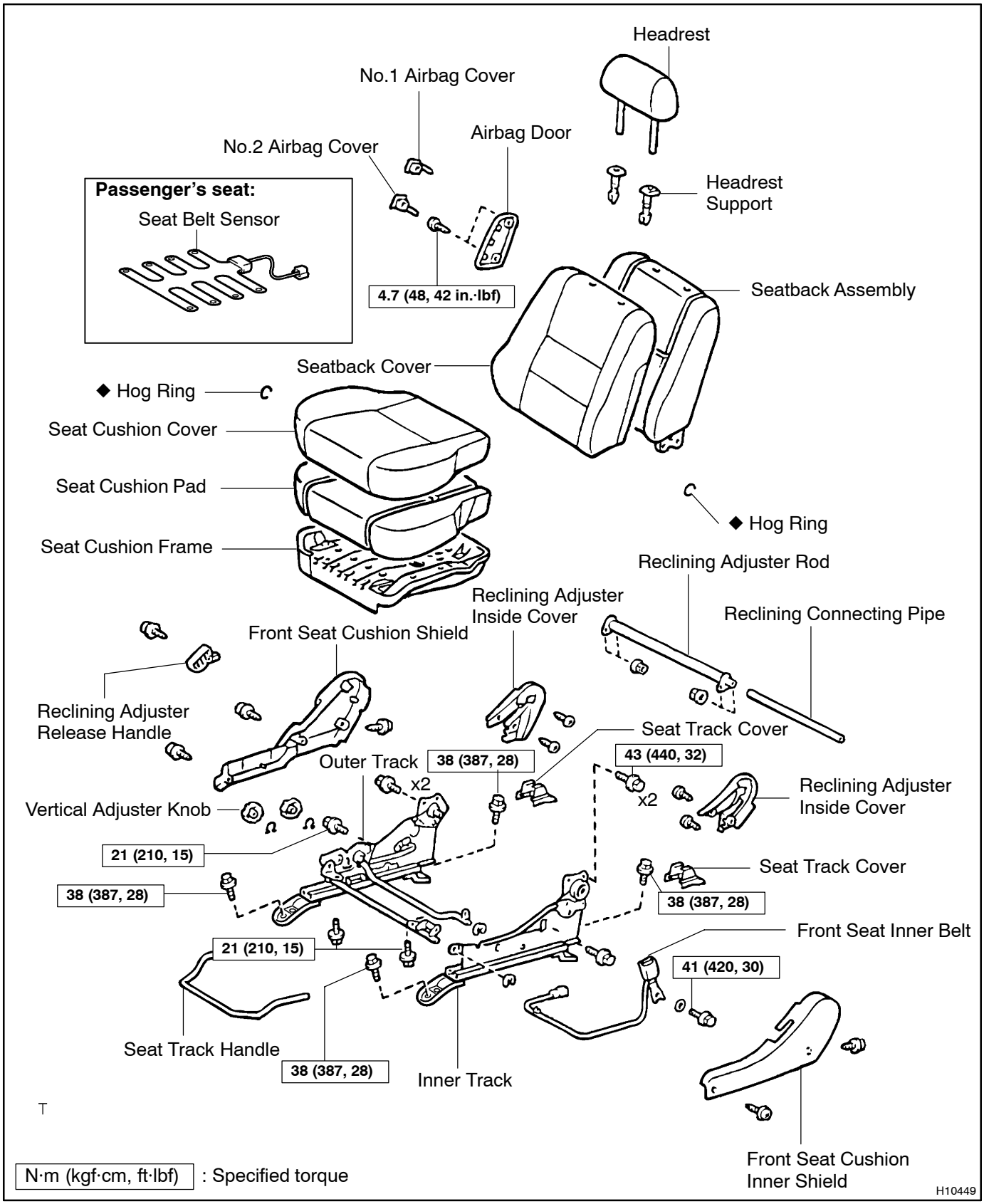
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

2. INSTALL SEAT TRACK COVERS

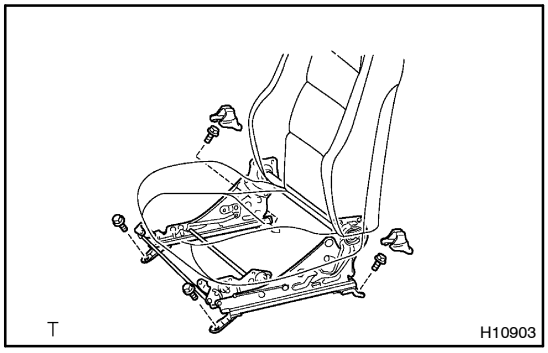
FRONT SEAT (Manual Adjuster Type)

BO2D7–01

COMPONENTS



BO2D8–01



REMOVAL

1. REMOVE SEAT TRACK COVERS

Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdriver tip before use.

2. REMOVE FRONT SEAT

(a) Remove the 4 bolts.

(b) Disconnect the connectors.

(c) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO2D9–01

DISASSEMBLY

1. REMOVE HEADREST

2. REMOVE VERTICAL ADJUSTER KNOBS

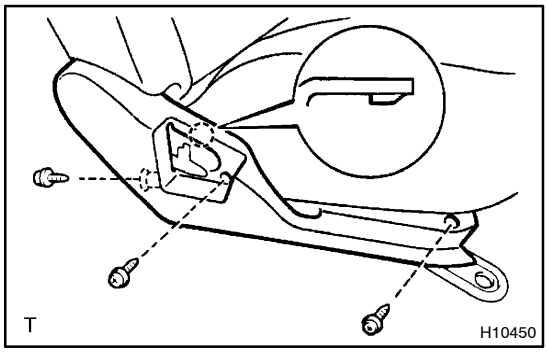
Using a screwdriver, remove the 2 clips and 2 vertical adjuster knobs.

HINT:

Tape the screwdriver tip before use.

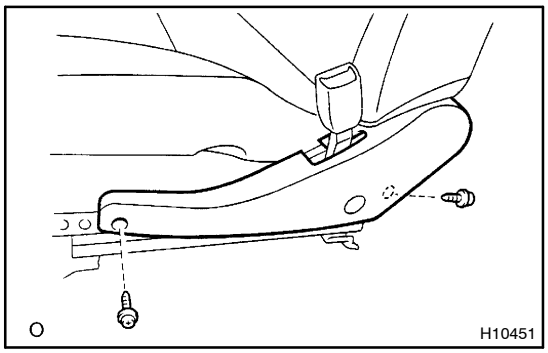
3. REMOVE RECLINING ADJUSTER RELEASE HANDLE

Remove the screw and reclining adjuster release handle.



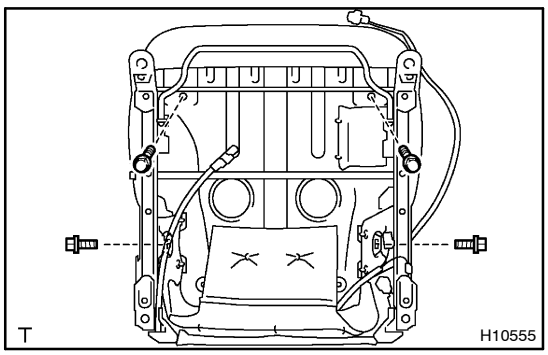
4. REMOVE FRONT SEAT CUSHION SHIELD

Remove the 3 screws and front seat cushion shield.



5. REMOVE FRONT SEAT CUSHION INNER SHIELD

Remove the 2 screws and front seat cushion inner shield.

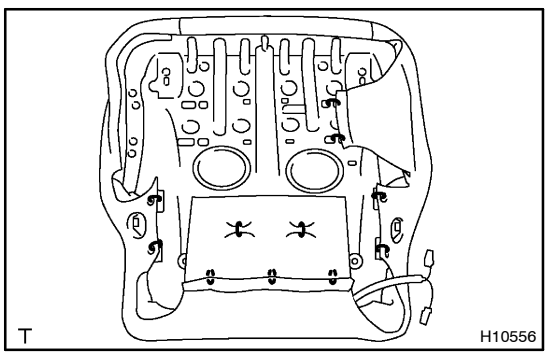


6. REMOVE SEAT CUSHION ASSEMBLY

(a) Unlatch the side airbag assembly wire harness clamps.

(b) Disengage the wire harness clamp.

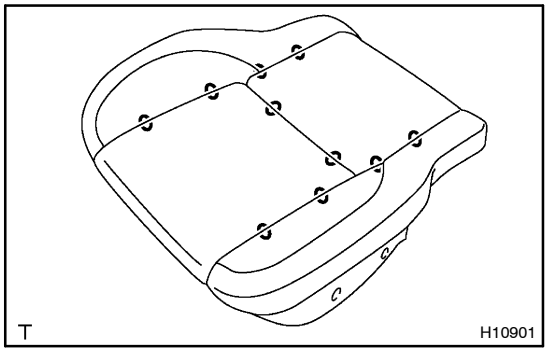
(c) Remove the 4 bolts and seat cushion assembly.



7. REMOVE SEAT CUSHION COVER

(a) Remove the hog rings.

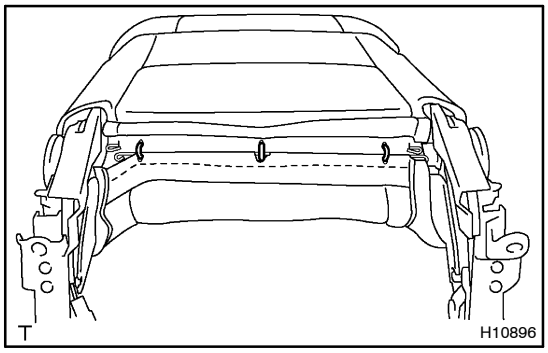
(b) Unlatch the seat cushion cover hooks and remove the seat cushion frame from the seat cushion cover with pad.



(c) Remove the hog rings and seat cushion cover from the seat cushion pad.

8. Passenger's side:
REMOVE SEAT BELT SENSOR

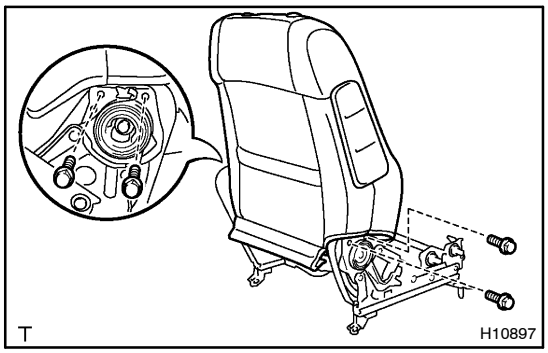
Remove the seat belt sensor from the seat cushion pad.



9. REMOVE SEATBACK ASSEMBLY

(a) Remove the 3 hog rings.

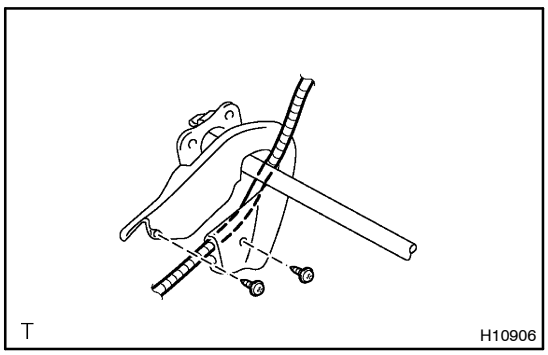
(b) Turn the seatback cover over, then remove the 6 hog rings.



(c) Remove the 4 seatback assembly set bolts.

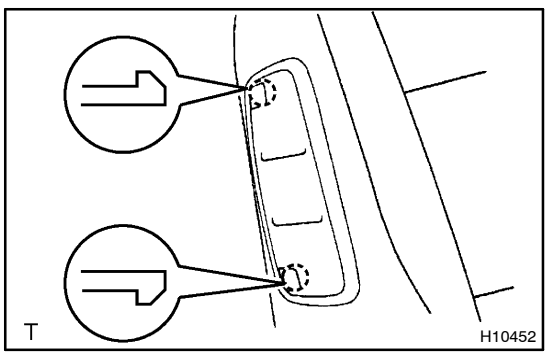
NOTICE:

Be careful not to pull the side airbag assembly wire harness.



(d) Remove the 2 screws and reclining adjuster inside cover and employ the same manner described above to the other side.

(e) Disengage the side airbag assembly wire harness from the reclining adjuster inside covers, then remove the seatback assembly.

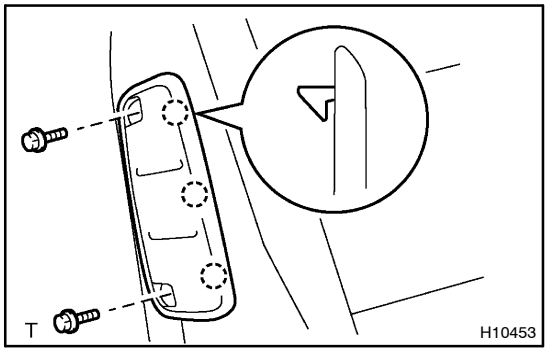


10. REMOVE SEATBACK COVER

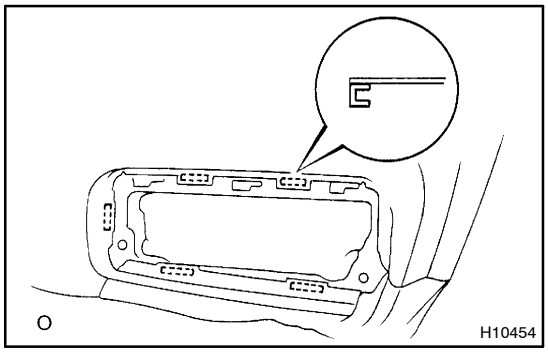
(a) Using a screwdriver, remove the No.1 and No.2 airbag covers.

HINT:

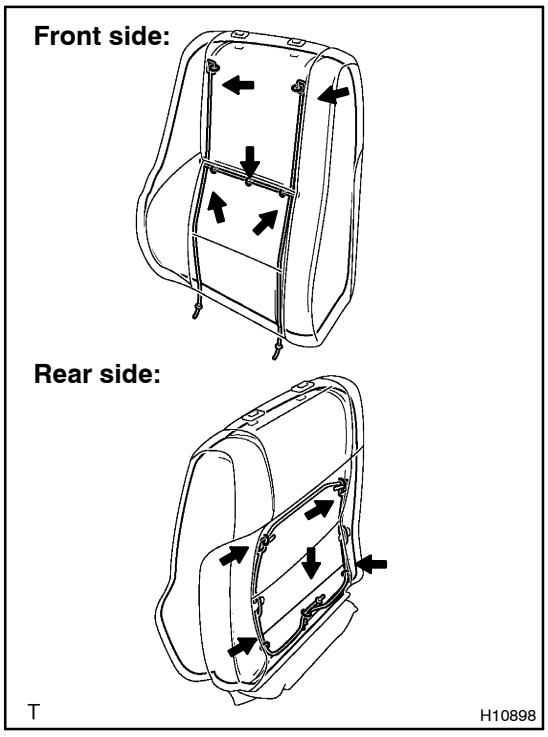
Tape the screwdriver tip before use.



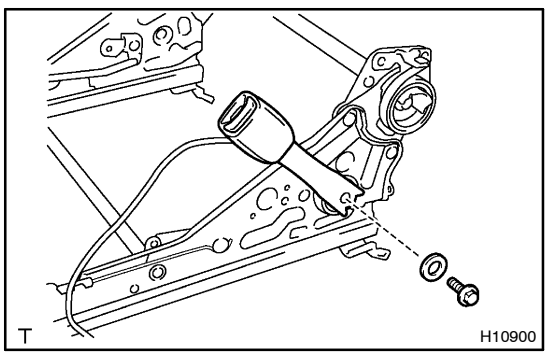
(b) Remove the 2 bolts.
(c) Slide the airbag door upward to remove it.



(d) Unlatch the seatback cover hooks circumference of the side airbag assembly.



(e) Remove the 10 hog rings, headrest supports and seatback cover as shown in the illustration.



11. REMOVE FRONT SEAT INNER BELT

Remove the bolt, washer and front seat inner belt.

12. REMOVE SEAT TRACK HANDLE

Using a screwdriver, remove the seat track handle.

HINT:

Tape the screwdriver tip before use.

13. REMOVE RECLINING CONNECTING ROD AND PIPE

Remove the 4 nuts, reclining connecting rod and pipe.

14. DISASSEMBLE OUTER TRACK AND INNER TRACK

Using a screwdriver, remove the 2 E–rings from the outer side on the inner track.

HINT:

Tape the screwdriver tip before use.

BO2DA–01

INSPECTION

INSPECT RECLINING LOCK POSITION AND SLIDING LOCK POSITION SLIPPING OFF

(a) When reclining the seat, inspect that the outer and inner recliners are released at the same time.

HINT:

When the reclining lock position slips off, disassemble the seat to adjust the position.

(b) When sliding the seat, inspect that the outer and inner tracks are locked at the same time.

HINT:

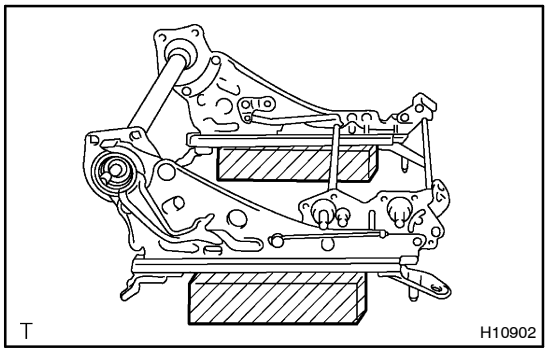
When sliding lock positions slip off, loosen the bolts to adjust the position.

BO2DB–01

REASSEMBLY

1. ASSEMBLE OUTER TRACK AND INNER TRACK

Assemble the outer track and inner track with 2 new E–rings.



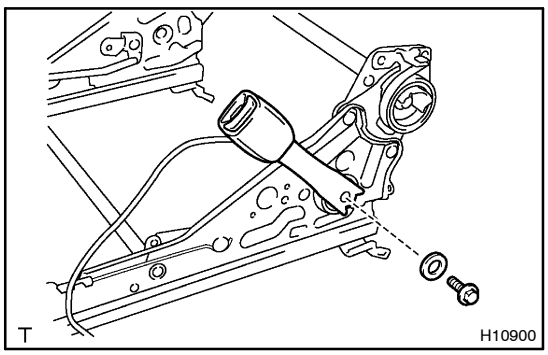
2. INSTALL RECLINING CONNECTING ROD AND PIPE

(a) Adjust the reclining lock positions of the seat adjusters.
(b) Slide the seat adjusters to the most front position.
(c) Place the adjusters on a spacer to adjust the seat rails in parallel and install the connecting pipe and rod with the 4 nuts.

HINT:

When installing the connecting pipe while raising up the adjusters, the lock positions adjusted in 2–(a) step slip off then lock error will occur.

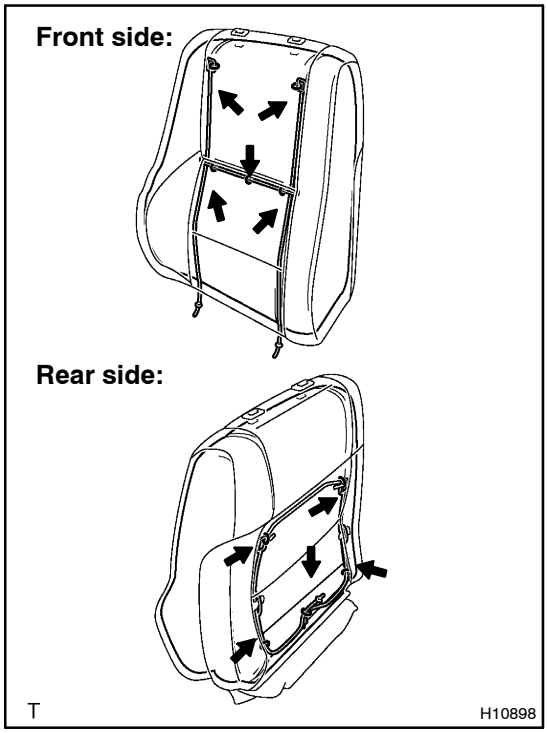
3. INSTALL SEAT TRACK HANDLE



4. INSTALL FRONT SEAT INNER BELT

Install the front seat inner belt with the washer and bolt.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)



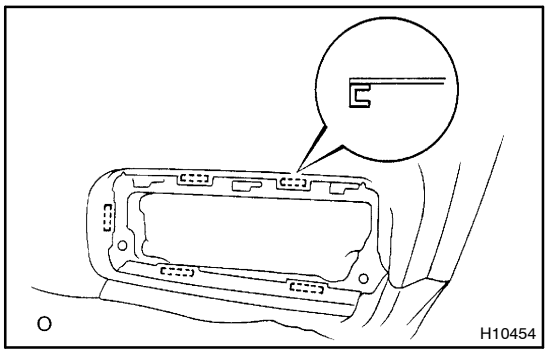
5. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog rings.

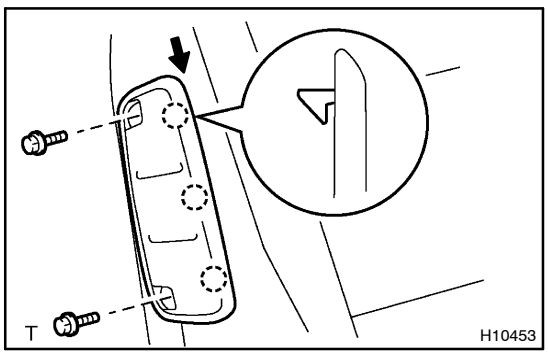
HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install the headrest supports.

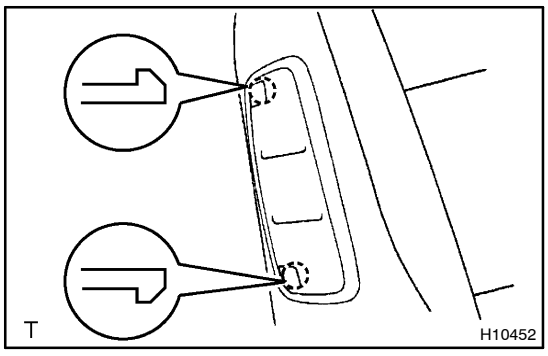


(c) Hook the seatback cover hooks through the holes in the circumference of the side airbag assembly.

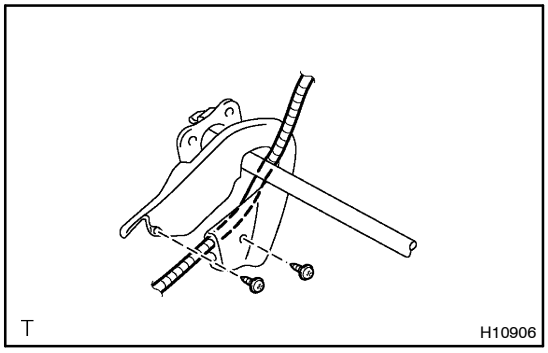


(d) Slide the airbag door downward to install it.

(e) Install the 2 bolts.



(f) Install the No.1 and No.2 airbag covers.



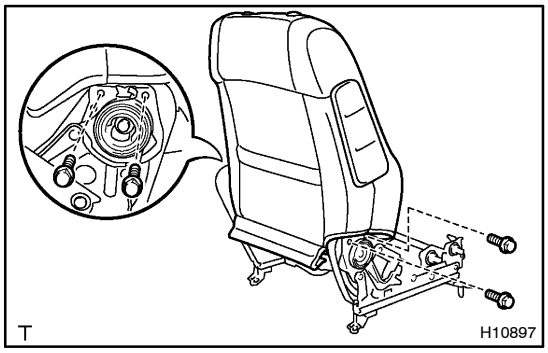
6. INSTALL SEATBACK ASSEMBLY

NOTICE:

Never use the seatback assembly from another vehicle. When replacing parts, replace them with new parts.

(a) Set the side airbag assembly wire harness to the reclining adjuster inside covers.

(b) Install the reclining adjuster inside cover with the 2 screws and employ the same manner described above to the other side.

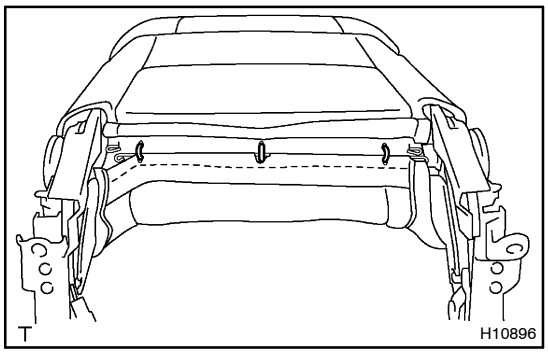


(c) Install the seatback assembly with the 4 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(d) Turn the seatback cover over, then install 6 new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.



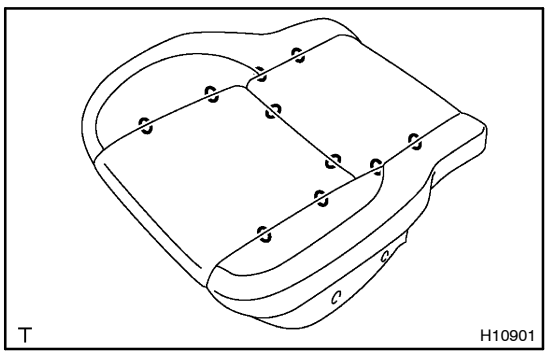
(e) Install 3 new hog rings as shown in the illustration.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

7. Passenger's seat:
INSTALL SEAT BELT SENSOR

Install the seat belt sensor to the seat cushion pad.

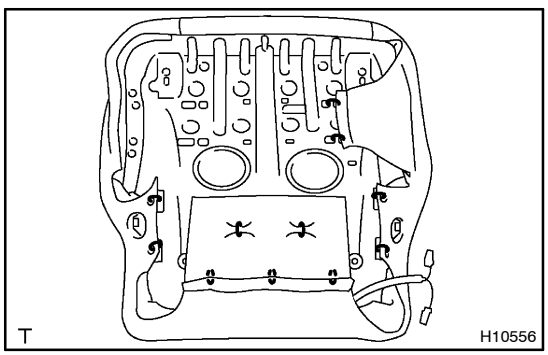


8. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to the seat cushion pad.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

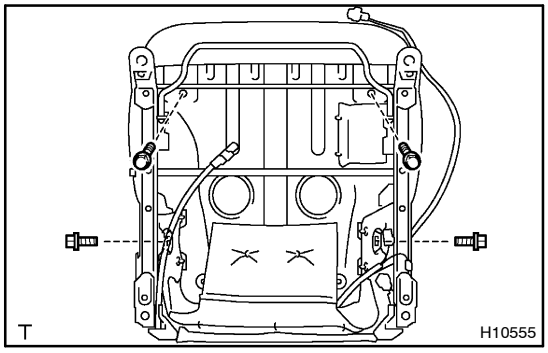


(b) Latch the seat cushion cover hooks to install the seat cushion cover with pad to the seat cushion pad.

(c) Install new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

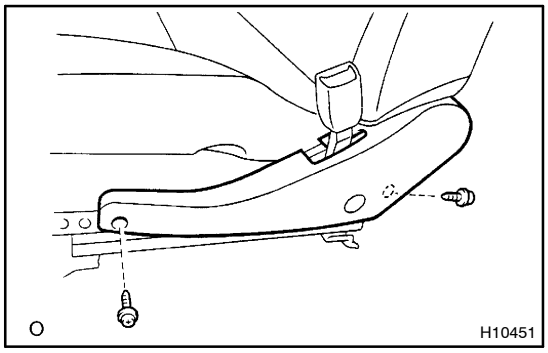


9. INSTALL SEAT CUSHION ASSEMBLY

(a) Install the seat cushion assembly with the 4 bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

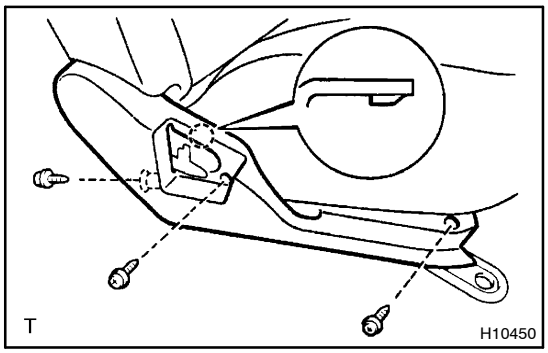
(b) Attach the wire harness clamps.

(c) Attach the side airbag assembly wire harness clamps.



10. INSTALL FRONT SEAT CUSHION INNER SHIELD

Install the front seat cushion inner shield with the 2 screws.



11. INSTALL FRONT SEAT CUSHION OUTER SHIELD

Install the front seat cushion outer shield with the 3 screws.

12. INSTALL RECLINING ADJUSTER RELEASE HANDLE

Install the reclining adjuster release handle with the screw.

13. INSTALL VERTICAL ADJUSTER KNOBS

Install the 2 vertical adjuster knobs with the 2 clips.

14. INSTALL HEADREST

BO2DC–01

INSTALLATION

1. INSTALL FRONT SEAT

(a) Mount the front seat to the vehicle.

NOTICE:

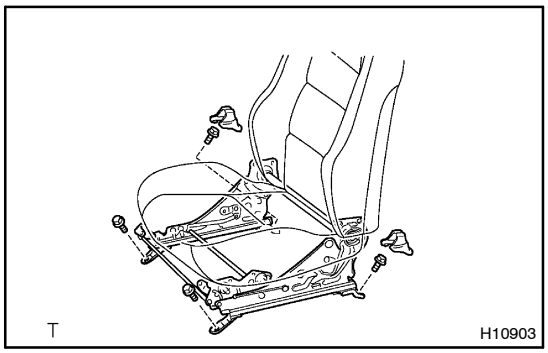
Be careful not to damage the body.

(b) Connect the connectors.

NOTICE:

When the wiring connector of the side airbag assembly is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded. To clear DTCs, see page DI–287.

(c) Slide the front seat to the rearmost position .



(d) Tighten the bolts on the front side temporarily, starting from the bolt on the inner side tighten them completely.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(e) Slide the front seat to the most front position.

(f) Tighten the bolts on the rear side temporarily, starting from the bolt on the inner side tighten them completely.

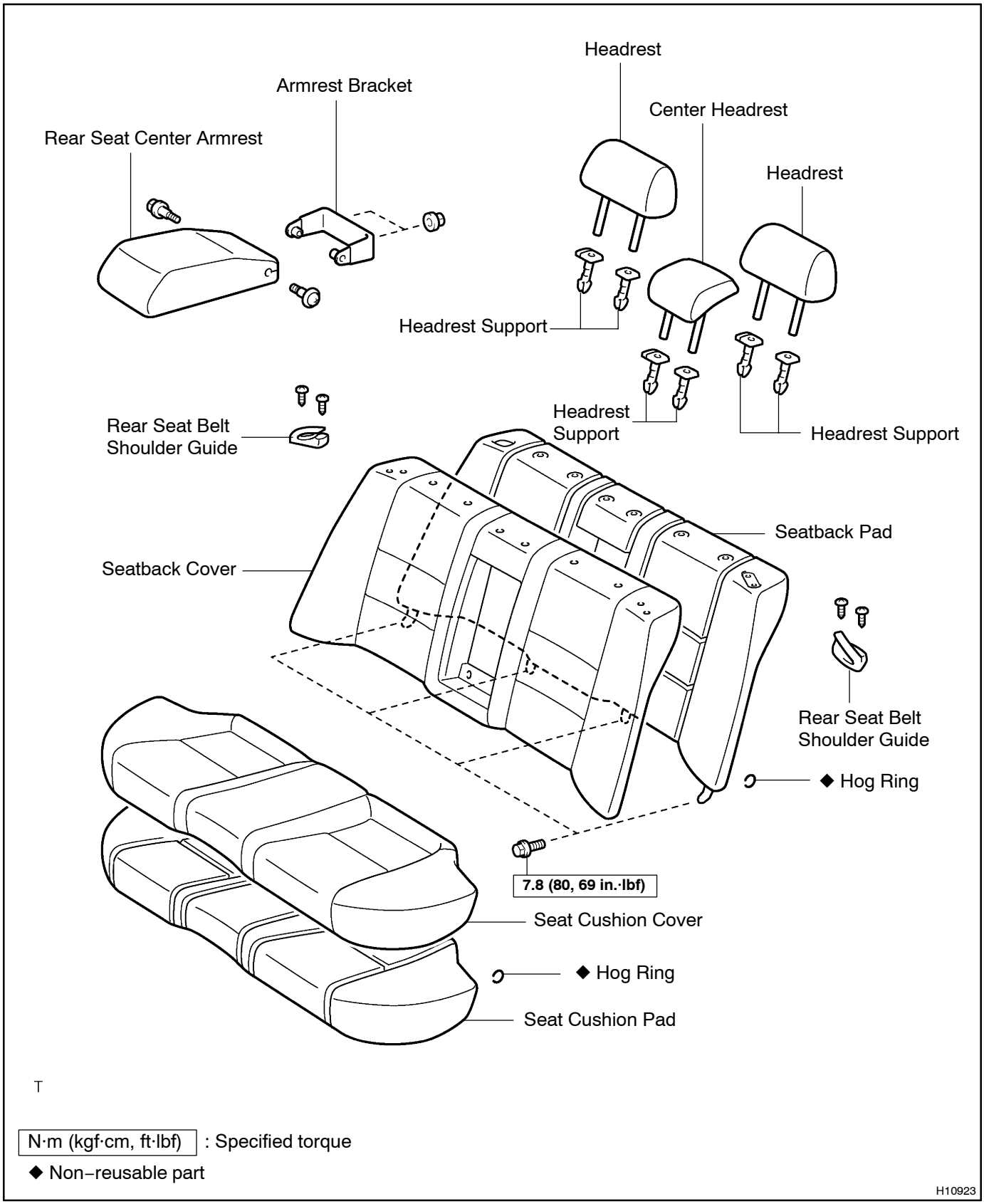
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

2. INSTALL SEAT TRACK COVERS

REAR SEAT

COMPONENTS

BO237–02



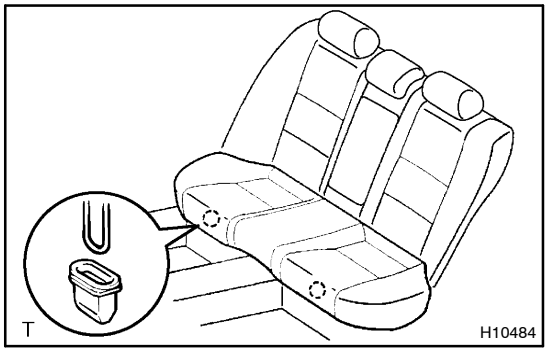
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

H10923

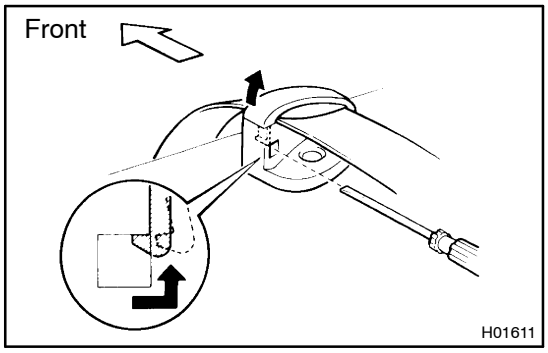
BO238–02

REMOVAL



1. REMOVE SEAT CUSHION ASSEMBLY

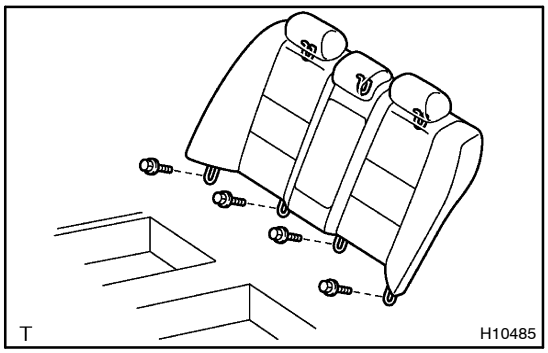
Pull up the front portion of the seat cushion assembly, then remove it.



2. REMOVE SEATBACK ASSEMBLY

(a) Using a screwdriver, remove the rear seat belt from the belt guide as shown in the illustration.

(b) Employ the same manner described above to the other sides.



(c) Remove the 4 bolts, then raise the seatback assembly upward to remove the seatback assembly.

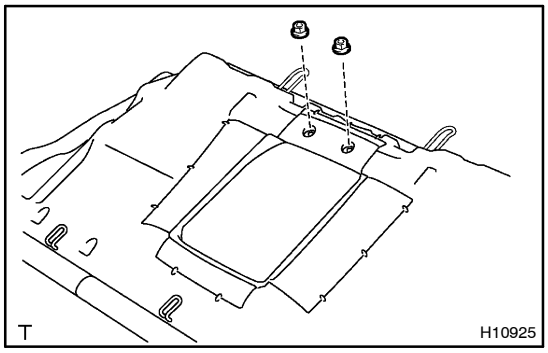
BO2DD–01

DISASSEMBLY

1. REMOVE HEADRESTS

2. REMOVE REAR SEAT BELT SHOULDER GUIDES

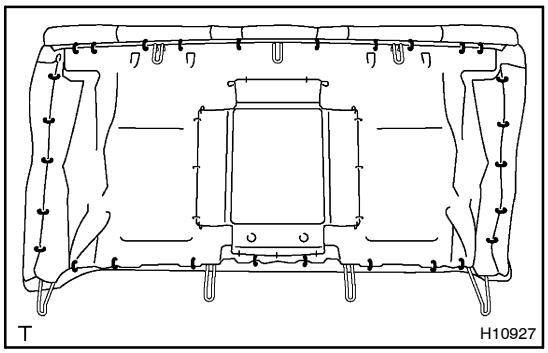
Remove the 4 screws and rear seat belt shoulder guides.



3. REMOVE REAR SEAT CENTER ARMREST

(a) Remove the 2 nuts and rear seat center armrest with bracket.

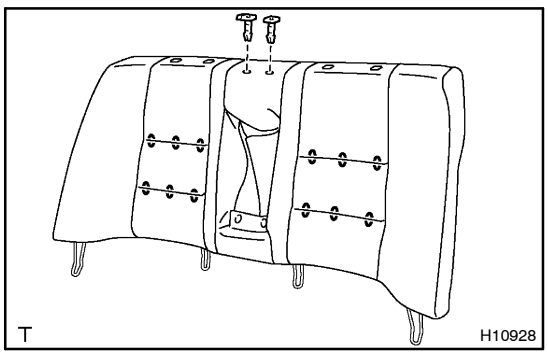
(b) Remove the 2 screws and armrest bracket.



4. REMOVE SEATBACK COVER

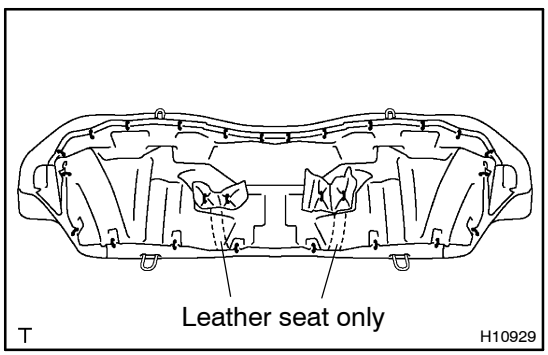
(a) Remove the 4 headrest supports.

(b) Remove the hog rings on the back of seatback assembly.



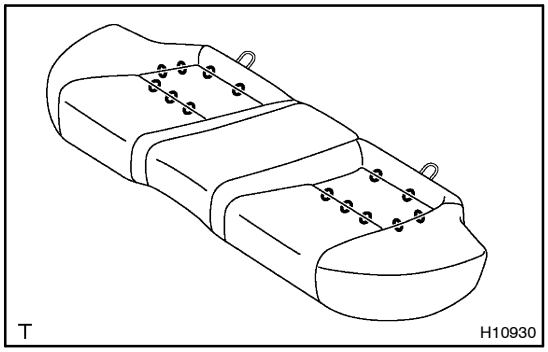
(c) Remove the center headrest supports.

(d) Remove the hog rings and seatback cover on the front of seatback assembly.



5. REMOVE SEAT CUSHION COVER

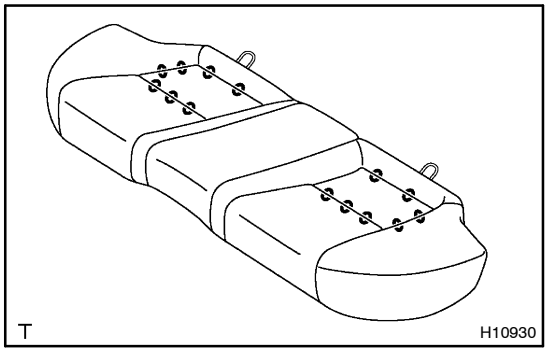
(a) Remove the hog rings on the back of seat cushion assembly.



(b) Remove the hog rings and seat cushion cover on the front of the seat cushion assembly.

BO2DE–01

REASSEMBLY

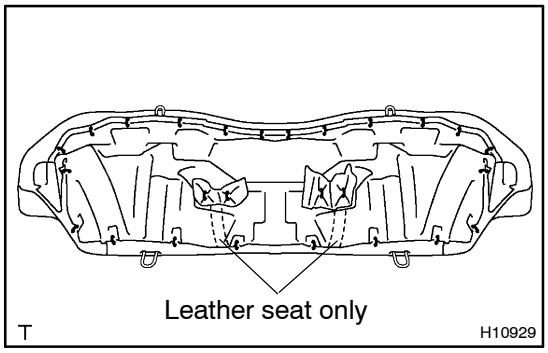


1. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to the front of seat cushion assembly.

HINT:

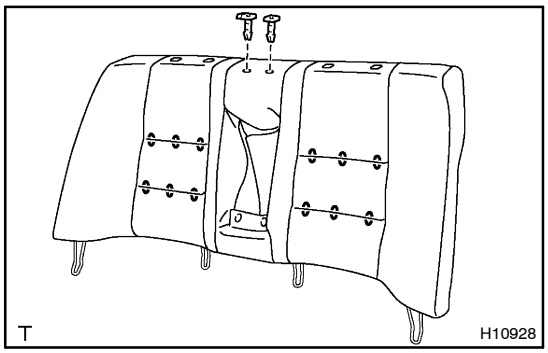
When installing the hog rings, take care to prevent wrinkles as little as possible.



(b) Install new hog rings to the back of seat cushion assembly.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.



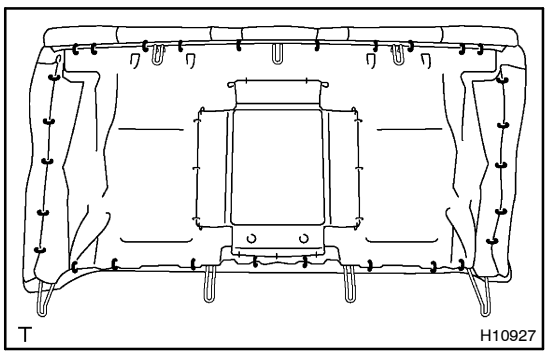
2. INSTALL SEATBACK COVER

(a) Install seatback cover with new hog rings to the front of seatback assembly.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install the center headrest supports.

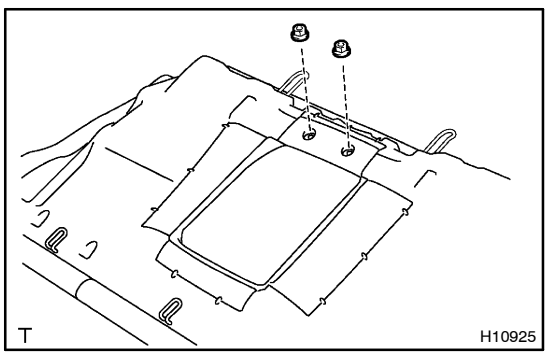


(c) Install new hog rings on the back of seatback assembly.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(d) Install the 4 headrest supports.



3. INSTALL REAR SEAT CENTER ARMREST

(a) Install the armrest bracket with the 2 screws to the rear seat center armrest.

(b) Install the rear seat center armrest with the bracket to the seatback assembly with the 2 nuts.

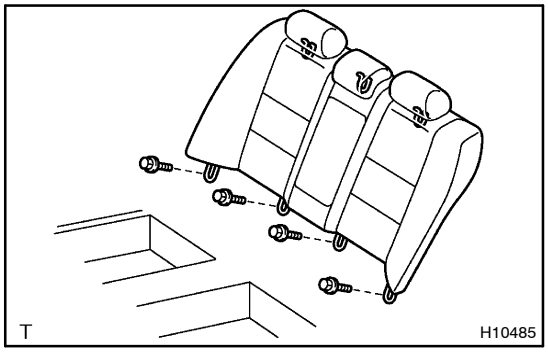
4. INSTALL REAR SEAT BELT SHOULDER GUIDES

Install the rear seat belt shoulder guides with the 4 screws to the seatback assembly.

5. INSTALL HEADRESTS

BO2DF–01

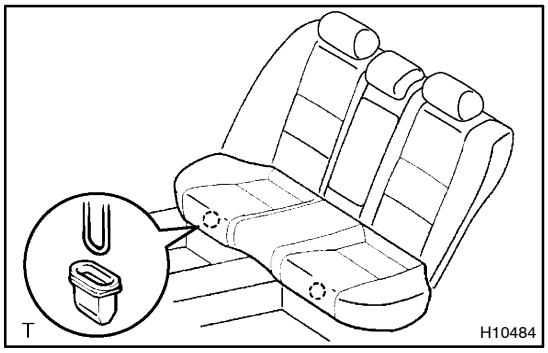
INSTALLATION



1. INSTALL SEATBACK ASSEMBLY

(a) Install the seatback assembly with the 4 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(b) Install the rear seat belts to the belt guides, then close the belt guides.



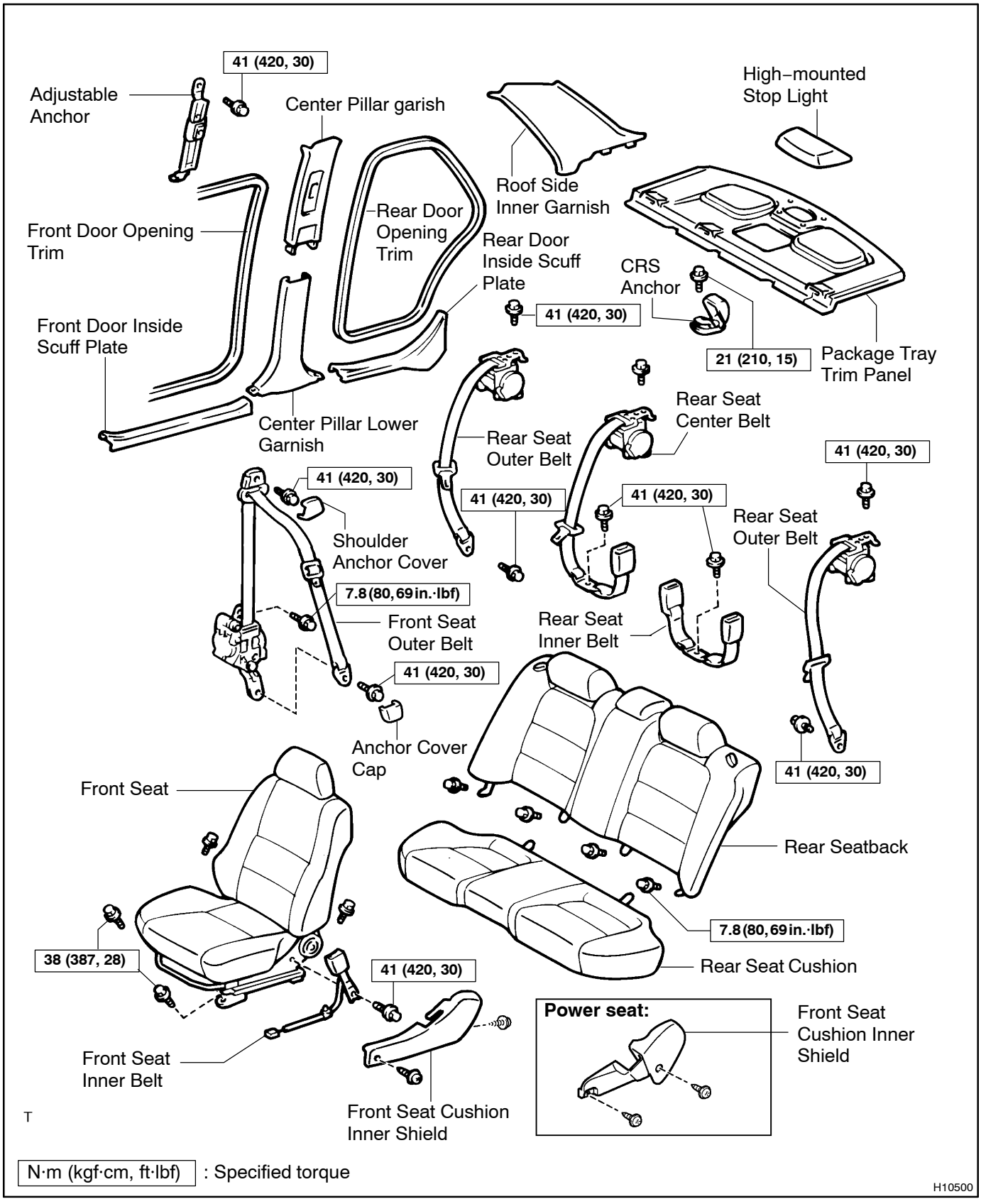
2. INSTALL SEAT CUSHION ASSEMBLY

Push down the front portion of the seat cushion assembly to install it.

SEAT BELT

COMPONENTS

BO0VN–04



BO0VO–04

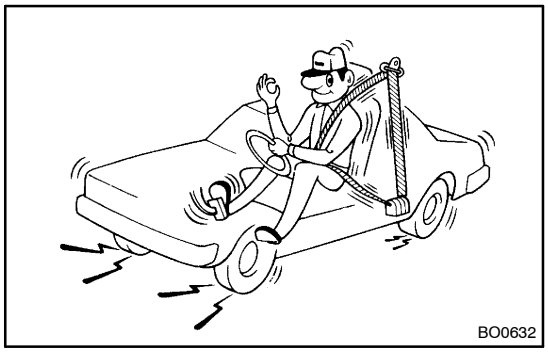
INSPECTION

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.

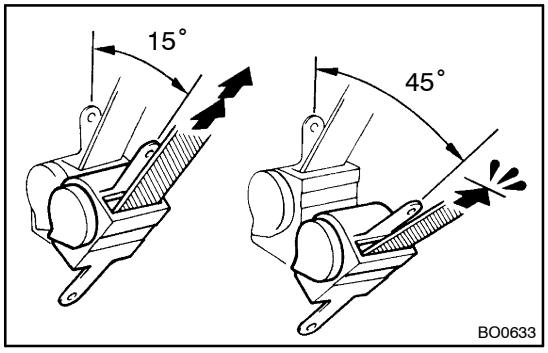
2. Driver's Seat Belt (ELR):

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 (ELR/ALR):

STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.

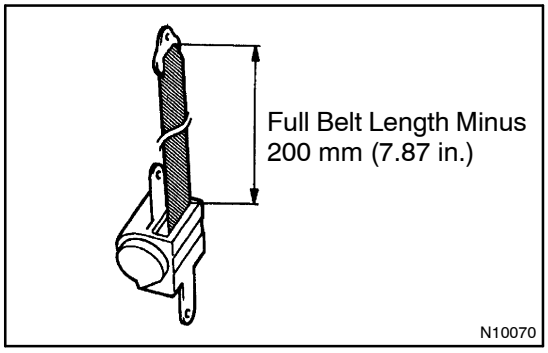
(b) Remove the locking retractor assembly.

(c) Pull out the whole belt and measure the length of the whole belt.

Then retract the belt slightly and pull it out again.

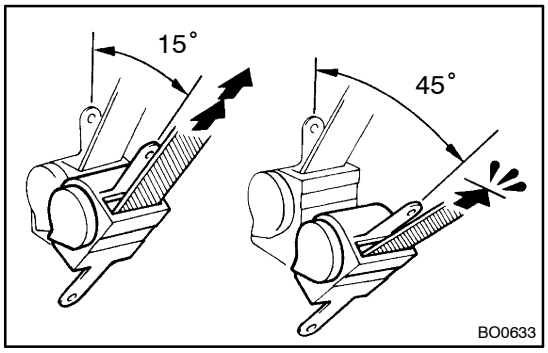
(d) Make sure that the belt cannot be extended further.

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.

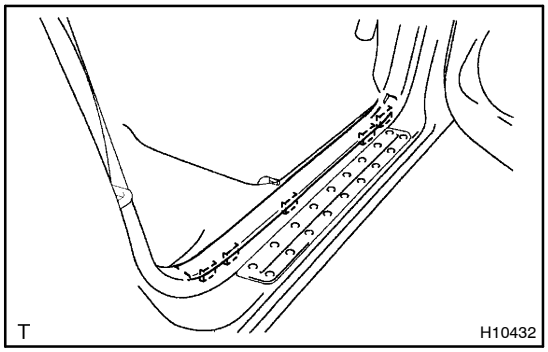
SEAT BELT PRETENSIONER

BO2DG–01

REMOVAL

NOTICE:

- **If the wiring connector of the seat belt pretensioner is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.**
- **Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.**

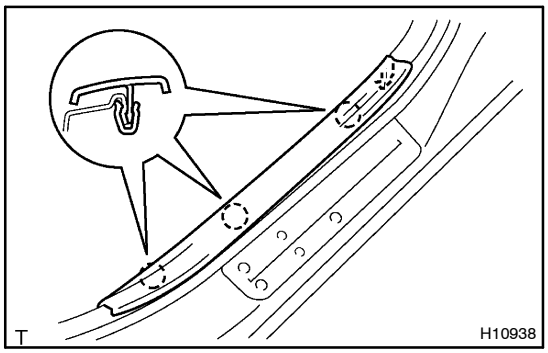


1. REMOVE FRONT DOOR INSIDE SCUFF PLATE

Using a screwdriver, remove the front door inside scuff plate.

HINT:

Tape the screwdriver tip before use.



2. REMOVE REAR DOOR INSIDE SCUFF PLATE

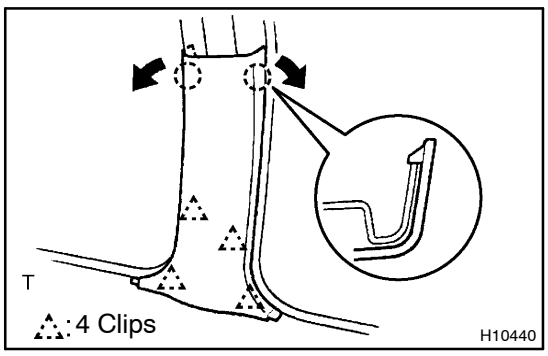
Using a screwdriver, remove the rear door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

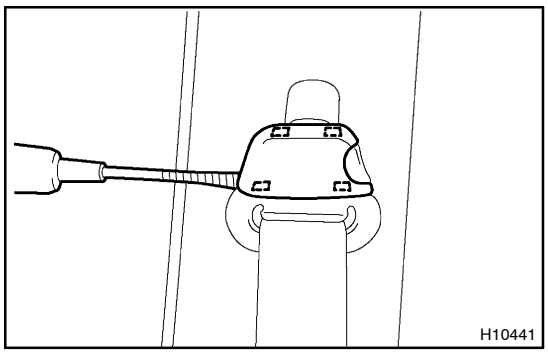
3. REMOVE REAR PART OF FRONT DOOR OPENING TRIM

4. REMOVE FRONT PART OF REAR DOOR OPENING TRIM



5. REMOVE CENTER PILLAR LOWER GARNISH

Remove the center pillar lower garnish as shown in the illustration.



6. REMOVE FRONT SEAT OUTER BELT

(a) Using a screwdriver, remove the shoulder anchor cover.

HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt and shoulder anchor.

(c) Using a screwdriver, remove the floor anchor cover.

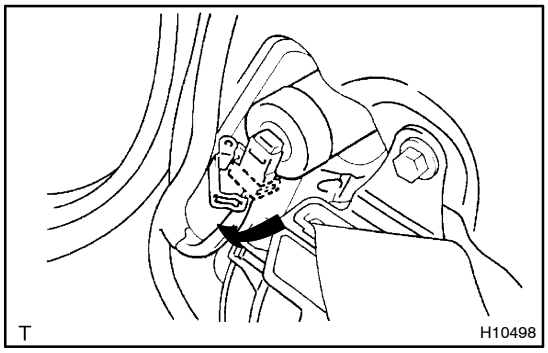
HINT:

Tape the screwdriver tip before use.

(d) Remove the bolt and floor anchor.

(e) Remove the retractor of front seat outer belt.

CAUTION:
Never disassemble the front seat outer belt.
NOTICE:
When removing the retractor of front seat outer belt, take care not to pull the seat belt pretensioner wire harness.



(1) Disconnect the pretensioner connector as shown in the illustration.

CAUTION:
When removing the seat belt pretensioner, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

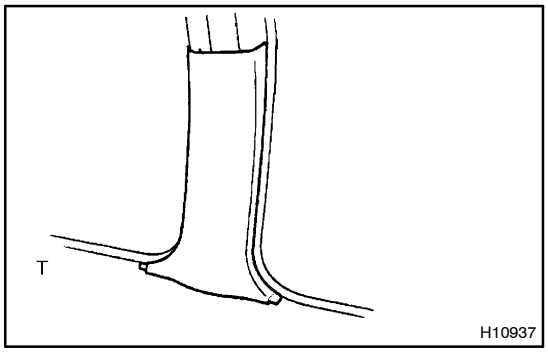
(2) Remove the bolt and retractor of front seat outer belt.

BO259–02

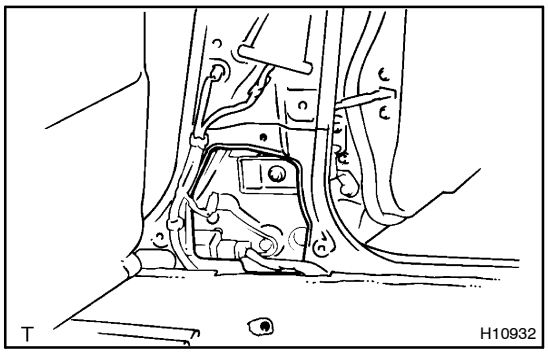
INSPECTION

1. PRETENSIONER IS NOT ACTIVATED

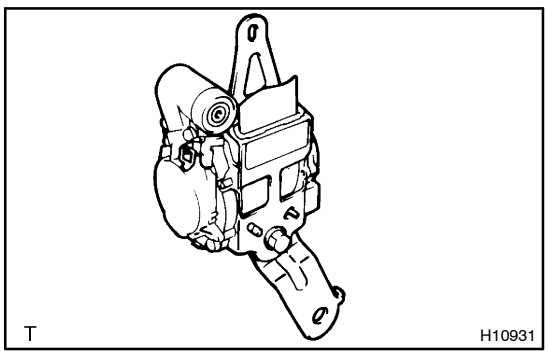
(a) Perform a diagnostic system check.
(See page DI–287)



(b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.
- Check for cuts and cracks in, or marked discoloration on the center pillar lower garnish.
- Check for cuts and cracks in wire harness, and for chipping in connectors.



- Check for deformation of the center pillar.

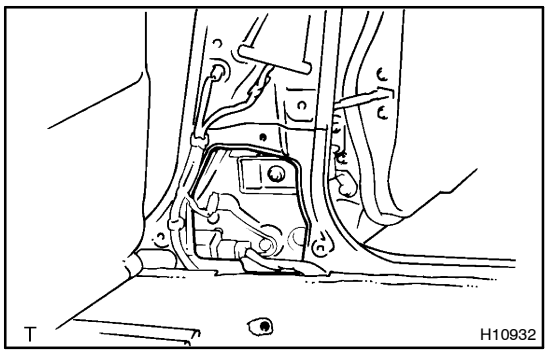


- Check for cuts and minute cracks in wire harness or marked discoloration on the front seat outer belt.

CAUTION:
For removal and installation of the front seat outer belt, see page BO–150 and BO–159.
Be sure to follow the correct procedure.

2. PRETENSIONER IS ACTIVATED

(a) Perform a diagnostic system check.
(See page DI–287)



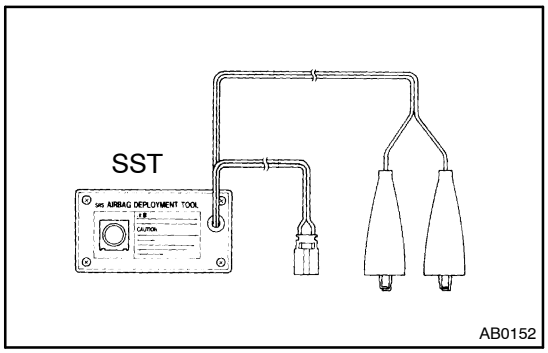
(b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.
- Check for deformation of the center pillar.
- Check for damage on the connector and wire harness.

BO2DH–01

DISPOSAL

HINT:

When scrapping vehicles equipped with a seat belt 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 in the seat belt pretensioner operation, contact the SERVICE DEPT. of DISTRIBUTOR. When disposing of a front seat outer belt (with seat belt pretensioner) activated in a collision, follow the same procedure given in step 1–(e) in "DISPOSAL".

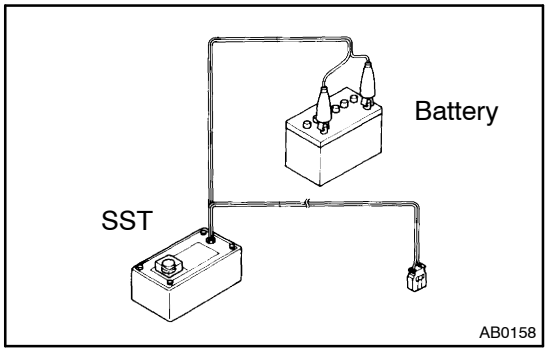


AB0152

CAUTION:

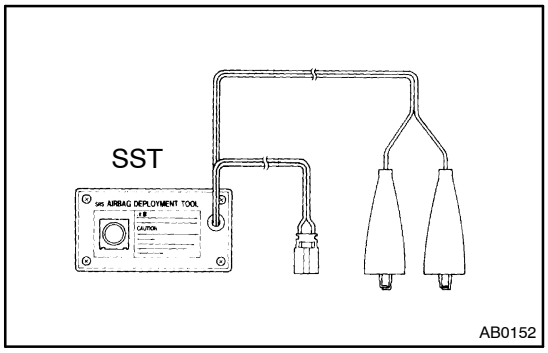
- **Never dispose of front seat outer belt which has an inactivated pretensioner.**
- **The seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation out–of–door and where it will not create a nuisance to nearby residents.**
- **When activating the seat belt pretensioner, always use the specified SST. (SRS Airbag Deployment Tool) Perform the operation in a place away from electrical noise.**

  SST 09082–00700, 09082–00740
- **When activating a front seat outer belt (with seat belt pretensioner), perform the operation at least 10 m (33 ft) away from the front seat outer belt.**
- **Use gloves and safety glasses when handling a front seat outer belt with activated pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with activated pretensioner.**



1. SEAT BELT PRETENSIONER ACTIVATION WHEN SCRAPPING VEHICLE

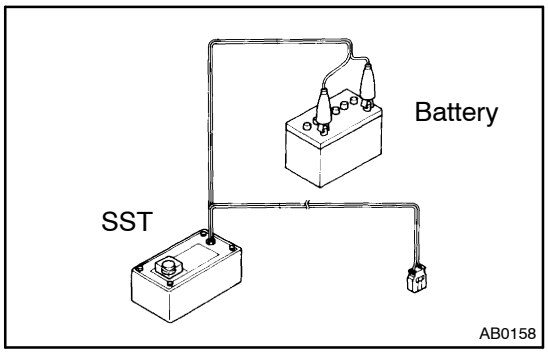
HINT:
Have a battery ready as the power source to activate the seat belt pretensioner.



(a) Check the functioning of SST.

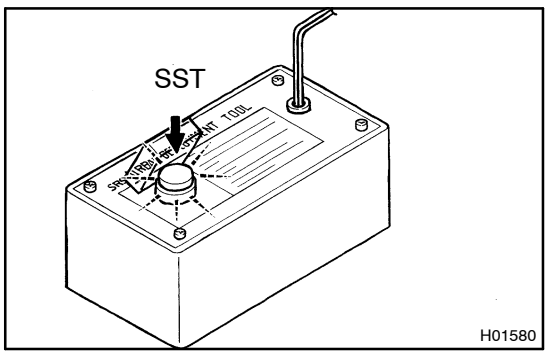
CAUTION:
When activating the seat belt pretensioner, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082–00700, 09082–00740



(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.

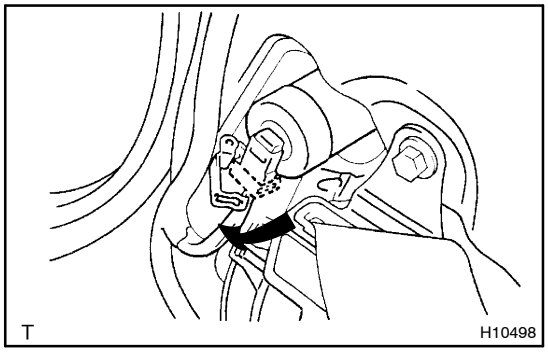
HINT:
Do not connect the yellow connector which will be connected with the seat belt pretensioner.



(2) Press the SST activation switch, and check 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.

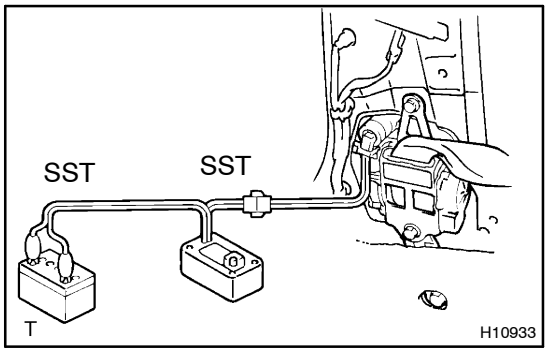
(b) Disconnect the pretensioner connector.
(1) Remove the front door inside scuff plate.
(2) Remove the rear door inside scuff plate.
(3) Remove the rear part of front door opening trim.
(4) Remove the front part of rear door opening trim.
(5) Remove the center pillar lower garnish.



(6) Disconnect the pretensioner connector as shown in the illustration.

(c) Install the SST.

(1) Buckle the front seat belt and check that there is no looseness and slack in the front seat inner belt and front seat outer belt.

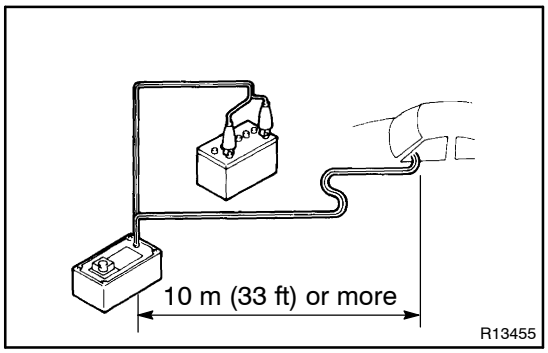


(2) Connect the 2 SST, then connect them to the seat belt pretensioner.

SST 09082–00700, 09082–00740

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.

(4) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (–) terminal.

(d) Activate the seat belt pretensioner.

(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 activate the seat belt pretensioner.

HINT:

The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.

(e) Dispose of front seat outer belt (with seat belt pretensioner).

CAUTION:

- **The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a front seat outer belt with activated seat belt pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with activated seat belt pretensioner.**

HINT:
When scrapping a vehicle, dispose the seat belt pretensioner and scrap the vehicle with activated front seat outer belt still installed.

2. ACTIVATION WHEN DISPOSING OF FRONT SEAT OUTER BELT ONLY

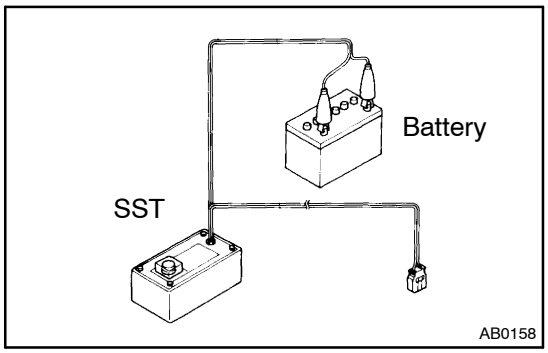
NOTICE:

- **When disposing of the front seat outer belt (with seat belt pretensioner) only, never use the customer's vehicle to activate the seat belt pretensioner.**
- **Be sure to follow the procedure given on the next page when activating the seat belt pretensioner.**

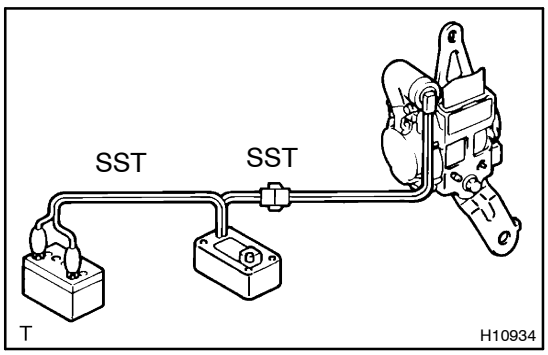
HINT:
Have a battery ready as the power source when activating the seat belt pretensioner.

(a) Remove the front seat outer belt (See page BO–147).

HINT:
Cut the belt near the seat belt retractor.

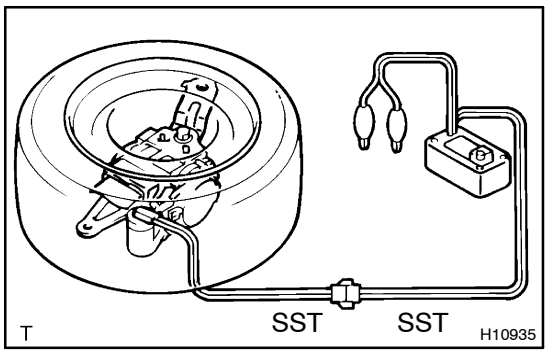


(b) Check functioning of SST (See step 1–(a)).
SST 09082–00700, 09082–00740



(c) Install the SST.
(1) Connect the 2 SST, then connect them to the seat belt pretensioner.
SST 09082–00700, 09082–00740

NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(2) Place the front seat outer belt on the ground and cover it with the disc wheel with tire.

NOTICE:
Place the front seat outer belt as shown in the illustration.

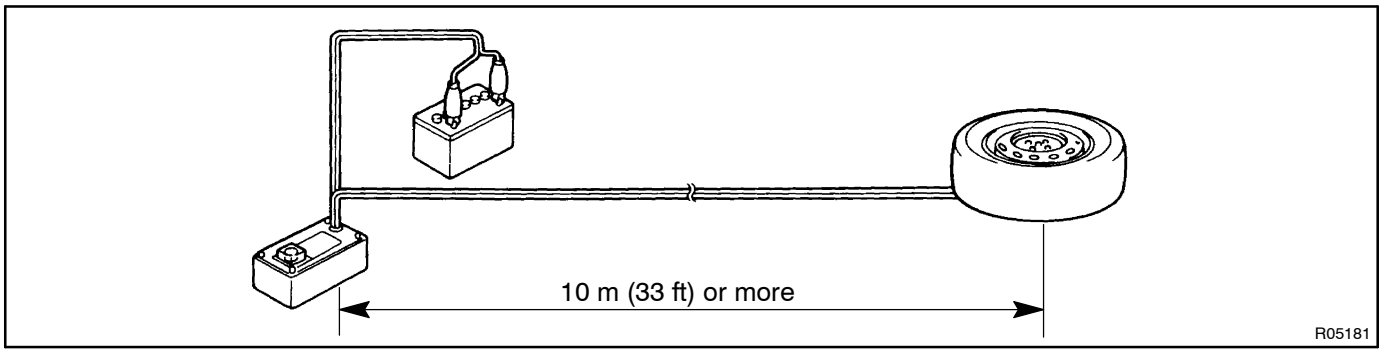
(3) Move the SST as least 10 m (33 ft) away from the disc wheel.

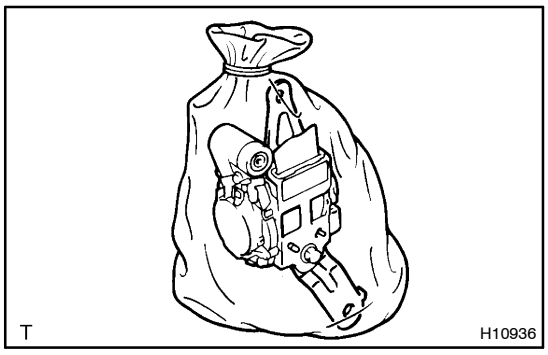
NOTICE:
Take care not to damage the SST wire harness.

(d) Activate the seat belt pretensioner.

(1) Connect the SST red clip to the battery positive (+) terminal and black clip to the battery negative (–) terminal.
(2) Check that no one is within 10 m (33 ft) area around the disc wheel.
(3) Press the SST activation switch and activate the seat belt pretensioner.

HINT:
The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.





(e) Dispose of front seat outer belt (with seat belt pretensioner).

CAUTION:

- **The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a front seat outer belt with activated seat belt pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with activated seat belt pretensioner.**

(1) Remove the disc wheel and SST.
(2) Place the front seat outer belt in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts.

BO1QY–05

REPLACEMENT

REPLACE REQUIREMENTS

In the following cases, replace the seat belt pretensioner.

- If the seat belt pretensioner has been activated.
- If the seat belt pretensioner has been found to be faulty in troubleshooting.
- If the front seat outer belt has been found to be faulty during checking items 1–(b) or 2–(b) (See page BO–152).
- If the front seat outer belt has been dropped.

CAUTION:

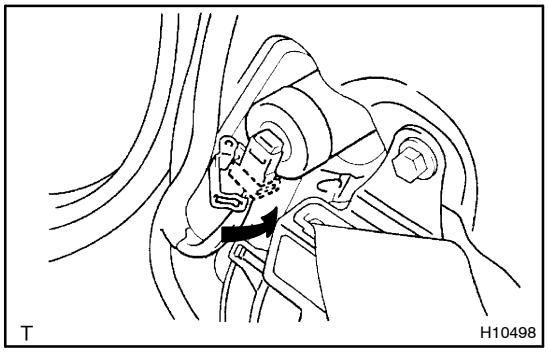
For removal and installation of the seat belt pretensioner, see page BO–150 and BO–159.
Be sure to follow the correct procedure.

BO2DI–01

INSTALLATION

NOTICE:

- **Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.**
- **Make sure that the front seat outer belt is installed with the specified torque.**
- **If the front seat outer belt has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front seat outer belt with a new one.**
- **When installing the front seat outer belt, take care that the wiring does not interfere with other parts and is not pinched between other parts.**



1. INSTALL FRONT SEAT OUTER BELT

(a) Install the retractor of front seat outer belt.

(1) Install the retractor of front seat outer belt with the bolt.

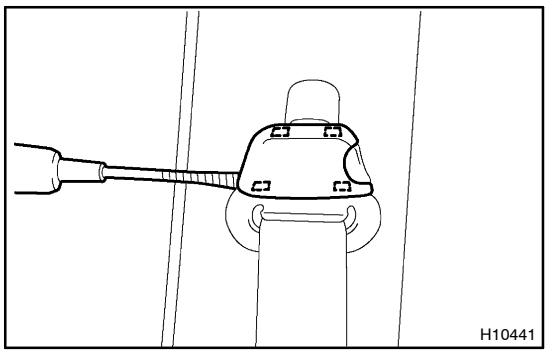
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(2) Connect the pretensioner connector as shown in the illustration.

(b) Install the floor anchor with the bolt.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

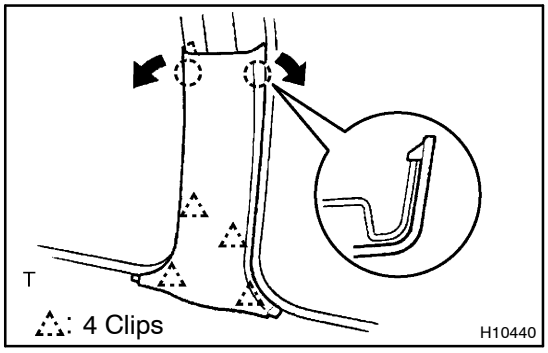
(c) Install the floor anchor cover.



(d) Install the shoulder anchor with the bolt.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

(e) Install the shoulder anchor cover.

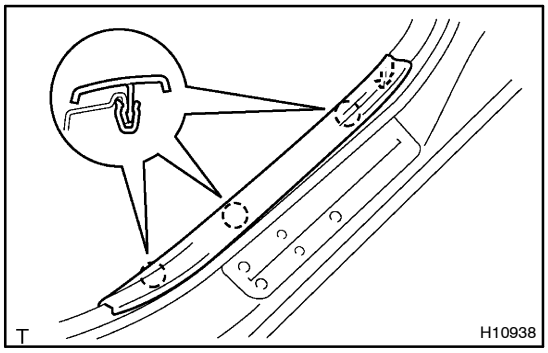


2. INSTALL CENTER PILLAR LOWER GARNISH

Install the center pillar lower garnish to the body.

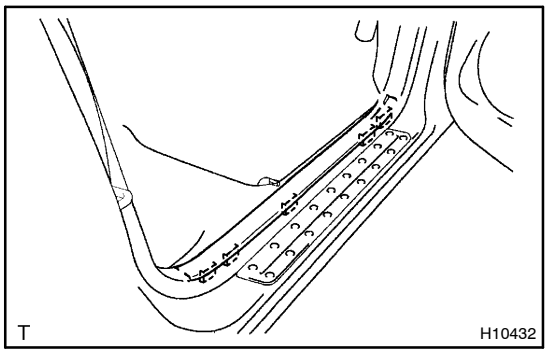
3. INSTALL FRONT PART OF REAR DOOR OPENING TRIM

4. INSTALL REAR PART OF FRONT DOOR OPENING TRIM



5. INSTALL REAR DOOR INSIDE SCUFF PLATE

Install the rear door inside scuff plate to the body.



6. INSTALL FRONT DOOR INSIDE SCUFF PLATE

Install the front door inside scuff plate to the body.

BRAKE SYSTEM

BR0MH–01

PRECAUTION

- **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 of the same part number or equivalent.**
- **It is very important to keep parts and the area clean when repairing the brake system.**
- **If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.**

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BR0MI–03

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–284
	2. Brake system (Air in)	BR–4
	3. Piston seals (Worn or damaged)	BR–25
		BR–34
	4. Master cylinder (Faulty)	BR–10
	5. Booster push rod (Out of adjustment)	BR–21
Brake drag	1. Brake pedal freeplay (Minimal)	BR–6
	2. Parking brake lever travel (Out of adjustment)	BR–9
	3. Parking brake wire (Sticking)	–
	4. Parking brake shoe clearance (Out of adjustment)	BR–44
	5. Pad (Cracked or distorted)	BR–22
		BR–31
	6. Piston (Stuck)	BR–25
		BR–34
	7. Piston (Frozen)	BR–25
		BR–34
	8. Tension or return spring (Faulty)	BR–40
	9. Booster push rod (Out of adjustment)	BR–21
	10. Booster system (Vacuum leaks)	BR–19
	11. Master cylinder (Faulty)	BR–10
Brake pull	1. Piston (Stuck)	BR–25
		BR–34
	2. Pad (Oily)	BR–22
		BR–31
	3. Piston (Frozen)	BR–25
		BR–34
	4. Disc (Scored)	BR–28
		BR–37
	5. Pad (Cracked or distorted)	BR–22
		BR–31
Hard pedal but brake inefficient	1. Brake system (Fluid leaks)	DI–284
	2. Brake system (Air in)	BR–4
	3. Pad (Worn)	BR–22
		BR–31
	4. Pad (Cracked or distorted)	BR–22
		BR–31
	5. Pad (Oily)	BR–22
		BR–31
	6. Pad (Glazed)	BR–22
		BR–31
	7. Disc (Scored)	BR–28
		BR–37
	8. Booster push rod (Out of adjustment)	BR–21
	9. Booster system (Vacuum leaks)	BR–19

Symptom	Suspect Area	See page
Noise from brake	1. Pad (Cracked or distorted)	BR–22 BR–31
	2. Installation bolt (Loose)	BR–25 BR–34
	3. Disc (Scored)	BR–28 BR–37
	4. Pad support plate (Loose)	BR–25
	5. Sliding pin (Worn)	BR–25
	6. Pad (Dirty)	BR–22 BR–31
	7. Pad (Glazed)	BR–22 BR–31
	8. Tension or return spring (Faulty)	BR–40
	9. Anti–squeal shim (Damaged)	BR–22 BR–31
	10. Shoe hold–down spring (Damaged)	BR–40

BRAKE FLUID

BR0MJ–03

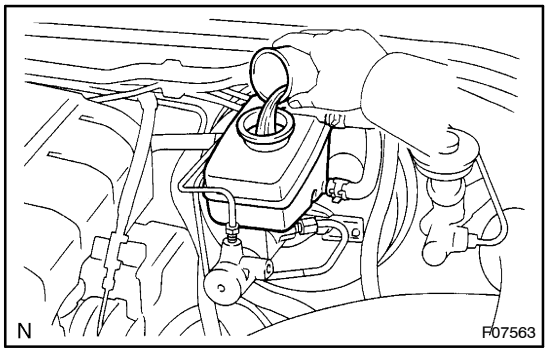
BLEEDING

HINT:

If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.

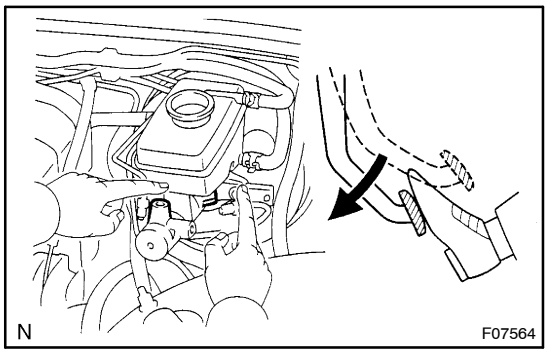
NOTICE:

Do not let brake fluid remain on painted surfaces. Wash it off immediately.



1. FILL RESERVOIR WITH BRAKE FLUID

Fluid: SAE J1703 or FMVSS NO. 116 DOT3



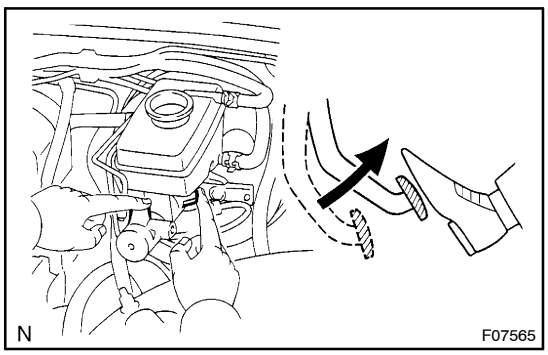
2. BLEED MASTER CYLINDER

HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the master cylinder of the air.

(a) Disconnect the brake lines from the master cylinder.
SST 09023–00100

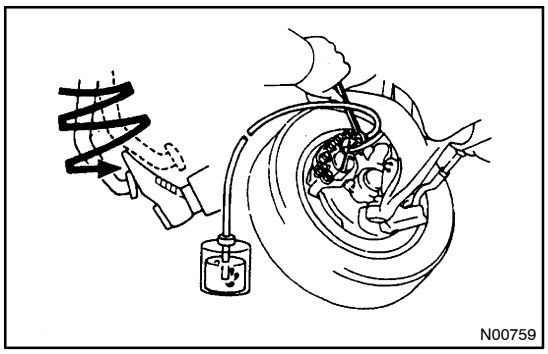
(b) Slowly depress the brake pedal and hold it.



(c) Block off the outer holes with your fingers, and release the brake pedal.

(d) Repeat (b) and (c) 3 or 4 times.

(e) Connect the brake lines to the master cylinder.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



3. BLEED BRAKE LINE

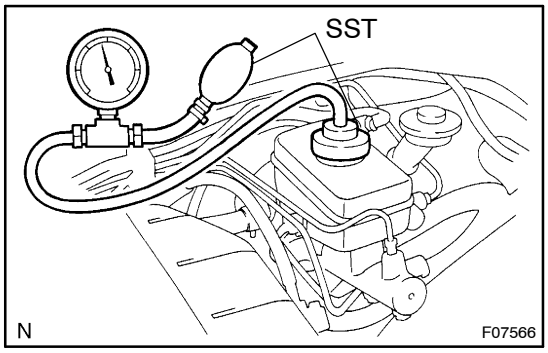
(a) Connect the vinyl tube to the caliper.

(b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.

(c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

(d) Repeat (b) and (c) until all the air in the fluid has been bled out.

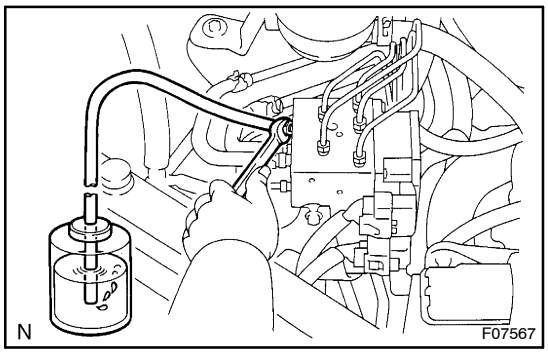
(e) Repeat the procedure on the previous page to bleed the brake line for each wheel.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



4. BLEED ABS & TRC ACTUATOR

CAUTION:
When repairing the brake master cylinder or ABS & TRC actuator, bleed the ABS & TRC actuator of the air.

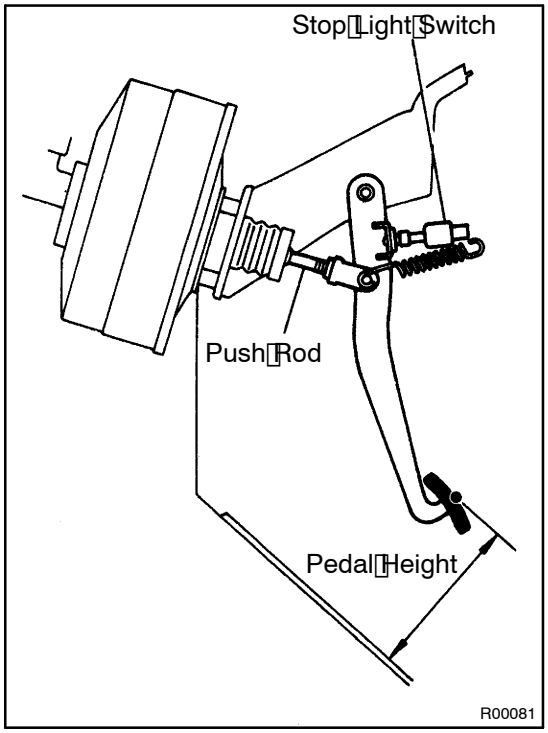
(a) Install the SST to the reservoir.
SST 09992–00242, 09992–00350



(b) Connect the vinyl tube to the ABS & TRC actuator, and loosen the bleeder plug.
(c) Using SST, apply pressure to the reservoir.
Pressure: 98.1 kpa (1.0 kgf/cm^2, 14.2 psi)
(d) Bleed the ABS & TRC actuator of the air, tighten the bleeder plug.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

5. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.
Fluid: SAE J1703 or FMVSS NO. 116 DOT3



BRAKE PEDAL

BR0MK–03

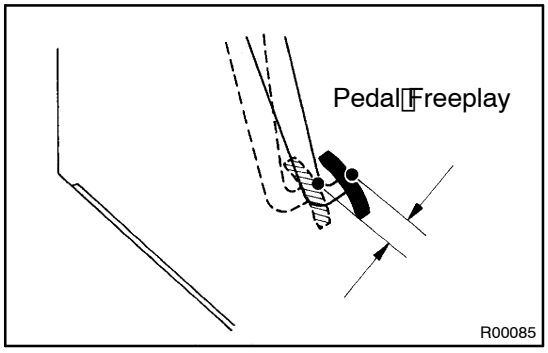
ON–VEHICLE INSPECTION

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:
154 – 164 mm (6.063 – 6.457 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

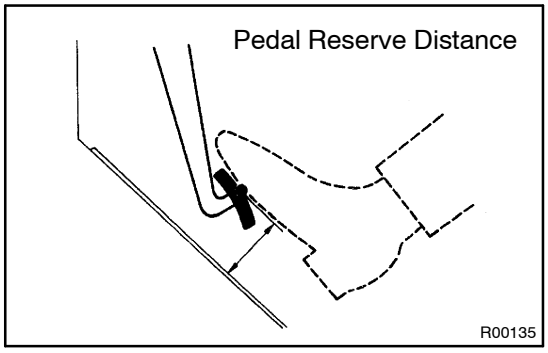
(a) Remove the No. 1 lower pad (See page BO–93).
(b) Disconnect the connector from the stop light switch.
(c) Loosen the stop light switch lock nut and remove the stop light switch.
(d) Loosen the push rod lock nut.
(e) Adjust the pedal height by turning the pedal push rod.
(f) Tighten the push rod lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
(g) Install the stop light switch and turn it until it slightly contacts the pedal stopper.
(h) Connect the connector to the stop light switch.
(i) Push in the brake pedal 5 – 15 mm (0.20 – 0.59 in.), turn the stop light switch to lock the nut in a position where the stop light goes off.
(j) After installation, push in the brake pedal 5 – 15 mm (0.20 – 0.59 in.), check that stop light lights up.
(k) After adjusting the pedal height, check the pedal freeplay.
(l) Install the No. 1 lower pad (See page BO–93).



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: 2.0 – 4.5 mm (0.08 – 0.18 in.)

HINT:
The freeplay to the 1st resistance is due to the play between the clevis and pin. This is magnified up to 2.0 – 4.5 mm (0.08 – 0.18 in.) at the pedal.
If incorrect, check the stop light switch clearance. If the clearance is OK, then troubleshoot the brake system.
Stop light switch clearance:
0.5 – 2.4 mm (0.020 – 0.094 in.)



4. CHECK PEDAL RESERVE DISTANCE

Release the parking brake lever.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

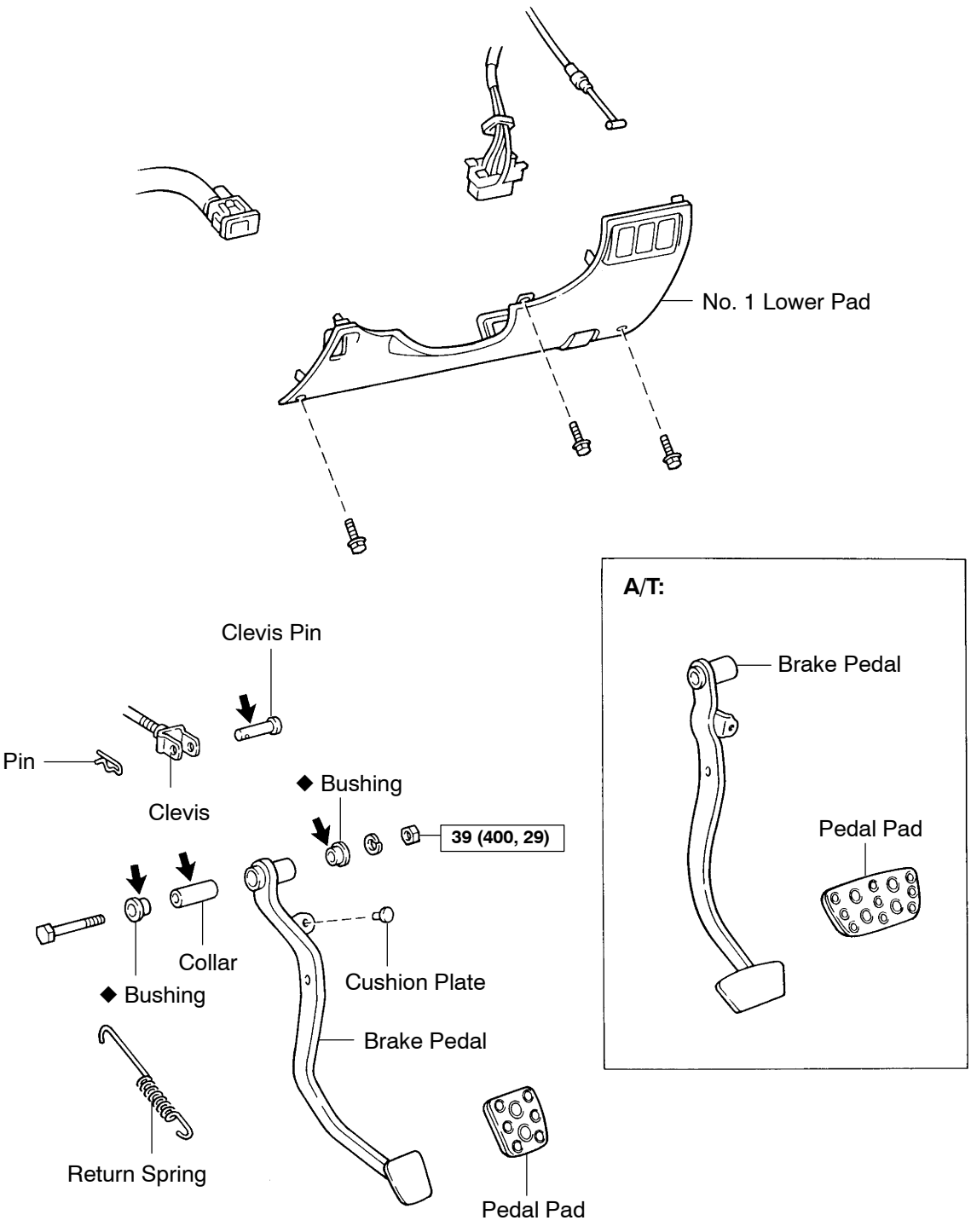
Pedal reserve distance from asphalt sheet at 490 N (50 Kgf, 110.2 lbf): More than 99 mm (3.90 in.)

If the reserve distance is incorrect, troubleshoot the brake system.

BR0YI–02

COMPONENTS

M/T:

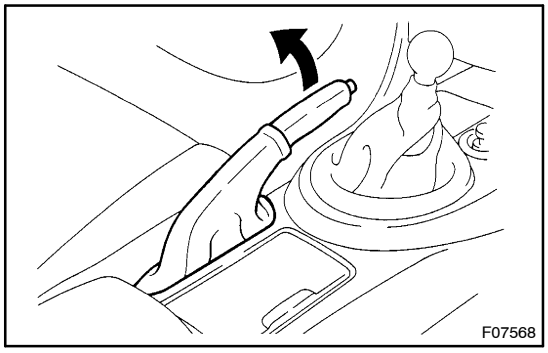


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

N ⬅ Lithium soap base glycol grease

F07590



PARKING BRAKE LEVER

BR0ZV–01

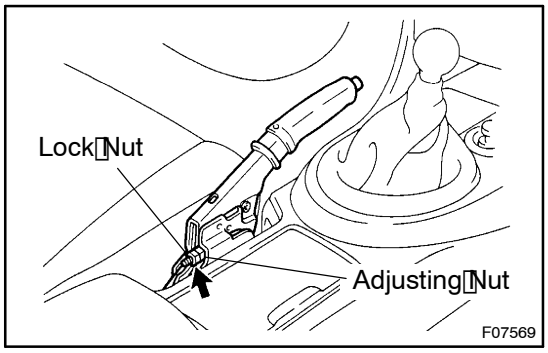
ON–VEHICLE INSPECTION

1. CHECK PARKING BRAKE LEVER TRAVEL

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 196 N (20 kgf, 44.1 lbf): 5 – 8 clicks

If incorrect, adjust the parking brake.



2. IF NECESSARY, ADJUST PARKING BRAKE

HINT:

Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

For shoe clearance adjustment (See page BR–44).

(a) Remove the parking brake lever hole cover.

(b) Loosen the lock nut and the turn adjusting nut until the lever travel is correct.

(c) Tighten the lock nut.

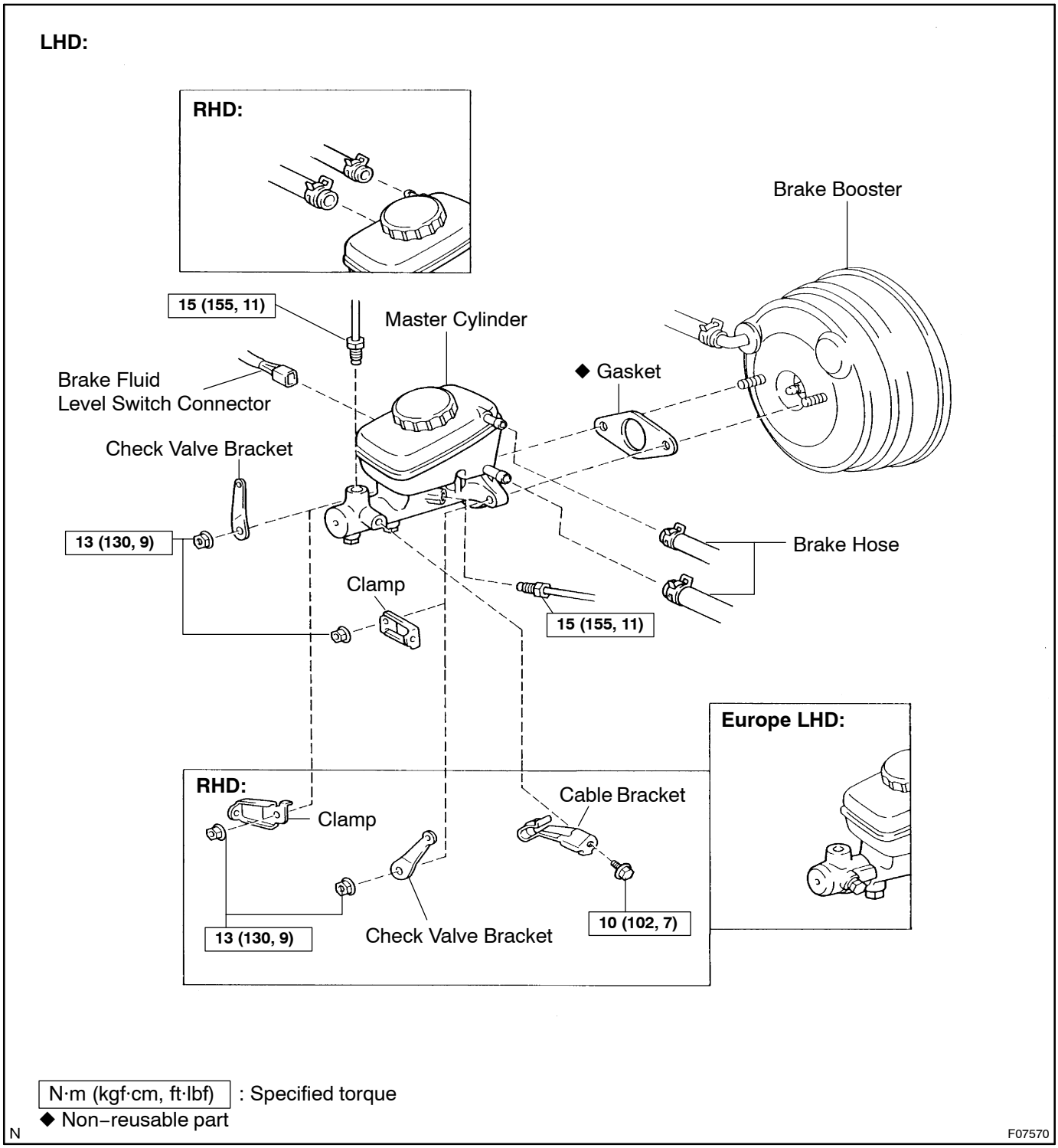
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(d) Install the parking brake lever hole cover.

BRAKE MASTER CYLINDER

COMPONENTS

BR0ZW–01



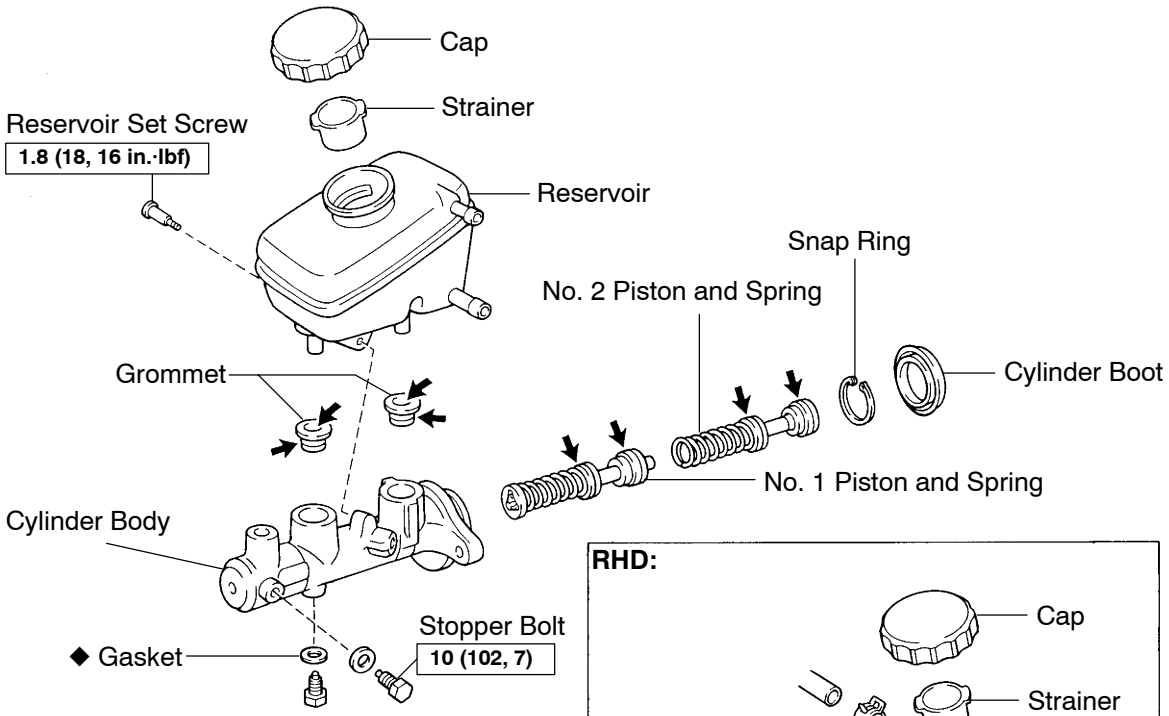
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

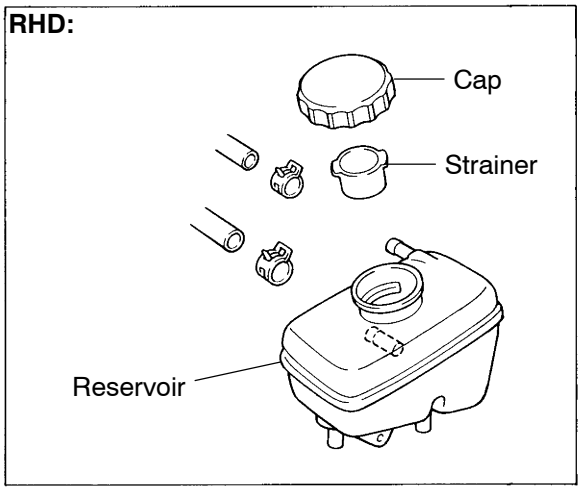
N

F07570

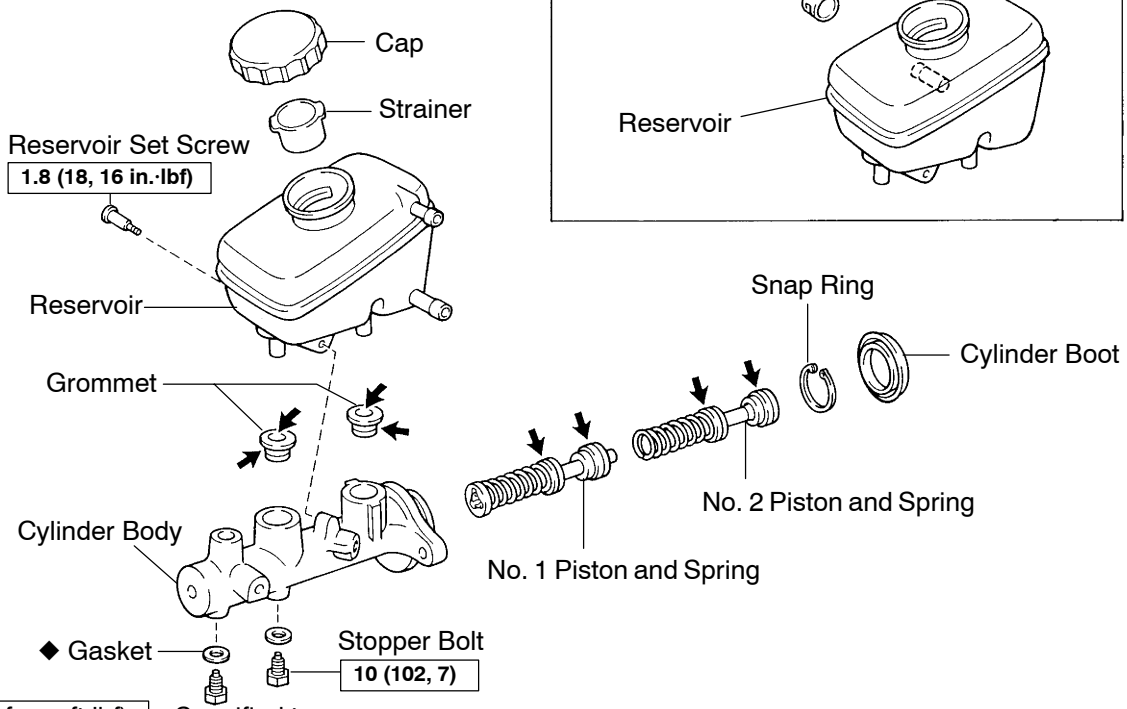
Europe LHD:



RHD:



Except Europe LHD:



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

◆ Non–reusable part

N ⬅ Lithium soap base glycol grease

F07571

BR0AF–04

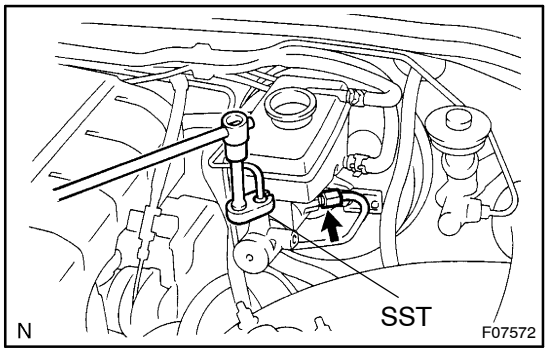
REMOVAL

1. TAKE OUT FLUID WITH SYRINGE

NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.

2. DISCONNECT BRAKE FLUID LEVEL SWITCH CONNECTOR

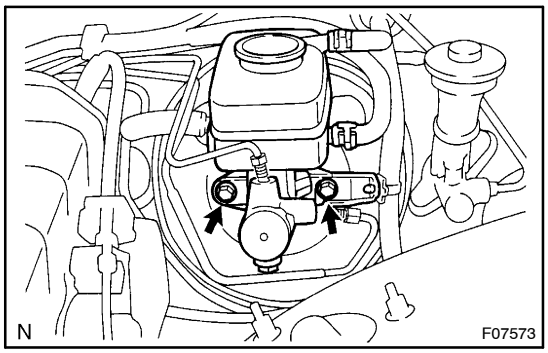


3. DISCONNECT BRAKE LINES

Using SST, disconnect the 2 brake lines.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



4. REMOVE MASTER CYLINDER

(a) RHD:

Remove the bolt and cable bracket.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

(b) Disconnect the 2 brake hoses.

(c) Remove the 2 nuts, and pull out the check valve bracket, brake hose clamp, master cylinder and gasket.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

BR0MO–03

DISASSEMBLY

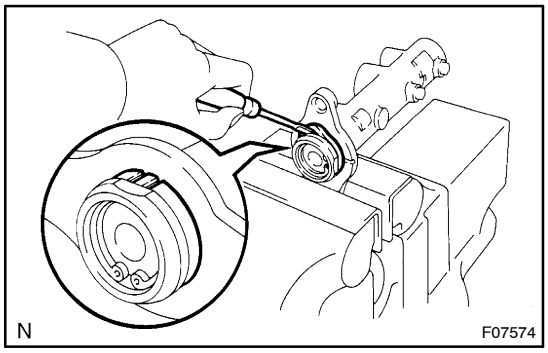
1. REMOVE RESERVOIR

Remove the set screw and pull out the reservoir.

Torque: 1.8 N·m (18 kgf·cm, 16 ft·lbf)

2. REMOVE 2 GROMMETS

3. PLACE CYLINDER IN VISE



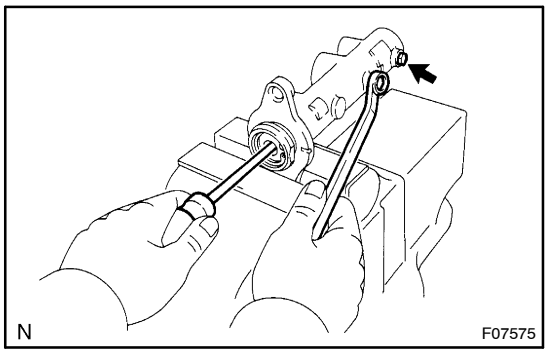
4. REMOVE MASTER CYLINDER BOOT

Using a screwdriver, remove the master cylinder boot.

HINT:

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

With the UP mark on the master cylinder boot facing upwards, install the cylinder boot on the master cylinder.



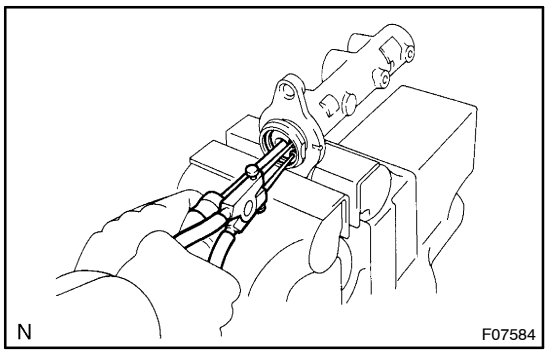
5. REMOVE 2 PISTON STOPPER BOLTS

Using a screwdriver, push the pistons in all the way and remove the 2 piston stopper bolts and 2 gaskets.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

HINT:

Tape the screwdriver tip before use.



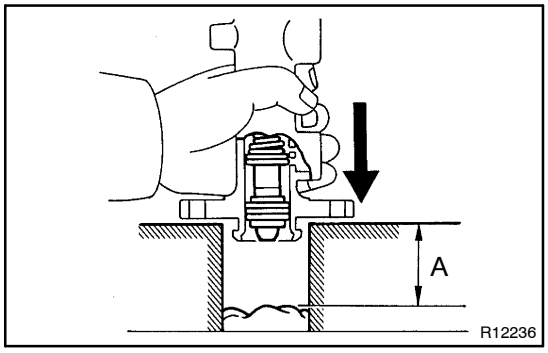
6. REMOVE PISTONS

(a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.

(b) Remove the No. 1 piston and spring by hand, pulling straight out, not at an angle.

NOTICE:

- **If pulled out 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.**



(c) Place a rag and 2 wooden blocks on the work table and lightly tap the cylinder flange against the block edges until the piston drops out of the cylinder.

HINT:

Make sure the distance (A) from the rag to the top of the blocks is at least 100 mm (3.94 in.).

BR0MP–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.

BR0MQ–02

REASSEMBLY

Reassembly is in the reverse order of disassmbly (See page BR–13).

HINT:

Apply lithium soap base glycol grease to the rubber parts indicated by the arrows (See page BR–10).

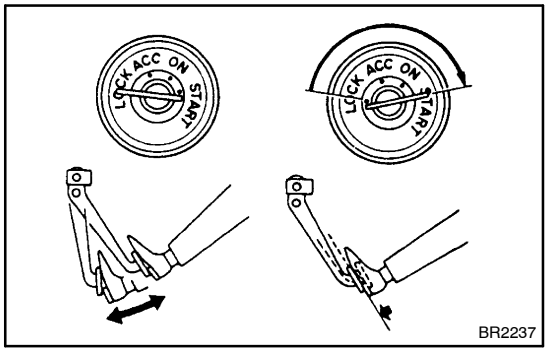
BR0MR–03

INSTALLATION

Installation is in the reverse order of removal (See page BR–12).

HINT:

- Before installation, adjust length of brake booster push rod (See page BR–21).
- After installation, fill the brake reservoir with brake fluid, bleed brake system (See page BR–4), and check for leaks.
- Check and adjust brake pedal (See page BR–6).



BRAKE BOOSTER ASSEMBLY

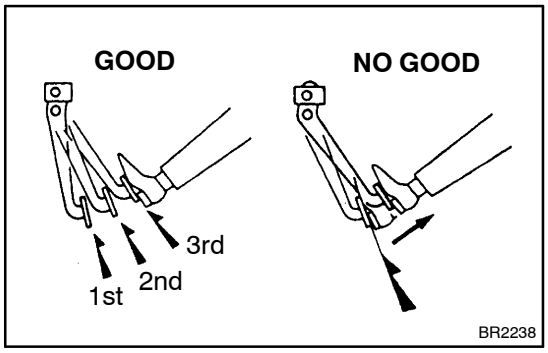
BR0NR–03

ON–VEHICLE INSPECTION

1. OPERATING CHECK

(a) Depress the bake 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.

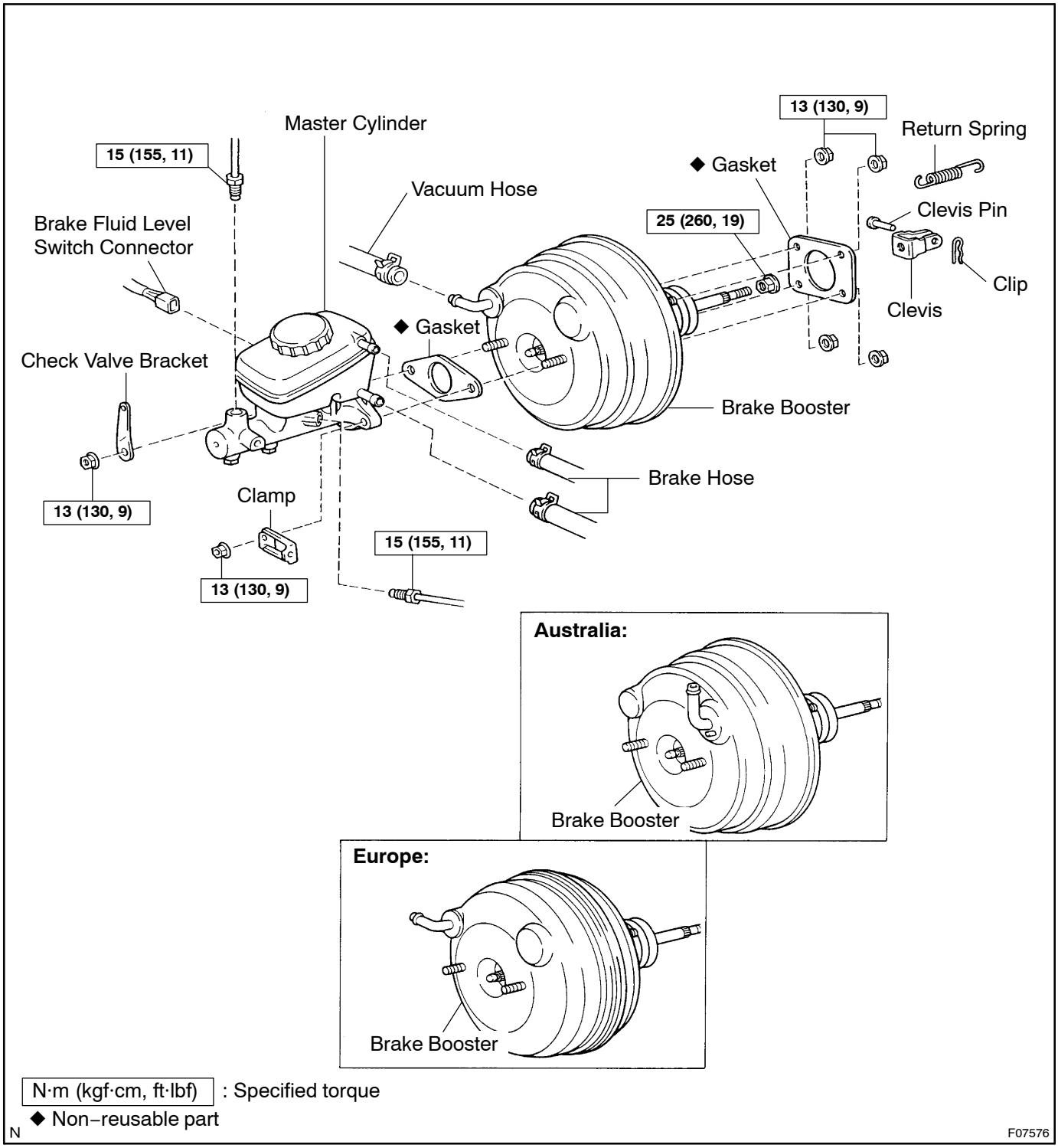
If the pedal goes down the farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air–tight.

(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.

BR0NS–03

COMPONENTS



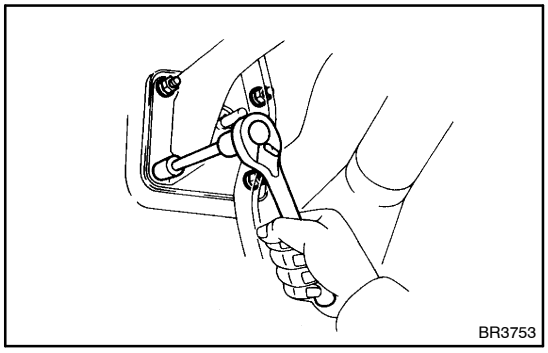
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

N

F07576

BR0NT–03



REMOVAL

1. REMOVE BRAKE MASTER CYLINDER
(See page BR–12)

2. REMOVE BRAKE BOOSTER

(a) Remove the vacuum hose from the brake booster.

(b) Remove the No. 1 lower pad (See page BO–93).

(c) Remove the return spring, clip and clevis pin.

(d) Remove the 4 booster installation nuts and clevis.

(e) Pull out the booster and gasket.

BR0NU–03

INSTALLATION

1. INSTALL BRAKE BOOSTER

(a) Install the booster and new gasket.

(b) Install and torque the booster installation nuts.

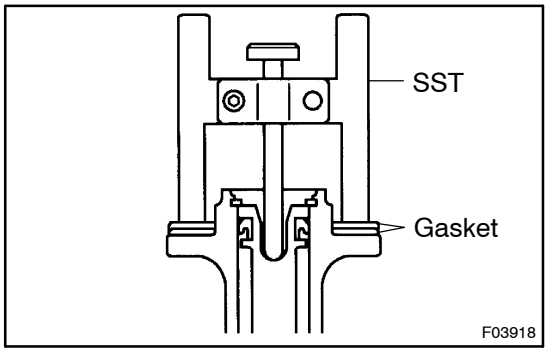
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(c) Install the clevis to the operating rod.

(d) Insert the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.

(e) Install the pedal return spring.

(f) Install the vacuum hose.



2. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Install 2 new gaskets on the master cylinder.

(b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.

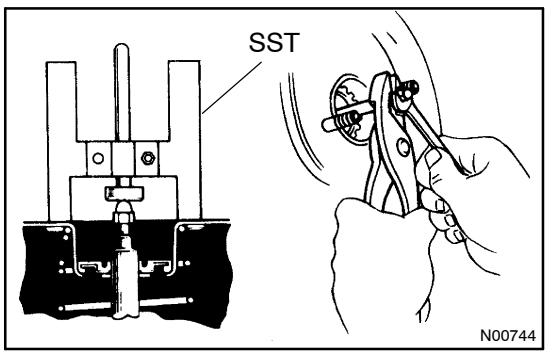
SST 09737–00010

(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 slightly touches the pin head.

HINT:

When adjusting the push rod, depress the brake pedal enough so that the push rod sticks out.

3. INSTALL BRAKE MASTER CYLINDER
(See page BR–17)

4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)

5. CHECK FOR FLUID LEAKAGE

6. CHECK AND ADJUST BRAKE PEDAL
(See page BR–6)

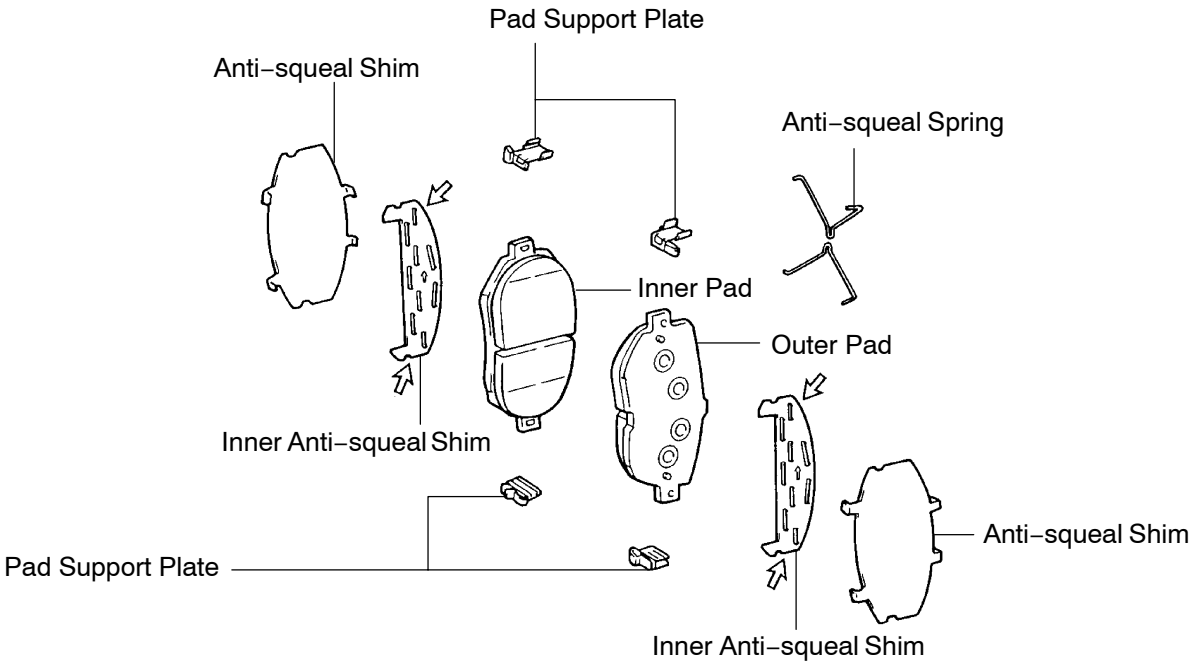
7. INSTALL NO. 1 LOWER PAD (See page BO–93)

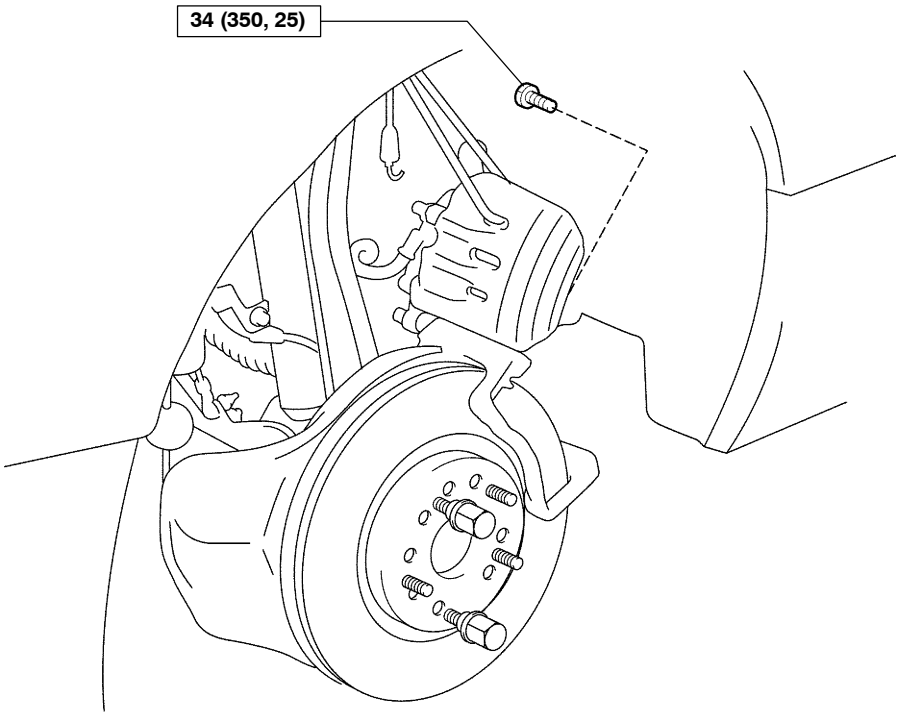
8. DO OPERATIONAL CHECK (See page BR–18)

FRONT BRAKE PAD

COMPONENTS

BR0JH–06





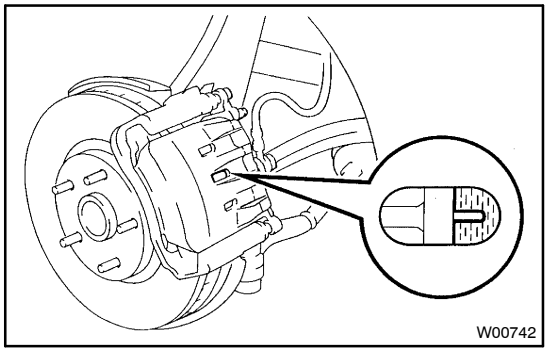
N·m (kgf·cm, ft·lbf) : Specified torque

⇨ Disc brake grease

F07909

BR0JI–08

REPLACEMENT

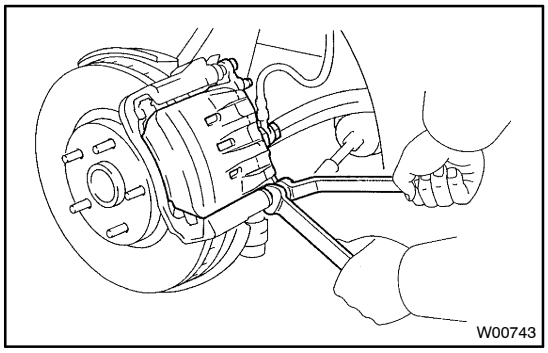


1. REMOVE FRONT WHEEL

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) Hold the sliding pin on the bottom and loosen the installation bolt.

(b) Remove the installation bolt.

(c) Lift up the caliper and suspend it securely.

HINT:

Do not disconnect the flexible hose from the caliper.

4. REMOVE 2 ANTI–SQUEAL SPRINGS

5. REMOVE 2 BRAKE PADS WITH 4 ANTI–SQUEAL SHIMS

6. REMOVE 4 PAD SUPPORT PLATES

NOTICE:

The anti–squeal springs and 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.

7. CHECK DISC THICKNESS AND RUNOUT
(See page BR–28)

8. INSTALL 4 PAD SUPPORT PLATES

9. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti–squeal shims must be replaced together with the pad.

(a) Install the 2 anti–squeal shims to each pad.

HINT:

- Apply disc brake grease to both sides of the inner anti–squeal shims (See page BR–22).
- Make sure that the arrow on the shims points upward.

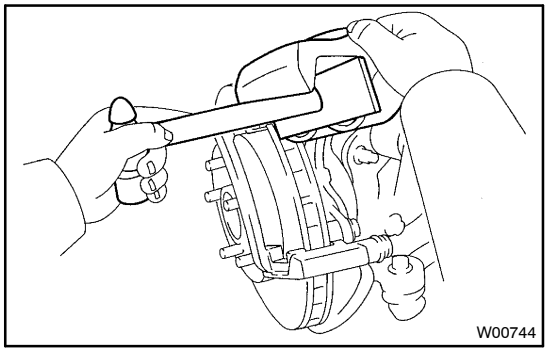
(b) Install the inner pad with the pad wear indicator plates facing downward.

(c) Install the outer pad.

NOTICE:

There should be no oil or grease adhering to the friction surfaces of the pads or the disc.

(d) Install the 2 anti–squeal springs.



10. INSTALL CALIPER

(a) Draw out a small amount of brake fluid from the reservoir.

(b) Press in the pistons with a hammer handle or similar implement.

HINT:

If the pistons are difficult to push in, loosen the bleeder plug and push in the pistons while letting some brake fluid escape.

(c) Install the caliper.

(d) Hold the sliding pin and torque the installation bolt.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

11. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

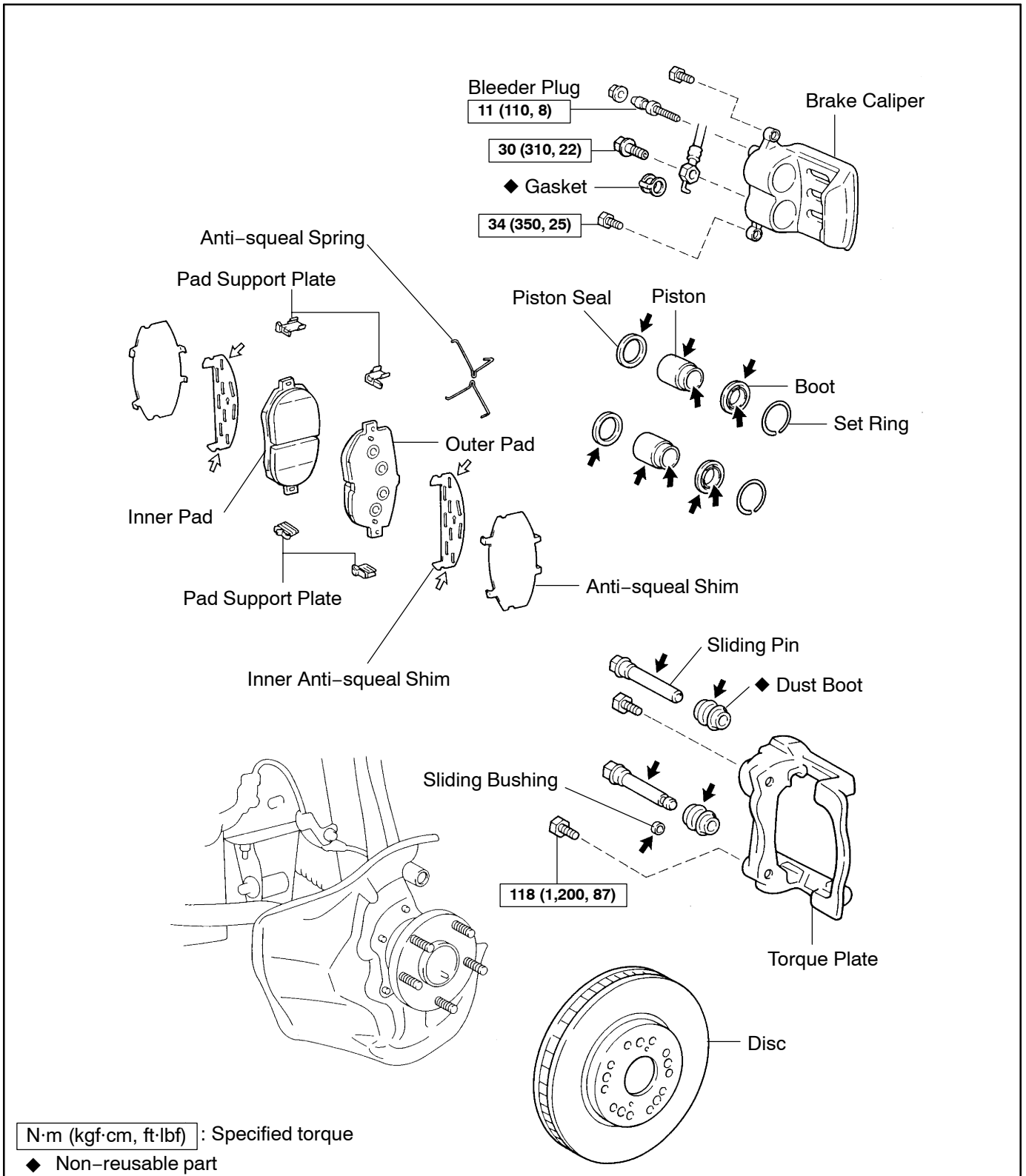
12. DEPRESS BRAKE PEDAL SEVERAL TIMES

13. CHECK THAT FLUID LEVEL IS AT MAX LINE

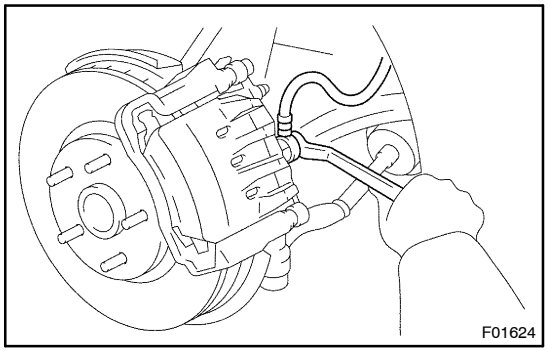
FRONT BRAKE CALIPER

COMPONENTS

BR0JJ–08



BR0JK–04



REMOVAL

1. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper. Use a container to catch brake fluid as it drains out.

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

HINT:

At the time of installation, install the flexible hose lock securely in the lock hole in the caliper.

2. REMOVE CALIPER

(a) Hold the sliding pin and loosen the 2 installation bolts.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(b) Remove the 2 installation bolts.

(c) Remove the caliper from the torque plate.

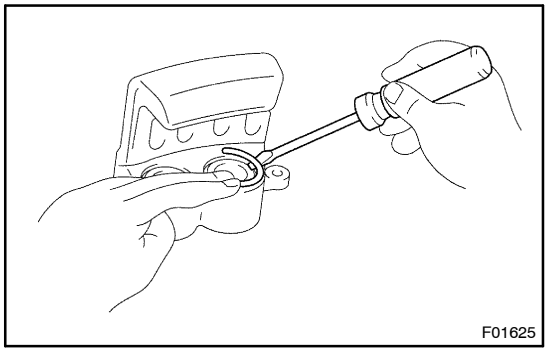
3. REMOVE 2 ANTI–SQUEAL SPRINGS

4. REMOVE 2 BRAKE PADS WITH 4 ANTI–SQUEAL SHIMS

5. REMOVE 4 PAD SUPPORT PLATES

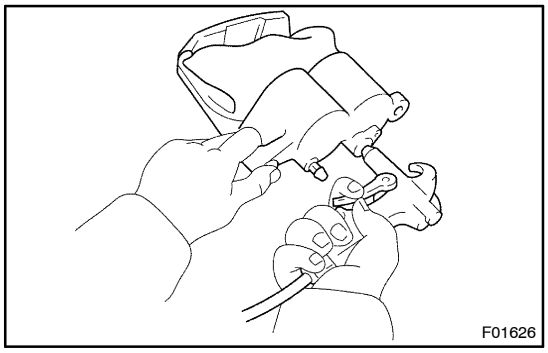
BR0JL–07

DISASSEMBLY



1. REMOVE SET RINGS AND CYLINDER BOOTS

Using a screwdriver, remove the 2 set rings and 2 cylinder boots.



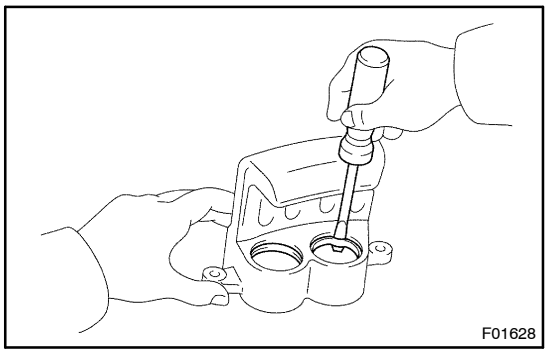
2. REMOVE PISTONS

(a) Put a piece of cloth or an equivalent between the piston and caliper.

(b) Use compressed air to remove the 2 pistons from the cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.



3. REMOVE PISTON SEALS FROM BRAKE CYLINDER

Using a screwdriver, remove the 2 piston seals.

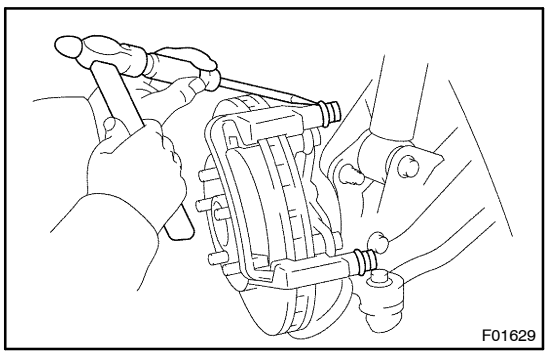
4. REMOVE SLIDING PINS AND DUST BOOTS

(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 the sliding bushing into the bottom side.



(b) Using a screwdriver and hammer, tap out the 2 dust boots.

NOTICE:

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

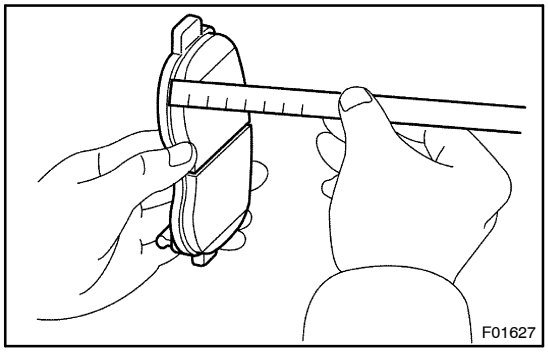
Confirm that the metal plate portion of the dust boot fits snugly in the torque plate.

HINT:

At the time of reassembly, use a 21 mm socket and tap in new dust boots into the torque plate.

BR0JM–08

INSPECTION



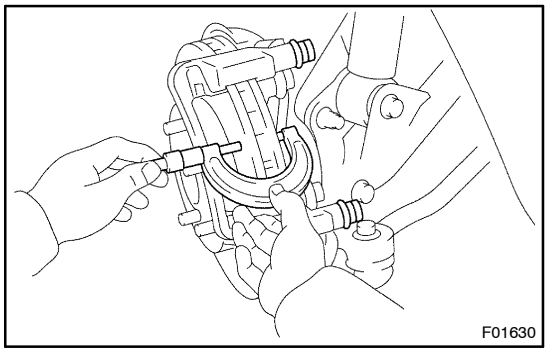
1. MEASURE PAD LINING THICKNESS

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 thickness is less than the minimum (the 1.0 mm slit is no longer visible), or if it shows signs of uneven wear.



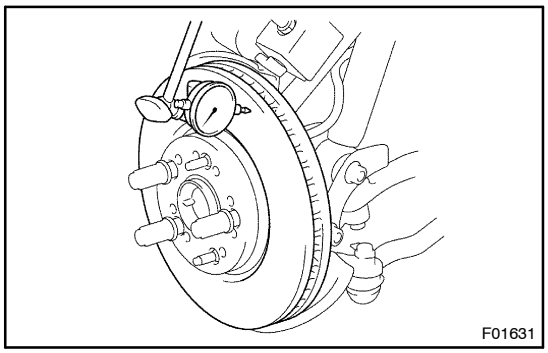
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 32.0 mm (1.260 in.)

Minimum thickness: 30.0 mm (1.181 in.)

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is scored or is worn unevenly.



3. MEASURE DISC RUNOUT

(a) Temporarily fasten the disc with the 3 hub nuts.

(b) Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) away from the outside edge.

Maximum disc runout:

Europe: 0.035 mm (0.0014 in.)

Except europe: 0.050 mm (0.0020 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–11). 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 3 hub nuts and disc. Turn the disc 1/5 turn and reinstall the disc. Install and torque the 3 hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(c) Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(d) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

- If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.
- 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.

(e) Install the torque plate and torque the 2 bolts.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

BR0JN–05

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–27).

HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR–25).

BR0JO–07

INSTALLATION

Installation is in the reverse order of removal (See page BR–26).

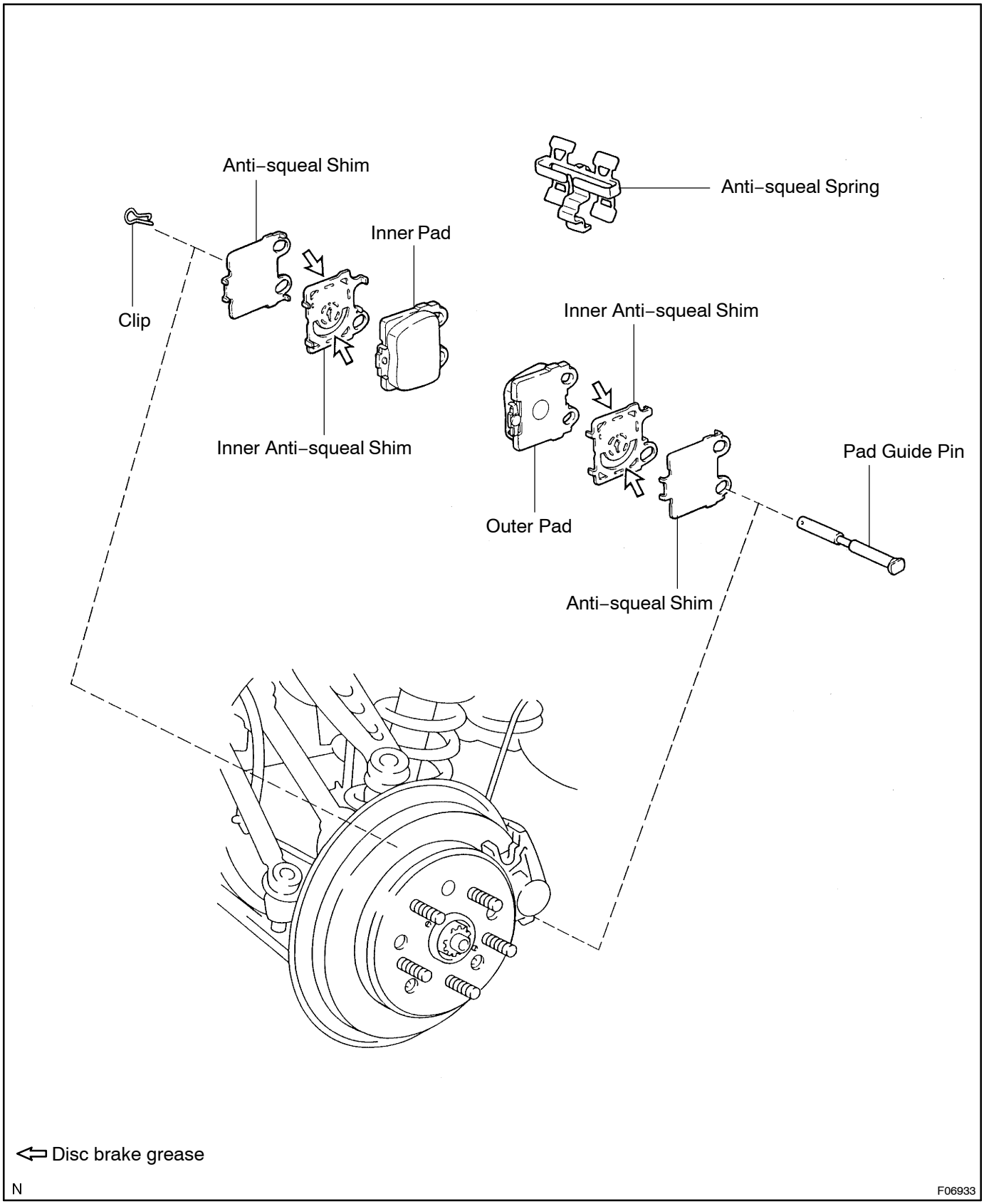
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR–4).
- Check for leaks.

REAR BRAKE PAD

COMPONENTS

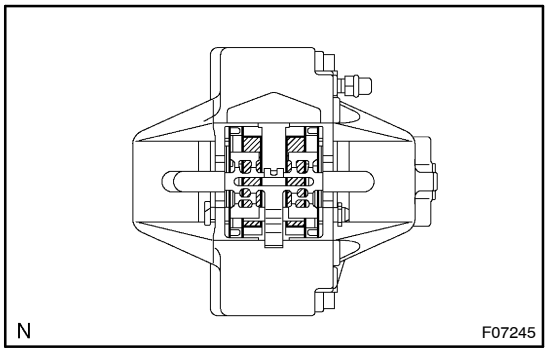
BR0JP–10



BR0ZX–01

REPLACEMENT

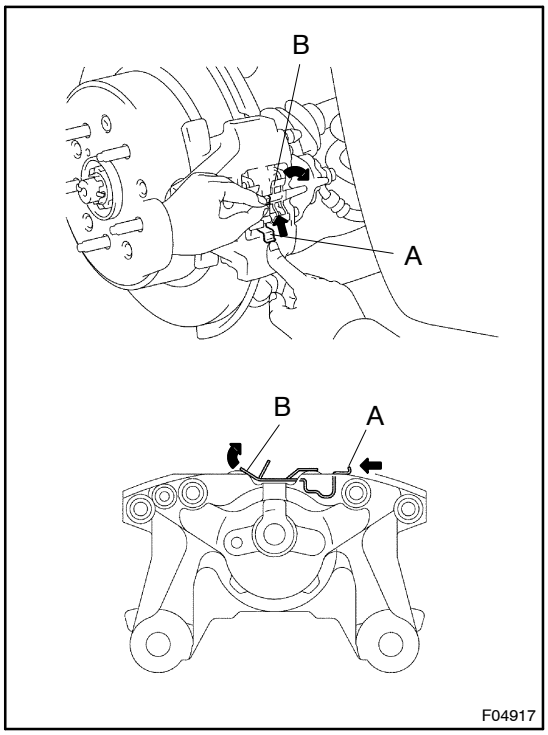
1. REMOVE REAR WHEEL



2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace pads if the thickness is not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. REMOVE ANTI–SQUEAL SPRING AND PAD GUIDE PIN

(a) Raise the "B" portion with hand, push up the "A" portion and unlatch the anti–squeal spring from brake caliper.

(b) Remove the anti–squeal spring.

NOTICE:

- **Do not deform the clip and anti–squeal spring.**
- **The clip and anti–squeal spring 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.**

(c) Remove the clip and pad guide pin.

4. REMOVE PADS AND ANTI–SQUEAL SHIMS

(a) Remove the 2 pads.

(b) Remove the 4 anti–squeal shims from each pad.

5. CHECK DISC THICKNESS AND RUNOUT

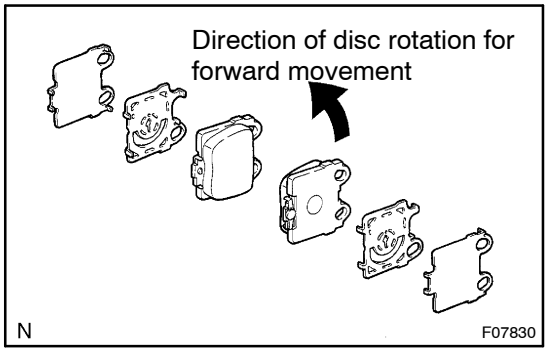
(See page BR–37)

6. 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 sides of inner anti–squeal shims (See page BR–31).

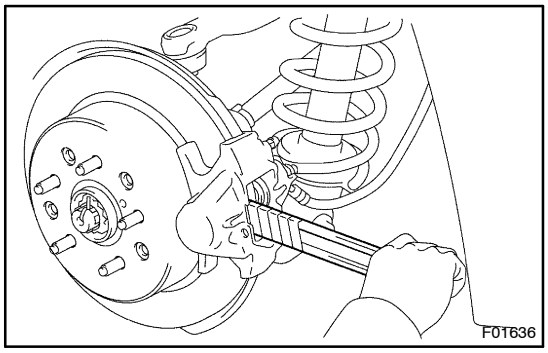


(b) Install the 2 anti–squeal shims on each pad.

HINT:

Make sure the arrows on the inner anti–squeal shims facing to the direction of disc rotation as shown in the illustration.

(c) Draw out a small amount of brake fluid from the reservoir.

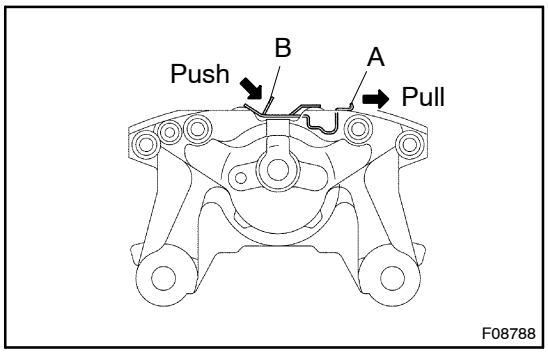


(d) Press in the pistons with a monkey wrench handle or equivalent.

HINT:

- Tape the monkey wrench handle before use.
- If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

(e) Install the 2 pads.

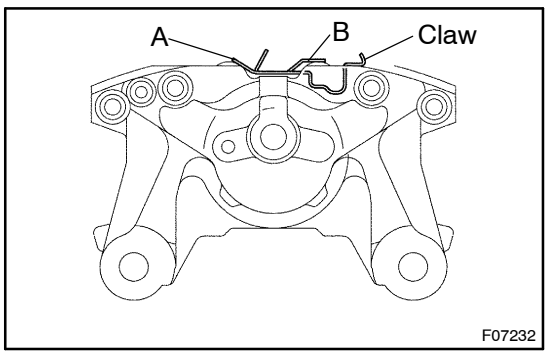


7. INSTALL PAD GUIDE PIN AND ANTI–SQUEAL SPRING

(a) Install the pad guide pin and clip.

(b) Install the anti–squeal spring.

(c) Push in the ”B” portion with hand, pull the ”A” portion and lutch the anti–squeal spring to brake caliper.



HINT:

- Ensure that the claw of the anti–squeal spring is raised up on the caliper securely.
- Ensure that there is no gap between the pad guide pin and anti–squeal spring.
- Ensure that ”A” and ”B” portions of anti–squeal spring are attached to the pad.

8. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

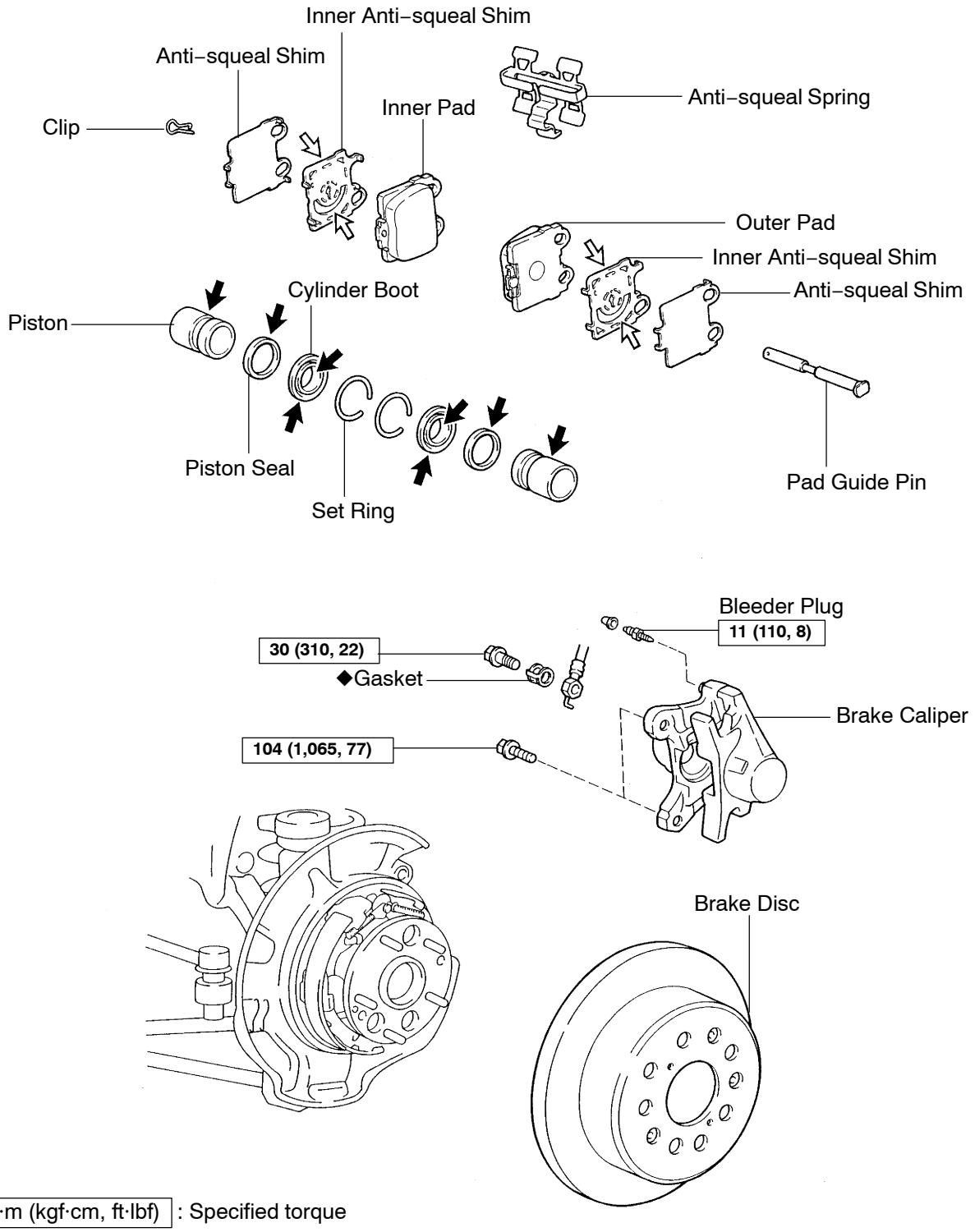
9. DEPRESS BRAKE PEDAL SEVERAL TIMES

10. CHECK THAT FLUID LEVEL IS AT MAX LINE

REAR BRAKE CALIPER

COMPONENTS

BR0JR–09



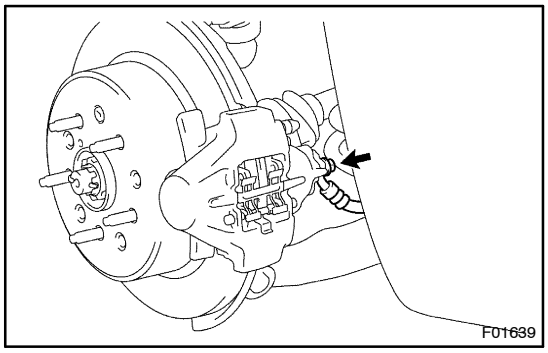
BR0JS–08

REMOVAL

1. REMOVE REAR WHEEL

Remove the rear wheel and temporarily fasten the disc with 3 hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



2. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper. Use a container to catch brake fluid as it drains out.

Torque: 30 N·m (310 kgf·cm, 22 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.

3. REMOVE CALIPER

(a) Remove the 2 installation bolts.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

(b) Remove the caliper.

4. REMOVE BRAKE PADS (See page BR–32)

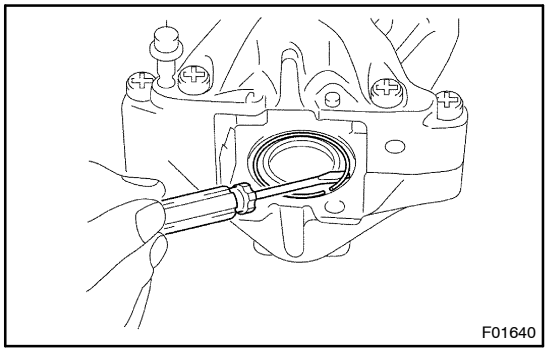
(a) Remove the anti–squeal spring.

(b) Remove the clip and pad guide pin.

(c) Remove the 2 pads with the 4 anti–squeal shims.

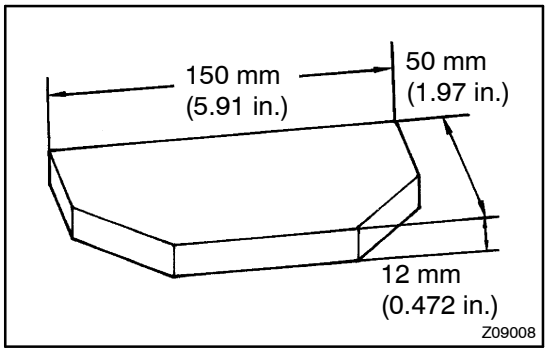
BR0JT–05

DISASSEMBLY



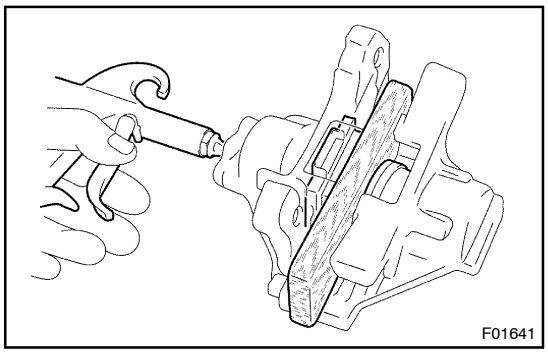
1. REMOVE SET RINGS AND BOOTS

Using a screwdriver, remove the 2 set rings and 2 boots.



2. REMOVE PISTONS FROM CYLINDER

(a) Prepare a wooden plate to hold the pistons.

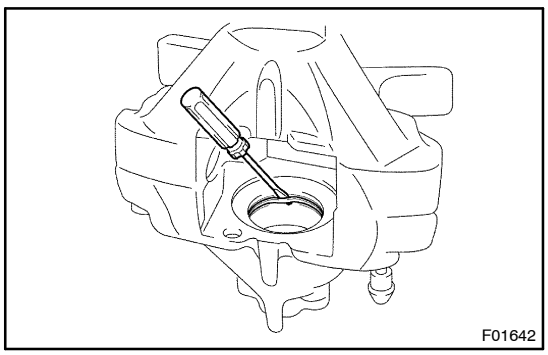


(b) Place the plate between the pistons and insert a pad on one side.

(c) Use compressed air to remove the pistons alternately from the caliper.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.

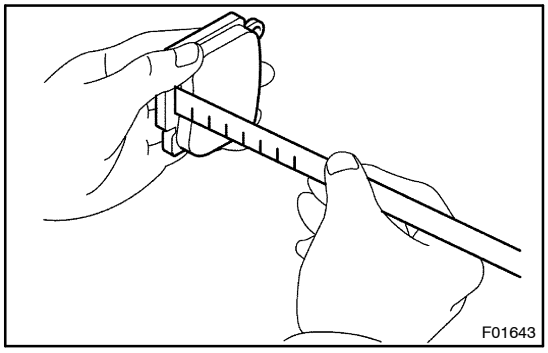


3. REMOVE PISTON SEALS

Using a screwdriver, remove the 2 piston seals from the caliper.

BR0JU–09

INSPECTION



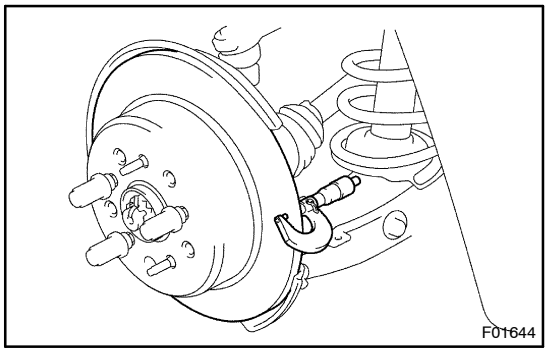
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 10.5 mm (0.413 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pads if the thickness is less than the minimum or if it shows signs of uneven wear.



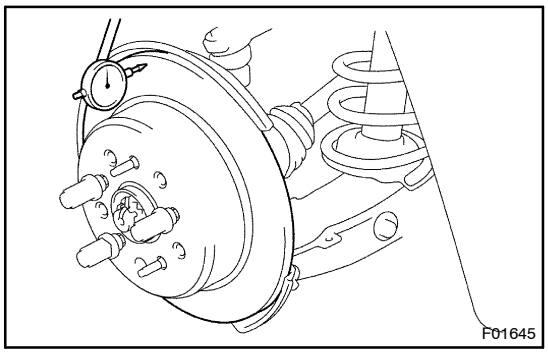
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 12.0 mm (0.472 in.)

Minimum thickness: 10.5 mm (0.413 in.)

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is badly scored or worn unevenly.



3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.394 in.) away from the outside edge.

Maximum disc runout: 0.05 mm (0.0020 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–47). 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 3 hub nuts and disc. Turn the disc 1/5 and reinstall the disc. Install and torque the 3 hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(b) 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.

- If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.
- 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.

BR0JV–04

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–36).

HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR–34).

BR0JW–04

INSTALLATION

Installation is in the reverse order of removal (See page BR–35).

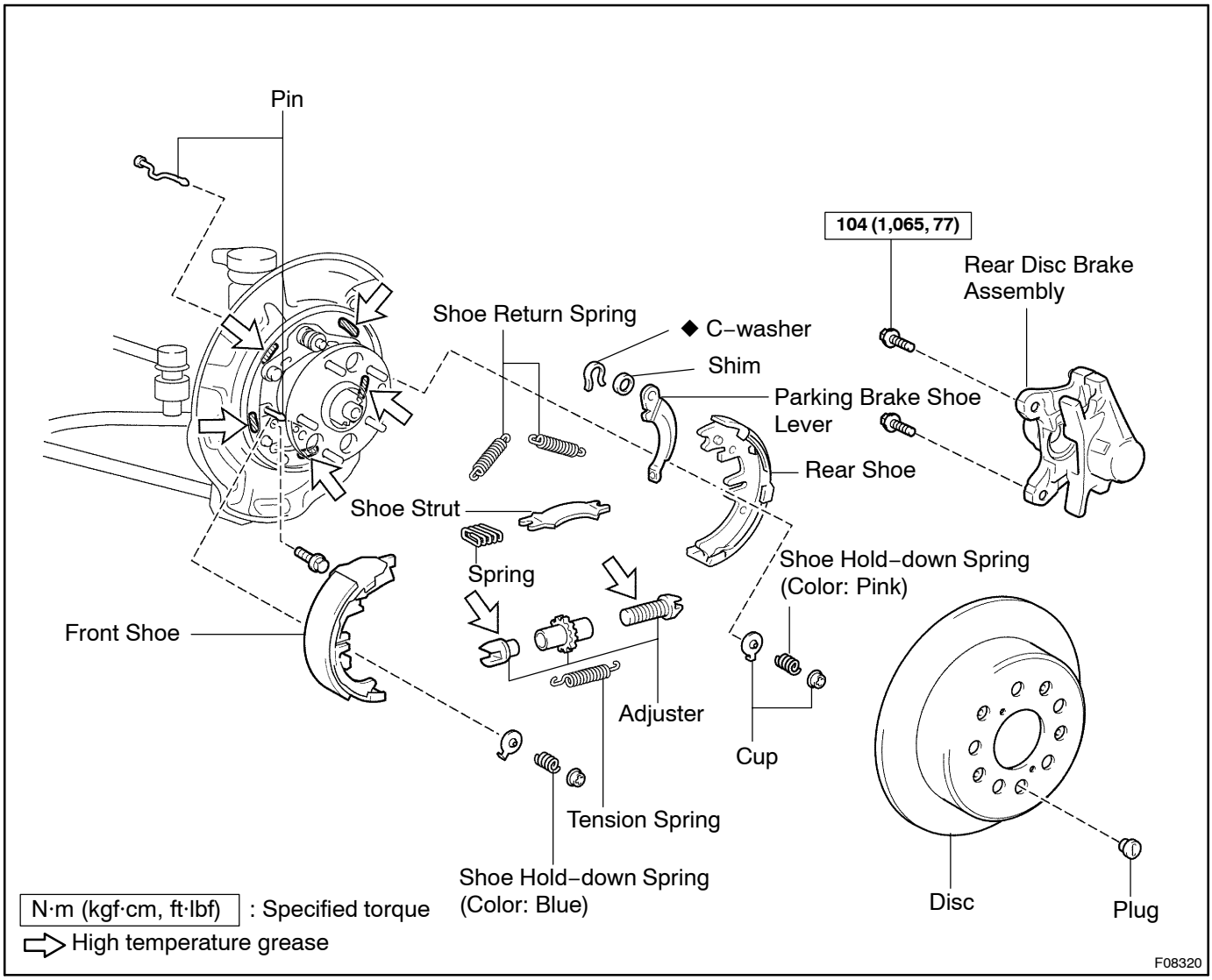
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR–4).
- Check for leaks.

PARKING BRAKE

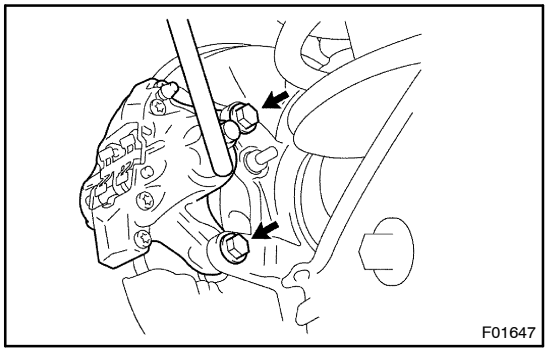
COMPONENTS

BR0JX–07



BR0JY–04

DISASSEMBLY



1. REMOVE REAR WHEEL

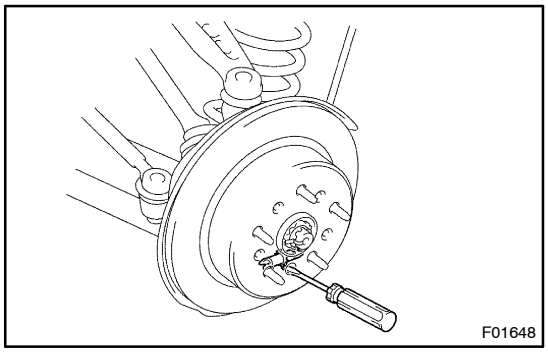
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE REAR DISC BRAKE ASSEMBLY

(a) Remove the 2 mounting bolts and remove the disc brake assembly.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

(b) Suspend the disc brake securely and so the hose is not stretched.



3. REMOVE DISC

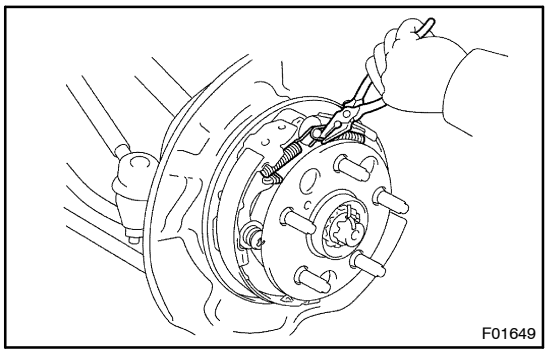
(a) Release the parking brake lever.

(b) Place matchmarks on the disc and rear axle hub.

(c) Remove the disc.

HINT:

- If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.
- If there are no matchmarks, temporarily install the disc, then measure the disc runout and install the disc in position (See page BR–37).



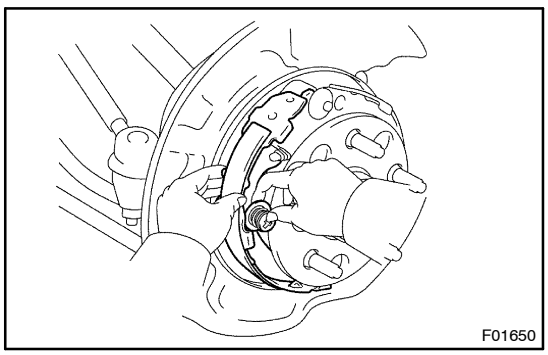
4. REMOVE SHOE RETURN SPRINGS

Using needle–nose pliers, remove the 2 shoe return springs.

5. REMOVE SHOE STRUT WITH SPRING

HINT:

At the time of reassembly, install the strut with the spring facing forward.



6. REMOVE FRONT SHOE AND ADJUSTER

(a) Slide out the front shoe and remove the shoe adjuster.

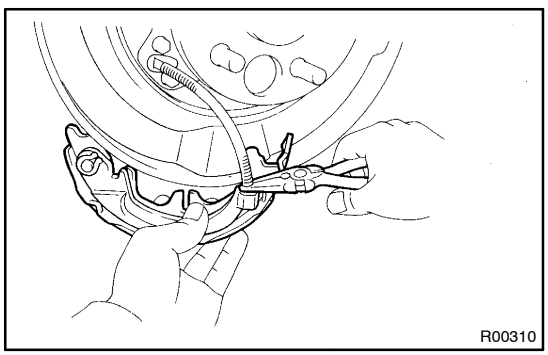
(b) Disconnect the tension spring and remove the front shoe.

(c) Remove the 2 cups, shoe hold–down spring.

7. REMOVE REAR SHOE AND TENSION SPRING

(a) Slide out the rear shoe.

(b) Remove the tension spring from the rear shoe.



(c) Disconnect the parking brake cable from the parking brake shoe lever.

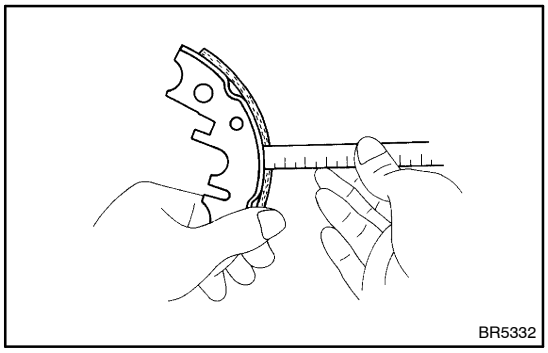
(d) Remove the 2 cups, shoe hold–down spring and pin.

BR0ZY–01

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



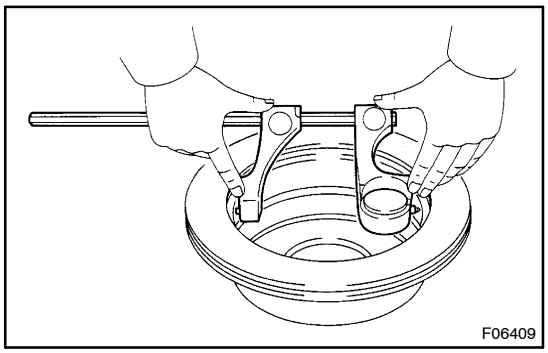
2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness: 2.5 mm (0.098 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 and uneven wear, replace the brake shoe.



3. MEASURE BRAKE DISC INSIDE DIAMETER

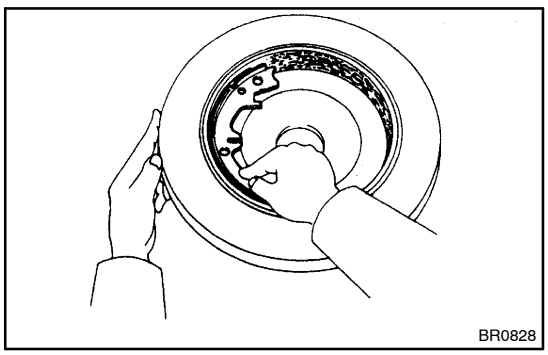
Using a brake drum gauge or equivalent, measure the inside diameter of the disc.

Standard inside diameter: 190 mm (7.48 in.)

Maximum inside diameter: 191 mm (7.52 in.)

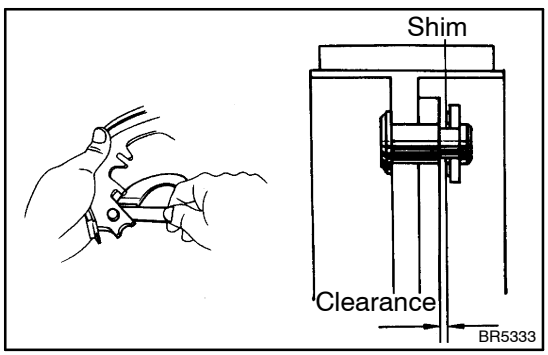
Replace the disc if the inside diameter is at the maximum value or more.

Replace the disc or grind it with a lathe if the disc is scored or worn unevenly.



4. INSPECT PARKING BRAKE SHOE 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.



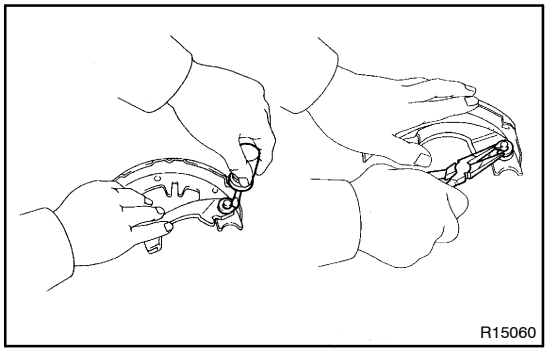
5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

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.

Thickness mm (in.)	Thickness mm (in.)
0.3 (0.012)	0.9 (0.035)
0.6 (0.024)	–



6. IF NECESSARY, REPLACE SHIM

(a) Using a screwdriver, remove the C–washer and shim.
(b) Install the correct size shim with a new C–washer.
(c) Remeasure the clearance.

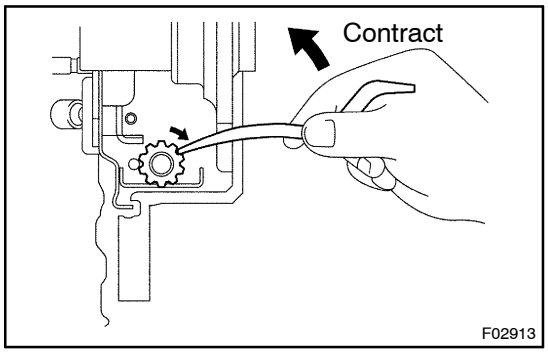
BR0K0–04

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–41).

HINT:

Apply high temperature grease to the parts indicated by the arrows (See page BR–40).



1. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the 3 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

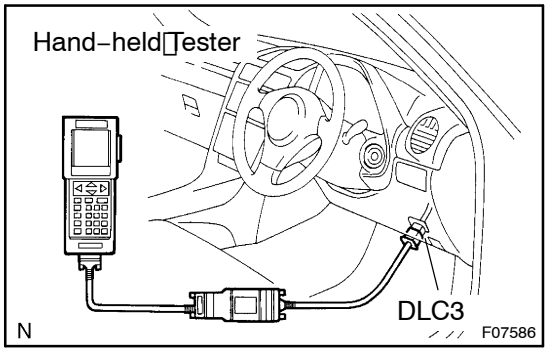
(a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.

(b) With the parking brake release button pushed in, pull on the parking brake lever with 88 N (9 kgf, 20 lbf) of force.

(c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.

(d) Repeat this procedure 2 or 3 times.

3. CHECK AND ADJUST PARKING BRAKE LEVER TRAVEL (See page BR–9)



ABS & TRC ACTUATOR

BR0ZZ–01

ON–VEHICLE INSPECTION

1. IN CASE OF USING HAND–HELD TESTER:

(a) Connect the hand–held tester to the DLC3.

(b) Start the engine and run it at idle.

(c) Select the ACTIVE TEST mode on the hand–held tester.

(d) Please refer to the hand–held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

(a) With the motor relay ON, check the actuator motor operation noise.

(b) Turn the motor relay OFF.

(c) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.

(d) With the motor relay ON, check that the pedal does not pulsate.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn ON the solenoid which is not described below.

(a) With the brake pedal depressed, perform the following operations.

(b) Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(c) Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.

(d) Turn the motor relay ON, and check that the pedal returns.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

(e) Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

As in the same procedure, check the solenoids of other wheels.

HINT:

Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page DI–223)

6. IN CASE OF NOT USING HAND–HELD TESTER:

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 instructions on pages DI–247 and DI–243. If the solenoid and/or pump motor relay are abnormal, replace the relay and inspect the actuator operation again.

7. INSPECT BATTERY VOLTAGE

Battery voltage: 10 – 14 V

8. DISCONNECT CONNECTORS FROM ACTUATOR

Disconnect the 2 connectors from the actuator.

9. CONNECT ACTUATOR CHECKER (SST) TO ACTUATOR

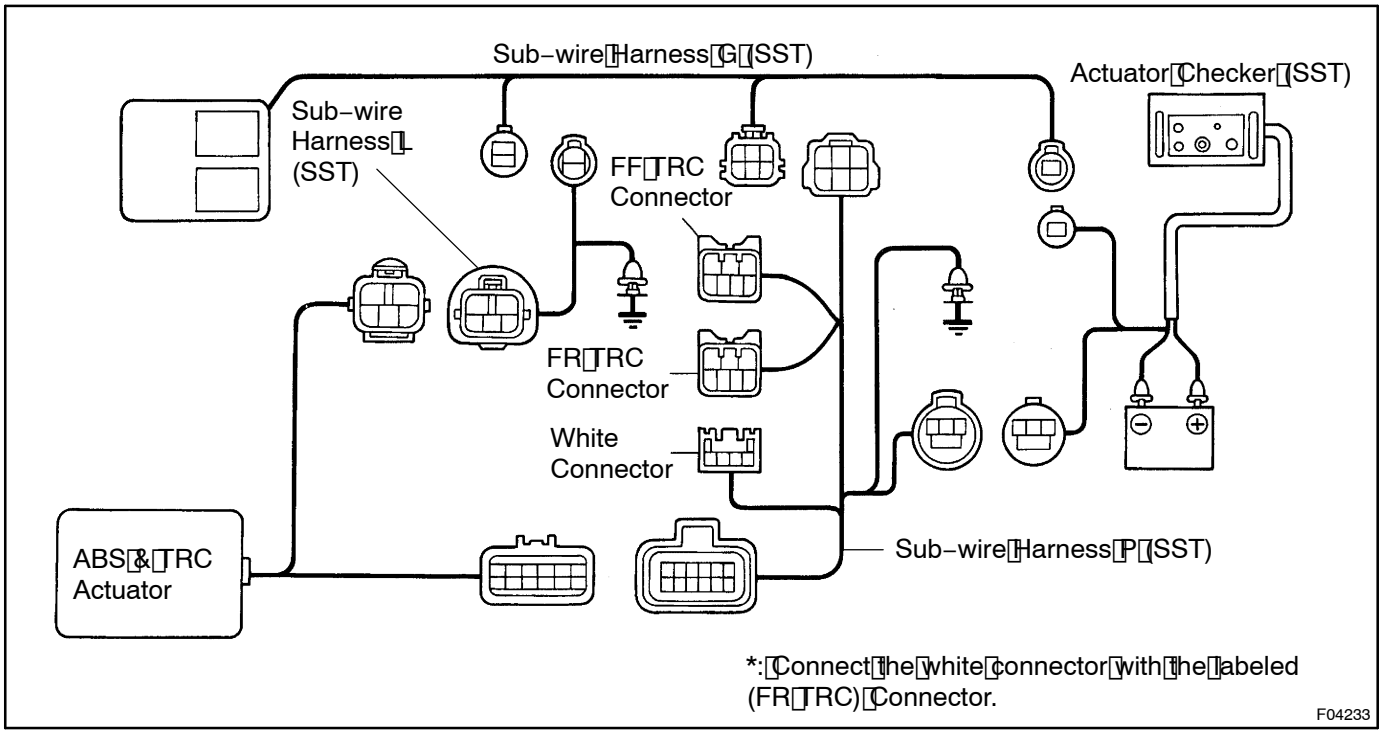
(a) Connect the actuator checker (SST) to the actuator side wire harnesses via the sub–wire harnesses (SST), as shown.

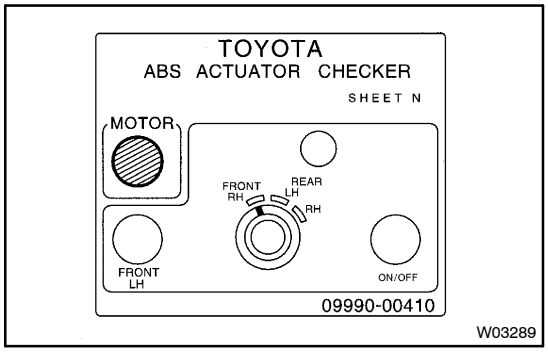
SST 09990–00150, 09990–00250, 09990–00360, 09990–00450

(b) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to negative (–) terminal. Connect the black cable of the sub–wire harness to the battery negative (–) terminal or body ground.

(c) Place "SHEET N" (SST) on the actuator checker.

SST 09990–00410





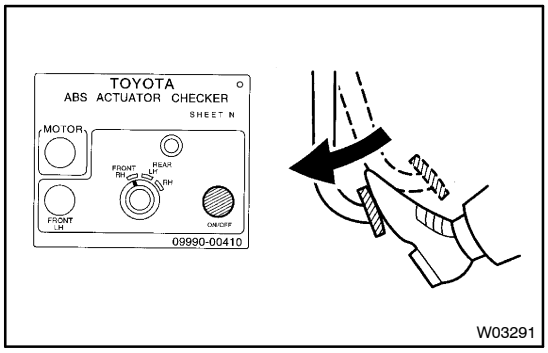
10. INSPECT BRAKE ACTUATOR OPERATION OF FRONT RH WHEEL

(a) Start the engine, and run it at idle speed.

(b) Turn the selector switch of the actuator checker to the "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.

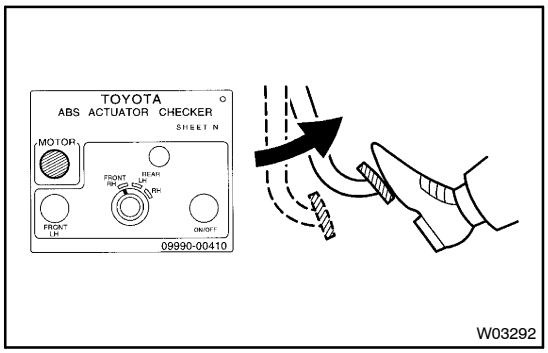


(e) Push the POWER switch and check that the brake pedal does not go down.

NOTICE:

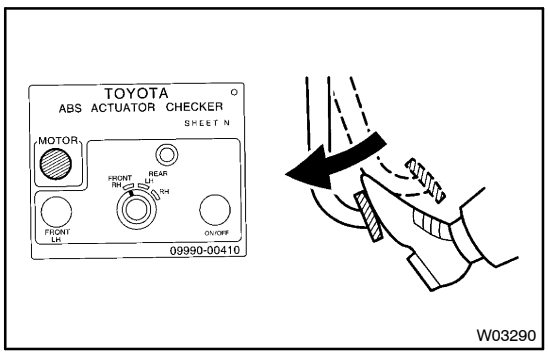
Do not push the POWER switch for more than 10 seconds.

(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.

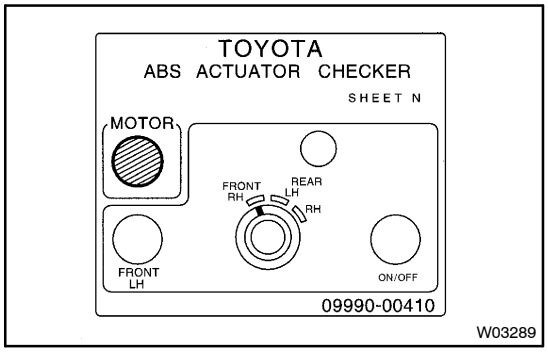
(j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the MOTOR switch for a few seconds. Check that the brake pedal does not pulsate.

(k) Release the brake pedal.

11. INSPECT FOR OTHER WHEELS

(a) Turn the selector switch to the "REAR LH" position, and inspect the "REAR LH" wheel.

(b) Repeat (c) to (j) of step 10, checking the actuator operation in the same way.



(c) Also, inspect the "REAR RH" and "FRONT RH" wheels preceding the same procedure.

HINT:

When inspecting the "FRONT LH" wheel, push the FRONT LH switch instead of the POWER switch. This makes it possible to inspect wherever the selector switch position indicates.

12. PUSH MOTOR SWITCH

Push and hold in the MOTOR switch for a few seconds.

13. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

(a) Disconnect the actuator checker (SST) and sub–wire harnesses (SST) from the actuator.

SST 09990–00150, 09990–00250, 09990–00360, 09990–00410, 09990–00450

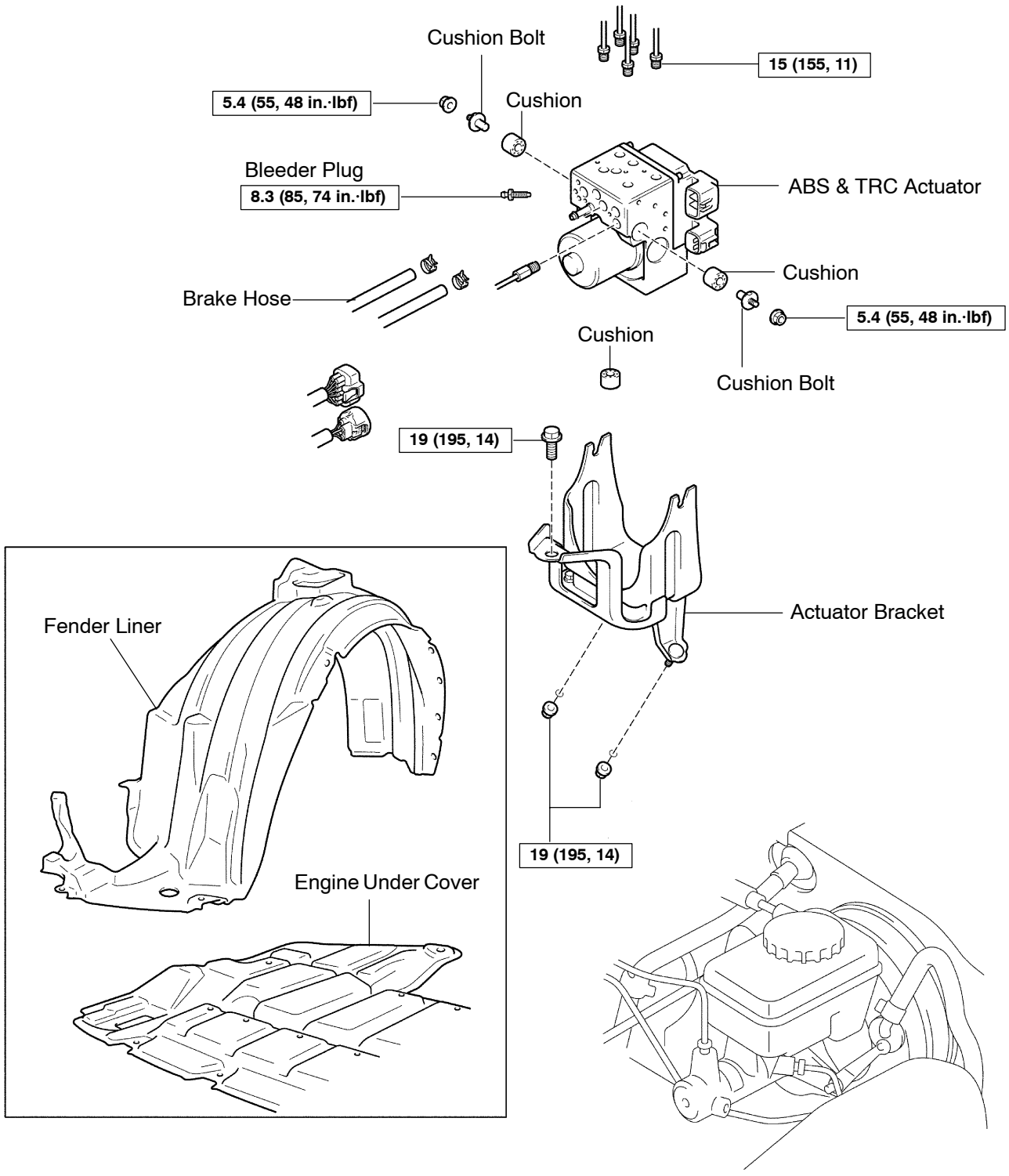
(b) Connect the 2 actuator connectors.

(c) Clear the DTC (See page DI–223).

BR100–01

COMPONENTS

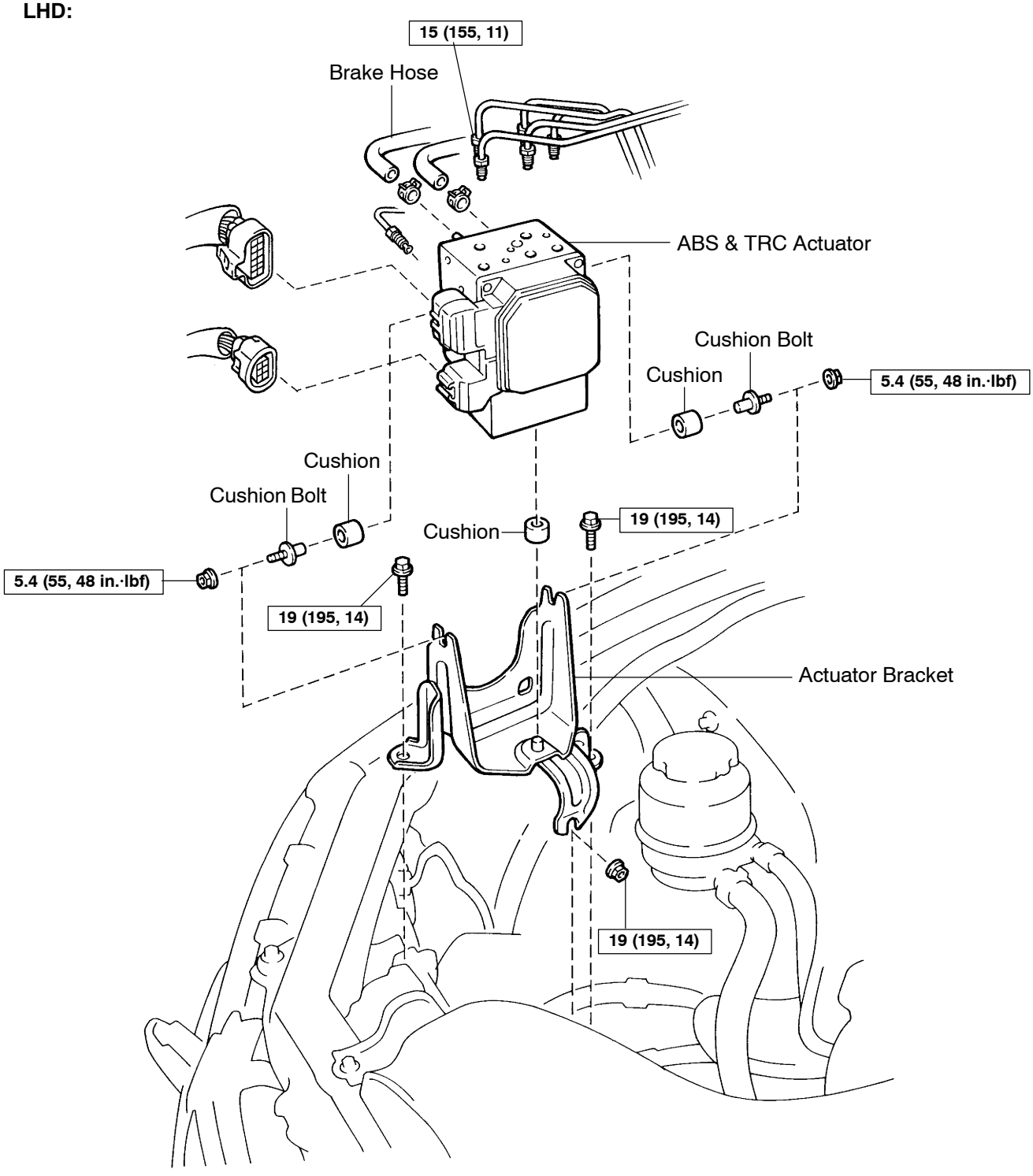
RHD:



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

F07579

LHD:



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

N

F08041

BR101–01

REMOVAL

1. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines from the ABS & TRC actuator.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

2. DISCONNECT 2 BRAKE HOSES AND 2 CONNECTORS

3. REMOVE ABS & TRC ACTUATOR ASSEMBLY

(a) RHD:
Remove the engine under cover and fender liner.

(b) RHD:
Remove the bolt, 2 nuts and ABS & TRC actuator assembly.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

(c) LHD:
Remove the nut, 2 bolts and ABS & TRC actuator assembly.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

4. REMOVE ABS & TRC ACTUATOR

(a) Remove the 2 nuts and ABS & TRC actuator.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Remove the 2 cushion bolts and 3 cushions.

BR102-01

INSTALLATION

Installation is in the reverse order of removal (See page BR–51).

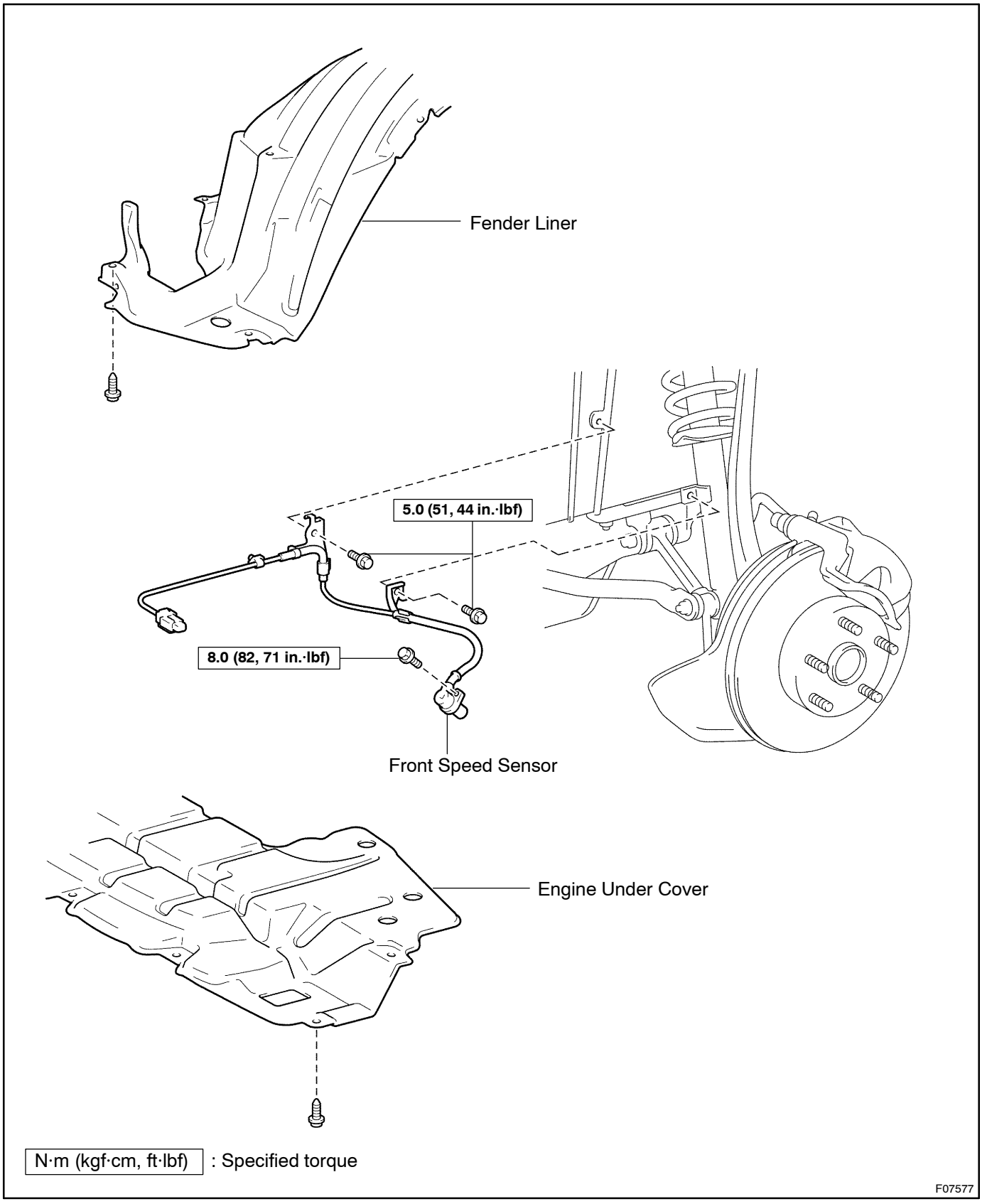
HINT:

- After installation, fill the brake reservoir with brake fluid, bleed brake system (See page BR–4).
- Check for leaks.

FRONT SPEED SENSOR

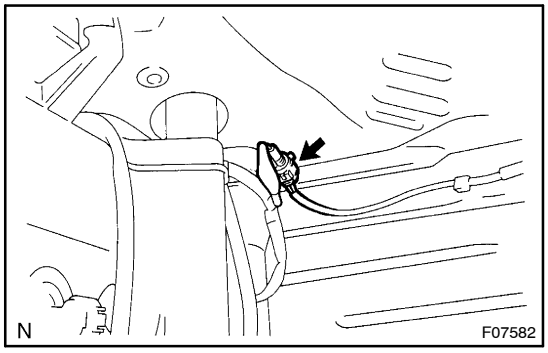
COMPONENTS

BR0K1–08



BR0K2–07

REMOVAL



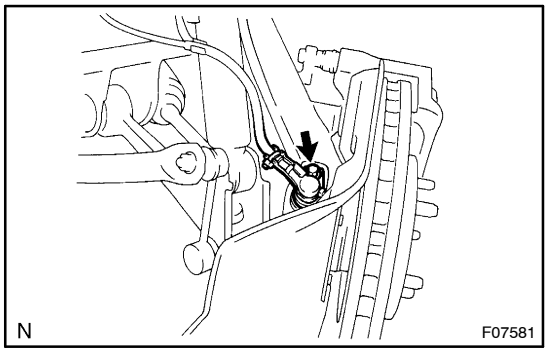
1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. DISCONNECT SPEED SENSOR CONNECTOR

(a) Remove the engine under cover and fender liner.

(b) Disconnect the speed sensor connector.



3. REMOVE SPEED SENSOR

(a) Remove the resin clip and 2 clamp bolts holding the sensor harness to the body.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(b) Remove the bolt and speed sensor from the steering knuckle.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

BR0K3–05

INSTALLATION

Installation is in the reverse order of removal (See page BR–54).

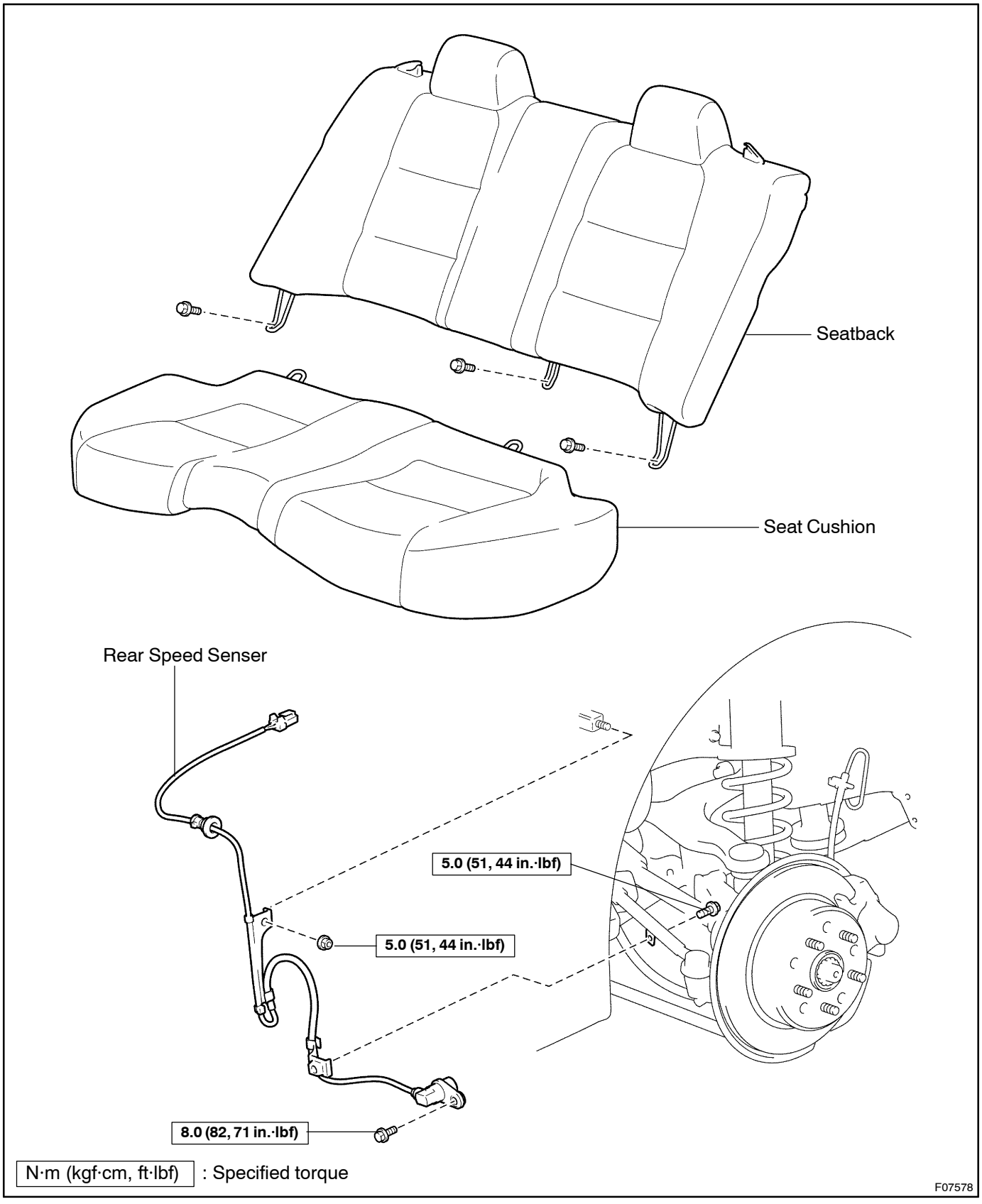
HINT:

After installation, check speed sensor signal (See page DI–223).

REAR SPEED SENSOR

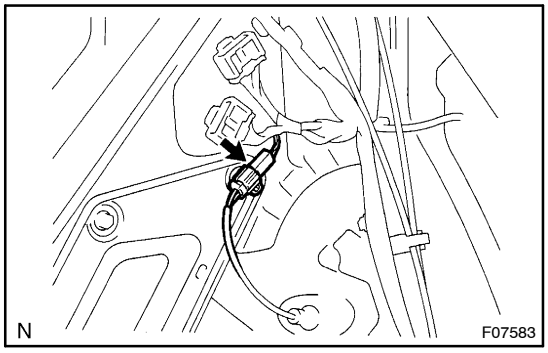
COMPONENTS

BR0K4–08



BR0K5–08

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 REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

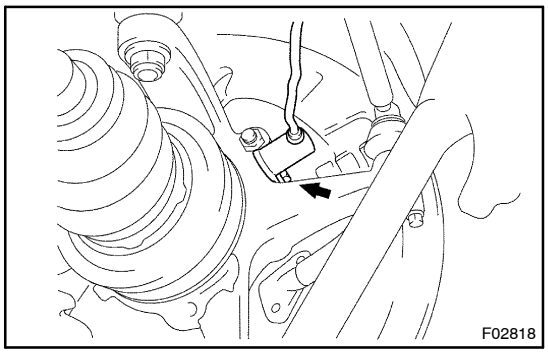
3. REMOVE SPEED SENSOR

(a) Remove the clamp bolt holding the sensor wire harness to the toe control link.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(b) Remove the clamp nut holding the sensor wire harness to the body.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)



(c) Remove the sensor installation bolt and speed sensor from the axle carrier.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

BR0K6–05

INSTALLATION

Installation is in the reverse order of removal (See page BR–57).

HINT:

After installation, check speed sensor signal (See page DI–223).

CHARGING SYSTEM

CH0B4–01

ON–VEHICLE INSPECTION

CAUTION:

- **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 do tests with a high voltage insulation resistance tester.**
- **Never disconnect the battery while the engine is running.**

1. CHECK BATTERY ELECTROLYTE LEVEL

Check the electrolyte quantity of each cell.

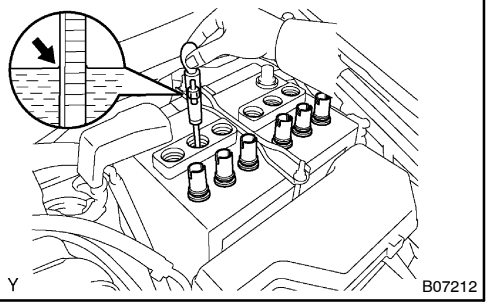
Maintenance–Free Battery:

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.

Except Maintenance–Free Battery



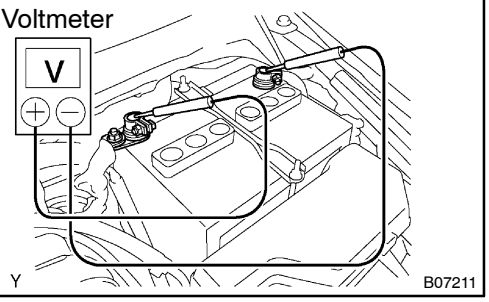
2. Except Maintenance–Free Battery: CHECK BATTERY SPECIFIC GRAVITY

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.

Maintenance–Free 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)

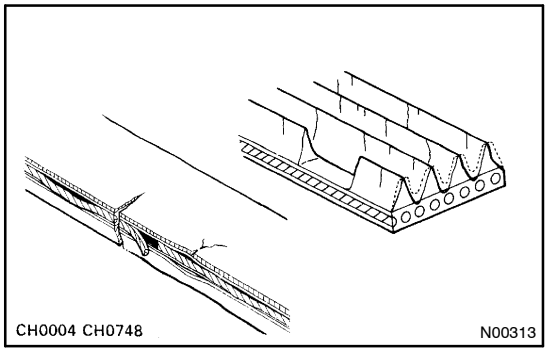
If the voltage is less than specification, charge the battery.

4. CHECK BATTERY TERMINALS 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 and fuses for continuity.



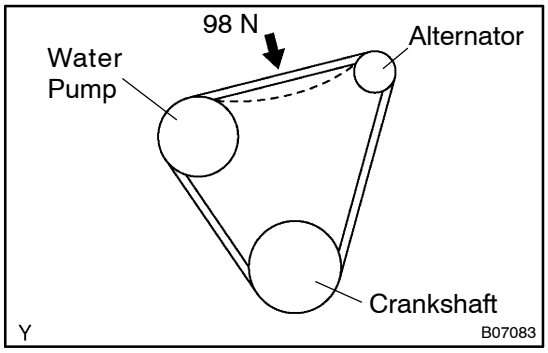
5. INSPECT DRIVE BELT

(a) Visually check the drive belt for excessive wear, frayed cords, etc.

If necessary, 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) Check the drive belt deflection by pressing on the belt at the points indicated in the illustration with 98 N (10 kgf, 22 lbf) of pressure.

Drive belt deflection:

New belt	11 – 13 mm (0.43 – 51 in.)
Used belt	14 – 18 mm (0.55 – 71 in.)

If the belt deflection is not as specified, adjust it.

Reference:

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

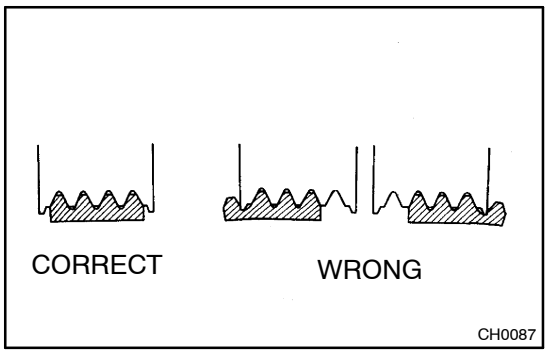
Drive belt tension:

New belt	520 – 755 N (53 – 77 kgf)
Used belt	196 – 392 N (20 – 40 kgf)

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 new belt, run the engine for about 5 minutes and recheck the belt tension.
- After installing a drive belt, check that it fits properly in the ribbed grooves.
- Check by hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.



6. VISUALLY CHECK ALTERNATOR WIRING ANDLISTEN FOR ABNORMAL NOISES

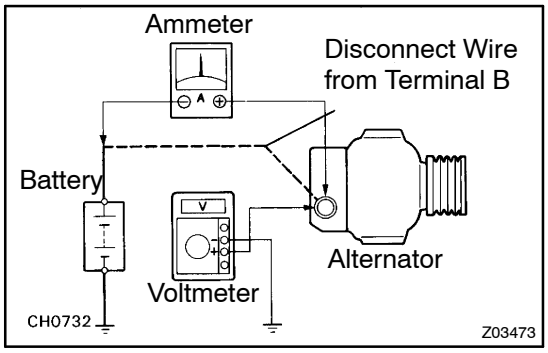
(a) Check that the wiring is in good condition.

(b) Check that there is no abnormal noise from the alternator while the engine is running.

7. CHECK CHARGE 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 charge 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 charge light circuit.



8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT:
If a battery/alternator 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 alternator, and connect it to the negative (–) probe of the ammeter.
- Connect the positive (+) probe of the ammeter to terminal B of the alternator.
- Connect the positive (+) probe of the voltmeter to terminal B of the alternator.
- Ground the negative (–) 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 IC regulator.
If the voltmeter reading is less than standard voltage, check the IC regulator and alternator 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 IC regulator.
- If the voltmeter reading is less than standard voltage, check the alternator.

9. INSPECT CHARGING CIRCUIT WITH LOAD

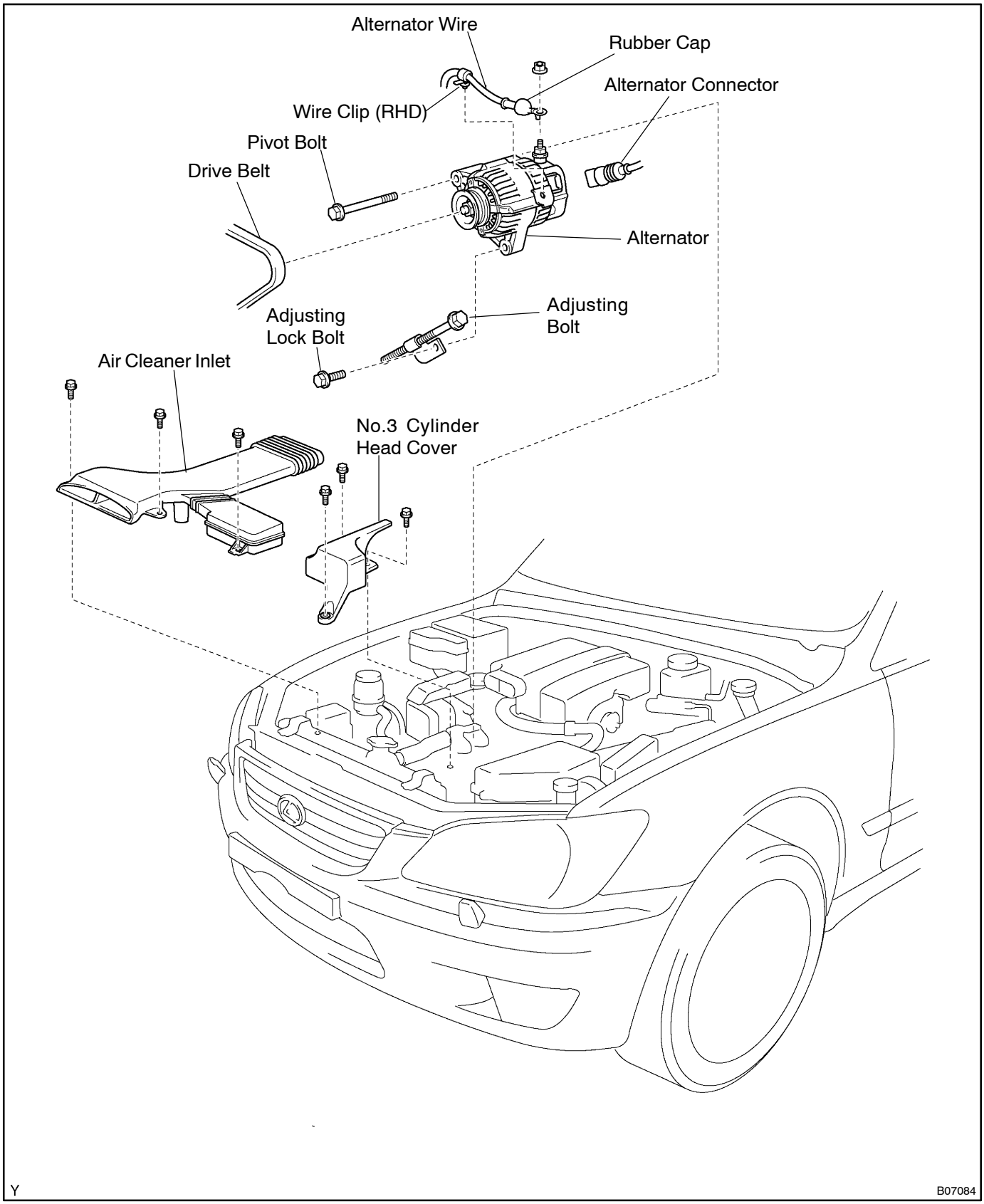
(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at HI.
(b) Check the reading on the ammeter.
Standard amperage: 30 A or more

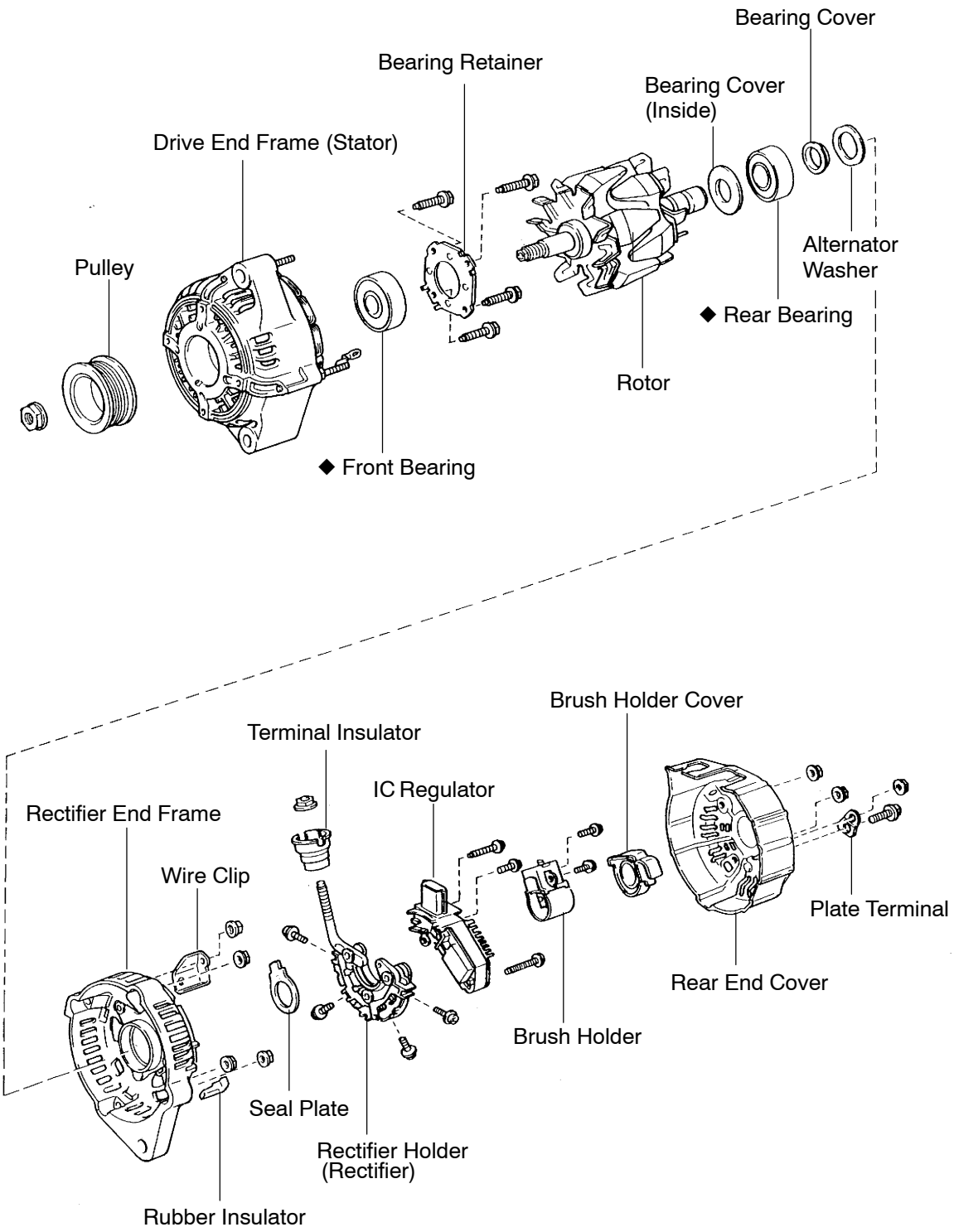
If the ammeter reading is less than the standard amperage, repair the alternator.
HINT:
If the battery is fully charged, the indication will sometimes be less than standard amperage.

ALTERNATOR

COMPONENTS

CH044–03





◆ Non–reusable part

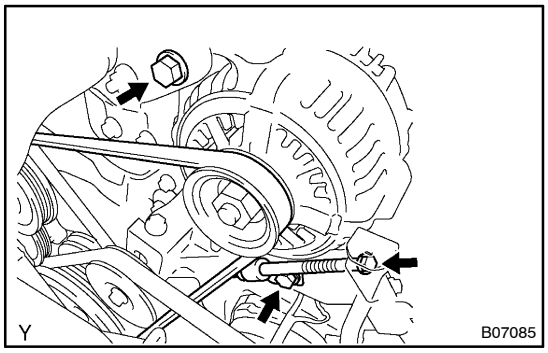
B01642

CH0B5–01

REMOVAL

1. REMOVE AIR CLEANER INLET

2. REMOVE NO.3 CYLINDER HEAD COVER



3. DISCONNECT DRIVE BELT FROM ALTERNATOR PULLEY

(a) Loosen the pivot bolt, adjusting lock bolt and adjusting bolt.

(b) Disconnect the drive belt from the alternator pulley.

4. REMOVE ALTERNATOR

(a) Disconnect the alternator connector.

(b) Remove the rubber cap and nut, and disconnect the alternator wire.

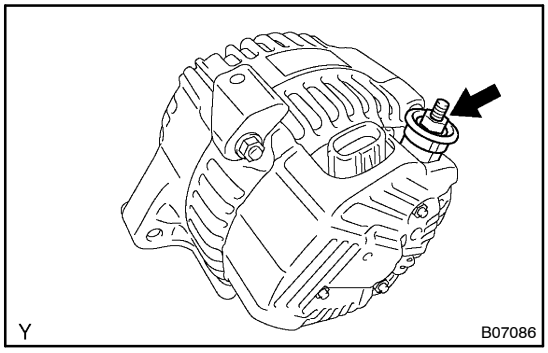
(c) RHD:
Disconnect the wire clamp from the wire clip on the alternator.

(d) Remove the pivot bolt and adjusting lock bolt.

(e) Remove the alternator.

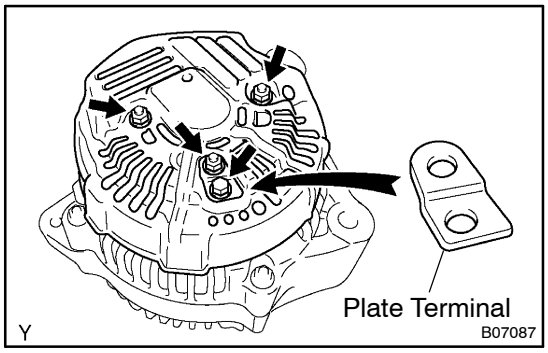
CH046–04

DISASSEMBLY

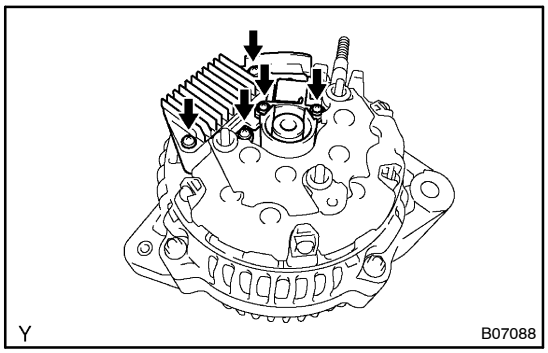


1. REMOVE REAR END COVER

(a) Remove the nut and terminal insulator.

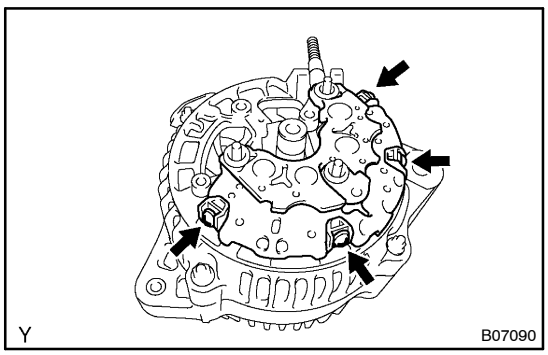


(b) Remove the bolt, 3 nuts, plate terminal and end cover.



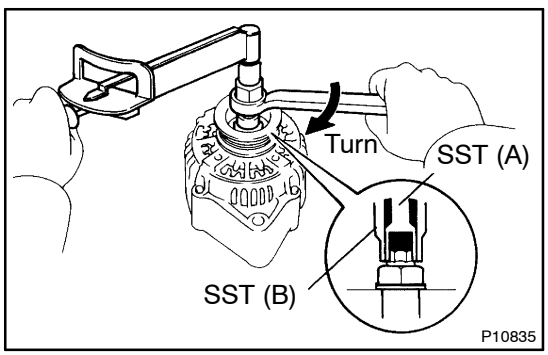
2. REMOVE BRUSH HOLDER AND IC REGULATOR

(a) Remove the brush holder cover from the brush holder.
(b) Remove the 5 screws, brush holder and IC regulator.
(c) Remove the seal plate from the rectifier end frame.



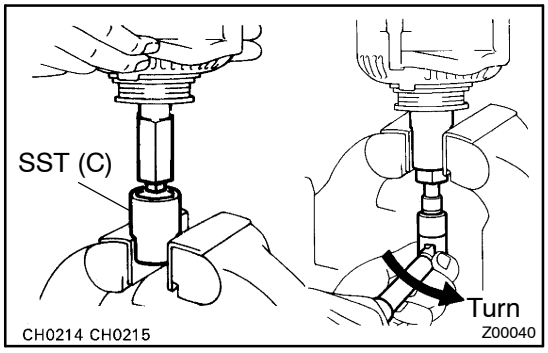
3. REMOVE RECTIFIER HOLDER

(a) Remove the 4 screws and rectifier holder.
(b) Remove the 4 rubber insulators.



4. REMOVE PULLEY

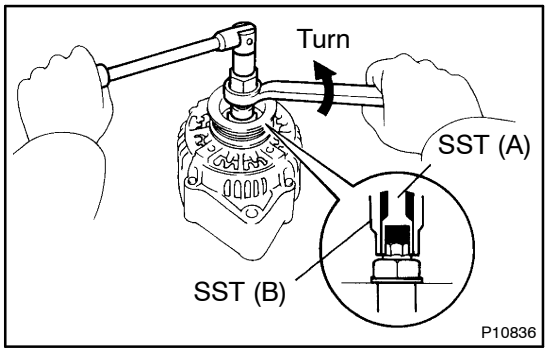
(a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820–06010, 09820–06020
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
(b) Check that SST (A) is secured to the rotor shaft.



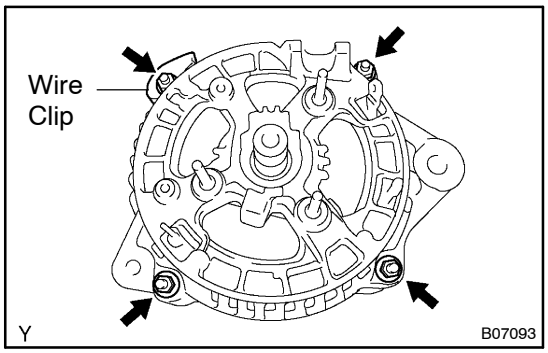
(c) Mount SST (C) in a vise.
(d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).
(e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE:
To prevent damage to the rotor shaft, do not loosen the pulley nut more than one–half of a turn.

(f) Remove the alternator from SST (C).

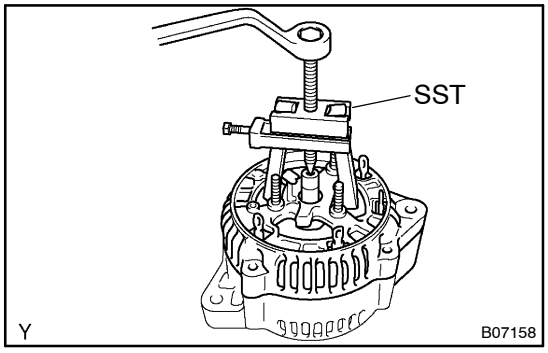


(g) Turn SST (B), and remove SST (A and B).
(h) Remove the pulley nut and pulley.



5. REMOVE RECTIFIER END FRAME

(a) Remove the 4 nuts and wire clip.



(b) Using SST, remove the rectifier end frame.
SST 09286–46011
(c) Remove the alternator washer.

6. REMOVE ROTOR FROM DRIVE END FRAME

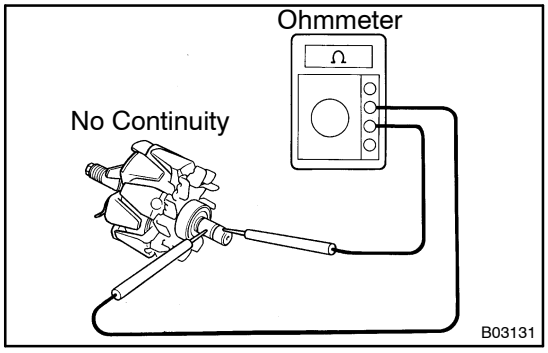
CH047–03

INSPECTION

1. INSPECT ROTOR

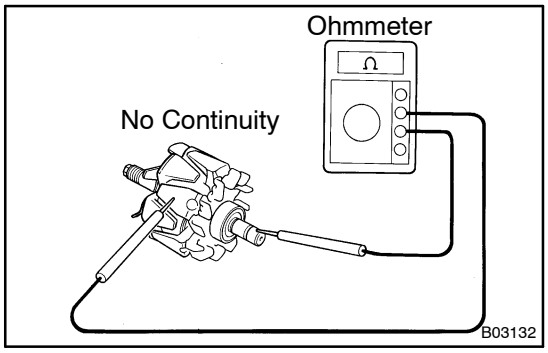
(a) Check rotor for open circuit.
Using an ohmmeter, check that there is continuity between the slip rings.
Standard resistance: 2.8 – 3.0 Ω at 20°C (68°F)

If there is no continuity, replace the rotor.



(b) Check the 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.

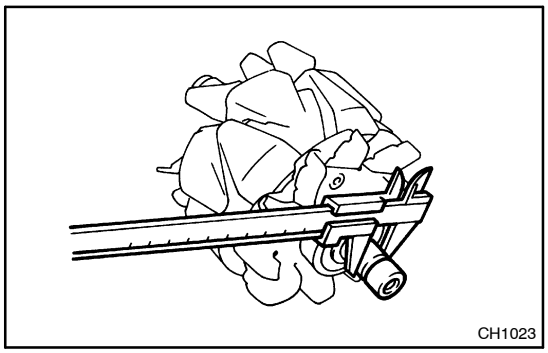


(c) Check that the slip rings are not rough or scored.

If rough or scored, replace the rotor.

(d) Using vernier calipers, 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.)

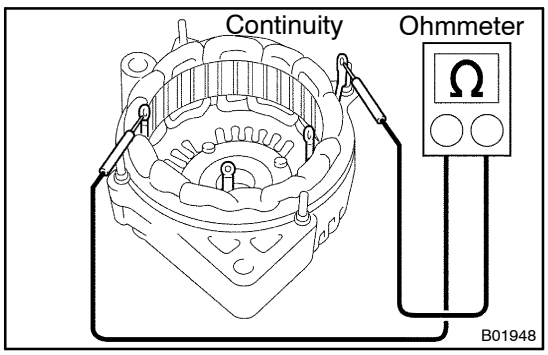
If the diameter is less than minimum, replace the rotor.



2. INSPECT STATOR (DRIVE END FRAME)

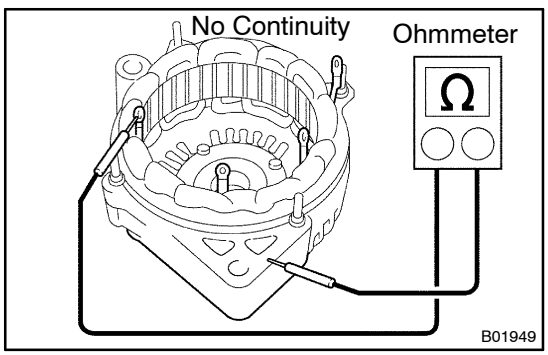
(a) Check the stator for open circuit.
Using an ohmmeter, check that there is continuity between the coil leads.

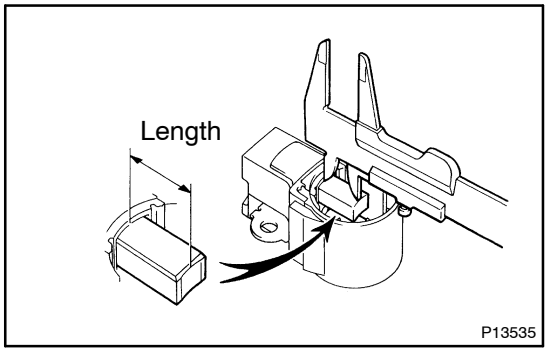
If there is no continuity, replace the drive end frame.



(b) Check the 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.



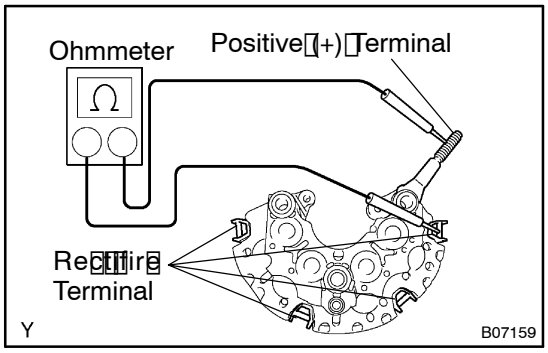


3. INSPECT BRUSHES

Using vernier calipers, measure the exposed brush length.

Standard exposed length:
9.5 – 11.5 mm (0.374 – 0.453 in.)
Minimum exposed length: 1.5 mm (0.059 in.)

If the exposed length is less than minimum, replace the brush holder.



4. INSPECT RECTIFIERS (RECTIFIER HOLDER)

(a) Check the positive (+) rectifier.

(1) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.

(2) Reverse the polarity of the tester probes and repeat step (a).

(3) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

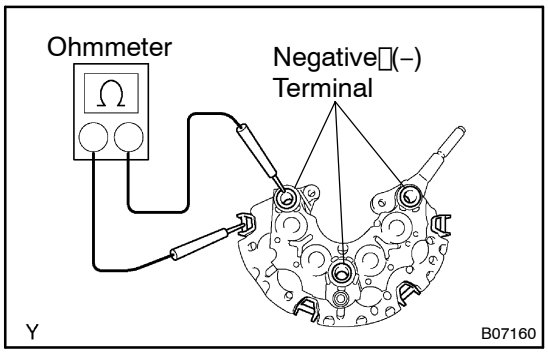
(b) Check the negative (–) rectifier.

(1) Using an ohmmeter, connect one tester probe to each negative (–) terminal and the other to each rectifier terminal.

(2) Reverse the polarity of the tester probes and repeat step (a).

(3) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



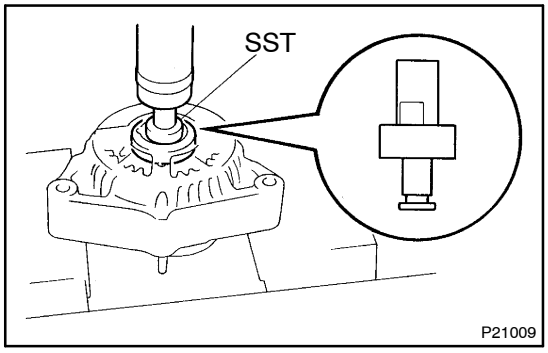
5. INSPECT BEARINGS

Check the bearing is not rough or worn.

If necessary, replace the bearing. (See page CH–11)

CH0B6–01

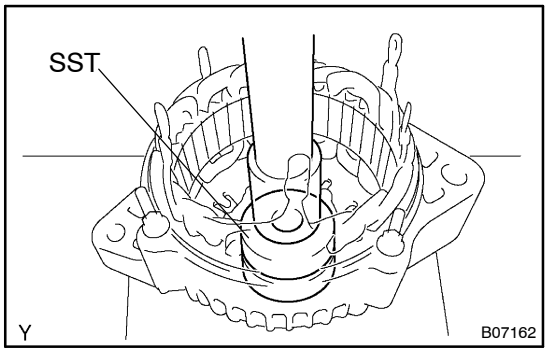
REPLACEMENT



1. REPLACE FRONT BEARING

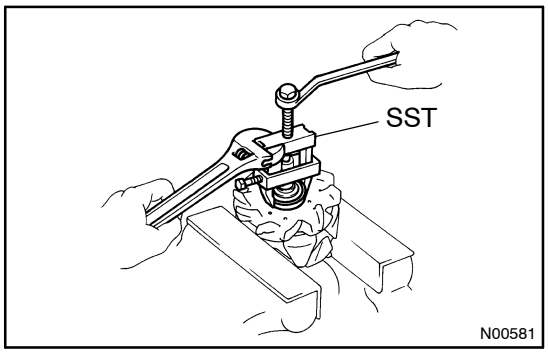
(a) Remove the 4 screws, bearing retainer and bearing.

(b) Using SST and a press, press out the bearing.
SST 09950–60010 (09951–00260, 09952–06010)



(c) Using SST and a press, press in a new bearing.
SST 09950–60010 (09951–00520)

(d) Install the bearing retainer with the 4 screws.
Torque: 3.0 N·m (31 kgf·cm, 27 in.·lbf)



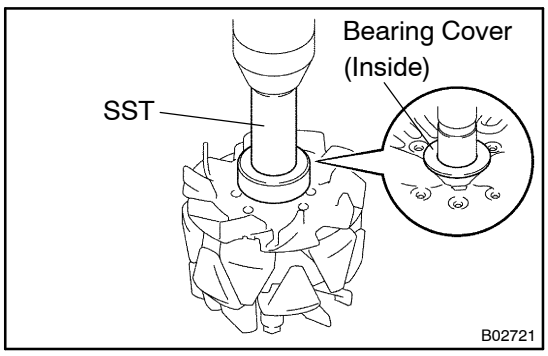
2. REPLACE REAR BEARING

(a) Using SST, remove the bearing cover (outside) and bearing.
SST 09820–00021

NOTICE:

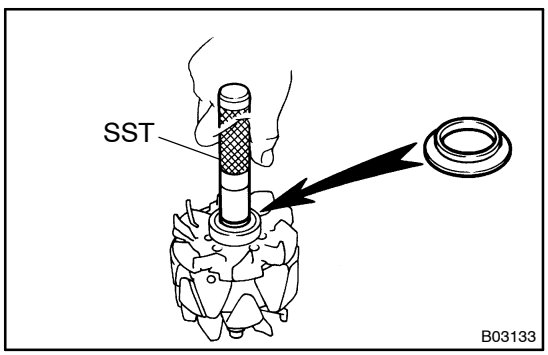
Be careful not to damage the fan.

(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

CH0B7–01

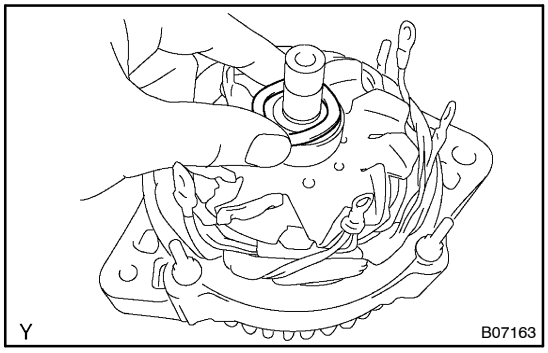
REASSEMBLY

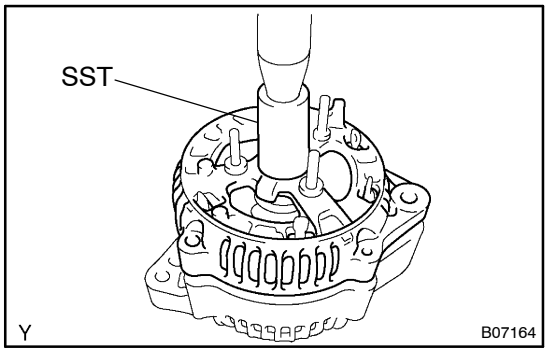
1. PLACE DRIVE END FRAME ON PULLEY

2. INSTALL ROTOR TO DRIVE END FRAME

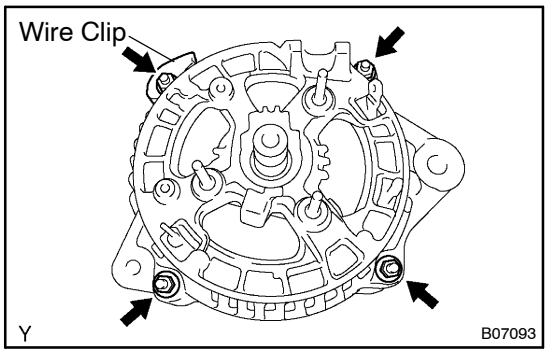
3. INSTALL RECTIFIER END FRAME

(a) Place the alternator washer on the rotor.

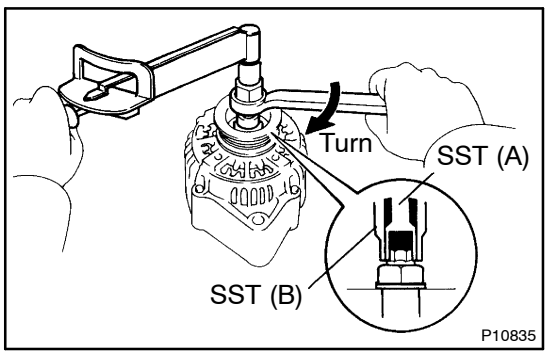




(b) Using SST and a press, slowly press in the rectifier end frame.
SST 09820–00030



(c) Install the wire clip and 4 nuts.
Torque:
4.5 N·m (46 kgf·cm, 40 in.·lbf) without wire clip
5.4 N·m (55 kgf·cm, 48 in.·lbf) with wire clip

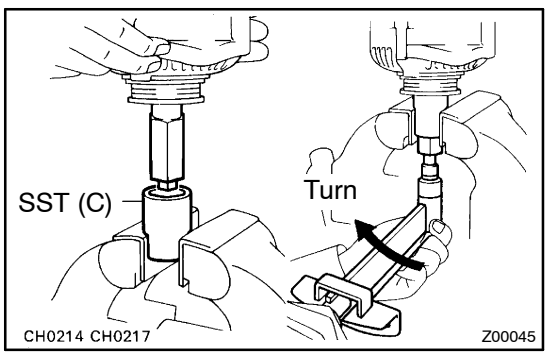


4. INSTALL PULLEY

(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.

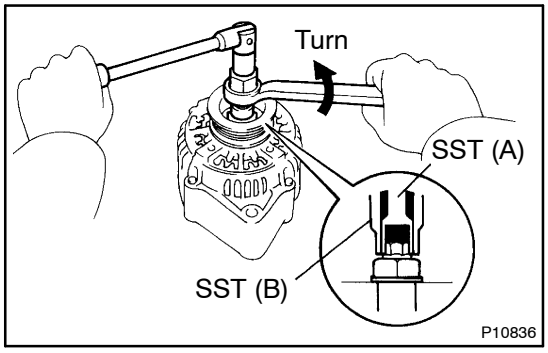


(d) Mount SST (C) in a vise.

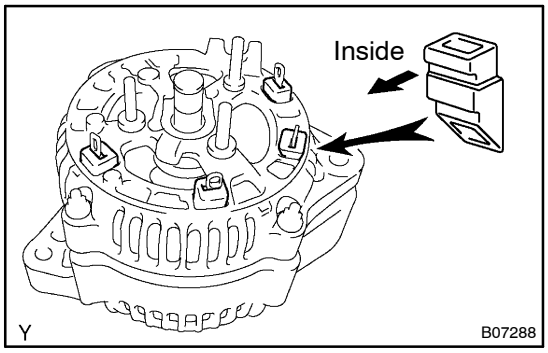
(e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).

(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 alternator from SST (C).

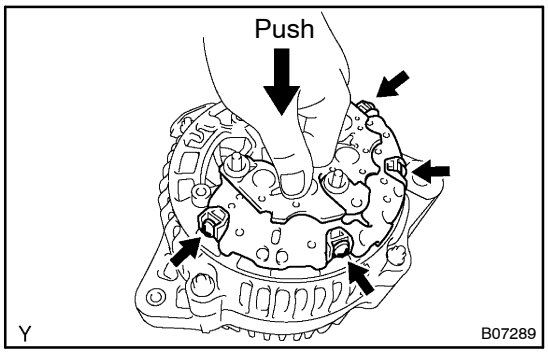


(h) Turn SST (B), and remove SST (A and B).



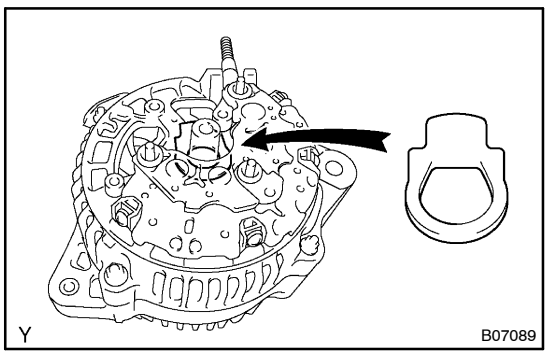
5. INSTALL RECTIFIER HOLDER

(a) Install the 4 rubber insulators on the lead wires.



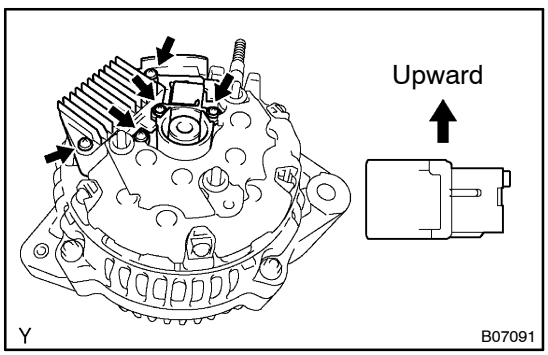
(b) Install the rectifier holder while pushing it with the 4 screws.

Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)



6. INSTALL IC REGULATOR AND BRUSH HOLDER

(a) Place the seal plate on the rectifier end frame.



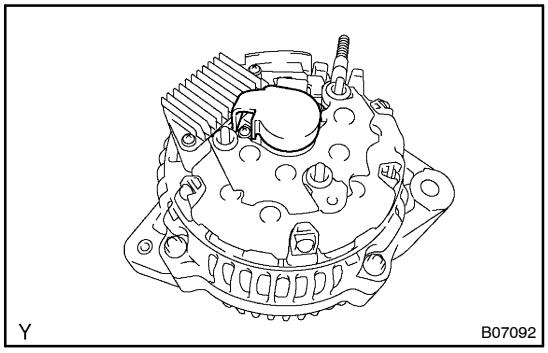
(b) Place the IC regulator and brush holder on the rectifier end frame.

NOTICE:

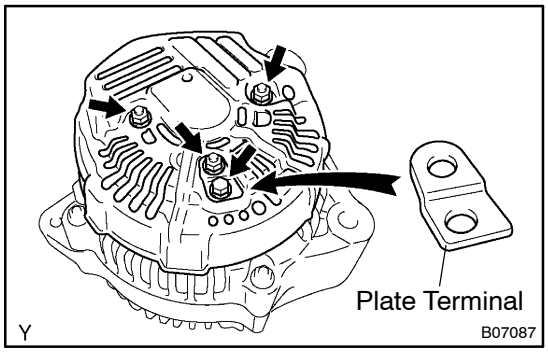
Be careful of the holder installation direction.

(c) Install the 5 screws.

Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)



(d) Place the brush holder cover on the brush holder.



7. INSTALL REAR END COVER

(a) Install the end cover and plate terminal with the bolt and 3 nuts.

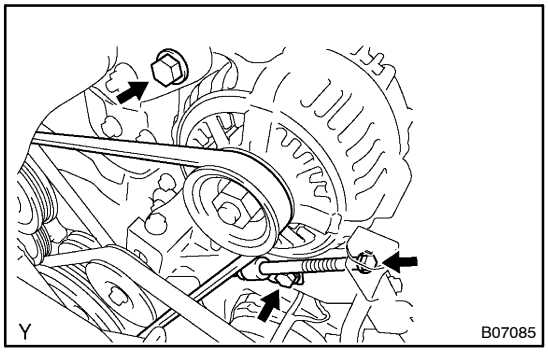
Torque:
4.4 N·m (45 kgf·cm, 39 in.·lbf) for nut
3.9 N·m (39 kgf·cm, 35 in.·lbf) for bolt

(b) Install the terminal insulator with the nut.

Torque: 4.1 N·m (41.5 kgf·cm, 36.3 in.·lbf)

8. CHECK THAT ROTOR ROTATES SMOOTHLY

CH0B8–01



INSTALLATION

1. INSTALL ALTERNATOR

(a) Temporarily install the alternator with the pivot bolt and adjusting lock bolt.

(b) Connect the alternator wire with the nut.

(c) RHD:
Install the wire clamp to the wire clip on the alternator.

(d) Install the rubber cap.

(e) Connect the alternator connector.

2. INSTALL DRIVE BELT

(a) Install the drive belt.

(b) Adjust the drive belt deflection. (See page CH–1)

(c) Tighten the adjusting lock bolt and pivot bolt.
Torque:
55 N·m (561 kgf·cm, 41 ft·lbf) for pivot bolt
13 N·m (133 kgf·cm, 10 ft·lbf) for lock bolt

3. INSTALL NO.3 CYLINDER HEAD COVER

4. INSTALL AIR CLEANER INLET

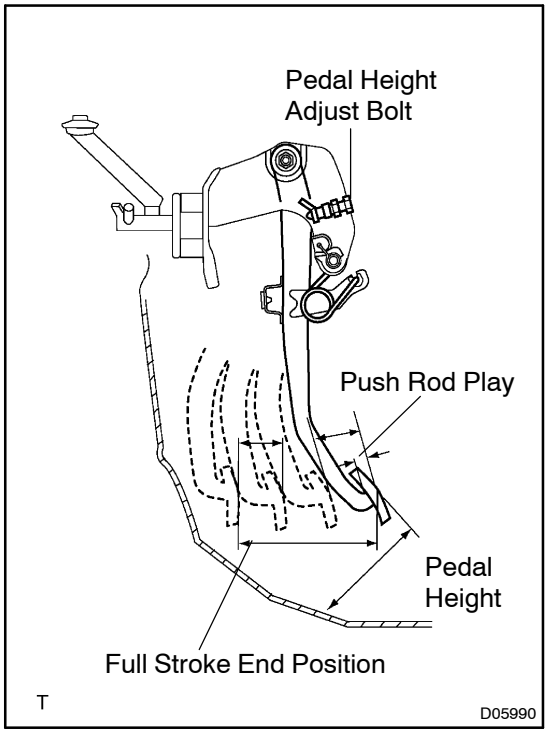
TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

CL07J–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
Clutch grabs/chatters	1. Engine mounting (Loosen)	–
	2. Clutch disc (Runout is excessive)	CL–14
	3. Clutch disc (Oily)	CL–14
	4. Clutch disc (Worn out)	CL–14
	5. Clutch disc (Damaged torsion rubber)	CL–14
	6. Clutch disc (Glazed)	CL–14
	7. Diaphragm spring (Out of tip alignment)	CL–17
Clutch pedal spongy	1. Clutch line (Air in line)	–
	2. Master cylinder cup (Damaged)	CL–4
	3. Release cylinder cup (Damaged)	CL–9
Clutch noisy	1. Release bearing (Worn, dirty or damaged)	CL–14
	2. Pilot bearing (Worn or damaged)	CL–14
	3. Input shaft bearing (Worn, dirty or damaged)	–
	4. Clutch disc torsion rubber (Damaged)	CL–14
Clutch slips	1. Clutch pedal (Freeplay out of adjustment)	CL–2
	2. Clutch disc (Oily)	CL–14
	3. Clutch disc (Worn out)	CL–14
	4. Diaphragm spring (Damaged)	CL–14
	5. Pressure plate (Distortion)	CL–14
	6. Flywheel (Distortion)	–
Clutch does not disengage	1. Clutch pedal (Freeplay out of adjustment)	CL–2
	2. Clutch line (Air in line)	–
	3. Master cylinder cup (Damaged)	CL–4
	4. Release cylinder cup (Damaged)	CL–9
	5. Input shaft bearing (Worn, dirty or damaged)	–
	6. Pilot bearing (Worn or damaged)	CL–14
	7. Clutch disc (Out of true)	CL–14
	8. Clutch disc (Runout is excessive)	CL–14
	9. Clutch disc (Lining broken)	CL–14
	10. Clutch disc (Dirty or burred)	CL–14
	11. Clutch disc (Oily)	CL–14
	12. Clutch disc (Lack of spline grease)	CL–17
	13. Diaphragm spring (Damaged)	CL–14
	14. Diaphragm spring (Out of tip alignment)	CL–17
	15. Pressure plate (Distortion)	CL–14



CLUTCH PEDAL

CL07K–01

INSPECTION

1. CHECK PEDAL HEIGHT

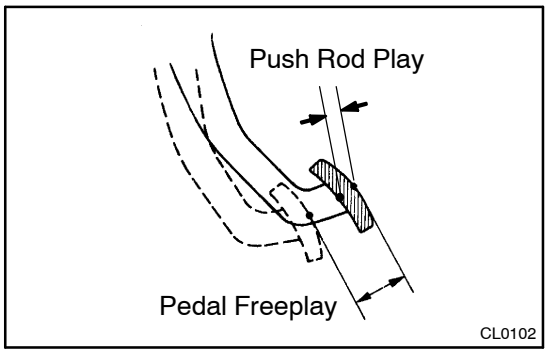
Pedal height from asphalt sheet:
RHD models: 161 – 171 mm (6.34 – 6.73 in.)
LHD models: 154 – 164 mm (6.06 – 6.46 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

Loosen the lock nut and clutch switch until the height is correct. Tighten the lock nut.

HINT:

Before rotating the clutch switch for pedal height adjustment, disconnect the clutch switch connector.



3. CHECK PEDAL FREEPLAY AND PUSH ROD PLAY

Push in on the pedal until the beginning of clutch resistance is felt.

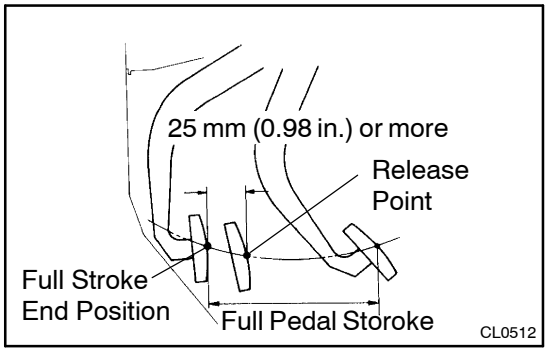
Pedal freeplay: 5.0 – 15.0 mm (0.197 – 0.591 in.)

Gently push on the pedal until the resistance begins to increase a little.

Push rod play at pedal top:
1.0 – 5.0 mm (0.039 – 0.197 in.)

4. IF NECESSARY, ADJUST PEDAL FREEPLAY AND PUSH ROD PLAY

(a) Loosen the lock nut and turn the push rod until the free-play and push rod play are correct.
(b) Tighten the lock nut.
(c) After adjusting the pedal freeplay, check the pedal height.



5. INSPECT FULL PEDAL STROKE

Full pedal stroke: 127.0 – 133.0 mm (5.00 – 5.24 in.)

6. INSPECT CLUTCH RELEASE POINT

(a) Pull the parking brake lever and install wheel stopper.

(b) Start the engine and idle the engine.

(c) Without depressing the clutch pedal, slowly shift the shift lever into the reverse position until the gears contact.

(d) Gradually depress the clutch pedal and measure the stroke distance from the point the gear noise stops (release point) up to the full stroke end position.

Standard distance: 25 mm (0.98 in.) or more
(From pedal stroke end position to release point)

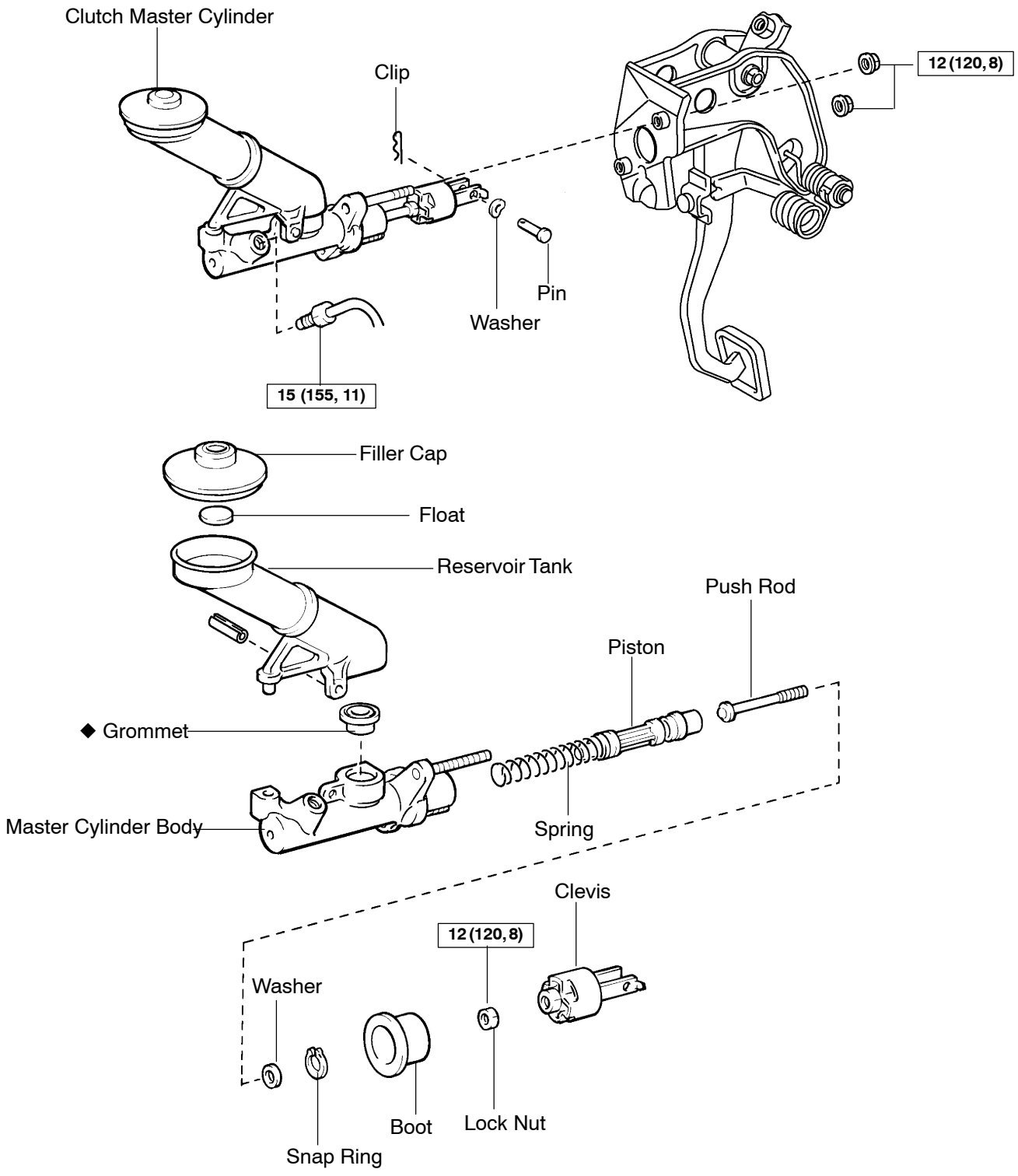
If the distance is not as specified, do the following operation.

- Inspect pedal height.
- Inspect push rod play and pedal freeplay.
- Bleed the clutch line.
- Inspect the clutch cover and disc.

CLUTCH MASTER CYLINDER

COMPONENTS

CL07L–01



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

D05991

CL07M–01

REMOVAL

1. DRAIN OUT FLUID WITH SYRINGE

2. REMOVE LOWER FINISH PANEL (See page BO–96)

3. DISCONNECT CLUTCH LINE UNION

Using SST, disconnect the union nut.

SST 09023–00100

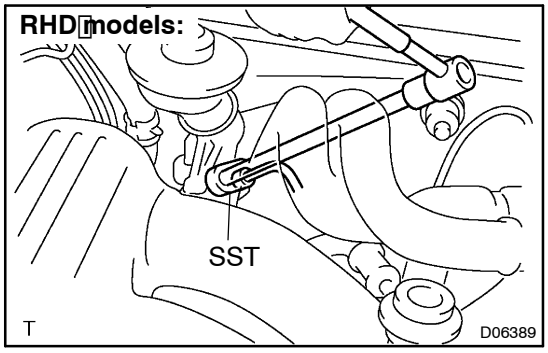
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

4. REMOVE CLIP AND PIN

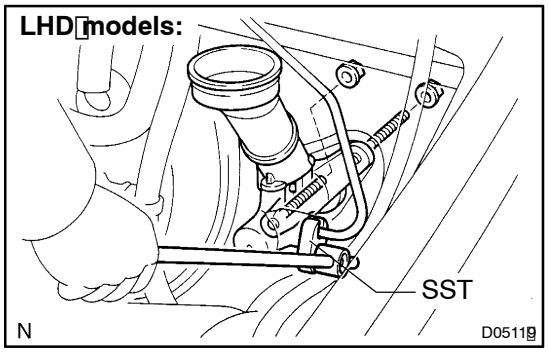
5. REMOVE 2 MOUNTING NUTS AND PULL OUT MASTER CYLINDER

Torque: 12 N·m (12 kgf·cm, 8 ft·lbf)

RHD models:

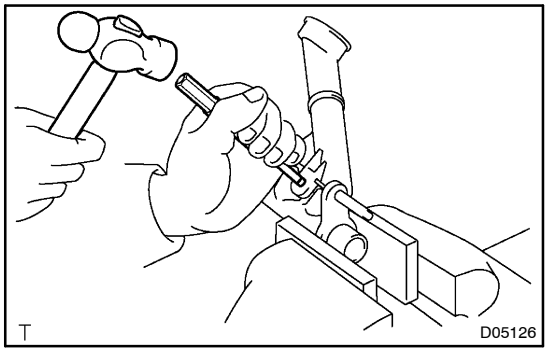


LHD models:



CL07N–01

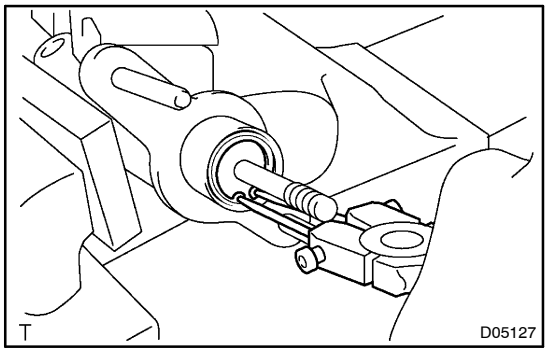
DISASSEMBLY



1. REMOVE RESERVOIR TANK

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

(b) Remove the reservoir tank and grommet.



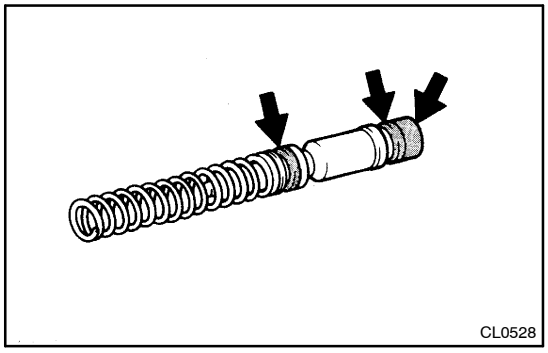
2. REMOVE PUSH ROD

(a) Pull back the boot, and using snap ring pliers, remove the snap ring.

(b) Pull out the push rod.

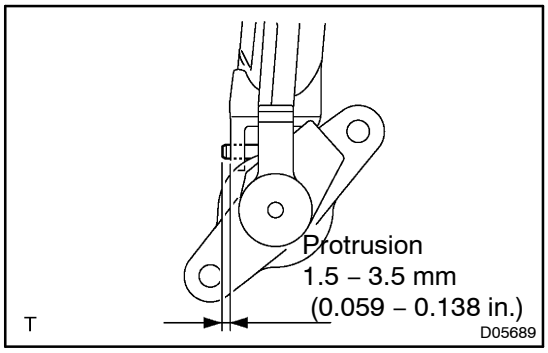
3. REMOVE PISTON

CL07O–01



REASSEMBLY

1. **COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**
2. **INSERT PISTON INTO CYLINDER**
3. **INSTALL PUSH ROD ASSEMBLY WITH NEW SNAP RING**



4. **INSTALL RESERVOIR TANK**

(a) Install the reservoir tank and a new grommet.

(b) Using a pin punch and hammer, drive in the slotted spring pin.

CL07P-01

INSTALLATION

Installation is in the reverse order of removal (See page CL–5)

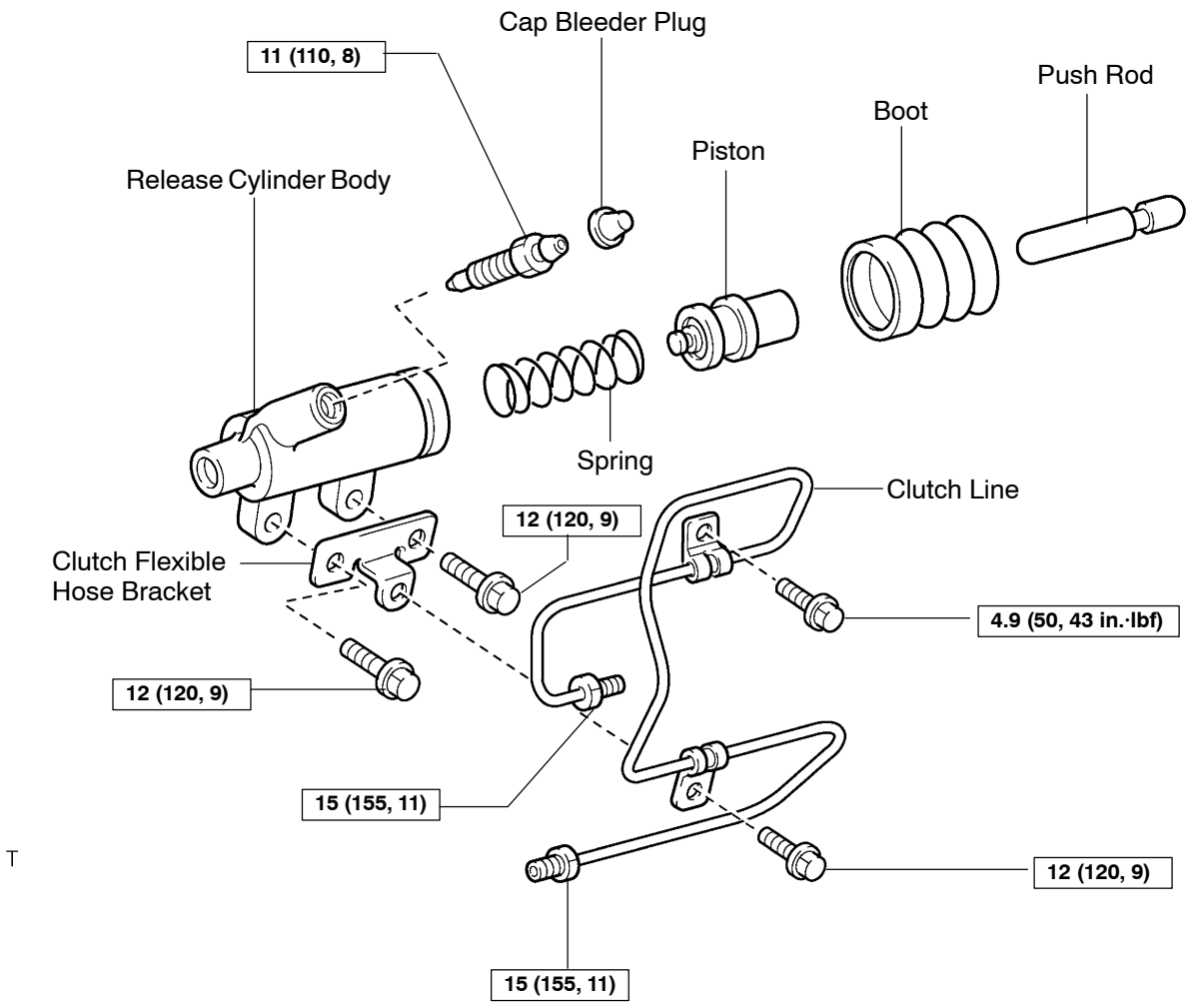
HINT:

After installation, adjust the clutch pedal and bleed the clutch system.

CLUTCH RELEASE CYLINDER

COMPONENTS

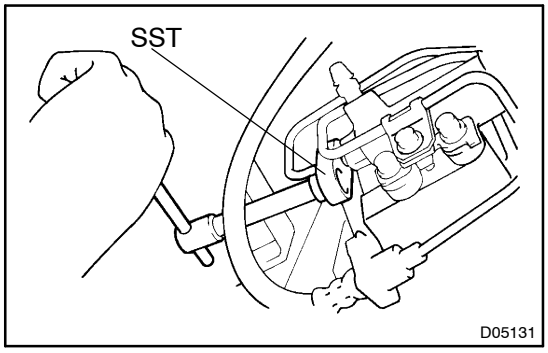
CL07Q–01

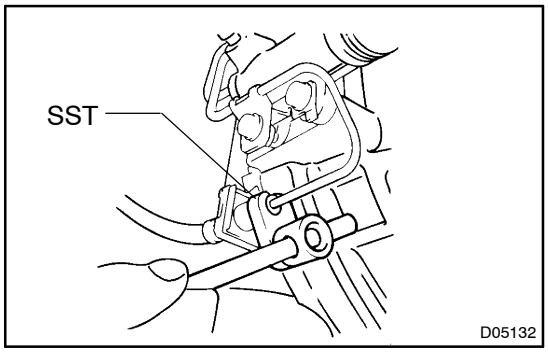


N·m (kgf·cm, ft·lbf) : Specified torque

D05997

CL07R–01





REMOVAL

1. DISCONNECT CLUTCH LINE

Using SST, disconnect the clutch line union. Use a container to catch the fluid.

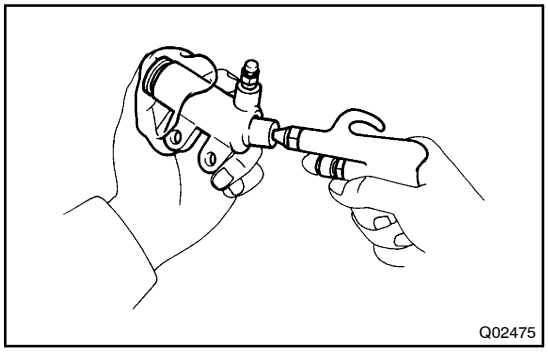
SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

2. REMOVE 2 BOLTS AND PULL OUT RELEASE CYLINDER

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

CL07S–01

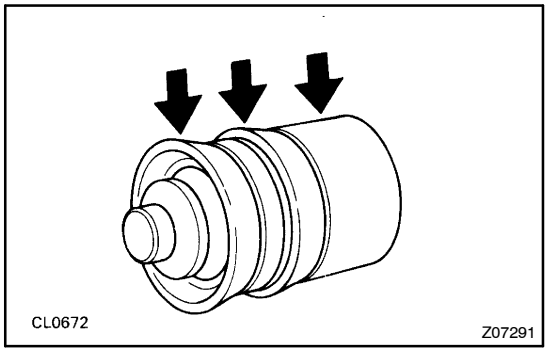


DISASSEMBLY

1. PULL OUT PUSH ROD WITH BOOT

2. REMOVE PISTON WITH SPRING

Using compressed air, remove the piston and spring from the cylinder.



CL07T–01

REASSEMBLY

1. **COAT PISTON WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**
2. **INSTALL PISTON WITH SPRING INTO CYLINDER**
3. **INSTALL BOOT WITH PUSH ROD TO CYLINDER**

CL07U–01

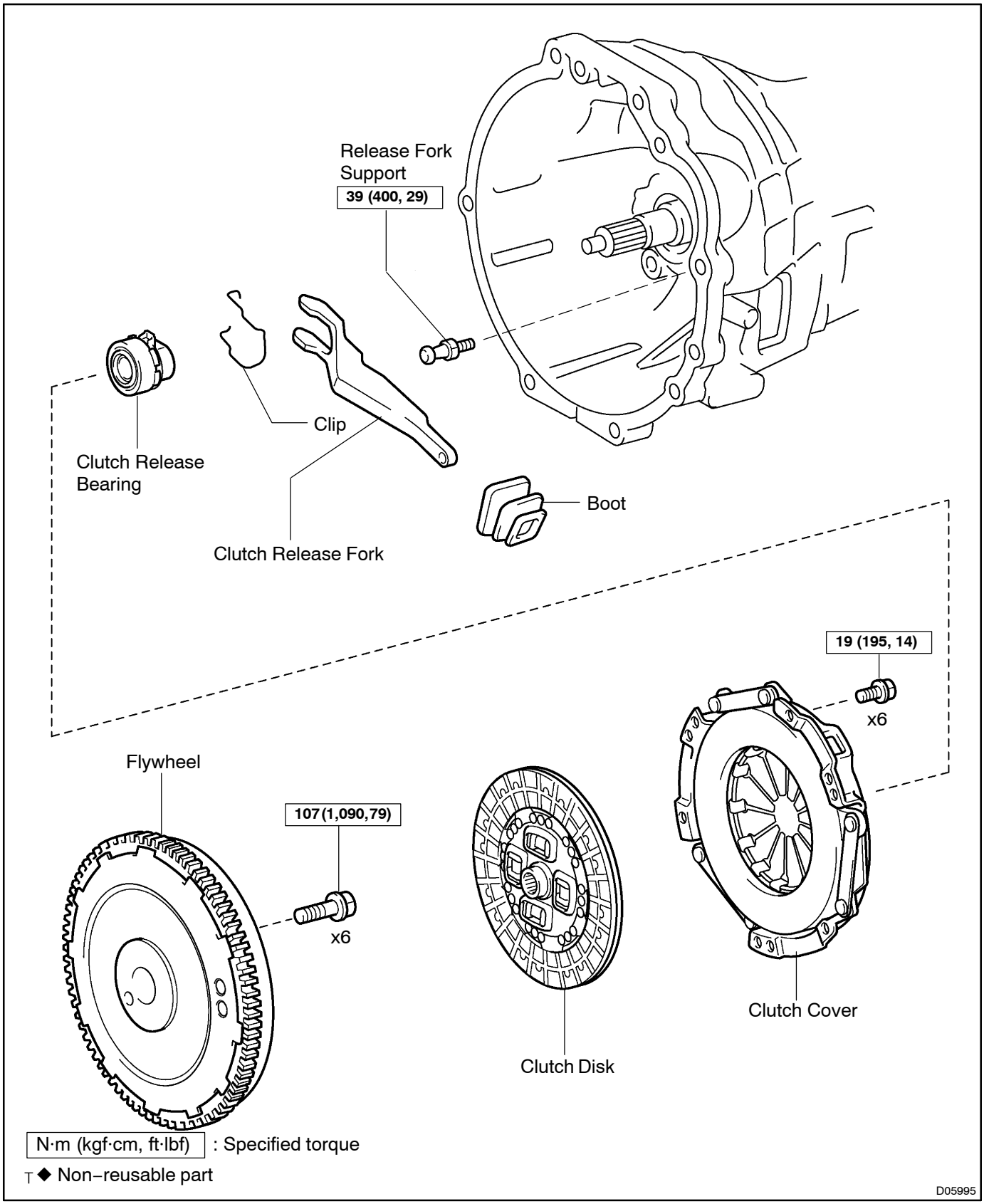
INSTALLATION

Installation is in the reverse order of removal (See page CL–10).

CLUTCH UNIT

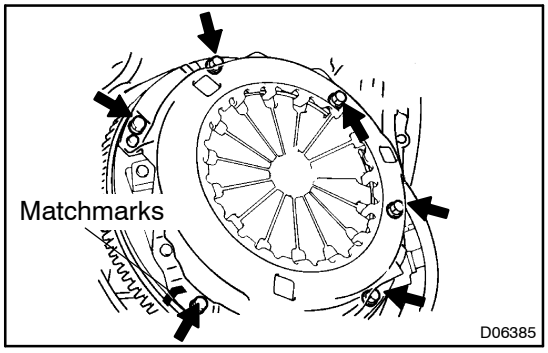
COMPONENTS

CL07V–01



CL07W–01

REMOVAL



1. REMOVE TRANSMISSION FROM ENGINE
(See page MT–5)

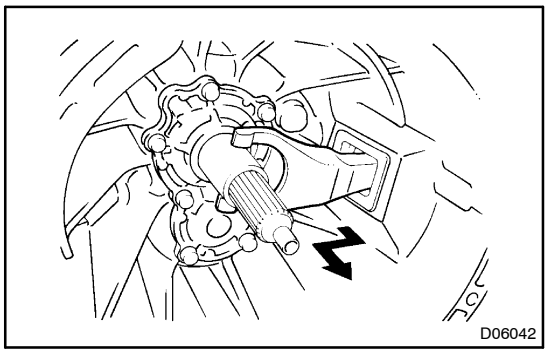
2. REMOVE CLUTCH COVER AND DISC

(a) Place matchmarks on the flywheel and clutch cover.

(b) Loosen each set bolt one turn at a time until spring tension is released.

(c) Remove the set bolts, and pull off the clutch cover with the clutch disc.

NOTICE:
Do not drop the clutch disc.

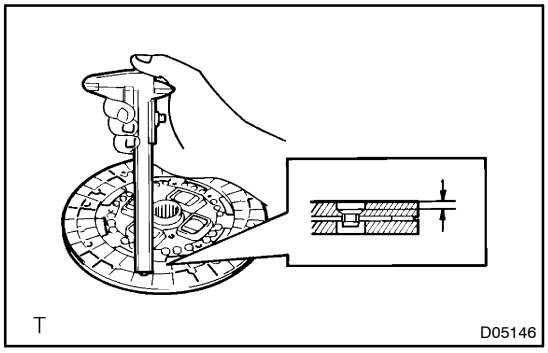


3. REMOVE BOOT, RELEASE BEARING AND FORK FROM TRANSMISSION

Remove the boot and release bearing together with the fork and then separate them.

CL07X–01

INSPECTION

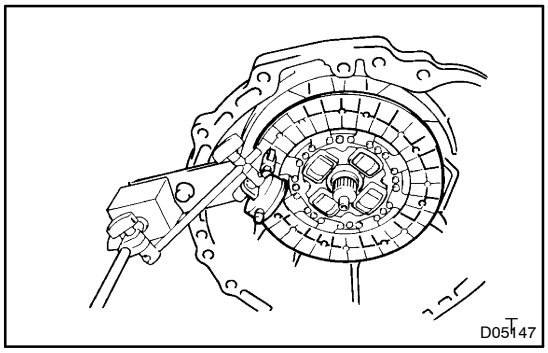


1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calipers, measure the rivet head depth.

Minimum rivet depth: 0.3 mm (0.012 in.)

If it is not as specified, replace the clutch disc.

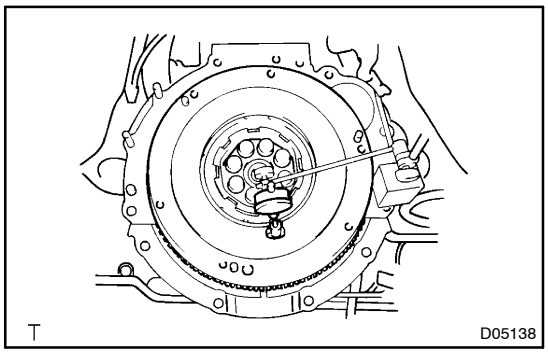


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If it is not as specified, replace the clutch disc.

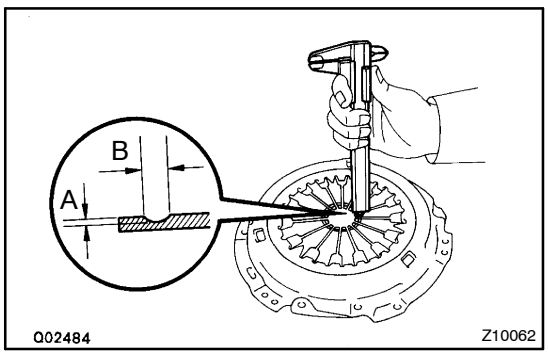


3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout: 0.3 mm (0.012 in.)

If it is not as specified, replace the clutch disc.



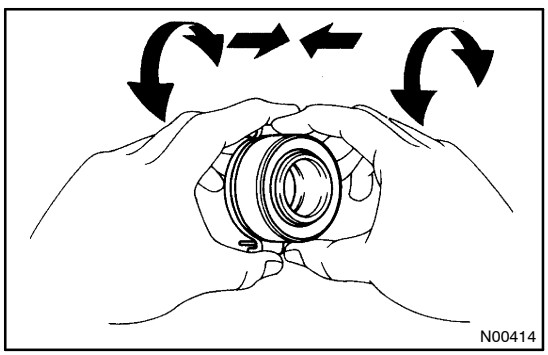
4. INSPECT DIAPHRAGM SPRING FOR WEAR

Using calipers, measure the diaphragm spring for depth and width of wear.

Maximum depth: A: 0.6 mm (0.024 in.)

Maximum width: B: 5.0 mm (0.197 in.)

If it is not as specified, replace the clutch cover.



5. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the axial direction.

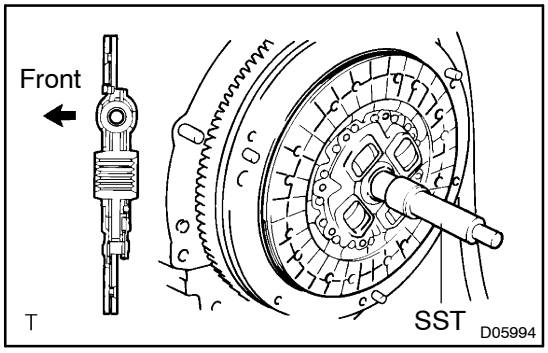
HINT:

The bearing is permanently lubricated and requires no cleaning or lubrication.

If necessary, replace the release bearing.

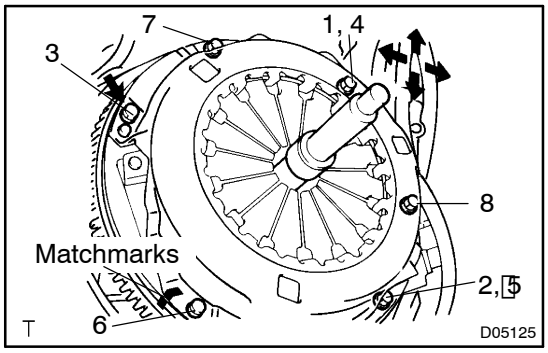
CL07Y-01

INSTALLATION



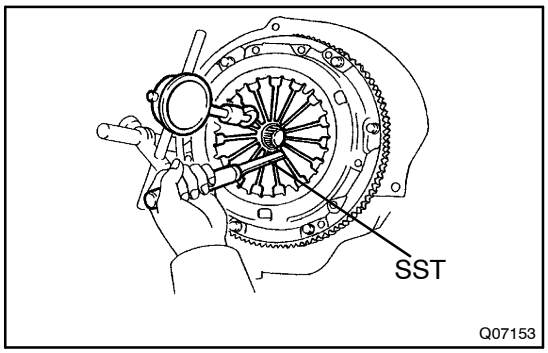
1. INSTALL CLUTCH DISC AND CLUTCH COVER ON FLYWHEEL

(a) Insert SST in the clutch disc, and then set them.
SST 09301–00110



(b) Align the matchmarks on the clutch cover and flywheel.
(c) Torque the 6 bolts on the clutch cover in the order shown.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:
Temporarily tighten the No.1 and No.2 bolts.



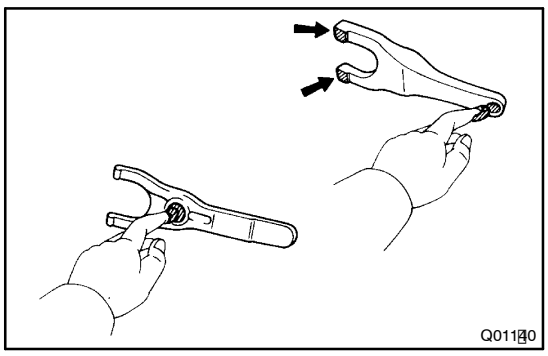
2. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

Using a dial indicator with roller instrument, check the diaphragm spring tip alignment.

Maximum non–alignment: 0.5 mm (0.020 in.)

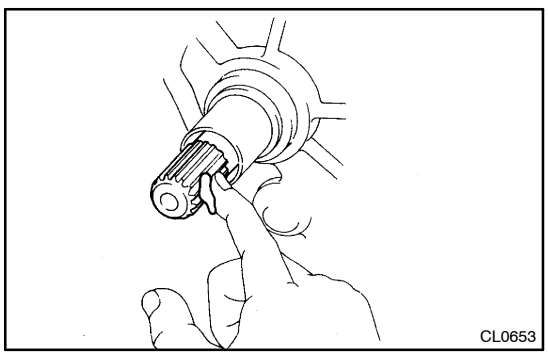
If the alignment is not as specified, with SST, adjust the diaphragm spring tip alignment.

SST 09333–00013



3. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2)

(a) Apply release hub grease to the these parts.
- Release fork and hub contact point
- Release fork and push rod contact point
- Release fork pivot point



(b) Apply clutch spline grease.
- Clutch disc spline

HINT:
Recommended grease part number 08887–01706 (100 g).

4. INSTALL BOOT, RELEASE BEARING AND FORK TO TRANSMISSION

Install the boot and bearing to the release fork, and then install them to the transmission.

5. INSTALL TRANSMISSION TO ENGINE
(See page MT–8)

COOLANT

CO066–04

INSPECTION

HINT:

Check the coolant level when the engine is cold.

1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR

The engine coolant level should be between the ”LOW” and ”FULL” lines.

If low, check for leak and add ”Toyota Long Life Coolant” or equivalent up to the ”FULL” line.

2. CHECK ENGINE COOLANT QUALITY

(a) Remove the 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 blown out under pressure.

(b) There should not be any excessive deposits of rust or scale around the radiator cap or radiator 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.

CO0UB–01

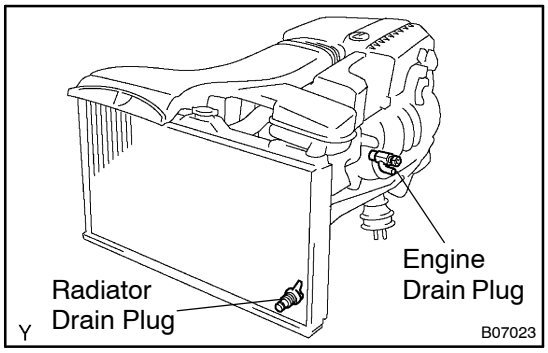
REPLACEMENT

1. DRAIN ENGINE COOLANT

(a) Remove the 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 blown out under pressure.



(b) Loosen the radiator and engine drain plugs, and drain the coolant.

(c) Close the drain plugs.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf) for engine

2. FILL ENGINE COOLANT

(a) Slowly fill the system with coolant.

- Use of improper coolants may damage engine cooling system.
- Use "Toyota Long Life Coolant" or equivalent and mix it with plan water according to the manufacturer's directions.
- Using of coolant which includes more than 50 % (freezing protection down to –35˚C (–31˚F) or 60 % (freezing protection down to –50˚C (–58˚F)) of ethylene–glycol is recommended but not more than 70 %.

NOTICE:

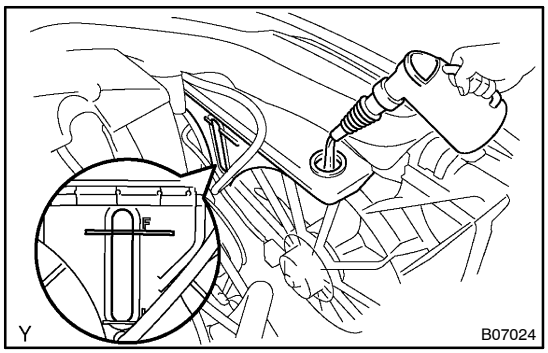
- **Do not use an alcohol type coolant or plain water alone.**
- **The coolant should be mixed with plain water (preferably demineralized water or distilled water).**

Capacity:

Europe	7.1 litters (7.5 US qts, 6.2 Imp. qts)
Others	6.6 litters (7.3 US qts, 6.1 Imp. qts)

(b) Install the radiator cap.

(c) Start the engine, and bleed the cooling system.



(d) Refill the radiator reservoir with coolant until it reaches the "FULL" line.

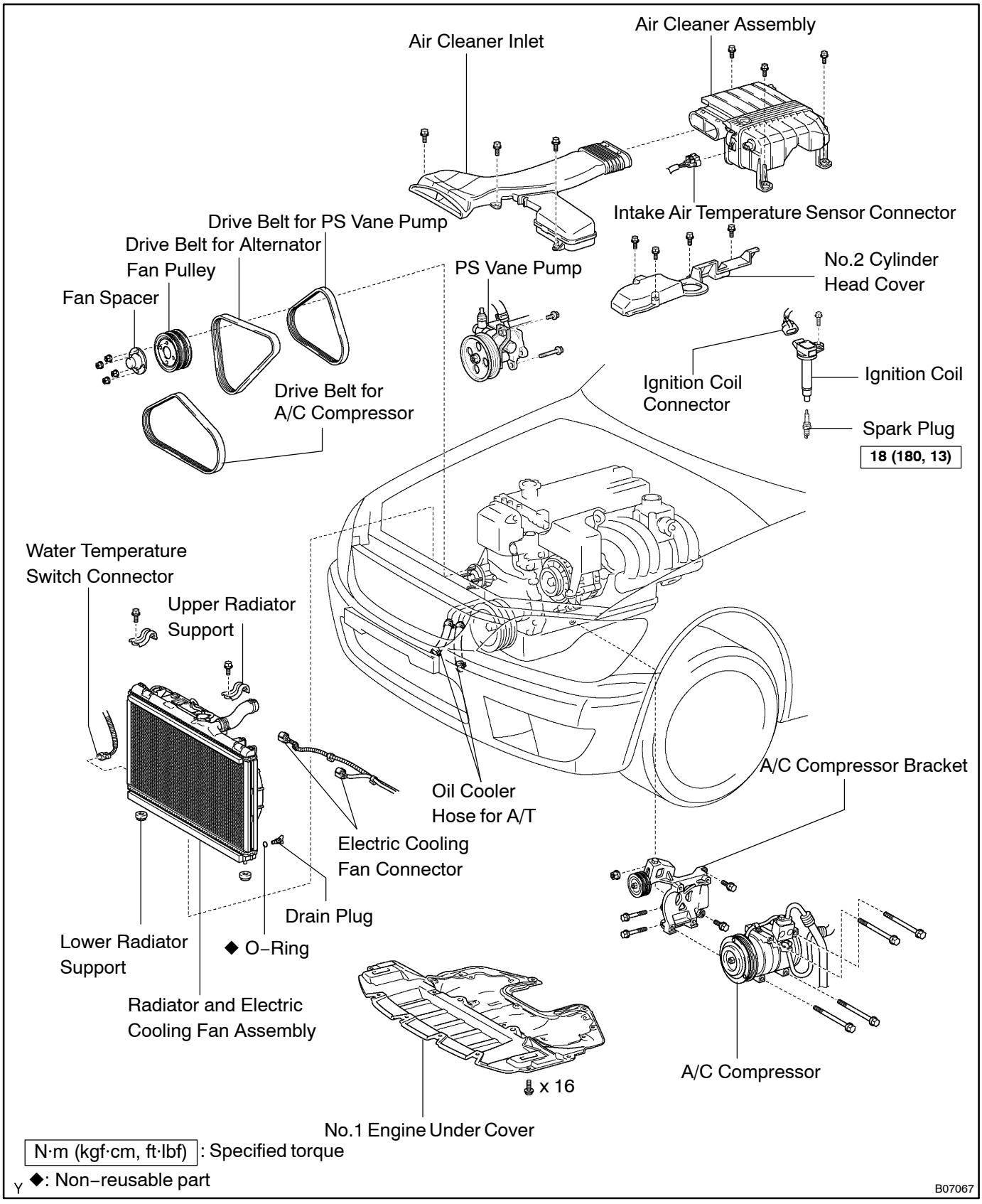
3. CHECK ENGINE COOLANT FOR LEAK

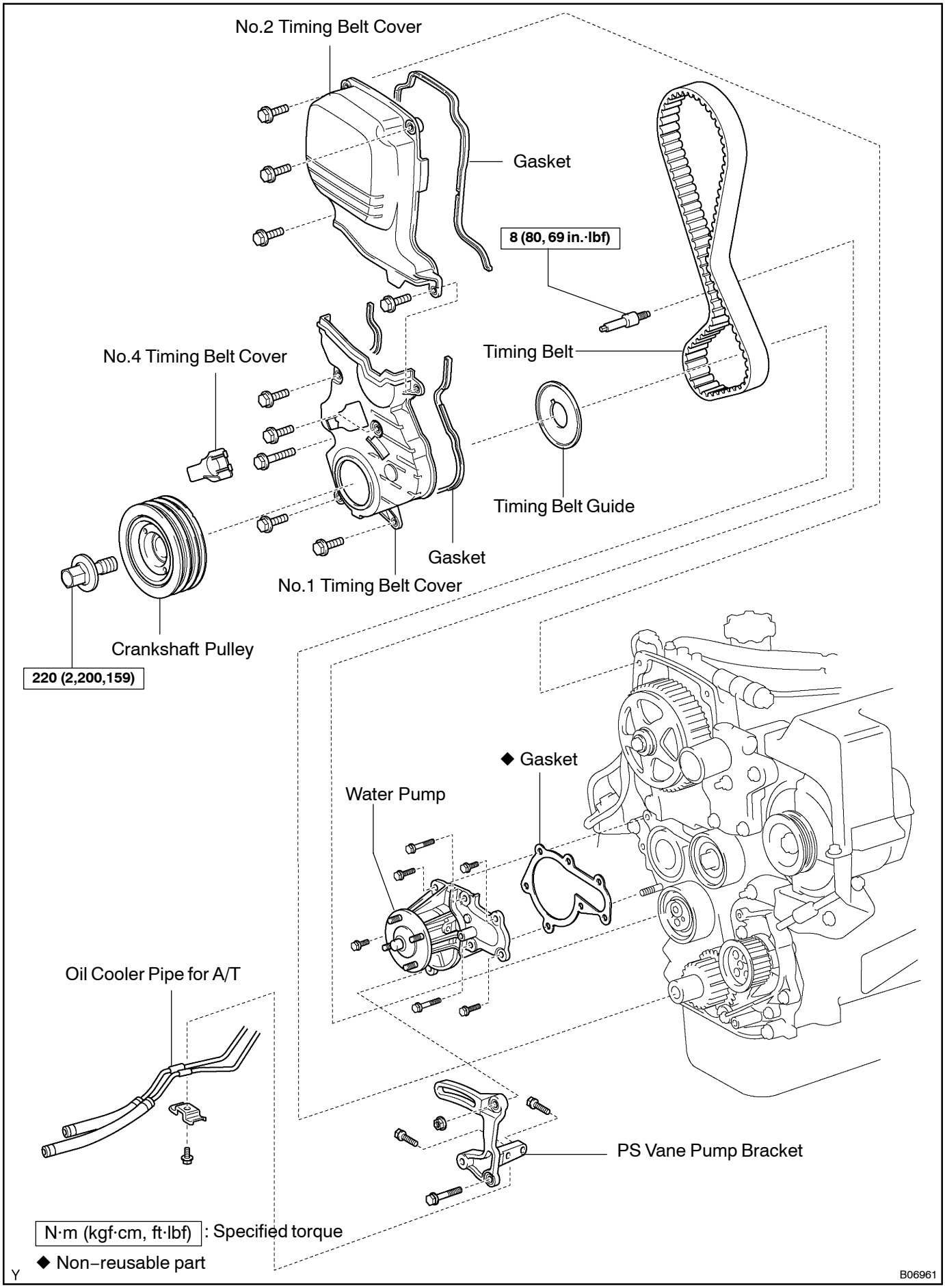
4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY

WATER PUMP

COMPONENTS

CO068–04

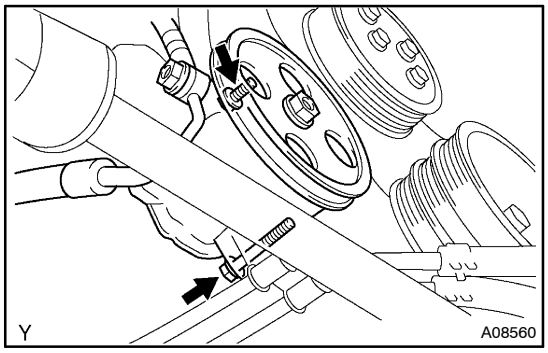



No.2 Timing Belt Cover
Gasket
8 (80, 69 in.·lbf)
Timing Belt
No.4 Timing Belt Cover
Timing Belt Guide
Gasket
No.1 Timing Belt Cover
Crankshaft Pulley
220 (2,200,159)
◆ Gasket
Water Pump
Oil Cooler Pipe for A/T
PS Vane Pump Bracket
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Y
B06961

CO0UC–01

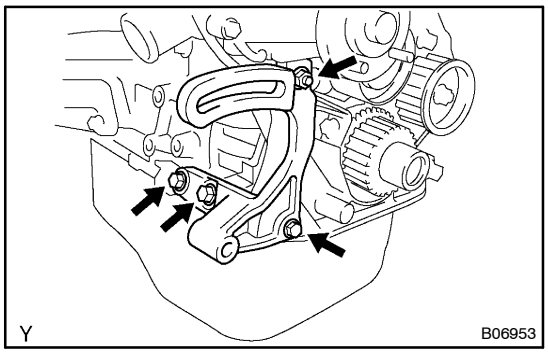
REMOVAL

1. DRAIN ENGINE COOLANT



2. DISCONNECT PS VANE PUMP WITHOUT DISCONNECTING HOSES

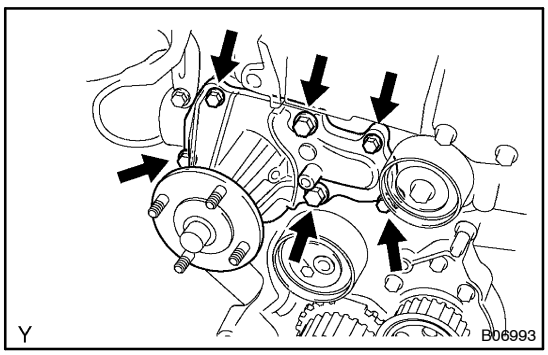
3. REMOVE TIMING BELT (See page EM–20)



4. REMOVE PS VANE PUMP BRACKET

(a) A/T:
Remove the bolt and pipe clamp, and disconnect the oil cooler pipes for A/T from the pump bracket.

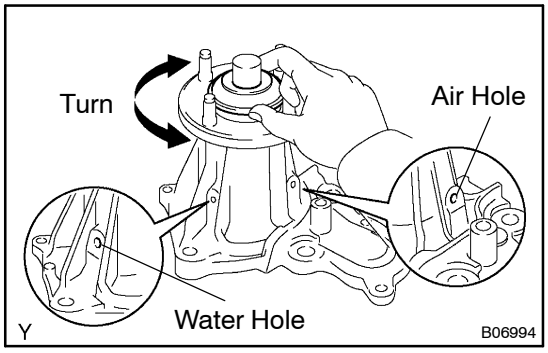
(b) Remove the 3 bolts, nut and pump bracket.



5. REMOVE WATER PUMP

Remove the 6 bolts, water pump and gasket.

CO06A–04



INSPECTION

INSPECT WATER PUMP

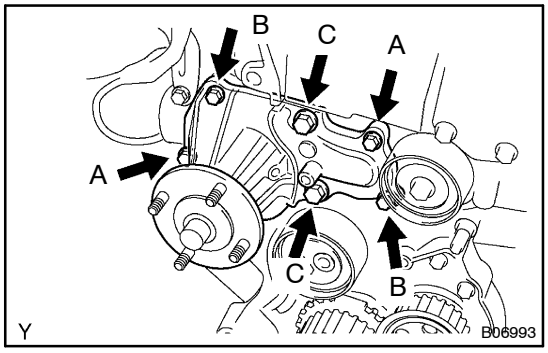
(a) Visually check the air hole and water hole for coolant leakage.

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.

CO0UD–01



INSTALLATION

1. INSTALL WATER PUMP

Install a new gasket and the water pump with the 6 bolts.

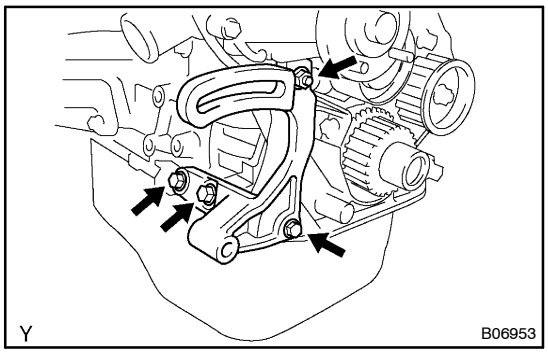
Torque:
9.0 N·m (90 kgf·cm, 78 in.·lbf) for 10 mm head
18.5 N·m (185 kgf·cm, 13 ft·lbf) for 12 mm head

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

20 mm (0.79 in.) for A
25 mm (0.98 in.) for B
45 mm (1.77 in.) for C



2. INSTALL PS VANE PUMP BRACKET

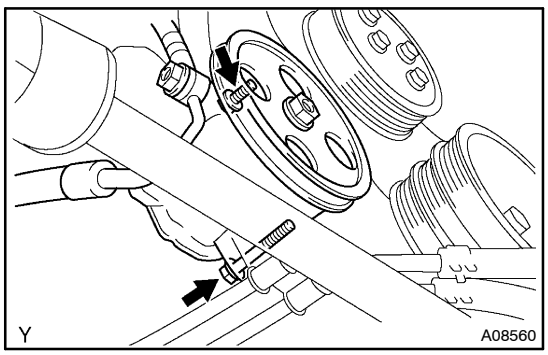
(a) Remove the pump bracket with the 3 bolts and nut.

Torque:
19 N·m (195 kgf·cm, 14 ft·lbf) for 12 mm head
39 N·m (400 kgf·cm, 29 ft·lbf) for 14 mm head

(b) A/T:

Connect the oil cooler pipes for A/T to the pump bracket with the bolt and pipe clamp.

3. INSTALL TIMING BELT (See page EM–26)



4. INSTALL PS VANE PUMP

Torque:
58 N·m (590 kgf·cm, 43 ft·lbf) for pivot bolt
39 N·m (400 kgf·cm, 29 ft·lbf) for adjusting lock bolt

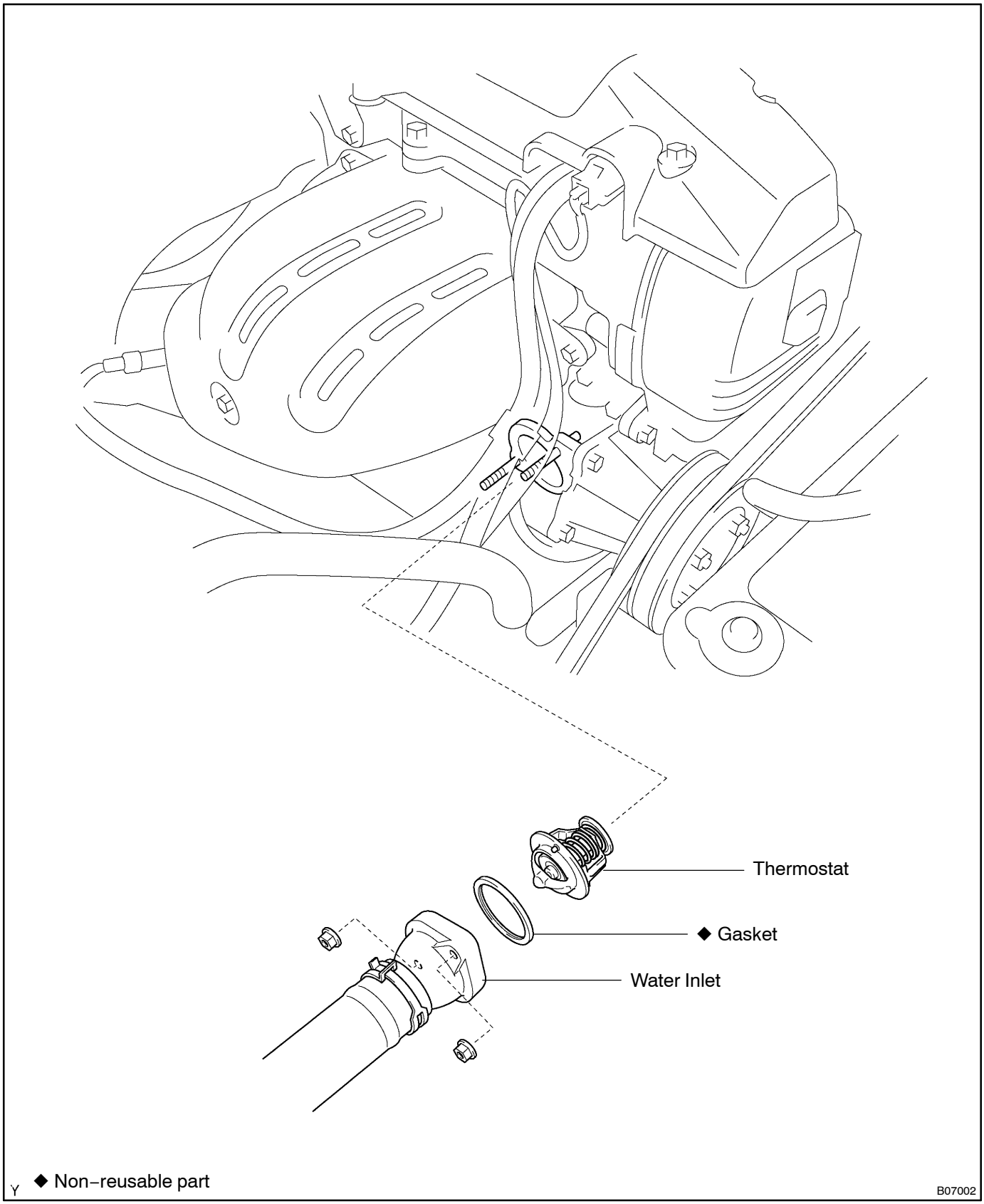
5. FILL WITH ENGINE COOLANT

6. START ENGINE AND CHECK FOR COOLANT LEAK

THERMOSTAT

COMPONENTS

CO06C–04

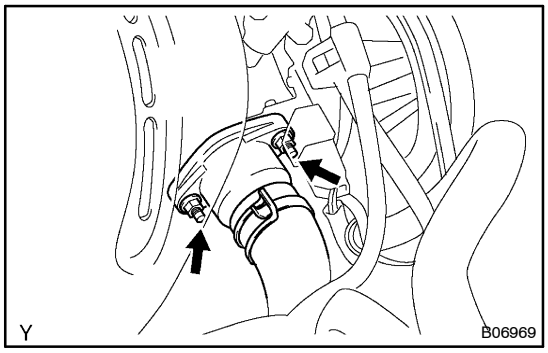


CO06D–04

REMOVAL

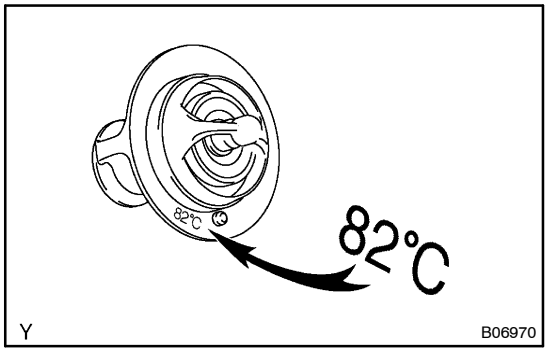
HINT:
Removal of the thermostat would have an adverse effect, causing a decline in cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. DRAIN ENGINE COOLANT



2. REMOVE WATER INLET AND THERMOSTAT

(a) Remove the 2 nuts, and disconnect the water inlet from the timing belt case.
(b) Remove the thermostat.
(c) Remove the gasket from the thermostat.



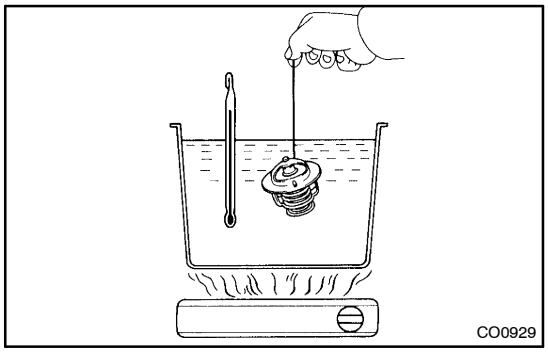
INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.

CO06E–04

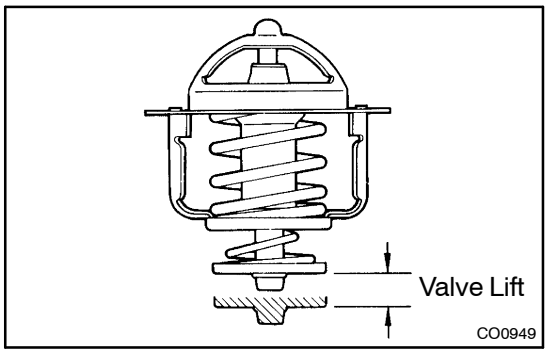


(a) Immerse the thermostat in water and gradually heat the water.

(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: 8 mm (0.31 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 temperature (below 40°C (104°F)).

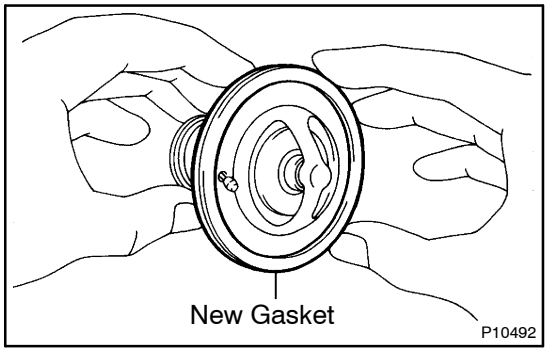
If not closed, replace the thermostat.

CO0UE–01

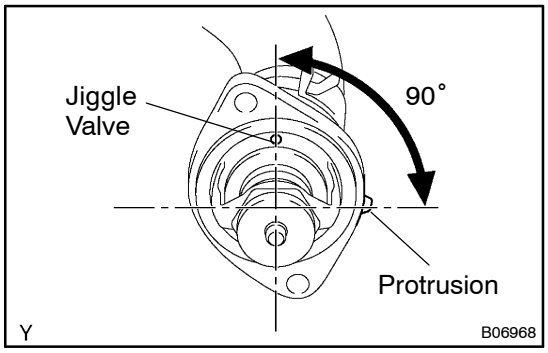
INSTALLATION

1. PLACE THERMOSTAT IN WATER INLET

(a) Install a new gasket to the thermostat.



(b) Align the jiggle valve of the thermostat with as shown in the illustration, and insert the thermostat in the water inlet.



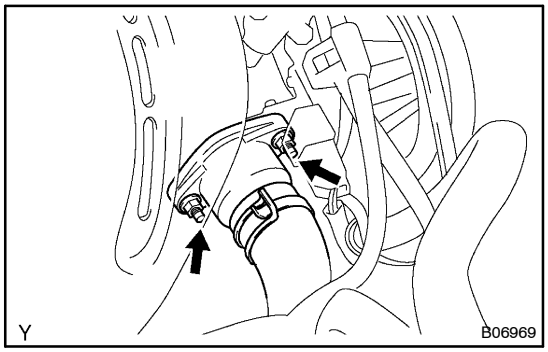
2. INSTALL WATER INLET AND THERMOSTAT

Install the water inlet and thermostat with the 2 nuts.

Torque: 9.0 N·m (90 kgf·cm, 78 in.·lbf)

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR COOLANT LEAK



RADIATOR

CO06G–04

ON–VEHICLE CLEANING

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 and radiator core.)

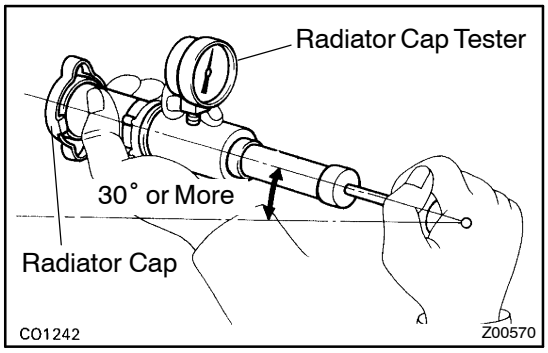
CO06H–05

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 blown out under pressure.



2. INSPECT RADIATOR CAP

NOTICE:

- **If the radiator cap has contaminations, always rinse it with water.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**
- **When performing steps (a) and (b) below, keep the tester at an angle of over 30° above the horizontal.**

(a) Using a radiator cap tester, slowly pump the tester and check if 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:

93 – 123 kPa (0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi)

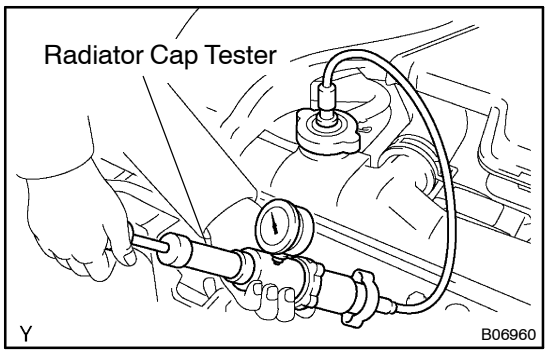
Minimum opening pressure:

78 kPa (0.8 kgf/cm^2, 11.4 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 LEAK

(a) Fill the radiator with coolant, and attach a radiator cap tester.

(b) Warm up the engine.

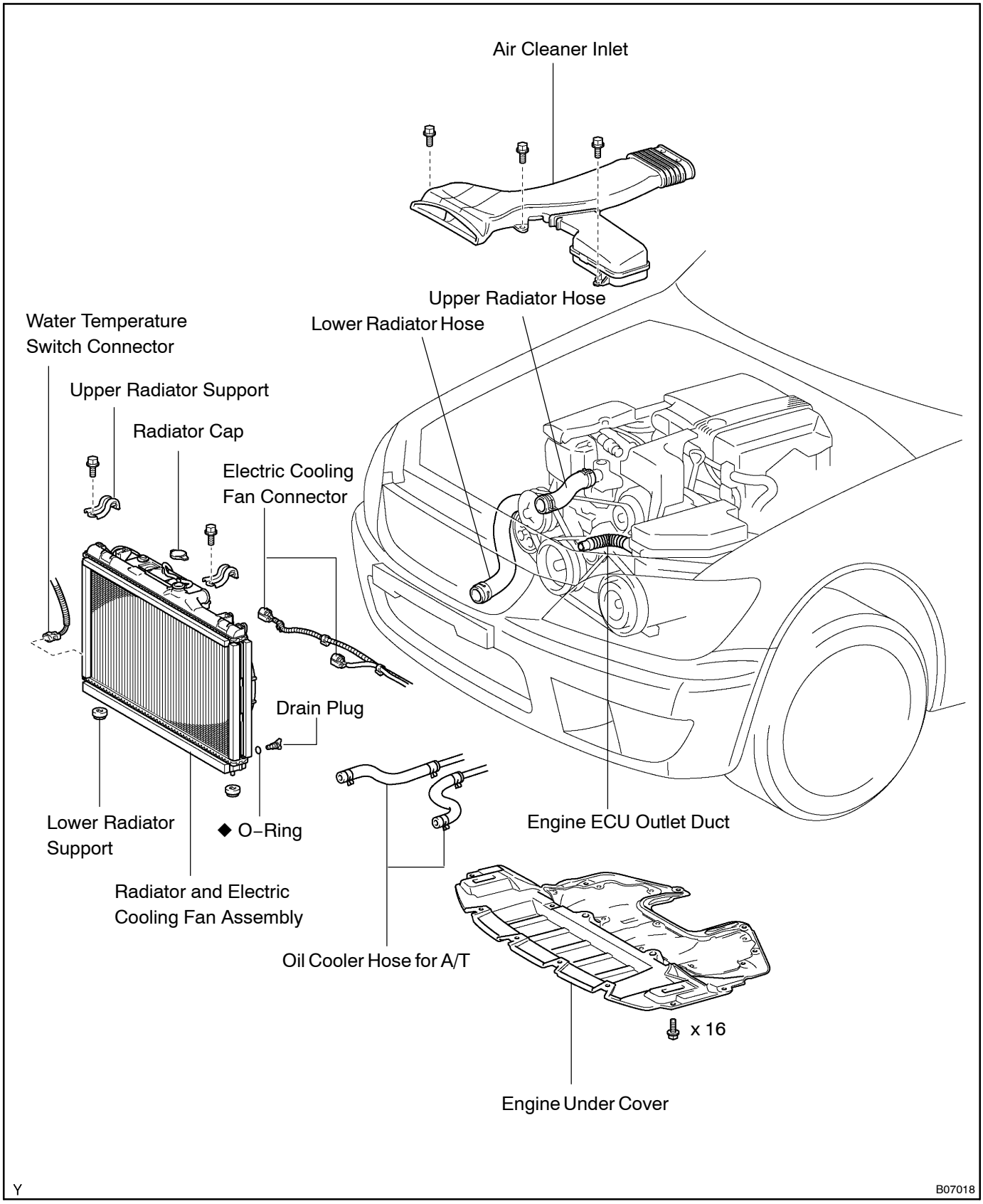
(c) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), and check that the pressure does not drop.

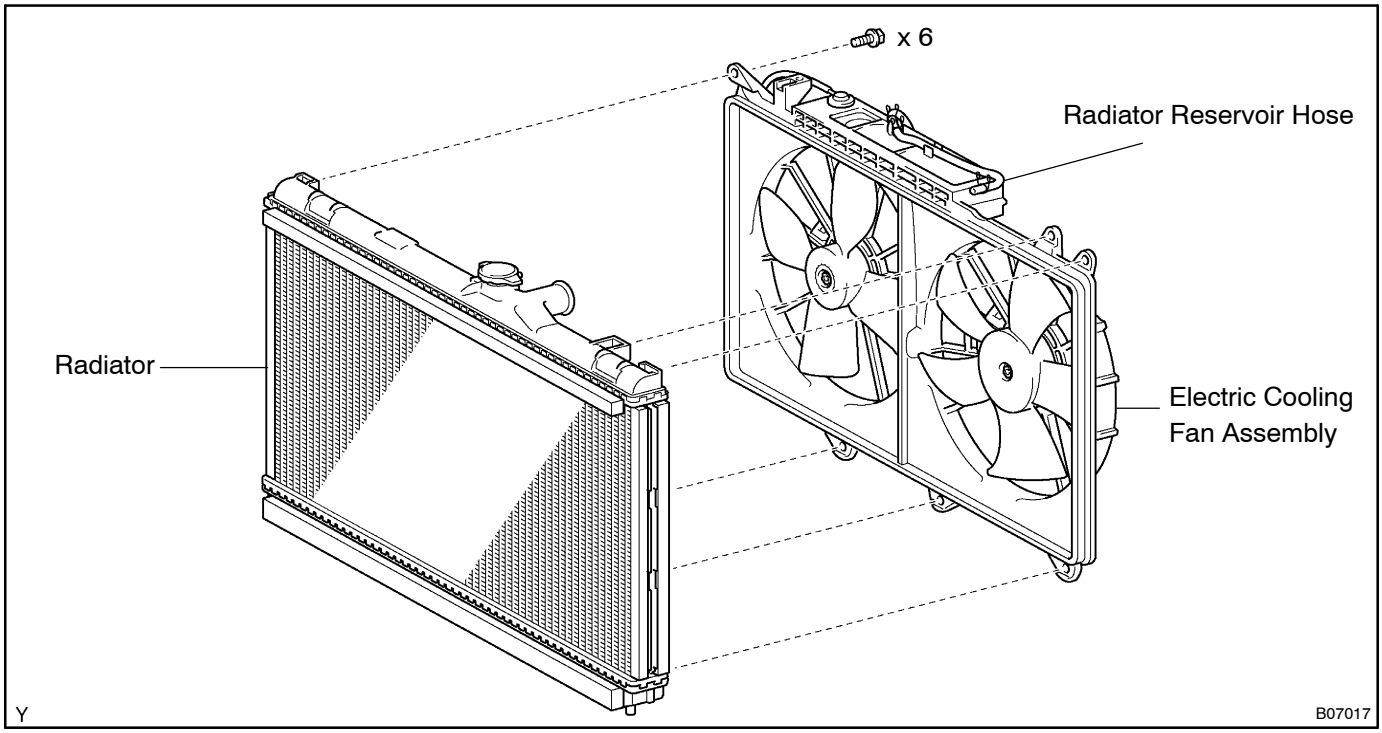
If the pressure drops, check the hoses, radiator or water pump for leak. If no external leak is found, check the heater core, cylinder block and head.

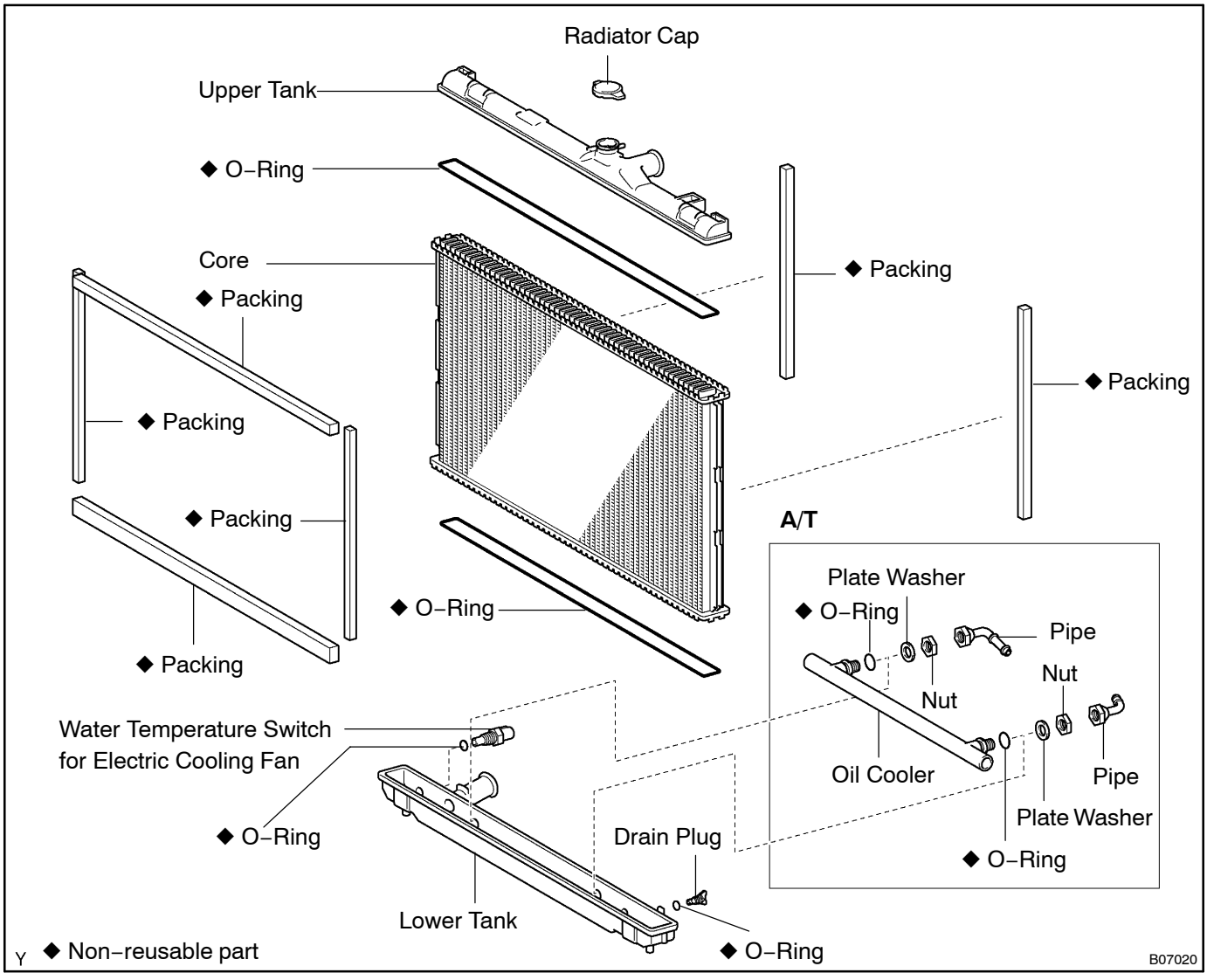
4. REINSTALL RADIATOR CAP

CO06I–04

COMPONENTS




x 6
Radiator Reservoir Hose
Radiator
Electric Cooling Fan Assembly
Y
B07017


Radiator Cap
Upper Tank
◆ O–Ring
Core
◆ Packing
◆ Packing
◆ Packing
◆ Packing
◆ Packing
◆ Packing
◆ Packing
◆ O–Ring
A/T
Plate Washer
◆ O–Ring
Pipe
Nut
Nut
Oil Cooler
Pipe
Plate Washer
◆ O–Ring
Water Temperature Switch for Electric Cooling Fan
◆ O–Ring
Drain Plug
Lower Tank
◆ O–Ring
Y ◆ Non–reusable part
B07020

CO0UF–01

REMOVAL

1. REMOVE NO.1 ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT

3. REMOVE AIR CLEANER INLET

4. REMOVE RADIATOR AND ELECTRIC COOLING FAN ASSEMBLY

(a) Disconnect the engine ECU outlet duct from the radiator.

(b) Disconnect the upper radiator hose from the radiator.

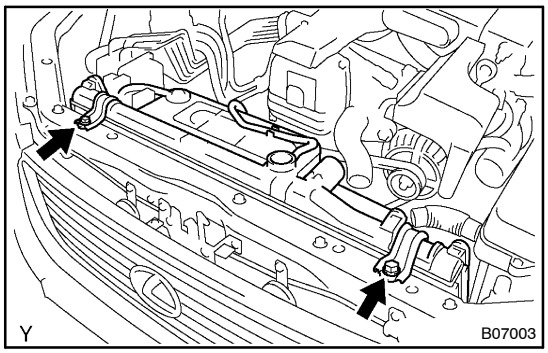
(c) Disconnect the lower radiator hose from the radiator.

(d) A/T:
Disconnect the 2 oil cooler hoses from the radiator.

(e) Disconnect the water temperature switch connector for the electric cooling fan.

(f) Disconnect the 2 electric cooling fan connectors.

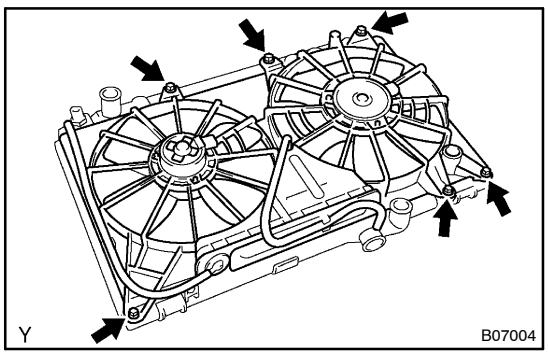
(g) Disconnect the wire for the electric cooling fan from the clamps on the electric cooling fan.



(h) Remove the 2 bolts and 2 upper radiator supports.

(i) Lift out the radiator and cooling fan assembly.

(j) Remove the 2 lower radiator supports.



5. REMOVE ELECTRIC COOLING FAN FROM RADIATOR

(a) Disconnect the radiator reservoir hose from the radiator.

(b) Remove the 6 bolts and electric cooling fan.

CO06K–04

DISASSEMBLY

1. REMOVE PACKINGS

2. REMOVE RADIATOR CAP

3. REMOVE DRAIN PLUG

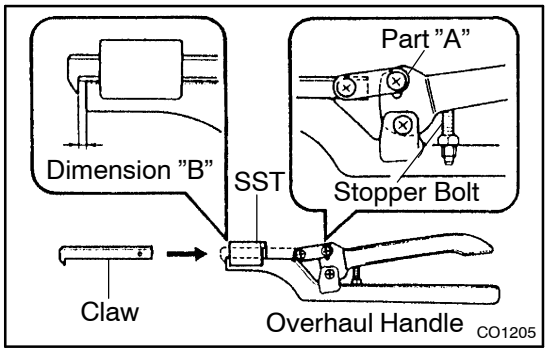
(a) Remove the drain plug.

(b) Remove the O–ring.

4. REMOVE WATER TEMPERATURE SWITCH

(a) Remove the water temperature switch.

(b) Remove the O–ring.



5. ASSEMBLE SST

SST 09230–01010

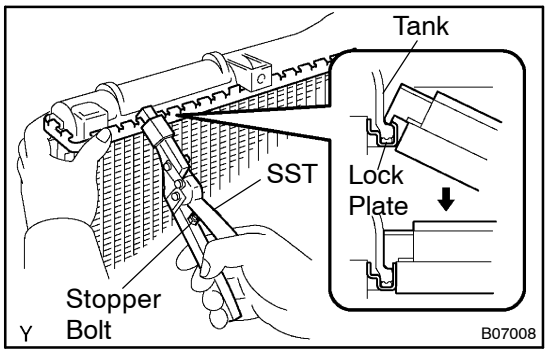
(a) Install the claw to the overhaul handle, inserting it in the hole in part "A" as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension "B" is as shown in the illustration.

Dimension B: 0.2 – 0.3 mm (0.008 – 0.012 in)

NOTICE:

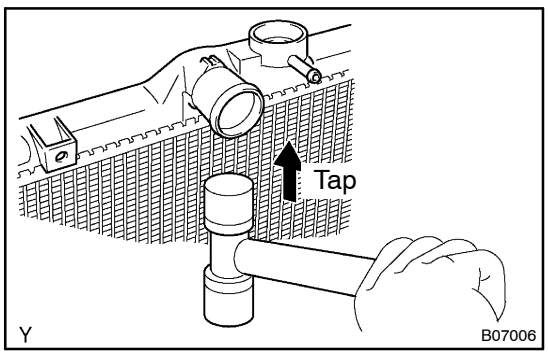
If this adjustment is not done the claw may be damaged.



6. UNCAULK LOCK PLATES

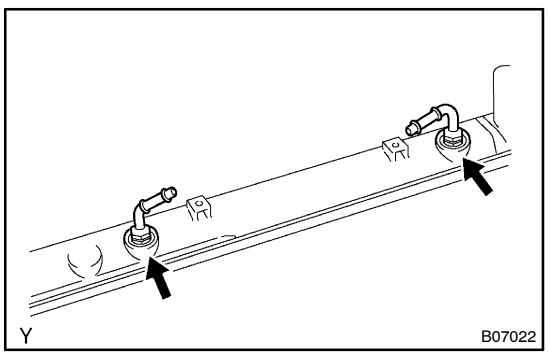
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230–01010



7. REMOVE TANKS AND O–RINGS

Lightly tap the bracket of the radiator (or radiator inlet or outlet) with a soft–faced hammer, and remove the tank and the O–ring.



8. A/T:

REMOVE OIL COOLER FROM LOWER TANK

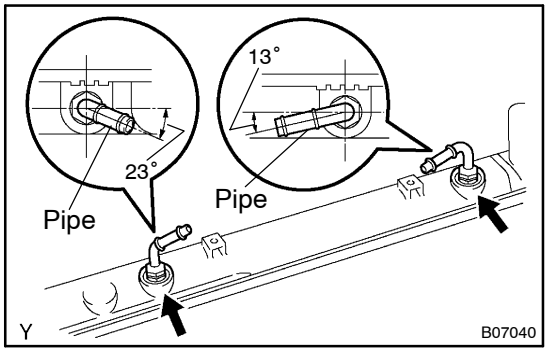
(a) Loosen the nut, and remove the cooler pipe. Remove the 2 cooler pipes.

(b) Remove the 2 nuts and 2 plate washers.

(c) Remove the oil cooler and 2 O–rings.

CO0UG–01

REASSEMBLY



1. A/T:

INSTALL OIL COOLER TO LOWER TANK

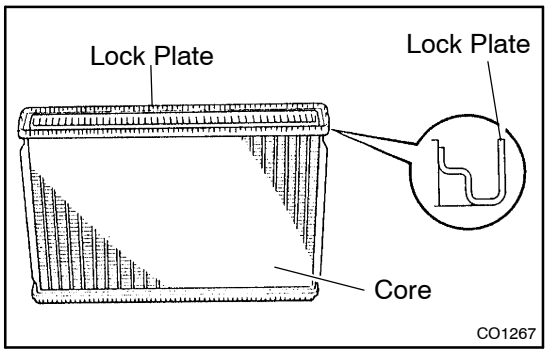
(a) Install 2 new O–rings to the oil cooler.

(b) Install the oil cooler to the lower tank with the 2 plate washers and nuts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

(c) Install the cooler pipes in the direction indicated in the illustration.

Torque: 14.7 N·m (150 kgf·cm, 11 ft·lbf)



2. INSPECT 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.

NOTICE:

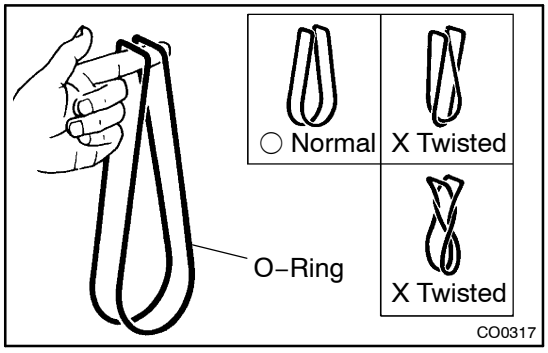
The radiator can only be recaulked 2 times. After the 2nd time, the radiator core must be replaced.

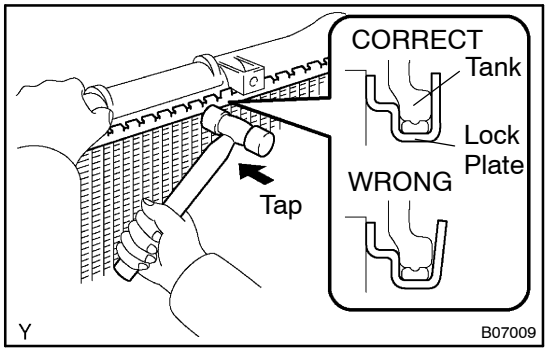
3. INSTALL NEW O–RINGS AND TANKS

(a) After checking that there are no foreign objects in the lock plate groove, install the new O–ring without twisting it.

HINT:

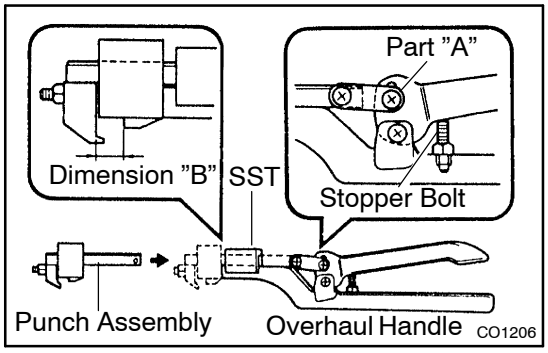
When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.





(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.



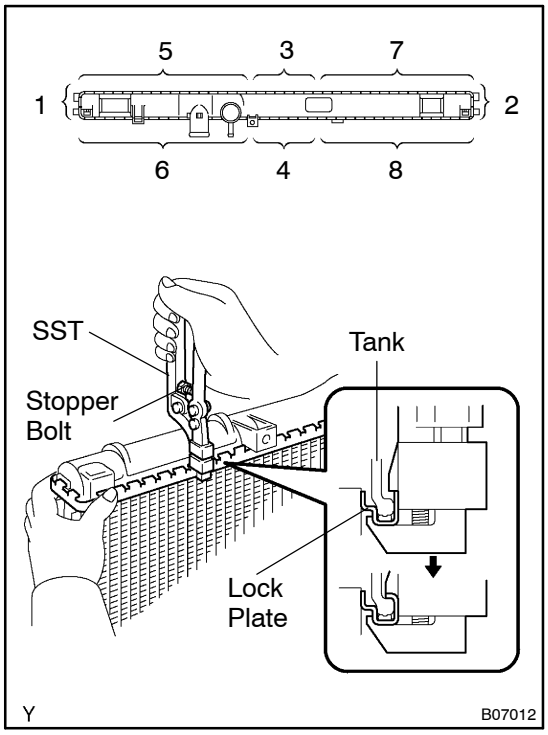
4. ASSEMBLE SST

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” is as shown in the illustration.

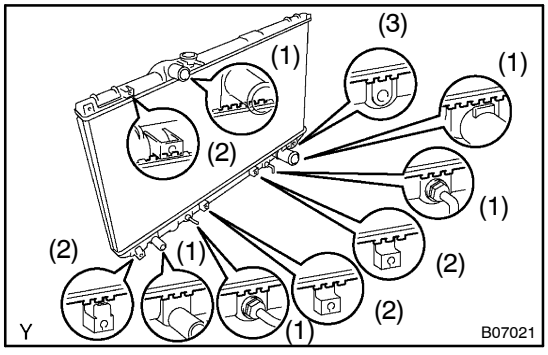
Dimension B: 8.4 mm (0.331 in.)



5. CAULK LOCK PLATE

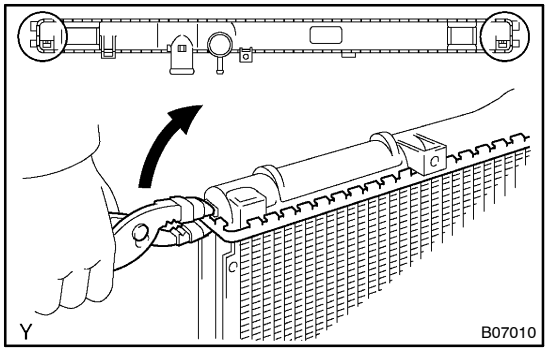
(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.

SST 09230–01010

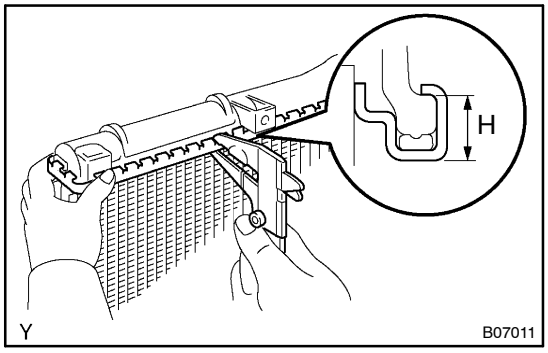


HINT:

- Do not stake the areas protruding around the pipes (1), brackets (2) and flange (3).



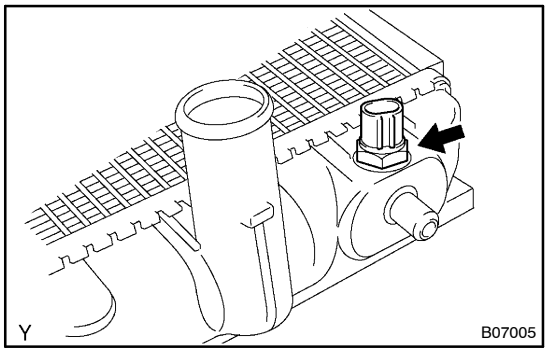
- The points shown in the illustration cannot be staked with the SST. Use pliers or similar object and be careful not to damage the core plates.



(b) Check the lock plate height (H) after completing the caulking.

Plate height (H): 7.40 – 7.80 mm (0.2913 – 0.3071 in.)

If not within the specified height, adjust the stopper bolt of the handle again and caulk again.



6. INSTALL WATER TEMPERATURE SWITCH

(a) Install a new O–ring to the water temperature switch.

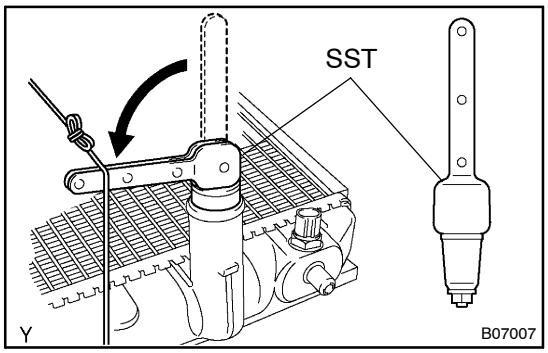
(b) Install the water temperature switch.

7. INSTALL DRAIN PLUG

(a) Install a new O–ring to the drain plug.

(b) Install the drain plug.

8. INSTALL RADIATOR CAP

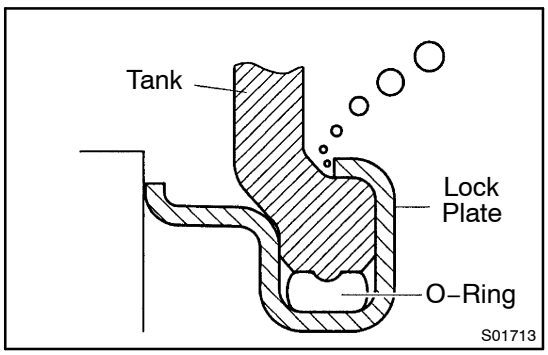


9. INSPECT FOR WATER LEAK

(a) Plug the inlet and outlet pipes of the radiator with SST.
SST 09230–01010

(b) Using a radiator cap tester, apply pressure to the radiator.
Test pressure: 177 kPa (1.8 kgf/cm^2, 26 psi)

(c) Submerge the radiator in water.



(d) Inspect for leak.

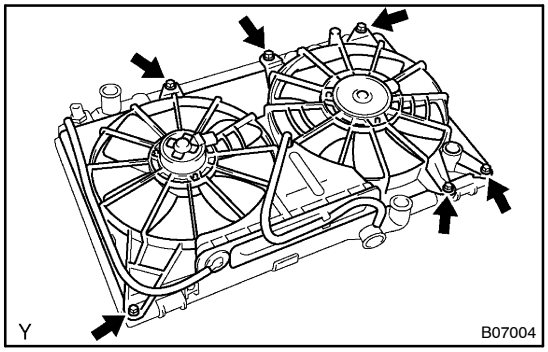
HINT:

On radiators with resin tanks, there is a clearance between the tank and lock plate where a minute amount of air will remain, giving the appearance of an air leak when the radiator is submerged in water. Therefore, before doing the water leak test, first swish the radiator around in the water until all air bubbles disappear.

10. INSTALL NEW PACKINGS

CO0UH–01

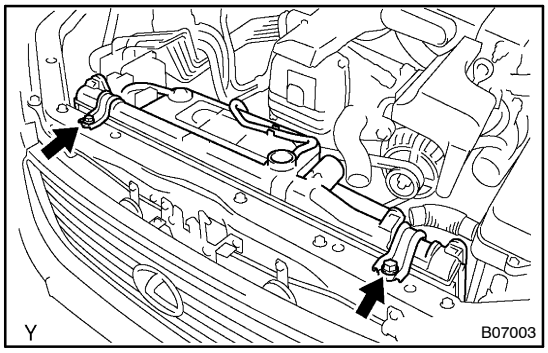
INSTALLATION



1. INSTALL ELECTRIC COOLING FAN TO RADIATOR

(a) Install the electric cooling fan with the 6 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

(b) Connect the radiator reservoir hose to the radiator.



2. INSTALL RADIATOR AND ELECTRIC COOLING FAN ASSEMBLY

(a) Install the 2 lower radiator supports to the radiator.

(b) Attach the 2 lower radiator supports on the radiator to the body bracket.

(c) Install the radiator and electric cooling fan assembly with the 2 upper radiator supports and 2 bolts.
Torque: 15.2 N·m (155 kgf·cm, 11 ft·lbf)

(d) Connect the wire for the electric cooling fan to clamps on the electric cooling fan.

(e) Connect the 2 electric cooling fan connectors.

(f) Connect the water temperature switch connector for the electric cooling fan.

(g) A/T:
Connect the 2 oil cooler hoses to the radiator.

(h) Connect the lower radiator hose to the radiator.

(i) Connect the upper radiator hose to the radiator.

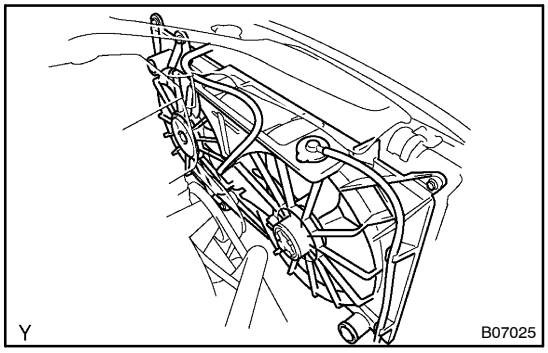
(j) Connect the engine ECU outlet duct to the radiator.

3. INSTALL AIR CLEANER INLET

4. FILL WITH ENGINE COOLANT (See page CO–2)

5. START ENGINE AND CHECK FOR ENGINE COOLANT AND A/T FLUID LEAKS

6. INSTALL NO.1 ENGINE UNDER COVER



ELECTRIC COOLING FAN

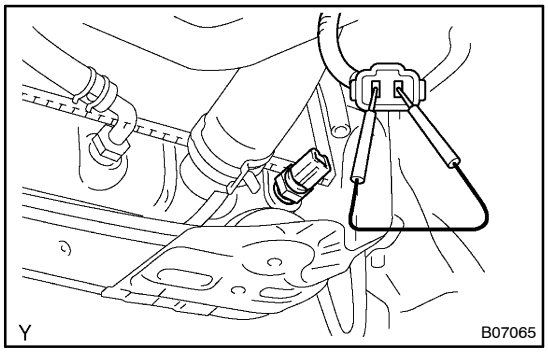
CO0AD–04

ON–VEHICLE INSPECTION

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83˚C (181˚F))

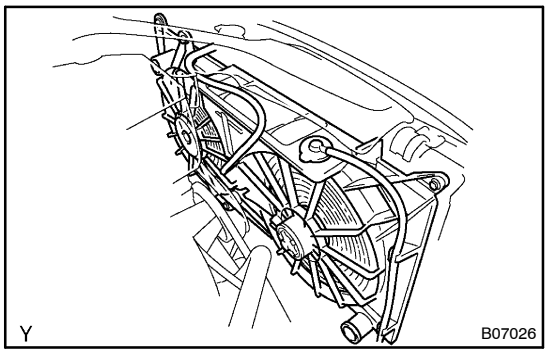
(a) Turn the ignition switch ON.

(b) Check that the cooling fan stops.



(c) Disconnect the water temperature switch connector.

(d) Connect the terminals on the water temperature switch connector.



(e) Check that the cooling fan rotates.

If not, check the fuse, cooling fan relay, cooling fan, and check for a open circuit between the cooling fan relay and water temperature switch.

(f) Reconnect the water temperature switch connector.

2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 93˚C (199˚F))

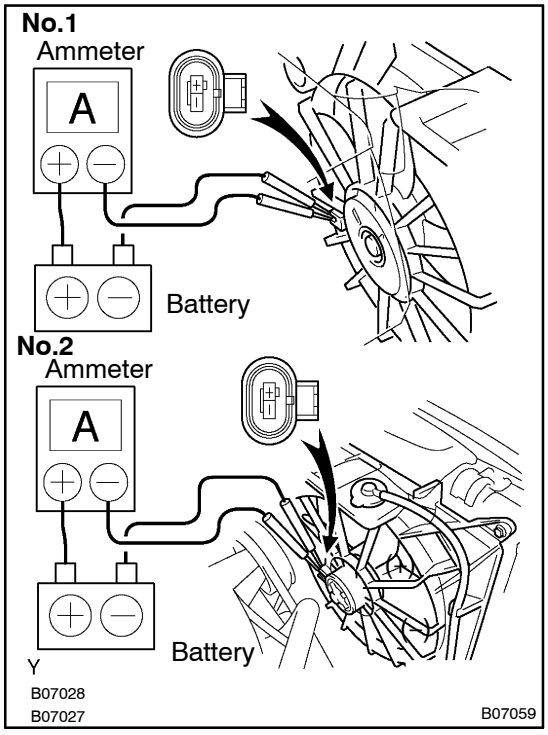
(a) Start the engine, and raise coolant temperature to above 93˚C (199˚F).

HINT:

Coolant temperature is the detected value by the water temperature switch on the radiator lower tank.

(b) Check that the cooling fan rotates.

If not, replace the water temperature switch.



3. INSPECT COOLING FANS

(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.

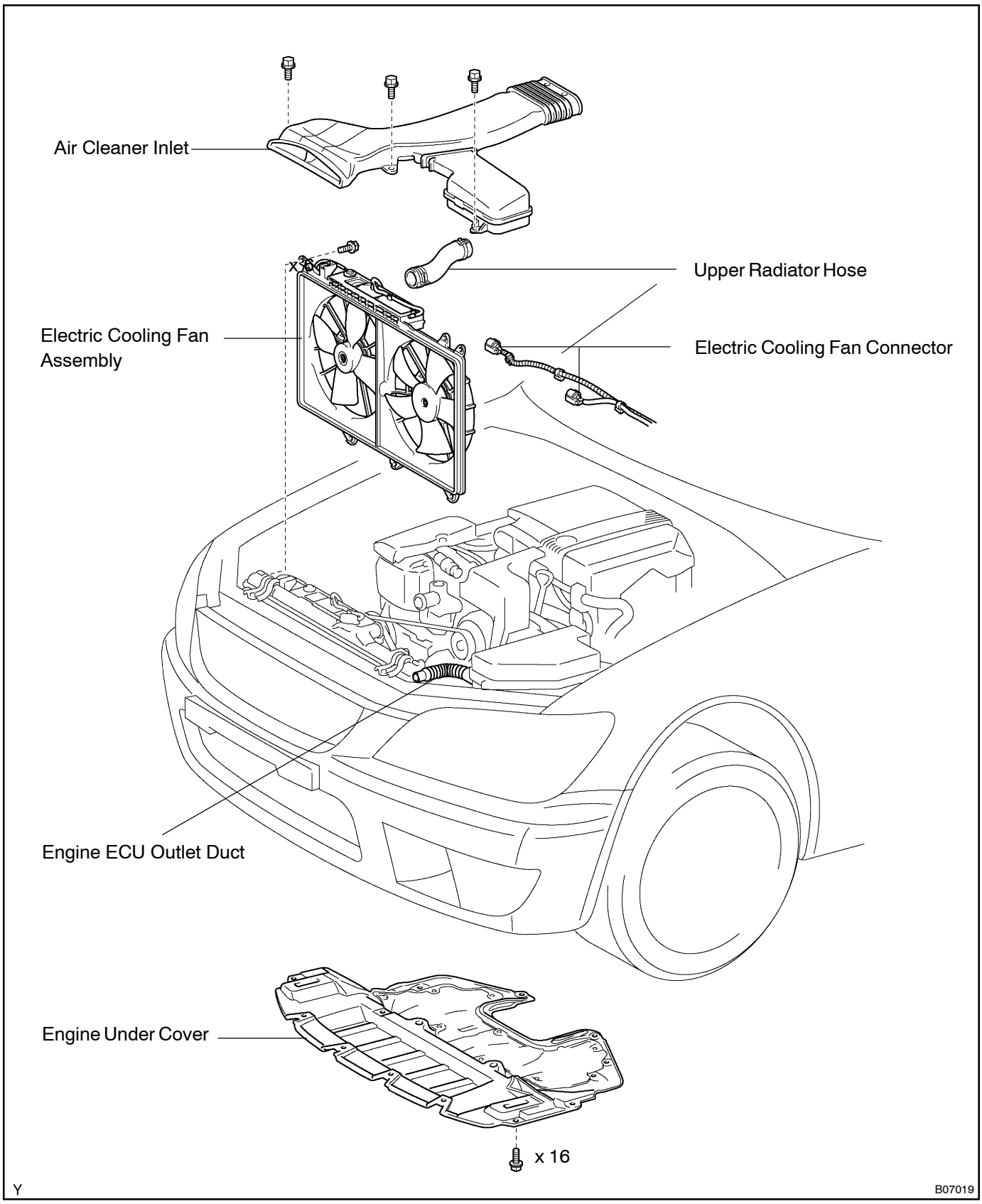
Standard amperage:

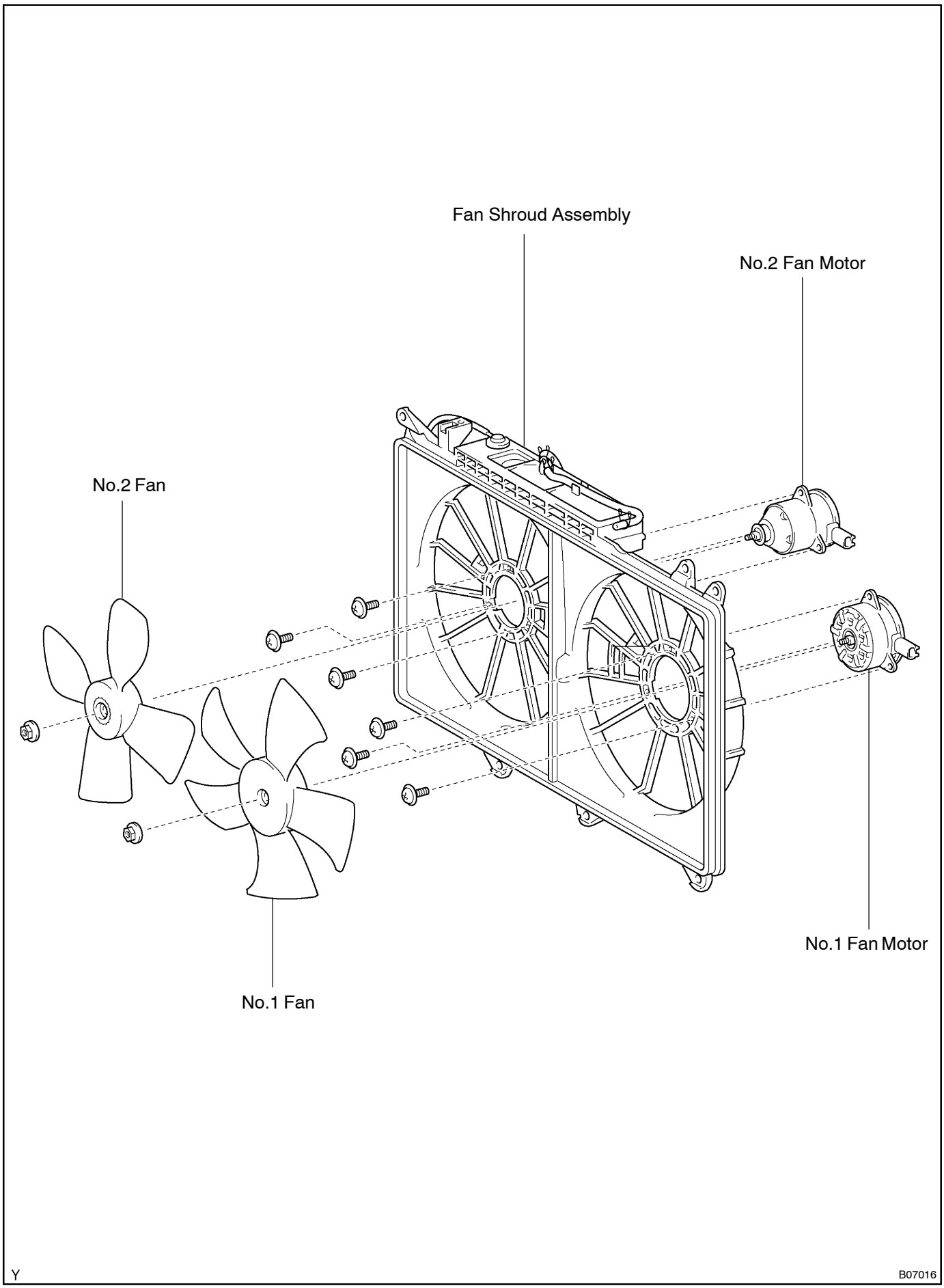
No.1	At 20°C (68°F)	7.8 – 11.8 A
No.2	At 20°C (68°F)	5.1 – 8.1 A

(d) Reconnect the cooling fan connector.

CO0AE–03

COMPONENTS




Fan Shroud Assembly
No.2 Fan Motor
No.2 Fan
No.1 Fan Motor
No.1 Fan
Y
B07016

CO0AF–04

REMOVAL

1. REMOVE NO.1 ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT

3. REMOVE AIR CLEANER INLET

4. REMOVE ELECTRIC COOLING FAN

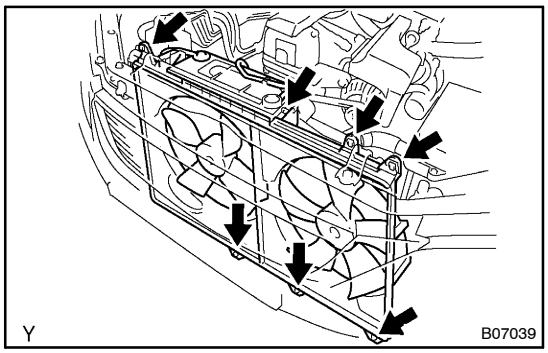
(a) Remove the upper radiator hose.

(b) Disconnect the engine ECU outlet duct from the fan shroud.

(c) Disconnect the 2 electric cooling fan connector.

(d) Disconnect the wire for the electric cooling fan from the clamps on the electric cooling fan.

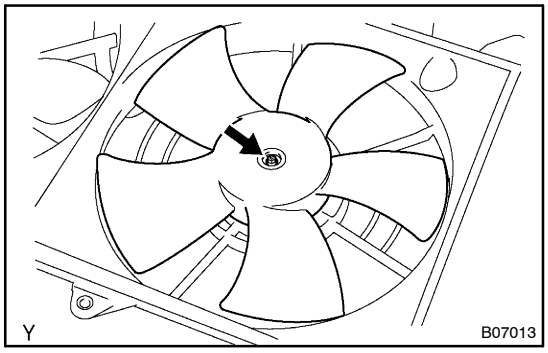
(e) Disconnect the radiator reservoir hose from the radiator.



(f) Remove the 6 bolts and electric cooling fan.

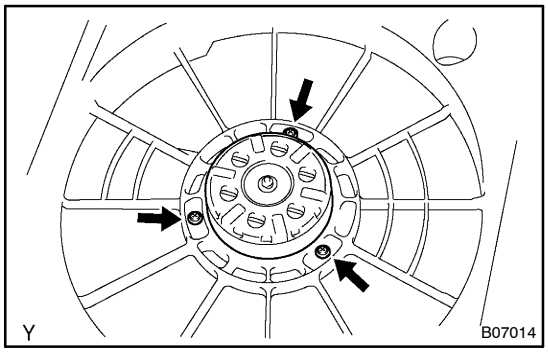
CO0AG–03

DISASSEMBLY



1. REMOVE FANS

Remove the nut and fan. Remove the 2 fans.

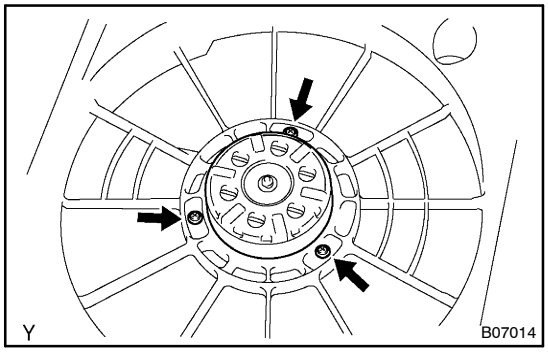


2. REMOVE FAN MOTORS

Remove the 3 screws and fan motor. Remove the 2 fan motors.

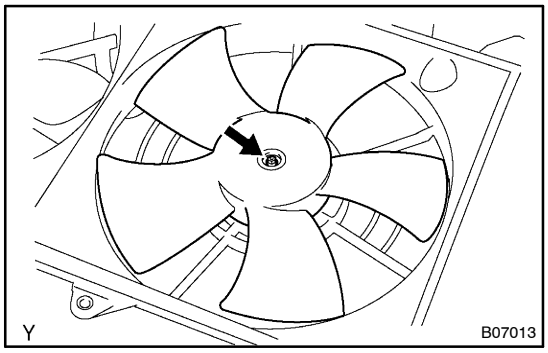
CO0UI–01

REASSEMBLY



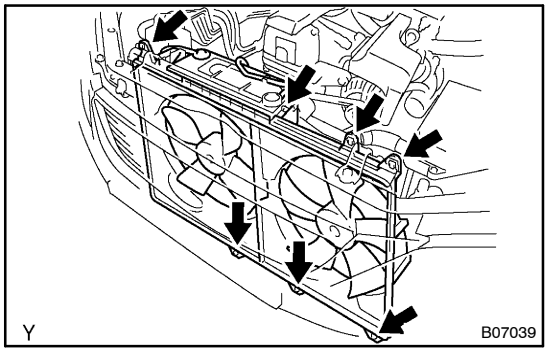
1. INSTALL FAN MOTORS

Install the fan motor with the 3 screws. Install the 2 fan motors.



2. INSTALL FANS

Install the fan with the nut. Install the 2 fans.



CO0AI–04

INSTALLATION

1. INSTALL ELECTRIC COOLING FAN

(a) Install the electric cooling fan with the 6 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

(b) Connect the radiator reservoir hose to the radiator.

(c) Connect the wire for the electric cooling fan to the clamps on the electric cooling fan.

(d) Connect the 2 electric cooling fan connectors.

(e) Connect the engine ECU outlet duct to the fan shroud.

(f) Connect the upper radiator hose to the radiator.

2. INSTALL AIR CLEANER INLET

3. FILL WITH ENGINE COOLANT

4. INSTALL NO.1 ENGINE UNDER COVER

5. START ENGINE AND CHECK FOR COOLANT LEAK

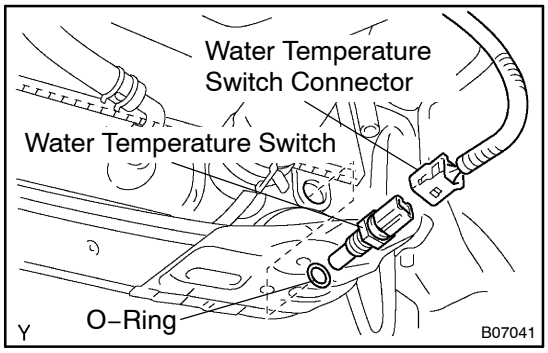
WATER TEMPERATURE SWITCH

CO0AJ–03

INSPECTION

1. REMOVE NO.1 ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT

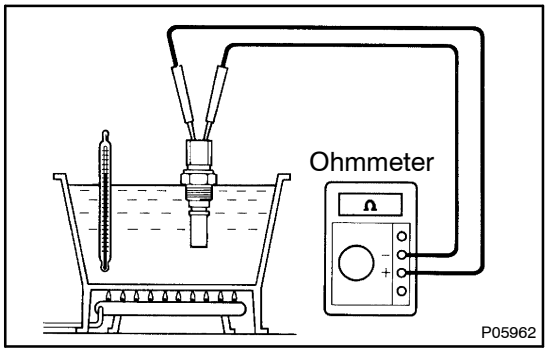


3. REMOVE WATER TEMPERATURE SWITCH

(a) Disconnect the connector.

(b) Remove the water temperature switch.

(c) Remove the O–ring from the water temperature switch.



4. INSPECT WATER TEMPERATURE SWITCH

(a) Using an ohmmeter, check that there is continuity between the terminals when the coolant temperature is above 93°C (199°F).

If there is no continuity, replace the switch.

(b) Using an ohmmeter, check that there is no continuity between the terminals when the coolant temperature is below 83°C (181°F).

If there is continuity, replace the switch.

5. REINSTALL WATER TEMPERATURE SWITCH

(a) Install a new O–ring to the water temperature switch.

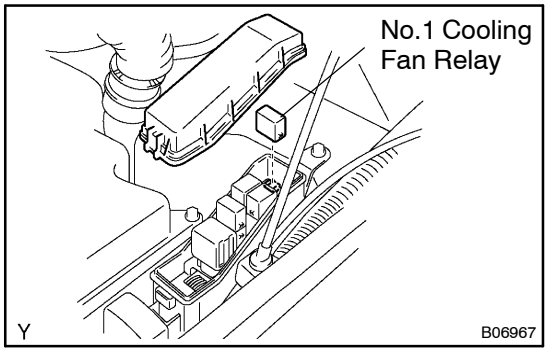
(b) Install the water temperature switch.

(c) Connect the connector.

6. REINSTALL NO.1 ENGINE UNDER COVER

7. REFILL WITH ENGINE COOLANT

8. START ENGINE AND CHECK FOR COOLANT LEAK



COOLING FAN RELAY

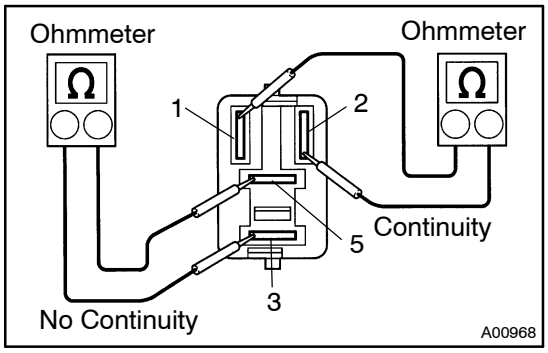
CO0BB–02

INSPECTION

1. INSPECT NO.1 COOLING FAN RELAY

(a) Remove the relay box cover.

(b) Remove the No.1 cooling fan relay. (Marking: FAN NO.1)



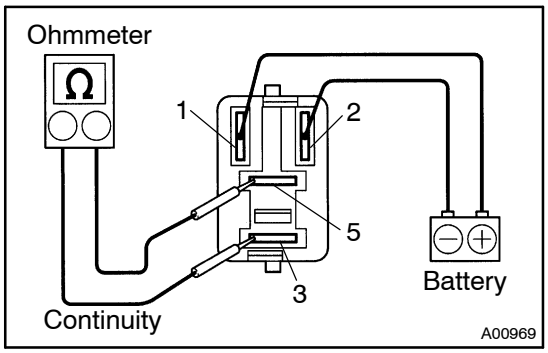
(c) Inspect the No.1 cooling fan relay continuity.

(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.



(d) Inspect the No.1 cooling fan relay operation.

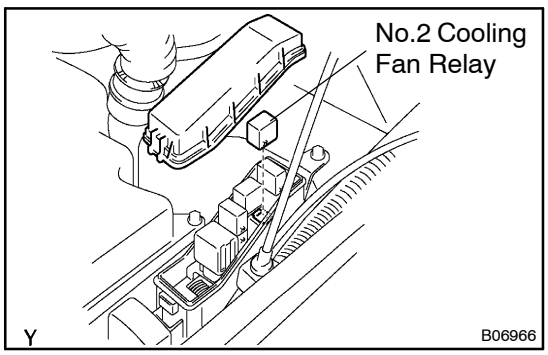
(1) Apply battery positive voltage to terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is continuity, replace the relay.

(e) Reinstall the No.1 cooling fan relay.

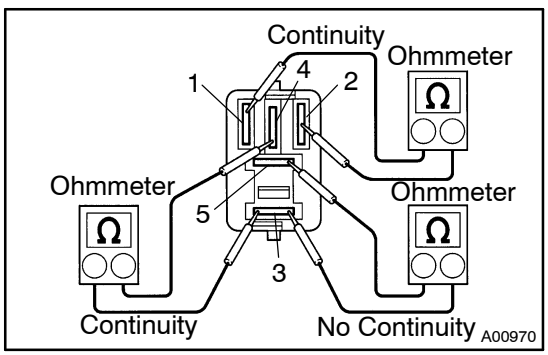
(f) Reinstall the relay box cover.



2. INSPECT NO.2 COOLING FAN RELAY

(a) Remove the relay box cover.

(b) Remove the No.2 cooling fan relay. (Marking: FAN NO.2)



(c) Inspect the No.2 cooling fan relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

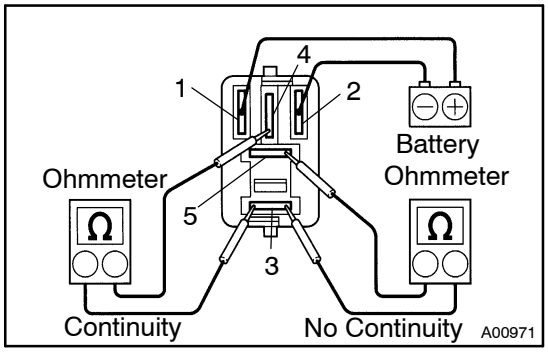
If there is no continuity, replace the relay.

(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.



(d) Inspect the No.2 cooling fan relay operation.
  (1) Apply battery positive voltage to 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.

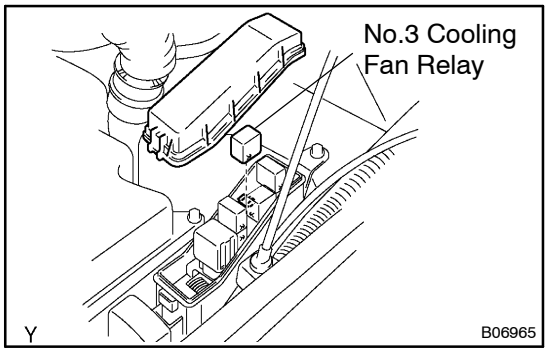
  (3) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

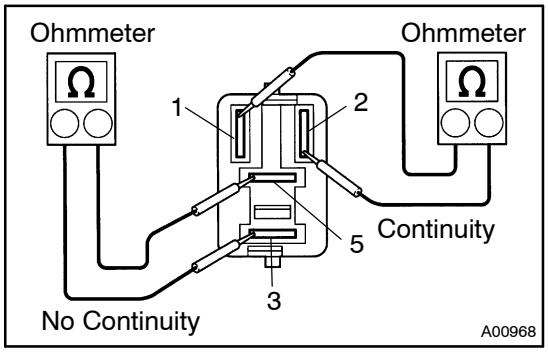
If there is no continuity, replace the relay.

(e) Reinstall the No.2 cooling fan relay.
(f) Reinstall the relay box cover.

3. INSPECT NO.3 COOLING FAN RELAY

(a) Remove the relay box cover.
(b) Remove the No.3 cooling fan relay. (Marking: FAN NO.3)



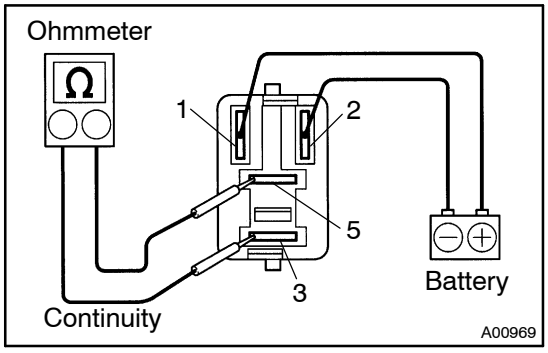


(c) Inspect the No.3 cooling fan relay continuity.
  (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

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.



(d) Inspect the No.3 cooling fan relay operation.
  (1) Apply battery positive voltage to 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.

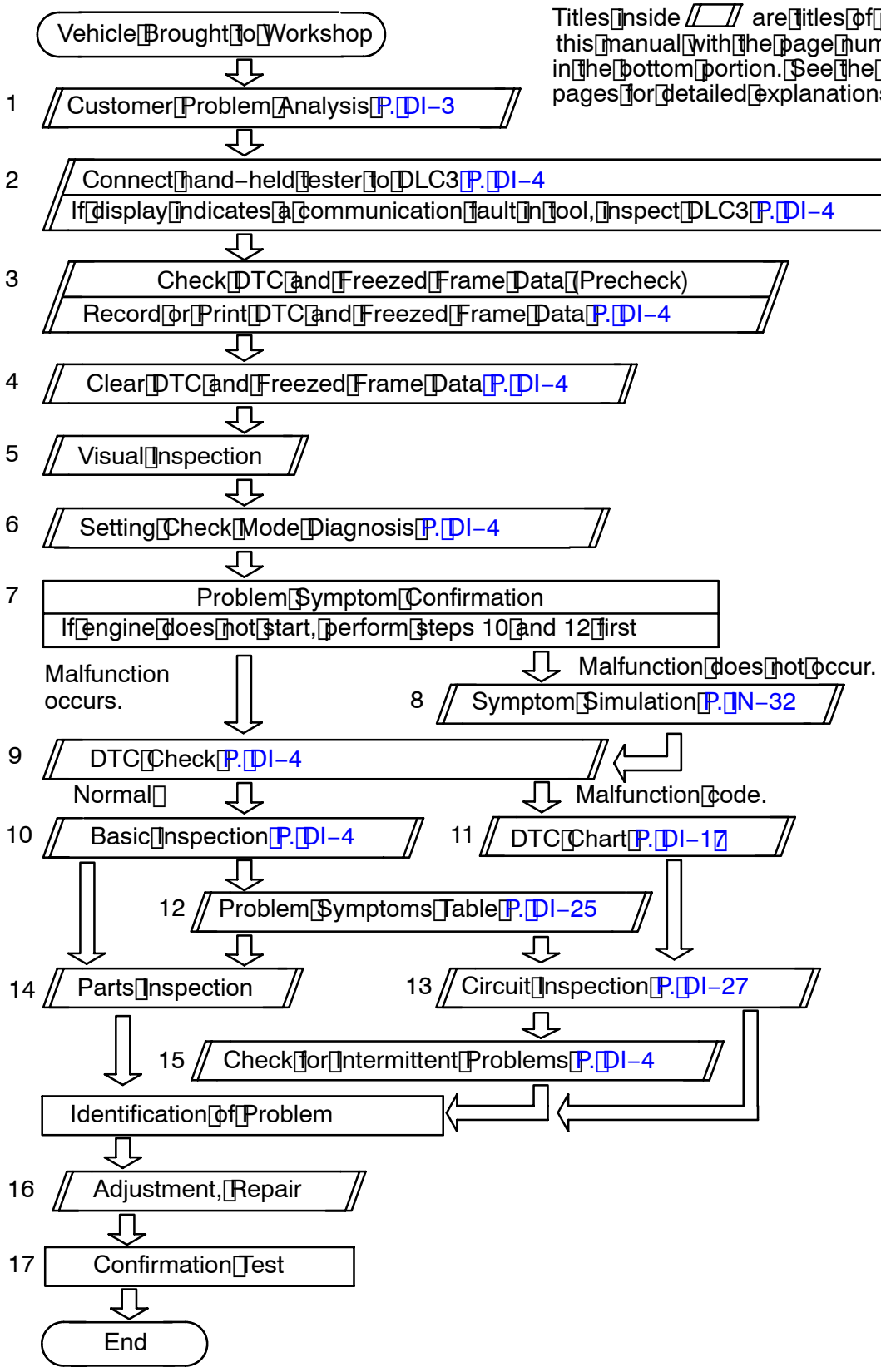
(e) Reinstall the No.3 cooling fan relay.
(f) Reinstall the relay box cover.

ENGINE

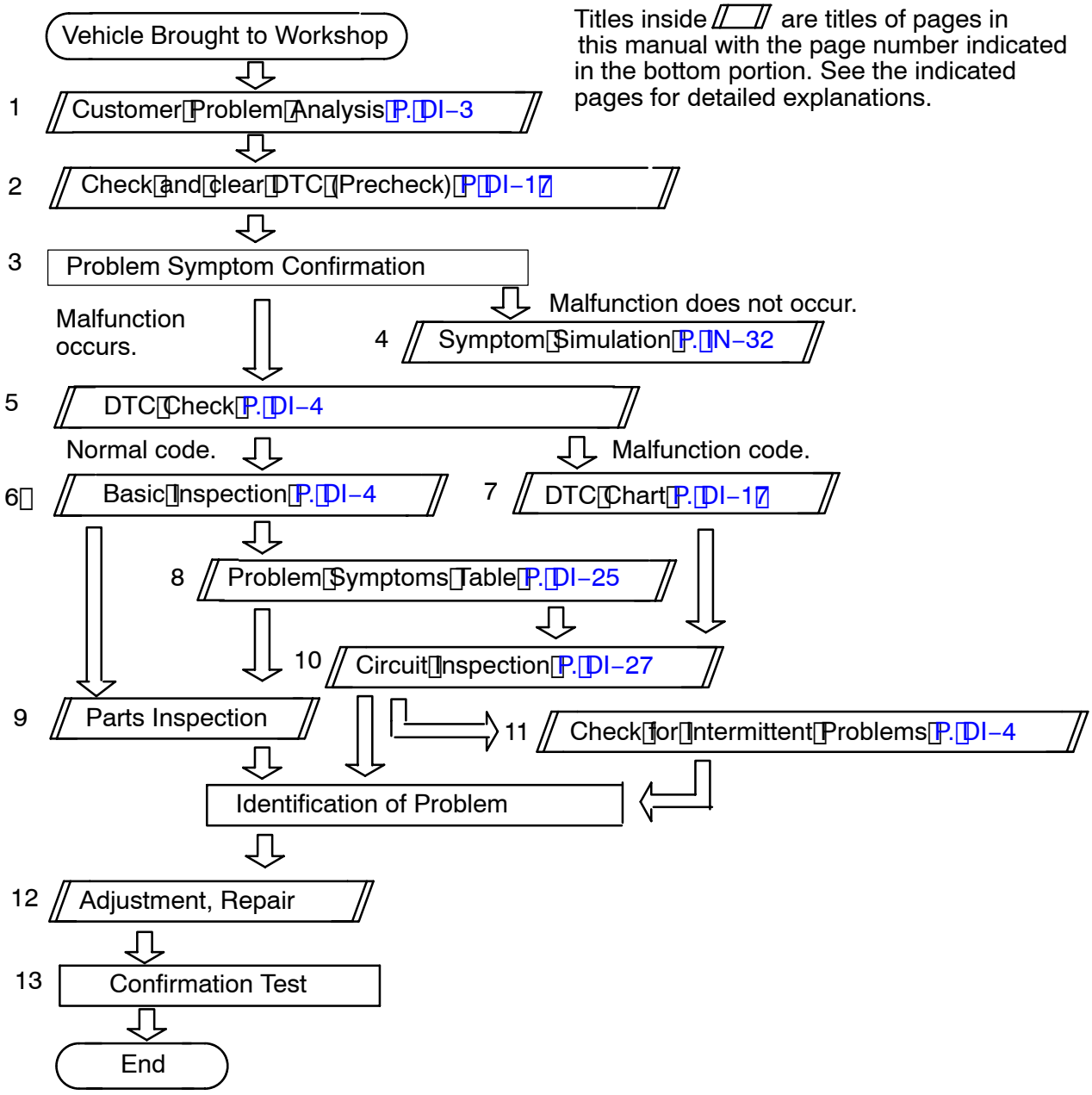
DI63H–01

HOW TO PROCEED WITH TROUBLESHOOTING

When using hand–held tester, troubleshoot in accordance with the procedure on the following page.



When not using hand–held tester, troubleshoot in accordance with the procedure on the following page.



DI63I–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

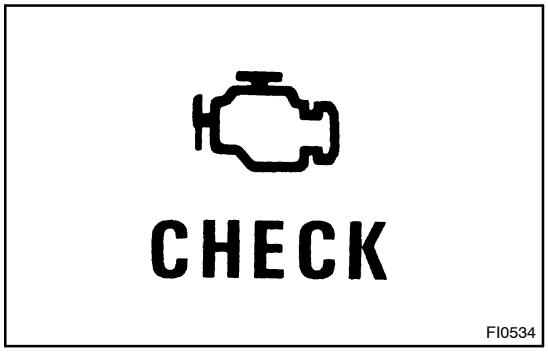
Problem Symptoms	☐ Engine does not Start	☐ Engine does not crank ☐ No initial combustion ☐ No complete combustion
	☐ Difficult to Start	☐ Engine cranks slowly ☐ Other _____
	☐ Poor Idling	☐ Incorrect first idle ☐ Idling rpm is abnormal ☐ High (rpm) ☐ Low (rpm) ☐ Rough idling ☐ Other _____
	☐ Poor Driveability	☐ 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 _____

DTC Inspection	Normal Mode (Precheck)	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )
	Check (Test) Mode	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )

DI63J–01

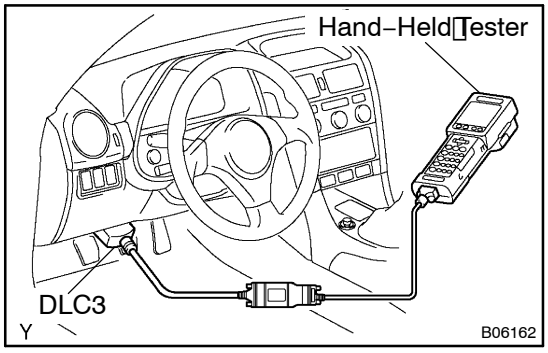
PRE–CHECK



1. DIAGNOSIS SYSTEM

(a) Description for EURO–OBD (European spec.) (Include Taiwan))

- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's engine ECU.
  Euro–OBD regulations require that the vehicle's on–board computer lights up the check engine warning ignition on the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031–6 are recorded in the engine ECU memory (See page DI–17). If the malfunction does not repaired in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the engine ECU memory.



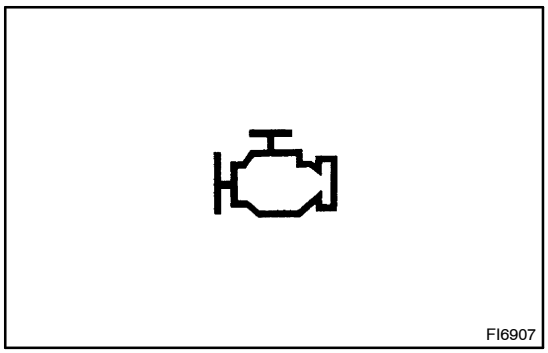
- To check the DTCs, connect the OBD scan tool or hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the OBD scan tool's instruction book.)
  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page DI–17)
- 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 DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting,

the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2)

- *2 trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this second detection causes the (CHK ENG) to light up. (2nd trip)
  (However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.)
- Freeze frame data:
  Freeze frame data records the engine condition when a misfire (DTCs P0300 – P0306) or fuel trim malfunction (DTCs P0171 and P0172) or other malfunction (first malfunction only), is detected.
  Because freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting, it is useful to determine whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- Priorities for troubleshooting.

If troubleshooting priorities for multiple DTCs are given in the applicable DTC chart, these should be followed.
If no instructions are given, troubleshoot DTCs according to the following priorities.

(1) DTCs other than fuel trim malfunction (DTCs P0171 and P0172) and misfire (DTCs P0300 – P0306).
(2) Fuel trim malfunction (DTCs P0171 and P0172).
(3) Misfire (DTCs P0300 – P0306).

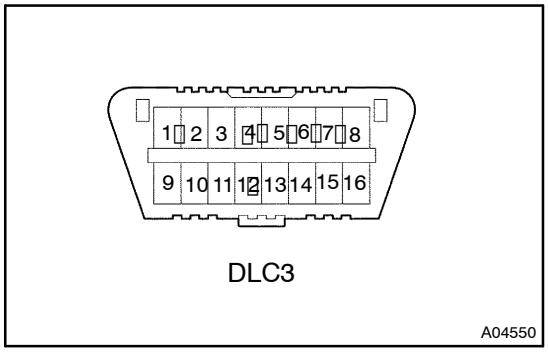

FI6907

(b) Description for M–OBD (Except European spec.)

- When troubleshooting Multiplex OBD (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the vehicle to the hand–held tester, and read off various data output from the vehicle's engine ECU.
- The vehicle's on–board computer indicates the check engine light (CHK ENG) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components.

In addition to an indication of the CHK ENG when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) recorded in the engine ECU memory (See page DI–17). When the malfunction does not reoccur, the CHK ENG is indicated until the ignition switch is turned off, and then the CHK ENG is not indicated when the ignition switch is turned on but the DTCs remain recorded in the engine ECU memory.

- To check the DTCs, connect the hand–held tester to Data Link Connector 3 (DLC3) on the vehicle or read the DTC which is indicated on the multi information display when TC and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the instruction book.)
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check (test) mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the CHK ENG on the light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2)
- * 2 trip detection logic
  When a logic malfunction is fist detected, the malfunction is temporally stored in the engine ECU memory. If the same malfunction is detected again during the second drive test, this second detection cases the CHK ENG to light up.
  The 2 trip repeats the same mode for 2 times. (However, the ignition switch must be turned OFF between the 1st trip and 2nd trip)
- Freeze frame data:
  Freeze frame data records the engine condition when malfunction is detected.
  Because freeze frame data records the engine conditions (fuel system, calculator load, water 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 was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.



(c) Check the DLC3.
The vehicle's engine ECU uses the ISO 9141–2 (Euro–OBD)/ISO 14230 (M–OBD) communication protocol. The terminal arrangement of DLC3 complies with ISO 15031–3 and matches the ISO 9141–2/ISO 14230 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus ⊕ Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
16	Battery Positive ↔ Body Ground/9 – 14 V	Always

HINT:
Only for Euro–OBD:
If your display shows UNABLE TO CONNECT TO VEHICLE when you have connected the cable of the OBD scan tool or hand–held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.
If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
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)

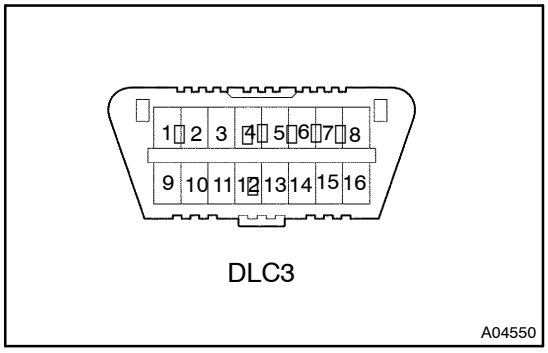
(a) Check the DTC using hand–held tester.

NOTICE:

Hand–held tester only:

When the diagnosis system is switched from normal mode to check mode, it erases all DTCs and freezed frame data recorded in normal mode. So before switching modes, always check the DTCs and freezed frame data, and note them down.

(1) Prepare the hand–held tester.
(2) Connect the hand–held tester to DLC3.
(3) Turn the ignition switch ON and push the hand–held tester main switch ON.
(4) Use the hand–held tester to check the DTCs and freezed frame data, note them down. (For operating instructions, see the hand–held tester instruction book.)
(5) See page DI–17 to confirm the details of the DTCs.

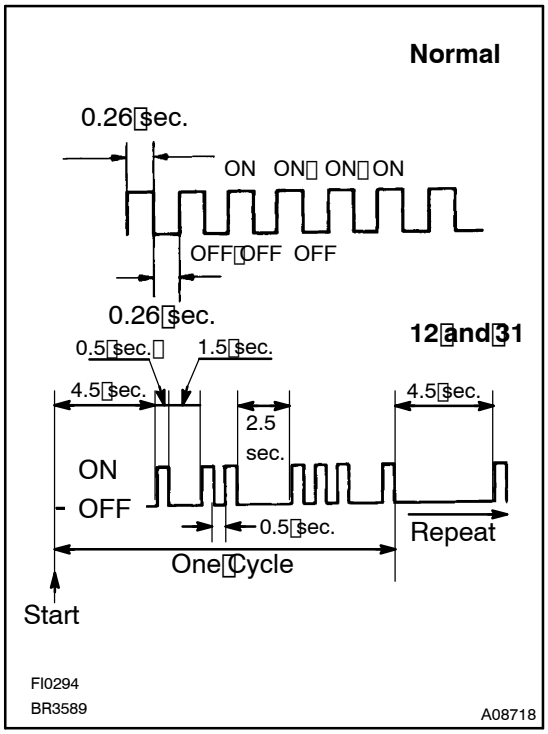


(b) Check the DTC when not using hand–held tester.

(1) Turn the ignition switch ON.

(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of the DLC3.

SST 09843–18040



(3) Read the DTC from the check engine warning light (CHK ENG).

As an example, the blinking patterns for codes, normal, 12 and 31 are as shown in the illustration.

(4) Check the details of the malfunction using the DTC chart on page.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.

HINT:

In the event of 2 or more malfunction codes, the indication will begin from the smaller numbered cord and continue in order to the larger.

(6) Push the function key of the steering switch until EFI will be displayed on the instrument panel.

(7) Read the DTC on the instrument panel.

HINT:

- If a DTC is not indicated, check the TC terminal circuit (See page DI–23).
- If a code No.89 is indicated, read the number of blinks of the ECT SNOW indication to get the DTC for the electric throttle control system (ETCS).

NOTICE:

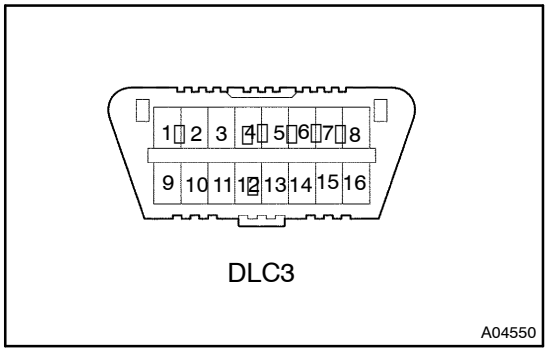
- **When simulating symptoms with out a hand–held tester to check the DTCs, use normal mode. For code on the DTC chart subject to ”2 trip detection logic”, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again. When the problem has been simulated twice, the CHECK ENG is indicated on the instrument panel and the DTCs are recorded in the engine ECU.**
- **Check the 1st trip DTC using Mode 7 for ISO 15031 (Continuous Test Results of Euro–OBD function in hand–held tester).**

(c) Check the DTC for ETCS

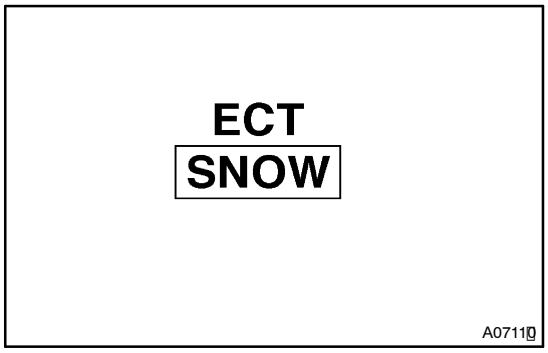
(1) Turn the ignition switch ON.

HINT:

If the ECT SNOW indicator does not light up, troubleshoot the combination meter (See page BE–75).



(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843–18040

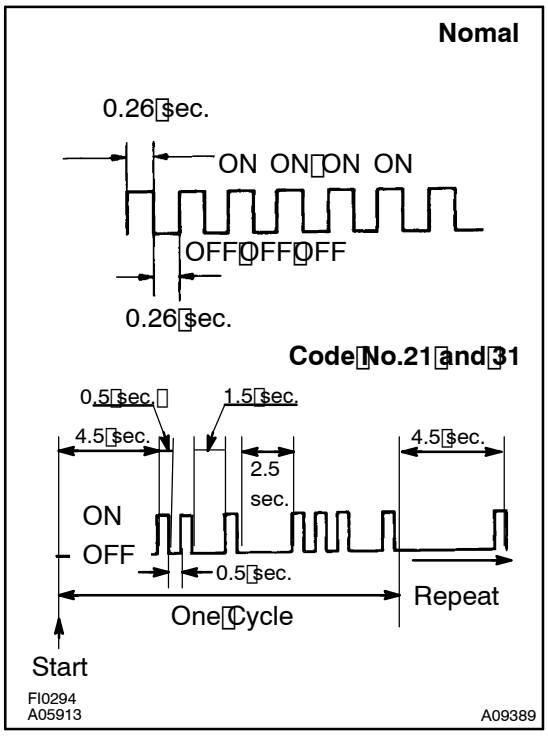


(3) Read the DTC from the ECT snow indicator the combination meter.

HINT:
If a DTC is not output, check the TC terminal circuit (See page DI–23).

(4) Check details of the malfunction using the DTC chart on page DI–17.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.



HINT:
In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the lager.

(d) Clear the DTC.
The DTCs and freezed frame data will be erased by either actions.

(1) Operating the hand–held tester to erase the codes. (See the hand–held tester's instruction book for operating instructions.)

(2) Disconnecting the battery terminals of EFI and ECTS fuses.

NOTICE:
If the hand–held tester switches the engine ECU 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 DTCs and freezed frame data will be erased.

3. INSPECT DIAGNOSIS (Check (Test) Mode)

HINT:
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 (test) mode.

(a) Check the DTC.

(1) Initial conditions

- Battery voltage 11 V or more
- Throttle valve fully closed.
- Transmission in P or N position
- A/C switched OFF

(2) Turn the ignition switch OFF.
(3) Prepare the hand–held tester.
(4) Connect the hand–held tester to the DLC3.
(5) Turn the ignition switch ON and push the hand–held tester main switch ON.
(6) Switch the hand–held tester from the normal mode to the check (test) mode.

NOTICE:
If the hand–held tester switches the engine ECU 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 DTCs and freezed frame data will be erased.

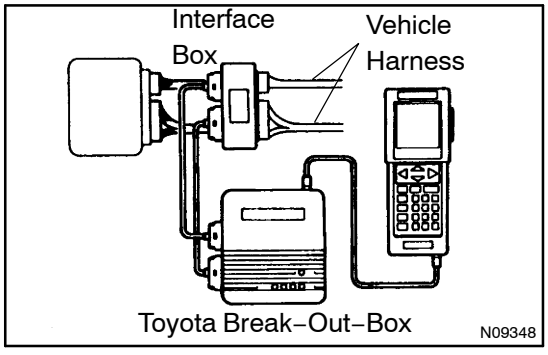
(7) Start the engine.
(8) Simulate the conditions of the malfunction described by the customer.

NOTICE:
Leave the ignition switch ON until you have checked the DTCs, etc.

(9) After simulating the malfunction conditions, use the hand–held tester diagnosis selector to check the DTCs 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 (test) mode to normal mode. so all DTCs, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.



(b) Engine ECU Terminal Values Measurement Using Break–Out–Box and Hand–Held Tester
(1) Hook up the break–out–box and hand–held tester to the vehicle.
(2) Read the engine ECU input/output values by following the prompts on the tester screen.

HINT:
- 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 hand–held tester/break–out–box operator’s manual for further details.

4. FAIL–SAFE CHART

If any of the following codes is recorded, the engine ECU enters fail–safe mode.

DTC No.	Fail–Safe Operation	Fail–Safe Deactivation Conditions
P0100/31	Ignition timing fixed at 5˚ BTDC	Returned to normal condition
P0110/24	Intake air temperature is fixed at 20˚C (68˚F)	Returned to normal condition
P0115/22	Water temperature is fixed at 80˚C (176˚F)	Returned to normal condition

P0120/41	VTA is fixed at 0°	The following condition must be repeated at least 2 times consecutively when closed throttle position switch is OFF: VTA ≧ 0.1 V and ≦ 0.95 V
P0135/21 P0141/21 P0155/28 P0161/28	The heater circuit in which an abnormality is detected is turned off	Ignition switch OFF
P0325/52 P0330/53	Max. timing retardation	Ignition switch OFF
P1300/14 P1305/15 P1310/14 P1315/14 P1320/14 P1325/14 P1330/14 P1340/14	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HINT:

Hand–held tester only:

By putting the vehicle's engine ECU in the check (test) 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 DTCs (See step 2).

(b) Set the check (Test) mode (See step 3).

(c) Perform a simulation test (See page IN–22).

(d) Check the connector and terminal (See page IN–32).

(e) Handle the connector (See page IN–32).

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 voltage 11 V or more when engine is stopped?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked?**

NO → **Proceed to problems table on page DI–25.**

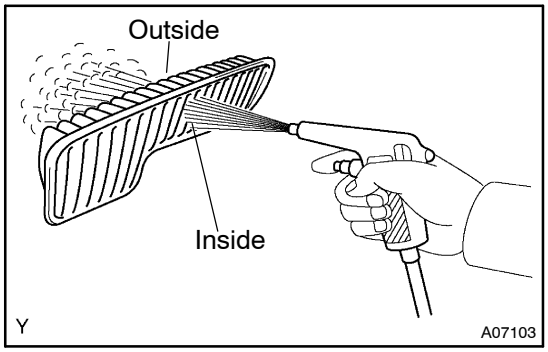
YES

3	Does engine start?

NO → Go to step 7.

YES

4	Check air filter.

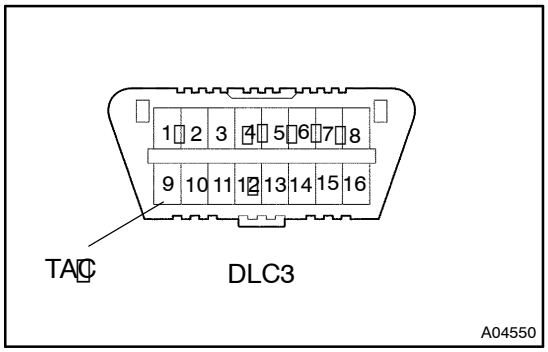


PREPARATION:
Remove the air filter.
CHECK:
Visually check that the air filter is not dirty or excessive oily.
HINT:
If necessary, clean the air filter with compressed air. First blow from inside thoroughly, then blow from outside of the air filter.

NG → Repair or replace

OK

5	Check idle speed.



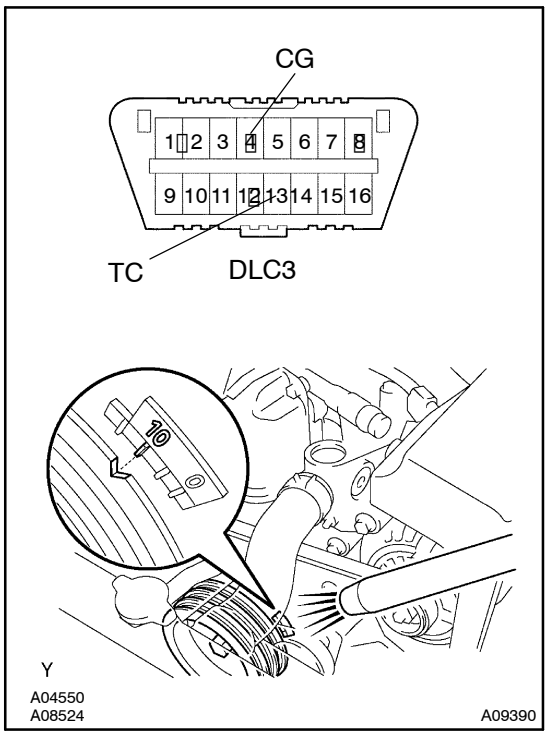
PREPARATION:
(a) Warm up the engine to normal operating temperature.
(b) Switch off all the accessories.
(c) Switch off the A/C.
(d) Shift the transmission into the N position.
(e) Connect the hand–held tester to the DLC3 on the vehicle.
(f) If you have no hand–held tester, connect tachometer test prove to terminal 9 (TAC) of the DLC3.
SST 09843–18030

NOTICE:
As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.
CHECK:
Check the idle speed.
OK:
Idle speed: 600 – 700 rpm

NG → Proceed to problem symptoms table on page DI–25.

OK

6	Check ignition timing.



PREPARATION:

(a) Warm up the engine to normal operating temperature.
(b) Shift the transmission into the N position.
(c) Keep the engine speed at idle.
(d) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843–18040
(e) Using a timing light, connect the tester to the ignition coil connector wire (See page EM–15).

CHECK:

Check the ignition timing.

OK:

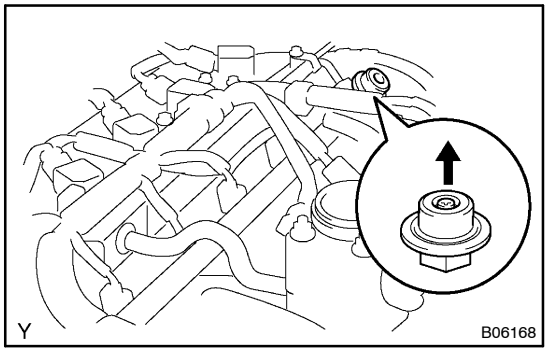
Ignition timing: 10° BTDC at idle

NG → **Proceed to page IG–1 and continue to trouble-shoot.**

OK

Proceed to problem symptoms table on page DI–25.

7	Check fuel pressure.



PREPARATION:

(a) Be sure that enough fuel is in the tank.
(b) Connect the hand–held tester to the DLC3.
(c) Turn the ignition switch ON and push hand–held tester main switch ON.
(d) Use the ACTIVE TEST mode to operate the fuel pump.
(e) Please refer to the hand–held tester operator's manual for further details.
(f) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page FI–6).

CHECK:

Check that pulsation damper screw rises up when fuel pump operates.

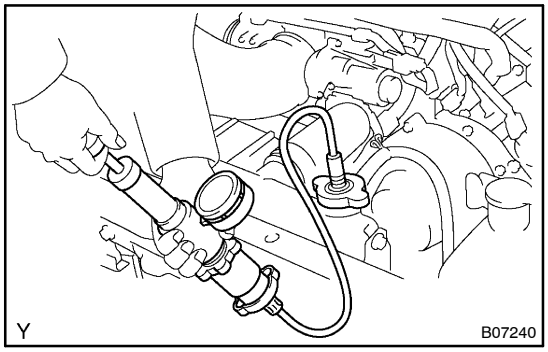
HINT:

At this time, you will hear a fuel flowing noise.

NG	**Proceed to page FI–6 and continue to trouble-shoot.**

OK

8	**Check for spark.**



PREPARATION:

(a) Remove the ignition coil from the spark plug.
(b) Remove the spark plug.
(c) Install the spark plug to the ignition coil.
(d) Disconnect the injector connector.
(e) Ground the spark plug.

CHECK:

Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being from injected from the injectors during this test, don't crank the engine for more than 5 – 10 seconds at a time.

NG	**Proceed to page IG–1 and continue to trouble-shoot.**

OK

Proceed to problem symptoms table on page DI–25.

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 varies differ from those listed here. So do not decide whether a part is faulty or not solely according to the "Normal Condition" here.

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: 25.7 – 46.4 % Racing without load (2,500rpm): 19.7 – 40.5 %
COOLANT TEMP	Water 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: 700 – 800 rpm
VEHICLE SPD	Vehicle Speed	Vehicle stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No.1	Idling: BTDC 5 – 15°
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to ambient temp.
MAP	Absolute Pressure Inside Intake Manifold	Idling: 26 – 47 kPa. Racing without load (2,500 rpm): 20 – 41 kPa
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0 %, 5 V → 100 %	Throttle fully closed: 8 – 20 % Throttle fully open: 64 – 96 %
O2S B1 S1	Voltage Output of Oxygen Sensor Bank 1 Sensor 1	Idling: 0.1 – 0.9 V
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 B1 S1	Oxygen Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2FT B2 S1	Oxygen Sensor Fuel Trim Bank 2, Sensor 1 (Same as SHORT FT #2)	0 ± 20 %
MIL ON RUN DIST	Distance since activation of check engine warning light	When there is no DTC: 0 km/h (0 mph)
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.92 – 3.37 ms
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
STARTER SIG	Starter Signal	Cranking: 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
CTP	Closed Throttle Position	Throttle fully closed: 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 – 300
INTAKE CTRL VSV	Intake Air Control Valve VSV Signal	VSV operating: ON

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
THROTTLE POS #2	Throttle position sensor No.2 output voltage	Throttle fully closed: 2.0 – 2.9 V Throttle fully open: 4.6 – 5.0 V
ACCEL POS	Accelerator pedal position sensor No.1 output voltage	Accelerator pedal released: 0.25 – 0.9 V Accelerator pedal depressed: 3.2 – 4.8 V
ACCEL POS #2	Accelerator pedal position sensor No.2 output voltage	Accelerator pedal released: 1.8 – 2.7 V Accelerator pedal depressed: 4.7 – 5.0 V
THROTTLE TARGET POS	Target position of throttle valve	Idling: 0.4 – 1.1 V
THROTTLE OPEN DUTY	Throttle motor opening duty ratio	Throttle fully closed: 0 % When accelerator pedal is depressed, duty ratio is increased
THROTTLE CLOSE DUTY	Throttle motor closed duty ratio	Throttle fully closed: 0 % When accelerator pedal is quick released, duty ratio is increased
THROTTLE MOTOR CTL	Whether or not throttle motor control is permitted	Idling: ON
THROTTLE CLUTCH CTL	Whether or not magnetic clutch control is permitted	Idling: ON
+BM	Whether or not electric throttle control system power is inputted	Idling: ON
ACCEL IDL	Whether or not accelerator pedal position sensor is detecting idle	Idling: ON
THROTTLE IDL	Whether or not throttle position sensor is detecting idle	Idling: ON
FAIL #1	Whether or not fail safe function is executed	ETCS is failed: ON
FAIL #2	Whether or not fail safe function is executed	ETCS is failed: ON
THROTTLE LEAN VALUE	Throttle fully closed learning value	0.4 – 0.8 V
ACCEL LEAN VALUE	Accelerator fully closed learning value	0.4 – 0.8 V
THROTTLE MOTOR	Throttle motor control current	Idling: 0 – 3.0 A
ETCS MAG CLUTCH	Magnetic clutch control current	0.8 – 1.0 A
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.5 – 1.4
TOTAL FT B2	Total Fuel Trim Bank 2: Average value for fuel trim system of bank 2	Idling: 0.5 – 1.4
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 warming 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 warming 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 warming up: 0 – 1,000 msec.
O2 RL B2 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warming up: 0 – 1,000 msec.

*: 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.

DI63K–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 the check mode, check the circuit for the 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.

ENGINE TROUBLE CODES

DTC No. (See page)	Detection Item	Trouble Area	*1 CHK ENG (MIL)	Memory
P0105/31 (DI–27)	Vacuum Sensor Circuit Malfunction	• Open or short in vacuum sensor circuit • Vacuum sensor • Engine ECU	○	○
P0106/31 (DI–31)	Vacuum Sensor Circuit Range/ Performance Problem (European spec.)	• Vacuum Sensor • Vacuum Line	○	○
P0110/24 (DI–32)	Intake Air Temp. Circuit Malfunction	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU	○*3	○
P0115/22 (DI–37)	Water Temp. Circuit Malfunction	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU	○	○
P0120/41 (DI–42)	Throttle Position Sensor Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU	○	○
P0121/41 (DI–47)	Throttle Position Sensor Circuit Range/Performance Problem	• Throttle position sensor	○	○
P0125/91 (DI–48)	Insufficient Coolant Temp. for Closed Loop Fuel Control (European spec.)	• Open or short in oxygen sensor (bank 1, 2 sensor 1) circuit • Oxygen Sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU	○	○
P0130/21 (DI–53)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU	○*3	○
P0133/21 (DI–57)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1) (European spec.)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU	○	○
P0135/21 (DI–61)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU	○*3	○
P0136/27 (DI–63)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in oxygen sensor circuit • Oxygen sensor	○*3	○

P0141/21 (DI–53)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135/21	○*3	○
P0150/28 (DI–53)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0130/21	○*3	○
P0153/28 (DI–57)	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1) (European spec.)	• Same a DTC No. P0130/21	○	○
P0155/28 (DI–61)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0135/21	○*3	○
P0171/25 (DI–66)	System too Lean (A/F Lean Malfunction, Bank 1)	• Air induction system • Injector blockage • Vacuum Sensor • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank1, 2 sensor1) circuit • Oxygen sensor (bank1, 2 sensor1) • Engine ECU	○*3	○
P172/26 (DI–66)	System too Rich (A/F Rich Malfunction, Bank 1) (European spec.)	• Injector leak, blockage • Vacuum sensor • Water temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank1, 2 sensor1) circuit • Oxygen sensor (bank1, 2 sensor1) • Engine ECU	○	○
P0174/25 (DI–66)	System too Lean (A/F Lean Malfunction, Bank 2)	• Same as DTC No. P0171/25	○*3	○
P0175/26 (DI–66)	System too Rich (A/F Rich Malfunction, Bank 2) (European spec.)	• Same as DTC No. P0172/26	○	○
P0300/93 (DI–72)	Random/Multiple Cylinder Misfire Detected (European spec.)	• Open or short engine wire • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Vacuum sensor • Water temp. sensor • Compression pressure • Valve clearance • Valve timing • Engine ECU	○	○
P0301/93 (DI–72)	Cylinder 1 Misfire Detected (European spec.)			
P0302/93 (DI–72)	Cylinder 2 Misfire Detected (European spec.)			
P0303/93 (DI–72)	Cylinder 3 Misfire Detected (European spec.)			
P0304/93 (DI–72)	Cylinder 4 Misfire Detected (European spec.)			
P0305/93 (DI–72)	Cylinder 5 Misfire Detected (European spec.)			
P0306/93 (DI–72)	Cylinder 6 Misfire Detected (European spec.)			
P0325/52 (DI–78)	Knock Sensor 1 Circuit Malfunction (Bank 1)	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU	○	○
P0330/55 (DI–81)	Knock Sensor 2 Circuit Malfunction (Bank 2)	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU	○	○

P0335/12, 13 (DI–81)	Crankshaft Position Sensor Circuit Malfunction (NE Signal)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU	○	○
P0340/12 (DI–83)	Camshaft Position Sensor Circuit Malfunction (G Signal)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • Engine ECU	○	○
P0420/94 (DI–85)	Catalyst System Efficiency Below Threshold (Bank 1) (European spec. (Except Taiwan))	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter	○	○
P0443/94 (DI–88)	Evaporative Emission Control System Purge Control Vent Control Malfunction (European spec.)	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU	○	○
P0500/42 (DI–91)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine ECU	○	○
P0505/33 (DI–96)	Idle Control System Malfunction (European spec.)	• Air induction system • Electric throttle control system	○	○
P1120/19 (DI–97)	Accelerator Pedal Position Sensor Circuit Malfunction	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU	○	○
P1121/19 (DI–102)	Accelerator Pedal Position Sensor Range/Performance Problem	• Accelerator pedal position sensor	○	○
P1125/89*2 (DI–103)	Throttle Control Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU	○	○
P1126/89*2 (DI–106)	Magnetic Clutch Circuit Malfunction	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU	○	○
P1127/89*2 (DI–109)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • Engine ECU	○	○
P1128/89*2 (DI–111)	Throttle Control Motor Lock Malfunction	• Throttle control motor • Throttle body	○	○
P1129/89*2 (DI–113)	Electric Throttle Control System Malfunction	• Electric throttle control system • Engine ECU	○	○
P1300/14 (DI–114)	Igniter Circuit Malfunction (No.1)	• Ignition system • Open or short in IGF or IGT1 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1305/15 (DI–114)	Igniter Circuit Malfunction (No.2)	• Ignition system • Open or short in IGF or IGT2 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1310/14 (DI–114)	Igniter Circuit Malfunction (No.3)	• Ignition system • Open or short in IGF or IGT3 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1315/14 (DI–114)	Igniter Circuit Malfunction (No.4)	• Ignition system • Open or short in IGF or IGT4 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○

P1320/14 (DI–114)	Igniter Circuit Malfunction (No.5)	• Ignition system • Open or short in IGF or IGT5 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1325/14 (DI–114)	Igniter Circuit Malfunction (No.6)	• Ignition system • Open or short in IGF or IGT6 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1335/13 (DI–121)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU	–	○
P1346/18 (DI–122)	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • ECM	○	○
P1349/59 (DI–123)	VVT System Malfunction (Bank 1)	• Valve timing • OCV • VVT controller assembly • Engine ECU	○*3	○
P1600/96 (DI–130)	Engine ECU BATT Malfunction (European spec.)	• Open in back up power source circuit • Engine ECU	○	○
P1633/89*2 (DI–132)	Engine ECU Malfunction (ETCS Circuit)	• Engine ECU	○	○
P1645/82 (DI–133)	Body ECU Malfunction	• Body ECU • A/C ECU • Communication bus	–	○
P1651/96 (DI–134)	VSV for ACIS Circuit Malfunction (European spec.)	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU	○	○
P1656/39 (DI–138)	OCV Circuit Malfunction (Bank 1)	• Open or short in OCV circuit • OCV • Engine ECU	○	○
P1780/97*2 (DI–141)	Park/Neutral Position Switch Malfunction (A/T for European spec.)	• Short in neutral start switch circuit • Neutral start switch • Engine ECU	○	○
B2795/99 (DI–513)	Unmatch Key Code	• Key • Unregistered key inserted before?	–	○

*1: ○: CHK ENG is indicated. –: CHK ENG is not indicated.
*2: If the DTC No.89 is indicated on the check engine warning light, read the DTC for ETCS from ECT SNOW indicator to get the detail of the DTC No.89. If using the hand–held tester, the detail DTC for ETCS is displayed on the hand–held tester.
*3: European spec.

ETCS TROUBLE CODES (When not use hand–held tester)

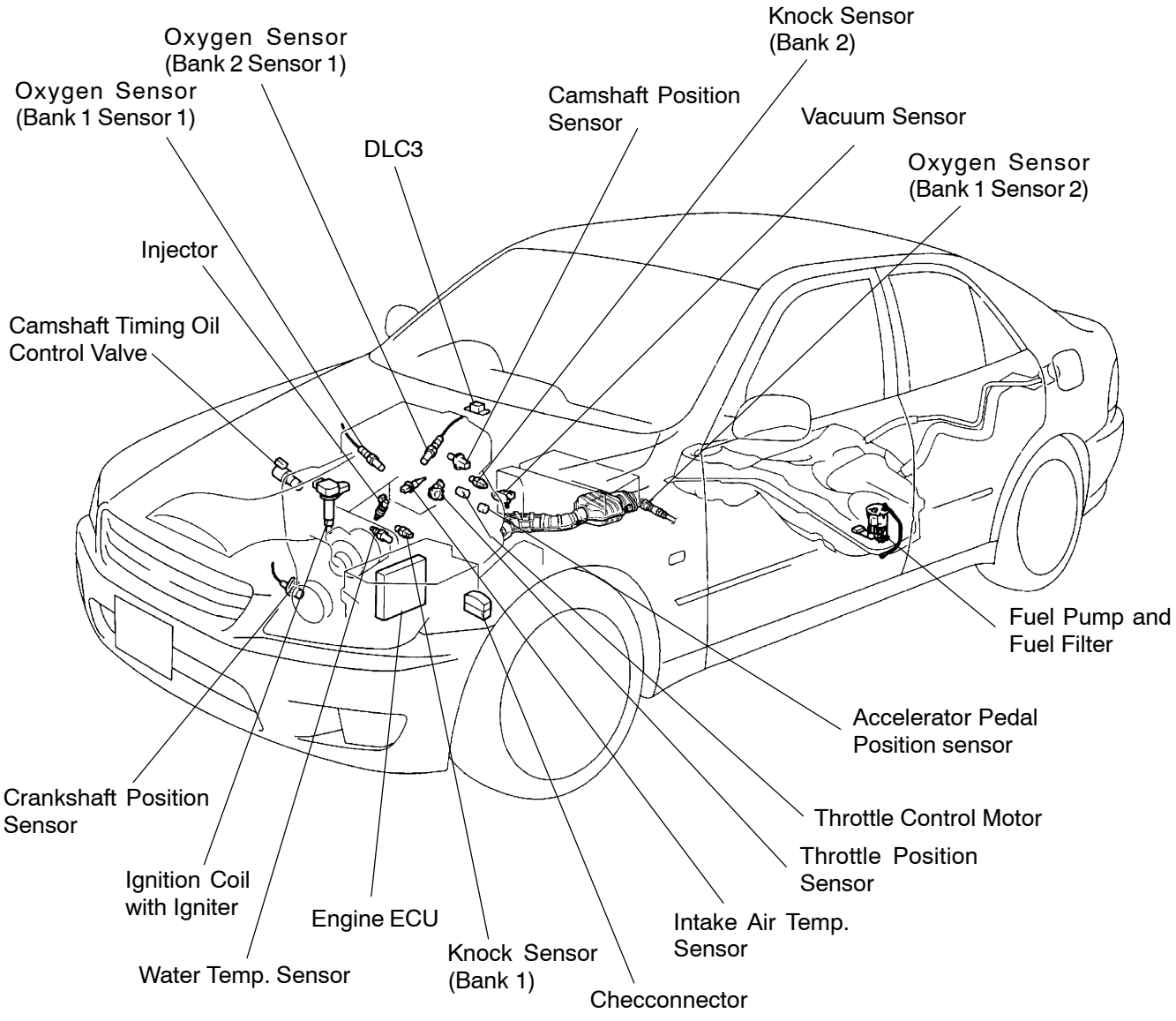
DTC No. (See page)	Detection Item	Trouble Area	* CHK ENG (MIL)	Memory
21 (DI–103)	Throttle Control Motor Circuit Malfunction	• Same as DTC No. P1125/89	○	○
22 (DI–106)	Magnetic Clutch Circuit Malfunction	• Same as DTC No. P1126/89	○	○
23 (DI–109)	ETCS Actuator Power Source Circuit Malfunction	• Same as DTC No. P1127/89	○	○

31 (DI–111)	Throttle Control Motor Lock Malfunction	• Same as DTC No. P1128/89	○	○
32 (DI–113)	Electric Throttle Control System Malfunction	• Same as DTC No. P1129/89	○	○
33 (DI–132)	ECU Malfunction (ETCS)	• Same as DTC No. P1633/89	○	○

*: ○ ... CHK ENG is indicated.

DI63L–01

PARTS LOCATION



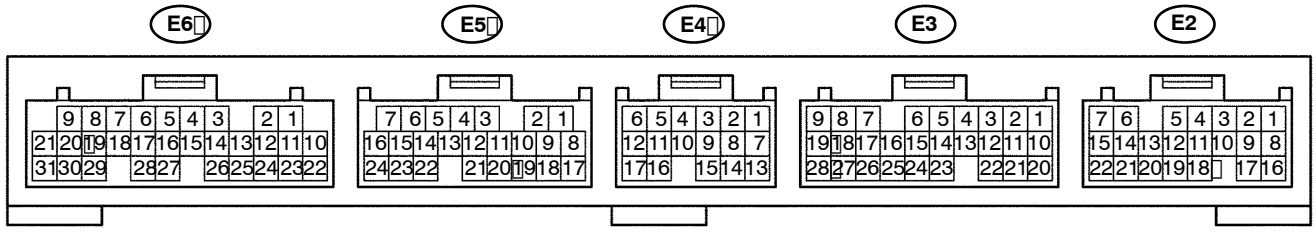
Y

A07108

DI63M–01

TERMINALS OF ECU

Engine ECU Terminals



A02508

A04997

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E2–1) – E1 (E5–17)	B–Y ↔ BR	Always	9 – 14
BM (E2–7) – E1 (E5–17)	L–W ↔ BR	Always	9 – 14
IGSW (E2–9) – E1 (E5–17)	B–O ↔ BR*1 B–R ↔ BR*2	IG switch ON	9 – 14
+B (E2–16) – E1 (E5–17)	B–R ↔ BR		
+B2 (E2–8) – E1 (E5–17)	B–R ↔ BR		
VC (E5–2) – E2 (E5–18)	L–Y ↔ BR	IG switch ON	4.5 – 5.5
VTA (E5–23) – E2 (E5–18)	W–R ↔ BR	IG switch ON, Accelerator pedal fully closed	0.4 – 1.0
		IG switch ON, Accelerator pedal fully open	3.2 – 4.8
VTA2 (E5–24) – E2 (E5–18)	R–B ↔ BR	IG switch ON, Accelerator pedal fully closed	2.0 – 2.9
		IG switch ON, Accelerator pedal fully open	4.6 – 5.1
VPA (E5–15) – E2 (E5–18)	LG–B ↔ BR	IG switch ON, Accelerator pedal fully closed	0.3 – 0.9
		IG switch ON, Accelerator pedal fully open	3.2 – 4.8
VPA2 (E5–16) – E2 (E5–18)	L–W ↔ BR	IG switch ON, Accelerator pedal fully closed	1.8 – 2.7
		IG switch ON, Accelerator pedal fully open	4.7 – 5.1
PIM (E5–9) – E2 (E5–18)	G–R ↔ BR	IG switch ON, Apply vacuum 26.7 Kpa (200 mmHg, 7.9 in.Hg)	3.3 – 3.9
THA (E5–22) – E2 (E5–18)	Y ↔ BR	Idling, Intake air temp. 20°C (68°F)	0.5 – 3.4
THW (E5–14) – E2 (E5–18)	R ↔ BR	Idling, Water temp. 80°C (176°F)	0.2 – 1.0
STA (E3–2) – E1 (E5–17)	B ↔ BR	Shift lever position P or N, Ignition switch START	6.0 or more
#10 (E5–5) – E01 (E6–21) #20 (E5–6) – E01 (E6–21) #30 (E6–1) – E01 (E6–21) #40 (E6–2) – E01 (E6–21) #50 (E6–3) – E01 (E6–21) #60 (E6–4) – E01 (E6–21)	R ↔ W–R L ↔ W–B G ↔ W–B R–W ↔ W–B L–R ↔ W–B B–W ↔ W–B	IG switch ON	9 – 14
		Idling	Pulse generation (See page DI–72)
IGT1 (E6–11) – E1 (E5–17) IGT2 (E6–12) – E1 (E5–17) IGT3 (E6–13) – E1 (E5–17) IGT4 (E6–14) – E1 (E5–17) IGT5 (E6–15) – E1 (E5–17) IGT6 (E6–16) – E1 (E5–17)	B–R ↔ BR Y–R ↔ BR G ↔ BR L–R ↔ BR L–Y ↔ BR W ↔ BR	Idling	Pulse generation (See page DI–114)
IGF (E6–25) – E1 (E5–17)	Y ↔ BR	IG switch ON	4.5 – 5.5
		Idling	Pulse generation (See page DI–114)
G2 (E6–10) – NE– (E5–22)	G ↔ L	Idling	Pulse generation (See page DI–81)
NE+ (E6–23) – NE– (E5–22)	B–W ↔ L		
MERL (E2–10) – E1 (E5–17)	B–O ↔ BR	IG switch ON	9 – 14

FC (E2–17) – E1 (E5–17)	G–Y ↔ BR	IG switch ON	9 – 14
STP (E3–6) – E1 (E5–17)	G–W ↔ BR	Brake pedal is depressed	7.5 – 14
		Brake pedal is released	Below 1.5
PRG (E5–7) – E1 (E5–17)	GR ↔ BR	IG switch ON	9 – 14
OX1A (E5–18) – E1 (E5–17) OX2A (E5–12) – E1 (E5–17) OX1B (E3–8) – E1 (E5–17)	W ↔ BR B ↔ BR W ↔ BR	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See page DI–53)
HT1A (E5–4) – E1 (E5–17) HT2A (E5–3) – E1 (E5–17) HT1B (E3–9) – E1 (E5–17)	LG ↔ BR G–B ↔ BR R–W ↔ BR	Idling	Below 3.0
		IG switch ON	9 – 14
KNK1 (E6–28) – E1 (E5–17)	B ↔ BR	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See page DI–78)
KNK2 (E6–27) – E1 (E5–17)	W ↔ BR*1 GR ↔ BR*2		
TC (E3–5) – E1 (E5–17)	R–W ↔ BR*1 Y–G ↔ BR*2	IG switch ON	9 – 14
W (E2–6) – E1 (E5–17)	R–L ↔ BR	Idling	9 – 14
		IG switch ON	Below 3.0
ACMG (E3–19) – E1 (E5–17)	L–W ↔ BR	A/C switch ON (At idling)	Below 3.0
		A/C switch OFF	9 – 14
ENG+ (E2–14) – ENG– (E2–21)	L ↔ P	Idling	Pulse generation
TRC+ (E2–13) – TRC– (E2–20)	R ↔ W		
OCV+ (E6–18) – OCV– (E6–17)	W–R ↔ Y–B	IG switch ON	Pulse generation (See page DI–123)
ACIS (E6–5) – E01 (E6–17)	Y–G ↔ W–B	IG switch ON	9 – 14
		Engine speed between 2,500 rpm and 4,000 rpm	Below 3.0
CL+ (E6–20) – CL– (E6–19)	R ↔ Y	Idling	Pulse generation (See page DI–103)
M+ (E6–8) – ME01 (E6–9) M– (E6–7) – ME01 (E6–9)	B–W ↔ BR L ↔ BR	Idling	Pulse generation (See page DI–103)
SIL (E3–23) – E1 (E5–17)	W ↔ BR		
SP2+ (E4–5) – SP2– (E4–11)	L–Y ↔ R–L	Vehicle is driving	Pulse generation (See page DI–91)

*1: LHD
*2: RHD

DI63N–01

PROBLEM SYMPTOMS TABLE

When the malfunction is not confirmed in the diagnostic trouble code check and the problem still can not be confirmed in the basic inspection, proceed to this problem symptoms table and troubleshoot according to the numbered order given below.

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST–6 ST–18
	2. Neutral start switch circuit	DI–141
	3. Body ECU	DI–549
No initial combustion (Does not start)	1. Engine ECU power source circuit	DI–149
	2. Ignition coil with igniter	DI–72
	3. Injector circuit	DI–72
No complete combustion (Does not start)	1. Ignition coil with igniter	DI–72
	2. Injector circuit	DI–72
Engine cranks normally (Difficult to start)	1. Starter signal circuit	DI–146
	2. Ignition coil with igniter	DI–114
	3. Spark plug	IG–1
	4. Compression	EM–3
	5. Injector circuit	DI–72
Cold engine (Difficult to start)	1. Starter signal circuit	DI–146
	2. Injector circuit	DI–72
	3. Ignition coil with igniter	DI–114
	4. Spark plug	IG–1
Hot engine (Difficult to start)	1. Starter signal circuit	DI–146
	2. Injector circuit	DI–72
	3. Ignition coil	IG–1
	4. Spark plug	IG–1
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–674
	2. Engine ECU power source circuit	DI–149
	3. Neutral start switch circuit	DI–141
	4. Back up power source circuit	DI–130
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–674
	2. Neutral start switch circuit	DI–141
	3. Injector circuit	DI–72
	4. Back up power source circuit	DI–130
Rough idling (Poor idling)	1. Vacuum sensor circuit	DI–27
	2. Injector circuit	DI–72
	3. Ignition coil with igniter	DI–114
	4. Compression	EM–3
	5. Back up power source circuit	DI–130
Hunting (Poor idling)	1. Vacuum sensor circuit	DI–27
	2. Engine ECU power source circuit	DI–149
Hesitation/Poor acceleration (Poor driveability)	1. Vacuum sensor circuit	DI–27
	2. Injector circuit	DI–72
	3. Ignition coil with igniter	DI–114
	4. A/T faulty	DI–175
Muffler explosion, after fire (Poor driveability)	1. Ignition coil	IG–1
	2. Spark plug	IG–1
	3. Injector circuit	DI–72
Surging (Poor driveability)	1. Spark plug	IG–1
	2. Injector circuit	DI–72
Engine stall (Soon after starting)	1. Vacuum sensor circuit	DI–27
Engine stall (After accelerator pedal depressed)	1. Vacuum sensor circuit	DI–27

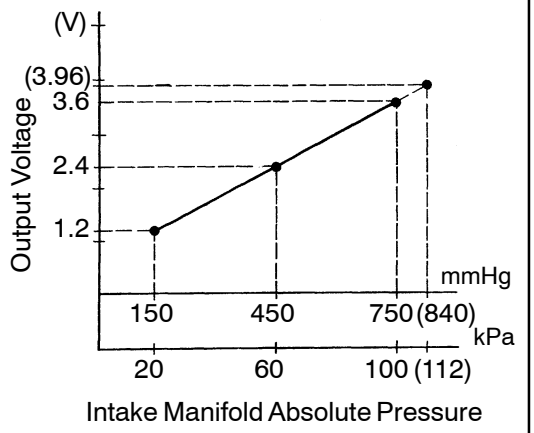
Engine stall (After accelerator pedal released)	1. Vacuum sensor circuit 2. Engine ECU	DI–27 IN–32
Engine stall (During A/C operation)	1. A/C signal circuit (Compressor circuit) 2. Engine ECU	DI–674 IN–32
Engine stall (When shifting N to D)	1. Neutral start switch circuit	DI–1241

DI63O–01

CIRCUIT INSPECTION

DTC	P0105/31	Vacuum Sensor Circuit Malfunction

CIRCUIT DESCRIPTION



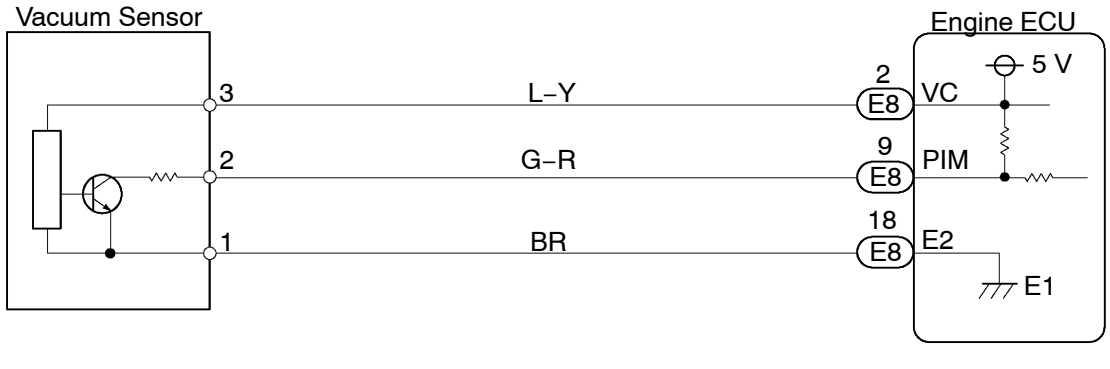
By a built–in sensor unit, the vacuum sensor detects the intake manifold pressure as a voltage. The engine ECU then determines the basic injection duration and basic ignition advance angle based on this voltage.
Since the vacuum sensor does not use the atmospheric pressure as a criterion, but senses the absolute pressure inside the intake manifold (the pressure in proportion to the preset absolute vacuum 0), it is not influenced by fluctuations in the atmospheric pressure due to high altitude and other factors. this permits it to control the air fuel ratio at the proper level under all conditions.

DTC No.	DTC Detecting Condition	Trouble Area
P0105/31	Open or short in vacuum sensor circuit	• Open or short in vacuum sensor circuit • Vacuum sensor • Engine ECU

HINT:
After confirming DTC P0105/31, use the hand–held tester to confirm the manifold absolute pressure from the CURRENT DATA.

Manifold Absolute Pressure (kPa)	Malfunction
Approx. 0	• PIM circuit short
130 or more	• VC circuit open or short • PIM circuit open • E2 circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of manifold absolute pressure.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the value of the manifold absolute pressure on the hand–held tester.

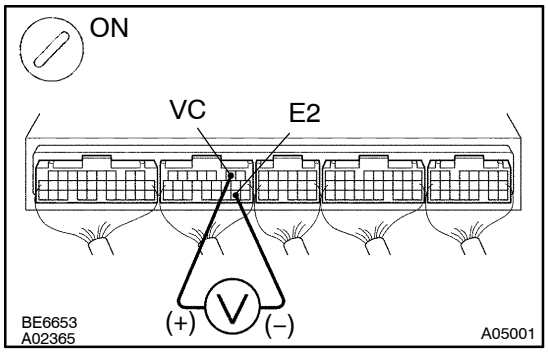
OK:

Same as atmospheric pressure.

OK	**Check for intermittent problems (See page DI–4).**

NG

2	**Check voltage between terminals VC and E2 of engine ECU Connector.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the engine ECU connector.

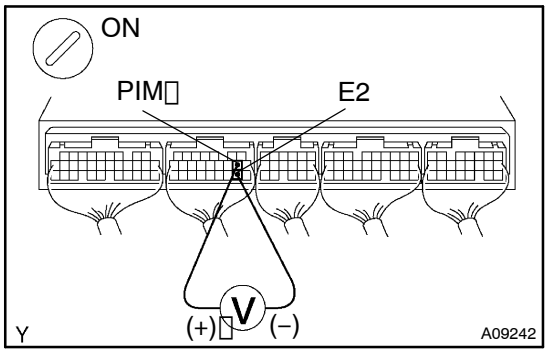
OK:

Voltage: 4.5 – 5.5 V

NG	**Check and replace engine ECU (See page IN–32).**

OK

3	Check voltage between terminals PIM and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals PIM and E2 of the engine ECU connector.

OK:
Voltage: 3.3 – 3.9 V

OK	Check and replace engine ECU (See page IN–32).

NG

4	Check for open and short in harness and connector between vacuum sensor and engine ECU.

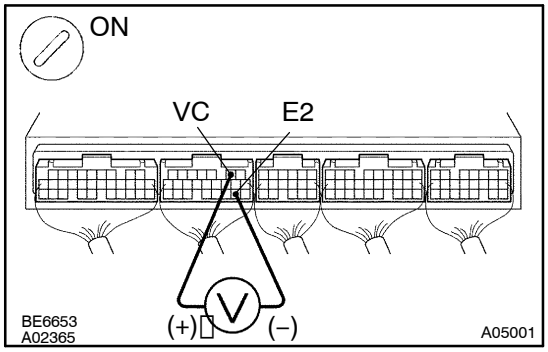
NG	Repair and replace harness or connector.

OK

Replace vacuum sensor (See page FI–60).

When not using hand–held tester:

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

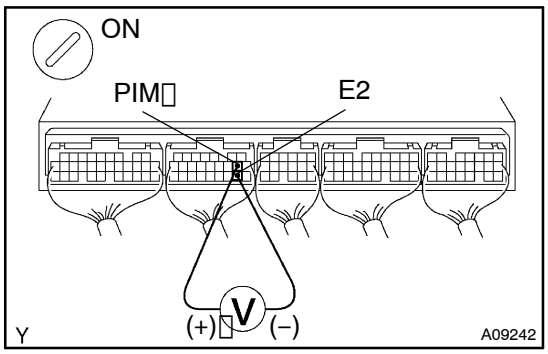
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG	Check and replace engine ECU (See page IN–32).

OK

2	Check voltage between terminals PIM and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals PIM and E2 of the engine ECU connector.

OK:

Voltage: 3.3 – 3.9 V

OK	Check and replace engine ECU (See page IN–32).

NG

3	Check for open and short in harness and connector between engine ECU and vacuum sensor (See page IN–32).

NG	Repair or replace harness or connector.

OK

Replace vacuum sensor.

DI63P–01

DTC	P0106/31	Vacuum Sensor Circuit Range/Performance Problem (European spec.)

CIRCUIT DESCRIPTION

Refer to DTC P0105/31 on page DI–27.

DTC No.	DTC Detecting Condition	Trouble Area
P0106/31	Conditions (a), (b), (c) and (d) continue with more than 10 seconds: (2 trip detection logic) (a) PIM > 3.3 V (b) Throttle position is closed (c) Engine speed is between 400 rpm and 1,000 rpm (d) THW ≧ 70°C (158°F)	• Vacuum sensor • Vacuum line
	Conditions (a), (b) and (c) continue with more than 10 second: (2 trip detection logic) (a) PIM < 1.5 V (b) Engine speed is 2,500 rpm (c) VTA ≧ 1 V	

INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0116/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0106/31) being output?

YES → Go to relevant DTC chart.

NO

2	Check vacuum sensor (See page FI–61).

NG → Replace vacuum sensor.

OK

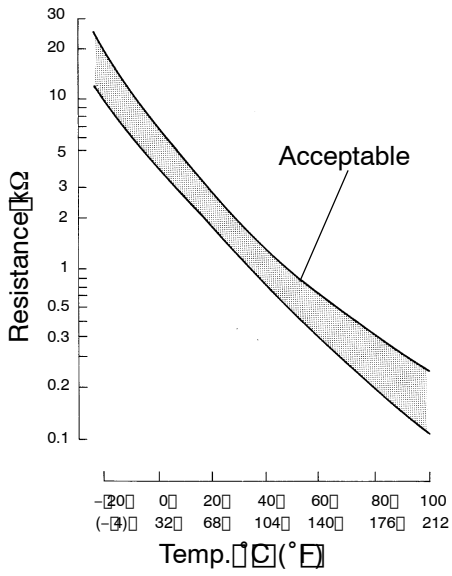
Check vacuum line for vacuum sensor for blockage.

DI63Q-01

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

(Fig. 1)



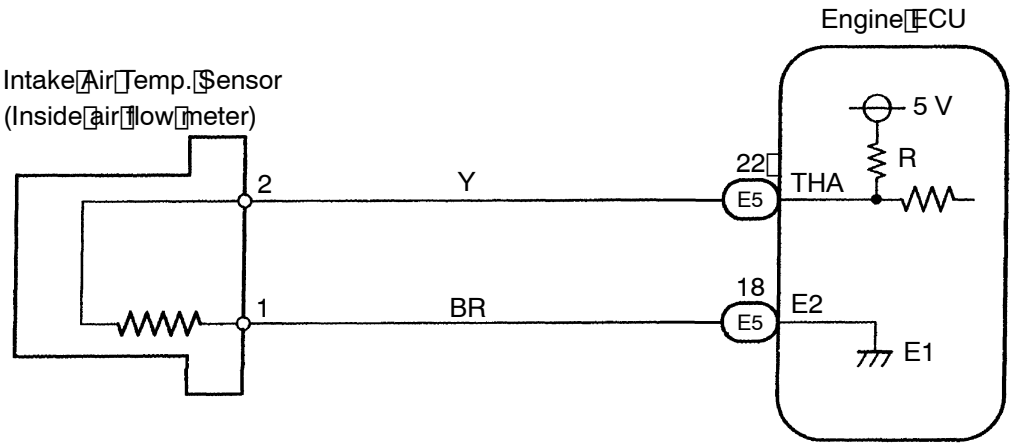
The intake air temperature sensor is built into the air cleaner and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).
The intake air temperature sensor is connected to the engine ECU (See below). The 5 V power source voltage in the engine ECU is applied to the intake air temp. sensor from terminal THA via resistor R.
That is, 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 engine ECU increases the fuel injection volume to improve driveability during cold engine operation.

DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU

HINT:
After confirming DTC P0110/24, use the hand–held tester to confirm the intake air temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140°C (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of intake air temperature.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Same as actual intake air temperature.

HINT:

- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

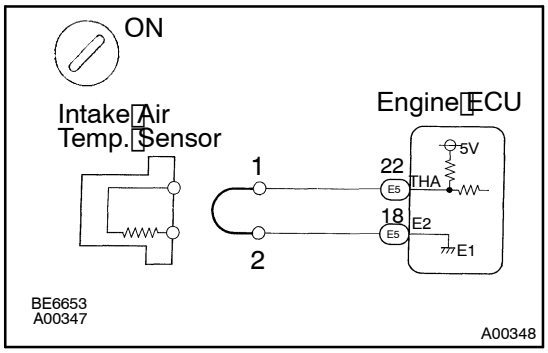
NG

–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–4).

2	Check for open in harness or engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

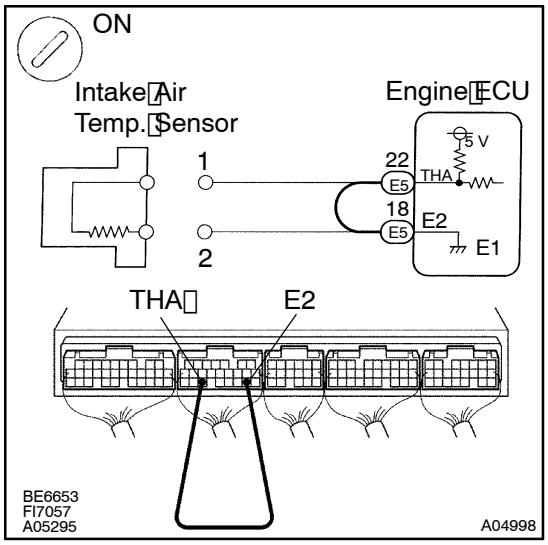
OK:

Temperature value: 140°C (284°F) or more

OK	Confirm good connection at sensor. If OK, replace intake air temperature sensor.

NG

3	Check for open in harness or engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.
(b) Connect between terminals THA and E2 of the engine ECU connector.

HINT:

The intake air temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–32).

CHECK:

Read the temperature value on the hand–held tester.

OK:

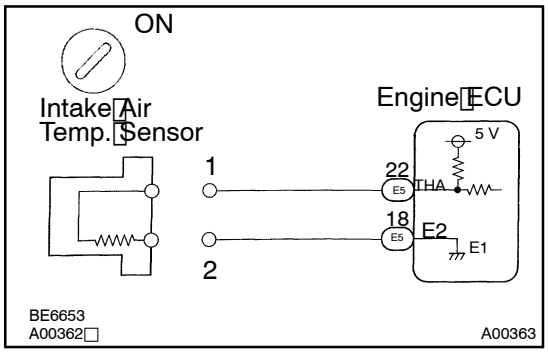
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THA, repair or replace harness.

NG

Confirm good connection at engine ECU. If OK, check and replace engine ECU (See page IN–32).

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

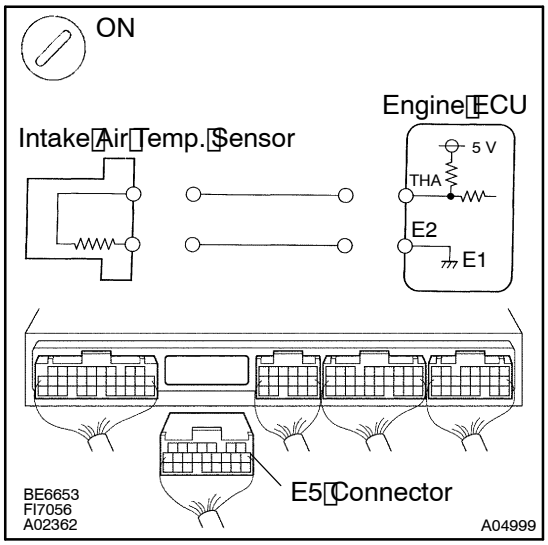
OK:

Temperature value: –40°C (–40°F)

OK	Replace intake air temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E5 connector from the engine ECU.

HINT:

The intake air temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

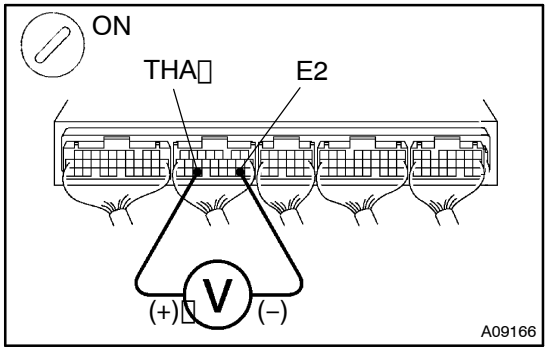
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–32).

When not using hand-held tester:

1	Check voltage between terminals THA and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THA and E2 of the engine ECU connector.

OK:

Intake Air Temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK	Check for intermittent problems (See page DI–17).

NG

2	Check intake air temperature sensor (See page FI–59).

NG	Replace intake air temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temperature sensor (See page DI–23).

NG	Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

DI63R–01

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the water temperature sensor changes the resistance value according to the water temperature.

The structure of the sensor and connection to the engine ECU is the same as in the DTC P0110/24 shown on page DI–32.

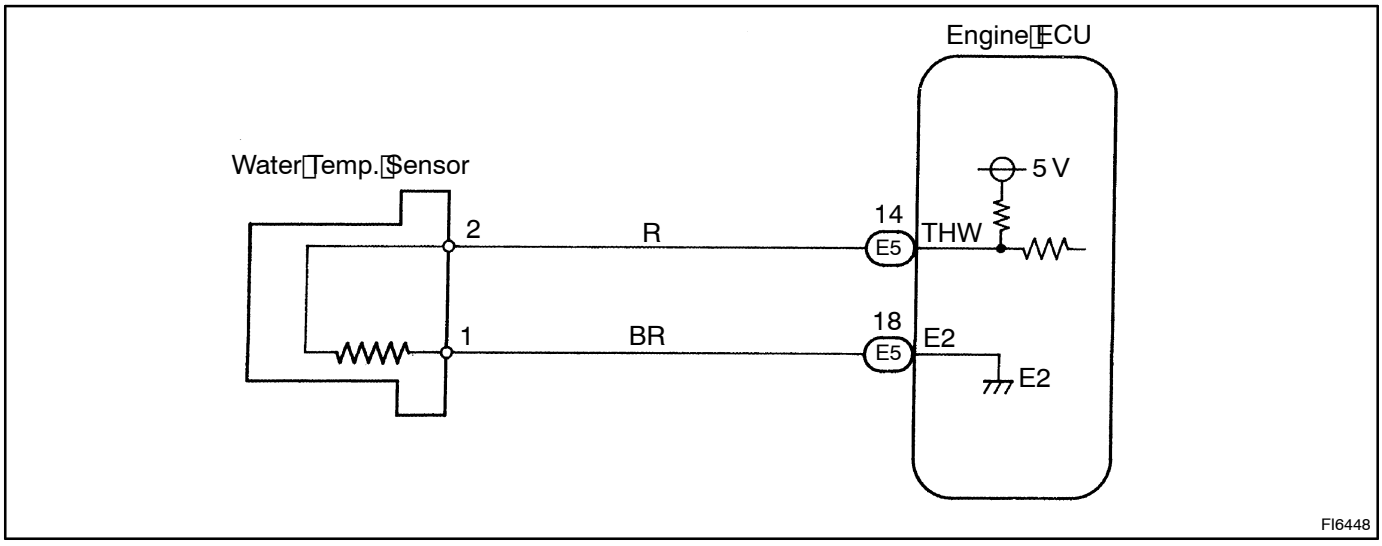
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU

HINT:

After confirming DTC P0115/22, use the hand–held tester to confirm the water temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140C° (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was Lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of water temperature.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and switch the hand–held tester main switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Same as actual water temperature.

HINT:

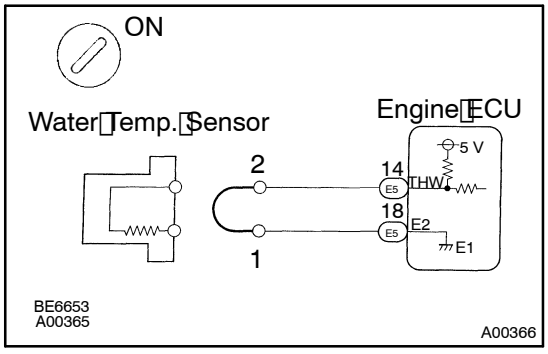
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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–4).

2	**Check for open in harness or engine ECU.**



PREPARATION:

(a) Disconnect the water temperature sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

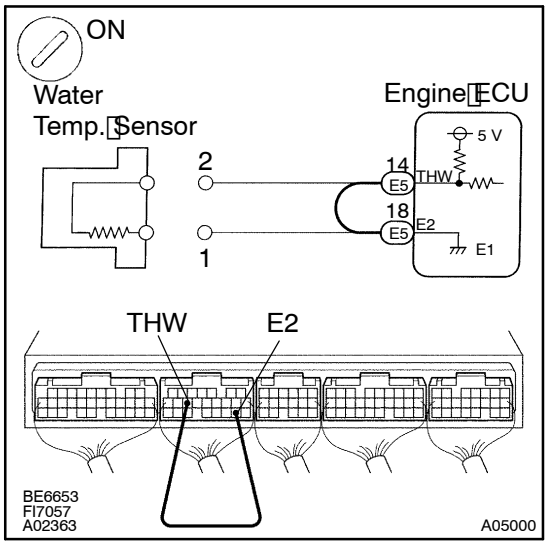
OK:

Temperature value: 140°C (284°F) or more

OK → **Confirm good connection at sensor. If OK, replace water temperature sensor.**

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Connect between terminals THW and E2 of the engine ECU connector.

HINT:

The water temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–32).

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

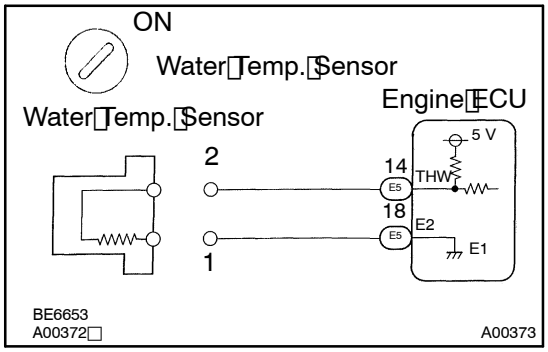
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THW, repair or replace harness.

NG

Confirm good connection at engine ECU. If OK, check and replace engine ECU (See page IN–32).

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the water temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

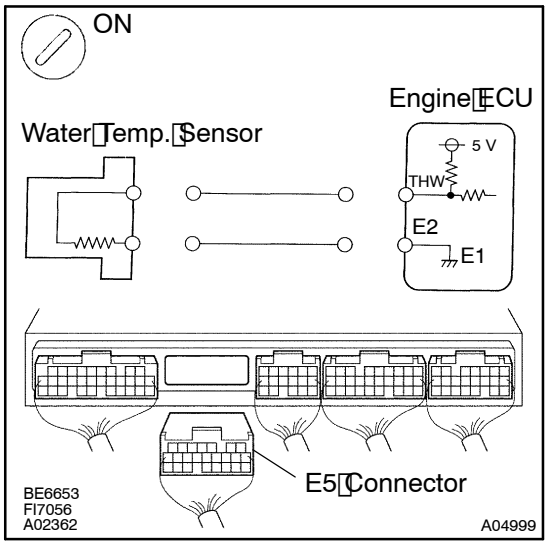
OK:

Temperature value: –40°C (–40°F)

OK	Replace water temperature sensor.

NG

5	**Check for short in harness or engine ECU.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E5 connector from the engine ECU.

HINT:

The water temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand-held tester.

OK:

Temperature value: –40°C (–40°F)

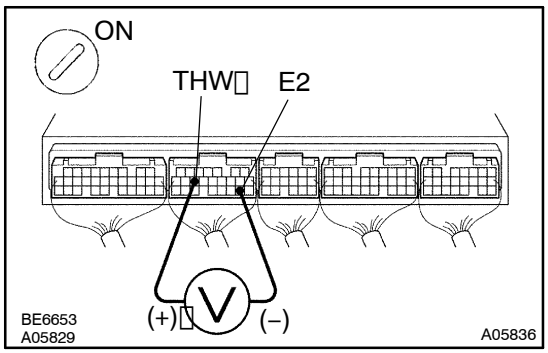
OK	**Repair or replace harness or connector.**

NG

Check and replace engine ECU (See page IN–32).

When not using hand-held tester:

1	**Check voltage between terminals THW and E2 of engine ECU connector.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THW and E2 of the engine ECU connector.

OK:

Water Temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK	**Check for intermittent problems (See page DI–25).**

NG

2	Check water temperature sensor (See page FI–57).

NG → Replace water temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and water temperature sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

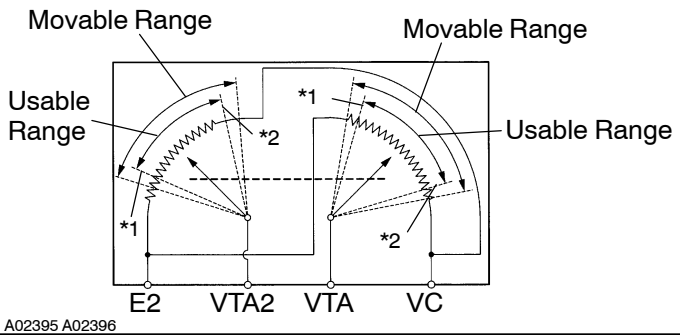
Check and replace engine ECU (See page IN–32).

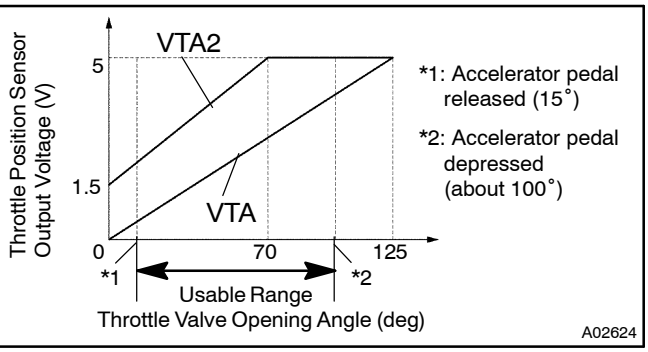
DI63S–01

DTC	P0120/41	Throttle Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Throttle position sensor is mounted on the throttle body and it have the 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor's own.
The voltage applied to the terminals VTA and VTA2 of the engine ECU changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.
The engine ECU judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the engine ECU controls the throttle motor to make the throttle valve angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the electromagnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.



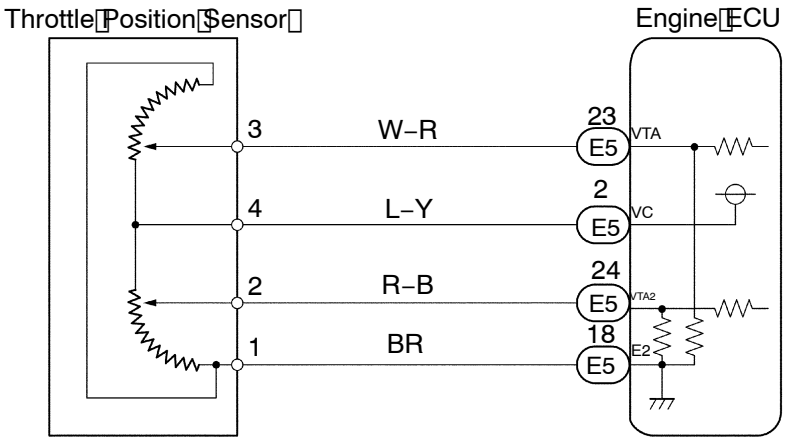


DTC No.	DTC Detecting Condition	Trouble Area
P0120/41	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (e) VTA–VTA2 ≦ 0.02 V	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU
	Condition (a) or (b) continues for 0.4 seconds: (a) VTA ≦ 0.2 V and VTA2 ≦ 0.5 V	

HINT:
After confirming DTC P0120/41, use the hand–held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Accelerator pedal position expressed as percentage and voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
THROTTLE POS	THROTTLE POS #2	THROTTLE POS	THROTTLE POS #2	
0 %	0 V	0 %	0 V	VC line open
0 %	2.0 – 2.9 V	0 %	4.6 – 5.1 V	VTA line open or grand short
8 – 20 %	0 V	64 – 96 %	0 V	VTA2 line open or grand short
100 %	5 V	100 %	5 V	E2 line open

WIRING DIAGRAM



A03843

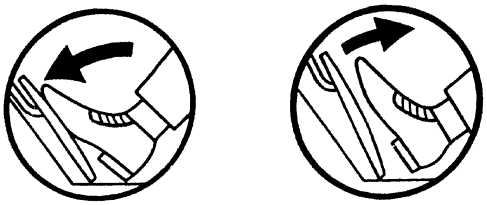
INSPECTION PROCEDURE

HINT:

- If DTCs P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, read throttle valve opening percentage.**



FI7052

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the throttle valve opening percentage for the VTA circuit and read the voltage for the VTA2 circuit.

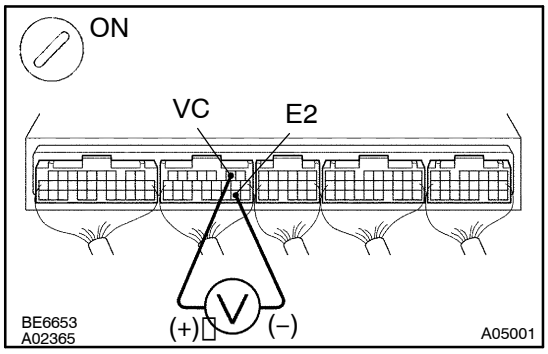
OK:

Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	8 – 20 %	2.0 – 2.9 V
Depressed	64 – 96 %	4.6 – 5.1 V

OK	**Check and replace engine ECU (See page IN–32).**

NG

2	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

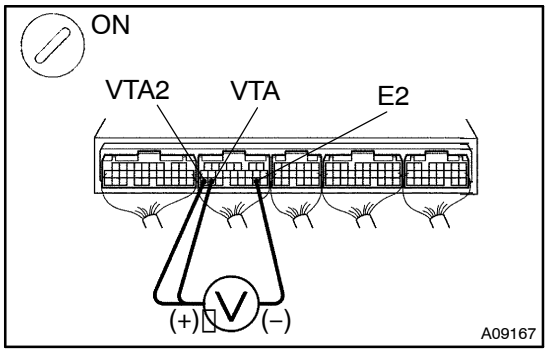
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG	Check and replace engine ECU (See page IN–32).

OK

3	Check voltage between terminals VTA, VTA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

OK	Check and replace engine ECU (See page IN–32).

NG

4	Check throttle position sensor (See page FI–32).

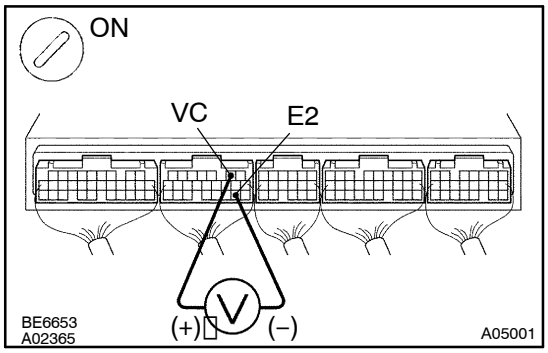
NG	Replace throttle position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between engine ECU and throttle position sensor (See page IN–32).

When not using hand–held tester:

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

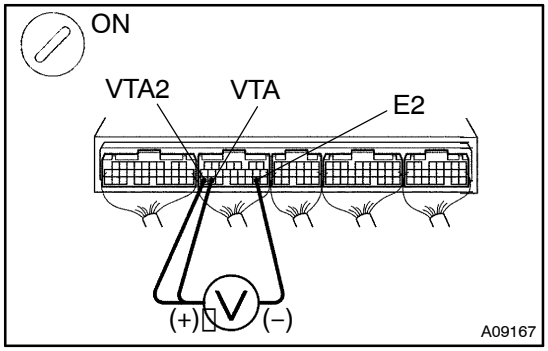
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG → Check and replace engine ECU (See page IN–32).

OK

2	Check voltage between terminals VTA and E2, and VTA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the engine ECU connector.

OK:

Accelerator Pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

OK → Check and replace engine ECU (See page IN–32).

NG

3	Check throttle position sensor (See page FI–32).

NG → Replace throttle position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between engine ECU and throttle position sensor (See page IN–32).

DI63T–01

DTC	P0121/41	Throttle Pedal Position Sensor Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0120/41 on page DI–42.

DTC No.	DTC Detecting Condition	Trouble Area
P0121/41	Condition (a) continue for 2.0 seconds: (a) Difference between VTA and VTA2 is out of threshold	• Throttle position sensor

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace throttle position sensor (See page FI–37).

DI63U–01

DTC	P0125/91	Insufficient Coolant Temp. for Closed Loop Fuel Control (European spec.)

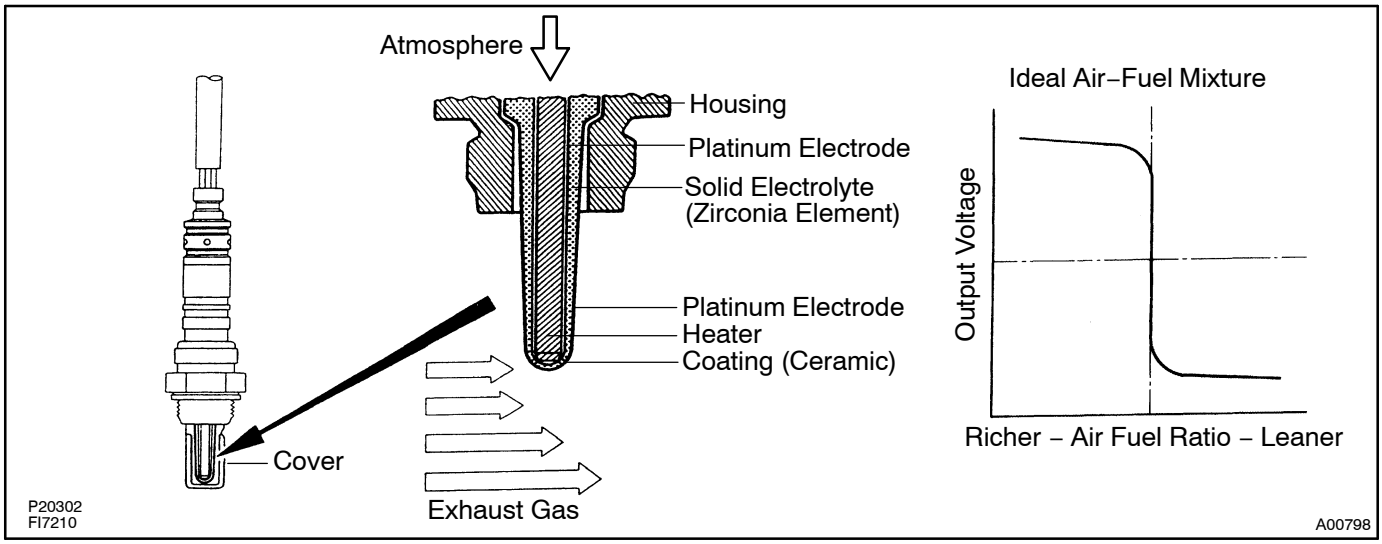
CIRCUIT DESCRIPTION

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 (bank 1, 2 sensor 1) has the characteristic which 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 the engine ECU with feedback to 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 engine ECU of the LEAN condition (small electromotive force: < 0.45 V).

When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the engine ECU of the RICH condition (large electromotive force: > 0.45 V). The engine ECU 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 engine ECU is unable to perform accurate air–fuel ratio control. The oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the engine ECU. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.

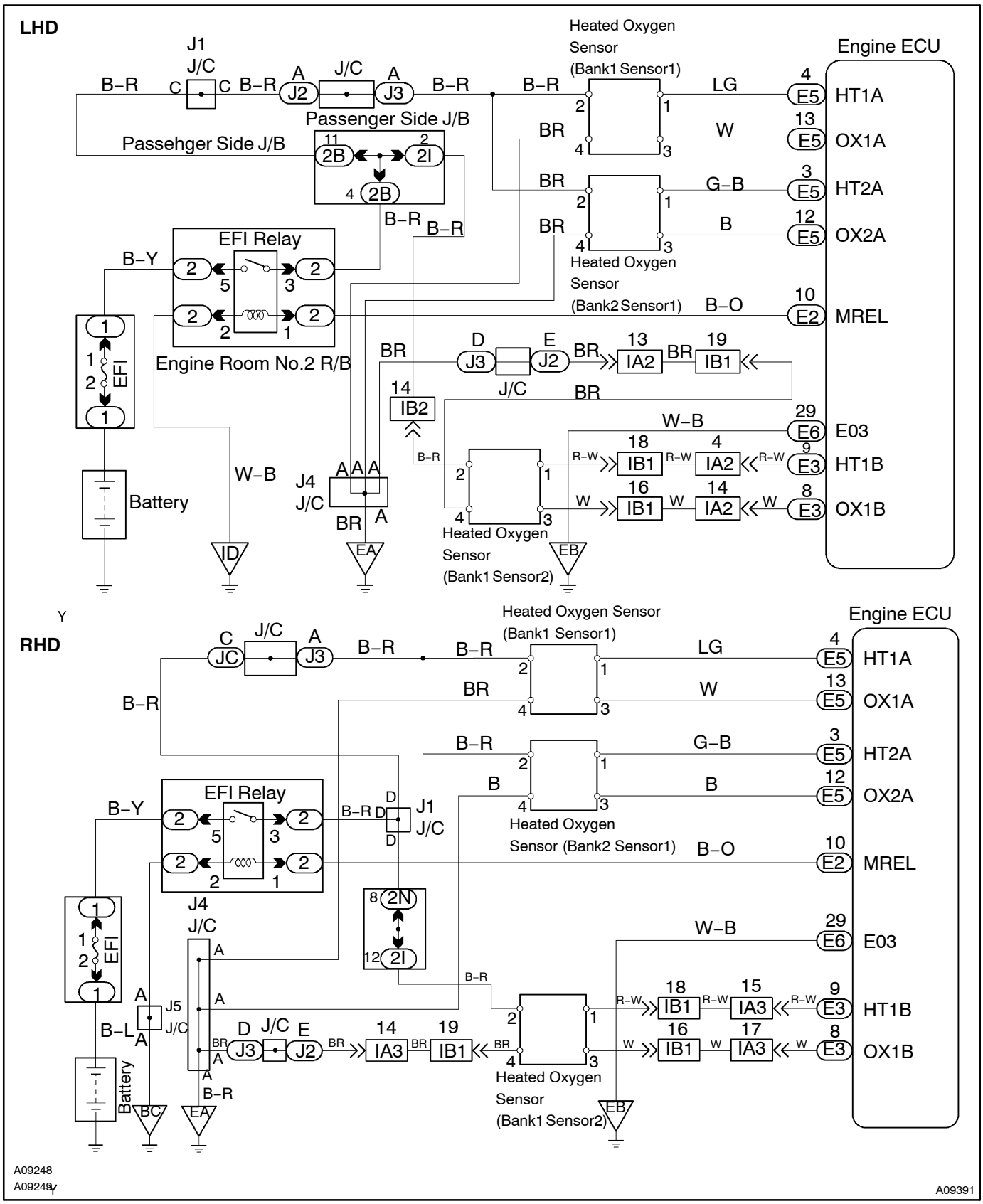


DTC No.	DTC Detecting Condition	Trouble Area
P0125/91	After engine is warmed up, heated oxygen sensors (bank 1, 2 sensor 1) output does not indicate RICH (≧0.45 V) even once when conditions (a), (b), (c) and (d) continue for at least 90 sec.: (b) Engine speed: 1,400 rpm or more (c) Vehicle speed: 40 – 100 km/h (25 – 62 mph) (d) Throttle valve does not fully closed (e) 180 sec. or more after starting engine	• Open or short in oxygen sensor (bank 1, 2 sensor 1) circuit • Oxygen sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU

HINT:

After confirming DTC P0125, use the hand–held tester to confirm voltage output of the oxygen sensor (bank 1, 2 sensor 1) from the CURRENT DATA. If voltage output of the oxygen sensor is less than 0.1 V, oxygen sensor circuit may be open or short.

WIRING DIAGRAM



INSPECTION PROCEDURE

When not using hand–held tester:

HINT:

- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0125 will be recorded. The CHE ENG (MIL) then comes on.

1	**Are there any other codes (besides DTC P0125) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	**Connect the hand–held tester, and read value for voltage output of oxygen sensors (bank 1, 2 sensor 1).**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Warm up the engine to normal operating temperature (above 75°C (169°F)).

CHECK:

Read voltage output of the oxygen sensors when the engine is suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 times using the accelerator pedal.

OK:

Oxygen sensor output a RICH signal (0.45 V or more) at least once.

OK → **Go to step 9**

NG

3	**Check for open and short in harness and connector between engine ECU and oxygen sensors (bank 1, 2 sensor 1) (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

4	Check whether misfire is occurred or not by monitoring DTC and data list.

NG → Perform troubleshooting for misfire (See page DI–25).

OK

5	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

6	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–1).

OK

7	Check injector injection (See page FI–19).

NG → Replace injector.

OK

8	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Replace oxygen sensor (bank 1, 2 sensor 1).

9	Perform confirmation driving pattern (See page DI–53).

GO

10	Is there DTC P0125 being output again?

YES → Check and replace engine ECU (See page IN–32).

NO

11	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI–4).

YES

DTC P0125 is caused by running out of fuel.

When not using hand–held tester:

1	Are there any other codes (besides code 91) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor (bank 1, 2 sensor 1).

DI63V–01

DTC	P0130/21	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0150/28	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0130/21 P0150/28	Voltage output of heated oxygen sensor remains at 0.35 V or more, or 0.55 V or less, during idling after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU

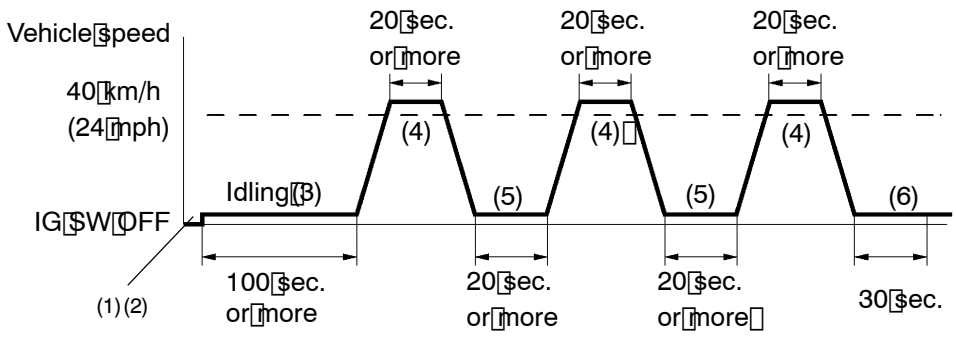
HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.
- The oxygen sensor's output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

CONFIRMATION DRIVING PATTERN



Y A09299

(1) Connect the hand–held tester to the DLC3.
(2) Switch the hand–held tester from the Normal mode to the Check (Test) Mode (See page DI–4).
(3) Start the engine and let the engine idle for 100 seconds or more.
(4) Drive the vehicle at 40 km/h (24 mph) or more for 20 seconds or more.

(5) Let the engine idle for 20 seconds or more.
(6) Let the engine idle for 30 seconds.

HINT:
If a malfunction exists, the CHK ENG (MIL) will be indicated on the multi information display during step (6).
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 hand–held tester, turn the ignition switch OFF after performing steps (3) to (6), then perform steps (3) to (6) again.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

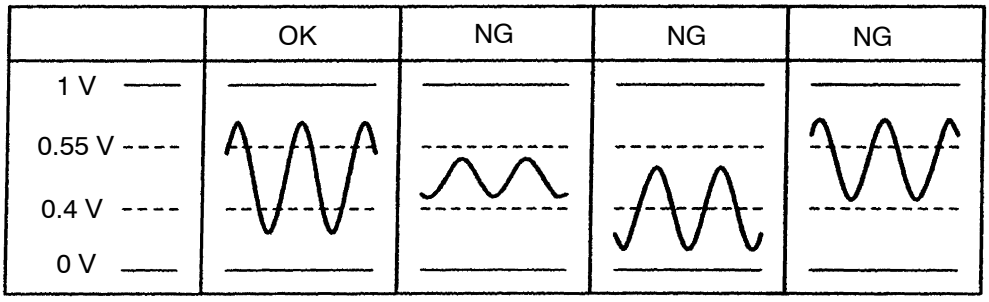
1	**Are there any other codes (besides DTC P0130 or P0150) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check output voltage of oxygen sensor during idling.**

PREPARATION:
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.
CHECK:
Use the hand–held tester to read the output voltage of the oxygen sensor during idling.
OK:
Oxygen sensor output voltage:
Alternates repeatedly between less than 0.35 V and more than 0.55 V (See the following table).



OK → Go to step 7.

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI–1).

OK

6	Check injector injection (See page FI–19).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern.

Go

8	Is there DTC P0130 or P0150 being output again?

NO → Check for intermittent problems (See page DI–4).

YES

Check and replace engine ECU (See page IN–32).

When not using hand–held tester:

1	Are there any other codes (besides code 21 or 28) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI563–02

DTC	P0133/21	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1) (European spec.)

DTC	P0153/28	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1) (European spec.)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0133/21 P0153/28	Response time for oxygen sensor's voltage output to change from rich to lean, or from lean to rich, is 1.1 sec. or more during idling after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0133 or P0153) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	**Check output voltage of oxygen sensor during idling.**

PREPARATION:

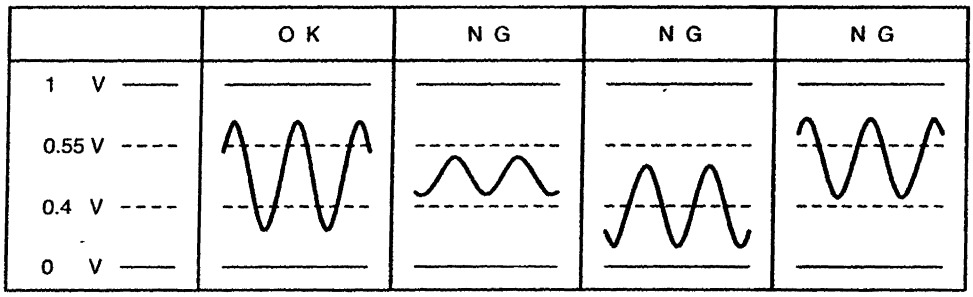
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Use the hand–held tester to read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



P18349

OK	Go to step 7

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–32).

NG	Repair or replace harness or connector.

OK

4	Check air induction system (See page FI–1).

NG	Repair or replace.

OK

5	Check fuel pressure (See page FI–6).

NG	Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–1).

OK

6	Check injector injection (See page FI–19).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern (See page DI–53).

GO

8	Is there DTC P0133 or P0153 being output again?

NO → Check for intermittent problems (See page DI–4).

YES

Check and replace engine ECU (See page IN–32).

When not using hand–held tester:

1	Are there any other codes (besides code 21 or 28) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI63W–01

DTC	P0135/21	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0141/27	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

DTC	P0155/28	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0135/21 P0141/21 P0155/28	When the heater operates, heater current exceeds 2 A (2 trip detection logic)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU
	Heater current of 0.2 A or less when the heater operates (2 trip detection logic)	

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to 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.

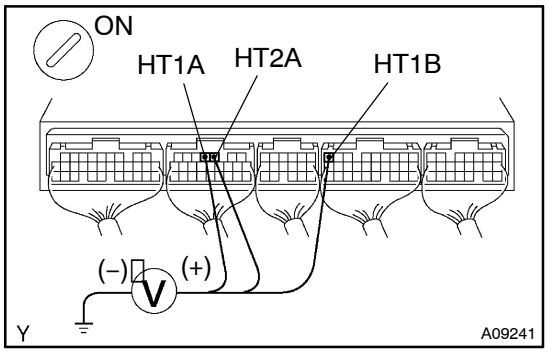
WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

INSPECTION PROCEDURE

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check voltage between terminals HT1A, HT2A, HT1B, of engine ECU connectors and body ground.**



LEXUS LS200 (RM684E)

PREPARATION:

(a) Remove engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals HT1A, HT2A, HT1B, of the engine ECU connectors and body ground.

HINT:

- Connect terminal HT1B to bank 2 sensor 1.
- Connect terminal HT1A to bank 1 sensor 1.

• Connect terminal HT2A to bank 1 sensor 2.

OK:

Voltage: 9 – 14 V

OK	Check and replace engine ECU (See page IN–32).

NG

2	Check resistance of oxygen sensor heater (See page FI–66).

NG	Replace oxygen sensor.

OK

Check and repair harness or connector between EFI main relay (Marking: EFI) and oxygen sensor, and oxygen sensor and engine ECU (See page IN–32).

DTC	P0136/27	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–48.

DTC No.	DTC Detecting Condition	Trouble Area
P0136/27	Voltage output of heated oxygen sensor remains at 0.4 V or more or 0.5 V or less when vehicle is driven at 30 km/h (19 mph) or more after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor

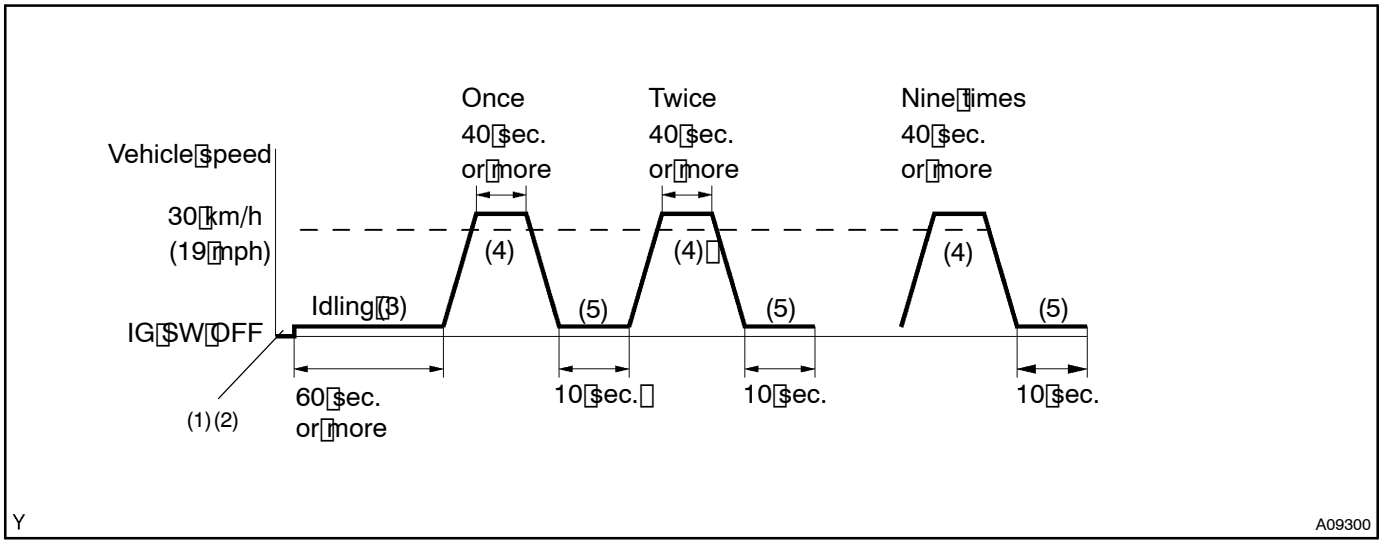
HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Sensor 2 refers to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–48.

CONFIRMATION DRIVING PATTERN



(1) Connect the hand–held tester to the DLC3.
(2) Switch the hand–held tester from the Normal Mode to the Check (Test) Mode (See page DI–4).
(3) Start the engine and let the engine idle for 60 seconds or more.
(4) Drive the vehicle at 30 km/h (18 mph) or more for 40 seconds or more.
(5) Let the engine idle for 10 seconds or more.
(6) Preform steps (4) to (5) 9 times.

HINT:

If a malfunction exists, the CHK ENG (MIL) will be indicated on the multi information display during step (6).

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 hand–held tester, turn the ignition switch OFF after performing steps (3) to (6), then perform steps (3) to (6) again.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0136) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	**Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

3	**Check output voltage of oxygen sensor.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) After warming up the engine, race the engine at 2,500 rpm for 3 min.

CHECK:

Read the voltage output of the oxygen sensor when the engine is suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 min. using the accelerator pedal.

OK:

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 oxygen sensor.

When not using hand–held tester:

1	Are there any other codes (besides code 27) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI63Y–01

DTC	P0171/25	System too Lean (A/F Lean Malfunction, Bank 1)

DTC	P0172/26	System too Rich (A/F Rich Malfunction, Bank 1) (European spec.)

DTC	P0174/25	System too Lean (A/F Lean Malfunction, Bank 2)

DTC	P0175/26	System too Rich (A/F Rich Malfunction, Bank 2) (European spec.)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared to 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 overtime 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 CHK ENG on the multi information display.

DTC No.	DTC Detecting Condition	Trouble Area
P0171/25 P0174/25	When air–fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on LEAN side (2 trip detection logic)	• Air induction system • Injector blockage • Vacuum sensor • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank 1, 2 sensor 1) • Oxygen sensor (bank 1, 2 sensor 1) • Engine ECU
P0172/26 P0175/26	When air–fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on RICH side (2 trip detection logic)	• Injector leak, blockage • Vacuum sensor • Water temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank 1, 2 sensor 1) • Oxygen sensor (bank 1, 2 sensor 1) • Engine ECU

HINT:

- When the DTC P0171/25 or P0174/25 is recorded, the actual air–fuel ratio is on the LEAN side. When DTC P0172/26 or P0175/26 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 P0171/25 and P0174/25 is recorded. The CHK ENG then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ± 35%, the system is functioning normally.
- The oxygen sensor (bank 1 sensor 1) output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–48.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check air induction system (See page FI–1).**

NG → **Repair or replace.**

OK

2	**Check injector injection (See page FI–19).**

NG → **Replace injector.**

OK

3	**Check vacuum sensor (See page FI–61) and water temperature sensor (See page FI–57).**

NG → **Repair or replace.**

OK

4	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter.

OK

6	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

7	Check output voltage of oxygen sensor (bank 1, 2 sensor 1) during idling.

PREPARATION:

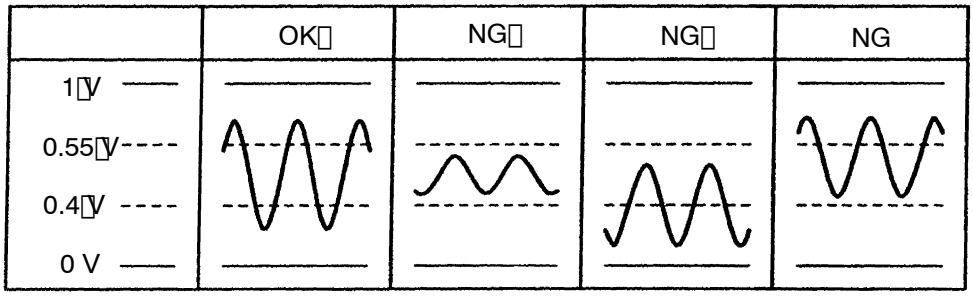
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Used the hand–held tester to read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.5 V (See the following table).



A00292

OK	Go to step 9.

NG

8	Check for open and short in harness and connector between engine ECU and oxygen sensor (bank 1, 2 sensor 1) (See page IN–32).

NG	Repair or replace harness or connector.

OK

Replace oxygen sensor.

9	Perform confirmation driving pattern (See page DI–53).

Go

10	Is there DTC P0171, P0172, P0174 or P0175 being output again?

YES	Check and replace engine ECU (See page IN–32).

NO

11	Did vehicle runs out of fuel in past?

NO	Check for intermittent problems (See page DI–25).

YES

DTC P0171, P0172, P0174, or P0175 is caused by running out of fuel.

When not using hand–held tester:

1	Check air induction system (See page FI–48).

NG → Repair or replace.

OK

2	Check fuel pressure (See page FI–1).

NG → Check and repair fuel pump, fuel pipe line and filter (See page FI–31).

OK

3	Check injector injection (See page FI–23).

NG → Replace injector.

OK

4	Check vacuum sensor (See page FI–61) and water temperature sensor (See page FI–57).

NG → Repair or replace.

OK

5	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

6	Does malfunction disappear when a good oxygen sensor (bank 1, 2 sensor 1) installed?

YES → Repair oxygen sensor.

NO

Check and replace engine ECU (See page IN–32).

DI63Z–01

DTC	P0300/93	Random/Multiple Cylinder Misfire Detected (European spec.)

DTC	P0301/93	Cylinder 1 Misfire Detected (European spec.)

DTC	P0302/93	Cylinder 2 Misfire Detected (European spec.)

DTC	P0303/93	Cylinder 3 Misfire Detected (European spec.)

DTC	P0304/93	Cylinder 4 Misfire Detected (European spec.)

DTC	P0305/93	Cylinder 5 Misfire Detected (European spec.)

DTC	P0306/93	Cylinder 6 Misfire Detected (European spec.)

CIRCUIT DESCRIPTION

Misfire: The engine ECU uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation for each cylinder.

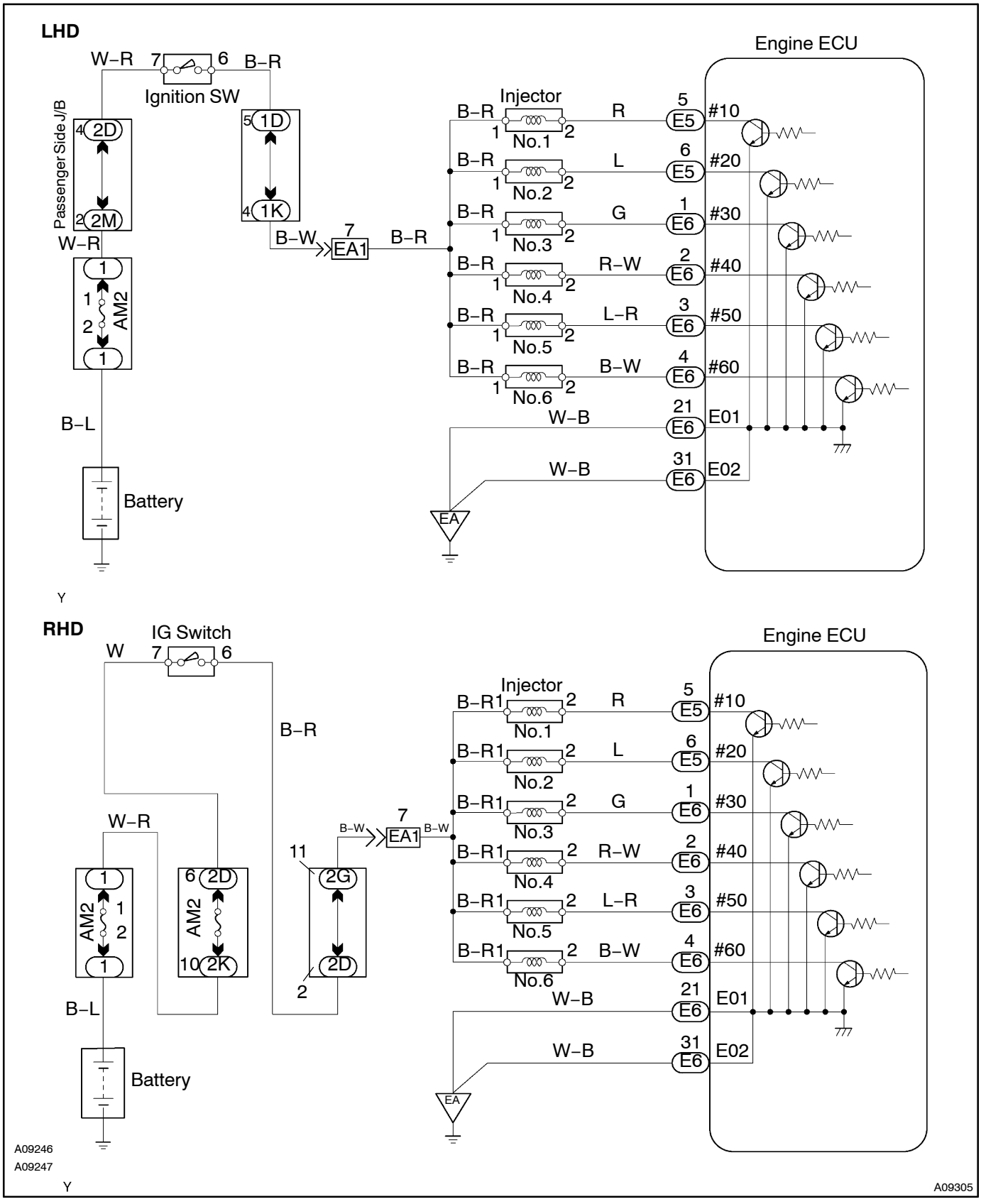
The engine ECU counts the number of times the engine speed change rate indicates that misfire has occurred. And when the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the CHK ENG lights up.

If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the CHK ENG blinks when misfiring occurs.

DTC No.	DTC Detecting Condition	Trouble Area
P0300/93	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions 1 trip detection logic: CHK ENG to brink 2 trip detection logic: CHK ENG to light up	• Open or short in engine wire • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Vacuum sensor • Water temp. sensor • Compression pressure • Valve clearance • Valve timing • Engine ECU
P0301/93 P0302/93 P0303/93 P0304/93 P0305/93 P0306/93	For any particular 200 revolutions of engine, misfiring is detected which can cause catalyst overheating (This causes CHK ENG to blink)	
	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emissions (2 trip detection logic)	

HINT:
When codes for a misfiring cylinder is recorded repeatedly but no random misfire code is recorded, it indicates that the misfires were detected and recorded at different times.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

(a) Connect the hand–held tester to the DLC3.
(b) Record DTC and the freeze frame data.
(c) Use the hand–held tester to set to the Check (Test) Mode (See page DI–4).
(d) Drive the vehicle several times with the engine speed, load and its surrounding ranges shown with ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the data list.

If you have no hand–held tester, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again.

HINT:

In order to memorize DTC of misfire, it is necessary to drive around MISFIRE RPM, MISFIRE LOAD in the data list for the following period of time.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

(e) Check whether there is misfire or not by monitoring DTC and the freeze frame data. After that, record them.
(f) Turn the ignition switch OFF and wait at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If it is the case that DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition of freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See confirmation driving pattern).
- When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is besides the range of ± 20 %, there is a possibility that the air–fuel ratio is inclining either to RICH (–20 % or less) or LEAN (+20 % or more).
- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility of misfire only during warmed up.
- In the case that misfire cannot be reproduced, the reason may be because of the driving with lack of fuel, the use of improper fuel, a stain of the ignition plug, and etc.

1	**Check wire harness, connector and vacuum hose in engine room.**

CHECK:

(a) Check the connection conditions of wire harness and connector.
(b) Check the disconnection, piping and break of vacuum hose.

NG	**Repair or replace, then confirm that there is no misfire (See confirmation driving pattern).**

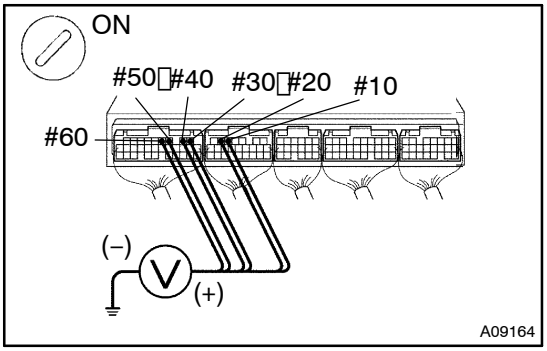
OK

2	Check spark plug and spark of misfiring cylinder (See page FI–19).

NG → Replace or check ignition system (See page IG–1).

OK

3	Check voltage of engine ECU terminals for injector of failed cylinder.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between applicable terminals #10 – #60 of the engine ECU connectors and body ground.

OK:

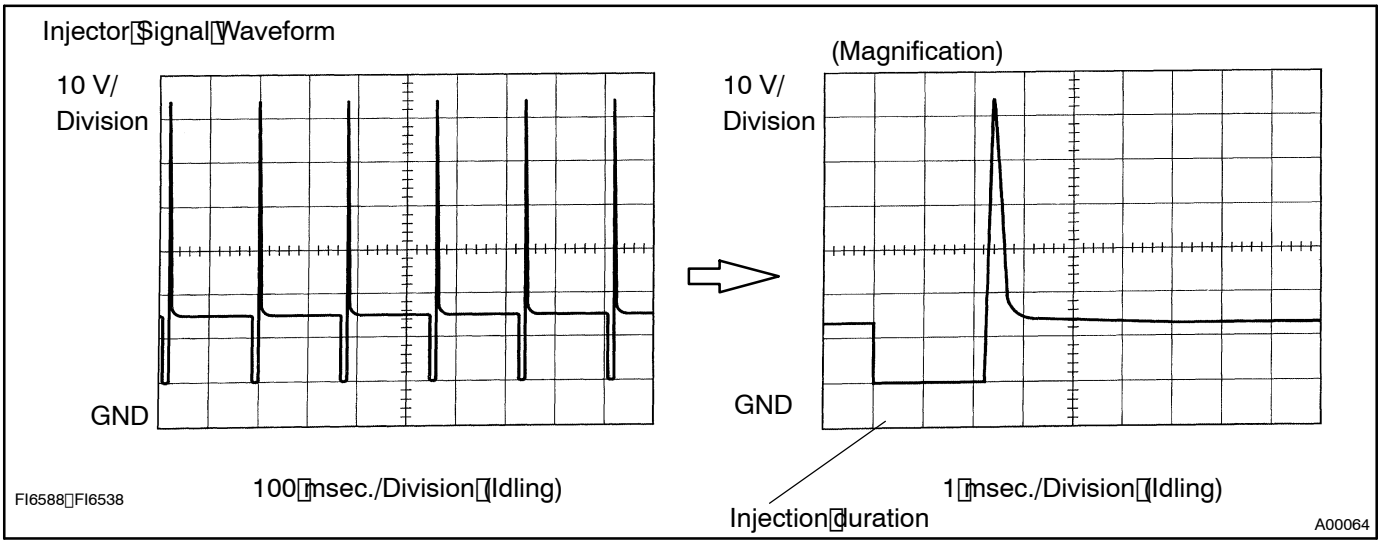
Voltage: 9 – 14 V

Reference: INSPECTION USING OSCILLOSCOPE

With the engine idling, check the waveform between terminals #10 – #60 and E01 of the engine ECU connectors.

HINT:

The correct waveform is as shown.



OK → Go to step 5.

NG

4	Check resistance of injector of misfiring cylinder (See page FI–19).

NG → Replace injector.

OK

Check for open and short in harness and connector between injector and engine ECU (See page IN–32).

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI–1).

OK

6	Check injector injection (See page FI–19).

NG → Replace injector.

OK

7	Check vacuum sensor (See page FI–61) and water temperature sensor (See page FI–57).

NG → Repair or replace.

OK

Check compression pressure (See page EM–3), valve clearance (See page EM–6) and valve timing (See page EM–25).

DI640–01

DTC	P0325/52	Knock Sensor 1 Circuit Malfunction (Bank 1)

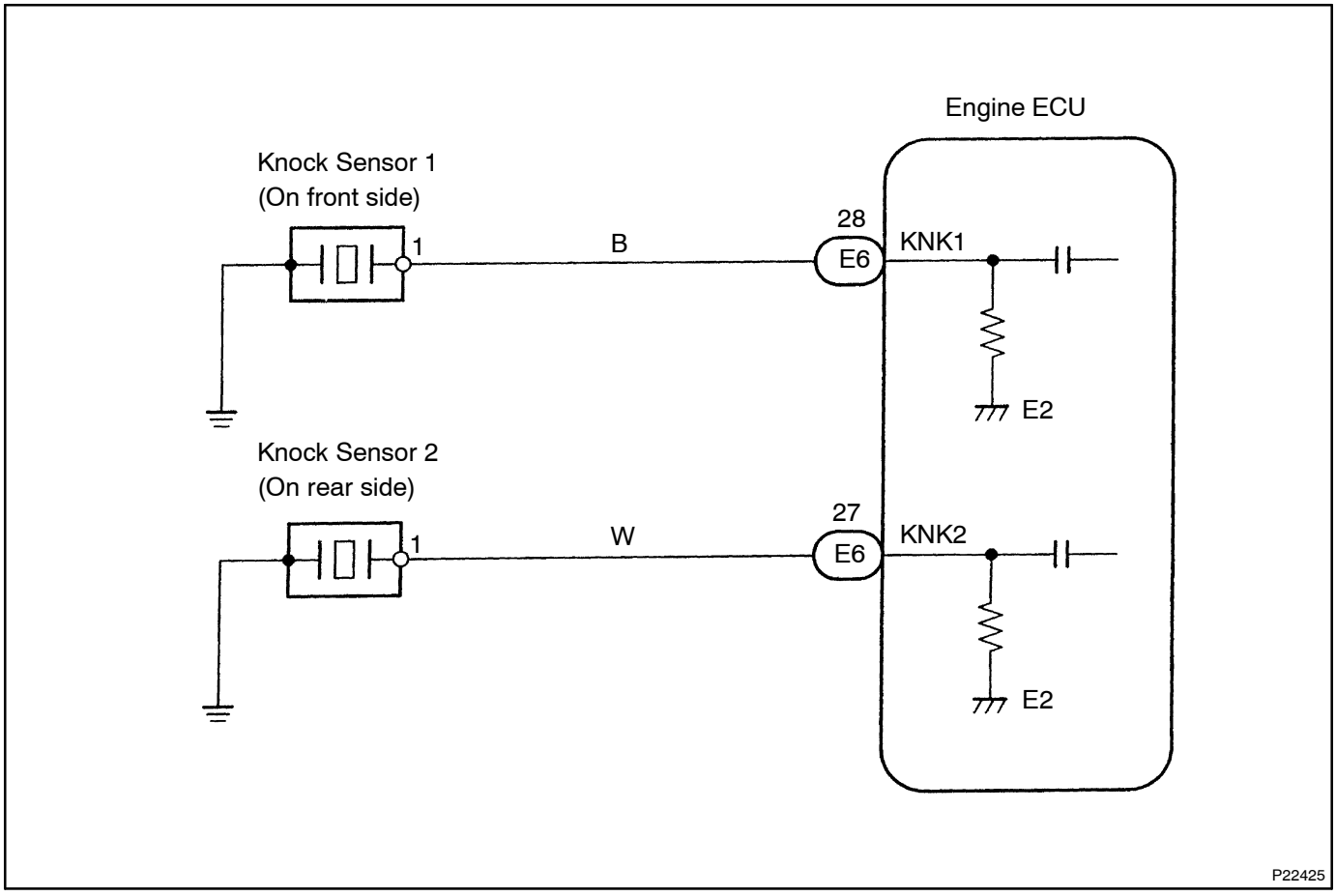
DTC	P0330/55	Knock Sensor 2 Circuit Malfunction (Bank 2)

CIRCUIT DESCRIPTION

Each of knock sensor is fitted one to the front and rear of the left side 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
P0325/52	No knock sensor 1 signal to engine ECU with engine speed between 1,600 rpm and 5,200 rpm	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU
P0330/55	No knock sensor 2 signal to engine ECU with engine speed between 1,600 rpm and 5,200 rpm	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU

WIRING DIAGRAM

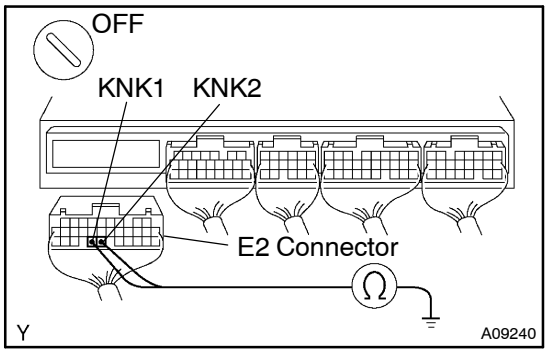


INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check continuity between terminal KNK1, KNK2 of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E2 connector from the engine ECU.

CHECK:

Measure the resistance between terminals KNK1, KNK2 of the engine ECU connector and body ground.

HINT:

- Connect terminal KNK1 to knock sensor 1.
- Connect terminal KNK2 to knock sensor 2.

OK:

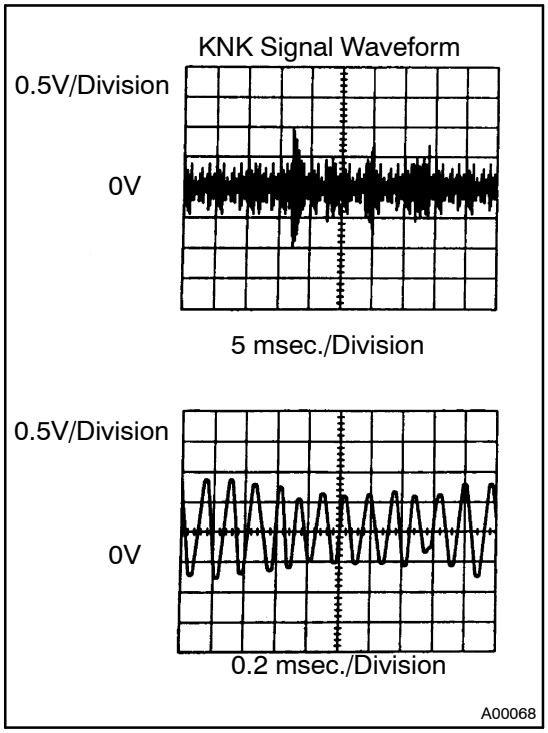
Resistance: 1 MΩ or higher

Reference: INSPECTION USING OSCILLOSCOPE

- With the engine racing (4,000 rpm), check the waveform between terminals KNK1, KNK2 of the engine ECU connector 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 0.141msec.
  (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.

OK	**Go to step 3.**

NG

2	Check knock sensor (See page FI–63).

NG → Replace knock sensor.

OK

3	Check for open and short in harness and connector between engine ECU and knock sensor (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Does malfunction disappear when a good knock sensor is installed?

YES → Replace knock sensor.

NO

Check and replace engine ECU (See page IN–32).

DI641–01

DTC	P0335/12, 13	Crankshaft Position Sensor Circuit Malfunction (NE Signal)

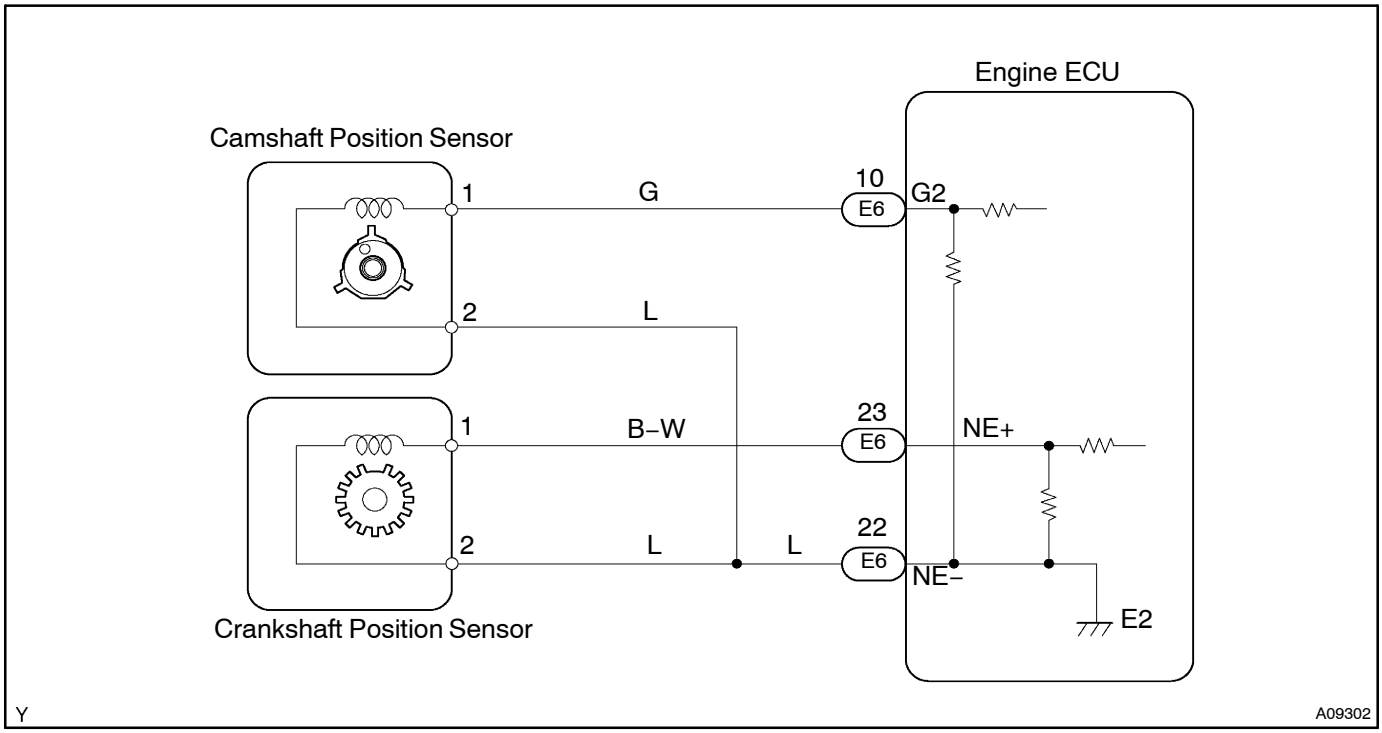
CIRCUIT DESCRIPTION

The crankshaft position sensor, which detects the engine speed and crankshaft angle signal (NE signal), has been installed on the oil pump body.

The NE signal plate of the crankshaft timing pulley has 34 teeth. The NE signal sensor generates 34 signals of every engine revolution. The engine ECU detects the standard crankshaft angle based on the G signal, and the actual crankshaft angle and the engine speed by the NE signal.

DTC No.	DTC Detecting Condition	Trouble Area
P0335/12, 13	No crankshaft position sensor signal to engine ECU during cranking (2 trip detection logic)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU
	No crankshaft position sensor signal to engine ECU with engine speed 600 rpm or more (2 trip detection logic)	

WIRING DIAGRAM

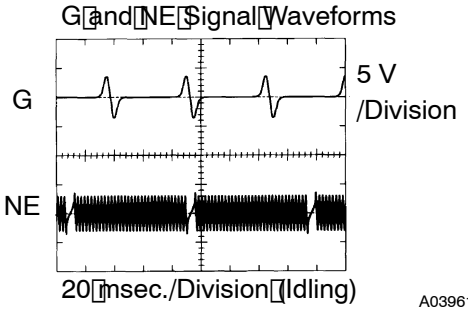


INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335/12, 13 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check resistance of crankshaft position sensor (See page IG–1).**



Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check the waveform between terminals G2 and NE–, and NE and NE– of the engine ECU connector.
HINT:
The correct waveforms are as shown.

NG → **Replace crankshaft position sensor.**

OK

2	**Check for open and short in harness and connector between engine ECU and crankshaft position sensor (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

3	**Inspect sensor installation and signal plate teeth of crankshaft timing pulley.**

NG → **Tighten sensor.**
Replace crankshaft timing pulley.

OK

Check and replace engine ECU (See page IN–32).

DI642–01

DTC	P0340/12	Camshaft Position Sensor Circuit Malfunction (G Signal)

CIRCUIT DESCRIPTION

Camshaft position sensor (G signal) consists of an iron core and pickup coil.
The G signal rotor has 3 teeth, and is installed on the intake camshaft.
When the camshaft rotates, the protrusion on the signal rotor 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 installed on the crankshaft timing pulley. The NE signal sensor generates 34 signals for every engine revolution. The engine ECU detects the standard crankshaft angle based on the G2 signal and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0340/12	No camshaft position sensor signal to engine ECU during cranking (2 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • Engine ECU
	No camshaft position sensor signal to engine ECU with engine speed 600 rpm or more	

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–81.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check resistance of camshaft position sensor (See page IG–1).**

Reference: INSPECTION USING OSCILLOSCOPE
Refer to DTC P0335/12, 13 on page DI–81.

NG → **Replace camshaft position sensor.**

OK

2	**Check for open and short in harness and connector between engine ECU and camshaft position sensor (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

3	Inspect sensor installation and signal rotor of the intake camshaft.

NG → Tighten sensor. Replace intake camshaft.

OK →

Check and replace engine ECU (See page IN–32).

DI643–01

DTC	P0420/94	Catalyst System Efficiency Below Threshold (Bank 1) (European spec. (Except Taiwan))

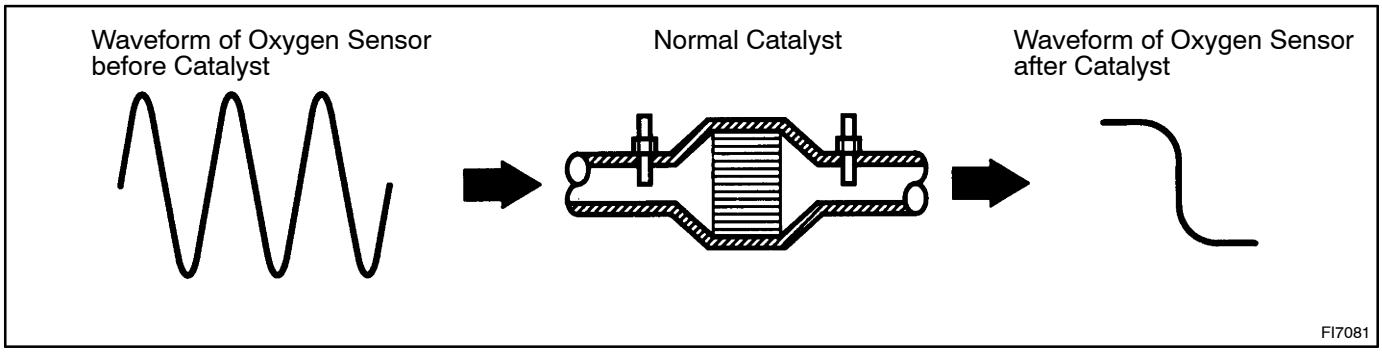
CIRCUIT DESCRIPTION

The engine ECU 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.

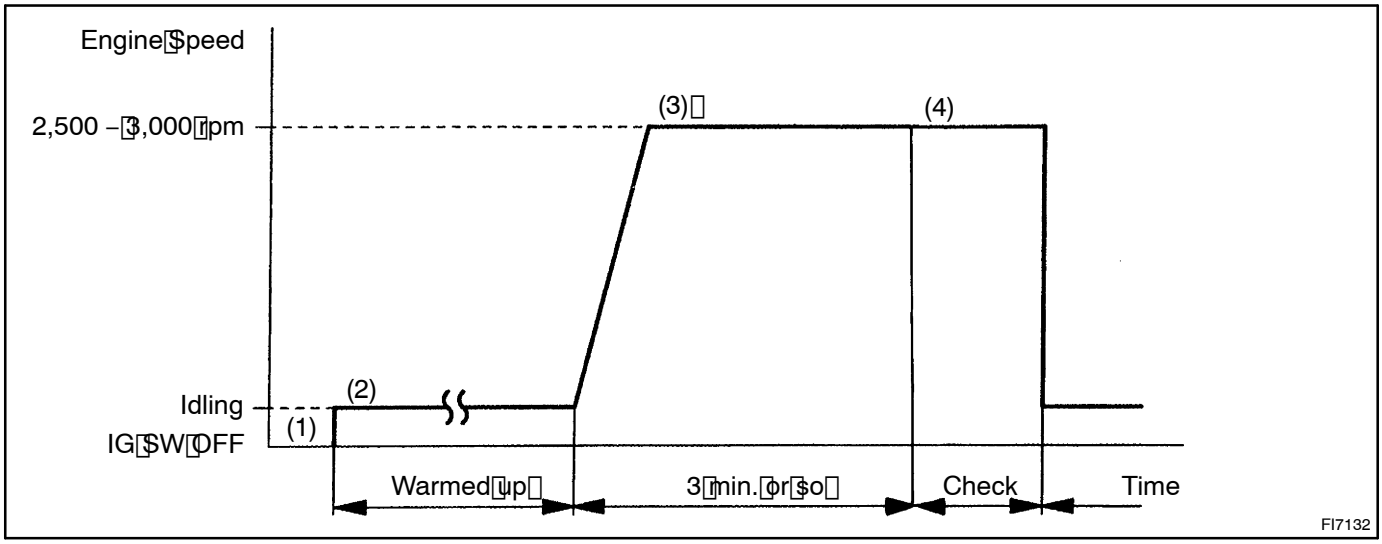
If the catalyst is functioning normally, the waveform of the oxygen sensor after the catalyst switches back and forth between rich and lean much more slowly than the waveform of the oxygen sensor before the catalyst.

But when both waveform change at a similar rate, it indicates that catalyst performance has deteriorated.

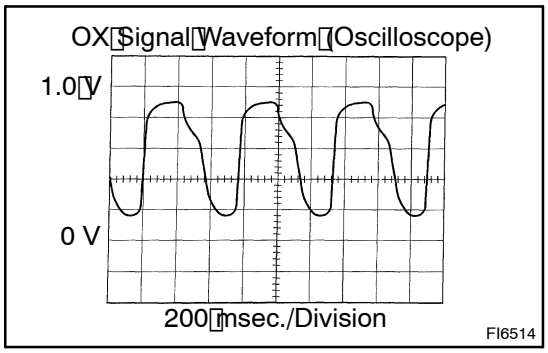


DTC No.	DTC Detecting Condition	Trouble Area
P0420/94	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of oxygen sensors have same amplitude (2 trip detection logic)	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the hand–held tester to the DLC3, or connect the probe of the oscilloscope between terminals OX1A, OX1B, OX2A, and E1 of the engine ECU connectors.
(2) Start the engine and warm it up with all the accessories switched OFF until engine coolant temperature is stable.
(3) Race the engine at 2,500 – 3,000 rpm for about 3 min.
(4) After confirming that the waveform of the oxygen sensor (bank 1, 2 sensor 1) (OX1A, OX2A), oscillate around 0.5 V during feedback to the engine ECU, check the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B).



HINT:
If there is a malfunction in the system, the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B) is almost the same as that of the oxygen sensor (bank 1, 2 sensor 1) (OX1A, OX2A) on the left.
There are some cases where, even though a malfunction exists, the CHK ENG may either light up or not light up.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides P0420/94) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

3	Check oxygen sensor (bank 1, 2 sensor 1) (See page FI–66).

NG → Repair or replace.

OK

4	Check oxygen sensor (bank 1 sensor 2) (See page FI–66).

NG → Repair or replace.

OK

Replace three–way catalytic converter.

DI644–01

DTC	P0443/94	Evaporative Emission Control System Purge Control Vent Control Malfunction*

***: European spec.**

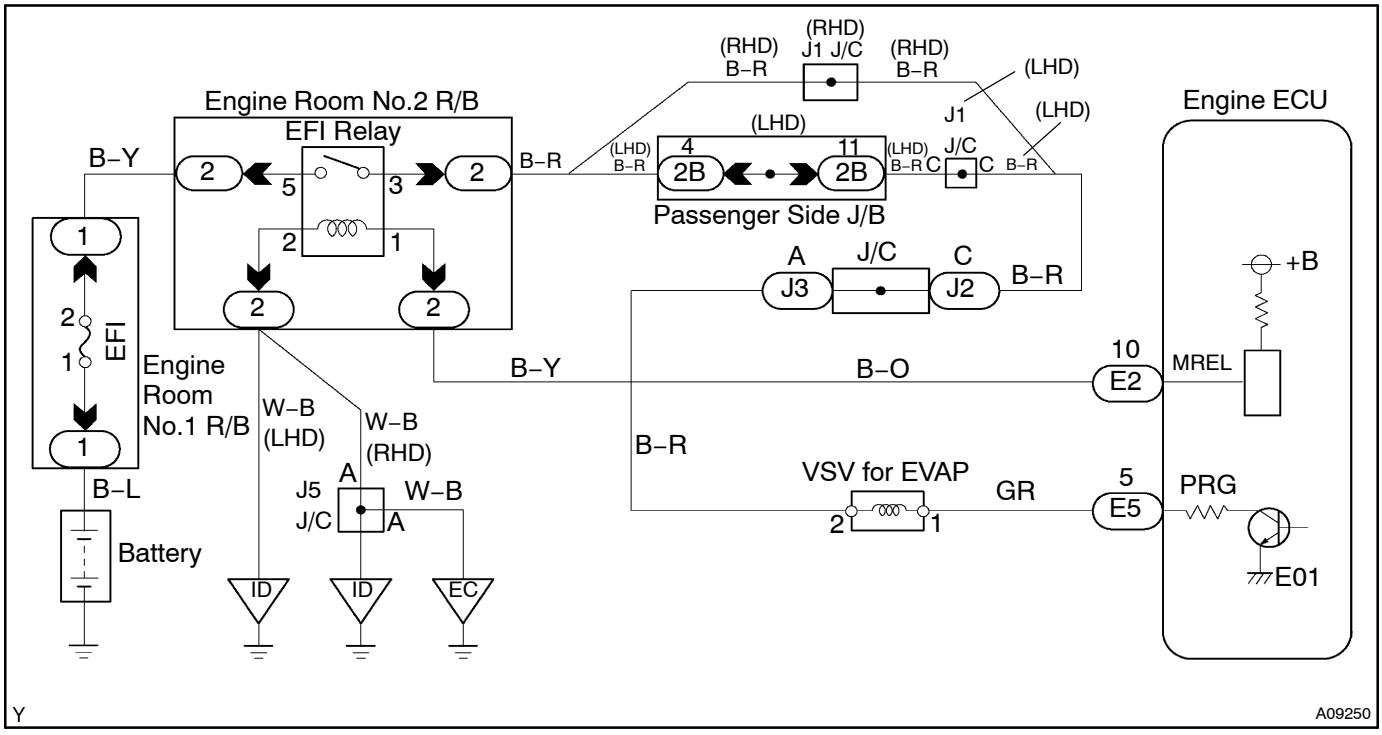
CIRCUIT DESCRIPTION

To reduce HC emissions, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.

The engine ECU changes the duty signal to the VSV for the EVAP so that the intake quantity of HC emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is wamed up.

DTC No.	DTC Detecting Condition	Trouble Area
P0443/94	Proper response to engine ECU command does not occur	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU

WIRING DIAGRAM



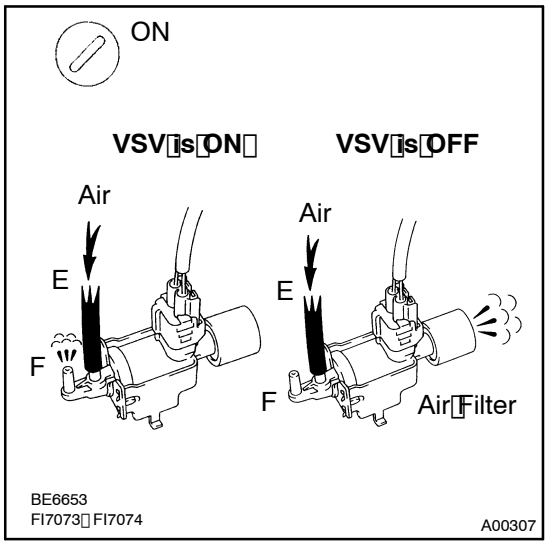
INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Connect hand–held tester and check operation of VSV for EVAP.



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation of the VSV when the VSV is operated by the hand–held tester.

OK:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air from port E is flows out through the air filter.

OK	Check for intermittent problems (See page DI–4).

NG

2	Check VSV for EVAP (See page FI–48).

NG	Replace VSV for EVAP.

OK

3	Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–32).

NG	Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

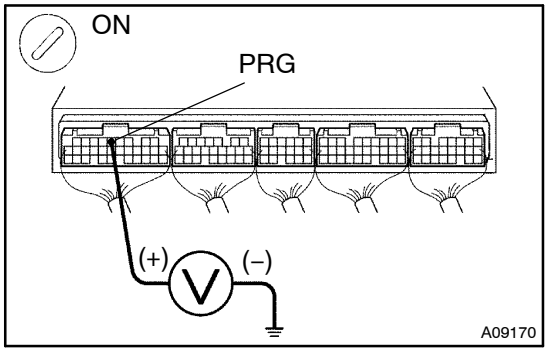
When not using hand–held tester:

1	Check VSV for EVAP (See page FI–48).

NG → Replace VSV for EVAP.

OK

2	Check voltage between terminal PRG of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal PRG of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–32).

OK

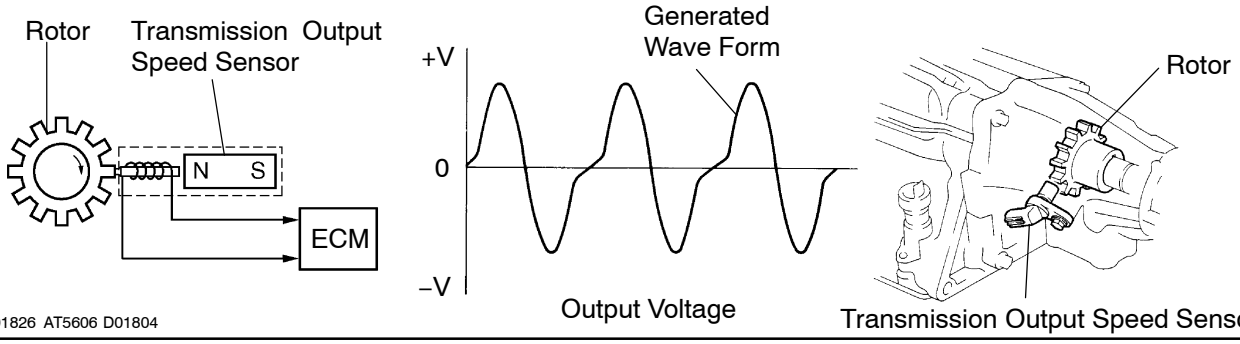
Check and replace engine ECU (See page IN–32).

DI645–01

DTC	P0500/42	Vehicle Speed Sensor Malfunction

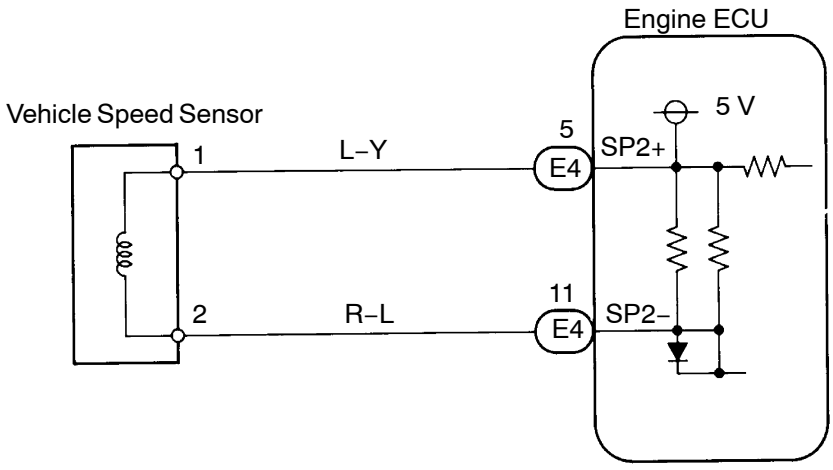
CIRCUIT DESCRIPTION

The vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the engine ECU. The engine ECU determines the vehicle speed based on these signals. An AC voltage is generated in the vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the engine ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	No vehicle speed sensor signal to engine ECU under conditions (a) and (b): (a) Park/neutral position switch is OFF (b) Vehicle is being driven	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and read value of vehicle speed value.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Start the engine and push the the hand–held tester main switch ON.

CHECK:

Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value.

OK → **Check and replace engine ECU (See page IN–32).**

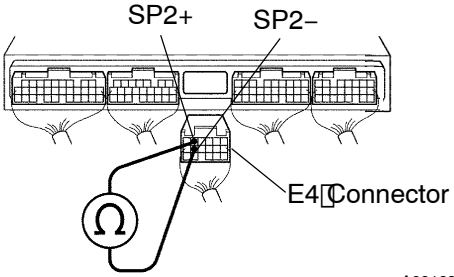
NG

2	**Check speedometer circuit (See page BE–83).**

NG → **Repair or replace speedometer circuit.**

OK

3	**Check resistance between terminals SP2+ and SP2– of engine ECU connector.**



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the E4 connector from the engine ECU.

CHECK:

Check the resistance between terminals SP2+ and SP2– of the engine ECU connector.

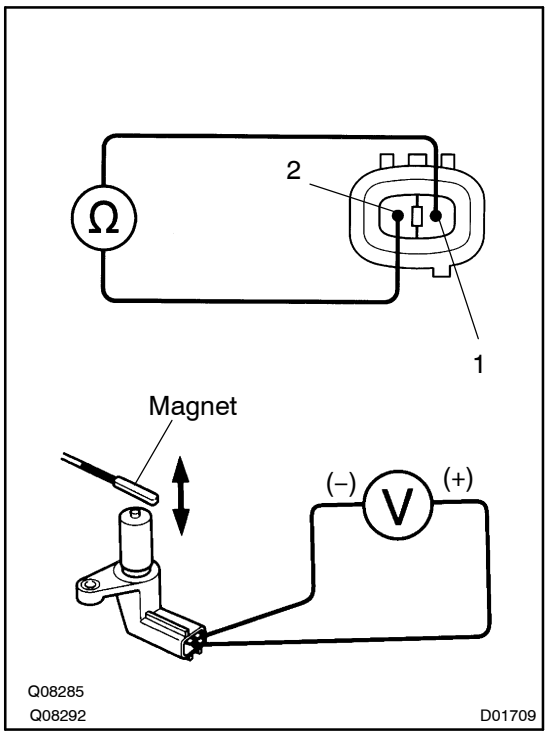
OK:

Resistance: 560 – 680 Ω

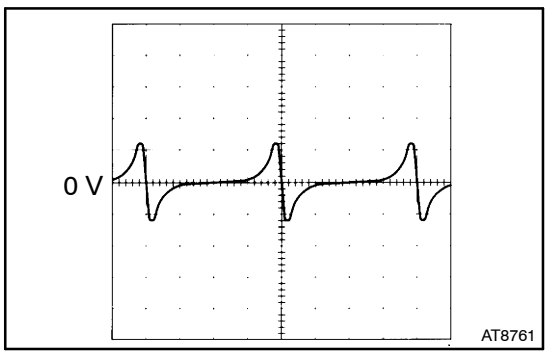
OK → **Check and replace engine ECU (See page IN–32).**

NG

4	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.
CHECK:
Measure the resistance between terminals 1 and 2 of the speed sensor.
OK:
Resistance: 560 – 680 Ω
Reference: CHECK VEHICLE SPEED SENSOR'S FUNCTION
CHECK:
Check the voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to the front end of the vehicle speed sensor then taken away quickly.
OK:
Voltage is generated intermittently.
HINT:
Voltage generated is extremely low.



Reference: INSPECTION USING OSCILLOSCOPE
Check the waveform between terminals SP2+ and SP2– when the vehicle speed is approx. 60 km/h (37 mph).

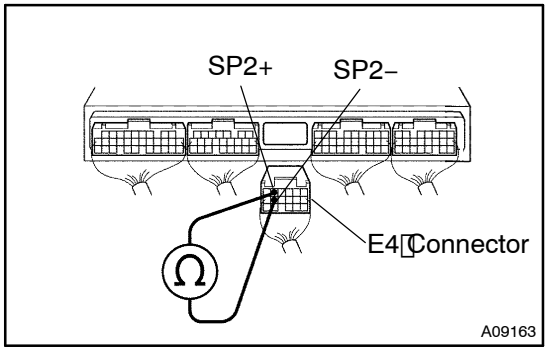
NG → **Replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page IN–32).

When not using hand-held tester:

1	Check resistance between terminals SP2+ and SP2– of engine ECU connector.

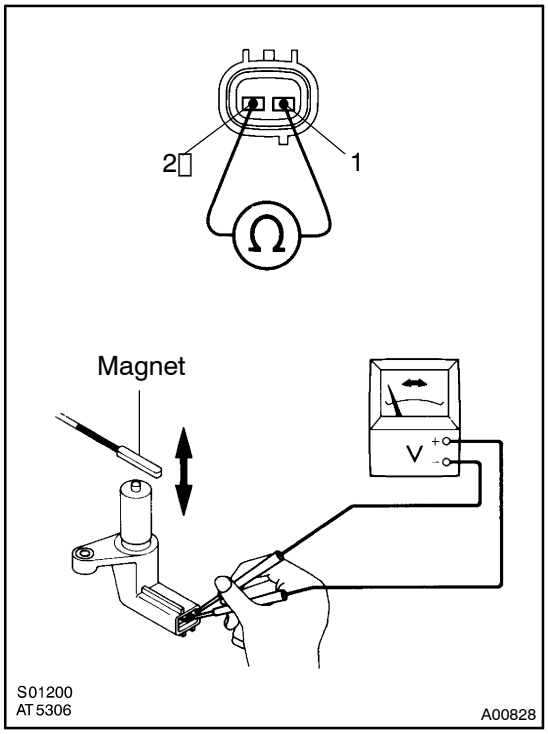


PREPARATION:
(a) Remove the engine ECU hood.
(b) Disconnect the E4 connector from the engine ECU.
CHECK:
Check the resistance between terminals SP2+ and SP2– of the engine ECU connector.
OK:
Resistance: 560 – 680 Ω

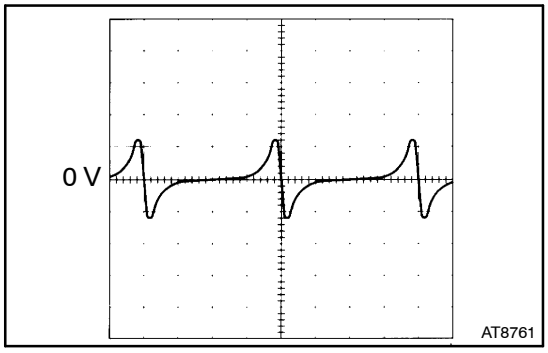
OK	Check and replace engine ECU (See page FI–67).

NG

2	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.
CHECK:
Measure the resistance between terminals 1 and 2 of the speed sensor.
OK:
Resistance: 560 – 680 Ω
Reference: CHECK VEHICLE SPEED SENSOR'S FUNCTION
CHECK:
Check the voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to the front end of the vehicle speed sensor then taken away quickly.
OK:
Voltage is generated intermittently.
HINT:
Voltage generated is extremely low.



Reference: INSPECTION USING OSCILLOSCOPE
Check the waveform between terminals SP2+ and SP2– when the vehicle speed is approx. 60 km/h (37 mph).

NG → **Replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page DI–91).

DI2P2–03

DTC	P0505/33	Idle Control System Malfunction (European spec.)

CIRCUIT DESCRIPTION

The idle speed is controlled by the Electric Throttle Control System (ETCS).
ETCS is composed of the throttle motor to operate the throttle valve, the magnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the engine ECU to control the ETCS and the one valve type throttle body.
The engine ECU controls the throttle motor to make the throttle valve opening angle properly for the target idle speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from target speed (2 trip detection logic)	• Air induction system • Electric throttle control system

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel was ratio lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides P0505/33) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

2	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

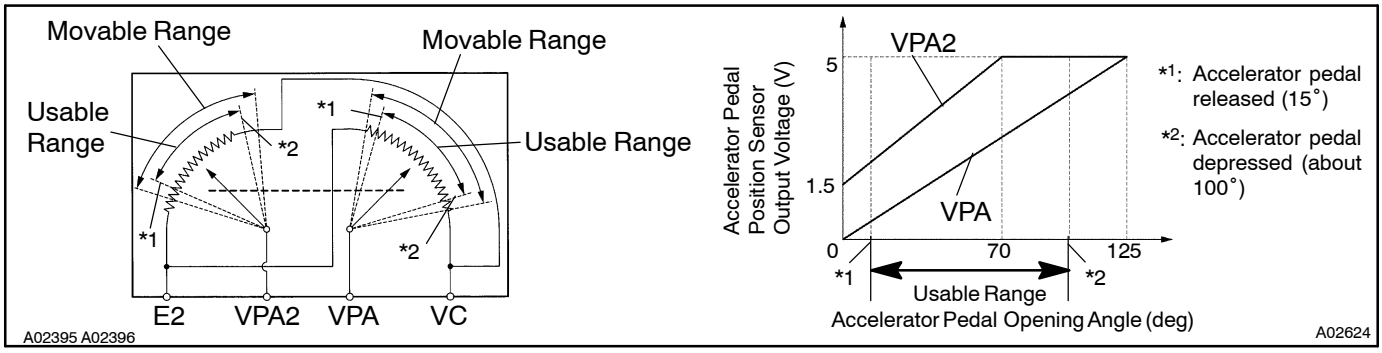
Check electric throttle control system (See page FI–32).

DI646–01

DTC	P1120/19	Accelerator Pedal Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Accelerator pedal position sensor is mounted on the throttle body and it have the 2 sensors to detects the accelerator position and a malfunction of the accelerator position's own.
The accelerator pedal position sensor is connected with the accelerator pedal by the accelerator wire and the voltage applied to the terminals VPA and VPA2 of the ECU changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal.
The engine ECU judges the current opening angle of the accelerator pedal from these signals input from terminals VPA and VPA2 and the engine ECU controls the throttle motor based on these signals.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

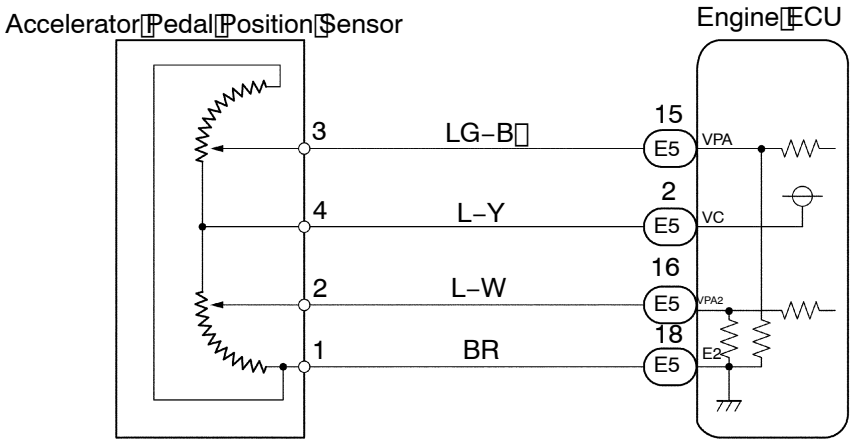


DTC No.	DTC Detecting Condition	Trouble Area
P1120/19	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VPA ≦ 0.2 V (b) VPA2 ≦ 0.5 V (c) VPA ≧ 4.8 V (d) When VPA ≧ 0.2 V and ≦ 1.8 V, and VPA2 ≧ 4.97 V (e) VPA–VPA2 ≦ 0.02 V	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU
	Condition (a) or (b) continues for 0.4 seconds: (a) VPA ≦ 0.2 V and VPA2 ≦ 1.5 V	

HINT:
After confirming DTC P1120/19, use the hand–held tester to confirm the accelerator pedal opening percentage.

Throttle valve position expressed as voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2	
0 V	0 V	0 V	0 V	VC line open
0 V	1.8 – 2.7 V	0 V	4.7 – 5.1 V	VPA line open or grand short
0.3 – 0.9 V	0 V	3.2 – 4.8 V	0 V	VPA2 line open or grand short
5 V	5 V	5 V	5 V	E2 line open

WIRING DIAGRAM



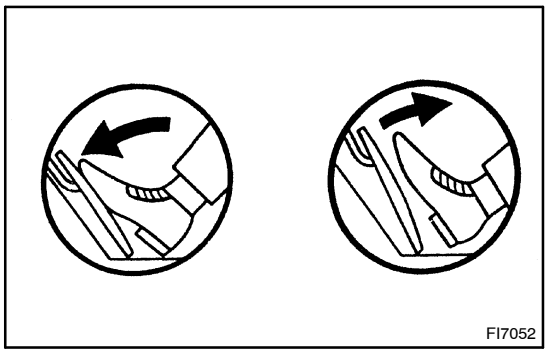
INSPECTION PROCEDURE

HINT:

- If DTC P0105/31, P0106/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, read voltage for accelerator pedal position sensor data.**



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the voltage for the accelerator pedal position sensor data.

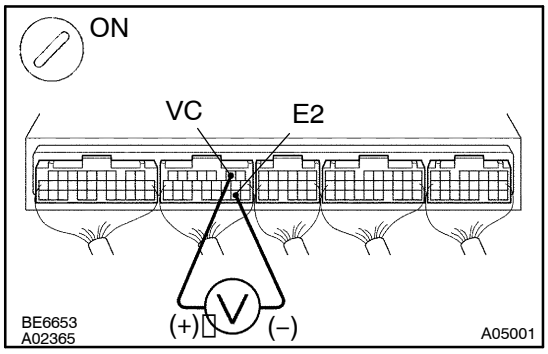
OK:

Accelerator Pedal	VPA	VPA2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK	**Check and replace engine ECU (See page IN–32).**

NG

2	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

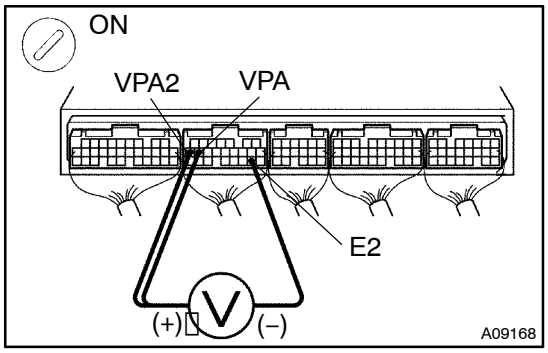
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG	Check and replace engine ECU (See page IN–32).

OK

3	Check voltage between terminals VPA, VPA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VPA – E2	VPA2 – E2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK	Check and replace engine ECU (See page IN–32).

NG

4	Check accelerator pedal position sensor (See page FI–32).

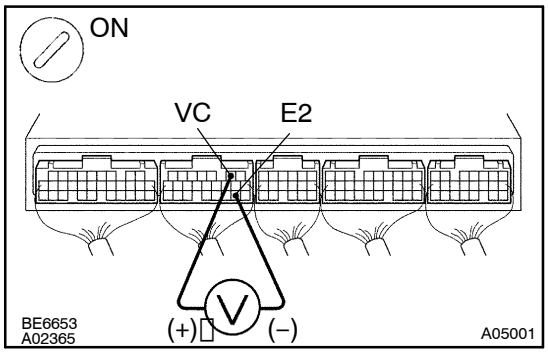
NG	Replace accelerator pedal position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between engine ECU and accelerator pedal position sensor (See page IN–32).

When not using hand–held tester:

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

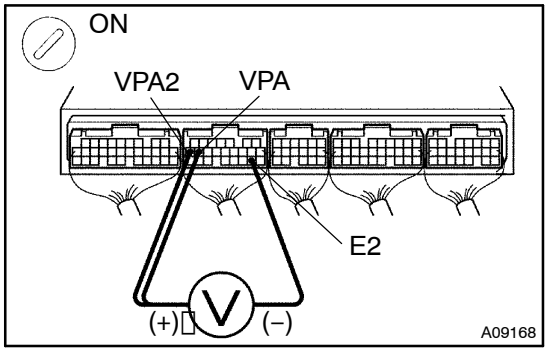
CHECK:
Measure the voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG → Check and replace engine ECU (See page IN–32).

OK

2	Check voltage between terminals VPA, VPA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VPA – E2	VPA2 – E2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK → Check and replace engine ECU (See page IN–32).

NG

3	Check accelerator pedal position sensor (See page FI–32).

NG → Replace accelerator pedal position sensor (See page FI–37).

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between engine ECU and accelerator pedal position sensor (See page IN–32).

DI647–01

DTC	P1121/19	Accelerator Pedal Position Sensor Range/ Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P1120/19 on page DI–97.

DTC No.	DTC Detecting Condition	Trouble Area
P1121/19	Condition (a) continue for 2.0 seconds: (a) Difference between VPA and VPA2 is out of threshold	• Accelerator pedal position sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace accelerator pedal position sensor (See page FI–37).

DI648–01

DTC	P1125/89*	Throttle Control Motor Circuit Malfunction

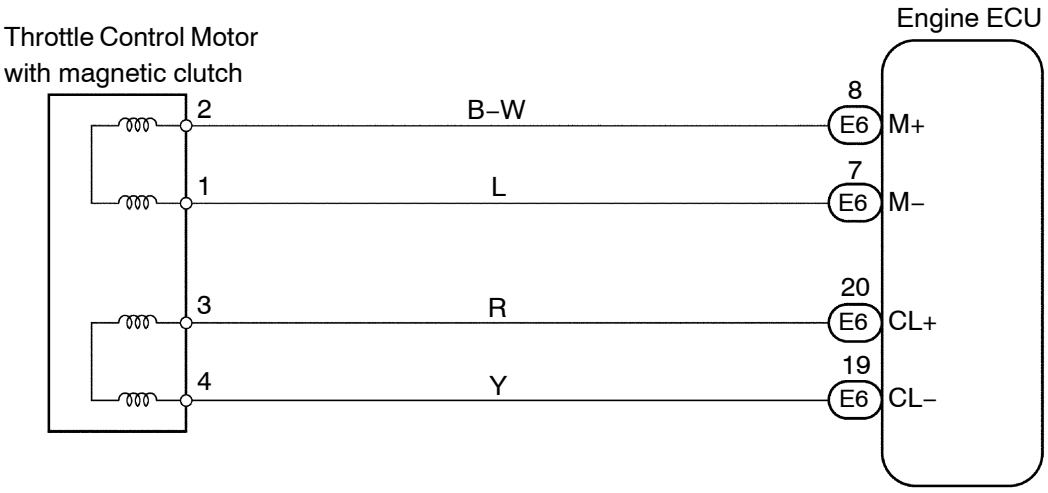
***: ETCS trouble code No. is 21.**

CIRCUIT DESCRIPTION

Throttle motor is operated by the engine ECU and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the engine ECU to control the throttle motor in order to the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1125/89*	Condition (a) and (b) continues for 0.5 seconds: (a) Throttle control motor output duty ≧ 80 % (b) Throttle control motor current < 0.5 A	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU
	Throttle control motor current ≧ 16 A	
	Under condition continue for 0.6 seconds: Throttle control motor current ≧ 7 A	

WIRING DIAGRAM

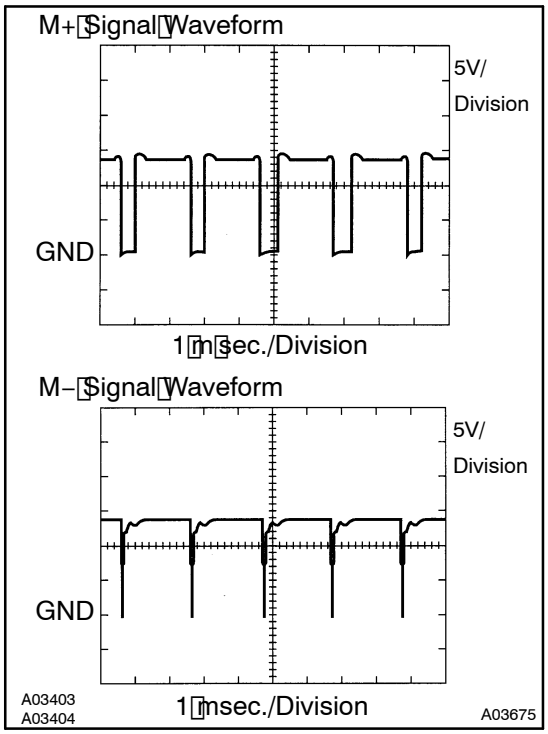


A02990

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check throttle control motor circuit.



PREPARATION:

(a) Connect the oscilloscope between terminals M+ or M– and E1 of the engine ECU connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals M+ or M– and E1 of the engine ECU when the engine is idling.

OK:

The correct waveforms are as shown.

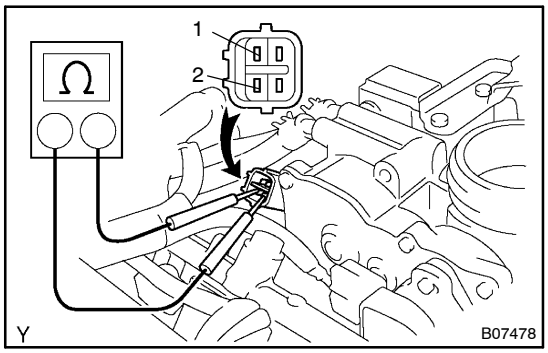
HINT:

The waveform frequency varies depending on the throttle opening.

OK	Check and replace engine ECU (See page IN–32).

NG

2	Check throttle control motor.



PREPARATION:

Disconnect the throttle control motor with the magnetic clutch connector.

CHECK:

Measure the resistance between terminals 1 and 2 of the throttle control motor with the magnetic clutch.

OK:

Resistance: 0.3 – 100 Ω at 20°C (68°F)

NG	Replace throttle control motor (See page FI–37).

OK

3	Check for open and short in harness and connector between throttle control motor and engine ECU (See page IN–32).

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–32).

DI649–01

DTC	P1126/89*	Magnetic Clutch Circuit Malfunction

*: ETCS trouble code No. is 22.

CIRCUIT DESCRIPTION

Magnetic clutch is mounted between the throttle motor and the valve, and it connects the throttle motor with the throttle valve.
Therefore, the throttle motor opens and closes the throttle valve through the magnetic clutch.
If the electric throttle control system has a malfunction, the magnetic clutch separates the throttle motor from the throttle valve in order not to operate the throttle valve by the throttle motor.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1126/89	Condition (a) continue for 0.8 seconds: (a) Magnetic clutch current ≧ 1.4 A or ≦ 0.4 A	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU
	Condition (a) continues for 1.5 seconds: (b) Magnetic clutch current ≧ 1.0 A or ≦ 0.8 A	

WIRING DIAGRAM

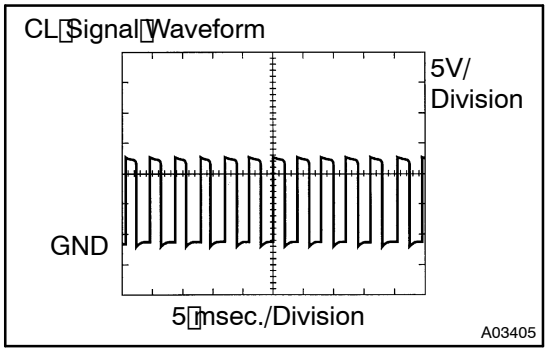
Refer to DTC P1125/89 on page DI–103.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check magnetic clutch circuit.**

When using hand–held tester:
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
CHECK:
Read the magnetic clutch current value on the hand–held tester.
OK:
Current: 0.8 – 1.0 A



When not using hand–held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals CL+ and CL– of the engine ECU connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals CL+ and CL– of the engine ECU when the engine is idling.

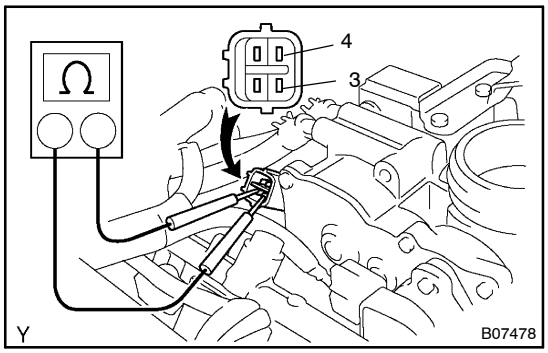
OK:

The correct waveform is as shown.

NG	**Go to step 4.**

OK

2	**Check magnetic clutch.**



PREPARATION:

Disconnect the throttle control motor with the magnetic clutch connector.

CHECK:

Measure the resistance between terminals 3 and 4 of the throttle control motor with the magnetic clutch.

OK:

Resistance: 4.2 – 5.2 Ω at 20°C (68°F)

NG	**Replace throttle control motor with magnetic clutch (See page FI–37).**

OK

3	**Check for open and short in harness and connector between magnetic clutch and engine ECU (See page IN–32).**

NG	**Repair or replace.**

OK

4	**Check operation of magnetic clutch.**

CHECK:

(a) Clear the DTC.

(b) Perform the following steps and check the DTC.

(1) Turn the ignition switch ON.

(2) Start the engine.

(3) Turn the ignition switch OFF and wait 3 seconds.

(4) Turn the ignition switch ON.

OK:

DTC 89 is not stored.

NG → **Replace throttle control motor (with magnetic clutch) (See page FI–37).**

OK

Check and replace engine ECU (See page IN–32).

DI64A–01

DTC	P1127/89*	ETCS Actuator Power Source Circuit Malfunction

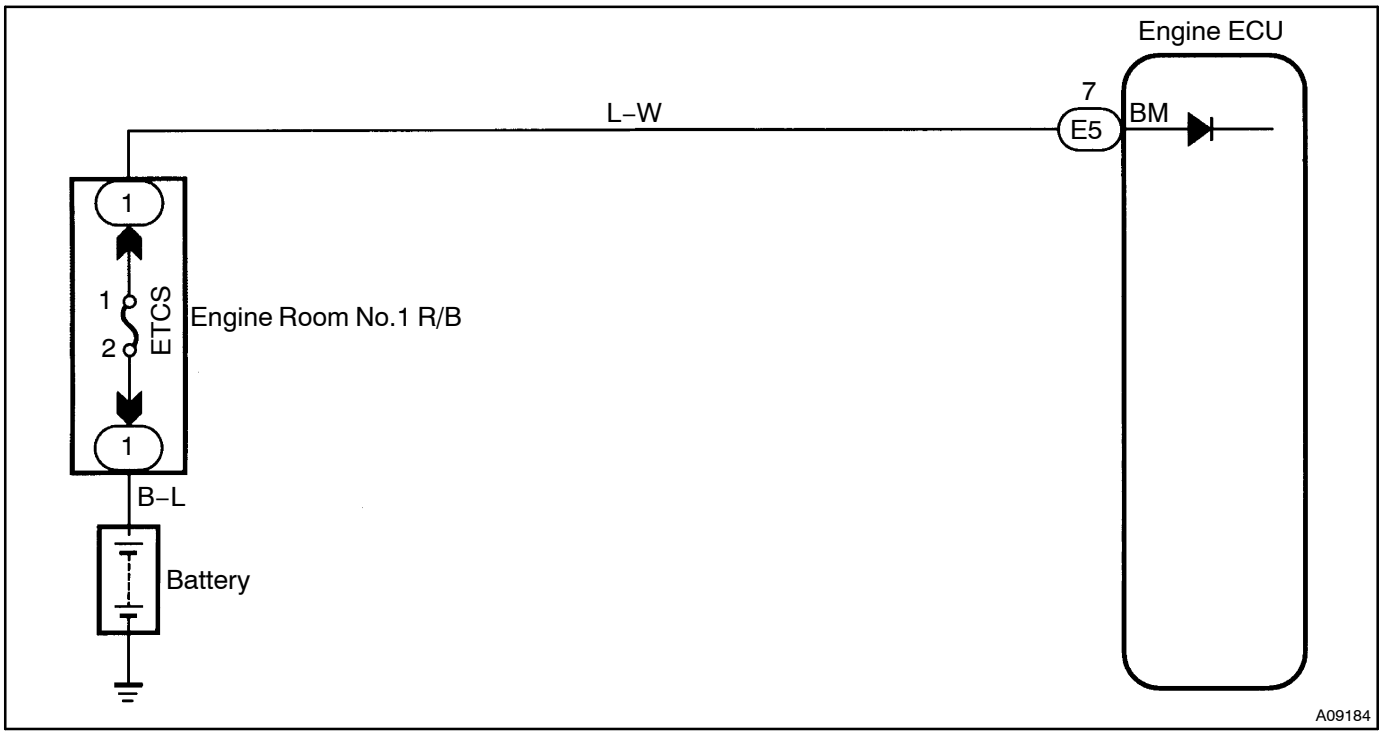
***: ETCS trouble code No. is 23.**

CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BM of the engine ECU even once when the ignition switch is OFF for the electric throttle control system.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1127/89	Open in ETCS power source circuit	• Open in ETCS power source circuit • Engine ECU

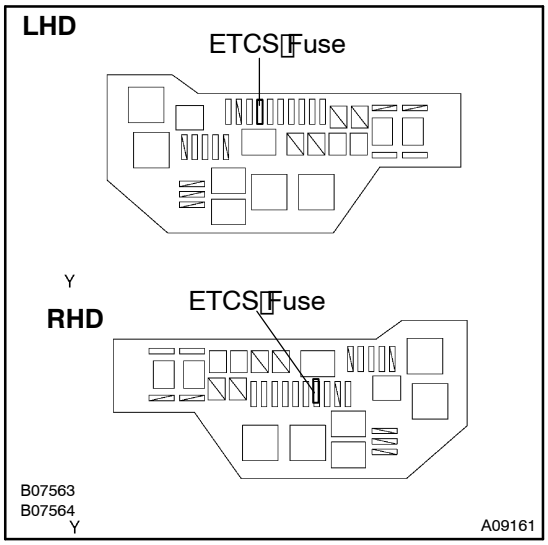
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check ETCS fuse.

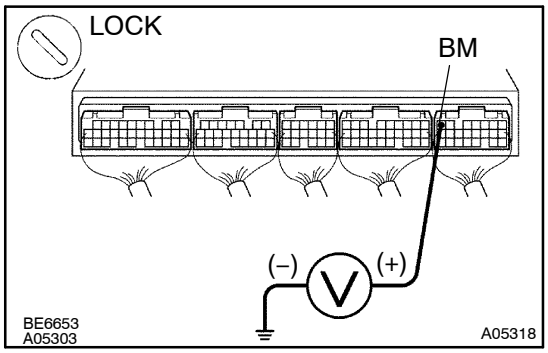


PREPARATION:
Remove the ETCS fuse from the engine room No.1 R/B.
CHECK:
Check the continuity of the ETCS fuse.
OK:
Continuity

NG → **Check for short in all harness and components connected to ETCS fuse.**

OK

2	Check voltage between terminal BM of engine ECU connector and body ground.



PREPARATION:
Remove the engine ECU hood.
CHECK:
Measure the voltage between terminal BM of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK → **Check and replace engine ECU (See page IN–32).**

NG

Check and repair harness or connector between battery and ETCS fuse, and ETCS fuse and engine ECU (See page IN–32).

DI64B–01

DTC	P1128/89*	Throttle Control Motor Lock Malfunction

*: ETCS trouble code No. is 31.

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECU and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the engine ECU to control the throttle motor in order the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1128/89	Lock throttle control motor during control throttle control motor	• Throttle control motor • Throttle body

INSPECTION PROCEDURE

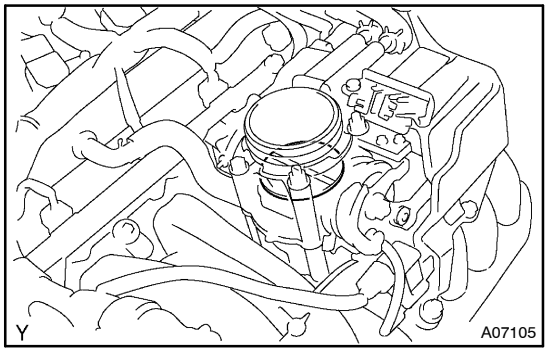
HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check throttle control motor (See page DI–103, step 2).**

NG → **Replace throttle control motor (See page FI–37).**

OK

2	**Visually check throttle valve.**



PREPARATION:
Remove the air cleaner.
CHECK:
Check whether or not a foreign body is caught between the throttle valve and the housing.

NG → **Remove a foreign body and clean throttle body.**

OK

Replace throttle body.

DI64C–01

DTC	P1129/89*	Electric Throttle Control System Malfunction

*: ETCS trouble code No. is 32.

CIRCUIT DESCRIPTION

Electric Throttle Control System (ETCS) is composed of the throttle motor to operate the throttle valve, the electromagnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the engine ECU to control the ETCS and the one valve type throttle body.

The engine ECU controls the throttle motor to make the throttle valve opening angle properly in response driving condition.

The throttle position sensor which is mounted on the throttle body detects the opening angle of the throttle valve, and it provides feedback to the engine ECU to control the throttle motor.

If the ETCS has a malfunction, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.

However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1129/89	Throttle opening angle continues to vary great from target throttle opening angle	• Electric throttle control system • Engine ECU

WIRING DIAGRAM

Refer to DTC P1125/89 on page DI–103.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P1129/89) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO →

Replace engine ECU, and clear DTC. If DTC P1129/89 is memorized again, and then replace throttle body.

DI64D–01

DTC	P1300/14	Igniter Circuit Malfunction (No.1)

DTC	P1305/15	Igniter Circuit Malfunction (No.2)

DTC	P1310/14	Igniter Circuit Malfunction (No.3)

DTC	P1315/14	Igniter Circuit Malfunction (No.4)

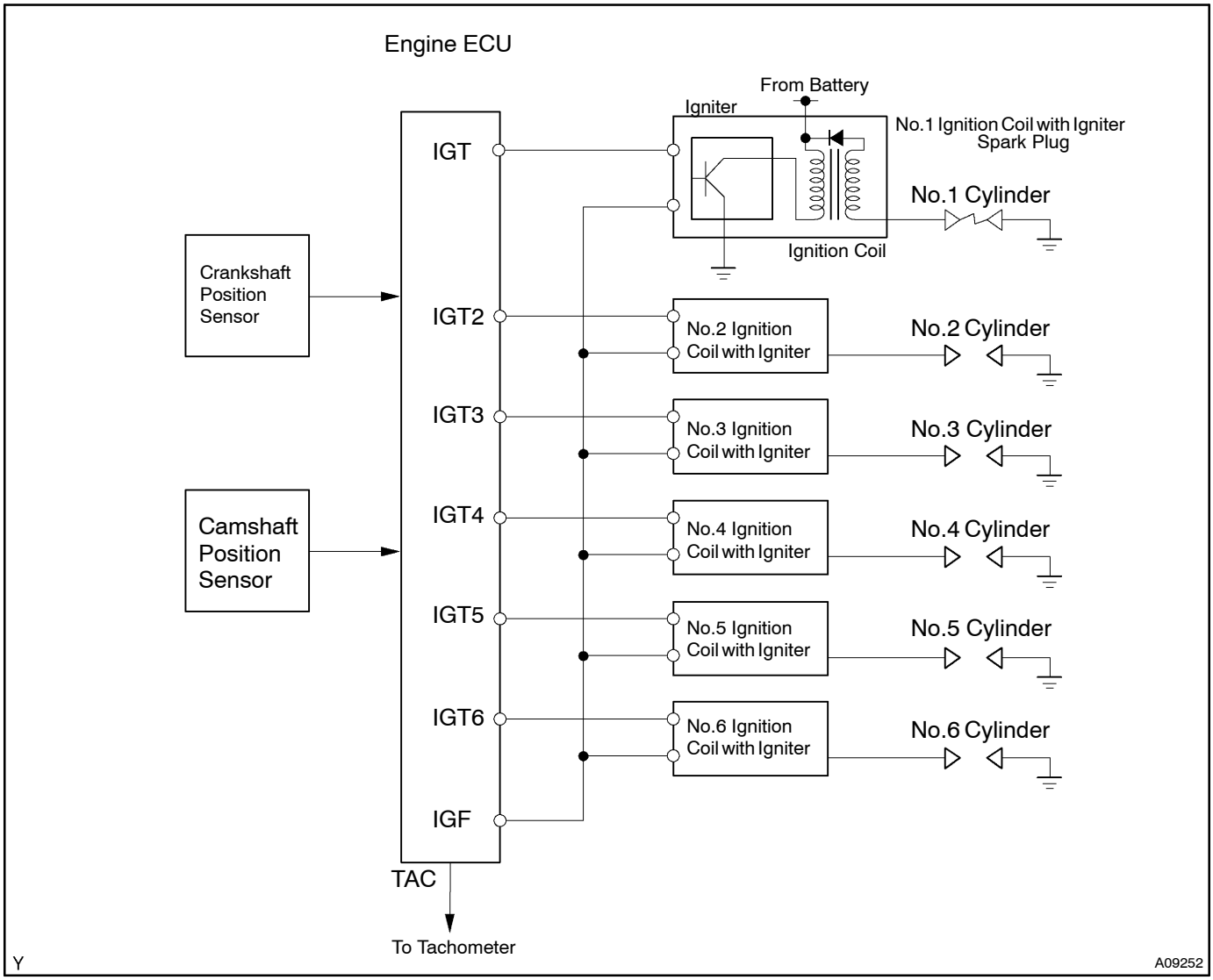
DTC	P1320/14	Igniter Circuit Malfunction (No.5)

DTC	P1325/14	Igniter Circuit Malfunction (No.6)

CIRCUIT DESCRIPTION

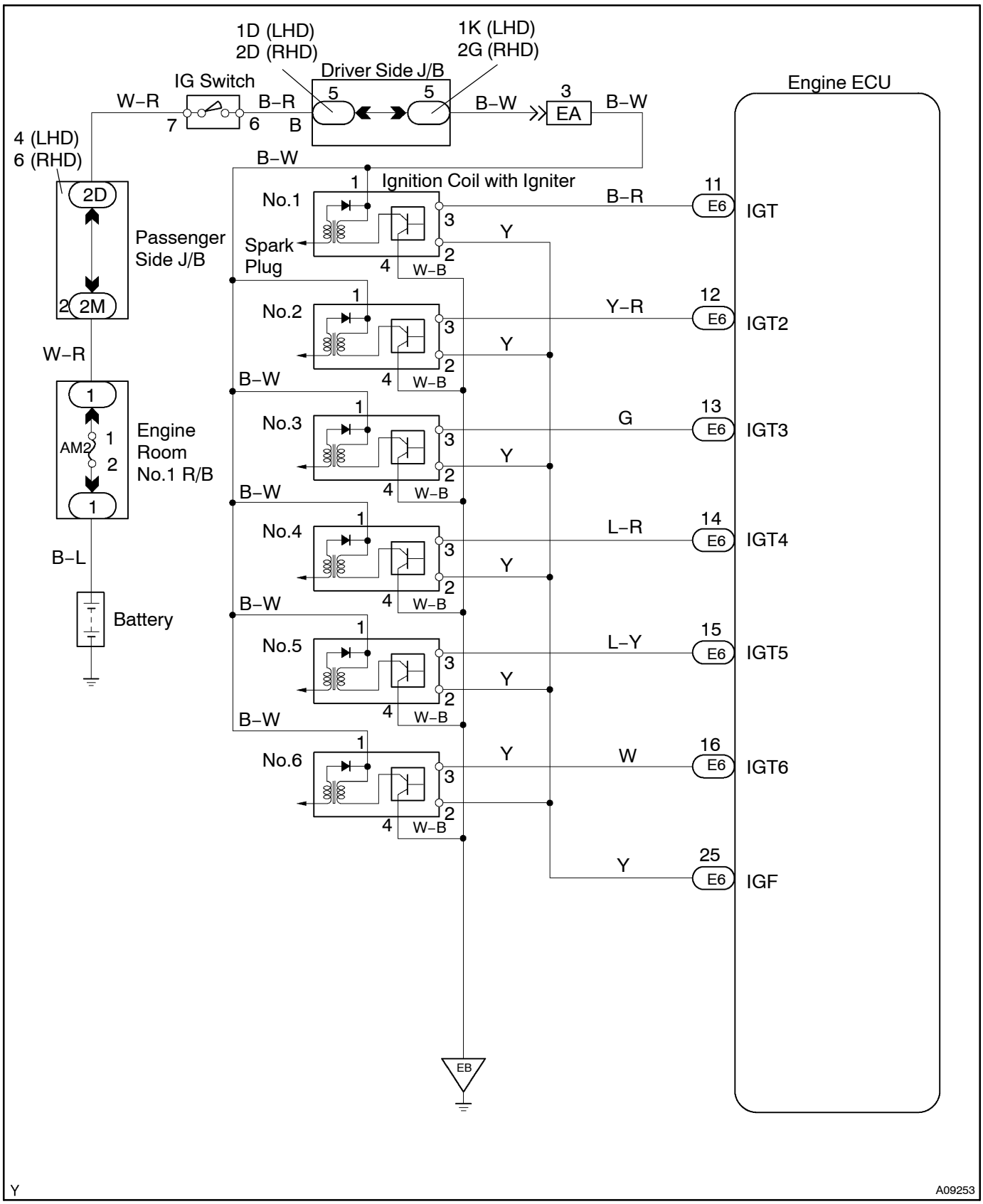
A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces high–voltage loss, and enhances the the overall reliability of the ignition system by eliminating the distributor. The DIS is a 1–cylinder ignition system which ignites one cylinder with one ignition coil. In the 1–cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug pass from the center electrode to the ground electrode.

The engine ECU determines ignition timing and outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the power transistors in the igniter cuts off the current to the primary coil in the ignition coil is supplied to the spark plug that are connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail–safe measure to the engine ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P1300/14 P1305/15 P1310/14 P1315/14 P1320/14 P1325/14	No IGF signal to engine ECU while engine is running	• Ignition system • Open or short in IGF and IGT1 – IGT6 circuit from ignition coil with igniter to engine ECU • No.1 – No.6 ignition coil with igniter • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1300/14 is displayed, check No.1 ignition coil with igniter circuit.
- If DTC P1305/15 is displayed, check No.2 ignition coil with igniter circuit.
- If DTC P1310/14 is displayed, check No.3 ignition coil with igniter circuit.
- If DTC P1315/14 is displayed, check No.4 ignition coil with igniter circuit.
- If DTC P1320/14 is displayed, check No.5 ignition coil with igniter circuit.
- If DTC P1325/14 is displayed, check No.6 ignition coil with igniter circuit.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check spark plug and spark (See page IG–1).**

NG → **Go to step 4.**

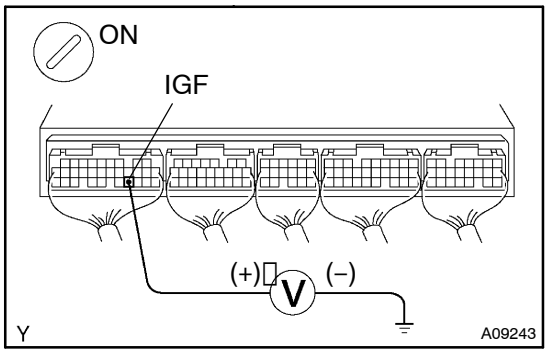
OK

2	**Check for open and short in harness and connector in IGF and IGT signal circuit between engine ECU and ignition coil with igniter (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

3	**Disconnect ignition coil with igniter connector, and check voltage between terminals IGF of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU hood.
(b) Disconnect the ignition coil with the igniter connector.
(c) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals IGF of the engine ECU connector and body ground.

OK:

Voltage: 4.5 – 5.5 V

OK → **Replace ignition coil with igniter.**

NG

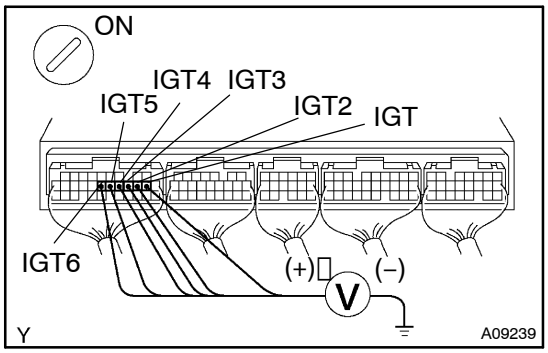
Check and replace engine ECU (See page IN–32).

4	Check for open and short in harness and connector in IGT signal circuit between engine ECU and ignition coil with igniter (See page IN–32).

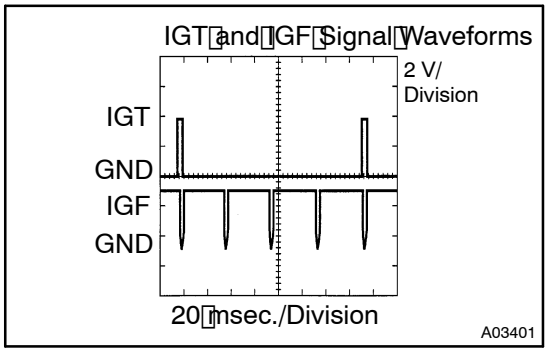
NG → Repair or replace harness or connector.

OK

5	Check voltage between terminals IGT – IGT6 of engine ECU connector and body ground.



PREPARATION:
Remove the engine ECU hood.
CHECK:
Measure the voltage between terminals IGT – IGT6 of the engine ECU connector and body ground when the engine is cranked.
OK:
Voltage: More than 0.1 V and less than 4.5 V

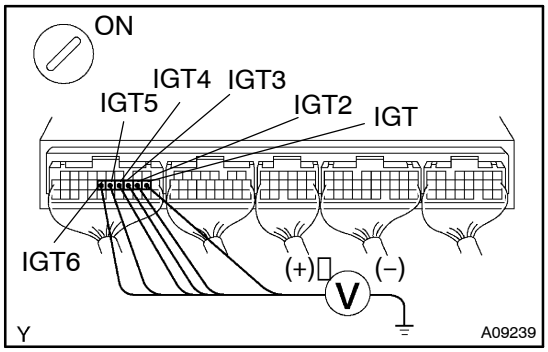


Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check the waveforms between terminals IGT – IGT6 and E1, and IGF and E1 of the engine ECU connector.
HINT:
Correct waveform appears as shown, with rectangle waves.

NG → Check and replace engine ECU (See page IN–32).

OK

6	Disconnect ignition coil with igniter connector and check voltage between terminals IGT – IGT6 of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the ignition coil with the igniter connector.

CHECK:

Measure the voltage between terminals IGT – IGT6 of the engine ECU connector and body ground when the engine is cranked.

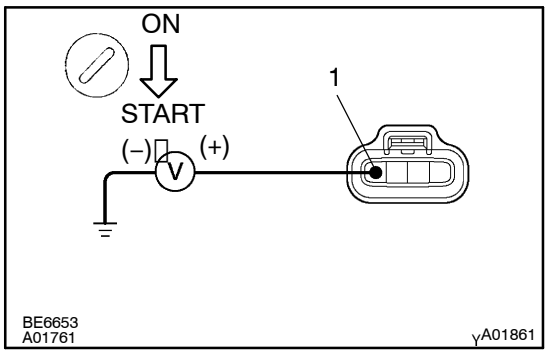
OK:

Voltage: More than 0.1 V and less than 4.5 V

NG	Check and replace engine ECU (See page IN–32).

OK

7	Check ignition coil with igniter power source circuit.



PREPARATION:

Disconnect the ignition coil with the igniter connector.

CHECK:

Measure the voltage between terminal 1 of the ignition coil with the igniter connector and body ground when the ignition switch is turned to ON and START position.

OK:

Voltage: 9 – 14 V

OK	Repair ignition coil with igniter power source circuit.

NG

8	Check for open and short in harness and connector between ignition switch and ignition coil with igniter (See page IN–32).

NG	Repair or replace harness or connector.

OK

Replace ignition coil with igniter.

DI64E–01

DTC	P1335/12,13	Crankshaft Position Sensor Circuit Malfunction (During engine running)

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 on page DI–81.

DTC No.	DTC Detecting Condition	Trouble Area
P1335/13	No crankshaft position sensor signal to engine ECU with engine speed 1,000 rpm or more	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–81.

INSPECTION PROCEDURE

HINT:

Refer to DTC P0335/12, 13 on page DI–81.

DI64F–01

DTC	P1346/18	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 on page DI–81.

DTC No.	DTC Detecting Condition	Trouble Area
P1346	Deviation in crankshaft position sensor signal and camshaft position sensor signal (2 trip detection logic)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–81.

INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335/12, 13 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check valve timing (Check for loose and jumping teeth of timing belt) (See page EM–25).**

NG → **Adjust valve timing (Repair or replace timing belt).**

OK

Check and replace engine ECU (See page IN–32).

DI64G-01

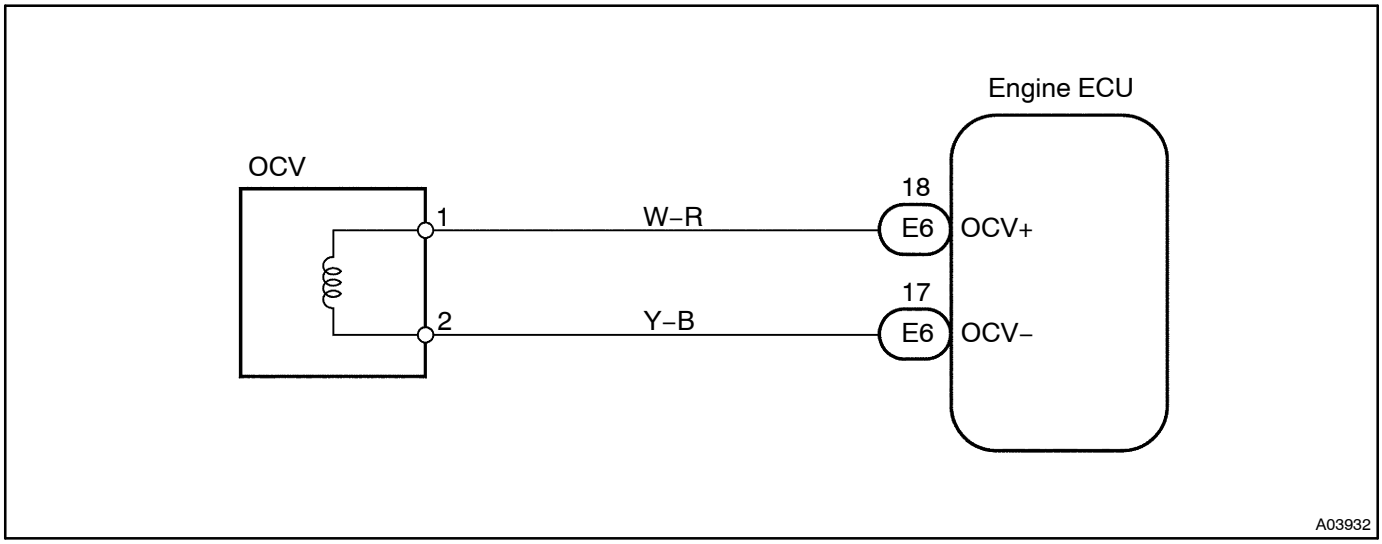
DTC	P1349/59	VVT System Malfunction (Bank 1)

CIRCUIT DESCRIPTION

VVT system controls the intake valve timing to proper timing in response to driving condition.
ECU controls OCV (Oil Control Valve) to make the intake valve timing properly, and, oil pressure controlled with OCV is supplied to the VVT controller, and then, VVT controller changes relative position between the camshaft and the crankshaft.

DTC No.	DTC Detecting Condition	Trouble Area
P1349/59	Condition (a) or (b) continues for after the engine is warmed up and engine speeded 400 – 4,000 rpm: (a) Valve timing does not change from of current valve timing (b) Current valve timing is fixed	• Valve timing • OCV • VVT controller assembly • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1349/59 is displayed, check left bank VVT system circuit.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Perform confirmation test.**

PREPARATION:
Start the engine.
CHECK:
Check whether or not rough idle or engine stall is occurred.
OK:
Normal engine speed (rough idle or engine stall is not occurred.)

NG → Go to step 5.

OK

2	Check operation of OCV.

PREPARATION:

(a) Start the engine and warmed it up.

(b) Connect the hand–held tester and select the VVT from the ACTIVE TEST menu.

CHECK:

Check the engine speed when the VVT active test is enabled.

OK:

VVT active test is in the OFF state: Normal engine speed

VVT active test is in the ON state: Rough idle or engine stall

OK → **VVT system is OK.***

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

3	Check whether or not DTC P1349 is stored.

PREPARATION:

(a) Clear the DTC (See page DI–17).

(b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI–123).

OK:

DTC P1349 is not stored.

OK → **VVT system is OK.***

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

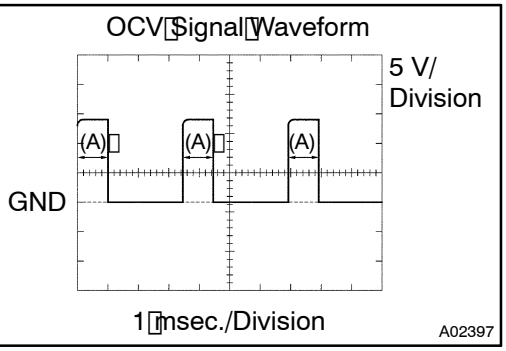
NG

4	Check valve timing (See page EM–20).

NG → Repair valve timing.

OK

5	Check voltage between terminals OCV+ and OCV– of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, and check the waveform between terminals OCV+ and OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG → Check and replace engine ECU (See page IN–32).

OK

6	Check OCV (See page FI–42).

NG → Replace OCV, and then go to step 7.

OK

7	Check camshaft timing gear (VVT–i) (See page EM–44).

NG → Replace

OK

8	**Check blockage of OCV, oil check valve and oil pipe No.1.**

NG → **Repair or replace.**

OK

9	**Check whether or not DTC P1349 is stored.**

NG → **Replace engine ECU.**

OK

VVT system is OK.*

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

When not using hand–held tester:

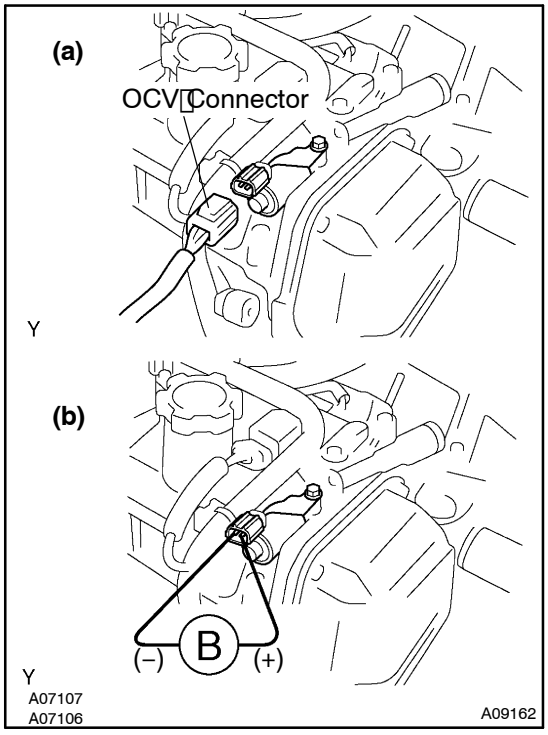
1	**Perform confirmation test.**

PREPARATION:
Start the engine.
CHECK:
Check whether or not rough idle or engine stall is occurred.
OK:
Normal engine speed (rough idle or engine stall is not occurred.)

NG → **Go to step 5.**

OK

2	**Check operation of OCV.**



PREPARATION:

Start the engine.

CHECK:

(a) Check the engine speed when disconnecting the OCV connector.

(b) Check the engine speed when apply battery voltage between the terminals of the OCV.

RESULT:

Result	Check (a)	Check (b)
1	Normal engine speed	Rough idle or engine stall
2	Except 1	

2	**Go to step 6.**

1

3	**Check whether or not DTC 59 is stored.**

PREPARATION:

(a) Clear the DTC (See page DI–17).

(b) Perform simulation test.

CHECK:

Check whether or not DTC 59 is stored (See page DI–123).

OK:

DTC 59 is not stored.

OK	**VVT system is OK.***

*: DTC 59 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the ECV controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the for foreign object in the engine oil.

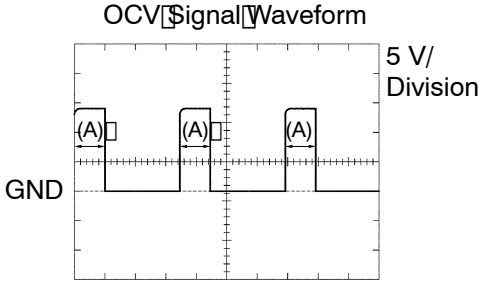
NG

4	**Check valve timing (See page EM–20).**

NG → Repair valve timing.

NG

5	Check voltage between terminals OCV+ and OCV– of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, and check the waveform between terminals OCV+ OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG → Check and replace engine ECU (See page IN–32).

OK

6	Check OCV (See page FI–42).

NG → Replace OCV, and then go to step 7.

OK

7	Check for open and short in harness and connector in OCV circuit.

NG → Repair or replace.

OK

8	Check camshaft timing gear (VVT–i) (See page EM–44).

NG → Replace.

OK

9	**Check blockage of OCV, oil check valve and oil pipe No.1.**

NG → **Repair or replace.**

OK

10	**Check whether or not DTC 59 is stored.**

NG → **Replace engine ECU.**

OK

VVT system is OK.*

*: DTC 59 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As the engine ECU controls so that foreign objects are ejected, there is no problem about the VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

DI64H–01

DTC	P1600/96	Engine ECU BATT Malfunction (European spec.)

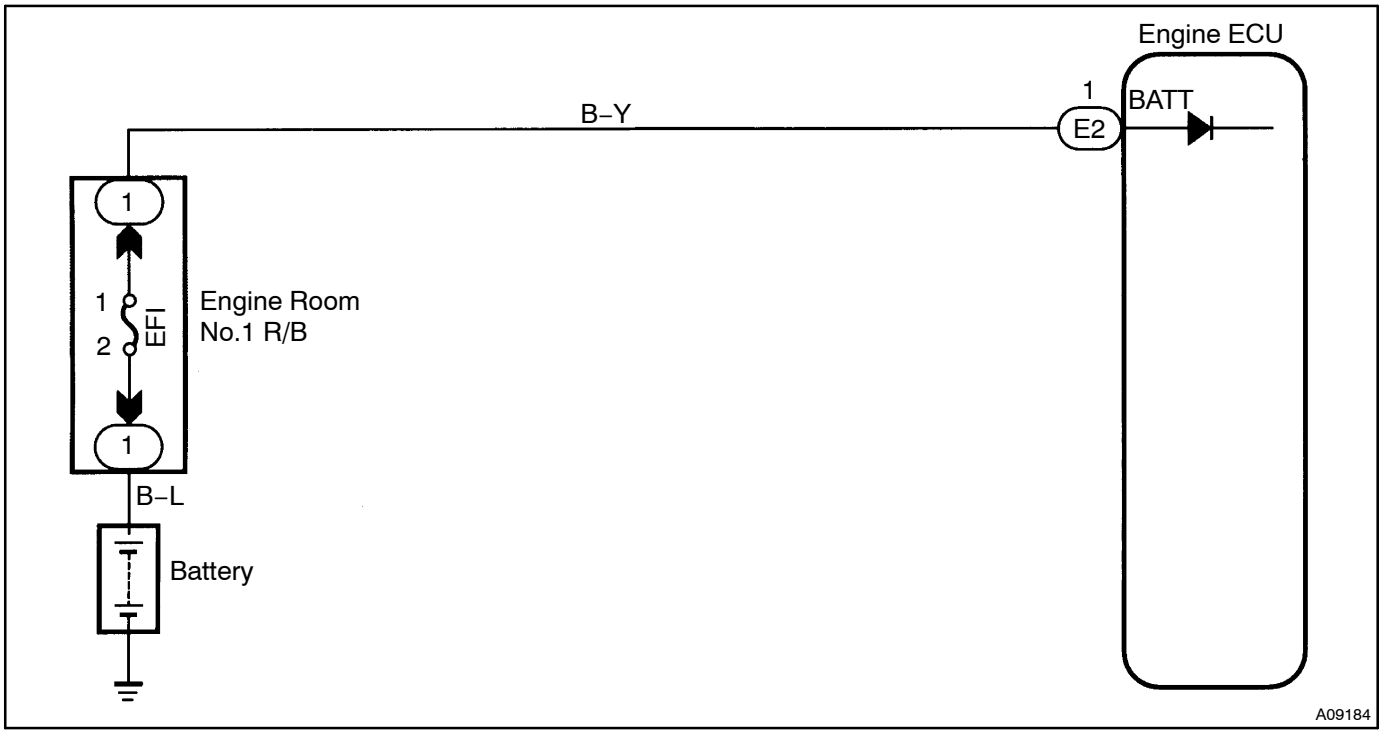
CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BATT of the engine ECU 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
P1600/96	Open in back up power source circuit	• Open in back up power source circuit • Engine ECU

HINT:
If DTC P1600/96 appear, the engine ECU does not store another DTC.

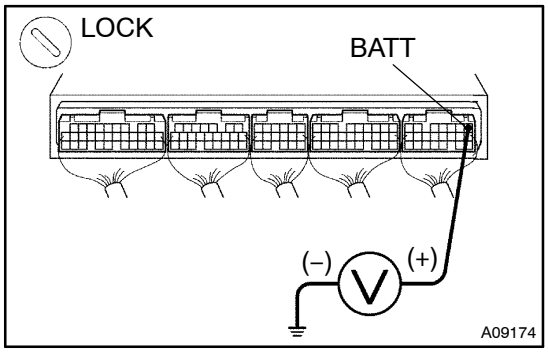
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check voltage between terminal BATT of engine ECU connector and body ground.**

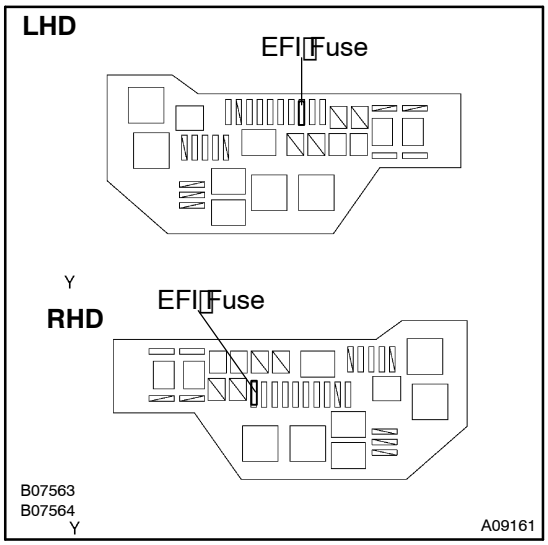


PREPARATION:
Remove the engine ECU hood.
CHECK:
Measure the voltage between terminal BATT of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–32).**

NG

2	**Check EFI fuse of engine rooom R/B.**



PREPARATION:
Remove the EFI fuse from the engine room R/B.
CHECK:
Check the continuity of the 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 and EFI fuse, and EFI fuse and engine ECU.

DI64I–01

DTC	P1633/89*	Engine ECU Malfunction (ETCS Circuit)

*: ETCS trouble code No. is 22.

CIRCUIT DESCRIPTION

Refer to DTC P1129 on page DI–47.

DTC No.	DTC Detecting Condition	Trouble Area
P1633/89	Engine ECU malfunction	• Engine ECU

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace engine ECU.

DI64J–01

DTC	P1645/82	Body ECU Malfunction

CIRCUIT DESCRIPTION

ECU receives the operating condition (ON/OFF) of A/C from A/C ECU and it also receives the electrical load information from the body ECU.
ECU uses these information to control the engine (idle up, etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P1645/82	Condition (a) or (b) continues for 5.0 seconds or more: (a) No communication from body ECU (b) No communication from A/C ECU	• Body ECU • A/C ECU • Communication bus

INSPECTION PROCEDURE

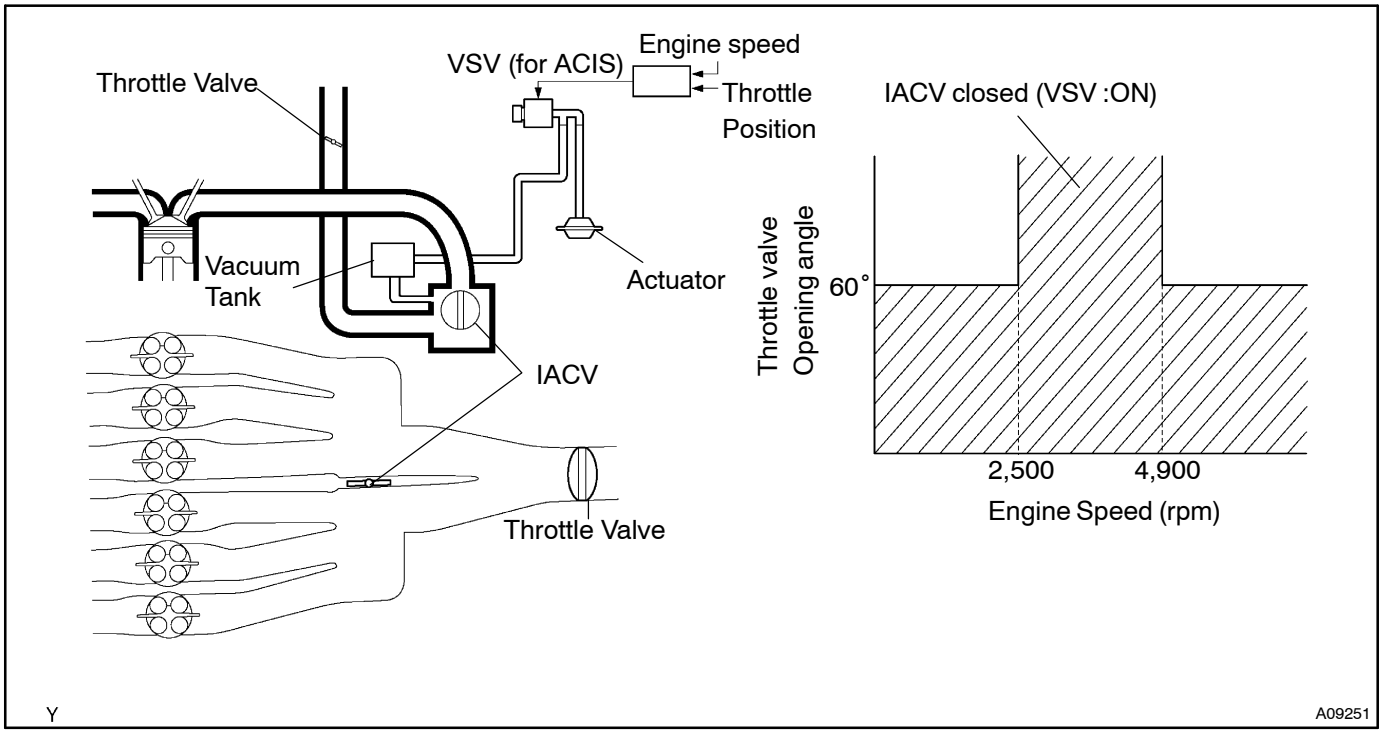
Perform troubleshooting the Multiplex Communication System (See page DI–618).

DI64K–01

DTC	P1651/96	VSV for ACIS Circuit Malfunction (European spec.)

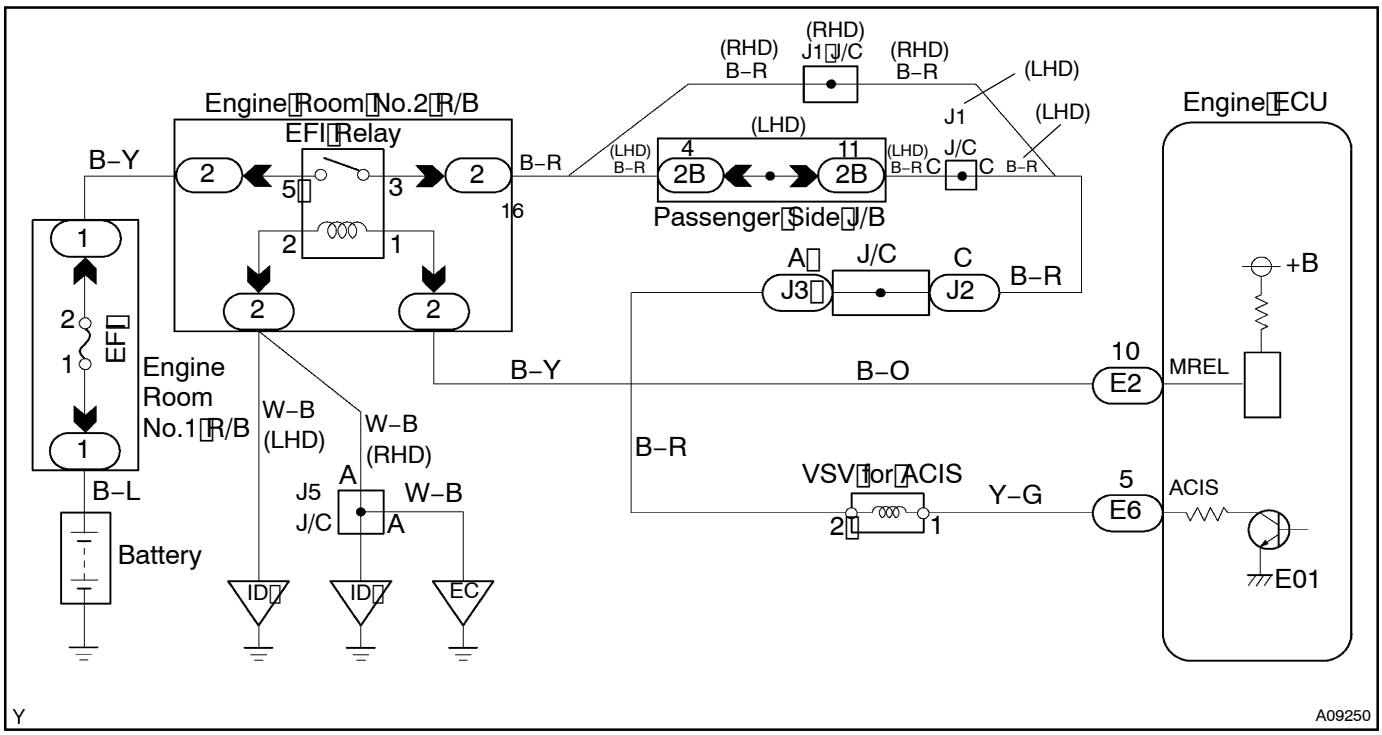
CIRCUIT DESCRIPTION

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 4,900 rpm or less and the throttle valve opening angle is 60˚ or more, the engine ECU turns the VSV ON and closes the IACV. At all other times, the VSV is OFF, so the IACV is open.



DTC No.	DTC Detecting Condition	Trouble Area
P1651/96	Proper response to engine ECU command does not occur (2 trip detection logic)	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU

WIRING DIAGRAM



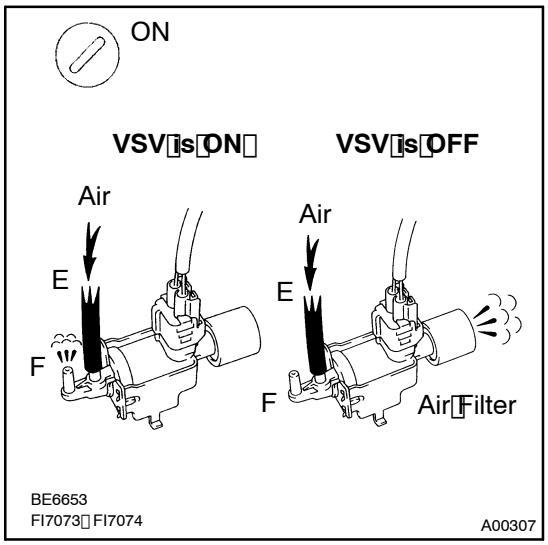
INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and check operation of VSV for ACIS.**



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check operation of the VSV when VSV is operated by the hand–held tester.

OK:

VSV is ON:

Air from port E flows out through port F.

VSV is OFF:

Air from port E flows out the air filter.

OK	**Check for vacuum tank (See page FI–48).**

NG

2	Check VSV for ACIS (See page FI–48).

NG → Replace VSV for ACIS.

OK

3	Check for open and short in harness and connector between EFI main relay and (Marking: EFI) engine ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

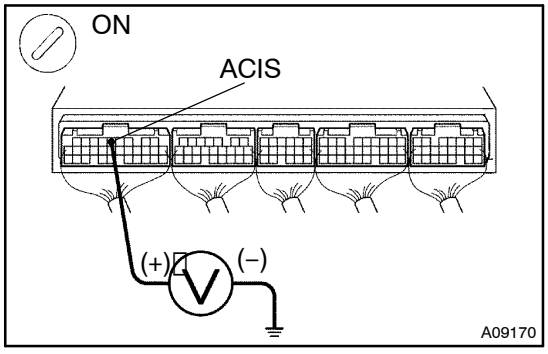
When not using hand–held tester:

1	Check VSV for ACIS (See page FI–48).

NG → Replace VSV for ACIS.

OK

2	Check voltage between terminal ACIS of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal ACIS of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay (Marking: EFI) and engine ECU (See page IN–32).

OK →

Check and replace engine ECU (See page IN–32).

DI64L–01

DTC	P1656/39	OCV Circuit Malfunction (Bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P1349/39 on page DI–123.

DTC No.	DTC Detecting Condition	Trouble Area
P1656/39	Open or short in oil control valve circuit	• Open or short in OCV circuit • OCV • Engine ECU

WIRING DIAGRAM

Refer to DTC P1349/39 on page DI–123.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check OCV circuit.

PREPARATION:

(a) Start the engine and warmed it up.

(b) Connect the hand–held tester and select the VVT from the ACTIVE TEST menu.

CHECK:

Check the engine speed when operate the OCV by the hand–held tester.

OK:

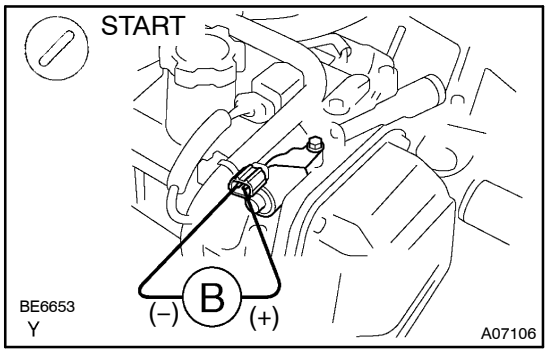
VVT system is OFF (OCV is OFF): Normal engine speed

VVT system is ON (OCV is ON): Rough idle or engine stalled

OK	Check for intermittent problems (See page DI–4).

NG

2	Check operation of OCV.



PREPARATION:

(a) Start the engine and warmed it up.

(b) Disconnect the OCV connector.

(c) Apply battery voltage between terminals of the OCV.

CHECK:

Check the engine speed.

OK:

Rough idle or engine stalled.

NG → Replace OCV.

OK

3	Check voltage between terminals OCV+ and OCV– of engine ECU connector (See page DI–123, step 3).

NG → Check and replace engine ECU (See page IN–32).

OK

4	Check for open and short in harness and connector between OCV and engine ECU (See page IN–32).

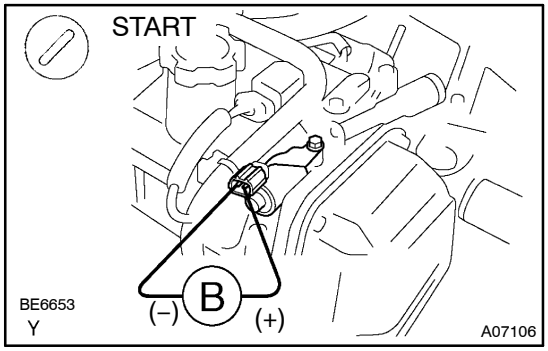
NG → Repair or replace.

OK

Check for intermittent problems (See page DI–4).

When not using hand-held tester:

1	Check operation of OCV.



PREPARATION:
(a) Start the engine and warmed it up.
(b) Disconnect the OCV connector.
(c) Apply battery voltage between terminals of the OCV.

CHECK:
Check the engine speed.

OK:
Rough idle or engine stalled.

NG → Replace OCV.

OK

2	Check voltage between terminals OCV+ and OCV– of engine ECU connector (See page DI–123, step 3).

NG → Check and replace engine ECU (See page IN–32).

OK

3	Check for open and short in harness and connector between OCV and engine ECU (See page IN–32).

NG → Repair or replace.

OK

Check for intermittent problems (See page DI–4).

DI64M–01

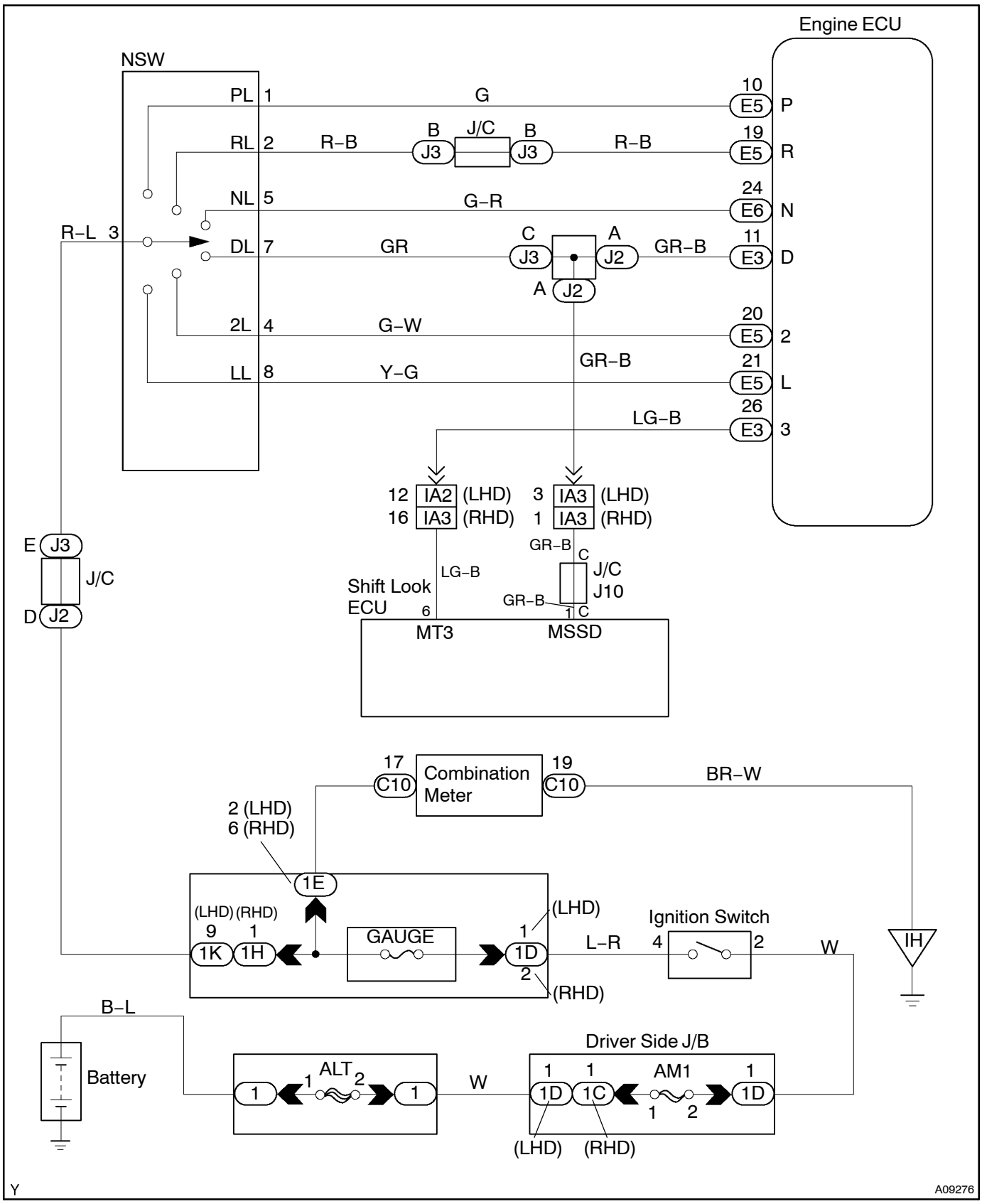
DTC	P1780/97	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever range and sends signals to the engine ECU.
The engine ECU receives signals (NSW, R, 3, 2 and L) from the neutral start switch. When the signal is not sent to the engine ECU from the neutral start switch, the engine ECU judges that the shift lever is in D range.

DTC No.	DTC Detection Condition	Trouble Area
P1780/97	2 or more switches are ON simultaneously for R, N, 3, 2 and L ranges (2 trip detection logic)	• Short in neutral start switch circuit • Neutral start switch • Engine ECU
	When driving under conditions (a) and (b) for 30 seconds or more, neutral start 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	

WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Read PNP, REVERSE, DRIVE, 3RD, 2ND and LOW signals.**

RESULT:

(a) Remove the DLC3 cover.

(b) Connect the hand–held tester to the DLC3.

(c) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Shift lever into the P, N, R, D, 3, 2 and L ranges, and read the PNP, REVERSE, DRIVE, 3RD, 2ND and LOW signals on the hand–held tester.

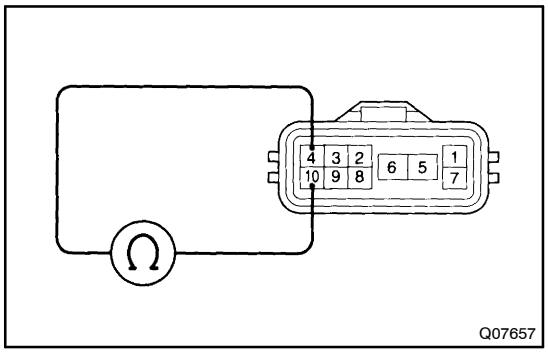
OK:

Shift range	Signal
P, N	PNP: OFF → ON
R	REVERSE: OFF → ON
D	DRIVE: OFF → ON
3	3RD: OFF → ON
2	2ND: OFF → ON
L	LOW: OFF → ON

OK → **Check and replace the engine ECU (See page IN–32).**

NG

2	**Check neutral start switch.**



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the neutral start switch connector.

CHECK:

Check the continuity between each terminal shown below when the shift lever is moved to each range.

OK:

Shift Range	Terminal No. to continuity	Terminal No. to continuity
P	3 – 7	1 – 2
R	3 – 5	–
N	3 – 5	1 – 2
D	3 – 9	–
2	3 – 4	–
L	3 – 8	–

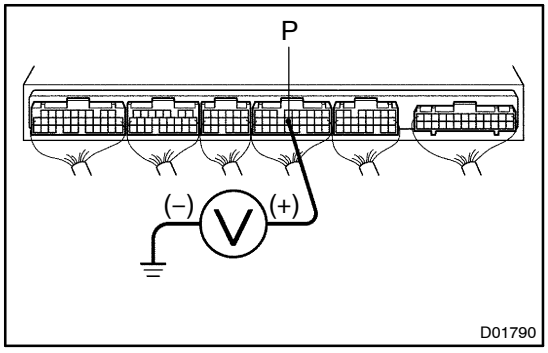
NG → **Replace neutral start switch.**

OK →

Repair or replace harness and connector between battery and neutral start switch, and neutral start switch and engine ECU (See page IN–32).

When not using hand–held tester:

1	**Measure voltage between each terminals of P, R, N, D, 3, 2, and L of engine ECU and body ground.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure the voltage between each terminals P, R, N, D, 3, 2 and L of the engine ECU and body ground when the shift lever is shifted to the following positions.

OK:

Tester Connection	Condition	Specified Condition
P– Body ground	Shift lever range: P	Battery voltage
R – Body ground	Shift lever range: R	Battery voltage*
N – Body ground	Shift lever range: N	Battery voltage
D – Body ground	Shift lever range: D Transmission control SW (for D and 3) : OFF	Battery voltage

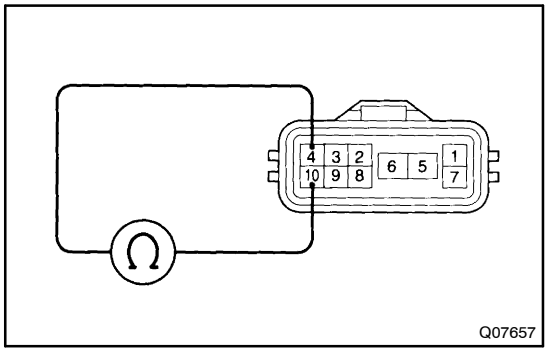
3 – Body ground	Shift lever range: 3	Battery voltage
2 – Body ground	Shift lever range: 2 Transmission control SW (for 2 and L) : OFF	Battery voltage
L – Body ground	Shift lever range: L Transmission control SW (for 2 and L) : ON	Battery voltage

HINT:
*: The voltage will drop slightly due to lighting up of the back up light.

OK → **Check and replace engine ECU (See page IN–32).**

NG

2 Check neutral start switch.



PREPARATION:
(a) Jack up the vehicle.
(b) Remove the neutral start switch connector.

CHECK:
Check the continuity between each terminal shown below when the shift lever is moved to each range.

OK:

Shift Range	Terminal No. to continuity	Terminal No. to continuity
P	3 – 7	1 – 2
R	3 – 5	–
N	3 – 5	1 – 2
D	3 – 9	–
2	3 – 4	–
L	3 – 8	–

NG → **Replace neutral start switch.**

OK

Repair or replace harness and connector between battery and neutral start switch, and neutral start switch and engine ECU (See page IN–32).

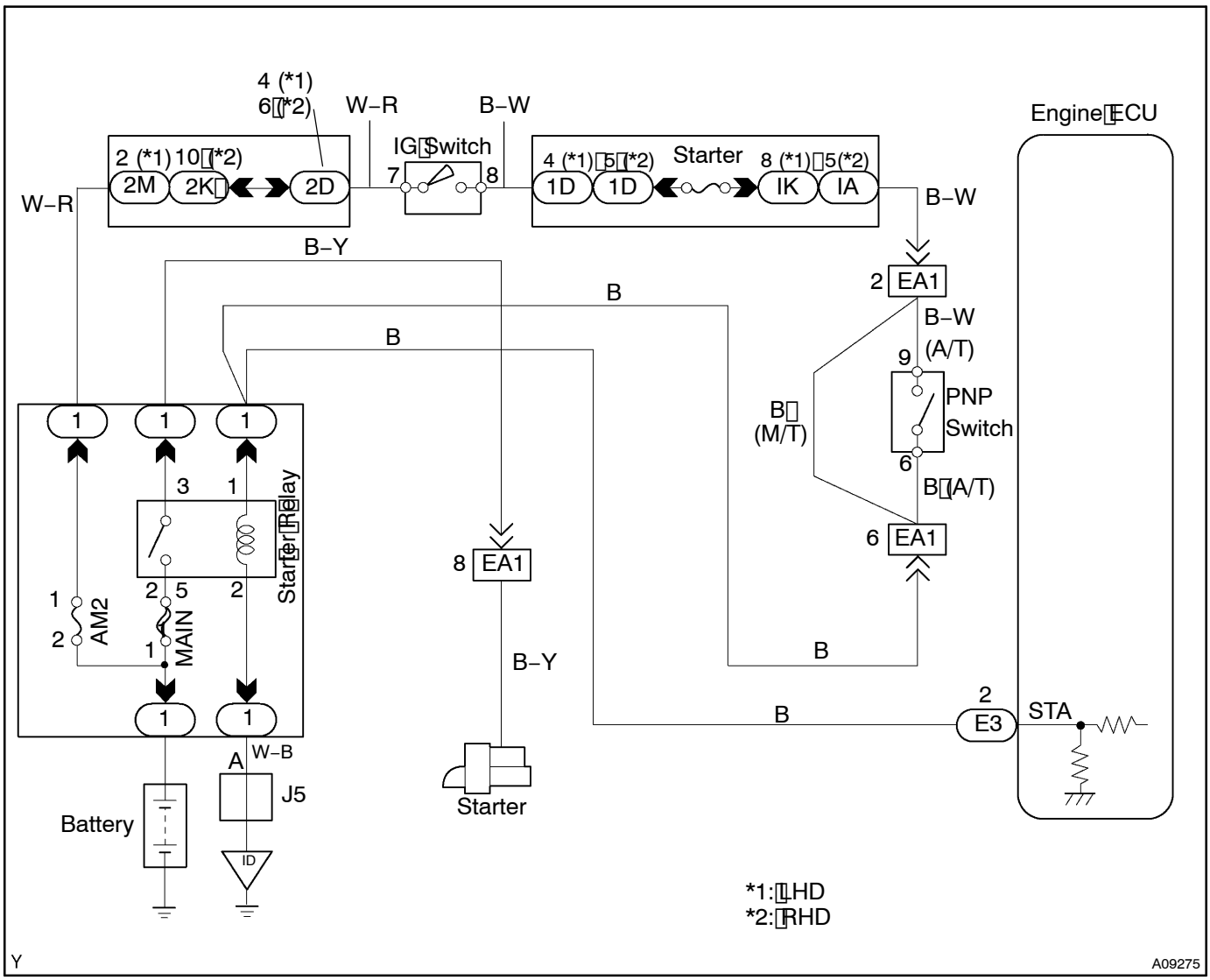
DI64N–01

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 engine ECU. 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–25.

When using hand–held tester:

1	Check STA signal.

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the STA signal on the hand–held tester while the starter operates.

OK:

Ignition Switch Position	ON	START
STA signal	OFF	ON

OK: Proceed to next circuit inspection shown on problem symptoms table (See page DI–25).

NG

2	Check for open in harness and connector between engine ECU and starter relay (Marking: ST) (See page IN–32).

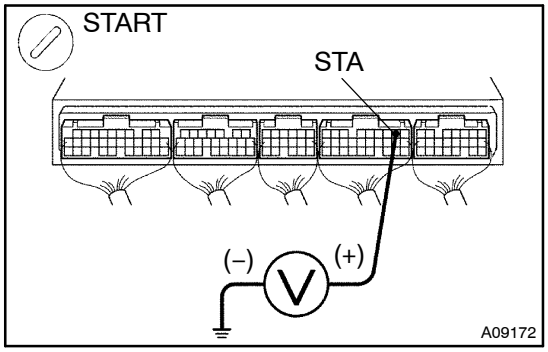
NG: Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

When not using hand–held tester:

1	Check voltage between terminal STA of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal STA of the engine ECU connector and body ground, during the engine cranking.

OK:

Voltage: 6 V or more

OK: Proceed to next circuit inspection shown on problem symptoms table (See page DI–25).

NG

2	Check for open in harness and connector between engine ECU and starter relay (Marking: ST) (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–32).

DI64O-01

ECU Power Source Circuit

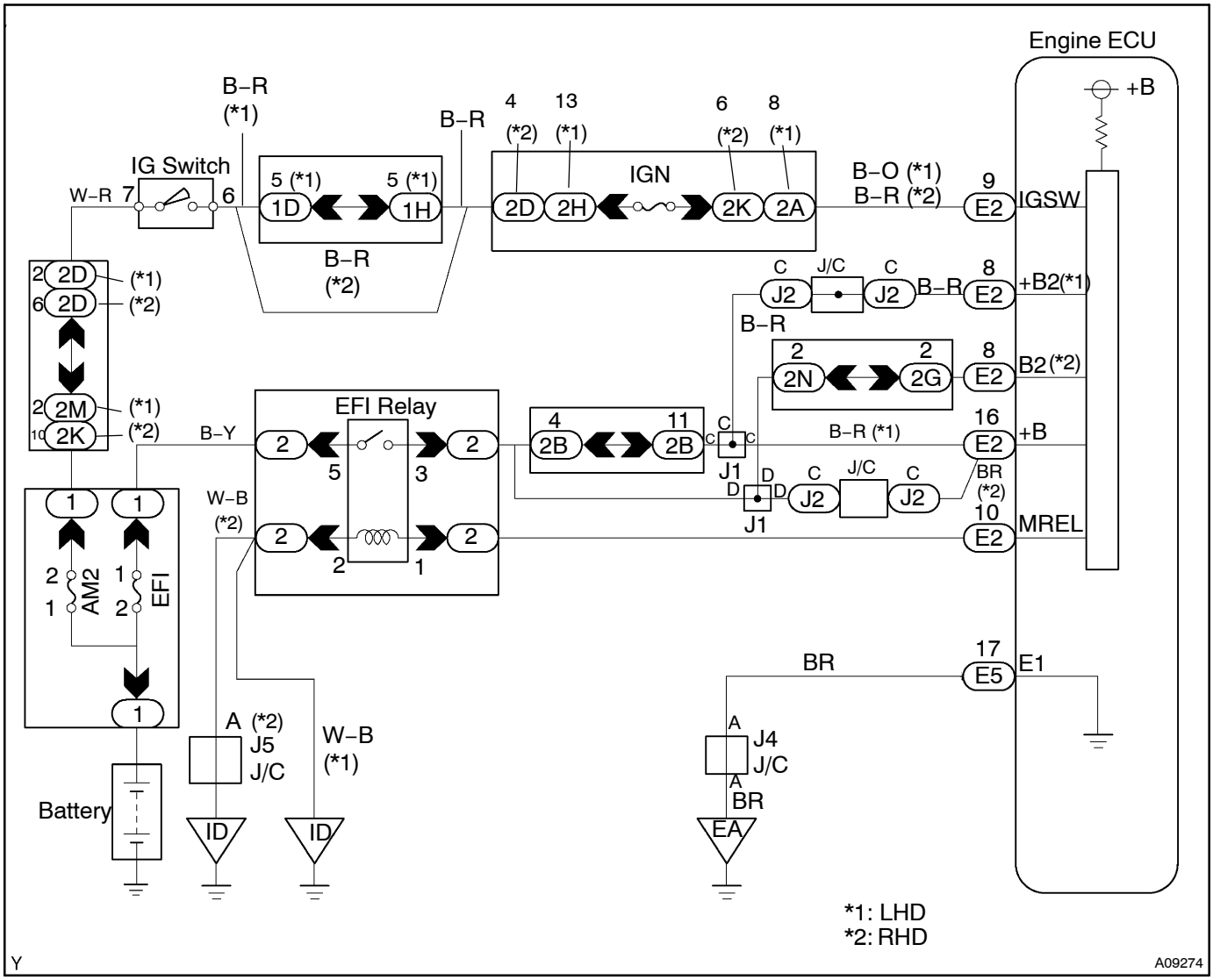
CIRCUIT DESCRIPTION

When the ignition switch is turned ON, battery positive voltage is applied to terminal IGSW of the engine ECU and the EFI main relay (Marking: EFI) control circuit in the engine ECU sends a signal to the terminal MREL of the engine ECU switching on the EFI main relay.

This signal causes current to flow to the coil, closing the contacts of the EFI main relay and supplying power to terminals +B of the engine ECU.

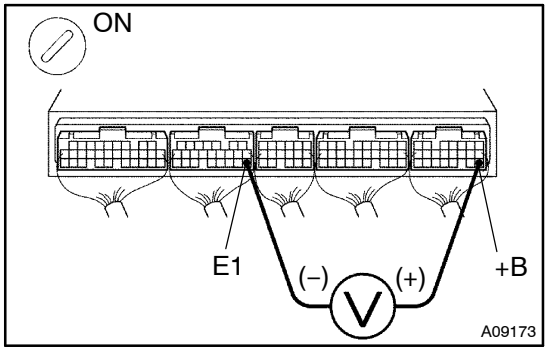
If the ignition switch is turned off, the engine ECU continues to switch on the EFI main relay for a maximum of 2 seconds for the initial setting of the ISC valve.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals +B and E1 of engine ECU connectors.



PREPARATION:
(a) Remove the engine ECU hood.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals +B and E1 of the engine ECU connectors.

OK:
Voltage: 9 – 14 V

OK	Proceed to next circuit inspection shown on Problem symptoms table (See page DI–25).

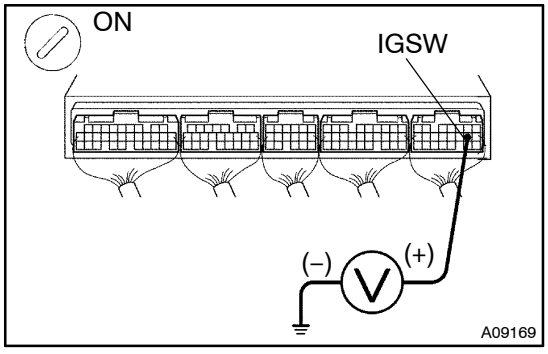
NG

2	Check for open in harness and connector between terminal E1 of engine ECU and body ground (See page IN–32).

NG	Repair or replace harness or connector.

OK

3	Check voltage between terminal IGSW of engine ECU connector and body ground.



PREPARATION:
Turn the ignition switch ON.

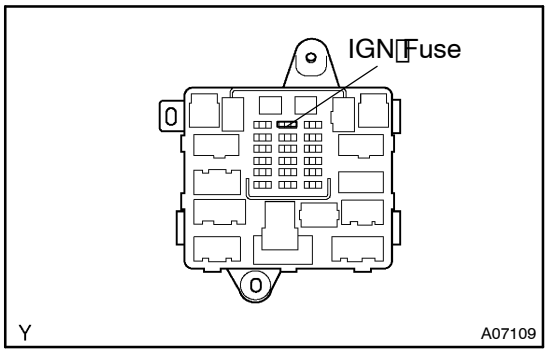
CHECK:
Measure the voltage between terminal IGSW of the engine ECU connector and body ground.

OK:
Voltage: 9 – 14 V

OK	Go to step 6.

NG

4	Check IGN fuse.



PREPARATION:
Remove the IGN fuse from the driver side J/B.
CHECK:
Check the continuity of the IGN fuse.
OK:
Continuity

NG → Check for short in all harness and components connected to IGN fuse.

OK

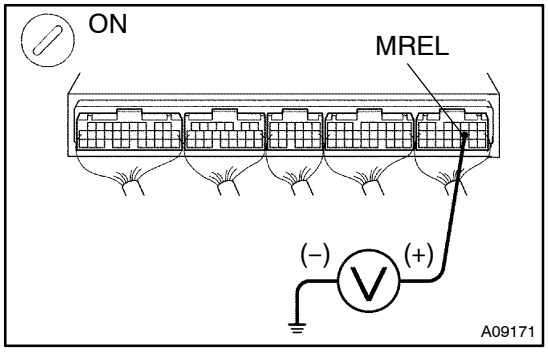
5	Check ignition switch (See page BE–23).

NG → Replace ignition switch.

OK

Check and repair harness and connector between battery and ignition switch, and ignition switch and engine ECU.

6	Check voltage between terminal MREL of engine ECU connector and body ground.



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminal MREL of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

NG → Check and replace engine ECU (See page IN–32).

OK

7	Check EFI fuse of engine room J/B (See page DI–149).

NG → Check for short in all harness and components connected to EFI fuse.

OK ↓

8	Check EFI main relay (Marking: EFI) (See page FI–50).

NG → Replace EFI main relay.

OK ↓

9	Check for open and short in harness and connector between terminal MREL of engine ECU and body ground (See page IN–32).

NG → Repair and replace harness or connector.

OK ↓

Check and repair harness or connector between EFI fuse and battery.

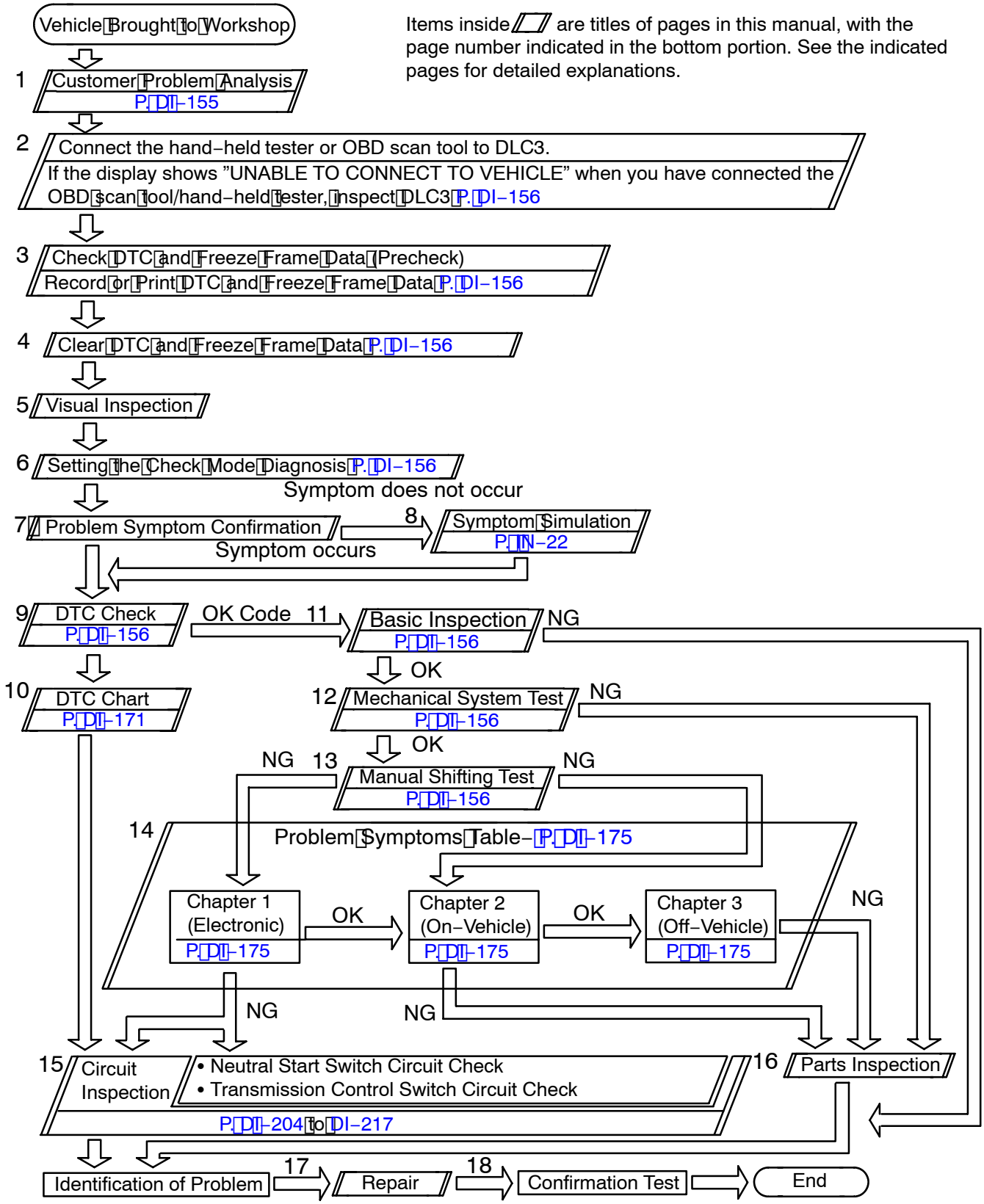
AUTOMATIC TRANSMISSION

HOW TO PROCEED WITH TROUBLESHOOTING

DI61K–02

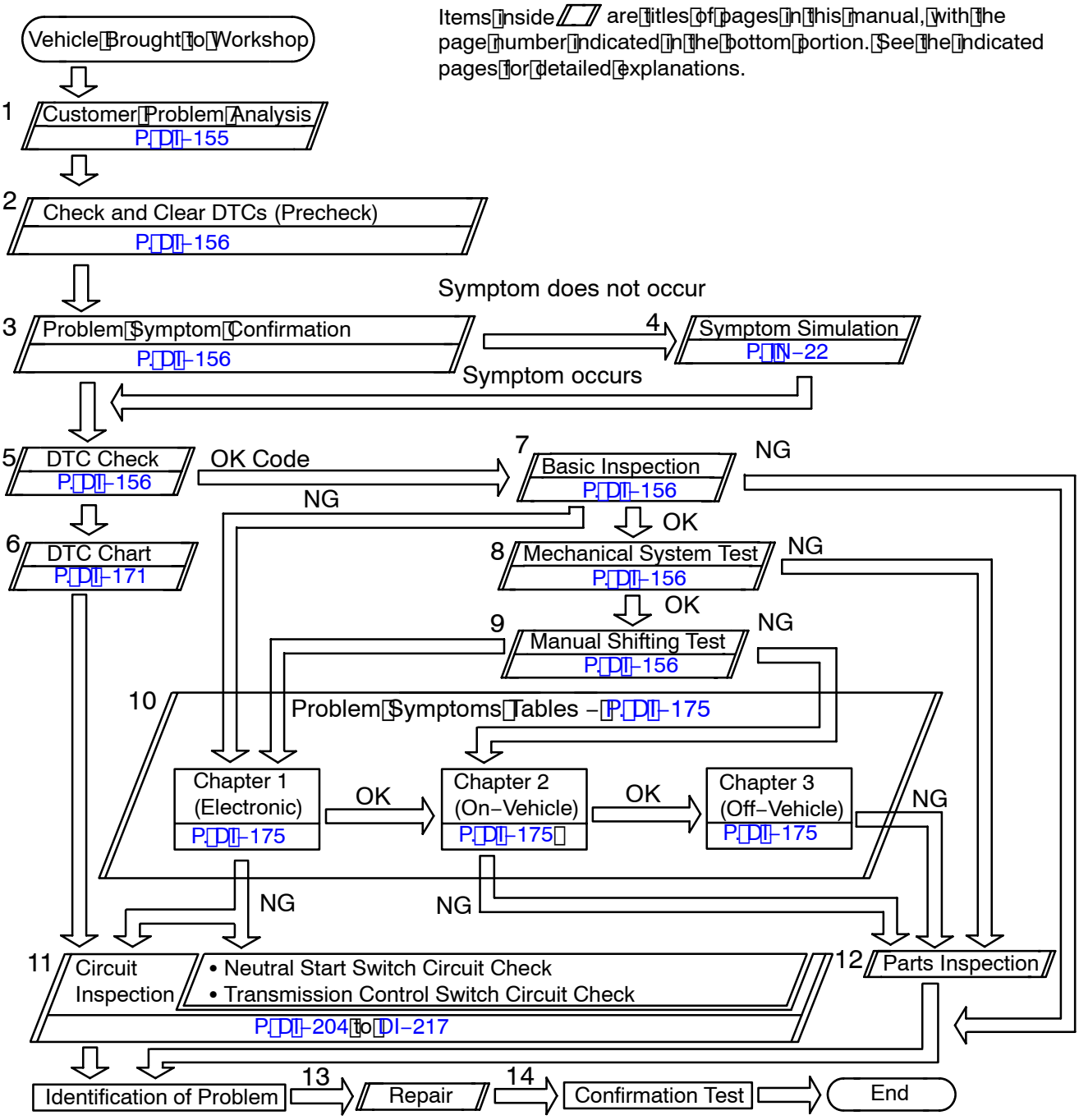
When using hand–held tester, troubleshoot in accordance with the procedure on the following pages.

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.



When not using hand–held tester, troubleshoot in accordance with the procedure on the following pages.

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.



DI61L–01

CUSTOMER PROBLEM ANALYSIS CHECK

Transmission Control System Check Sheet	Inspector's Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

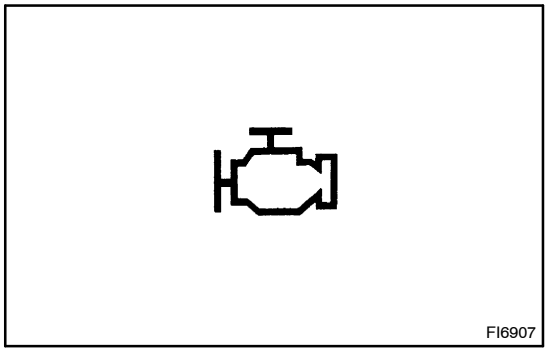
Date Problem Occurred	/ /
How Often Does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Vehicle does not move (☐ Any range ☐ Particular range)
	☐ No up–shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → 4th)
	☐ No down–shift (☐ 4th → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)
	☐ Lock–up malfunction
	☐ Shift point too high or too low
	☐ Harsh engagement (☐ N → D ☐ Lock–up ☐ Any drive range)
	☐ Slip or shudder
	☐ No kick–down
	☐ Others ( )

Check Item	Indicator Light	☐ Normal ☐ Remains ON

DTC Check	1st Time	☐ Normal code	☐ Malfunction code (Code)
	2nd Time	☐ Normal code	☐ Malfunction code (Code)

DI61M–02

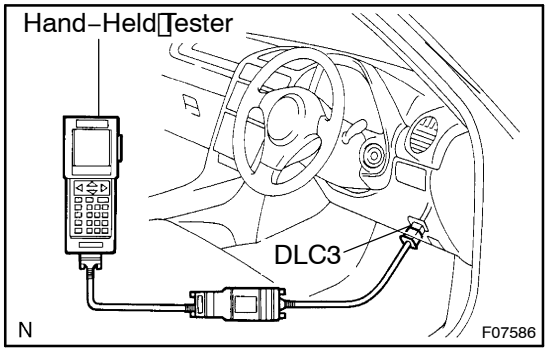

FI6907

PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description for EURO–OBD (European spec.) (Including Taiwan))

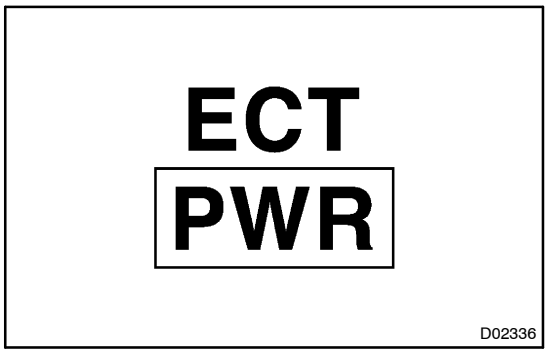
- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's engine ECU.
  Euro–OBD regulations require that the vehicle's on–board computer lights up the check engine warning light on the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031–6 are recorded in the engine ECU memory (See page DI–171). If the malfunction does not reoccur in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the engine ECU memory.



- To check the DTCs, connect the OBD scan tool or hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the OBD scan tool's instruction book.)
  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits. (See DTC chart on page DI–171)
- 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 DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting,

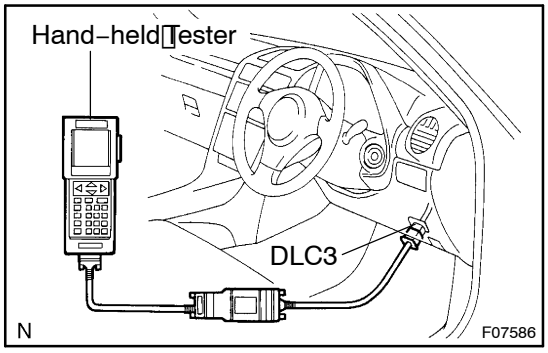
the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2)

- *2 Trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this second detection causes the (CHK ENG) to light up. (2nd trip)
  (However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.)

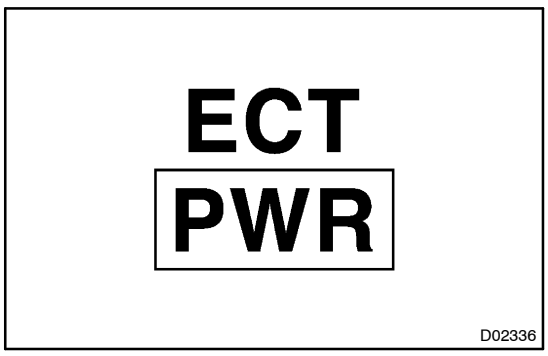


(b) Description for M–OBD (Except European spec.)

- When troubleshooting Multiplex (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the hand–held tester to the vehicle, and read off various data output from the vehicle's Engine and ECT ECU.
  The vehicle's on–board computer lights up the PWR indicator light on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components. In addition to the PWR indicator light lighting up when a malfunction is detected, the applicable DTCs are recorded in the Engine and ECT ECU memory (See page DI–171).
  If the malfunction only occurs in 3 trips, the PWR indicator light goes off but the DTCs remain recorded in the Engine and ECT ECU memory.



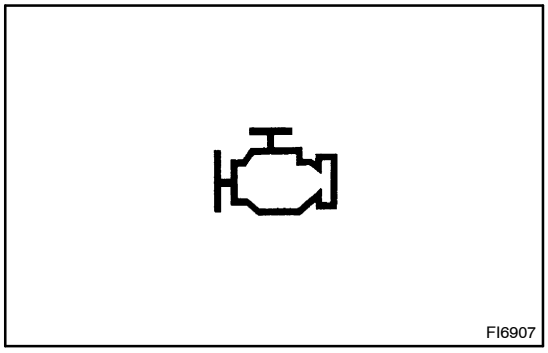
- To check the DTCs, connect a hand–held tester to DLC3 on the vehicle or read the number of blinks of the PWR indicator light when TC and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and activate the several actuators and check freeze frame data and various forms of engine data (For instruction book).
- The diagnosis system operates in normal mode during normal vehicle use, and also has a check (test) mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2–trip detection logic (*) to prevent erroneous detection and ensure thorough malfunction detection. By switching the Engine and ECT ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the PWR indicator light to light up for a malfunction that is only detected once or momentarily.
- *2 trip detection logic:
  When a logic malfunction is first detected, the malfunction is temporarily stored in the Engine and ECT ECU memory.
  If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the PWR indicator light to light up.



2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) M–OBD only:
Check the PWR indicator light.
(1) Turn the ignition switch ON.
(2) Check that the PWR indicator lights light up when the pattern select switch is selected to PWR and goes off when the pattern select switch is selected to SNOW.

HINT:
- If the PWR indicator light does not light up or stay on all the time, carry out the check for "Pattern Select Switch Circuit" on page DI–212.
- If the PWR indicator light blinks, a malfunction code is stored in the ECU memory.


FI6907

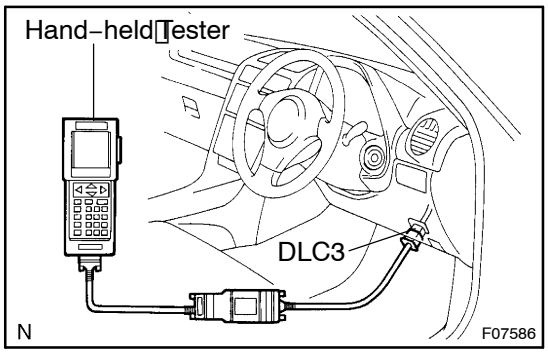
(b) Euro–OBD only:
Check the CHK ENG.
(1) The CHK ENG comes on when the ignition switch is turned ON and the engine is not running.

HINT:
If the CHK ENG does not light up, troubleshoot the combination meter (See page BE–2).

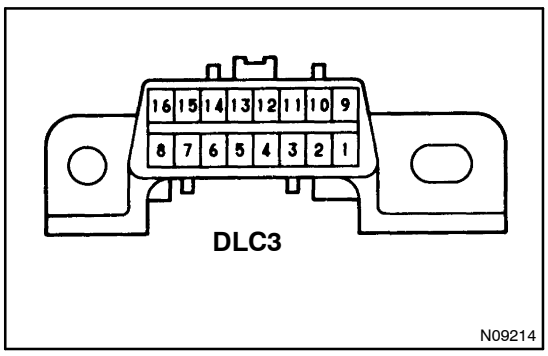
(2) When the engine is started, the CHK ENG should go off. If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(c) Check the DTC (Using hand–held tester).

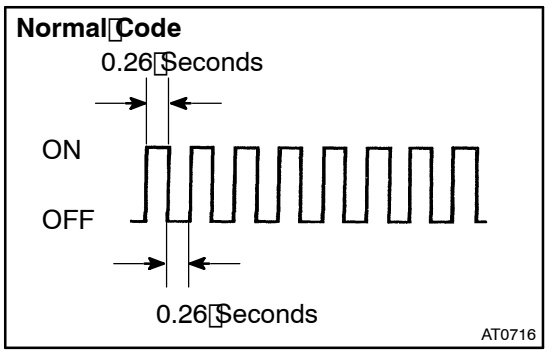
NOTICE:
When the diagnostic system is switched from normal mode to check (test) mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.



(1) Prepare hand–held tester.
(2) Connect the hand–held tester to DLC3 at the lower part of the instrument panel.
(3) Turn the ignition switch ON and turn the hand–held tester switch ON.
(4) Use the hand–held tester to check the DTCs and instructions, see the hand–held tester instruction book.
(5) See page DI–156 to confirm the details of the DTCs.

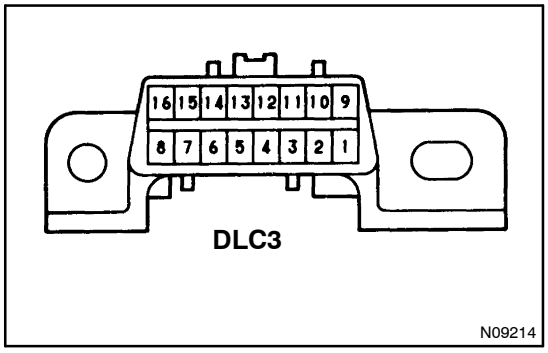


(d) M–OBD only:
Check the DTC (Not using hand–held tester).
(1) Turn the ignition switch ON, but do not start the engine.
(2) Select the pattern select switch to NORM.
(3) Using SST, connect terminals 13 (TC) and 4 (CG) of DLC3.
SST 09843–18040



(4) Read the DTC indicated by the number of times the PWR indicator light blinks.

HINT:
If the system is operating normally, the light will blink 2 times per second.



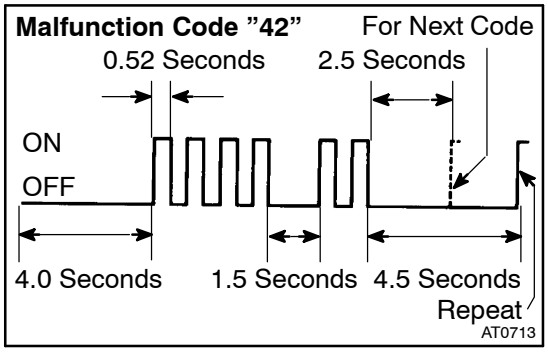
(e) Inspect the DLC3.

(1) The vehicle's Engine and ECT ECU uses ISO 9141–2 (Euro–OBD)/ISO 14230 (M–OBD) for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141–2/ISO 14230 format.

Terminal No.	Connection	Voltage or Resistance	Condition
7	Bus ⊕ Line	Pulse generation	During transmission
4	Chassis Ground	↔ Body Ground / 1 Ω or less	Always
16	Battery Positive	↔ Body Ground / 9 – 14 V	Always

HINT:
Only for Euro–OBD:
If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the OBD scan tool or 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.

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- 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) The malfunction code is indicated, as shown in the chart on the left (DTC "42" is shown as an example).

HINT:
When 2 or more malfunction codes are stored in memory, the lower–numbered code is displayed first.

3. INSPECT DIAGNOSIS (CHECK MODE)

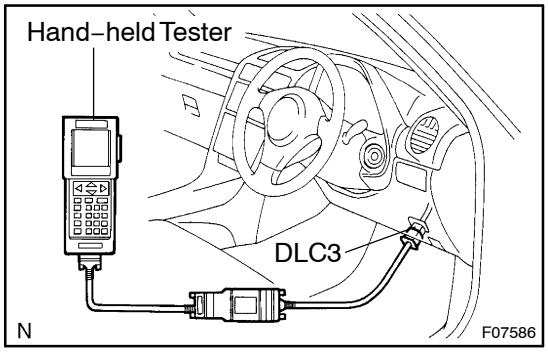
HINT:
Hand–held tester only: Compared to the Normal mode, the Check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in normal mode can also be detected in Check mode.

(a) Check the DTC.

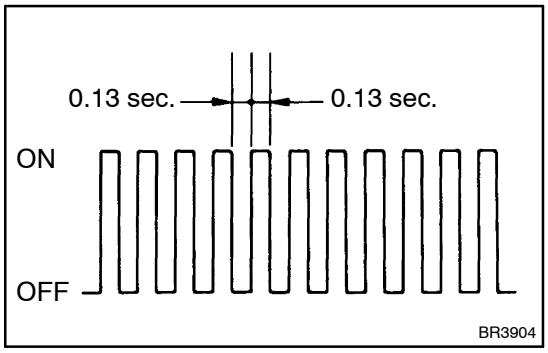
(1) Check the initial conditions.
- Battery positive voltage 11 V or more
- Throttle valve fully closed
- Transmission in P range
- Air conditioning switched off

(2) Turn the ignition switch OFF.

(3) Prepare a hand–held tester.



(4) Connect the hand–held tester to DLC3 at the lower part of the instrument panel.
(5) Turn the ignition switch ON and switch the hand–held tester ON.



(6) Switch the hand–held tester from Normal mode to Check mode (Check that the PWR indicator light flashes).
(7) Start the engine (PWR indicator light 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 hand–held tester diagnosis selector to check the DTCs and freeze frame data, etc.

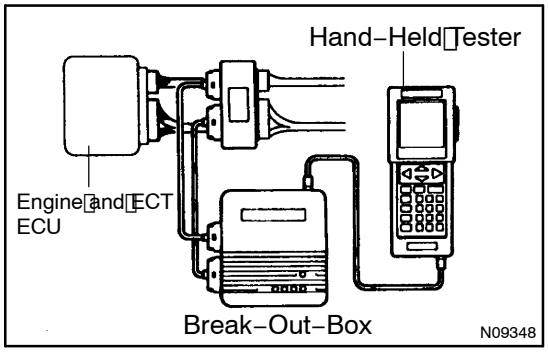
HINT:

Take care not to turn the ignition switch OFF, as turning it off switches the diagnosis system from Check mode to Normal mode, all DTCs etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

(b) When using hand–held tester:
Clear the DTC.
The following actions will erase the DTC and freeze frame data. Operate a hand–held tester to erase the codes.

(c) When not using hand–held tester:
Clear the DTC.
Remove the EFI fuse from engine room J/B for 10 seconds or more.



4. ENGINE AND ECT ECU OR ECT ECU STANDARD VALUES MEASUREMENT USING BREAK–OUT–BOX AND HAND–HELD TESTER

(a) Hook up the break–out–box and hand–held tester to the vehicle.

(b) Read the Engine and ECT ECU input/output values by following the prompts on the tester screen.

HINT:

Hand–held tester has "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems. Please refer to the hand–held tester/break–out–box operator's manual for further details.

5. PROBLEM SYMPTOM CONFIRMATION

Taking into consideration the results of the customer problem analysis, try to reproduce the symptoms of the trouble. If the problem is that the transmission does not shift up, shift down, or the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and simulate the problem symptoms.

6. ROAD TEST

NOTICE:

Perform the test at normal operating ATF temperature: 50 – 80°C (122 – 176°F).

(a) D range test

Shift into the D range and fully depress the accelerator pedal and check the following points:

(1) Check up–shift operation.

Check to see that 1 → 2, 2 → 3 and 3 → 4 up–shift takes place, and that the shift points conform to the automatic shift schedule (See page SS–28).

HINT:

- 4th Gear Up–shift Prohibition Control (1. Water temp. is 60°C (140°F) less than. 2. Vehicle speed is 63 km/h less than.)
- 4th Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Water temp. is 60°C (140°F) less than.)
- 4th Gear Flex Lock–up Prohibition Control (1. Brake pedal is depressed. 2. ATF temp. is 50°C (122°F) less than.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → 4 up–shift.

(3) Check for abnormal noises and vibration.

Drive in D range lock–up or 4th 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, etc.

(4) Check kick–down operation.

While running in the D range, 2nd, 3rd and 4th gears, check to see that the possible kick–down vehicle speed limits for 2 → 1, 3 → 2 and 4 → 3 kick–downs conform to those indicated in the automatic shift schedule (See page SS–28).

(5) Check abnormal shock and slip at kick–down.

(6) Check the lock–up mechanism.

- Drive in D range 4th 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) 3 range test

Shift into the 3 range and fully depress the accelerator pedal and check the following points:

(1) Check up–shift operation.

Check to see that 1 → 2 and 2 → 3 up–shift takes place, and that the shift points conform to the automatic shift schedule (See page SS–28).

HINT:

- 3rd Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Water temp. is 60°C (140°F) less than.)
- Australia only:

3rd Gear Flex Lock–up Prohibition Control (1. Brake pedal is depressed. 2. ATF temp. is 50°C (122°F) less than.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2 and 2 → 3 up–shift.

(3) Check for abnormal noises and vibration.

Drive in 3 range lock–up or 3rd 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, etc.

(4) Check kick–down operation.

While running in the 3 range, 2nd and 3rd gears, check to see that the possible kick–down vehicle speed limits for 2 → 1 and 3 → 2 kick–downs conform to those indicated in the automatic shift schedule (See page SS–28).

(5) Check abnormal shock and slip at kick–down.

(6) Check the lock–up mechanism.

- Drive in 3 range 3rd gear, at a steady speed (lock–up ON) of about 70 km/h (43 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.

(c) 2 range test

Shift into the 2 range 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–28).

HINT:

- There is no 3rd gear up–shift and lock–up in the 2 range.
- There is no 1st gear down–shift in the 2 range (SNOW mode).

(2) Check engine braking.

While running in the 2 range 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.

(d) L range test

Shift into the L range and fully depress the accelerator pedal and check the following points:

(1) Check no up–shift.

While running in the L range, check that there is no up–shift to 2nd gear.

(2) Check engine braking.

While running in the L range, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration.

(e) R range test

Shift into the R range and fully depress the accelerator pedal and check for slipping.

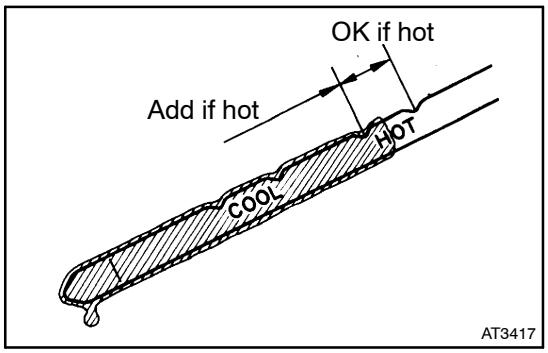
CAUTION:
Before conducting this test ensure that the test area is free from people and obstruction.

(f) P range test
Stop the vehicle on a grade (more than 5°) and after shifting into the P range, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.

7. BASIC INSPECTION

(a) Check the fluid level.

HINT:
Drive the vehicle so that the engine and transmission are at normal operating temperature.
Fluid temperature: 70 – 80 °C (158 – 176 °F)



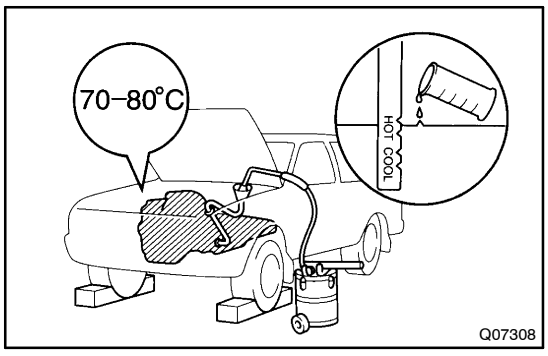
(1) Park the vehicle on a level surface and set the parking brake.
(2) With the engine idling and the brake pedal depressed, shift the shift lever into all ranges from P to L range and return to P range.
(3) Pull out the dipstick and wipe it clean.
(4) Push it back fully into the pipe.
(5) Pull it out and check that the fluid level is in the HOT range.

If the level is not within the range, add new fluid.
Fluid type: TYPE T–IV or equivalent

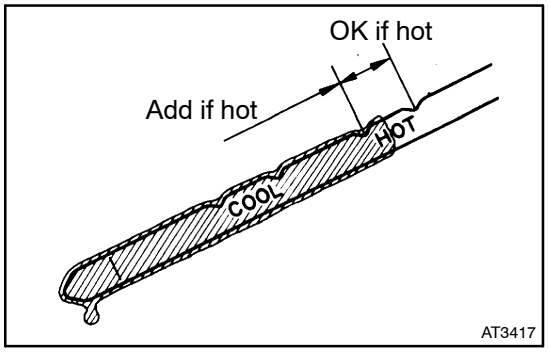
NOTICE:
Do not overfill.

(b) Check the fluid condition.
If the fluid smells burnt or is black, replace it.

(c) Replace the ATF.
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.



(3) With the engine OFF add new fluid through the oil filler pipe.
Fluid type: TYPE T–IV or equivalent
Capacity: 2.4 liters (2.5 US qts, 2.1 Imp.qts)
(4) Start the engine and shift the shift lever into all ranges from P to L range and then shift into P range.



(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.

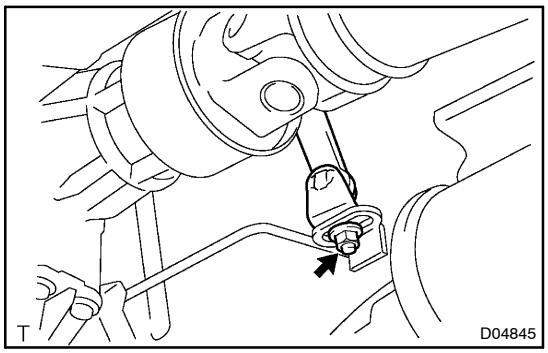
NOTICE:

Do not overfill.

(d) Check the fluid leaks.

Check for leaks in the transmission.

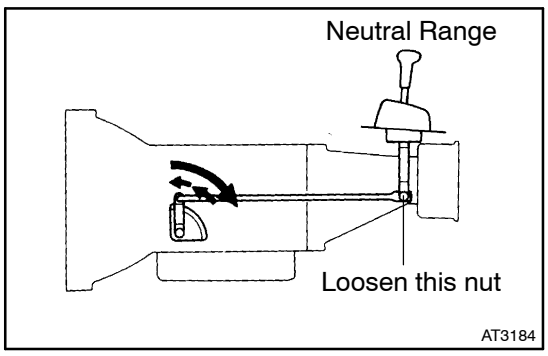
If there are leaks, it is necessary to repair or replace O–rings, gasket, oil seals, plugs or other parts.



(e) Inspect and adjust the shift lever position.

When shifting the shift lever from the N range to other ranges, check that the lever can be shifted smoothly and accurately to each range and that the position indicator is 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.

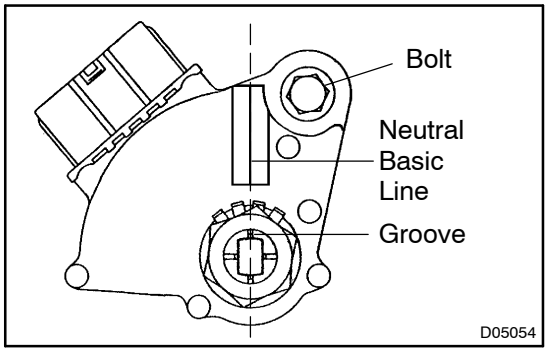
(3) Return the control shaft lever 2 notches to N range.

(4) Set the shift lever to N range.

(5) While holding the shift lever lightly toward the R range 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 range and reverses when shifting it to the R range.



(f) Inspect and adjust the neutral start switch.

Check that the engine can be started with the shift lever only in the N or P range, but not in other ranges.

If it is not as stated above, carry out the following adjustment procedures.

(1) Loosen the neutral start switch bolt and set the shift lever to the N range.

(2) Align the groove with neutral basic line.

(3) Hold the switch in position and tighten the bolt.

Torque: 5.4 N·m (55 kgf·cm, 4 ft·lbf)

For continuity inspection of the neutral start switch, see page DI–204.

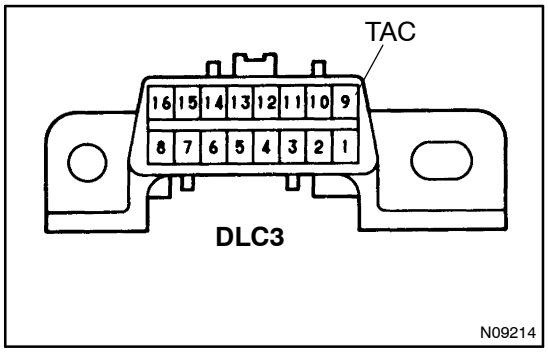
8. MECHANICAL SYSTEM TESTS

(a) Measure the 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 ranges.

NOTICE:

- **Do the test at normal operating ATF temperature 50 – 80 °C (122 – 176 °F).**
- **Do not continuously run this test for longer than 5 seconds.**
- **To ensure safety, do 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 2 wheels.

(2) Connect a hand–held tester to DLC3 or tachometer to terminal TAC of DLC3 with SST.

SST 09843–18030

(3) Fully apply the parking brake.

(4) Keep your left foot depressing firmly on the brake pedal.

(5) Start the engine.

(6) Shift into the D range. Depress all the way down on the accelerator pedal with your right foot.
Quickly read the stall speed at this time.

Stall speed: 2,500 ± 150 rpm

(7) Do the same test in the R range.

Stall speed: 2,500 ± 150 rpm

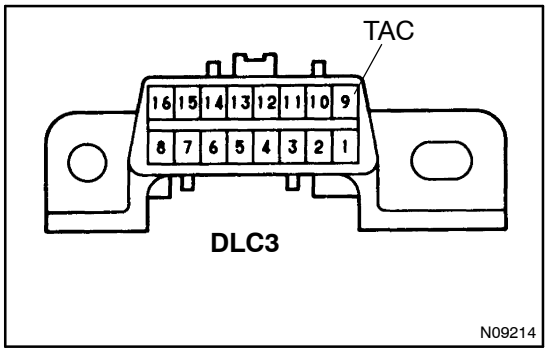
Evaluation:

Problem	Possible cause
(a) Stall speed low in D and R ranges	• 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 range	• Line pressure too low • Forward clutch slipping • No.2 one–way clutch not operating properly • O/D one–way clutch not operating properly
(c) Stall speed high in R range	• Line pressure too low • Direct clutch slipping • 1st & reverse brake slipping • O/D one–way clutch not operating properly
(d) Stall speed high in D and R ranges	• Line pressure too low • Improper fluid level • O/D one–way clutch not operating properly

(b) Measure the 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 & reverse brake.

NOTICE:

- **Do the test at normal operating ATF 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) Chock the 2 wheels.
(2) Connect a hand–held tester to DLC3 or tachometer to terminal TAC of DLC3 with SST.
SST 09843–18030
(3) Start engine and check idle speed.
Idle speed (In N range and A/C OFF): 750 ± 50 rpm
(4) Shift the lever from N to D range. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.
Time lag: N → D less than 1.2 seconds
In the same way, measure the time lag for N → R.
Time lag: N → R less than 1.5 seconds

Evaluation (If N → D or N → R time lag is longer than the specified):

Problem	Possible cause
N → D time lag is longer	• Line pressure too low • Forward clutch worn • O/D one–way clutch not operating properly
N → R time lag is longer	• Line pressure too low • Direct clutch worn • 1st & reverse brake worn • U/D one–way clutch not operating properly

9. HYDRAULIC TEST

Measure the line pressure.

NOTICE:

- **Do the test at normal operation ATF 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 stopper 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 left side of the transmission case and connect SST.
(See page AT–28 for the location to connect SST)

SST 09992–00095 (09992–00231, 09992–00271)

(3) Fully apply the parking brake and chock the 4 wheels.

(4) Start the engine and check idling speed.

(5) Keep your left foot depressing firmly on the brake pedal and shift into D range.

(6) Measure the line pressure when the engine is idling.

(7) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(8) In the same way, do the test in R range.

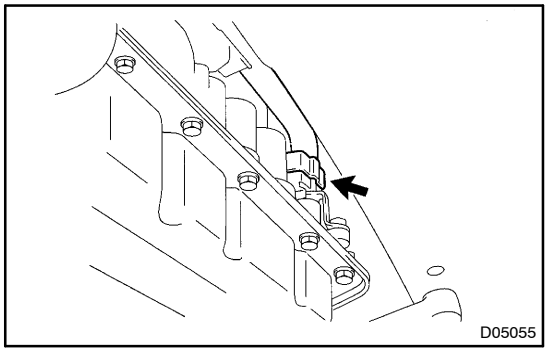
Specified line pressure:

Condition	D range kPa (kgf / cm², psi)	R range kPa (kgf / cm², psi)
Idling	395 – 455 (4.0 – 4.6, 57 – 65)	570 – 650 (5.8 – 6.6, 83 – 94)
Stall	1,150 –1,400 (11.7 – 14.2, 166 – 202)	1,530 – 1,880 (15.6 – 19.2, 222 – 273)

If the measured pressure is not up to the specified value, recheck the throttle cable adjustment and retest.

Evaluation:

Problem	Possible cause
If the measured values at all ranges are higher	• SLT solenoid valve defective • Throttle valve defect • Regulator valve detective
If the measured values at all ranges are lower	• SLT solenoid valve defective • Throttle valve defect • Regulator valve defect • Oil pump defect • O/D direct clutch defect
If pressure is low in the D range only	• D range circuit fluid leakage • Forward clutch defect
If pressure is low in the R range only	• R range circuit fluid leakage • Direct clutch defect • 1st & reverse brake defect



10. MANUAL SHIFTING TEST

HINT:

By this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transmission.

(a) Disconnect the solenoid wire.

(b) Inspect the manual driving operation.

Check that the shift and gear positions correspond to the table below.

While driving, shift through the L, 2 and D ranges.

Check that the gear change corresponds to the shift range.

Shift range	Gear position
D	4th
2	3rd
L	1st
R	Reverse
P	Pawl Lock

HINT:

If the L, 2 and D range gear positions are difficult to distinguish, do the above read test.

If any abnormality is found in the above test, the problem is in the transaxle ifself.

(c) Connect the solenoid wire.

(d) Cancel out DTC.

DI61N–02

DIAGNOSTIC TROUBLE CODE CHART

If a DTC is displayed during the DTC check, check the circuit listed in the table below and proceed to the page given.

Except Europe:

DTC No. (See Page)	Detection Item	Trouble Area	*1 PWR Indicator Light Blink	*2 Memory
P0500/42 (DI–180)	Vehicle Speed Sensor Malfunction (Transmission Output Speed Sensor)	• Open or short in transmission output speed sensor circuit • Transmission output speed sensor • Combination meter • Engine and ECT ECU • Automatic Transmission Assembly	○	○
P0710/38 (DI–183)	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor circuit • Engine and ECT ECU	○	○
P0715/67 (DI–185)	Input/Turbine Speed Sensor Circuit Malfunction (Transmission Input Speed Sensor)	• Open or short in transmission input speed sensor circuit • Transmission input speed sensor • Engine and ECT ECU • Automatic Transmission Assembly	○	○
P0753/62 (DI–190)	Shift Solenoid ”A” Electrical Malfunction (No.1 Solenoid Valve)	• Open or short No.1 solenoid valve circuit • No.1 solenoid valve • Engine and ECT ECU	○	○
P0758/63 (DI–190)	Shift Solenoid ”B” Electrical Malfunction (No.2 Solenoid Valve)	• Open or short No.2 solenoid valve circuit • No.2 solenoid valve • Engine and ECT ECU	○	○
P1755/68 (DI–198)	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU	X	○
P1760/77 (DI–200)	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU	X	○

*1: ”○” mark means PWR indicator light blinks once every 2 seconds.
”X” mark means PWR indicator light never blinks.
*2: ”○” mark means Engine and ECT ECU memorizes the malfunction code if the Engine and ECT ECU detects the DTC detection condition.
HINT:
This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

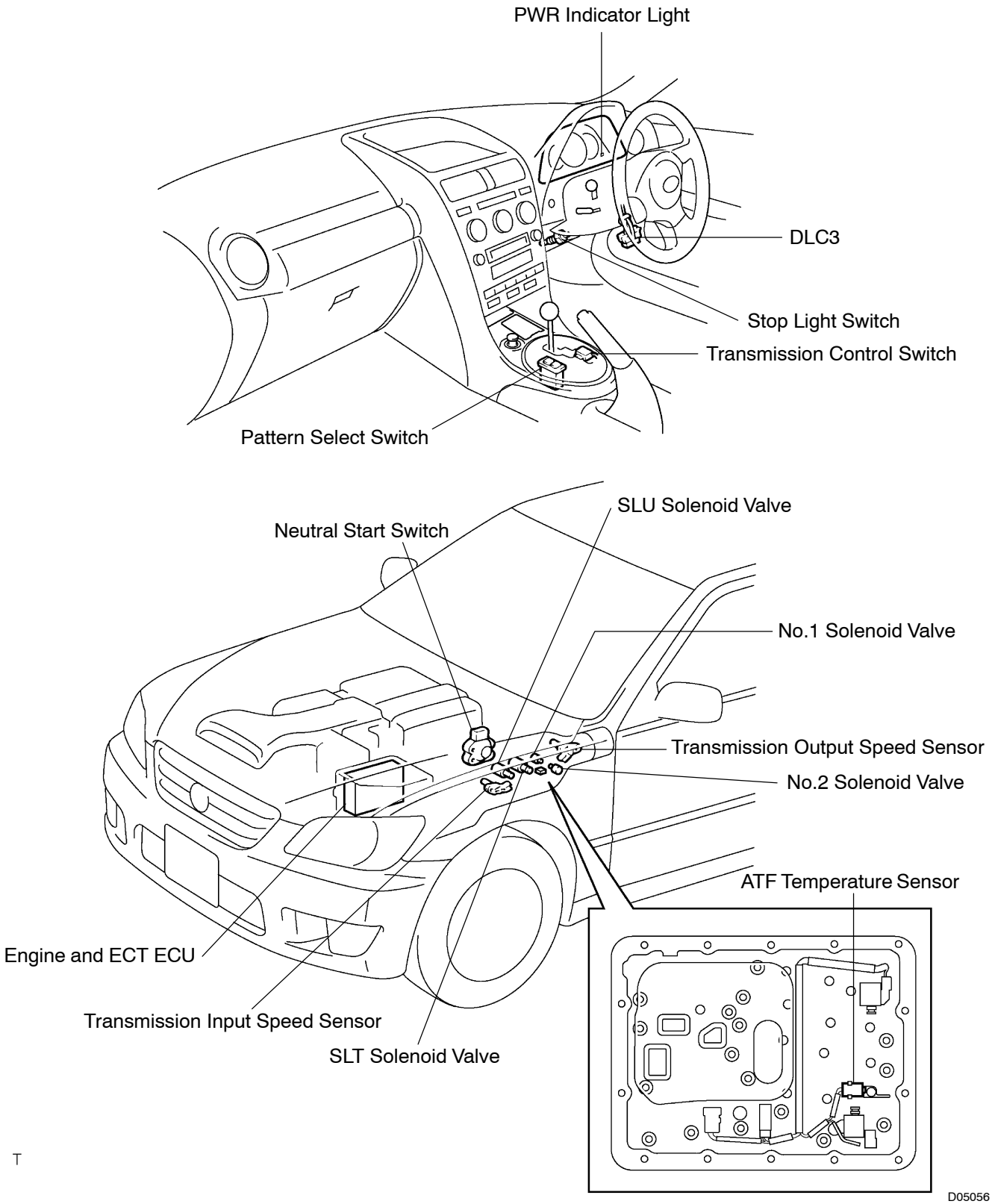
Europe:

DTC No. (See Page)	Detection Item	Trouble Area	Check engine warning light *1	Memory *2
P0500 (DI–180)	Vehicle Speed Sensor Malfunction (Transmission Output Speed Sensor)	• Open or short in transmission output speed sensor circuit • Vehicle speed sensor • Combination meter • Engine and ECT ECU • Automatic transaxle assembly	○	○
P0710 (DI–183)	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • Engine and ECT ECU	○	○
P0750 (DI–188)	Shift Solenoid ”A” Malfunction (No. 1 Solenoid Valve)	• No. 1 solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Automatic transmission assembly	○	○
P0753 (DI–190)	Shift Solenoid ”A” Electrical Malfunction (No. 1 Solenoid Valve)	• Open or short in No. 1 solenoid valve circuit • No. 1 solenoid valve • Engine and ECT ECU	○	○
P0755 (DI–188)	Shift Solenoid ”B” Malfunction (No. 2 Solenoid Valve)	• No. 2 solenoid valve is stuck open or closed • Valve body is blocked up or stuck	○	○
P0758 (DI–190)	Shift Solenoid ”B” Electrical Malfunction (No. 2 Solenoid Valve)	• Open or short in No. 2 solenoid valve circuit • No. 2 solenoid valve • Engine and ECT ECU	○	○
P0770 (DI–194)	Shift Solenoid ”C” Malfunction (SLU Solenoid Valve)	• SLU solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Lock–up clutch • Automatic transmission assembly	○	○
P1520 (DI–197)	Stop Light Switch Circuit	• Open or short in stop light switch circuit • Stop light switch • Engine and ECT ECU	○	○
P1755 (DI–198)	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU	○	○
P1760 (DI–200)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU	○	○
P1780 (DI–203)	Neutral Start Switch Circuit Malfunction	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU	○	○

*1: ”○” mark means Check engine warning light blinks once every 2 seconds.
”X” mark means PWR indicator light never blinks.
*2: ”○” mark means Engine and ECT ECU memorizes the malfunction code if the Engine and ECT ECU detects the DTC detection condition.
HINT:
This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

DI61O–02

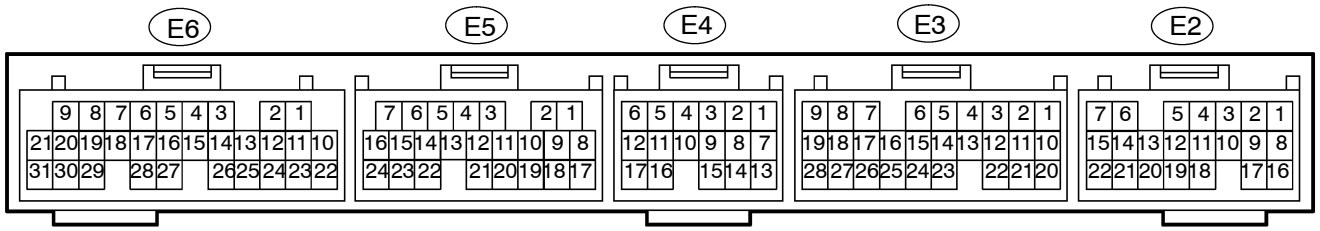
PARTS LOCATION



DI61P–02

TERMINALS OF ECU

Engine and ECT ECU Terminals



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
OIL – E2 (E4, 17 – E5, 18)	GR ↔ BR	ATF temperature: 115°C (239°F) or more	Below 1.5
S1 – E1 (E4, 1 – E5, 17)	L–Y ↔ BR	IG ON	9.0 – 14
		1st or 2nd gear	9.0 – 14
		3rd or 4th gear	Below 1.5
S2 – E1 (E4, 2 – E5, 17)	G–Y ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	9.0 – 14
		1st or 4th gear	Below 1.5
SLU^+ – SLU^- (E4, 7 – E4, 13)	G–W ↔ L–R	IG ON	Below 3.0
		Moving	Pulse signal is output Below 1.5 ↔ 4 – 6
$SP2^+$ – $SP2^-$ (E4, 5 – E4, 11)	L–Y ↔ R–L	Moving	Pulse signal is output Below 1.5 ↔ 4 – 6
L – E1 (E5, 21 – E5, 17)	Y–G ↔ BR	IG ON and Shift lever L range	9.0 – 14
		IG ON and Shift lever other than L range	Below 1.5
2 – E1 (E5, 20 – E5, 17)	G–W ↔ BR	IG ON and Shift lever 2 range	9.0 – 14
		IG ON and Shift lever other than 2 range	Below 1.5
D – E1 (E3, 11 – E5, 17)	GR–B ↔ BR	IG ON and Shift lever D range	9.0 – 14
		IG ON and Shift lever other than D range	Below 1.5
R – E1 (E5, 19 – E5, 17)	R–B ↔ BR	IG ON and Shift lever R range	9.0 – 14
		IG ON and Shift lever other than R range	Below 1.5
N – E1 (E6, 24 – E5, 17)	G–R ↔ BR	IG ON and Shift lever N range	9.0 – 14
		IG ON and Shift lever other than N range	Below 1.5
P – E1 (E5, 10 – E5, 17)	G ↔ BR	IG ON and Shift lever P range	9.0 – 14
		IG ON and Shift lever other than P range	Below 1.5
STP – E1 (E3, 6 – E5, 17)	G–W ↔ BR	IG ON and Brake pedal is depressed	7.5 ~ 14
		IG ON and Brake pedal is released	Below 1.5

DI61Q–02

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the DTC 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 trouble-shooting.

The Matrix Chart is divided into 3 chapters.

When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to Chapter 2 or 3, proceed as instructed.

- 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 Engine and ECT ECU.

CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

Symptom	Suspect Area	See page
No up–shift (A particular gear, from 1st to 3rd gear, is not –up shifted)	Engine and ECT ECU	IN–32
No up–shift (3rd → 4th)	1. Transmission control switch 2. Engine and ECT ECU	DI–217 IN–32
No down–shift (4th → 3rd)	1. Transmission control switch 2. Engine and ECT ECU	DI–217 IN–32
No down–shift (A particular gear, from 1st to 3rd gear, is not –down shifted)	Engine and ECT ECU	IN–32
No lock–up	1. Stop light switch signal circuit 2. Engine and ECT ECU	DI–209 IN–32
No lock–up off	Engine and ECT ECU	IN–32
Shift point too high or too low	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–212 IN–32
Up–shift to 4th from 3rd while engine is cold	Engine and ECT ECU	IN–32
No kick–down	1. Kick–down switch circuit 2. Engine and ECT ECU	DI–214 IN–32
Engine stalls when starting off or stopping	1. Stop light switch signal circuit 2. Engine and ECT ECU	DI–209 IN–32
No pattern select	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–212 IN–32
No 2nd start	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–212 IN–32

CHAPTER 2: ON–VEHICLE REPAIR
(★: A45DE AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM690E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Transmission control rod 2. Manual valve 3. Off–vehicle repair matrix chart	DI–156 ★ –
Vehicle does not move in R range	1. Reverse control valve 2. Off–vehicle repair matrix chart	★ –
Vehicle does not move in particular range or ranges (except R range)	Off–vehicle repair matrix chart	–
No up–shift (1st → 2nd)	1. 1–2 shift valve* 2. Off–vehicle repair matrix chart	★ –
No up–shift (2nd → 3rd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	★ –
No up–shift (3rd → 4th)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (4th → 3rd)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (3rd → 2nd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (2nd → 1st)	1. 1–2 shift valve 2. Off–vehicle repair matrix chart	★ –
No lock–up or No lock–up off	1. Lock–up signal valve 2. Lock–up control valve 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (N → D)	1. Accumulator control valve 2. C_1 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (Lock–up)	Off–vehicle repair matrix chart	–
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (N → L)	1. Accumulator control valve 2. C_1 accumulator 3. C_2 accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (1st → 2nd / D range)	1. Accumulator control valve 2. B_1 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (1st → 2nd / 2 range)	1. Accumulator control valve 2. B_2 accumulator 3. C_1 accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (1st → 2nd → 3rd → 4th)	1. Accumulator control valve 2. Check ball 3. Throttle valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. C_2 accumulator 3. 2–3 shift timing valve 4. Off–vehicle repair matrix chart	★ ★ ★ –

Harsh engagement (3rd → 4th)	1. Accumulator control valve 2. B_0 accumulator 3. Check ball 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (4th → 3rd)	1. Accumulator control valve 2. B_0 accumulator 3. Off–vehicle repair matrix chart	★ ★ –
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Off–vehicle repair matrix chart	DI–156 ★ –
Slip or shudder (Particular range)	1. Transmission control rod 2. Off–vehicle repair matrix chart	DI–156 –
No engine braking (1st / L range)	1. Low coast modulator valve 2. Modulator valve 3. Off–vehicle repair matrix chart	★ ★ –
No engine braking (2nd / 2 range)	Off–vehicle repair matrix chart	–
No kick–down	1. 1–2 shift valve 2. 2–3 shift valve 3. 3–4 shift valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Poor acceleration	1. C_0 exhaust valve 2. Off–vehicle repair matrix chart	★ –
Engine stall when starting off or stopping	Off–vehicle repair matrix chart	–

CHAPTER 3: OFF–VEHICLE REPAIR
(★: A45DE AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM690E)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Torque converter 2. Oil pump 3. O/D direct clutch (C_0) 4. Front clutch (C_1) 5. Rear clutch (C_2) 6. O/D one–way clutch (F_0) 7. O/D planetary gear unit	AT–33 ★ ★ ★ ★ ★ ★
Vehicle does not move in R range	1. O/D direct clutch (C_0) 2. Rear clutch (C_2) 3. 1st & reverse brake (B_3)	★ ★ ★
Vehicle does not move in D, 2 and 1 ranges	1. O/D direct clutch (C_0) 2. Front clutch (C_1)	★ ★
Vehicle does not move in D, 2 ranges	Front clutch (C_1)	★
Vehicle does not move in 2 range	2nd brake (B_2)	★
Vehicle does not move in 1 range	1st & reverse brake (B_3)	★
No up–shift (1st → 2nd)	1. O/D direct clutch (C_0) 2. 2nd brake (B_2)	★ ★
No up–shift (2nd → 3rd)	Direct clutch (C_2)	★
No up–shift (3rd → 4th)	1. O/D brake (B_0) 2. O/D direct clutch (C_0) 3. O/D one–way clutch (F_0)	★ ★ ★
No down–shift (2nd → 1st)	1. 2nd brake (B_2) 2. 1st & reverse brake (B_3) 3. No.1 one–way clutch (F_1)	★ ★ ★
No lock–up or No lock–up off	Torque converter	AT–33
Harsh engagement (N → D)	1. Front clutch (C_1) 2. No.1 one–way clutch (F_1)	★ ★
Harsh engagement (N → R)	1. Rear clutch (C_2) 2. 1st & reverse brake (B_3)	★ ★
Harsh engagement (2nd → 3rd)	1. O/D direct clutch (C_0) 2. Rear clutch (C_2)	★ ★
Harsh engagement (3rd → 4th)	O/D brake (B_0)	★
Harsh engagement (4th → 3rd)	1. O/D brake (B_0) 2. O/D one–way clutch (F_0)	★ ★
Harsh engagement (Lock–up)	Torque converter	AT–33
Slip or shudder (Forward and reverse / After warm–up)	1. Torque converter 2. O/D one–way clutch (F_0) 3. O/D direct clutch (C_0)	★ ★ ★
Slip or shudder (Forward and reverse / Just after engine starts)	Torque converter	AT–33
Slip or shudder (R range)	1. 2nd brake (B_2) 2. Rear clutch (C_2)	★ ★
Slip or shudder (1st)	1. 1st & reverse brake (B_3) 2. No. 1 one–way clutch (F_1)	★ ★
Slip or shudder (2nd)	1. 2nd brake (B_2) 2. Front clutch (C_1)	★ ★
Slip or shudder (3rd)	1. Front clutch (C_1) 2. Rear clutch (C_2)	★ ★

Slip or shudder (4th)	1. O/D brake (B_0) 2. Front clutch (C_1) 3. Rear clutch (C_2)	★ ★ ★
No engine braking (1st – 3rd: D range)	1. O/D direct clutch (C_0) 2. O/D one–way (F_0)	★ ★
No engine braking (1st: L range)	1st & reverse brake (B_3)	★
No engine braking (2nd: 2 range)	O/D direct clutch (C_1)	★
Poor acceleration (All range)	Torque converter	AT–33
Poor acceleration (4th)	1. O/D direct clutch (C_0) 2. O/D planetary gear unit	★ ★
Poor acceleration (other than 4th)	O/D brake (B_0)	★
Poor acceleration (other than 2nd)	2nd brake (B_2)	★
Poor acceleration (1st and 2nd)	Direct clutch (C_2)	★
Poor acceleration (L and R ranges)	1. 1st & reverse brake (B_3) 2. O/D brake (B_0) 3. Rear clutch (C_2)	★ ★ ★
Poor acceleration (R range)	Forward clutch (C_1)	★
Engine stalls when starting off or stopping	Torque converter	AT–33

DI61R–02

CIRCUIT INSPECTION

DTC	P0500/42	Vehicle Speed Sensor Malfunction (Transmission Output Speed Sensor)

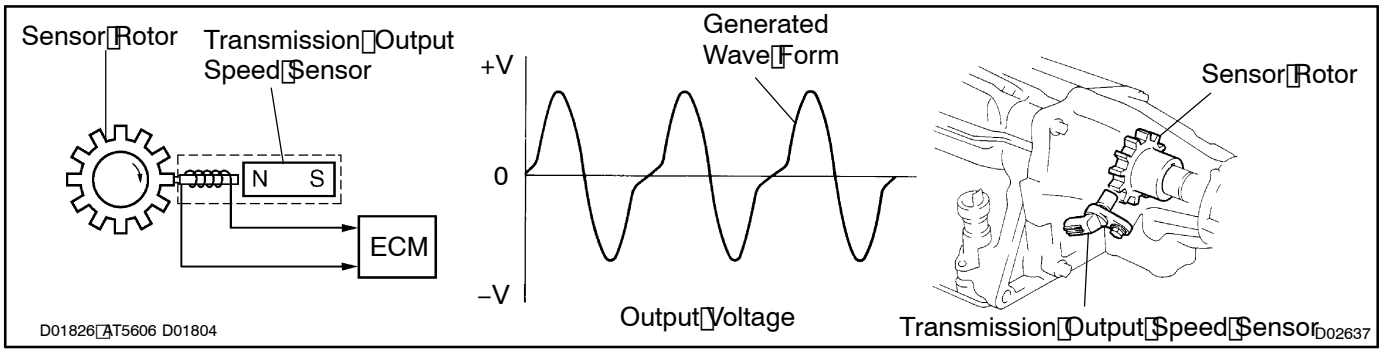
CIRCUIT DESCRIPTION

The transmission output speed sensor detects the rotation speed of the transmission output shaft and sends signals to the Engine and ECT ECU. The Engine and ECT ECU determines the vehicle speed based on these signals.

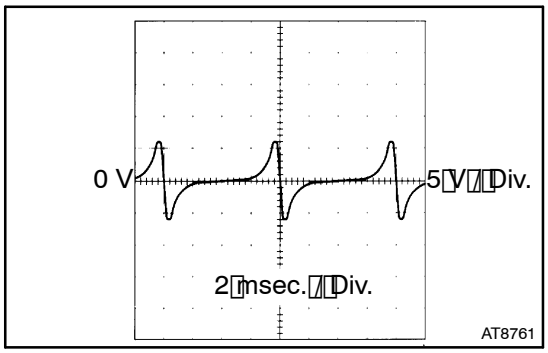
An AC voltage is generated in the transmission output speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the Engine and ECT ECU.

The gear shift point and lock–up timing are controlled by the Engine and ECT ECU based on the signals from this transmission output speed sensor and the throttle position sensor signal.

If the vehicle speed sensor malfunctions, the Engine and ECT ECU uses input signals from the transmission input speed sensor as a back–up signal.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	All conditions below are detected 8 secs. or more. (1–trip detection logic) (a) No signal from transmission output speed sensor are input to Engine and ECT ECU. (b) Neutral start switch: OFF (Other than P or N)	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine and ECT ECU • Automatic transmission (clutch, brake or gear etc.)
	Clutch or brake slips or gear is broken	



HINT:

Refer to the chart for the wave form between terminals $SP2^{+}$ and $SP2^{-}$ when vehicle speed is approx. 60 km/h (37 mph).

WIRING DIAGRAM

See page DI–91.

INSPECTION PROCEDURE

1	**Check operation of speedometer.**

PREPARATION:
(a) Connect hand–held tester to DLC3.
(b) Start engine and hand–held tester main switch ON.
CHECK:
HINT:
Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
OK:

Vehicle speed matches tester speed value.

OK → **Check and replace Engine and ECT ECU (See page IN–32).**

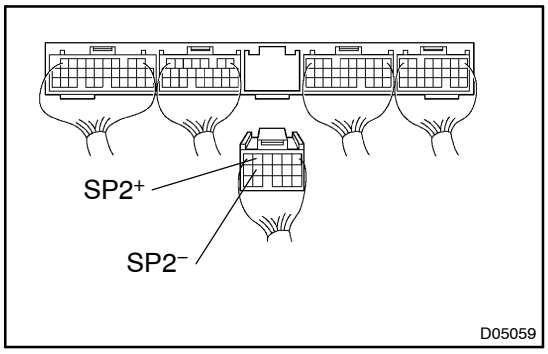
NG

2	**Check speedometer circuit (See page BE–83).**

NG → **Repair or replace speedometer circuit.**

OK

3	**Check resistance between terminals SP2+ and SP2– of Engine and ECT ECU.**



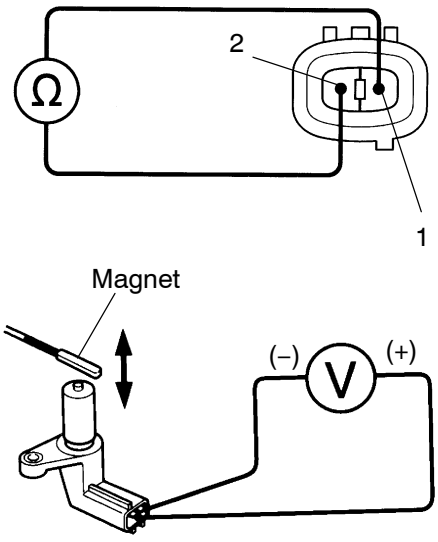
PREPARATION:
Disconnect the connector from Engine and ECT ECU.
CHECK:
Check resistance between terminals SP2+ and SP2– of Engine and ECT ECU.
OK:

Resistance: 560 – 680 Ω at 20°C (68°F)

OK → **Check and replace the Engine and ECT ECU (See page IN–32).**

NG

4	Check transmission output speed sensor.



Q08285
Q08292 D01709

PREPARATION:

Remove the transmission output speed sensor from the transmission.

CHECK:

(a) Measure resistance between terminals 1 and 2 of vehicle speed sensor.

(b) Check voltage between terminals 1 and 2 of transmission output speed sensor when a magnet is put close to the front end of the transmission output speed sensor then taken away quickly.

OK:

(a) Resistance: 560 – 680 Ω at 20°C (68°F)

(b) Voltage is generated intermittently.

HINT:

The generated voltage is extremely low.

NG → **Replace the transmission output speed sensor.**

OK

Check and repair the harness and connector between Engine and ECT ECU and transmission output speed sensor (See page IN–32).

DI61S–02

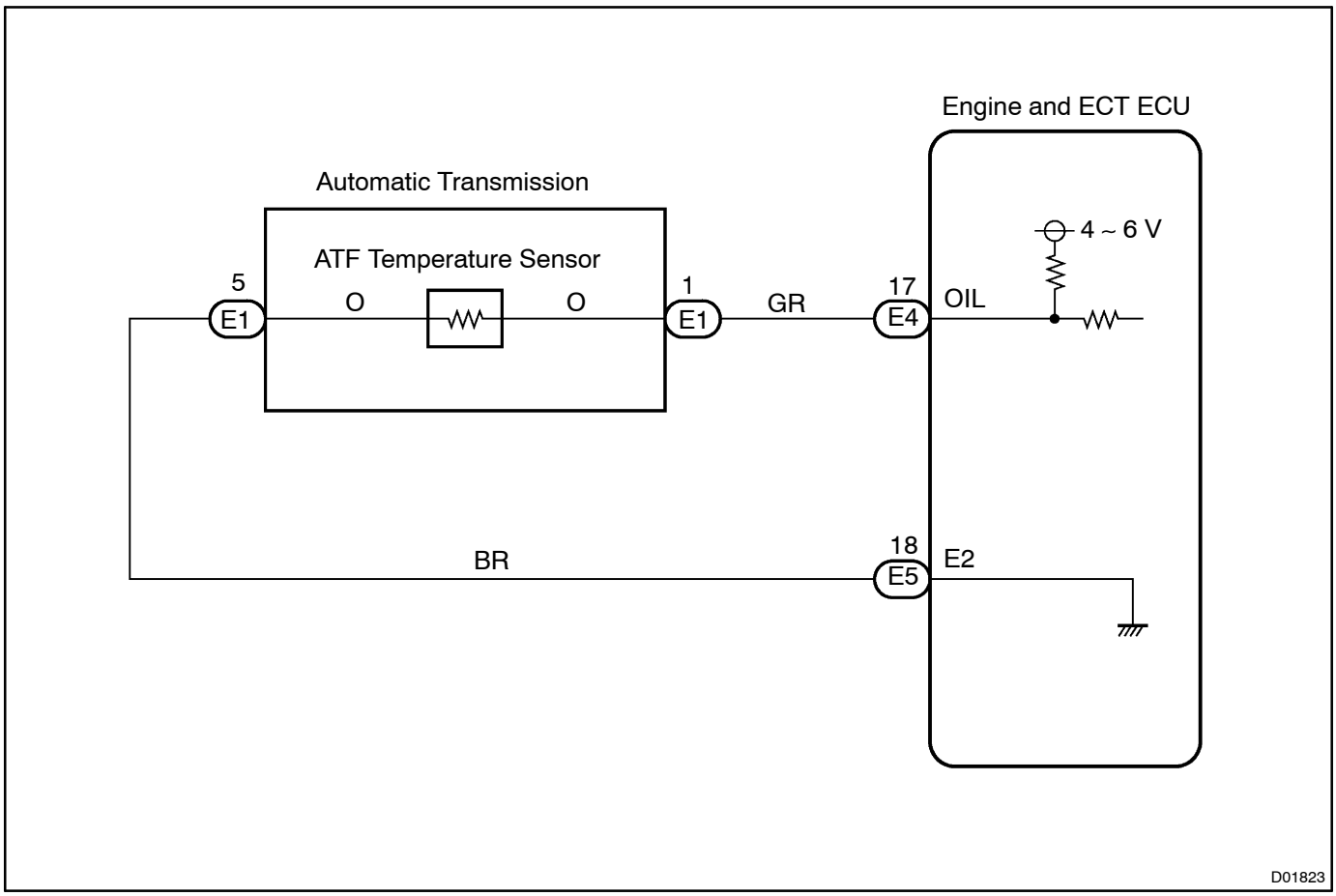
DTC	P0710/38	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the Engine and ECT ECU.

DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either (a) or (b) is detected for 0.5 sec. or more. (a) Temp. sensor resistance is less than 79 Ω (b) After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	• Open or short in ATF temp. sensor circuit • ATF temp. sensor • Engine and ECT ECU

WIRING DIAGRAM



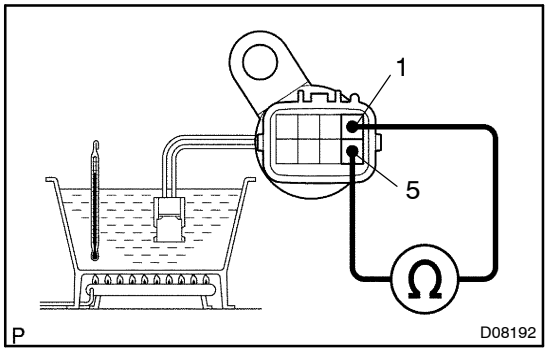
INSPECTION PROCEDURE

1	Check harness and connector between ATF temperature sensor and Engine and ECT ECU (See page IN–32).

NG → Repair or replace the harness or connector.

OK

2	Check ATF Temperature Sensor.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the solenoid wiring.

Remove the ATF temperature sensor.

CHECK:

Measure resistance between terminals 1 and 5 of solenoid wiring connector at 10°C (50°F) and 110°C (230°F).

OK:

Resistance:

10°C (50°F): 6.5 kΩ

110°C (230°F): 200 – 300 Ω

NG → Replace solenoid wiring.

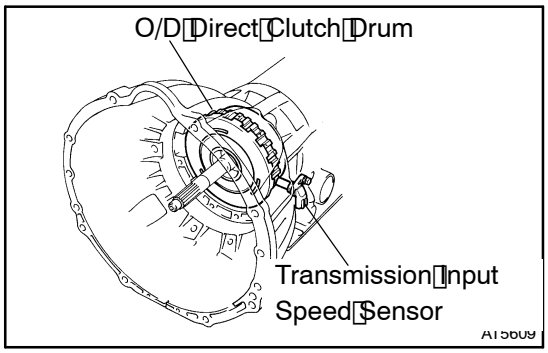
OK

Check and replace the Engine and ECT ECU (See page IN–32).

DI61T–02

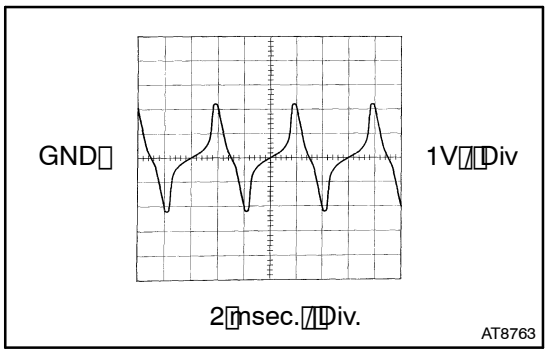
DTC	P0715/67	Input/Turbine Speed Sensor Circuit Malfunction (Transmission Input Speed Sensor)

CIRCUIT DESCRIPTION



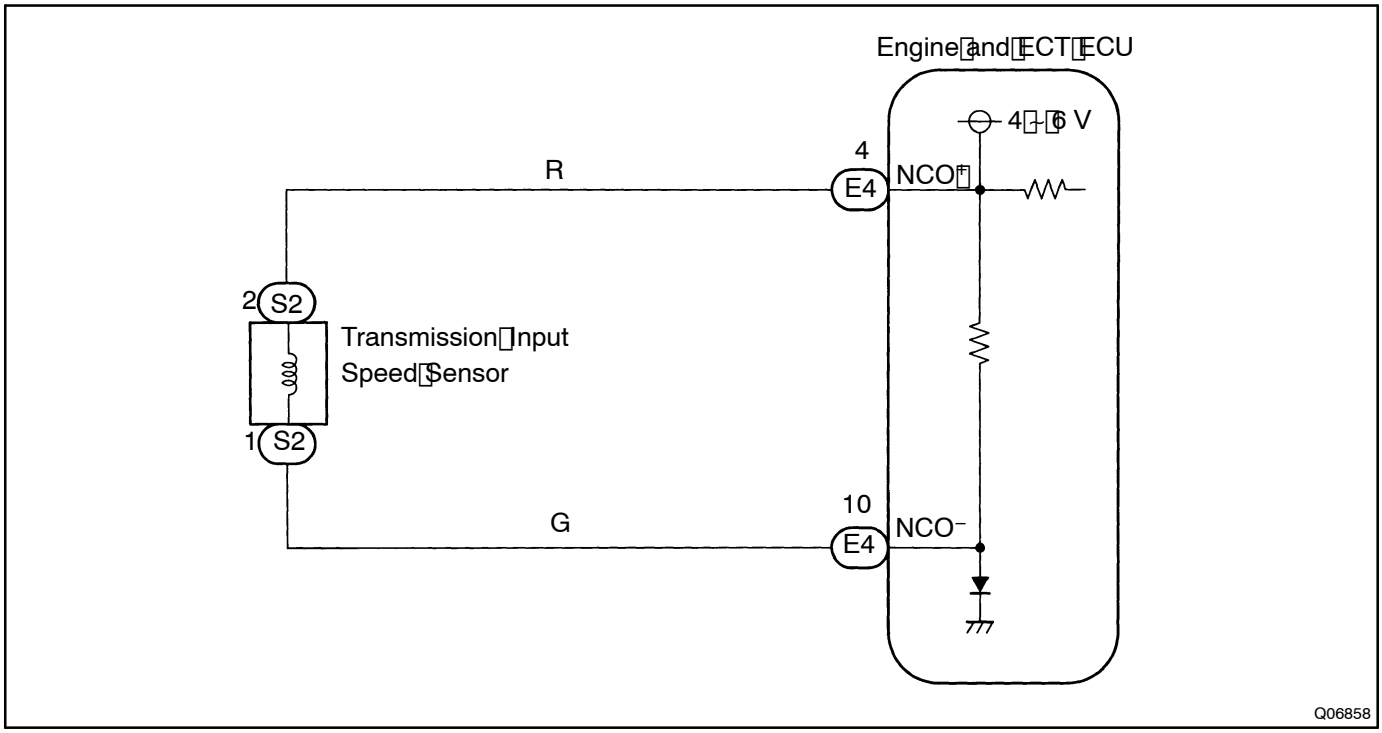
This sensor detects the rotation speed of the O/D input shaft from the rotation of the O/D direct clutch drum.
Its construction is the same as that of the transmission output speed sensor (See page DI–180).
By comparing the O/D direct clutch speed signal to the transmission output speed sensor signal, the Engine and ECT ECU detects the shift timing of the gear and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus performing smooth gear shift.

DTC No.	DTC Detection Condition	Trouble Area
P0715	All conditions below are detected for 5 secs. or more (1–trip detection logic) (a) Gear change not being performed (b) Gear position: 1st, 2nd or 3rd (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Park/neutral position switch: OFF (f) No. 1, No. 2, SLU solenoid valves and transmission output speed sensor are in normal operation	• Open or short in transmission input speed sensor circuit • Transmission input speed sensor • Engine and ECT ECU



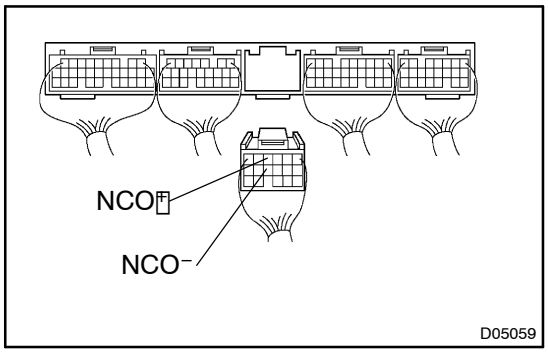
HINT:
Refer to the chart for the wave form between terminals NCO^{+} and NCO^{-} during engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check resistance between terminals NCO+ and NCO– of Engine and ECT ECU.**

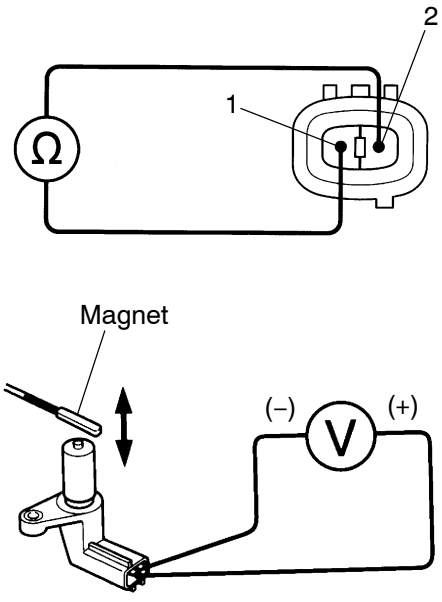


PREPARATION:
Disconnect the connector from Engine and ECT ECU.
CHECK:
Check resistance between terminals NCO+ and NCO– of Engine and ECT ECU.
OK:
Resistance: 560 – 680 Ω at 20°C (68°F)

OK	**Check and replace the Engine and ECT ECU (See page IN–32).**

NG

2	Check transmission input speed sensor.



Q08285
Q08292 D01709

PREPARATION:

Remove the transmission input speed sensor from the transmission.

CHECK:

(a) Measure resistance between terminals 1 and 2 of transmission input 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 kept away quickly.

OK:

(a) Resistance: 560 – 680 Ω at 20°C (68°F)

(b) Voltage is generated intermittently.

HINT:

The generated voltage is extremely low.

NG → **Replace the transmission input speed sensor.**

OK

Check and repair harness and connector between Engine and ECT ECU and transmission input speed sensor (See page IN–32).

DI7YN–01

DTC	P0750	Shift Solenoid ”A” Malfunction (No. 1 Solenoid Valve)

DTC	P0755	Shift Solenoid ”B” Malfunction (No. 2 Solenoid Valve)

SYSTEM DESCRIPTION

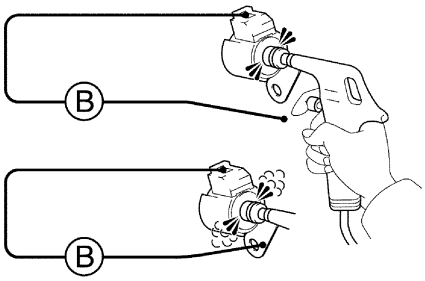
The Engine and ECT ECU uses signals from the vehicle speed sensor and input / turbine speed sensor to detect the actual gear position (1st, 2nd, 3rd or 4th gear). The Engine and ECT ECU then compares the actual gear with the shift schedule in the Engine and ECT ECU memory to detect mechanical trouble of the shift solenoid valves, valve body and automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the Engine and ECT ECU 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 • Automatic transmission assembly

Check the shift solenoid valve No.1 when DTC P0750 is output and check shift solenoid valve No.2 when DTC P0755 is output.

INSPECTION PROCEDURE

1	Check No. 1 or No. 2 solenoid valve operation.



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the No. 1 or No. 2 solenoid valve.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valves do not leak air.
(b) When battery positive voltage is supplied to the solenoid valves, check that the solenoid valves are open.

OK:

(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

NG → **Replace the No. 1 or No. 2 solenoid valve.**

OK

2	Check valve body (See page DI–175).

NG → **Repair or replace the valve body.**

OK

Replace the transmission (See page AT–28).

DI61U–02

DTC	P0753/62,P0758/63	Shift Solenoid A/B Electrical Malfunction (No.1 /No.2 Solenoid Valve)

CIRCUIT DESCRIPTION

Shifting from 1st to 4th is done in combination with ON and OFF of the No. 1 and No. 2 solenoid valves controlled by Engine and ECT ECU. If an open or short circuit occurs in either of the shift solenoid valves, the Engine and ECT ECU controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

Position	NORMAL			NO.1 SOLENOID MALFUNCTIONING			NO.2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS VALVE 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	4th
	ON	ON	2nd	X	ON	3rd	OFF	X	4th	4th
	OFF	ON	3rd	X	ON	3rd	OFF	X	4th	4th
	OFF	OFF	4th	X	OFF	4th	OFF	X	4th	4th
2	ON	OFF	1st	X	ON	3rd	ON	X	1st	3rd
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	3rd
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	3rd
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st

X: Malfunctions

HINT:

Check the No.1 solenoid valve when DTC P0753/62 is output and check the No.2 solenoid valve when DTC P0758/63 is output.

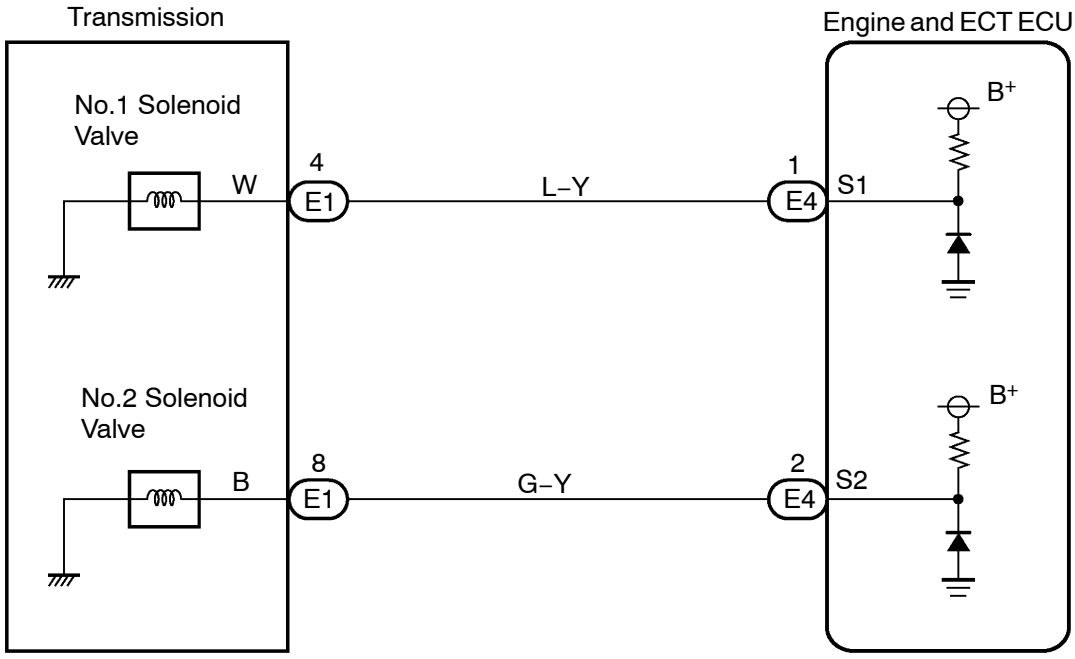
DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The Engine and ECT ECU checks for an open or short circuit in the No.1 and No.2 solenoid valve circuit when it changes gear positions. The Engine and ECT ECU records DTC P0753/62 or P0758/63 if condition (a) or (b) is detected once, but it does not light up PWR indicator light. After Engine and ECT ECU detects condition (a) or (b) continuously 2 times or more in 1–trip, it causes the PWR indicator light to light up until condition (a) or (b) disappears. After that, if the Engine and ECT ECU detects condition (a) or (b) once, it starts lighting up PWR indicator light again. (a) Solenoid resistance is 8 Ω or less (short circuit) when the solenoid is energized. (b) Solenoid resistance is 100 kΩ or more (open circuit) when the solenoid is not energized.	• Open or short in No.1/No.2 solenoid valve circuit • No.1/No.2 solenoid valve • Engine and ECT ECU

Fail Safe Function

If either of the solenoid valve circuits develops an open or a short, the Engine and ECT ECU turns the other solenoid valve ON and OFF to shift to the gear positions shown in the table above. The Engine and ECT ECU also turns the SL solenoid valve OFF at the same time. If both solenoids are malfunctioning, hydraulic control cannot be done electronically and must be done manually.

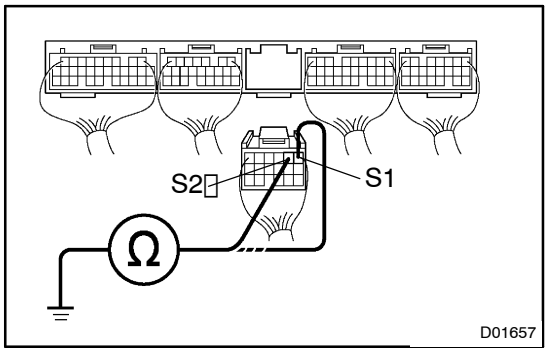
Manual shifting as shown in the above table must be done (In the case of a short circuit, the Engine and ECT ECU stops sending current to the short circuited solenoid).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal S1 or S2 of Engine and ECT ECU and body ground.**

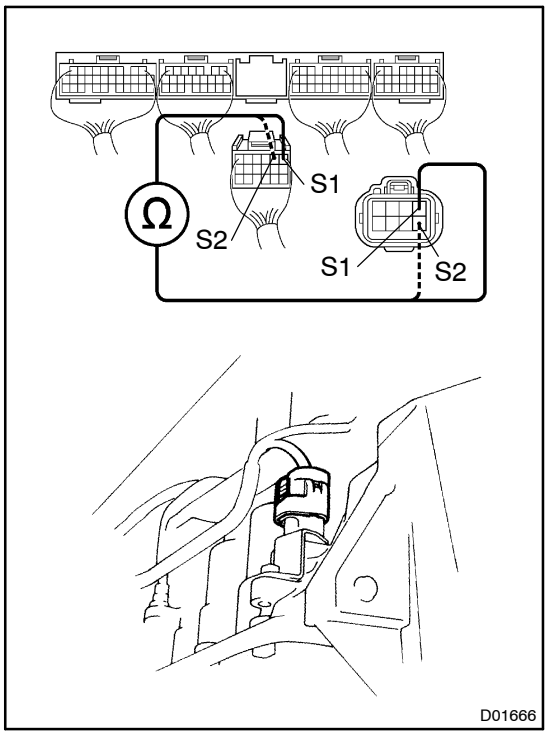


PREPARATION:
Disconnect the connector from Engine and ECT ECU.
CHECK:
Measure resistance between terminal S1 or S2 of Engine and ECT ECU and body ground.
OK:
Resistance: 11 – 15 Ω at 20°C (68°F)

OK	**Check and replace the Engine and ECT ECU (See page IN–32).**

NG

2	**Check harness and connector between Engine and ECT ECU and automatic transmission solenoid connector.**

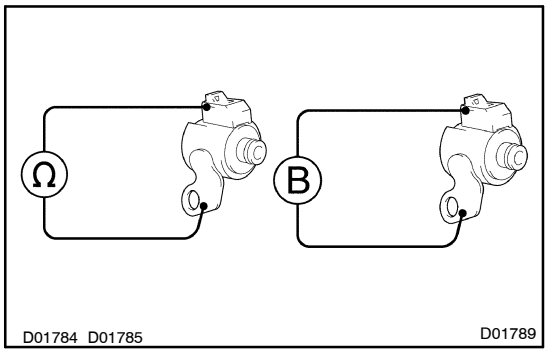


PREPARATION:
(a) Disconnect the connector from Engine and ECT ECU.
(b) Disconnect the solenoid connector from the automatic transmission.
CHECK:
Check the harness and connector between terminal S1 or S2 of Engine and ECT ECU and terminal S1 or S2 of solenoid connector.
OK:
There is no open and short circuit.

NG	**Repair or replace the harness or connector.**

OK

3	Check No.1 or No.2 solenoid valve.



Electrical Check:

PREPARATION:

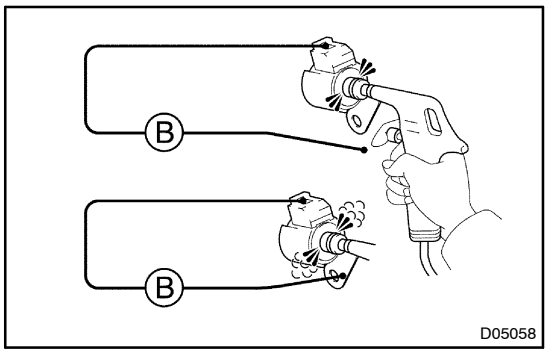
(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the No.1 or No.2 solenoid valve.

CHECK:

(a) Measure resistance between solenoid connector and body ground.
(b) Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

(a) Resistance: 11 – 15 Ω at 20 °C (68 °F)
(b) The solenoid makes an operating noise.



Mechanical Check:

PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the No.1 or No.2 solenoid valve.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valves do not leak air.
(b) When battery positive voltage is supplied to the solenoid valves, check that the solenoid valves open.

OK:

(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

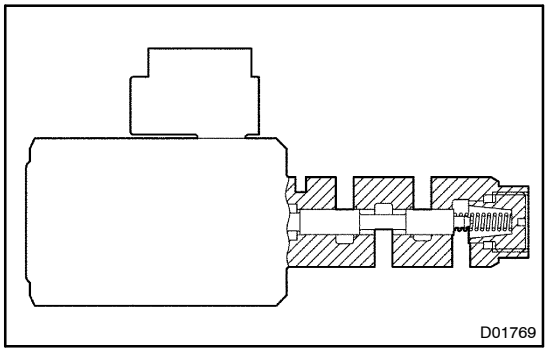
NG → **Replace the solenoid valve.**

OK

Repair or replace the solenoid wire.

DI7YO–01

DTC	P0770	Shift Solenoid ”C” Malfunction (SLU Solenoid Valve)



SYSTEM DESCRIPTION

The Engine and ECT ECU uses the signals from the Throttle Position Sensor and Air–flow Meter to monitor the engagement condition of the lock–up clutch.

Then the Engine and ECT ECU compares the engagement condition of the lock–up clutch with the lock–up schedule in the Engine and ECT ECU memory to detect mechanical trouble of the SLU solenoid valve, valve body, torque converter clutch and automatic transmission assembly (clutch, brake or gear etc.).

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)	• SLU solenoid valve is stuck open or closed • Valve body blocked up or stuck • Lock–up clutch • Automatic transmission assembly

INSPECTION PROCEDURE

HINT:

In case of using hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Active test.**

PREPARATION:

(a) Remove the DLC3 cover.
(b) Connect the hand–held tester.
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Using active test, check the lock–shift operation.

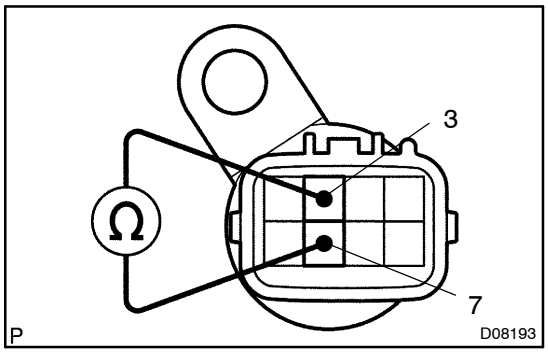
OK:

Lock–up ON

NG → **Replace the torque converter clutch.**

OK

2	Check SLU solenoid valve resistance.

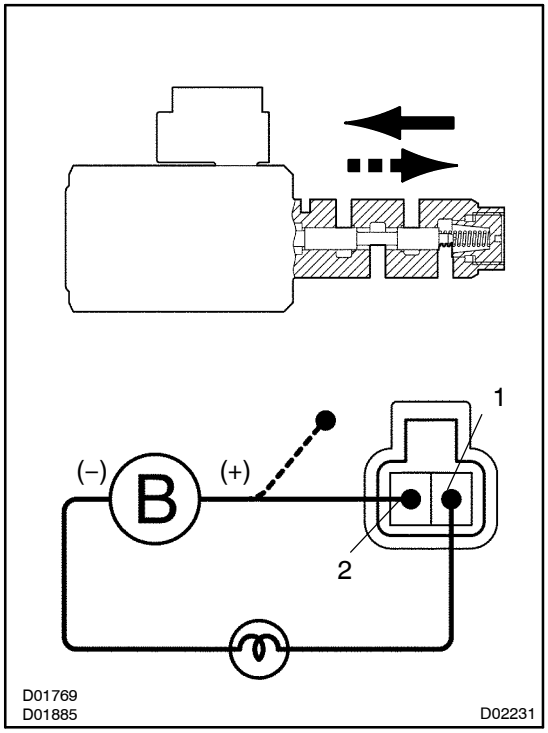


PREPARATION:
Disconnect the solenoid wire connector.
CHECK:
Measure the resistance between terminals 3 and 7 of solenoid connector.
OK:
Resistance: 5.0 ~ 5.6 Ω at 20 °C (68 °F)

NG → **Replace the SLU solenoid valve.**

OK

3	Check SLU solenoid valve operation.



PREPARATION:
(a) Remove the oil pan.
(b) Remove the SLU solenoid valve.
CHECK:
Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
OK:

When B^+ is applied.	Valve moves in ➡ direction in illustration on the left.
When B^+ is cut off.	Valve moves in ⬅ direction in illustration on the left.

NG → **Replace the SLU solenoid valve.**

OK

4	Check valve body.

NG → Repair or replace the valve body.

OK

Replace the torque converter clutch (See page AT–32).

DI7YP–01

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 depressed, this switch sends a signal to Engine and ECT ECU. Then the Engine and ECT ECU cancels operation of the lock–up clutch while braking is in progress.

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 • Engine and ECT ECU

WIRING DIAGRAM

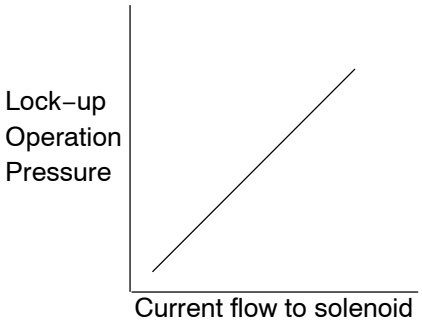
See page DI–209.

INSPECTION PROCEDURE

See page DI–209.

DI61V–02

DTC	P1755/68	Liner Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)

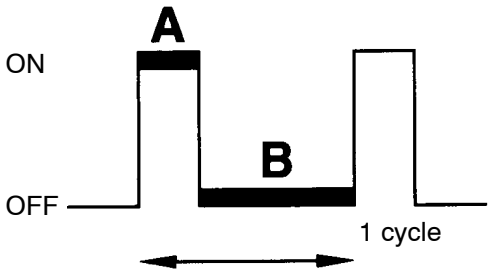


CIRCUIT DESCRIPTION

The amount of current flow to the solenoid is controlled by the (*) duty ratio of the Engine and ECT ECU output signal. The higher the duty ratio becomes, the higher the lock–up hydraulic pressure becomes during the lock–up operation.

(*) 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



BE4056

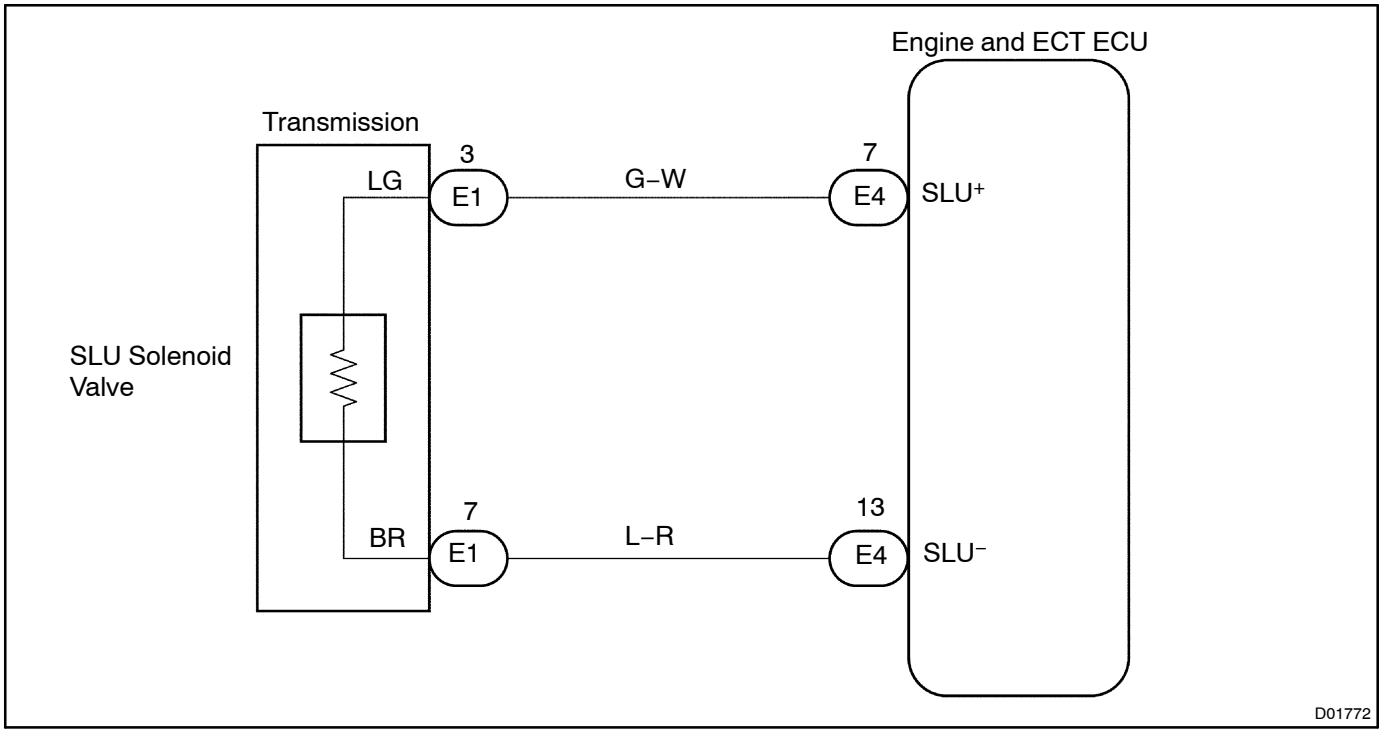
(*)

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

D00160

DTC No.	DTC detection condition	Trouble Area
P1755/68	The following condition is detected. Signal output from SLU is ON for 3.3 msecs. or more and duty ratio is at least 95 % for 1 second.	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU • Automatic transmission assembly

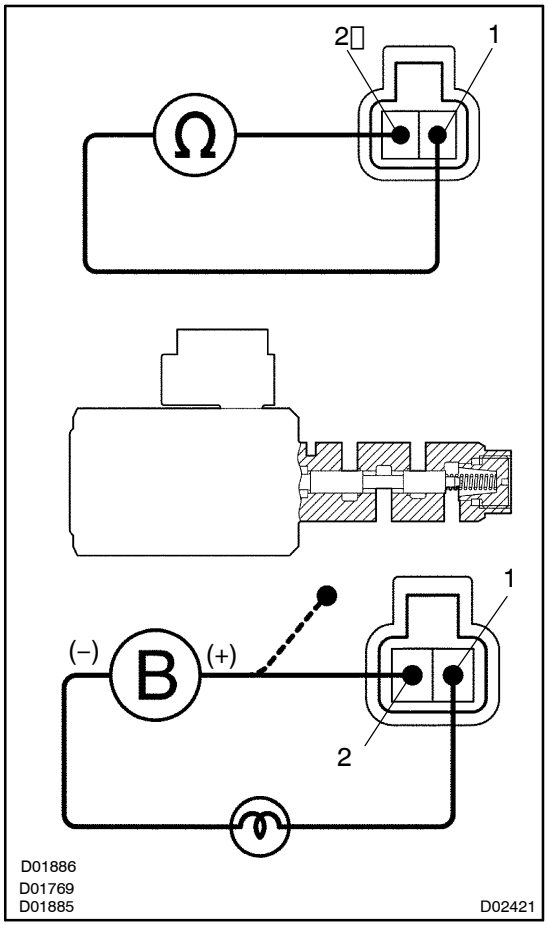
WIRING DIAGRAM



D01772

INSPECTION PROCEDURE

1	Check SLU solenoid valve.



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.

CHECK:

Measure the resistance between terminals 1 and 2.

OK:

5.0 – 5.6 Ω at 20°C (68°F)

Check solenoid operation:

PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Remove the SLU solenoid valve.

CHECK:

Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 1.

OK:

When B^+ is applied.	Valve moves in ➡ direction in the illustration.
When B^+ is cut off.	Valve moves in ⬅ direction in the illustration.

NG → **Replace SLU solenoid valve.**

OK

2	Check harness and connector between SLU solenoid valve and Engine and ECT ECU (See page IN–32).

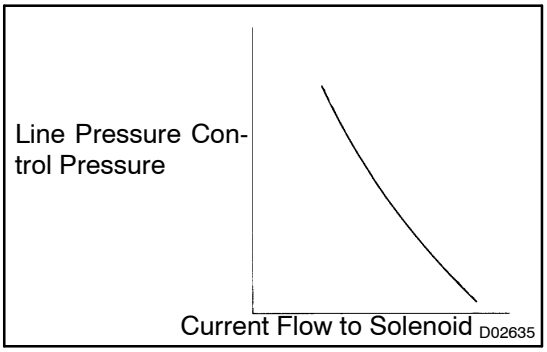
NG → **Repair or replace the harness or connector.**

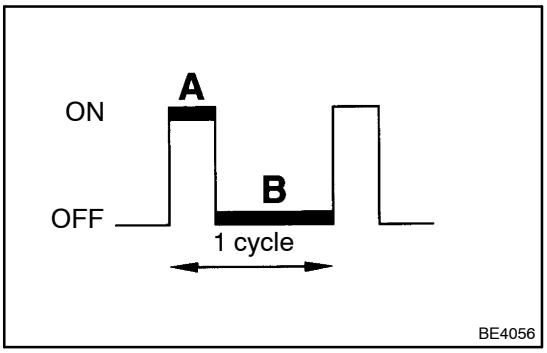
OK

Check and replace the Engine and ECT ECU (See page IN–32).

DI61W–02

DTC	P1760/77	Linear Solenoid for Line Pressure Control Circuit malfunction (SLT Solenoid Valve)



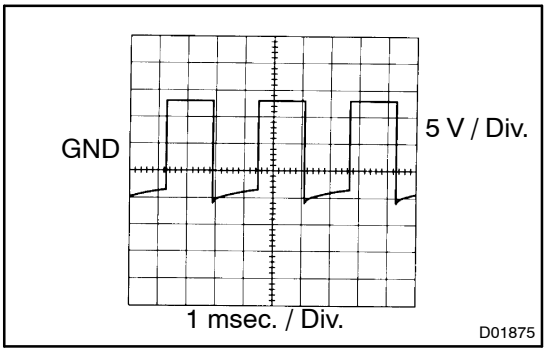


CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the SLT solenoid valve, under electronic control, to precisely and minutely modulates and generates line pressure according to the accelerator pedal effort, or engine power output detected.
This reduces the function of line pressure and provides smooth shifting characteristics.
Upon receiving the throttle valve opening angle signal, Engine and ECT ECU controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure, generating throttle pressure.
(*) 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

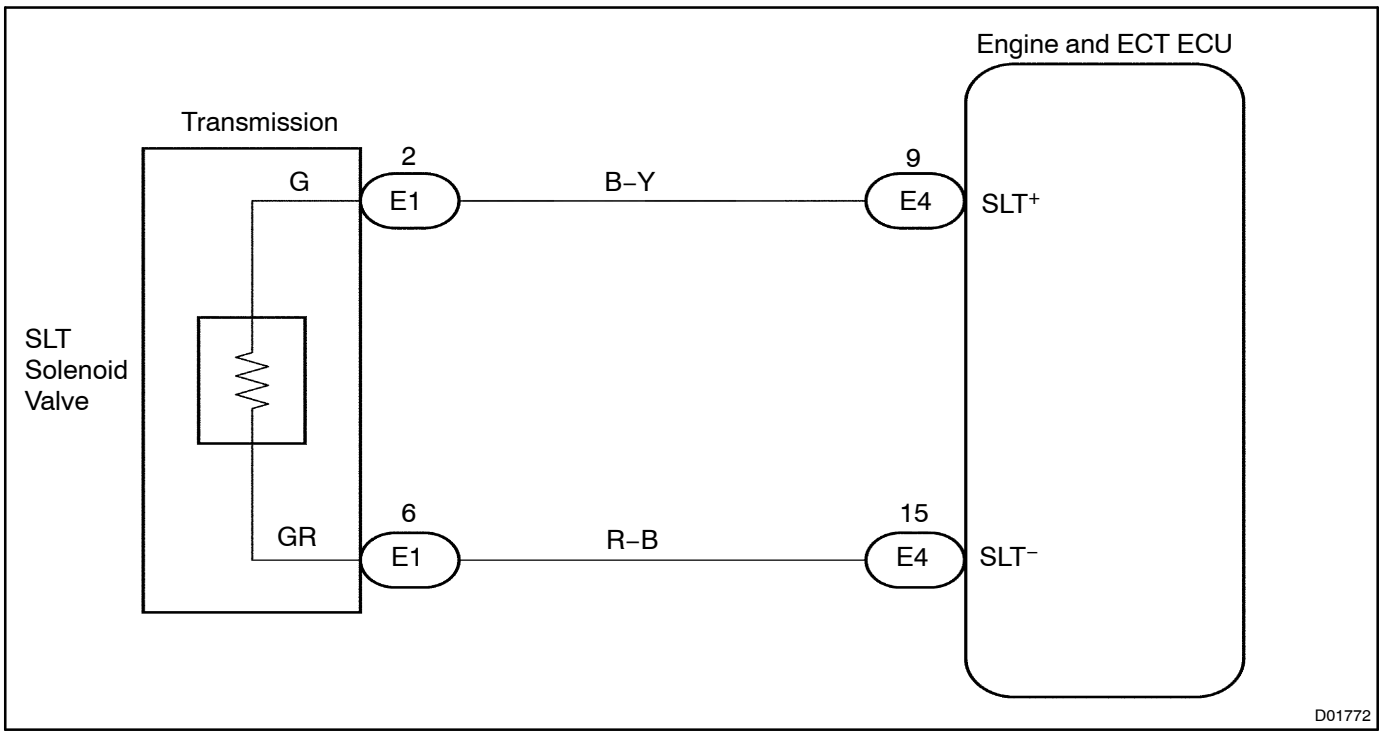
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

DTC No.	DTC Detecting Condition	Trouble Area
P1760/77	(a) or (b) condition below is detected for 1 second or more. (a) SLT⁻ terminal: 0V (b) SLT⁻ terminal: 12V	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU



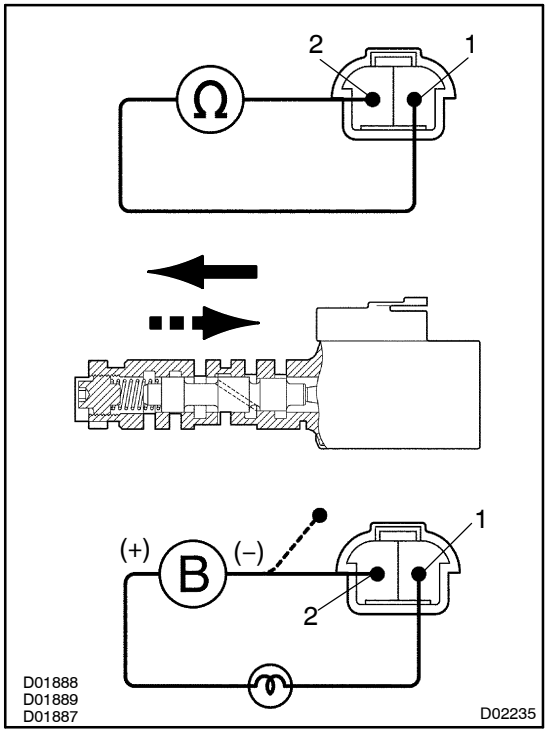
HINT:
Refer to the chart for the wave form between terminals SLT+ and SLT– during engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check SLT solenoid valve.**



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.

Check solenoid resistance:

CHECK:

Measure resistance between terminals 1 and 2 of solenoid connector.

OK:

Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

Check solenoid operation:

CHECK:

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:

When battery positive voltage is applied.	Valve moves in ← direction in the illustration.
When battery positive voltage is cut off.	Valve moves in ■ ■ → direction in the illustration.

NG → **Replace SLT solenoid valve.**

OK

2	**Check harness and connector between SLT solenoid valve and Engine and ECT ECU (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

Check and replace Engine and ECT ECU (See page IN–32).

DI7YQ–01

DTC	P1780	Neutral Start Switch Circuit

CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever position and sends signals to the Engine and ECT ECU. The Engine and ECT ECU receives signals (NSW, R, 2 and L) from the neutral start switch. When the signal is not sent to the Engine and ECT ECU from the neutral start switch, the Engine and ECT ECU judges that the shift lever is in D range.

DTC No.	DTC Detection Condition	Trouble Area
P1780	2 or more switches are ON simultaneously (for R, N, 2 and L ranges. (2–trip detection logic)	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU
	When driving under conditions (a) and (b) for 30 seconds or more, the neutral start switch is ON (N range). (2–trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 ~ 2,500 rpm	

WIRING DIAGRAM

See page DI–204.

INSPECTION PROCEDURE

See page DI–204.

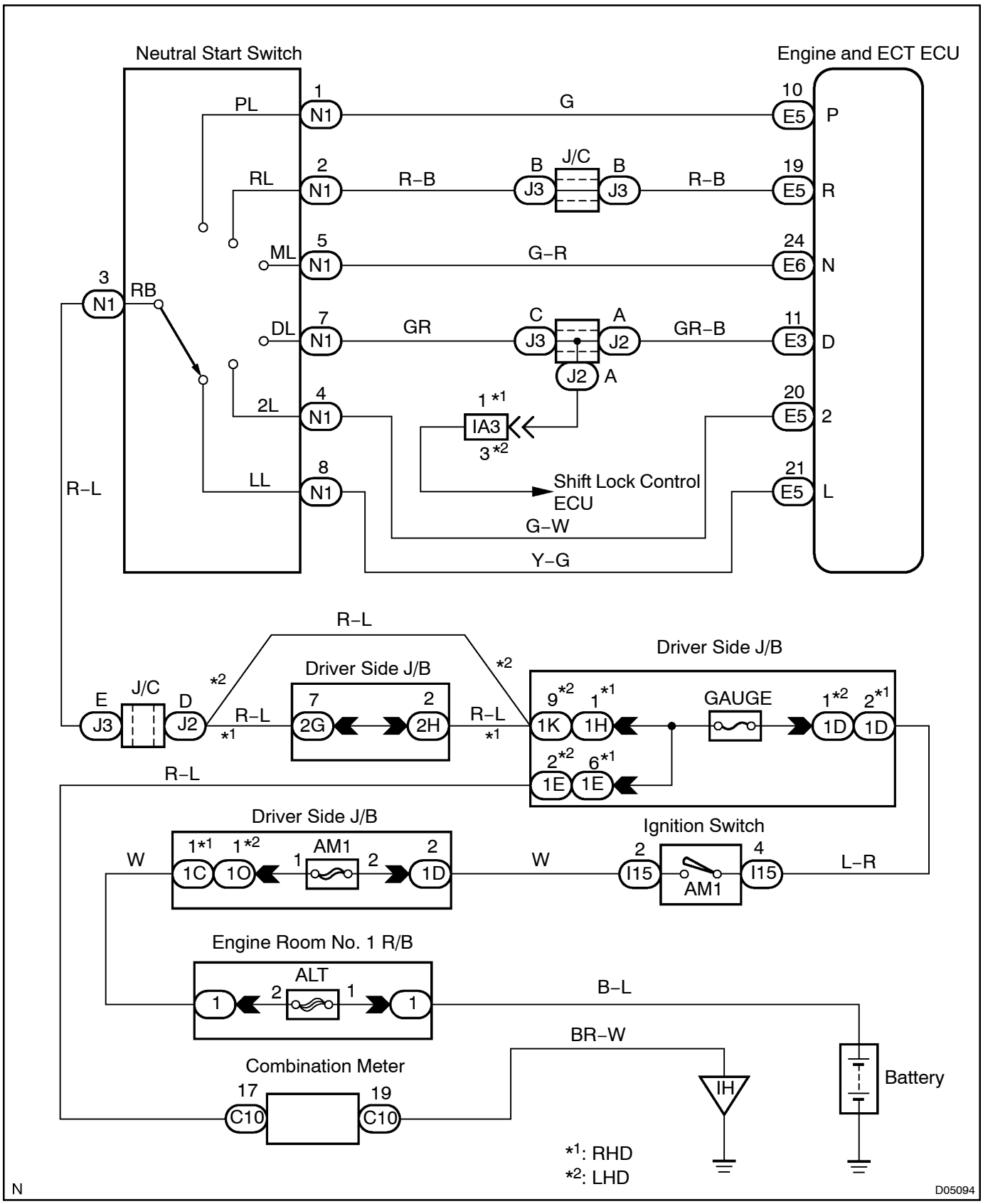
DI61X–02

Neutral Start Switch Circuit Malfunction

CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever range and sends signals to the Engine and ECT ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Read PNP, REVERSE, DRIVE, 2ND and LOW signals.**

PREPARATION:
(a) Remove the DLC3 cover.
(b) Connect a hand–held tester to the DLC3.
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:
Shift lever into the P, R, N, D, 2 and L ranges, and read the PNP, REVERSE, DRIVE, 2ND and LOW signals on the hand–held tester.

OK:

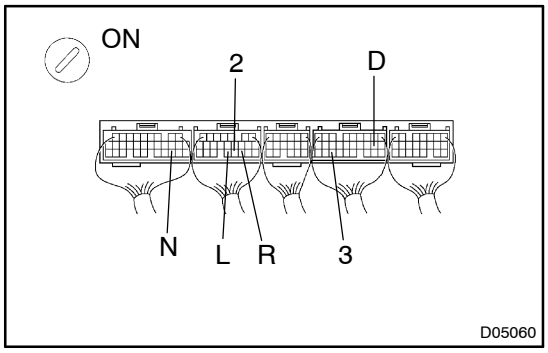
Shift range	Signal
P, N	PNP : OFF → ON
R	REVERSE : OFF → ON
D	DRIVE : OFF → ON
2	2ND : OFF → ON
L	LOW : OFF → ON

OK → **Check and replace the Engine and ECT ECU (See page IN–32).**

NG

Go to step 3.

2	**Measure voltage between each terminals of P, R, N, D, 2 and L of Engine and ECT ECU and body ground.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between each terminals P, R, N, D, 2 and L of Engine and ECT ECU and body ground when the shift lever is shifted to the following positions.

OK:

Tester connection	Condition	Specified condition
P – Body ground	Shift lever range : P	Battery positive voltage
R – Body ground	Shift lever range : R	Battery positive voltage*
D – Body ground	Shift lever range : D	Battery positive voltage
N – Body ground	Shift lever range : N	Battery positive voltage
2 – Body ground	Shift lever range : 2	Battery positive voltage
L – Body ground	Shift lever range : L	Battery positive voltage

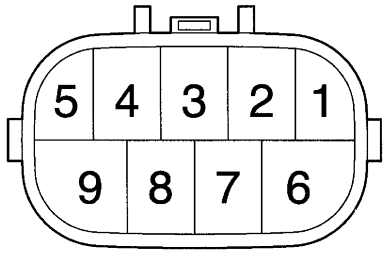
HINT:

*: The voltage will drop slightly due to lighting up of the back up light.

OK → **Check and replace the Engine and ECT ECU (See page IN–32).**

NG

3	Check neutral start switch.



D05057

PREPARATION:

(a) Jack up the vehicle.

(b) Remove the neutral start switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each range.

OK:

Shift Range	Terminal No. to continuity	Terminal No. to continuity
P	1 – 3	6 – 9
R	2 – 3	–
N	3 – 5	6 – 9
D	3 – 7	–
2	3 – 4	–
L	3 – 8	–

NG → Replace the neutral start switch.

OK →

Repair or replace harness and connector between battery and neutral start switch, neutral start switch and Engine and ECT ECU (See page IN–32).

DI61Y–02

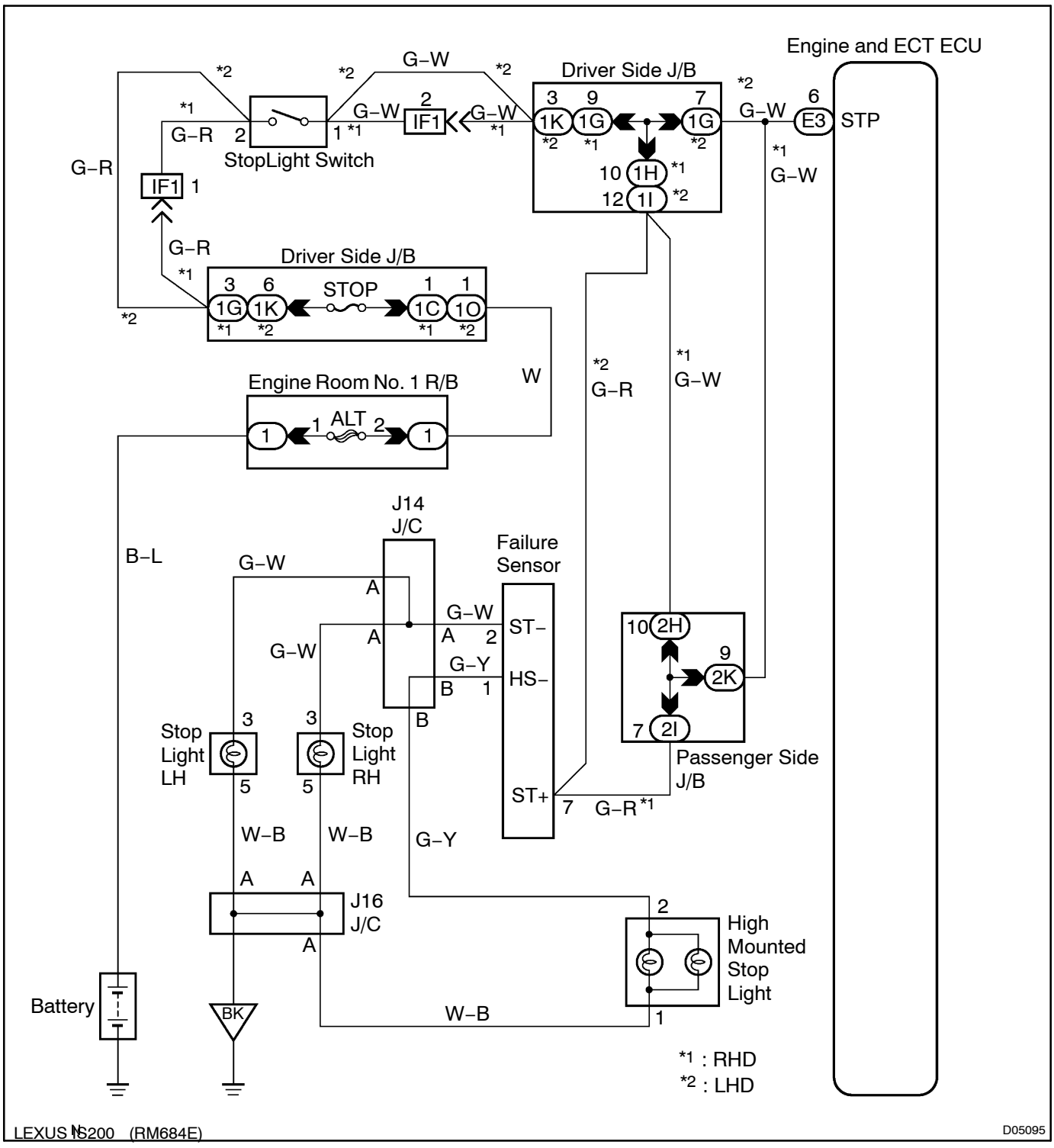
Stop Light Switch Signal Circuit

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 depressed, this switch sends a signal to Engine and ECT ECU. Then the Engine and ECT ECU cancels operation of the lock–up clutch while braking is in progress.

WIRING DIAGRAM



D05095

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions 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.

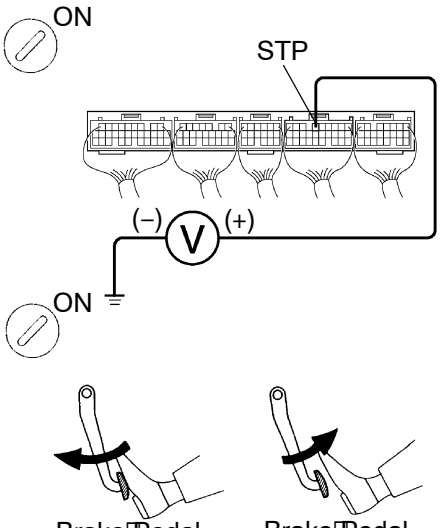
1	**Check operation of stop light.**

CHECK:
Check if the stop lights go on and off normally when the brake pedal is depressed and released.

NG → **Check and repair stop light circuit.**

OK ↓

2	**Check STP signal.**



When using hand–held tester:
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and hand–held tester main switch ON.
CHECK:
Read the STP signal on the hand–held tester.
OK:
Brake pedal is depressed: STP...ON
Brake pedal is released: STP...OFF

When not using hand–held tester:
PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.
CHECK:
Check voltage between terminal STP of the Engine and ECT ECU 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–4).**

NG ↓

3	**Check harness and connector between Engine and ECT ECU and stop light switch (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

Check and replace Engine and ECT ECU (See page IN–32).

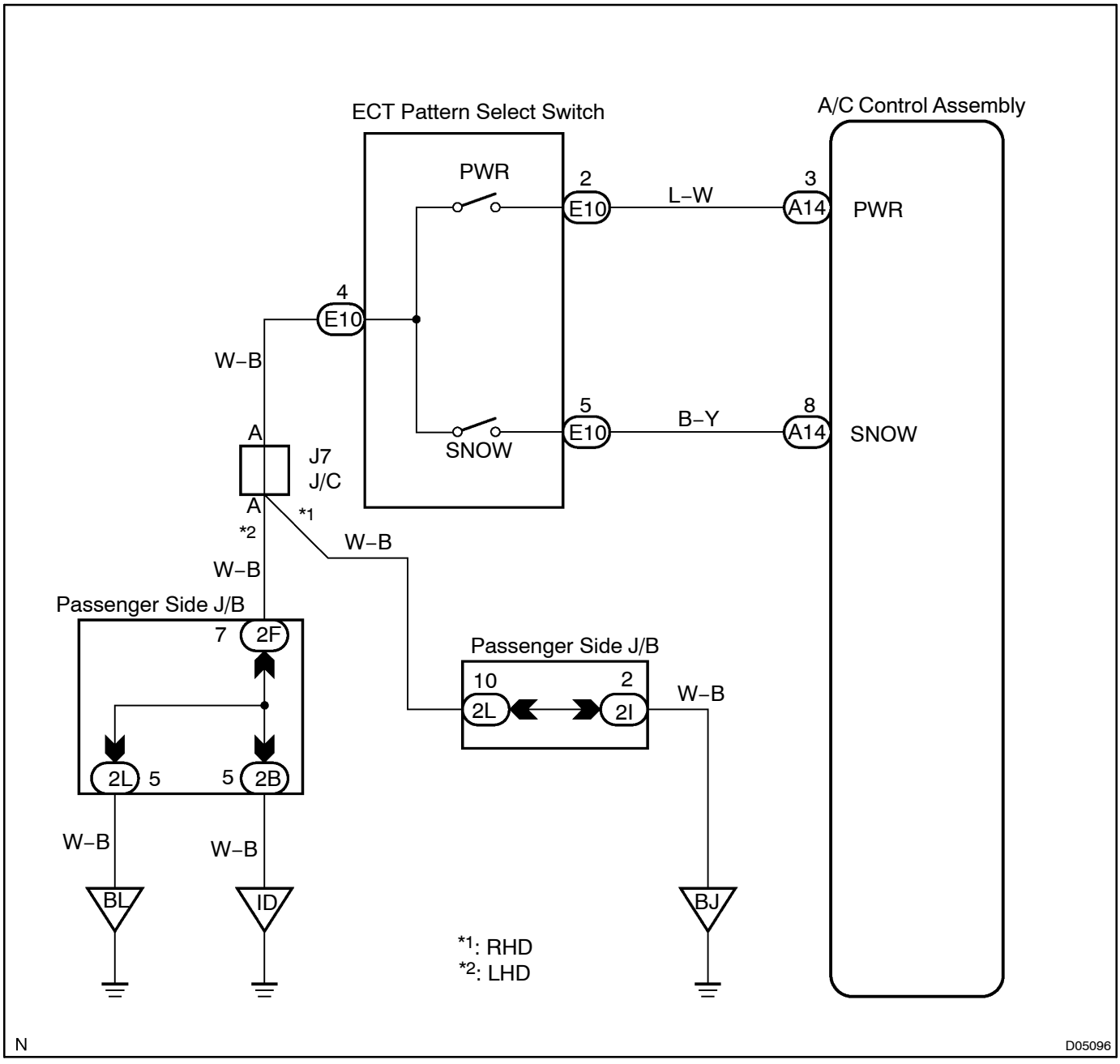
DI61Z–02

Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

The Engine & ECT ECU memory contains the shift programs for the NORMAL, POWER and SNOW patterns, 2 range, L range and the lock–up patterns. By following the programs corresponding to the signals from the pattern select switch, the neutral start switch and other various sensors, the Engine & ECT ECT switches the solenoid valves ON and OFF, and controls the transaxle gear change and the lock–up clutch operation.

WIRING DIAGRAM



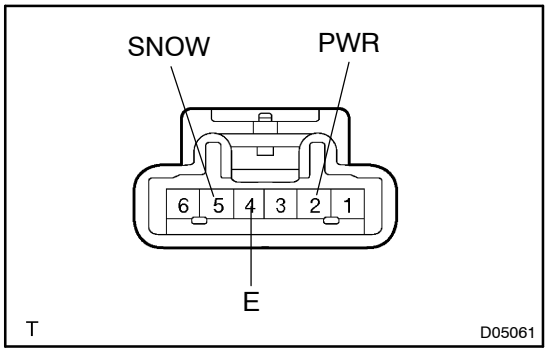
INSPECTION PROCEDURE

1	Check output voltage of A/C control assembly (See page DI–672).

NG → Check and replace the Engine and ECT ECU and A/C control assembly.

OK

2	Check Engine and ECT ECU pattern select switch.



PREPARATION:

Disconnect the pattern select switch connector.

CHECK:

Check continuity between terminals 2 and 4 (PWR), 4 and 5 (SNOW) of pattern select switch connector when the select switch is set to PWR, NORM and SNOW positions.

OK:

Switch position	Tester connection	Specified condition
PWR	2 – 4	Continuity
NORM	2 – 4, 4 – 5	No continuity
SNOW	4 – 5	Continuity

NG → Replace the pattern select switch.

OK

3	Repair or replace harness and connector between A/C control assembly and ECT pattern select switch, ECT pattern select switch and body earth.

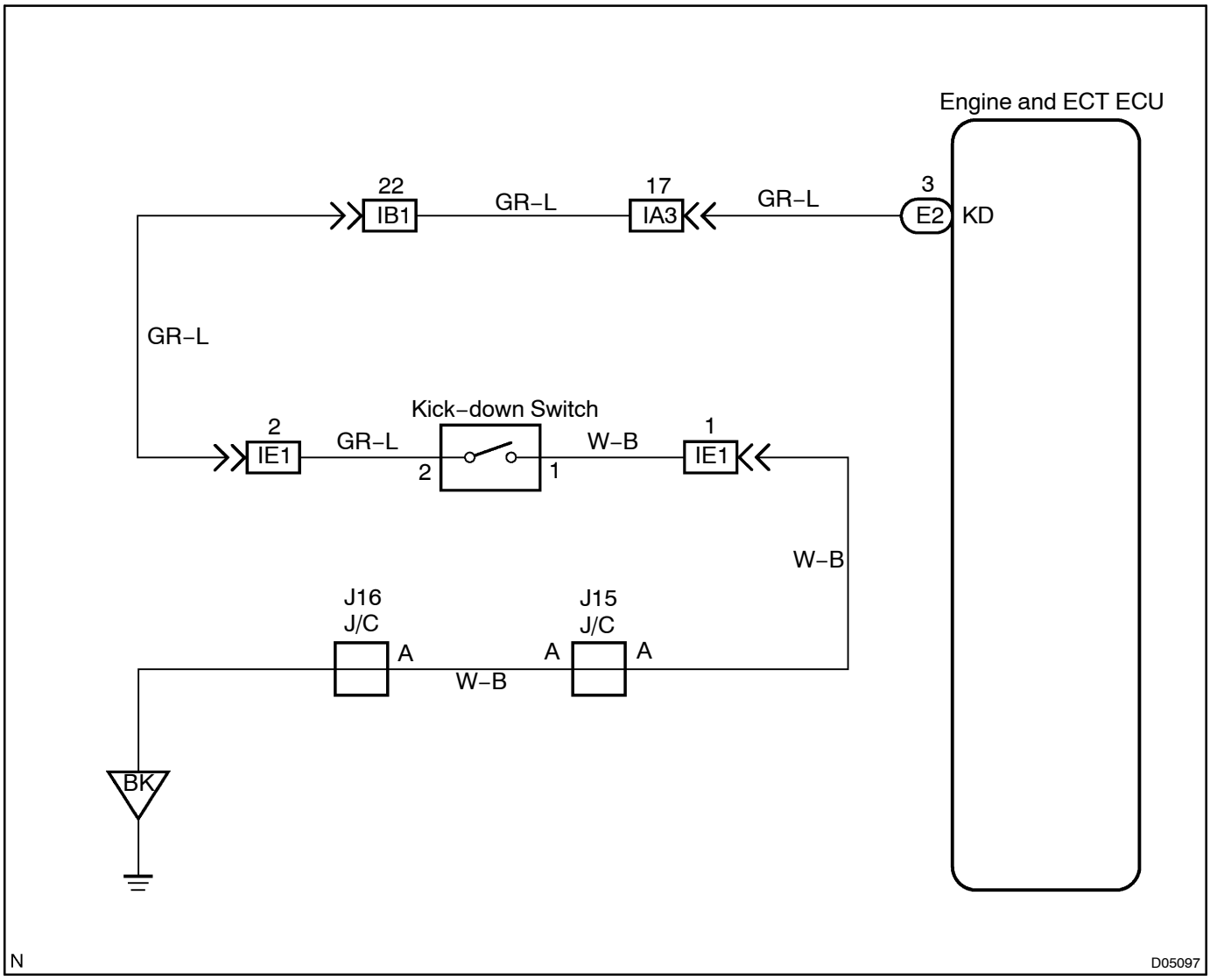
DI620–02

Kick–down Switch Circuit (LHD)

CIRCUIT DESCRIPTION

The kick–down switch is turned ON when the accelerator pedal is depressed to the full throttle and sends signals to Engine and ECT ECU.
When the kick–down switch is turned ON, the Engine and ECT ECU controls gear shifting according to the programmed shift diagrams.
If a short circuit develops in the kick–down switch, the Engine and ECT ECU disregards the kick–down signals and controls shifting at the normal shift points.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check KICK DOWN SW signal.

When using hannd–held tester:

PREPARATION:

(a) Remove the DLC3 cover.

(b) Connect a hand–held tester to the DLC3.

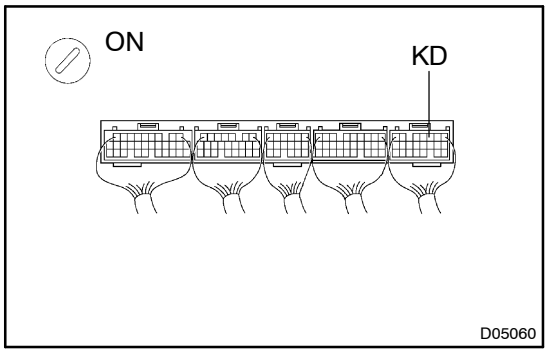
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Read the KICK DOWN SW signal on the hand–held tester.

OK:

Accelerator Pedal	KICK DOWN SW signal
Fully depressed (kick–down SW is ON)	ON
Released (kick–down SW is OFF)	OFF



When not using hand–held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal KD of Engine and ECT ECU connector and body ground when accelerator pedal is fully depressed or not.

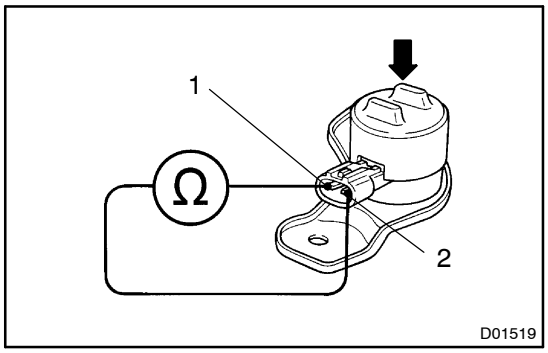
OK:

Accelerator Pedal	Voltage
Fully depressed (kick–down SW is ON)	Below 1 V
Released (kick–down SW is OFF)	10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symproms table (See page DI–175).**

NG

2	Check kick–down switch.



PREPARATION:
Disconnect the kick–down switch connector.
CHECK:
Check continuity at each terminal of kick–down switch connector.
OK:

Kick–down Switch	Specified condition
ON	No continuity
OFF	Continuity

NG → Replace kick–down switch

OK →

3	Check harness and connector between Engine and ECT ECU and kick–down switch, kick–down switch and body ground (See page IN–32).

NG → Repair or replace the harness or connector.

OK →

Check and replace Engine and ECT ECU (See page IN–32).

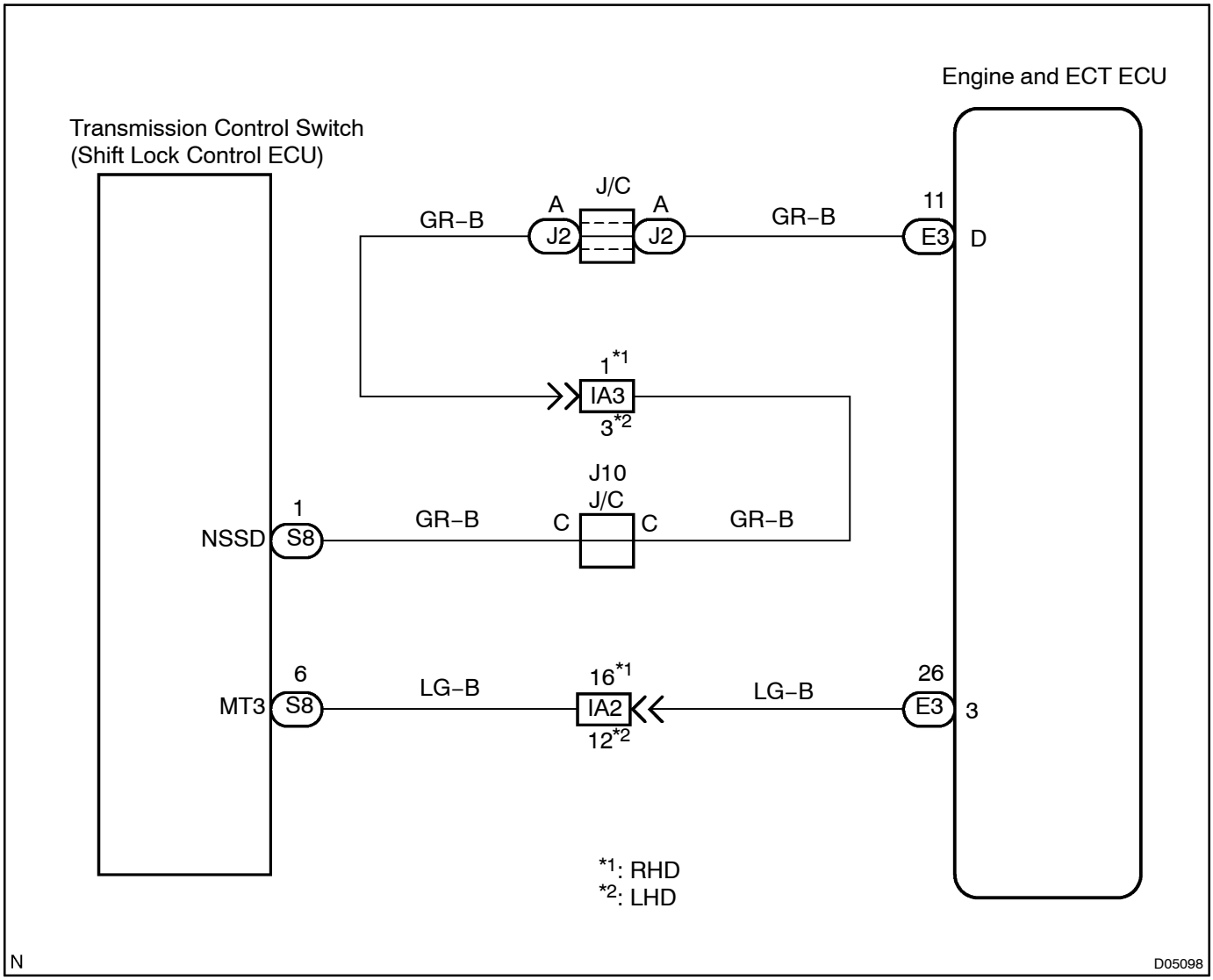
DI621–02

Transmission Control Switch Circuit

CIRCUIT DESCRIPTION

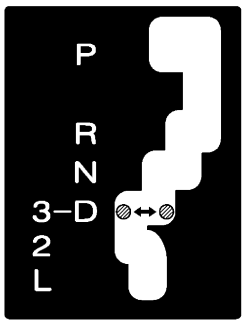
When the shift lever is in the 3 range (with transmission control switch for D and 3 is pressed), ”3” in the shift position indicator light will come on and when the shift lever is in the D range (with transmission control switch for D and 3 is released), ”D” in the shift position indicator light will come on.
When the shift lever is in 3 range, the Engine and ECT ECU prohibits shifting to 4th.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of transmission control switch.



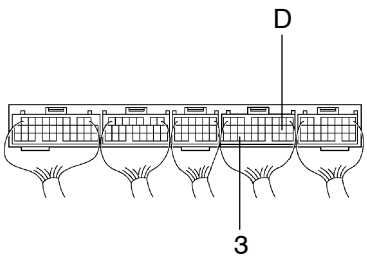
PREPARATION:
Turn the ignition switch ON.
CHECK:
Check the shift indicator light when the shift lever is in each position
OK:

Shift Lever Position	Specified Condition
D	"D" indicator light comes on
Except D	"D" indicator light goes off
3	"3" indicator light comes on
Except 3	"3" indicator light goes off

NG → **Go to step 4.**

OK

2	Check voltage between each of terminals D, 3 of Engine and ECT ECU and body ground.



PREPARATION:
Remove the Engine and ECT ECU with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Check voltage between terminal D and 3 of Engine and ECT ECU and body ground.
OK:

Tester connection	Shift lever position	Specified condition
D – Body ground	D or 4	9 – 14 V
	Except D and 4	Below 1.5 V
3 – Body ground	3	9 – 14 V
	Except 3	Below 1.5 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–175).**

NG

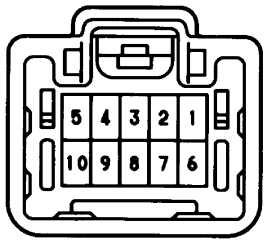
3	Check harness and connector between battery and Engine and ECT ECU, Engine and ECT ECU and shift indicator light (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace Engine and ECT ECU (See page IN–32).

4	**Check transmission control switch.**



D02199

CHECK:

(a) Disconnect the transmission control switch connector.

(b) Check continuity between each terminal of transmission control switch connector.

OK:

Shift position	Tester connection	Specified value
3	1 – 6	Continuity
Except 3	1 – 6	No continuity

NG → **Replace transmission control switch.**

OK →

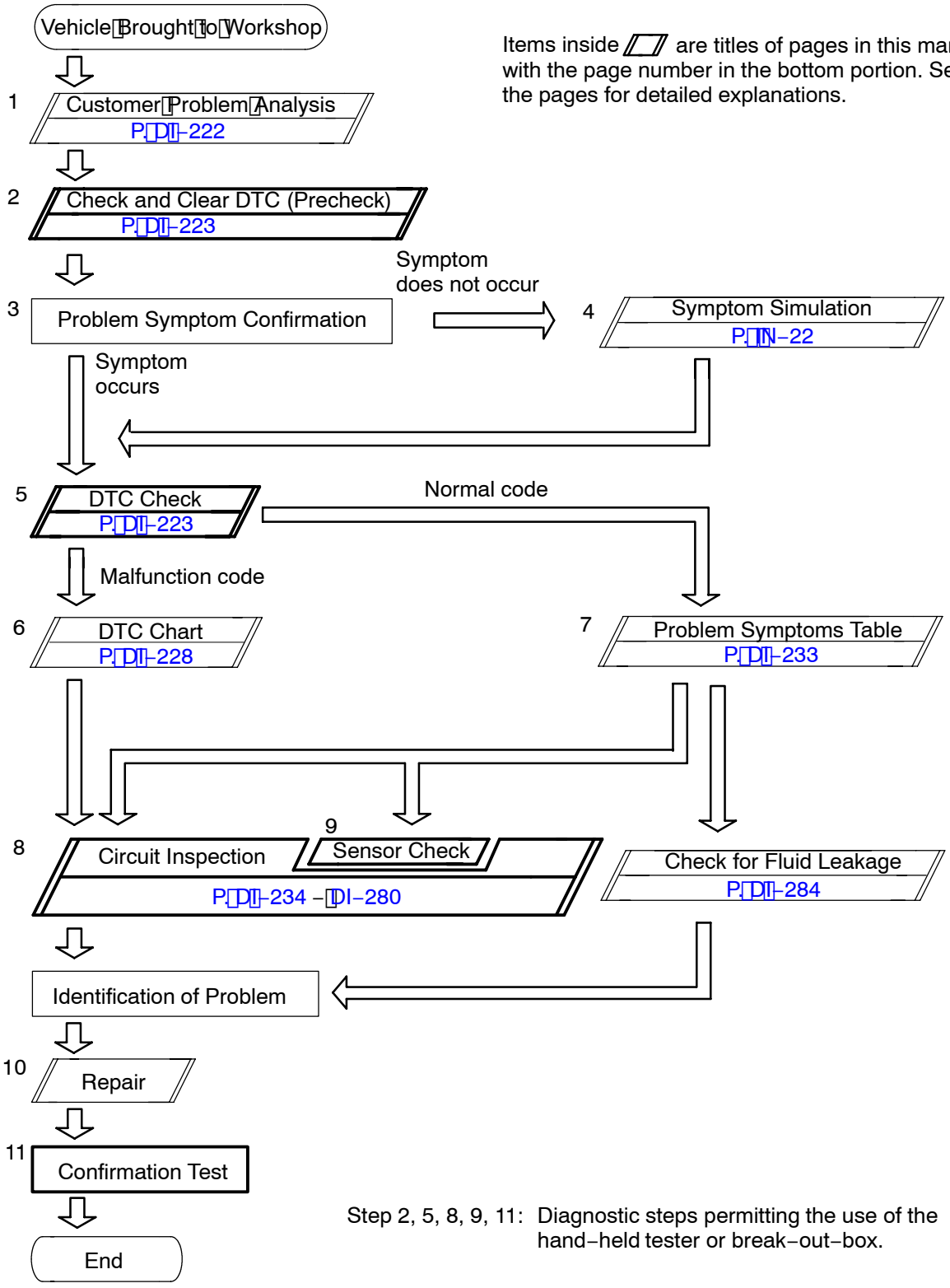
Check and replace combination meter (See combination meter troubleshooting section on page BE–1).

ABS & TRACTION CONTROL SYSTEM

DI0BV–05

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot 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 hand–held tester or break–out–box.

DI0BW–04

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & TRC 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 the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

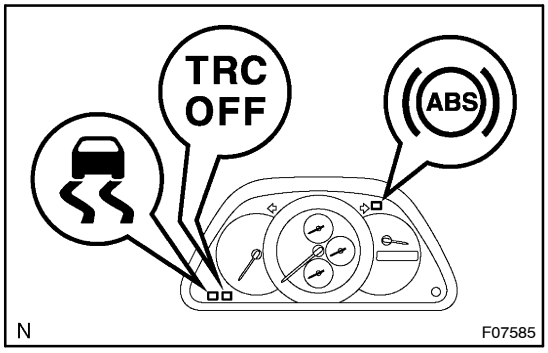
Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ TRC does not operate. (Wheels spin when starting rapidly.)	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	TRC OFF Indicator Light Abnormal	☐ Remains ON ☐ Blinks ☐ Does not Light Up
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Light	☐ Normal ☐ Malfunction Code (Code)

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI600–01

PRE–CHECK



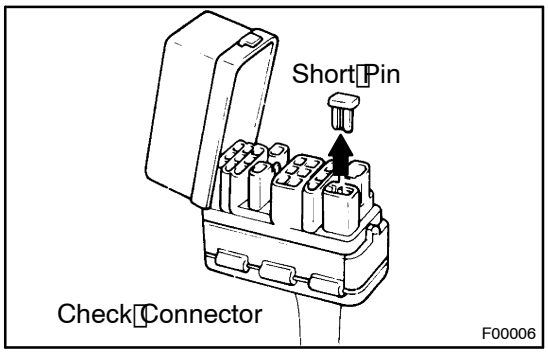
1. DIAGNOSIS SYSTEM

(a) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light, TRC OFF indicator light and SLIP indicator light go on for 3 seconds.

HINT:

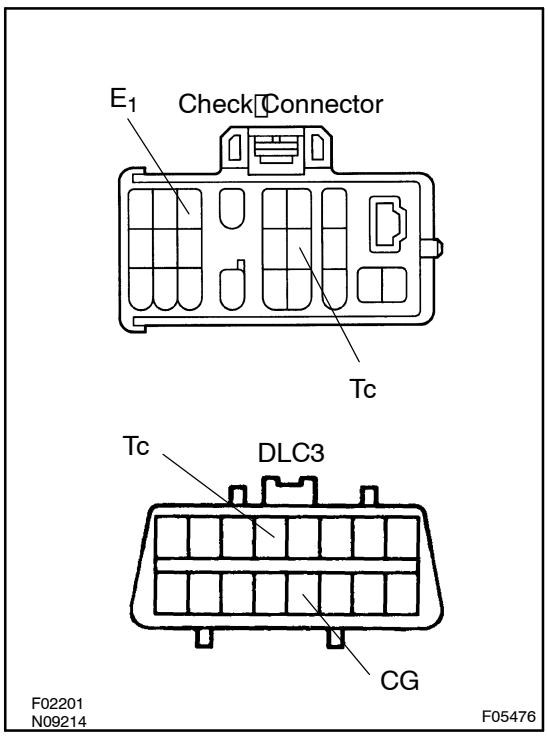
If the indicator check result is not normal, proceed to trouble-shooting for the ABS warning light circuit, TRC OFF indicator light circuit and SLIP indicator light circuit (See page DI–270, DI–275, DI–278).



(b) In case of not using hand–held tester:

Check the DTC.

(1) Disconnect the short pin from the check connector.



(2) Using SST, connect terminals Tc and E_1 of check connector or Tc and CG of DLC3.

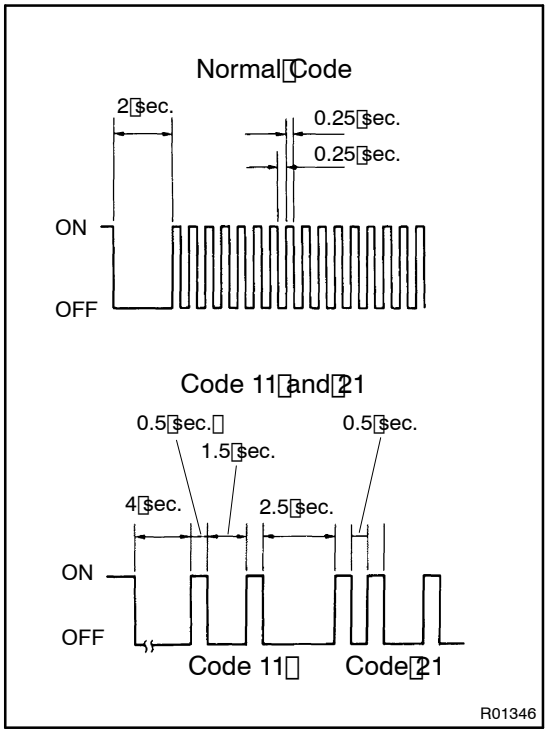
SST 09843–18020

(3) Turn the ignition switch ON.

(4) Read the DTC from the ABS warning light and TRC OFF indicator light on the combination meter.

HINT:

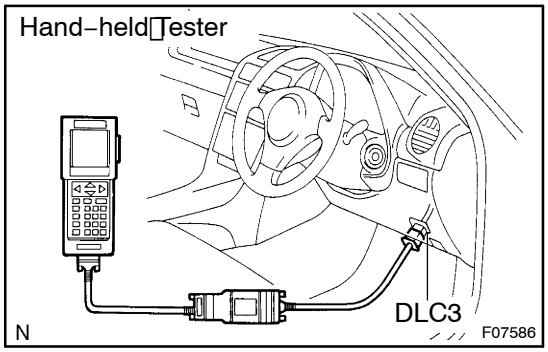
- If no code appears, inspect the diagnostic circuit, ABS warning light circuit or TRC OFF indicator light circuit (See page DI–270, DI–275, DI–280).



• As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(5) Codes are explained in the code table on page DI–228.

(6) After completing the check, disconnect terminals Tc and E_1 of check connector or Tc and CG of DLC3 and turn off the display.
If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.



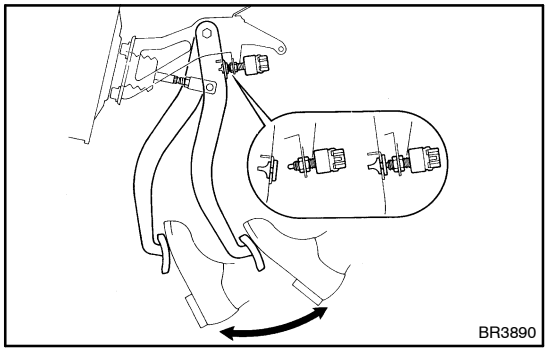
(c) In case of using hand–held tester:
Check the DTC.

(1) Hook up the hand–held tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.



(d) In case of not using hand–held tester:
Clear the DTC.

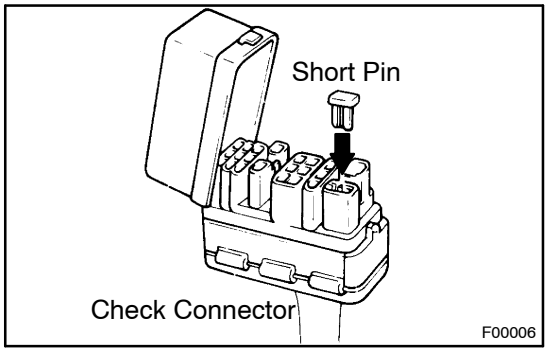
(1) Using SST, connect terminals Tc and E_1 of check connector or Tc and CG of DLC3 and remove the short pin from check connector.
SST 09843–18020

(2) Turn the ignition 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.

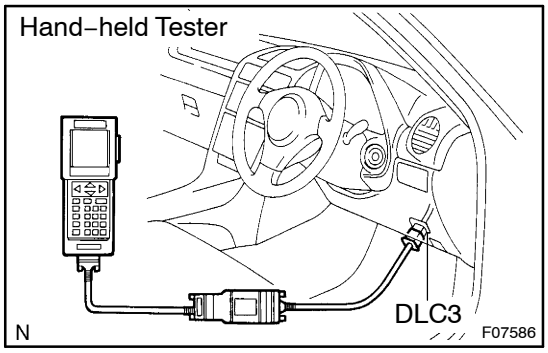
(5) Remove the SST from the terminals of check connector or DLC3.
SST 09843–18020



(6) Connect the short pin to check connector.

HINT:

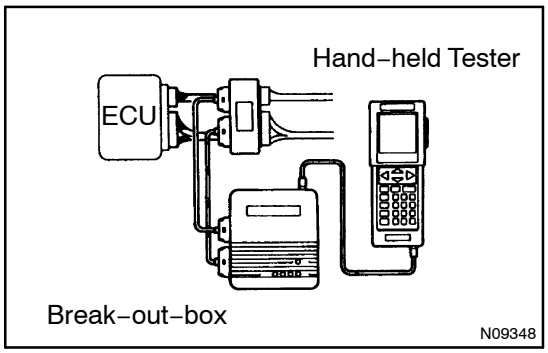
The DTC stored in the ECU will be erased when the battery terminal is disconnected for the troubleshooting.



(e) In case of using hand–held tester:

Clear the DTC.

(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes. (See hand–held tester operator's manual.)



(f) Refernce:

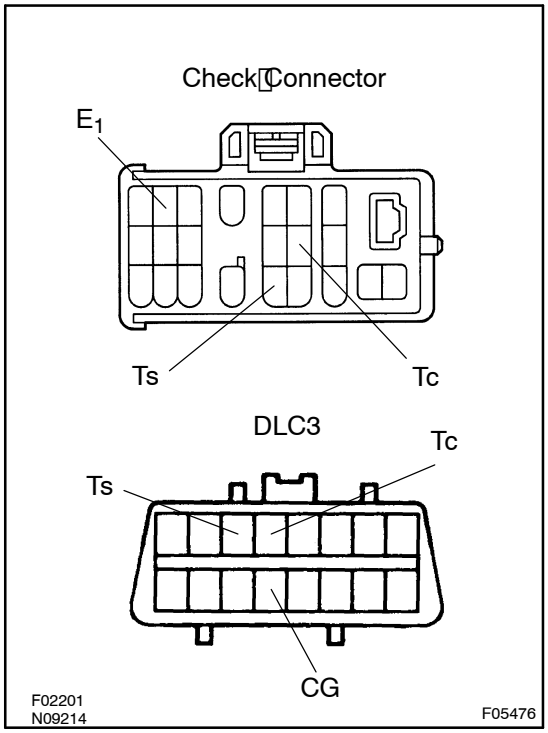
Using break–out–box and hand–held tester, measure the ECU terminal values.

(1) Hook up the hand–held tester and break–out–box to the vehicle.
(2) Turn the ignition switch ON.
(3) Read the ECU input/output values by following the prompts on the tester screen.

HINT:

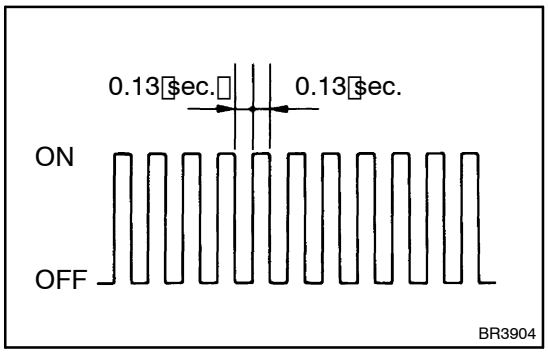
Hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.

Please refer to the hand–held tester/break–out–box operator's manual for further details.



2. SPEED SENSOR SIGNAL CHECK

(a) In case of not using hand–held tester:
Check the speed sensor signal.
(1) Turn the ignition switch OFF.
(2) Using SST, connect terminals Ts and E_1 of check connector or Ts and CG of DLC3.
SST 09843–18020
(3) Start the engine.

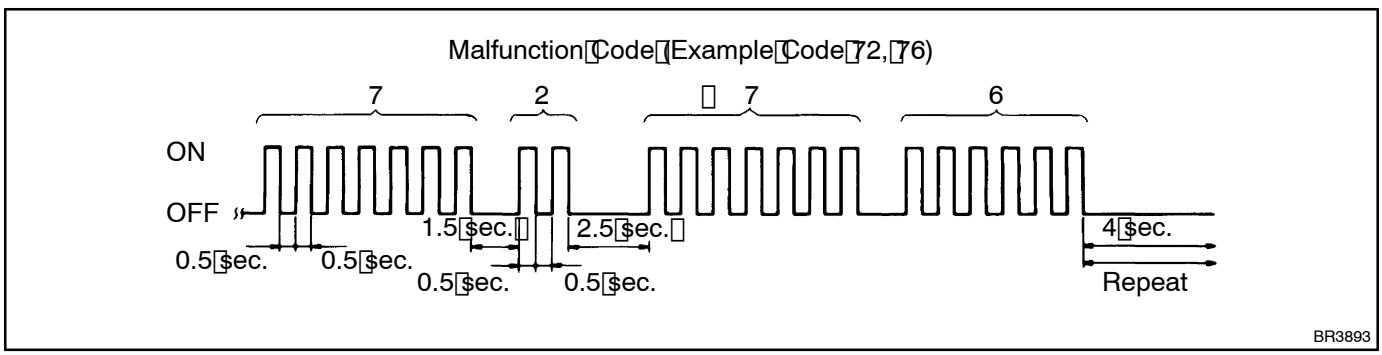


(4) Check that the ABS warning light blinks.

HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit (See page DI–270).

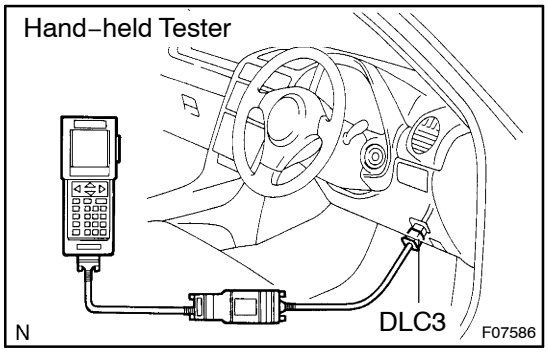
(5) Drive vehicle straight forward.
Drive vehicle faster than 45 km/h (28 mph) for several seconds.
(6) Stop the vehicle.
(7) Using SST, connect terminals Tc and E_1 of check connector or Tc and CG of DLC3.
SST 09843–18020
(8) Read the number of blinks of the ABS warning light.

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 malfunctions 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 check connector or Ts and CG, Tc and CG of DLC3, and turn ignition switch OFF.

SST 09843–18020



(b) In case of using and–held tester:
Check the speed sensor signal.
(1) Hook up the hand–held tester to the DLC3.
(2) Do step (3) to (6) on the previous page.
(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

DTC of speed sensor check function:

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Right front speed sensor rotor • Right front speed sensor circuit
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Left front speed sensor rotor • Left front speed sensor circuit
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Right rear speed sensor rotor • Right rear speed sensor circuit
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Left rear speed sensor rotor • Left rear speed sensor circuit
C1275/75	Abnormal change in output voltage of right front speed sensor	• Right front speed sensor rotor • Right front speed sensor
C1276/76	Abnormal change in output voltage of left front speed sensor	• Left front speed sensor rotor • Left front speed sensor
C1277/77	Abnormal change in output voltage of right rear speed sensor	• Right rear speed sensor rotor • Right rear speed sensor
C1278/78	Abnormal change in output voltage of left rear speed sensor	• Left rear speed sensor rotor • Left rear speed sensor

DI0BY–04

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843–18020, connect the terminals Tc and E_1 of check connector or Tc and CG of DLC3, and remove the short pin.
- If any abnormality is not found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed for 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 chart of anti–lock brake system:

DTC No. (See Page)	Detection Item	Trouble Area
C0278/11 (DI–247)	Open circuit of ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit • ABS & TRC ECU
C0279/12 (DI–247)	Short circuit of ABS solenoid relay circuit	
C0273/13 (DI–243)	Open circuit of ABS motor relay circuit	• ABS motor relay • ABS motor relay circuit • ABS & TRC ECU
C0274/14 (DI–243)	Short circuit of ABS motor relay circuit	
C0226/21 (DI–240)	Open or short circuit of right front solenoid circuit	• ABS & TRC actuator • SFRR or SFRH circuit • ABS & TRC ECU
C0236/22 (DI–240)	Open or short circuit of left front solenoid circuit	• ABS & TRC actuator • SFLR or SFLH circuit • ABS & TRC ECU
C0246/23 (DI–240)	Open or short circuit of right rear solenoid circuit	• ABS & TRC actuator • SRRR or SRRH circuit • ABS & TRC ECU
C0256/24 (DI–240)	Open or short circuit of left rear solenoid circuit	• ABS & TRC actuator • SRLR or SRLH circuit • ABS & TRC ECU
C1225/25 (DI–240)	Open or short circuit of SMC circuit	• ABS & TRC actuator • SMC circuit • ABS & TRC ECU
C1226/26 (DI–240)	Open or short circuit of SPC circuit	• ABS & TRC actuator • SPC circuit • ABS & TRC ECU
C1227/27 (DI–240)	Open or short circuit of SRC circuit	• ABS & TRC actuator • SRC circuit • ABS & TRC ECU
C0200/31 (DI–234)	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 • ABS & TRC ECU
C0205/32 (DI–234)	Left front wheel speed sensor signal malfunction	
C0210/33 (DI–234)	Right rear wheel speed sensor signal malfunction	
C0215/34 (DI–234)	Left rear wheel speed sensor signal malfunction	

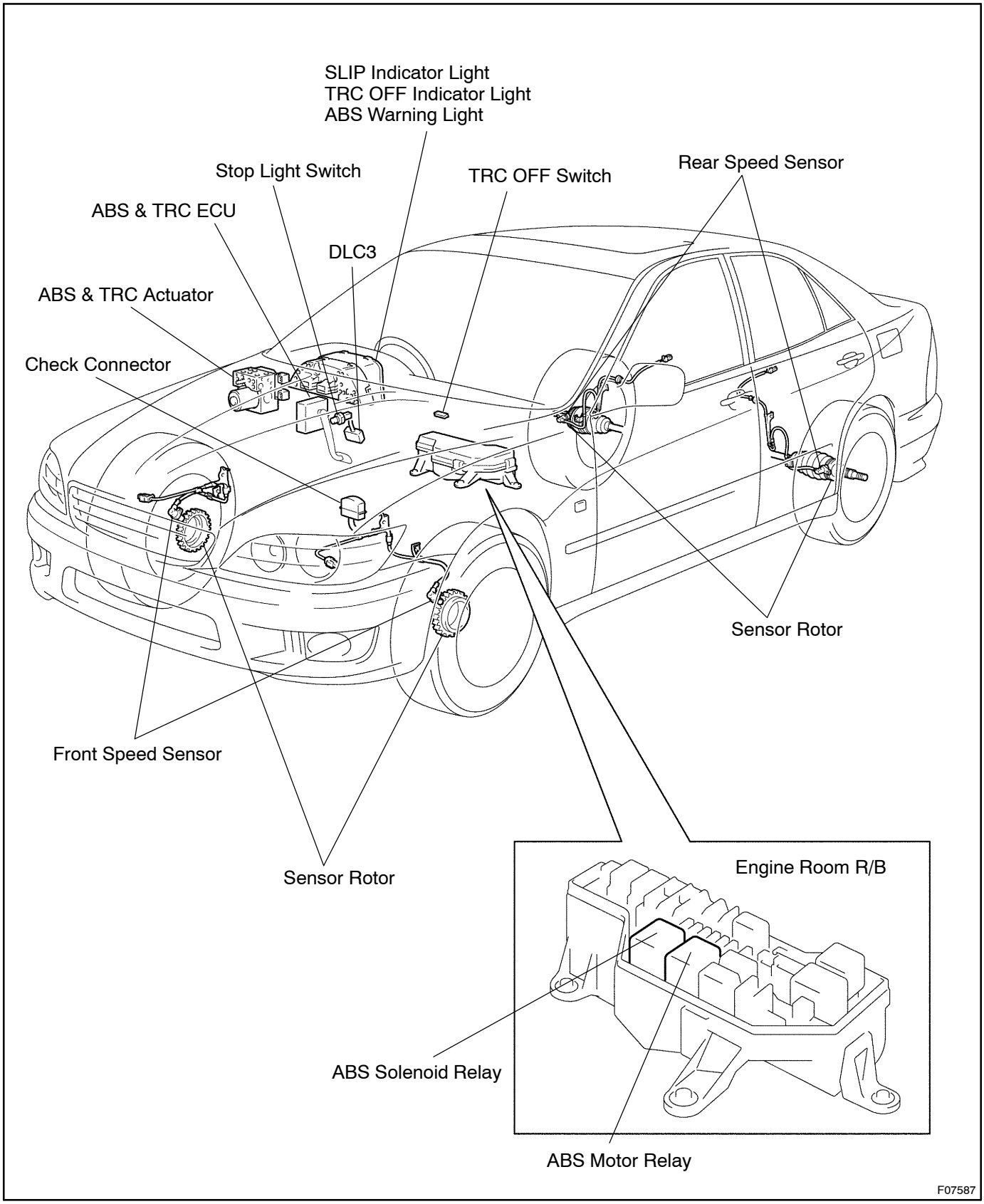
C1241/41 (DI–259)	Low battery voltage or abnormally high battery voltage	• Battery • Charging system • Power source circuit • ABS & TRC ECU
C1249/49 (DI–263)	Open circuit of stop light switch circuit	• Stop light switch • Stop light switch circuit • ABS & TRC ECU
C1251/51 (DI–266)	Pump motor is locked	• ABS & TRC Actuator • ABS & TRC Actuator circuit
Always ON (DI–268)	Malfunction in ECU	• ABS & TRC ECU

DTC chart of traction control system:

C1223/43 (DI–256)	Malfunction in ABS control system	• ABS control system
C1224/44 (DI–257)	Open or short circuit of NE signal circuit	• NEO circuit • Engine and ECT ECU • ABS & TRC ECU
C1201/51 (DI–251)	Malfunction in engine control system	• Engine control system
C1202/52 (DI–252)	Brake fluid level low Open circuit in brake fluid level warning switch circuit	• Brake fluid level • Brake fluid warning switch • Brake fluid level warning switch circuit • ABS & TRC ECU
C1203/53 (DI–254)	Malfunction in ECM communication circuit	• TRC+ or TRC – circuit • EFI+ or EFI– circuit • Engine and ECT ECU • ABS & TRC ECU

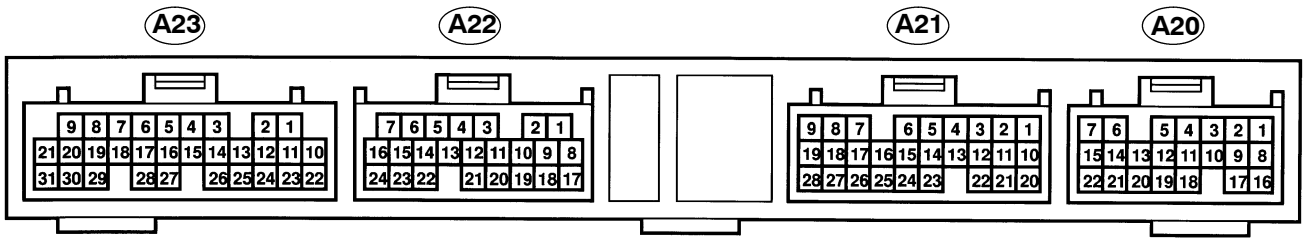
DI0BZ–05

PARTS LOCATION



DI1AE–04

TERMINALS OF ECU



F02094

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SPC (A23 – 4) – GND (A22 – 8, 17, A23 – 31)	LG ↔ W–B	IG switch ON, TRC OFF indicator light OFF	10 – 14
SFLR (A23 – 7) – GND (A22 – 8, 17, A23 – 31)	W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRH (A23 – 8) – GND (A22 – 8, 17, A23 – 31)	R–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRR (A23 – 9) – GND (A22 – 8, 17, A23 – 31)	W–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
FR+ (A23 – 14) – FR– (A23 – 13)	O ↔ B	IG switch ON, slowly turn right front wheel	AC generation
FL+ (A23 – 16) – FL– (A23 – 15)	LG ↔ V	IG switch ON, slowly turn left front wheel	AC generation
SR (A23 – 19) – R+ (A23 – 1)	L–R ↔ L–B	IG switch ON, ABS warning light OFF	Below 1.5
SFLH (A23 – 21) – GND (A22 – 8, 17, A23 – 31)	W–G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
MT (A23 – 28) – GND (A22 – 8, 17, A23 – 31)	L–Y ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
MR (A23 – 29) – GND (A22 – 8, 17, A23 – 31)	R–Y ↔ W–B	IG switch ON, ABS motor stops	10 – 14
Tc (A22 – 3) – GND (A22 – 8, 17, A23 – 31)	R–W ↔ W–B	IG switch ON	10 – 14
Ts (A22 – 4) – GND (A22 – 8, 17, A23 – 31)	W–L ↔ W–B	IG switch ON	10 – 14
IG1 (A22 – 6) – GND (A22 – 8, 17, A23 – 31)	B–R ↔ W–B	IG switch ON	10 – 14
NEO (A22 – 7) – GND (A22 – 8, 17, A23 – 31)	G ↔ W–B	Engine idling	Pulse generation
RR+ (A22 – 11) – RR– (A22 – 12)	W ↔ B	IG switch ON, slowly turn right rear wheel	AC generation
ENG+ (A22 – 14) – ENG– (A22 – 22)	L ↔ B	IG switch ON, Engine idling	Pulse generation
RL+ (A22 – 19) – RL– (A22 – 20)	R ↔ L	IG switch ON, slowly turn left rear wheel	AC generation
TRC+ (A22 – 24) – TRC– (A22 – 16)	R ↔ W	IG switch ON, Engine idling	Pulse generation
LBL+ (A21 – 1) – GND (A22 – 8, 17, A23 – 31)	Y–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level and pasrking brake switch is OFF (Brake warning light is OFF)	10 – 14

WA (A21 – 5) – GND (A22 – 8, 17, A23 – 31)	W–G ↔ W–B	IG switch ON, ABS warning light ON	Below 2.0
		IG switch ON, ABS warning light OFF	10 – 14
IND (A21 – 6) – GND (A22 – 8, 17, A23 – 31)	LG–B ↔ W–B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
STP (A21 – 7) – GND (A22 – 8, 17, A23 – 31)	G–W ↔ W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
LBL– (A21 – 11) – GND (A22 – 8, 17, A23 – 31)	Y–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level	About 4 – 8
WT (A21 – 13) – GND (A22 – 8, 17, A23 – 31)	LG ↔ W–B	IG switch ON, TRC OFF indicator light ON	Below 2.0
		IG switch ON, TRC OFF indicator light OFF	10 – 14
SP1 (A21 – 16) – GND (A22 – 8, 17, A23 – 31)	R–B ↔ W–B	Vehicle driving at about 20 km/h (12 mph)	Pulse generation
D/G (A21 – 25) – GND (A22 – 8, 17, A23 – 31)	W ↔ W–B	IG switch ON	10 – 14
CSW (A21 – 26) – GND (A22 – 8, 17, A23 – 31)	LG–R ↔ W–B	IG switch ON, TRC cut switch pushed in	Below 1.5
		IG switch ON, TRC cut switch released	10 –14
SRLR (A20 – 1) – GND (A22 – 8, 17, A23 – 31)	R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
AST (A20 – 6) – GND (A22 – 8, 17, A23 – 31)	Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRLH (A20 – 7) – GND (A22 – 8, 17, A23 – 31)	G–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (A20 – 8) – GND (A22 – 8, 17, A23 – 31)	G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRC (A20 – 15) – GND (A22 – 8, 17, A23 – 31)	L–W ↔ W–B	IG switch ON, TRC OFF Indicator light OFF	10 – 14
SFRH (A20 – 16) – GND (A22 – 8, 17, A23 – 31)	W–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SMC (A20 – 22) – GND (A22 – 8, 17, A23 – 31)	P ↔ W–B	IG switch ON, TRC OFF indicator light OFF	10 – 14

DI0C1–04

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.

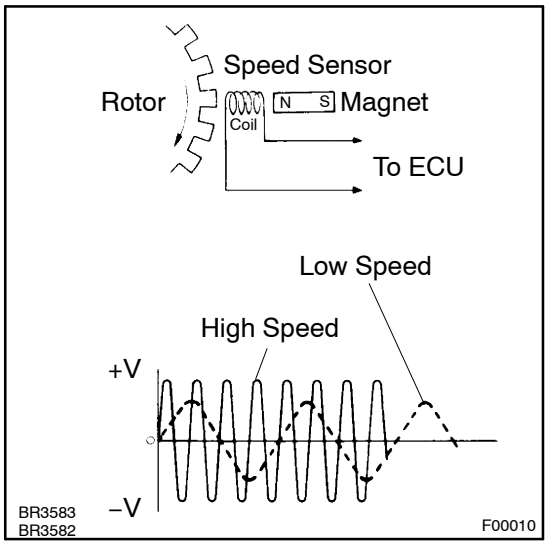
Symptom	Suspect Area	See page
ABS does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit 3. Speed sensor circuit 4. Check the ABS & TRC actuator with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–284).	 DI–223 DI–259 DI–234 BR–45
ABS does not operate efficiently	Only when 1. to 4. are all normal and the problem is still occurring, replace the ABS & TRC 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 & TRC actuator with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–284).	 DI–223 DI–234 DI–263 BR–45
ABS warning light abnormal	1. ABS warning light circuit 2. ABS & TRC ECU	DI–270 DI–268
DTC check cannot be done	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. ABS warning light circuit 2. TRC OFF indicator light circuit 3. Tc terminal circuit	 DI–270 DI–275 DI–280
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. ABS & TRC ECU	DI–282 DI–268
TRC does not operate	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC 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–223 DI–259 BR–45 DI–234
SLIP indicator light abnormal	SLIP indicator light circuit	DI–278
TRC OFF indicator light abnormal	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRC ECU. 1. TRC OFF indicator light circuit 2. TRC cut switch circuit	 DI–275 DI–275

DI1GH–03

CIRCUIT INSPECTION

DTC	C0200 / 31 – C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS & TRC control 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
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 4.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. (When RL and RR wheels are fauly for 200 sec.) 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. Continuous noise occurs in to the speed sensor signals with the vehicle speed at 20 km/h (12 mph) or more continues for 5 sec or more. 4. The speed sensor signal circuit is open circuit continues for 0.5 sec. or more.	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • ABS & TRC ECU

HINT:

DTC No. C0200 / 31 is for the right front speed sensor.

DTC No. C0205 / 32 is for the left front speed sensor.

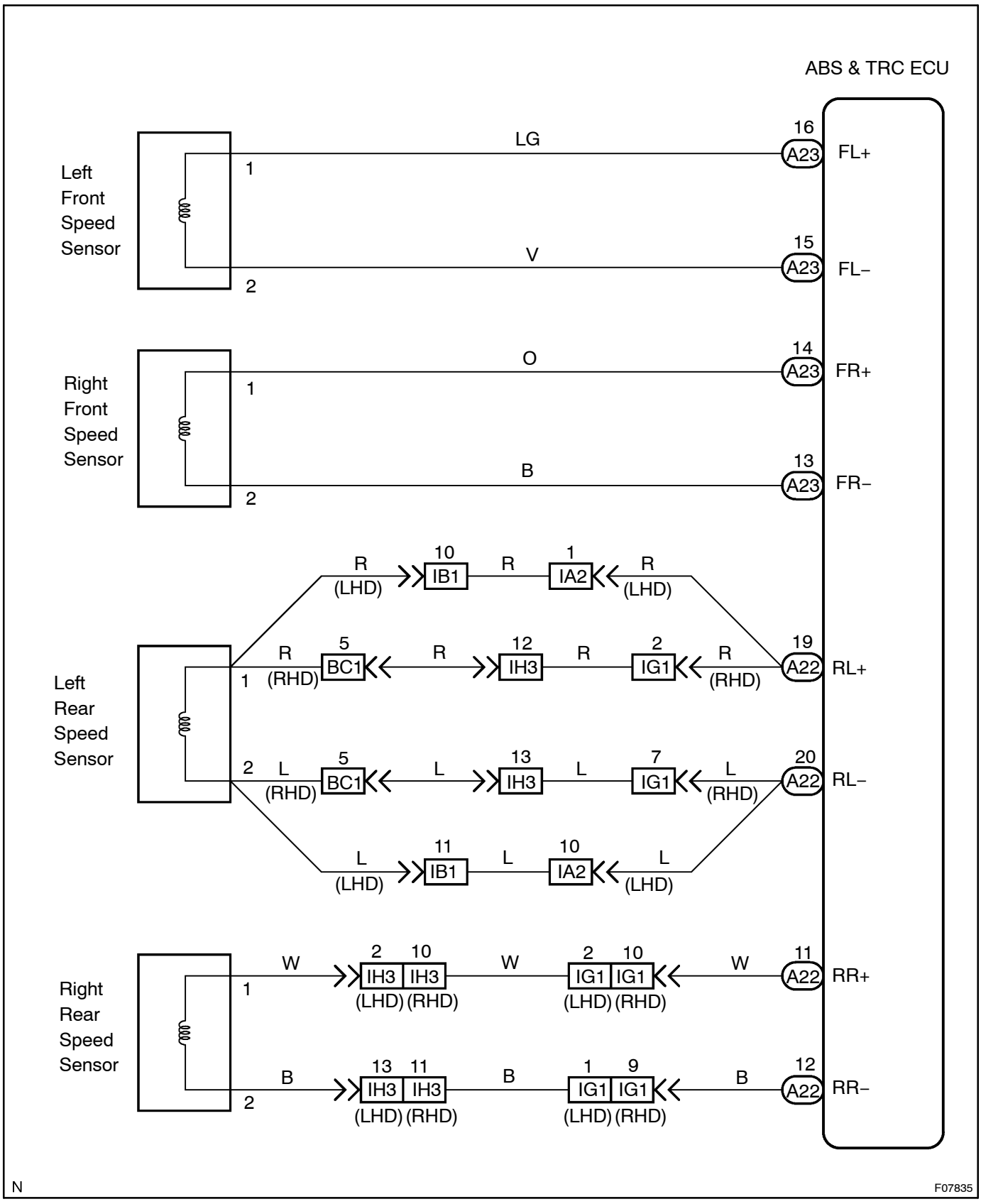
DTC No. C0210 / 33 is for the right rear speed sensor.

DTC No. C0215 / 34 is for the left rear speed sensor.

Fail safe function:

If any trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of speed sensor.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:
Check that there is no difference between the speed value output from the speed sensor displayed by the hand–held tester and the speed value displayed by the speedometer when driving the vehicle.

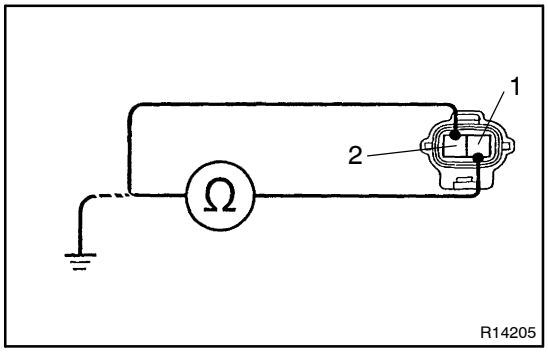
OK:

There is almost no difference from the displayed speed value.

OK → **Check and replace ABS & TRC ECU.**

NG

2	**Check speed sensor.**



Front:

PREPARATION:
(a) Remove the front fender liner.
(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
(c) Disconnect the speed sensor connector.

CHECK:
Measure resistance between terminals 1 and 2 of speed sensor connector.

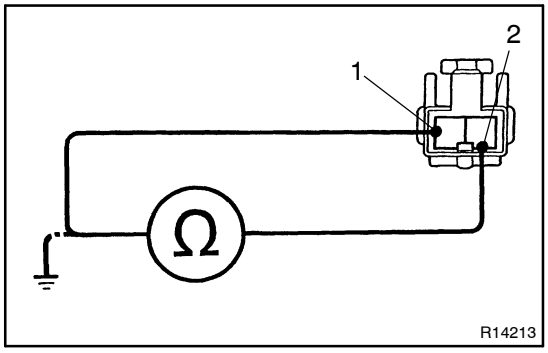
OK:

Resistance: 1.4 – 1.8 kΩ at 20 °C

CHECK:
Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 10 MΩ or higher



Rear:

PREPARATION:

(a) Remove the seat cushion and seatback.

(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(c) Disconnect the speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:

Resistance: 0.9 – 1.3 kΩ at 25 ± 5°C

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 first (See page DI–223).

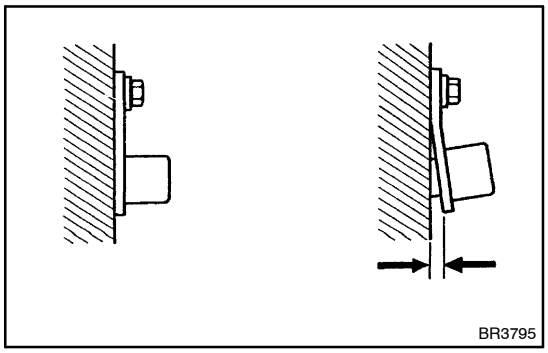
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and ABS & TRC ECU (See page IN–32).**

NG	**Repair or replace harness or connector.**

OK

4	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 front steering knuckle or rear axle carrier.

NG	Replace speed sensor.

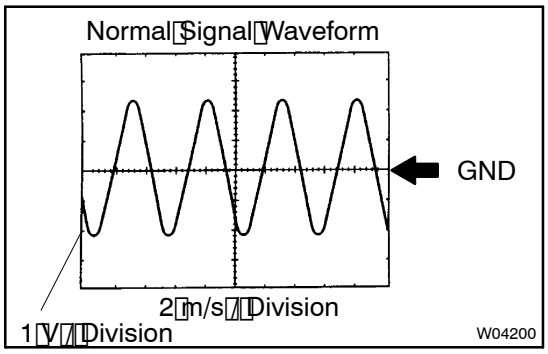
NOTICE:

Check the speed sensor signal (See page DI–223).

OK

5	Check speed sensor and sensor rotor serrations.

(REFERENCE) INSPECTION USING OSCILLOSCOPE



PREPARATION:

(a) Remove the ABS & TRC ECU with connectors still connected.

(b) Connect the oscilloscope to the terminals FR+, FL+, RR+ or RL+ and GND of the ABS & TRC ECU.

CHECK:

Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

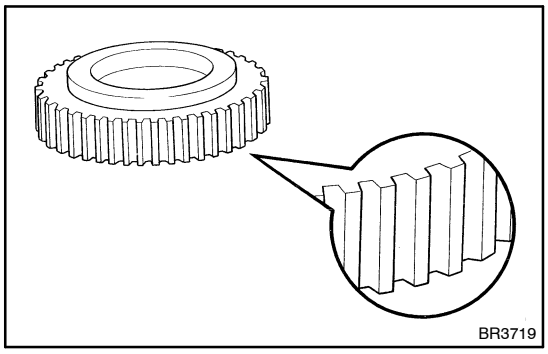
HINT:

Check the stuck of the foreign objects on the sensor tip in case of noise occurrence.

OK	Check and replace ABS & TRC ECU.

NG

6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove front speed sensor rotor (See page SA–13).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

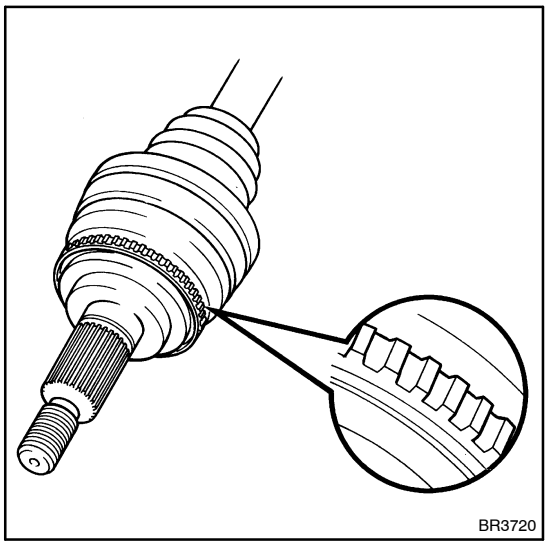
Remove the front speed sensor (See page BR–54).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.



Rear:

PREPARATION:

Remove the drive shaft (See page SA–56).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove rear speed sensor (See page BR–57).

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 first (See page DI–223).

OK

Check and replace ABS & TRC ECU.

DI601–01

DTC	C0226 / 21 – C1227 / 27	ABS & TRC Solenoid Circuit

CIRCUIT DESCRIPTION

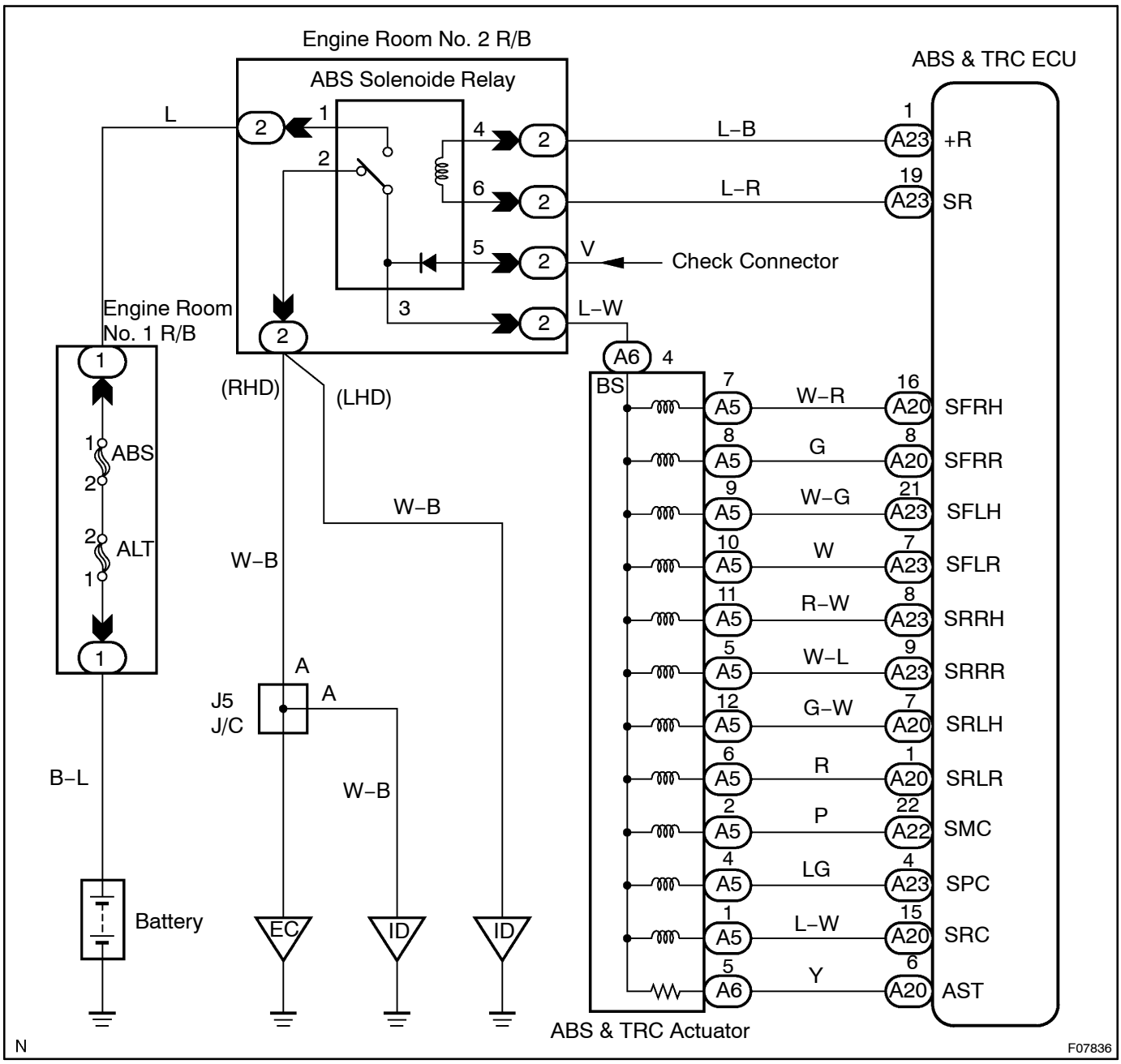
This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit for SFRH or SFRR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SFRH or SFRR circuit • ABS & TRC ECU
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SFLH or SFLR circuit • ABS & TRC ECU
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SRRH or SRRR circuit • ABS & TRC ECU
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SRLH or SRLR circuit • ABS & TRC ECU
C1225/25	Open or short circuit for SMC circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SMC circuit • ABS & TRC ECU
C1226/26	Open or short circuit for SPC circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SPC circuit • ABS & TRC ECU
C1227/27	Open or short circuit for SRC circuit continues for 0.05 sec. or more.	• ABS & TRC actuator • SRC circuit • ABS & TRC ECU

Fail safe function:

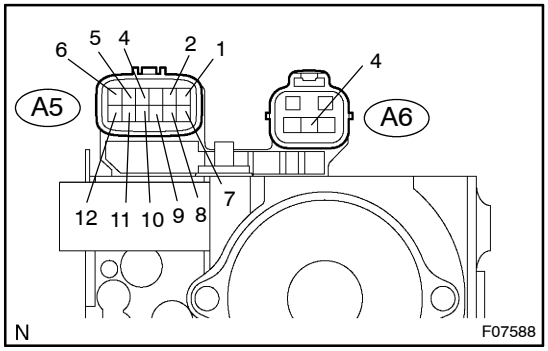
If any trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ABS & TRC actuator solenoid.



PREPARATION:
Disconnect the 2 connectors from the ABS & TRC actuator.
CHECK:
Check continuity between terminals A6 – 4 and A5 – 1, 2, 4, 5, 6, 7, 8, 9, 10, 11 and 12 of ABS & TRC actuator.
OK:

Continuity

HINT:
(Reference)
Resistance of each solenoid
SFRH, SFLH, SRRH, SRLH, SMC: 8.3 – 9.3 Ω
SFRR, SFLR, SRRR, SRLR: 4.0 – 4.6 Ω
SRC: 8.1 – 9.1 Ω
SPC: 3.7 – 4.3 Ω

NG → Replace ABS & TRC actuator.

OK

2	Check for open and short circuit in harness and connector between ABS & TRC ECU and ABS & TRC actuator (See page IN–32).

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.

DI1GJ–03

DTC	C0273 / 13, C0274 / 14	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

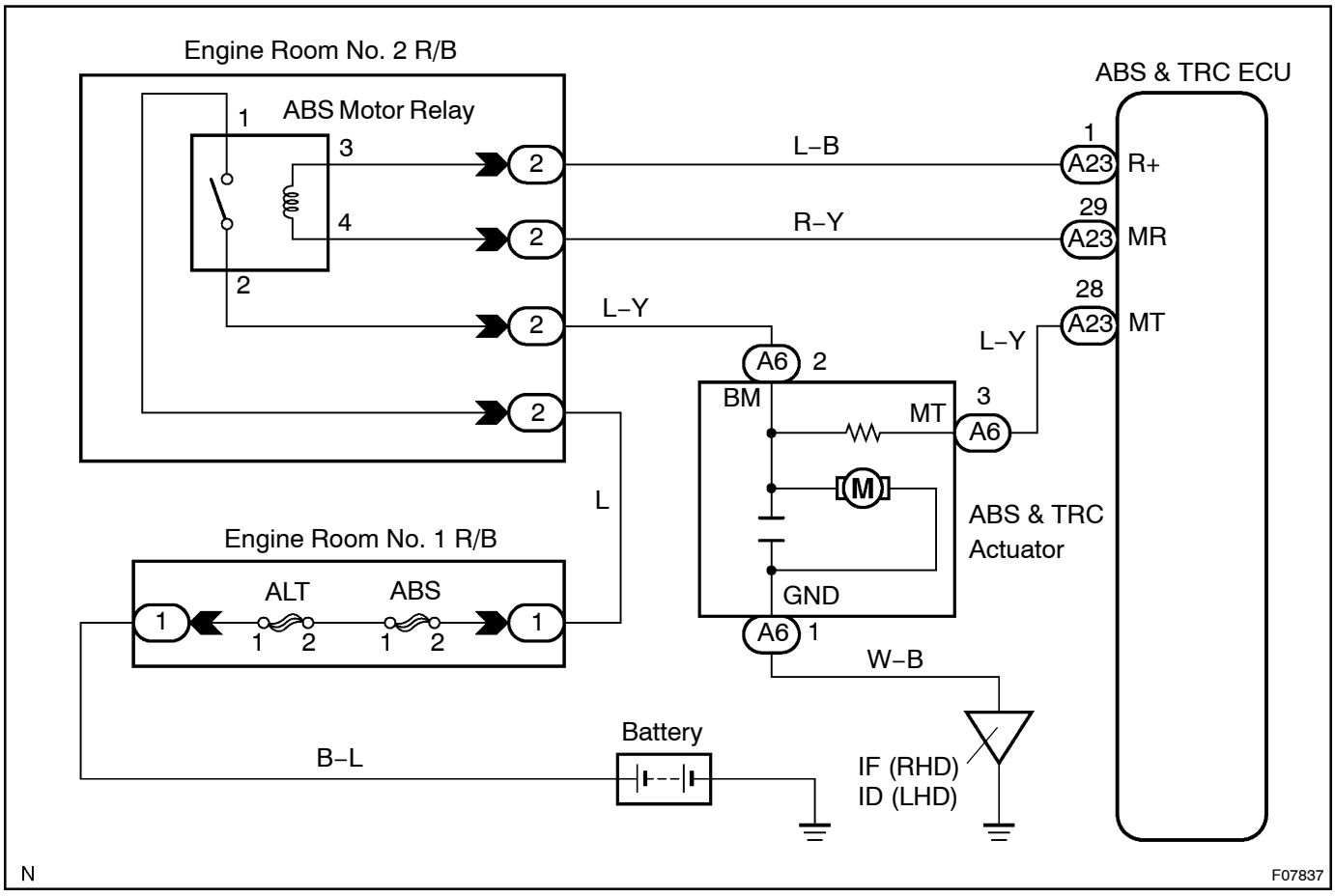
The ABS motor relay supplies power to the ABS pump motor. While the ABS & TRC are activated, the ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. and 2. continued for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V in the initial check or ABS, TRC are in operation, and when the motor relay is ON, however, the contact point of the motor relay is OFF. 2. ECU terminal IG1 is 9.5 V or less, and when the motor relay is ON, but the contact point of the motor relay does not become ON.	• ABS motor relay • ABS motor relay circuit • ABS & TRC ECU
C0274 / 14	When the motor relay is OFF, the condition that the contact point of motor relay is ON continues for 4 sec. or more.	

Fail safe function:

If any trouble occurs in the ABS motor relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

1	**Check ABS motor relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

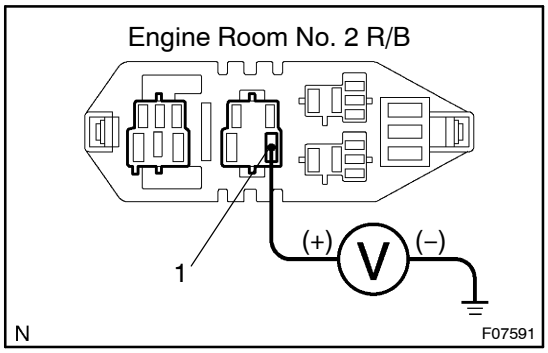
CHECK:
Check the operation sound of the ABS motor relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS motor relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.**



PREPARATION:
Remove the ABS motor relay from the engine room No. 2 R/B.

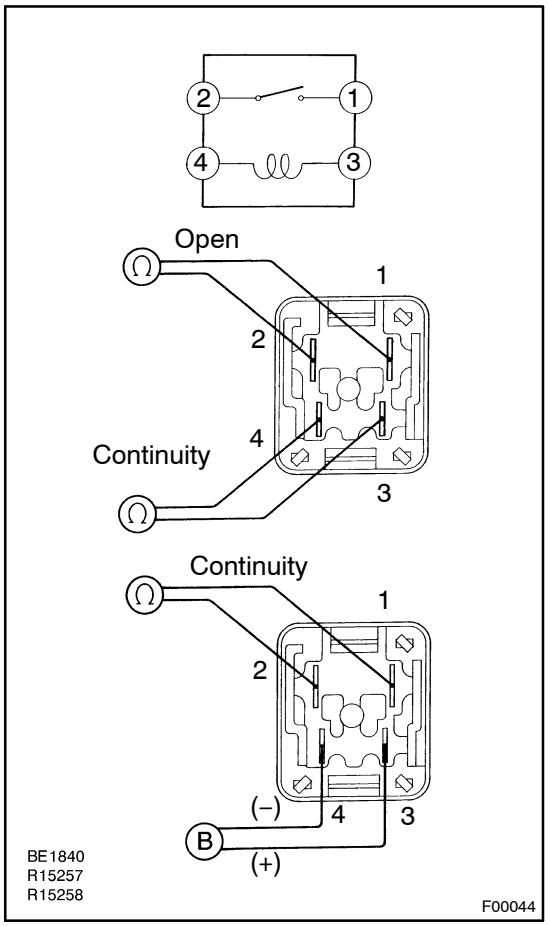
CHECK:
Measure voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS motor relay.



CHECK:

Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

(a) Apply battery voltage between terminals 3 and 4.

(b) Check continuity between terminals.

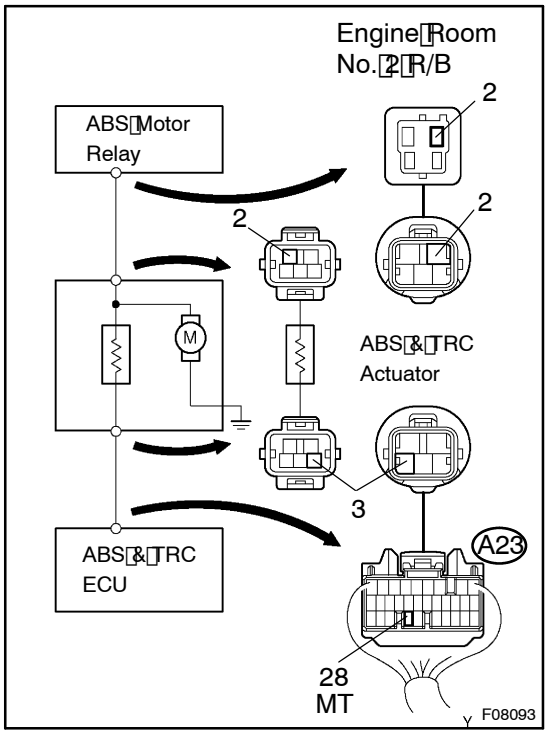
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS motor relay.**

OK

4	**Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT of ABS & TRC ECU.**



CHECK:

Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT (A23 – 28) of ABS & TRC ECU.

OK:

Continuity

HINT:

There is a resistance of 26 – 40 Ω between terminals 2 and 3 of ABS & TRC actuator.

NG	**Repair or replace harness or ABS & TRC actuator.**

OK

5	**Check for open and short circuit in harness and connector between ABS motor relay and ABS & TRC ECU (See page IN–32).**

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.

DI1GK–03

DTC	C0278 / 11, C0279 / 12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

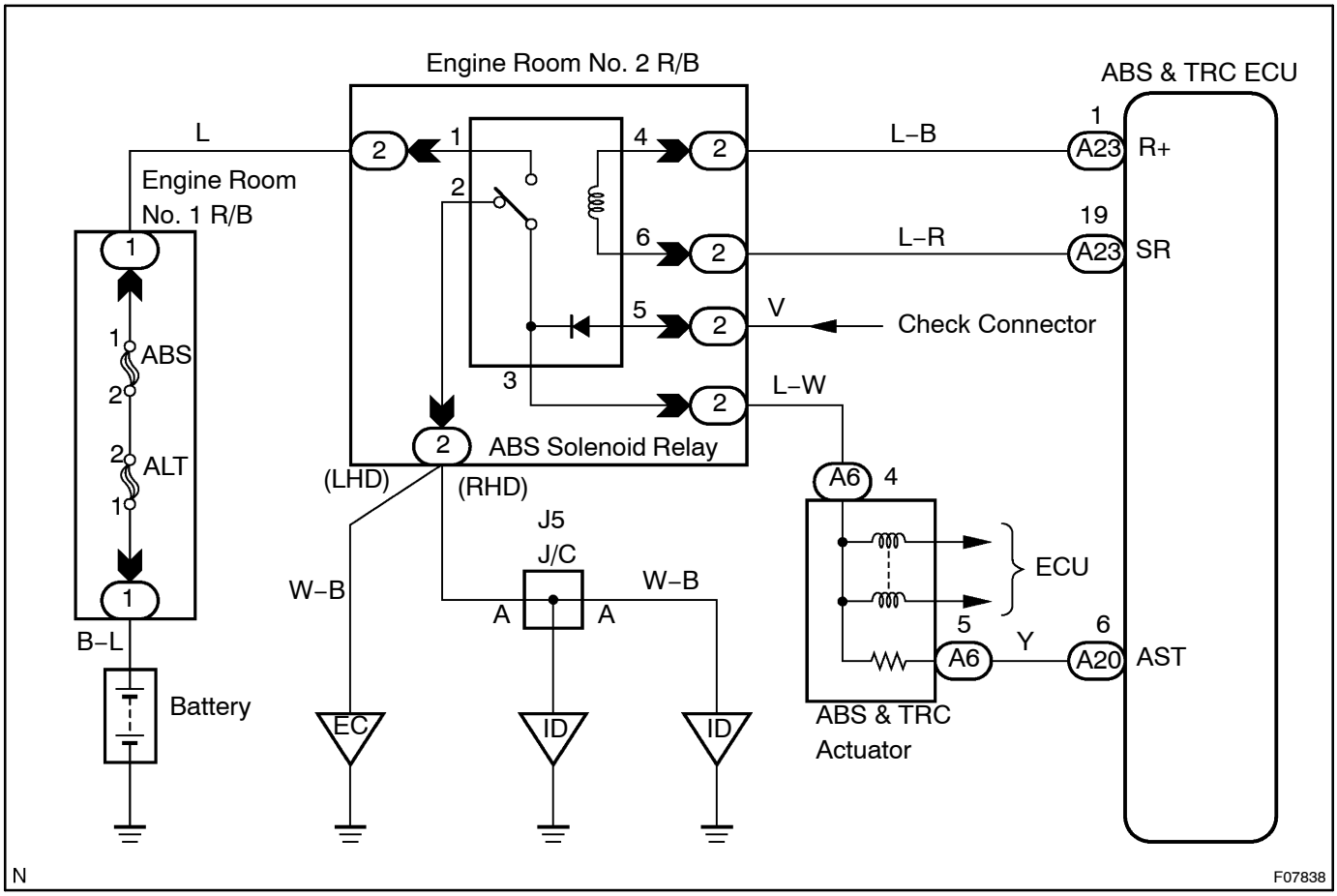
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. 2. With solenoid relay ON driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	• ABS solenoid relay • ABS solenoid relay circuit • ABS &TRC ECU
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the contact point of the solenoid relay is ON continues for 0.2 sec. or more.	

Fail safe function:

If any trouble occurs in the ABS solenoid relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



N F07838

INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check ABS solenoid relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

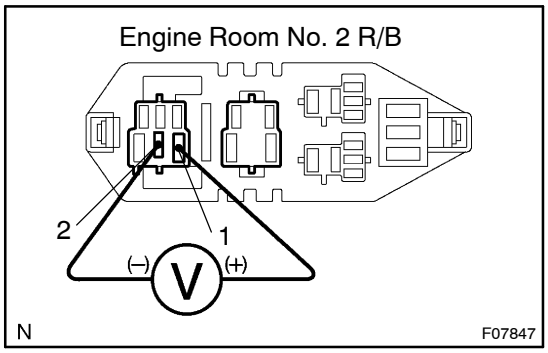
CHECK:
Check the operation sound of the ABS solenoid relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS solenoid relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).**



PREPARATION:
Remove the ABS solenoid relay from the engine room No. 2 R/B.

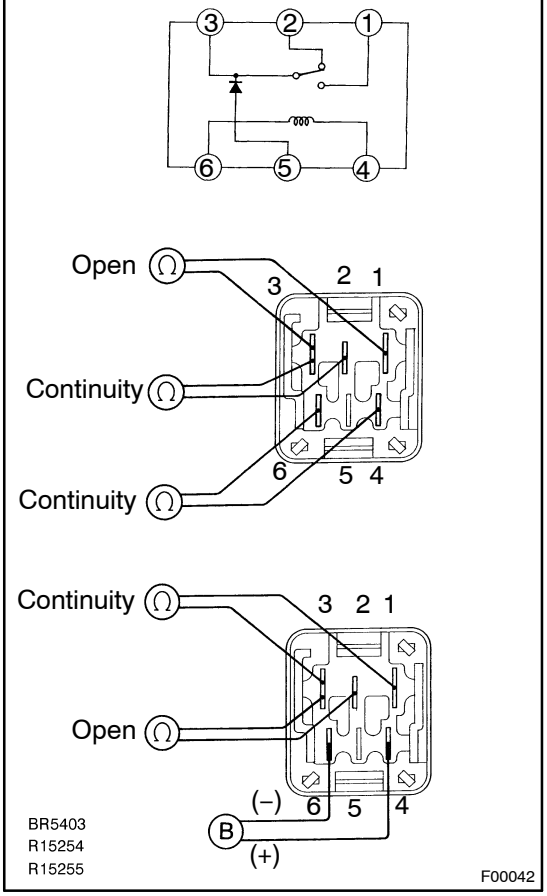
CHECK:
Measure the voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS solenoid relay.



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 voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

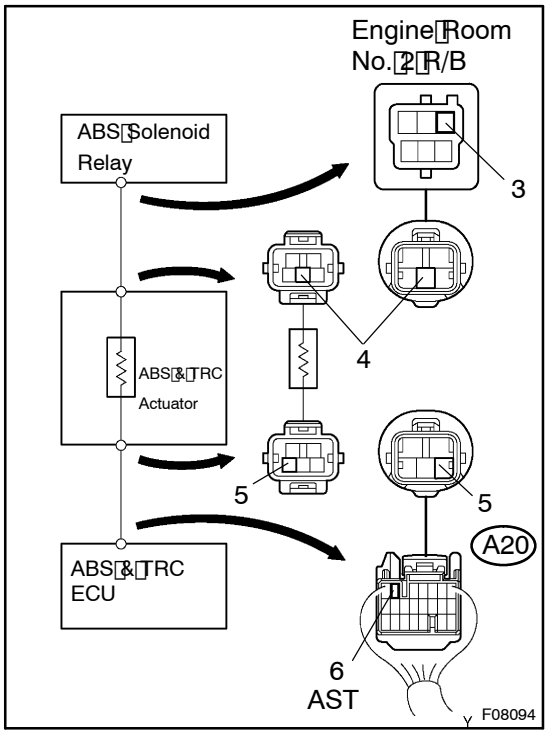
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST of ABS & TRC ECU.



CHECK:

Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST (A20 – 6) of ABS & TRC ECU

OK:

Continuity

HINT:

There is a resistance of 26 – 40 Ω between terminals 4 and 5 of ABS & TRC actuator.

NG	Repair or replace harness or ABS & TRC actuator.

OK

5	Check for open and short circuit in harness and connector between ABS solenoid relay and ABS & TRC ECU (See page IN–32).

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.

DI1GY-05

CIRCUIT INSPECTION

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If any trouble occurs in the engine control system, the ECU prohibits TRC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	• Engine control system

INSPECTION PROCEDURE

1	Check the DTC for the engine (See page DI–4).

*1 → **Repair engine control system according to the code output.**

*2 →

Check for engine and ECT ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI1GZ–06

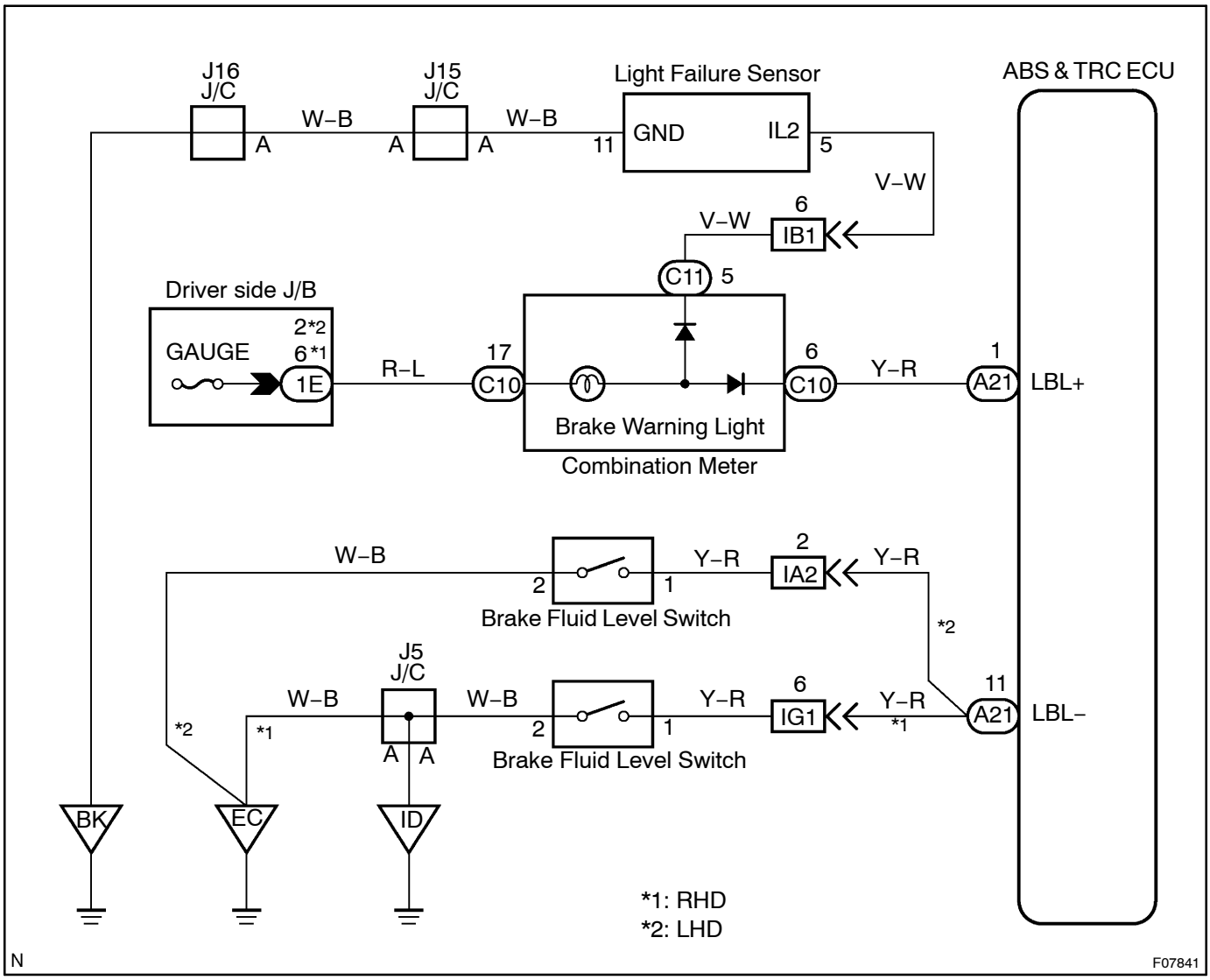
DTC	C1202 / 52	Brake Fluid Warning Switch Circuit

CIRCUIT DESCRIPTION

The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.
HINT:
Pull the parking brake lever also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

DTC No.	DTC Detecting Condition	Trouble Area
C1202 / 52	When any of the following 1. or 2. is detected: 1. Low fluid level condition in the brake master cylinder reservoir tank continues for 10 sec. or more. 2. With ECU terminal IG1 voltage is 9.5 V to 17.2 V and open circuit for the brake fluid level warning switch circuit continues for 2 sec. or more.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit • ABS & TRC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check brake fluid level.

CHECK:

Check the amount of fluid in the brake reservoir.

NG → Check and repair brake fluid leakage and add fluid.

OK

2	Check brake fluid level warning switch (See page BE–83).

NG → Replace brake fluid level warning switch.

OK

3	Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC ECU.

DI1H0–06

DTC	C1203 / 53	ECM Communication Circuit Malfunction

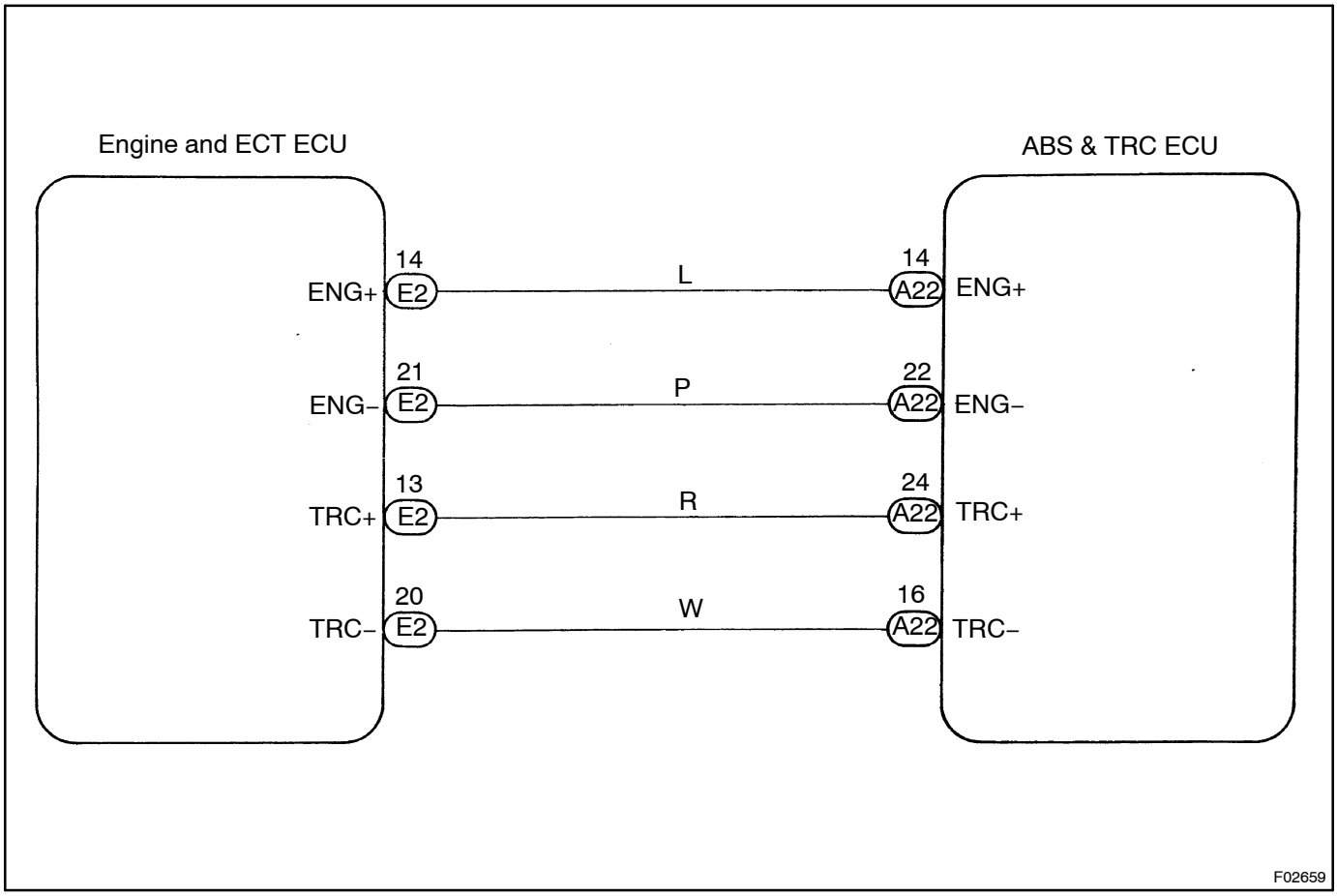
CIRCUIT DESCRIPTION

The circuit is used to send TRC control information from the ABS & TRC ECU to the engine and ECT ECU (TRC+, TRC–), and engine control information from the engine and ECT ECU to the ABS & TRC ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either of the following 1., 2. or 3. continues for 5 sec.: 1. When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to engine and ECT ECU continues for more than 5 sec. 2. When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500 rpm or more and data receipt from engine and ECT ECU is impossible. 3. The condition that the data sent from engine and ECT ECU becomes repeatedly normal and abnormal occurs 10 times or more for 60 sec.	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine and ECT ECU • ABS & TRC ECU

Fail safe function:
If any trouble occurs in the engine and ECT ECU communication circuit, the ECU prohibits TRC controls.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals ENG+, ENG–, TRC+, TRC– of ABS & TRC ECU and engine and ECT ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace engine and ECT ECU or ABS & TRC ECU.

DI1H3-05

DTC	C1223/43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223/43	ABS control system is abnormal.	• ABS control system

INSPECTION PROCEDURE

1	Check the DTC for the ABS (See page DI–223).

*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

DI1H4–06

DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

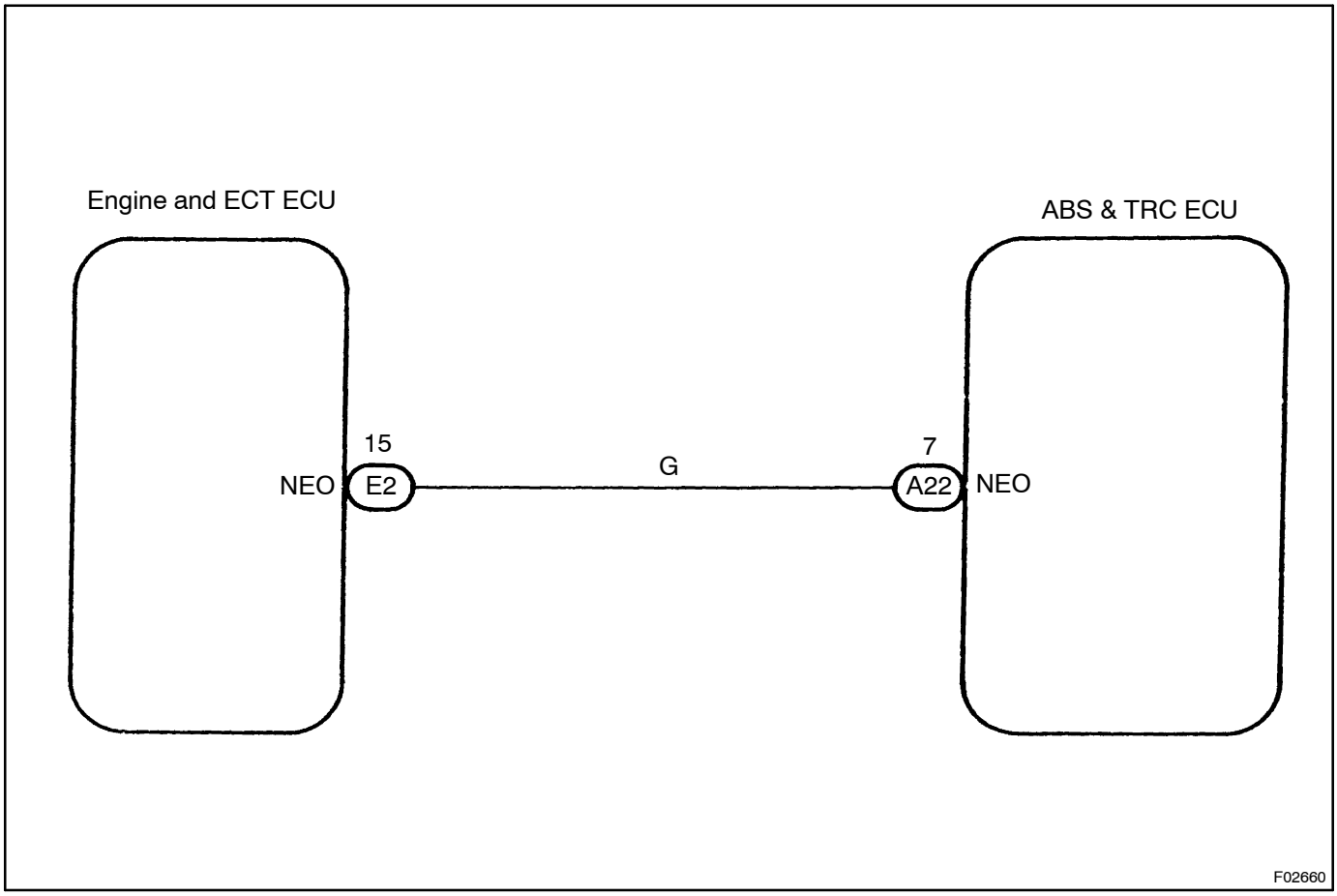
The ABS & TRC ECU receives engine revolution speed signals (NE signals) from the engine and ECT ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When any of the following 1. through 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data receiving from the engine and ECT ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRC is operating and when open or short circuit for engine revolution signal circuit continues for 0.24 sec. or more.	• NEO circuit • Engine and ECT ECU • ABS & TRC ECU

Fail safe function:

If any trouble occurs in the NE signal circuit, the ECU prohibits TRC controls.

WIRING DIAGRAM



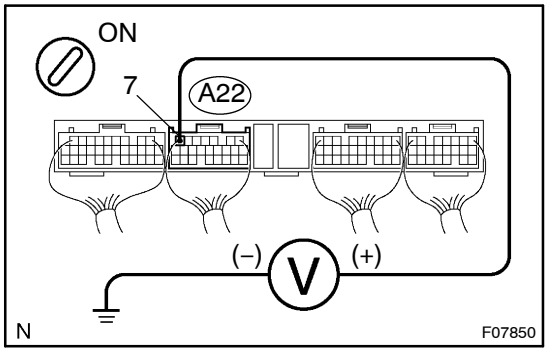
INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals NEO of ABS & TRC ECU and terminal NEO of engine and ECT ECU (See page IN–32).

NG → Repair or replace harness and connector.

OK

2	Check voltage between terminals NEO of ABS & TRC ECU and body ground.



PREPARATION:

(a) Remove the ABS & TRC ECU with connectors still connected.

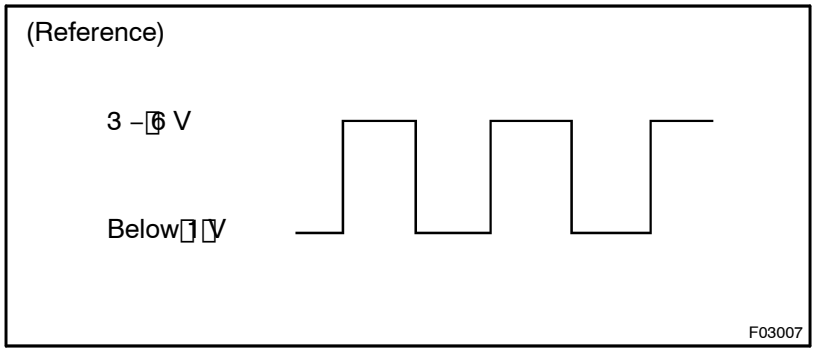
(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal NEO (A22 – 7) of ABS & TRC 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)	3 – 6 V ↔ below 1 V (Pulse)



NG → Check and replace ABS & TRC ECU or engine and ECT ECU.

OK

If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

DI0WV–06

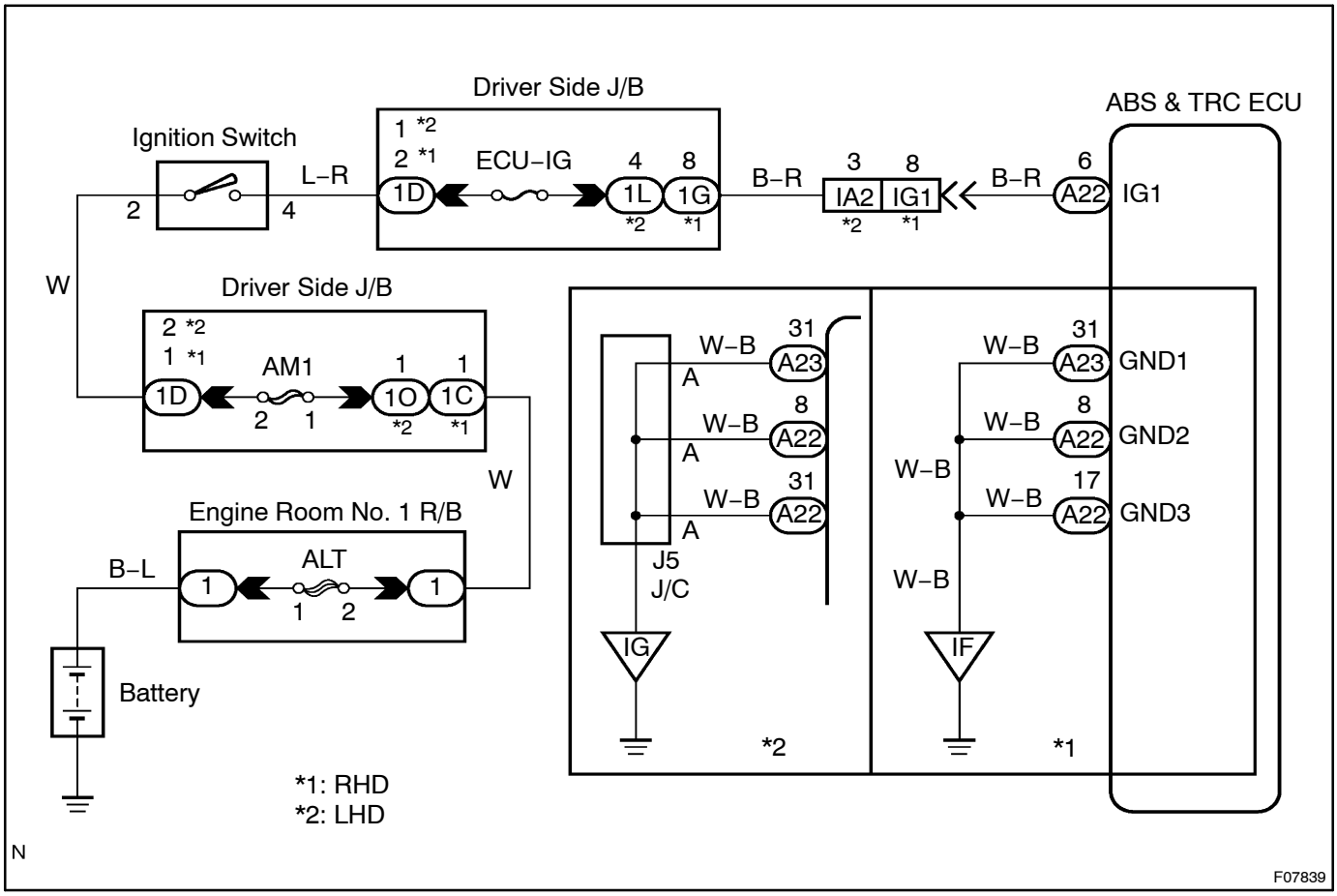
DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. through 4.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains at below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more. 3. The condition that ECU terminal IG1 voltage is more than 17.2 V continues for 1.2 sec ore more. 4. While the solenoid relay outputs ON signal, ECU terminal IG1 voltage becomes more than 17.2 V, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit • ABS & TRC ECU

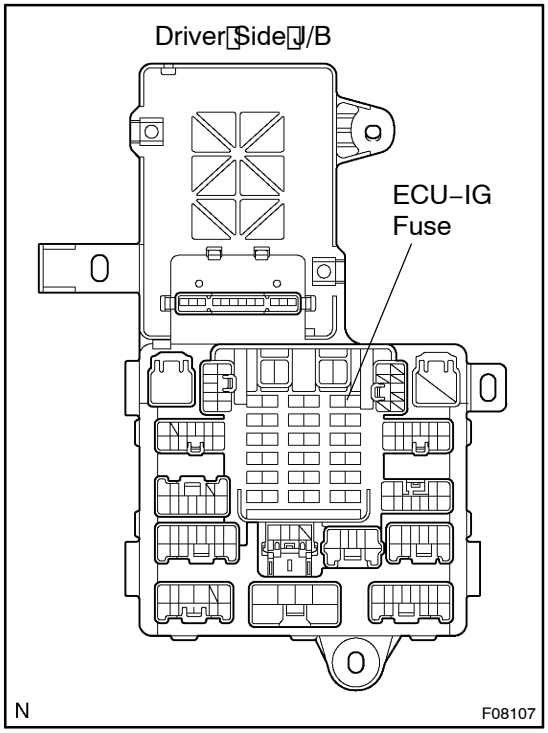
Fail safe function:
If any trouble occurs in the power source circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:
Remove ECU–IG fuse from driver side J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page CH–1).**

OK

3	**Check voltage of the ECU IG power souce.**

In case of using the hand–held tester.

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the DATALIST mode on the hand–held tester.

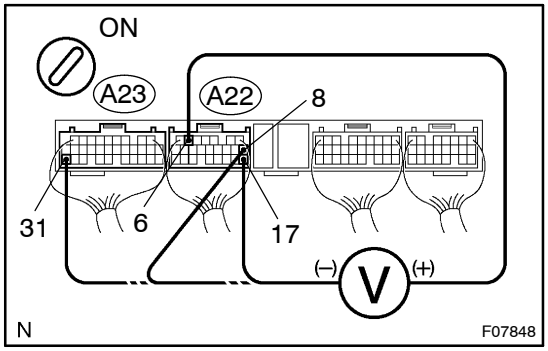
CHECK:

Check the voltage condition output from the ECU displayed by the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove the ABS & TRC ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 (A22 – 6) and GND (A23 – 31, A22 – 8, 17) of ABS & TRC ECU.

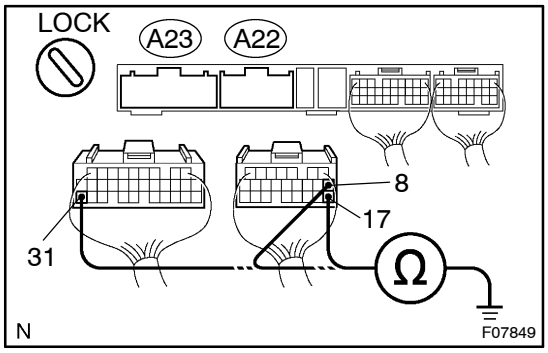
OK:

Voltage: 10 – 14 V

OK → **Ignition switch OFF, check and replace ABS & TRC ECU.**

NG

4	Check continuity between terminal GND of ABS & TRC ECU connector and body ground.



CHECK:

(a) Disconnect the 2 connector (A22, A23) from the ABS & TRC ECU.

(b) Measure resistance between terminal GND (A22 – 8, 17, A23 – 31) of ABS & TRC ECU connector and body ground.

OK:

Resistance: 1 Ω or less

NG → **Repair or replace harness or connector.**

OK

Check for open circuit in harness and connector between ABS & TRC ECU and battery (See page IN–32).

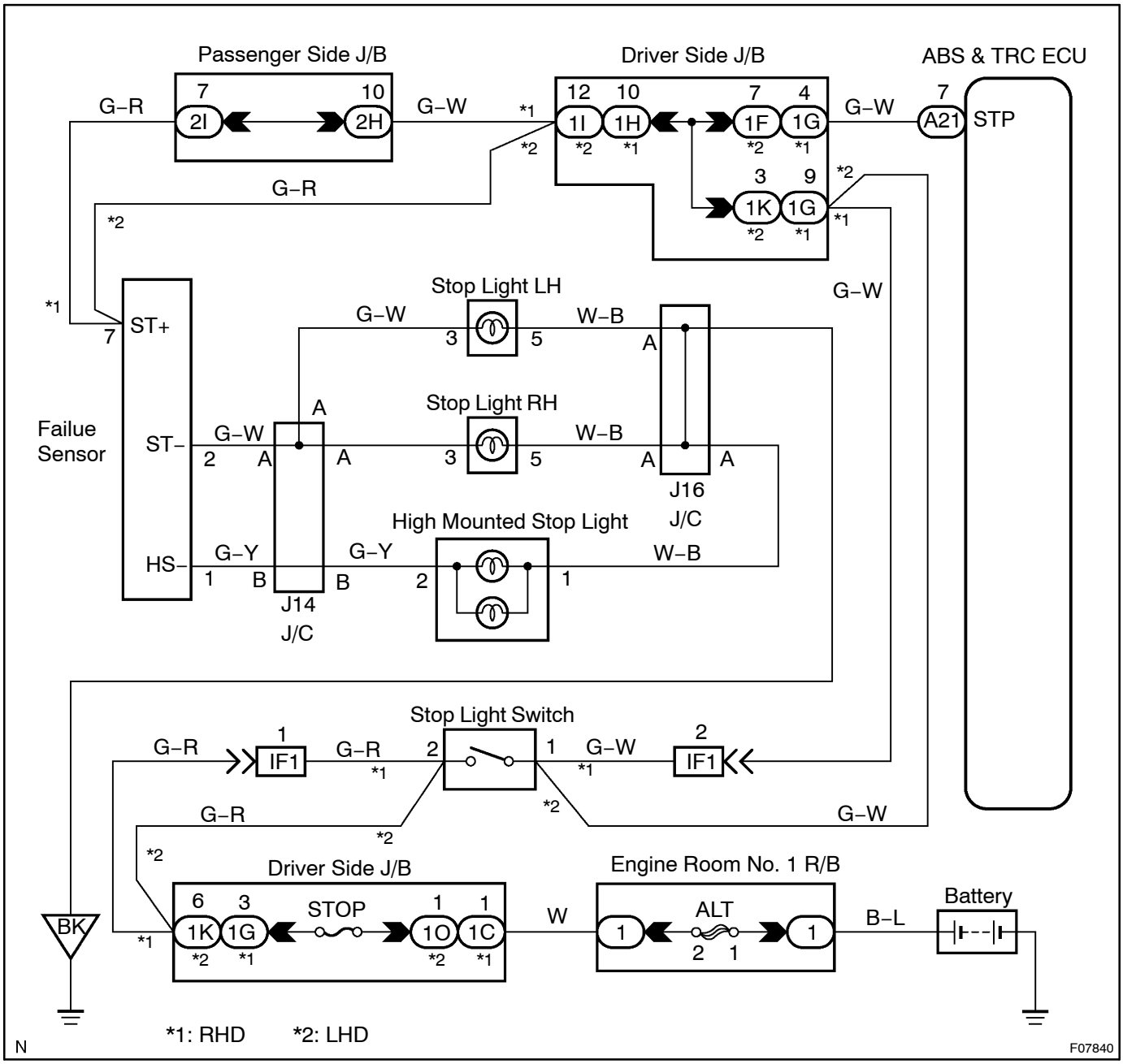
DI0WX–07

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non–operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	• Stop light switch • Stop light switch circuit • ABS &TRC ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of the stop light switch.

CHECK:
Check that the stop light lights up when brake pedal is depressed and turns off when the brake pedal is released.

OK → Go to step 3.

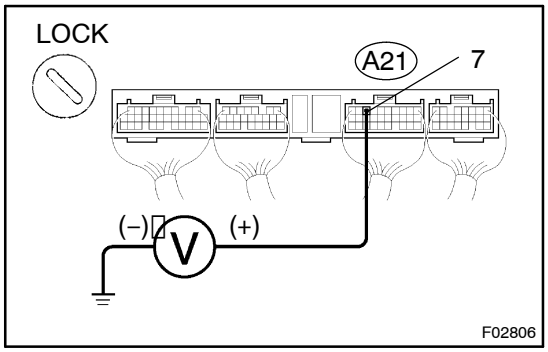
NG

2	Check stop light circuit (See page BE–65).

NG → Repair or replace stop light circuit.

OK

3	Check voltage between terminal STP of ABS & TRC ECU and body ground.



PREPARATION:
Remove ABS & TRC ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP (A21 – 7) of ABS & TRC ECU and body ground when brake pedal is depressed.
OK:
Voltage: 8 – 14 V

OK → Check and replace ABS & TRC ECU.

NG

4	Check for open circuit in harness and connector between ABS & TRC ECU and stop light switch (See page IN–32).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–233).

DI1GO–04

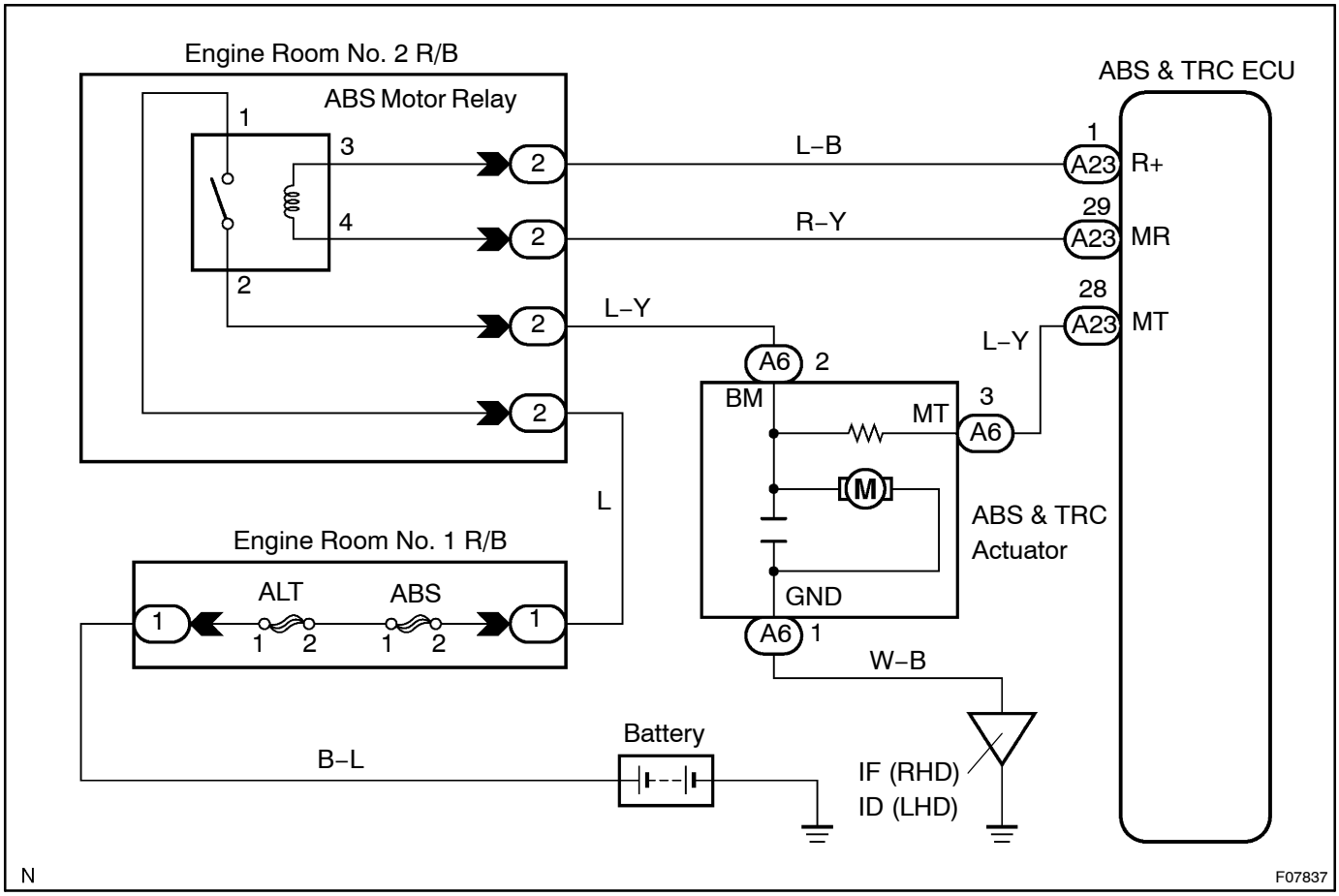
DTC	C1251 / 51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. Actuator drive motor is not operating normally. 2. Open circuit condition of actuator drive motor continues for 2 sec. or more.	• ABS & TRC Actuator • ABS & TRC Actuator Circuit

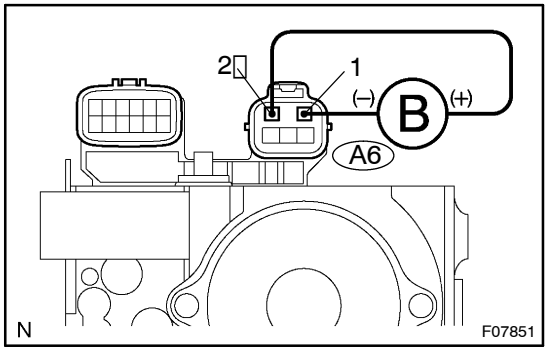
Fail safe function:
If any trouble occurs in the ABS pump motor, the ECU cuts off current to the ABS solenoid relay and prohibits ABS & TRC controls and the brake system becomes normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of pump motor.**



PREPARATION:

Disconnect the connector from the ABS & TRC actuator.

CHECK:

Connect positive ⊕ lead to BM (A6 – 2) terminal and negative ⊖ lead to GND (A6 – 1) terminal of the ABS & TRC actuator, check that the pump motor is operated.

OK:

The running sound of the pump motor should be heard.

OK	**Check for open circuit in harness and connector between ABS motor relay, ABS & TRC actuator and ABS & TRC ECU (See page IN–32).**

NG

Replace ABS & TRC actuator.

DI0CG–04

DTC	Always ON	ABS & TRC ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	ABS & TRC ECU internal malfunction is detected.	• ABS & TRC ECU

Fail safe function:
If any trouble occurs in the ECU, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control and TRC control.

INSPECTION PROCEDURE

1	Is DTC output?

Check DTC on page DI–223.

YES → Repair circuit indicated by the code output.

NO

2	Is normal code displayed?

YES → Check solenoid relay. Check for short circuit in harness and connector between solenoid relay and check connector (See page IN–32).

NO

3	Does ABS warning light go off?

YES → Check for open or short circuit in harness and connector between ECU–IG fuse and ABS & TRC ECU (See page IN–32).

NO

4	**Check battery voltage.**

CHECK:

Check the battery voltage.

OK:

10 – 14 V

NG → **Check and repair the charging system (See page CH–1).**

OK

5	**Check ABS warning light.**

PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the connector from the ABS & TRC ECU.

(c) Turn the ignition switch ON.

CHECK:

Check the ABS warning light goes off.

OK → **Check and replace ABS & TRC ECU.**

NG

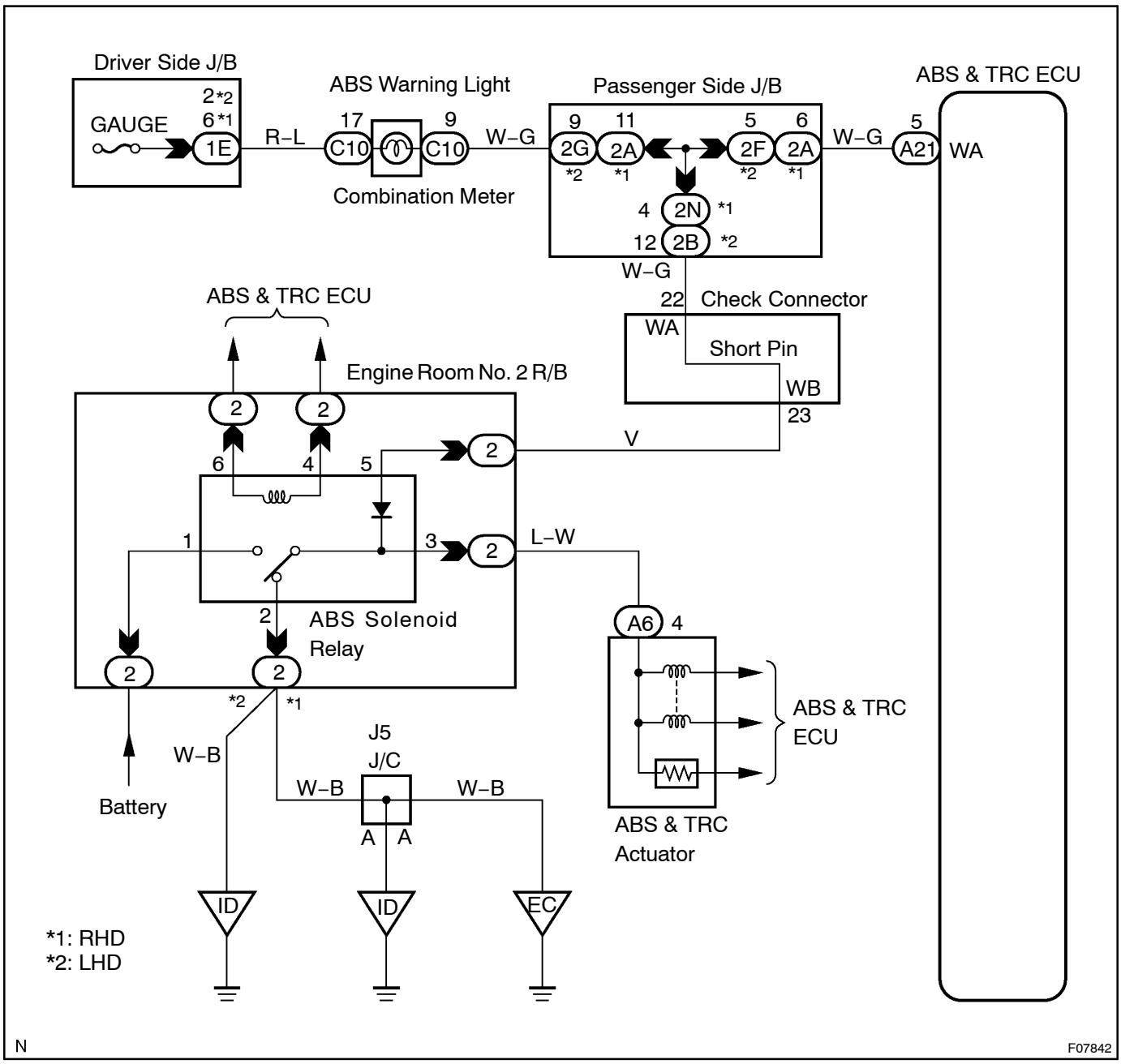
Check for short circuit in harness and connector between ABS warning light, check connector, DLC3 and ABS & TRC ECU (See page IN–32).

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects a 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 check connector or DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	*1
ABS warning light remains on	*2

*1: Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

*2: After inspection with step 4, start the inspection from step 5 in case of using the hand–held tester and start from step 6 in case of not using hand–held tester.

1	**Check operation of the ABS warning light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the hand–held tester.

OK → **Check and replace ABS & TRC ECU.**

NG

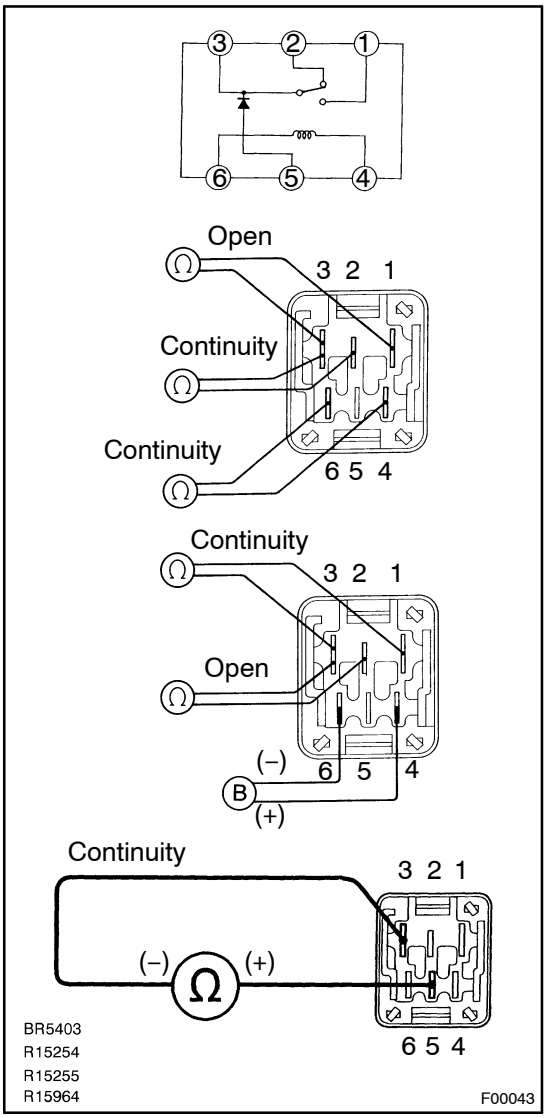
2	**Check ABS warning light.**

See combination meter troubleshooting (See page BE–2).

NG → **Repair bulb or combination meter assembly (See page BE–80).**

OK

3	Check ABS solenoid relay.



PREPARATION:

Remove ABS solenoid relay from engine room No. 2 R/B.

CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 30 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery 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 no continuity exists, connect the ⊖ test lead to terminal 5 and the ⊕ lead to terminal 3. Recheck continuity between terminals.

NG → **Ignition switch OFF, replace ABS solenoid relay.**

OK

Repair or replace and check for open circuit in harness and connector between check connector and ABS solenoid relay and body ground (See page IN–32).

4	Check that the ABS & TRC ECU connectors are securely connected to the ABS & TRC ECU.

NO → Connect the connector to the ABS & TRC ECU.

YES

5	Check operation of the ABS warning light (See step 1).

OK → Check and replace ABS & TRC ECU.

NG

6	Is DTC output?

Check DTC on page DI–223.

YES → Repair circuit indicated by the output code.

NO

7	Does ABS warning light go off if short pin is removed?

NO → Check for short circuit in harness and connector between warning light and check connector and ABS & TRC ECU (See page IN–32).

YES

8	Check ABS solenoid relay (See step 3).

NG → Ignition switch OFF, replace ABS solenoid relay.

OK

Check for short circuit in harness and connector between check connector and ABS solenoid relay (See page IN–32).

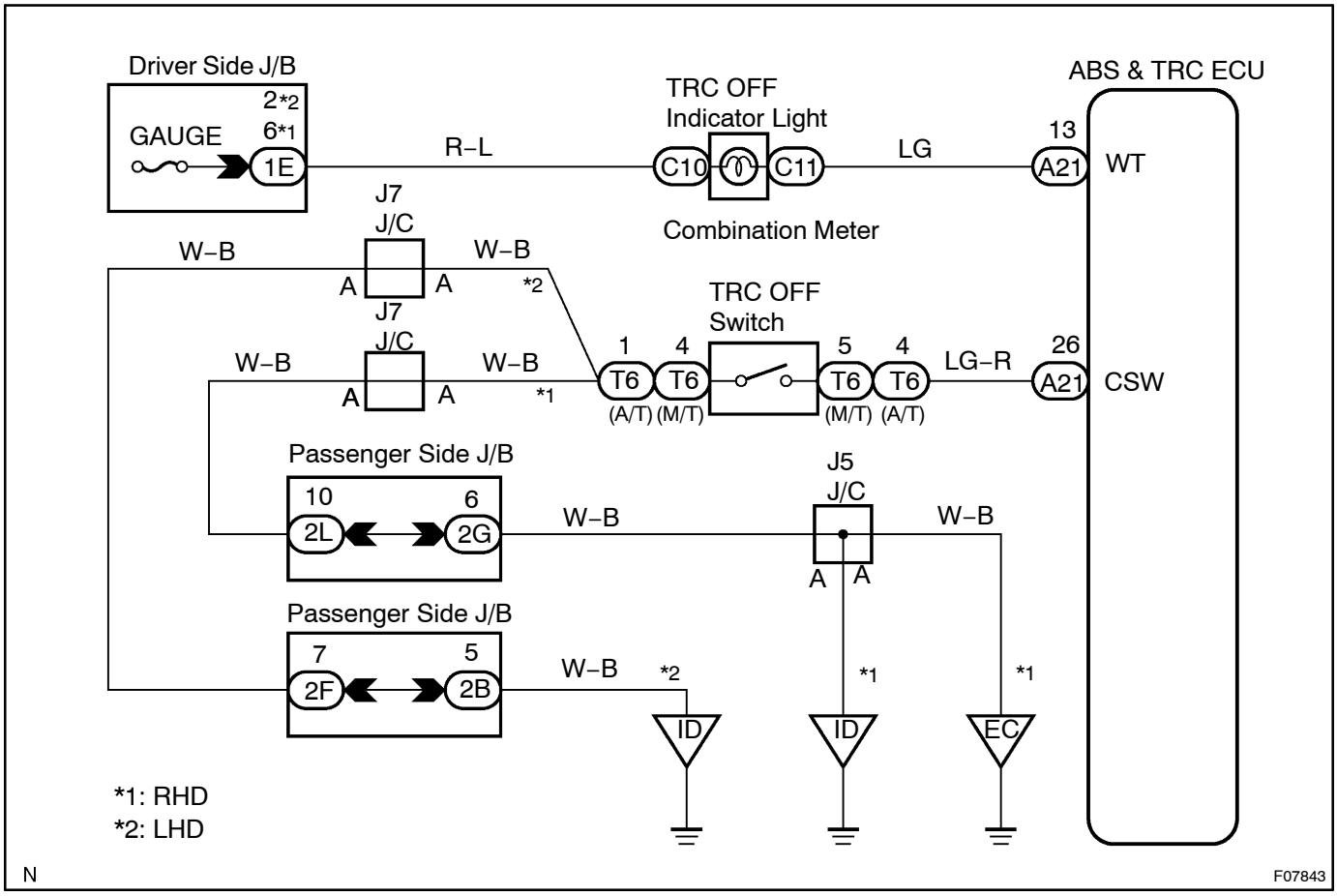
DI559–02

TRC OFF Indicator, TRC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRC control main switch. When the TRC cut switch is pushed on, TRC control goes off and the TRC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the TRC OFF indicator light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

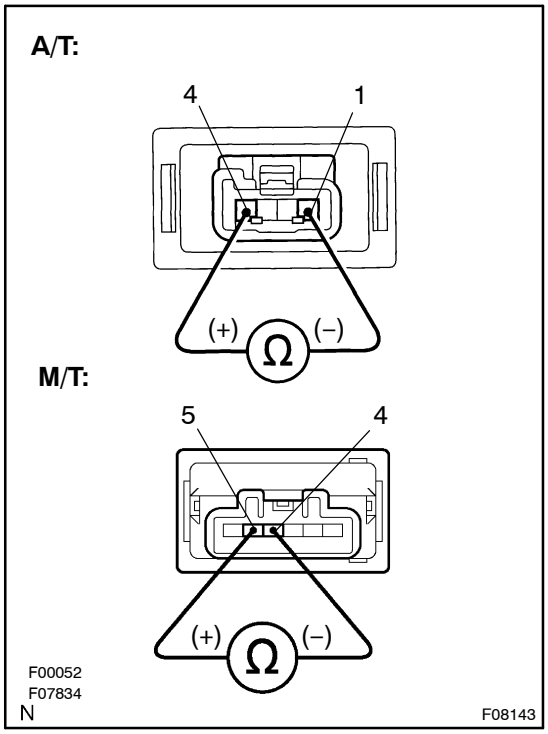
CHECK:

Check that ”ON” and ”OFF” of the TRC OFF indicator light can be shown on the combination meter by the hand–held tester.

NG → **Go to step 4.**

OK

2	**Check TRC OFF switch.**



PREPARATION:

Remove the TRC OFF switch and disconnect the connector from the TRC OFF switch.

CHECK:

Measure resistance between terminals 1 and 4 (A/T) or 4 and 5 (M/T) of TRC OFF switch when TRC OFF switch is on and off.

OK:

TRC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRC OFF switch.**

OK

3	Check for open and short circuit in harness and connector between terminal CSW of ABS & TRC ECU and TRC OFF switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check TRC OFF indicator light.

See combination meter troubleshooting on page BE–2.

NG → Repair bulb or combination meter assembly (See page BE–80).

OK

5	Check for open and short circuit in harness and connector between terminal WT of ABS & TRC ECU and TRC OFF indicator light (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace ABS & TRC ECU.

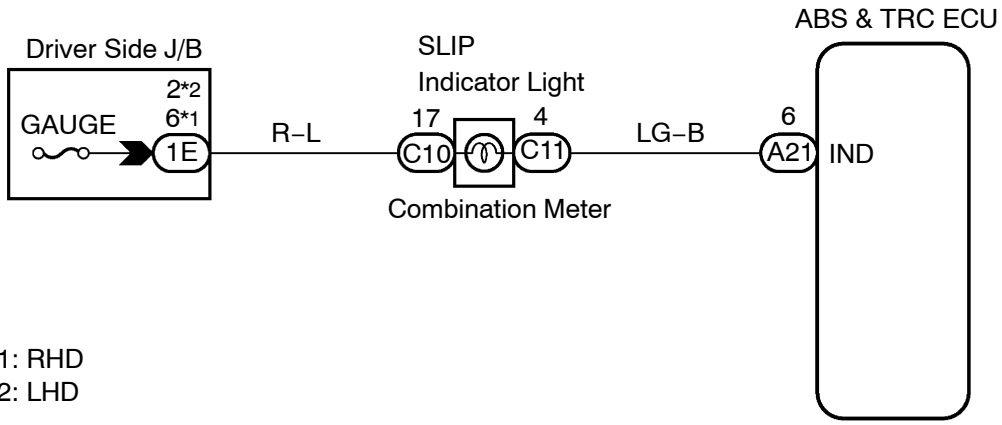
DI55A–02

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the SLIP indicator light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the SLIP indicator light can be shown on the combination meter by the hand–held tester.

OK	**Go to step 4.**

NG

2	Check that the SLIP indicator light is ON for 3 seconds soon after ignition switch is turned ON.

OK → Check and replace ABS & TRC ECU.

NG

3	Check SLIP indicator light.

See combination meter troubleshooting on page BE–2.

NG → Repair bulb or combination meter assembly (See page BE–80).

OK

4	Check for open and short circuit in harness and connector between ABS & TRC ECU and SLIP indicator light (See page IN–32).

NG → Repair or replace harness or connector.

OK

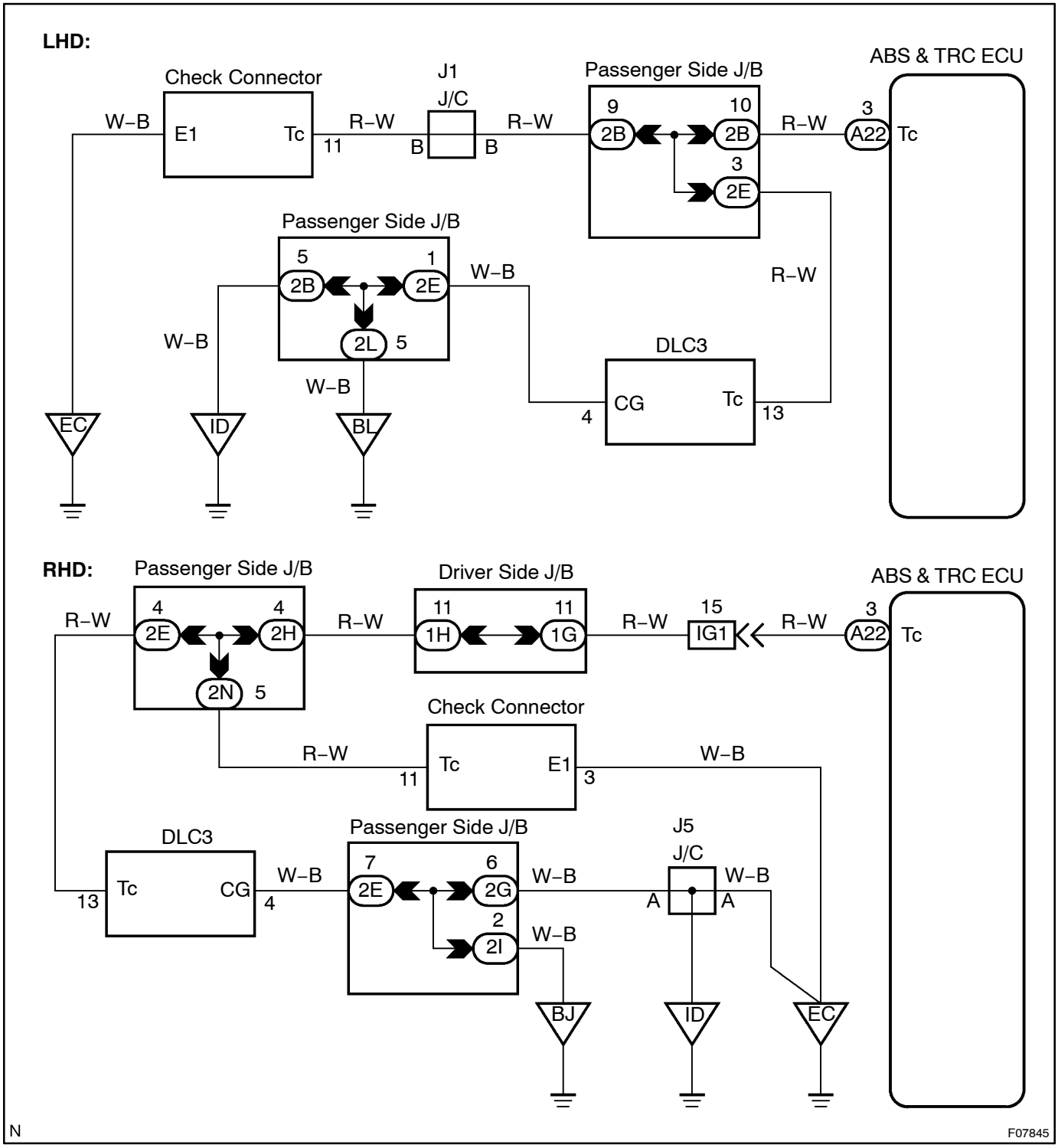
Check and replace ABS & TRC ECU.

Tc Terminal Circuit

CIRCUIT DESCRIPTION

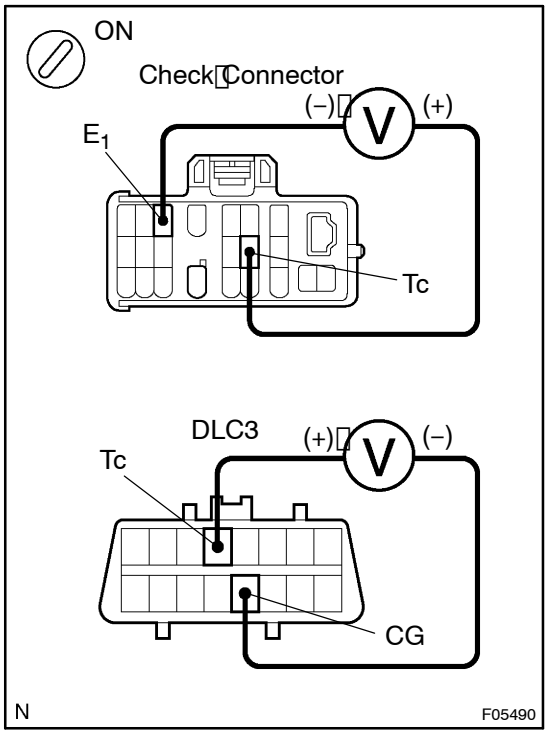
Connecting between terminals Tc and E_1 of the check connector or Tc and CG of the DLC3 causes the ECU to display the DTC by blinking the ABS warning light and TRC OFF indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E_1 of check connector or Tc and CG of DLC3.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Tc and E_1 of check connector or Tc and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK	If ABS warning light does not blink even after Tc and E_1 or Tc and CG have been connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & TRC ECU and check connector or DLC3, check connector or DLC3 and body ground (See page IN–32).

NG	Repair or replace harness or connector.

OK

Check and replace ABS & TRC ECU.

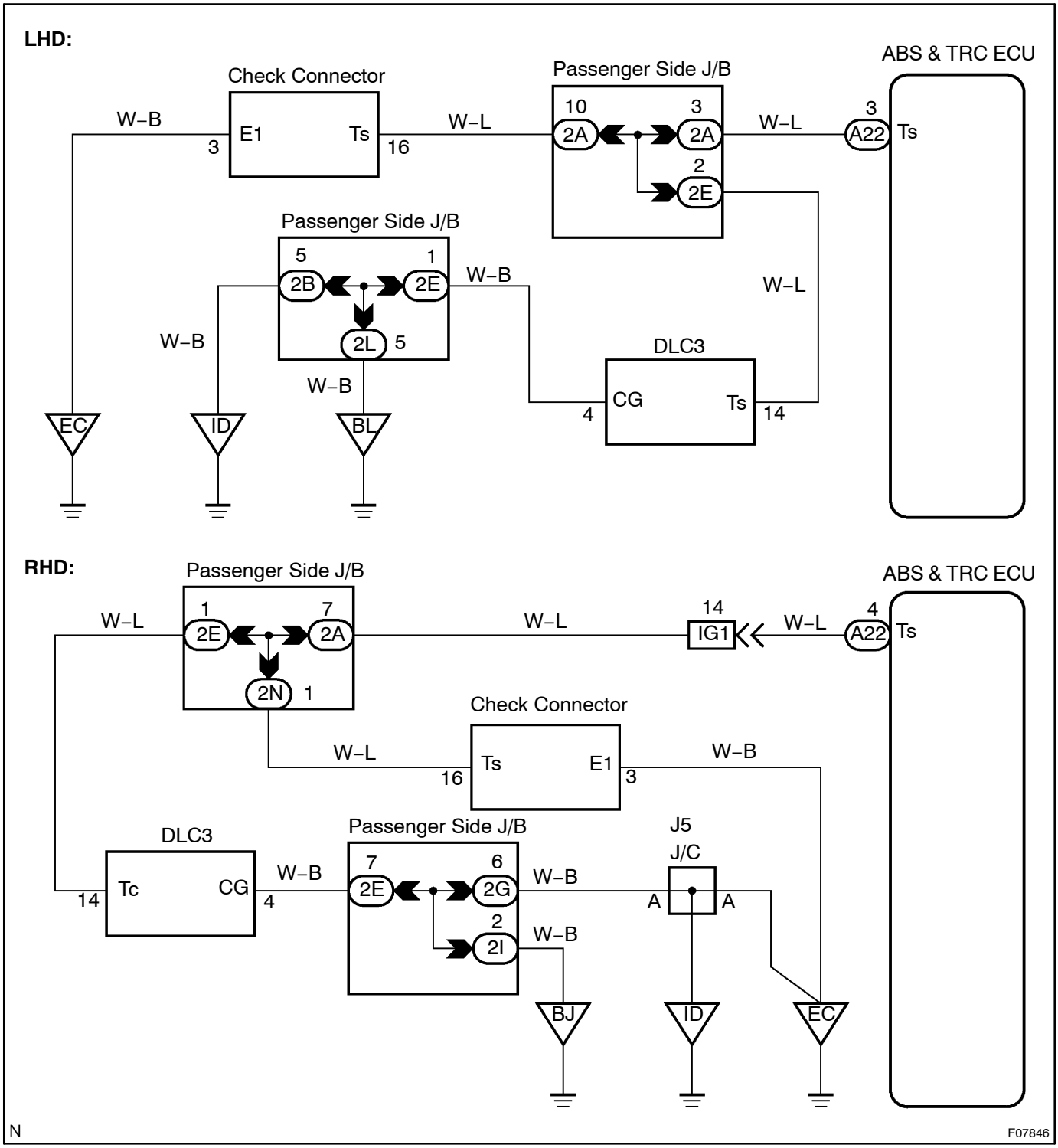
DI0CM–04

Ts Terminal Circuit

CIRCUIT DESCRIPTION

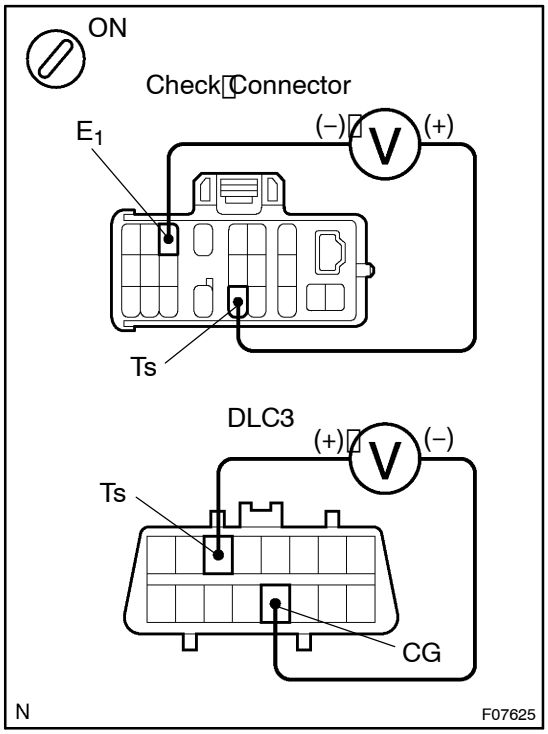
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check. Connecting terminals Ts and E_1 of the check connector or Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and E_1 of check connector or Ts and CG of DLC3.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and E_1 of check connector or Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK	If ABS warning light does not blink even after Ts and E_1 or Ts and CG have been connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between ABS & TRC ECU and check connector or DLC3, check connector or DLC3 and body ground (See page IN–32).

NG	Repair or replace harness or connector.

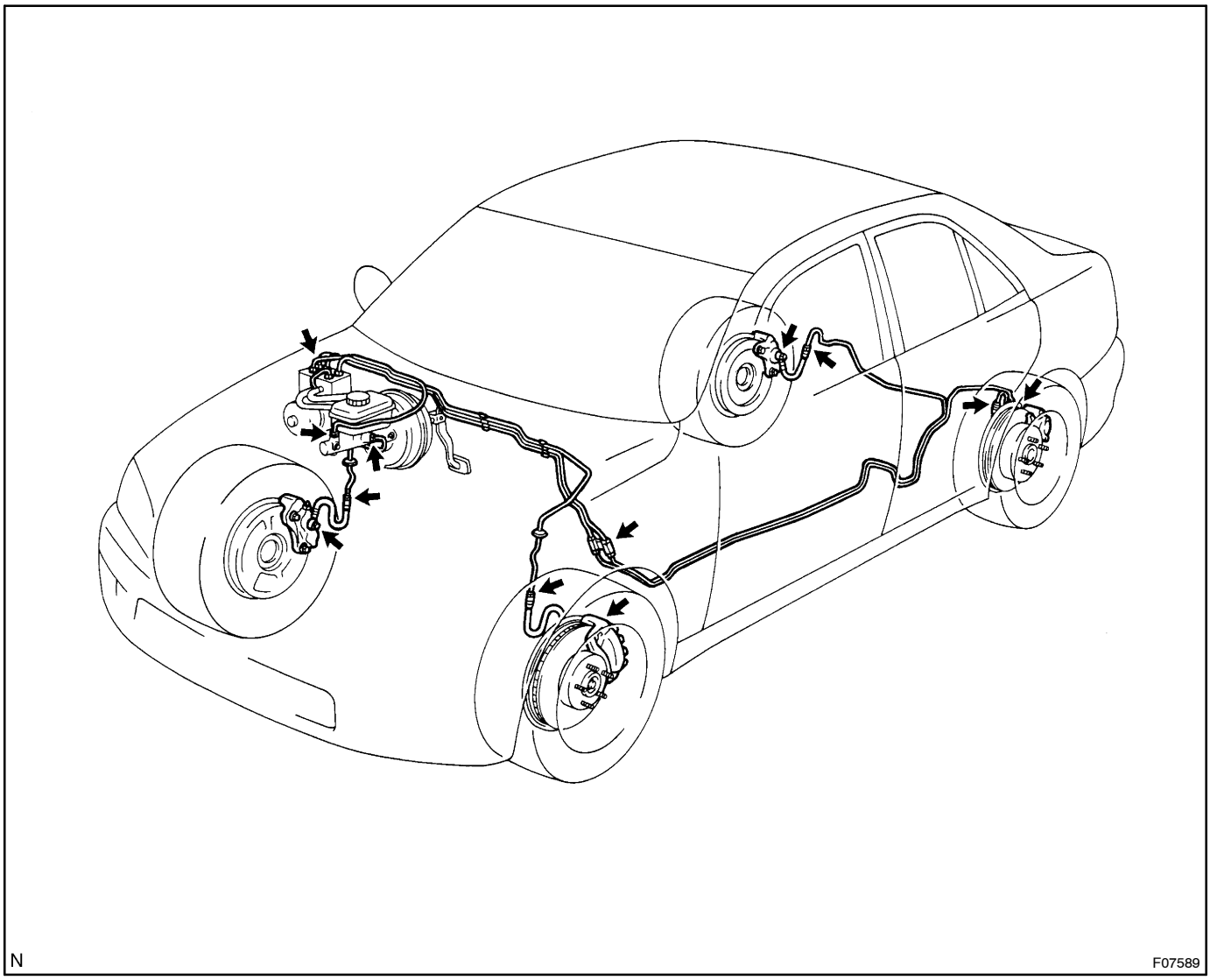
OK

Check and replace ABS & TRC ECU.

DI0CR–04

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



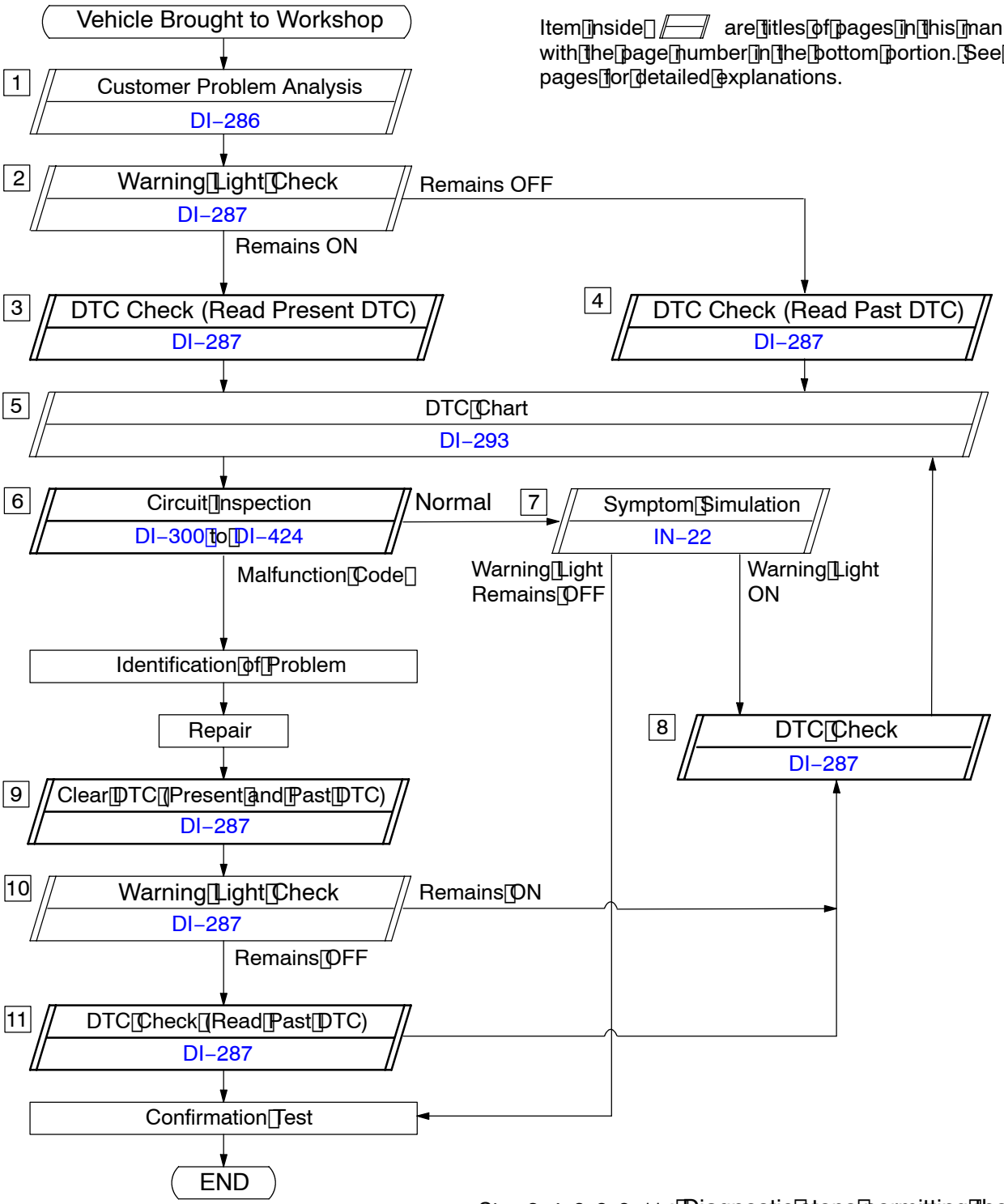
N

F07589

SUPPLEMENTAL RESTRAINT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI4Z2–02



Item inside ▭ are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 3, 4, 6, 8, 9, 11 : Diagnostic steps permitting the use of the hand–held tester.

DI15Z–07

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 Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	**Approx.**

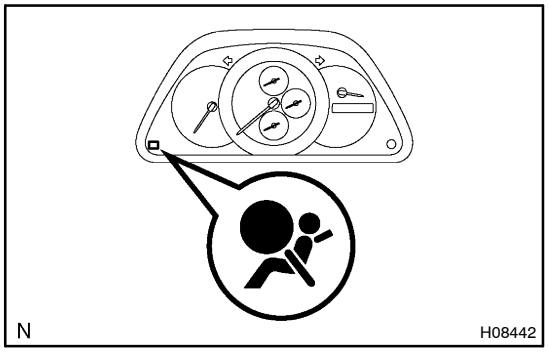
Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

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.]

DI4L1–04



PRE–CHECK

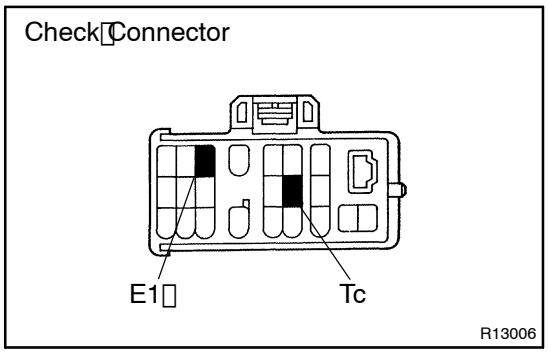
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ACC or ON position 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–419.



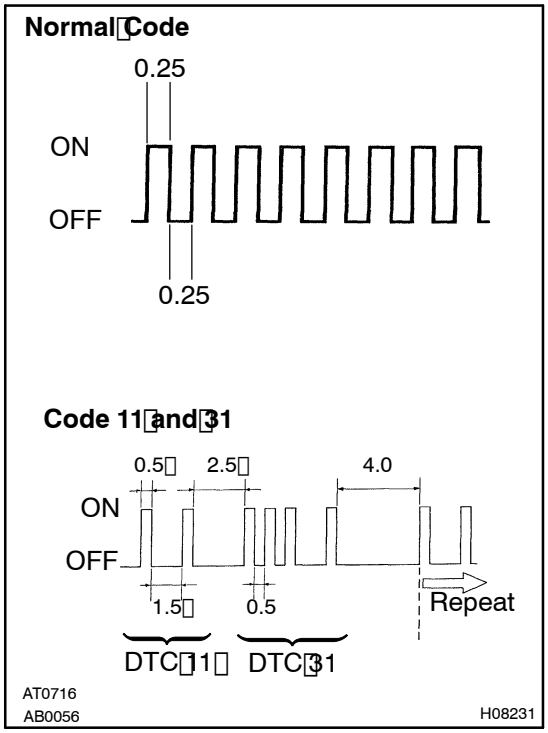
2. DTC CHECK (Using diagnosis check wire)

(a) Present troubles codes:
Output the DTC.
(1) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.
(2) Using SST, connect terminals Tc and E1 of the check connector.
SST 09843–18020

NOTICE:
Pay due attention to the terminal connecting position to avoid a malfunction.

(b) Past troubles codes:
Output the DTC.
(1) Using a service wire, connect Terminals Tc and E1 of the check connector.
SST 09843–18020
(2) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

NOTICE:
Pay due attention to the terminal connecting position to avoid a malfunction.

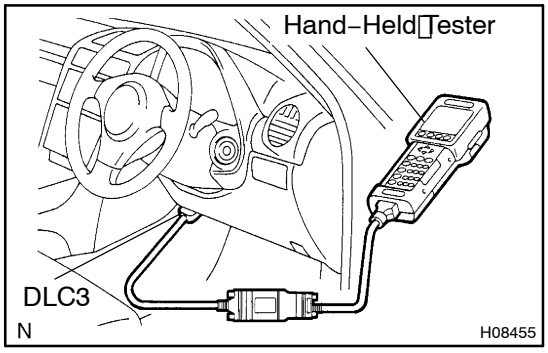


(c) Read the DTC.
Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- 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.

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 a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page DI–424.



3. DTC CHECK (Using hand–held tester)

(a) Hook up the hand–held tester to the DLC3.
(b) Read the DTCs by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

4. DTC CLEARANCE (Not using service wire)

When the ignition switch is turned off, the diagnostic trouble code is cleared.
HINT:
DTC might not be cleared by turning the ignition switch OFF. In this case, proceed to the next step.

5. DTC CLEARANCE (Using service wire)

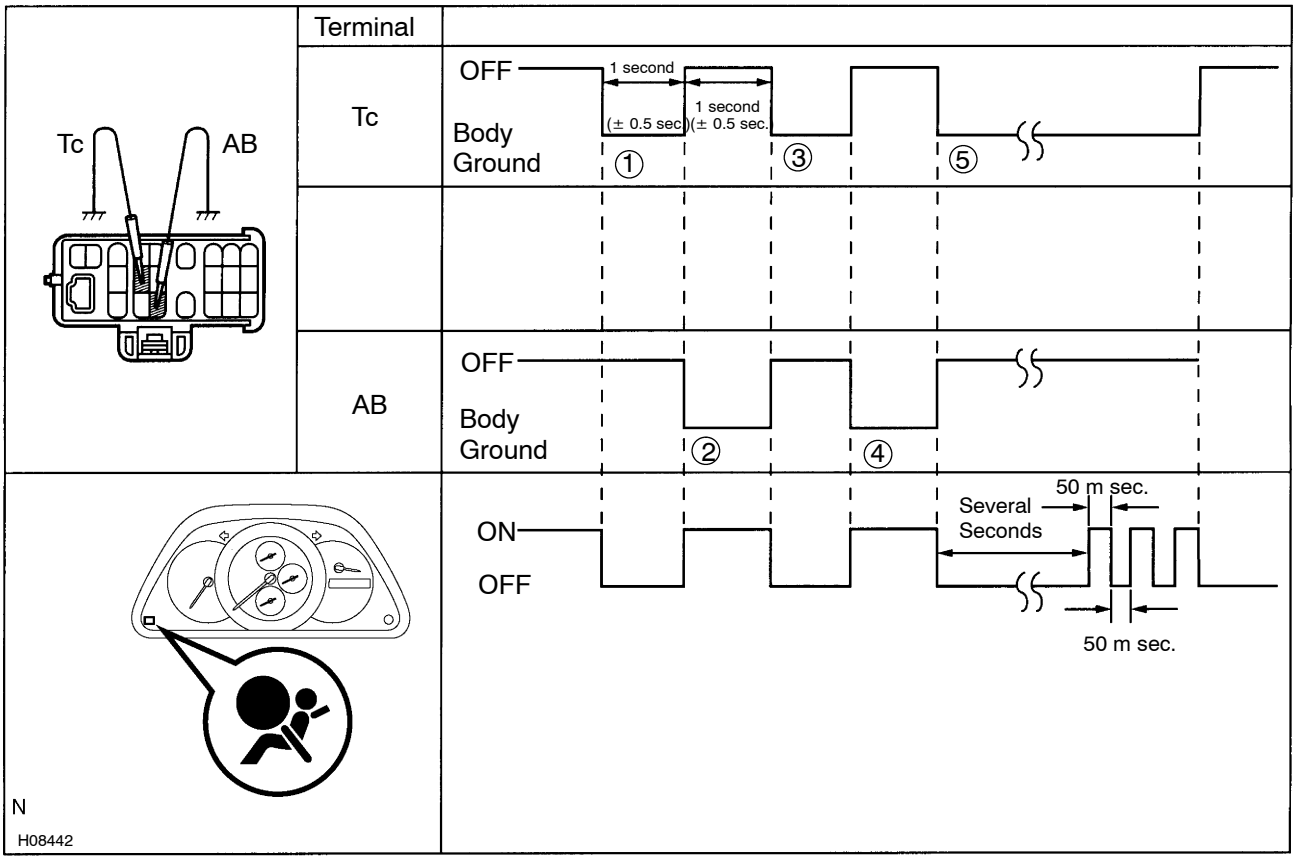
(a) Connect the 2 service wires to terminals Tc and AB of check connector.
(b) Turn the ignition switch to ACC or ON and wait for approx. 6 seconds.

(c) Starting with the Tc terminal, ground alternately terminal Tc and terminal AB twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remains grounded.

HINT:

When alternately grounding terminals Tc and AB, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

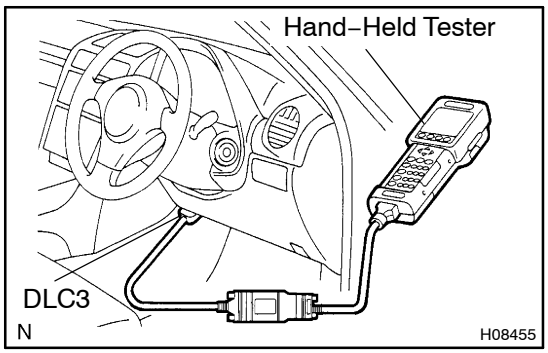
If DTCs are not cleared, repeat the above procedure until the codes are cleared.



H01461

H08501

(d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 m sec. cycle to indicate the codes which have been cleared.



6. DTC CLEARANCE (Using hand–held tester)

(a) Hook up the hand–held tester to the DLC3.

(b) Clear the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the hand–held tester operation's manual for further details.

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

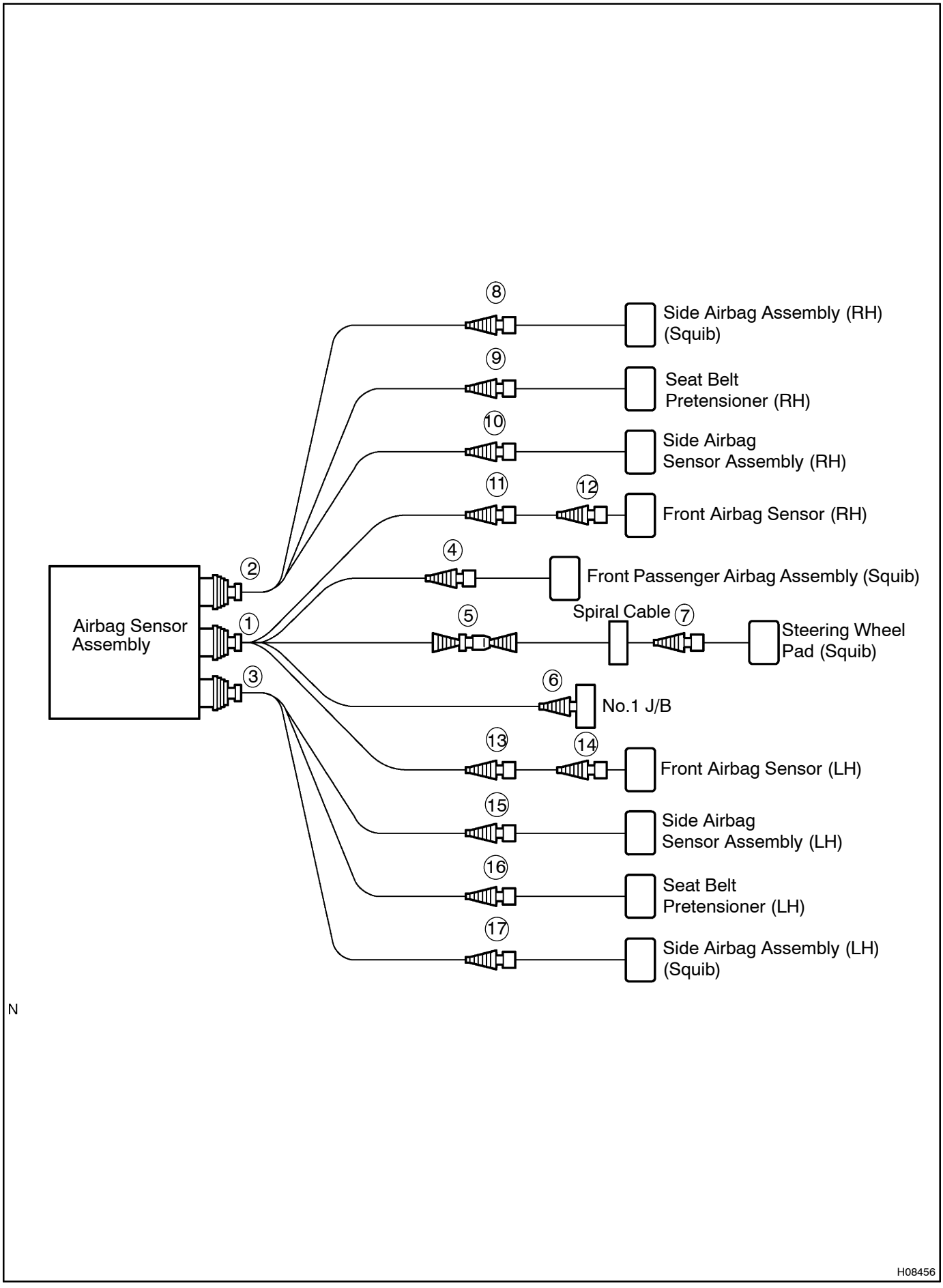
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure as shown in the illustration of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

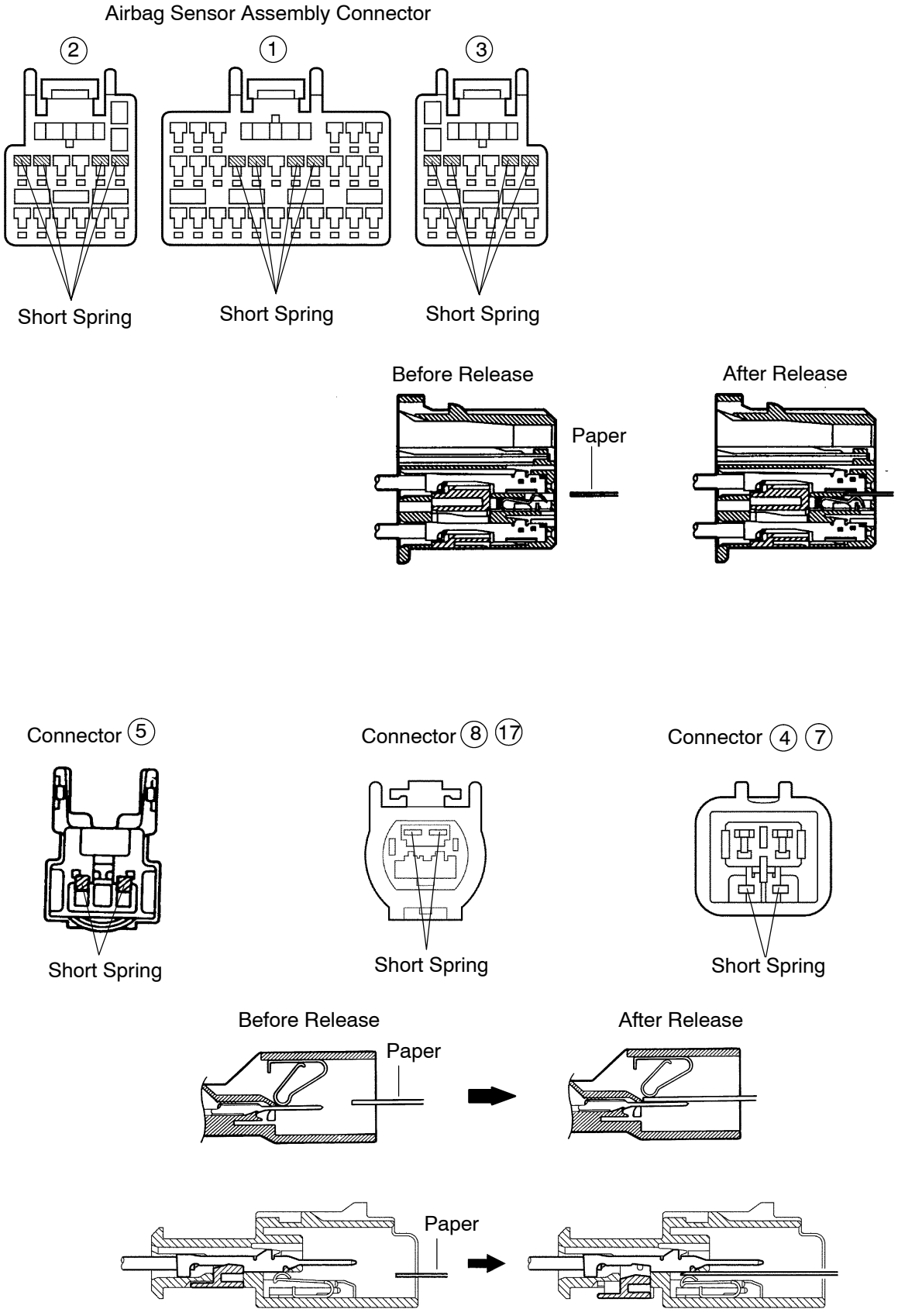
CAUTION:

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 inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.**


Airbag Sensor Assembly
1
2
3
8
Side Airbag Assembly (RH) (Squib)
9
Seat Belt Pretensioner (RH)
10
Side Airbag Sensor Assembly (RH)
11
12
Front Airbag Sensor (RH)
4
Front Passenger Airbag Assembly (Squib)
5
Spiral Cable 7
Steering Wheel Pad (Squib)
6
No.1 J/B
13
14
Front Airbag Sensor (LH)
15
Side Airbag Sensor Assembly (LH)
16
Seat Belt Pretensioner (LH)
17
Side Airbag Assembly (LH) (Squib)
N
H08456


Airbag Sensor Assembly Connector
2
1
3
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Connector 5
Connector 8 17
Connector 4 7
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Paper
H01356
H01233
AB0130
H00992
AB0045
AB0046
H02249
H02248
H01358

DI1AZ–08

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
B0100/13 (DI–300)	• Short in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI–305)	• Open in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI–309)	• Short in D squib circuit (to Ground)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI–313)	• Short in D squib circuit (to B+)	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI–317)	• Short in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI–321)	• Open in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0107/51 (DI–324)	• Short in P squib circuit (to Ground)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0108/52 (DI–327)	• Short in P squib circuit (to B+)	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0110/43 (DI–330)	• Short in side squib (RH) circuit	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0111/44 (DI–334)	• Open in side squib (RH) circuit	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0112/41 (DI–337)	• Short in side squib (RH) circuit (to Ground)	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0113/42 (DI–340)	• Short in side squib (RH) circuit (to B+)	• Side airbag assembly RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0115/47 (DI–343)	• Short in side squib (LH) circuit	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0116/48 (DI–347)	• Open in side squib (LH) circuit	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink

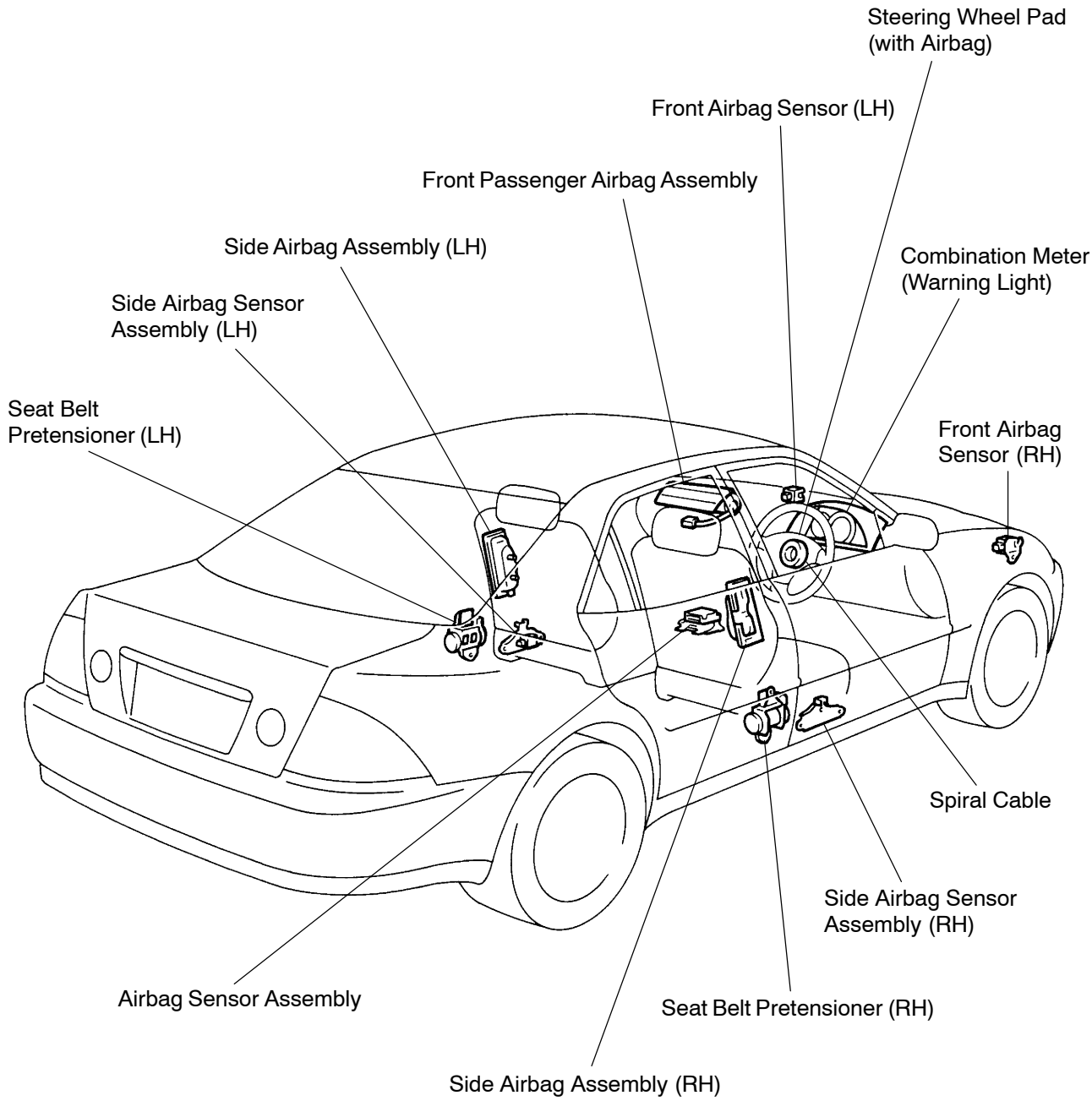
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0117/45 (DI–350)	• Short in side squib (LH) circuit (to Ground)	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0118/46 (DI–353)	• Short in side squib (LH) circuit (to B+)	• Side airbag assembly LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0130/63 (DI–356)	• Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0131/64 (DI–360)	• Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0132/61 (DI–363)	• Short in P/T squib (RH) circuit (to Ground)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0133/62 (DI–366)	• Short in P/T squib (RH) circuit (to B+)	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	Blink
B0135/73 (DI–369)	• Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0136/74 (DI–373)	• Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0137/71 (DI–376)	• Short in P/T squib (LH) circuit (to Ground)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B0138/72 (DI–379)	• Short in P/T squib (LH) circuit (to B+)	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	Blink
B1100/31 (DI–382)	• Airbag sensor assembly malfunction	• Airbag sensor assembly	ON
B1140/32 (DI–384)	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly (RH) • Airbag sensor assembly • Wire harness	Blink
B1141/33 (DI–392)	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly (LH) • Airbag sensor assembly • Wire harness	Blink
B1156/B1157/15 (DI–400)	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Airbag sensor assembly • Wire harness • Engine room main wire haness	ON
B1158/B1159/16 (DI–408)	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Wire harness • Engine room main wire harness	ON
Normal (DI–416)	• System normal	–	OFF
	• Voltage source drop	• Battery • Airbag sensor assembly	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.

DI1B0–09

PARTS LOCATION

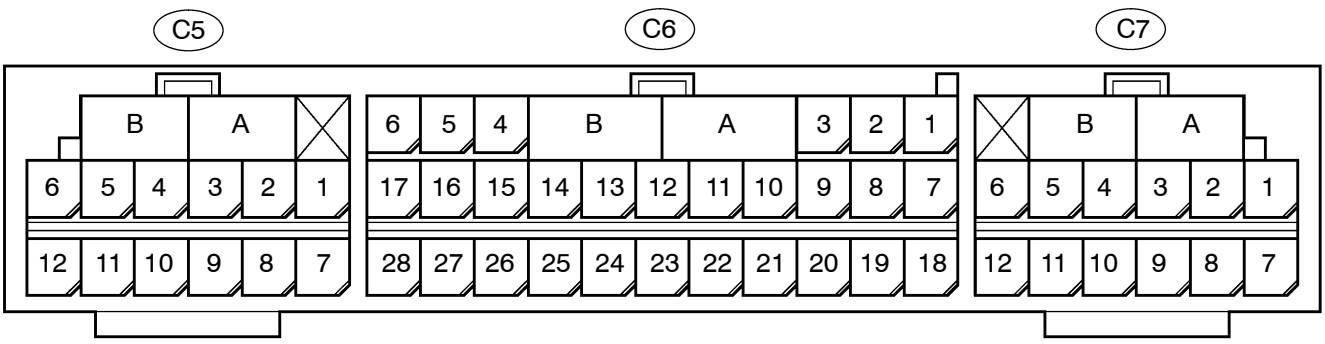


N

H08502

DI1B1–14

TERMINALS OF ECU



H01357

No.	Symbol	Terminal Name
A	–	Electrical Connector Check Mechanism
B	–	Electrical Connector Check Mechanism
C6 – 3	LA	SRS Warning Light
C6 – 5	IG2	Power Source (IGN Fuse)
C6 – 6	ACC	Power Source (CIG Fuse)
C6 – 9	SR+	Front Airbag Sensor (RH)
C6 – 10	P+	Squib (Passenger)
C6 – 11	P–	Squib (Passenger)
C6 – 12	SIL	Diagnosis
C6 – 13	D–	Squib (Driver)
C6 – 14	D+	Squib (Driver)
C6 – 15	SL+	Front Airbag Sensor (LH)
C6 – 19	Tc	Diagnosis
C6 – 20	SR–	Front Airbag Sensor (RH)
C6 – 26	SL–	Front Airbag Sensor (LH)
C6 – 27	E1	Ground
C6 – 28	E2	Ground
C5 – 1	PL–	Squib (Seat Belt Pretensioner, LH)
C5 – 2	PL+	Squib (Seat Belt Pretensioner, LH)
C5 – 5	SFL+	Squib (Side, LH)
C5 – 6	SFL–	Squib (Side, LH)
C5 – 7	VUPL	Side Airbag Sensor Assembly (LH)
C5 – 9	SSL	Side Airbag Sensor Assembly (LH)
C5 – 10	FSL	Side Airbag Sensor Assembly (LH)
C5 – 12	ESL	Side Airbag Sensor Assembly (LH)

No.	Symbol	Terminal Name
C7 – 1	SFR–	Squib (Side, RH)
C7 – 2	SFR+	Squib (Side, RH)
C7 – 5	PR+	Squib (Pretensioner, RH)
C7 – 6	PR–	Squib (Pretensioner, RH)
C7 – 7	ESR	Side Airbag Sensor Assembly (RH)
C7 – 9	FSR	Side Airbag Sensor Assembly (RH)
C7 – 10	SSR	Side Airbag Sensor Assembly (RH)
C7 – 12	VUPR	Side Airbag Sensor Assembly (RH)

DI164–24

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
• With the ignition switch in ACC or ON position, 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–419
• With the ignition switch in ACC or ON position, the SRS warning light does not light up.	• SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	DI–419
• DTC is not displayed. • SRS warning light is always lit up at the time of DTC check procedure. • DTC is displayed without Tc and E1 terminal connection.	• Tc terminal circuit	DI–424

DI18Q–14

CIRCUIT INSPECTION

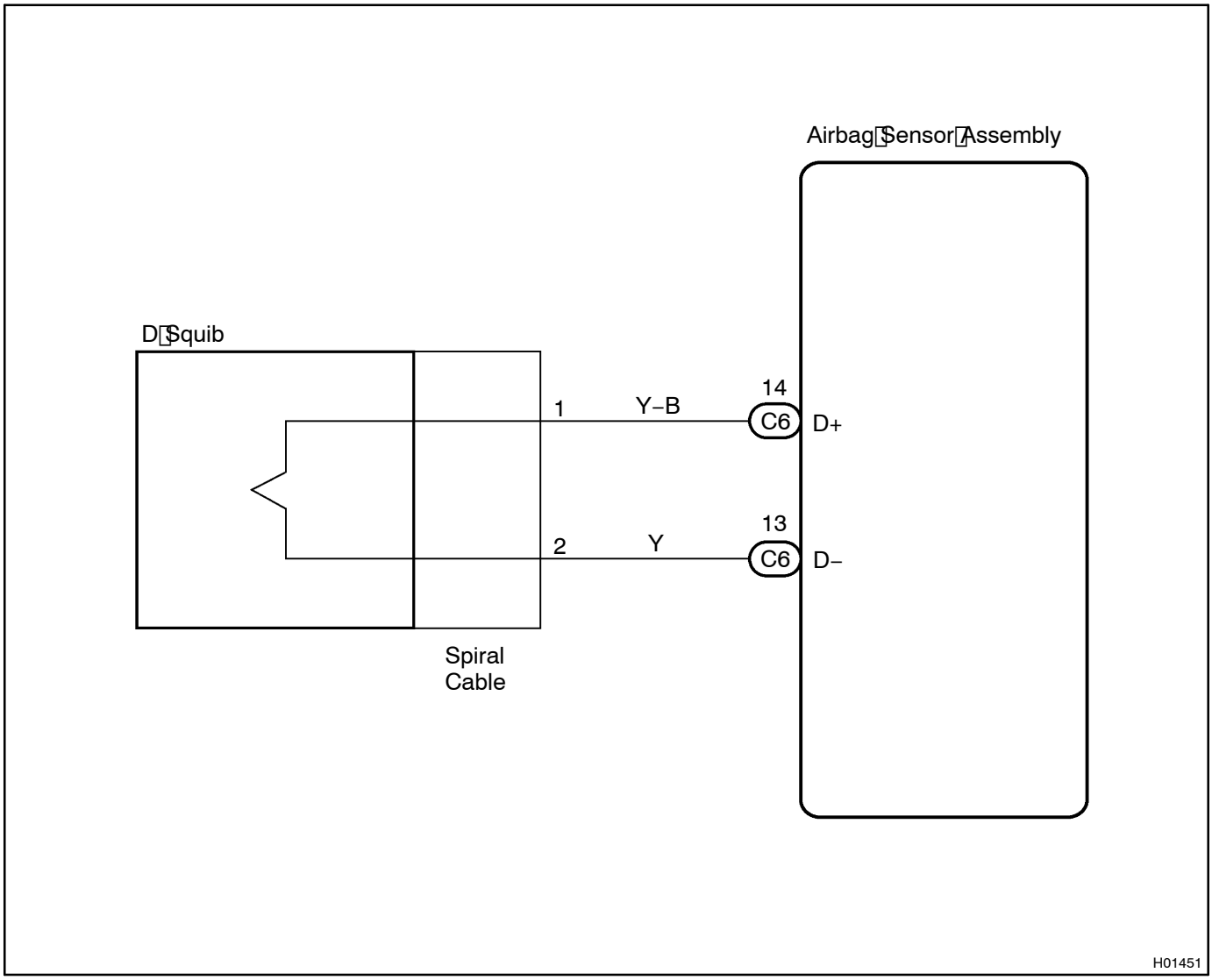
DTC	B0100/13	Short in D Squib Circuit

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 component, see OPERATION on page RS–2.
DTC B0100/13 is recorded when a short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	• 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

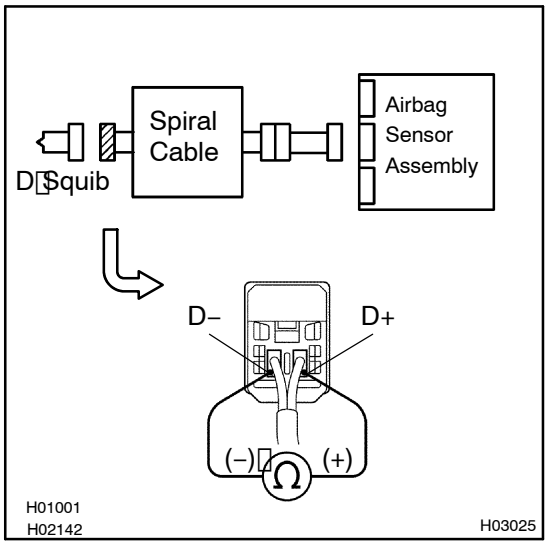
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D Squib circuit.



PREPARATION:
Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable.
(See page DI–287)

CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

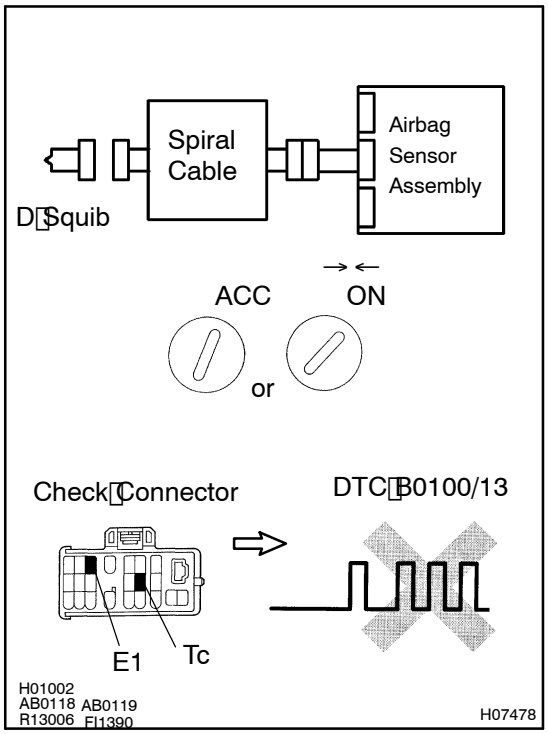
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0100/13 is not output.

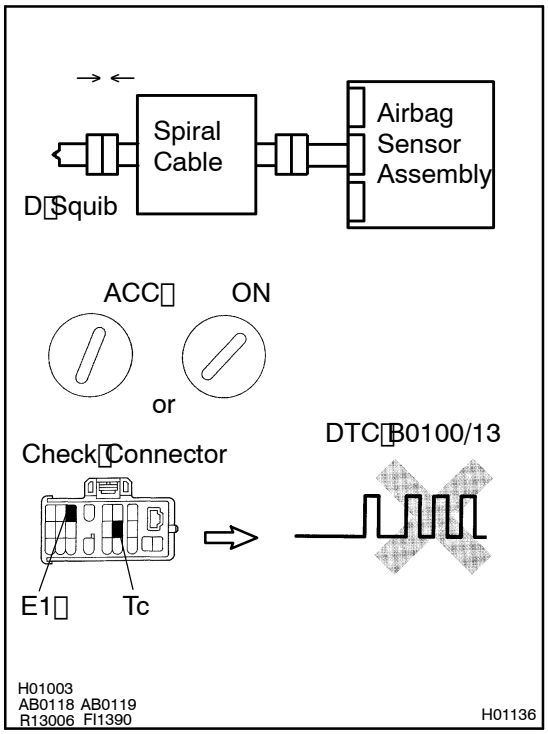
HINT:

Codes other than code B0100/13 may be output at this time, but they are not 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 for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0100/13 is not output.

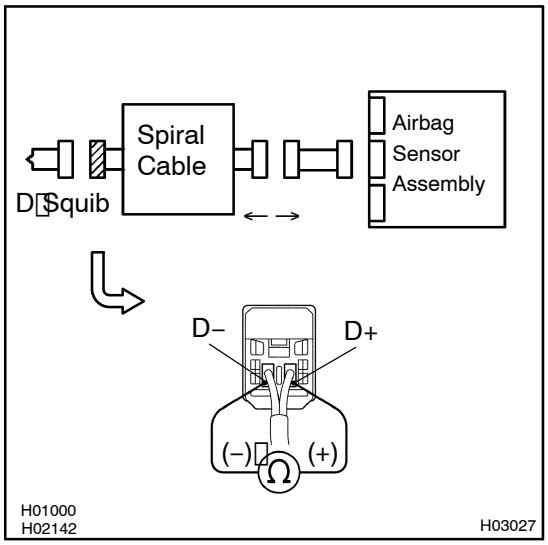
HINT:
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

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 the connector between the airbag sensor assembly and the spiral cable.

(b) Release the airbag activation prevention mechanism of the spiral cable connector on the airbag sensor assembly side. (See page DI–287)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

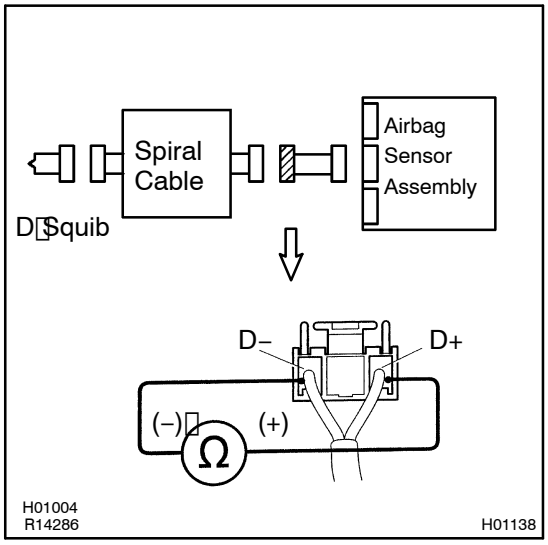
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable.
(See page DI–287)

CHECK:

For the connector (on the spiral cable side) between the airbag sensor assembly and the 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.

DI18R–22

DTC	B0101/14	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 component, see OPERATION on page RS–2.
DTC B0101/14 is recorded when an open is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	• 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

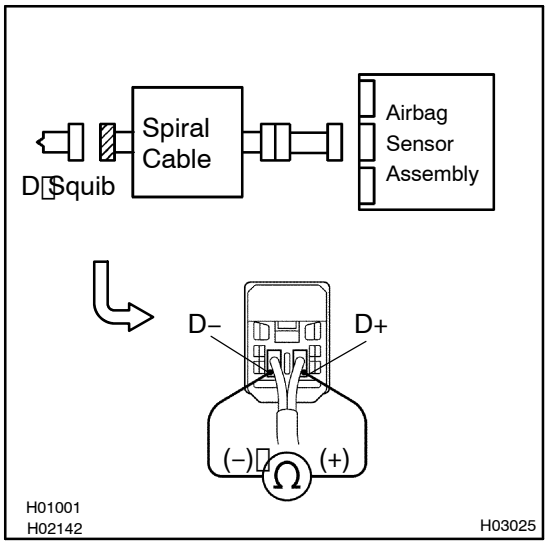
WIRING DIAGRAM

See page DI–300.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.

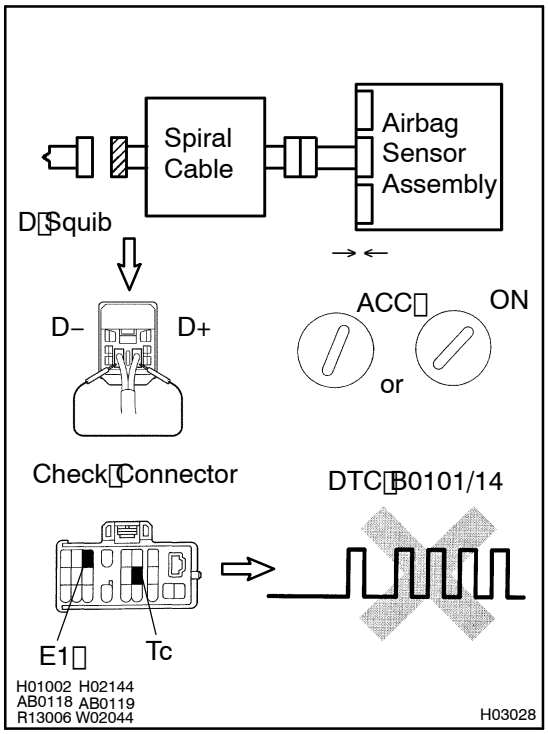


CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.
OK:
Resistance: Below 1 Ω

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0101/14 is not output.

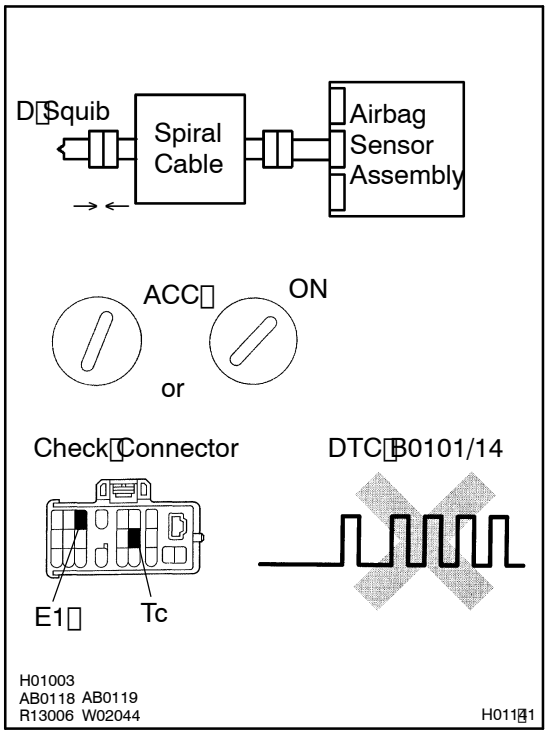
HINT:

Codes other than code B0101/14 may be output at this time, but they are not 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 for 90 seconds.

(c) Connect the steering wheel pad connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0101/14 is not output.

HINT:

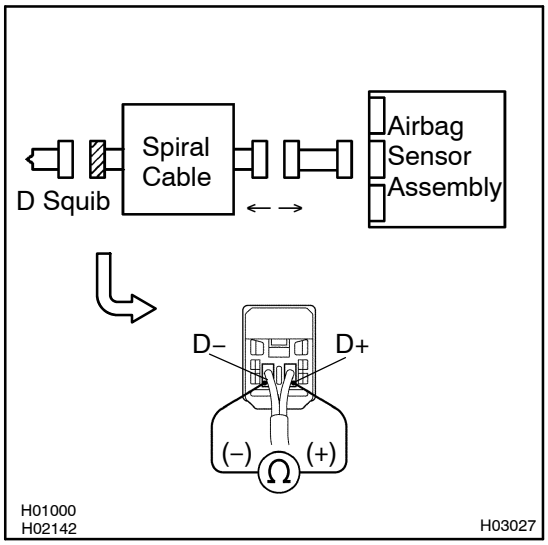
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

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 the connector between the airbag sensor assembly and the spiral cable.

CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D–.

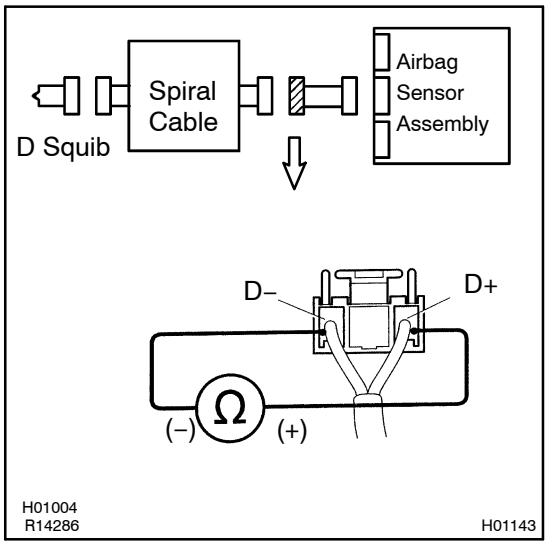
OK:

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 spiral cable side) between the airbag sensor assembly and the 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.

DI4L2-04

DTC	B0102/11	Short in D Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It 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 B0102/11 is recorded when a ground short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	• Short circuit in D squib wire harness (to ground) • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

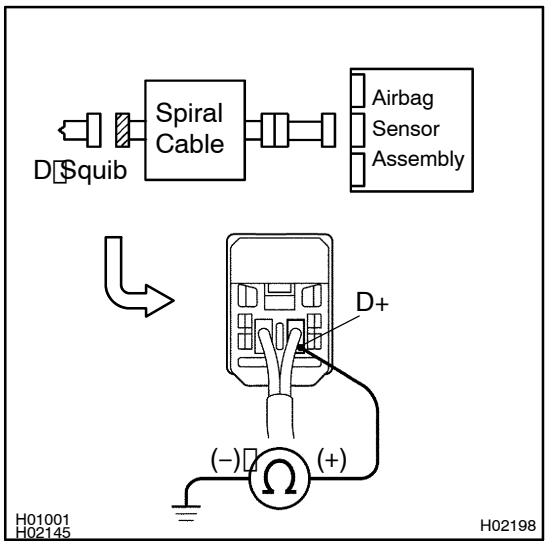
WIRING DIAGRAM

See page DI–300.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.

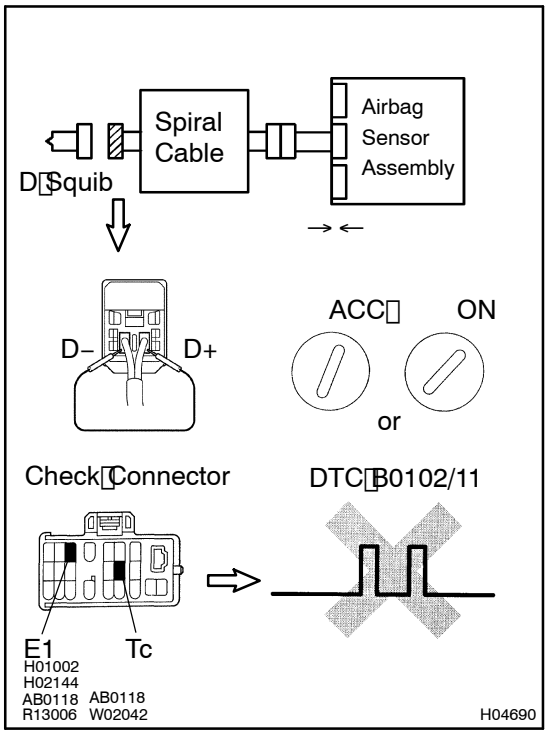


CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0102/11 is not output.

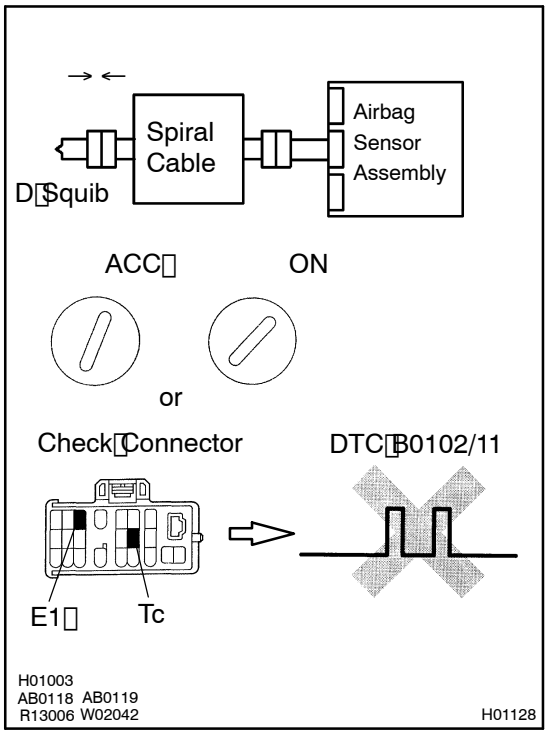
HINT:

Codes other than code B0102/11 may be output at this time, but they are not 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 for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0102/11 is not output.

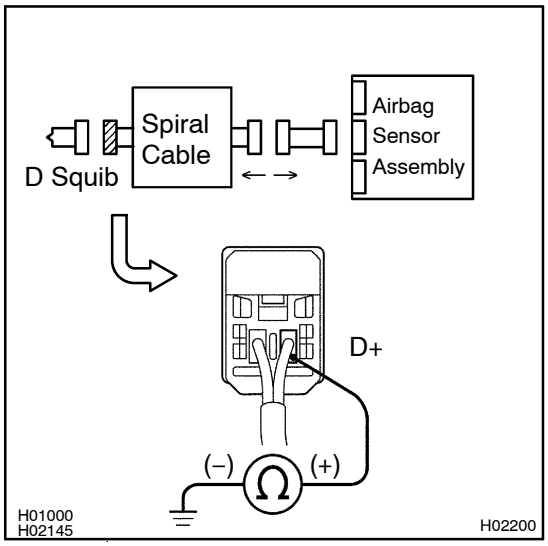
HINT:
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	Check spiral cable.



PREPARATION:
Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:
For the connector (on the spiral cable side) between the steering wheel pad and the spiral cable, measure the resistance between D+ and body ground.

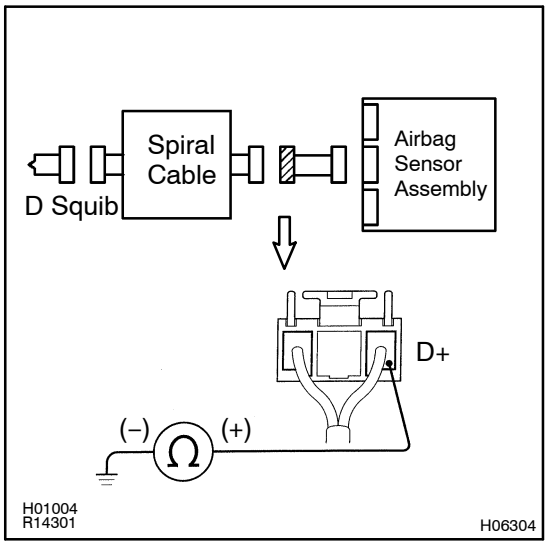
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:
For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the resistance between D+ and body ground.

OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI4L3–04

DTC	B0103/12	Short in D Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It 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 B0103/12 is recorded when a B+ short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	• Short circuit in D squib wire harness (to B+) • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

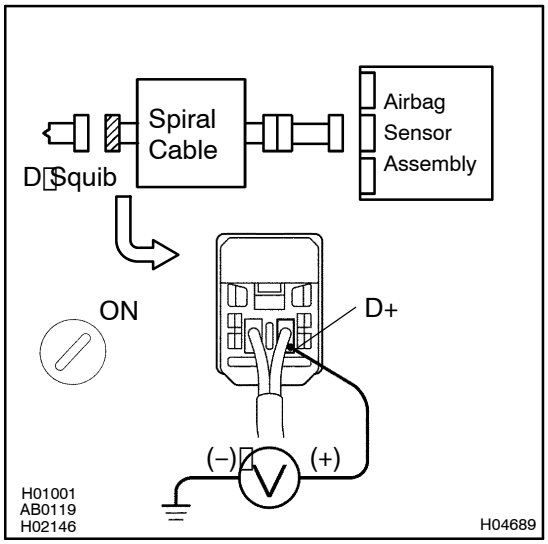
WIRING DIAGRAM

See page DI–300.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check D squib circuit.



CHECK:

(a) Turn ignition switch to ON.
(b) For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

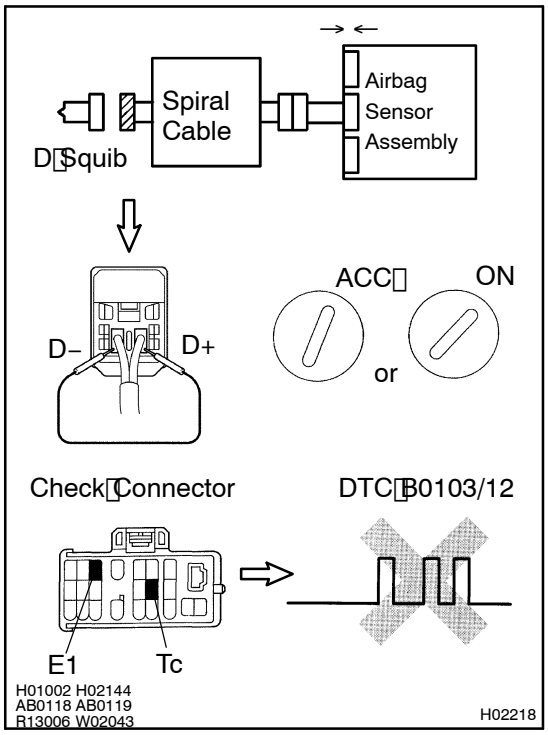
OK:

Voltage: 0 V

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D– of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0103/12 is not output.

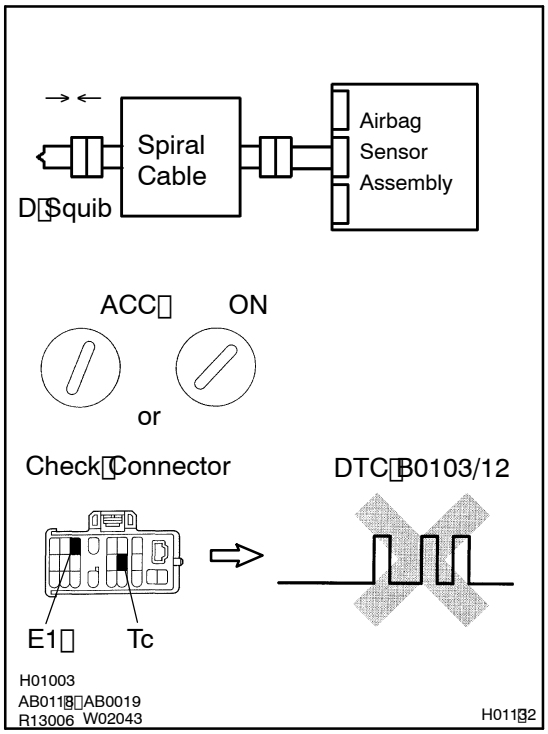
HINT:

Codes other than code B0103/12 may be output at this time, but they are not 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 for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0103/12 is not output.

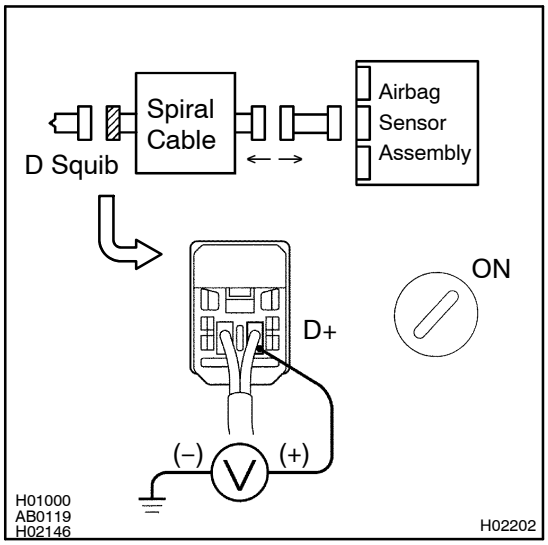
HINT:
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

5	Check spiral cable.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect the connector between the airbag sensor assembly and the spiral cable.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the voltage between D+ and body ground.

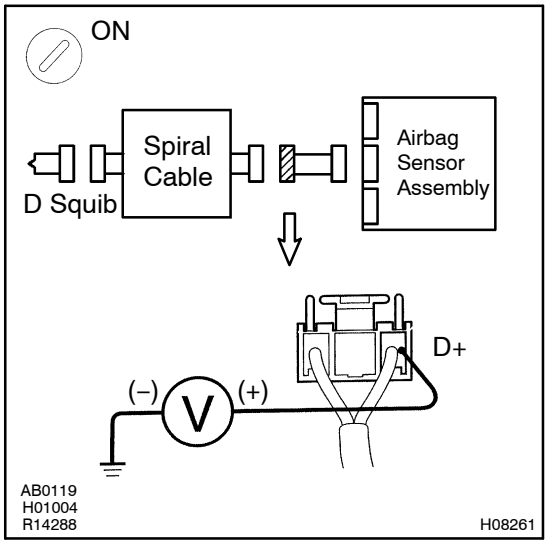
OK:

Voltage: 0 V

NG → **Repair or replace spiral cable.**

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the voltage between D+ and body ground.

OK:

Voltage: 0 V

NG → **Repair or replace harness 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. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1B6-19

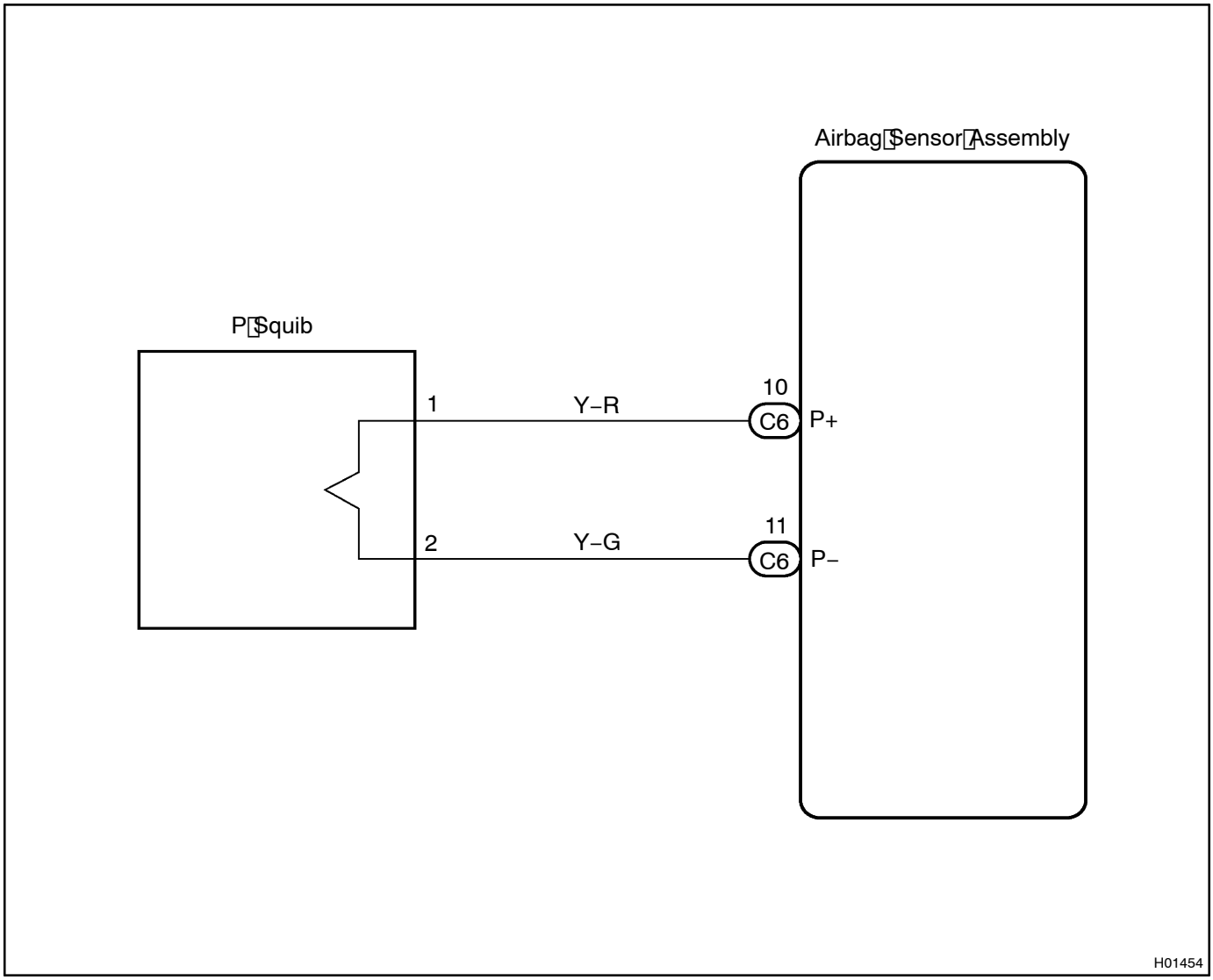
DTC	B0105/53	Short in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the 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 B0105/53 is recorded when a short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	• Short circuit in P squib wire harness • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

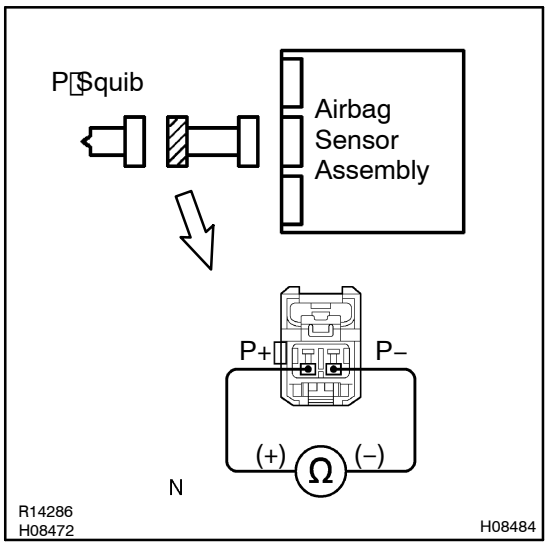
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the front passenger airbag assembly and the airbag sensor assembly. (See page DI–287)

CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

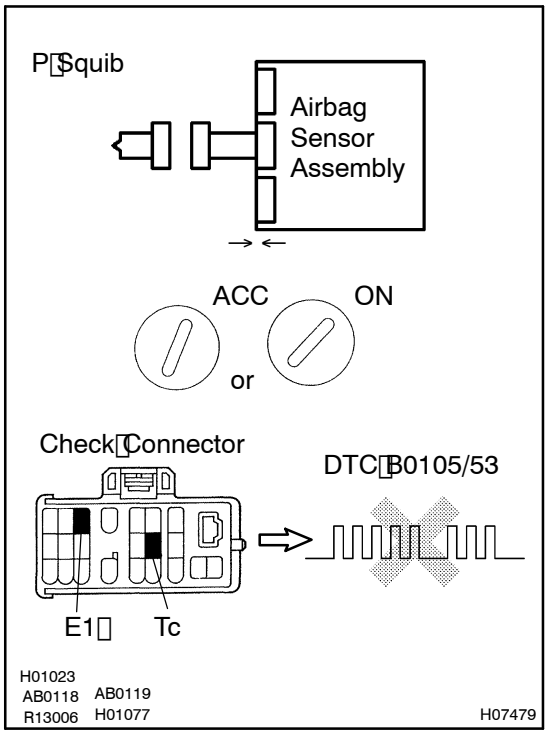
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0105/53 is not output.

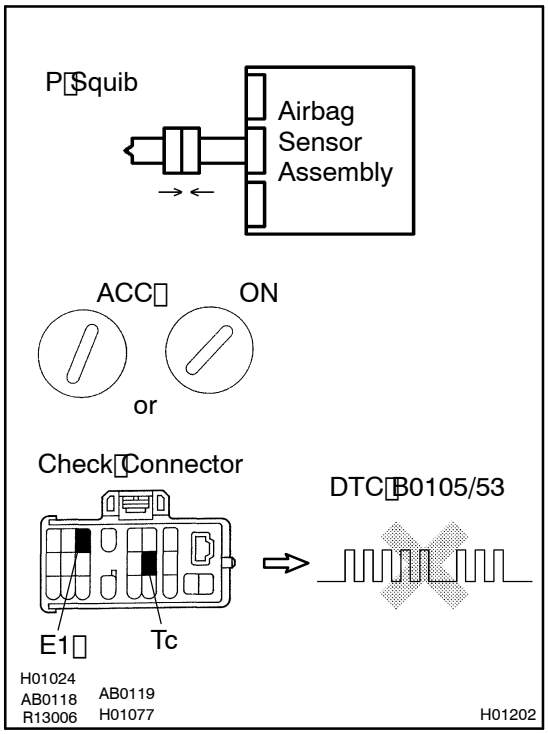
HINT:

Codes other than code B0105/53 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 for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0105/53 is not output.

HINT:
Codes other than code B0105/53 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.

DI1B7–24

DTC	B0106/54	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 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 B0106/54 is recorded when an open is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	• 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

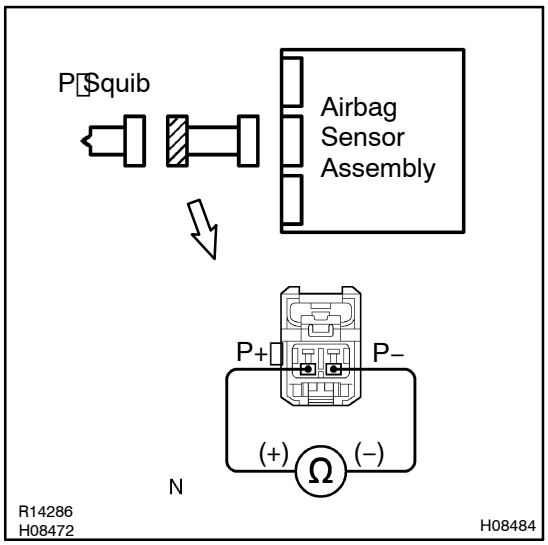
WIRING DIAGRAM

See page DI–317.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P–.

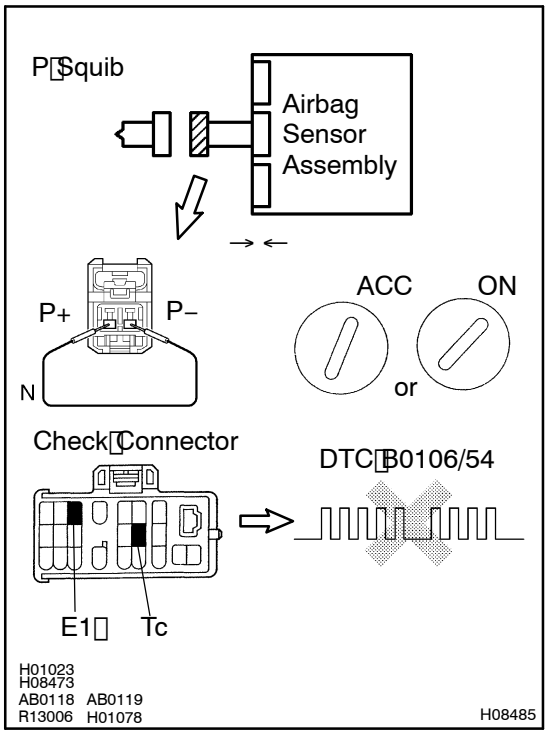
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0106/54 is not output.

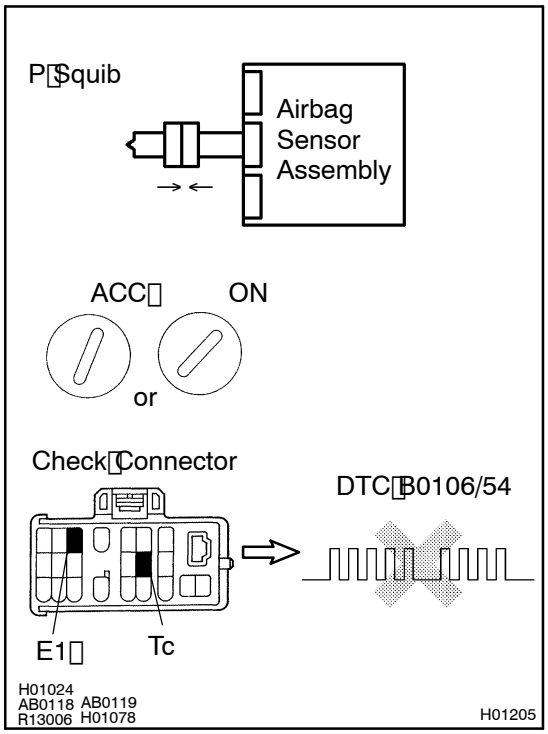
HINT:

Codes other than code B0106/54 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 for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0106/54 is not output.

HINT:

Codes other than code B0106/54 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.

DI1B8–16

DTC	B0107/51	Short in P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly 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 component, see OPERATION on page RS–2.
DTC B0107/51 is recorded when a ground short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	• Short circuit in P squib wire harness (to ground) • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

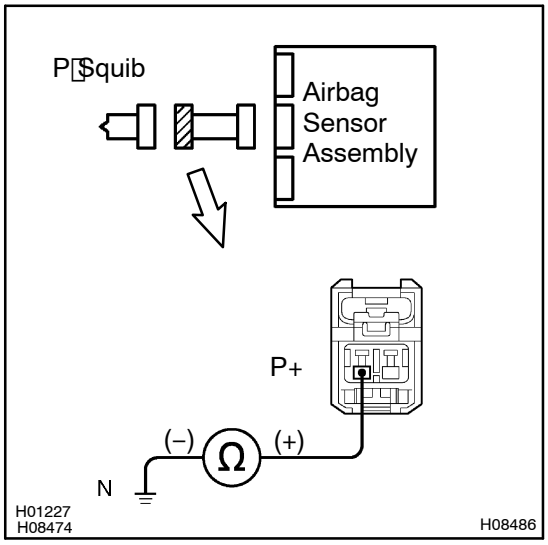
WIRING DIAGRAM

See page DI–317.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.

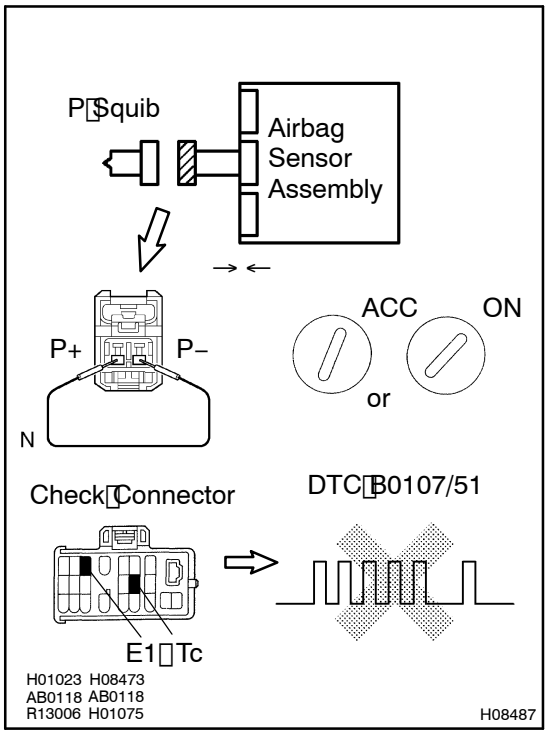


CHECK:
For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0107/51 is not output.

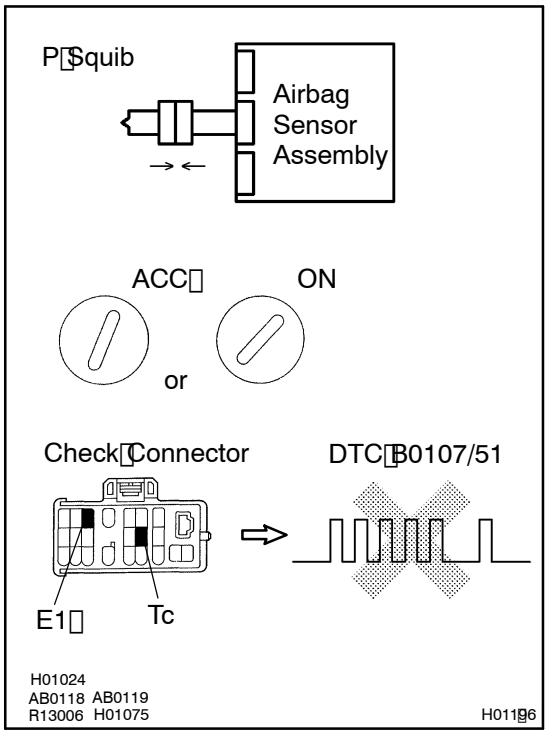
HINT:

Codes other than code B0107/51 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 for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0107/51 is not output.

HINT:
Codes other than code B0107/51 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.

DI1B9-22

DTC	B0108/52	Short in P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly 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 component, see OPERATION on page RS–2.
DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	• Short circuit in P squib wire harness (to B+) • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

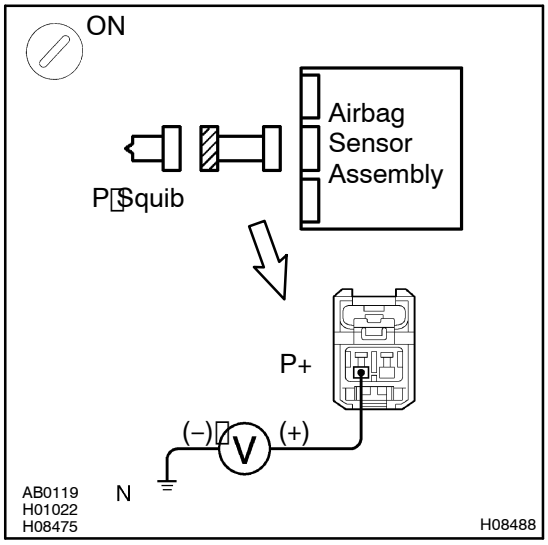
WIRING DIAGRAM

See page DI–317.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P squib circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the voltage between the P+ and body ground.

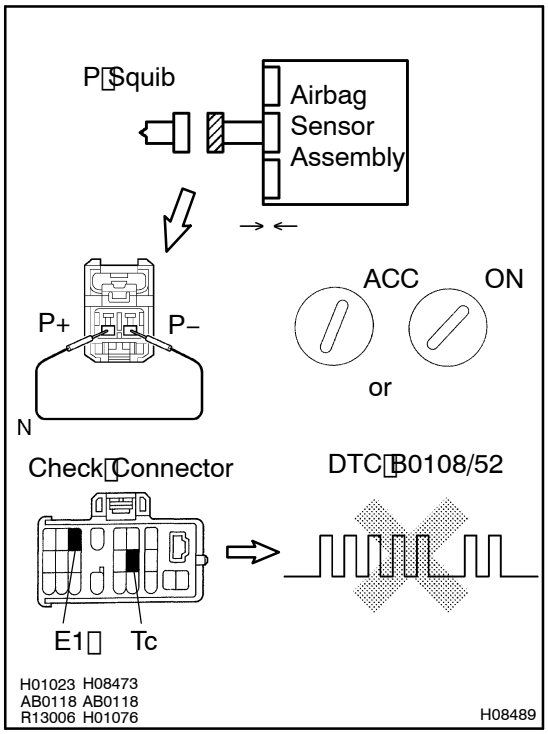
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P– of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0108/52 is not output.

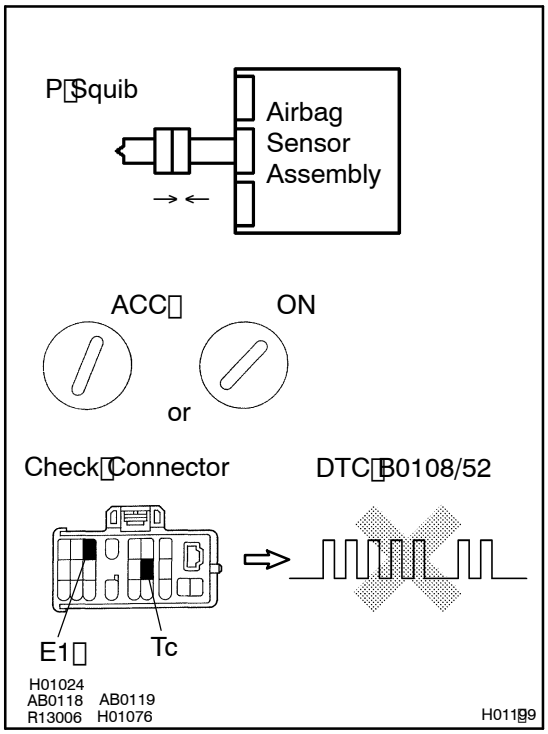
HINT:

Codes other than code B0108/52 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 for 90 seconds.

(c) Connect the front passenger airbag assembly connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0108/52 is not output.

HINT:

Codes other than code B0108/52 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.

DI1NC–09

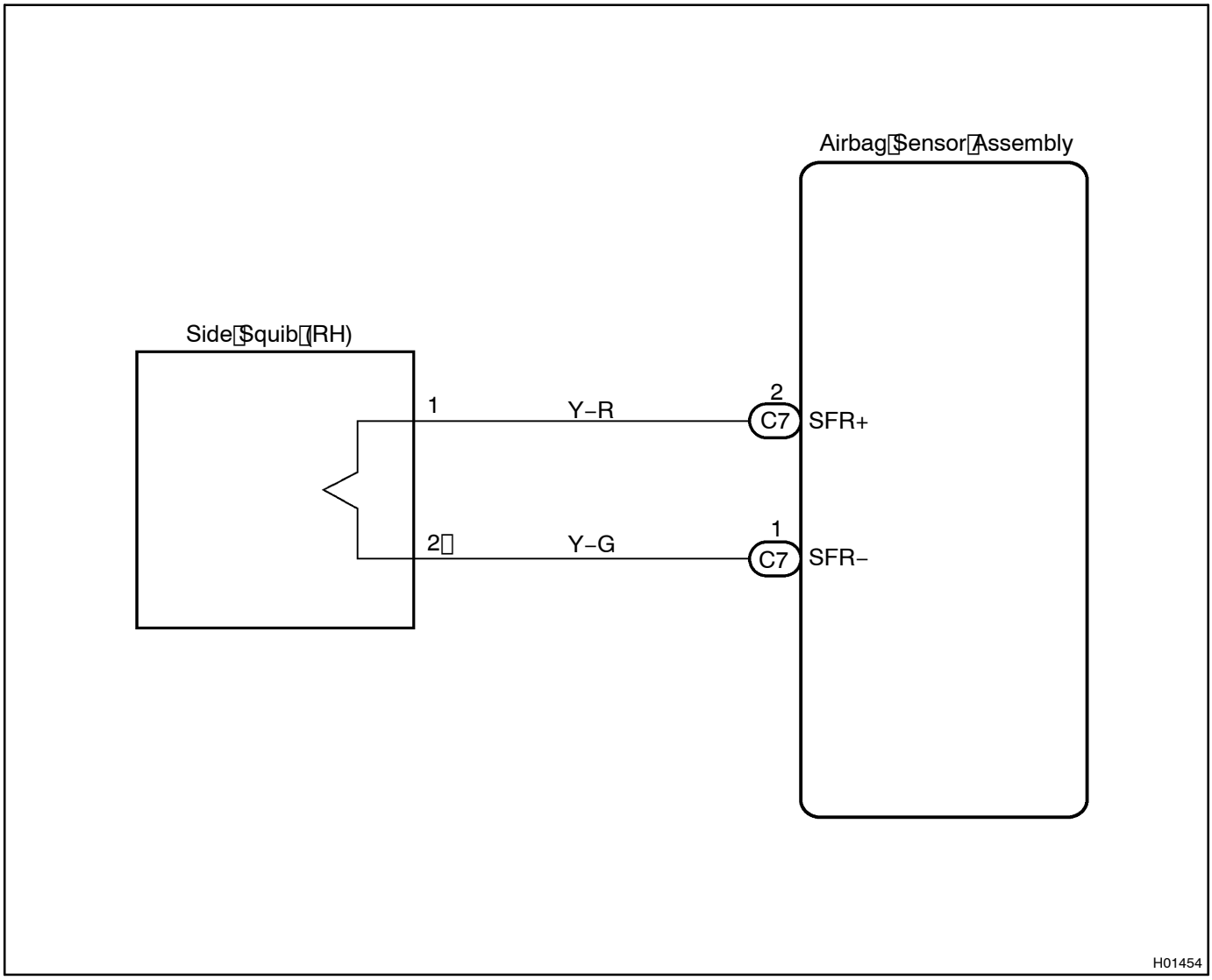
DTC	B0110/43	Short in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It 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 B0110/43 is recorded when a short is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0110/43	• Short circuit between SFR+ wire harness and SFR– wire harness of squib • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

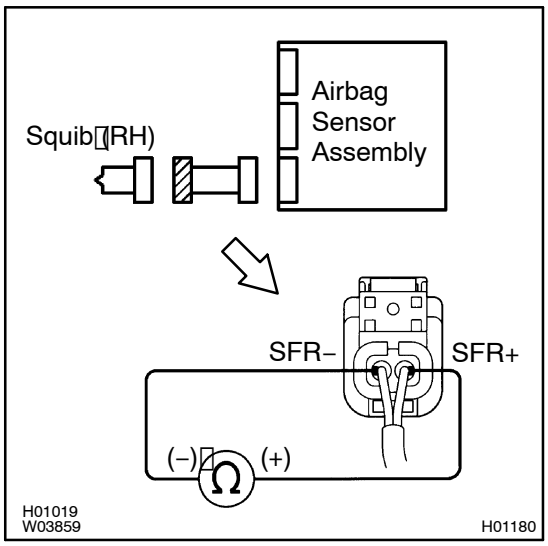
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the side airbag assembly (RH). (See page DI–287)

CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR–.

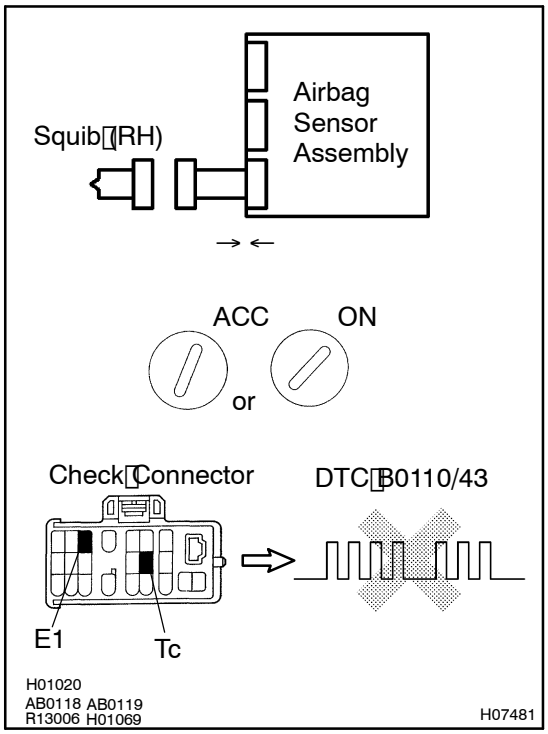
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0110/43 is not output.

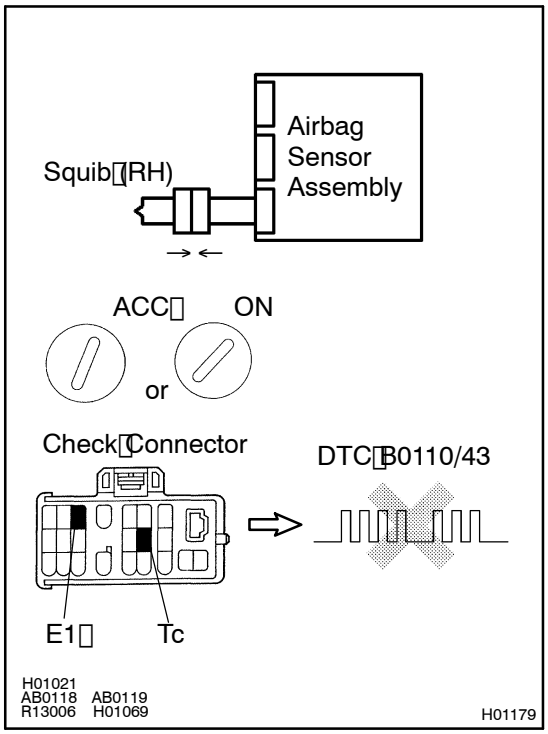
HINT:

Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.

(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(c) Clear DTC stored in memory. (See page DI–287)

(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(f) Check DTC. (See page DI–287)

OK:

DTC B0110/43 is not output.

HINT:

Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

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.

DI1ND–09

DTC	B0111/44	Open in Side Squib (RH) Circuit

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It 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 B0111/44 is recorded when an open is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	• Open circuit in SFR+ wire harness or SFR– wire harness of squib • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

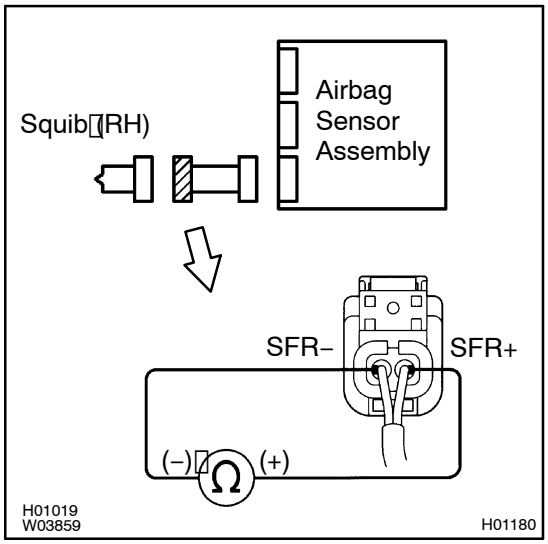
WIRING DIAGRAM

See page DI–330.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and SFR–.

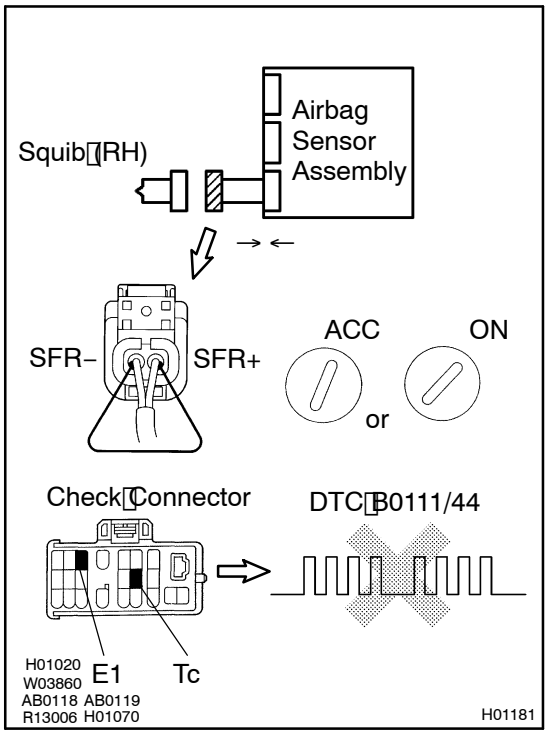
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0111/44 is not output.

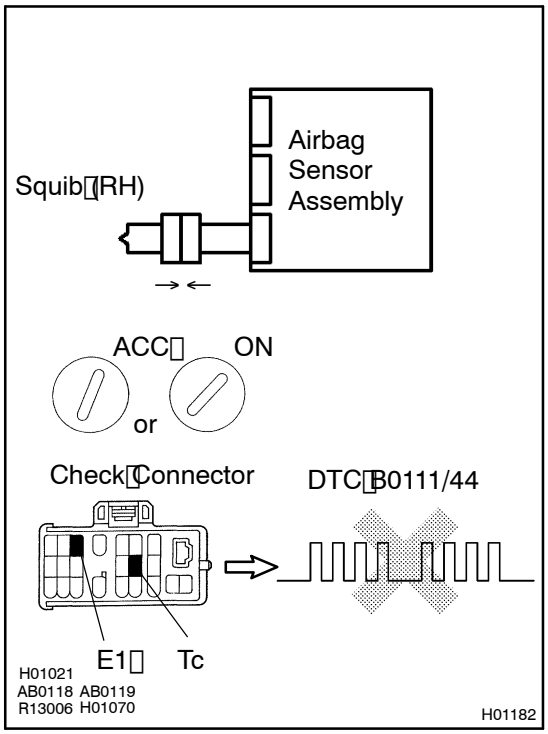
HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0111/44 is not output.

HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

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.

DTC	B0112/41	Short in Side Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It 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 B0112/41 is recorded when a ground short is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	• Short circuit in side squib (RH) wire harness (to ground) • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

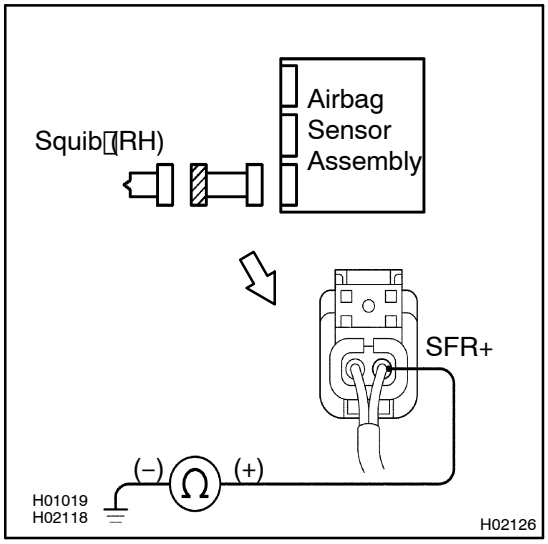
WIRING DIAGRAM

See page DI–330.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.

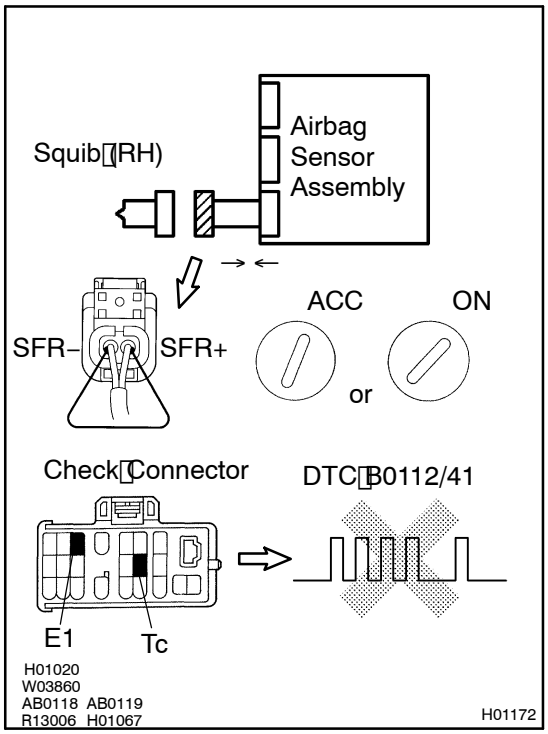


CHECK:
For the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the resistance between SFR+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0112/41 is not output.

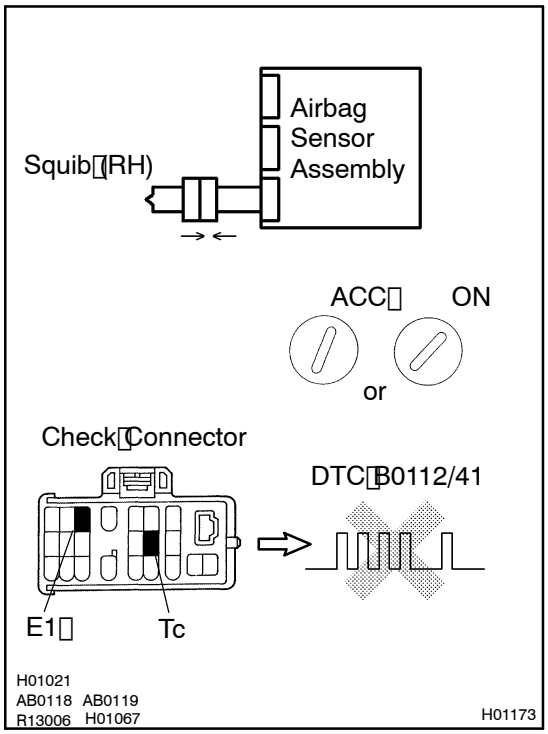
HINT:

Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0112/41 is not output.

HINT:

Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

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.

DI1NF–09

DTC	B0113/42	Short in Side Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib (RH) circuit consists of the airbag sensor assembly and side airbag assembly (RH).
It 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 B0113/42 is recorded when a B+ short is detected in the side squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	• Short circuit in side squib (RH) wire harness (to B+) • Side squib (RH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (RH) • Airbag sensor assembly • Wire harness

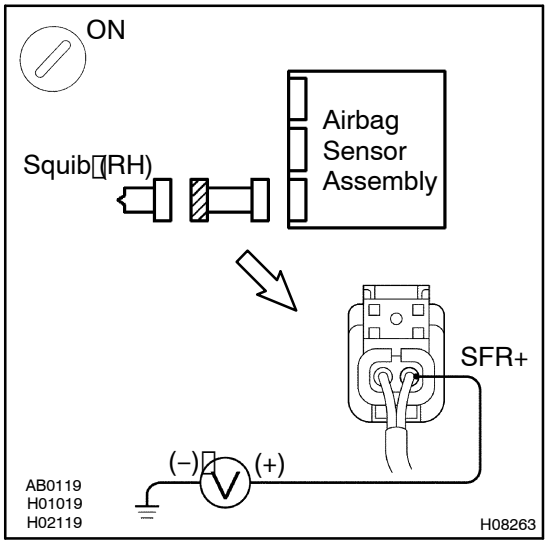
WIRING DIAGRAM

See page DI–330.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (RH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the side airbag assembly (RH) and the airbag sensor assembly, measure the voltage between SFR+ and body ground.

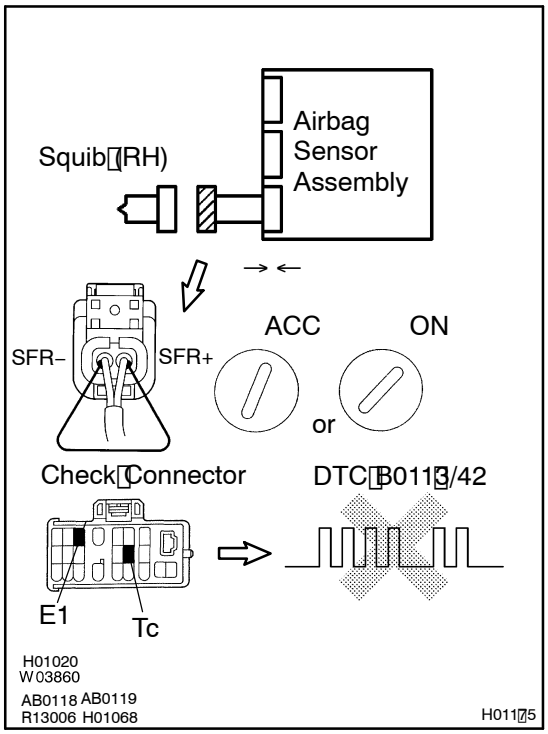
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between side airbag assembly (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFR+ and SFR– of the connector (on the side airbag assembly side) between the side airbag assembly (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0113/42 is not output.

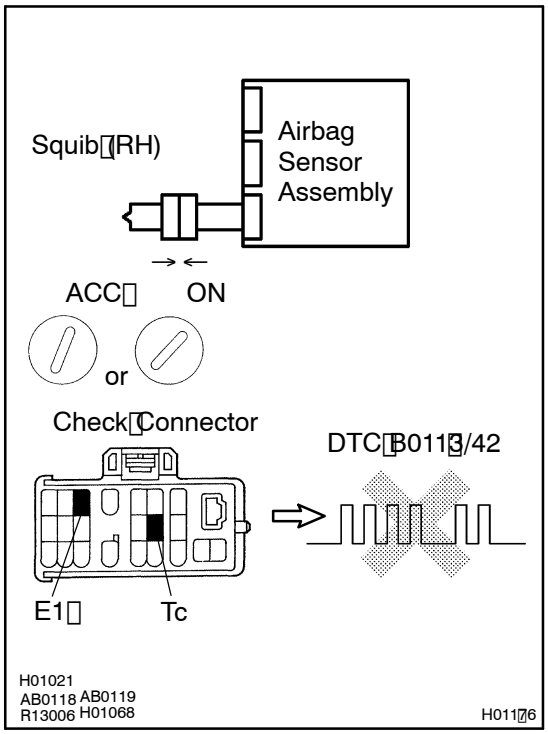
HINT:

Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0113/42 is not output.

HINT:

Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (RH).

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.

DI1NG–09

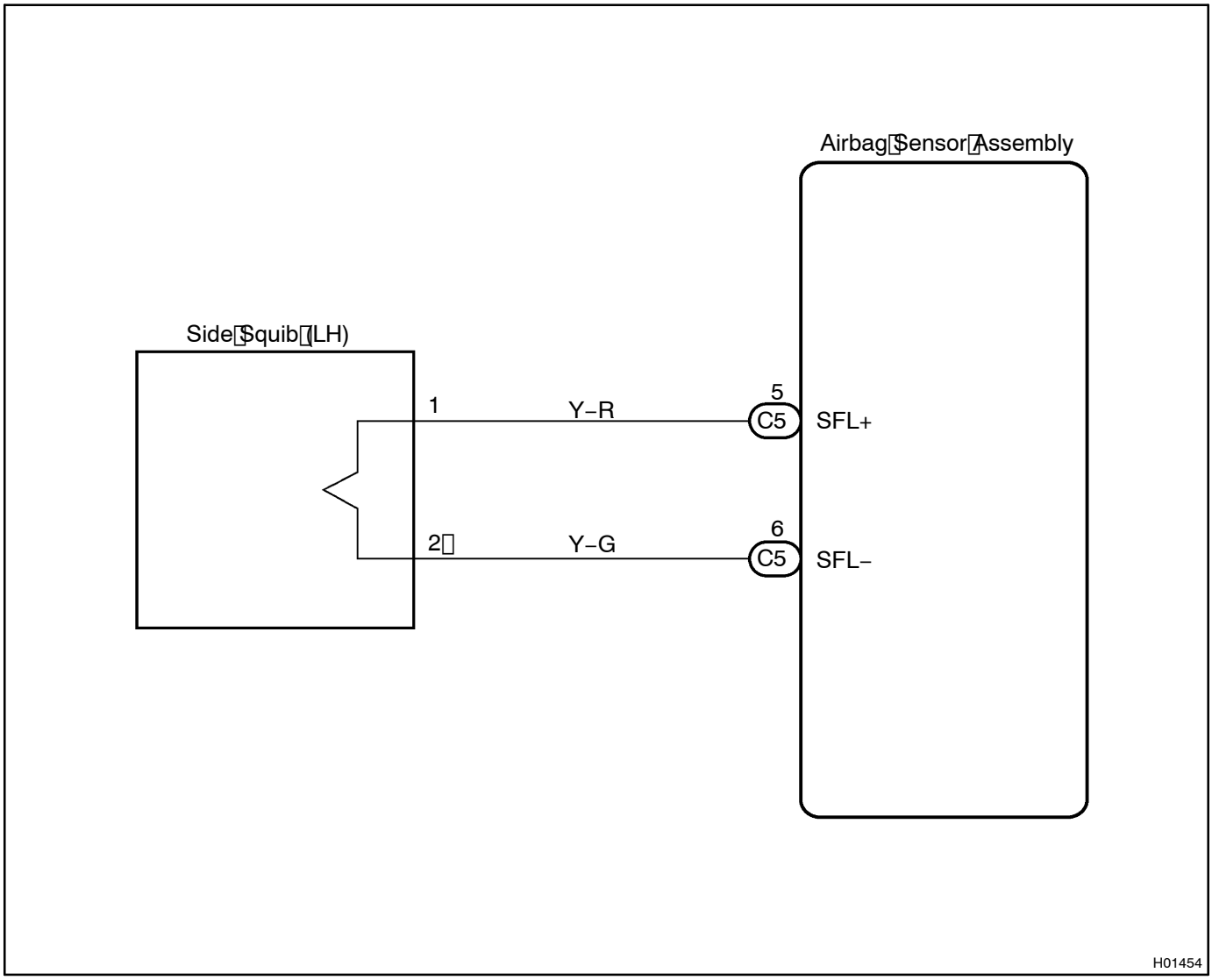
DTC	B0115/47	Short in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It 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 B0115/47 is recorded when a short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0115/47	• Short circuit between SFL+ wire harness and SFL– wire harness of squib • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

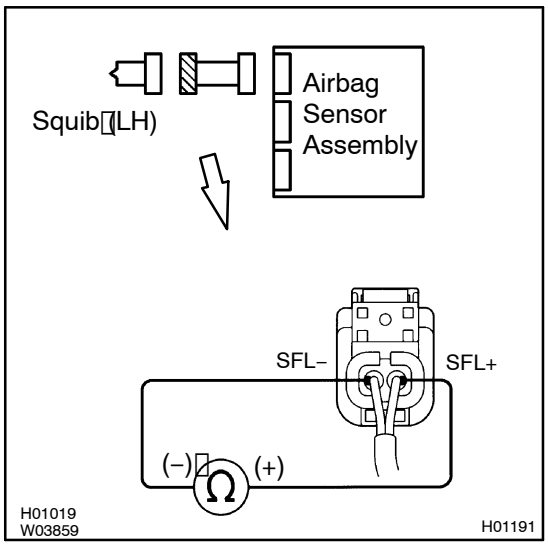
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the side airbag assembly (LH). (See page DI–287)

CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL–.

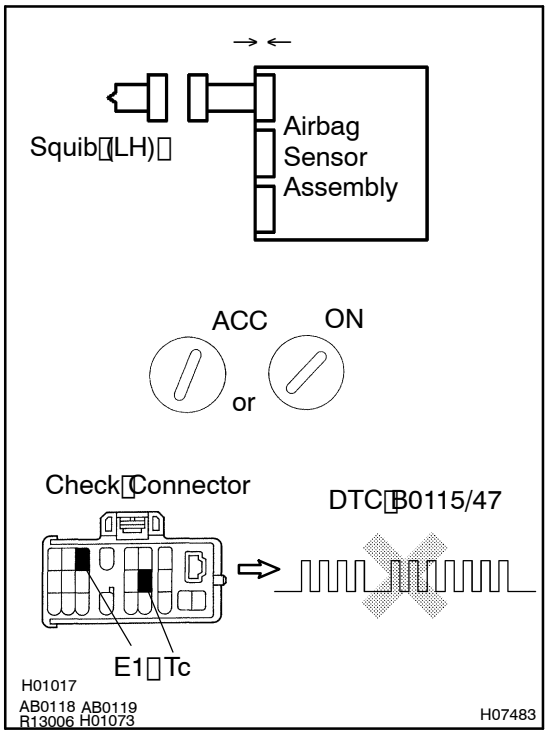
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0115/47 is not output.

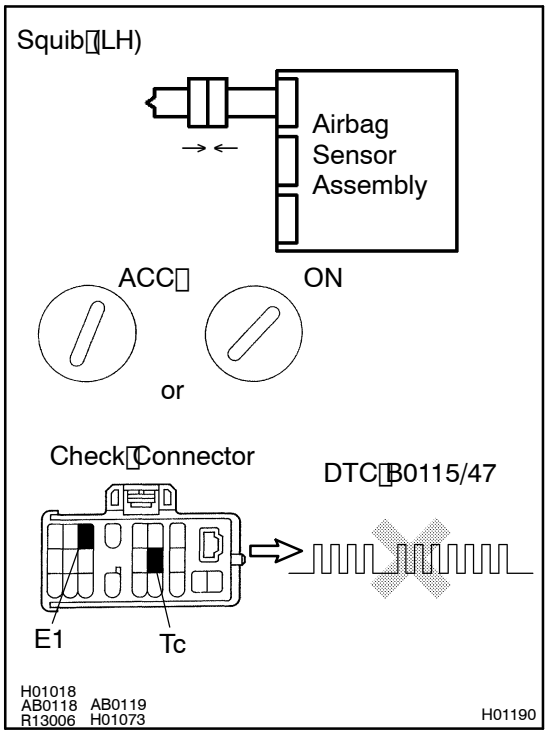
HINT:

Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0115/47 is not output.

HINT:
Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

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.

DI1NH–09

DTC	B0116/48	Open in Side Squib (LH) Circuit

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It 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 B0116/48 is recorded when an open is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	• Open circuit in SFL+ wire harness or SFL– wire harness of squib • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

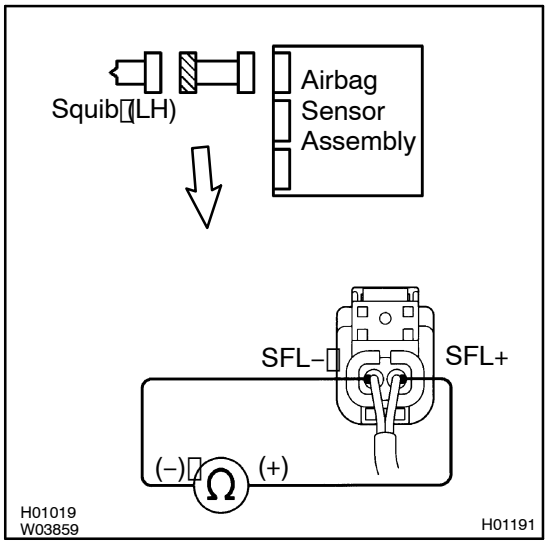
WIRING DIAGRAM

See page DI–343.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.



CHECK:

For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and SFL–.

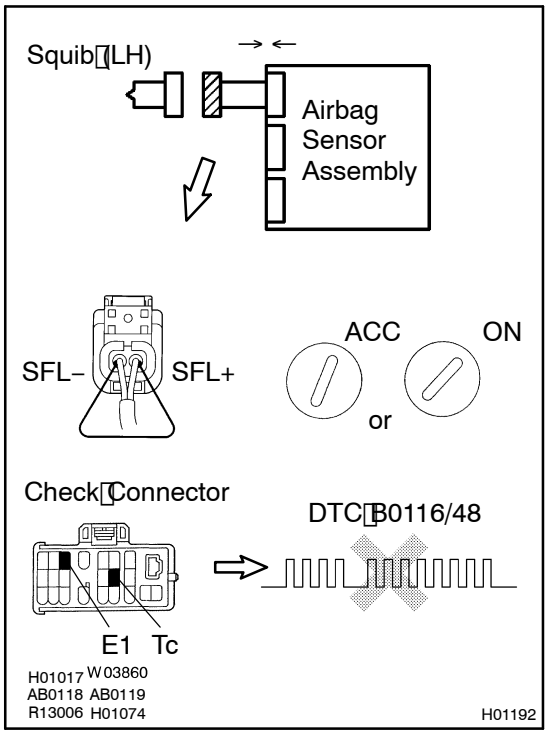
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFL+ and SFL– of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.

(c) 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 for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0116/48 is not output.

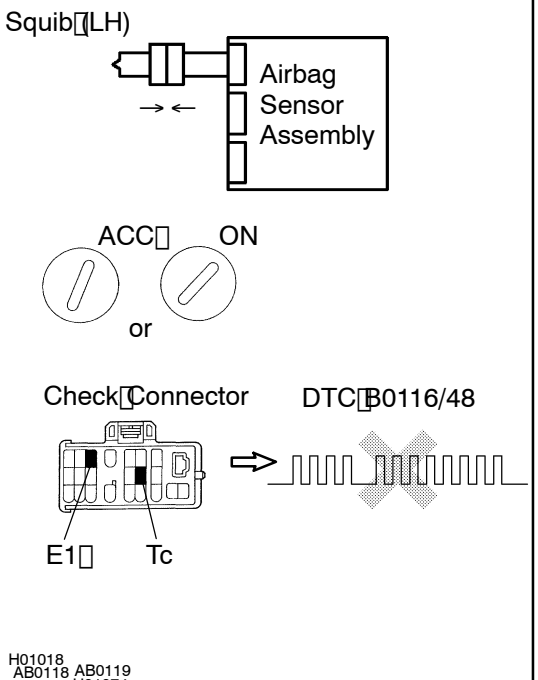
HINT:

Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0116/48 is not output.

HINT:

Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

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.

DI1NI–09

DTC	B0117/45	Short in Side Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It 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 B0117/45 is recorded when a ground short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	• Short circuit in side squib (LH) wire harness (to ground) • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

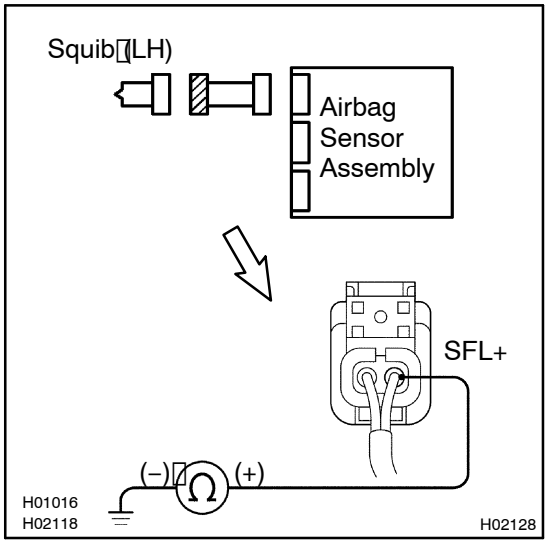
WIRING DIAGRAM

See page DI–343.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.

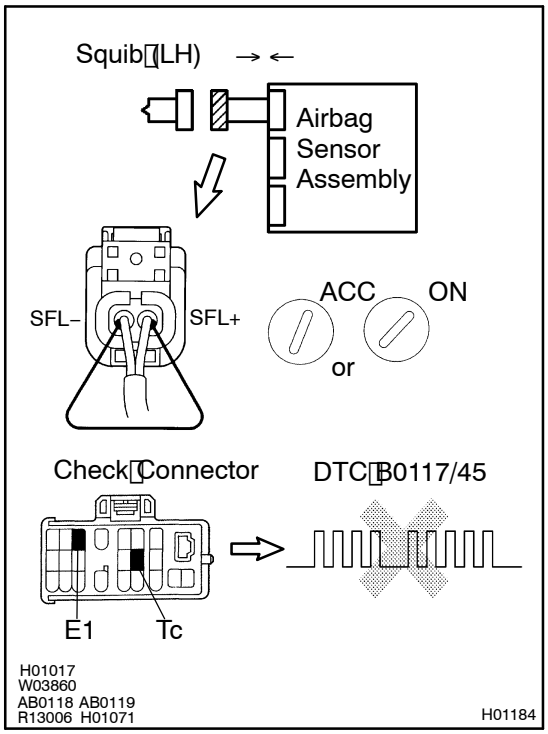


CHECK:
For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the resistance between SFL+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFL+ and SFL– of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0117/45 is not output.

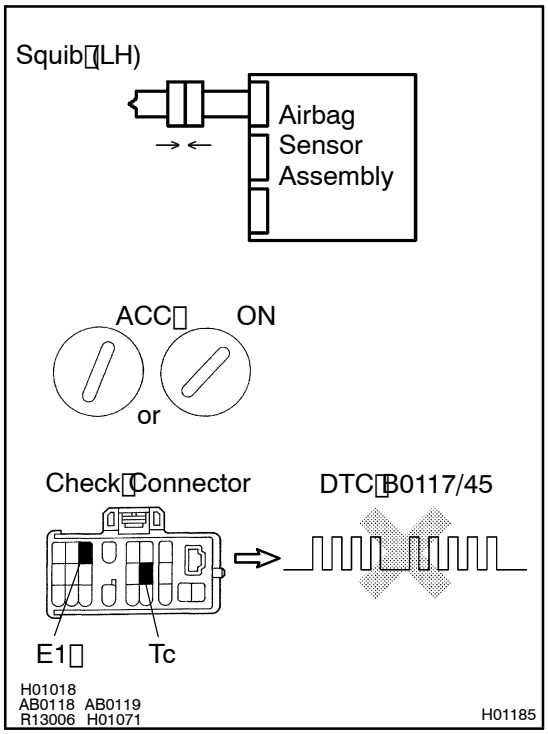
HINT:

Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the side airbag assembly (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0117/45 is not output.

HINT:
Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

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.

DI1NJ–09

DTC	B0118/46	Short in Side Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The side squib (LH) circuit consists of the airbag sensor assembly and side airbag assembly (LH).
It 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 B0118/46 is recorded when a B+ short is detected in the side squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	• Short circuit in side squib (LH) wire harness (to B+) • Side squib (LH) malfunction • Airbag sensor assembly malfunction	• Side airbag assembly (LH) • Airbag sensor assembly • Wire harness

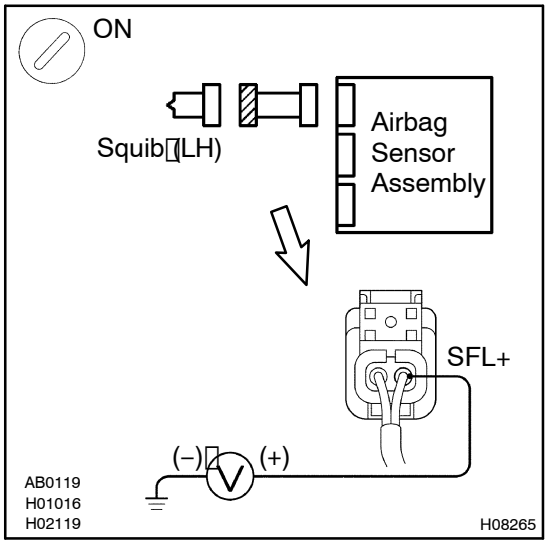
WIRING DIAGRAM

See page DI–343.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check side squib (LH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly, measure the voltage between SFL+ and body ground.

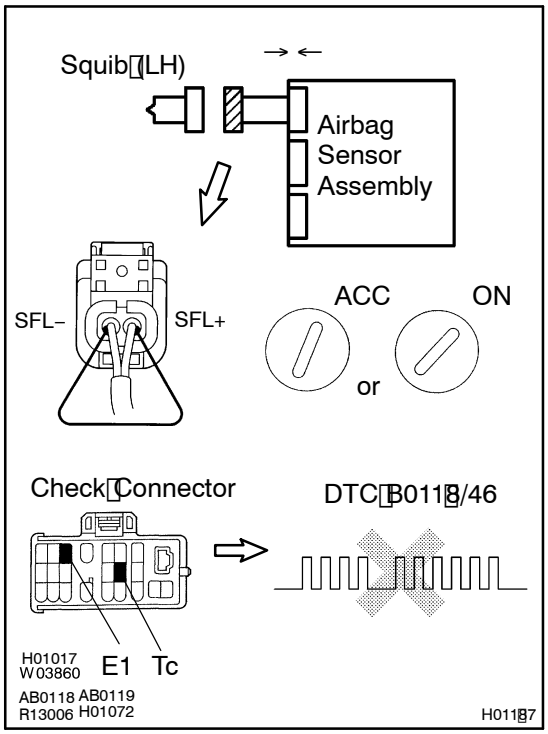
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between side airbag assembly (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect SFL+ and SFL– of the connector (on the side airbag assembly side) between the side airbag assembly (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0118/46 is not output.

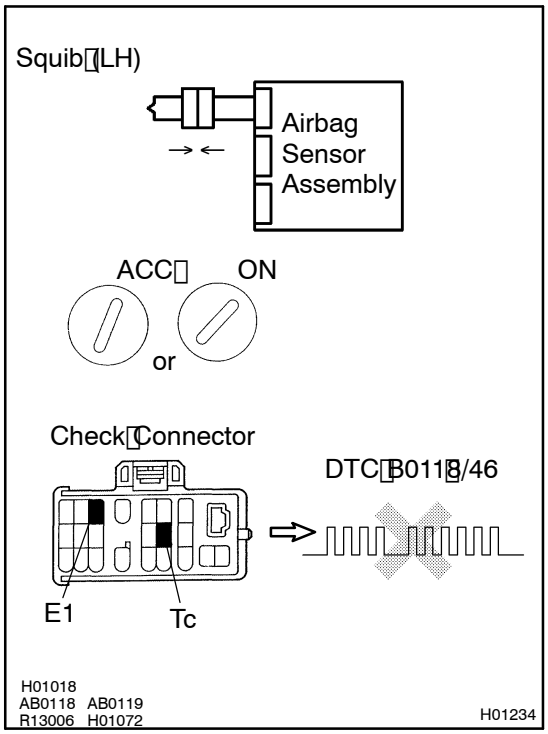
HINT:

Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check side squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag assembly (LH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0118/46 is not output.

HINT:

Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

NG	Replace side airbag assembly (LH).

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.

DI16S–24

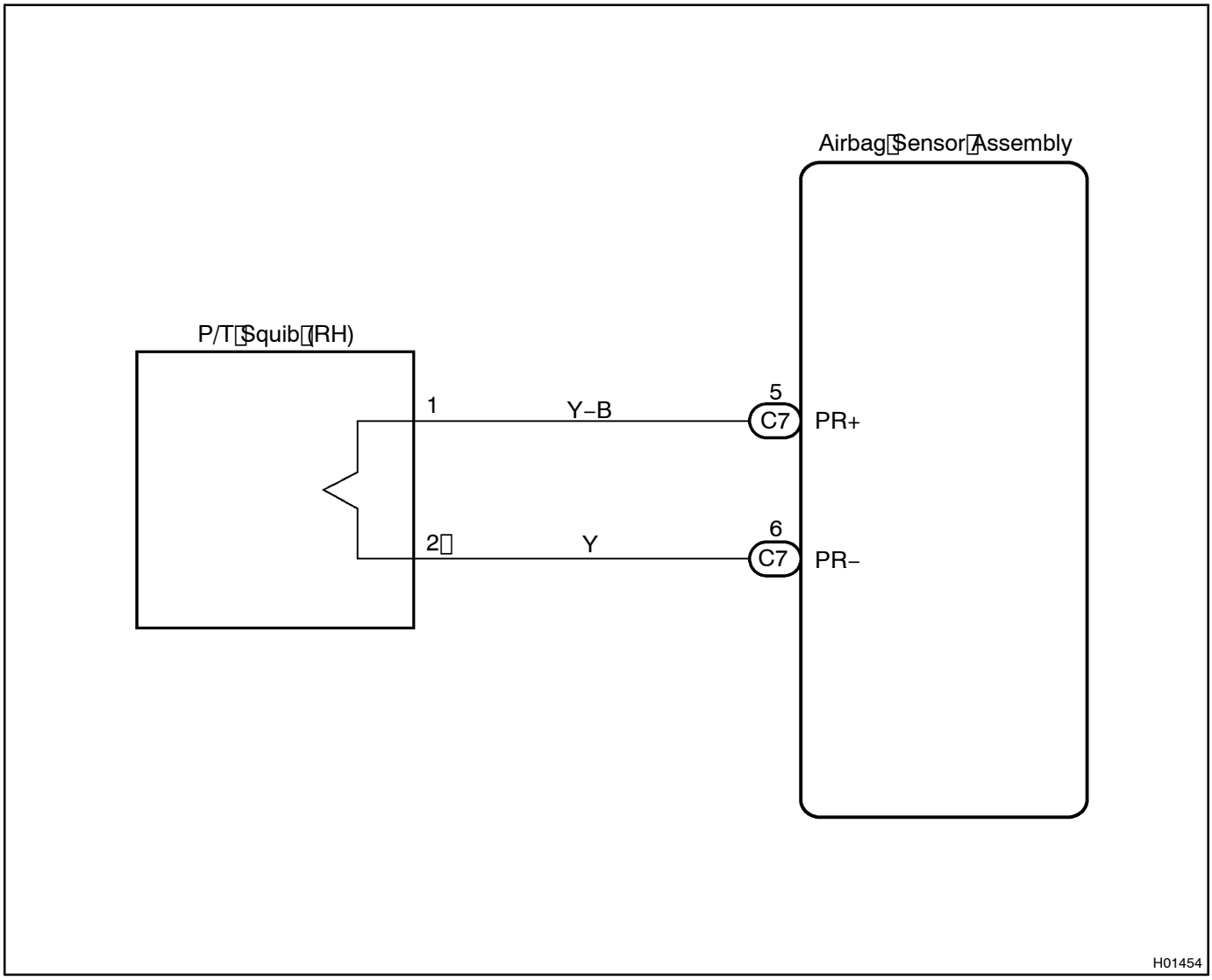
DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It 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 B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	• Short circuit between PR+ wire harness and PR– wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

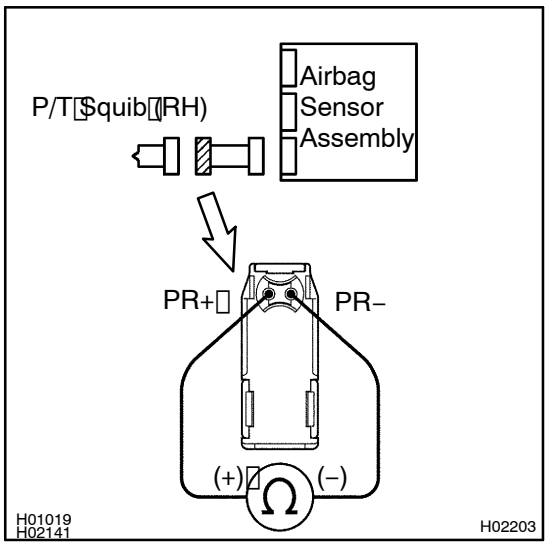
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (RH). (See page DI–287).

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR–.

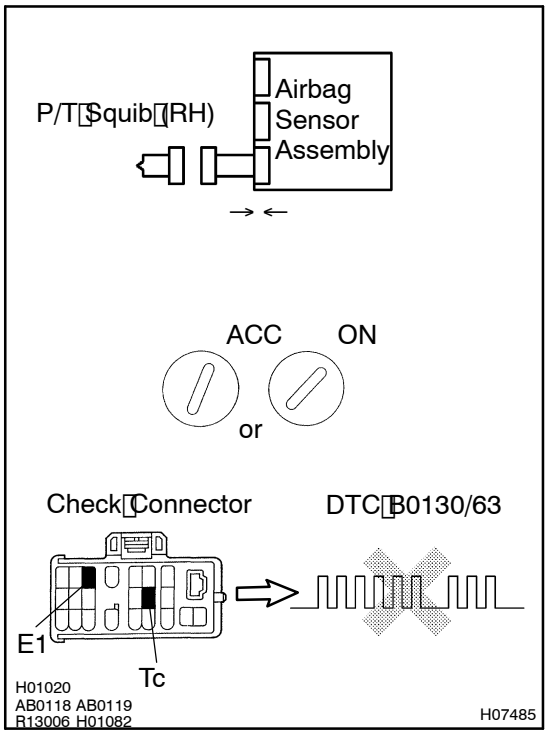
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0130/63 is not output.

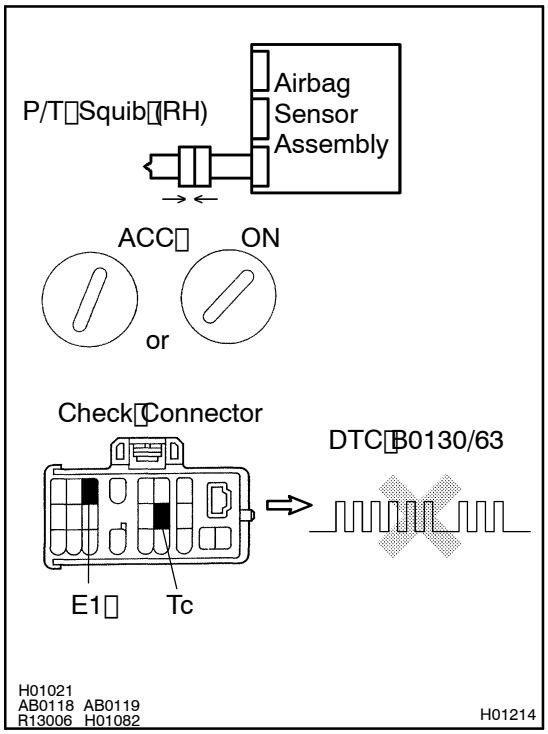
HINT:

Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the seat belt pretensioner (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.

(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(c) Clear DTC stored in memory. (See page DI–287)

(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(f) Check DTC. (See page DI–287)

OK:

DTC B0130/63 is not output.

HINT:

Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

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.

DI1BG–19

DTC	B0131/64	Open in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (RH) consists of the airbag sensor assembly and seat belt pretensioner (RH).
It 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 B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	• Open circuit in PR+ wire harness or PR– wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

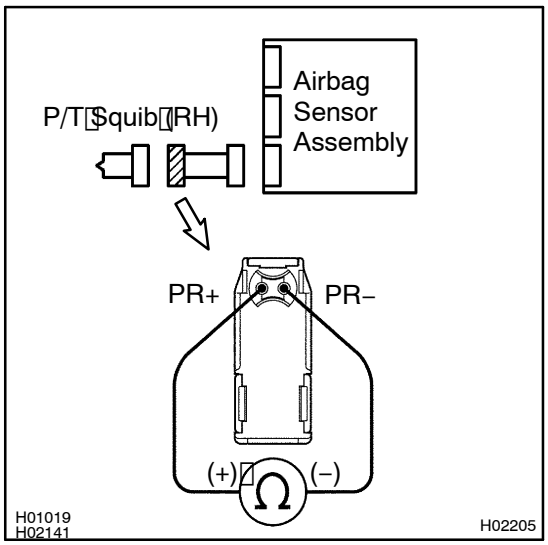
WIRING DIAGRAM

See page DI–356.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR–.

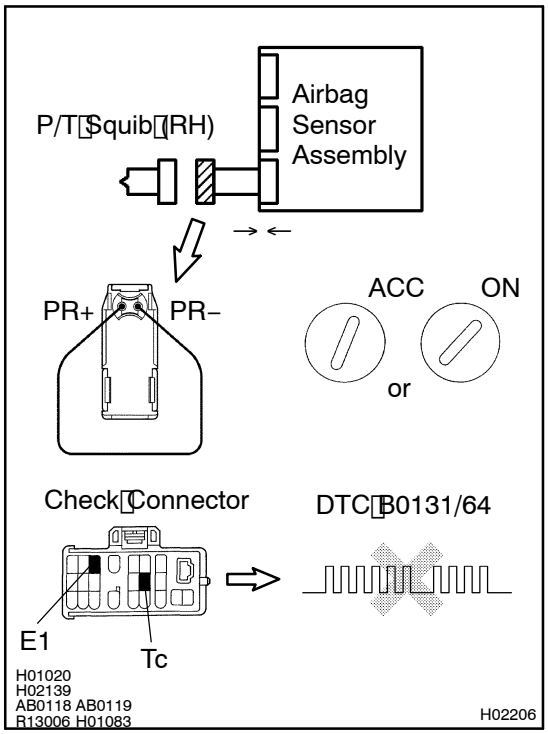
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0131/64 is not output.

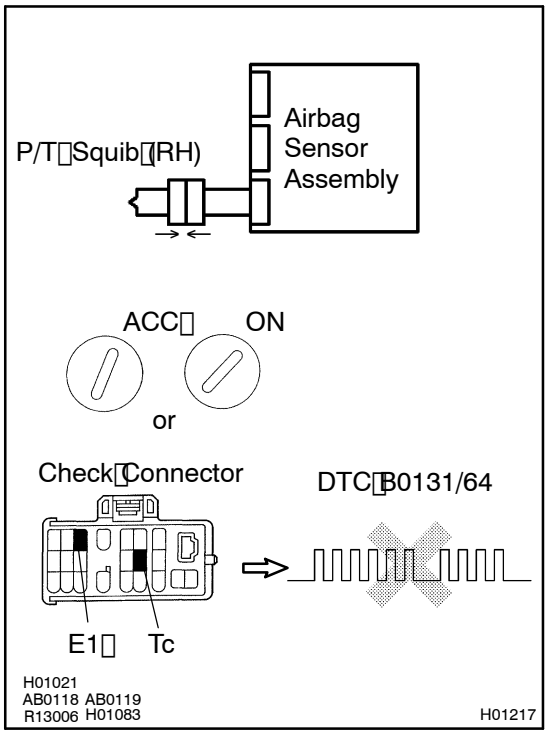
HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0131/64 is not output.

HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

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.

DTC	B0132/61	Short in P/T Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It 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 B0132/61 is recorded when a ground short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	• Short circuit in P/T squib (RH) wire harness (to ground) • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

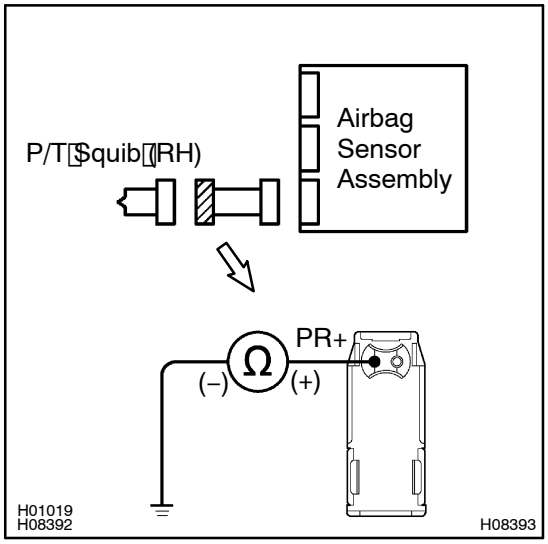
WIRING DIAGRAM

See page DI–356.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and body ground.

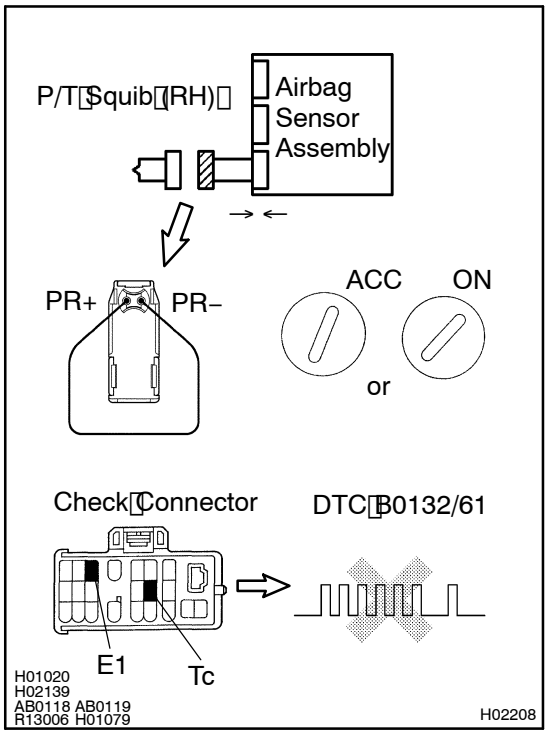
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0132/61 is not output.

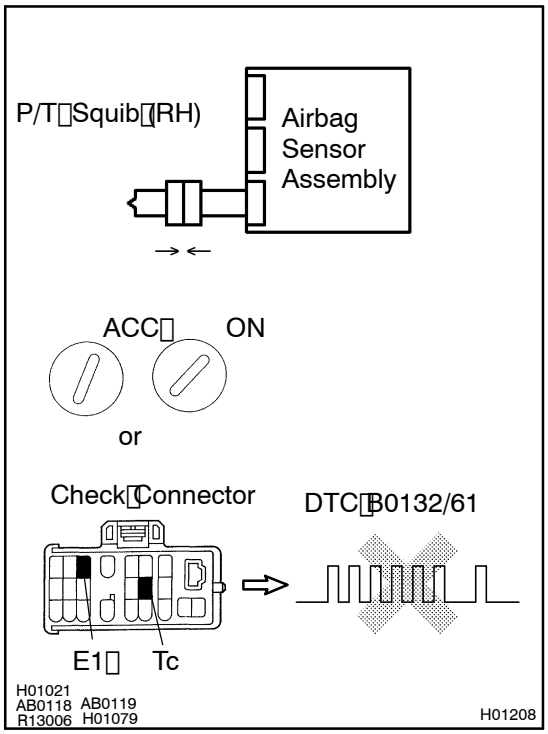
HINT:

Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0132/61 is not output.

HINT:
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

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.

DI1BI–18

DTC	B0133/62	Short in P/T Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It 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 B0133/62 is recorded when a B+ short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	• Short circuit in seat belt pretensioner (RH) wire harness (to B+) • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

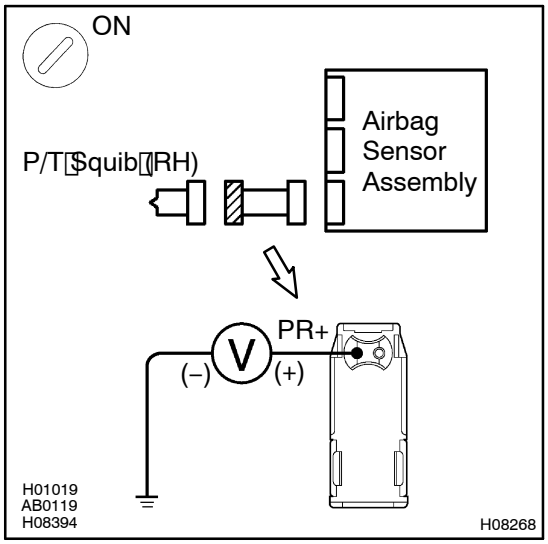
WIRING DIAGRAM

See page DI–356.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (RH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the voltage between PR+ and body ground.

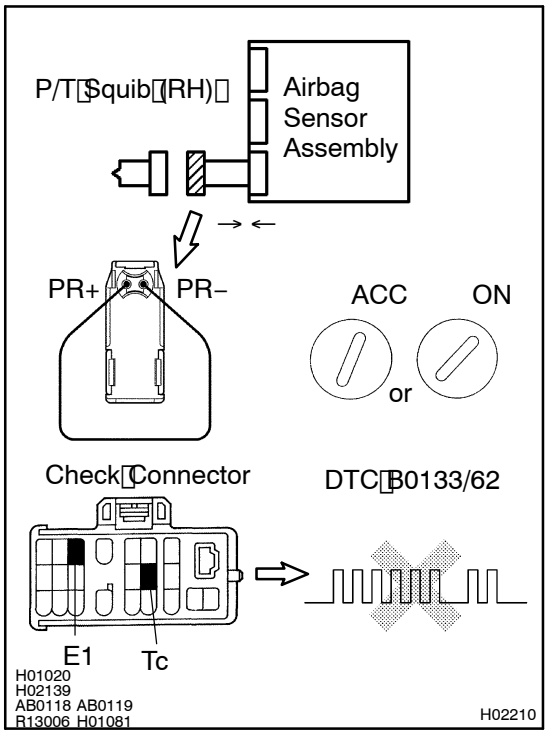
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0133/62 is not output.

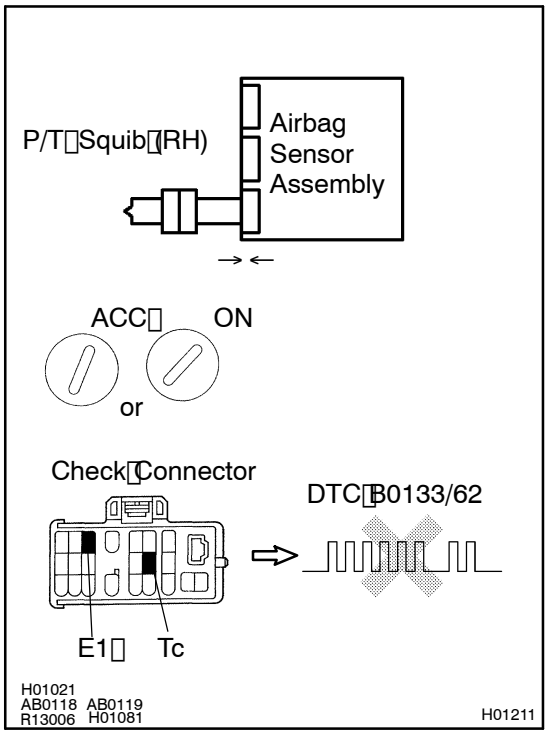
HINT:

Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0133/62 is not output.

HINT:
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (RH).

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.

DI16W–24

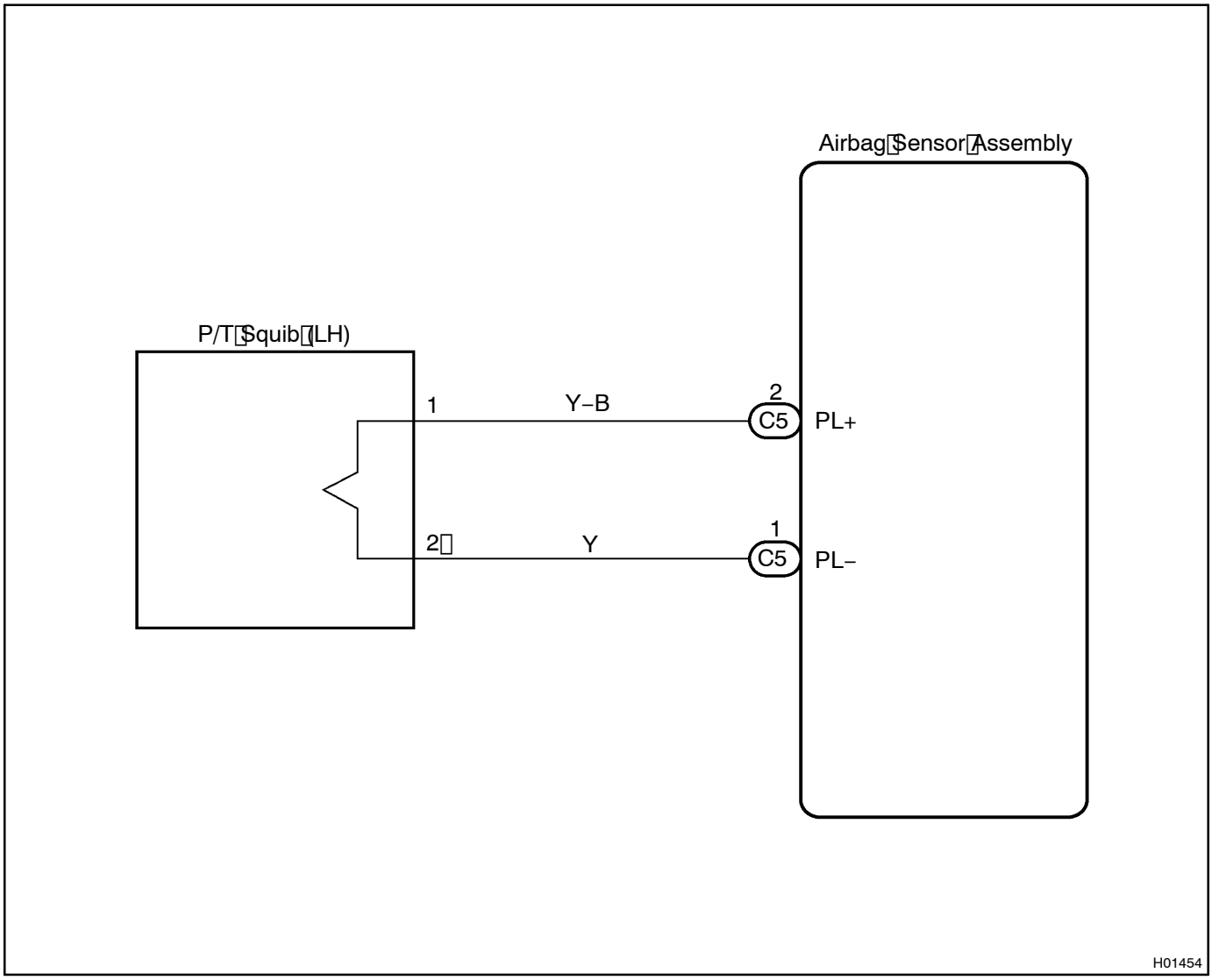
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It 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 B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	• Short circuit between PL+ wire harness and PL– wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

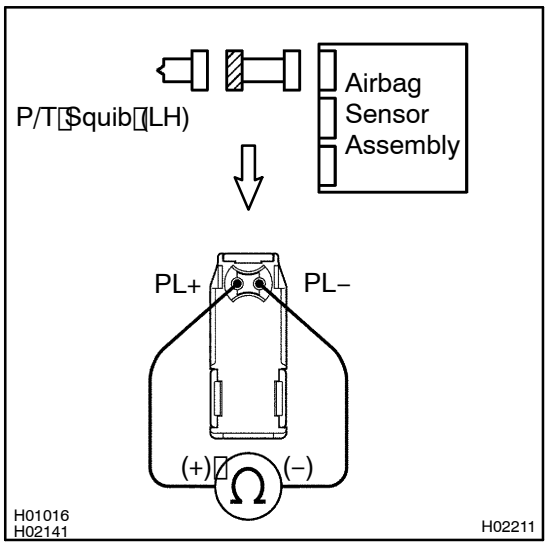
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (LH). (See page DI–287)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL–.

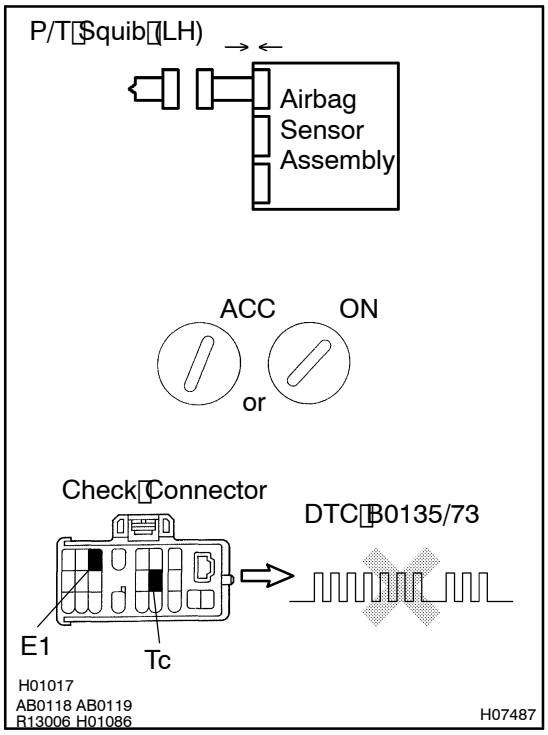
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0135/73 is not output.

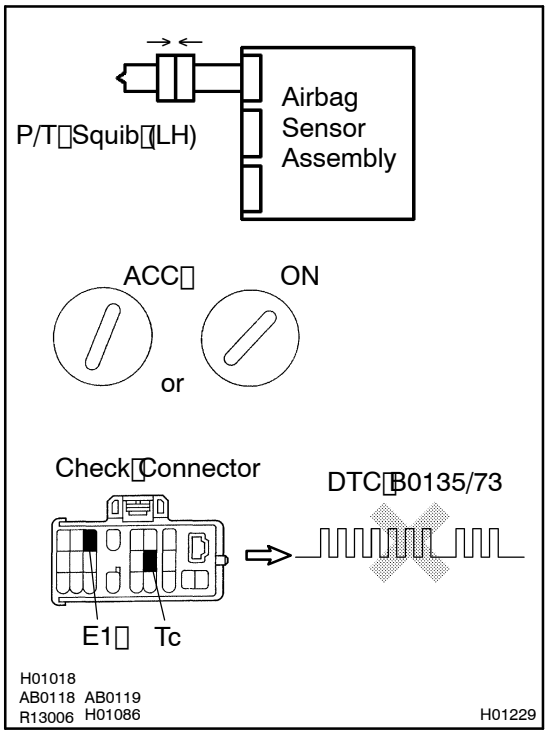
HINT:

Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory. (See page DI–287)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC. (See page DI–287)

OK:

DTC B0135/73 is not output.

HINT:
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

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.

DI1BJ–20

DTC	B0136/74	Open in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (LH) consists of the airbag sensor assembly and seat belt pretensioner (LH). It 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 B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	• Open circuit in PL+ wire harness or PL– wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

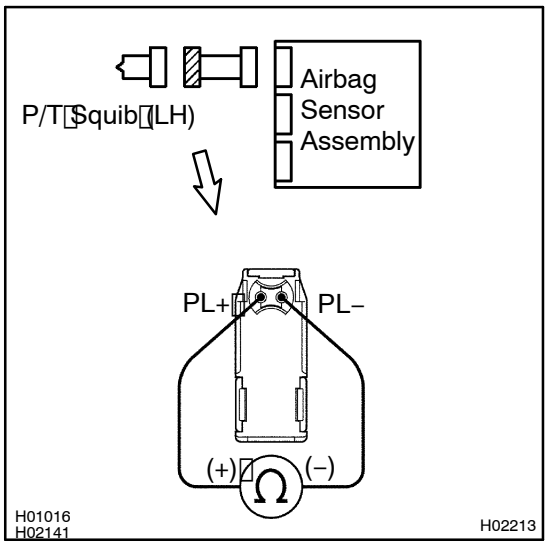
WIRING DIAGRAM

See page DI–369.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.

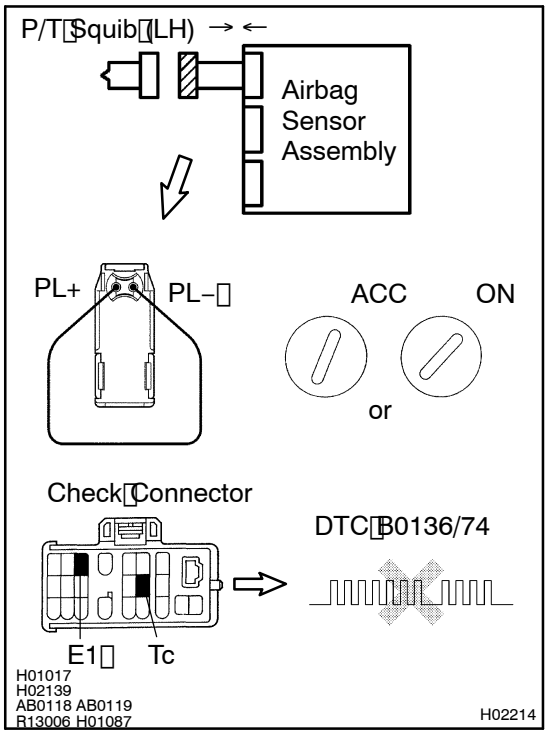


CHECK:
For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0136/74 is not output.

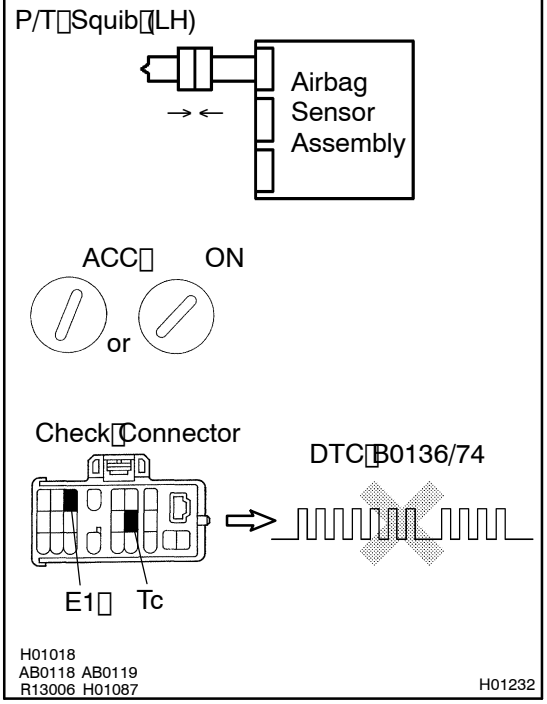
HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory. (See page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0136/74 is not output.

HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

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.

DTC	B0137/71	Short in P/T Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It 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 B0137/71 is recorded when a ground short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	• Short circuit in P/T squib (LH) wire harness (to ground) • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

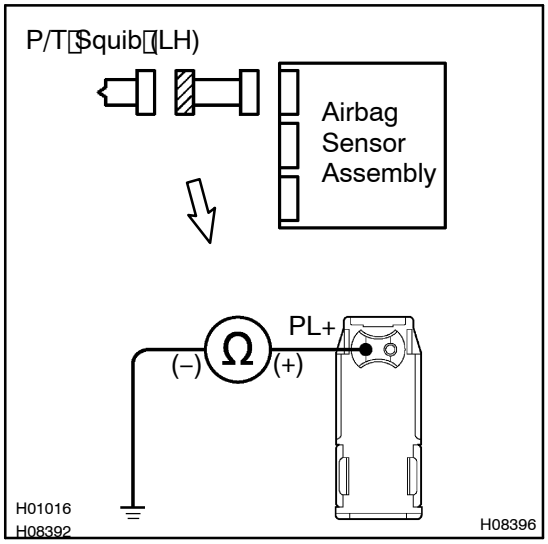
WIRING DIAGRAM

See page DI–369.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and body ground.

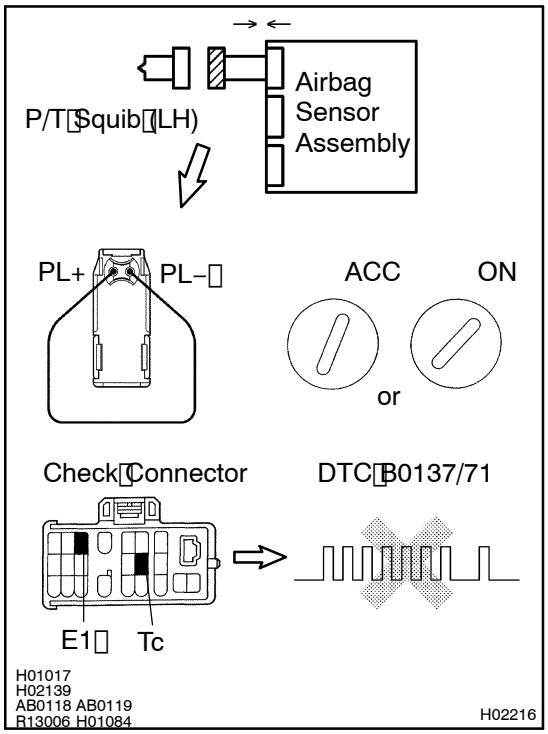
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0137/71 is not output.

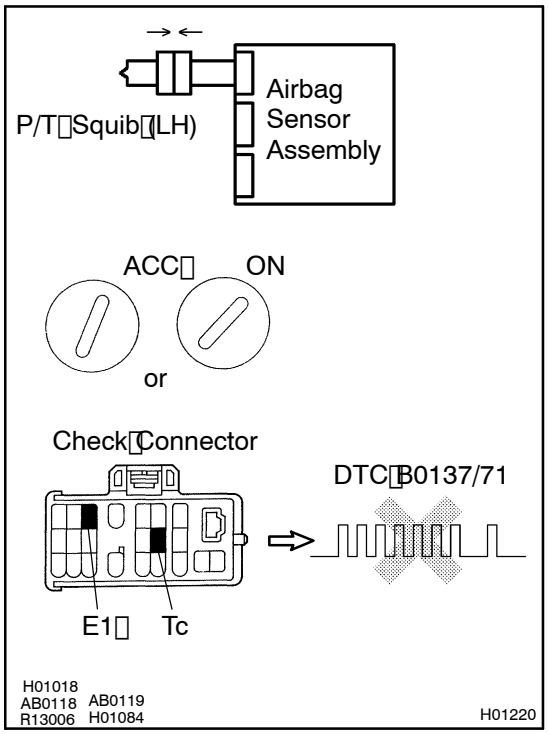
HINT:

Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0137/71 is not output.

HINT:
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

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.

DI1BL–19

DTC	B0138/72	Short in P/T Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It 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 B0138/72 is recorded when a B+ short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	• Short circuit in seat belt pretensioner (LH) wire harness (to B+) • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

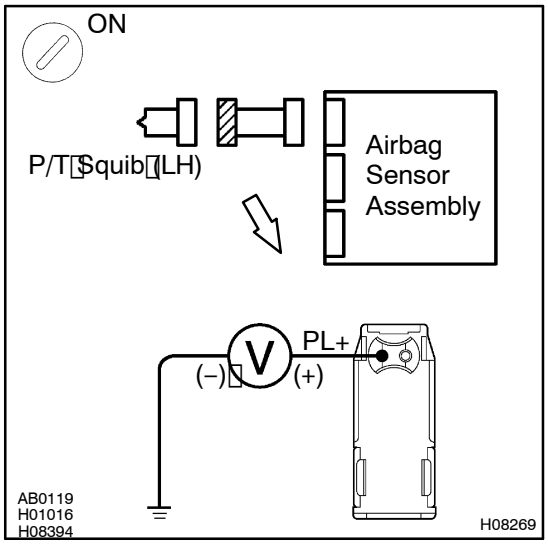
WIRING DIAGRAM

See page DI–369.

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check P/T squib (LH) circuit.



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the voltage between PL+ and body ground.

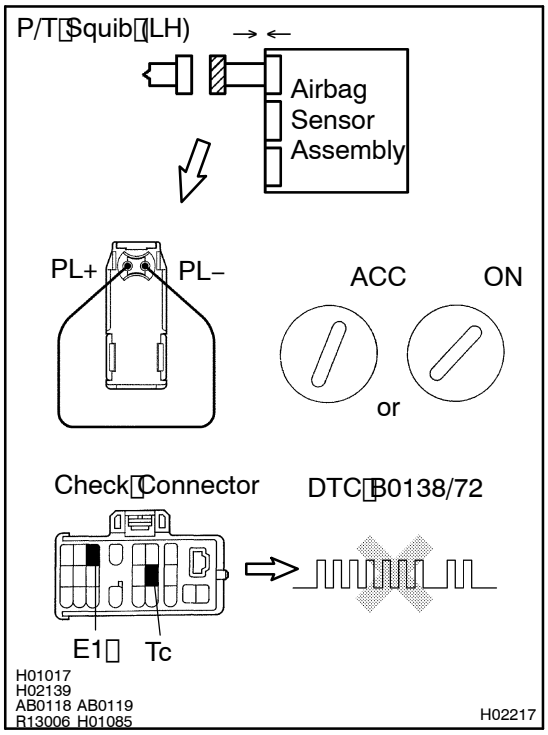
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL– of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B0138/72 is not output.

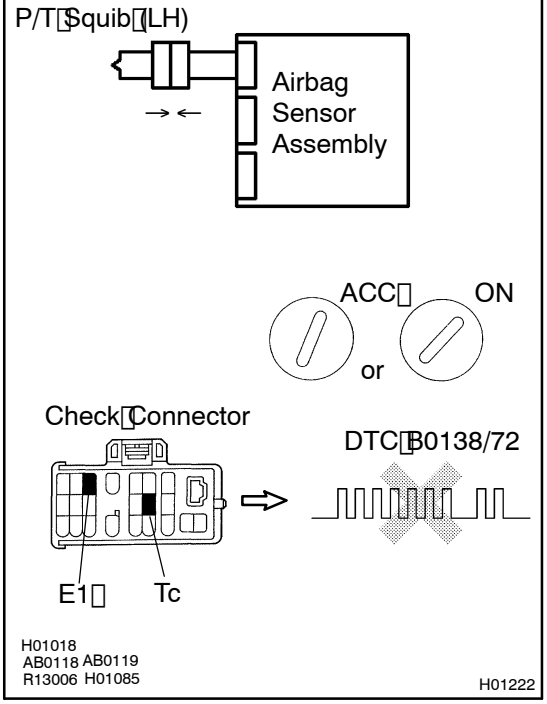
HINT:

Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI–287)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI–287)

OK:

DTC B0138/72 is not output.

HINT:
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

NG	Replace seat belt pretensioner (LH).

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.

DTC	B1100/31	Airbag Sensor Assembly Malfunction

CIRCUIT DESCRIPTION

The airbag sensor assembly consists of the 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 detects diagnosis system malfunction.
DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

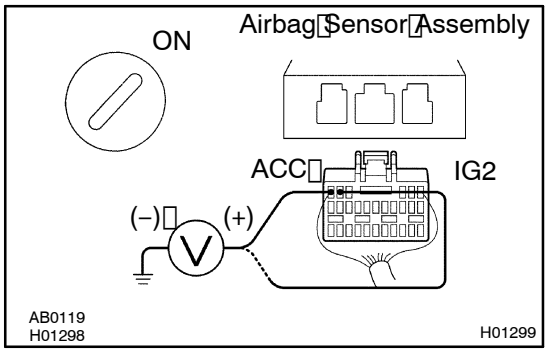
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

INSPECTION PROCEDURE

HINT:
When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check voltage at IG2 and ACC of airbag sensor assembly.



CHECK:

(a) Turn ignition switch to ON.
(b) Measure the voltage between body ground and each of IG2 and ACC terminals of the airbag sensor assembly connector.

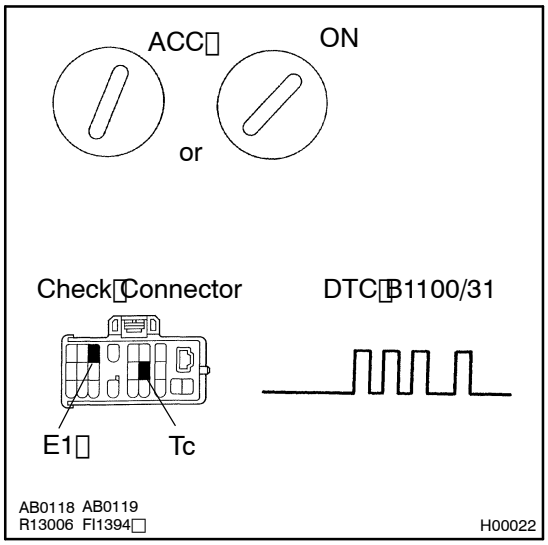
OK:

Voltage: 10 – 14 V

NG	Check that an abnormality occurs on the battery and charging system.

OK

3	Is DTC B1100/31 output again?



PREPARATION:

Clear DTC. (See step 5 on page DI–287)

CHECK:

(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(c) Repeat operation in step (a) and (b) at least 5 times.

(d) Check DTC. (See page DI–287)

HINT:

Codes other than code B1100/31 may be output at this time, but they are not relevant to this check.

NO → **Using simulation method, reproduce malfunction symptoms. (See page IN–22)**

YES

Replace airbag sensor assembly.

DI4L8–04

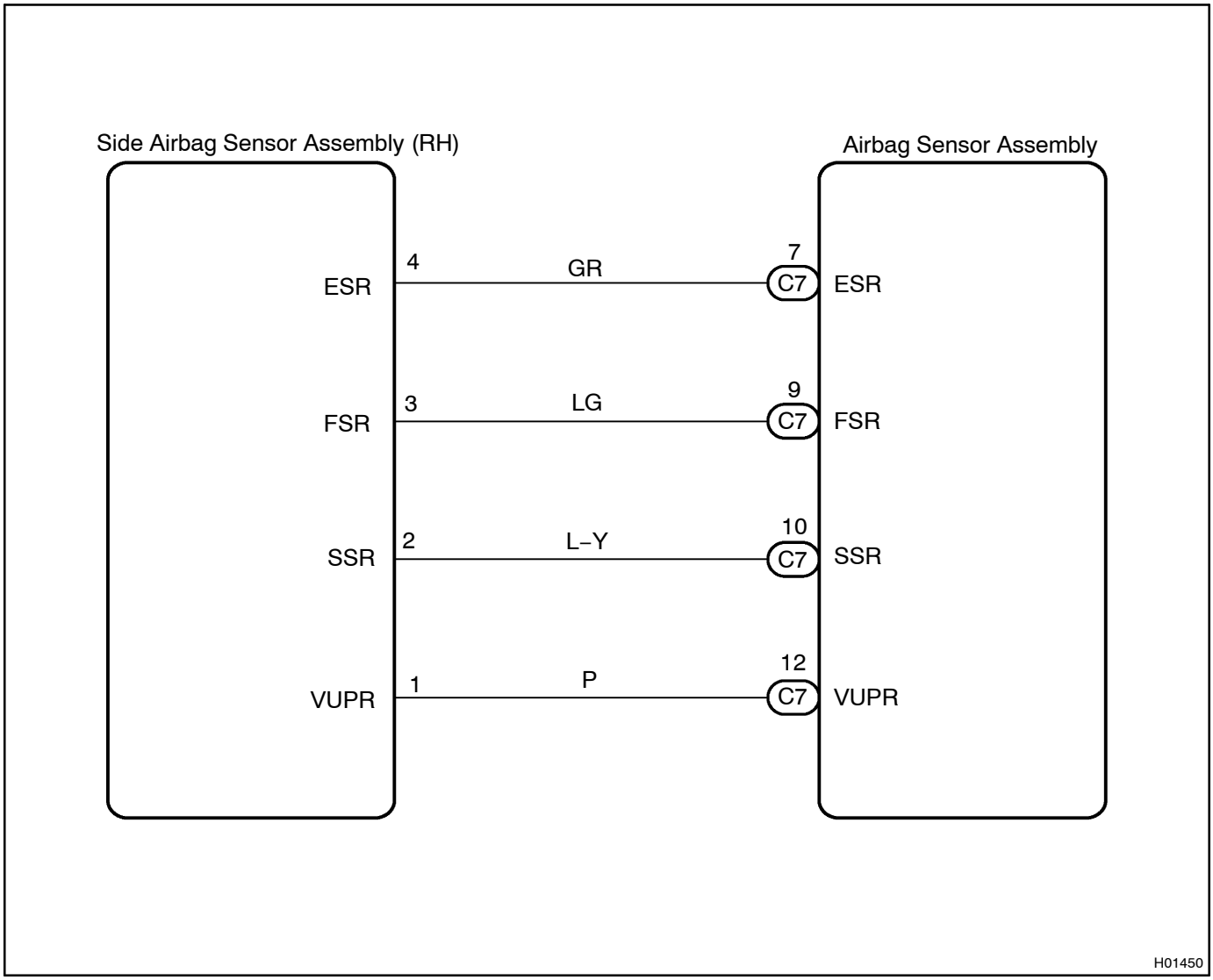
DTC	B1140/32	Side Airbag Sensor Assembly (RH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assembly (RH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.
It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and diagnosis system malfunction.
DTC B1140/32 is recorded when occurrence of a malfunction in the side airbag sensor assembly (RH) is detected.

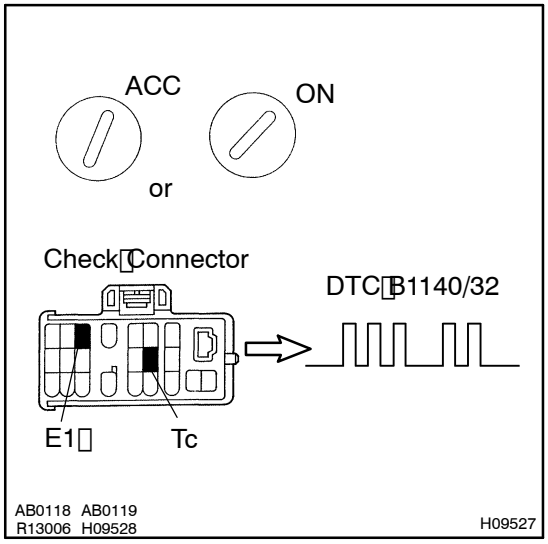
DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	• Side airbag sensor assembly (RH) malfunction	• Side airbag sensor assembly (RH) • Wire harness • Airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC B1140/32 output?



CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

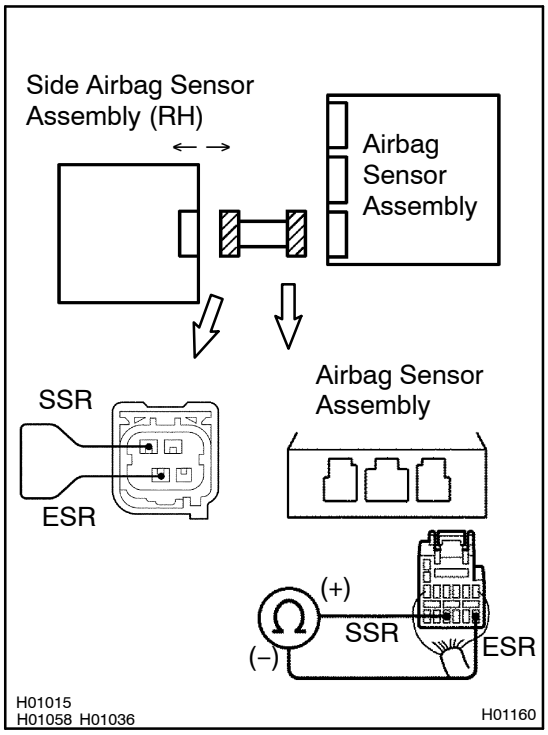
YES → **The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

NO

2	Is connector of side airbag sensor assembly (RH) properly connected?

3	Prepare for inspection. (See step 1 on DI–416)

4	**Check wire harness.**



PREPARATION:

(a) Disconnect the side airbag sensor assembly (RH) connector.

(b) Using a service wire, connect SSR and ESR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between SSR and ESR.

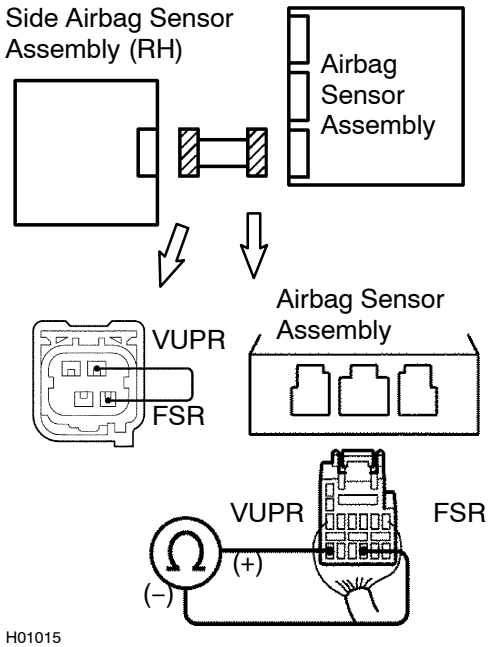
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect VUPR and FSR of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (RH) and airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between VUPR and FSR.

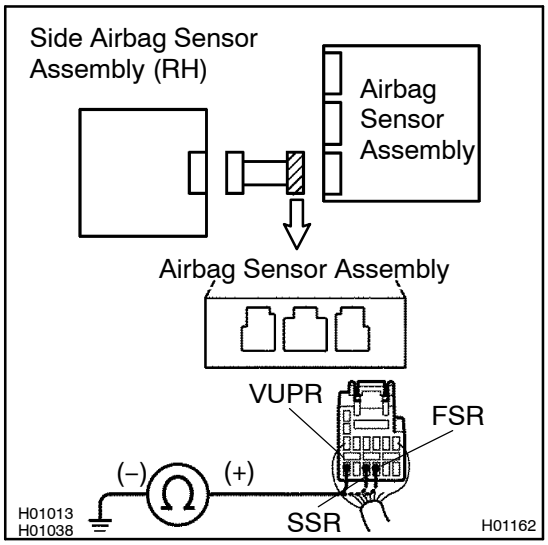
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.**

OK

6	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SSR, VUPR and FSR.

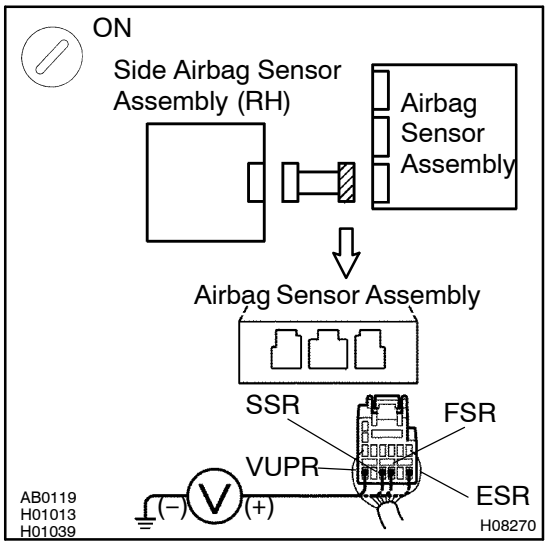
OK:

Resistance: Below 1 Ω

NG	Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.

OK

7	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (RH) and the airbag sensor assembly, measure the voltage between the body ground and each of SSR, VUPR, ESR and FSR.

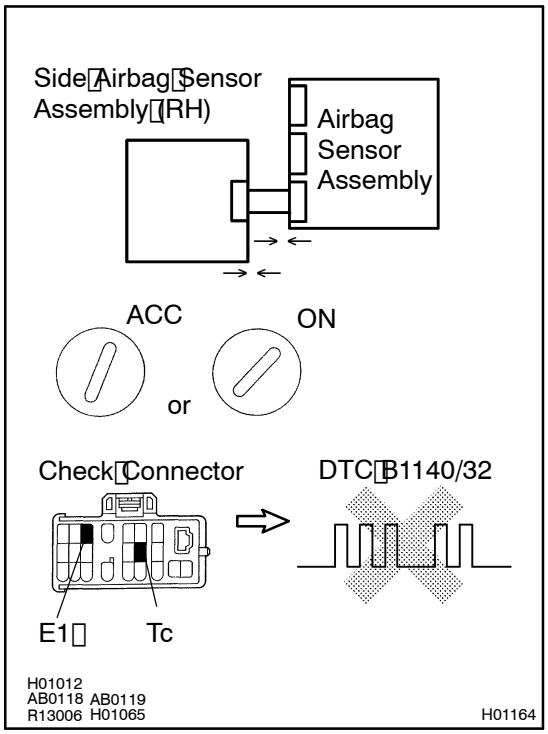
OK:

Voltage: 0 V

NG	Repair or replace harness or connector between side airbag sensor assembly (RH) and airbag sensor assembly.

OK

8	Is DTC B1140/32 output again?



PREPARATION:

(a) Connect the connector to the side airbag sensor assembly (RH).

(b) Connect the connector to the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1140/32 is not output.

HINT:

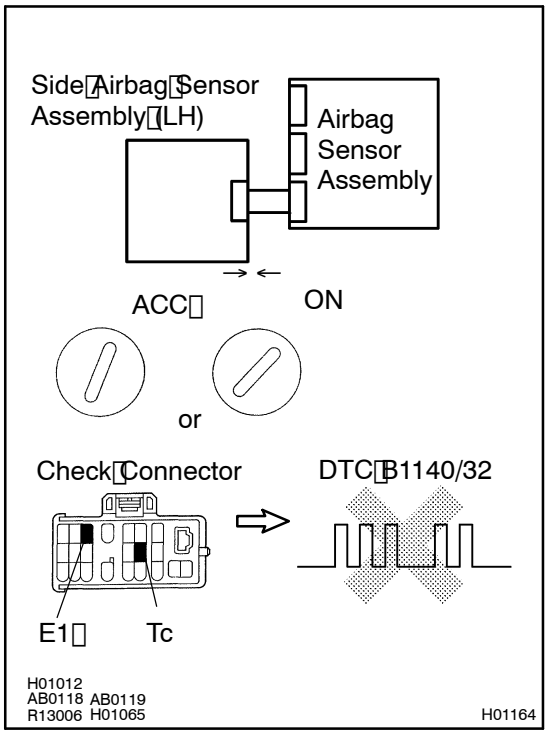
Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG	Go to step 9.

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.

9	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the side airbag sensor (RH) from the connector and connect the side airbag sensor (LH) to the connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1140/32 is not output.

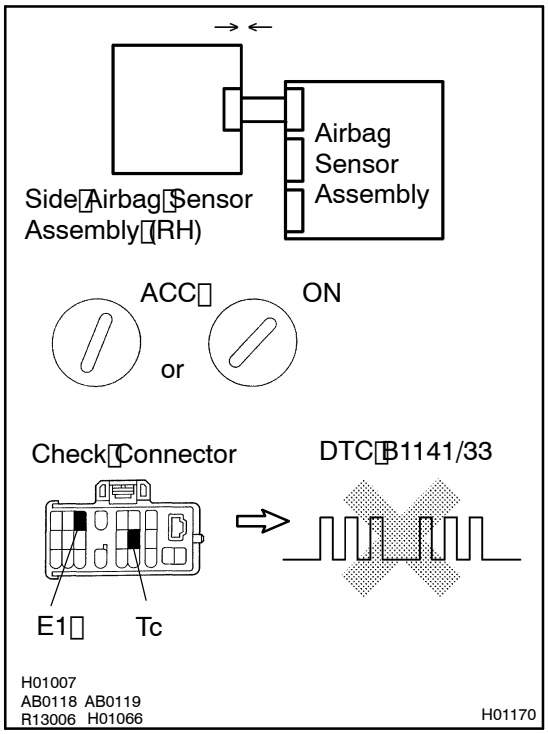
HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

10	Check side airbag sensor assembly (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag sensor (RH) to the connector that the side airbag sensor (LH) was connected to.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1141/33 is not output.

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NG → **Replace side airbag sensor assembly (RH).**

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.

DI4L9–04

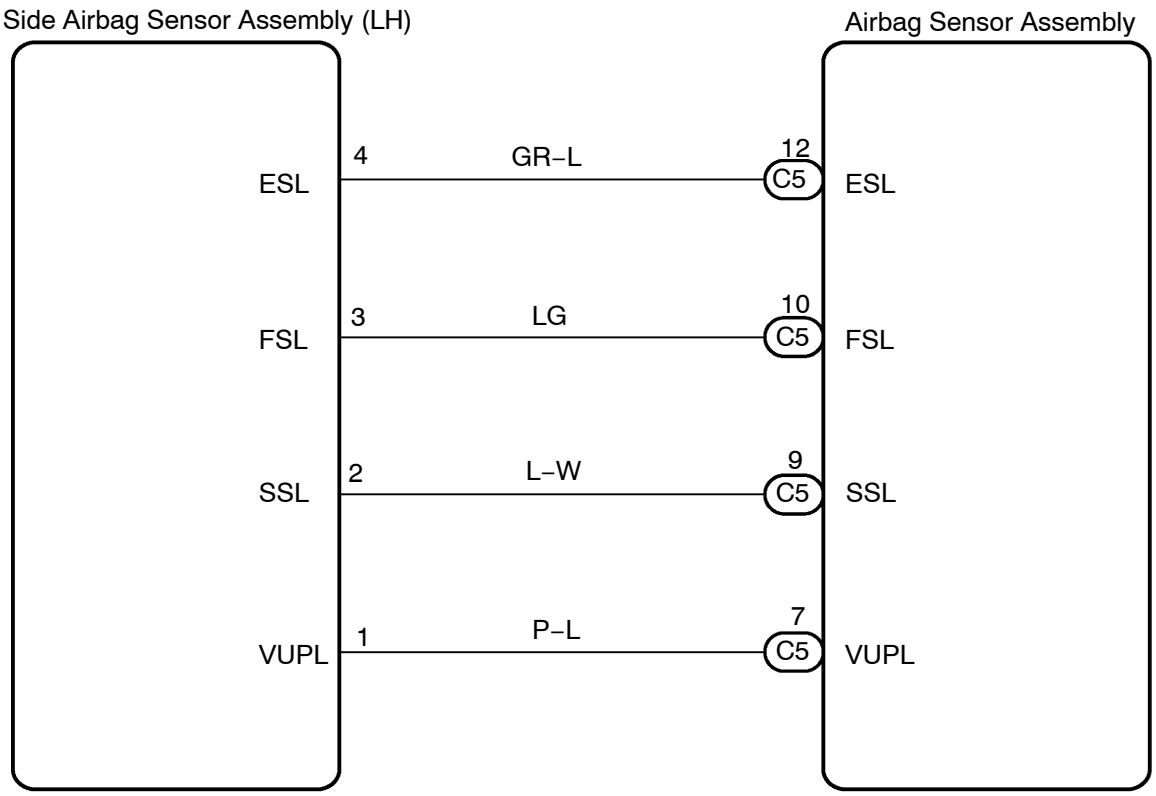
DTC	B1141/33	Side Airbag Sensor Assembly (LH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assembly (LH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.
It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.
DTC B1141/33 is recorded when occurrence of a malfunction in the side airbag sensor assembly (LH) is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	• Side airbag sensor assembly (LH) malfunction	• Side airbag sensor assembly (LH) • Wire harness • Airbag sensor assembly

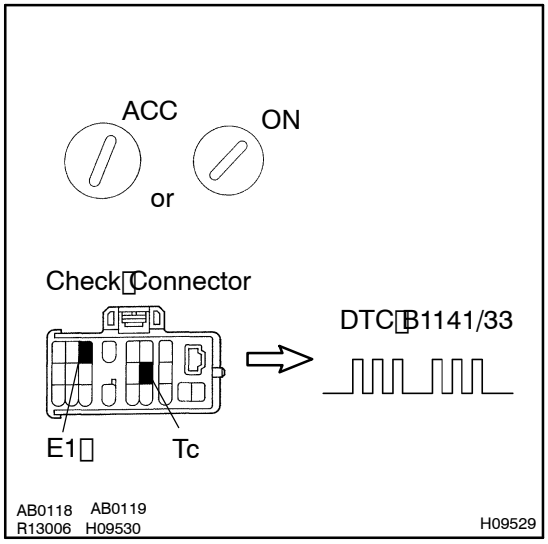
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1	Is DTC B1141/33 output?



CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

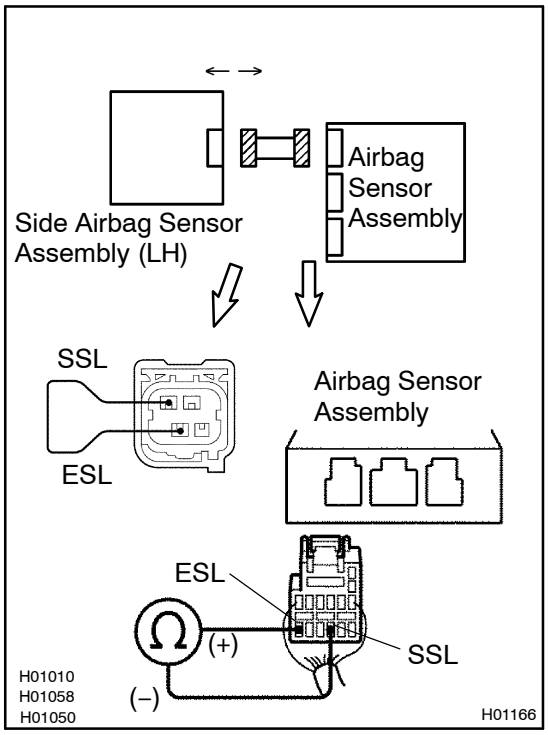
YES	The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

NO

2	Is connector of side airbag sensor assembly (LH) properly connected?

3	Prepare for inspection. (See step 1 on page DI–416)

4	**Check wire harness.**



PREPARATION:

(a) Disconnect the side airbag sensor assembly connector (LH).

(b) Using a service wire, connect SSL and ESL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between SSL and ESL.

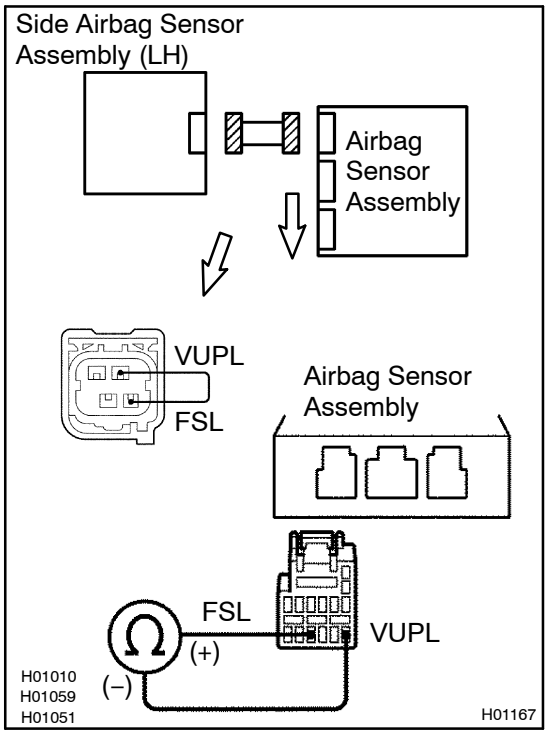
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect VUPL and FSL of the connector (on the side airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly.

CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between VUPL and FSL.

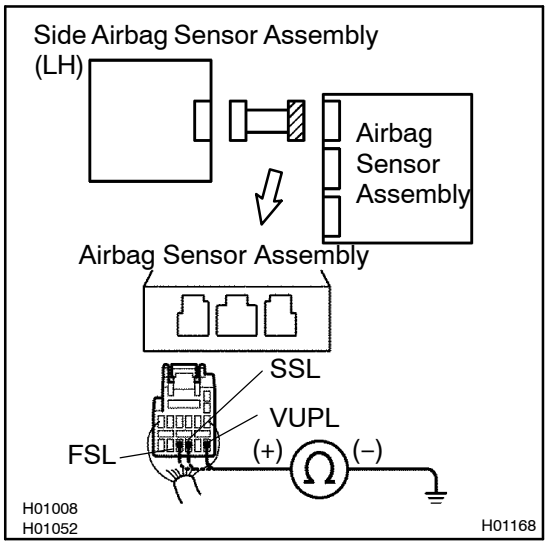
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

6	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SSL, VUPL and FSL.

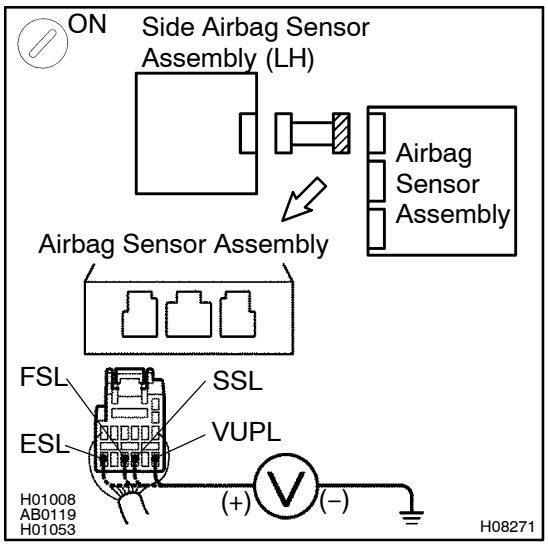
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

7	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the side airbag sensor assembly (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SSL, ESL, VUPL and FSL.

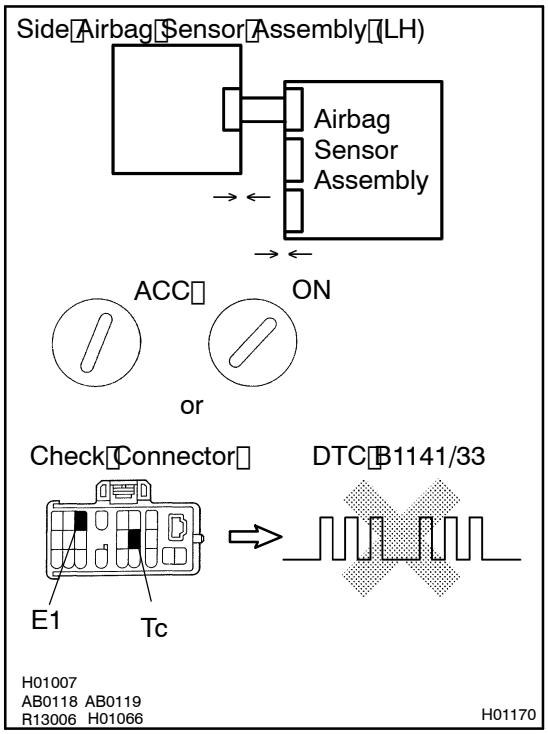
OK:

Voltage: 0 V

NG → **Repair or replace harness or connector between side airbag sensor assembly (LH) and airbag sensor assembly.**

OK

8	Is DTC B1141/33 output again?



PREPARATION:

(a) Connect the connector to the side airbag sensor assembly (LH).

(b) Connect the connector to the airbag sensor assembly.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1141/33 is not output.

HINT:

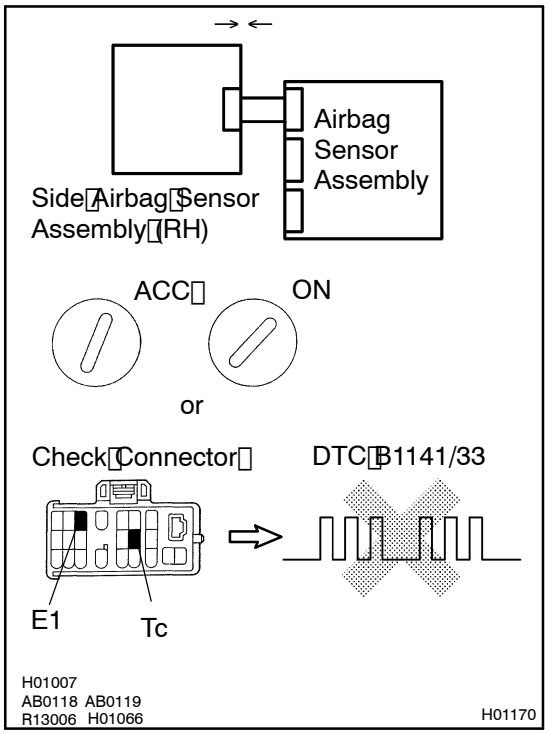
Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NO	Go to step 9.

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.

9	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the side airbag sensor (LH) from the connector and connect the side airbag sensor (RH) to the connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1141/33 is not output.

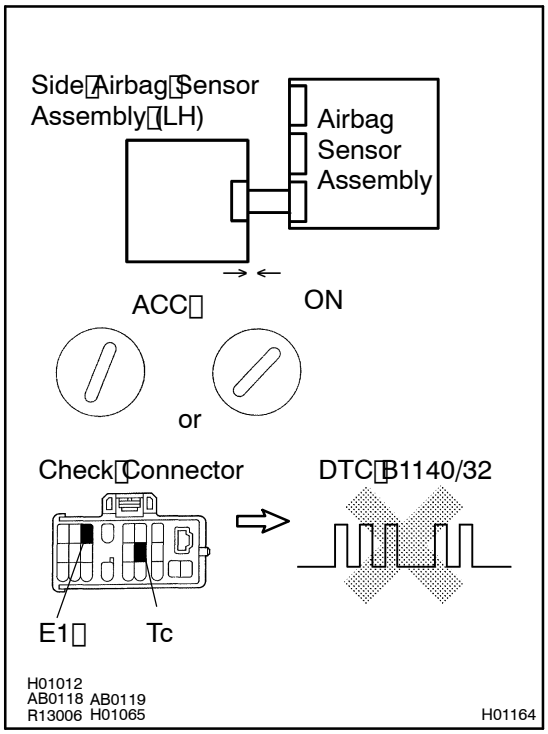
HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

10	Check side airbag sensor assembly (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the side airbag sensor (LH) to the connector that the side airbag sensor (RH) was connected to.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1140/32 is not output.

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

NG → **Replace side airbag sensor assembly (LH).**

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.

DI4LA–03

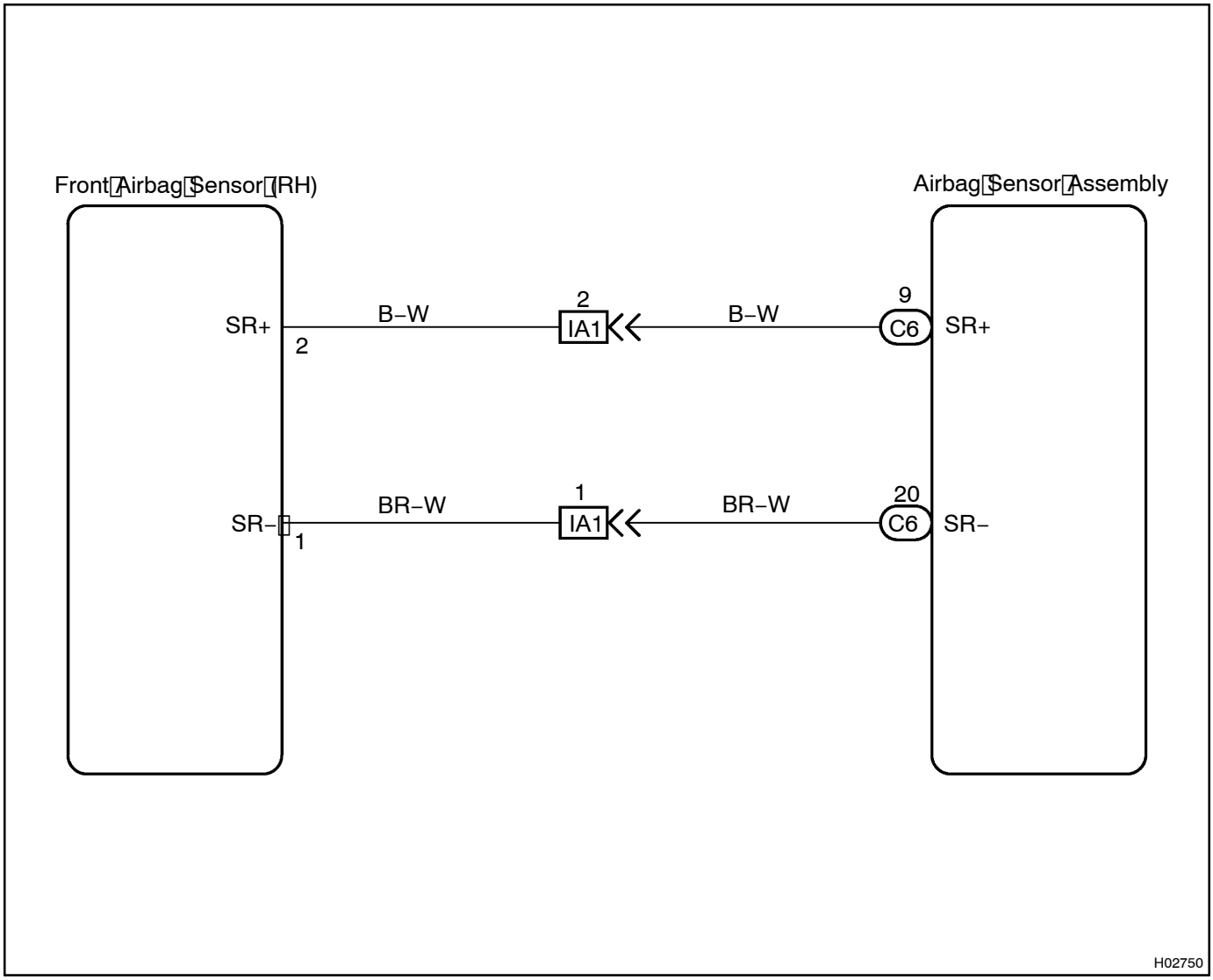
DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1156/B1157/15 is recorded when malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Wire harness • Engine room main wire harness • Airbag sensor assembly

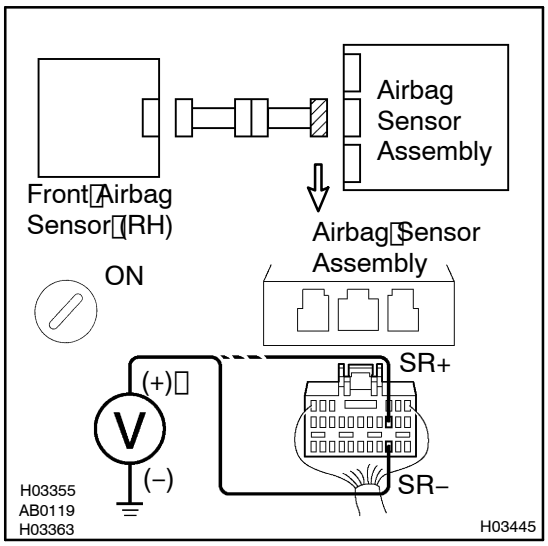
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of SR+ and SR–.

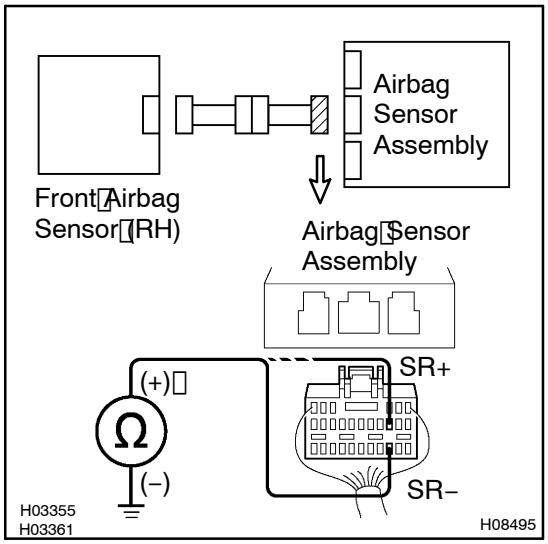
OK:

Voltage: Below 1 V

NG	Go to step 8.

OK

3	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SR+ and SR–.

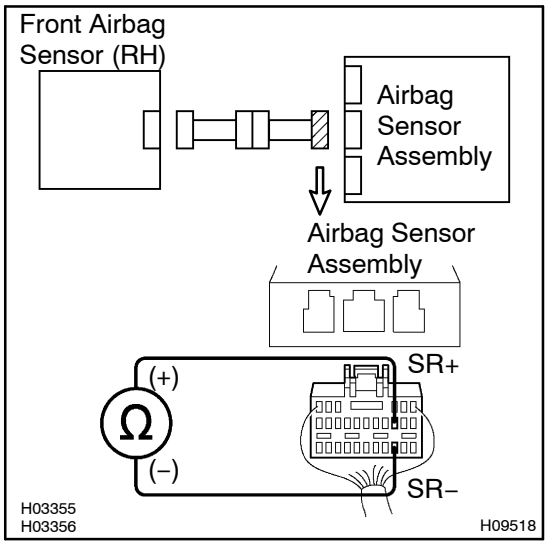
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 9.

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR–.

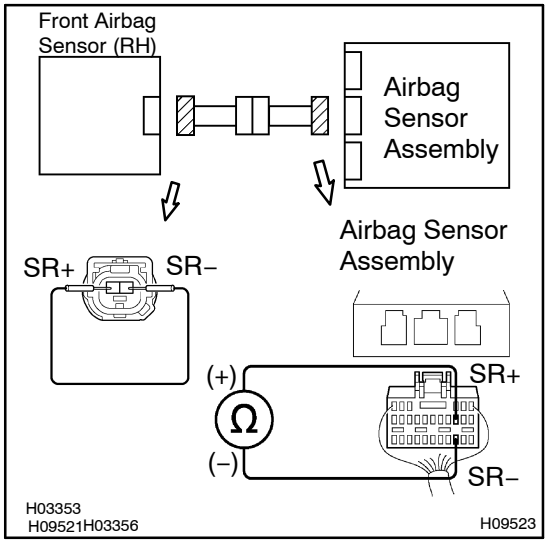
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 10.**

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect SR+ and SR– of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR–.

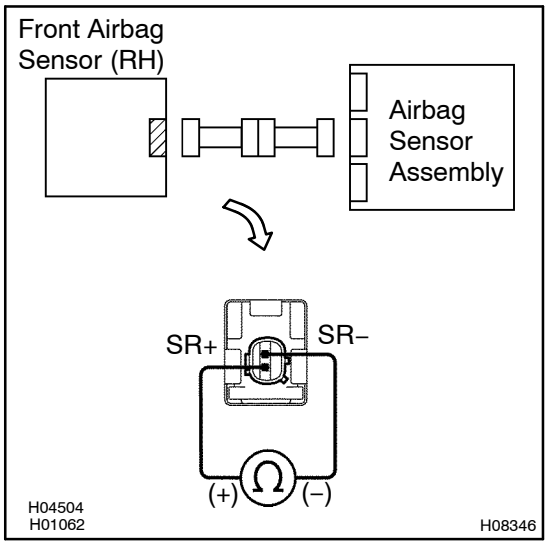
OK:

Resistance: Below 1 Ω

NG → **Go to step 11.**

OK

6	**Check front airbag sensor (RH).**



CHECK:

For the connector of the front airbag sensor (RH), measure the resistance between SR+ and SR–.

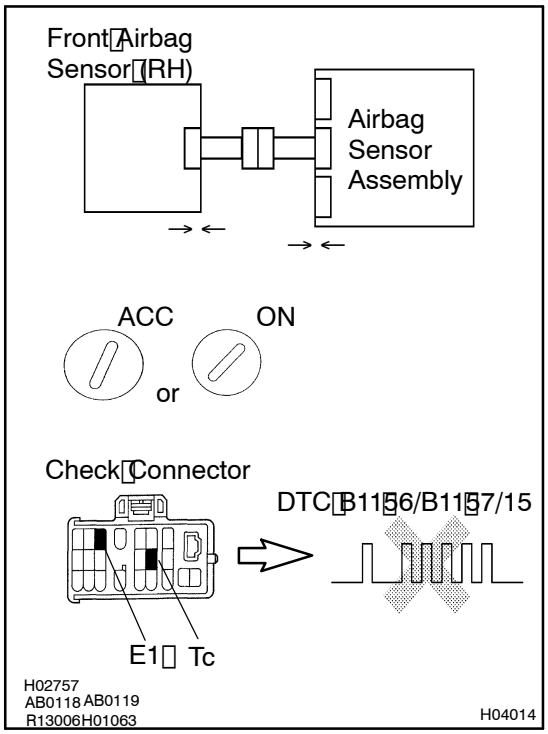
OK:

Resistance: 300 – 1500 Ω

NG → **Replace front airbag sensor (RH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front airbag sensor (RH) connector and airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1156/B1157/15 is not output.

HINT:

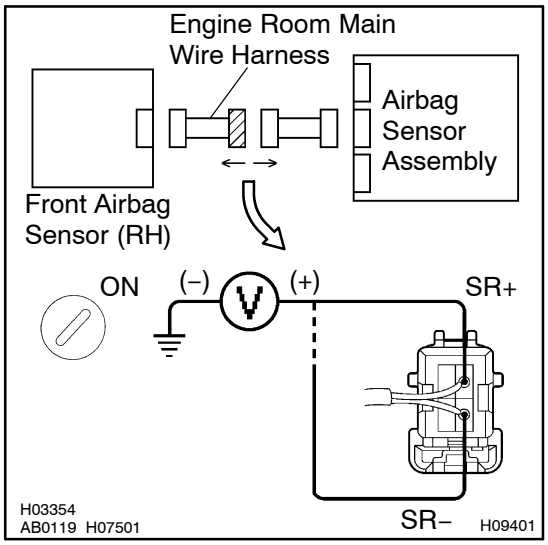
Codes other than code B1156/B1157/15 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor 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.

8	Check engine room main wire harness (to B+).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the RH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SR+ and SR–.

OK:

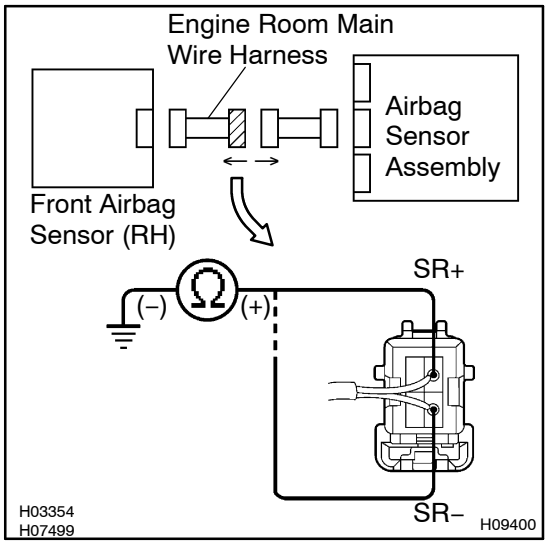
Voltage: Below 1 V

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	Check engine room main wire harness (to ground).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SR+ and SR–.

OK:

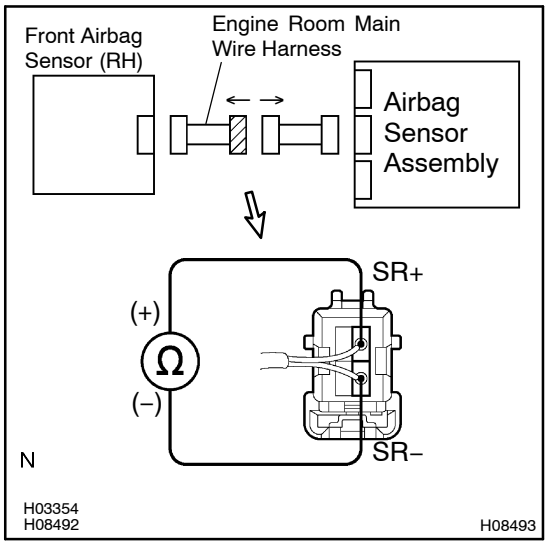
Resistance: 1 MΩ or Higher

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SR+ and SR–.

OK:

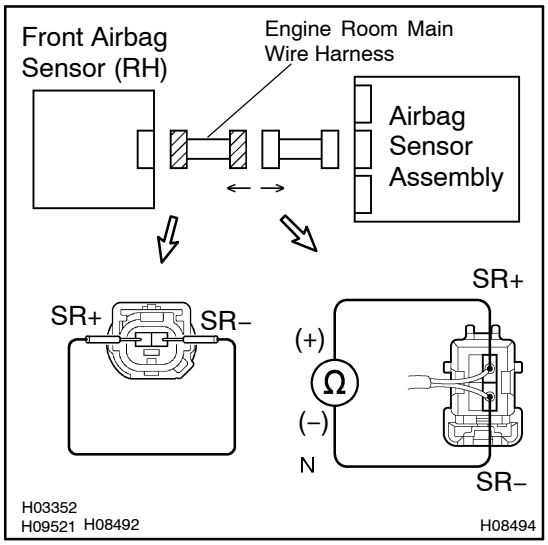
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect SR+ and SR– of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (RH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SR+ and SR–.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI58Q-02

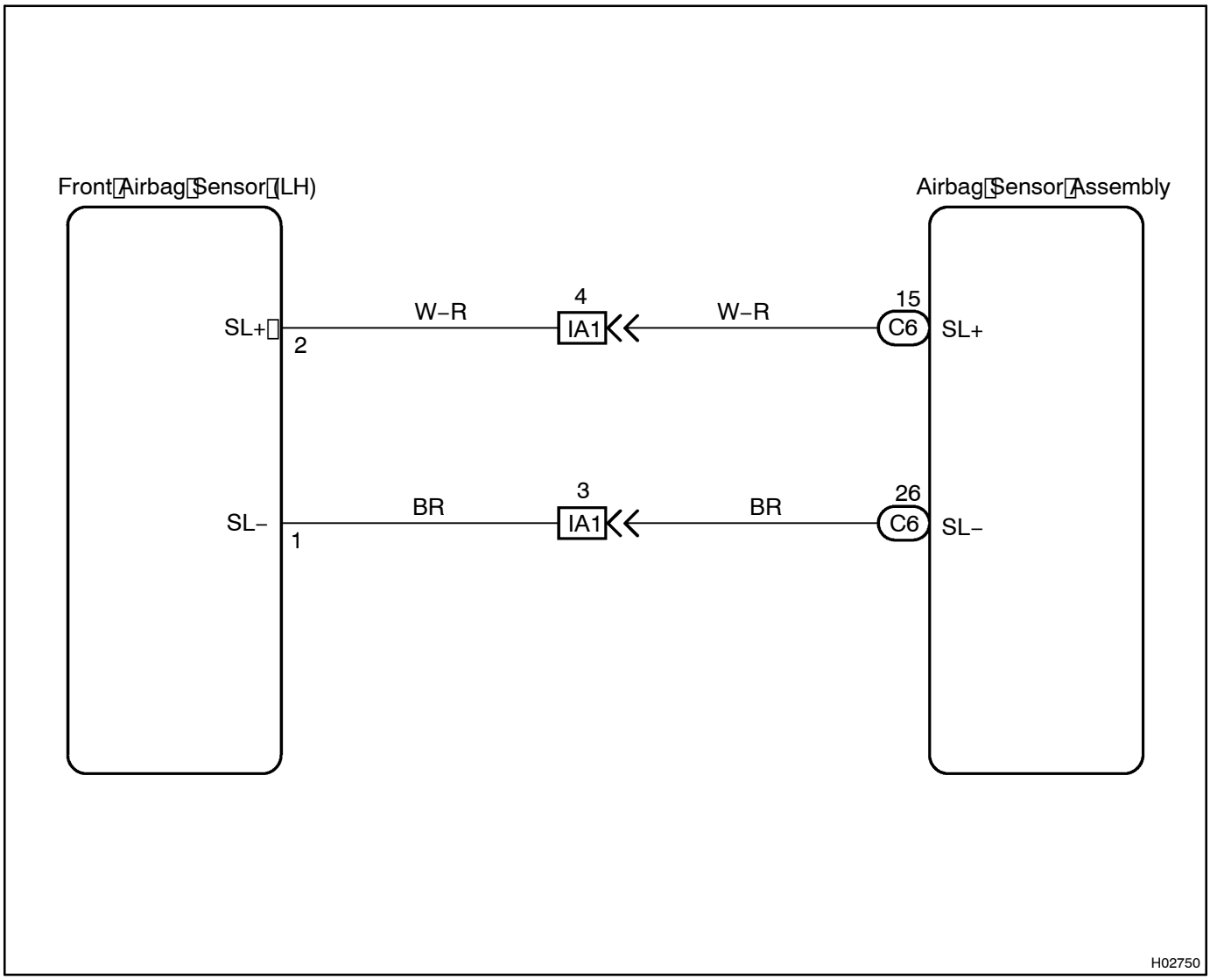
DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (LH) circuit consists of the airbag sensor assembly and front airbag sensor (LH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1158/B1159/16 is recorded when malfunction is detected in the front airbag sensor (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/B1159/16	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Wire harness • Engine room main wire harness

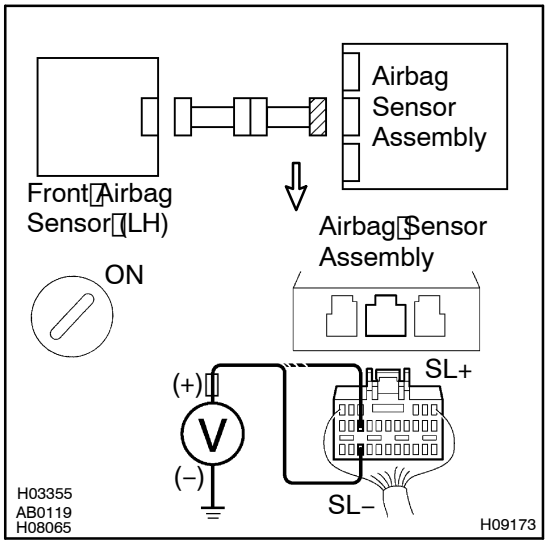
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI–416)

2	Check wire harness (to B+).



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SL+ and SL–.

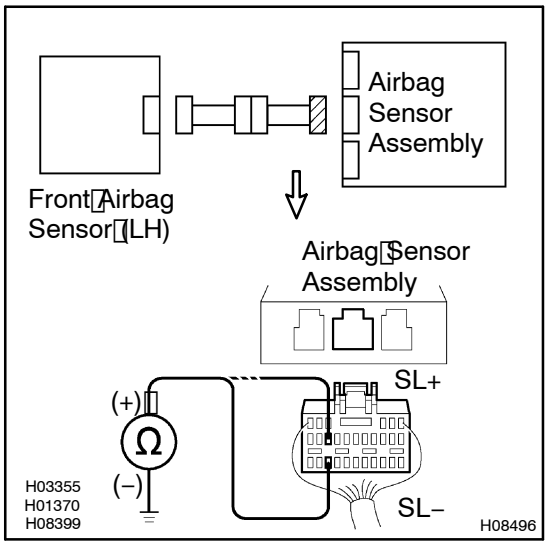
OK:

Voltage: Below 1 V

NG	Go to step 8.

OK

3	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SL+ and SL–.

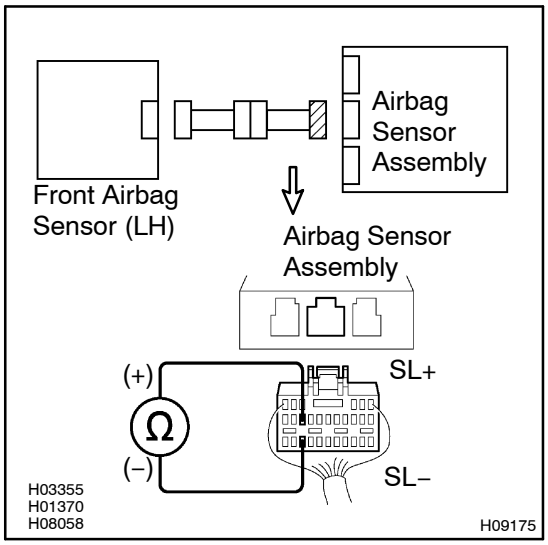
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 9.

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL–.

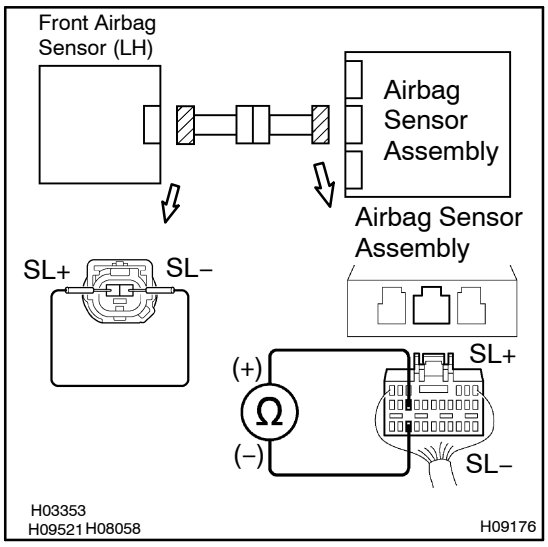
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 10.**

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect SL+ and SL– of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL–.

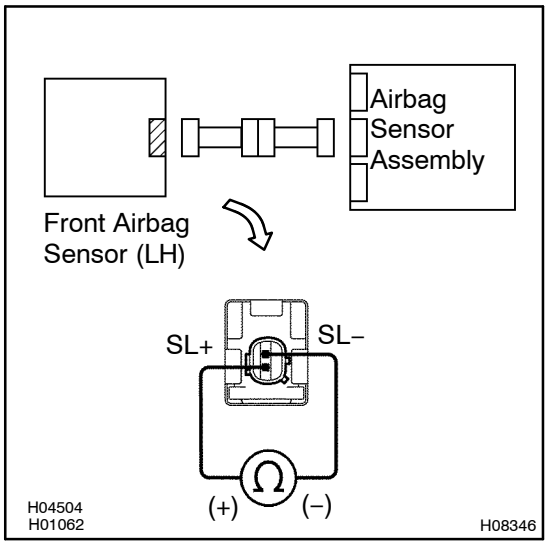
OK:

Resistance: Below 1 Ω

NG → **Go to step 11.**

OK

6	**Check front airbag sensor (LH).**



CHECK:

For the connector of the front airbag sensor (LH), measure the resistance between SL+ and SL–.

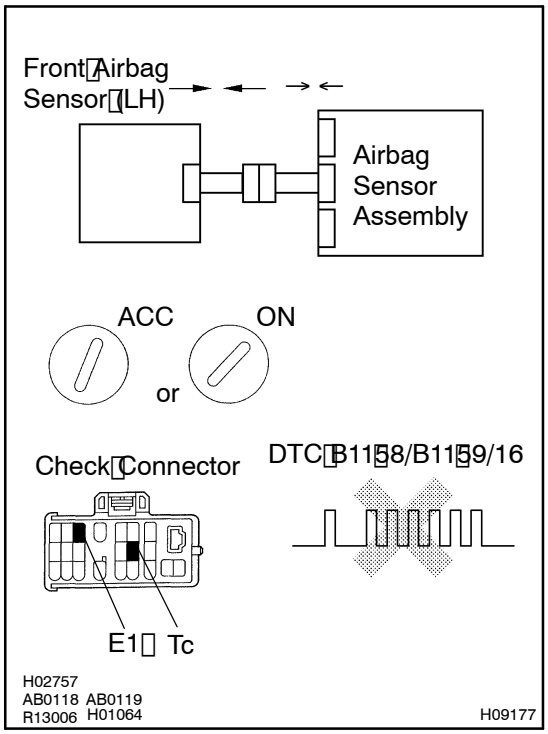
OK:

Resistance: 300 – 1500 Ω

NG → **Replace front airbag sensor (LH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(b) Clear DTC stored in memory. (See page DI–287)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC. (See page DI–287)

OK:

DTC B1158/B1159/16 is not output.

HINT:

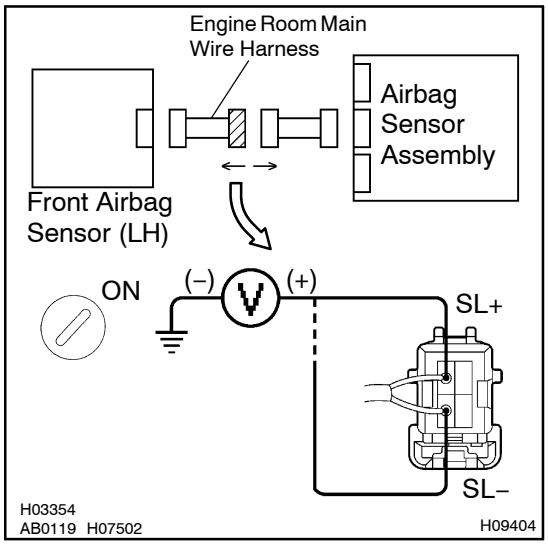
Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor 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.

8	Check engine room main wire harness (to B+).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SL+ and SL–.

OK:

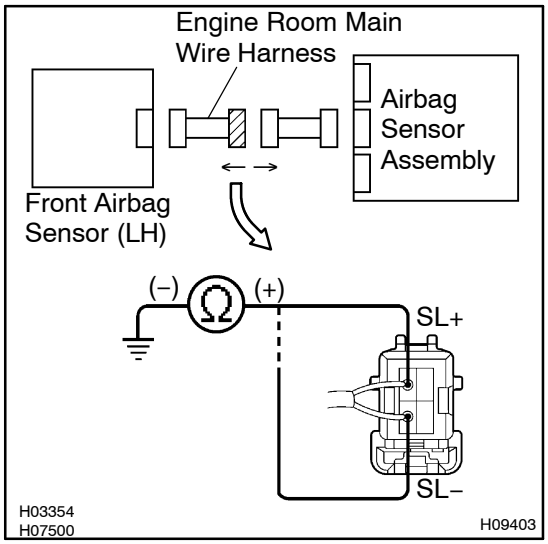
Voltage: Below 1 V

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	Check engine room main wire harness (to ground).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SL+ and SL–.

OK:

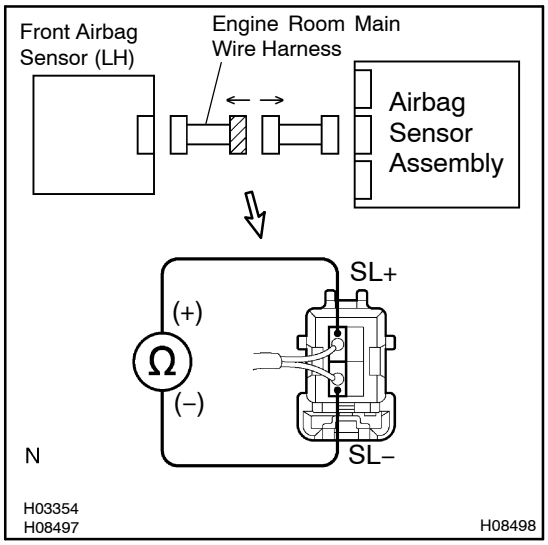
Resistance: 1 MΩ or Higher

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL–.

OK:

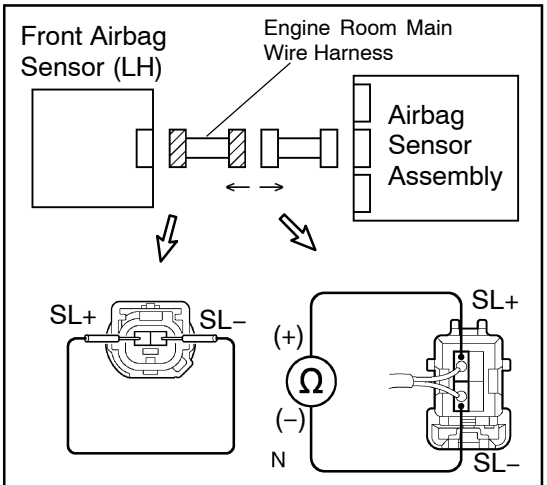
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect SL+ and SL– of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL–.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI1BN–11

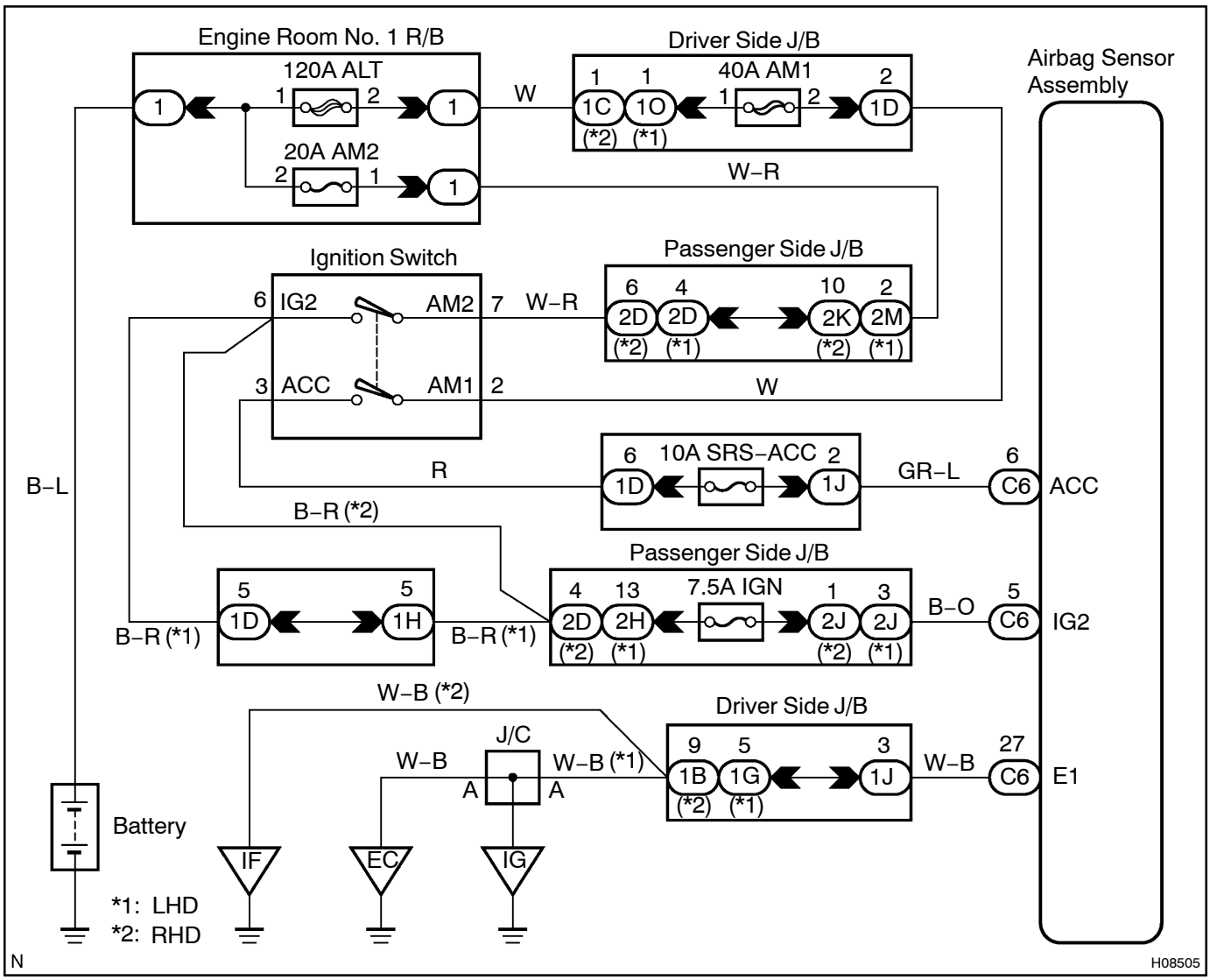
DTC	Normal	Source Voltage Drop

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 from other circuits that is 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.

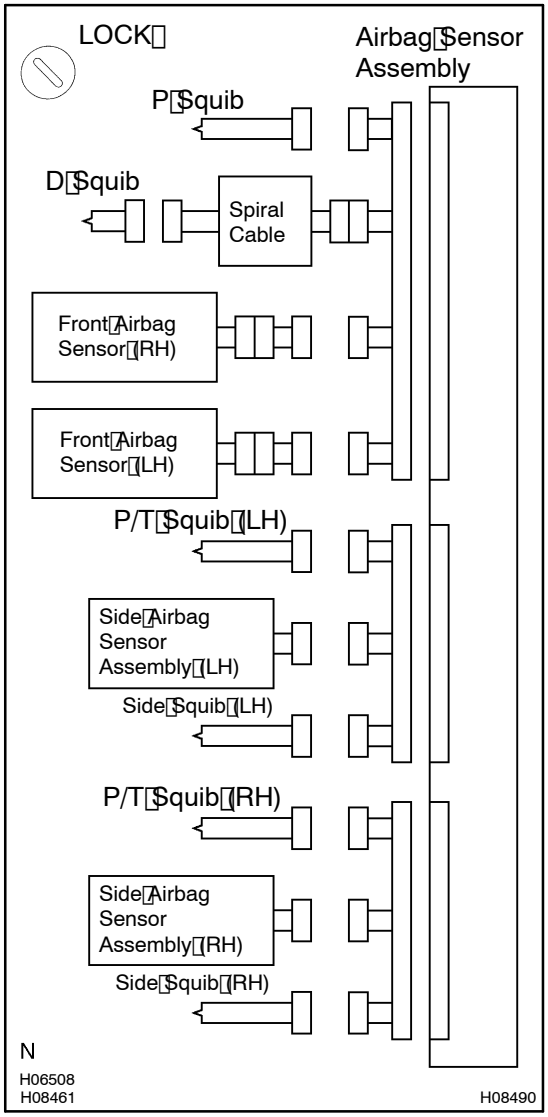
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection.**



PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(b) Remove the steering wheel pad. (See page SR–12)

(c) Disconnect the connector of the front passenger airbag assembly. (See page RS–27)

(d) Disconnect the connectors of the side airbag assembly RH and LH. (See page RS–39)

(e) Disconnect the connectors of the seat belt pretensioner RH and LH. (See page BO–150)

(f) Disconnect the connectors of the airbag sensor assembly. (See page RS–54)

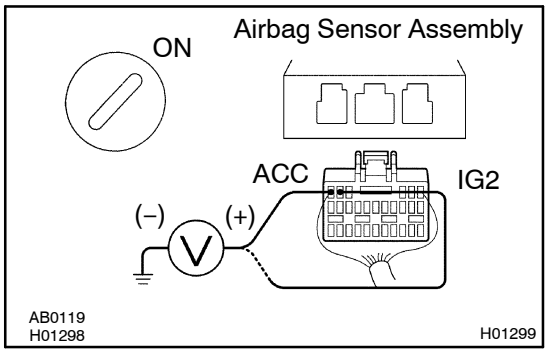
(g) Disconnect the connectors of the front airbag sensor RH and LH. (See page RS–59)

(h) Disconnect the connectors of the side airbag sensor assembly RH and LH. (See page RS–64)

CAUTION:

Store the steering wheel pad, front passenger airbag assembly and seatback assembly (with side airbag assembly) with the front surface facing upward.

2	Check source voltage.



PREPARATION:

Connect negative (–) terminal cable to the battery.

CHECK:

(a) Turn ignition switch ON.

(b) Measure the voltage of each of IG2 and ACC on the sensor and operate electric system. (defogger, wiper, headlight, heater blower, etc.)

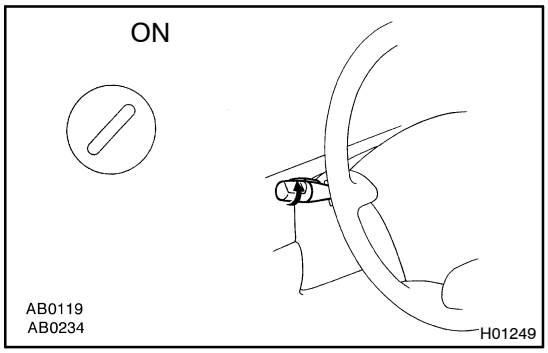
OK:

Voltage: 10 – 14 V

NG	Check harness between battery and airbag sensor assembly, and check battery and charging system.

OK

3	Does SRS warning light turn OFF?



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Connect the steering wheel pad connector.

(c) Connect the front passenger airbag assembly connector.

(d) Connect the airbag sensor assembly connectors.

(e) Connect the side airbag assembly connectors.

(f) Connect the seat belt pretensioner connectors.

(g) Connect the side airbag sensor assembly connectors.

(h) Connect the front airbag sensor connectors.

(i) Turn ignition switch to 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.

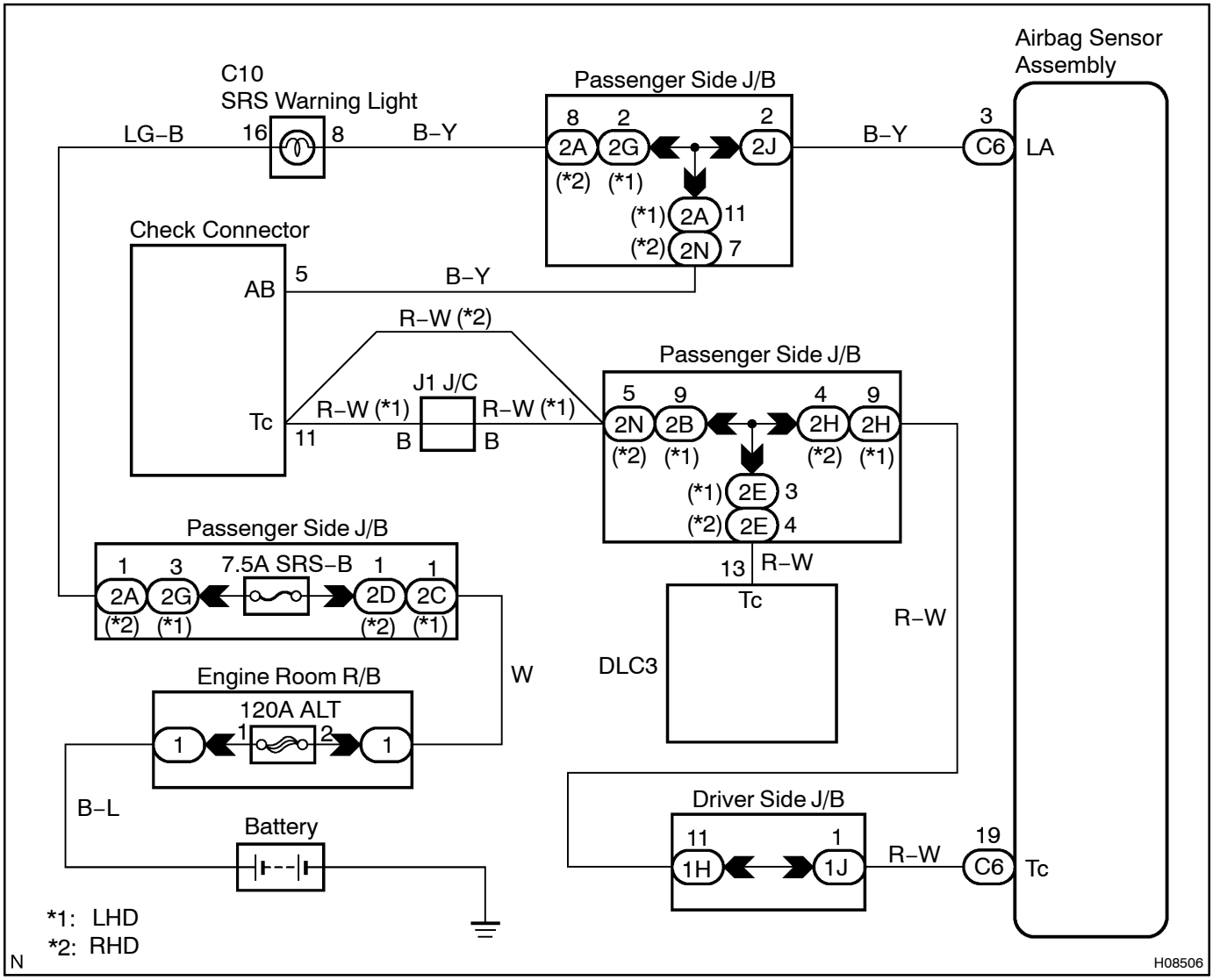
DI56Q–02

SRS Warning Light Circuit Malfunction

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 check connector are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

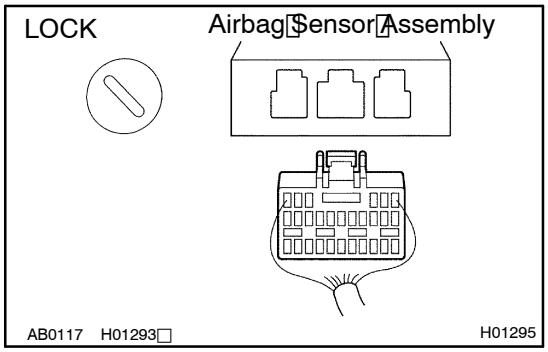


INSPECTION PROCEDURE

Always lights up, when ignition switch is in LOCK position

1	Prepare for inspection. (See step 1 on page DI–416)

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 for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.
(d) Connect negative (–) terminal cable to the battery.

CHECK:

Check operation of the SRS warning light.

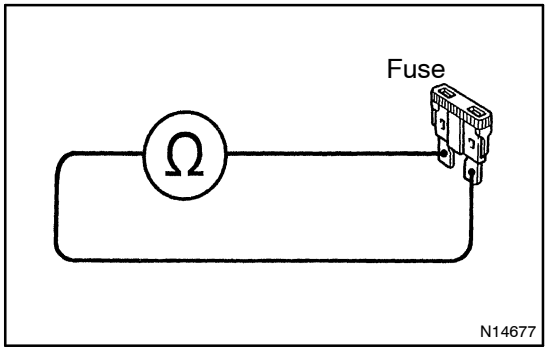
NO → **Check SRS warning light circuit or terminal AB circuit of check connector.**

YES

Replace airbag sensor assembly.

Does not light up, when ignition switch is turned to ACC or ON

1	Check SRS–B Fuse.



PREPARATION:
Remove SRS–B fuse.
CHECK:
Check continuity of SRS–B fuse.
OK:

Continuity

HINT:

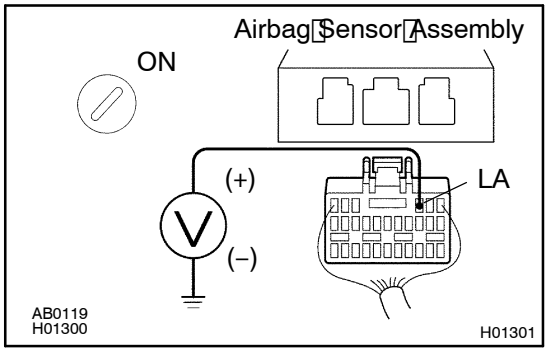
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG	Go to step 5.

OK

2	Prepare for inspection. (See step 1 on page DI–416)

3	Check SRS warning light circuit.



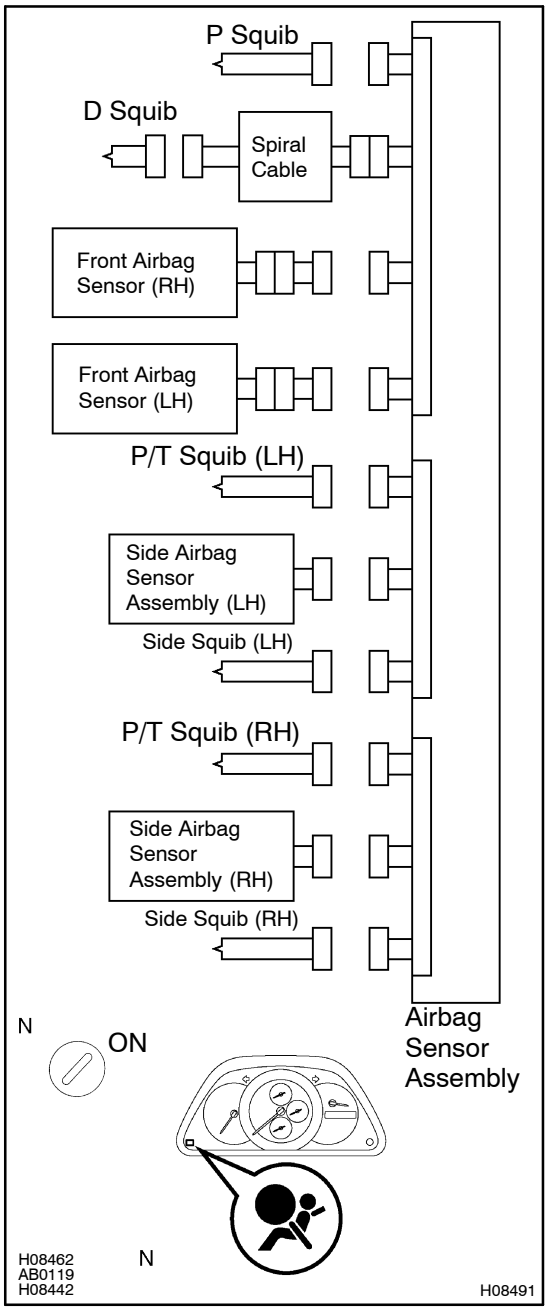
PREPARATION:
(a) Connect negative (–) terminal cable to the battery.
(b) Turn ignition switch to ACC or ON.
CHECK:
Measure the voltage LA terminal of the harness side connector of the airbag sensor assembly.
OK:

Voltage: 10 – 14 V

NG	Check SRS warning light bulb or repair SRS warning light circuit.

OK

4	Does SRS warning light come on?



PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery.
(b) Connect the airbag sensor assembly connectors.
(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.
(d) Turn ignition switch to ACC or ON.

CHECK:

Check operation of the 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 SRS–B fuse burnt out again?

NO → Using simulation method, reproduce malfunction symptoms. (See page IN–22)

YES

Check harness between SRS–B fuse and SRS warning light.

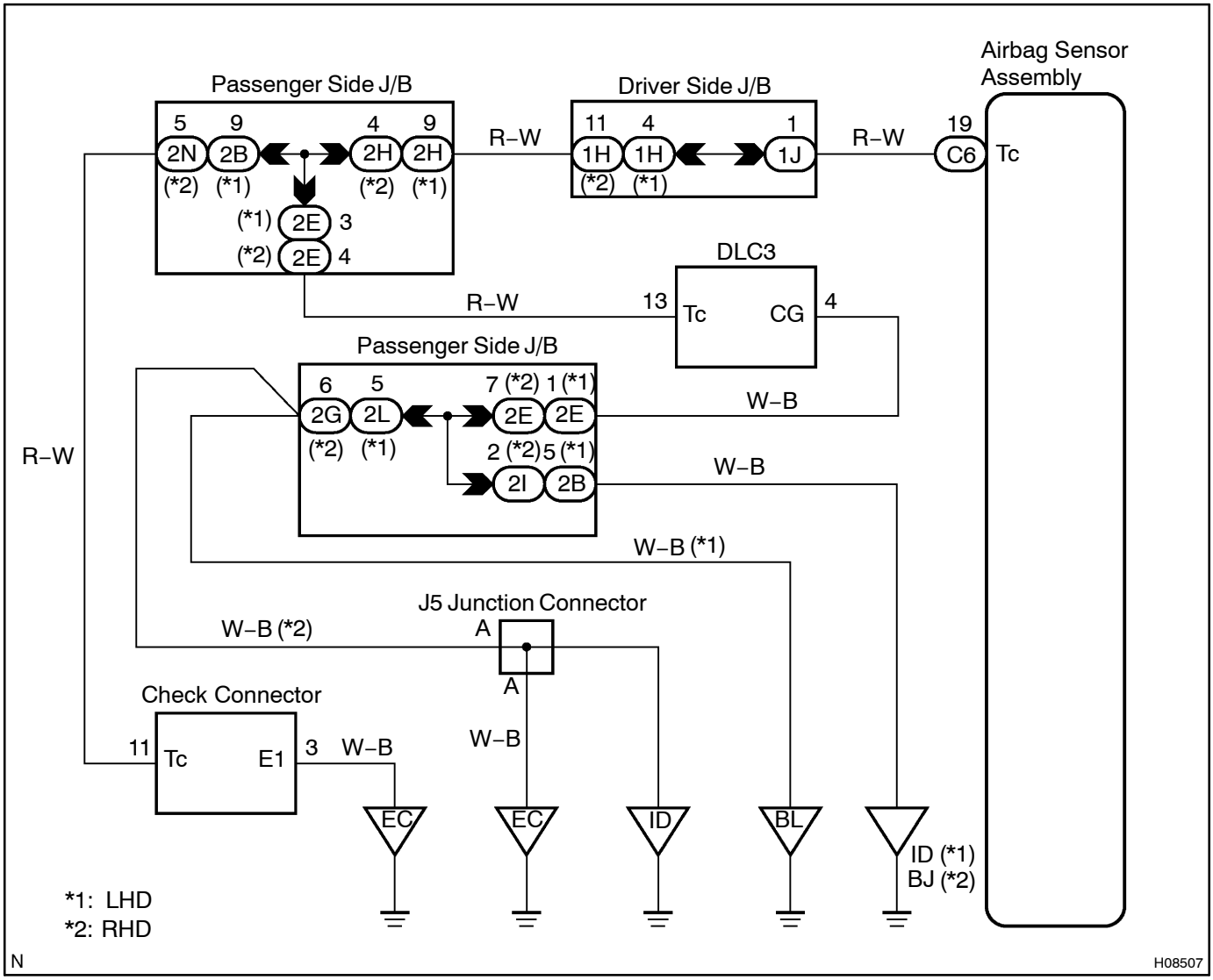
DI1BQ–11

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E1 of the check connector the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

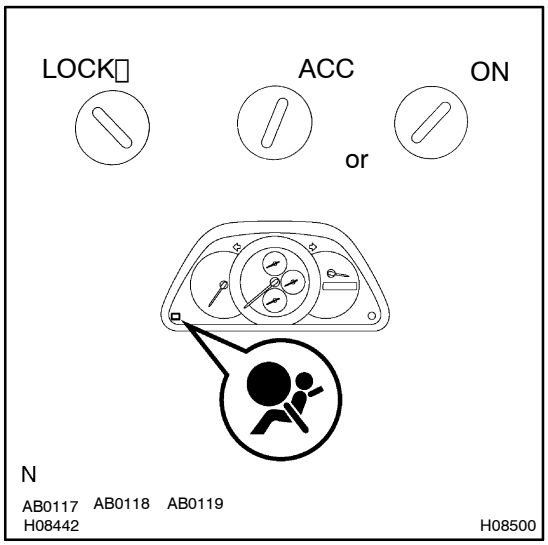
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	Does SRS warning light light up for approx. 6 seconds?



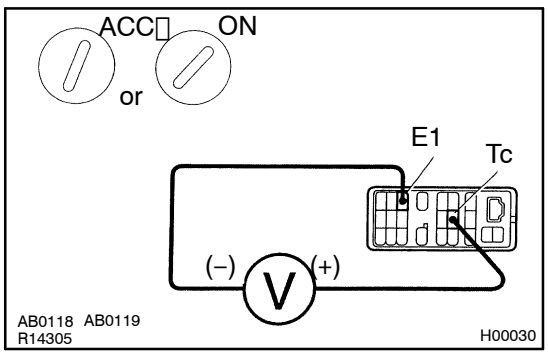
PREPARATION:

Check operation of the SRS warning light after the ignition switch is turned from LOCK position to ACC or ON position.

NO	Check SRS warning light system. (See page DI–287)

YES

2	Check voltage between terminals Tc and E1 of check connector.



PREPARATION:

Turn ignition switch to ACC or ON.

CHECK:

Measure the voltage between terminals Tc and E1 of check connector.

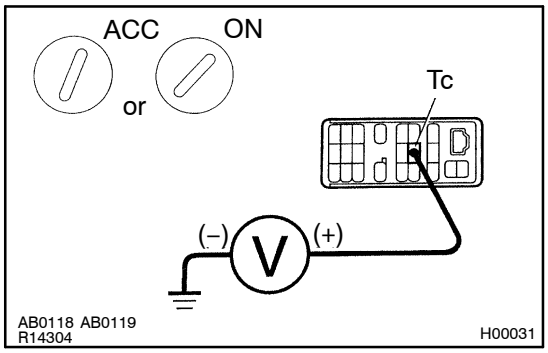
OK:

Voltage: 10 – 14 V

OK	Go to step 4.

NG

3	Check voltage between terminal Tc of check connector and body ground.



CHECK:

Measure the voltage between terminal Tc of check connector and body ground.

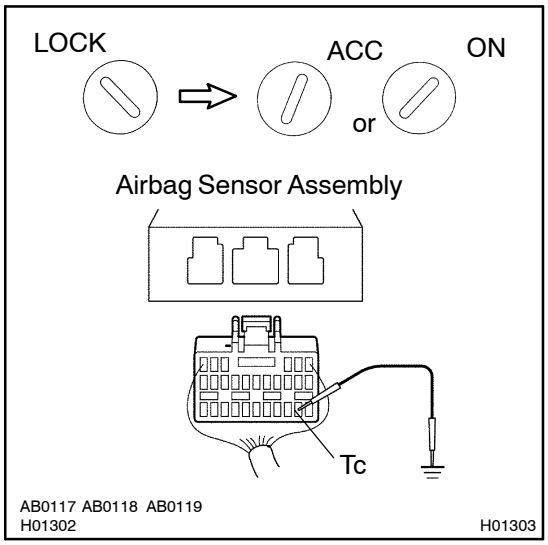
OK:

Voltage: 10 – 14 V

OK	Check harness between terminal E1 of check connector 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 for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.
(d) Insert a service wire into terminal Tc from back side as shown in the illustration.
(e) Connect the airbag sensor assembly connector with a service wire.
(f) Connect negative (–) terminal cable to the battery.
(g) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(h) Connect a service wire of terminal Tc to body ground.

CHECK:

Check operation of the SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

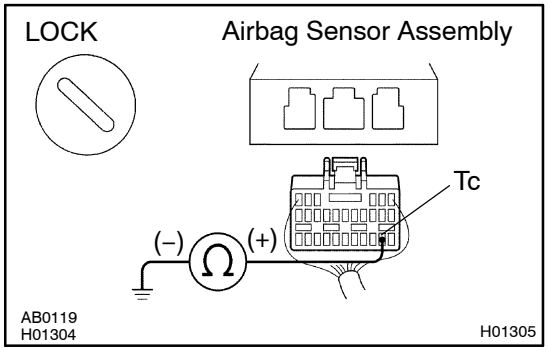
OK	Check harness between the airbag sensor assembly and check connector.

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 for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.

CHECK:

Check resistance between terminal Tc of the airbag sensor assembly connector and body ground.

OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector.**

OK

Replace airbag sensor assembly.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI611–01

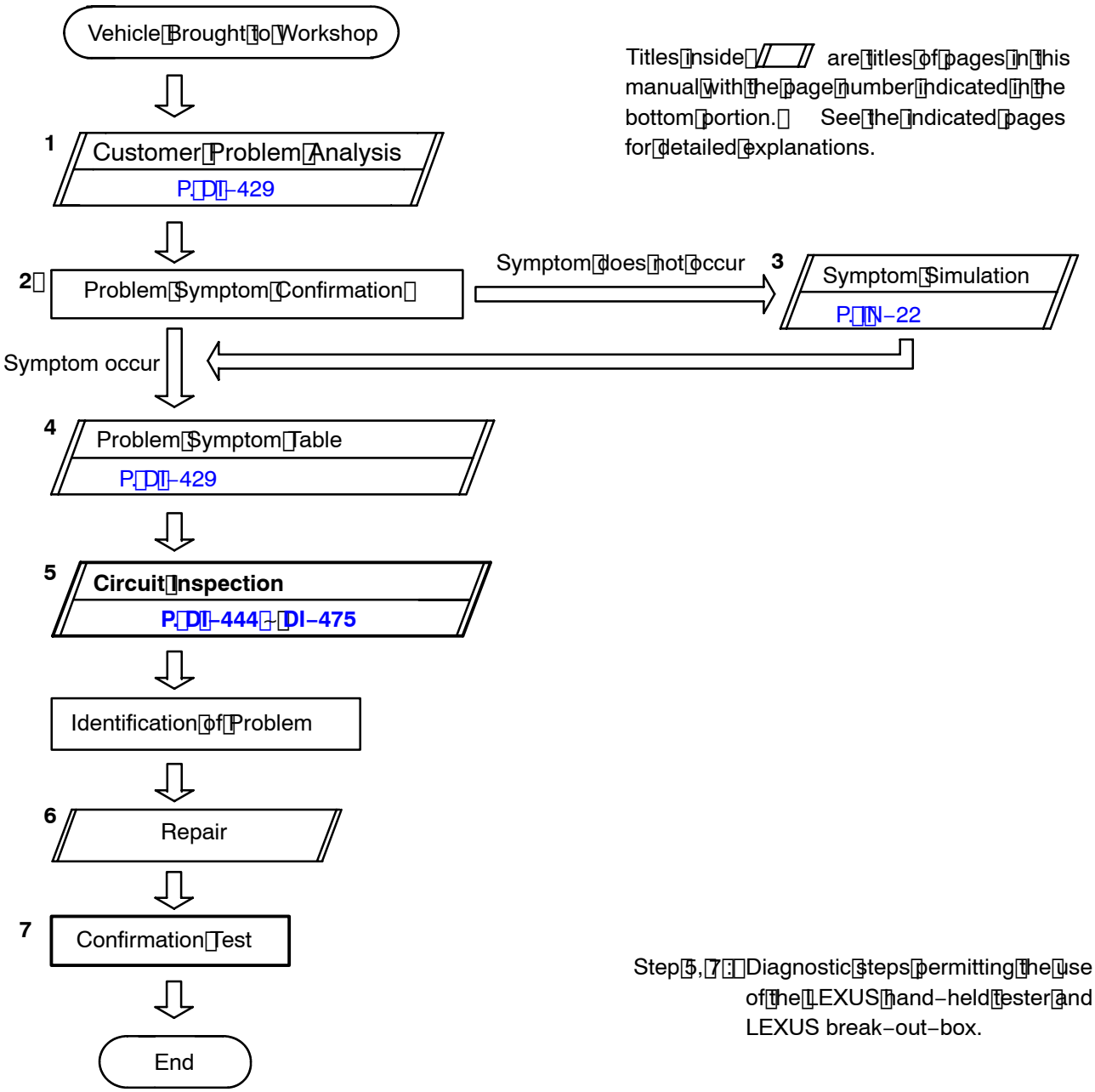
HINT:

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 use 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.

DI612–01

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT 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 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 ☐ 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.		

DI613–01

PRE–CHECK

1. OUT LINE OF THEFT DETERRENT SYSTEM

When the theft deterrent system detects any theft, it informs people around with flashing lights and sound.

The performance of the theft deterrent system has been improved by adding the lights (HAZARDS) to the existing system(for EUROPE model).

There are 2 modes in this system, which are active mode and passive mode.

Except Europe Models:

All initial setting are performed in active mode. It can be switched to passive mode.

2. PARTIAL CHANGE OF SYSTEM SETTING METHOD

There are 4 conditions in this system which are disarmed state, arming preparation, armed state and alarm sounding.

(1) Disarmed state
- When the alarming function does not operate.
- When theft deterrent function is not performed.

(2) Arming preparation
- Time until transferring to armed state.
- Theft deterrent function is not performed.

(3) Armed state
When theft deterrent function is possible.

(4) Alarm sounding:
In this condition, once theft is detected, it is informed using light and sound to people around the vehicle.
Refer to the table for alarming method or time.

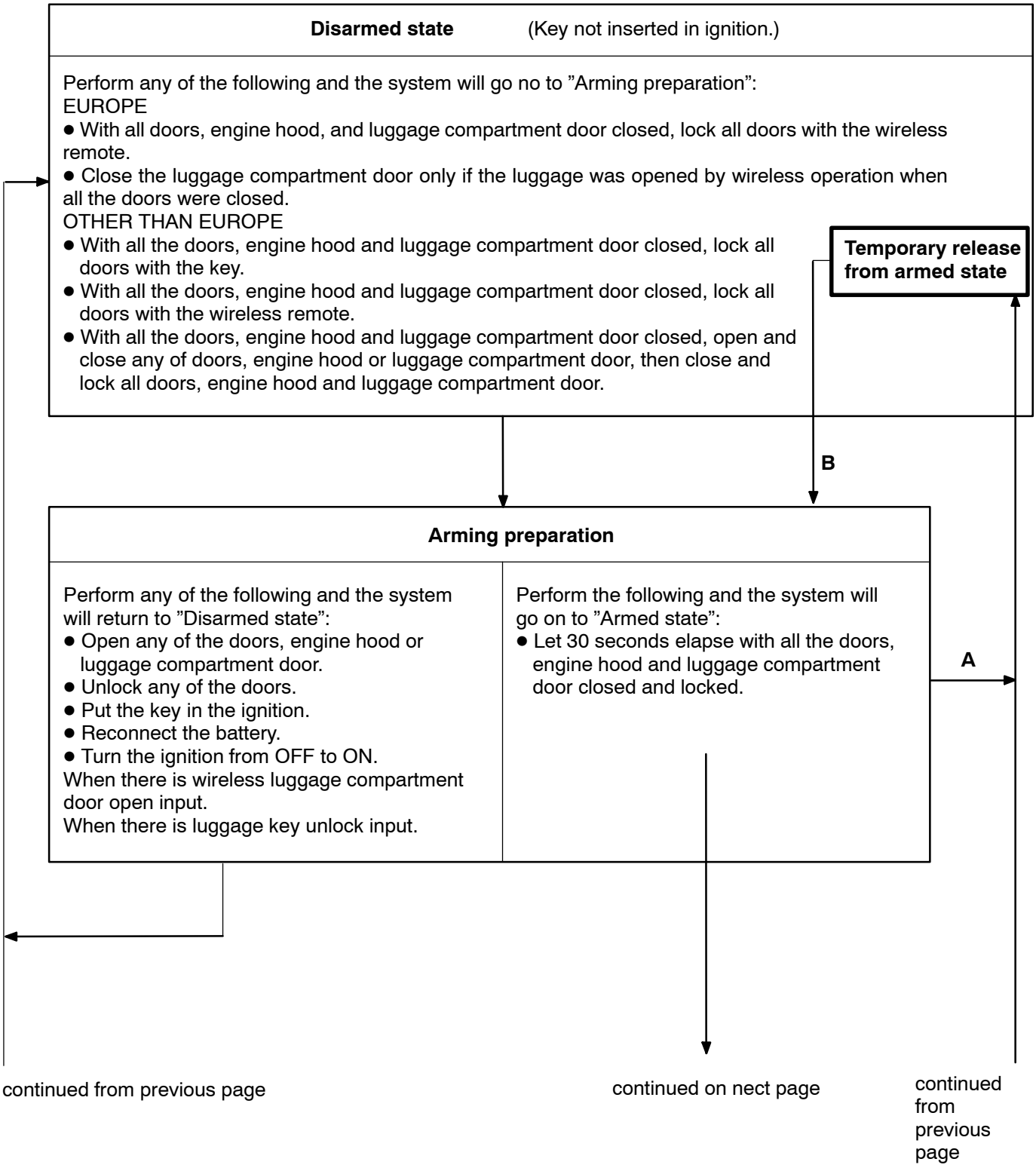
Alarming method	Horn	Europe, Australia
	Security horn	Europe, Australia
	Headlight	Australia
	Taillight	Australia
	Hazard	Europe, Australia
Alarming time	30 seconds	
Alarming output	(Except hazard flashing) Continuous 0.25 secs.: (ON) 0.25 secs.: (OFF)	

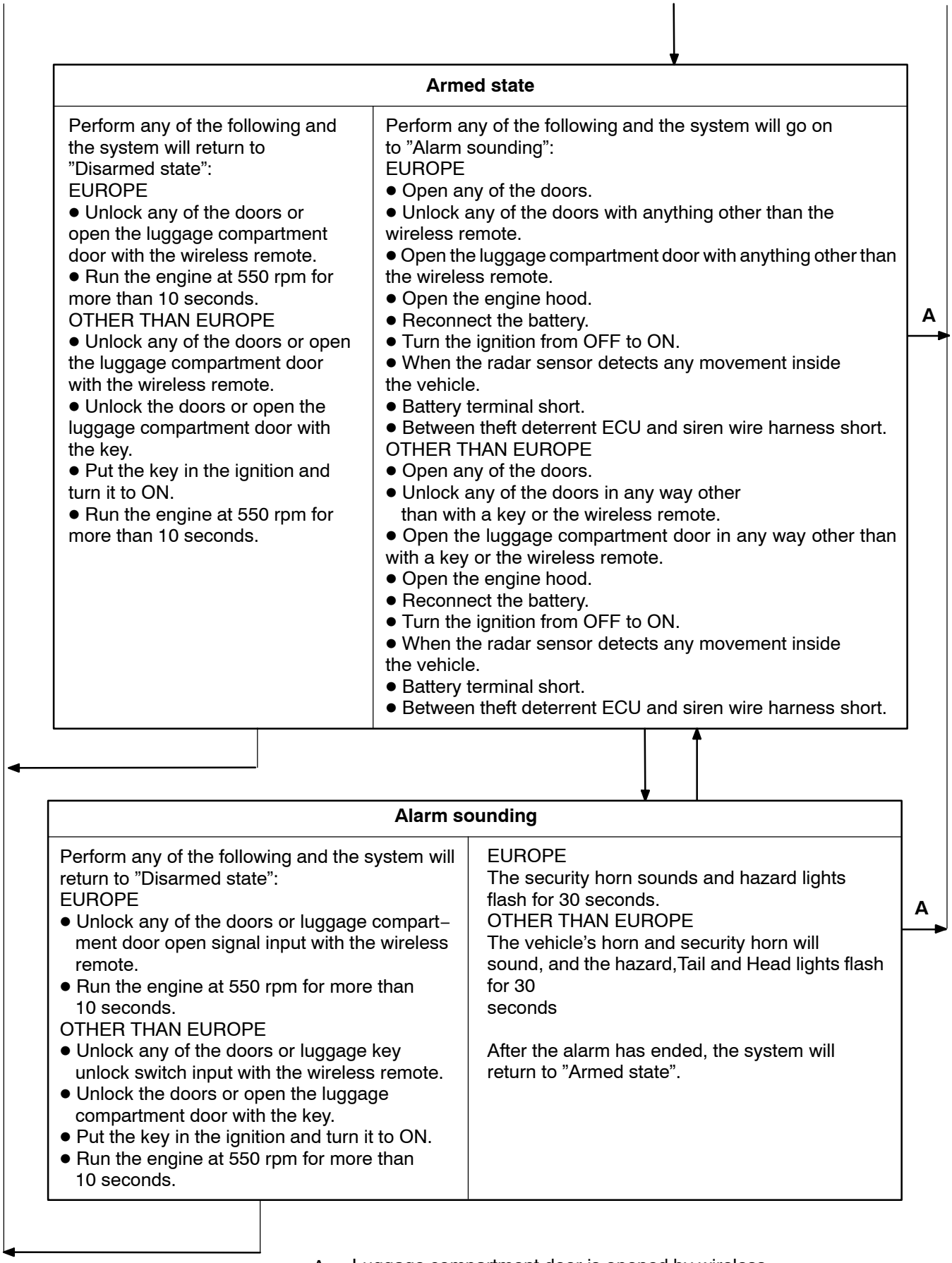
HINT:

Alarming output for hazard is same as the one for the hazard on the vehicle.

In the arming condition when either of doors is unlocked with key not in the key cylinder, force lock signal is output.

3. ACTIVE ARMING MODE





A: Luggage compartment door is opened by wireless.

B: Luggage compartment door is closed.

(a) Indicator light output:

Condition		Output by alarm system	Output by immobilizer	Output by checking visually
Disarming condition	With Key	Goes off	Goes off	Goes off
	Without key		Blinks	Blinks
Disarming preparation condition		Lights up	Blinks	Lights up
Arming condition		Goes off	Blinks	Blinks
Alarming condition		Lights up	Blinks	Lights up

HINT:
The indicator light might blink even under the disarming condition. (This is caused by output from the immobilizer)
The indicator always blink by output from the immobilizer at any time under the arming condition.
Blinking frequency 0.75 (S): ON 1.25 (S): OFF

(b) Answer back and ON/OFF function of radar sensor:
HINT:
Radar sensor si switched ON/OFF while synchronizing with a change in set/un–set condition of the alarm system described below. It is also switched ON/OFF by the method described in (2).

(1) Radar sensor operation condition:

Sensor operation starts:	When the condition for arming preparation condition is met.
Sensor operation stops:	When the condition is transformed to the disarming condition.

(2) Radar sensor ON/OFF switching function:
Every time the button of the wireless door lock system is pressed under the arming preparation condition, sensor is switched ON/OFF.

(3) Answer back:
When the sensor is switched OFF, hazard warning light blinks 5 times as "Answer back". When the sensor is switched ON, the hazard warning light blinks once in the same manner as a normal answer back of the wireless door lock system.

(c) Compulsion door lock function.

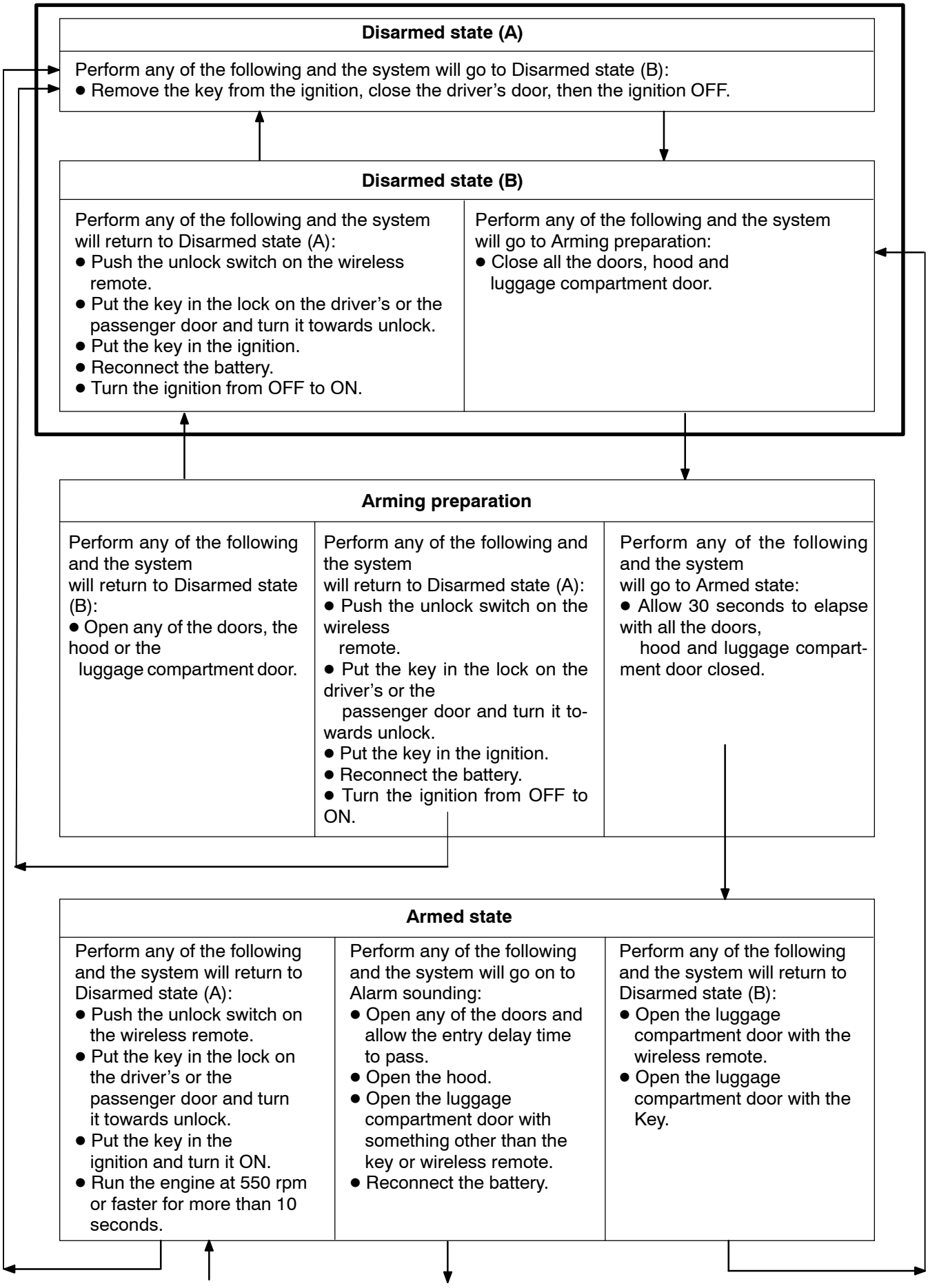
(1) This is a control function to lock a door forcibly to prevent someone from invading in the vehicle when the inner door lock knob is unlocked under the arming condition, that is, when the alarming starts.
In Europe, when a door is locked with a key the alarm sounds, however doors are not locked forcibly.

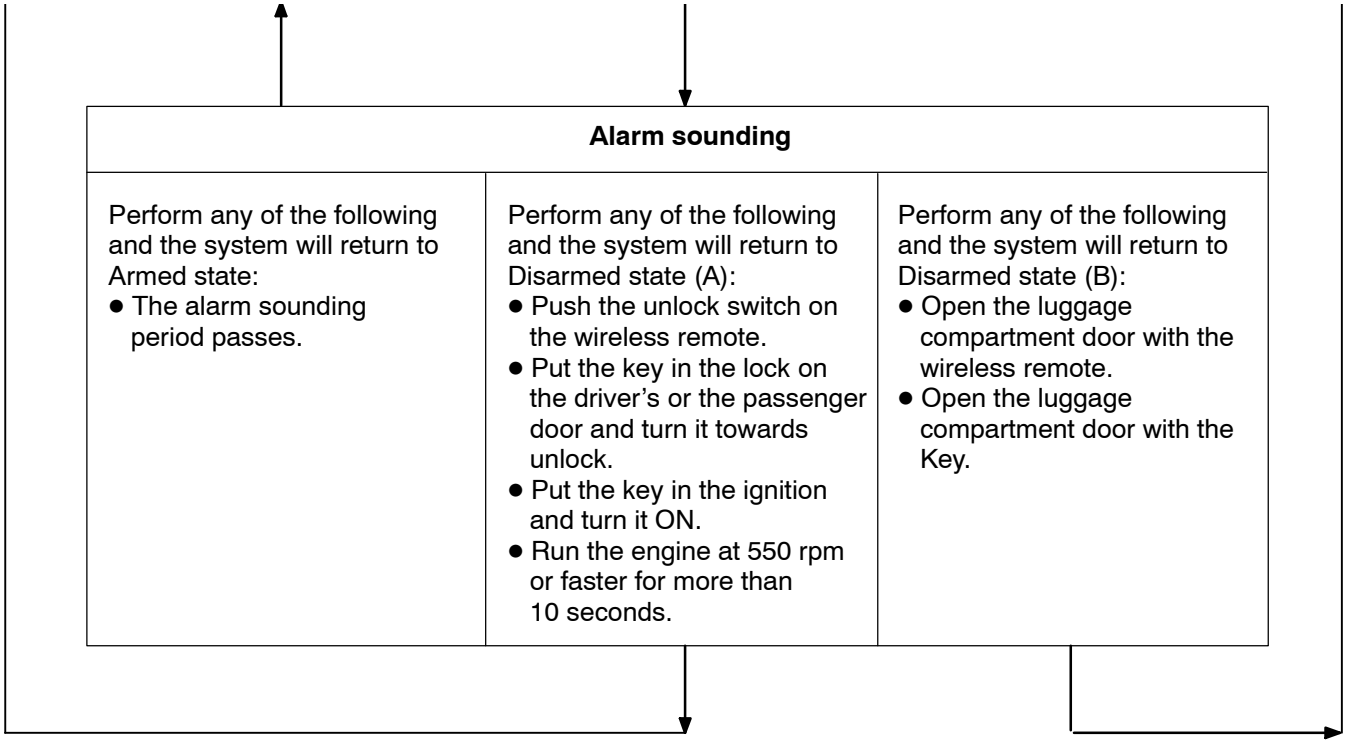
(2) The setting specifications of the compulsion door lock function change as follows according to whether the double lock system is available or not.

Destination		Double lock	Compulsion door lock
Europe	RHD	○	X
		X	○
	LHD	X	○
Australia / General countries		X	○

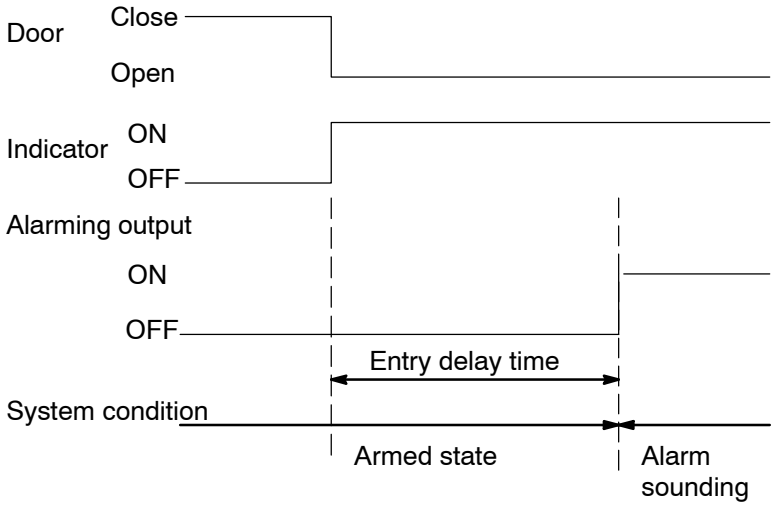
4. PASSIVE ARMING MODE (Except Europe Models)

- This mode can be switched according to the specified operation.
- All initially set modes (when shipped from factory) are active mode. (No passive mode)


Disarmed state (A)
Perform any of the following and the system will go to Disarmed state (B):
● Remove the key from the ignition, close the driver's door, then the ignition OFF.
Disarmed state (B)
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition.
● Reconnect the battery.
● Turn the ignition from OFF to ON.
Perform any of the following and the system will go to Arming preparation:
● Close all the doors, hood and luggage compartment door.
Arming preparation
Perform any of the following and the system will return to Disarmed state (B):
● Open any of the doors, the hood or the luggage compartment door.
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition.
● Reconnect the battery.
● Turn the ignition from OFF to ON.
Perform any of the following and the system will go to Armed state:
● Allow 30 seconds to elapse with all the doors, hood and luggage compartment door closed.
Armed state
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition and turn it ON.
● Run the engine at 550 rpm or faster for more than 10 seconds.
Perform any of the following and the system will go on to Alarm sounding:
● Open any of the doors and allow the entry delay time to pass.
● Open the hood.
● Open the luggage compartment door with something other than the key or wireless remote.
● Reconnect the battery.
Perform any of the following and the system will return to Disarmed state (B):
● Open the luggage compartment door with the wireless remote.
● Open the luggage compartment door with the Key.


Alarm sounding
Perform any of the following and the system will return to Armed state:
● The alarm sounding period passes.
Perform any of the following and the system will return to Disarmed state (A):
● Push the unlock switch on the wireless remote.
● Put the key in the lock on the driver's or the passenger door and turn it towards unlock.
● Put the key in the ignition and turn it ON.
● Run the engine at 550 rpm or faster for more than 10 seconds.
Perform any of the following and the system will return to Disarmed state (B):
● Open the luggage compartment door with the wireless remote.
● Open the luggage compartment door with the Key.

HINT:
In armed state either closed door is opened, entry delay occurs. (15 secs.)
During this time, the mode transfers to disarmed state when the condition described above * is met.
When the condition is not met, the system judges theft occurs, the mode transfers to alarm sounding.



(a) Indiatcor light output

Condition		Output by alarm system	Output by immobilizer	Output by checking visually
Disarming condition	With Key	Goes off	Goes off	Goes off
	Without key		Blinks	Blinks
Disarming preparation condition		Lights up	Blinks	Lights up
Arming condition		Goes off	Blinks	Blinks
Alarming condition		Lights up	Blinks	Lights up

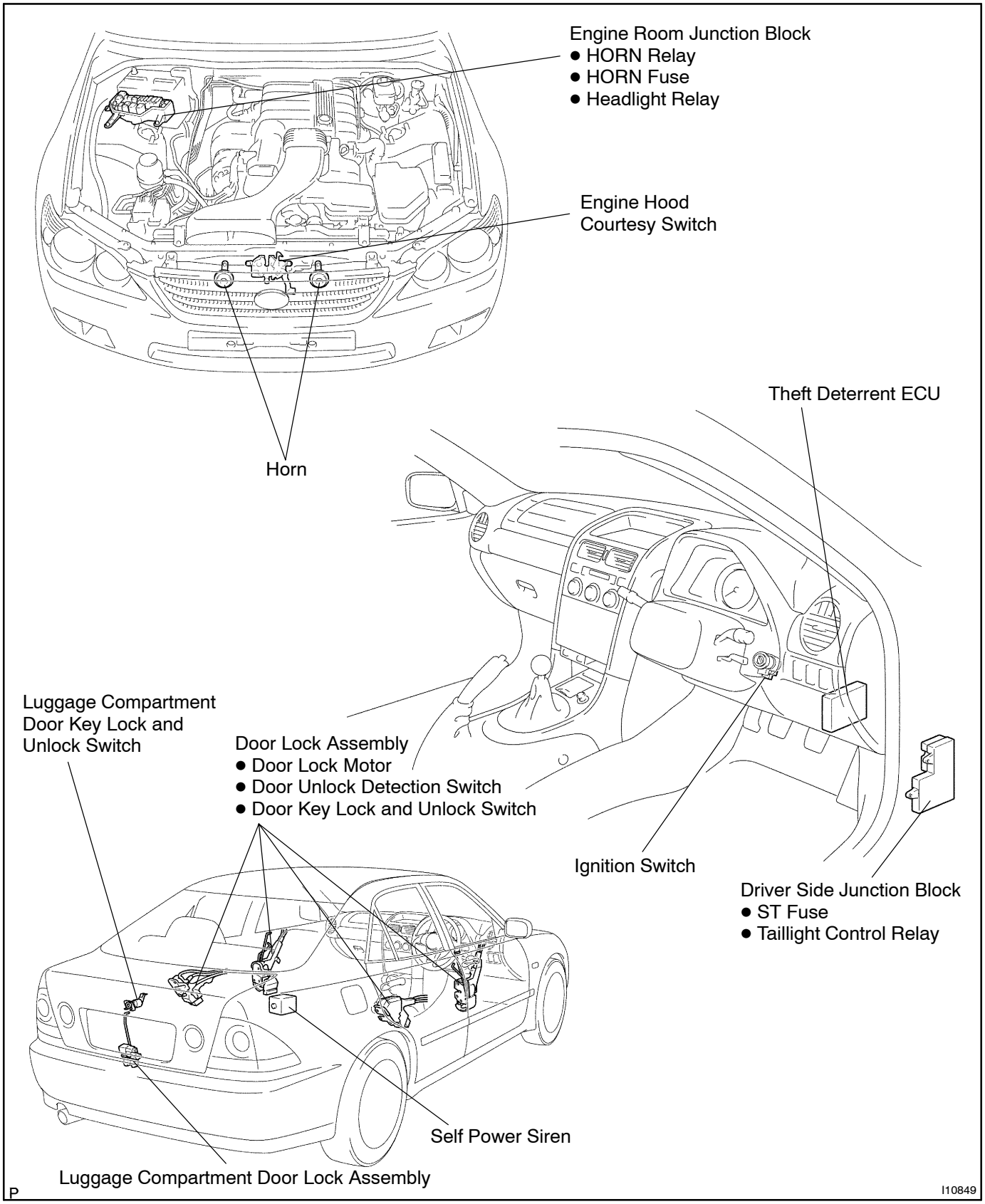
HINT:
The indicator light might blink even under the disarming condition. (This is caused by output from the immobilizer)
The indicator always blink by output from the immobilizer at any time under the arming condition.
Blinking frequency 0.75 (S): ON 1.25 (S): OFF

(b) Transfer to active mode:
In each passive mode, when ”disarmed state of active mode → arming preparation transfer condition” is met, the active mode transfers to each condition. In this case, active mode continues till disarmed state.

Passive mode when transfer condition is met.	Active mode transfer condition
Disarmed state	Arming preparation condition
Arming preparation condition	Arming preparation condition
Armed state (During entry delay time)	Arming condition (After alarming time has elapsed, arming condition)
Alarm sounding	After alarming time has elapsed, arming condition

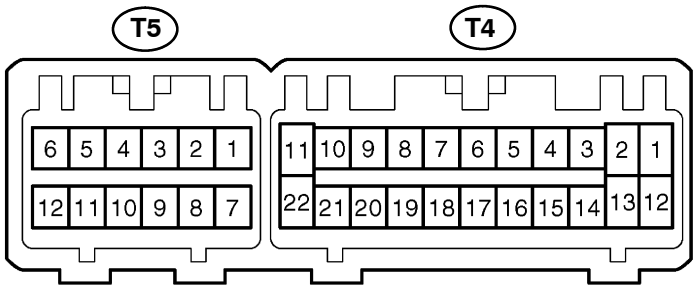
DI614–01

PARTS LOCATION



DI615–01

TERMINALS OF ECU



I01920

Symbols (Terminals No.)	Wiring Color	Condition	STD Value
HEAD ↔ E (T4–1 ↔ T4–22)	R–B ↔ W–B	Light control switch position is HEAD.	Below 1 V
		Light control switch position is OFF or TAIL.	10 – 14 V
TAIL ↔ E (T4–2 ↔ T4–22)	R–W ↔ W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
DSWH ↔ E (T4–4 ↔ T4–22)	L–R ↔ W–B	Engine hood courtesy switch position is OFF. (Engine hood closed)	Below 1 V
		Engine hood courtesy switch position is ON. (Engine hood opened)	10 – 14 V
LUG ↔ E (T4–5 ↔ T4–22)	B–W ↔ W–B	Luggage compartment door key lock and unlock switch position is ON.	Below 1 V
		Luggage compartment door key lock and unlock switch position is OFF.	10 – 14 V
S+B ↔ E (T4–8 ↔ T4–22)	G ↔ W–B	Constant	10 – 14 V
CLTB ↔ E (T4–9 ↔ T4–22)	R ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
IG ↔ E (T4–10 ↔ T4–22)	B–R ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
+B1 ↔ E (T4–11 ↔ T4–22)	W–R ↔ W–B	Constant	10 – 14 V
H ↔ E (T4–12 ↔ T4–22)	R–Y ↔ W–B	Light control switch position is HEAD.	Below 1 V
		Light control switch position is OFF or TAIL.	10 – 14 V
T ↔ E (T4–13 ↔ T4–22)	R ↔ W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
A ↔ E (T4–14 ↔ T4–22)	G–Y ↔ W–B	Light control switch position is AUTO.	Below 1 V
		Light control switch position is OFF, TAIL or HEAD.	10 – 14 V
FOG ↔ E (T4–17 ↔ T4–22)	W–R ↔ W–B	Fog light switch position is ON.	Below 1 V
		Fog light switch position is OFF.	10 – 14 V
TOUT ↔ E (T4–18 ↔ T4–22)	G–O ↔ W–B	Radar sensor detection invader	Below 1 V
		Constant	10 – 14 V
KSW ↔ E (T4–19 ↔ T4–22)	B–Y ↔ W–B	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
CLTS ↔ E (T4–20 ↔ T4–22)	Y ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
CLTE ↔ E (T4–21 ↔ T4–22)	BR ↔ W–B	Constant	Below 1 V

E ↔ Body ground (T4–22 ↔ Body ground)	W–B ↔ Body ground	Constant	Below 1 V
+B2 ↔ E (T5–1 ↔ T4–22)	R–Y ↔ W–B	Constant	10 – 14 V
HORN ↔ E (T5–4 ↔ T4–22)	G–W ↔ W–B	Horn switch position is ON.	Below 1 V
		Horn switch position is OFF.	10 – 14 V
CLTS ↔ E (T5–9 ↔ T4–22)	L–Y ↔ W–B	Theft deterrent sylstem change condition.	One time
		Contstant	10 – 14 V
TRIG ↔ E (T5–10 ↔ T4–22)	L–O ↔ W–B	I¥Theft deterrent system is alarming contidion.	Below 1 V
		Constant	10 – 14 V
IND ↔ E (T5–12 ↔ T4–22)	L–B ↔ W–B	During set preparation.	3 – 5 V

DI616–01

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and trouble-shoot 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.

Symptom	Suspect Area	See page
The theft deterrent system cannot be set	1. Indicator light circuit 2. ECU power source circuit 3. Key unlock warning switch circuit 4. Luggage compartment door key lock and unlock switch circuit 5. Luggage compartment door courtesy switch circuit 6. Door key lock and unlock switch circuit 7. Door courtesy switch circuit 8. Door unlock detection switch circuit 9. Engine hood courtesy switch circuit	DI–444 DI–446 DI–465 DI–467 DI–586 DI–598 DI–583 DI–595 DI–475
The indicator light does not blink when system is set.	Indicator light circuit	DI–444
When the system is set (The system does not operate when the rear door is unlocked).	Door unlock detection switch circuit	DI–595
When the system is set (The system does not operate when the luggage compartment door is opened by a method other than the key).	Luggage compartment door courtesy switch circuit	DI–586
When the system is set (The system does not operate when the engine hood is opened).	Engine hood courtesy switch circuit	DI–475
When the system is set (It is not canceled when the ignition key is turned to ACC or ON position (Except Europe Models)).	Ignition switch circuit	DI–449
When the system is set (It still operates when the luggage compartment door is opened with the key (Except Europe Models)).	Luggage compartment door key lock and unlock switch circuit	DI–467
When the system is set (The system does not operate when after 30 seconds put your hand through the window and shake it near the sensor).	Radar sensor circuit	DI–473
While the system is in warning operation (Horns do not sound).	Horn relay circuit	DI–451
While the system is in warning operation (Siren does not sound).	Self power siren circuit	DI–470
While the system is in warning operation (When the siren does not sound or stops soon after it starts).	Self power siren battery	BE–124
While the system is in warning operation (Headlights do not flash).	Headlight control relay circuit	DI–459
While the system is in warning operation (Taillights do not flash).	Taillight control relay circuit	DI–462
While the system is in warning operation (Hazard lights do not flash).	Hazard switch circuit	DI–568
While the system is in warning operation (The door lock is not locked).	Door unlock detection switch circuit	DI–595
System is still set even when a rear door is open	Door courtesy switch circuit	DI–583
Even when the system is not set (Horns sound).	Horn relay circuit	DI–451

Even when the system is not set (Siren sounds).	Self power siren circuit	DI–470
Even when the system is not set (when the siren does not sound or stops soon after it starts).	Self power siren battery	BE–124
Even when the system is not set (Headlights stay on).	Headlight control relay circuit	DI–459
Even when the system is not set (Taillights stay on).	Taillight control relay circuit	DI–462
Even when the system is not set (Hazard lights do not flash).	Hazard switch circuit	DI–568

DI617–01

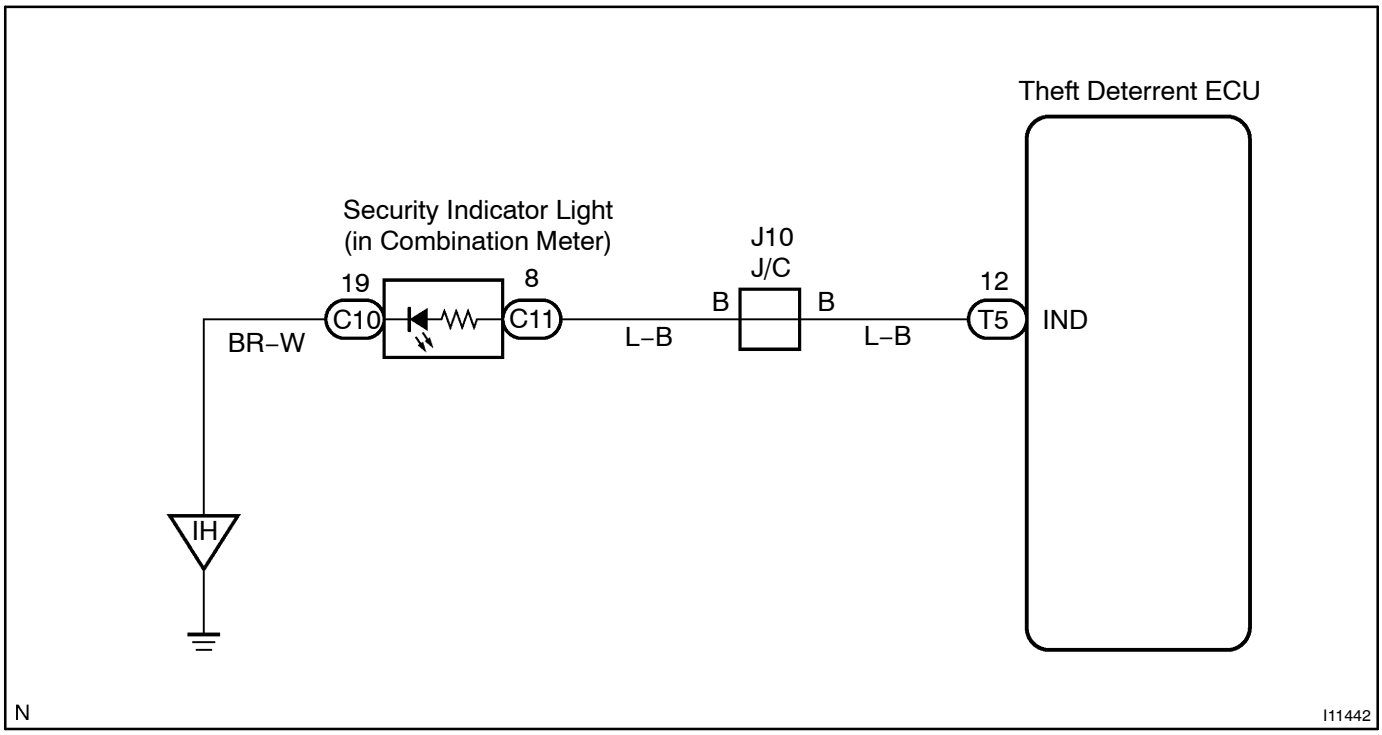
CIRCUIT INSPECTION

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

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check theft deterrent indicator using LEXUS hand–held tester.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Connect terminals Tc and E1 of DLC1.
CHECK:
Check that the theft deterrent indicator can light in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check indicator light (See page BE–124).**

NG → **Replace the bulb or meter wire harness.**

OK

3	**Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN–32).**

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 in problem symptom table (See page DI–442).

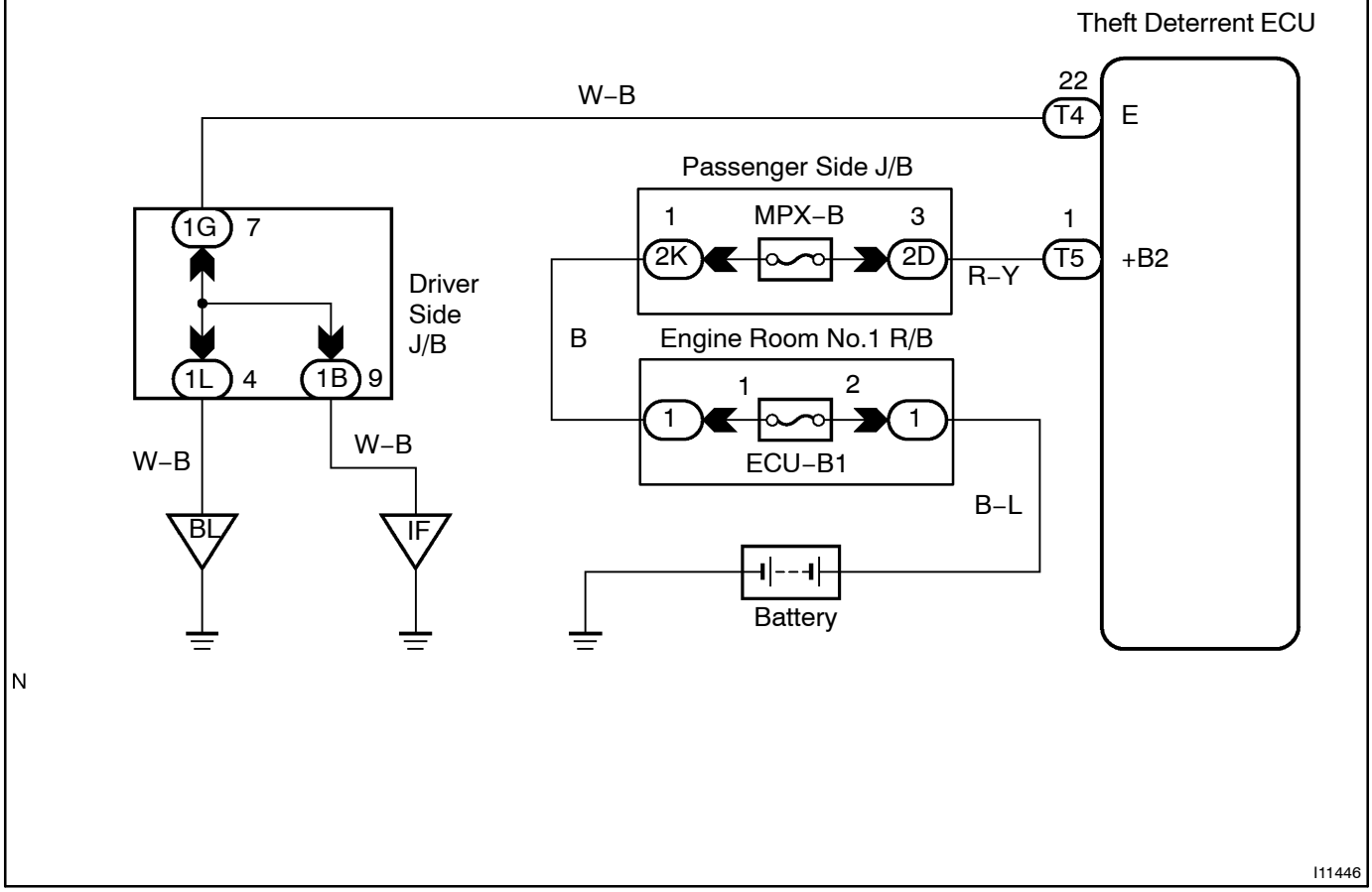
DI618–01

ECU Power Source Circuit

CIRCUIT DESCRIPTION

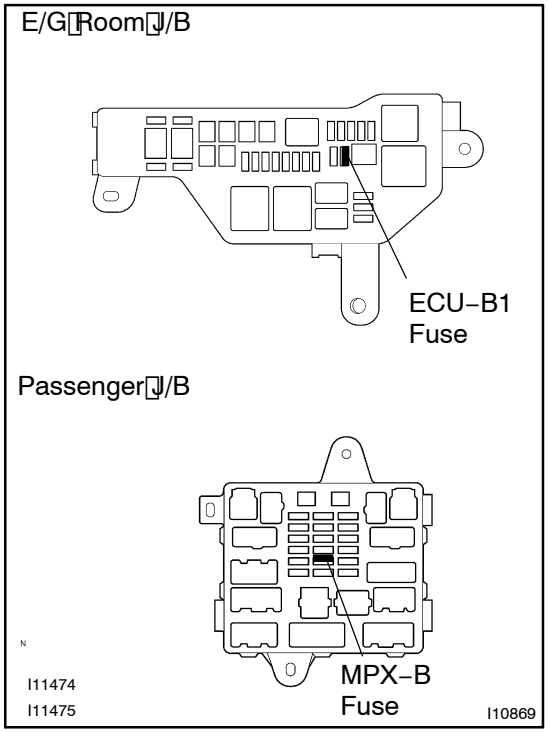
This circuit provides power to operate the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check MPX–B and ECU–B1

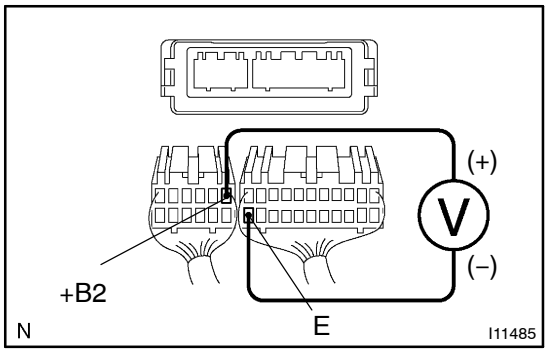


PREPARATION:
Remove MPX–B and ECU–B1 fuse from engine room junction block No.2.
CHECK:
Check continuity of MPX–B and ECU–B1 fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to the MPX–B and ECU–B1 fuse (See attached wiring diagram).**

OK

2	Check voltage between terminals +B2 and E of theft deterrent ECU connector.



PREPARATION:
Disconnect the theft deterrent ECU connector.
CHECK:
Measure voltage between terminals +B2 and E of theft deterrent ECU connector.
OK:
Voltage: 10~14V

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–442).**

NG

3	Check for open in harness and connector between ECU and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.

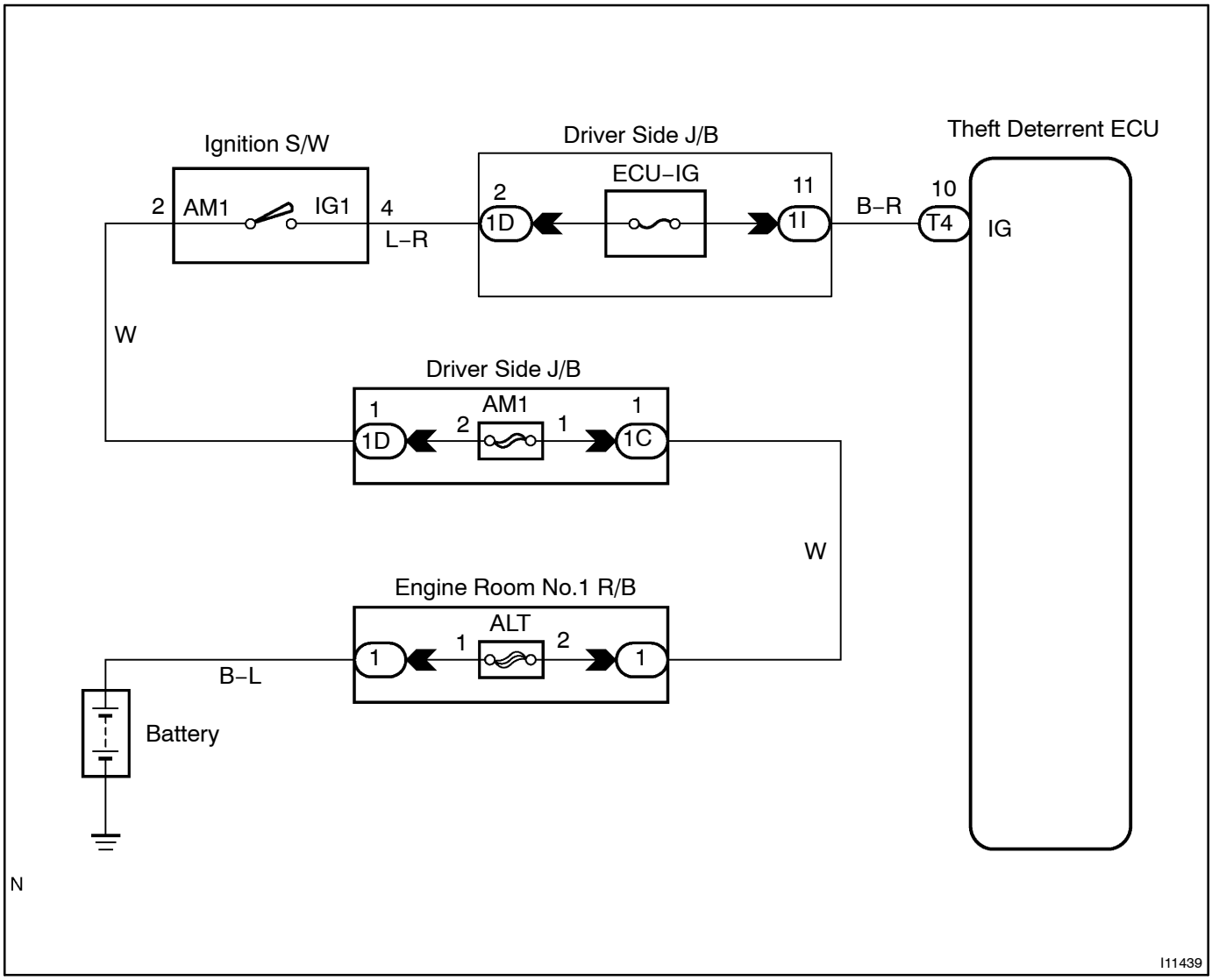
DI619–01

Ignition Switch Circuit

CIRCUIT DESCRIPTION

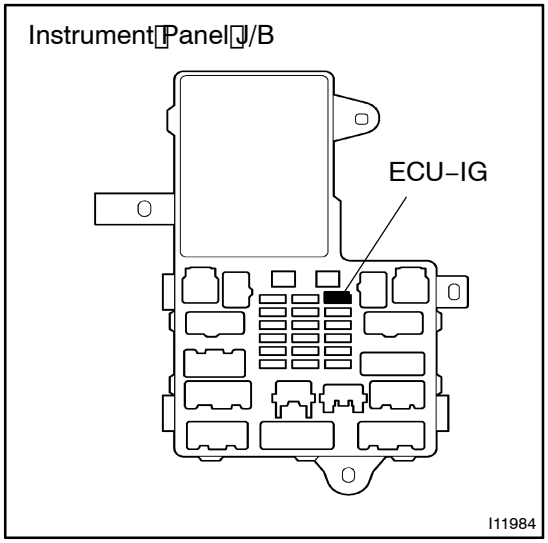
When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU. Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU. When the battery positive voltage is applied 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 ECU–IG fuse.



PREPARATION:
(a) Remove the fuse box opening cover.
(b) Remove ECU–IG fuse from instrument panel junction block.

CHECK:
Check continuity of ECU–IG fuses.

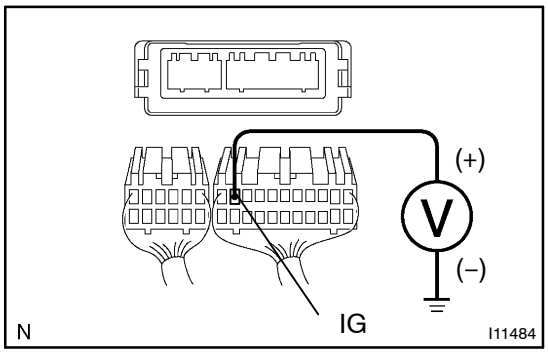
OK:

Continuity

NG → **Check for short in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

OK

2	Check voltage between terminals IG 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 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–32).**

OK

Check and replace theft deterrent ECU.

DI61A–01

Horn Relay Circuit

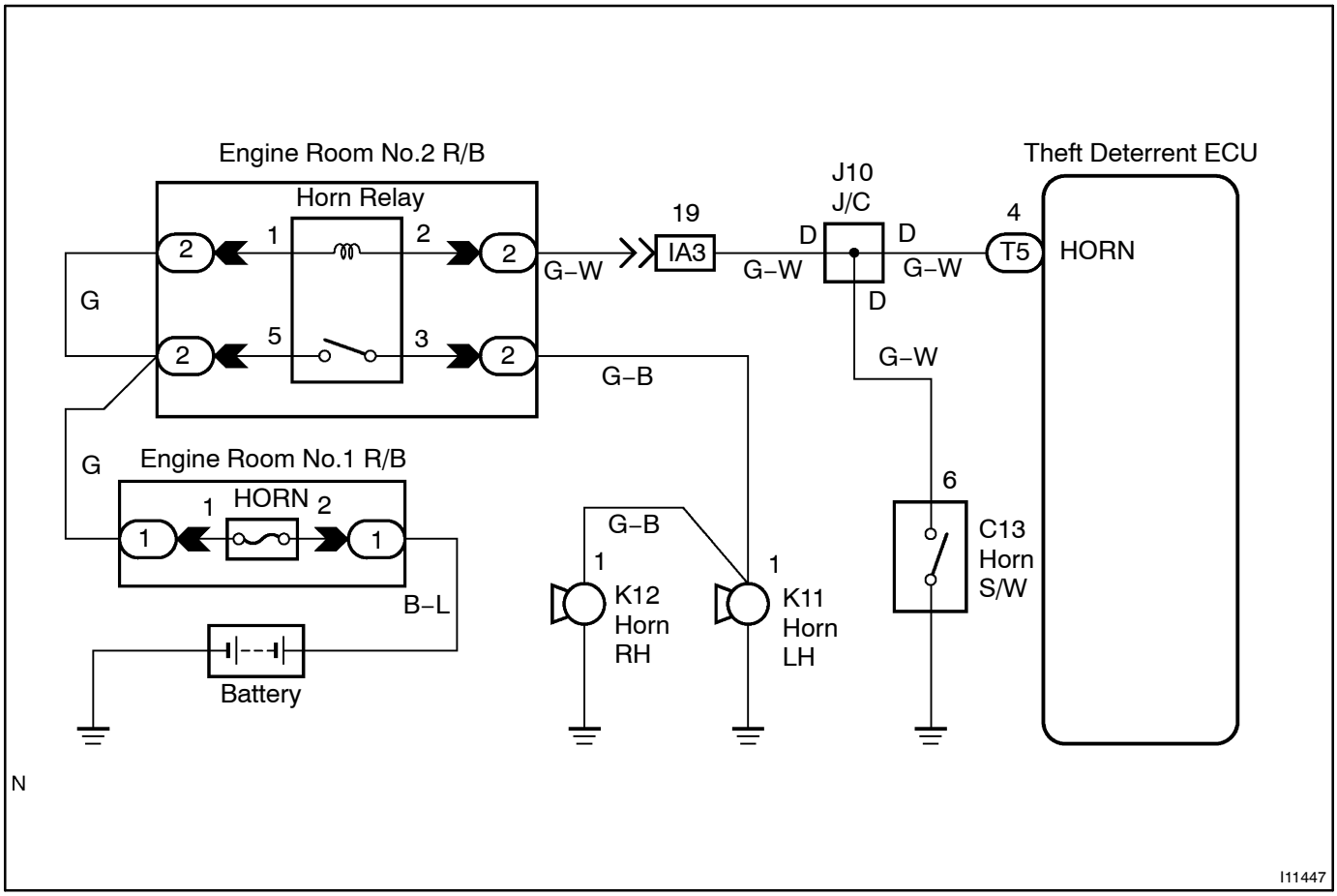
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor 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 transistor 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. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 seconds.

WIRING DIAGRAM

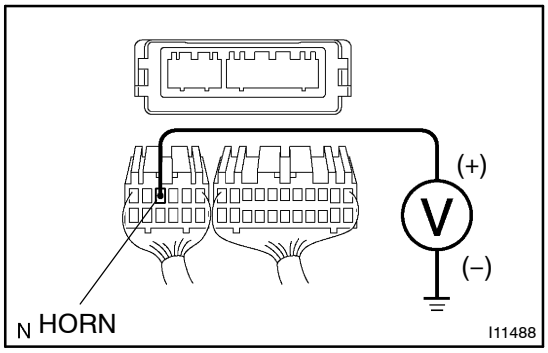


INSPECTION PROCEDURE

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 (See page IN–32).**

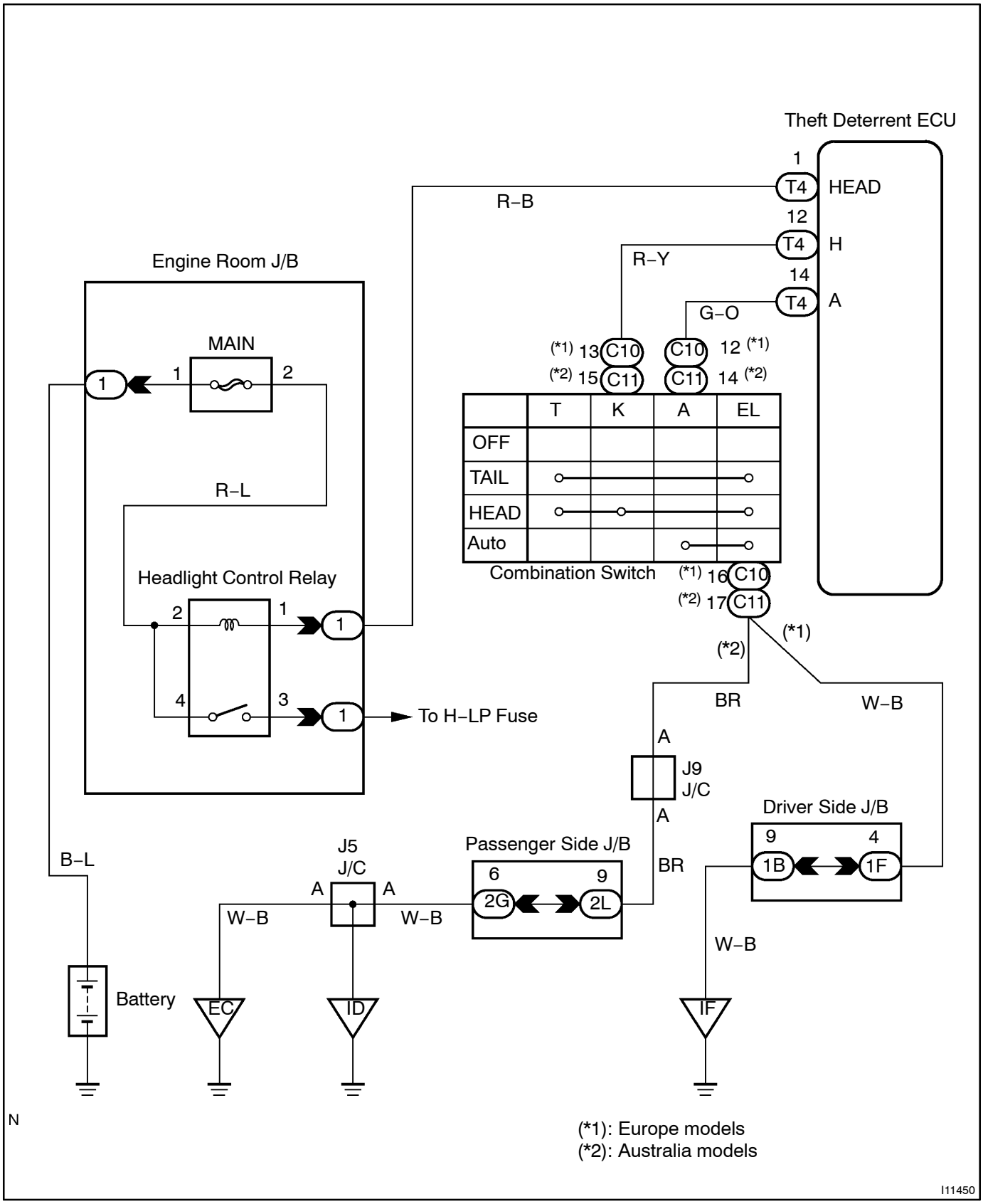
OK

Check and replace theft deterrent ECU (See page IN–32).

DI61B–01

Light control switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check headlight control switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check the headlight control switch using DATA LIST.
OK:

Terminal (tester display) / Switch position	Headlight Switch (Tail)	Headlight Switch (Head)	Auto light switch
OFF	OFF	OFF	OFF
TAIL	ON	OFF	OFF
HEAD	ON	ON	OFF
AUTO	OFF	OFF	ON

OK → **Proceed to next circuit inspection shown in problem symptoms table.(See page DI–442).**

NG

2	**Check headlight control switch (See page BE–30).**

NG → **Replace the headlight control switch.**

OK

3	Check wireharness and connector between headlight control switch and Body ECU (See page IN–32).

NG → Repair or replace wireharness or connector.

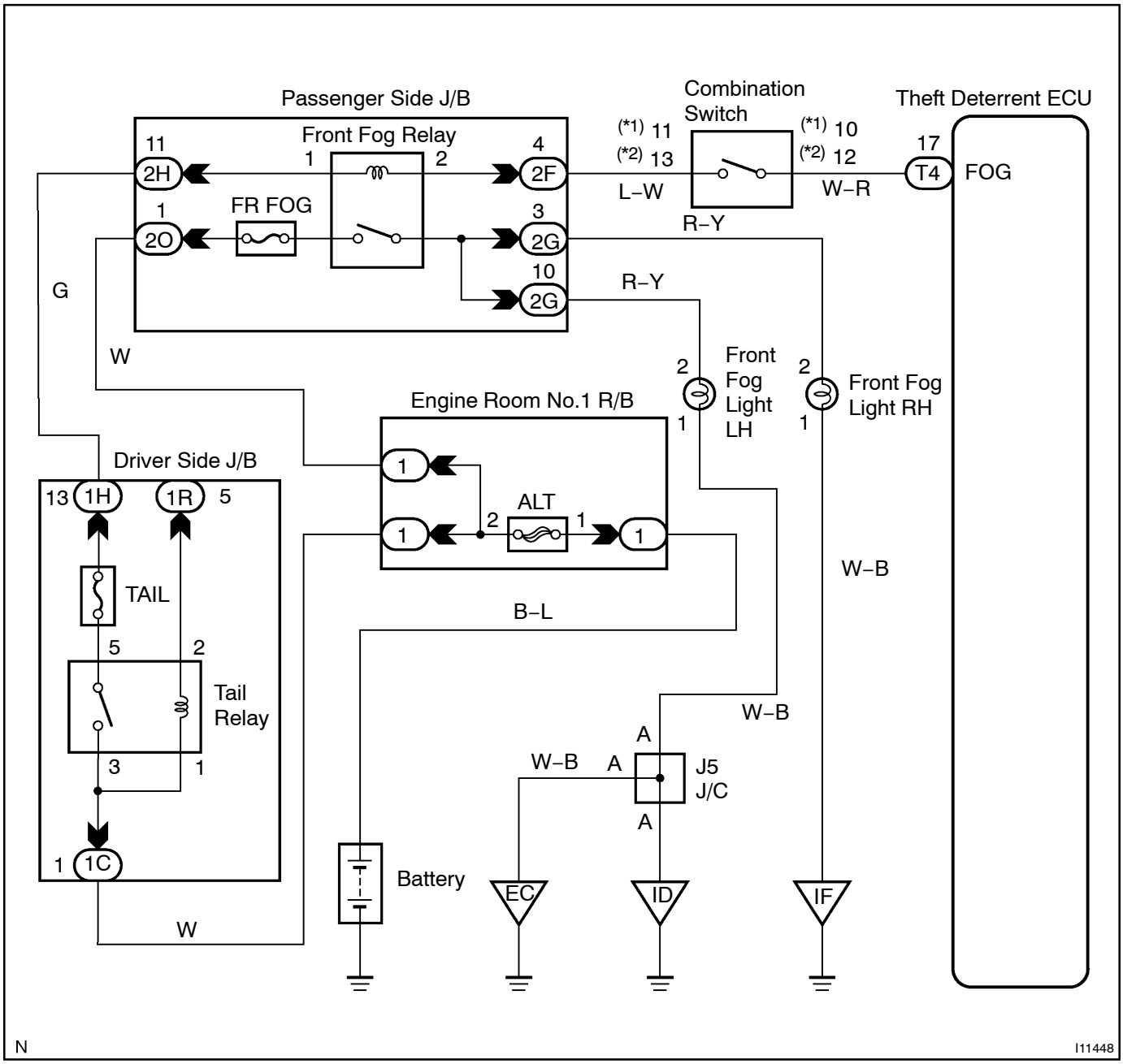
OK →

Proceed to next circuit inspection shown on problem symptoms table (See page DI–442).

DI61C–01

Front fog light switch and relay circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check front fog light relay using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the front fog light relay can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check front fog light relay (See page BE–45).**

NG → **Replace the front fog light relay.**

OK

3	**Check front fog light switch (See page BE–45).**

NG → **Replace the front fog light switch.**

OK

4	**Check wire harness and connector between front fog light relay and theft deterrent ECU, battery and front fog light relay (See page IN–32).**

NG → **Repair or replace wire harness or connector.**

OK

5	Check wire harness and connector between front fog light switch and theft deterrent ECU, battery and front fog light switch (See page IN–32).

NG → Repair or replace wire harness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table (See page DI–442).

DI61D–01

Headlight Control Relay Circuit

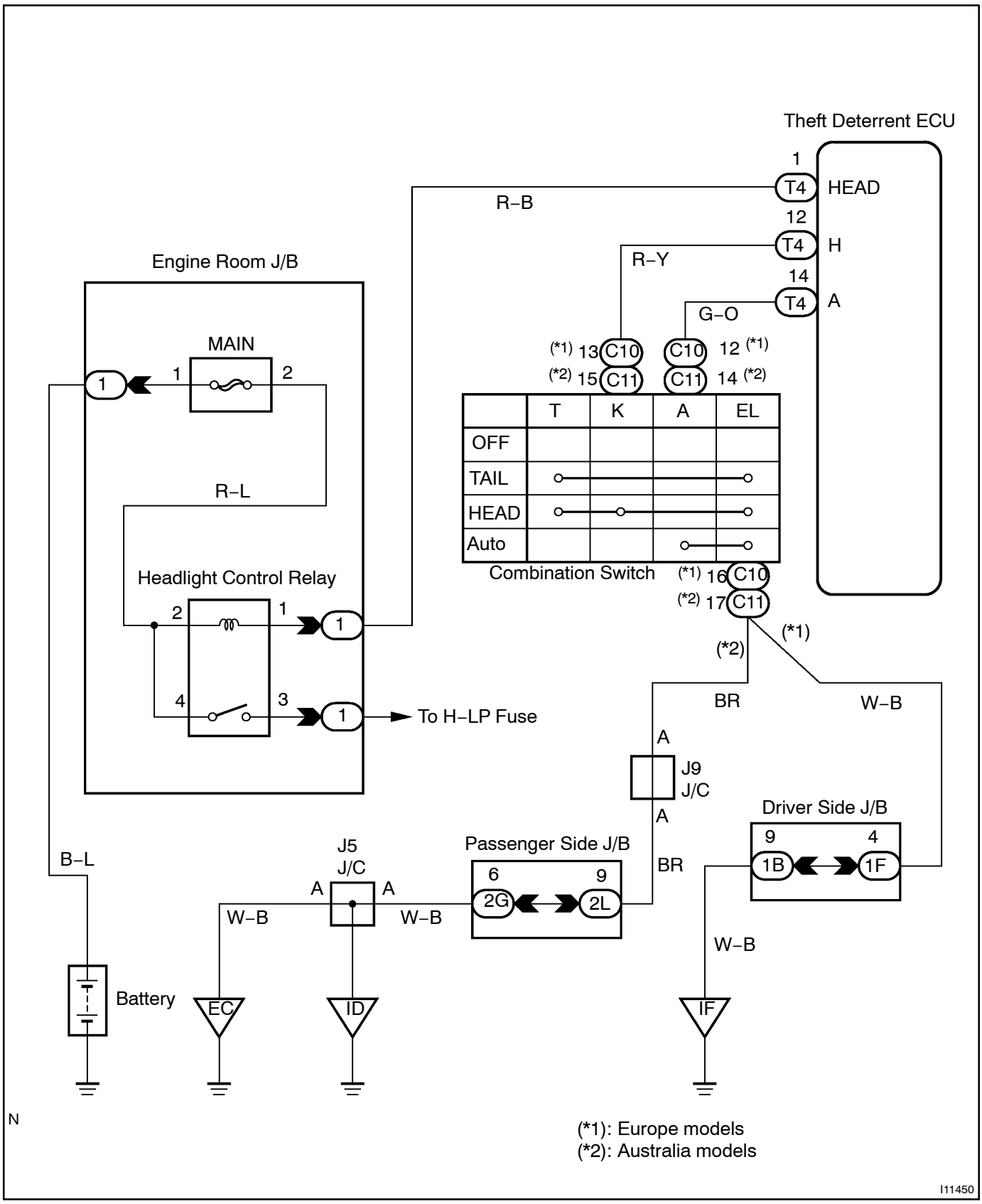
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF at approximately 0.25 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 transistor 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 a key. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 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.

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check headlight relay using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC 3.

CHECK:

Check that the headlight relay can operate in an ACTIVE TEST.

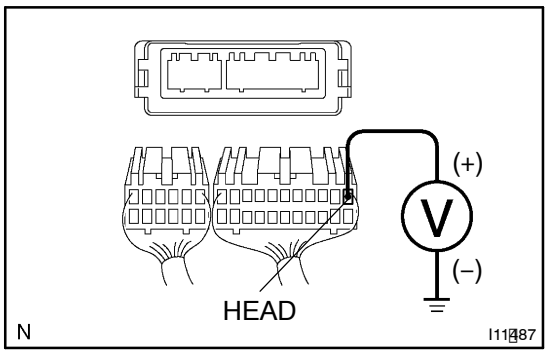
HINT:

If the headlight relay is normal, the headlight comes ”ON”. In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**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–32).**

OK

Check and replace theft deterrent ECU (See page IN–32).

DI61E–01

Taillight Control Relay Circuit

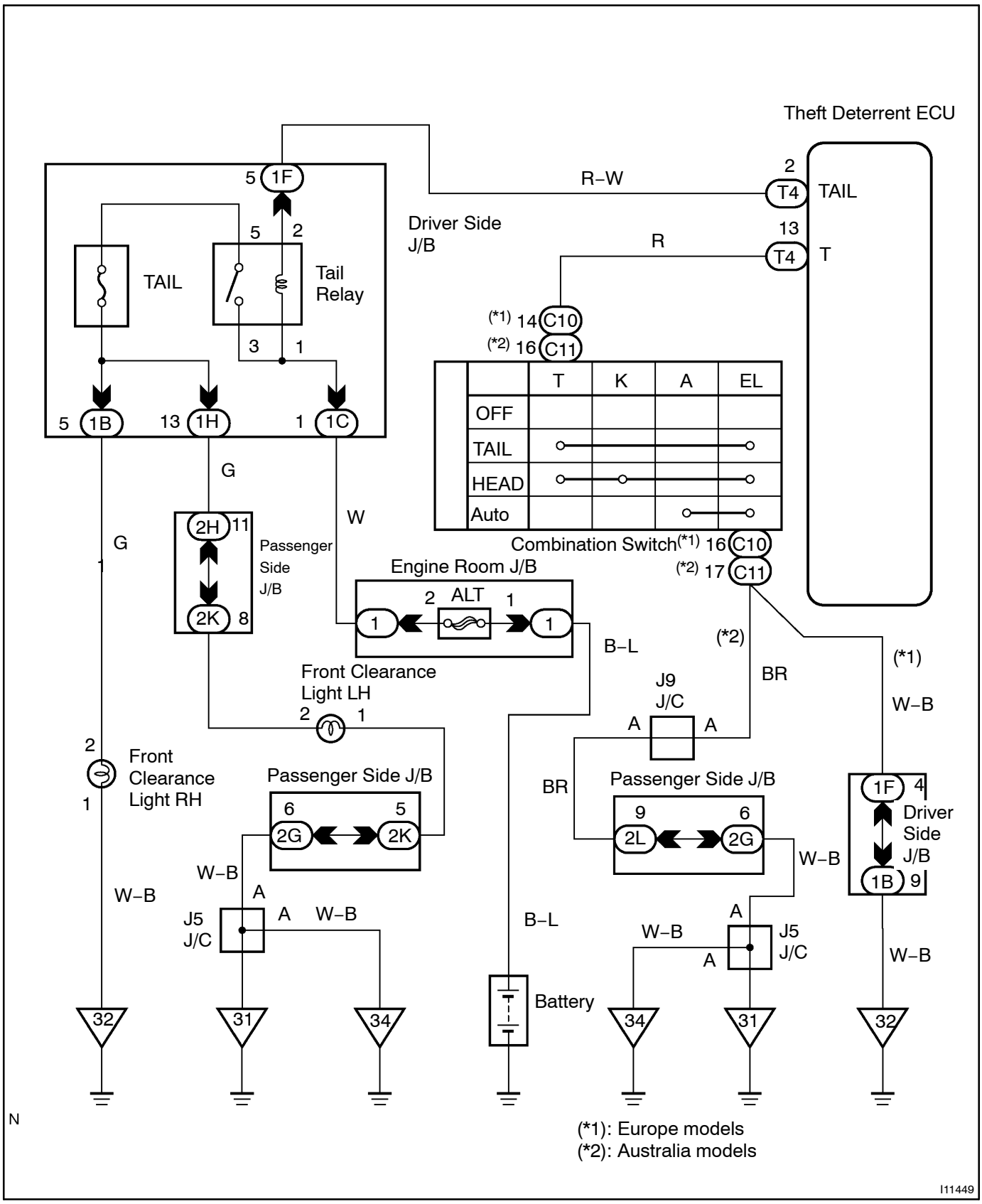
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor 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 transistor 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 a key. (Except Europe Models)
(2) Turn the ignition switch to ACC or ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 30 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.

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check tail light relay using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC 3.

CHECK:

Check that the tail light relay can operate in an ACTIVE TEST.

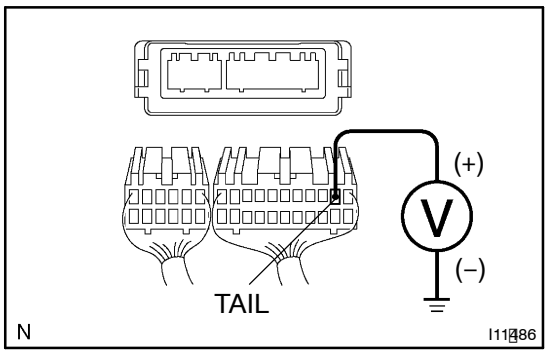
HINT:

If the headlight relay is normal, the headlight comes ”ON”. In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**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–32).**

OK

Check and replace theft deterrent ECU (See page IN–32).

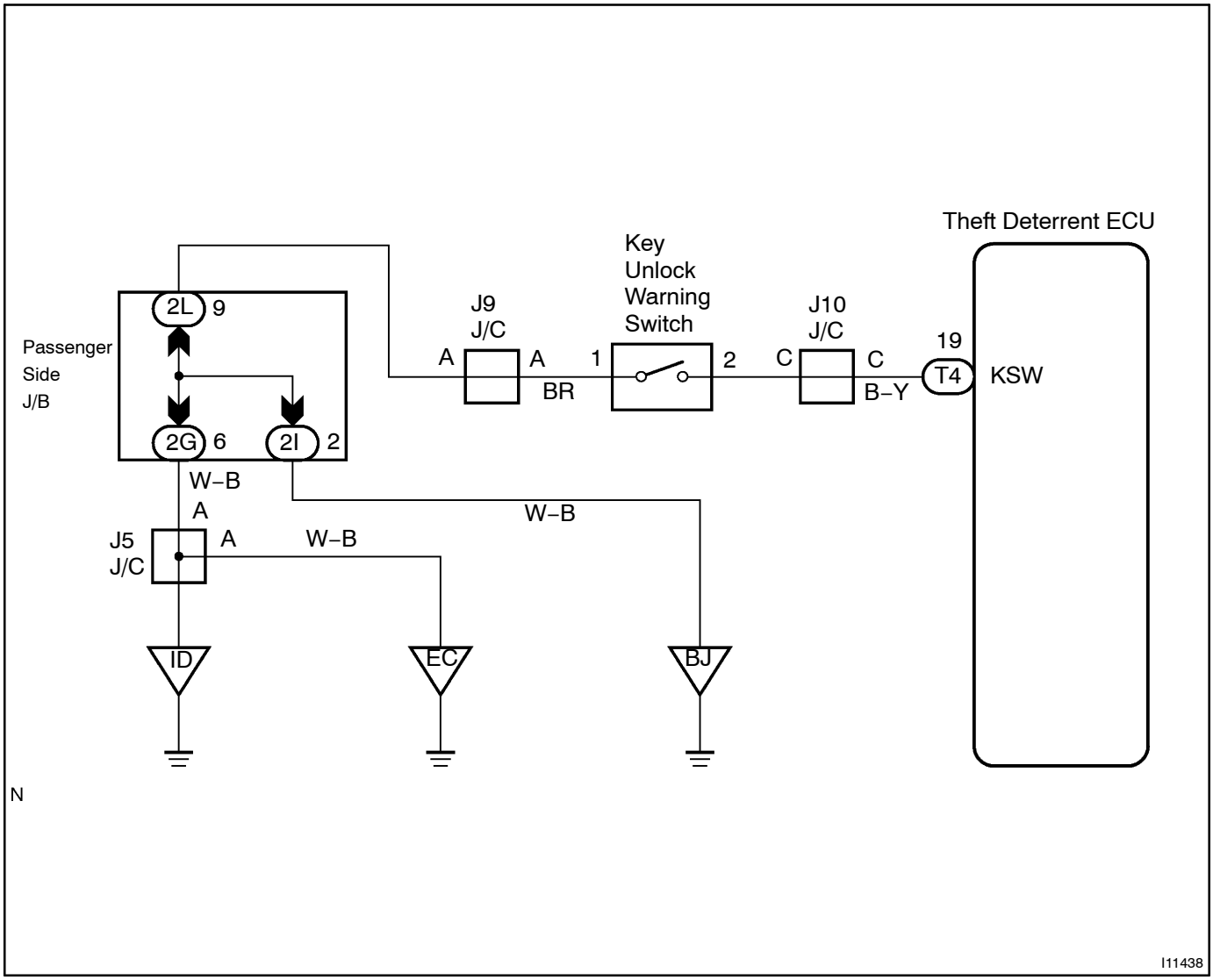
DI61F–01

Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

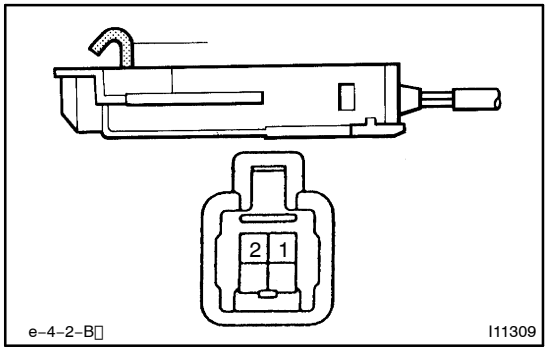
The key unlock warning switch goes ON when the ignition key is inserted in the key cylinder and goes OFF when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

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 into 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–32).

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 in problem symptom table (See page DI–442).

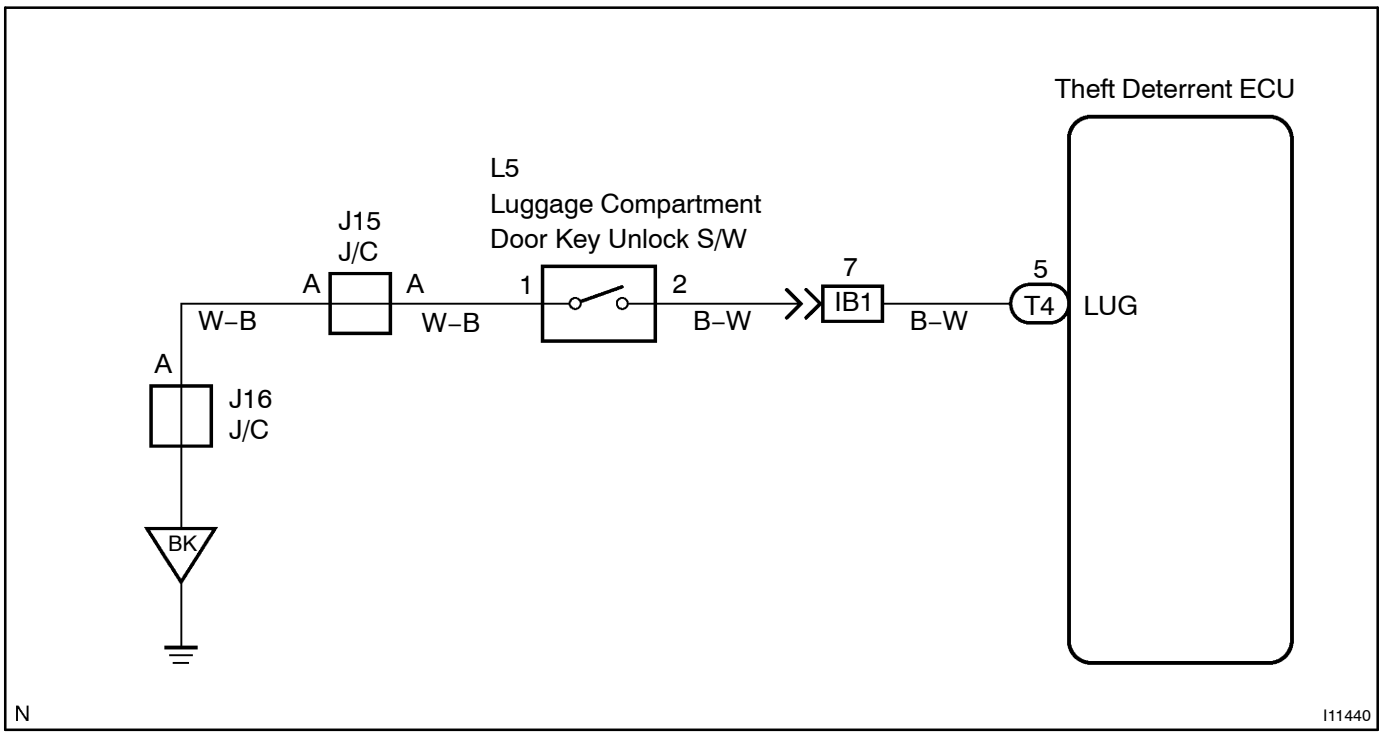
DI61G-01

Luggage Compartment Door Key Lock and Unlock Switch Circuit (Except Europe Models)

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

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

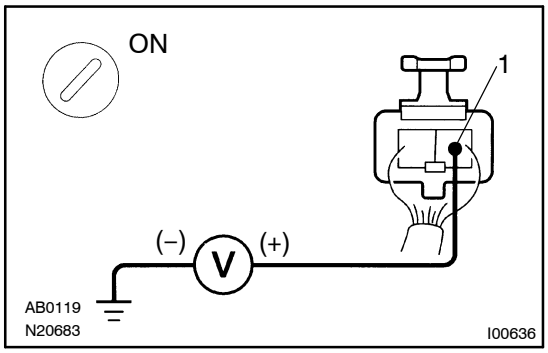
1	**Check luggage compartment door lock and unlock switch using LEXUS hand–held tester.**

PREPARATION:
Connect the LEXUS hand–held tester to the DLC 3.
CHECK:
Check the luggage compartment door lock and unlock switch using DATA LIST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	**Check voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground.**



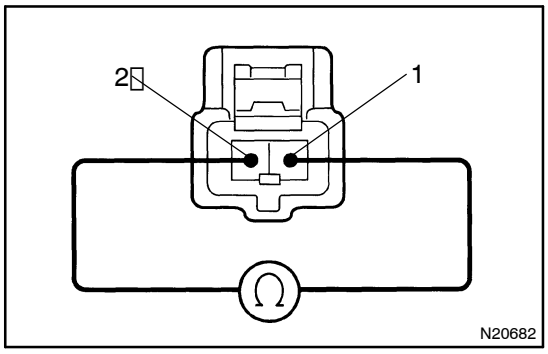
PREPARATION:
(a) Remove luggage compartment door trim.
(b) Turn ignition switch ON.
CHECK:
Measure voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground, when the key is turned to the unlock side and not turned.
OK:

Key operation	Voltage
Turned to the unlock side	0 V
Not turned	Battery positive voltage

OK → **Check and replace theft deterrent ECU.*1**

NG

3	**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 ↓

4	**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–32).**

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 in problem symptom table (See page DI–442).

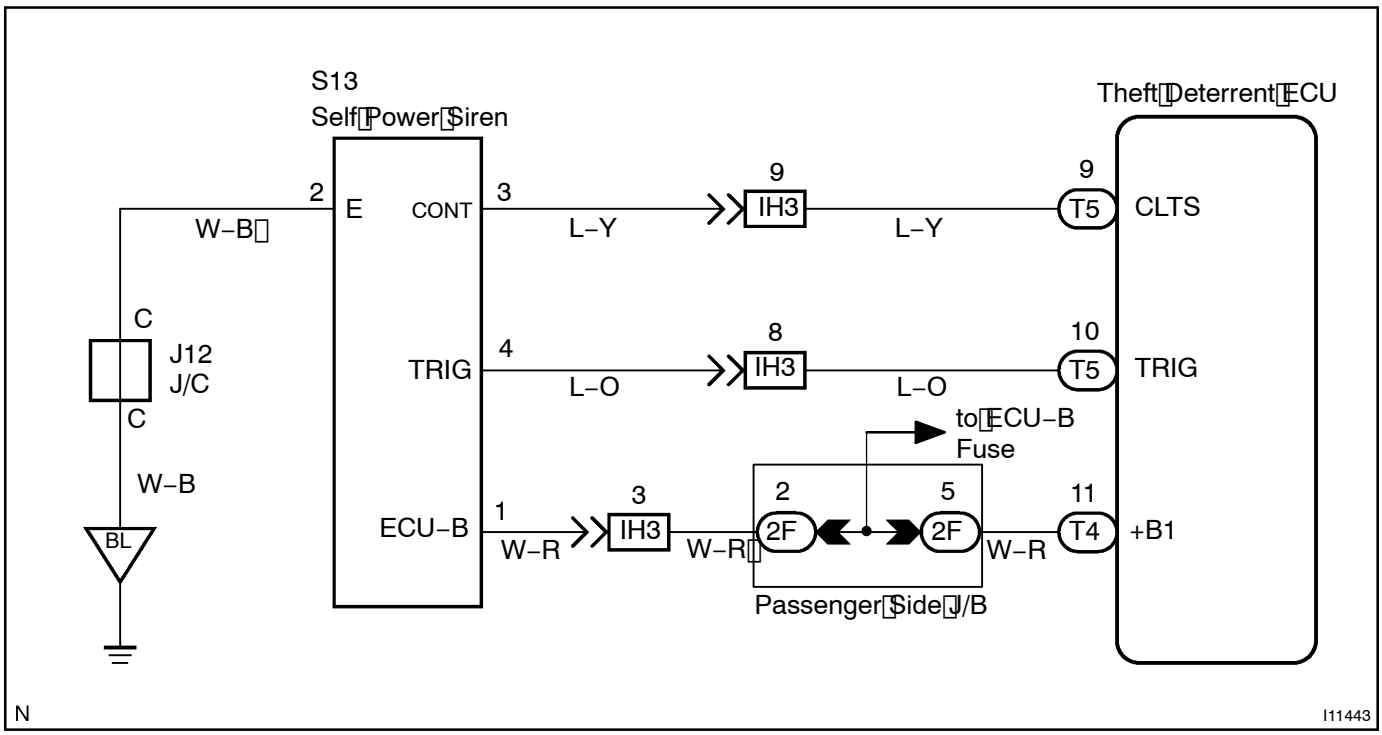
DI61I–01

Self Power Siren

CIRCUIT DESCRIPTION

A radio transmitter is integrated into the dome light.
This creates a spherical electric field inside the vehicle, detects intrusion using the Doppler effect caused by movement of an object in the vehicle, and outputs a warning trigger signal to the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check self power siren using LEXUS hand–held tester.**

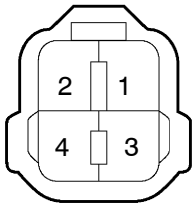
PREPARATION:
Connect the LEXUS hand–held tester to the DLC3.
CHECK:
Check that the self power alarm can operated in an ACTIVE TEST.
OK:
The self power alarm should sound.

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).**

NG

2	Check self power siren.

Connector connected



N I11492

PREPARATION:

(a) Remove the self power siren.
(b) Disconnect the self power siren connector.

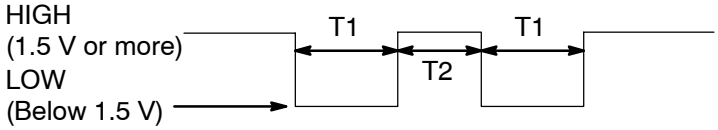
CHECK:

(a) Case 1:
Check terminal 3 in case of the system set signal is not input to the siren.
(b) Case 2:
Check terminal 4 in case of the siren drive signal is not input when the alarm is triggered.

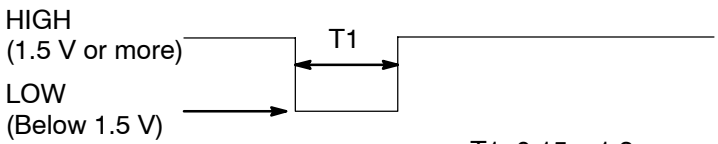
OK:

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery voltage
2 – Ground	Constant	No voltage
3 – Ground	When transforming from armed or arming preparation state to disarmed state.	Using an oscilloscope *1
	When transforming from the arming preparation state to armed state.	Using an oscilloscope *2
	Normal condition	Approx. 1.4 V
4 – Ground	Normal condition	Battery voltage
	Arming condition	Below 1 V

*1: wave pattern



*2: wave pattern



T1: 0.15 – 1.3 secs
T2: 0.15 – 0.25 secs

OK → **Replace self power siren.**

NG

3	Check harness and connector between ECU and alarm, alarm and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Proceed to next circuit inspection shown in problem symptom table (See page DI–442).

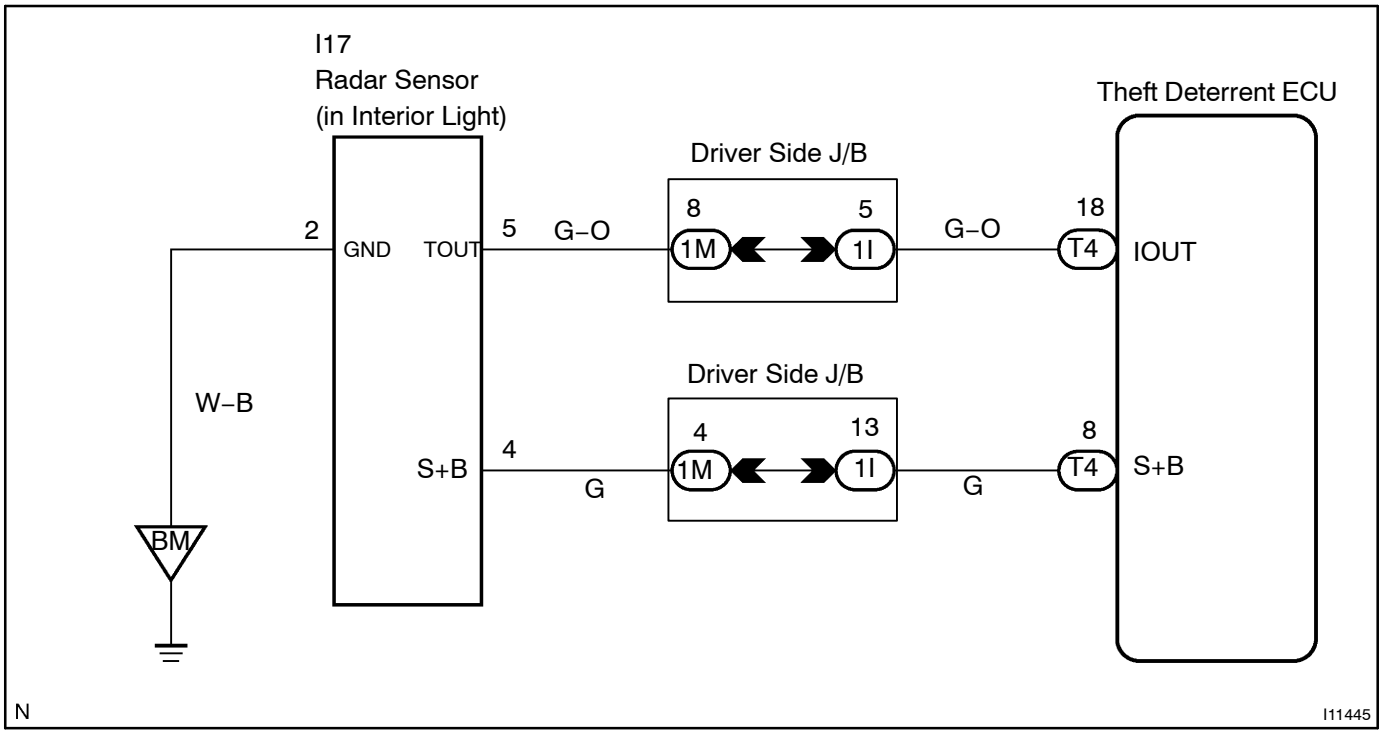
DI61J–01

Radar Sensor (Except Singapore)

CIRCUIT DESCRIPTION

Based on the alarm sounding state input from the theft deterrent ECU (to the TRIG terminal) an alarm is issued.
However, the armed/disarmed state is determined by the CONT terminal, which monitors vehicle status, and input to the TRIG terminal is only accepted from the ECU while armed state is ON.
Moreover, open circuit detection is only carried out while armed state is ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check radar sensor operation.**

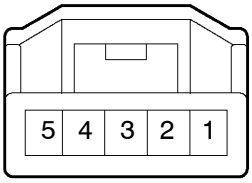
CHECK:
Set the system with a window open, and after 30 seconds put your hand through the window and shake it near the sensor to check if the alarm is triggered.

OK	**No problem.**

NG

2	Check radar sensor.

Connector connected



N I11491

PREPARATION:

Remove the room light assembly.

CHECK:

Measure the voltage and continuity at terminals.

OK:

Tester connection	Condition	Specified condition
1 – Ground	Arming preparation state or armed state.	Battery voltage
	Disarmed state.	Below 1 V
2 – Ground	When the sensor does not detect any movement.	6.8 V ± 2 V
	When the sensor detects movement when in arming preparation or armed state.	Below 1 V
4 – Ground	Constant	Continuity

NG → **Replace radar sensor. (in Room light assembly)**

OK

3	Check harness and connector between ECU and sensor, sensor and body ground (See page IN–32).

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 in problem symptom table (See page DI–442).

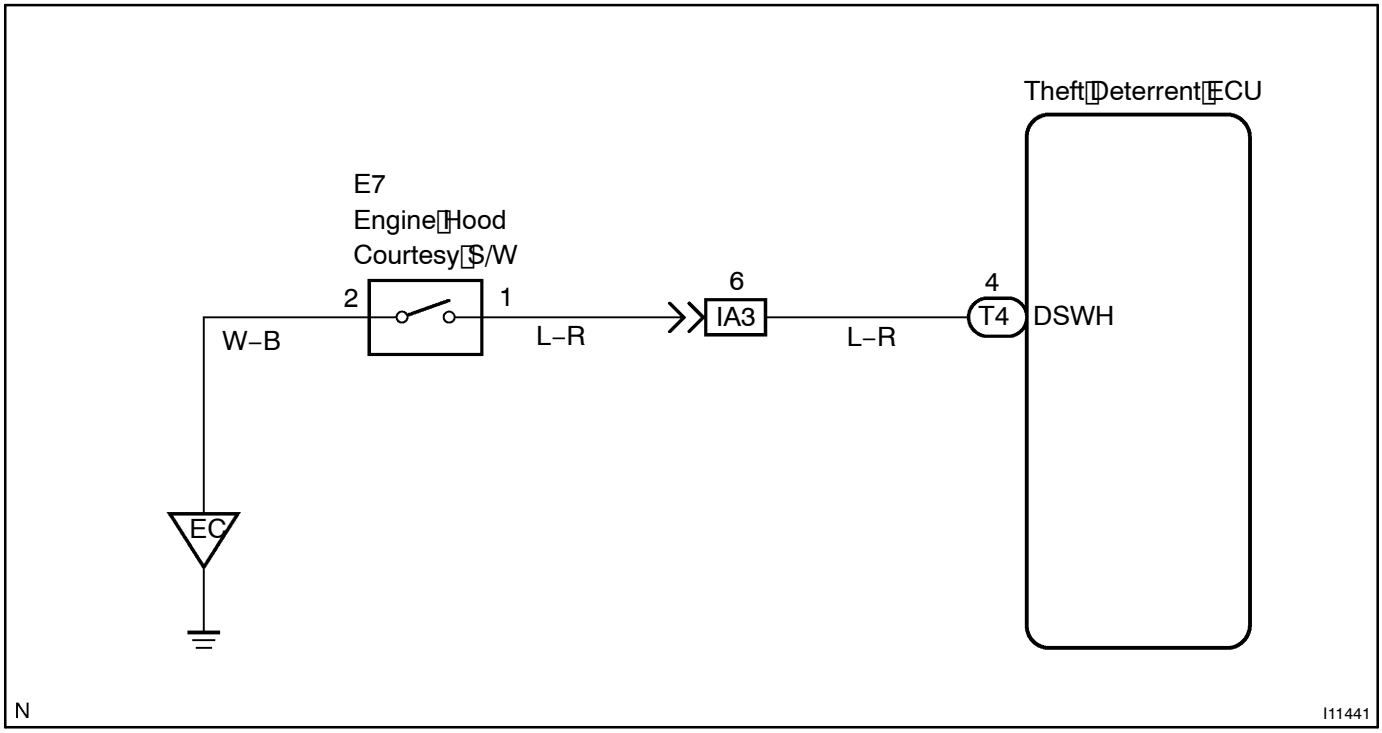
DI61H–01

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

HINT:

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check hood courtesy switch using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

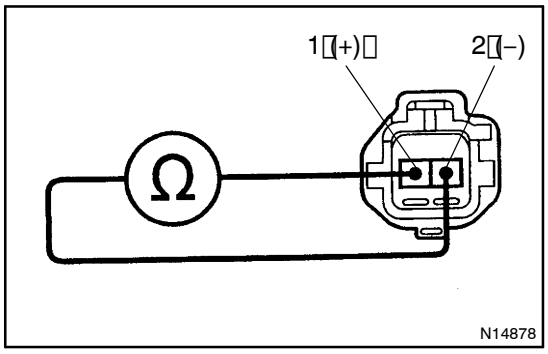
Check the hood courtesy switch using DATA LIST.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–442).

NG

2	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

3	Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

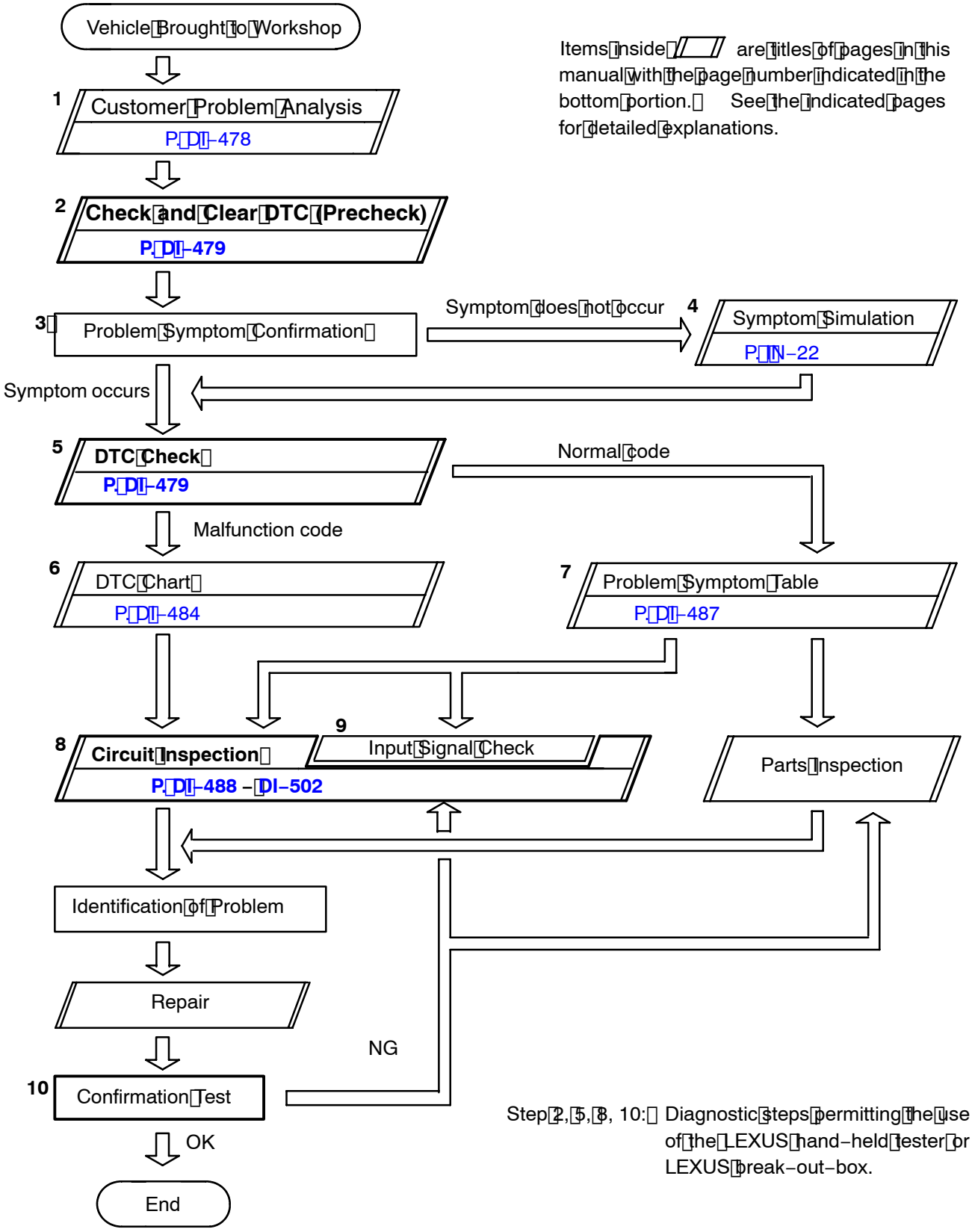
Check and replace theft deterrent ECU (See page IN–32).

CRUISE CONTROL SYSTEM

DI26R–11

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



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.

DI26S–10

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**	/ /
	Frequency Problem Occurs?	☐ 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 ☐ 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 ☐ Blinks

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI26T–12

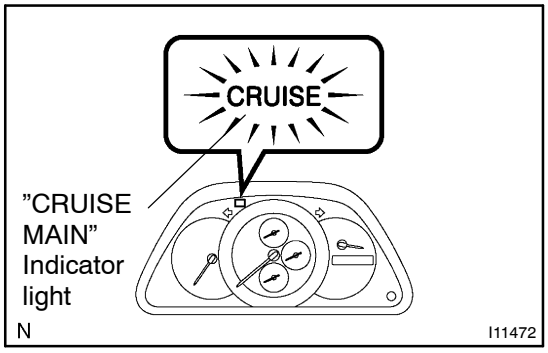
PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Check the indicator.

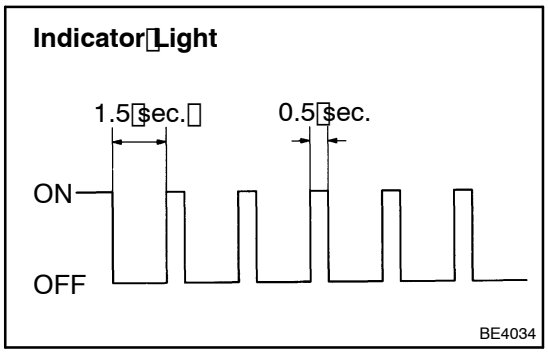
(1) Turn the ignition switch to ON.

(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:

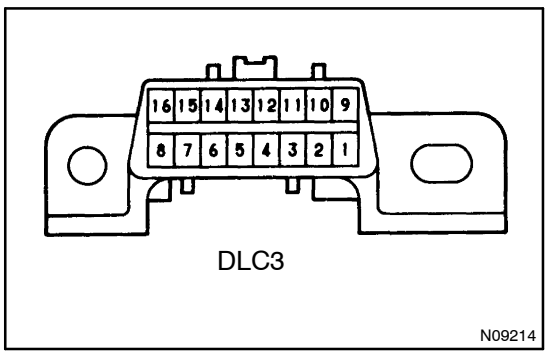
If the indicator check result is not normal, proceed to trouble-shooting (See page BE–2) for the combination meter section.



(b) Check the DTC.

HINT:

If a malfunction occurs in the speed sensor 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 stored in memory as a diagnostic trouble code.



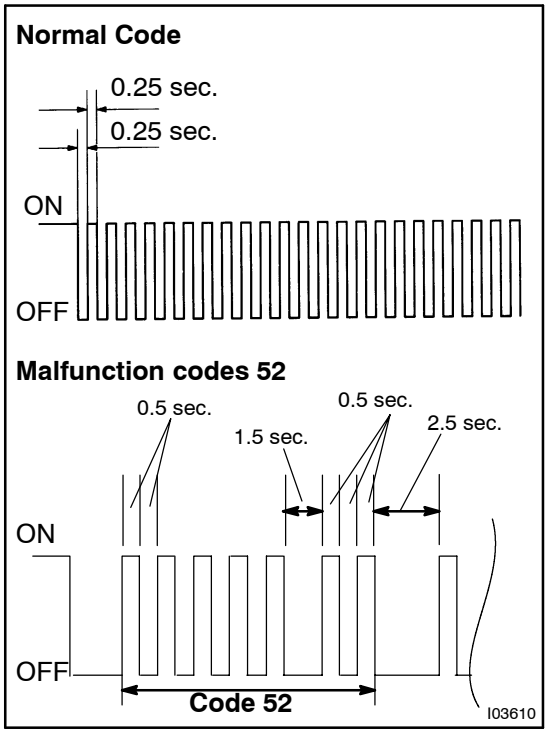
(c) Output DTC using diagnosis check wire.

(1) Turn the ignition switch ON.

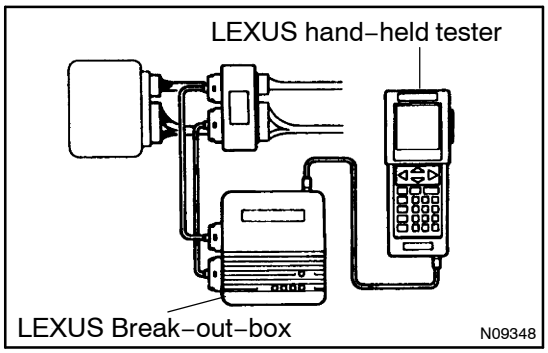
(2) Using SST, connect terminals Tc and E_1 of DLC3.

SST 09843–18020

(3) Read the DTC on the CRUISE MAIN indicator light.

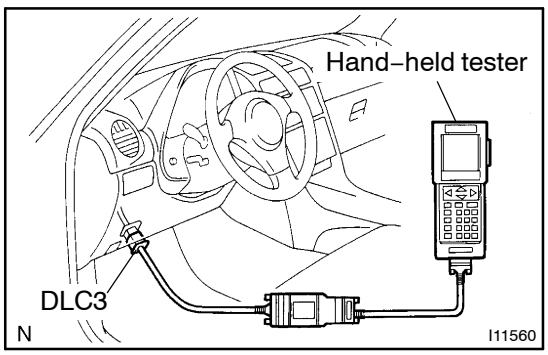


HINT:
If the DTC is not output, inspect the diagnosis circuit.
As an example, the blinking patterns for codes; normal 52 are shown in the illustration.



2. ECU TERMINAL VALUES MEASUREMENT BY USING LEXUS BREAK–OUT–BOX AND LEXUS HAND–HELD TESTER

(a) Hook up the LEXUS 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 DLC3.
(b) Monitor the ECU data by following the prompts on the tester screen.

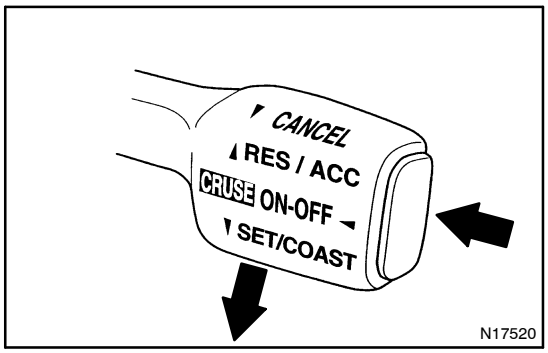
HINT:
LEXUS hand–held tester has a "Snapshot" function which records the monitored data.
Please refer to the LEXUS hand–held tester operator's manual for further details.

4. DTC CLEARANCE

(a) The following actions will erase the DTCs and freeze frame data.
  (1) Operating the OBD II scan tool (complying with SAEJ1978) 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.

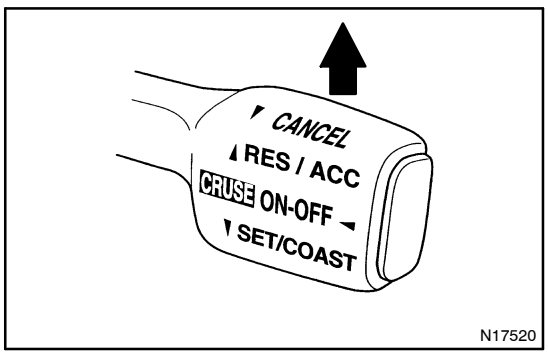
(b) After completing repairs, the DTC retained in memory can be cleared by removing the ECU–B fuse for 10 seconds or more with the ignition switch off.

(c) Check that the normal code is displayed after connecting the fuse.

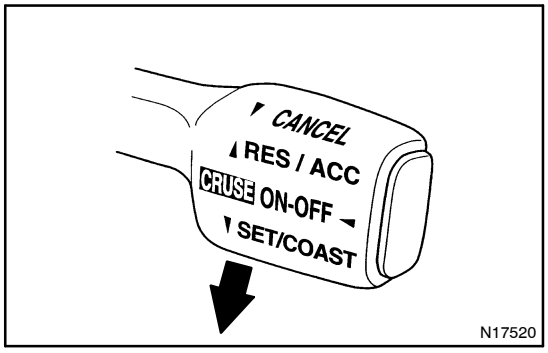


5. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

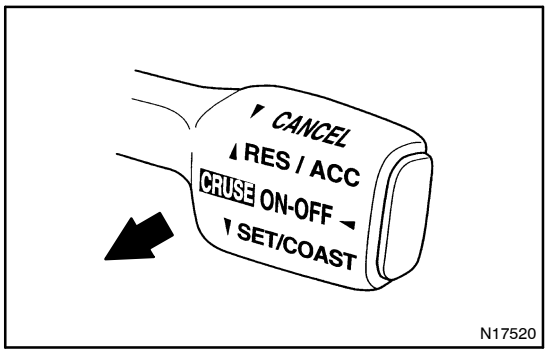
(a) Inspect the SET switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Press the control switch to the SET/COAST.
  (4) After releasing the switch, check that the vehicle cruises at the desired speed.



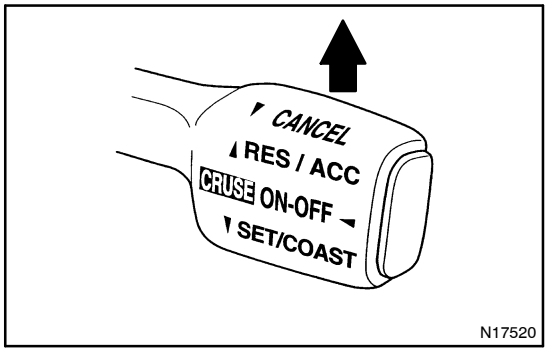
(b) Inspect the ACCEL switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed increases while the control switch is turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
  (4) Momentarily 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).



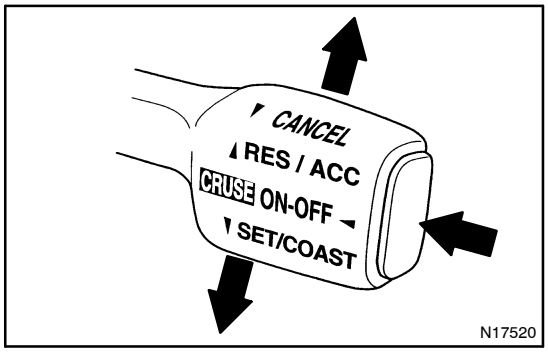
(c) Inspect the COAST switch.
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
  (4) Momentarily 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) Inspect the CANCEL switch.
  (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 range (A/T)
    - Push the main switch OFF
    - Pull the cruise control switch to CANCEL



(e) Inspect the RESUME switch.
  (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 range (A/T)
    • 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
(Using LEXUS hand–held tester)

(a) Connect the LEXUS hand–held tester to DLC3
(b) Check the control switch (MAIN, CANCEL, SET/COAST, RES/ACC)

DI26U–11

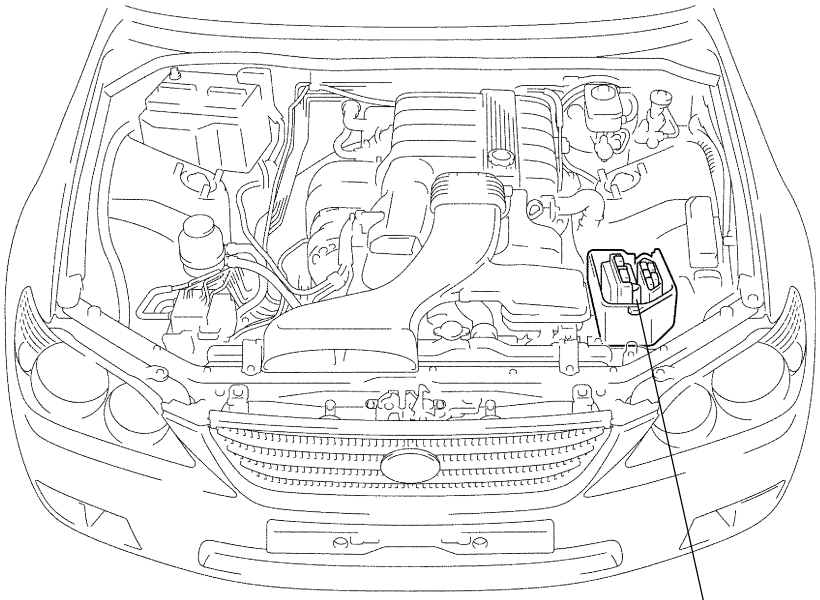
DIAGNOSTIC TROUBLE CODE CHART

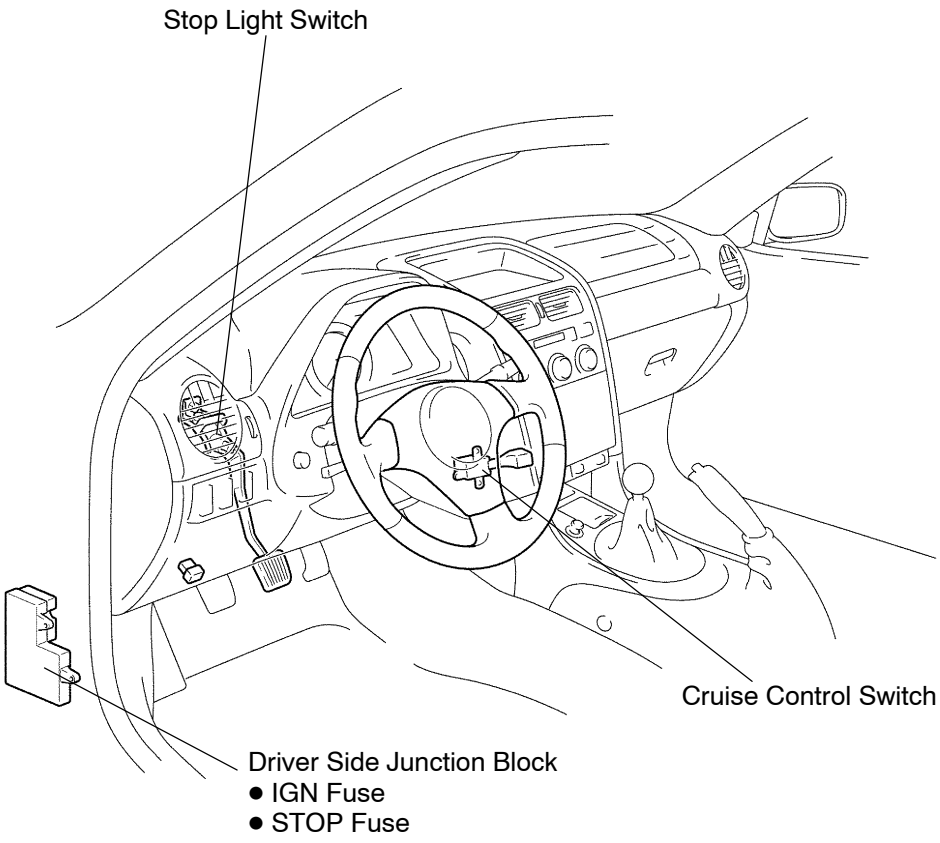
If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See Page)	Circuit Inspection	Trouble Area
P0500/ 21,23 (DI–488)	Vehicle Speed Sensor malfunction	• Harness or connector between Engine and ECT ECU and vehicle speed sensor • Vehicle speed sensor • Engine and ECT ECU
P1520/ 52 (DI–489)	Stop Light Switch Circuit malfunction	• Stop light switch • Harness or connector between Engine and ECT ECU and stop light switch circuit • Engine and ECT ECU
P1566/ 54 (DI–494)	Input Signal Circuit	• Engine and ECT ECU

DI622–01

PARTS LOCATION



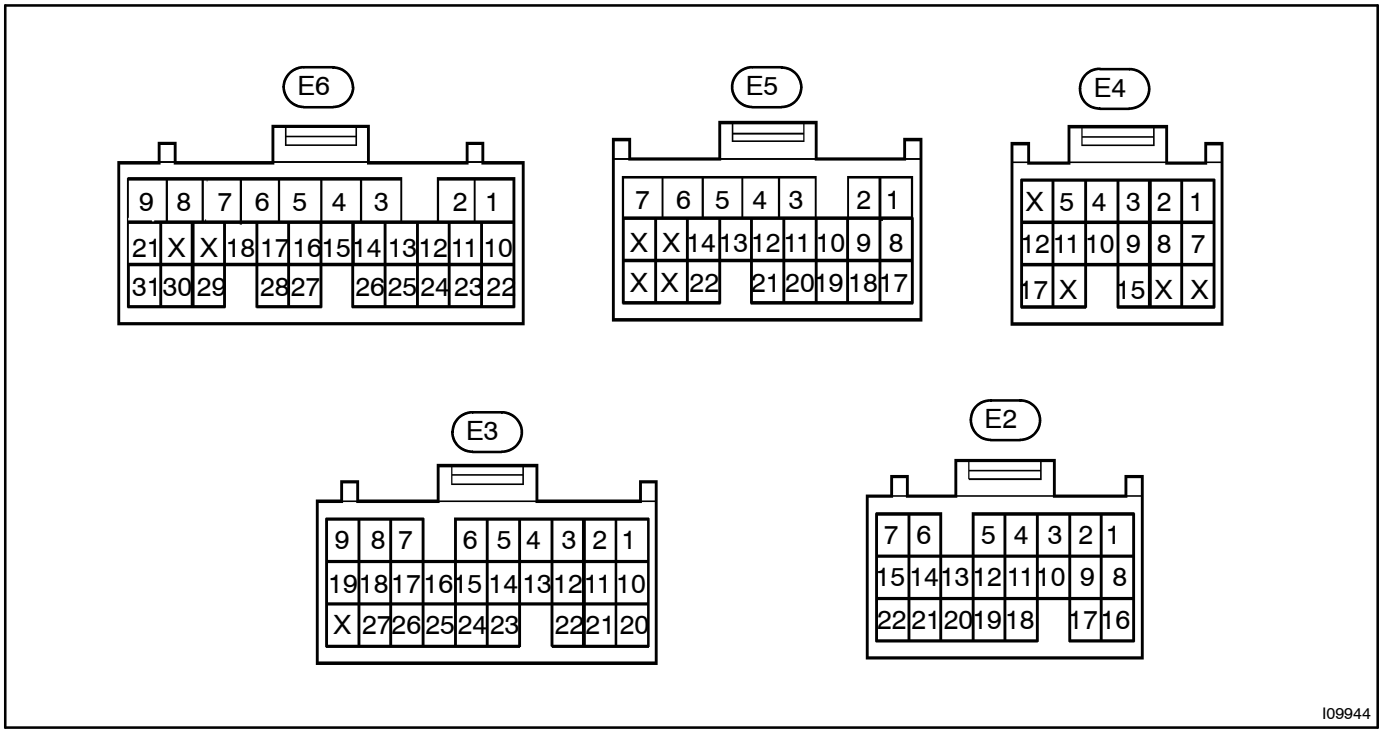


P

I10856

DI3MK–03

TERMINALS OF ECU



I09944

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ E1 (E3–6 ↔ E5–17)	G–W ↔ BR	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
CCS ↔ E1 (E3–22 ↔ E5–17)	L–R ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch hold ON	6.9 – 9.8 V
		Ignition switch ON SET/COAST switch hold ON	4.7 – 6.9 V
		Ignition switch ON RES/ACC switch hold ON	2.4 – 3.8 V
		Ignition switch ON MAIN switch hold ON	Below 1 V
ST1– ↔ E1 (E3–12 ↔ E5–17)	B–L ↔ BR	Depress brake pedal	Below 1 V
		Release brake pedal	10 – 14 V

DI26X–11

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Input Signal Circuit 2. Vehicle Speed Sensor Circuit 3. Stop Light Switch Circuit 4. Neutral Start Switch Circuit 5. Engine and ECT ECU	DI–494 DI–488 DI–489 DI–204 IN–32
SET not occurring or CANCEL occurring. (DTC is not output)	1. Engine and ECT ECU	IN–32
Actual vehicle speed deviates above or below the set speed.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–494 IN–32
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road. (Hurting)	1. Engine and ECT ECU	IN–32
Cruise control not cancelled, even when brake pedal is depressed.	1. Stop Light Switch Circuit 2. Engine and ECT ECU	DI–489 IN–32
Cruise control not cancelled, even when transmission is shifted to ”N” position.	1. Neutral Start Switch Circuit 2. Engine and ECT ECU	DI–204 IN–32
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Switch Circuit 2. Engine and ECT ECU	DI–498 IN–32
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–494 IN–32
Poor response is ACCEL and RESUME modes.	1. Engine and ECT ECU	IN–32
O/D does not resume, even though the road is not uphill.	1. Engine and ECT ECU	IN–32
DTC memory is erased.	1. Engine and ECT ECU	IN–32
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Engine and ECT ECU	– IN–32
Cruise MAIN indicator light remains ON or falls to light up.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–494 IN–32

DI3CI–04

CIRCUIT INSPECTION

DTC	P0500/21,23	Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

See page DI–91.

DTC No.	Detection Item	Trouble Area
P0500/21,23	Speed signal is not input to the Engine and ECT ECU while cruise control is set.	• Combination meter • Harness or connector between Engine and ECT ECU and vehicle speed sensor • Vehicle speed sensor • Engine and ECT ECU

WIRING DIAGRAM

See page DI–91.

INSPECTION PROCEDURE

See page DI–91.

DI623–01

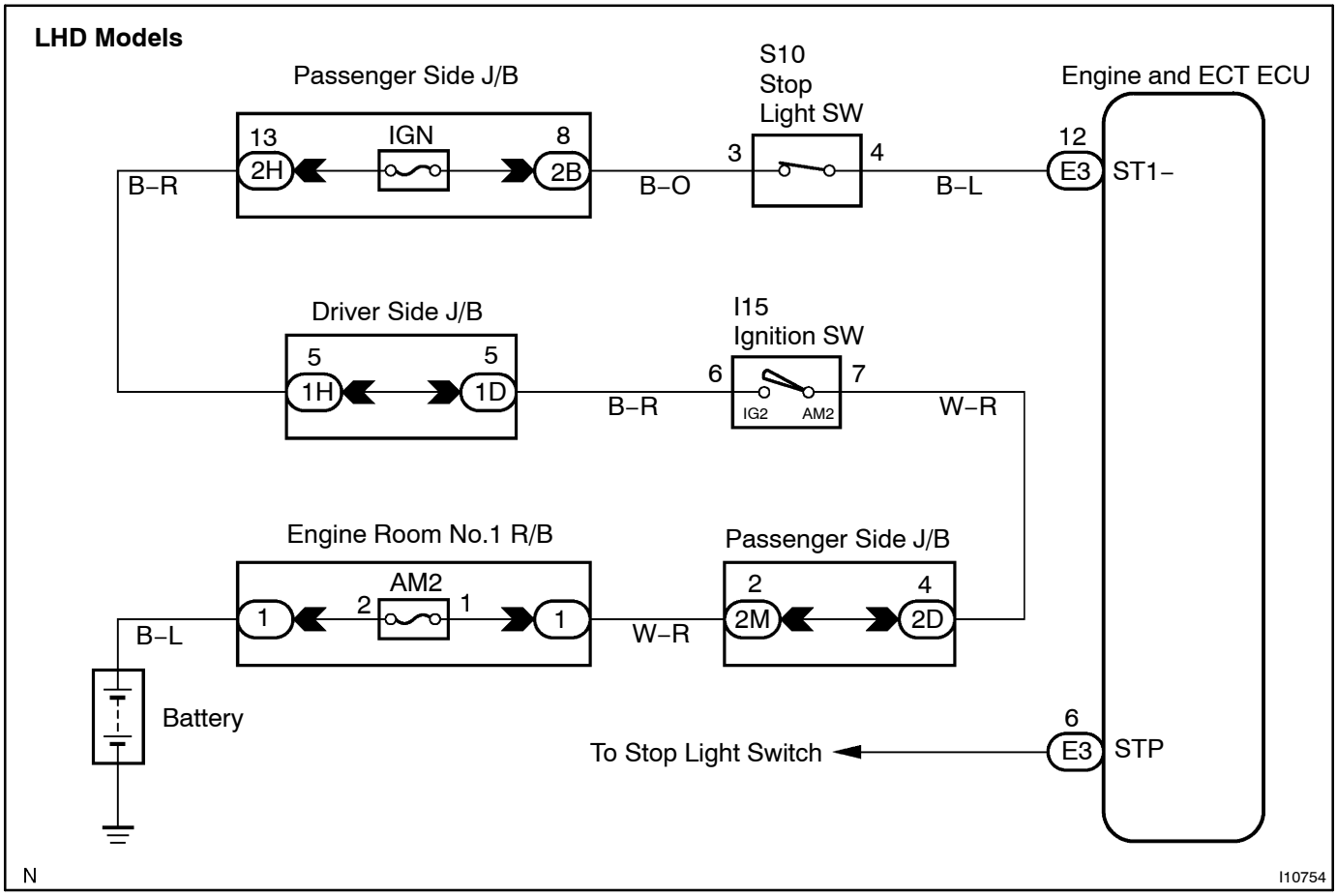
DTC	P1520/52	Stop light switch circuit

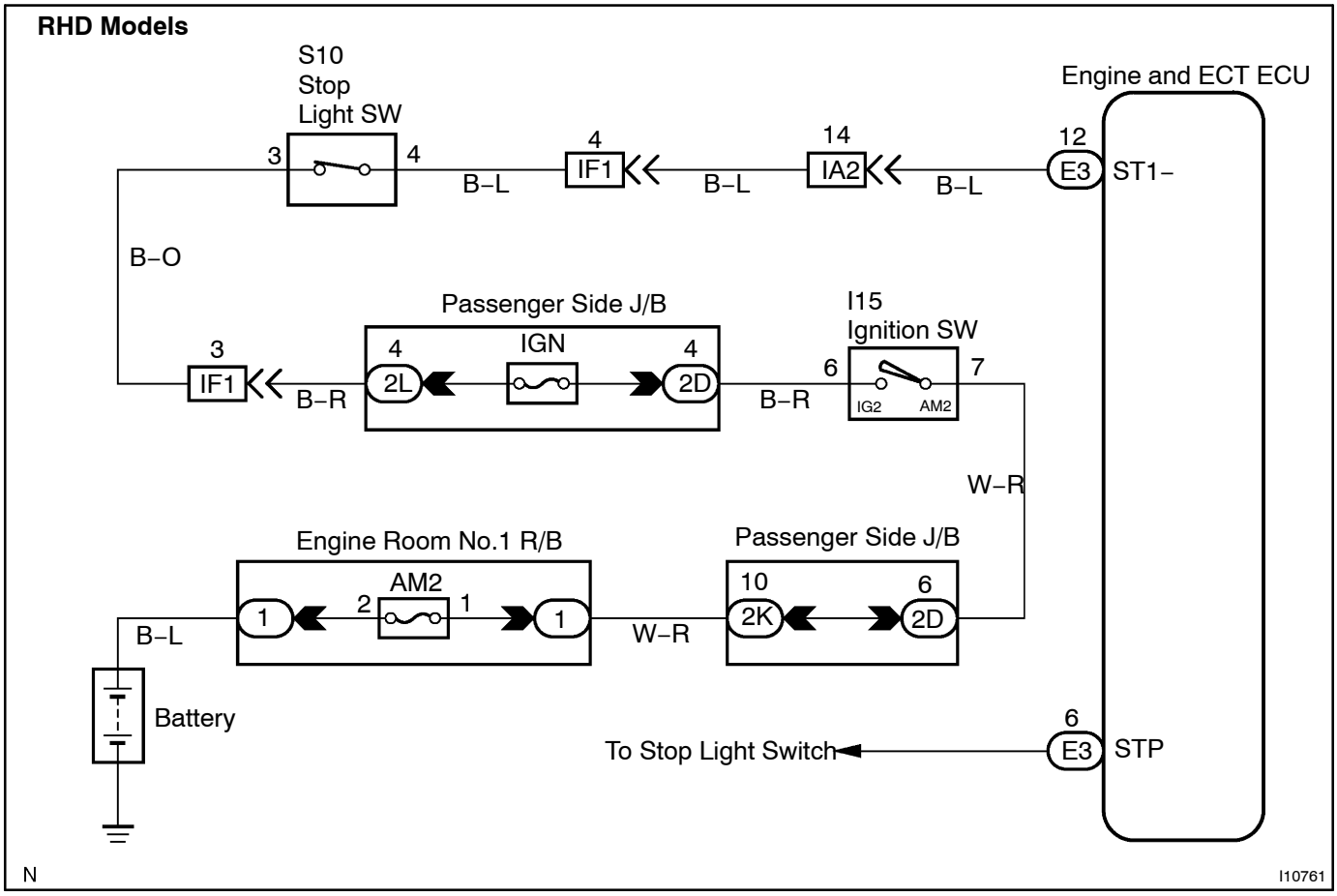
CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the Engine and ECT ECU. When the Engine and ECT 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 condition is that battery voltage is supplied to terminal STP.
When the brake is on, battery voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the Engine and ECT ECU, and the Engine and ECT ECU turns the cruise control OFF.
If the harness connected to terminal STP has an open circuit, terminal STP will have battery voltage and the cruise control will be turned OFF.

DTC No.	Detection Item	Trouble Area
52	Stop light switch circuit.	• Stop light switch • Harness or connector between Engine and ECT ECU and stop light switch circuit • Engine and ECT ECU

WIRING DIAGRAM




RHD Models
S10
Stop
Light SW
3
4
B–L
4
IF1
B–L
14
IA2
B–L
12
E3
ST1–
Engine and ECT ECU
B–O
Passenger Side J/B
3
IF1
B–R
4
2L
IGN
4
2D
B–R
I15
Ignition SW
6
7
IG2
AM2
W–R
Engine Room No.1 R/B
AM2
2
1
1
1
B–L
Passenger Side J/B
10
2K
6
2D
W–R
Battery
6
E3
STP
To Stop Light Switch
N
I10761

INSPECTION PROCEDURE

HINT:

In case of using the LEXUS hand–held tester, start the inspection from step 1 and in case of not using the LEXUS hand–held tester, start from step 2.

1	**Check stop light switch using LEXUS hand–held tester.**

PREPARATION:

Connect the LEXUS hand–held tester to the DLC3.

CHECK:

Check the stop light switch using DATALIST.

OK:

Condition	Stop light switch 1 (Sub CPU)	Stop light switch 2 (Sub CPU)	Stop light switch 2 (Main CPU)
Depressed	ON	ON	ON
Released	OFF	OFF	OFF

HINT:

- Stop light SW 1 has a function to disconnect the connection (OFF) when depressing the pedal, however, Engine and ECT ECU controls by the logic rivers, so with the LEXUS hand–held tester, it displays ON.
- Stop light SW 1 indicates the input of ST1–terminal and Stop light SW 2 indicates the input of STP terminal.

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–487).**

NG

2	**Check operation of stop light.**

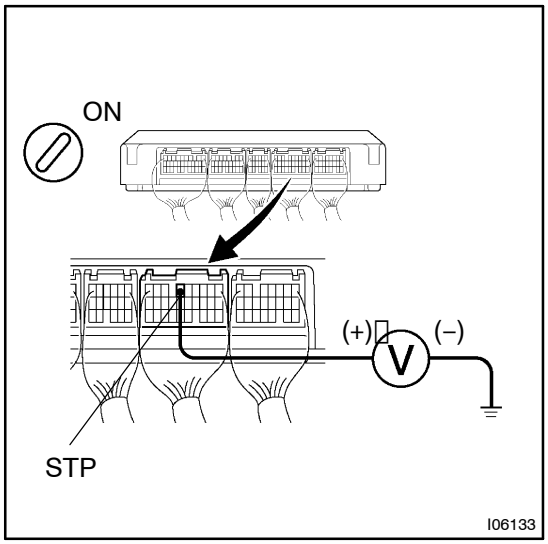
CHECK:

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–65).**

OK

3	**Check voltage between terminal STP of Engine and ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine and ECT ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal STP of Engine and ECT ECU connector and body ground, when the brake pedal is depressed and released.

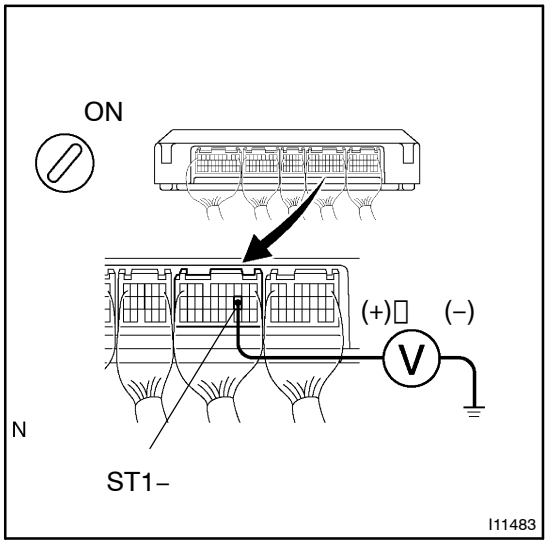
OK:

Depressed	10 – 14 V
Released	Below 1 V

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–487).**

NG

4	**Check voltage between terminal ST1– of Engine and ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine and ECT ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal ST1– of Engine and ECT ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Depressed	Below 1 V
Released	10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–487).**

NG

5	Check wire harness and connector between terminal STP of Engine and ECT ECU and stop light switch, and terminal ST1– of Engine and ECT ECU and stop light switch (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace Engine and ECT ECU (See page IN–32).

DI3CL–04

DTC	P1566/54	Input Signal Circuit abnormal

CIRCUIT DESCRIPTION

DTC No.	Detection Item	Trouble Area
P1566/54	• Stop light switch input signal circuit abnormal.	• Engine and ECT ECU

INSPECTION PROCEDURE

Check and replace Engine and ECT ECU (See page IN–32).

DI624–01

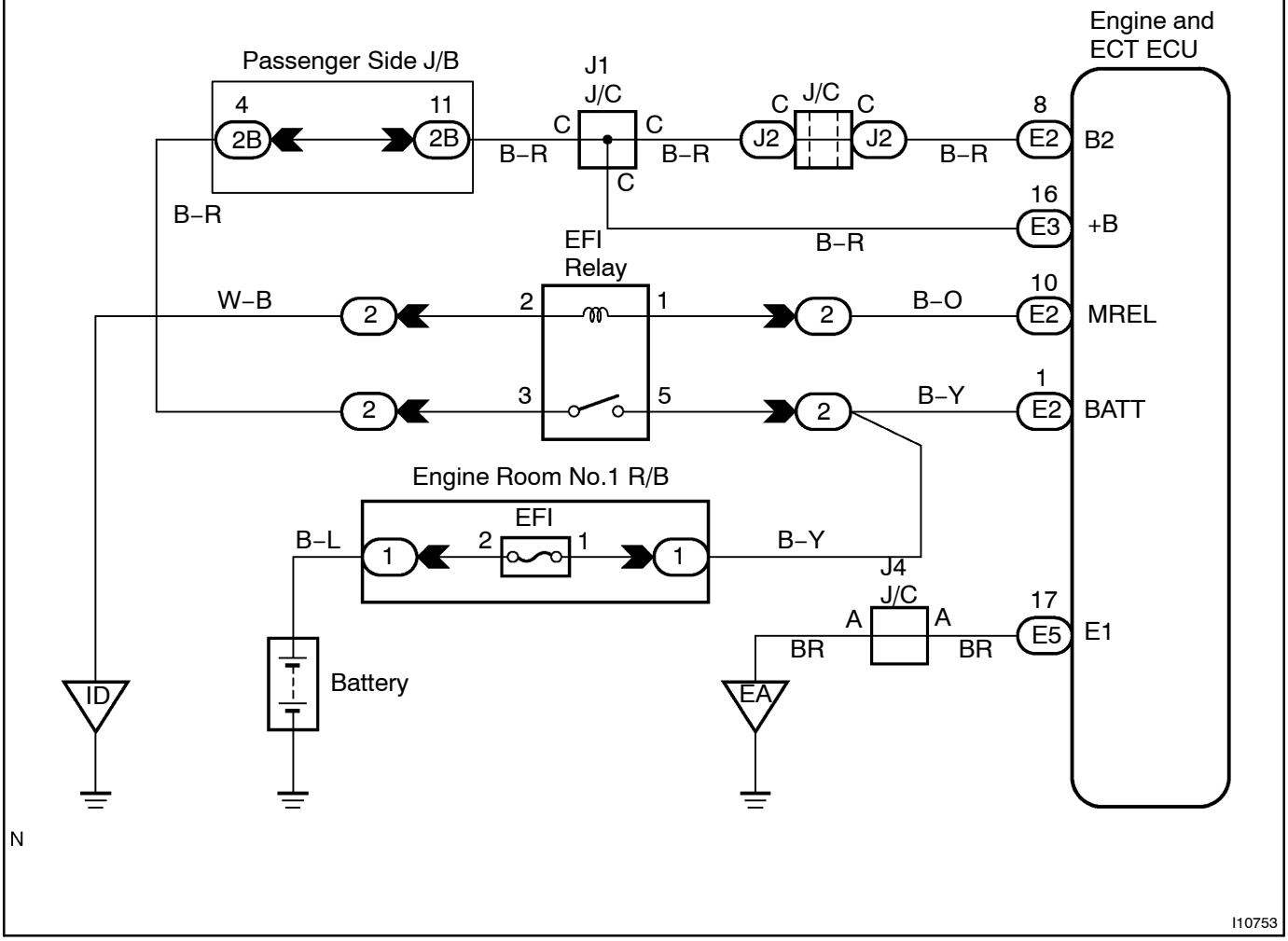
Power source circuit

CIRCUIT DESCRIPTION

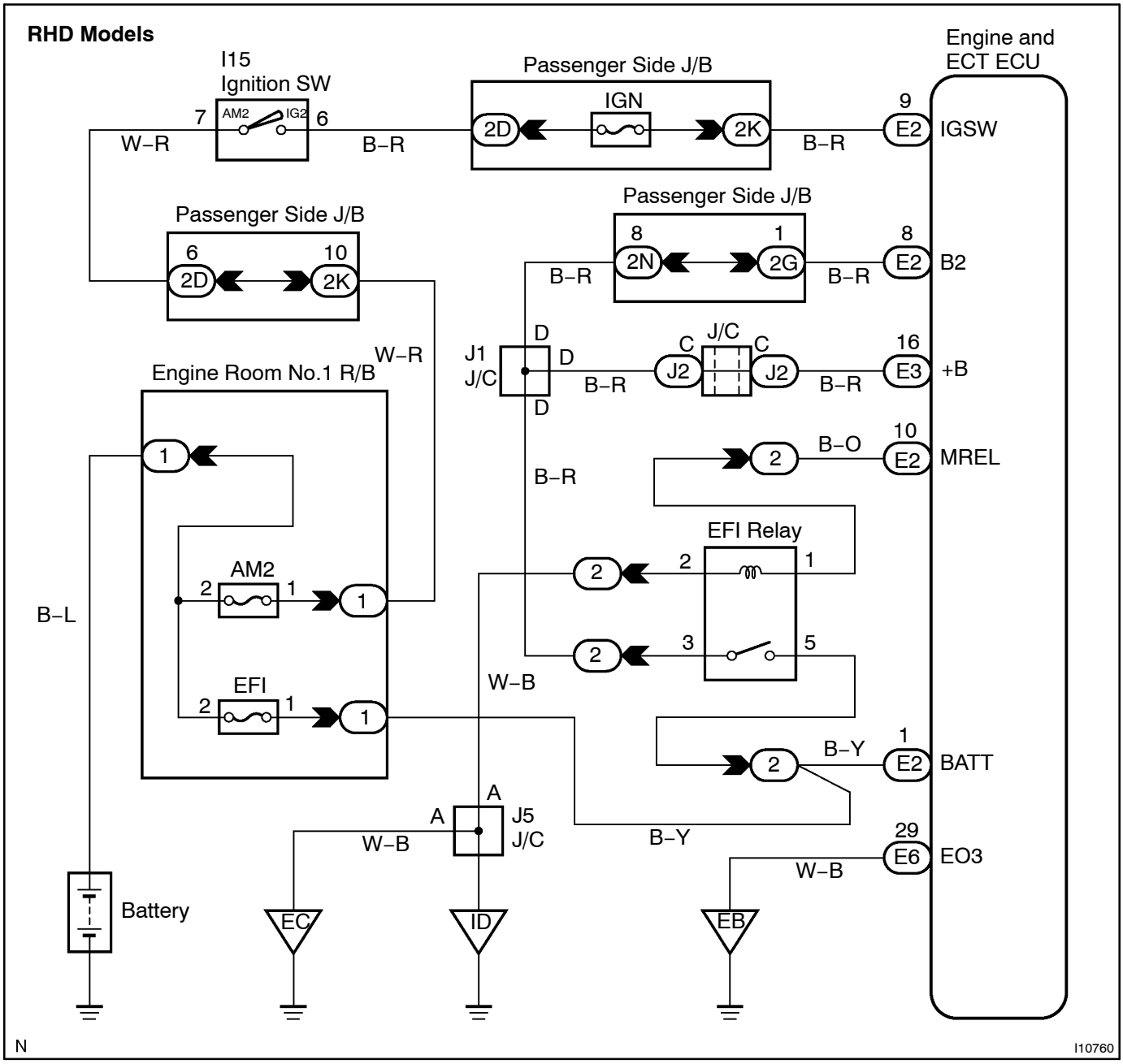
This circuit provides power to operate the Engine and ECT ECU.

WIRING DIAGRAM

LHD Models



I10753


RHD Models
I15
Ignition SW
AM2
IG2
7
6
W–R
B–R
Passenger Side J/B
IGN
2D
2K
B–R
9
E2
IGSW
Engine and
ECT ECU
Passenger Side J/B
6
10
2D
2K
W–R
Passenger Side J/B
8
1
2N
2G
B–R
B–R
8
E2
B2
J1
J/C
D
D
D
B–R
J/C
C
C
J2
J2
B–R
16
E3
+B
Engine Room No.1 R/B
1
AM2
2
1
1
B–L
EFI
2
1
1
B–R
2
B–O
10
E2
MREL
EFI Relay
2
2
1
2
3
5
W–B
2
B–Y
1
E2
BATT
A
A
J5
J/C
W–B
B–Y
29
E6
EO3
W–B
Battery
EC
ID
EB
N
I10760

INSPECTION PROCEDURE

1	**Check IGN and EFI fuse.**

CHECK:
Check continuity of IGN and EFI fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals IGSW, BATT and GND of Engine and ECT ECU connector (See page IN–32).**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Engine and ECT ECU connector.
CHECK:
Measure voltage between terminals IGSW, BATT and GND
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–487).**

NG ↓

3	**Check wireharness and connector between Engine and ECT ECU and body ground (See page IN–32).**

NG → **Repair or replace wireharness or connector.**

OK ↓

Check and repair wireharness and connector between Engine and ECT ECU and battery (See page IN–32).

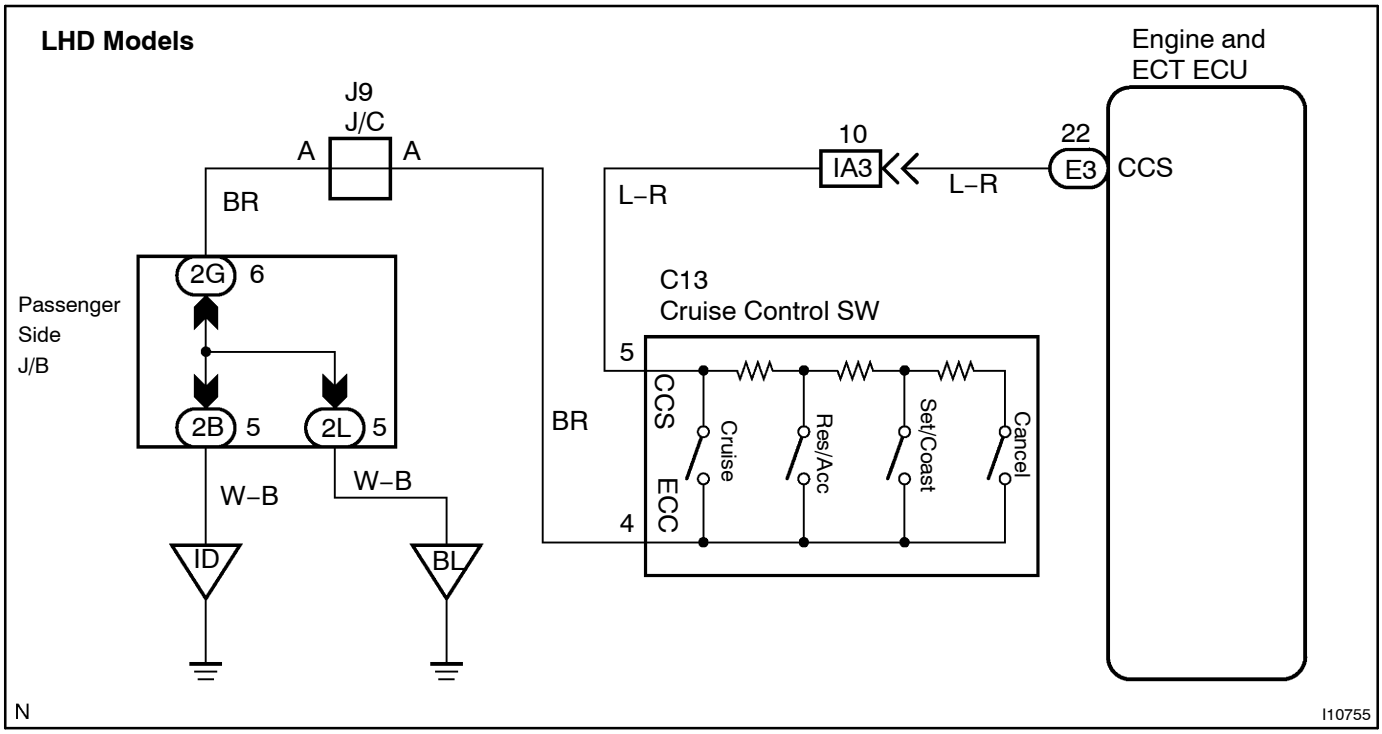
DI625–01

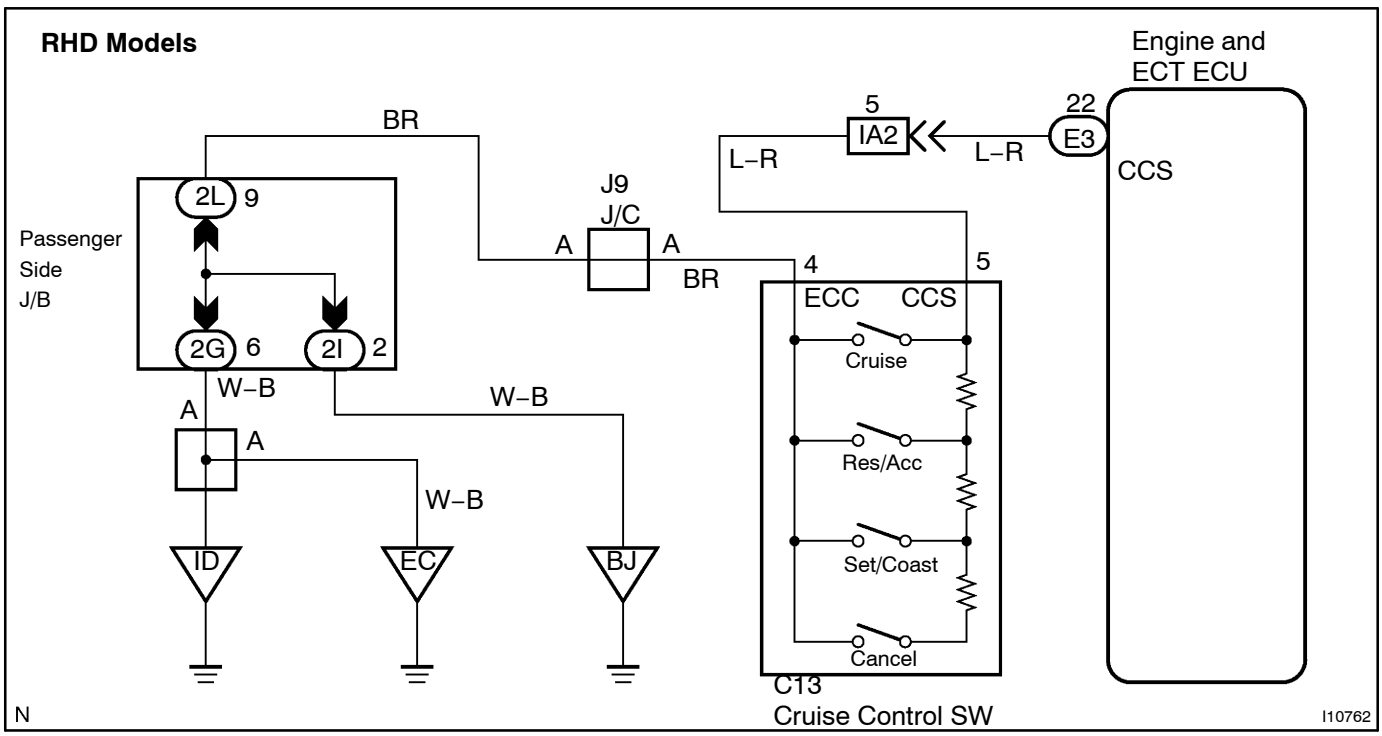
Cruise Control Switch Circuit

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signal (each voltage) to the ECU.

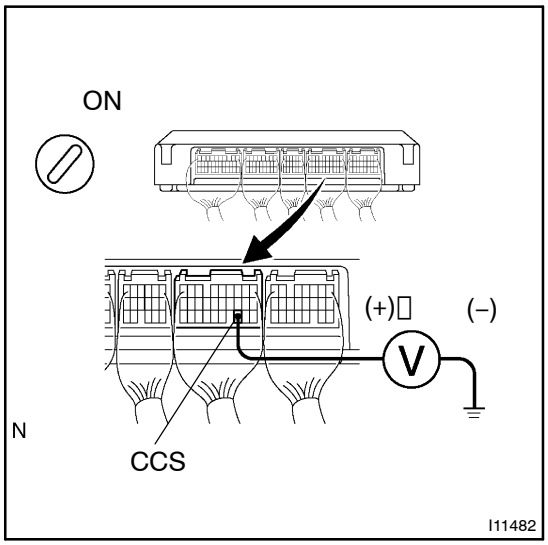
WIRING DIAGRAM





INSPECTION PROCEDURE

1	**Check voltage between terminals CCS of Engine & ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine & ECT ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

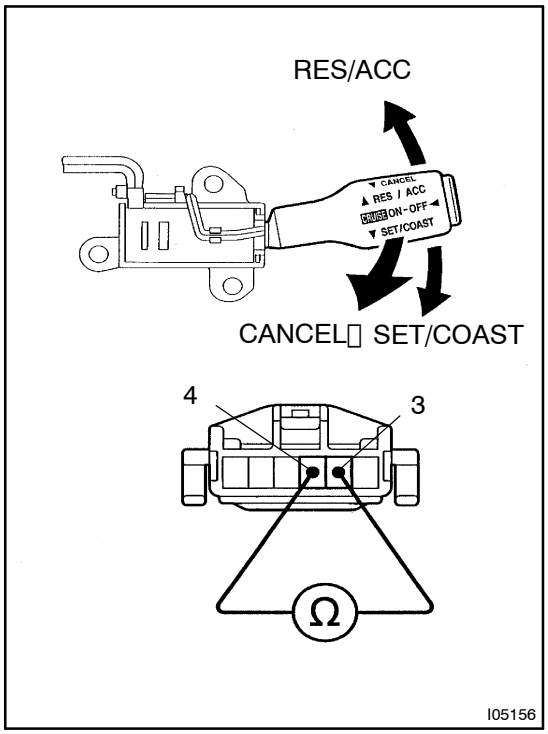
Measure voltage between terminals CCS of Engine & ECT ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 – 16 V
RES/ACC	2.4 – 3.8 V
SET/COAST	4.7 – 6.9 V
CANCEL	6.9 – 9.8 V

NG → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–487).**

OK

2	Check control switch continuity.



PREPARATION:

(a) Remove steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

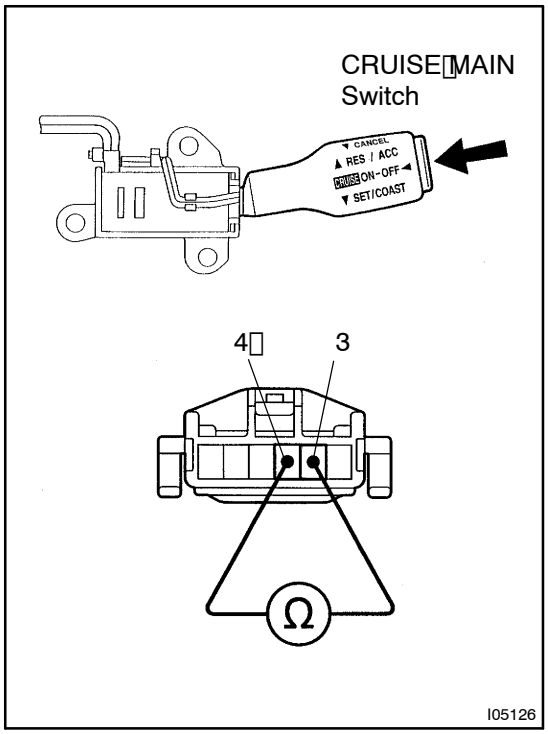
Measure resistance between terminals 4 and 5 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
RES/ACC	220 – 260
SET/COAST	600 – 660
CANCEL	1,500 – 1,600

NG → **Replace control switch.**

OK

3	Check main switch continuity.



PREPARATION:

(a) Remove steering wheel center pad. (See page SR–12)

(b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 4 and 5 of control switch connector when main switch is held ON and OFF.

OK:

Switch position	Tester connection	Specified condition
OFF	–	No continuity
Hold ON	4 – 5	Continuity

NG → **Replace control switch.**

OK

4	Check harness and connector between Engine & ECT ECU and cruise control switch, cruise control switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

5	Check cruise control indicator light (See combination meter).

NG → Replace combination meter.

OK

Check and replace Engine and ECT ECU (See page IN–32).

DI090–19

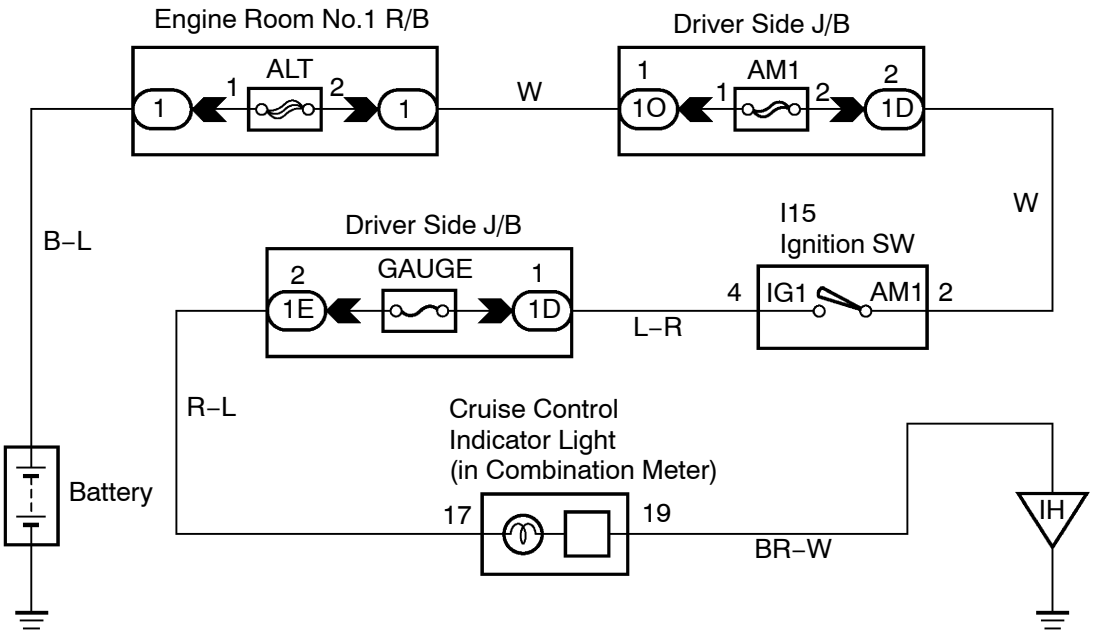
CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM

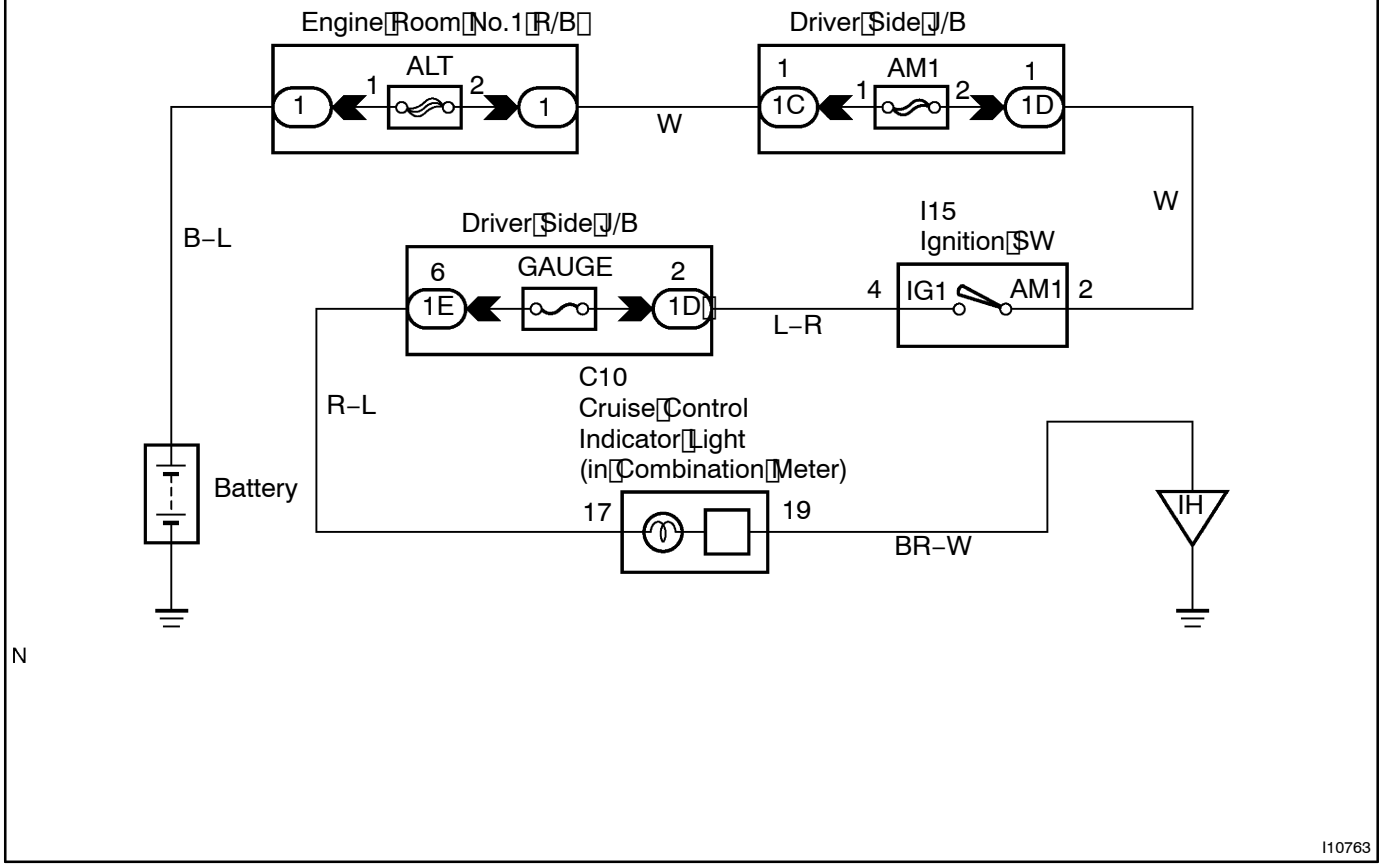
LHD Models



N

I10752

RHD Models



I10763

INSPECTION PROCEDURE

1	Check combination meter (See page BE–2).

NG → Replace combination meter.

OK

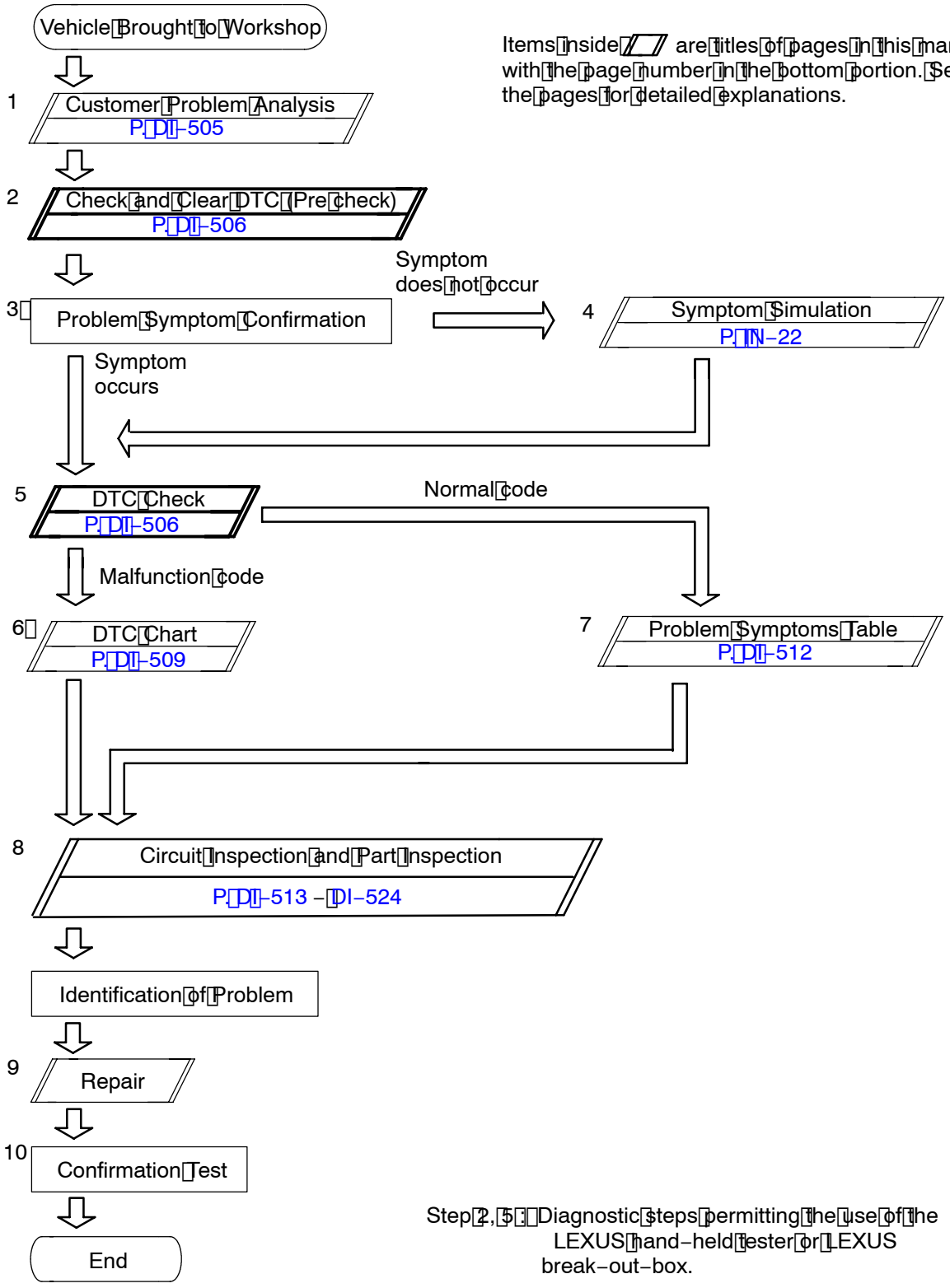
Check and replace Engine and ECT ECU (See page IN–32).

ENGINE IMMOBILISER SYSTEM

DI1AJ–15

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot 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: Diagnostic steps permitting the use of the LEXUS hand–held tester or LEXUS break–out–box.

DI1AK–11

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBLISER Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

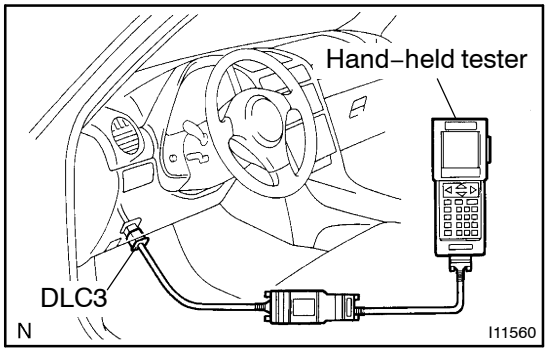
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Immobiliser is not set. (Engine starts with key codes other than the registered key code.)
	☐ Engine does not start.

Check Item	**Malfunction Indicator Lamp**	☐ Normal ☐ Remains ON ☐ Does not Light Up

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI1AL–16



PRE–CHECK

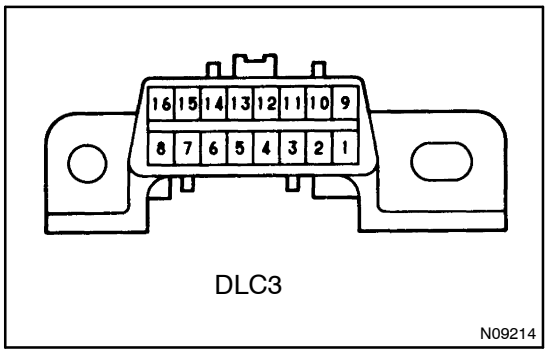
1. DIAGNOSIS SYSTEM

(a) Description

Engine and ECT ECU controls the function of immobiliser on this vehicle.

Data of the immobiliser or DTC can be read form DLC3 of the vehicle. When a trouble occurs on immobiliser, check engine warning light does not light up but DTC inspection is performed.

Therefore when there seems to be a trouble on immobiliser, use LEXUS hand–held tester or SST to check and troubleshoot it.



(b) Check the DLC3.

The vehicle's engine & ECT ECU uses ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

Terminal No.	Connection / Voltage or Resistance	Condition
7	Bus ⊕ Line / Pulse generation	During transmission
4	Chassis 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 hand–held tester to DLC3, turned the ignition switch ON and operated the hand–held tester, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- 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 DTC using hand–held tester.

NOTICE:

Hand–held tester only: When the diagnosis system is switched from normal mode to check mode, it erases all DTCs and freezed frame data recorded in normal mode. So before switching modes, always check the DTCs and freezed frame data, and note them down.

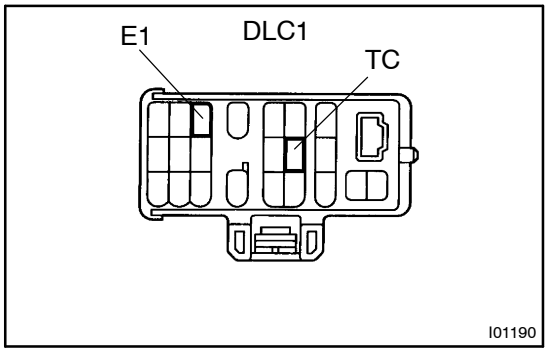
(1) Prepare the hand–held tester.

(2) Connect the hand–held tester to DLC3.

(3) Turn the ignition switch ON and push the hand–held tester main switch ON.

(4) Use the hand–held tester to check the DTCs and freezed frame data, note them down. (For operating instructions, see the hand–held tester instruction book.)

(5) See page DI–17 to confirm the details of the DTCs.



(b) Check the DTC (Using diagnosis check wire)

(1) Turn ignition switch ON.

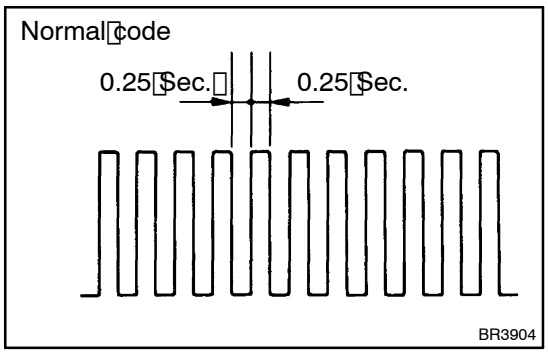
(2) Using SST, connect between terminals 11 (TC) and 3 (E1) of DLC1.

SST 09843–18040

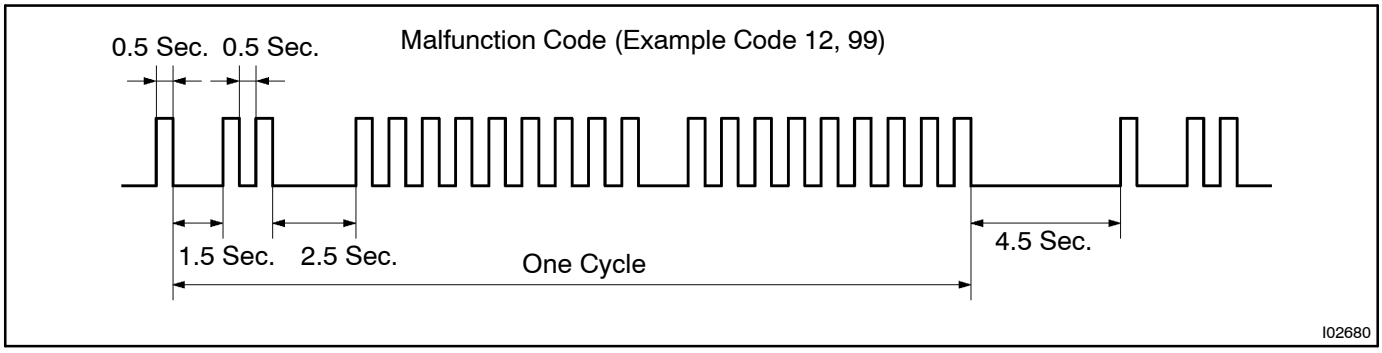
(3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit.
- Engine & ECT ECU controls the immobiliser function on this vehicle, DTC is out put with engine data.



As an example, the blinking patterns for codes; normal, 12 and 99 are shown in the charts.



(4) When DTC ”99” is output, there is a trouble of immobiliser. Start troubleshooting referring to PROBLEM SYMPTOMS TABLE.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.

HINT:

In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the larger.

(c) Clear the DTC.

The following operations will erase the DTCs and freeze frame data.

(1) Operating the OBD ll scam tool (complying with SAEJ1978) or LEXUS hand–held tester to erase the codes. (See the OBD ll scan tool’s instruction book for operating instructions.)

(2) Disconnecting the battery terminals or EFI fuse.

DI626–01

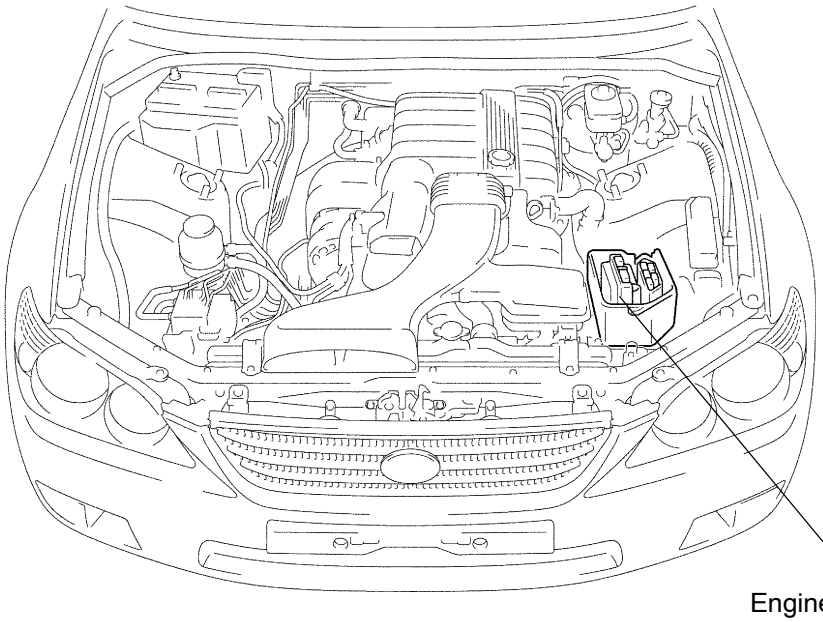
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See Page)	Detection Item	Trouble Area
B2795 (DI–513)	Unmatched key code	• Key • Unregistered key inserted before
B2796 (DI–514)	No communication in immobiliser system	• Key • Transponder key coil • Amplifier • Wirehaness • Engine & ECT ECU
B2797 (DI–518)	Communication malfunction No.1	• Communication contents • Unregistered key inserted before
B2798 (DI–524)	Communication malfunction No.2	• Key • Transponder key coil • Amplifier • Wire haness • Engine & ECT ECU

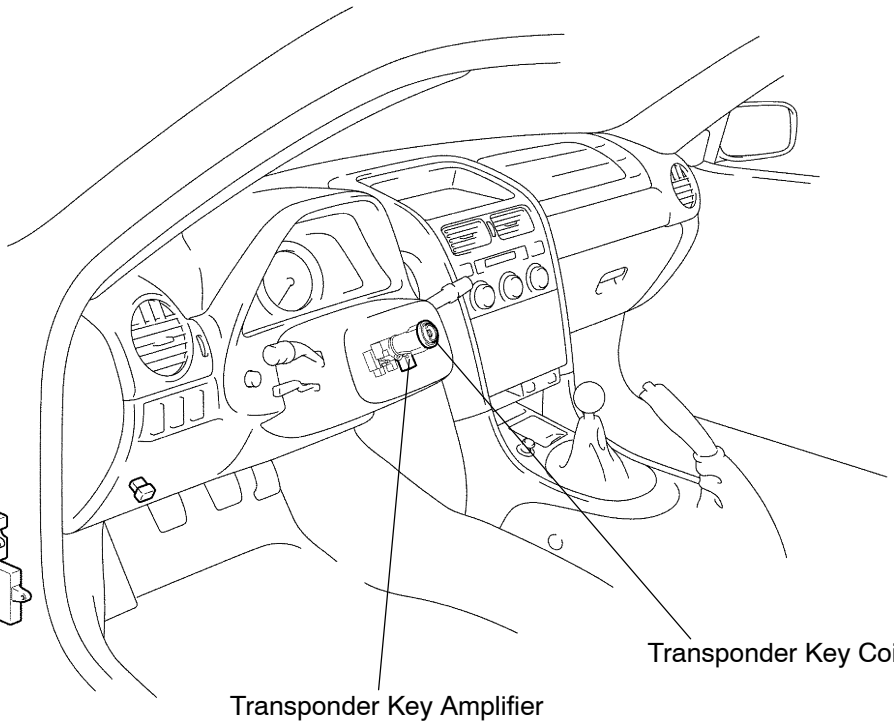
HINT:
To reduce the unnecessary exchange of Engine & ECT ECU, check that a trouble occurs with the original Engine & ECT ECU at the time of excanging Engine & ECT ECU and the trouble will disappear with a new Engine & ECT ECU.

DI627–01

PARTS LOCATION



Engine and ECT ECU



Driver Side
Junction Block
● IGN Fuse

Transponder Key Amplifier

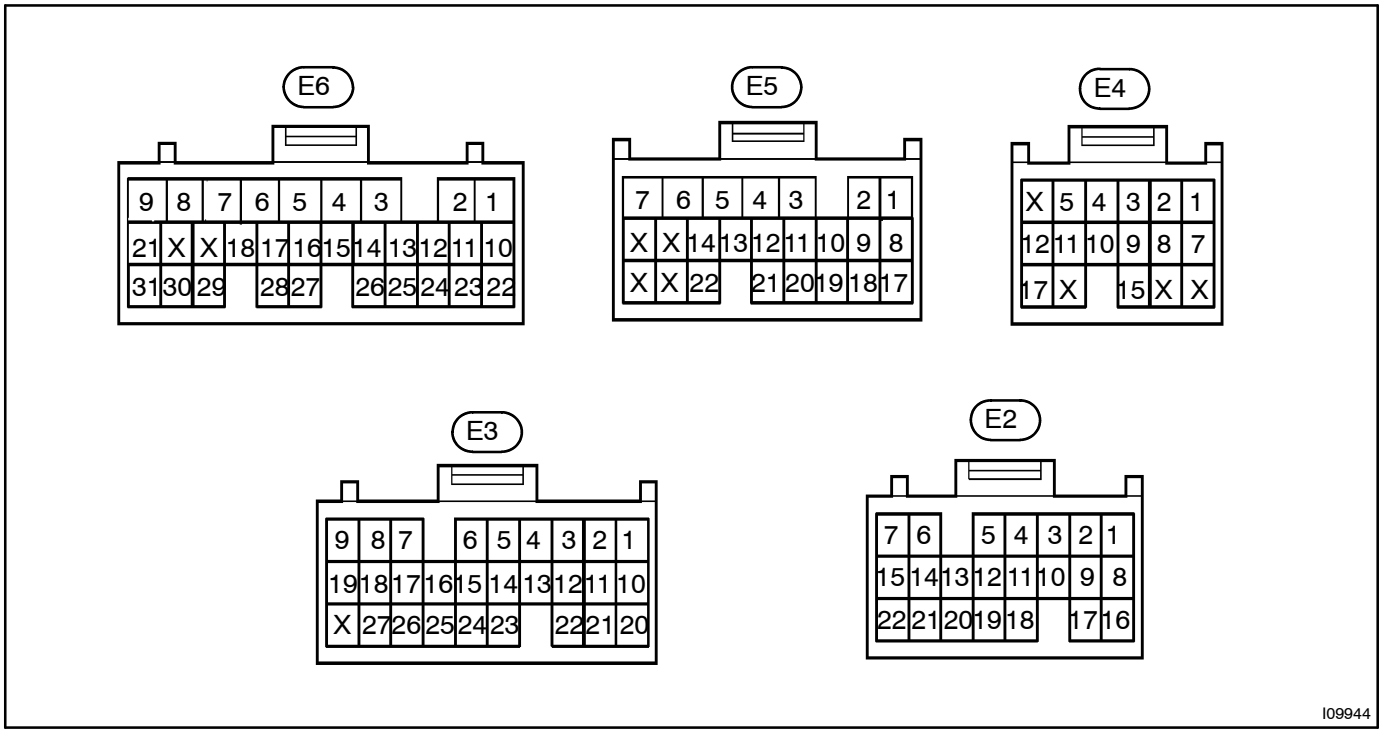
Transponder Key Coil

P

I10857

DI3ML–03

TERMINALS OF ECU



I09944

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TXCT – E1 (E3 – 19 ↔ E5 – 17)	P ↔ BR	Ignition Switch ON	10 – 14
CODE – E1 (E3 – 14 ↔ E5 – 17)	G ↔ BR	Ignition Switch ON	10 – 14
RXCK – E1 (E3 – 18 ↔ E5 – 17)	V ↔ BR	Ignition Switch ON	10 – 14

DI1AP–14

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Immobiliser is not set. (Engine starts with key codes other than the registered key code.)	1. Engine and ECT ECU	IN–32
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. Engine and ECT ECU	*1 IN–32 BE–201 IN–32
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. Engine and ECT ECU	*2 IN–32 IN–32
Security indicator is always ON. (Although code has been registered in the automatic registration mode, indicator is not OFF.)	1. Wire harness 2 Transponder key coil 3. Amplifier 4. Engine and ECT ECU	IN–32 BE–201 IN–32
Security indicator is OFF. (When DTC of immobiliser is output)	1. Wire harness 2 Transponder key coil 3. Amplifier 4. Engine and ECT ECU	IN–32 BE–201 IN–32
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. Engine and ECT ECU	IN–32 IN–32
Security indicator is abnormally blinking.	1. Wire harness 2. Engine and ECT ECU	IN–32 IN–32

*1 : Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key.

*2 : Finish the automatic registration mode because the mode might still remain.

DI1AS–15

CIRCUIT INSPECTION

DTC	B2795/99	Unmatched Key Code

This DTC is output when an unregistered key is inserted. When this DTC is output, delete DTC and insert the key that a customer keeps to check that B2795 is output.
When a key that outputs B2795 is found, register this key. when B2795 is not output, there is a possibility that the unregistered key has been inserted before. (Engine and ECT ECU is normal.)
Inquire a customer the condition of using the system to find the cause of the trouble.
(Example: Another key has been inserted, etc..)

DTC No.	DTC Detecting Condition	Trouble Area
B2795/99	No communication	• Key

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

HINT:
When inserting the key that does not start the engine, DTC (B 2795) is stored in memory.

RESULT:

OK	All keys starts the engine.
NG	A specific key does not start the engine.

OK → **No problem.**

HINT:
If the result is ”OK”, please confirm whether or not customers have ever inserted the unregistered key or the immobiliser key (with transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

NG

Register the key that does not start the engine.

DI628–01

DTC	B2796/99	No Communication in Immobiliser system

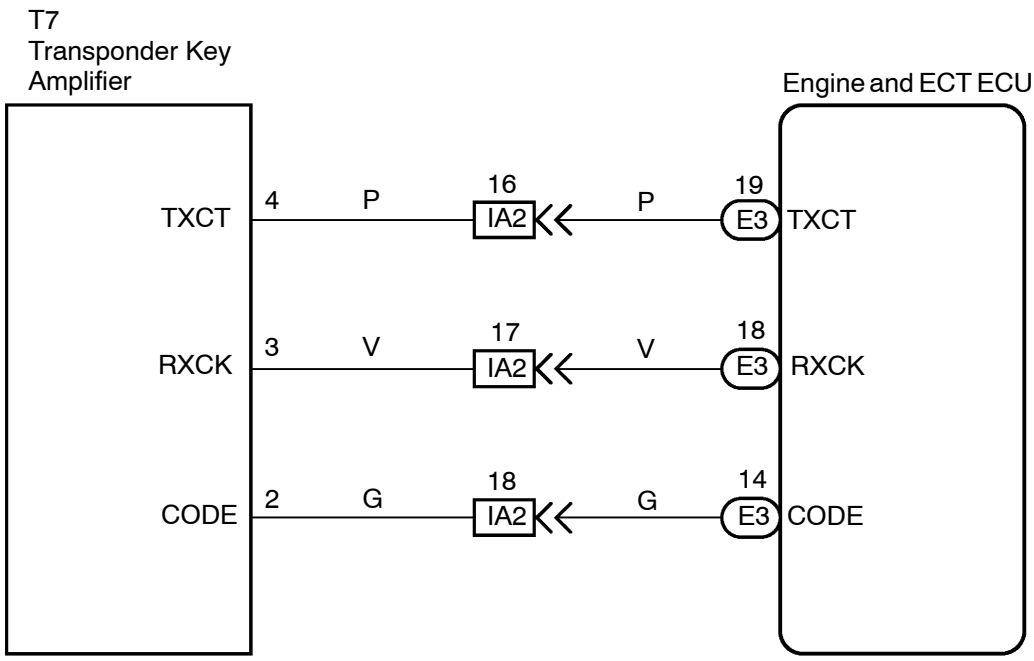
CIRCUIT DESCRIPTION

This code is stored in memory when inserting the key that does not have a transponder chip or if communication between the key and Engine and ECT ECU is impossible.

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	• Key • Transponder Key Coil • Transponder Key Amplifier • Wire harness • Engine and ECT ECU

WIRING DIAGRAM

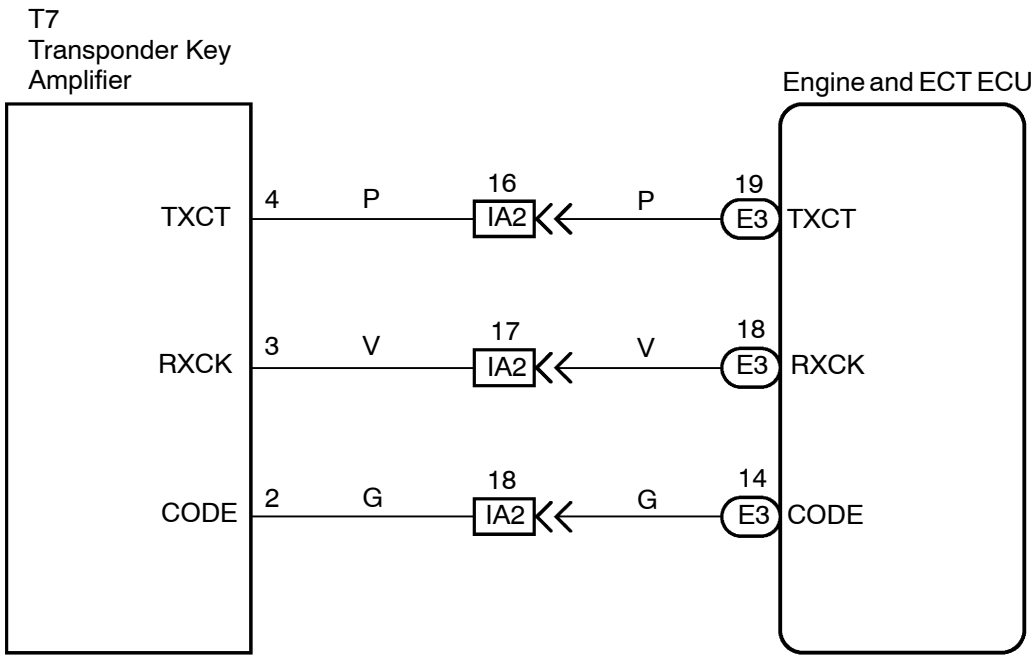
LHD Models



N

I10750

RHD Models



N

I10759

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

RESULT:

A	All keys start the engine.
B	A specific key does not start the engine. In this case, DTC (B2796) is stored in memory.
C	All keys do not start the engine. In this case, DTC (B2796) is stored in memory.

A → **No problem at this time.**

HINT:
If the result is "A", please confirm whether or not customers have ever inserted the key (without transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

B → **The transponder chip of a specific key is defective. Replace the key.**

C

2	**Check transponder key coil (See page BE–201).**

NG → **Replace transponder key coil.**

OK

3	**Check harness and connector between transponder key amplifier and Engine and ECT ECU.**

NG → **Repair or replace harness and connector.**

OK

4	**Does it operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace Engine and ECT ECU.

DI629–01

DTC	B2797/99	Communication Malfunction No.1

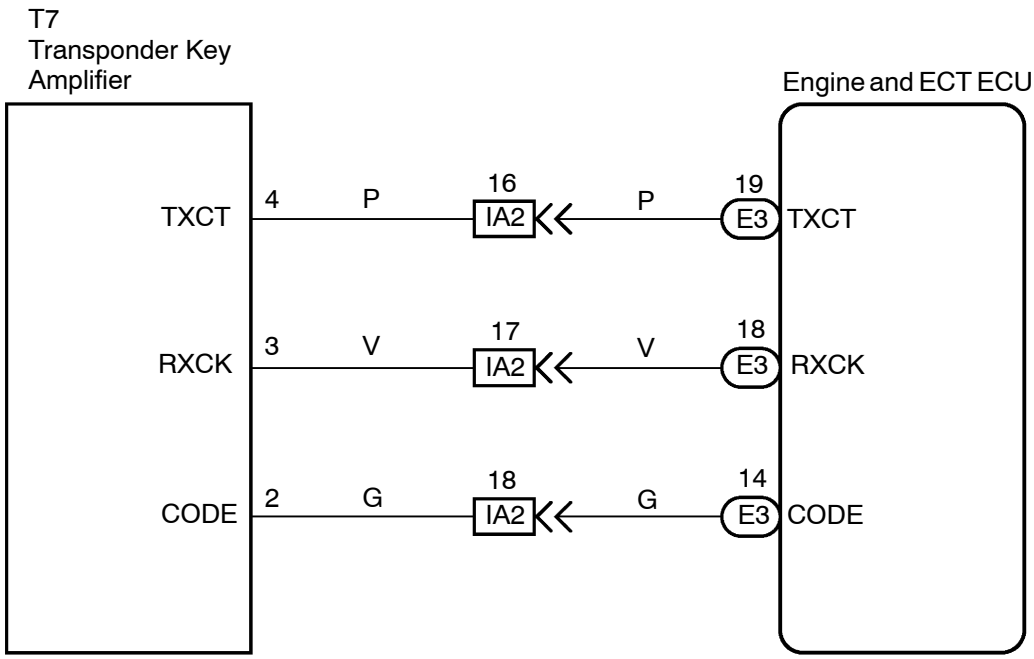
CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs. (Example. Some noise is included in communication line.)

DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	• Wire Harness • Transponder Key Amplifier • Engine and ECT ECU

WIRING DIAGRAM

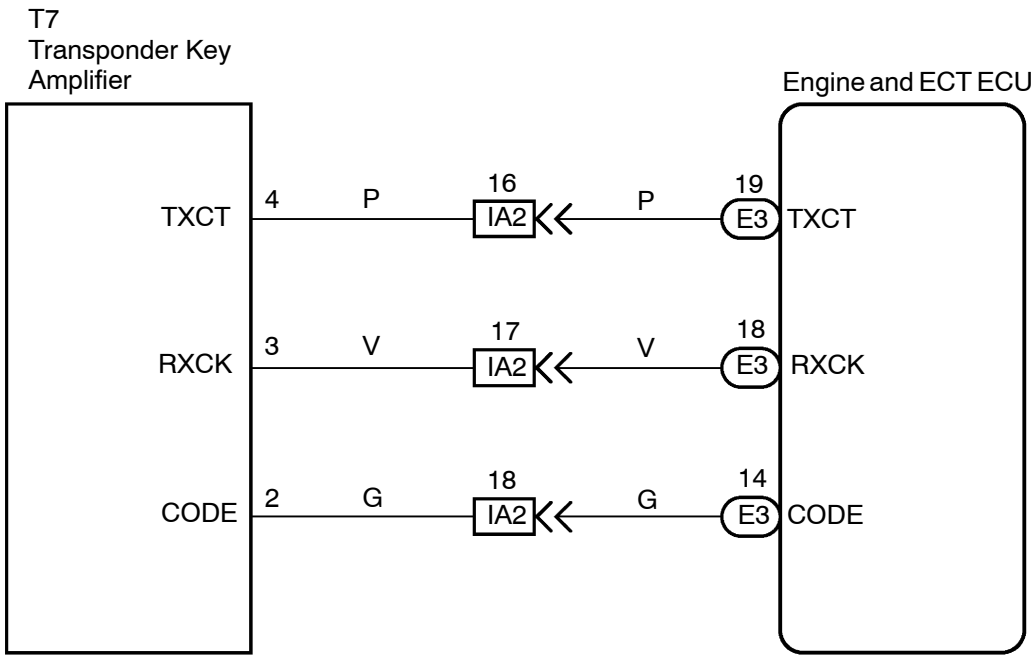
LHD Models



N

I10750

RHD Models

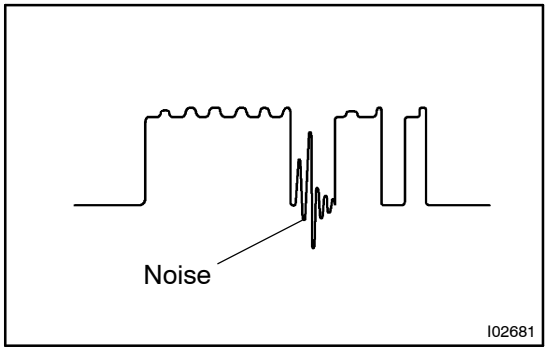


N

I10759

INSPECTION PROCEDURE

1	**Noise check**



PREPARATION:
Insert the already registered master key in the key cylinder.
CHECK:
Using an oscilloscope or TOYOTA hand–held tester, check that noise is included in the signals sent to the CODE terminal of Engine and ECT ECU.
OK:
No noise is detected.

NG → **Try to find the cause of the noise and remove it.**

OK

2	**Does the system operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace Engine and ECT ECU.

DI62A–01

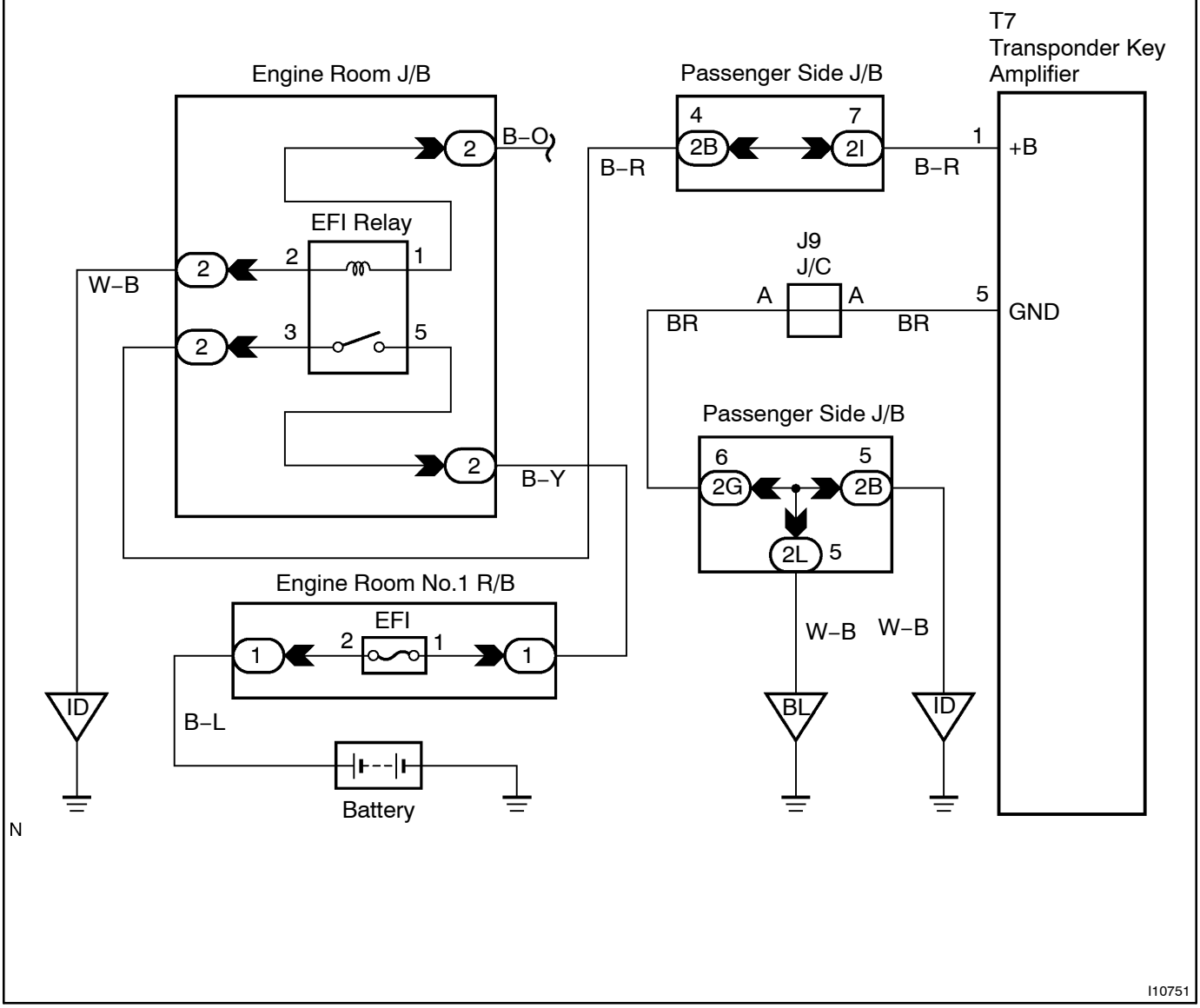
Power source circuit

CIRCUIT DESCRIPTION

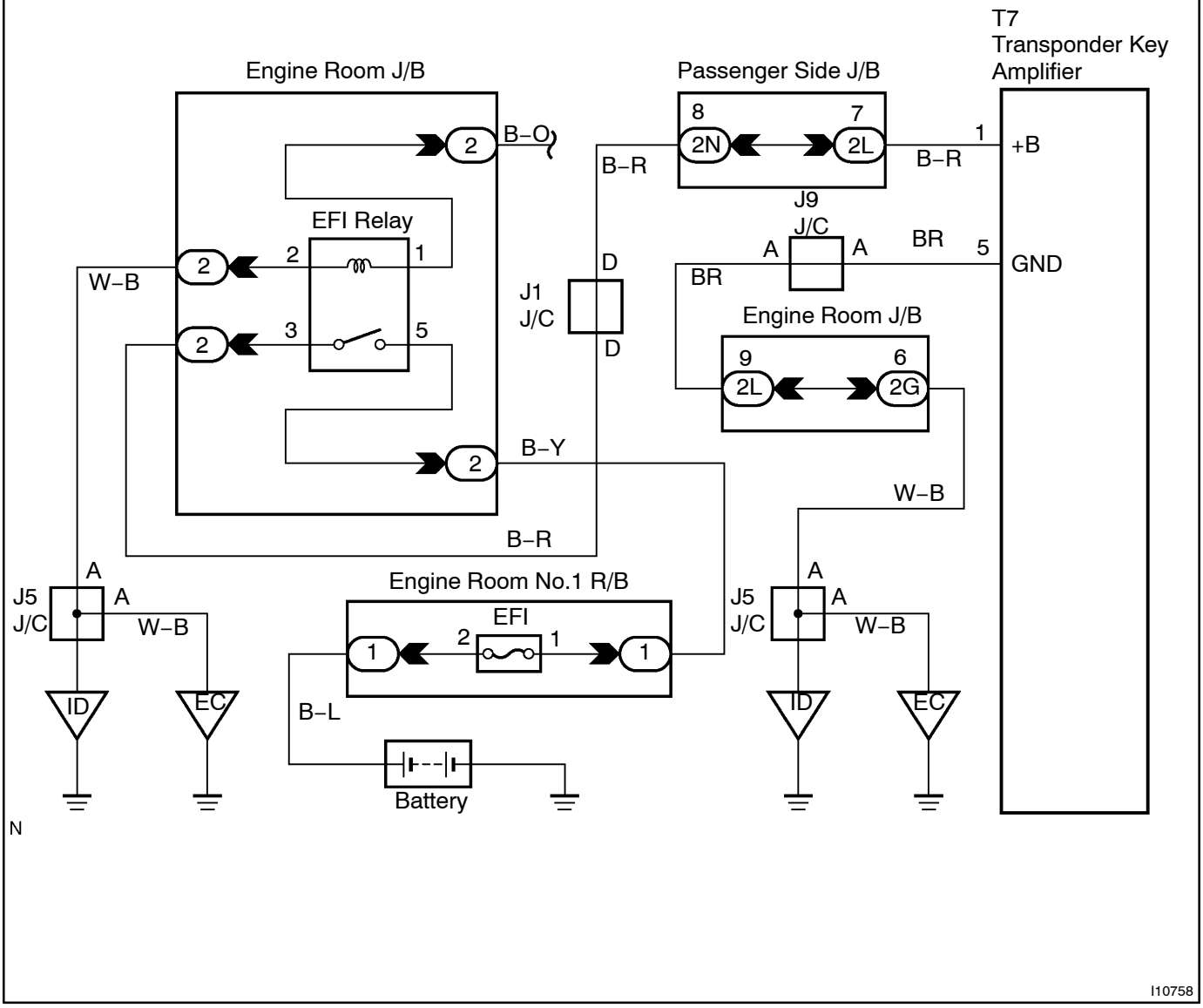
This circuit provides power to operate the Transponder Key ECU

WIRING DIAGRAM

LHD Models



RHD Models


T7
Transponder Key
Amplifier
Engine Room J/B
Passenger Side J/B
B–O
B–R
8
7
2N
2L
1
+B
B–R
J9
J/C
A
A
BR
5
GND
BR
EFI Relay
2
1
3
5
W–B
D
J1
J/C
D
Engine Room J/B
9
6
2L
2G
B–Y
W–B
B–R
A
J5
J/C
A
W–B
Engine Room No.1 R/B
EFI
2
1
1
1
B–L
Battery
ID
EC
N
I10758

INSPECTION PROCEDURE

1	**Check EFI fuse.**

CHECK:
Check continuity of EFI fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals EFI and GND of Transponder Key ECU connector.**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Transponder Key ECU connector.
CHECK:
Measure voltage between terminals +B and GND.
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–512).**

NG ↓

3	**Check wireharness and connector between Transponder Key ECU and body ground.**

NG → **Repair or replace wireharness or connector.**

OK ↓

Check and repair wirehareness and connector between Transponder Key ECU and Battery.

DI62B–01

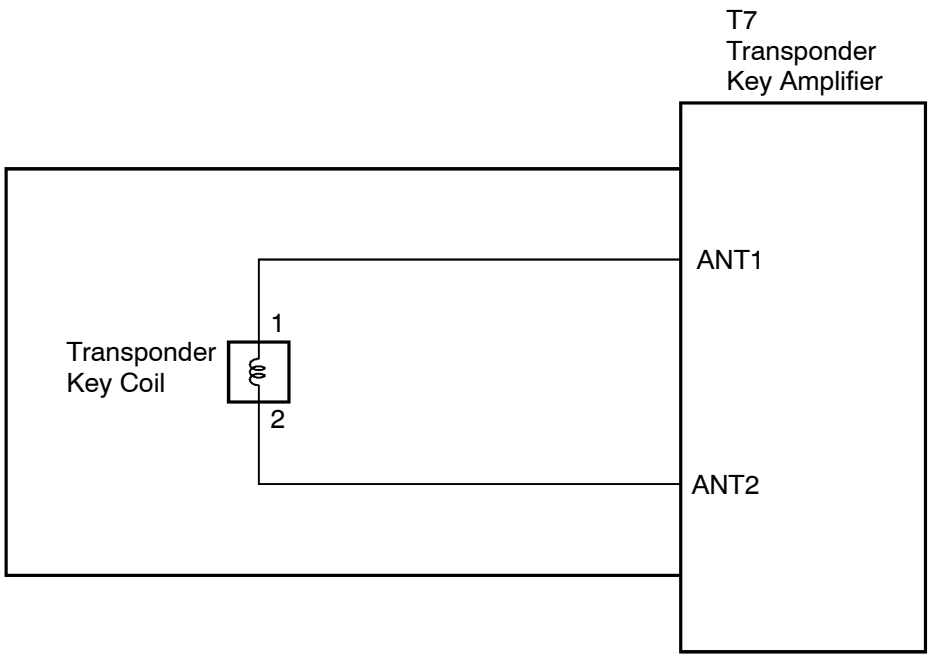
Transponder key coil circuit

CIRCUIT DESCRIPTION

DTC No. (See Page)	Detection Item	Trouble Area
B2798/99	Communication error	• Key • Transponder Key Coil • Transponder Key Amplifier • Wire harness • Engine & ECT ECU

WIRING DIAGRAM

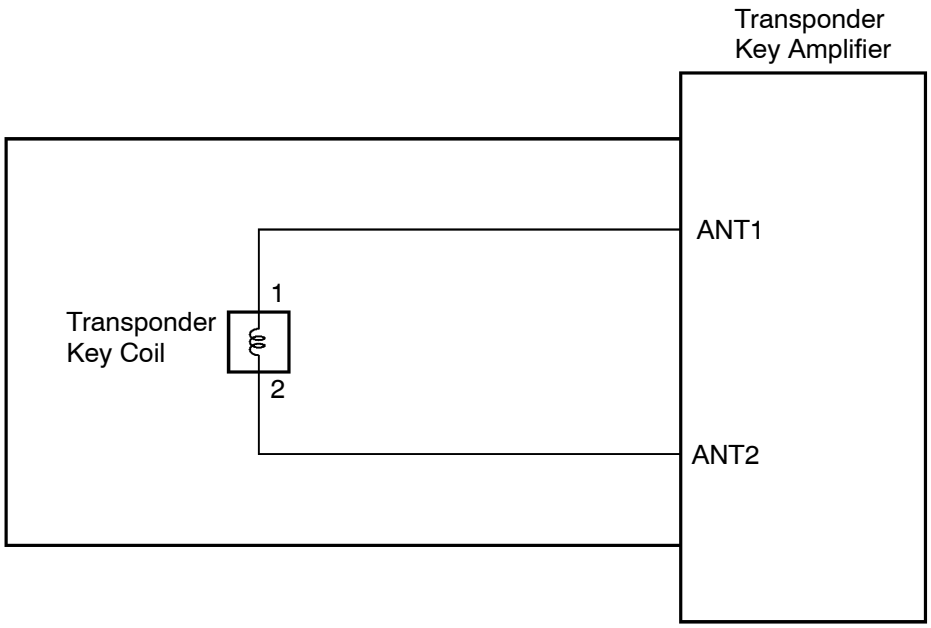
LHD Models



N

I10749

RHD Models



N

I10749

INSPECTION PROCEDURE

1	Check transponder key coil (See page BE–201).

NG → Replace transponder key coil

OK

2	Check harness and connector between transponder key amplifier and Engine & ECT ECU.

NG → Repair of replace harness and connector

OK

3	Does the system operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

Replace Engine & ECT ECU

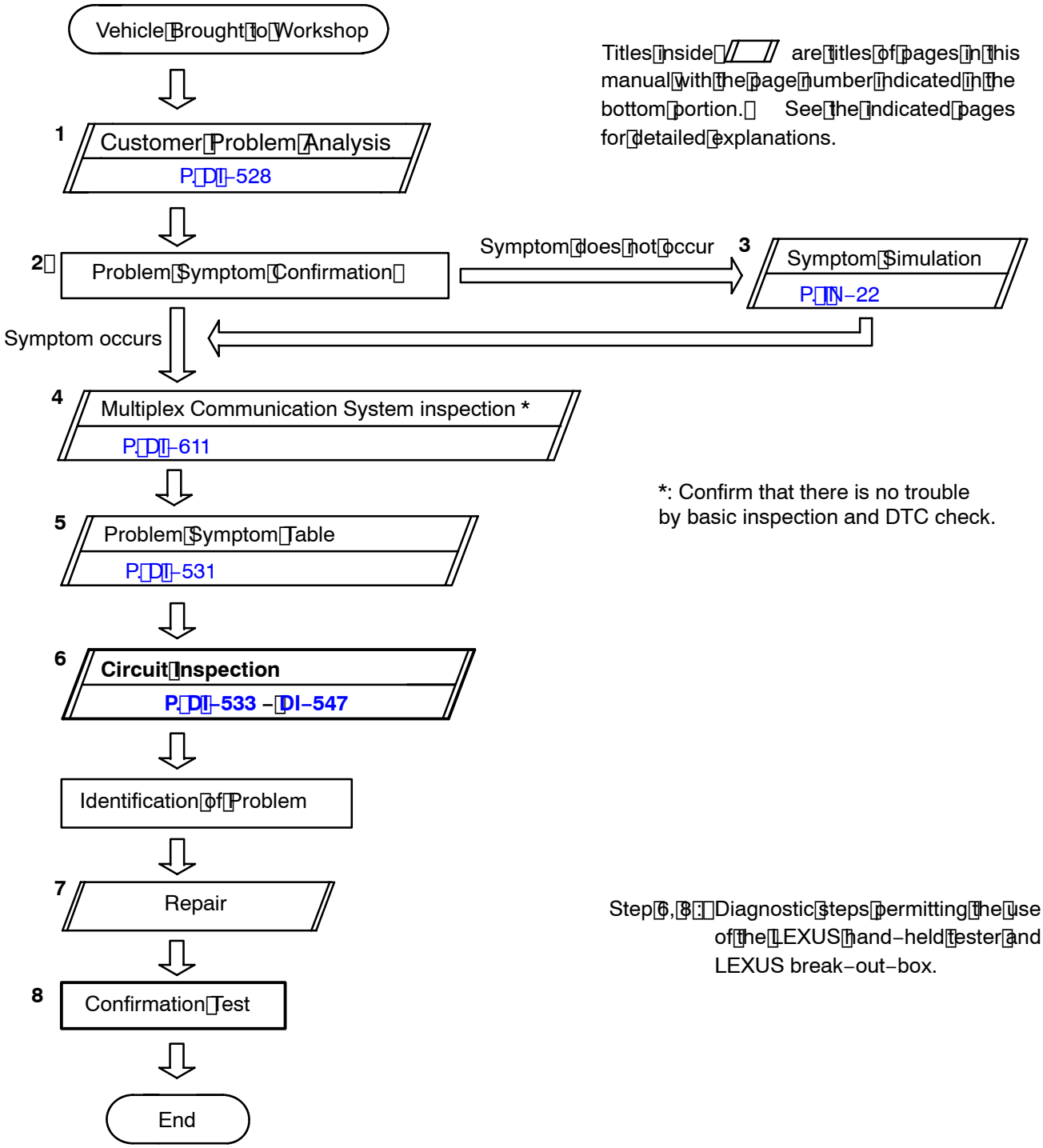
COMBINATION METER SYSTEM

DI60O–01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



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.

*: Confirm that there is no trouble by basic inspection and DTC check.

Step 6, 8: Diagnostic steps permitting the use of the LEXUS hand–held tester and LEXUS break–out–box.

DI60P–01

CUSTOMER PROBLEM ANALYSIS CHECK

COMBINATION METER SYSTEM Check Sheet

Inspector's name: _____

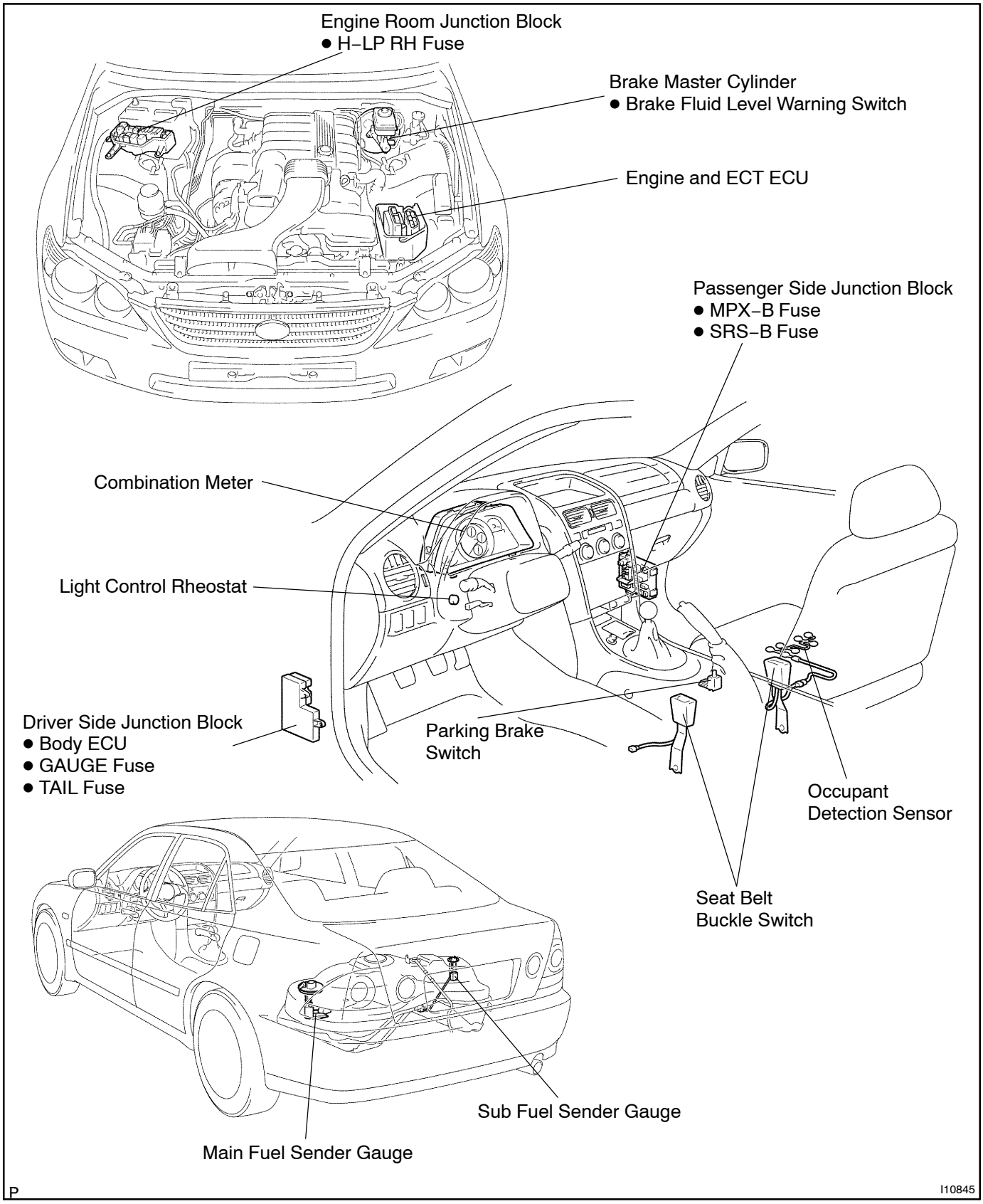
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought In	/ /	**Odometer Reading**	**km** **Mile**

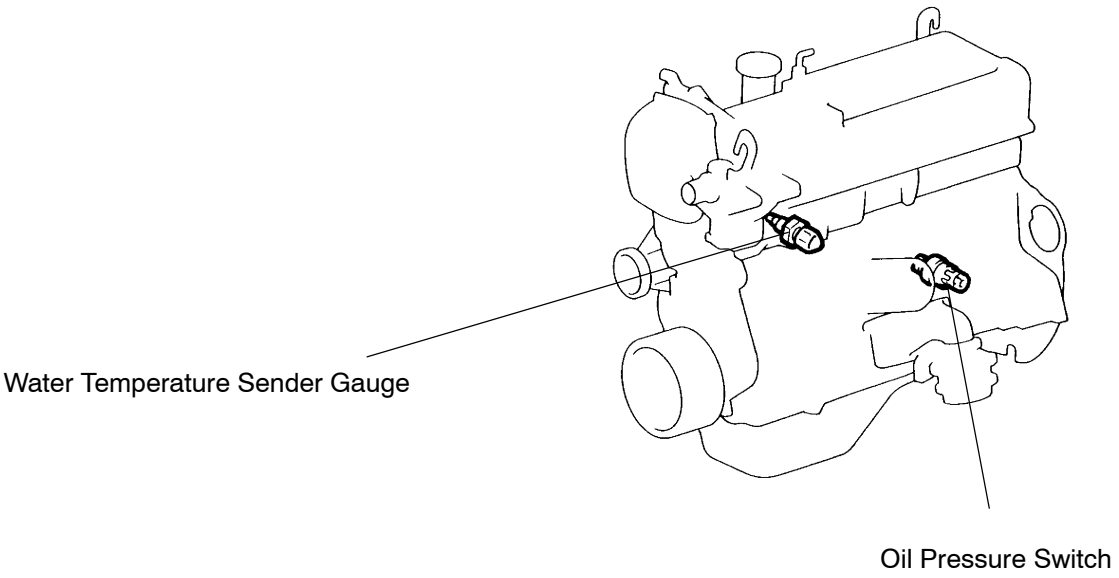
Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom	**Gauge**	☐ Speedometer does not operate or operates abnormally.
		☐ Tachometer does not operate or operates abnormally.
		☐ Fuel Gauge does not operate or operates abnormally.
		☐ Water Temperature Gauge does not operate or operates abnormally.
		☐ Voltmeter does not operate operates abnormally.
		☐ Specific Fuel Consumption Gauge does not operate or operates abnormally.
	Indicator Light and Warning Light	☐ Shift indicator light does not light up.
		☐ Open door warning light does not light up.
		☐ Driver seat belt warning does not light up.
		☐ Low oil pressure warning light does not light up.
		☐ Discharge warning does not light up.
		☐ Brake warning light does not light up.
		☐ CRUISE MAIN indicator light does not light up.
		☐ SNOW indicator light does not light up.
		☐ ECT PWR indicator light does not light up.
		☐ Engine Oil Level Warning light does not light up.
		☐ Others.

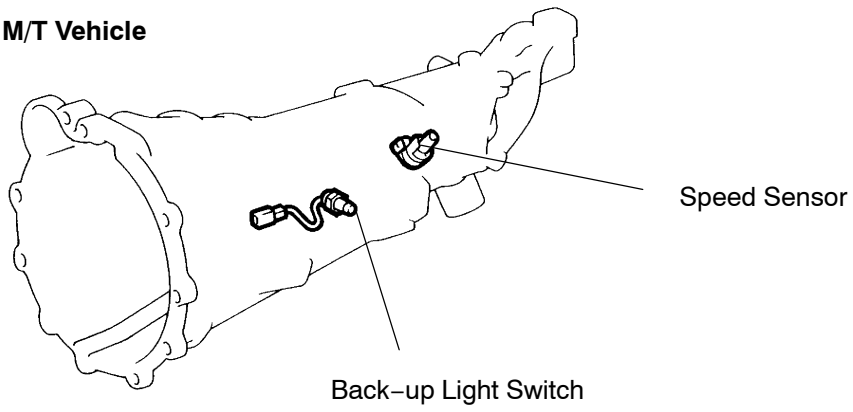
DI60Q–01

PARTS LOCATION

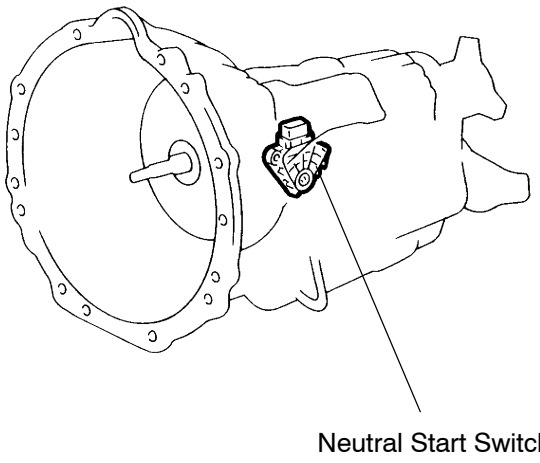




M/T Vehicle



A/T Vehicle



N

I11340

DI60R–01

PROBLEM SYMPTOMS TABLE

GAUGE:

Symptom	Suspect Area	See page
Speedometer does not operate or operates abnormally.	1. Speedometer 2. Speed Sensor Circuit	DI–533 DI–541
Tachometer does not operate or operates abnormally.	1. Tachometer 2. Igniter Signal Circuit	DI–534 DI–543
Fuel Gauge does not operate or operates abnormally.	1. Fuel Receiver Gauge 2. Fuel Sender Gauge 3. Wire Harness 4. Combination Meter 5. Body ECU	DI–535 BE–83 – BE–77 DI–549
Water Temperature Gauge does not operate.	1. Water Temperature Receiver Gauge 2. Water Temperature Sender Gauge 3. WIre Harness 4. Combination Meter 5. Engine and ECT ECU	DI–537 BE–83 – BE–77 DI–1

INDICATOR LIGHT AND WARNING LIGHT:

Symptom	Suspect Area	See page
Shift indicator light does not light up.	1. Bulb circuit 2. A/T shift indicator light switch 3. Transmission control switch 4. Engine and ECT ECU	DI–545 DI–217 DI–1
Open door warning light does not light up.	1. Bulb circuit 2. Door courtesy switch 3. Body ECU	DI–545 BE–57 DI–549
Driver seat belt warning light does not light up.	1. Bulb Circuit 2. Driver Buckle Switch CIrcuit 3. Meter Circuit Plate 4. Wire Harness 5. Body ECU	DI–545 BE–83 BE–77 – DI–549
Low oil pressure warning light does not light up.	1. Bulb Circuit 2. Low oil pressure warning switch 3. Engine and ECT ECU	DI–545 BE–83 DI–1
Discharge warning light does not light up.	1. Bulb circuit 2. Alternator 3. Engine and ECT ECU	DI–545 CH–9 DI–1
Brake warning light does not light up.	1. Bulb circuit 2. Parking brake switch 3. Brake fluid level warning switch 4. Combination meter 5. A/C ECU	DI–545 BE–83 BE–83 BE–77 DI–667
CRUISE MAIN indicator light does not light up.	1. Bulb circuit 2. Cruise control switch 3. Combination meter 4. A/C ECU 5. Engine and ECT ECU	DI–545 DI–498 BE–77 DI–667 DI–1
ECT SNOW indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter 4. A/C ECU 5. Engine and ECT ECU	DI–545 DI–212 BE–77 DI–667 DI–1

ECT PWR indicator light does not light up.	1. Bulb circuit 2. ECT pattern indicator signal 3. Combination meter 4. Engine and ECT ECU	DI–545 DI–212 BE–77 DI–1
Engine oil level warning light does not light up.	1. Bulb circuit 2. Engine oil level warning sensor 3. Combination meter	DI–545 BE–83 BE–77
Any of indicator lights does not light up.	1. Bulb circuit 2. Combination meter ECU power source circuit 3. Combination meter	DI–545 DI–547 BE–77

DI60S–01

CIRCUIT INSPECTION

Speedometer

INSPECTION PROCEDURE

HINT:

If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:

Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:

The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check speedometer (See page BE–83).**

NG → **Replace speedometer.**

OK

3	**Check circuit plate (See page BE–83).**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60T–01

Tachometer

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK ⇒ **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check tachometer (See page BE–83).**

NG ⇒ **Replace tachometer.**

OK

3	**Check circuit plate (See page BE–83).**

NG ⇒ **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60U–01

Fuel gauge

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table. (See page DI–531).**

NG

2	**Check fuel receiver gauge (See page BE–83).**

NG → **Replace fuel receiver gauge.**

OK

3	**Check fuel sender gauge (See page BE–83).**

NG → **Replace fuel sender gauge.**

OK

4	Check circuit plate (See page BE–83).

NG → Replace circuit plate.

OK →

Check and replace combination meter (See page BE–77).

DI60V–01

Water Temperature Gauge

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table. (See page DI–531).**

NG

2	**Check water temperature receiver gauge (See page BE–83).**

NG → **Replace speedometer assembly.**

OK

3	**Check water temperature sender gauge (See page BE–83).**

NG → **Replace water temperature sender gauge.**

OK

4	Check circuit plate (See page BE–83).

NG → Replace circuit plate.

OK

Check and replace combination meter (See page BE–77).

Voltmeter

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check voltmeter (See page BE–83).**

NG → **Replace speedometer assembly.**

OK

3	**Check circuit plate (See page BE–83).**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60X–01

Specific Fuel Consumption Gauge

INSPECTION PROCEDURE

HINT:
If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check that the probe moves as LEXUS hand–held tester directs in each range.

OK:
The probe operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check specific fuel consumption gauge (See page BE–83).**

NG → **Replace speedometer assembly.**

OK

3	**Check circuit plate (See page BE–83).**

NG → **Replace circuit plate.**

OK

Check and replace combination meter (See page BE–77).

DI60Y–01

Speed Sensor Circuit

INSPECTION PROCEDURE

When using LEXUS hand–held tester:

1	**Check speedometer value.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the DATALIST mode on the LEXUS hand–held tester.

CHECK:

When driving the vehicle, check that patameter value of "Speedometer" changes on the screen of the LEXUS hand held tester.

NOTICE:

- **Be sure to safely route all cables when driving with the tester connected to the vehicle (i.e., keep cables away from feet, pedals, steering wheel and shift lever).**
- **2 persons are required when test driving with the tester: 1 person to drive the vehicle, and 1 person to operate the tester.**

OK:

The speed displayed on the screen of the tester changes as the vehicle speed chages.

OK → **Replace combination meter.**

NG

2	**Check harness and connector between combination meter and ABS ECU (See page IN–32).**

NG → **Repair or replace harness or connector.**

OK

Check speed sensor circuit and ABS ECU (See page DI–221).

When not using LEXUS hand-held tester:

1	Check ENGINE TROUBLESHOOTING on page DTC P0500.

OK → Replace combination meter.

NG

2	Check harness and connector between combination meter and ABS ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check speed sensor circuit and ABS ECU (See page DI–221).

DI60Z–01

Igniter Signal Circuit

INSPECTION PROCEDURE

When using LEXUS hand–held tester:

1	Check tachometer value.

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the DATALIST mode on the LEXUS hand–held tester.

CHECK:

When running the engine, check that parameter value of "Tachometer" changes on the screen of the LEXUS hand held tester.

OK:

The revolutions displayed on the screen of the tester changes as the engine rotates.

OK → Replace combination meter.

NG

2	Check harness and connector between combination meter and Engine and ECT ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check igniter circuit (See page DI–53).

When not using LEXUS hand–held tester:

1	Check ENGINE TROUBLESHOOTING on page DTC P1300.

OK → Replace combination meter.

NG

2	Check harness and connector between combination meter and Engine and ECT ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check igniter circuit (See page DI–53).

DI27L–04

Bulb Circuit

INSPECTION PROCEDURE

HINT:

If there is not the LEXUS hand–held tester, begin with STEP 2.

1	**Perform active test.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:

Check that light turns ON or OFF as the LEXUS hand–held tester directs.

HINT:

All lights flush except shift indicator.

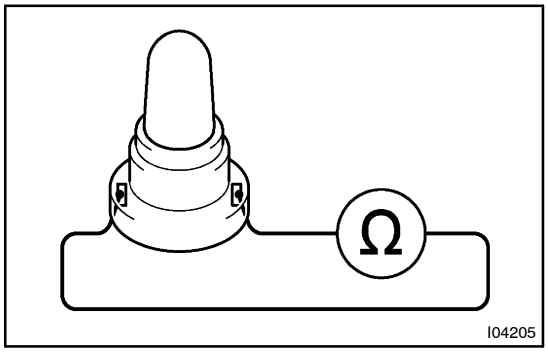
OK:

The light operates normally.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).**

NG

2	**Check bulb.**



CHECK:

Apply the tester as shown to test for continuity.

OK:

Continuity

NG → **Replace bulb.**

OK

3	Check circuit plate (See page BE–83).

NG → Replace circuit plate.

OK

Check and replace combination meter (See page BE–77).

DI610-01

Combination Meter ECU Power Source Circuit

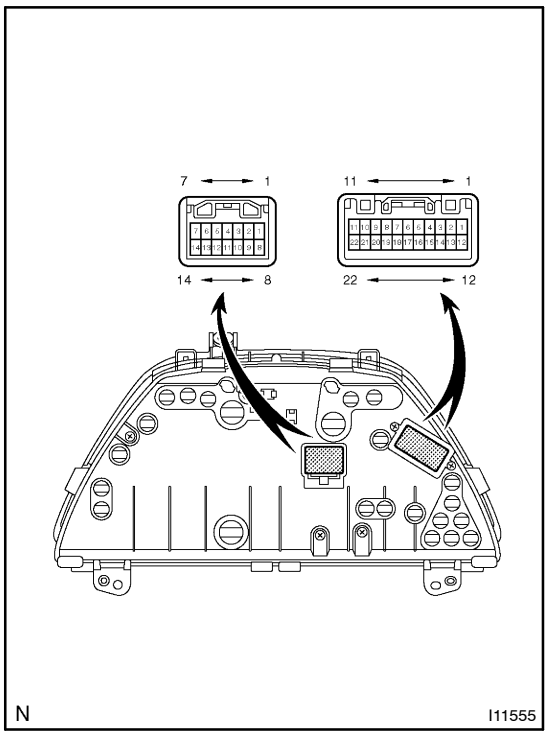
INSPECTION PROCEDURE

1	Check fuses (GAUGE, MPX-B and DOME fuse).

NG → Replace fuse.

OK

2	Check voltage between terminals A15 and A19 of combination meter connector.



PREPARATION:

(a) Remove combination meter.

(b) Disconnect the combination meter connector.

CHECK:

Measure voltage between terminals A15 and A19 of combination meter connector.

OK:

Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptoms table (See page DI–531).

NG

3	Check for open in harness and connector between terminal GND of combination meter and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connetor between combination meter and battery.

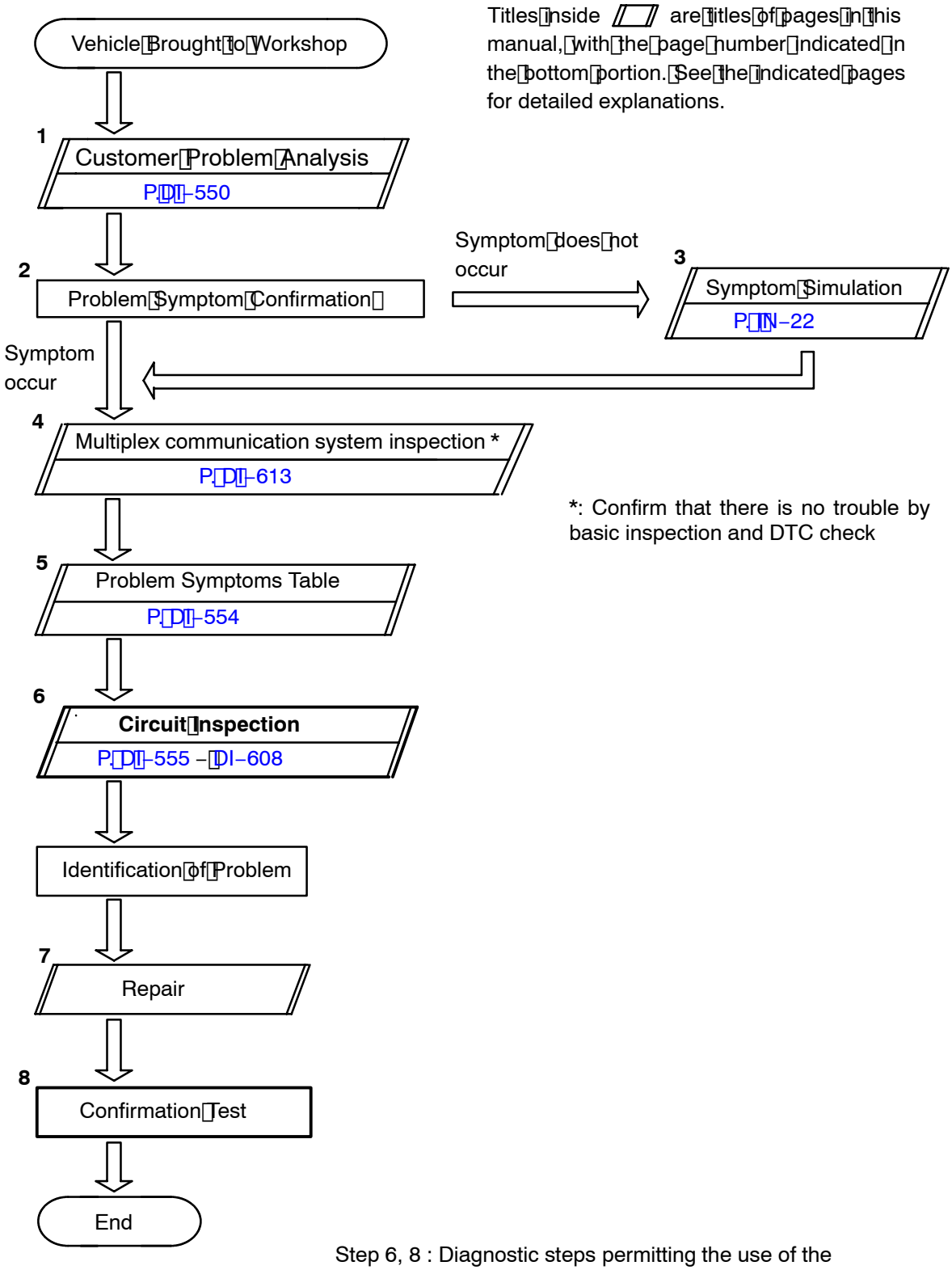
BODY CONTROL SYSTEM

DI62C–01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the trouble shooting.



Step 6, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester .

DI62D–01

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

Inspector's name: _____

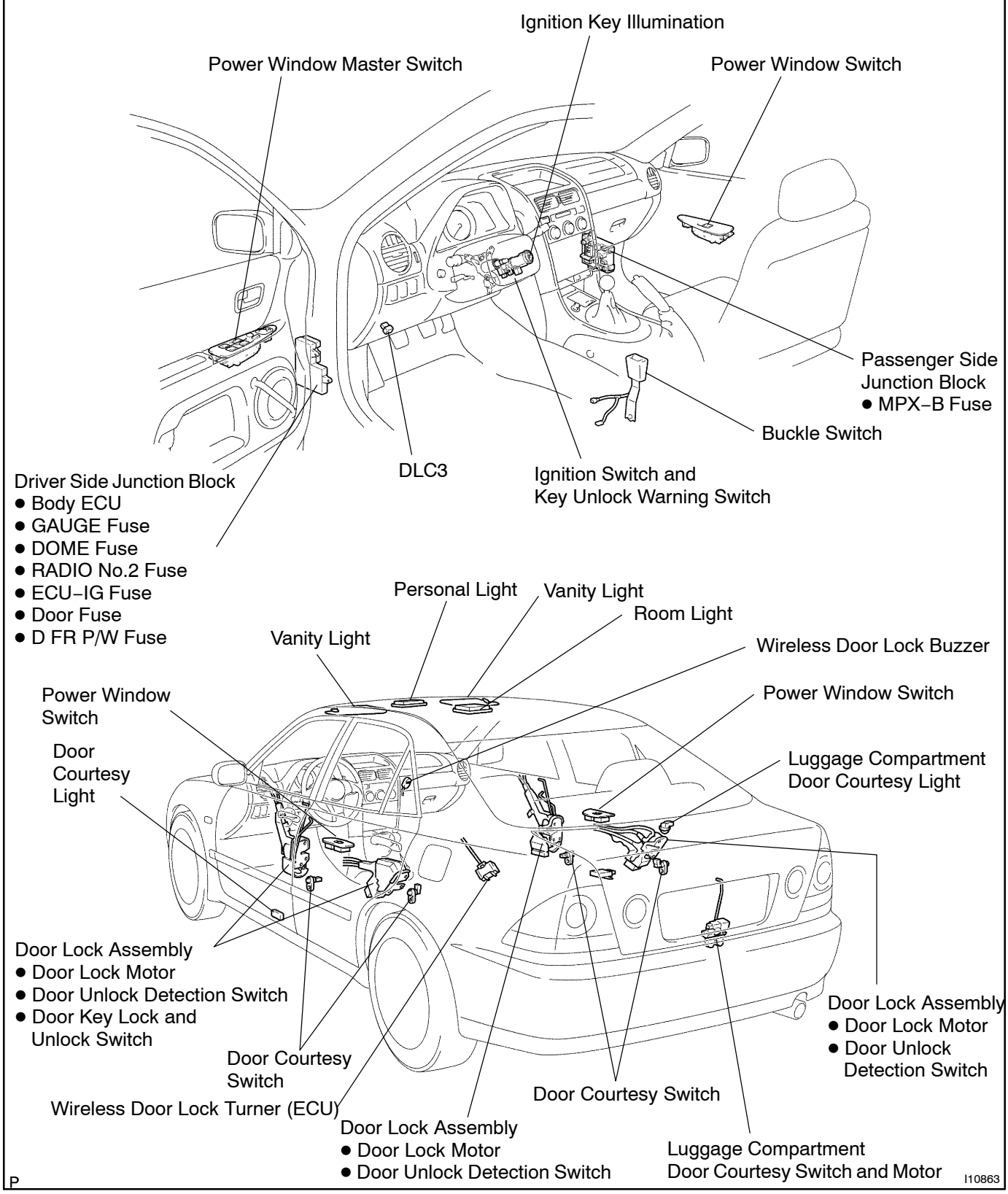
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem 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))

Malfunction System	☐ Key Reminder System
	☐ Light Control System
	☐ Illuminated Entry System
	☐ Seat Belt Warning
	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Wireless Door Lock Control System
	☐ Others

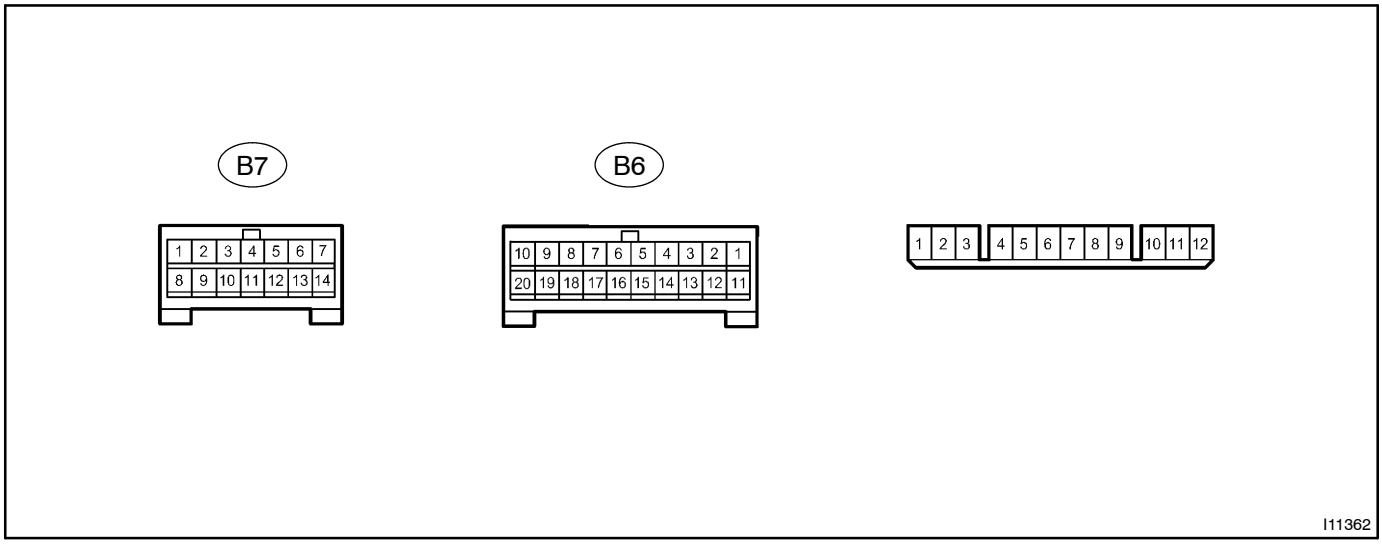
DI62E–01

PARTS LOCATION



DI62F–01

TERMINALS OF ECU



Symbols (Terminal No.)	Wring Color	Condition	STD Voltage (V)
BSUB – GND (1 – 12)	–	Constant	10 – 14 V
BECU – GND (2 – 12)	–	Constant	10 – 14 V
IG – GND (3 – 12)	–	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
ACC – GND (4 – 12)	–	Ignition switch position is LOCK.	Below 1 V
		Ignition switch position is ACC.	10 – 14 V
DEF – GND (5 – 12)	–	Defogger switch position is ON.	Below 1 V
MPX3 (6)	–	Multiplex communication circuit.	–
MPX1 – MPX2 (7 – B6–5)	L	Multiplex communication circuit.	–
ILE – GND (8 – 12)	–	Each interior light switch ON.	Below 1 V
ACT+ – ACT– (9 – 10)	–	Door lock operating.	10 – 14 V
DCTY – GND (11 – 12)	–	Driver door opened.	Below 1 V
		Driver door closed.	10 – 14 V
GND1 – Body ground (12 – Body ground)	–	Constant	Below 1 V
RLD – GND2 (B6–1 – B6–19)	G–B – BR	Rear Left side power window DOWN operation.	Below 1 V
TAIL – GND2 (B6–2 – B6–19)	G – BR	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
KSW – GND2 (B6–6 – B6–19)	B–Y – BR	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
DCLP – GND2 (B6–7 – B6–19)	R–W – BR	Each interior light switch ON.	Below 1 V
PCTY – GND2 (B6–8 – B6–19)	R–B – BR	Passenger door opened.	Below 1 V
		Passenger door closed.	10 – 14 V

PCLP – GND2 (B6–9 – B6–19)	R–G – BR	Each interior light switch ON.	Below 1 V
HAZ – GND2 (B6–10 – B6–19)	G–W – BR	Hazard warning switch position is ON.	Below 1 V
RLU – GND2 (B6–11 – B6–19)	R – BR	Rear Left side power window UP operation.	Below 1 V
OBD2 – GND2 (B6–14 – B6–19)	W – BR	OBD2 communication circuit.	–
PU – GND2 (B6–17 – B6–19)	Y–B – BR	Front Left side power window UP operation.	Below 1 V
PD – GND2 (B6–18 – B6–19)	L–W – BR	Front Left side power window DOWN operation.	Below 1 V
GND2 – Body ground (B6–19 – Body ground)	BR – Body ground	Constant	Below 1 V
PRG – RDA (B7–1 – B7–2)	LG – R–L	Wireless door lock receiver communication circuit.	–
DBKL – GND2 (B7–3 – B6–19)	P–G – BR	With seat belt ON.	Below 1 V
		No seat belt ON.	10 – 14 V
LSWP – GND2 (B7–4 – B6–19)	L–R – BR	Except driver's door is unlocked.	Below 1 V
		Except driver's door is locked.	10 – 14 V
RCTY – GND2 (B7–5 – B6–19)	R–L – BR	Rear door opened.	Below 1 V
		Rear door closed.	10 – 14 V
DCTY – GND2 (B7–6 – B6–19)	R–G – BR	Driver door opened.	Below 1 V
		Driver door closed.	10 – 14 V
LCTY – GND2 (B7–7 – B6–19)	R–L – BR	Luggage compartment door opened.	Below 1 V
		Luggage compartment door closed.	10 – 14 V
TR+ – GND2 (B7–8 – B6–19)	L–W – BR	Luggage compartment door opener switch is operated.	Below 1 V
		Luggage compartment door opener switch is not operated.	10 – 14 V
RRU – GND2 (B7–11 – B6–19)	R–W – BR	Rear Right side power window UP operation.	Below 1 V
RRD – GND2 (B7–12 – B6–19)	G – BR	Rear Right side power window DOWN operation.	Below 1 V
FE – GND2 (B7–13 – B6–19)	BR–W – BR	Constant	Below 1 V
FR – GND2 (B7–14 – B6–19)	Y–R – BR	Ignition switch position ON and fuel sender gauge position float UP.	Approx. o.5 V
		Ignition switch position ON and fuel sender gauge position float DOWN.	Approx. o.5 V

DI62G–01

PROBLEM SYMPTOMS TABLE

LIGHT CONTROL:

Symptom	Suspect Area	See page
Auto turn–off does not operate	1. Door courtesy switch circuit (Driver side) 2. Ignition switch 3. Body ECU 4. Theft deterrent ECU	DI–583 DI–558 – –

DOOR LOCK CONTROL:

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control S/W.	1. Door lock control switch circuit 2. Body ECU 3. Power window master switch	DI–598 – –
Door key linked function does not operate.	1. Door key lock and unlock switch circuit 2. Body ECU 3. Power window master switch	DI–598 – –
Key confinement prevention function does not operate.	1. Key unlock switch circuit 2. Body ECU 3. Power window master switch	DI–575 – –

WIRELESS DOOR LOCK CONTROL:

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate.	1. Transmitter 2. Key unlock warning switch circuit 3. Wireless door lock ECU 4. Body ECU	BE–132 DI–575 BE–132 –
Lock (or unlock) function does not operate.	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Body ECU	DI–598 DI–595 –
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system .	1. Door courtesy switch circuit 2. Body ECU	DI–583 –

OTHERS:

Symptom	Suspect Area	See page
Does not operate the illuminated entry	1. Illumination circuit 2. Body ECU	DI–564 –
Key remainder system does not operate.	1. Key unlock warning switch circuit 2. Body ECU	DI–575 –
Seat belt warning does not operate.	1. Driver buckle switch circuit 2. Body ECU 3. Combination meter	DI–578 – BE–2

DI62H–01

CIRCUIT INSPECTION

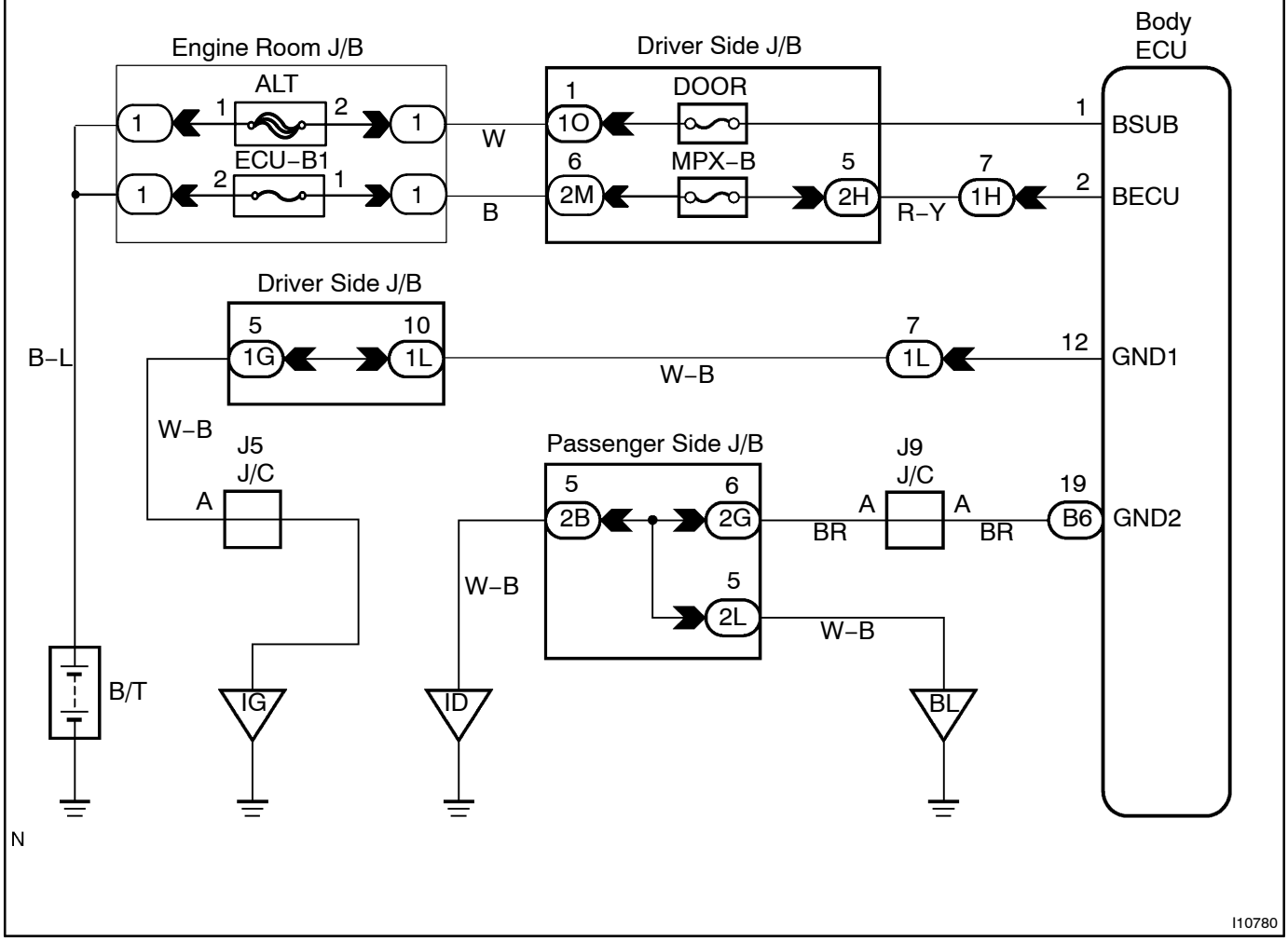
Power source circuit

CIRCUIT DESCRIPTION

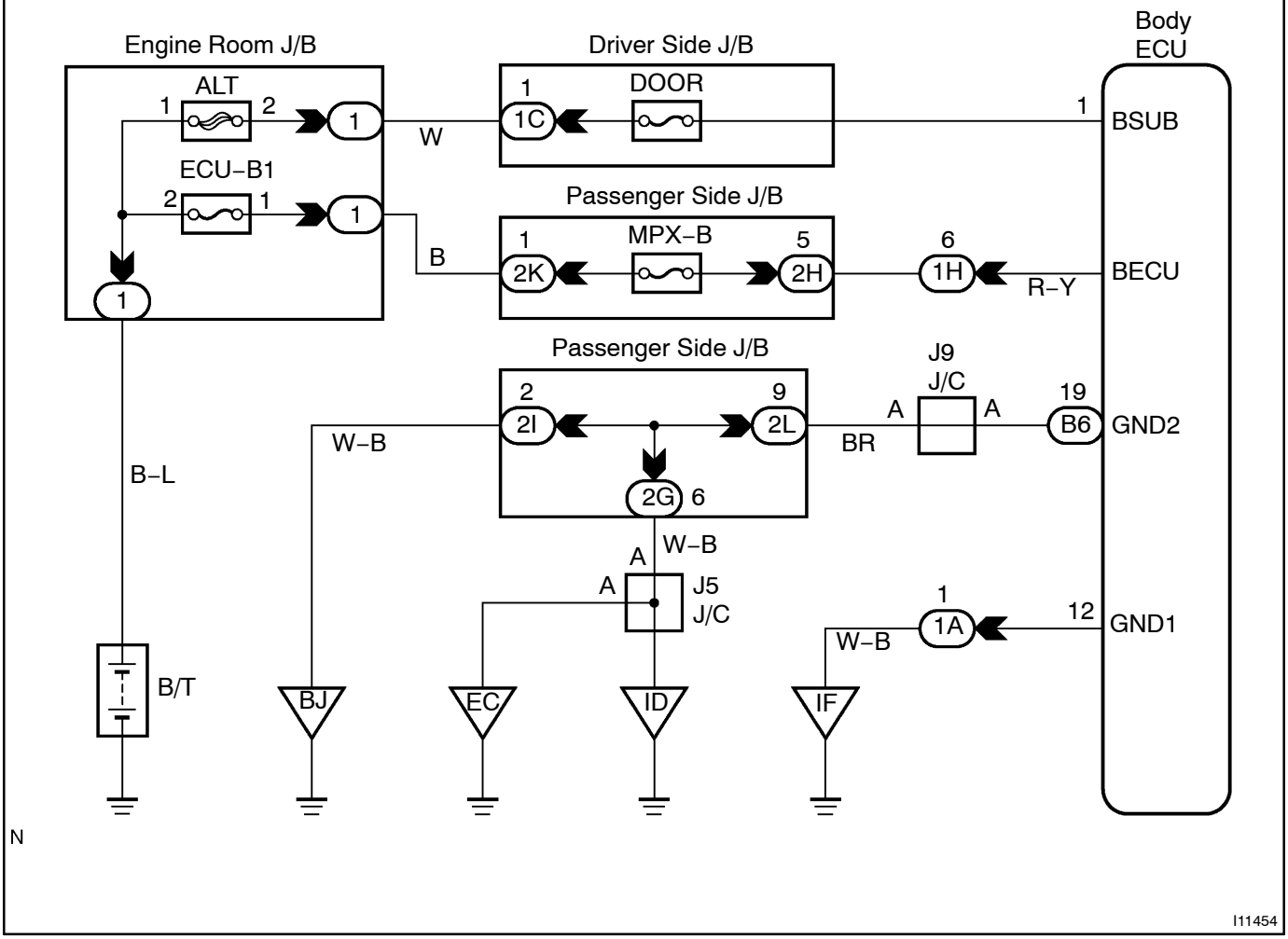
This circuit provides power to operate the Body ECU.

WIRING DIAGRAM

LHD Models



RHD Models


Engine Room J/B
Driver Side J/B
Body ECU
ALT
ECU–B1
DOOR
MPX–B
Passenger Side J/B
Passenger Side J/B
J9 J/C
J5 J/C
BSUB
BECU
GND2
GND1
W
B
R–Y
W–B
B–L
BR
B/T
BJ
EC
ID
IF
N
I11454

INSPECTION PROCEDURE

1	**Check MPX–B and DOOR fuse.**

CHECK:

Check continuity of MPX–B and DOOR fuse.

OK:

Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals BECU, BSUB and GND, GND2 of Body ECU connector.**

PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the Body ECU connector.

CHECK:

Measure voltage between terminals BECU, BSUB and GND, GND2.

OK:

Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on problem symptoms table.** (See page DI–554)

NG

3	**Check wireharness and connector between Body ECU and body ground.**

NG → **Repair or replace wireharness or connector.**

OK

Check and repair wireharness and connector between Body ECU and battery.

DI62I–01

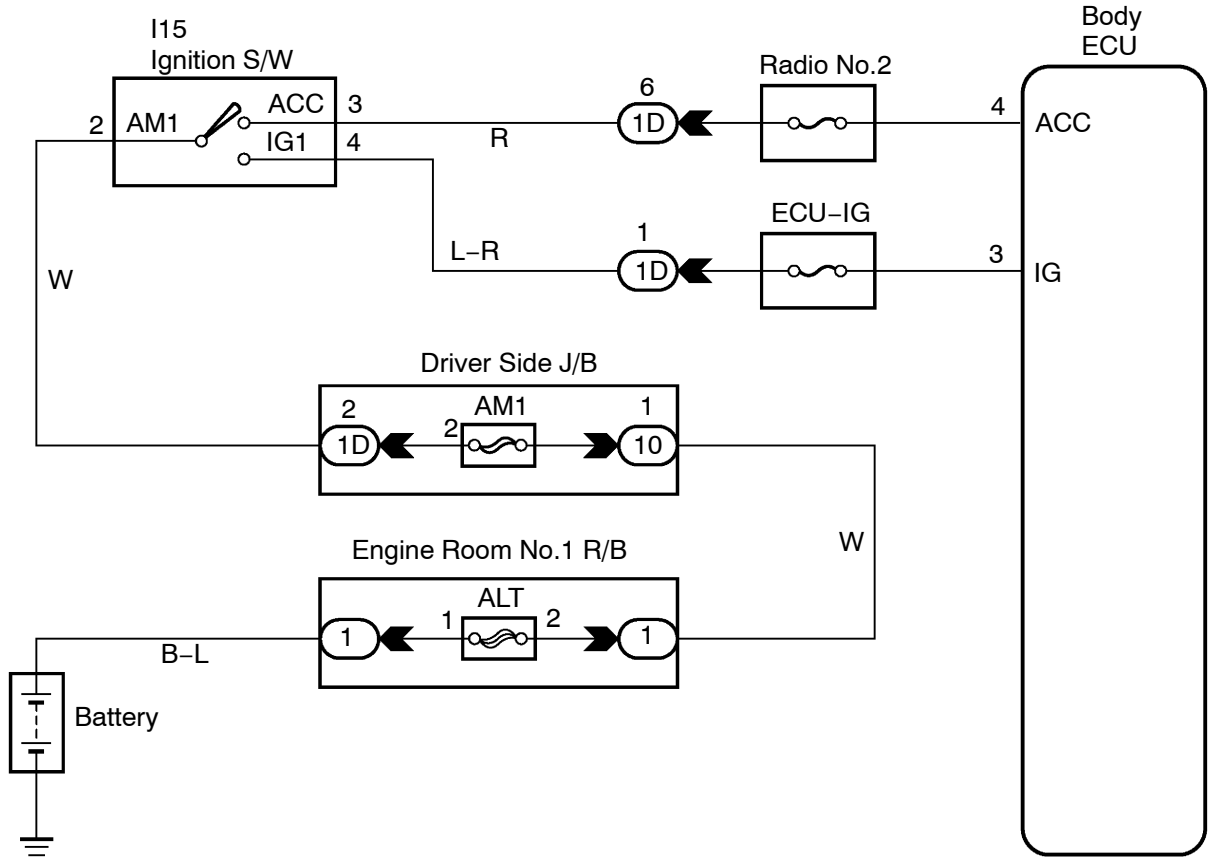
Ignition switch power source circuit

CIRCUIT DESCRIPTION

When the ignition switch is turned to the ACC position, battery voltage is applied to the terminal ACC of the ECU and when the ignition switch is turned to the ON position, battery voltage is applied to the terminal IG of the ECU.

WIRING DIAGRAM

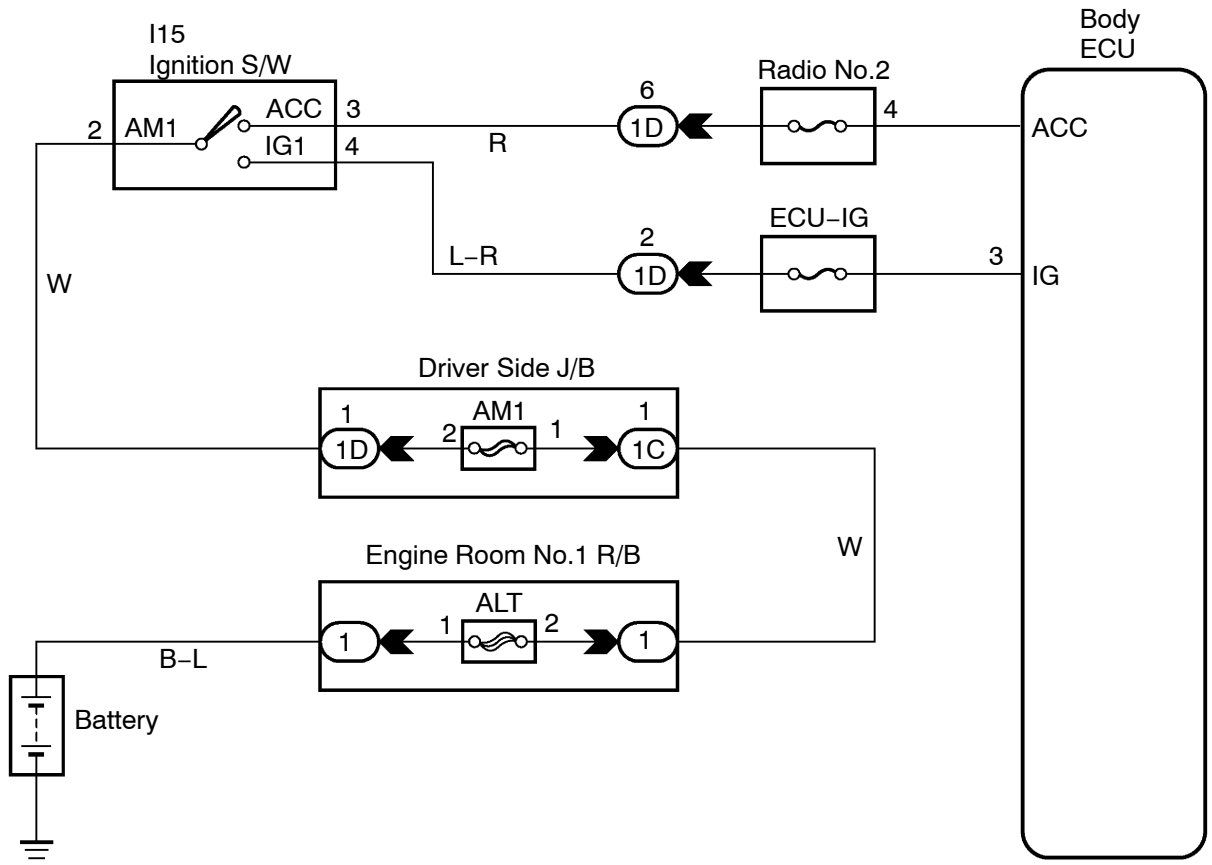
LHD Models



N

I10779

RHD Models


I15
Ignition S/W
2
AM1
ACC
IG1
3
4
R
6
1D
Radio No.2
4
Body
ECU
ACC
W
L–R
2
1D
ECU–IG
3
IG
Driver Side J/B
1
1D
AM1
2
1
1
1C
W
Engine Room No.1 R/B
ALT
1
1
2
1
B–L
Battery
N
I11451

INSPECTION PROCEDURE

1	Check ECU–IG and RADIO No.2 fuse.

CHECK:
Check continuity of ECU–IG and RADIO No.2 fuse.
OK:
Continuity

NG → Replace the failure fuse.

OK

2	Check voltage between terminals ACC, IG and GND of Body ECU connector.

PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals ACC, IG, and GND.
OK:
Voltage: 10 – 14V

OK → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

NG

3	Check wireharness and connector between Body ECU and body ground.

NG → Repair or replace wireharness or connector.

OK

Check and repair wireharness and connector between Body ECU and battery.

DI62J–01

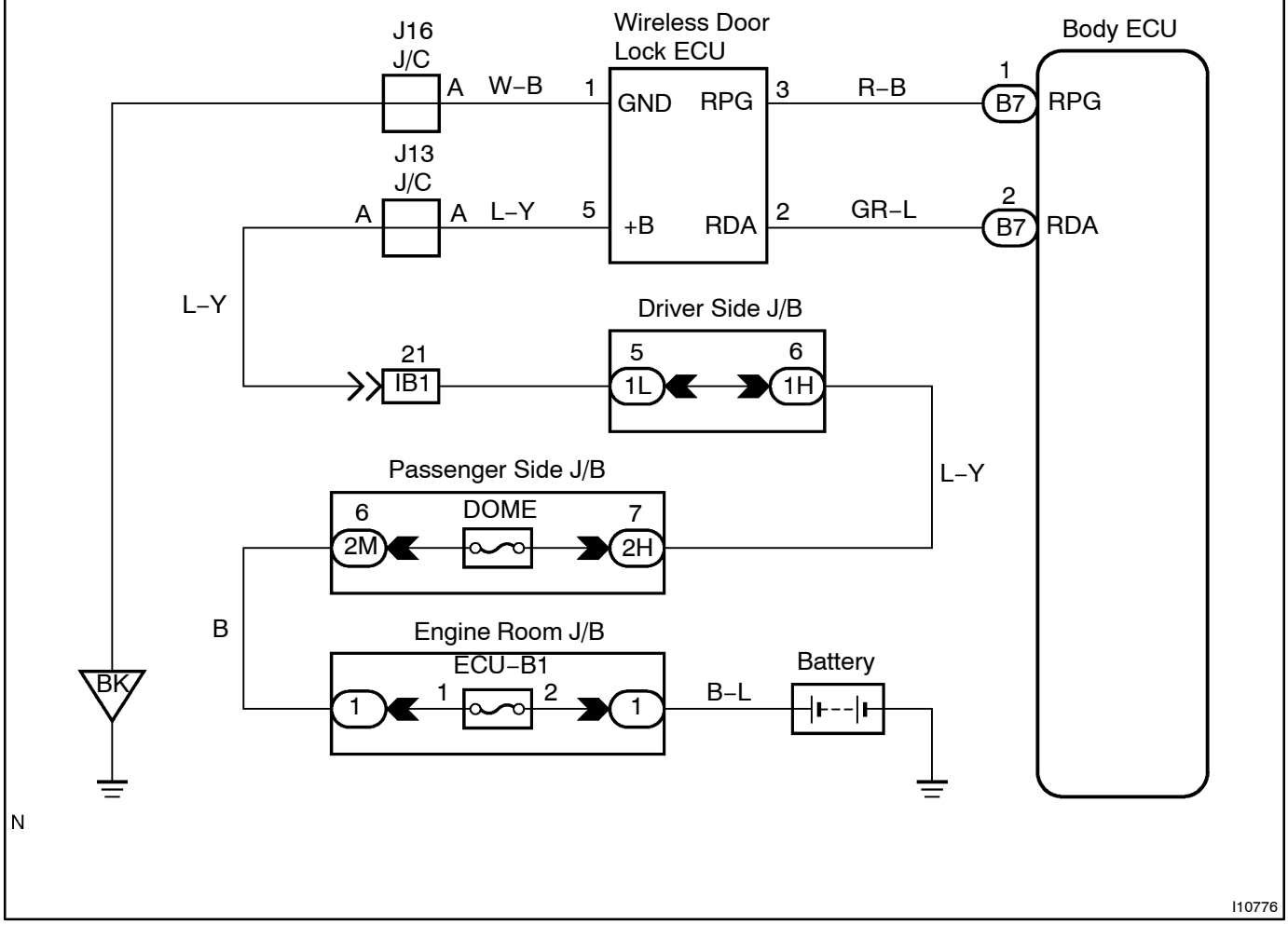
Wireless door lock tuner circuit

CIRCUIT DESCRIPTION

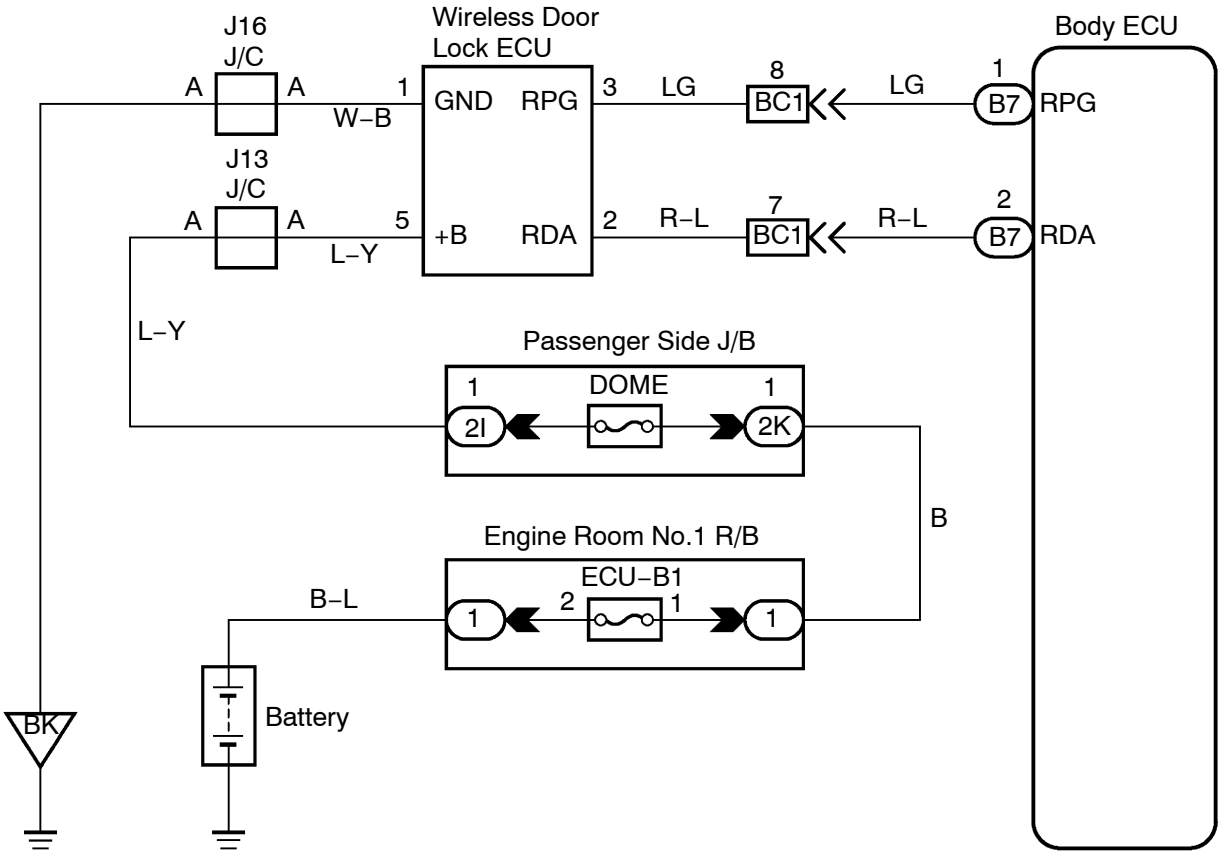
The signal from the transmitter will be input to the body ECU through RDA line. RDA line is diagnosed by the Body ECU, so check DTC also in case of the failure of the wireless function.

WIRING DIAGRAM

LHD Models



RHD Models


J16
J/C
A
A
1
W–B
Wireless Door
Lock ECU
GND
RPG
3
LG
8
BC1
LG
1
B7
RPG
Body ECU
J13
J/C
A
A
5
L–Y
+B
RDA
2
R–L
7
BC1
R–L
2
B7
RDA
L–Y
Passenger Side J/B
1
DOME
1
2I
2K
B
Engine Room No.1 R/B
ECU–B1
B–L
2
1
1
1
1
Battery
BK
N
I11460

INSPECTION PROCEDURE

1	Check that DTC 42 is not output

NG → Check the RDA line.

OK

2	Check wireharness

PREPARATION:
Disconnect connectors of wireless door lock tuner and Body ECU.
CHECK:
Check continuity between terminals PRG of wireless door lock tuner and PRG of Body ECU.
OK:
Continuity

NG → Repair or replace wireharness

OK

3	Check the wireless door lock tuner

CHECK:
Replace the wireless door lock tuner and check if it recovers normally.
OK:
Must be recovered normally.

NG → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

OK

Failure of the original wireless door lock tuner.

D162K–01

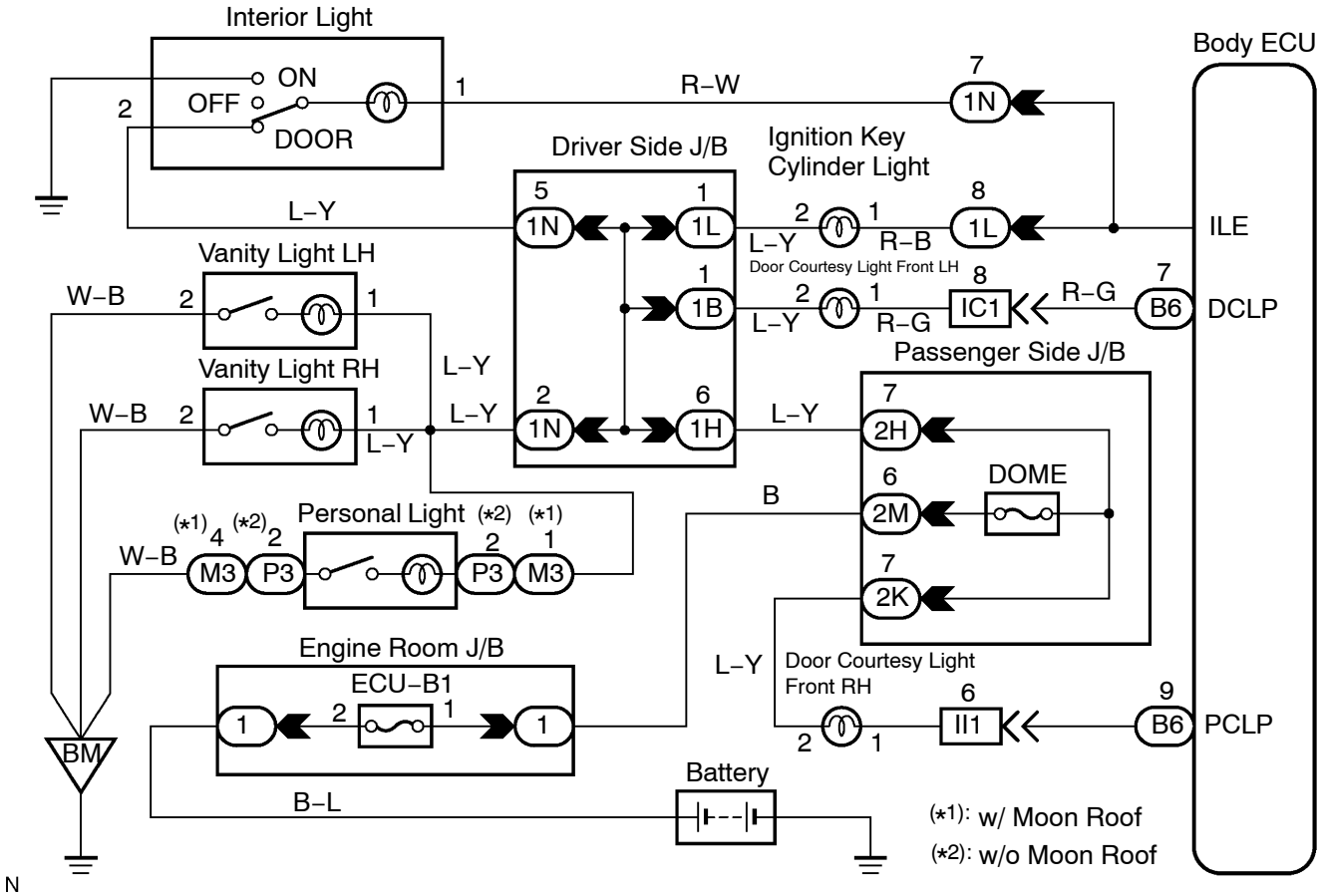
Illumination circuit

CIRCUIT DESCRIPTION

Receiving the courtesy signal from the Body ECU will make the interior light, ignition light, and courtesy light come on.

WIRING DIAGRAM

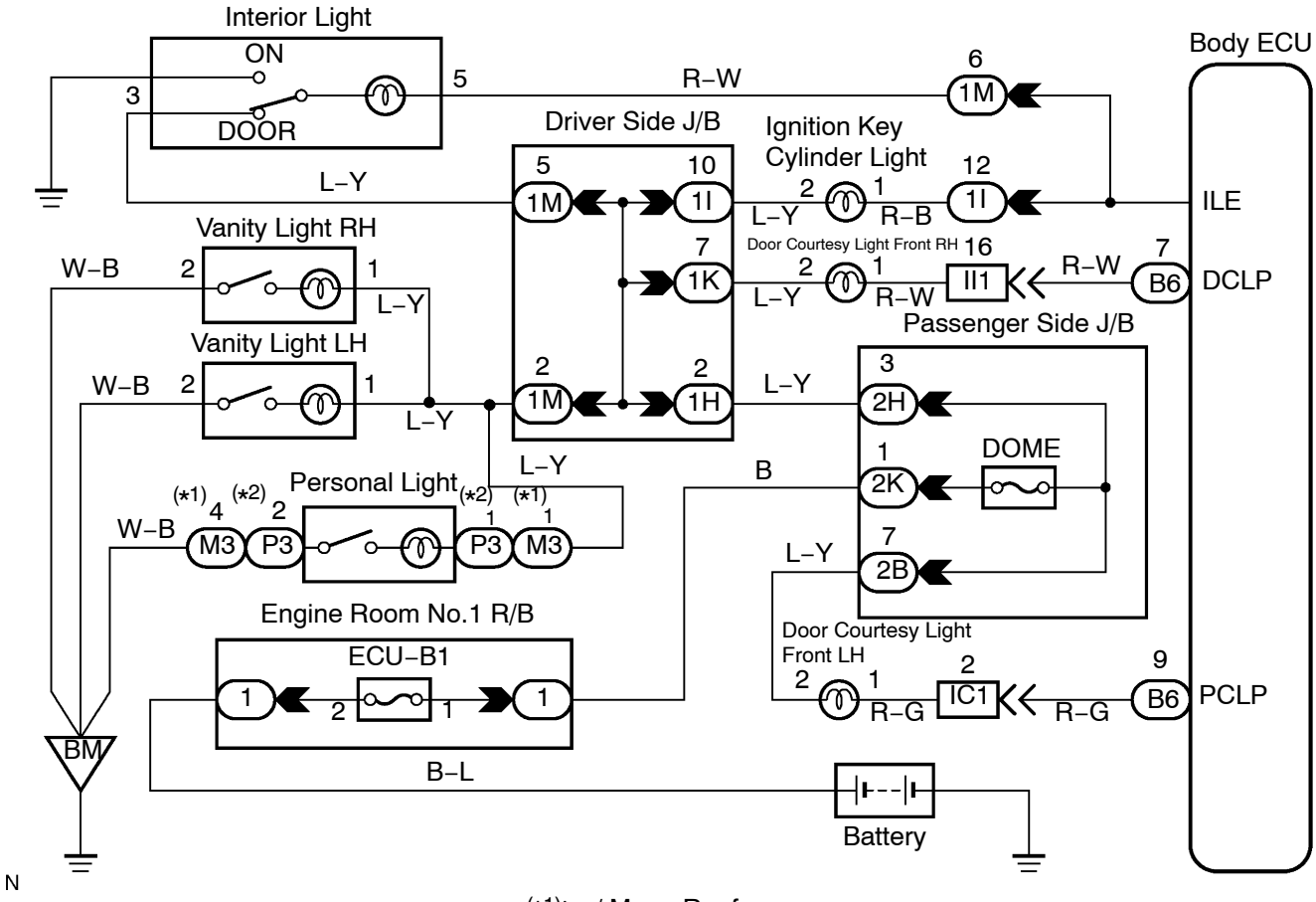
LHD Models



N

I10775

RHD Models



(*1): w/ Moon Roof

(*2): w/o Moon Roof

I11458

INSPECTION PROCEDURE

1	Check DOME fuse.

NG → Replace the fuse.

OK

2	Check illumination light.

NG → Replace the failure light.

OK

3	Check wireharness and connector between each illumination light and Body ECU, battery and each illumination light.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

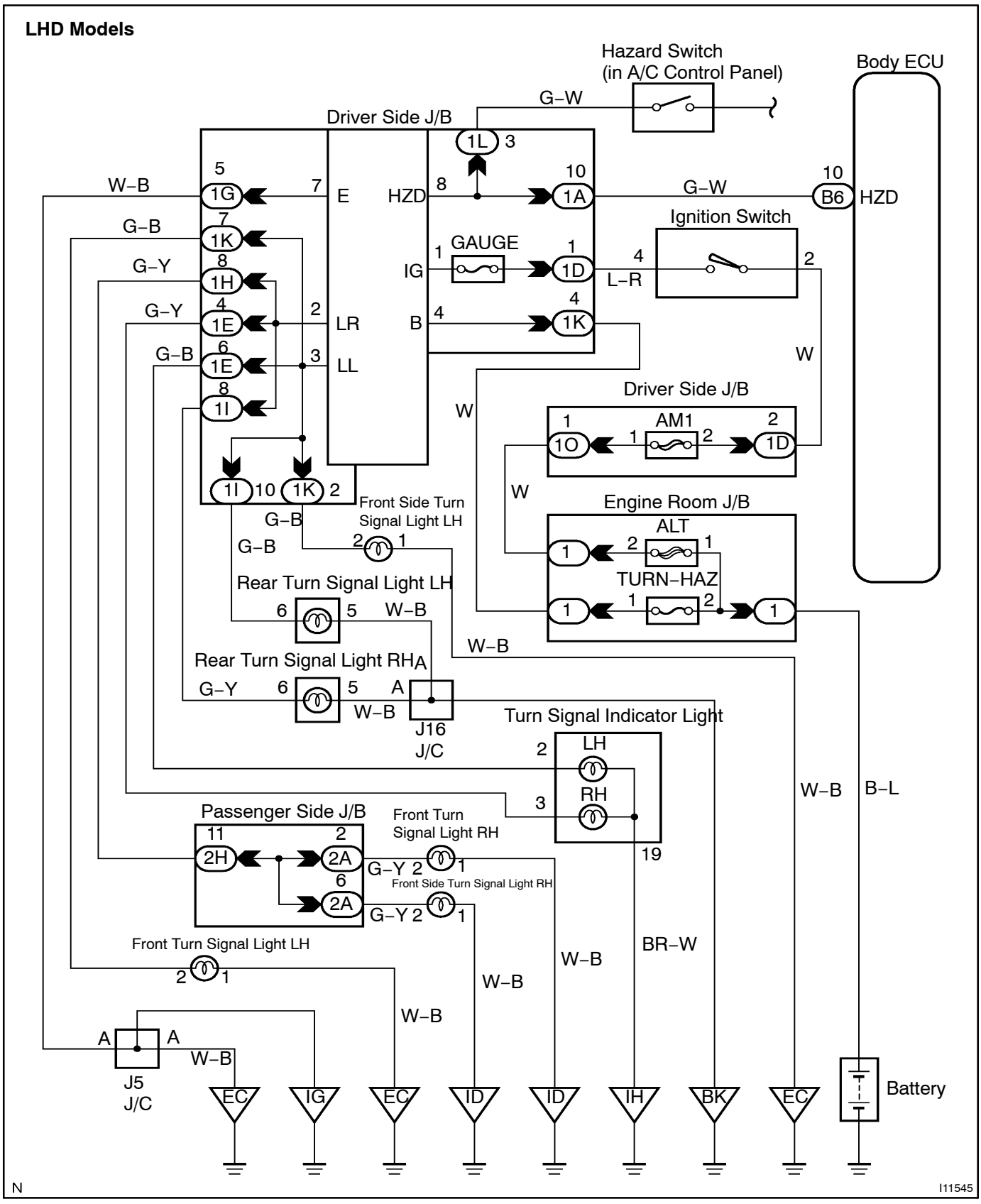
DI62L–01

Hazard switch circuit

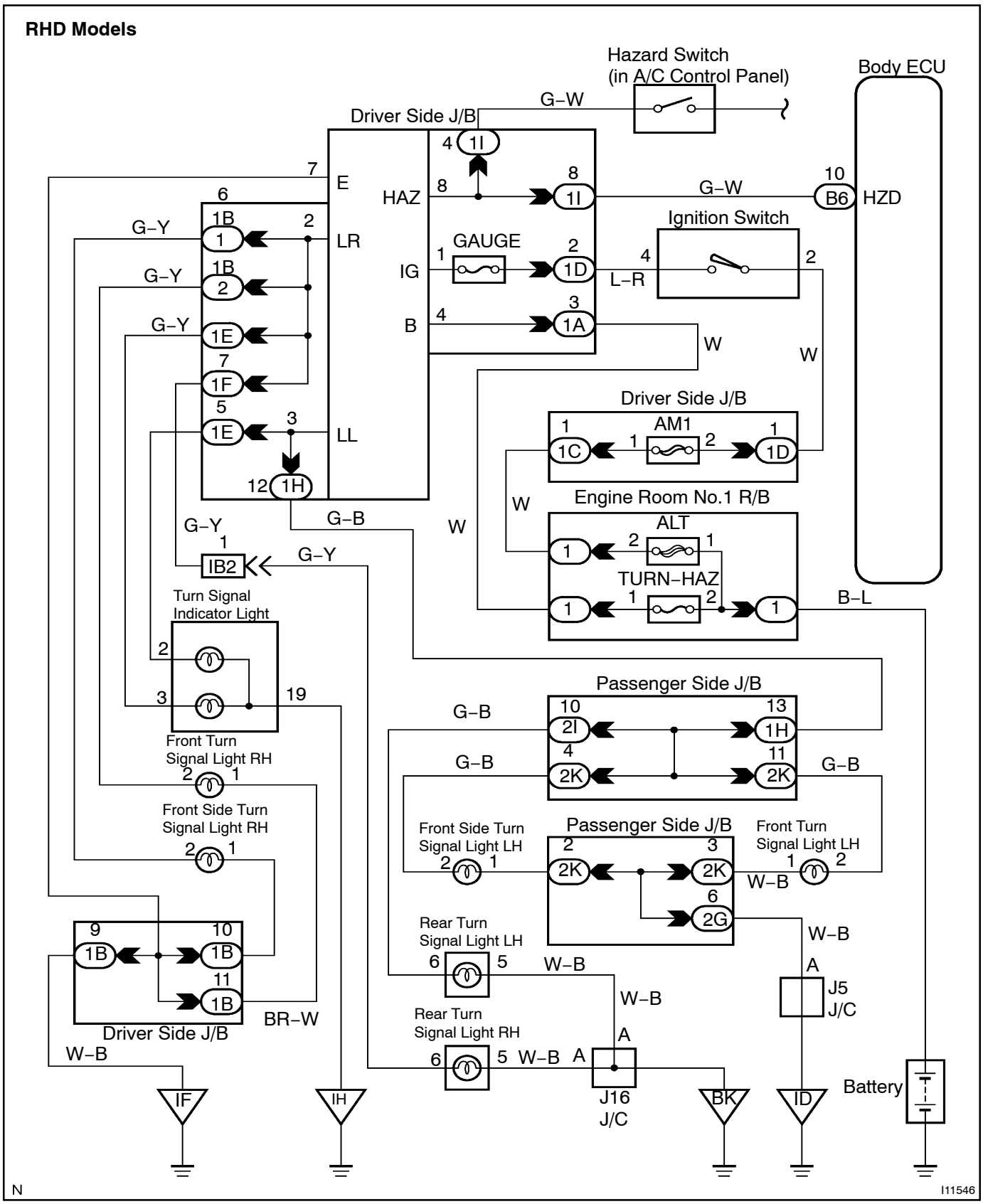
CIRCUIT DESCRIPTION

Body ECU activates the flasher relay during warning of the theft deterrent system and flashers the hazard. When the security operates, body ECU activates the flasher relay, however when the normal hazard switch operates, the hazard switch activates the flasher relay.

WIRING DIAGRAM



RHD Models


Hazard Switch
(in A/C Control Panel)
Body ECU
G–W
Driver Side J/B
4 1I
7
E
6
1B
2
LR
G–Y
1
1B
2
G–Y
1E
G–Y
7
1F
5
1E
3
LL
12 1H
HAZ
8
8 1I
10 B6 HZD
GAUGE
IG
1
2 1D
4
L–R
Ignition Switch
2
B
4
3 1A
W
W
Driver Side J/B
1 AM1 1
1C 1 2 1D
W
Engine Room No.1 R/B
ALT
2 1
1
TURN–HAZ
1 2
1
B–L
G–B
G–Y
1
IB2
G–Y
Turn Signal
Indicator Light
2
3
19
Front Turn
Signal Light RH
2 1
Front Side Turn
Signal Light RH
2 1
Passenger Side J/B
G–B
10 2I
13 1H
4 2K
11 2K
G–B
G–B
Front Side Turn
Signal Light LH
2 1
Passenger Side J/B
2 2K
3 2K
6 2G
Front Turn
Signal Light LH
1 2
W–B
W–B
Rear Turn
Signal Light LH
6 5
W–B
W–B
A
J5
J/C
9 1B
10 1B
11 1B
BR–W
Driver Side J/B
W–B
Rear Turn
Signal Light RH
6 5 W–B A
A
J16
J/C
IF
IH
BK
ID
Battery
N
I11546

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check hazard operation using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC 3.
CHECK:
Check that the hazard can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check hazard switch (See page DI–667).**

NG → **Replace the hazard switch.**

OK

3	**Check wire harness and connector between hazard switch and Body ECU.**

NG → **Repair or replace wire harness or connector.**

OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

DI62M–01

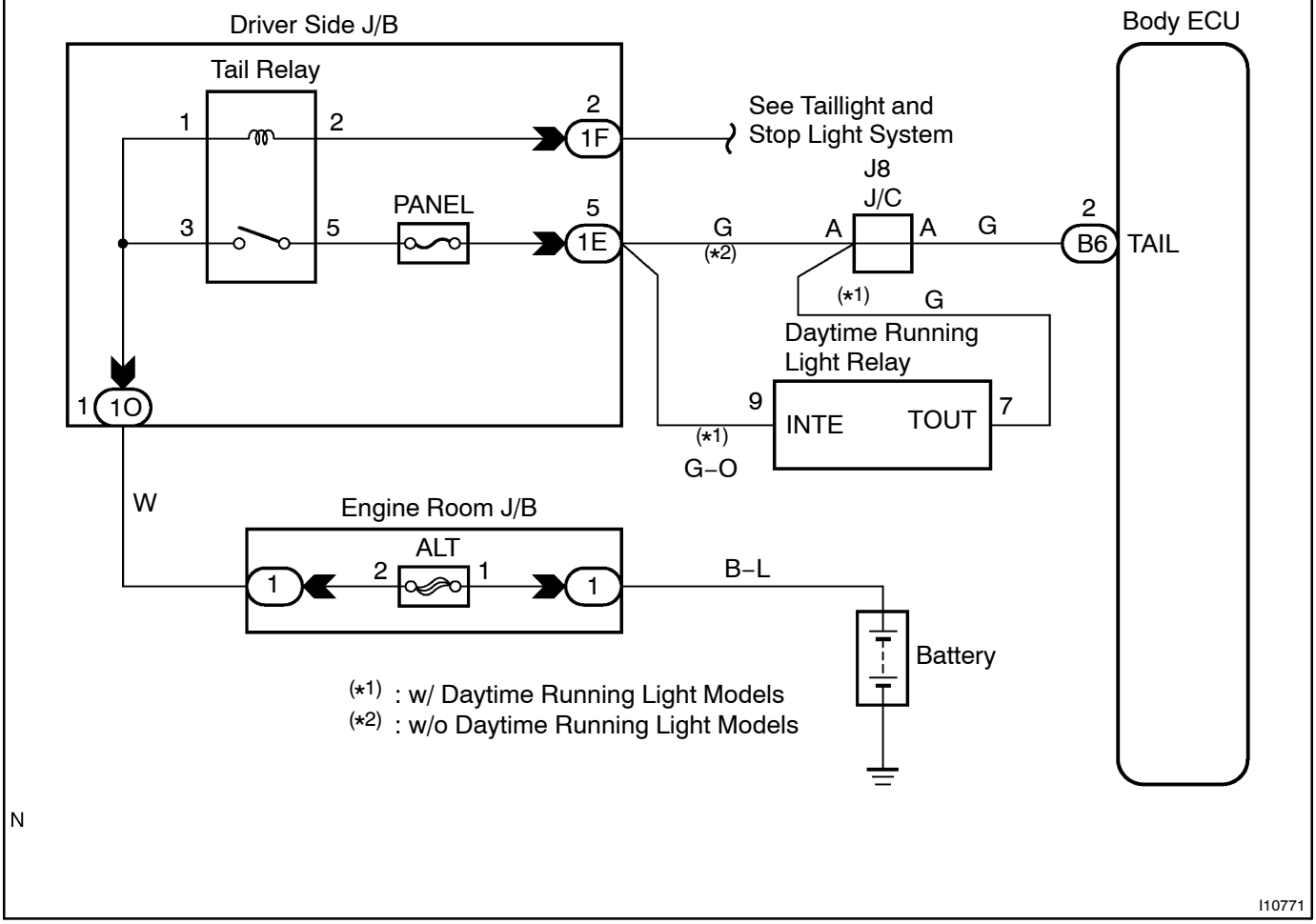
Taillight relay circuit

CIRCUIT DESCRIPTION

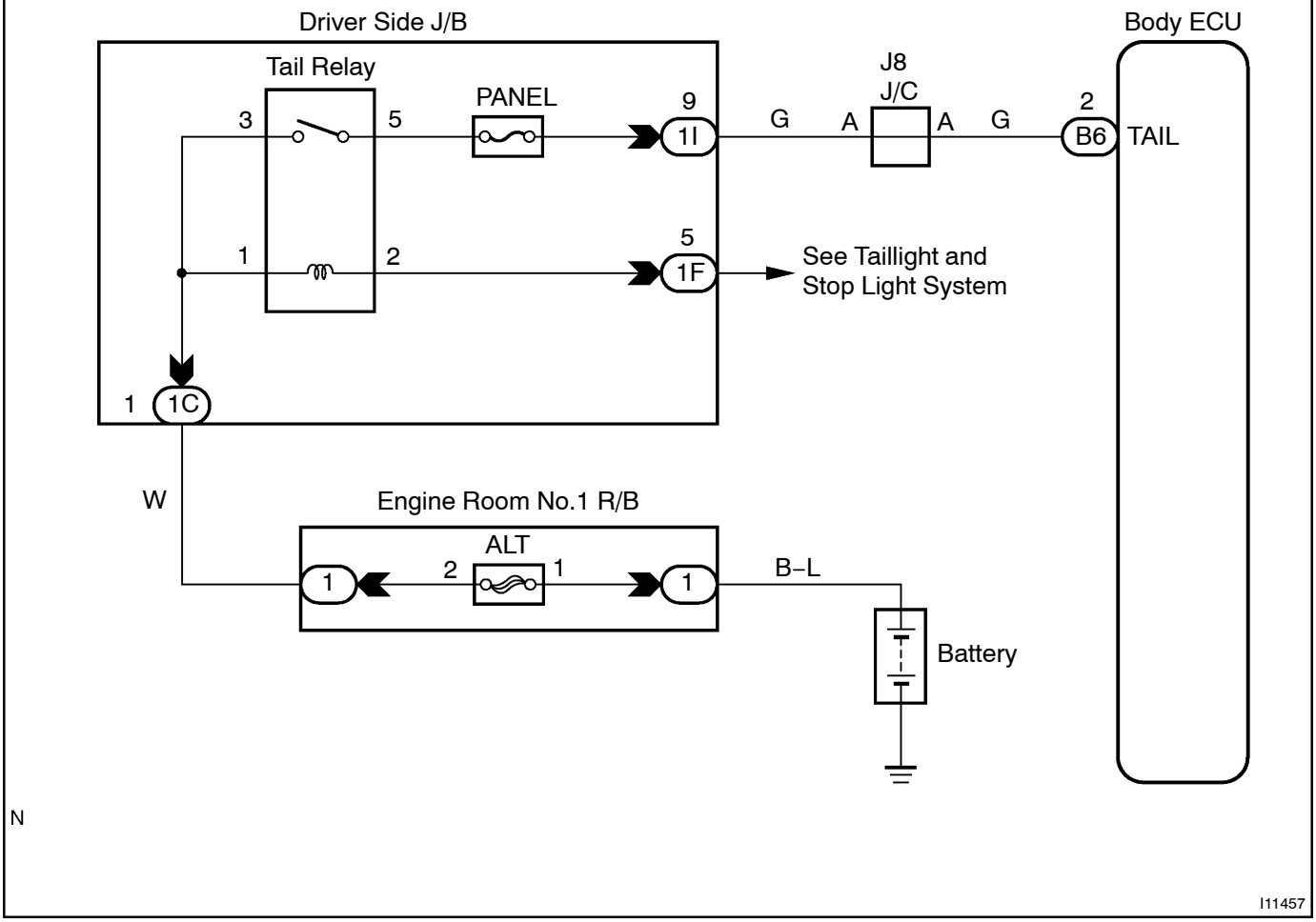
Taillight relay will be ”ON” by operating the taillight switch. The transistor which activates the tail light relay has two sorts: one activates by the tail light switch for fail safe and the other activates by CPU.

WIRING DIAGRAM

LHD Models



RHD Models


Driver Side J/B
Tail Relay
3
5
PANEL
9
1I
G
J8
J/C
A
A
G
2
B6
TAIL
Body ECU
1
2
5
1F
See Taillight and
Stop Light System
1
1C
W
Engine Room No.1 R/B
ALT
1
2
1
1
B–L
Battery
N
I11457

INSPECTION PROCEDURE

1	Check taillight relay (See page BE–30).

NG → Replace the taillight relay.

OK

2	Check wireharness and connector between taillight relay and Body ECU, battery and taillight relay.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62N–01

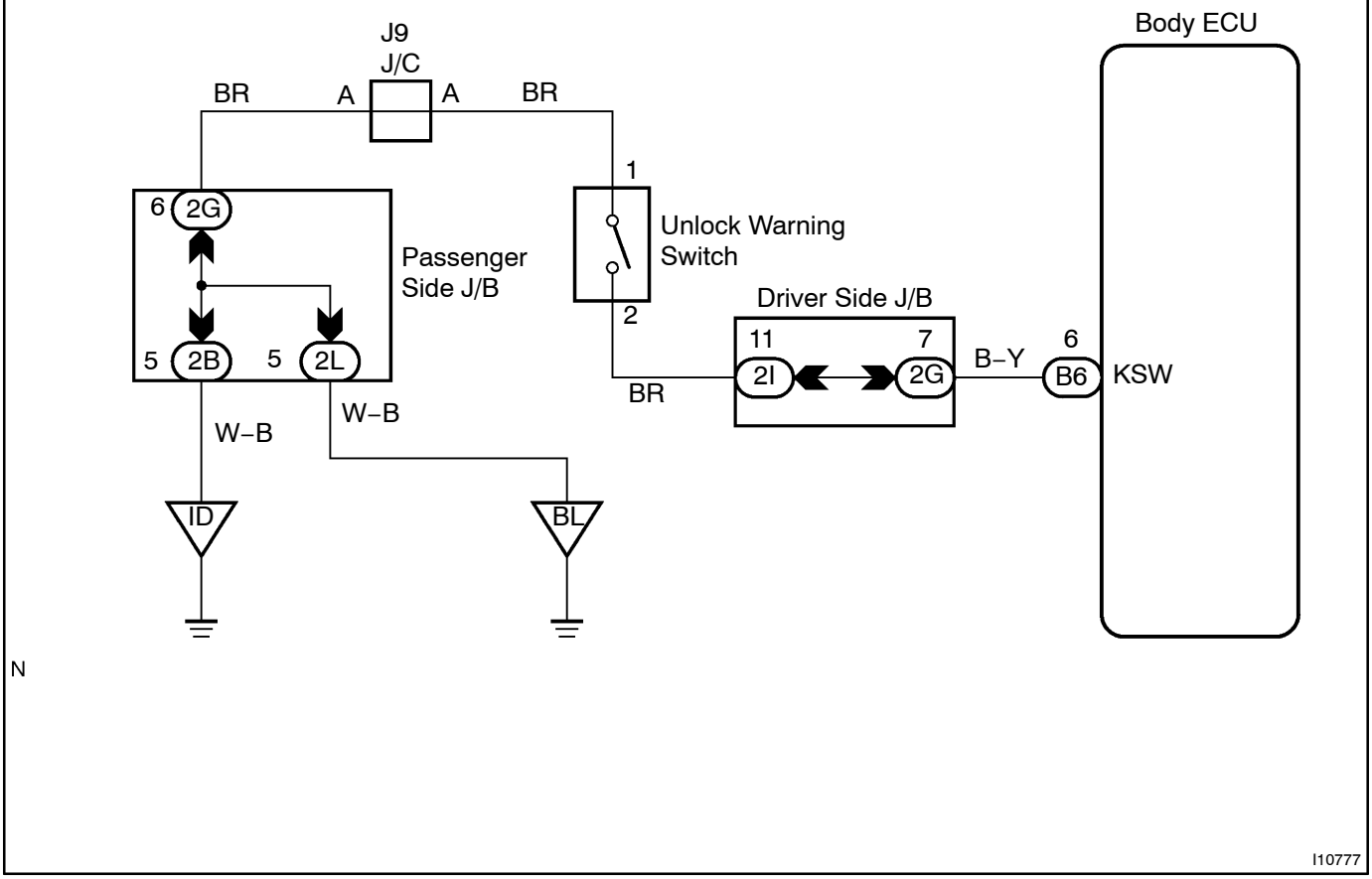
Key unlock warning switch circuit

CIRCUIT DESCRIPTION

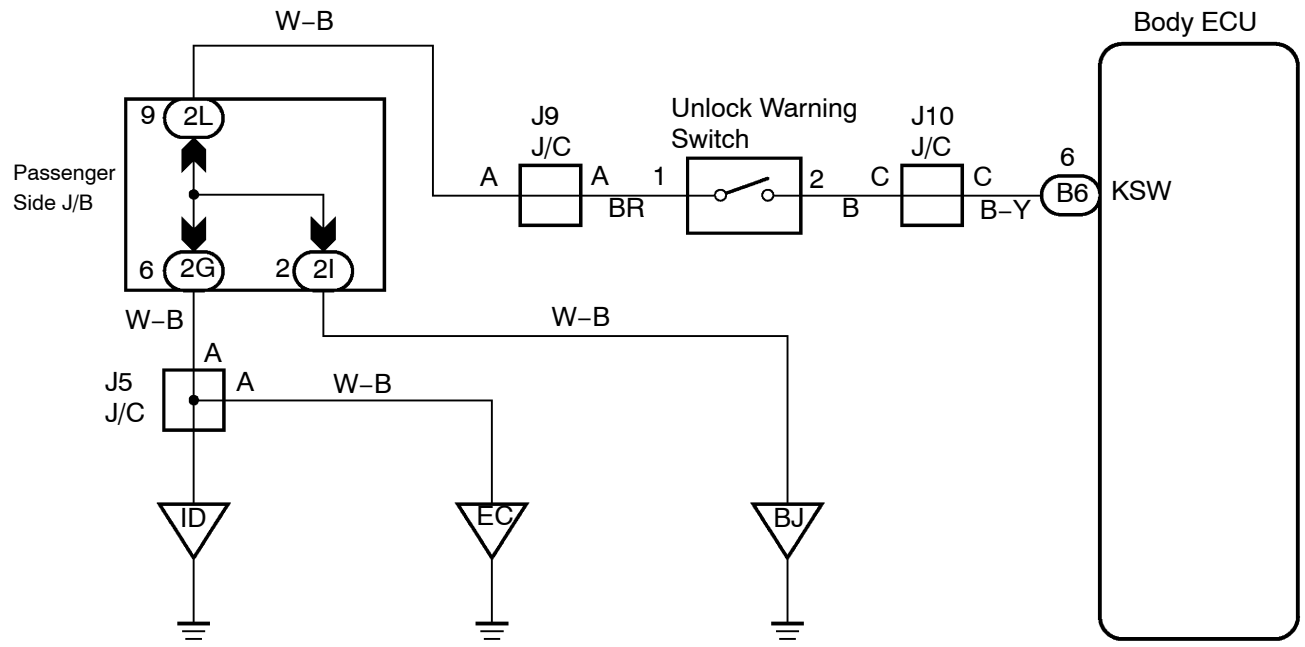
The key unlock warning switch goes on when the ignition key is inserted in the key cylinder and goes off when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is on.

WIRING DIAGRAM

LHD Models



RHD Models



N

I11467

INSPECTION PROCEDURE

1	Check key unlock warning switch (See page BE–23).

NG → Replace the key unlock warning switch.

OK

2	Check wireharness and connector between key unlock warning switch and Body ECU.

NG → Repair or replace wireharness or connector.

OK

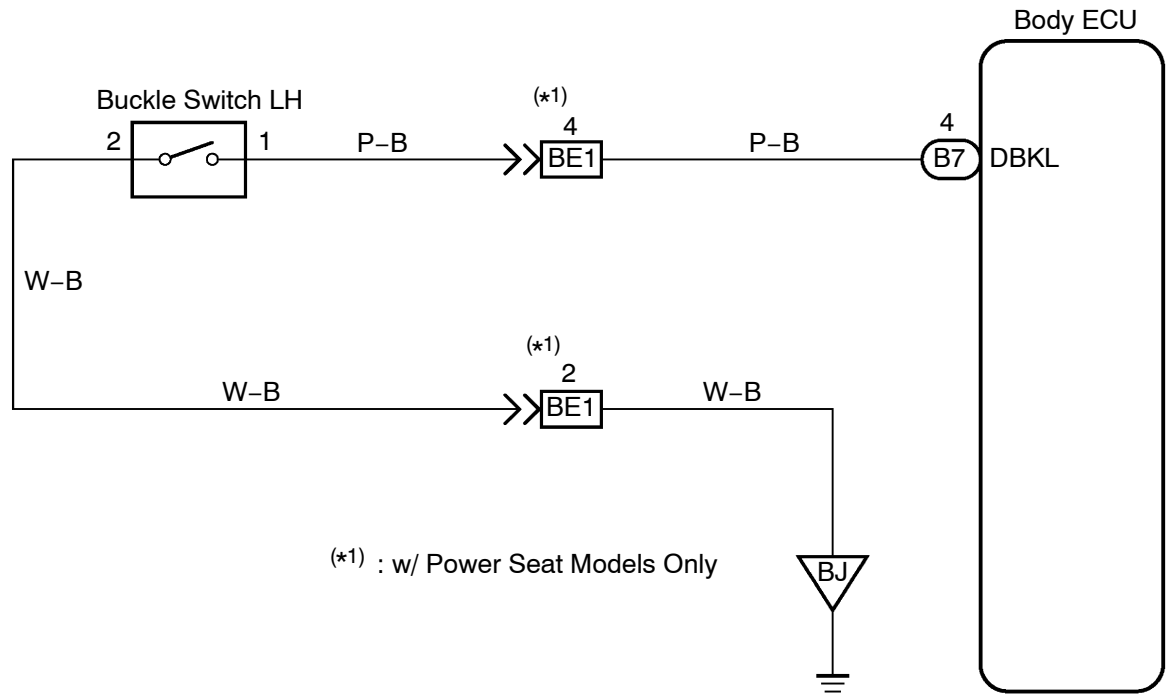
Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62O-01

Driver buckle switch circuit

WIRING DIAGRAM

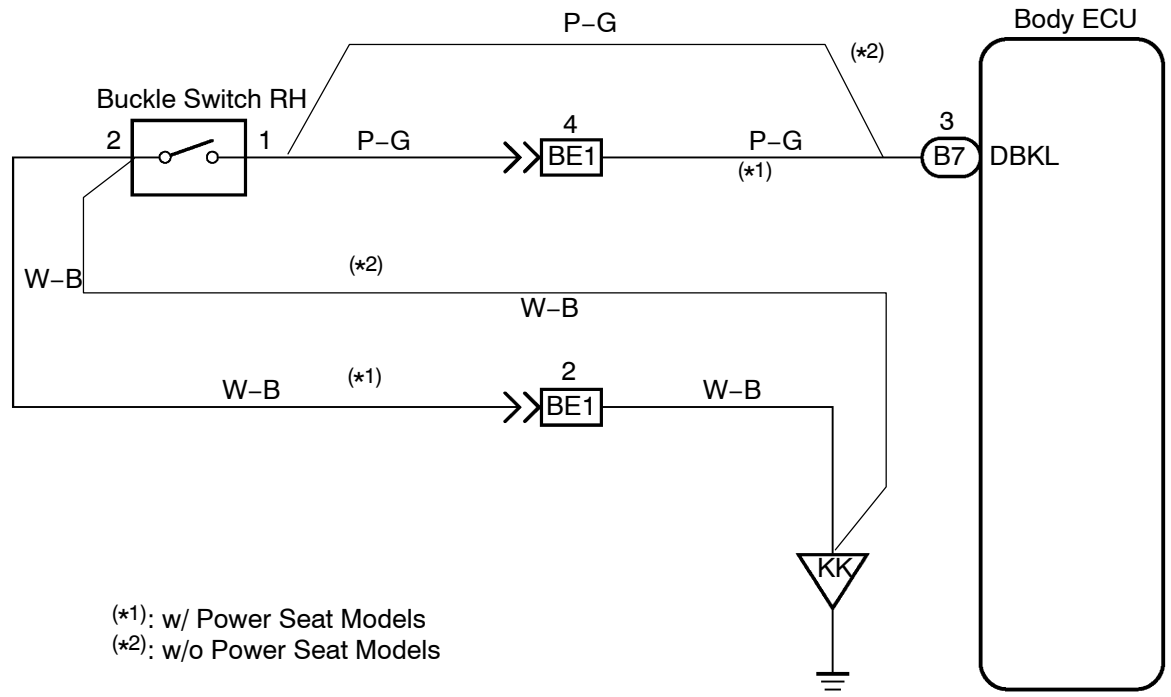
LHD Models



N

I10770

RHD Models



N

I11453

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check driver buckle switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the driver buckle switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check driver buckle switch. (See page BE–83)**

NG → **Replace the driver buckle switch.**

OK

3	**Check wire harness and connector between driver buckle switch and body ground.**

NG → **Repair or replace wire harness or connector.**

OK

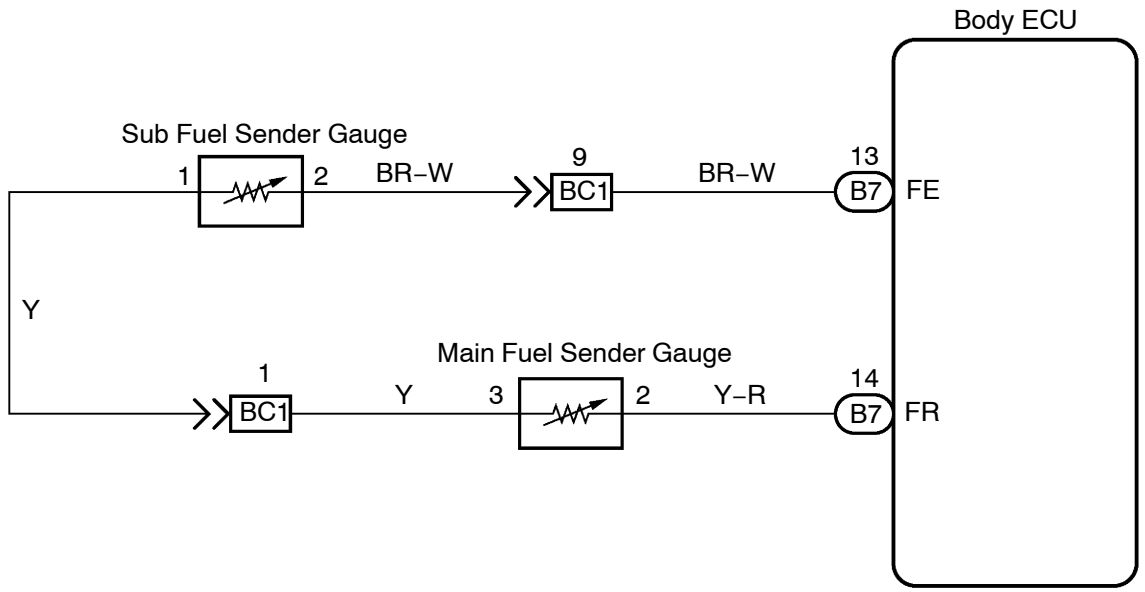
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

DI62P–01

Fuel Sender gauge circuit

WIRING DIAGRAM

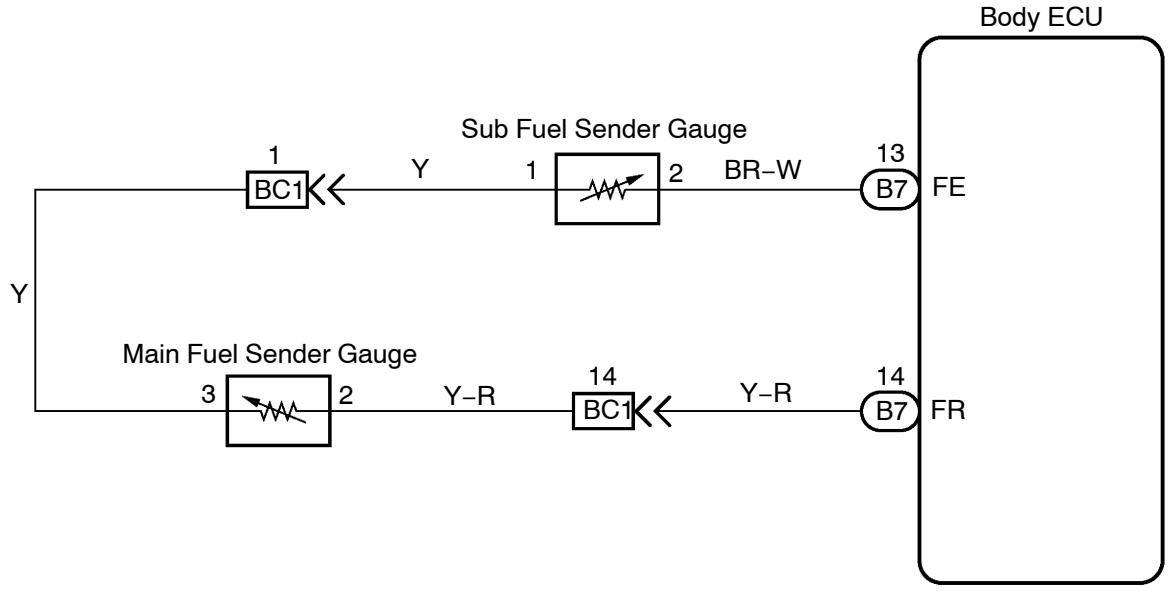
LHD Models



N

I10768

RHD Models



N

I11465

INSPECTION PROCEDURE

1	Check fuel sender gauge (See page BE–83).

NG → Replace the fuel sender gauge.

OK

2	Check wireharness and connector between fuel sender gauge and Body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62Q-01

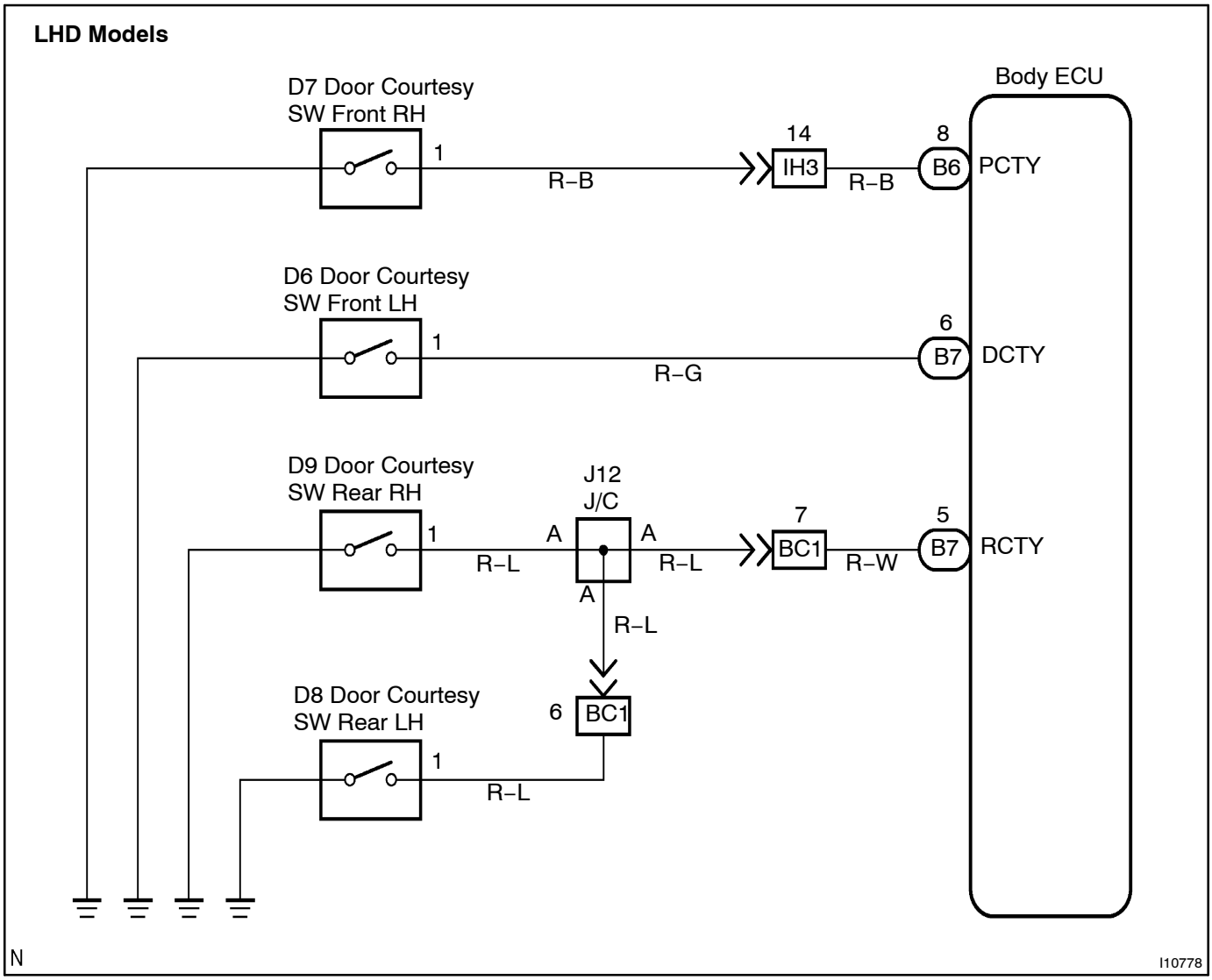
Door courtesy switch circuit

CIRCUIT DESCRIPTION

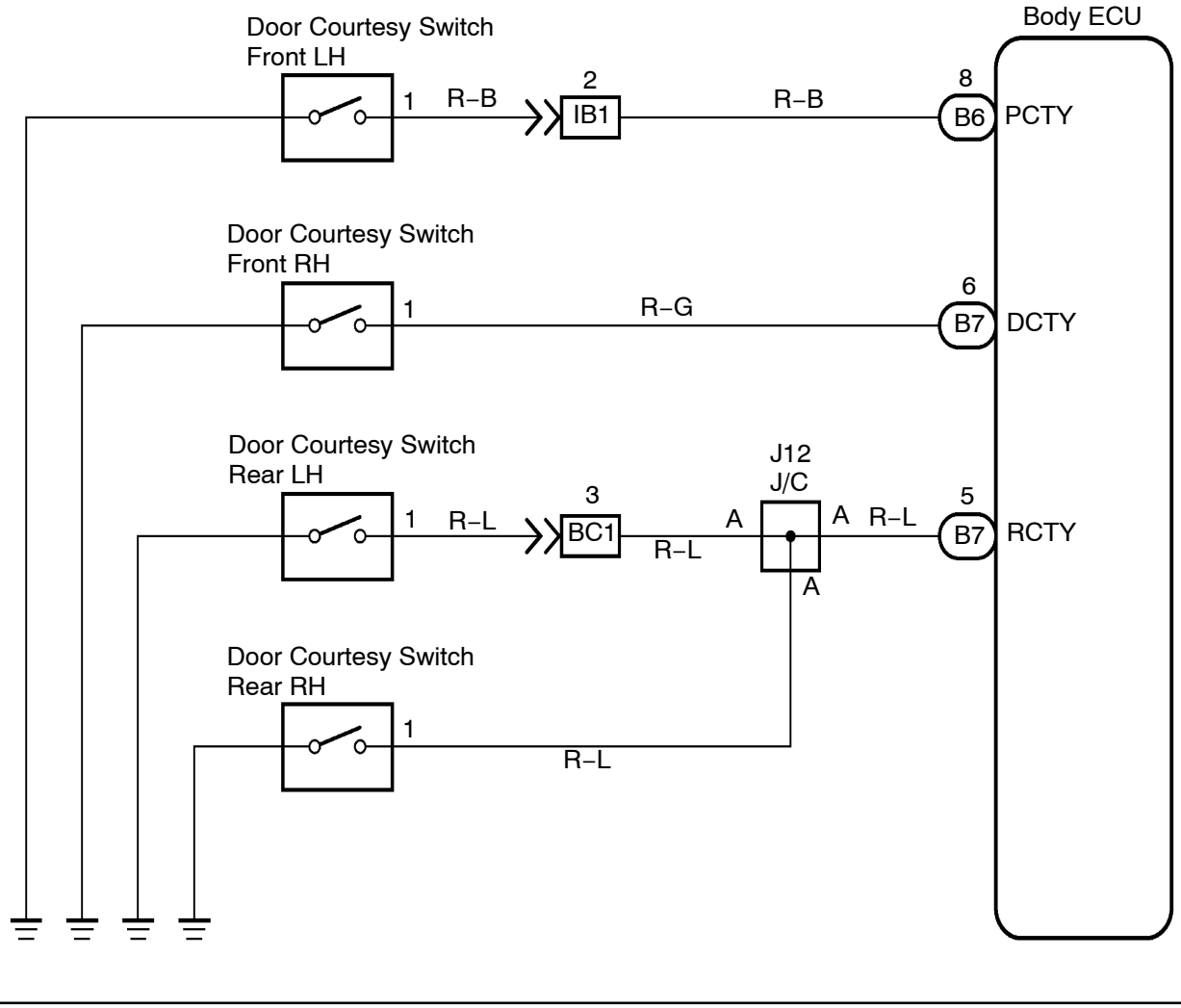
The door courtesy switch goes on when the door is opened and goes off when door is closed.

WIRING DIAGRAM

LHD Models



RHD Models


Body ECU
Door Courtesy Switch
Front LH
1
R–B
2
IB1
R–B
8
B6
PCTY
Door Courtesy Switch
Front RH
1
R–G
6
B7
DCTY
Door Courtesy Switch
Rear LH
1
R–L
3
BC1
R–L
J12
J/C
A
A
R–L
5
B7
RCTY
A
Door Courtesy Switch
Rear RH
1
R–L
N
I11452

INSPECTION PROCEDURE

1	Check courtesy switch (See page BE–57).

NG → Replace the courtesy switch.

OK

2	Check that there is a grounding malfunction caused by looseness of the tighten screw.

NG → Install screw.

OK

3	Check wireharness and connector between courtesy light and body ECU, courtesy switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

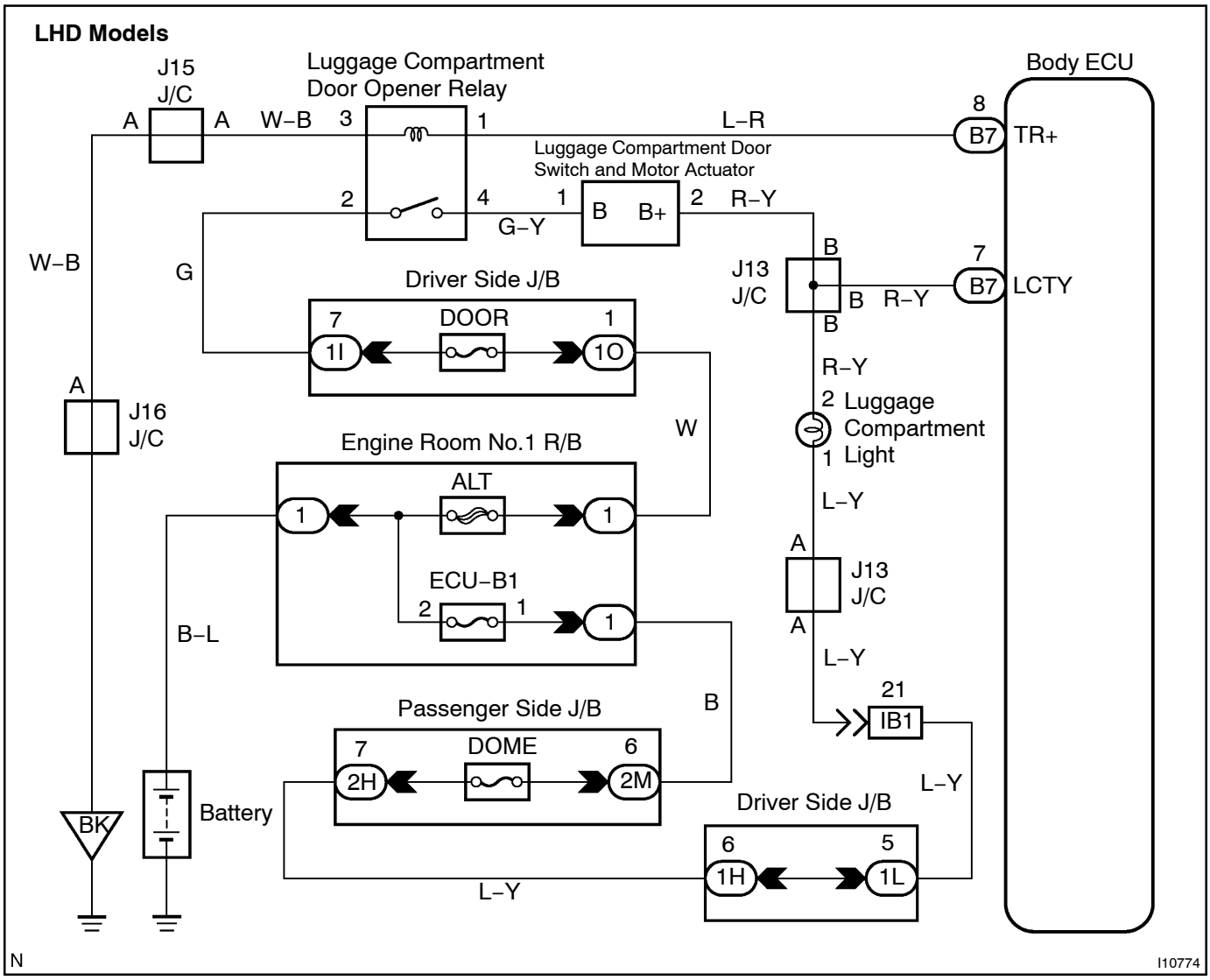
DI62R–01

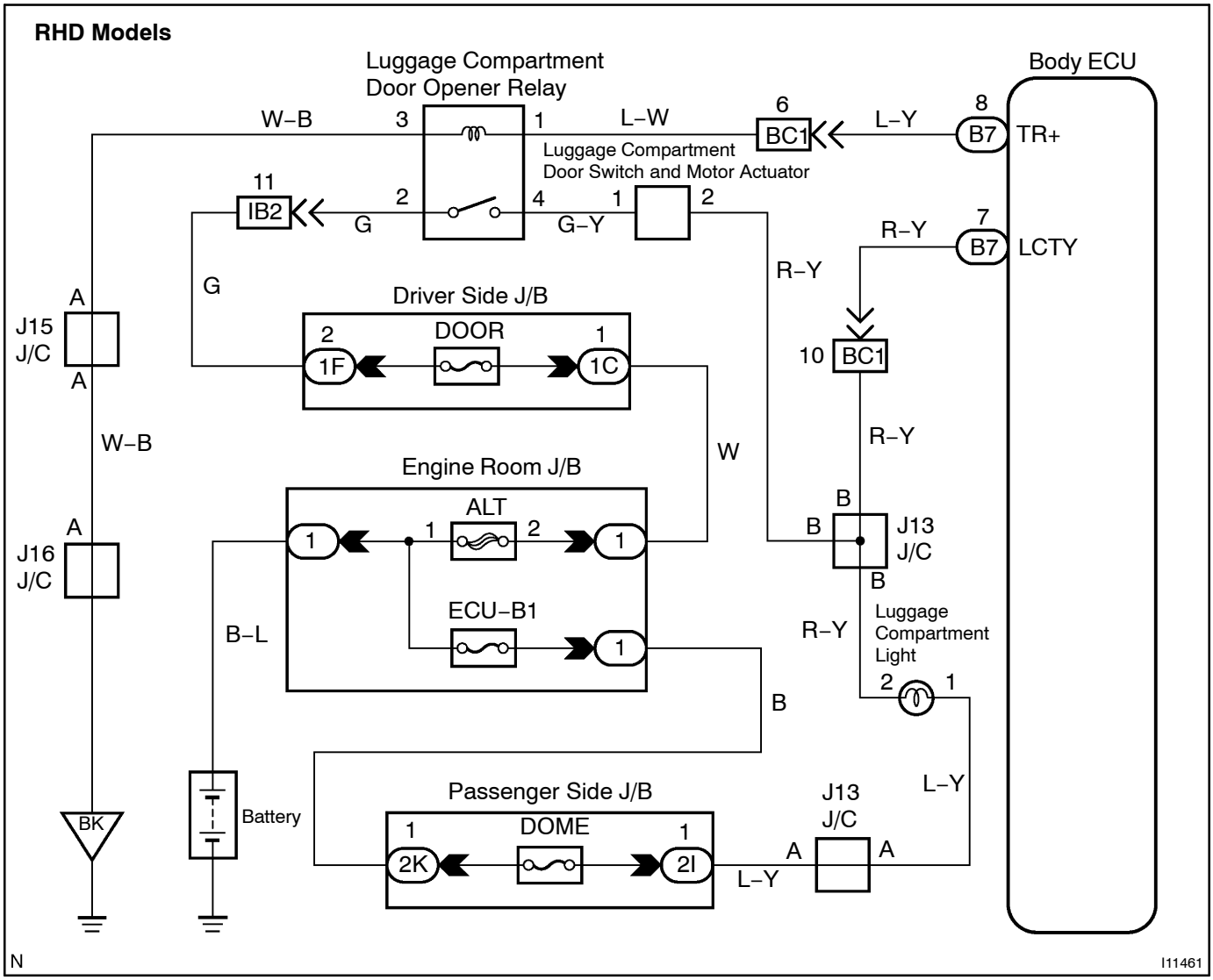
Luggage courtesy switch circuit

CIRCUIT DESCRIPTION

The luggage courtesy switch goes on when luggage compartment door is opened and goes off when luggage compartment door is closed.

WIRING DIAGRAM




RHD Models
Luggage Compartment
Door Opener Relay
Body ECU
W–B
3
1
L–W
6
BC1
L–Y
8
B7
TR+
Luggage Compartment
Door Switch and Motor Actuator
11
IB2
2
G
4
G–Y
1
2
R–Y
7
B7
LCTY
G
R–Y
A
J15
J/C
A
Driver Side J/B
2
DOOR
1
1F
1C
10
BC1
W–B
W
R–Y
Engine Room J/B
ALT
B
A
J16
J/C
1
1
2
1
B
J13
J/C
B
ECU–B1
B–L
R–Y
Luggage
Compartment
Light
2
1
1
B
L–Y
Passenger Side J/B
J13
J/C
Battery
BK
1
DOME
1
2K
2I
A
A
L–Y
N
I11461

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check luggage courtesy switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the luggage courtesy switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check luggage courtesy switch (See page BE–57).**

NG → **Replace the luggage courtesy switch.**

OK

3	**Check wire harness and connector between luggage courtesy switch and Body ECU.**

NG → **Repair or replace wire harness or connector.**

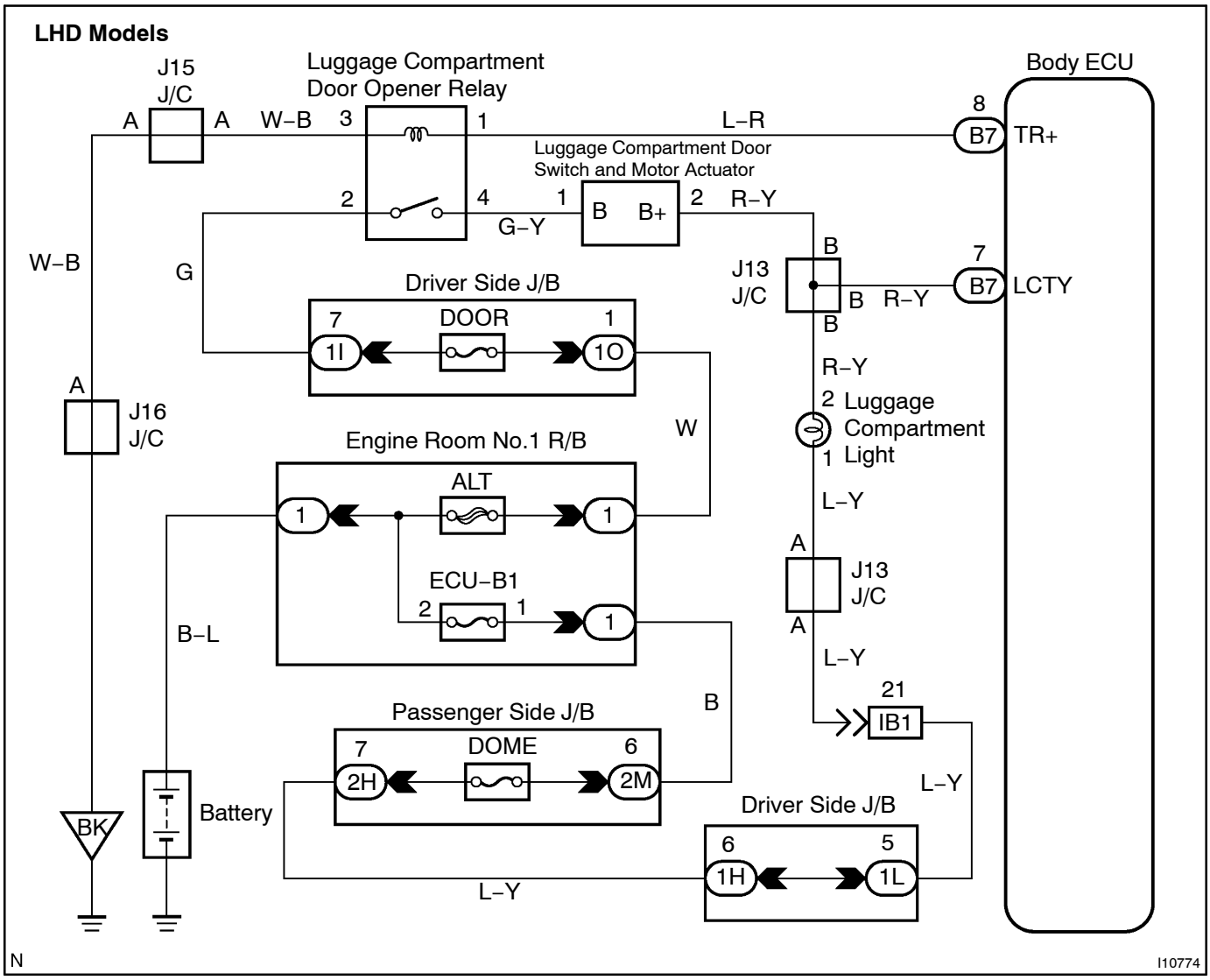
OK

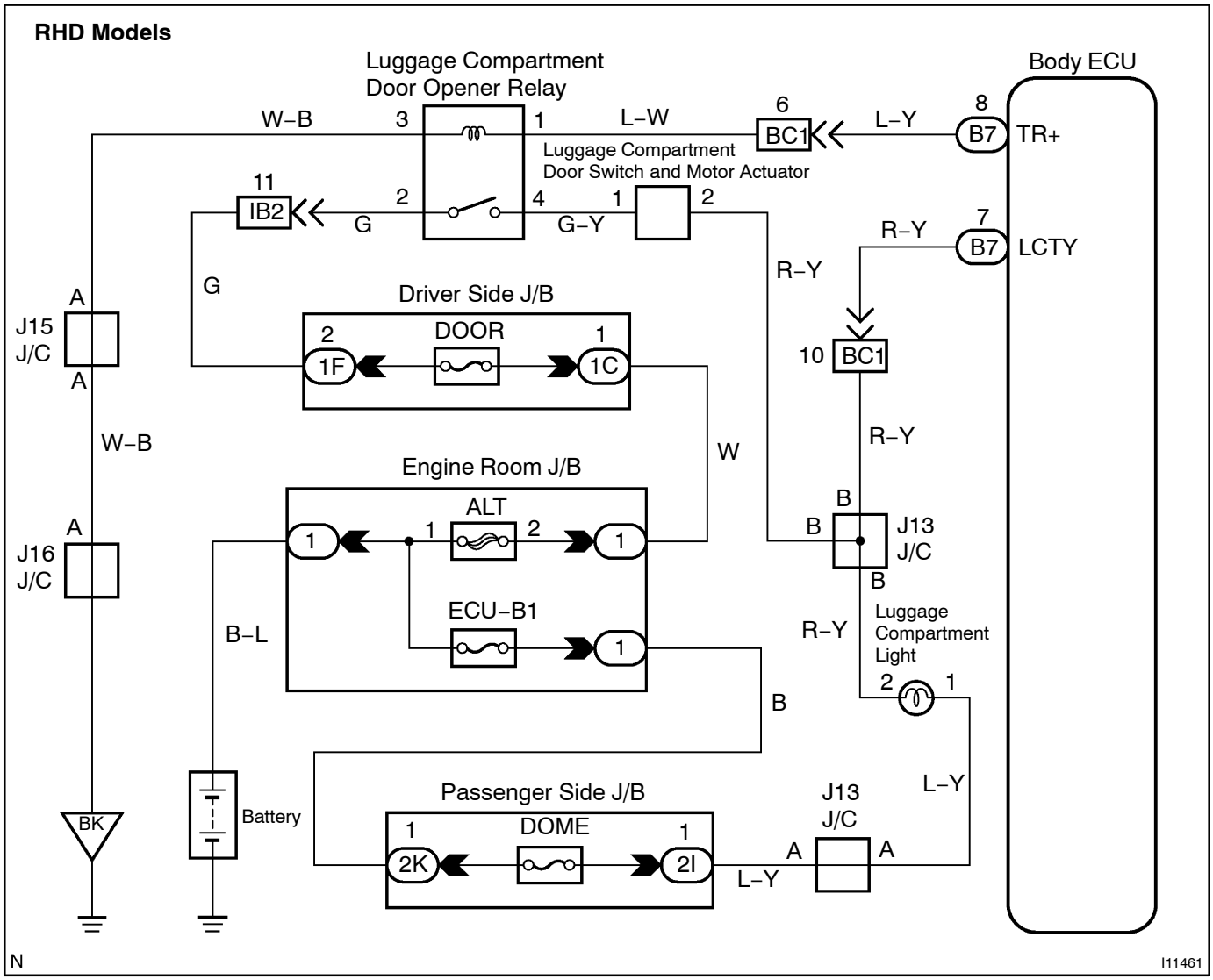
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

DI62S–01

Luggage opener relay and motor

WIRING DIAGRAM




RHD Models
Luggage Compartment
Door Opener Relay
Body ECU
W–B
3
1
L–W
6
BC1
L–Y
8
B7
TR+
Luggage Compartment
Door Switch and Motor Actuator
11
IB2
2
G
4
G–Y
1
2
R–Y
7
B7
LCTY
G
R–Y
A
J15
J/C
A
Driver Side J/B
2
DOOR
1
1F
1C
10
BC1
W–B
W
R–Y
Engine Room J/B
ALT
A
J16
J/C
1
1
2
1
B
B
J13
J/C
B
ECU–B1
B–L
R–Y
Luggage
Compartment
Light
2
1
1
B
L–Y
Passenger Side J/B
J13
J/C
Battery
BK
1
DOME
1
2K
2I
A
A
L–Y
N
I11461

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check luggage opener motor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the luggage opener motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)**

NG

2	**Check luggage opener motor. (See page BE–114)**

NG → **Replace the luggage opener motor.**

OK

3	**Check wire harness and connector between luggage opener motor and Body ECU, and luggage opener relay and Body ECU.**

NG → **Repair or replace wire harness or connector.**

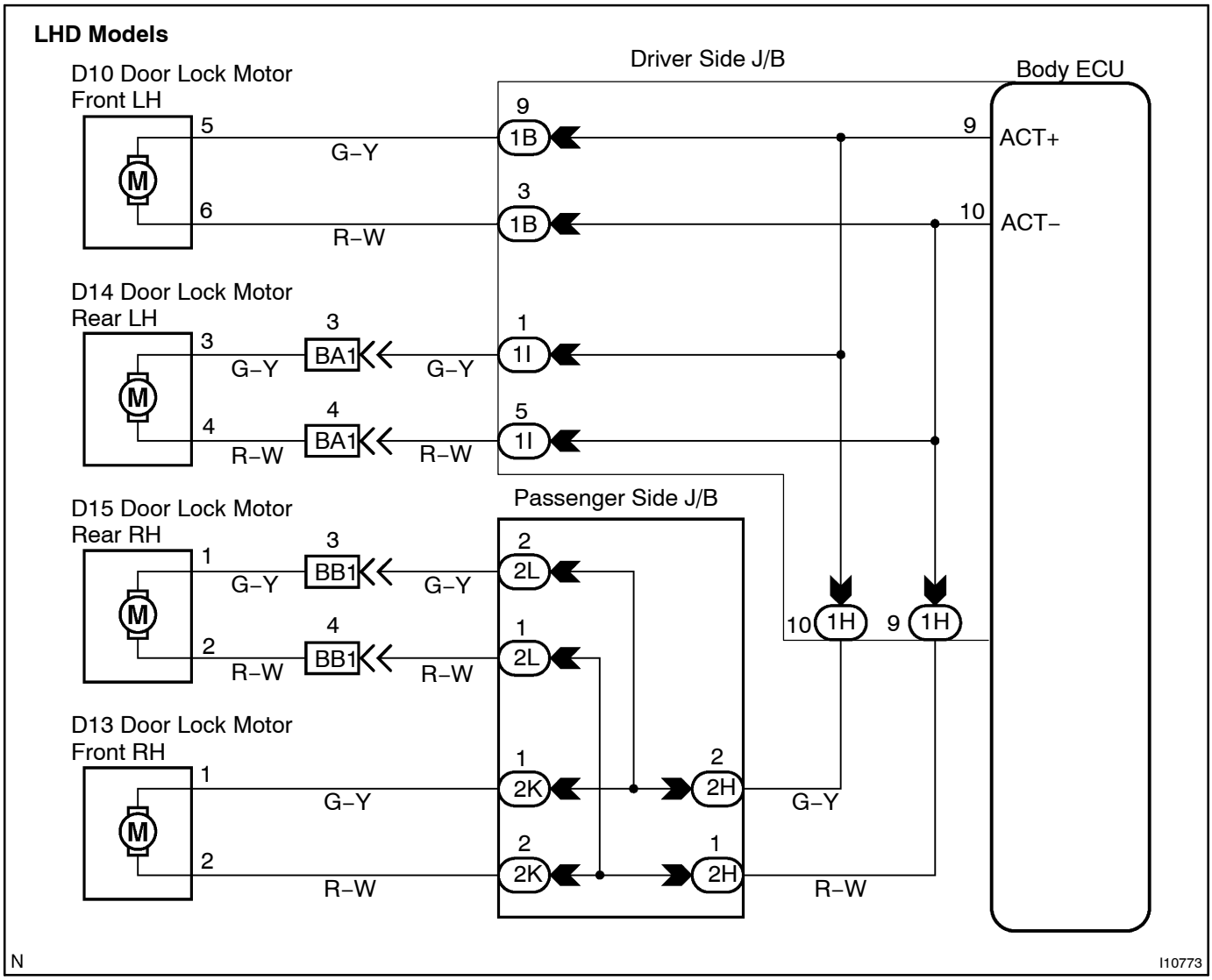
OK

Proceed to next circuit inspection shown on problem symptoms table. (See page DI–554)

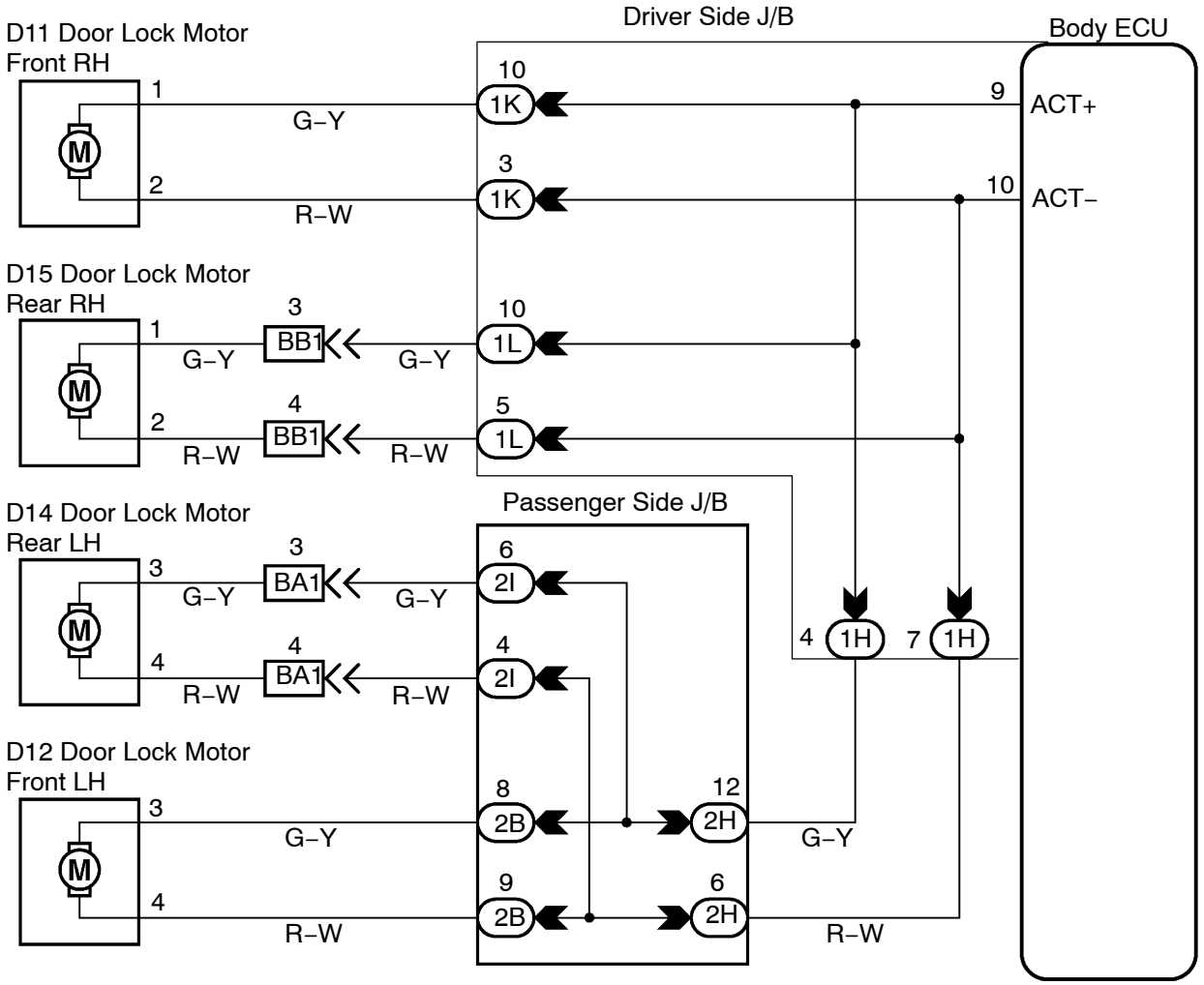
DI62T–01

Door lock motor circuit

WIRING DIAGRAM



RHD Models


D11 Door Lock Motor
Front RH
D15 Door Lock Motor
Rear RH
D14 Door Lock Motor
Rear LH
D12 Door Lock Motor
Front LH
Driver Side J/B
Passenger Side J/B
Body ECU
ACT+
ACT–
G–Y
R–W
BB1
BA1
1K
1L
2I
2B
1H
2H
N
I11459

INSPECTION PROCEDURE

1	Check door lock motor (See page BE–114).

NG → Replace the door lock motor.

OK

2	Check wireharness and connector between door lock motor and body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

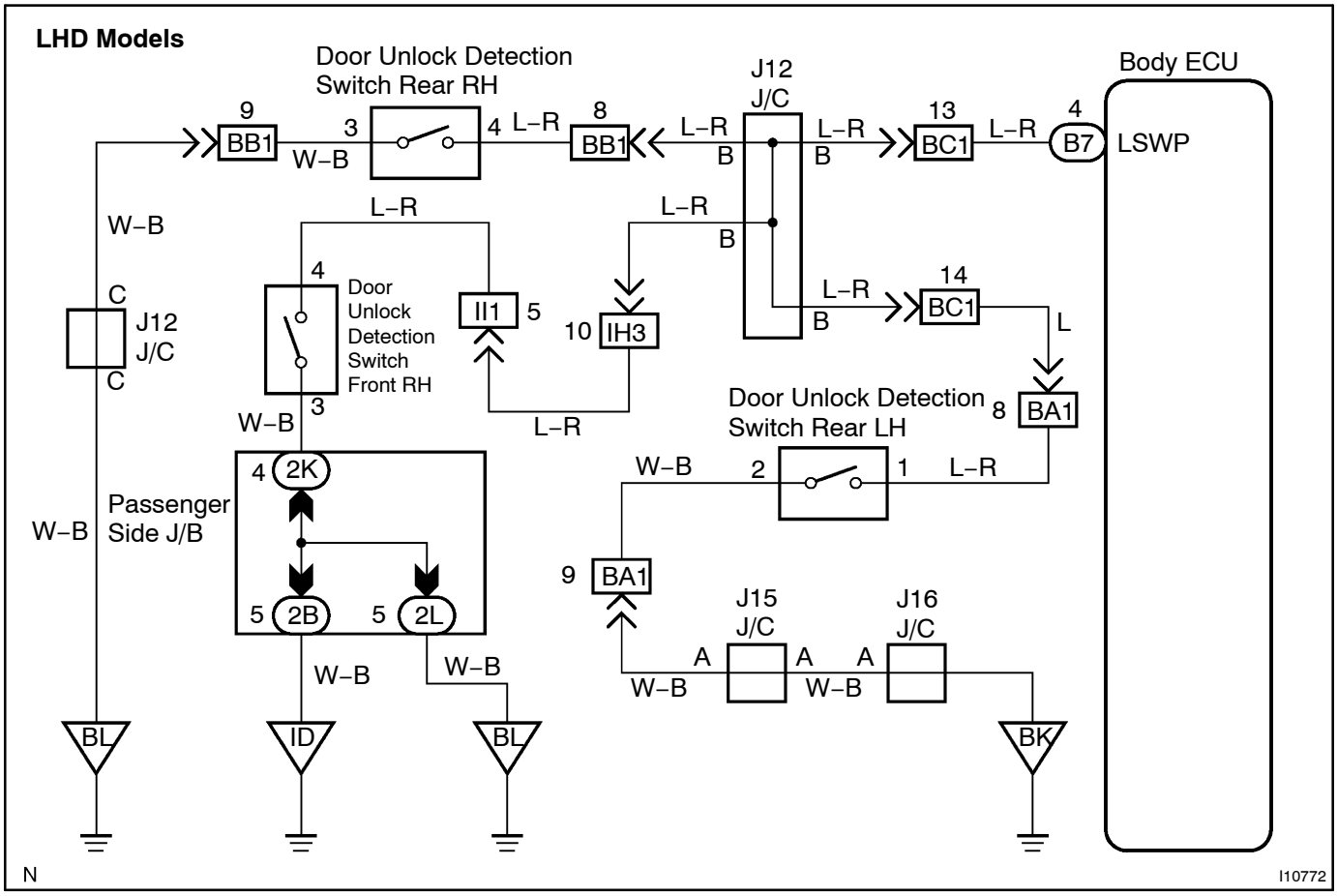
DI62U-01

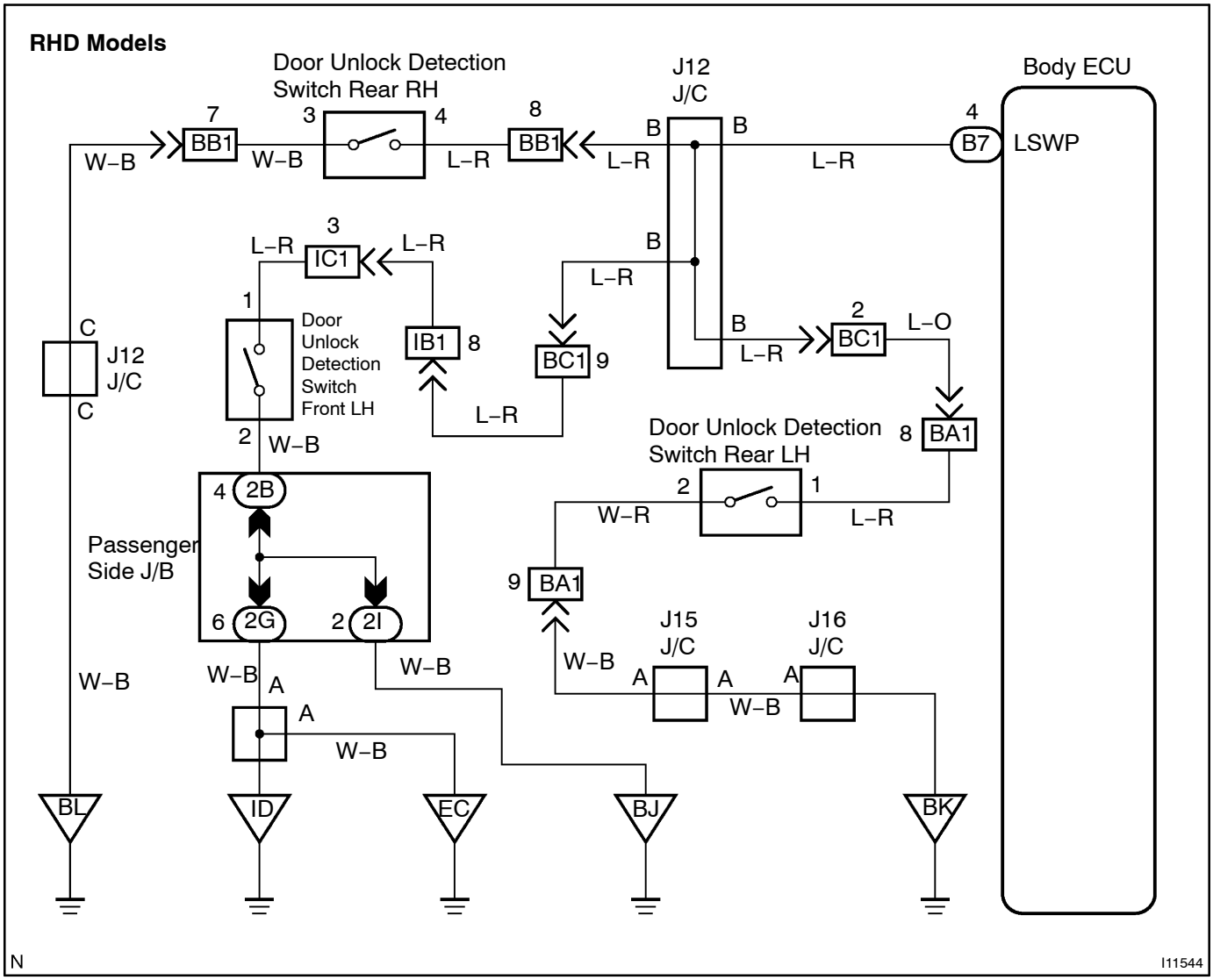
Door unlock detection switch circuit

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




RHD Models
Door Unlock Detection Switch Rear RH
J12 J/C
Body ECU
7
BB1
3
4
8
BB1
B
B
4
B7
LSWP
W–B
W–B
L–R
L–R
L–R
3
L–R
IC1
L–R
B
L–R
1
Door Unlock Detection Switch Front LH
IB1
8
BC1
9
B
2
BC1
L–O
L–R
C
J12 J/C
C
2
W–B
L–R
Door Unlock Detection Switch Rear LH
8
BA1
4
2B
2
1
W–R
L–R
Passenger Side J/B
9
BA1
6
2G
2
2I
J15 J/C
J16 J/C
W–B
W–B
W–B
A
A
A
A
W–B
W–B
BL
ID
EC
BJ
BK
N
I11544

INSPECTION PROCEDURE

1	Check door unlock detection switch (See page BE–114).

NG → Replace the door unlock detection switch.

OK

2	Check wireharness and connector between door unlock detection switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

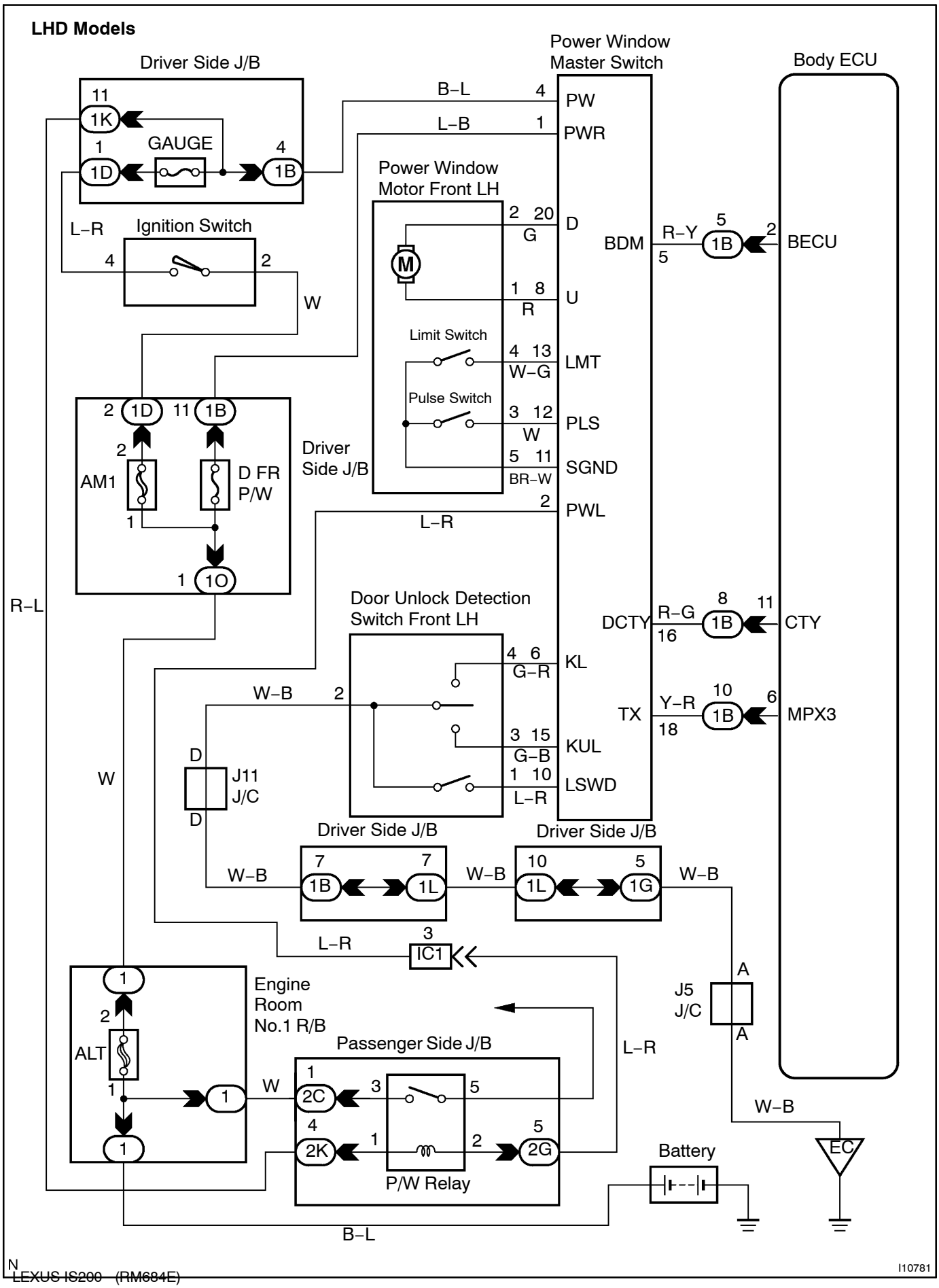
DI62V–01

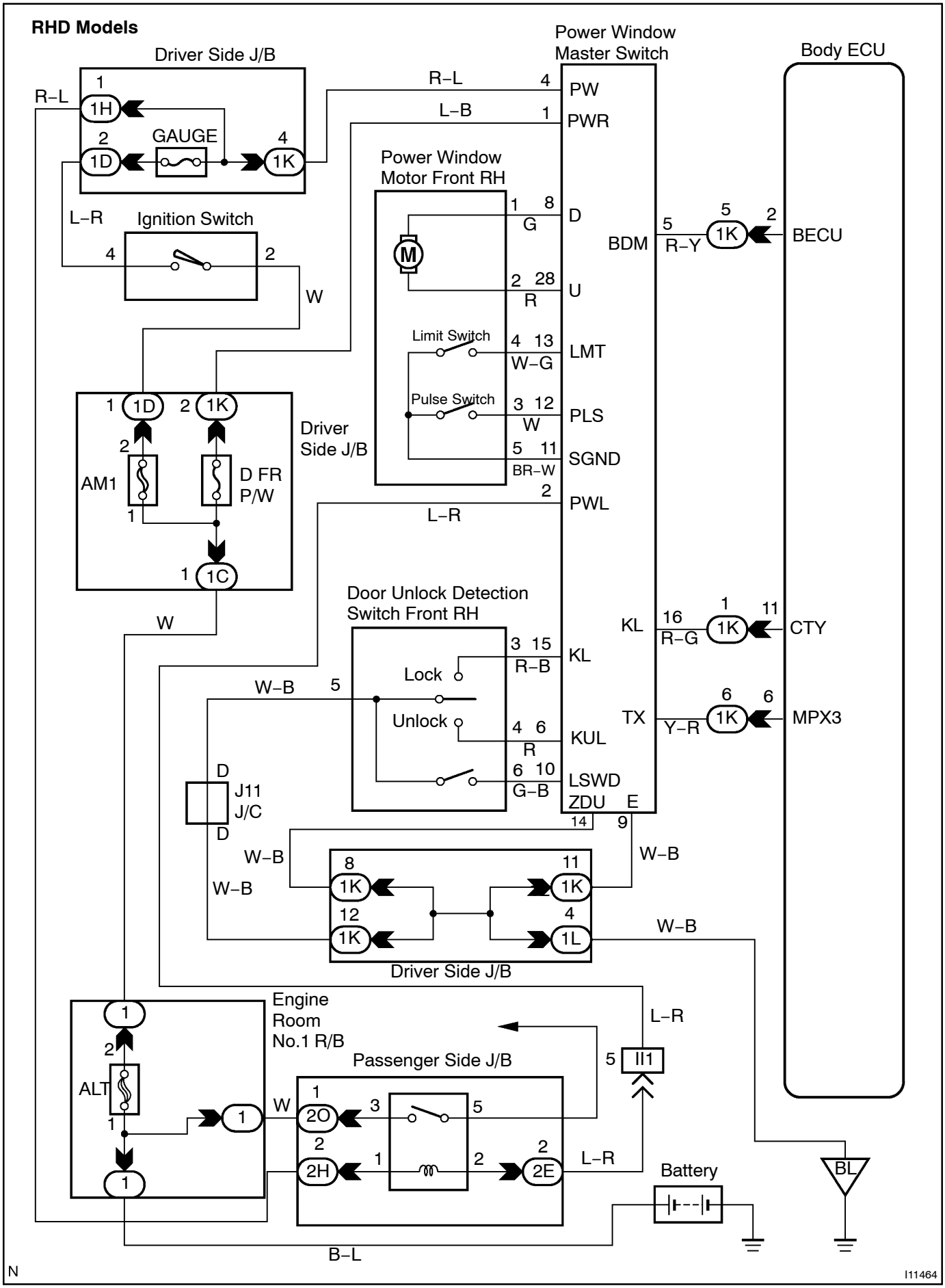
Power window master switch circuit

CIRCUIT DESCRIPTION

Power window master switch circuit can be checked using DTC check. (See page DI–622)

WIRING DIAGRAM




RHD Models
Driver Side J/B
Power Window Master Switch
Body ECU
R–L
L–B
GAUGE
1H
1D
1K
PW
PWR
Power Window Motor Front RH
D
G
U
R
Limit Switch
LMT
W–G
Pulse Switch
PLS
W
SGND
BR–W
PWL
L–R
BDM
R–Y
BECU
Ignition Switch
W
1C
AM1
D FR P/W
Driver Side J/B
Door Unlock Detection Switch Front RH
KL
R–B
Lock
Unlock
KUL
R
LSWD
G–B
ZDU
E
W–B
J11 J/C
16
R–G
CTY
TX
Y–R
MPX3
1L
Engine Room No.1 R/B
Passenger Side J/B
ALT
2O
2H
2E
II1
L–R
Battery
BL
B–L
N
I11464

INSPECTION PROCEDURE

1	Check the power window master switch circuit using DTC check (See page DI–622).

OK → Proceed to next circuit inspection shown on problem symptom table (See page DI–554).

OK

2	Check the power window master switch. (See page BE–109)

NG → Replace the power window master switch.

OK

3	Check wireharness and connector between power window master switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

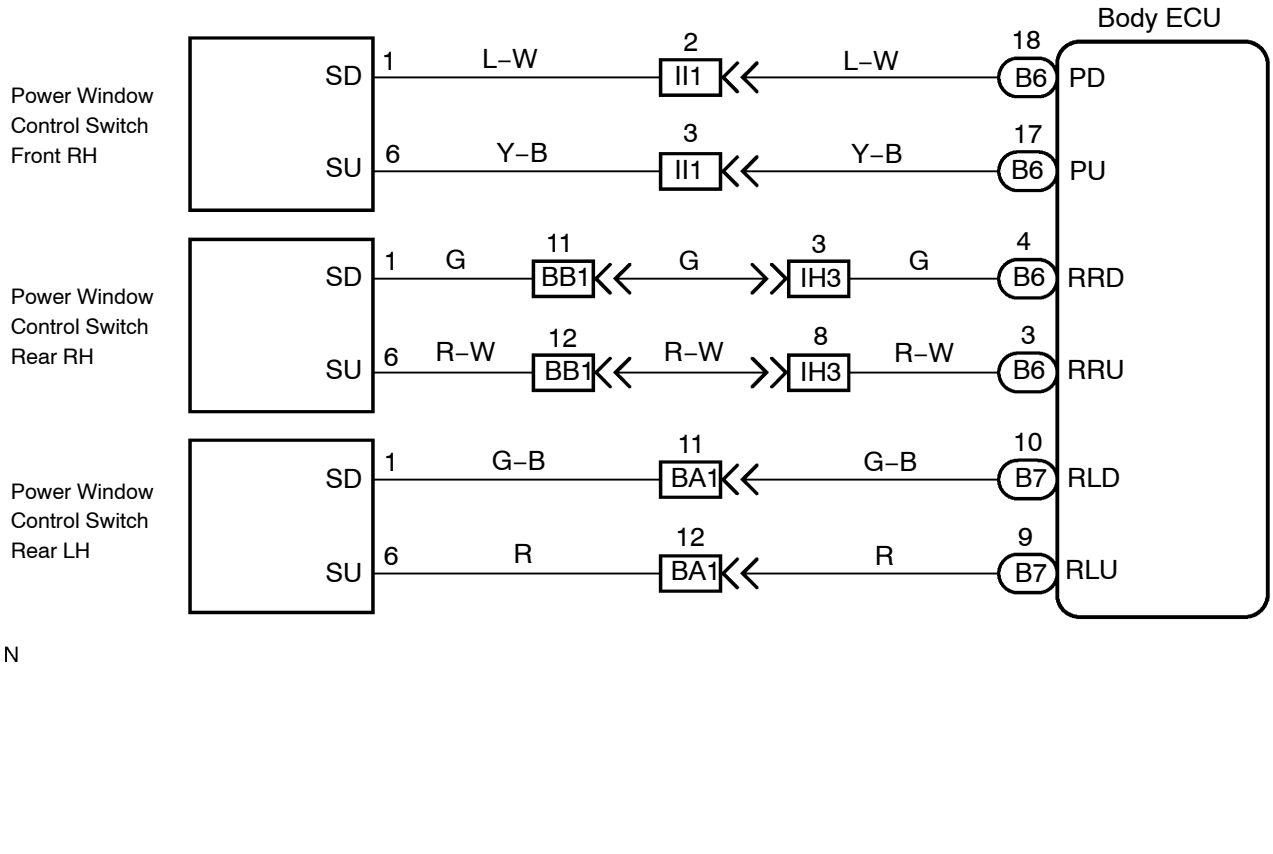
Proceed to next circuit inspection shown on problem symptom table (See page DI–554).

DI62W–01

Power window switch circuit

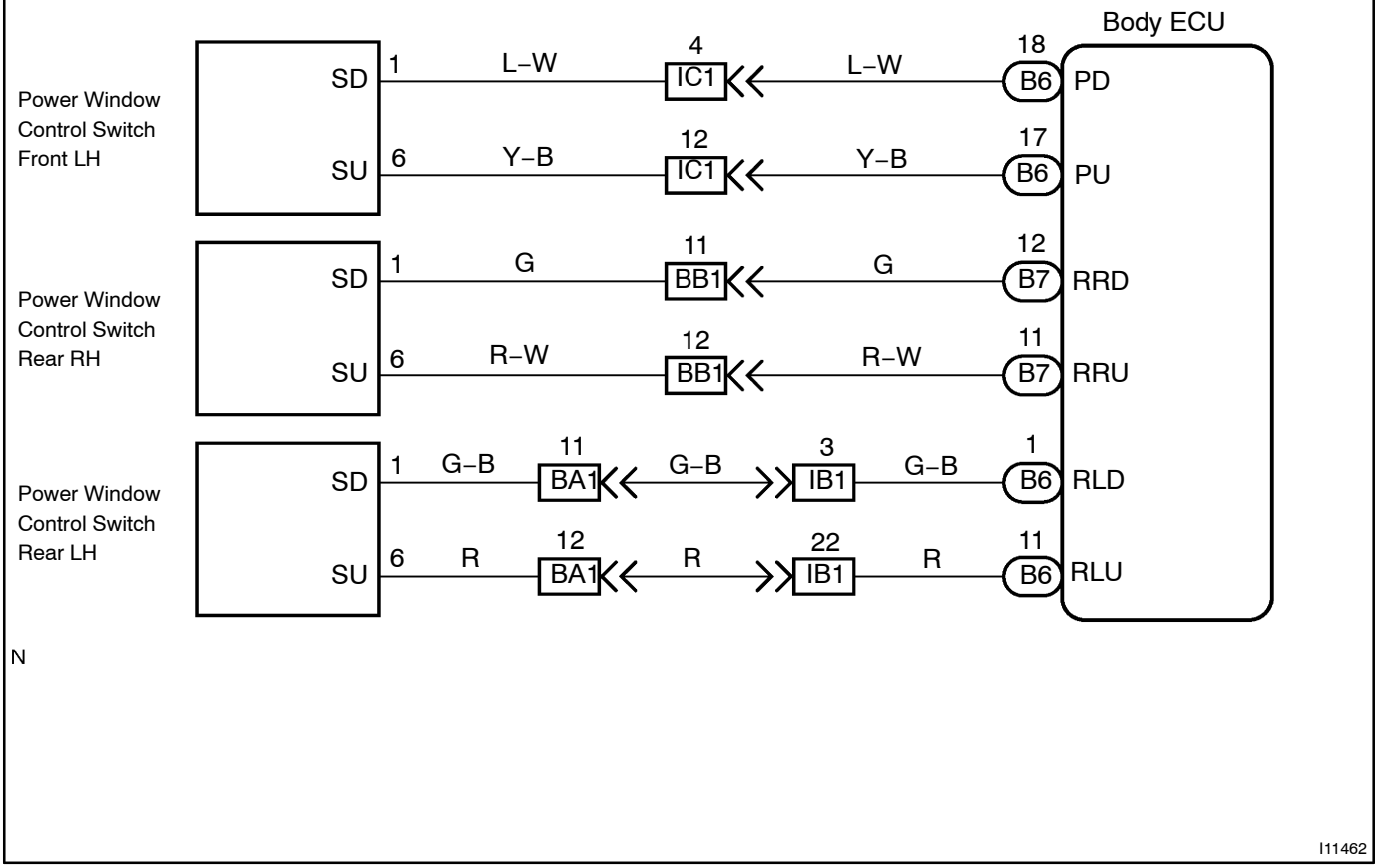
WIRING DIAGRAM

LHD Models



I10769

RHD Models


Body ECU
Power Window Control Switch Front LH
SD
SU
1
L–W
4
IC1
L–W
18
B6
PD
6
Y–B
12
IC1
Y–B
17
B6
PU
Power Window Control Switch Rear RH
SD
SU
1
G
11
BB1
G
12
B7
RRD
6
R–W
12
BB1
R–W
11
B7
RRU
Power Window Control Switch Rear LH
SD
SU
1
G–B
11
BA1
G–B
3
IB1
G–B
1
B6
RLD
6
R
12
BA1
R
22
IB1
R
11
B6
RLU
N
I11462

INSPECTION PROCEDURE

1	Check the power window switch. (See page BE–109)

NG → Replace the power window switch.

OK

2	Check wireharness and connector between power window switch and body ECU.

NG → Repair or replace wireharness or connector.

OK

3	Check wireharness and connector between power window switch and body ground.

NG → Repair or replace wireharness or connector.

OK

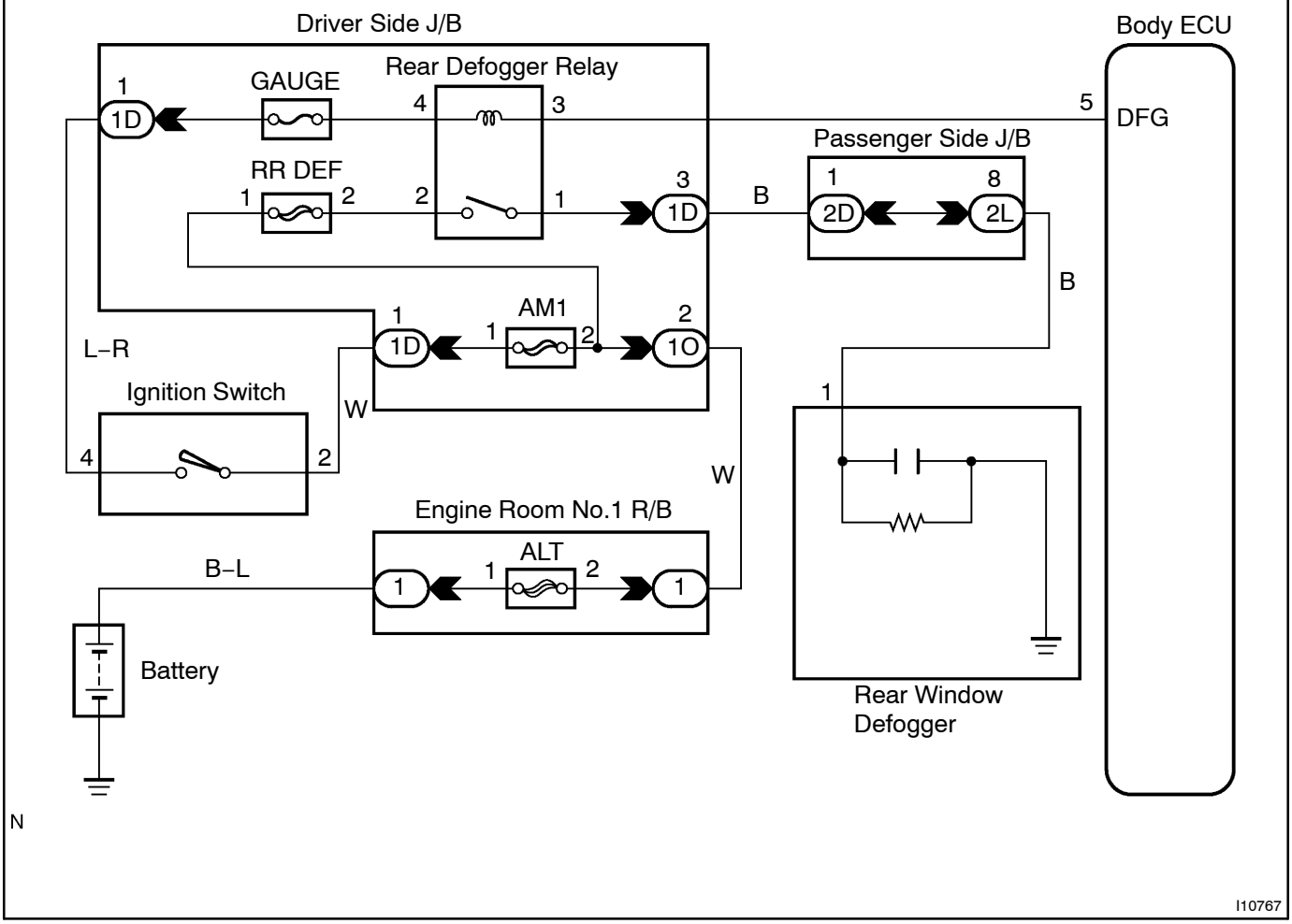
Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62X–01

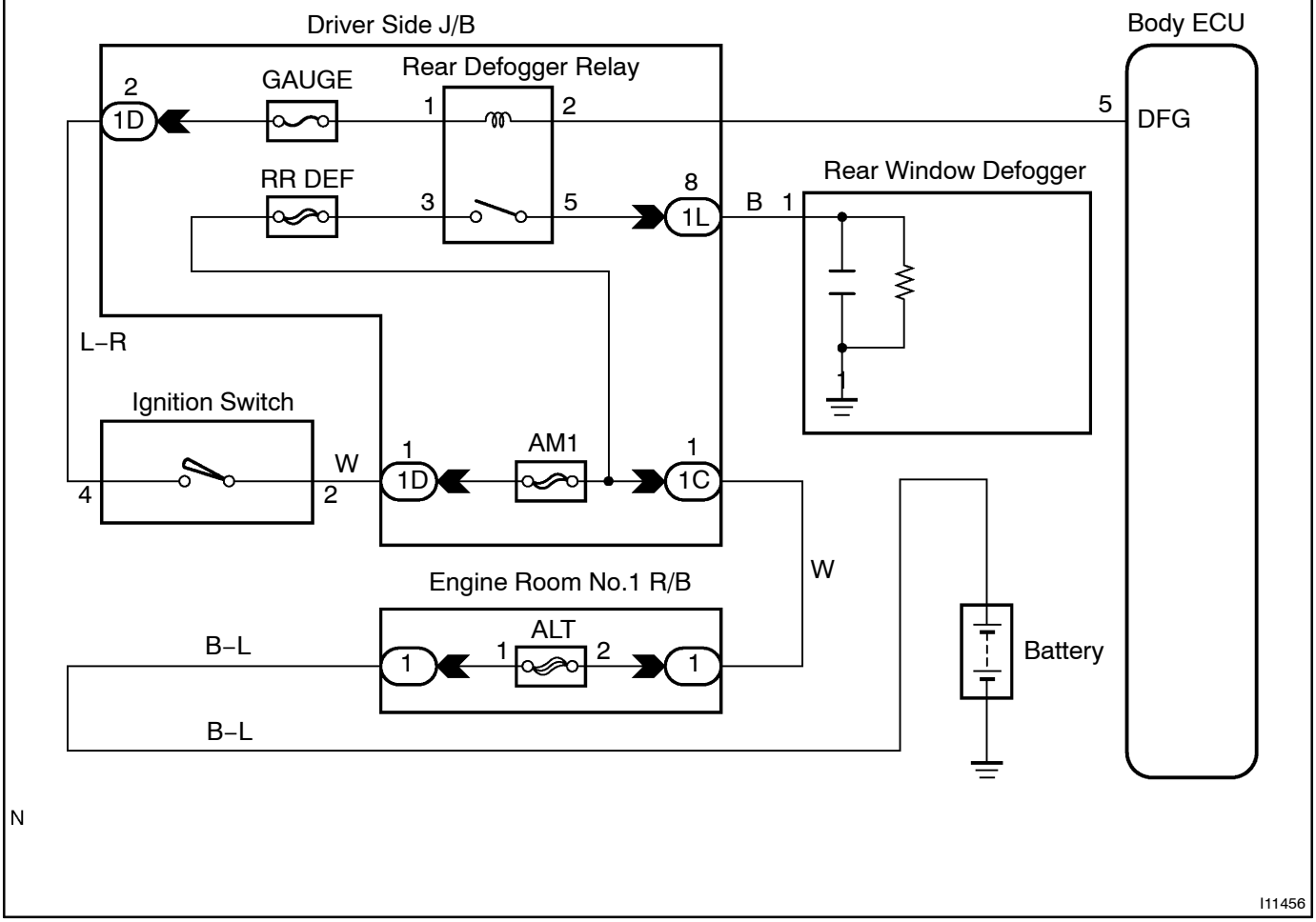
Front Deicer and Rear defogger relay circuit

WIRING DIAGRAM

LHD Models



RHD Models


Driver Side J/B
Body ECU
GAUGE
Rear Defogger Relay
2
1D
1
2
5
DFG
RR DEF
3
5
8
1L
B
1
Rear Window Defogger
L–R
Ignition Switch
W
1
AM1
1
4
2
1D
1C
W
Engine Room No.1 R/B
ALT
B–L
1
1
2
1
Battery
B–L
N
I11456

INSPECTION PROCEDURE

1	Check rear defogger relay (See page BE–96).

NG → Replace the rear defogger relay.

OK

2	Check front defogger relay (See page BE–96).

NG → Replace the rear defogger relay.

OK

3	Check wire harness and connector between rear defogger relay and body ECU, front defogger relay and body ECU.

NG → Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–554).

DI62Y–01

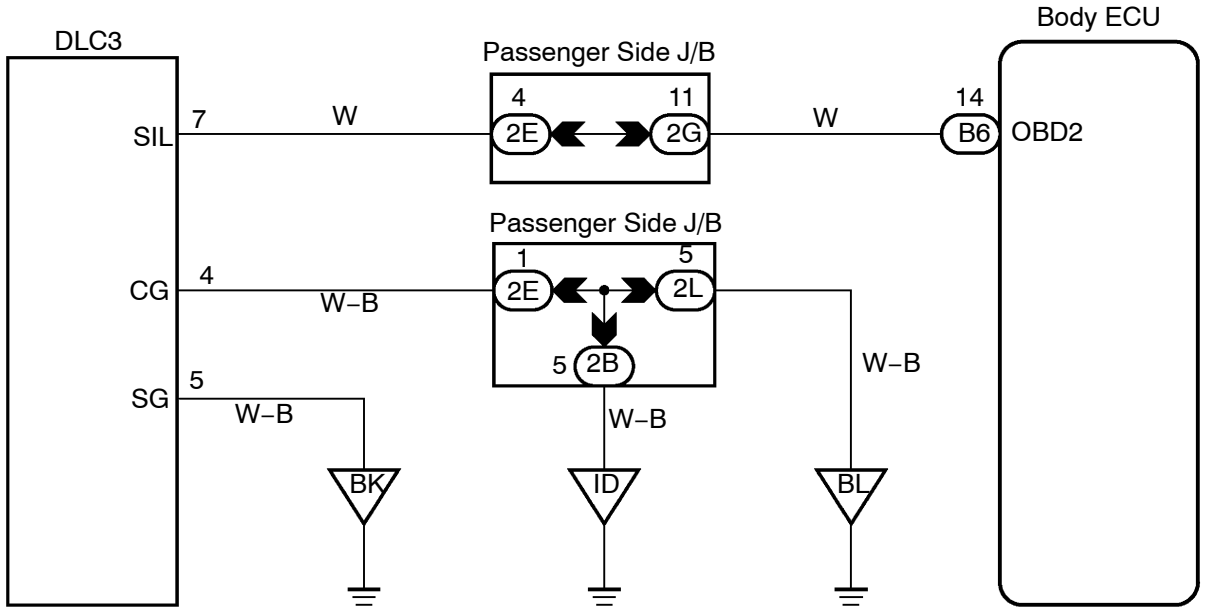
Diagnosis Circuit

CIRCUIT DESCRIPTION

This circuit sends a signal to the ECU that DTC output is required.

WIRING DIAGRAM

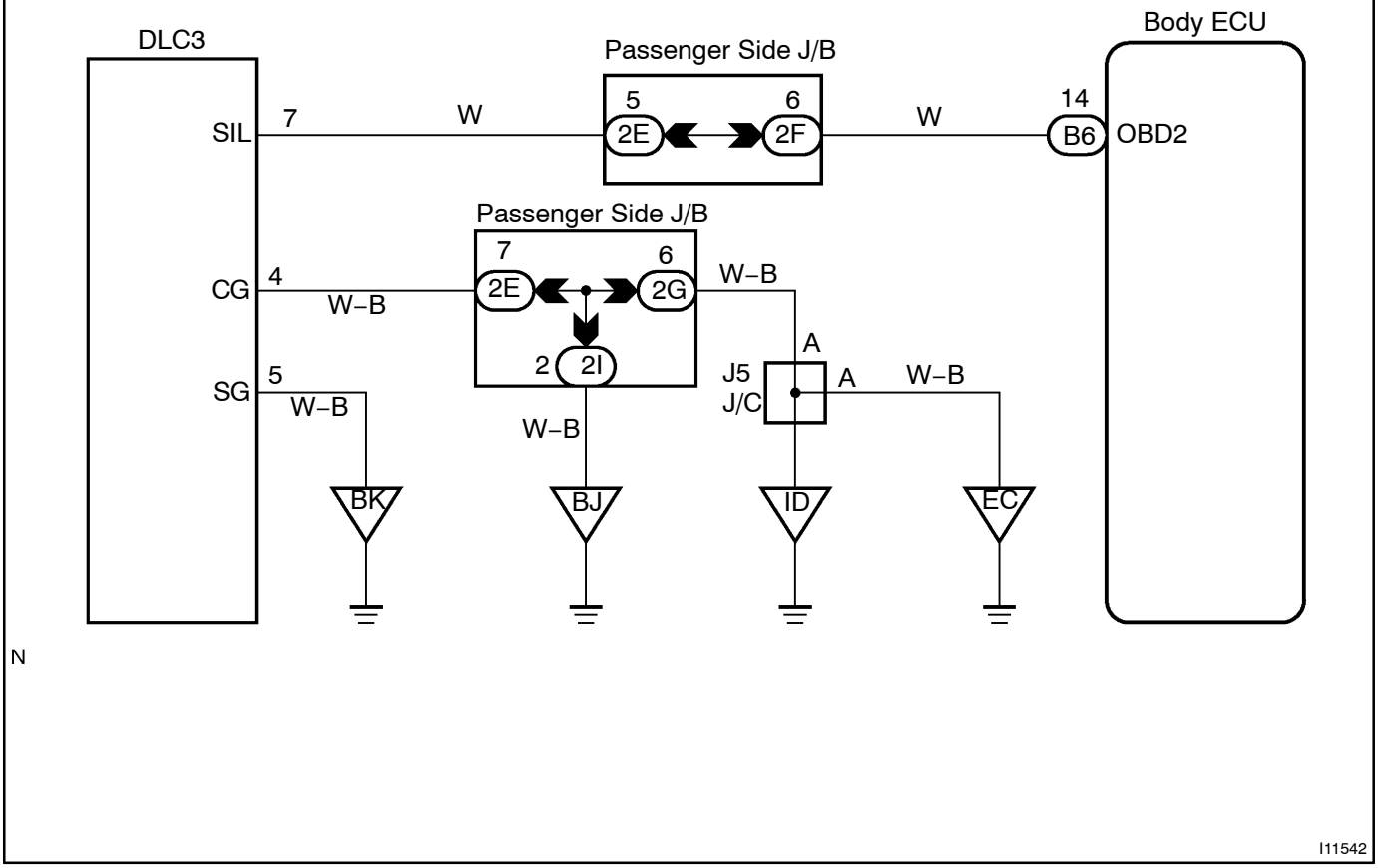
LHD Models



N

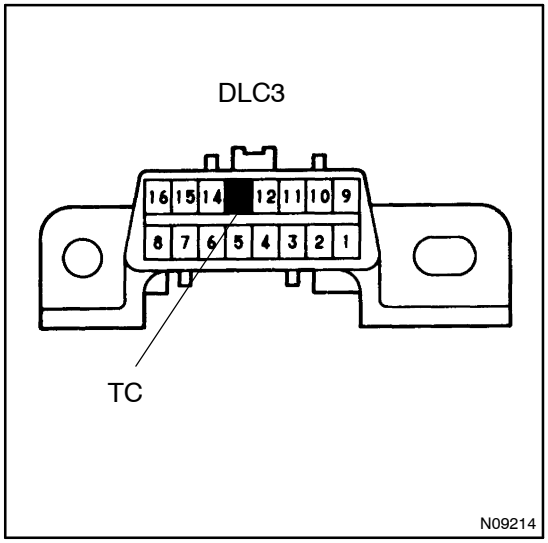
I11541

RHD Models


DLC3
SIL
CG
SG
7
4
5
W
W–B
W–B
Passenger Side J/B
5
6
2E
2F
W
14
B6
OBD2
Body ECU
Passenger Side J/B
7
6
2E
2G
W–B
2
2I
W–B
A
J5
J/C
A
W–B
BK
BJ
ID
EC
N
I11542

INSPECTION PROCEDURE

1	Check voltage between terminals Tc and E_1 of DLC3.



PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals Tc and E_1 of DLC3.
OK:
Voltage: 10 – 14 V

OK → Proceed to next circuit inspection shown in problem symptom table (See page DI–554).

NG

2	Check harness and connector between body ECU and DLC3, DLC3 and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

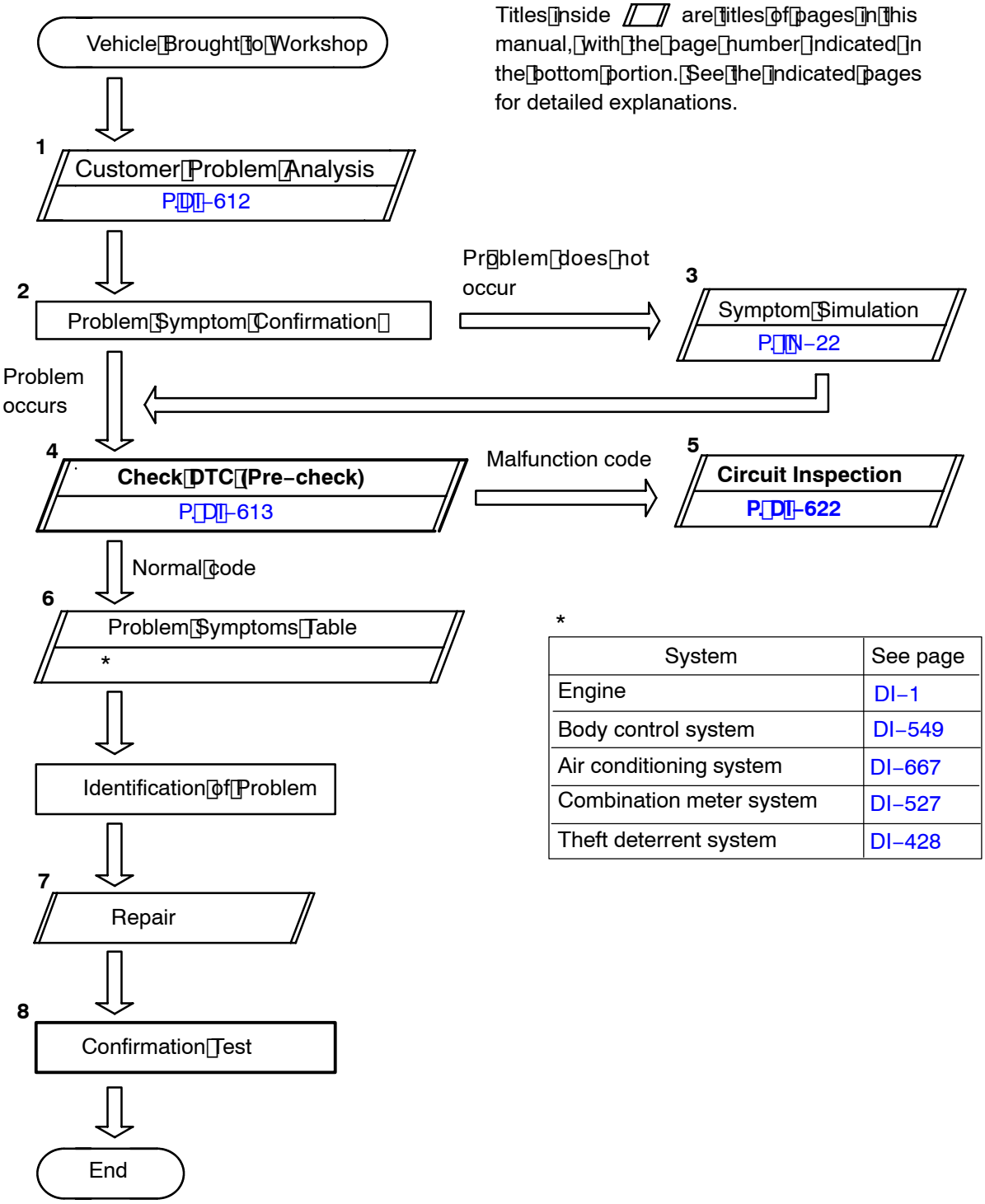
Check and replace Body ECU (See page IN–32).

MULTIPLEX COMMUNICATION SYSTEM

DI62Z–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.

*

System	See page
Engine	DI–1
Body control system	DI–549
Air conditioning system	DI–667
Combination meter system	DI–527
Theft deterrent system	DI–428

Step 4, 8 : Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI630–01

CUSTOMER PROBLEM ANALYSIS CHECK

MULTIPLEX COMMUNICATION 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 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))

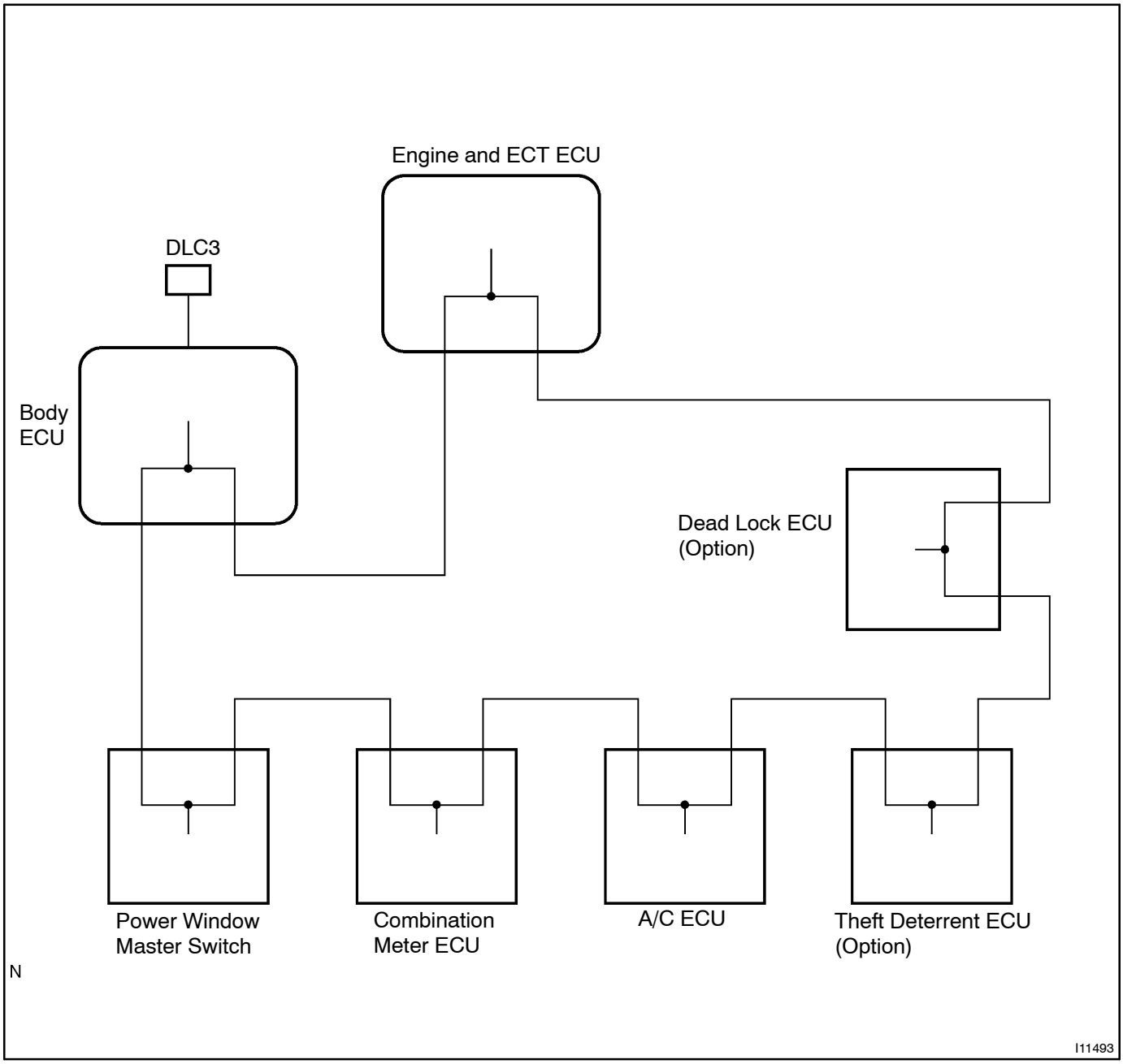
Malfunction System	☐ Engine
	☐ Body Control System
	☐ Air Conditioning System
	☐ Combination Meter System
	☐ Theft Deterrent System

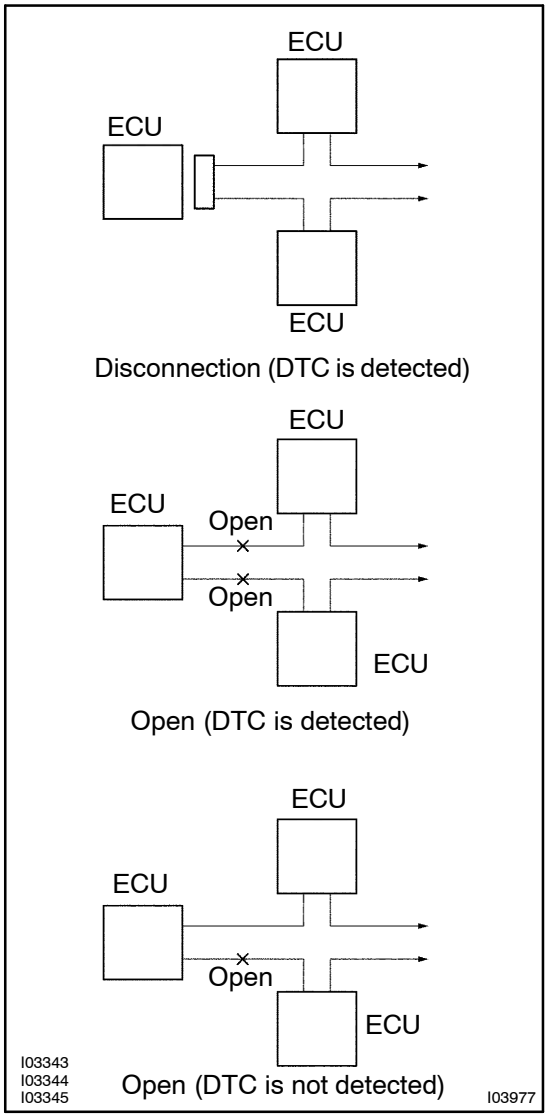
DI631–01

PRE–CHECK

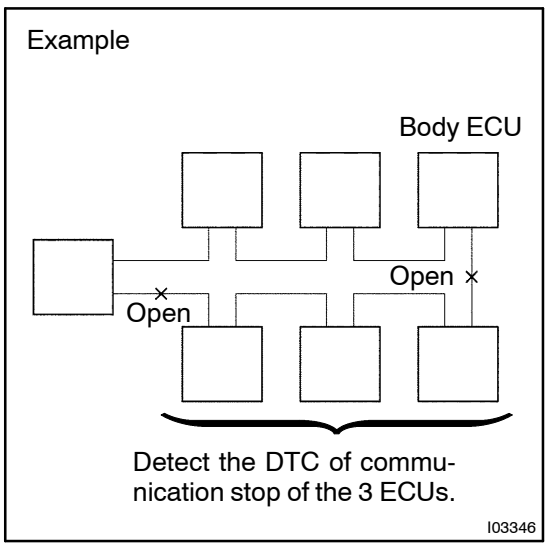
1. DIAGNOSIS SYSTEM

(a) As shown in the following illustration, each ECU of this vehicle is connected by communication bus and it transmits each signal by communication. This communication bus is self–diagnosed by Body ECU and it memorizes DTC when it detects communication stop to ECU or communication bus +B short or GND short. There is a possibility that Body ECU cannot self–diagnose accurately unless it doesn't work normal. So, please note that the troubleshooting of Body Electrical System should be done after confirming if Body ECU and Open door indicator works normal by 2 "BASIC INSPECTION" described later.





(b) If DTC of ECU communication stop is output, there is a possibility of connector disconnection or 2 communication buses open. It will not become abnormal with only 1 communication bus open.



(c) If 2 communication buses are open at the position as shown in the illustration, DTC of ECU communication stop between those 2 buses is output.

2. BASIC INSPECTION

INSPECT BODY ECU

1	**Check Body ECU operation.**

HINT:
With this inspection Body ECU CPU can be diagnosed if it works normal or not.

CHECK:

Check if the luggage compartment door opener works normal.

OK	**Go to next step "OPEN DOOR INDICATOR LIGHT INSPECTION".**

NG

2	**Check luggage compartment door opener system (Except Body ECU). (See page BE–114)**

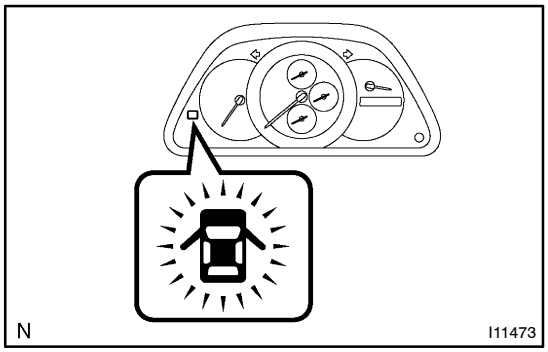
OK	**Replace the Body ECU.**

NG

Repair of replace malfunction part.

INSPECT OPEN DOOR INDICATOR LIGHT.

1	**Check open door indicator light.**



CHECK:

Check if open door indicator light is turned on when either door open.

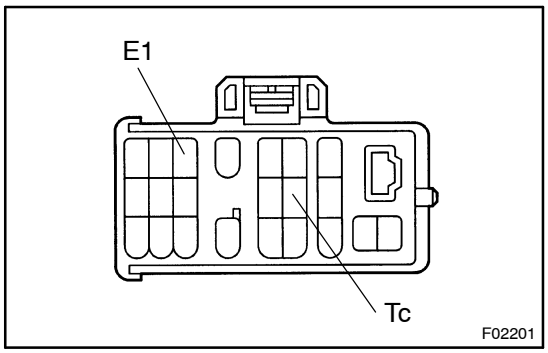
HINT:

If open door indicator light is not turned on, DTC will not be output.

OK	Go to step 3. "DTC CHECK".

NG

Repair the open door indicator light.
(See page BE–83)

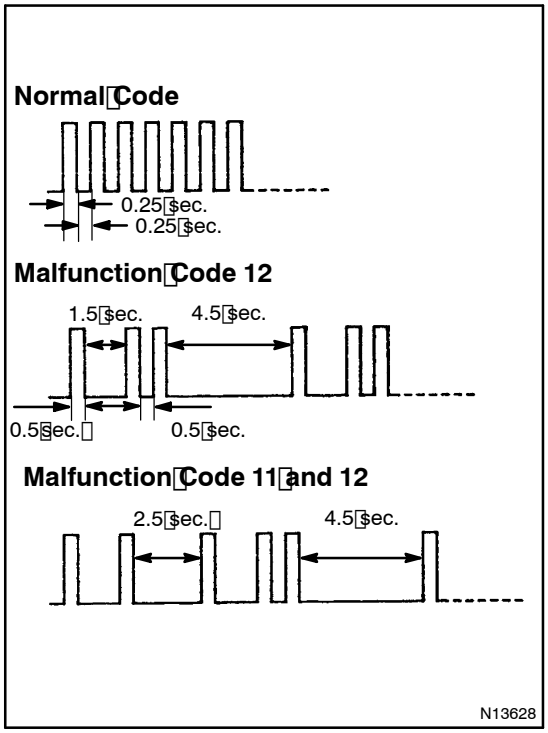


3. DTC CHECK (Using diagnosis check wire)

(a) Using SST, connect terminals Tc and E1 of DLC1.
SST 09843–18020

(b) Turn the ignition switch ON.

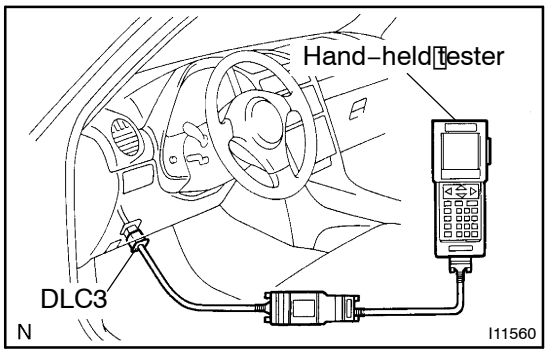
(c) Read the DTC on the open door indicator light.



As an example, the blinking patterns for codes; normal, 12, and 11 and 12 are shown in the illustration.

(d) Check for the problem using the DTC table on the next page.

(e) After completing the check, turn the ignition switch off, and disconnect terminals Tc and E1.



4. DTC CHECK (Using LEXUS hand–held tester)

(a) Prepare the hand–held tester.

(b) Connect the hand–held tester to DLC3.

(c) Turn the ignition switch ON and switch the hand–held tester main switch ON.

(d) Use the hand–held tester to check the DTCs, note them down. (For opening instructions, see the hand–held tester's instruction book.)

(e) See page DI–618 to confirm the details of the DTCs.

5. DTC CLEARANCE

DTC will be cleared when the troble output to DTC is recovered normally.

DI632–01

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).

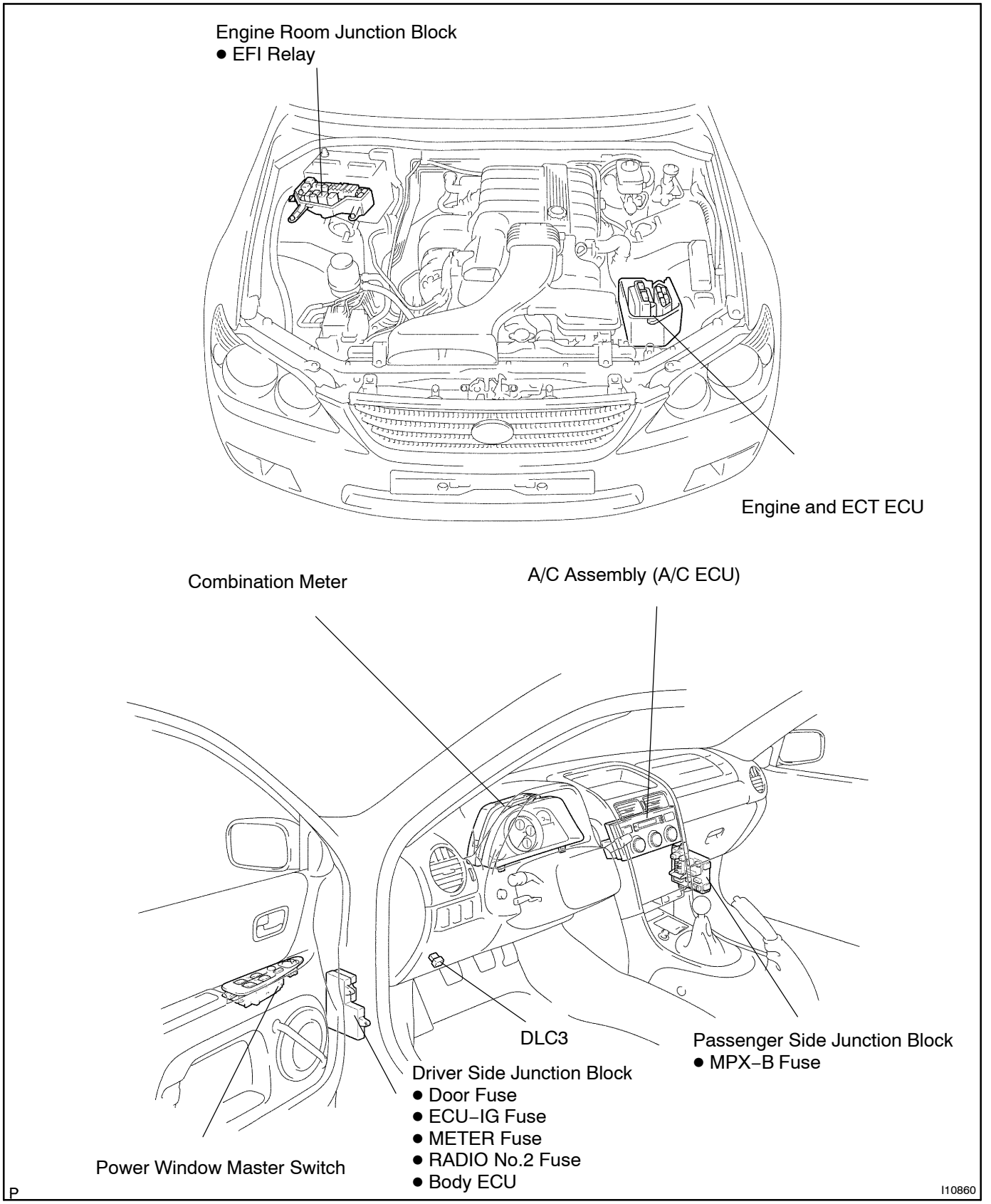
DTC No. (See Page)	Detection Item	Trouble Area
B1211/11 (DI–622)	Power window master switch ECU communication stop	• Wireharness • Power window master switch ECU
B1214/14 B1215/15 (DI–626)	Communication bus malfunction (+B short)	• Wireharness • ECU
	Communication bus malfunction (GND short)	
B1241/41 (DI–629)	Power window master switch ECU switch circuit diagnosis	• Power window master switch
B1242/42 (DI–630)	Wireless door lock tuner circuit malfunction	• Wireharness • Wireless door lock tuner
B1244/44 (DI–632)	Light sensor circuit malfunction	• Light sensor • Wireharness
B1261/61 (DI–634)	Engine and ECT ECU communication stop	• Wireharness • Engine and ECT ECU
B1262/62 (DI–636)	A/C ECU communication stop	• Wireharness • A/C ECU
B1269/69 (DI–638)	Theft deterrent ECU communication stop	• Wireharness • Theft deterrent ECU
B1271/71 (DI–640)	Combination meter ECU communication stop	• Wireharness • Combination meter ECU

HINT:

- DTC 71 are not output through open door warning light on meter because of system itself.
- When some of the DTC 14, 15 is output, the DTC of other ECU communication stop is also output. In this case, please repair DTC 14, 15 first. The following shows DTCs which are output when +B or GND short occurs on communication bus.

DI633–01

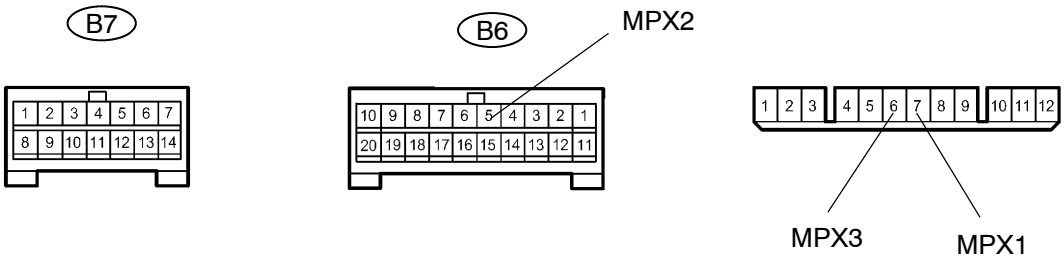
PARTS LOCATION



DI634–01

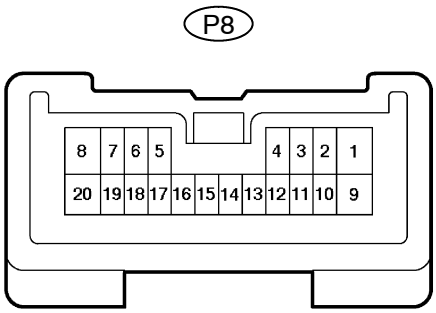
TERMINALS OF ECU

BODY CONTROL ECU



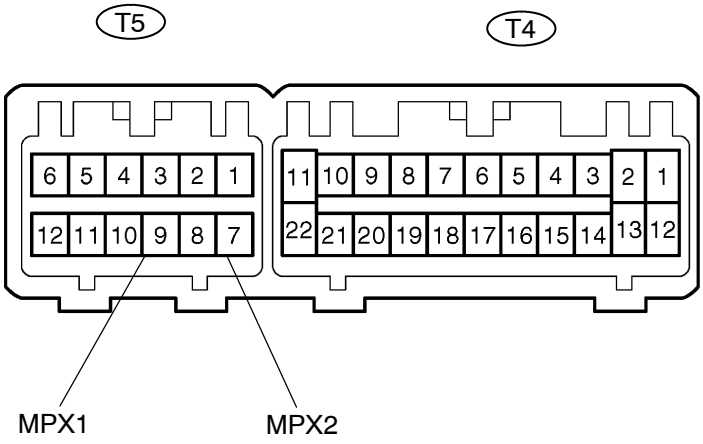
I11362

POWER WINDOW MASTER SWITCH



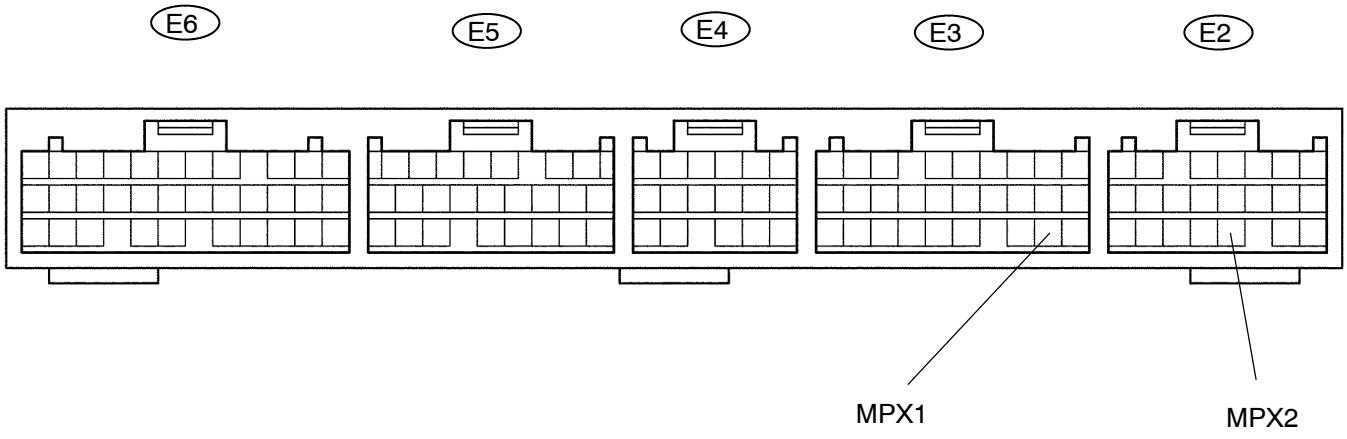
I11502

THEFT DETERRENT ECU

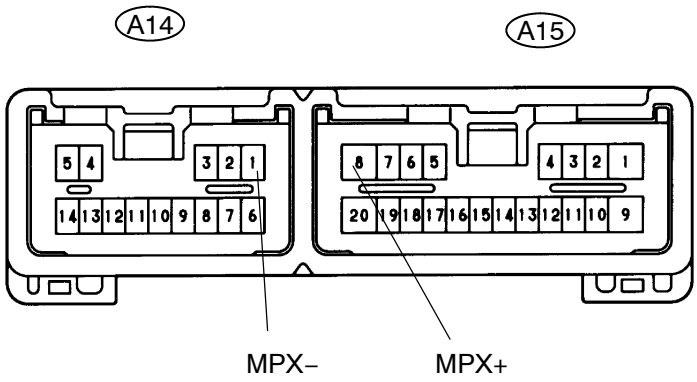


I01920

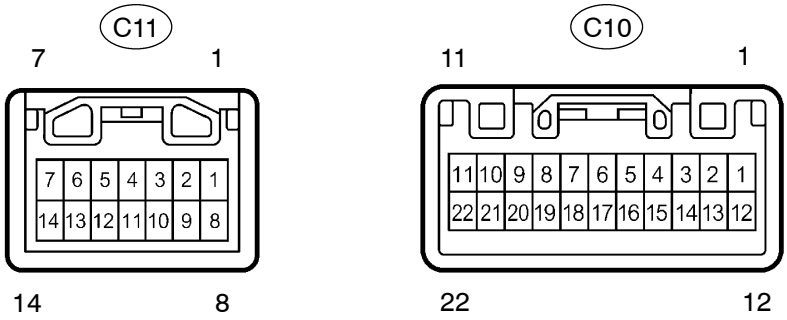
ENGINE AND ECT ECU



A/C ECU



COMBINATION METER ECU



DI635–01

CIRCUIT INSPECTION

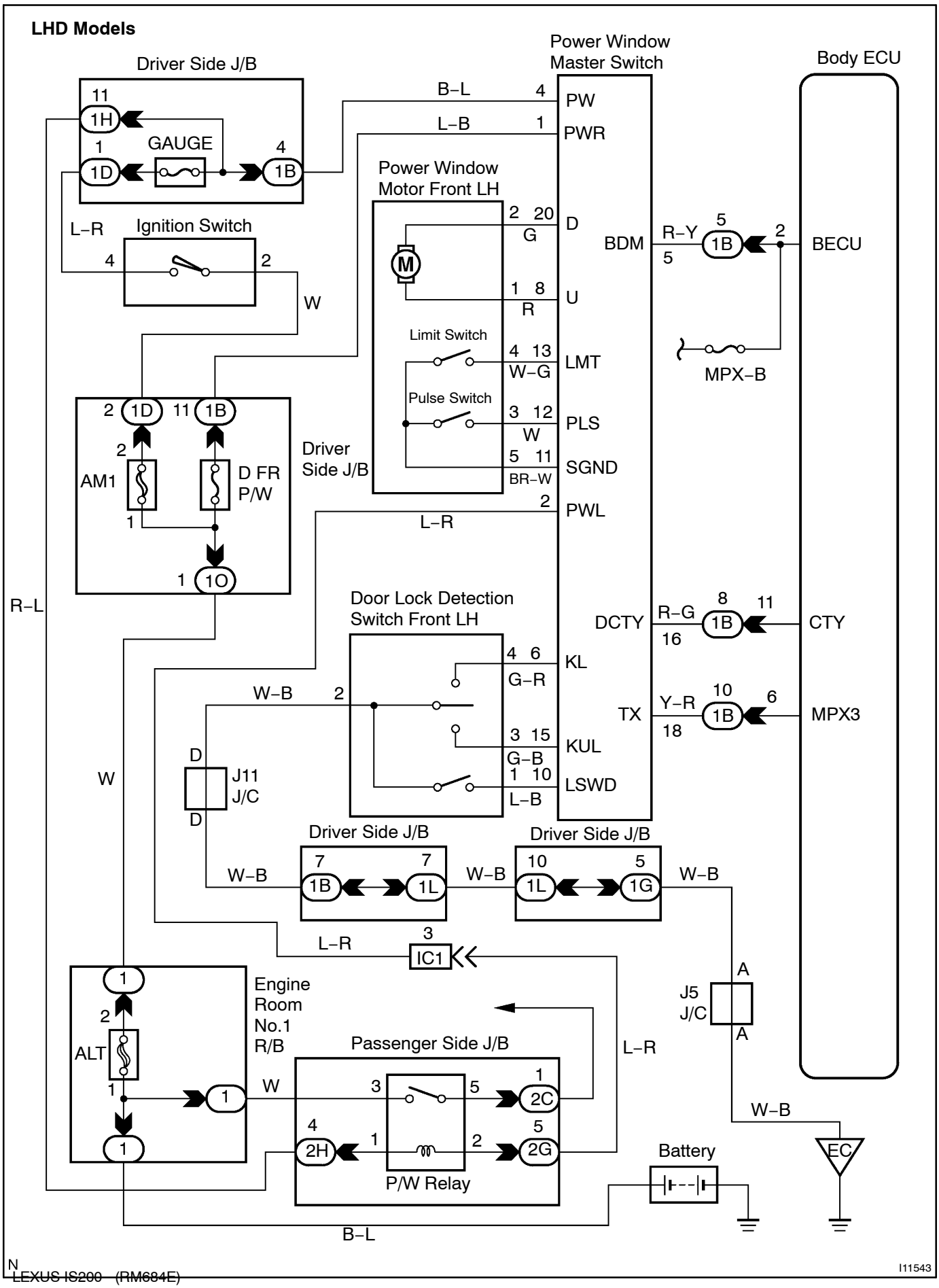
DTC	B1211 / 11	Power window master switch ECU communication stop

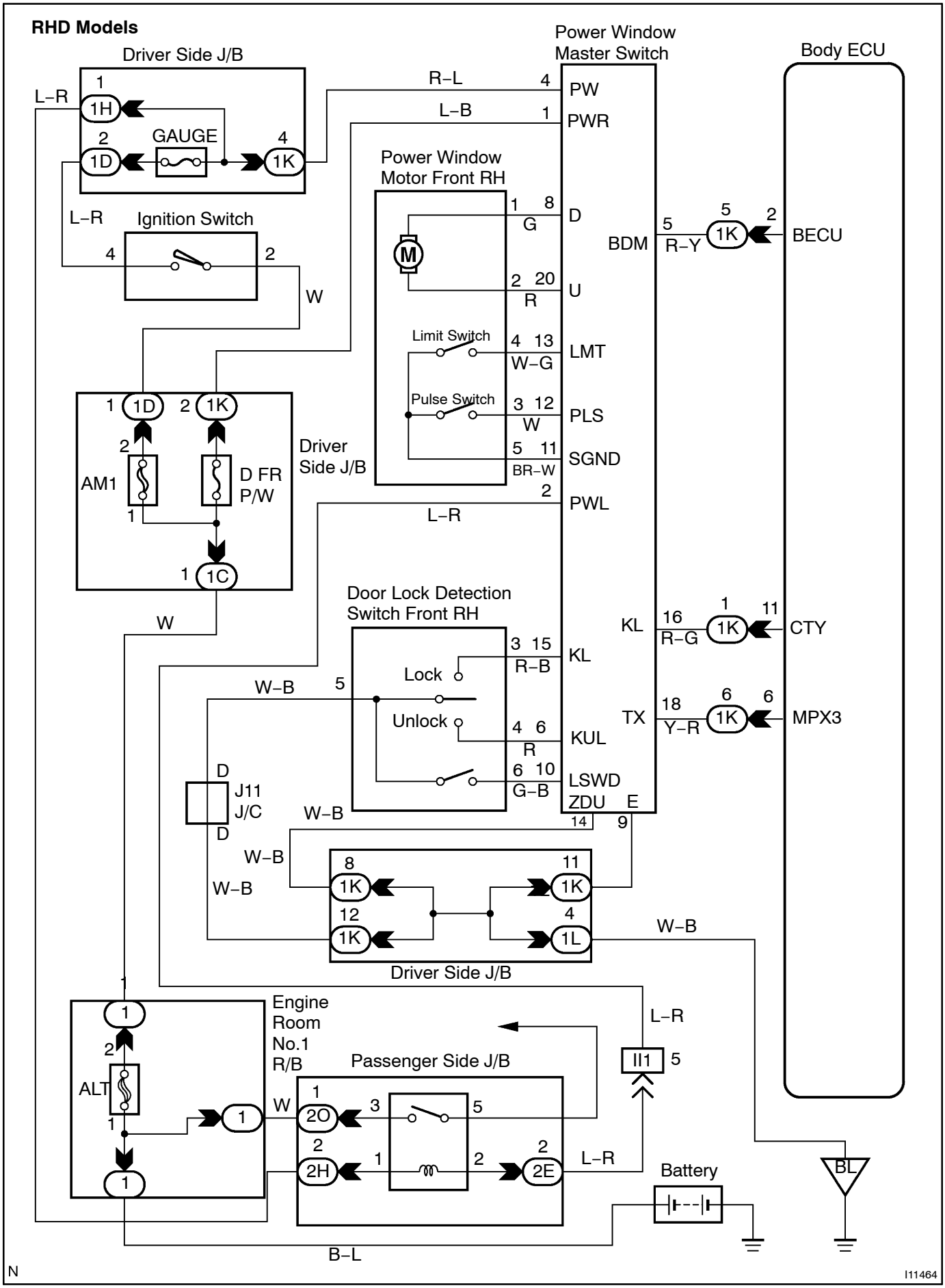
CIRCUIT DESCRIPTION

This DTC is output when communication stops between power window master switch ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1211/11	No communication from power window master switch ECU more than 10 seconds.	• Power window master switch ECU • Wireharness

WIRING DIAGRAM




RHD Models
Driver Side J/B
Power Window Master Switch
Body ECU
L–R
R–L
L–B
PW
PWR
GAUGE
Power Window Motor Front RH
Ignition Switch
W
D
G
U
R
BDM
R–Y
BECU
Limit Switch
LMT
W–G
Pulse Switch
PLS
W
SGND
BR–W
PWL
AM1
D FR P/W
Driver Side J/B
Door Lock Detection Switch Front RH
Lock
Unlock
KL
R–B
KUL
R
LSWD
G–B
ZDU
E
J11 J/C
W–B
CTY
R–G
TX
Y–R
MPX3
Driver Side J/B
Engine Room No.1 R/B
ALT
Passenger Side J/B
II1
L–R
Battery
BL
B–L
N
I11464

INSPECTION PROCEDURE

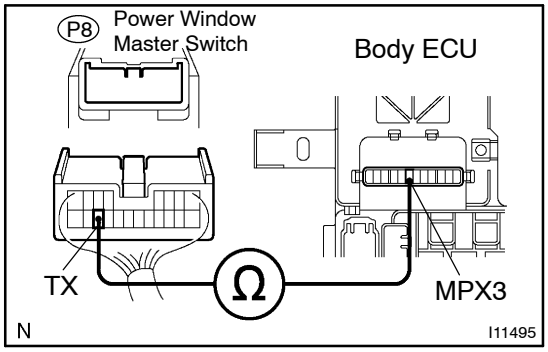
1	**Check power window master switch ECU.**

CHECK:
Check if the driver door window glass auto up.
HINT:
With this inspection, power window master switch CPU can be diagnosed if it works normally or not.

NG → **Replace the power window master switch.**

OK

2	**Check wireharness.**



PREPARATION:
Disconnect connector of body ECU and ”P8” of power window master switch.
CHECK:
Check continuity between terminals MPX3 of body ECU and TX of power window master switch.
OK:
There is a continuity in wireharness.
HINT:
If there is OPEN in wireharness, please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the power window master switch.

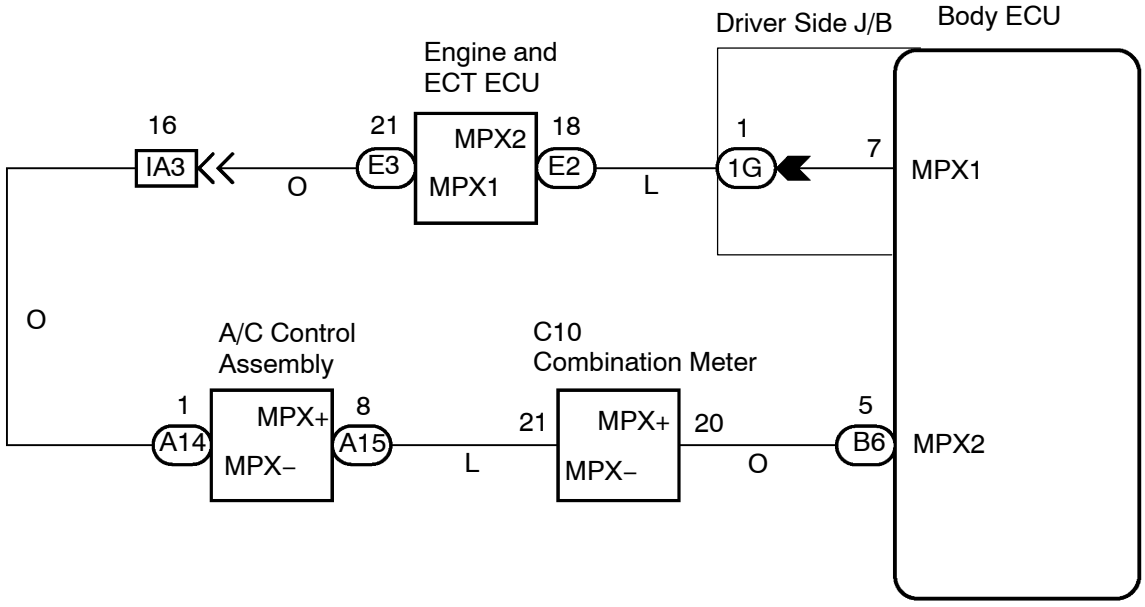
DI636–01

DTC	B1214 / 14	Communication bus malfunction (+B short)

DTC	B1215 / 15	Communication bus malfunction (GND short)

WIRING DIAGRAM

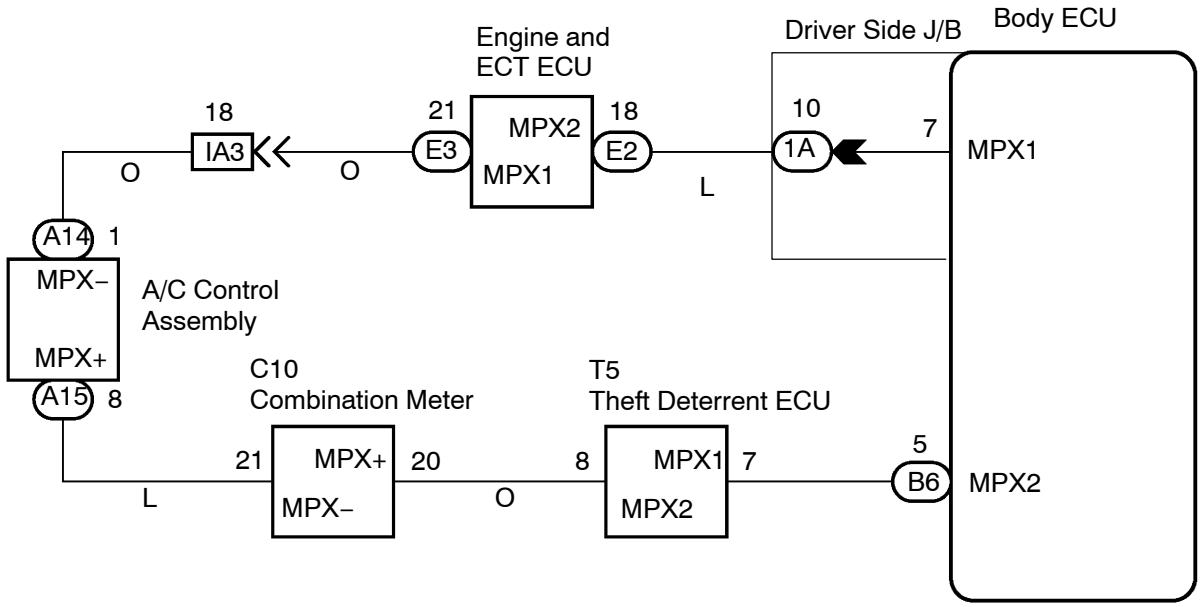
LHD Models



N

I10747

RHD Models

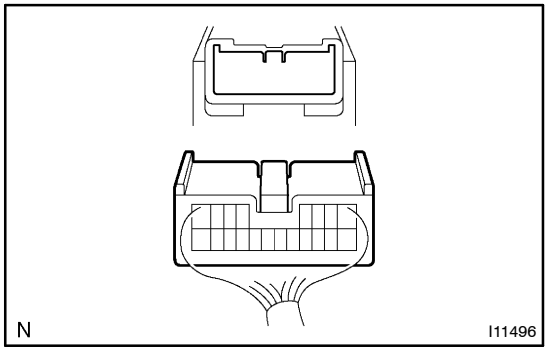


N

I10764

INSPECTION PROCEDURE

1	**Check the communication circuit inside power window master switch ECU.**

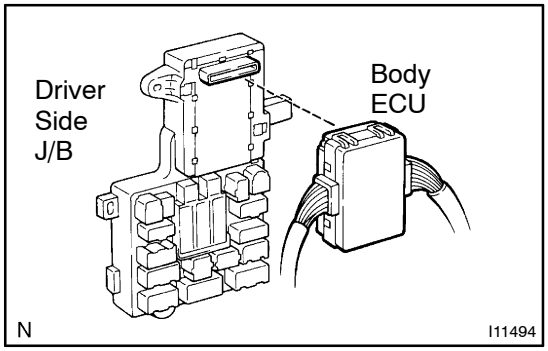


PREPARATION:
Disconnect the connector ”P8” of power window master switch.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	**Replace the power window master switch.**

NG

2	**Check for short circuit between power window master switch and body ECU.**



PREPARATION:
(a) Connect the connector ”P8” of power window master switch.
(b) Disconnect the connector of body ECU.
HINT:
Connector is disconnected by removing Body ECU from driver side junction block.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	**Repair or replace the wireharness between power window master switch and body ECU.**

NG

Replace the body ECU.

DI637–01

DTC	B1241 / 41	Body ECU switch circuit diagnosis

CIRCUIT DESCRIPTION

These DTC notify how switch works as follows:
If DTC is not output when operating switch, it means failure of switch contact. If DTC is output when not operating switch, it means stick of switch. When something wrong is found by this diagnosis, inspect each switch. Then, replace the switch if there is a problem, or check the wireharness if there is no problem.

DTC No.	DTC Detecting Condition	Trouble Area
B1241/41	Stick of switch	• Power window master switch

HINT:
Please refer to BE section for switch inspection, and to each door system of DI section for wireharness inspection.

DI638–01

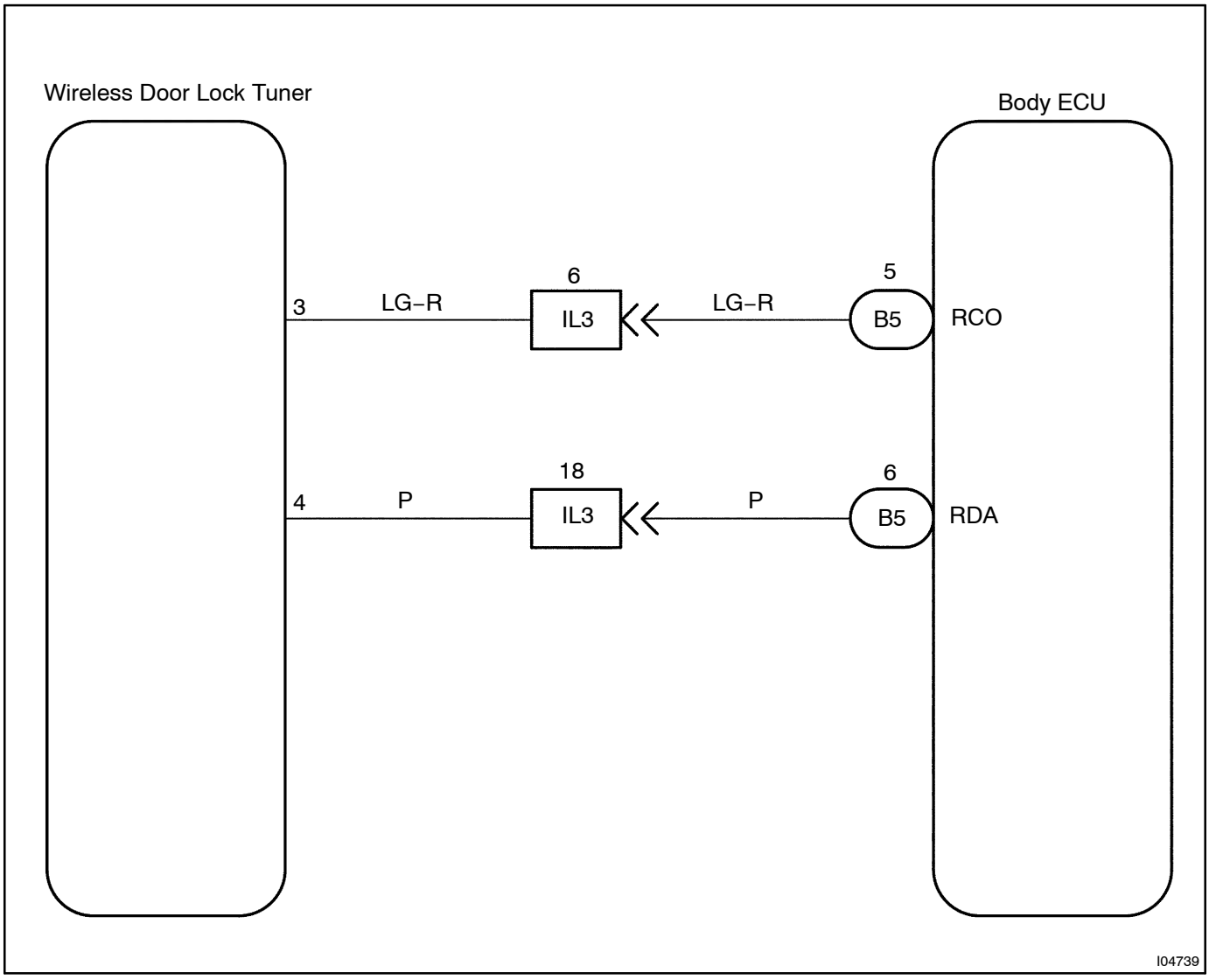
DTC	B1242 / 42	Wireless door lock tuner circuit malfunction

CIRCUIT DESCRIPTION

This DTC is output when GND short of RDA terminal is detected.

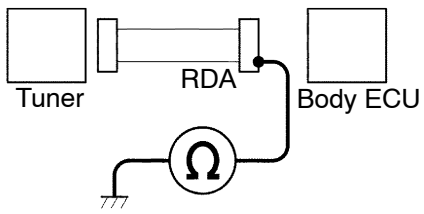
DTC No.	DTC Detecting Condition	Trouble Area
B1242/42	GND short of RDA terminal	• Wireharness • Wireless door lock tuner • Body ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check wireharness.

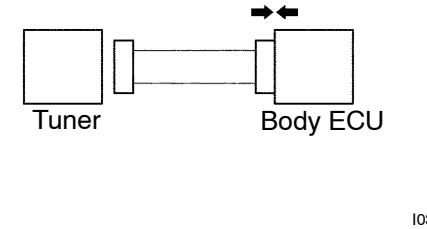


PREPARATION:
Disconnect the connector of tuner and body ECU.
CHECK:
Check the continuity between wireharness and body ground.
OK:
No continuity.

NG	Repair or replace the wireharness.

OK

2	Check body ECU.



PREPARATION:
Connect the connector of body ECU.
CHECK:
Check the DTC.
OK:
B1242/42 is not output.

NG	Replace the body ECU.

OK

Replace the tuner.

DI639–01

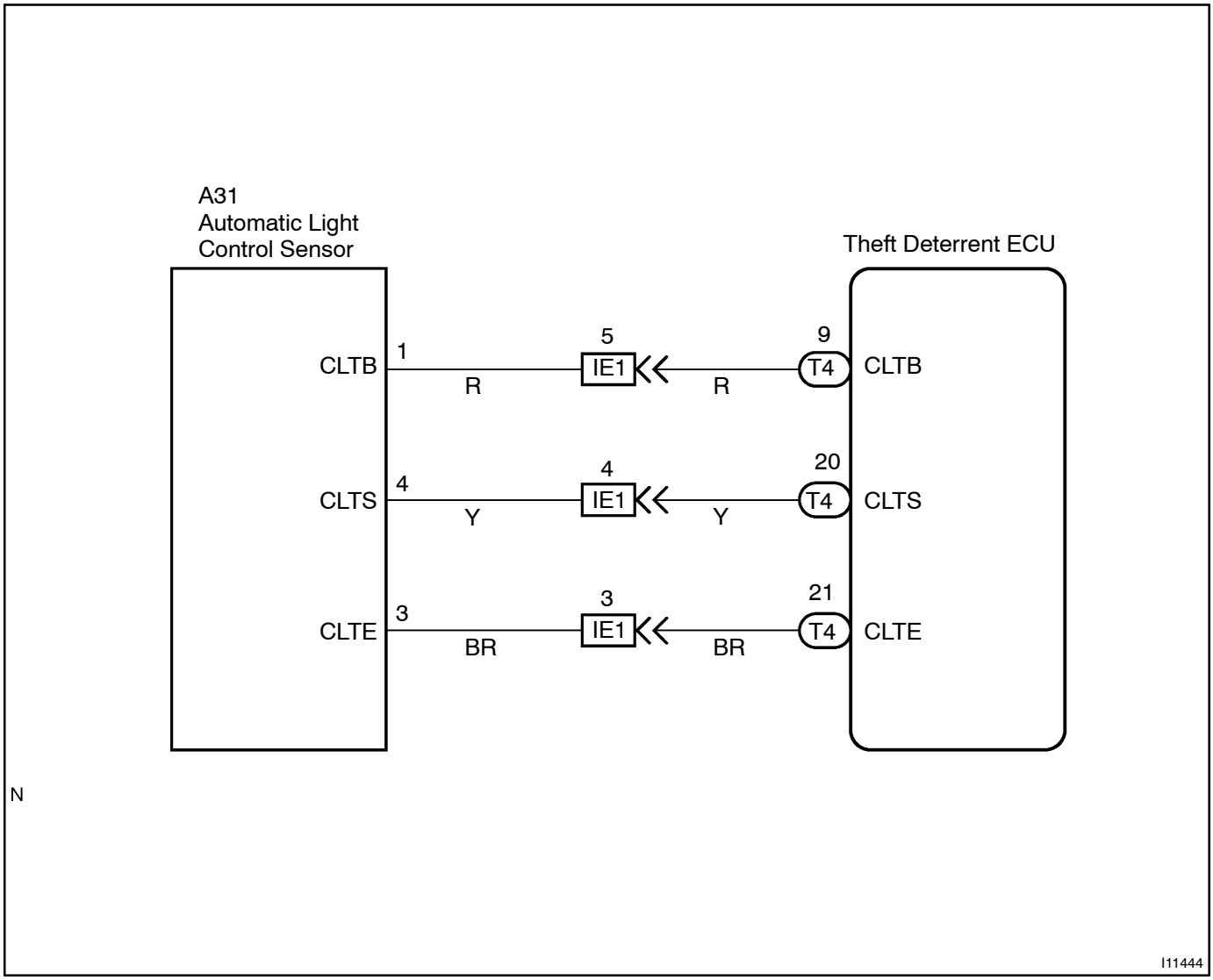
DTC	B1244 / 44	Light sensor circuit malfunction

CIRCUIT DESCRIPTION

This DTC is output when failure of light sensor circuit is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1244/44	• Malfunction of light sensor • Open or short of light sensor circuit	• Light sensor • Wireharness • Theft deterrent ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check light sensor (See page BE–30).

NG → Replace the light sensor.

OK

2	Check wireharness and connector between light sensor and theft deterrent ECU.

NG → Repair or replace wireharness or connector.

OK

Replace the theft deterrent ECU.

DI63A–01

DTC	B1261/61	Engine and ECT ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between Engine and ECT ECU and Body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1261/61	No communication from Engine and ECT ECU more than 10 seconds.	• Engine and ECT ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

INSPECTION PROCEDURE

1	Check Engine and ECT ECU.

CHECK:

Check that the engine starts normally.

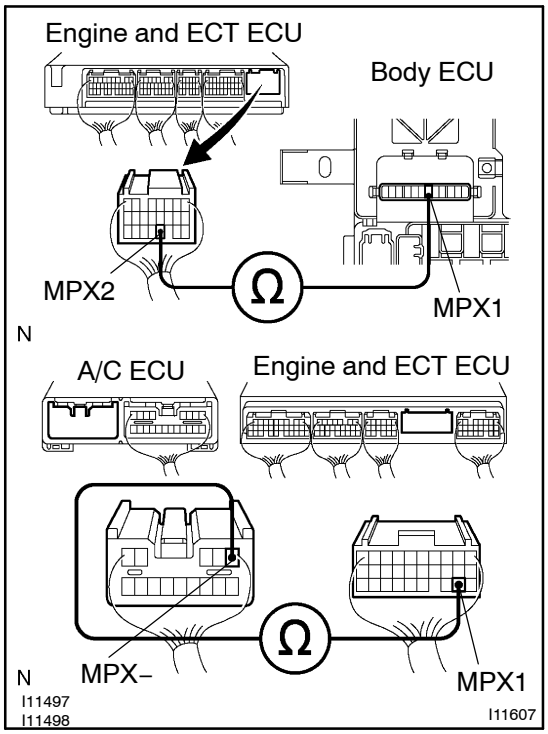
HINT:

With this inspection, Engine and ECT ECU CPU can be diagnosed if it works normally or not.

NG → Replace the Engine and ECT ECU.

OK

2	Check wireharness



PREPARATION:

Disconnect connector "B6" of body ECU, "E2"(or "E3")of Engine and ECT ECU and "A14 (or A15)" of A/C ECU.

CHECK:

(a) Check continuity between terminals MPX1 of body ECU and MPX2 of Engine and ECT ECU.

(b) Check continuity between terminals MPX1 of Engine and ECT ECU and MPX– of A/C ECU.

OK:

There is a continuity in wireharness of both (a) and (b), or either (a) or (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the Engine and ECT ECU.

DI63B–01

DTC	B1262 / 62	A/C ECU communication stop

CIRCUIT DESCRIPTION

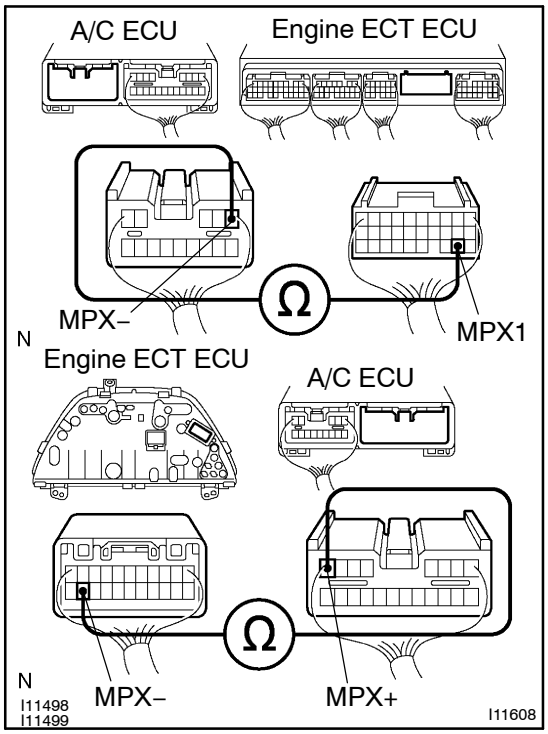
This DTC is output when communication stops between Engine and ECT ECU and Body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1262/62	No communication from ECU more than 10 seconds.	• A/C ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

1	**Check wireharness**



PREPARATION:

Disconnect connector of ”C10” of combination meter ”A14” or ”A15” of A/C ECU and ”E3” of Engine and ECT ECU.

CHECK:

(a) Check continuity between terminals MPX– of A/C ECU and MPX1 of Engine and ECT ECU.

(b) Check continuity between terminals MPX– of combination meter and MPX+ of A/C ECU.

OK:

There is a continuity in wireharness of both (a) and (b), (a) or either (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the A/C ECU.

DI63C–01

DTC	B1269 / 69	Theft deterrent ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between theft deterrent ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1273/73	No communication from theft deterrent ECU more than 10 seconds.	• Theft deterrent ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

INSPECTION PROCEDURE

1	Check theft deterrent ECU.

CHECK:

Check that the operation of the theft deterrent function is normal.

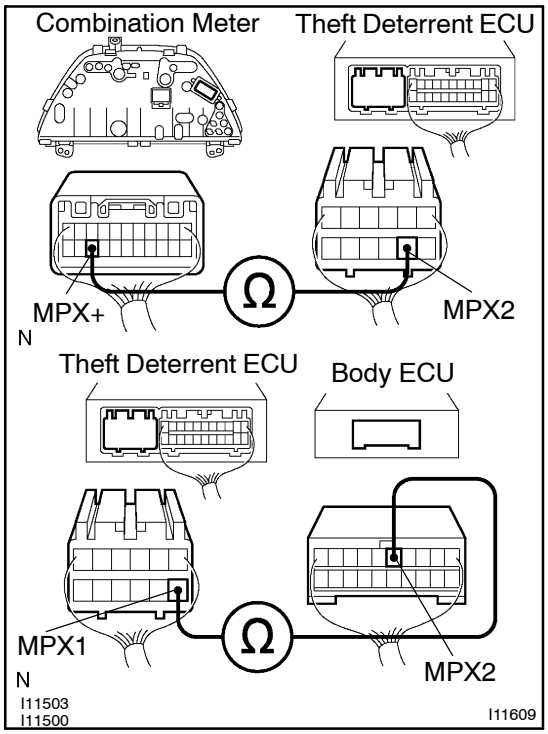
HINT:

With this inspection, the theft deterrent ECU CPU can be diagnosed if it works normally or not.

NG → **Replace the theft deterrent ECU.**

OK

2	Check wireharness



PREPARATION:

Disconnect connector ”B6” of body ECU, ”C10” of combination meter ECU and ”T5” of theft deterrent ECU.

CHECK:

(a) Check continuity between terminals MPX2 of theft deterrent ECU and MPX+ of combination meter ECU.

(b) Check continuity between terminals MPX2 of body ECU and MPX1 of theft deterrent ECU.

OK:

There is a continuity in wireharness of both (a) and (b), or either (a) or (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the theft deterrent ECU.

DI63D–01

DTC	B1271/71	Combination meter ECU communication stop

CIRCUIT DESCRIPTION

This DTC is output when communication stops between combination meter ECU and body ECU.

DTC No.	DTC Detecting Condition	Trouble Area
B1271/71	No communication from Combination meter ECU more than 10 seconds.	• Combination meter ECU • Wireharness

WIRING DIAGRAM

See page DI–626.

INSPECTION PROCEDURE

1	Check combination meter ECU.

CHECK:

Start the engine and check that the speed meter and tacometer operate normally.

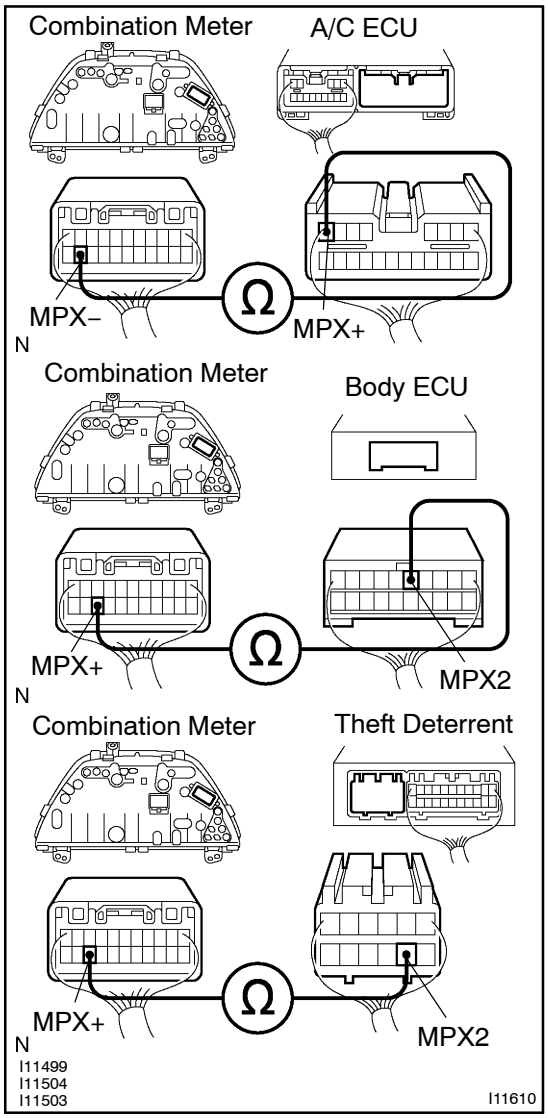
HINT:

With this inspection, the combination meter ECU CPU can be diagnosed if it works normally or not.

NG → Replace the combination meter ECU.

OK

2	Check wireharness



PREPARATION:

Disconnect connector ”A15” of A/C ECU, ”C10” of combination meter ECU ”B6” of body ECU and ”T5” of theft deterrent ECU.

CHECK:

(a) Check continuity between terminals MPX+ of A/C ECU and MPX– of combination meter ECU.

(b) w/o Theft Deterrent System:
Check continuity between terminals MPX+ of combination meter and MPX2 of body ECU.
w/ Theft Deterrent System:
Check continuity between terminals MPX+ of combination meter and MPX2 of theft deterrent ECU.

OK:

There is a continuity in wireharness of both (a) and (b), or either (a) or (b).

HINT:

If there is OPEN in wireharness of either (a) or (b), please repair it.

NG → **Repair or replace wireharness.**

OK

Replace the combination meter ECU.

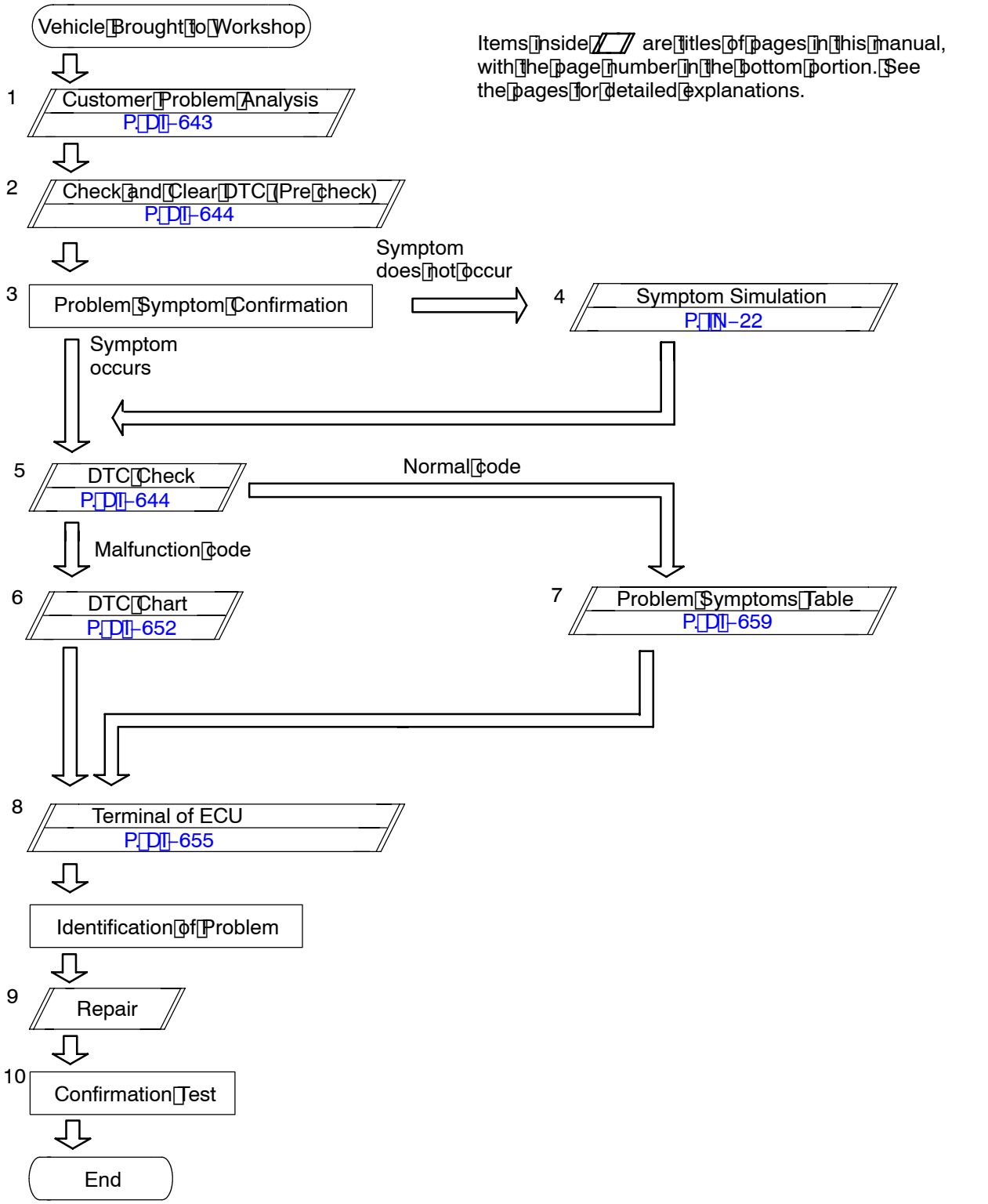
LEXUS NAVIGATION SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI27W–04

HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



DI27X–04

CUSTOMER PROBLEM ANALYSIS CHECK

LEXUS NAVIGATION 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 ☐ Intermittent (Times a day)

Problem Symptom	**Navigation malfunction**	☐ Cursor movement is defective.
		☐ Cursor does not move.
		☐ GPS mark does not appear.
		☐ Map is not displayed.
		☐ Others ( )
	Display malfunction	☐ Screen is dark.
		☐ Screen is white.
		☐ Color is not uniform.
		☐ Screen is in disorder.
		☐ Others ( )
	Control Switch malfunction	☐ Can not operate with panel switches.
		☐ Can not operate with touch switches.
		☐ Others ( )

	Parts name	**1st time malfunction code.**	**2nd time malfunction code.**
DTC Check	Navigation ECU		
	Multi Display		
	Radio receiver assembly		
	Power amplifier		

DI63E–01

PRE–CHECK

1. DIAGNOSIS SYSTEM DESCRIPTION

HINT:

There are several diagnosis functions in the LEXUS Navigation System.

Though each operation procedure is explained on the following pages, the outline is as follows.

(a) SYSTEM CHECK
In this mode, communication circuit is inspected and self diagnosis is conduced in each system (Navigation ECU, Multi display, radio receiver, power amplifier and CD auto changer). The result is displayed on the screen.
At the bottom of the screen the map area is displayed.

(b) DISPLAY CHECK
In this mode, images and touch switches on the screen are inspected.

(c) VEHICLE SIGNAL DISPLAY CHECK
In this mode, 2 items of vehicle signal conditions input in the navigation ECU are displayed at the real time (renewed every approx. 1 sec.).

(d) INTERNAL COEFFICIENT SET
This sets time and data of calender and compensation coefficient to improve the accuracy of navigation system.
It is not always necessary to adjust the compensation coefficient, however when the error is excessive due to replacement of tires etc., reset the coefficient again.

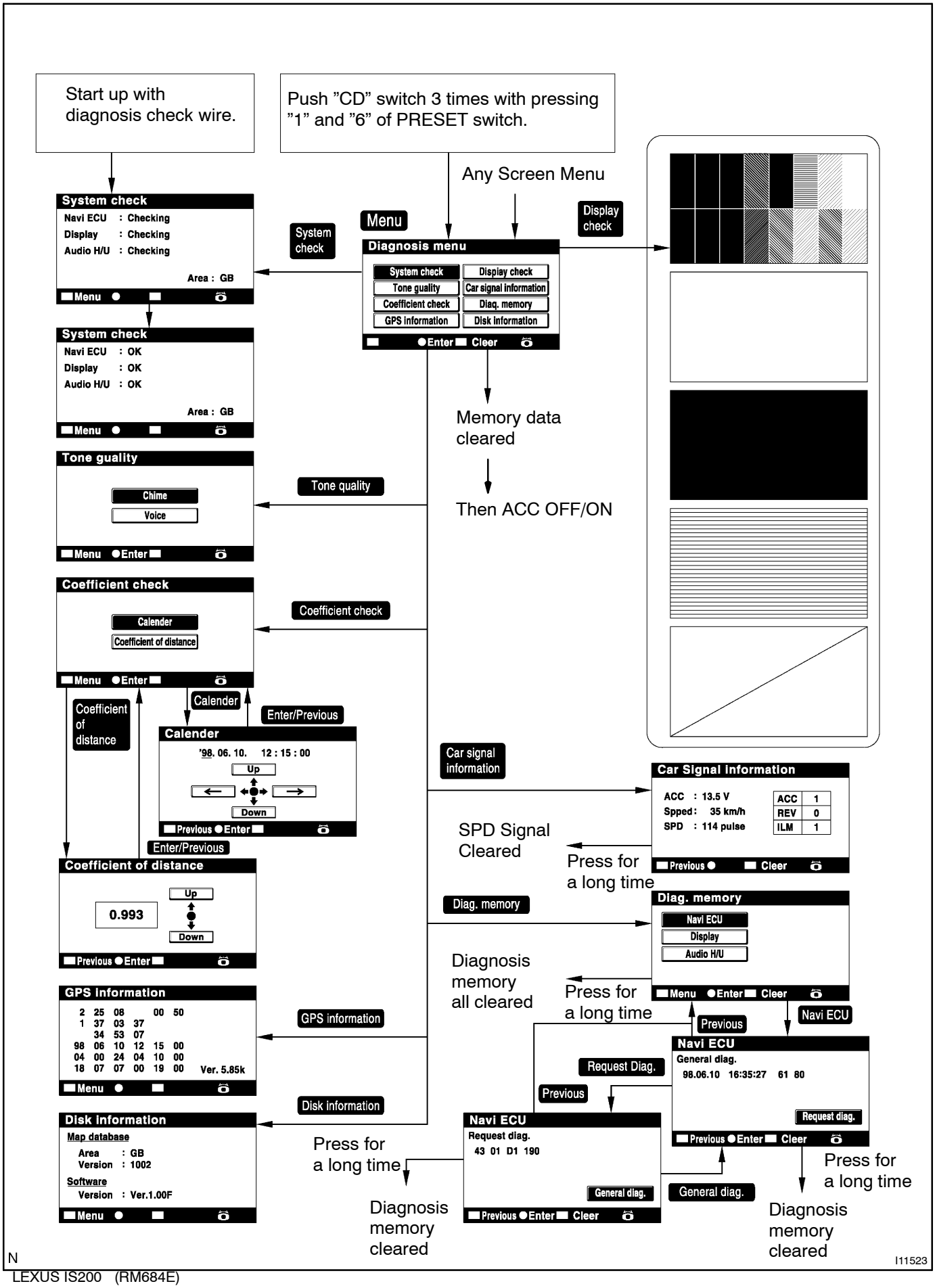
(e) DIAGNOSIS MEMORY
Information is stored in the diagnosis memory when an error occurs in the communication of the system and the system.

(f) GPS INFORMATION
GPS information receiving condition is displayed.

(g) TONE QUALITY CHECK
Chime or navigation voice recorded in CD–ROM can be heard when necessary.

(h) DISK INFORMATION
Area and version No. of map data base and version No. of navigation soft are displayed.

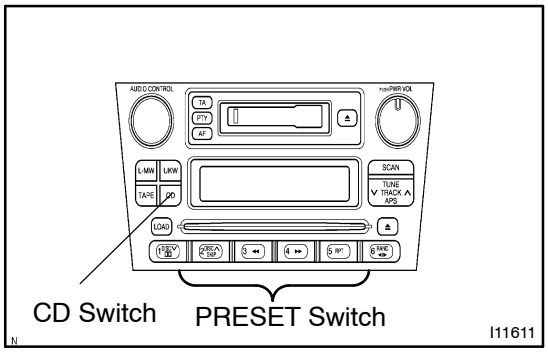
2. DIAGNOSIS CHECK



(a) DIAGNOSIS START–UP

HINT:

There are two ways to startup diagnosis menu, one is using the diagnosis check wire and the other is using the switch.

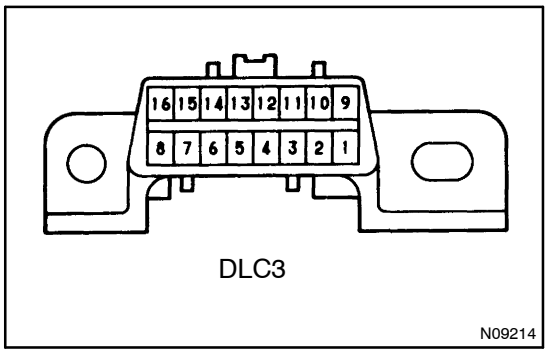


(b) START–UP BY SWITCH OPERATION

For shifting to diagnosis mode, push ”CD” switch 3 times with pressing ”1” and ”6” of PRESET switch at the same time while the audio power is OFF and ACC is ON.

NOTICE:

On the screen with LEXUS mark displayed at the time of starting up, do not perform the transmitting operation to the diagnosis mode.



(c) START–UP WITH DIAGNOSIS CHECK WIRE

With the ignition switch in ACC or ON position or engine running, the system is started up by connecting TC and CG terminals of DLC3 to SST.

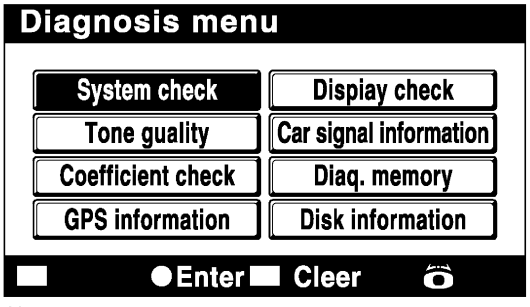
SST 09843–18020

(d) SYSTEM STARTING

It takes approximately 30 seconds to check the system.

(e) FINISHING

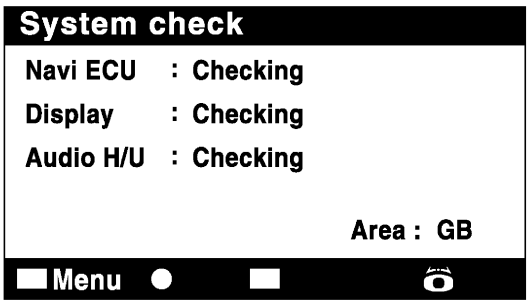
Diagnosis mode finishes by turning the ignition switch ACC or OFF.



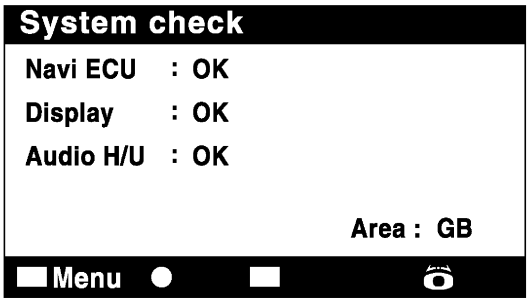
(f) DIAGNOSIS MENU DISPLAY

When starting up by switch operation the top menu is displayed on the screen.

Each diagnosis function can be performed by touching switches on this screen.



N I11505



N I11506

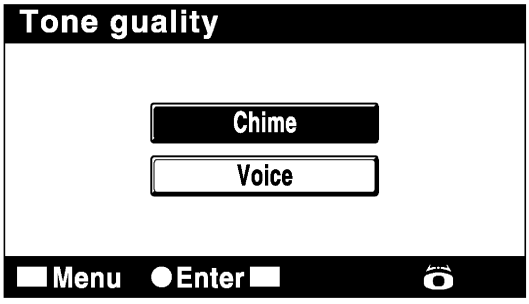
(g) SYSTEM CHECK SCREEN

- This screen performs the system inspection.
- After the system inspection completes, when pressing ”MENU”, screen returns to the diagnosis menu screen.
  (In diagnosis mode, the every screen can return to the diagnosis menu screen by pressing ”MENU”.)
- On ”SYSTEM CHECK” screen, up to 3 logical addresses and 3 diagnosis codes of the equipment are displayed.
  In the case of normal condition, ”O.K.” is displayed.
- On a screen, up to 3 diagnosis codes for each equipment are displayed.
  When diagnosis codes are more than 4, the screen is switched to another screen and returned every 3 seconds.

HINT:

*: Logical address refers to the codes allotted to each part of objected equipment which has been subdivided.

- When an objected equipment is not connected, ”–D0” of the diagnosis code is displayed.
- Diagnosis codes are displayed orderly when diagnosis completes.
- If the same diagnosis code is received several times, only 1 code is displayed.



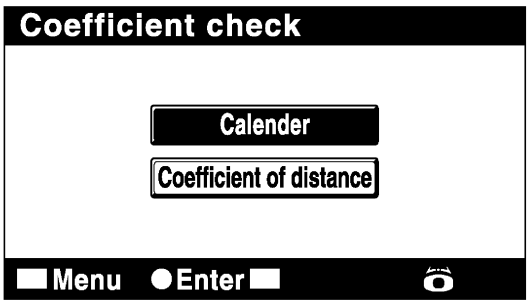
N I11507

(h) TONE QUALITY CHECK

- On the diagnosis menu screen, when pressing ”TONE QUALITY CHECK”, the screen turns to the screen shown in the illustration.
- Tone check is performed by pressing the menu displayed on this screen.
- When pressing ”CHIME”, chime of ”poop” sounds 1 times.
- When pressing ”VOICE”, the voice saying ”Please proceed to the highlighted route. Then the route guideance will start.” sounds 1 time.

HINT:

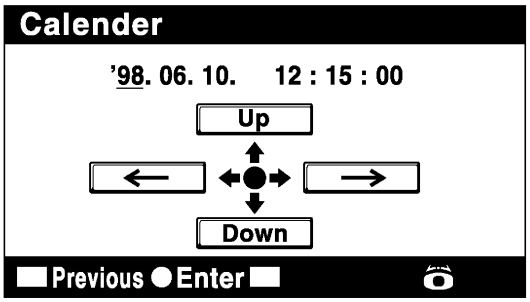
No sound and voice appear without map CD ROM.



N I11508

(i) COEFFICIENT SCREEN

- When pressing ”COEFFICIENT CHECK” on the diagnosis menu screen, the screen turns to the screen shown in the illustration.
- On this screen, selection of year, date, and item of speed compensation coefficient can be performed.



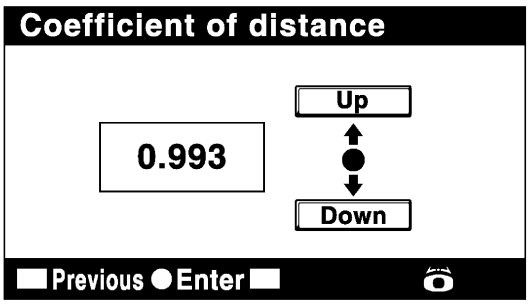
N I11509

(j) CALENDER SCREEN

- When pressing ”CALENDER” on the internal coefficient set screen turns to calender screen.
- When the screen turns to this screen, GPS time that the Navigation ECU currently sets is displayed.

HINT:
This GPS clock is used for calculation to clarify the present site.

- In GPS information, year and date are included, when GPS information is received, automatically year and date are modified.
- On this screen GPS time inside Navigation ECU is modified.
- By pressing ”NEXT”, the year or date to be changed can be selected, pressing triangularity mark, setting can be changed and pressing ”SET”, setting completes.



N I11510

(k) SPEED COMPENSATION COEFFICIENT SCREEN

- When pressing ”COEFFICIENT OF DISTANCE” on the internal coefficient set screen, the screen turns to the speed compensation coefficient screen.

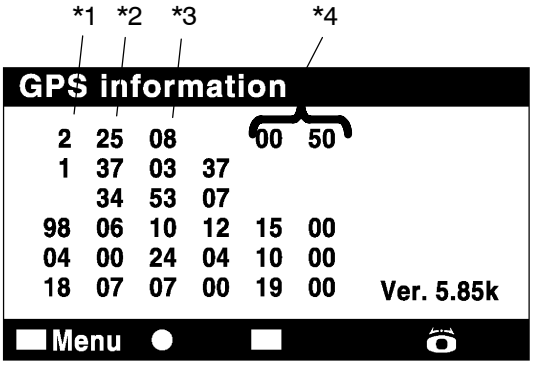
HINT:
Navigation ECU compensates automatically the error between the distance calculated by ECU and actually measured and performs map–matching. Accordingly it is not necessary for a driver to compensate the error.

- This screen sets the value of how far the vehicle should go or should delay, when the present site on the map directed by a cursor does not match the real site because of tire replacement etc., This value is called speed compensation coefficient.

HINT:
After matching the present site directed by a cursor on the map with the real site correctly the vehicle is driven on the straight road for 5 Km. When the site on the map is 50 M (1 %) ahead of the real site, the value is 0.990, when 50 M behind, the value is 1.010.

- By pressing triangularity mark, the value is changes, by pressing ”SET”, setting completes.

<Example>



N

*1: Two–measurement satellite is caught

*2: 25 satellites available for navigation

*3: 6 satellites that GPS antenna receives the signals from

*4: Height +50 M

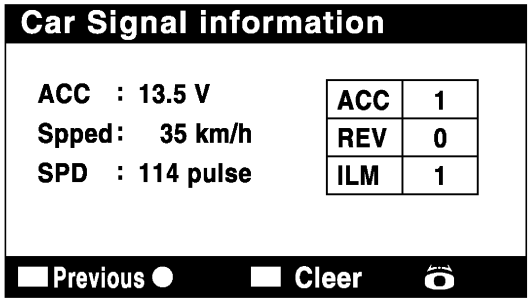
*5: East longitude
137 degree, 2 minutes, 37 seconds

*6: North altitude
34 degree, 53 minutes, 7 seconds

*7: 97 years, 6 months, 11 days,
17 times, 22 minutes, 00 seconds

*8: ID number of satellite

I11511 I12198



N I11519

(l) GPS INFORMATION SCREEN

- On the diagnosis menu screen, when pressing ”GPS INFORMATION”, the screen turns to the screen shown in the illustration.
- The displayed contents on this screen are as follows.

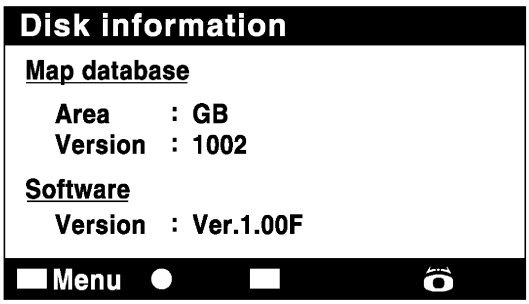
*1: Measurement conditions on present site
0: No measurement satellite is caught.
1: One measurement satellite is caught.
2: Two–measurement satellites are caught.
3: Two–dimensional measurement
4: Three dimensional measurement
F: Receiver disorder
*2: Number of satellites available for navigation.
*3: Number of satellites that GPS antenna receives the signals from
*4: Height (M)
*5: Longitude (degree; minute; second)
(In the case of west longitude, ”–” is displayed on the column of first letter, in the case of east longitude, nothing is displayed.)
*6: Altitude (degree; minute; second)
(In the case of south altitude, ”–” is displayed on the column of first letter, in the case of north altitude, nothing is displayed.)
*7: Year, date
(Year: month: day: time: minute: second)
*8: ID of satellite that GPS antenna receives radio wave from setellitry.

(m) CAR SIGNAL INFORMATION SCREEN

- When pressing ”CAR SIGNAL INFO.” the screen turns to the screen shown in the illustration.
- This screen inspects whether the following signals are received or send normally.

SPEED: This displays the current vehicle speed.
(The displayed unit is the unit currently set.)
SPD: This displays the count of pulse. Pulse is added as the vehicle runs.

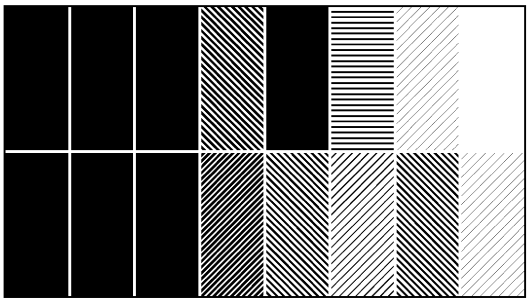
- If touching ”CLEAR”, the value of SPD turns to ”0”.
- Each signal is renewed every 1 seconds.



N I11512

(n) DISC INFORMATION

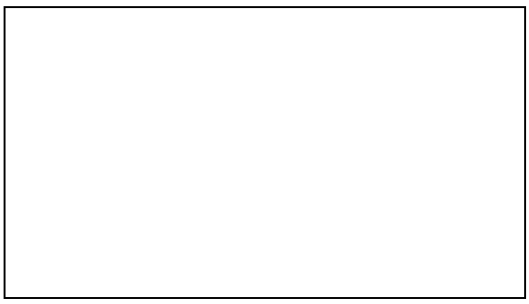
- On the diagnosis menu screen when pressing ”DISK INFORMATION”, the screen turns to the screen shown in the illustration.
- This screen displays the information MAP DATABASE and NAVIGATION SOFT.



N I11514

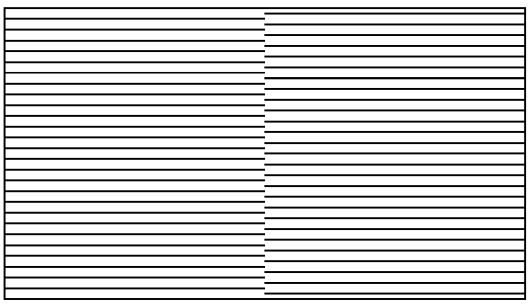
(o) DISPLAY CHECK SCREEN

- On the diagnosis menu screen when pressing ”DISPLAY CHECK”, the screen turns to the screen shown in the illustration.
- On this screen when pressing ”BASE/SPRITE” or ”ON SCREEN”, the screen changes to the one shown in the illustration, this screen displays a color bar.
- On this screen when ”–” displayed on the screen is touched, the touched part is deleted.
- If the screen is left untouched for 10 seconds, it turns to display check screen.

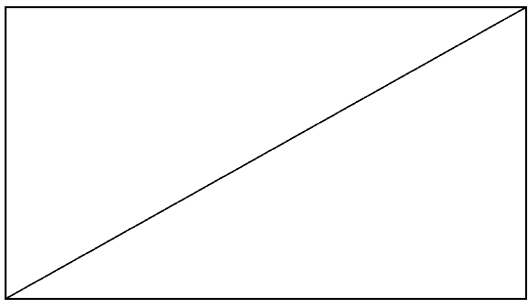


N I11515

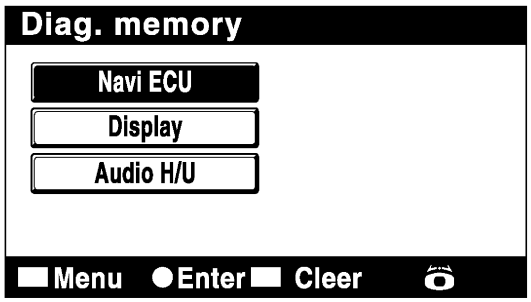
N I11516



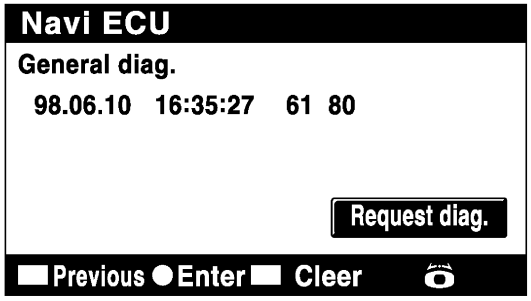
N I11517



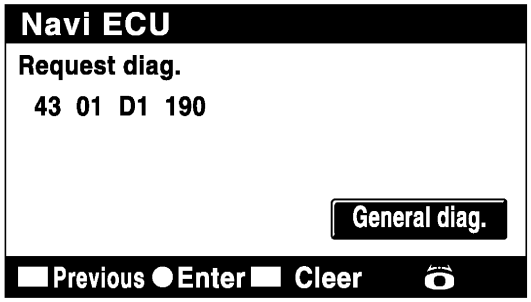
N I11518



N I11520



N I11521



N I11522

(p) DIAGNOSIS MEMORY SCREEN

- On the diagnosis menu screen when pressing ”DIAG. MEMORY” the screen turns to the screen shown in the illustration.
- Up to 6 diagnosis codes per an equipment are displayed. If more than 6 diagnosis codes are displayed, oldest diagnosis code will be deleted orderly.
- If the same diagnosis code occurred, the date when the code occurred is renewed.
- When the same diagnosis code occurs, the data when it occurred is renewed.
- All the diagnosis codes will be cleared by pressing the clear button for several seconds.
- All the general diag. codes of each ECU will be cleared by pressing the clear button for several seconds on the ”general diag.” screen.
- All the request diag. codes of each ECU will be cleared by pressing the clear button for several seconds on the ”request diag.” screen.
- There are2 kinds of diagnosis codes, ”General diag”. and ”Request diag”. which are detected by equipment except ECU.
- ”General diag.” displays the date of occurrence and diagnosis code when an occurrence of diagnosis code is notified from the navigation ECU to another equipment by general diag. notification.
- ”Request diag.” displays connection confirmation number and diagnosis code when a diagnosis code is gained from diagnosis memory response.

DI27Z–04

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- *: Logical address refers to the code allotted to each part of objected equipment which has been subdivided.
- Must have DTC judgement for the items with the making of a circle (○) in the system check at the time of system checking. (See page DI–644)
- Diagnosis memory can be memorized when detecting DTC under the usual using condition. (See page DI–644)
- In case that DTC D1, D2 and D4 of each unit are detected, check the wire harness of AVC–LAN, then change each unit.
- In case that DTC other than DTC D1 D2 or D4 of each unit is detected, change the parts specified.

1. NAVIGATION ECU

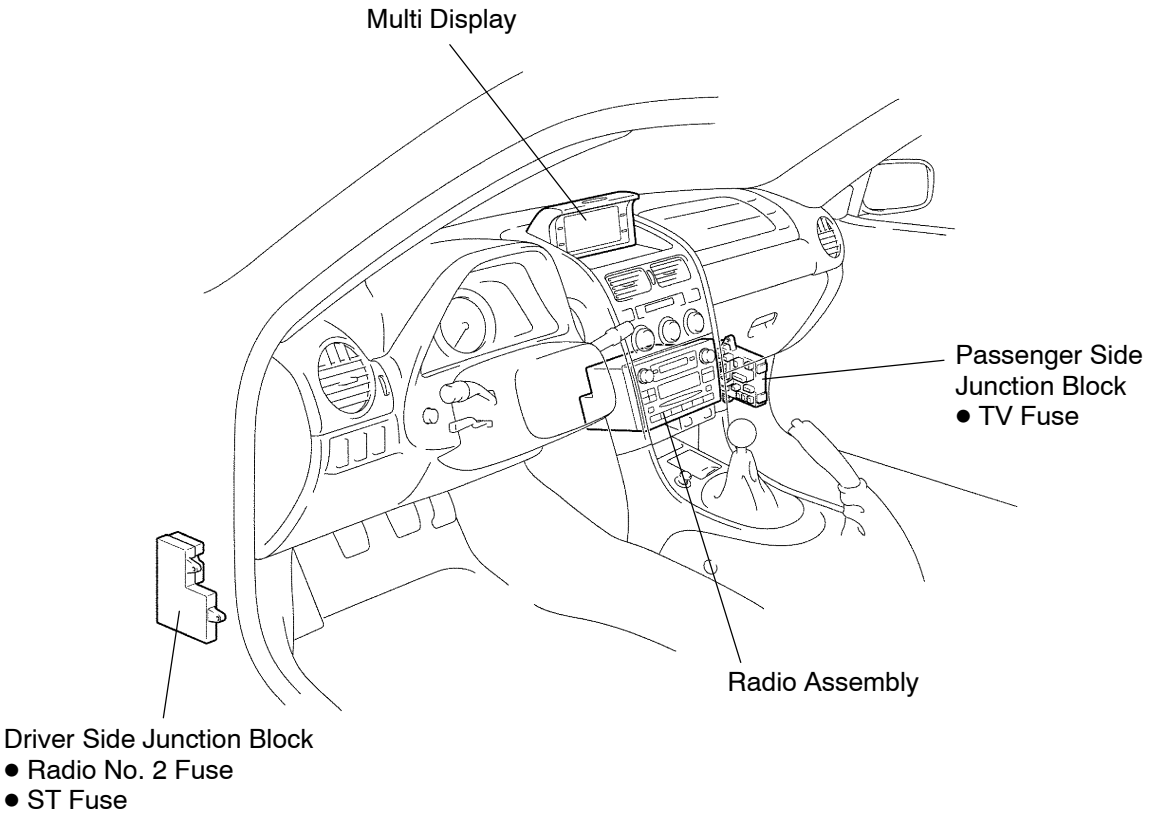
*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
21	01	ROM error	There is an error on internal ROM.	● Navigation ECU	○	X
58	40	Navigation ECU error	When GYRO error is detected.	● Navigation ECU	○	○
96	51	CD–ROM not inserted	CD–ROM is not inserted	● Insert the CD–ROM	○	X
96	52	Different disk	The inserted CD–ROM is not in compliance with the standard.	● Replace the CD–ROM	X	○
96	53	Not readable disk	The data in CD–ROM can not read properly.	● Inspect the CD–ROM	○	○
80	63	GPS error	There is an error on the GPS receiver.	● Navigation ECU	○	○
80	62	GPS antenna power source error	There is an error on the power source circuit to GPS antennas.	● Inspect the antenna cable ● Replace GPS antenna	○	○
80	61	GPS antenna not connected	GPS antenna is not connected.	● Connect GPS antenna	○	○
58	71	SPD signal not connected	Conditions that GPS speed is more than 16 mph and SPD signal remains "0" continue for more than 10 seconds.	● Wire harness and connector	X	○

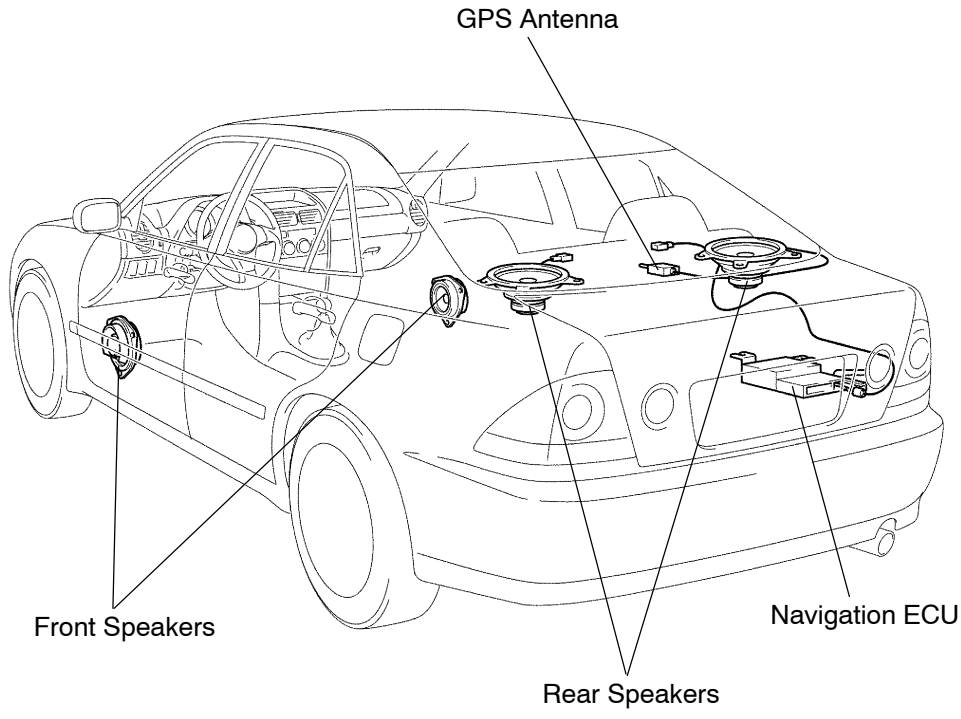
2. DISPLAY ECU

*: Logic address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
01	21	ROM error	There is an error on internal ROM.	● Display ECU	○	X
01	22	RAM error	There is an error on internal RAM.	● Display ECU	○	X

DI280–04

PARTS LOCATION





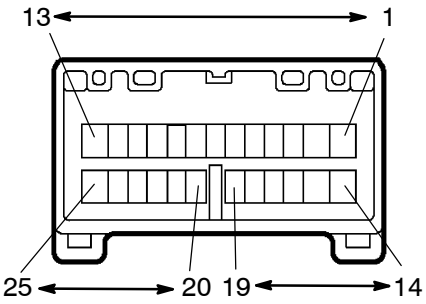
P

I10859

DI63F–01

TERMINALS OF ECU

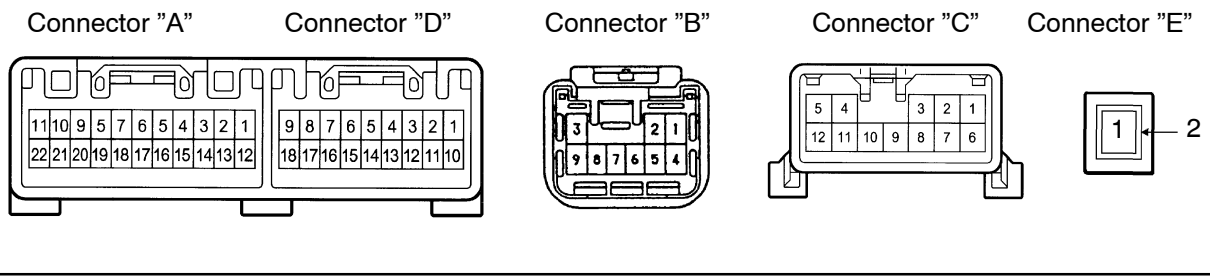
1. MULTI DISPLAY



I11419

Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit is detected. / Problem symptom when short circuit is detected.
+B – GND1 (1 – 22)	Constant	Battery voltage	Screen is in disorder.
ST1 – GND1 (3 – 22)	Ignition switch position START	Battery voltage	–
G – GND1 (4 – 22)	Diagnosis display check screen is white.	Using an oscilloscope *2	Screen color turns to pink.
SYNC – GND1 (5 – 22)	Navigation screen is display.	Using an oscilloscope *1	Screen noise or other types of noise occur.
VG – GND1 (6 – 22)	Constant	Continuity	Normal.
DTX+ – Body ground (9 – Body ground)	Ignition switch position ACC	Approx. 2.5 V	Screen is in display. / Navigation system does not operate.
RE1 – GND1 (10 – 22)	Ignition switch position ACC	Approx. 3 V	Controller does not operate.
SGD1 – Body ground (12 – Body ground)	Constant	Continuity	Normal.
ACC – GND1 (14 – 22)	Ignition switch position ACC	Battery voltage	Screen is in disorder / Fuse is blown.
R – GND1 (16 – 22)	Diagnosis display check screen is white.	Using an oscilloscope *2	Screen color turns to light blue.
B – GND1 (17 – 22)	Ignition switch position ACC	Using an oscilloscope *2	Screen color turns to yellow.
VR – GND1 (18 – 22)	Constant	Approx. 2.5 V	Screen is in disorder. / Navigation system does not operate.
GND1 – Body ground (22 – Body ground)	Diagnosis display check screen is white.	Continuity	Normal.
RE2 – GND1 (24 – 22)	Constant	0 V	Screen is in disorder.
BGND – Body ground (25 – Body ground)	Constant	Continuity	Normal.

2. NAVIGATION ECU

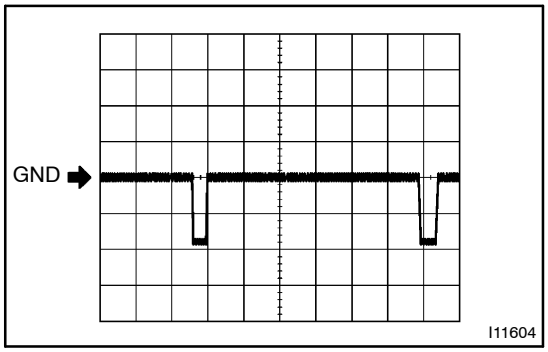


Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit / Problem symptom when short circuit
A1 – B6 (B–TV – GND1)	Constant	Battery voltage	Screen is in disorder. / Fuse is blown.
A2 – B6 (ILL – GND1)	Light control switch position TAIL or HEAD	Battery voltage	OPEN/TILT switch and control switch illumination does not light up. / Fuse is blown.
A3 – B6 (G – GND1)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to pink.
A4 – B6 (SYNC – GND1)	Diagnosis display check screen is while	Using an oscilloscope *1	Screen is in disorder.
A5 – Body ground (VG – GND1)	Constant	Continuity	Normal
A8 – Body ground (DTX+ – GND1)	Ignition switch position ACC.	Approx. 2.5 V	Screen noise or other types of noise occur. / Navigation system does not operate.
A11 – Body ground (GND2 – Body ground)	Constant	Continuity	Normal.
A13 – B6 (R – GND1)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to light blue.
A14 – B6 (B – GND1)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to light yellow.
A15 – Body ground (VR – Body ground)	Constant	Continuity	Normal
A19 – Body ground (DTX– – Body ground)	Ignition switch position ACC.	Approx. 2.5 V	Screen noise or other types of noise occur. / Navigation system does not operate.
A22 – B6 (RE2 – GND1)	Diagnosis display check screen is while	0 V	Screen is in disorder.
B2 – B6 (TC – GND1)	Ignition switch position OFF and connect terminals TC and CG of DLC3.	Continuity	Screen ins in disorder. / Constant screen is normal.
B3 – B6 (+B – GND1)	Constant	Battery voltage	Screen is in disorder. / Fuse is blown.

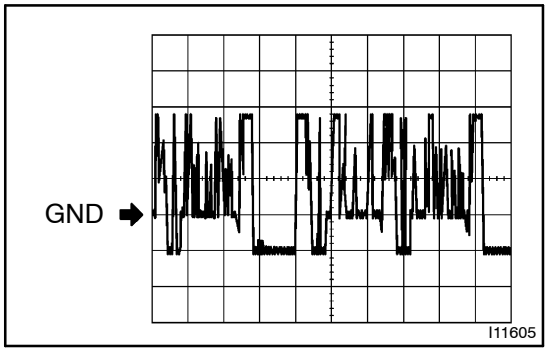
B6 – Body ground (GND1 – Body ground)	Constant	Continuity	Normal.
B7 (SPD)	Input signal displayed	–	Navigation operation is available during driving, or a cursor on present site does not move.
B9 – B6 (ACC – GND1)	Ignition switch position ACC.	Battery voltage	Screen is in disorder.
			Fuse is blown.
C1 – B6 (AUO+ – GND1)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C2 – B6 (AUI– – GND1)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C6 – B6 (AUO– – GND1)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C7 – B6 (AUI– – GND1)	Speaker sounding.	5 – 7 V	Diver side speaker does not sound.
C9 (MUTE)	Speaker sounding.	–	Screen noise or other types of noise occur.
			Driver side speaker does not sound.
C10 (REV)	Input signal display.	–	–
D4 (TX5+)	System checking	–	Screen is in disorder.
			Navigation system does not operate.
D13 (TX5–)	System checking	–	Screen is in disorder.
			Navigation system does not operate.

3. NAVIGATION CONTROLLER HOLDER

Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit / Problem symptom when short circuit
GND – Body ground (1 – Body ground)	Constant	Continuity	Normal.
TX– – Body ground (2 – Body ground)	Constant	Continuity	Normal.
TX+ – TX– (3 – 2)	Ignition switch position ACC	Approx. 3 V	Controller does not operate.
ILL+ – GND (4 – 1)	Light control switch position FLASH or HI	Battery voltage	Illumination light does not light up. / Fuse is blown.
ACC – GND (5 – 1)	Ignition switch position ACC	Battery voltage	Controller does not operate. / Fuse is blown.



Oscilloscope
Wave *1
HINT:
- Terminal SYNC, EXSYNG ↔ GND1
- Gauge set 500 mV/DIV 10 μs/DIV
- Condition: Screen is display



Wave *2
HINT:
- Terminal R, G, B, E*–R, E*–G, EX–B ↔ GND1
- Gauge set 200 mV/DIV 10 μs/DIV
- Condition: Screen changing

DI282–04

PROBLEM SYMPTOMS TABLE

HINT:
Inspect the input/output voltage of the terminals which are described in the column of Terminal in the table.
Inspect other terminals which are not described referring to "Terminal of ECU".

Symptom	Suspect Area	See page
The screen is dark, nothing shines on the screen.	1. Multi display (connector "A") 2. Wire harness and connector	DI–655 IN–32
Nothing appears on the screen. (Back light lights up.)	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector B terminal ACC, +B Connector A terminal R, G,B) 3. Wire harness and connector	 DI–655 DI–655 DI–655 IN–32
The screen is white.	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector A terminal R, G,B) 3. Wire harness and connector	 DI–655 DI–655 IN–32
The screen is in disorder. (Synchronizing disorderly.)	1. Multi display (Terminal SYNC) 2. Navigation ECU (Connector A terminal SYNC) 3. Wire harness and connector	 DI–655 DI–655 IN–32
The color on the screen is unusual.	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector A terminal R, G,B) 3. Wire harness and connector	 DI–655 DI–655 IN–32
Remote control switch does not work.	1. Remote controller 2. Cradle 3. Display ECU 4. WIre harness	– – DI–655 IN–32
GPS mark does not appear at any time and at any place.	1. Navigation ECU (Diagnosis check) 2. Wire harness and connector	 DI–655 IN–32
A cursor on present site does not move.	1. Navigation ECU (SPD signal is checked on the "CAR SIGNAL INFORMATION" during diagnosis check.) 2. Wire harness and connector	 DI–655 IN–32
Movement of cursor on present site is always unusual.	1. Navigation ECU	DI–655
Even though the battery has not been removed, the route and destination are not displayed.	1. Navigation ECU (Connector B terminal "+B") 2. Wire harness and connector	 DI–655 IN–32
Navigation voice can not be heard at all from the driver's side speaker.	1. Navigation ECU (Volume adjustment)	 DI–655
No sound except the navigation voice can be heard at all from the driver's side speaker.	1. Power amplifier (Connector A terminal FL+, FL–) 2. Navigation ECU (Connector "C" terminal "AUI+" , "AUI–", "AUO+", "AUO–") 3 Wire harness and connector	 DI–655 DI–655 IN–32
No sound can be heard at all from the driver's side speaker.	1. Driver's side speaker 2. Wire harness and connector	– IN–32

No sound can be heard from any speakers.	1. See "AUDIO SYSTEM"	BE–158
No map is Multi displayed on the screen.	1. Navigation ECU (Diagnosis check)	DI–655

DI63G–01

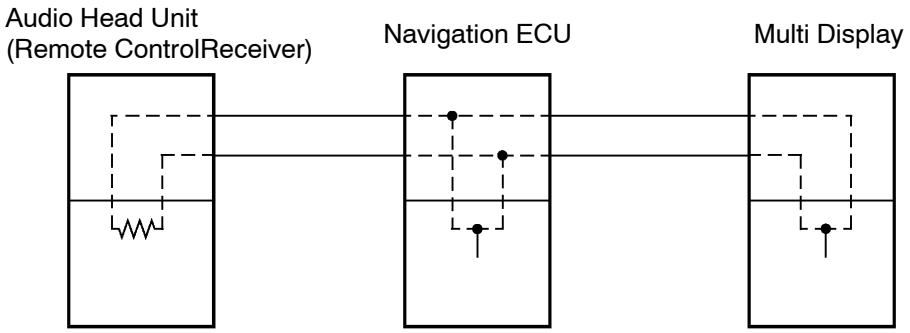
CIRCUIT INSPECTION

AVC–LAN (Communication bus) Circuit

CIRCUIT DESCRIPTION

Each unit of LEXUS navigation system connected with AVC–LAN (communication bus) transfers the signal of each switch by communication.
When +B short and GND short occur in this AVC–LAN, LEXUS navigation system will not function normally as the communication is discontinued.
In this AVC–LAN, Navigation ECU becomes the master of the communication, and the audio head unit has a resistance necessary for transmitting the communication.
Multi Display is connected between Navigation ECU and Audio head unit, LEXUS navigation system has the structure that makes communication impossible without Navigation ECU, Multi Display or Audio head unit.

AVC–LAN

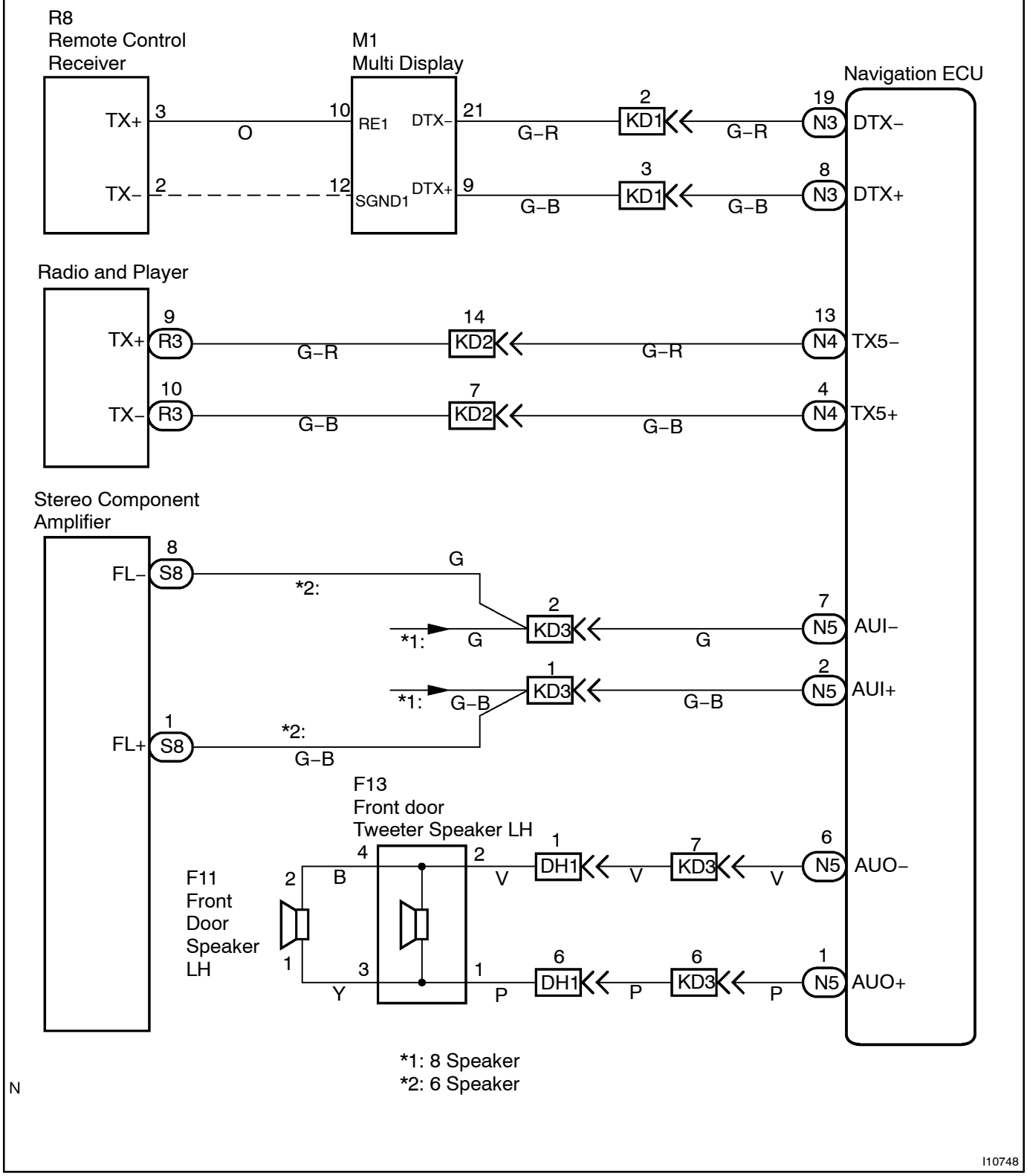


N

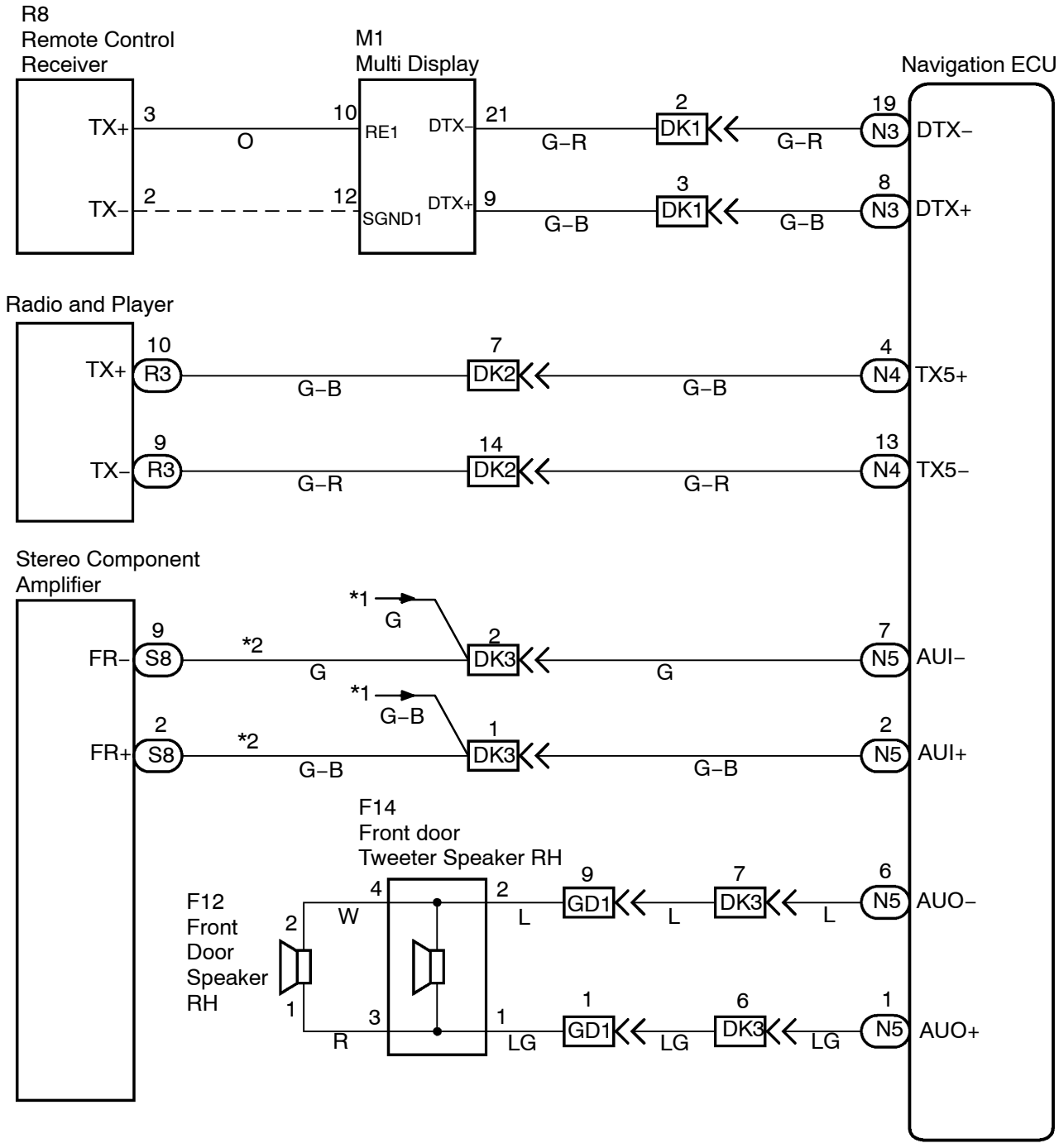
I11572

WIRING DIAGRAM

LHD Models



RHD Models



*1: 8 Speakers
*2: 6 Speakers

I10756

INSPECTION PROCEDURE

1	Disconnect the connector "S8" of power amplifier and check if AVC–LAN will be recovered normally.

CHECK:
Check that the display will change by pressing either of the Panel switch or Touch switch on the display.
HINT:
It can be judged that AVC–LAN is recovered if the display is changed.

OK → Replace the power amplifier

NG

2	Check wire harness and connector between radio and player and Navigation ECU. (See page IN–32)

NG → Repair or replace wire harness or connector between radio and player and Navigation ECU.

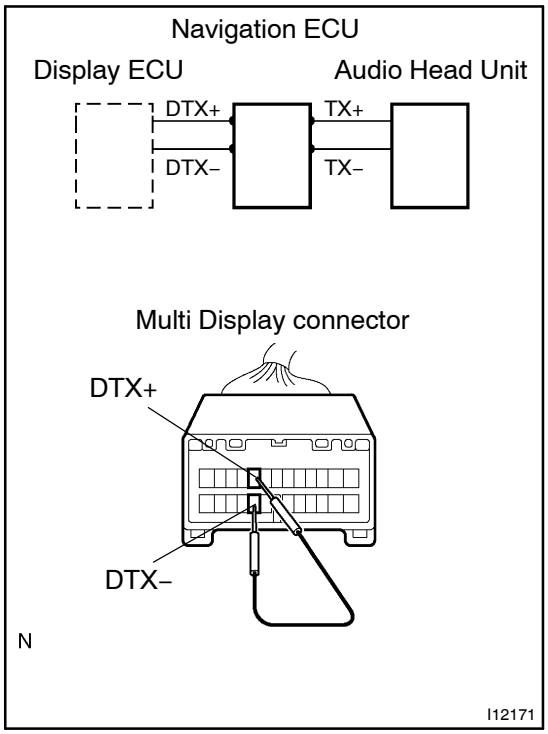
OK

3	Check wire harness and connector between Multi Display and Navigation ECU. (See page IN–32)

NG → Repair or replace wire harness or connector between Multi Display and Navigation ECU.

OK

4	Skip Display ECU and check AVC–LAN.



PREPARATION:

(a) Connect all the connectors except ”M1” of the Multi Display.

(b) Using 2 SSTs (Diagnosis check wire P/N 09893–12040), connect the terminal DTX+ of connector ”M1” and DTX+ of connector ”M1” of Multi Display.

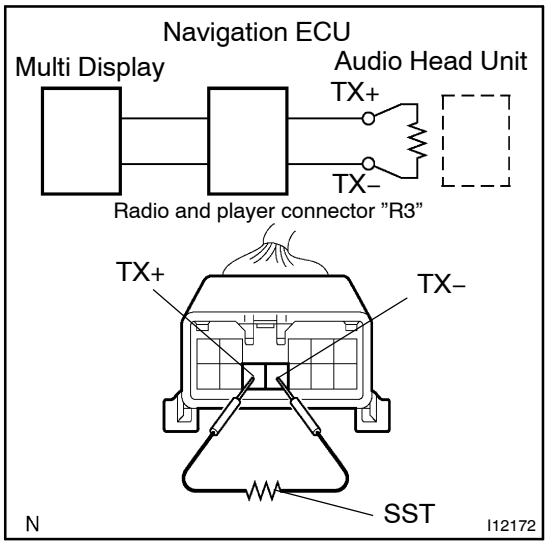
CHECK:

Operate radio and player (CD, Cassette tape, etc.) and check that the sound comes out from the speaker.
(Check that AVC–LAN is recovered.)

OK → **Replace the Multi Display.**

NG

5	Skip radio and player and check AVC–LAN.



PREPARATION:

(a) Connect Multi Display connector.
(b) Disconnect radio and player "F" connector.
(c) Using SST (Navigation Check Wire P/N 09843–18050), connect the terminal TX+ to terminal TX– of "F" connector of radio and player.

CHECK:

Operate the panel switch and the touch switch of the display and check that the navigation functions.
(Check that AVC–LAN is recovered.)

OK → **Replace the radio and player.**

NG

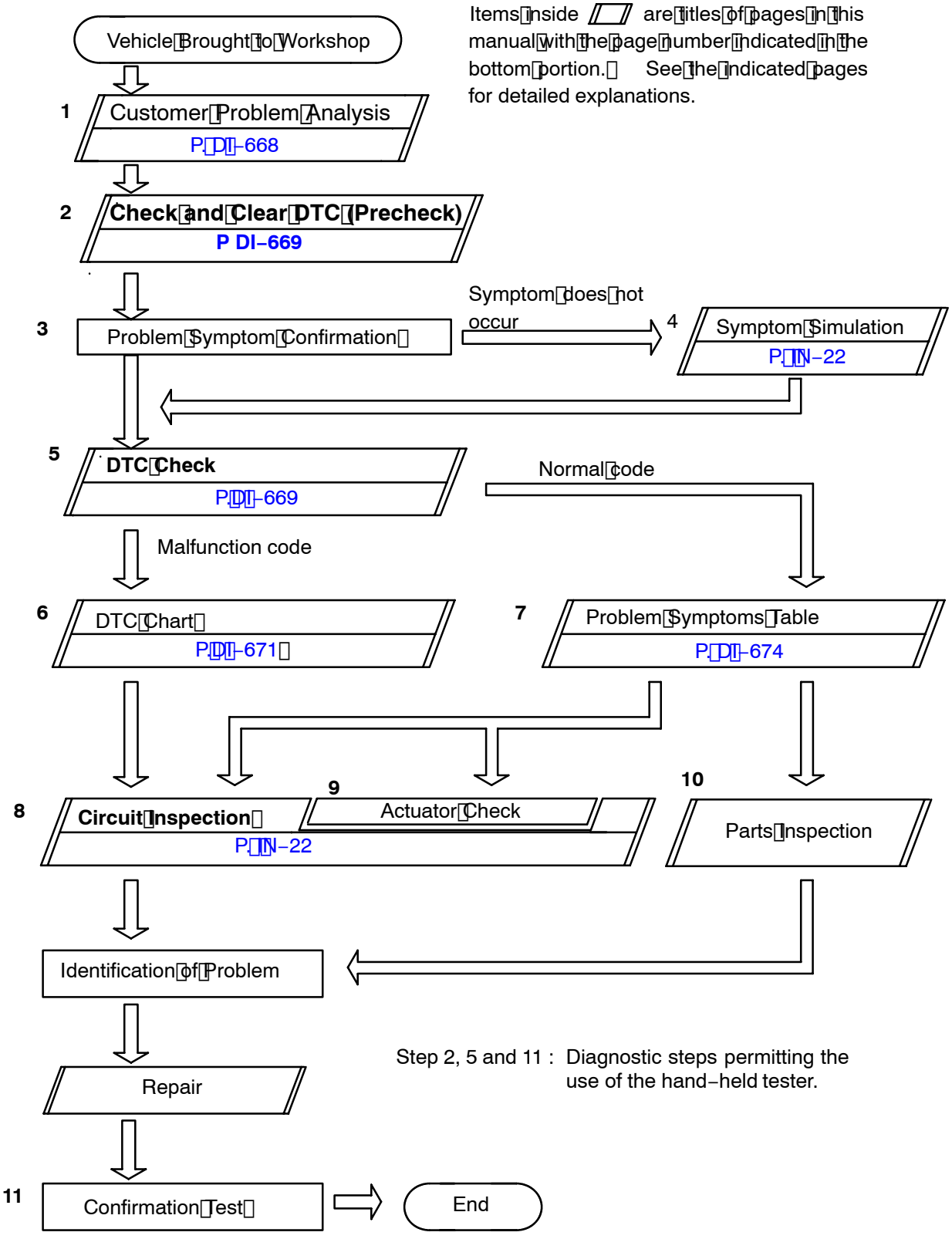
Replace the Navigation ECU.

AIR CONDITIONING SYSTEM

DI602–01

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



DI603–01

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**

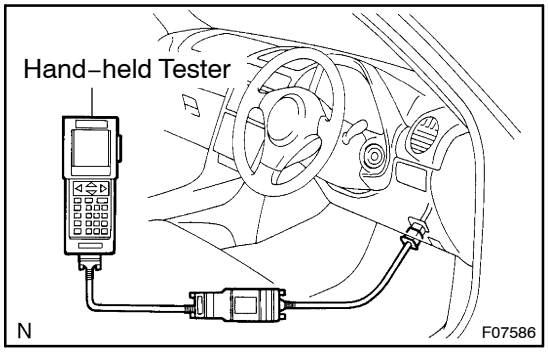
Date of Problem Occurrence	/ /
How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)
Weather	☐ Fine ☐ Cloudy ☐ Snowy ☐ Various / Other
Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F °C)

Symptoms	**Air Flow Control is Faulty**	☐ Blower motor does 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 rise ☐ 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 chage ☐ Will not enter the desired mode

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI604–01

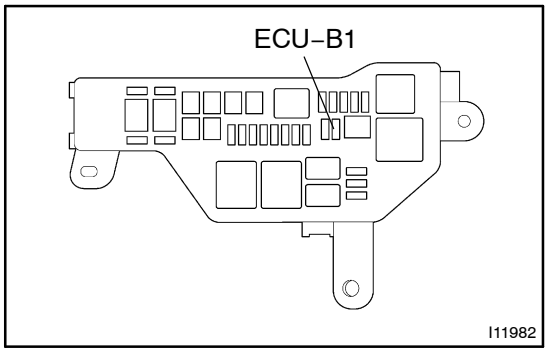
PRE–CHECK



1. DTC CHECK USING HAND–HELD TESTER

(a) Hook up the hand–held tester to the DLC3.

(b) Read the diagnostic trouble codes by following the prompts on the tester screen.
Please refer to the hand–held tester operator's manual for further details.



2. CLEARING DTC

(a) Pull out the ECU–B1 fuse in engin room J/B for 10 sec. or longer to clear diagnostic the DTC's memory.

(b) After reinserting the fuse, check that the normal code is output.

3. ACTUATOR CHECK

(a) Connect the hand–held tester to the DLC 3.
(b) Turn the ignition switch to ON and hand held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.
(d) Check the temperature and air flow visual and by hand.

Step No.	Pattern No.	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnetic clutch	Air mix damper
1	0	OFF	FACE	FRESH	OFF	Cool side (–10% open)
2	1	1	↑	↑	↑	↑
3	2	17	↑	↑	ON	↑
4	3	↑	↑	RECIRC	↑	↑
5	4	↑	↑	↑	↑	Cool / Hot (50% open)
6	5	↑	BI–LEVEL	↑	↑	↑
7	6	↑	FOOT*1	↑	↑	Hot side (110% open)
8	7	↑	FOOT*2	↑	↑	↑
9	8	↑	FOOT/DEF	↑	↑	↑
10	9	31	DEF	↑	↑	↑

(*1): There is leakage from defroster.
(*2): There is no leakage from defroster.

DI605–01

DIAGNOSTIC TROUBLE CODE CHART

If 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.)

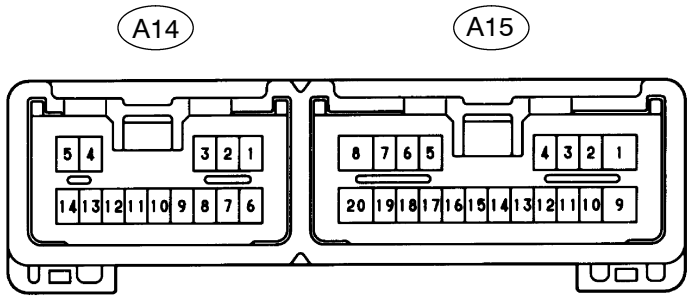
DTC No. (See page)	Detection Item	Trouble Area	Memory
B1400	Normal	–	–
B1411 (DI–676)	Room temperature sensor circuit	• Room temp. sensor • Harness or connector between room temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
B1412 (DI–679)	Ambient temperature sensor circuit	• Ambient temp. sensor • Harness or connector between ambient temp. sensor and engine (and ECT) ECU • Harness or connector between engine (and ECT) ECU and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
B1413 (DI–682)	Evaporator temperature sensor circuit	• Evaporator temp. sensor • Harness or connector between evaporator temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
B1421 *3 (DI–685)	Solar sensor circuit	• Solar sensor • Harness or connector between solar sensor and A/C control assembly • A/C control assembly	– ○ (8.5 min. or more)
B1423 (DI–688)	Open in pressure sensor circuit Abnormal refrigerant pressure [below 196 kPa (2.0 kgf/cm², 28 psi) over 3,140 kPa (32.0 kgf/cm², 455 psi)]	• Pressure switch • Harness or connector between pressure switch and engine (and ECT) ECU. • Harness or connector between engine (and ECT) ECU and A/C control assembly • Refrigerant pipe line • A/C control assembly • Compressor	–
B1431 (DI–691)	Air mix damper position sensor circuit	• Air mix damper position sensor • A/C control assembly • Harness or connector between air mix damper position sensor and A/C control assembly	○ (1 min. or more)
B1433 (DI–694)	Air outlet damper position sensor circuit	• Air outlet damper position sensor circuit • A/C control assembly • Harness or connector between air mix damper position sensor and A/C control assembly	○ (1 min. or more)

HINT:

- *1 If the room temp. is approx. –20°C (–4°F) or lower, DTC B1411 may be output even though the system is normal.
- *2 If the ambient temperature is approx. –50°C (–58°F) or lower, a DTC may be output even though the system is normal.
- *3 If the check is being performed in a dark place, DTC B1421 (solar sensor circuit abnormal) could be displayed. In this case, perform DTC check again while shining a light, such as an inspection light, on the solar sensor. If DTC B1421/21 is still displayed, there could be trouble in the solar sensor circuit.

DI606–01

TERMINALS OF ECU



I07266

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
MPX– ↔ GND (A14–1 ↔ A14–14)	O ↔ W–B	IG ON.	Pulse generation
PKB ↔ GND (A14–2 ↔ A14–14)	Y–R ↔ W–B	IG ON. Brake warning light: ON	Below 1.0 V
		IG ON. Brake warning light: OFF	10 – 14 V
PWR ↔ GND (A14–3 ↔ A14–14)	L–W ↔ W–B	IG ON. Pattern select switch: PWR	Below 1.0 V
		IG ON. Pattern select switch: Except PWR	10 – 14 V
ACC ↔ GND (A14–4 ↔ A14–14)	GR ↔ W–B	IG ACC.	10 – 14 V
		IG OFF.	Below 1.0 V
+B ↔ Body ground (A14–5 ↔ Body ground)	R–Y ↔ Body Ground	Always	10 – 14 V
HR ↔ Body Ground (A14–6 ↔ Body Ground)	L ↔ Body Ground	IG ON.	Below 1.0 V
		IG OFF.	10 – 14 V
BLW ↔ GND (A14–7 ↔ A14–14)	V ↔ W–B	IG ON. Operate blower motor	Pulse generation
SNOW ↔ GND (A14–8 ↔ A14–14)	B–Y ↔ W–B	IG ON. Pattern select switch: SNOW	Below 1.0 V
		IG ON. Pattern select switch: Except SNOW	10 – 14 V
P–S/B ↔ GND (A14–10 ↔ A14–14)	P–B ↔ W–B	IG ON. Passenger seat belt warning: Flash	Below 1.0 V
		IG ON. Passenger seat belt warning: OFF	10 – 14 V
ILL+ ↔ GND (A14–12 ↔ A14–14)	G ↔ W–B	Light control switch: ON	10 – 14 V
		Light control switch: OFF	Below 1.0 V
IG ↔ GND (A14–13 ↔ A14–14)	B–R ↔ W–B	IG ON.	10 – 14 V
		IG OFF.	Below 1.0 V
GND ↔ Body ground (A14–14 ↔ Body ground)	W–B ↔ Body Ground	Always	Continuity
HAZD ↔ GND (A15–1 ↔ A14–14)	G–W ↔ W–B	IG ON. Hazard switch: ON	Continuity
		IG ON. Hazard switch: OFF	No Continuity
FRS ↔ GND (A15–2 ↔ A14–14)	R–W ↔ W–B	IG ON. Air inlet selector: FRESH	Below 1.0 V
		IG ON. Air inlet selector: RECIRC	No voltage
AOD ↔ GND (A15–3 ↔ A14–14)	L–R ↔ W–B	IG ON. Mode selector: FACE	Below 1.0 V
		IG ON. Mode selector: DEF	10 – 14 V
AMH ↔ GND (A15–4 ↔ A14–14)	LG–R ↔ W–B	IG ON. Temperature control: Max. Hot	10 – 14 V
		IG ON. Temperature control: Max. Cool	Below 1.0 V
TE ↔ SG (A15–5 ↔ A15–18)	B–R ↔ BR–W	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

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S5 ↔ SG (A15–6 ↔ A15–18)	GR–R ↔ BR–W	IG ON.	4.5 – 5.5 V
MPX+ ↔ GND (A15–8 ↔ A14–14)	L ↔ R–B	IG ON.	Pulse generation
MR/F ↔ GND (A15–9 ↔ A14–14)	*1 GR–R ↔W–B *2 GR–G ↔W–B	IG ON. Air inlet selector: FRESH	10 – 14 V
		IG ON. Air inlet selector: RECIRC	Below 1.0 V
REC ↔ GND (A15–10 ↔ A14–14)	Y–G ↔ W–B	IG ON. Air inlet selector: FRESH	Below 1.0 V
		IG ON. Air inlet selector: RECIRC	10 – 14 V
AOF ↔ GND (A15–11 ↔ A14–14)	P–L ↔ W–B	IG ON. Mode selector: FACE	10 – 14 V
		IG ON. Mode selector: DEF	Below 1.0 V
AMC ↔ GND (A15–12 ↔ A14–14)	P–B ↔ W–B	IG ON. Temperature control: Max. Hot	Below 1.0 V
		IG ON. Temperature control: Max. Cool	10 – 14 V
TS ↔ SG (A15–13 ↔ A15–18)	GR–L ↔ BR–W	IG ON. Solar sensor subject to electric light	0.8 – 4.3 V
		IG ON. Solar sensor is covered by a cloth	Below 0.8 V
TPM ↔ SG (A15–15 ↔ A15–18)	R–Y ↔ BR–W	IG ON. Mode selector: FACE	3.5 – 4.5 V
		IG ON. Mode selector: DEF	0.5 – 1.5 V
TP ↔ SG (A15–14 ↔ A15–18)	V–W ↔ BR–W	IG ON. Temperature control: Max. Hot	0.5 – 1.5 V
		IG ON. Temperature control: Max. Cool	3.5 – 4.5 V
TS ↔ SG (A15–13 ↔ A15–18)	GR–L ↔ BR–W	IG ON. Solar sensor subject to electric light	0.8 – 4.3 V
		IG ON. Solar sensor is covered by a cloth	Below 0.8 V
TR ↔ SG (A15–17 ↔ A15–18)	L–W ↔ BR–W	IG ON. Cabin temp.: 25 °C (77 °F)	1.8 – 2.2 V
		IG ON. Cabin temp.: 40 °C (104 °F)	1.2 – 1.6 V
SG ↔ Body Ground (A15–18 ↔ Body Ground)	BR–W ↔ Body Ground	Always	Continuity

*1:LHD models
*2:RHD models

DI607–01

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate	1. A/C control assembly 2. ACC power source circuit	IN–32 DI–712
Air Flow Control: No blower operation	1. ACC power source circuit 2. Heater main relay circuit 3. Blower motor circuit 4. A/C control assembly	DI–712 DI–715 DI–718 IN–32
Air Flow Control: No blower control	1. Heater main relay circuit 2. Blower motor circuit 3. A/C control assembly 4. Solar sensor circuit	DI–715 DI–718 IN–32 DI–685
Air Flow Control: Insufficient air flow	Blower motor circuit	DI–718
Temperature Control: No cool air comes out	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Compressor circuit 5. Pressure switch circuit 6. Air mix damper position sensor circuit 7. Air mix damper control servomotor circuit 8. Room temp. sensor circuit 9. Ambient temp. sensor circuit 10. A/C control assembly	AC–23 AC–16 AC–3 DI–721 DI–688 DI–691 DI–697 DI–676 DI–679 IN–32
Temperature Control: No warm air comes out	1. Air mix damper position sensor circuit 2. Air mix damper control servomotor circuit 3. Room temp. sensor circuit 4. Ambient temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C control assembly	DI–691 DI–697 DI–676 DI–679 DI–682 IN–32
Temperature Control: Output air is warmer or cooler that the set temperature or response is slow	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Cooling fan system 5. Solar sensor circuit 6. Room temp. sensor circuit 7. Ambient temp. sensor circuit 8. Evaporator temp. sensor circuit 9. Air mix damper position sensor circuit 10. Air mix damper control servomotor circuit 11. Air inlet damper control servomotor circuit 12. Condenser 13. Evaporator 14. Heater radiator 15. Expansion valve 16. A/C control assembly	AC–23 AC–16 AC–3 CO–22 DI–685 DI–676 DI–679 DI–682 DI–691 DI–697 DI–697 AC–48 AC–32 AC–32 AC–53 IN–32

Symptom	Suspect Area	See page
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Room temp. sensor circuit 2. Ambient temp. sensor circuit 3. Air mix damper position sensor circuit 4. Air mix damper control servomotor circuit 5. A/C control assembly	DI–676 DI–679 DI–691 DI–697 IN–32
No air inlet control	1. Air inlet damper control servomotor circuit 2. A/C control assembly	DI–700 IN–32
No air flow mode	1. Air outlet damper position sensor circuit 2. Air outlet damper control servomotor circuit 3. A/C control assembly	DI–694 DI–703 IN–32
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C control assembly	DI–721 IN–32
Set temp. value displayed does not change up with operation of temp. control switch.	A/C control assembly	IN–32
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–706 IN–32

DI608–01

CIRCUIT INSPECTION

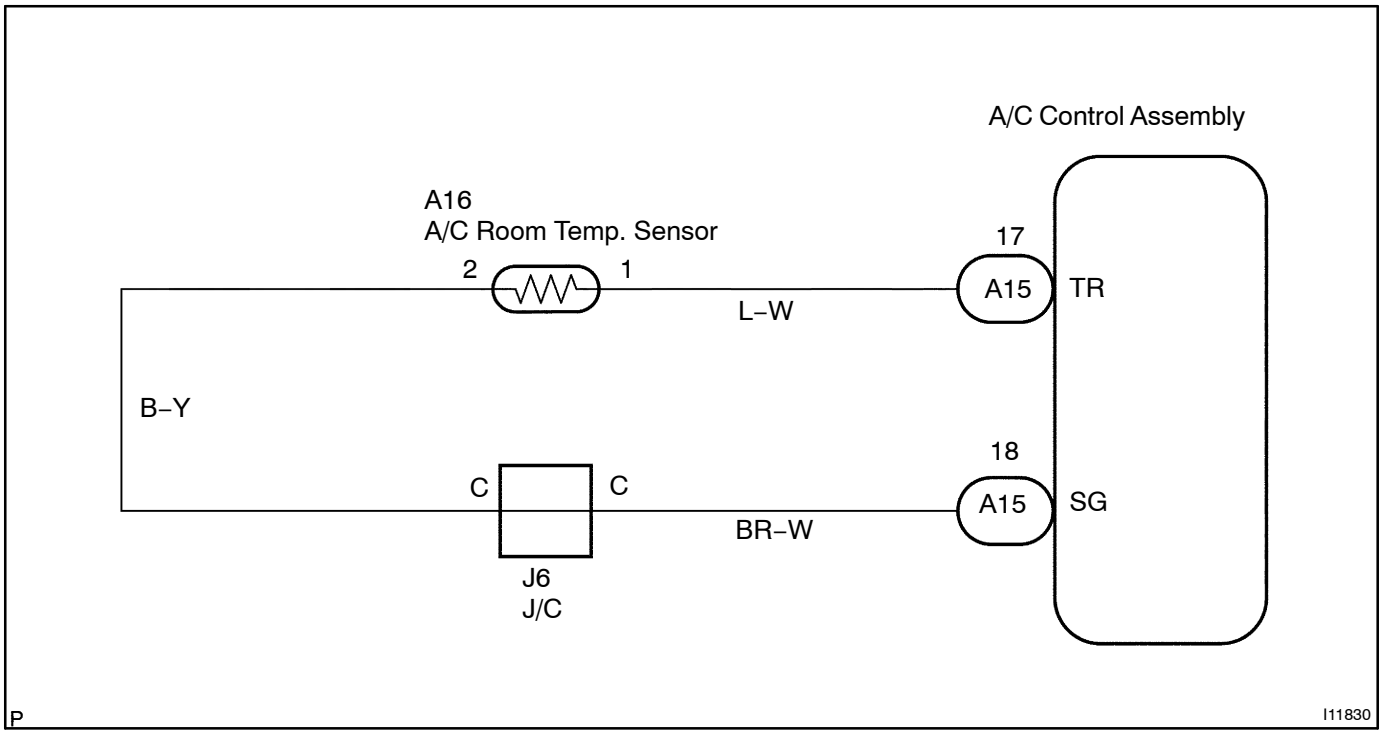
DTC	B1411	Room Temperature Sensor Circuit

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
B1411	Open or short in room temperature sensor circuit.	• Room temperature sensor. • harness or connector between room temperature sensor and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

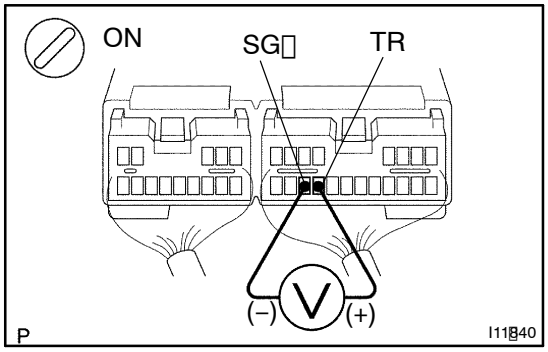
1	**Check room temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the room temp. sensor using DATA LIST.

OK ⇒ **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TR and SG of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TR and SG of A/C control assembly connector at each temperature.

OK:

Voltage:
at 25°C (77°F): 1.8 – 2.2 V
at 40°C (104°F): 1.2 – 1.6 V

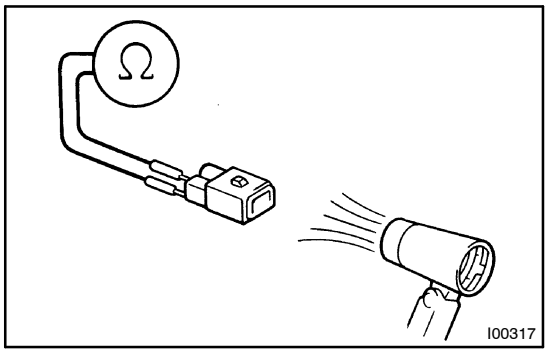
HINT:
As the temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1411 is displayed, check and replace A/C control assembly.

3	Check room temperature sensor.



PREPARATION:
Remove room temperature sensor (See page AC–66).
CHECK:
Measure resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.
OK:

Resistance:
at 25°C (77°F): 1.65 – 1.75 KΩ
at 50°C (122°F): 0.55 – 0.65 KΩ

HINT:
As the temperature increases, the resistance decreases.

NG → **Replace room temperature sensor.**

OK

4	Check harness and connector between A/C control assembly and room temperature sensor (See page IN–32).

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DI609–01

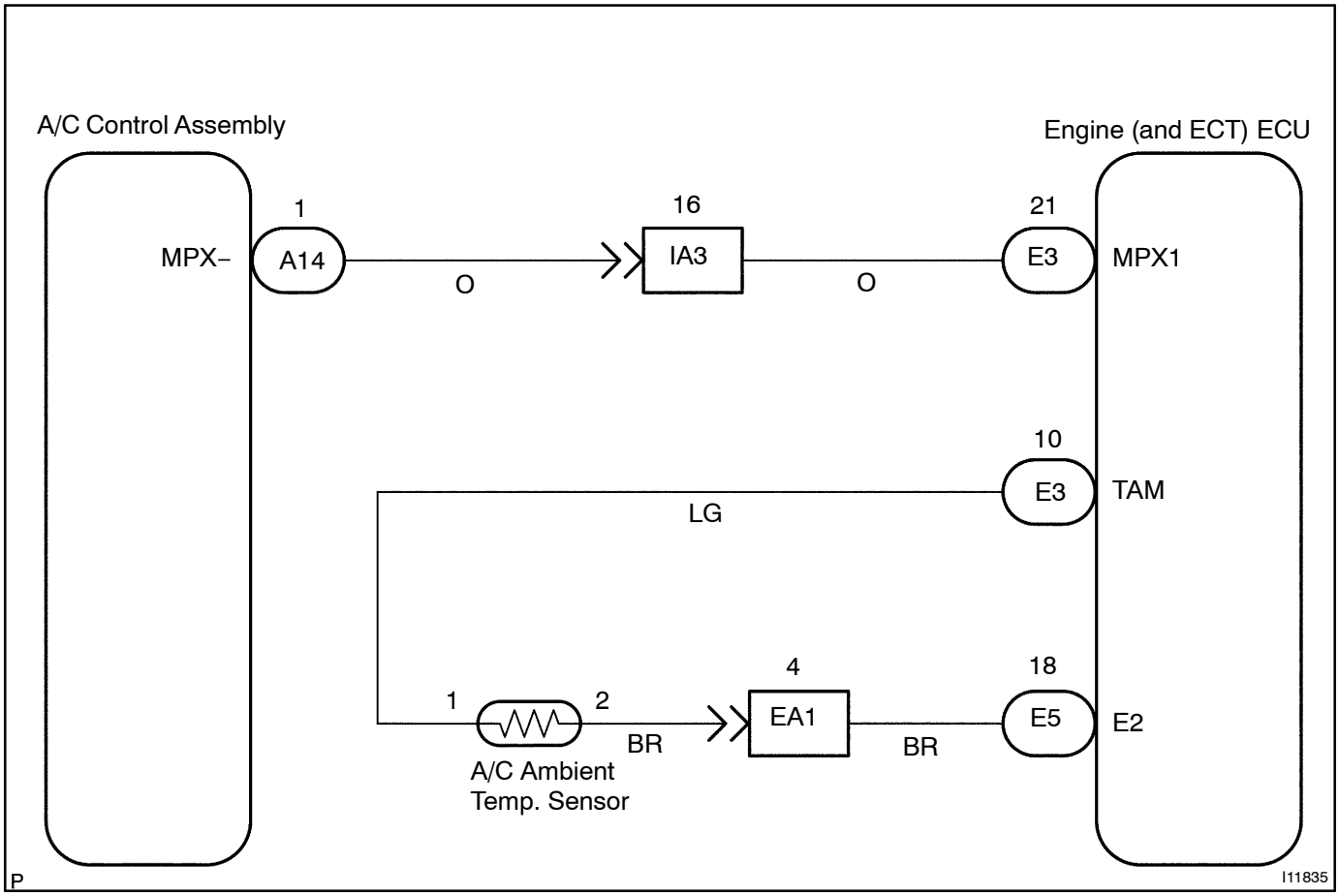
DTC	B1412	Ambient Temperature Sensor Circuit

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
B1412	Open or short in ambient temperature sensor circuit.	• Ambient temperature sensor. • Harness or connector between ambient temperature sensor and engine (and ECT) ECU • Harness or connector between engine (and ECT) ECU and A/C control assembly • Engine (and ECT) ECU • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

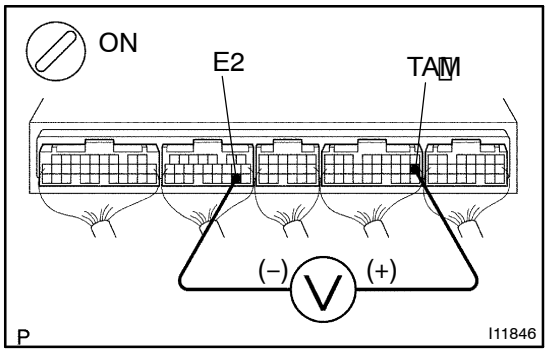
1	**Check ambient temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the ambient temp. sensor using DATA LIST.

OK ⇒ **Check and replace engine (and ECT) ECU.**

NG

2	**Check voltage between terminals TAM and E2 of engine (and ECT) ECU.**



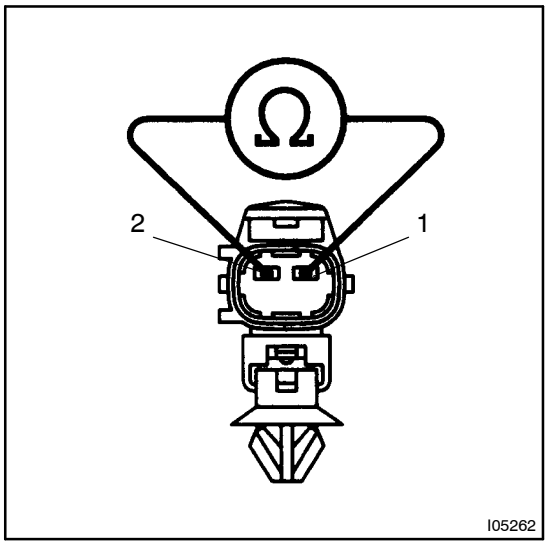
PREPARATION:
Remove engine (and ECT) ECU with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TAM and E2 of engine (and ECT) ECU connector at each temperature.
OK:
Voltage:
at 25°C (77°F): 1.35 – 1.75 V
at 40°C (104°F): 0.85 – 1.25 V
HINT:
As the temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1412 is displayed, check and replace engine (and ECT) ECU and A/C control assembly.

3	Check ambient temperature sensor.



PREPARATION:
Disconnect ambient temperature sensor (See page AC–67).
CHECK:
Measure 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 50°C (122°F): 0.5 – 0.7 kΩ

HINT:
As the temperature increases, the resistance decreases.
NOTICE:
When installing the ambient temperature sensor, be sure to connect the sensor connector before connecting the battery.

NG → **Replace ambient temperature sensor.**

OK

4	Check harness and connector between engine (and ECT) ECU and ambient temperature sensor (See page IN–32).

NG → **Repair or replace harness or connector.**

OK

5	Check harness and connector between engine (and ECT) ECU and A/C control assembly (See page IN–32).

NG → **Repair or replace harness or connector.**

OK

Check and replace engine (and ECT) ECU or A/C control assembly.

DI60A–01

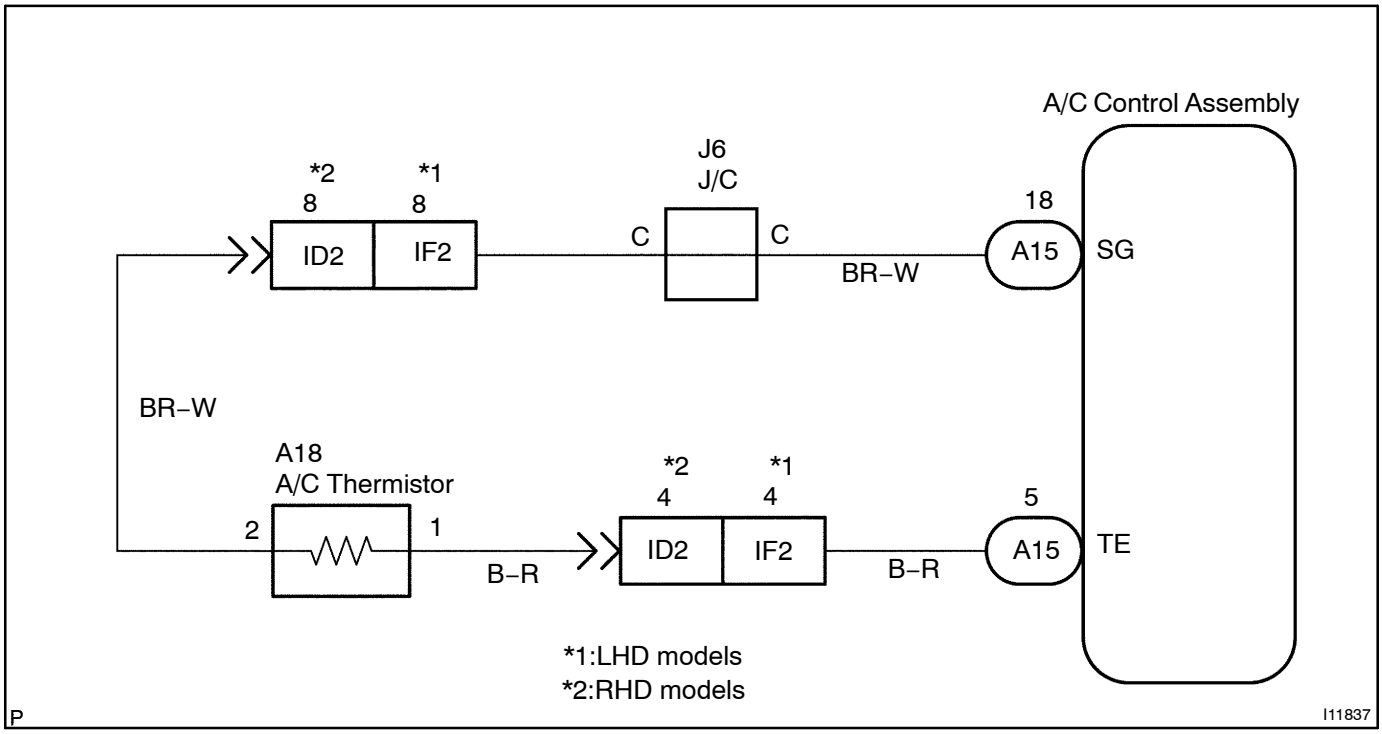
DTC	B1413	Evaporator Temperature Sensor circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the A/C unit and sends the appropriate signals to the A/C control assembly.

DTC No.	Detection Item	Trouble Area
B1413	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

HINT:
In case of using the hand–held tester start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

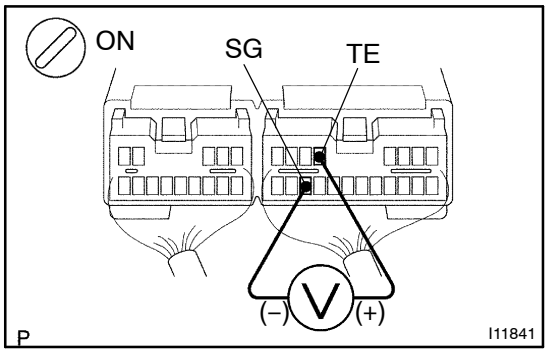
1	**Check evaporator temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the evaporator temp. sensor using DATA LIST.

OK	**Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TE and SG5 of A/C control assembly connector.**



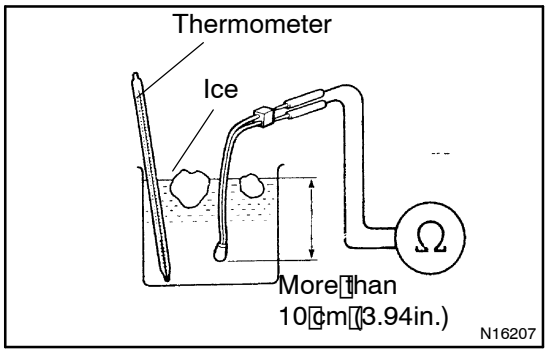
PREPARATION:
Remove the A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TE and SG of A/C control assembly connector at each temperature.
OK:
Voltage:
at 0°C (32°F): 2.0 – 2.4 V
at 15°C (59°F): 1.4 – 1.8 V
HINT:
As the temperature increases, the voltage decreases.

NG	**Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1413 is displayed, check and replace A/C control assembly.

3	Check evaporator temperature sensor.



PREPARATION:
Remove evaporator temperature sensor (See page AC–68).
CHECK:
Measure resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.
OK:

Resistance:
at 0°C (32°F): 4.5 – 5.2 kΩ
at 15°C (59°F): 2.0 – 2.7 kΩ

HINT:
As the temperature increases, the resistance decreases.

NG	Replace evaporator temperature sensor.

OK

4	Check harness and connector between A/C control assembly and evaporator temperature sensor (See page IN–32).

NG	Repair or replace harness or connector.

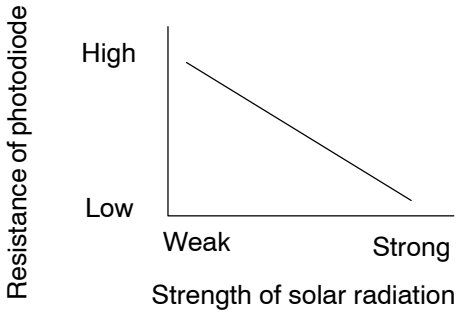
OK

Check and replace A/C control assembly.

DI60B–01

DTC	B1421	Solar Sensor Circuit

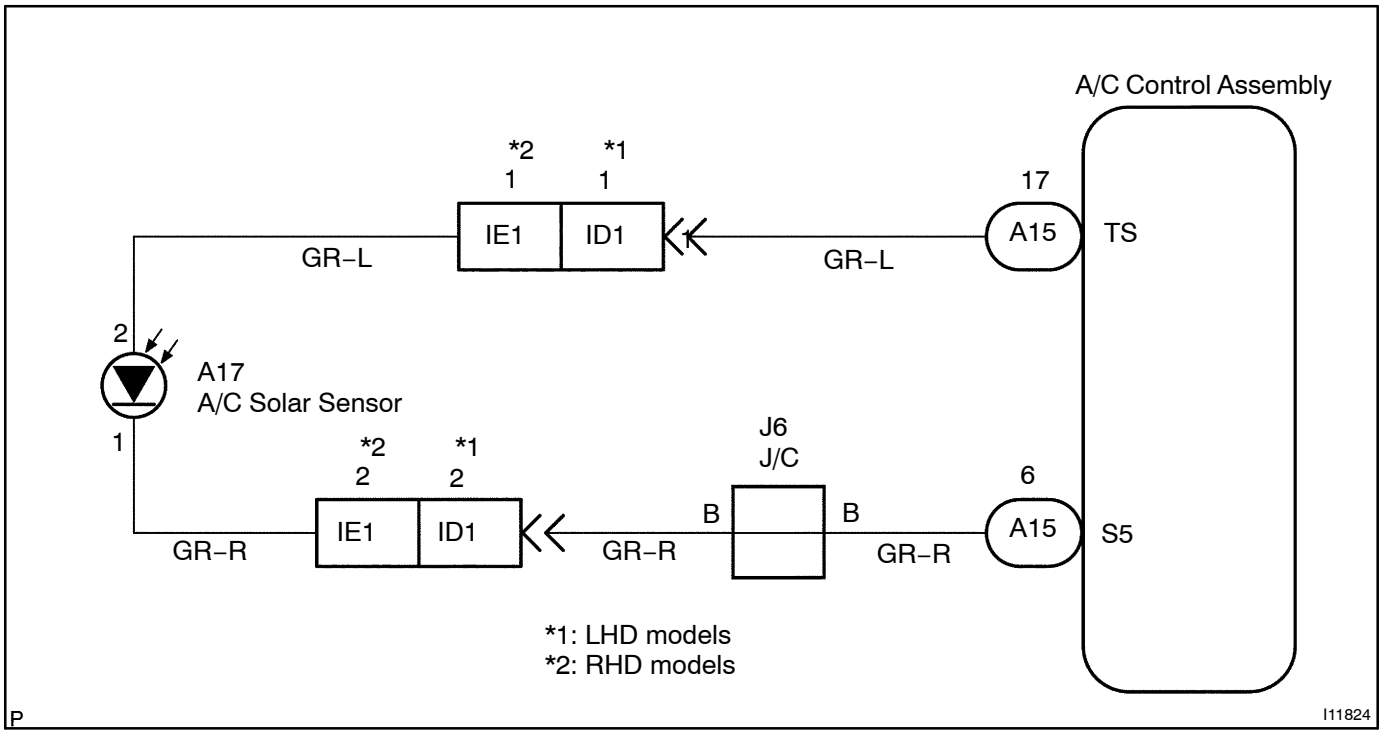
CIRCUIT DESCRIPTION



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
B1421	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code B1421 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

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

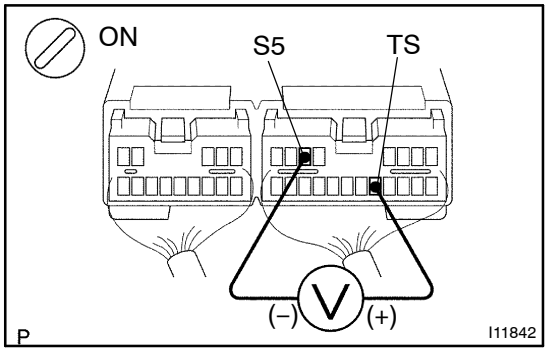
1	**Check solar sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the solar sensor using DATA LIST.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals S5 and TS of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) 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	0.8 – 4.3 V
Sensor covered by a cloth	Below 0.8 V

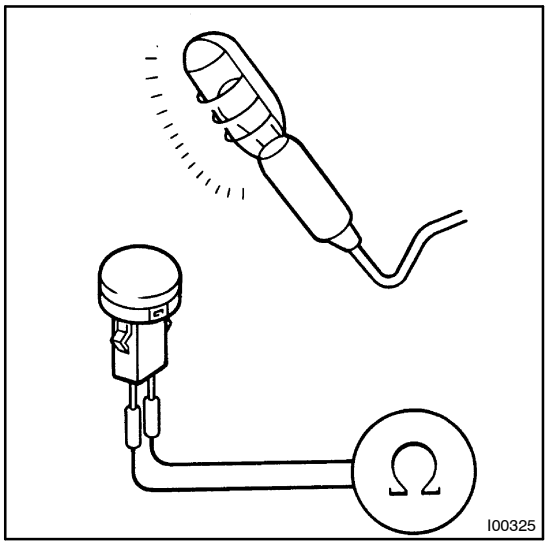
HINT:
As the inspection light is moved away from the sensor, the voltage increases.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1421 is displayed, check and replace A/C control assembly.

3	Check solar sensor.



PREPARATION:

Remove solar sensor (See page AC–65).

CHECK:

(a) Cover the sensor with a cloth.

(b) Measure resistance between terminals 1 and 2 of solar sensor connector.

HINT:

Connect positive (+) lead of ohmmeter to terminal 1 and negative (–) lead to terminal 2 of the solar sensor.

OK:

Resistance: ∞ Ω (no continuity)

PREPARATION:

(a) Remove the cloth from the solar sensor and subject the sensor to electric light.

(b) Measure resistance.

OK:

Resistance: Approx. 10 kΩ (continuity)

HINT:

As the electric light is moved away from the sensor, the resistance increases.

NG → **Replace solar sensor.**

OK ↓

4	Check harness and connector between A/C control assembly and solar sensor (See page IN–32).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace A/C control assembly.

DI60C–01

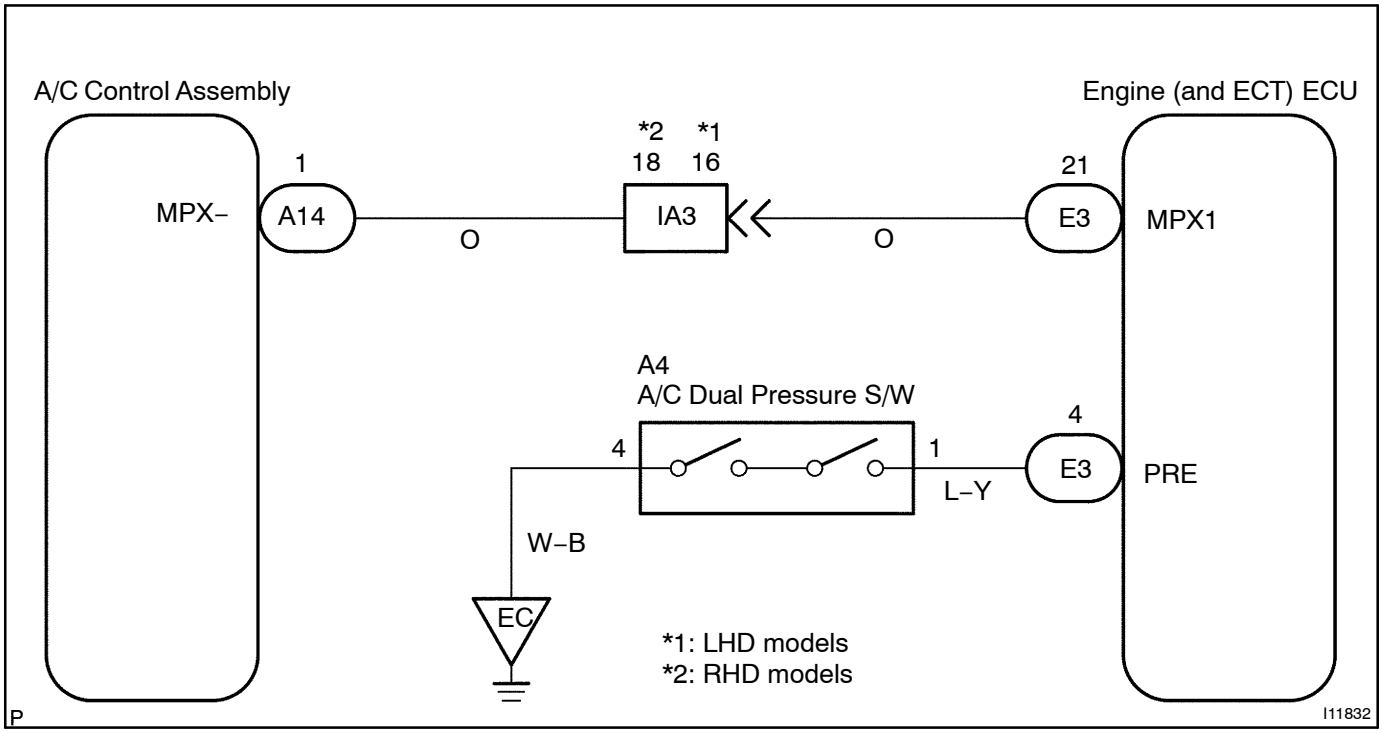
DTC	B1423	Pressure Switch Circuit

CIRCUIT DESCRIPTION

The pressure switch sends the appropriate signals to the engine (and ECT) ECU when the A/C refrigerant pressure drops too low or rises too high. When the engine (and ECT) ECU receives these signals, it outputs signals via the engine (and ECT) ECU to switch OFF the compressor relay and turns the magnetic clutch OFF.

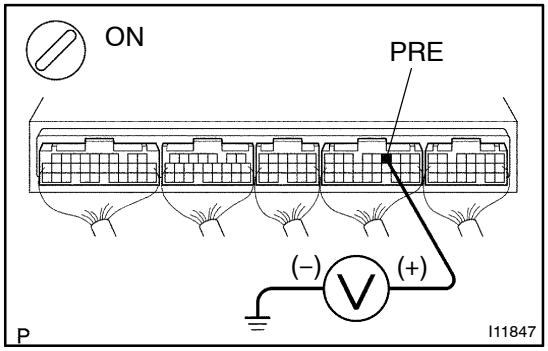
DTC No.	Detection Item	Trouble Area
B1423	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 181 kPa (2.0 kg/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)	• Pressure switch. • Harness or connector between pressure switch and engine (and ECT) ECU • Harness or connector engine (and ECT) ECU and A/C control assembly • Refrigerant pipe line. • Engine (and ECT) ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal PRE of engine (and ECT) ECU and body ground.



PREPARATION:

Install the manifold gauge set.

CHECK:

(a) Turn ignition switch to ON.

(b) Check voltage between terminal PRE of engine (and ECT) ECU connector and body ground when refrigerant pressure is changed.

OK:

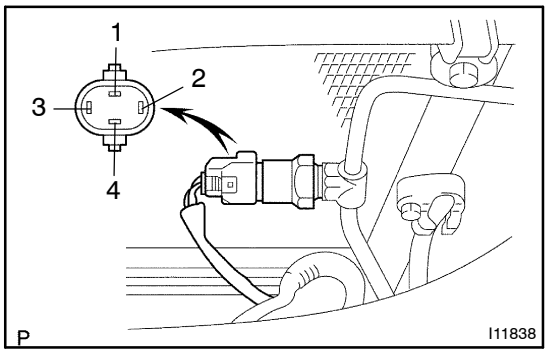
The voltage changes with refrigerant pressure, as shown in the diagram below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (10V) 225 kPa 196 kPa OFF (12V)	ON (10V) 2,550 kPa 3,140 kPa OFF (12V)

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	Check pressure switch.



PREPARATION:

Disconnect pressure switch connector.

CHECK:

(a) Turn ignition switch to ON.

(b) Check continuity between terminals 1 and 4 of pressure switch when refrigerant pressure is changed.

OK:

The continuity changes with refrigerant pressure as shown below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (continuity) 211 kPa 181 kPa OFF (continuity)	ON (continuity) 2,550 kPa 3,140 kPa OFF (continuity)

NG	**Repair or replace harness or connector.**

OK

3	Check harness and connector between engine (and ECT) ECU and pressure switch, pressure switch and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between engine (and ECT) ECU and A/C control assembly. (See page IN–32)

NG → Repair or replace harness or connector.

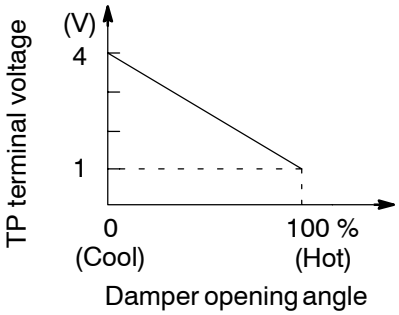
OK

Check and replace engine (and ECT) ECU.

DI60D–01

DTC	B1431	Air Mix Damper Position Sensor Circuit

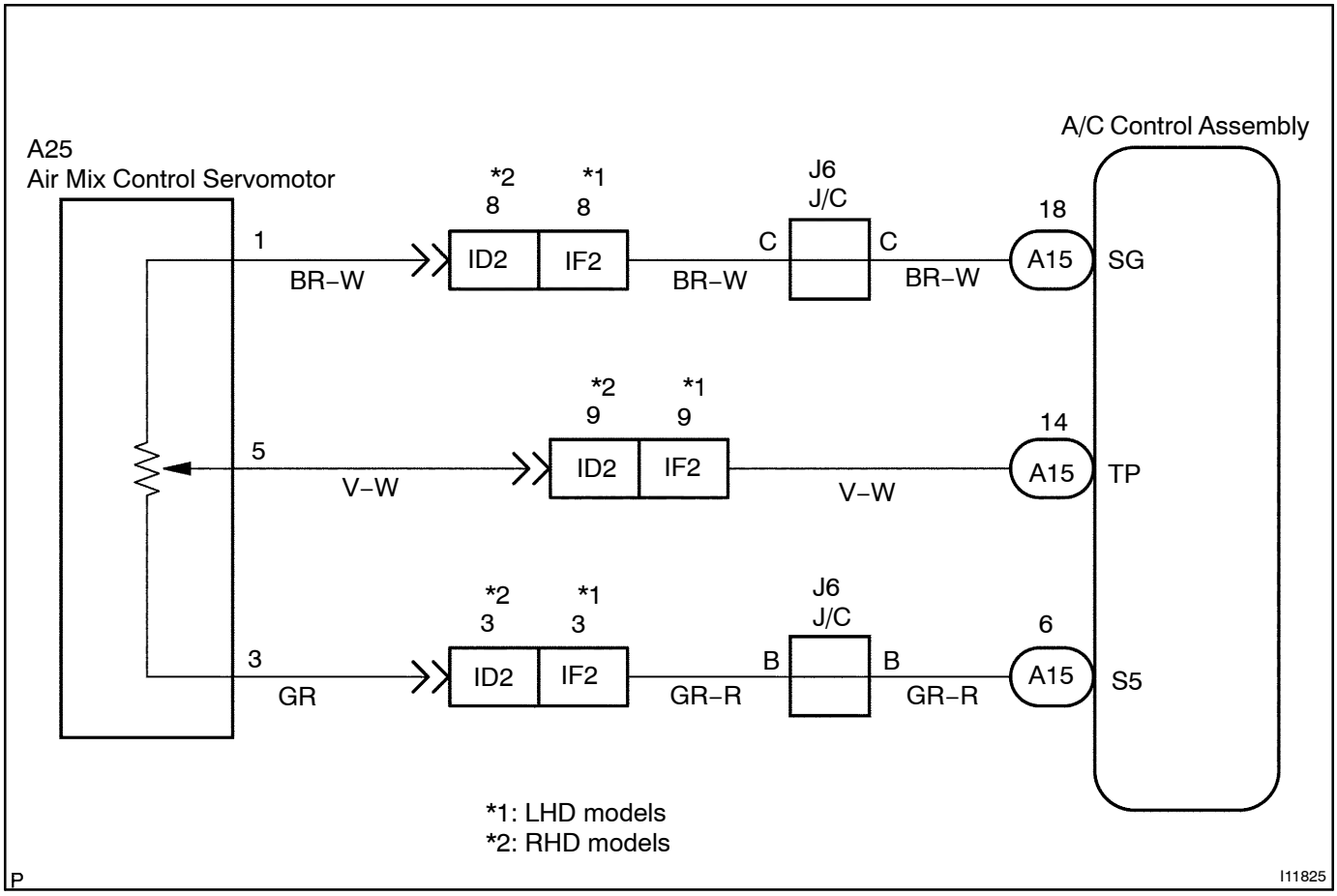
CIRCUIT DESCRIPTION



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 damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1431	Short to ground or power source circuit in air mix damper position sensor circuit.	• Air mix damper position sensor. • Harness or connector between air mix damper control servomotor assembly and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check air mix damper position using hand–held tester.**

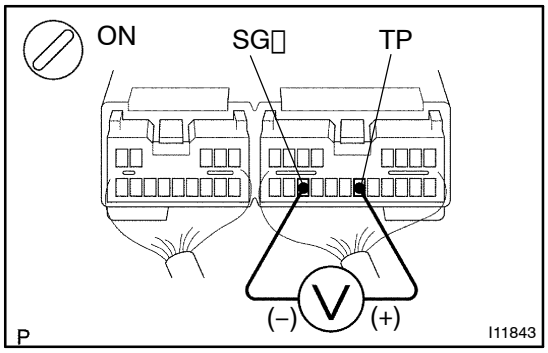
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air mix damper and the target position of air mix damper.
OK:

The current position and target position are almost similar.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TP and SG of A/C control assembly connector.**



PREPARATION:
Remove A/C control assembly with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Change the set temperature to activate the air mix damper control servomotor, 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. warm	0.5 – 1.5 V

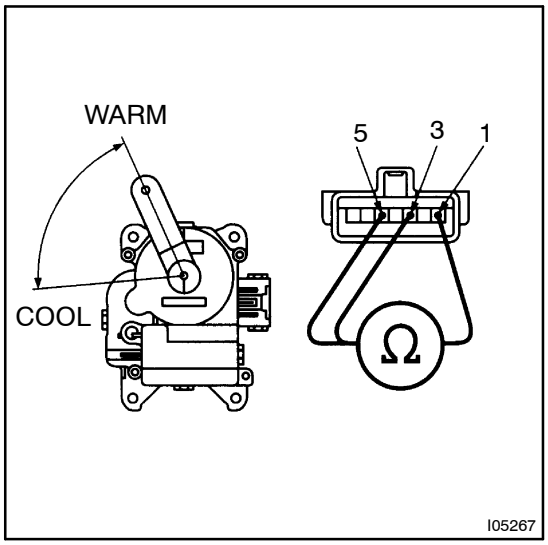
HINT:
As the set temperature increases, the voltage decreases.

NG → **Go to step 3.**

Ok

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1431 displayed, check and replace A/C control assembly.

3	Check air mix damper position sensor.



PREPARATION:
Remove the air mix damper control servomotor.

CHECK:
Measure resistance between terminals 1 and 3 of air mix damper control servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:
While operating air mix damper control servomotor, following the procedure on page DI–697, measure resistance between terminals 1 and 5 of air mix damper control servomotor assembly connector.

OK:

Position	Resistance
Max. cool	3.6 – 6.8 kΩ
Max. warm	0.5 – 1.1 kΩ

HINT:
As the air mix damper control servomotor moves from cool side to hot side, the resistance decreases.

NG	Replace air mix damper control servomotor assembly.

OK

4	Check harness and connector between A/C control assembly and air mix damper control servomotor assembly (See page IN–32).

NG	Repair or replace harness or connector.

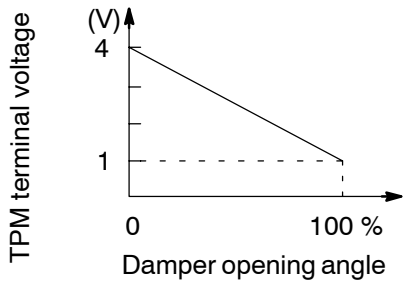
OK

Check and replace A/C control assembly.

DI60E–01

DTC	B1433	Air Outlet Damper Position Sensor Circuit

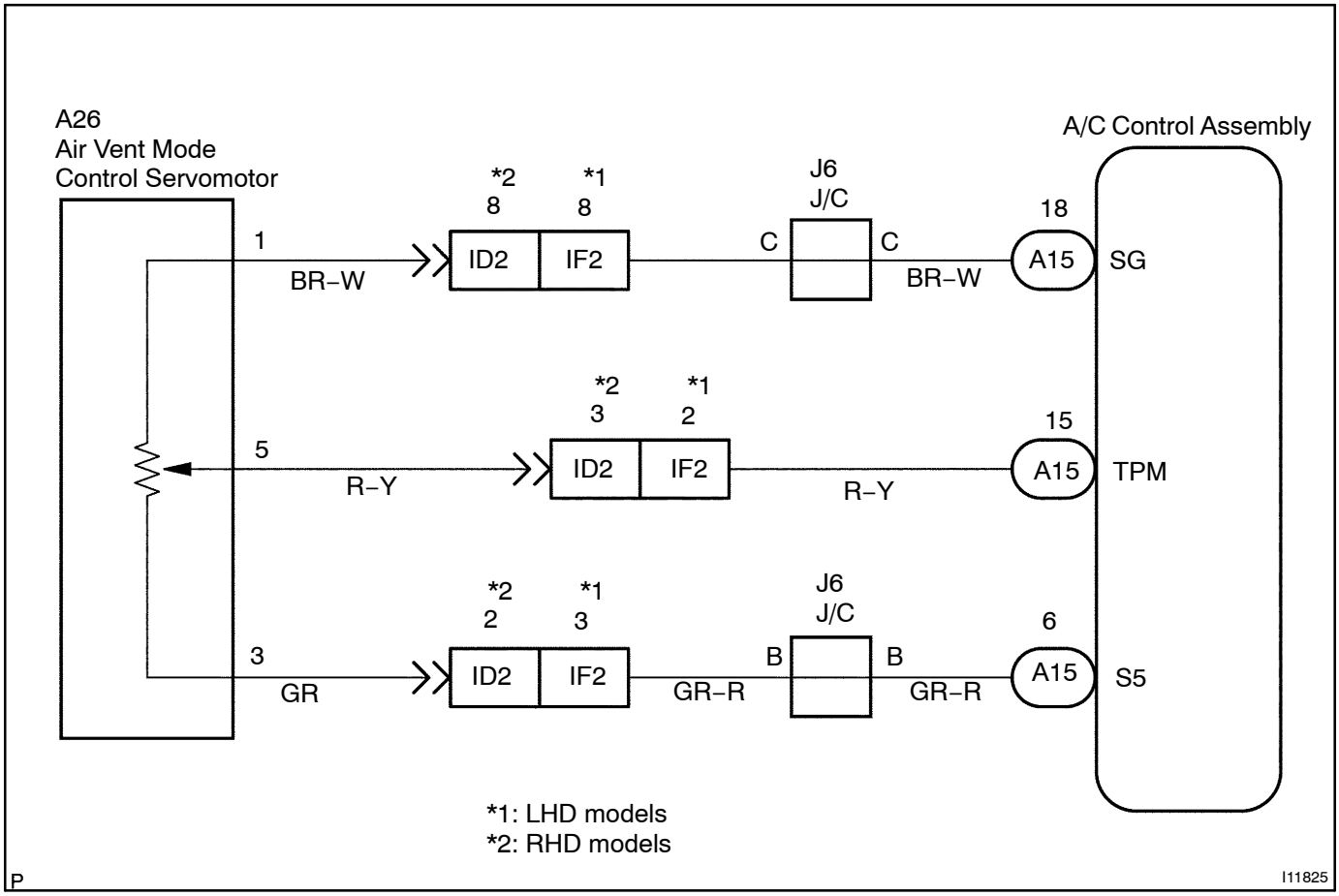
CIRCUIT DESCRIPTION



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 outlet damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1433	Short to ground or power source circuit in air outlet damper position sensor circuit.	• Air outlet damper position sensor. • Harness or connector between air outlet damper control servomotor assembly and A/C control assembly. • A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

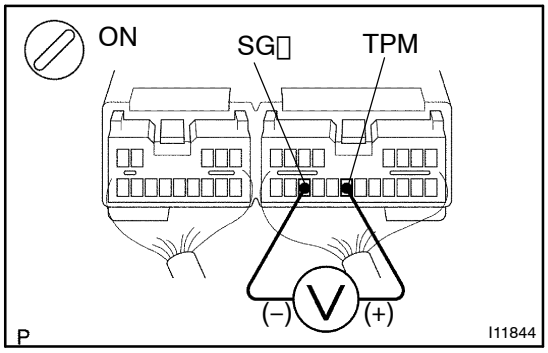
1	**Check air outlet damper position using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air outlet damper and the target position of air outlet damper.
OK:
The current position and target position are almost similar.

OK → **Check and replace A/C control assembly.**

NG

2	**Check voltage between terminals TPM and SG of A/C control assembly connector.**



PREPARATION:
(a) Remove A/C control assembly with connectors still connected.
(b) Turn ignition switch to ON.
CHECK:
Measure the voltage between terminals TPM and SG of A/C control assembly.
OK:

Mode selector	Voltage
FACE	3.5 – 4.5 V
DEF	0.5 – 1.5 V

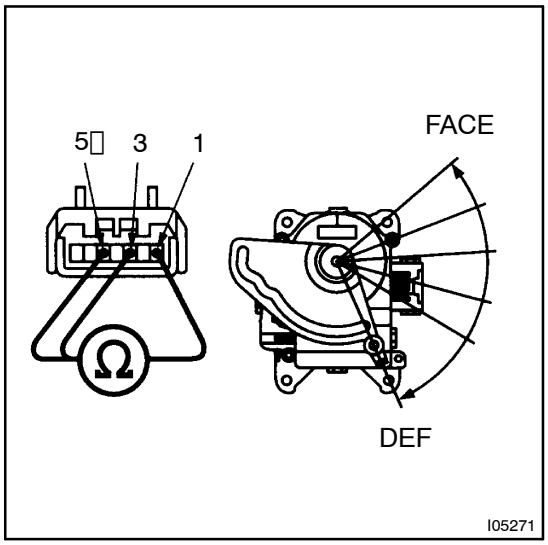
HINT:
As the air outlet damper control servomotor is moved from FACE side to DEF side, the voltage decreases gradually without interruption.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–674). However, if DTC B1434 is displayed, check and replace A/C control assembly.

3	**Check air outlet damper position sensor.**



PREPARATION:
Remove the air outlet servomotor.

CHECK:
Measure resistance between terminals 1 and 3 of air outlet servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:
While operating air outlet damper control servomotor as in the procedure on page DI–703, measure resistance between terminals 3 and 5 of air outlet damper control servomotor.

OK:

Resistance:

Damper Position	Resistance
DEF	0.5 – 1.1 kΩ
FACE	3.6 – 6.8 kΩ

HINT:
As the air outlet servomotor moves from DEF side to FACE side, the resistance decreases gradually without interruption.

NG	**Replace air outlet damper control servomotor assembly.**

OK

4	**Check harness and connector between A/C control assembly and air outlet damper control servomotor assembly (See page IN–32).**

NG	**Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

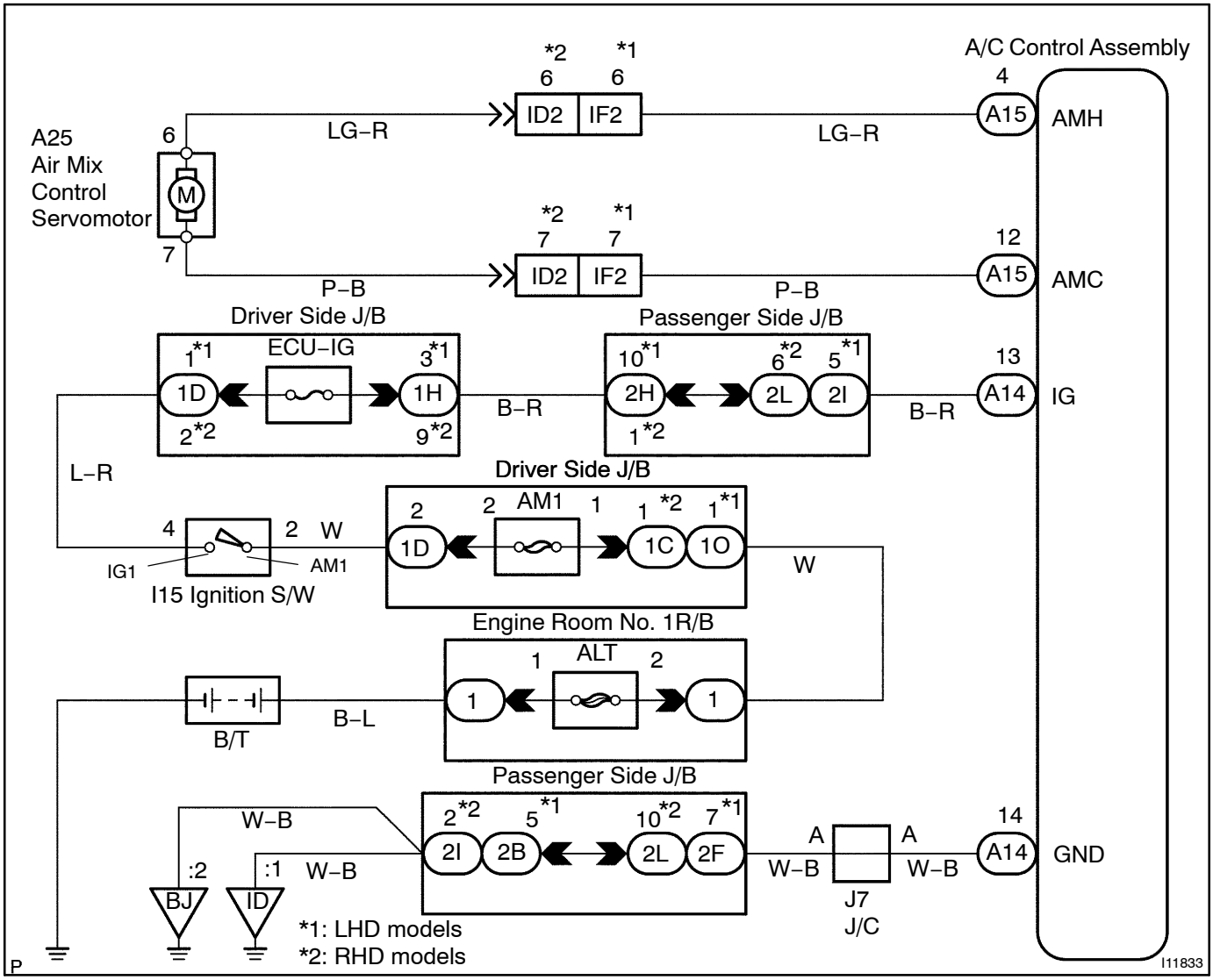
DI60F–01

Air Mix Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air mix damper control servomotor is controlled by the A/C control assembly and moves the air mix damper to the desired position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

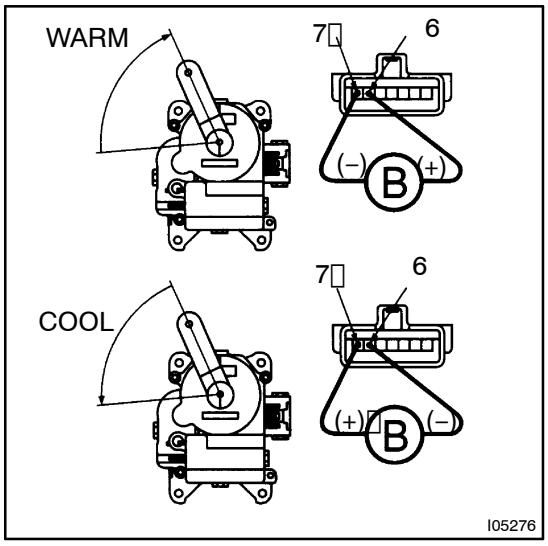
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
(a) Enter into ACTIVE TEST function of hand–held tester.
(b) Check air mix damper operates as hand–held tester directs.
OK:

Pattern No.	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 problem symptoms table (See page DI–674).**

NG

2	**Check air mix damper control servomotor.**



PREPARATION:
Remove air mix damper control servomotor.
CHECK:
Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.
OK:
The lever turns smoothly to Hot side.
CHECK:
Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.
OK:
The lever turns smoothly to Cool side.

NG → **Replace air mix damper control servomotor assembly.**

OK

3	Check harness and connector between A/C control assembly and air mix damper control servomotor assembly (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace A/C control assembly.

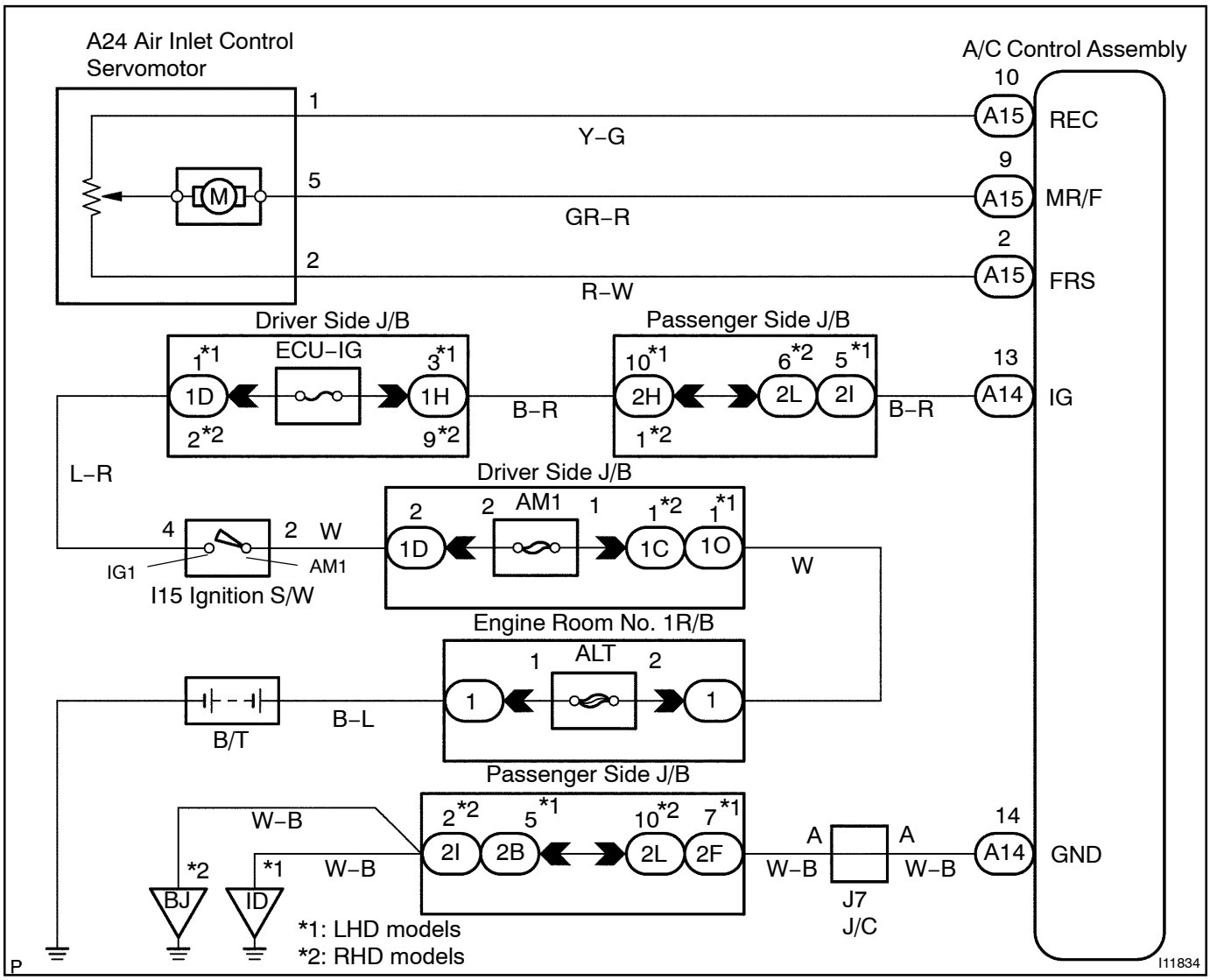
DI60G–01

Air Inlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

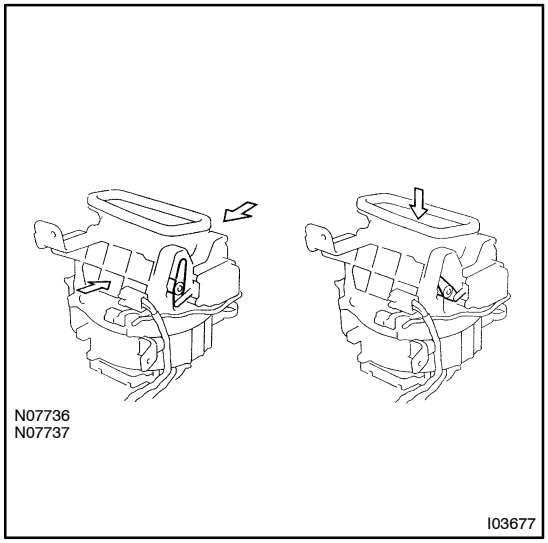
The air inlet damper control servomotor is controlled by the A/C control assembly and moves the air inlet damper to the desired position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



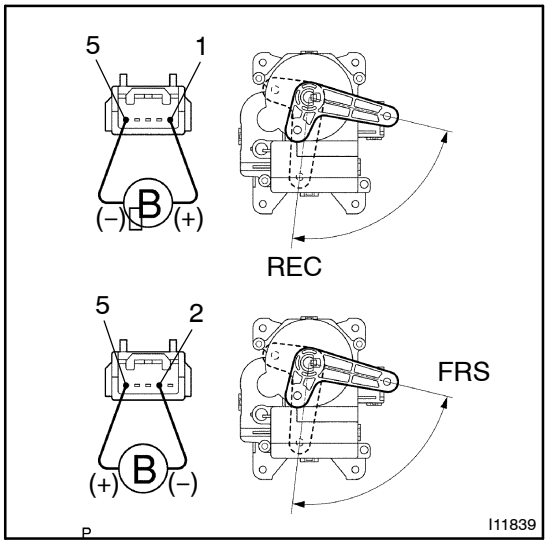
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
(a) Enter into ACTIVE TEST function of hand–held tester.
(b) Check air inlet damper operates as hand–held tester directs.
OK:

Pattern No.	Air Inlet Damper
0 – 3	FRS
4 – 9	REC

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	Check air inlet damper control servomotor.



PREPARATION:
Remove the air inlet damper control servomotor.
CHECK:
Connect positive (+) lead to terminal 1 and negative (–) lead to terminal 5.
OK:
The lever moves smoothly to REC position.
CHECK:
Connect positive (+) lead to terminal 5 and negative (–) lead to terminal 2.
OK:
The lever moves smoothly to FRS position.

NG → **Replace air inlet damper control servomotor assembly.**

OK

3	Check harness and connector between A/C control assembly and air inlet damper control servomotor (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace A/C control assembly.

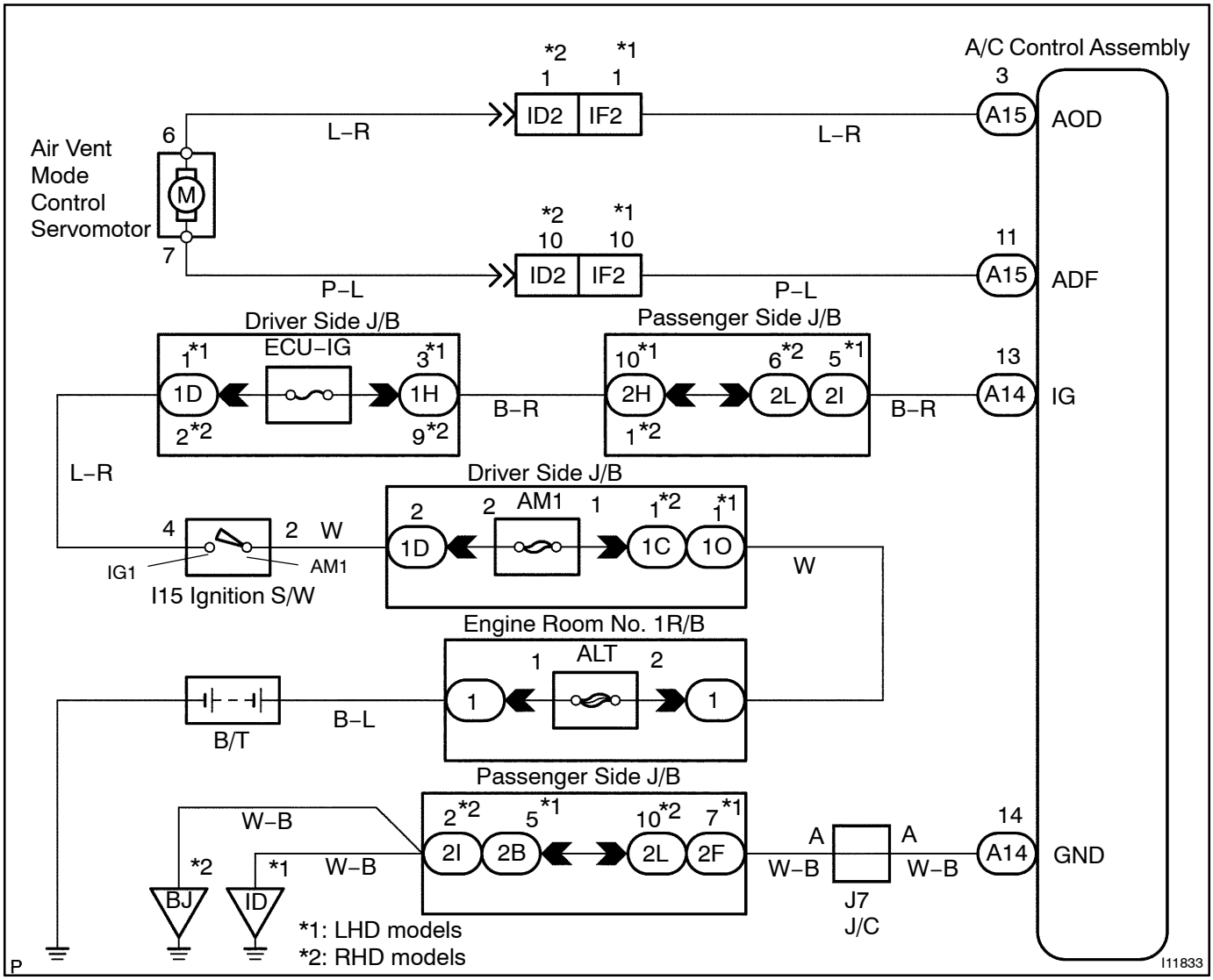
DI60H–01

Air Outlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by the 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.**

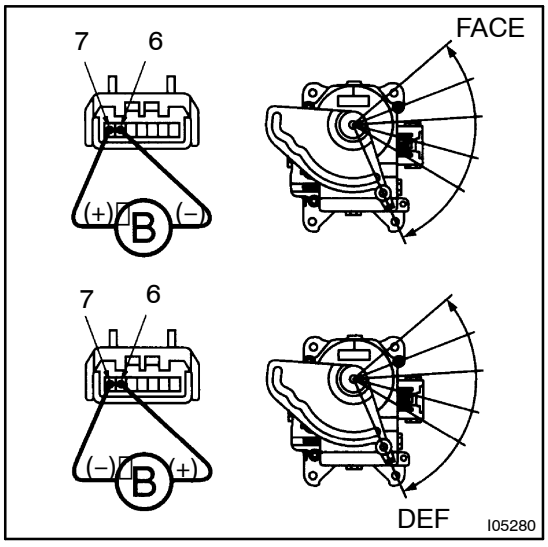
Pattern NO.	Air Flow
0 – 4	FACE
5	BI–LEVEL
6, 7	FOOT
8	FOOT/DEF
9	DEF

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
(a) Enter into ACTIVE TEST function of hand–held tester.
(b) Check mode damper operates as hand–held tester directs.
OK:
The mode changes with the change in the hand–held tester as shown in the table.

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check air outlet damper control servomotor.**



PREPARATION:
Remove the air outlet damper control servomotor.
CHECK:
Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.
OK:
The lever moves smoothly to FACE position.
CHECK:
Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.
OK:
The lever moves smoothly to DEF position.

NG	**Replace air outlet servomotor.**

OK

3	Check for open and short in harness and connector between A/C control assembly and outlet servomotor, outlet damper control servomotor and battery, outlet damper control servomotor and body ground (See page IN–32).

NG → Repair or replace harness or connector.

OK →

Check and replace A/C control assembly.

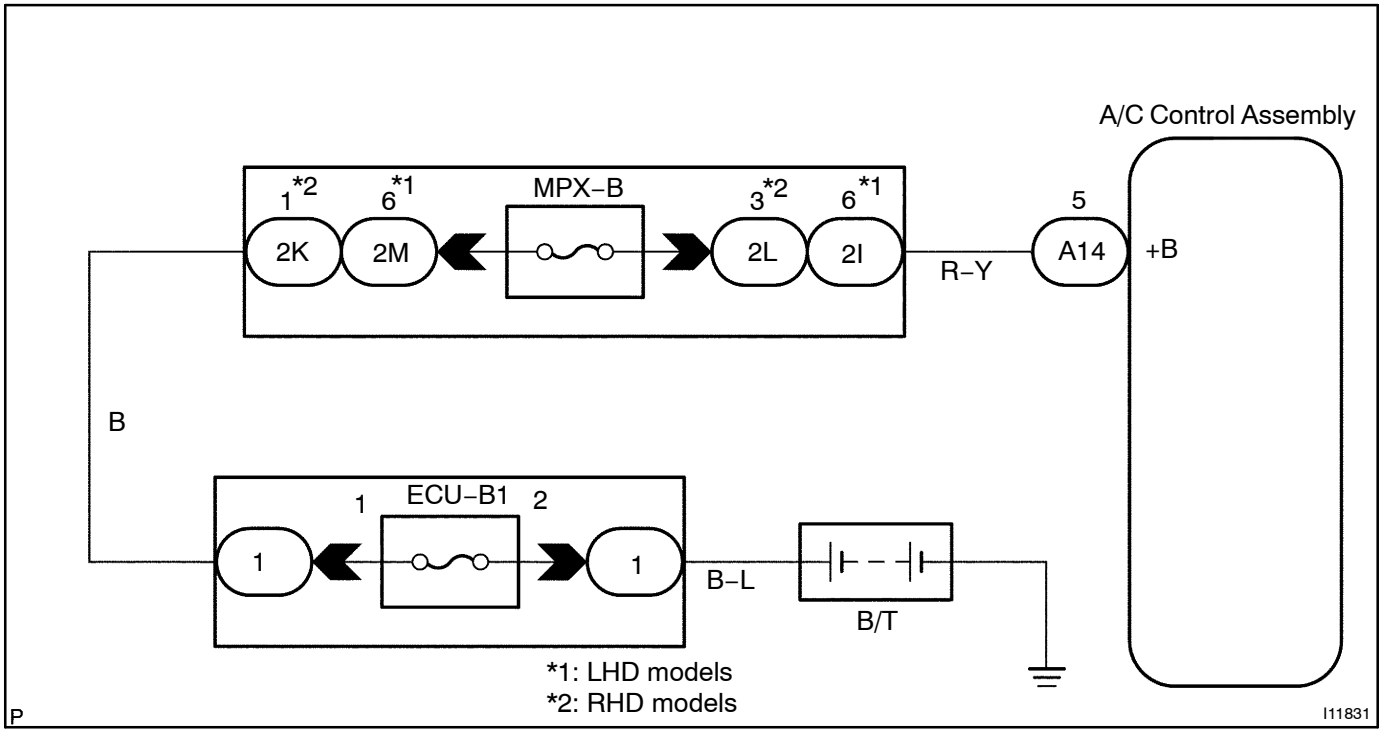
DI60I–01

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

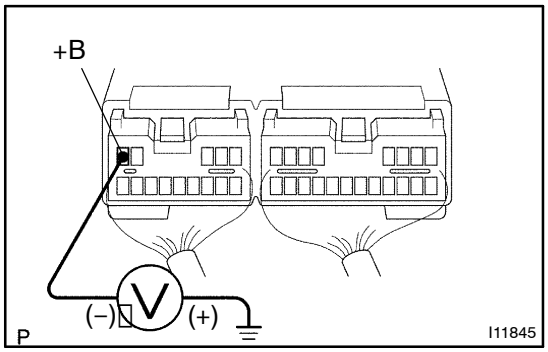
This is the back up poser source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal +B of A/C control assembly connector and body ground.**



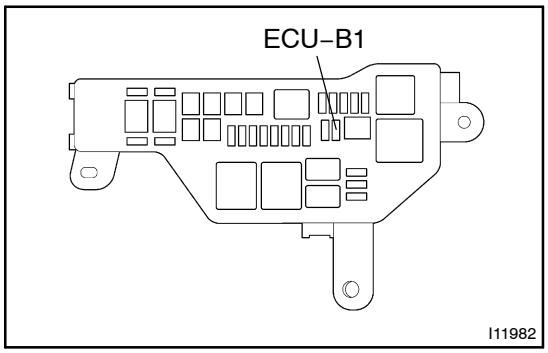
PREPARATION:
Remove the A/C control assembly with connector still connected.
CHECK:
Measure voltage between terminal +B of A/C control assembly connector and body ground.
OK:

Voltage: Battery voltage

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check ECU–B1 fuse.**



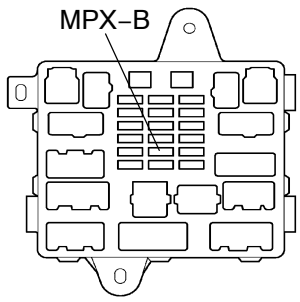
PREPARATION:
Remove ECU–B1 fuse from engine room J/B.
CHECK:
Check continuity of ECU–B1 fuse.
OK:

Continuity

NG	**Check for short in all the harness and components connected to the ECU–B1 fuse (See attached wiring diagram).**

OK

3	Check MPX–B fuse.



PREPARATION:
Remove MPX–B fuse from passenger side J/B.
CHECK:
Check continuity of MPX–B fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to the MPX–B fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

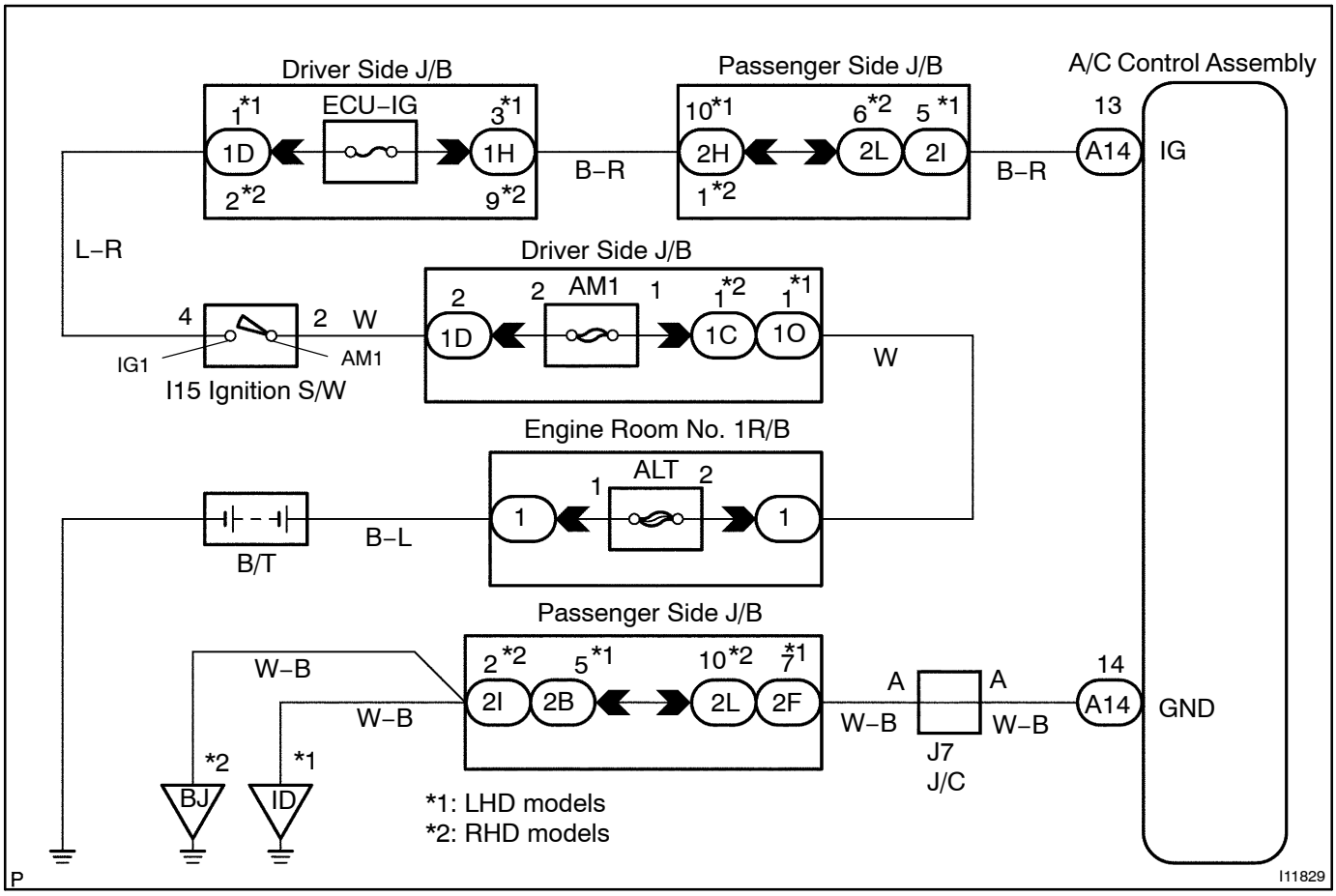
DI60J–01

IG Power Source Circuit

CIRCUIT DESCRIPTION

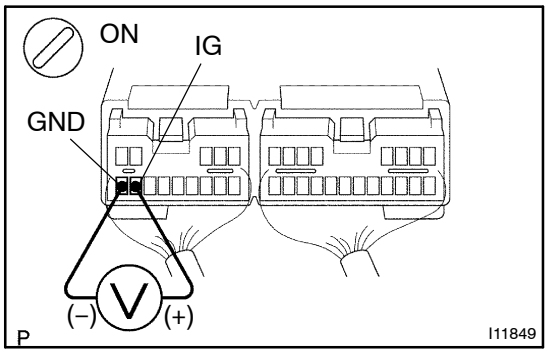
This is the power source for the A/C control assembly (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals IG and GND of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected.

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals IG and GND of A/C control assembly.

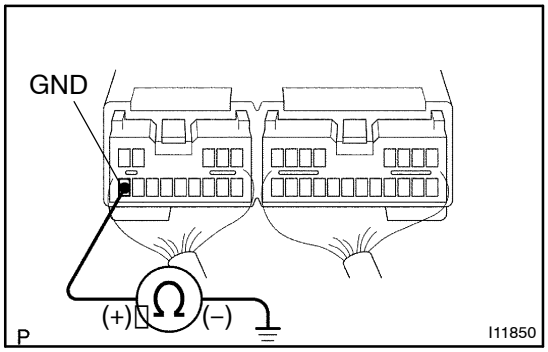
OK:

Voltage : 10 – 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

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.

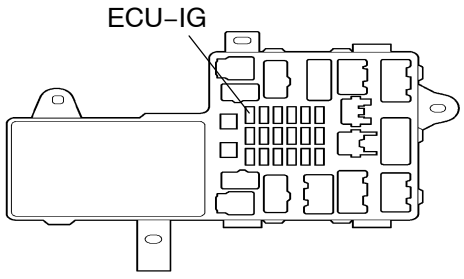
OK:

Resistance : 0 Ω (Continuity)

NG	**Repair or replace harness or connector.**

OK

3	Check ECU–IG fuse.



PREPARATION:

Remove ECU–IG fuse from driver side J/B.

CHECK:

Check continuity of ECU–IG fuse.

OK:

Continuity exists.

NG → **Check for shot in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

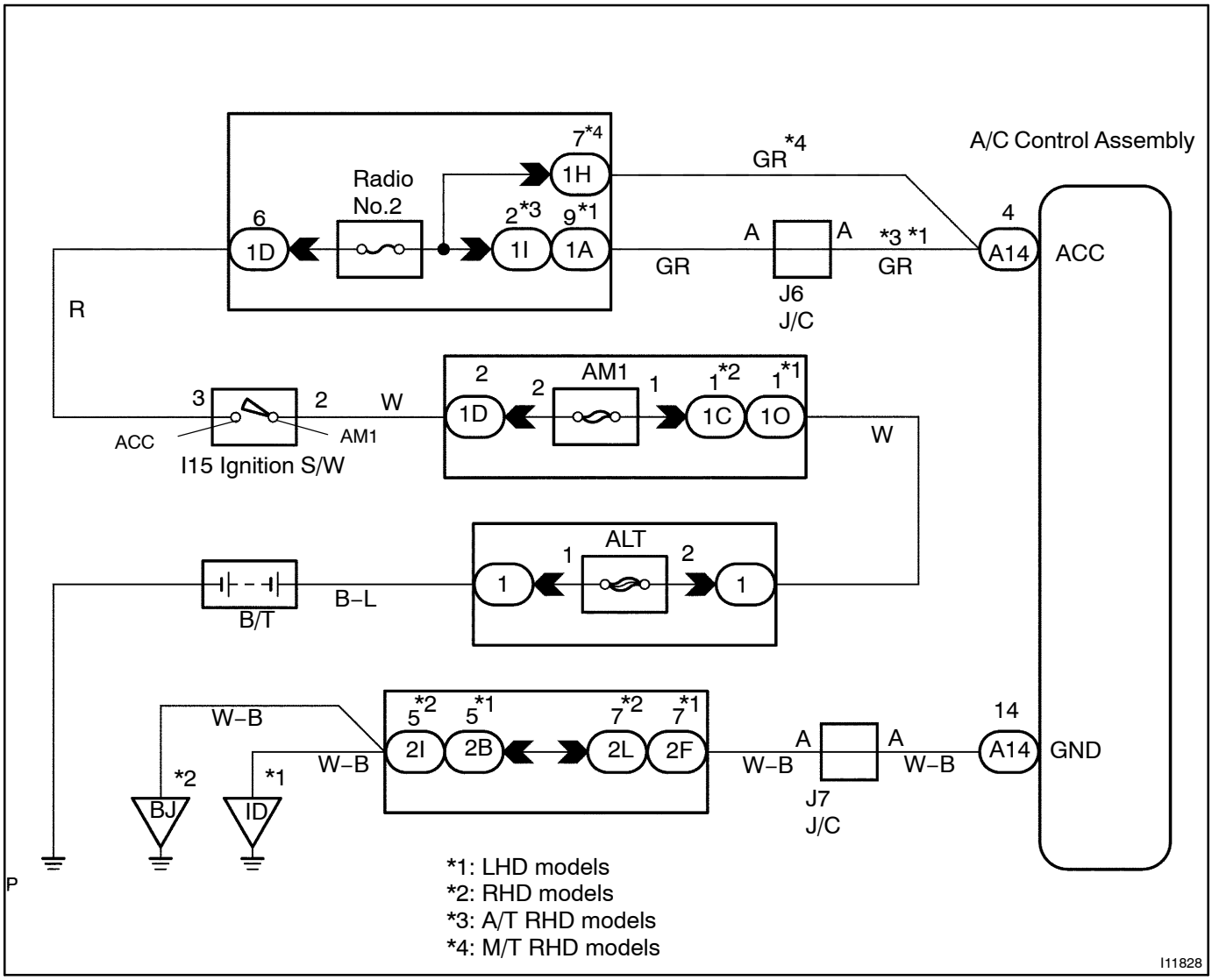
DI60K–01

ACC Power Source Circuit

CIRCUIT DESCRIPTION

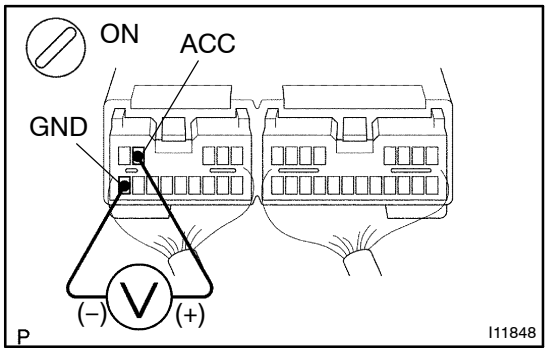
This is the power source for A/C control assembly and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals ACC and GND of A/C control assembly connector.**



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

(a) Turn ignition switch to ACC.

(b) Measure voltage between terminals ACC and GND of A/C control assembly.

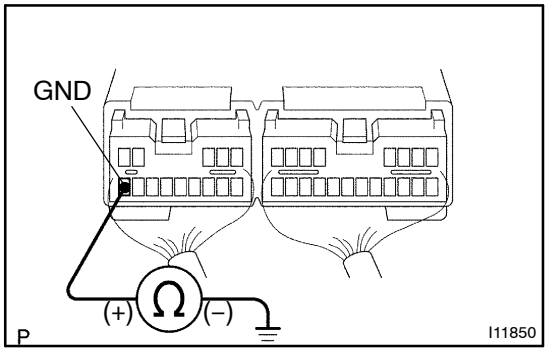
OK:

Voltage : Battery voltage

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

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.

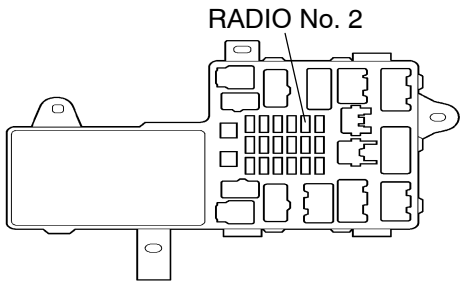
OK:

Resistance : 0 Ω (continuity)

NG	**Repair or replace harness or connector.**

OK

3	Check RADIO No.2 fuse.



PREPARATION:
Remove RADIO No.2 fuse from driver side J/B.
CHECK:
Check continuity of RADIO No.2.
OK:

Continuity

NG → **Check for short in all the harness and components connected to the RADIO No.2 fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

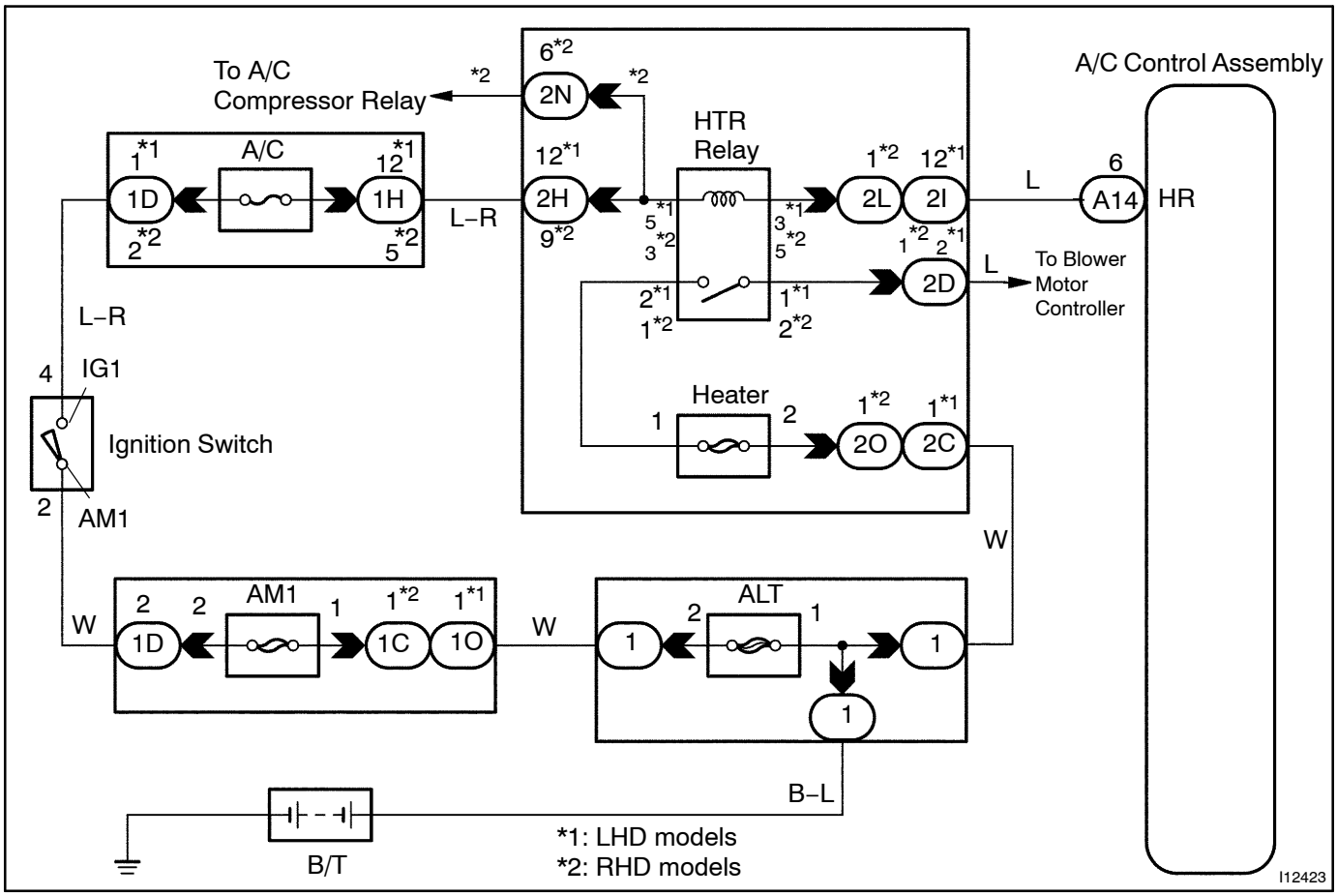
DI60L–01

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

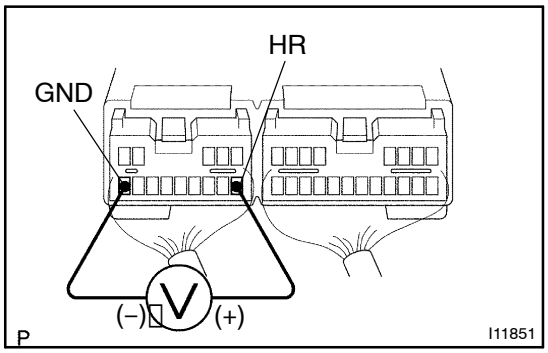
The heater main relay is switched on by signals from the A/C control assembly. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal HR of A/C control assembly connector and body ground.**



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

Measure voltage between terminal HR of A/C control assembly and body ground when ignition switch is ON and OFF.

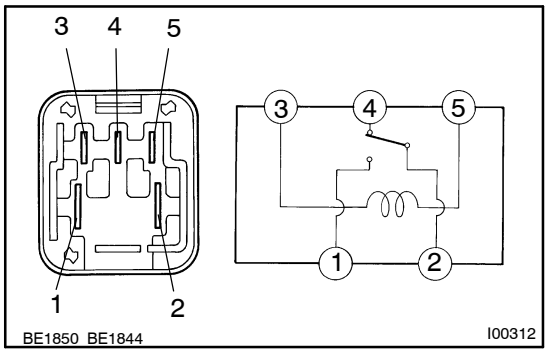
OK:

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	Check heater main relay.



PREPARATION:
Remove heater main relay from passenger side J/B.
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

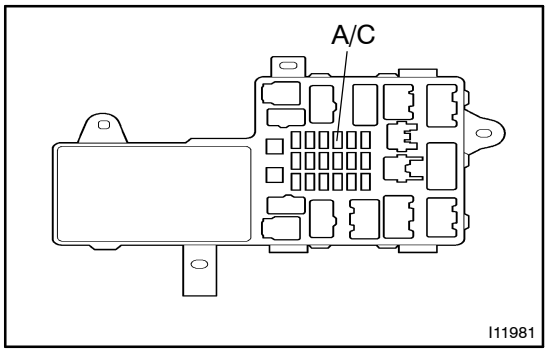
PREPARATION:
Apply battery positive voltage between terminals 3 and 5.
CHECK:
Check continuity between each pair of terminal shown below.
OK:

Tester connection	Specified condition
1 – 2	Continuity
2 – 4	No continuity

NG → **Replace hater main relay.**

OK

3	Check A/C fuse



PREPARATION:
Remove A/C fuse from driver side J/B.
CHECK:
Check continuity of A/C fuse.
OK:
Continuity exists.

NG → **Check for short in all the harness and components connected to the A/C fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

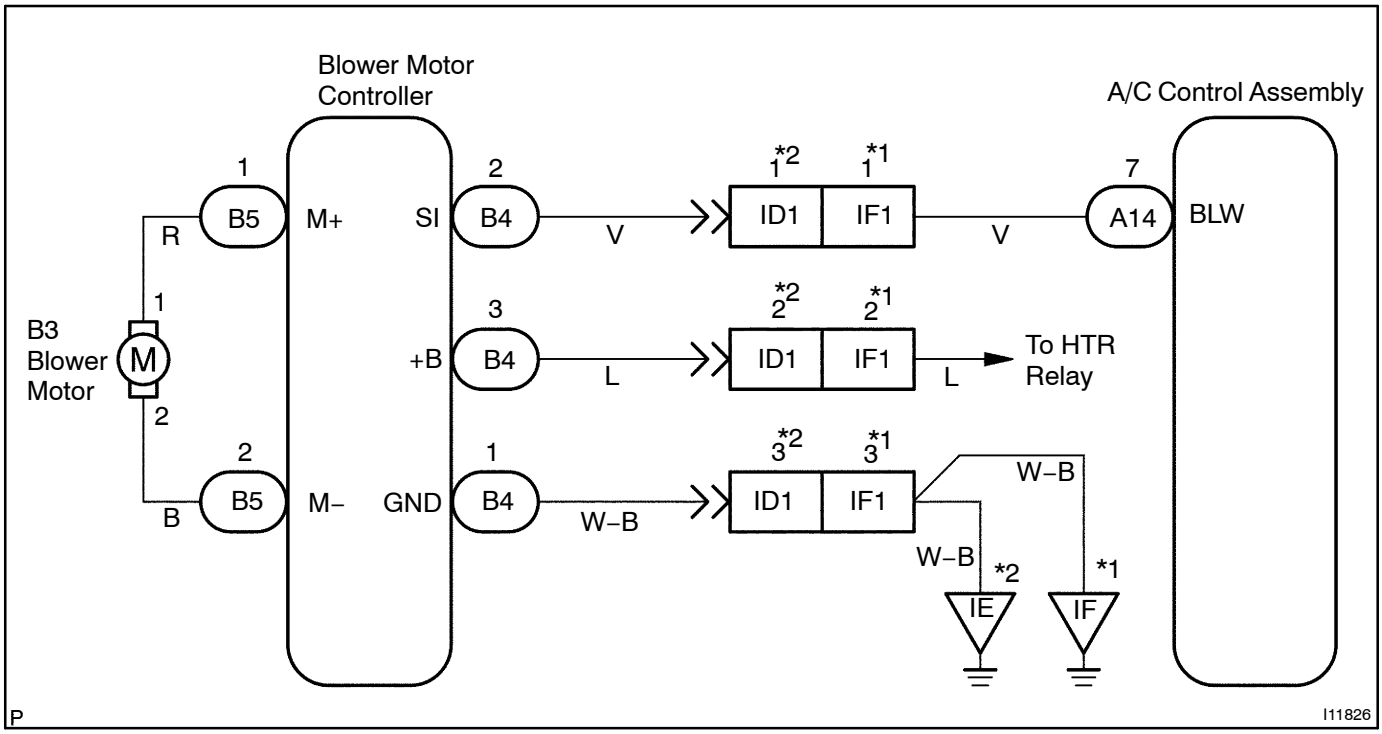
DI60M–01

Blower Motor Circuit

CIRCUIT DESCRIPTION

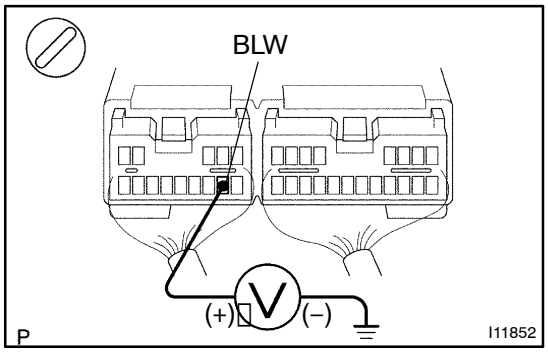
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal BLW of A/C control assembly connector and body ground.**

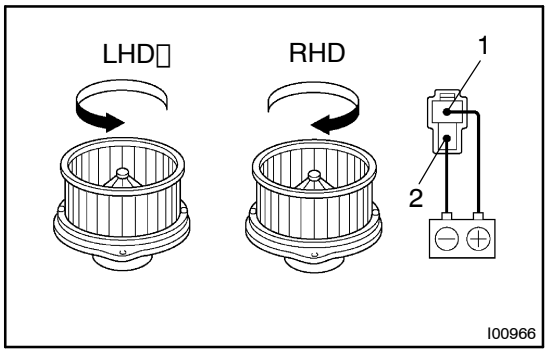


PREPARATION:
Remove the A/C control assembly with connector still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Operate blower motor.
(c) Measure voltage between terminal BLW of A/C control assembly and body ground.
OK:
Voltage: 1 – 3 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–674).**

NG

2	**Check blower motor.**

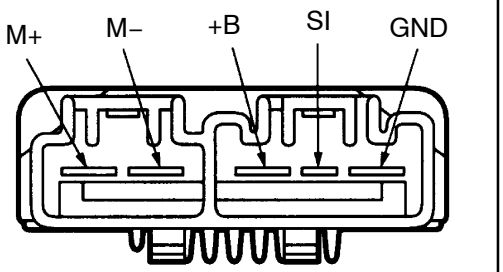


PREPARATION:
Remove blower motor.
CHECK:
Connect the positive (+) lead from the battery to terminal 1 of blower motor connector and the negative (–) lead to terminal 2.
OK:
Blower motor operates smoothly.

NG	**Replace blower motor.**

OK

3	Check blower motor control relay.



I05291

PREPARATION:

Remove blower motor control relay with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Operate blower motor (High blower speed).

OK:

Terminals	Standard Value
GND ↔ Body Ground	Continuity
+B ↔ Body Ground	Battery voltage
+M ↔ Body Ground	Battery voltage
M+ ↔ M–	Battery voltage
SI ↔ Body Ground	1 – 3 V

NG → **Replace blower motor relay.**

OK →

Repair or replace harness or connector.

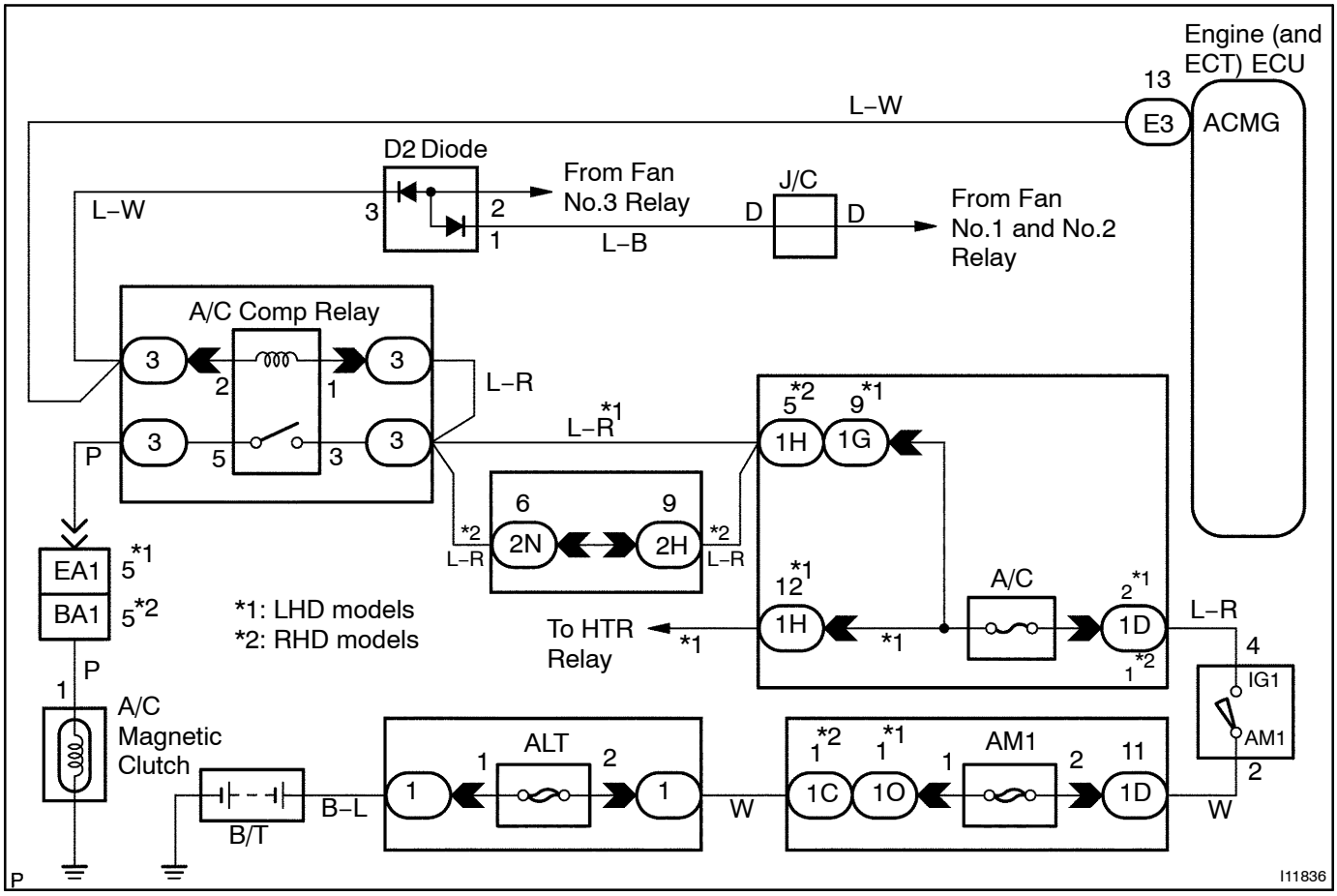
DI60N–01

Compressor Circuit

CIRCUIT DESCRIPTION

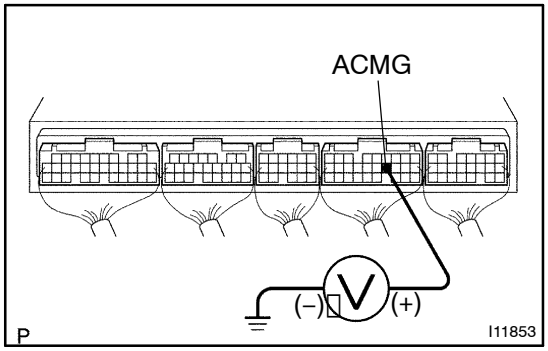
The A/C control assembly outputs the magnetic clutch ON signal from terminal MPX+ to the engine (and ECT) ECU. When the engine (and ECT) ECU receives this signal, it sends a signal from terminal ACMG and switches the A/C magnetic clutch relay ON, this turning the A/C compressor magnetic clutch ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal ACMG of engine (and ECT) ECU.



CHECK:

(a) Start engine.
(b) Push AUTO SW.
(c) Measure voltage between terminal ACMG of engine (and ECT) ECU connector and body ground when A/C switch is ON and OFF.

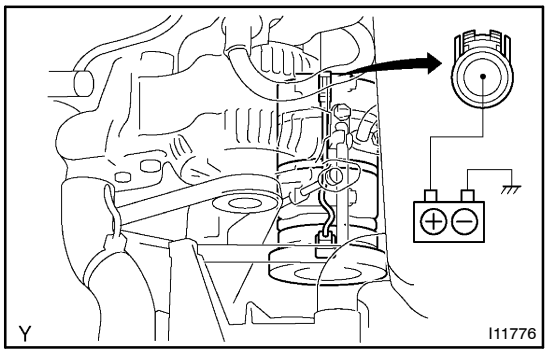
OK:

A/C switch	Voltage
ON	10 – 14 V
OFF	0 V

OK → Check and replace engine (and ECT) ECU and/or A/C control assembly.

NG

2	Check A/C compressor magnetic clutch.



PREPARATION:

Disconnect magnetic clutch connector.

CHECK:

Connect positive (+) lead connected to battery to magnetic clutch connector terminal.

OK:

Magnetic clutch is energized.

NG → Repair A/C compressor magnetic clutch.

OK

3	Check harness and connector between A/C compressor and compressor relay (See page IN–32).

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between compressor relay and engine (and ECT) ECU (See page IN–32).

NG → Repair or replace harness or connector.

OK

5	Check harness and connector between engine (and ECT) ECU and A/C control assembly (See page IN–32).

NG → Repair or replace harness or connector.

OK

Check and replace engine (and ECT) ECU and/or A/C control assembly.

EMISSION CONTROL SYSTEM

EC00B–06

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 from being released from the fuel tank (2).
The function of each system is shown in these table.

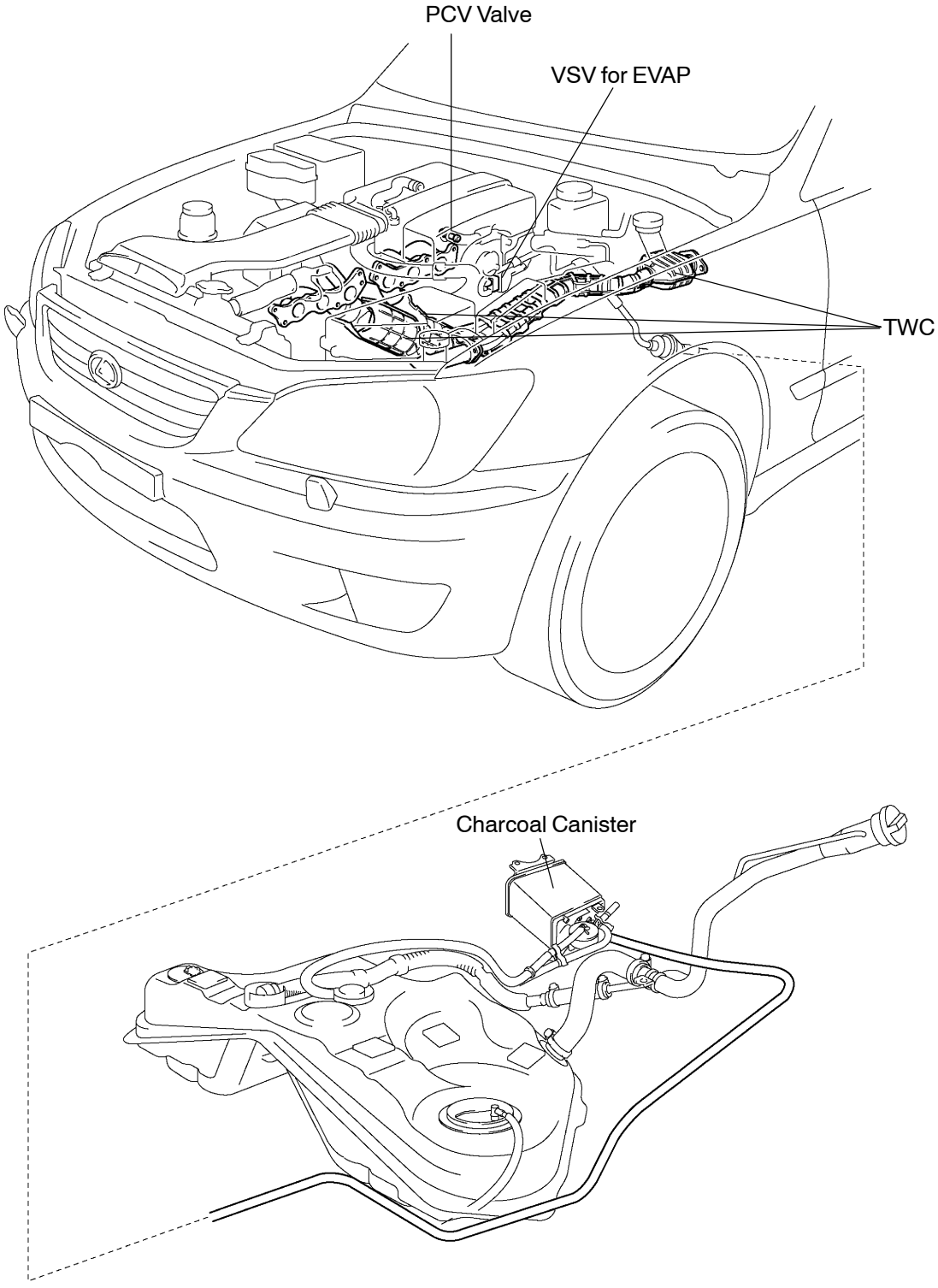
System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces blow–by gas (HC)
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Three–Way Catalytic Converter	TWC	Reduces CO, HC and NOx
(4) Sequential Multiport Fuel Injection *	EFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: * For inspection and repair of the EFI system, refer to the FI section this manual.

PARTS LAYOUT AND SCHEMATIC DRAWING

EC04V–05

LOCATION

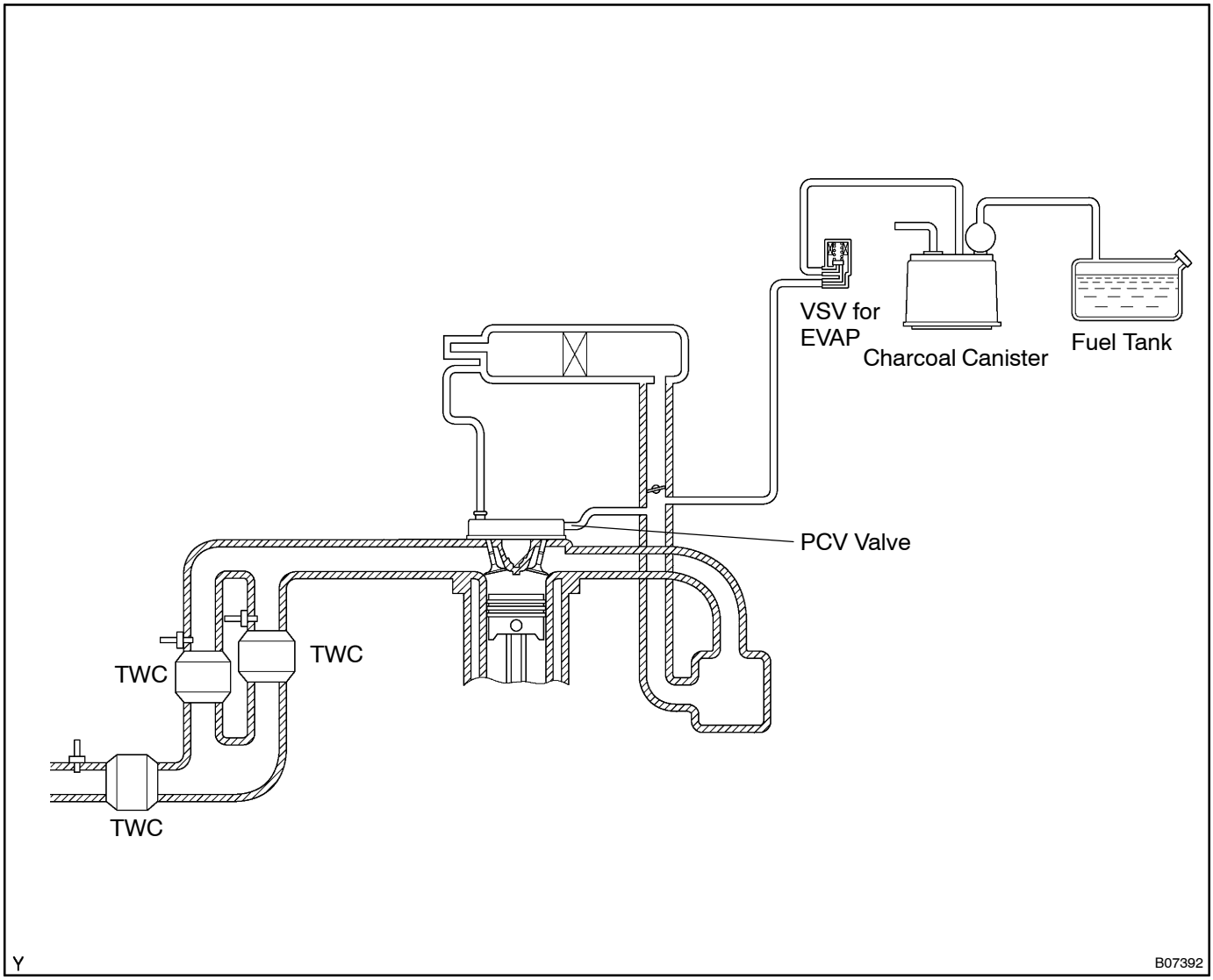


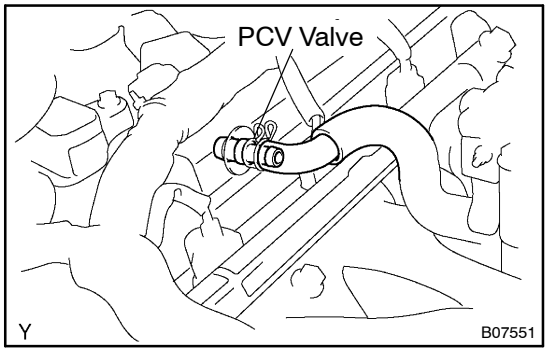
Y

B06165

EC04W–05

DRAWING





POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

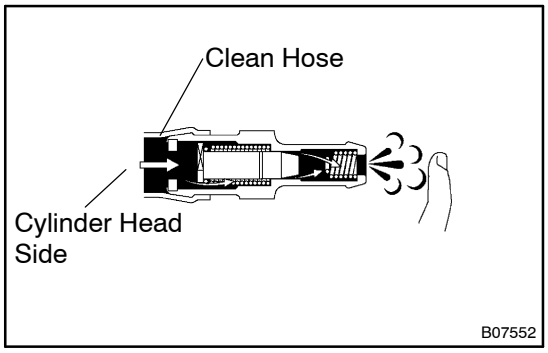
EC04X–04

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

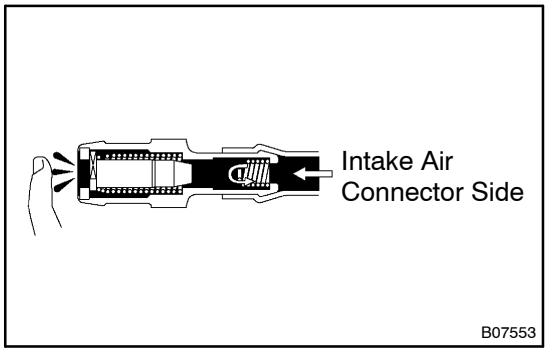
3. INSPECT PCV VALVE OPERATION

(a) Blow air into the cylinder head side, and check that air passes through easily.

CAUTION:

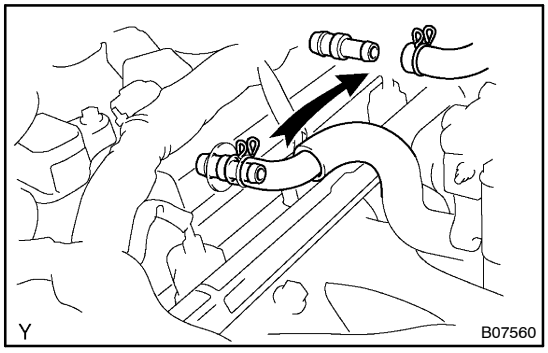
Do not suck air through the valve.

Petroleum substances inside the valve are harmful.



(b) Blow air into the intake air connector side, and check that air passes through with difficulty.

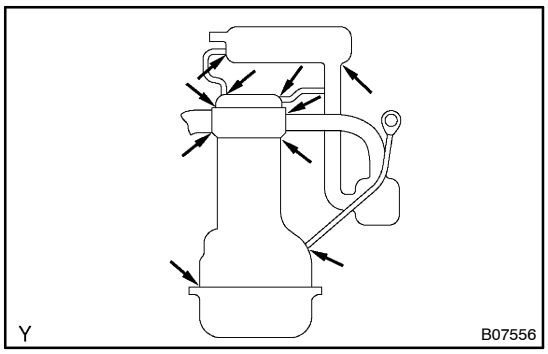
If operation is not as specified, replace the PCV valve.



4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE

The port faces in the direction indicated in the illustration.



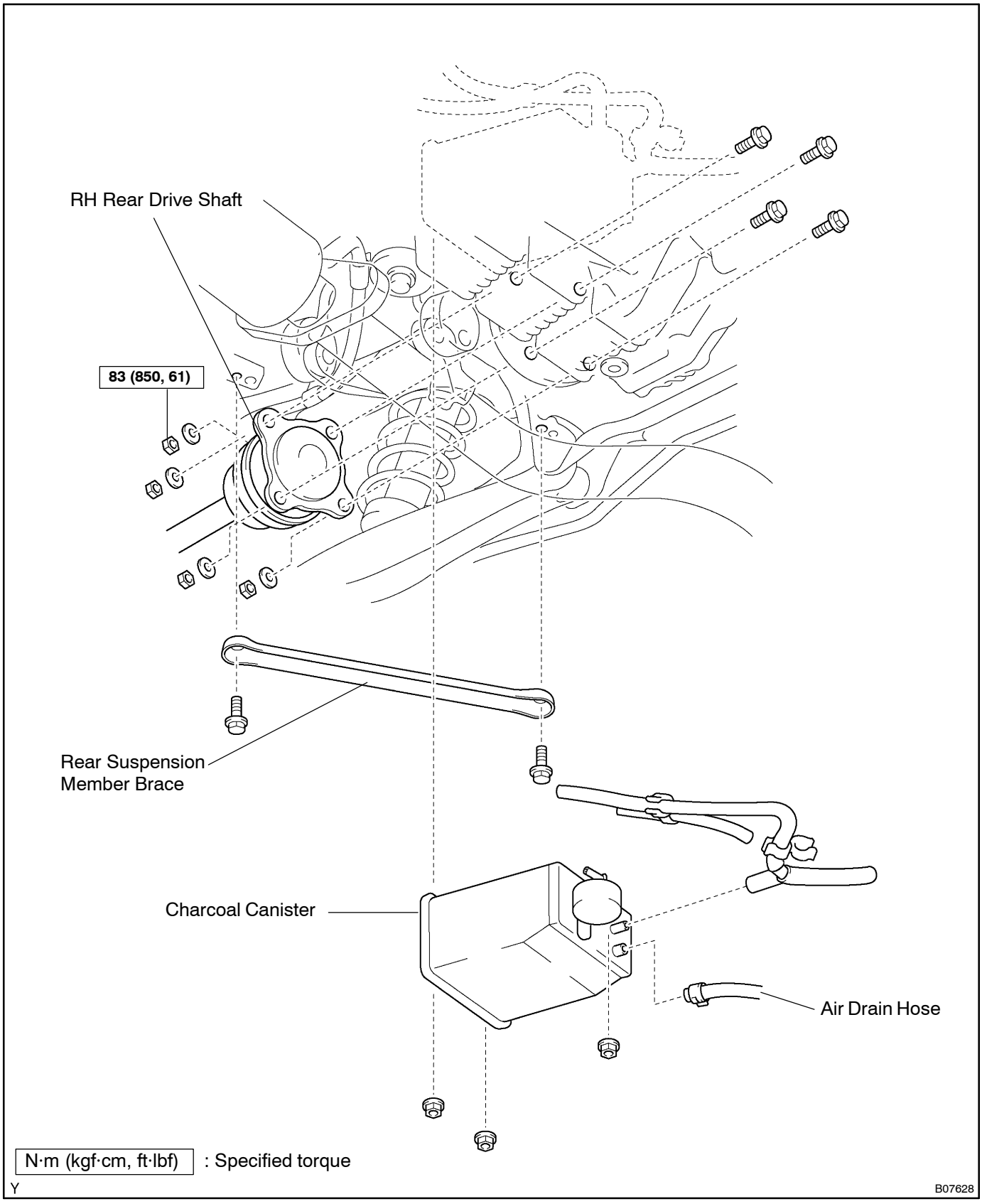
6. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

COMPONENTS

EC053–04



EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

EC0CG–01

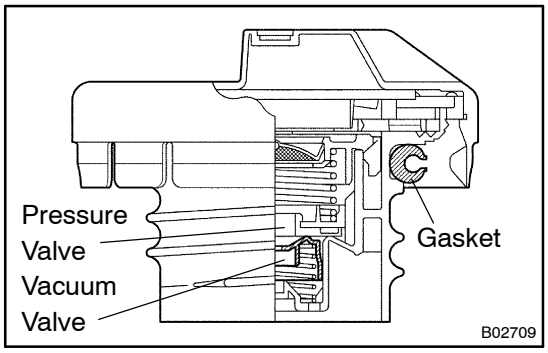
INSPECTION

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for connections, sharp bends or damage.

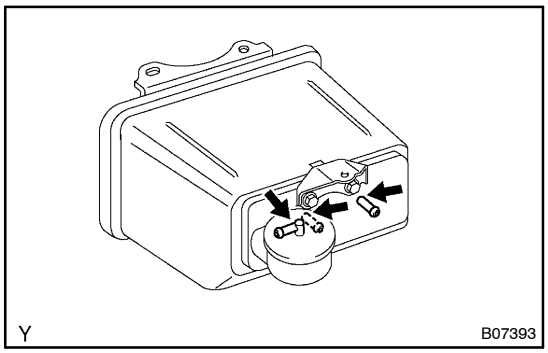
2. VISUALLY INSPECT FUEL TANK

Look for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

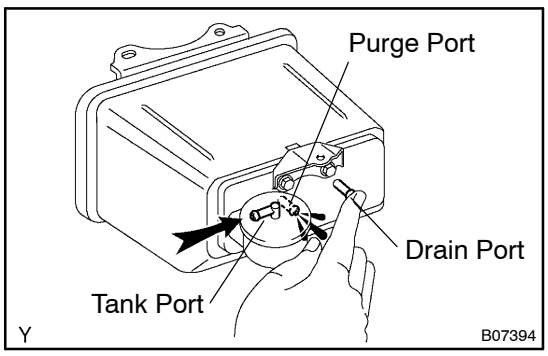
Check if the cap and/or gasket are deformed or damaged.
If necessary, repair or replace the cap.



4. REMOVE CHARCOAL CANISTER

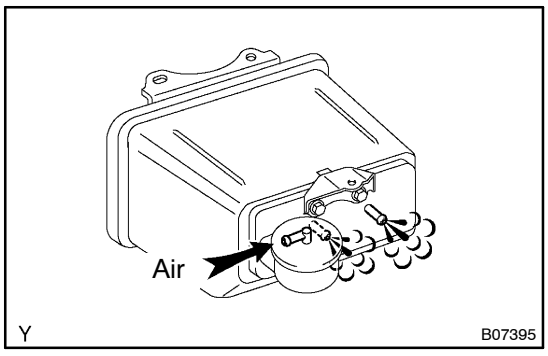
5. INSPECT CHARCOAL CANISTER

(a) Visually check the charcoal canister for cracks or damage.

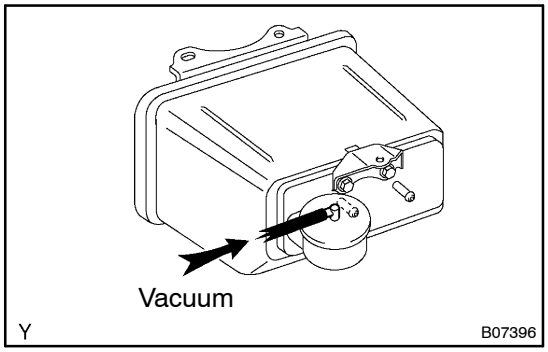


(b) Inspect the charcoal canister operation.

(1) While holding the drain port(s) closed, blow air (19.6 kPa, 0.2 kgf/cm^2, 2.8 psi) into the tank port and check that air flows from the purge port.

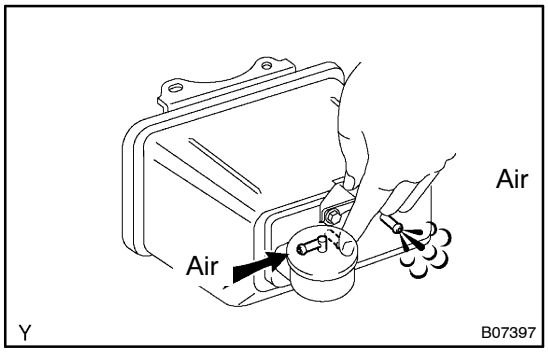


(2) Blow air (19.6 kPa, 0.2 kgf/cm^2, 2.8 psi) into tank port and check that air flows without resistance from the other port.



(3) Apply vacuum (9.8 kPa, 73.5 mmHg, 2.9 in.Hg) to tank port and check that the vacuum gauge indicator with settle at about 2.0 kPa (15.0 mmHg, 0.6 in.Hg).

If operation is not as specified, replace the charcoal canister.



(c) Clean the filter in the canister.
Clean the filter by blowing 294 kPa (3 kgf/cm², 43 psi) of compressed air into tank port while holding purge port closed.

NOTICE:

- **Do not attempt to wash the canister.**
- **No activated carbon should come out.**

6. REINSTALL CHARCOAL CANISTER

7. REMOVE VSV FOR EVAP

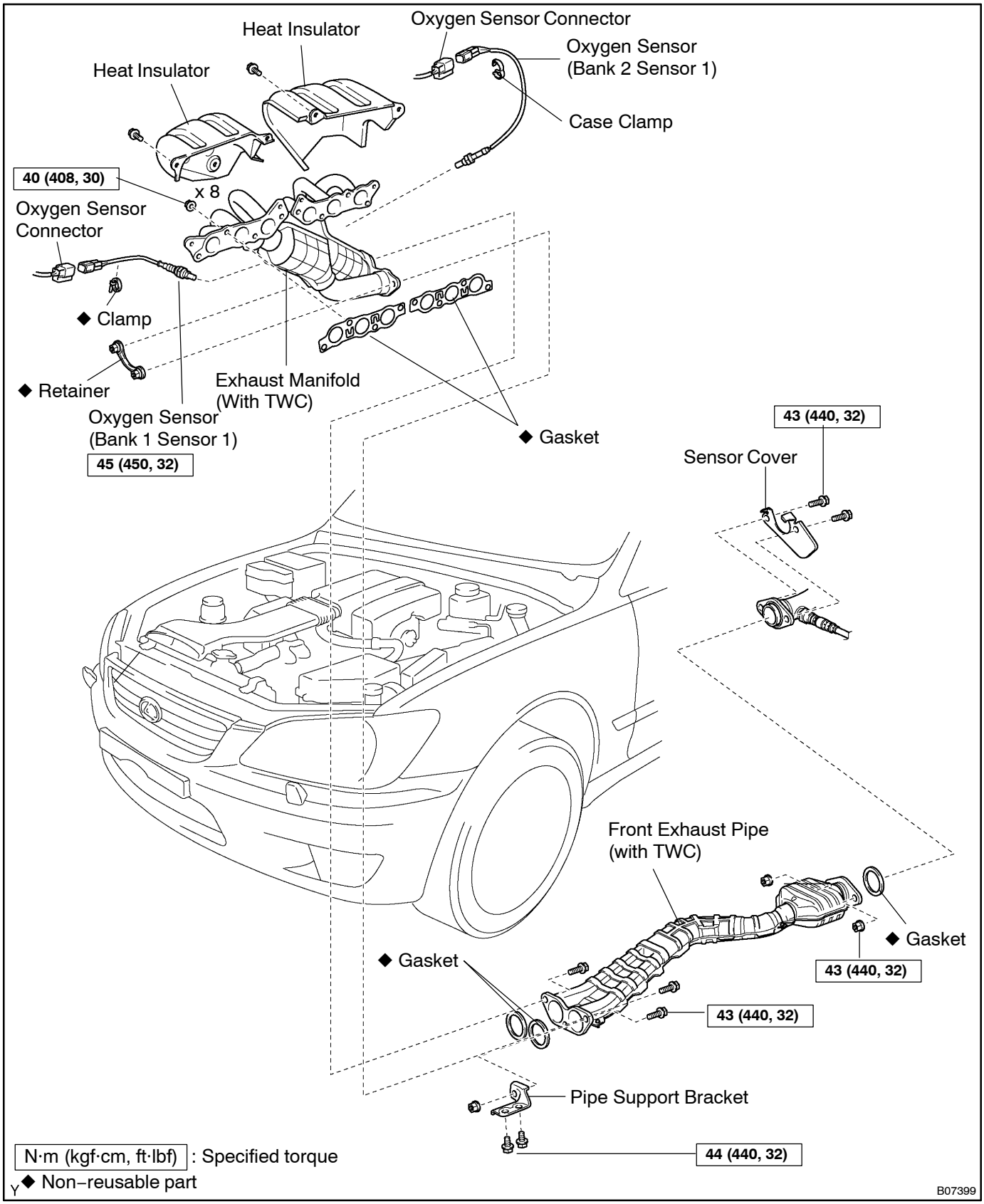
8. INSPECT VSV FOR EVAP (See page FI–53)

9. REINSTALL VSV FOR EVAP

THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM

COMPONENTS

EC04Y–03



EC04Z–01

INSPECTION

1. INSPECT EXHAUST PIPE ASSEMBLY

(a) Check the connections for looseness or damage.

(b) Check the clamps for weakness, cracks or damage.

2. INSPECT TWC

Check for dents or damage.

If any part of the protector is damaged or dented to the extent that it contacts the TWC, repair or replace it.

3. INSPECT TWC HEAT INSULATOR

(a) Check the heat insulator for damage.

(b) Check for adequate clearance between the catalytic converter and heat insulator.

EC050–03

REPLACEMENT

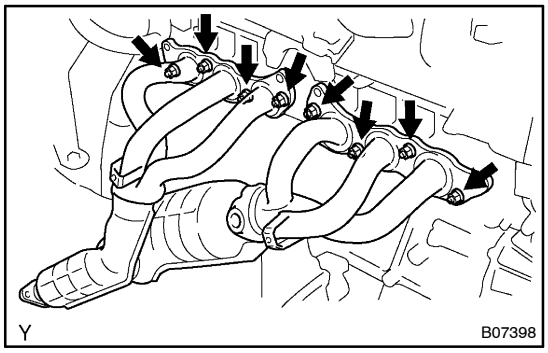
1. DISCONNECT FRONT EXHAUST PIPE FROM EXHAUST MANIFOLD (See page EM–71)

2. DISCONNECT HEATED OXYGEN SENSORS FROM EXHAUST MANIFOLD

(a) Disconnect the 2 oxygen sensor connectors.

(b) Remove the clamp and case clamp.

(c) Disconnect the 2 oxygen sensors (bank 1 sensor 1, 2).



3. REMOVE EXHAUST MANIFOLD (WITH TWC)

(a) Remove the 6 bolts and 2 heat insulators.

(b) Remove the 8 nuts, exhaust manifold and 2 gaskets.

4. REINSTALL EXHAUST MANIFOLD (WITH TWC)

(a) Install 2 new gaskets and the exhaust manifold with the 8 nuts. Uniformly tighten the nuts in several passes.

Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)

(b) Install the 6 bolts and 2 heat insulators.

5. RECONNECT OXYGEN SENSORS TO EXHAUST MANIFOLD

(a) Connect the 2 oxygen sensors (bank 1 sensor 1, 2).

(b) Install a new clamp and case clamp.

(c) Connect the 2 oxygen sensor connectors.

6. RECONNECT FRONT EXHAUST PIPE TO EXHAUST MANIFOLD (See page EM–76)

CO/HC

INSPECTION

EM115–01

HINT:

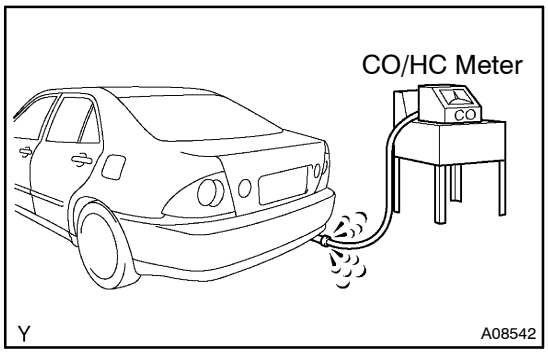
This check is used only to determine whether or not the idle CO/HC complies with specifications.

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
(f) EFI 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 INTO TAILPIPE AT LEAST 40 cm (1.3 ft) DURING IDLING

5. CHECK CO/HC CONCENTRATION AT IDLE

Idle CO concentration: 0 – 0.5 %

Idle HC concentration: Applicable local regulation

If the CO/HC concentration does not conform to specifications, perform troubleshooting in the order given below.

(a) Check oxygen sensor operation.
(b) See the table next page for possible causes, and then inspect and correct the applicable causes if necessary.

HC	CO	Problems	Causes
Normal	High	Rough idle	1. Faulty ignition: • Incorrect timing • Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinder
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hoses • Intake manifold • Throttle body • Brake 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 EFI systems: • Faulty pressure regulator • Defective water temp. sensor • Faulty engine ECU • Faulty injectors • Faulty throttle position sensor • Faulty vacuum sensor

COMPRESSION

EM07Y–06

INSPECTION

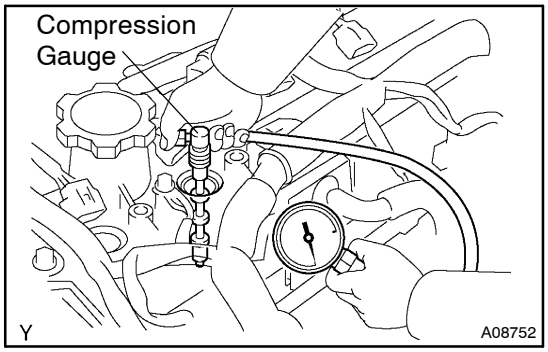
HINT:

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 (See page IG–6)**
3. **REMOVE SPARK PLUGS (See page IG–1)**
4. **DISCONNECT INJECTOR CONNECTORS**



5. **INSPECT 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.

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:
1,255 kPa (12.8 kgf/cm², 182 psi) or more
Minimum pressure: 981 kPa (10.0 kgf/cm², 142 psi)
Difference between each cylinder:
98 kPa (1.0 kgf/cm², 14 psi) or less

(e) If the cylinder compression in one 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.

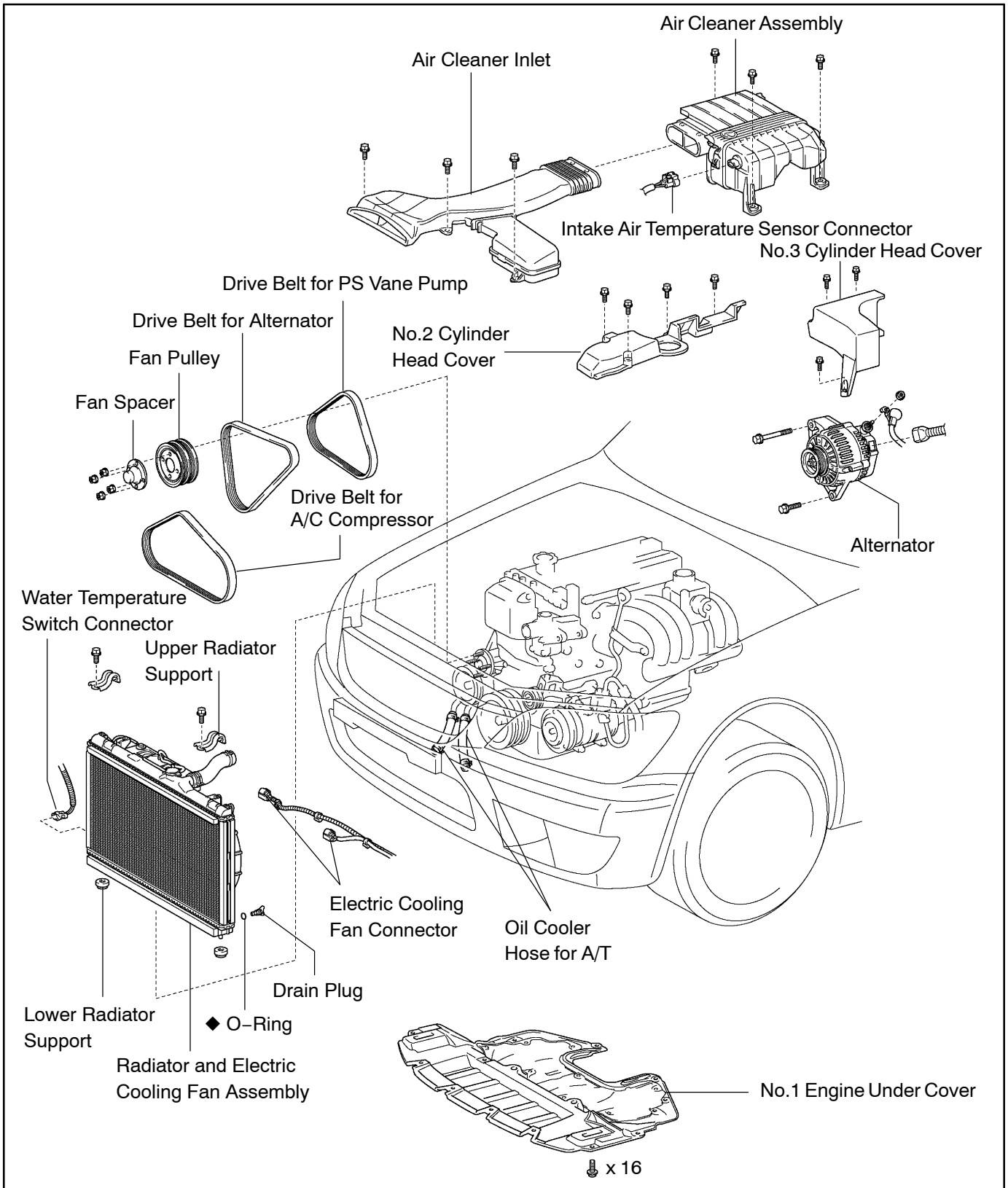
- If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are probably worn or damaged.
- If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.

6. **RECONNECT INJECTOR CONNECTORS**
7. **REINSTALL SPARK PLUGS (See page IG–1)**
8. **RECONNECT IGNITION COILS (See page IG–6)**

VALVE CLEARANCE

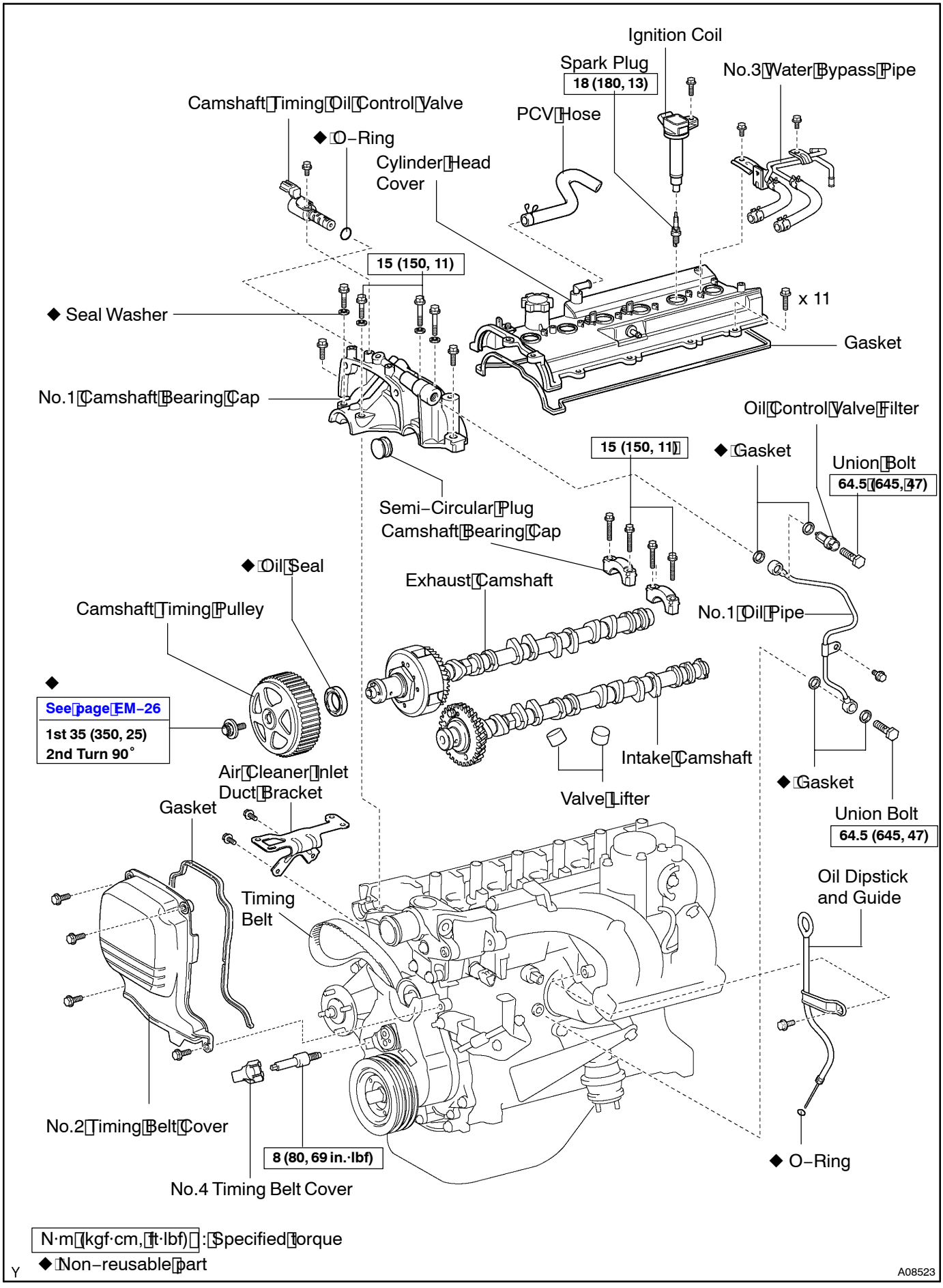
COMPONENTS

EM116–01



Y ◆: Non–reusable part

A08549



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

A08523

EM11I–01

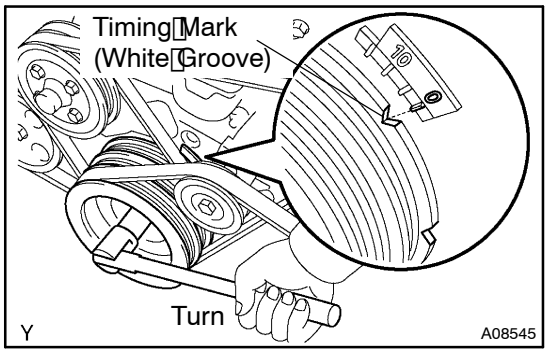
ADJUSTMENT

HINT:

Inspect and adjust the valve clearance when the engine is cold.

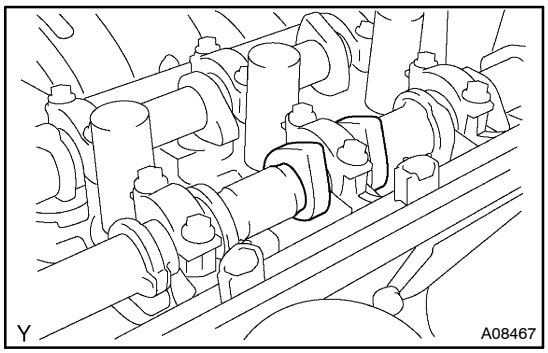
1. REMOVE NO.1 ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE AIR CLEANER INLET
4. REMOVE AIR CLEANER ASSEMBLY
5. REMOVE PCV HOSE
6. REMOVE NO.2 CYLINDER HEAD COVER
7. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD
8. REMOVE IGNITION COILS (See page IG–6)
9. REMOVE SPARK PLUGS (See page IG–1)
10. REMOVE NO.3 WATER BYPASS PIPE
11. REMOVE AIR CLEANER INLET DUCT BRACKET
12. REMOVE CYLINDER HEAD COVER

Remove the 11 bolts, cylinder head cover and gasket.



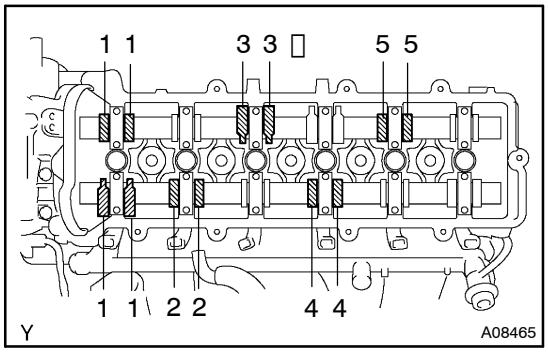
13. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley, and align the timing mark (white groove) with the timing mark "0" of the No.1 timing belt cover.



(b) Check that the No.4 cylinder cam lobes of the intake camshaft faces nearly straight up.

If not, revolve the crankshaft 1 (360°) and align the mark as above.



14. INSPECT VALVE CLEARANCE

(a) Check only those valves indicated in the illustration.

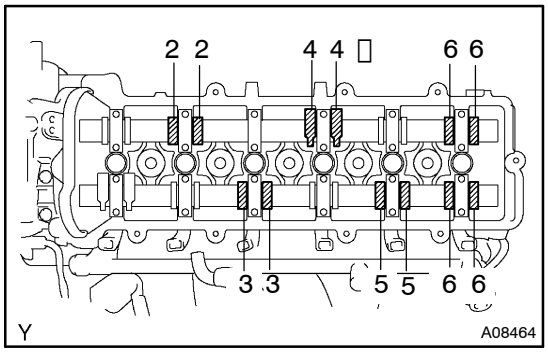
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

(2) Record the out–of–specification valve clearance measurements. They will be used later to determine the required replacement valve lifter.

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 one revolution (360°) and align the mark as above.



(c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))

15. REMOVE RADIATOR ASSEMBLY (See page CO–15)

16. REMOVE DRIVE BELT FOR A/C COMPRESSOR (See page AC–17)

17. REMOVE DRIVE BELT FOR ALTERNATOR (See page CH–6)

HINT:

Before removing the drive belt, loosen the 4 fan pulley nuts.

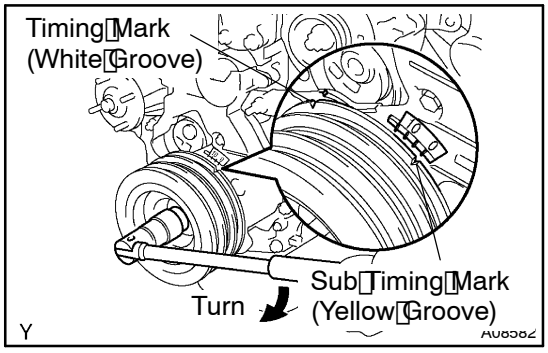
18. REMOVE DRIVE BELT FOR PS VANE PUMP (See page SR–27)

19. REMOVE FAN SPACER AND PULLEY

20. REMOVE NO.2 TIMING BELT COVER

Remove the 4 bolts, timing belt cover and gasket.

21. REMOVE NO.4 TIMING BELT COVER

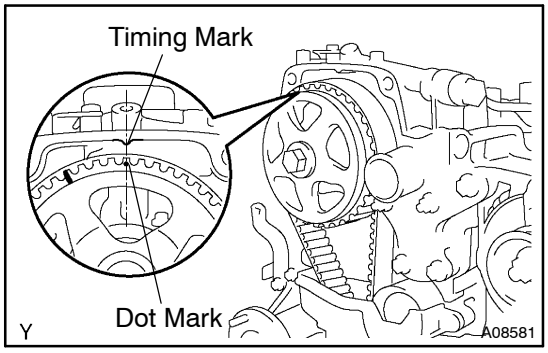


22. SET NO.1 CYLINDER TO APPROX. 60° BTDC/COMPRESSION

(a) Turn the crankshaft pulley, and align the sub timing mark (yellow groove – 60° mark BTDC) with the timing mark "0" of the No.1 timing belt cover.

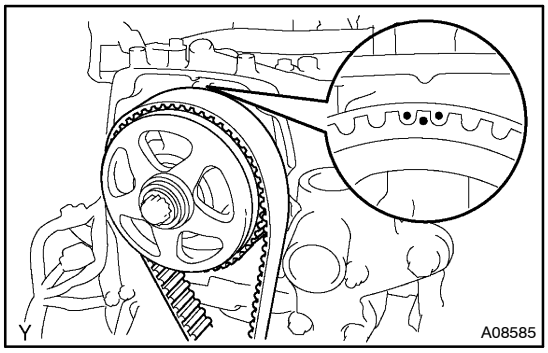
NOTICE:

- **Always turn the crankshaft clockwise.**
- **If the timing belt is disengaged, having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other. Thus results in damage when you remove the camshaft timing pulley (See page EM–59). So, always set the crankshaft pulley at the correct angle.**



(b) Check that the dot mark (60˚ mark BTDC) of the camshaft timing pulley is aligned with the timing mark of the No.1 bearing cap.

If not, revolve the crankshaft 1 (360˚).

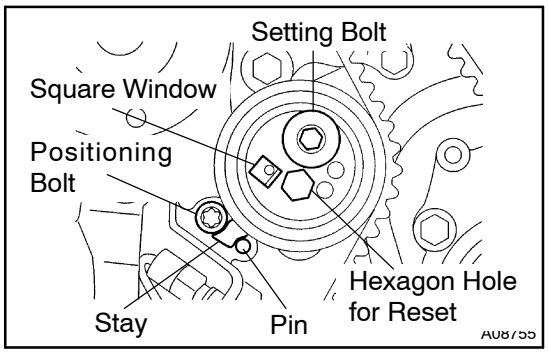


23. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEY

HINT:

When re–using timing belt:

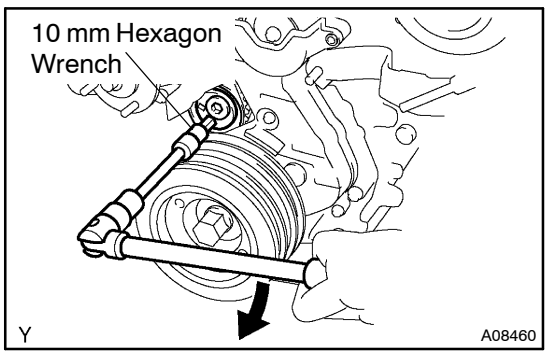
Place the matching marks on the timing belt and the camshaft timing pulley as shown in the illustration.

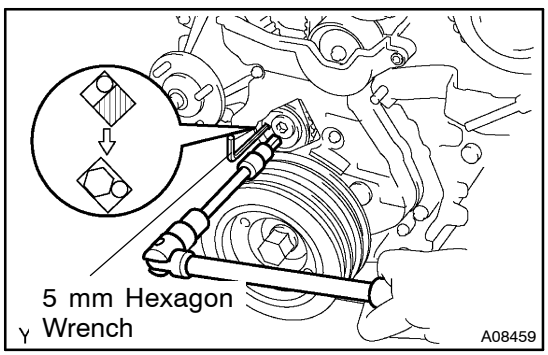


(a) Using a 10 mm hexagon wrench, insert the auto tensioner rod inside of the No.1 idler pulley to the hexagon hole for reset in the No.1 idler pulley.

NOTICE:

Must not apply torque with more than 39 N·m (400 kgf·cm, 29 ft·lbf).

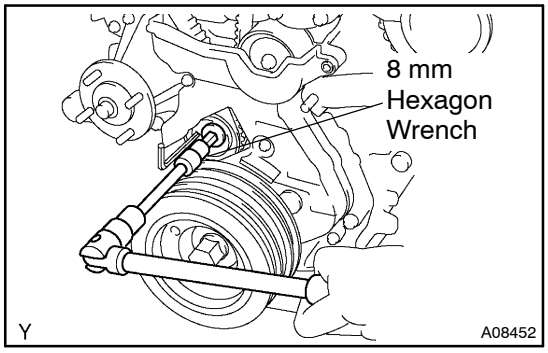




(b) After confirming the movement of the pin inside the square window, insert a 5 mm hexagon wrench.

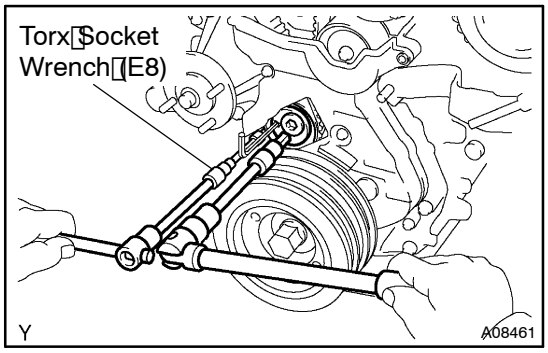
HINT:

Be sure to insert the wrench only after you feel the knocking while inserting the auto tensioner.

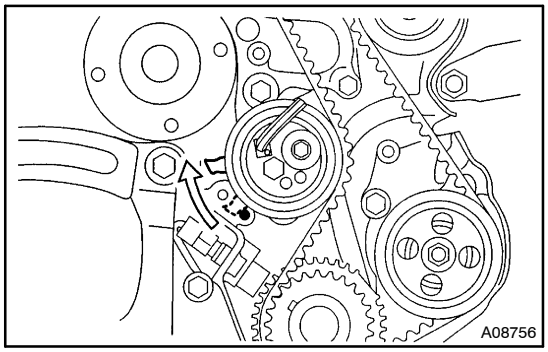


(c) Using a 8 mm hexagon wrench, loosen the bolt of the No.1 idler pulley (timing belt tensioner).

NOTICE:
Least necessary losing is required only to move the No.1 idler pulley.



(d) Using a 10 mm hexagon wrench, keep holding the No.1 idler pulley lightly toward the direction of tensing and take out the positioning bolt using a torx socket wrench (E8).



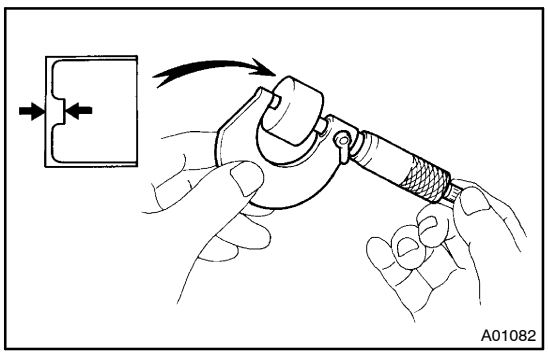
(e) Move the No.1 idler pulley by hand toward the direction of loosening the timing belt.

(f) Disconnect the timing belt from the camshaft timing pulley.

24. REMOVE CAMSHAFT TIMING PULLEY AND CAMSHAFTS (See page EM–36)

25. ADJUST VALVE CLEARANCE

(a) Remove the valve lifter.



(b) Determine the replacement valve lifter size by following the Formula or Charts:

(1) Using a micrometer, measure the thickness of the removed valve lifter.

(2) Calculate the thickness of a new lifter so that the valve clearance comes within specified value.

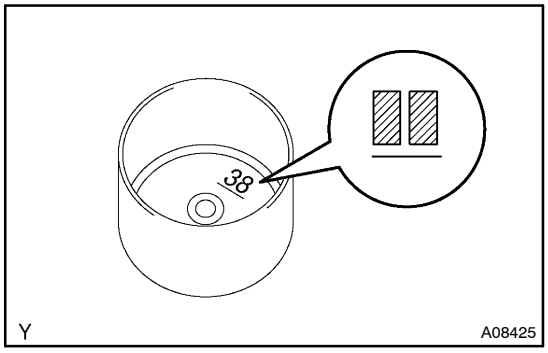
T ..... Thickness of removed valve lifter
A ..... Measured valve clearance
N ..... Thickness of new valve lifter

Intake: N = T + (A – 0.20 mm (0.008 in.))
Exhaust: N = T + (A – 0.30 mm (0.012 in.))

(3) Select a new valve lifter with a thickness as close as possible to the calculated value.

HINT:

- Valve lifters are available in 35 sizes in increments of 0.020 mm (0.0008 in.), from 5.060 mm (0.1992 in.) to 5.740 mm (0.2260 in.).

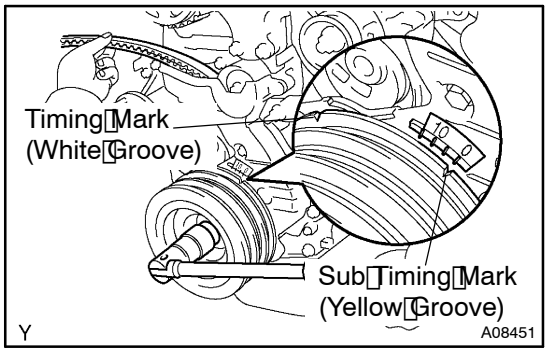


- Identification number inside the valve lifter shows the value of the two decimal places. (The illustration shows 5.380 mm (0.2118 in.).)

(c) Install a new valve lifter.

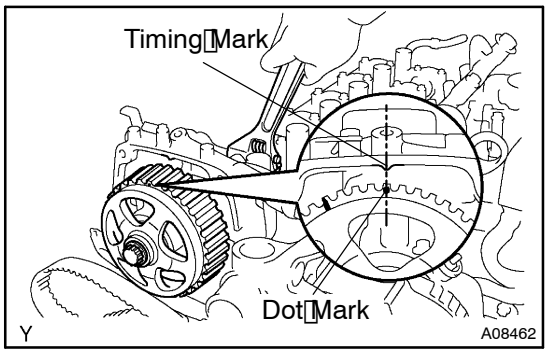
26. REINSTALL CAMSHAFTS AND CAMSHAFT TIMING PULLEY (See page EM–59)

27. RECHECK VALVE CLEARANCE

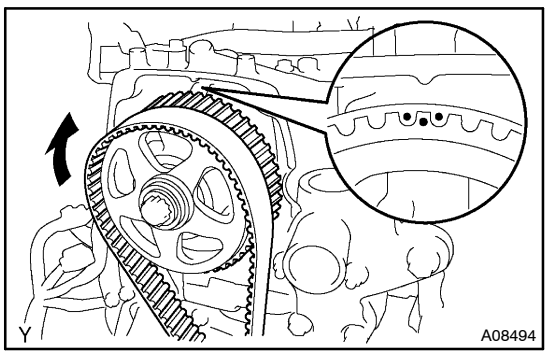


28. RESET NO.1 CYLINDER TO APPROX. 60° BTDC/ COMPRESSION

(a) Crankshaft Pulley Position:
Turn the crankshaft pulley, and align the sub timing mark (yellow groove – 60° mark BTDC) with the timing mark "0" of the No.1 timing belt cover.



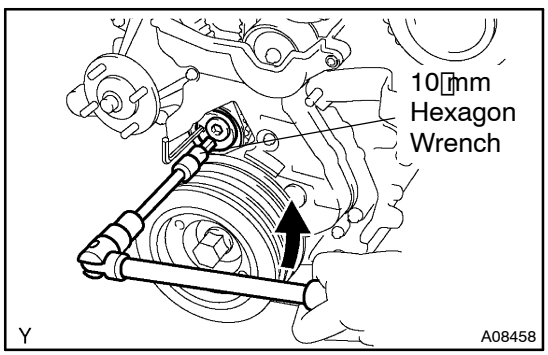
(b) Camshaft Timing Pulley Position:
Using the hexagon portion of the camshaft, turn the camshaft, align the dot mark (60° mark BTDC) of the camshaft timing pulley with the timing mark of the No.1 bearing cap.



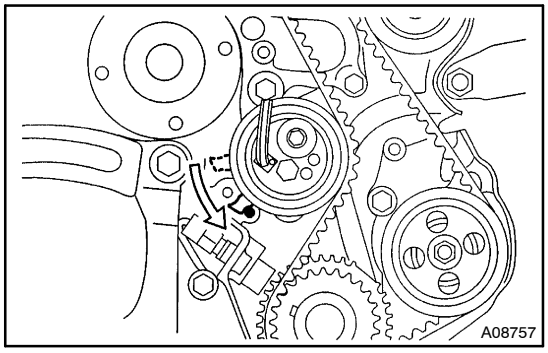
29. RECONNECT TIMING BELT TO CAMSHAFT TIMING PULLEY

(a) Install the timing belt, check the tension between the crankshaft timing pulley, oil pump pulley, No.2 idler pulley and camshaft timing pulley.

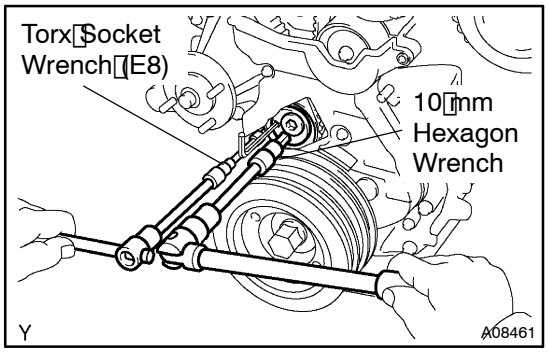
HINT:
When re–using timing belt:
Align the marked points during removal.



(b) Using a 10 mm hexagon wrench, keep holding the No.1 idler pulley toward the direction of tensing the timing belt.



(c) After confirming that the stay of the No.1 idler pulley touches the pin, install the positioning bolt by hand.

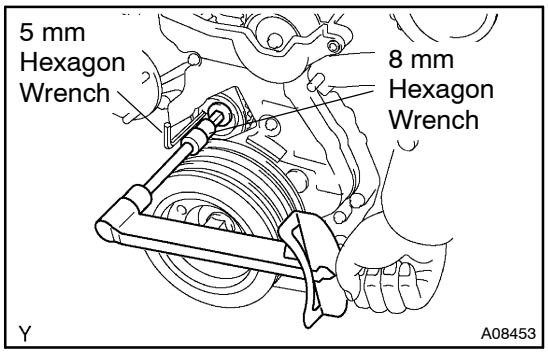


(d) Using a torx socket wrench (E8), tighten the positioning bolt.

Torque: 31 N·m (320 kgf·cm, 23 ft·lbf)

NOTICE:

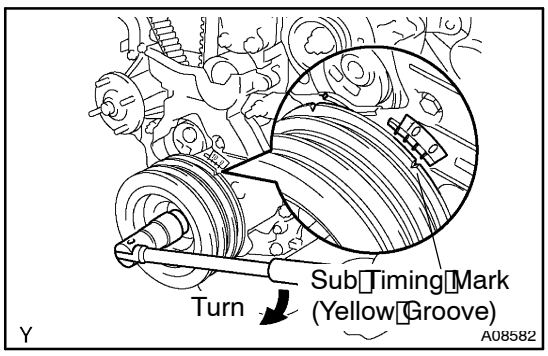
Be careful not to allow the bolt to come onto the stay of the No.1 idler pulley.



(e) Using a 8 mm hexagon wrench, tighten the bolt of the No.1 idler pulley (timing belt tensioner).

Torque: 42.5 N·m (425 kgf·cm, 31 ft·lbf)

(f) Take the 5 mm hexagon wrench for lock out of the square window.

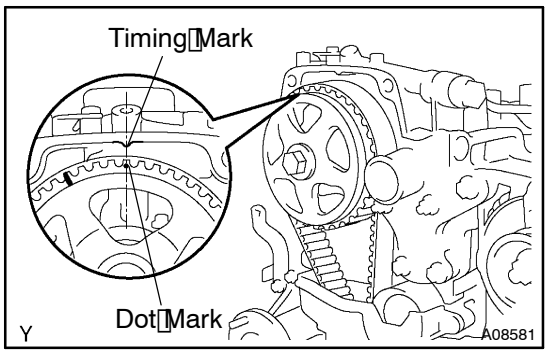


30. CHECK VALVE TIMING

(a) Slowly revolve the crankshaft 2 times, and align the sub timing mark (yellow groove – 60° mark BTDC) with the timing mark "0" of the No.1 timing belt cover.

NOTICE:

Always turn the crankshaft clockwise.



(b) Check that the dot mark (60° mark BTDC) of the camshaft timing pulley is aligned with the timing mark of the No.1 bearing cap.

31. REINSTALL NO.4 TIMING BELT COVER

32. REINSTALL NO.2 TIMING BELT COVER

(a) Install the gasket to the timing belt cover.

(b) Install the timing belt cover with the 4 bolts.

Torque: 6 N·m (60 kgf·cm, 52 in.·lbf)

33. REINSTALL CYLINDER HEAD COVER

(See page EM–59)

34. REINSTALL AIR CLEANER INLET DUCT BRACKET
Torque: 18.5 N·m (190 kgf·cm, 14 ft·lbf)
35. REINSTALL NO.3 WATER BYPASS PIPE
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)
36. REINSTALL SPARK PLUGS (See page IG–1)
37. REINSTALL IGNITION COILS (See page IG–6)
38. RECONNECT ENGINE WIRE TO CYLINDER HEAD
39. REINSTALL NO.2 CYLINDER HEAD COVER
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)
40. REINSTALL PCV HOSE
41. REINSTALL FAN PULLEY AND SPACER
HINT:
Temporarily install the 4 nuts.
42. REINSTALL DRIVE BELT FOR PS VANE PUMP (See page SR–37)
43. REINSTALL DRIVE BELT FOR ALTERNATOR (See page CH–15)
44. REINSTALL DRIVE BELT FOR A/C COMPRESSOR (See page AC–18)
45. RETIGHTEN MOUNTING NUTS OF FAN PULLEY AND SPACER
Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)
46. REINSTALL RADIATOR ASSEMBLY (See page CO–21)
47. REINSTALL AIR CLEANER ASSEMBLY
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)
48. REINSTALL AIR CLEANER INLET
Torque: 5 N·m (50 kgf·cm, 43 in.·lbf)
49. REFILL ENGINE WITH COOLANT
50. START ENGINE CHECK FOR LEAK
51. REINSTALL NO.1 ENGINE UNDER COVER
52. ROAD TEST
Check abnormal noise, shock, slippage, correct shift points and smooth operation.
53. RECHECK ENGINE COOLANT LEVEL

Valve Lifter Selection Chart (Intake)

Measured clearance mm (in.) \ Installed lifter thickness mm (in.)	5.060 (0.1992)	5.080 (0.2000)	5.100 (0.2008)	5.120 (0.2016)	5.140 (0.2024)	5.160 (0.2031)	5.180 (0.2039)	5.200 (0.2047)	5.210 (0.2051)	5.220 (0.2055)	5.230 (0.2059)	5.240 (0.2063)	5.250 (0.2067)	5.260 (0.2071)	5.270 (0.2075)	5.280 (0.2079)	5.290 (0.2083)	5.300 (0.2087)	5.310 (0.2091)	5.320 (0.2094)	5.330 (0.2098)	5.340 (0.2102)	5.350 (0.2106)	5.360 (0.2110)	5.370 (0.2114)	5.380 (0.2118)	5.390 (0.2122)	5.400 (0.2126)	5.410 (0.2130)	5.420 (0.2134)	5.430 (0.2138)	5.440 (0.2142)	5.450 (0.2146)	5.460 (0.2150)	5.470 (0.2154)	5.480 (0.2157)	5.490 (0.2161)	5.500 (0.2165)	5.510 (0.2169)	5.520 (0.2173)	5.530 (0.2177)	5.540 (0.2181)	5.550 (0.2185)	5.560 (0.2189)	5.570 (0.2193)	5.580 (0.2197)	5.590 (0.2201)	5.600 (0.2205)	5.620 (0.2213)	5.640 (0.2220)	5.660 (0.2228)	5.680 (0.2236)	5.700 (0.2244)	5.720 (0.2252)	5.740 (0.2260)
0.000 – 0.030 (0.0000 – 0.0012)									06	06	06	06	06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56
0.031 – 0.050 (0.0012 – 0.0020)							06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56	58
0.051 – 0.070 (0.0020 – 0.0028)						06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60
0.071 – 0.090 (0.0028 – 0.0035)					06	06	06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62
0.091 – 0.110 (0.0036 – 0.0043)				06	06	06	08	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	54	56	58	60	62	64
0.111 – 0.130 (0.0044 – 0.0051)			06	06	06	08	10	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	56	58	60	62	64	66
0.131 – 0.149 (0.0052 – 0.0059)		06	06	06	08	10	12	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	58	60	62	64	66	68
0.150 – 0.250 (0.0059 – 0.0098)																																																									
0.251 – 0.270 (0.0099 – 0.0106)	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	70	72	74	74	74
0.271 – 0.290 (0.0107 – 0.0114)	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	72	74	74	74	
0.291 – 0.310 (0.0115 – 0.0122)	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74	74	74		
0.311 – 0.330 (0.0122 – 0.0130)	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74			
0.331 – 0.350 (0.0130 – 0.0138)	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74				
0.351 – 0.370 (0.0138 – 0.0146)	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74					
0.371 – 0.390 (0.0146 – 0.0154)	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74						
0.391 – 0.410 (0.0154 – 0.0161)	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74							
0.411 – 0.430 (0.0162 – 0.0169)	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74									
0.431 – 0.450 (0.0170 – 0.0177)	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74												
0.451 – 0.470 (0.0178 – 0.0185)	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74														
0.471 – 0.490 (0.0185 – 0.0193)	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																
0.491 – 0.510 (0.0193 – 0.0201)	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																		
0.511 – 0.530 (0.0201 – 0.0209)	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																				
0.531 – 0.550 (0.0209 – 0.0217)	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																						
0.551 – 0.570 (0.0217 – 0.0224)	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																								
0.571 – 0.590 (0.0225 – 0.0232)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.591 – 0.610 (0.0233 – 0.0240)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.611 – 0.630 (0.0241 – 0.0248)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.631 – 0.650 (0.0248 – 0.0256)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.651 – 0.670 (0.0256 – 0.0264)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	74	74	74	74																										
0.671 – 0.690 (0.0264 – 0.0272)	54	56	58	60	62	64	66	68	70	70	72	72	74	74	74	74	74	74																										
0.691 – 0.710 (0.0272 – 0.0280)	56	58	60	62	64	66	68	70	72	72	74	74	74	74	74	74																										
0.711 – 0.730 (0.0280 – 0.0287)	58	60	62	64	66	68	70	72	74	74	74	74	74	74																										
0.731 – 0.750 (0.0288 – 0.0295)	60	62	64	66	68	70	72	74	74	74	74	74																												
0.751 – 0.770 (0.0296 – 0.0303)	62	64	66	68	70	72	74	74	74	74																												
0.771 – 0.790 (0.0304 – 0.0311)	64	66	68	70	72	74	74	74																														
0.791 – 0.810 (0.0311 – 0.0319)	66	68	70	72	74	74	74																															
0.811 – 0.830 (0.0319 – 0.0327)	68	70	72	74	74	74																																
0.831 – 0.850 (0.0327 – 0.0335)	70	72	74	74	74																																	
0.851 – 0.870 (0.0335 – 0.0343)	72	74	74	74																																		
0.871 – 0.890 (0.0343 – 0.0350)	74	74	74																																			
0.891 – 0.910 (0.0351 – 0.0358)	74	74																																				
0.911 – 0.930 (0.0359 – 0.0366)	74																																					

New lifter thickness mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)		

Intake valve clearance (Cold):
0.15 – 0.25 mm (0.006 – 0.010 in.)

EXAMPLE: The 5.250 mm (0.2067 in.) lifter is installed, and the measured clearance is 0.400 mm (0.0157 in.).
Replace the 5.250 mm (0.2067 in.) lifter with a new No. 48 lifter.

A01234

Valve Lifter Selection Chart (Exhaust)

Measured clearance mm (in.) \ Installed lifter thickness mm (in.)	5.060 (0.1992)	5.080 (0.2000)	5.100 (0.2008)	5.120 (0.2016)	5.140 (0.2024)	5.160 (0.2031)	5.180 (0.2039)	5.200 (0.2047)	5.210 (0.2051)	5.220 (0.2055)	5.230 (0.2059)	5.240 (0.2063)	5.250 (0.2067)	5.260 (0.2071)	5.270 (0.2075)	5.280 (0.2079)	5.290 (0.2083)	5.300 (0.2087)	5.310 (0.2091)	5.320 (0.2094)	5.330 (0.2098)	5.340 (0.2102)	5.350 (0.2106)	5.360 (0.2110)	5.370 (0.2114)	5.380 (0.2118)	5.390 (0.2122)	5.400 (0.2126)	5.410 (0.2130)	5.420 (0.2134)	5.430 (0.2138)	5.440 (0.2142)	5.450 (0.2146)	5.460 (0.2150)	5.470 (0.2154)	5.480 (0.2157)	5.490 (0.2161)	5.500 (0.2165)	5.510 (0.2169)	5.520 (0.2173)	5.530 (0.2177)	5.540 (0.2181)	5.550 (0.2185)	5.560 (0.2189)	5.570 (0.2193)	5.580 (0.2197)	5.590 (0.2201)	5.600 (0.2205)	5.620 (0.2213)	5.640 (0.2220)	5.660 (0.2228)	5.680 (0.2236)	5.700 (0.2244)	5.720 (0.2252)	5.740 (0.2260)
0.000 – 0.030 (0.0000 – 0.0012)																			06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	36	38	40	42	44	46
0.031 – 0.050 (0.0012 – 0.0020)																06	06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	38	40	42	44	46	48
0.051 – 0.070 (0.0020 – 0.0028)														06	06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	40	42	44	46	48	50
0.071 – 0.090 (0.0028 – 0.0035)												06	06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	42	44	46	48	50	52
0.091 – 0.110 (0.0036 – 0.0043)											06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	44	46	48	50	52	54
0.111 – 0.130 (0.0044 – 0.0051)									06	06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56
0.131 – 0.150 (0.0052 – 0.0059)								06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	48	50	52	54	56	58
0.151 – 0.170 (0.0059 – 0.0067)						06	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60
0.171 – 0.190 (0.0067 – 0.0075)					06	06	06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62
0.191 – 0.210 (0.0075 – 0.0083)				06	06	06	08	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	54	56	58	60	62	64
0.211 – 0.230 (0.0083 – 0.0091)			06	06	06	08	10	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	56	58	60	62	64	66
0.231 – 0.249 (0.0091 – 0.0098)		06	06	06	08	10	12	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	58	60	62	64	66	68
0.250 – 0.350 (0.0098 – 0.0138)																																																									
0.351 – 0.370 (0.0138 – 0.0146)	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	70	72	74	74	74
0.371 – 0.390 (0.0146 – 0.0154)	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	72	74	74	74	
0.391 – 0.410 (0.0154 – 0.0161)	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74	74	74		
0.411 – 0.430 (0.0162 – 0.0169)	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74			
0.431 – 0.450 (0.0170 – 0.0177)	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74					
0.451 – 0.470 (0.0178 – 0.0185)	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74						
0.471 – 0.490 (0.0185 – 0.0193)	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74						
0.491 – 0.510 (0.0193 – 0.0201)	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74							
0.511 – 0.530 (0.0201 – 0.0209)	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74									
0.531 – 0.550 (0.0209 – 0.0217)	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74											
0.551 – 0.570 (0.0217 – 0.0224)	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74														
0.571 – 0.590 (0.0225 – 0.0232)	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																
0.591 – 0.610 (0.0233 – 0.0240)	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																		
0.611 – 0.630 (0.0241 – 0.0248)	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																			
0.631 – 0.650 (0.0248 – 0.0256)	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74	74																			
0.651 – 0.670 (0.0256 – 0.0264)	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74	74																				
0.671 – 0.690 (0.0264 – 0.0272)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74	74																					
0.691 – 0.710 (0.0272 – 0.0280)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74	74																						
0.711 – 0.730 (0.0280 – 0.0287)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74	74	74																						
0.731 – 0.750 (0.0288 – 0.0295)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	74	74	74	74																								
0.751 – 0.770 (0.0296 – 0.0303)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	74	74	74	74																								
0.771 – 0.790 (0.0304 – 0.0311)	54	56	58	60	62	64	66	68	70	70	72	72	74	74	74	74	74	74																										
0.791 – 0.810 (0.0311 – 0.0319)	56	58	60	62	64	66	68	70	72	72	74	74	74	74	74	74																										
0.811 – 0.830 (0.0319 – 0.0327)	58	60	62	64	66	68	70	72	74	74	74	74	74	74																										
0.831 – 0.850 (0.0327 – 0.0335)	60	62	64	66	68	70	72	74	74	74	74	74																												
0.851 – 0.870 (0.0335 – 0.0343)	62	64	66	68	70	72	74	74	74	74																												
0.871 – 0.890 (0.0343 – 0.0350)	64	66	68	70	72	74	74	74																														
0.891 – 0.910 (0.0351 – 0.0358)	66	68	70	72	74	74	74																															
0.911 – 0.930 (0.0359 – 0.0366)	68	70	72	74	74	74																																
0.931 – 0.950 (0.0367 – 0.0374)	70	72	74	74	74																																	
0.951 – 0.970 (0.0374 – 0.0382)	72	74	74	74																																		
0.971 – 0.990 (0.0382 – 0.0390)	74	74	74																																			
0.991 – 1.010 (0.0390 – 0.0398)	74	74																																				
1.011 – 1.030 (0.0398 – 0.0406)	74																																					

New lifter thickness mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)		

Exhaust valve clearance (Cold):
0.25 – 0.35 mm (0.010 – 0.014 in.)

EXAMPLE: The 5.340 mm (0.2102 in.) lifter is installed, and the measured clearance is 0.440 mm (0.0173 in.).
Replace the 5.340 mm (0.2102 in.) lifter with a new No. 48 lifter.

A01235

IGNITION TIMING

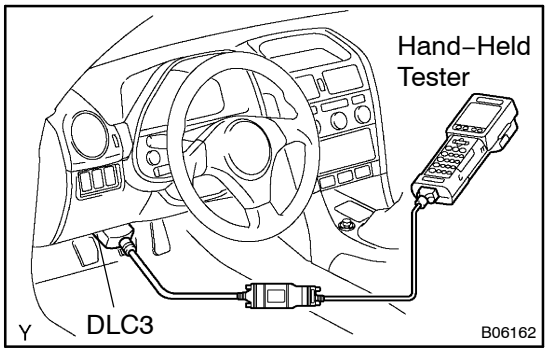
EM117–01

INSPECTION

1. REMOVE AIR CLEANER INLET

2. WARM UP ENGINE

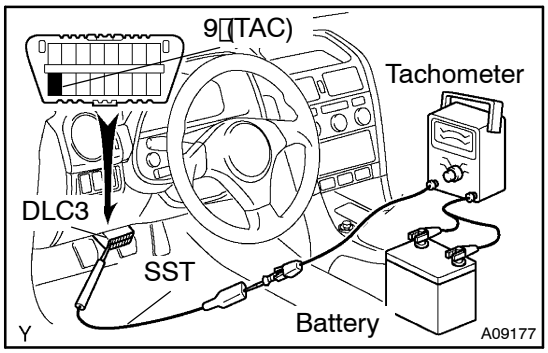
Allow the engine to warm up to normal operating temperature.



3. CONNECT HAND–HELD TESTER

(a) Connect a hand–held tester to the DLC3.

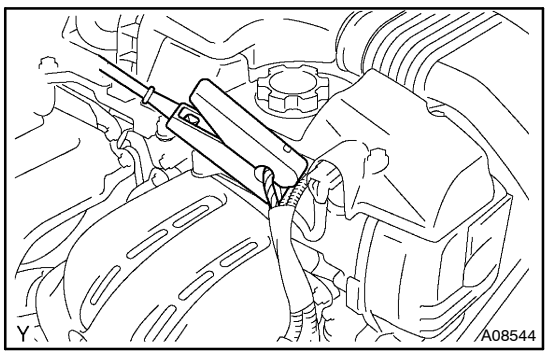
(b) Please refer to the hand–held tester operator's manual for further details.



If you have no hand–held tester, connect a tachometer tester probe to terminal 9 (TAC) of the DLC3 with SST.

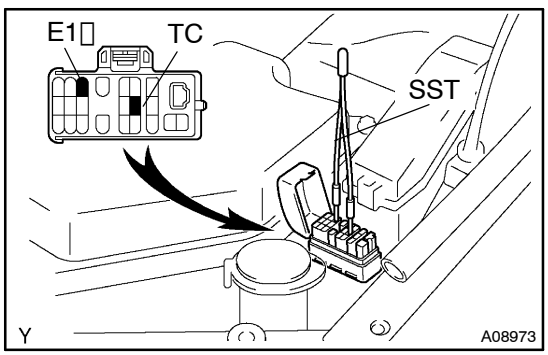
SST 09843–18030

4. CHECK IDLE SPEED (See page EM–17)



5. CONNECT TIMING LIGHT TO ENGINE

Connect the tester clip of the timing light to the wire harness as shown in the illustration.



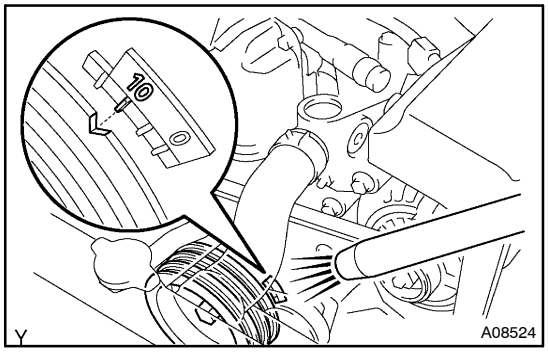
6. INSPECT IGNITION TIMING

(a) Using SST, connect terminals TC and E1 of the check connector.

SST 09843–18020

HINT:

After engine rpm is kept at 1,000 – 1,500 rpm for 5 seconds, check that it returns to idle speed.



(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 check connector.
SST 09843–18020

7. FURTHER CHECK IGNITION TIMING
Ignition timing: 9 – 13˚ BTDC @ idle
(Transmission in neutral position)

HINT:
The timing mark moves in a range between 9˚ and 13˚.

8. DISCONNECT TIMING LIGHT FROM ENGINE

9. DISCONNECT HAND–HELD TESTER

10. REINSTALL AIR CLEANER INLET

IDLE SPEED

EM118–01

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
(f) EFI system wiring connectors fully plugged
(g) Ignition timing checked correctly
(h) Transmission in neutral position

2. CONNECT HAND–HELD TESTER (See page EM–15)

3. INSPECT IDLE SPEED

(a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
(b) Check the idle speed.

Idle speed: 650 ± 50 rpm

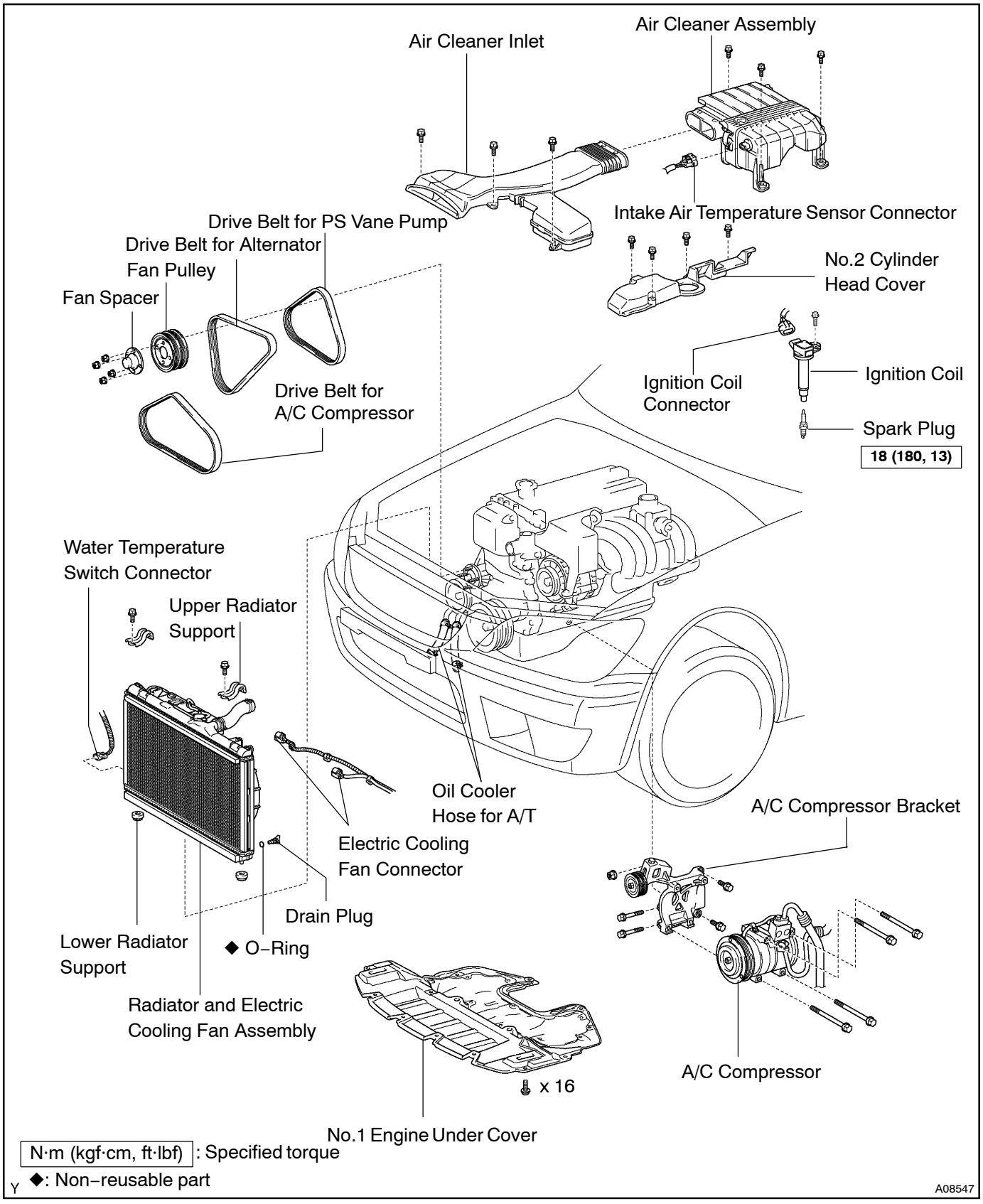
If the idle speed is not as specified, check the throttle body.

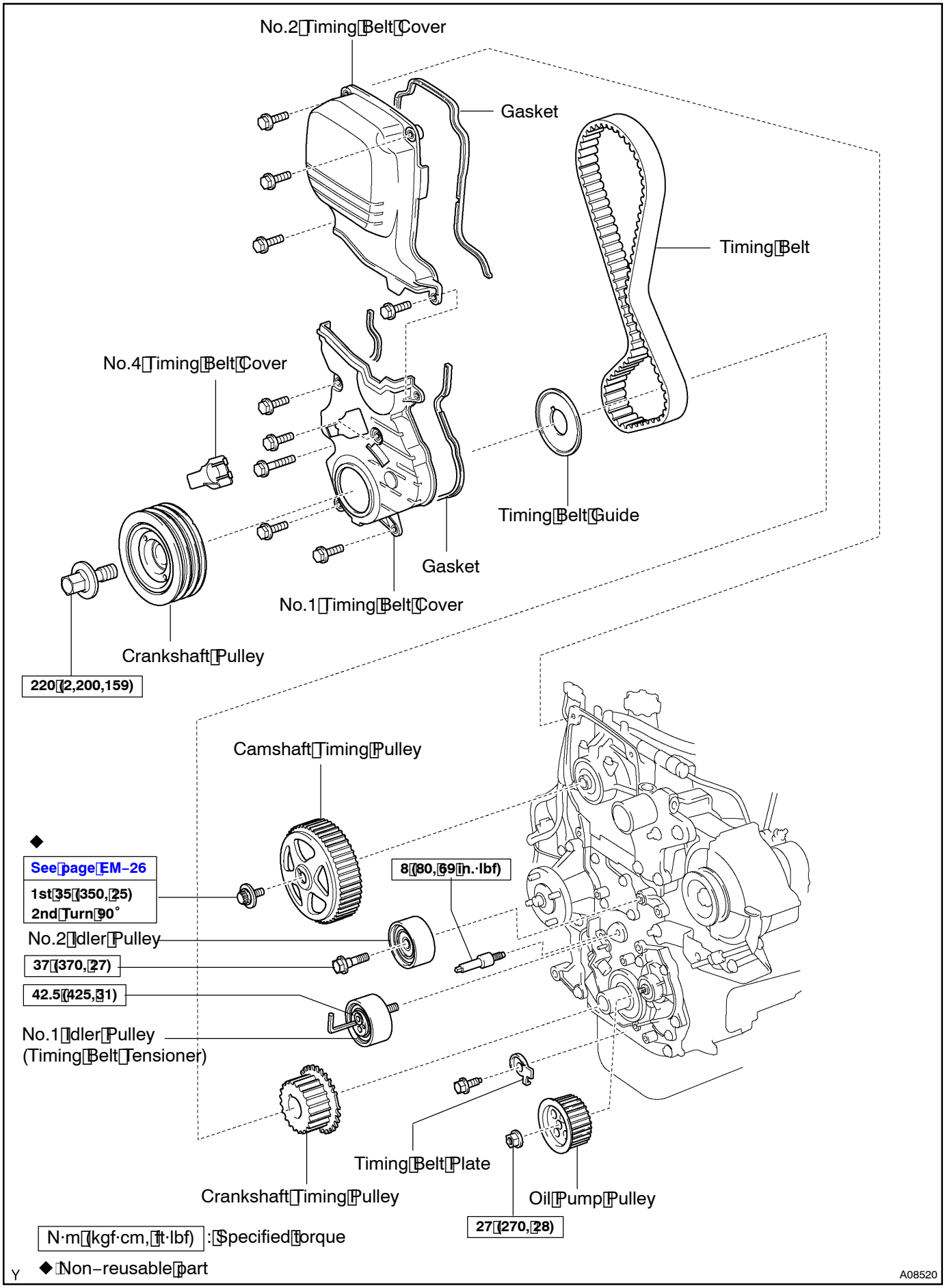
4. DISCONNECT HAND–HELD TESTER

TIMING BELT

COMPONENTS

EM083–04




No.2 Timing Belt Cover
Gasket
Timing Belt
No.4 Timing Belt Cover
Timing Belt Guide
Gasket
No.1 Timing Belt Cover
Crankshaft Pulley
220 (2,200,159)
Camshaft Timing Pulley
◆
See page EM–26
1st 35 (350, 25)
2nd Turn 90°
8 (80, 69 in.·lbf)
No.2 Idler Pulley
37 (370, 27)
42.5 (425, 31)
No.1 Idler Pulley
(Timing Belt Tensioner)
Timing Belt Plate
Crankshaft Timing Pulley
Oil Pump Pulley
27 (270, 20)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
A08520

EM119-01

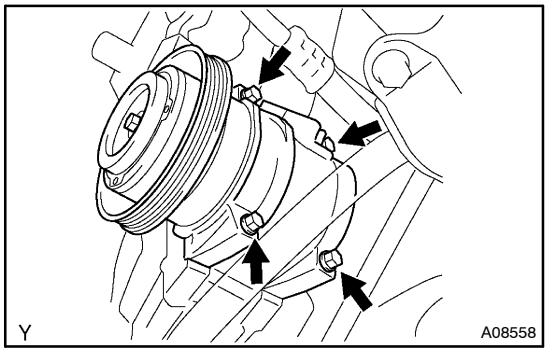
REMOVAL

1. REMOVE NO.1 ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE AIR CLEANER INLET
4. REMOVE AIR CLEANER ASSEMBLY
5. REMOVE NO.2 CYLINDER HEAD COVER
6. REMOVE IGNITION COILS (See page IG–6)
7. REMOVE SPARK PLUGS (See page IG–1)
8. REMOVE RADIATOR ASSEMBLY (See page CO–16)
9. REMOVE DRIVE BELT FOR A/C COMPRESSOR (See page AC–17)
10. REMOVE DRIVE BELT FOR ALTERNATOR (See page CH–6)

HINT:

Before removing the drive belt, loosen the 4 fan pulley nuts.

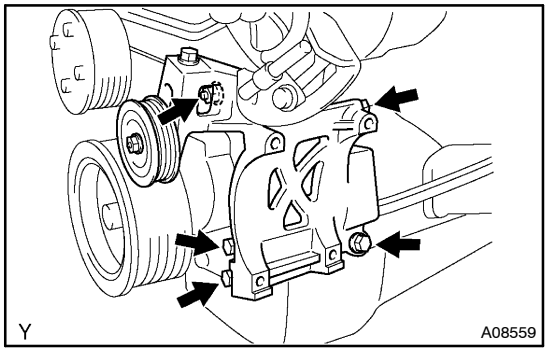
11. REMOVE DRIVE BELT FOR PS VANE PUMP (See page SR–27)
12. REMOVE FAN SPACER AND PULLEY



13. REMOVE A/C COMPRESSOR WITHOUT DISCONNECTING HOSES

(a) Disconnect the A/C compressor connector.

(b) Remove the 4 bolts, and disconnect the A/C compressor.

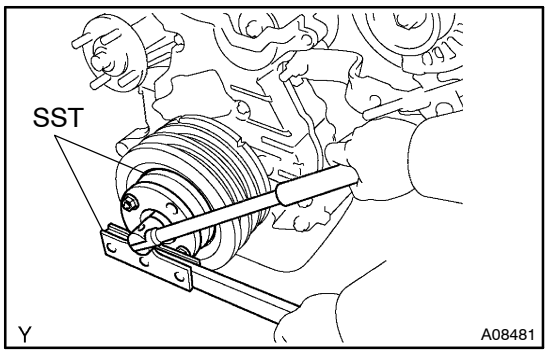


14. REMOVE A/C COMPRESSOR BRACKET

Remove the 4 bolts, nut and compressor bracket.

15. REMOVE NO.2 TIMING BELT COVER

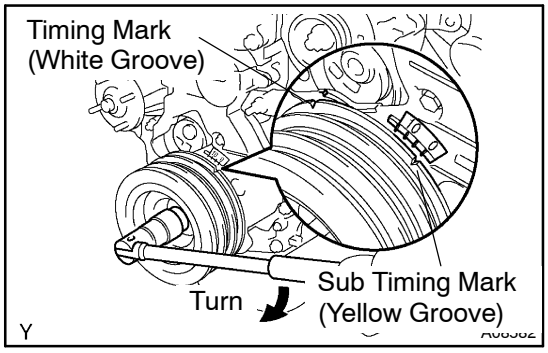
Remove the 4 bolts, timing belt cover and gasket.



16. LOOSEN CRANKSHAFT PULLEY BOLT

Using SST, loosen the pulley bolt.

SST 09213–54015 (90119–08216), 09330–00021

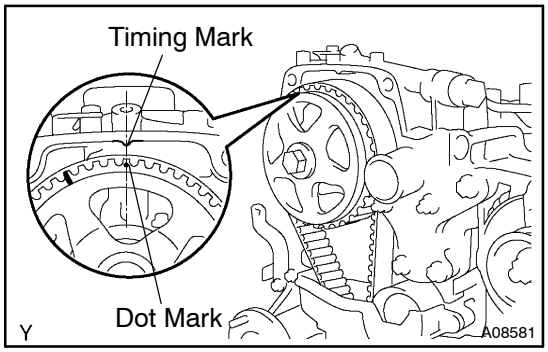


17. SET NO.1 CYLINDER TO APPROX. 60° BTDC/COMPRESSION

(a) Turn the crankshaft pulley, and align the sub timing mark (yellow groove – 60° mark BTDC) with the timing mark "0" of the No.1 timing belt cover.

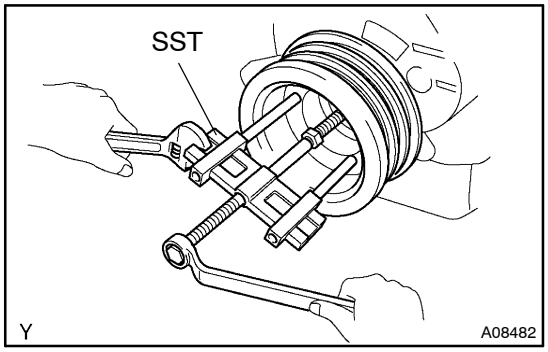
NOTICE:

- **Always turn the crankshaft clockwise.**
- **If the timing belt is disengaged, having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other. Thus results in damage when you remove the camshaft timing pulley (step 22). So, always set the crankshaft pulley at the correct angle.**



(b) Check that the dot mark (60° mark BTDC) of the camshaft timing pulley is aligned with the timing mark of the No.1 bearing cap.

If not, revolve the crankshaft 1 (360°).



18. REMOVE CRANKSHAFT PULLEY

(a) Remove the crankshaft pulley bolt.

NOTICE:

Do not turn the crankshaft pulley.

(b) Using SST, remove the crankshaft pulley.

SST 09950–50012 (09951–05010, 09952–05010, 09953–05010, 09953–05020, 09954–05030)

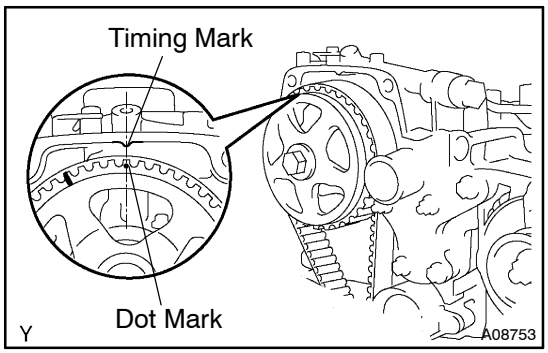
19. REMOVE NO.1 TIMING BELT COVER

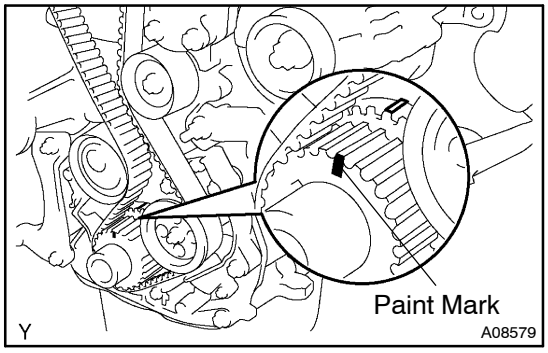
Remove the 4 bolts, timing belt cover and gasket.

20. REMOVE TIMING BELT GUIDE

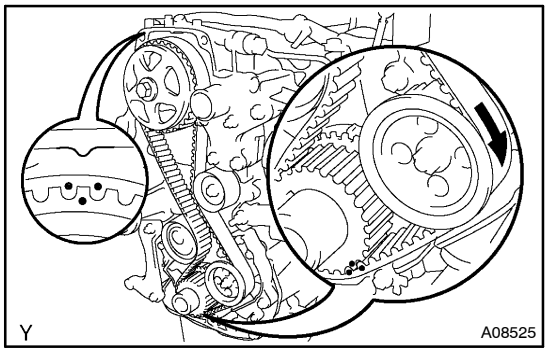
21. REMOVE TIMING BELT

(a) Check that the dot mark (60° mark BTDC) of the camshaft timing pulley is aligned with the timing mark of the No.1 bearing cap.

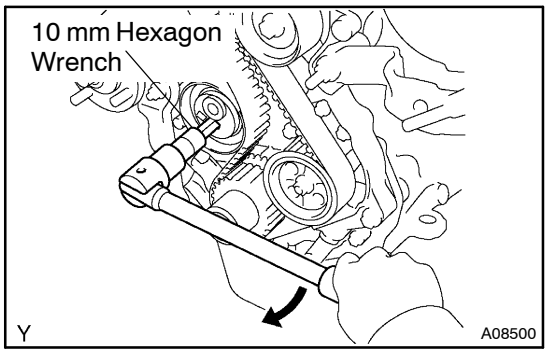




(b) Align the gear of the crankshaft timing pulley with the protrusion of the timing belt case and mark it with paint as shown in the illustration.

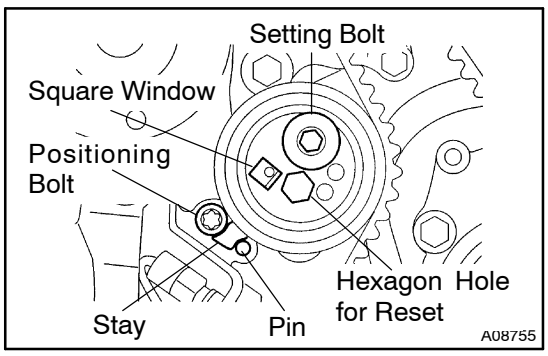


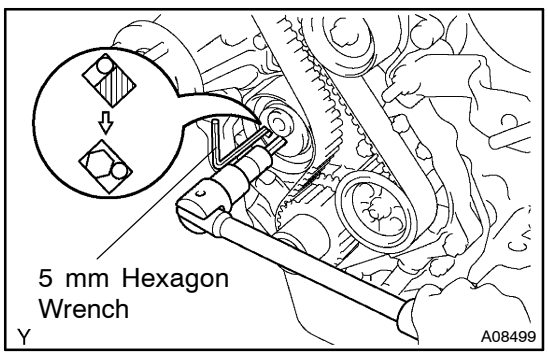
HINT:
When re–using timing belt:
Draw an arrow on the timing belt in the direction of engine revolution, and place the matching marks on the timing belt and the camshaft timing pulley, and the timing belt and the crankshaft timing pulley.



(c) Using a 10 mm hexagon wrench, insert the auto tensioner rod inside of the No.1 idler pulley to the hexagon hole for reset in the No.1 idler pulley.

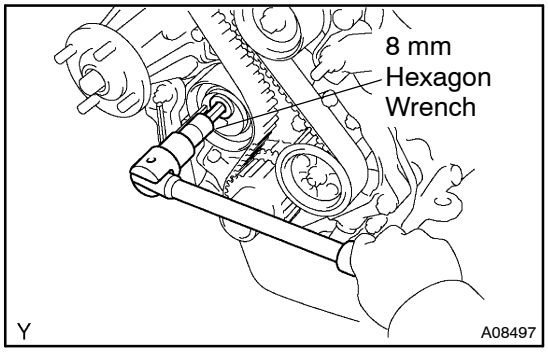
NOTICE:
Must not apply torque with more than 39 N·m (400 kgf·cm, 29 ft·lbf).





(d) After confirming the movement of the pin inside the square window, insert a 5 mm hexagon wrench.

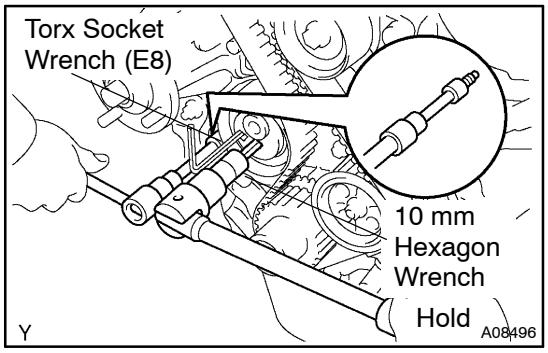
HINT:
Be sure to insert the wrench only after you feel the knocking while inserting the auto tensioner.



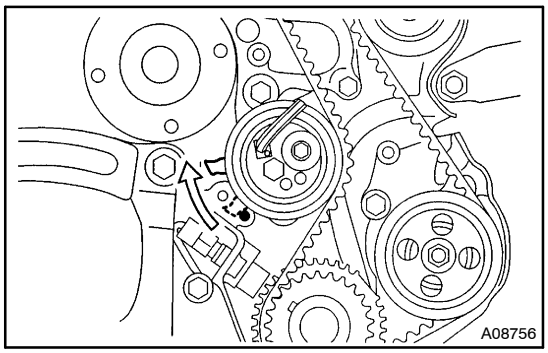
(e) Using a 8 mm hexagon wrench, loosen the bolt of the No.1 idler pulley (timing belt tensioner).

NOTICE:

Least necessary losing is required only to move the No.1 idler pulley.

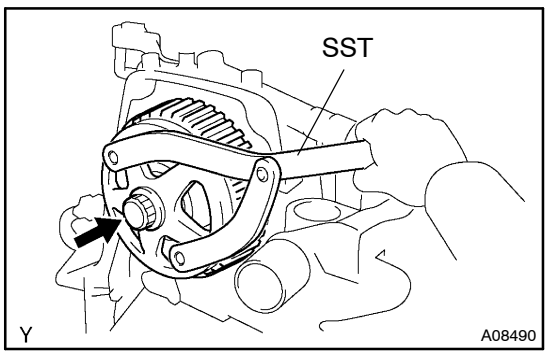


(f) Using a 10 mm hexagon wrench, keep holding the No.1 idler pulley lightly toward the direction of tensing and take out the positioning bolt using a torx socket wrench (E8).



(g) Move the No.1 idler pulley by hand toward the direction of loosening the timing belt.

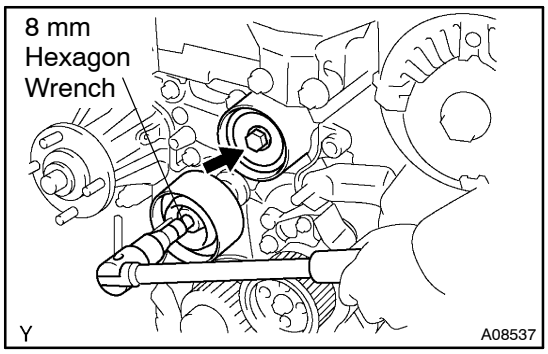
(h) Remove the timing belt.



22. REMOVE CAMSHAFT TIMING PULLEY

(a) Using SST, loosen the cam–pulley set bolt.
SST 09960–10010 (09962–01000, 09963–01000)

(b) Remove the bolt and timing pulley.

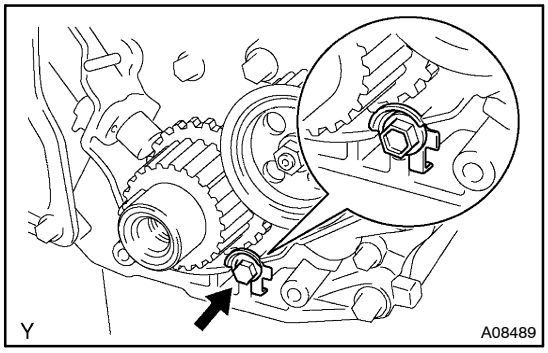


23. REMOVE NO.2 IDLER PULLEY

Remove the bolt and pulley.

24. REMOVE NO.1 IDLER PULLEY (TIMING BELT TENSIONER)

Using a 8 mm hexagon wrench, remove the pulley (tensioner).



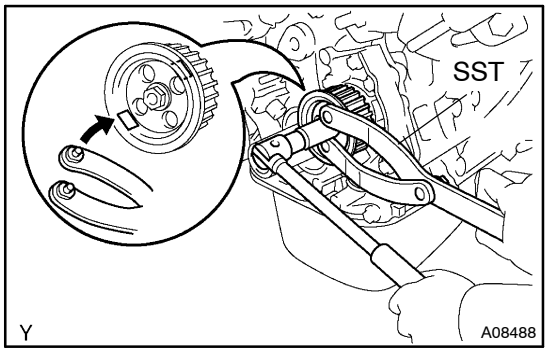
25. REMOVE CRANKSHAFT TIMING PULLEY

(a) Remove the bolt and timing belt plate.

(b) Remove the timing pulley.

NOTICE:

Do not scratch the angle sensor of the timing pulley.



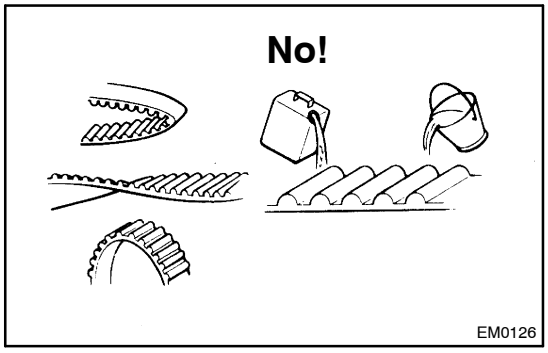
26. REMOVE OIL PUMP PULLEY

(a) Using SST, loosen the pulley nut.

SST 09960–10010 (09962–01000, 09963–00600)

(b) Remove the nut and pulley.

EM11A–01



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 mounting bolt of the camshaft timing pulley.**

If there are any defects as shown in the illustration, check these points:

(a) Premature parting
- Check for proper installation.
- Check the timing cover gasket for damage and proper installation.

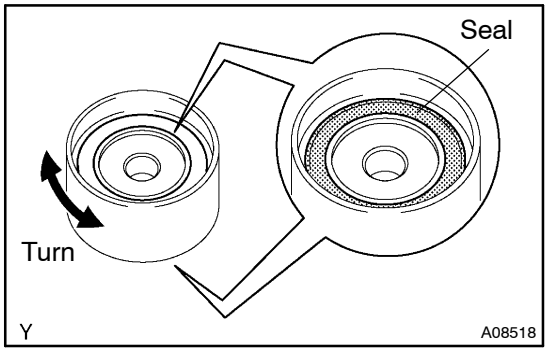
(b) If the belt teeth are cracked or damaged, check to see if either camshaft or oil pump is locked.

(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.

(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 the 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.

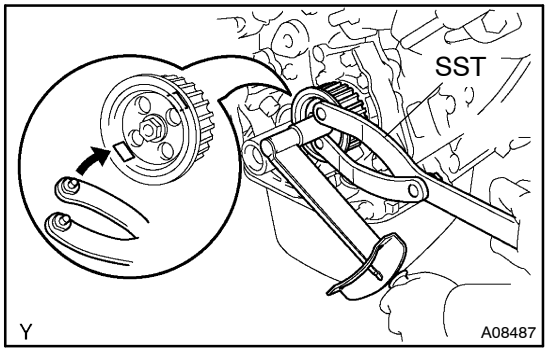
If leakage is found, replace the idler pulley.

(b) Check that the idler pulley turns smoothly.

If necessary, replace the idler pulley.

EM11B–01

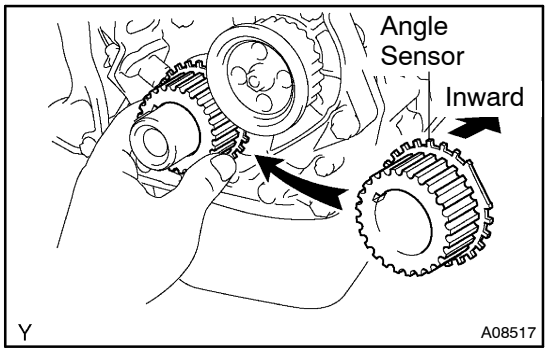
INSTALLATION



1. INSTALL OIL PUMP PULLEY

(a) Align the cutouts of the pulley and shaft, and slide on the pulley.

(b) Using SST, install the pulley nut.
SST 09960–10010 (09962–01000, 09963–00600)
Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)

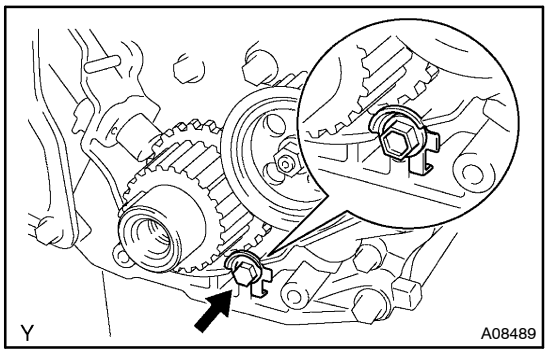


2. INSTALL CRANKSHAFT TIMING PULLEY

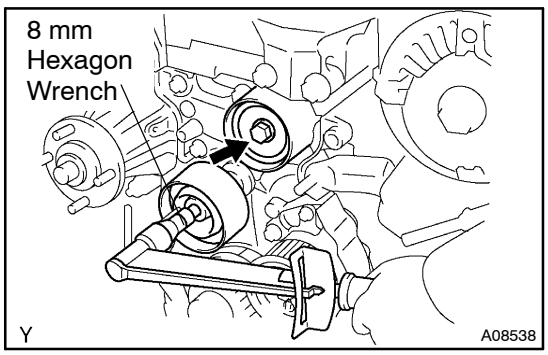
(a) Align the timing pulley set key with the key groove of the pulley.

(b) Slide on the timing pulley with the angle sensor facing inward.

NOTICE:
Do not scratch the angle sensor of the timing pulley.



(c) Install the timing belt plate with the bolt.
Torque: 9 N·m (90 kgf·cm, 78 in.·lbf)



3. INSTALL NO.1 IDLER PULLEY (TIMING BELT TENSIONER)

Using a 8 mm hexagon wrench, temporarily install the pulley (tensioner).

4. INSTALL NO.2 IDLER PULLEY

(a) Install the pulley with the bolt.
Torque: 37 N·m (370 kgf·cm, 27 ft·lbf)

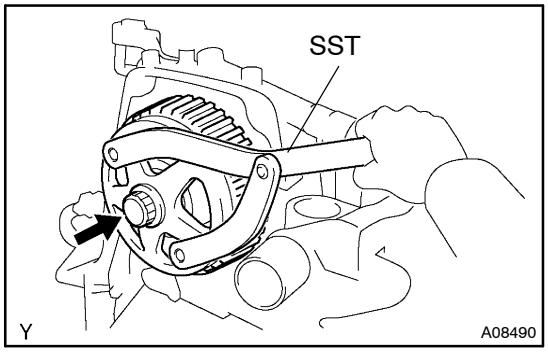
(b) Check that the idler pulley moves smoothly.

5. INSTALL CAMSHAFT TIMING PULLEY

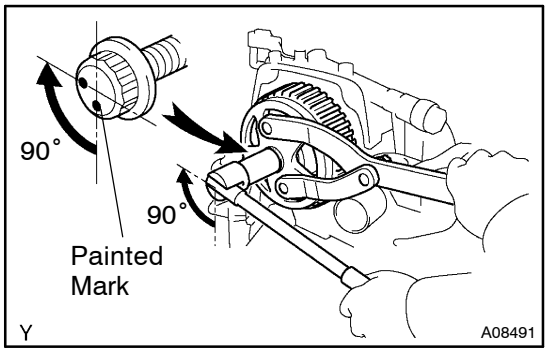
NOTICE:
NEVER reuse the cam–pulley set bolt.

HINT:
The cam–pulley set bolt is tightened in 2 progressive steps (steps (b) and (d)).

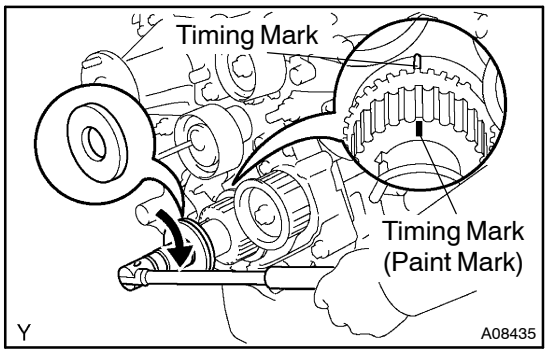
(a) Align the camshaft knock pin with the groove in the pulley and slide on the pulley.



(b) Using SST, install and tighten a new cam–pulley set bolt.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)

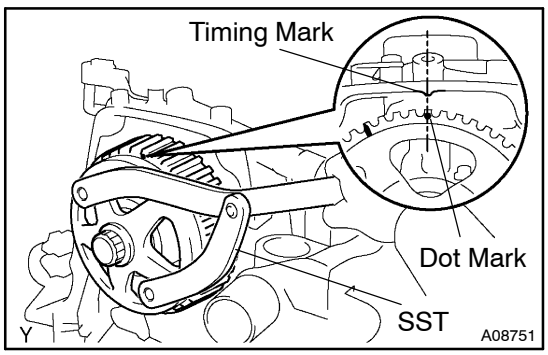


(c) Mark the cam–pulley set bolt with paint.
(d) Retighten the cam–pulley set bolt by 90°.
(e) Check that the painted mark is now at a 90° angle to (c).



6. SET NO.1 CYLINDER TO APPROX. 60° BTDC/COMPRESSION

(a) Crankshaft Timing Pulley Position:
Using the crankshaft pulley bolt and plate washer, turn the crankshaft, and align the timing mark (paint mark) of the crankshaft timing pulley with the timing mark of the timing belt case.



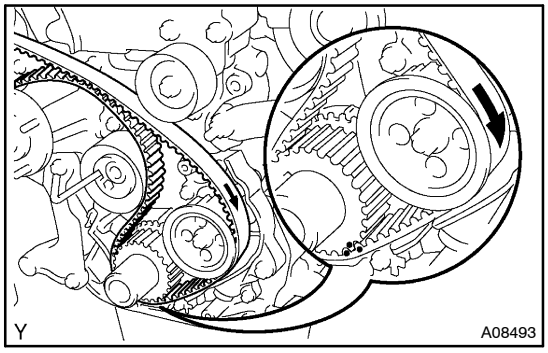
(b) Camshaft Timing Pulley Position:
Using SST, turn the camshaft pulley, align the dot mark (60° mark BTDC) of the camshaft timing pulley with the timing mark of the No.1 bearing cap.
SST 09960–10010 (09962–01000, 09963–01000)

7. INSTALL TIMING BELT

NOTICE:

The engine should be cold.

(a) Remove any oil or water on the crankshaft timing pulley, oil pump pulley, No.1 idler pulley, No.2 idler pulley and camshaft timing pulley, and keep them clean.



(b) Install the timing belt on the crankshaft timing pulley, oil pump pulley, No.1 idler pulley and No.2 idler pulley.

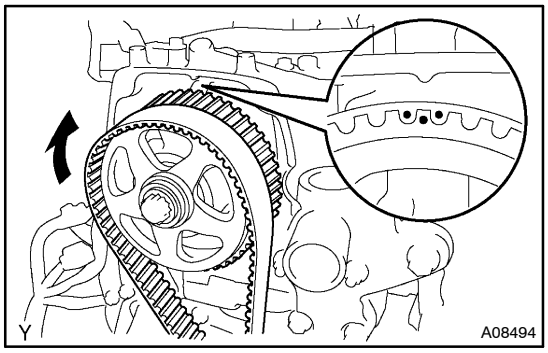
NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

HINT:

When re–using timing belt:

Align the marked points during removal, and install the belt with the arrow pointing to the direction of engine revolution.

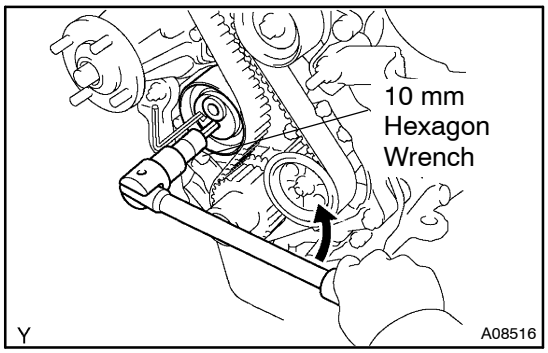


(c) Install the timing belt, check the tension between the crankshaft timing pulley, oil pump pulley, No.2 idler pulley and camshaft timing pulley.

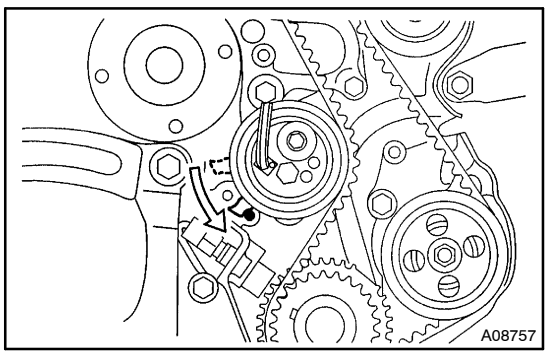
HINT:

When re–using timing belt:

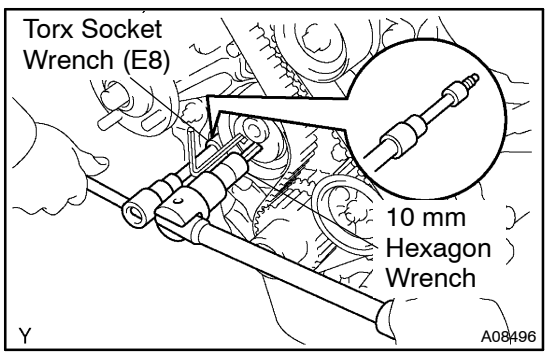
Align the marked points during removal.



(d) Using a 10 mm hexagon wrench, keep holding the No.1 idler pulley toward the direction of tensing the timing belt.



(e) After confirming that the stay of the No.1 idler pulley touches the pin, install the positioning bolt by hand.

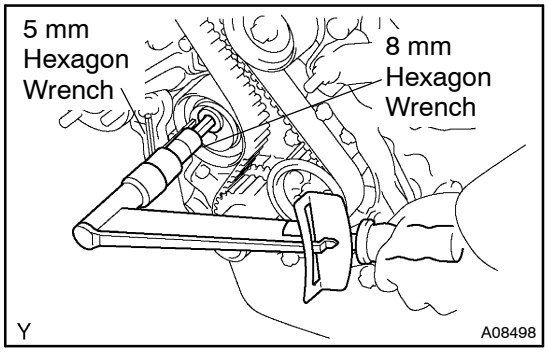


(f) Using a torx socket wrench (E8), tighten the positioning bolt.

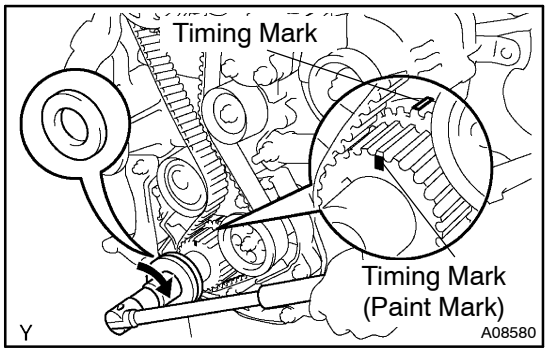
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

NOTICE:

Be careful not to allow the bolt to come onto the stay of the No.1 idler pulley.

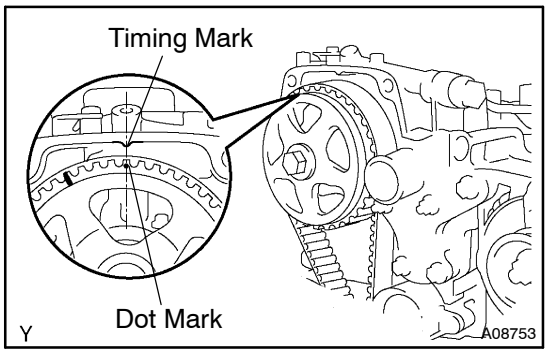


(g) Using a 8 mm hexagon wrench, tighten the bolt of the No.1 idler pulley (timing belt tensioner).
Torque: 42.5 N·m (425 kgf·cm, 31 ft·lbf)
(h) Take the 5 mm hexagon wrench for lock out of the square window.

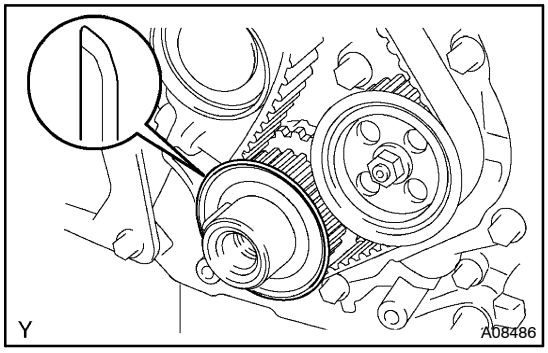


8. CHECK VALVE TIMING
(a) Temporarily install the crankshaft pulley bolt and plate washer.
(b) Slowly revolve the crankshaft 2 times, and align the timing mark (paint mark) of the crankshaft timing pulley with the timing mark of the timing belt case.

NOTICE:
Always turn the crankshaft clockwise.

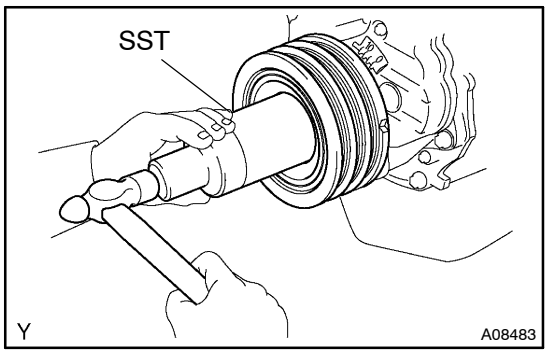


(c) Check that the dot mark (60° mark BTDC) of the camshaft timing pulley is aligned with the timing mark of the No.1 bearing cap.
(d) Remove the crankshaft pulley bolt and plate washer.

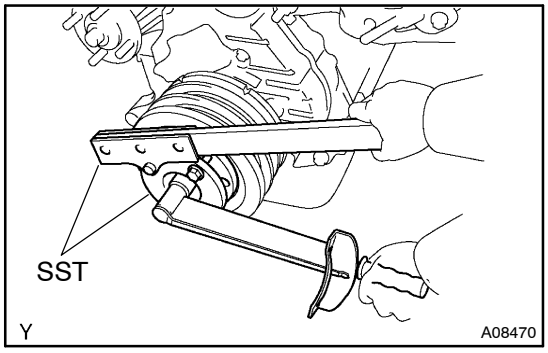


9. INSTALL TIMING BELT GUIDE
Install the guide with the cup side facing outward.

10. INSTALL NO.1 TIMING BELT COVER
(a) Install the gasket to the timing belt cover.
(b) Install the timing belt cover with the 4 bolts.
Torque: 6 N·m (60 kgf·cm, 52 in.·lbf)



11. INSTALL CRANKSHAFT PULLEY
(a) Align the pulley set key with the key groove of the pulley.
(b) Using SST and a hammer, tap in the pulley.
SST 09316–60011 (09316–00011)



(c) Using SST, install the pulley bolt.
SST 09213–54015 (90119–08216), 09330–00021
Torque: 220 N·m (2,200 kgf·cm, 159 ft·lbf)

12. INSTALL NO.2 TIMING BELT COVER

(a) Install the gasket to the timing belt cover.

(b) Install the timing belt cover with the 4 bolts.
Torque: 6 N·m (60 kgf·cm, 52 in.·lbf)

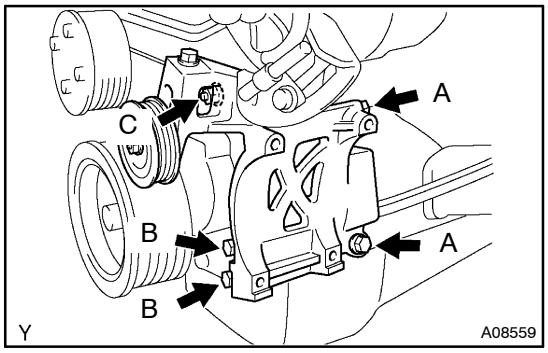
13. INSTALL FAN PULLEY AND SPACER

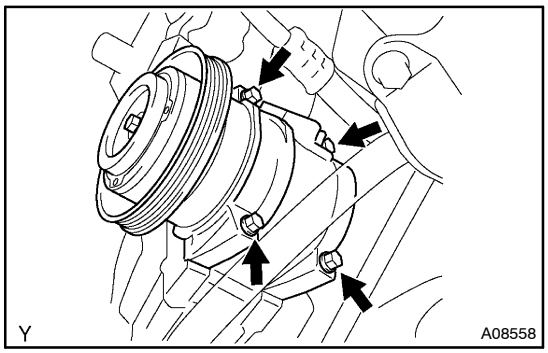
HINT:
Temporarily install the 4 nuts.

14. INSTALL A/C COMPRESSOR BRACKET

(a) Install the compressor bracket with the 4 bolts and nut.

(b) Tighten the bolt B, nut C and bolt A.
Torque: 46.5 N·m (475 kgf·cm, 34 ft·lbf)





15. INSTALL A/C COMPRESSOR

(a) Install the A/C compressor with the 4 bolts.
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)

(b) Connect the A/C compressor connector.

16. INSTALL DRIVE BELT FOR PS VANE PUMP
(See page SR–37)

17. INSTALL DRIVE BELT FOR ALTERNATOR
(See page CH–15)

18. INSTALL DRIVE BELT FOR A/C COMPRESSOR
(See page AC–18)

19. TIGHTEN MOUNTING NUTS OF FAN PULLEY AND SPACER
Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

20. INSTALL RADIATOR ASSEMBLY (See page CO–21)

21. INSTALL SPARK PLUGS (See page IG–1)

22. INSTALL IGNITION COILS (See page IG–6)

23. INSTALL NO.2 CYLINDER HEAD COVER

24. INSTALL AIR CLEANER ASSEMBLY

25. INSTALL AIR CLEANER INLET

26. FILL ENGINE WITH COOLANT

27. START ENGINE AND CHECK FOR LEAK

28. INSTALL NO.1 ENGINE UNDER COVER

29. ROAD TEST

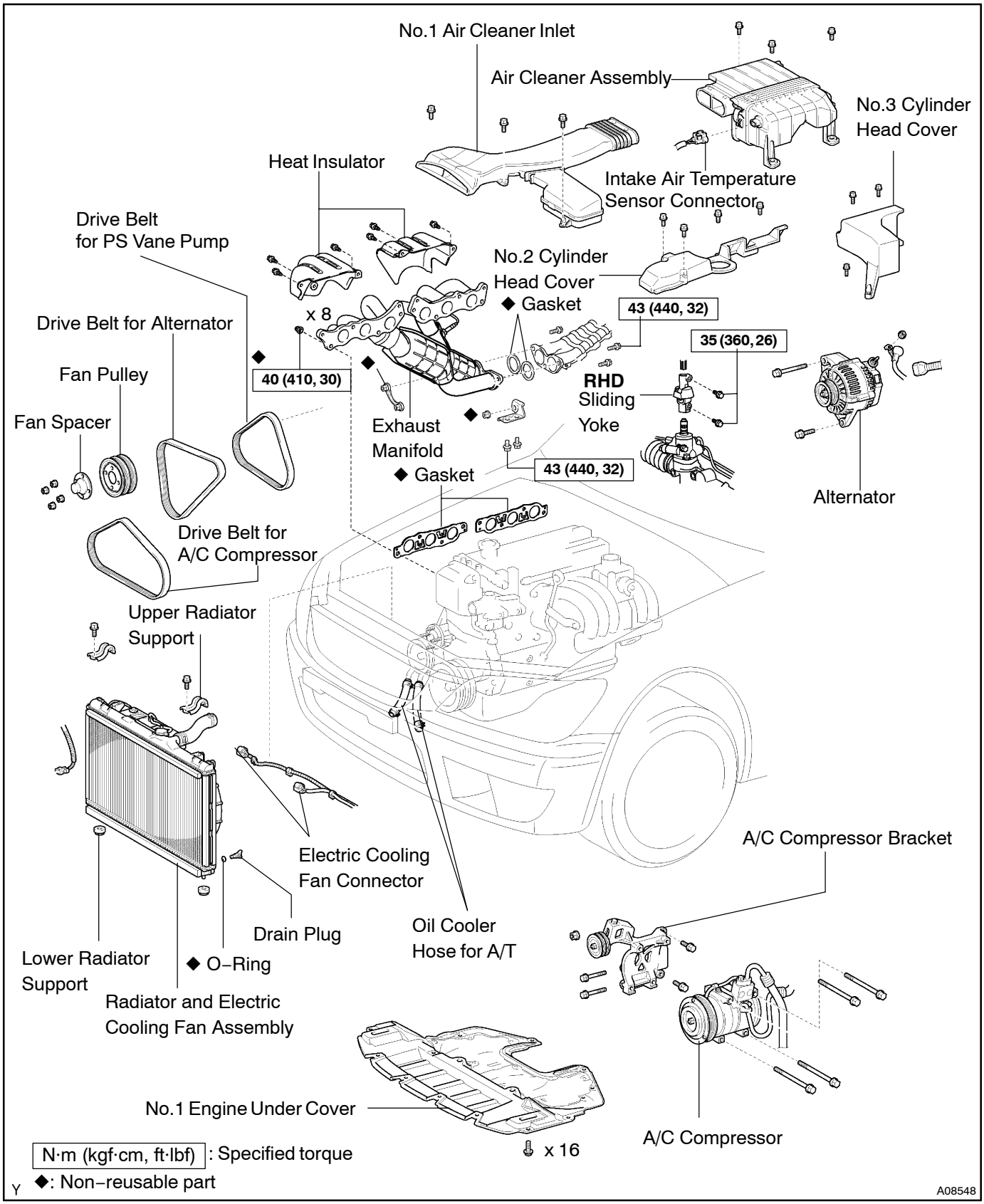
Check abnormal noise, shock, slippage, correct shift points and smooth operation.

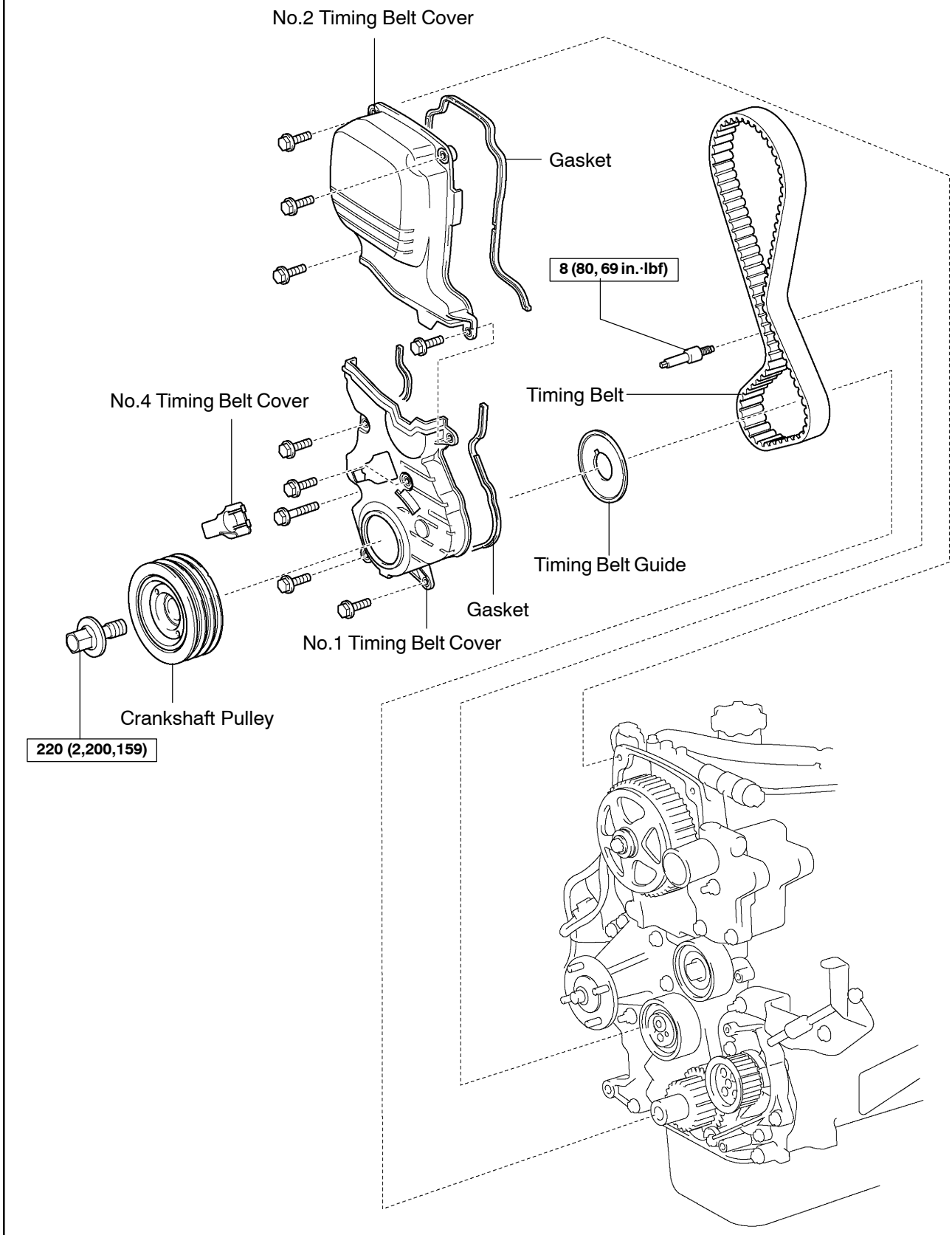
30. RECHECK ENGINE COOLANT LEVEL

CYLINDER HEAD

COMPONENTS

EM11C–01

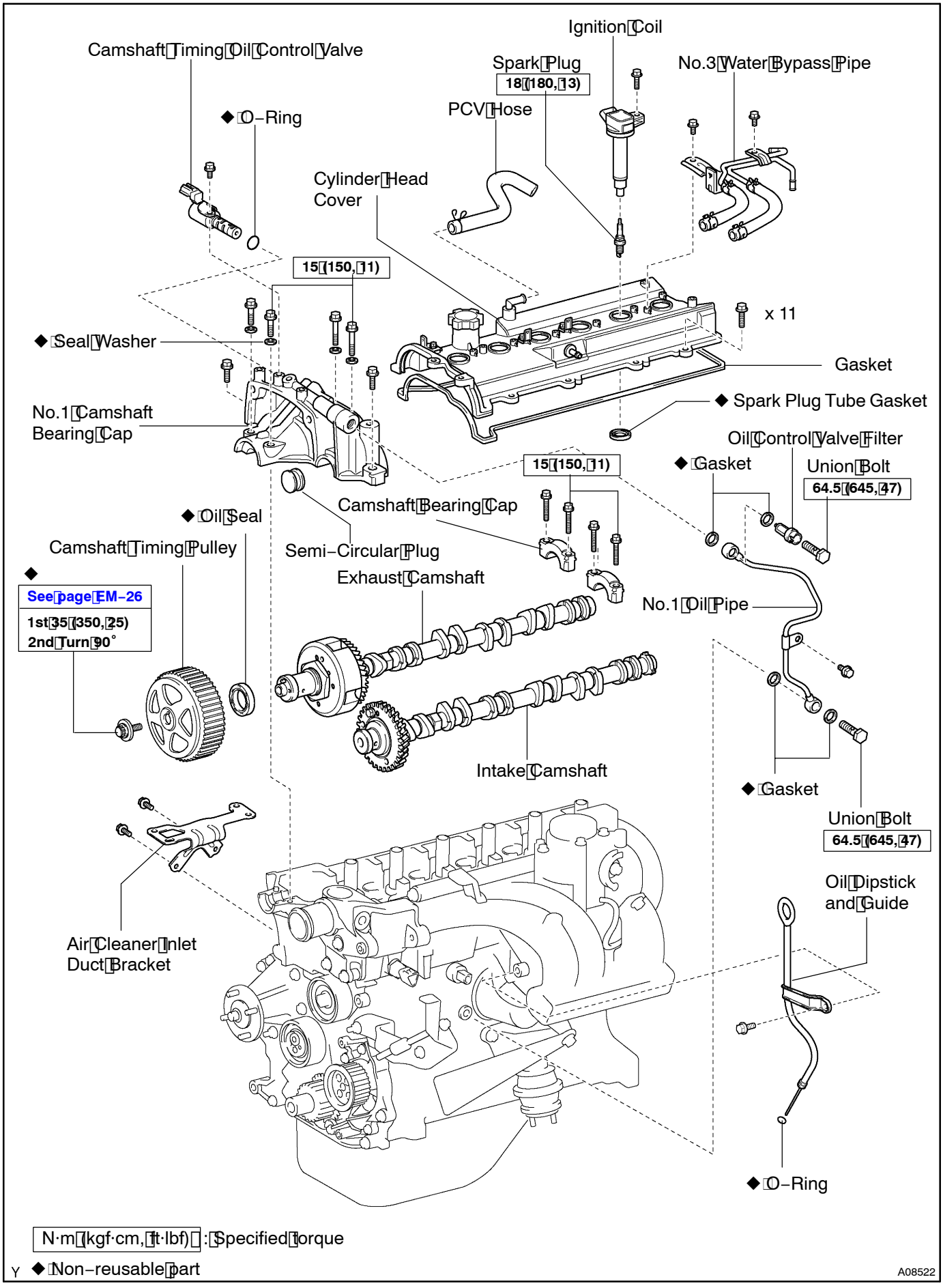


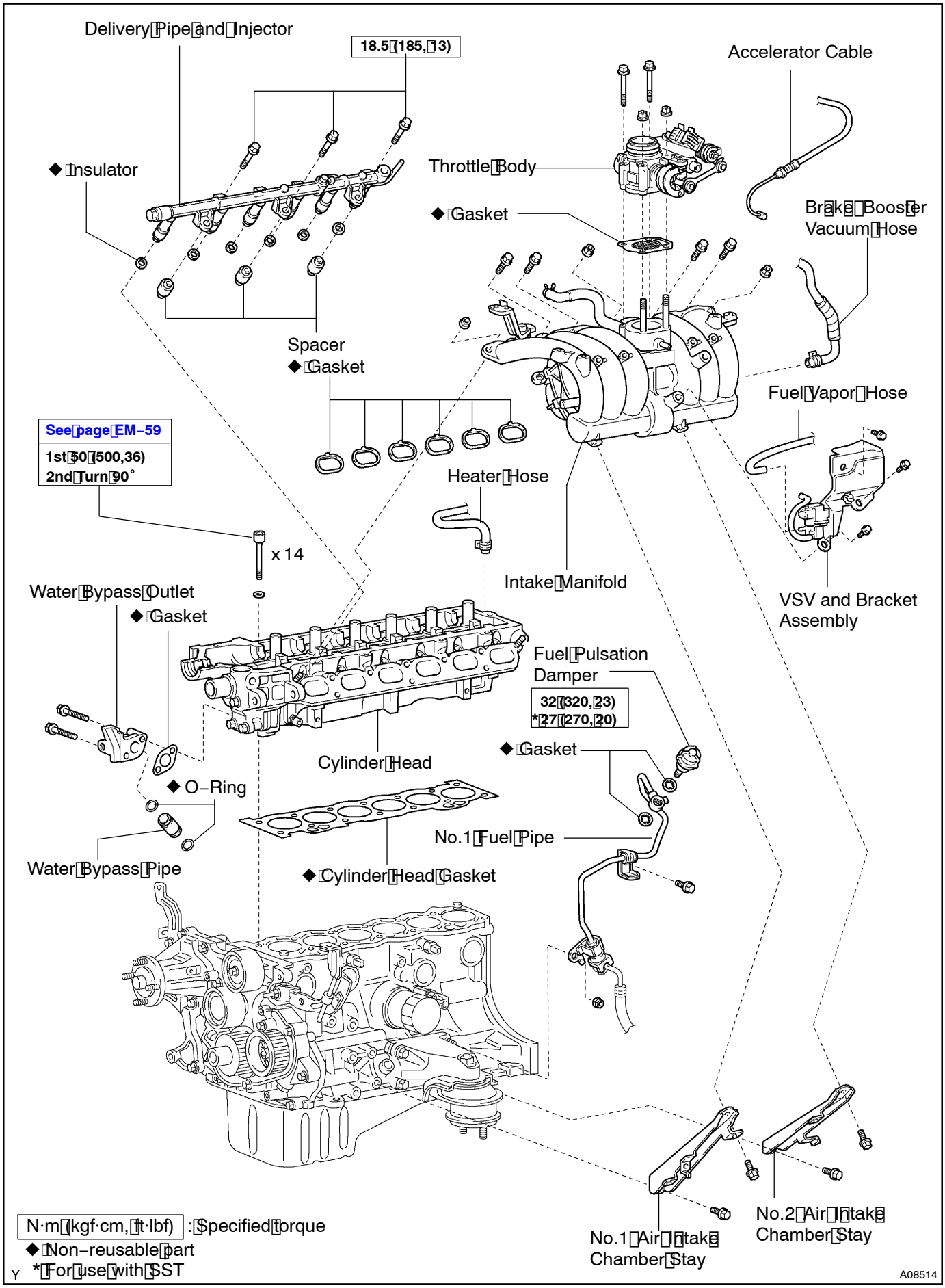


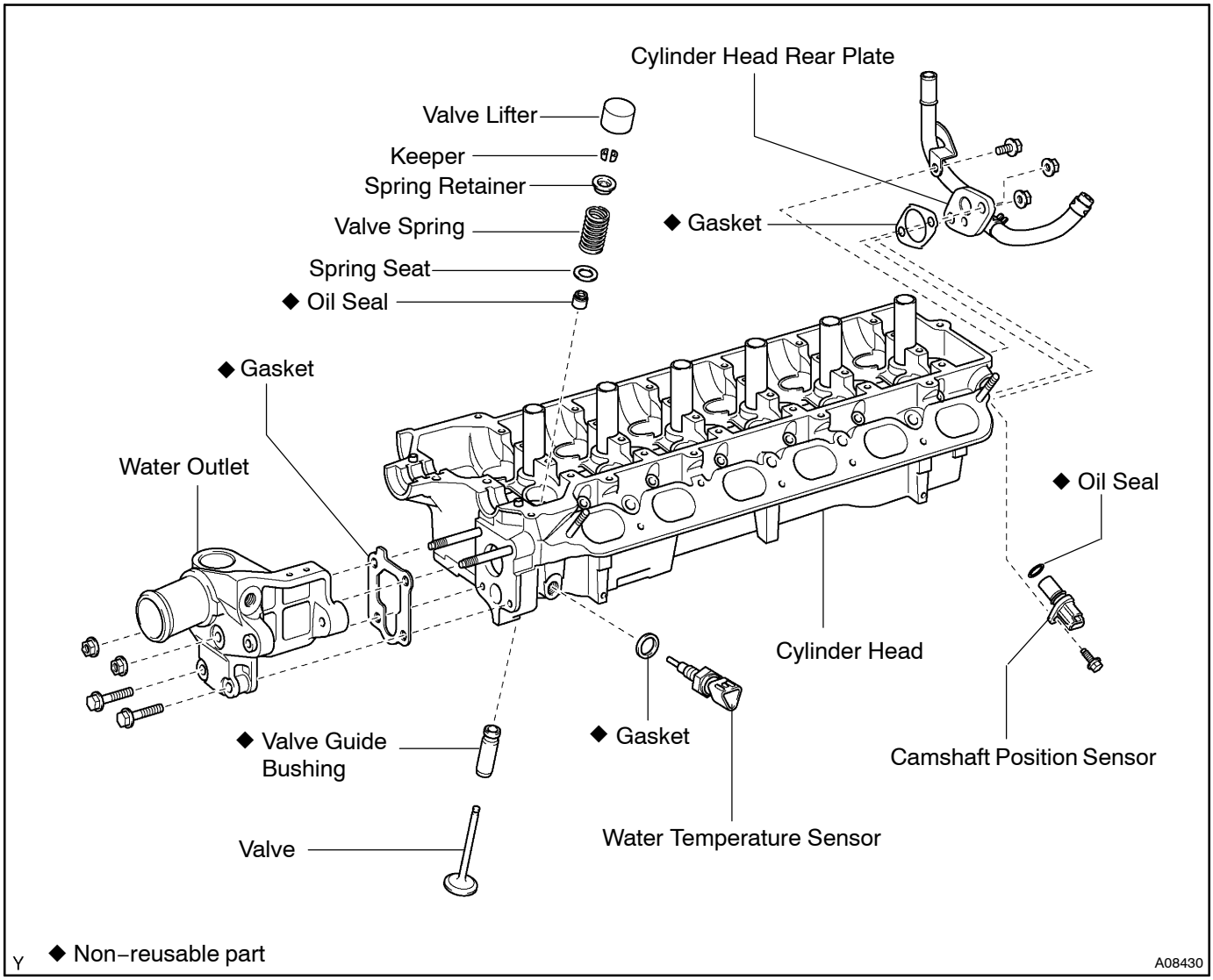
N·m (kgf·cm, ft·lbf) : Specified torque

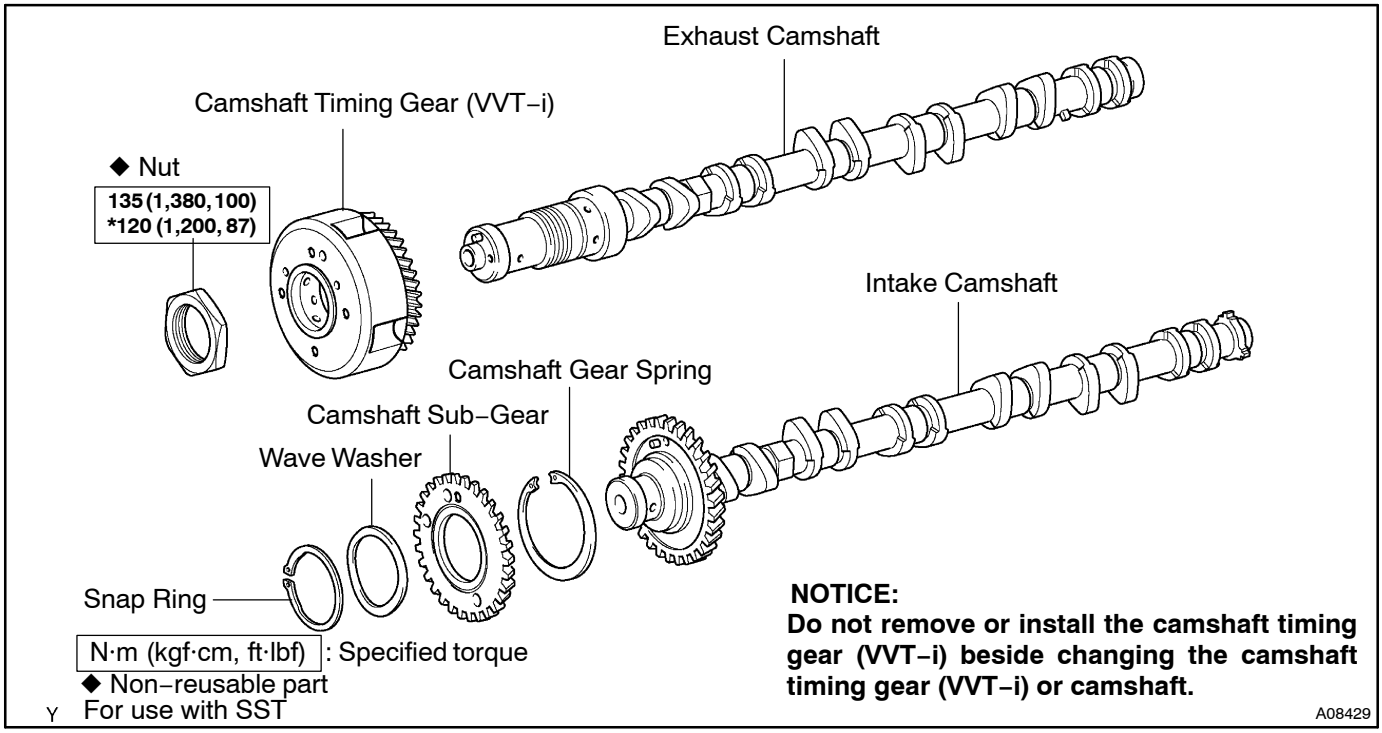
◆ Non–reusable part

A08521


Ignition Coil
Camshaft Timing Oil Control Valve
Spark Plug
18 (180, 13)
No.3 Water Bypass Pipe
◆ O–Ring
PCV Hose
Cylinder Head Cover
15 (150, 11)
x 11
◆ Seal Washer
Gasket
No.1 Camshaft Bearing Cap
◆ Spark Plug Tube Gasket
Oil Control Valve Filter
◆ Gasket
Union Bolt
64.5 (645, 47)
15 (150, 11)
Camshaft Bearing Cap
◆ Oil Seal
Camshaft Timing Pulley
Semi–Circular Plug
◆
See page EM–26
1st 35 (350, 25)
2nd Turn 90°
Exhaust Camshaft
No.1 Oil Pipe
Intake Camshaft
◆ Gasket
Union Bolt
64.5 (645, 47)
Oil Dipstick and Guide
Air Cleaner Inlet Duct Bracket
◆ O–Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
A08522


Delivery Pipe and Injector
18.5 (185, 13)
Accelerator Cable
◆ Insulator
Throttle Body
◆ Gasket
Brake Booster Vacuum Hose
Spacer
◆ Gasket
Fuel Vapor Hose
See page EM–59
1st 50 (500, 36)
2nd Turn 90°
x 14
Heater Hose
Intake Manifold
VSV and Bracket Assembly
Water Bypass Outlet
◆ Gasket
Fuel Pulsation Damper
32 (320, 23)
*27 (270, 20)
Cylinder Head
◆ Gasket
◆ O–Ring
No.1 Fuel Pipe
Water Bypass Pipe
◆ Cylinder Head Gasket
No.1 Air Intake Chamber Stay
No.2 Air Intake Chamber Stay
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
* For use with SST
A08514


Cylinder Head Rear Plate
Valve Lifter
Keeper
Spring Retainer
Valve Spring
Spring Seat
◆ Oil Seal
◆ Gasket
◆ Gasket
Water Outlet
◆ Oil Seal
Cylinder Head
◆ Valve Guide Bushing
◆ Gasket
Camshaft Position Sensor
Valve
Water Temperature Sensor
Y ◆ Non–reusable part
A08430

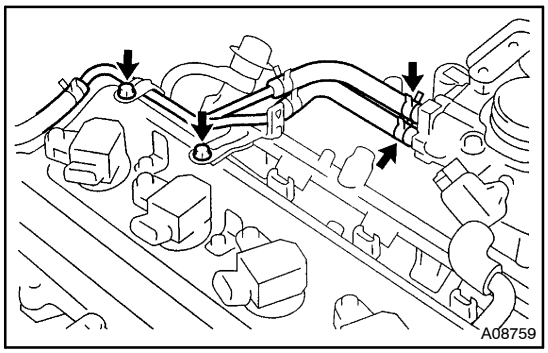

Exhaust Camshaft
Camshaft Timing Gear (VVT–i)
◆ Nut
135 (1,380, 100)
*120 (1,200, 87)
Intake Camshaft
Camshaft Gear Spring
Camshaft Sub–Gear
Wave Washer
Snap Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Y For use with SST
NOTICE:
Do not remove or install the camshaft timing gear (VVT–i) beside changing the camshaft timing gear (VVT–i) or camshaft.
A08429

EM11D–01

REMOVAL

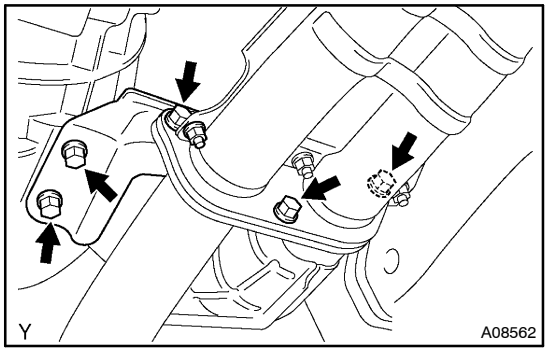
NOTICE:
Do not remove or install the camshaft timing gear (VVT–i) beside changing the camshaft timing gear (VVT–i) or camshaft.

1. REMOVE NO.1 ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE AIR CLEANER INLET
4. REMOVE AIR CLEANER ASSEMBLY
5. REMOVE NO.3 CYLINDER HEAD COVER
6. REMOVE ALTERNATOR (See page CH–6)
7. REMOVE PCV HOSE
8. REMOVE NO.2 CYLINDER HEAD COVER
9. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD
10. REMOVE IGNITION COILS (See page IG–6)
11. REMOVE SPARK PLUGS (See page IG–1)

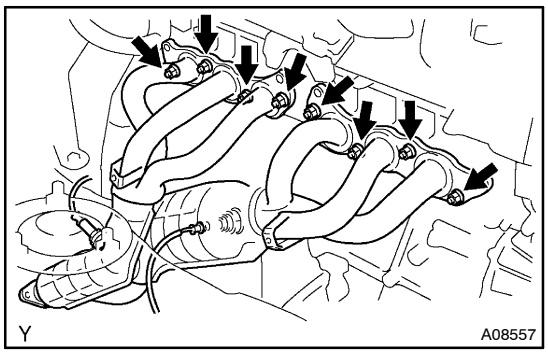


12. REMOVE NO.3 WATER BYPASS PIPE
(a) Disconnect the 4 water bypass hoses.
(b) Remove the 2 bolts and water bypass pipe.
13. DISCONNECT HEATER HOSE FROM CYLINDER HEAD REAR PLATE
14. M/T:
REMOVE CYLINDER HEAD REAR PLATE

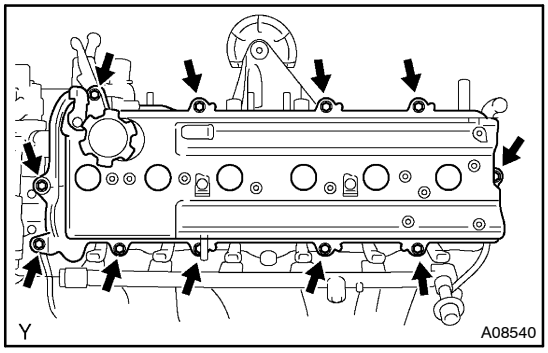
Remove the bolt, 2 nuts, rear plate and gasket.



15. REMOVE EXHAUST MANIFOLD
(a) Remove the 3 bolts, retainer and nut holding the front exhaust manifold to the front exhaust pipe.
(b) Remove the 2 bolts and exhaust manifold stay.
(c) Remove the 6 bolts and 2 heat insulators.
(d) Disconnect the 2 oxygen sensor connectors.

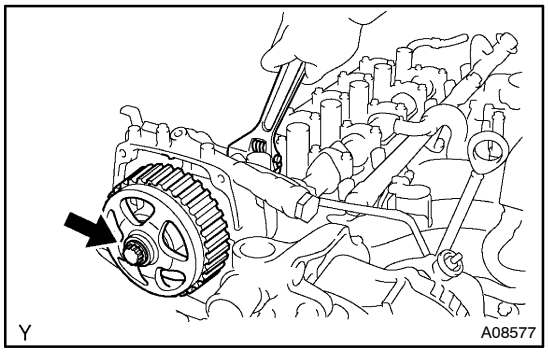


(e) Remove the 8 nuts, exhaust manifold and 2 gaskets.
16. RHD:
REMOVE STEERING SLIDING YOKE
(See page SR–12)
17. REMOVE TIMING BELT (See page EM–20)
18. REMOVE AIR CLEANER INLET DUCT BRACKET



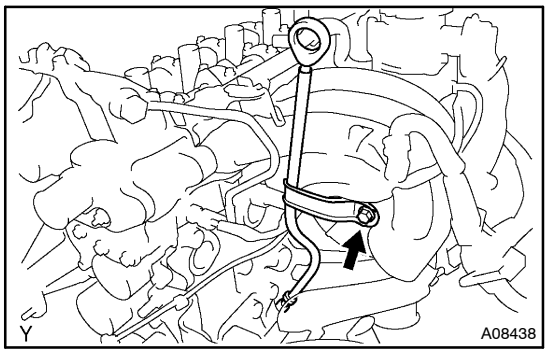
19. REMOVE CYLINDER HEAD COVER

Remove the 11 bolts, cylinder head cover and gasket.



20. REMOVE CAMSHAFT TIMING PULLEY

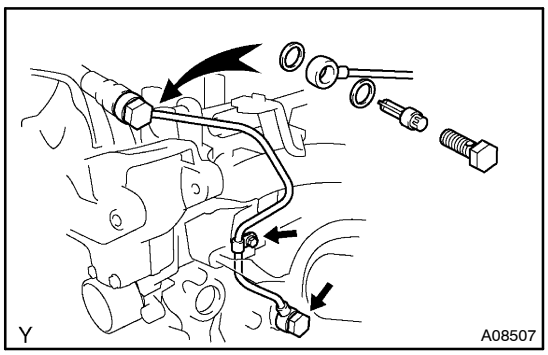
Hold the hexagon portion of the camshaft with a wrench, and remove the cam–pulley set bolt and camshaft timing pulley.



21. REMOVE OIL DIPSTICK AND GUIDE

(a) Remove the bolt and pull out the dipstick guide together with the dipstick.

(b) Remove the O–ring from the dipstick guide.



22. REMOVE NO.1 OIL PIPE

(a) Remove the bolt holding the oil pipe to the cylinder head.

(b) Remove the union bolt and 2 gaskets, and disconnect the oil pipe from the cylinder block.

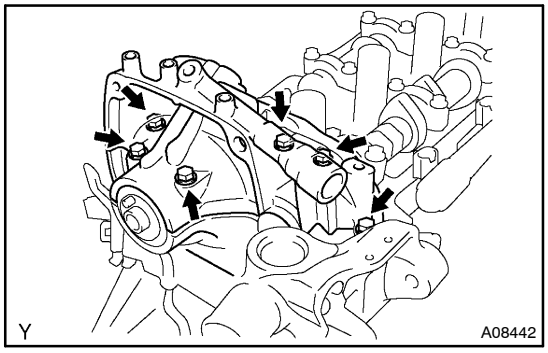
(c) Remove the union bolt, oil control valve filter, 2 gaskets and oil pipe from the No.1 camshaft bearing cap.

23. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE
(See page FI–44)

24. REMOVE CAMSHAFTS

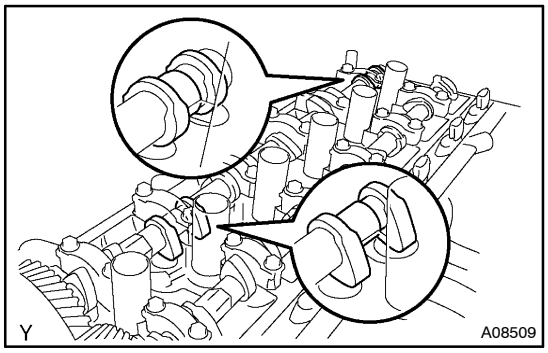
NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept leveled while it is being removed. If the camshaft is not kept leveled, 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.



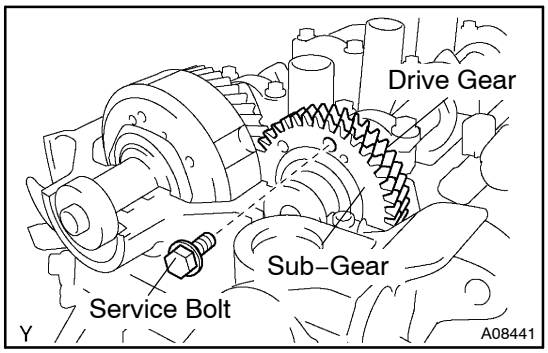
(a) Remove the No.1 camshaft bearing cap.
Remove the 6 bolts, 4 seal washers and No.1 camshaft bearing cap.

(b) Remove the camshaft oil seal and semi–circular plug.



(c) Remove the exhaust camshaft.

(1) Check or set the exhaust camshaft as shown in the illustration so that the No.2 and No.6 cylinder cam lobes face down toward their valve lifters with equal force.

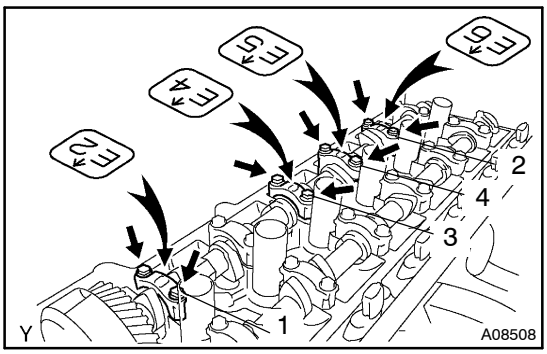


(2) Secure the intake camshaft sub–gear to the drive gear with a service bolt.

Recommended service bolt:

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 – 20 mm (0.63 – 0.79 in.)

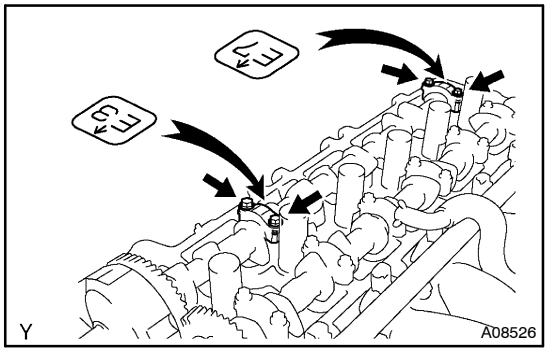
HINT:
When removing the camshaft, make sure that the torsional spring force of the sub–gear has been eliminated by the above operation.



(3) Uniformly loosen and remove the 8 bearing cap bearing cap bolts on the No.2, No.4, No.5 and No.6 bearing caps, in several passes, in the sequence shown.

NOTICE:
Do not remove the No.3 and No.7 bearing cap bolts at this stage.

(4) Remove the No.2, No.4, No.5 and No.6 bearing caps.



(5) Alternately and uniformly loosen and remove the 4 bearing cap bolts on the No.3 and No.7 bearing caps.

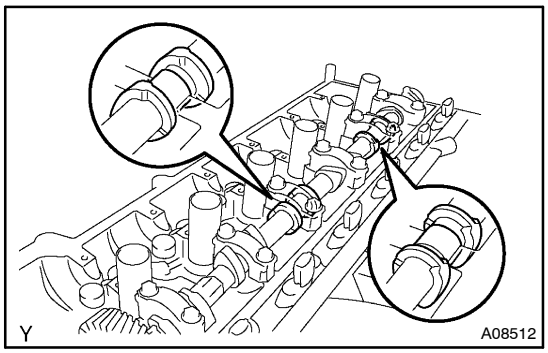
HINT:

- As the 4 No.3 and No.7 bearing cap bolts are loosened, make sure that the camshaft is lifted out straight and level.
- If the camshaft is not being lifted out straight and level, uniformly retighten the 4 No.3 and No.7 bearing cap bolts. Then reverse the order of above steps from (4) to (1) and and repeat steps from (1) to (5) once again.

NOTICE:

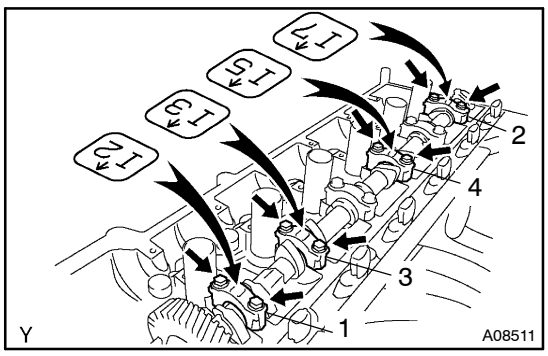
Do not pry on or attempt to force the camshaft with a tool or other object.

(6) Remove the No.3 and No.7 bearing caps and exhaust camshaft.



(d) Remove the intake camshaft.

(1) Check or set the intake camshaft as shown in the illustration so that the No.3 and No.5 cylinder cam lobes face down toward their valve lifters with equal force.

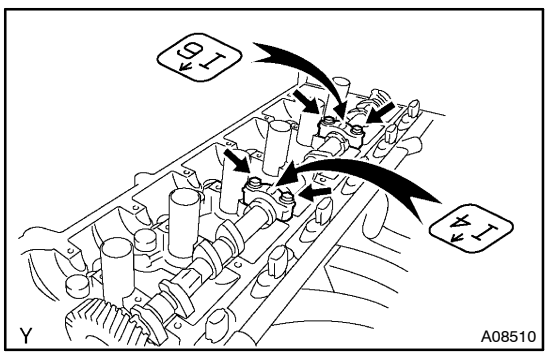


(2) Uniformly loosen and remove the 8 bearing cap bolts on the No.2, No.3, No.5 and No.7 bearing caps, in several passes, in the sequence shown.

NOTICE:

Do not remove the No.4 and No.6 bearing cap bolts at this stage.

(3) Remove the No.2, No.3, No.5 and No.7 bearing caps.



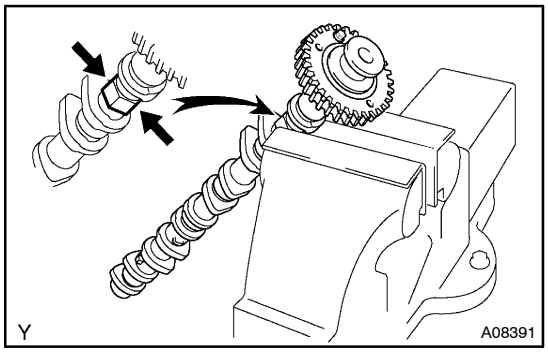
(4) Alternately and uniformly loosen and remove the 4 bearing cap bolts on the No.4 and No.6 bearing caps.

HINT:

- As the 4 No.4 and No.6 bearing cap bolts are loosened, make sure that the camshaft is lifted out straight and level.
- If the camshaft is not being lifted out straight and level, uniformly retighten the 4 No.4 and No.6 bearing cap bolts. Then reverse the order of above steps from (3) to (1) and and repeat steps from (1) to (4) once again.

NOTICE:
Do not pry on or attempt to force the camshaft with a tool or other object.

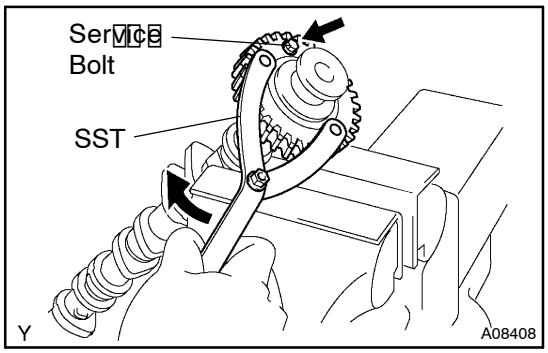
(5) Remove the No.4 and No.6 bearing caps and intake camshaft.



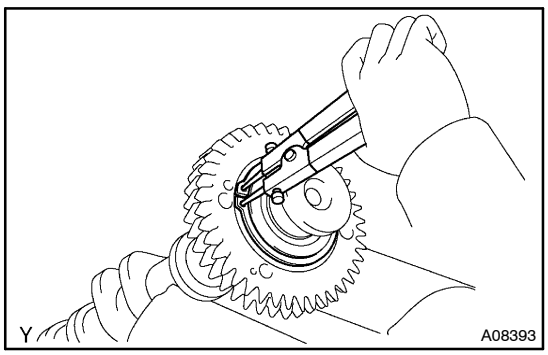
25. DISASSEMBLE INTAKE CAMSHAFT

(a) Mount the camshaft in a vise.

NOTICE:
Be careful not to damage the camshaft.

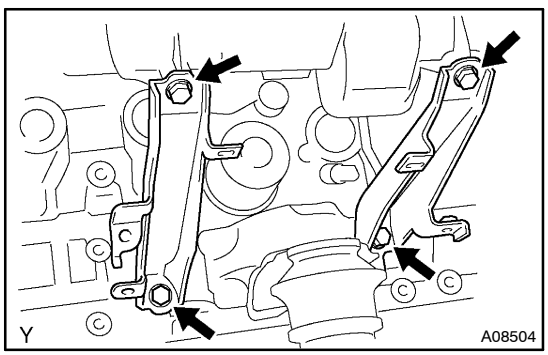


(b) Using SST, turn the sub–gear clockwise, and remove the service bolt.
SST 09960–10010 (09962–01000, 09963–00500)

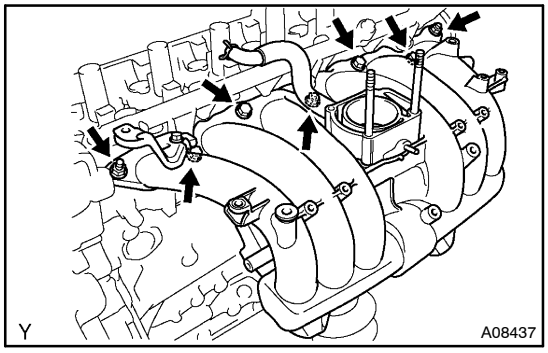


(c) Using snap ring pliers, remove the snap ring.
(d) Remove the wave washer, camshaft sub–gear and gear spring.

26. REMOVE THROTTLE BODY (See page FI–36)



27. REMOVE NO.1 AND NO.2 AIR INTAKE CHAMBER STAYS

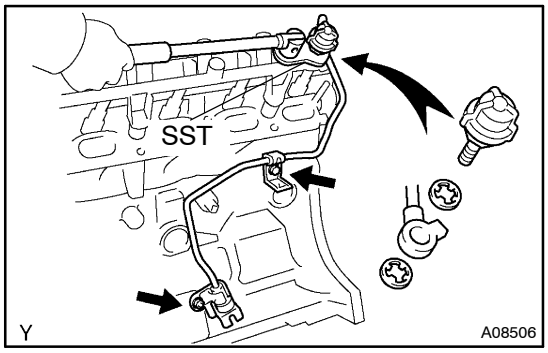


28. REMOVE INTAKE MANIFOLD

(a) A/T:
Remove the bolt, and disconnect the oil dipstick guide for the A/T.

(b) Disconnect the brake booster vacuum hose.

(c) Remove the 4 bolts, 3 nuts, intake manifold and 6 gaskets.



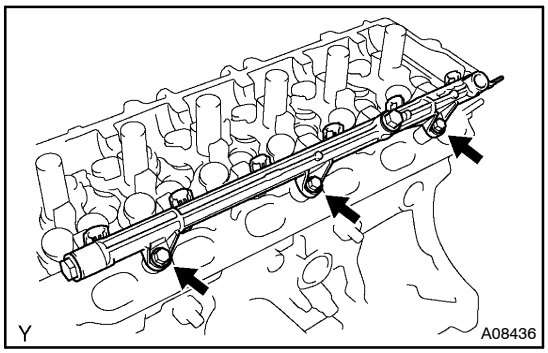
29. DISCONNECT NO.1 FUEL PIPE

(a) Using SST, remove the fuel pressure pulsation damper and 2 gasket.
SST 09612–24014 (09617–24011)

CAUTION:

- **Put a shop towel under the delivery pipe.**
- **Slowly loosen the pulsation damper.**

(b) Remove the bolt and nut, and disconnect the No.1 fuel pipe.



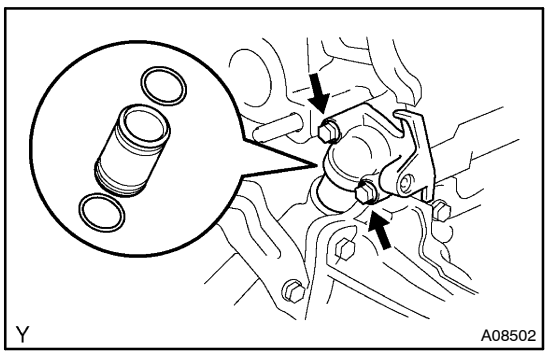
30. REMOVE DELIVERY PIPE AND INJECTORS

(a) Remove the 3 bolts and delivery pipe together with the 6 injectors.

NOTICE:

Be careful not to drop the injectors when removing the delivery pipe.

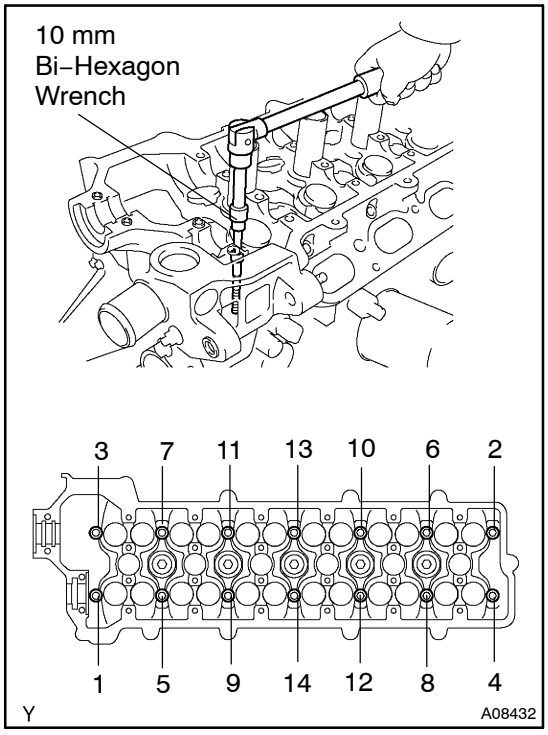
(b) Remove the 6 insulators and 3 spacers from the cylinder head.



31. REMOVE WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE

(a) Remove the 2 bolts, water bypass outlet, No.1 water bypass pipe and gasket.

(b) Remove the 2 O–rings from the No.1 water bypass pipe.

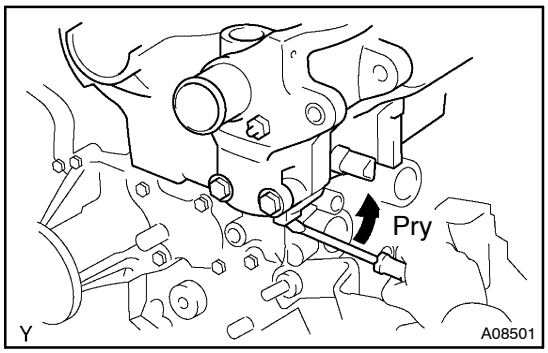


32. REMOVE CYLINDER HEAD

(a) Using a 10 mm bi–hexagon wrench, uniformly loosen the 14 cylinder head bolts, in several passes, in the sequence shown. Remove the 14 cylinder head bolts and plate washers.

NOTICE:

Cylinder head warpage or cracking could result from removing bolts in incorrect order.



(b) Lift the cylinder head from the dowels on the cylinder block, and place the cylinder head on wooden blocks on a bench.

HINT:

If the cylinder head is 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.

EM089–04

DISASSEMBLY

1. REMOVE WATER OUTLET

Remove the 2 bolts, 2 nuts, water outlet and gasket.

2. REMOVE WATER TEMPERATURE SENSOR

3. REMOVE CAMSHAFT POSITION SENSOR

(a) Remove the bolt and position sensor.

(b) Remove the O–ring from the position sensor.

4. A/T:

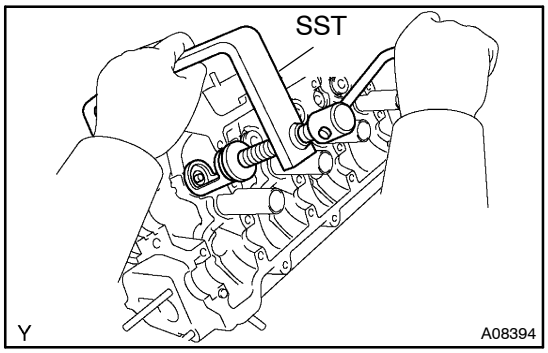
REMOVE CYLINDER HEAD REAR PLATE

Remove the 2 bolts, nut, rear plate and gasket.

5. REMOVE VALVE LIFTERS

HINT:

Arrange the valve lifters in the correct order.



6. REMOVE VALVES

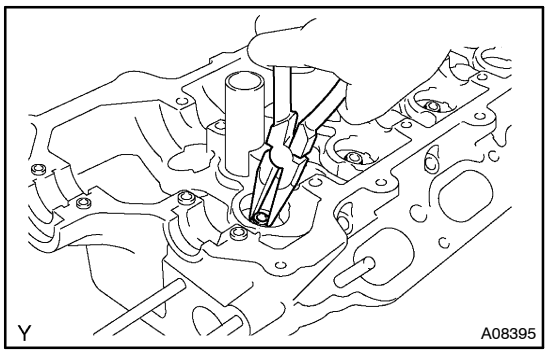
(a) Using SST, compress the valve spring and remove the 2 keepers.

SST 09202–70020 (09202–00010)

(b) Remove the spring retainer, valve spring, valve and spring seat.

HINT:

Arrange the valves, valve springs, spring seats and spring retainers in the correct order.



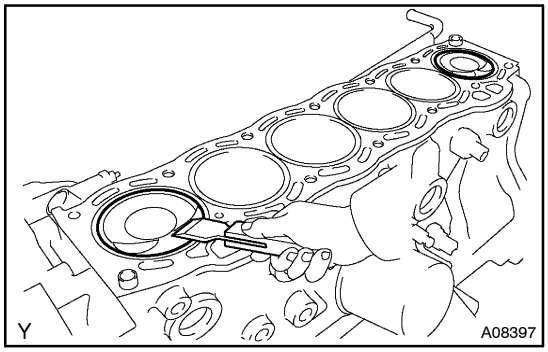
(c) Using needle–nose pliers, remove the oil seal.

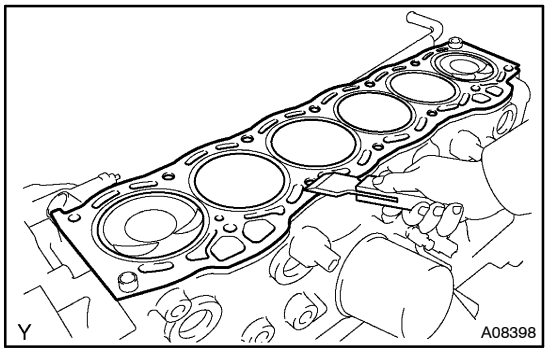
EM11E–01

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 top surface of the piston.





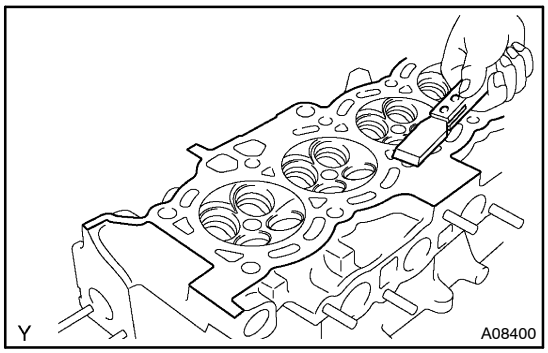
(b) Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high–pressure compressed air.

2. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS (See page EM–89)

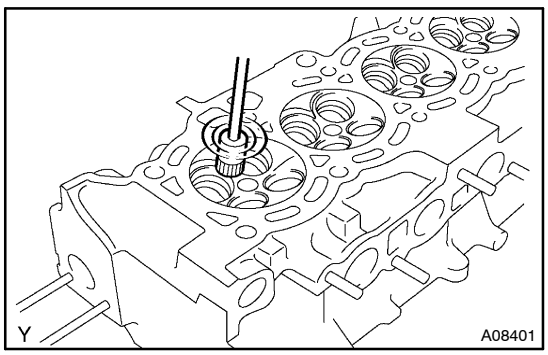


3. CLEAN CYLINDER HEAD

(a) Using a gasket scraper, remove all the gasket material from the contact surface of the cylinder block.

NOTICE:

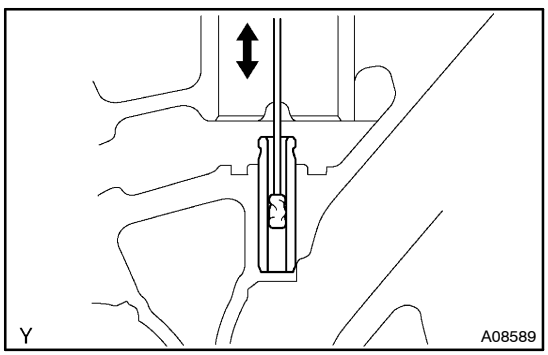
Be careful not to scratch the cylinder block contact surface.



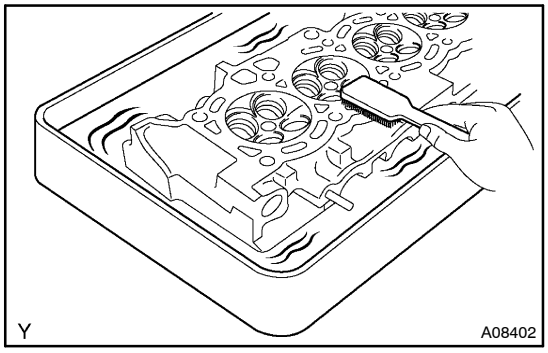
(b) Using a wire brush, remove all the carbon from the combustion chamber.

NOTICE:

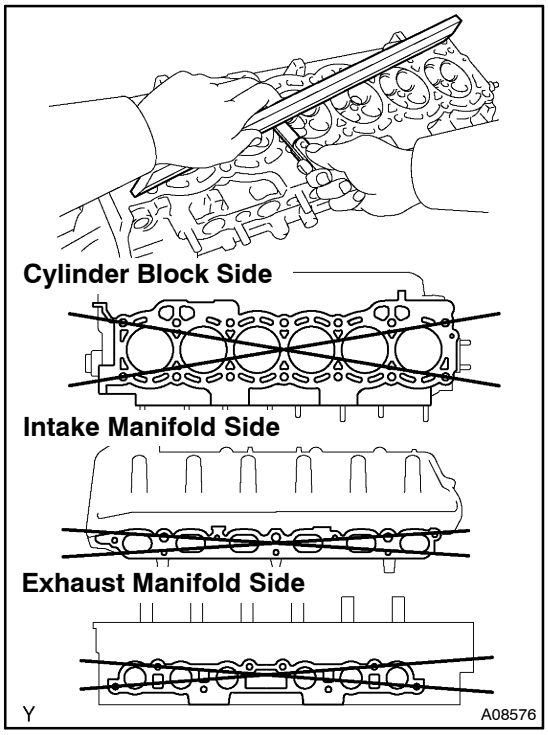
Be careful not to scratch the cylinder block contact surface.



(c) Using a valve guide bushing brush and solvent, clean all the guide bushings.



(d) Using a soft brush and solvent, thoroughly clean the cylinder head.



4. INSPECT CYLINDER HEAD

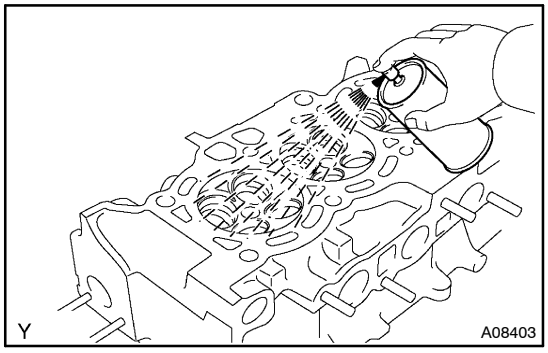
(a) Inspect for flatness.

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and the manifolds for warpage.

Maximum warpage:

Cylinder block side	0.20 mm (0.0079 in.)
Intake manifold side	0.20 mm (0.0079 in.)
Exhaust manifold side	0.30 mm (0.0118 in.)

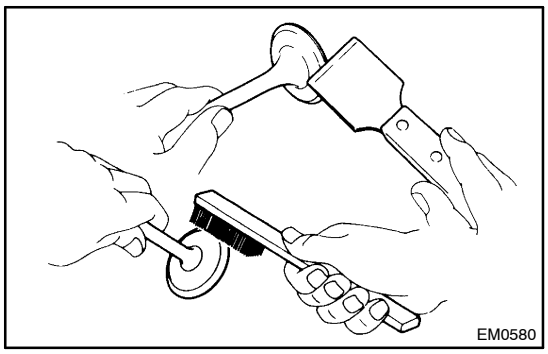
If warpage is greater than maximum, replace the cylinder head.



(b) Inspect for cracks.

Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

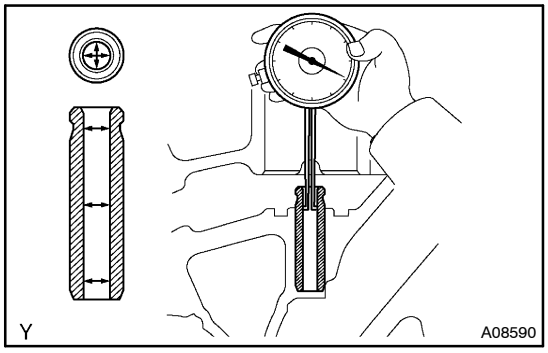
If cracked, replace the cylinder head.



5. CLEAN VALVES

(a) Using a gasket scraper, chip off any carbon from the valve head.

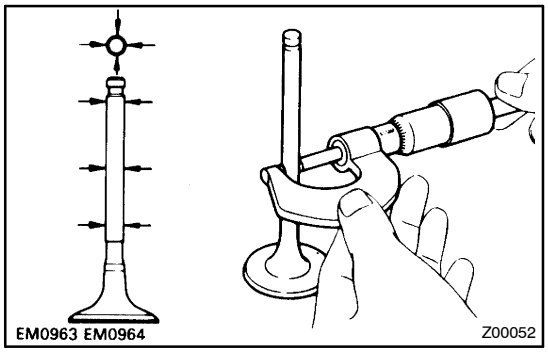
(b) Using a wire brush, thoroughly clean the valve.



6. INSPECT VALVE STEMS AND GUIDE BUSHINGS

(a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:
5.010 – 5.030 mm (0.1972 – 0.1980 in.)



(b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:

Intake	4.970 – 4.985 mm (0.1957 – 0.1963 in.)
Exhaust	4.965 – 4.980 mm (0.1955 – 0.1961 in.)

(c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

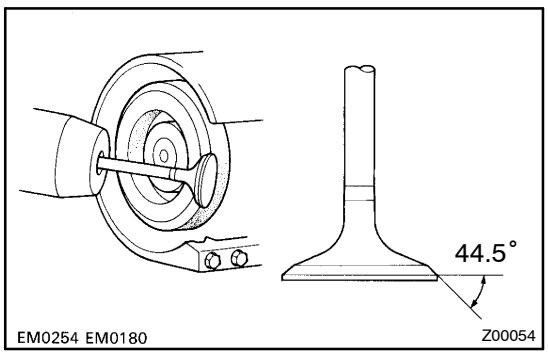
Standard oil clearance:

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. (See page EM–53)

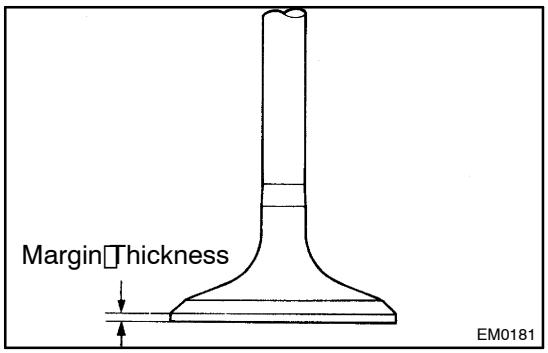


7. INSPECT AND GRIND VALVES

(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°



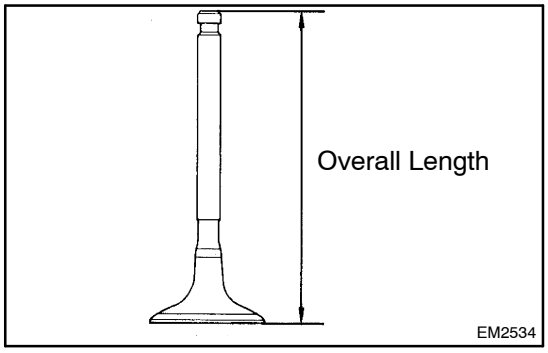
(c) Check the valve head margin thickness.

Standard margin thickness:

Intake	0.8 mm (0.0315 in.)
Exhaust	1.0 mm (0.0394 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.

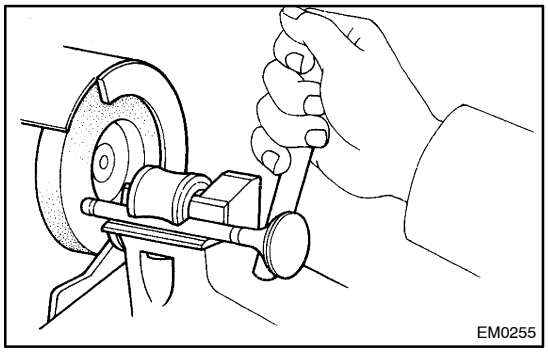
Standard overall length:

Intake	91.75 mm (3.6122 in.)
Exhaust	91.79 mm (3.6138 in.)

Minimum overall length:

Intake	91.25 mm (3.5925 in.)
Exhaust	91.29 mm (3.5941in.)

If the overall length is less than minimum, replace the valve.

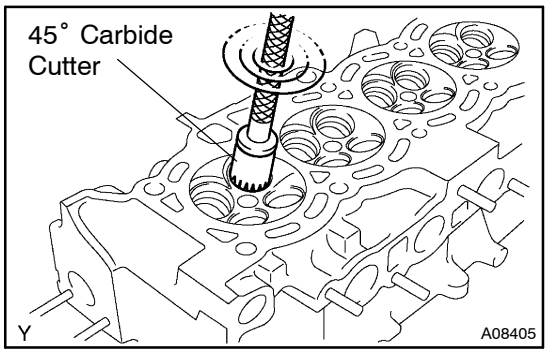


(e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

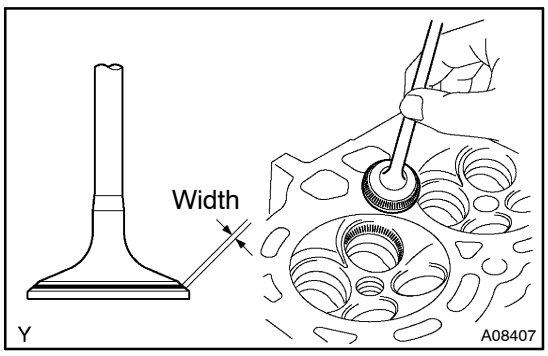
NOTICE:

Do not grind off more than the minimum length.



8. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.



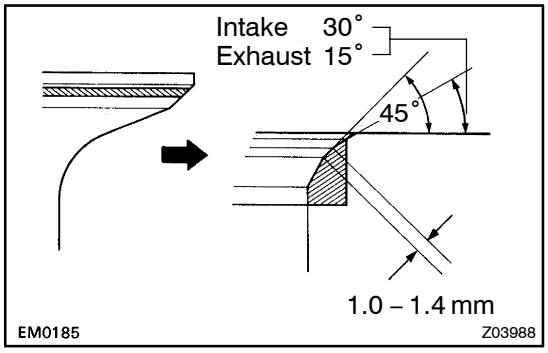
(b) Check the valve seating position.

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:

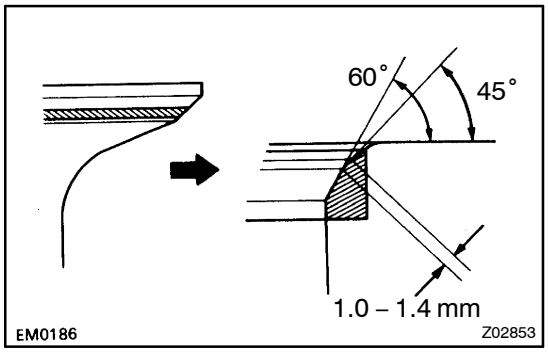
1.0 – 1.4 mm (0.039 – 0.055 in.)



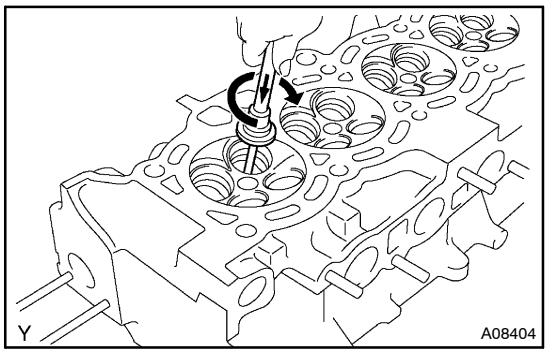
If not, correct the valve seats as follows:

(1) Intake:
If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

(2) Exhaust:
If the seating is too high on the valve face, use 15° and 45° cutters to correct the seat.

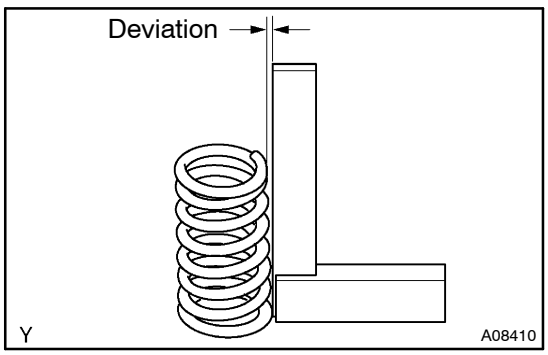


(3) If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.



(d) Hand–lap the valve and valve seat with an abrasive compound.

(e) After hand–lapping, clean the valve and valve seat.

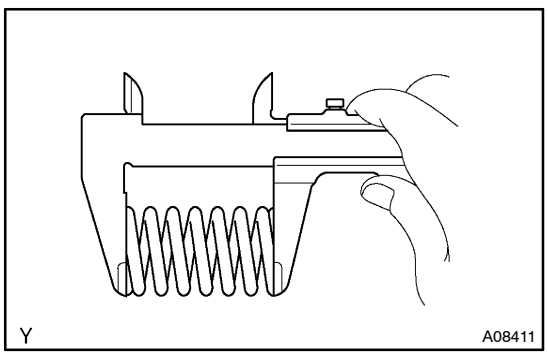


9. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

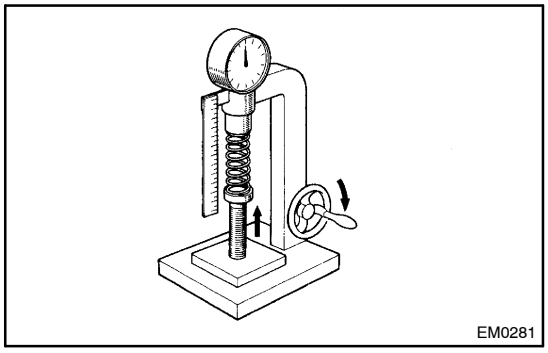
If the deviation is greater than maximum, replace the valve spring.



(b) Using a vernier caliper, measure the free length of the valve spring.

Free length: 47.3 mm (1.862 in.)

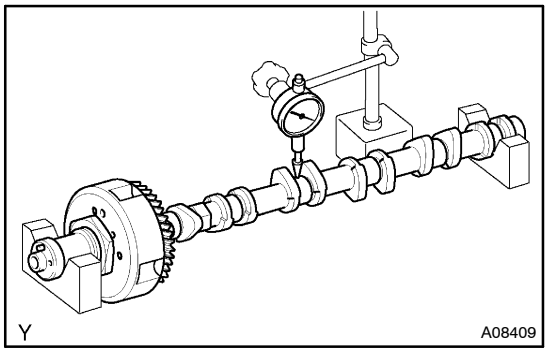
If the free length is not as specified, replace the valve spring.



(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:
188 – 204 N (19.2 – 20.8 kgf, 42.3 – 45.9 lbf)
at 33.5 mm (1.319 in.)

If the installed tension is not as specified, replace the valve spring.

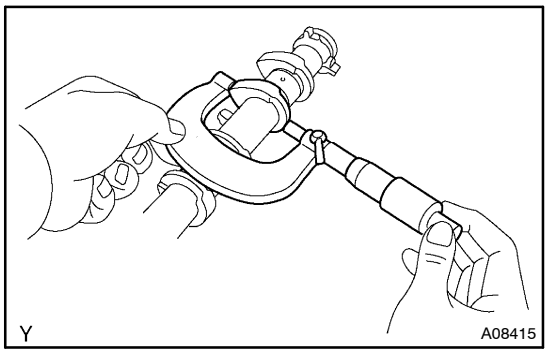


10. INSPECT CAMSHAFTS AND CAMSHAFT TIMING GEAR (VVT–i)

(a) Inspect the circle runout.
(1) Place the camshaft on V–blocks.
(2) 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.



(b) Using a micrometer, measure the cam lobe height.

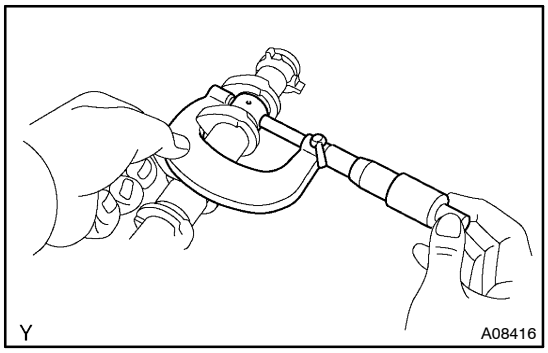
Standard cam lobe height:

Intake	46.75 – 46.85 mm (1.8405 – 1.8445 in.)
Exhaust	46.27 – 46.37 mm (1.8216 – 1.8256 in.)

Minimum cam lobe height:

Intake	46.6 mm (1.8346 in.)
Exhaust	46.1 mm (1.8150 in.)

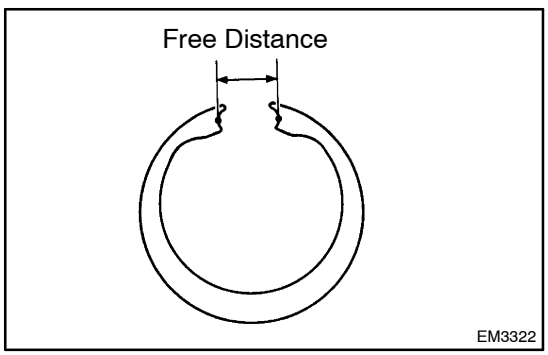
If the cam lobe height is less than minimum, replace the camshaft.



(c) Using a micrometer, measure the journal diameter.

Journal diameter:
26.959 – 26.975 mm (1.0614 – 1.0620 in.)

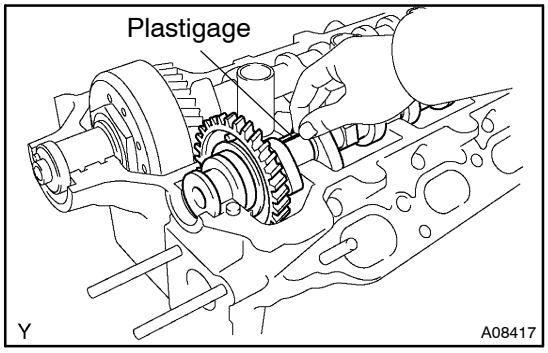
If the journal diameter is not as specified, check the oil clearance.



(d) Using vernier calipers, measure the free distance between the gear spring ends.

Free distance: 17.6 – 18.2 mm (0.693 – 0.717 in.)

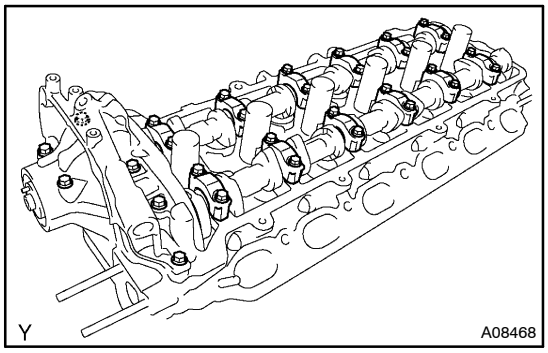
If the free distance is not as specified, replace the gear spring.



(e) Inspect the journal oil clearance.
(1) Clean the bearing caps and camshaft journals.
(2) Check that bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

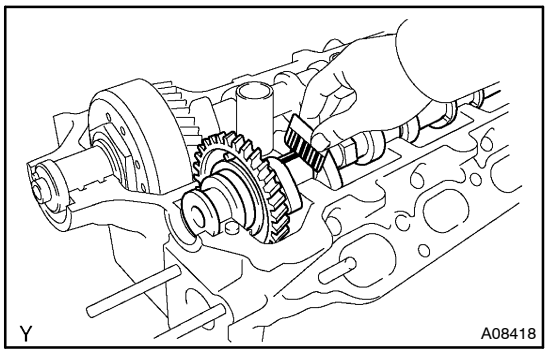
(3) Place the camshafts on the cylinder head.
(4) Lay a strip of Plastigage across each of the camshaft journals.



(5) Install the bearing caps. (See page EM–59)

NOTICE:
Do not turn the camshaft.

(6) Remove the bearing caps.

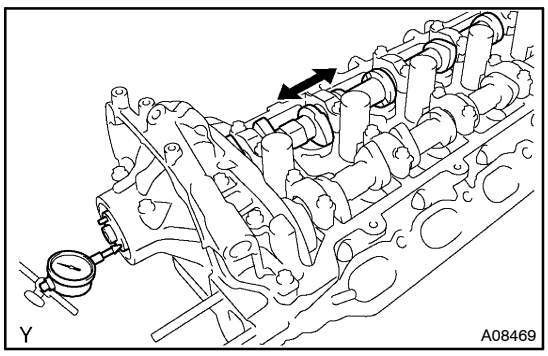


(7) Measure the Plastigage at its widest point.

Standard oil clearance:
0.025 – 0.062 mm (0.0010 – 0.0024 in.)
Maximum oil clearance: 0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

(8) Completely remove the Plastigage.

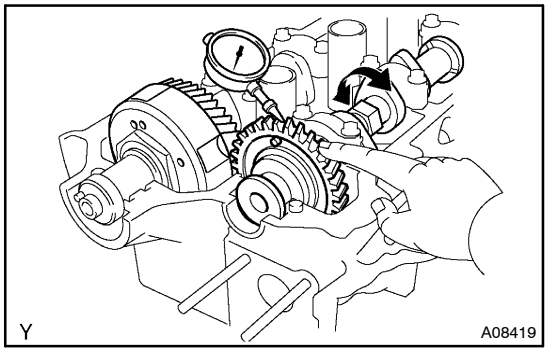


(f) Inspect the camshaft thrust clearance.
(1) Install the camshaft. (See page EM–59)
(2) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

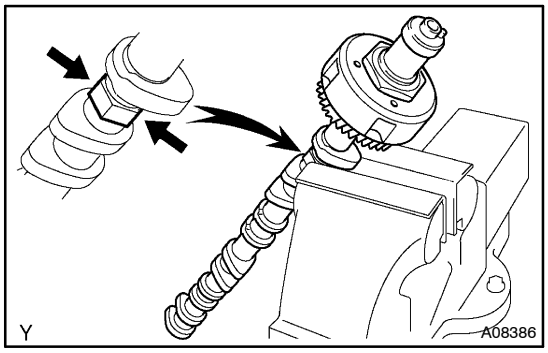
Standard thrust clearance:

Intake	0.045 – 0.100 mm (0.0018 – 0.0039 in.)
Exhaust	0.045 – 0.110 mm (0.0012 – 0.0043 in.)

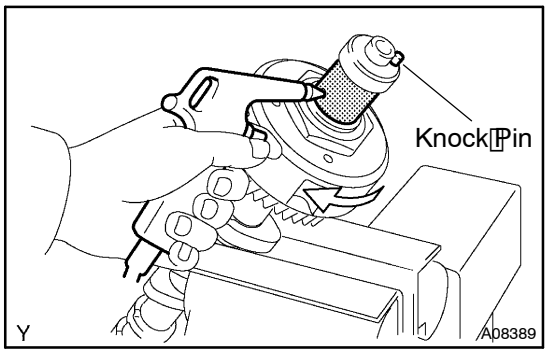
If the thrust clearance is not as specified, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.



(g) Inspect the camshaft gear backlash.
(1) Install the camshafts without installing the intake cam sub-gear. (See page EM–59)
(2) 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.

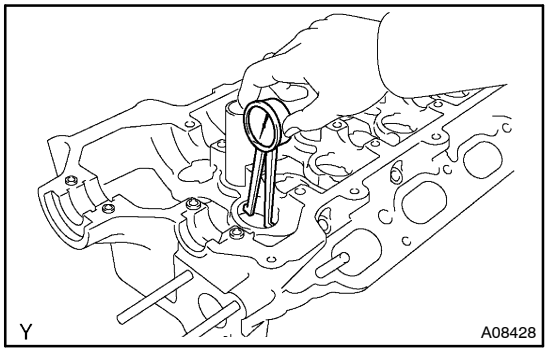


(h) Inspect the camshaft timing gear (VVT–i) operation.
(1) Mount the hexagon wrench head portion of the exhaust camshaft in a vise.
(2) Check that camshaft timing gear (VVT–i) will not turn.



(3) Cover the port except the port on the advance angle side shown in the illustration with the vinyl tape.
(4) Using an air gun, apply about 100 kPa (1 kgf/cm^3, 14 psi) of air pressure to the port on the advance side.

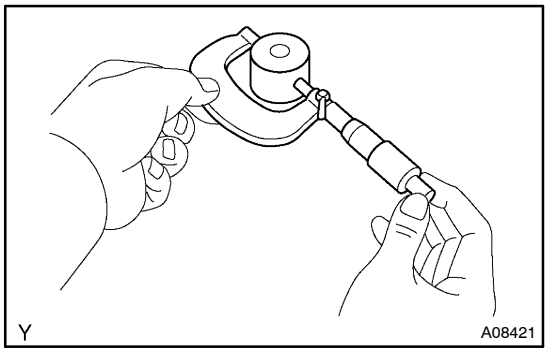
NOTICE:
When the oil is splashed, wipe it off with a shop lug and the likes.
HINT:
Perform this in order to release the lock pin for the maximum delay angle locking.
(5) Under the condition of (4), turn the camshaft timing gear (VVT–i) to the advance angle side (the white arrow marked direction in the illustration) with your hand.
Standard: Must turn
HINT:
Depending on the air pressure, the camshaft timing gear (VVT–i) will turn to the advance angle side without applying force by hand. Also, under the condition that the pressure can be hardly applied because of the air leakage from the port, there may be the case that the lock pin could be hardly released.
(6) Except the position where the lock pin meets at the maximum delay angle, let the camshaft timing gear (VVT–i) turn back and forth and check the movable range and that there is no disturbance.
Standard: Movable smoothly in the range about 25°
(7) Turn the camshaft timing gear (VVT–i) with your hand and lock it at the maximum delay angle position.



11. 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 – 31.025 mm (1.2205 – 1.2215 in.)



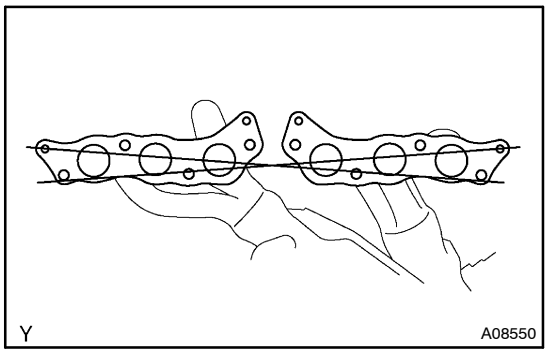
(b) Using a micrometer, measure the lifter diameter.

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 – 0.059 mm (0.0009 – 0.0023 in.)
Maximum oil clearance: 0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.

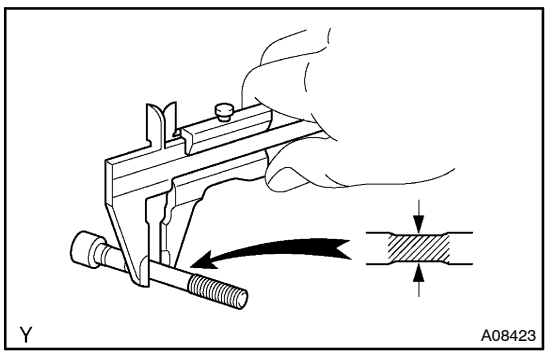


12. INSPECT EXHAUST MANIFOLD

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage: 0.70 mm (0.0276 in.)

If warpage is greater than maximum, replace the manifold.



13. INSPECT CYLINDER HEAD BOLTS

Using vernier calipers, measure the tension portion diameter of the bolt.

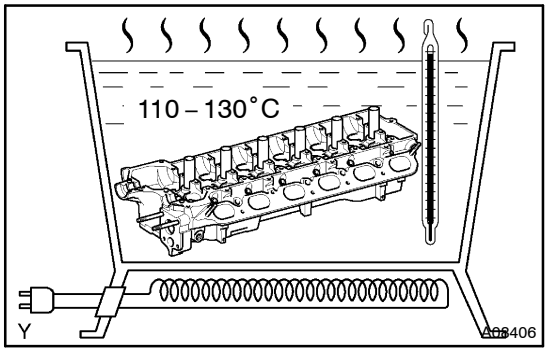
Standard outside diameter:
8.7 – 8.8 mm (0.343 – 0.346 in.)
Minimum outside diameter: 8.6 mm (0.339 in.)

If the diameter is less than minimum, replace the bolt.

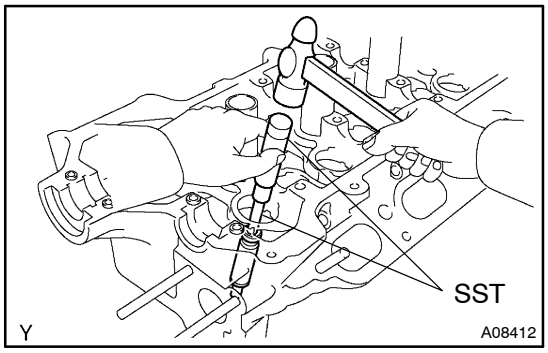
EM11F–01

REPLACEMENT

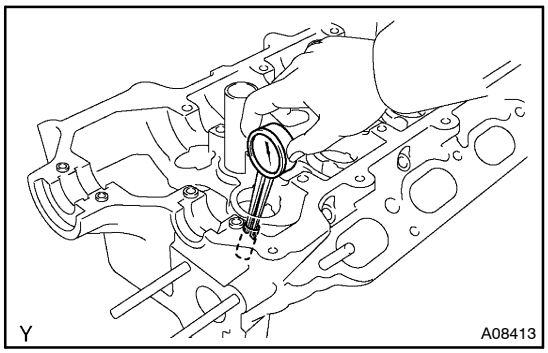
1. REPLACE VALVE GUIDE BUSHINGS



(a) Gradually heat the cylinder head to 110 – 130°C (230 – 266°F).



(b) Using SST and a hammer, tap out the guide bushing.
SST 09201–10000 (09201–01050),
09950–70010 (09951–07100)



(c) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

Both intake and exhaust

Bushing bore diameter mm (in.)	Bushing size
9.679 – 9.701 (0.3811 – 0.3819)	Use STD
9.729 – 9.751 (0.3830 – 0.3839)	Use O/S 0.05

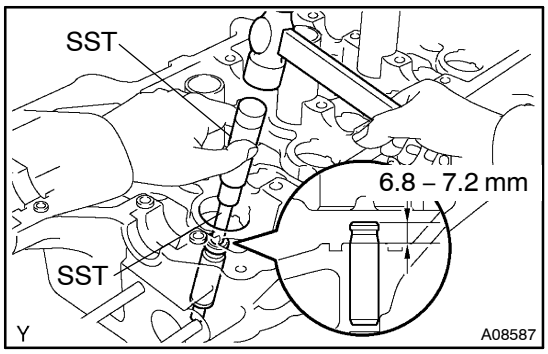
(d) Select a new guide bushing (STD or O/S 0.05).

If the bushing bore diameter of the cylinder head is greater than 9.701 mm (0.3819 in.), machine the bushing bore to the following dimensions:

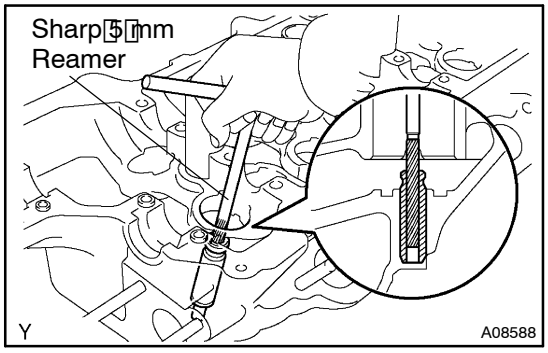
9.729 – 9.751 mm (0.3830 – 0.3839 in.)

If the bushing bore diameter of the cylinder head is greater than 9.751 mm (0.3839 in.), replace the cylinder head.

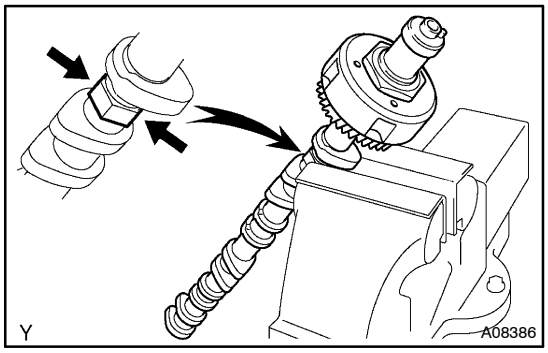
(e) Gradually heat the cylinder head to 110 – 130°C (230 – 266°F).



(f) Using SST and a hammer, tap in a new guide bushing until there is 6.8 – 7.2 mm (0.268 – 0.283 in.) protruding from the cylinder head.
SST 09201–10000 (09201–01050),
09950–70010 (09951–07100)



(g) Using a sharp 5 mm reamer, ream the guide bushing to obtain the specified standard clearance (See page EM–44) between the guide bushing and valve stem.



2. REPLACE CAMSHAFT TIMING GEAR (VVT–i)

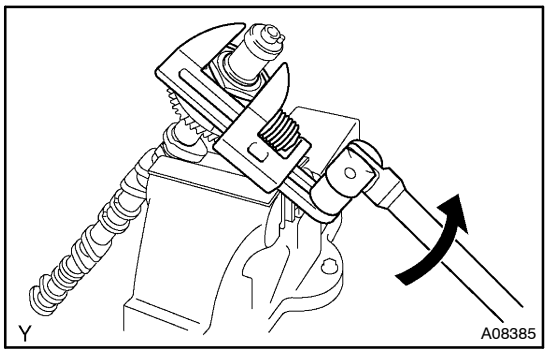
NOTICE:

Do not remove or install the camshaft timing gear (VVT–i) beside changing the camshaft timing gear (VVT–i) or camshaft.

(a) Mount the hexagon wrench head portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



(b) Using SST, remove the lock nut and camshaft timing gear (VVT–i).

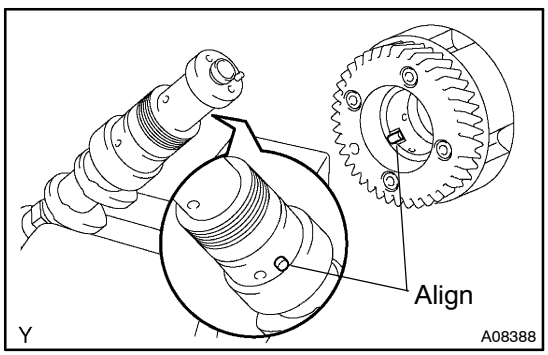
SST 09922–10010

NOTICE:

- **Remove it under the condition that the lock pin is operated, and lock at the maximum delay angle position.**
- **Never remove the 4 bolts on the gear.**

HINT:

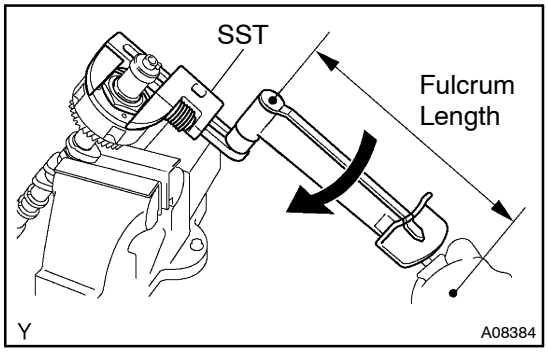
In case of having difficulty to remove the timing gear (VVT–i), apply a slight hitting using a plastic–faced hammer and then remove it.



(c) Align the knock pin and knock pin groove and install the camshaft timing gear (VVT–i) on the camshaft.

NOTICE:

Install it under the condition that the lock pin is operated and lock at the maximum delay angle position.



(d) Apply the engine oil on a new nut, the placing surface of the timing gear (VVT–i) and the screw portion.

NOTICE:

Must change the nut to a new one when to change the camshaft timing gear (VVT–i).

HINT:

Be sure to apply the oil, otherwise the prescribed torque cannot be obtained.

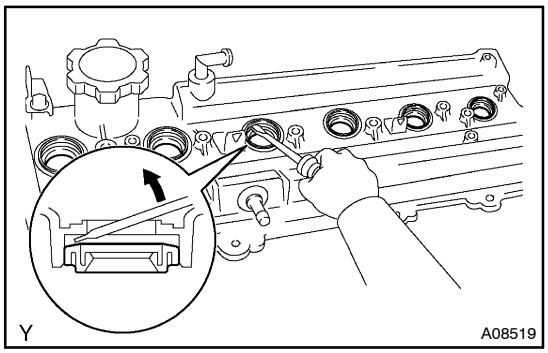
(e) Using SST, install and torque the lock nut.

SST 09922–10010

Torque: 120 N·m (1,200 kgf·cm, 87 ft·lbf)

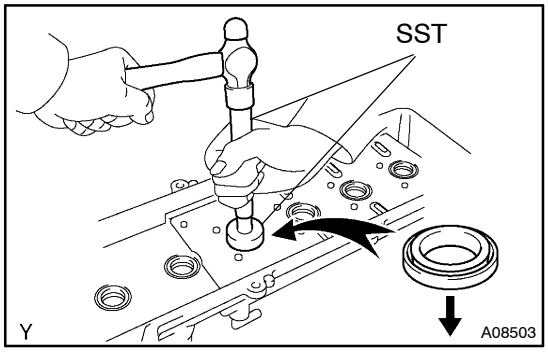
HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).



3. REPLACE SPARK PLUG TUBE GASKETS

(a) Using a screwdriver, pry off the tube gasket.



(b) Using SST and a hammer, tap in a new tube gasket until its surface is flush with the upper edge of the cylinder head cover.

SST 09950–60010 (09951–00240, 09951–00450, 09952–06010), 09950–70010 (09951–07100)

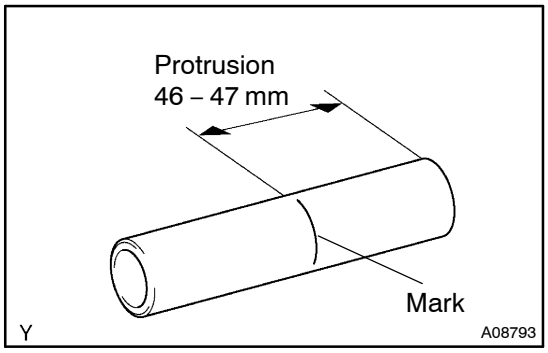
(c) Apply a light coat of MP grease to the tube gasket lip.

EM11G–01

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



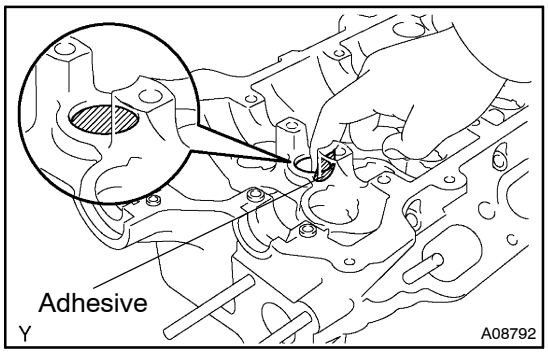
1. INSTALL SPARK PLUG TUBES

HINT:

When using a new cylinder head, spark plug tubes must be installed.

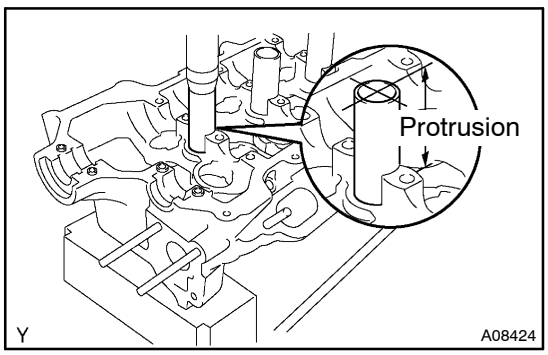
(a) Mark the standard position away from the edge, onto a new spark plug tube.

Standard protrusion: 46 – 47 mm (1.81 – 1.85 in.)



(b) Apply adhesive to the spark plug tube hole of the cylinder head.

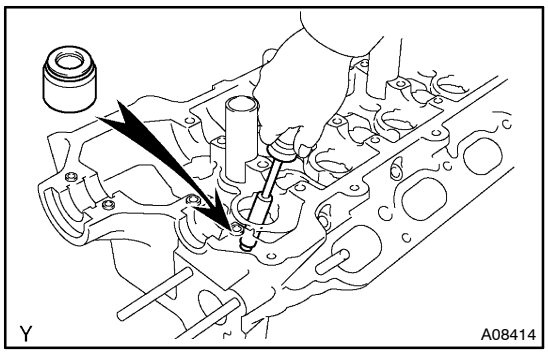
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent



(c) Using a press, press in the spark plug tube until there is standard protrusion protruding from the camshaft bearing cap installation surface of the cylinder head.

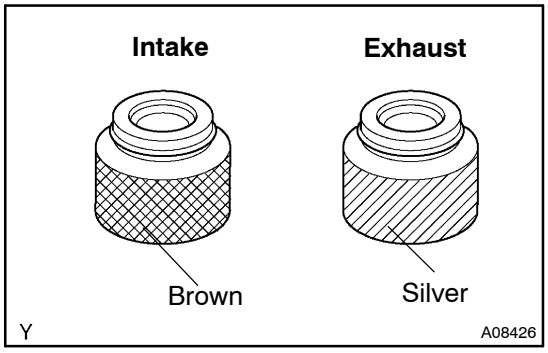
NOTICE:

Avoid pressing a new spark plug tube in too far by measuring the amount of the protrusion while pressing.



2. INSTALL VALVES

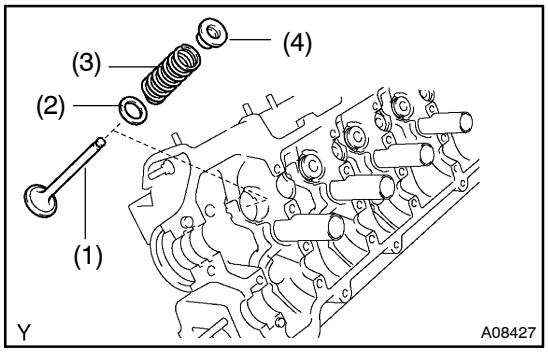
(a) Install a new oil seal on the valve guide bushing.



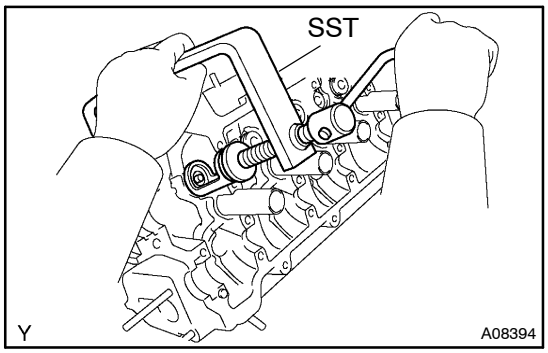
HINT:
The intake valve oil seal is brown and the exhaust valve oil seal is silver.

NOTICE:

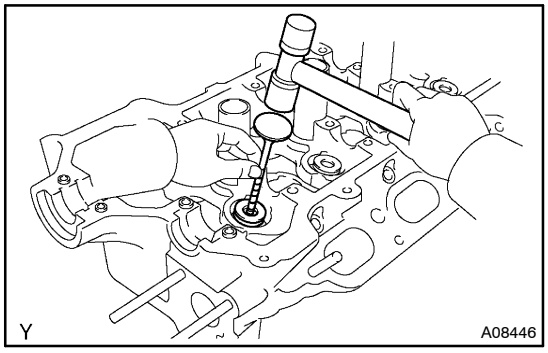
Pay much attention when assembling the oil seal for intake and exhaust. Assembling the wrong one may cause a failure.



(b) Install the valve (1), spring seat (2), valve spring (3) and spring retainer (4).



(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 and the valve stem (not in use) tip wound with vinyl tape, lightly tap the valve stem tip to assure proper fit.

NOTICE:

Be careful not do damage the valve stem tip.

3. INSTALL VALVE LIFTERS

(a) Install the valve lifter.

(b) Check that the valve lifter rotates smoothly by hand.

4. A/T:

INSTALL CYLINDER HEAD REAR PLATE

Install a new gasket and the rear plate with the 2 bolts and nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

5. INSTALL CAMSHAFT POSITION SENSOR

(a) Install a new O–ring to the camshaft position sensor.

(b) Install the camshaft position sensor with the bolt.

Torque: 9 N·m (90 kgf·cm, 78 in.·lbf)

6. INSTALL WATER TEMPERATURE SWITCH

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

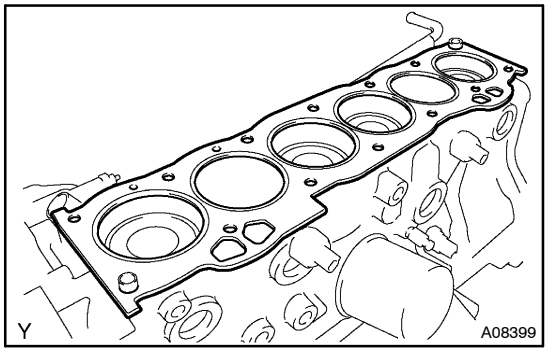
7. INSTALL WATER OUTLET

Install a new gasket and the water outlet with the 2 bolts and 2 nuts.

Torque: 29 N·m (290 kgf·cm, 21 ft·lbf)

EM11H–01

INSTALLATION



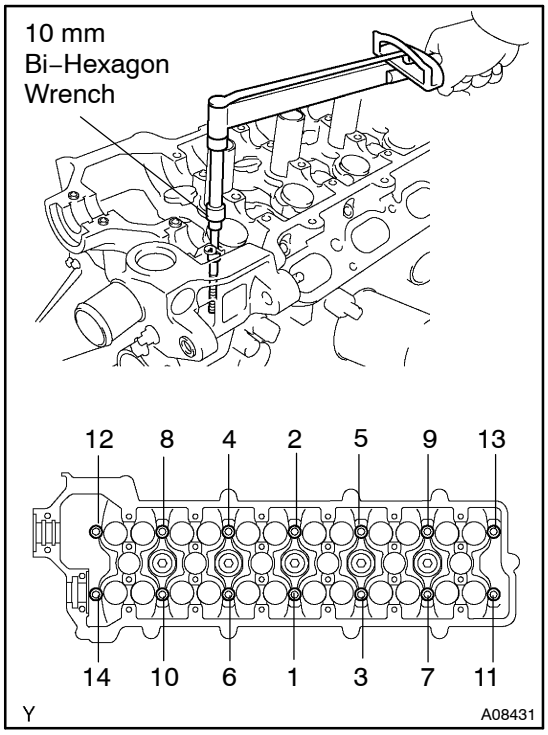
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

(a) Place a new cylinder head gasket in position on the cylinder block.

NOTICE:

Be careful of the installation direction.

(b) Place the cylinder head in position on the cylinder head gasket.



2. INSTALL CYLINDER HEAD BOLTS

HINT:

- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (e)).
- If any cylinder head bolt is broken or deformed, replace it.

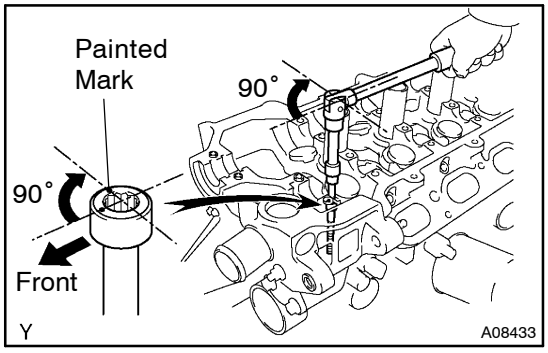
(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts and plate washers.

(b) Install the plate washer to the cylinder head bolt.

(c) Install and uniformly tighten the 14 cylinder head bolts and plate washers, in several passes, in the sequence shown.

Torque: 50 N·m (500 kgf·cm, 36 ft·lbf)

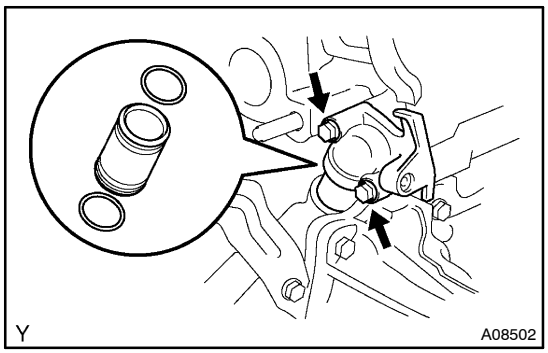
If any of the cylinder head bolt does not meet the torque specification, replace the cylinder head bolt.



(d) Mark the front of the cylinder head bolt 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.

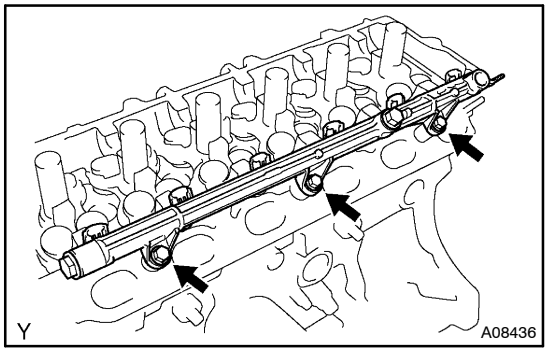


3. INSTALL WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE

(a) Install 2 new O–rings to the No.1 water bypass pipe.

(b) Install a new gasket, the No.1 water bypass pipe and water bypass outlet with the 2 bolts.

Torque: 9 N·m (90 kgf·cm, 78 in.·lbf)



4. INSTALL INJECTORS AND DELIVERY PIPE

(a) Place the 3 spacers and 6 insulators in position on the cylinder head.

(b) Attach the 6 injectors and delivery pipe assembly to the cylinder head.

(c) Temporarily install the 3 bolts holding the delivery pipe to the cylinder head.

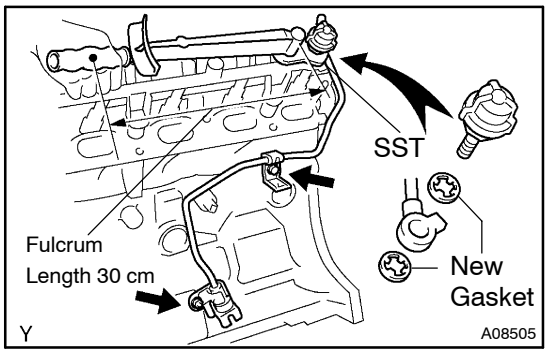
(d) Check that the injectors rotate smoothly.

HINT:

If injectors do not rotate smoothly, the probable cause is incorrect installation of O–ring. Replace the O–ring.

(e) Tighten the 3 bolts holding the delivery pipe to the cylinder head.

Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)



5. CONNECT NO.1 FUEL PIPE

(a) Connect the No.1 fuel pipe to the LH engine mounting bracket with the nut by hand.

(b) Tighten the fuel pressure pulsation damper with 2 new gaskets by hand.

(c) Using SST, tighten the fuel pressure pulsation damper.

SST 09612–24014 (09617–24011)

Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)

HINT:

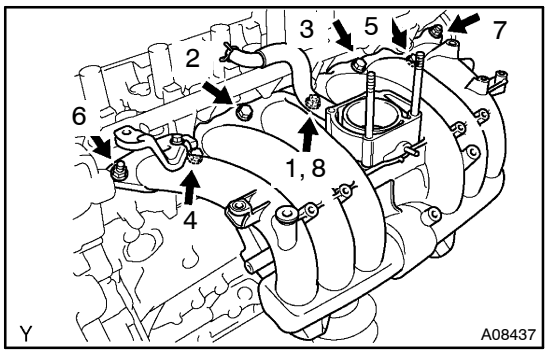
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

(d) Tighten the bolt holding the No.1 fuel pipe to the cylinder head.

Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)

(e) Tighten the the nut holding the No.1 fuel pipe to the LH engine mounting bracket.

Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)



6. INSTALL INTAKE MANIFOLD

(a) Install 6 new gasket to the intake manifold.

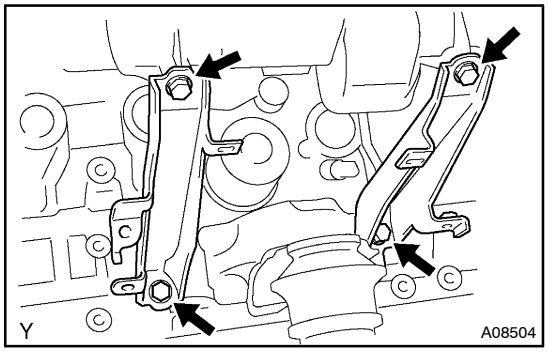
(b) Install the intake manifold with the 4 bolts and 3 nuts, in several passes, in the sequence shown.

Torque: 28 N·m (280 kgf·cm, 20 ft·lbf)

(c) A/T:

Connect the oil dipstick guide for the A/T with the bolt.

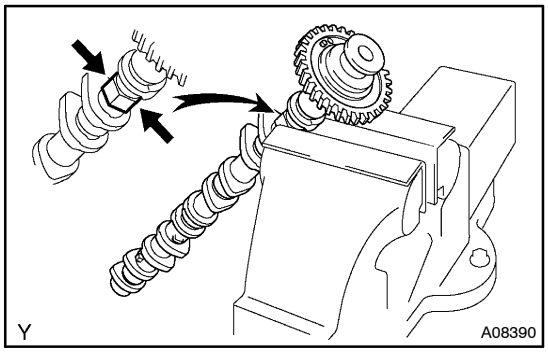
(d) Connect the brake booster vacuum hose.



7. INSTALL NO.1 AND NO.2 AIR INTAKE CHAMBER STAYS

Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

8. INSTALL THROTTLE BODY (See page FI–41)

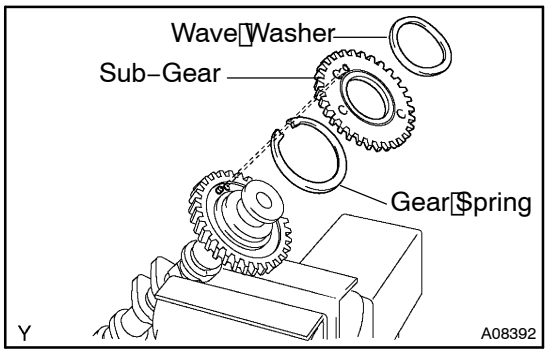


9. ASSEMBLE INTAKE CAMSHAFT

(a) Mount the hexagon wrench head portion of the camshaft in a vise.

NOTICE:

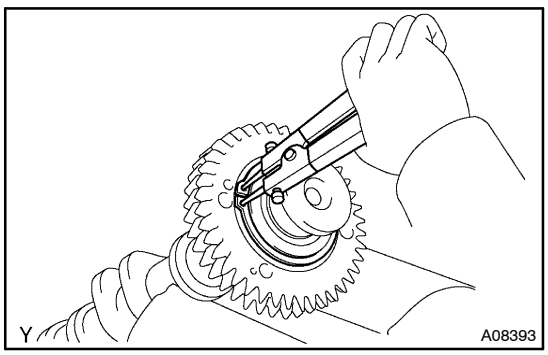
Be careful not to damage the camshaft.



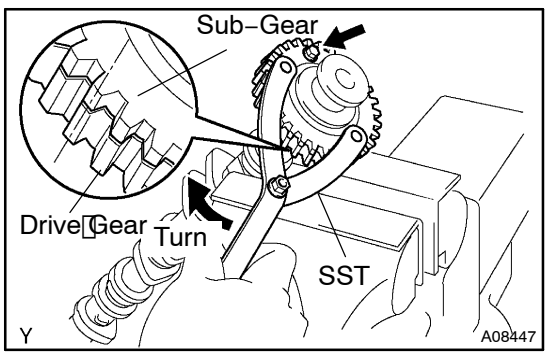
(b) Install the camshaft gear spring, camshaft sub–gear and wave washer.

HINT:

Align the pins on the gears with the spring ends.



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



(d) Using SST, align the holes of the camshaft drive gear and sub–gear by turning camshaft sub–gear clockwise, and install a service bolt.

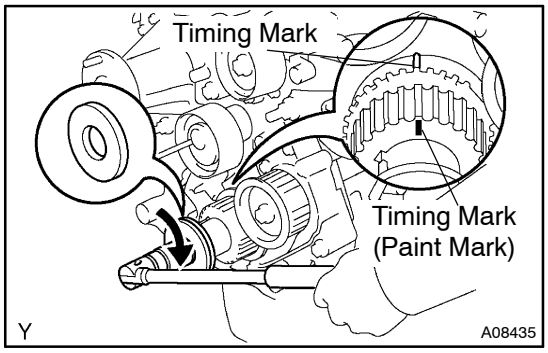
SST 09960–10010 (09962–01000, 09963–00500)

(e) Align the gear teeth of the drive gear and sub–gear, and tighten the service bolt.

10. INSTALL CAMSHAFTS

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept leveled while it is being installed. If the camshaft is not kept leveled, 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.

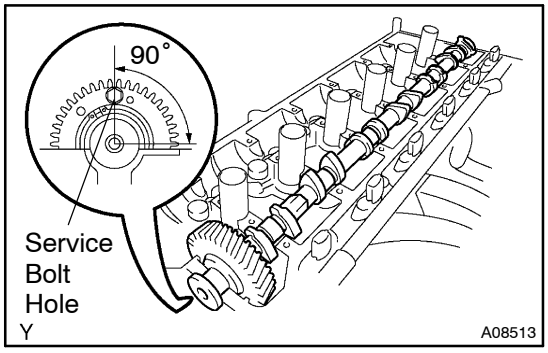


(a) Set the No.1 cylinder to the approx. 60° BTDC/compression.

Using the crankshaft pulley bolt and plate washer, turn the crankshaft, and align the timing mark (paint mark) of the crankshaft timing pulley with the timing mark of the timing belt case.

NOTICE:

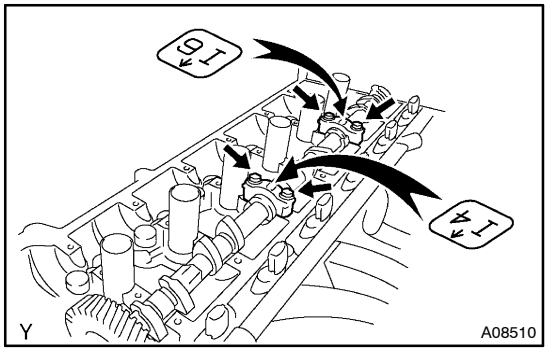
Having the crankshaft at the wrong angle can cause the piston head and valve head to come into contact with each other. Thus results in damage, when you install the camshafts. So, always set the crankshaft at the correct angle.



(b) Install the intake camshaft.

(1) Apply engine oil to the cam and gear of the camshaft, and the journal of the cylinder head.

(2) Place the intake camshaft as shown in the illustration so that the service bolt holes of the intake camshaft gears are directly above.

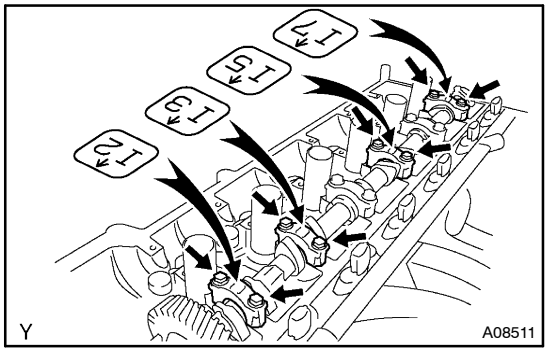


(3) Place the No.4 and No.6 bearing caps in their proper locations.

(4) Temporarily tighten the 4 bearing cap bolts uniformly and alternately in several passes until the bearing caps are snug with the cylinder head.

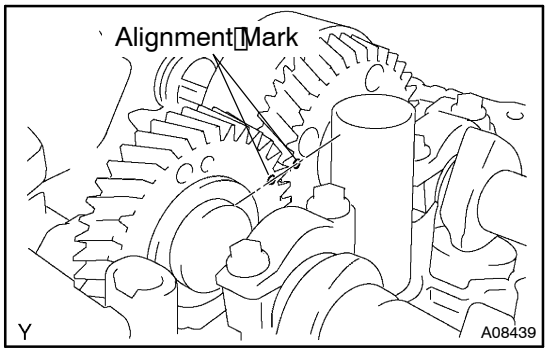
NOTICE:

While tightening the bolts, install the camshaft by keeping it leveled.

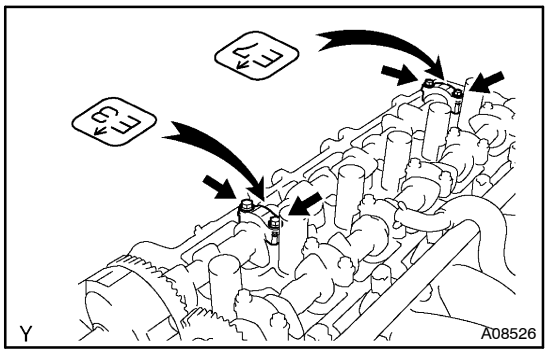


(5) Place the No.2, No.3, No.5 and No.7 bearing caps in their proper locations.
(6) Temporarily tighten the 8 bearing cap bolts, alternately tightening the right and left bolts uniformly.
(7) Uniformly tighten the 12 bearing cap bolts, in several passes.

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

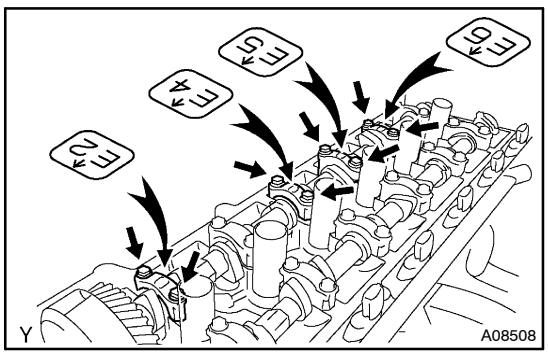


(c) Install the exhaust camshaft.
(1) Apply engine oil to the cam and gear of the camshaft, and the journal of the cylinder head.
(2) Engage the exhaust camshaft gear to the intake camshaft gear by matching the alignment marks on each gear.
(3) Roll down the exhaust camshaft onto the bearing journals while engaging gears with each other.



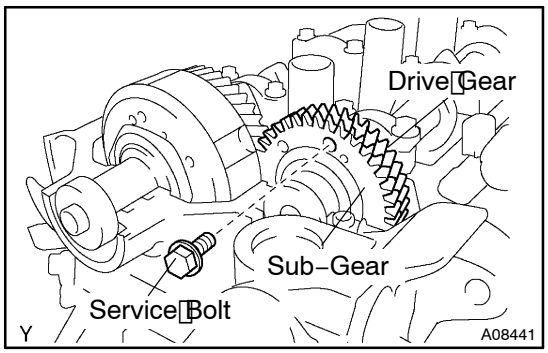
(4) Place the No.3 and No.7 bearing caps in their proper locations.
(5) Temporarily tighten the 4 bearing cap bolts uniformly and alternately in several passes until the bearing caps are snug with the cylinder head.

NOTICE:
While tightening the bolts, install the camshaft by keeping it leveled.



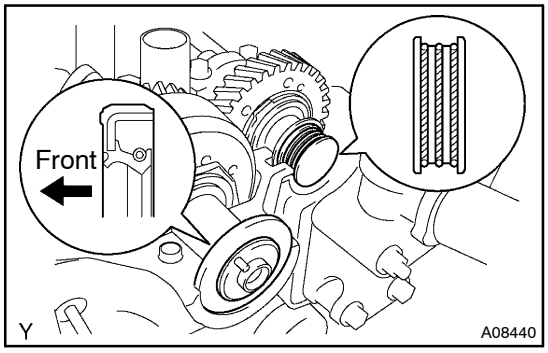
(6) Place the No.2, No.4, No.5 and No.6 bearing caps in their proper locations.
(7) Temporarily tighten the 8 bearing cap bolts alternately tightening the right and left bolts uniformly.
(8) Uniformly tighten the 12 bearing cap bolts, in several passes.

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



(9) Remove the service bolt.

(d) Check and adjust the valve clearance.
(See page EM–6)
Turn the camshaft and position the cam lobe upward, and inspect and adjust the valve clearance.



(e) Install a new oil seal to the camshaft.

NOTICE:

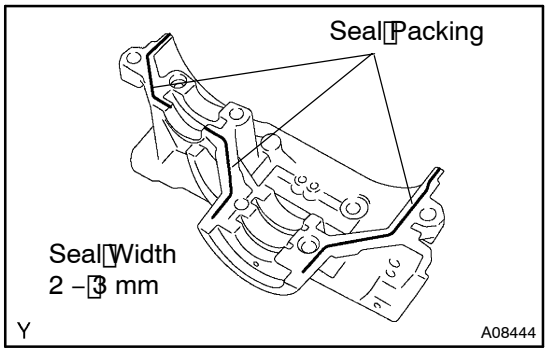
- **Do not rotate the lip.**
- **Install the oil seal to the deepest of the cylinder head.**
- **Avoid any flakes or dust on the lip.**

(f) Install the semi–circular plug.

(1) Remove any old packing (FIPG) material.

(2) Apply a seal packing to the semi–circular plug grooves.

Seal packing: Part No. 08826–00080 or equivalent



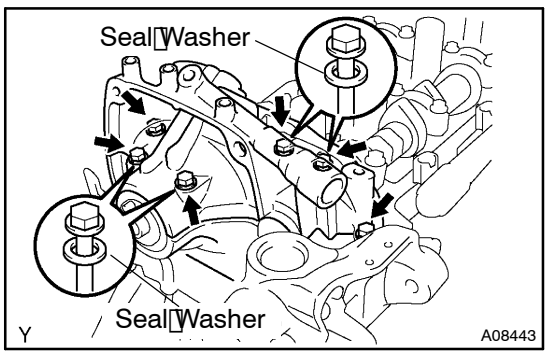
(g) Install the No.1 camshaft bearing cap.

(1) Remove any old packing (FIPG) material from the bearing cap and cylinder head.

(2) Apply a seal packing to the bearing cap 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 5 minutes of application. Otherwise, the material must be removed and reapplied.
- Immediately remove the nozzle from the tube and reinstall the cap.



(3) Install 4 new seal washers as shown in the illustration.

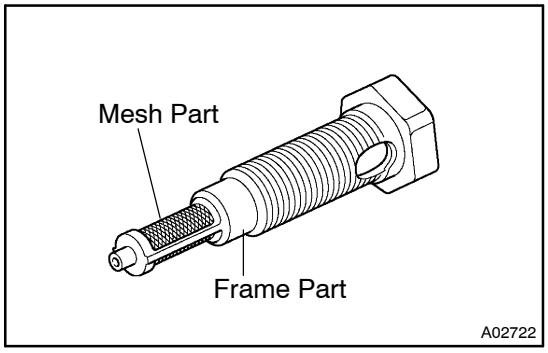
(4) Install the No.1 bearing cap with the 6 bolts.

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

NOTICE:

- **Check that there is no clearance between the surfaces contacting with the No.1 camshaft bearing cap and cylinder head.**
- **If the No.1 camshaft bearing cap fits in the cylinder head tightly, push the bearing cap by hand. Do not hit in the bearing cap with a hammer or the likes.**

11. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (See page FI–44)

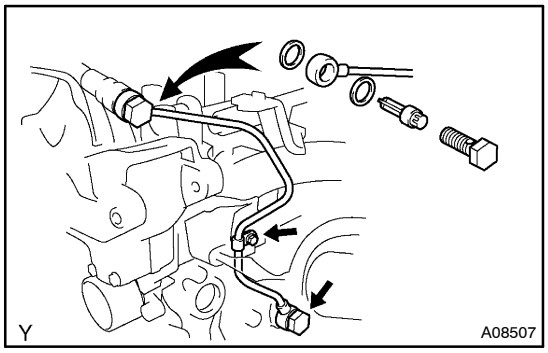


12. INSTALL NO.1 OIL PIPE

(a) Install the oil control valve filter to the union bolt.

NOTICE:

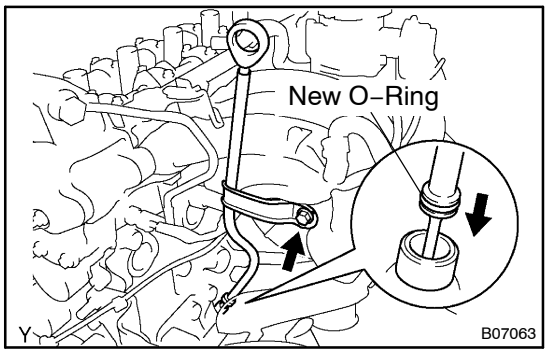
In case of touching the filter, avoid holding the mesh part and hold the frame part.



(b) Install the oil pipe to the No.1 camshaft bearing cap with 2 new gaskets and the union bolt.
Torque: 64.5 N·m (645 kgf·cm, 47 ft·lbf)

(c) Install the oil pipe to the cylinder block with 2 new gaskets and the union bolt.
Torque: 64.5 N·m (645 kgf·cm, 47 ft·lbf)

(d) Install the bolt holding the oil pipe to the cylinder head.
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)



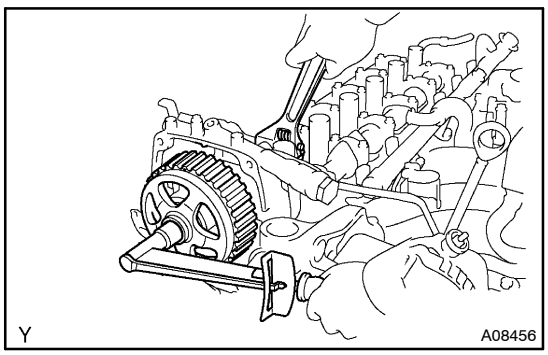
13. INSTALL OIL DIPSTICK AND GUIDE

(a) Install a new O–ring to the dipstick guide.

(b) Apply engine oil on the O–ring.

(c) Push in the dipstick guide together with the dipstick into the hole of the oil dipstick guide support.

(d) Install the dipstick guide with the bolt.
Torque: 5.5 N·m (55 kgf·cm, 48 in.·lbf)



14. INSTALL CAMSHAFT TIMING PULLEY

NOTICE:

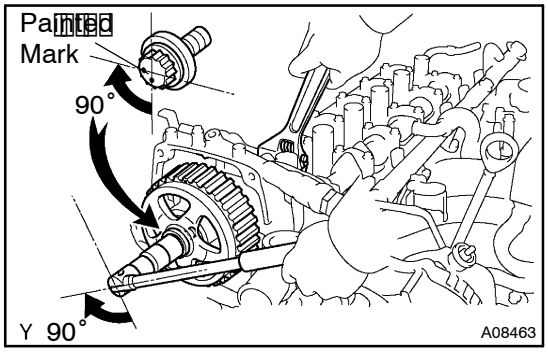
NEVER reuse the cam–pulley set bolt.

HINT:

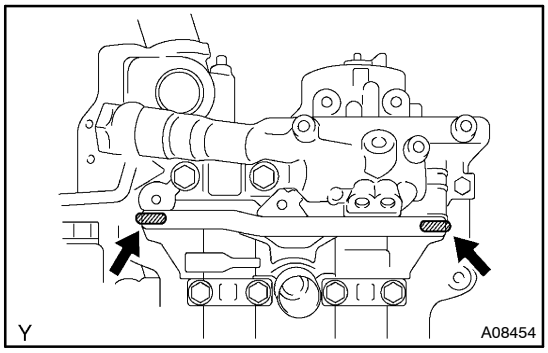
The cam–pulley set bolt is tightened in 2 progressive steps (steps (b) and (d)).

(a) Align the camshaft knock pin with the groove in the pulley, and slide on the pulley.

(b) Hold the hexagon portion of the camshaft with a wrench, and tighten a new cam–pulley set bolt.
Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)



(c) Mark the timing pulley bolt with paint.
(d) Retighten the timing pulley bolt by 90°.
(e) Check that the painted mark is now at a 90° angle to (d).

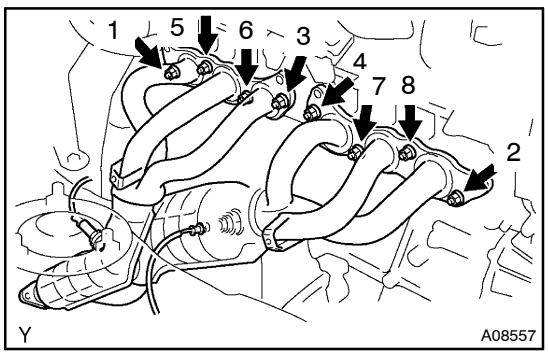


15. INSTALL CYLINDER HEAD COVER
(a) Remove any old packing (FIPG) material.
(b) Apply a seal packing to the cylinder head as shown in the illustration.
Seal packing: Part No. 08826–00080 or equivalent
(c) Install the gasket to the head cover.
(d) Install the head cover with the 11 bolts.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

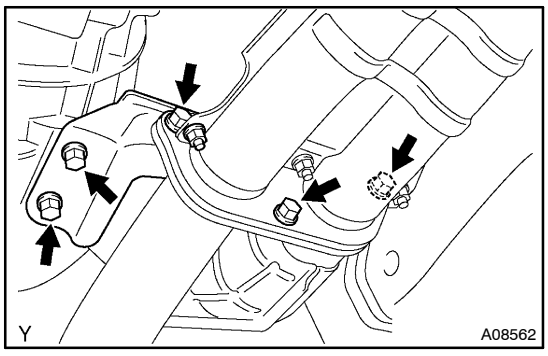
16. INSTALL AIR CLEANER INLET DUCT BRACKET
Torque: 18.5 N·m (190 kgf·cm, 14 ft·lbf)

17. INSTALL TIMING BELT (See page EM–26)

18. RHD:
INSTALL STEERING SLIDING YOKE
(See page SR–23)



19. INSTALL EXHAUST MANIFOLD
(a) Install 2 new gaskets to the cylinder head.
(b) Install the exhaust manifold with 8 new nuts, in several passes, in the sequence shown.
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)
(c) Connect the 2 oxygen sensor connectors.
(d) Install the 2 heat insulators with the 6 bolts.
Torque: 18.5 N·m (190 kgf·cm, 14 ft·lbf)



(e) Temporarily install the exhaust manifold stay to the transmission with the 2 bolts.
(f) Install 2 new gaskets to front end of the front exhaust pipe, and connect the front exhaust pipe to the exhaust manifold with the 3 bolts, a new retainer and a new nut.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(g) Tighten the 2 bolts holding the exhaust manifold stay to the transmission.
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

20. M/T:
INSTALL CYLINDER HEAD REAR PLATE

Install a new gasket, the rear plate and No.2 water bypass pipe with the bolt and 2 nuts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

21. CONNECT HEATER HOSE TO CYLINDER HEAD REAR PLATE

22. INSTALL NO.3 WATER BYPASS PIPE
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)

23. INSTALL SPARK PLUGS (See page IG–1)

24. INSTALL IGNITION COILS (See page IG–6)

25. CONNECT ENGINE WIRE TO CYLINDER HEAD

26. INSTALL NO.2 CYLINDER HEAD COVER
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)

27. INSTALL PCV HOSE

28. INSTALL ALTERNATOR (See page CH–15)

29. INSTALL NO.3 CYLINDER HEAD COVER
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

30. INSTALL AIR CLEANER ASSEMBLY
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

31. INSTALL AIR CLEANER INLET
Torque: 5 N·m (50 kgf·cm, 43 in.·lbf)

32. FILL WITH ENGINE COOLANT

33. START ENGINE AND CHECK FOR LEAK

34. INSTALL NO.1 ENGINE UNDER COVER

35. ROAD TEST

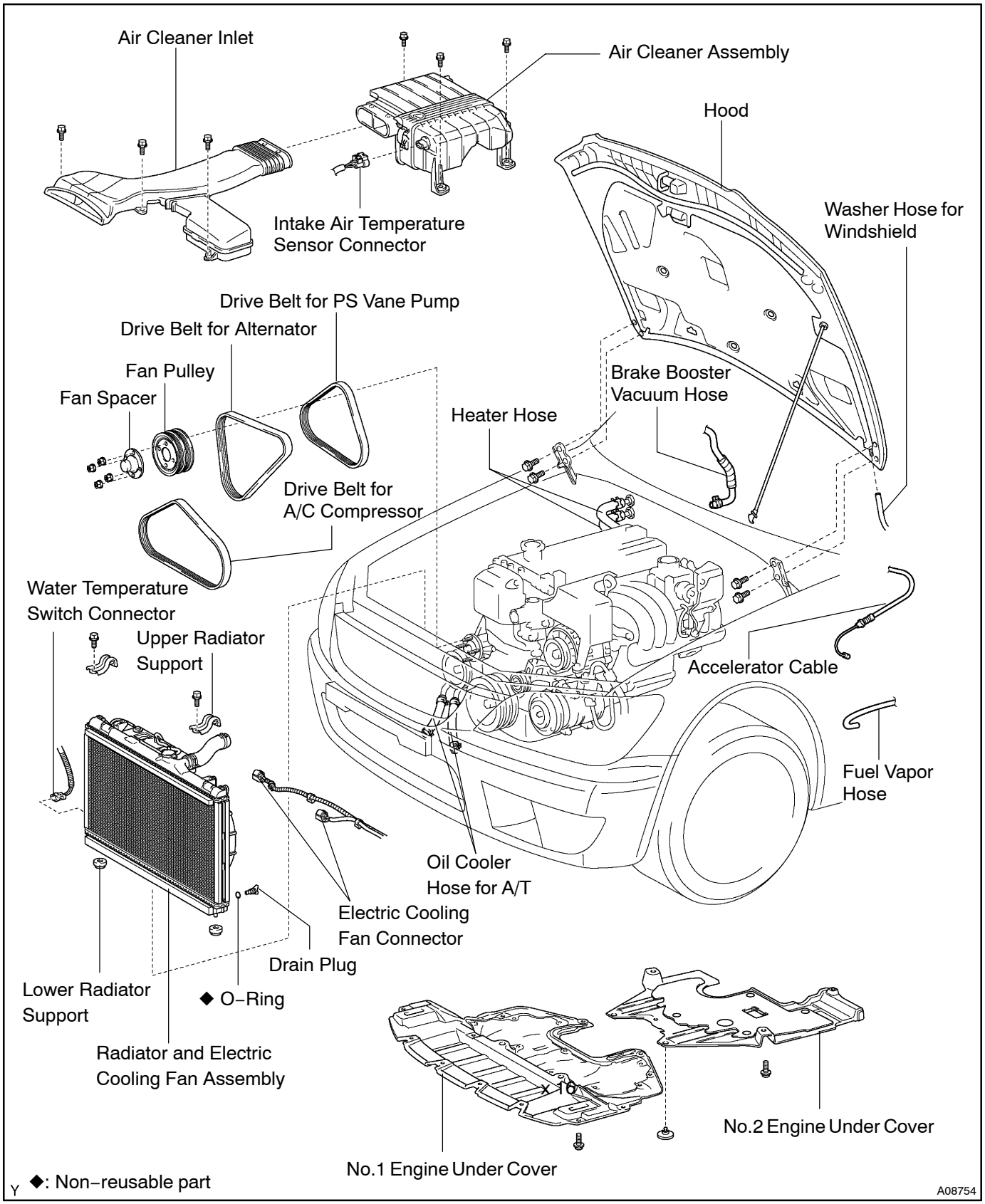
Check abnormal noise, shock, slippage, correct shift points and smooth operation.

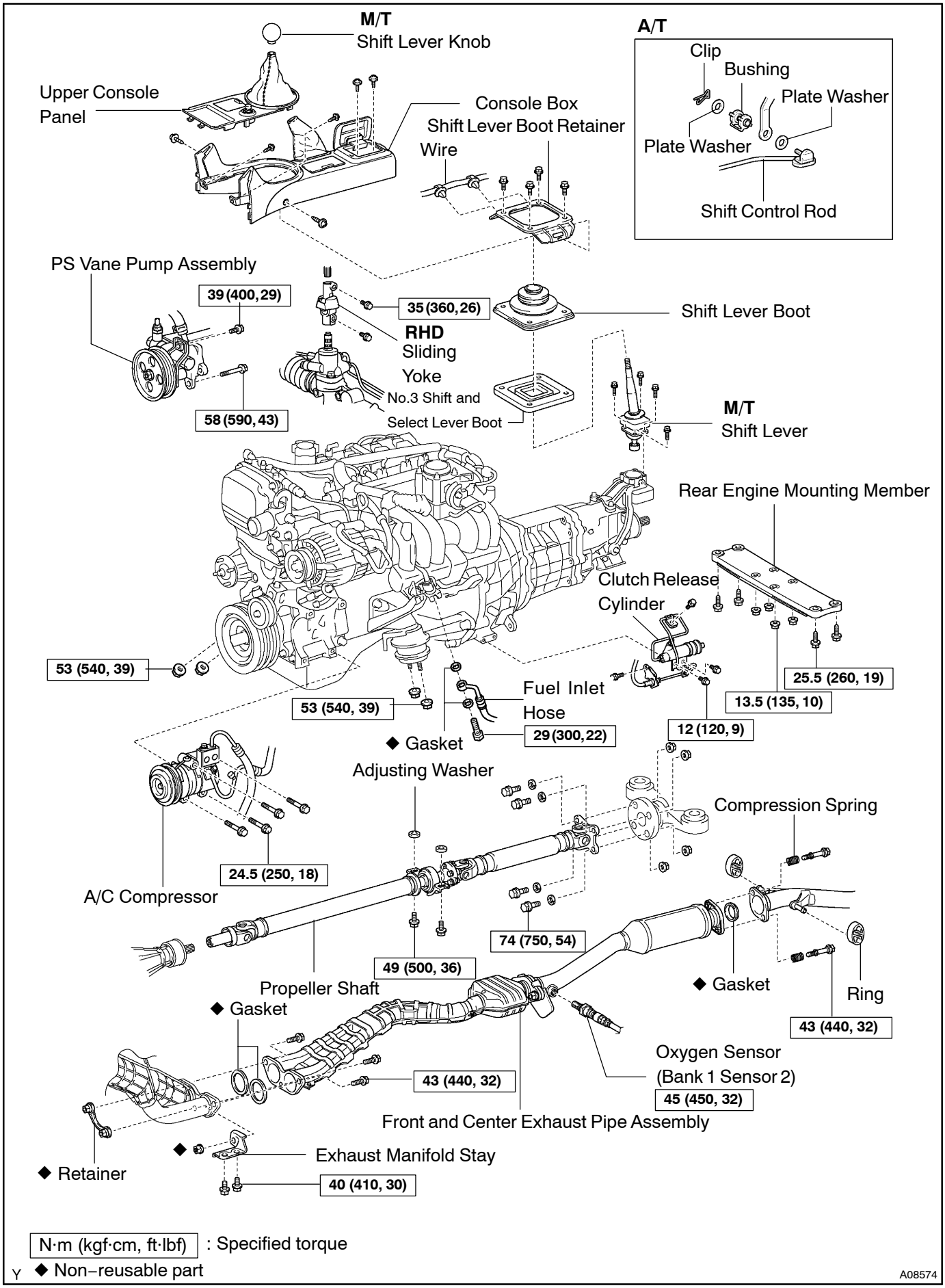
36. RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL

ENGINE UNIT

COMPONENTS

EM11O–01

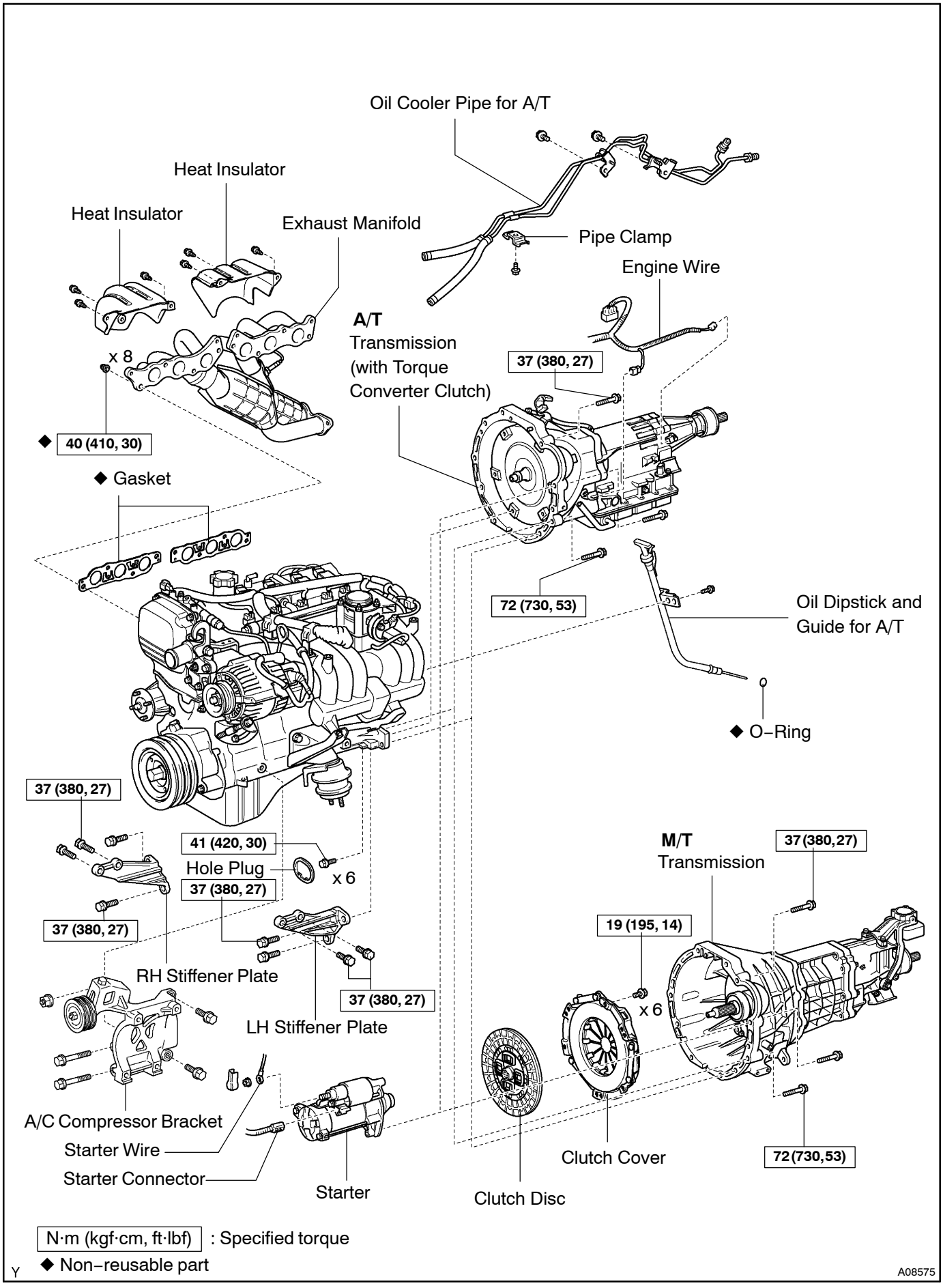




N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

A08574


Oil Cooler Pipe for A/T
Heat Insulator
Heat Insulator
Exhaust Manifold
Pipe Clamp
Engine Wire
A/T
Transmission
(with Torque
Converter Clutch)
x 8
37 (380, 27)
◆ 40 (410, 30)
◆ Gasket
72 (730, 53)
Oil Dipstick and
Guide for A/T
◆ O–Ring
37 (380, 27)
41 (420, 30)
Hole Plug
x 6
37 (380, 27)
37 (380, 27)
RH Stiffener Plate
37 (380, 27)
LH Stiffener Plate
M/T
Transmission
37 (380, 27)
19 (195, 14)
x 6
A/C Compressor Bracket
Starter Wire
Starter Connector
Starter
Clutch Disc
Clutch Cover
72 (730, 53)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Y
A08575

EM11M–01

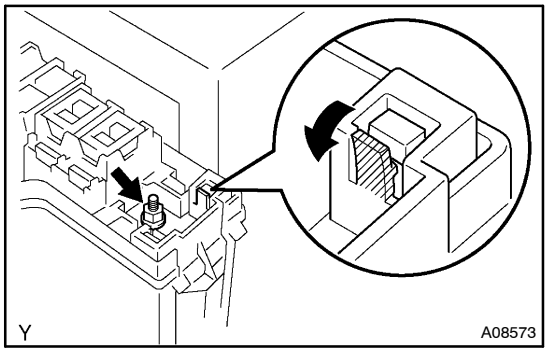
REMOVAL

1. REMOVE HOOD
2. REMOVE NO.1 AND NO.2 ENGINE UNDER COVERS
3. DRAIN ENGINE COOLANT
4. DRAIN ENGINE OIL
5. DISCONNECT ACCELERATOR CABLE
6. REMOVE AIR CLEANER INLET
7. REMOVE AIR CLEANER ASSEMBLY
8. REMOVE RADIATOR ASSEMBLY (See page CO–16)
9. REMOVE NO.3 CYLINDER HEAD COVER
10. REMOVE DRIVE BELT FOR A/C COMPRESSOR (See page AC–17)
11. REMOVE DRIVE BELT FOR ALTERNATOR (See page CH–6)

HINT:

Before removing the drive belt, loosen the 4 fan pulley nuts.

12. REMOVE DRIVE BELT FOR PS VANE PUMP (See page SR–27)
13. REMOVE FAN SPACER AND PULLEY



14. DISCONNECT ENGINE WIRE

HINT:

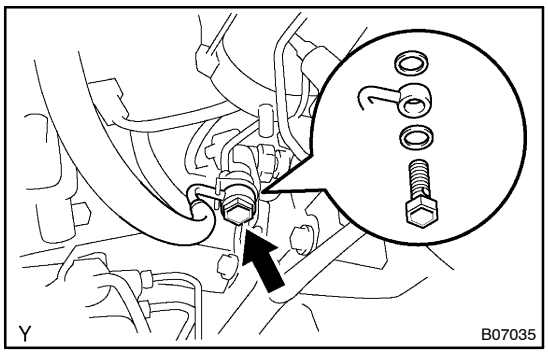
- Disconnect the engine wire from the vehicle side and remove it with engine assembly.
- In order to disconnect the engine room No.2 relay block and alternator wire, first remove the nut and push the tab on the side cover inward and then, pull the alternator wire upward with the side cover to remove.

15. DISCONNECT HOSES

(a) Disconnect the 2 heater hoses.

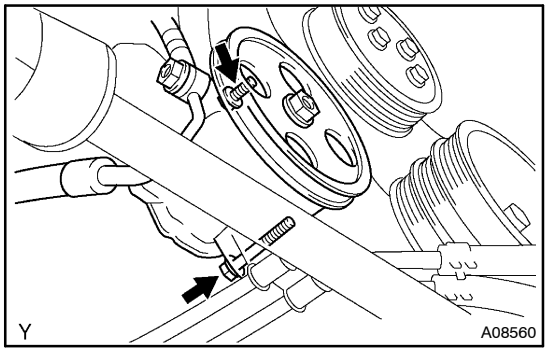
(b) Disconnect the brake booster vacuum hose.

(c) Disconnect the fuel vapor feed hose.



(d) Disconnect the fuel inlet hose.

16. M/T:
REMOVE TRANSMISSION SHIFT LEVER (See page MT–5)



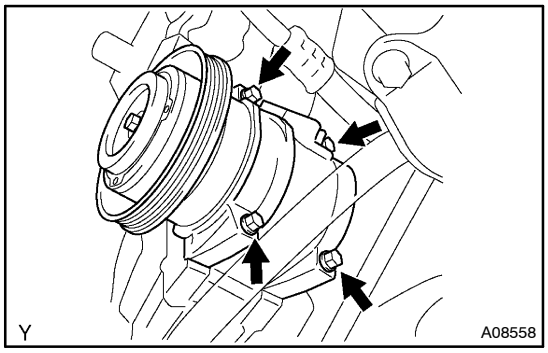
17. REMOVE PS VANE PUMP WITHOUT DISCONNECTING HOSES

(a) Disconnect the PS solenoid valve connector.

(b) Remove the 2 bolts, and disconnect the PS vane pump.

HINT:

Put aside the vane pump, and suspend it securely.



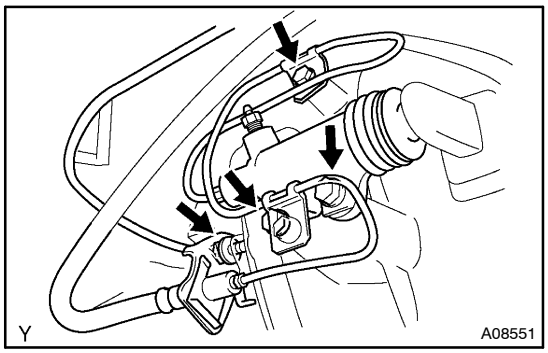
18. REMOVE A/C COMPRESSOR WITHOUT DISCONNECTING HOSES

(a) Disconnect the A/C compressor connector.

(b) Remove the 4 bolts, and disconnect the A/C compressor.

HINT:

Put aside the vane pump, and suspend it securely.

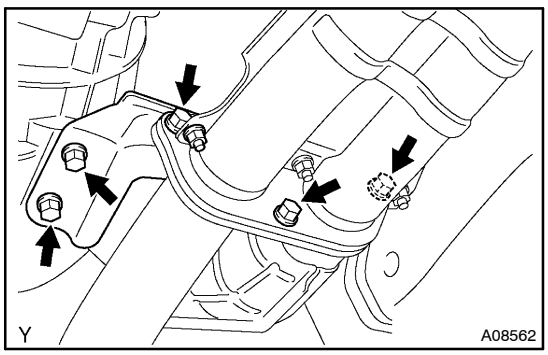


19. M/T:
DISCONNECT CLUTCH RELEASE CYLINDER FROM TRANSMISSION

Remove the 4 bolts, and disconnect the clutch release cylinder and tube assembly and ground strap.

HINT:

Put aside the clutch release cylinder, and suspend it securely.



20. REMOVE FRONT AND CENTER EXHAUST PIPE ASSEMBLY

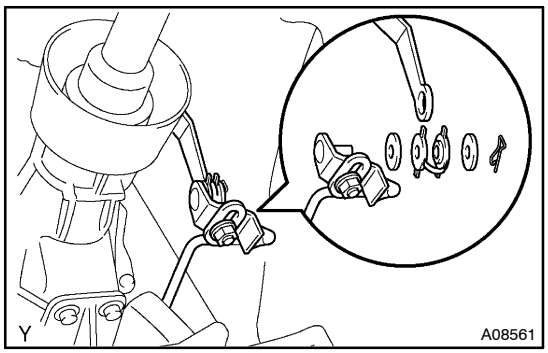
(a) Remove the 3 bolts, retainer and nut holding the front exhaust manifold to the front exhaust pipe.

(b) Remove the 2 bolts and exhaust manifold stay.

(c) Remove the 2 bolts and nuts holding the center exhaust pipe to the tailpipe.

(d) Remove the front and center exhaust pipe assembly and 3 gaskets.

21. REMOVE PROPELLER SHAFT (See page PR–4)

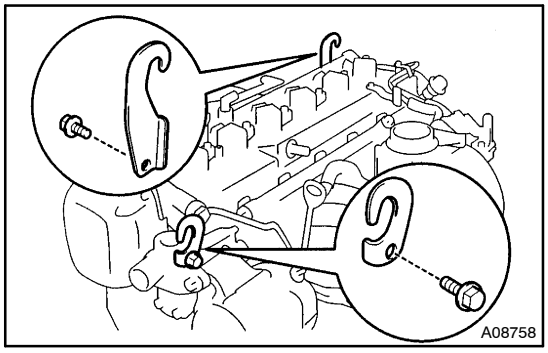


22. A/T:
DISCONNECT TRANSMISSION SHIFT CONTROL ROD

(a) Remove the clip and 2 plate washers, and disconnect the shift control rod.

(b) Remove the bushing.

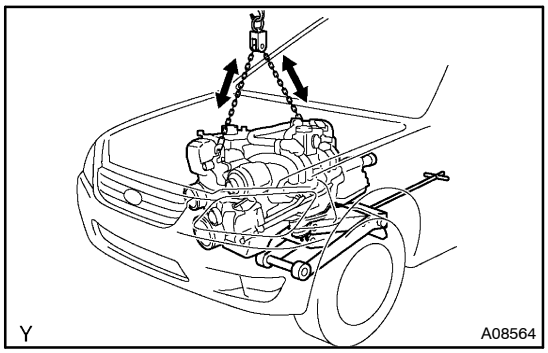
23. RHD:
REMOVE STEERING SLIDING YOKE (See page SR–23)



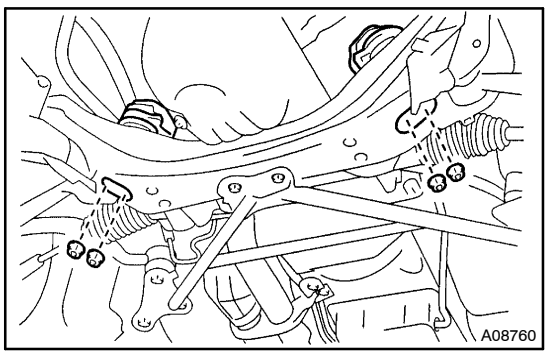
24. REMOVE ENGINE AND TRANSMISSION ASSEMBLY FROM VEHICLE

(a) Install the No.1 and No.2 engine hangers in the correct direction.
Part No.:
No.1 engine hanger 12281–70050
No.2 engine hanger 12282–70020
Bolt 91622–61020
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

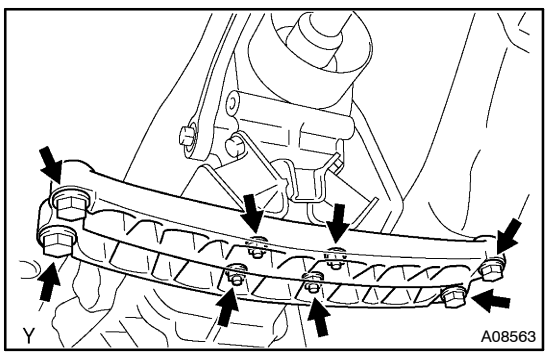
NOTICE:
Prepare new bolts.



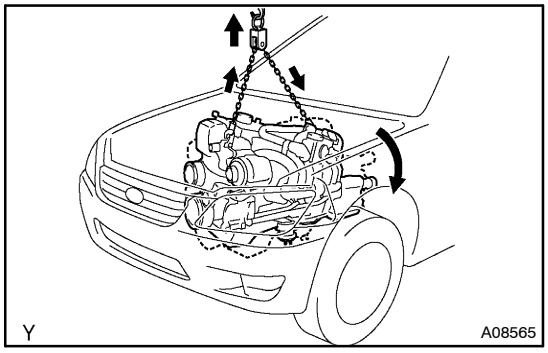
(b) Attach the engine sling device to the engine hangers.



(c) Remove the 4 nuts holding the engine mounting insulators to the front suspension crossmember.



(d) Remove the 4 bolts, 4 nuts and rear engine mounting member.



(e) Lift the engine out of the vehicle slowly and carefully.

NOTICE:
Make sure the engine is clear of all wiring, hoses and cables.

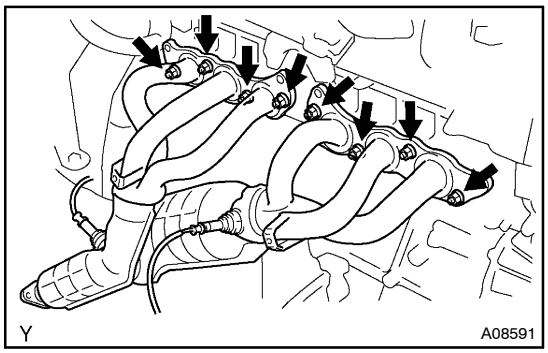
(f) Place the engine and transmission assembly onto the stand.

25. A/T:
REMOVE OIL DIPSTICK AND GUIDE FOR A/T

(a) Remove the bolt.

(b) Pull out the dipstick guide and dipstick from the dipstick tube.

(c) Remove the O–ring from the dipstick guide.



26. REMOVE EXHAUST MANIFOLD

(a) Remove the 6 bolts and 2 heat insulators.

(b) Remove the 8 nuts, exhaust manifold and 2 gaskets.

27. A/T:
REMOVE OIL COOLER PIPES

(a) Remove the 3 bolts and pipe clamps.

(b) Loosen the 2 union nuts, and remove the 2 oil cooler pipes.

28. A/T:
REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLTS (See page AT–29)

29. REMOVE STARTER

30. REMOVE TRANSMISSION

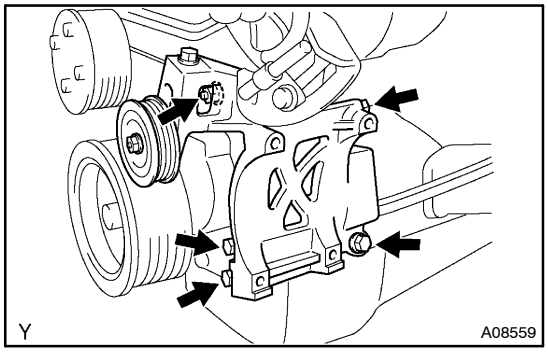
(a) Remove the 8 bolts.

(b) Remove the transmission together with the torque converter clutch (A/T) from the engine.

31. M/T:
REMOVE CLUTCH COVER AND DISC
(See page CL–15)

32. REMOVE STIFFENER PLATES

Remove the 4 bolts and 2 stiffener plates.

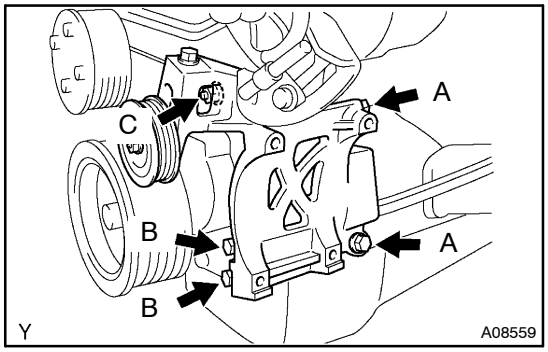


33. REMOVE A/C COMPRESSOR BRACKET

Remove the 4 bolts, nut and compressor bracket.

EM11N–02

INSTALLATION



1. INSTALL A/C COMPRESSOR BRACKET

(a) Install the compressor bracket with the 4 bolts and nut.

(b) Tighten the bolt B, nut C and bolt A.

Torque: 46.5 N·m (475 kgf·cm, 34 ft·lbf)

2. INSTALL STIFFENER PLATES

Install the LH and RH stiffener plates with the 4 bolts.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

3. M/T:

INSTALL CLUTCH DISC AND COVER

(See page CL–17)

4. INSTALL TRANSMISSION TO ENGINE

(a) A/T:

Check the torque converter clutch installation.

(See page AT–32)

(b) Attach the transmission to the engine.

(c) Install the 8 bolts.

Torque:

37 N·m (380 kgf·cm, 27 ft·lbf) for 14 mm head

72 N·m (730 kgf·cm, 53 ft·lbf) for 17 mm head

5. INSTALL STARTER (See page ST–17)

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

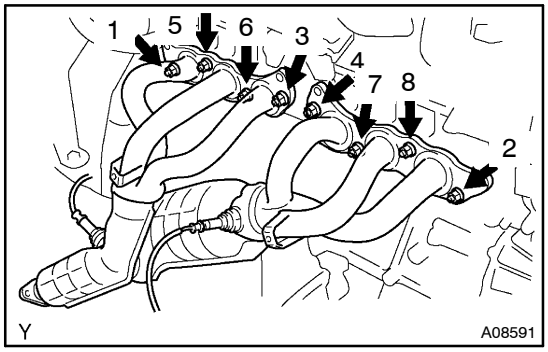
6. A/T:

INSTALL TORQUE CONVERTER CLUTCH BOLTS

(See page AT–32)

7. A/T:

INSTALL OIL COOLER PIPE FOR A/T



8. INSTALL EXHAUST MANIFOLD

(a) Install 2 new gaskets to the cylinder head.

(b) Install the exhaust manifold with 8 new nuts, in several passes, in the sequence shown.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

(c) Install the 2 heat insulators with the 6 bolts.

Torque: 18.5 N·m (190 kgf·cm, 14 ft·lbf)

9. A/T:

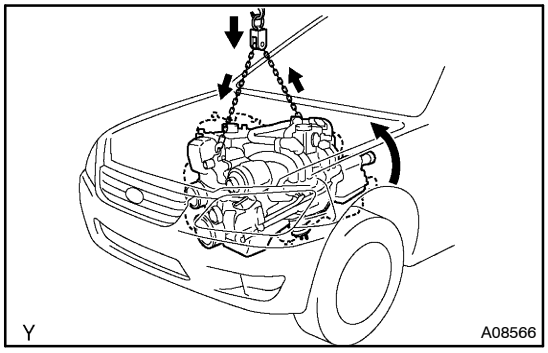
INSTALL OIL DIPSTICK GUIDE AND DIPSTICK FOR A/T

(a) Install a new O–ring to the dipstick guide.

(b) Push in the dipstick guide end to the dipstick tube of the transmission oil pan.

(c) Install the dipstick guide with the bolt.

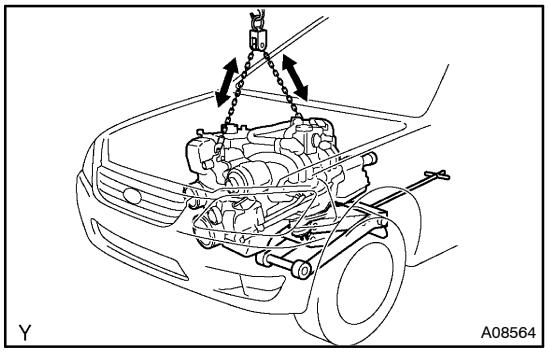
(d) Install the dipstick.



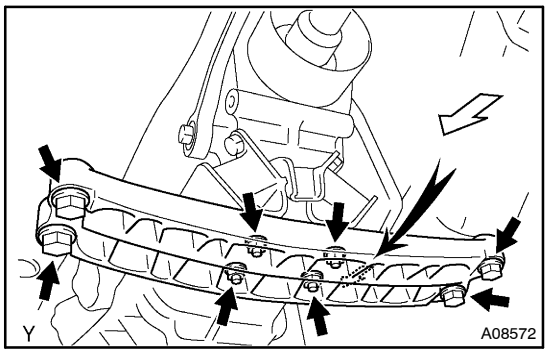
10. INSTALL ENGINE AND TRANSMISSION ASSEMBLY IN VEHICLE

(a) Attach the engine sling device to the engine hangers.

(b) Slowly lower the engine and transmission assembly into the engine compartment. Tilt the transmission downward, and lower the engine and transmission assembly.



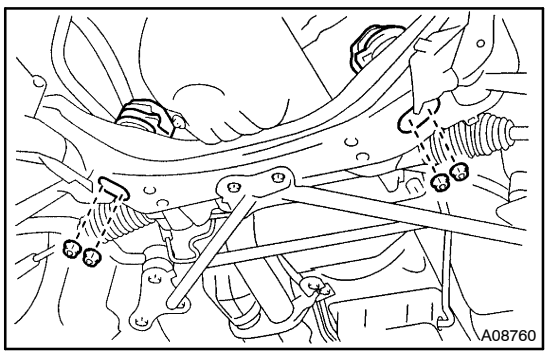
(c) Keep the engine level with a jack.



(d) Install the rear engine mounting member with the 4 bolts and 4 nuts.

Torque:
25.5 N·m (260 kgf·cm, 19 ft·lbf) for bolts
13.5 N·m (135 kgf·cm, 10 ft·lbf) for nuts

NOTICE:
Be careful of installation direction.

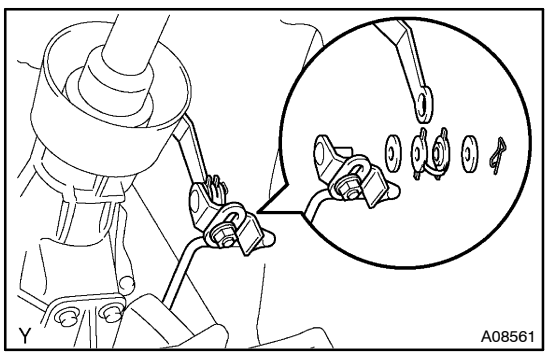


(e) Install the 4 nuts holding the engine mounting insulators to the front suspension crossmember.

Torque: 53 N·m (540 kgf·cm, 39 ft·lbf)

(f) Remove the engine sling device.

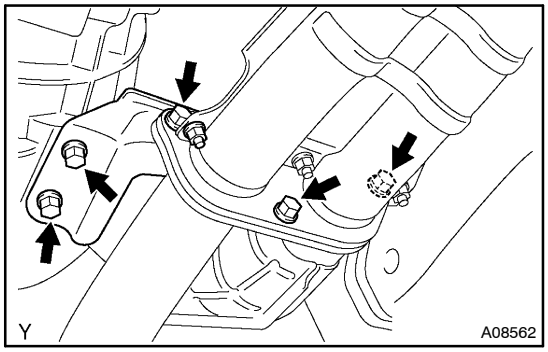
11. RHD:
INSTALL STEERING SLIDING YOKE
(See page SR–23)



12. A/T:
CONNECT TRANSMISSION SHIFT CONTROL ROD

Connect the shift control rod to the shift lever with the bushing, 2 plate washers and clip.

13. INSTALL PROPELLER SHAFT (See page PR–10)



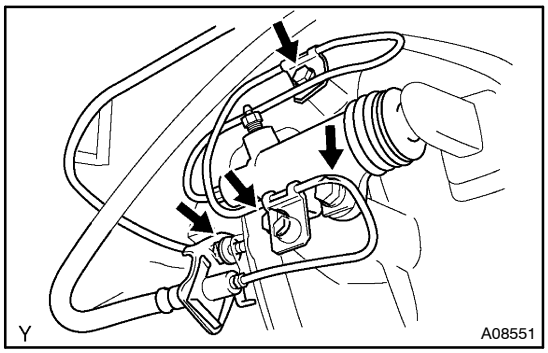
14. INSTALL FRONT AND CENTER EXHAUST PIPE ASSEMBLY

(a) Temporarily install the exhaust manifold stay to the transmission with the 2 bolts.

(b) Install 2 new gaskets to front end of the front exhaust pipe, and connect the front exhaust pipe to the exhaust manifold with the 3 bolts, a new retainer and a new nut.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

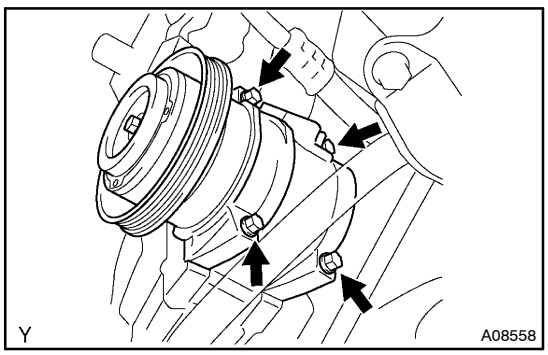
(c) Tighten the 2 bolts holding the exhaust manifold stay to the transmission.
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

(d) Install a new gasket to rear end of the center exhaust pipe, and connect the center exhaust pipe to the tailpipe with the 2 bolts, 2 compression springs and 2 new nuts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



15. M/T:
INSTALL CLUTCH RELEASE CYLINDER TO TRANSMISSION

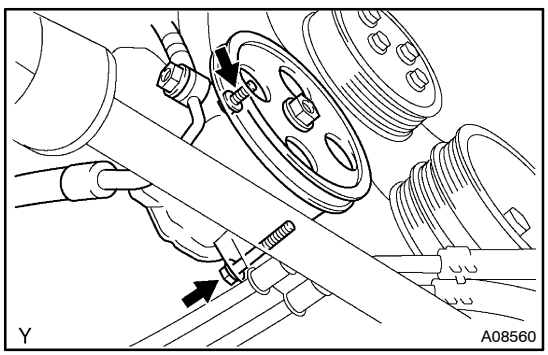
Connect the clutch release cylinder and tube assembly and ground strap with the 4 bolts.
Torque:
12 N·m (120 kgf·cm, 9 ft·lbf) for 12 mm head
72 N·m (730 kgf·cm, 53 ft·lbf) for 17 mm head



16. INSTALL A/C COMPRESSOR

(a) Install the A/C compressor with the 4 bolts.
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)

(b) Connect the A/C compressor connector.



17. INSTALL PS VANE PUMP

(a) Install the PS vane pump with the 2 bolts.
Torque:
58 N·m (590 kgf·cm, 43 ft·lbf) for pivot bolt
39 N·m (400 kgf·cm, 29 ft·lbf) for adjusting lock bolt

(b) Connect the PS solenoid valve connector.

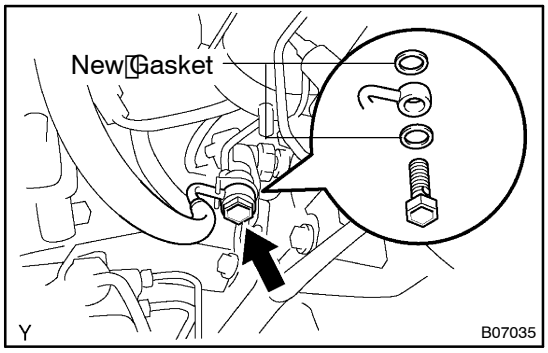
18. M/T:
INSTALL TRANSMISSION SHIFT LEVER
(See page MT–8)

19. CONNECT HOSES

(a) Connect the 2 heater hoses.

(b) Connect the brake booster vacuum hose.

(c) Connect the fuel vapor feed hose.



(d) Connect the fuel inlet hose.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

20. CONNECT ENGINE WIRE

21. INSTALL FAN PULLEY AND SPACER

HINT:

Temporarily install the 4 nuts.

22. INSTALL DRIVE BELT FOR PS VANE PUMP
(See page SR–37)

23. INSTALL DRIVE BELT FOR ALTERNATOR
(See page CH–15)

24. INSTALL DRIVE BELT FOR A/C COMPRESSOR
(See page AC–18)

25. TIGHTEN MOUNTING NUTS OF FAN PULLEY AND SPACER
Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

26. INSTALL RADIATOR ASSEMBLY (See page CO–21)

27. INSTALL NO.3 CYLINDER HEAD COVER

28. INSTALL AIR CLEANER ASSEMBLY

29. INSTALL AIR CLEANER INLET

30. CONNECT ACCELERATOR CABLE

31. FILL ENGINE WITH OIL

32. FILL ENGINE WITH COOLANT

33. START ENGINE AND CHECK FOR LEAK

34. RECHECK ENGINE COOLANT AND OIL LEVELS

35. INSTALL NO.1 AND NO.2 ENGINE UNDER COVERS

36. INSTALL HOOD

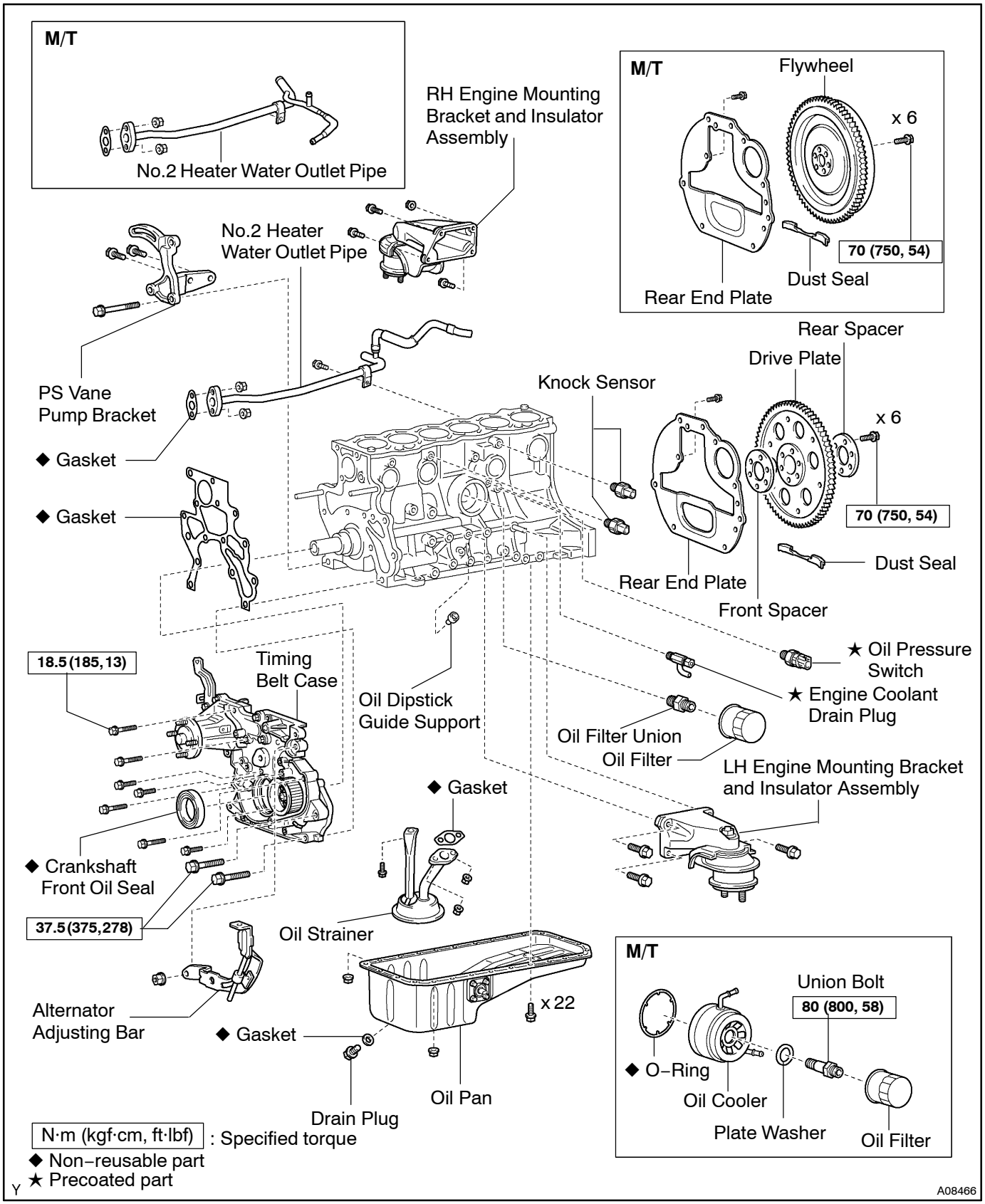
37. ROAD TEST

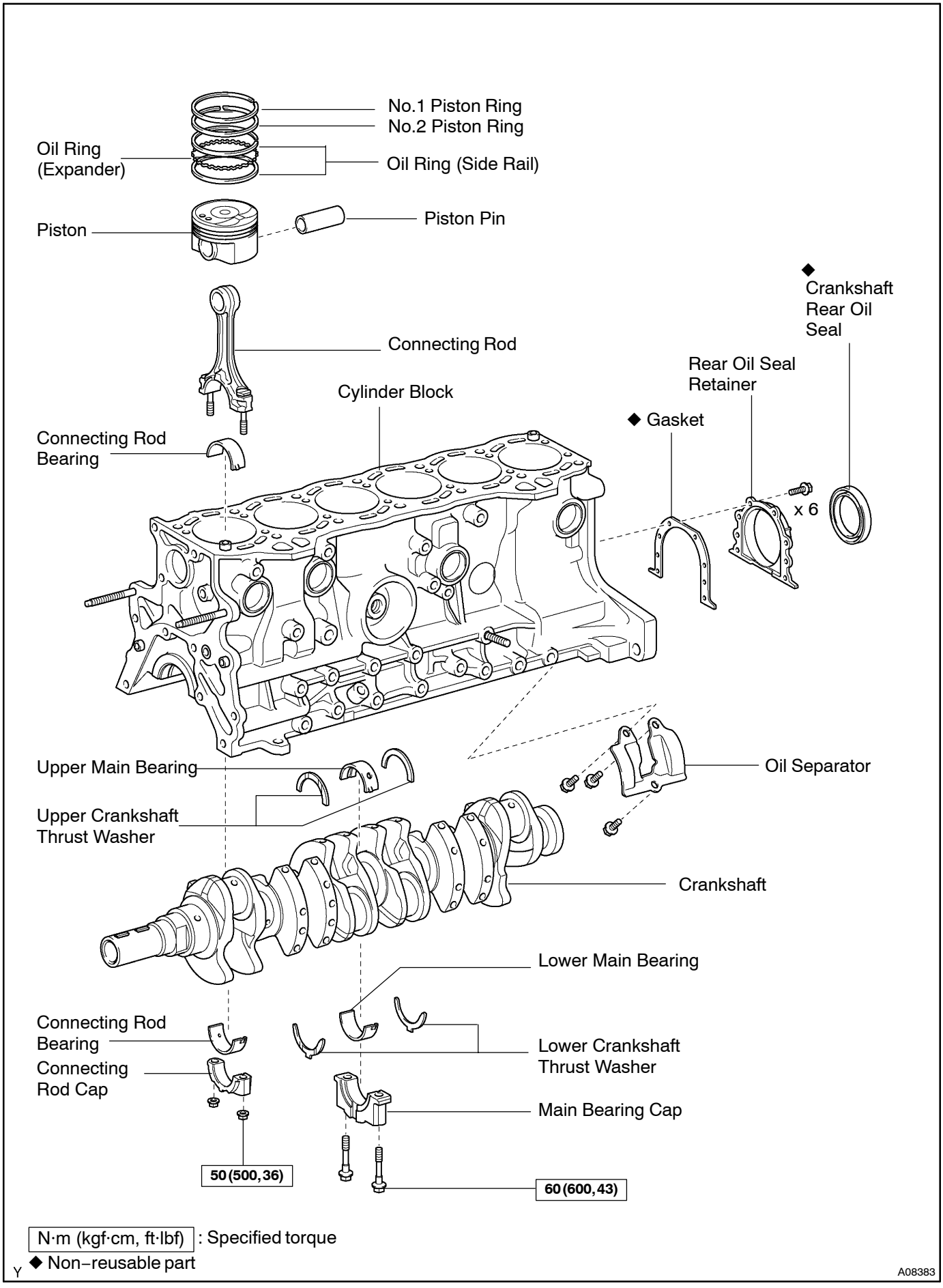
Check abnormal noise, shock, slippage, correct shift points and smooth operation.

CYLINDER BLOCK

COMPONENTS

EM11K–01





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

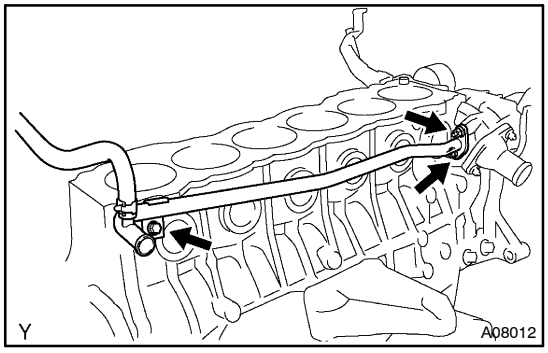
◆ Non–reusable part

A08383

EM11P–01

DISASSEMBLY

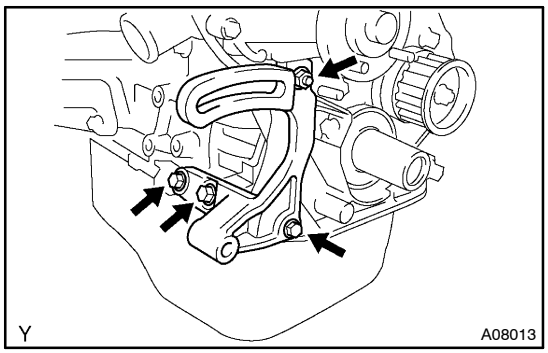
1. REMOVE DRIVE PLATE OR FLYWHEEL
2. REMOVE REAR END PLATE
3. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY
4. REMOVE TIMING BELT AND PULLEYS (See page EM–20)
5. REMOVE CYLINDER HEAD (See page EM–36)
6. REMOVE KNOCK SENSORS (See page FI–63)
7. REMOVE OIL FILTER (See page LU–3)
8. A/T:
   REMOVE OIL FILTER UNION
9. M/T:
   REMOVE OIL COOLER (See page LU–17)
10. REMOVE ENGINE COOLANT DRAIN UNION
11. REMOVE OIL PRESSURE SWITCH (See page LU–1)
12. REMOVE LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY
13. REMOVE OIL DIPSTICK GUIDE SUPPORT



14. REMOVE NO.2 HEATER WATER OUTLET PIPE

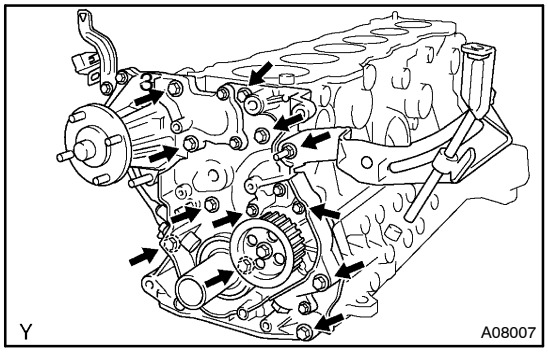
Remove the bolt, 2 nuts, No.2 heater water outlet pipe and gasket.

15. REMOVE RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY
16. REMOVE OIL PAN AND OIL STRAINER (See page LU–8)



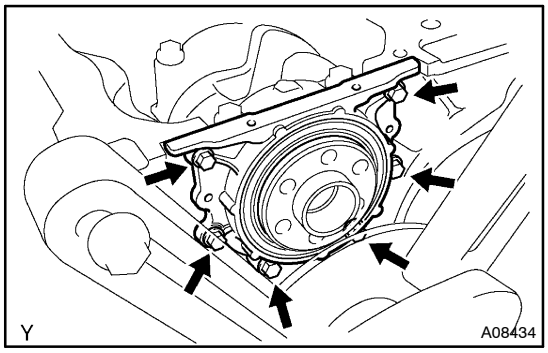
17. REMOVE PS VANE PUMP BRACKET

Remove the 3 bolts, nut and pump bracket.



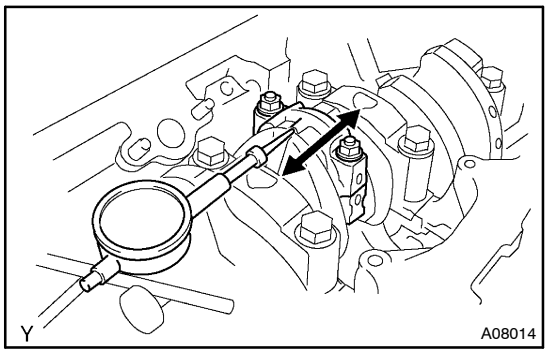
18. REMOVE TIMING BELT CASE

Remove the 11 bolts, nut, timing belt case, alternator adjusting bar and gasket.



19. REMOVE REAR OIL SEAL RETAINER

Remove the 6 bolts, retainer and gasket.

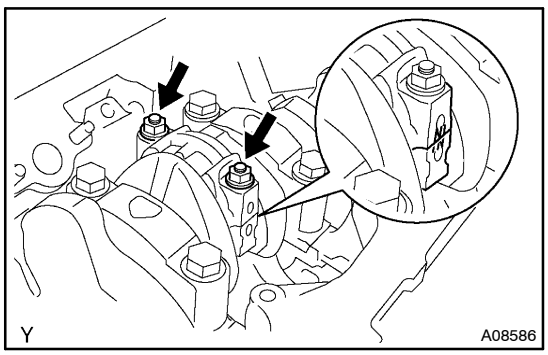


20. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

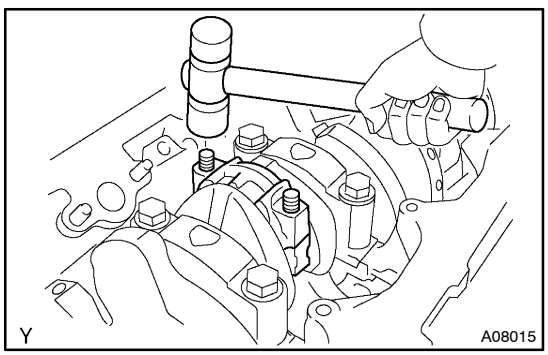
Standard thrust clearance:
0.200 – 0.402 mm (0.0079 – 0.0158 in.)
Maximum thrust clearance: 0.45 mm (0.0188 in.)

If the thrust clearance is greater than maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.



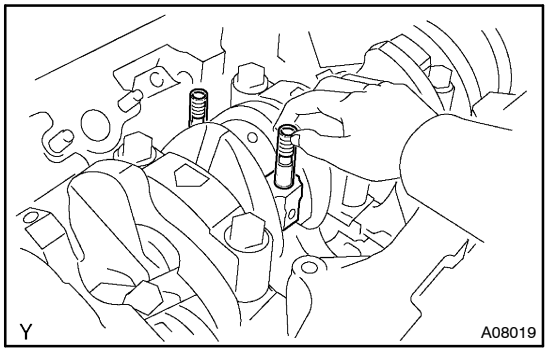
21. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

(a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.
(b) Remove the 2 connecting rod cap nuts.

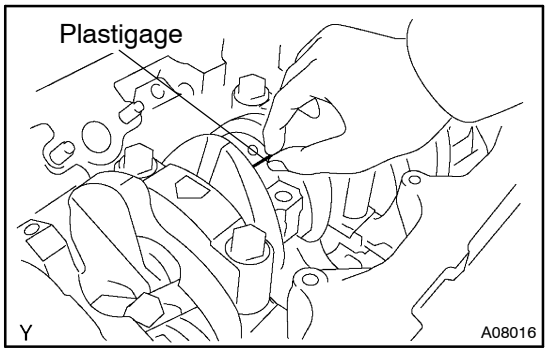


(c) Using a plastic–faced hammer, lightly tap the connecting rod bolts and lift off the connecting rod cap and lower bearing.

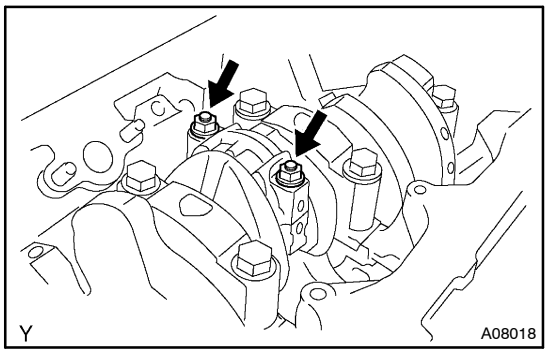
HINT:
Keep the lower bearing inserted with the connecting rod cap.



(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.
(e) Clean the crank pin and bearing.
(f) Check the crank pin and bearing for pitting and scratches. If the crank pin or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.



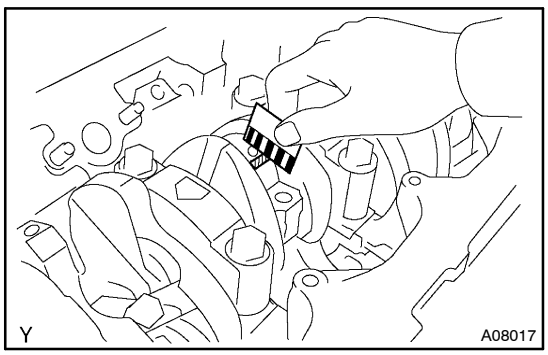
(g) Lay a strip of Plastigage across the crank pin.



(h) Install the connecting rod cap with the 2 nuts.
(See page EM–97)

NOTICE:
Do not turn the crankshaft.

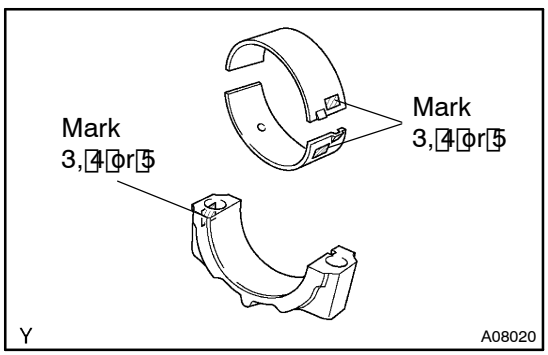
(i) Remove the 2 nuts, connecting rod cap and lower bearing. (See procedure (b) and (c))



(j) Measure the Plastigage at its widest point.
Standard oil clearance:

STD size	0.016 – 0.047 mm (0.0006 – 0.0019 in.)

Maximum oil clearance: 0.07 mm (0.0028 in.)
If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.

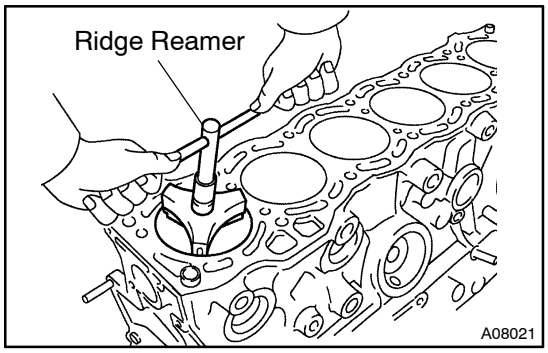


HINT:
If using a standard bearing, replace it with one having the same number marked on the connecting rod cap. There are 3 sizes of standard bearings, marked "3", "4" and "5" accordingly.

Reference
Standard sized bearing center wall thickness:

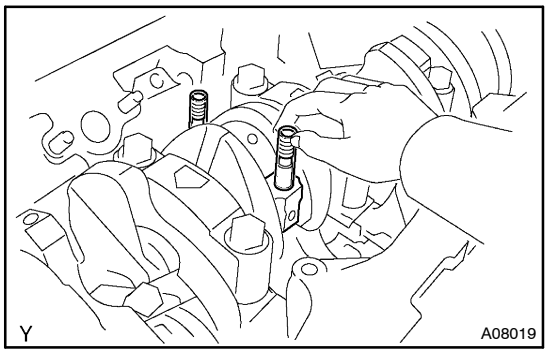
Mark "3"	1.488 – 1.492 mm (0.0586 – 0.0587 in.)
Mark "4"	1.492 – 1.496 mm (0.0587 – 0.0589 in.)
Mark "5"	1.496 – 1.500 mm (0.0589 – 0.0591 in.)

(k) Completely remove the Plastigage.



22. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.

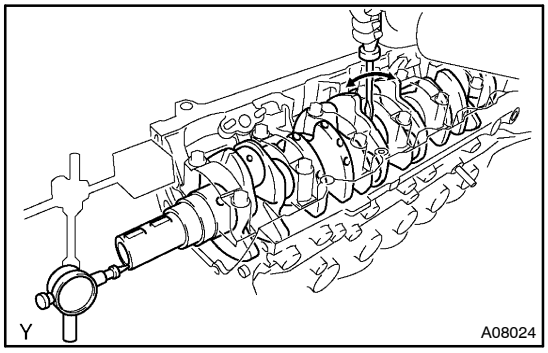


(b) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

(c) 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.



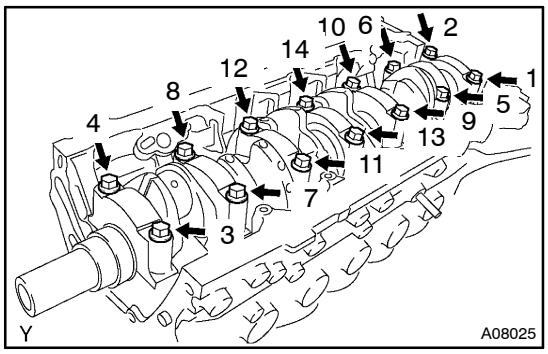
23. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.020 – 0.221 mm (0.0008 – 0.0087 in.)
Maximum thrust clearance: 0.30 mm (0.0118 in.)

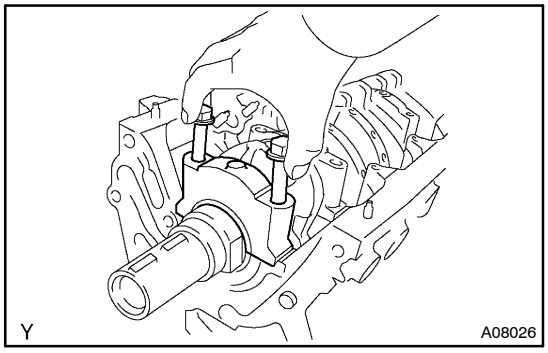
If the thrust clearance is greater than maximum, replace the thrust washer as a set.

Thrust washer thickness:
1.940 – 1.990 mm (0.0764 – 0.0783 in.)



24. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

(a) Uniformly loosen and remove the 14 main bearing cap bolts, in several passes, in the sequence shown.



(b) Using the removed main bearing cap bolts, wiggle the cap back and forth, and remove the 7 main bearing caps, 7 lower bearings and 2 lower thrust washers (No.4 main bearing cap only).

HINT:

- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in the correct order.

(c) Lift out the crankshaft.

HINT:

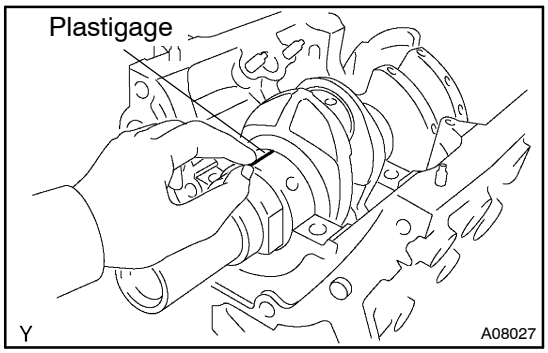
Keep the upper bearing and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

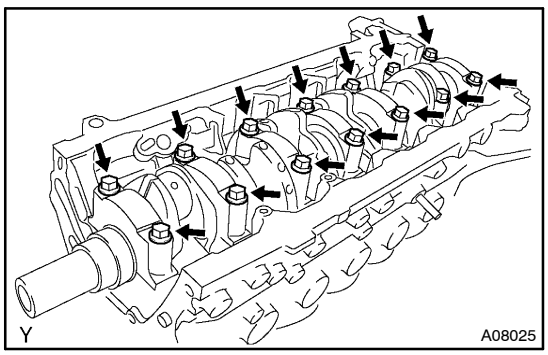
(e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

(f) Place the crankshaft on the cylinder block.



(g) Lay a strip of Plastigage across each journal.

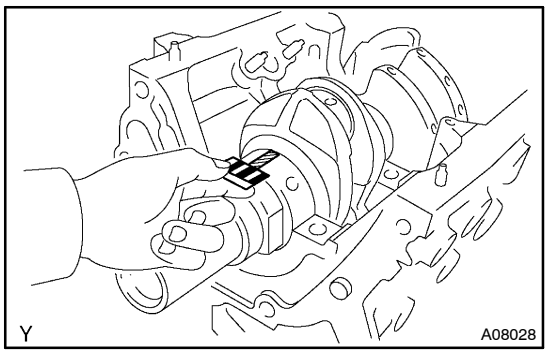


(h) Install the main bearing caps. (See page EM–97)

NOTICE:

Do not turn the crankshaft.

(i) Remove the main bearing caps.
(See procedure (a) and (b) above)



(j) Measure the Plastigage at its widest point.

Standard oil clearance:

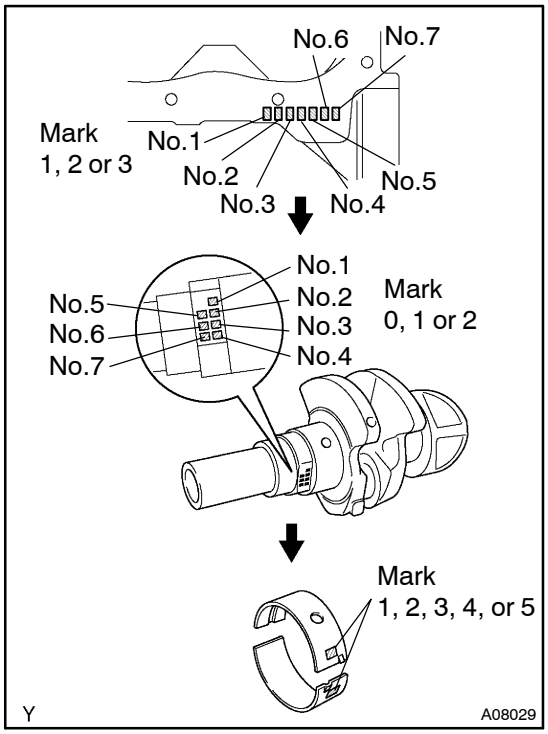
No.4	STD size	0.032 – 0.050 mm (0.0013 – 0.0020 in.)
Others	STD size	0.020 – 0.038 mm (0.0008 – 0.0015 in.)

Maximum oil clearance: 0.08 mm (0.0031 in.)

HINT:
If replacing the cylinder block subassembly, the bearing standard clearance will be:

No.4	0.020 – 0.068 mm (0.0008 – 0.0024 in.)
Others	0.008 – 0.050 mm (0.0003 – 0.0020 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.



HINT:
If using a standard 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 selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly.

	Number marked								
Cylinder block	1			2			3		
Crankshaft	0	1	2	0	1	2	0	1	2
Use bearing	1	2	3	2	3	4	3	4	5

EXAMPLE: Cylinder block "2" + Crankshaft "1"
= Total number 3 (Use bearing "3")

Reference

Cylinder block main journal bore diameter:

Mark "1"	59.026 – 59.032 mm (2.3239 – 2.3241 in.)
Mark "2"	59.032 – 59.038 mm (2.3241 – 2.3243 in.)
Mark "3"	59.038 – 59.044 mm (2.3243 – 2.3246 in.)

Crankshaft main journal diameter:

No.4

Mark "0"	54.982 – 54.988 mm (2.1646 – 2.1649 in.)
Mark "1"	54.976 – 54.982 mm (2.1644 – 2.1646 in.)
Mark "2"	54.970 – 54.976 mm (2.1642 – 2.1644 in.)

Others

Mark "0"	54.994 – 55.000 mm (2.1651 – 2.1654 in.)
Mark "1"	54.988 – 54.994 mm (2.1649 – 2.1651 in.)
Mark "2"	54.982 – 54.988 mm (2.1646 – 2.1649 in.)

Standard sized bearing center wall thickness:

Mark "1"	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
Mark "2"	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
Mark "3"	2.006 – 2.009 mm (0.0790 – 0.0791 in.)
Mark "4"	2.009 – 2.012 mm (0.0791 – 0.0792 in.)
Mark "5"	2.012 – 2.015 mm (0.0792 – 0.0793 in.)

(k) Completely remove the Plastigage.

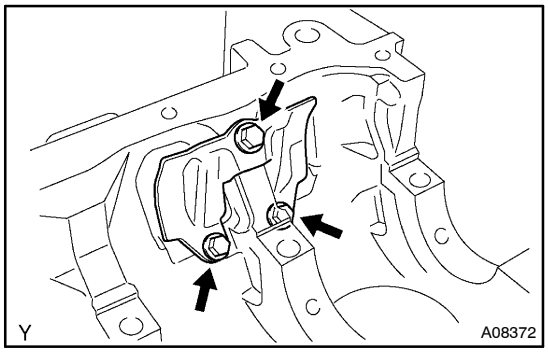
25. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the 7 upper bearings and 2 upper thrust washers from the cylinder block.

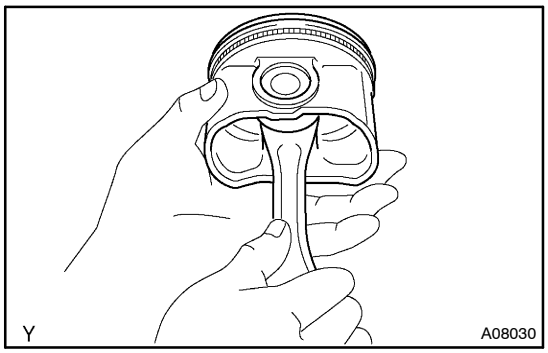
HINT:

Arrange the main bearing caps, bearings and thrust washers in the correct order.



26. REMOVE OIL SEPARATOR

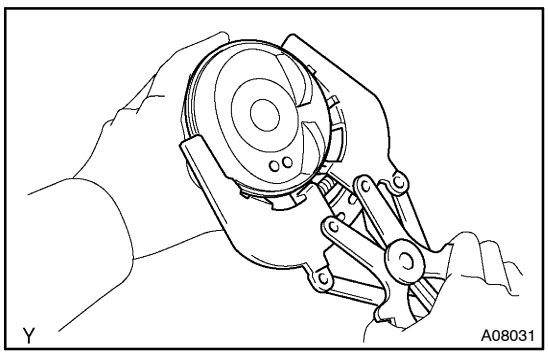
Remove the 3 bolts and oil separator.



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.



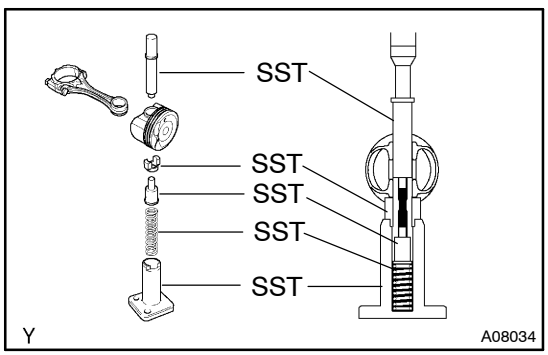
28. REMOVE PISTON RINGS

(a) Using a piston ring expander, remove the No.1 and No.2 piston rings.

(b) Remove the 2 side rails and oil ring expander by hand.

HINT:

Arrange the piston rings in correct order only.



29. DISCONNECT CONNECTING ROD FROM PISTON

Using SST, press out the piston pin from the piston.

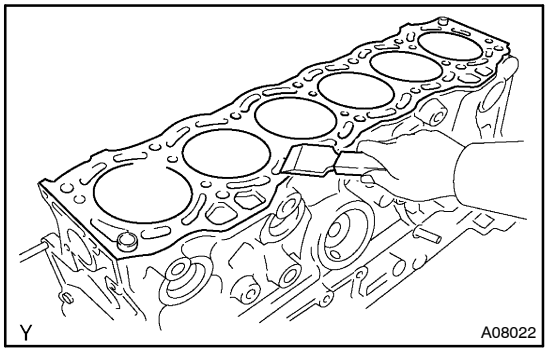
SST 09221–25026 (09921–00021, 09221–00030, 09221–00061, 09221–00170, 09221–00210)

HINT:

- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.

EM11Q-01

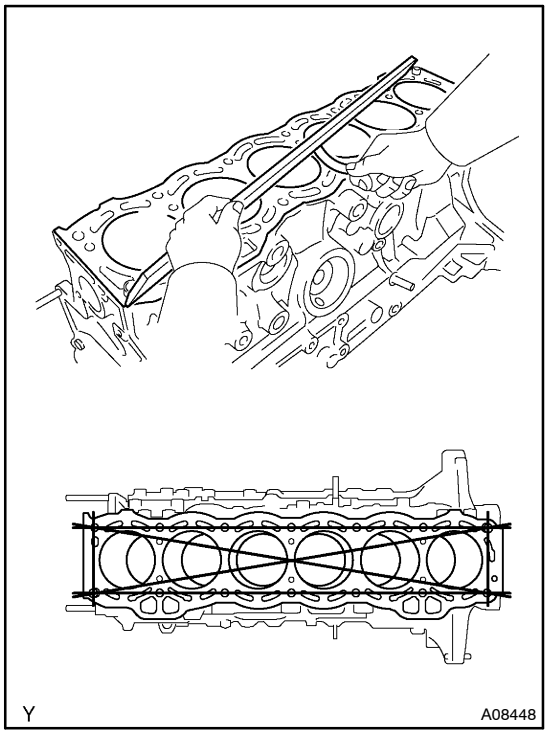
INSPECTION



1. CLEAN CYLINDER BLOCK

(a) Remove the gasket material.
Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

(b) Clean the cylinder block.
Using a soft brush and solvent, thoroughly clean the cylinder block.

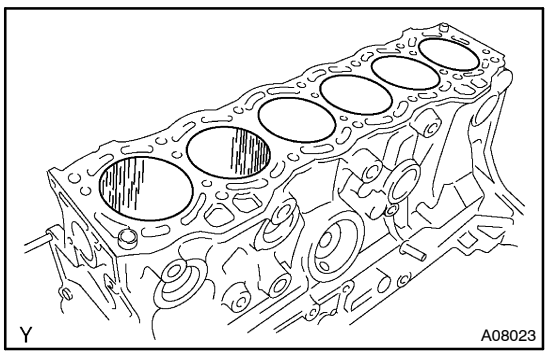


2. INSPECT CYLINDER BLOCK

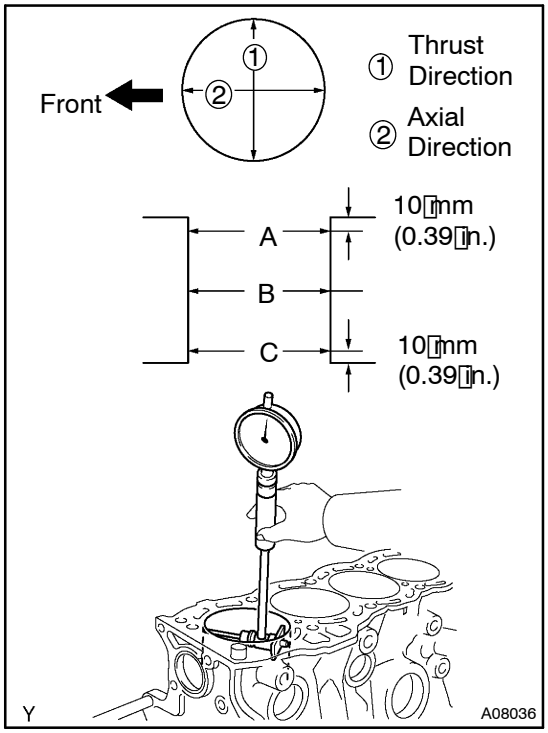
(a) Inspect for flatness.
Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

Maximum warpage: 0.05 mm (0.0020 in.)

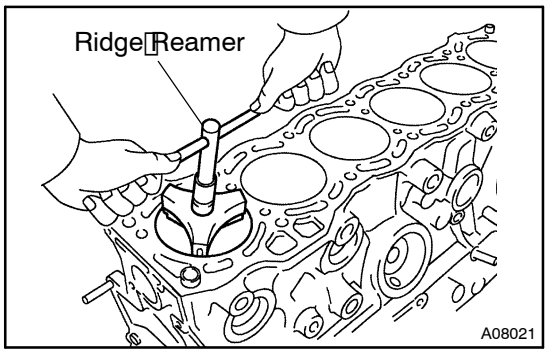
If warpage is greater than maximum, replace the cylinder block.



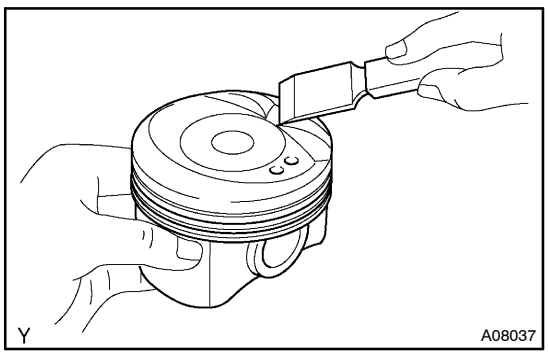
(b) Visually check the cylinder for vertical scratches.
If deep scratches are found, rebore all the 6 cylinders and replace all the 6 pistons. (See page EM–94) If necessary, replace the cylinder block.



(c) Inspect the cylinder bore diameter.
Using a cylinder gauge, measure the cylinder bore diameter at the positions A, B and C in the thrust and axial directions.
Standard diameter:
75.010 – 75.023 mm (2.9531 – 2.9537 in.)
Maximum diameter: 75.223 mm (2.9615 in.)
If the diameter is greater than maximum, rebore all the 6 cylinders and replace all the 6 pistons. (See page EM–94) If necessary, replace the cylinder block.

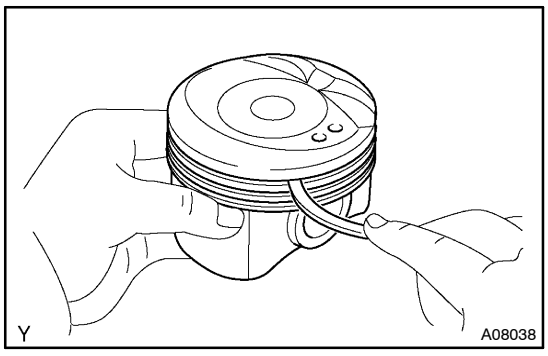


(d) Remove the cylinder ridge.
If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

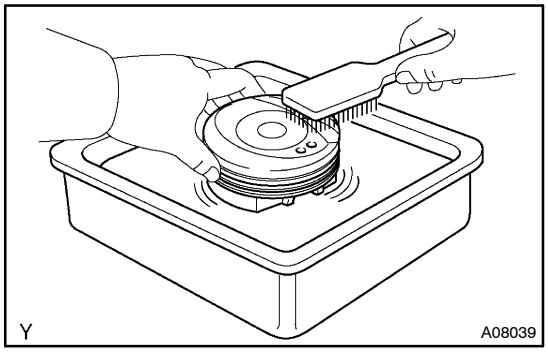


3. CLEAN PISTON

(a) Using a gasket scraper, remove the carbon from the piston top.



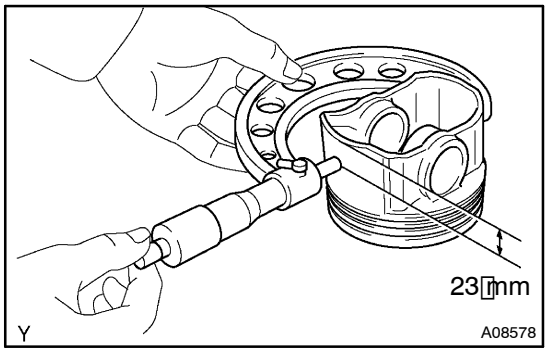
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



4. INSPECT PISTON AND CONNECTING ROD

(a) Inspect the piston oil clearance.

(1) Using a micrometer, measure the piston diameter at a right angles to the piston pin center line, 23 mm (0.91 in.) below the skirt bottom edge.

Piston diameter:

STD	74.93 – 74.94 mm (2.9500 – 2.9504 in.)
O/S 0.50	75.43 – 75.44 mm (2.9697 – 2.9701 in.)

(2) Measure the cylinder bore diameter in the thrust directions. (See step 2)

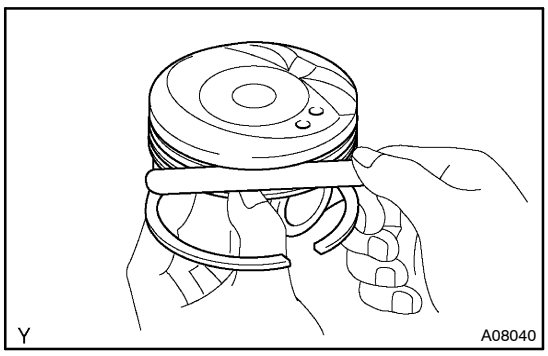
(3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

0.070 – 0.093 mm (0.0028 – 0.0037 in.)

Maximum oil clearance: 0.11 mm (0.0043 in.)

If the oil clearance is greater than maximum, replace all the 6 pistons and rebore all the 6 cylinders. (See page EM–94) If necessary, replace the cylinder block.



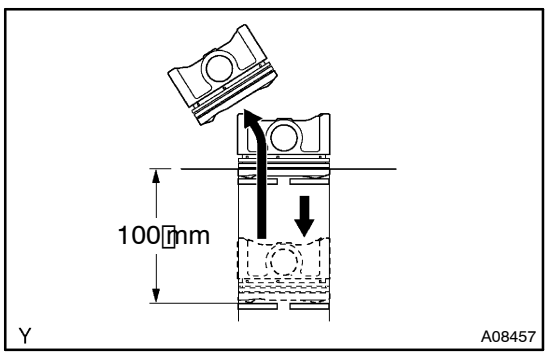
(b) Inspect the piston ring groove clearance.

Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

Ring groove clearance:

No.1	0.030 – 0.080 mm (0.0012 – 0.0031 in.)
No.2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)

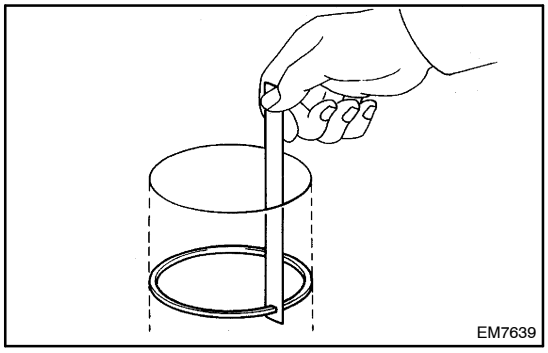
If the clearance is not as specified, replace the piston.



(c) Inspect the piston ring end gap.

(1) Insert the piston ring into the cylinder bore.

(2) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 100 mm (3.94 in.) from the top of the cylinder block.



(3) Using a feeler gauge, measure the end gap.

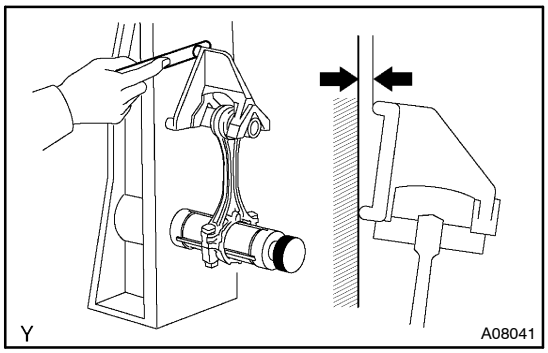
Standard end gap:

No.1	0.20 – 0.30 mm (0.0078 – 0.0118 in.)
No.2	0.35 – 0.50 mm (0.0138 – 0.0196 in.)
Oil (Side rail)	0.15 – 0.40 mm (0.0059 – 0.0157 in.)

Maximum end gap:

No.1	0.90 mm (0.0354 in.)
No.2	1.10 mm (0.0433 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, rebore all the 6 cylinders (see page EM–94) or replace the cylinder block.



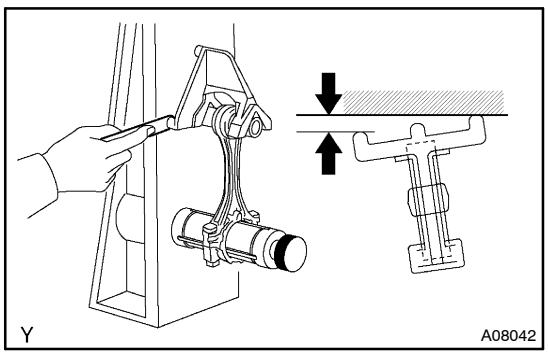
(d) Using a rod aligner and feeler gauge, check the connecting rod alignment.

(1) 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.

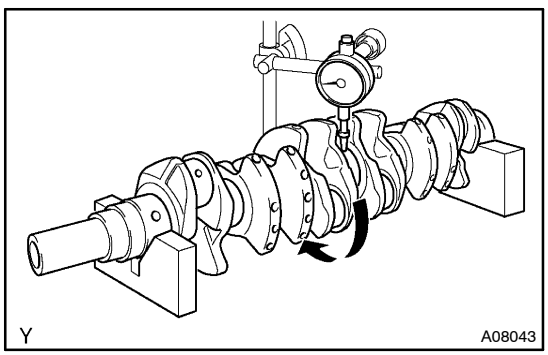


(2) Check for twist

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.



5. INSPECT CRANKSHAFT

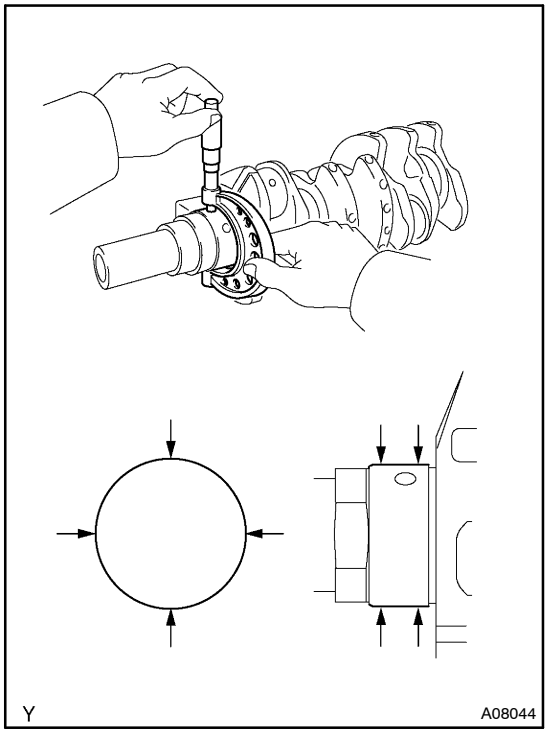
(a) Inspect for circle runout.

(1) Place the crankshaft on V–blocks.

(2) 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 crankshaft.



(b) Inspect the main journals and crank pins.

(1) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

No.4	STD size	54.970 – 54.988 mm (2.1641 – 2.1649 in.)
Others	STD size	54.982 – 55.000 mm (2.1646 – 2.1654 in.)

Crank pin diameter:

STD size	43.985 – 44.000 mm (1.7317 – 1.7322 in.)

If the diameter is not as specified, check the oil clearance. (See page EM–82) If necessary, grind or replace the crankshaft.

(2) 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.

6. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

Grind and hone the main journals and/or crank pins to the finished undersized diameter. (See procedure in step 5) Install new main journal and/or crankshaft pin undersized bearings.

EM11J–01

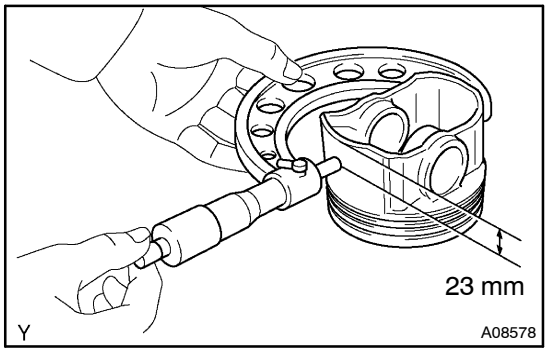
REPLACEMENT

1. REPLACE OVERSIZED (O/S) PISTONS FOR CYLINDER BORING

HINT:

- Bore all the 6 cylinders for the O/S piston outside diameter.
- Replace all the piston rings with ones to match the O/S pistons.

(a) Keep 6 new O/S pistons.
O/S 0.50 piston diameter:
75.43 – 75.44 mm (2.9697 – 2.9701 in.)

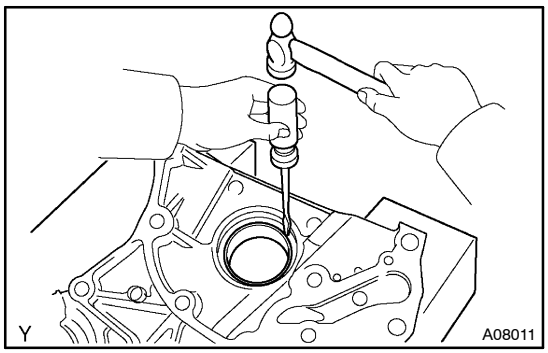


(b) Using a micrometer, measure the piston diameter at a right angles to the piston pin center line, 23 mm (0.91 in.) below the skirt bottom edge.

(c) Calculate the amount of each cylinder to be rebored as follows:
Size to be rebored = P + C – H
P = Piston diameter
C = Piston oil clearance
0.070 – 0.093 mm (0.0028 – 0.0037 in.)
H = Allowance for honing
0.02 mm (0.0008 in.) or less

(d) Bore and hone the cylinders to calculated dimensions.
Maximum honing: 0.02 mm (0.0008 in.)

NOTICE:
Excess honing will destroy the finished roundness.

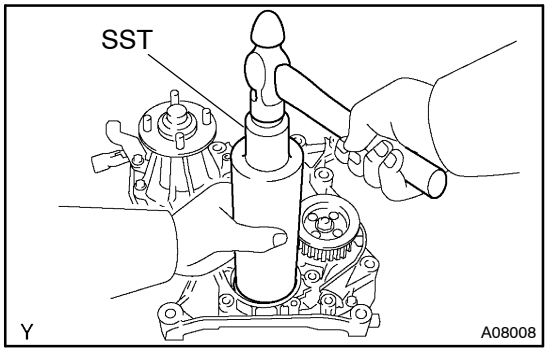


2. REPLACE CRANKSHAFT FRONT OIL SEAL

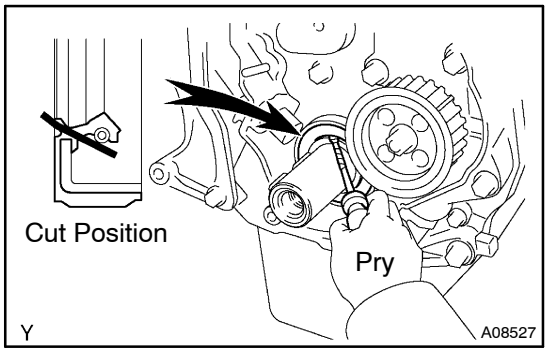
HINT:

There are 2 methods ((a) and (b)) to replace the oil seal.

(a) If the timing belt case is removed from the cylinder block:
(1) Using a screwdriver and hammer, tap out the oil seal.

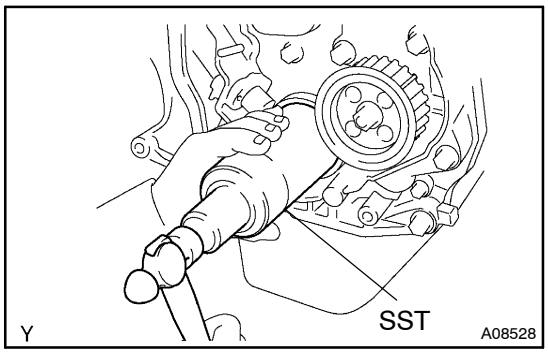


(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing belt case edge.
SST 09316–60011 (09316–00011)

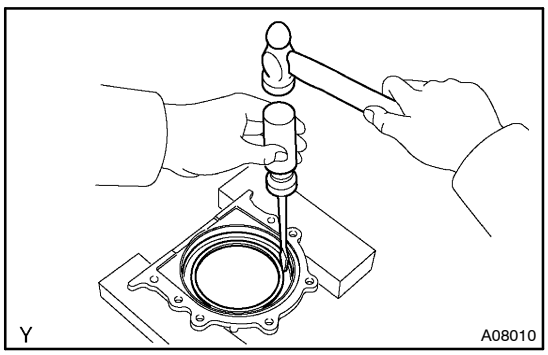


(b) If the timing belt case is installed to the cylinder block:
(1) Using a knife, cut off the oil seal lip.
(2) Using a screwdriver, pry out the oil seal.

NOTICE:
Be careful not to damage the crankshaft. Tape the screwdriver tip.



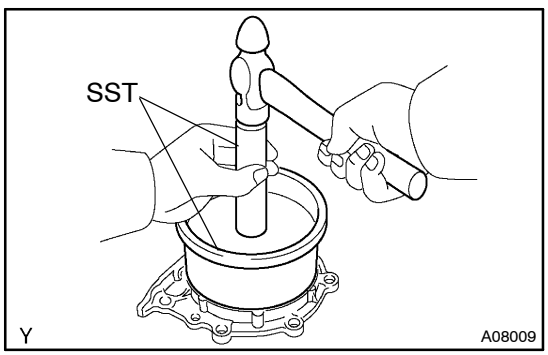
(3) Using SST and a hammer, tap in the oil seal until its surface is flush with the timing belt case edge.
SST 09316–60011 (09316–00011)



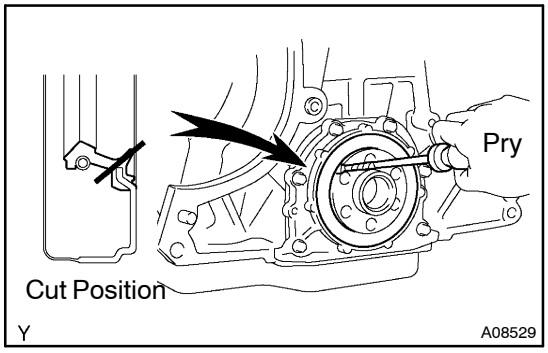
3. REPLACE CRANKSHAFT REAR OIL SEAL

HINT:
There are 2 methods ((a) and (b)) to replace the oil seal.

(a) If the rear oil seal retainer is removed from the cylinder block:
(1) Using a screwdriver and hammer, tap out the oil seal.

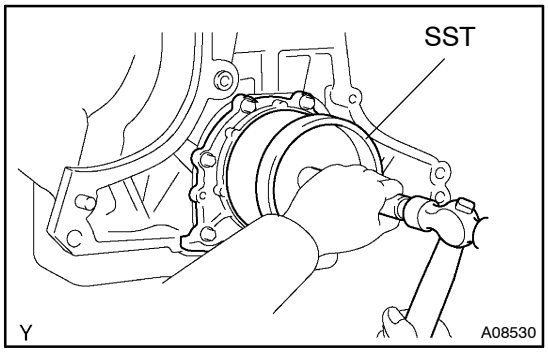


(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223–15030, 09950–70010 (09951–07100)



(b) If rear oil seal retainer is installed to 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) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.

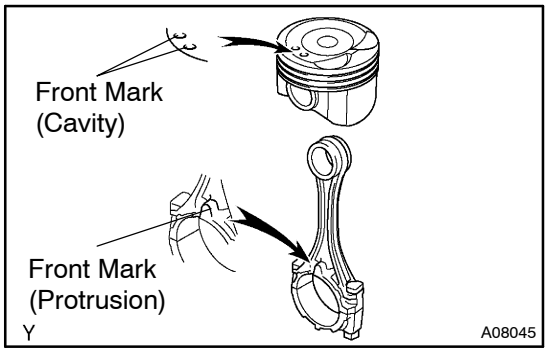
SST 09223–15030, 09950–70010 (09951–07100)

EM11L–01

REASSEMBLY

HINT:

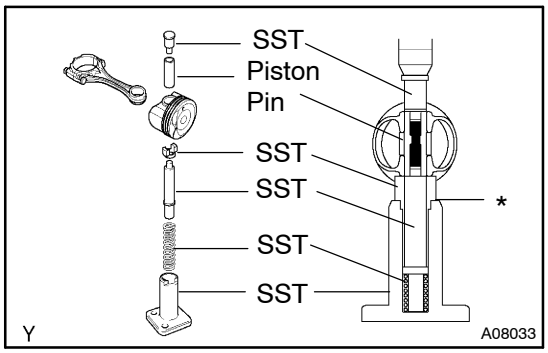
- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O–rings and oil seals with new parts.



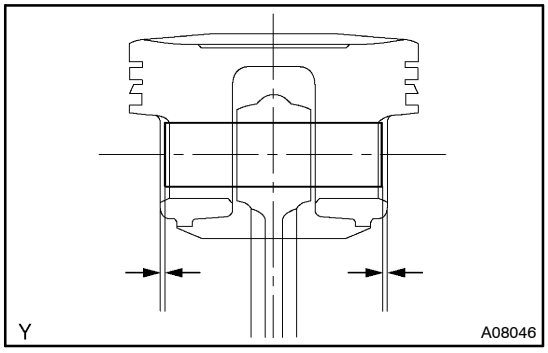
1. ASSEMBLE PISTON AND CONNECTING ROD

(a) Coat the piston pin and piston hole of the piston with engine oil.

(b) Align the front marks of the piston and connecting rod.



(c) Using SST, press in the piston.
SST 09221–25026 (09921–00021, 09221–00030, 09221–00061, 09221–00170, 09221–00210)



(d) After installing the piston pin, check that when the connecting rod is aligned with the center of the piston the space between the piston and each end of the piston pin is equal on the left and right sides.

HINT:

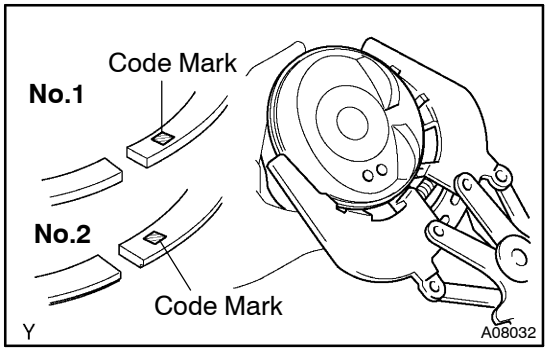
If the piston pin is off–center due to insufficient insertion pressure on piston pin, place a washer at the position indicated by * in the illustration for (c). Then while checking that the space is equal at the ends of the piston pin on the left and right sides, press in the washer.

2. INSTALL PISTON RINGS

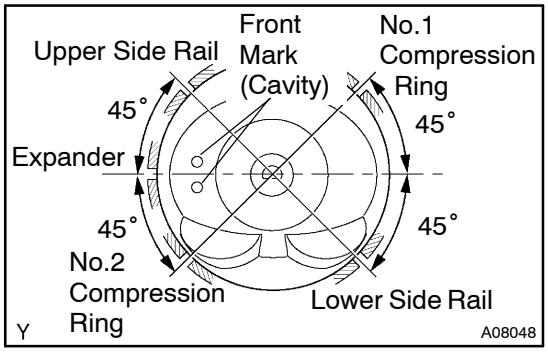
(a) Install the oil ring expander and 2 side rails by hand.

(b) Using a piston ring expander, install the No.2 and No.1 piston rings with the code mark facing upward.

Code mark:



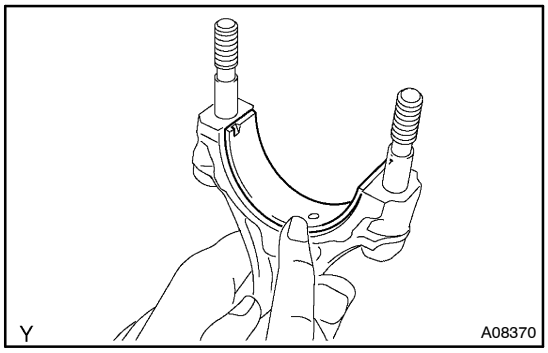
No.1	1R
No.2	2R



(c) Position the piston rings so that the ring ends are as shown.

NOTICE:

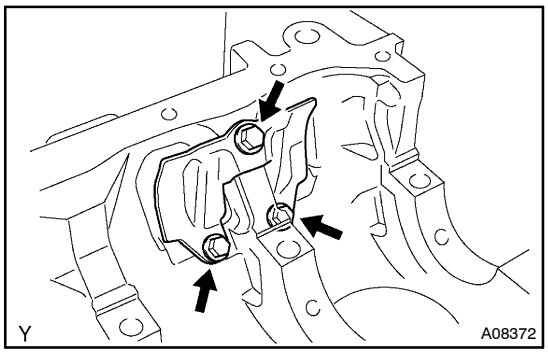
Do not align the ring ends.



3. INSTALL CONNECTING ROD BEARINGS

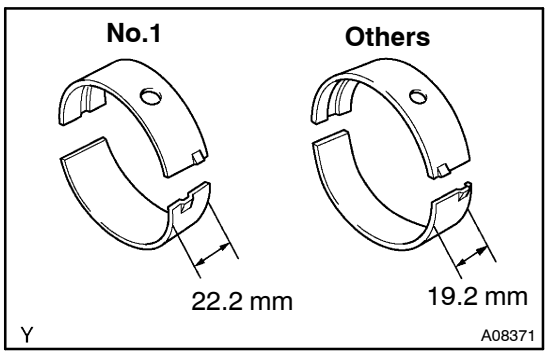
(a) Align the bearing claw with the groove of the connecting rod or connecting cap.

(b) Install the bearings in the connecting rod and connecting rod cap.



4. INSTALL OIL SEPARATOR

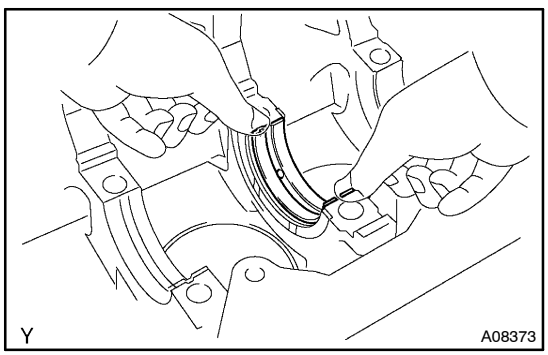
Install the oil separator with the 3 bolts.



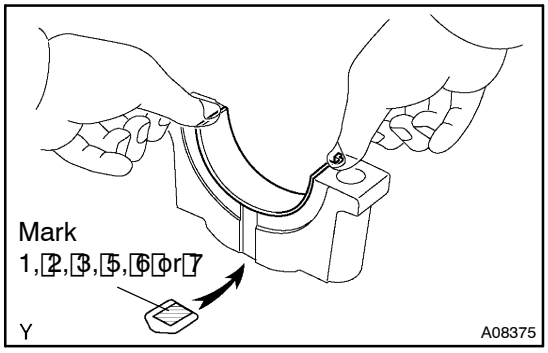
5. INSTALL MAIN BEARINGS

HINT:

- Main bearings come in widths of 19.2 mm (0.756 in.) and 22.2 mm (0.874 in.). Install the 22.2 mm (0.874 in.) bearings in the No.1 cylinder block journal position with the main bearing cap. Install the 19.2 mm (0.756 in.) bearings in the other positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.

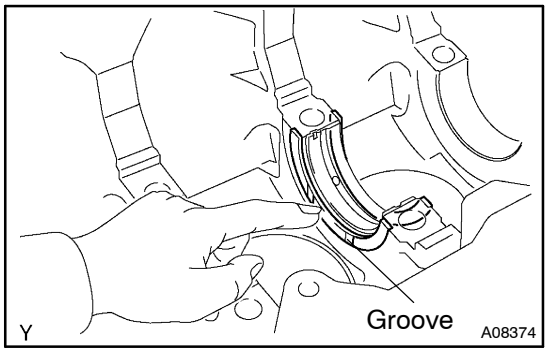


(a) Align the bearing claw with the claw groove of the cylinder block, and push in the 7 upper bearings.



(b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 7 lower bearings.

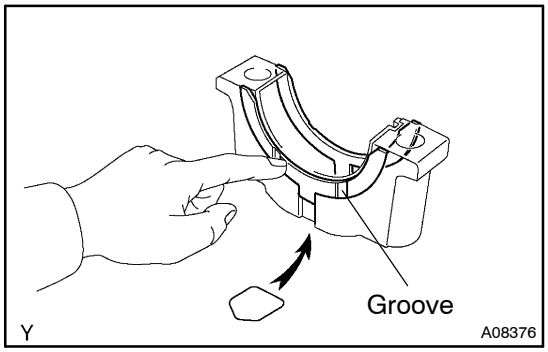
HINT:
A number is marked on each main bearing cap to indicate the installation position.



6. INSTALL UPPER THRUST WASHERS

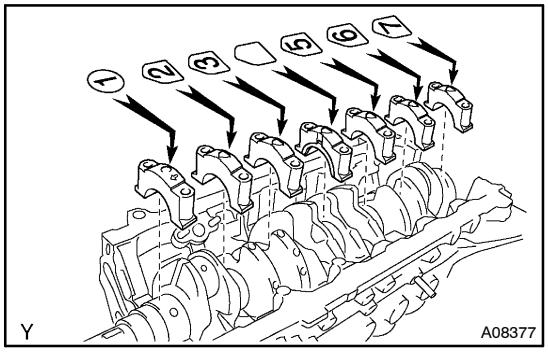
Install the 2 thrust washers under the No.4 journal position of the cylinder block with the oil grooves facing outward.

7. PLACE CRANKSHAFT ON CYLINDER BLOCK



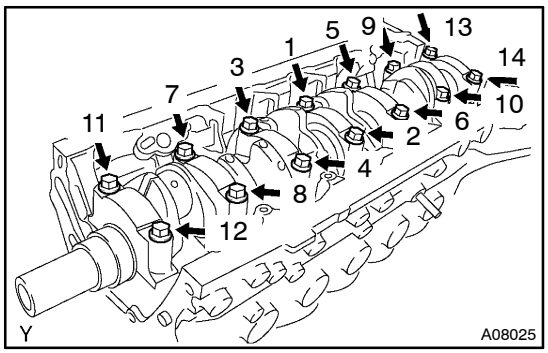
8. INSTALL MAIN BEARING CAPS AND LOWER THRUST WASHERS

(a) Install the 2 thrust washers on the No.4 bearing cap with the oil grooves facing outward.



(b) Install the 7 main bearing caps in their proper locations.

HINT:
Each bearing cap has a number and a front mark.



(c) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.

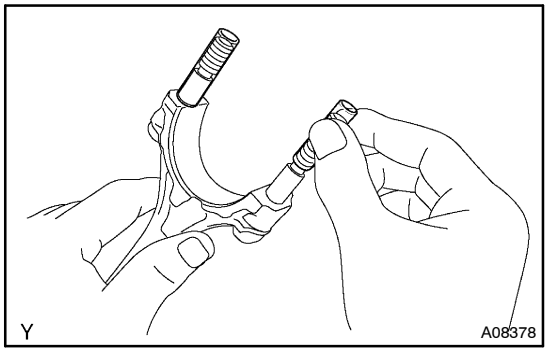
(d) Install and uniformly tighten the 14 bolts of the main bearing cap, in several passes, in the sequence shown.

Torque: 60 N·m (600 kgf·cm, 43 ft·lbf)

(e) Check that the crankshaft turns smoothly.

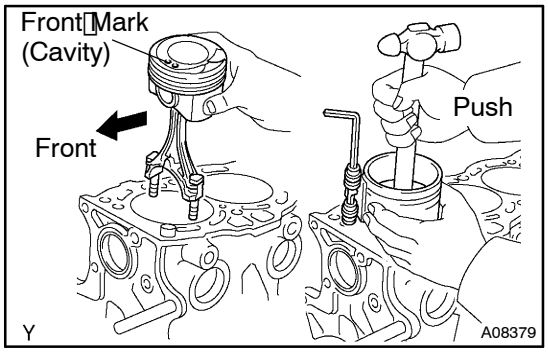
9. CHECK CRANKSHAFT THRUST CLEARANCE

(See page EM–82)

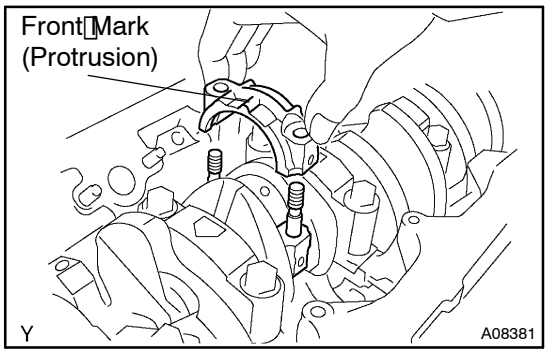


10. INSTALL PISTON AND CONNECTING ROD ASSEMBLES

(a) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



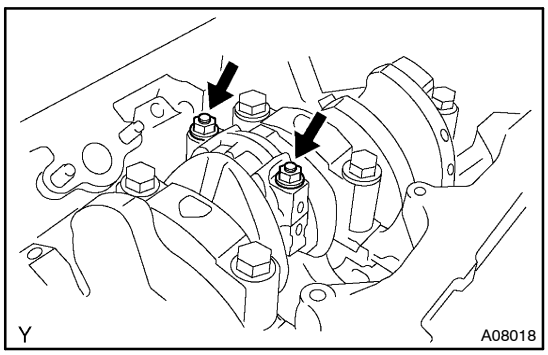
(b) Using a piston ring compressor, push the correct numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



11. INSTALL CONNECTING ROD CAP

(a) Match the numbered connecting rod cap with the connecting rod.

(b) Install the connecting rod cap with the front mark facing forward.



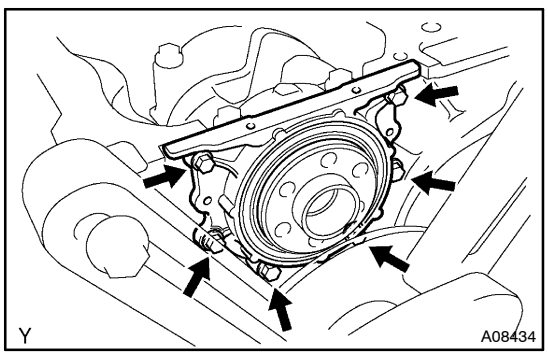
(c) Apply a light coat of engine oil on the threads and under the nuts of the connecting rod cap.

(d) Install and alternately tighten the 2 cap nuts in several passes.

Torque: 50 N·m (500 kgf·cm, 36 ft·lbf)

(e) Check that the crankshaft turns smoothly.

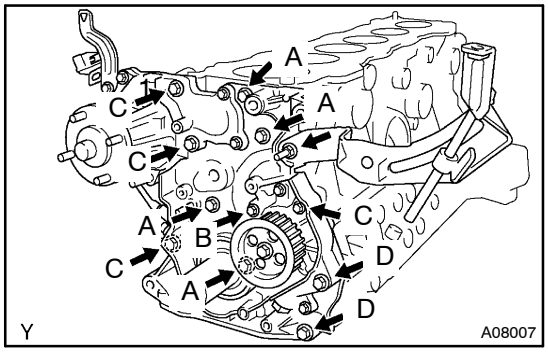
12. CHECK CONNECTING ROD THRUST CLEARANCE
(See page EM–82)



13. INSTALL REAR OIL SEAL RETAINER

Install a new gasket and the retainer with the 6 bolts.

Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)



14. INSTALL TIMING BELT CASE

Install a new gasket, the timing belt case and alternator adjusting bar with the 11 bolts and nut.

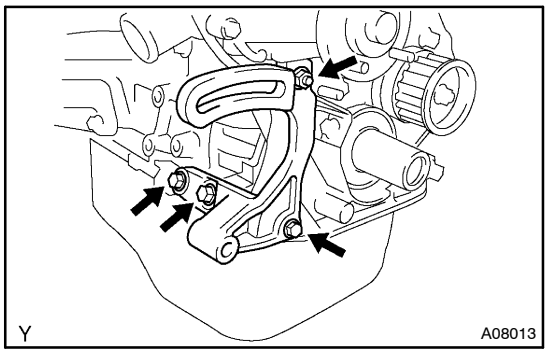
Torque:
18.5 N·m (185 kgf·cm, 13 ft·lbf) for 12 mm head
37.5 N·m (375 kgf·cm, 27 ft·lbf) for 14 mm head

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

30 mm (1.18 in.) for A
35 mm (1.38 in.) for B
40 mm (1.57 in.) for C
50 mm (1.97 in.) for D



15. INSTALL PS VANE PUMP BRACKET

Install the pump bracket with the 3 bolts and nut.

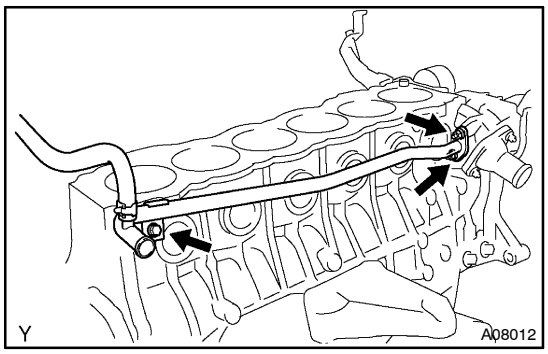
Torque:
19.1 N·m (195 kgf·cm, 14 ft·lbf) for 12 mm head
39.2 N·m (400 kgf·cm, 29 ft·lbf) for 14 mm head

16. INSTALL OIL STRAINER AND OIL PAN
(See page LU–14)

17. INSTALL RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Install the mounting bracket with the 3 bolts and nut.

Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)



18. INSTALL NO.2 HEATER WATER OUTLET PIPE

Install a new gasket and the No.2 heater water outlet pipe with the bolt and 2 nuts.

Torque: 9.5 N·m (95 kgf·cm, 82 in.·lbf)

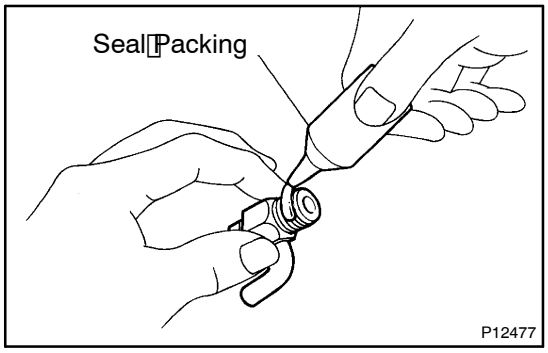
19. INSTALL OIL DIPSTICK GUIDE SUPPORT

20. INSTALL LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Install the mounting bracket with the 3 bolts.

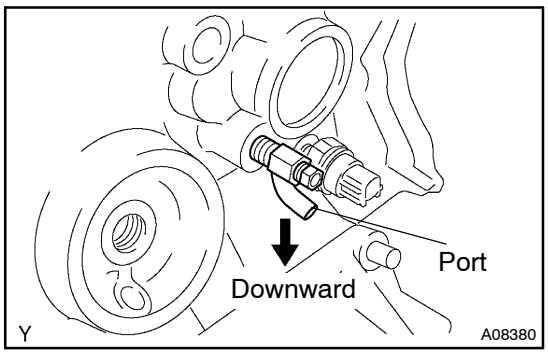
Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)

21. INSTALL OIL PRESSURE SWITCH
(See page LU–1)



22. 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: 25 N·m (250 kgf·cm, 18 ft·lbf)

HINT:
After applying the specified torque, rotate the drain union clockwise until its drain port is facing downward.

23. A/T:
INSTALL OIL FILTER UNION
Torque: 30 N·m (300 kgf·cm, 22 ft·lbf)

24. M/T:
INSTALL OIL COOLER (See page LU–19)

25. INSTALL OIL FILTER (See page LU–3)

26. INSTALL KNOCK SENSORS (See page FI–63)

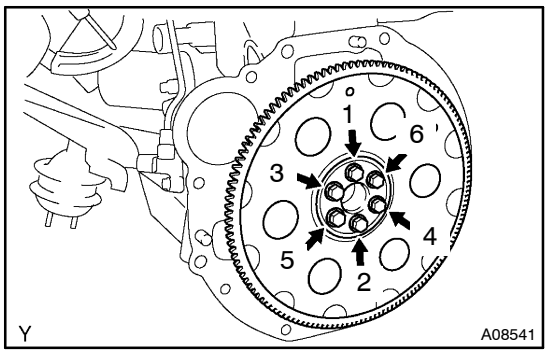
27. INSTALL OIL DIPSTICK GUIDE SUPPORT

28. INSTALL CYLINDER HEAD (See page EM–59)

29. INSTALL TIMING BELT AND PULLEYS
(See page EM–26)

30. DISCONNECT ENGINE FROM ENGINE STAND

31. INSTALL REAR END PLATE



32. INSTALL DRIVE PLATE OR FLYWHEEL

(a) A/T:
Install the front spacer, drive plate and rear plate on the crankshaft.

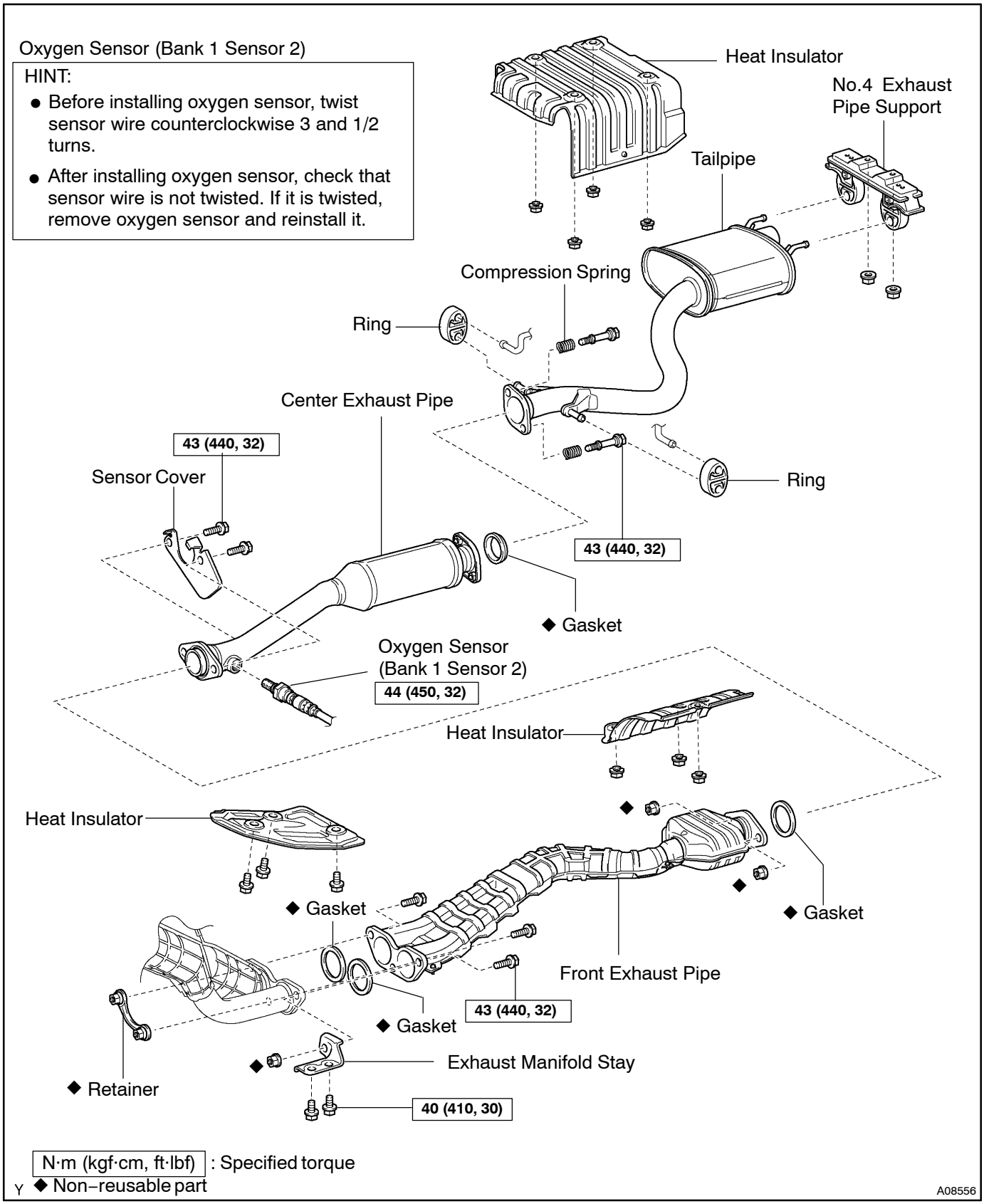
(b) M/T:
Install the flywheel on the crankshaft.

(c) Install and uniformly tighten the 6 bolts in several passes, in the sequence shown.
Torque: 75 N·m (750 kgf·cm, 54 ft·lbf)

EXHAUST SYSTEM

COMPONENTS

EM08M–04



EFI SYSTEM

SF0N1–04

PRECAUTION

1. BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY

HINT:

Any diagnostic trouble code retained by the engine ECU will be erased when the battery negative (–) terminal cable is removed from the battery.

Therefore, if necessary, read the diagnostic trouble code(s) 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 the event of engine misfire, these precautions should be taken.
  (1) Check proper connection of 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 the handling oxygen sensors.
  (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 cause air suction and cause the engine to run out of tune.

7. ELECTRONIC CONTROL SYSTEM

(a) Before removing EFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF 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 (–) cable terminals.

(c) Do not permit parts to receive a severe impact during removal or installation. Handle all EFI parts carefully, especially the engine ECU.

(d) Do not be careless during troubleshooting as there are numerous transistor circuits and even slight terminal contact can further troubles.

(e) Do not open the ECU 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 EFI parts and wiring connectors.

(g) Parts should be replaced as an assembly.

(h) Care is required 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.

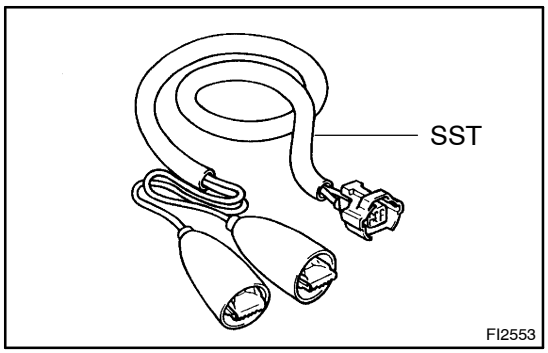
(i) When inspecting a connector with a volt/ohmmeter.

(1) Carefully take out the water–proofing rubber if it is a water–proof type connector.

(2) Insert the test probe into the connector from wiring side when checking the continuity, amperage or voltage.

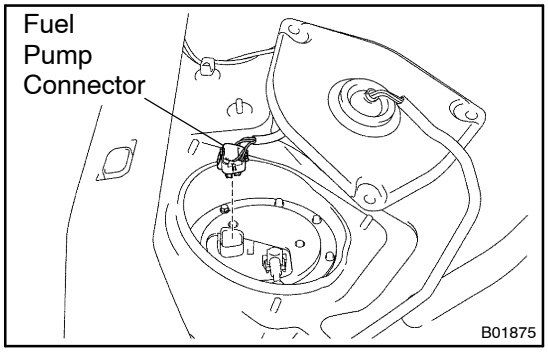
(3) Do not apply unnecessary force to the terminal.

(4) After checking, install the water–proofing rubber on the connector securely.



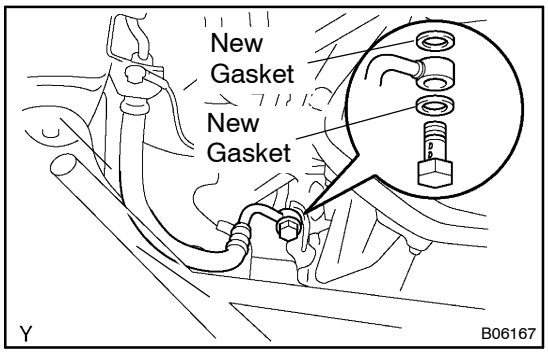
(5) Use SST for inspection or test of the injector or its wiring connector.

SST 09842–30070

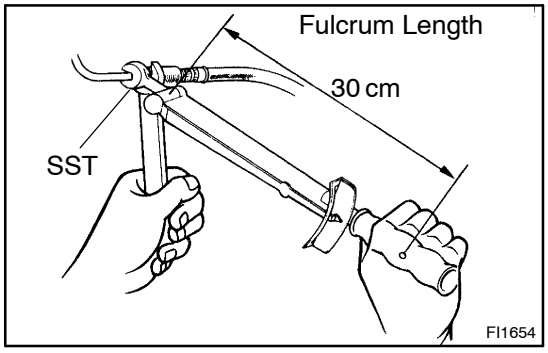


8. FUEL SYSTEM

(a) When disconnecting the high pressure fuel 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 OFF.
(3) Put a container under the connection.
(4) Slowly loosen the connection.
(5) Disconnect the connection.
(6) Plug the connection with a rubber plug.
(7) Reconnect the fuel pump connector.



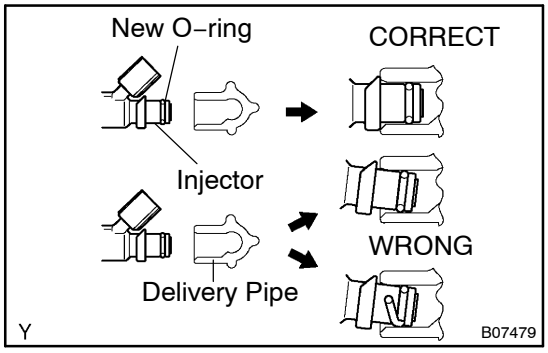
(b) When connecting the flare nut or union bolt on the high pressure pipe union, observe these procedures:
(1) Union Bolt Type:
Always use a new gasket.
(2) Union Bolt Type:
Tighten the union bolt by hand.
(3) Union Bolt Type:
Tighten the union bolt to the specified torque.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



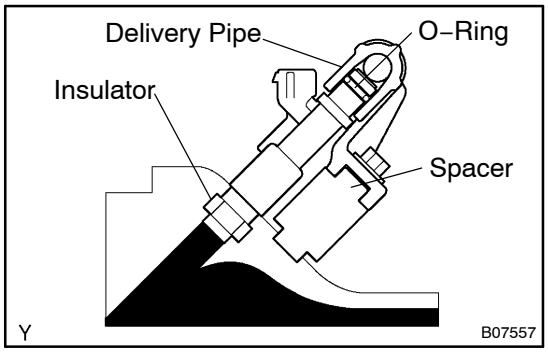
(4) Flare Nut Type:
Apply a light coat of engine oil to the flare and tighten the flare nut by hand.
(5) Flare Nut Type:
Using SST, tighten the flare nut to the specified torque.
SST 09631–22020

NOTICE:
Do not rotate the fuel pipe, when tightening the flare nut.
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf) for using SST
38 N·m (387 kgf·cm, 28 ft·lbf)

HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

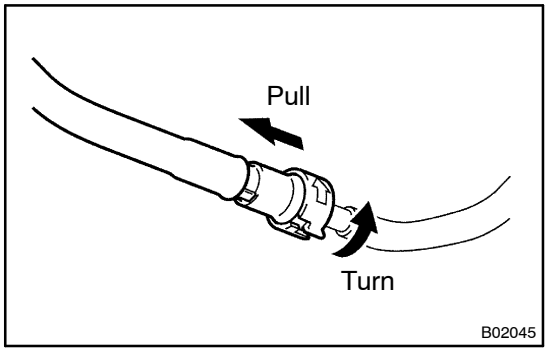


(c) Observe these precautions when removing and installing the injectors.
(1) Never reuse the O–ring.
(2) When placing a new O–ring on the injector, take care not to damage it in any way.
(3) Coat a new O–ring with spindle oil or gasoline before installing–never use engine, gear or brake oil.

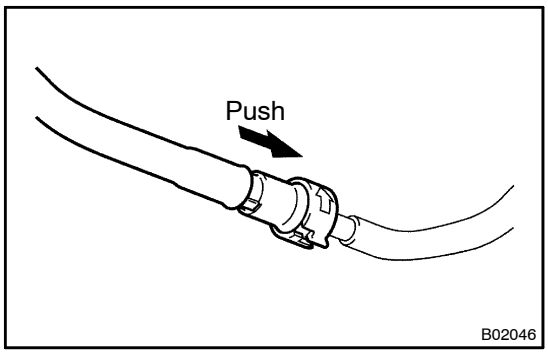


(d) Install the injector to the delivery pipe and intake manifold as shown in the illustration.
Before installing the injector, must apply spindle oil or gasoline on the place where a delivery pipe or touches an O–ring of the injector.

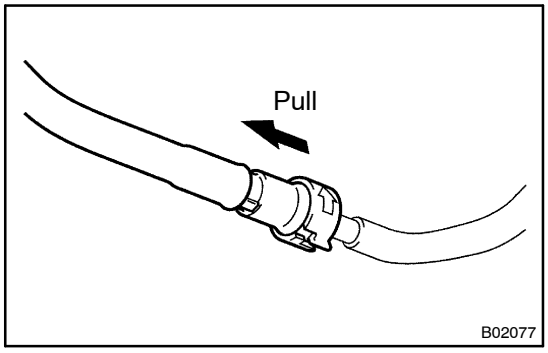
(e) Observe these precautions when disconnecting the fuel tube connector (quick type):
(1) Check that there is any dirt like mud on the pipe and around the connector before disconnecting them and clean the dirt away.
(2) Be sure to disconnect with hands.



(3) When the connector and the pipe are stuck, push and pull the connector to free to disconnect and pull it out. Do not use any tool at this time.
(4) Inspect that 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.

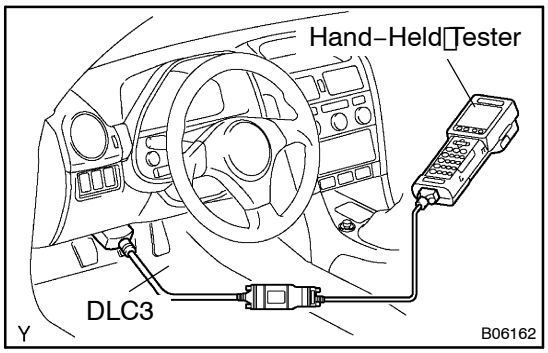


(f) Observe these precautions when connecting the fuel tube connector (quick type):
(1) Check that there is any damage or foreign objects on the connected part of the pipe.
(2) Match the axis of the connector with axis of the pipe, and push in the connector until the connector makes a ”click” sound. In case the connections is tight, apply little amount of new engine oil on the tip of the pipe.



(3) After having finished the connection, check that the pipe and the connector are securely connected by pulling them.
(4) Check that 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 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.



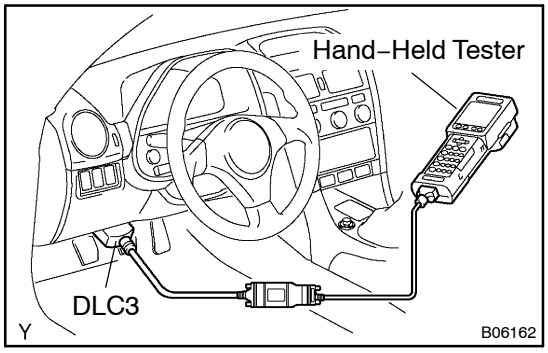
(h) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
(1) Connect a hand–held tester to the DLC3.
(2) Turn the ignition switch ON and push the hand–held tester main switch ON.

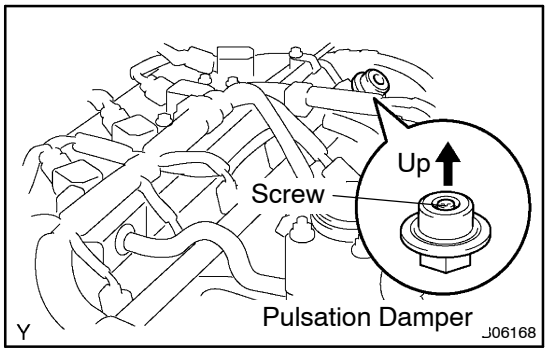
NOTICE:
Do not start the engine.

(3) Select the ACTIVE TEST mode on the hand–held tester.
(4) Please refer to the hand–held tester operator's manual for further details.
(5) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See page FI–6)
(6) Check that there are no leaks from any part of the fuel system.
(7) Turn the ignition switch OFF.
(8) Disconnect the hand–held tester from the DLC3.
(9) Start the engine.

NOTICE:
Keep cranking the engine until the air is removed from the fuel line.

(10) After the engine starts, check again that there are no fuel leaks.





FUEL PUMP

SF0N2–04

ON–VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

(a) Connect a hand–held tester to the DLC3.

(b) Turn the ignition switch ON and hand–held tester main switch ON.

NOTICE:

Do not start the engine.

(c) Select the ACTIVE TEST mode on the hand–held tester.

(d) Please refer to the hand–held tester operator's manual for further details.

(e) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See step 3)

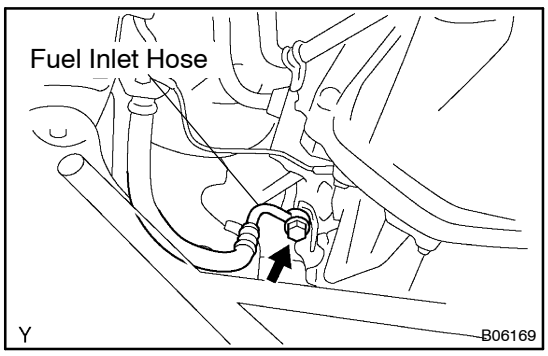
(f) Check that the pulsation damper screw rises up when the fuel pump operates.

If there is no pressure, check these parts:

- Fusible link
- Fuses
- EFI main relay
- Fuel pump
- Engine ECU
- Wiring connections

(g) Turn the ignition switch OFF.

(h) Disconnect the hand–held tester from the DLC3.



2. CHECK FUEL PRESSURE

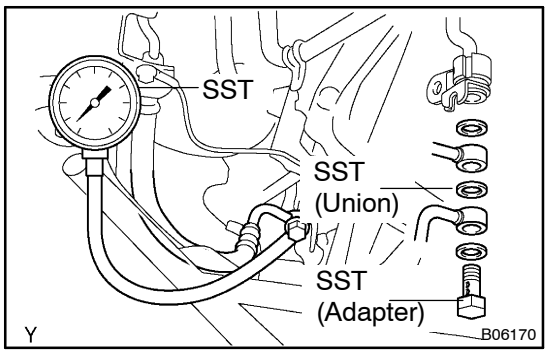
(a) Check the battery voltage is above 12 V.

(b) Disconnect the negative (–) terminal cable from the battery.

(c) Remove the union bolt and 2 gaskets, and disconnect the fuel inlet hose from the fuel pipe support.

NOTICE:

- **Put a shop towel under the fuel pipe support.**
- **Slowly loosen the union bolt.**

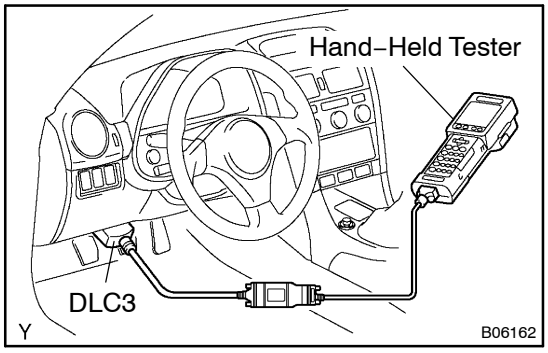


(d) Install the fuel inlet hose and SST (pressure gauge) to the fuel pipe support with the 3 gaskets and SST (union and adapter).

SST 09268–45014 (09268–41190, 90405–06167)

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

(e) Wipe off any splattered gasoline.



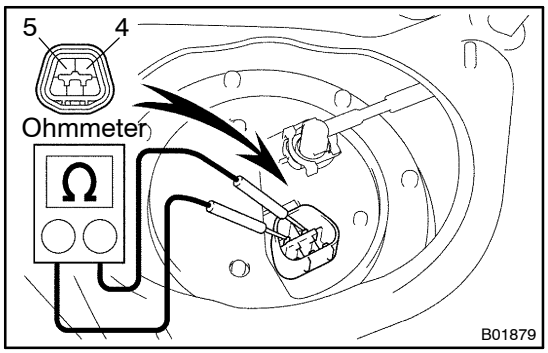
(f) Connect a hand–held tester to the DLC3.
(See step 1 in check fuel pump operation (a) to (e))
(g) Measure the fuel pressure.
Fuel pressure:
304 – 343 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)

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

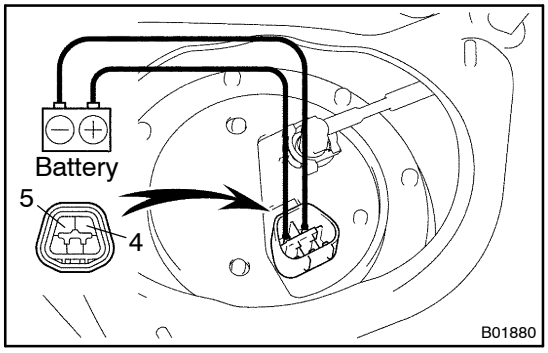
(h) Disconnect the hand–held tester from the DLC3.
(i) Start the engine.
(j) Measure the fuel pressure at idle.
Fuel pressure:
304 – 343 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)
(k) Stop the engine.
(l) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.
Fuel pressure: 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.
(m) After checking fuel pressure, disconnect the negative (–) terminal cable from the battery and carefully remove SST to prevent gasoline from splashing.
SST 09268–45014
(n) Reconnect the fuel inlet hose to the fuel pipe support with 2 new gaskets and the union bolt.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)
(o) Reconnect the negative (–) terminal cable to the battery.
(p) Check for fuel leaks.



3. INSPECT FUEL PUMP
(a) Remove the rear seat cushion.
(b) Remove the 3 cap nuts and floor service hole cover.
(c) Disconnect the fuel pump & sender gauge connector.
(d) 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.



(e) Inspect the 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:

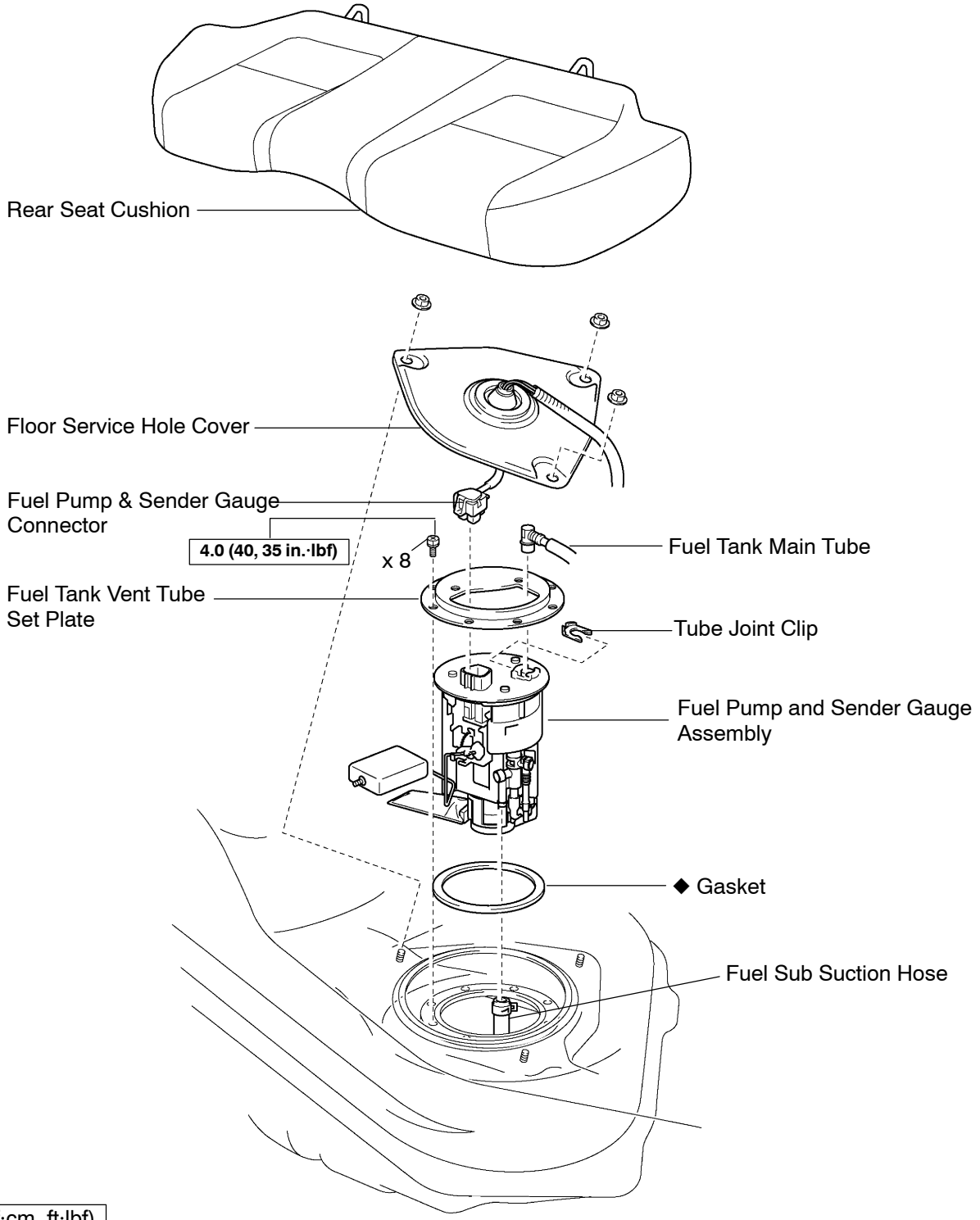
- **These tests must be done quickly (within 10 seconds) to prevent the coil burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**

If operation is not as specified, replace the fuel pump.

(f) Reconnect the fuel pump & sender gauge connector.
(g) Reinstall the floor service hole cover with the cap nuts.
(h) Reinstall the rear seat cushion.

SF0N3–04

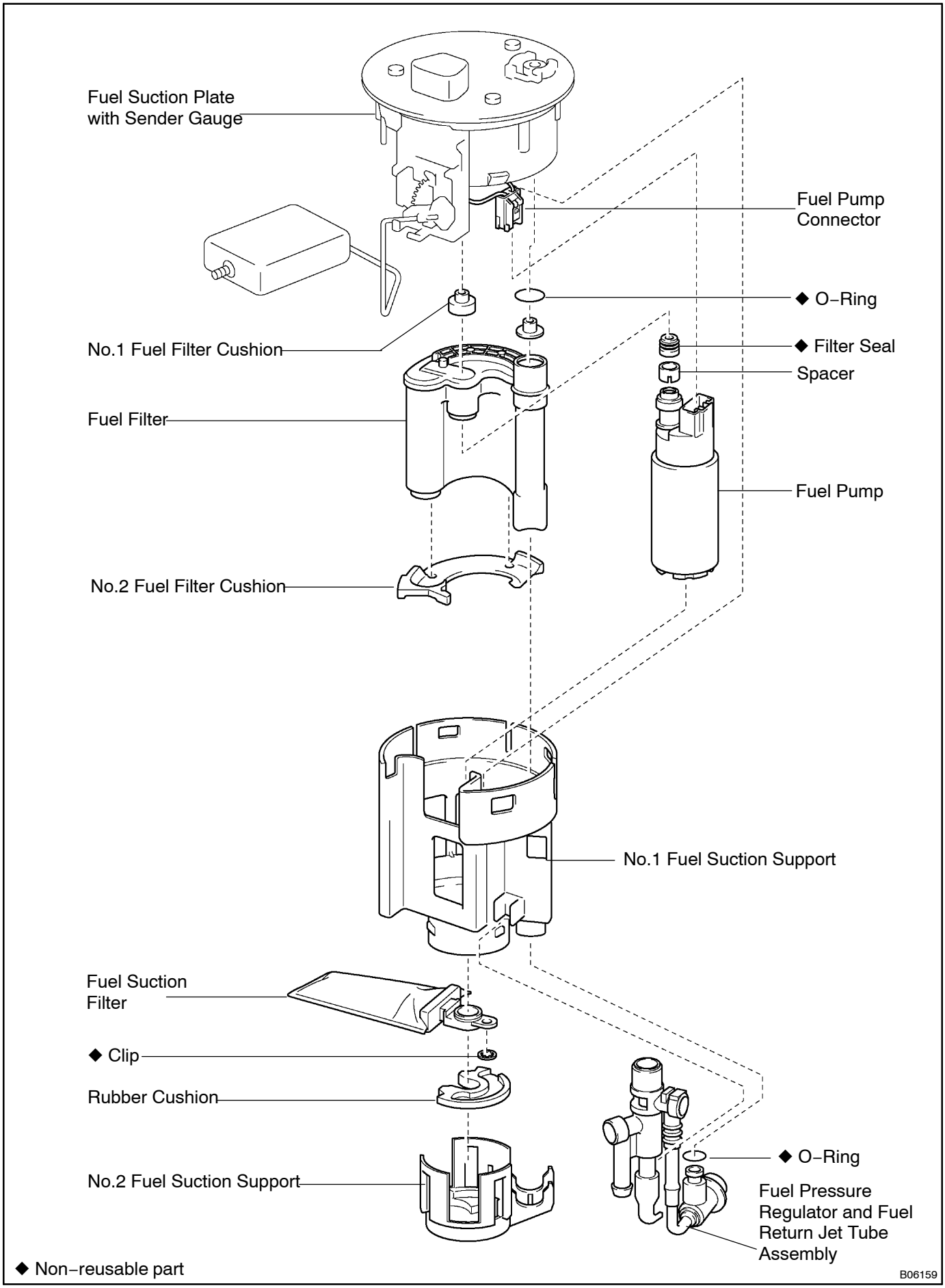
COMPONENTS



N·m (kgf·cm, ft·lbf)

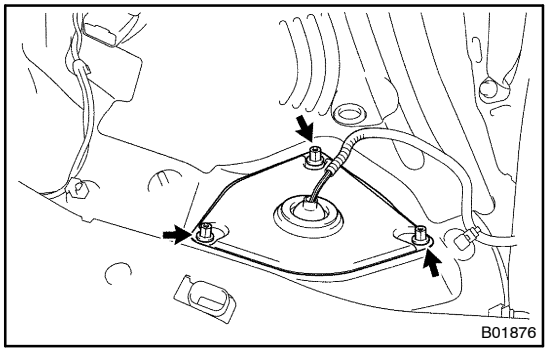
◆ Non–reusable part: Specified torque

B06160


Fuel Suction Plate with Sender Gauge
Fuel Pump Connector
◆ O–Ring
No.1 Fuel Filter Cushion
◆ Filter Seal
Spacer
Fuel Filter
Fuel Pump
No.2 Fuel Filter Cushion
No.1 Fuel Suction Support
Fuel Suction Filter
◆ Clip
Rubber Cushion
◆ O–Ring
No.2 Fuel Suction Support
Fuel Pressure Regulator and Fuel Return Jet Tube Assembly
◆ Non–reusable part
B06159

SF0N4–03

REMOVAL



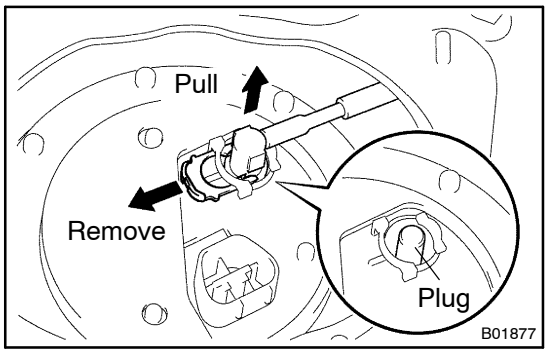
CAUTION:
Do not smoke or work near an open frame when working the fuel pump.

1. **REMOVE REAR SEAT CUSHION**
2. **REMOVE FLOOR SERVICE HOLE COVER**

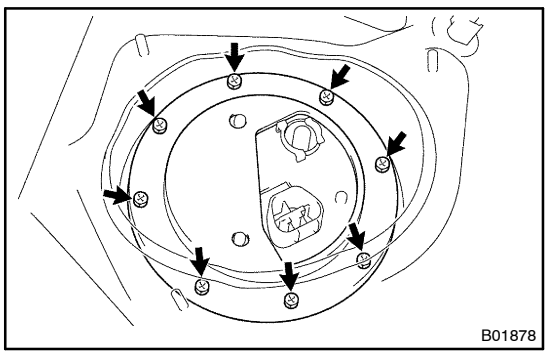
Remove the 3 cap nuts and service hole cover.

3. **DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR**
4. **DISCONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) FROM FUEL SECTION PLATE**

CAUTION:
- **Perform disconnecting operation of the fuel tube connector (quick type) after observing precaution. (See page FI–1)**
- **As there is retained pressure in the fuel line, prevent it from splashing inside the vehicle compartment.**

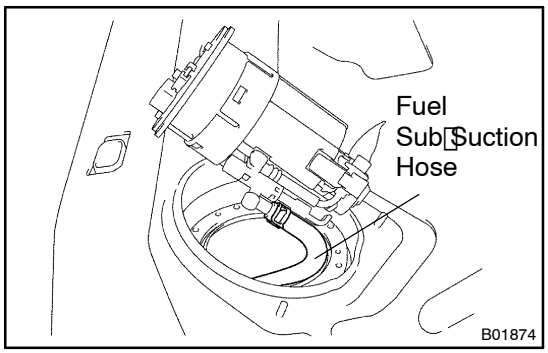


(a) Remove the tube joint clip.
(b) Pull out the fuel main tube.
(c) Plug the port of the fuel suction plate with a clean rubber cap.



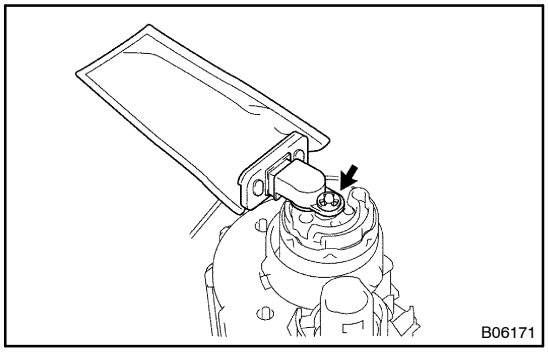
5. **REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK**

(a) Remove the 8 bolts and fuel tank vent tube set plate.



(b) Lift up the fuel pump and sender gauge assembly, and disconnect the fuel sub suction hose from the fuel return jet tube and remove the fuel pump, sender gauge assembly and gasket.

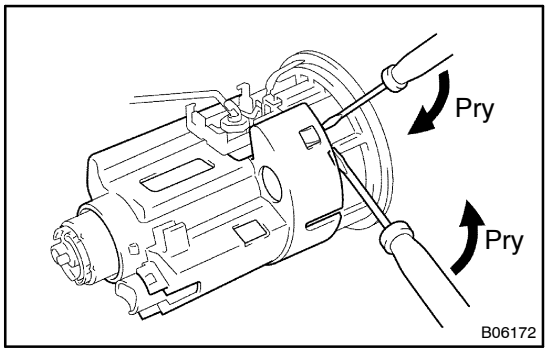
6. **REMOVE NO.2 FUEL SUCTION SUPPORT (See page FI–17)**
7. **REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY (See page FI–17)**



8. REMOVE FUEL SUCTION FILTER

(a) Remove the clip.

(b) Pull out the suction filter.



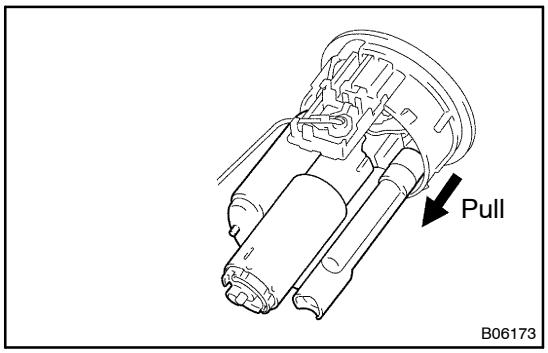
9. REMOVE NO.1 FUEL SUCTION SUPPORT

(a) Using 2 screwdrivers, disconnect the 4 snap claws from the claw holes and remove the fuel suction support.

NOTICE:

Be careful not to damage the suction support and suction plate.

(b) Remove the No.2 fuel filter cushion.



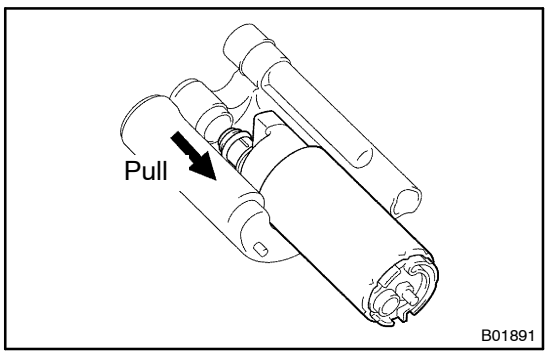
10. REMOVE FUEL FILTER AND FUEL PUMP ASSEMBLY

(a) Disconnect the fuel pump connector from the fuel pump.

(b) Pull out the fuel filter and fuel pump assembly.

(c) Remove the No.1 fuel filter cushion.

(d) Remove the O–ring from the fuel port of the fuel suction plate.

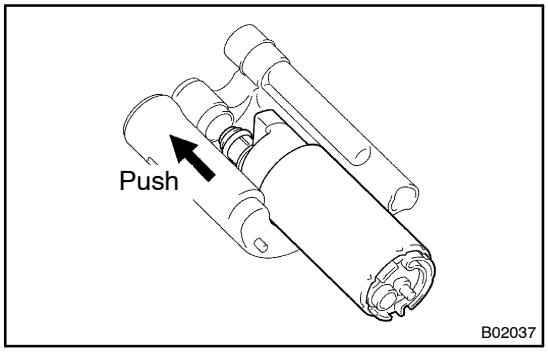


11. REMOVE FUEL PUMP FROM FUEL FILTER

Pull out the fuel pump.

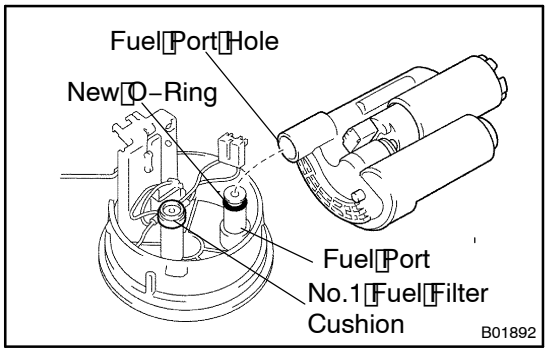
SF11S–01

INSTALLATION



1. INSTALL FUEL PUMP TO FUEL FILTER

Push in the fuel pump.



2. INSTALL FUEL FILTER AND FUEL PUMP ASSEMBLY

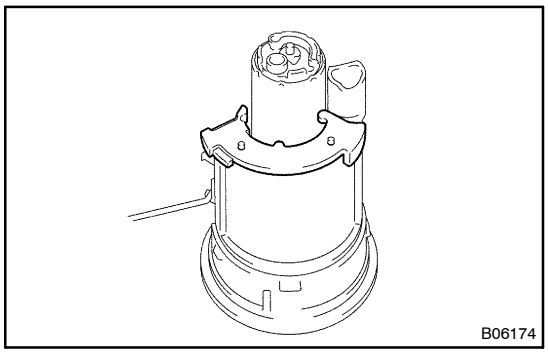
(a) Install the No.1 fuel filter cushion to the fuel suction plate.

(b) Apply a light coat of gasoline to a new O–ring and install it to the fuel port of the fuel suction plate.

(c) Align the fuel port of the fuel suction plate with the fuel port hole of the fuel filter.

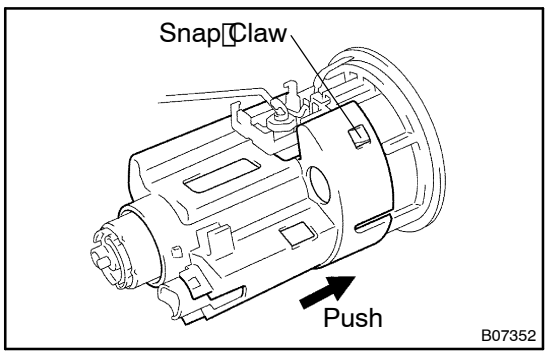
(d) Push in the fuel filter.

(e) Connect the fuel pump connector.

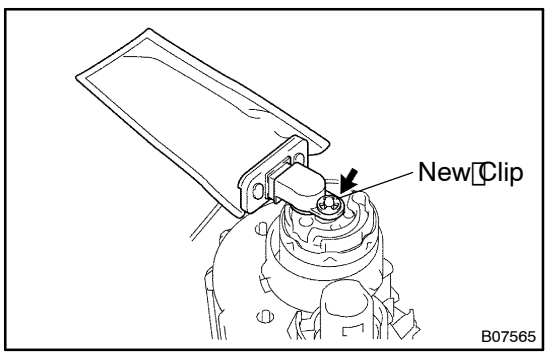


3. INSTALL NO.1 FUEL SUCTION SUPPORT

(a) Install the No.2 fuel filter cushion the fuel filter.



(b) Push the fuel suction support in and attach the 4 snap claws to the claw holes.

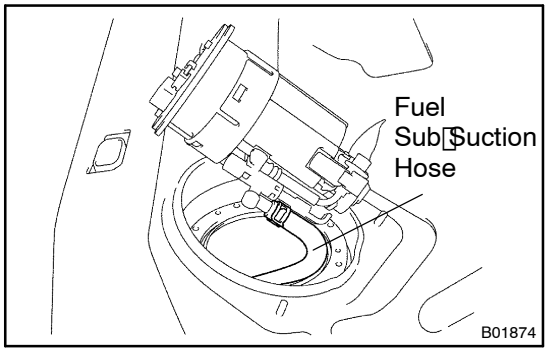


4. INSTALL FUEL SUCTION FILTER

Install the suction filter with a new clip.

5. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY (See page FI–18)

6. INSTALL NO.2 FUEL SUCTION SUPPORT (See page FI–18)

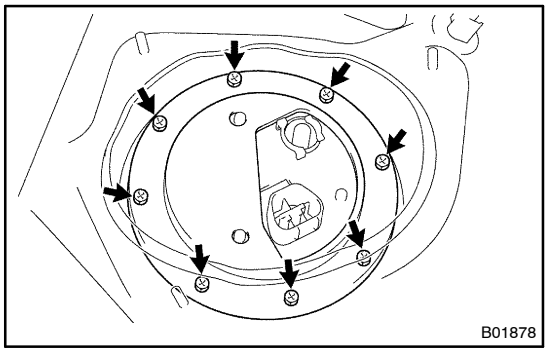


7. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK

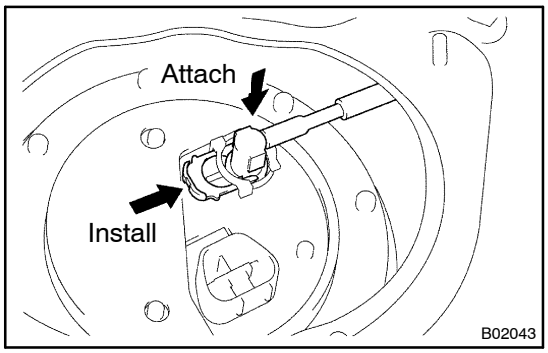
(a) Install a new gasket to the fuel suction plate.

(b) Connect the fuel sub suction hose to the fuel return jet tube.

(c) Attach the fuel pump and sender gauge assembly to the fuel tank.



(d) Install the fuel tank vent tube set plate with the 8 bolts.
Torque: 4.0 N·m (40 kgf·cm, 35 in.·lbf)



8. CONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) TO FUEL SUCTION PLATE

(a) Attach the fuel tube connector to the port of the fuel suction plate.

(b) Install the tube joint clip.

9. CONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

10. CHECK FOR FUEL LEAKS (See page FI–1)

11. INSTALL FLOOR SERVICE HOLE COVER

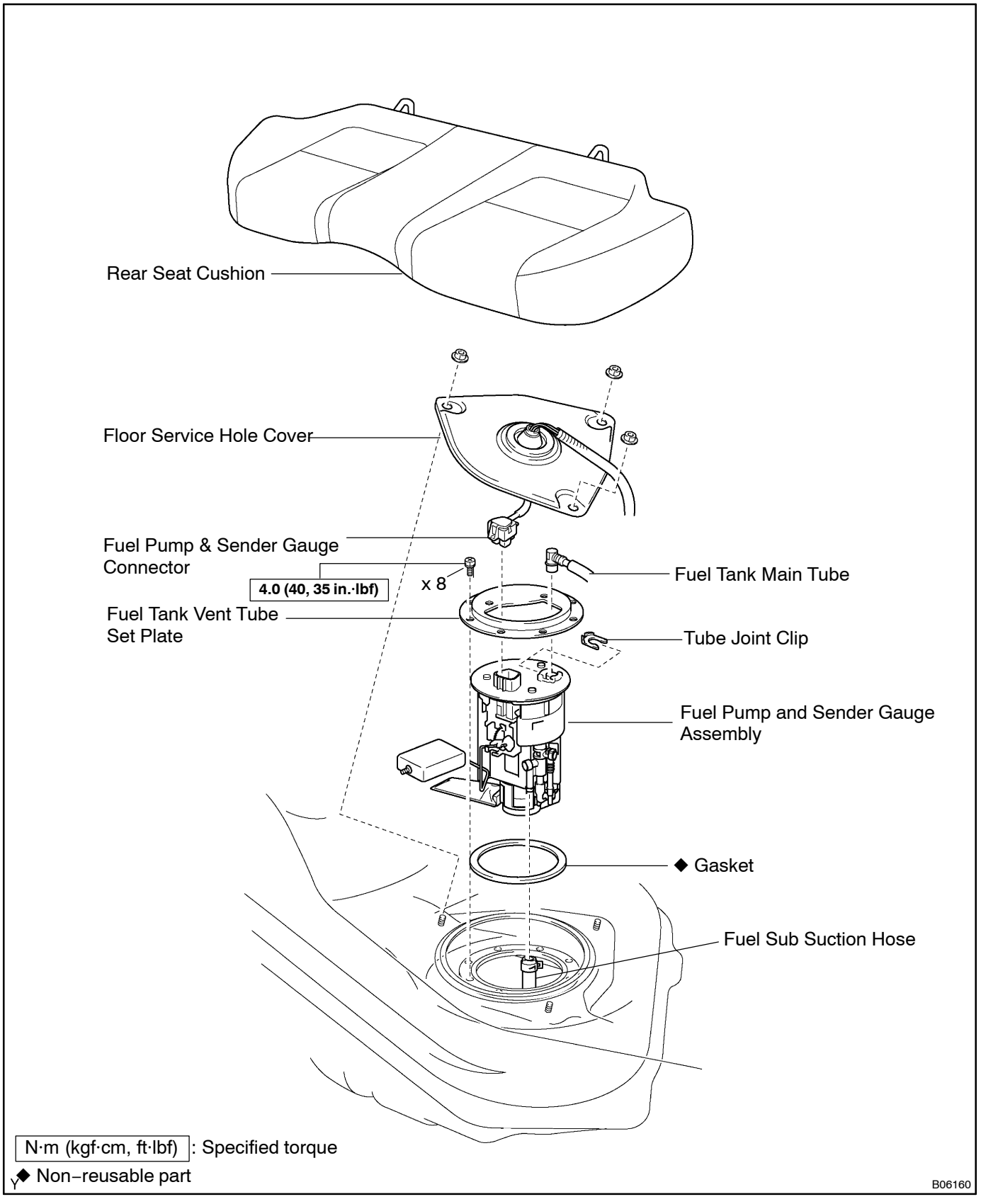
Install the service hole cover with the 3 cap nuts.

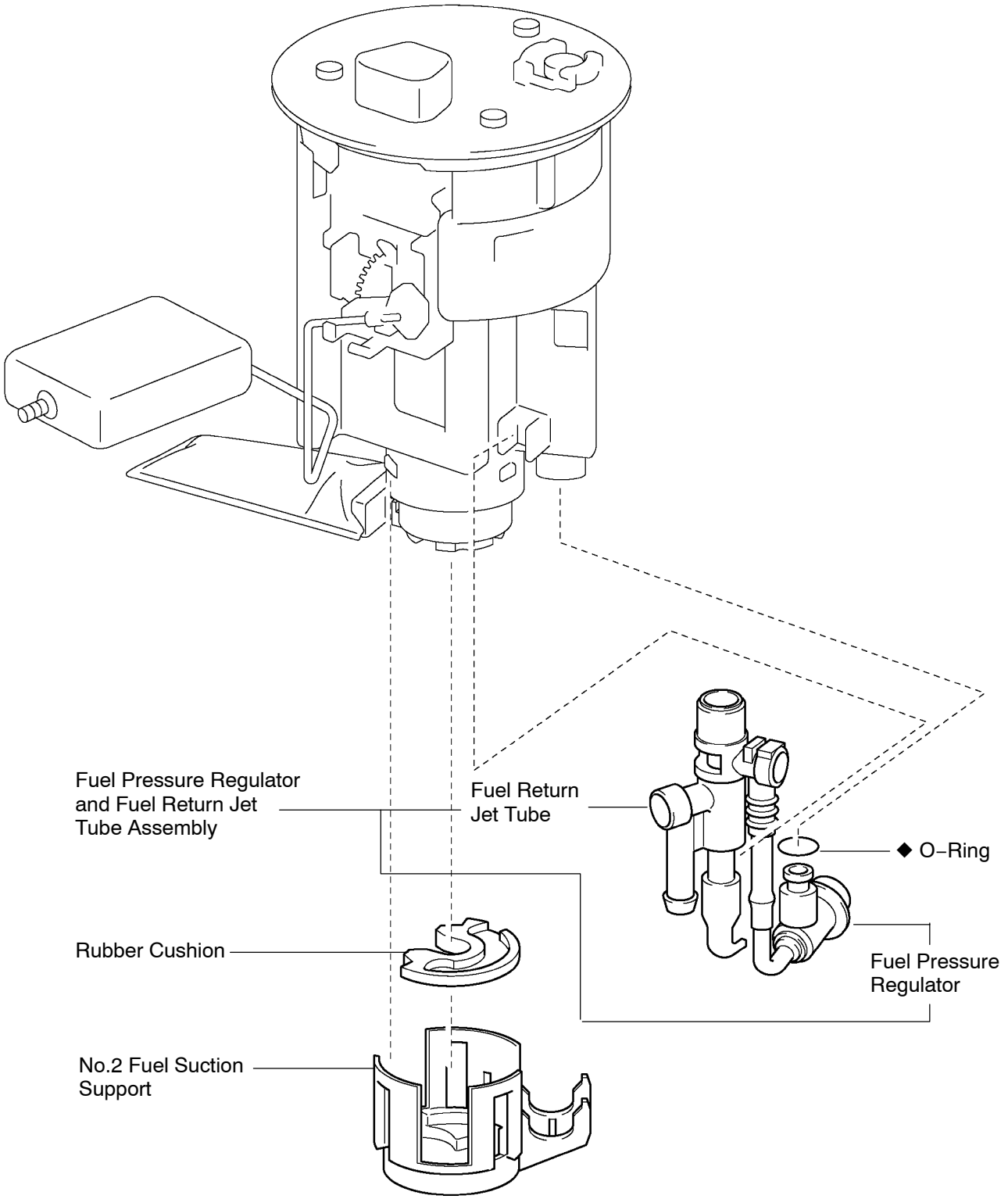
12. INSTALL REAR SEAT CUSHION

FUEL PRESSURE REGULATOR

COMPONENTS

SF0N6–03

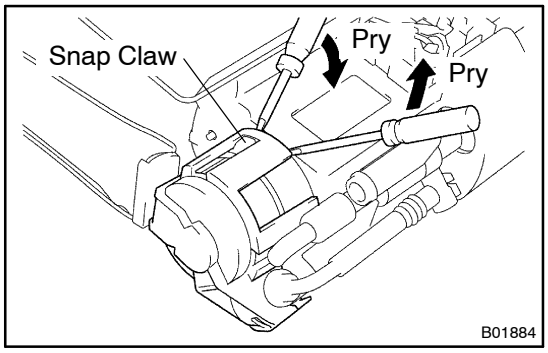



Fuel Pressure Regulator and Fuel Return Jet Tube Assembly
Fuel Return Jet Tube
◆ O–Ring
Rubber Cushion
Fuel Pressure Regulator
No.2 Fuel Suction Support
◆ Non–reusable part
B06161

SF0N7–03

REMOVAL

1. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK (See page FI–11)



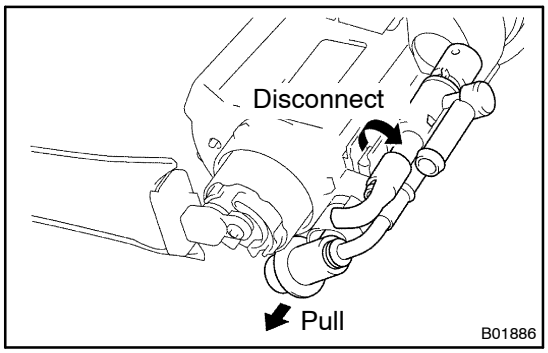
2. REMOVE NO.2 FUEL SUCTION SUPPORT

(a) Using 2 screwdrivers, disconnect the 4 snap claws from the claw holes and remove the fuel suction support.

NOTICE:

Be careful not to damage the suction supports.

(b) Remove the rubber cushion.



3. REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

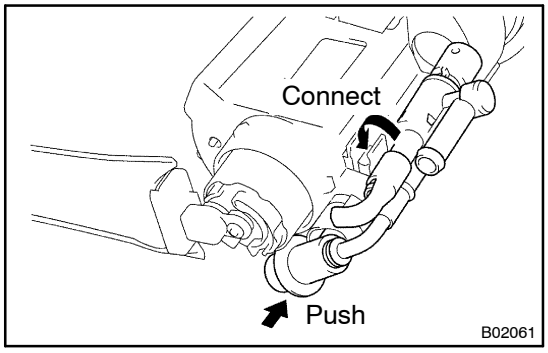
(a) Disconnect the fuel return jet tube from the clamp of the No.2 fuel suction support.

(b) Pull out the fuel pressure regulator from the fuel filter, and remove the fuel pressure regulator and fuel return jet tube assembly.

(c) Remove the O–ring from the fuel pressure regulator.

SF0N8–03

INSTALLATION



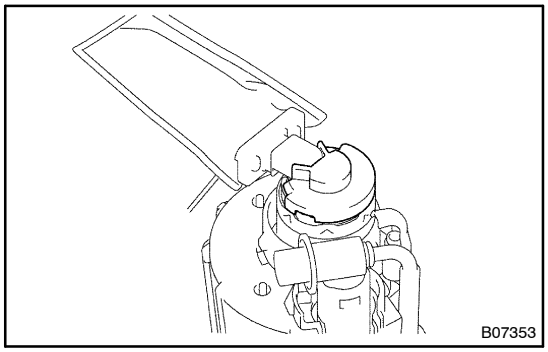
1. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

(a) Apply a light coat of gasoline to a new O–ring, and install it to the fuel pressure regulator.

(b) Push in the fuel pressure regulator to the fuel filter.

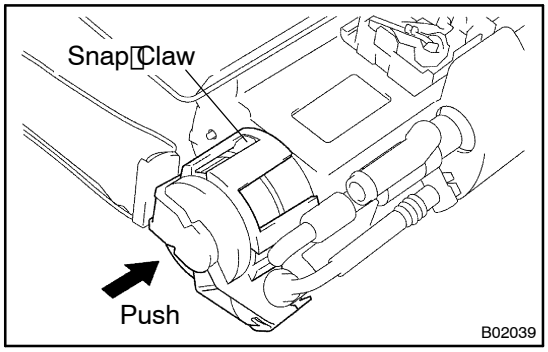
(c) Check that the fuel pressure regulator rotates smoothly. If it does not rotates smoothly, the O–ring may be pinched, so remove the fuel pressure regulator and perform again steps (b) and (c) above.

(d) Connect the fuel return jet tube to the clamp of the No.2 fuel suction support.



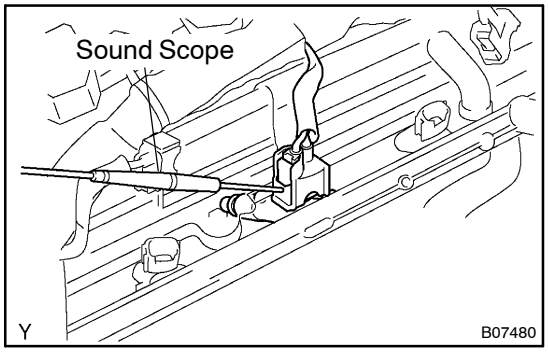
2. INSTALL NO.2 FUEL SUCTION SUPPORT

(a) Install the rubber cushion to the fuel pump.



(b) Push the fuel suction support in and attach the 4 snap claws to the claw holes.

3. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK (See page FI–13)



INJECTOR

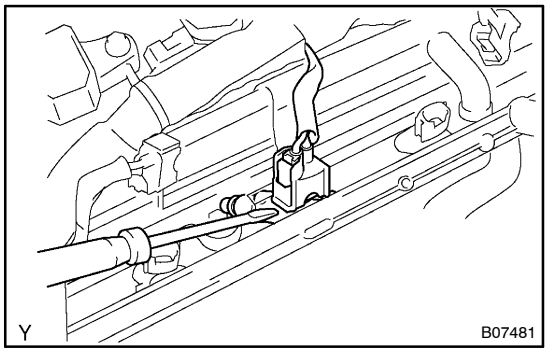
SF0N9–03

ON–VEHICLE INSPECTION

1. INSPECT INJECTOR OPERATION

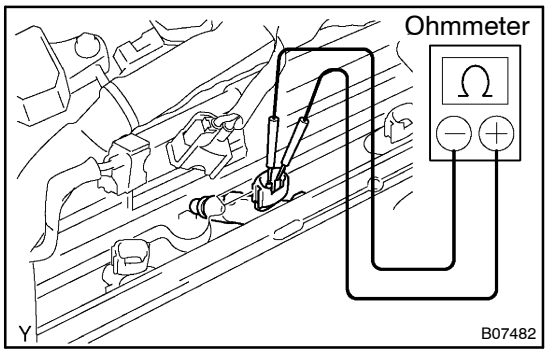
Check operation sound from each injector.

(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 transmission operation with a screwdriver.

If no sound or an unusual sound is heard, check the wiring connector, injector or injection signal from the ECU.



2. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connectors.

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

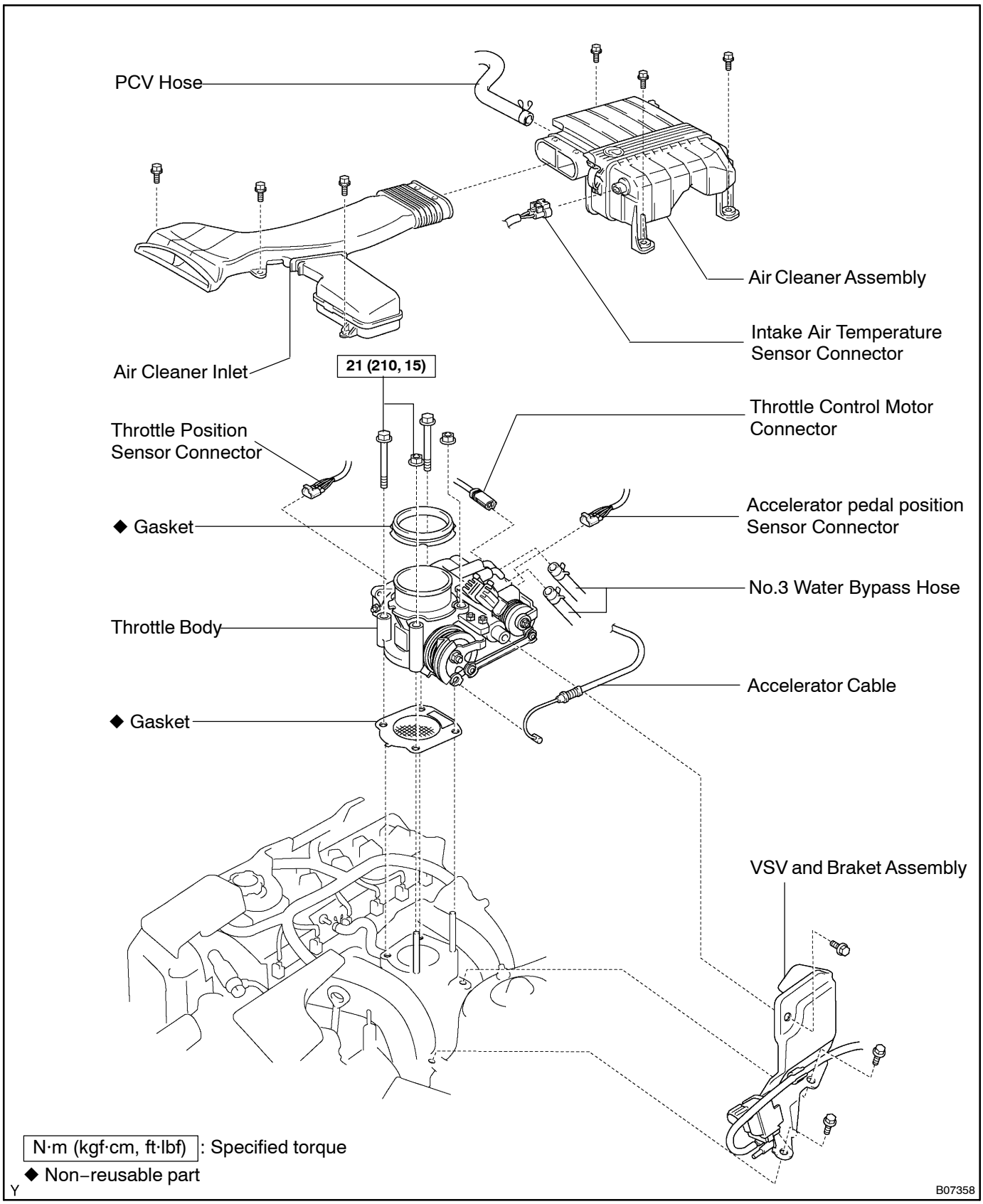
Resistance: 13.4 – 14.2 Ω at 20°C (68°F)

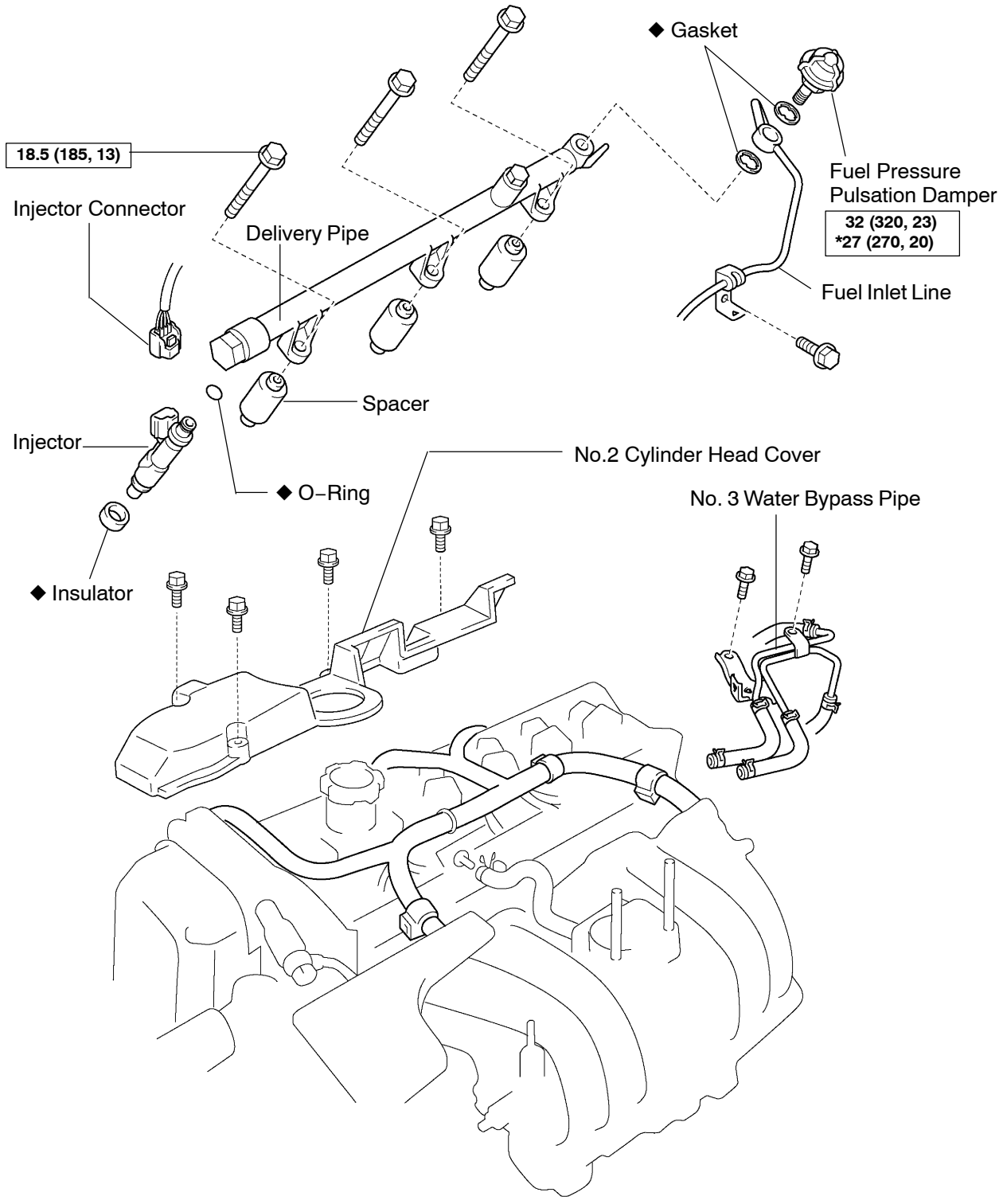
If the resistance is not as specified, replace the injector.

(c) Reconnect the injector connectors.

FI0LN–01

COMPONENTS





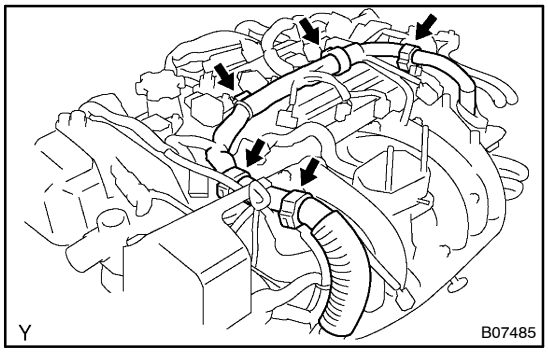
Y N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
* For use with SST

B07483

SF11T–01

REMOVAL

1. REMOVE AIR CLEANER INLET
2. REMOVE AIR CLEANER ASSEMBLY
3. REMOVE NO.2 CYLINDER HEAD COVER
4. REMOVE THROTTLE BODY (See page FI–36)

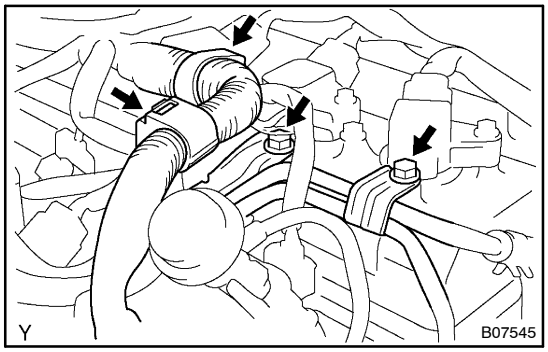


5. DISCONNECT ENGINE WIRE

(a) Disconnect the engine wire clamp from the bracket on the No.3 water bypass pipe.

(b) Disconnect the 2 engine wire clamps from the 2 brackets on the cylinder head cover.

(c) Disconnect the 2 engine wire clamps from the 2 brackets on the intake manifold.



6. REMOVE NO.3 BYPASS PIPE FROM CYLINDER HEAD COVER

Remove the 2 bolts and No.3 water bypass pipe from the cylinder head cover.

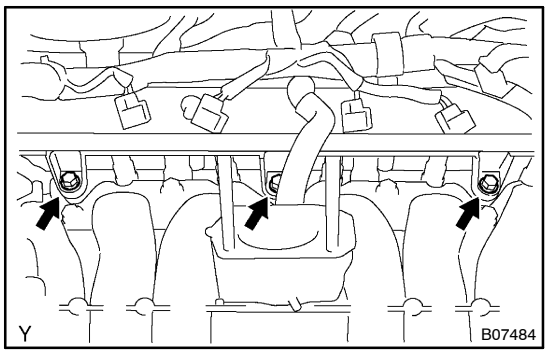
7. REMOVE FUEL PRESSURE PULSATION DAMPER (See page FI–28)

8. REMOVE DELIVERY PIPE AND INJECTORS

NOTICE:

- **Be careful not to drop the injectors when removing the delivery pipe.**
- **Pay attention to put any hung load on the injector to and from the side direction.**

(a) Disconnect the 6 injector connectors.



(b) Remove the 3 bolts and delivery pipe together with the 6 injectors.

(c) Pull out the 6 injectors from the delivery pipe.

(d) Remove the O–ring, grommet and insulator from each injector.

(e) Remove the 3 spacers from the intake manifold.

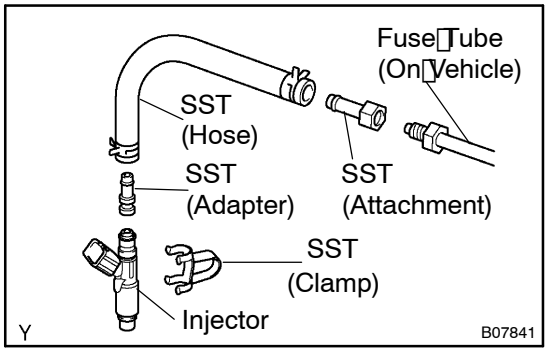
SF0NC–04

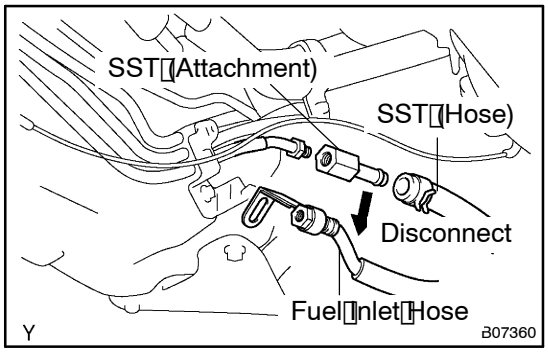
INSPECTION

1. INSPECT INJECTOR INJECTION

CAUTION:

Keep injector clear of sparks during the test.



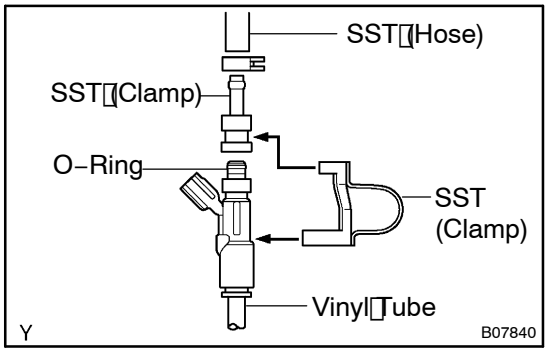


(a) Remove the nut, and disconnect the fuel inlet hose from the fuel main tube.

(b) Temporarily install SST (attachment) to the fuel main tube.
SST 09268–41047 (09268–52011)

(c) Tighten the flare nut on the fuel main tube.
(See page FI–1)

(d) Connect SST (hose) to the SST (attachment).
SST 09268–41047



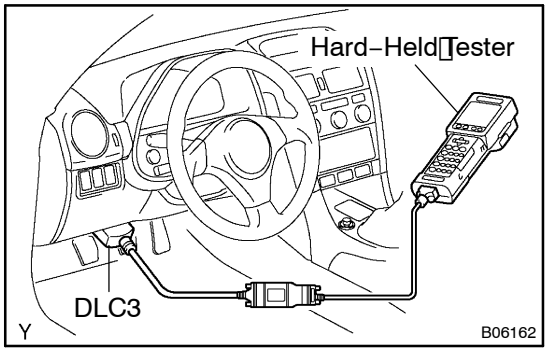
(e) Install the O–ring to the injector.

(f) Connect SST (hose) to the injector with SST (adapter), and hold the injector and adapter with SST (clamp).
SST 09268–41047 (09268–41110, 09268–41300)

(g) Put the injector into the graduated cylinder.

CAUTION:

Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.



(h) Connect the hand–held tester to the DLC3.

(i) Connect the negative (–) terminal cable to the battery.

(j) Turn the ignition switch ON and hand–held tester main switch ON.

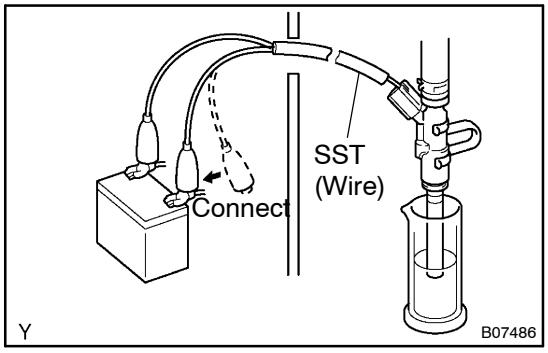
NOTICE:

Do not start the engine.

(k) Select the ACTIVE TEST mode on the hand–held tester.

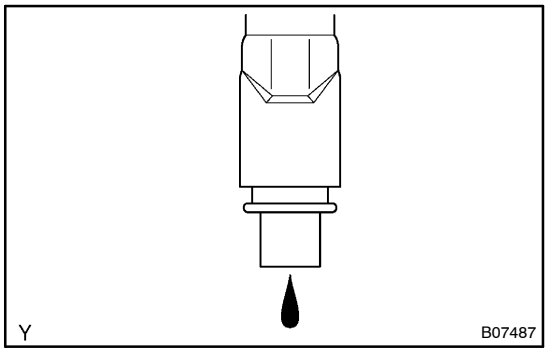
(l) Please refer to the hand–held tester operator's manual for further details.

(m) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector.
(See page FI–6)



(n) 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
Injection volume:
47 – 58 cm^3 (2.9 – 3.6 cu in.) per 15 seconds
Difference between each injector:
11 cm^3 (0.7 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 27 minutes

(b) Turn the ignition switch OFF.

(c) Disconnect the negative (–) terminal cable from the battery.

(d) Remove the SST.
SST 09268–41047, 09842–30070

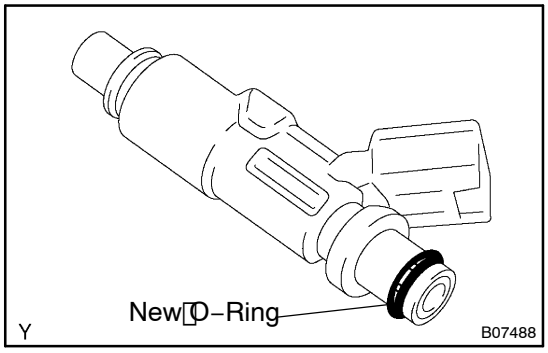
(e) Reconnect the fuel inlet hose to the fuel main tube. (See page FI–1)

(f) Install the fuel inlet hose with the nut.
Torque: 9 N·m (90 kgf·cm, 80 in.·lbf)

(g) Disconnect the hand–held tester from the DLC3.

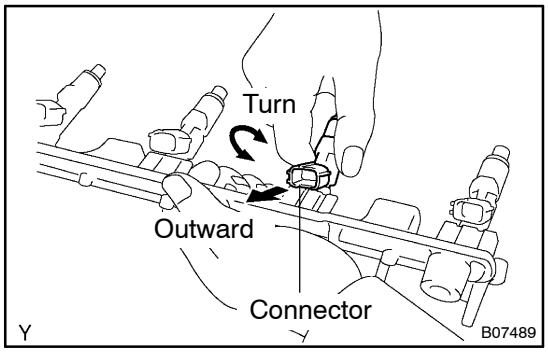
SF11U–01

INSTALLATION



1. INSTALL INJECTORS AND DELIVERY PIPE

(a) Apply a light coat of gasoline to a new O–ring and install it to the injector.



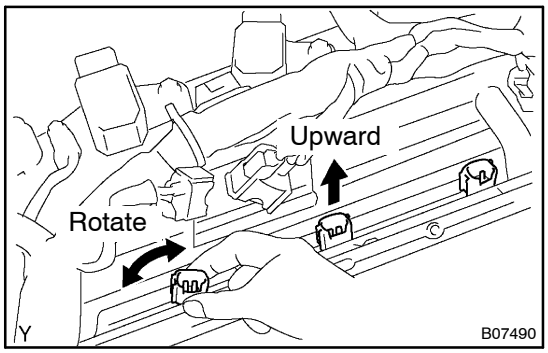
(b) While turning the injector left and right, install it to the delivery pipe. Install the 6 injectors.

(c) Position the injector connector upward.

(d) Place 6 new insulators and the 3 spacers in position on the cylinder head.

(e) Place the 6 injectors and delivery pipe assembly in position on the cylinder head.

(f) Temporarily install the 3 bolts holding the delivery pipe to the cylinder head.



(g) Check that the injectors rotate smoothly.

HINT:

If the injectors do not rotate smoothly, the probable cause is incorrect installation of the O–rings. Replace the O–rings.

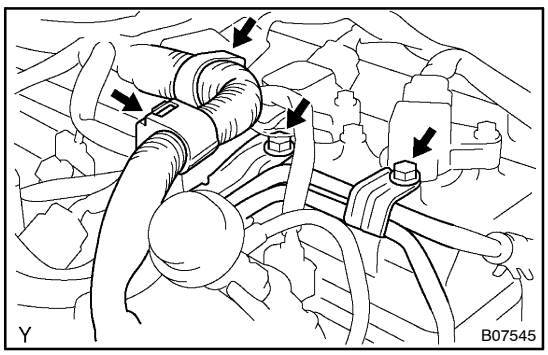
(h) Position the injector connector upward.

(i) Tighten the 3 bolts holding the delivery pipe to the intake manifold.

Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

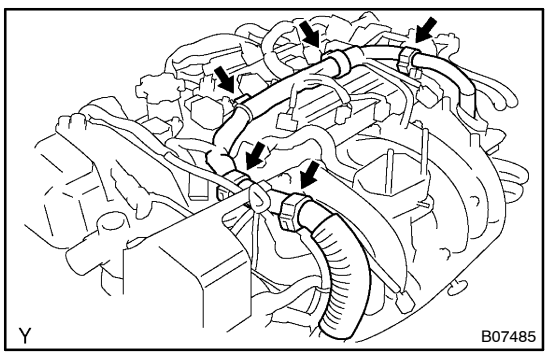
2. INSTALL FUEL PRESSURE PULSATION DAMPER

(See page FI–29)



3. INSTALL NO.3 WATER BYPASS PIPE

Install the No.3 wather bypass pipe to the cylinder head cover with the 2 bolts.



4. INSTALL ENGINE WIRE

(a) Install the 2 engine wire clamps to the 2 brackets on the intake manifold.

(b) Install the 2 engine wire clamps to the 2 brackets on the cylinder head cover.

(c) Install the engine wire clamp to the bracket on the No.3 water bypass pipe.

5. INSTALL NO.2 CYLINDER HEAD COVER

6. INSTALL THROTTLE BODY

(See page FI–36)

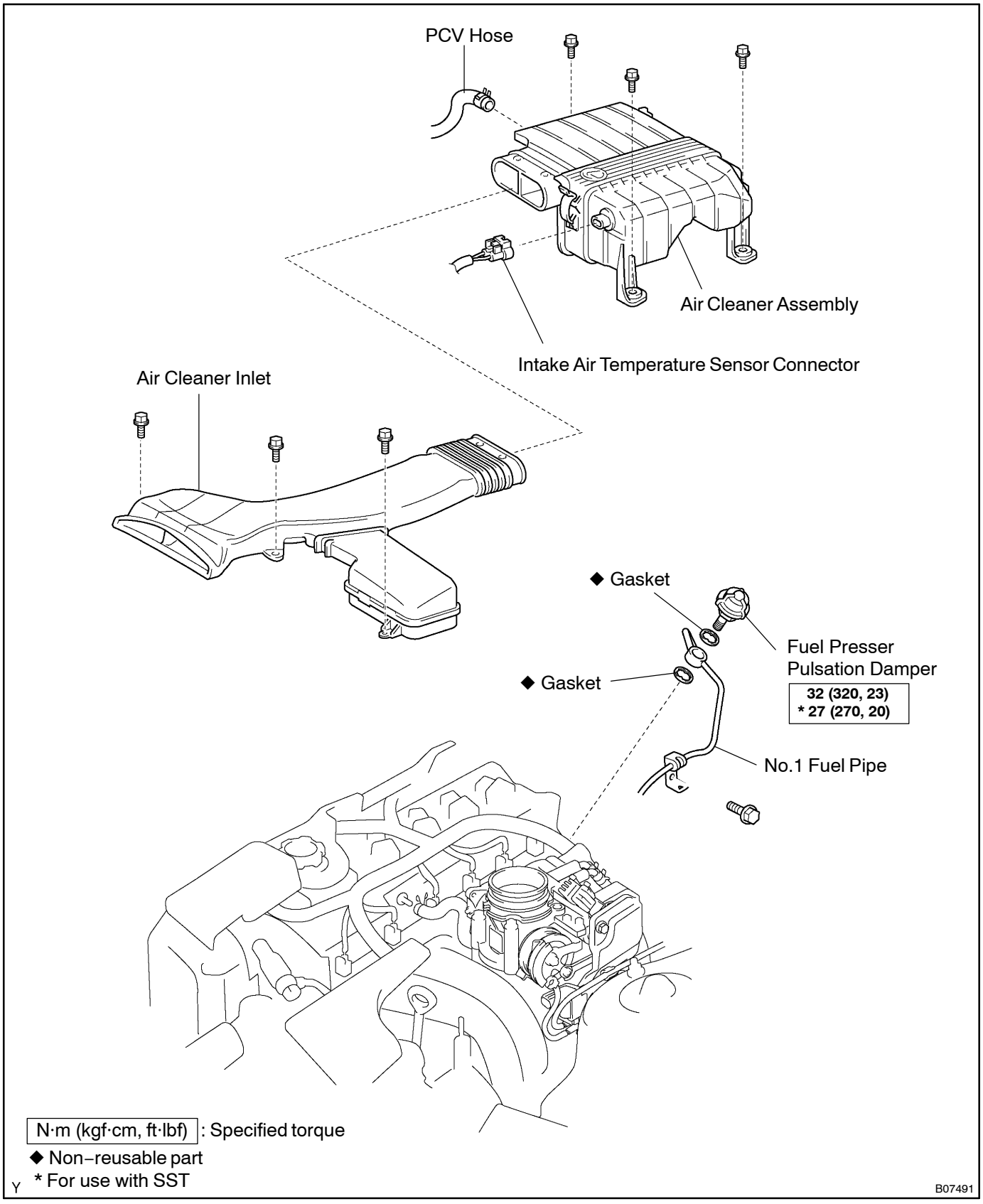
7. INSTALL AIR CLEANER ASSEMBLY
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

8. INSTALL AIR CLEANER INLET
Torque: 5 N·m (50 kgf·cm, 43 in.·lbf)

FUEL PRESSURE PULSATION DAMPER

COMPONENTS

SF0NE–04

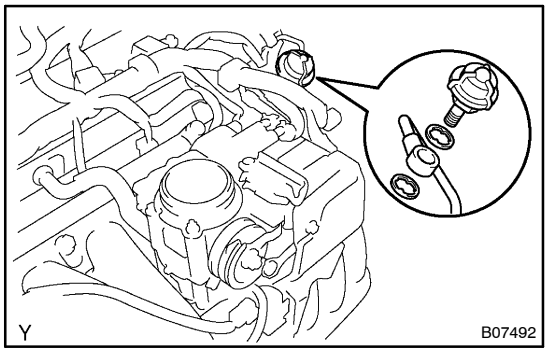


SF11V–01

REMOVAL

1. REMOVE AIR CLEANER INLET

2. REMOVE AIR CLEANER ASSEMBLY



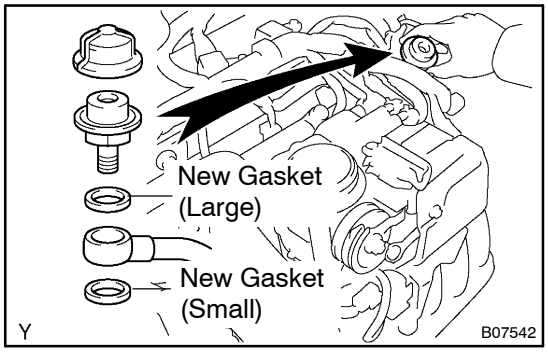
3. REMOVE FUEL PRESSURE PULSATION DAMPER

Using SST, remove the pulsation damper and 2 upper gaskets.

SST 09617–24011

CAUTION:

- **Put a shop towel under the delivery pipe.**
- **Slowly loosen the pulsation damper.**



SF11W–01

INSTALLATION

1. INSTALL FUEL PRESSURE PULSATION DAMPER

(a) Temporarily install the fuel inlet pipe and pulsation damper with 2 new upper gaskets.

(b) Using SST, tighten the pulsation damper.
SST 09617–24011
Torque:
32 N·m (320 kgf·cm, 23 ft·lbf)
27 N·m (270 kgf·cm, 20 ft·lbf) for using SST

2. REMOVE AIR CLEANER ASSEMBLY
Torque: 5 N·m (50 kgf·cm, 43 in.·lbf)

3. REMOVE AIR CLEANER INLET
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

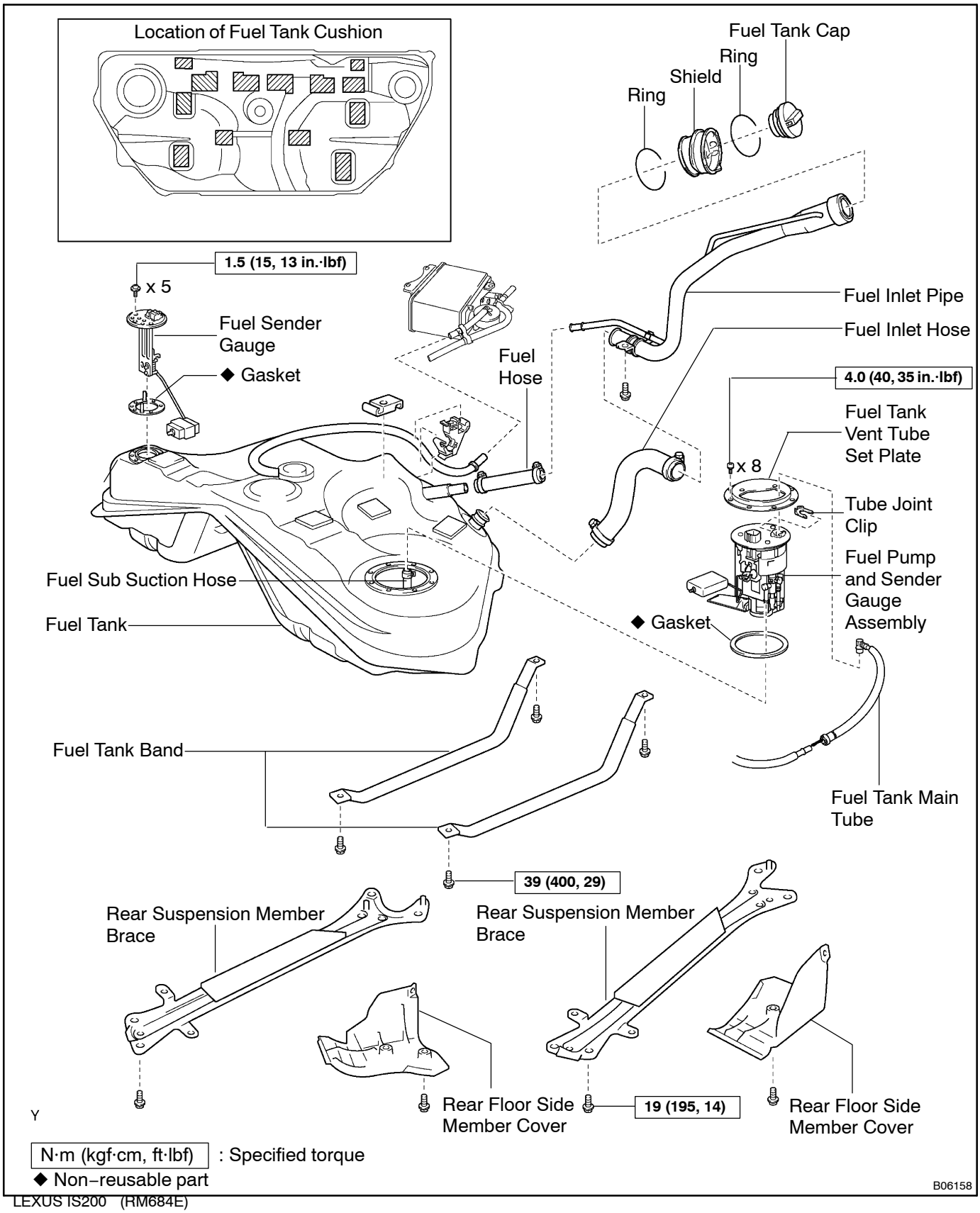
FUEL TANK AND LINE

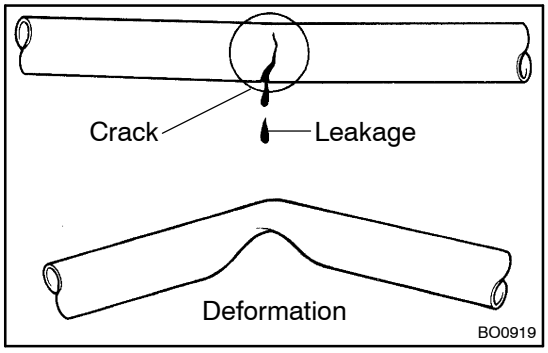
FI026–02

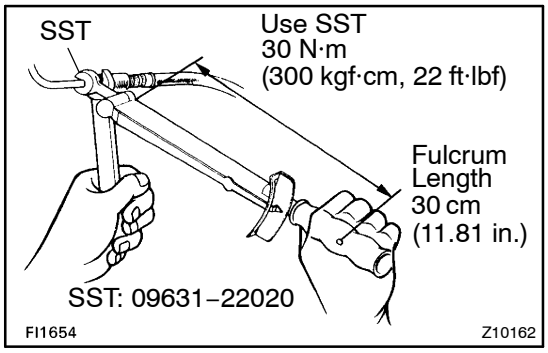
COMPONENTS

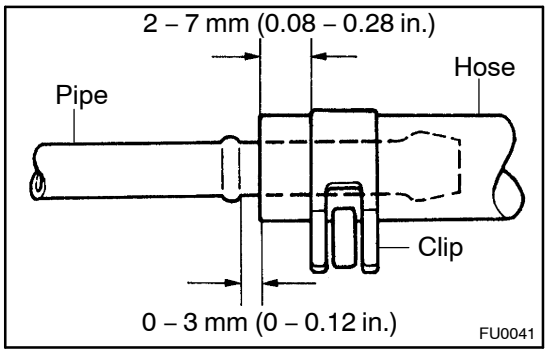
CAUTION:

- **Always use new gasket when replacing the fuel tank or component parts.**
- **Apply proper torque to all parts tightened.**









SF0NI–04

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.

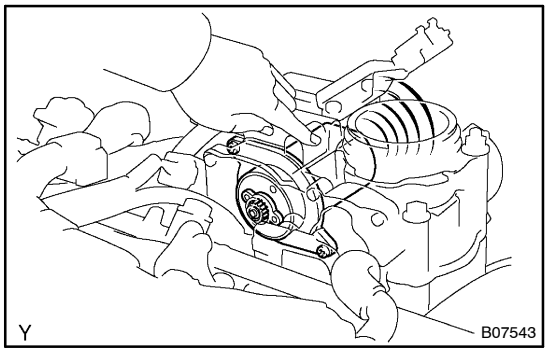
THROTTLE BODY

SF11X–01

ON–VEHICLE INSPECTION

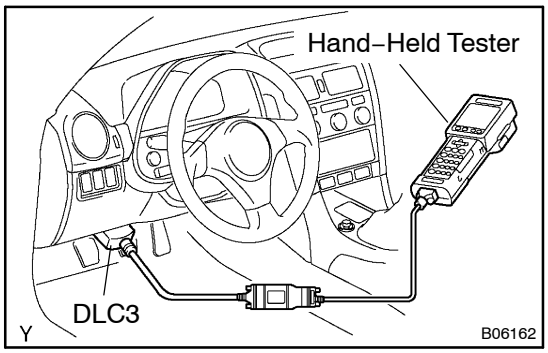
1. INSPECT SYSTEM OPERATION

(a) Check that the throttle linkage moves smoothly.



(b) Inspect the throttle control motor for operating sound.
  (1) Turn the ignition switch ON.
  (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

If operation is not as specified, check the throttle control motor, wiring and engine ECU.



(c) Inspect the throttle position sensor and accelerator pedal position sensor function.
  (1) Connect the hand–held tester to the DLC3.
  (2) When turning the accelerator pedal position sensor lever to the full–open position, check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA shows the standard value.

  Throttle valve opening percentage: 60 % or more

If operation is not as specified, check that the throttle position sensor, accelerator pedal position sensor, wiring and engine ECU.

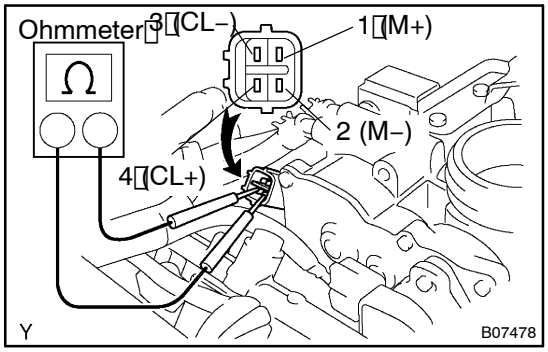
(d) Start the engine, and check that the check engine warning light does not light up.

(e) Inspect the idle speed.

  Idle speed: 650 ± 50 rpm

NOTICE:

Perform inspection under condition without electrical load.



2. INSPECT THROTTLE CONTROL MOTOR

(a) Disconnect the throttle control motor connector.

(b) Using an ohmmeter, measure the resistance between terminal 3 (CL–) and 4 (CL+).

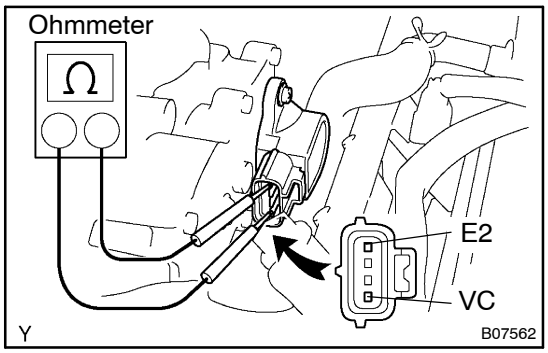
Resistance: 4.4 – 5.0 Ω at 20°C (68°F)

(c) Using an ohmmeter, measure the resistance between terminal 1 (M+) and 2 (M–).

Resistance: 0.3 – 100 Ω at 20°C (68°F)

If the resistance is not as specified, replace the throttle control motor. (See page FI–37)

(d) Reconnect the throttle control motor connector.



3. INSPECT THROTTLE POSITION SENSOR

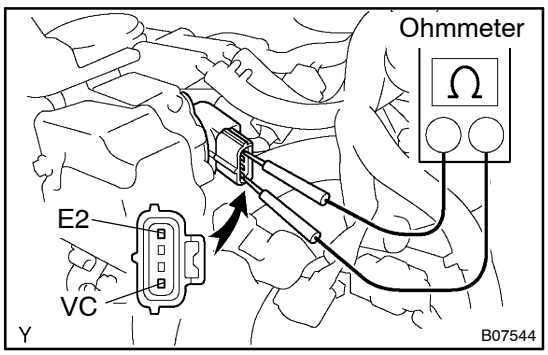
(a) Disconnect the throttle position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: 1.25 – 2.35 kΩ at 20°C (68°F)

If the resistance is not as specified, replace the throttle position sensor. (See page FI–37)

(c) Reconnect the throttle position sensor connector.



4. INSPECT ACCELERATOR PEDAL POSITION SENSOR

(a) Disconnect the accelerator pedal position sensor connector.

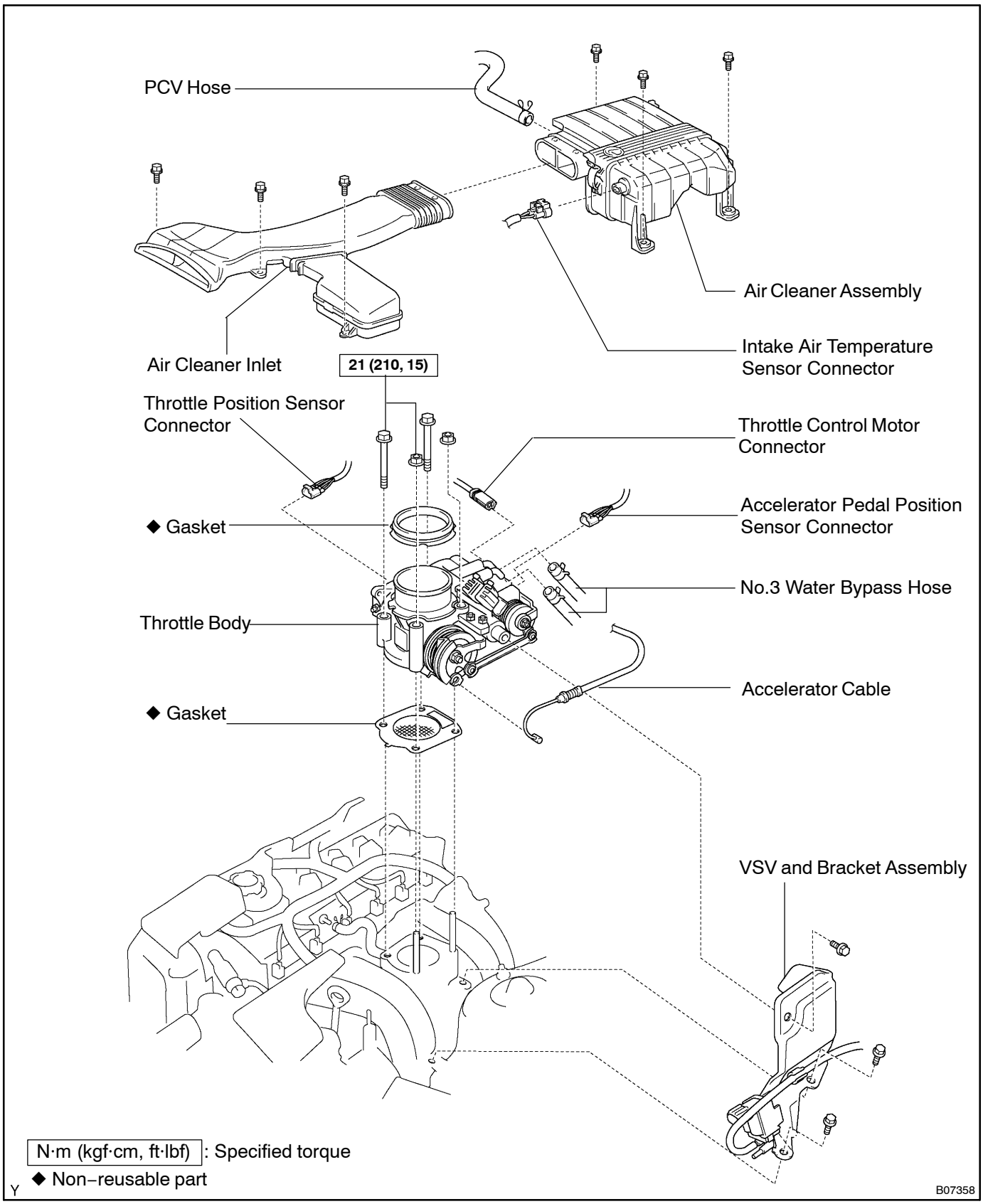
(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

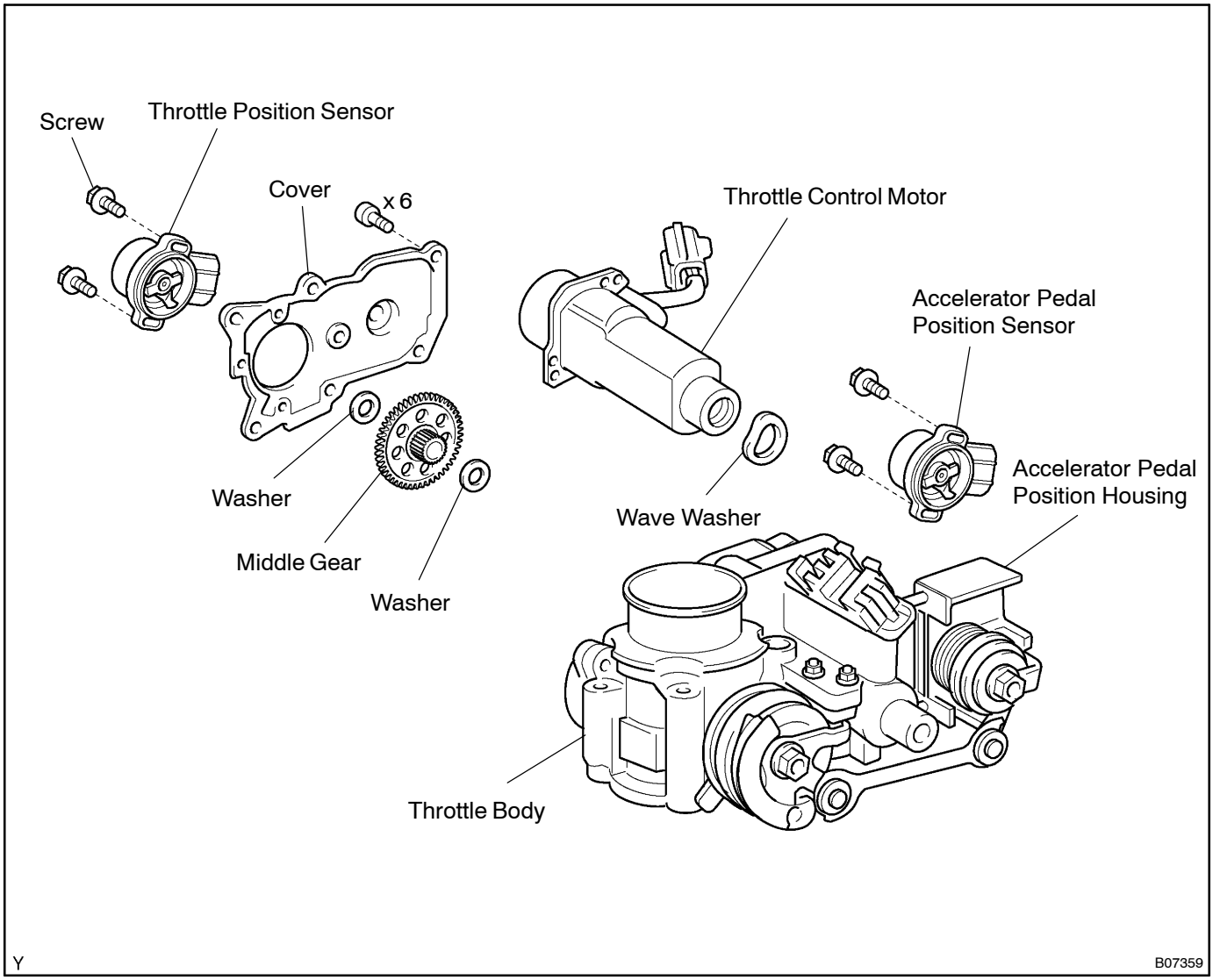
Resistance: 1.25 – 2.35 kΩ at 20°C (68°F)

If the resistance is not as specified, replace the accelerator pedal position sensor. (See page FI–37)

(c) Reconnect the accelerator pedal position sensor connector.

COMPONENTS


PCV Hose
Air Cleaner Assembly
Intake Air Temperature Sensor Connector
Air Cleaner Inlet
21 (210, 15)
Throttle Position Sensor Connector
Throttle Control Motor Connector
◆ Gasket
Accelerator Pedal Position Sensor Connector
No.3 Water Bypass Hose
Throttle Body
Accelerator Cable
◆ Gasket
VSV and Bracket Assembly
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Y
B07358


Screw
Throttle Position Sensor
Cover
x 6
Throttle Control Motor
Accelerator Pedal
Position Sensor
Accelerator Pedal
Position Housing
Washer
Middle Gear
Washer
Wave Washer
Throttle Body
Y
B07359

SF11Y–01

REMOVAL

1. DRAIN ENGINE COOLANT

2. REMOVE AIR CLEANER INLET

3. REMOVE AIR CLEANER ASSEMBLY

4. REMOVE VSV AND BRACKET ASSEMBLY

Remove the 3 bolts, the VSV and bracket assembly.

5. REMOVE THROTTLE BODY

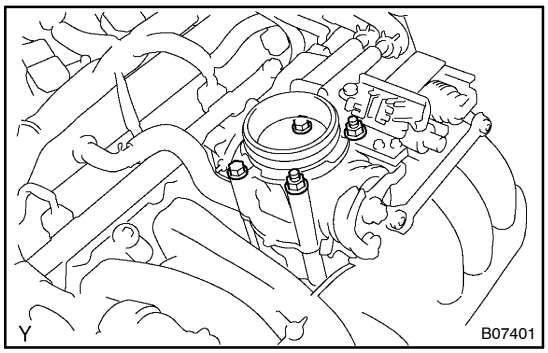
(a) Disconnect the accelerator cable.

(b) Disconnect throttle position sensor connector.

(c) Disconnect the throttle control motor connector.

(d) Disconnect the accelerator pedal position sensor connector.

(e) Disconnect the 2 No.3 water bypass hoses from the throttle body.



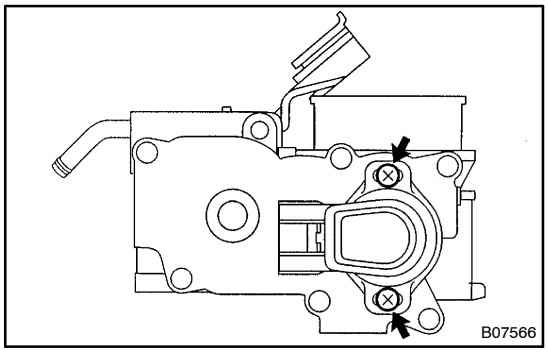
(f) Remove the 2 bolts, 2 nuts, throttle body and gasket from the intake manifold.

SF11Z–01

REPLACEMENT

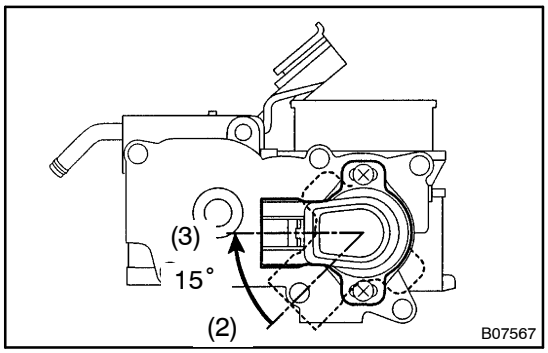
NOTICE:

- **To prevent deterioration, do not shock the throttle position sensor and accelerator pedal position sensor.**
- **Mixing of the foreign objects may cause the gear locking, so thoroughly check that there is no stuck of any foreign objects and clean up if any.**



1. REPLACE THROTTLE POSITION SENSOR

(a) Remove the 2 set screws and throttle position sensor.

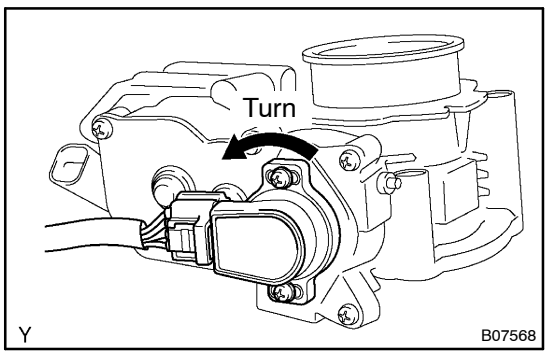


(b) Reinstall the throttle position sensor.

(1) Check that the throttle valve is under the condition of the opener opening angle (about 4°).

(2) Install the sensor to the place where is at 15° rotated to the right from the specified installation position.

(3) Gradually turn sensor counterclockwise until it touches the throttle valve shaft and temporarily torque the 2 set screws.



(c) Adjust the throttle position sensor.

(1) Connect the throttle position sensor connector.

NOTICE:

At this time, do not connect the throttle control motor connector.

(2) Connect the hand–held tester to the DLC3.

(3) Turn the ignition switch ON.

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

(4) While reading the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA, turn the throttle position sensor slowly to left and set the sensor at the center value of the standard value, and then torque the screws.

Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)

Standard throttle valve opening percentage:

15.2 ± 0.8 %

NOTICE:

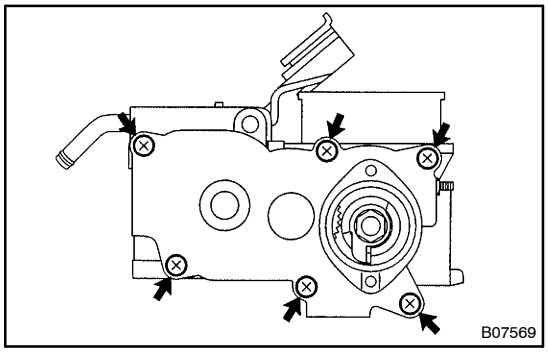
At the time of tightening the screw, as the sensor itself tends to turn causing to slanting, check that it is within the standard value after having finished the torque.

(5) Fully close the throttle valve with a screwdriver and check that the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA stays with the standard value.

Standard throttle valve opening percentage:
10 – 14 %

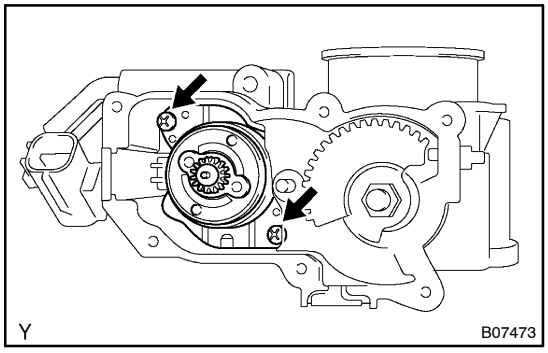
If the throttle valve opening percentage is not as specified, repeat steps (4) through (5).

(6) Paint the sensor set screws.
(7) Turn the ignition switch OFF.
(8) Disconnect the hand–held tester the DLC3.
(9) Disconnect the throttle position sensor connector.

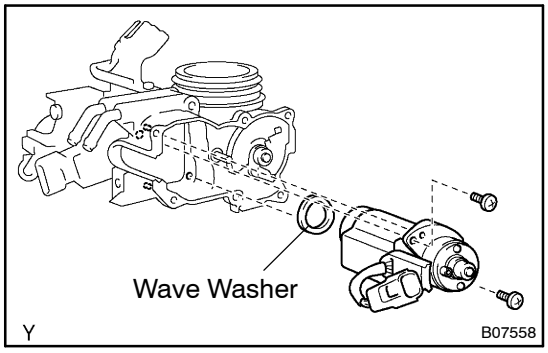


2. REPLACE THROTTLE CONTROL MOTOR

(a) Remove the throttle position sensor. (See step 1)
(b) Remove the throttle control motor.
(1) Remove the 6 screws and cover.
(2) Remove washer, middle gear and washer.



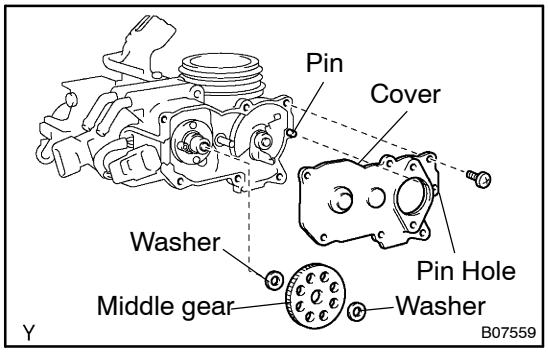
(3) Disconnect the throttle control motor connector from the connector bracket.
(4) Remove the 2 screws, throttle control motor and wave washer from the throttle body.



(c) Reinstall a new throttle control motor.
  (1) Insert the wave washer into the throttle body.
  (2) Align the pin holes of the throttle control motor with the positioning pins of the throttle body.
  (3) Attach the grommet to the throttle control motor cover.
  (4) Reconnect the connector to the bracket.
  (5) Install the throttle control motor with the 2 screws.

Torque: 3.4 N·m (35 kgf·cm, 30 in.·lbf)

  (6) Apply the grease thinly on the whole surface of the gear teeth.



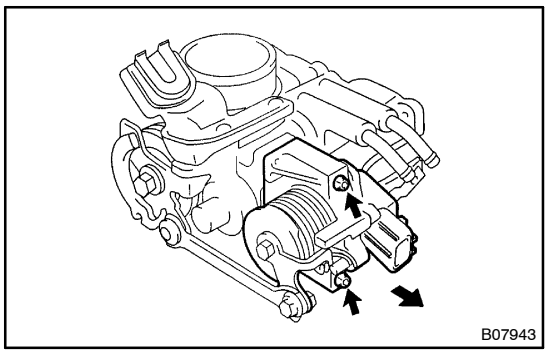
  (7) Install the washer middle gear and washer.

NOTICE:

Do not apply the grease other than specified because grease has been already applied to the component to be replaced.

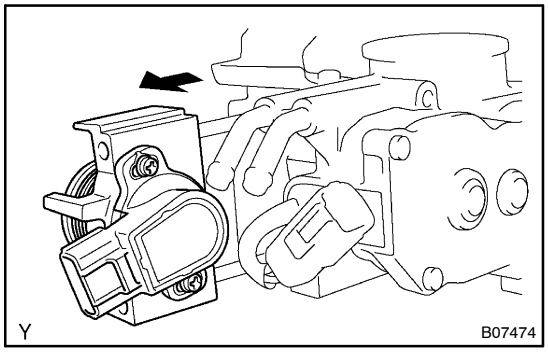
  (8) Install the washer as shown in the illustration.
  (9) Align the pin hole of the cover with the positioning pin of the throttle body.
  (10) Install the cover with the 6 screws.

(d) Reinstall and adjust the throttle position sensor. (See step 1)

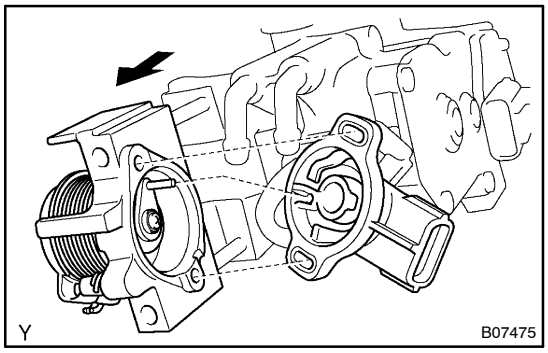


3. REPLACE ACCELERATOR PEDAL POSITION SENSOR

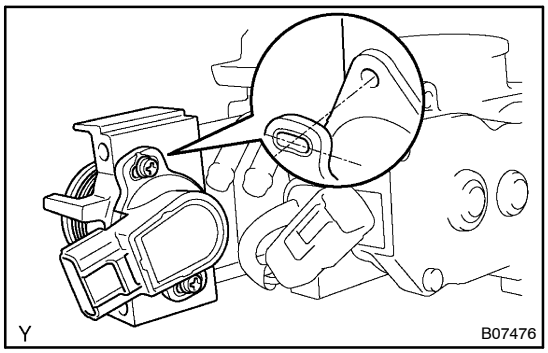
(a) Remove the accelerator pedal position sensor.
  (1) Remove the 2 nuts holding the accelerator pedal position housing to the throttle body.



(2) Slide the accelerator pedal position housing.
(3) Remove the 2 screws and accelerator pedal position sensor.



(b) Reinstall the accelerator pedal position sensor.
(1) Align the pin groove of the accelerator pedal position sensor with the pin of the lever pin of the housing.



(2) Align the flange center of the sensor with the that of the bolt hole of the housing.
(3) Install the accelerator pedal position sensor with the 2 screws.

Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)

(4) Install the accelerator pedal position housing with the 2 nuts.

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

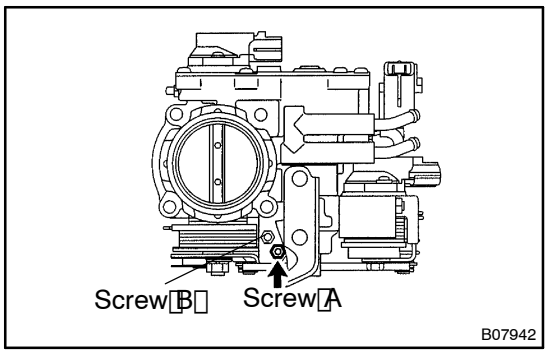
(c) Inspect and adjust the accelerator pedal position sensor.
(1) Connect the accelerator pedal position sensor connector.
(2) Connect the hand–held tester to the DLC3.
(3) Turn the ignition switch ON.

NOTICE:
After turning the ignition switch ON, do not depress the accelerator pedal.

(4) Check that the ACCEL POS#1 (VPA) voltage of the CURRENT DATA shows the standard value.

Standard accelerator pedal position voltage:
0.3 – 0.9 V

(5) Loosen the nut, and adjust the voltage with the screw A.



NOTICE:
Do not turn screw B.

4. AFTER INSTALL THROTTLE BODY, INSPECT SYSTEM OPERATION (See page FI–32)

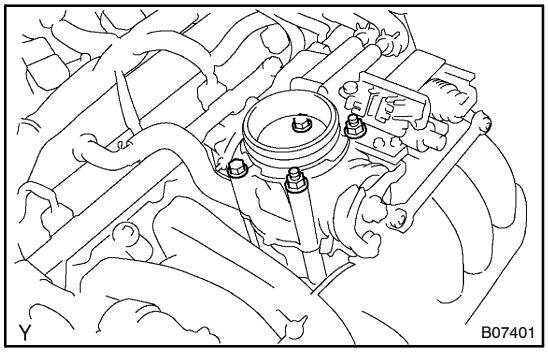
FI0LO–01

INSTALLATION

1. INSTALL THROTTLE BODY

(a) Place a new gasket on the intake manifold.

(b) Install the throttle body to the intake manifold.



(c) Install the 2 bolts and 2 nuts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(d) Connect the 2 No.3 water bypass hoses to the throttle body.

(e) Connect the accelerator pedal position sensor connector.

(f) Connect the throttle control motor connector.

(g) Connect the throttle position sensor.

(h) Connect the accelerator cable.

2. INSTALL VSV AND BRACKET ASSEMBLY

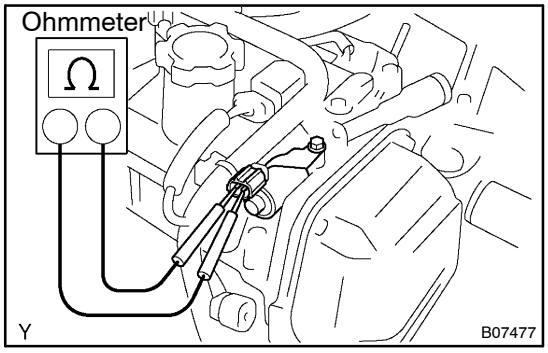
Install the VSV and bracket assembly with the 3 bolts.

Torque: 7.5 N·m (75 kgf·cm, 66 in.·lbf)

3. INSTALL AIR CLEANER ASSEMBLY

4. INSTALL AIR CLEANER INLET

5. FILL WITH ENGINE COOLANT



CAMSHAFT TIMING OIL CONTROL VALVE

SF0NR–04

ON–VEHICLE INSPECTION

1. REMOVE AIR CLEANER INLET

2. REMOVE AIR CLEANER ASSEMBLY

3. REMOVE NO.2 CYLINDER HEAD COVER

4. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE RESISTANCE

(a) Disconnect the oil control valve connector.

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

Resistance: 5.5 – 12 Ω at 20°C (68°F)

If the resistance is not as specified, replace the valve.

(c) Reconnect the oil control valve connector.

5. INSPECT VVT–i OPERATION

(a) Allow the engine to warm up to normal operating temperature.

(b) Check that the engine stalls or becomes in rough–idling state when the battery positive voltage is applied to the oil control valve with the engine idling.

If operation is not as specified, check the oil control valve (see page FI–44), VVT–i pulley, intake camshaft, wiring and engine ECU.

6. INSTALL NO.2 CYLINDER HEAD COVER

7. INSTALL AIR CLEANER ASSEMBLY

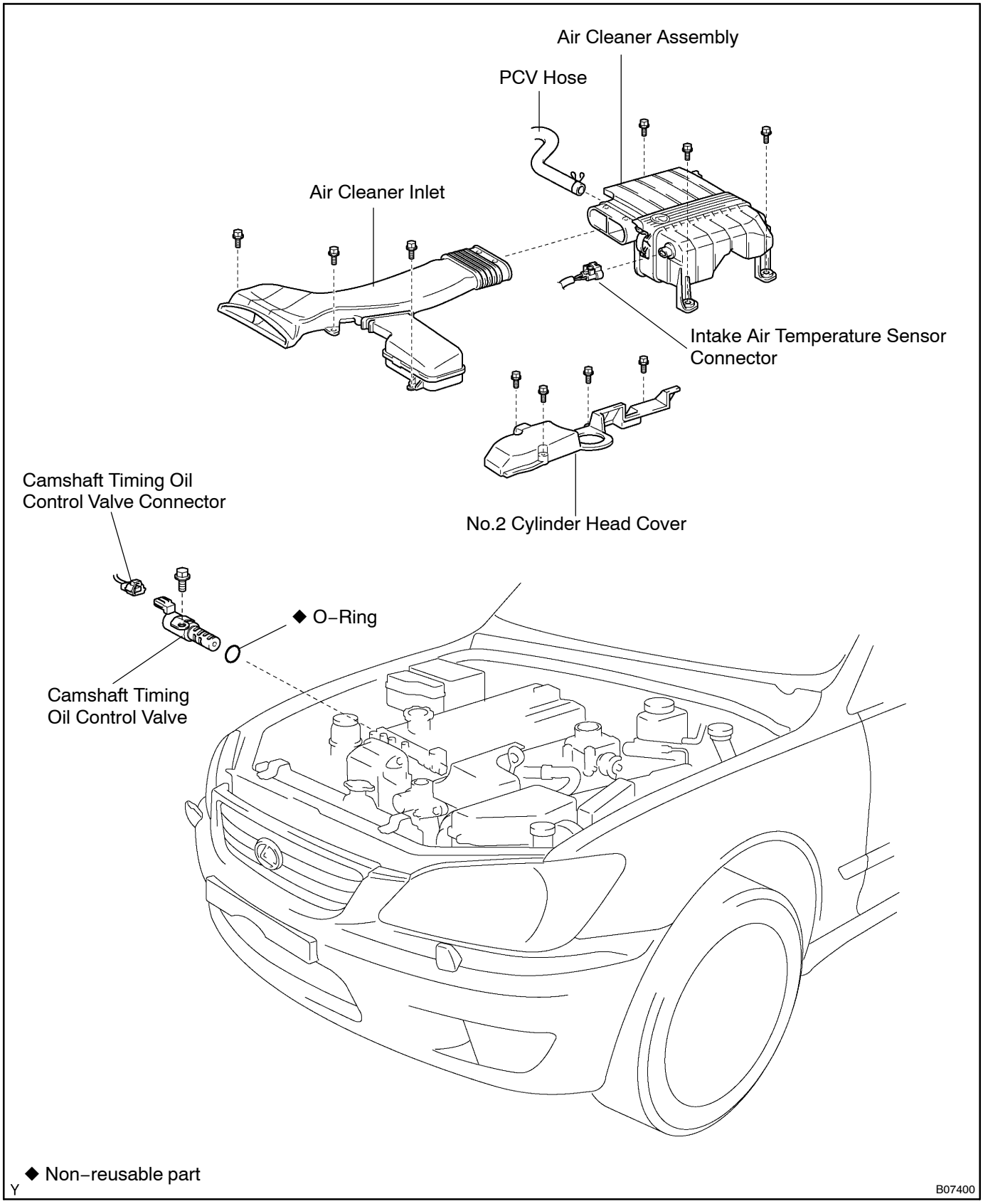
Torque: 7.5 N·m (75 kgf·cm, 6.5 in.·lbf)

8. INSTALL AIR CLEANER INLET

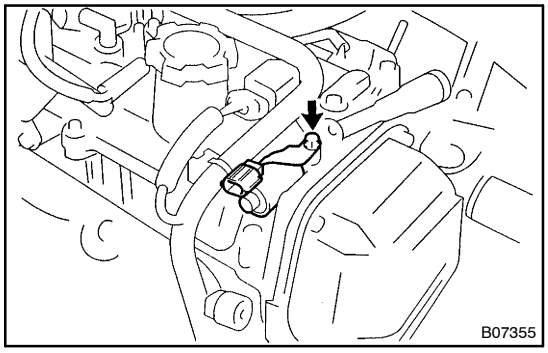
Torque: 5 N·m (50 kgf·cm, 43 in.·lbf)

SF0NQ–02

COMPONENTS



SF0NS–02



INSPECTION

1. REMOVE AIR CLEANER INLET

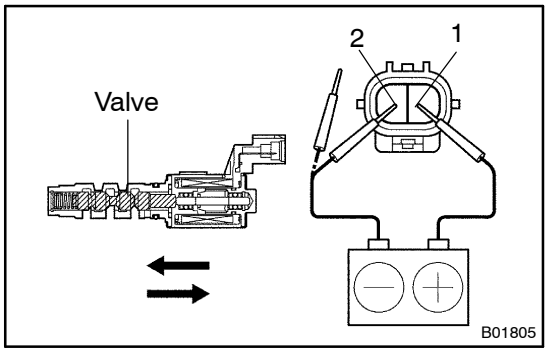
2. REMOVE AIR CLEANER ASSEMBLY

3. REMOVE NO.2 CYLINDER HEAD COVER

4. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE

(a) Disconnect the oil control valve connector.

(b) Remove the bolt, oil control valve and O–ring.



5. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE OPERATION

Connect positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, and check the movement of the valve.

Battery voltage is applied	Valve moves in ← direction
Battery voltage is cut off	Valve moves in → direction

If operation is not as specified, replace the valve.

6. REINSTALL CAMSHAFT TIMING OIL CONTROL VALVE

(a) Install a new O–ring to the oil control valve.

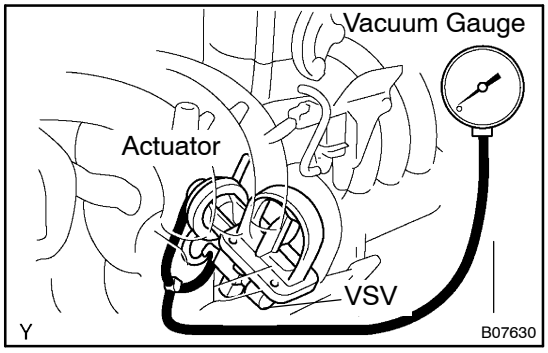
(b) Install the oil control valve with the bolt.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)

(c) Connect the oil control valve connector.

7. INSTALL NO.2 CYLINDER HEAD COVER
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)

8. INSTALL AIR CLEANER ASSEMBLY
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

9. INSTALL AIR CLEANER INLET
Torque: 5 N·m (50 kgf·cm, 43 in.·lbf)



ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

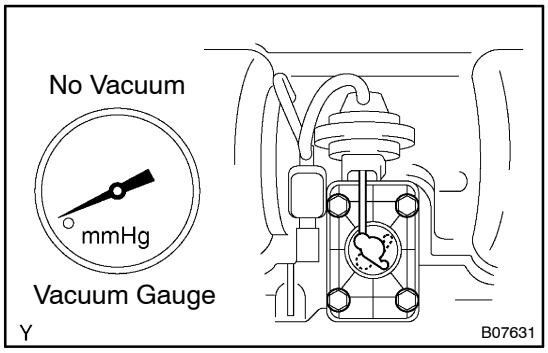
FI0LU–01

ON–VEHICLE INSPECTION

1. CONNECT VACUUM GAUGE

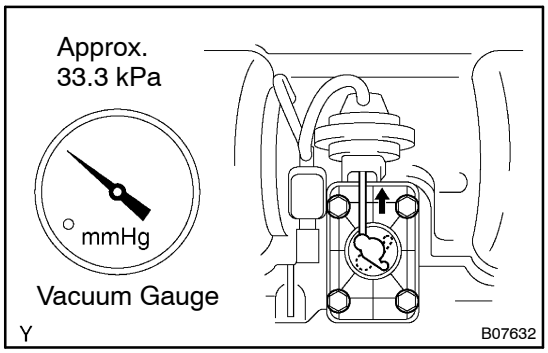
Using a 3–way connector, connect vacuum gauge to the hose between the actuator and VSV.

2. START ENGINE



3. INSPECT INTAKE AIR CONTROL VALVE

(a) While the engine is idling, check that the vacuum gauge needle does not move.



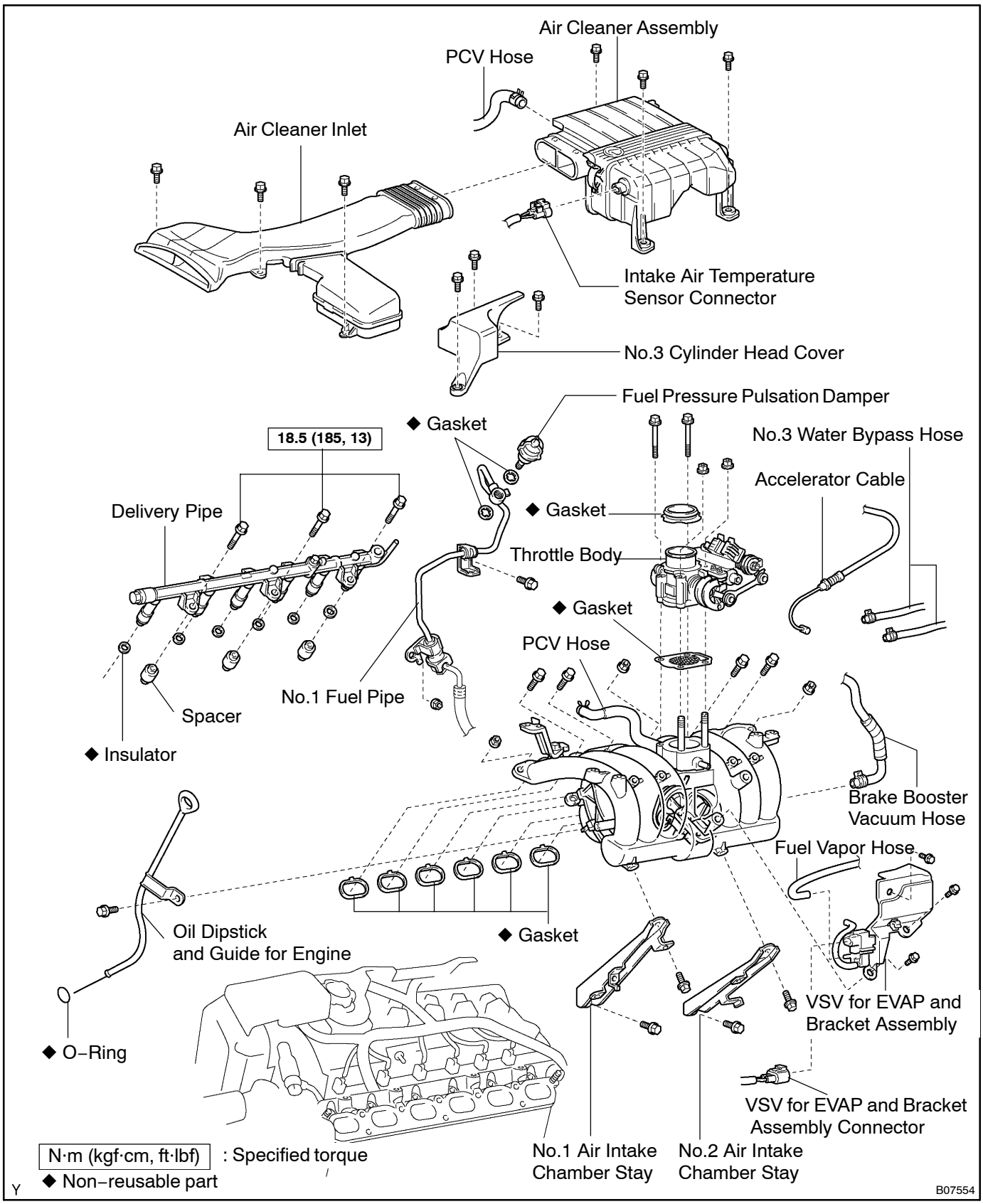
(b) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle momentarily fluctuates approx. 33.3 kPa (250 mmHg, 9.84 in.Hg) or more. (The actuator rod is pulled down.)

4. REMOVE VACUUM GAUGE

Remove the vacuum gauge, and reconnect the vacuum hoses to their proper locations.

FI0LQ–01

COMPONENTS



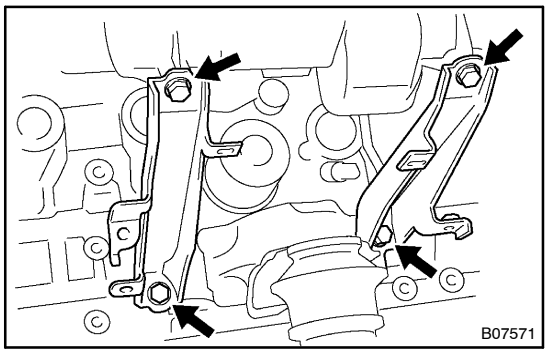
FI0LR–01

REMOVAL

1. REMOVE AIR CLEANER INLET
2. REMOVE AIR CLEANER ASSEMBLY
3. REMOVE NO.3 CYLINDER HEAD COVER
4. REMOVE THROTTLE BODY
(See page FI–36)
5. REMOVE DELIVERY PIPE AND INJECTORS
(See page FI–22)
6. REMOVE OIL DIPSTICK AND GUIDE FOR ENGINE
(See page EM–71)
7. REMOVE NO.2 ENGINE UNDER COVER
8. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM–71)
9. REMOVE INTAKE MANIFOLD

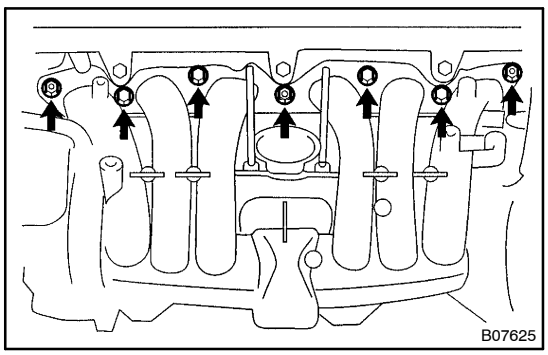
(a) Disconnect the brake booster vacuum hose from the intake manifold.

(b) Disconnect the PCV hose from the intake manifold.

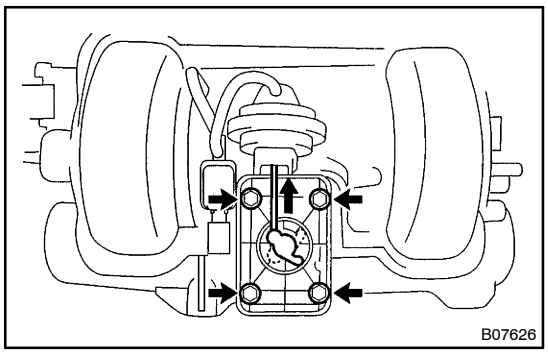


(c) Remove the 2 bolts and No.1 air intake chamber stay.

(d) Remove the 2 bolts and No.2 air intake chamber stay.



(e) Remove the 4 bolts, 3 nuts, intake manifold and 6 gaskets.

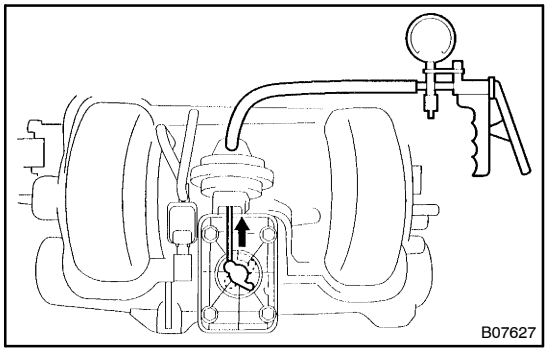


10. REMOVE INTAKE AIR CONTROL VALVE ASSEMBLY

(a) Disconnect the vacuum hose from the intake manifold.

(b) Remove the 4 bolts, intake air control valve assembly and gasket.

FI0LS–01



INSPECTION

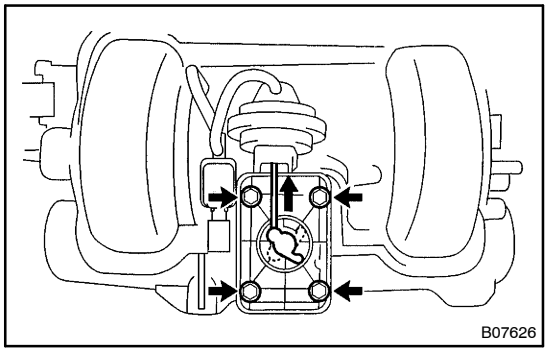
INSPECT INTAKE AIR CONTROL VALVE

(a) Disconnect the vacuum hose from the intake manifold.

(b) Apply vacuum (33 kPa, 250 mmHg, 9.7 in.Hg) to the intake air control valve assembly, check that the actuator rod moves.

FI0LT–01

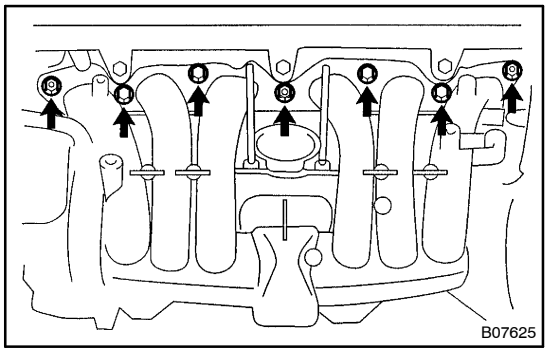
INSTALLATION



1. INSTALL INTAKE AIR CONTROL VALVE ASSEMBLY

(a) Install a new gasket and the intake air control valve assembly with the 4 bolts.

(b) Connect the vacuum hose to the intake manifold.

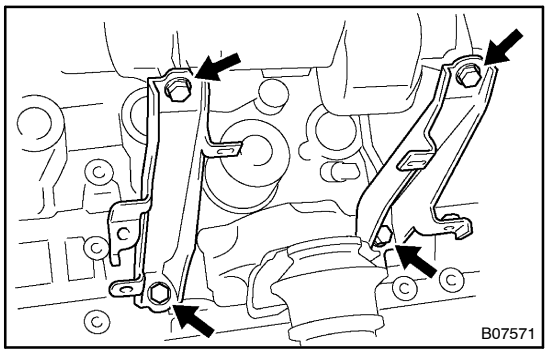


2. INSTALL INTAKE MANIFOLD

(a) Install 6 new gaskets and the intake manifold with the 4 bolts and 3 nuts.

(b) Connect the brake booster vacuum hose to the intake manifold.

(c) Connect the PCV hose to the intake manifold.



(d) Install the No.1 air intake chamber stay with the 2 bolts.

(e) Install the No.2 air intake chamber stay with the 2 bolts.

3. INSTALL DELIVERY PIPE AND INJECTORS (See page FI–25)

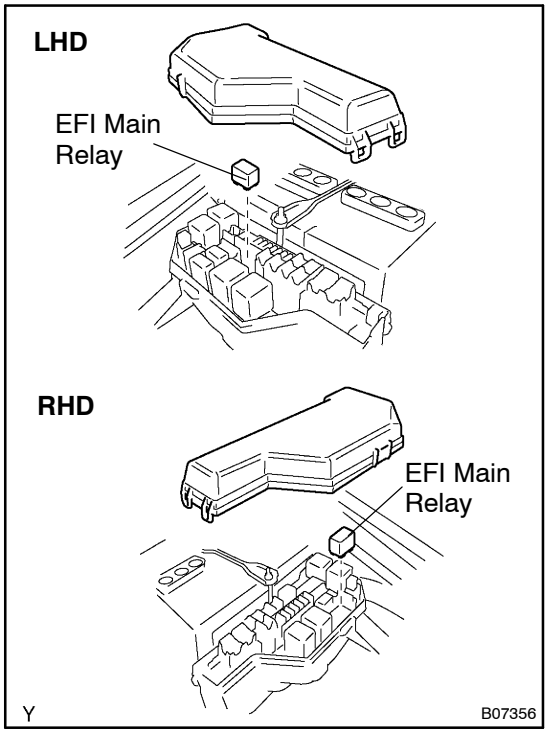
4. INSTALL THROTTLE BODY (See page FI–41)

5. INSTALL OIL DIPSTICK AND GUIDE FOR ENGINE (See page EM–71)

6. INSTALL NO.2 ENGINE UNDER COVER

7. INSTALL AIR CLEANER ASSEMBLY

8. NSTALL AIR CLEANER INLET



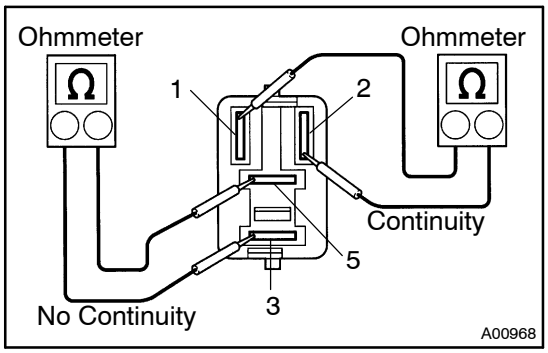
EFI MAIN RELAY

SF0NY–03

INSPECTION

1. REMOVE ENGINE ROOM NO.2 R/B COVER

2. REMOVE EFI MAIN RELAY (Marking:EFI)



3. INSPECT EFI MAIN RELAY

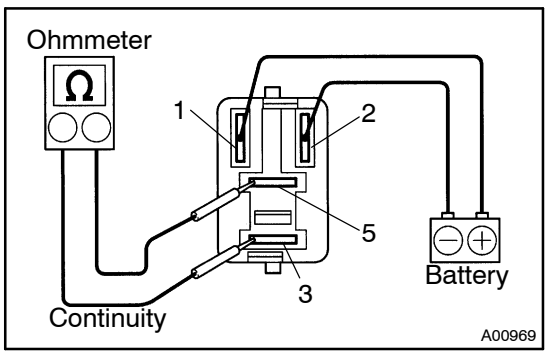
(a) Inspect the relay continuity.

(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.



(b) Inspect the 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.

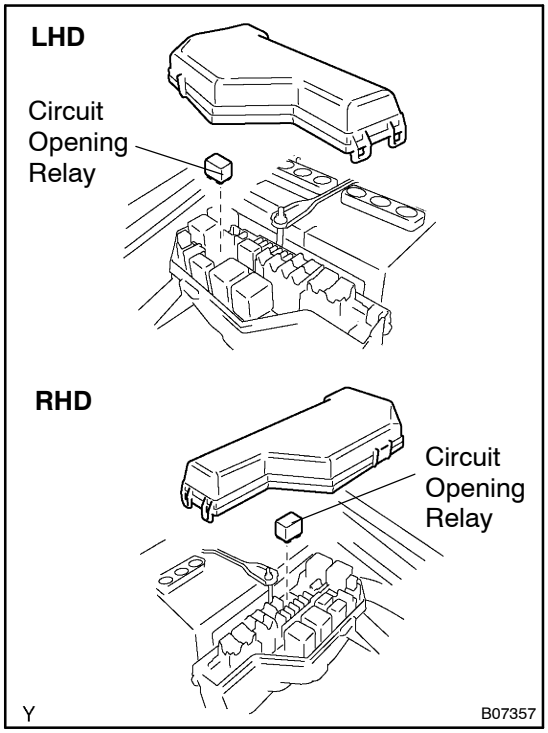
4. REINSTALL EFI MAIN RELAY

5. REINSTALL ENGINE ROOM NO.2 R/B COVER

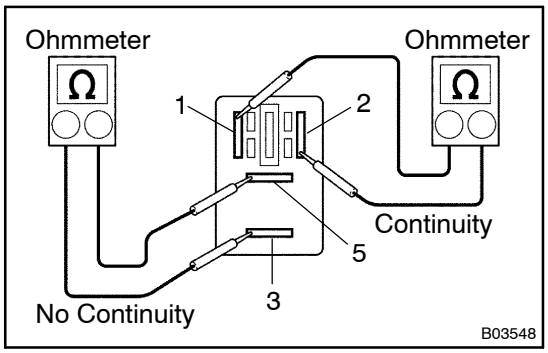
CIRCUIT OPENING RELAY

FI0LP–01

INSPECTION



1. **REMOVE ENGINE ROOM NO.2 R/B COVER**
2. **REMOVE CIRCUIT OPENING RELAY**



3. **INSPECT CIRCUIT OPENING RELAY**

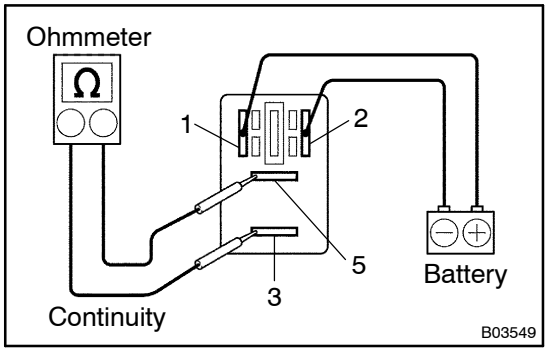
(a) Inspect the relay continuity.

(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.



(b) Inspect the relay operation.

(1) Apply battery across terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

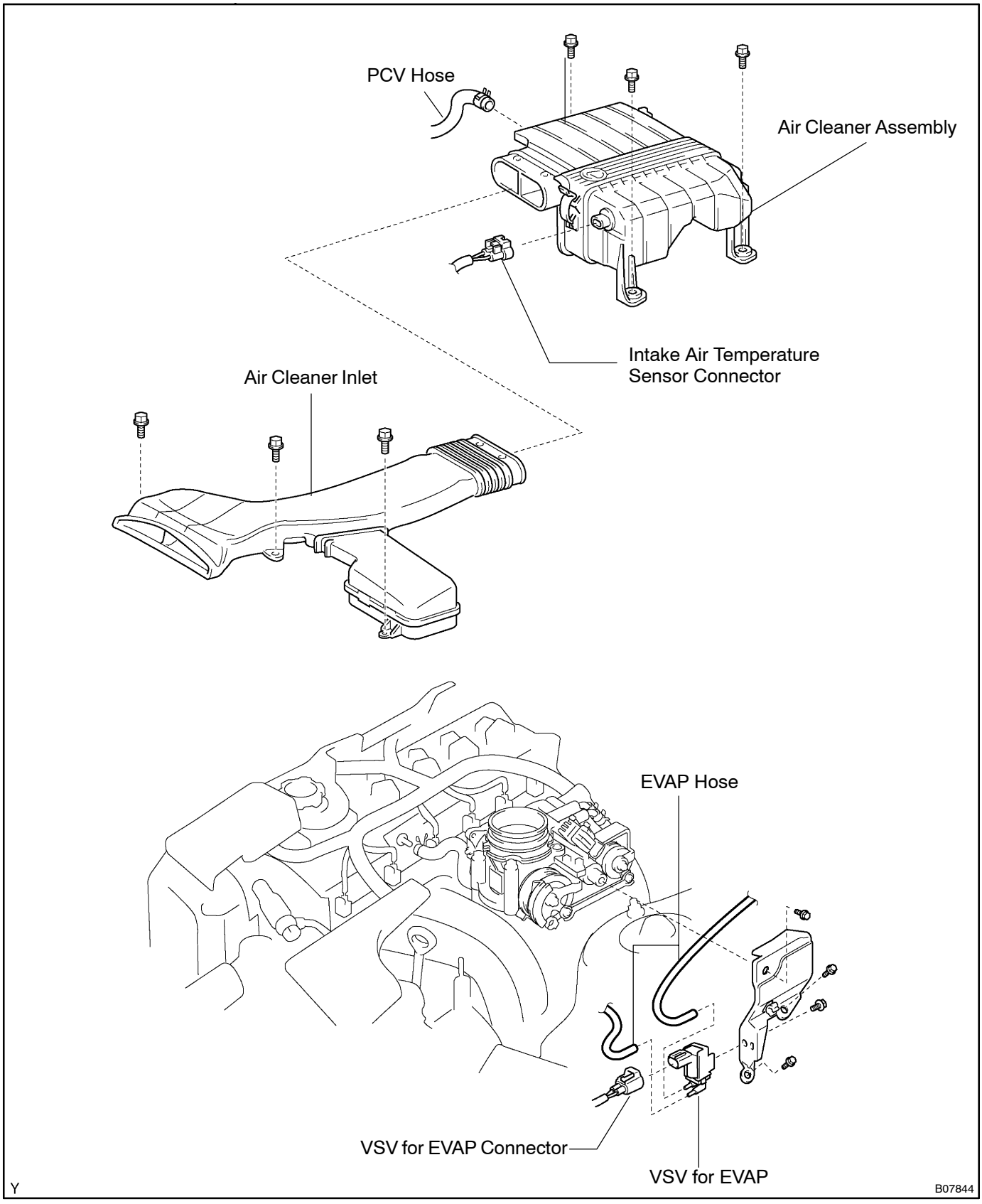
If there is no continuity, replace the relay.

4. **REINSTALL CIRCUIT OPENING RELAY**
5. **REINSTALL ENGINE ROOM NO.2 R/B COVER**

VSV FOR EVAPORATIVE EMISSION (EVAP)

COMPONENTS

SF123–01



SF06L–04

INSPECTION

1. REMOVE AIR CLEANER INLET

2. REMOVE AIR CLEANER ASSEMBLY

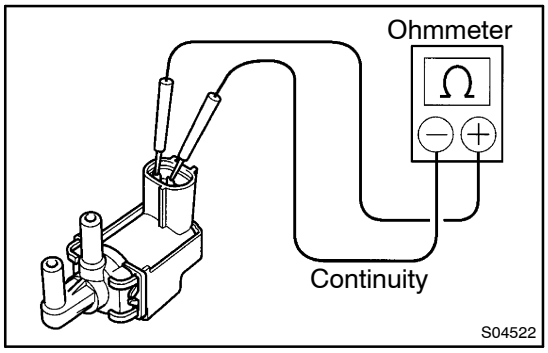
3. REMOVE VSV AND BRACKET ASSEMBLY

Remove the 3 bolts, the VSV and bracket assembly.

4. REMOVE VSV

(a) Disconnect the 2 EVAP hoses from the VSV.

(b) Remove the screw and VSV.

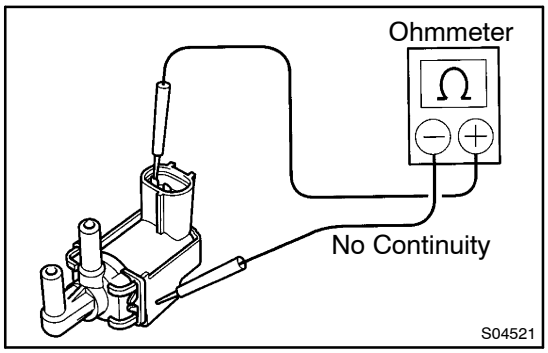


5. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20°C (68°F)

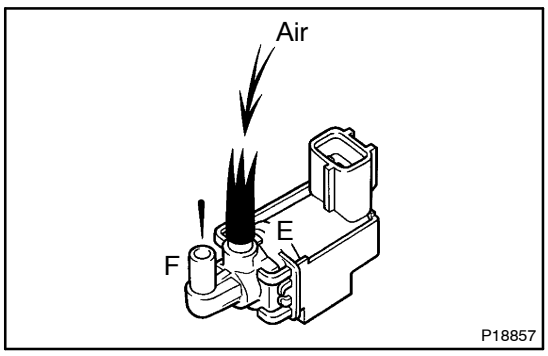
If there is no continuity, replace the VSV.



6. INSPECT VSV FOR GROUND

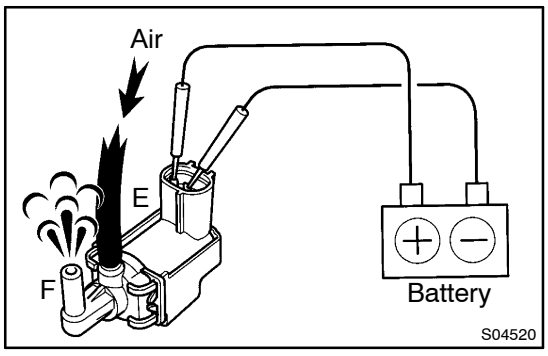
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



7. 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.

8. REINSTALL VSV

(a) Install the VSV with the screw.

(b) Connect the 2 EVAP hoses to the VSV.

9. INSTALL VSV AND BRACKET ASSEMBLY

Install the VSV and bracket assembly with the 3 bolts.

Torque: 7.5 N·m (75 kgf·cm, 66 in.·lbf)

10. INSTALL AIR CLEANER ASSEMBLY

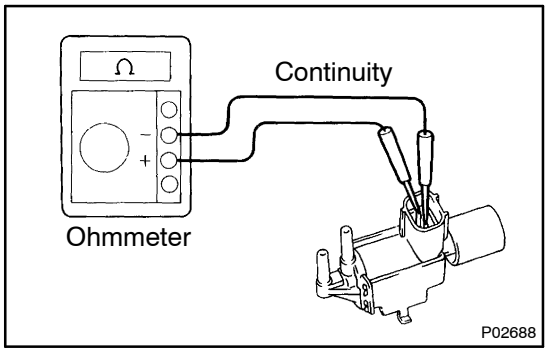
11. INSTALL AIR CLEANER INLET

VSV FOR ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

SF122–01

INSPECTION

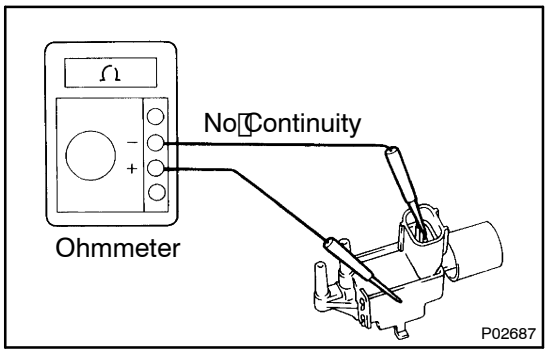
1. **REMOVE VSV FOR ACIS**
(See page FI–47)



2. **INSPECT VSV**

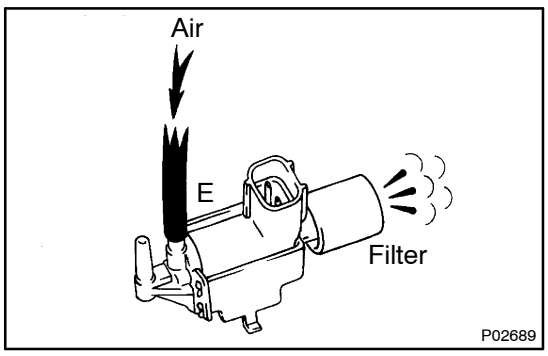
(a) Inspect the VSV for open circuit.
Using an ohmmeter, check that there is continuity between the terminals.
Resistance: 38.5 – 44.5 Ω at 20°C (68°F)

If there is no continuity, replace the VSV.

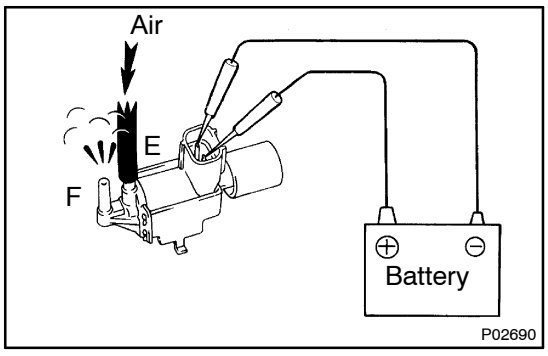


(b) Inspect the VSV for ground.
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(c) Inspect the VSV operation.
(1) Check that air flows from port E to the filter.



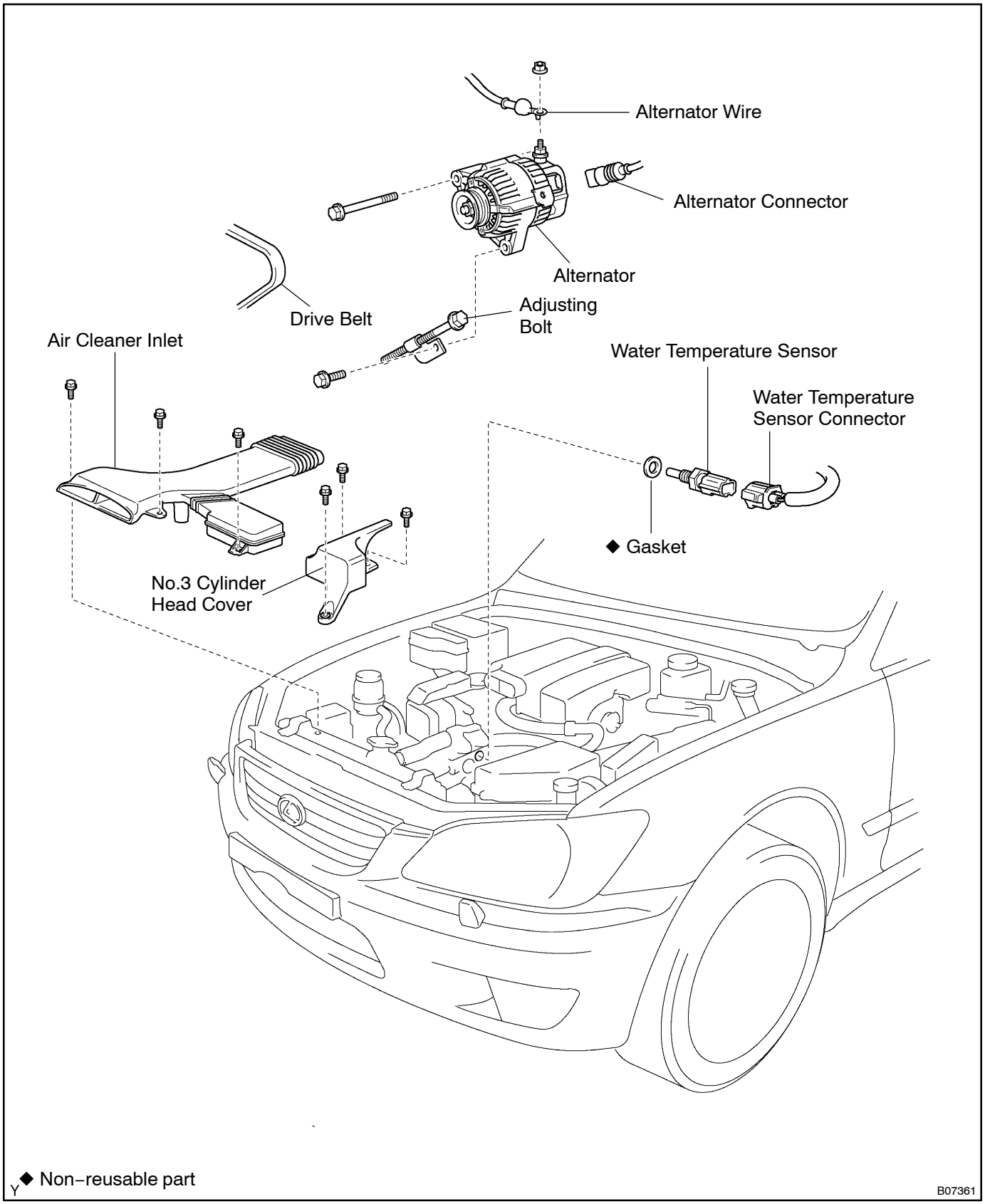
(2) Apply battery voltage across the terminals.
(3) Check that air flows from ports E to F.

3. **REINSTALL VSV FOR VSV**
(See page FI–49)

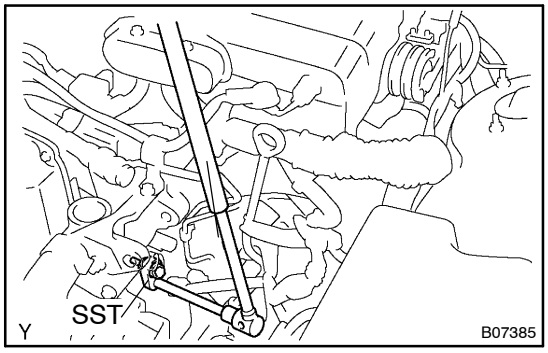
WATER TEMPERATURE SENSOR

COMPONENTS

SF0O5–03



SF0O6-03



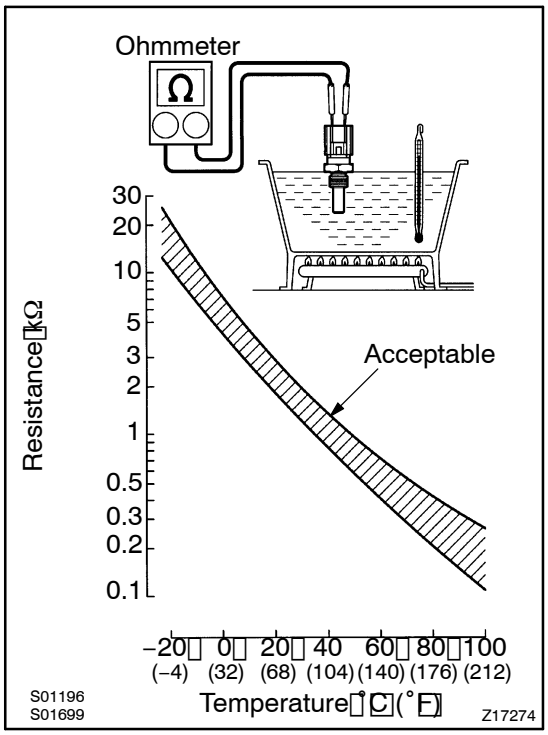
INSPECTION

1. **DRAIN ENGINE COOLANT**
2. **REMOVE AIR CLEANER INLET**
3. **REMOVE NO.3 CYLINDER HEAD COVER**
4. **REMOVE ALTERNATOR (See page CH–6)**
5. **REMOVE WATER TEMPERATURE SENSOR**

(a) Disconnect the sensor connector.

(b) Using SST, remove the sensor and gasket.

SST 09205–76030



6. **INSPECT WATER TEMPERATURE SENSOR**

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the graph

If the resistance is not as specified, replace the sensor.

7. **REINSTALL WATER TEMPERATURE SENSOR**

(a) Install a new gasket to the sensor.

(b) Using SST, install the sensor.

SST 09205–76030

Torque: 19.6 N·m (200 kgf·cm, 14 ft·lbf)

(c) Connect the sensor connector.

8. **REINSTALL ALTERNATOR (See page CH–15)**
9. **REINSTALL NO.3 CYLINDER HEAD COVER**

Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

10. **REINSTALL AIR CLEANER INLET**

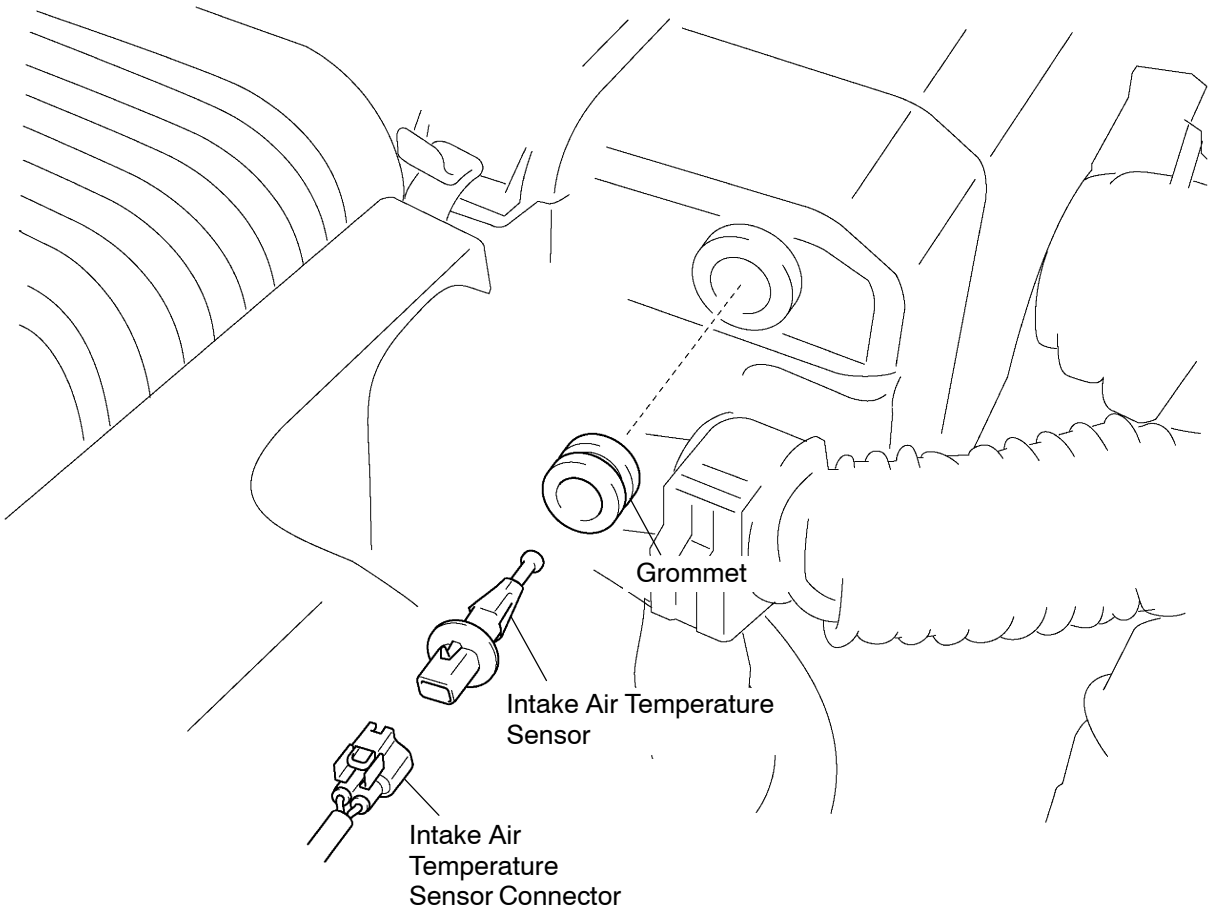
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)

11. **REFILL WITH ENGINE COOLANT**

INTAKE AIR TEMPERATURE SENSOR

COMPONENTS

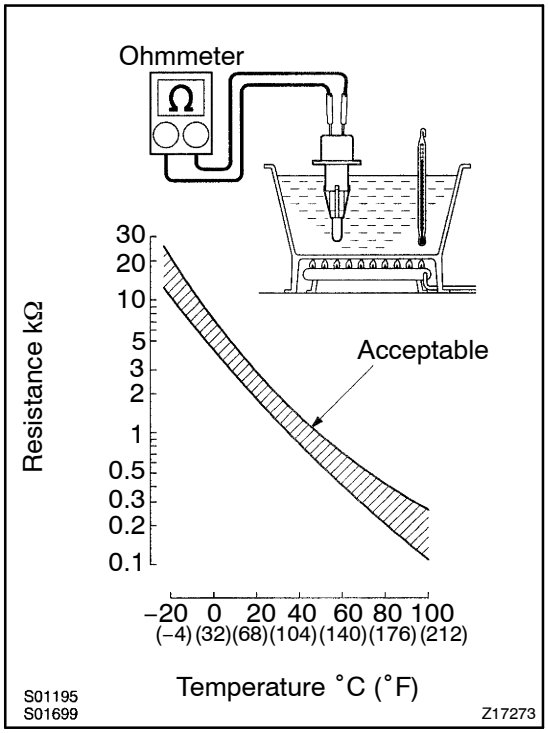
FI050–03



Y

B07570

FI051–03



INSPECTION

1. REMOVE INTAKE AIR TEMPERATURE SENSOR

2. INSPECT INTAKE AIR TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the graph

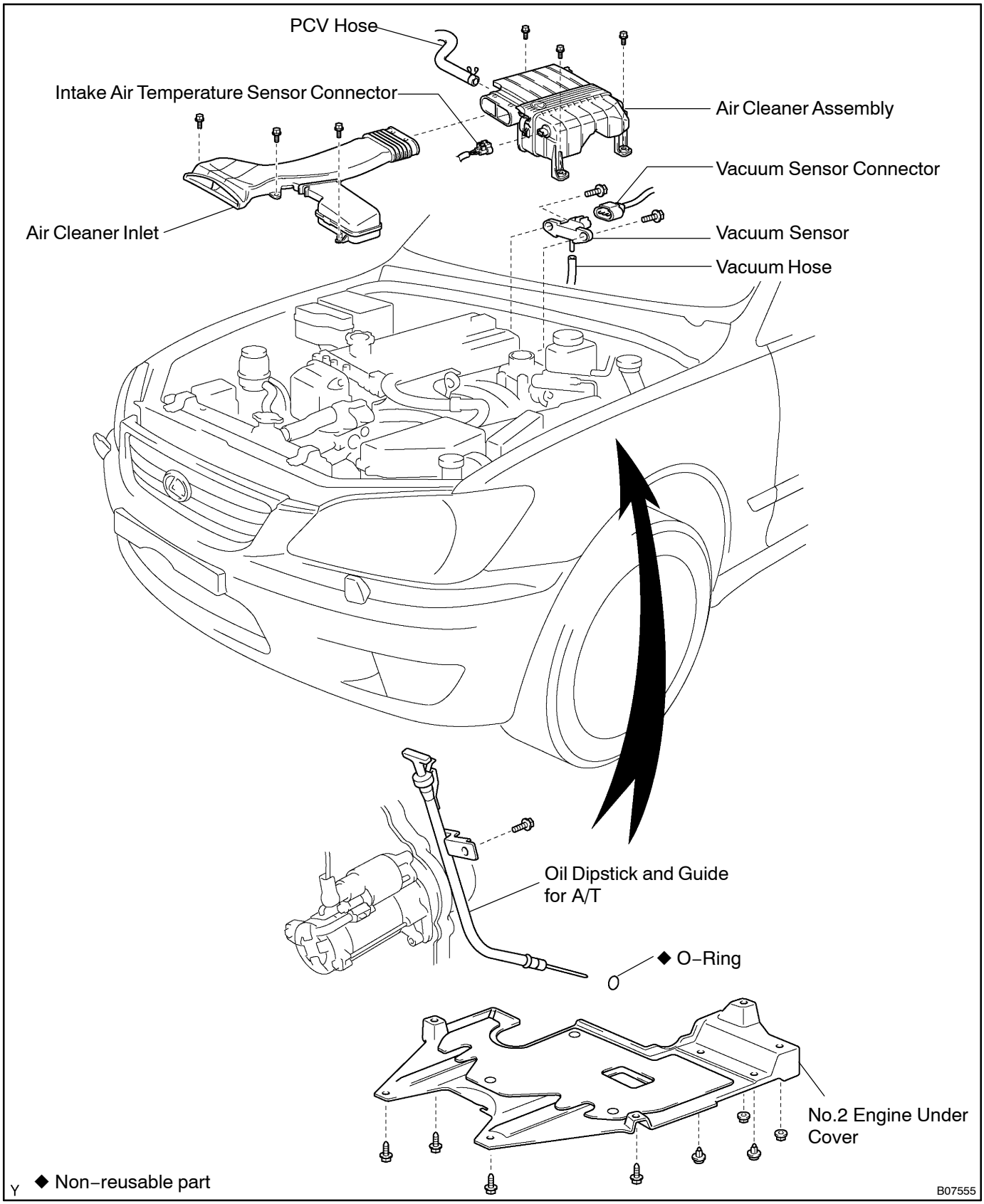
If the resistance is not as specified, replace the sensor.

3. REINSTALL INTAKE AIR TEMPERATURE SENSOR

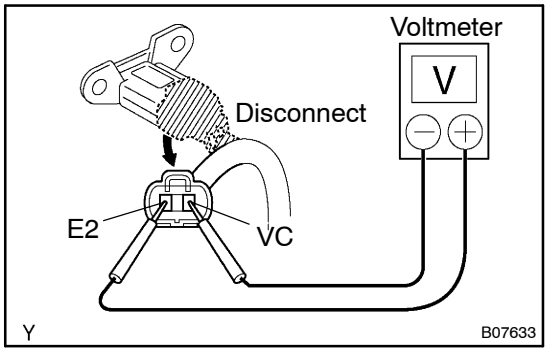
VACUUM SENSOR

COMPONENTS

FI0LV–01



FI04Z–02



INSPECTION

1. REMOVE AIR CLEANER INLET

2. REMOVE AIR CLEANER ASSEMBLY

3. INSPECT POWER SOURCE VOLTAGE OF VACUUM SENSOR

(a) Disconnect the vacuum sensor connector.

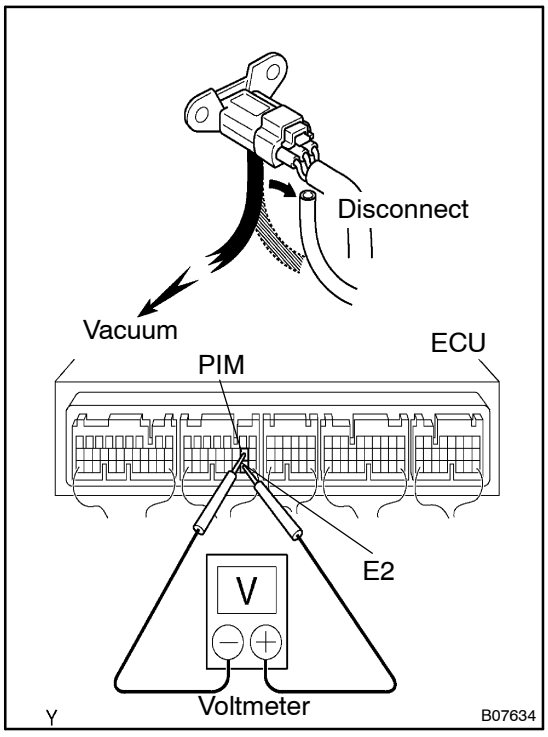
(b) Turn the ignition switch ON.

(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 OFF.

(e) Reconnect the vacuum sensor connector.



4. INSPECT POWER OUTPUT OF VACUUM SENSOR

(a) Turn the ignition switch ON.

(b) Disconnect the vacuum hose from the vacuum sensor.

(c) Connect a voltmeter to terminals PIM and E2 of the ECU, and measure the output voltage under ambient atmospheric pressure.

(d) Apply vacuum to the vacuum sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) segments to 66.7 kPa (500 mmHg, 19.69 in.Hg).

(e) Measure the voltage drop from step (c) above for each segment.

Voltage Drop:

Applied Vacuum kPa (mmHg, in.Hg)	13.3 (100, 3.94)	26.7 (200, 7.87)	40.0 (300, 11.81)	53.5 (400, 15.75)	66.7 (500, 19.69)
Voltage drop V	0.3 – 0.5	0.7 – 0.9	1.1 – 1.3	1.5 – 1.7	1.9 – 2.1

(f) Turn the ignition switch OFF.

(g) Reconnect the vacuum hose to the vacuum sensor.

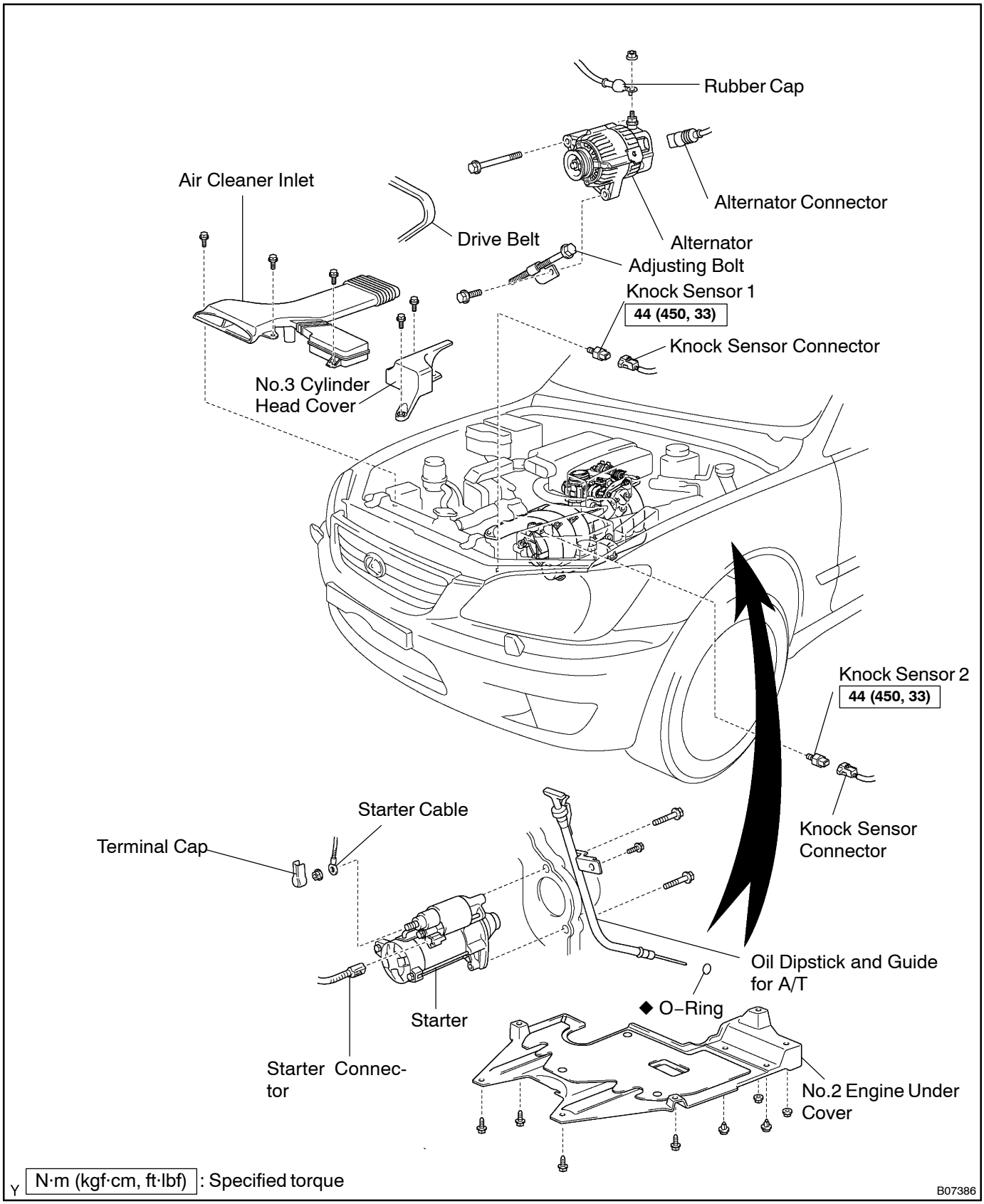
5. INSTALL AIR CLEANER ASSEMBLY

6. INSTALL AIR CLEANER INLET

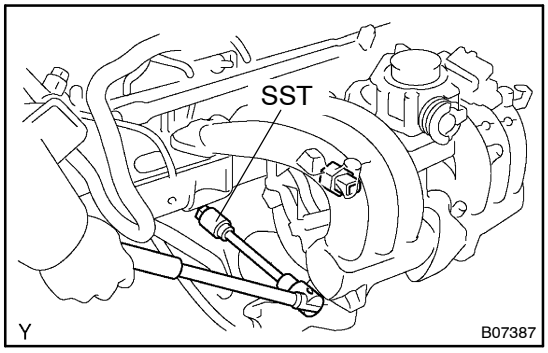
KNOCK SENSOR

COMPONENTS

SF0O9–03



SF0OA–03



INSPECTION

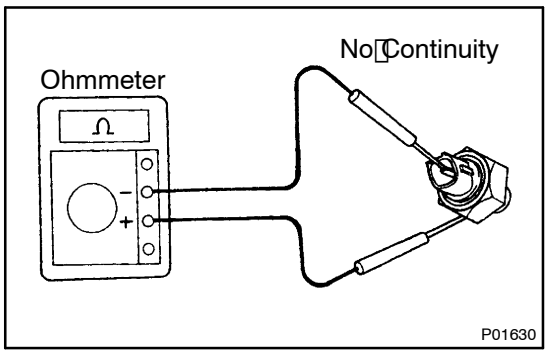
1. REMOVE AIR CLEANER INLET
2. REMOVE NO.3 CYLINDER HEAD COVER
3. REMOVE ALTERNATOR (See page CH–6)
4. REMOVE KNOCK SENSOR 1

(a) Disconnect the knock sensor connector.

(b) Using SST, remove the knock sensor.

SST 09816–30010

5. REMOVE OIL DIPSTICK AND GUIDE FOR A/T
6. REMOVE STARTER (See page ST–3)
7. REMOVE KNOCK SENSOR 2 (See step 2)



8. INSPECT KNOCK SENSORS

Using an ohmmeter, check that there is no continuity between the terminal and body.

If there is continuity, replace the sensor.

9. REINSTALL KNOCK SENSORS

(a) Using SST, install the knock sensor.

SST 09816–30010

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

(b) Connect the knock sensor connector.

10. REINSTALL STARTER (See page ST–17)
11. REINSTALL OIL DIPSTICK AND GUIDE FOR A/T

HINT:

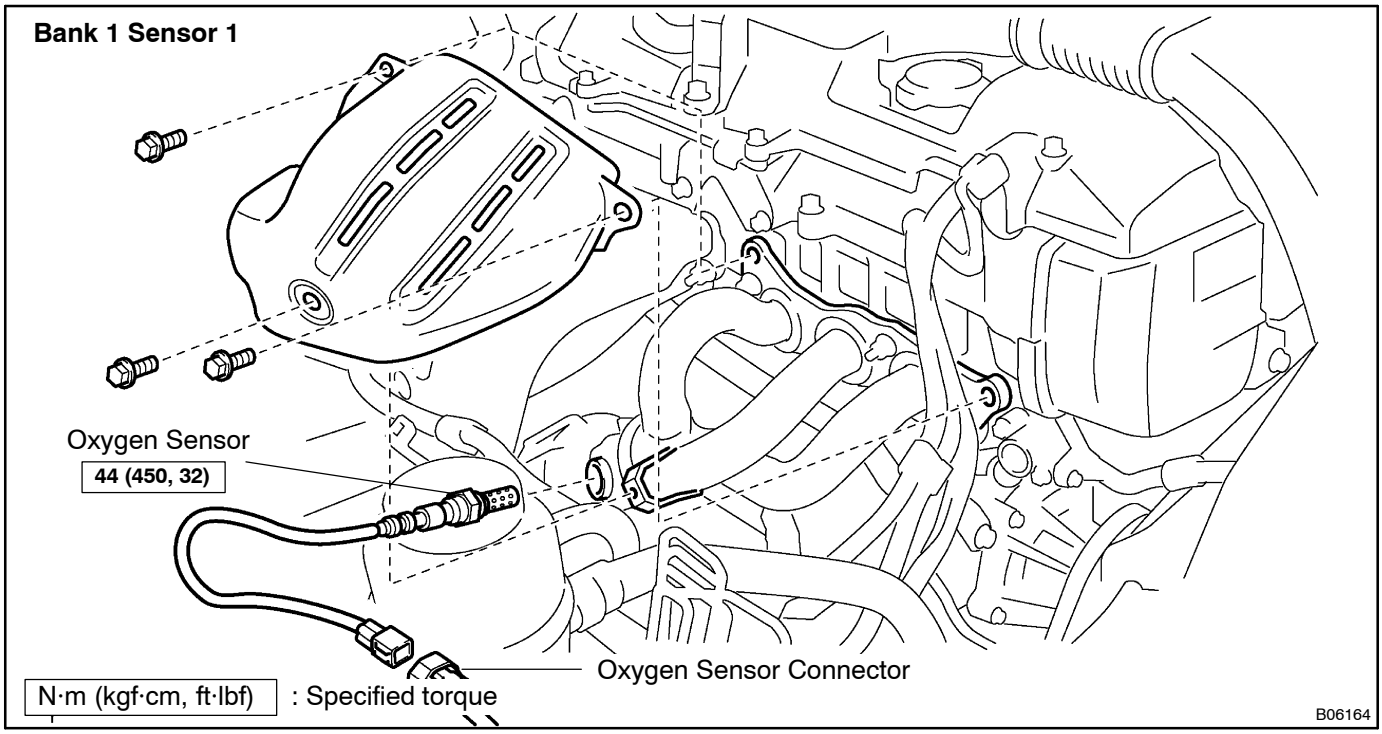
Use a new O–ring.

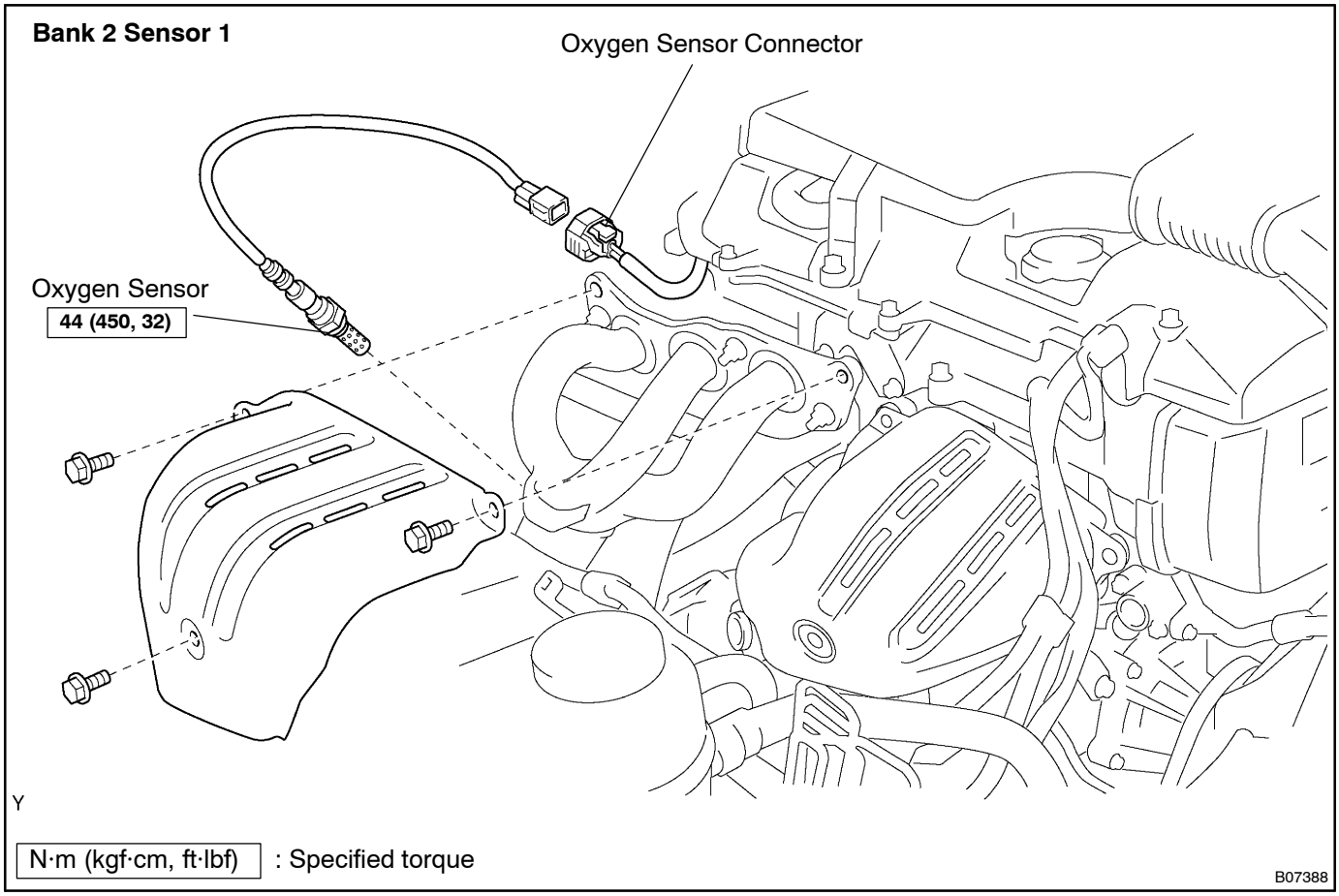
12. REINSTALL ALTERNATOR (See page CH–15)
13. REINSTALL NO.3 CYLINDER HEAD COVER
14. REINSTALL AIR CLEANER INLET

OXYGEN SENSOR

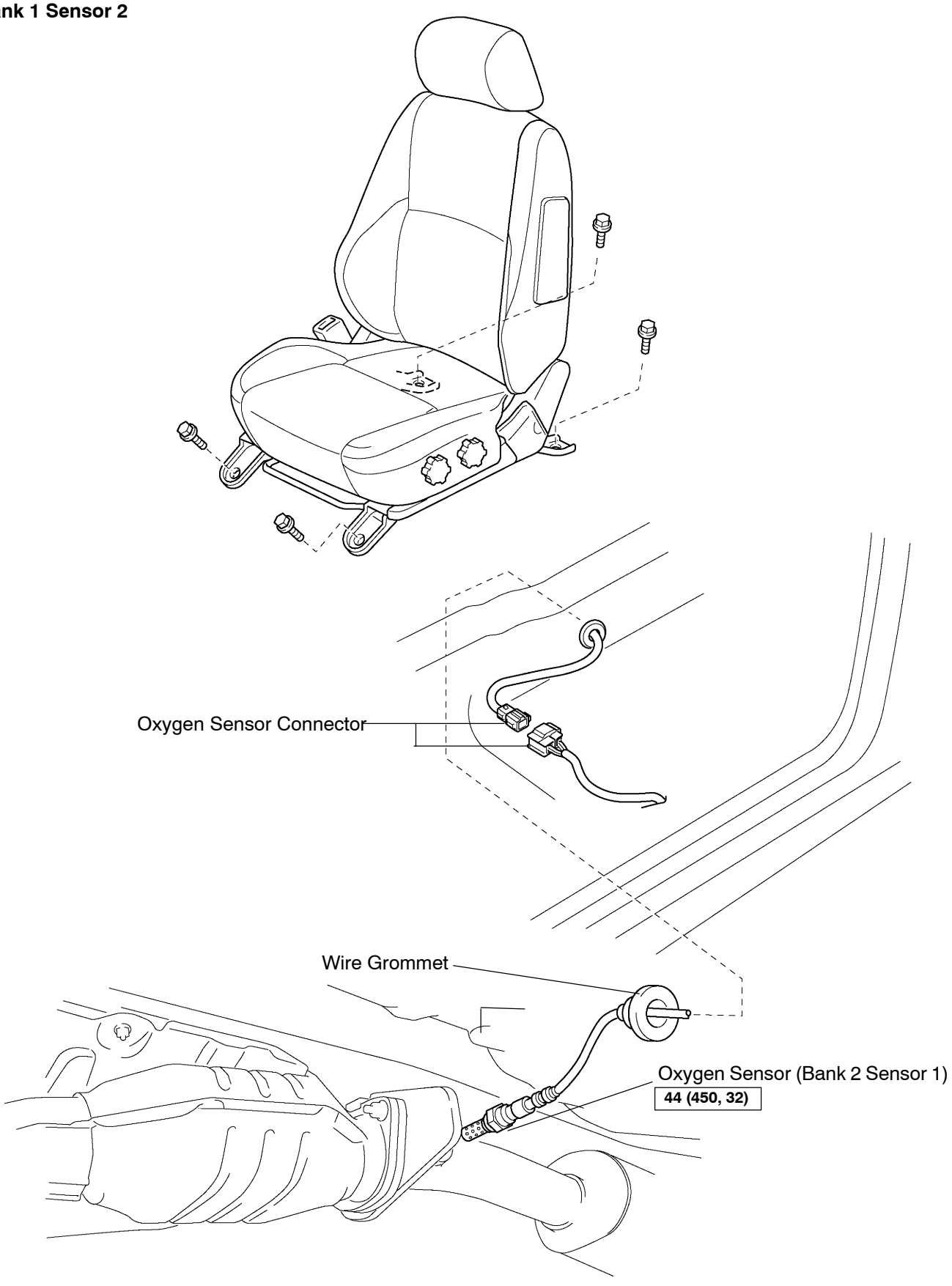
COMPONENTS

SF120–01





Bank 1 Sensor 2

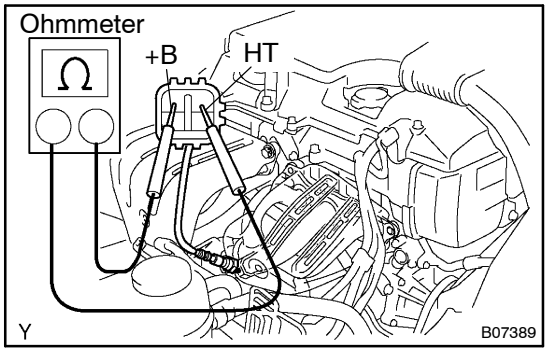


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

B06163

SF0OC–03



INSPECTION

1. INSPECT HEATER RESISTANCE OF OXYGEN SENSORS (BANK 1, 2 SENSOR 1)

(a) Disconnect the oxygen sensor connectors.

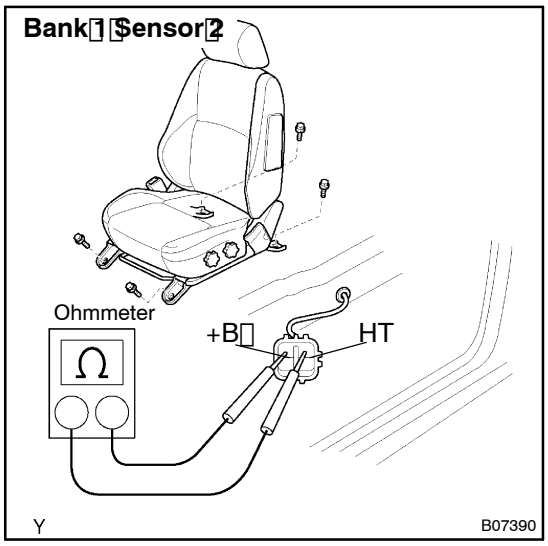
(b) Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance:
11 – 16 Ω at 20°C (68°F)
23 – 32 Ω at 800°C (1472°F)

If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)

(c) Reconnect the oxygen sensor connectors.



2. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR (BANK 1 SENSOR 2)

(a) Remove the driver's seat.

(b) Take out the front side of the floor carpet.

(c) Disconnect the oxygen sensor connector.
Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance:
11 – 16 Ω at 20°C (68°F)
23 – 32 Ω at 800°C (1472°F)

If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)

(d) Reconnect the oxygen sensor connector.

(e) Reinstall the floor carpet.

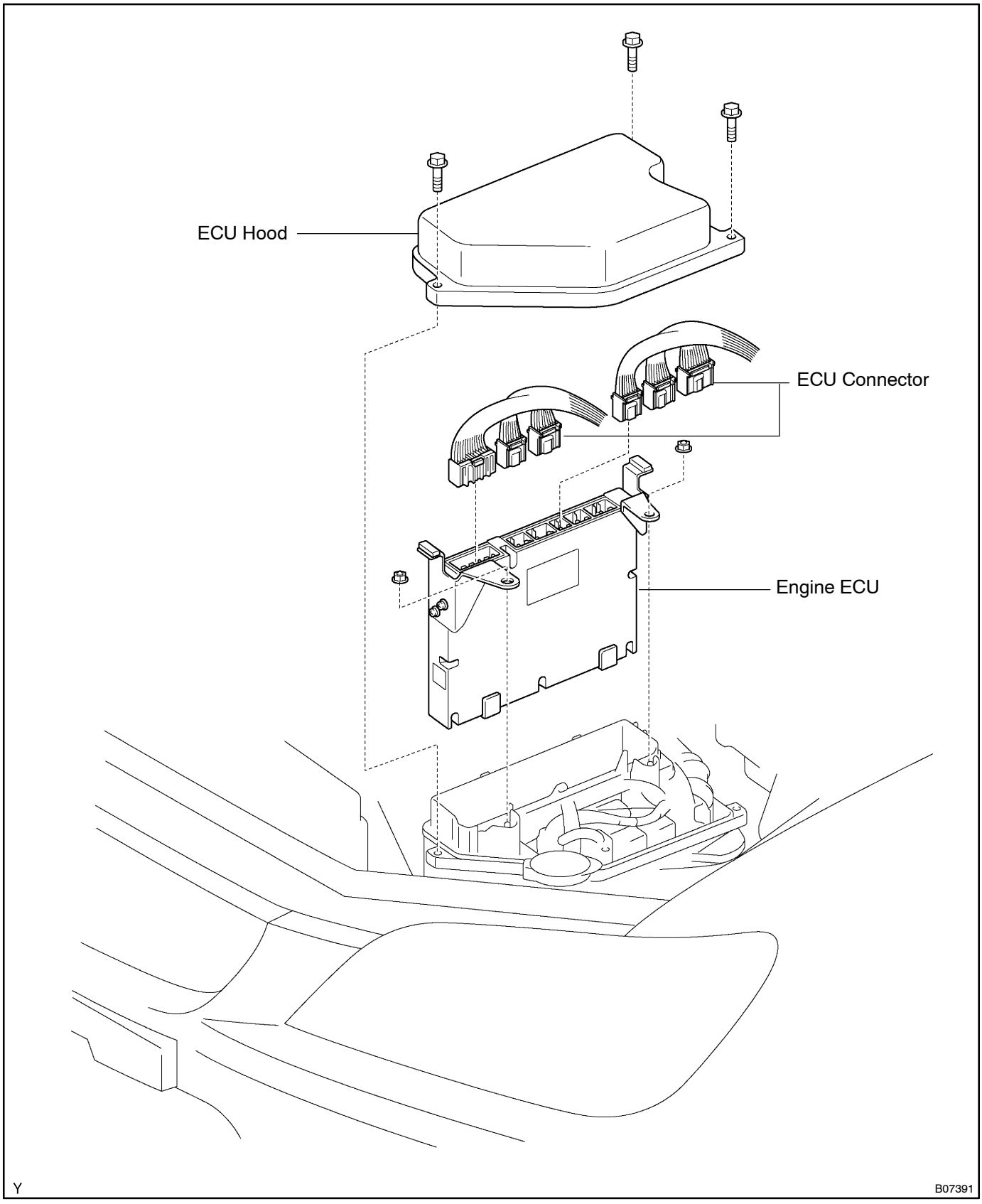
(f) Reinstall the driver's seat.

3. INSPECT OPERATION OF HEATED OXYGEN SENSOR (See page DI–53)

ENGINE ECU

COMPONENTS

FI029–02



FI02A–01

INSPECTION

1. REMOVE ENGINE ECU
2. INSPECT ENGINE ECU (See page DI–23)
3. REINSTALL ENGINE ECU

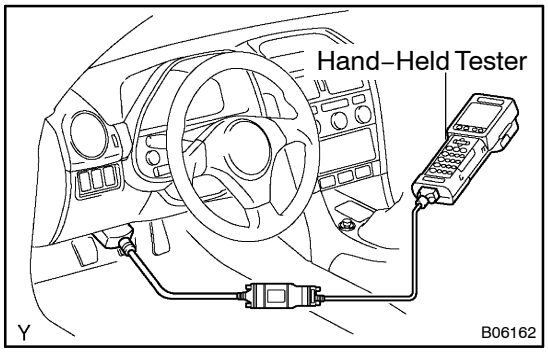
FUEL CUT RPM

SF121–01

INSPECTION

1. WARM UP ENGINE

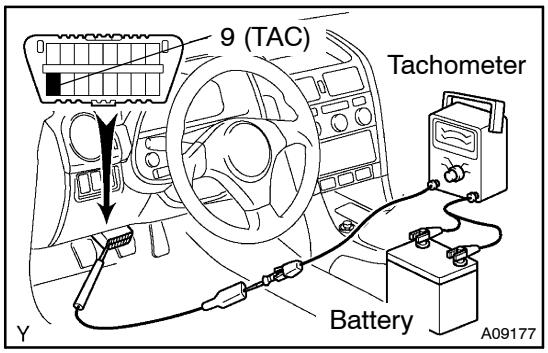
Allow the engine to warm up to normal operating temperature.



2. CONNECT HAND–HELD TESTER TO DLC3

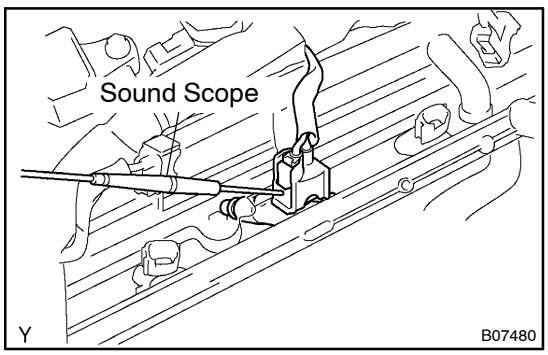
(a) Connect the hand–held tester to the DLC3.

(b) Please refer to the hand–held tester operator's manual for further details.



If you have no hand–held tester, connect a tachometer tester probe to terminal 9 (TAC) of the DLC3 with SST.

SST 09843–18030



3. INSPECT FUEL CUT–OFF OPERATION

(a) Increase the engine speed to at least 2,500 rpm.

(b) 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:

MT: 1200 rpm

A/T: 1400 rpm

4. DISCONNECT HAND–HELD TESTER FROM DLC3

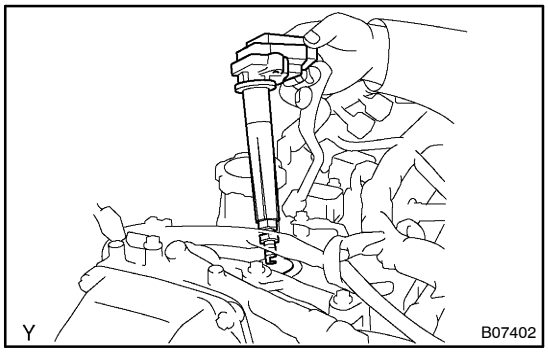
IGNITION SYSTEM

IG0EA–01

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 WITH IGNITER AND SPARK TEST

Check that the spark occurs.

(1) Remove the ignition coils with igniters.
(See page IG–6)

(2) Using a 16 mm plug wrench, remove the spark plugs.

(3) Install the spark plugs to each ignition coil with igniter, and connect the ignition coil with igniter connector.

(4) Disconnect the injector connectors.

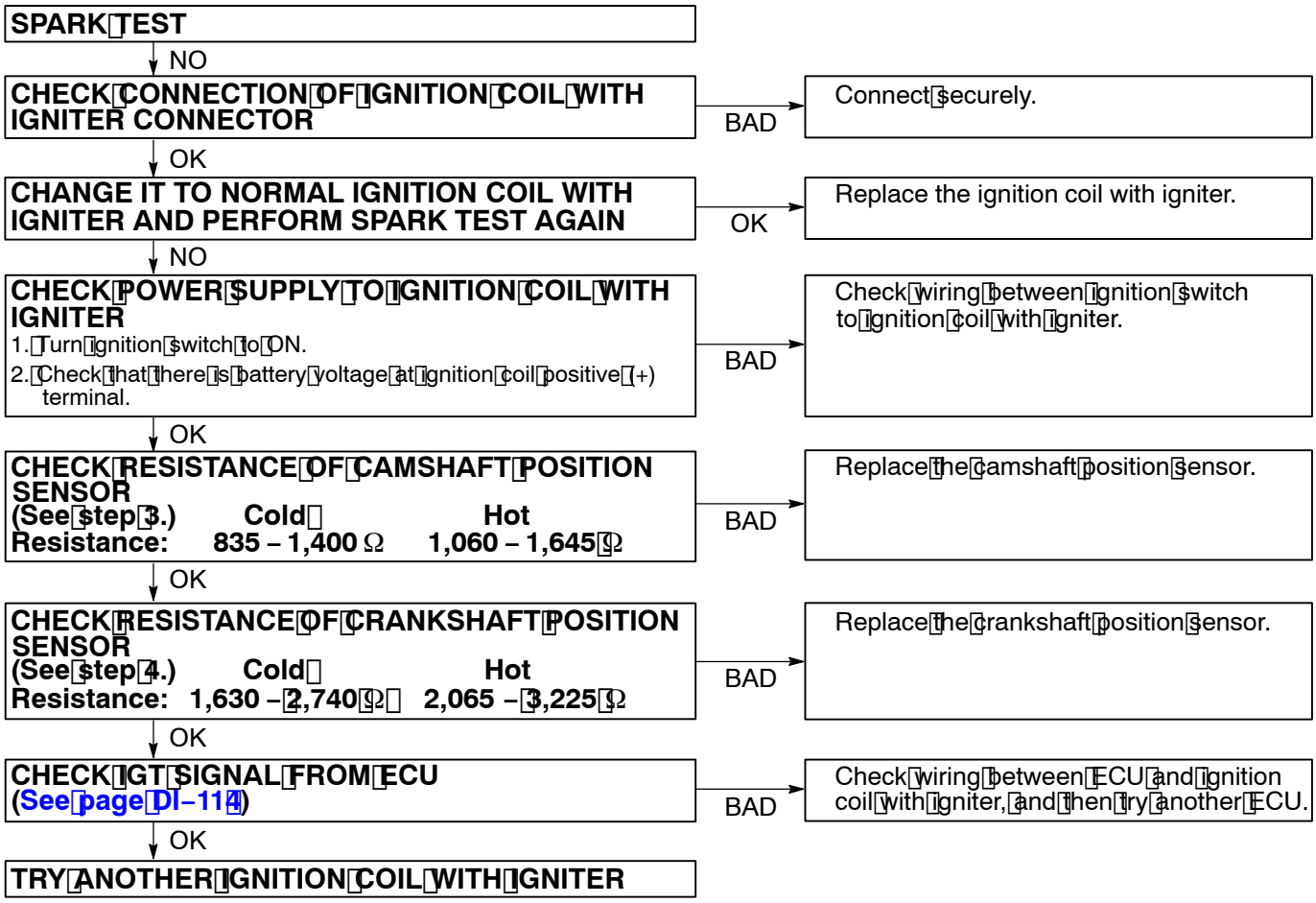
(5) Ground the spark plug.

(6) Check if spark occurs while engine is being cranked.

NOTICE:

To prevent gasoline from being injected from injectors during this test, crank the engine for no more than 5 – 10 seconds at time.

If the spark done not occur, do the test as follows:



(7) Using a 16 mm plug wrench, install the spark plugs.

Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)

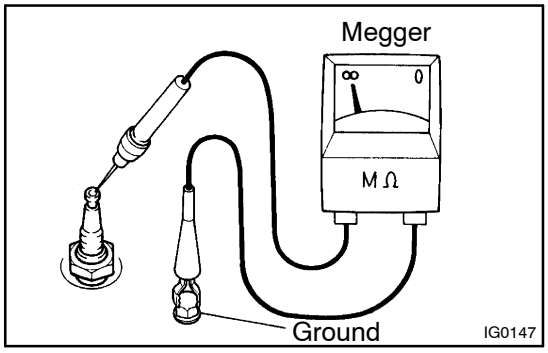
(8) Reinstall the ignition coils with igniters.
(See page IG–6)

2. INSPECT SPARK PLUGS

NOTICE:

- **Never use a wire brush for cleaning.**
- **Never attempt to adjust the electrode gap on used spark plug.**
- **Spark plug should be replaced every 144,000 km (90,000 miles).**

(a) Remove the ignition coils with igniters.
(See page IG–6)



(b) Check the electrode.

- Using a megger (insulation resistance meter), measure the insulation resistance.

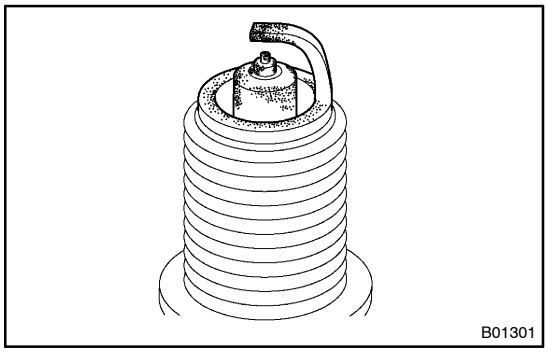
Correct insulation resistance:
10 MΩ or more

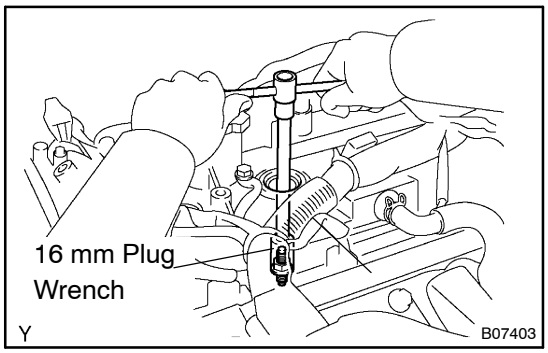
If the resistance is less than specified, proceed to step (d).

HINT:

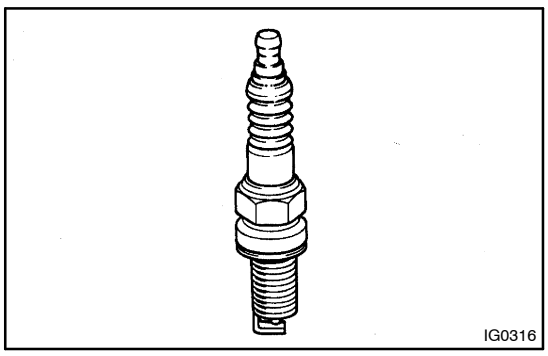
If a megger is not available, the following simple method of inspection provides fairly accurate results.

- Simple Method:
  - Quickly race the engine to 4,000 rpm 5 times.
  - Remove the spark plug. (See step (c))
  - Visually check the spark plug.
    If the electrode is dry ... Okay.
    If the electrode is wet ... Proceed to step (d).
  - Reinstall the spark plug. (See step (g))





(c) Using a 16 mm plug wrench, remove the spark plugs.

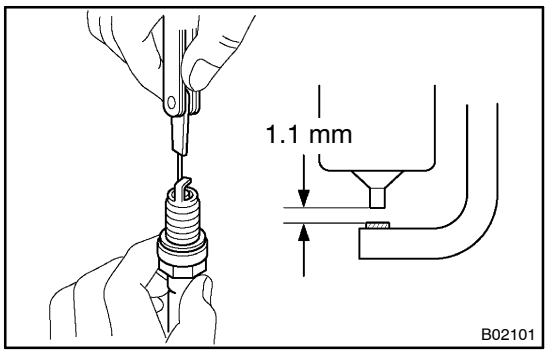


(d) Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

DENSO	SK20R11
NGK	IFR6A11



(e) Check the spark plug electrode gap.

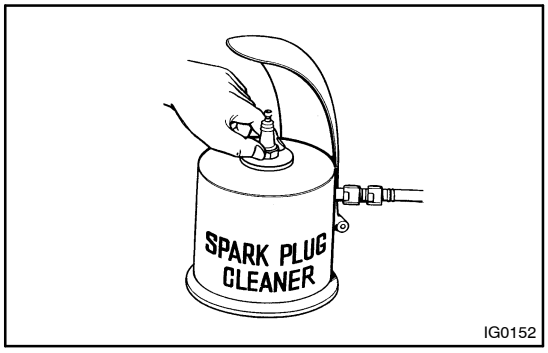
Maximum electrode gap for used spark plug:
1.2 mm (0.047 in.)

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 a used plug.



(f) 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/cm², 85 psi)
Duration:
20 seconds or less

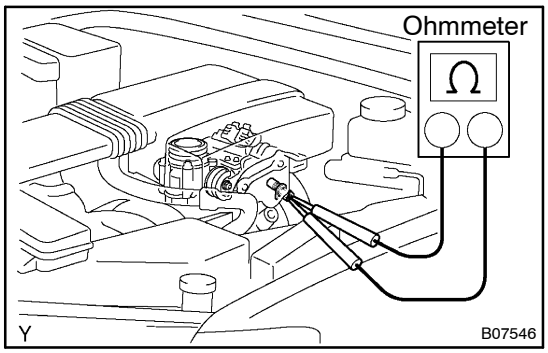
HINT:
If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

(g) Using a 16 mm plug wrench, install the spark plugs.
Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)

(h) Reinstall the ignition coils with igniters.
(See page IG–6)

3. INSPECT CAMSHAFT POSITION SENSOR

(a) Remove the air cleaner inlet.
(b) Remove the air cleaner assembly.
(c) Disconnect the camshaft position sensor connector.



(d) Using an ohmmeter, measure the resistance between terminals.

Resistance:

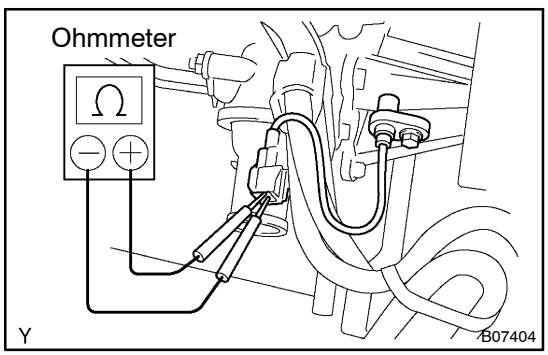
Cold	835 – 1,400 Ω
Hot	1,060 – 1,645 Ω

If the resistance is not as specified, replace the camshaft position sensor.

(e) Connect the camshaft position sensor connector.
(f) Install the air cleaner assembly.
(g) Install the air cleaner inlet.

4. INSPECT CRANKSHAFT POSITION SENSOR

(a) Remove the air cleaner inlet.
(b) Disconnect the crankshaft position sensor connector.



(c) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	1,630 – 2,740 Ω
Hot	2,065 – 3,225 Ω

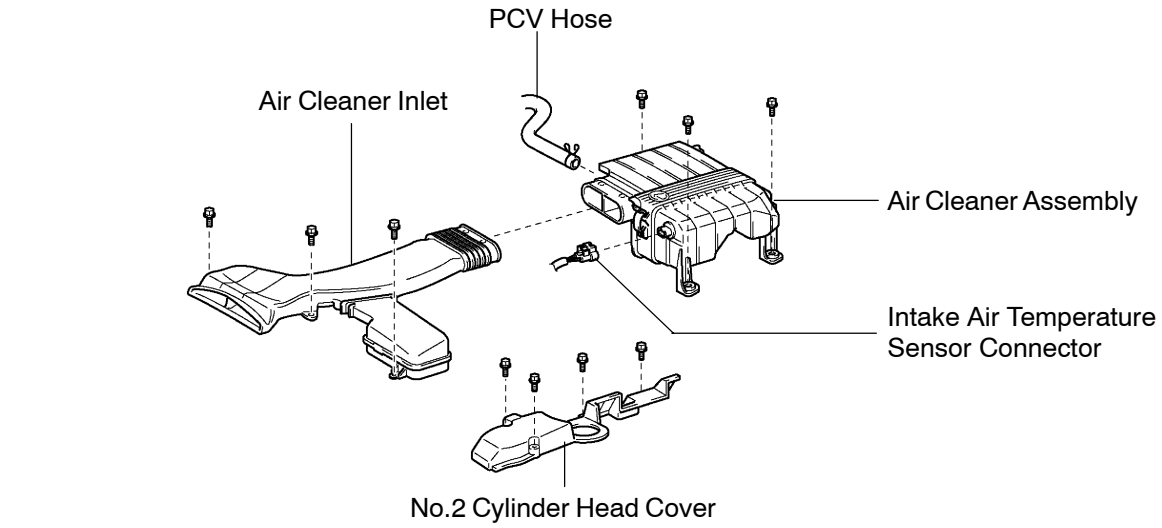
If the resistance is not as specified, replace the crankshaft position sensor.

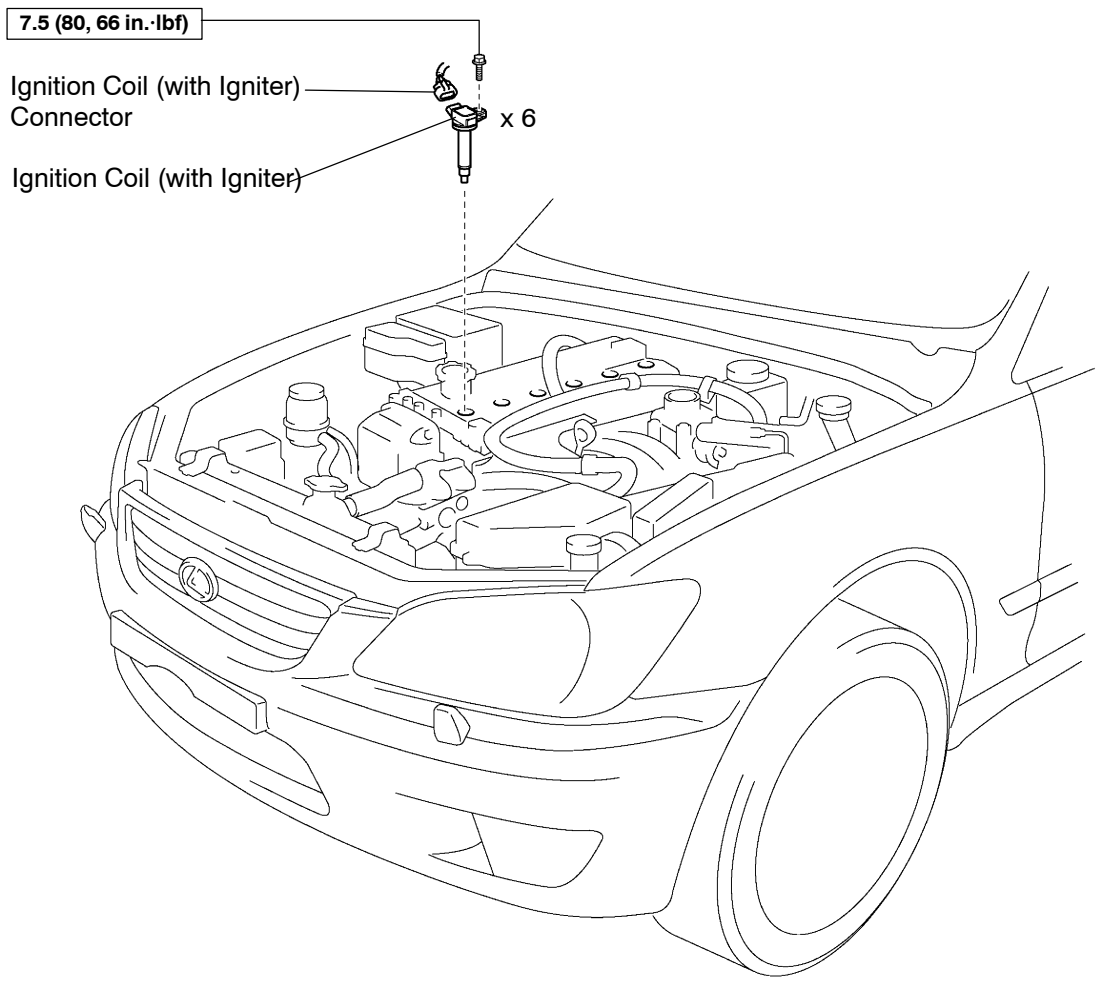
(d) Connect the crankshaft position sensor connector.
(e) Install the air cleaner inlet.

IGNITION COIL

COMPONENTS

IG05T–03





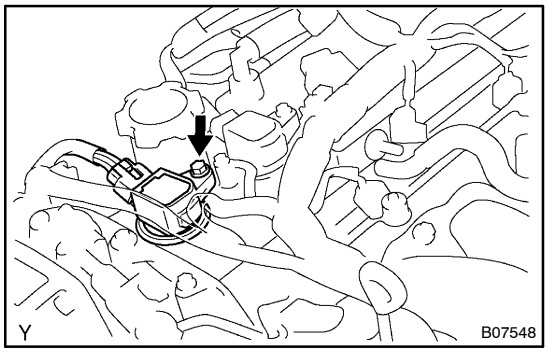
Y N·m (kgf·cm, ft·lbf) : Specified torque

B07547

IG0EB–01

REPLACEMENT

1. **REMOVE AIR CLEANER INLET**
2. **REMOVE AIR CLEANER ASSEMBLY**
3. **REMOVE NO.2 CYLINDER HEAD COVER**



4. **REMOVE IGNITION COILS FROM SPARK PLUGS**

(a) Disconnect the ignition coil connectors.

(b) Remove the bolt, and pull out the ignition coil. Remove the 6 ignition coils.

5. **REINSTALL NEW IGNITION COILS**

(a) Connect a new ignition coil to the spark plug, and attach the ignition coil to the cylinder head cover, and install the bolt. Install the 6 ignition coils.

Torque: 7.5 N·m (80 kgf·cm, 66 in.·lbf)

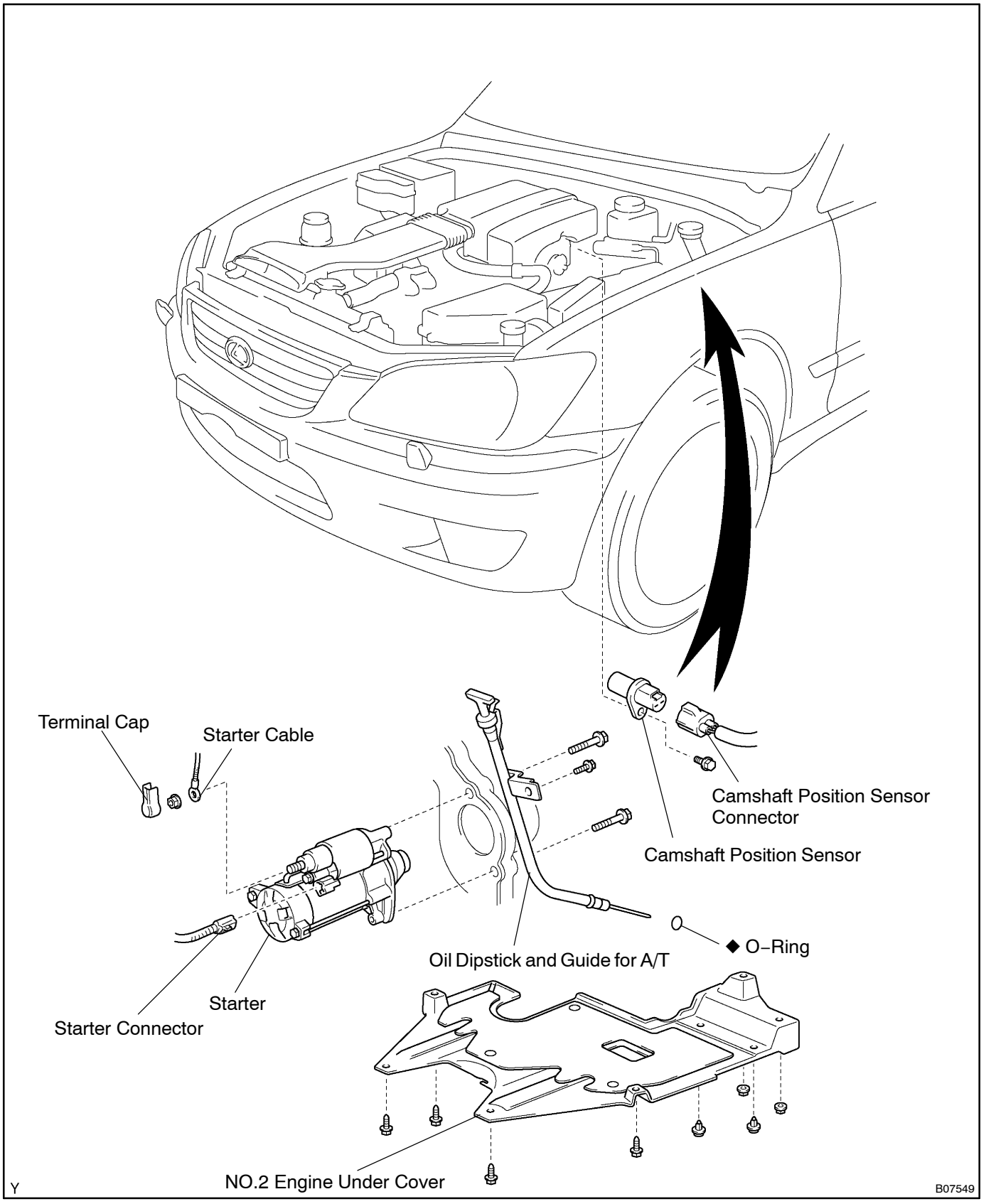
(b) Connect the 6 ignition coil connectors.

6. **REINSTALL NO.2 CYLINDER HEAD COVER**
7. **REINSTALL AIR CLEANER ASSEMBLY**
8. **REINSTALL AIR CLEANER INLET**

CAMSHAFT POSITION SENSOR

COMPONENTS

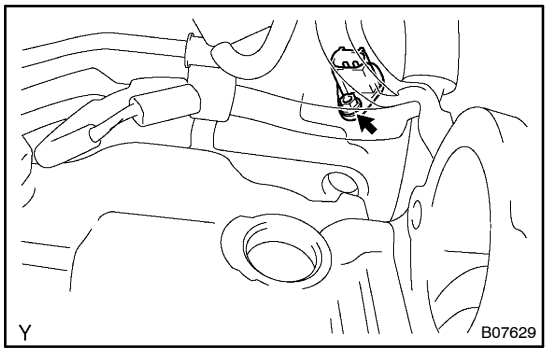
IG05V–03



IG0EC–01

REPLACEMENT

1. **REMOVE NO.2 ENGINE UNDER COVER**
2. **REMOVE OIL DIPSTICK AND GUIDE FOR A/T**
3. **REMOVE STARTER (See page ST–3)**



4. **REMOVE CAMSHAFT POSITION SENSOR**

(a) Disconnect the camshaft position sensor connector.

(b) Remove the bolt and camshaft position sensor.

5. **REINSTALL CAMSHAFT POSITION SENSOR**

(a) Install the camshaft position sensor with the bolt.

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

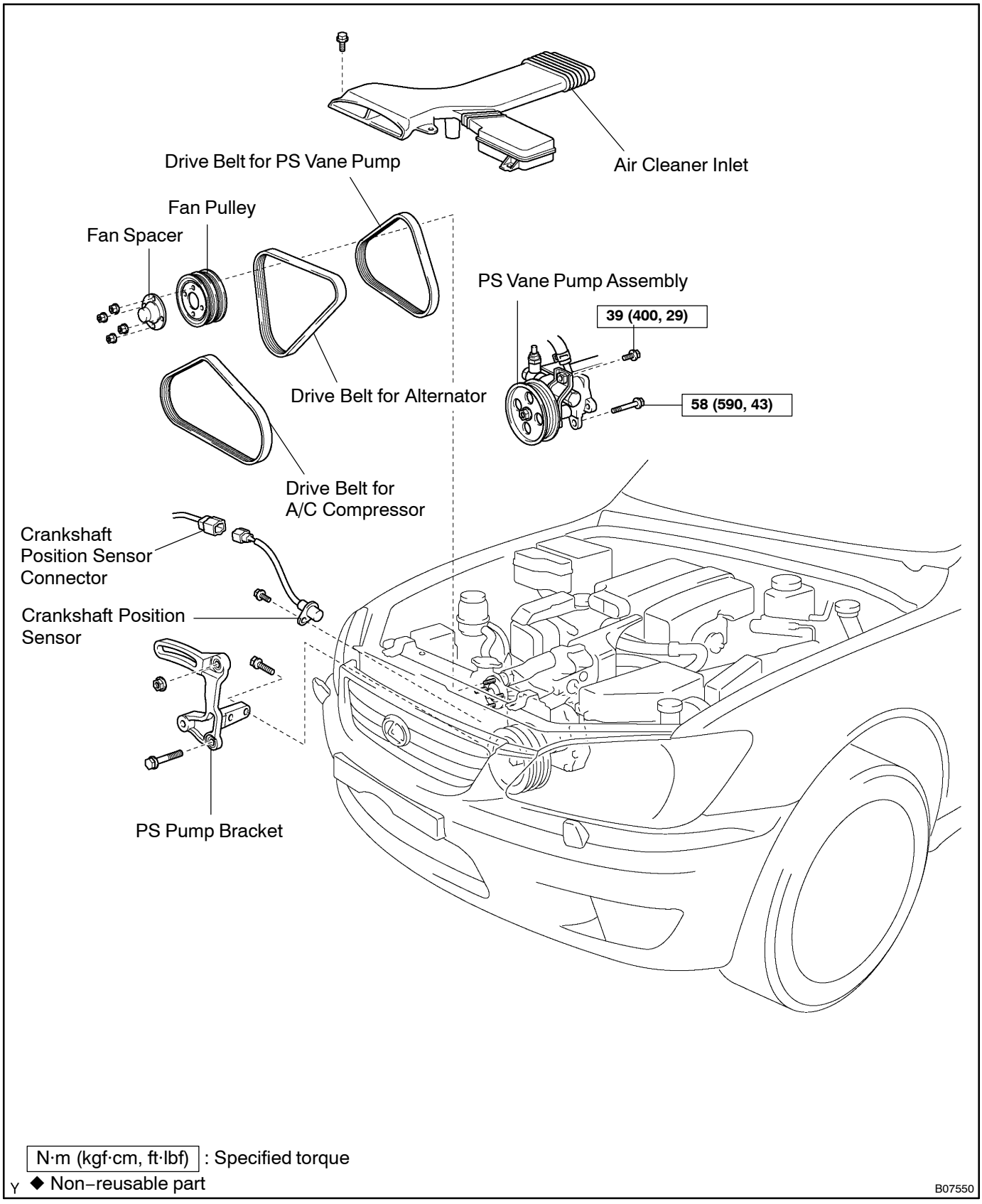
(b) Connect the camshaft position sensor connector.

6. **REINSTALL STARTER (See page ST–17)**
7. **REINSTALL OIL DIPSTICK AND GUIDE FOR A/T**
8. **REINSTALL NO.2 ENGINE UNDER COVER**

CRANKSHAFT POSITION SENSOR

IG060–03

COMPONENTS



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

◆ Non–reusable part

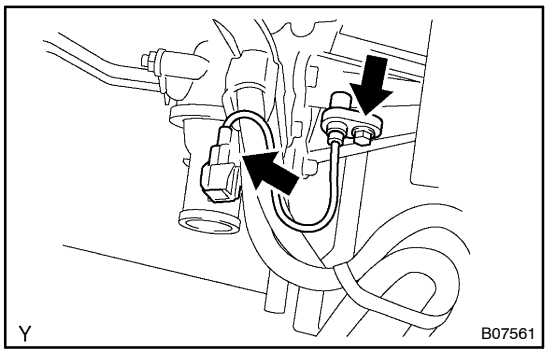
B07550

IG0ED–01

REPLACEMENT

1. REMOVE AIR CLEANER INLET
2. REMOVE DRIVE BELT FOR A/C COMPRESSOR (See page EM–20)
3. REMOVE DRIVE BELT FOR ALTERNATOR (See page CH–6)
4. REMOVE DRIVE BELT FOR PS VANE PUMP (See page EM–71)
5. REMOVE FAN SPACER AND PULLEY
6. REMOVE PS VANE PUMP WITHOUT DISCONNECTING HOSE (See page EM–71)
7. REMOVE PS PUMP BRACKET

Remove the 2 bolts, nut and the PS pump bracket.



8. REMOVE CRANKSHAFT POSITION SENSOR

(a) Disconnect the crankshaft position sensor connector.

(b) Remove the bolt and crankshaft position sensor.

9. REINSTALL CRANKSHAFT POSITION SENSOR

(a) Install the crankshaft position sensor with the bolt.

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

(b) Connect the crankshaft position sensor connector.

10. REINSTALL PS PUMP BRACKET

Install the PS pump bracket with the 2 bolts and nut.

11. REINSTALL PS VANE PUMP (See page EM–76)
12. REINSTALL FAN SPACER AND PULLEY
13. REINSTALL DRIVE BELT FOR PS VANE PUMP (See page EM–76)
14. REINSTALL DRIVE BELT FOR ALTERNATOR (See page CH–15)
15. REMOVE DRIVE BELT FOR A/C COMPRESSOR (See page EM–26)
16. REMOVE AIR CLEANER INLET

HOW TO USE THIS MANUAL

IN00U–29

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 headings 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–22.

Be sure to read this before performing troubleshooting.

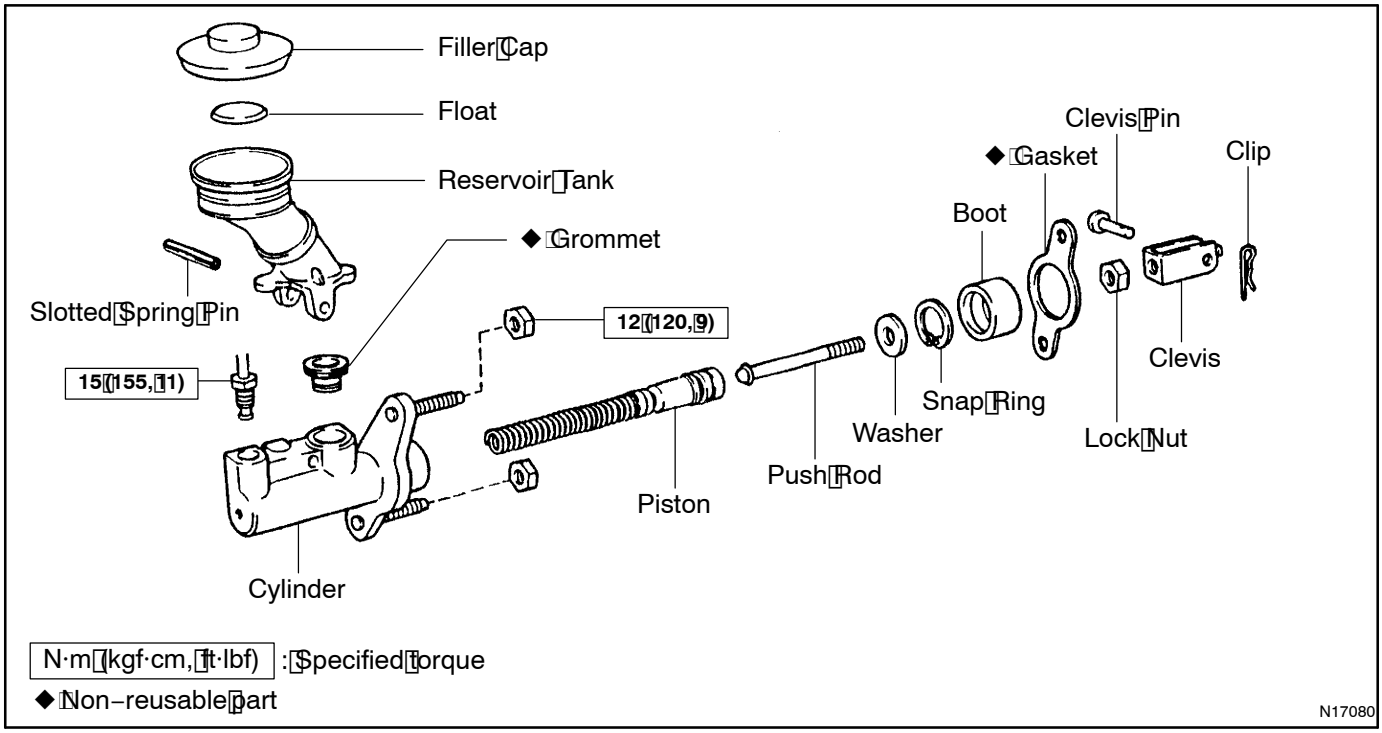
4. PREPARATION

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.

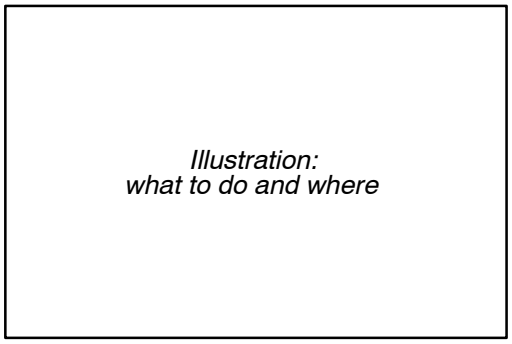
Example:



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.

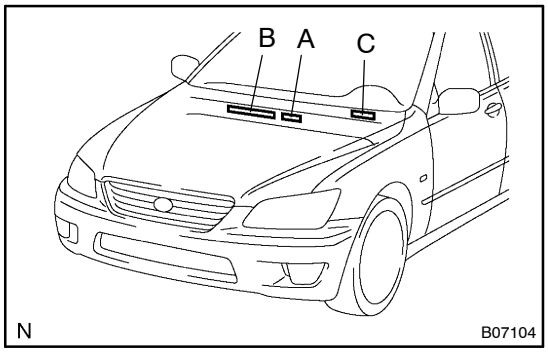
Example:

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

IDENTIFICATION INFORMATION

IN04P–04

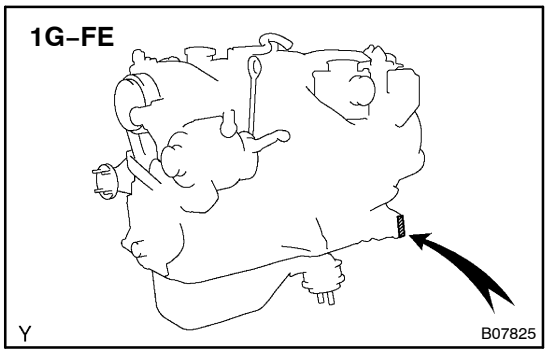
VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER



1. VEHICLE IDENTIFICATION NUMBER

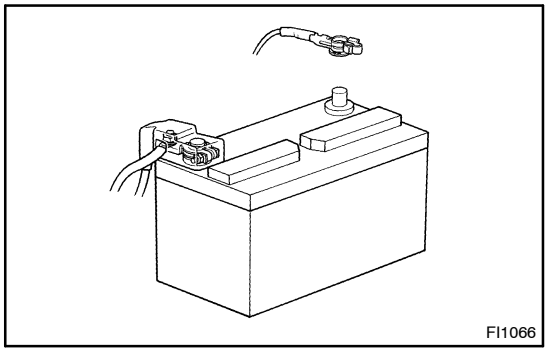
The vehicle identification number is stamped on the cowl panel. This number has also been stamped on the manufacture's plate and the identification number plate (Europe RHD), as shown in the illustration.

A: Manufacture's Plate
B: Vehicle Identification Number
C: Identification Number Plate (Europe RHD)



2. ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block, as shown in the illustration.


FI1066

REPAIR INSTRUCTIONS

IN0DC–02

GENERAL INFORMATION

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) Installation and removal of battery terminal:

(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, first disconnect the negative (–) terminal cable.

(3) When disconnecting the terminal cable, 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 after loosening the nut, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.

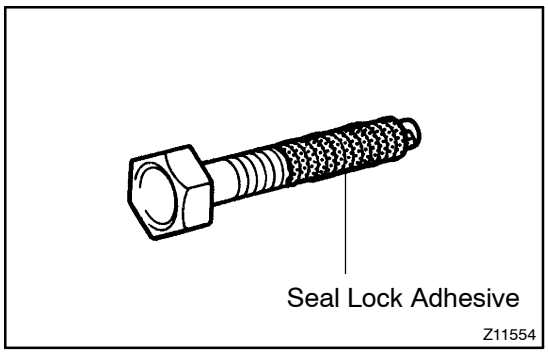
(6) Be sure the cover for the positive (+) terminal is properly in place.

(d) Check hose and wiring connectors to make sure that they are connected securely and correctly.

(e) Non–reusable parts

(1) Always replace cotter pins, gaskets, O–rings, 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, 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.

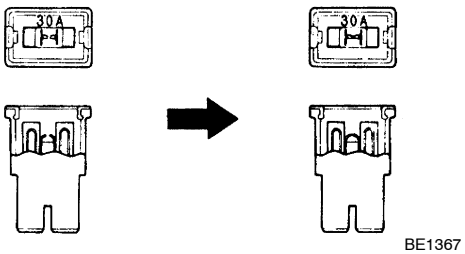
(3) Precoated parts are indicated in the component illustrations by the "★" symbol.

(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.

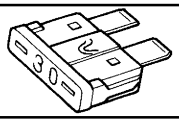
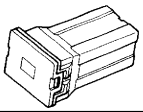
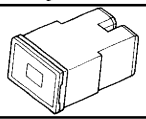
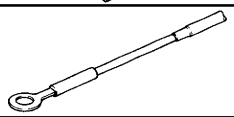
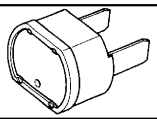
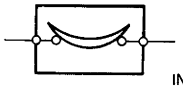
(i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in Preparation section in this manual.

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.

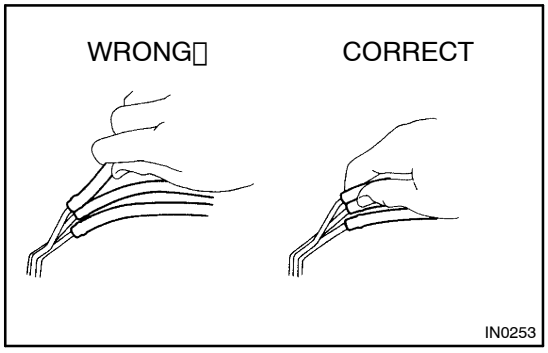
Illustration	Symbol	Part Name	Abbreviation
 BE5594	IN0365	FUSE	FUSE
 BE5595	IN0366	MEDIUM CURRENT FUSE	M–FUSE
 BE5596	IN0367	HIGH CURRENT FUSE	H–FUSE
 BE5597	IN0367	FUSIBLE LINK	FL
 BE5598	 IN0368	CIRCUIT BREAKER	CB

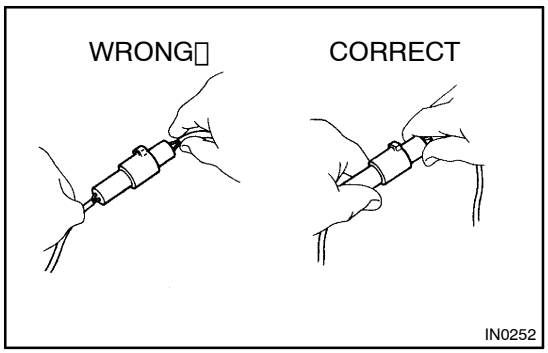
V00076

(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–8).
- Cancel the parking brake on the level place and shift the transmission in Neutral (or N range).
- When jacking up the front wheels of the vehicle, at first place stoppers behind the rear wheels.
- When jacking up the rear wheels of the vehicle, at first place stoppers before the front wheels.
- When either the front or rear wheels only should be jacked up, set rigid racks and place stoppers in front and behind the other wheels on the ground.
- After the vehicle is jacked up, be sure to support it on rigid racks. 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 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.

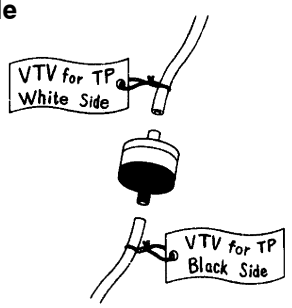
(5) When steam cleaning an engine, protect the electronic components, air filter and emission–related components from water.

(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 air.

Example



IN0002

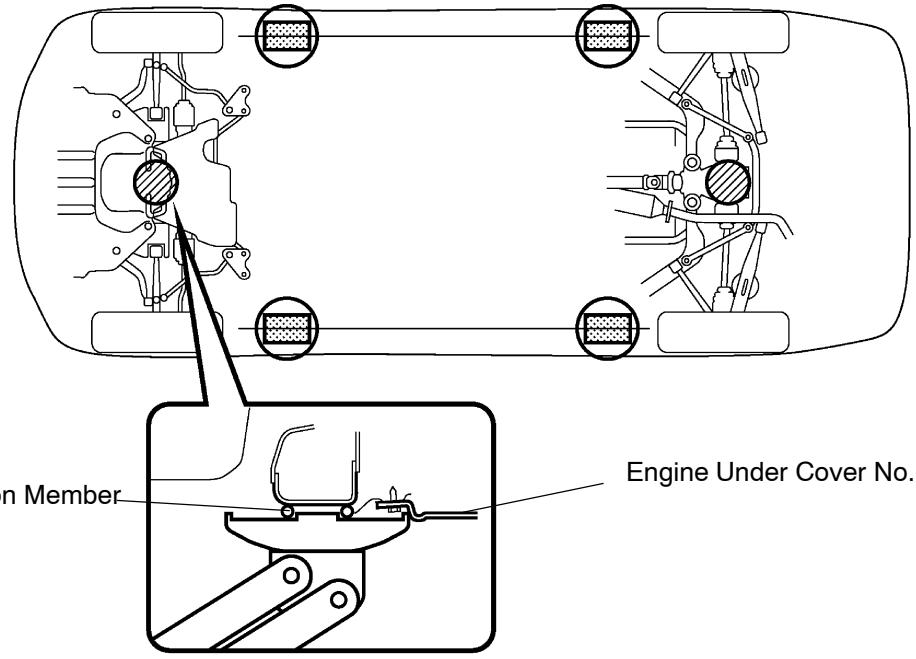
(m) Installation and removal of vacuum hose:
(1) When disconnecting vacuum hoses, use tags to identify where they should be reconnected to.
(2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

(n) Bleeding of hydraulic brake booster:
When repairing the ABS and TRC system, bleeding the air out of the hydraulic brake booster
(See page BR–4).

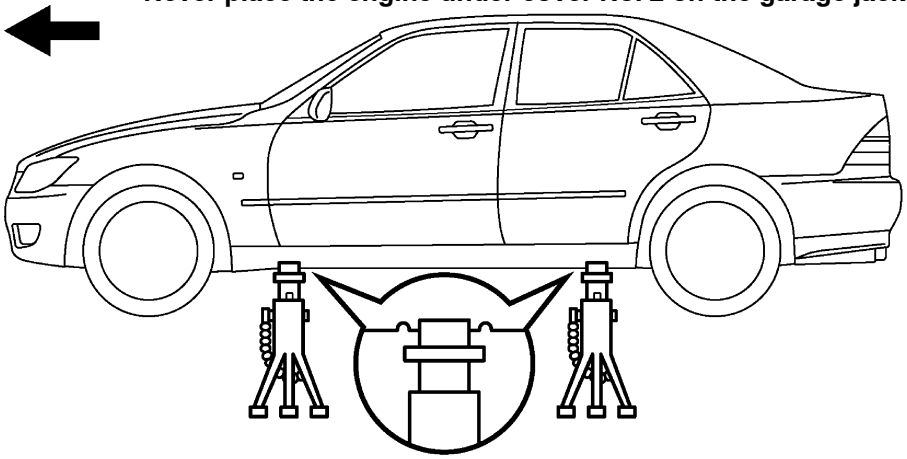
(o) Unless otherwise stated, all resistance is measured at an ambient temperature of 20°C (68°F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.

IN04O–04

VEHICLE LIFT AND SUPPORT LOCATIONS



NOTICE:
Never place the engine under cover No. 2 on the garage jack.



JACK POSITION
Front - - - - - - - - - Front suspension member
Rear - - - - - - - - - Differential carrier

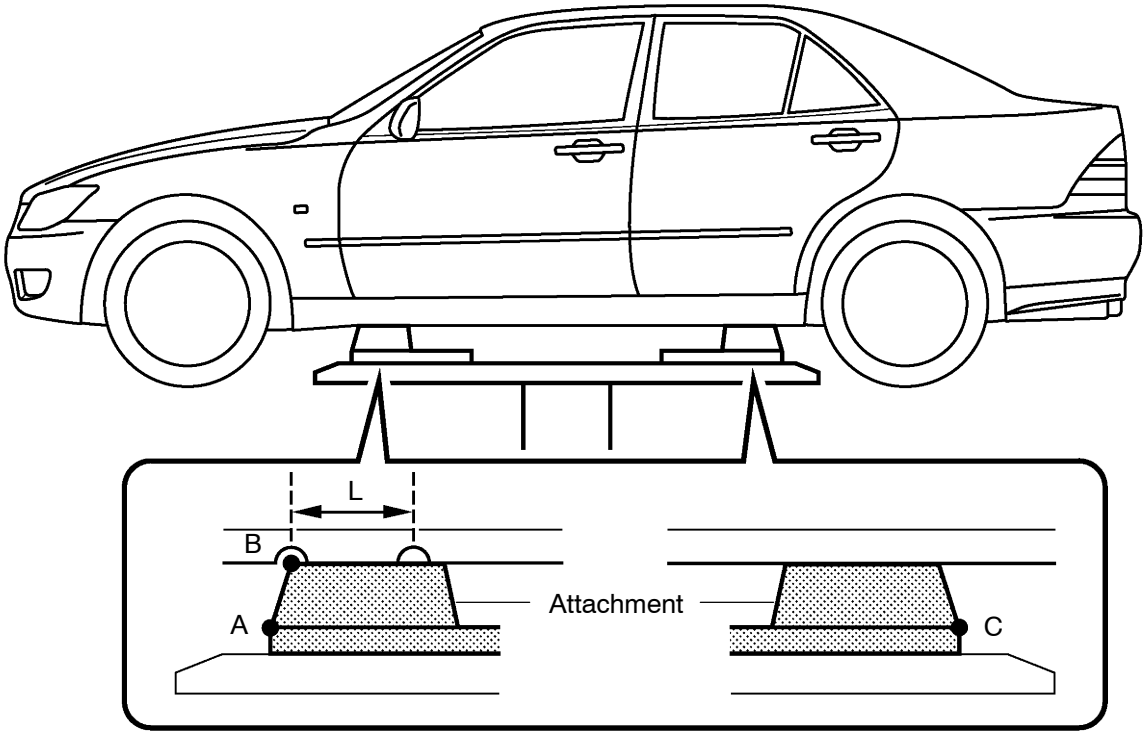
CAUTION : When jacking–up the front and rear, make sure the vehicle is not carrying any extra weight.

PANTOGRAPH JACK POSITION

SUPPORT POSITION
Safety stand and swing arm type lift - - - - - - - - - - - - - - - - - - -

I11883

Plate type lift



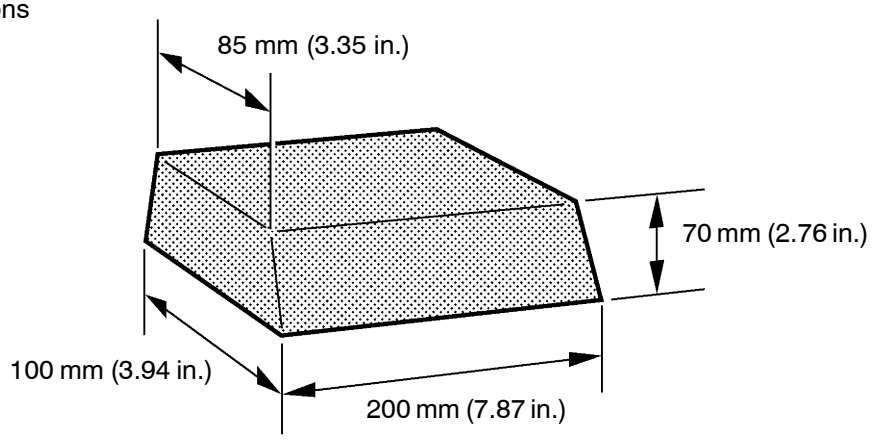
HINT :

Right and left set position	Place the vehicle over the center of the lift.
Front and rear set position	● When using attachments, place the one for front side vertically and the one for rear side horizontally to the vehicle. ● Align the cushion gum ends of the plate with the attachment lower ends (A, C). ● Align the attachment upper end (B) with the rocker flange rear side notch.

NOTICE :

Check the interference of the attachment with the front floor cover when placing the attachment on the plate.

Attachment dimensions



I11884

FOR ALL OF VEHICLES

IN0DS–02

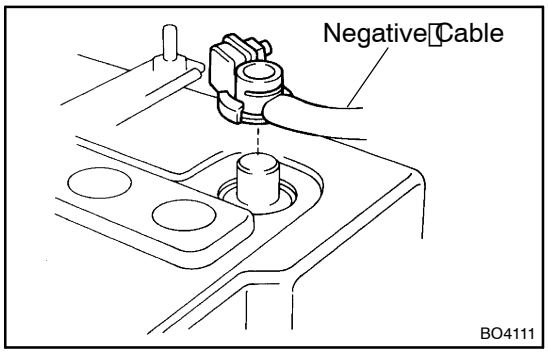
PRECAUTION

1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

(a) The LEXUS IS200 is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag assembly, side airbag assembly and seat belt pretensioners.

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–287).

(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 another battery.

(3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor and seat belt pretensioner should be inspected (See page RS–15, RS–28, RS–42, RS–60, RS–65 and BO–152).

(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, side airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor or seat belt pretensioner.

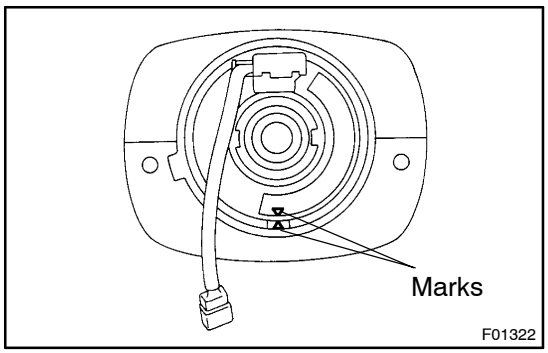
(7) If the airbag sensor assembly, side airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor or seat belt pretensioner has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.

(8) Do not directly expose the airbag sensor assembly, side airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor or seat belt pretensioner 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–287).



(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–23 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.
Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag deploys for some reason. In addition do not store a steering wheel pad on top of another one.

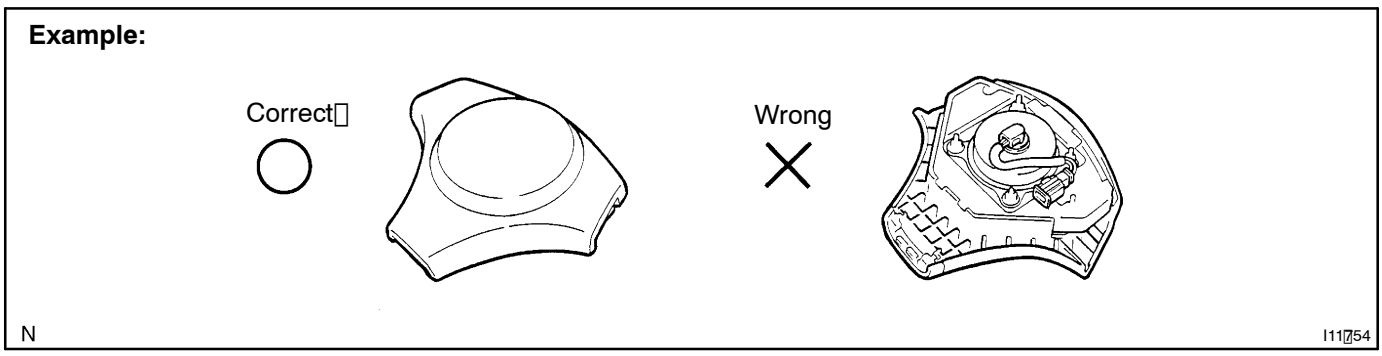
(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

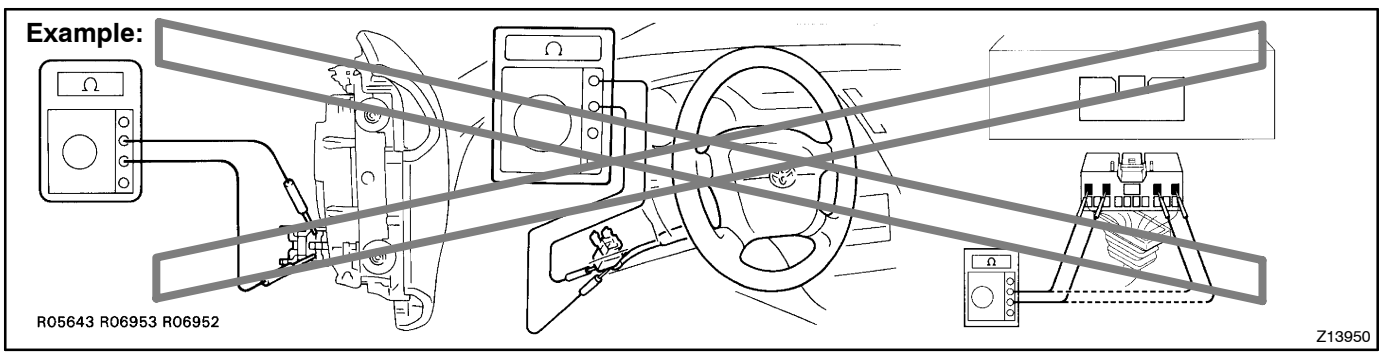
(3) Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.

(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–17).
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 deploys.

(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.

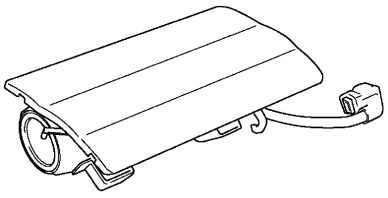
(4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the assembly before starting work.

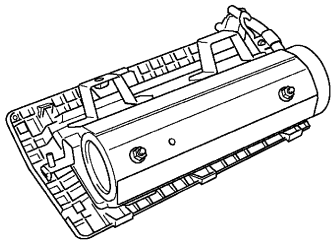
(6) When disposing of a vehicle or the front passenger airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS–30).
Perform the operation in a safe place away from electrical noise.

Example:

Correct



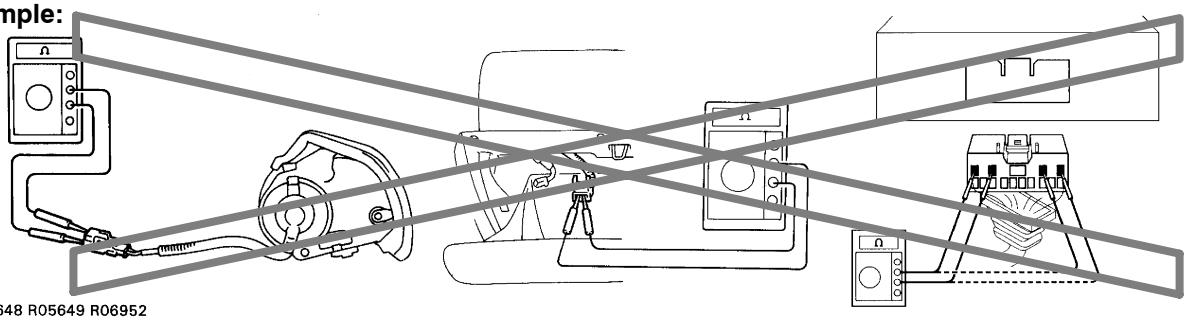
Wrong



Y

B07590

Example:



R05648 R05649 R06952

Z13951

(f) SIDE AIRBAG ASSEMBLY

(1) Always store a removed or new side 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 deploys.

(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

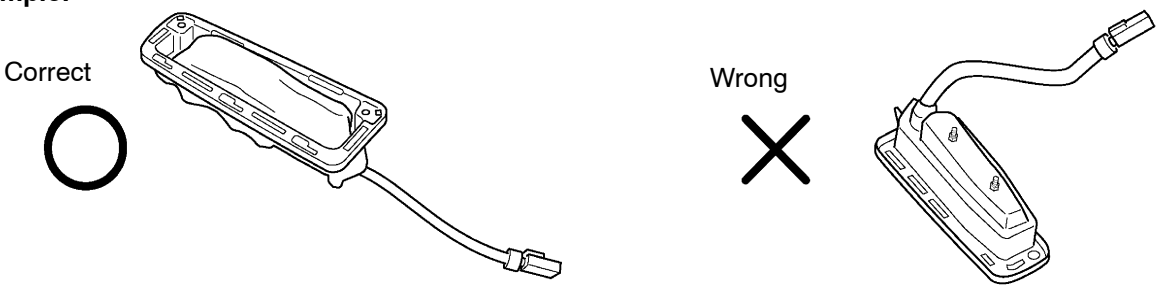
(3) Grease should not be applied to the side airbag assembly and the surface should not be cleaned with detergents of any kind.

(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) under the seat before starting work.

(6) When disposing of a vehicle or the side airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS–43). Perform the operation in a safe place away from electrical noise.

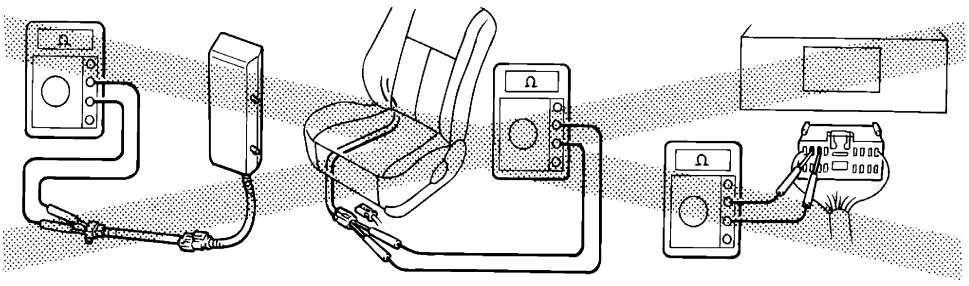
Example:



Y

B07100

Example:



B01546

(g) SEAT BELT PRETENSIONER

(1) Never measure the resistance of the seat belt pretensioner. (This may cause the seat belt pretensioner to activate, which is very dangerous.)

(2) Never disassemble the seat belt pretensioner.

(3) Never install the seat belt pretensioner in another vehicle.

(4) Store the seat belt pretensioner where the ambient temperature remains below 80°C (176°F) and away from electrical noise without high humidity.

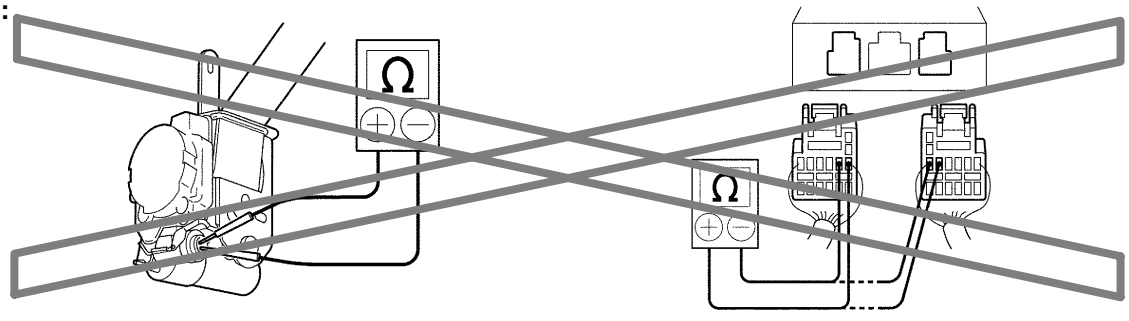
(5) When using electric welding, first disconnect the connector (yellow color and 2 pins) before starting work.

(6) When disposing of a vehicle or the seat belt pretensioner alone, the seat belt pretensioner should be activated before disposal (See page BO–153). Perform the operation in a safe place away from electrical noise.

(7) The seat belt pretensioner is hot after activation, so let it cool down sufficiently before the disposal. However never apply water to the seat belt pretensioner.

(8) Oil or water should not be put on the front seat outer belt and the front seat outer belt should not be cleaned with detergents of any kind.

Example:



(h) 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 loosing the set bolts of the airbag sensor assembly.

(i) WIRE HARNESS AND CONNECTOR

The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are 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–68.

2. 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.

(g) Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

3. 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) Avoid winding the antenna feeder together with other wiring as much as possible, and 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.

4. FOR USING HAND–HELD TESTER

CAUTION:

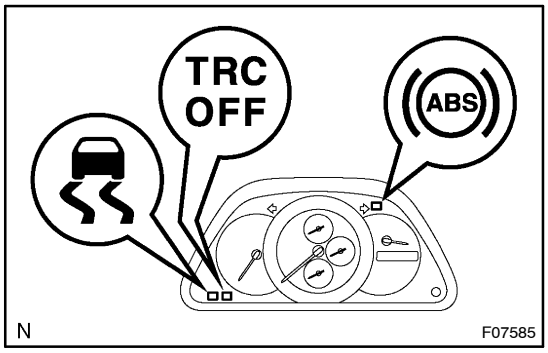
Observe the following items for safety reasons:

- **Before using the hand–held tester, the hand–held tester's operator manual should be read thoroughly.**
- **Be sure to route all cables securely when driving with the 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 hand–held tester, one person to drive the vehicle and the other person to operate the hand–held tester.**

5. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TRC) SYSTEM

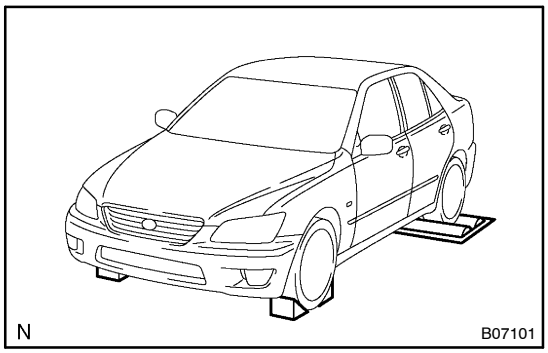
NOTICE:

When using a 2–wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the rear wheels and driving the wheels, always push in the TRC cut switch and turn the TRC system OFF.

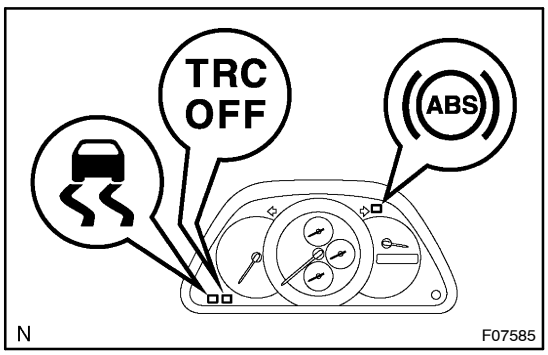


(a) Confirm TRC system is OFF.
  (1) Press the TRC cut switch.
  (2) Check that the TRC system is turned OFF by the TRC cut switch.

HINT:
The SLIP indicator light should always operate right after the engine is restarted.

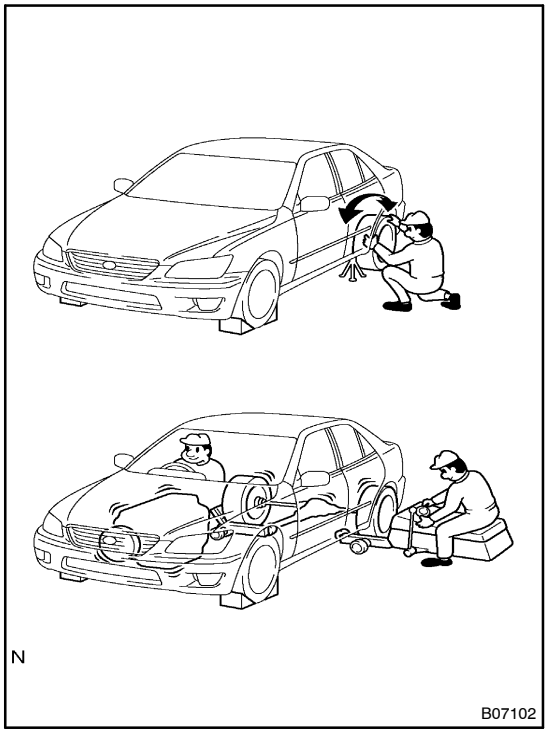


(3) Begin measurements.



(4) Press the TRC cut switch to turn the TRC to the operative mode and check that the TRC OFF indicator light goes off.

HINT:
The SLIP indicator light blinks when the TRC system is operational.



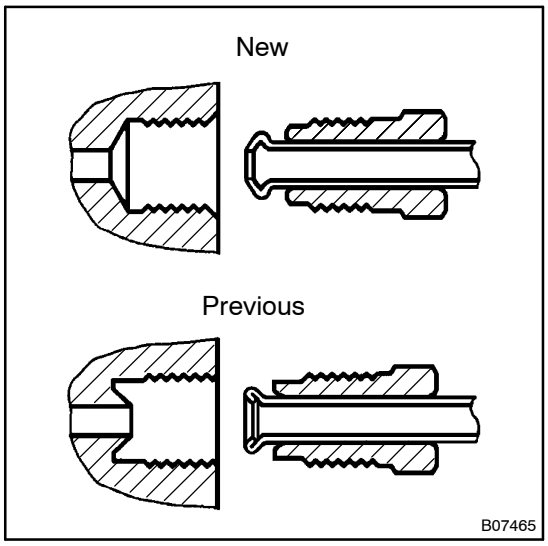
6. FOR VEHICLES EQUIPPED WITH LIMITED SLIP DIFFERENTIAL

(a) Never apply driving force when RH or LH rear wheel only is touching the ground.

(b) During service/rectification work never spin (race) the RH or LH rear wheel only such as with ON–The Car type wheel balancer, both rear wheels must be off the ground.

HINT:

- In case of the above, due to the construction of the LSD the driving force is transmitted to the opposite wheel and therefore it is possible for the vehicle to start suddenly if only one rear wheel is off the ground. Furthermore it could result in component damage to the LSD due to the loads acting on it.
- Always raise both rear wheels off the ground and support the vehicle on suitable safety stand.



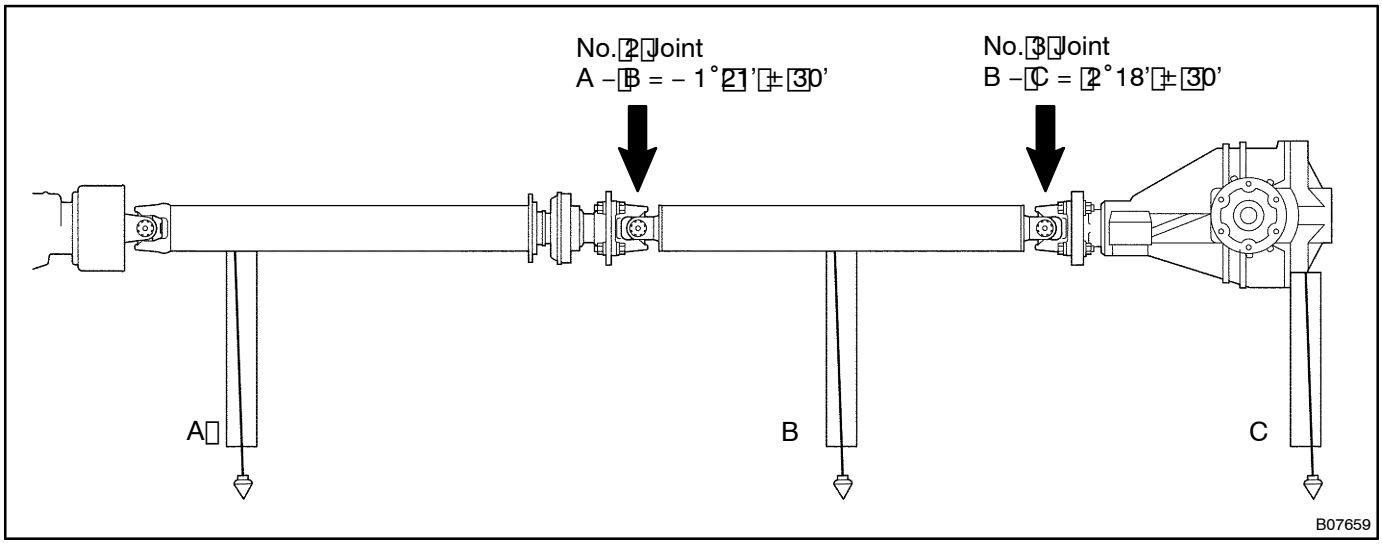
7. FOR VEHICLES EQUIPPED WITH BRAKE PIPE FITTING OF NEW STANDARD

The LEXUS IS200 uses a flare shape of a new standard for the brake pipe fitting.

When ordering or replacing the parts, please be sure to check and use the fitting of the same flare type.

8. INSPECTION AND ADJUSTMENT OF JOINT ANGLE DURING REMOVAL AND INSTALLATION OF PROPELLER SHAFT

When performing operations which involve the removal and installation of the propeller shaft, always check the joint angle. Make adjustments if necessary (See page PR–11).



HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

IN04S–07

GENERAL INFORMATION

A large number of ECU controlled systems are used in the LEXUS IS200. 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:
The troubleshooting procedure and how to make use of it are described on the following pages.

System	Page
1. Engine	DI–1
2. Automatic Transmission	DI–153
3. ABS & Traction Control (TRC) System	DI–221
4. Supplemental Restraint System	DI–285
5. Theft Deterrent System	DI–428
6. Cruise Control System	DI–477
7. Engine Immobiliser System	DI–504
8. Combination Meter System	DI–527
9. Body Control System	DI–549
10. Multiplex Communication System	DI–611
11. LEXUS Navigation System	DI–642
12. Air Conditioning System	DI–667

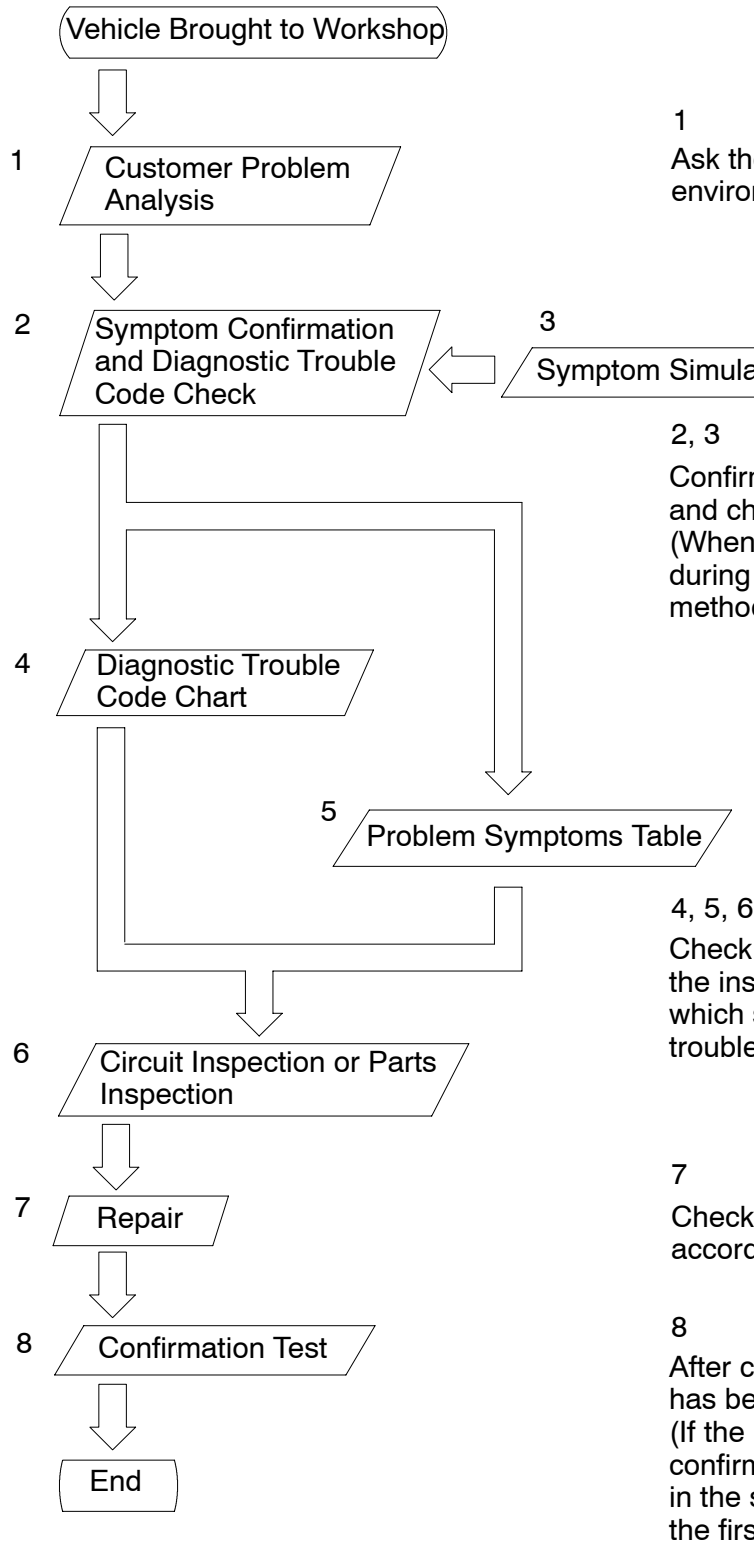
FOR USING HAND–HELD TESTER

- Before using the tester, the tester's operator manual should be read thoroughly.
- If the tester cannot communicate with ECU controlled systems when you have connected the cable of the tester to DLC3, turned the ignition switch ON and operated the tester, there is a problem on the vehicle side or tester side.
  (1) If communication is normal when the tester 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 tester is connected to another vehicle, the problem is probably in the tester itself, so perform the Self Test procedures outline in the Tester Operator's Manual.

IN04T–05

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 Diagnostics 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 problem symptoms table.

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 judgment. 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 Diagnostics 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**	

☐ **Constant** ☐ **Sometimes (times per day/month)**

2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the LEXUS IS200 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 IS200.

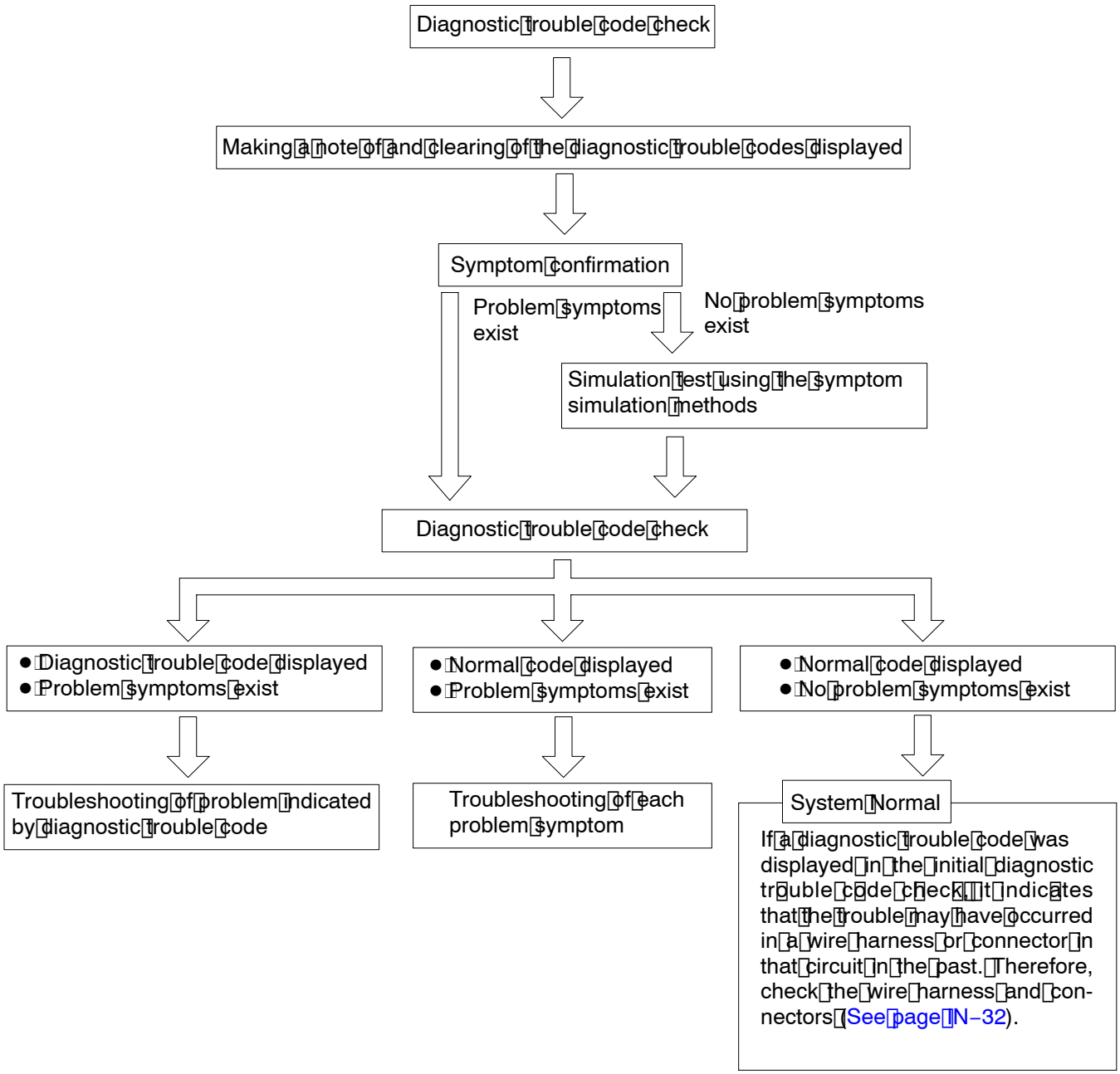
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
Engine	○(with check Mode)	○	○
Automatic Transmission	○(with check Mode)	○	
ABS & Traction Control (TRC) System	○	○	○
Supplemental Restraint System	○		
Theft Deterrent System			○
Cruise Control System	○	○	
Engine Immobiliser System	○		
Combination Meter System			○
Body Control System			○
Multiplex Communication System	○		
LEXUS Navigation System	○		
Air Conditioning System	○		○

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 points on the previous page, 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 table.

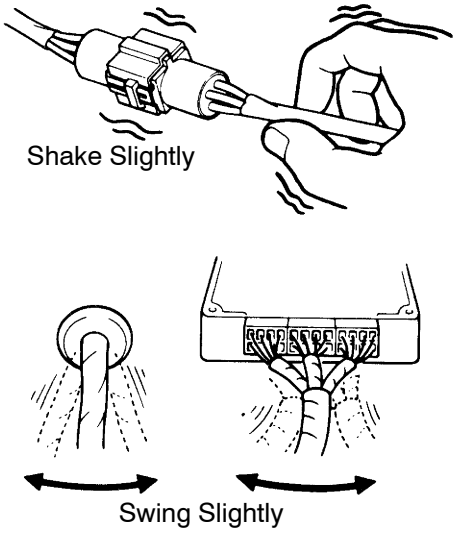
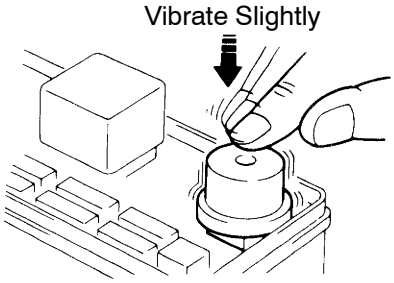


3. SYMPTOM SIMULATION

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 problem symptoms table 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

V07268

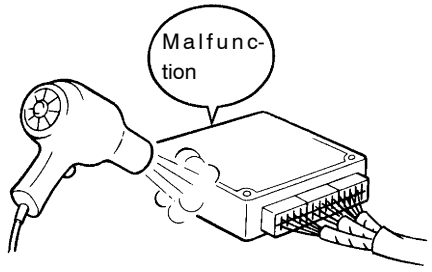
2	HEAT METHOD: When the problem seems to occur when the suspect area is heated.

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.

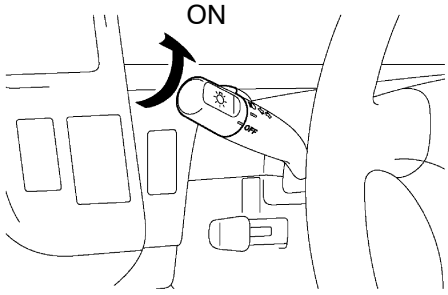
HINT:

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.

FI6649

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.

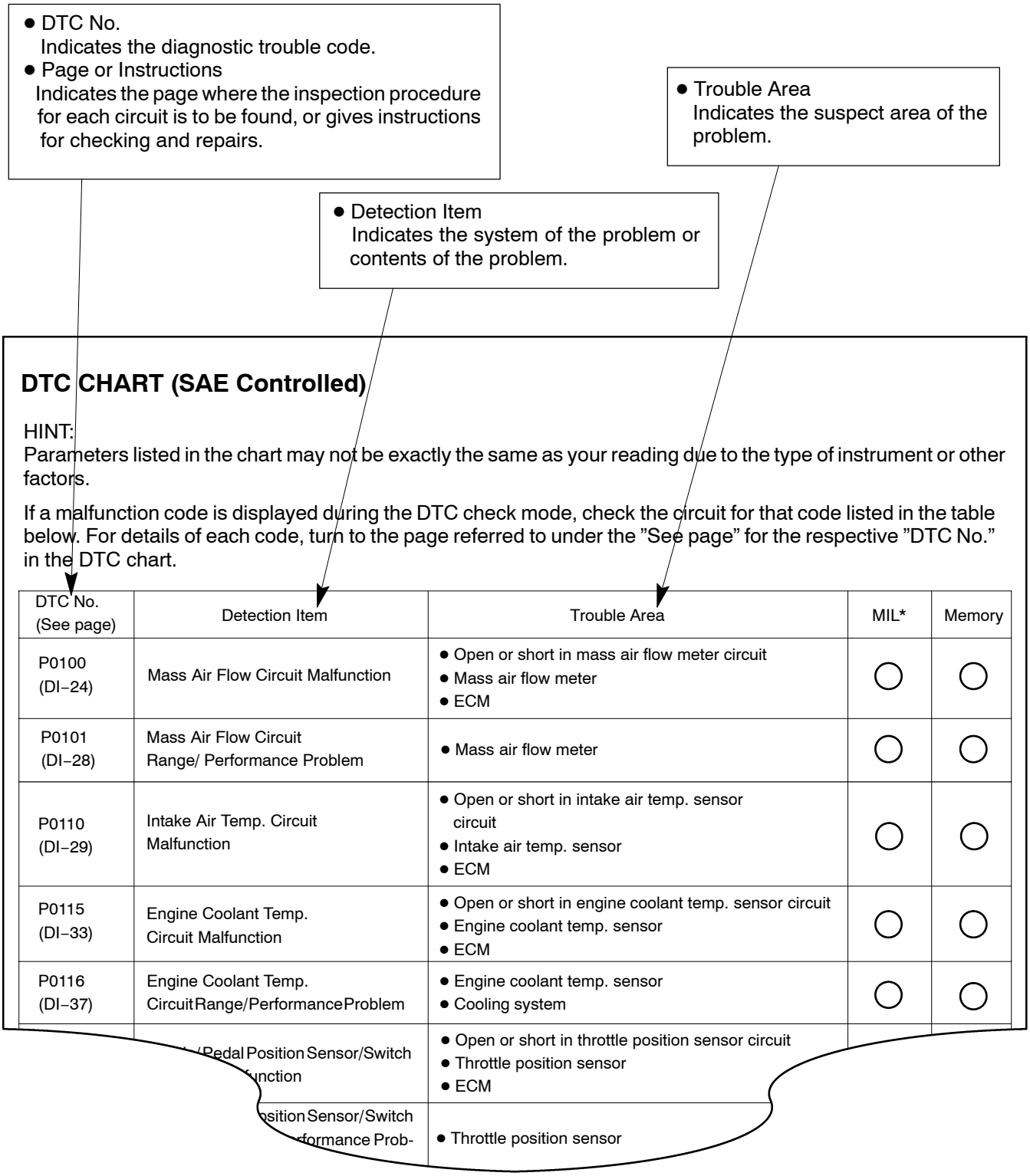


B02389

B02390

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 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.

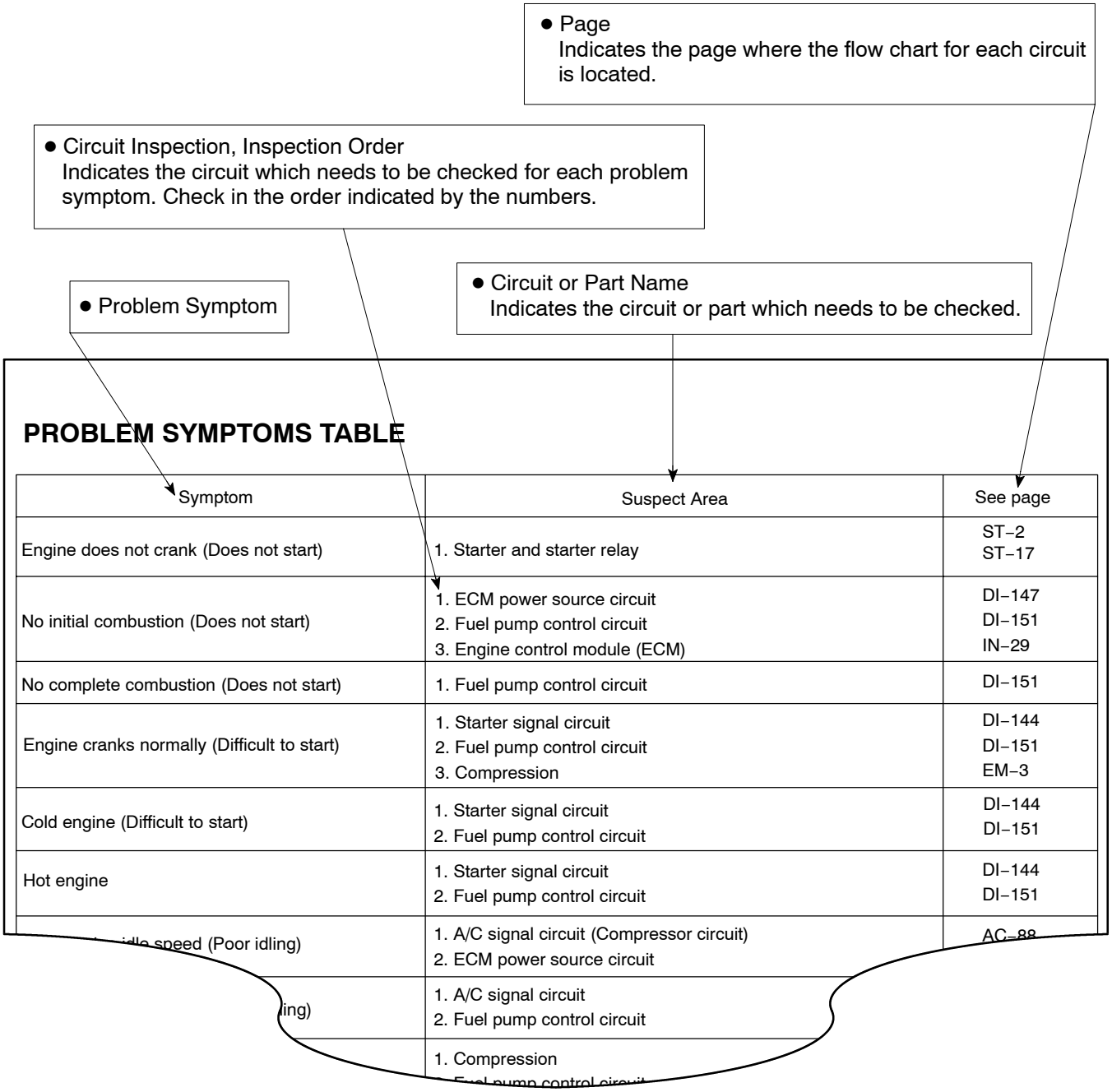
DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P0100 (DI–24)	Mass Air Flow Circuit Malfunction	● Open or short in mass air flow meter circuit ● Mass air flow meter ● ECM	○	○
P0101 (DI–28)	Mass Air Flow Circuit Range/ Performance Problem	● Mass air flow meter	○	○
P0110 (DI–29)	Intake Air Temp. 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	○	○
	/Pedal Position Sensor/Switch unction	● Open or short in throttle position sensor circuit ● Throttle position sensor ● ECM		
	osition Sensor/Switch formance Prob-	● Throttle position sensor		

5. PROBLEM SYMPTOMS TABLE

The suspected 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.

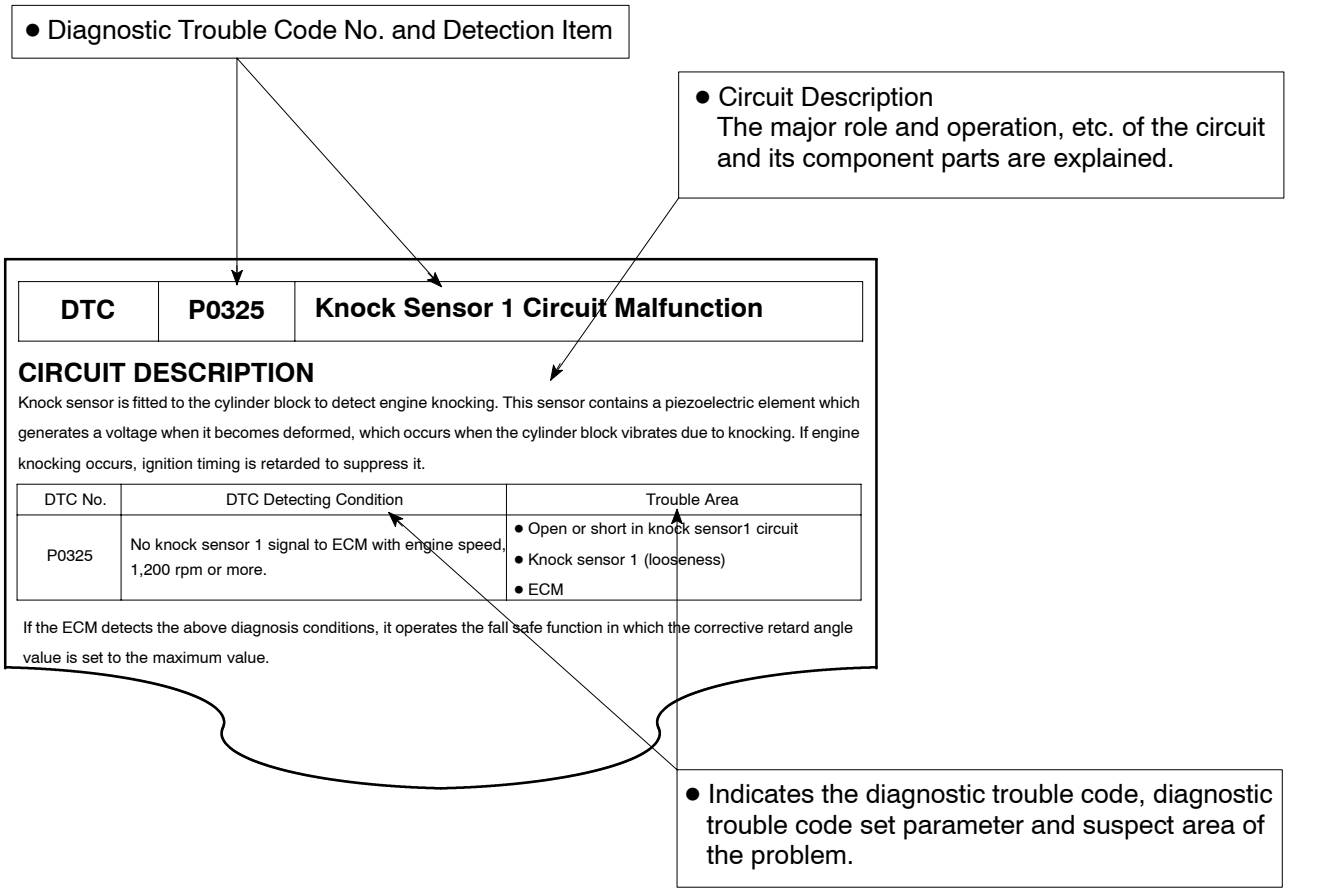


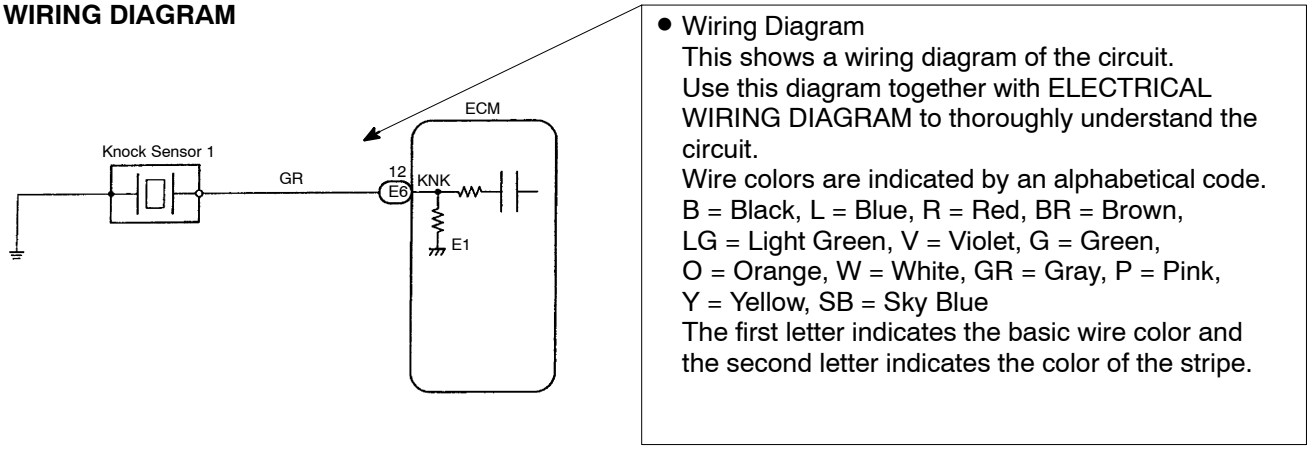
PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST–2 ST–17
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI–147 DI–151 IN–29
No complete combustion (Does not start)	1. Fuel pump control circuit	DI–151
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI–144 DI–151 EM–3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI–144 DI–151
Hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI–144 DI–151
idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	AC–88
ling)	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.





V08423

● Indicates the position of the ignition switch during the check.

LOCK
Ignition Switch LOCK (OFF)

ON
Ignition Switch ON

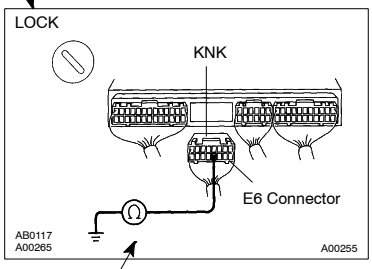
START
Ignition Switch START

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–68).
(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

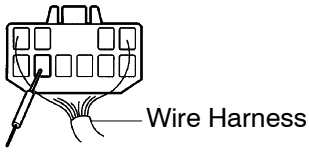
OK	**Go to step 3.**

NG

2	**Check knock sensor (See page SF–61).**

OK	**Replace knock sensor.**

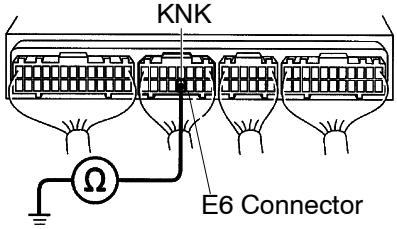
● Indicates the place to check the voltage or resistance.
● Indicates the connector position to be checked, from the front or back side.



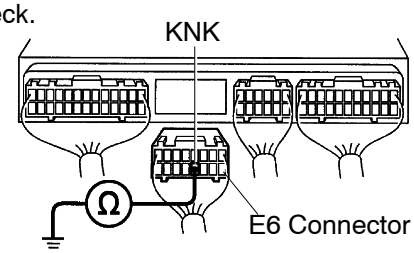
Check from the connector back side. (with harness)

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.

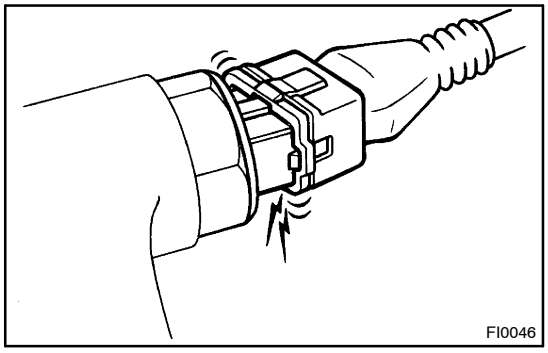


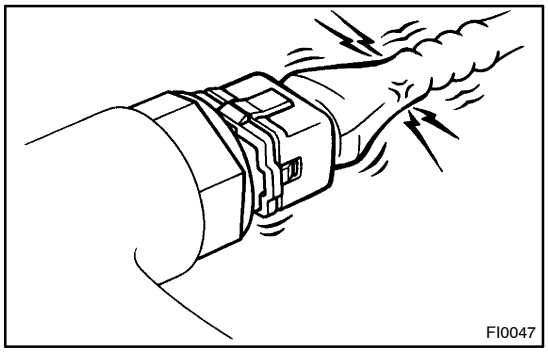
Connector being checked is connected.

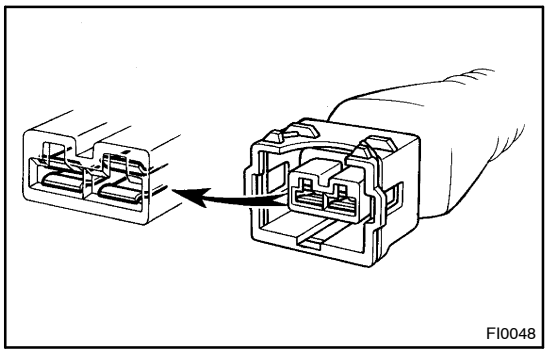


Connector being checked is disconnected.

V08425


FI0046


FI0047


FI0048

IN011–20

HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

1. CONNECTOR CONNECTION AND TERMINAL INSPECTION

- For troubleshooting, diagnostic trouble code charts or problem symptom table 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. 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:

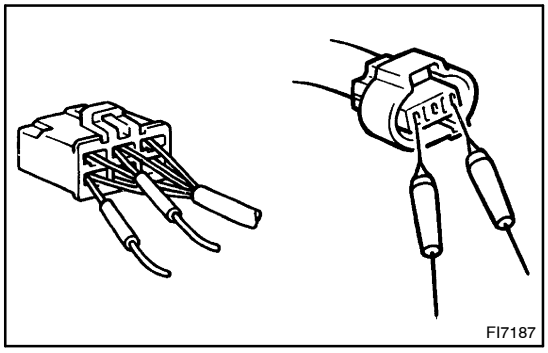
- It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators
- Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of 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.

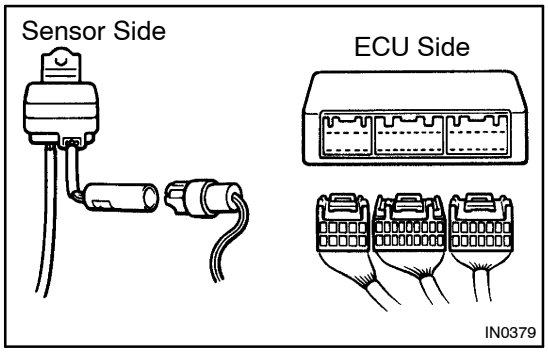
HINT:

When there is a short circuit between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.



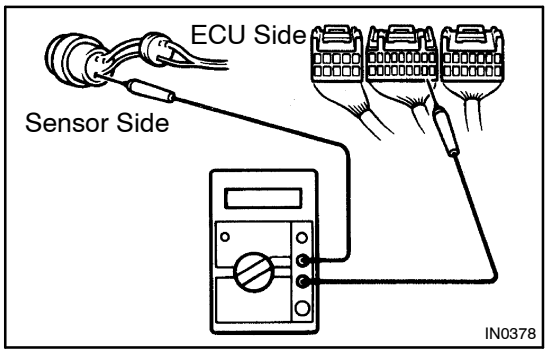
2. CONNECTOR HANDLING

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.



3. CONTINUITY CHECK (OPEN CIRCUIT CHECK)

(a) Disconnect the connectors at both ECU and sensor sides.

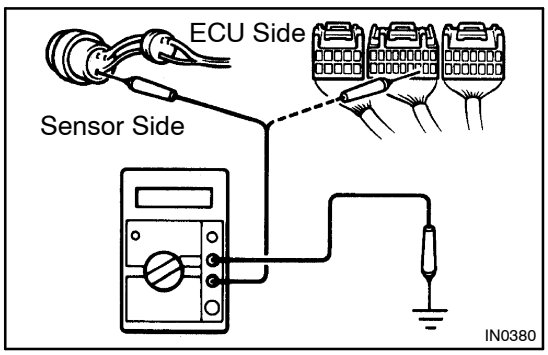


(b) Measure the resistance between the applicable terminals of the connectors.

Resistance: 1 Ω or less

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



4. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

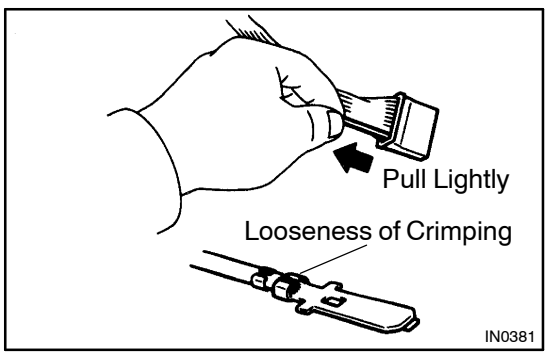
(a) Disconnect the connectors on both ends.

(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.



5. 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 from the back.

(d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

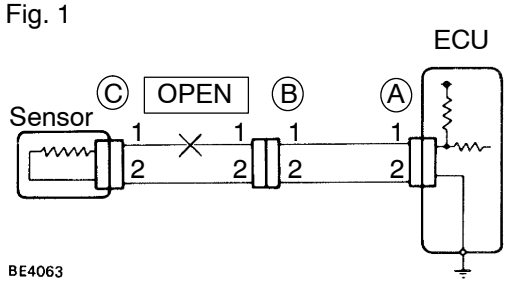
NOTICE:

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.

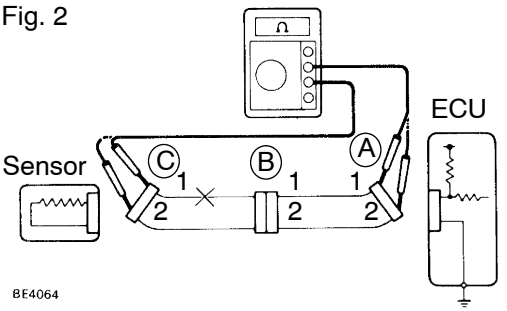
Fig. 1



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.

Fig. 2



(a) Check the continuity.

(1) Disconnect connectors "A" and "C" and measure the resistance between them.

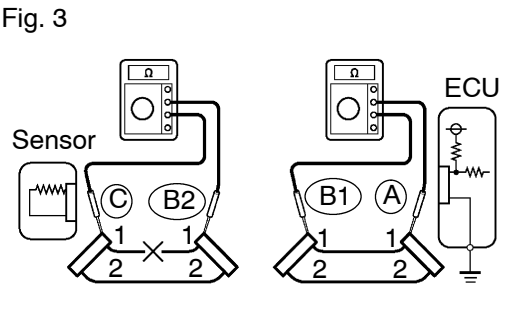
In the case of Fig. 2,

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".

Fig. 3



(2) Disconnect connector "B" and measure the resistance between the connectors.

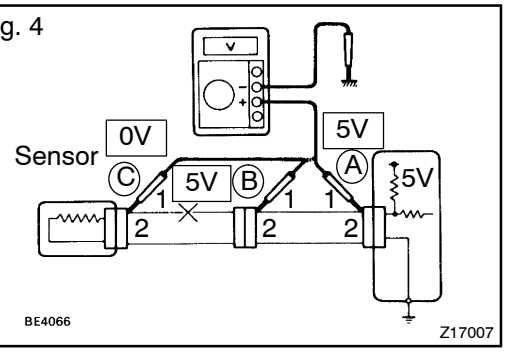
In the case of Fig. 3,

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:

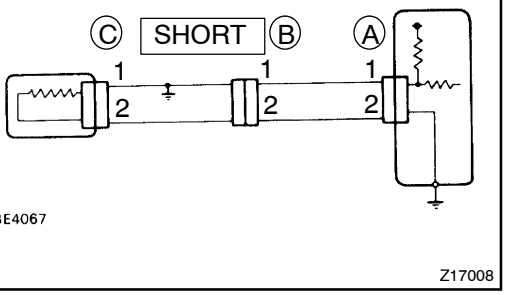
5V: Between Terminal 1 of connector ”A” and Body Ground

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”.

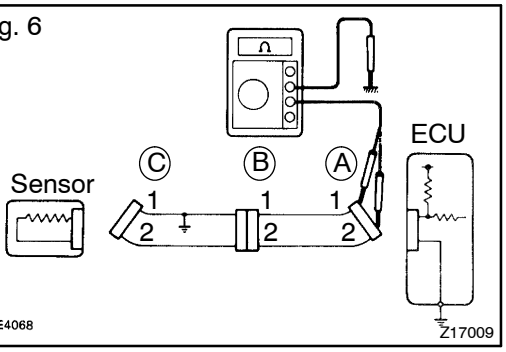
Fig. 5



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.

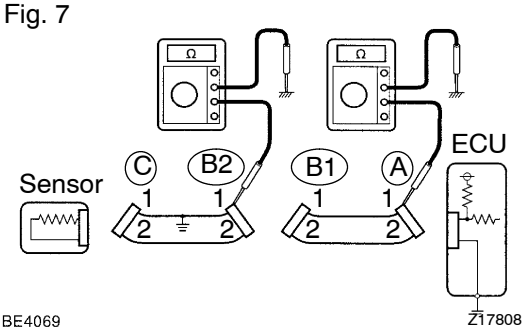
In the case of Fig. 6

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”.

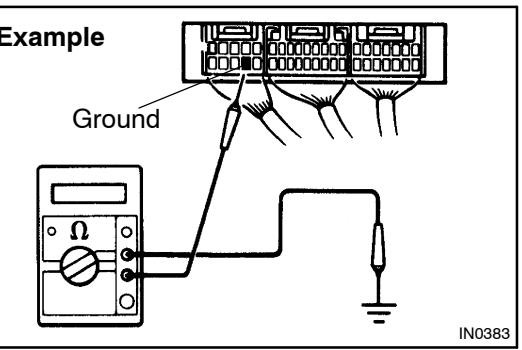
Fig. 7



(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”.

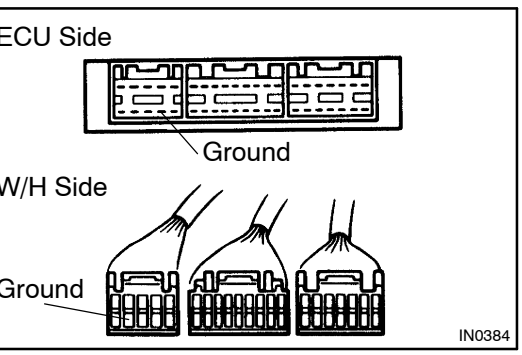
8. CHECK AND REPLACE ECU

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

ABBREVIATIONS USED IN THIS MANUAL

IN0DT–01

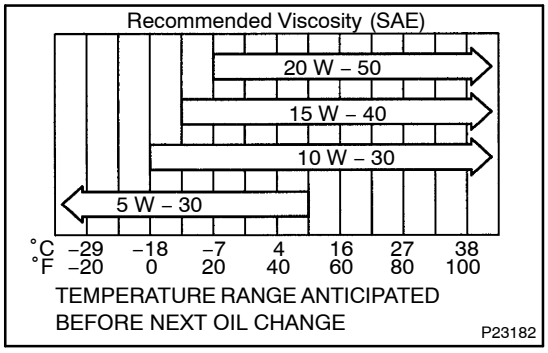
Abbreviations	Meaning
ABS	Anti–Lock Brake System
A/C	Air Conditioner
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACSD	Automatic Cold Start Device
A.D.D.	Automatic Disconnecting Differential
A/F	Air–Fuel Ratio
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
AP	Accelerator Pedal
APPROX.	Approximately
A/T	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
B/L	Bi–Level
B/S	Bore–Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
CARB	Carburetor
CB	Circuit Breaker
CCo	Catalytic Converter For Oxidation
CD	Compact Disc
CF	Cornering Force
CG	Center Of Gravity
CH	Channel
COMB.	Combination
CPE	Coupe
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve

CW	Curb Weight
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
D/INJ	Direct Injection
DLC	Data Link Connector
DLI	Distributorless Ignition
DOHC	Double Over Head Cam
DP	Dash Pot
DS	Dead Soak
DSP	Digital Signal Processor
DTC	Diagnostic Trouble Code
ECAM	Engine Control And Measurement System
ECD	Electronic Controlled Diesel
ECDY	Eddy Current Dynamometer
ECT	Electronic Control Transmission
ECU	Electronic Control Unit
ED	Electro–Deposited Coating
EDU	Electronic Driving Unit
EDIC	Electric Diesel Injection Control
EFI	Electronic Fuel Injection
E/G	Engine
EGR	Exhaust Gas Recirculation
EGR–VM	Egr–Vacuum Modulator
ELR	Emergency Locking Retractor
ENG	Engine
EPROM	Erasable Programmable Read Only Memory
ESA	Electronic Spark Advance
ETCS	Electronic Throttle Control System
EVAP	Fuel Evaporative System
EVP	Evaporator
E–VRV	Electric Vacuum Regulating Valve
EXH	Exhaust
FE	Fuel Economy
FF	Front–Engine Front–Wheel–Drive
F/G	Fuel Gage
FIPG	Formed In Place Gasket
FL	Fusible Link
F/P	Fuel Pump
FPU	Fuel Pressure Up
Fr	Front
FR	Front–Engine Rear–Wheel–Drive
F/W	Flywheel
FW/D	Flywheel Damper

FWD	Front–Wheel–Drive
GAS	Gasoline
GND	Ground
HAC	High Altitude Compensator
H/B	Hatchback
H–FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Head Lamp)
HSG	Housing
HT	Hard Top
HWS	Heated Windshield System
IAC	Idle Air Control
IC	Integrated circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
IIA	Integrated Ignition Assembly
IN	Intake (Manifold, Valve)
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
ISC	Idle Speed Control
J/B	Junction Block
J/C	Junction Connector
KD	Kick–Down
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left–Hand
LHD	Left–Hand Drive
L/H/W	Length, Height, Width
LLC	Long–Life Coolant
LNG	Liquified Natural Gas
LO	Low
LPG	Liquified Petroleum Gas
LSD	Limited Slip Differential
LSP & PV	Load Sensing Proportioning And Bypass Valve
LSPV	Load Sensing Proportioning Valve
MAP	Manifold Absolute Pressure
MAX.	Maximum
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MP	Multipurpose
MPI	Multipoint Electronic Fuel Injection

MPX	Multiplex Communication System
M/T	Manual Transmission
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
No.	Number
O2S	Oxygen Sensor
OC	Oxidation Catalyst
O/D	Overdrive
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
O/S	Oversize
P & BV	Proportioning And Bypass Valve
PCS	Power Control System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PROM	Programmable Read Only Memory
PS	Power Steering
PTO	Power Take–Off
R & P	Rack And Pinion
RAM	Random Access Memory
R/B	Relay Block
RBS	Recirculating Ball Type Steering
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right–Hand
RHD	Right–Hand Drive
RLY	Relay
ROM	Read Only Memory
Rr	Rear
RR	Rear–Engine Rear–Wheel Drive
RRS	Rigid Rear Suspension
RWD	Rear–Wheel Drive
SC	Supercharger
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SRS	Supplemental Restraint System

SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold–Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
TACH	Tachometer
TBI	Throttle Body Electronic Fuel Injection
TC	Turbocharger
TCCS	TOYOTA Computer–Controlled System
TCV	Timing Control Valve
TDC	Top Dead Center
TEMP.	Temperature
TEMS	TOYOTA Electronic Modulated Suspension
TIS	Total Information System For Vehicle Development
T/M	Transmission
TRC	Traction Control System
TURBO	Turbocharge
TVV	Thermal Vacuum Valve
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Skid Control Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
w/	With
WGN	Wagon
W/H	Wire Harness
w/o	Without
WU–TWC	Warm Up Three–Way Catalytic Converter
WU–OC	Warm Up Oxidation Catalytic Converter
1st	First
2nd	Second
2WD	Two Wheel Drive Vehicle (4x2)
4WD	Four Wheel Drive Vehicle (4x4)



OIL AND FILTER

LU0GI–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. Recommended viscosity is as shown in the illustration.

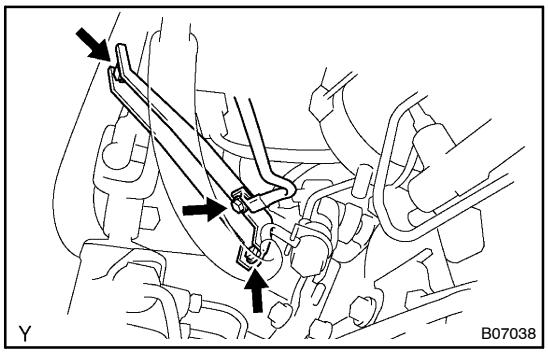
2. CHECK ENGINE OIL LEVEL

After warming up the engine, and then 5 minutes after the engine stops, oil level should be between the low level and full level marks of the dipstick.

If low, check for leakage and add oil up to the full level mark.

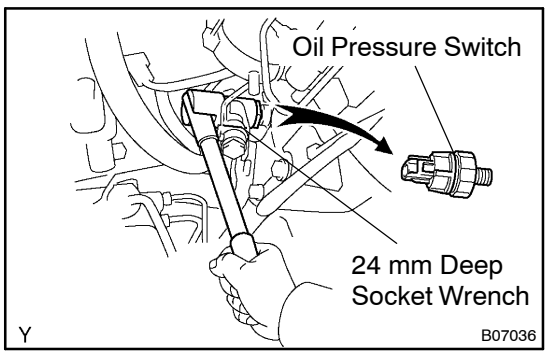
3. CHECK OIL PRESSURE

(a) Remove the No.2 engine under cover.

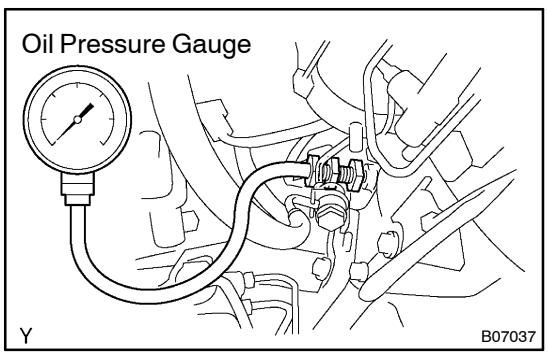


(b) Remove the bolt and disconnect the ground cable.

(c) Remove the 2 bolts and No.2 air intake chamber stay.



(d) Using a 24 mm deep socket wrench, remove the oil pressure switch.



(e) Install the oil pressure gauge.

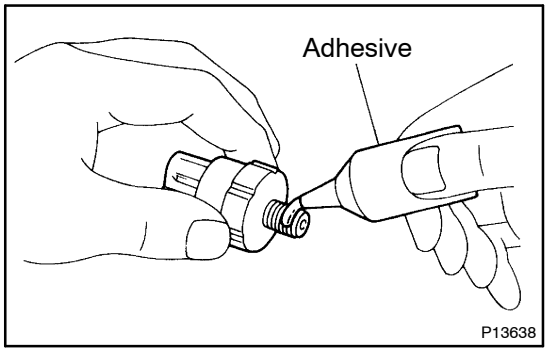
(f) Allow the engine to warm up to normal operating temperature.

(g) Check the oil pressure.

Oil pressure:

At idle	49 kPa (0.5 kgf/cm^2, 7.3 psi) or more
At 3,000 rpm	284 – 441 kPa (2.9 – 4.5 kgf/cm^2, 41 – 64 psi)

(h) Remove the oil pressure gauge.



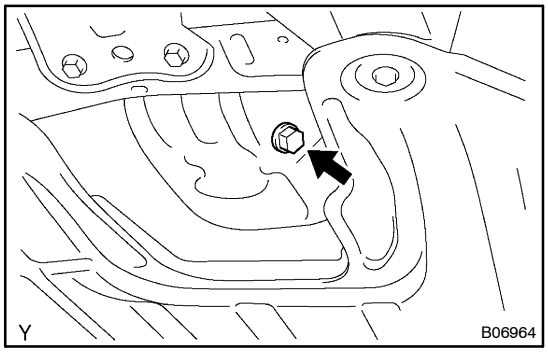
(i) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(j) Reinstall the oil pressure switch.
(k) Reinstall the and No.2 air intake chamber stay with the 2 bolts.
Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)
(l) Reconnect the ground cable with the bolt.
(m) Reinstall the No.2 engine under cover.
(n) Start the engine and check for oil leak.

LU0GJ–01

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.**
- **Care should be taken, therefore, when changing engine oil to minimize the frequency and length of time your skin is exposed to used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be thoroughly washed 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 filters must be disposed of only at designated disposal sites.**



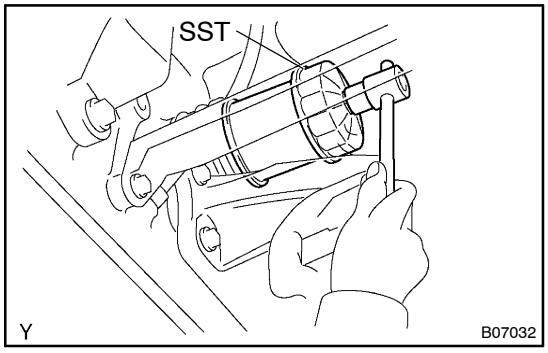
1. DRAIN ENGINE OIL

(a) Remove the oil filler cap.

(b) Remove the oil drain plug, and drain the oil into a container.

2. REPLACE OIL FILTER

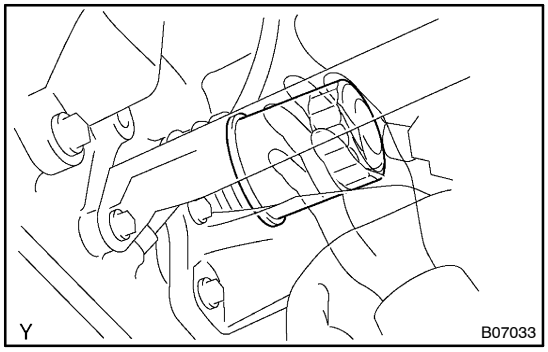
(a) Remove the No.1 engine under cover.



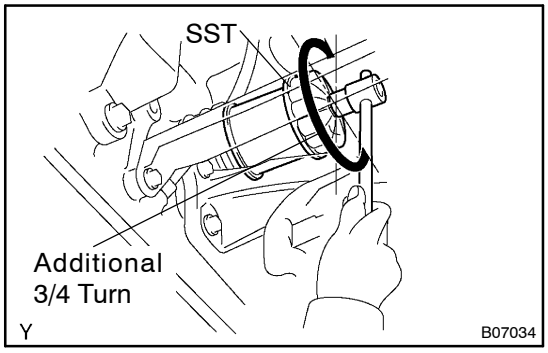
(b) Using SST, remove the oil filter.
SST 09228–07501

(c) Clean the oil filter contacting the oil filter mounting.

(d) Lubricate the filter rubber gasket with clean engine oil.



(e) Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.



(f) Using SST, give it an additional 3/4 turn to seat the filter.
SST 09228–07501

(g) Reinstall the No.1 engine under cover.

3. FILL WITH ENGINE OIL

(a) Clean and install the oil drain plug with a new gasket.
Torque: 37.5 N·m (375 kgf·cm, 27 ft·lbf)

(b) Fill with new engine oil.
Capacity:

Drain and refill		
w/ Oil filter change	M/T	4.2 liters (4.4 US qts, 3.7 Imp. qts)
	A/T	4.1 liters (4.3 US qts, 3.6 Imp. qts)
w/o Oil filter change	M/T	4.0 liters (4.2 US qts, 3.5 Imp. qts)
	A/T	3.9 liters (4.1 US qts, 3.4 Imp. qts)
Dry fill	M/T	4.6 liters (4.9 US qts, 4.0 Imp. qts)
	A/T	4.5 liters (4.8 US qts, 4.0 Imp. qts)

(c) Reinstall the oil filler cap.

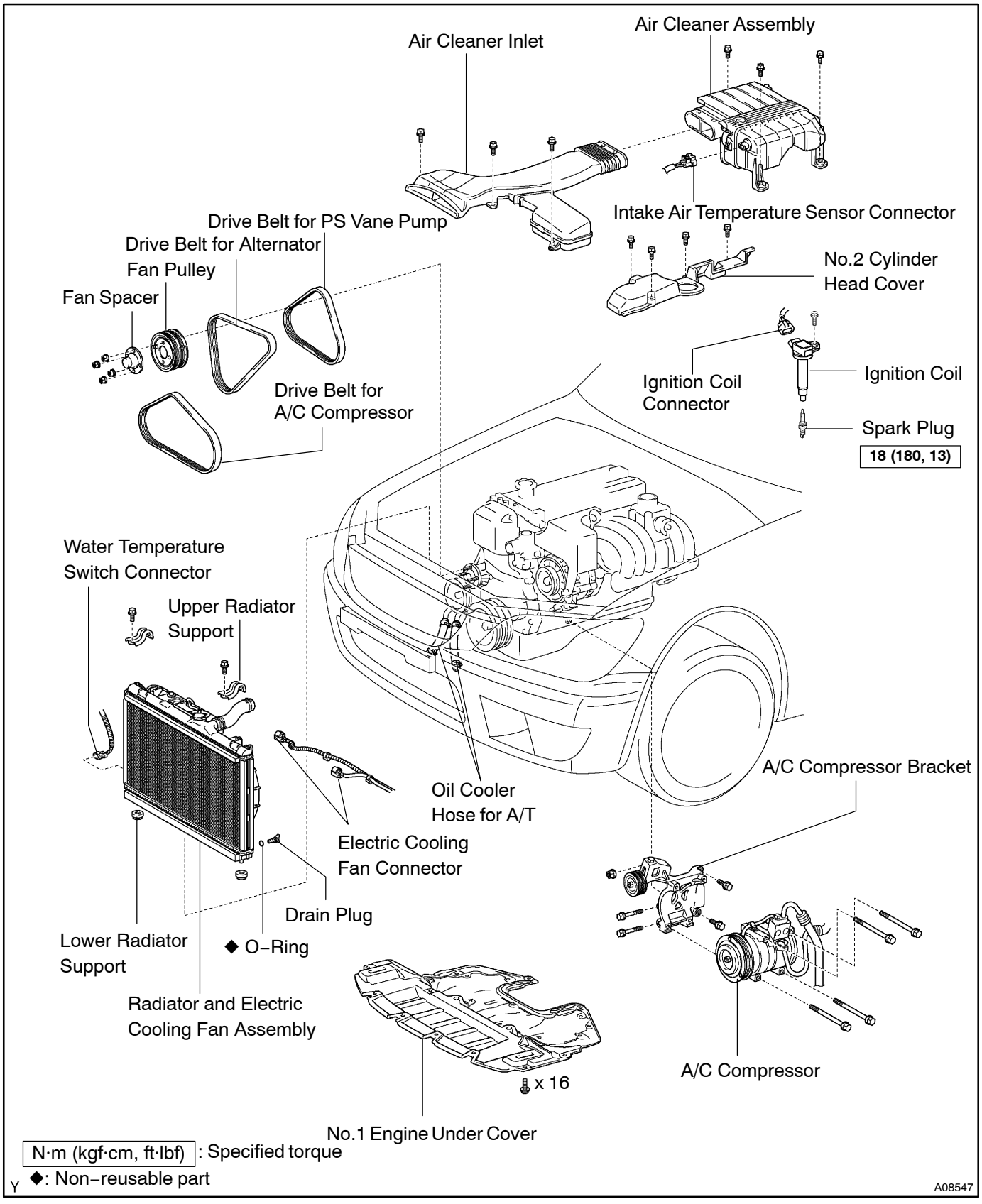
4. START ENGINE AND CHECK FOR OIL LEAK

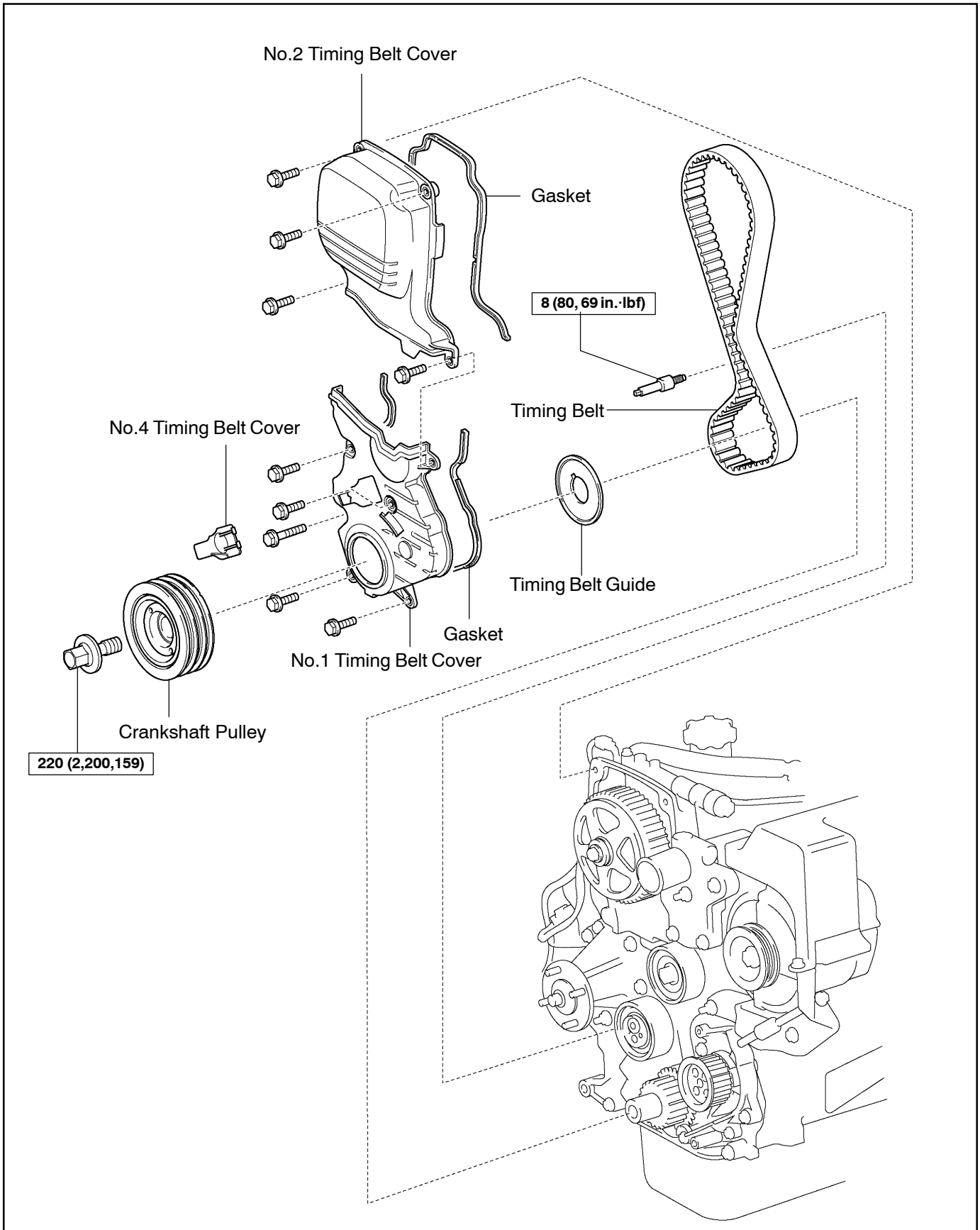
5. RECHECK ENGINE OIL LEVEL

OIL PUMP

COMPONENTS

LU03J–04



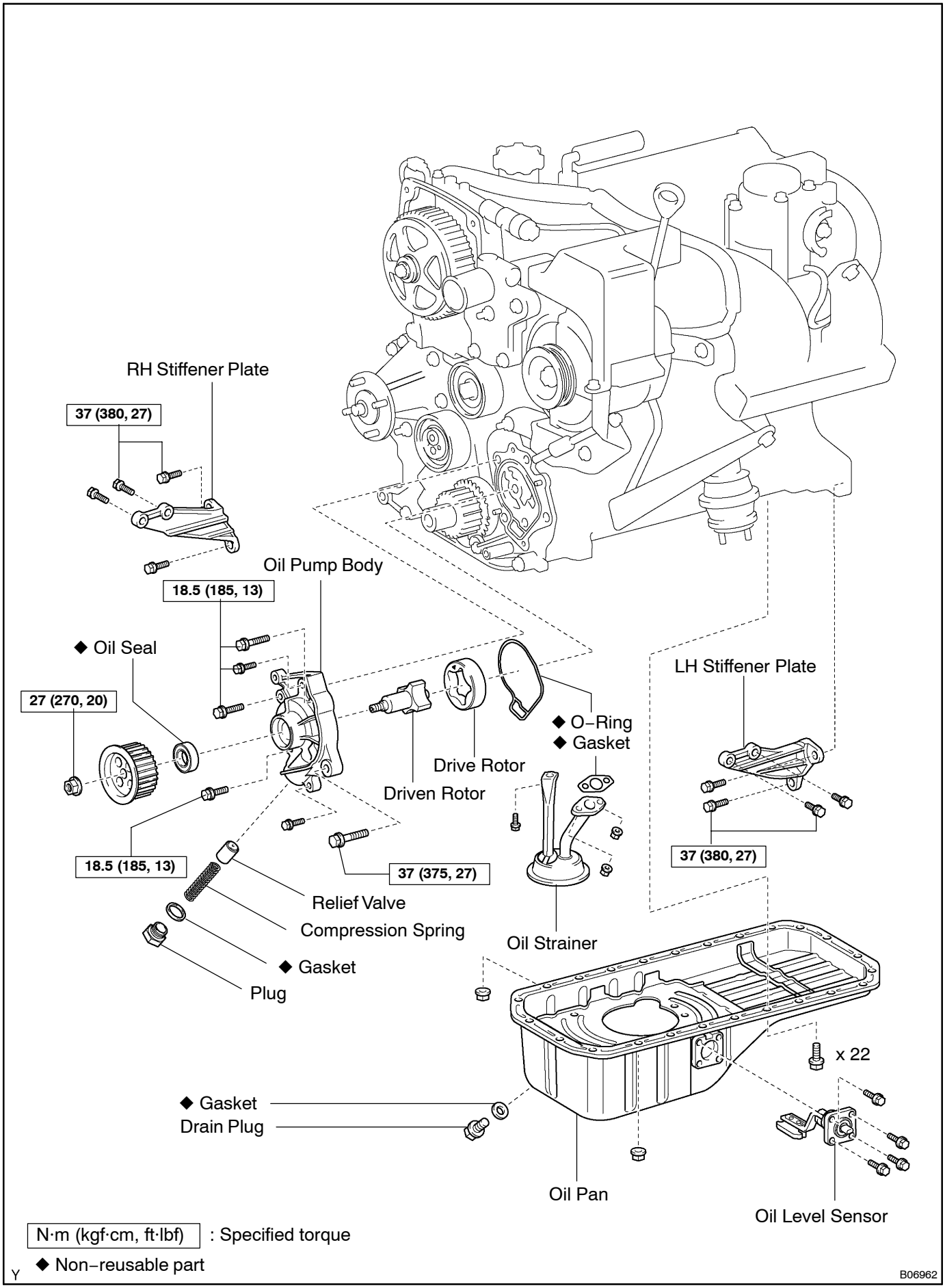


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

Y

A08543

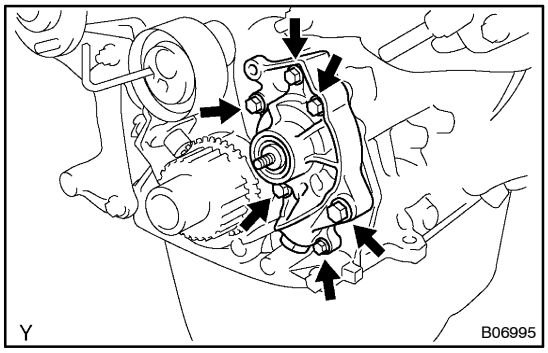

RH Stiffener Plate
37 (380, 27)
Oil Pump Body
18.5 (185, 13)
◆ Oil Seal
27 (270, 20)
◆ O–Ring
◆ Gasket
Drive Rotor
Driven Rotor
LH Stiffener Plate
37 (380, 27)
18.5 (185, 13)
37 (375, 27)
Relief Valve
Compression Spring
◆ Gasket
Plug
Oil Strainer
x 22
◆ Gasket
Drain Plug
Oil Pan
Oil Level Sensor
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Y
B06962

LU0GK–01

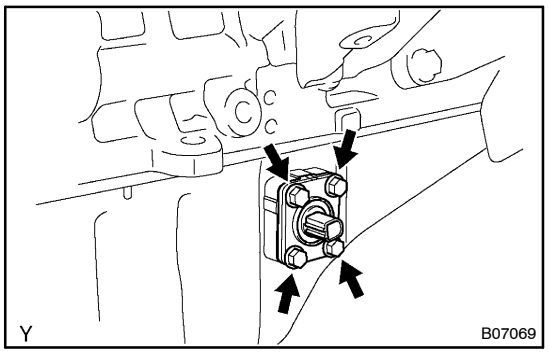
REMOVAL

HINT:
When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

1. **DRAIN ENGINE OIL**
2. **REMOVE TIMING BELT AND OIL PUMP PULLEY** (See page EM–20)

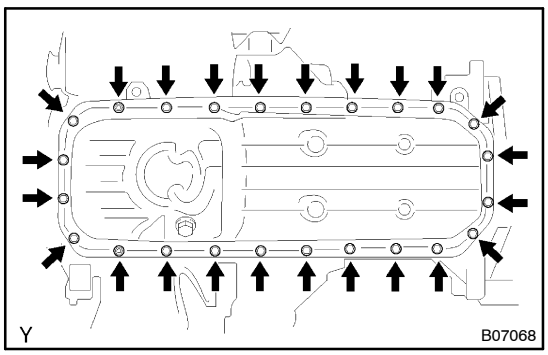


3. **REMOVE OIL PUMP**
(a) Remove the 6 bolts and oil pump.
(b) Remove the O–ring.
4. **REMOVE RH AND LH STIFFENER PLATES**

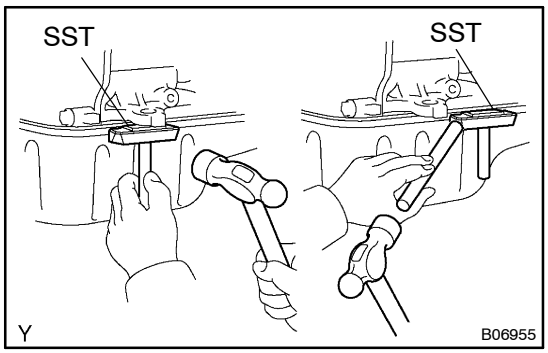


5. **REMOVE OIL LEVEL SENSOR**
(a) Disconnect the level sensor connector.
(b) Remove the 4 bolts and level sensor.

NOTICE:
Be careful not to drop the oil level sensor when removing it.

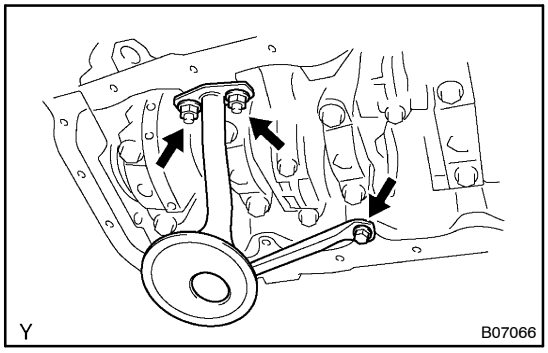


6. **REMOVE OIL PAN**
(a) Remove the oil dipstick.
(b) Remove the 22 bolts and 2 nuts.



(c) Insert the blade of SST between the cylinder block and oil pan, and cut off applied sealer and remove the oil pan.
SST 09032–00100

NOTICE:
- **Do not use SST for the timing belt case and rear oil seal retainer.**
- **Be careful not to damage the oil pan flange.**

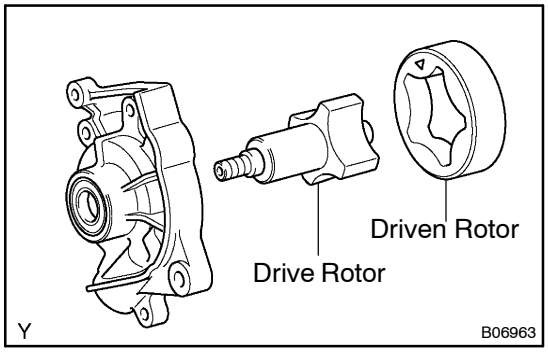


7. REMOVE OIL STRAINER

Remove the bolt, 2 nuts, oil strainer and gasket.

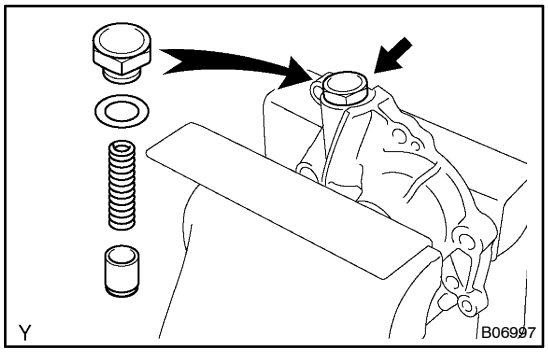
LU03L–04

DISASSEMBLY



1. REMOVE DRIVE AND DRIVEN ROTORS

Pull out the drive and driven rotors.



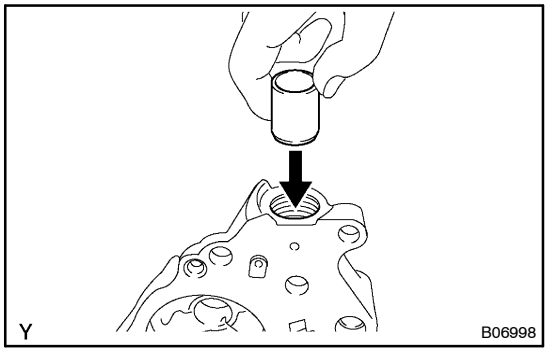
2. REMOVE RELIEF VALVE

(a) Carefully mount the oil pump body in a soft jaw vise.

(b) Remove the plug, gasket, spring and relief valve.

LU0GL–01

INSPECTION



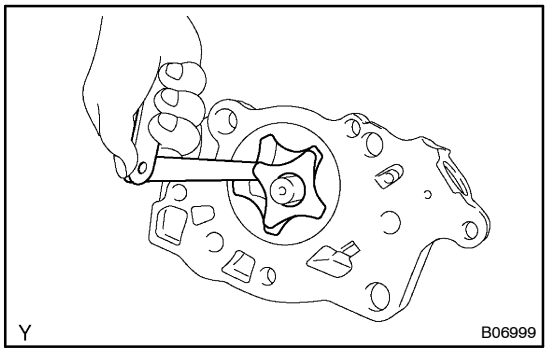
1. INSPECT RELIEF VALVE

Coat the valve with engine oil and check if it falls smoothly into the valve hole by its own weight.

If it doesn't, replace the relief valve. If necessary, replace the oil pump assembly.

2. INSPECT DRIVE AND DRIVEN ROTORS

(a) Place the drive and driven rotors into the oil pump body. (See page LU–14)



(b) Inspect the rotors for tip clearance.

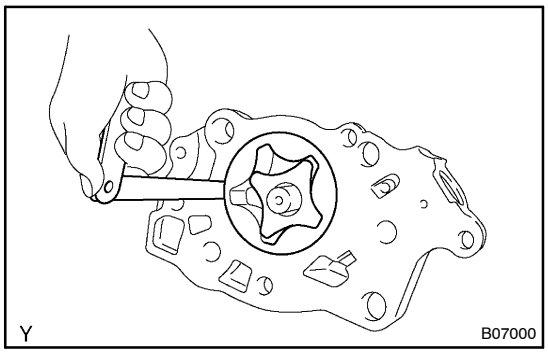
Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Standard tip clearance:

0.04 – 0.16 mm (0.0016 – 0.0063 in.)

Maximum tip clearance: 0.20 mm (0.0079 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.



(c) Inspect the rotors for body clearance.

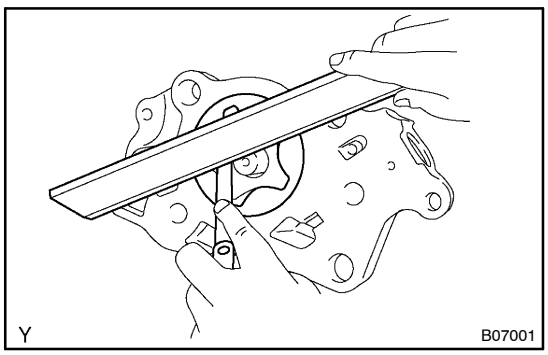
Using a feeler gauge, measure the clearance between the driven rotor and body.

Standard body clearance:

0.10 – 0.16 mm (0.0039 – 0.0063 in.)

Maximum body clearance: 0.20 mm (0.0079 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



(d) Inspect the rotors for side clearance.

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:

0.03 – 0.09 mm (0.0012 – 0.0035 in.)

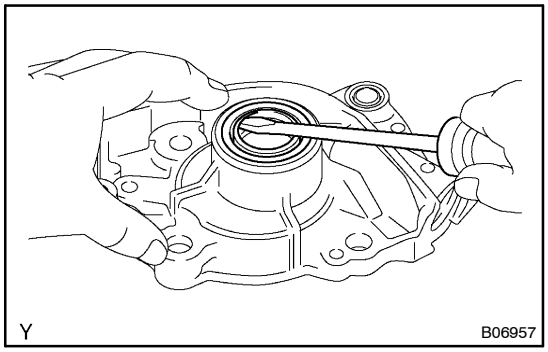
Maximum side clearance: 0.15 mm (0.0059 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

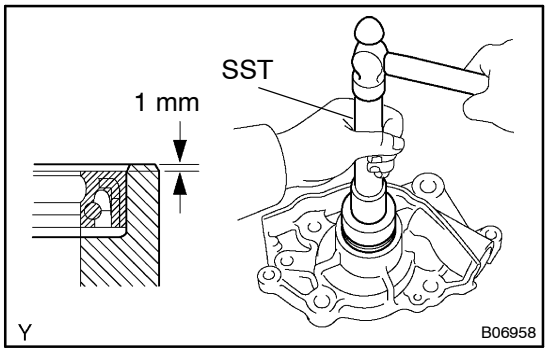
LU03N–04

REPLACEMENT

REPLACE OIL PUMP OIL SEAL



(a) Using a screwdriver, pry out the oil seal.

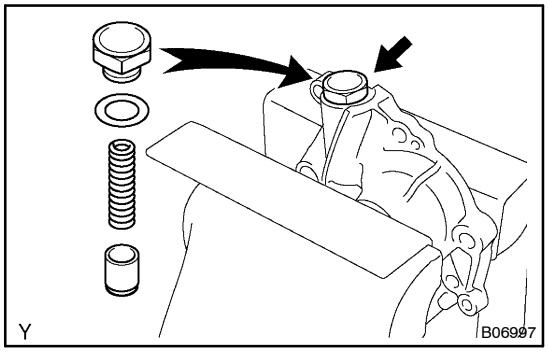


(b) Using SST and a hammer, tap in a new oil seal to a depth of approx. 1 mm (0.04 in.) from the oil pump body edge.
SST 09950–60010 (09951–00300),
09950–70010 (09951–07100)

(c) Apply MP grease to the oil seal lip.

LU0GM–01

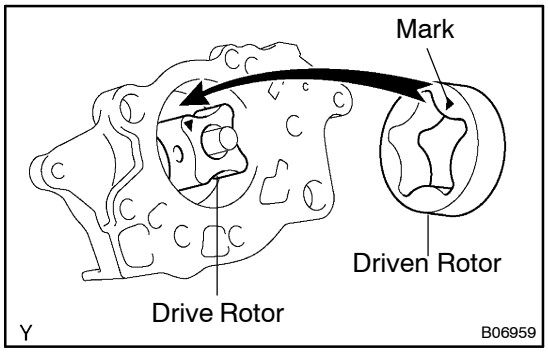
REASSEMBLY



1. INSTALL RELIEF VALVE

(a) Insert the relief valve and spring into the oil pump body hole.

(b) Install the plug with a new gasket.
Torque: 36.8 N·m (375 kgf·cm 27 ft·lbf)

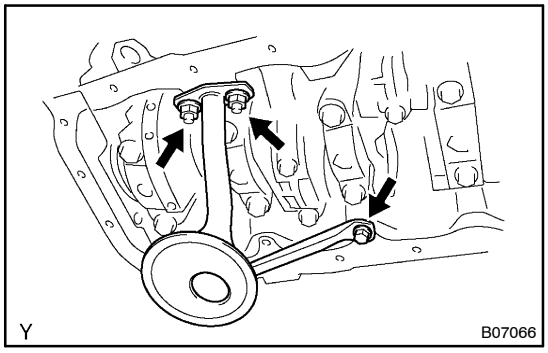


2. INSTALL DRIVE AND DRIVEN ROTORS

Install the drive and driven rotors into pump body with the mark on the driven rotor facing the pump body side.

LU0GN–01

INSTALLATION



1. INSTALL OIL STRAINER

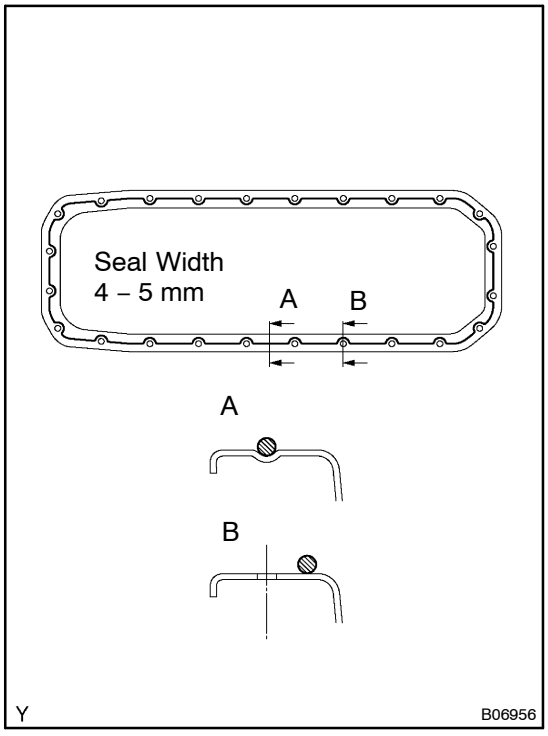
Install a new gasket and the oil strainer with the bolt and 2 nuts.

Torque:
8.5 N·m (85 kgf·cm, 74 in.·lbf) for bolt
18.5 N·m (185 kgf·cm, 13 ft·lbf) for nut

2. INSTALL OIL PAN

(a) Remove any old seal packing (FIPG) material and be careful not to drop any oil on the surfaces of the oil pan 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 surface.

NOTICE:
Do not use a solvent which will affect the painted surfaces.



(b) Apply a seal packing to the oil pan 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.
- 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 the cap.

(c) Install the oil pan with the 22 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.
Torque: 5.5 N·m (55 kgf·cm, 48 in.·lbf)

(d) Install the dipstick.

3. INSTALL RH AND LH STIFFENER PLATES
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

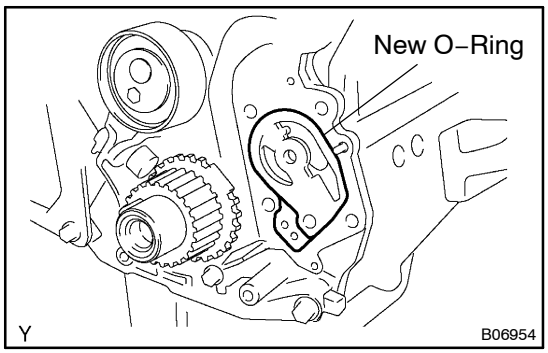
4. INSTALL OIL LEVEL SENSOR

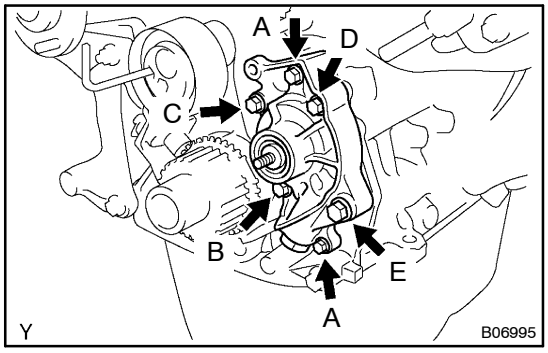
(a) Install the level sensor with the 4 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Connect the level sensor connector.

5. INSTALL OIL PUMP

(a) Install a new O–ring into the timing belt case groove.





(b) Install the oil pump with the 6 bolts.

Torque:
9 N·m (90 kgf·cm, 78 in.·lbf) for 10 mm head
18.5 N·m (185 kgf·cm, 13 ft·lbf) for 12 mm head
37 N·m (375 kgf·cm, 27 ft·lbf) for 14 mm head

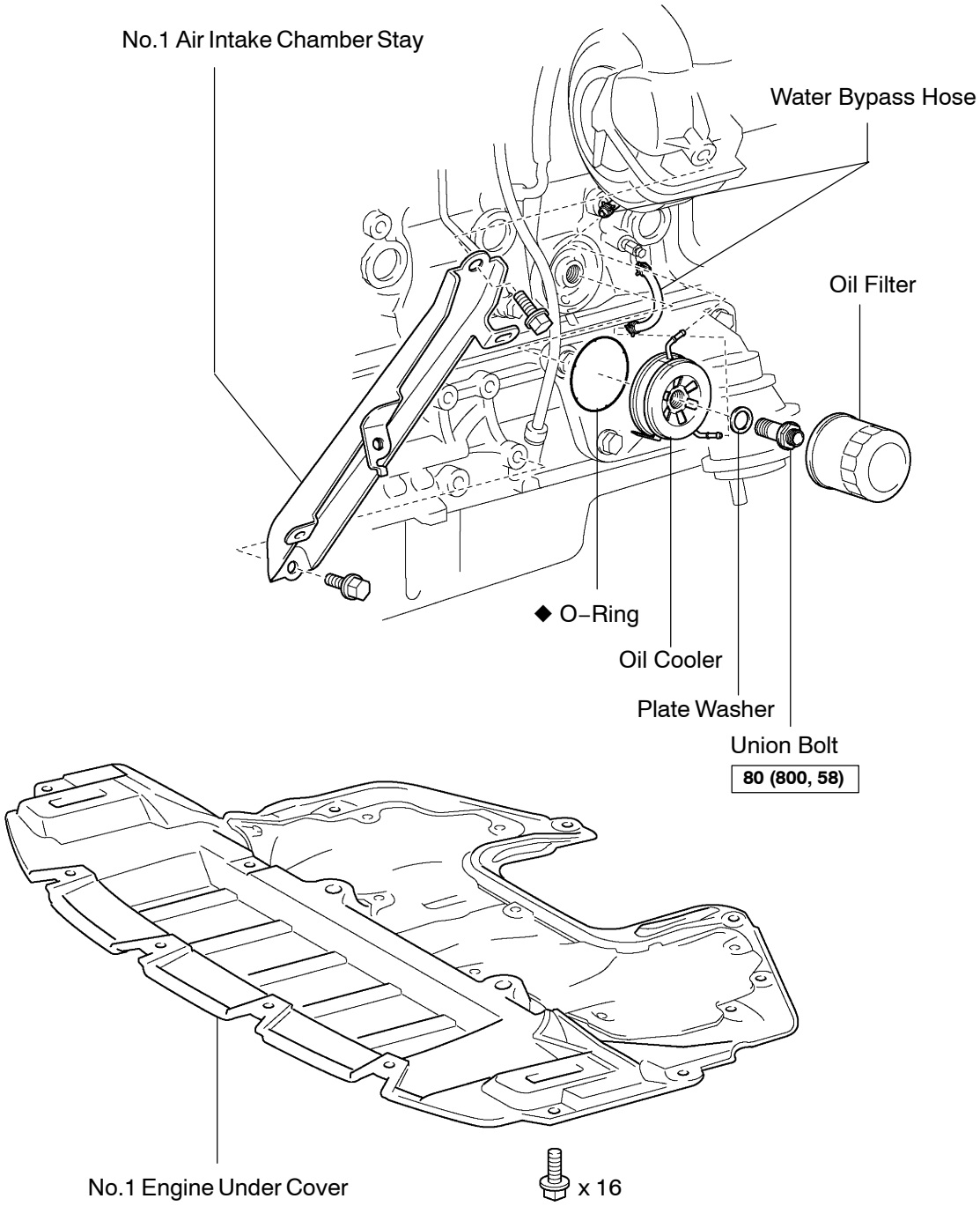
HINT:
Each bolt length is indicated in the illustration.
Bolt length:
20 mm (0.79 in.) for A
30 mm (1.18 in.) for B
35 mm (1.38 in.) for C
40 mm (1.57 in.) for D
50 mm (1.97 in.) for E

6. **INSTALL OIL PUMP PULLEY AND TIMING BELT (See page EM–26)**
7. **FILL WITH ENGINE OIL**
8. **START ENGINE AND CHECK FOR OIL LEAK**
9. **RECHECK ENGINE OIL LEVEL**

OIL COOLER

COMPONENTS

LU03Q–04



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

◆ Non–reusable part

Y

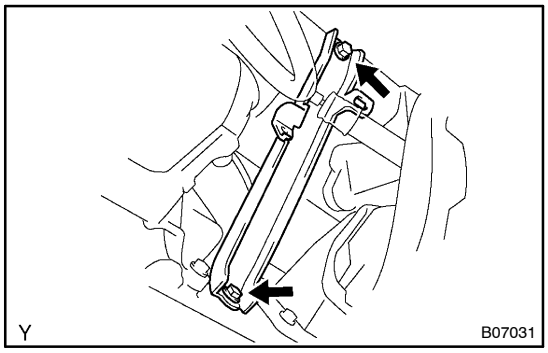
B07029

LU0GO–01

REMOVAL

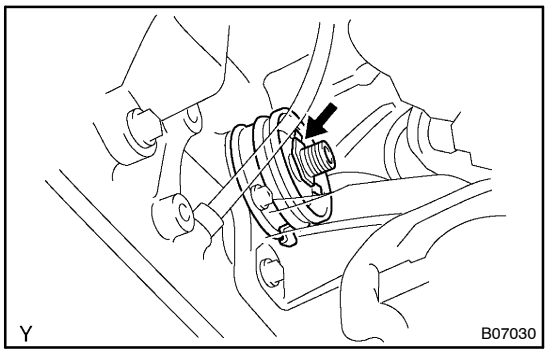
1. REMOVE NO.1 ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT



3. REMOVE NO.1 AIR INTAKE CHAMBER STAY

4. REMOVE OIL FILTER (See page LU–3)



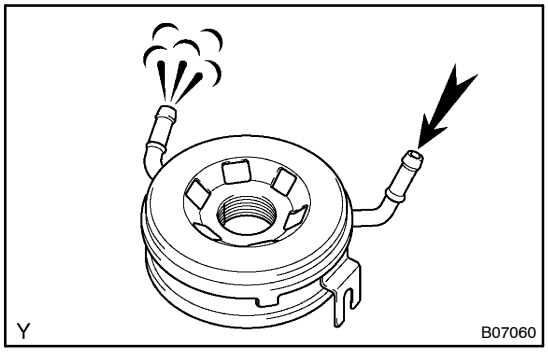
5. REMOVE OIL COOLER

(a) Remove the union bolt and plate washer.

(b) Disconnect the 2 water bypass hoses from the oil cooler and remove the oil cooler.

(c) Remove the O–ring from the oil cooler.

LU03S–04



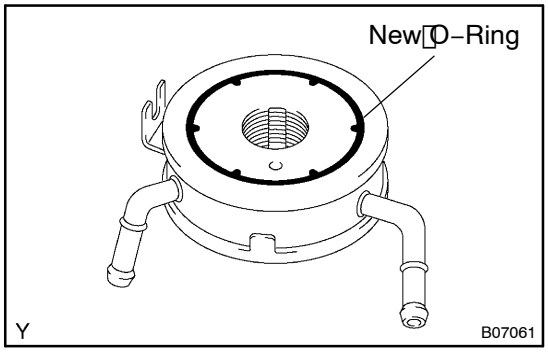
INSPECTION

INSPECT OIL COOLER

Check the oil cooler for damage or clogging.
If necessary, replace the oil cooler.

LU0GP–01

INSTALLATION

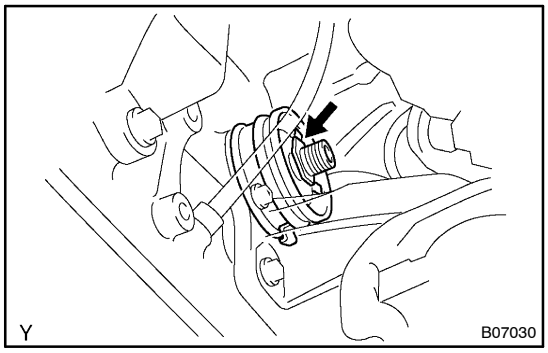


1. INSTALL OIL COOLER

(a) Clean the oil cooler contact surface on the oil cooler mounting.

(b) Install a new O–ring to the oil cooler.

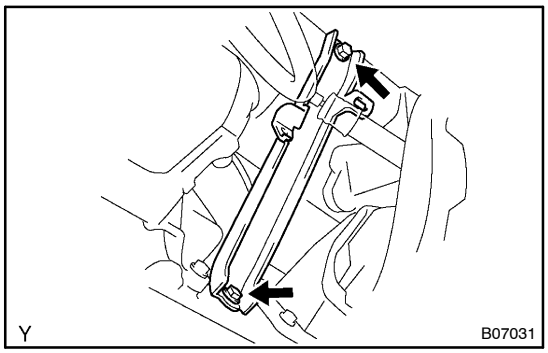
(c) Connect the 2 water bypass hoses to the oil cooler.



(d) Apply a light coat of engine oil on the threads and under the head of the union bolt.

(e) Install the oil cooler with the plate washer and union bolt.
Torque: 80 N·m (800 kgf·cm, 58 ft·lbf)

2. INSTALL OIL FILTER (See page LU–3)



3. INSTALL NO.1 AIR INTAKE CHAMBER STAY
Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

4. FILL WITH ENGINE COOLANT

5. START ENGINE AND CHECK FOR LEAK

6. INSTALL NO.1 ENGINE UNDER COVER

7. CHECK ENGINE OIL LEVEL

ENGINE

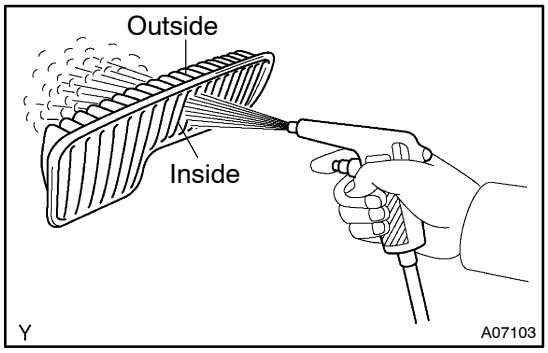
MA028–02

INSPECTION

HINT:

Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT** (See page EM–18)
2. **INSPECT DRIVE BELT** (See page CH–1)
3. **REPLACE SPARK PLUGS** (See page IG–1)



4. **INSPECT AIR FILTER**

(a) Remove the air filter.

(b) Visually check that the air filter is not excessively damaged or oily.

If necessary, replace the air filter.

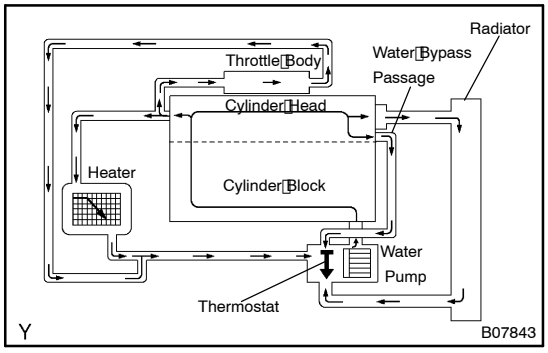
(c) Clean the filter with compressed air.
First blow from the inside thoroughly, then blow the outside of the filter.

(d) Reinstall 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. **INSPECT COOLING, HEATER SYSTEM HOSES AND CONNECTIONS**

(a) Check the relating parts for coolant leakage and damage.

• Radiator	• Water pump
• Radiator reservoir	• Cylinder block & Cylinder head
• Drain plugs	• Heater
• Water inlet	• Throttle body
• Water outlet	• Oil cooler

(b) Check the hoses cracks or deterioration.

(c) Check the clamps for looseness.

(d) The coolant level at radiator reservoir should be between "LOW" and "FULL" lines.

8. **REPLACE ENGINE COOLANT** (See page CO–2)
9. **INSPECT PCV VALVE, HOSES AND CONNECTIONS** (See page EC–4)
10. **INSPECT CHARCOAL CANISTER** (See page EC–6)
11. **Except Europe:**
REPLACE FUEL FILTER (See page FI–9)
12. **INSPECT FUEL TANK CAP** (See page EC–6)

13. INSPECT FUEL LINES, CONNECTIONS AND FUEL VAPOR CONTROL VALVE

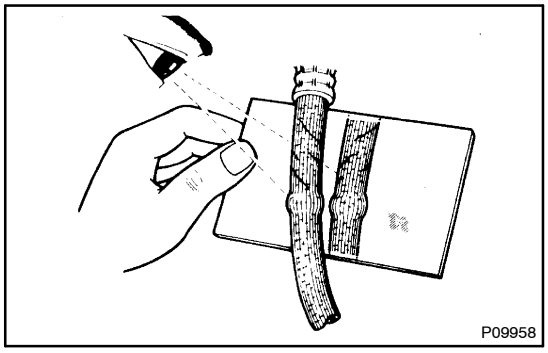
Visually check the fuel lines for cracks, leakage, loose connections, deformation or tank band looseness.

14. INSPECT EXHAUST PIPES AND MOUNTINGS

Visually check the pipes, hangers and connections for severe corrosion, leaks or damage.

15. INSPECT BATTERY (See page CH–1)

16. INSPECT VALVE CLEARANCE (See page EM–6)



BRAKE

MA01R-03

INSPECTION

1. **INSPECT BRAKE PEDAL AND PARKING BRAKE (See pages BR-6 and BR-42)**
2. **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 all brake lines and hoses for:
- Damage
- Wear
- Deformation
- Cracks
- Corrosion
- Leaks
- Bends
- Twists

(b) Check all clamps for tightness and connections for leakage.

(c) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.

(d) Check that the lines installing grommets pass through the center of the grommets.

3. **INSPECT FRONT AND REAR BRAKE PADS AND DISCS**
   (FRONT PADS: See page BR-23)
   (REAR PADS: See page BR-32)
   (FRONT DISCS: See page BR-28)
   (REAR DISCS: See page BR-37)
4. **INSPECT PARKING BRAKE LININGS AND DRUMS (See page BR-42)**
5. **INSPECT OR CHANGE BRAKE FLUID (See page BR-4)**
   Fluid: SAE J1703 or FMVSS No.116 DOT3

CHASSIS

MA026–02

INSPECTION

1. INSPECT POWER STEERING FLUID (See page SR–6)

2. INSPECT STEERING LINKAGE

(a) Check the steering wheel freeplay. (See page SR–9)

(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.

3. INSPECT SRS AIRBAG

(DRIVER'S SIDE: See page RS–15)

(PASSENGER'S SIDE: See page RS–28)

4. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.

5. CHECK WHEEL ALIGNMENT (SIDE SLIP)

Side slip: 3.0 mm/m (0.118 in./3.3 ft) or less

6. INSPECT LOWER BALL JOINTS AND DUST COVERS

(a) Jack up the front of the vehicle and support it with stands.

(b) Make sure the front wheels are in a straight–ahead position, and depress the brake pedal.

(c) Jack up the lower suspension arm until there is about half a load on the front coil spring.

(d) Inspect the dust cover for damage.

7. CHECK AUTOMATIC TRANSMISSION AND DIFFERENTIAL

Visually check the automatic transmission and differential for oil leakage.

If leakage is found, check for the cause and repair it.

8. CHECK MANUAL TRANSMISSION AND DIFFERENTIAL

Visually check the manual transmission and differential for oil leakage.

If leakage is found, check for the cause and repair it.

9. REPLACE AUTOMATIC TRANSMISSION FLUID (See page DI–156)

10. REPLACE MANUAL TRANSMISSION FLUID (See page MT–5)

11. REPLACE DIFFERENTIAL OIL (See page SA–69)

12. INSPECT FRONT AND REAR SUSPENSIONS

(a) Check the suspension parts for looseness or damage.

(b) Check the shock absorber performance.

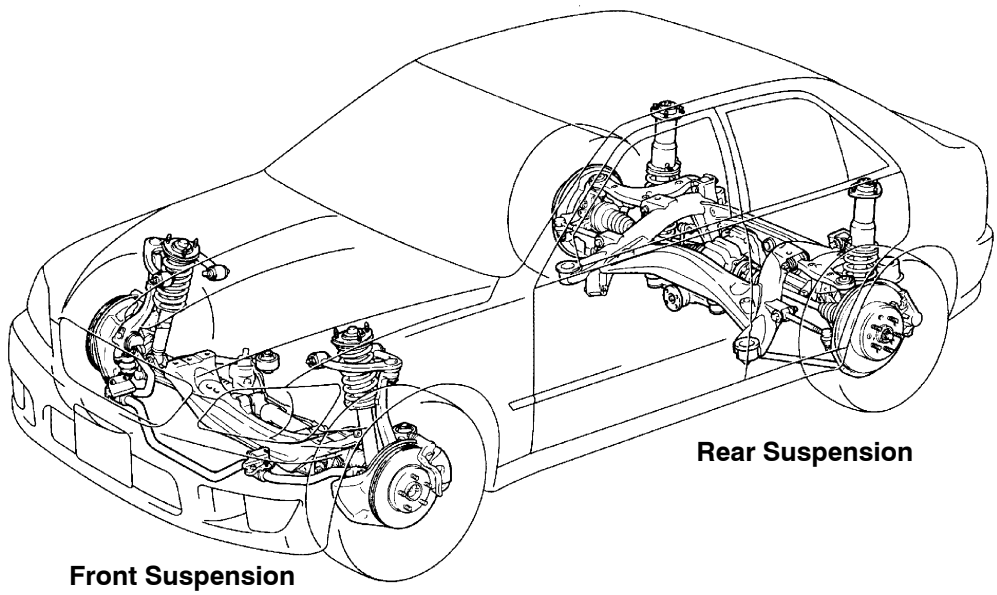
(c) Check the vehicle for tilting.

(d) Check the springs for wear or breakage.

(e) Check the suspension bushings for wear.

(f) Check the wheel bearings for wear or noise.

- Jack up the front and rear axle and support them on stands.
- Move the wheel in axial and radial directions and check the wheel bearing for wear.
- Rotate the wheel and check the bearing for noise.



Y

B07842

BODY

MA027–02

INSPECTION

1. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

(a) Where necessary, tighten all parts of the chassis.
- Front axle and suspension
- Driven train
- Rear axle and suspension
- Steering system
- Brake system
- Engine mounting etc.

(b) Where necessary, tighten all parts of the body.
- Seat belt system
- Seats
- Doors and hood
- Body mountings
- Fuel tank
- Exhaust pipe system etc.

2. CHECK TIRES AND INFLATION PRESSURE

(a) Check tires for abnormal abrasion or cracks.

(b) Check and adjust the tires inflation pressure.

Cold tire inflation pressure: (See page SA–2)

3. CHECK LIGHTS, HORNS, WIPERS AND WASHERS

Check the function of lights, horns, wipers and washers.

4. ROAD TEST

(a) Check the engine and chassis for abnormal noises.

(b) Check that the vehicle does not wander or pull to one side.

(c) Check that the brakes work properly and do not drag.

(d) Do setting of the parking brake shoes and drum.

5. 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 locks operate properly
  - Doors close properly
- Luggage compartment door
  - Door lock operates properly
- Seat adjusts easily and locks securely in any position
  - Front seat back locks securely in any position
  - Folding–down rear seat backs lock securely

(b) Be sure to deliver a clean car. Especially check:
- Steering wheel
- Shift lever knob
- All switch knobs
- Seats

MANUAL TRANSMISSION SYSTEM

MT08U–01

PRECAUTION

When working with FIPG material, you must observe the following items.

- **Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all the loose material.**
- **Clean both sealing surfaces with a non–residue solvent.**
- **Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

MT08V–01

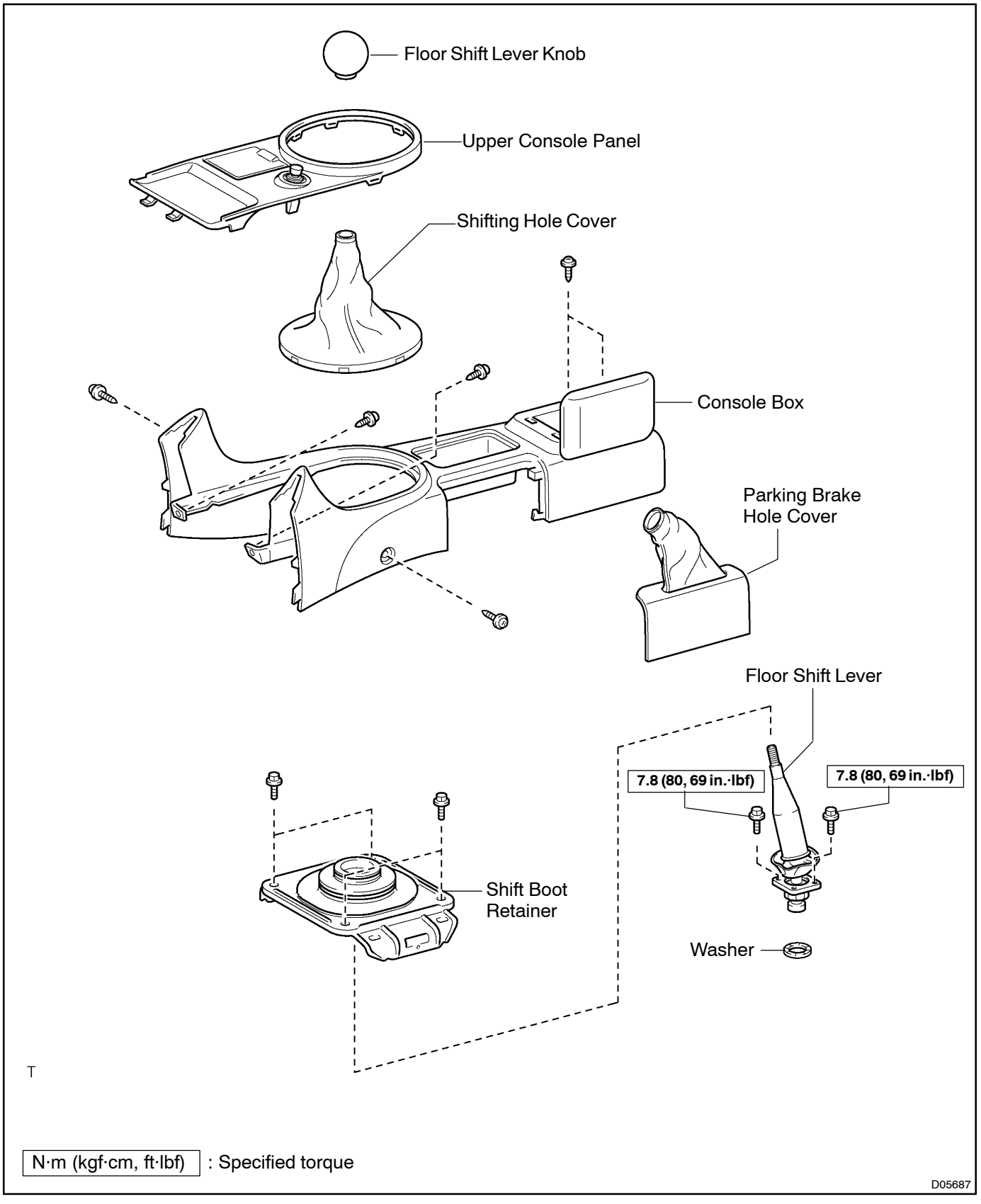
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	1. Oil (Level low)	MT–5
	2. Oil (Wrong)	MT–5
	3. Gear (Worn or damaged)	MT–11
	4. Bearing (Worn or damaged)	MT–11
Oil leakage	1. Oil (Level too high)	MT–5
	2. Gasket (Damaged)	MT–11
	3. Oil seal (Worn or damaged)	MT–11
	4. O–Ring (Worn or damaged)	MT–11
Hard to shift or will not shift	1. Synchronizer ring (Worn or damaged)	MT–38 MT–43 MT–54
	2. Shift key spring (Damaged)	MT–43 MT–49
Jumps out of gear	1. Locking ball spring (Damaged)	MT–11
	2. Shift fork (Worn)	MT–11
	3. Gear (Worn or damaged)	MT–11
	4. Bearing (Worn or damaged)	MT–11

MANUAL TRANSMISSION UNIT

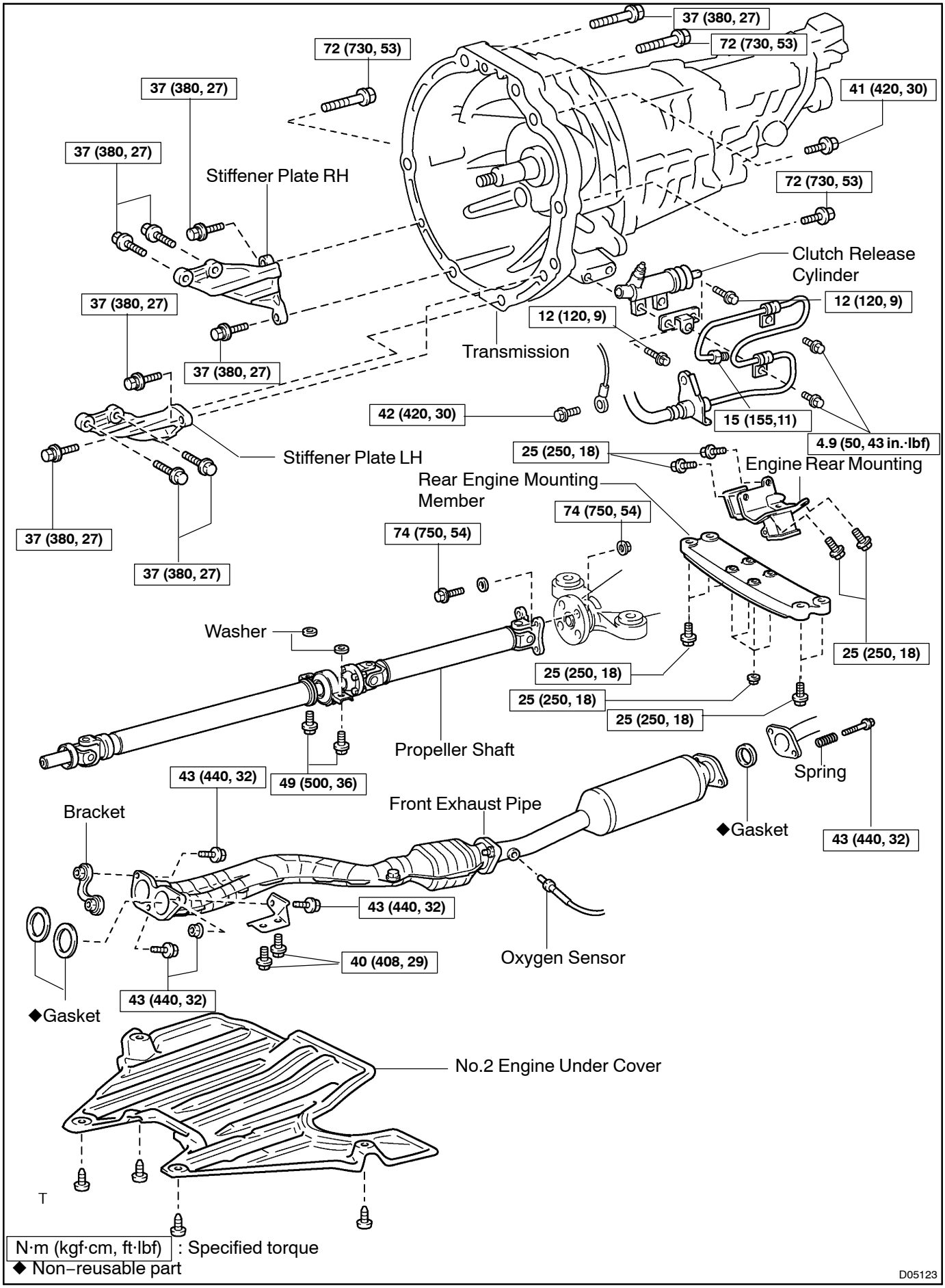
COMPONENTS

MT08R–01



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

D05687



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

D05123

MT08S–01

REMOVAL

1. REMOVE UPPER CONSOLE PANEL AND CONSOLE BOX

(a) Remove the shift lever knob.

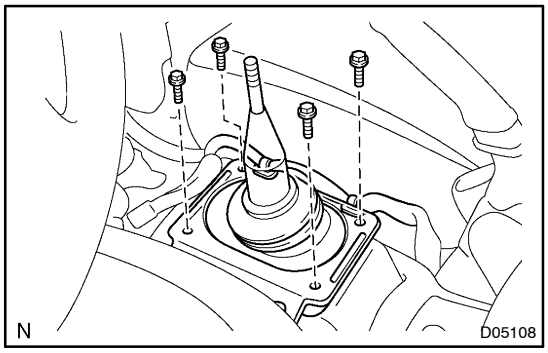
(b) Using a screwdriver, pry out upper console panel.

(c) Using a screwdriver, pry out parking brake hole cover.

HINT:

Tape the screwdriver, tip before use.

(d) Remove the 4 screws and console box.

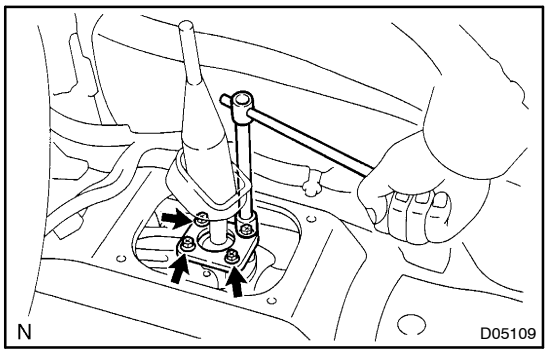


2. REMOVE SHIFT BOOT RETAINER

(a) Disconnect the 2 wire harness clamps.

(b) Remove the 4 bolts and shift boot retainer.

3. REMOVE SHIFT BOOT



4. REMOVE TRANSMISSION SHIFT LEVER

Remove the 4 bolts and transmission shift lever.

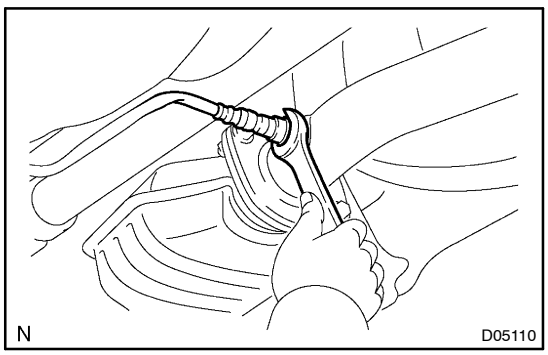
5. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

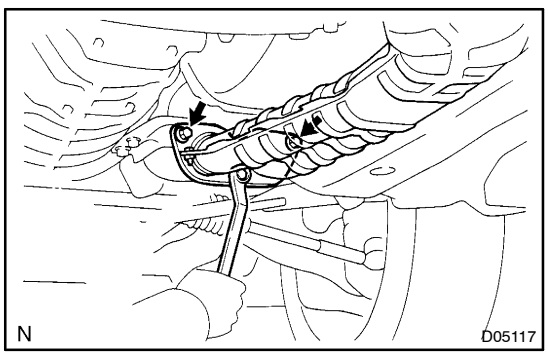
6. DRAIN TRANSMISSION OIL

7. REMOVE NO.2 ENGINE UNDER COVER

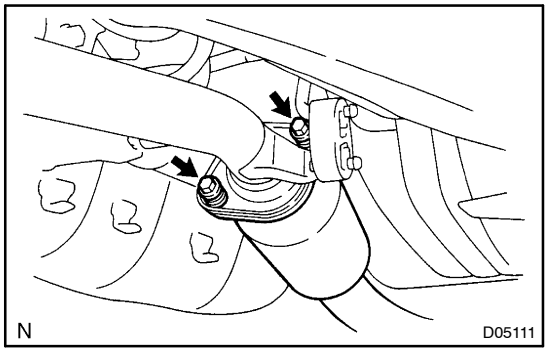


8. REMOVE EXHAUST FRONT PIPE

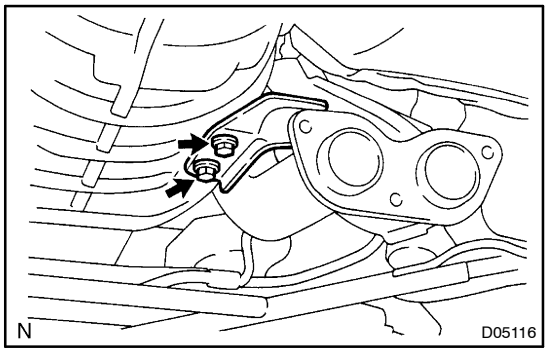
(a) Disconnect the oxygen sensor.



(b) Remove the 3 bolts, nuts and bracket.

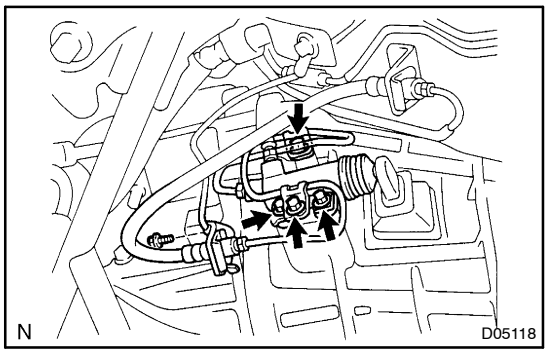


(c) Remove the 2 bolts and 2 springs.
(d) Remove the front exhaust pipe.



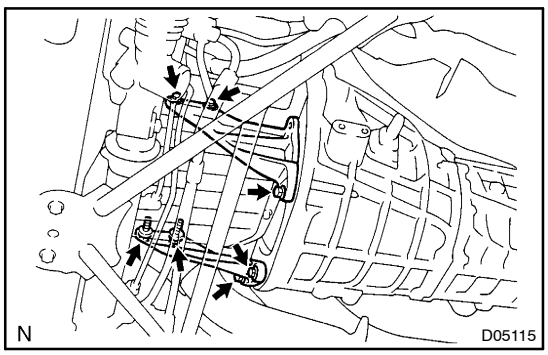
9. REMOVE EXHAUST MANIFOLD STAY

Remove the 2 bolts and exhaust manifold stay.



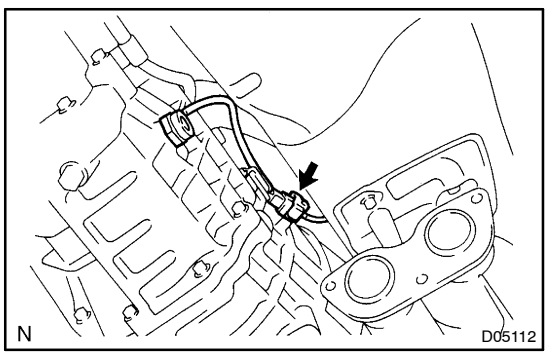
10. DISCONNECT CLUTCH RELEASE CYLINDER AND EARTH WIRE

Remove the 5 bolts and disconnect the clutch release cylinder and earth wire.

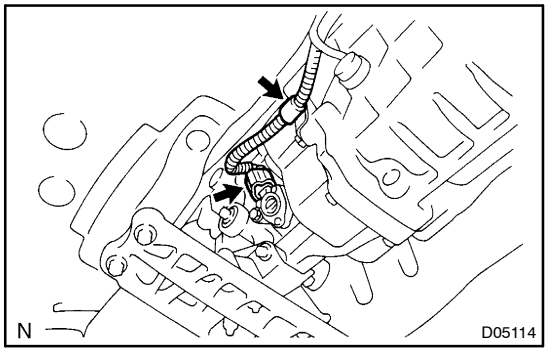


11. REMOVE STIFFENER PLATES

Remove the 7 bolts and stiffener plates LH and RH.



12. DISCONNECT BACK–UP LIGHT SWITCH CONNECTOR

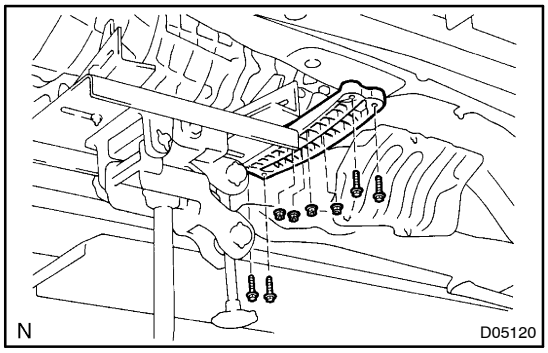


13. DISCONNECT SPEED SENSOR CONNECTOR

14. JACK UP TRANSMISSION SLIGHTLY

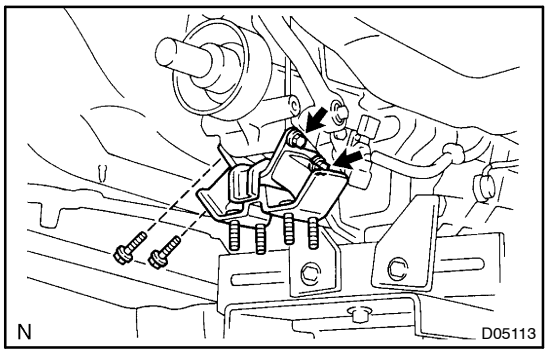
Using a transmission jack, support the transmission.

15. REMOVE STARTER SET BOLT



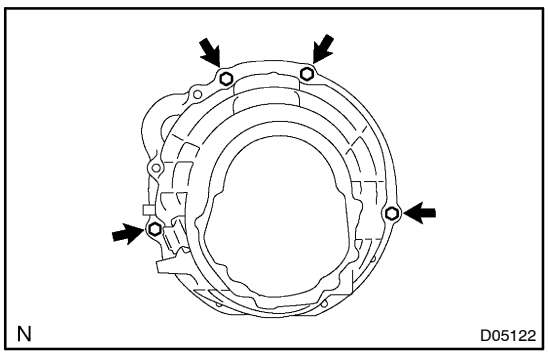
16. REMOVE REAR ENGINE MOUNTING MEMBER

Remove the 4 bolts , 4 nuts and rear engine mounting member.



17. REMOVE ENGINE REAR MOUNTING

Remove the 4 bolts and engine rear mounting.



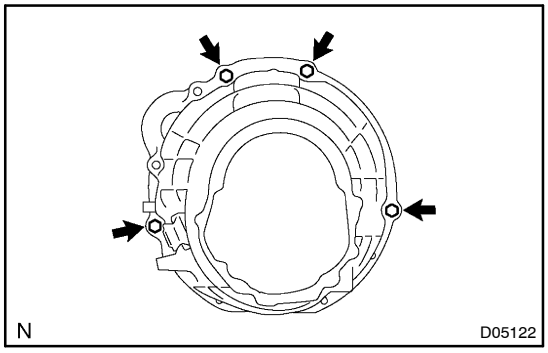
18. REMOVE TRANSMISSION

(a) Remove the 4 bolts.

(b) Lower the engine rear side and remove the transmission from the engine.

MT08T–01

INSTALLATION



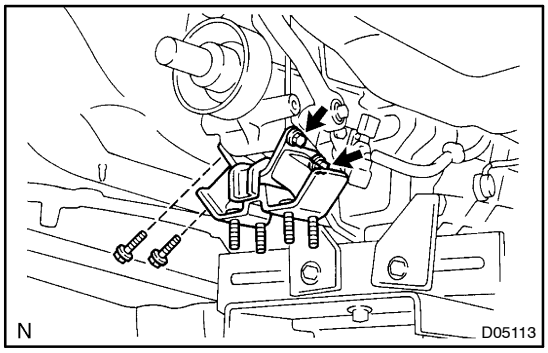
1. INSTALL TARNSMISSION

(a) Raise the engine front side.

(b) Align the input spline with a clutch disc and install the transmission to the engine

(c) Install the 4 bolts.

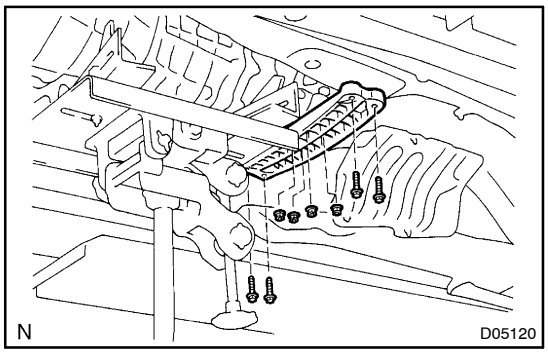
Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)



2. INSTALL ENGINE REAR MOUNTING

Install the engine rear mounting with 4 bolts.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



3. INSLTALL REAR ENGINE MOUNTING MEMBER

Install the rear engine mounting member with 4 bolts and 4 nuts.

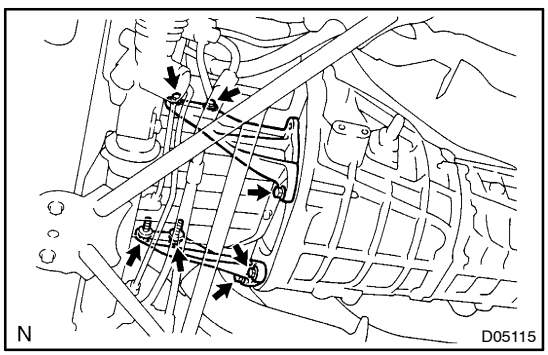
Torque:
Nut: 13 N·m (135 kgf·cm, 9 ft·lbf)
Bolt: 25 N·m (250 kgf·cm, 18 ft·lbf)

4. INSTALL STARTER SET BOLT

Torque: 42 N·m (420 kgf·cm, 30 ft·lbf)

5. CONNECT SPEED SENSOR CONNECTOR

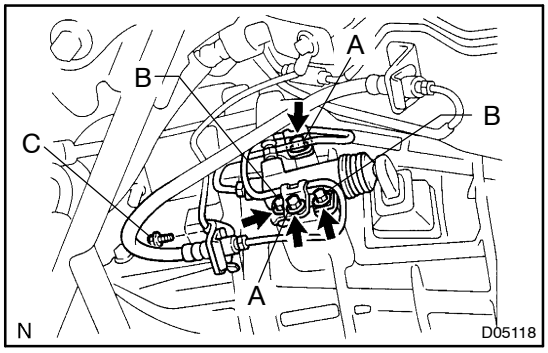
6. CONNECT BACK–UP LIGHT SWITCH CONNECTOR



7. INSTALL STIFFNER PLATES

Install the stiffner plates with 7 bolts.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

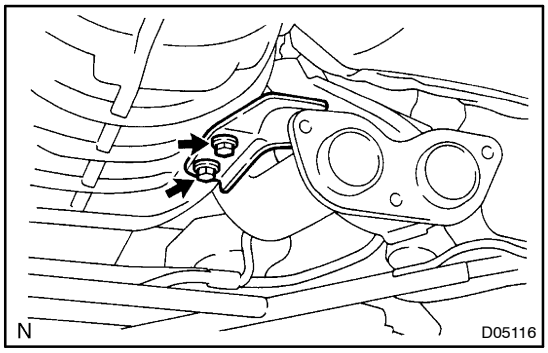


8. CONNECT CLUTCH RELEASE CYLINDER AND EARTH WIRE

Connect the clutch release cylinder and earth wire with 5 bolts.

Torque:
Bolt (A): 4.9 N·m (50 kgf·cm, 43 in.·lbf)
Bolt (B): 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt (C): 42 N·m (420 kgf·cm, 30 ft·lbf)

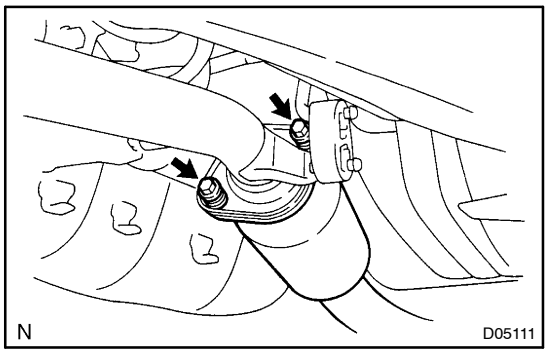
9. INSTALL PROPELLER SHAFT (See page PR–10)



10. INSTALL EXHAUST MANIFOLD STAY

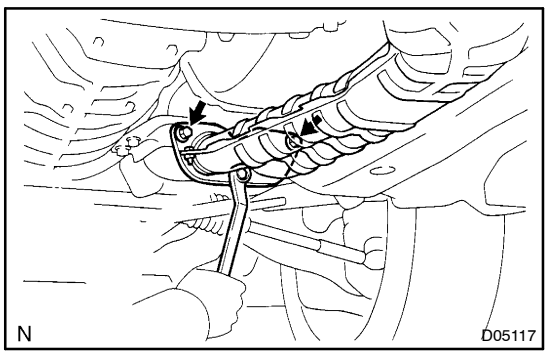
Install the exhaust manifold stay with the 2 bolts.

Torque: 40 N·m (408 kgf·cm, 29 ft·lbf)

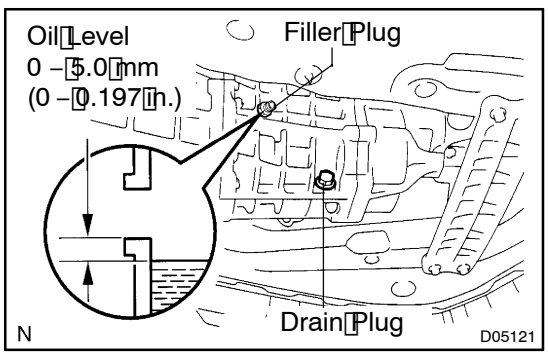


11. INSTALL EXHAUST FRONT PIPE

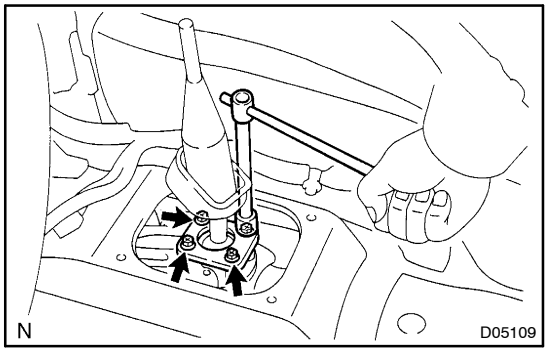
(a) Install 3 new gaskets.
(b) Install the exhaust front pipe.
(c) Install the 2 springs and 2 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



(d) Install the bracket with the 2 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(e) Install the bolts and nut.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(f) Install the oxygen sensor.



12. FILL WIHT TRANSMISSION OIL
Oil grade: API GL–3
Viscosity: SAE 75W–90
DCapacity: 1.8 litter (1.9 USqts, 1.6 Imp.qts)
13. INSTALL NO.2 ENGINE UNDER COVER
14. LOWER VEHICLE



15. INSTALL TRANSMISSION SHIFT LEVER

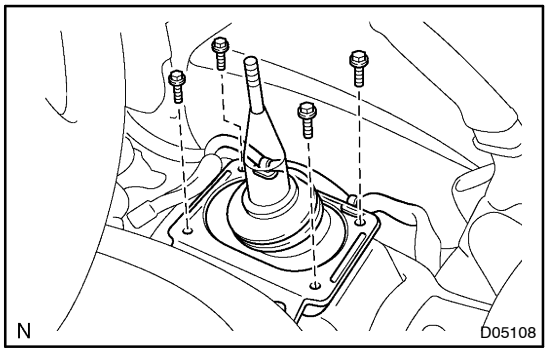
(a) Install the 2 washers.

(b) Apply MP grease to the tip of shift lever.

(c) Install the shift lever with 4 bolts.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

16. INSTALL SHIFT BOOT



17. INSTALL SHIFT BOOOT RETAINER

(a) Install the shift boot retaiver with 4 bolts.

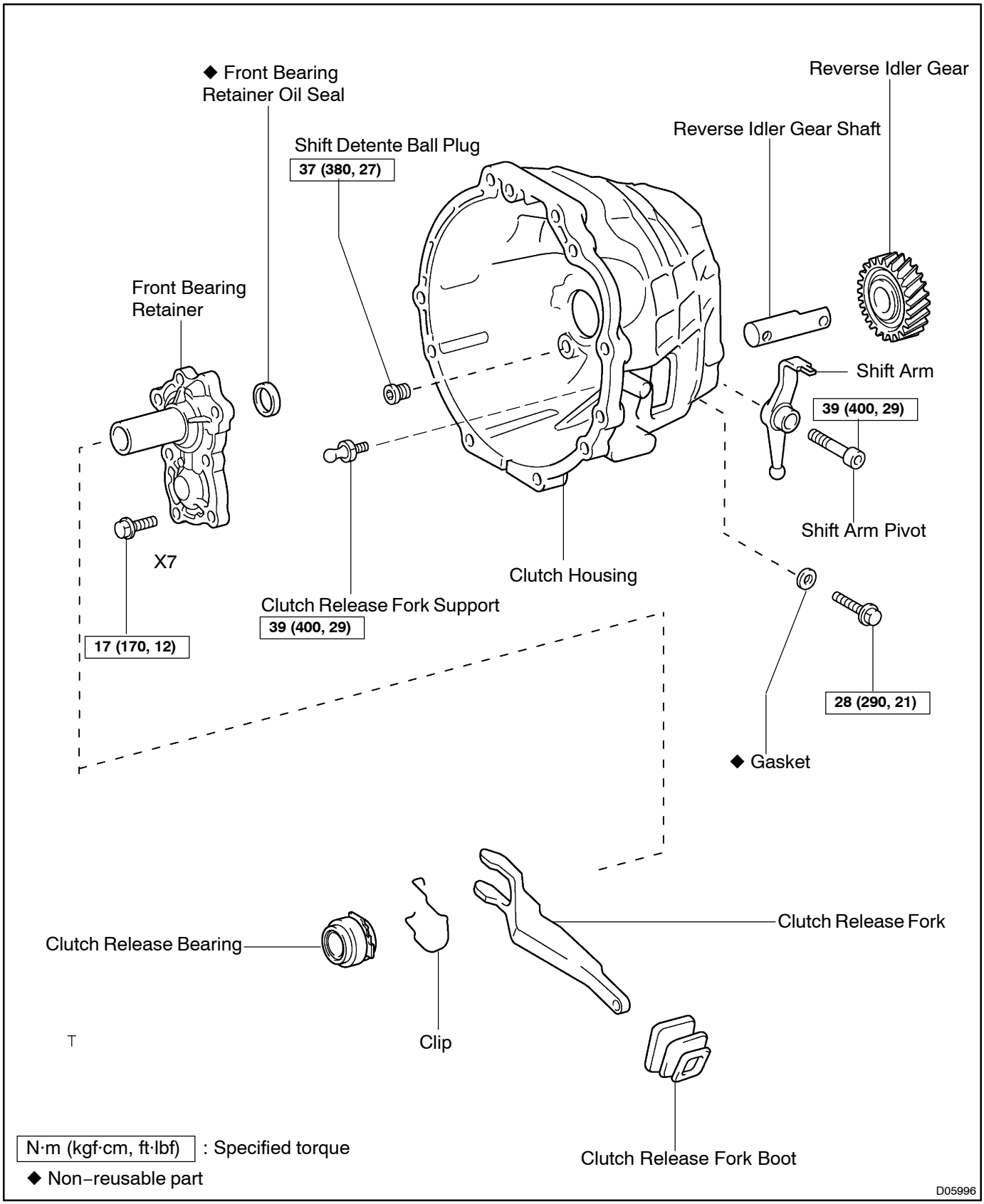
(b) Connect the wire harness clamps.

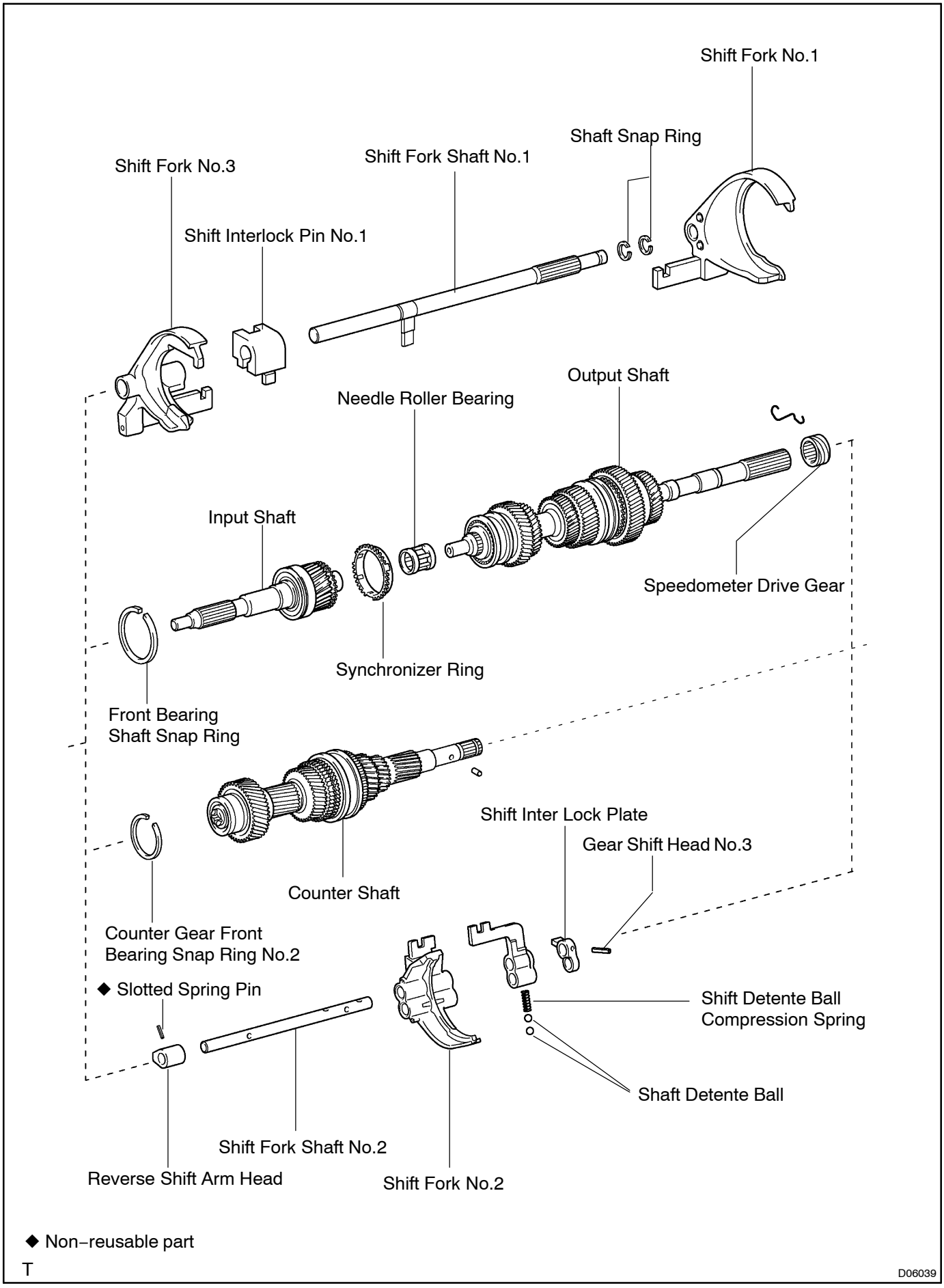
18. INSTALL UPPER CONSOLE PANEL AND COSOLE BOX (See page BO–104)

MANUAL TRANSMISSION ASSEMBLY

COMPONENTS

MT08W–01

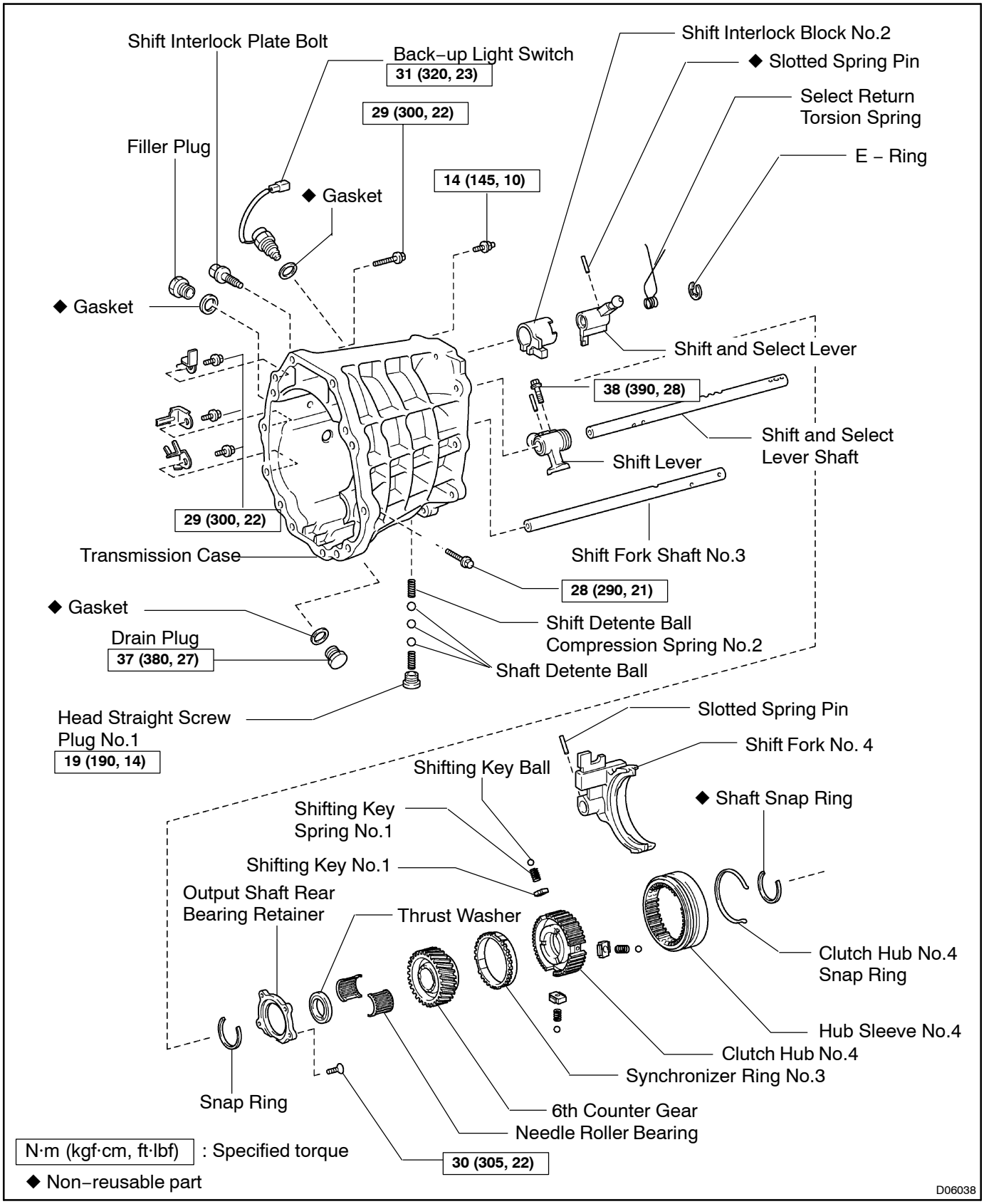


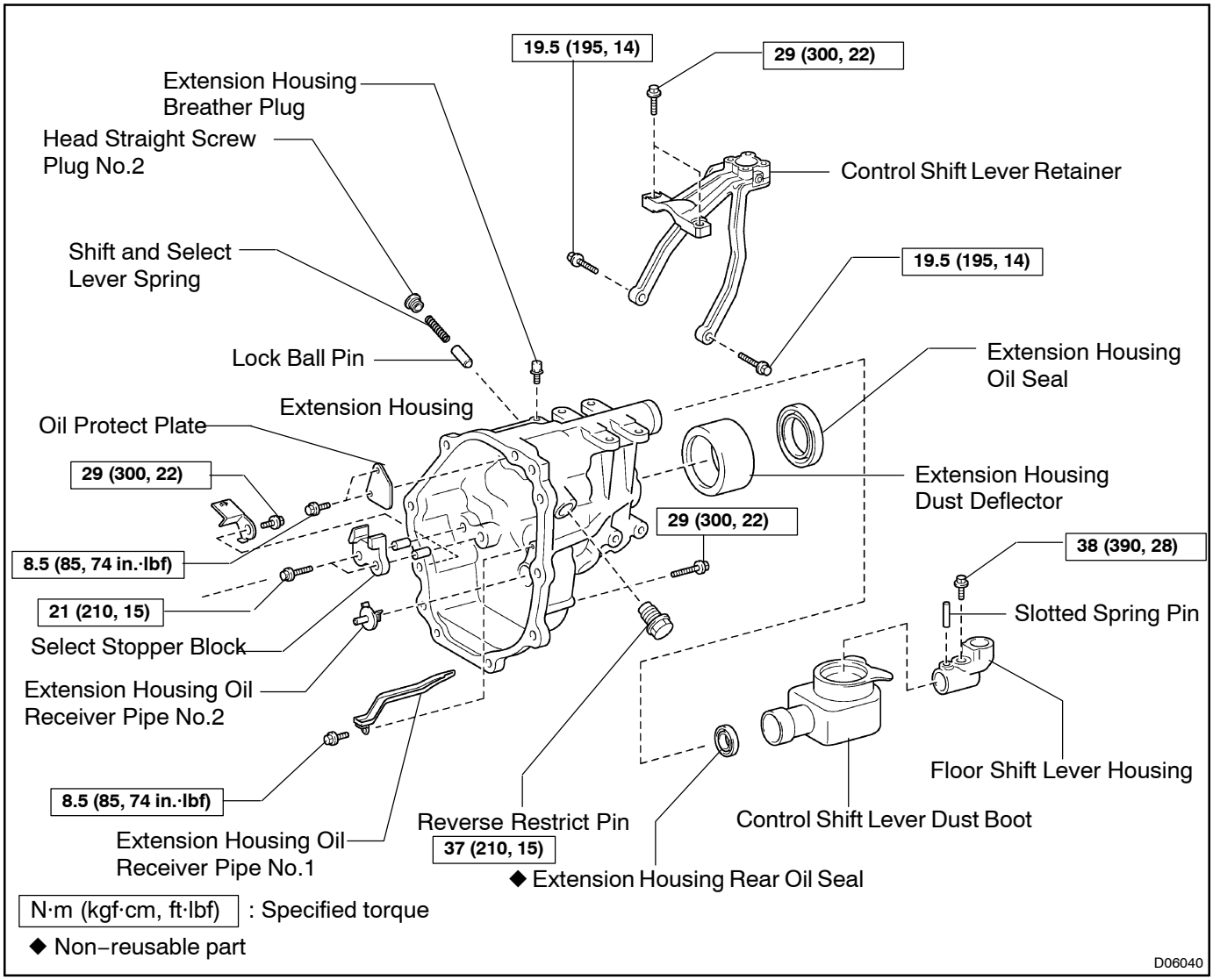


◆ Non–reusable part

T

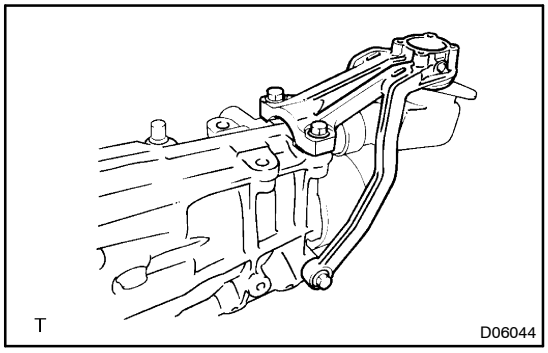
D06039


Shift Interlock Plate Bolt
Back–up Light Switch
31 (320, 23)
29 (300, 22)
Filler Plug
◆ Gasket
14 (145, 10)
Shift Interlock Block No.2
◆ Slotted Spring Pin
Select Return Torsion Spring
E – Ring
◆ Gasket
Shift and Select Lever
38 (390, 28)
Shift and Select Lever Shaft
Shift Lever
29 (300, 22)
Transmission Case
Shift Fork Shaft No.3
28 (290, 21)
◆ Gasket
Drain Plug
37 (380, 27)
Shift Detente Ball
Compression Spring No.2
Shaft Detente Ball
Head Straight Screw Plug No.1
19 (190, 14)
Slotted Spring Pin
Shift Fork No. 4
Shifting Key Ball
◆ Shaft Snap Ring
Shifting Key Spring No.1
Shifting Key No.1
Output Shaft Rear Bearing Retainer
Thrust Washer
Clutch Hub No.4 Snap Ring
Hub Sleeve No.4
Clutch Hub No.4
Synchronizer Ring No.3
Snap Ring
6th Counter Gear
Needle Roller Bearing
30 (305, 22)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
D06038


19.5 (195, 14)
29 (300, 22)
Extension Housing Breather Plug
Head Straight Screw Plug No.2
Control Shift Lever Retainer
Shift and Select Lever Spring
19.5 (195, 14)
Lock Ball Pin
Extension Housing Oil Seal
Extension Housing
Oil Protect Plate
29 (300, 22)
Extension Housing Dust Deflector
29 (300, 22)
38 (390, 28)
8.5 (85, 74 in.·lbf)
Slotted Spring Pin
21 (210, 15)
Select Stopper Block
Extension Housing Oil Receiver Pipe No.2
Floor Shift Lever Housing
8.5 (85, 74 in.·lbf)
Reverse Restrict Pin
37 (210, 15)
Control Shift Lever Dust Boot
Extension Housing Oil Receiver Pipe No.1
◆ Extension Housing Rear Oil Seal
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
D06040

MT08X–01

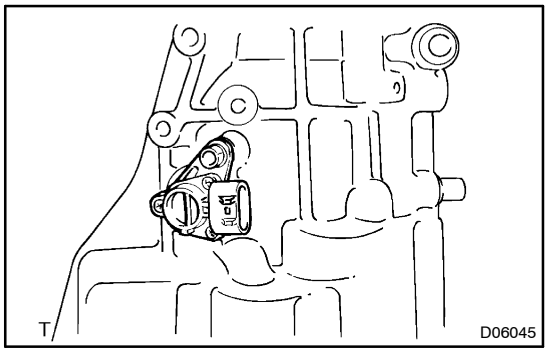
DISASSEMBLY



1. REMOVE SHIFT LEVER RETAINER

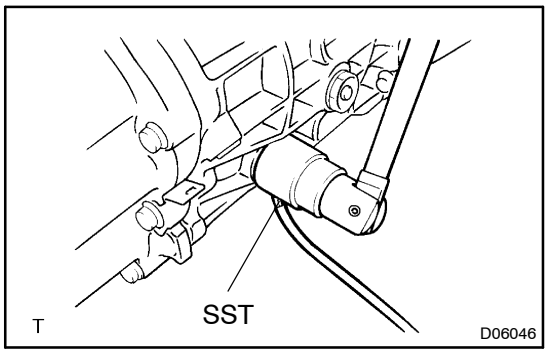
(a) Remove the 4 bolts and disconnect the control shift lever dust boot.

(b) Remove the shift lever retainer.



2. REMOVE VEHICLE SPEED SENSOR

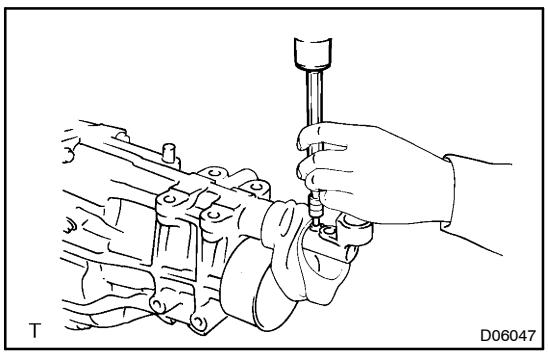
Remove the bolt and vehicle speed sensor.



3. REMOVE BACK–UP LIGHT SWITCH

(a) Disconnect the connector clamp.

(b) Using SST, remove the back–up light switch and gasket.
SST 09817–16011



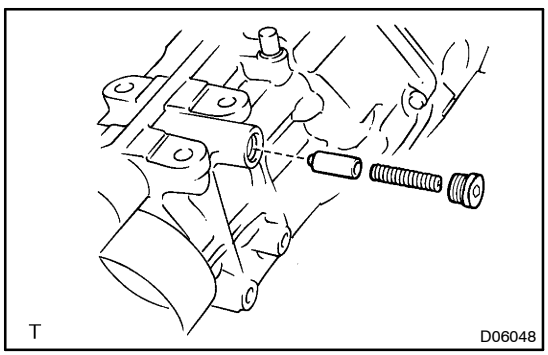
4. REMOVE FLOOR SHIFT LEVER HOUSING

(a) Turn over the control shift lever dust boot.

(b) Remove the bolt.

(c) Using a pin punch and hammer, drive out slotted spring pin and remove the floor shift lever housing.

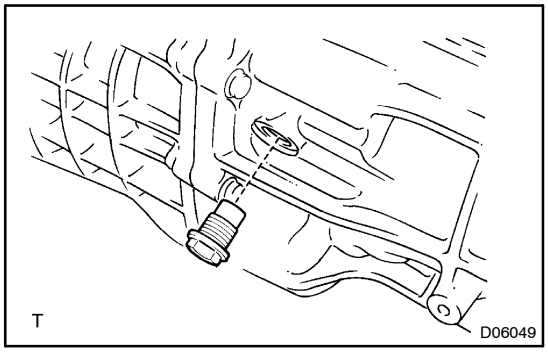
5. REMOVE CONTROL SHIFT LEVER DUST BOOT



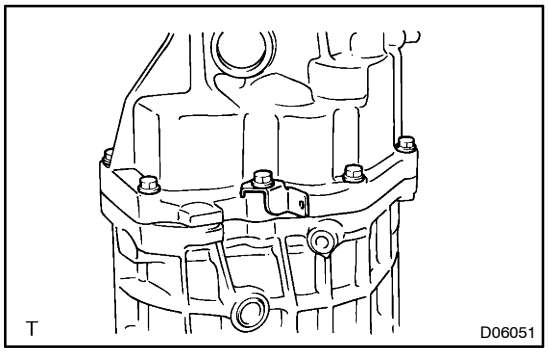
6. REMOVE LOCK BALL PIN

(a) Using a hexagon wrench (8 mm, 0.31 in.), remove the head straight screw plug No. 2.

(b) Remove the shift and select lever spring and lock ball pin.

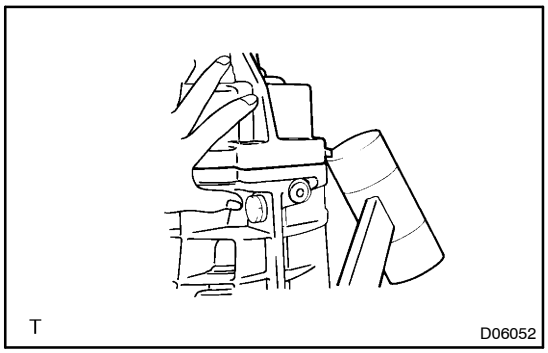


7. REMOVE REVERSE RESTRICT PIN

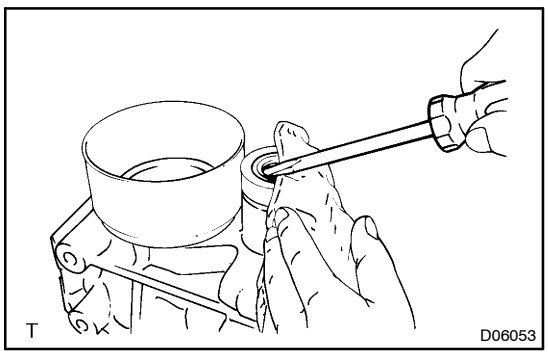


8. REMOVE EXTENSION HOUSING

(a) Remove the 9 bolts and clamp.

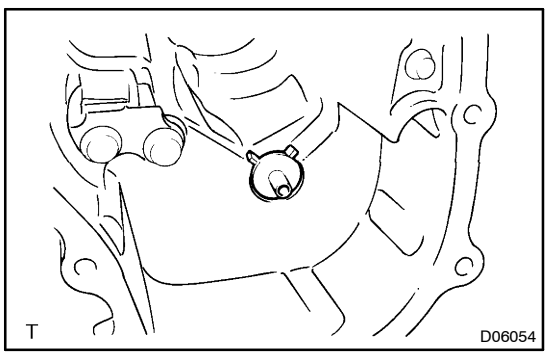


(b) Using a plastic hammer, carefully tap out the extension housing.

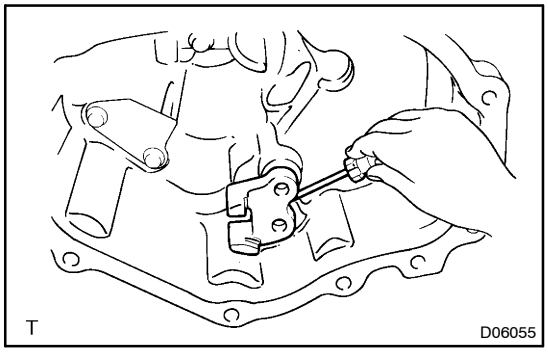


9. REMOVE EXTENSION HOUSING REAR OIL SEAL

Using a screwdriver and a cloth, remove the extension housing rear oil seal.



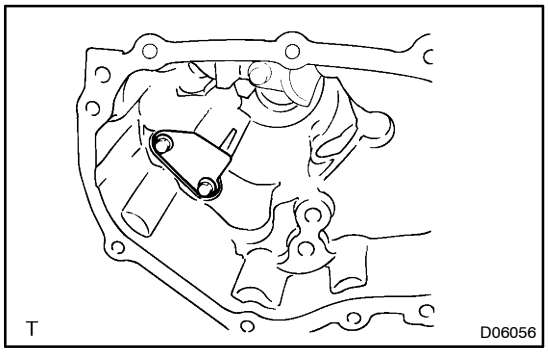
10. REMOVE EXTENSION HOUSING OIL RECEIVER PIPE NO. 2



11. REMOVE SELECT STOPPER BLOCK

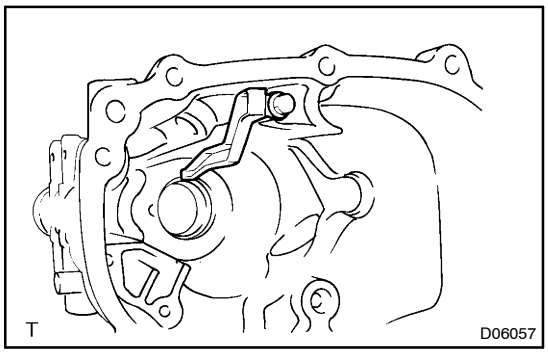
(a) Remove the 2 bolts.

(b) Using a screwdriver, remove the select stopper block.



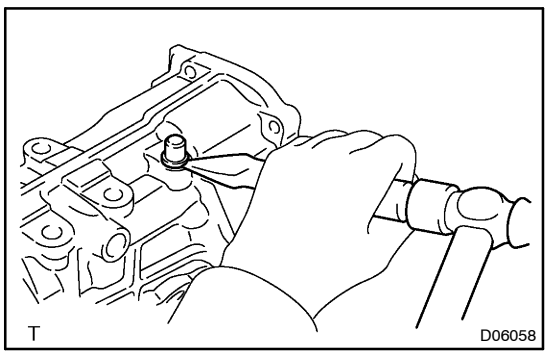
12. REMOVE OIL PROTECT PLATE

Remove the 2 bolts and oil protect plate.



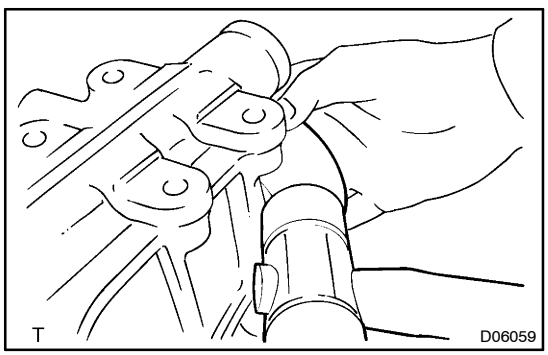
13. REMOVE EXTENSION HOUSING OIL RECEIVER PIPE NO.1

Remove the bolt and extension housing oil receiver pipe No.1.



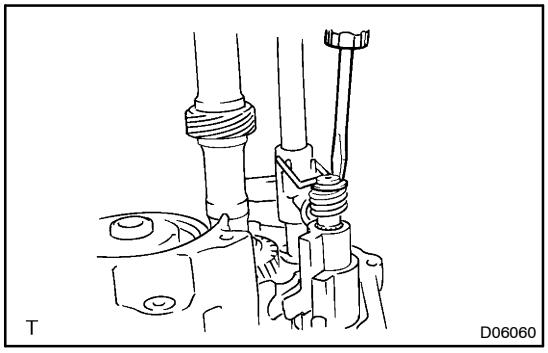
14. REMOVE EXTENSION HOUSING BREATHER PLUG

Using a chisel and hammer, remove the extension housing breather plug.



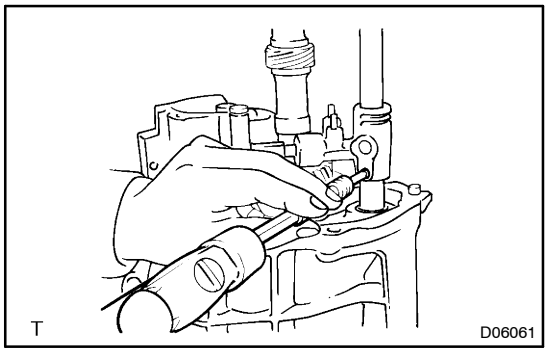
15. REMOVE EXTENSION HOUSING DUST DEFLECTOR

Using a plastic hammer, remove the extension housing dust deflector.



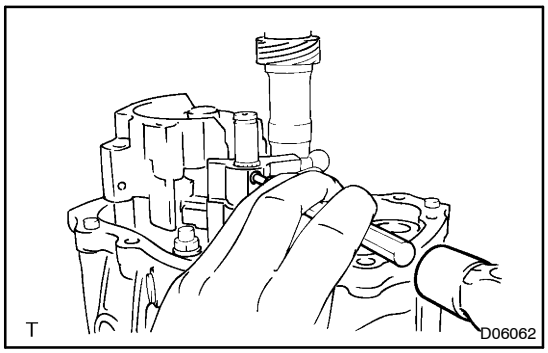
16. REMOVE SELECT RETURN TORSION SPRING

Using a screwdriver, remove the shift fork shaft E–ring and select return torsion spring.



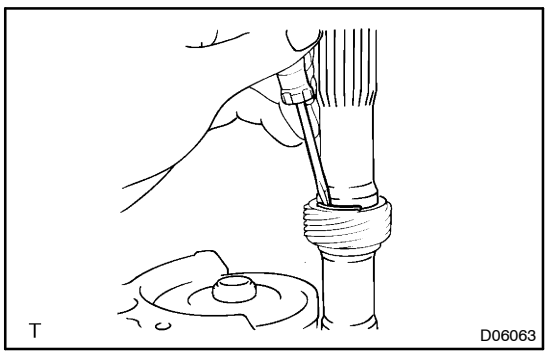
17. REMOVE SHIFT LEVER HOUSING

(a) Remove the bolt.
(b) Using a pin punch and hammer, drive out the slotted spring pin.
(c) Remove the gear shift fork shaft No. 1 and shift lever housing.



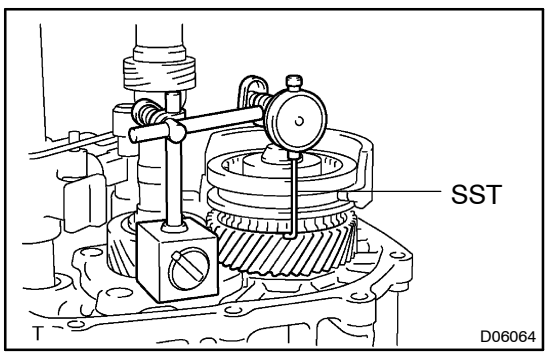
18. REMOVE SHIFT INTERLOCK PIN NO. 2

(a) Using a pin punch and hammer, drive out the slotted spring pin.
(b) Remove the shift and select lever.
(c) Remove the shift interlock block No. 2.



19. REMOVE SPEEDOMETER DRIVE GEAR

(a) Using a screwdriver, remove the clip.
(b) Remove the speedometer drive gear.

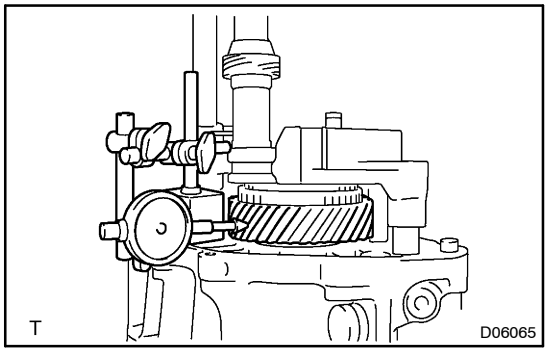


20. INSPECT COUNTER 6TH GEAR THRUST CLEARANCE

Using SST and dial indicator, measure the counter 6th gear thrust clearance.

SST 09350–20015 (09530–06120)

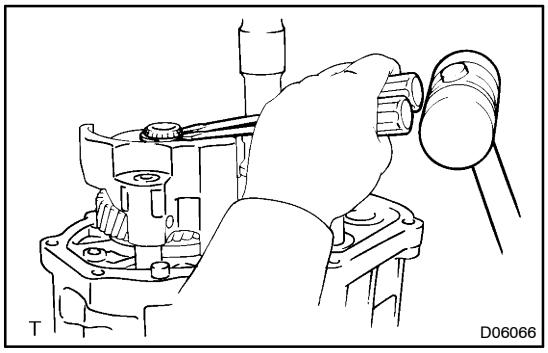
Standard clearance:
0.10 – 0.40 mm (0.0039 – 0.0157in.)



21. INSPECT COUNTER 6TH GEAR OIL CLEARANCE

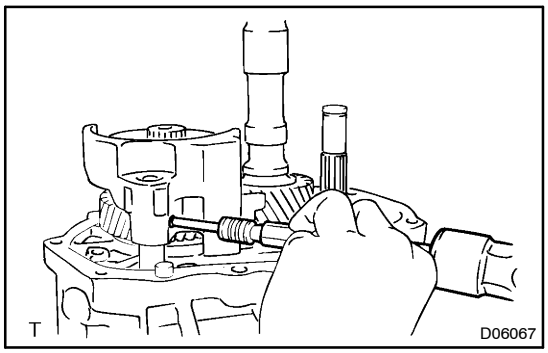
Using a dial indicator, measure the counter 6th gear oil clearance.

Standard clearance:
0.015 – 0.068 mm (0.00059 – 0.00268 in.)

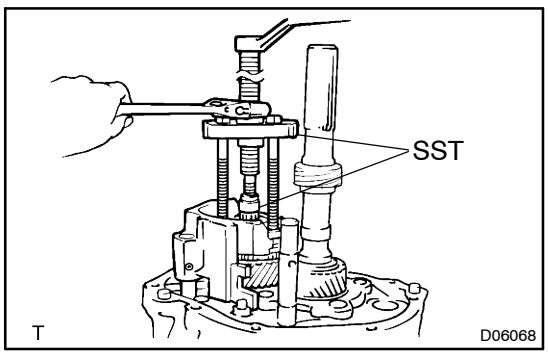


22. REMOVE 6TH GEAR

(a) Using 2 screwdrivers, remove the shaft snap ring.

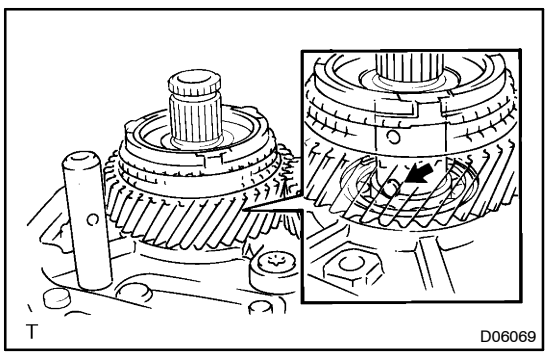


(b) Using a pin punch and hammer, remove the slotted spring pin.

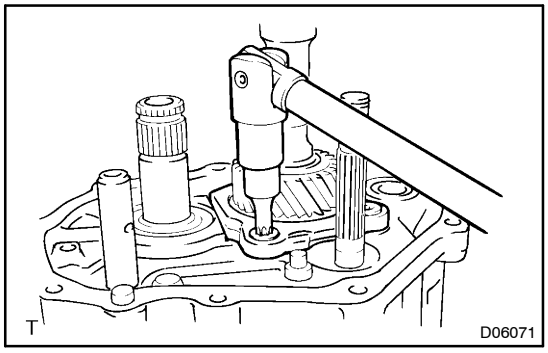


(c) Using SST, remove the clutch hub No. 4 and shift fork No.4.

SST 09950–30011 (09951–03010, 09953–03010),
09950–40011 (09957–07010)

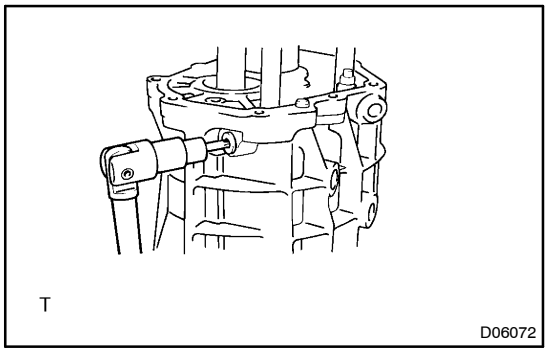


(d) Remove the counter 6th gear needle roller bearing, 6th gear thrust washer and gear thrust washer straight pin.

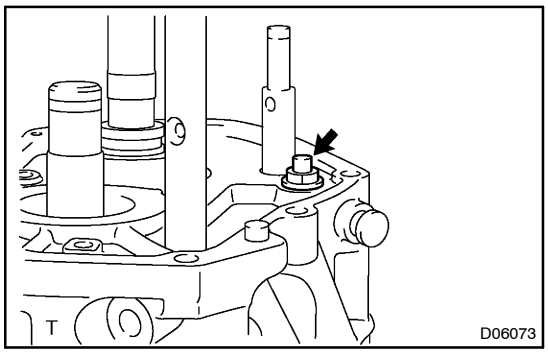


23. REMOVE TRANSMISSION CASE

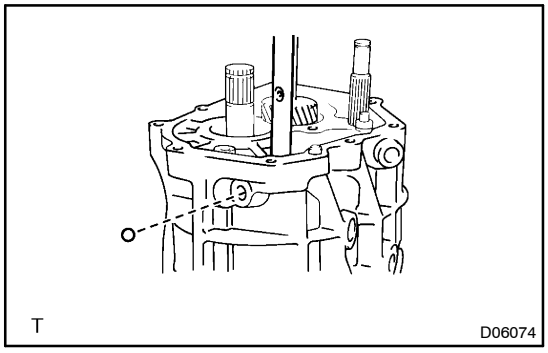
(a) Using a torx wrench (T45), remove the 4 bolts and transmission output shaft rear bearing retainer.



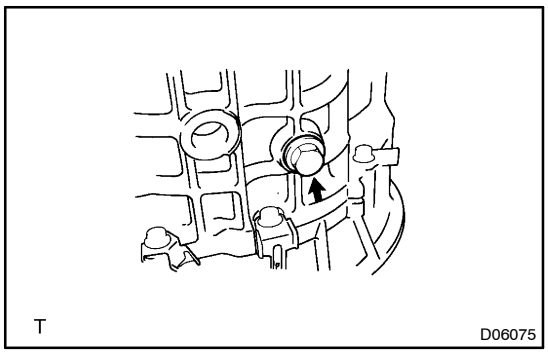
(b) Using a torx wrench (T30), remove the head straight screw plug No. 1, shift detente ball compression spring No. 2 and shaft detente ball.



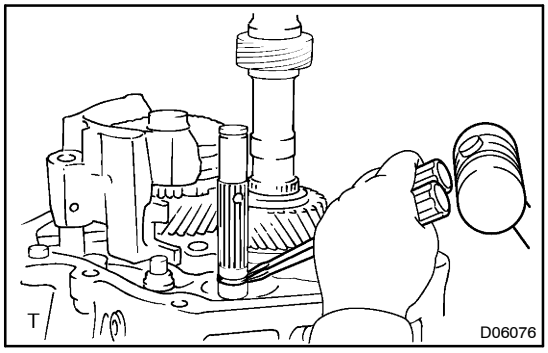
(c) Remove the shift and select lever stopper bolt.



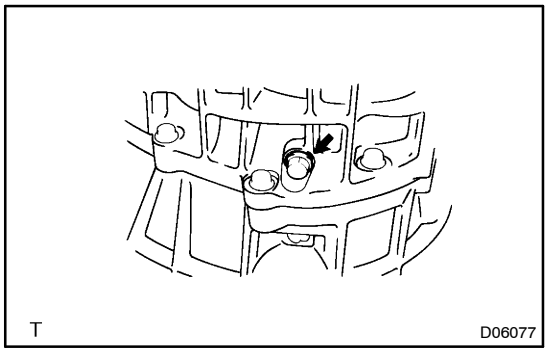
(d) Pull out the shift fork shaft and remove the shaft detente ball.



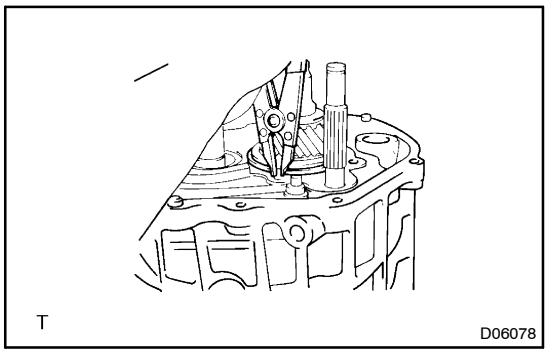
(e) Remove the shift interlock plate bolt.



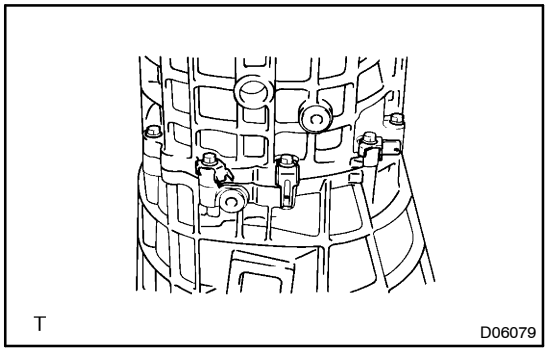
(f) Using 2 screwdrivers, remove the snap ring.



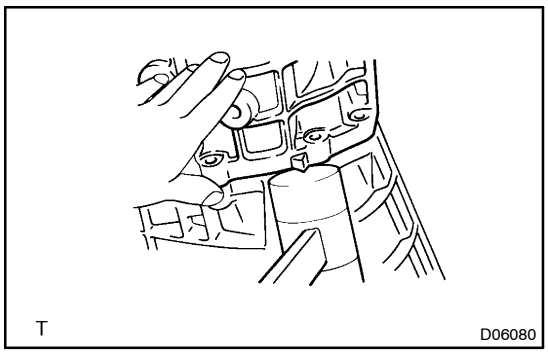
(g) Remove the reverse idler gear shaft bolt and reverse idler gear shaft gasket.



(h) Using snap ring expander, remove the output shaft bearing snap ring.

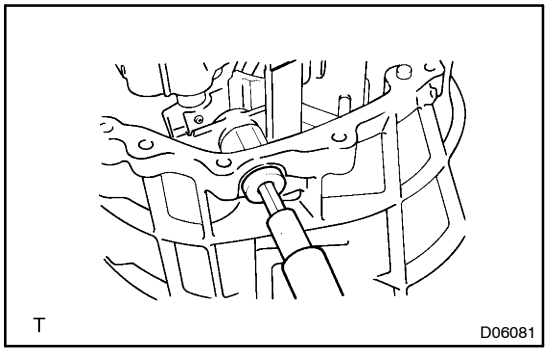


(i) Remove the 10 bolts.



(j) Using a plastic hammer, carefully tap the transmission case.

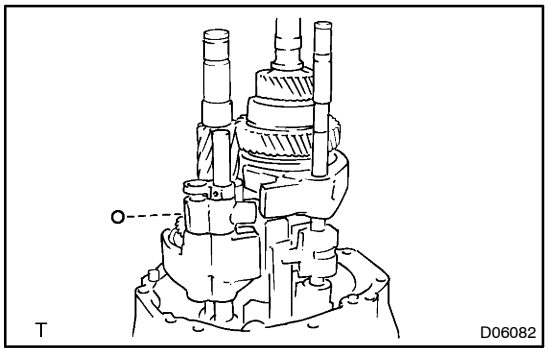
(k) Remove the shift detente ball compression spring No. 2.



24. REMOVE 5TH SHIFT ARM

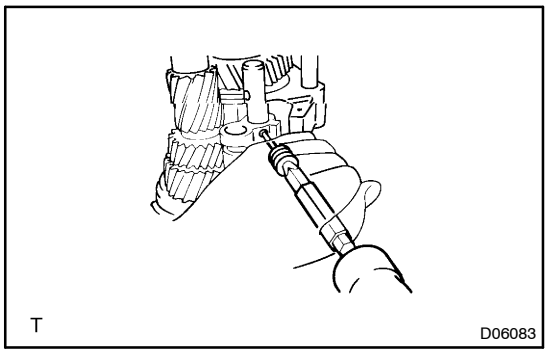
(a) Using a hexagon wrench (8 mm, 0.31 in.), remove the shift arm pivot.

(b) Remove the 5th shift arm.



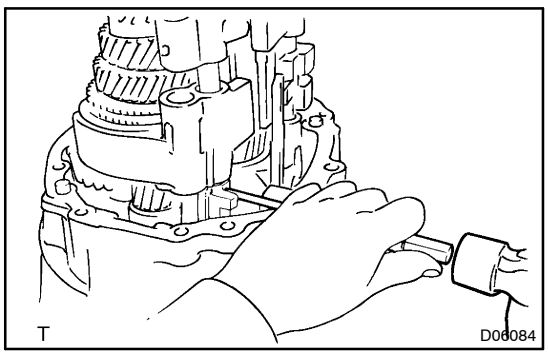
25. REMOVE GEAR SHIFT FORK SHAFT NO. 2

(a) Remove the shaft detente ball from gear shift head No. 3.



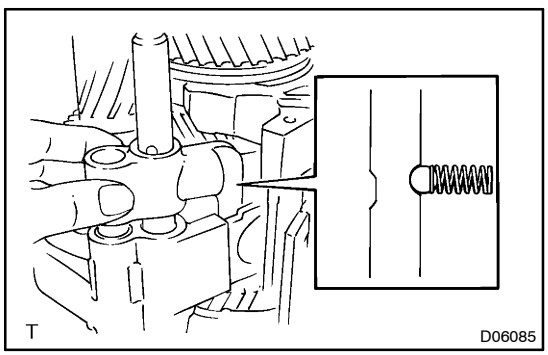
(b) Using a pin punch and hammer, drive out the slotted spring pin.

(c) Remove the shift interlock plate.

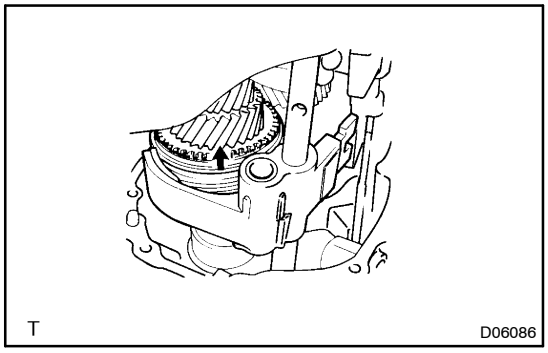


(d) Hold up the gear shift fork shaft No. 2 lightly.

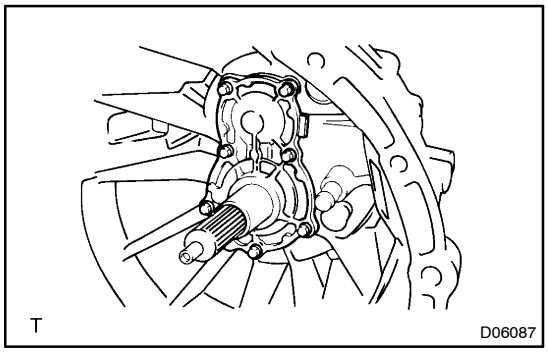
(e) Using a pin punch and hammer, remove the slotted spring pin.



(f) Remove the gear shift head No. 3 shaft detente ball, shift detente ball compression spring.

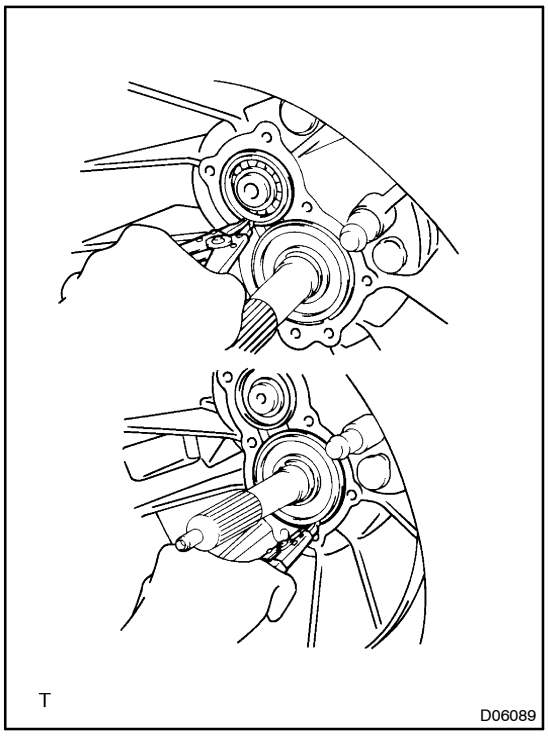


(g) Pull out the gear shift fork shaft.
(h) Remove the 3rd, 4th shift fork and reverse shift arm head.



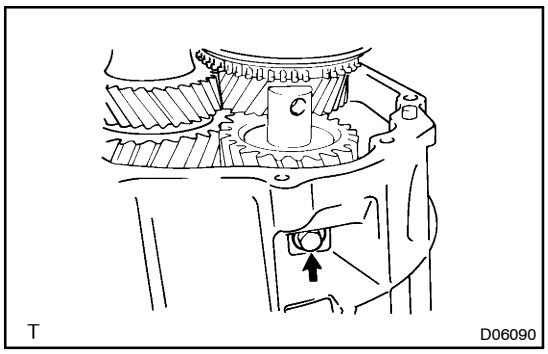
26. REMOVE FRONT BEARING RETAINER

Remove the 7 bolts and front bearing retainer.

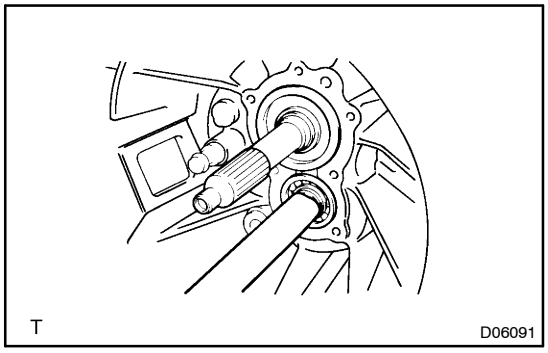


27. REMOVE COUNTER SHAFT

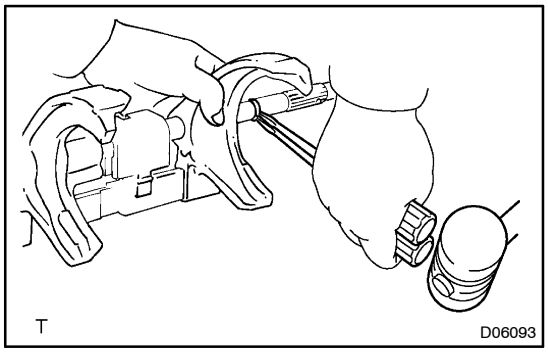
(a) Using a snap ring expander, remove the 2 snap ring.



(b) Remove the bolt and reverse idler gear shaft gasket.



(c) Press out the input shaft, output shaft, counter shaft, reverse idler gear shaft and gear shift fork shaft No. 1 with hammer handle or equivalent.



28. REMOVE SHIFT INTERLOCK PIN NO. 1

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

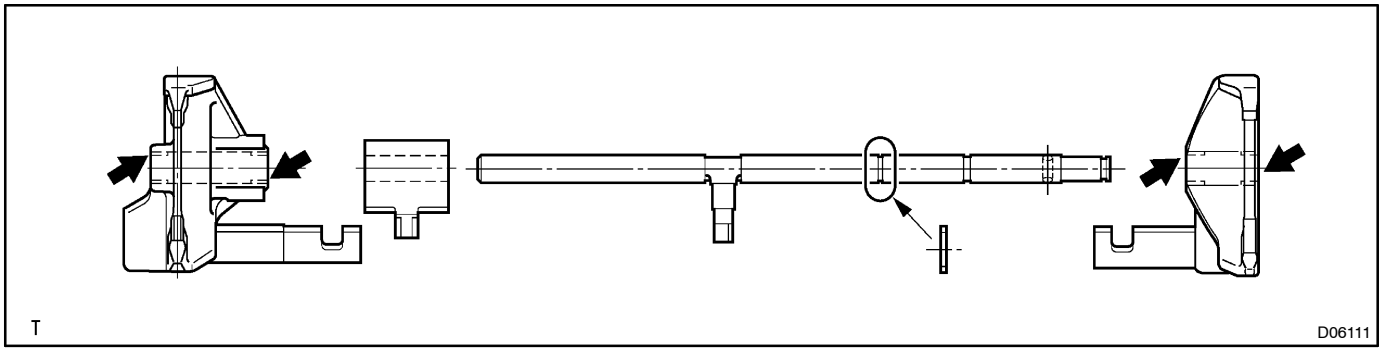
(b) Remove the shift fork No.1, shift fork No.3 and shift interlock pin No. 1 from gear shift fork shaft No. 1.

MT08Y–01

REASSEMBLY

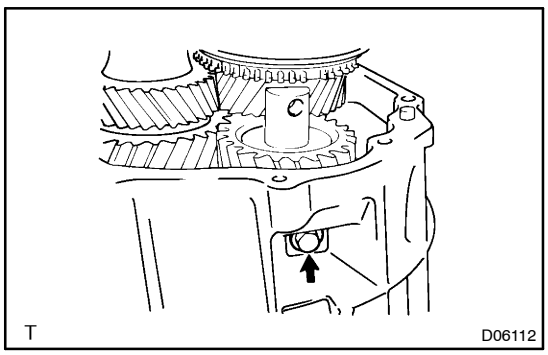
1. INSTALL INTERLOCK PIN NO. 1

(a) Apply gear oil to bush of each shift forks.
(b) Install the shift fork No.1 to gear shift fork shaft No. 1
(c) Using a screwdriver, install the new snap ring.
(d) Install the shift interlock pin No. 1
(e) Install the shift fork No.3.

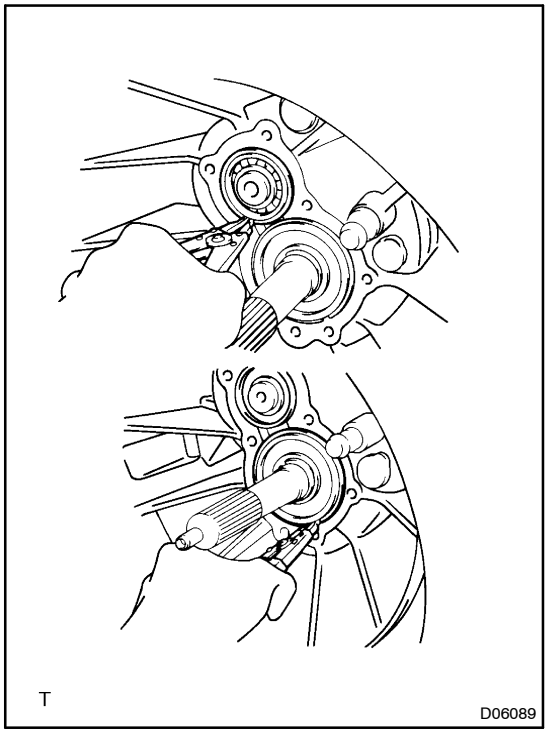


2. INSTALL OUTPUT SHAFT

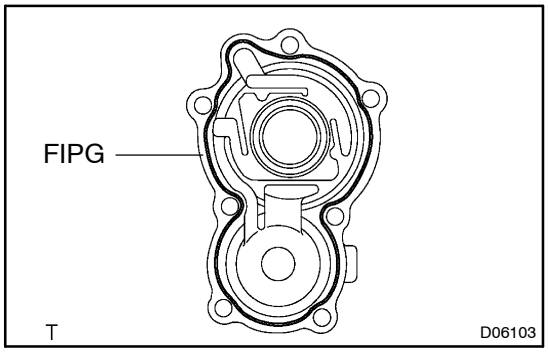
(a) Apply gear oil to input shaft needle roller bearing and reverse idler gear shaft.
(b) Install the input shaft to output shaft.
(c) Install the input shaft, output shaft, counter shaft, reverse idler gear and shift fork shaft No. 1 to clutch housing.



(d) Install a new gasket to idler gear shaft.
(e) Install the idler gear shaft set bolt temporarily (clutch housing side).

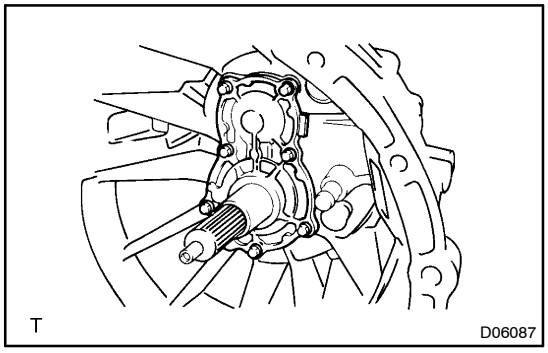


(f) Using a snap ring expander, install the 2 snap ring.

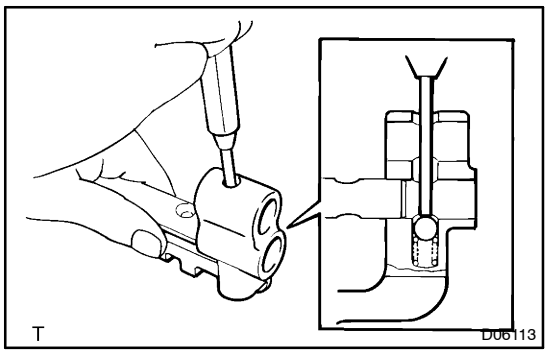


3. INSTALL FRONT BEARING RETAINER

(a) Apply FIPG to the front bearing retainer, as shown in the illustration.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

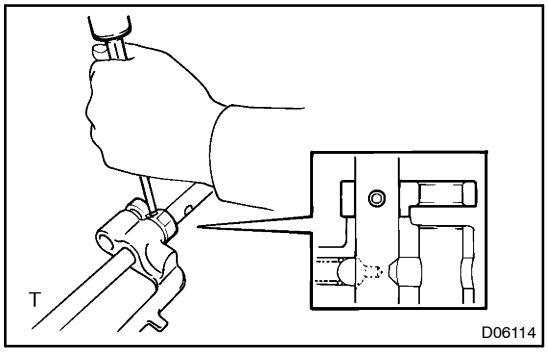


(b) Coat sealant to 7 bolts and install the front bearing retainer.
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent



4. INSTALL GEAR SHIFT HEAD NO. 3

(a) Install the shift detente ball compression spring.
(b) Using a pin punch, hold the shaft detente ball and install the gear shift detente ball and install the gear shift head No. 3 to gear shift fork shaft No. 2.

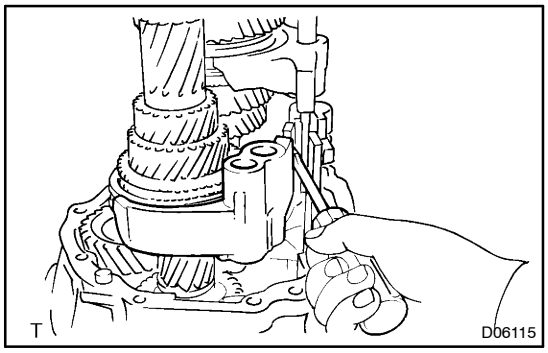


5. INSTALL SHIFT INTERLOCK PLATE

(a) Install the shift interlock plate to gear shift fork shaft No. 2.

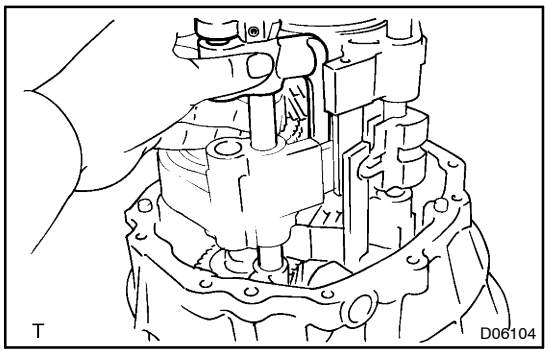
(b) Using a pin punch and hammer, drive in the slotted spring pin.

Drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)



6. INSTALL 3RD AND 4TH SHIFT FORK

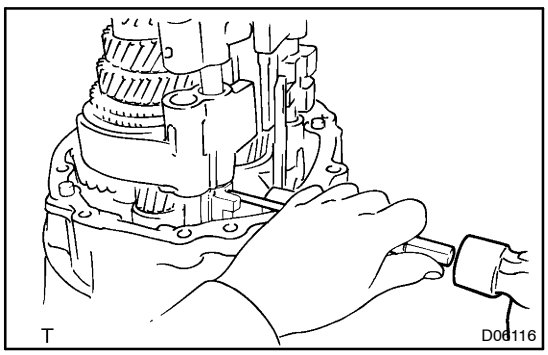
Using a screwdriver, install the 3rd and 4th shaft fork to counter shaft.



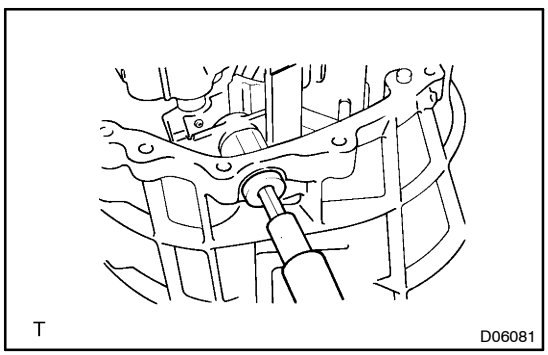
7. INSTALL GEAR SHIFT FORK SHAFT NO. 2

(a) Install the reverse shift arm head to clutch housing temporarily.

(b) Install the gear shift fork shaft No. 2.



(c) Using a pin punch and hammer, dive in the slotted spring pin.

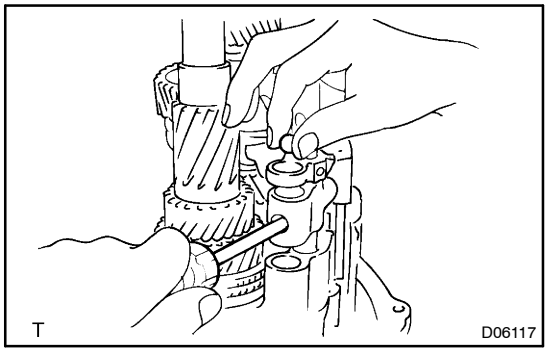


8. INSTALL 5TH SHIFT ARM

(a) Install the 5th shift arm.

(b) Using a hexagon wrench (8.0 mm, 0.31 in.), install the pivot bolt.

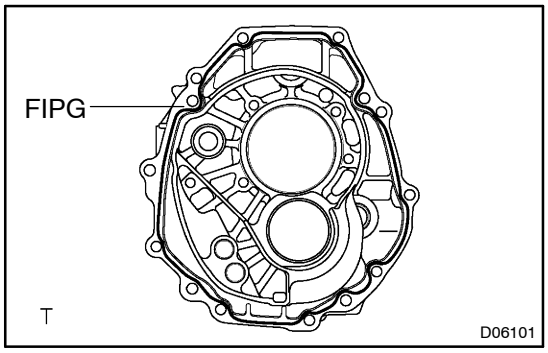
Torque: 39 N·m (390 kgf·cm, 29 ft·lbf)



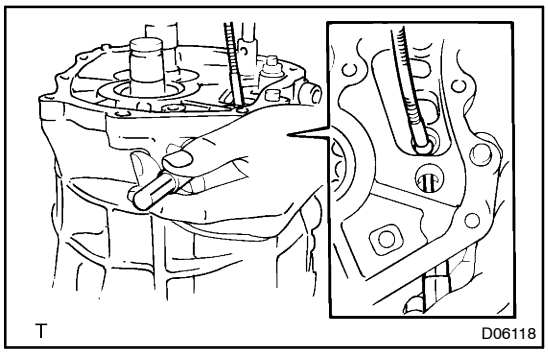
9. INSTALL TRANSMISSION CASE

(a) Apply MP grease to the shaft detente ball.

(b) Using a screwdriver, install the shaft detente ball to gear shift head No. 3.

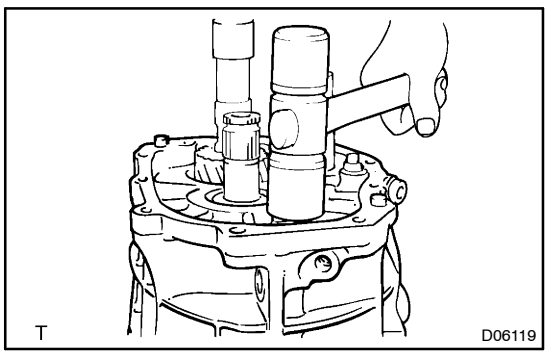


(c) Apply FIPG to transmission case, as shown in the illustration.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

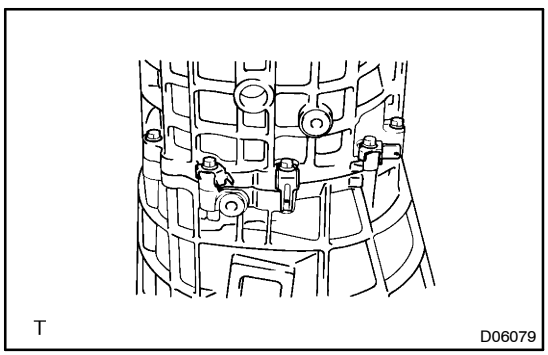


(d) Install the shaft detente ball compression spring No. 2.

(e) Using a pin punch and magnetic finger, hold the shaft detente ball and install the transmission case temporarily.

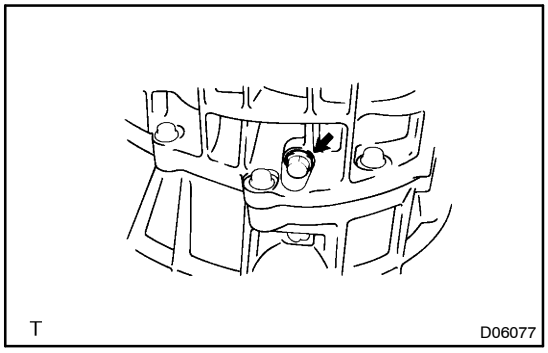


(f) Using a plastic hammer, tap on the transmission case to install it.

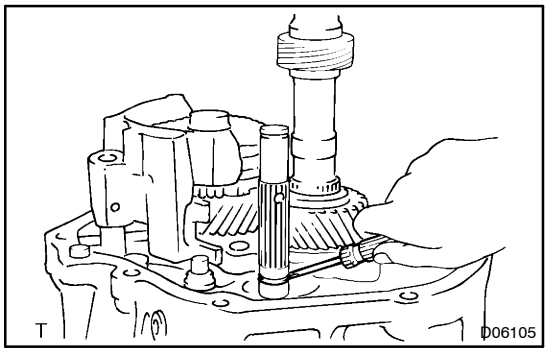


(g) Coat sealant to 10 bolts.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

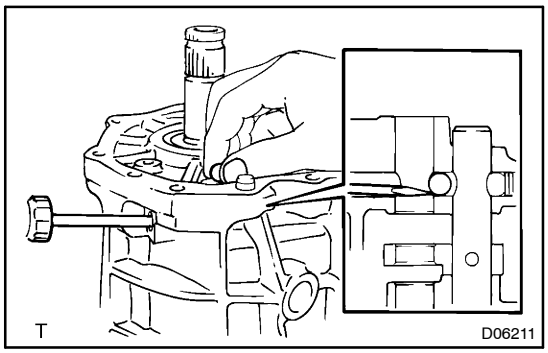
(h) Install the 10 bolts.
Torque: 29 N·m (290 kgf·cm, 21 ft·lbf)



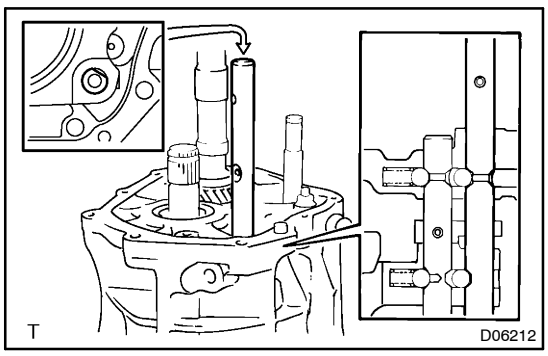
(i) Install a new reverse idler gear shaft gasket.
(j) Install the idler gear shaft set bolt (transmission case side).
Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)
(k) Tighten the idler gear shaft set bolt (clutch housing side).
Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)



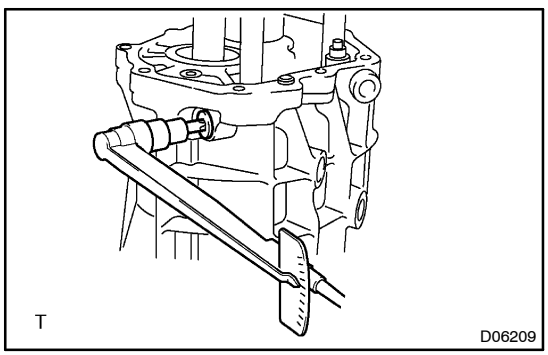
(l) Using a screwdriver, install a new snap ring.



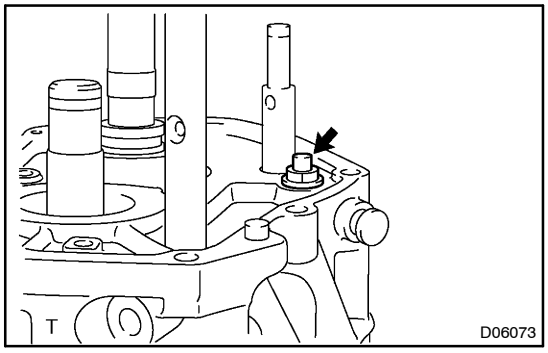
10. INSTALL SHIFT FORK SHAFT NO. 3
(a) Apply MP grease to shaft detente ball No. 2.
(b) Using a screwdriver, install the shaft detente ball to transmission case.



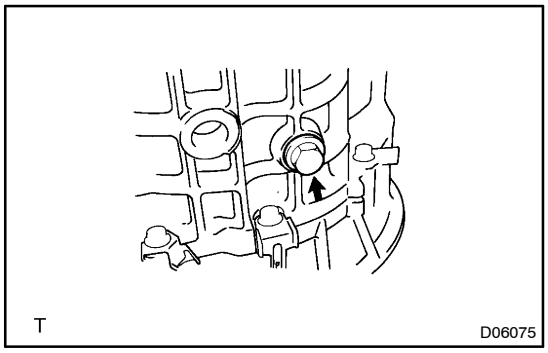
(c) Install the shift fork shaft No. 3.
(d) Coat sealant to head straight screw plug No. 1.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent



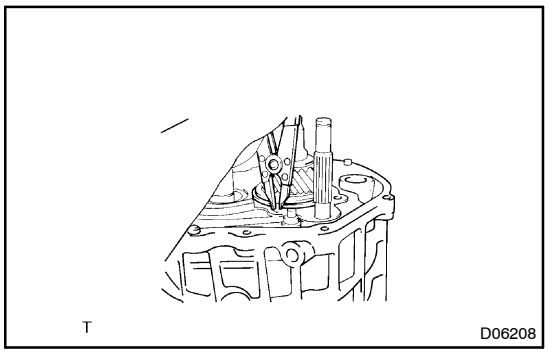
(e) Install the shaft detente ball and shift detente ball compression spring No. 2.
(f) Using a torx wrench (T30), install the head straight screw plug No. 1.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



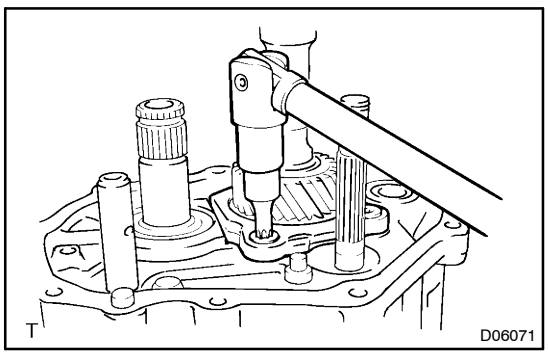
(g) Install the shift and select lever stopper bolt.
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)



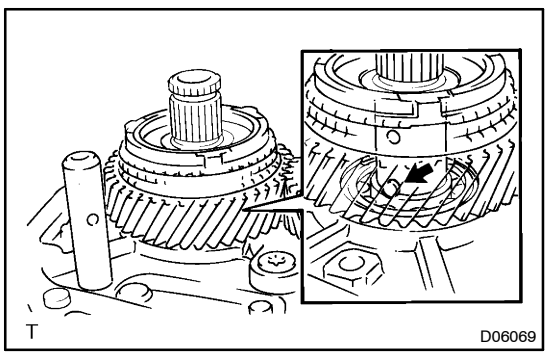
11. INSTALL SHIFT INTERLOCK PLATE BOLT
(a) Coat sealant to shift interlock plate bolt.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(b) Install the shift interlock plate bolt.
Torque: 31 N·m (320 kgf·cm, 23 ft·lbf)



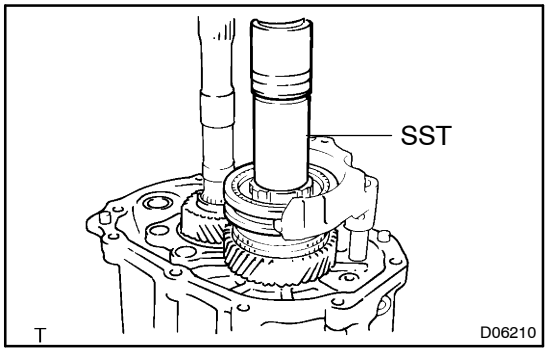
12. INSTALL OUTPUT SHAFT REAR BEARING RETAINER
(a) Using a snap ring expander, install the output shaft bearing snap ring.



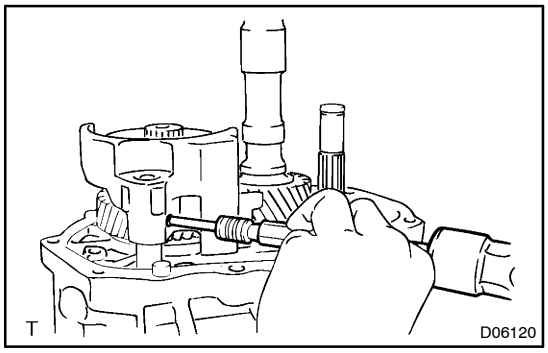
(b) Coat sealant to 4 bolts.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(c) Using a torx wrench (T45), install the output shaft rear bearing retainer with 4 bolts.
Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)



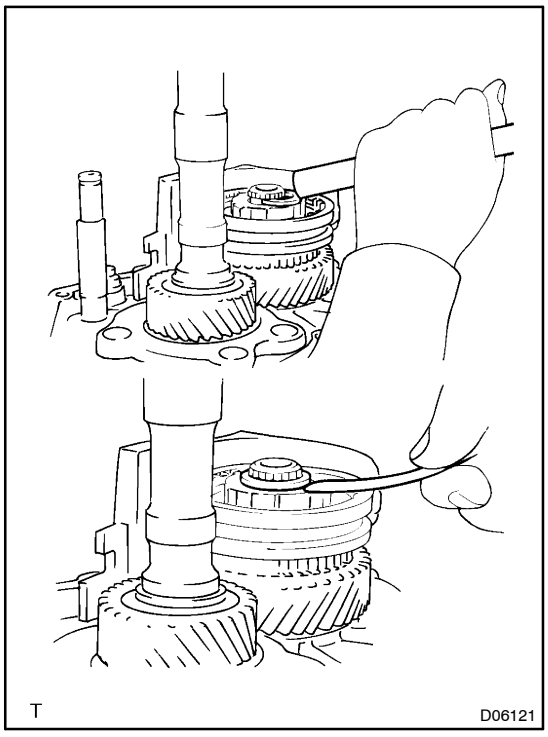
13. INSTALL CLUTCH HUB NO. 4
(a) Install the gear thrust washer pin to counter shaft.
(b) Apply gear oil to 6th gear thrust washer, 6th gear needle roller bearing, 6th counter gear synchronizer ring No. 3 and install them to counter shaft.



(c) Using SST and press, install the clutch hub No. 4 with 3rd and 4th shift fork.
SST 09632–36010



(d) Using a pin punch and hammer, drive in the slotted spring pin.
Drive in depth: 0 ± 0.5 mm (0 ± 0.02 in.)

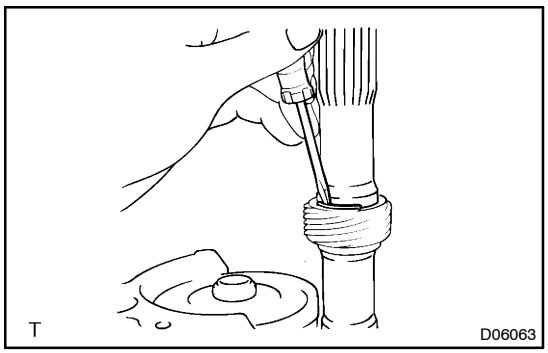


14. INSTALL SHAFT SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
A	2.80 (0.1102)
B	2.85 (0.1122)
C	2.90 (0.1142)
D	2.95 (0.1162)
E	3.00 (0.1181)
F	3.05 (0.1201)

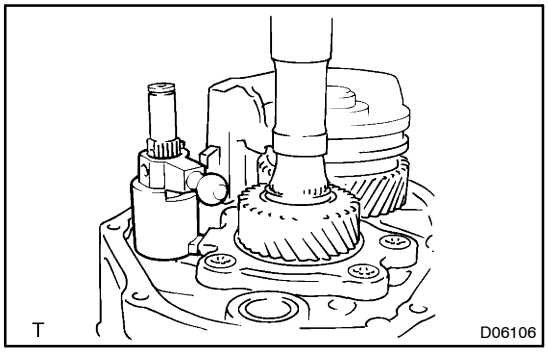
(b) Using a brass bar and hammer, tap in the snap ring.



15. INSTALL SPEEDOMETER DRIVE GEAR

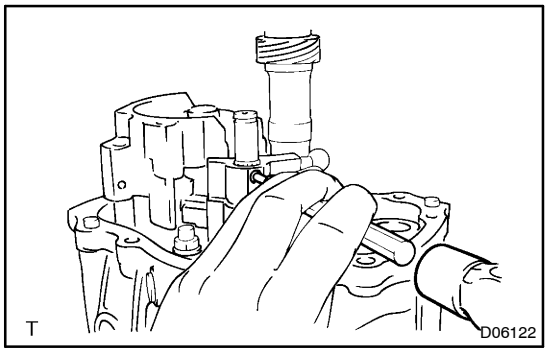
(a) Put a clip on the speedometer drive gear and install the speedometer drive gear on the output shaft.

(b) Using a screwdriver, install the clip.

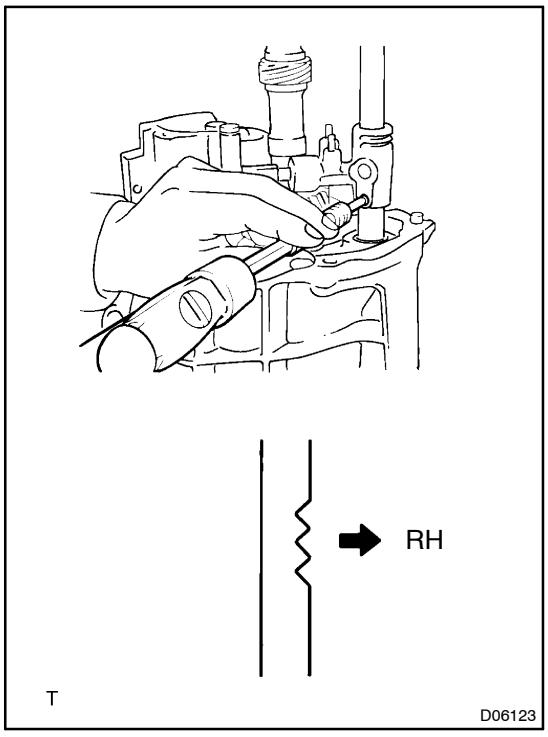


16. INSTALL SHIFT AND SELECT LEVER

(a) Install the shift interlock block No. 2 and shift and select lever.

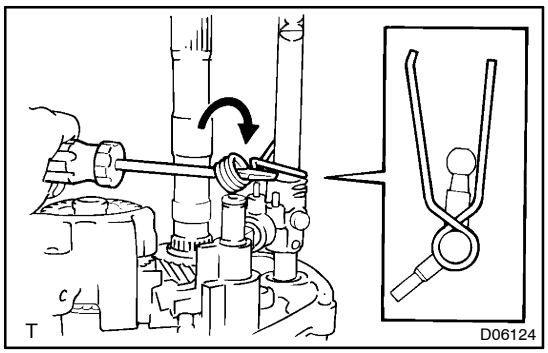


(b) Using a pin punch and hammer, drive in the slotted spring pin.
Drive in depth: 0 + 0.5 mm (0 + 0.02 in,)



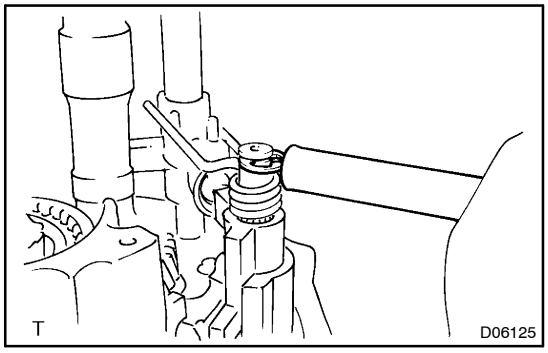
17. INSTALL SHIFT LEVER HOUSING

(a) Install the shift lever housing to gear shift fork shaft No. 1.
(b) Install the gear shift fork shaft No. 1 to transmission case.
(c) Using a pin punch and hammer, drive in the slotted spring pin.
Drive in depth: 0 + 0.5 mm (0 + 0.02 in,)
(d) Apply sealant to the bolt.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(e) Install the bolt.
Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)

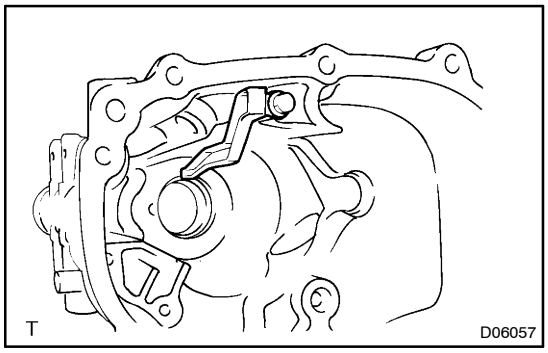


18. INSTALL SELECT RETURN TORSION SPRING

(a) Using a screwdriver, install the select return torsion spring.



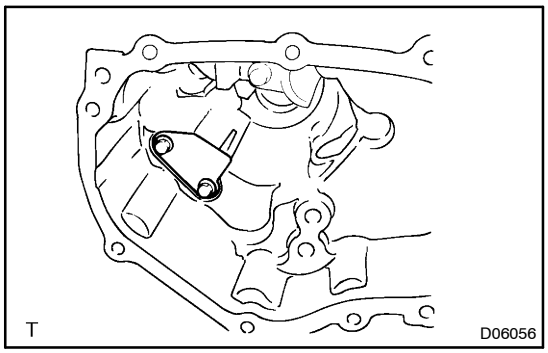
(b) Using a brass bar and hammer, install the shift fork shaft E–ring.



19. INSTALL EXTENSION HOUSING OIL RECEIVER PIPE NO. 1

Install the extension housing oil seal receiver pipe No. 1 with bolt.

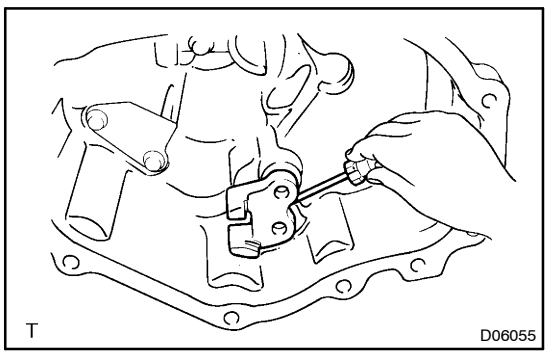
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)



20. INSTALL OIL FILTER PLATE

Install the oil filter plate with 2 bolts.

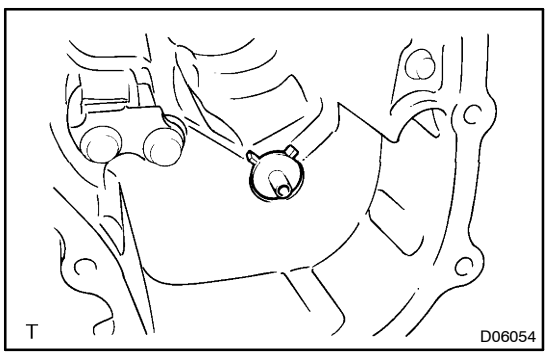
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)



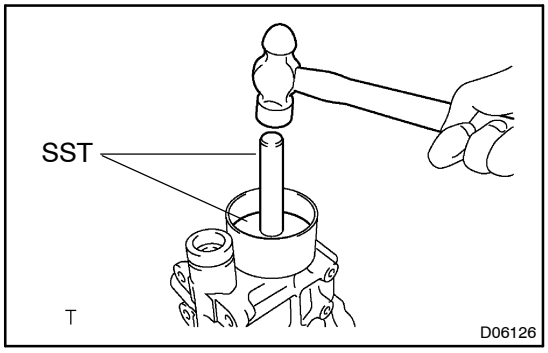
21. INSTALL SELECT STOPPER BLOCK

Install the select stopper block with the 2 bolts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



22. INSTALL EXTENSION HOUSING OIL RECEIVER NO. 2

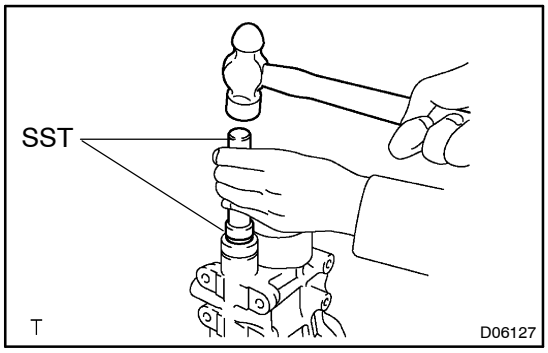


23. INSTAL EXTENSION HOUSING DUST DEFLECTOR

Using SST and a hammer, drive in the extension housing dust deflector.

SST 09950–60020 (09951–00750),
09950–70010 (09951–07100)

Drive in depth: 1.5 ± 0.5 mm (0.059 ± 0.02 in.)

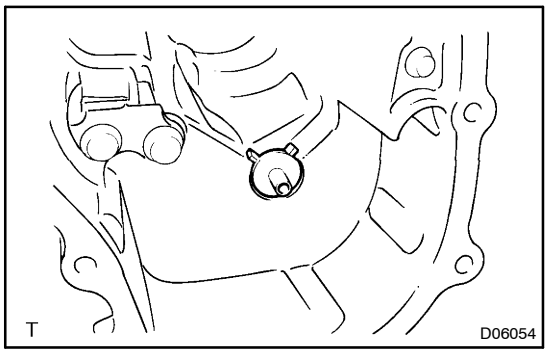


24. INSTALL EXTENSION HOUSING REAR OIL SEAL

(a) Using SST and hammer, install a new extension housing rear oil seal.

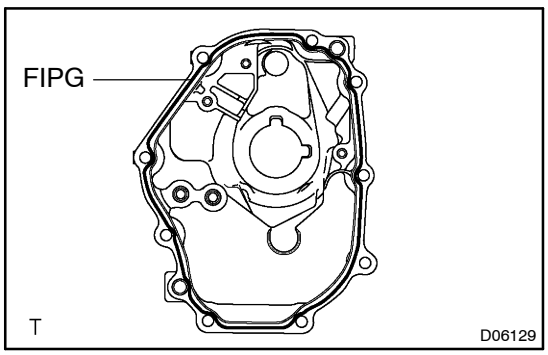
SST 09325–20010

(b) Apply MP grease to lip of extension housing oil seal.



25. INSTALL EXTENSION HOUSING BLEEDER PLUG

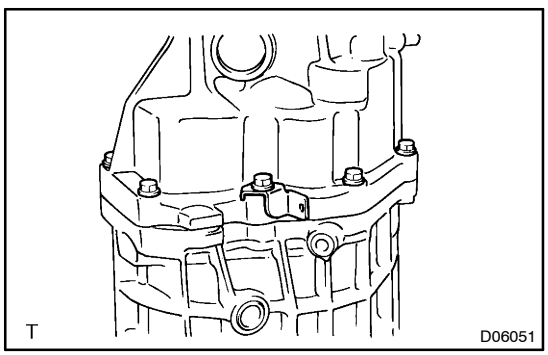
Using a screwdriver, and hammer, install the extension housing bleeder plug.



26. INSTALL EXTENSION HOUSING

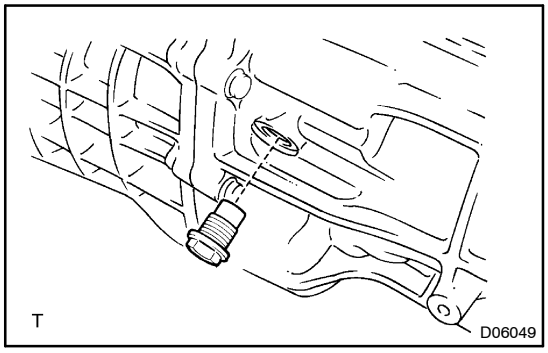
(a) Apply FIPG to extension housing, as shown in the illustration.

FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

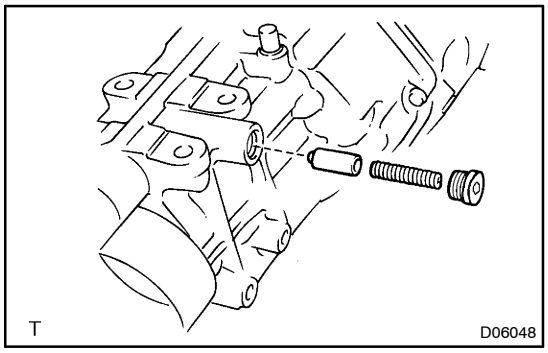


(b) Install the extension housing with 9 bolts and clamp.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



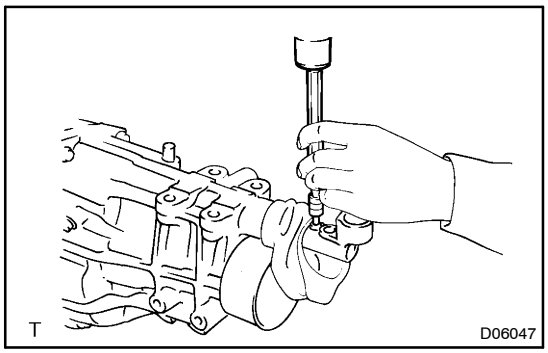
27. INSTALL REVERSE RESTRICT PIN
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

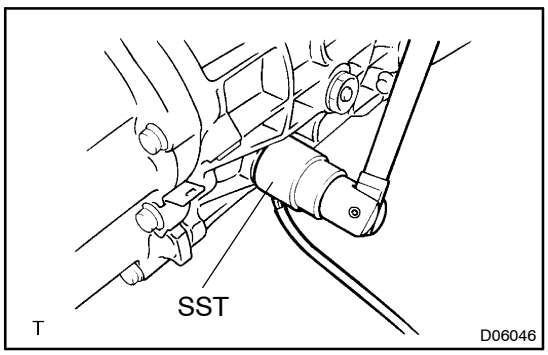


28. INSTALL LOCK BALL PIN
(a) Apply sealant to head straight screw plug No. 2.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(b) Install the lock ball pin and shift and select spring.
(c) Using a hexagon wrench (8.0 mm, 0.31 in.), install the head straight screw plug No. 2.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

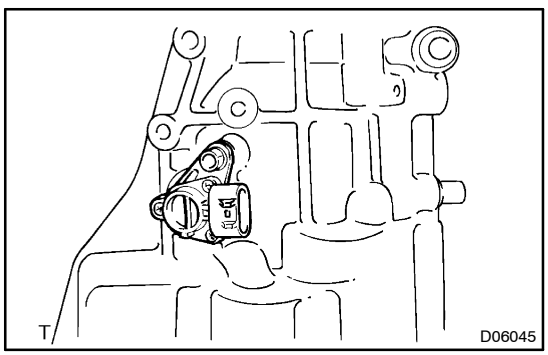
29. INSTALL CONTROL SHIFT LEVER DUST BOOT

30. INSTALL FLOOR SHIFT LEVER HOUSING
(a) Install the floor shift lever spring.
(b) Using a pin punch and hammer, drive in the slotted spring pin until it is flush with floor shift lever housing.
(c) Apply sealant to the bolt.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(d) Install the bolt.
Torque: 38 N·m (390 kgf·cm, 28 ft·lbf)

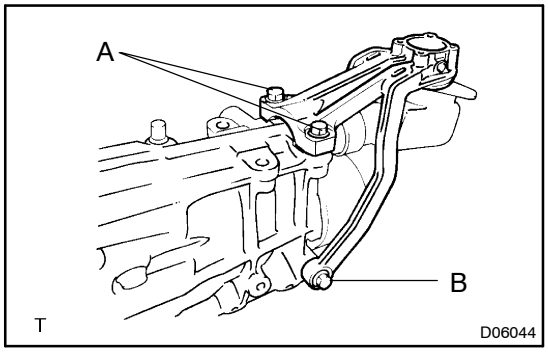




31. INSTALL BACK–UP SWITCH
Install the back–up switch together with new gasket.
SST 09817–16011
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)



32. INSTALL VEHICLE SPEED SENSOR
Install the vehicle speed sensor with the bolt.
Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)



33. INSTALL CONTROL SHIFT LEVER RETAINER

Install the control shift lever retainer with the 4 bolts.

Torque:
Bolt (A): 29 N·m (300 kgf·cm, 27 ft·lbf)
Bolt (B): 19.5 N·m (195 kgf·cm, 14 ft·lbf)

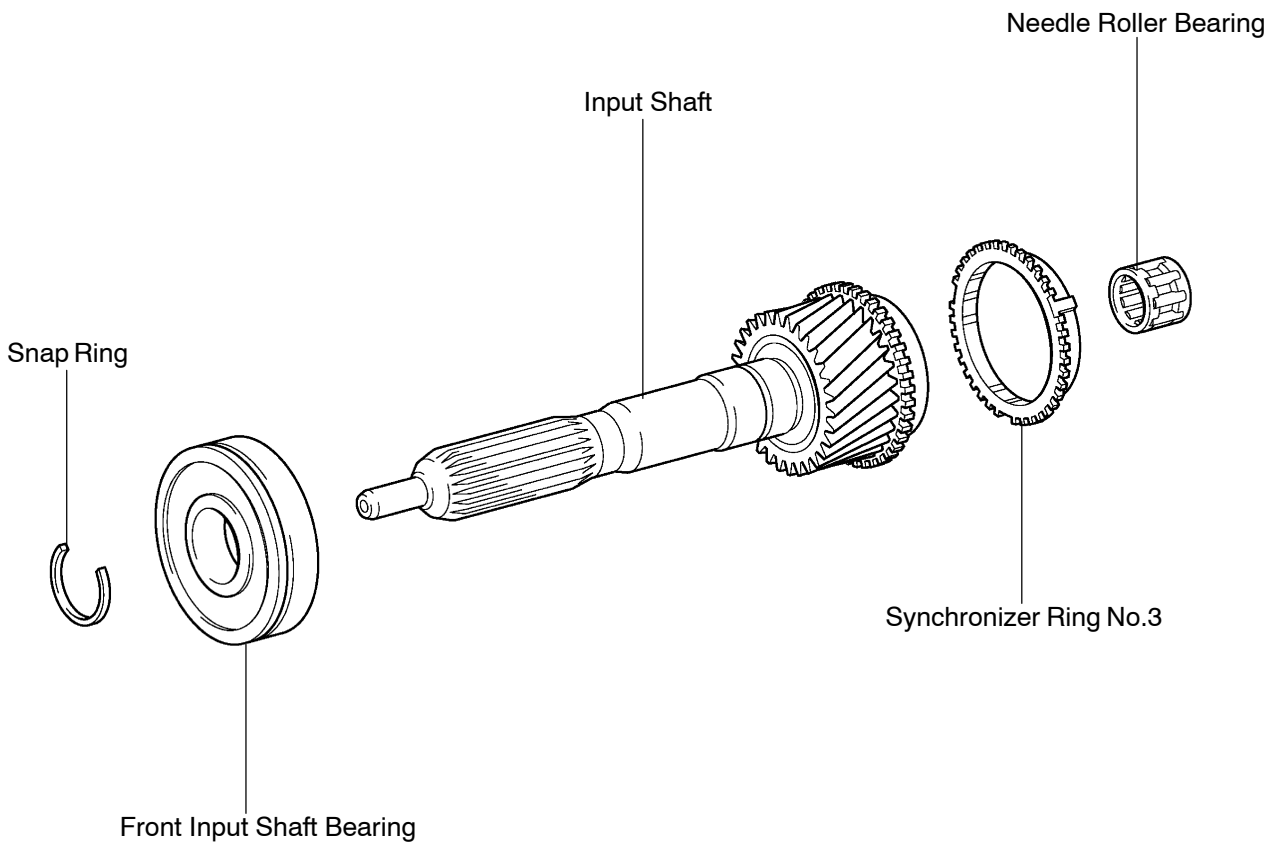
34. INSTALL CLUTCH RELEASE FORK SUPPORT

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

INPUT SHAFT

COMPONENTS

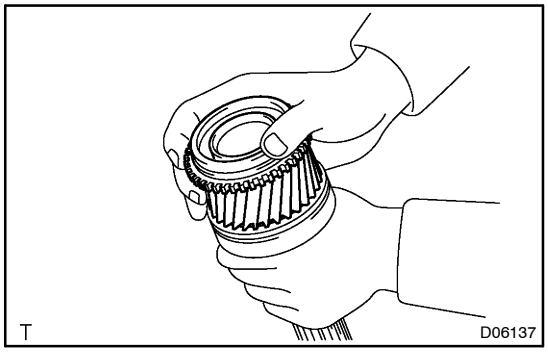
MT08Z–01



MT090–01

INSPECTION

INSPECT SYNCHRONIZER RING



(a) Check for wear or damage.

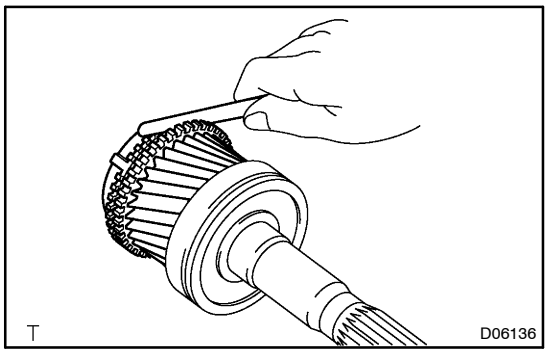
(b) Check for the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.
Minimum clearance: 0.8 mm (0.031 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

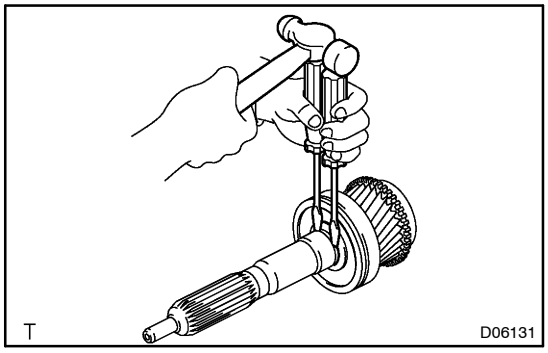
NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

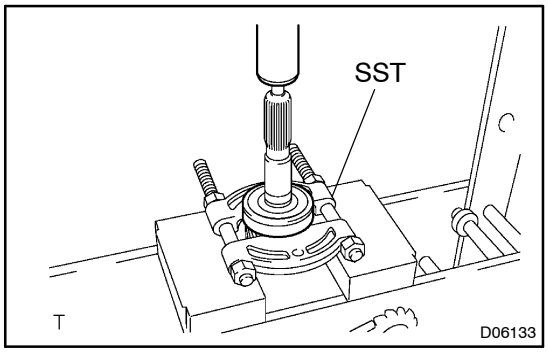
MT091–01

REPLACEMENT

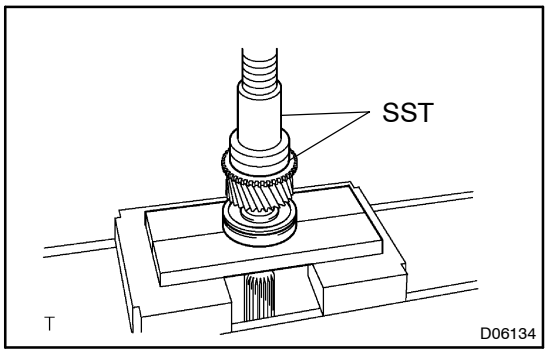
IF NECESSARY, REPLACE INPUT SHAFT BEARING



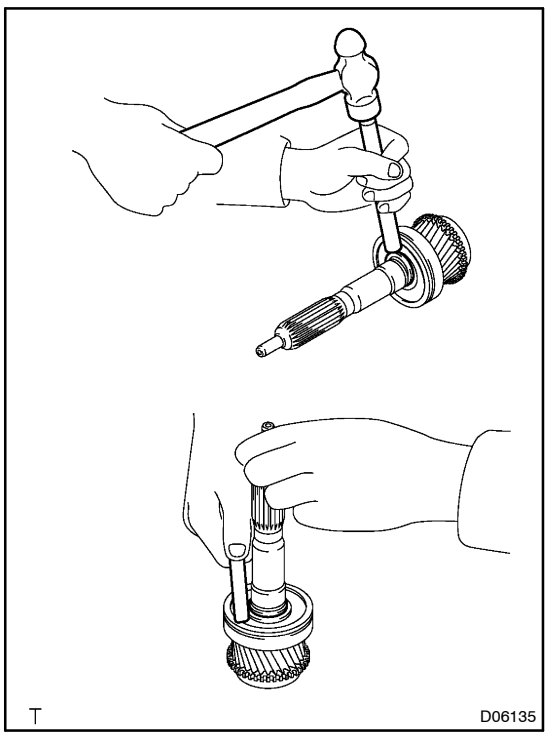
(a) Using 2 screwdrivers and hammer, remove the snap ring.



(b) Using SST and press, remove the input shaft bearing.
SST 09950–00020



(c) Using SST and press, install a new bearing.
SST 09527–20011, 09950–60010 (09951–00560)



(d) Select a snap ring that allows minimum axial play.

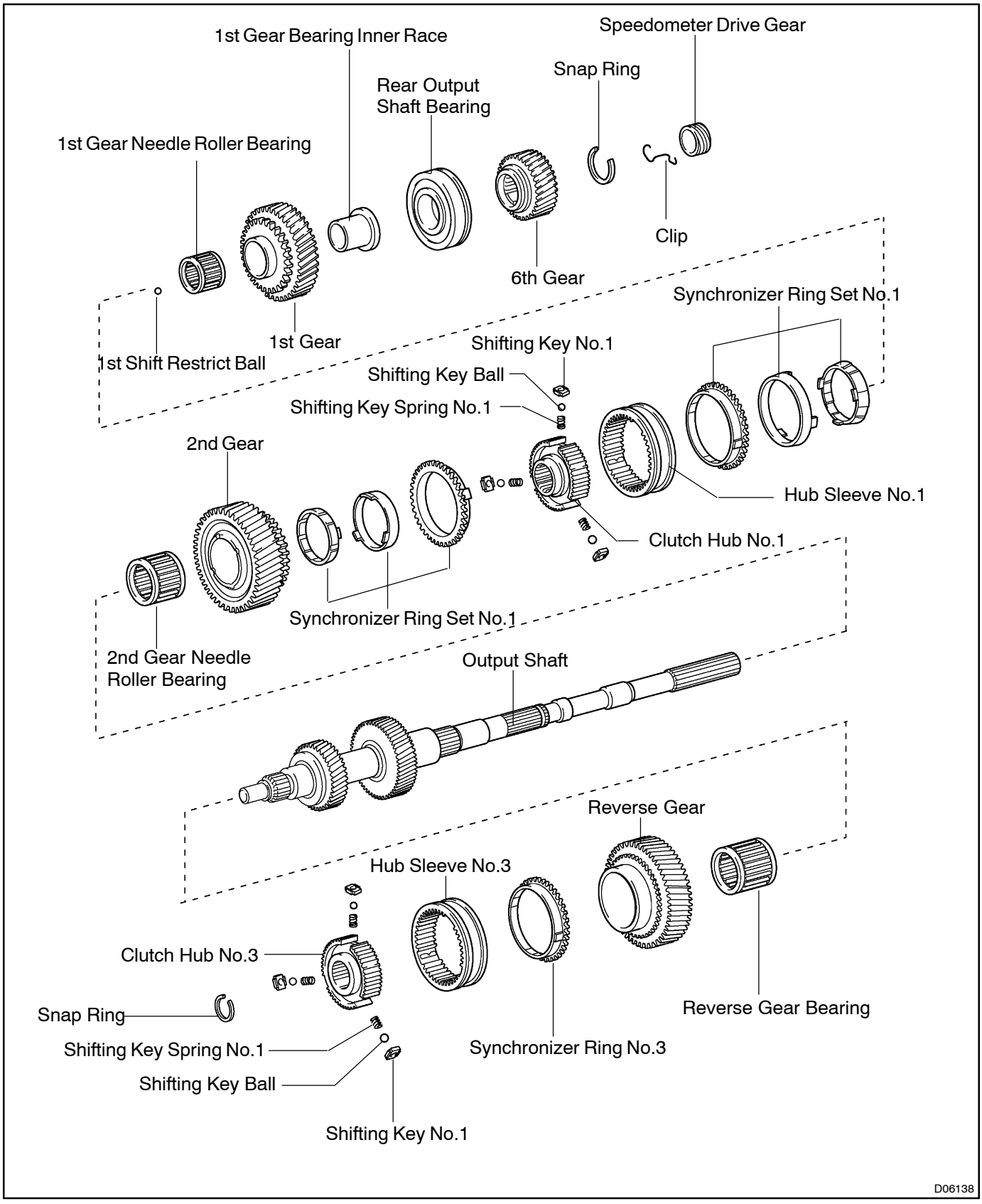
Mark	Thickness mm (in.)
0	1.95 (0.077)
1	2.00 (0.079)
2	2.05 (0.081)
3	2.10 (0.083)
4	2.15 (0.085)
5	2.20 (0.087)

(e) Using brass bar and hammer, install the snap ring.

OUTPUT SHAFT

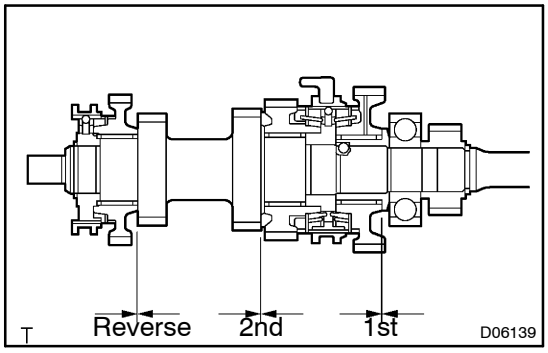
COMPONENTS

MT092–01



MT093–01

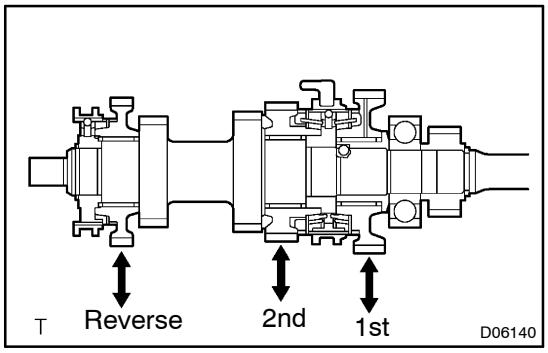
DISASSEMBLY



1. INSPECT EACH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance of each gear.

Standard clearance:
1st gear: 0.15 – 0.40 mm (0.0059 – 0.0157 in.)
2nd and reverse gear:
0.10 – 0.45 mm (0.0039 – 0.0177 in.)

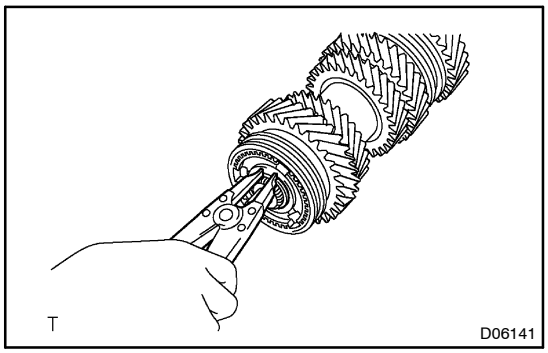


2. INSPECT EACH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance of each gear.

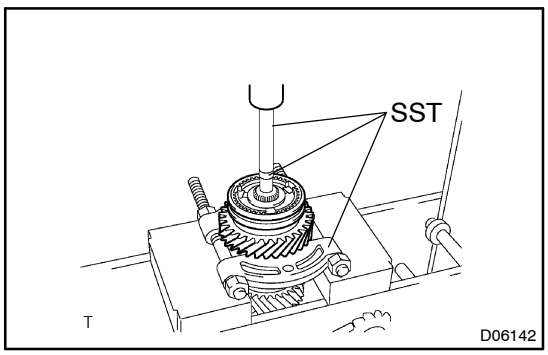
Standard clearance:
0.015 – 0.066 mm (0.00059 – 0.00260 in.)

If the clearance exceeds the standard, replace the gear, shaft or needle roller bearing.

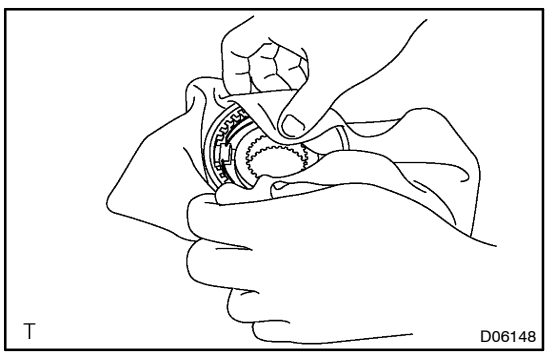


3. REMOVE REVERSE GEAR

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

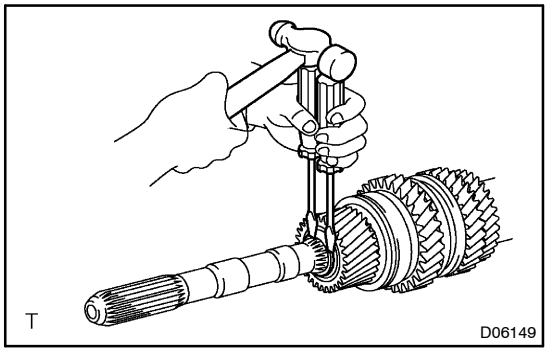


(b) Using SST and a press, remove the transmission clutch hub No. 3 and reverse gear, synchronizer ring No. 3 and reverse gear bearing.
SST 09950–00020, 09950–60010 (09951–00230), 09950–70010 (09951–07100)



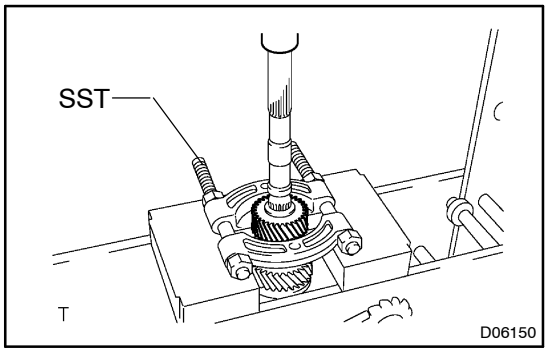
4. REMOVE HUB SLEEVE NO.3

(a) Cover the hub sleeve No.3 with a cloth, remove the hub sleeve No.3.
(b) Remove the 3 shifting keys, 3 shifting springs and 3 shifting key balls.

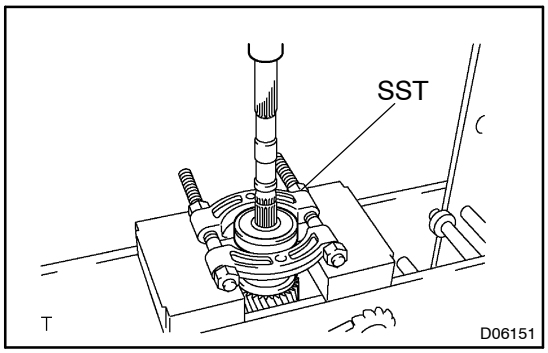


5. REMOVE 6TH GEAR

(a) Using 2 screwdrivers and hammer, remove the 6th gear shaft snap ring.



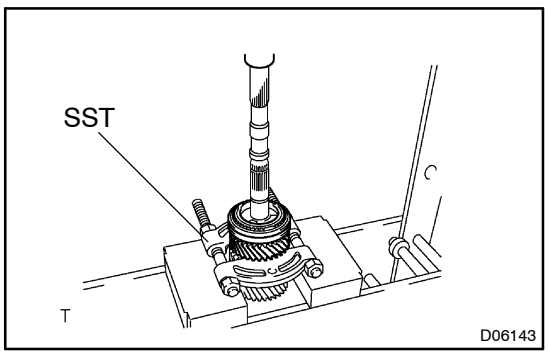
(b) Using SST and press, remove the 6th gear.
SST 09950–00020



6. REMOVE 1ST GEAR

(a) Using SST and press, remove the output shaft bearing RR.
SST 09950–00020

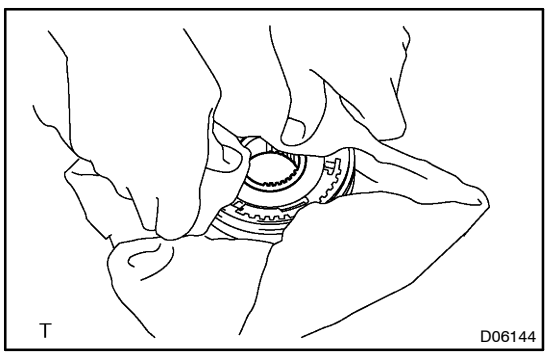
(b) Remove the 1st gear bearing inner race 1st gear needle roller bearing and 1st shift restrict ball.



7. REMOVE 2ND GEAR

Using SST and press, remove the 2nd gear, transmission clutch hub No. 1 and 2nd gear needle roller bearing.
SST 09950–00020

8. REMOVE SYNCHRONIZER RING SET NO. 1



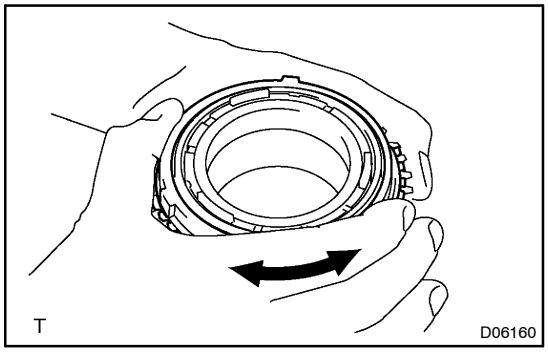
9. REMOVE HUB SLEEVE NO. 1

(a) Cover the hub sleeve No. 1 with a cloth, remove the hub sleeve No.1.

(b) Remove the 3 shifting keys, 3 shifting springs and 3 shifting key balls.

MT094–01

INSPECTION



1. INSPECT 1ST AND 2ND GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

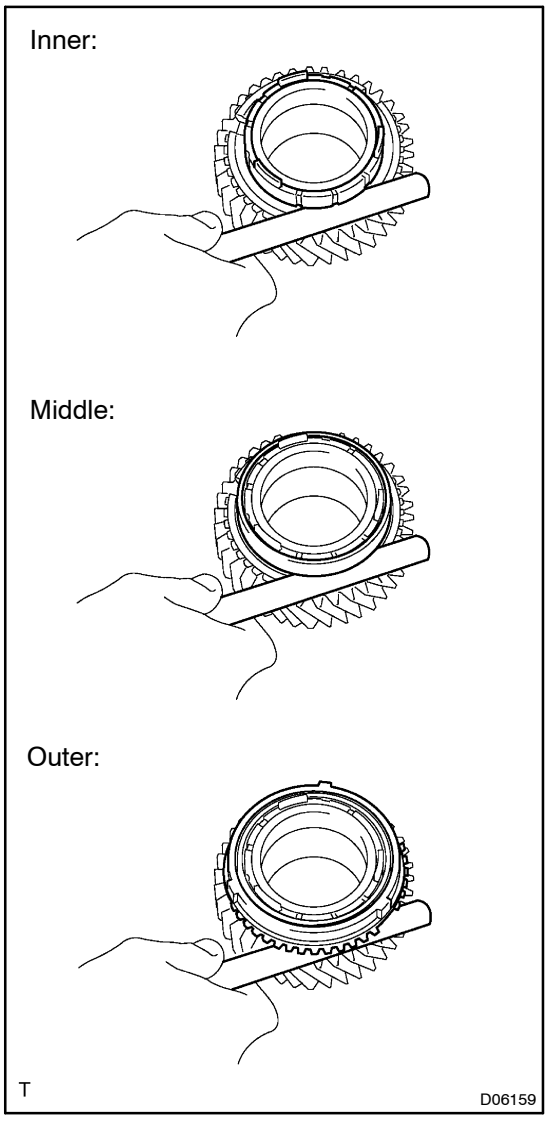
(b) Check for the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

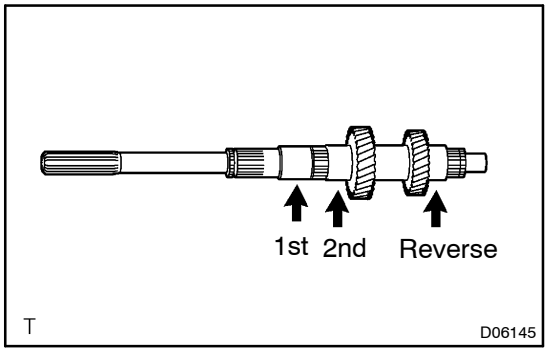
Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.



(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.
Standard clearance:
Inner: 0.98 – 1.62 mm (0.039 – 0.064 in.)
Middle: 0.68 – 1.92 mm (0.027 – 0.076 in.)
Outer: 0.88 – 1.72 mm (0.035 – 0.068 in.)

If the clearance is not as standard, replace the synchronizer ring.

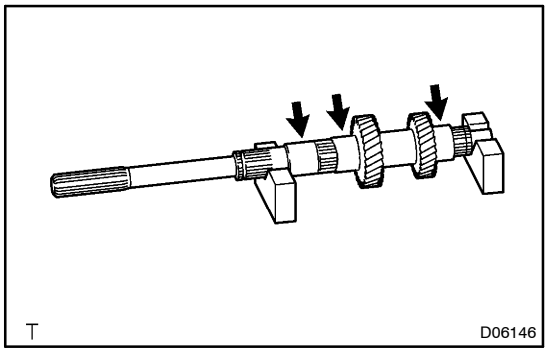


2. INSPECT OUTPUT SHAFT

(a) Using a micrometer, measure the outer diameter of the output shaft journal.

Minimum diameter:
1st gear: 31.984 – 32.000 mm (1.259 – 1.260 in.)
2nd gear: 42.984 – 43.000 mm (1.692 – 1.693 in.)
Reverse gear: 40.984 – 41.000mm (1.6135 – 1.6141 in.)

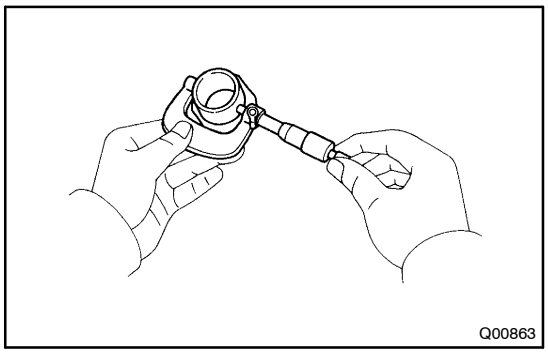
If the outer diameter is less than the minimum, replace the output shaft.



(b) Using a dial indicator, check for the shaft runout.

Maximum runout: 0.03 mm (0.0012 in.)

If the runout exceeds the maximum replace the output shaft.

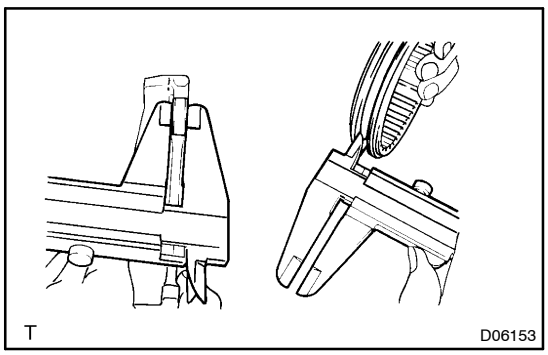


3. INSPECT 1ST GEAR BEARING INNER RACE

Using a micrometer, measure the outer diameter of the inner race.

Minimum diameter: 4.0284 – 40.300 (1.586 – 1.587 in.)

If the outer diameter is less than the minimum, replace the inner race.



4. INSPECT HUB SLEEVE NO. 1 AND NO. 3 CLEARANCE

(a) Using vernier calipers, measure thickness claw of shift fork.

Standard thickness: 7.9 – 8.0 mm (0.311 – 0.315 in.)

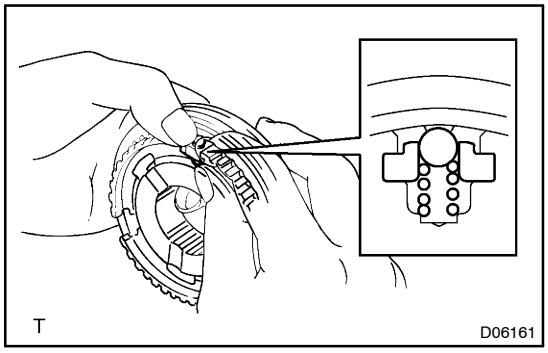
(b) Using vernier calipers, measure the groove of hub sleeve and subtract the shift fork claw thickness from hub sleeve groove.

Maximum clearance:
0.15 – 0.35 mm (0.0059 – 0.0138 in.)

If the clearance exceeds the maximum, replace the shift fork or hub sleeve.

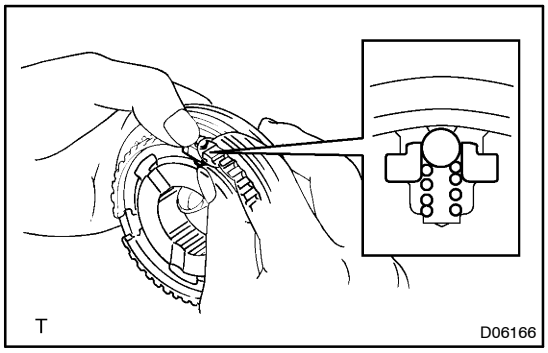
MT095–01

REASSEMBLY



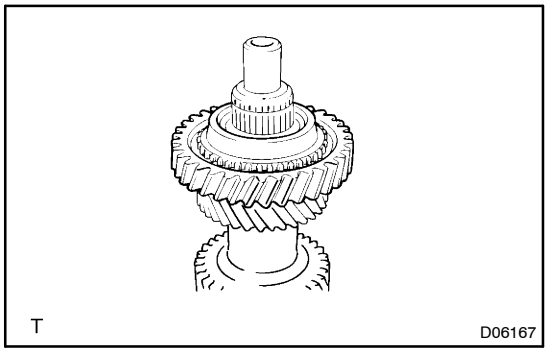
1. INSTALL HUB SLEEVE NO. 1

(a) Install the hub sleeve No. 1 to clutch hub No. 1.
(b) Install the shifting key and spring to clutch hub.
(c) While pushing the spring, install the shifting key ball.



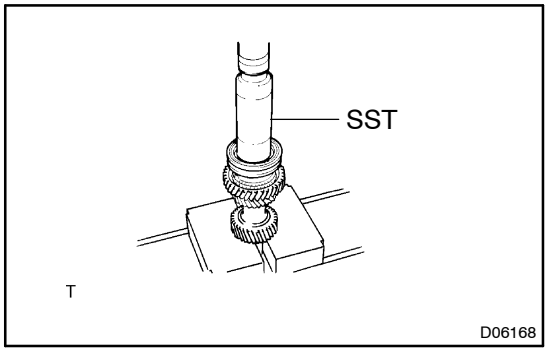
2. INSTALL HUB SLEEVE NO. 3

(a) Install the hub sleeve No. 3 to clutch hub No. 3.
(b) Install the shifting key and spring to clutch hub.
(c) While pushing the spring, install the shifting key ball.



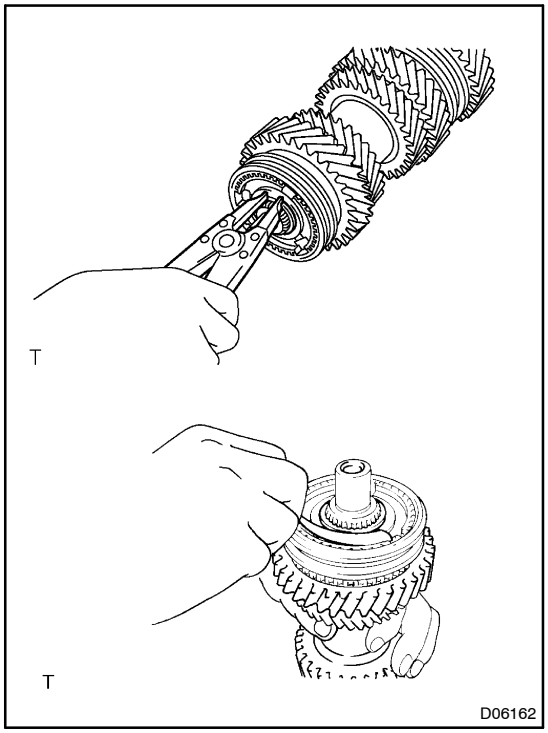
3. INSTALL REVERSE GEAR

(a) Apply gear oil to the shaft, inner of reverse gear bearing, inner of reverse gear and cone of reverse gear.
(b) Install the reverse gear bearing and reverse gear.



4. INSTALL TRANSMISSION CLUTCH HUB NO. 3

(a) Install the synchronizer ring No. 3 to reverse gear.
(b) Using SST and press, install the transmission clutch hub No. 3.
SST 09309–37010

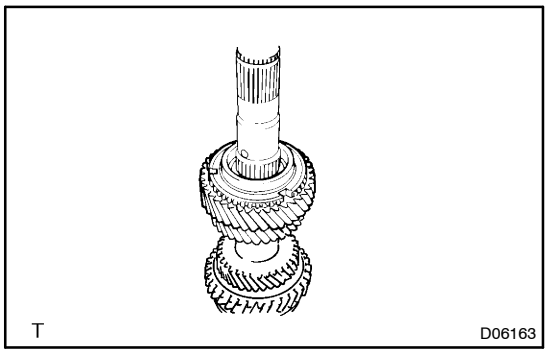


5. INSTALL TRANSMISSION CLUTCH HUB NO. 3 SHAFT SNAP RING

(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	1.80 (0.0709)
B	1.85 (0.0728)
C	1.90 (0.0748)
D	1.95 (0.0768)
E	2.00 (0.0787)
F	2.05 (0.0807)

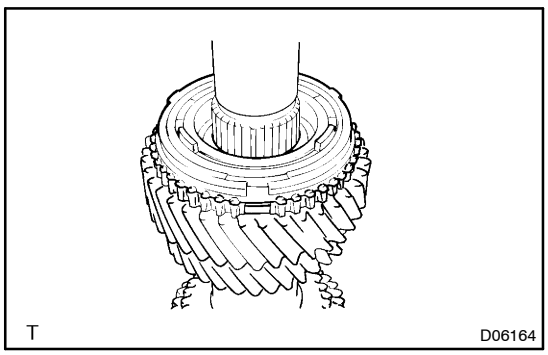
(b) Using a snap ring expander, install the snap ring.



6. INSTALL 2ND GEAR

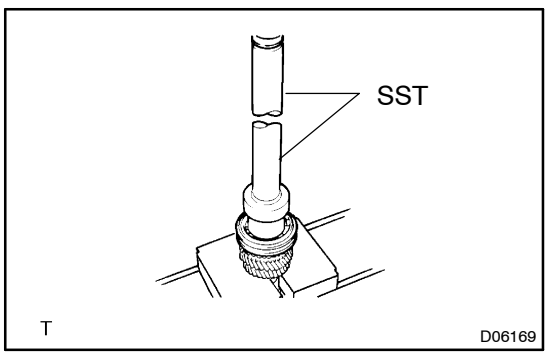
(a) Apply gear oil to the shaft, inner of reverse gear bearing, inner of the 2nd gear needle roller bearing, inner of 2nd gear and cone of 2nd gear.

(b) Install the 2nd gear needle roller bearing and 2nd gear to output shaft.

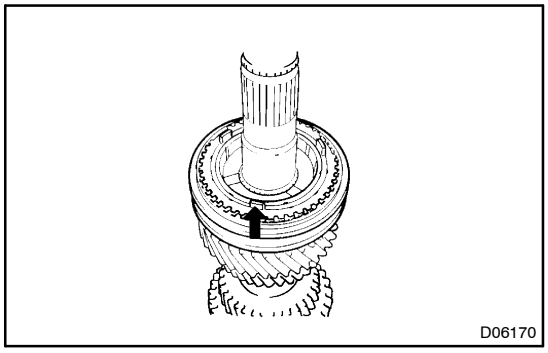


7. INSTALL TRANSMISSION CLUTCH HUB NO. 1

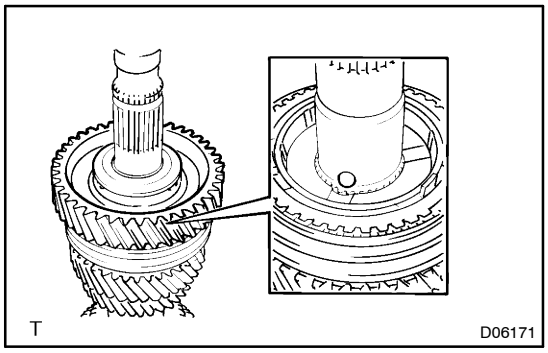
(a) Place the synchronizer ring set (for 2nd gear) on the gear and align the ring slots with the shifting keys.



(b) Using SST and press, install the clutch hub No. 1.
SST 09309–35010, 09631–12090



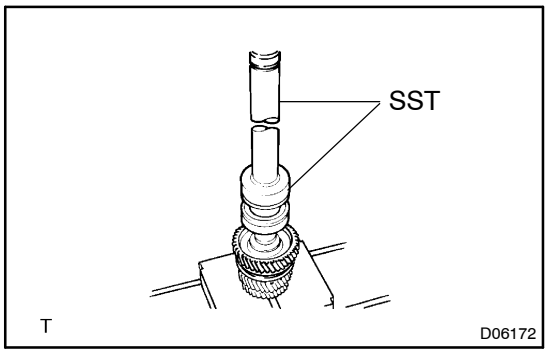
(c) Place the synchronizer ring set (for 1st gear) on the gear and align the ring slots with the shifting keys.



8. INSTALL 1ST GEAR

(a) Apply gear oil to the shaft needle roller bearing inner race, inner of 1st gear and cone of 1st gear.

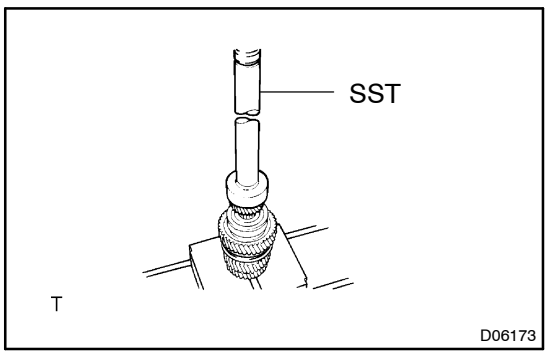
(b) Install the 1st gear shift restrict ball, 1st gear, bearing inner race, 1st gear needle roller bearing and 1st gear.



9. INSTALL REAR OUTPUT SHAFT BEARING

Using SST and press, install the rear output shaft bearing.

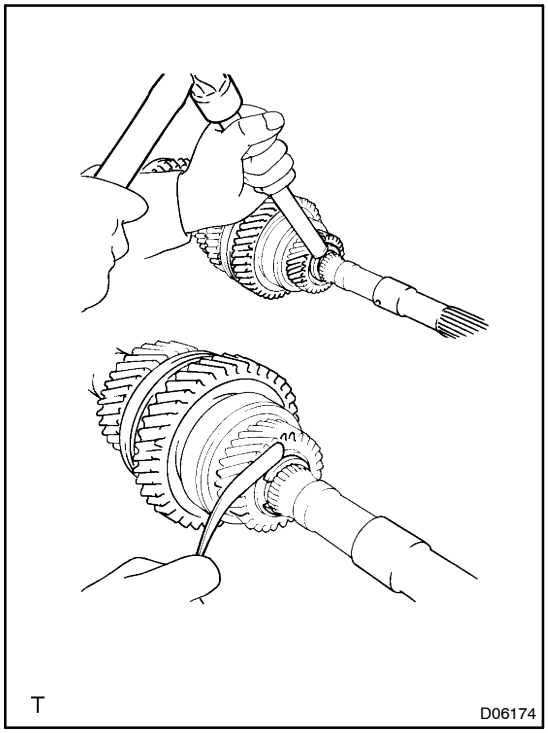
SST 09309–35010, 09316–60011 (09316–00021)



10. INSTALL 6TH GEAR

Using SST and press, install the 6th gear.

SST 09309–35010



11. INSTALL 6TH GEAR SHAFT SNAP RING

(a) Select a snap ring that allows the minimum axial play.

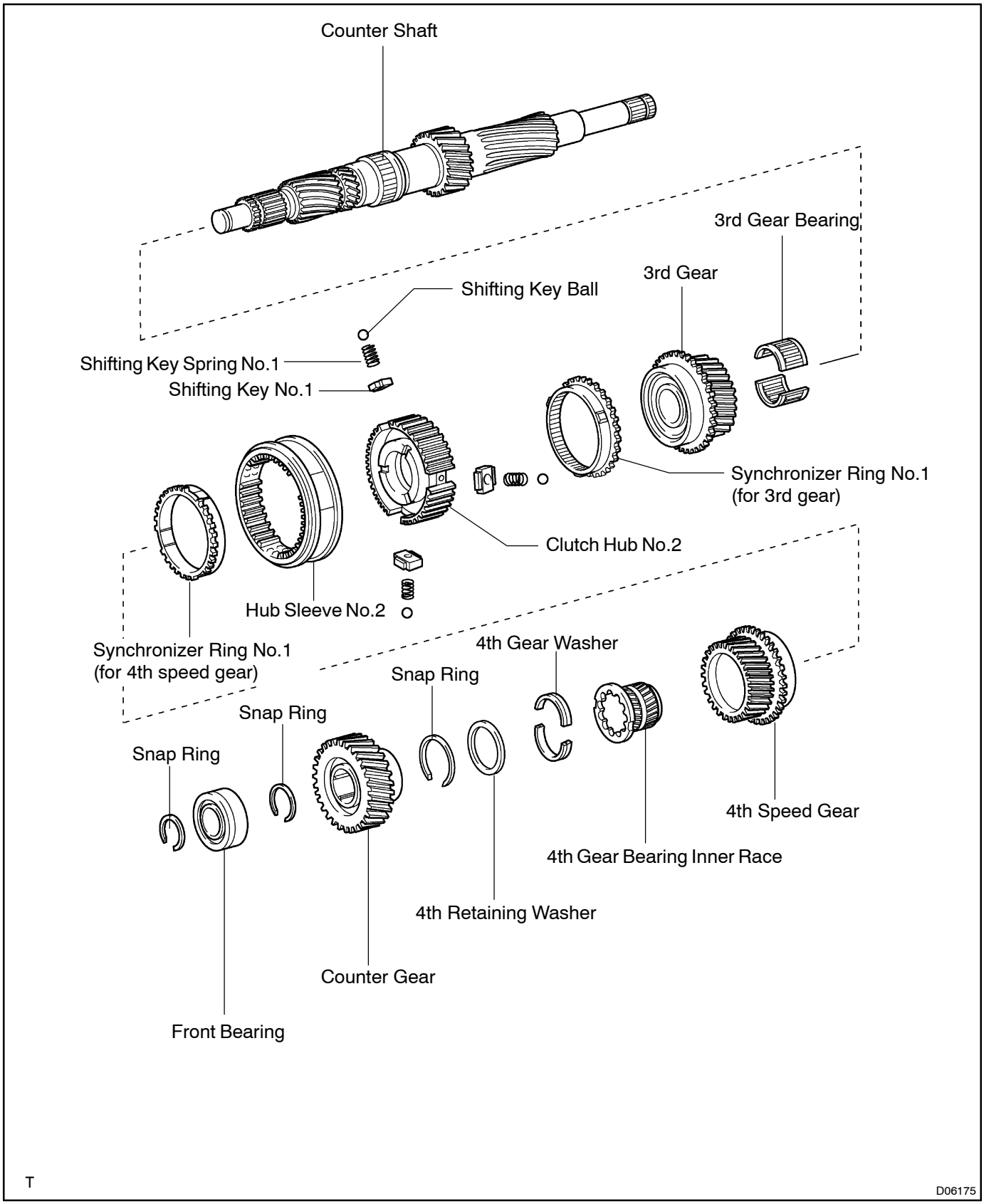
Mark	Thickness mm (in.)
A	2.67 (0.1051)
B	2.73 (0.1075)
C	2.79 (0.1098)
D	2.85 (0.1122)
E	2.91 (0.1146)
F	2.97 (0.1169)
G	3.03 (0.1192)
H	3.09 (0.1217)
J	3.15 (0.1240)
K	3.21 (0.1263)
L	3.27 (0.1287)

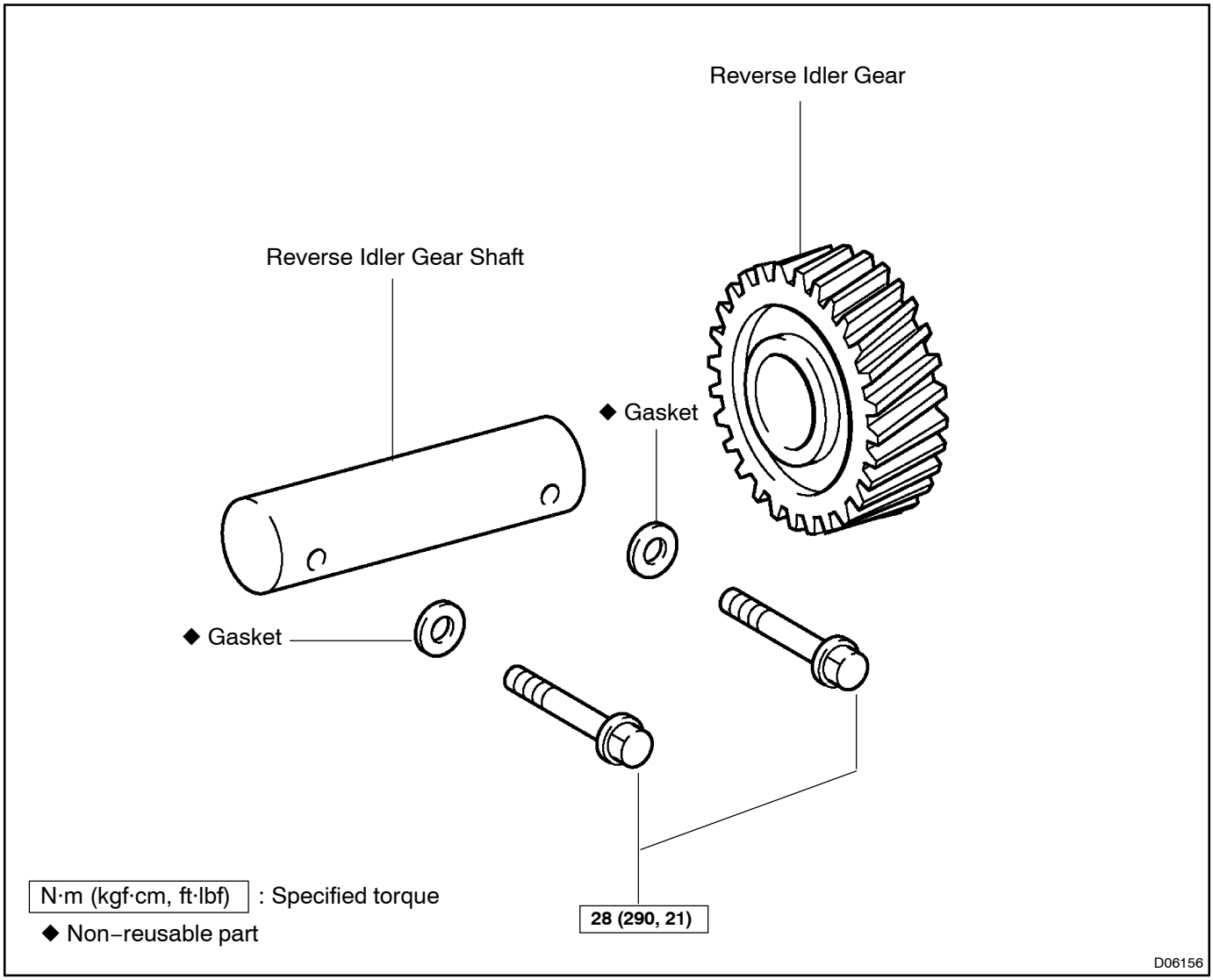
(b) Using a brass bar and hammer, install the snap ring.

COUNTER GEAR AND REVERSE IDLER GEAR

COMPONENTS

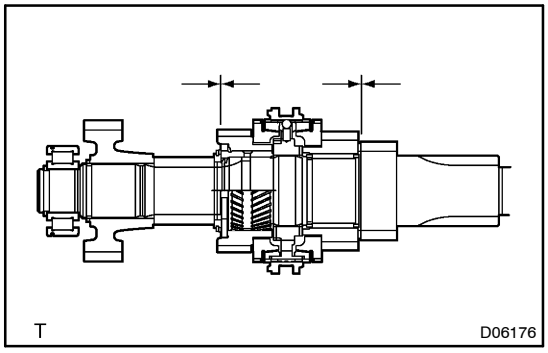
MT096–01




Reverse Idler Gear
Reverse Idler Gear Shaft
◆ Gasket
◆ Gasket
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
28 (290, 21)
D06156

MT097–01

DISASSEMBLY

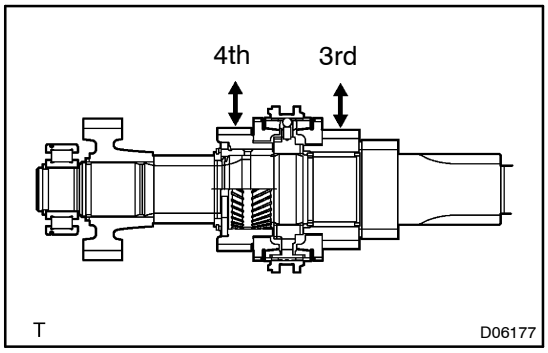


1. INSPECT THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance of each gear.

Standard clearance:
0.10 – 0.35 mm (0.0039 – 0.0138 in.)

If the clearance is not as standard, adjust the clearance by using 4th gear washer.

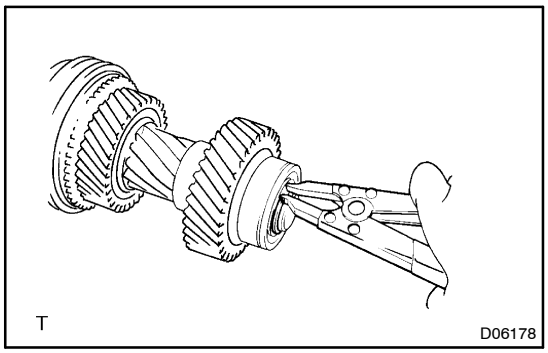


2. INSPECT RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance of each gear.

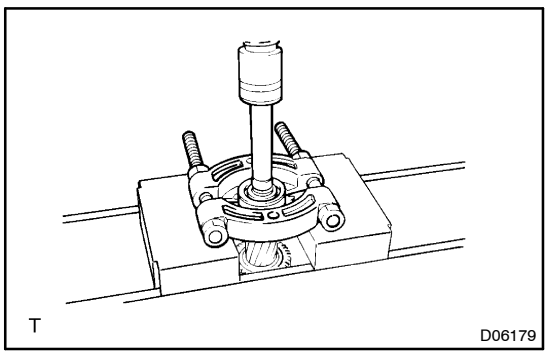
Standard clearance:
3rd gear: 0.015 – 0.068 mm (0.00059 – 0.00268 in.)
4th gear: 0.065 – 0.115 mm (0.00256 – 0.0453 in.)

If the clearance exceeds the standard, replace the needle roller bearing and gear.



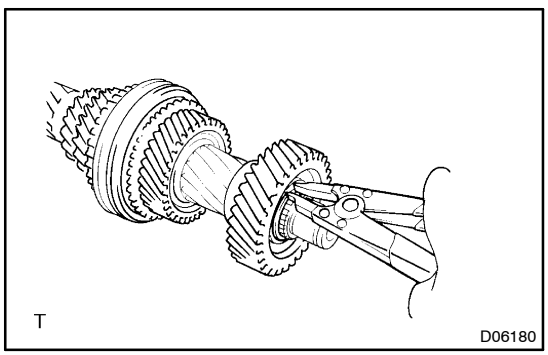
3. REMOVE COUNTER GEAR FRONT BEARING

(a) Using a snap ring expander, remove the counter gear front bearing snap ring No. 2.



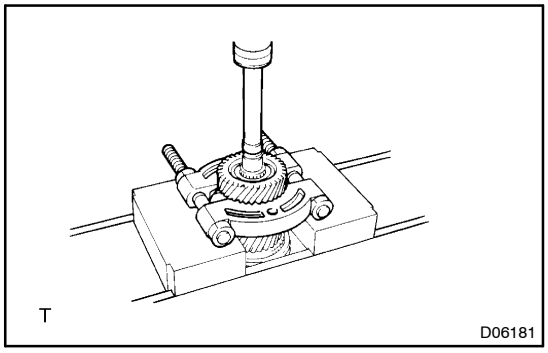
(b) Using SST and press, remove the counter gear front bearing.

SST 09950–00020, 09950–60010 (09950–00230), 09950–70010 (09951–07100)

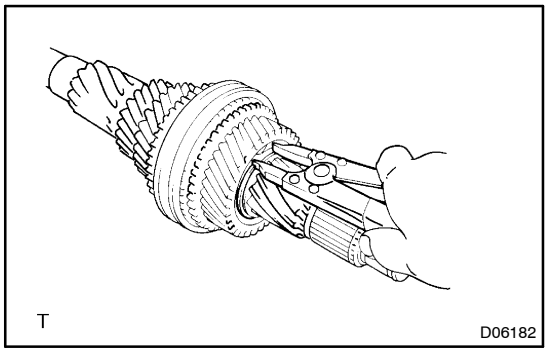


4. REMOVE COUNTER GEAR

(a) Using a snap ring expander, remove the transmission clutch hub No. 3 shaft snap ring.

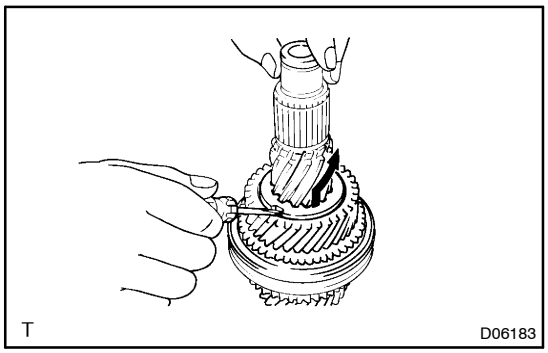


(b) Using SST and press, remove the counter gear.
SST 09950–00020, 09950–60010 (09951–00230), 09950–70010 (09951–07010)

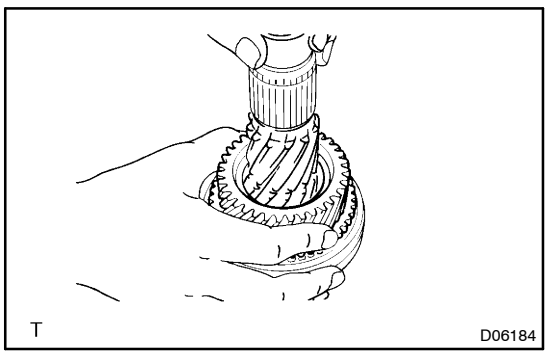


5. REMOVE 4TH SPEED GEAR

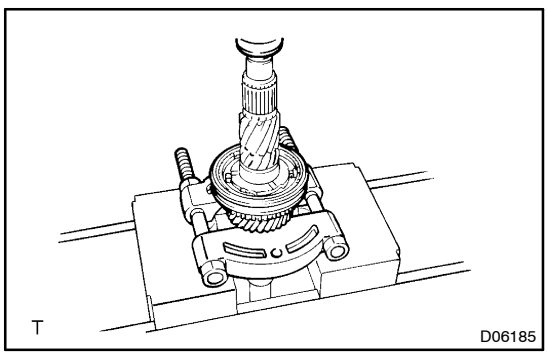
(a) Using a snap ring expander, remove the snap ring.
(b) Remove the 4th retaining washer and 4th gear washer.



(c) Using a screwdriver, remove the 4th gear bearing inner race.

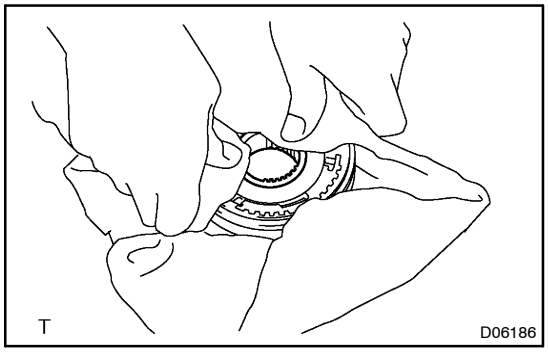


(d) Remove the counter shaft 4th speed gear and synchronizer ring No. 1.



6. REMOVE 3RD GEAR

Using SST and press, remove the transmission clutch hub No. 2, 3rd gear, synchronizer ring No. 1 and needle roller bearing.
SST 09950–00020



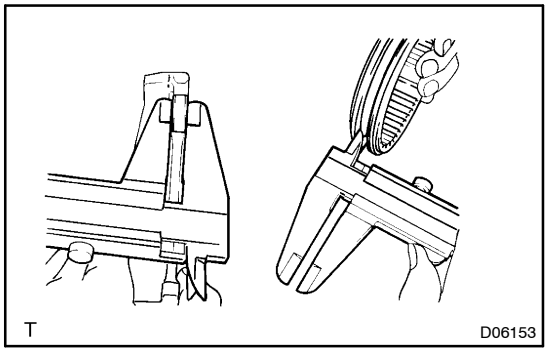
7. REMOVE HUB SLEEVE NO.2

(a) Cover the hub sleeve No.2 with a cloth.

(b) Remove the hub sleeve No. 2, 3 No. 1 shifting keys, 3 No. 1 shifting key springs and 3 shifting key balls.

MT098–01

INSPECTION

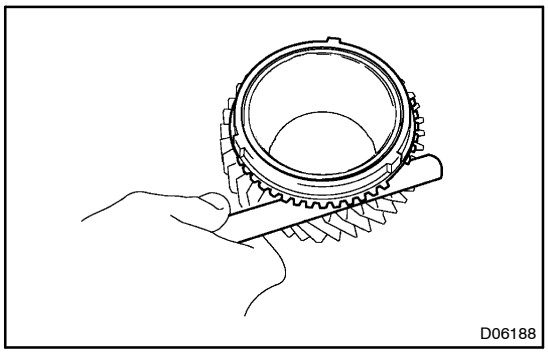


1. INSPECT TRANSMISSION HUB SLEEVE NO. 2 CLEARANCE

(a) Using vernier calipers, measure thickness claw of 3rd and 4th shift fork.
Standard thickness: 7.8 – 8.0 mm (0.307 – 0.315 in.)

(b) Using vernier calipers, measure the groove of hub sleeve No. 2 and subtract the shift fork claw thickness from hub sleeve groove.
Maximum clearance:
0.15 – 0.35 mm (0.0059 – 0.138 in.)

If the clearance exceeds the maximum, replace the shift fork or hub sleeve.



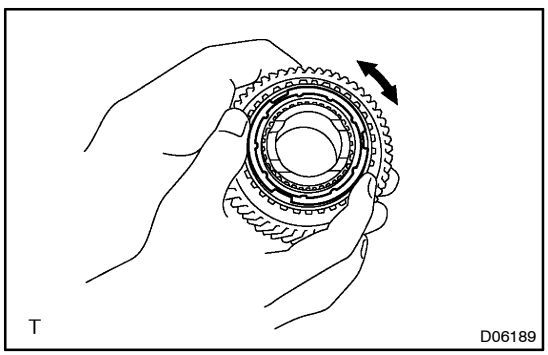
2. INSPECT SYNCHRONIZER RING NO. 1

(a) Apply the gear oil to cone of 3rd gear and synchronizer ring No. 1.

(b) Install the synchronizer ring to 3rd gear.

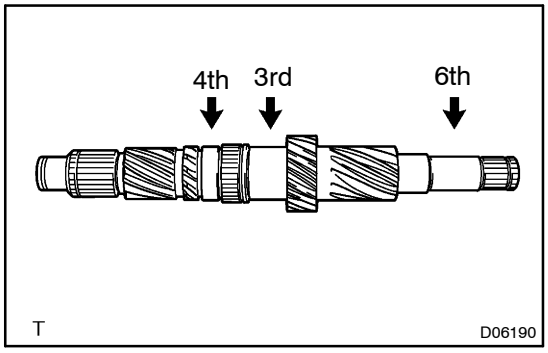
(c) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.
Standard clearance:
3rd gear: 0.9 – 1.7 mm (0.0354 – 0.0669in.)
4th gear: 0.8 – 1.6 mm (0.031 – 0.062 in.)

If the clearance is not as standard, replace the synchronizer ring.



(d) Check the braking effect of the synchronizer ring . Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If it does not lock, replace the synchronizer ring.

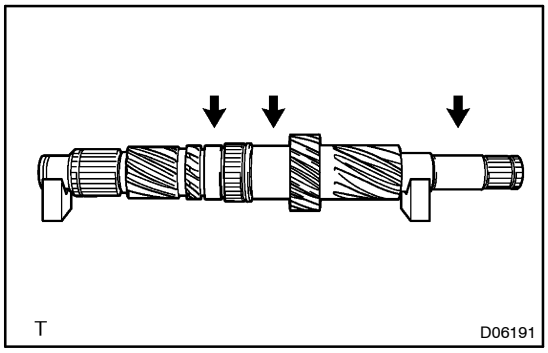


3. INSPECT COUNTER SHAFT

(a) Using a micrometer, measure outer diameter of counter gear journal.

Standard diameter:
3rd gear: 39.284 – 39.300 mm (1.5466 – 1.5472 in.)
4th gear:37.984 – 38.000 mm (1.495 – 1.496 in.)
6th gear: 24.987 – 25.000 mm (0.9837 – 0.9842 in.)

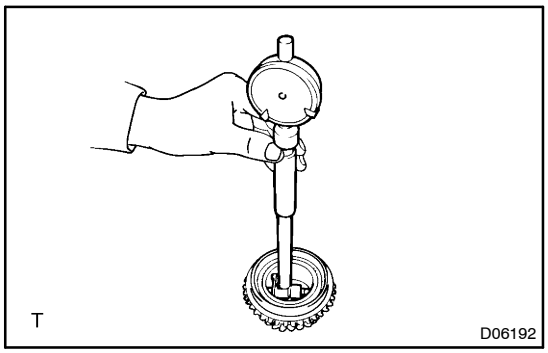
If the outer diameter is not as standard, replace the counter shaft.



(b) Using a dial indicator, check the counter shaft runout.

Maximum runout: 0.3 mm (0.00012in.)

If the runout exceeds the maximum, replace the counter shaft.

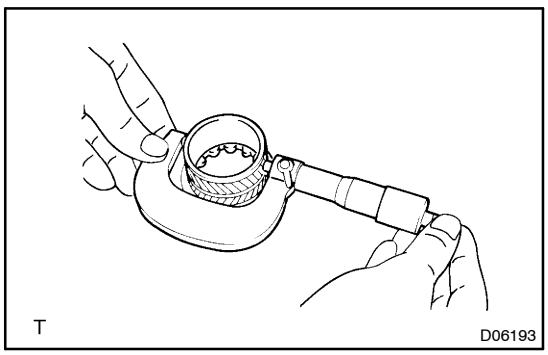


4. INSPECT 3RD AND COUNTER SHAFT 4TH SPEED GEAR

Using a cylinder gauge, measure the inner diameter of each gear.

Standard diameter:
3rd gear: 43.015 – 43.040 mm (1.6935 – 1.6945 in.)
4th gear: 46.315 – 46.340 mm (1.8234 – 1.8244 in.)

If the inner diameter is not as standard, replace the gear.

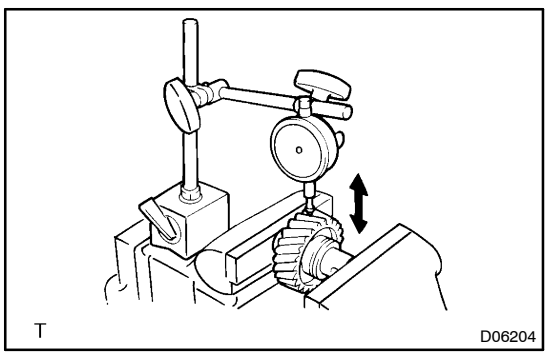


5. INSPECT 4TH GEAR BEARING INNER RACE

Using a micrometer, measure the outer diameter of 4th gear inner race.

Standard diameter:
46.225 – 46.250 mm (1.8199 – 1.8207 in.)

If the outer diameter is not as standard, replace the 4th gear bearing inner race.

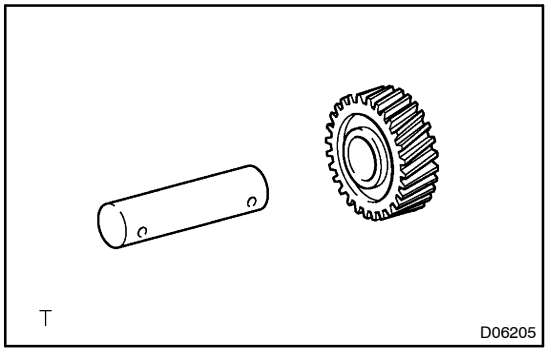


6. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance.

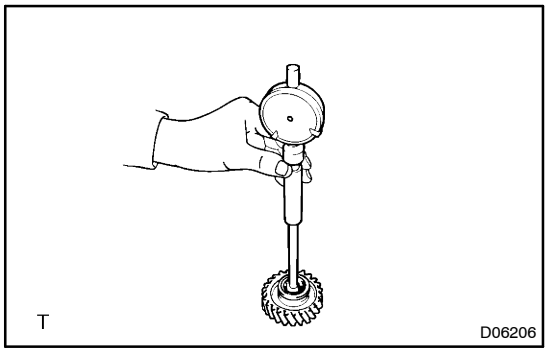
Standard clearance:
0.040 – 0.082 mm (0.00157 – 0.00323 in.)

If the clearance is not as standard, replace the idler gear or shaft.



7. INSPECT REVERSE IDLER GEAR

(a) Remove the reverse idler gear from the idler gear shaft.

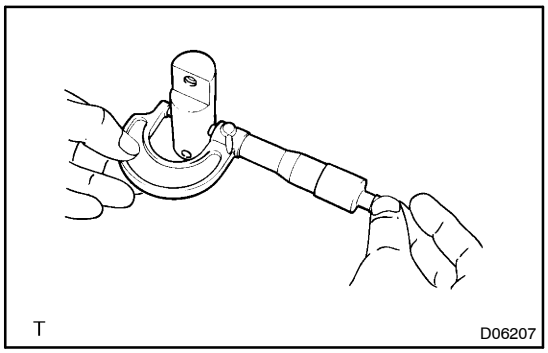


(b) Using a cylinder gauge, measure the inner diameter of reverse idler gear.

Standard diameter:

22.04 – 22.06 mm (0.868 – 0.869 in.)

If the inner diameter is not as standard, replace the gear.



8. INSPECT REVERSE IDLER SHAFT

Using a micrometer, measure the outer diameter of the shaft.

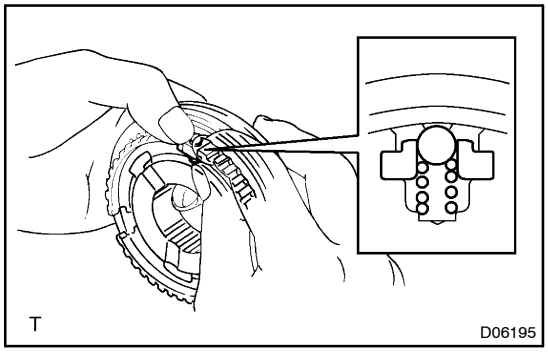
Standard diameter:

21.979 – 22.000 mm (0.865 – 0.866 in.)

If the outer diameter is not as standard, replace the shaft.

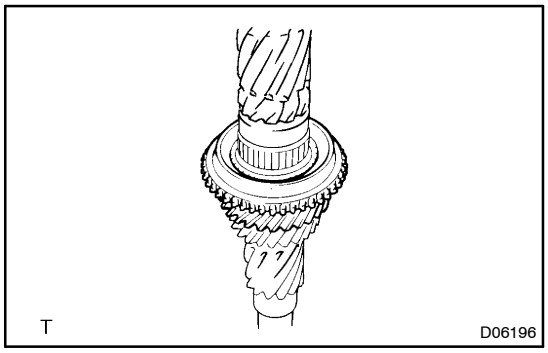
MT099–01

REASSEMBLY



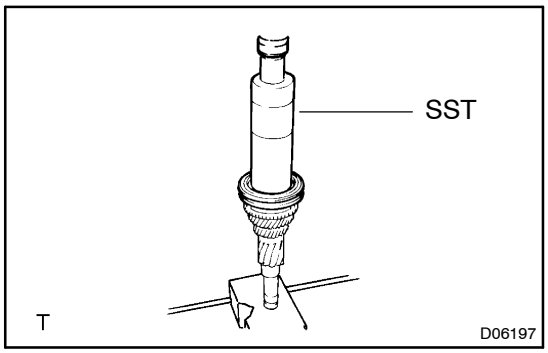
1. INSTALL HUB SLEEVE NO. 2

(a) Install the hub sleeve No. 1 to clutch hub No. 1.
(b) Install the shifting key and spring to clutch hub.
(c) While pushing the spring, install the shifting key ball.



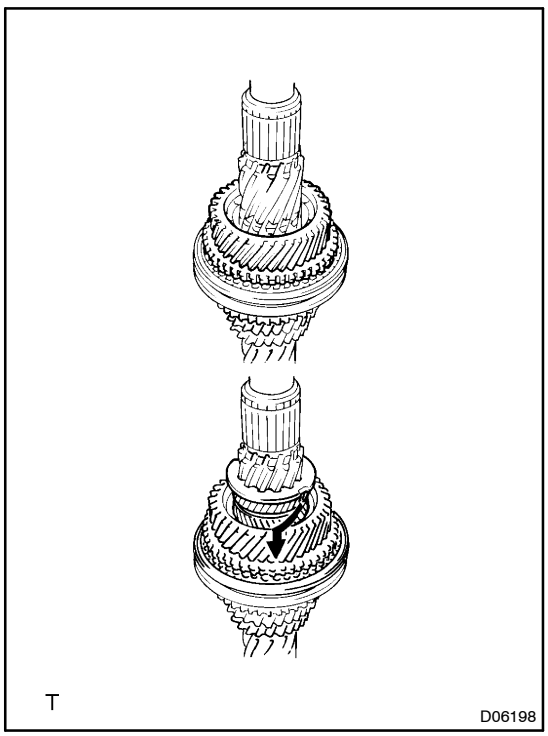
2. INSTALL 3RD GEAR

(a) Apply the gear oil to the shaft, 3rd gear bearing, inner of gear and cone of gear.
(b) Install the 3rd gear bearing and 3rd gear to the counter shaft.



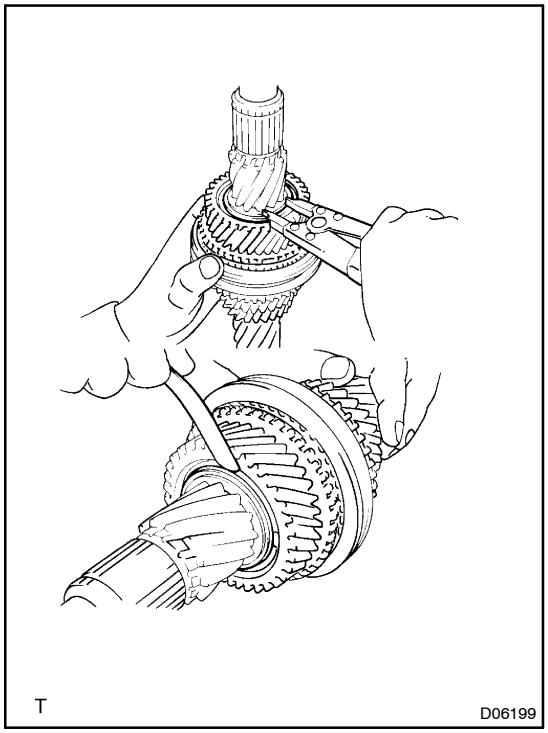
3. INSTALL CLUTCH HUB NO. 2

(a) Install the synchronizer ring No. 1 (for 3rd gear) to the 3rd gear.
(b) Using SST and press, install the clutch hub No. 3.
SST 09316–60011 (09316–00011)



4. INSTALL 4TH SPEED GEAR

(a) Install the synchronizer ring No. 1 (for 4th gear) to the clutch hub No. 2.
(b) Apply the gear oil to 4th gear bearing gear and cone of counter shaft 4th gear.
(c) Install the counter shaft 4th speed gear and 4th gear bearing inner race to the counter shaft.
(d) Install the 4th gear washer and 4th washer retaining ring.

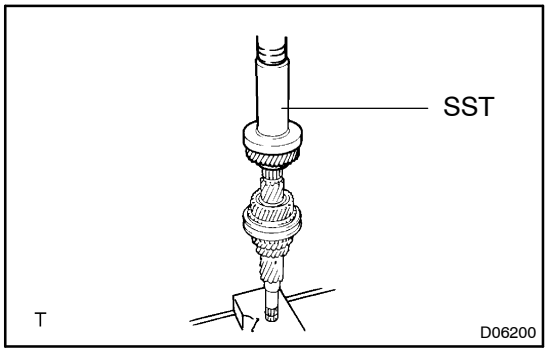


5. INSTALL 4TH WASHER RETAINING SNAP RING

(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	3.75 (0.1476)
B	3.80 (0.1496)
C	3.85 (0.1516)
D	3.90 (0.1535)
E	3.95 (0.1555)
F	4.00 (0.1575)
G	4.05 (0.1594)
H	4.10 (0.1614)

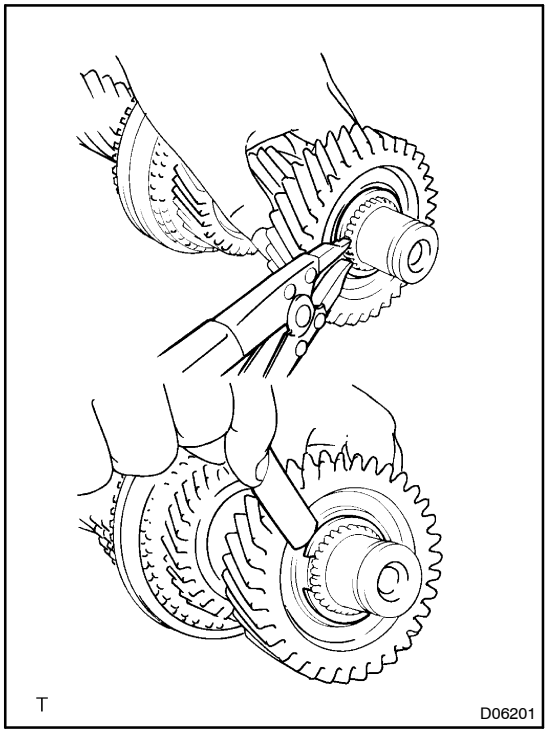
(b) Using a snap ring expander, install the snap ring.



6. INSTALL COUNTER GEAR

Using SST and press, install the counter gear.

SST 09309–36010

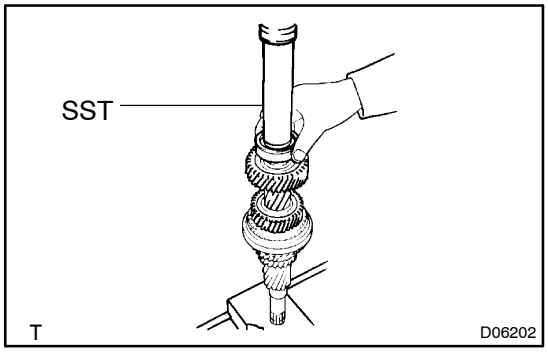


7. INSTALL CLUTCH HUB NO. 3 SHAFT SNAP RING

(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	1.80 (0.0709)
B	1.85 (0.0728)
C	1.90 (0.0748)
D	1.95 (0.0768)
E	2.00 (0.0787)
F	2.05 (0.0807)

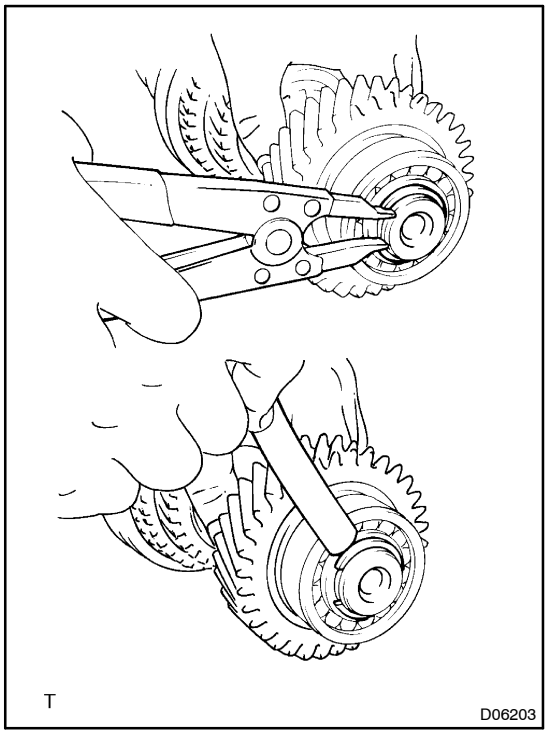
(b) Using a snap ring expander, install the snap ring.



8. INSTALL FRONT BEARING

Using SST and press, install the counter gear front bearing.

SST 09330–50010



9. INSTALL FRONT BEARING SNAP RING NO. 2

(a) Select a snap ring that allows the minimum axial play.

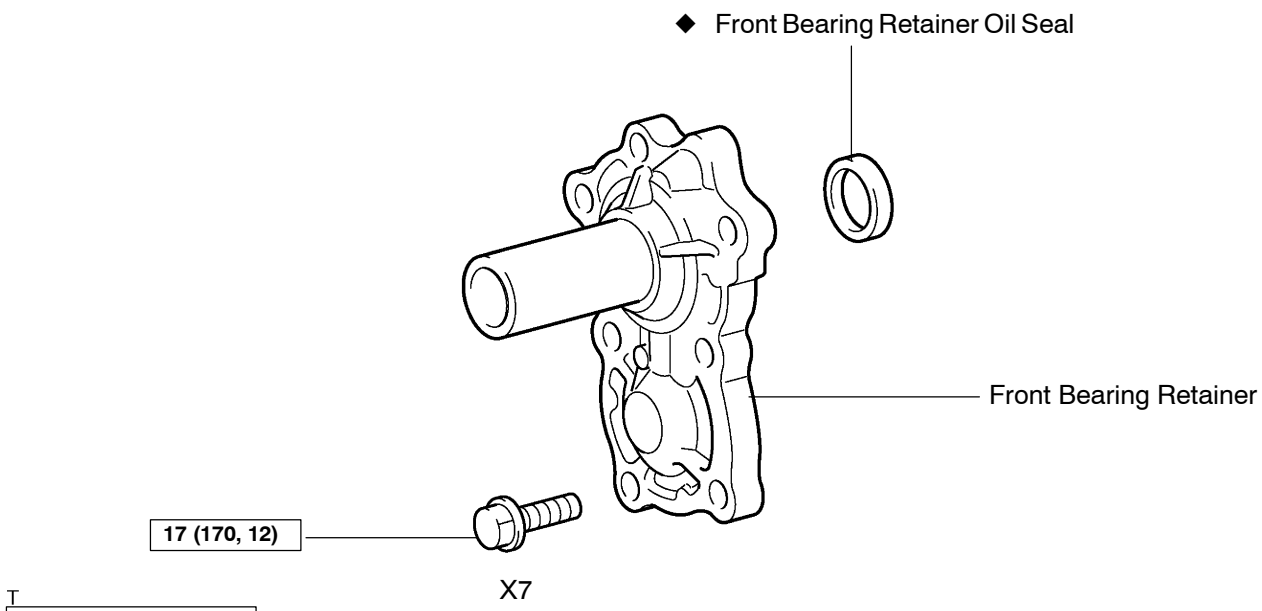
Mark	Thickness mm (in.)
1	2.05 (0.0807)
2	2.10 (0.0827)
3	2.15 (0.0846)
4	2.20 (0.0866)
5	2.25 (0.0886)
6	2.30 (0.0906)

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

FRONT BEARING RETAINER OIL SEAL

MT09A–01

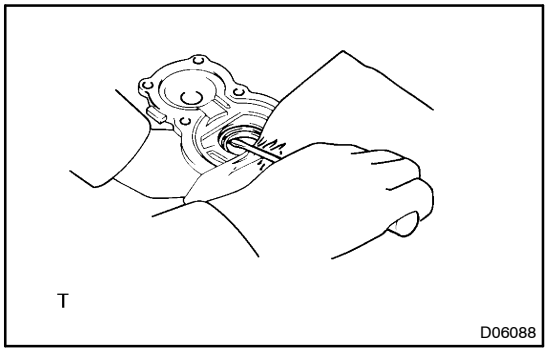
COMPONENTS



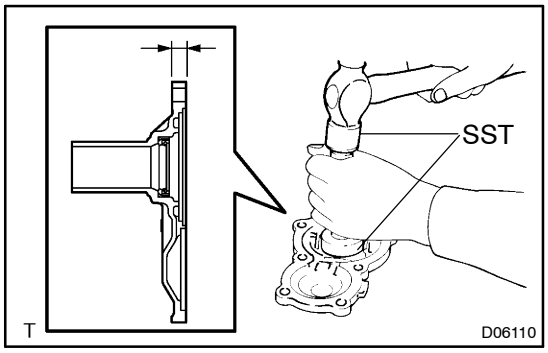
MT09B–01

REPLACEMENT

IF NECESSARY, REPLACE FRONT BEARING RETAINER OIL SEAL



(a) Using a screwdriver, pry out the oil seal.



(b) Using SST and a press, install the new oil seal.

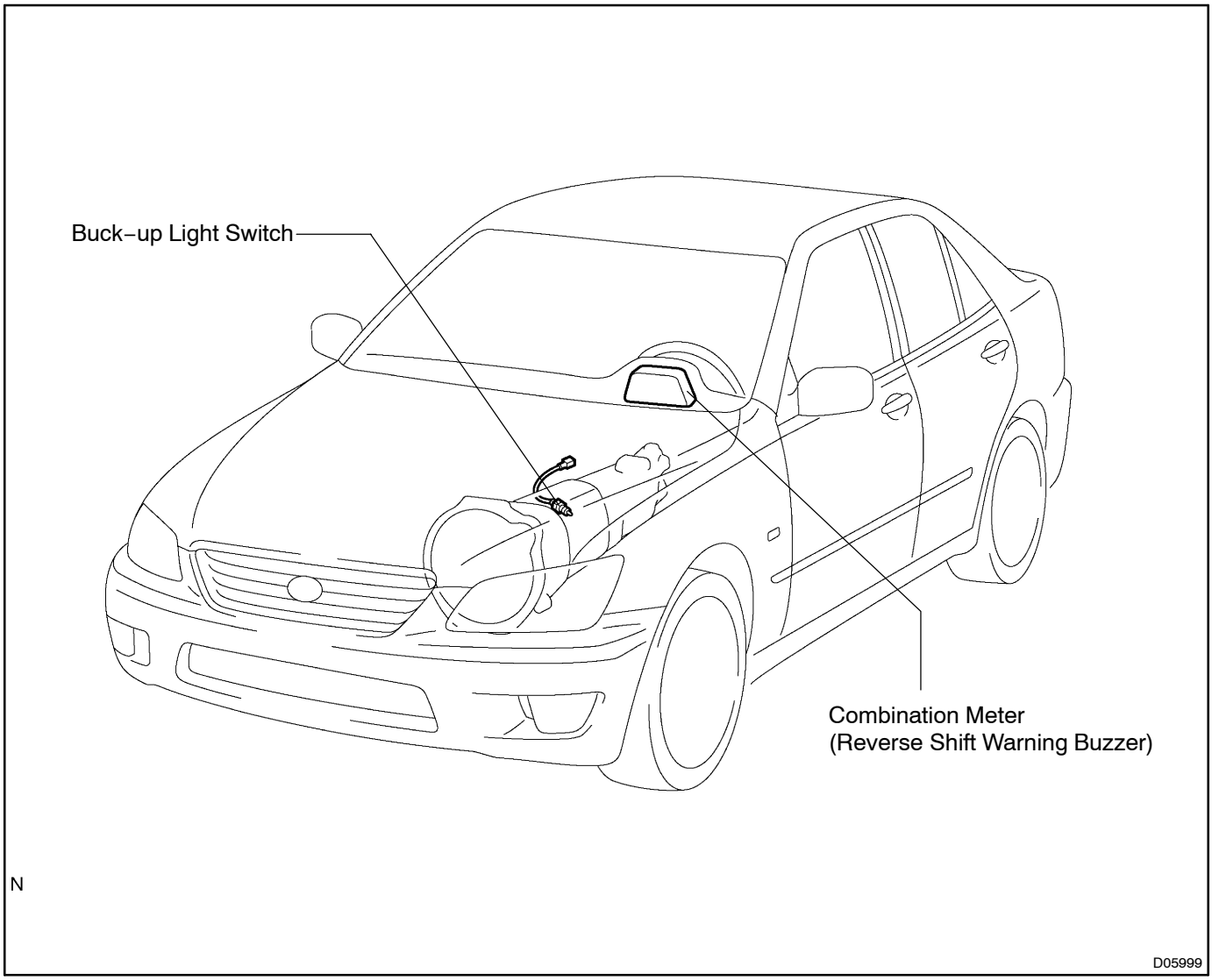
SST 09950–60010 (09951–00420), 09950–70010 (09951–07100)

Drive in depth: 11.5 ± 0.4 mm (0.453 ± 0.016 in.)

REVERSE SHIFT WARNING BUZZER SYSTEM

LOCATION

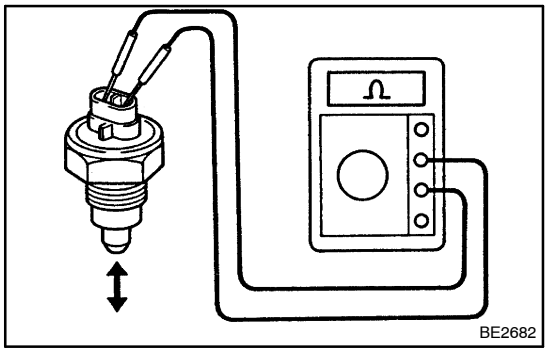
MT09E–01



MT09F–01

INSPECTION

1. INSPECT REVERSE SHIFT WARNING BUZZER SYSTEM (See page BE–83)



2. INSPECT BACK–UP LIGHT SWITCH CONTINUITY

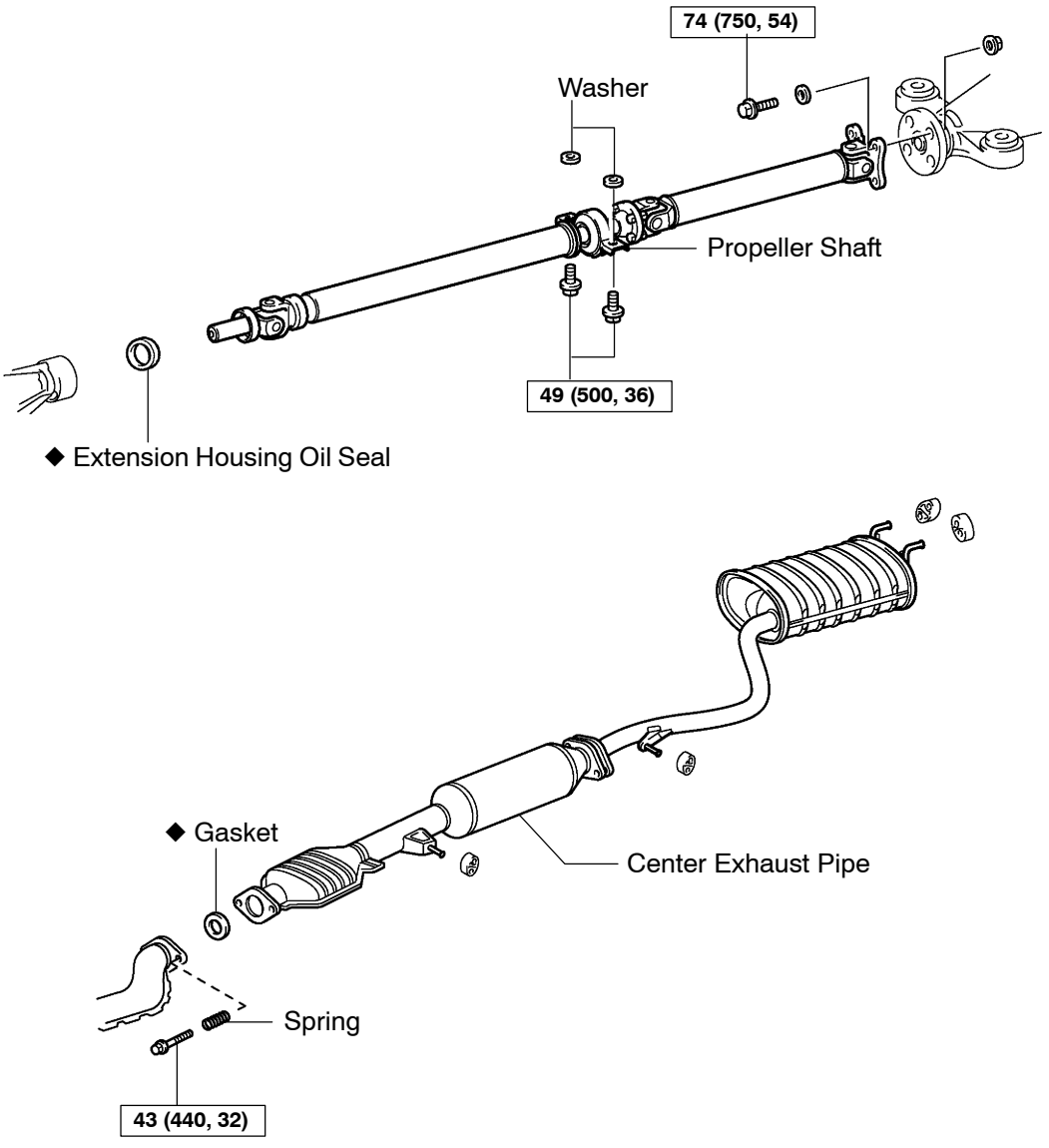
Switch position	Tester connection	Specified condition
Free	1–2	No continuity
Push	1–2	Continuity

If continuity is not as specified, replace the switch.

OIL SEAL

COMPONENTS

MT09C–01



T

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

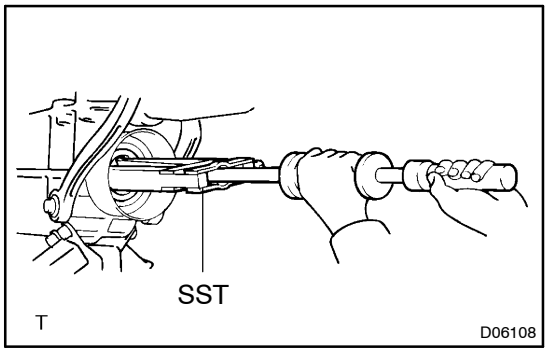
◆ Non–reusable part

D05134

MT09D–01

REPLACEMENT

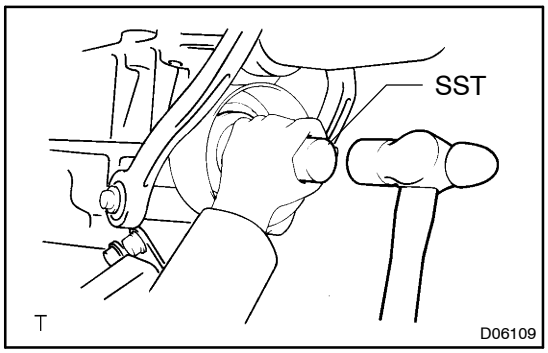
1. DRAIN TRANSMISSION OIL
2. REMOVE PROPELLER SHAFT (See page PR–4)



3. REMOVE EXTENSION HOUSING OIL SEAL

Using SST, pull out the extension housing oil seal.

SST 09308–00010



4. INSTALL NEW EXTENSION HOUSING OIL SEAL

(a) Coat MP grease to lip of new oil seal.

(b) Using SST and a hammer, install the new oil seal.

SST 09325–20010

5. INSTALL PROPELLER SHAFT (See page PR–10)
6. FILL WITH TRANSMISSION OIL

MAINTENANCE

EQUIPMENT

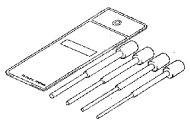
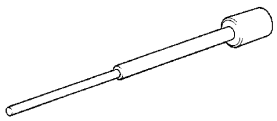
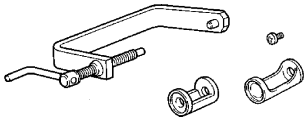
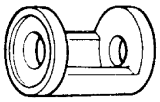
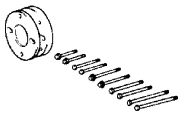
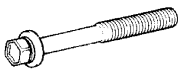
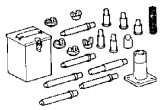
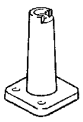
PP0Q1–04

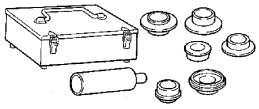
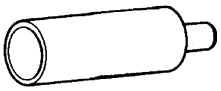
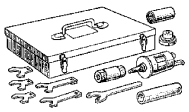
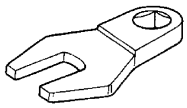
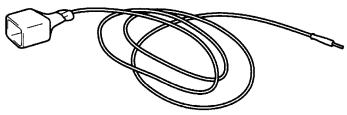
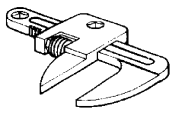
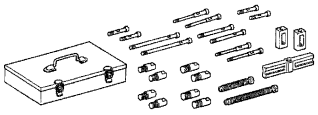
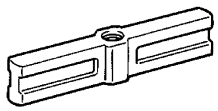
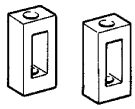
Mirror	Brake hose
Torque wrench	

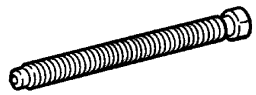
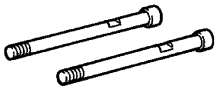
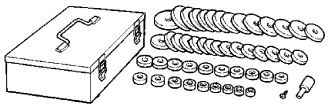
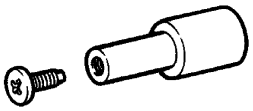
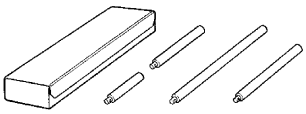
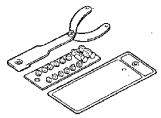
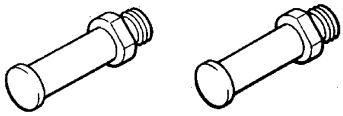
ENGINE MECHANICAL

PP23C–01

SST (Special Service Tools)

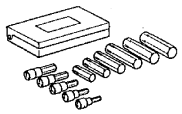
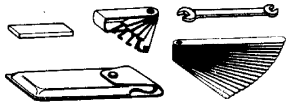
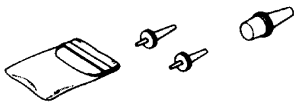
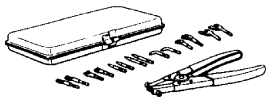
	09201–10000	Valve Guide Bushing Remover & Replacer Set	
	(09201–01050)	Valve Guide Bushing Remover & Replacer 5	
	09202–70020	Valve Spring Compressor	
	(09202–00010)	Attachment	
	09213–54015	Crankshaft Pulley Holding Tool	
	(90119–08216)	Bolt	
	09221–25026	Piston Pin Remover & Replacer	
	(09221–00021)	Body	
	(09221–00030)	Spring	
	(09221–00061)	Bushing ”C”	
	(09221–00170)	Guide ”J”	
	(09221–00210)	Guide ”M”	

	09223–15030	Oil Seal & Bearing Replacer	Crankshaft rear oil seal
	09316–60011	Transmission & Transfer Bearing Replacer	
	(09316–00011)	Replacer Pipe	Crankshaft pulley Crankshsaft front oil seal
	09330–00021	Companion Flange Holding Tool	Crankshaft pulley
	09612–24014	Steering Gear Housing Overhaul Tool Set	
	(09617–24011)	Steering Rack Wrench	Fuel pressure pulsation damper
	09843–18020	Diagnosis Check Wire	
	09843–18030	Tacho–pulse Pickup Wire No.2	
	09922–10010	Variable Open Wrench	Camshaft timing gear (VVT–i)
	09950–50012	Puller C Set	
	(09951–05010)	Hanger 150	Crankshaft pulley
	(09952–05010)	Slide Arm	Crankshaft pulley
	(09953–05010)	Center Bolt 100	Crankshaft pulley

	(09953–05020)	Center Bolt 150	Crankshaft pulley
	(09954–05030)	Claw No.3	Crankshaft pulley
	09950–60010	Replacer Set	
	(09951–00240)	Replacer 24	Spark plug tube gasket
	(09951–00450)	Replacer 45	Spark plug tube gasket
	(09952–06010)	Adapter	Spark plug tube gasket
	09950–70010	Handle Set	
	(09951–07100)	Handle 100	Valve guide bushing Spark plug tube gasket Crankshaft rear oil seal
	09960–10010	Variable Pin Wrench Set	
	(09963–00500)	Pin 5	Camshaft sub–gear
	(09963–00600)	Pin 6	Oil pump pulley
	(09963–01000)	Pin 10	Camshaft timing pulley Oil pump pulley Camshaft sub–gear

PP1BL–04

RECOMMENDED TOOLS

	09040–00010	Hexagon Wrench Set .	
	09090–04010	Engine Sling Device .	For suspension engine
	09200–00010	Engine Adjust Kit .	
	09258–00030	Hose Plug Set .	Plug for vacuum hose, fuel hose etc.
	09904–00010	Expander Set .	

PP1BM–05

EQUIPMENT

Abrasive compound	Valve
Caliper gauge	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune–up tester	
Groove cleaning tool	
Heater	
Magnetic finger	
Micrometer	
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Press	
Ridge reamer	
Soft brush	
Solvent	
Spring tester	Valve spring
Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
V–block	
Vernier calipers	
Wire brush	

PP23D–01

SSM (Special Service Materials)

08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Spark plug tube
08826–00080	Seal Packing Black or equivalent (FIPG)	No.1 camshaft bearing cap Cylinder head semi–circular plug Cylinder head cover
08826–00100	Seal Packing 1282B, THREE BOND 1282B or equivalent (FIPG)	Coolant drain union

EMISSION CONTROL

EQUIPMENT

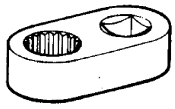
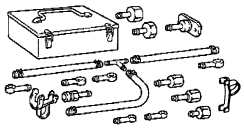
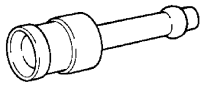
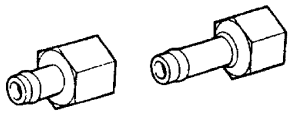
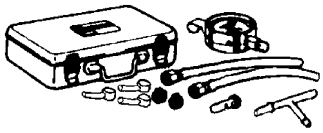
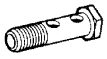
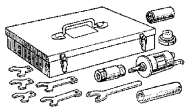
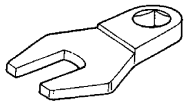
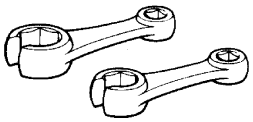
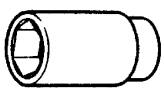
PP109–01

Torque wrench	
Vacuum gauge	

ELECTRONIC FUEL INJECTION

PP23R–01

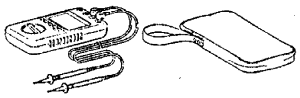
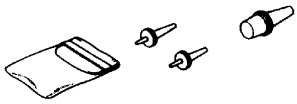
SST (Special Service Tools)

	09205–76030	Cylinder Head Setting Bolt Tightening Adaptor	Water temperature sensor
	09268–41047	Injection Measuring Tool Set	
	(09268–41110)	Adaptor	
	(09268–41300)	Clamp	
	(09268–52011)	Injection Measuring Attachment	
	09268–45014	EFI Fuel Pressure Gauge	
	(09268–41190)	Adaptor	
	(90405–06167)	I Union	
	09612–24014	Steering Gear Housing Overhaul Tool Set	
	(09617–24011)	Steering Rack Wrench	Fuel pressure pulsation damper
	09631–22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	Fuel line flare nut
	09816–30010	Oil Pressure Switch Socket	Knock sensor

	09842–30070 Wiring "F" EFI Inspection	Injector

PP0TI–04

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	
	09258–00030	Hose Plug Set .	

PP0TJ–03

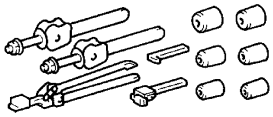
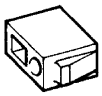
EQUIPMENT

Graduated cylinder	Injector
Hand–held tester	
Heater	Water temperature sensor
Sound scope	Injector
Thermometer	Water temperature sensor
Torque wrench	
Vacuum gauge	

COOLING

PP0TK–04

SST (Special Service Tools)

	09230–01010	Radiator Service Tool Set	
	09231–14010	Punch	

PP0TM–05

EQUIPMENT

Heater	Thermostat, Water temperature switch
Radiator cap tester	
Thermometer	Thermostat, Water temperature switch
Torque wrench	
Vernier calipers	

PP1IA–03

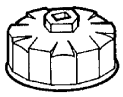
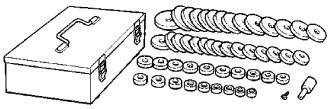
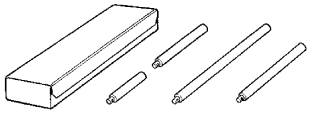
COOLANT

Item		Capacity	Classification
Engine coolant	Europe	7.1 liters (7.5 US qts, 6.2 Imp. qts)	”Toyota Long Life Coolant” or equivalent
	Others	6.6 liters (7.3 US qts, 6.1 Imp. qts)	

LUBRICATION

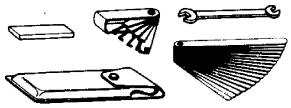
PP23E–01

SST (Special Service Tools)

	09032–00100	Oil Pan Seal Cutter	
	09228–07501	Oil Filter Wrench	
	09950–60010	Replacer Set	Oil pump oil seal
	(09951–00300)	Replacer 30	Oil pump oil seal
	09950–70010	Handle Set	Oil pump oil seal
	(09951–07100)	Handle 100	Oil pump oil seal

PP23F–01

RECOMMENDED TOOLS

	09200–00010 Engine Adjust Kit .	

PP1IE–02

EQUIPMENT

Oil pressure gauge	
Precision straight edge	
Torque wrench	

PP1IF–03

LUBRICANT

Item	Capacity	Classification
Engine oil (M/T)		API grade SH, Energy–Conserving II or SJ, Energy–Conserving or ILSAC multigrade engine oil.
Dry fill	4.6 liters (4.9 US qts, 4.0 Imp. qts)	
Drain and refill		
w/ Oil filter change	4.2 liters (4.4 US qts, 3.7 Imp. qts)	
w/o Oil filter change	4.0 liters (4.2 US qts, 3.5 Imp. qts)	
Engine oil (A/T)		
Dry fill	4.5 liters (4.8 US qts, 4.0 Imp. qts)	
Drain and refill		
w/ Oil filter change	4.1 liters (4.3 US qts, 3.6 Imp. qts)	
w/o Oil filter change	3.9 liters (4.1 US qts, 3.4 Imp. qts)	

PP1IG–02

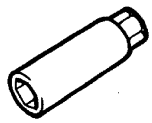
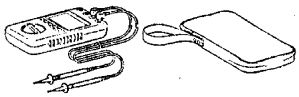
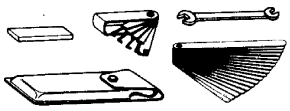
SSM (Special Service Materials)

08826–00080	Seal Packing Black or equivalent (FIPG)	Oil pan
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Oil pressure switch

IGNITION

PP106–02

RECOMMENDED TOOLS

	09045–38162	Spark Plug Wrench .	
	09082–00040	TOYOTA Electrical Tester.	
	09200–00010	Engine Adjust Kit .	

PP0TU–03

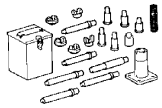
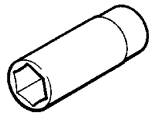
EQUIPMENT

Megger insulation resistance meter	Spark plug
Spark plug cleaner	
Torque wrench	

STARTING

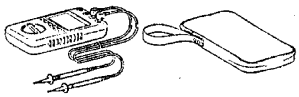
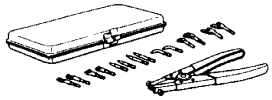
PP23G–01

SST (Special Service Tools)

	09221–25026	Piston Pin Remover & Replacer	
	(09221–00071)	Guide "A"	Center bearing
	(09221–00090)	Guide "C"	Center bearing
	09810–38140	Starter Magnet Switch Nut Wrench 14	Terminal nut

PP108–05

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	
	09904–00010	Expander Set .	

PP0TX–06

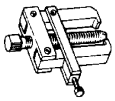
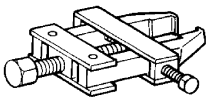
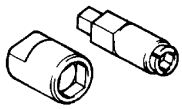
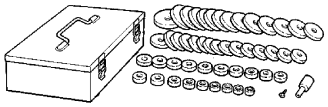
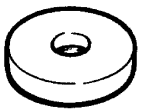
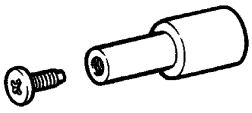
EQUIPMENT

Ohmmeter	
Caliper gauge	Center bearing
Dial indicator	Commutator runout
Micrometer	Planetary shaft
Press	Magnetic switch terminal kit
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V–block	Commutator
Vernier calipers	Commutator, Brush

CHARGING

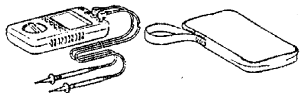
PP23H–01

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
	(09951–00260)	Replacer 26	Roter front bearing
	(09951–00520)	Replacer 52	Roter front bearing
	(09952–06010)	Adapter	Roter front bearing

PP0TZ–04

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP0U0–04

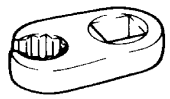
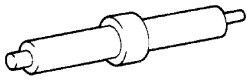
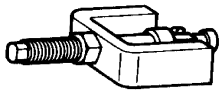
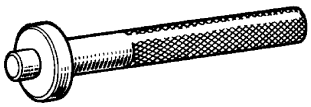
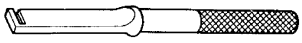
EQUIPMENT

Ammeter (A)	
Battery specific gravity gauge	Except maintenance–free battery
Ohmmeter	
Torque wrench	
Vernier calipers	Rotor (Slip ring), brush

CLUTCH

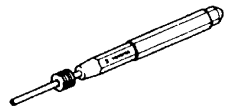
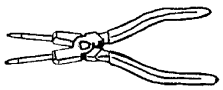
PP23L–01

SST (Special Service Tools)

	09023–00100	Union Nut Wrench 10 mm	Clutch line
	09301–00110	Clutch Guide Tool	
	09303–35011	Input Shaft Front Bearing Puller	
	09304–30012	Input Shaft Front Bearing Replacer	
	09333–00013	Clutch Diaphragm Spring Aligner	

PP23M–01

RECOMMENDED TOOLS

	09031–00030	Pin Punch .	Reservoir tank
	09905–00013	Snap Ring Pliers .	

PP0E9–01

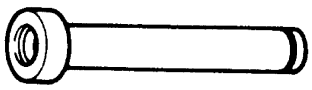
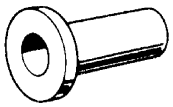
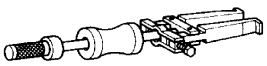
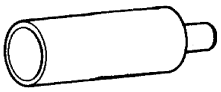
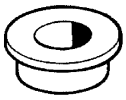
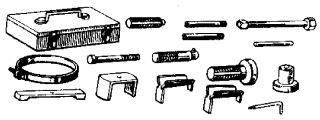
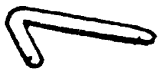
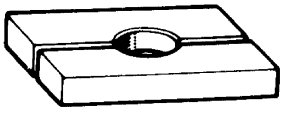
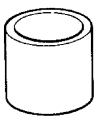
EQUIPMENT

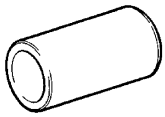
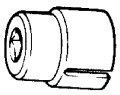
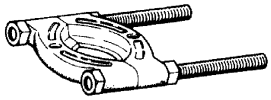
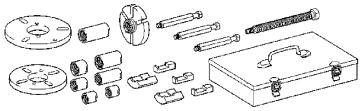
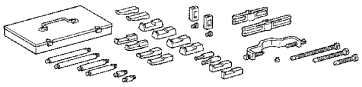
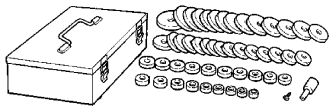
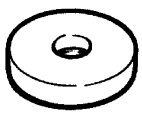
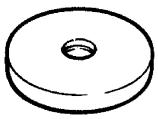
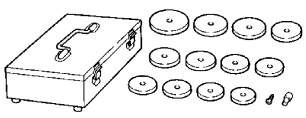
Calipers	
Torque wrench	
Dial indicator with magnetic base	

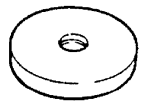
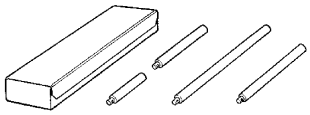
MANUAL TRANSMISSION

PP23N–01

SST (Special Service Tools)

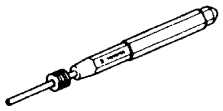
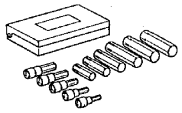
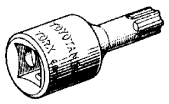
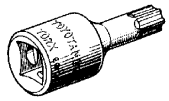
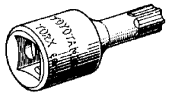
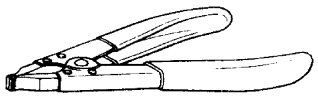
	09309–35010	Transmission Rear Bearing Replacer	Output shaft bearing No. 1 Clutch hub 6th gear
	09309–36010	Transmission Rear Bearing Replacer	Counter gear
	09309–37010	Transmission Bearing Replacer	Clutch hub No. 3
	09308–00010	Oil Seal Puller	Extension housing oil seal
	(09316–00011)	Replacer Pipe	Clutch hub No. 2
	(09316–00021)	Replacer ”A”	Output shaft bearing rr.
	09325–20010	Transmission Oil Plug	Extension housing rear oil seal
	09330–50010	Propeller Shaft Center Bearing Replacer	Counter gear front bearing
	09350–20015	TOYOTA Automatic Transmission Tool Set	
	(09350–06120)	No.2 Measure Terminal	6th gear thrust clearance
	09527–20011	Rear Axle Shaft Bearing Remover	Input shaft bearing
	09631–12090	Seal Ring Tool	Clutch hub No. 1

	09632–36010	Steering Vane Pump Bearing Replacer	Clutch hub No. 4
	09817–16011	Back–up Light Switch Tool	Back–up light switch
	09950–00020	Bearing Remover	Clutch hub No. 4
	09950–30011	Puller A Set	
	(09951–03010)	Upper Plate	Clutch hub No. 4
	(09953–03010)	Center Bolt	Clutch hub No. 4
	09950–40011	Puller B Set	Clutch hub No. 4
	(09957–04010)	Attachment	Clutch hub No. 4
	09950–60010	Replacer Set	
	(09951–00230)	Replacer 23	Counter gear front bearing Counter gear
	(09951–00420)	Replacer 42	Front bearing retainer oil seal
	(09951–00560)	Replacer 56	Input shaft bearing
	09950–60020	Replacer Set No.2	

	(09951–00750) Replacer 75	Extension housing dust deflector
	09950–70010 Handle Set	
	(09951–07100) Handle 100	Extension housing dust deflector

PP23O–01

RECOMMENDED TOOLS

	09031–00030	Pin Punch .	
	09040–00010	Hexagon Wrench Set .	
	09042–00010	Torx Socket T30 .	
	09042–00020	Torx Socket T40 .	
	09042–00050	Torx Socket T45 .	
	09905–00012	Snap Ring No.1 Expander .	

PP23P–01

EQUIPMENT

Dial indicator	
Micrometer	
Torque wrench	
Feeler gauge	
Magnetic finger	

PP23Q–01

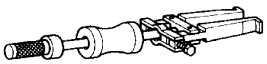
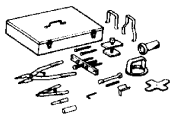
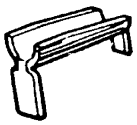
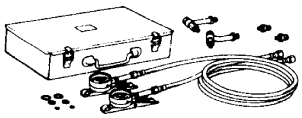
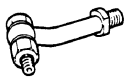
LUBRICANT

Item	Capacity	Classification
Manual transmission oil	1.8 liters (1.9 US qts, 1.6 Imp. qts)	API GL–3 SAE 75W–90

AUTOMATIC TRANSMISSION

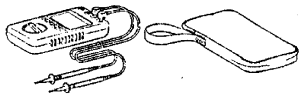
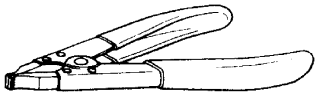
PP23V–01

SST (Special Service Tools)

	09308–00010	Oil Seal Puller	Extension housing oil seal
	09325–20010	Transmission Oil Plug	Extension housing oil seal
	09350–30020	TOYOTA Automatic Transmission Tool Set	
	(09351–32020)	Stator Stopper	Torque converter and drive plate
	09843–18040	Diagnosis Check Wire No.2	
	09992–00095	Automatic Transmission Oil Pressure Gauge Set	
	(09992–00231)	Adaptor C	
	(09992–00271)	Gauge Assy	

PP23W–01

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	
	09905–00012	Snap Ring No.1 Expander .	

PP23X–01

EQUIPMENT

Torque wrench	
Dial indicator with magnetic base	Drive plate runout
Vernier calipers	Torque converter
Straight edge	Torque converter

PP23Y–01

LUBRICANT

Item	Capacity	Classification
Automatic transmission fluid		
Dry fill	6.6 liters (7.0 US qts, 5.8 Imp. qts)	TYPE T–IV or equivalent
Drain and refill	2.4 liters (2.5 US qts, 2.1 Imp. qts)	

PP23Z–01

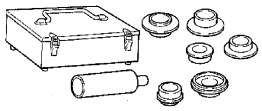
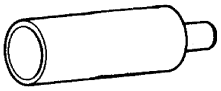
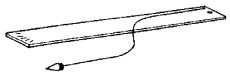
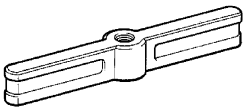
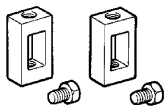
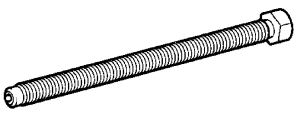
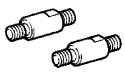
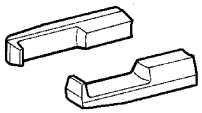
SSM (Special Service Materials)

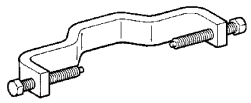
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	

PROPELLER SHAFT

PP23J–01

SST (Special Service Tools)

	09316–60011	Transmission & Transfer Bearing Replacer	
	(09316–00011)	Replacer Pipe	Dust cover
	09325–20010	Transmission Oil Plug	Oil leakage prevention
	09330–00021	Companion Flange Holding Tool	Universal joint flange
	09370–50010	Drive Line Angle Gauge	Joint angle
	09950–40011	Puller B Set	
	(09951–04020)	Hanger 200	Universal joint flange
	(09952–04010)	Slide Arm	Universal joint flange
	(09953–04030)	Center Bolt 200	Universal joint flange
	(09954–04010)	Arm 25	Universal joint flange
	(09955–04061)	Claw No.6	Universal joint flange
	(09957–04010)	Attachment	Universal joint flange

 (09958–04011) Holder	Universal joint flange

PP23K–01

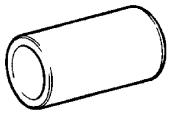
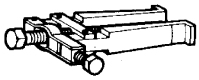
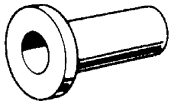
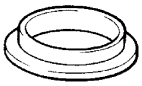
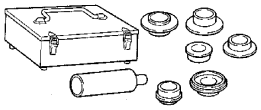
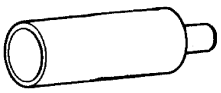
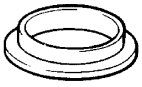
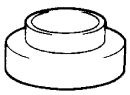
EQUIPMENT

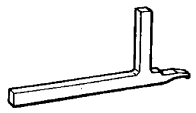
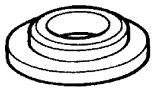
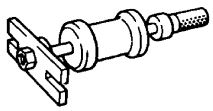
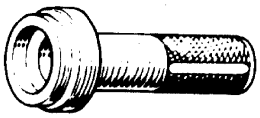
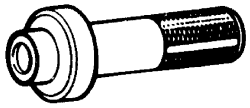
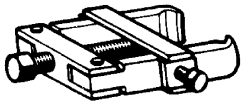
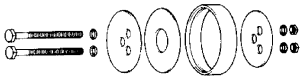
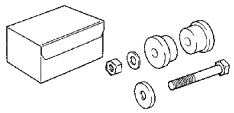
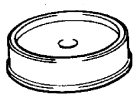
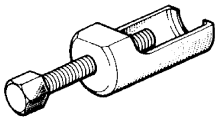
Torque wrench	
Dial indicator	

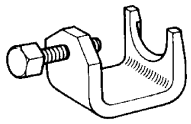
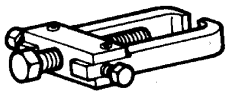
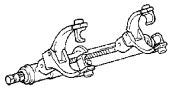
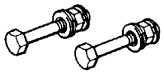
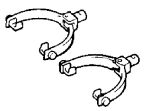
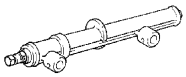
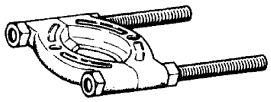
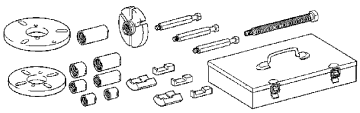
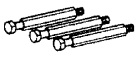
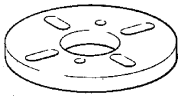
SUSPENSION AND AXLE

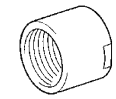
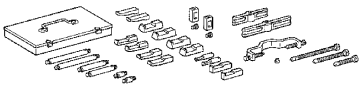
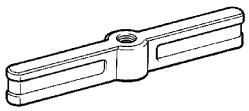
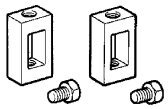
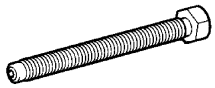
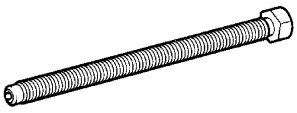
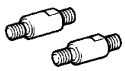
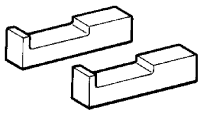
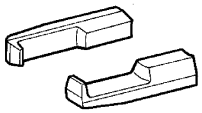
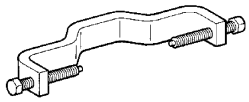
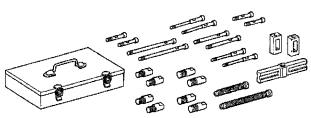
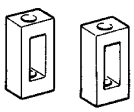
PP242–01

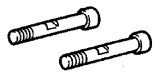
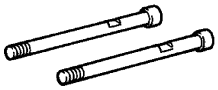
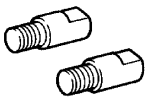
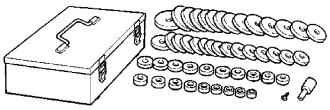
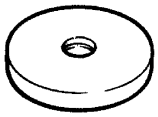
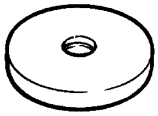
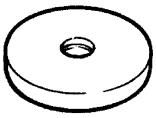
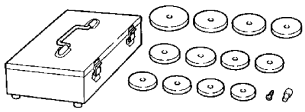
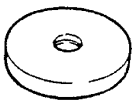
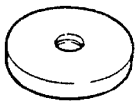
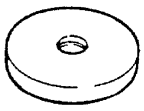
SST (Special Service Tools)

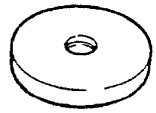
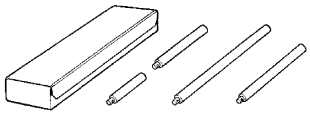
	09223–00010	Cover & Seal Replacer	Rear differential
	09223–15020	Oil Seal & Bearing Replacer	Rear axle
	09308–00010	Oil Seal Puller	Front axle Rear differential
	09308–10010	Oil Seal Puller	Rear differential
	09309–36010	Transmission Rear Bearing Replacer	Rear drive shaft
	09316–12010	Transfer Bearing Replacer	Rear differential
	09316–60011	Transmission & Transfer Bearing Replacer	Front axle
	(09316–00011)	Replacer Pipe	
	(09316–00071)	Replacer ”F”	
	09330–00021	Companion Flange Holding Tool	Rear differential
	09502–12010	Differential Bearing Replacer	Rear drive shaft
	09502–24010	Bearing Replacer	Front axle

	09504–22011	Differential Side Bearing Replacer	Rear differential
	09506–30012	Differential Drive Pinion Rear Bearing Cone Replacer	Rear differential
	09520–24010	Differential Side Gear Shaft Puller	Rear differential
	09527–17011	Rear Axle Shaft Bearing Remover	Rear axle
	09554–22010	Differential Oil Seal Replacer	Rear differential
	09554–30011	Differential Oil Seal Replacer	Rear differential
	09556–22010	Drive Pinion Front Bearing Remover	Rear differential
	09570–24010	Differential Mounting Cushion Remover & Replacer	Rear differential
	09608–16042	Front Hub Bearing Adjusting Tool	Rear drive shaft
	(09608–02021)	Bolt & Nut	
	(09608–02041)	Retainer	
	09608–32010	Steering Knuckle Oil Seal Replacer	Front axle
	09610–20012	Pitman Arm Puller	Front axle Front suspension Rear axle Rear suspension

	09628–10011	Ball Joint Puller	Front axle Rear axle
	09628–62011	Ball Joint Puller	Front suspension Rear axle Rear suspension
	09710–04081	Base	Rear differential
	09727–30021	Coil Spring Compressor	Front suspension Rear suspension
	(09727–00010)	Bolt Set	
	(09727–00021)	Arm Set	
	(09727–00031)	Compressor	
	09950–00020	Bearing Remover	Front axle Rear axle Rear differential
	09950–30011	Puller A Set	Rear differential
	(09951–03010)	Upper Plate	
	(09953–03010)	Center Bolt	
	(09954–03010)	Arm	
	(09955–03030)	Lower Plate 130	

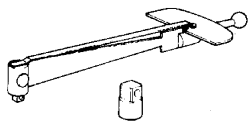
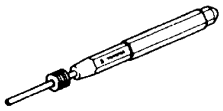
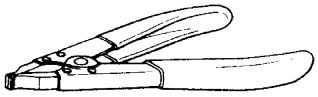
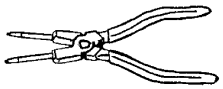
	(09956–03020) Adapter 18	
	09950–40011 Puller B Set	
	(09951–04020) Hanger 200	Front axle Rear axle Rear differential
	(09952–04010) Slide Arm	Front axle Rear axle Rear differential
	(09953–04020) Center Bolt 150	Front axle
	(09953–04030) Center Bolt 200	Front axle Rear axle Rear differential
	(09954–04010) Arm 25	Front axle Rear axle Rear differential
	(09955–04051) Claw No.5	Front axle Rear axle
	(09955–04061) Claw No.6	Rear differential
	(09957–04010) Attachment	Front axle Rear axle Rear differential
	(09958–04011) Holder	Front axle Rear axle Rear differential
	09950–50012 Puller C Set	
	(09952–05010) Slide Arm	Front axle Rear axle Rear differential

	(09954–05020)	Claw No.2	Rear axle
	(09954–05030)	Claw No.3	Front axle Rear differential
	(09955–05040)	Adapter No.4	Front axle Rear axle Rear differential
	09950–60010	Replacer Set	
	(09951–00400)	Replacer 40	Rear differential
	(09951–00480)	Replacer 48	Rear axle Rear differential
	(09951–00560)	Replacer 56	Front axle
	(09951–00600)	Replacer 60	Rear differential
	(09951–00650)	Replacer 65	Rear axle
	09950–60020	Replacer Set No.2	
	(09951–00710)	Replacer 71	Front axle Rear differential
	(09951–00750)	Replacer 75	Rear axle
	(09951–00790)	Replacer 79	Rear differential

	(09951–01030) Replacer 103	Rear axle
	09950–70010 Handle Set	
	(09951–07100) Handle 100	Rear axle Rear differential
	(09951–07150) Handle 150	Front axle Rear differential
	(09951–07200) Handle 200	Rear differential

PP240–01

RECOMMENDED TOOLS

	09025–00010	Torque Wrench (30 kgf–cm)	
	09031–00030	Pin Punch .	
	09905–00012	Snap Ring No.1 Expander .	
	09905–00013	Snap Ring Pliers .	

PP0T3-03

EQUIPMENT

Dial indicator with magnetic base	
Micrometer	
Torque wrench	
Vernier caliper	

PP0T4–03

LUBRICANT

REAR DRIVE SHAFT		
Item	Capacity	Classification
● Europe, Taiwan, Australia (M/T), New Zealand (M/T), Hong Kong (M/T), Thai Land (M/T)		
Outboard joint grease Color: Black	120 – 130 g (4.2 – 4.6 oz.)	
Inboard joint grease Color: Yellow ocher	215 – 225 g (7.6 – 8.9 oz.)	
● Others		
Outboard joint grease Color: Black	107 – 117 g (3.8 – 4.1 oz.)	
Inboard joint grease Color: Yellow ocher	180 – 190 g (6.3 – 6.7 oz.)	
REAR DIFFERENTIAL		
Item	Capacity	Classification
Differential oil	2 pinion differential: 1.05 liters (1.11 US qts, 0.92 lmp qts) LSD: 1.00 liters (1.06 US qts, 0.88 lmp qts)	Hypoid gear oil API GL–5 Above –18˚C (0˚F) SAE 90 Below –18˚C (0˚F) SAE 80W–90 or 80W

PP241–01

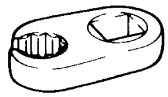
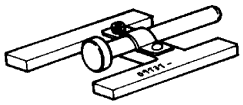
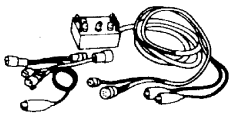
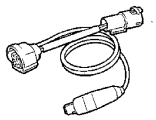
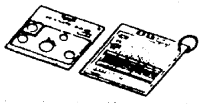
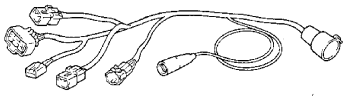
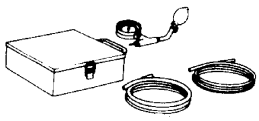
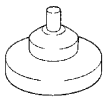
SSM (Special Service Materials)

08826–00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	

BRAKE

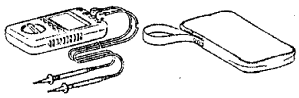
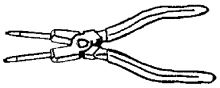
PP23I–01

SST (Special Service Tools)

	09023–00100	Union Nut Wrench 10 mm	
	09737–00010	Brake Booster Push Rod Gauge	
	09843–18020	Diagnosis Check Wire	
	09990–00150	ABS Actuator Checker and Sub–harness	
	09990–00250	ABS Actuator Checker Sub–harness ”G”	
	09990–00360	ABS Actuator Checker Sub–harness ”L”	
	09990–00410	ABS Actuator Checker Sheet ”N”	
	09990–00450	ABS Actuator Checker Sub–harness ”P”	
	09992–00242	Turbocharger Pressure Gauge	
	09992–00350	Brake Reservoir Pressure Adapter	

PP0P2-06

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	
	09905–00013	Snap Ring Pliers .	

PP0P3–03

EQUIPMENT

Torque wrench	
Micrometer	Brake disc
Dial indicator	Brake disc
Brake drum gauge	Brake disc

PP0P4–02

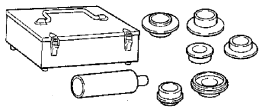
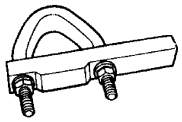
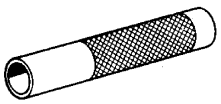
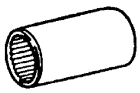
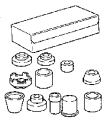
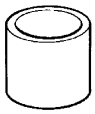
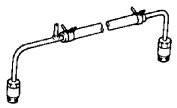
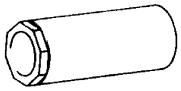
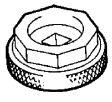
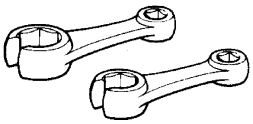
LUBRICANT

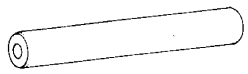
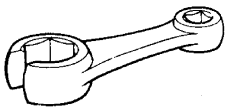
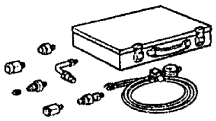
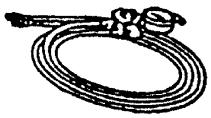
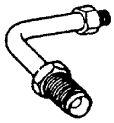
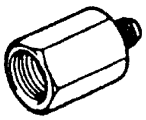
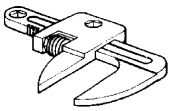
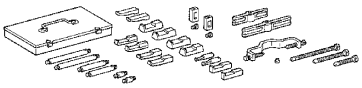
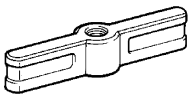
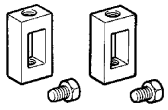
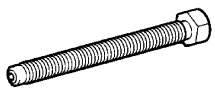
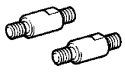
Item	Capacity	Classification
Brake fluid	–	SAE J1703 or FMVSS No. 116, DOT 3

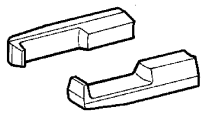
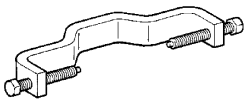
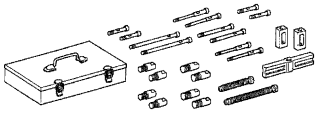
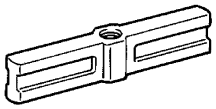
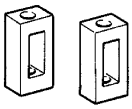
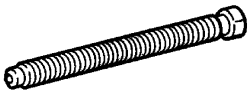
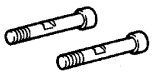
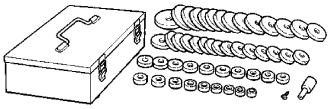
STEERING

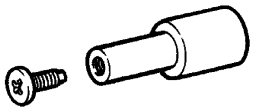
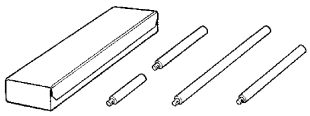
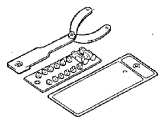
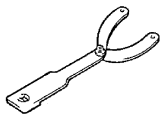
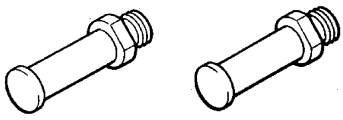
PP23T–01

SST (Special Service Tools)

	09316–60011	Transmission & Transfer Bearing Replacer	Tilt steering column
	(09316–00051)	Replacer "D"	
	09612–00012	Rack & Pinion Steering Rack Housing Stand	PS gear
	09612–22011	Tilt Handle Bearing Replacer	Tilt steering column
	09616–00010	Steering Worm Bearing Adjusting Socket	PS gear
	09630–24014	Steering Rack Oil Seal Tool Set	PS gear
	(09620–24051)	Seal Ring Tool	
	09631–12071	Steering Rack Oil Seal Test Tool	PS gear
	09631–20060	Bearing Guide Nut Wrench	PS gear
	09631–20081	Seal Ring Tool	PS gear
	09631–20090	Cylinder End Stopper Nut Wrench	PS gear
	09631–22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	PS gear

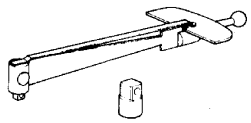
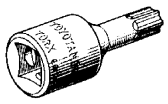
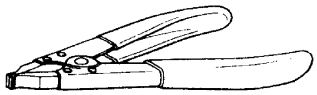
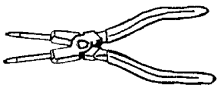
	09631–33010	Steering Rack Cover "I"	PS gear
	09633–00020	Power Steering Hose Nut Wrench	PS gear
	09640–10010	Power Steering Pressure Gauge Set	Power steering fluid
	(09641–01010)	Gauge Assy	
	(09641–01030)	Attachment B	
	(09641–01060)	Attachment E	
	09703–30010	Brake Shoe Return Spring Tool	Tilt steering column
	09922–10010	Variable Open Wrench	PS gear
	09950–40011	Puller B Set	Tilt steering column
	(09951–04010)	Hanger 150	
	(09952–04010)	Slide Arm	
	(09953–04020)	Center Bolt 150	
	(09954–04010)	Arm 25	

	(09955–04061) Claw No.6	
	(09958–04011) Holder	
	09950–50012 Puller C Set	Tilt steering column
	(09951–05010) Hanger 150	
	(09952–05010) Slide Arm	
	(09953–05020) Center Bolt 150	
	(09954–05020) Claw No.2	
	09950–60010 Replacer Set	
	(09951–00180) Replacer 18	PS gear
	(09951–00240) Replacer 24	PS gear
	(09951–00250) Replacer 25	PS gear
	(09951–00280) Replacer 28	PS gear
	(09951–00310) Replacer 31	PS gear

	(09951–00320) Replacer 32	PS vane pump PS gear
	(09951–00340) Replacer 34	PS gear
	(09951–00360) Replacer 36	PS gear
	(09951–00430) Replacer 43	PS gear
	(09952–06010) Adapter	PS gear
	09950–70010 Handle Set	
	(09951–07100) Handle 100	PS vane pump PS gear
	(09951–07150) Handle 150	PS gear
	(09951–07200) Handle 200	PS gear
	(09951–07360) Handle 360	PS gear
	09960–10010 Variable Pin Wrench Set	PS vane pump
	(09962–01000) Variable Pin Wrench Arm Assy	
	(09963–01000) Pin 10	

PP23U–01

RECOMMENDED TOOLS

	09025–00010	Torque Wrench (30 kgf–cm)	PS vane pump PS gear
	09042–00010	Torx Socket T30 .	Tilt steering column
	09905–00012	Snap Ring No.1 Expander .	
	09905–00013	Snap Ring Pliers .	

PP18L–05

EQUIPMENT

Belt tension gauge	Drive belt
Caliper gauge	PS vane pump
Vernier calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

PP18M–04

LUBRICANT

Item	Capacity	Classification
Power steering fluid (Total)	0.9 liters (1.0 US qts, 0.8 Imp.qts)	ATF DEXRON® II or III

PP18N–04

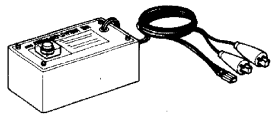
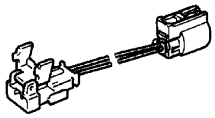
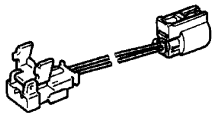
SSM (Special Service Materials)

08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	PS gear

SUPPLEMENTAL RESTRAINT SYSTEM

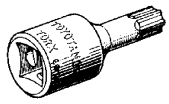
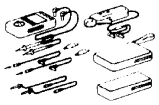
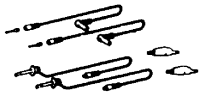
PP0MQ–01

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	

PP1XL–01

RECOMMENDED TOOLS

	09042–00020	Torx Socket T40 .	Airbag sensor assembly
	09082–00050	TOYOTA Electrical Tester Set.	
	09082–00040	TOYOTA Electrical Tester.	
	(09083–00150)	Test Lead Set	Seat belt pretensioner connector

PP0MS–01

EQUIPMENT

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
Torque wrench	
Vinyl bag	Airbag disposal

BODY ELECTRICAL

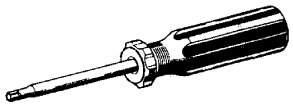
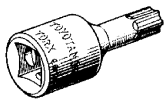
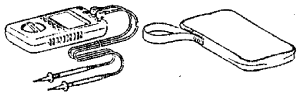
PP0O0–11

SST (Special Service Tools)

	09843–18020 Diagnosis Check Wire	

PP0O1–11

RECOMMENDED TOOLS

	09041–00030	Torx Driver T30 .	For removing and installing steering wheel pad
	09042–00010	Torx Socket T30 .	For removing and installing steering wheel pad
	09082–00040	TOYOTA Electrical Tester.	

PP0O2–10

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
Dry cell battery	Fuel sender gauge
Heat light	Seat heater
Hexagon wrench (6 mm)	Power seat
Torque wrench	
Clip remover	For removing cowl louver
Masking tape	Rear window defogger wire
Tin foil	Rear window defogger wire

PP0T6-08

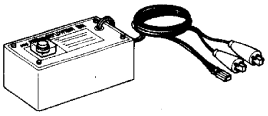
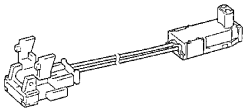
SSM (Special Service Materials)

	08888–88888	DuPont Paste No. 4817 or equivalent	Rear window defogger

BODY

PP0T8–04

SST (Special Service Tools)

	09812–00010	Door Hinge Set Bolt Wrench	
	09806–30010	Windshield Moulding Remover	
	09082–00700	SRS Airbag Deployment Tool	
	09082–00740	Airbag Deployment Wire Sub–harness No.2	

PP1EI–04

RECOMMENDED TOOLS

	09070–20010 Moulding Remover .	

PP0TA–02

EQUIPMENT

Clip remover	
Torque wrench	
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	
Wooden block or similar object	For tying both piano wire ends
Plastic sheet	To avoid surface damage
Rope (no projections, difficult to break)	Seat belt pretensioner disposal
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner disposal
Tire with disc wheel Width: 185mm (7.28 in.) Inner diam 360 mm (14.17 in.)	Seat belt pretensioner disposal
Vinyl bag	Seat belt pretensioner disposal

PP0TB–01

LUBRICANT

Item	Capacity	Classification
MP grease	–	–

PP0TC–01

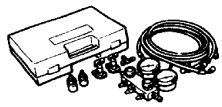
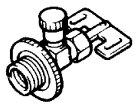
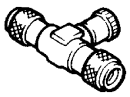
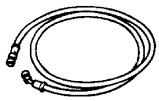
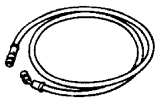
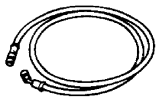
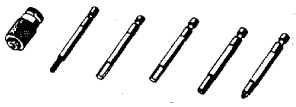
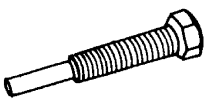
SSM (Special Service Materials)

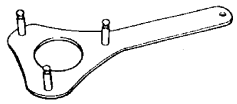
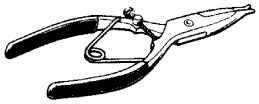
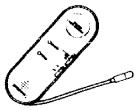
	08833–00070 Adhesive 1324, THREE BOND 1324 or equivalent	
	08833–00030 Three cement black or equivalent	
	08850–00801 Windshield Glass Adhesive Set or equivalent	

AIR CONDITIONING

PP0SN–02

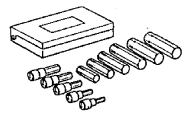
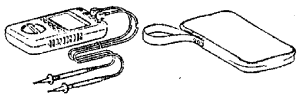
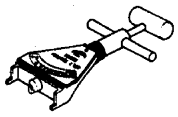
SST (Special Service Tools)

	07110–58060	Air Conditioner Service Tool Set	
	(07117–58060)	Refrigerant Drain Service Valve	
	(07117–58070)	T–Joint	
	(07117–58080)	Quick Disconnect Adapter	High pressure side
	(07117–58090)	Quick Disconnect Adapter	Low pressure side
	(07117–88060)	Refrigerant Charging Hose	High pressure side (Color: Red)
	(07117–88070)	Refrigerant Charging Hose	Low pressure side (Color: Blue)
	(07117–88080)	Refrigerant Charging Hose	Utility (Color: Green)
	07110–61050	Wrench Set	Expansion valve
	(07111–21020)	Holder	
	(07111–32020)	Hexagon Wrench	5 mm (0.20 in.)
	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	

PP23S–01

RECOMMENDED TOOLS

	09040–00010	Hexagon Wrench Set .	
	09082–00040	TOYOTA Electrical Tester.	
	09216–00021	Belt Tension Gauge .	

PP0SP–01

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Sernsor
Torque wrench	
Dial indicator	Magnetic clutch
Plastic hammer	Magnetic clutch

PP0SQ–01

LUBRICANT

Item	Capacity	Classification
Compressor oil	–	ND–OIL 8 or equivalent
When replacing condenser	40 cc (1.4 fl. oz.)	
When replacing evaporator	40 cc (1.4 fl. oz.)	

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

PR05A–01

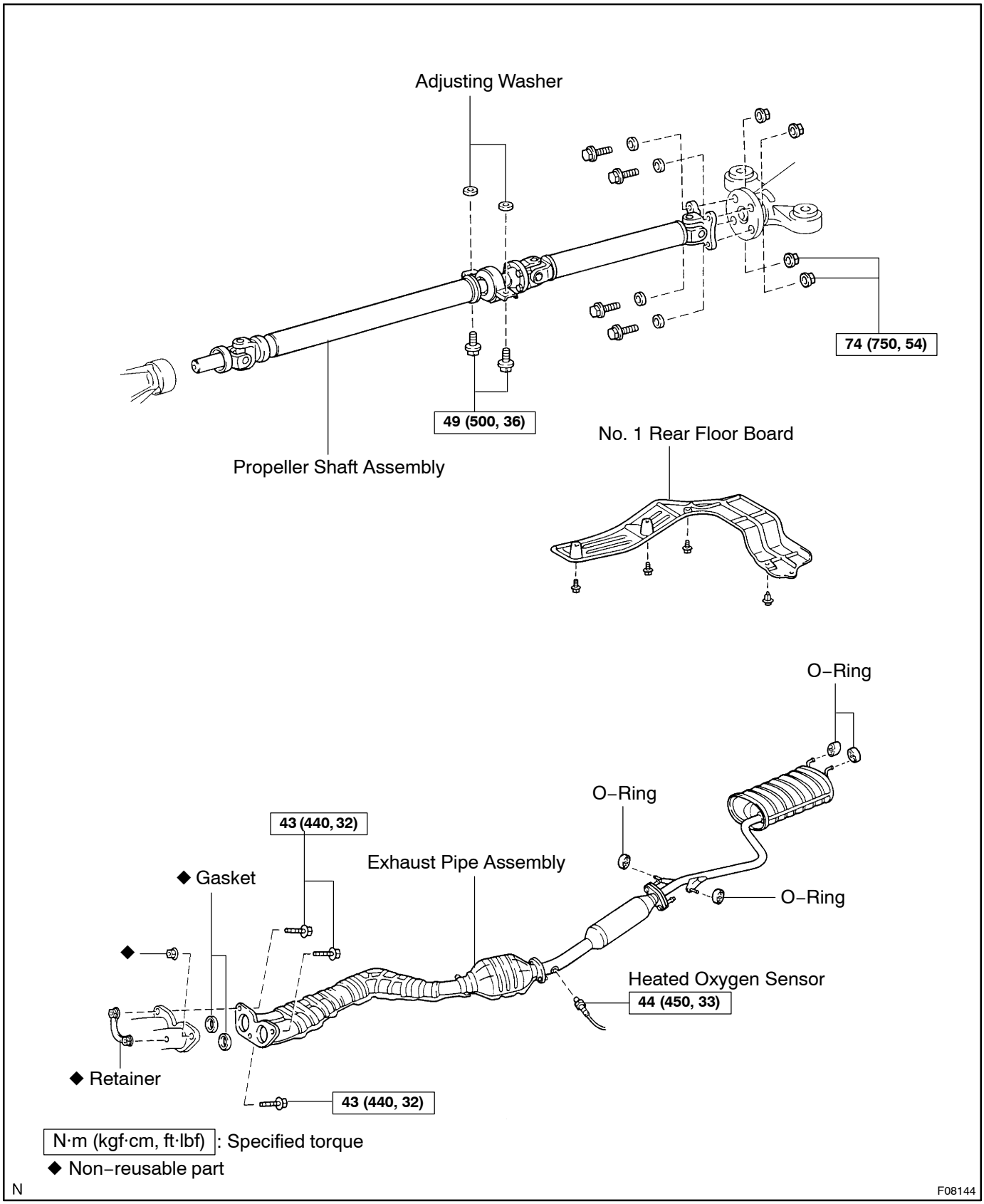
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	1. Sleeve yoke spline (Worn) 2. Spider bearing (Worn or stuck)	– PR–6
Vibration	1. Sleeve yoke spline (Stuck) 2. Propeller shaft (Runout) 3. Propeller shaft (Imbalance)	– PR–6 –

PROPELLER SHAFT ASSEMBLY

PR05B–01

COMPONENTS

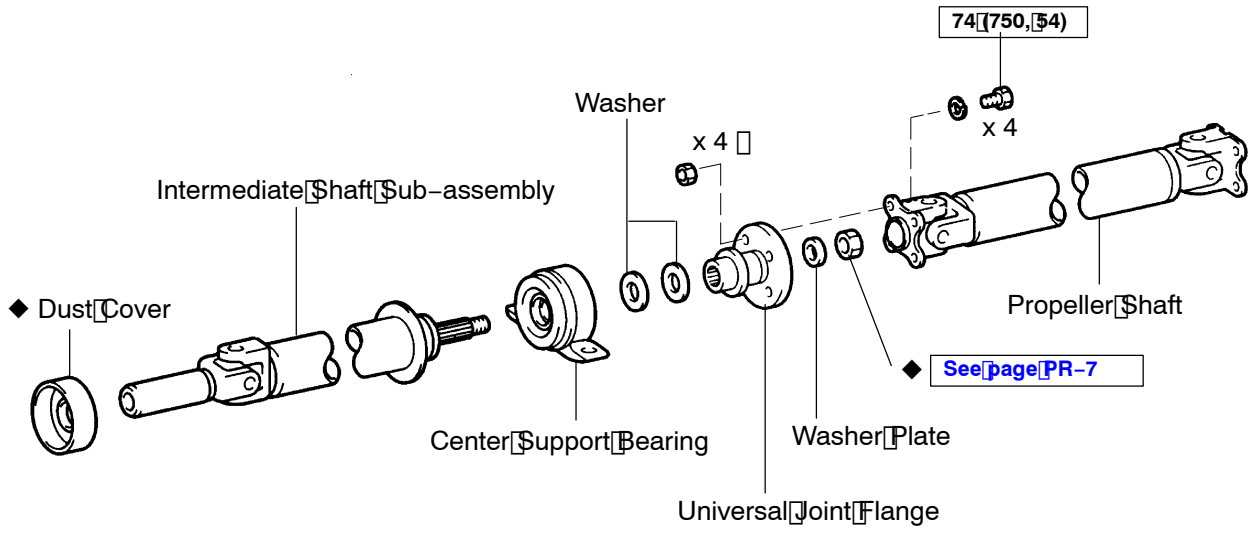


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

N

F08144


74 (750, 54)
x 4
Washer
x 4
Intermediate Shaft Sub–assembly
◆ Dust Cover
Propeller Shaft
◆ See page PR–7
Center Support Bearing
Washer Plate
Universal Joint Flange
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
F08147

PR05C–01

REMOVAL

1. REMOVE NO. 1 REAR FLOOR BOARD

2. REMOVE EXHAUST PIPE ASSEMBLY

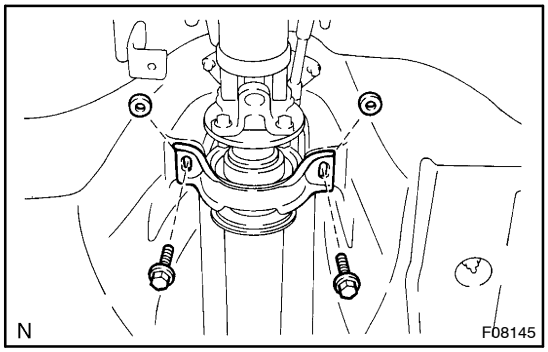
(a) Disconnect the heated oxygen sensor.

(b) Remove the 3 bolts, retainer and nut from the exhaust manifold.

(c) Disconnect the exhaust pipe assembly from the 4 O–rings.

(d) Remove the exhaust pipe assembly.

(e) Remove the 2 gaskets from exhaust pipe assembly.



3. REMOVE PROPELLER SHAFT

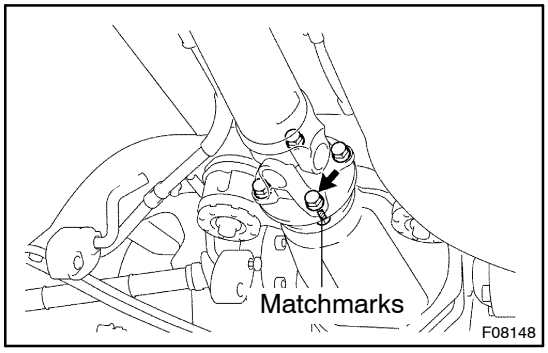
(a) Remove the 2 center support bearing set bolts and adjusting washers.

HINT:

Production vehicles are not equipped with adjusting washers.

NOTICE:

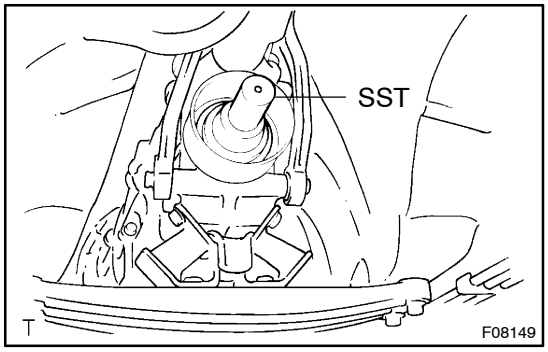
When removing the set bolts, support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.



(b) Place matchmarks on the differential companion flange and propeller shaft.

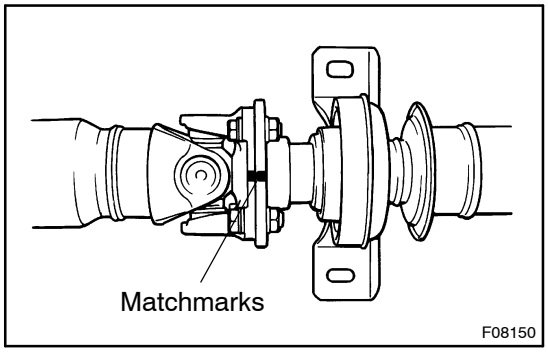
(c) Remove the 4 bolts, washers and nuts.

(d) Pull the yoke from the transmission.



(e) Install SST in the transmission to prevent oil leakage.
SST 09325–20010

PR05D–01



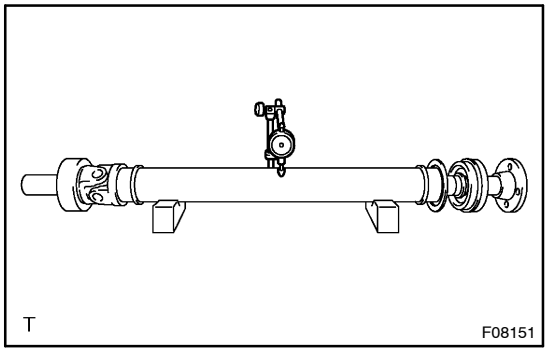
DISASSEMBLY

DISASSEMBLE PROPELLER SHAFT

(a) Place matchmarks on the universal joint flange and propeller shaft flange.
(b) Remove the 4 bolts, washers and nuts.
(c) Separate the intermediate shaft and propeller shaft.

PR05E–01

INSPECTION

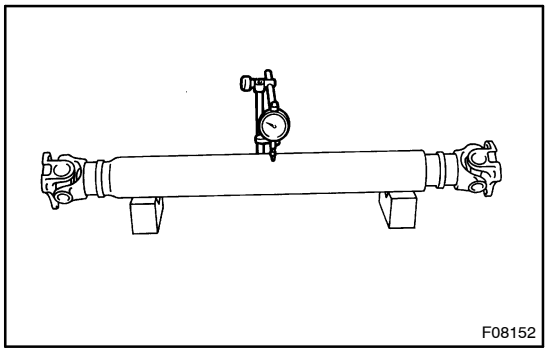


1. INSPECT RUNOUT OF INTERMEDIATE SHAFT

Using a dial indicator, inspect the intermediate shaft runout.

Maximum runout: 0.8 mm (0.031 in.)

If the runout is greater than the maximum, replace the intermediate shaft sub–assembly.

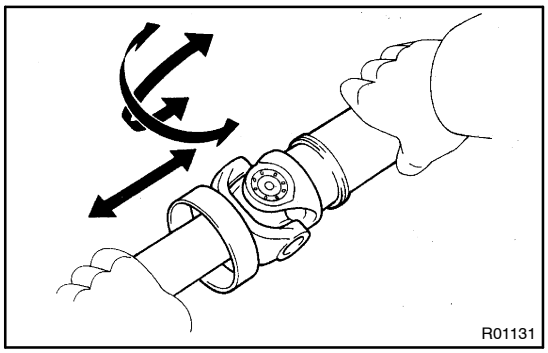


2. INSPECT RUNOUT OF PROPELLER SHAFT

Using a dial indicator, inspect the propeller shaft runout.

Maximum runout: 0.8 mm (0.031 in.)

If the runout is greater than the maximum, replace the propeller shaft assembly.

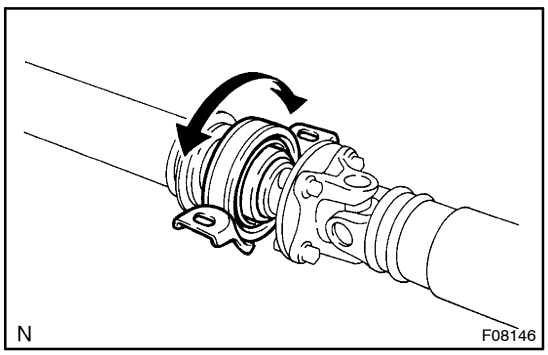


3. INSPECT SPIDER BEARING

(a) Check if the spider bearing rotates smoothly.

(b) Check if there any play in the spider bearing.

If necessary, replace the propeller shaft assembly or intermediate shaft sub–assembly.



4. INSPECT CENTER SUPPORT BEARING

(a) Check if the bearing turns smoothly.

(b) Check for crack in or damage to the cushion.

If the center support bearing is damaged, worn or does not turn smoothly, replace it.

PR05F–01

REPLACEMENT

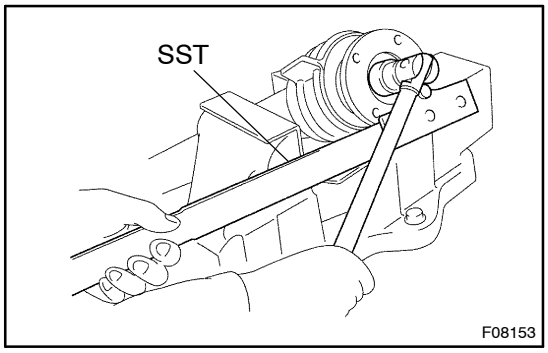
NOTICE:

Be careful not to grip the propller shaft tube too tightly in the vise as will cause deformation.

1. REPLACE CENTER SUPPORT BEARING

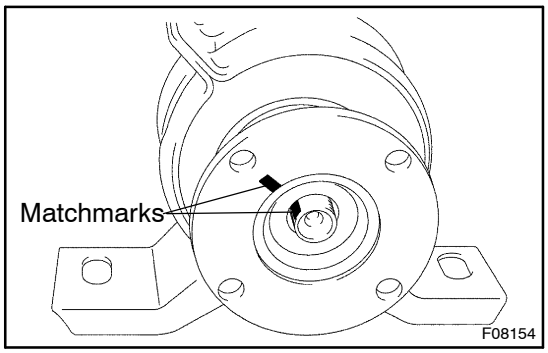
(a) Using a chisel and hammer, unstake the staked part of the nut.

(b) Mount the intermediate shaft sub–assembly in a vise.

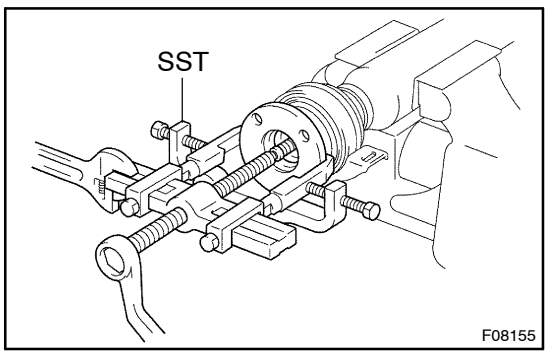


(c) Using SST to hold the universal joint flange, remove the nut.
SST 09930–00021

(d) Remove the washer plate.



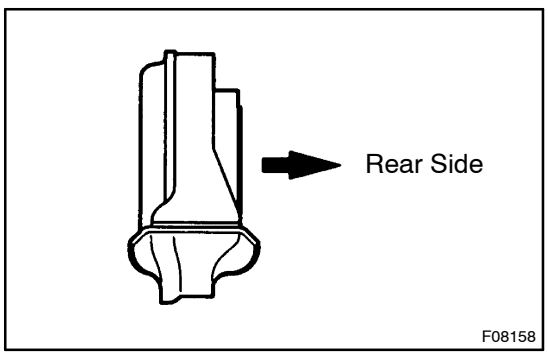
(e) Place matchmarks on the universal joint flange and intermediate shaft.



(f) Using SST, remove the universal joint flange.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011)

(g) Remove the 2 washers.

(h) Remove the center support bearing.

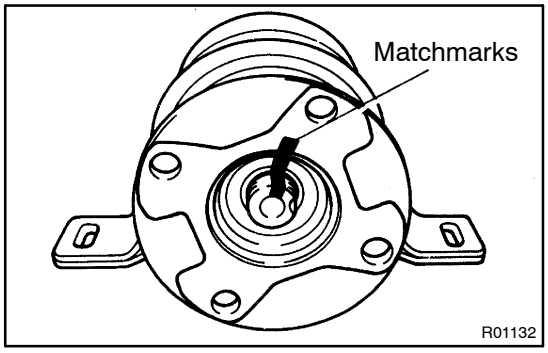


(i) Install a new center support bearing to intermediate shaft.

HINT:

Install the center support bearing in the direction, as shown.

(j) Install the 2 washers.

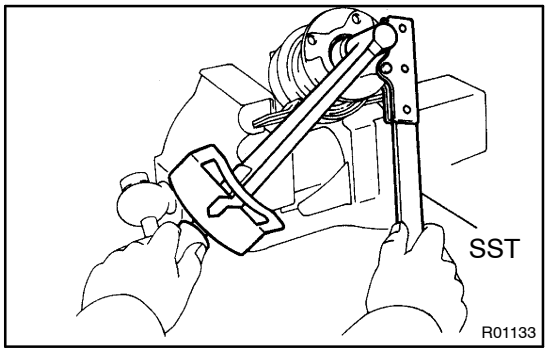


(k) Align the matchmarks and install the universal joint flange.

HINT:

If replacing eighter the center flange or intermediate shaft, reassemble them so that the front yoke of the intermediate shaft and the rear yoke of the propeller shaft are facing in the same direction.

(l) Install the washer plate.

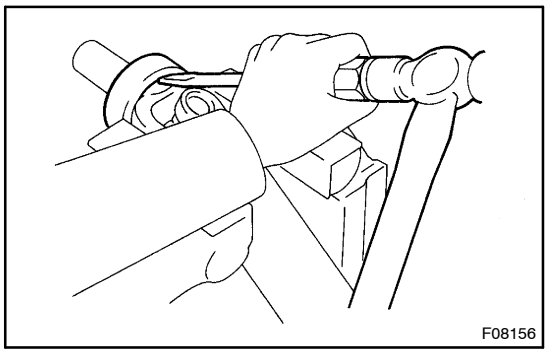


(m) Using SST to hold the flange, torque a new nut.
SST 09330–00021
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

(n) Loosen the nut.

(o) Torque the nut again.
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

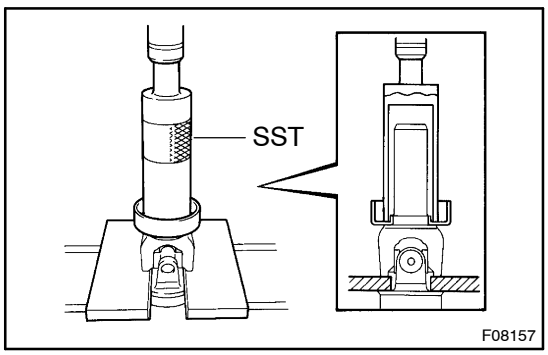
(p) Using a chisel and hammer, stake the nut.



2. REPLACE DUST COVER

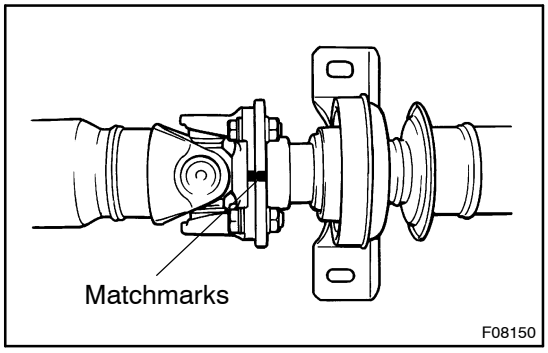
(a) Mount the intermediate shaft sub–assembly in a vise.

(b) Using a screwdriver and hammer, remove the dust cover.



(c) Using SST and press, install a new dust cover.
SST 09316–60011 (09316–00011)

PR05G–01



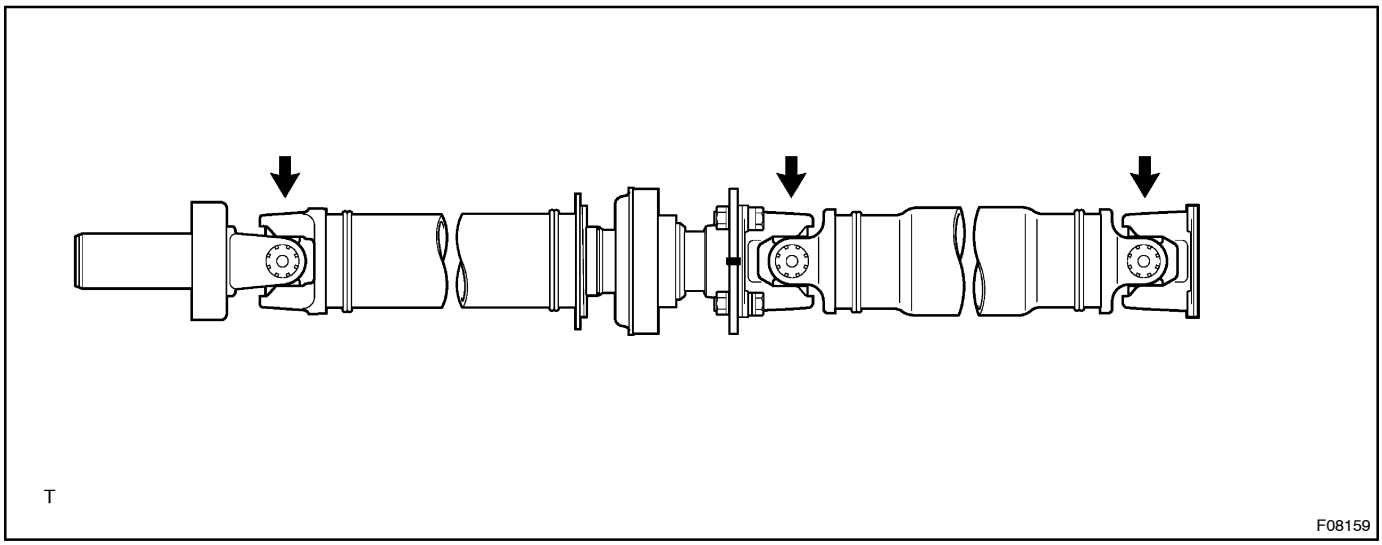
REASSEMBLY

REASSEMBLE PROPELLER SHAFT

(a) Assemble the propeller shaft, align the matchmarks on the universal joint flanges and connect the flanges with the 4 bolts, washers and nuts.

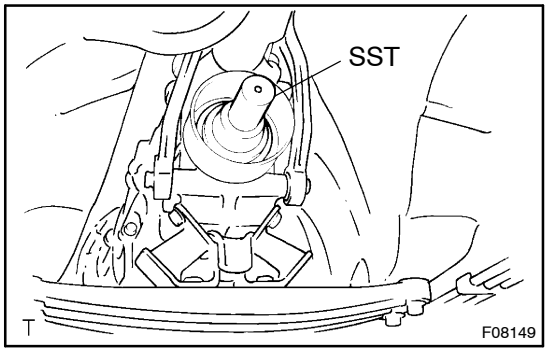
(b) Torque the 4 nuts.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

HINT:
Assemble the propeller shaft so that each joint faces in the direction as shown in the illustration.



PR05H–01

INSTALLATION



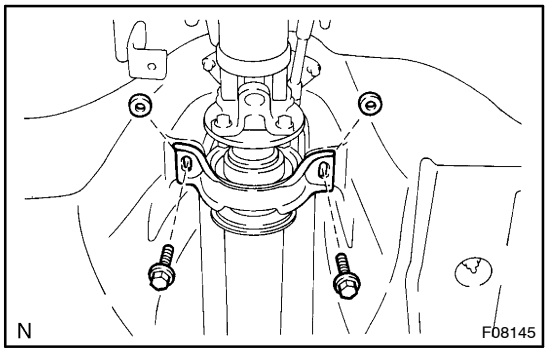
1. INSTALL PROPELLER SHAFT

(a) Remove the SST.
SST 09325–20010

(b) Insert the propeller shaft assembly to the transmission.

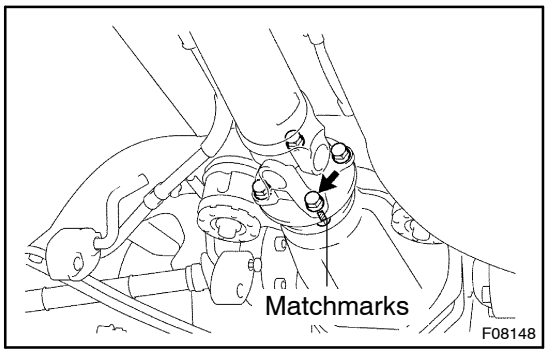
NOTICE:

Support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.

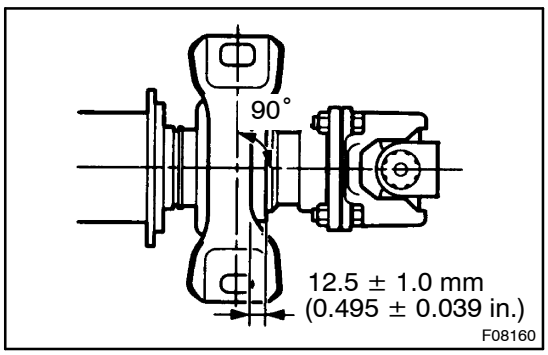


(c) Temporarily install the 2 center support bearing set bolts with the adjusting washers.

HINT:
Use the adjusting washers wich were removed.



(d) Align the matchmarks and install the propeller shaft on the differential with the 4 bolts, washers and nuts.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



(e) Torque the 2 center support bearing set bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:
Adjust the center support bearing to keep the dimension, as shown with the vehicle in the unladen condition.
Under the same condition, check if the center line of the center support bearing is at right angles to the shaft axial direction.

2. INSTALL EXHAUST PIPE ASSEMBLY

(a) Connect the exhaust pipe assembly to the 4 O–rings.

(b) Install the exhaust pipe assembly with the 2 gaskets, 3 bolts, retainer and nut.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(c) Connect the heated oxygen sensor.
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

3. INSTALL NO. 1 REAR FLOOR BOARD

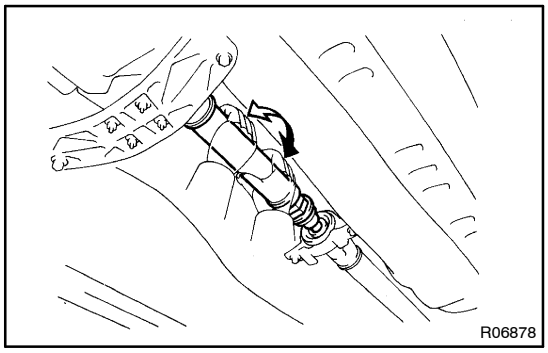
JOINT ANGLE

PR05I–01

ADJUSTMENT

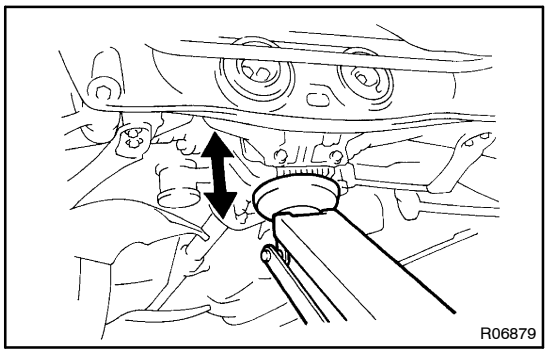
NOTICE:

When doing operations which involve the removal and installation of the propeller shaft, always check the joint. Make adjustments if necessary.

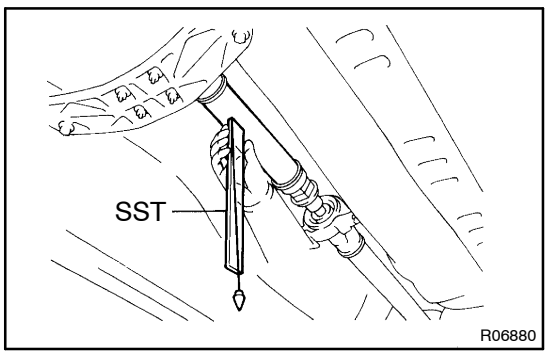


1. STABILIZE PROPELLER SHAFT AND DIFFERENTIAL

(a) Turn the propeller shaft several times by hand to stabilize the center support bearing.

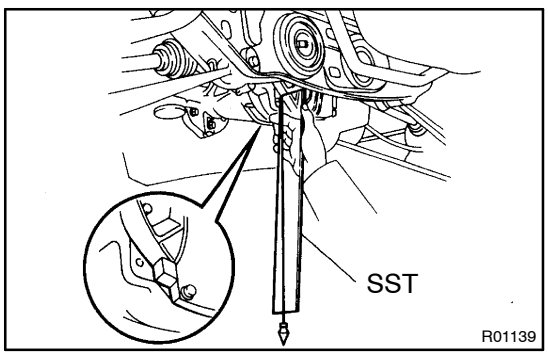


(b) Using a jack, raise and lower the differential to stabilize the differential mounting cushion.



2. CHECK JOINT ANGLE OF NO. 2 JOINT AND NO. 3 JOINT

(a) Using SST, measure the installation angle of the intermediate shaft and propeller shaft.
SST 09370–50010



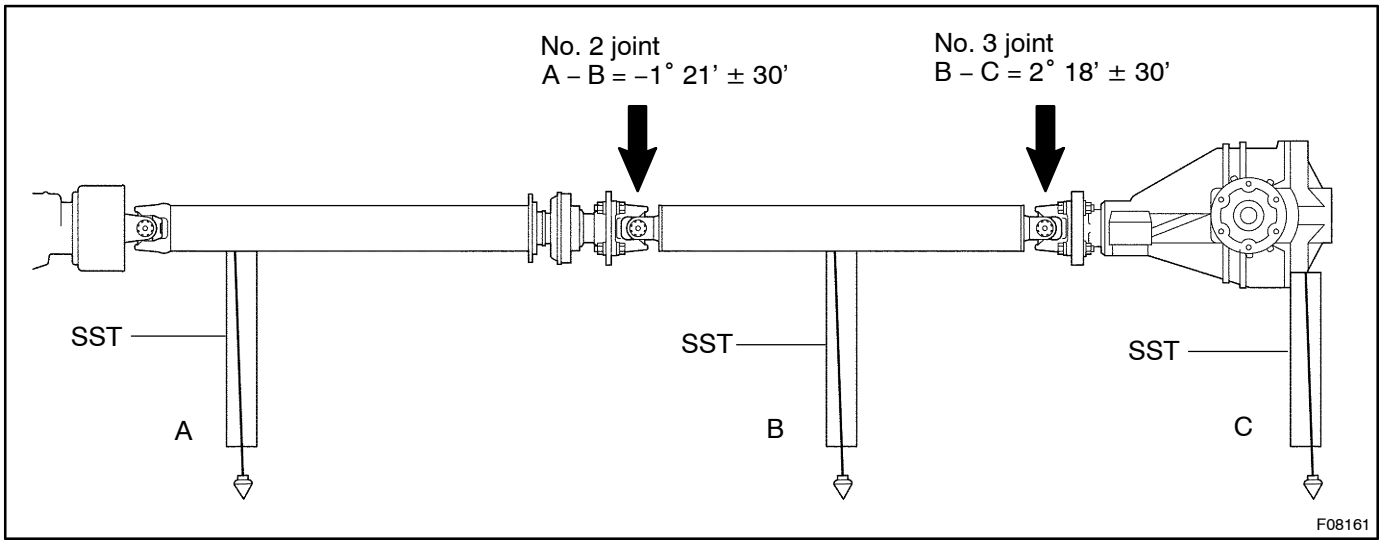
(b) Using SST, measure the installation angle of the differential.
SST 09370–50010

HINT:

Measure the installation angle by placing the SST in the position, as shown in the illustration.

(c) Calculate the No. 2 joint angle.
No. 2 joint angle:
A – B = –1° 21' ± 30'
A: Intermediate shaft installation angle
B: Propeller shaft installation angle

(d) Calculate the No. 3 joint angle.
No. 3 joint angle:
B – C = 2° 18' ± 30'
B: Propeller shaft installation angle
C: Differential installation angle



If the measured angle is not within the specification, adjust it with the center support bearing adjusting washer and differential adjusting shim.

Center support bearing adjusting washer thickness:

Thickness mm (in.)	Thickness mm (in.)
2.0 (0.079)	9.0 (0.354)
4.5 (0.177)	11.0 (0.433)
6.5 (0.256)	13.5 (0.531)

NOTICE:
- **Left and right washers should be the same thickness.**
- **2 washers should not be assembled together.**
- **Some vehicles are not assembled with washers.**

SRS AIRBAG

PRECAUTION

RS01Y–29

NOTICE:

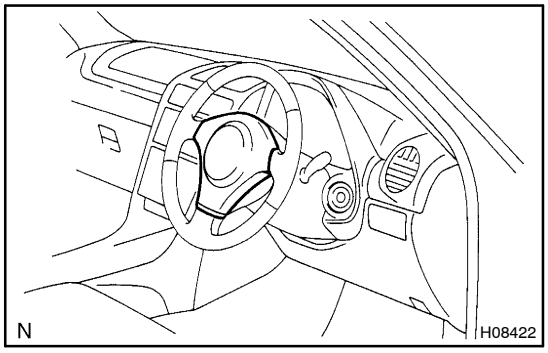
- The LEXUS IS200 is equipped with SRS, which comprises a driver airbag, front passenger airbag, and side airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake 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, side airbag assembly, airbag sensor assembly, front airbag sensor and side airbag sensor assembly should be inspected.
(See page RS–15, RS–28, RS–42, RS–55, RS–60 and RS–65)
- 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, side airbag assembly, airbag sensor assembly, front airbag sensor or side airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor or side 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.
- 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–287).
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

CAUTION:

- Work must be started 90 seconds after 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, side airbag assembly, airbag sensor assembly, front airbag sensor or side airbag sensor assembly directly to hot air or flames.

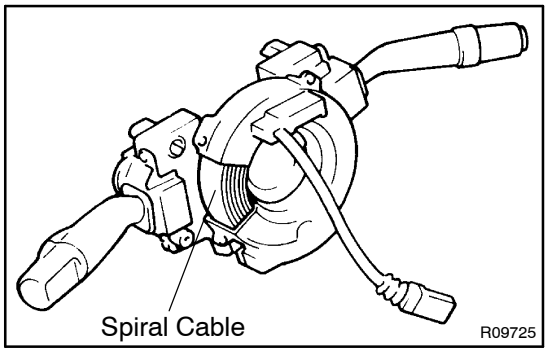
RS0HI–01

OPERATION



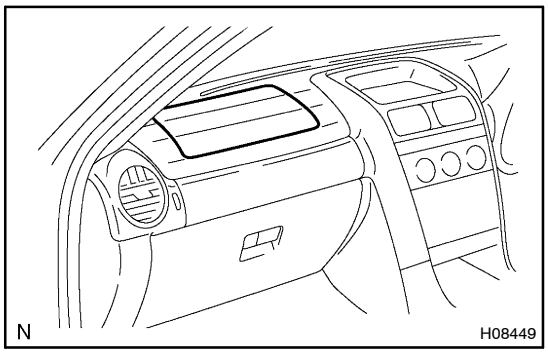
1. STEERING WHEEL PAD (with AIRBAG)

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.



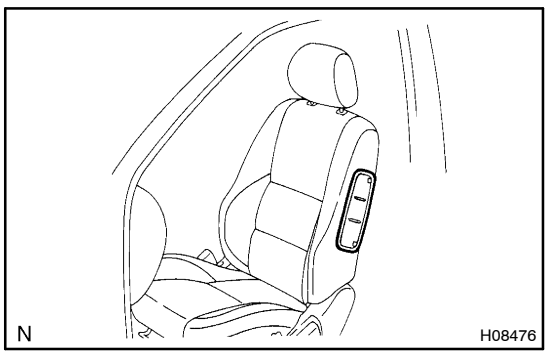
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



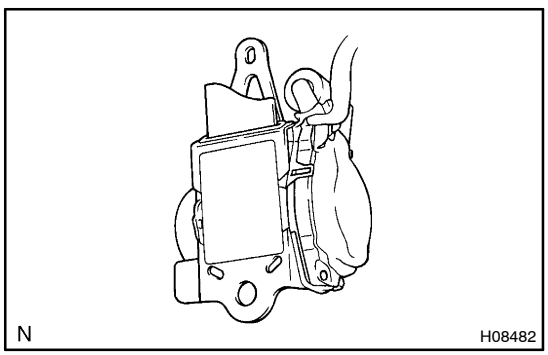
3. FRONT PASSENGER AIRBAG ASSEMBLY

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.



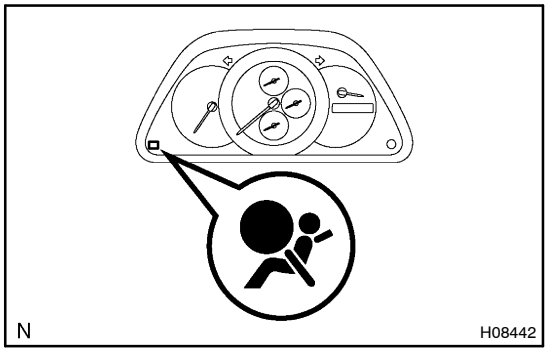
4. SIDE AIRBAG ASSEMBLY

The inflater and bag of the SRS side airbag are stored in the side 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 side airbag sensor assembly.



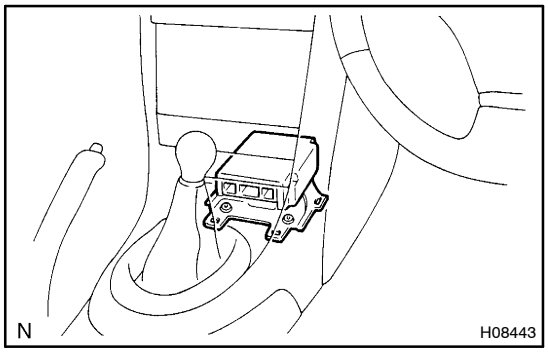
5. SEAT BELT PRETENSIONER

The seat belt pretensioner system is a component of the front seat outer belt. The pretensioner contains a squib, gas generant, wire, piston, etc., and operates in the event of a frontal collision.



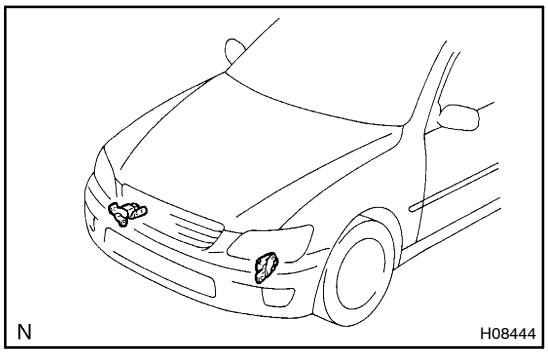
6. SRS WARNING LIGHT

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 self–diagnosis. In normal operation conditions when the ignition switch is turned to the ACC or ON position, the light goes on for about 6 seconds and then goes off.



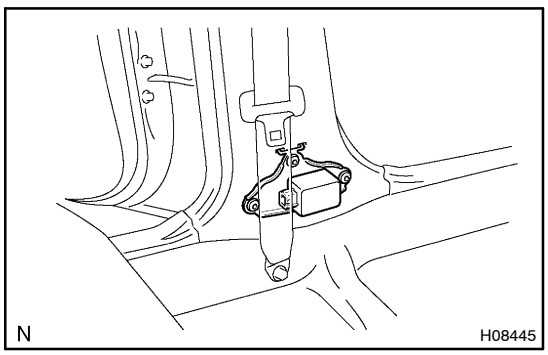
7. AIRBAG SENSOR ASSEMBLY

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, ignition control and drive circuit, etc. It receives signals from the airbag sensor and judges whether the SRS must be activated or not.



8. FRONT AIRBAG SENSOR

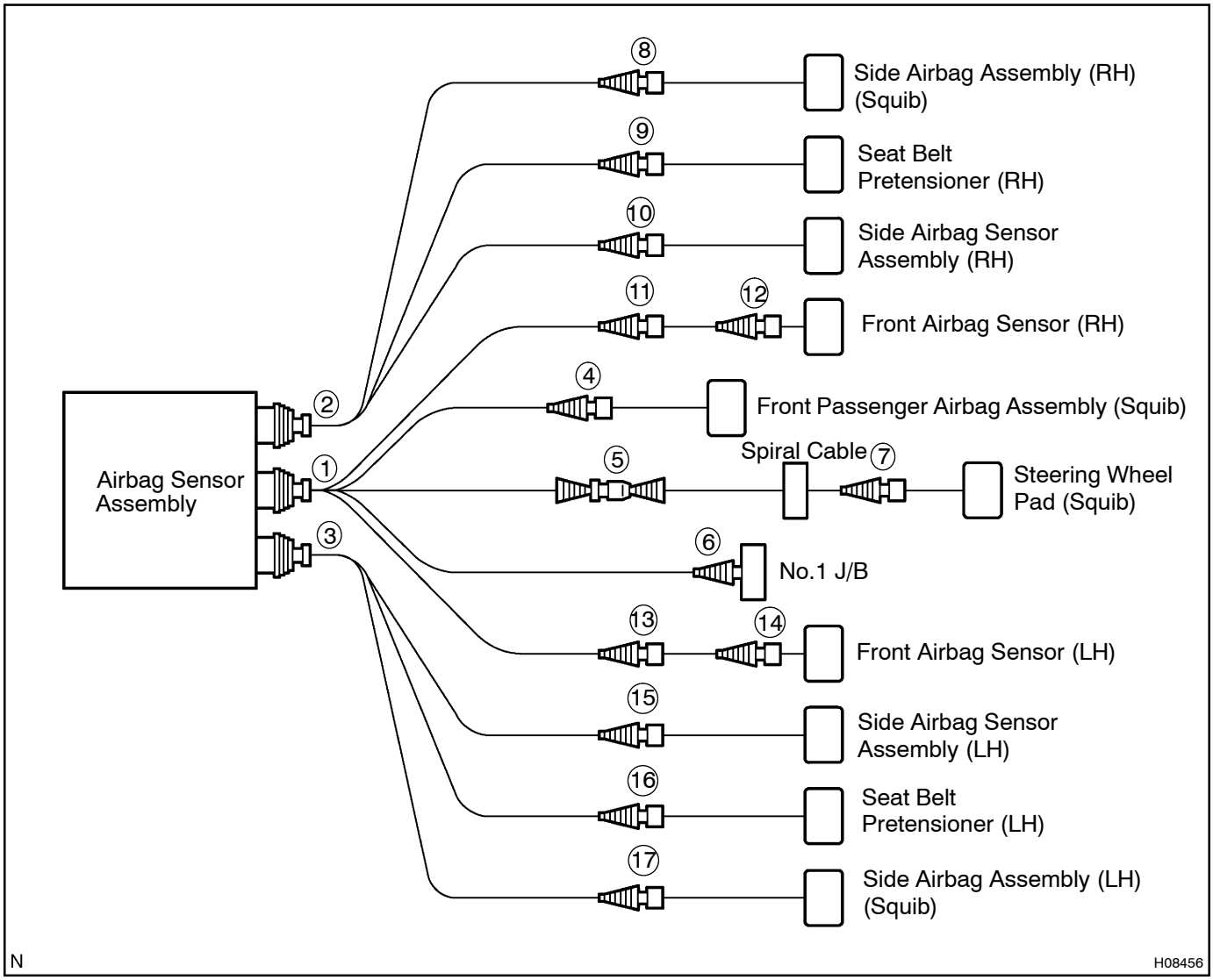
The front airbag sensor is mounted inside each of the side members. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit, contact is made in the sensor, sending a signal to the airbag sensor assembly. The sensor cannot be disassembled.



9. SIDE AIRBAG SENSOR ASSEMBLY

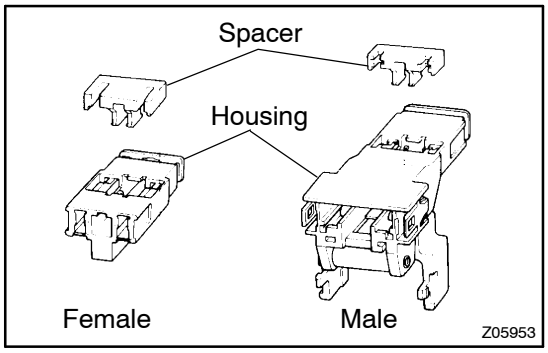
The side airbag sensor assembly is mounted in the LH and RH center pillars. The side airbag sensor assembly consists of a lateral deceleration sensor, safing sensor and diagnosis circuit, etc. It receives signals to the airbag sensor assembly to judge from the side airbag sensors whether the SRS side airbag must be activated or not.

10. SRS CONNECTORS



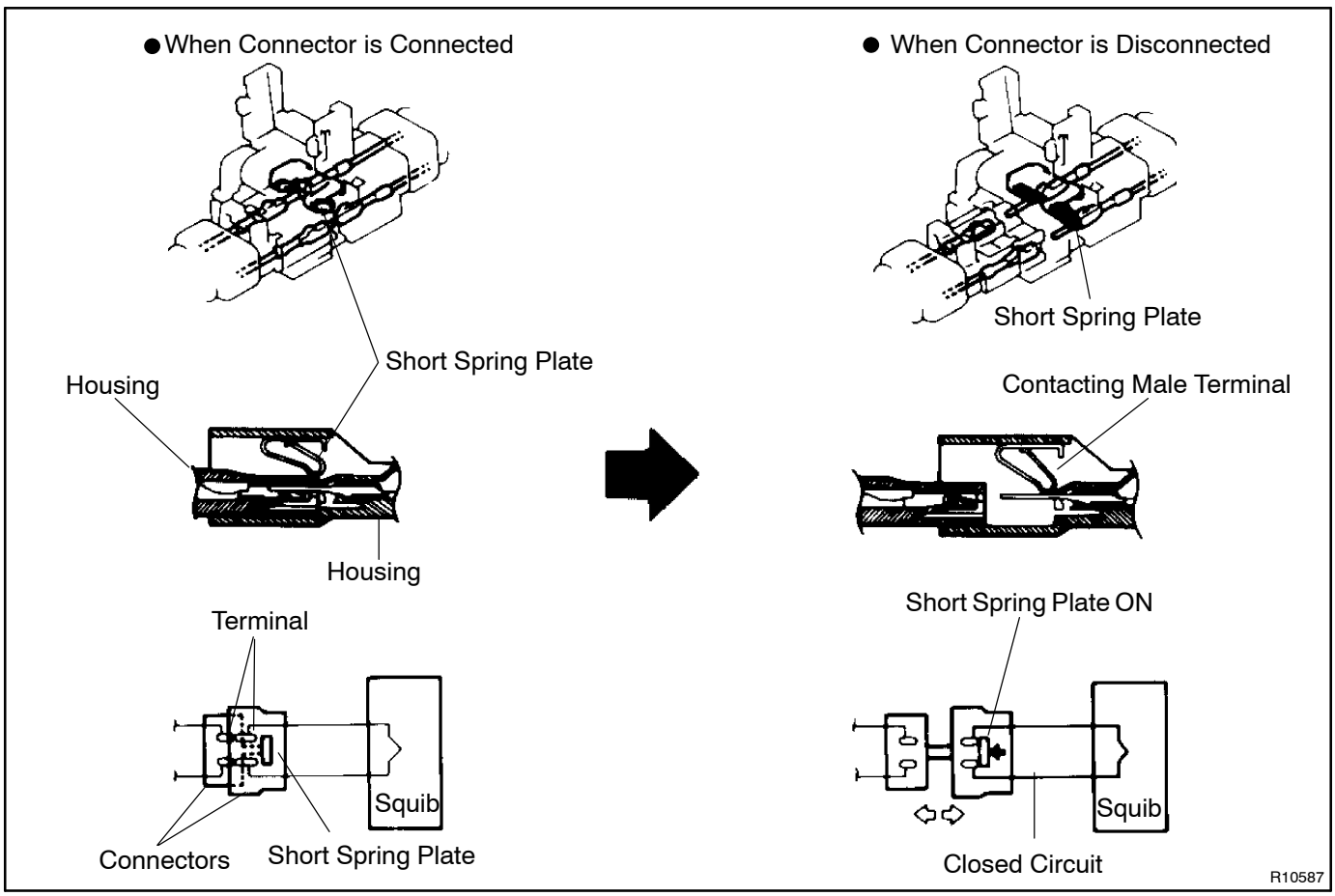
No.	Item	Application
(1)	Terminal Twin–Lock Mechanism	Connectors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
(2)	Airbag Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 5, 7, 8, 9, 16, 17
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3
(4)	Connector Twin–Lock Mechanism	Connectors 5

(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 on the previous page to ensure high reliability. These connectors use durable gold–plated terminals.

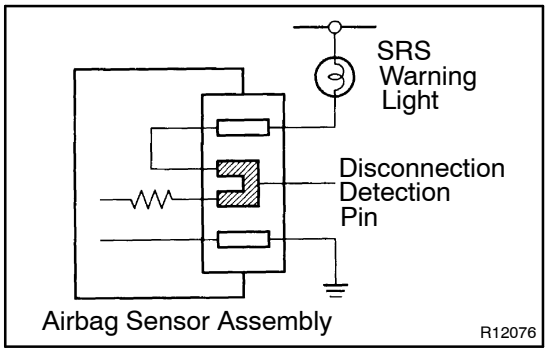


(1) Terminal twin–lock mechanism:
Each connector has a two–piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by 2 locking devices (the retainer and the lance) to prevent terminals from coming out.

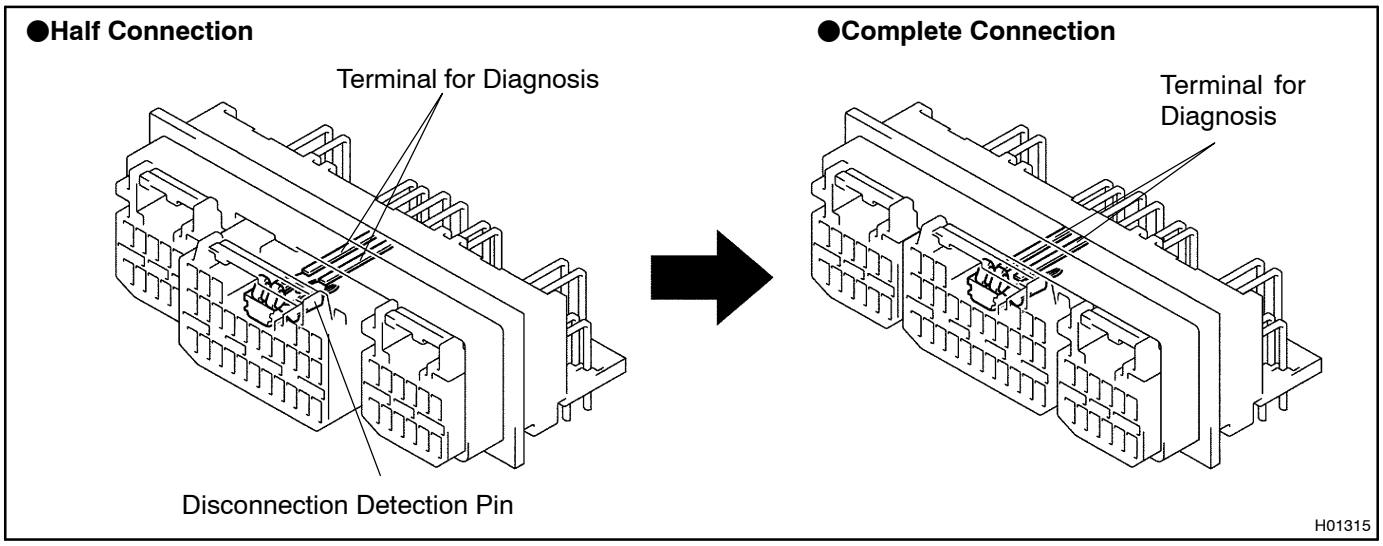
(2) Airbag activation prevention mechanism:
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects positive (+) terminal and negative (–) terminal of the squib.



HINT:
The type of connector is shown in the diagram on the previous page.

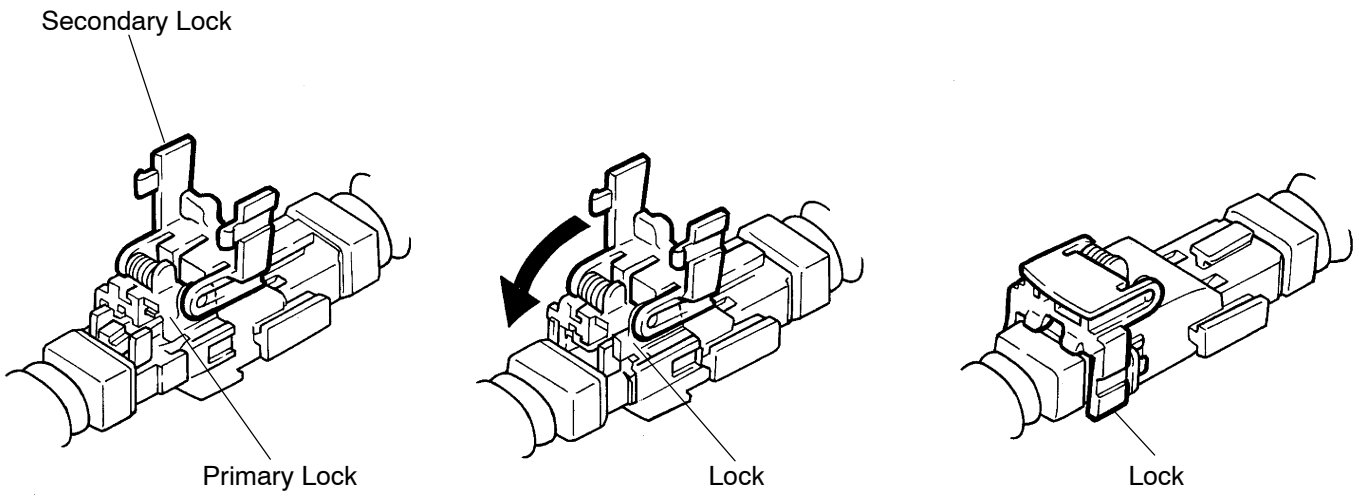


(3) Electrical connection check mechanism:
This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects with the diagnosis terminals when the connector housing lock is locked.



HINT:
The connectors shown in this illustration are connectors, ”1”, ”2” and ”3” in step 10.

(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.



Primary Lock Incomplete (Secondary Lock Prevented)

Primary Lock Complete (Secondary Lock Permitted)

Twin–Lock Completed

H03989

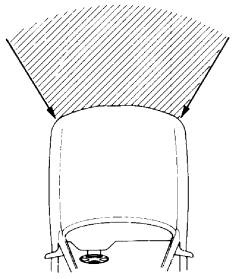


Fig.1

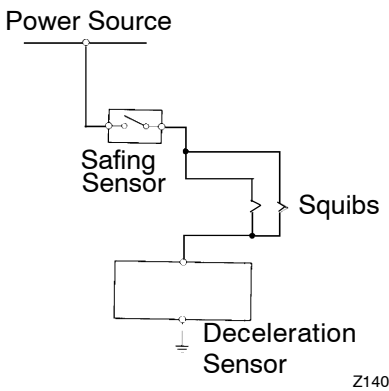
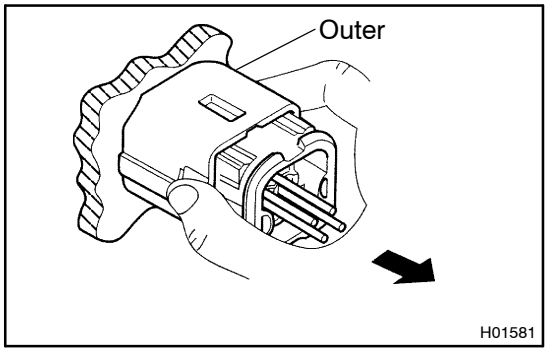


Fig.2

Z14034

(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 deceleration 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.



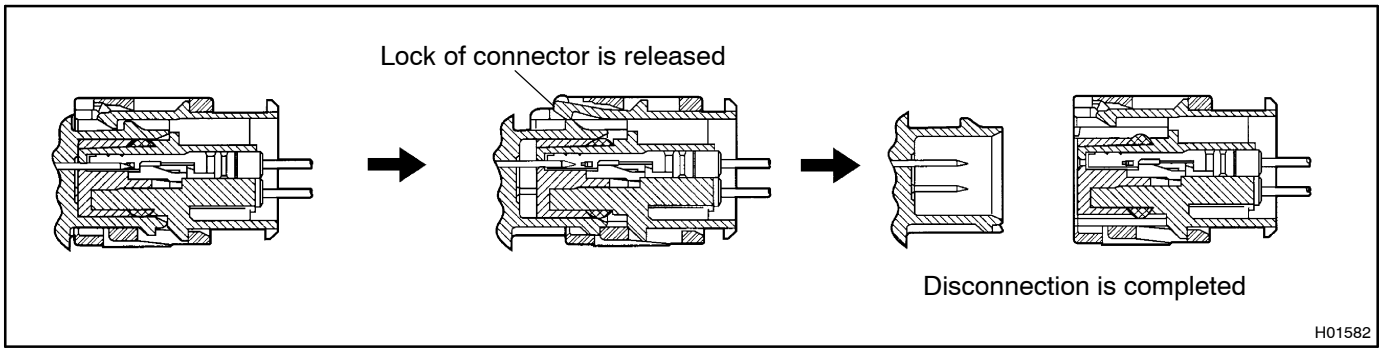
11. DISCONNECTION OF FRONT AIRBAG SENSOR AND SIDE AIRBAG SENSOR ASSEMBLY CONNECTORS

(a) While holding both flank sides of the outer, slide the outer to the direction shown by an arrow.

(b) Lock of the connectors is released, then disconnect the connectors.

HINT:

Be sure to hold both flank sides of the outer. If holding the top and bottom sides, it will obstruct disconnection.



12. CONNECTION OF FRONT AIRBAG SENSOR AND SIDE AIRBAG SENSOR ASSEMBLY CONNECTORS

(a) Align the male connector (of the side of sensor) and female connector in the same direction as shown in the illustration and fit in them without rubbing.

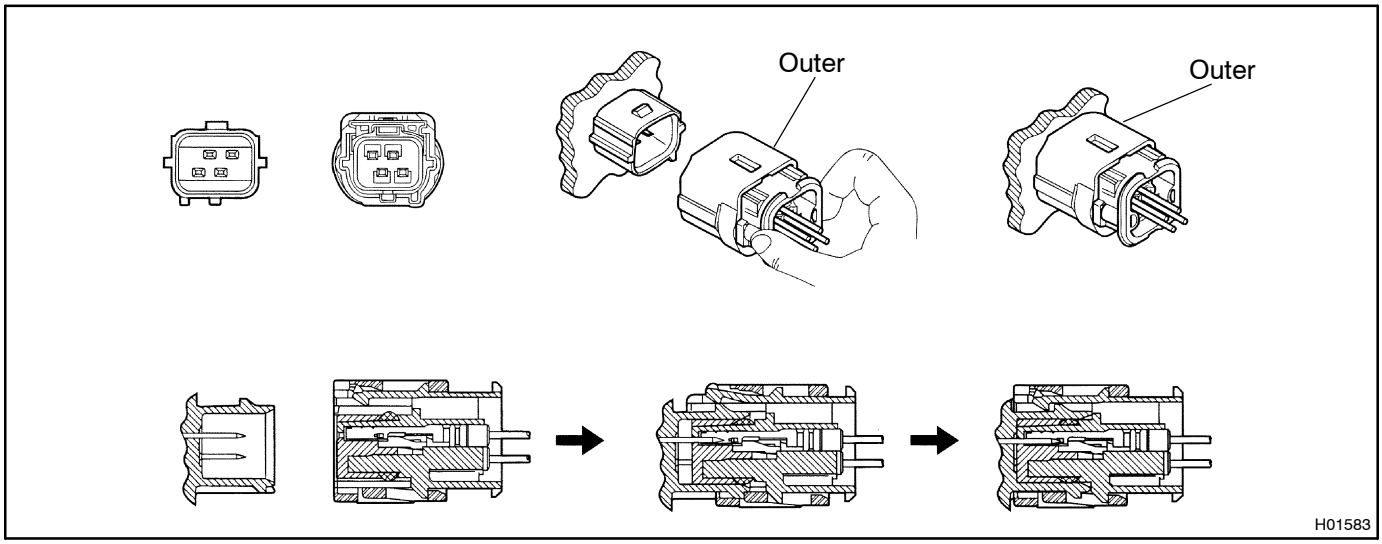
(b) As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops half way, connectors will separate.

(c) Be sure to insert until they are locked. After fitting in, pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

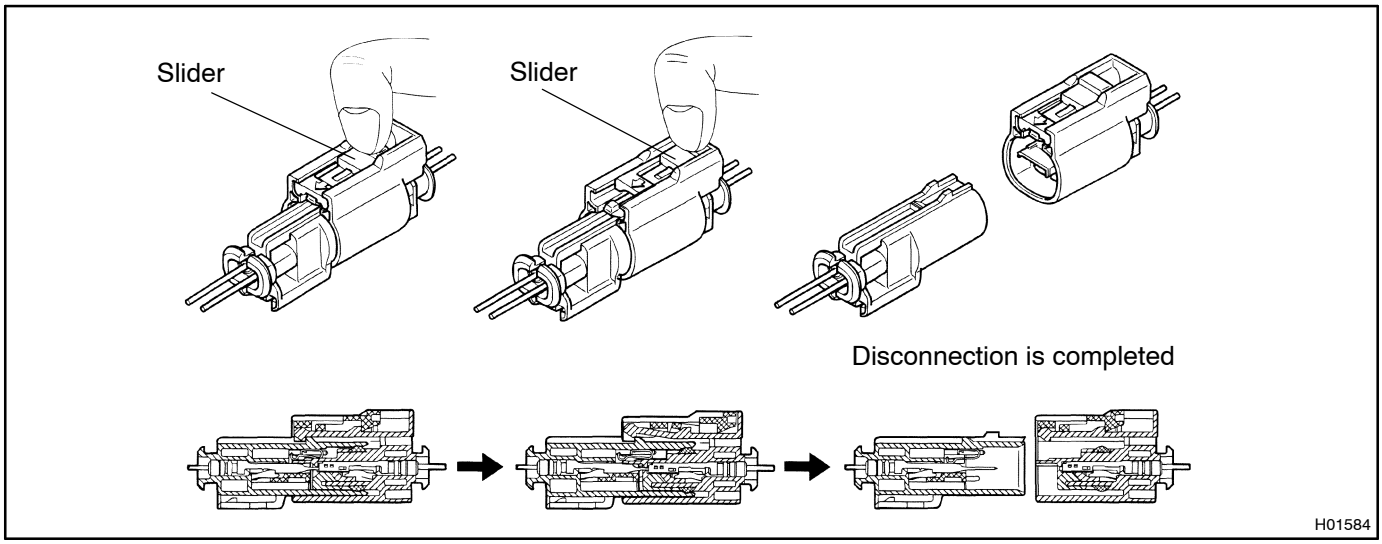
HINT:

- Do not fit in while holding the outer.
- When fitting in, the outer slides. Do not touch it.



13. DISCONNECTION OF SIDE AIRBAG CONNECTOR

(a) Place a finger on the slider.
(b) Slide the slider to release lock.
(c) Disconnect the connector.



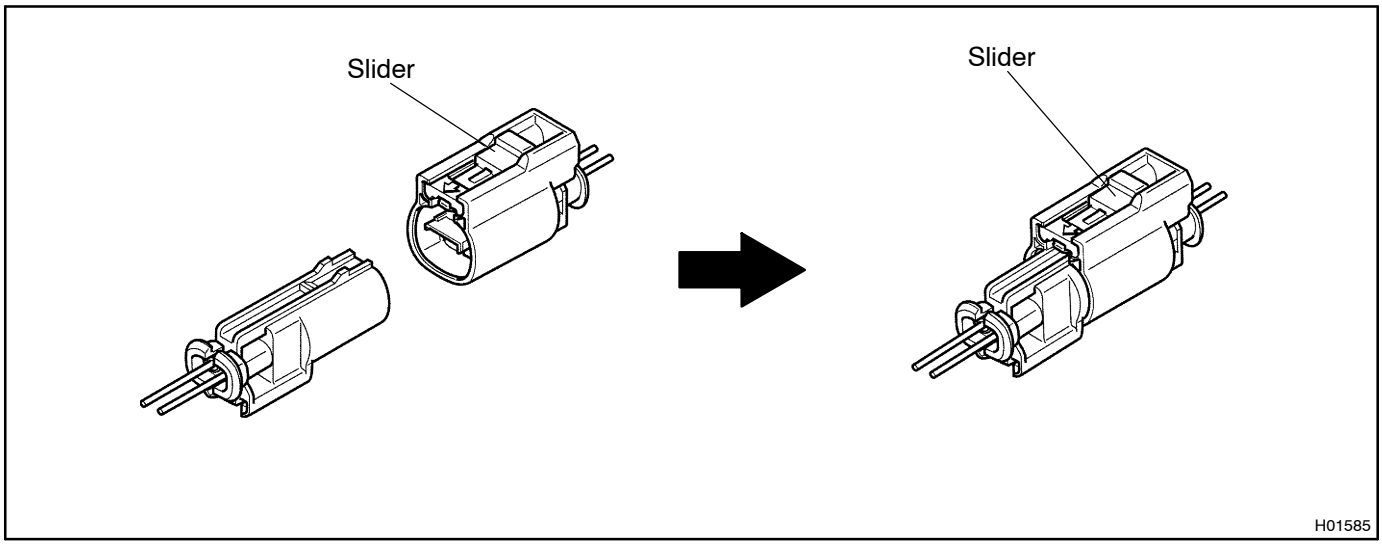
14. CONNECTION OF SIDE AIRBAG CONNECTOR

(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.

(b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

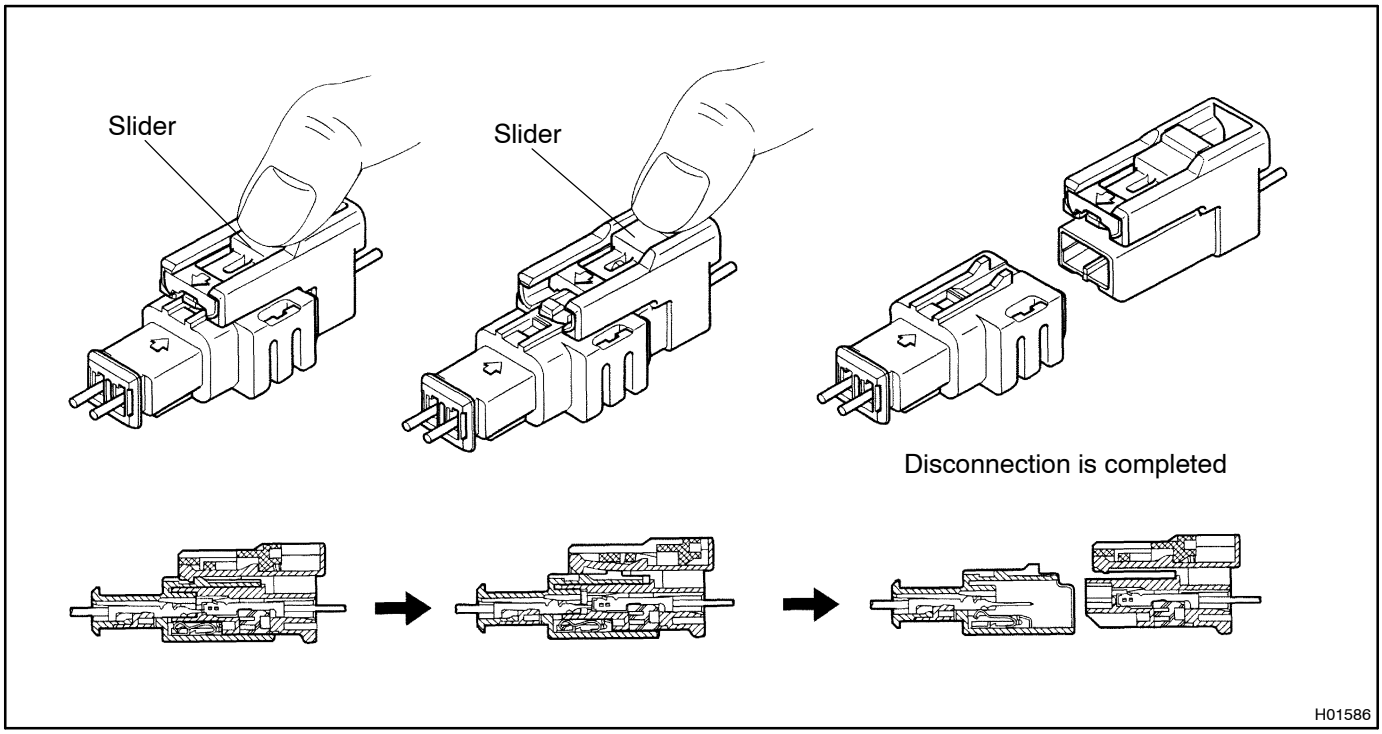
HINT:

- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



15. DISCONNECTION OF STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY CONNECTORS

(a) Place a finger on the slider.
(b) Slide the slider to release lock.
(c) Disconnect the connector.



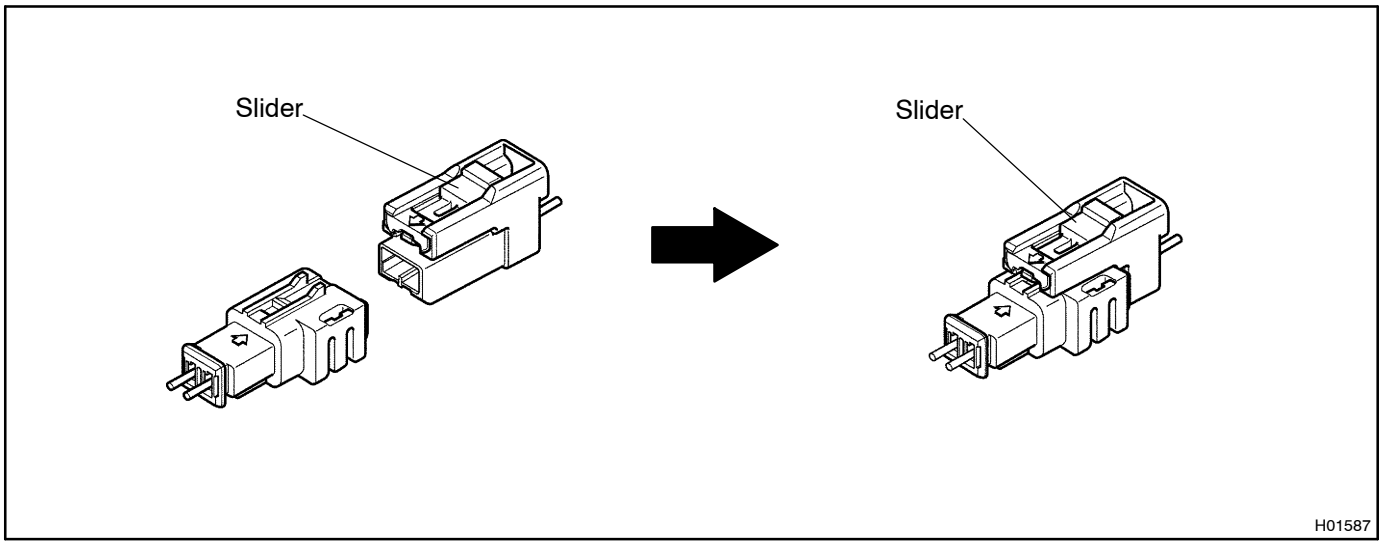
16. CONNECTION OF STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY CONNECTORS

(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.

(b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

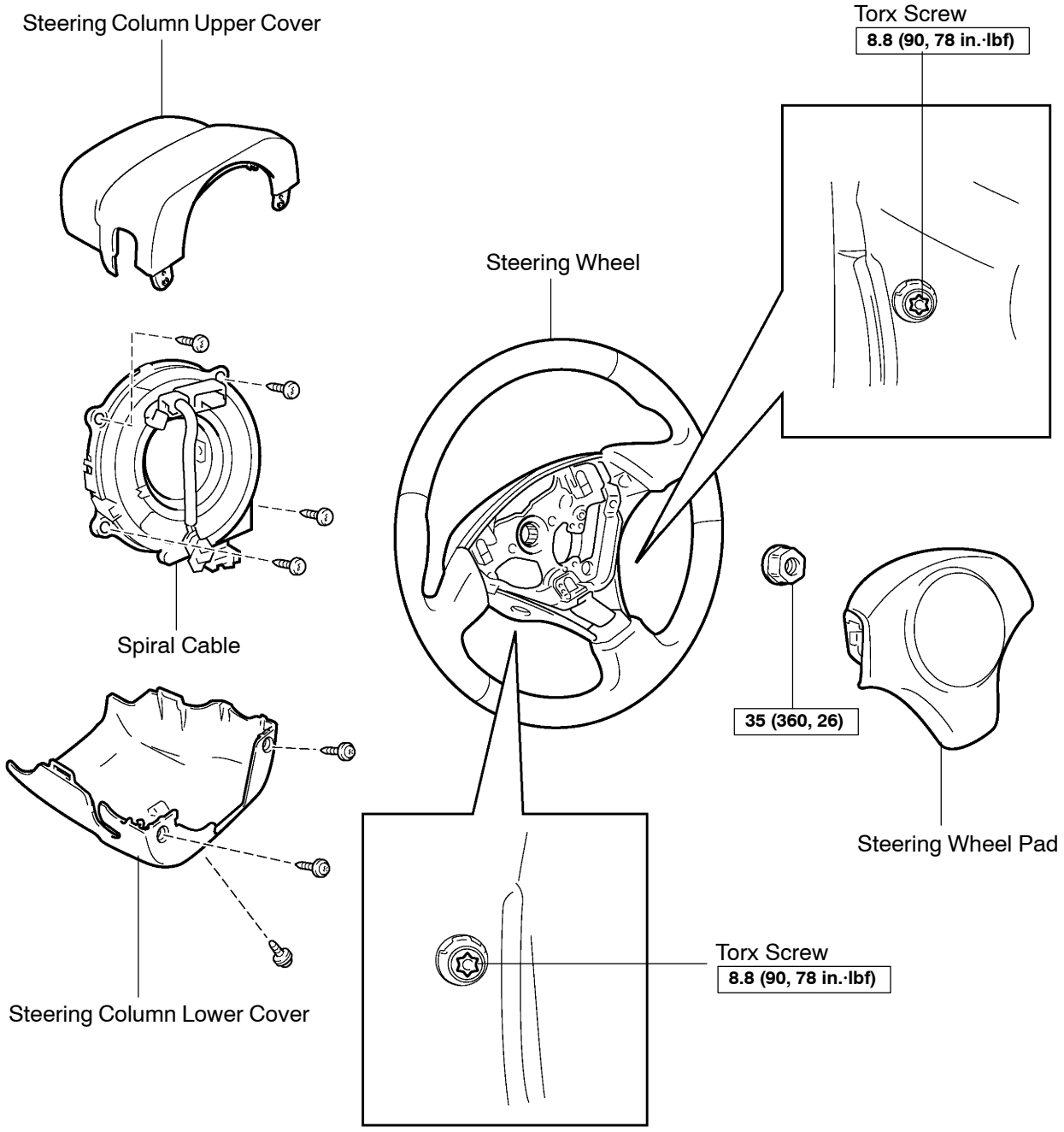
- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



STEERING WHEEL PAD AND SPIRAL CABLE

COMPONENTS

RS00Y–25



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

H08428

RS00Z–18

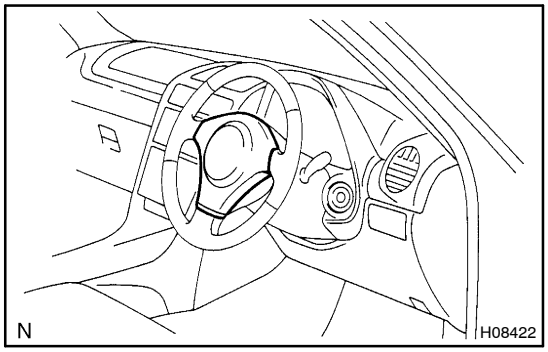
REMOVAL

HINT:

For step 1 to 4, refer to page SR–12.

1. **REMOVE STEERING WHEEL PAD**
2. **REMOVE STEERING WHEEL**
3. **REMOVE STEERING COLUMN UPPER AND LOWER COVERS**
4. **REMOVE SPIRAL CABLE**

RS010-24



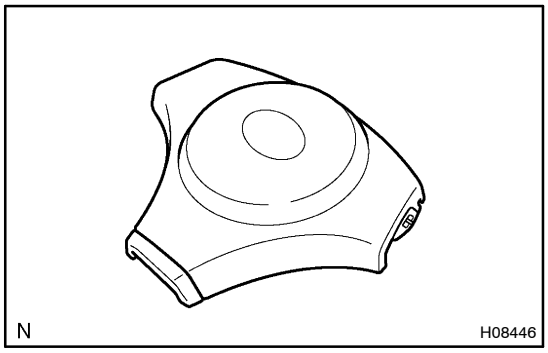
INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

(a) Do a diagnostic system check. (See page DI–287)

(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.

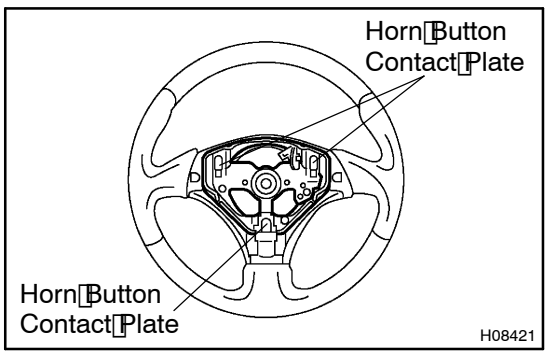


2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check. (See page DI–287)

(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

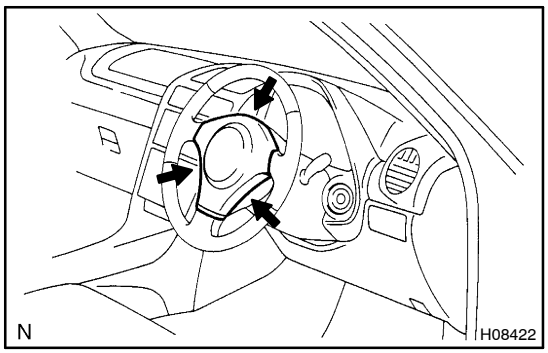
- Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
- Check cuts and cracks in the wire harness, and chipping in the connectors.



- Check the deformation of the horn button contact plate on 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 a new steering wheel pad is installed on the steering wheel.

CAUTION:

For removal and installation of the steering wheel pad, see page SR–12 and SR–23, and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check. (See page DI–287)

(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 a new steering wheel pad is installed on the steering wheel.

RS011–23

DISPOSAL

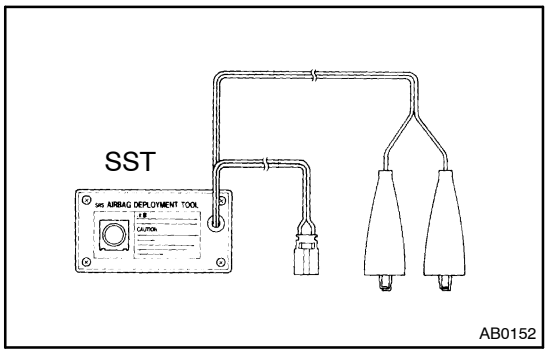
HINT:

When 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 DISTRIBUTOR.

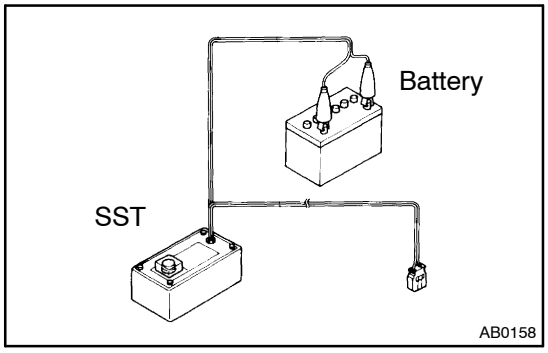
When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given in step 1–(d) in "DISPOSAL".

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.**

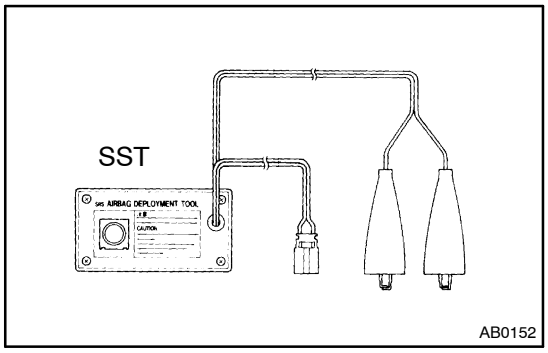


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082–00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.**
- **The steering wheel 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

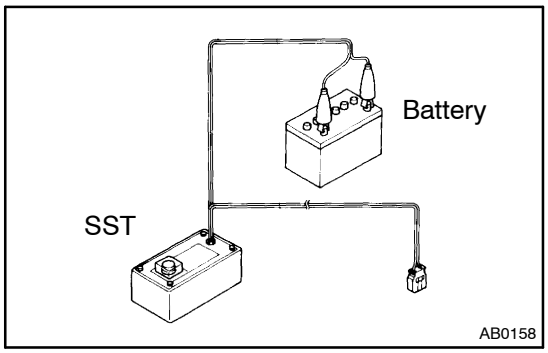
HINT:
Have a battery ready as the power source to deploy the airbag.



(a) Check functioning of the SST.

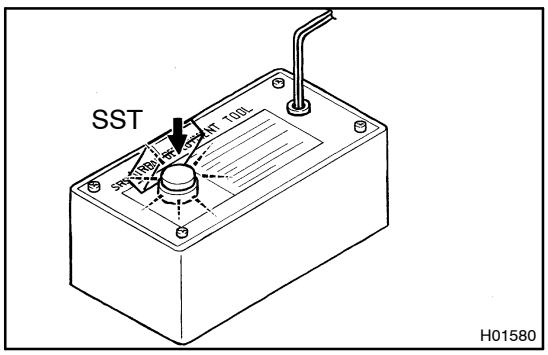
CAUTION:
When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082–00700



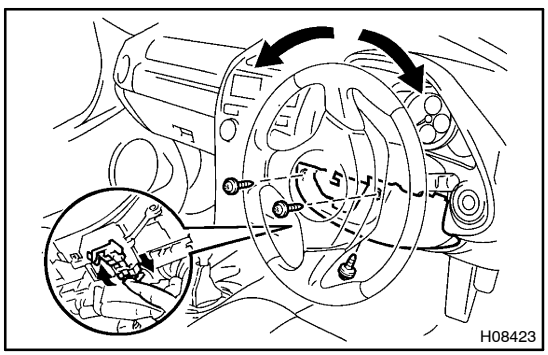
(1) Connect the SST to the battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

HINT:
Do not connect the yellow connector which will be connected with the supplemental restraint system.



(2) Check 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.

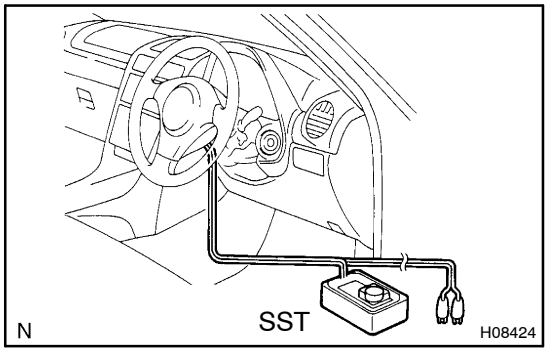


(b) Install the SST.

CAUTION:
Check that there is no looseness in the steering wheel and steering wheel pad.

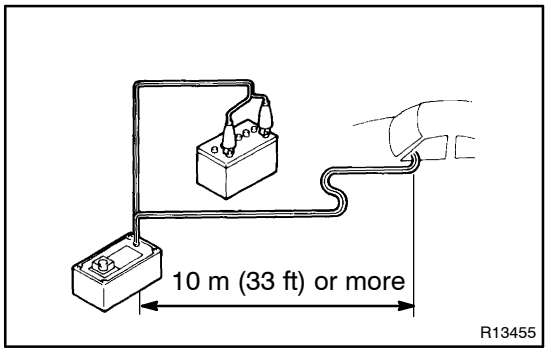
(1) Remove the steering column lower cover.
Remove the 3 screws and steering column lower cover as shown in the illustration.

(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



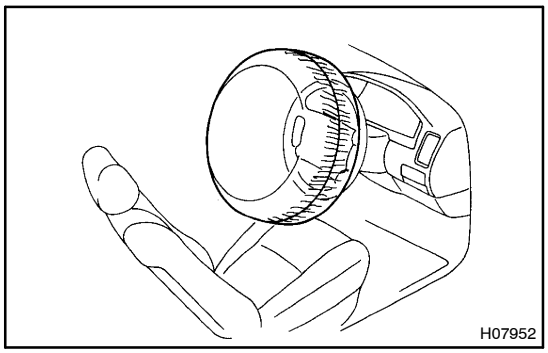
(4) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(5) Close all the doors and windows 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.

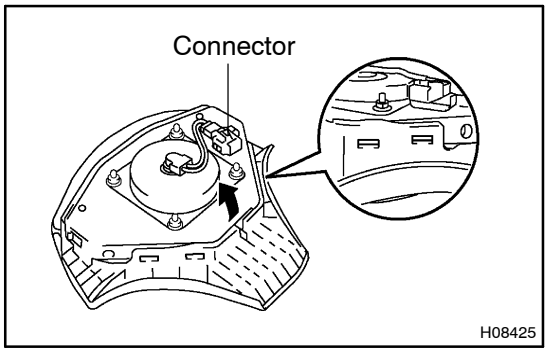
2. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD ONLY

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.



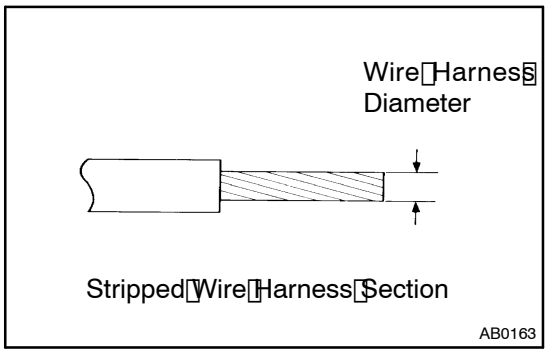
(a) Remove the steering wheel pad. (See page SR–12)

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) Disconnect the engagement of the claw and remove the steering wheel pad cover.



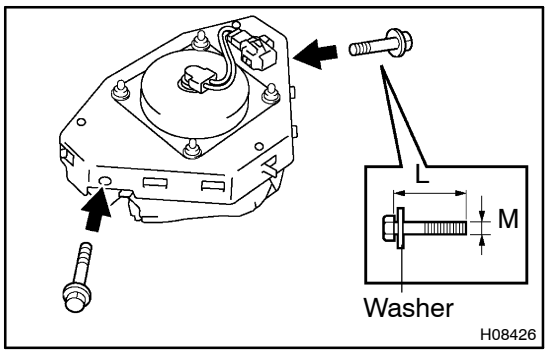
(d) Using a service–purpose wire harness, tie down the steering wheel pad to the disc wheel.
Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in^2. or more).

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).

HINT:

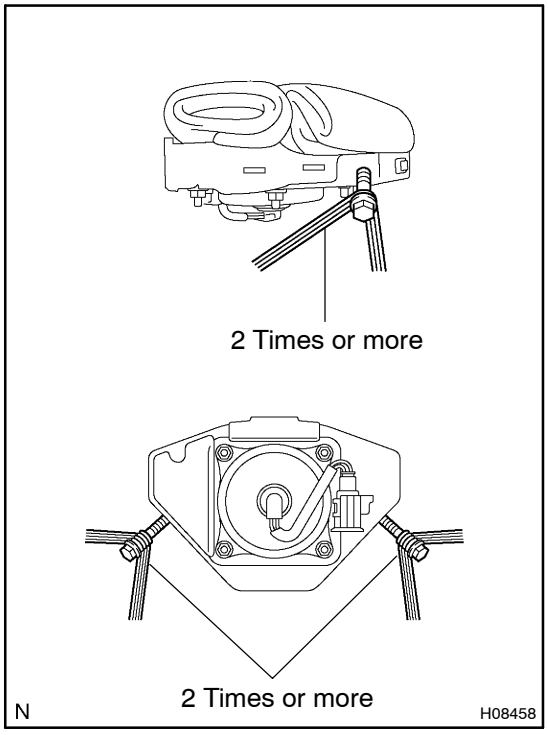
To calculate the square of the stripped wire harness section:
Square = 3.14 x (Diameter)^2 divided by 4



(1) Install the 2 bolts with the washers in the 2 bolt holes in the steering wheel pad.
Bolt:
L: 35.0 mm (1.387 in.)
M: 6.0 mm (0.236 in.)
Pitch: 1.0 mm (0.039 in.)

NOTICE:

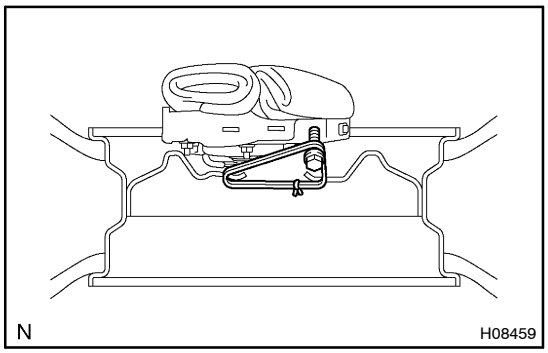
- **Tighten the bolts by hand until the bolts become difficult to turn.**
- **Do not tighten the bolts too much.**



(2) Using 3 wire harness, wind 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 slack in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed. This is highly dangerous.**



(3) 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 through a hub hole in the disc wheel.

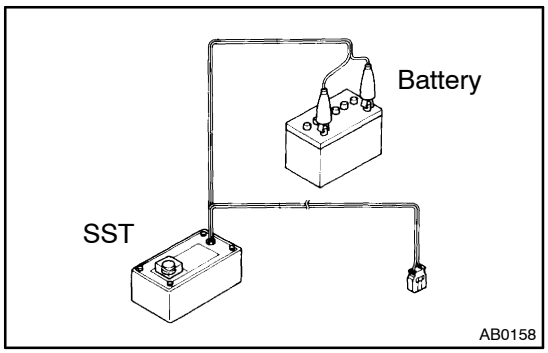
CAUTION:

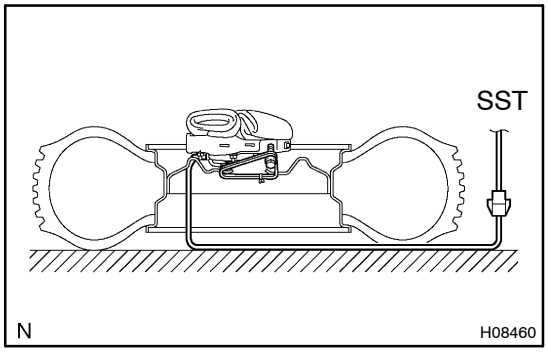
- **Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free through the shock from the airbag deploying.**
- **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock from 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 when disposing of the airbag use a redundant disc wheel.

(e) Check functioning of the SST. (See step 1–(a))
SST 09082–00700





(f) Install the SST.

CAUTION:

Place the disc wheel on the level ground.

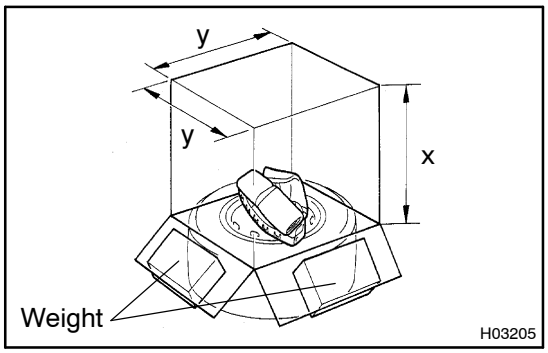
(1) Connect the connector of 2 SST to the steering wheel pad connector.

SST 09082–00700, 09082–00760

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.



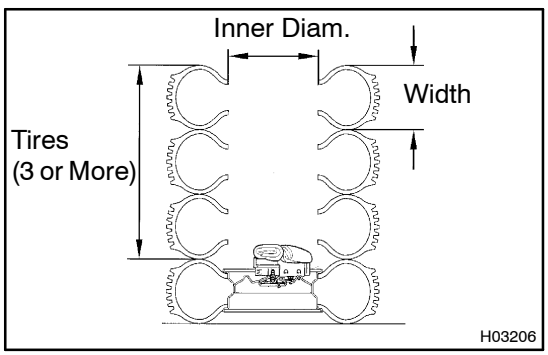
(g) Cover the steering wheel pad with a cardboard box or tires.

- Covering method using a cardboard box:
  Cover the steering wheel pad with the cardboard box and weight the cardboard box down in 4 places with at least 190 N (20 kg, 44 lb).

  Size of cardboard box:
  Must exceed the following dimensions:
  X = 460 mm (18.11 in.)
  Y = 650 mm (25.59 in.)

NOTICE:

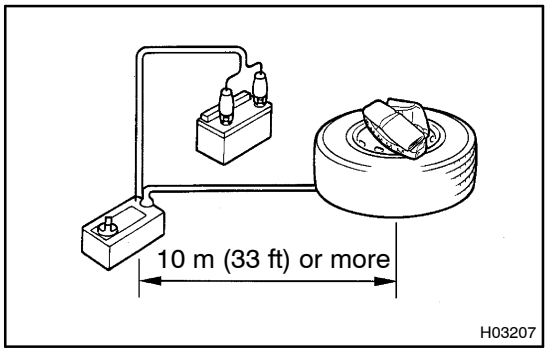
- **When dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire to which the steering wheel pad is tied, X should be the following size.**
  X = 460 mm (18.11 in.) + width of tire
- **If a cardboard box smaller than the specified size is used, the cardboard box will be broken 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.

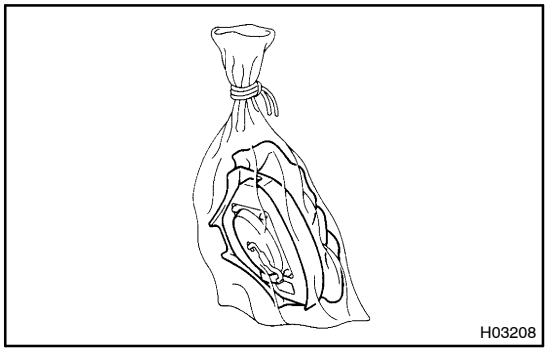
  Tire size: Must exceed the following dimensions–
  Width: 185 mm (7.87 in.)
  Inner diameter: 360 mm (14.17 in.)

CAUTION:
Do not use tires with disc wheels.
NOTICE:
The tires may be marked by the airbag deployment, so use the redundant tires.



(h) 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.



(i) 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.

RS012–19

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

Case	Replacing part
If the airbag has been deployed.	Steering wheel pad
If the steering wheel pad has been found to be faulty in troubleshooting.	Steering wheel pad
If the spiral cable has been found to be faulty in troubleshooting.	Spiral cable
If the steering wheel pad has been found to be faulty during checking items. (See page RS–15)	Steering wheel pad
If the steering wheel has been found to be faulty during checking items (See page RS–15).	Steering wheel
If the spiral cable has been found to be faulty during checking items (See page RS–15).	Spiral cable
If the steering wheel pad has been dropped.	Steering wheel pad

CAUTION:

For removal and installation of the steering wheel pad, see page SR–12 and SR–23. Be sure to follow the correct procedure.

RS013–19

INSTALLATION

HINT:

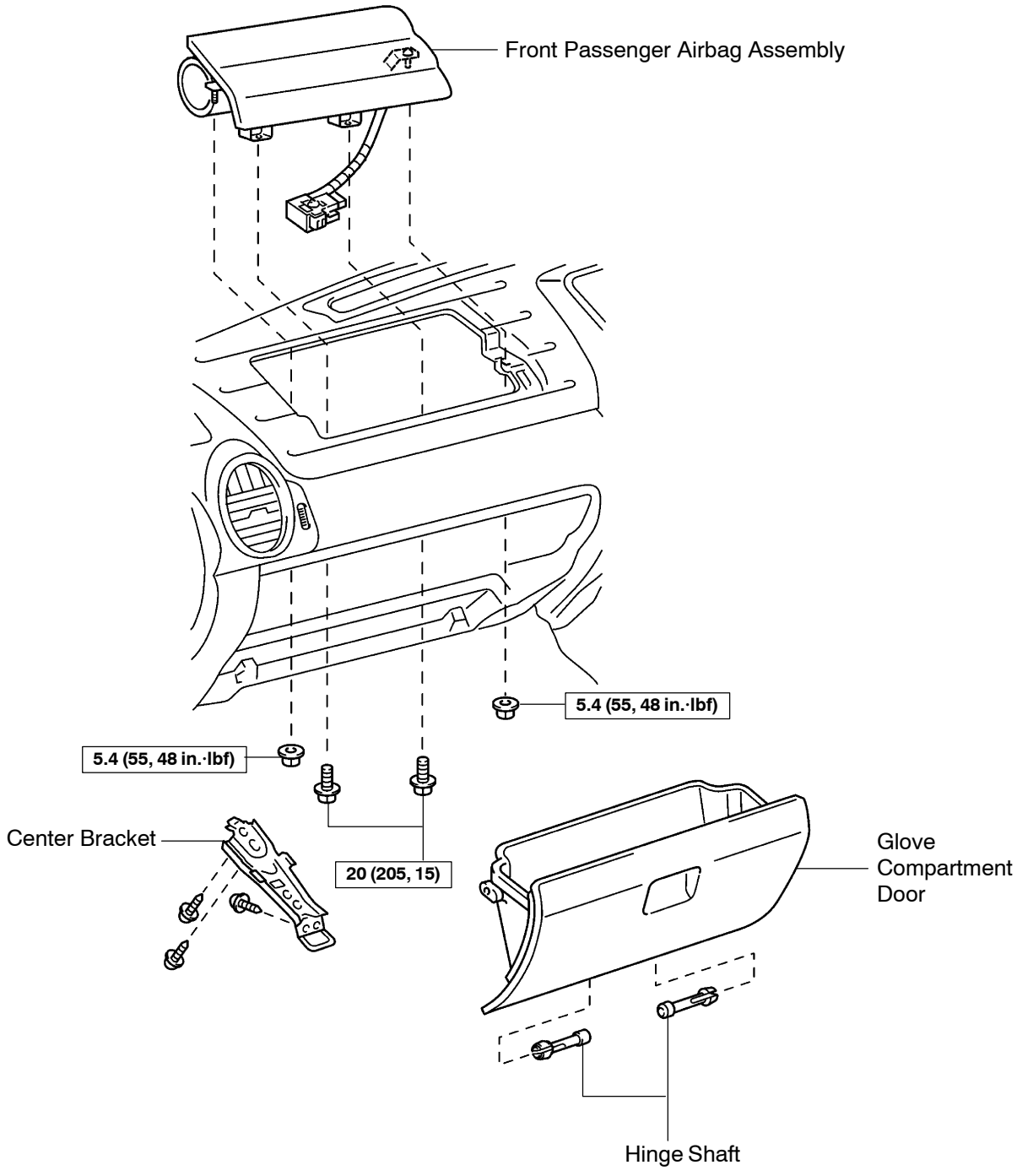
For step 1 to 4, refer to page SR–23.

1. **INSTALL SPIRAL CABLE**
2. **INSTALL STEERING COLUMN UPPER AND LOWER COVERS**
3. **INSTALL STEERING WHEEL**
4. **INSTALL STEERING WHEEL PAD**

FRONT PASSENGER AIRBAG ASSEMBLY

RS014–26

COMPONENTS



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

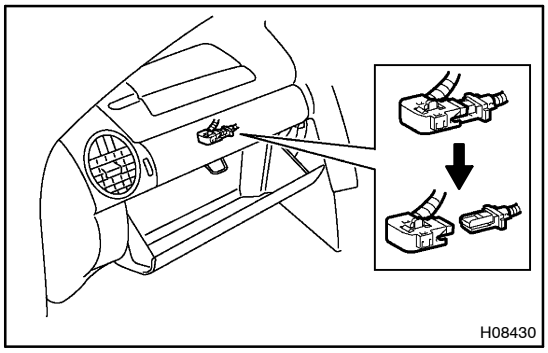
H08429

RS02P–07

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected and the ignition switch is in ON or ACC position, DTCs will be recorded.**
- **Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.**



1. DISCONNECT FRONT PASSENGER AIRBAG ASSEMBLY CONNECTOR

Open the glove compartment door and disconnect the front passenger airbag assembly connector.

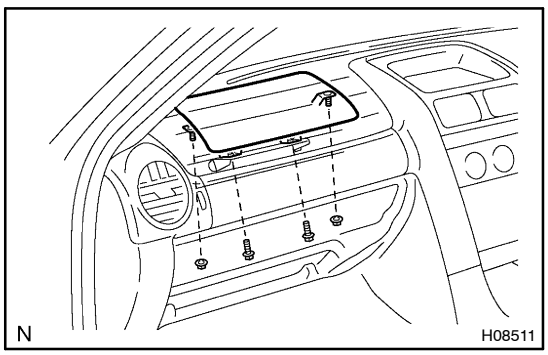
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

2. REMOVE GLOVE COMPARTMENT DOOR
(See page BO–93)

3. REMOVE CENTER BRACKET

Remove the 3 screws and center bracket.



4. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

(a) Remove the 2 bolts and nuts from the front passenger airbag assembly.

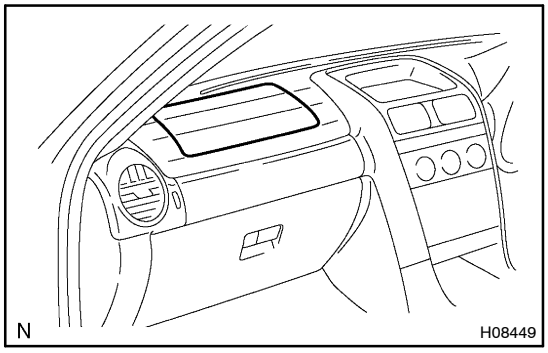
(b) Disconnect the engagement of the claw at 10 positions and remove the front passenger airbag assembly from the instrument panel.

CAUTION:

- **Do not store the front passenger airbag assembly with the airbag deployment side facing downward.**
- **Never disassemble the front passenger airbag assembly.**

RS02Q–08

INSPECTION

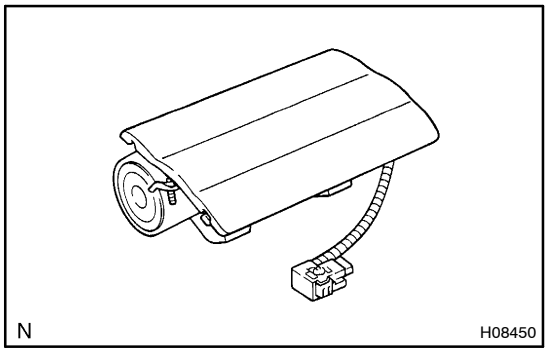


1. VEHICLE NOT INVOLVED IN COLLISION

(a) Do a diagnostic system check. (See page DI–287)

(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.

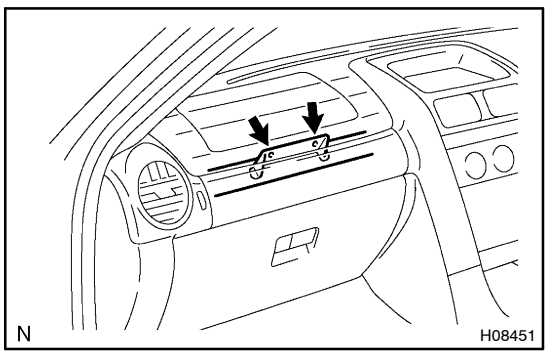


2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check. (See page DI–287)

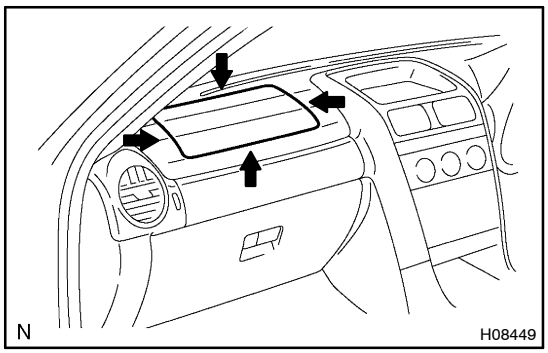
(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.

- Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly.
- Check cuts and cracks in the wire harness, and for chipping in the 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 front passenger airbag assembly.

CAUTION:

For removal and installation of the front passenger airbag assembly, see page RS–27 and RS–37, and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check. (See page DI–287)

(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.

RS0HJ–01

DISPOSAL

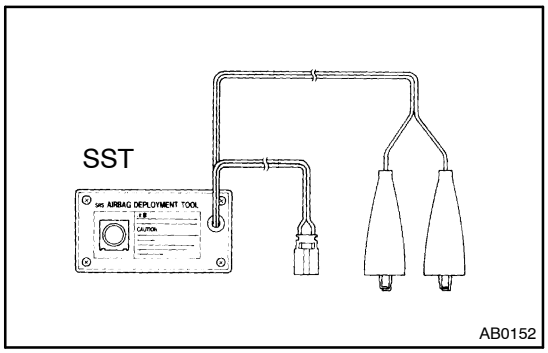
HINT:

When 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 DISTRIBUTOR.

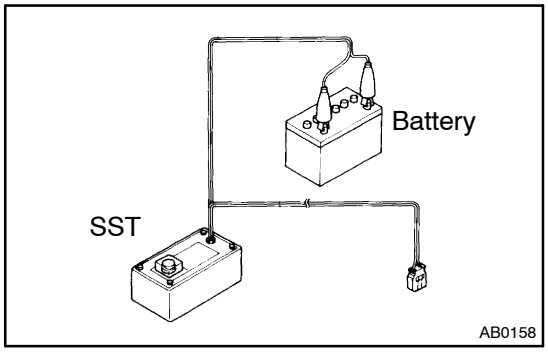
When disposing of a front passenger airbag assembly with an airbag deployed in a collision, follow the same procedure given in step 1–(e) in "DISPOSAL".

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 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 the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with the deployed airbag.**



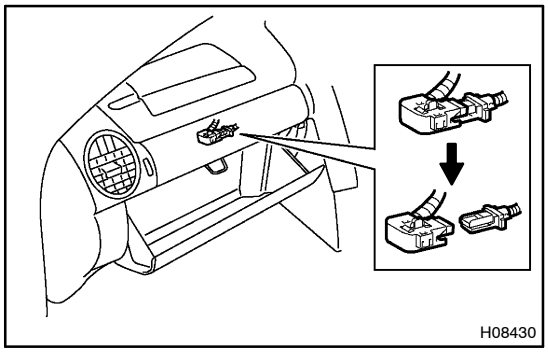
1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Check functioning of the SST. (See page RS–17)

SST 09082–00700

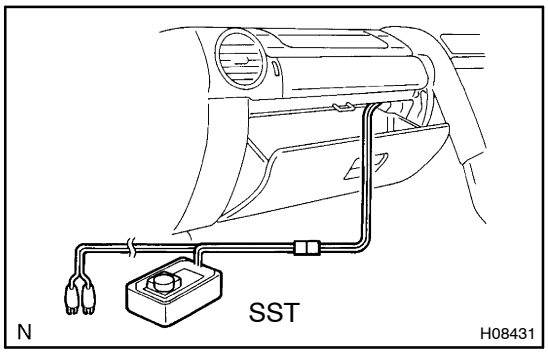


(b) Disconnect the front passenger airbag assembly connector.

Open the glove compartment door and disconnect the front passenger airbag assembly connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



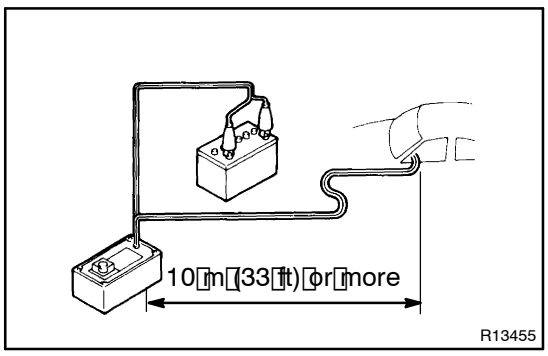
(c) Install the SST.

(1) Connect the connector of 2 SST to the front passenger airbag assembly connector.

SST 09082–00700, 09082–00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



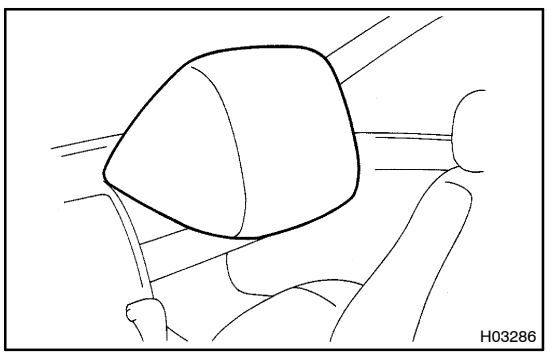
(2) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.

(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) Check 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.

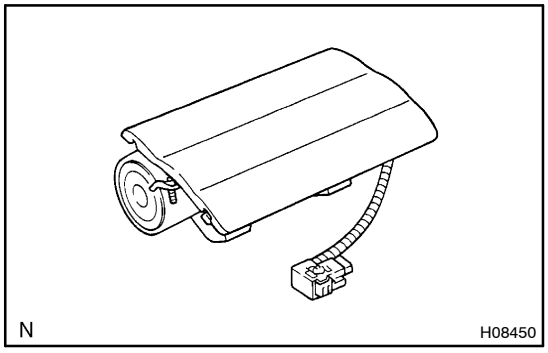
2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY ONLY

NOTICE:

- **When disposing of the front passenger airbag assembly only, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

HINT:

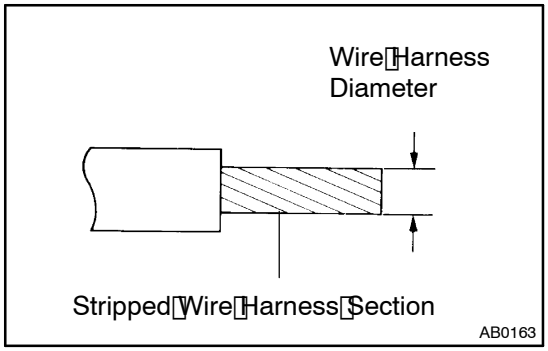
Have a battery ready as the power source to deploy the airbag.



(a) Remove the front passenger airbag assembly. (See page RS–27)

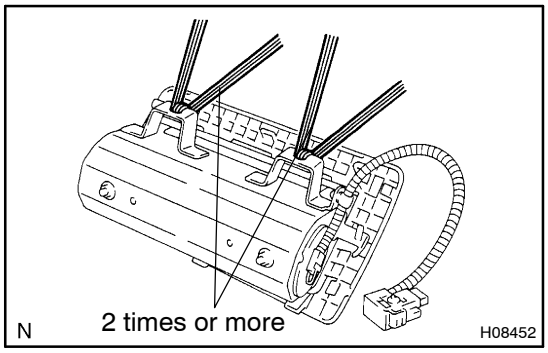
CAUTION:

- **When removing the front passenger airbag assembly, work must be started 90 seconds after 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 side facing upward.**

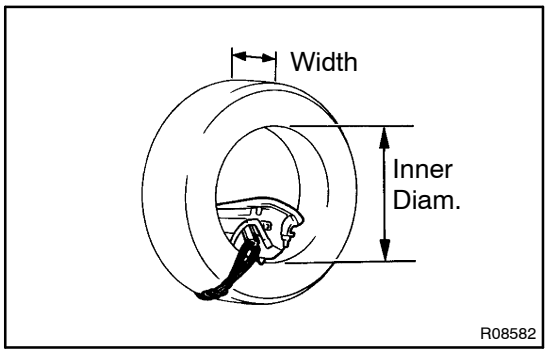


(b) Using a service–purpose wire harness for the vehicle, tie down the front passenger airbag assembly to the tire.
Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in.^{2} or more)

CAUTION:
If the front passenger airbag assembly is tied down with too thin wire harness, it may snap. This is highly dangerous. Always use a wire harness which is at least 1.25 mm^2 (0.0019 $in.^2$).
HINT:
To calculate the square of the stripped wire harness section:
Square = 3.14 X $(Diameter)^2$ divided by 4



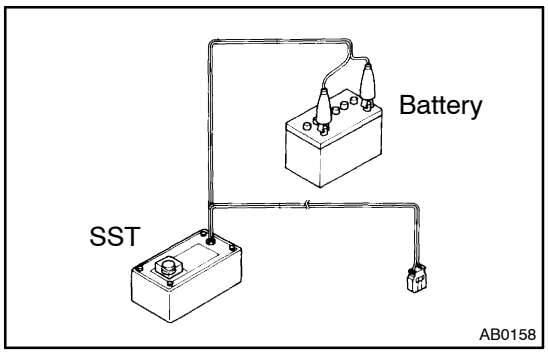
(1) Pass the wire harness through the installation holes, as shown in the illustration.



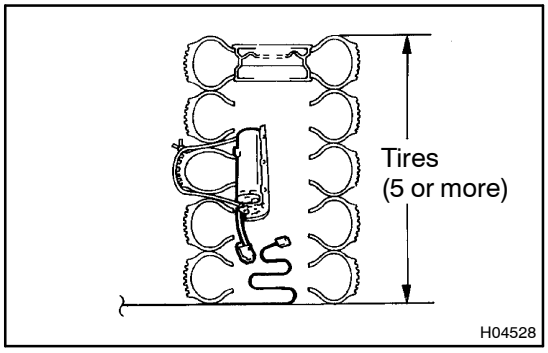
(2) Position the front passenger airbag assembly inside the tire with the airbag deployment side facing inside. Tie the front passenger airbag assembly to the tire, as shown in the illustration.
Tire size: Must exceed the following dimensions–
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

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 from the airbag deploying.**
- **Always tie down the front passenger airbag assembly with the airbag deployment side facing inside.**

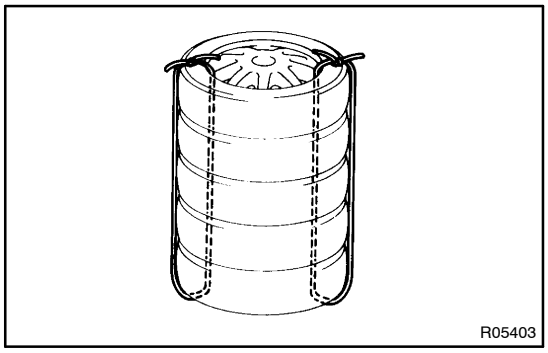
NOTICE:
The tire will be marked by the airbag deployment, so use a redundant tire.



(c) Check functioning of the SST.
SST 09082–00700



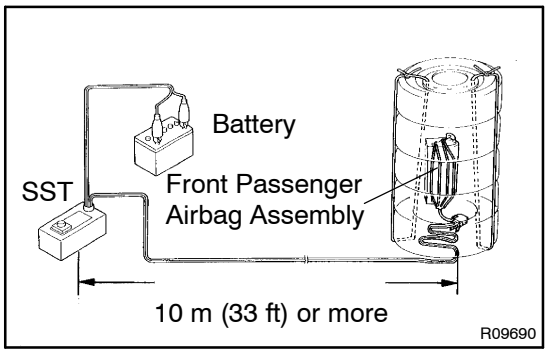
(d) Place tires.
(1) Place at least 2 tires under the tire to which the front passenger airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the front passenger airbag assembly is tied. The top tire should have the wheel installed.



(3) Tie the tires together with the 2 wire harness.

CAUTION:
Make sure that the wire harness is tight. It is very dangerous if loose wire harness result in the tires coming free due to the shock from 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.

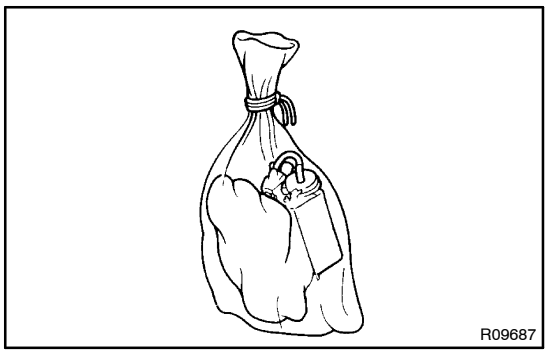


(e) Install the SST.
Connect the connector of 2 SST to the front passenger airbag assembly connector.
SST 09082–00700, 09082–00760

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) Check 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.

RS018–17

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

Case	Replacing part
If the airbag has been deployed.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty in trouble-shooting.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty during checking items. (See page RS–28)	Front passenger airbag assembly
If the instrument panel has been found to be faulty during checking items (See page RS–28).	Instrument panel
If the instrument panel reinforcement has been found to be faulty during checking items (See page RS–28).	Instrument panel reinforcement
If the front passenger airbag assembly has been dropped.	Front passenger airbag assembly

CAUTION:

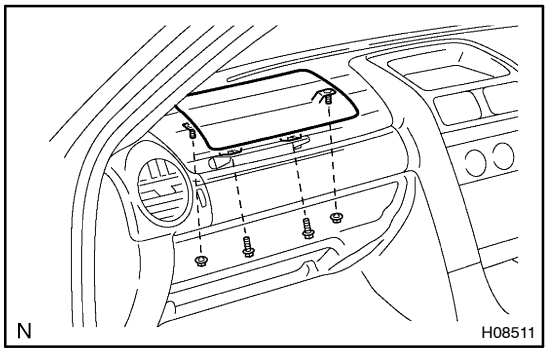
For replacement of the front passenger airbag assembly, see page RS–27 and RS–37. Be sure to follow the correct procedure.

RS019-09

INSTALLATION

NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



1. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

Connect the engagement of the claw at 10 positions and install the front passenger airbag assembly to the instrument panel with the 2 bolts and nuts.

Torque:

Bolt: 20 N·m (205 kgf·cm, 15 ft·lbf)

Nut: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

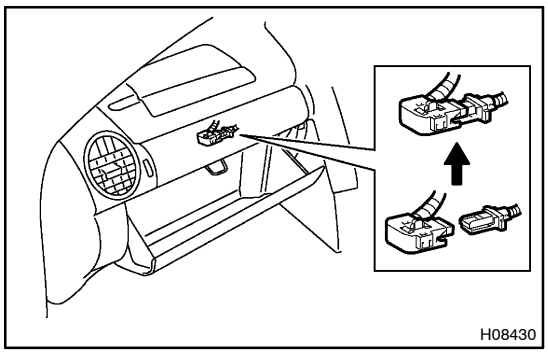
- **Make sure that the front passenger airbag assembly is installed with the specified torque.**
- **When installing the front passenger airbag assembly, take care that the wiring does not interfere with other parts and is not pinched between other parts.**
- **If the front passenger airbag assembly 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. INSTALL CENTER BRACKET

Install the center bracket with the 3 screws.

3. INSTALL GLOVE COMPARTMENT DOOR

(See page BO–104)

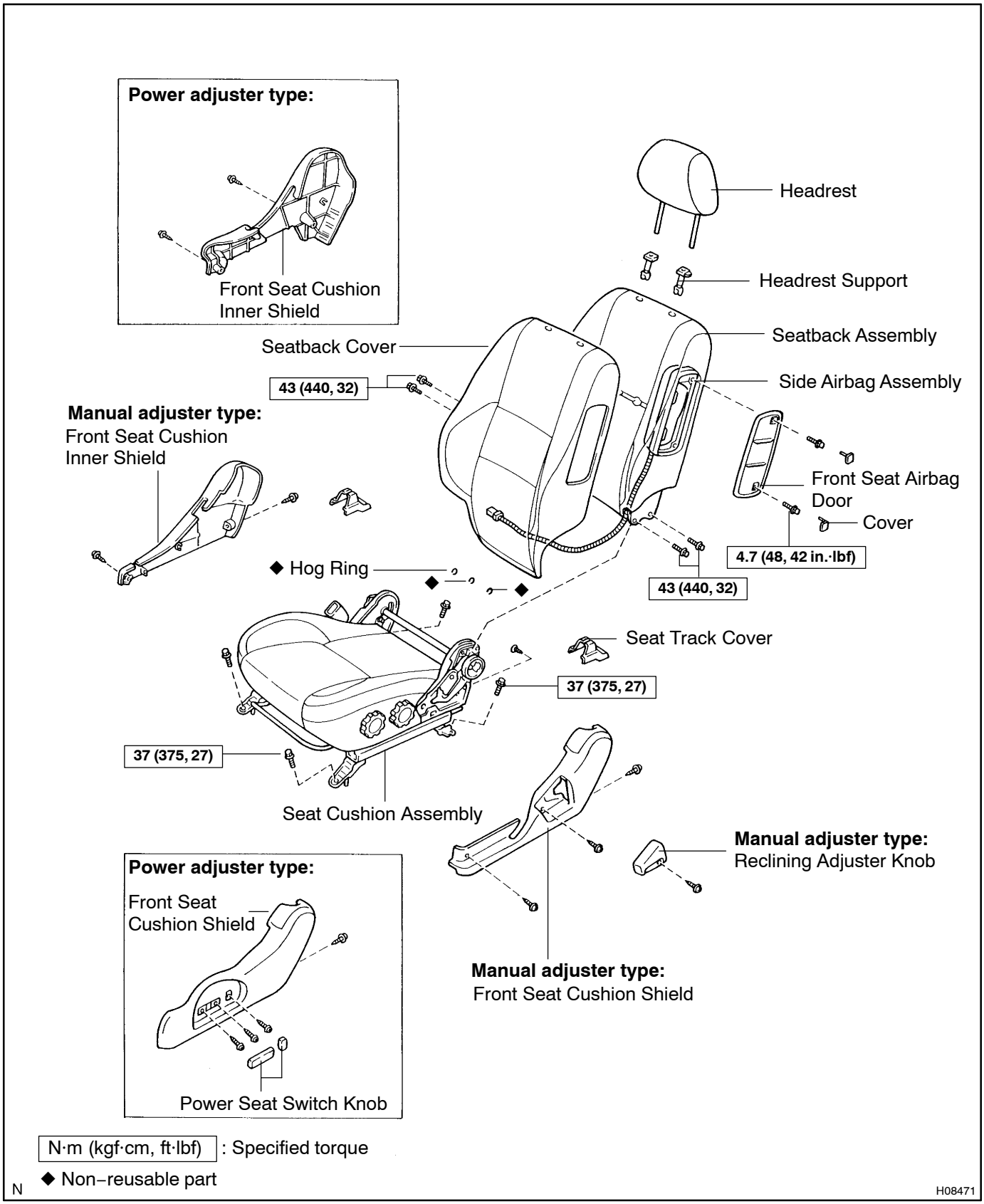


4. CONNECT FRONT PASSENGER AIRBAG ASSEMBLY CONNECTOR

SIDE AIRBAG ASSEMBLY

COMPONENTS

RS0HK–01



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

◆ Non–reusable part

N

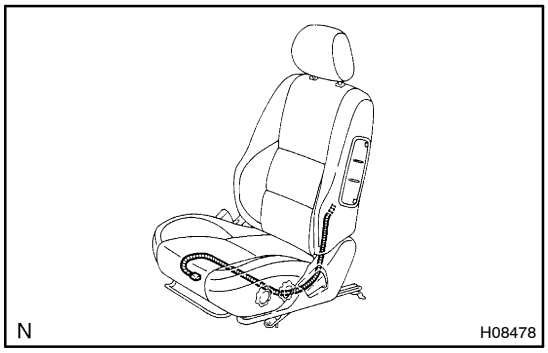
H08471

RS0HL–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 them with new parts.**



1. REMOVE FRONT SEAT

(a) Remove the 2 seat track covers and 4 bolts.

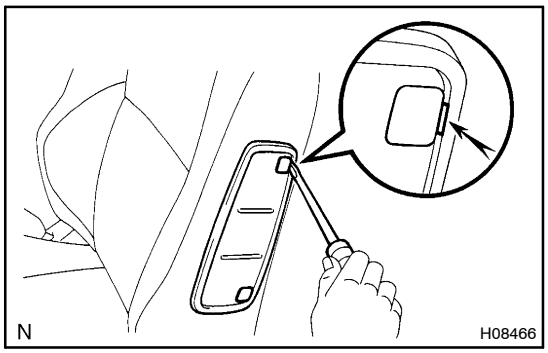
(b) Disconnect the connectors under the front seat.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(c) Remove the front seat.

2. REMOVE HEADREST

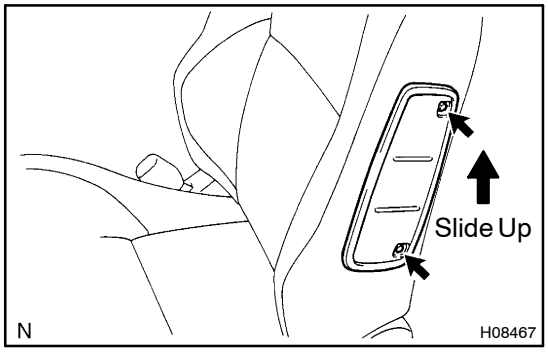


3. REMOVE FRONT SEAT AIRBAG DOOR

(a) Using a screwdriver, remove the 2 covers.

HINT:

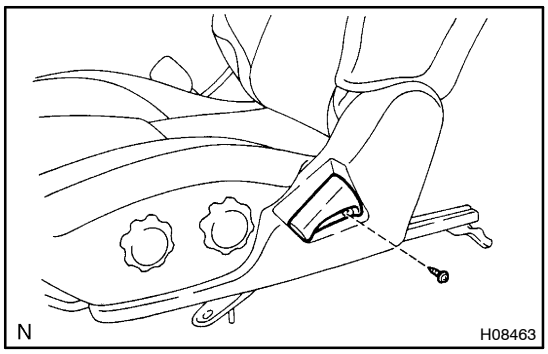
Tape the screwdriver tip before use.



(b) Remove the 2 bolts.

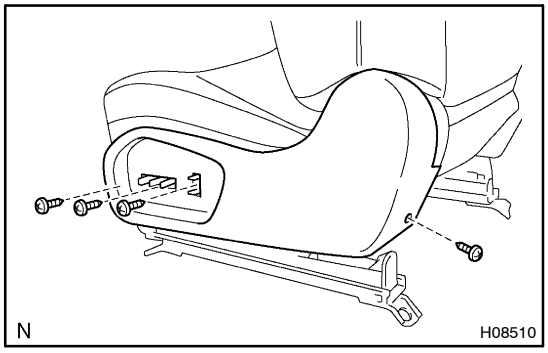
(c) Slide up the front seat airbag door and remove it.

4. Power adjuster type:
REMOVE POWER SEAT SWITCH KNOBS



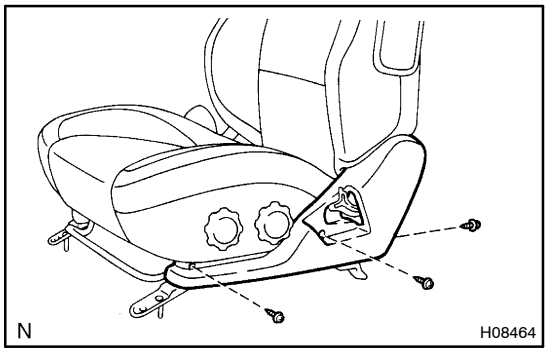
5. Manual adjuster type:
REMOVE RECLINING ADJUSTER KNOB

Remove the screw and reclining adjuster knob.



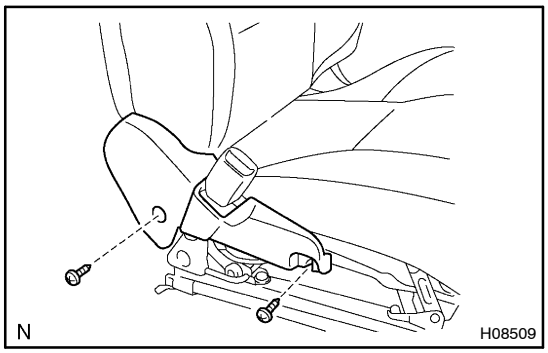
6. Power adjuster type:
REMOVE FRONT SEAT CUSHION SHIELD

Remove the 4 screws and front seat cushion shield.



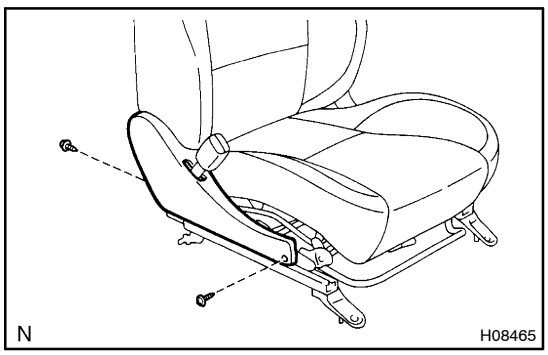
7. Manual adjuster type:
REMOVE FRONT SEAT CUSHION SHIELD

Remove the 3 screws and front seat cushion shield.



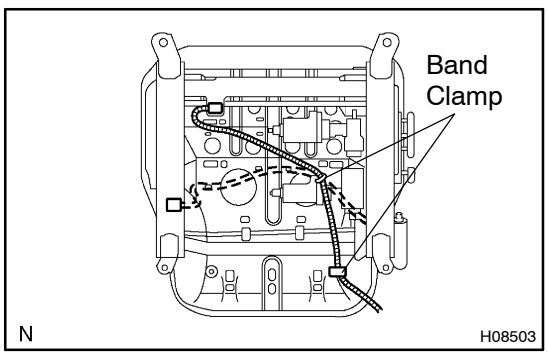
8. Power adjuster type:
REMOVE FRONT SEAT CUSHION INNER SHIELD

Remove the 2 screws and front seat cushion inner shield.



9. Manual adjuster type:
REMOVE FRONT SEAT CUSHION INNER SHIELD

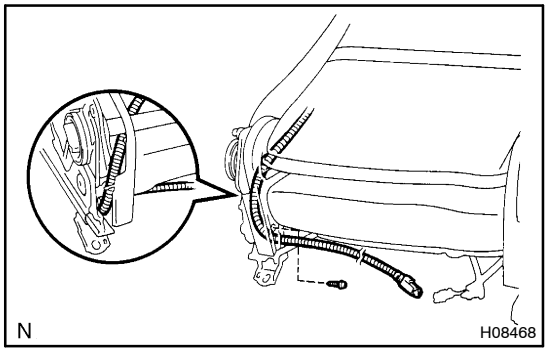
Remove the 2 screws and front seat cushion inner shield.



10. DISCONNECT WIRE HARNESS FOR SIDE AIRBAG ASSEMBLY FROM SEAT CUSHION ASSEMBLY

(a) Remove the band clamps.

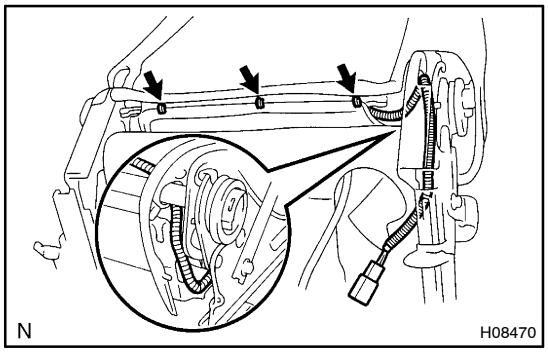
(b) Pull out the wire harness of the side airbag assembly and seat heater (w/ seat heater).



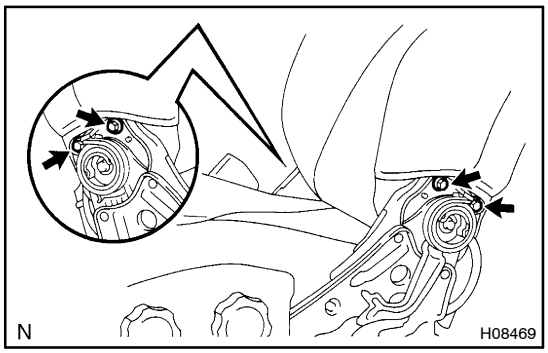
11. REMOVE SEATBACK ASSEMBLY

(a) Remove the LH reclining adjuster inside cover set screw.

(b) Disconnect the wire harness of the side airbag assembly from the LH reclining adjuster inside cover.



(c) Remove the 3 hog rings.



(d) Remove the 4 bolts and move the seatback assembly a little upward.

NOTICE:

Do not apply unnatural force to the airbag wire harness.

(e) Remove the seatback assembly.

NOTICE:

Take care not to let the airbag wire harness catch on the seat adjuster assembly, as this can damage the airbag wire harness.

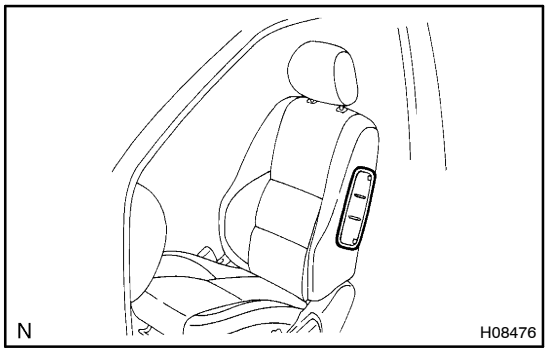
RS05I–06

INSPECTION

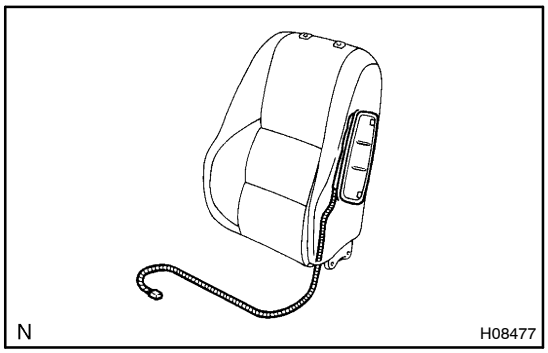
1. VEHICLE NOT INVOLVED IN COLLISION

(a) Do a diagnostic system check. (See page DI–287)

(b) Do a visual check which includes the following item with the seatback assembly installed in the vehicle.



Check for cuts, minute cracks or marked discoloration of the front seat airbag door.



2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check. (See page DI–287)

(b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.

- Check cuts and cracks of the side airbag assembly.
- Check for cuts, minute cracks or marked discoloration of the front seat airbag door.
- Check cuts and cracks in the wire harness, and chipping in the connectors.

CAUTION:

For removal and installation of the seatback assembly, see page RS–39 and RS–50. Be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check. (See page DI–287)

(b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.

- Check the seatback installation part of the seat adjuster.
- Check the damage to the connector and wire harness.

HINT:

If the seat adjuster is deformed, never repair it. Always replace it with a new one.

RS0HM–01

DISPOSAL

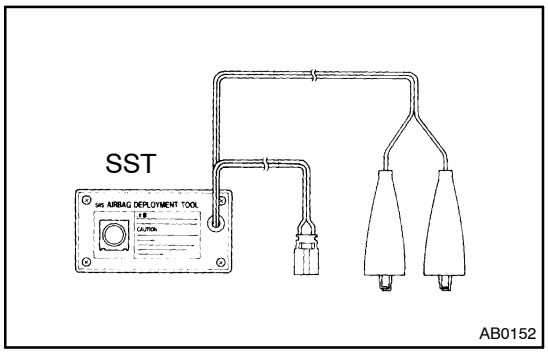
HINT:

When scrapping vehicles equipped with an SRS or disposing of the side 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 DISTRIBUTOR.

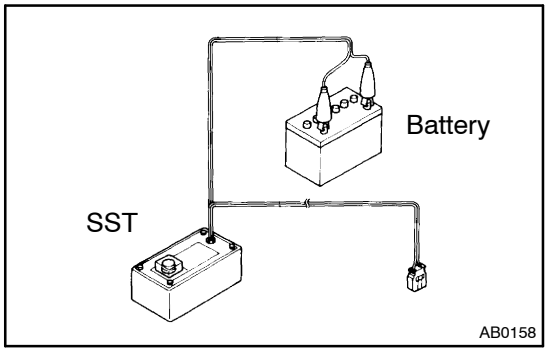
When disposing of a side airbag assembly with an airbag deployed in a collision, follow the same procedure given in step 1–(e) in "DISPOSAL".

CAUTION:

- **Never dispose of a side 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 at least 10 m (33 ft) away from the airbag assembly.**
- **The side 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 side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a side airbag assembly with the deployed airbag.**



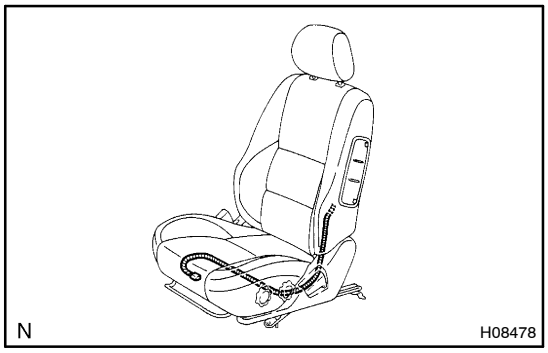
1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Check functioning of the SST. (See page RS–17)

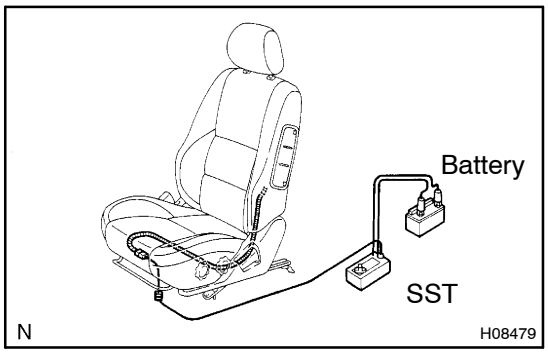
SST 09082–00700



(b) Disconnect the side airbag assembly connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



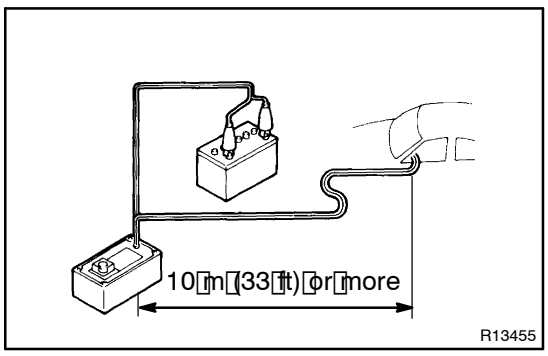
(c) Install the SST.

(1) Connect the connector of 2 SST to the side airbag assembly connector.

SST 09082–00700, 09082–00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



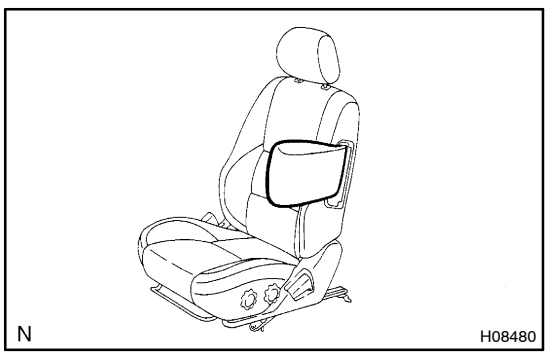
(2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(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 battery negative (–) terminal.



(d) Deploy the airbag.

(1) Check 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 SST activation switch lights up.

(e) Dispose of side airbag assembly.

CAUTION:

- **The side 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 side airbag assembly with the deployed airbag.**
- **Do not apply water, etc. to a side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the side airbag assembly still installed.

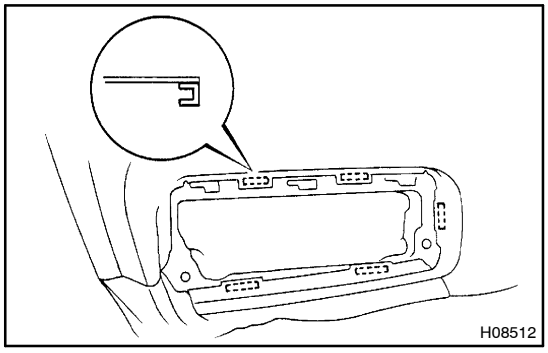
2. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY

NOTICE:

- **When disposing of the side airbag assembly only, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

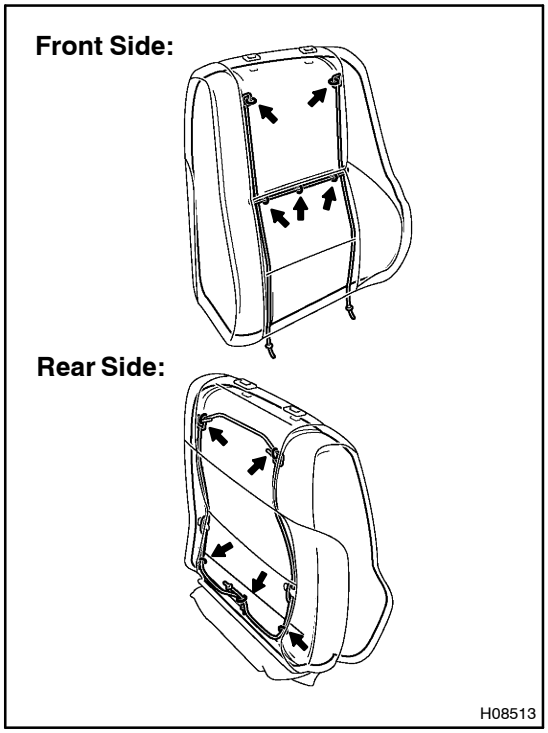
HINT:

Have a battery ready as the power source to deploy the airbag.

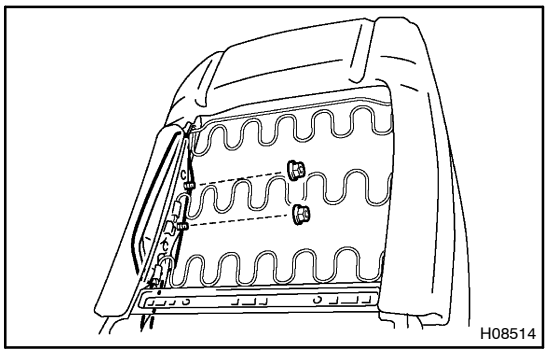


(a) Remove the side airbag assembly.

(1) Disengage the seatback cover hooks circumference of the side airbag assembly.



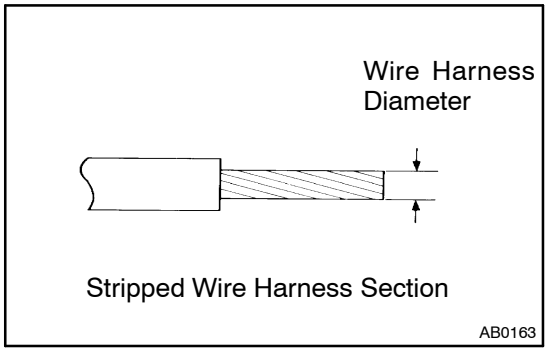
(2) Remove the 10 hog rings, headrest supports and seat back cover, as shown in the illustration.



(3) Remove the 2 nuts and side airbag assembly.

CAUTION:

Store the side airbag assembly with the airbag deployment side facing upward.



(b) Using a service–purpose wire harness, tie down the side airbag assembly.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in^2 or more)

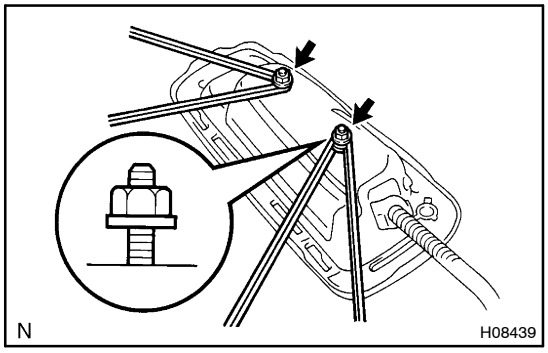
CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the side airbag assembly, 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).

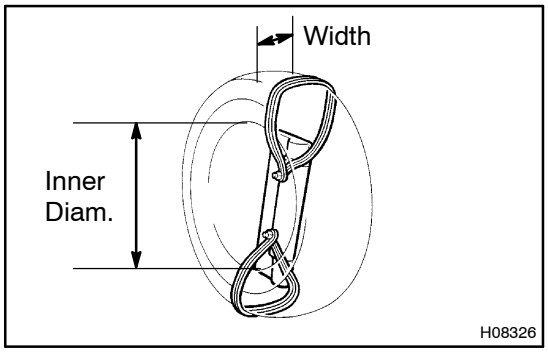
HINT:

To calculate the square of the stripped wire harness section:

Square = 3.14 x (Diameter)^2 divided by 4



(1) Install the 2 nuts to the side airbag assembly.
(2) Wind the wire harness around the stud bolts of the side airbag assembly, as shown in the illustration.



(3) Position the side airbag assembly inside the tire with the airbag deployment direction facing inside. Tie the side airbag assembly to the tire, as shown in the illustration.

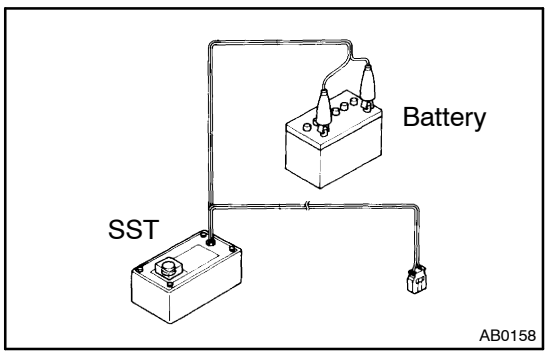
Tire size: Must exceed the following dimensions:–
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:

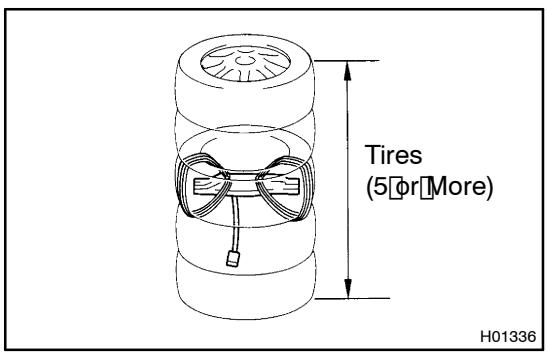
- **Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the side airbag assembly coming free due to the shock from the airbag deploying.**
- **Always tie down the side airbag assembly with the airbag deployment side facing inside.**

NOTICE:

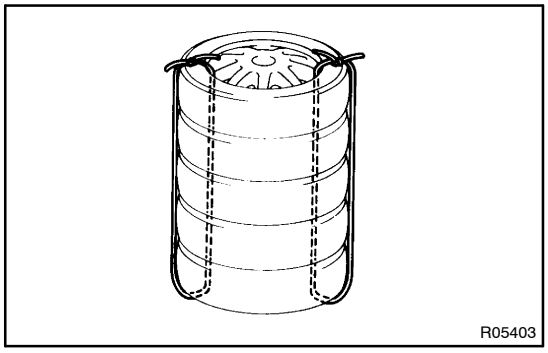
The tire will be marked by the airbag deployment, so when disposing of the airbag use a redundant tire.



(c) Check functioning of the SST. (See page RS–17)
SST 09082–00700



(d) Place the tires.
(1) Place at least 2 tires under the tire to which the side airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the side airbag assembly is tied. The top tire should have the wheel installed.


R05403

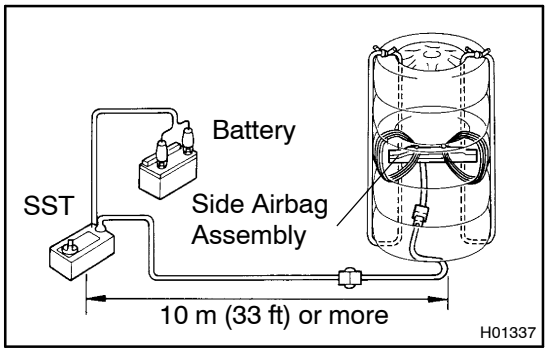
(3) Tie the tires together with the 2 wire harness.

CAUTION:

Make sure that the wire harness is tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



H01337

(e) Install the SST.

Connect the connector of 2 SST to the side airbag assembly connector.

SST 09082–00700, 09082–00750

(f) Deploy the airbag.

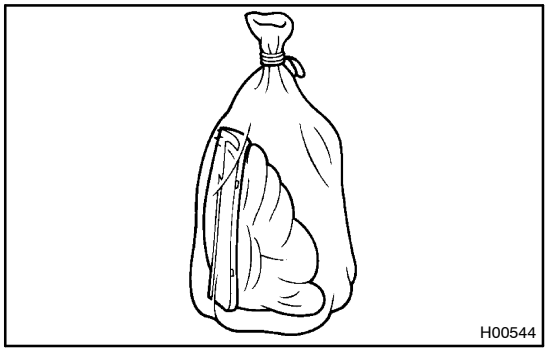
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

(2) Check that no one is within 10 m (33 ft) area around the tire which the side 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.


H00544

(g) Dispose of the side airbag assembly.

CAUTION:

- **The side 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 side airbag assembly with the deployed airbag.**
- **Do not apply water etc. to a side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the side airbag assembly from the tire.

(2) Place the side airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS05K–06

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the seatback assembly or front seat airbag door.

Case	Replacing part
If the side airbag has been deployed.	Seatback assembly
If the side airbag assembly has been found to be faulty in troubleshooting.	Seatback assembly
If the side airbag assembly has been found to be faulty during checking items. (See page RS–42)	Seatback assembly
If the front seat airbag door has been found to be faulty during checking items. (See page RS–42)	Front seat airbag door
If the seatback assembly has been dropped.	Seatback assembly

CAUTION:

For removal and installation of the seatback assembly, see page RS–39 and RS–50. Be sure to follow the correct procedure.

RS0E5–02

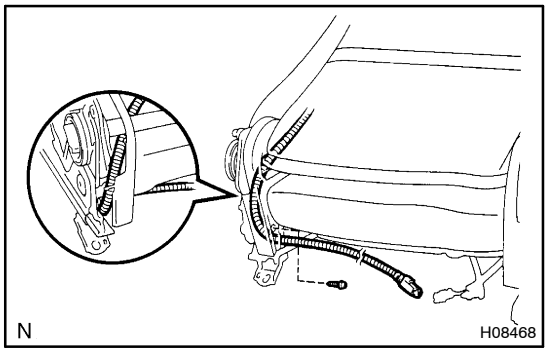
INSTALLATION

NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.

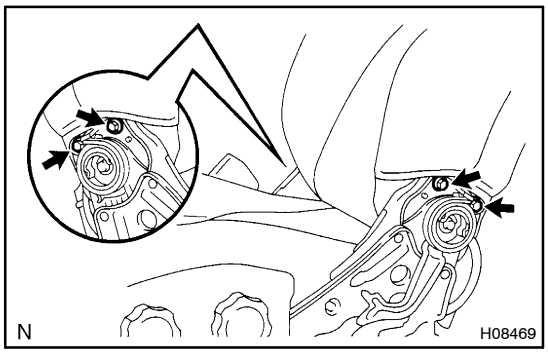
1. INSTALL SEATBACK ASSEMBLY

(a) Temporarily install the seatback assembly.



(b) Set the wire harness of the side airbag assembly to the LH reclining adjuster inside cover, as shown.

(c) Install the LH reclining adjuster inside cover set screw.

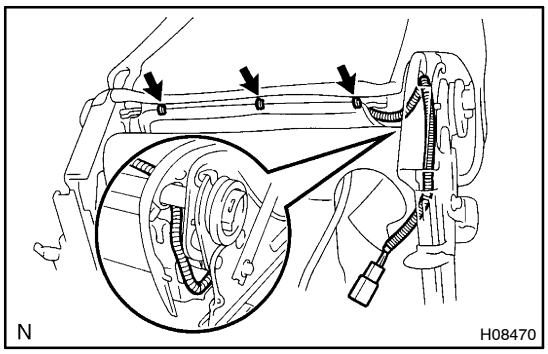


(d) Install the 4 bolts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

NOTICE:

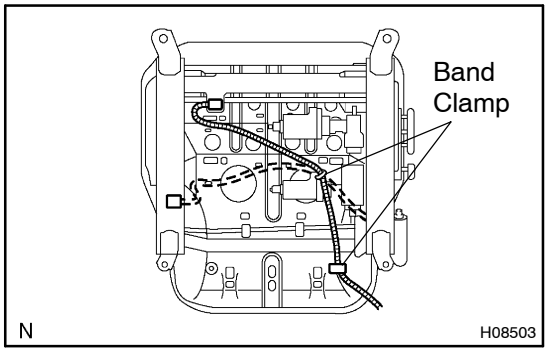
- **Make sure that the seatback assembly is installed with the specified torque.**
- **If the seatback assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the seatback assembly with a new one.**
- **When installing the seatback assembly, take care it is not pinched between other parts.**



(e) Install 3 new hog rings, as shown in the illustration.

HINT:

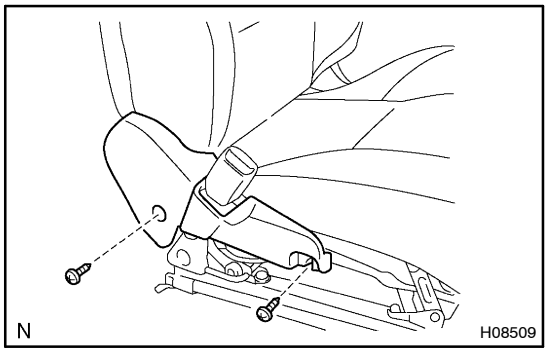
When installing the hog rings, take care to prevent wrinkles as little as possible.



2. SET WIRE HARNESS FOR SIDE AIRBAG ASSEMBLY TO SEAT CUSHION ASSEMBLY

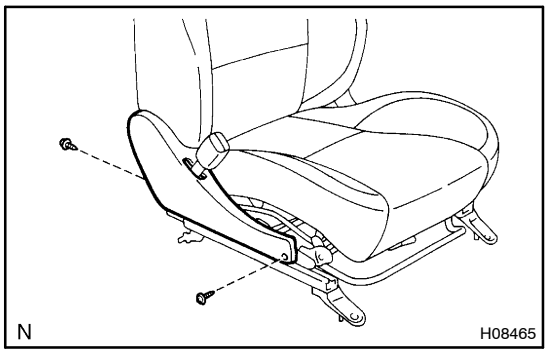
(a) Set the wire harness of the side airbag assembly and seat heater (w/ seat heater).

(b) Install the band clamps, as shown in the illustration.



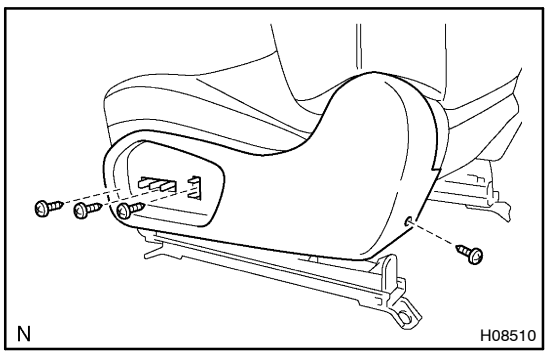
3. Power adjuster type:
INSTALL FRONT SEAT CUSHION INNER SHIELD

Install the front seat cushion inner shield with the 2 screws.



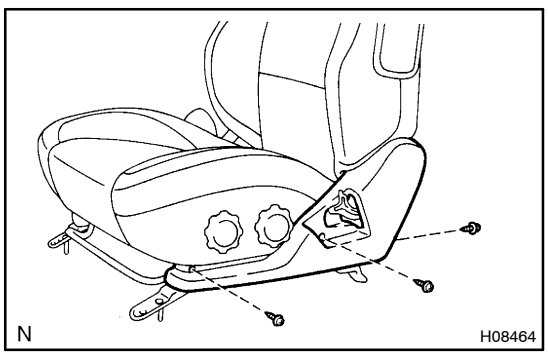
4. Manual adjuster type:
INSTALL FRONT SEAT CUSHION INNER SHIELD

Install the front seat cushion inner shield with the 2 screws.



5. Power adjuster type:
INSTALL FRONT SEAT CUSHION SHIELD

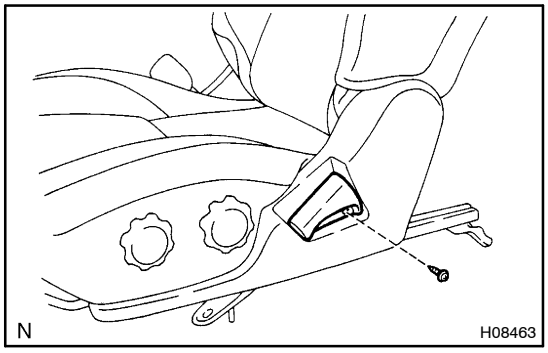
Install the front seat cushion shield with the 4 screws.



6. Manual adjuster type:
INSTALL FRONT SEAT CUSHION SHIELD

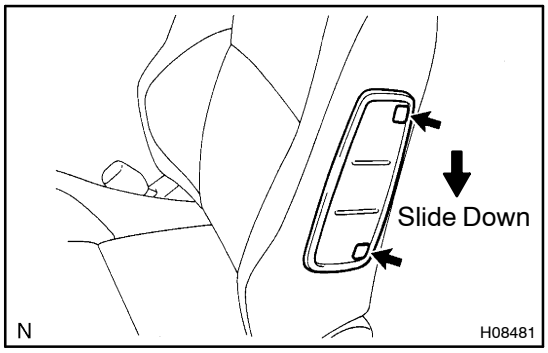
Install the front seat cushion shield with the 3 screws.

7. Power adjuster type:
INSTALL POWER SEAT SWITCH KNOBS



8. Manual adjuster type:
INSTALL RECLINING ADJUSTER KNOB

Install the reclining adjuster knob with the screw.



9. INSTALL FRONT SEAT AIRBAG DOOR

(a) Slide down the front seat airbag door and install it.

(b) Install the front seat airbag door with the 2 screws.
Torque: 4.7 N·m (48 kgf·cm, 42 in.·lbf)

10. INSTALL HEADREST

11. INSTALL FRONT SEAT

(a) Mount the front seat to the vehicle.

NOTICE:

When mounting the seat to the vehicle, take care not to damage the airbag wire harness.

(b) Connect the connectors under the front seat.

(c) Slide the front seat to the front most position.

NOTICE:

Make sure that seat adjuster locks.

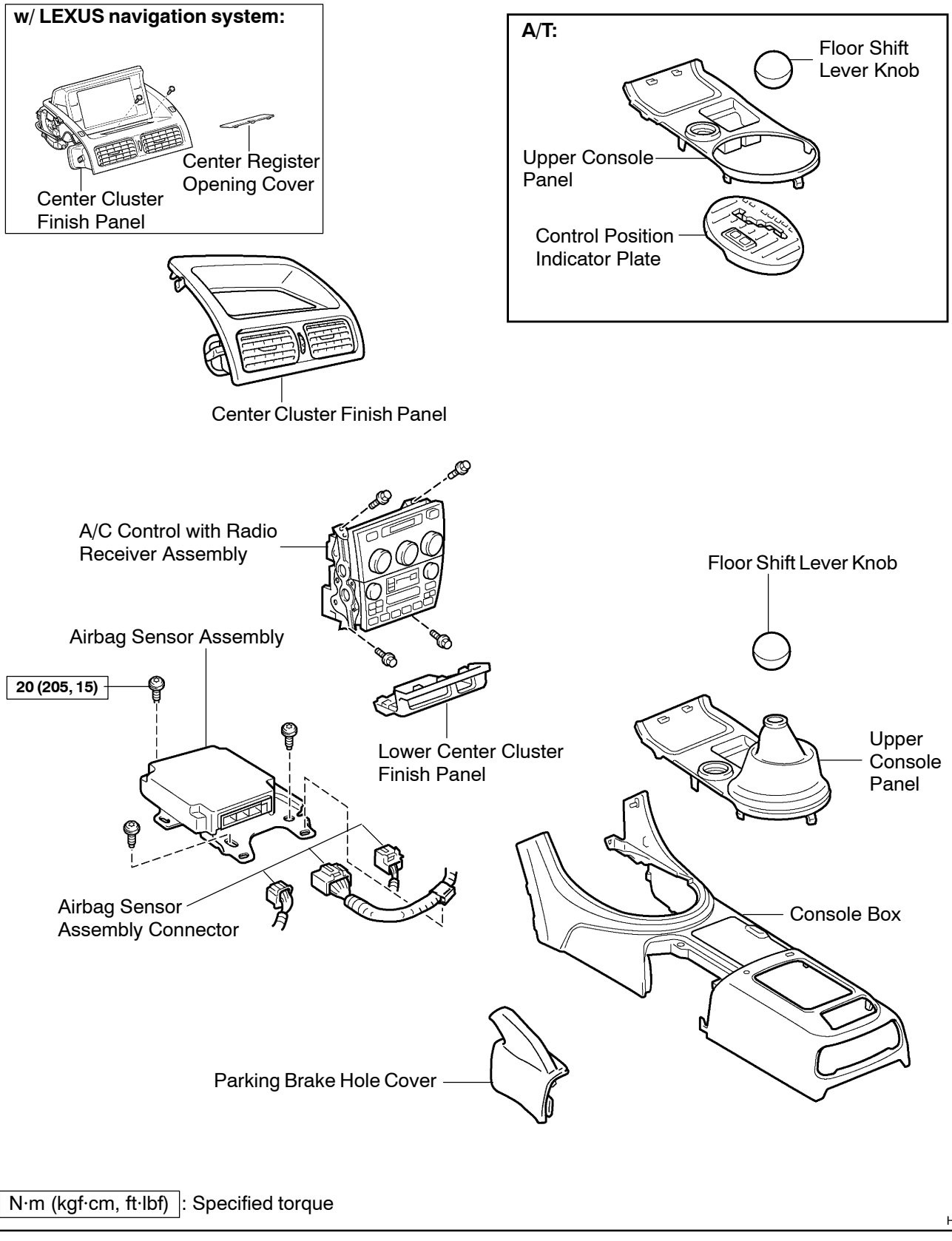
(d) Tighten the bolts on the rear side temporarily, starting from the bolt on the inner side tighten them completely.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

(e) Slide the seat to the rearmost position to install the bolts on the front side.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

AIRBAG SENSOR ASSEMBLY

COMPONENTS

RS01G–15



RS0EY–04

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.)

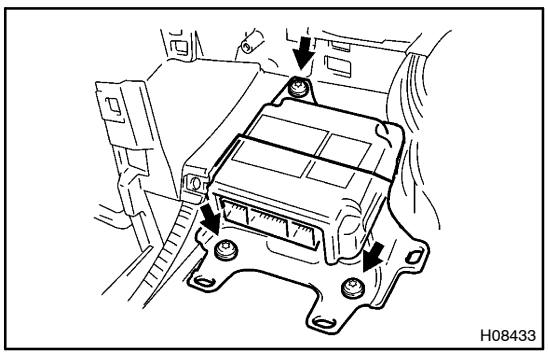
HINT:

For step 1 to 8, refer to page BO–96.

1. **REMOVE FLOOR SHIFT LEVER KNOB**
2. **REMOVE UPPER CONSOLE PANEL**
3. **w/ LEXUS navigation system:**
   REMOVE CENTER REGISTER OPENING COVER
4. **REMOVE CENTER CLUSTER FINISH PANEL**
5. **REMOVE LOWER CENTER CLUSTER FINISH PANEL**
6. **REMOVE A/C CONTROL WITH RADIO RECEIVER ASSEMBLY**
7. **REMOVE PARKING BRAKE HOLE COVER**
8. **REMOVE CONSOLE BOX**
9. **A/T:**
   REMOVE CONTROL POSITION INDICATOR PLATE

(a) Disconnect the connector.

(b) Disconnect the engagement of the claw at 4 positions and remove the control position indicator plate.



10. **REMOVE AIRBAG SENSOR ASSEMBLY**

(a) Disconnect the 3 airbag sensor assembly connectors.

NOTICE:

Disconnect the connectors with the sensor assembly installed.

(b) Using a torx wrench, remove the 3 screws and airbag sensor assembly.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

RS05T–01

INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check (See page DI–287).

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check (See page DI–287).

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly (See page RS–54).

RS01J–13

REPLACEMENT

REPLACEMENT REQUIREMENTS

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–54 and RS–57. Be sure to follow the correct procedure.

RS0EZ–04

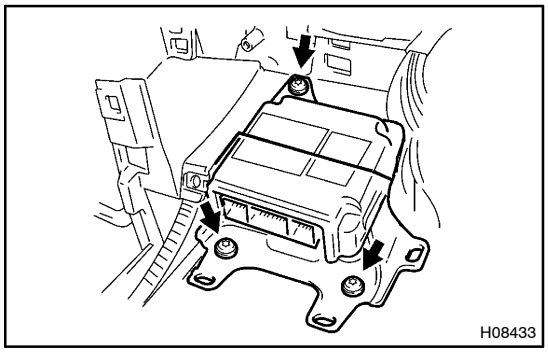
INSTALLATION

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.**

HINT:

For step 3 to 10, refer to page BO–104.



1. INSTALL AIRBAG SENSOR ASSEMBLY

(a) Using a torx wrench, install the airbag sensor assembly with the 3 screws.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(b) Connect the 3 airbag sensor assembly connectors.

NOTICE:

- **Connection 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 sensor 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. A/T:
INSTALL CONTROL POSITION INDICATOR PLATE

(a) Connect the engagement of the claw at 4 positions and install the control position indicator plate.

(b) Connect the connector.

3. INSTALL CONSOLE BOX

4. INSTALL PARKING BRAKE HOLE COVER

5. INSTALL A/C CONTROL WITH RADIO RECEIVER ASSEMBLY

6. INSTALL LOWER CENTER CLUSTER FINISH PANEL

7. INSTALL CENTER CLUSTER FINISH PANEL

8. w/ LEXUS navigation system:
INSTALL CENTER REGISTER OPENING COVER

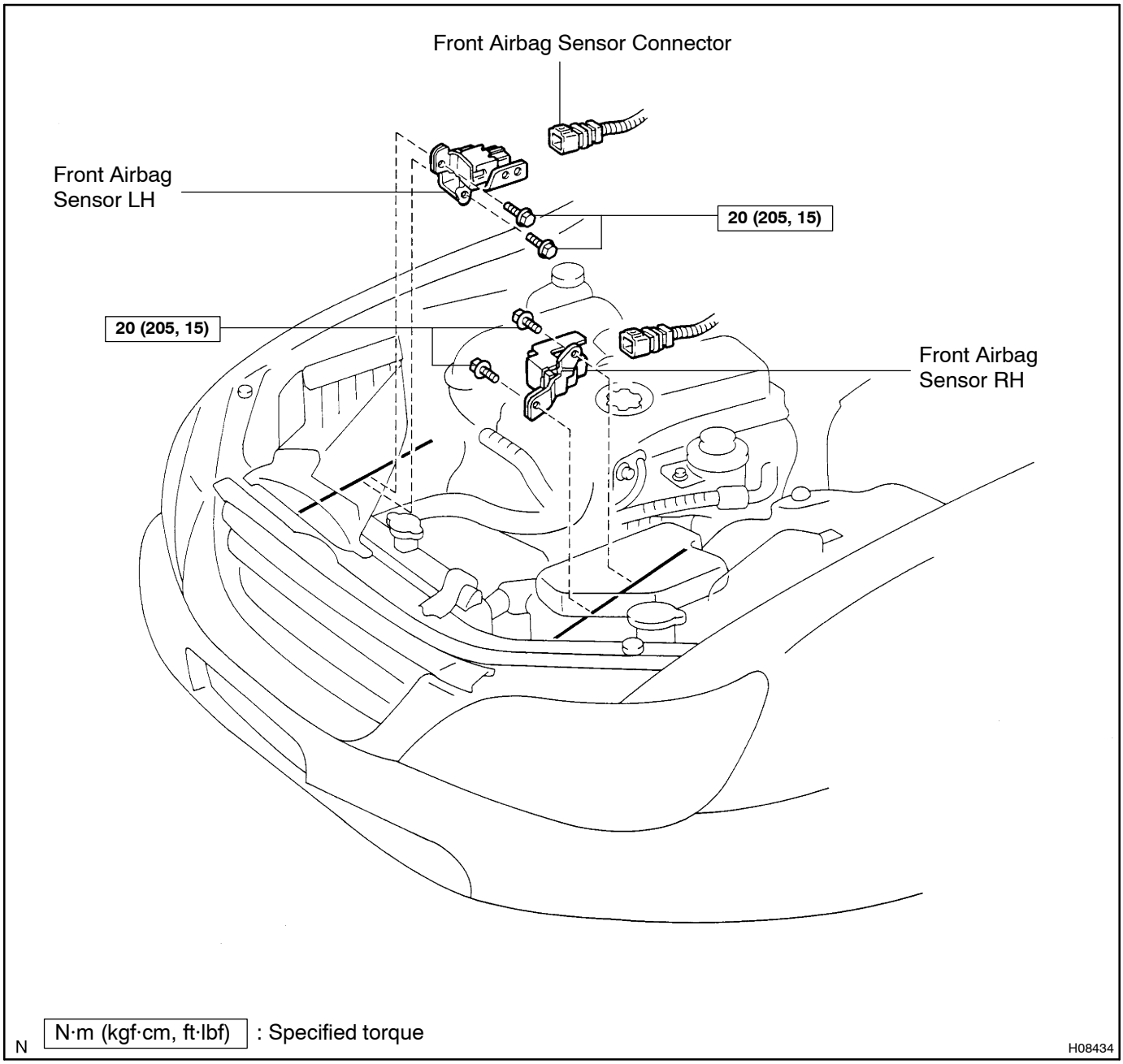
9. INSTALL UPPER CONSOLE PANEL

10. INSTALL FLOOR SHIFT LEVER KNOB

FRONT AIRBAG SENSOR

RS01L–20

COMPONENTS

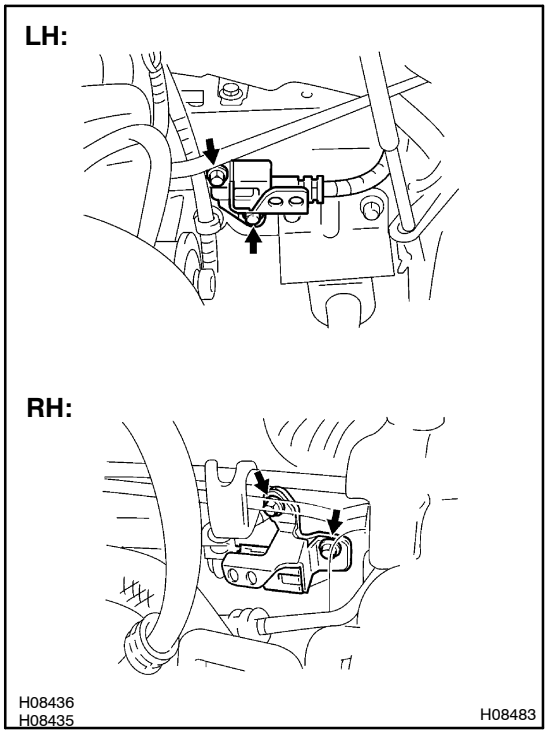


RS0HN–01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch at ON or ACC position, DTCs will be recorded.**
- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the sensor involved in a collision when the SRS has deployed.**
- **Never repair a sensor in order to reuse it.**



REMOVE FRONT AIRBAG SENSOR

(a) Disconnect the front airbag sensor connector.

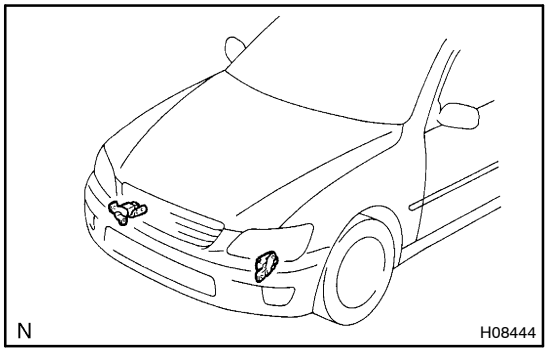
NOTICE:

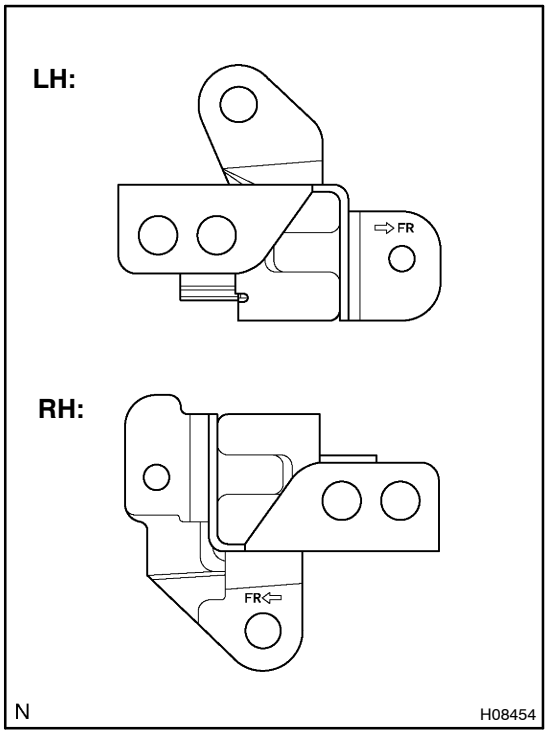
Disconnect the connector with the sensor assembly installed.

(b) Remove the 2 bolts and front airbag sensor.

(c) Employ the same manner described above to the other side.

RS01N–22





INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page DI–287)

2. VEHICLE INVOLVED IN COLLISION

(a) Do a diagnostic system check. (See page DI–287)

(b) If the front fender of the vehicle or its periphery is damaged, do a visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:

- Bracket deformation
- Paint peeling off the bracket
- Cracks, dents or chips in the case
- Cracks, dents, chipping and scratches in the connector
- Peeling off of the label or damage to the serial number

RS01O–10

REPLACEMENT

REPLACEMENT REQUIREMENTS

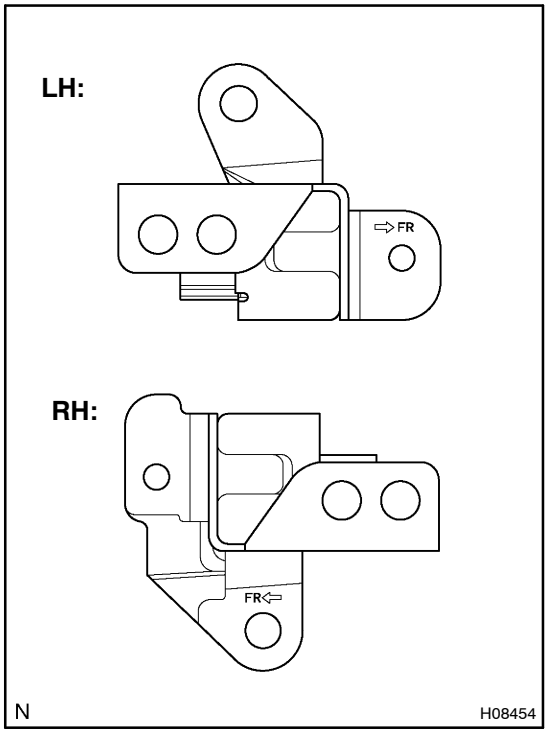
In the following cases, replace the front airbag sensor.

- If the SRS has been deployed in a collision. (Replace both the left and right airbag sensors.)
- If the front airbag sensor has been found to be faulty in troubleshooting.
- If the front airbag sensor has been found to be faulty during checking items. (See page RS–60)
- If the front airbag sensor has been dropped.

CAUTION:

For removal and installation of the front airbag sensor, see page RS–59 and RS–62. Be sure to follow the correct procedure.

RS01P–21



INSTALLATION

INSTALL FRONT AIRBAG SENSOR

(a) Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

NOTICE:

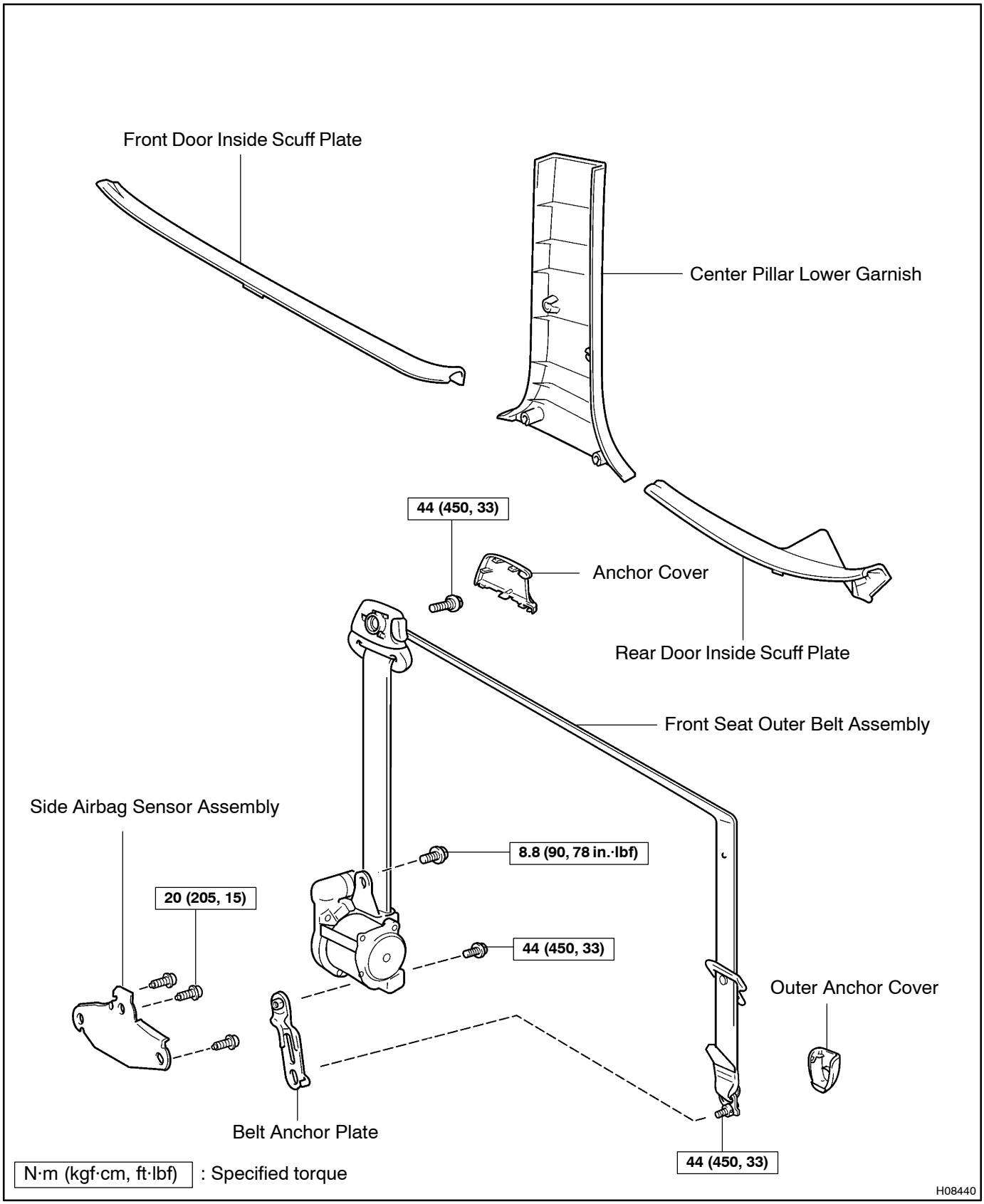
- **Connection of the connector is done after the sensor has been installed.**
- **Make sure the sensor is installed with the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, brackets or connector, replace the removed sensor with a new one.**
- **The front sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnostic system.**

(b) Connect the front airbag sensor connector.

SIDE AIRBAG SENSOR ASSEMBLY

COMPONENTS

RS01Q–10



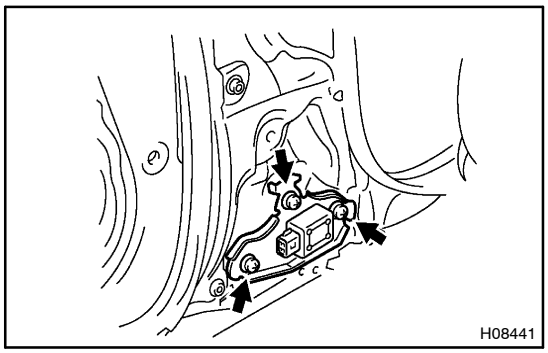
RS0HO–01

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 FRONT AND REAR DOOR INSIDE SCUFF PLATES**
2. **REMOVE CENTER PILLAR LOWER GARNISH**
3. **REMOVE FRONT SEAT OUTER BELT ASSEMBLY (See page BO–147)**



4. **REMOVE SIDE AIRBAG SENSOR ASSEMBLY**

(a) Disconnect the side airbag sensor assembly connector.

NOTICE:

Disconnect the connector with the sensor assembly installed.

(b) Using a torx wrench, remove the 3 screws and side airbag sensor assembly.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

RS05V–03

INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page DI–287)

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check. (See page DI–287)

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the side airbag sensor assembly. (See page RS–64)

RS01T–06

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the side airbag sensor assembly.

- If the side airbag sensor assembly has been deployed in a collision.
- If the side airbag sensor assembly has been found to be faulty in troubleshooting.
- If the side airbag sensor assembly has been dropped.

CAUTION:

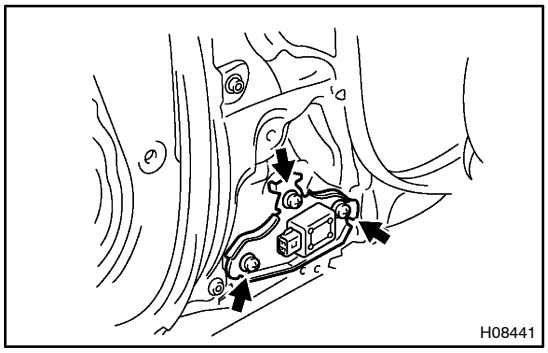
For removal and installation of the side airbag sensor assembly, see page RS–64 and RS–67. Be sure to follow the correct procedure.

RS0HP–01

INSTALLATION

NOTICE:

- **Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.**
- **Never reuse the side airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



1. INSTALL SIDE AIRBAG SENSOR ASSEMBLY

(a) Using a torx wrench, install the side airbag sensor assembly with the 3 screws.

Torx wrench: T40 (Part No. 09042–00020 or locally manufactured tool)

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(b) Connect the side airbag sensor assembly connector.

NOTICE:

- **Connection 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 sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installation, shake the sensor assembly to check that there is no looseness.**

2. INSTALL FRONT SEAT OUTER BELT ASSEMBLY (See page BO–147)

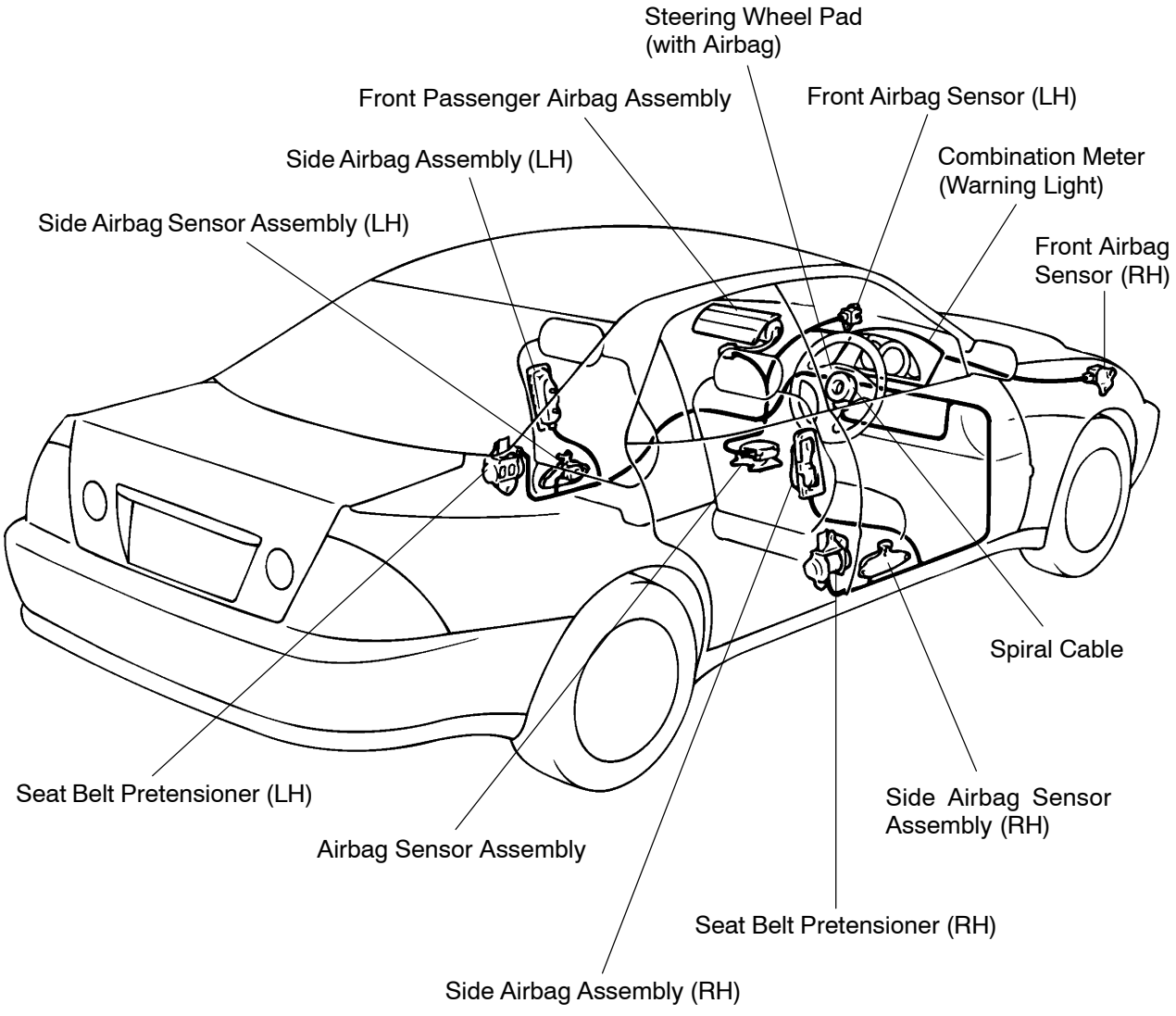
3. INSTALL CENTER PILLAR LOWER GARNISH

4. INSTALL FRONT AND REAR DOOR INSIDE SCUFF PLATES

WIRE HARNESS AND CONNECTOR

RS01V–17

LOCATION



RS01W–09

INSPECTION

HINT:

The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color.

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page DI–287)

2. VEHICLE INVOLVED IN COLLISION

(a) Do a diagnostic system check. (See page DI–287)

(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–09

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 checking items. (See page RS–69)

CAUTION:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SA0R1–04

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
Wanders/pulls	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheel alignment (Incorrect)	SA–5
		SA–8
	3. Steering linkage (Loose or worn)	–
	4. Hub bearing (Loose or worn)	SA–11
		SA–47
	5. Steering gear (Out of adjustment or broken)	SR–46
	6. Suspension parts (Worn)	–
Bottoming	1. Vehicle (Overloaded)	–
	2. Spring (Weak)	SA–18
		SA–104
	3. Shock absorber (Worn)	SA–22
		SA–107
Sways/pitches	1. Tire (Worn or improperly inflated)	SA–2
	2. Stabilizer bar (Bent or broken)	SA–41
		SA–122
	3. Shock absorber (Worn)	SA–22
		SA–107
Front wheel shimmy	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheel (Out of balance)	SA–2
	3. Shock absorber (Worn)	SA–22
	4. Wheel alignment (Incorrect)	SA–5
	5. Ball joint (Worn)	SA–29
		SA–36
		SA–39
	6. Hub bearing (Loose or worn)	SA–11
	7. Steering linkage (Loose or worn)	–
	8. Steering gear (Out of adjustment or broken)	SR–46
Abnormal tire wear	1. Tire (Improperly inflated)	SA–2
	2. Wheel alignment (Incorrect)	SA–5
		SA–8
	3. Shock absorber (Worn)	SA–22
		SA–107
	4. Suspension parts (Worn)	–
Noise in rear differential	1. Oil level (Low or wrong grade)	SA–65
	2. Excessive backlash between pinion and ring gear	SA–72
	3. Ring, pinion or side gears (Worn or chipped)	SA–72
	4. Side bearing (Worn)	SA–72
Oil leak from rear differential	1. Oil level (Too high or wrong grade)	SA–65
	2. Drive pinion oil seal (Worn or damaged)	SA–63
	3. Side gear oil seal (Worn or damaged)	SA–68
	4. Companion flange (Loose or damaged)	SA–77
	5. Side gear shaft (Damaged)	SA–72

TIRE AND WHEEL

SA0R2–03

INSPECTION

1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

Cold tire inflation pressure:

Europe:

Up to 4 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	250 (2.5, 36)*1 240 (2.4, 35)*2 230 (2.3, 33)*3	260 (2.6, 38)*1 240 (2.4, 35)*2 230 (2.3, 33)*3
205/55R16 89V	230 (2.3, 33)*1 230 (2.3, 33)*2 230 (2.3, 33)*3	240 (2.4, 35)*1 230 (2.3, 33)*2 230 (2.3, 33)*3

5 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	260 (2.6, 38)*1 250 (2.5, 36)*2 230 (2.3, 33)*3	340 (3.4, 49)*1 280 (2.8, 41)*2 240 (2.4, 35)*3
205/55R16 89V	240 (2.4, 35)*1 240 (2.4, 35)*2 230 (2.3, 33)*3	310 (3.1, 45)*1 270 (2.7, 39)*2 230 (2.3, 33)*3

*1: For driving at 210 km/h (131 mph) or over

*2: For driving at 160 km/h (100 mph) to 210 km/h (131 mph)

*3: For driving under 160 km/h (100 mph)

Others:

Up to 4 passengers:

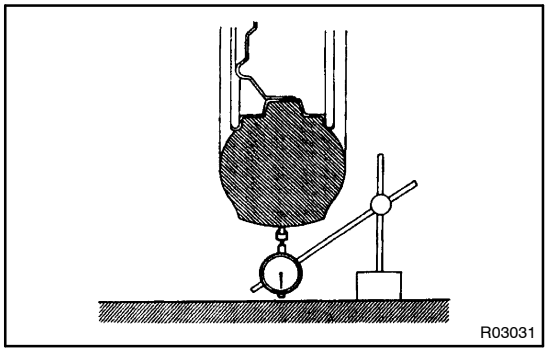
Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	280 (2.8, 41)*4 230 (2.3, 33)*5	280 (2.8, 41)*4 230 (2.3, 33)*5
205/55R16 89V	270 (2.7, 39)*4 220 (2.2, 32)*5	270 (2.7, 39)*4 220 (2.2, 32)*5

5 passengers:

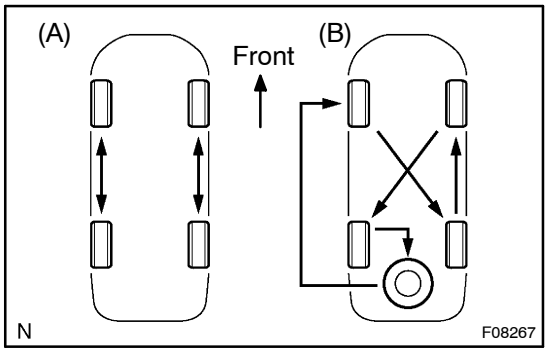
Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	290 (2.9, 42)*4 230 (2.3, 33)*5	320 (3.2, 46)*4 240 (2.4, 35)*5
205/55R16 89V	280 (2.8, 41)*4 220 (2.2, 32)*5	310 (3.1, 45)*4 220 (2.2, 32)*5

*4: For driving at 140 km/h (88 mph) or over

*5: For driving under 140 km/h (88 mph)

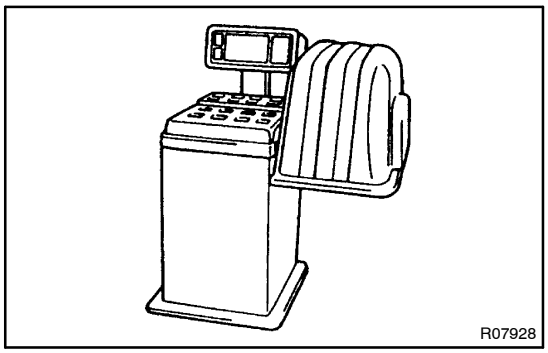


(b) Check the tire runout.
Tire runout: 1.4 mm (0.055 in.) or less



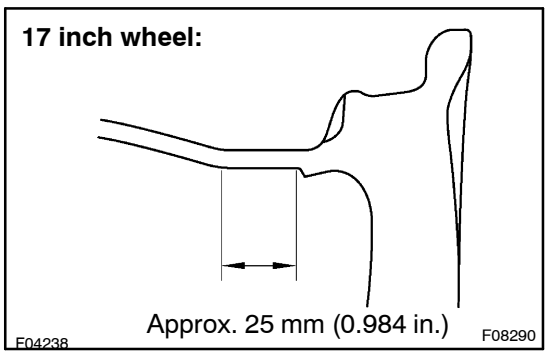
2. ROTATING TIRES

HINT:
Rotate tires as shown in the illustration as rotation way differs according to whether the tire turning direction is specified (A) or (B).



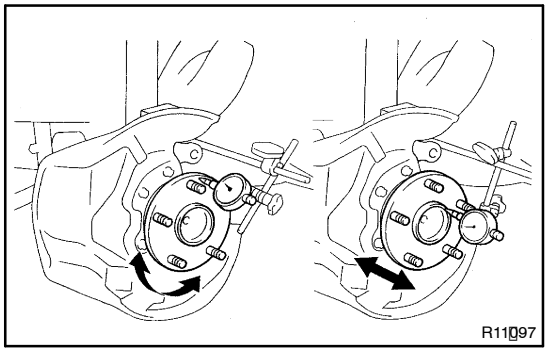
3. INSPECT WHEEL BALANCE

(a) Check and adjust the off–the–car balance.
(b) If necessary, check and adjust the on–the–car balance.
Imbalance after adjustment: 8.0 g (0.018 lb) or less



NOTICE:

- **Adhere the sticking type balance weight to the flat position as shown in the illustration.**
- **Push the balance weight securely with a finger to adhere it to the position.**
  (Pushing force: 10 kgf/more than 2 secs.)
- **After cleaning the surface which the balance weight will be adhered to of dirt, oil and water with a cleaning detergent, adhere the balance weight to the surface.**
- **Do not touch the sticking surface of the tape.**
- **Do not use the once used balance weight.**
- **Please use the TOYOTA genuine sticking type balance weight.**



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.)

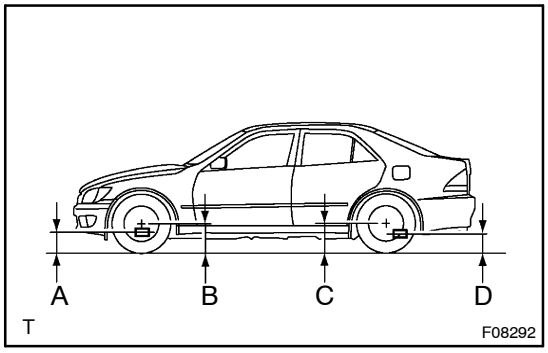
5. CHECK FRONT SUSPENSION FOR LOOSENESS

6. CHECK STEERING LINKAGE FOR LOOSENESS

7. CHECK BALL JOINT FOR LOOSENESS AND EXCESSIVE PLAY (See page SA–36)

8. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check if oil leaks
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



FRONT WHEEL ALIGNMENT

SA1IU–01

INSPECTION

1. MEASURE VEHICLE HEIGHT

Vehicle height:

Front vehicle height	Rear vehicle height
66 mm (2.60 in.)	66 mm (2.60 in.)

Measuring points:

A: Ground clearance of the front No .1 lower suspension arm mounting bolt center.

B: Ground clearance of the front wheel center.

C: Ground clearance of the rear wheel center.

D: Ground clearance of the No. 2 lower suspension arm mounting bolt (Suspension member side) tail center.

Vehicle height:

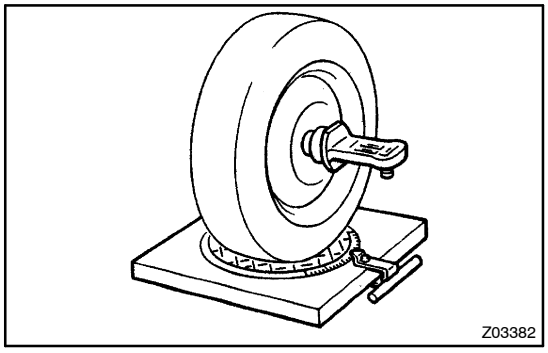
Front: B – A

Rear: C – D

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

If the vehicle height is not the specified value, try to adjust it by pushing down on or lifting the body.



2. INSTALL CAMBER–CASTER–KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber, caster and steering axis inclination:

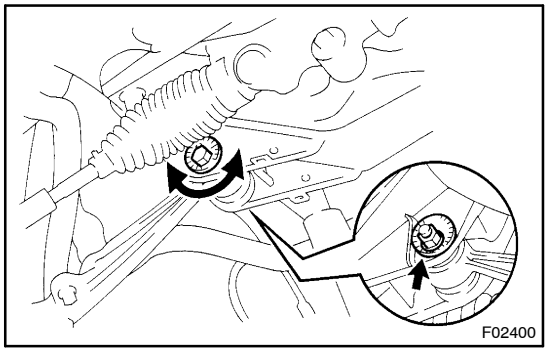
Camber	–0°21' ± 30' (–0.35° ± 0.5°)
Right–left error	30' (0.5°) or less
Caster	5°46' ± 30' (5.77° ± 0.5°)
Right–left error	30' (0.5°) or less
Steering axis inclination	9°16' ± 30' (9.27° ± 0.5°)
Right–left error	30' (0.5°) or less

If the caster and steering axis inclination are not within the specified values, after the camber has been correctly adjusted, recheck the suspension parts for damaged and/or worn out parts.

4. ADJUST CAMBER

HINT:

After adjusting the camber, inspect the caster and toe–in.

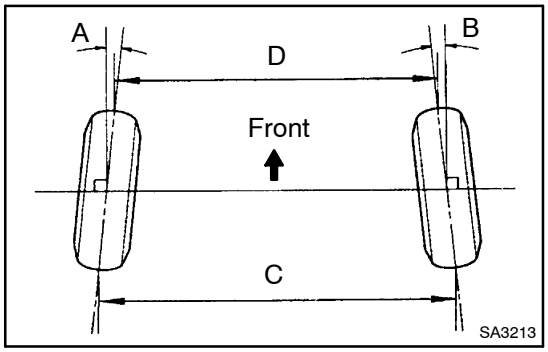


(a) Loosen the camber adjusting cam nut of the No. 1 lower suspension arm.
(b) Turn the camber adjusting cam of the No. 1 lower suspension arm and adjust the camber.

HINT:

- Try to adjust the camber to the center of the specified value.
- Camber will change about 7.5' (0.13°) with each graduation of the adjusting cam.

(c) Torque the camber adjusting cam nut of the No. 1 lower suspension arm.
Torque: 184 N·m (1,880 kgf·cm, 136 ft·lbf)



5. INSPECT TOE–IN

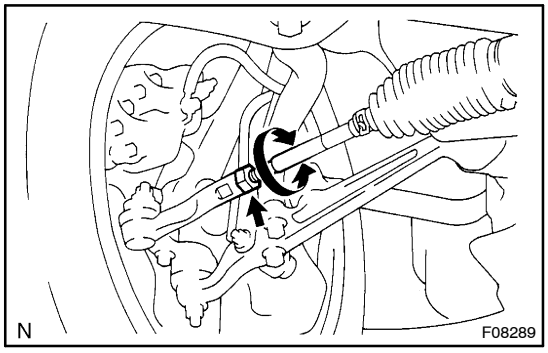
Toe–in:

Toe–in (total)	A + B: 0°06' ± 12' (0.1° ± 0.2°) C – D: 1 ± 2 mm (0.04 ± 0.08 in.)

If the toe–in is not within the specified value, adjust it at the rack ends.

6. ADJUST TOE–IN

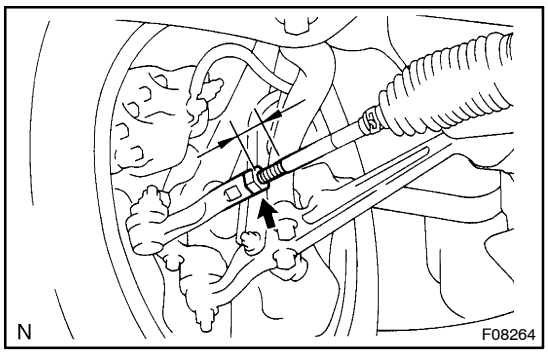
(a) Using pliers, remove the boot clips.



(b) Loosen the tie rod end lock nuts.
(c) Turn the right and left rack ends by an equal amount to adjust the toe–in.

HINT:

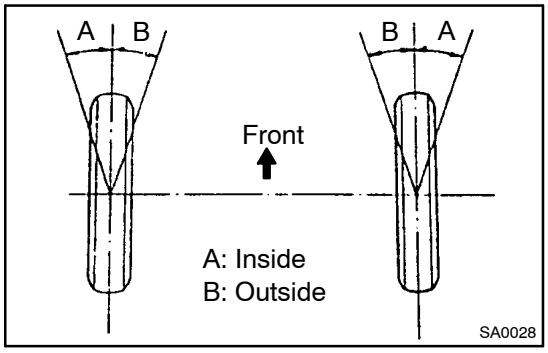
Try to adjust the toe–in to the center of the specified value.



(d) Make sure that the lengths of the right and left rack ends are same.
Rack end length difference: 1.5 mm (0.059 in.) or less
(e) Torque the tie rod end lock nuts.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)
(f) Place the boots on the seats and using pliers, install the clips.

HINT:

Make sure that the boots are not twisted.



7. INSPECT WHEEL ANGLE

Turn the steering wheel fully, and measure the turning angle.

Wheel turning angle:

Inside wheel	41˚02’ (39˚02’ – 42˚02’) 41.03˚ (39.03˚ – 42.03˚)
Outside wheel (Reference)	33˚30’ 33.5˚

If the right and left inside wheel angles differ from the specified value, inspect the toe–in.

REAR WHEEL ALIGNMENT

SA0R4–03

INSPECTION

1. **MEASURE VEHICLE HEIGHT (See page SA–5)**
2. **INSTALL CAMBER–CASTER–KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER**

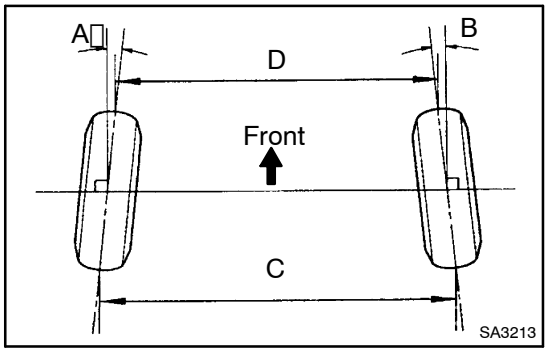
Follow the specific instructions of the equipment manufacturer.

3. **INSPECT CAMBER**

Camber:

Camber Right–left error	–0°23' ± 30' (–0.38° ± 0.5°) 30' (0.5°) or less

If the camber is not within the specified valve, after the toe–in is inspected, see step 5. to adjust.

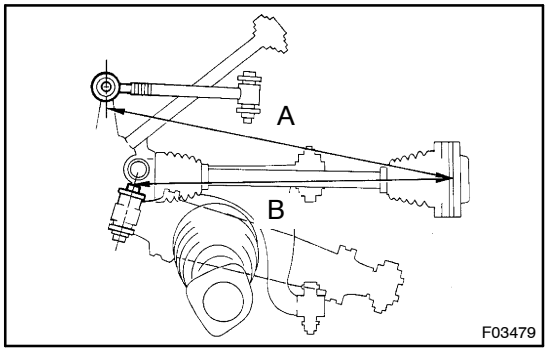


4. **INSPECT TOE–IN**

Toe–in:

Toe–in (total)	A + B: 0°12' ± 12' (0.2° ± 0.2°) C – D: 2 ± 2 mm (0.08 ± 0.08 in.)

If the toe–in is not within the specified valve, after the camber is inspected, see step 5. to adjust.



5. **ADJUST CAMBER AND TOE–IN**

(a) Measure the lengths of the toe control link (A) and No. 2 lower suspension arm (B), as shown in the illustration.

(b) Obtain the difference between A and B.

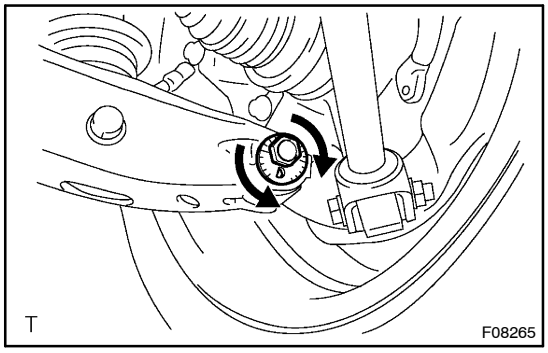
(c) Employ the same manner described above to the other side.

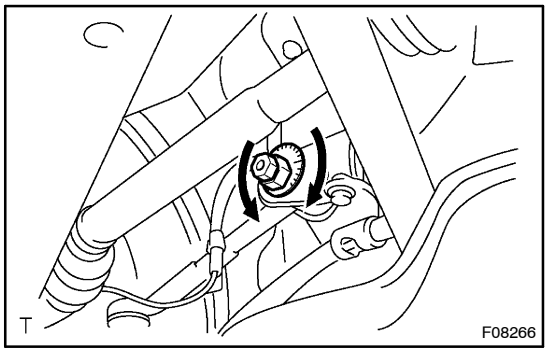
(d) Obtain the difference between right and left from the values obtained above.

Right and left difference: 4.0 mm (0.157 in.) or less

If they are not within the specified value, adjust the lengths of them by turning the adjusting cam.

(e) Inspect the camber and toe–in.





(f) Adjust the camber.
  (1) Loosen the camber adjusting cam nut of the No. 2 lower suspension arm.
  (2) Turn the camber adjusting cam of the No. 2 lower suspension arm and adjust the camber.

HINT:
Camber will change about 5.0' (0.08°) with each graduation of the adjusting cam.

  (3) Torque the camber adjusting cam nut.
  Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

(g) Adjust the toe–in.
  (1) Loosen the camber adjusting cam nut of the toe control link.
  (2) Turn the camber adjusting cam of the toe control link and adjust the toe–in.

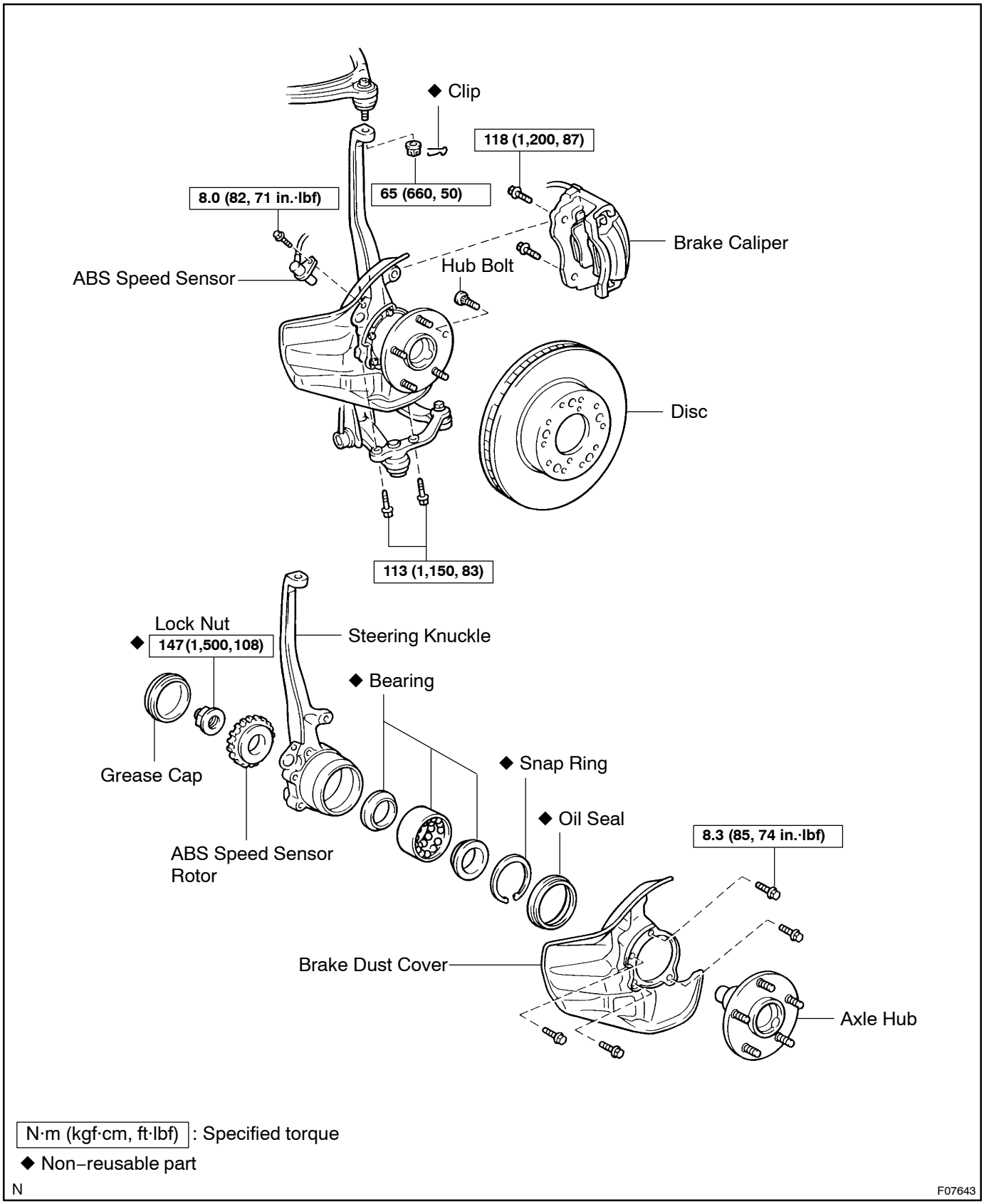
HINT:
Toe–in will change about 4.0 mm (0.157 in.) with each graduation of the adjusting cam.

  (3) Torque the camber adjusting cam nut.
  Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

FRONT AXLE HUB

COMPONENTS

SA0R5–04



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

◆ Non–reusable part

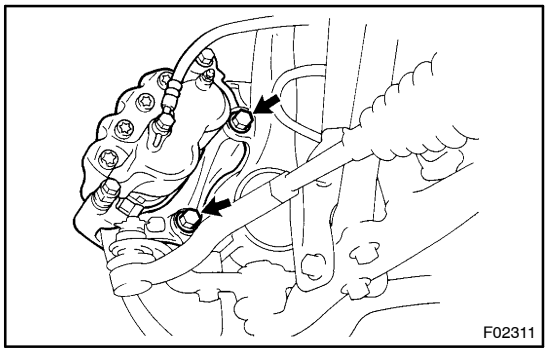
N

F07643

SA0R6–03

REMOVAL

1. REMOVE FRONT WHEEL

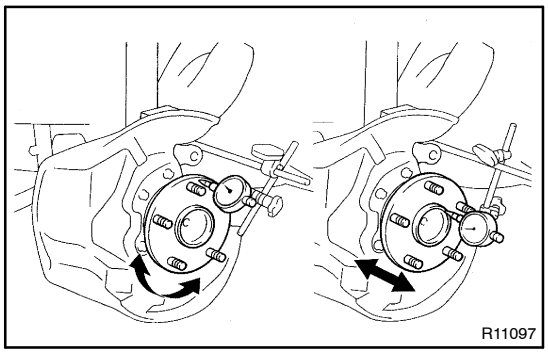


2. REMOVE FRONT BRAKE CALIPER AND DISC

(a) Remove the 2 bolts and brake caliper from the steering knuckle.

(b) Support the brake caliper securely.

(c) Remove the disc.



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 bearing.

(b) 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.)

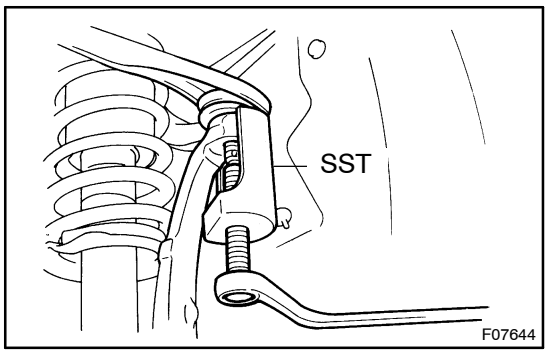
If the deviation exceeds the maximum, replace the axle hub.

4. REMOVE ABS SPEED SENSOR

Remove the bolt and disconnect the ABS speed sensor from the steering knuckle.

5. REMOVE STEERING KNUCKLE WITH AXLE HUB

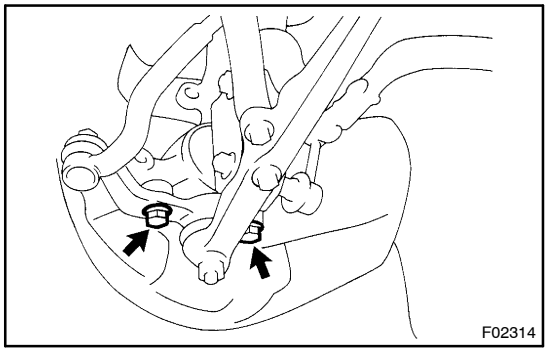
(a) Remove the clip and nut.



(b) Using SST, remove the steering knuckle from the upper suspension arm.

SST 09610–20012

(c) Temporarily install the steering knuckle to the upper suspension arm with the nut.



(d) Remove the 2 bolts and disconnect the lower ball joint from the steering knuckle.

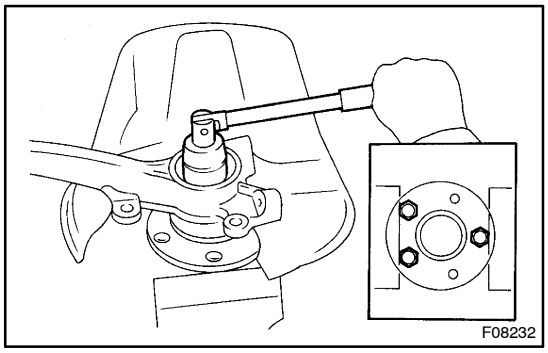
(e) Remove the nut and steering knuckle with the axle hub from the upper suspension arm.

SA0R7–04

DISASSEMBLY

1. REMOVE GREASE CAP

Using a screwdriver and hammer, remove the grease cap from the steering knuckle.



2. REMOVE LOCK NUT

(a) Mount the axle hub in a soft jaw vise.

HINT:

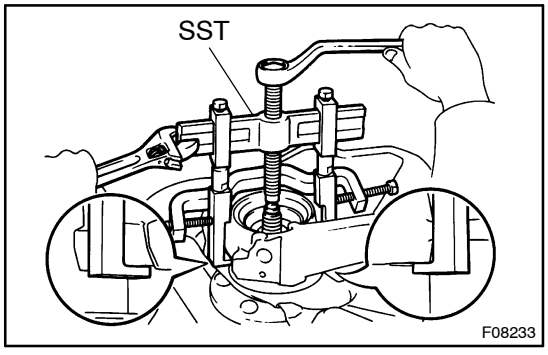
Close the vise until it holds hub bolts. Do not tighten further.

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

(c) Using a socket wrench (32 mm), remove the lock nut.

3. REMOVE ABS SPEED SENSOR ROTOR AND AXLE HUB

(a) Remove the 4 bolts and shift the brake dust cover toward the outside.



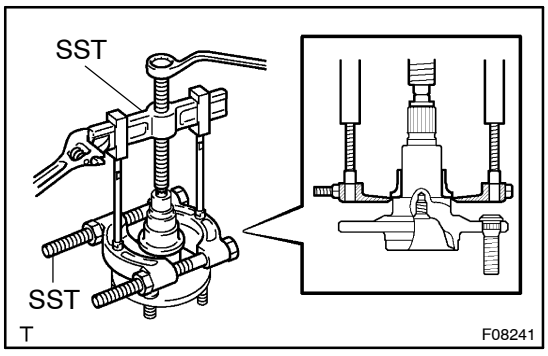
(b) Using SST, remove the ABS speed sensor rotor and axle hub from the steering knuckle.

SST 09950–40011 (09951–04020, 09952–04010, 09953–04020, 09954–04010, 09955–04051, 09957–04010, 09958–04011)

NOTICE:

Take care not to scratch the serrations of the sensor rotor.

(c) Remove the brake dust cover.



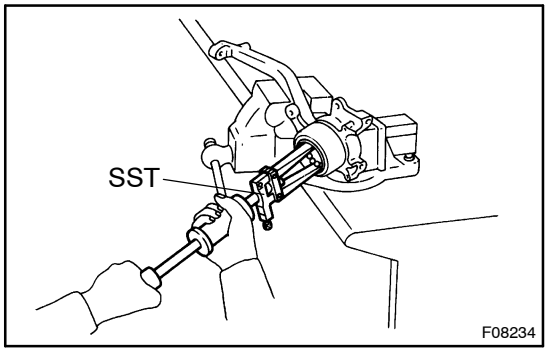
4. REMOVE INNER RACE (OUTSIDE)

Using SST, remove the inner race from the axle hub.

SST 09950–00020, 09950–40011 (09951–04020, 09953–04030, 09957–04010), 09950–50012 (09952–05010, 09954–05030, 09955–05040)

NOTICE:

Be careful not to damage the axle hub.



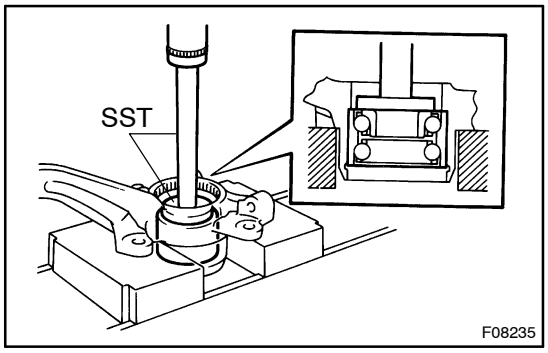
5. REMOVE OIL SEAL

Using SST, remove the oil seal from the steering knuckle.

SST 09308–00010

6. REMOVE BEARING

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

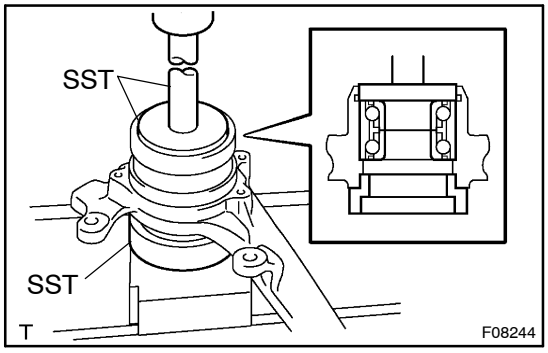


(b) Using SST and a press, remove the bearing from the steering knuckle.

SST 09950–60010 (09951–00560), 09950–70010 (09951–07150)

SA0R8–03

REASSEMBLY

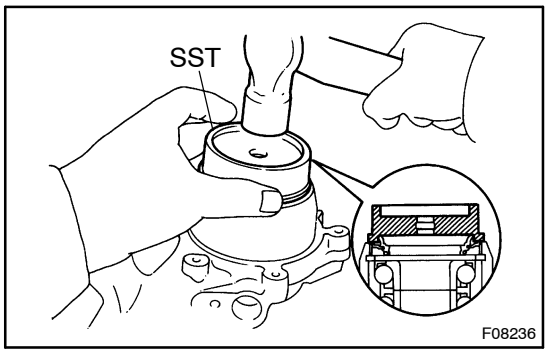


1. INSTALL BEARING

(a) Using SST and a press, install a new bearing to the steering knuckle.
SST 09502–24010, 09950–60020 (09951–00710), 09950–70010 (09951–07150)

NOTICE:
If the inner race and balls come loose from the bearing outer race, make sure that they are installed on the same side as before.

(b) Using snap ring pliers, install a new snap ring to the steering knuckle.



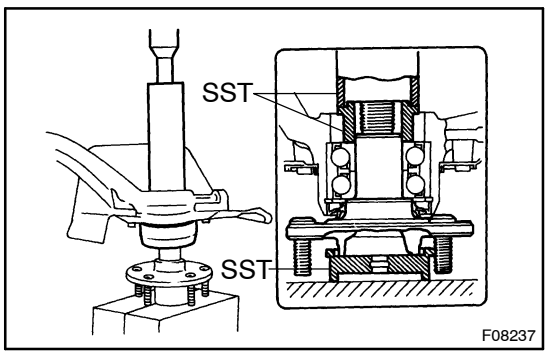
2. INSTALL OIL SEAL

(a) Using SST and a hammer, install a new oil seal until it is flush with the end surface of the steering knuckle.
SST 09608–32010

(b) Coat MP grease to the oil seal lip.

3. INSTALL AXLE HUB

(a) Install the brake dust cover to the steering knuckle with the 4 bolts.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



(b) Using SST and a press, install the axle hub to the steering knuckle.
SST 09316–60011 (09316–00011, 09316–00071), 09608–32010

4. INSTALL ABS SPEED SENSOR ROTOR

Install the speed sensor rotor to the steering knuckle with its concave surface facing to the inner side.

NOTICE:
Do not scratch the serrations of the sensor rotor.

5. INSTALL LOCK NUT

(a) Using a socket wrench (32 mm), install a new lock nut.
Torque: 147 N·m (1,500 kgf·cm, 108 ft·lbf)

(b) Using a chisel and hammer, stake the lock nut.

6. INSTALL GREASE CAP

Using a screwdriver and hammer, install the grease cap to the steering knuckle.

SA0R9–03

INSTALLATION

1. INSTALL STEERING KNUCKLE WITH AXLE HUB

(a) Temporarily install the steering knuckle to the upper suspension arm with the nut.

(b) Connect the steering knuckle to the lower ball joint with the 2 bolts.

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

(c) Torque the nut on the upper side of the steering knuckle.

Torque: 65 N·m (660 kgf·cm, 50 ft·lbf)

(d) Install a new clip.

If the holes for the clip are not aligned, tighten the nut further up to 60°.

2. CONNECT ABS SPEED SENSOR TO STEERING KNUCKLE

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

3. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION (See page SA–11)

4. INSTALL DISC AND BRAKE CALIPER

Install the disc, brake caliper and 2 bolts.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

5. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

6. DEPRESS BRAKE PEDAL SEVERAL TIMES

7. CHECK FRONT WHEEL ALIGNMENT (See page SA–5)

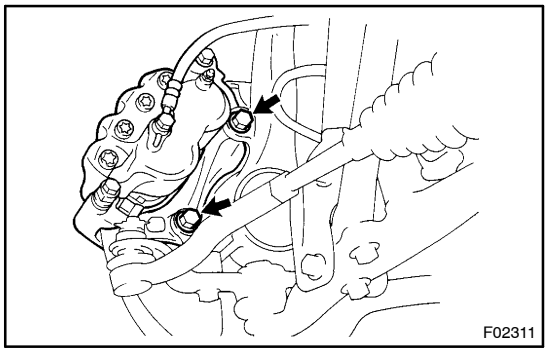
8. CHECK ABS SPEED SENSOR SIGNAL (See page DI–223)

FRONT WHEEL HUB BOLT

SA0RA–03

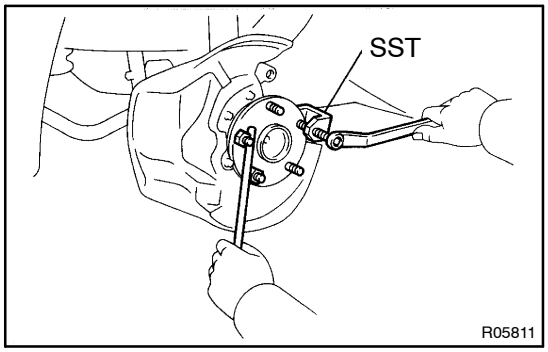
REPLACEMENT

1. REMOVE FRONT WHEEL



2. REMOVE BRAKE CALIPER AND DISC

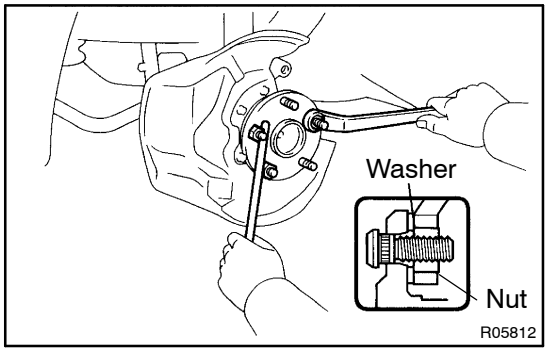
(a) Remove the 2 bolts and brake caliper from the steering knuckle.
(b) Support the brake caliper securely.
(c) Remove the disc.



3. REMOVE HUB BOLT

Using SST and a brass bar or an equivalent to hold, remove the hub bolt.

SST 09628–10011



4. INSTALL HUB BOLT

(a) Install a washer and nut to a new hub bolt, as shown in the illustration.
(b) Using a brass bar or an equivalent to hold, install the hub bolt by torquing the nut.

5. INSTALL DISC AND BRAKE CALIPER

(a) Install the disc.
(b) Install the brake caliper and 2 bolts to the steering knuckle.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

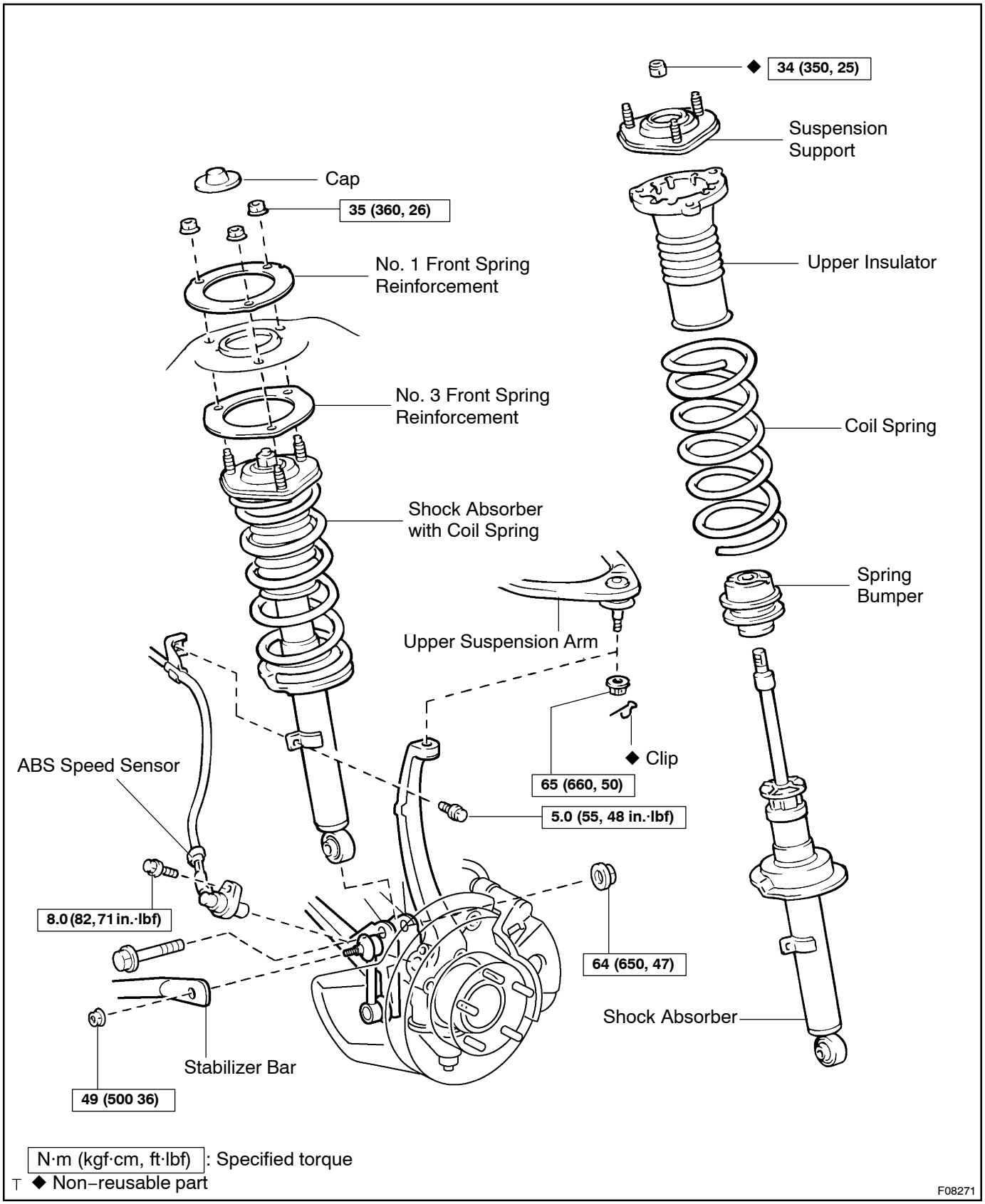
6. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

FRONT SHOCK ABSORBER

COMPONENTS

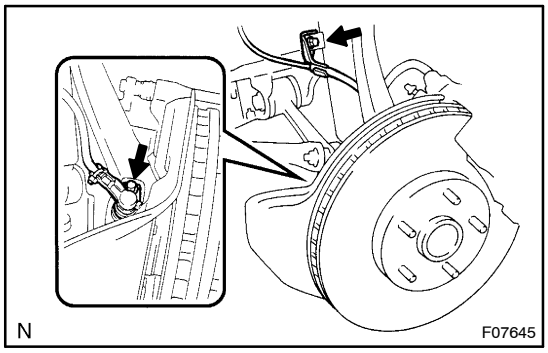
SA0RB–04



SA0RC–02

REMOVAL

1. REMOVE FRONT WHEEL



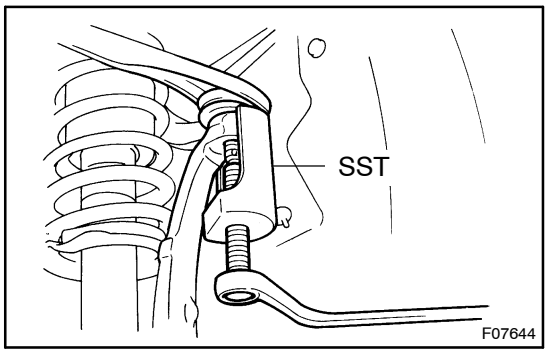
2. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS CLAMP

(a) Remove the bolt and disconnect the ABS speed sensor from the steering knuckle.

(b) Remove the bolt and disconnect the ABS speed sensor wire harness clamp from the shock absorber.

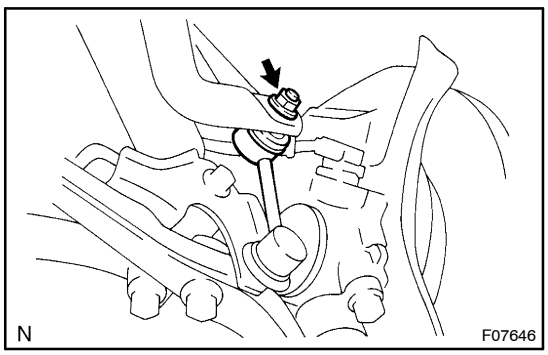
3. DISCONNECT UPPER SUSPENSION ARM FROM STEERING KNUCKLE

(a) Remove the clip and nut.



(b) Using SST, disconnect the upper suspension arm.
SST 09610–20012

(c) Support the steering knuckle securely.

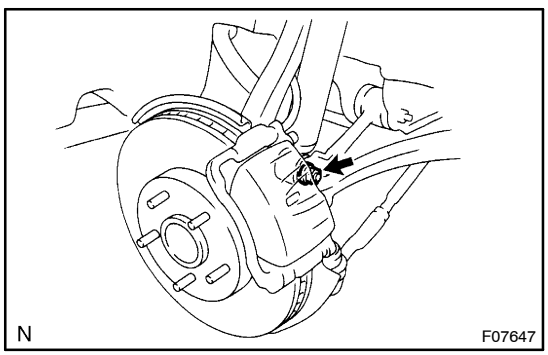


4. DISCONNECT STABILIZER BAR LINK FROM STABILIZER BAR

Remove the nut and disconnect the stabilizer bar link.

HINT:

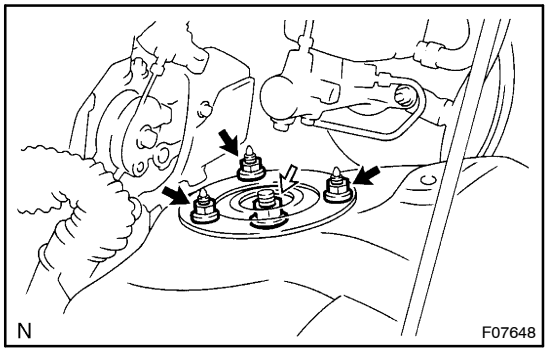
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.



5. REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Remove the nut and bolt, and disconnect the shock absorber from the shock absorber bracket.

(b) Remove the cap from the suspension support.



(c) Loosen the nut in the center of the suspension support.

NOTICE:

Do not remove it.

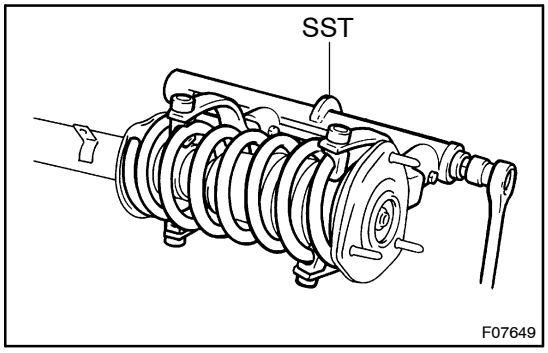
HINT:

If not disassembling the shock absorber, it is not necessary to loosen the nut.

(d) Remove the 3 nuts, No. 1 front spring reinforcement and shock absorber with coil spring from the body.

(e) Remove the No. 3 front spring reinforcement from the shock absorber.

SA0RD–03



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

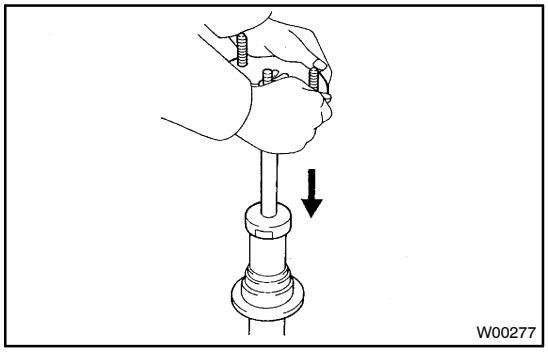
NOTICE:

Do not use an impact wrench. It will damage the SST.

(b) Remove the suspension support nut.

(c) Remove the suspension support, upper insulator, coil spring and spring bumper from the shock absorber.

SA0RE–03



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds. If there is any abnormality, replace the shock absorber with a new one.

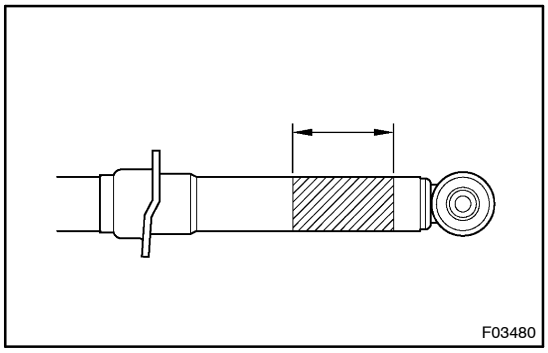
NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA–23.

SA0RF–03

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER PISTON ROD



2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

(a) Place the shock absorber horizontally to prevent the oil from coming out.

(b) Using a drill, make a hole on the top of the shell as shown to discharge the gas inside.

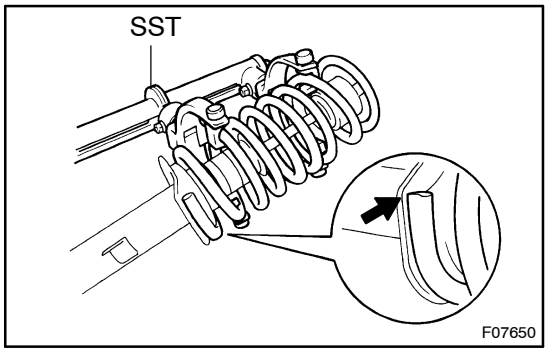
CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**

SA0RG–03

REASSEMBLY

1. INSTALL SPRING BUMPER TO PISTON ROD



2. INSTALL COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:

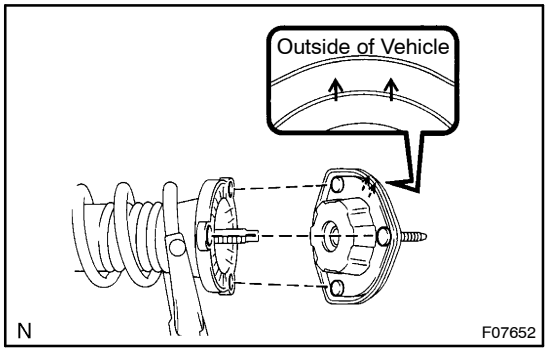
Do not use an impact wrench. It will damage the SST.

(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

3. INSTALL UPPER INSULATOR TO SHOCK ABSORBER



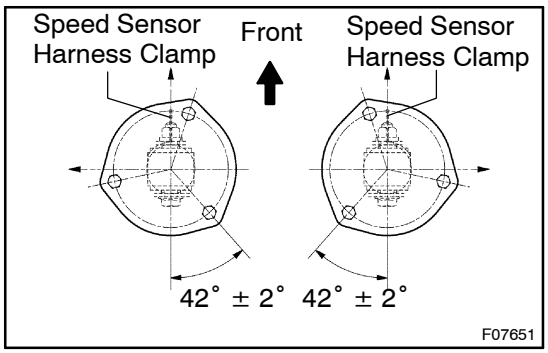
4. INSTALL SUSPENSION SUPPORT

(a) Install the suspension support to the shock absorber, as shown in the illustration.

HINT:

Align the bolt of the suspension support with the cut–out of the upper insulator.

(b) Temporarily tighten a new lock nut.



(c) Align the suspension support with the shock absorber lower bolt as shown in the illustration.

5. REMOVE SST

SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

HINT:

After removing the SST, recheck the direction of the suspension support.

SA1IV–01

INSTALLATION

1. INSTALL FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Install the No. 3 front spring reinforcement to the shock absorber.

(b) Install the shock absorber, No. 1 front spring reinforcement to the body with the 3 nuts.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Connect the shock absorber to the shock absorber bracket with the bolt and nut.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

HINT:

After stabilizing the suspension, torque the nut.

(d) Torque the nut in the center of the suspension support.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

HINT:

If the shock absorber has not been disassembled, it is not necessary to torque the nut.

(e) Install the cap to the suspension support.

2. CONNECT STABILIZER BAR LINK TO STABILIZER BAR

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

HINT:

If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.

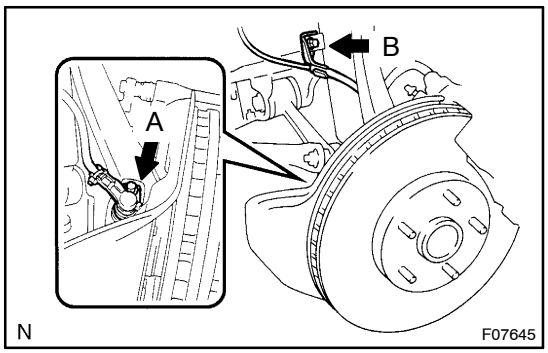
3. CONNECT UPPER SUSPENSION ARM TO STEERING KNUCKLE

(a) Connect the upper suspension arm with the nut.

Torque: 65 N·m (660 kgf·cm, 50 ft·lbf)

(b) Install a new clip.

If the holes for the clip are not aligned, tighten the nut further up to 60°.



4. CONNECT ABS SPEED SENSOR AND WIRE HARNESS CLAMP

Torque:

Bolt A: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

Bolt B: 5.0 N·m (55 kgf·cm, 48 in.·lbf)

5. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

6. CHECK FRONT WHEEL ALIGNMENT

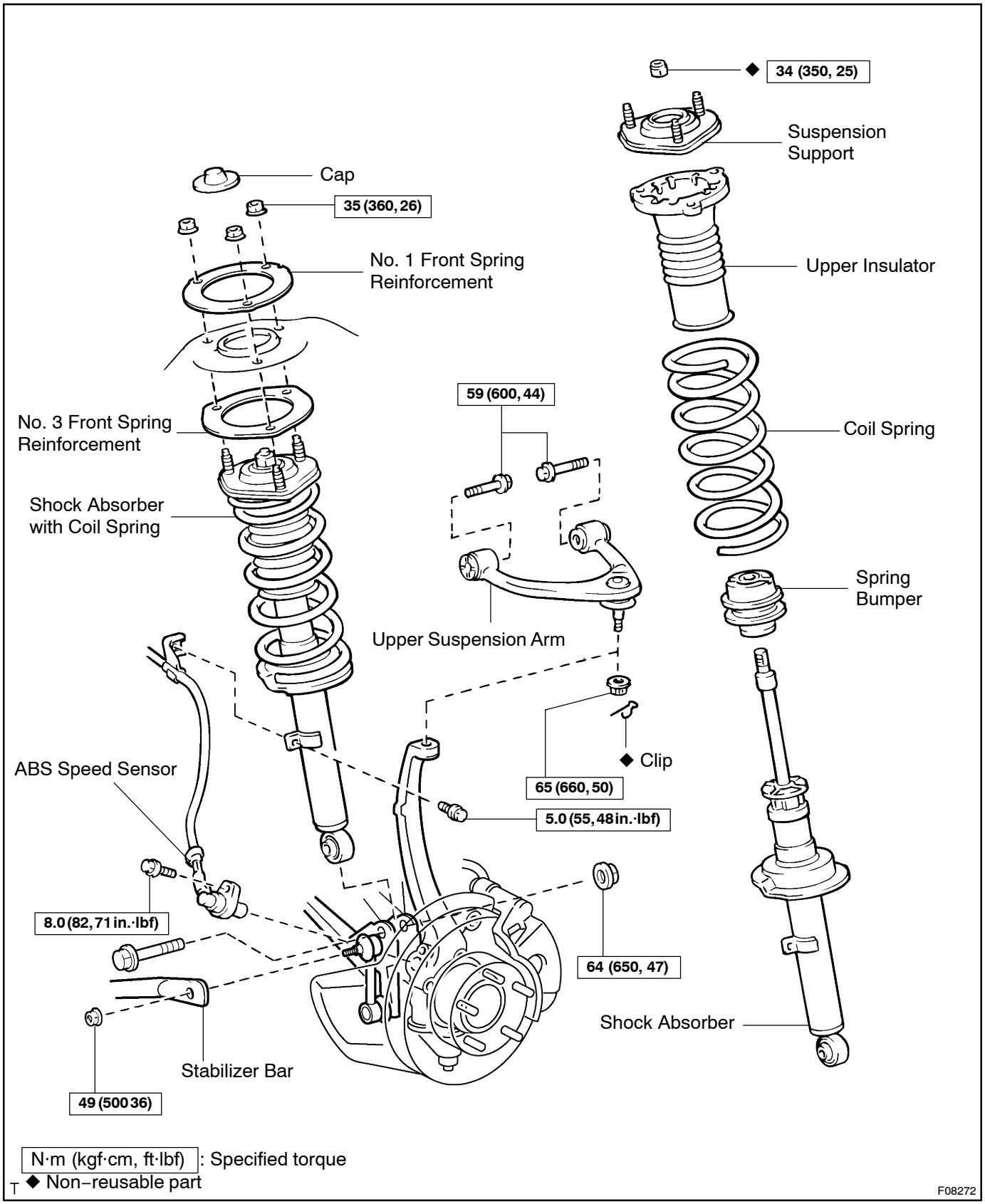
(See page SA–5)

7. CHECK ABS SPEED SENSOR SIGNAL
(See page DI–223)

FRONT UPPER SUSPENSION ARM

COMPONENTS

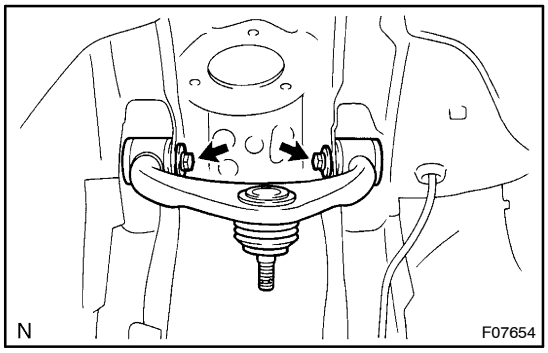
SA0RI–04



SA0RJ–03

REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE FRONT SHOCK ABSORBER
(See page SA–19)



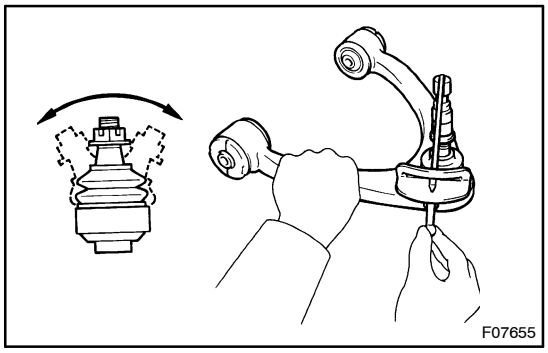
3. REMOVE UPPER SUSPENSION ARM

Remove the 2 bolts and upper suspension arm from the body.

SA0RK–03

INSPECTION

1. INSPECT UPPER SUSPENSION ARM BALL JOINT BOOT FOR DAMAGE



2. INSPECT UPPER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.·lbf)

SA0RL–03

INSTALLATION

1. INSTALL UPPER SUSPENSION ARM TO BODY
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)

HINT:

After stabilizing the suspension, torque the bolt.

2. INSTALL FRONT SHOCK ABSORBER (See page SA–25)

3. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

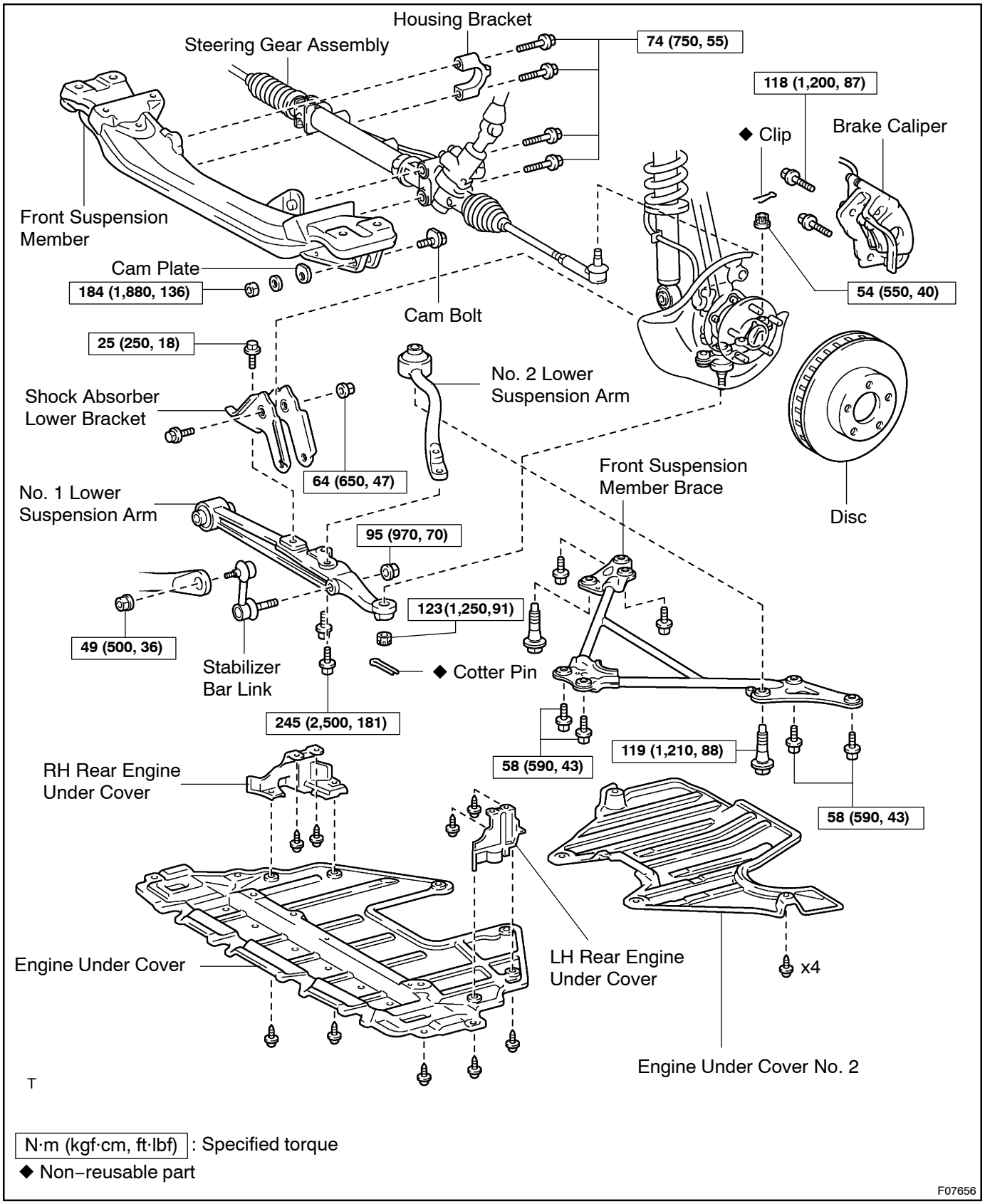
4. CHECK FRONT WHEEL ALIGNMENT (See page SA–5)

5. CHECK ABS SPEED SENSOR SIGNAL (See page DI–223)

FRONT LOWER SUSPENSION ARM

SA0RM–03

COMPONENTS



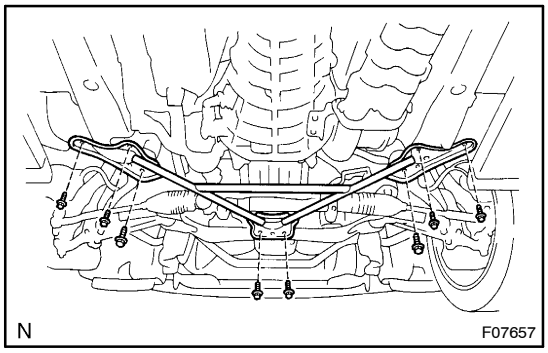
SA0RN–02

REMOVAL

1. REMOVE FRONT WHEEL

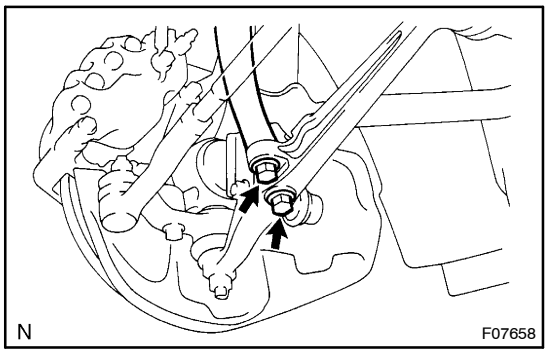
2. REMOVE ENGINE UNDER COVER AND ENGINE UNDER COVER NO. 2

3. REMOVE RH AND LH REAR ENGINE UNDER COVER



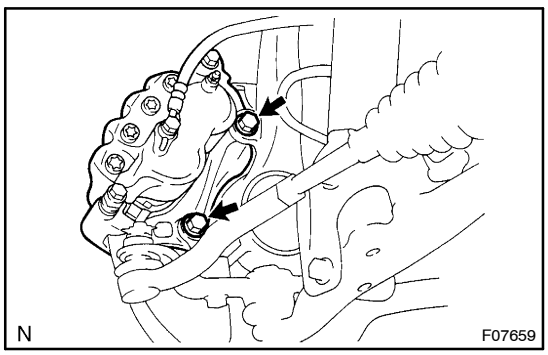
4. REMOVE FRONT SUSPENSION MEMBER BRACE

Remove the 8 bolts and suspension member brace.



5. REMOVE NO. 2 LOWER SUSPENSION ARM

Remove the 2 bolts and No. 2 lower suspension arm from the No. 1 lower suspension arm.



6. REMOVE BRAKE CALIPER AND DISC

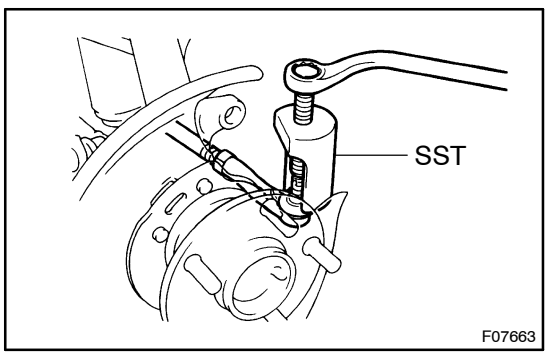
(a) Remove the 2 bolts and brake caliper from the steering knuckle.

(b) Support the brake caliper securely.

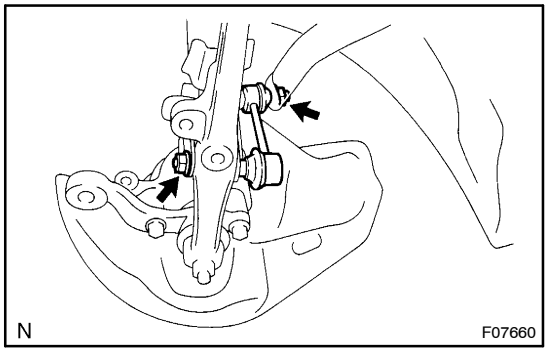
(c) Remove the disc.

7. DISCONNECT TIE ROD END FROM LOWER BALL JOINT

(a) Remove the clip and nut.



(b) Using SST, disconnect the tie rod end.
SST 09610–20012

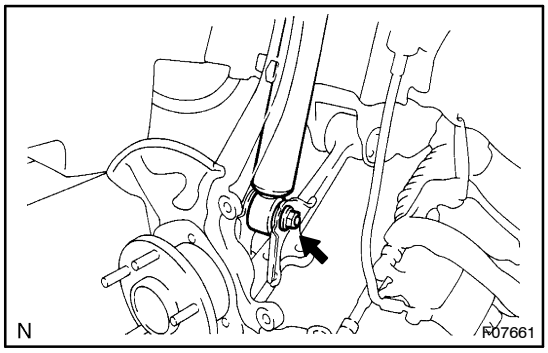


8. REMOVE STABILIZER BAR LINK

Remove the 2 nuts and stabilizer bar link.

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

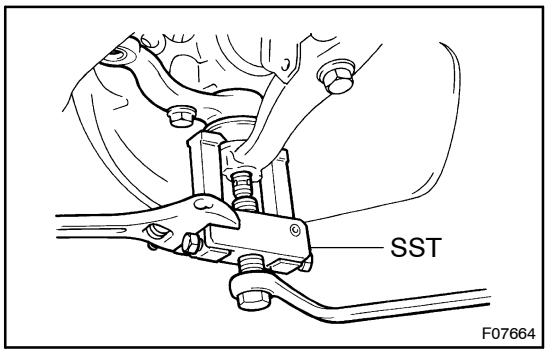


9. DISCONNECT SHOCK ABSORBER FROM SHOCK ABSORBER BRACKET

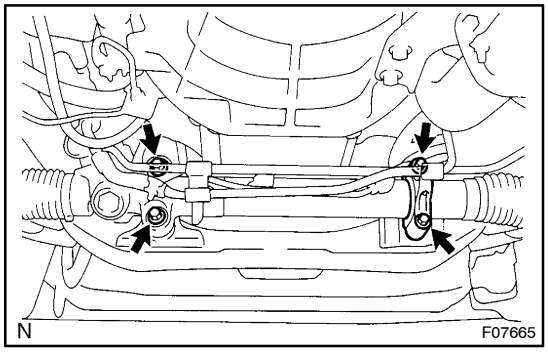
Remove the nut and bolt and disconnect the shock absorber.

10. DISCONNECT LOWER BALL JOINT FROM NO. 1 LOWER SUSPENSION ARM

(a) Remove the cotter pin and nut.



(b) Using SST, disconnect the lower ball joint.
SST 09628–62011



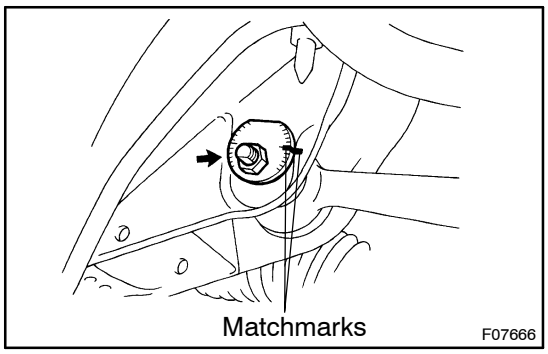
11. DISCONNECT STEERING GEAR ASSEMBLY

(a) Remove the 4 bolts, housing bracket and disconnect the steering gear assembly.

NOTICE:

Be careful not to damage the return tube and pressure feed tube.

(b) Support the steering gear assembly securely.



12. REMOVE NO. 1 LOWER SUSPENSION ARM

(a) Place matchmarks on the cam plate and suspension member.

(b) Remove the nut, washer, cam plate, cam bolt and No.1 lower suspension arm from the suspension member.

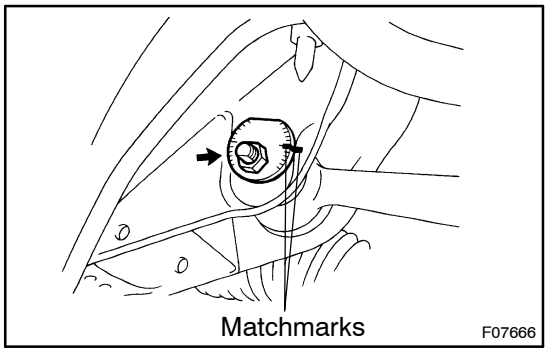
13. REMOVE SHOCK ABSORBER LOWER BRACKET

Remove the bolt and shock absorber lower bracket from the No. 1 lower suspension arm.

SA1IW–01

INSTALLATION

1. INSTALL SHOCK ABSORBER LOWER BRACKET TO NO. 1 LOWER SUSPENSION ARM
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



2. INSTALL NO. 1 LOWER SUSPENSION ARM
(a) Install the No. 1 lower suspension arm to the suspension member with the cam bolt, cam plate, washer and nut.
Torque: 184 N·m (1,880 kgf·cm, 136 ft·lbf)

HINT:
After stabilizing the suspension, align the matchmarks on the cam plate and suspension member, and torque the nut.

(b) Connect the lower ball joint to the No. 1 lower suspension arm with the nut.
Torque: 123 N·m (1,250 kgf·cm, 91 ft·lbf)

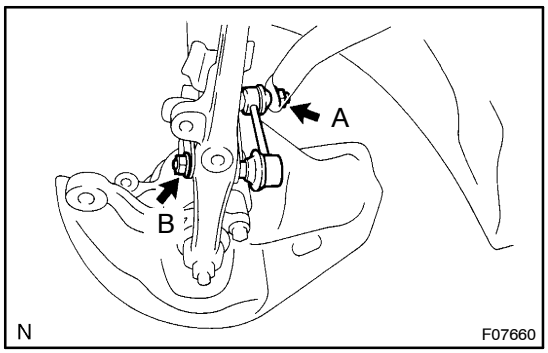
(c) Install a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

3. CONNECT STEERING GEAR ASSEMBLY
Torque: 74 N·m (750 kgf·cm, 55 ft·lbf)

NOTICE:
Be careful not to damage the return tube and pressure feed tube.

4. CONNECT SHOCK ABSORBER TO FRONT SHOCK ABSORBER BRACKET
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



5. INSTALL STABILIZER BAR LINK
Torque:
Nut A: 49 N·m (500 kgf·cm, 36 ft·lbf)
Nut B: 95 N·m (970 kgf·cm, 70 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

6. CONNECT TIE ROD END TO LOWER BALL JOINT

(a) Connect the tie rod end to the lower ball joint with the nut.
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)

(b) Install a new clip.

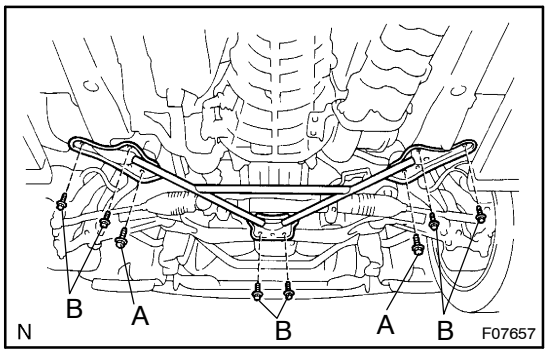
HINT:
If the holes for the clip are not aligned, tighten the nut further up to 60°.

7. INSTALL DISC AND BRAKE CALIPER

Install the disc, brake caliper and 2 bolts.
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

8. CONNECT NO. 2 LOWER SUSPENSION ARM TO NO. 1 LOWER SUSPENSION ARM
Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)

HINT:
After stabilizing the suspension, torque the bolt.



9. INSTALL FRONT SUSPENSION MEMBER BRACE
Torque:
Bolt A: 119 N·m (1,210 kgf·cm, 88 ft·lbf)
Bolt B: 58 N·m (590 kgf·cm, 43 ft·lbf)

HINT:
- Install the bolt A through the No.2 lower suspension arm.
- After stabilizing the suspension, torque the bolt A.

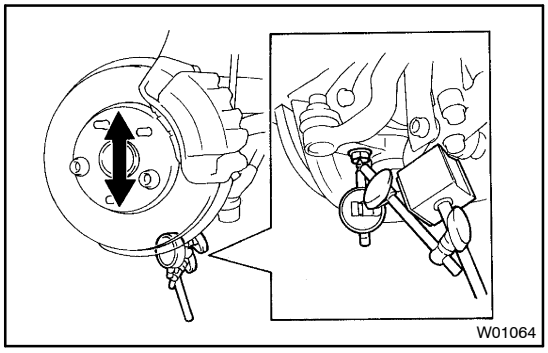
10. INSTALL RH AND LH REAR ENGINE UNDER COVER

11. INSTALL ENGINE UNDER COVER AND ENGINE UNDER COVER NO. 2

12. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

13. DEPRESS BRAKE PEDAL SEVERAL TIMES

14. CHECK FRONT WHEEL ALIGNMENT
(See page SA–5)



FRONT LOWER BALL JOINT

SA0RP–03

ON–VEHICLE INSPECTION

INSPECT LOWER BALL JOINT EXCESSIVE PLAY ON–VEHICLE

(a) Remove the front wheel and install the hub nuts to the disc.

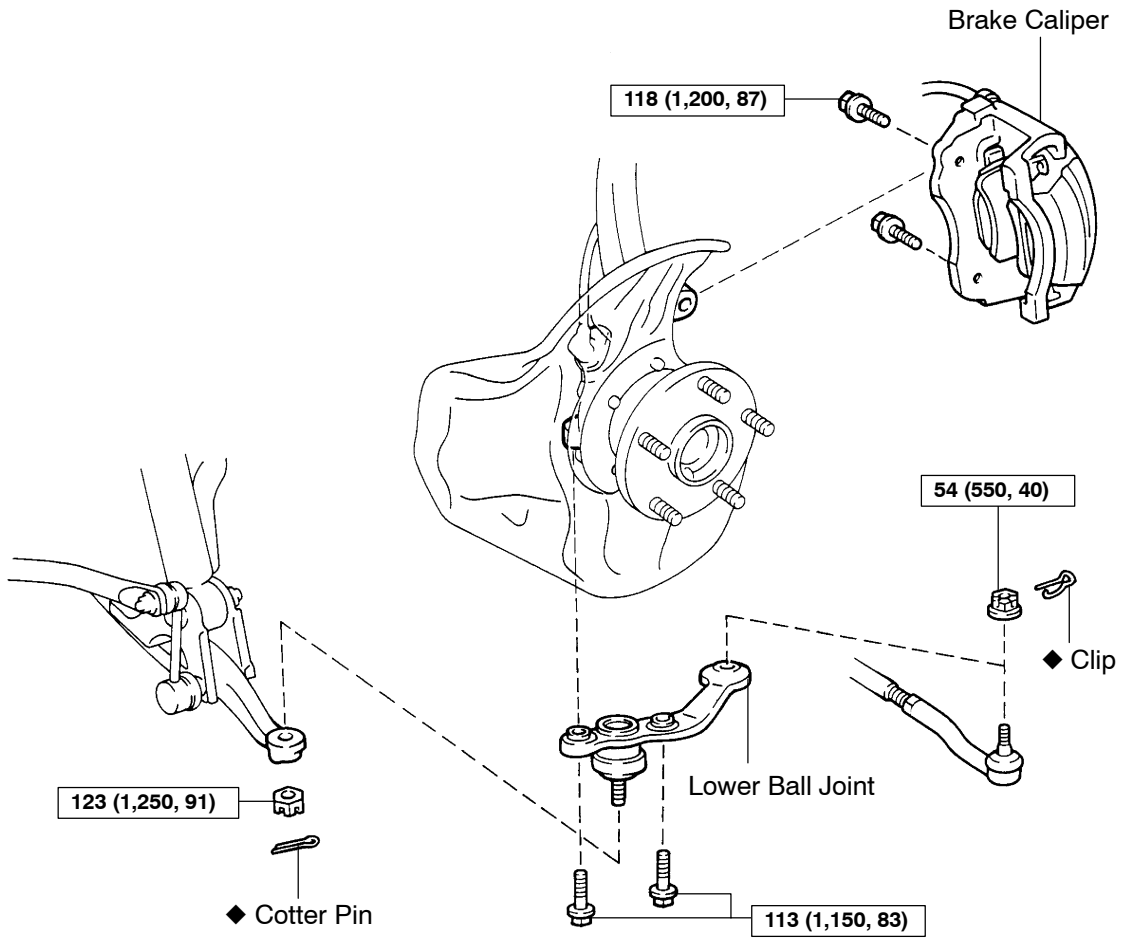
(b) Using a dial indicator, check the lower ball joint for excessive play when you push the hub nuts up and down with a force of 294 N (30 kgf, 66 lbf).

Maximum: 0.9 mm (0.035 in.)

If it is not within the specified value, replace the lower ball joint.

SA0RQ–03

COMPONENTS



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

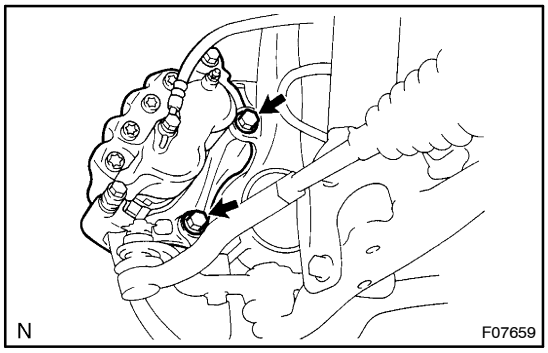
N◆ Non–reusable part

F07667

SA0RR–03

REMOVAL

1. REMOVE FRONT WHEEL



2. REMOVE BRAKE CALIPER

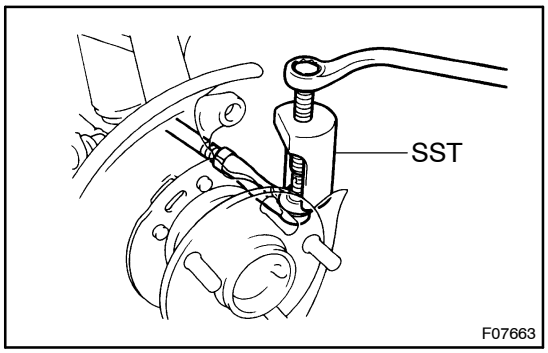
(a) Remove the 2 bolts and brake caliper from the steering knuckle.

(b) Support the brake caliper securely.

(c) Remove the disc.

3. DISCONNECT TIE ROD END FROM LOWER BALL JOINT

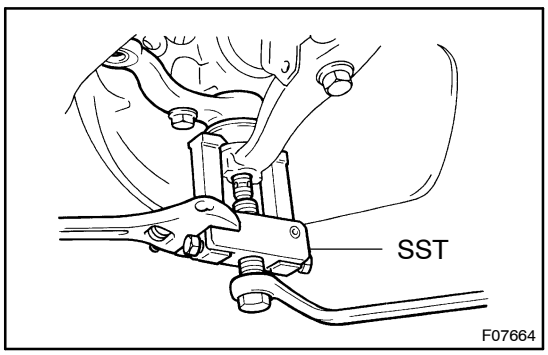
(a) Remove the clip and nut.



(b) Using SST, disconnect the tie rod end.
SST 09610–20012

4. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM

(a) Remove the cotter pin and nut.



(b) Using SST, remove the lower ball joint.
SST 09628–62011

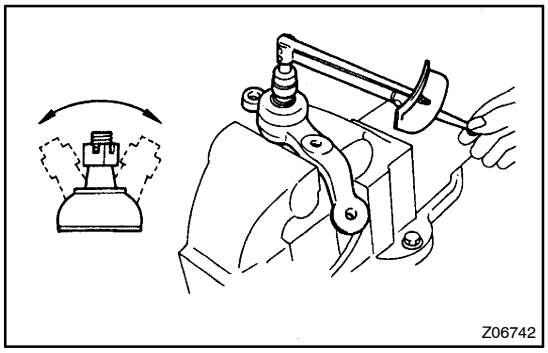
5. REMOVE LOWER BALL JOINT

Remove the 2 bolts and lower ball joint from the steering knuckle.

SA1IX–01

INSPECTION

1. INSPECT LOWER BALL JOINT BOOT FOR DAMAGE



2. INSPECT LOWER BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using torque wrench, turn the nut continuously 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
0.5 – 3.0 N·m (5 – 30 kgf·cm, 0.4 – 26 in.·lbf)

SA0RT–03

INSTALLATION

1. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint to the steering knuckle with the 2 bolts.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

(b) Connect the lower ball joint to the No. 1 lower suspension arm with the nut.
Torque: 123 N·m (1,250 kgf·cm, 91 ft·lbf)

(c) Install a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

2. CONNECT TIE ROD END TO LOWER BALL JOINT

(a) Connect the tie rod end with the nut.
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)

(b) Install a new clip.

If the holes for the clip are not aligned, tighten the nut further up to 60°.

3. INSTALL DISC AND BRAKE CALIPER

Install the disc, brake caliper and 2 bolts.
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

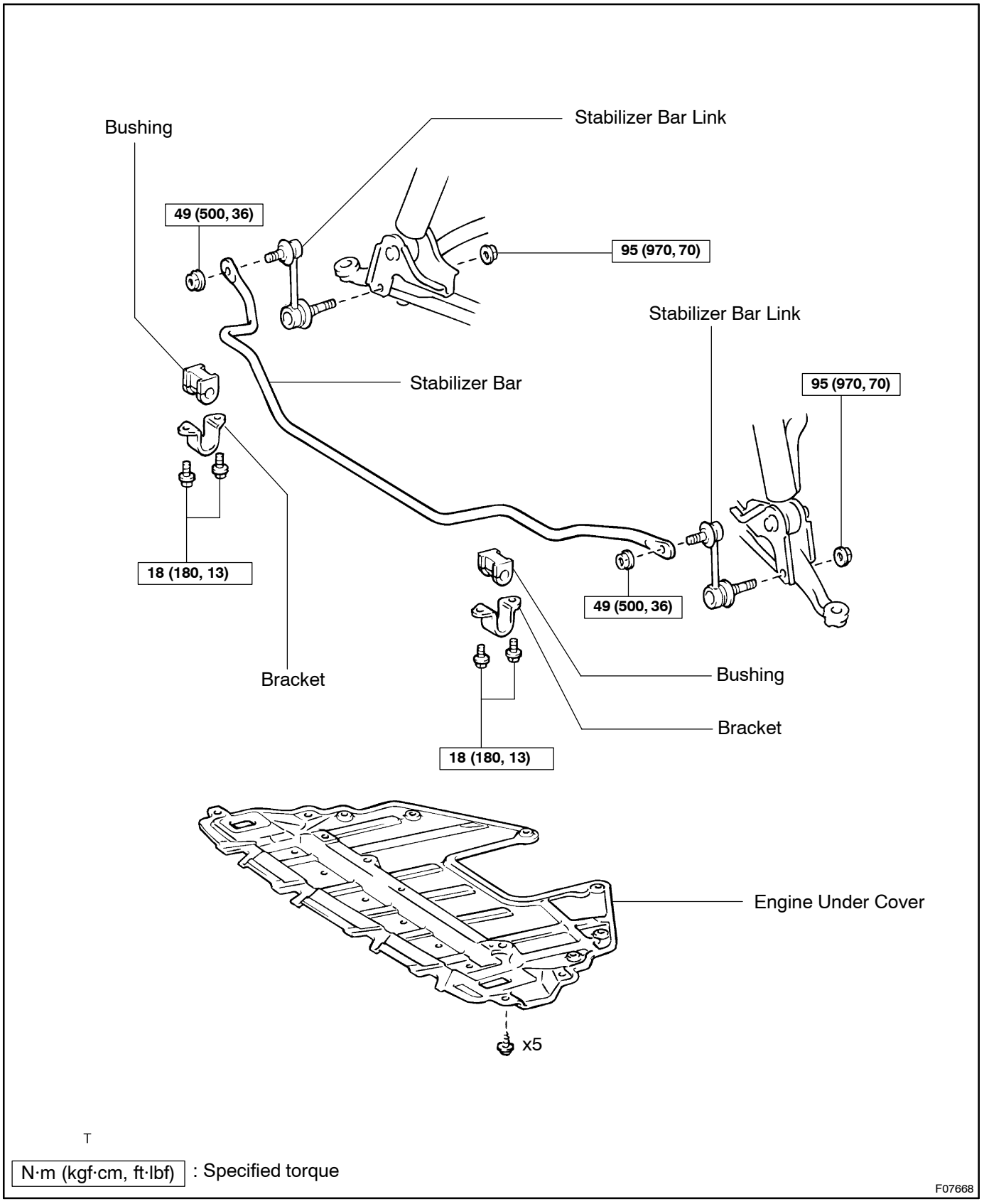
4. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

5. CHECK FRONT WHEEL ALIGNMENT (See page SA–5)

FRONT STABILIZER BAR

COMPONENTS

SA0RU–03



T

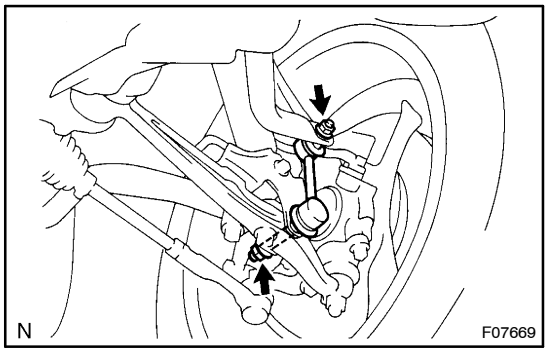
N·m (kgf·cm, ft·lbf) : Specified torque

F07668

SA1IY–01

REMOVAL

1. REMOVE ENGINE UNDER COVER



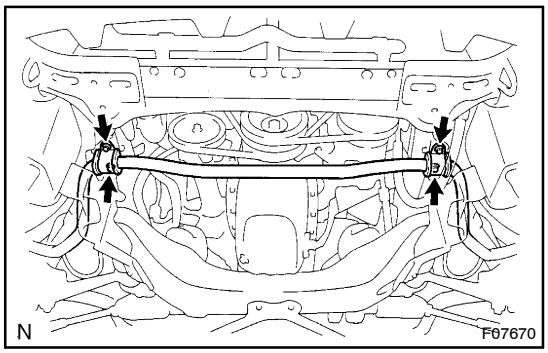
2. REMOVE RH AND LH STABILIZER BAR LINKS

(a) Remove the 2 nuts and stabilizer bar link.

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

(b) Employ the same manner described above to the other side.



3. REMOVE STABILIZER BAR

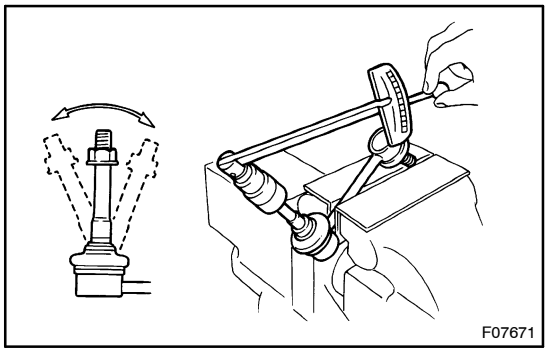
Remove the 4 bolts and stabilizer bar.

4. REMOVE 2 BRACKETS AND BUSHINGS FROM STABILIZER BAR

SA0RW–03

INSPECTION

1. INSPECT STABILIZER BAR LINK BALL JOINT BOOT FOR DAMAGE



2. INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

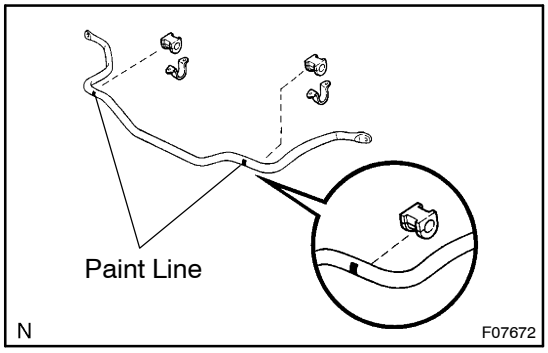
(a) As shown in the illustration, flip the ball joint stud back and forth 5 times before installing the nut.

(b) Using a torque wrench, turn the stud continuously 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
0.05 – 1.9 N·m (0.5 – 20 kgf·cm, 0.4 – 16 in.·lbf)

SA1IZ–01

INSTALLATION



1. INSTALL 2 BUSHINGS AND BRACKETS TO STABILIZER BAR

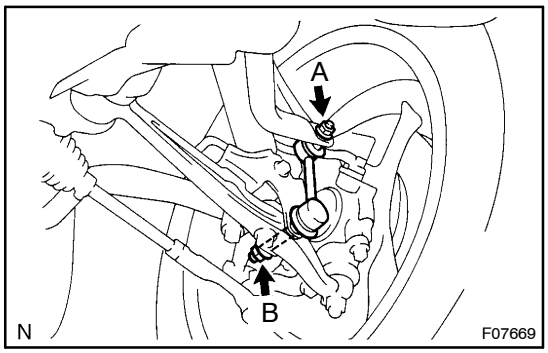
HINT:

- Install the bushing to the stabilizer bar so that the cutout of the bushing faces the front of the vehicle, as shown in the illustration.
- Install the bushing to the outside of the paint line on the stabilizer bar.

2. INSTALL STABILIZER BAR

Install the stabilizer bar to the body with the 4 bolts.

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)



3. INSTALL RH AND LH STABILIZER BAR LINKS

Torque:

Nut A: 49 (500 kgf·cm, 36 ft·lbf)

Nut B: 95 (970 kgf·cm, 70 ft·lbf)

HINT:

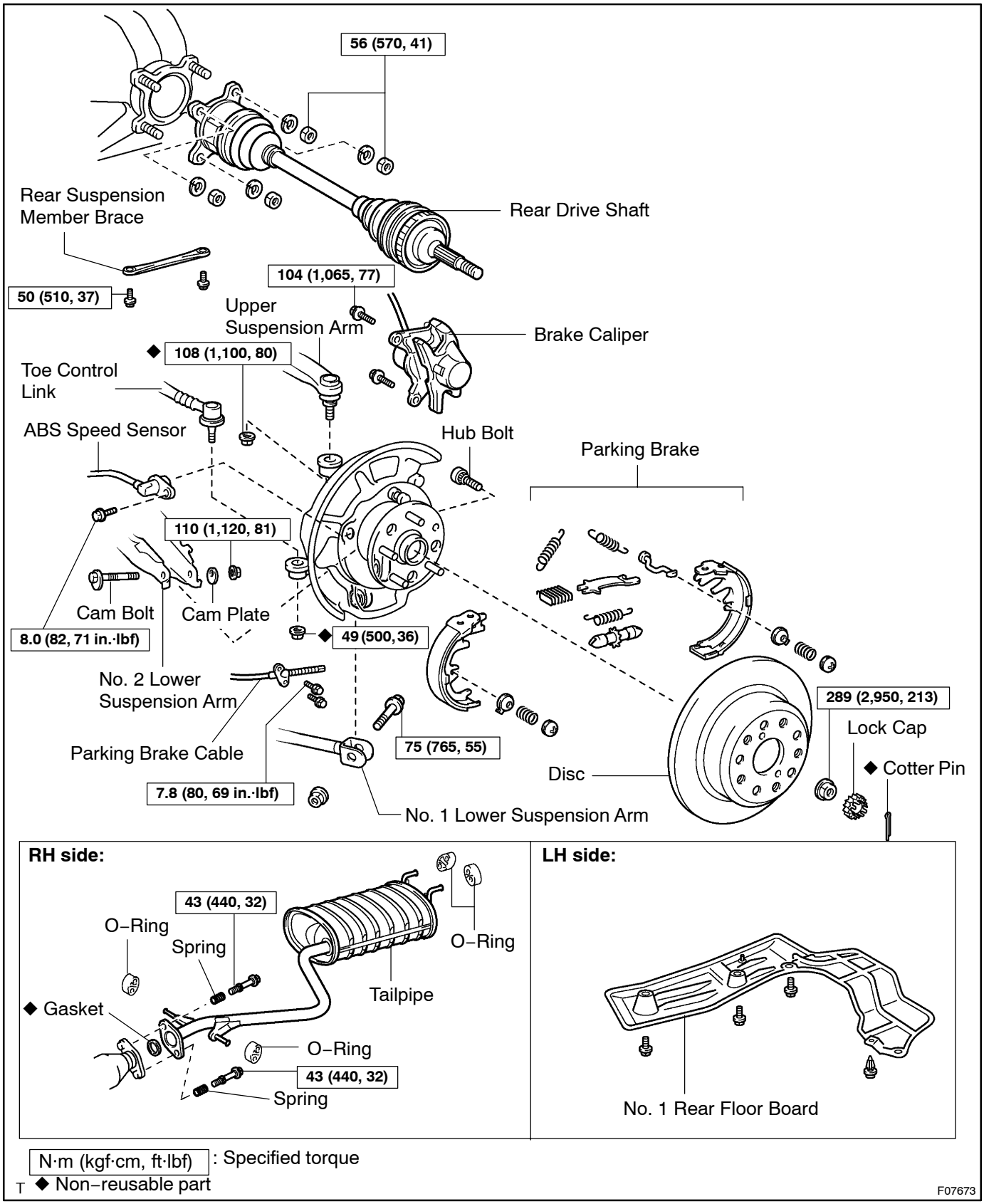
If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

4. INSTALL ENGINE UNDER COVER

REAR AXLE CARRIER

COMPONENTS

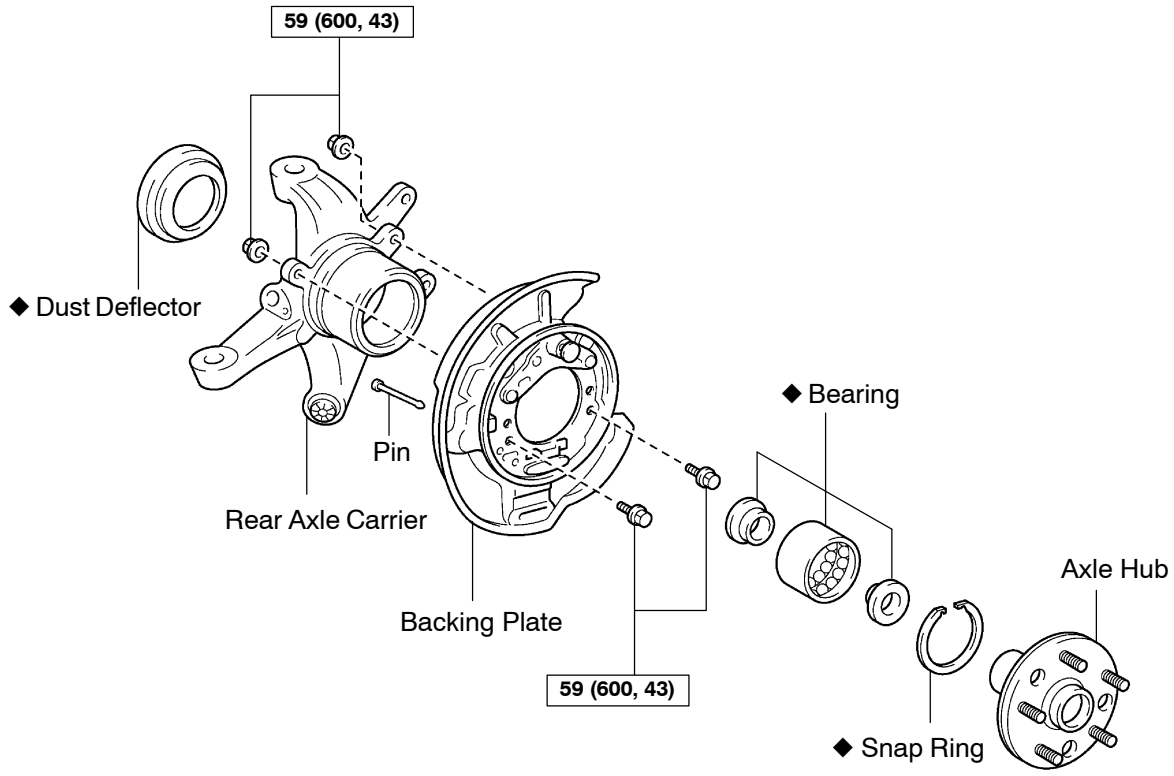
SA1J0–01



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

T ◆ Non–reusable part

F07673



T

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

◆ Non–reusable part

F07674

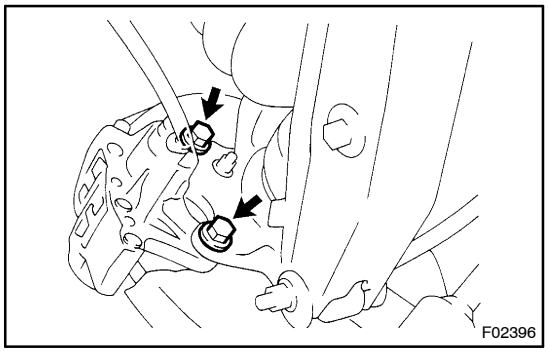
SA1J1–01

REMOVAL

1. REMOVE REAR WHEEL

2. DISCONNECT ABS SPEED SENSOR R FROM REAR AXLE CARRIER

Remove the bolt and disconnect the ABS speed sensor.

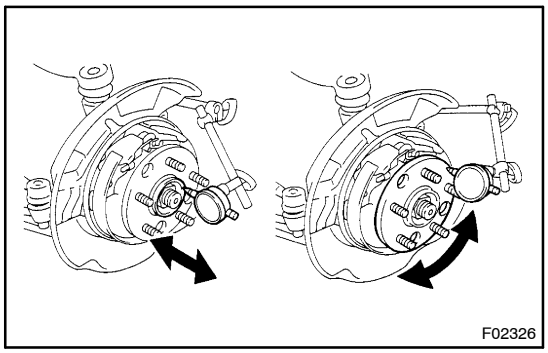


3. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

(a) Remove the 2 bolts and brake caliper from the axle carrier.

(b) Support the brake caliper securely.

(c) Remove the disc.



(d) 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.

(e) 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.

(f) Install the disc, brake caliper and 2 bolts to the axle carrier.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

4. REMOVE DRIVE SHAFT (See page SA–56)

5. REMOVE BRAKE CALIPER AND DISC

(a) Remove the 2 bolts and brake caliper from the axle carrier.

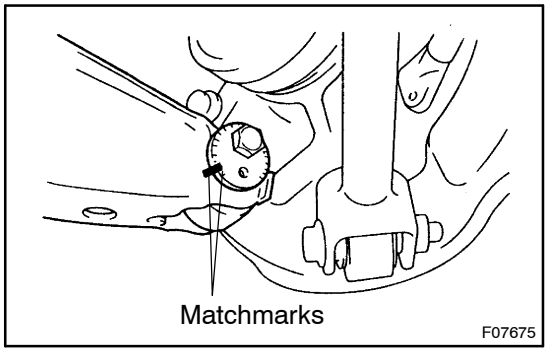
(b) Support the brake caliper securely.

(c) Remove the disc.

6. REMOVE PARKING BRAKE SHOE (See page BR–41)

7. DISCONNECT PARKING BRAKE CABLE FROM BACKING PLATE

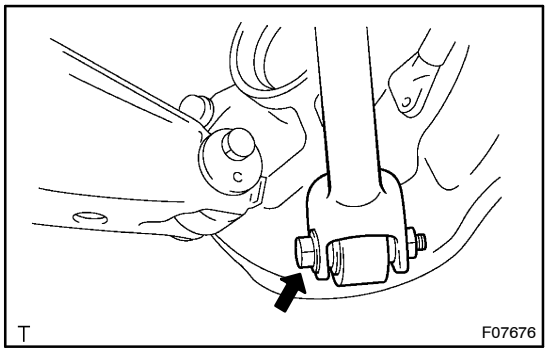
Remove the 2 bolts and disconnect the parking brake cable.



8. LOOSEN NO. 2 LOWER SUSPENSION ARM MOUNTING NUT (OUTSIDE)

(a) Place matchmarks on the cam bolt and No. 2 lower suspension arm.

(b) Loosen the nut of the No. 2 lower suspension arm (outside).

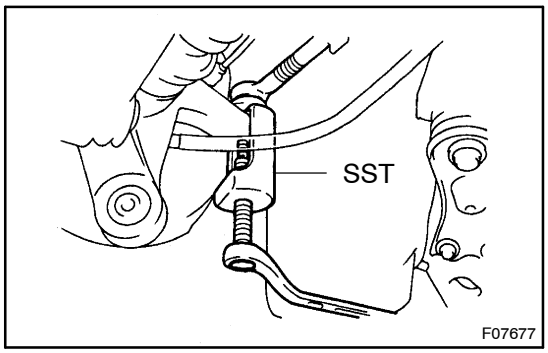


9. DISCONNECT NO. 1 LOWER SUSPENSION FROM REAR AXLE CARRIER

Remove the nut and bolt and disconnect the No. 1 lower suspension arm.

10. DISCONNECT TOE CONTROL LINK FROM AXLE CARRIER

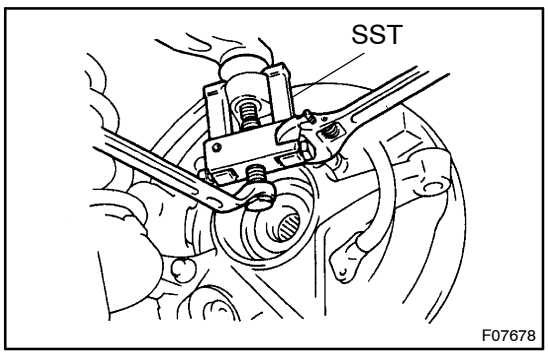
(a) Remove the nut.



(b) Using SST, disconnect the toe control link.
SST 09610–20012

11. DISCONNECT UPPER SUSPENSION ARM FROM REAR AXLE CARRIER

(a) Remove the nut.



(b) Using SST, disconnect the upper suspension arm.
SST 09628–62011

NOTICE:

Support the axle carrier.

12. REMOVE REAR AXLE CARRIER

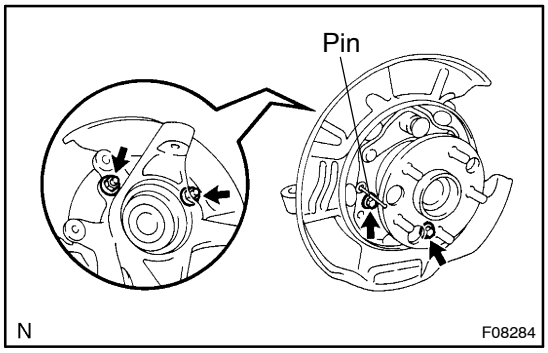
Remove the nut, cam plate, cam bolt and axle carrier from the No. 2 lower suspension.

SA1J2–01

DISASSEMBLY

1. REMOVE DUST DEFLECTOR

Using a screwdriver, remove the dust deflector.



2. REMOVE AXLE HUB

(a) Remove the 2 bolts, nuts and pin.

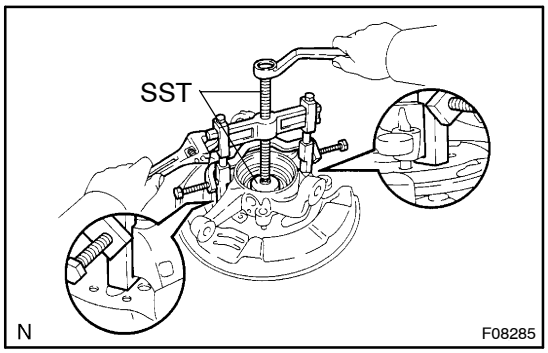
(b) Mount the axle carrier in a vise.

HINT:

Use a set of soft jaws in the vise to protect the axle carrier.

NOTICE:

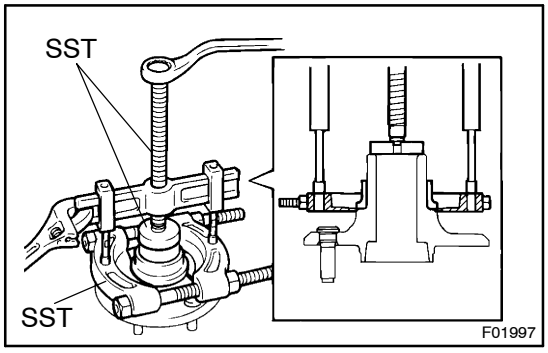
Do not tighten the vise too tight.



(c) Using SST, remove the axle hub from the axle carrier.

SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04051, 09957–04010, 09958–04011), 09950–60010 (09951–00480)

(d) Remove the backing plate.



(e) Using SST, remove the bearing inner race from the axle hub.

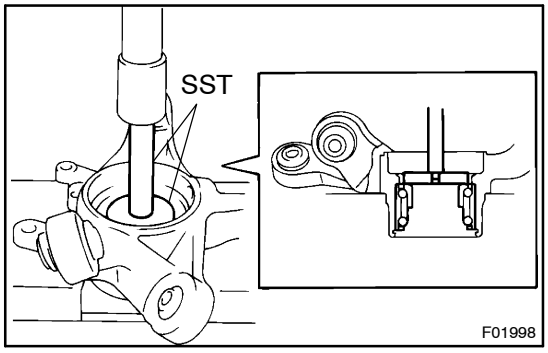
SST 09950–00020, 09950–40011 (09951–04020, 09953–04030, 09957–04010), 09950–50012 (09952–05010, 09954–05020, 09955–05040), 09950–60010 (09951–00480)

NOTICE:

Be careful not to damage the axle hub.

3. REMOVE BEARING

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

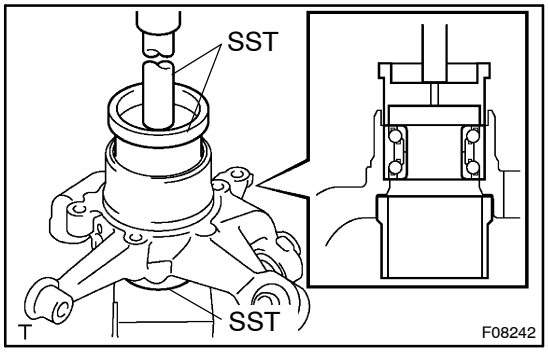


(b) Using SST and a press, remove the bearing from the axle carrier.

SST 09950–60010 (09951–00650),
09950–70010 (09951–07100)

SA0S1–03

REASSEMBLY



1. INSTALL BEARING

(a) Using SST and a press, install a new bearing to the axle carrier.

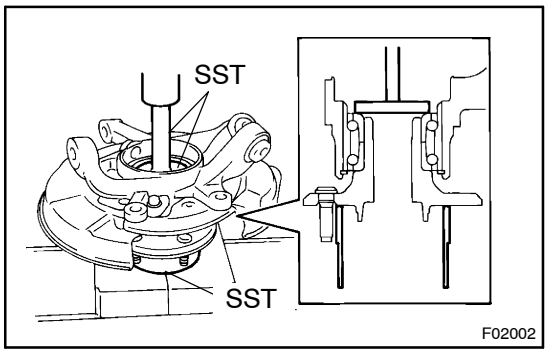
SST 09223–15020, 09527–17011, 09950–70010 (09951–07100)

(b) Using snap ring pliers, install a new snap ring to the axle carrier.

2. INSTALL AXLE HUB

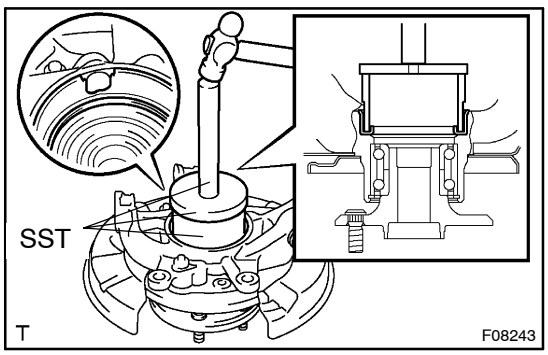
(a) Install the backing plate, pin, 2 bolts and nuts.

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



(b) Using SST and a press, install the axle hub to the axle carrier.

SST 09527–17011, 09950–60020 (09551–00750), 09950–70010 (09951–07100)



3. INSTALL DUST DEFLECTOR

Using SST and a hammer, install a new dust deflector to the axle carrier.

SST 09527–17011, 09950–60020 (09951–01030), 09950–70010 (09951–07100)

HINT:

Align the speed sensor installation hole of dust deflector and that of axle carrier.

SA1J3–01

INSTALLATION

1. INSTALL REAR AXLE CARRIER

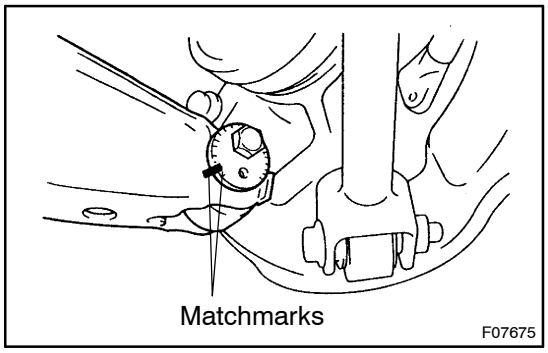
(a) Temporarily install the axle carrier to the upper suspension arm with a new nut.

(b) Connect the No. 1 lower suspension arm to the axle carrier with the bolt and nut.

Torque: 75 N·m (765 kgf·cm, 55 ft·lbf)

HINT:

After stabilizing the suspension, torque the nut.



(c) Connect the No. 2 lower suspension arm to the axle carrier with the cam bolt, cam plate and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, align the matchmarks on the cam bolt and No. 2 lower suspension arm, torque the nut.

(d) Connect the toe control link to the axle carrier with a new nut.

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

(e) Torque the nut on the upper side of the axle carrier.

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)

2. CONNECT PARKING BRAKE CABLE TO BACKING PLATE

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

3. INSTALL PARKING BRAKE SHOE (See page BR–44)

4. INSTALL DISC AND BRAKE CALIPER

Install the disc, brake caliper and 2 bolts.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

5. INSTALL DRIVE SHAFT (See page SA–62)

6. CONNECT ABS SPEED SENSOR TO REAR AXLE CARRIER

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

7. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION (See page SA–47)

8. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

9. DEPRESS BRAKE PEDAL SEVERAL TIMES

10. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

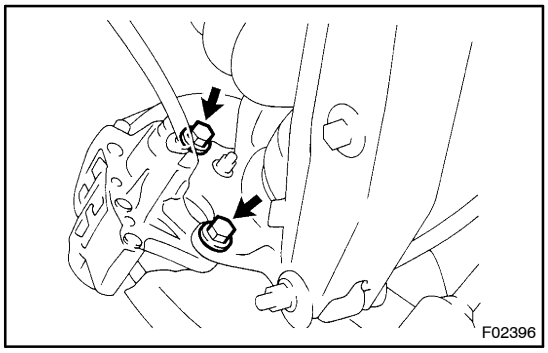
11. CHECK ABS SPEED SENSOR SIGNAL (See page DI–223)

REAR WHEEL HUB BOLT

SA0S3–03

REPLACEMENT

1. REMOVE REAR WHEEL

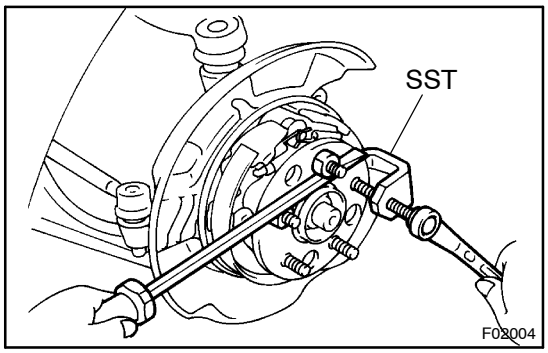


2. REMOVE BRAKE CALIPER AND DISC

(a) Remove the 2 bolts and brake caliper from the axle carrier.

(b) Support the brake caliper securely.

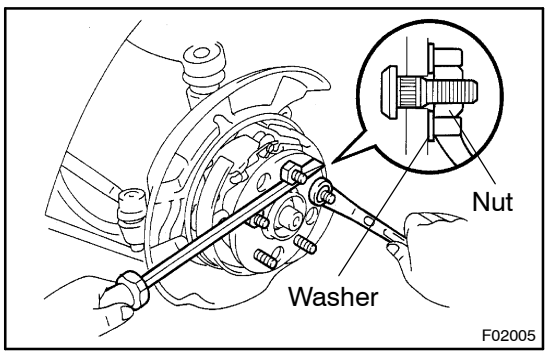
(c) Remove the disc.



3. REMOVE HUB BOLT

Using SST and a screwdriver or an equivalent to hold, remove the hub bolt.

SST 09628–10011



4. INSTALL HUB BOLT

(a) Install a washer and nut to a new bolt, as shown in the illustration.

(b) Using a screwdriver or an equivalent to hold, install the hub bolt by turning the nut.

5. INSTALL DISC AND BRAKE CALIPER

Install the disc, brake caliper and 2 bolts to the axle carrier.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

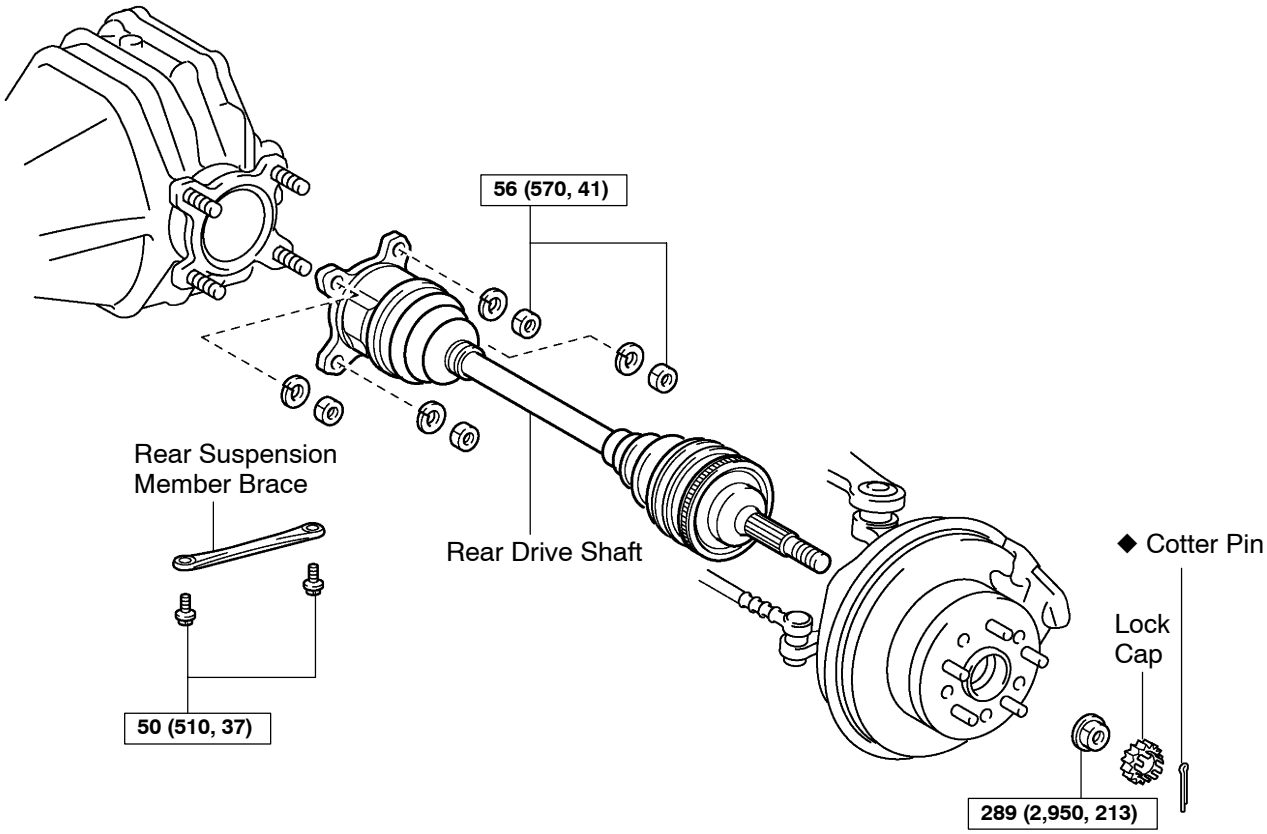
6. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

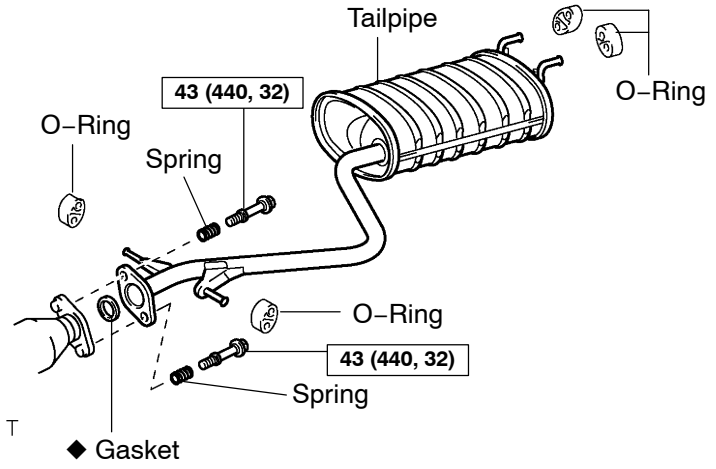
REAR DRIVE SHAFT

COMPONENTS

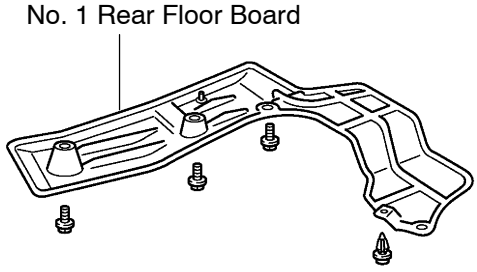
SA1J4–01



RH side:

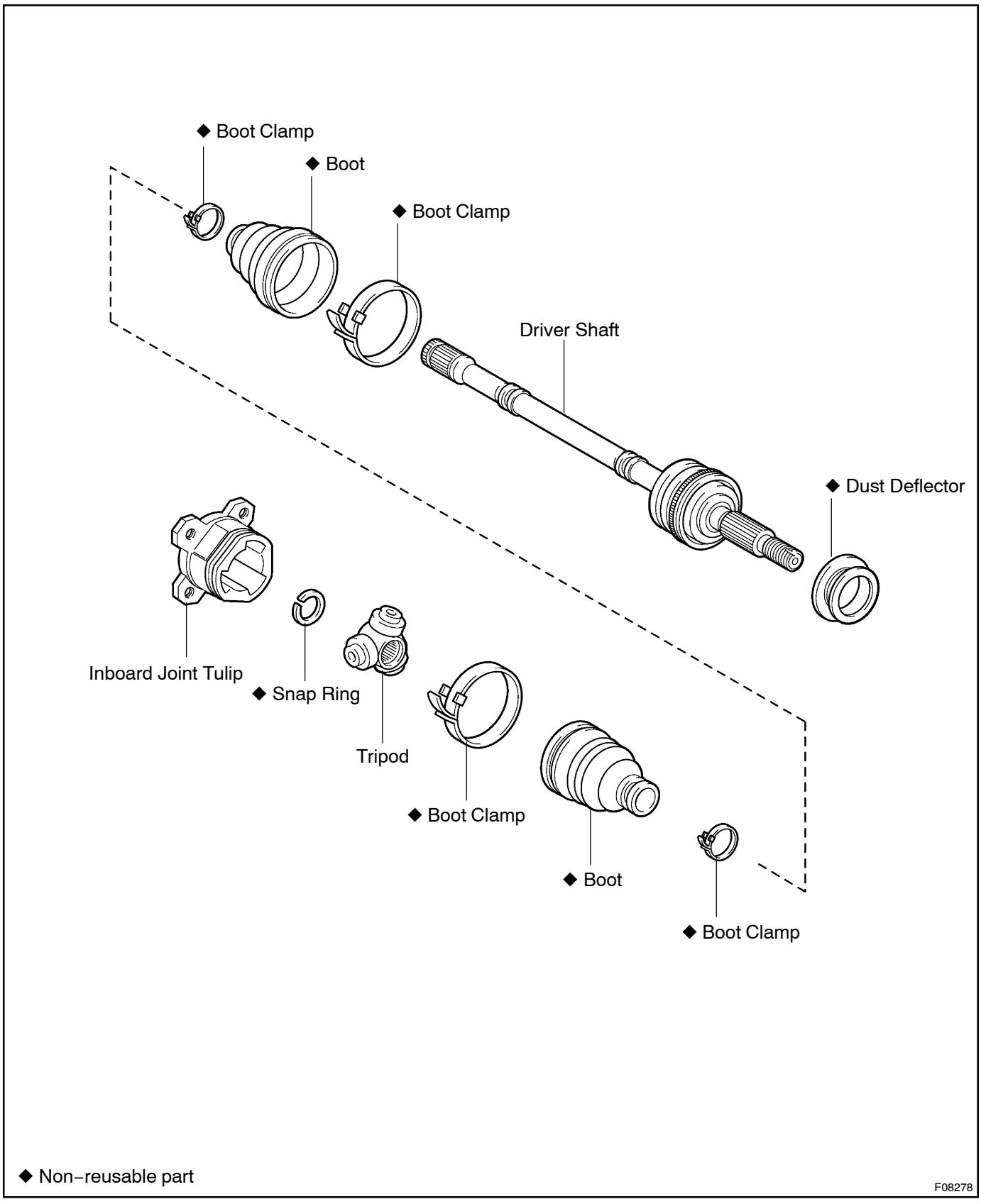


LH side:



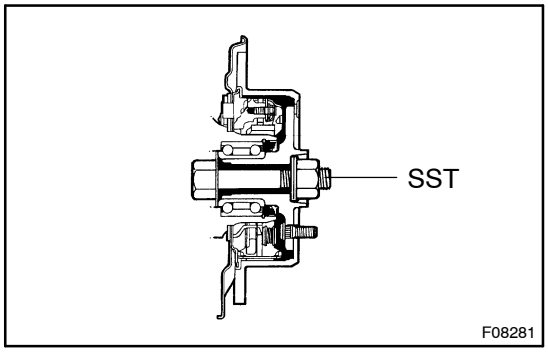
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

F08283


◆ Boot Clamp
◆ Boot
◆ Boot Clamp
Driver Shaft
◆ Dust Deflector
Inboard Joint Tulip
◆ Snap Ring
Tripod
◆ Boot Clamp
◆ Boot
◆ Boot Clamp
◆ Non–reusable part
F08278

SA1J5–01

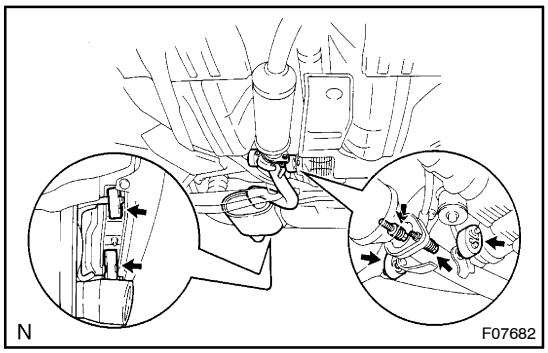
REMOVAL



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)
- **After disconnecting the drive shaft from the axle hub, work carefully so as not to damage the ABS speed sensor rotor serration on the drive shaft.**

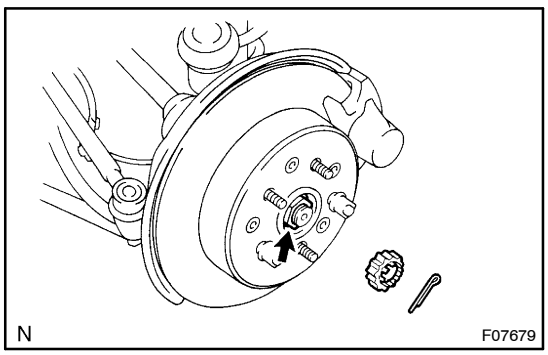
1. REMOVE REAR WHEEL



2. RH side:
REMOVE TAILPIPE

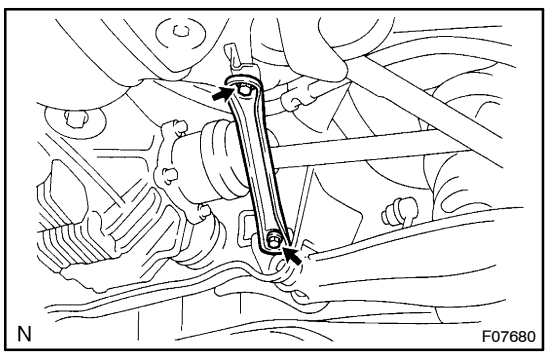
(a) Remove the 2 bolts, springs and disconnect the tailpipe from the center exhaust pipe.
(b) Disconnect the 4 O–rings from the tailpipe and remove the tailpipe.
(c) Support the center exhaust pipe securely.
(d) Remove the gasket.

3. LH side:
REMOVE NO. 1 REAR FLOOR BOARD



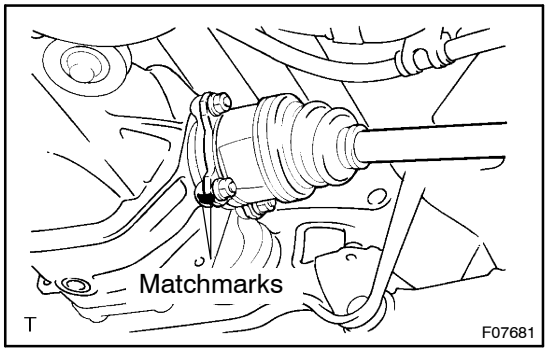
4. REMOVE COTTER PIN, LOCK CAP AND LOCK NUT

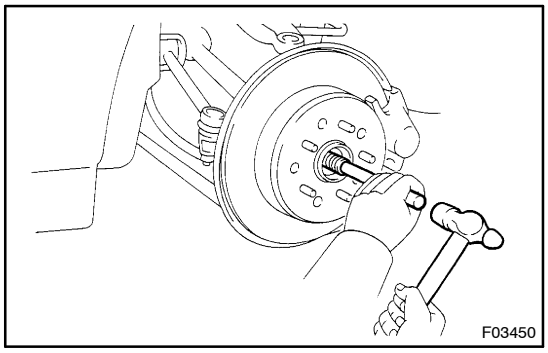
(a) Remove the cotter pin and lock cap.
(b) While depressing the brake pedal, using a socket wrench (32 mm), remove the nut.



5. REMOVE REAR SUSPENSION MEMBER BRACE

Remove the 2 bolts and suspension member brace.





6. REMOVE REAR DRIVE SHAFT

(a) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to marks.

(b) Remove the 4 nuts and washers while depressing the brake pedal.

(c) Push and compress the inboard joint and disconnect the drive shaft from the side gear shaft.

NOTICE:

Be careful not to damage the boots and end cover.

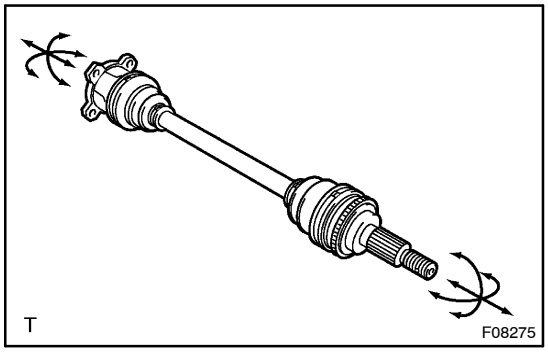
(d) Using a brass bar and hammer, lightly tap the end of the drive shaft to disengage the axle hub and remove the drive shaft.

NOTICE:

Be careful not to damage the boots, ABS speed sensor rotor of the drive shaft and oil seal of the axle hub bearing.

SA1J6–01

DISASSEMBLY



1. CHECK DRIVE SHAFT

(a) Check that operation of the joint is smooth within the sliding region in the axial direction.

(b) Check that the boots are not cracked, damaged or leaking.

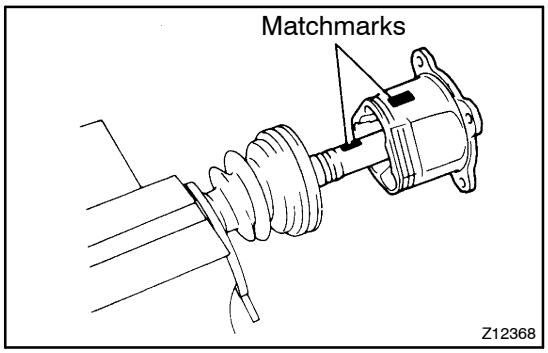
(c) Check that there are no scratches on the ABS speed sensor rotor.

2. REMOVE INBOARD AND OUTBOARD JOINT BOOT CLAMPS

Using a screwdriver, loosen the 4 boot clamps.

3. REMOVE INBOARD JOINT TULIP

(a) Slide the inboard joint boot toward the outboard.



(b) Place matchmarks on the inboard joint tulip and drive shaft.

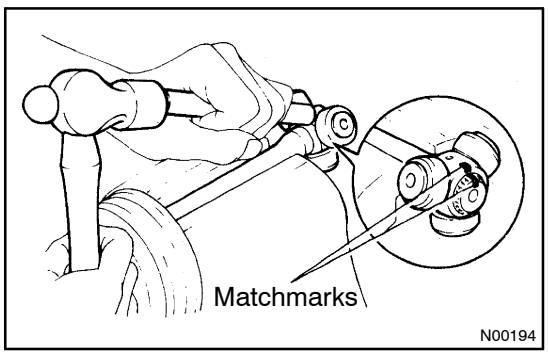
NOTICE:

Do not punch the marks.

(c) Remove the inboard joint tulip from the drive shaft.

4. REMOVE TRIPOD

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



(b) Place matchmarks on the drive shaft and tripod.

NOTICE:

Do not punch the marks.

(c) Using a brass bar and hammer, remove the tripod from the drive shaft.

NOTICE:

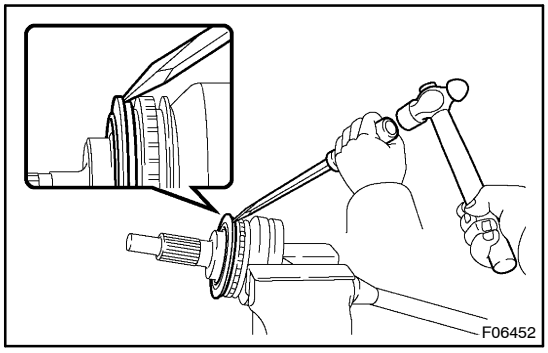
Do not tap the roller.

5. REMOVE INBOARD AND OUTBOARD JOINT BOOTS AND CLAMPS

Slide out the 2 boots and 4 clamps.

NOTICE:

Do not disassemble the outboard joint.

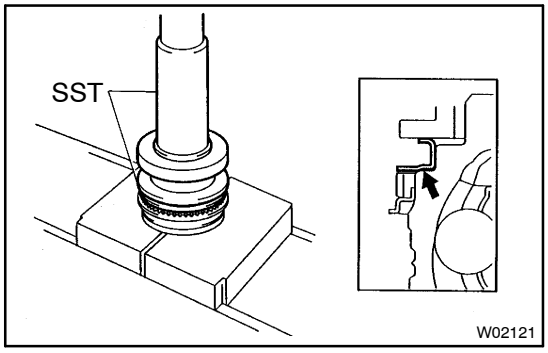


6. REMOVE DUST DEFLECTOR

Using a screwdriver and hammer, remove the dust deflector.

SA1J7–01

REASSEMBLY



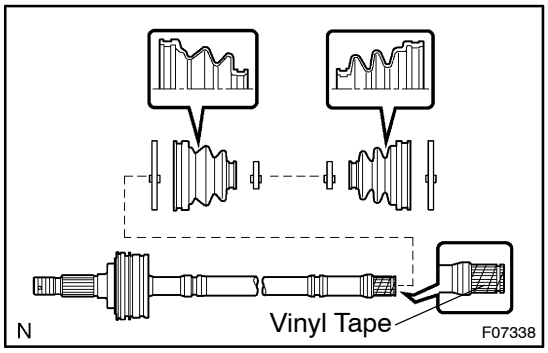
1. INSTALL NEW DUST DEFLECTOR

Using SST and a press, install a new dust deflector.

SST 09309–36010, 09502–12010

NOTICE:

Be careful not to damage the ABS speed sensor rotor.



2. TEMPORARILY INSTALL 2 NEW OUTBOARD AND INBOARD JOINT BOOTS AND 4 BOOT CLAMPS

HINT:

Before installing the 2 boots, wrap the spline of the drive shaft with vinyl tape to prevent the boots from being damaged.

3. INSTALL TRIPOD

(a) Place the beveled side of the tripod axial spline toward the outboard joint.

(b) Align the matchmarks placed before removal.

(c) Using a brass bar and hammer, tap in the tripod to the drive shaft.

NOTICE:

Do not tap the roller.

(d) Using a snap ring expander, install a new snap ring.

4. INSTALL BOOT TO DRIVE SHAFT

Before assembling the boot, pack the outboard joint and boot with grease in the boot kit.

Grease capacity (Color = Black):

Country (Transmission type)	Capacity
Europe	120 – 130 g (4.2 – 4.6 oz.)
Taiwan	
Australia (M/T)	
New Zealand (M/T)	
Hong Kong (M/T)	
Thai Land (M/T)	
Others	107 – 117 g (3.8 – 4.1 oz.)

5. INSTALL INBOARD JOINT TULIP

(a) Pack the inboard joint and boot with grease in the boot kit.

Grease capacity (Color = Yellow ocher):

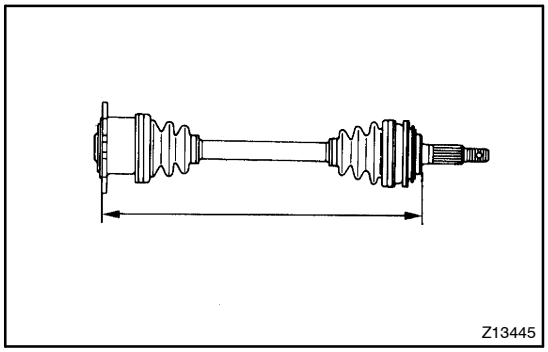
Country (Transmission type)	Capacity
Europe	215 – 225 g (7.6 – 8.9 oz.)
Taiwan	
Australia (M/T)	
New Zealand (M/T)	
Hong Kong (M/T)	
Thai Land (M/T)	
Others	180 – 190 g (6.3 – 6.7 oz.)

(b) Align the matchmarks placed before removal, and install the inboard joint tulip to the drive shaft.

(c) Temporarily install the boot to the inboard joint tulip.

6. CHECK DRIVE SHAFT LENGTH

(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.

Standard length:

Country (Transmission type)	Length
Europe	RH: 604.3 ± 5.0 mm (23.791 ± 0.197 in.) LH: 558.3 ± 5.0 mm (21.980 ± 0.197 in.)
Taiwan	
Australia (M/T)	
New Zealand (M/T)	
Hong Kong (M/T)	
Thai Land (M/T)	
Others	RH: 603.3 ± 5.0 mm (23.752 ± 0.197 in.) LH: 558.3 ± 5.0 mm (21.980 ± 0.197 in.)

7. INSTALL BOOT CLAMPS

(a) Place 4 boot clamps on the 2 boots.

(b) Bend the band and lock it with a screwdriver.

8. CHECK DRIVE SHAFT (See page SA–58)

SA1J8–01

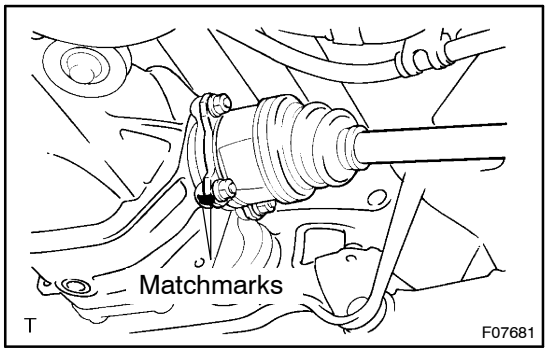
INSTALLATION

1. INSTALL REAR DRIVE SHAFT

(a) Install the drive shaft to the axle hub.

NOTICE:

- **Be careful not to damage the boots and ABS speed sensor rotor of the drive shaft and oil seal of the axle hub bearing.**
- **Make sure the outboard joint side of the drive shaft does not bend too much.**



(b) Align the matchmarks and push and compress the inboard joint and connect the drive shaft to the side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

(c) Install the 4 washers and nuts while depressing the brake pedal.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

2. INSTALL REAR SUSPENSION MEMBER BRACE

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

3. INSTALL LOCK NUT, LOCK CAP AND COTTER PIN

(a) While applying brakes, using a socket wrench (32 mm), install the nut.

Torque: 289 N·m (2,950 kgf·cm, 213 ft·lbf)

(b) Install the lock cap and a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

4. RH side:

INSTALL TAILPIPE

(a) Install a new gasket.

(b) Install the tailpipe to the 4 O–rings.

(c) Connect the tailpipe to the center exhaust pipe with the 2 springs and bolts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

5. LH side:

INSTALL NO. 1 REAR FLOOR BOARD

6. CHECK REAR WHEEL ALIGNMENT

(See page SA–8)

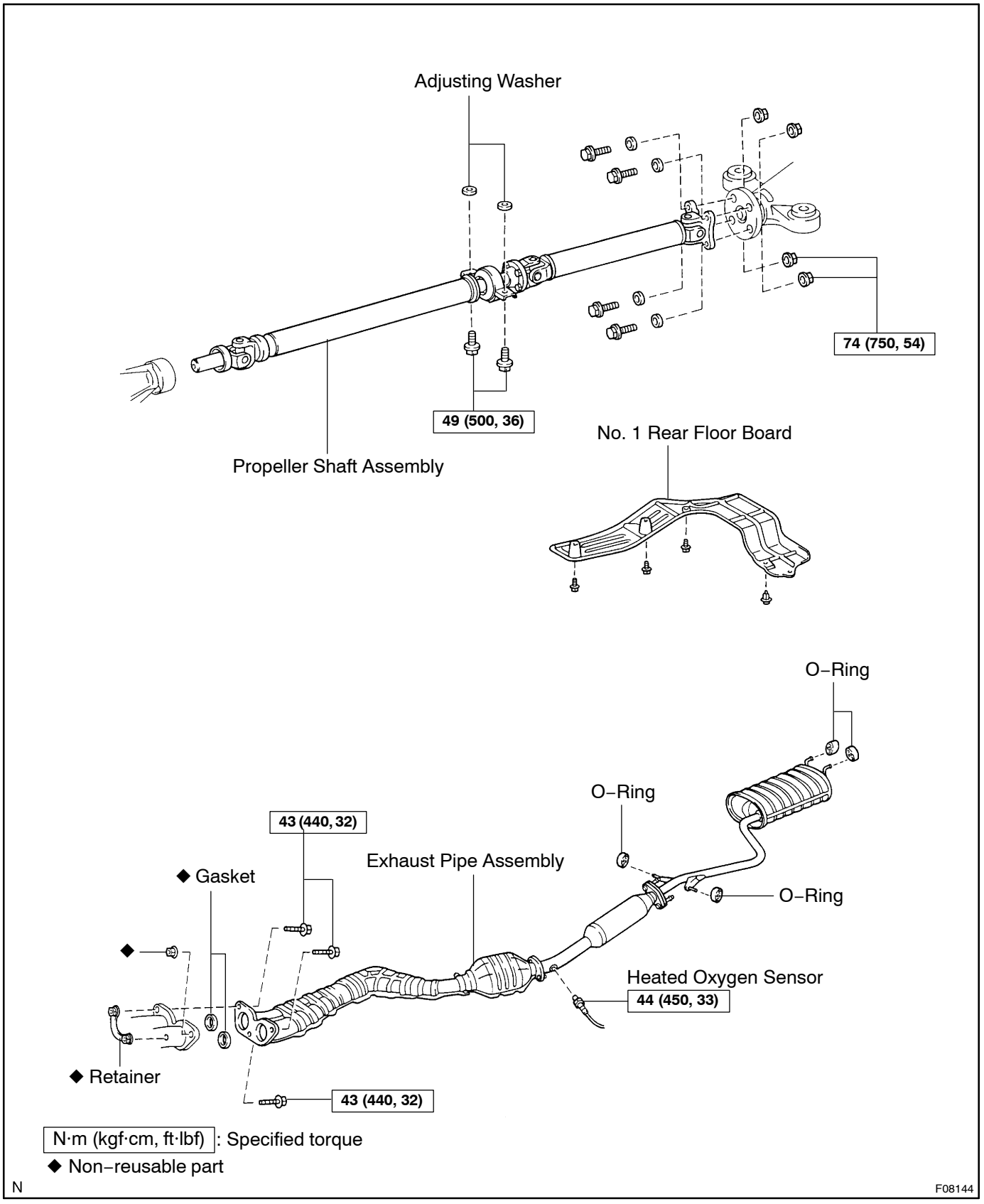
7. CHECK ABS SPEED SENSOR SIGNAL

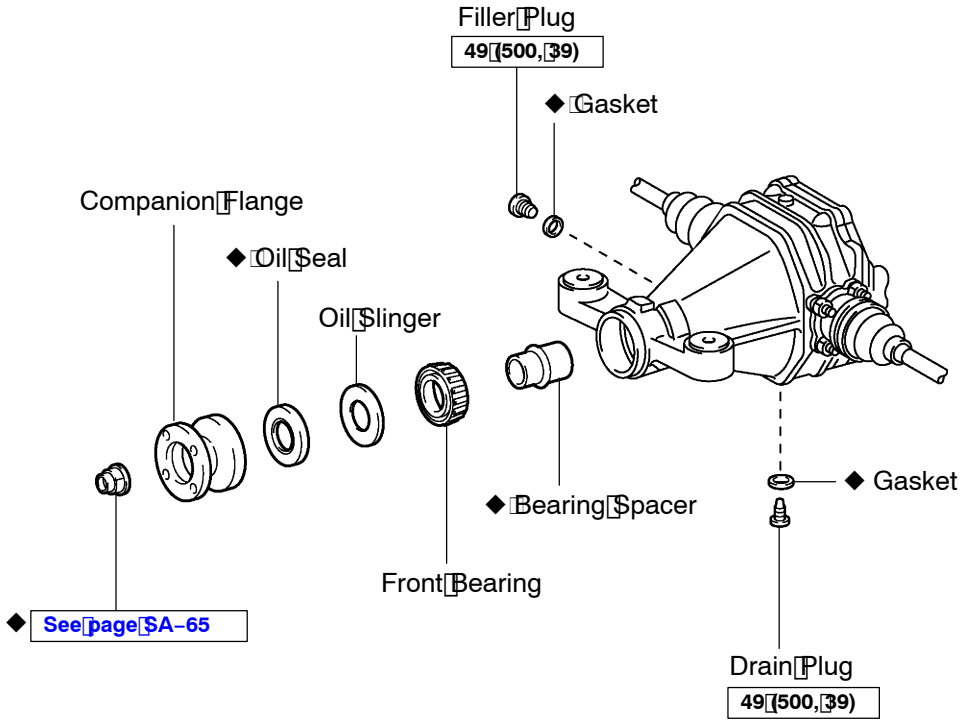
(See page DI–223)

REAR DIFFERENTIAL FRONT OIL SEAL

COMPONENTS

SA1J9–01

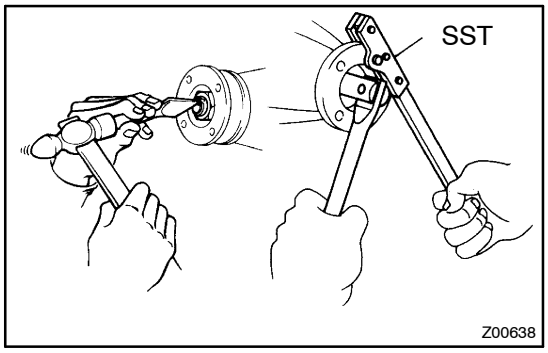



Filler Plug
49 (500, 39)
◆ Gasket
Companion Flange
◆ Oil Seal
Oil Slinger
◆ Bearing Spacer
Front Bearing
◆ Gasket
◆ See page SA–65
Drain Plug
49 (500, 39)
T
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
F07687

SA1JA–01

REPLACEMENT

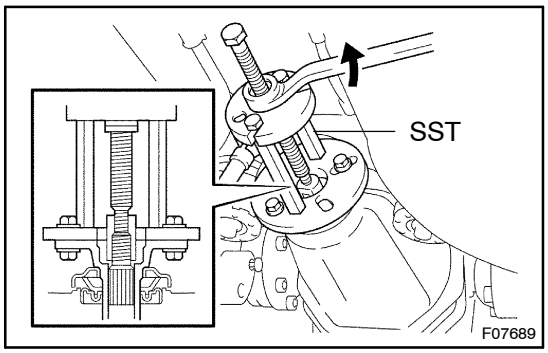
1. REMOVE NO. 1 REAR FLOOR BOARD
2. DRAIN DIFFERENTIAL OIL
3. REMOVE PROPELLER SHAFT (See page PR–4)



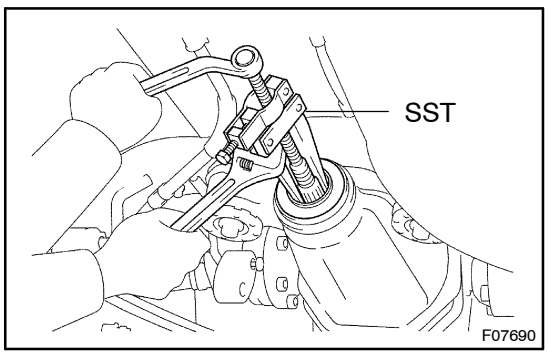
4. REMOVE COMPANION FLANGE

(a) Using a chisel and hammer, unstake the nut.

(b) Using SST to hold the flange, remove the nut.
SST 09330–00021



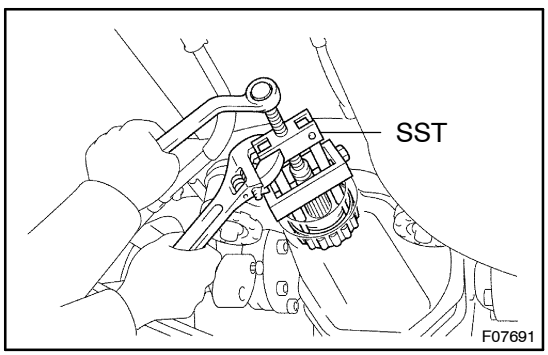
(c) Using SST, remove the companion flange.
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



5. REMOVE REAR DIFFERENTIAL FRONT OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal.
SST 09308–10010

(b) Remove the oil slinger.



6. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the drive pinion.
SST 09556–22010

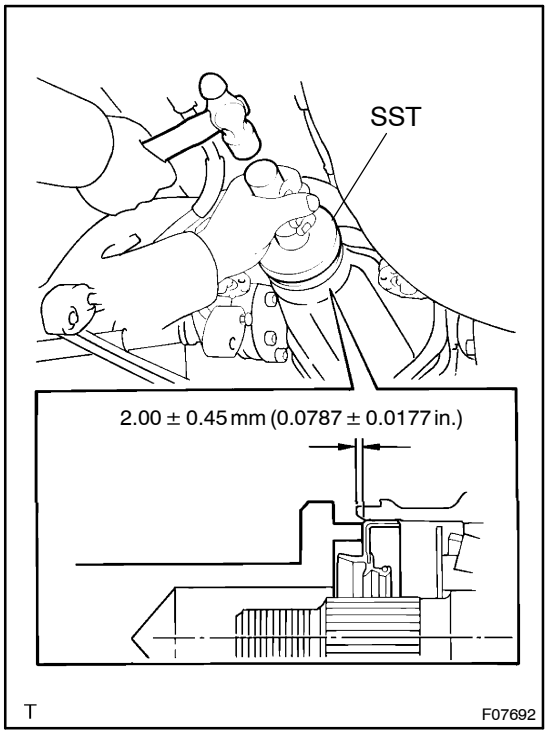
(b) Remove the bearing spacer.

7. INSTALL BEARING SPACER, FRONT BEARING AND OIL SLINGER

Install a new bearing spacer, front bearing and oil slinger.

HINT:

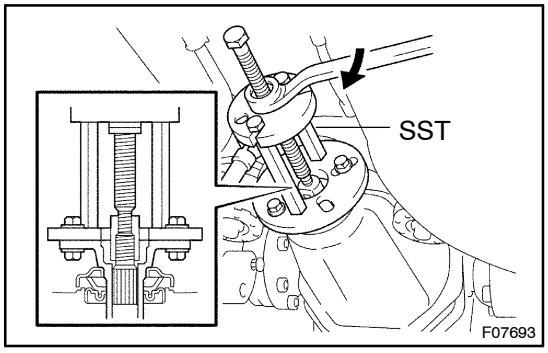
- Install the bearing spacer with its larger diameter side facing the rearward.
- Install the oil slinger with the concave surface facing the bearing side.



8. INSTALL REAR DIFFERENTIAL FRONT OIL SEAL

(a) Using SST and hammer, install a new oil seal.
SST 09554–30011
Oil seal drive in depth:
2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)

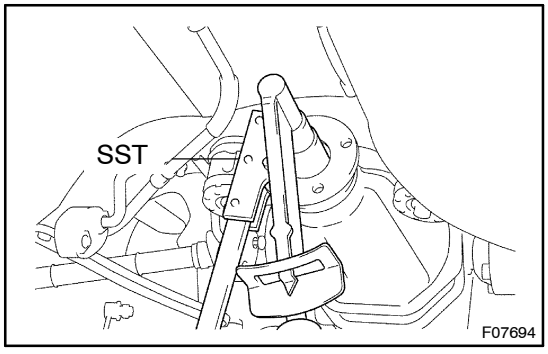
(b) Coat MP grease to the oil seal lip.



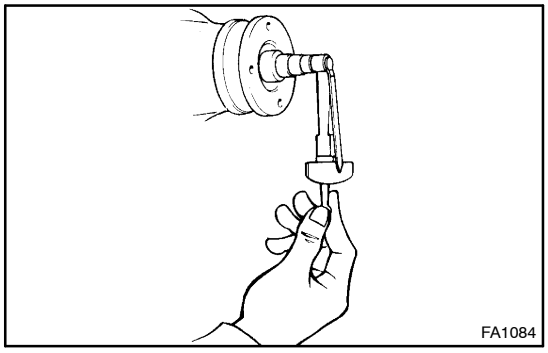
9. INSTALL COMPANION FLANGE

(a) Using SST, install the companion flange.
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

(b) Coat the threads of a new nut with hypoid gear oil LSD.



(c) Using SST to hold the flange, torque the nut while checking the preload.
SST 09330–00021


FA1084

10. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload of the using the backlash between the drive pinion and ring gear.

Preload (at starting):
New bearing:
1.4 – 2.0 N·m (14 – 20 kgf·cm, 12.4 – 17.7 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 the specified value, replace the bearing spacer.

If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

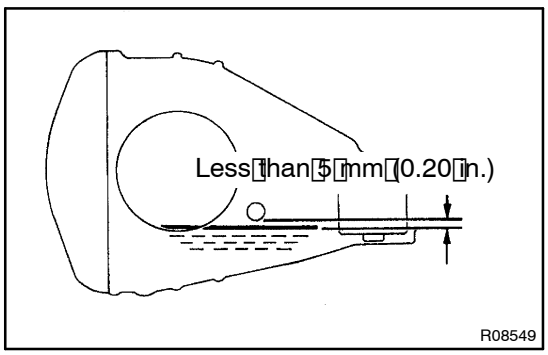
Torque: 223 N·m (2,274 kgf·cm, 164 ft·lbf) or less

If the maximum torque is exceeded while retighten the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

11. STAKE DRIVE PINION NUT

Using a chisel and hammer, stake the nut.

12. INSTALL PROPELLER SHAFT (See page PR–10)



R08549

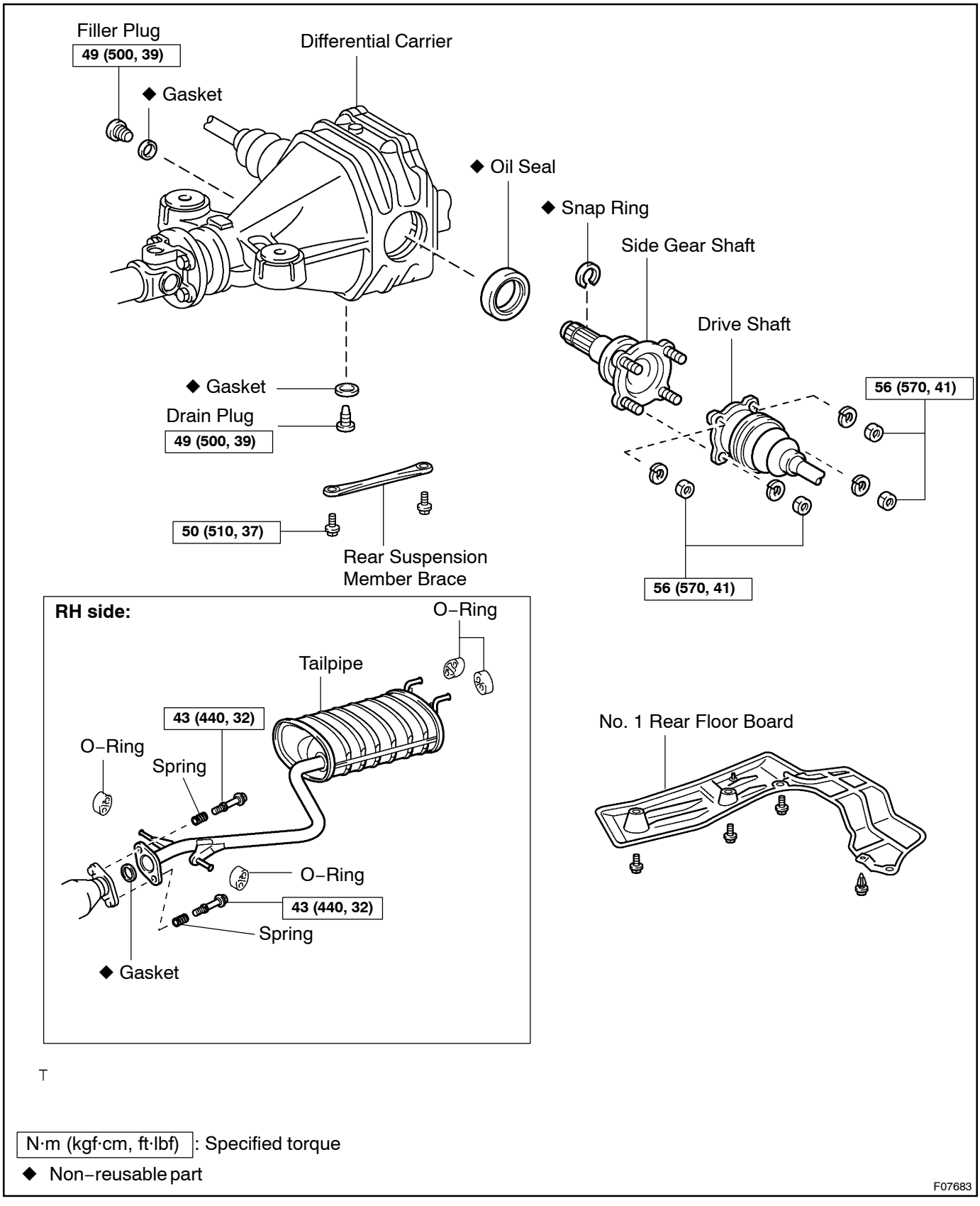
13. FILL AND CHECK DIFFERENTIAL OIL LEVEL
Torque: 49 N·m (500 kgf·cm, 39 ft·lbf)
Oil grade: Hypoid gear oil API GL–5
Viscosity:
Above –18 °C (0 °F) SAE 90
Below –18 °C (0 °F) SAE 80W–90 or 80W
Capacity:
2 pinion defferential:
1.05 liters (1.11 US qts, 0.92 lmp qts)
LSD:
1.00 liters (1.06 US qts, 0.88 lmp qts)

14. INSTALL NO. 1 REAR FLOOR BOARD

REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

SA0S9–03

COMPONENTS



T

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

◆ Non–reusable part

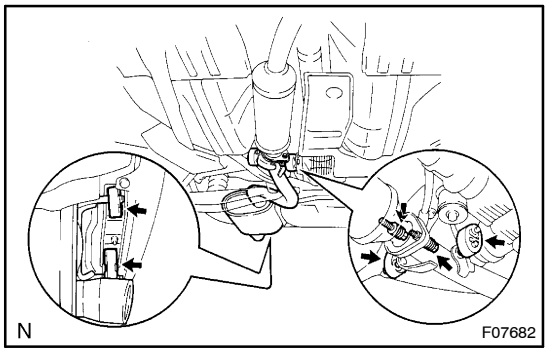
F07683

SA1JB–01

REPLACEMENT

1. REMOVE NO. 1 REAR FLOOR BOARD

2. DRAIN DIFFERENTIAL OIL



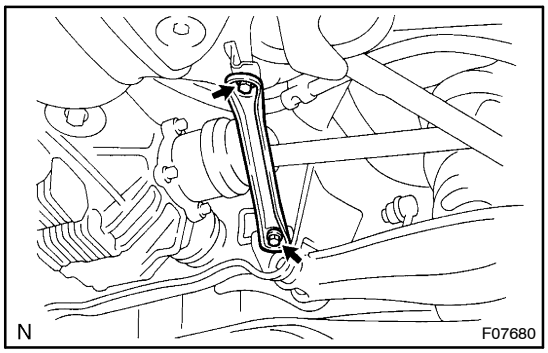
3. RH side:
REMOVE TAILPIPE

(a) Remove the 2 bolts, springs and disconnect the tailpipe from the center exhaust pipe.

(b) Disconnect the 4 O–rings from the tailpipe and remove the tailpipe.

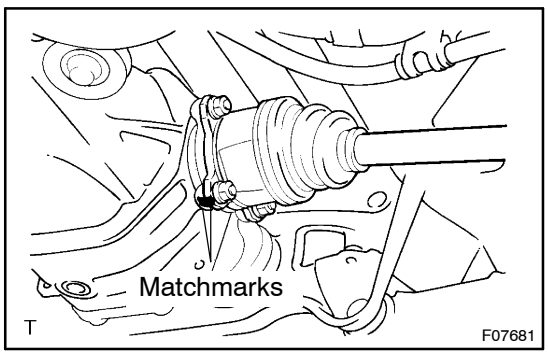
(c) Support the center exhaust pipe securely.

(d) Remove the gasket.



4. REMOVE REAR SUSPENSION MEMBER BRACE

Remove the 2 bolts and suspension member brace.



5. DISCONNECT DRIVE SHAFT FROM SIDE GEAR SHAFT

(a) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to mark the matchmarks. Use paint, etc.

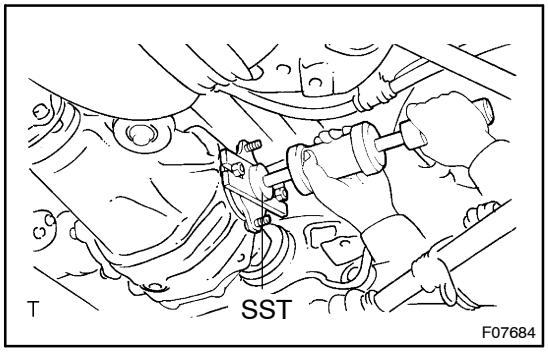
(b) Remove the 4 nuts and washers while depressing the brake pedal.

(c) Push and compress the inboard joint and disconnect the drive shaft from the side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

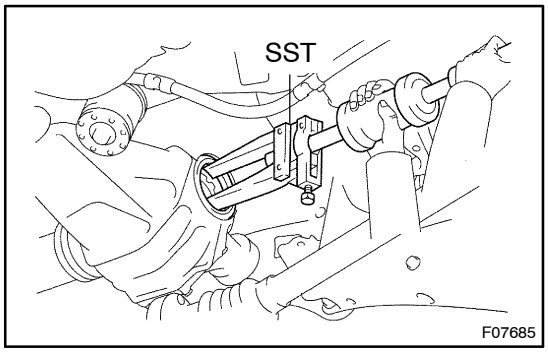
(d) Support the drive shaft securely.



6. REMOVE SIDE GEAR SHAFT

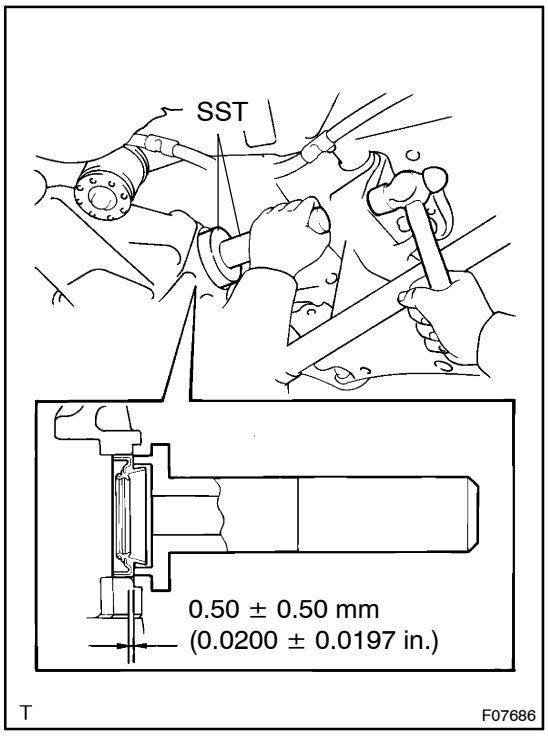
(a) Using SST and the 2 nuts, remove the side gear shaft.
SST 09520–24010

(b) Using needle–nose pliers, remove the snap ring from the side gear shaft.



7. REMOVE SIDE GEAR SHAFT OIL SEAL

Using SST, remove the oil seal.
SST 09308–00010



8. INSTALL SIDE GEAR SHAFT OIL SEAL

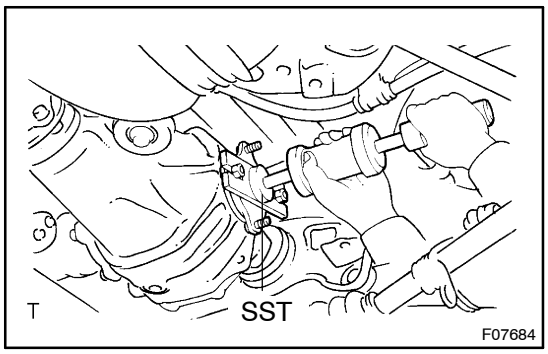
(a) Using SST and a hammer, install a new oil seal.
SST 09554–22010
Oil seal drive in depth:
0.50 ± 0.50 mm (0.0200 ± 0.0197 in.)

(b) Coat MP grease to the oil seal lip.

9. INSTALL SIDE GEAR SHAFT

(a) Using needle–nose pliers, install a new snap ring to the side gear shaft.

(b) Coat the snap ring with MP grease.



(c) Using SST and the 2 nuts, install the side gear shaft.
SST 09520–24010

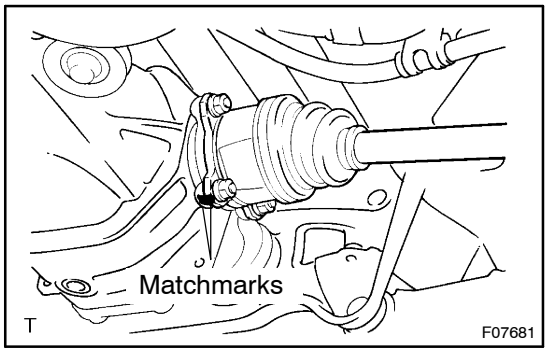
NOTICE:

Be careful not to damage the side gear shaft oil seal.

HINT:

- Before installing the drive shaft, set the snap ring with it's opening side facing downward.
- Whether the side gear shaft is in contact with the side gear or not can be known from the sound or feeling when driving it.

(d) Check that the side gear shaft will not come out by trying to pull it out by hand.



10. CONNECT DRIVE SHAFT TO SIDE GEAR SHAFT

(a) Align the matchmarks and push and compress the inboard joint and connect the drive shaft to the side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

(b) Install the 4 washers and nuts while depressing the brakes pedal.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

11. INSTALL REAR SUSPENSION MEMBER BRACE

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

12. RH side:

INSTALL TAILPIPE

(a) Install a new gasket.

(b) Install the tailpipe to the 4 O–rings.

(c) Connect the tailpipe to the center exhaust pipe with the 2 springs and bolts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

13. FILL AND CHECK DIFFERENTIAL OIL LEVEL

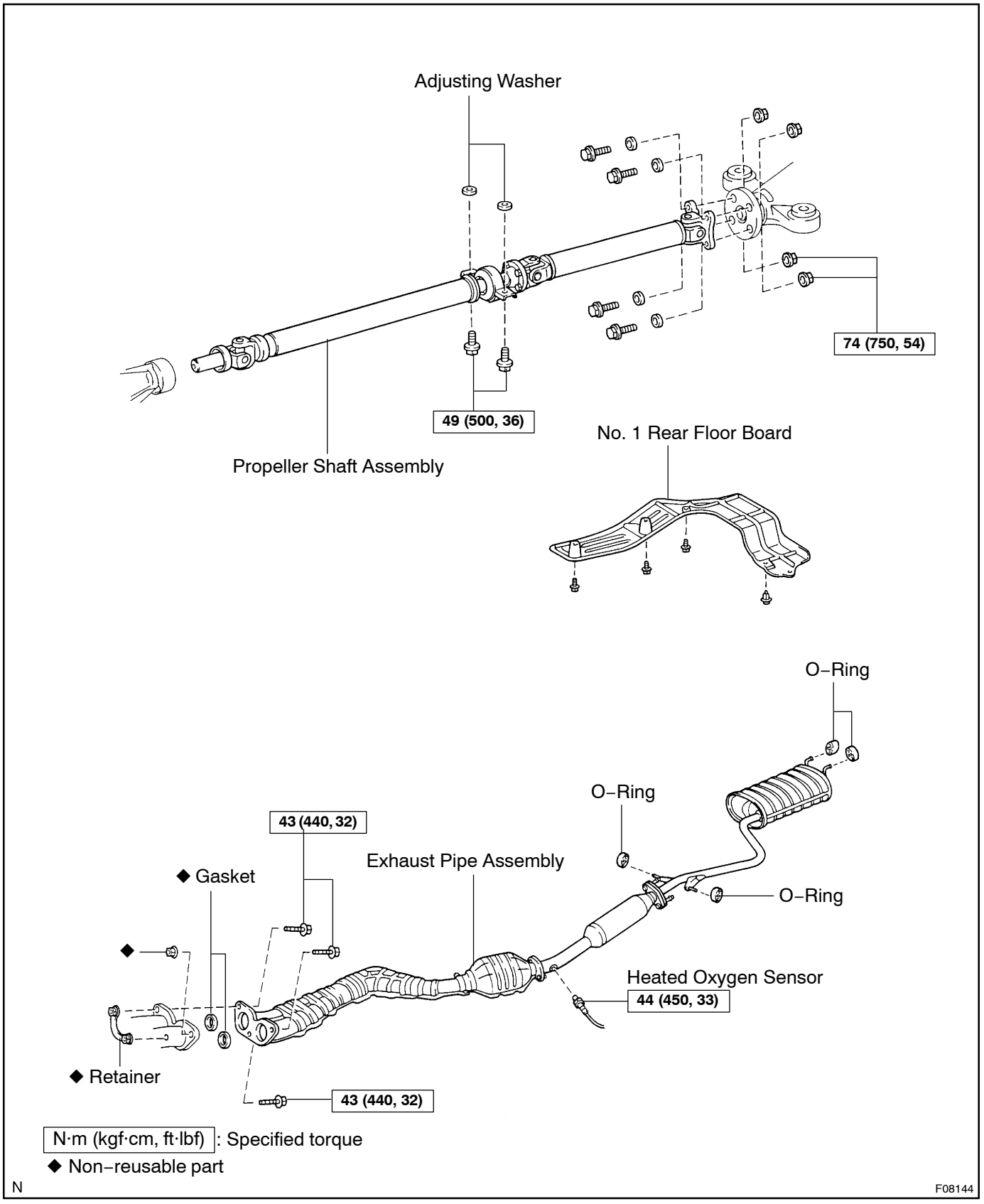
(See page SA–65)

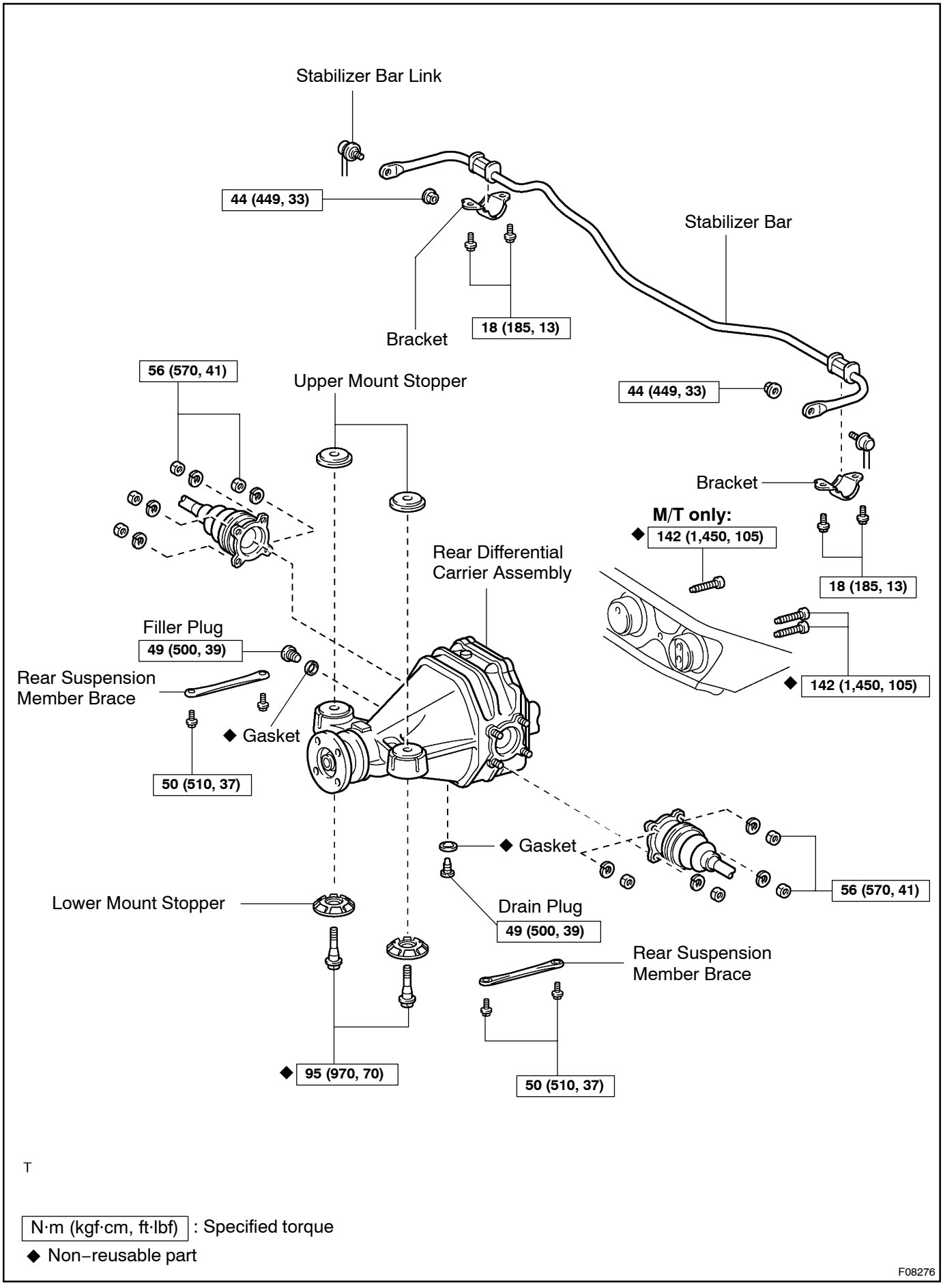
14. INSTALL NO. 1 REAR FLOOR BOARD

REAR DIFFERENTIAL CARRIER

COMPONENTS

SA1JC–01



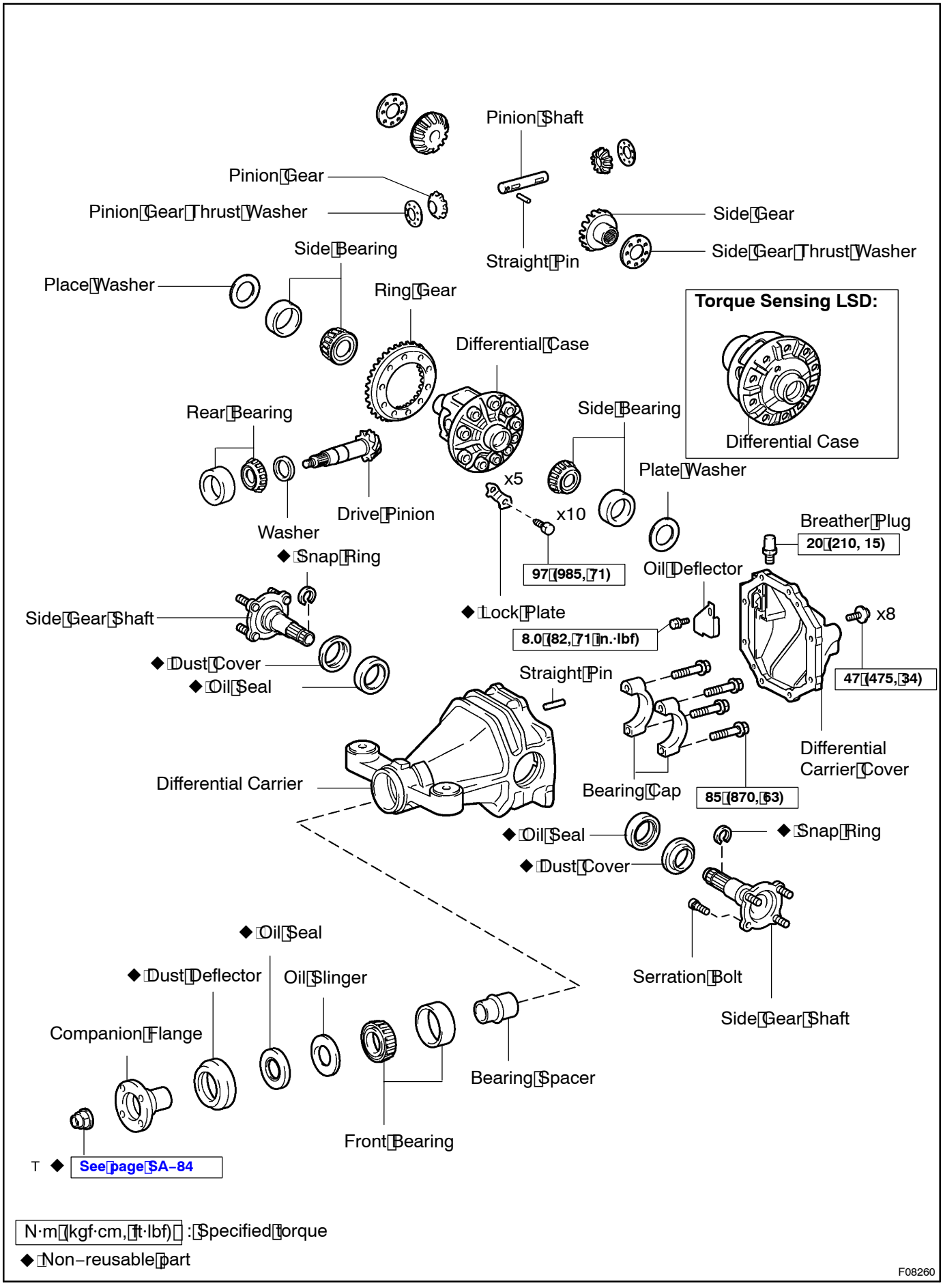


T

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

◆ Non–reusable part

F08276

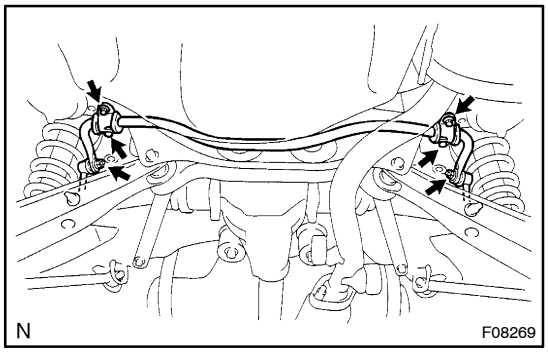

Pinion Shaft
Pinion Gear
Pinion Gear Thrust Washer
Side Gear
Side Gear Thrust Washer
Straight Pin
Side Bearing
Place Washer
Ring Gear
Differential Case
Torque Sensing LSD:
Differential Case
Rear Bearing
Side Bearing
Plate Washer
x5
x10
Drive Pinion
Washer
97 (985, 71)
Breather Plug
20 (210, 15)
◆ Snap Ring
Oil Deflector
Side Gear Shaft
◆ Lock Plate
8.0 (82, 71 in.·lbf)
x8
◆ Dust Cover
◆ Oil Seal
Straight Pin
47 (475, 34)
Differential Carrier Cover
Differential Carrier
Bearing Cap
85 (870, 63)
◆ Oil Seal
◆ Snap Ring
◆ Dust Cover
◆ Oil Seal
Serration Bolt
◆ Dust Deflector
Oil Slinger
Side Gear Shaft
Companion Flange
Bearing Spacer
Front Bearing
T ◆ See page SA–84
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
F08260

SA1JD–01

REMOVAL

1. REMOVE NO. 1 REAR FLOOR BOARD

2. DRAIN DIFFERENTIAL OIL



3. DISCONNECT 2 STABILIZER BAR BRACKETS

Remove the 4 bolts and 2 brackets from the rear suspension member.

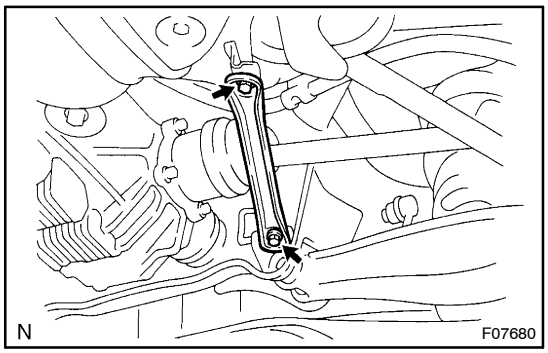
4. DISCONNECT STABILIZER BAR LINK FROM STABILIZER BAR

Remove the 2 nuts and disconnect the stabilizer bar link.

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

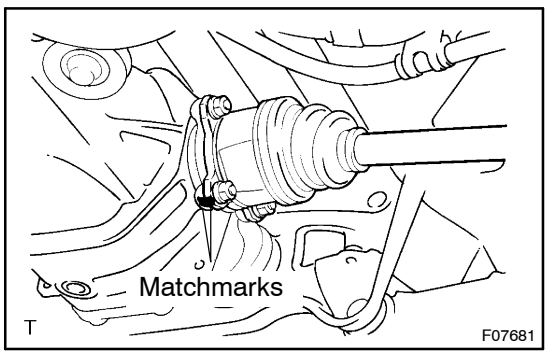
5. REMOVE PROPELLER SHAFT (See page PR–4)



6. REMOVE RH AND LH REAR SUSPENSION MEMBER BRACES

(a) Remove the 2 bolts and suspension member brace.

(b) Employ the same manner described above to the other side.



7. DISCONNECT RH AND LH DRIVE SHAFTS FROM SIDE GEAR SHAFTS

(a) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to mark the matchmarks. Use paint, ect.

(b) Remove the 4 nuts and washers while depressing the brake pedal.

(c) Push and compress the inboard joint and disconnect the drive shaft from the side gear shaft.

NOTICE:

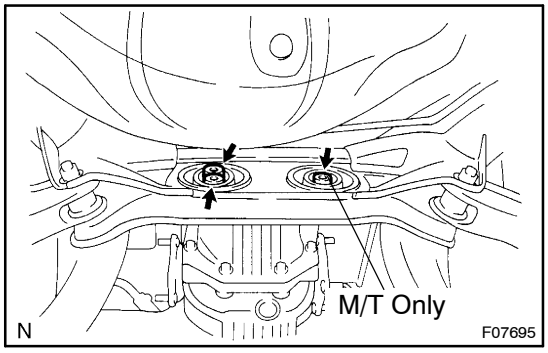
Be careful not to damage the boots and end cover.

(d) Support the drive shaft securely.

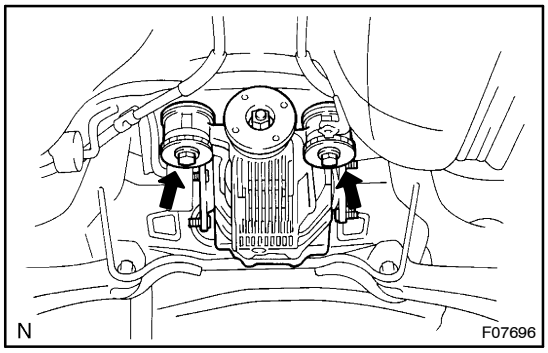
(e) Employ the same manner described above to the other side.

8. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

(a) Support the rear differential carrier assembly with a jack.



(b) Using a hexagon wrench (12 mm), remove the 2 (A/T) or 3 (M/T) hexagon bolts.



(c) Remove the 2 bolts, lower mount stoppers and rear differential carrier assembly from the rear suspension member.

(d) Lower the rear differential carrier assembly.

NOTICE:

Do not let the rear differential carrier assembly interfere with the drive shaft.

(e) Remove the 2 upper mount stoppers from the rear differential carrier.

SA1JE-01

DISASSEMBLY

1. REMOVE DIFFERENTIAL CARRIER COVER

(a) Remove the 8 bolts from the carrier cover.

(b) Using a brass bar and hammer, separate the cover from the carrier.

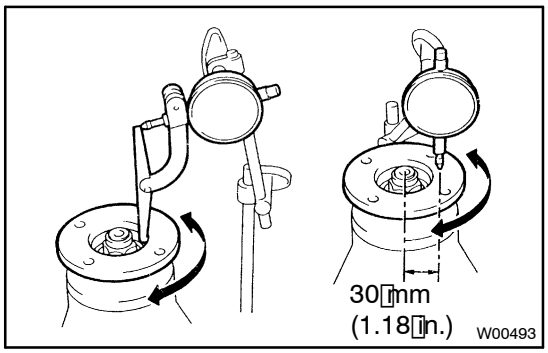
(c) Remove the breather plug from the differential carrier cover.

(d) Remove the bolt and oil deflector from the differential carrier cover.

2. REMOVE DIFFERENTIAL CARRIER STRAIGHT PIN

Using pliers, remove the straight pin from the differential carrier.

3. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND, ETC.

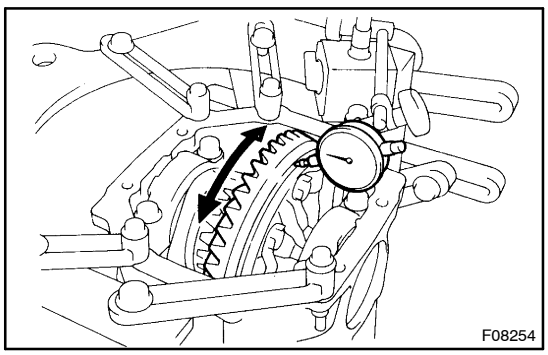


4. CHECK COMPANION FLANGE RUNOUT

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum runout: 0.09 mm (0.0035 in.)

If the runout is greater than the maximum, replace the companion flange.

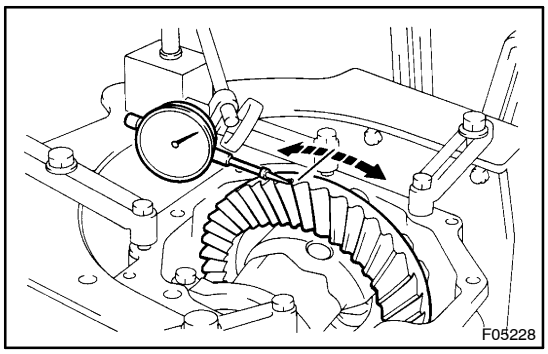


5. CHECK RING GEAR RUNOUT

Using a dial indicator, while turning the companion flange measure the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, replace the ring gear and drive pinion as a set.



6. CHECK RING GEAR BACKLASH

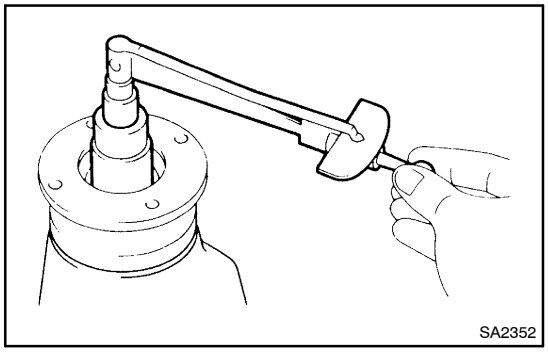
Using a dial indicator, while holding the companion flange measure the ring gear backlash.

Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

HINT:

Measure at 3 or more places on the circumference of the ring gear.

If the backlash is not within the specified value, adjust the backlash (See page SA–84).


SA2352

7. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

Preload (at starting):
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

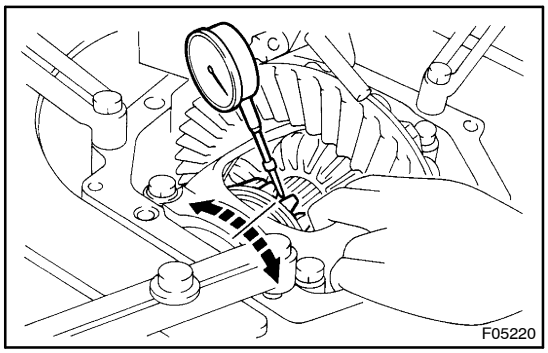
8. CHECK TOTAL PRELOAD

Using a torque wrench, measure the total preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):
Drive pinion preload plus
0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)

If necessary, disassemble and inspect the differential.

9. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA–84)

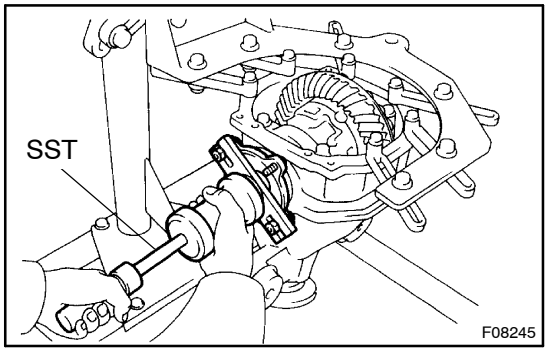

F05220

10. 2 pinion differential:
CHECK SIDE GEAR BACKLASH

Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.

Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specified value, install the correct thrust washers (See page SA–84).

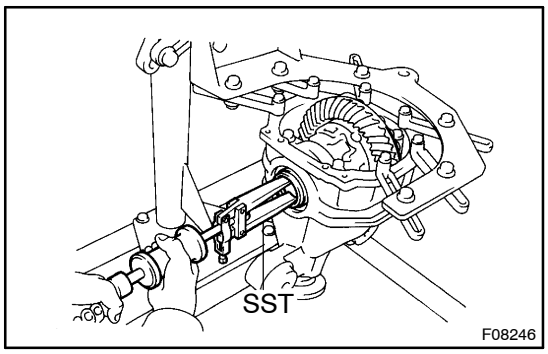


F08245

11. REMOVE SIDE GEAR SHAFTS

(a) Using SST and the 2 nuts, remove the 2 side gear shafts from the differential carrier.
SST 09520–24010

(b) Using a screwdriver, remove the 2 snap rings from the side gear shafts.



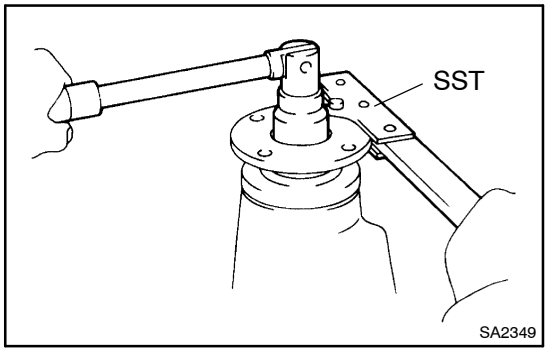
F08246

12. REMOVE SIDE GEAR SHAFT OIL SEALS

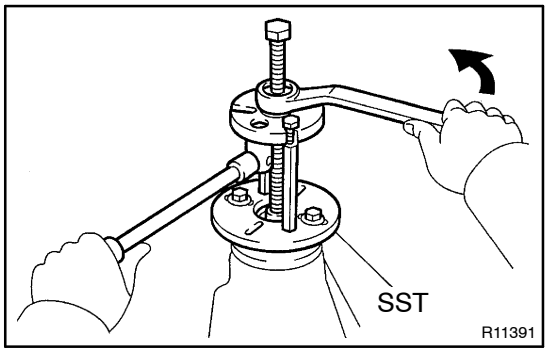
Using SST, remove the 2 side gear shaft oil seals.
SST 09308–00010

13. REMOVE COMPANION FLANGE

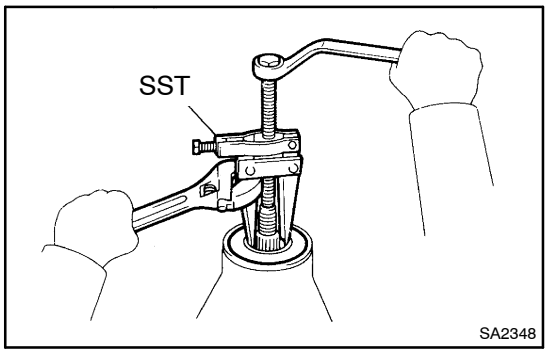
(a) Using a chisel and hammer, unstake the nut.



(b) Using SST to hold the flange, remove the nut.
SST 09330–00021



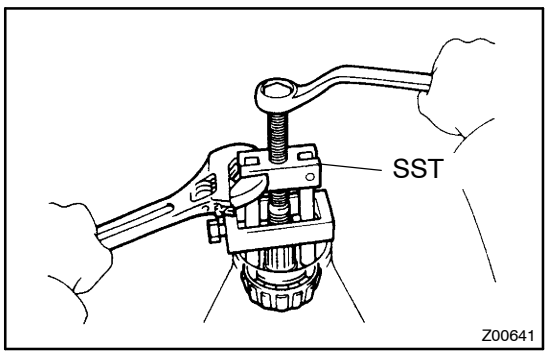
(c) Using SST, remove the companion flange.
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



14. REMOVE FRONT OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the differential carrier.
SST 09308–10010

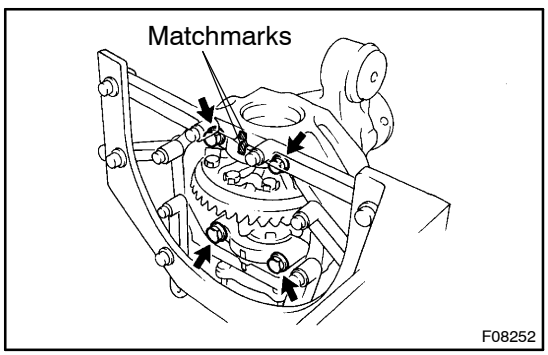
(b) Remove the oil slinger.



15. REMOVE FRONT BEARING

Using SST, remove the front bearing from the drive pinion.
SST 09556–22010

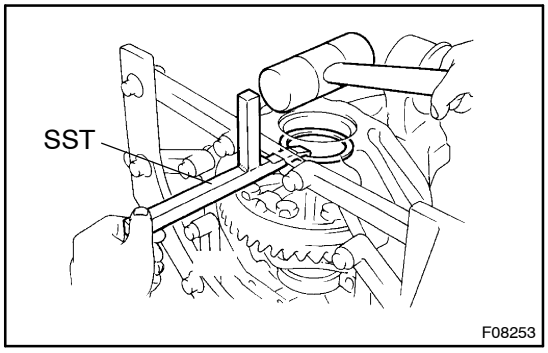
If the front bearing is damaged or worn, replace the front bearing.



16. REMOVE DIFFERENTIAL CASE ASSEMBLY

(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the 4 bolts and 2 bearing caps.



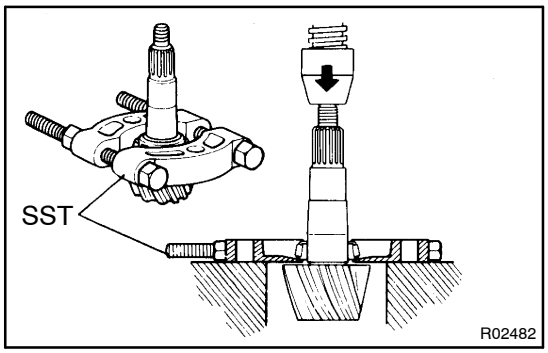
(c) Using SST and a plastic hammer, remove the 2 plate washers.
SST 09504–22011

HINT:
Measure the plate washer and note down the thickness.

(d) Remove the differential case with the bearing outer races from the differential carrier.

HINT:
Tag the bearing outer races to show the location for reassembling.

17. REMOVE DRIVE PINION AND BEARING SPACER FROM DIFFERENTIAL CARRIER

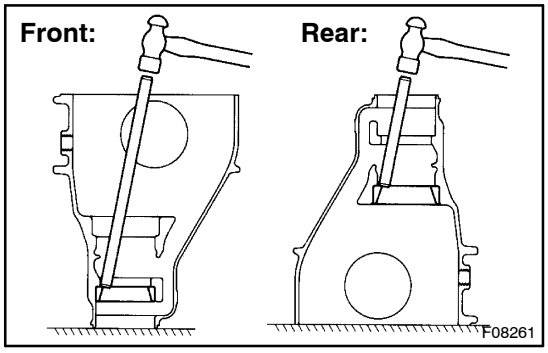


18. REMOVE REAR BEARING

(a) Using SST and a press, remove the rear bearing from the drive pinion.
SST 09950–00020

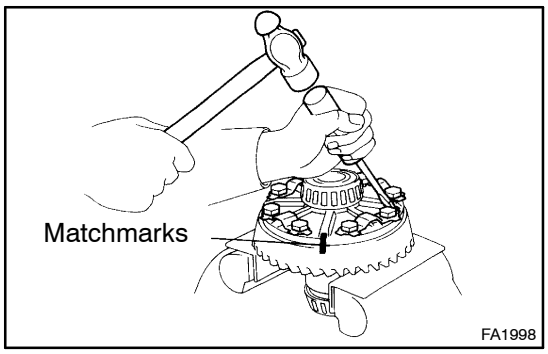
HINT:
If the drive pinion or ring gear is damaged, replace them as a set.

(b) Remove the washer.



19. REMOVE FRONT AND REAR BEARING OUTER RACES

Using a brass bar and hammer, remove the front and rear bearing outer races.



20. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.

(b) Using a screwdriver and hammer, unstake the 5 lock plates.

(c) Remove the 10 bolts and 5 lock plates.

(d) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

21. CHECK DIFFERENTIAL CASE RUNOUT

(a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.

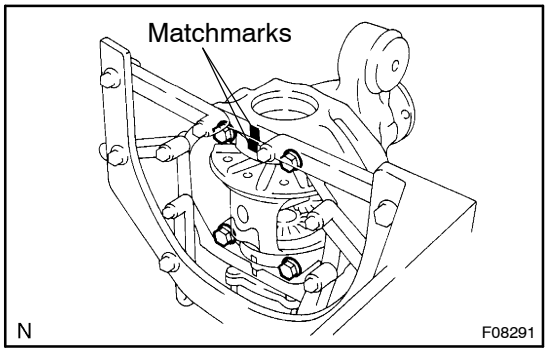
(b) Install the assembled plate washers onto the side bearings.

(c) Install the differential case in the differential carrier.

HINT:

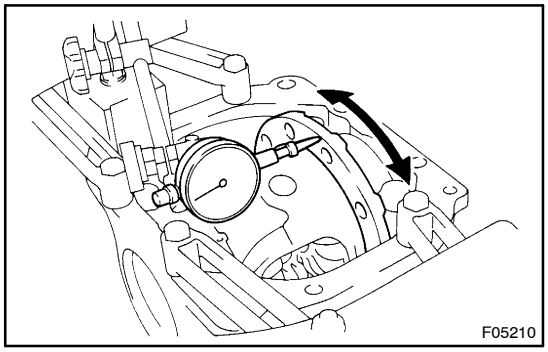
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.



(d) Align matchmarks on the bearing cap and differential carrier.

(e) Install and uniformly tighten the 4 bolts a little at a time.

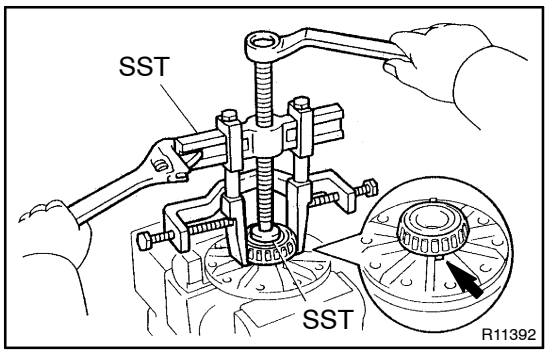


(f) Using a dial indicator, while turning the companion flange measure the differential case runout.

Maximum runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, replace the differential case and side bearings as a set.

(g) Remove the differential case.



22. REMOVE SIDE BEARINGS

(a) 2 pinion differential:

Using SST, remove the 2 side bearings from the differential case.

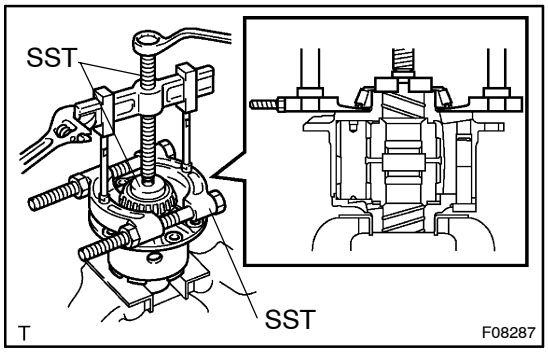
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00480)

HINT:

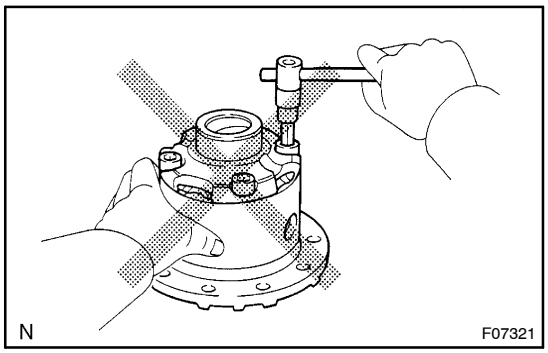
Fix the claws of SST to the notches in the differential case.

(b) Torque sensing LSD ring gear side:
Using SST, remove the side bearing from the differential case.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00480)

HINT:
Fix the claws of SST to the notches in the differential case.

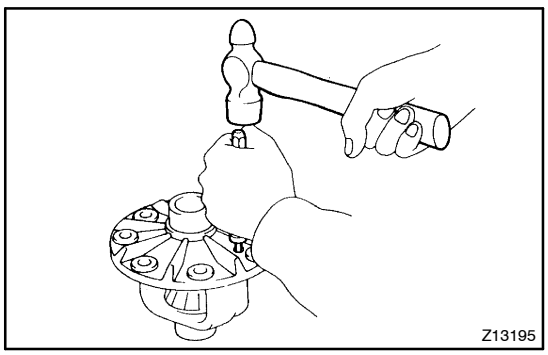


(c) Torque sensing LSD ring gear back side:
Using SST, remove the side bearing from the differential case.
SST 09950–00020, 09950–40011 (09951–04020, 09953–04030, 09957–04010), 09950–50012 (09952–05010, 09954–05030, 09955–05040)



23. 2 pinion differential:
DISASSEMBLE DIFFERENTIAL CASE ASSEMBLY

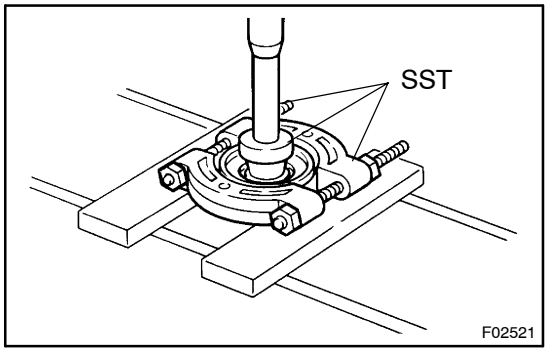
NOTICE:
If equipped with torque sensing LSD, do not disassemble the differential case.



(a) Using a pin punch (5 mm) and hammer, remove the straight pin.
(b) Remove the pinion shaft, 2 pinion gears, pinion gear thrust washers, side gears and side gear thrust washers from the differential case.

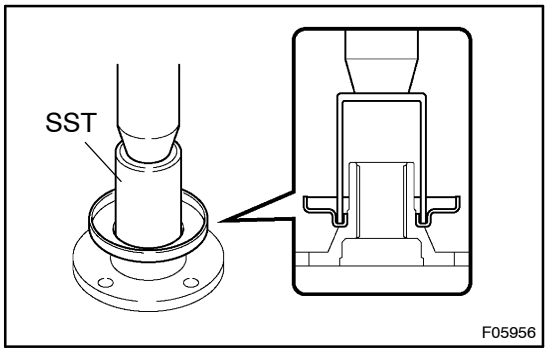
SA0SE–03

REPLACEMENT



1. REPLACE COMPANION FLANGE DUST DEFLECTOR, IF NECESSARY

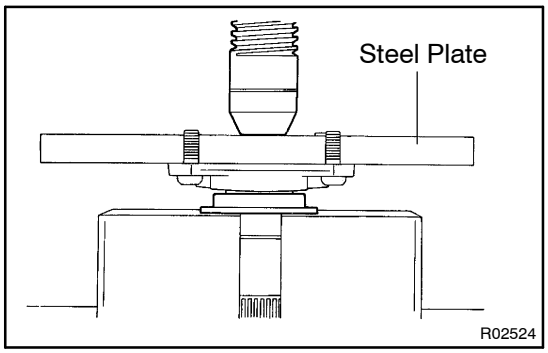
(a) Using SST and a press, remove the dust deflector.
SST 09950–00020, 09950–60010 (09951–00400), 09950–70010 (09951–07100)



(b) Using SST and a press, install a new dust deflector.
SST 09223–00010

2. REPLACE SIDE GEAR SHAFT DUST COVER, IF NECESSARY

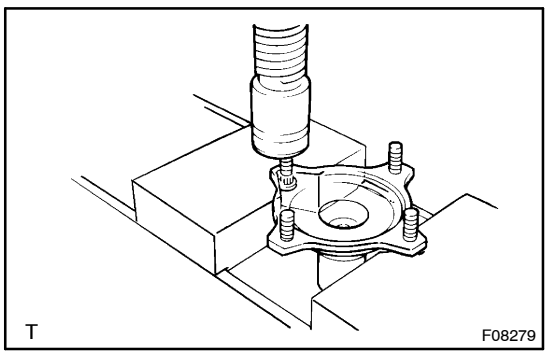
(a) Using screwdriver and hammer, remove the dust cover.



(b) Using a steel plate and press, install a new dust cover.

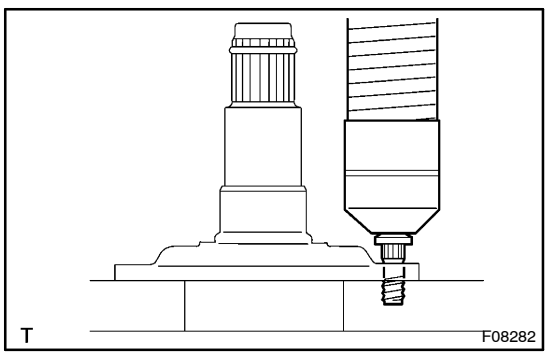
NOTICE:

Be careful not to deform the dust cover.



3. REPLACE SIDE GEAR SHAFT SERRATION BOLT, IF NECESSARY

(a) Using a press, remove the serration bolt.



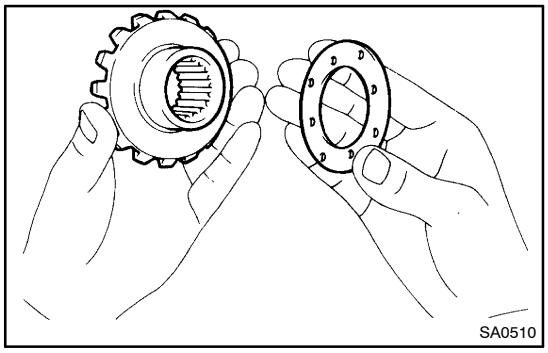
(b) Using a press, install a new serration bolt.

SA1JF–01

REASSEMBLY

HINT:

- Using a shop rag, clean off any foreign object from the parts.
- Apply all of the sliding and rotating surfaces with hypoid gear oil.


SA0510

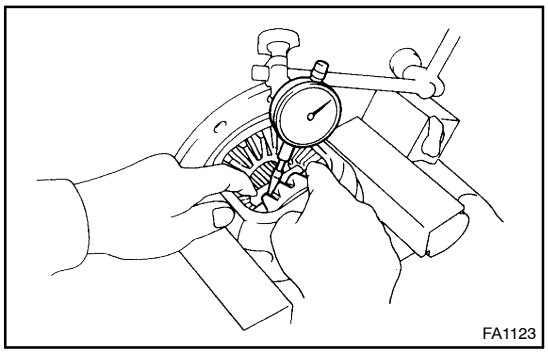
1. 2 pinion differential:
MEASURE SIDE GEAR BACKLASH AND REASSEMBLE DIFFERENTIAL CASE

(a) Install the 2 thrust washers to the 2 side gears.

(b) Install the 2 side gears, pinion gears, pinion gear thrust washers and pinion shaft in the differential case.

HINT:

Align the holes of the differential case and pinion shaft.

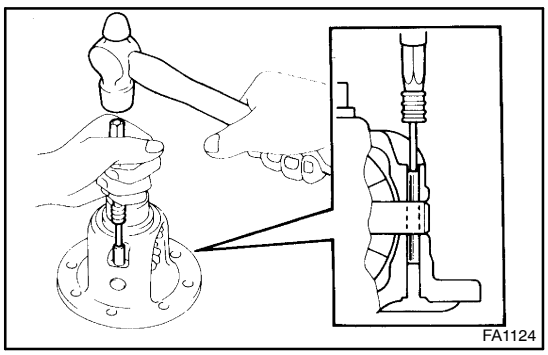

FA1123

(c) Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.
Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specified value, install the side gear thrust washers with different thicknesses.

Thrust washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.0 (0.039)	1.2 (0.047)
1.1 (0.043)	1.3 (0.051)


FA1124

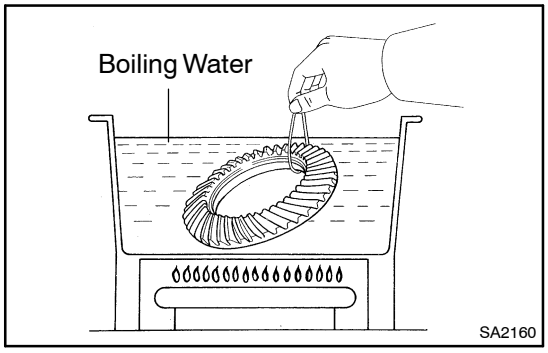
2. 2 pinion differential:
INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

(a) Using a 5 mm pin punch and hammer, install the straight pin through the differential case and hole of the pinion shaft.

(b) Using a chisel and hammer, stake the outside of the differential case pin hole.

3. INSTALL RING GEAR ON DIFFERENTIAL CASE

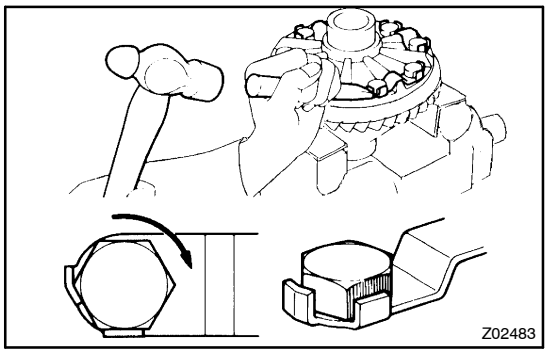
(a) Clean the contact surfaces of the differential case and ring gear.



(b) Heat the ring gear to approx. 100°C (212°F) in boiling water.
(c) Carefully take the ring gear out of the boiling water.
(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

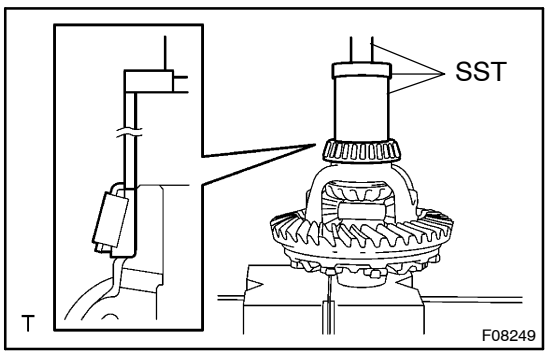
HINT:
Align the matchmarks on the ring gear and differential case.

(e) Temporarily install 5 new lock plates and 10 bolts so that the bolt holes in the ring gear and differential case are not misaligned.
(f) After the ring gear has cooled sufficiently, torque the 10 ring gear set bolts.
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)



(g) Using a chisel and hammer, stake the 5 lock plates.

HINT:
Stake the claws of the lock plates to fix the bolts. For the claw contacting the protruding portion of the bolt, stake only the half of it along the tightening direction.



4. INSTALL SIDE BEARINGS

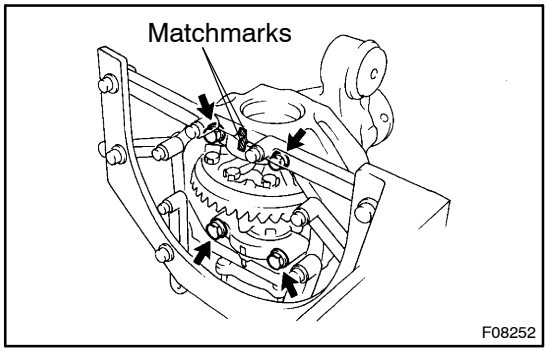
Using SST and a press, install the 2 bearings to the differential case.

SST 09710–04081, 09950–60010 (09951–00600), 09950–70010 (09951–07100)

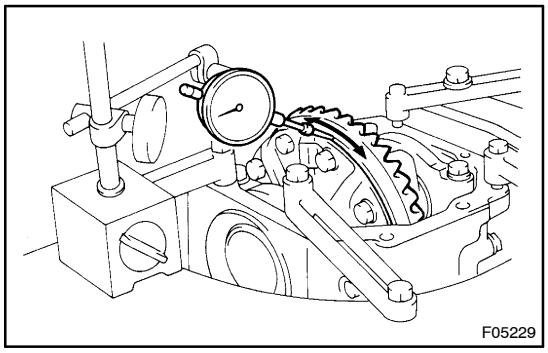
5. CHECK RING GEAR RUNOUT

(a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
(b) Install the assembled plate washers onto the side bearings.
(c) Install the differential case in the differential carrier.

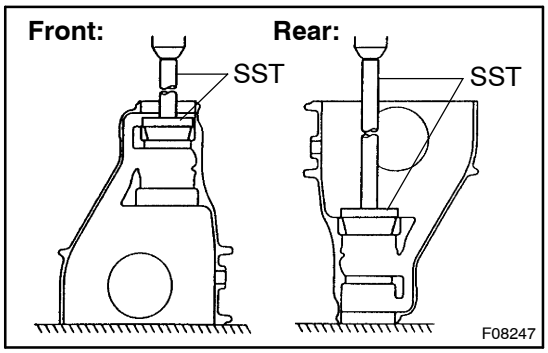
HINT:
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.
However, select a plate washer that allows no clearance between it and the carrier.



(d) Align matchmarks on the bearing cap and differential carrier.
(e) Install and uniformly tighten the 4 bolts a little at a time.



(f) Using a dial indicator, measure the ring gear runout.
Maximum runout: 0.07 mm (0.0028 in.)
(g) Remove the differential case.



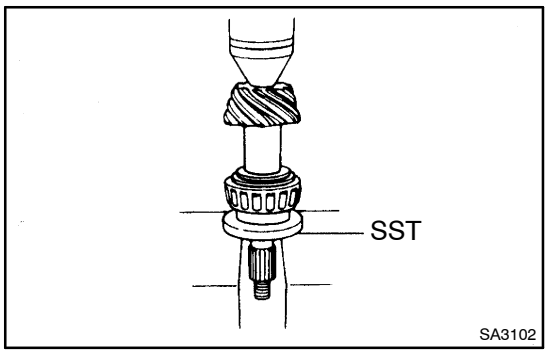
6. INSTALL FRONT AND REAR BEARING OUTER RACES

(a) Using SST and a press, install the front bearing outer race.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)
(b) Using SST and a press, install the rear bearing outer race.
SST 09950–60020 (09951–00790), 09950–70010 (09951–07200)

7. INSTALL REAR BEARING

(a) Install the washer on the drive pinion.

HINT:
First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



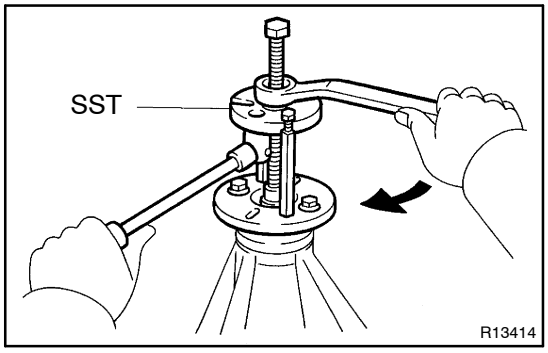
(b) Using SST and a press, install the rear bearing onto the drive pinion.
SST 09506–30012

8. TEMPORARILY ADJUST DRIVE PINION PRELOAD

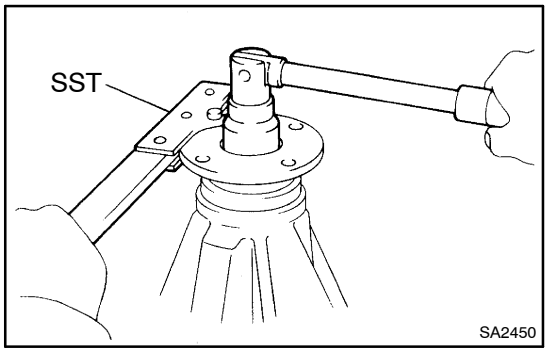
(a) Install the drive pinion and front bearing.

HINT:
Assemble the spacer and oil seal after adjusting the gear contact pattern.

(b) Install the oil slinger.



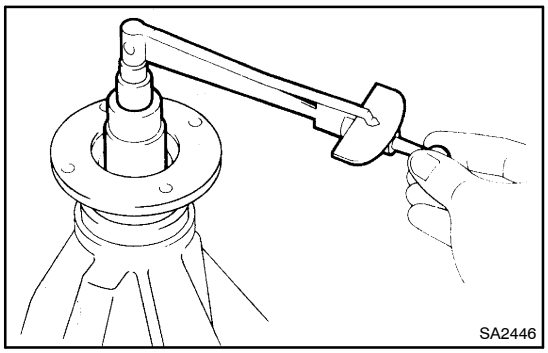
(c) Using SST, install the companion flange.
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



(d) Using SST to hold the flange and adjust the drive pinion preload by tightening the nut.

NOTICE:

- **Coat the nut and threads of the drive pinion with hypoid gear oil LSD.**
- **As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.**



(e) Using a torque wrench, measure the drive pinion preload using the backlash between the drive pinion and ring gear.

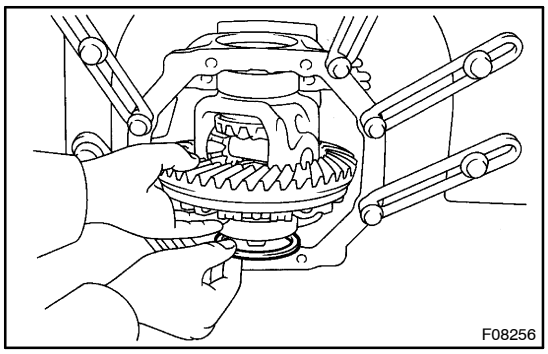
Preload (at starting):
New bearing:
1.4 – 2.0 N·m (14 – 20 kgf·cm, 12.4 – 17.7 in.·lbf)
Reused bearing:
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

HINT:
Measure the drive pinion preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

9. INSTALL DIFFERENTIAL CASE IN DIFFERENTIAL CARRIER

(a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.

(b) Install the differential case in the differential carrier.

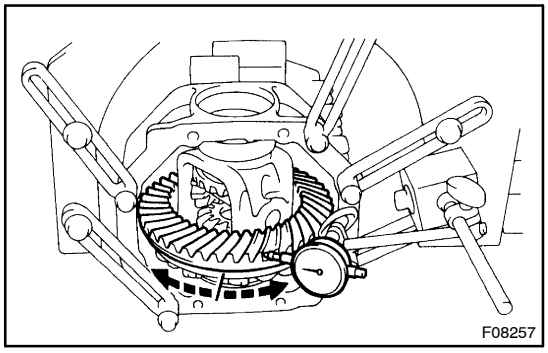


10. ADJUST RING GEAR BACKLASH

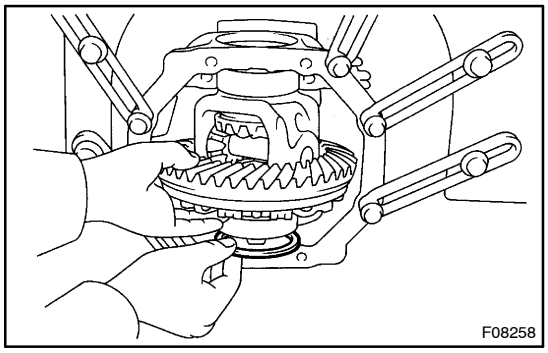
(a) Install the plate washer on the ring gear back side.

HINT:
Make sure that the ring gear has backlash.

(b) Tap on the ring gear with a plastic hammer so that the washer fits to the bearing.



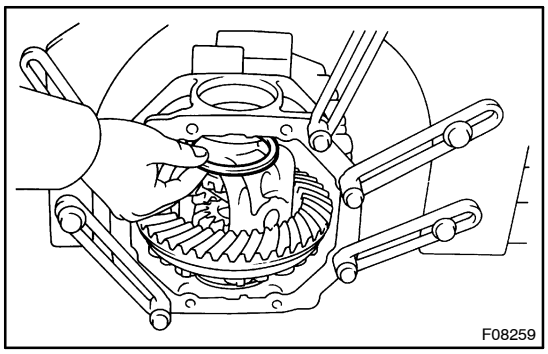
(c) Using a dial indicator, while holding the companion flange, measure the ring gear backlash.
Backlash (Reference):
0.13 – 0.18 mm (0.0051 – 0.0071 in.)



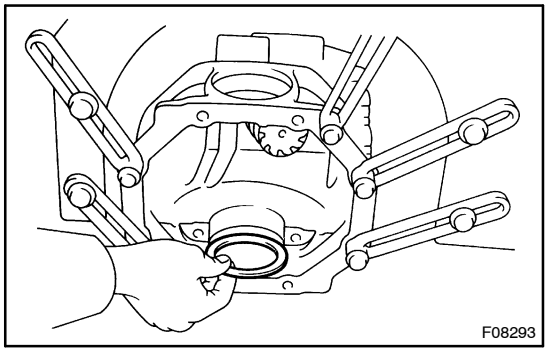
(d) Select a plate washer for back side ring gear, using the backlash as reference.

Side plate washer thickness:

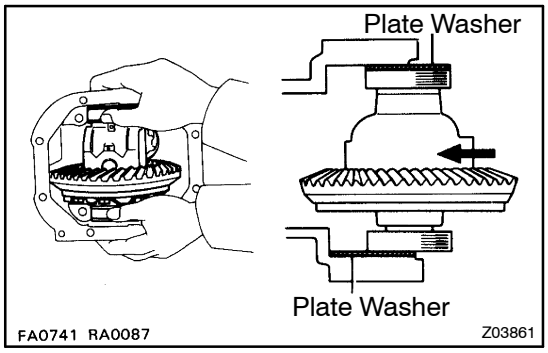
Thickness mm (in.)	Thickness mm (in.)
2.58 (0.1016)	2.92 (0.1150)
2.60 (0.1024)	2.94 (0.1157)
2.62 (0.1031)	2.96 (0.1165)
2.64 (0.1039)	2.98 (0.1173)
2.66 (0.1047)	3.00 (0.1181)
2.68 (0.1055)	3.02 (0.1189)
2.70 (0.1063)	3.04 (0.1197)
2.72 (0.1071)	3.06 (0.1205)
2.74 (0.1079)	3.08 (0.1213)
2.76 (0.1087)	3.10 (0.1220)
2.78 (0.1094)	3.12 (0.1228)
2.80 (0.1102)	3.14 (0.1236)
2.82 (0.1110)	3.16 (0.1244)
2.84 (0.1118)	3.18 (0.1252)
2.86 (0.1126)	3.20 (0.1260)
2.88 (0.1134)	3.22 (0.1268)
2.90 (0.1142)	3.24 (0.1276)



(e) Select a ring gear teeth side plate washer so that there is no clearance between the outer race and case.
(f) Remove the plate washers and differential case.

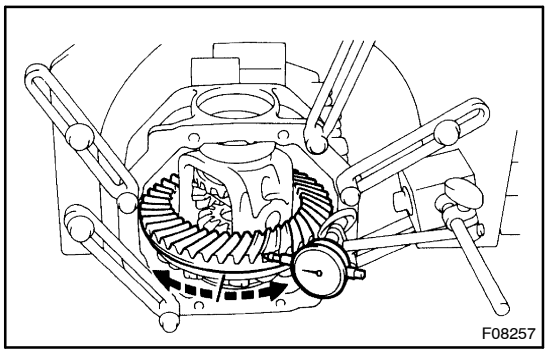


(g) Install the plate washer into the ring gear back side of the carrier.



(h) Place the other plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.

(i) Tap on the ring gear with a plastic hammer so that the washers fit to the bearing.



(j) Using a dial indicator, while holding the companion flange measure the ring gear backlash.

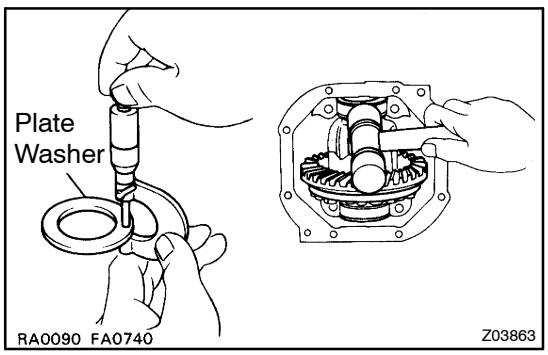
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

If the backlash is not within the specified value, adjust it by either increasing or decreasing the thickness of washers on both sides by an equal amount.

HINT:

There should be no clearance between the plate washer and case.

Make sure that there is ring gear backlash.



11. ADJUST SIDE BEARING PRELOAD

(a) Remove the ring gear teeth side plate washer and using a micrometer, measure the thickness.

(b) Using the backlash as a reference, install a new washer 0.06 – 0.09 mm (0.0024 – 0.0035 in.) thicker than the washer removed.

HINT:

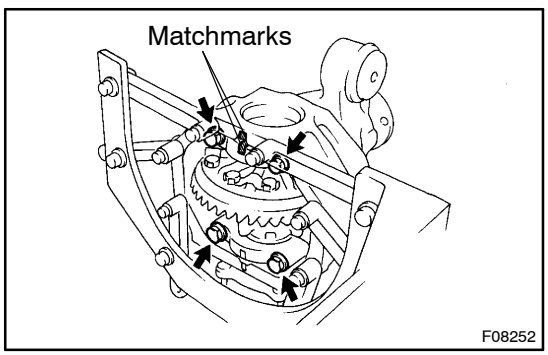
Select a washer which can be pressed in 2/3 of the way with your finger.

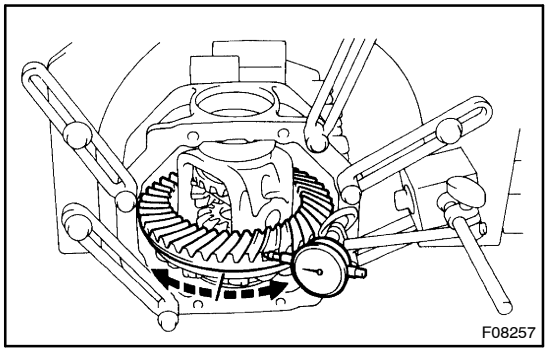
(c) Using a plastic hammer, install the plate washer.

(d) Align matchmarks on the bearing cap and differential carrier.

(e) Tighten the 4 bolts.

Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)




F08257

(f) Using a dial indicator, while holding the companion flange adjust the ring gear backlash until it is within the specified value.

Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

If the backlash is not within the specified value, adjust by either increasing or decreasing the thickness of washers on both sides by an equal amount.

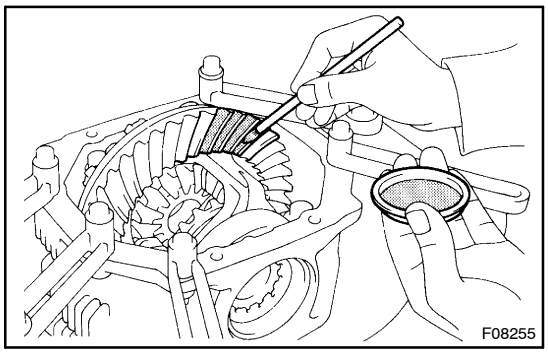
HINT:

The backlash will change by about 0.02 mm (0.0008 in.) corresponding to 0.03 mm (0.0012 in.) change in the plate washer.

12. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the total preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):
Drive pinion preload plus
0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)

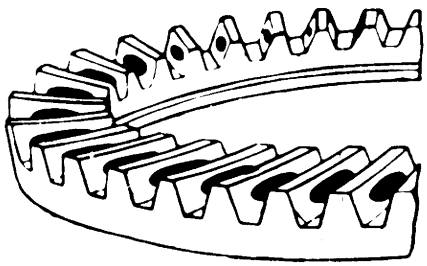

F08255

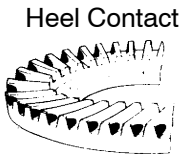
13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

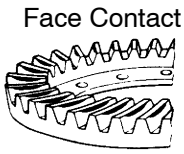
(a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.

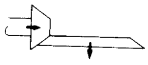
(b) Hold the companion flange firmly and rotate the ring gear in both directions.

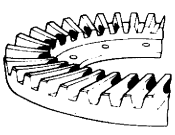
(c) Inspect the tooth contact pattern.

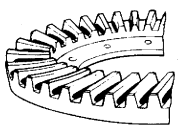

Proper Contact

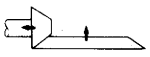

Heel Contact


Face Contact

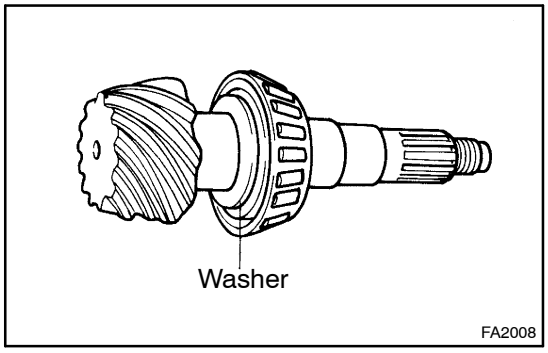

Select an adjusting shim that will bring the drive pinion closer to the gear.


Toe Contact


Flank Contact


Select an adjusting shim that will shift the drive pinion gear away from the ring gear.

R02495



If the teeth are not contacting properly, use the following table to select a proper washer for correction.

Washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.03 (0.0799)
1.73 (0.0681)	2.06 (0.0811)
1.76 (0.0693)	2.09 (0.0822)
1.79 (0.0704)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0847)
1.85 (0.0729)	2.18 (0.0858)
1.88 (0.0740)	2.21 (0.0870)
1.91 (0.0752)	2.24 (0.0882)
1.94 (0.0764)	2.27 (0.0894)
1.97 (0.0776)	2.30 (0.0906)
2.00 (0.0787)	2.33 (0.0918)

14. REMOVE COMPANION FLANGE (See page SA–77)

15. REMOVE OIL SLINGER

16. REMOVE FRONT BEARING (See page SA–77)

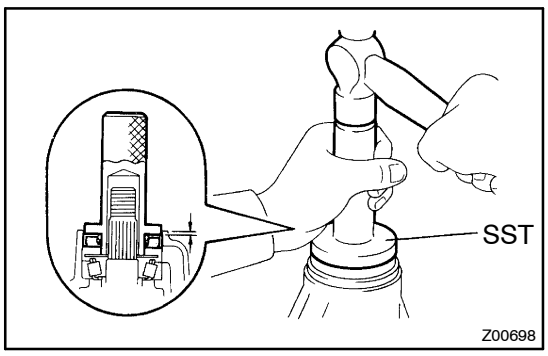
17. INSTALL BEARING SPACER

Install a new bearing spacer.

HINT:

Face the spacer with the large inner diameter to the rear side.

18. INSTALL FRONT BEARING AND OIL SLINGER



19. INSTALL FRONT OIL SEAL

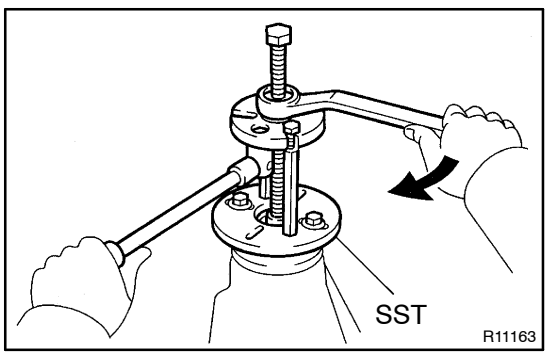
(a) Using SST and a hammer, install a new oil seal.

SST 09554–30011

Oil seal drive in depth:

2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)

(b) Coat MP grease to the oil seal lip.

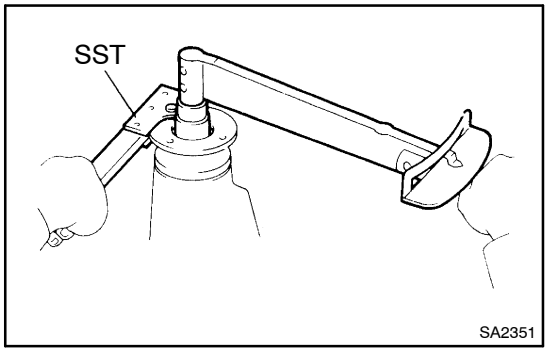


20. INSTALL COMPANION FLANGE

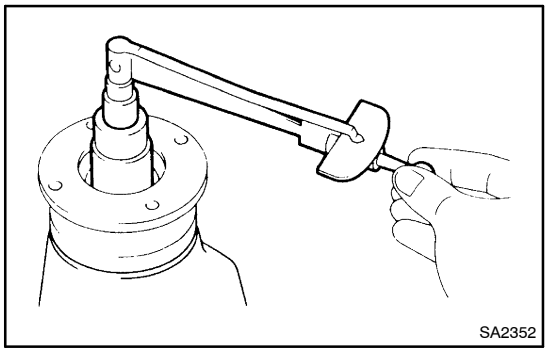
(a) Using SST, install the companion flange.

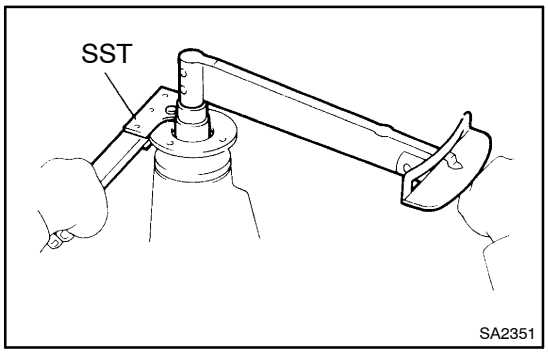
SST 09950–30011 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

(b) Coat the thread of a new nut with hypoid gear oil LSD.



(c) Using SST to hold the flange, tighten the nut.
SST 09330–00021





21. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash between the drive pinion and ring gear.

Preload (at starting):
New bearing:
1.4 – 2.0 N·m (14 – 20 kgf·cm, 12.4 – 17.7 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 the specified value, replace the bearing spacer.

If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

SST 09330–00021

Torque: 223 N·m (2,274 kgf·cm, 164 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

Do not loosen the pinion nut to reduce the preload.

22. RECHECK TOTAL PRELOAD (See page SA–77)

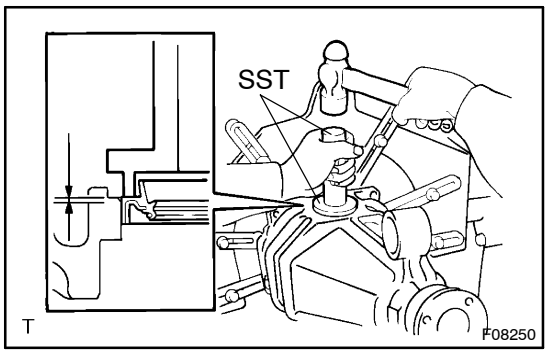
23. RECHECK RING GEAR BACKLASH (See page SA–77)

24. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step. 13)

25. CHECK COMPANION FLANGE RUNOUT (See page SA–77)

26. STAKE DRIVE PINION NUT

Using a chisel and hammer, stake the nut.



27. INSTALL SIDE GEAR SHAFT OIL SEALS

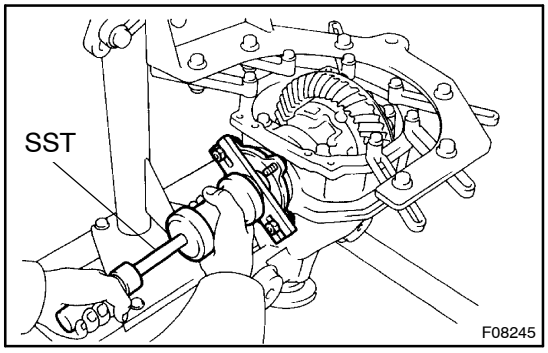
(a) Using SST and a press, install 2 new oil seals.
SST 09554–22010
Oil seal drive in depth:
0.50 ± 0.50 mm (0.0200 ± 0.0197 in.)

(b) Coat MP grease to the oil seal lip.

28. INSTALL SIDE GEAR SHAFTS

(a) Using needle–nose pliers, install 2 new snap rings to the side gear shafts.

(b) Coat the MP grease to the snap rings



(c) Using SST and the 2 nuts, install the 2 side gear shafts to the differential carrier.
SST 09520–24010

NOTICE:

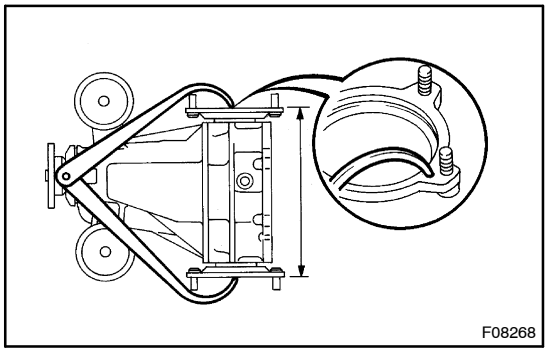
Be careful not to damage the side gear shaft oil seal.

HINT:

- Before installing the drive shaft, set the snap ring with it's opening side facing downward.
- Whether the side gear shaft is in contact with the side gear or not can be known from the sound or feeling when driving it.

(d) Check that the side gear shaft will not come out by trying to pull it out by hand.

29. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.



30. INSPECT DIFFERENTIAL CARRIER

Using vernier calipers, measure the distance between the mating surfaces of the right and left side gear shafts, as shown in the illustration.

Standard distance:

Country (Transmission type)	Standard distance
Europe	2 pinion differential: 244.74 mm (9.6354 in.) or less LSD: 244.30 mm (9.6181 in.) or less
Taiwan	
Australia (M/T)	
New Zealand (M/T)	
Hong Kong (M/T)	
Thai Land (M/T)	
Others	246.74 mm (9.1742 in.) or less

31. INSTALL DIFFERENTIAL CARRIER STRAIGHT PIN

Using a plastic hammer, install the straight pin.

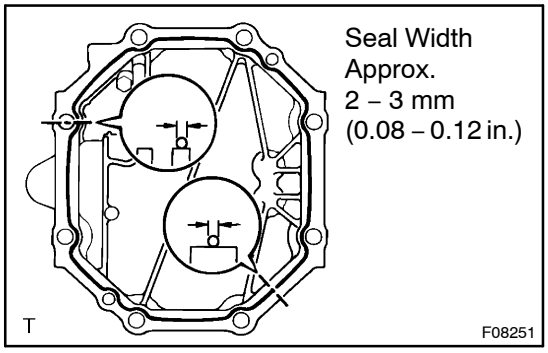
32. INSTALL DIFFERENTIAL CARRIER COVER

(a) Install the oil deflector with the bolt to the carrier cover.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(b) Install the breather plug to the carrier cover.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(c) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential carrier and carrier cover.

(d) Clean both installation surfaces of loose FIPG and oil material with gasoline or alcohol.



(e) Apply FIPG to the carrier cover, as shown in the illustration.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent.

HINT:
Install the carrier cover within 10 minutes after applying FIPG.

(f) Install the differential carrier cover with the 8 bolts.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

SA1JG–01

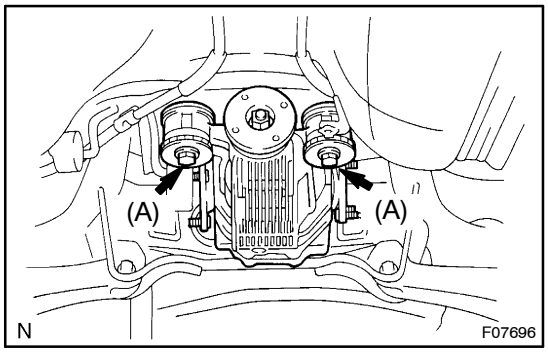
INSTALLATION

1. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

(a) Install the 2 upper mount stoppers on the rear differential carrier assembly.

HINT:

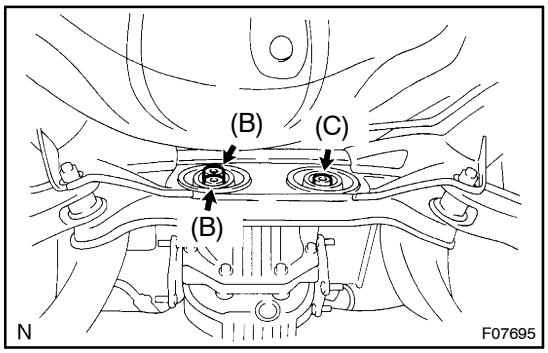
Use the upper mount stopper which was removed.



(b) Support the rear differential carrier assembly with a jack and temporally install the lower mount stoppers and 2 new bolt (A).

NOTICE:

Do not let the rear differential carrier assembly interfere with the drive shaft.



(c) Temporally install 2 new hexagon bolts (B).

(d) M/T:

Temporally install a new hexagon bolt (C).

(e) Using a 12 mm hexagon wrench, torque the 2 hexagon bolts (B).

Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

(f) M/T:

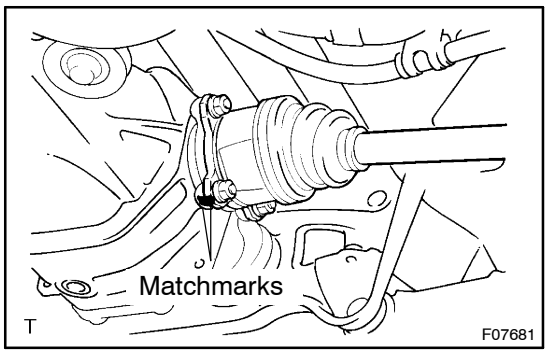
Using a 12 mm hexagon wrench, torque the hexagon bolt (C).

Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

(g) Torque the 2 bolts (A).

Torque: 95 N·m (970 kgf·cm, 70 ft·lbf)

(h) Lower the jack.



2. CONNECT RH AND LH DRIVE SHAFTS TO SIDE GEAR SHAFTS

(a) Align the matchmarks, and push and compress the inboard joint and connect the drive shaft to the side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

(b) Install the 4 washers and nuts while depressing the brakes pedal.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(c) Employ the same manner described above to the other side.

3. **INSTALL RH AND LH REAR SUSPENSION MEMBER BRACES**
   Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)
4. **INSTALL PROPELLER SHAFT (See page PR–10)**
5. **CONNECT STABILIZER BAR LINK TO STABILIZER BAR**
   Torque: 44 N·m (449 kgf·cm, 33 ft·lbf)

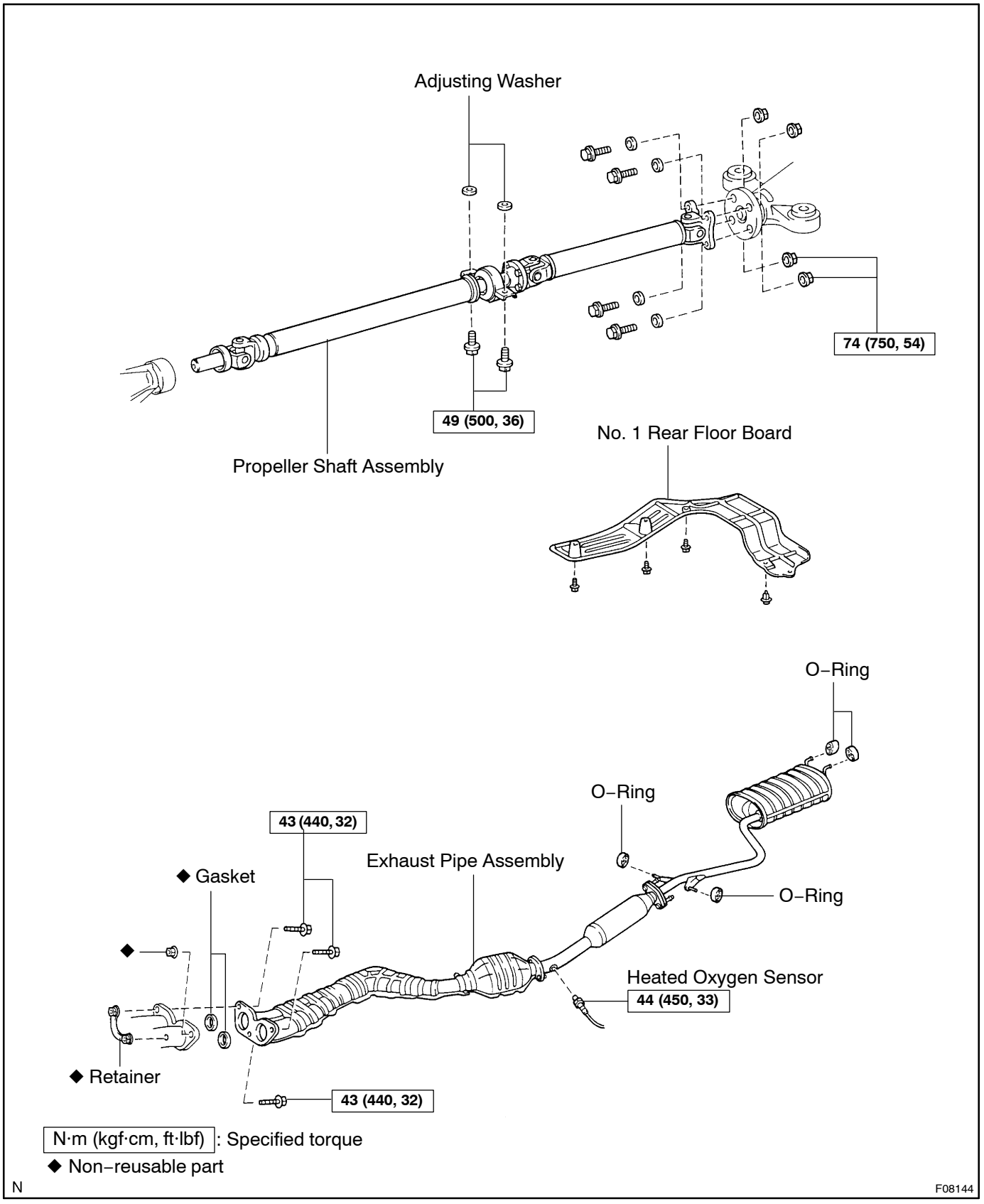
HINT:
If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

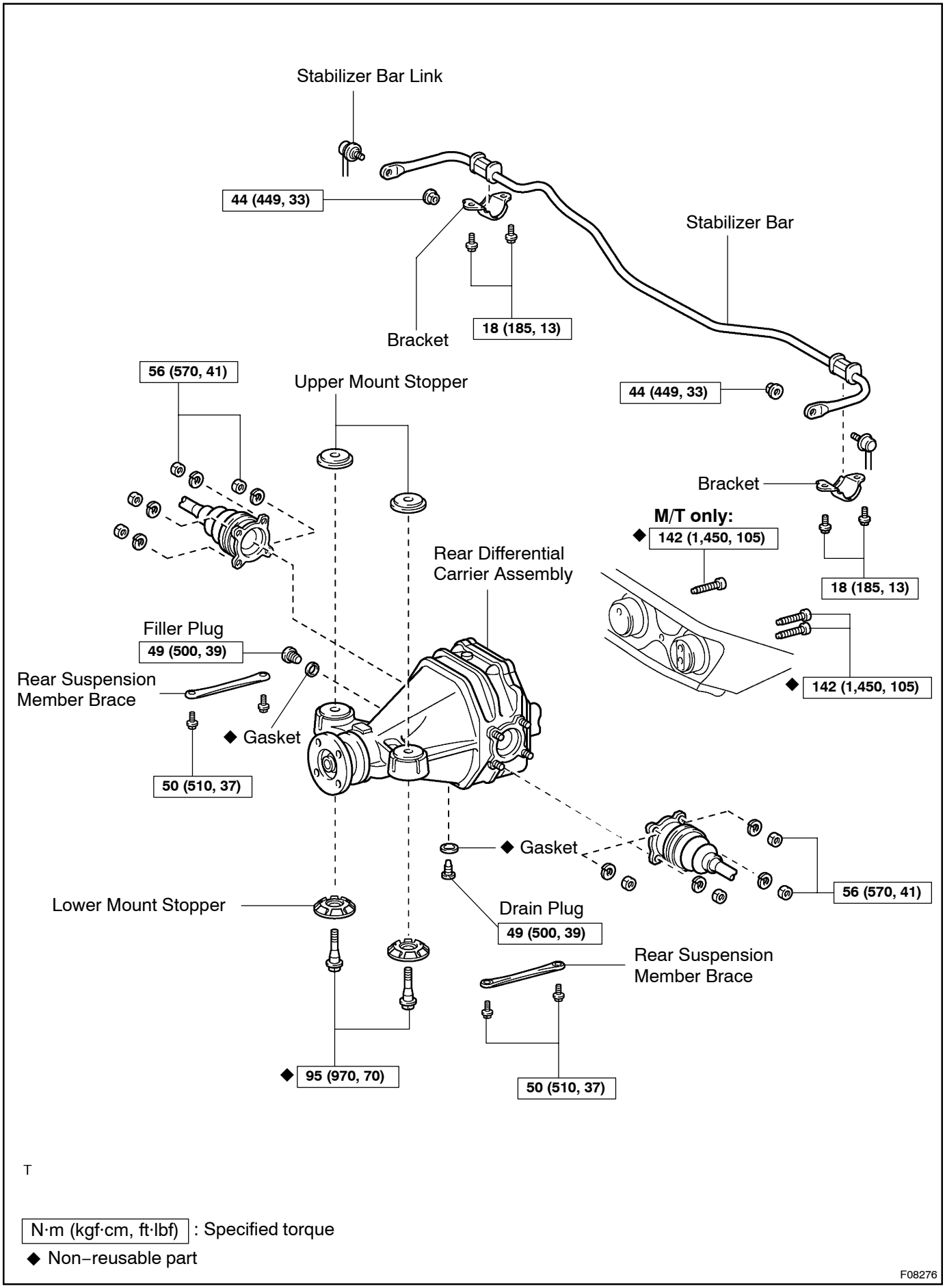
6. **CONNECT 2 STABILIZER BAR BRACKETS TO REAR SUSPENSION MEMBER**
   Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
7. **FILL AND CHECK DIFFERENTIAL OIL LEVEL (See page SA–65)**
8. **INSTALL NO. 1 REAR FLOOR BOARD**

DIFFERENTIAL MOUNTING CUSHION

SA1JH–01

COMPONENTS



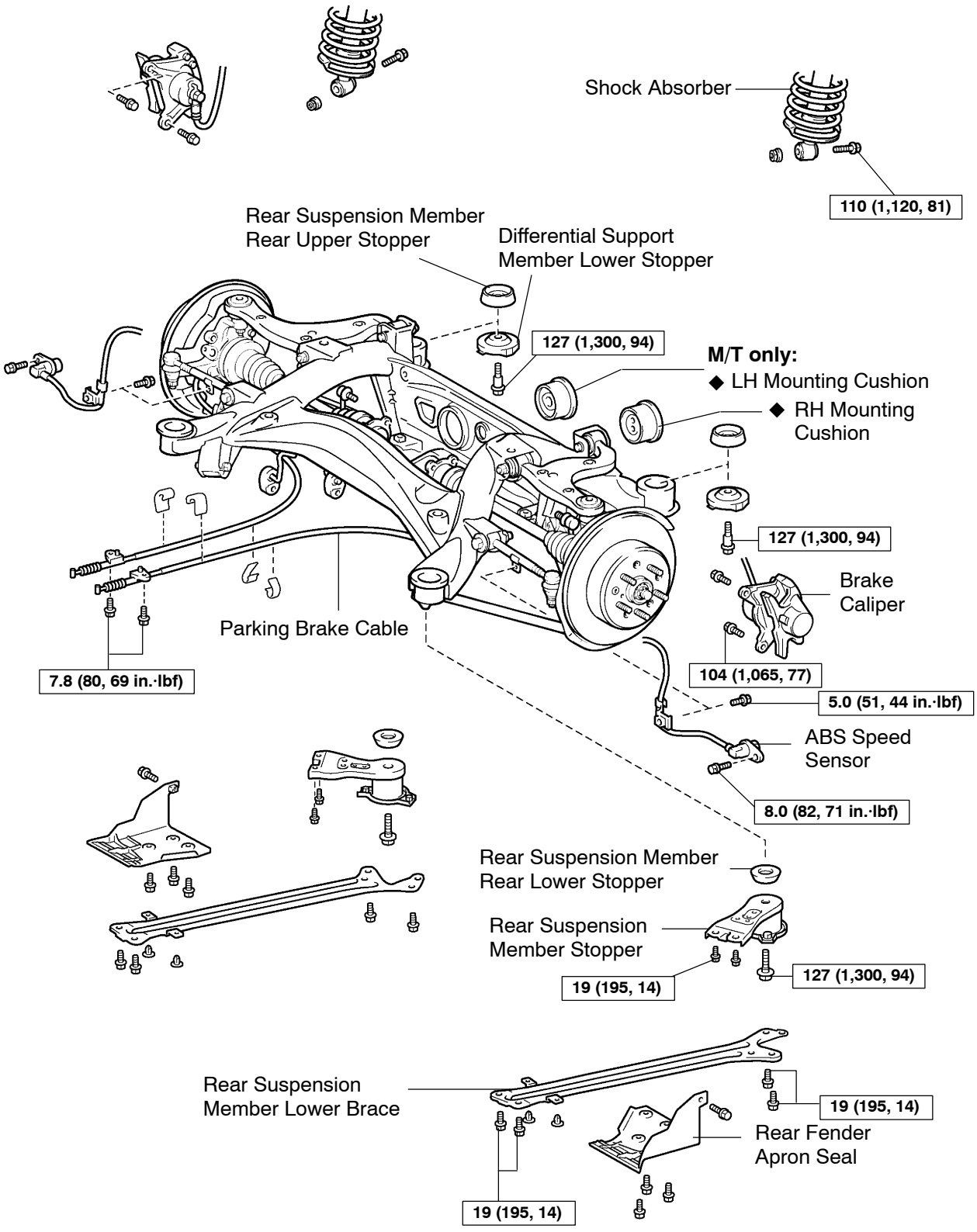


T

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

◆ Non–reusable part

F08276



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

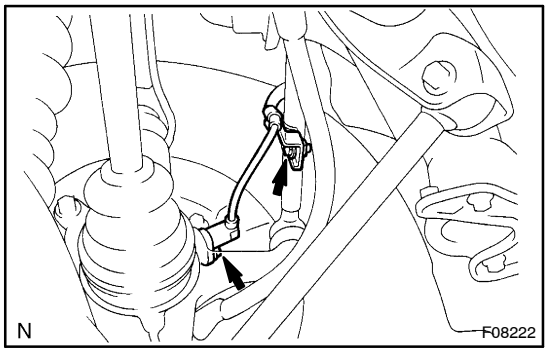
◆ Non–reusable part

F07707

SA1JI–01

REPLACEMENT

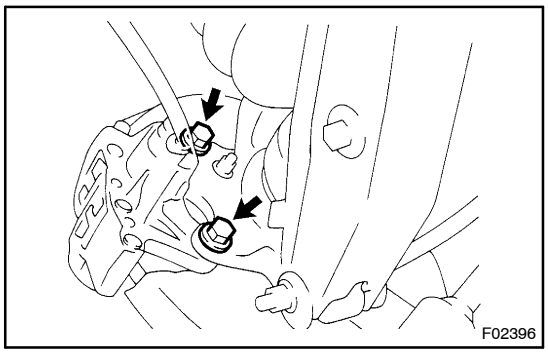
1. REMOVE REAR WHEELS
2. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY (See page SA–75)



3. DISCONNECT RH AND LH ABS SPEED SENSORS AND WIRE HARNESS

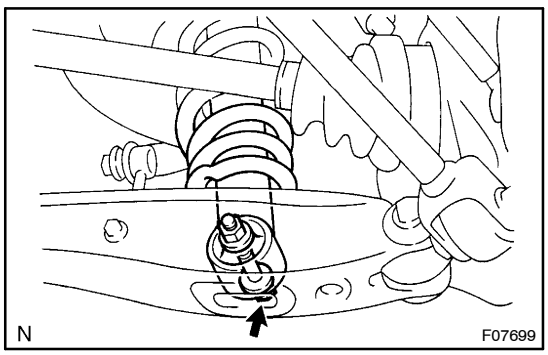
(a) Remove the bolt and disconnect the ABS speed sensor from the rear axle carrier.
(b) Remove the bolt and disconnect the ABS speed sensor wire harness clamp from the toe control link.
(c) Employ the same manner described above to the other side.

4. REMOVE RH AND LH REAR FENDER APRON SEALS



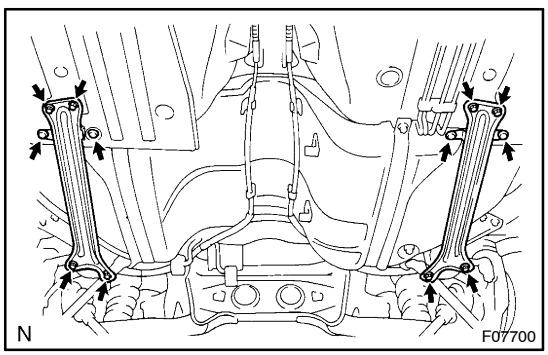
5. REMOVE RH AND LH BRAKE CALIPERS

(a) Remove the 2 bolts and brake caliper from the axle carrier.
(b) Support the brake caliper securely.
(c) Employ the same manner described above to the other side.



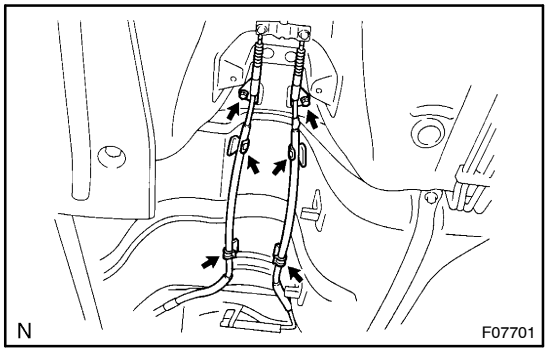
6. DISCONNECT RH AND LH SHOCK ABSORBERS FROM NO. 2 LOWER SUSPENSION ARMS

(a) Remove the nut and bolt, and disconnect the shock absorber.
(b) Employ the same manner described above to the other side.



7. REMOVE RH AND LH REAR SUSPENSION MEMBER LOWER BRACES

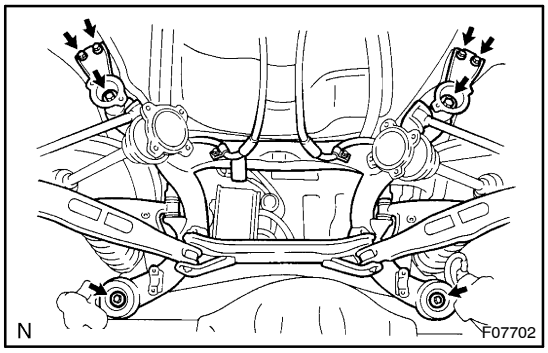
Remove the 8 bolts, 4 clips and 2 lower braces.



8. DISCONNECT PARKING BRAKE CABLE

(a) Disconnect the parking brake cable from the 4 clamps.

(b) Remove the 2 bolts and disconnect the parking brake cable.



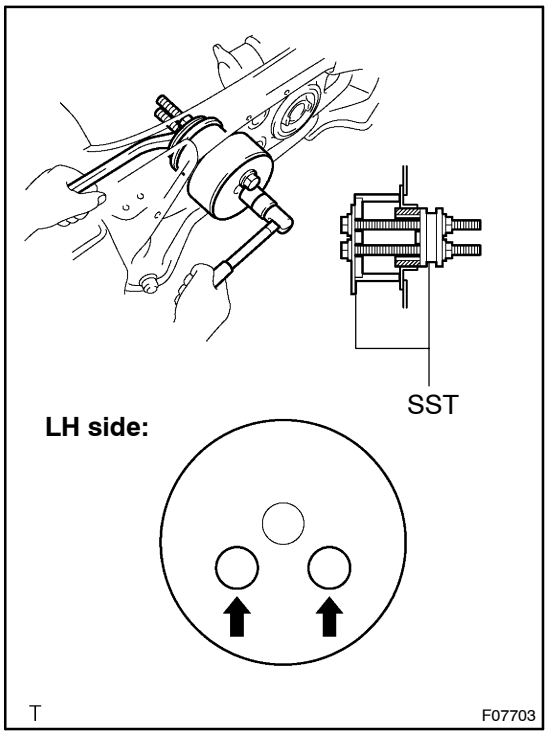
9. REMOVE REAR SUSPENSION MEMBER

(a) Support the rear suspension member with a jack.

(b) Remove the 8 bolts, 2 rear suspension member stoppers and 2 differential support member lower stoppers.

(c) Lower the rear suspension member.

(d) Remove the rear suspension member rear upper and lower stoppers from the rear suspension member.



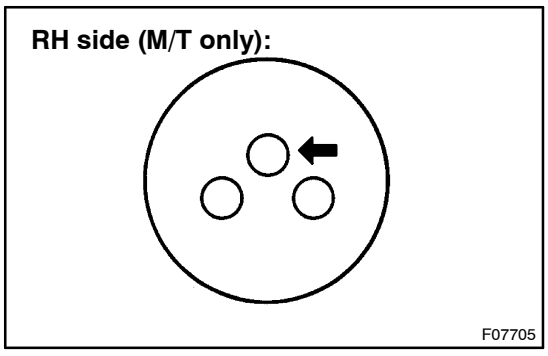
10. REMOVE DIFFERENTIAL MOUNTING CUSHION

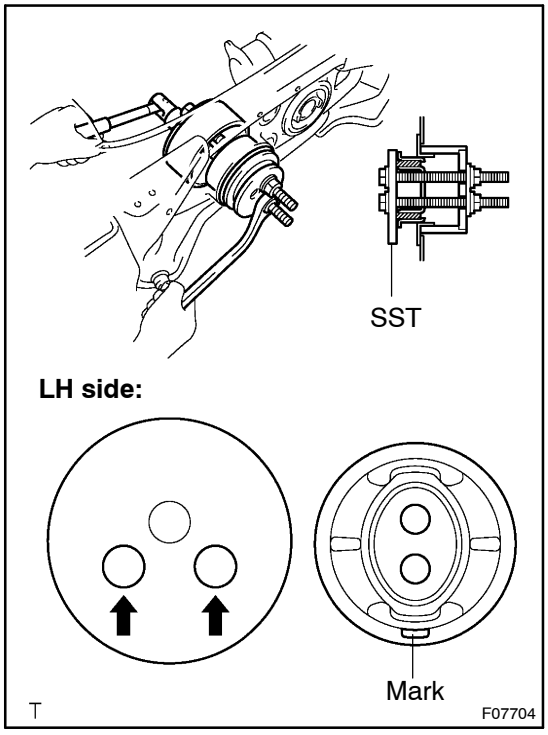
Using SST, remove the differential mounting cushion.

SST 09316–12010, 09570–24010

NOTICE:

- **When driving out the mounting cushion, be careful not to touch the suspension member with the SST.**
- **Align the SST straight so that the bolt of the SST is parallel with the center line of the mounting cushion.**
- **When installing the bolts to the RH and LH differential mounting cushions, make sure that the bolts are passed through the correct holes in the SST, as shown in the illustration.**





11. INSTALL DIFFERENTIAL MOUNTING CUSHION

Using SST, install the cushion so that the marks are positioned, as shown in the illustration.

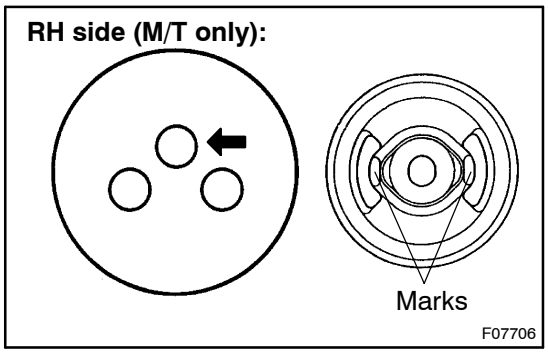
SST 09570–24010

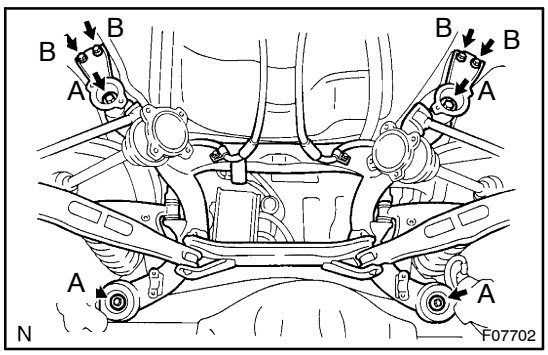
NOTICE:

- **Be careful not to confuse RH and LH sides, and its top and bottom.**
- **Set the SST after temporarily installing the differential mounting cushion into the member so as not to install at an angle.**
- **To confirm that the differential mounting cushion is aligned straight in relation to the member, check that the SST is fully in contact with all of the cushion.**

12. INSTALL REAR SUSPENSION MEMBER

(a) Install the rear suspension member rear upper and lower stoppers to the rear suspension member.





(b) Install the 2 differential support member lower stopper, rear suspension member stopper with the 8 bolts.

Torque:
A bolt: 127 N·m (1,300 kgf·cm, 94 ft·lbf)
B bolt: 19 N·m (195 kgf·cm, 14 ft·lbf)

(c) Lower the jack.

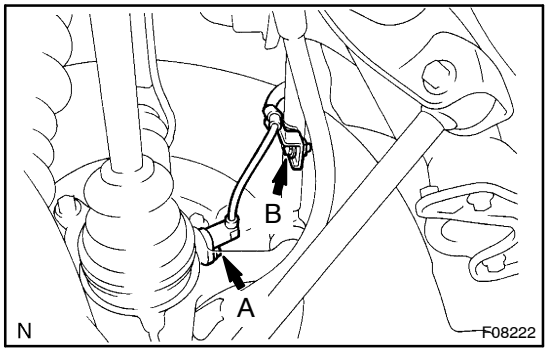
13. CONNECT PARKING BRAKE CABLE
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

14. INSTALL RH AND LH REAR SUSPENSION MEMBER LOWER BRACES
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

15. CONNECT RH AND LH SHOCK ABSORBERS TO NO. 2 LOWER SUSPENSION ARMS
Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

16. INSTALL RH AND LH BRAKE CALIPERS TO STEERING KNUCKLES
Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

17. INSTALL RH AND LH REAR FENDER APRON SEALS

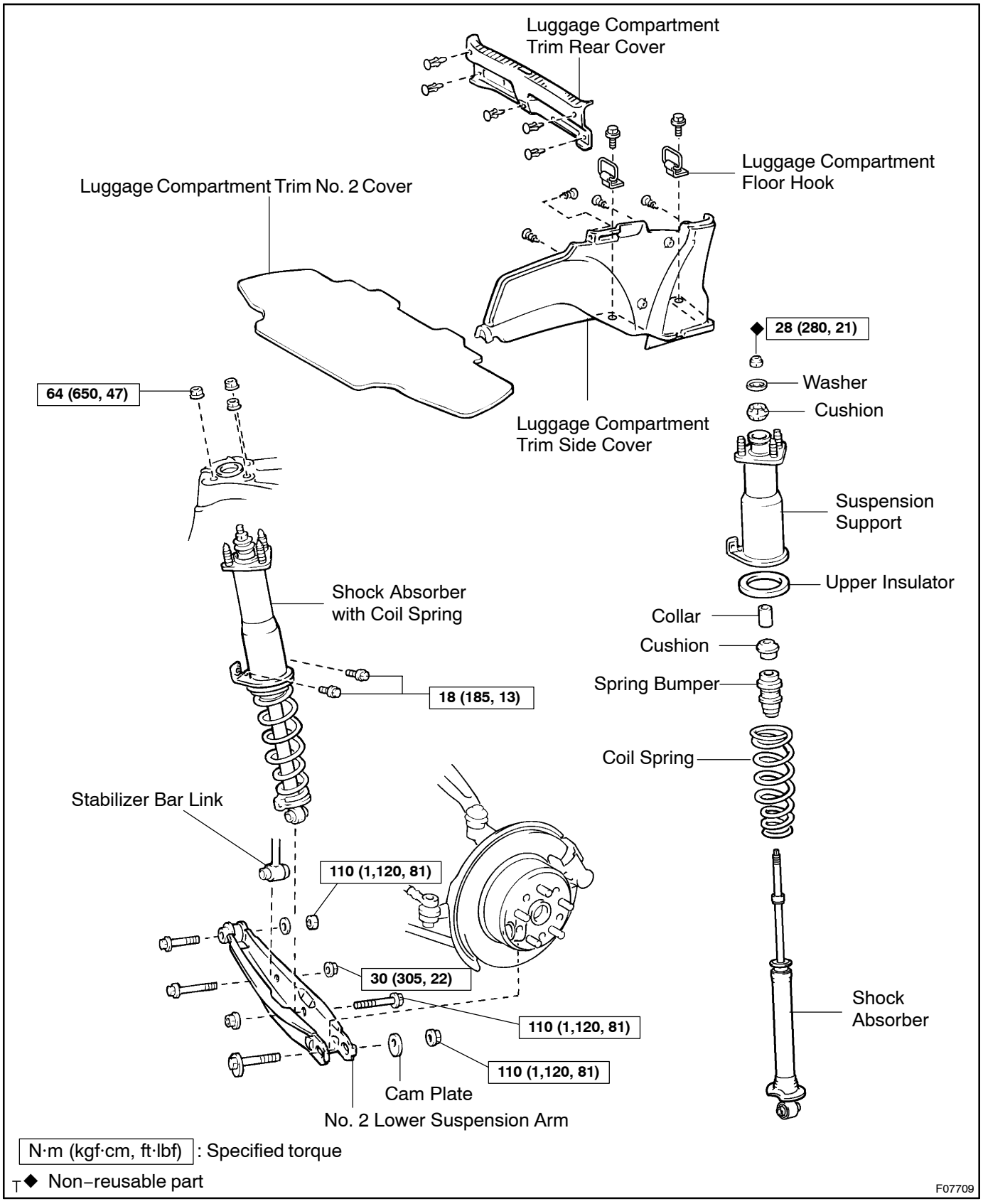


18. **CONNECT RH AND LH ABS SPEED SENSORS AND WIRE HARNESS**
    Torque:
    Bolt A: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
    Bolt B: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
19. **INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY**
    (See page SA–95)
20. **INSTALL REAR WHEELS**
    Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
21. **DEPRESS BRAKE PEDAL SEVERAL TIMES**
22. **CHECK REAR WHEEL ALIGNMENT**
    (See page SA–8)
23. **CHECK ABS SPEED SENSOR SIGNAL**
    (See page DI–223)

REAR SHOCK ABSORBER

COMPONENTS

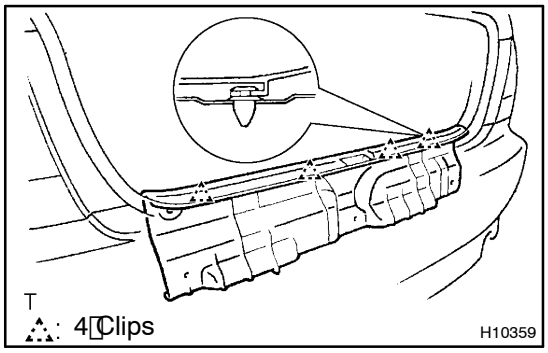
SA0SI–04



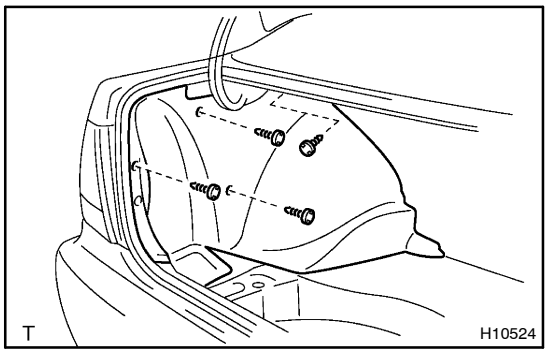
SA1JJ–02

REMOVAL

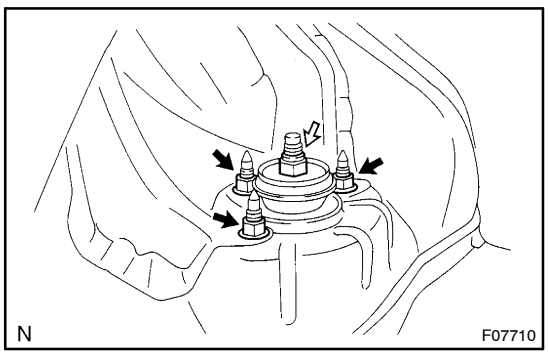
1. REMOVE REAR WHEEL
2. REMOVE LUGGAGE COMPARTMENT TRIM NO. 2 COVER



3. REMOVE LUGGAGE COMPARTMENT TRIM REAR COVER
4. REMOVE LUGGAGE COMPARTMENT FLOOR HOOKS



5. REMOVE LUGGAGE COMPARTMENT TRIM SIDE COVER
6. REMOVE NO. 2 LOWER SUSPENSION ARM (See page SA–116)



7. **REMOVE REAR SHOCK ABSORBER WITH COIL SPRING**

(a) Loosen the nut in the center of the suspension support.

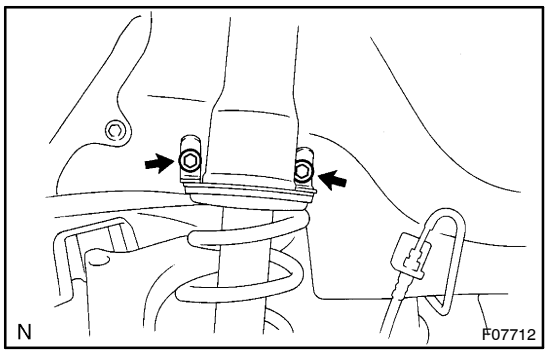
NOTICE:

Do not remove it.

HINT:

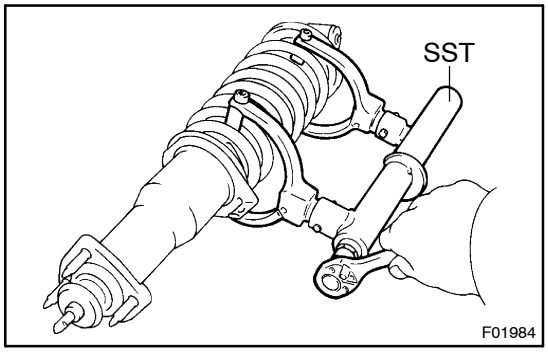
If not disassembling the shock absorber, it is not necessary to loosen the nut.

(b) Remove the 3 nuts from the body.



(c) Remove the 2 bolts and shock absorber with the coil spring from the body.

SA0SK–03



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

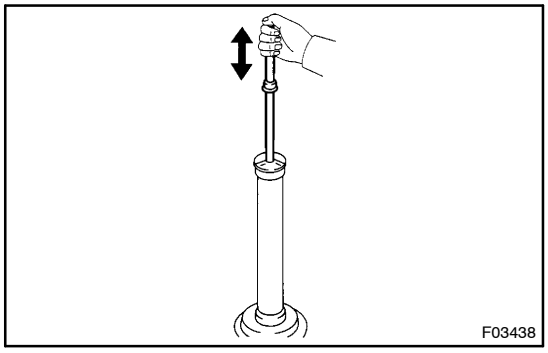
NOTICE:

Do not use an impact wrench. It will damage the SST.

(b) Remove the suspension support nut.

(c) Remove the washer, cushion, suspension support, upper insulator, coil spring, collar, cushion and spring bumper.

SA0SL–03



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber with a new one.

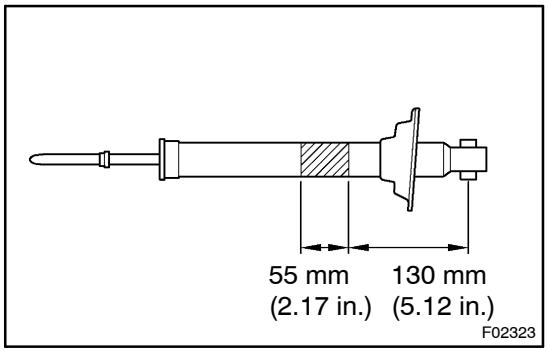
NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA–108.

SA0SM–03

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD



2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown to discharge the gas inside.

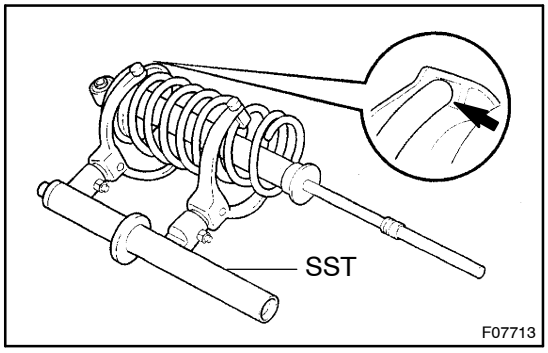
CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**

SA0SN–03

REASSEMBLY

INSTALL SUSPENSION SUPPORT AND COIL SPRING



(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:

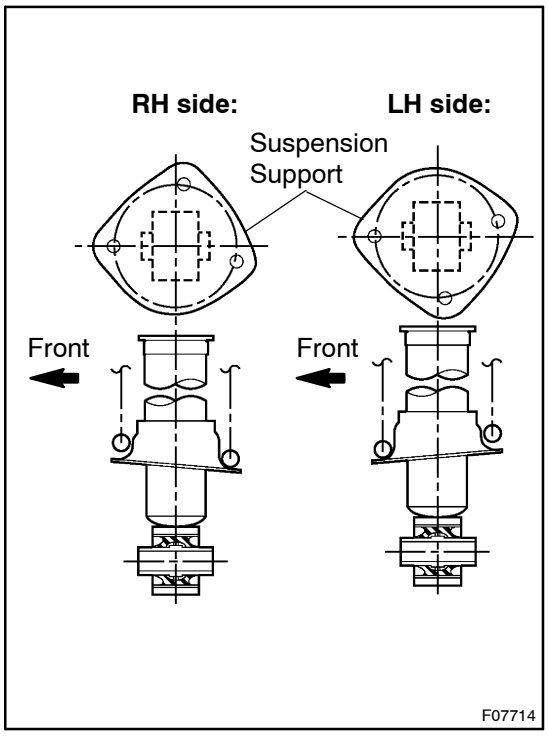
Do not use an impact wrench. It will damage the SST.

(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

(c) Install the spring bumper, cushion, collar, upper insulator, suspension support, cushion and washer to the shock absorber and temporarily tighten a new nut.



(d) Rotate the suspension support, as shown in the illustration.

(e) Remove the SST.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

HINT:

After removing the SST, recheck the direction of the suspension support.

SA0SO–03

INSTALLATION

1. INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

(a) Install the suspension support to the body with the 3 nuts.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

(b) Connect the shock absorber with coil spring to the body with the 2 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Torque the nut in the center of the suspension support.
Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

HINT:
If the shock absorber has not been disassembled, it is not necessary to torque the nut.

2. INSTALL NO. 2 LOWER SUSPENSION ARM (See page SA–117)

3. INSTALL LUGGAGE COMPARTMENT TRIM SIDE COVER

4. INSTALL LUGGAGE COMPARTMENT FLOOR HOOKS

5. INSTALL LUGGAGE COMPARTMENT TRIM REAR COVER

6. INSTALL LUGGAGE COMPARTMENT TRIM NO. 2 COVER

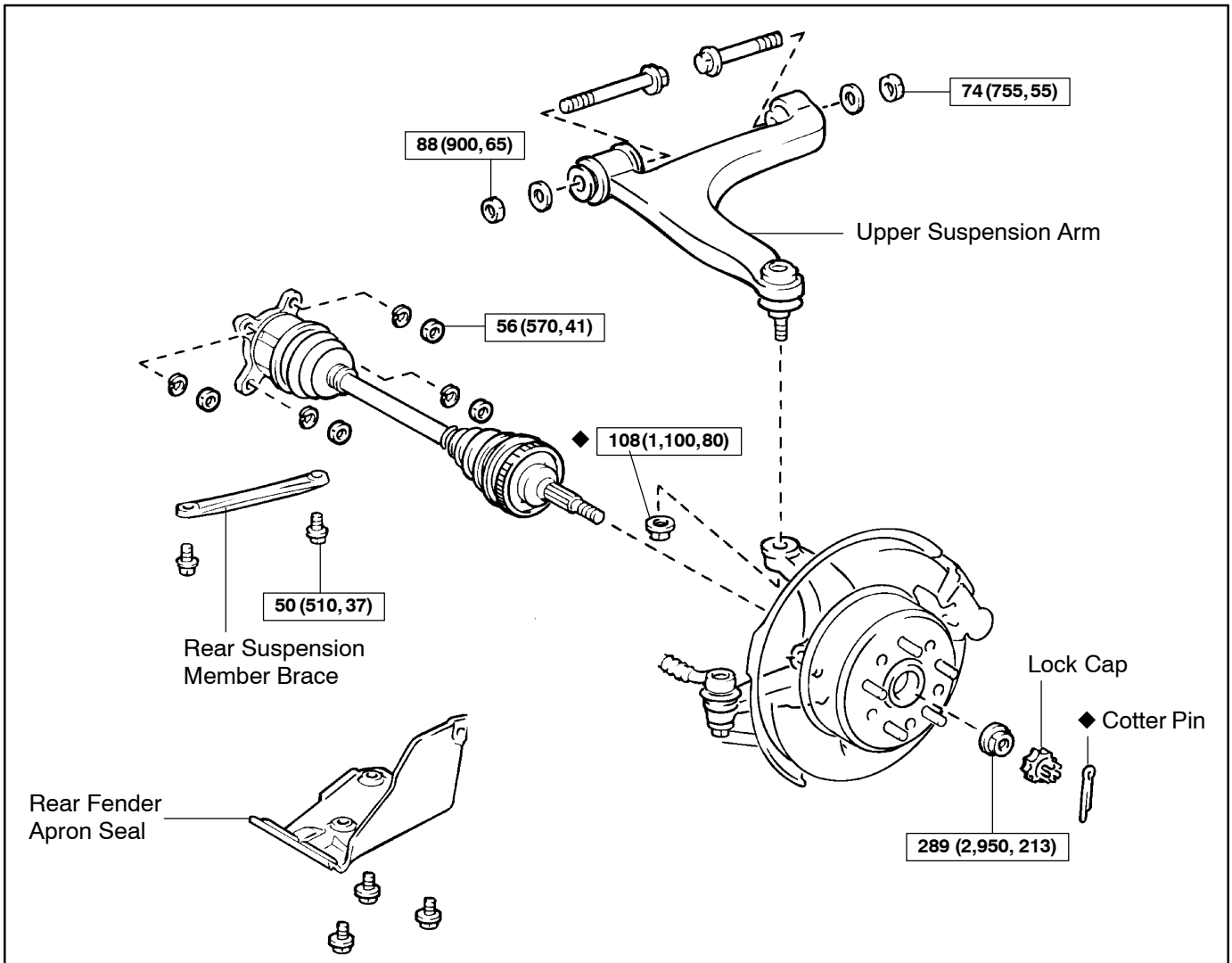
7. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

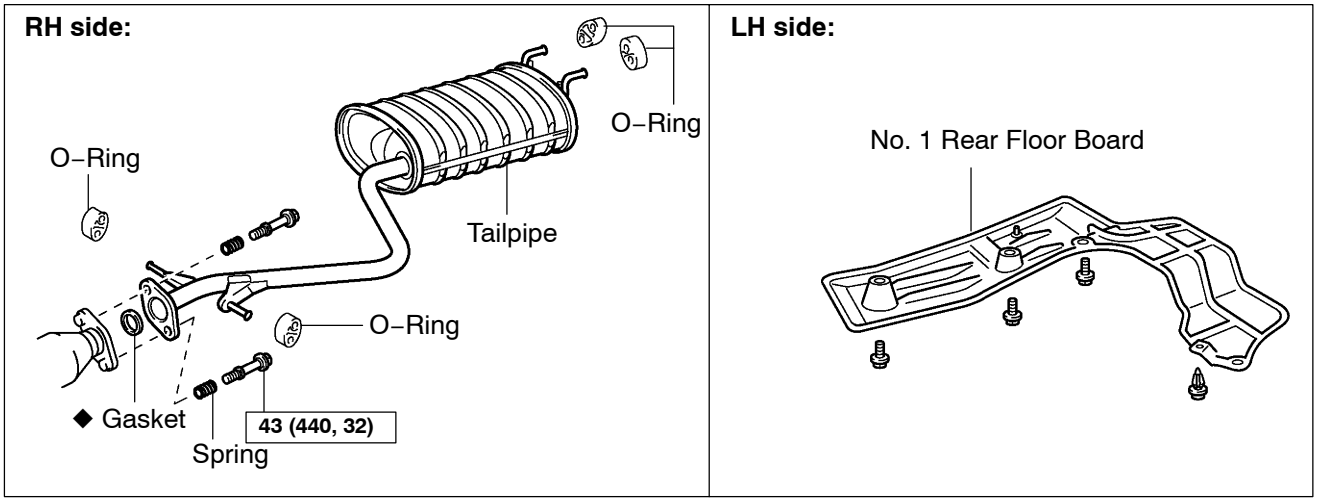
8. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

REAR UPPER SUSPENSION ARM

COMPONENTS

SA0SP–03





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

◆ Non–reusable part

F07715

SA0SQ–03

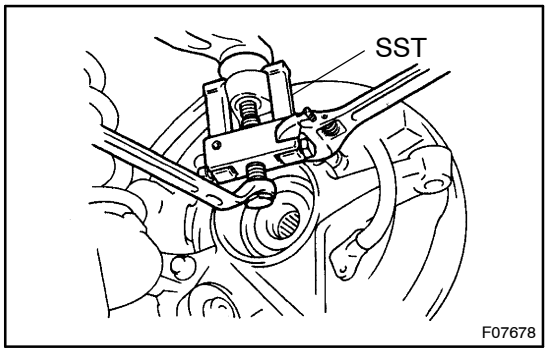
REMOVAL

1. REMOVE REAR WHEEL

2. REMOVE DRIVE SHAFT (See page SA–56)

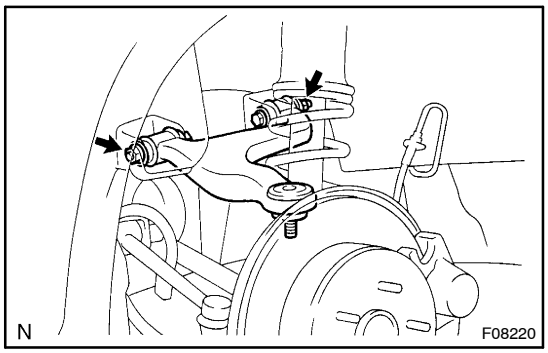
3. REMOVE UPPER SUSPENSION ARM

(a) Remove the nut.



(b) Using SST, disconnect the upper suspension arm from the axle carrier.
SST 09628–62011

(c) Support the axle carrier securely.

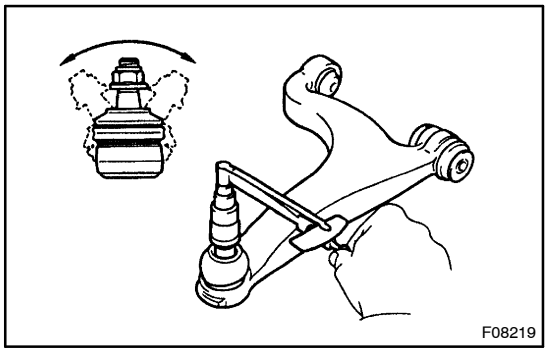


(d) Remove the 2 nuts, washers, bolts and upper suspension arm from the body.

SA0SR–03

INSPECTION

1. INSPECT UPPER SUSPENSION ARM BALL JOINT BOOT FOR DAMAGE

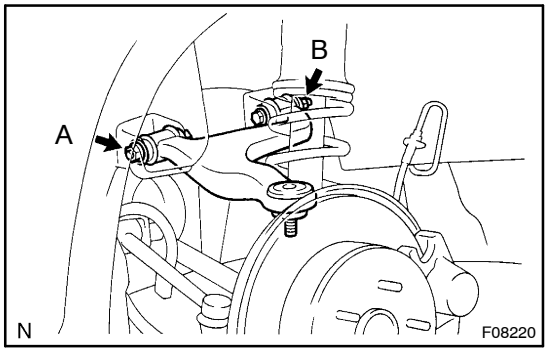


2. INSPECT UPPER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using torque wrench, turn the nut continuously 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
1.0 – 2.9 N·m (10 – 30 kgf·cm, 9 – 26 in.·lbf)



SA1JK–01

INSTALLATION

1. INSTALL UPPER SUSPENSION ARM

(a) Install the upper suspension arm to the body with the 2 bolts, washers and 2 nuts.

Torque:
Nut A: 88 N·m (900 kgf·cm, 65 ft·lbf)
Nut B: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:

After stabilizing the suspension arm, torque the nut.

(b) Connect the upper suspension arm to the axle carrier with a new nut.

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)

2. INSTALL DRIVE SHAFT (See page SA–62)

3. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

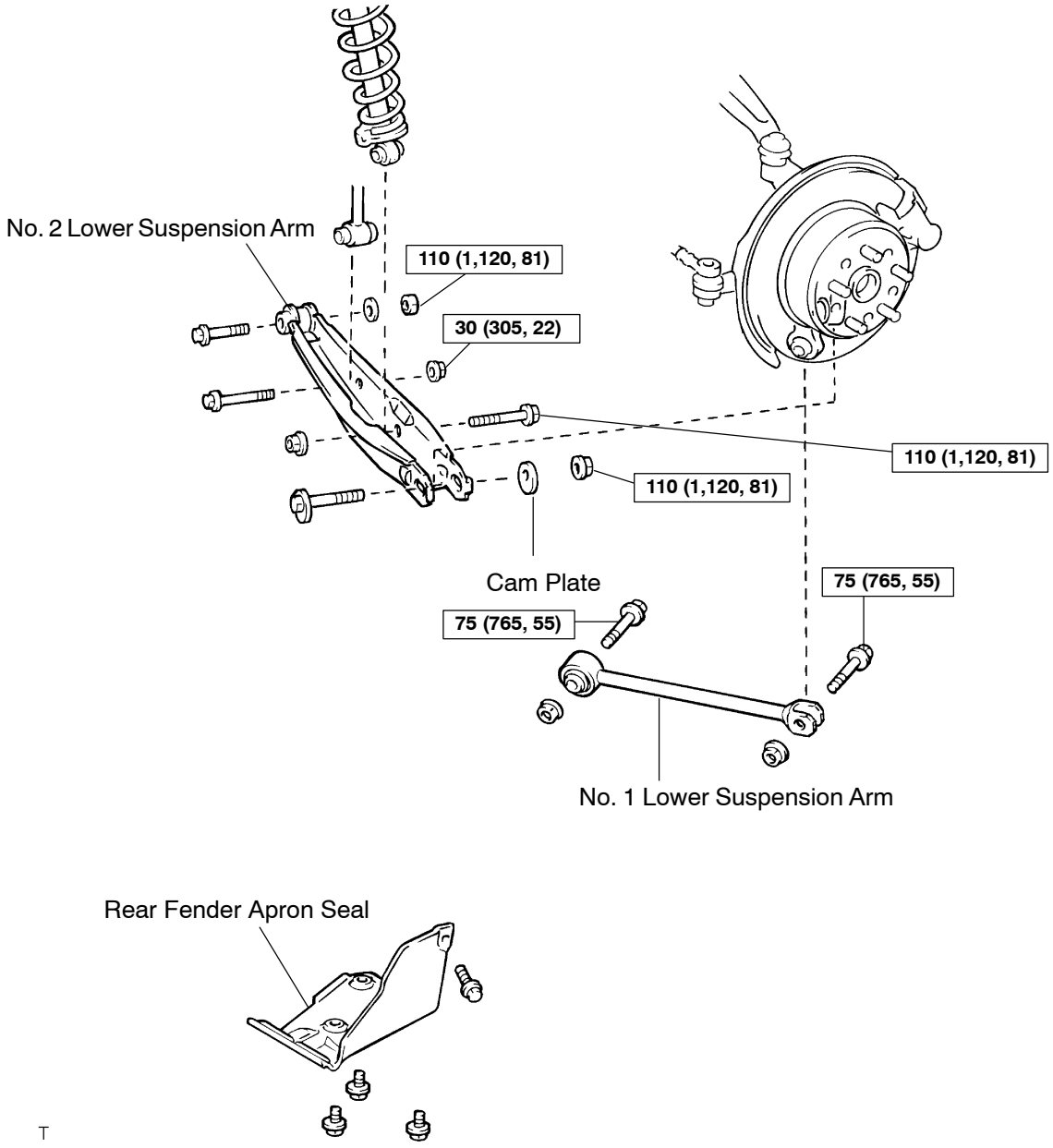
4. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

5. CHECK ABS SPEED SENSOR SIGNAL (See page DI–223)

REAR LOWER SUSPENSION ARM

COMPONENTS

SA0ST–03



T

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

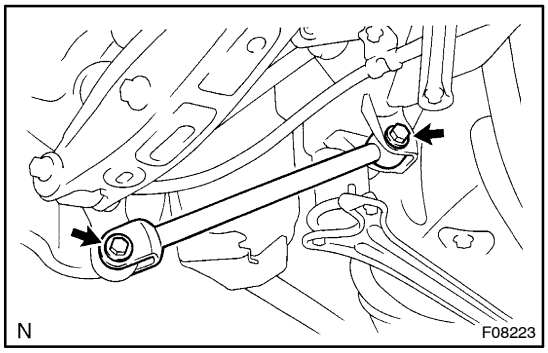
F08221

SA1JL–01

REMOVAL

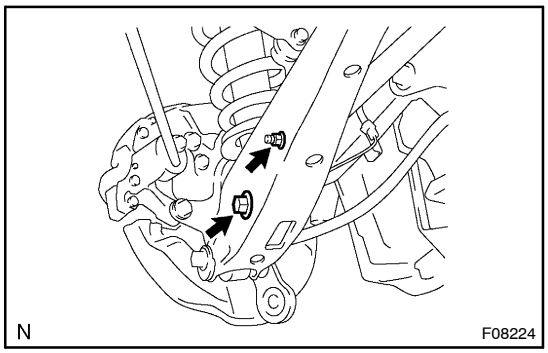
1. REMOVE REAR WHEEL

2. REMOVE REAR FENDER APRON SEAL



3. REMOVE NO. 1 LOWER SUSPENSION ARM

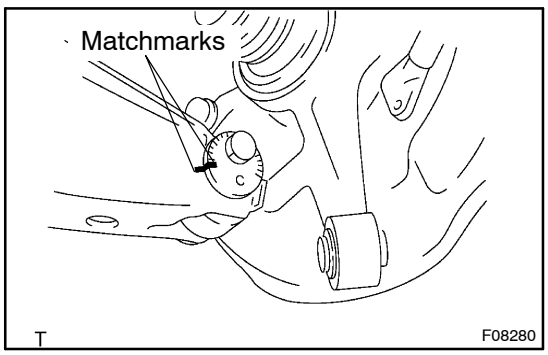
Remove the 2 bolts, nuts, and No. 1 lower suspension arm.



4. REMOVE NO. 2 LOWER SUSPENSION ARM

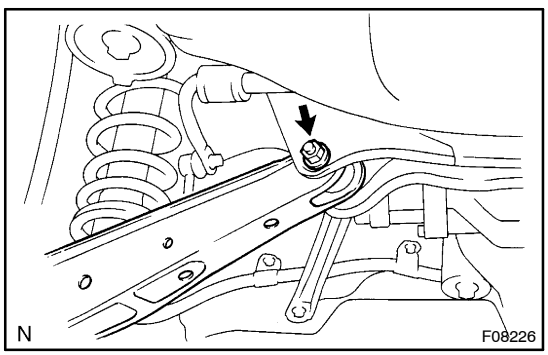
(a) Remove the nut and bolt, and disconnect the stabilizer bar link from the No. 2 lower suspension arm.

(b) Remove the bolt and nut, and disconnect the shock absorber from the No. 2 lower suspension arm.



(c) Place matchmarks on the cam bolt and No. 2 lower suspension arm.

(d) Remove the nut, cam plate and cam bolt, and disconnect the axle carrier.



(e) Remove the nut, washer, bolt and No. 2 lower suspension arm from the rear suspension member.

SA1JM–01

INSTALLATION

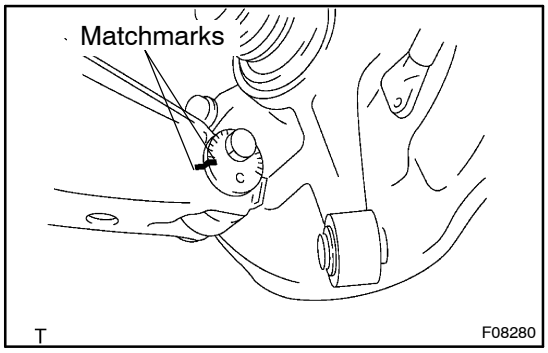
1. INSTALL NO. 2 LOWER SUSPENSION ARM

(a) Install the No. 2 lower suspension arm to the rear suspension member with bolt, washer and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, torque the nut.



(b) Connect the No. 2 lower suspension arm to the axle carrier with the cam bolt, cam plate and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, align the matchmarks on the cam bolt and No. 2 lower suspension arm, and torque the nut.

(c) Connect the shock absorber to the No. 2 lower suspension arm with the bolt and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, torque the nut.

(d) Connect the stabilizer bar link to the No. 2 lower suspension arm with the bolt and nut.

Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)

2. INSTALL NO. 1 LOWER SUSPENSION ARM

Torque: 75 N·m (765 kgf·cm, 55 ft·lbf)

HINT:

After stabilizing the suspension, torque the bolt.

3. INSTALL REAR FENDER APRON SEAL

4. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

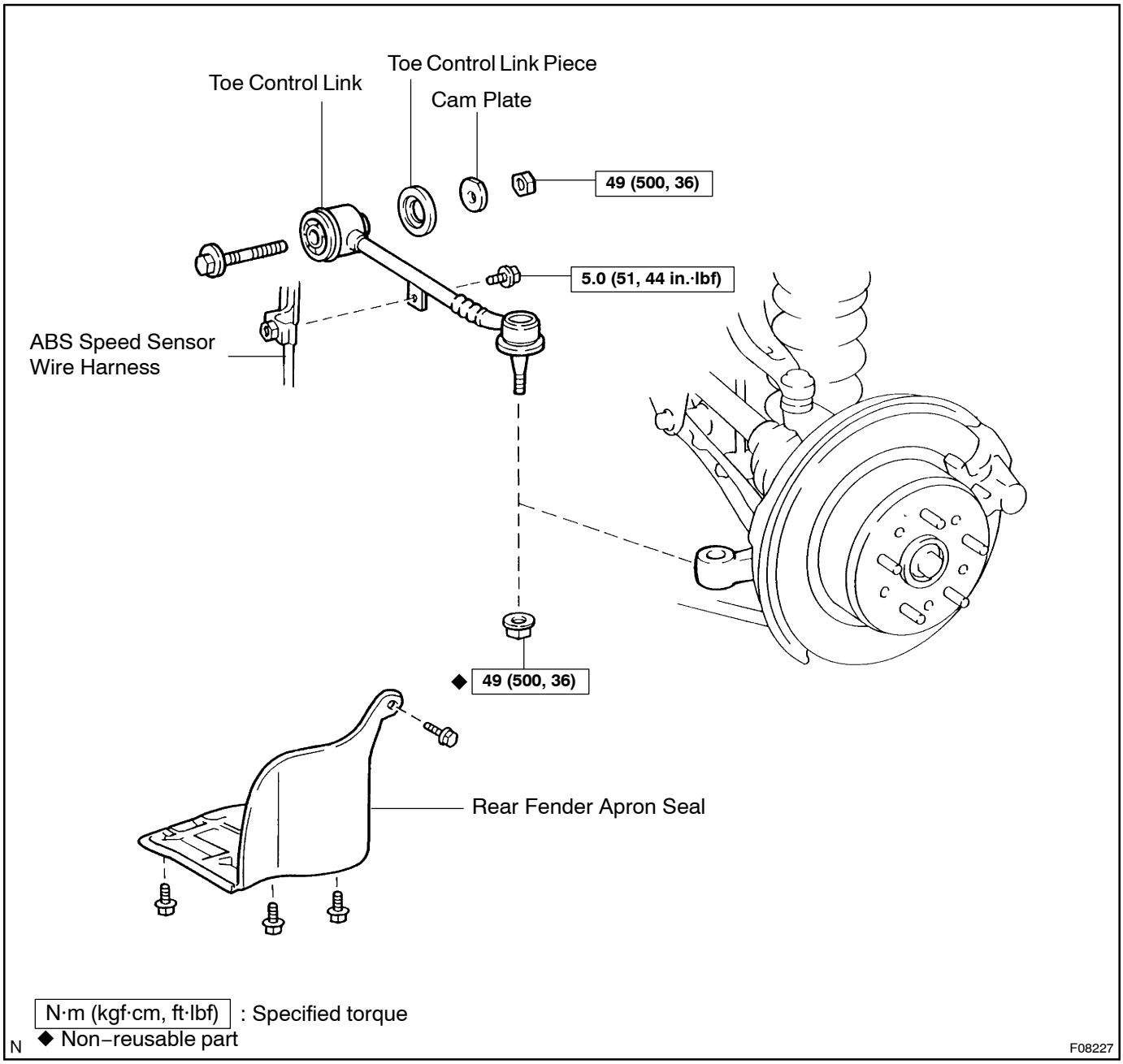
5. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

6. CHECK ABS SPEED SENSOR SIGNAL (See page DI–223)

TOE CONTROL LINK

COMPONENTS

SA0SW–03



SA0SX–03

REMOVAL

1. REMOVE REAR WHEEL

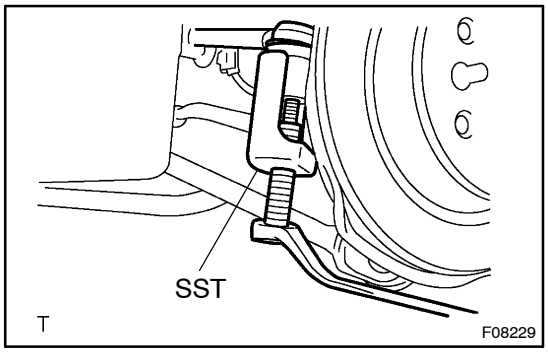
2. REMOVE REAR FENDER APRON SEAL

3. DISCONNECT ABS SPEED SENSOR WIRE HARNESS FROM TOE CONTROL LINK

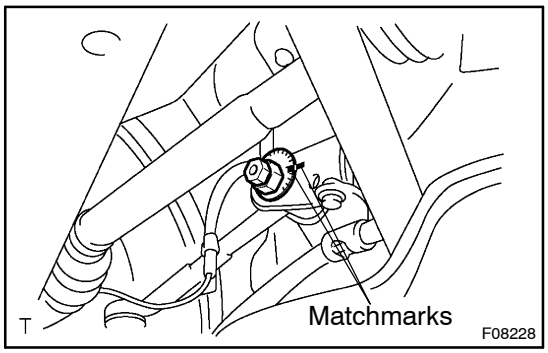
Remove the bolt and disconnect the ABS speed sensor wire harness.

4. REMOVE TOE CONTROL LINK

(a) Remove the nut.



(b) Using SST, disconnect the toe control link from the axle carrier.
SST 09610–20012



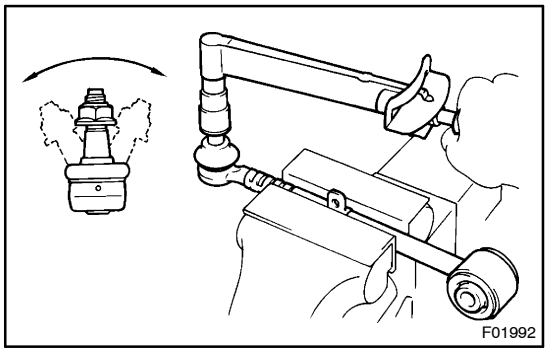
(c) Place matchmarks on the cam plate and rear suspension member.

(d) Remove the nut, cam plate, cam bolt, toe control link piece and toe control link from the axle carrier.

SA0SY–03

INSPECTION

1. INSPECT TOE CONTROL LINK BALL JOINT BOOT FOR DAMAGE

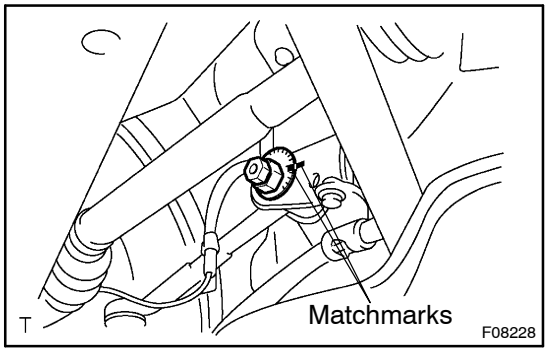


2. INSPECT TOE CONTROL LINK BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
1.0 – 2.5 N·m (10 – 25 kgf·cm, 9 – 22 in.·lbf)



SA1JN–01

INSTALLATION

1. INSTALL TOE CONTROL LINK

(a) Install the toe control link, toe control link piece to the rear suspension member with the cam bolt, cam plate and nut.

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

HINT:

After stabilizing the suspension arm, align the matchmarks on the cam plate and rear suspension member, and torque the nut.

(b) Connect the toe control link to the axle carrier with a new nut.

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

2. CONNECT ABS SPEED SENSOR WIRE HARNESS TO TOE CONTROL LINK

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

3. INSTALL REAR FENDER APRON SEAL

4. INSTALL REAR WHEEL

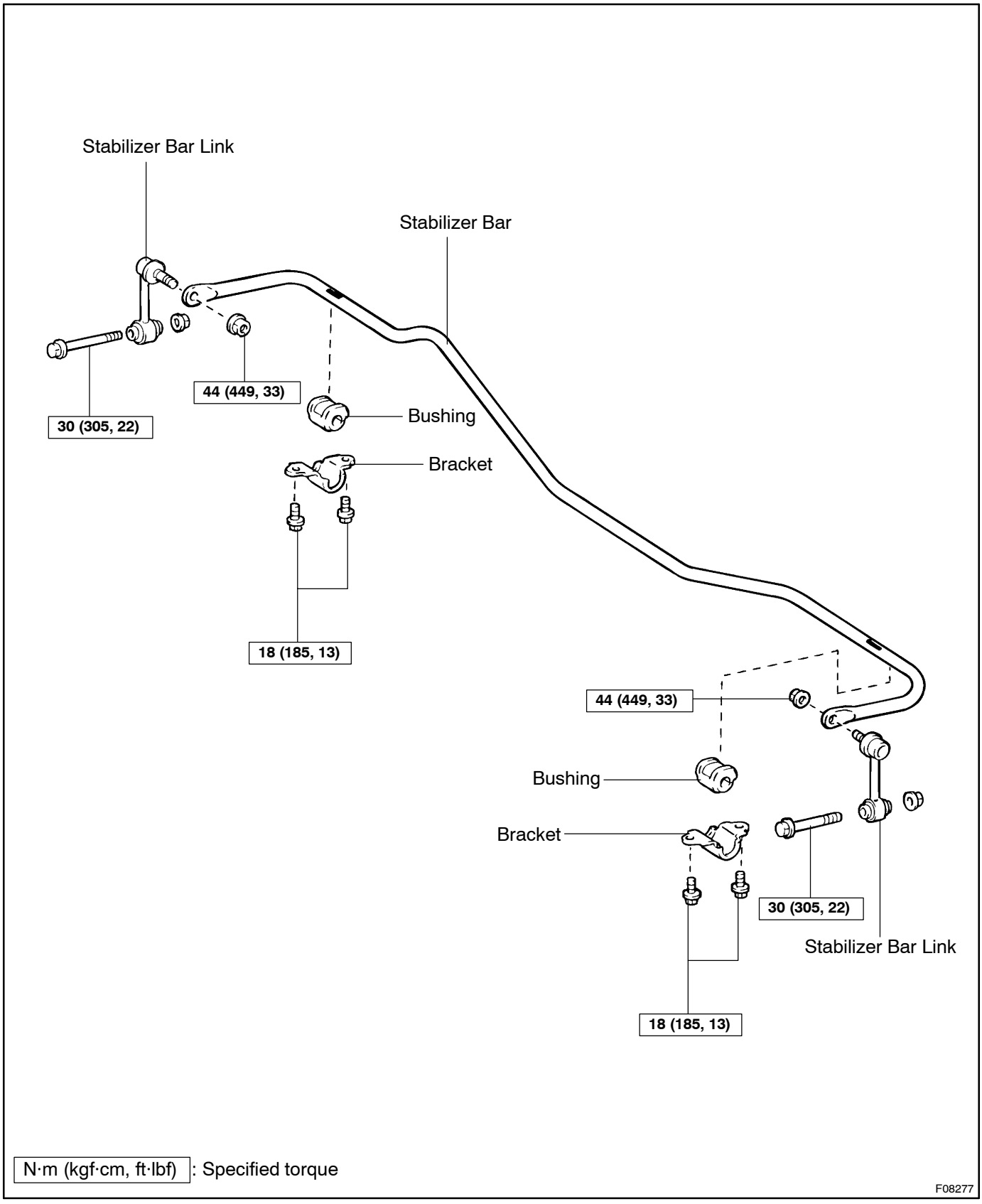
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

5. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

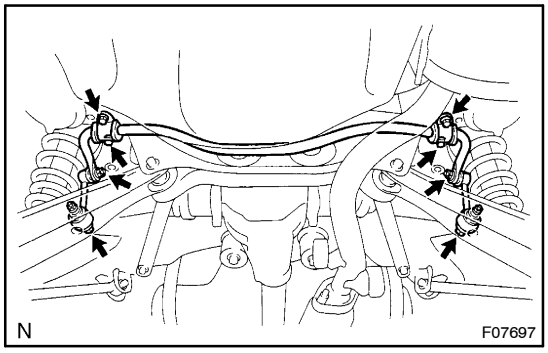
REAR STABILIZER BAR

COMPONENTS

SA0T0–03



SA1JO–01



REMOVAL

1. REMOVE STABILIZER BAR

(a) Remove the 4 nuts, 2 bolts and stabilizer bar links.

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

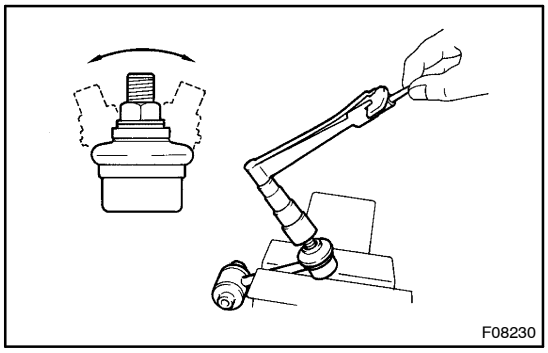
(b) Remove the 4 bolts and stabilizer bar.

2. REMOVE 2 BRACKETS AND BUSHINGS FROM STABILIZER BAR

SA0T2-03

INSPECTION

1. INSPECT STABILIZER BAR LINK BALL JOINT BOOT FOR DAMAGE



2. INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

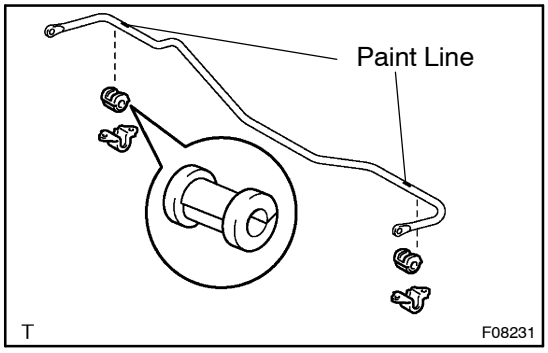
(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously 1 turn per 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 – 9.0 in.·lbf)

SA1JP–01

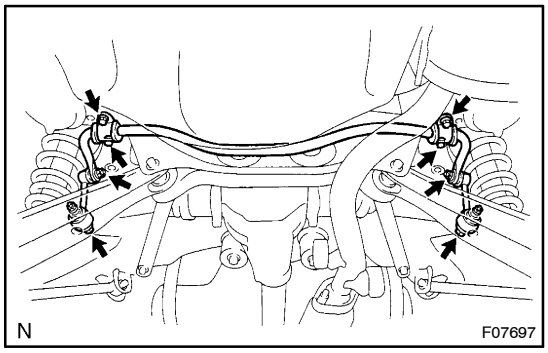
INSTALLATION



1. INSTALL 2 BUSHINGS AND BRACKETS TO STABILIZER BAR

HINT:

- Install the bushing to the outside of the paint line on the stabilizer bar.
- Install the bushing to the stabilizer bar so that the cutout of the bushing faces the rear of the vehicle, as shown in the illustration.



2. INSTALL STABILIZER BAR

(a) Install the stabilizer bar to the body with the 4 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Install the 2 stabilizer bar links with the 2 bolts and 4 nuts.
Torque:
Bolt: 30 N·m (305 kgf·cm, 22 ft·lbf)
Nut: 44 N·m (449 kgf·cm, 33 ft·lbf)

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

STEERING SYSTEM

PRECAUTION

SR0L4–03

- **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 IS200 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 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.**

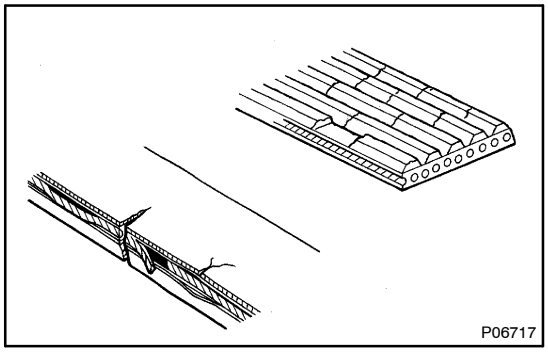
TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SR0L5–05

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–6
	3. Drive belt (Loose)		SR–3
	4. Front wheel alignment (Incorrect)		SA–5
	5. Steering system joints (Worn)		–
	6. Suspension arm ball joints (Worn)	Upper	SA–29
		Lower	SA–39
	7. Steering column (Binding)		–
	8. Power steering vane pump		SR–25
	9. Power steering gear		SR–38
Poor return	1. Tires (Improperly inflated)		SA–2
	2. Front wheel alignment (Incorrect)		SA–5
	3. Steering column (Binding)		–
	4. Power steering gear		SR–38
Excessive play	1. Steering system joints (Worn)		–
	2. Suspension arm ball joints (Worn)	Upper	SA–29
		Lower	SA–39
	3. Intermediate shaft (Worn)		–
	4. Front wheel bearing (Worn)		SA–11
	5. Power steering gear		SR–38
Abnormal noise	1. Power steering fluid level (Low)		SR–6
	2. Steering system joints (Worn)		–
	3. Power steering vane pump		SR–25
	4. Power steering gear		SR–38



DRIVE BELT

SR0QZ–02

INSPECTION

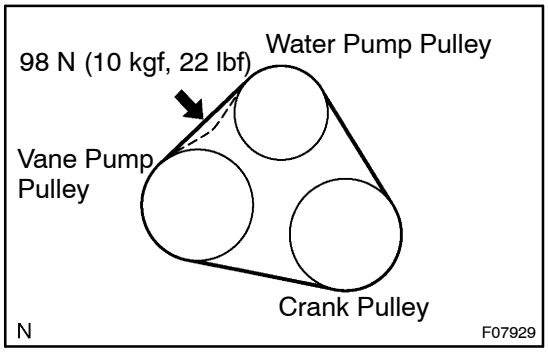
INSPECT DRIVE BELT

(a) Visually check the belt for excessive wear, frayed cords etc.

If any defect has been found, replace the drive belt.

HINT:

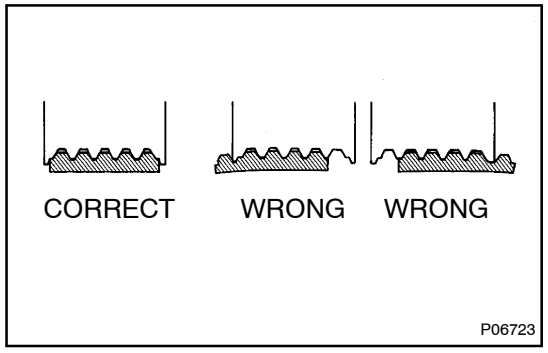
Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.



(b) Measure the drive belt deflection.

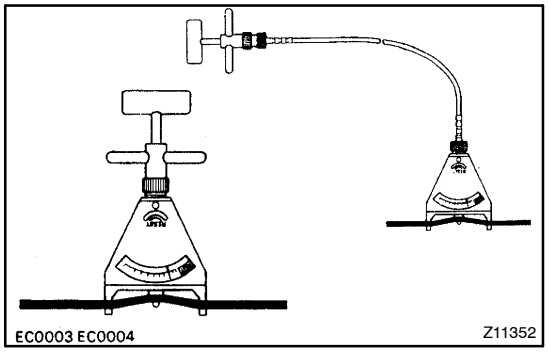
Drive belt tension: at 98 N (10 kgf, 22 lbf)
New belt: 5.5 – 7.0 mm (0.217 – 0.276 in.)
Used belt: 7.0 – 9.0 mm (0.276 – 0.354 in.)

If the belt deflection 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.



(Reference)

- Using a belt tension gauge, measure the drive belt tension.

  Drive belt tension:
  New belt: 441 – 539 N (45 – 55 kgf)
  Used belt: 196 – 343 N (20 – 35 kgf)

If the belt tension is not as specified, adjust it.

POWER STEERING FLUID

SR05P–06

BLEEDING

1. **CHECK FLUID LEVEL (See page SR–6)**
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**

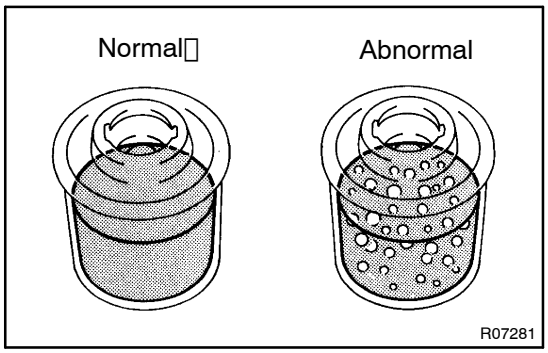
Run the engine at idle for a few minutes.

6. **TURN STEERING WHEEL**

(a) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2–3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2–3 seconds.

(b) Repeat (a) several times.

7. **STOP ENGINE**

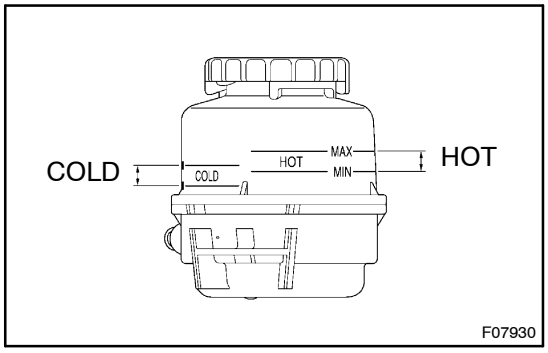


8. **CHECK FOR FOAMING OR EMULSIFICATION**

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–6)**

SR05Q–06



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

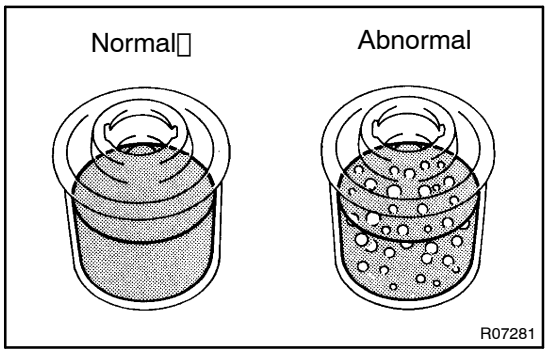
HINT:

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.

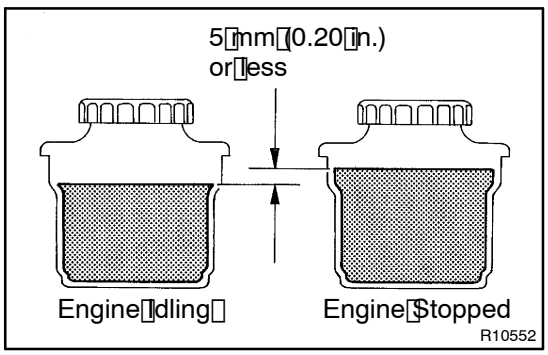
(d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

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–5).



(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–5).

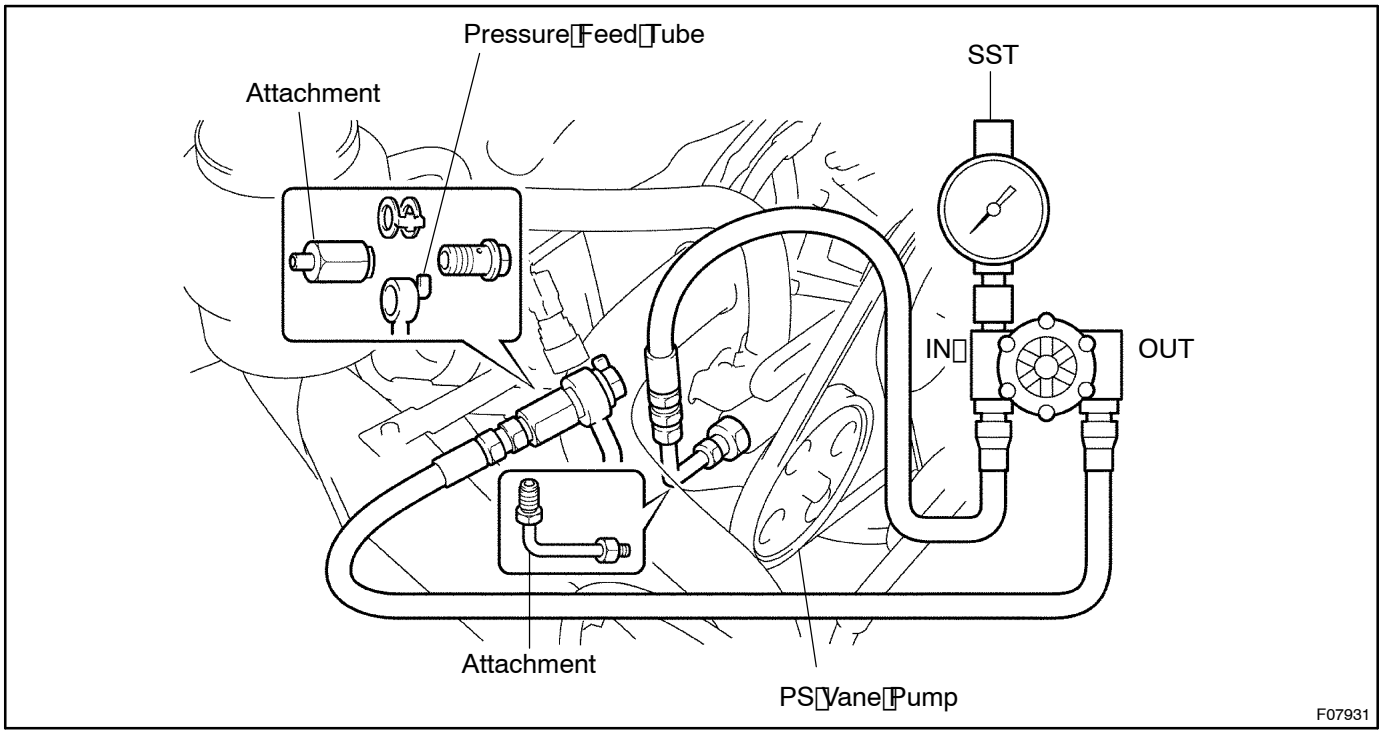
(i) Check the fluid level.

2. CHECK STEERING FLUID PRESSURE

(a) Disconnect the pressure feed tube from the PS vane pump (See page SR–27).

(b) Connect SST, as shown in the illustration below.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

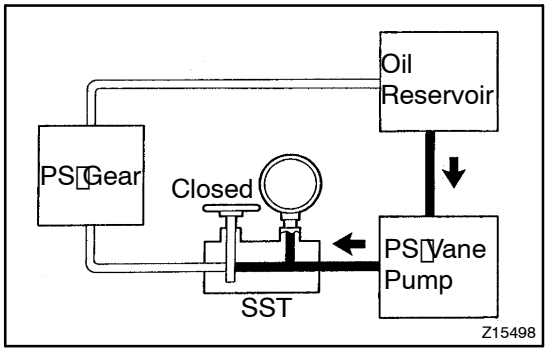
NOTICE:
Check that the valve of the SST is in the open position.



(c) Bleed the power steering system (See page SR–5).

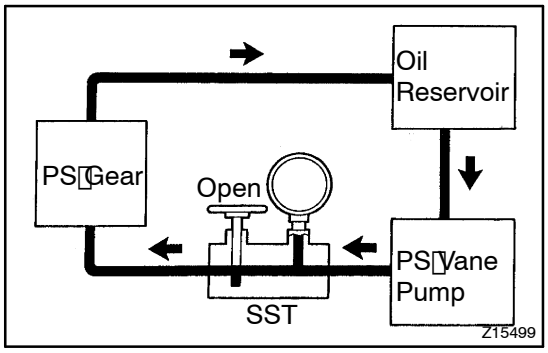
(d) Start the engine and run it at idle.

(e) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 °C (176 °F)



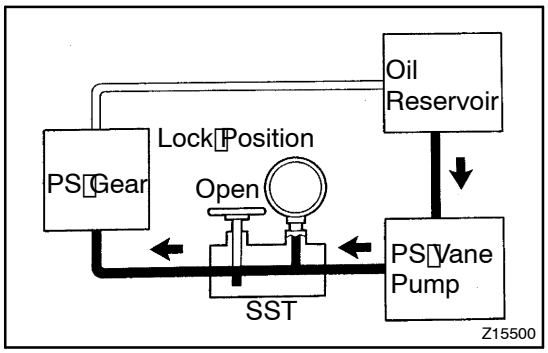
(f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Minimum fluid pressure:
6,374 kPa (65 kgf/cm², 925 psi)

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/cm², 71 psi) or less

NOTICE:
Do not turn the steering wheel.



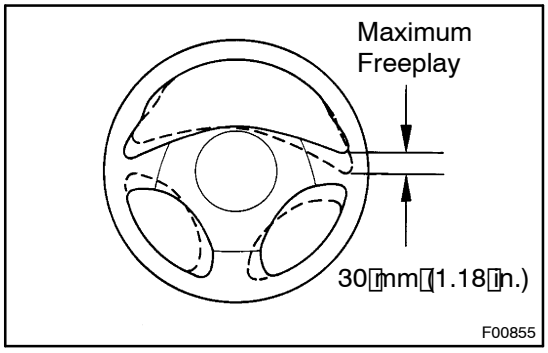
(i) With the engine idling and valve fully opened, turn the steering wheel to full lock position.
Minimum fluid pressure:
6,374 kPa (65 kgf/cm², 925 psi)

NOTICE:
- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

(j) Disconnect the SST.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

(k) Connect the pressure feed tube to the PS vane pump (See page SR–37).

(l) Bleed the power steering system (See page SR–5).



STEERING WHEEL

SR05R–06

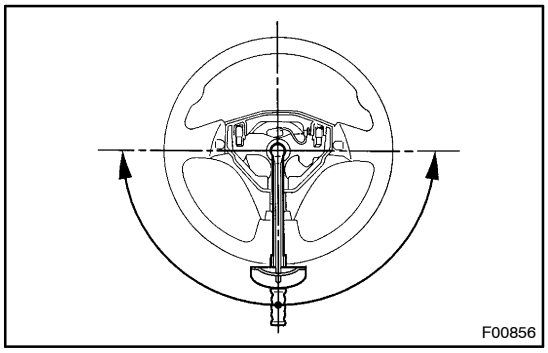
INSPECTION

1. CHECK STEERING WHEEL FREEPLAY

(a) Stop the vehicle and face the tires straight ahead.

(b) Rock the steering wheel gently up and down with a finger lightly, check the steering wheel freeplay.

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–12).

(c) Start the engine and run it at idle.

(d) Measure the steering effort in both directions.

Steering effort (Reference):

4.2 – 5.4 N·m (43 – 55 kgf·cm, 37 – 48 in.·lbf)

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

(e) Torque the steering wheel set nut.

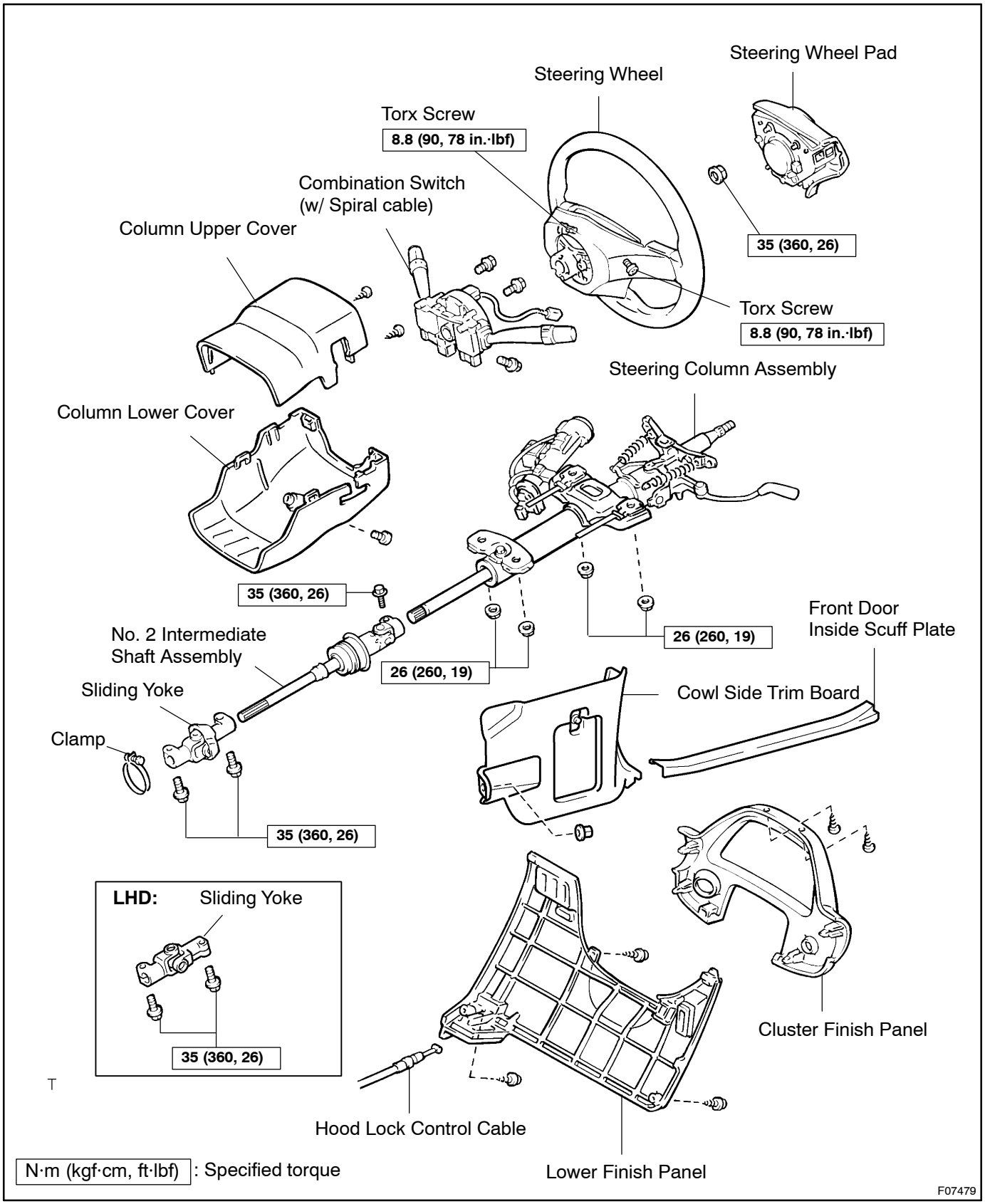
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

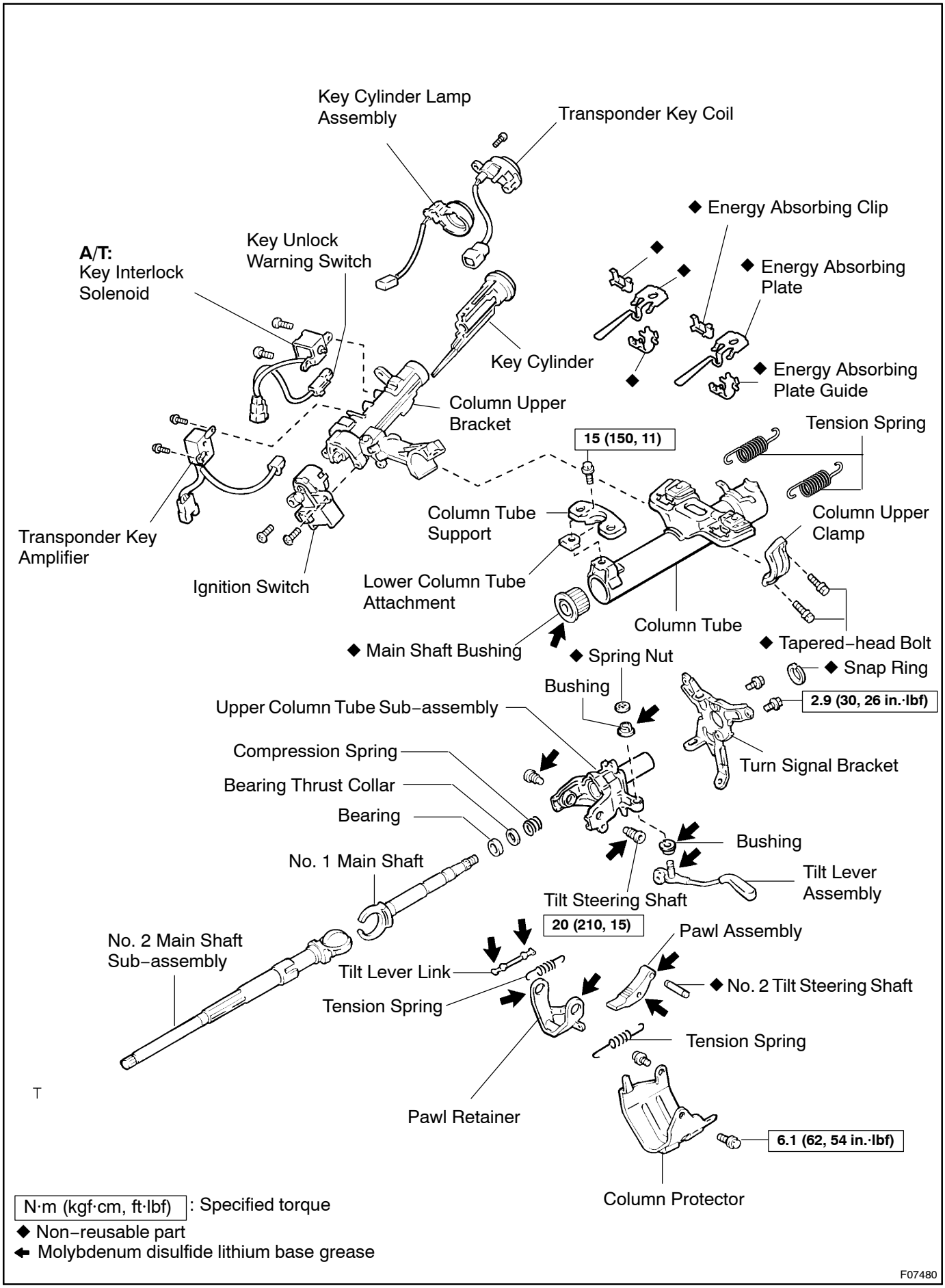
(f) Install the steering wheel pad (See page SR–23).

TILT STEERING COLUMN

COMPONENTS

SR0U6–01




Key Cylinder Lamp Assembly
Transponder Key Coil
◆ Energy Absorbing Clip
Key Unlock Warning Switch
A/T:
Key Interlock Solenoid
◆ Energy Absorbing Plate
Key Cylinder
◆ Energy Absorbing Plate Guide
Column Upper Bracket
15 (150, 11)
Tension Spring
Column Tube Support
Column Upper Clamp
Transponder Key Amplifier
Ignition Switch
Lower Column Tube Attachment
Column Tube
◆ Main Shaft Bushing
◆ Spring Nut
◆ Tapered–head Bolt
◆ Snap Ring
Bushing
2.9 (30, 26 in.·lbf)
Upper Column Tube Sub–assembly
Turn Signal Bracket
Compression Spring
Bearing Thrust Collar
Bearing
Bushing
No. 1 Main Shaft
Tilt Lever Assembly
Tilt Steering Shaft
20 (210, 15)
Pawl Assembly
No. 2 Main Shaft Sub–assembly
Tilt Lever Link
◆ No. 2 Tilt Steering Shaft
Tension Spring
Tension Spring
Pawl Retainer
6.1 (62, 54 in.·lbf)
Column Protector
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Molybdenum disulfide lithium base grease
F07480

SR0U7–01

REMOVAL

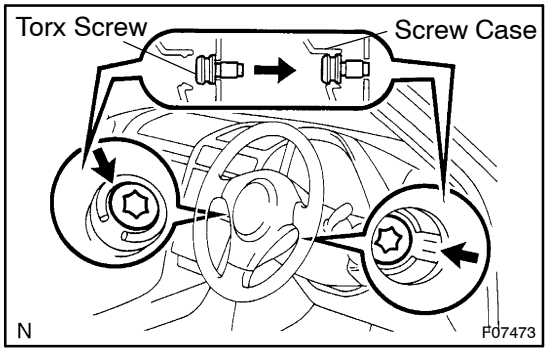
1. REMOVE STEERING WHEEL PAD

NOTICE:

If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.

(a) Place the front wheels facing straight ahead.

(b) Using a torx socket wrench, loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.



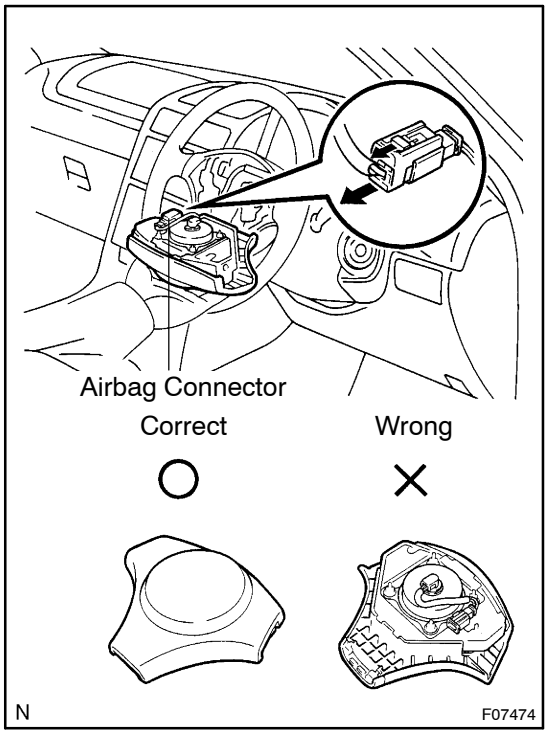
(c) Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

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

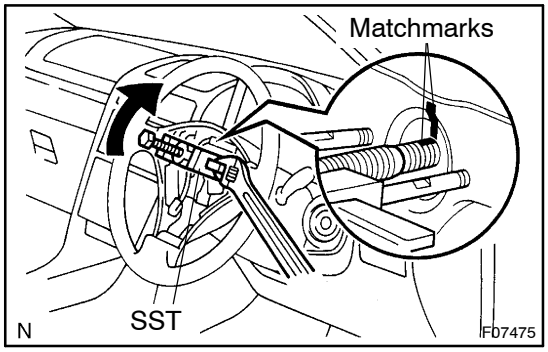
(a) Disconnect the connector.

(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 09950–50012 (09951–05010, 09952–05010, 09953–05020, 09954–05020)



3. REMOVE FRONT DOOR INSIDE SCUFF PLATE AND COWL SIDE TRIM BOARD

(a) Remove the front door inside scuff plate.

(b) Remove the clip and cowl side trim board.

4. REMOVE LOWER FINISH PANEL

(a) Remove the 3 screws.

(b) Disconnect the connectors and remove the lower finish panel.

(c) Disconnect the hood lock control cable.

5. REMOVE CLUSTER FINISH PANEL

(a) Remove the 2 screws.

(b) Disconnect the connector and remove the cluster finish panel.

6. REMOVE COLUMN UPPER AND LOWER COVERS

(a) Remove the 3 screws and column lower cover.

(b) Remove the column upper cover.

7. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

(a) Disconnect the connectors.

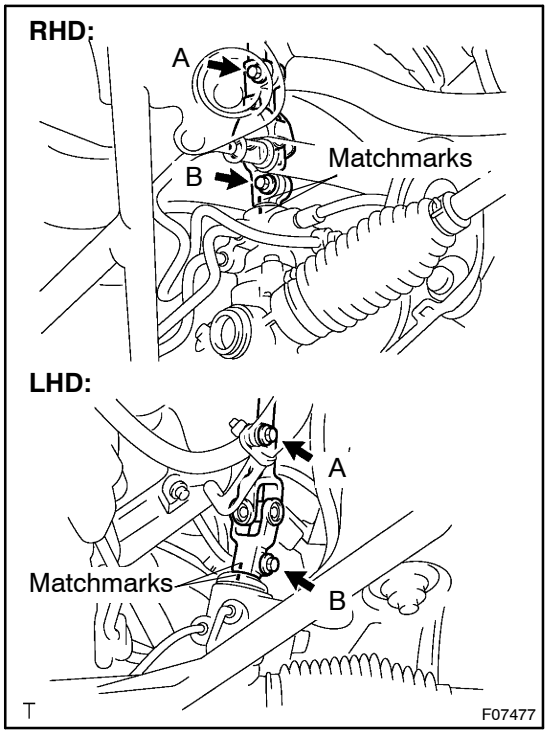
(b) Disconnect the airbag connector.

(c) Remove the 3 screws and combination switch.

8. REMOVE SPIRAL CABLE (See page SE–26)

NOTICE:

Do not disassemble the cable or apply oil to it.



9. DISCONNECT SLIDING YOKE

(a) Place matchmarks on the sliding yoke and control valve shaft.

(b) Loosen the bolt A and remove the bolt B.

10. REMOVE STEERING COLUMN ASSEMBLY

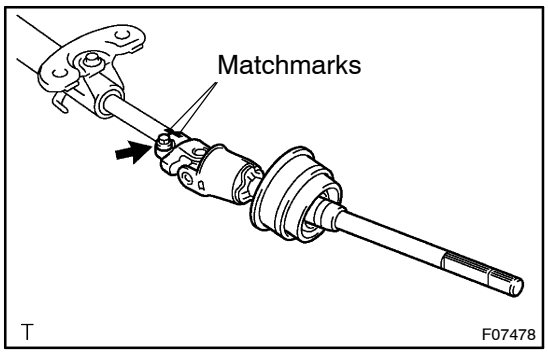
(a) Loosen the clamp.

(b) Disconnect the connectors.

(c) Remove the 4 nuts and steering column assembly.

11. REMOVE SLIDING YOKE

Remove the bolt A and sliding yoke.



12. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Place matchmarks on the No. 2 intermediate shaft assembly and main shaft.

(b) Remove the bolt and No. 2 intermediate shaft assembly.

SR0U8–01

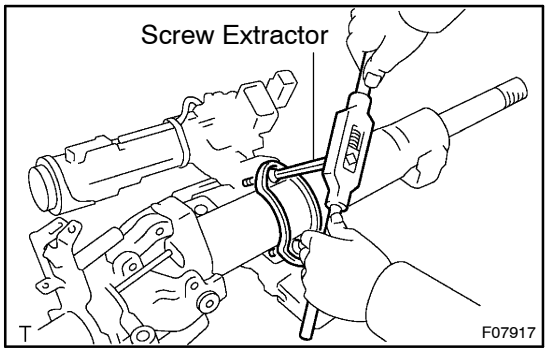
DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY COIL AND KEY CYLINDER LAMP ASSEMBLY

Remove the screw, transponder key coil and key cylinder 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.

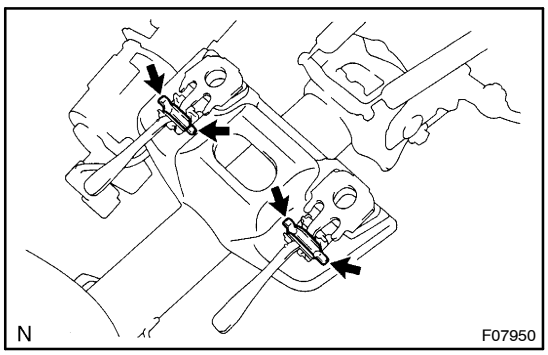
(b) Using a 3 – 4 mm (0.12 – 0.16 in.) drill, drill into the 2 bolts.

(c) Using a screw extractor, remove the 2 bolts, column upper bracket and column upper clamp.

3. REMOVE COLUMN TUBE SUPPORT

(a) Remove the bolt and column tube support with the lower column tube attachment.

(b) Remove the lower column tube attachment from the column tube support.



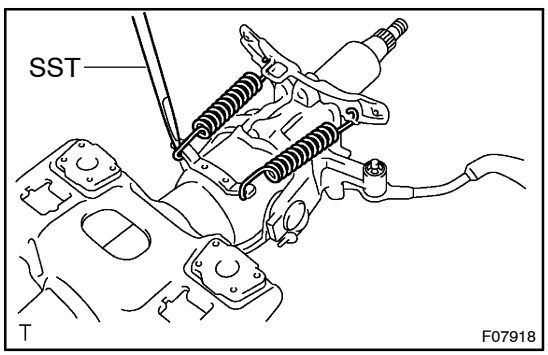
4. REMOVE 2 ENERGY ABSORBING PLATES

(a) Using pliers, remove the 2 energy absorbing clips.

(b) Remove the 2 energy absorbing plates and energy absorbing plate guides.

5. REMOVE COLUMN PROTECTOR

Remove the 2 bolts and column protector.



6. REMOVE 2 TENSION SPRINGS

Using SST, remove the 2 tension springs.

SST 09703–30010

7. REMOVE TURN SIGNAL BRACKET

(a) Using pliers, remove the tension spring.

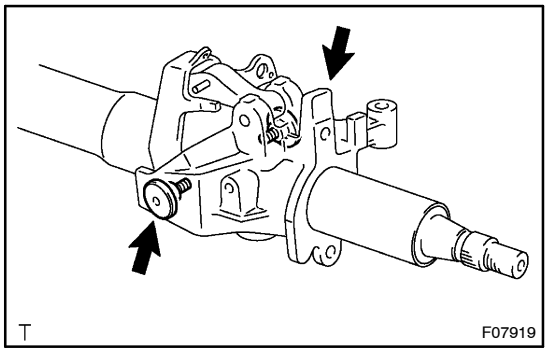
(b) Remove the 2 bolts and turn signal bracket.

8. REMOVE TILT LEVER ASSEMBLY

(a) Remove the tension spring.

(b) Remove the spring nut, tilt lever assembly and tilt lever link.

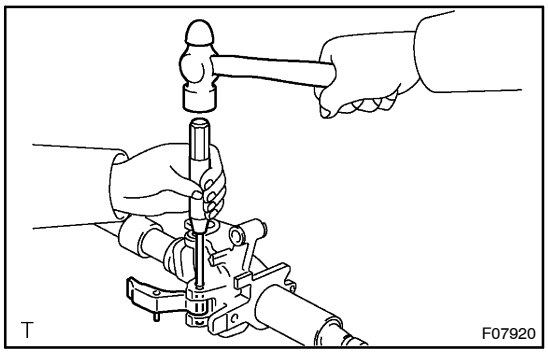
(c) Remove the 2 bushings from the upper column tube sub–assembly.



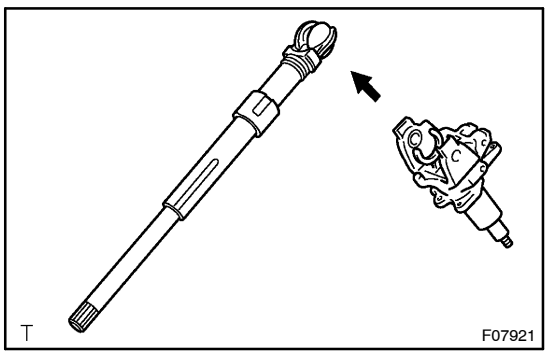
9. REMOVE MAIN SHAFT ASSEMBLY WITH UPPER COLUMN TUBE SUB–ASSEMBLY

(a) Using a hexagon wrench (6 mm), remove the 2 tilt steering shafts.

(b) Remove the pawl retainer and main shaft assembly with the upper column tube sub–assembly.

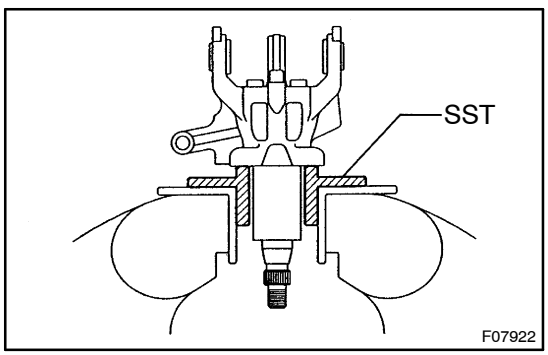


(c) Using a pin punch (5 mm) and hammer, remove the No. 2 tilt steering shaft and pawl assembly.

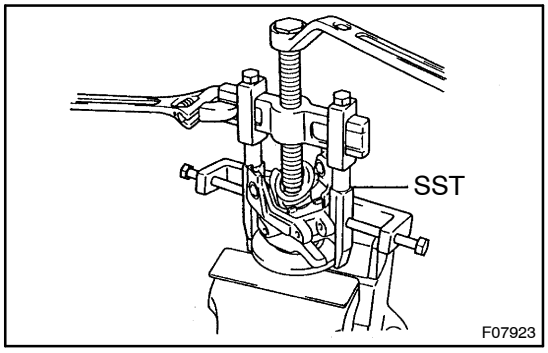


10. REMOVE UPPER COLUMN TUBE SUB–ASSEMBLY FROM MAIN SHAFT ASSEMBLY

(a) Bent the joint of the main shaft at right angles, leaving the cross ball in the No. 2 main shaft sub–assembly, separate the main shaft into the No. 1 main shaft with upper column tube sub–assembly and No. 2 main shaft sub–assembly.



(b) Secure the No. 1 main shaft with upper column tube sub–assembly and SST in a vise.
SST 09316–60011 (09316–00051)

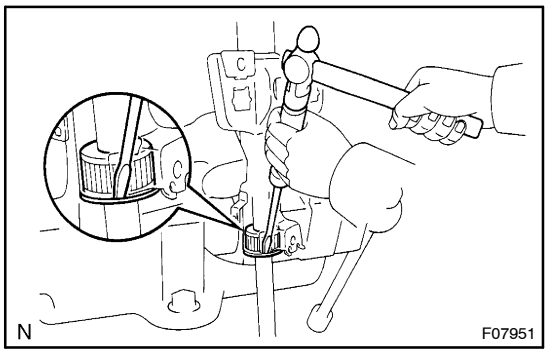


(c) Using SST, compress the spring of the upper column tube sub–assembly.
SST 09950–40011 (09951–04010, 09952–04010, 09953–04020, 09954–04010, 09955–04061, 09958–04011)

NOTICE:
Do not overtighten the SST.

(d) Using snap ring expander, remove the snap ring and No. 1 main shaft.

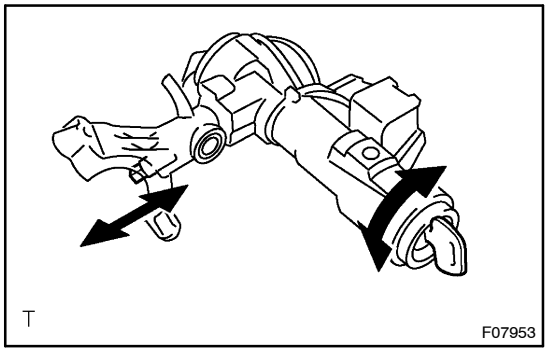
11. REMOVE COMPRESSION SPRING, BEARING THRUST COLLAR AND BEARING



12. REMOVE MAIN SHAFT BUSHING

Using a screwdriver, tap out the main shaft bushing.

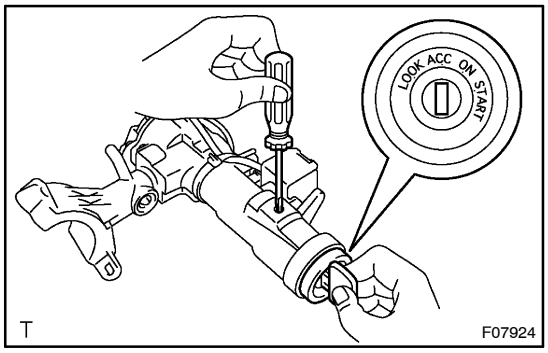
SR0LE–05



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–23)

4. IF NECESSARY, REPLACE IGNITION SWITCH

(a) Remove the 2 screws and ignition switch from the column upper bracket.

(b) Install a new ignition switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH (See page BE–23)

6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

(a) Slide the key unlock waring switch out of the column upper bracket.

(b) Slide a new key unlock waring switch in the column upper bracket.

7. A/T: INSPECT KEY INTERLOCK SOLENOID (See page AT–17)

8. A/T: IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

(a) Remove the 2 screws and key interlock solenoid.

(b) Install a new key interlock solenoid with the 2 screws.

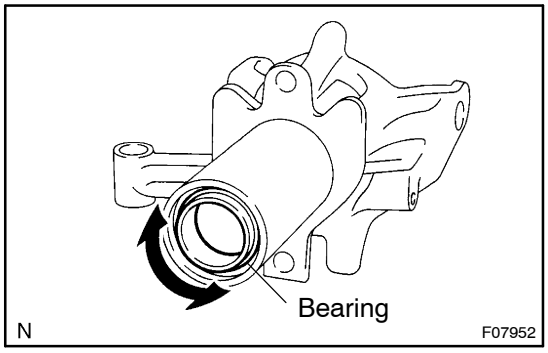
9. INSPECT TRANSPONDER KEY COIL (See page BE–201)

10. IF NECESSARY, REPLACE TRANSPONDER KEY COIL

11. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

(a) Remove the 2 screws and transponder key amplifier.

(b) Install a new transponder key amplifier with the 2 screws.



12. INSPECT BEARING

Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the upper column tube sub–assembly.

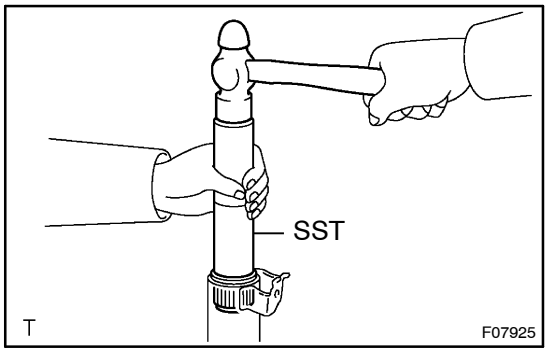
SR0U9–01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE
(See page SR–10)



2. INSTALL MAIN SHAFT BUSHING

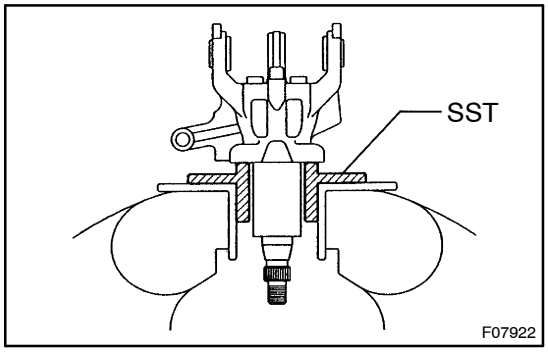
(a) Coat a new main shaft bushing with molybdenum disulfide lithium base grease.

(b) Using SST and a hammer, tap in the main shaft bushing.
SST 09612–22011

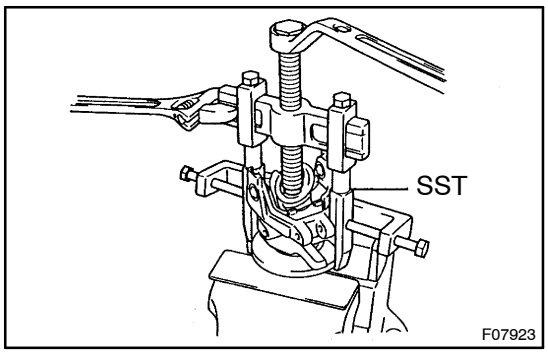
3. INSTALL COMPRESSION SPRING, BEARING THRUST COLLAR AND BEARING

4. INSTALL UPPER COLUMN TUBE SUB–ASSEMBLY TO MAIN SHAFT ASSEMBLY

(a) Temporarily install the upper column tube sub–assembly to the No. 1 main shaft.



(b) Secure the No. 1 main shaft with upper column tube sub–assembly and SST in a vise.
SST 09316–60011 (09316–00051)

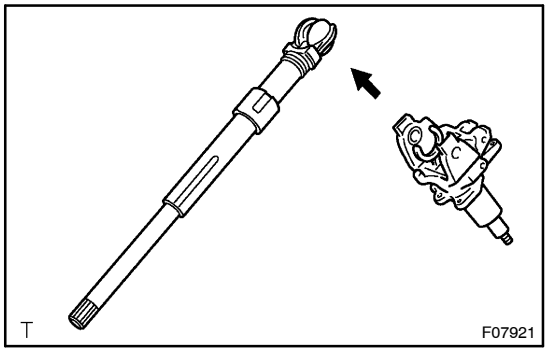


(c) Using SST, compress the spring of the upper column tube sub–assembly.
SST 09950–40011 (09951–04010, 09952–04010, 09953–04020, 09954–04010, 09955–04061, 09958–04011)

NOTICE:

Do not overtighten the SST.

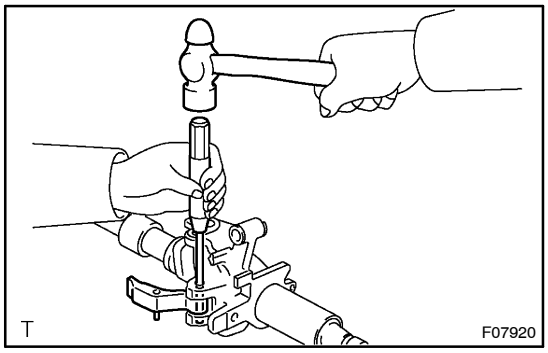
(d) Using a snap ring expander, install a new snap ring and No. 1 main shaft.



(e) Assemble the No. 1 main shaft with upper column tube sub–assembly and No. 2 main shaft sub–assembly.

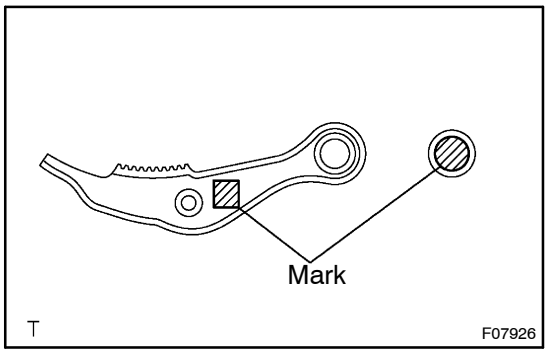
NOTICE:

Do not bend the universal joint of the shaft more than 20°.



5. INSTALL MAIN SHAFT ASSEMBLY WITH UPPER COLUMN TUBE SUB–ASSEMBLY

(a) Using a pin punch (5 mm) and hammer, install the pawl assembly with a new No. 2 tilt steering shaft.

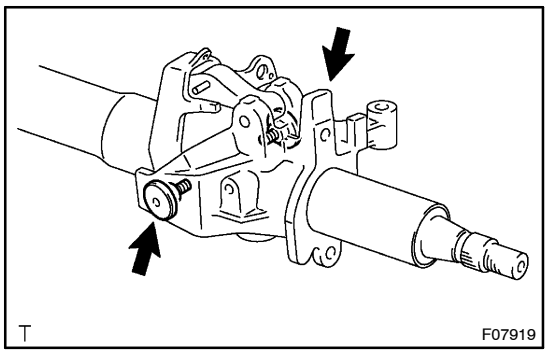


HINT:

Install a new No. 2 tilt steering shaft with the one having the mark corresponding to the mark stamped on the pawl assembly.

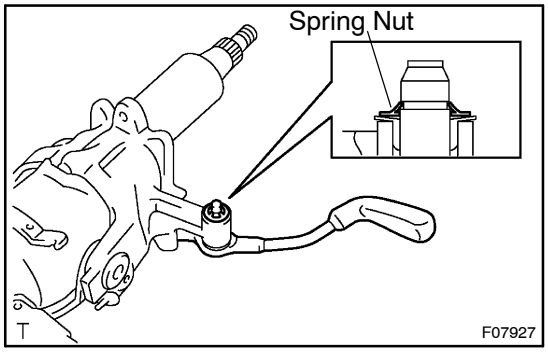
Pawl assembly mark	No. 2 tilt steering shaft color	No. 2 tilt steering shaft part number
1	White	45856–26010
2	Yellow	45856–26020
3	Black	45856–26030

(b) Install the main shaft assembly with the upper column tube sub–assembly and pawl retainer.



(c) Using a hexagon wrench (6 mm), install the 2 tilt steering shafts.

Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)



6. INSTALL TILT LEVER ASSEMBLY

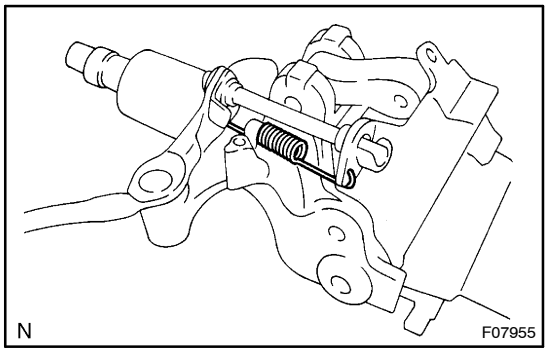
(a) Install the 2 bushings to the upper column tube sub–assembly.

(b) Install the tilt lever assembly with a new spring nut.

NOTICE:

Make sure that the spring nut is installed facing in the correct direction.

(c) Install the tilt lever link.



(d) Install the tension spring.

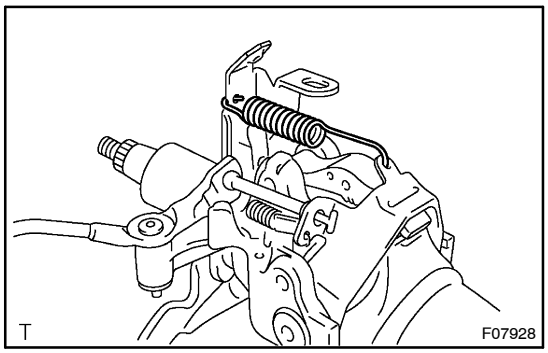
NOTICE:

Make sure that the tension spring is installed facing in the correct direction.

7. INSTALL TURN SIGNAL BRACKET

(a) Install the turn signal bracket with the 2 bolts.

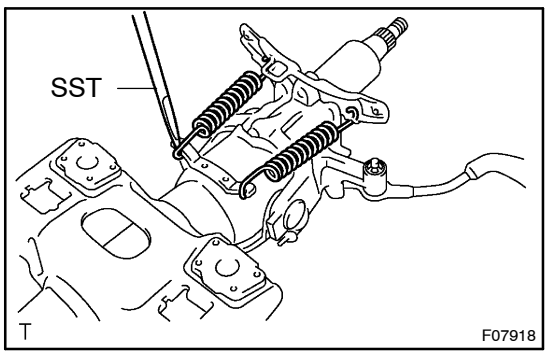
Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)



(b) Using pliers, install the tension spring.

NOTICE:

Make sure that the tension spring is installed facing in the correct direction.



8. INSTALL 2 TENSION SPRINGS

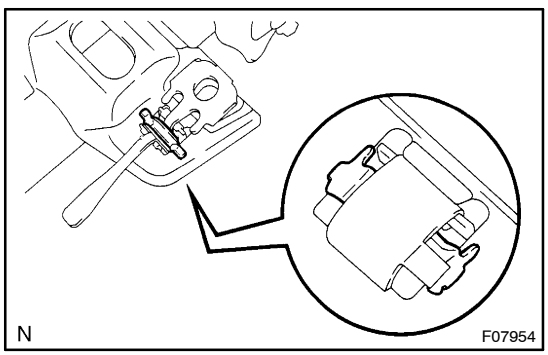
Using SST, install the 2 tension springs.

SST 09703–30010

9. INSTALL COLUMN PROTECTOR

Install the column protector with the 2 bolts.

Torque: 6.1 N·m (62 kgf·cm, 54 in.·lbf)



10. INSTALL 2 ENERGY ABSORBING PLATES

(a) Install the 2 new energy absorbing plate guides and energy absorbing plates.

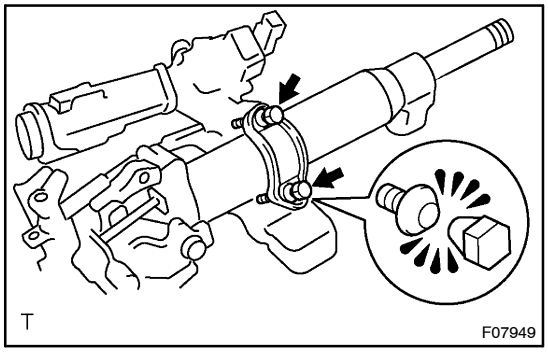
(b) Install the 2 new energy absorbing clips.

11. INSTALL COLUMN TUBE SUPPORT

(a) Install the lower column tube attachment to the column tube support.

(b) Install the column tube support with the lower column tube attachment with the bolt.

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



12. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Install the column upper bracket and column upper clamp with 2 new tapered–head bolts.

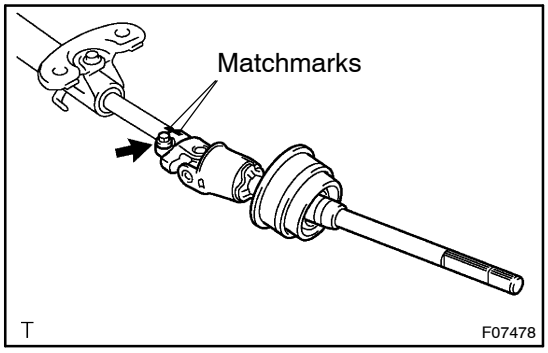
(b) Tighten the 2 tapered–head bolts until the bolt heads break off.

13. INSTALL TRANSPONDER KEY COIL AND KEY CYLINDER LAMP ASSEMBLY

Install the key cylinder lamp assembly and transponder key coil with the screw.

SR0UA–01

INSTALLATION



1. INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the No. 2 intermediate shaft assembly and main shaft.

(b) Install the No. 2 intermediate shaft assembly with the bolt.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

2. INSTALL SLIDING YOKE

Temporarily install the sliding yoke with the bolt A.

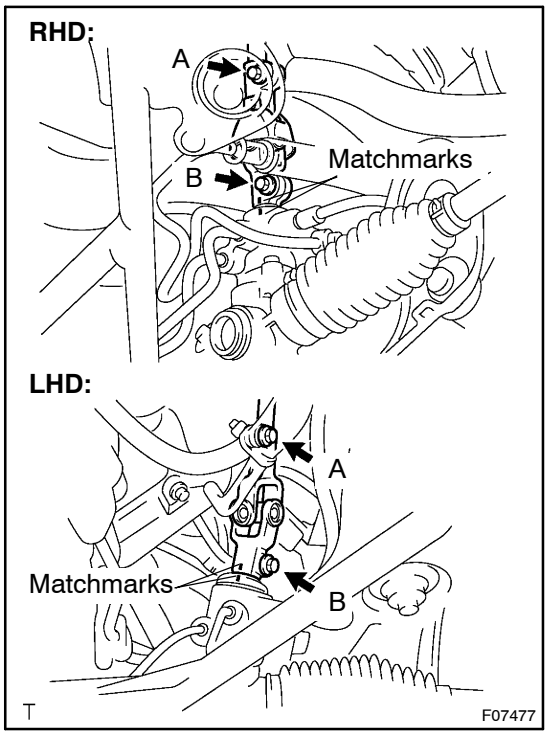
3. INSTALL STEERING COLUMN ASSEMBLY

(a) Install the steering column assembly with the 4 nuts.

Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)

(b) Connect the connectors.

(c) Tighten the clamp.



4. CONNECT SLIDING YOKE

(a) Align the matchmarks on the sliding yoke and control valve shaft.

(b) Install the bolt B.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Torque the bolt A.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

5. INSTALL SPIRAL CABLE (See page BE–26)

6. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

(a) Install the combination switch with the 3 screws.

(b) Connect the airbag connector.

(c) Connect the connectors.

7. INSTALL COLUMN UPPER AND LOWER COVERS

(a) Install the column upper cover.

(b) Install the column lower cover with the 3 screws.

8. INSTALL CLUSTER FINISH PANEL

(a) Connect the connector and install the cluster finish panel.

(b) Install the 2 screws.

9. INSTALL LOWER FINISH PANEL

(a) Connect the hood lock control cable to the lower finish panel.

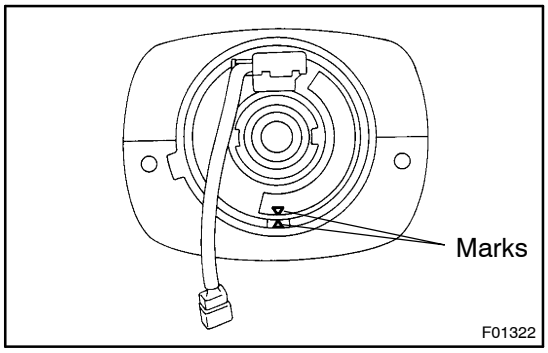
(b) Connect the connectors and install the lower finish panel.

(c) Install the 3 screws.

10. INSTALL FRONT DOOR INSIDE SCUFF PLATE AND COWL SIDE TRIM BOARD

(a) Install the cowl side trim board with the clip.

(b) Install the front door inside scuff plate.



11. 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.

(c) Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to either left or right of the center.

12. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and main shaft assembly.

(b) Install the steering wheel set nut.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

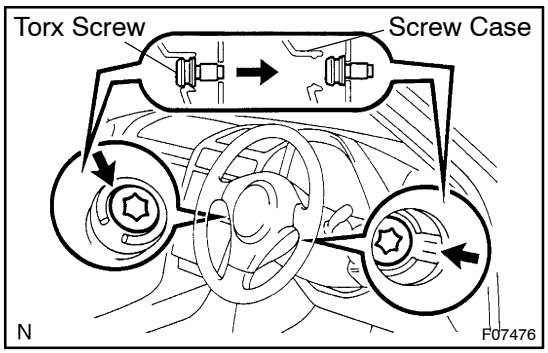
(c) Connect the connector.

13. INSTALL STEERING WHEEL PAD

NOTICE:

- **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**
- **Make sure the wheel pad is installed with the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects on 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 that they are not pinched between other parts.**

(a) Connect the airbag connector.



(b) Install the steering wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

(c) Using a torx socket wrench, torque the 2 screws.

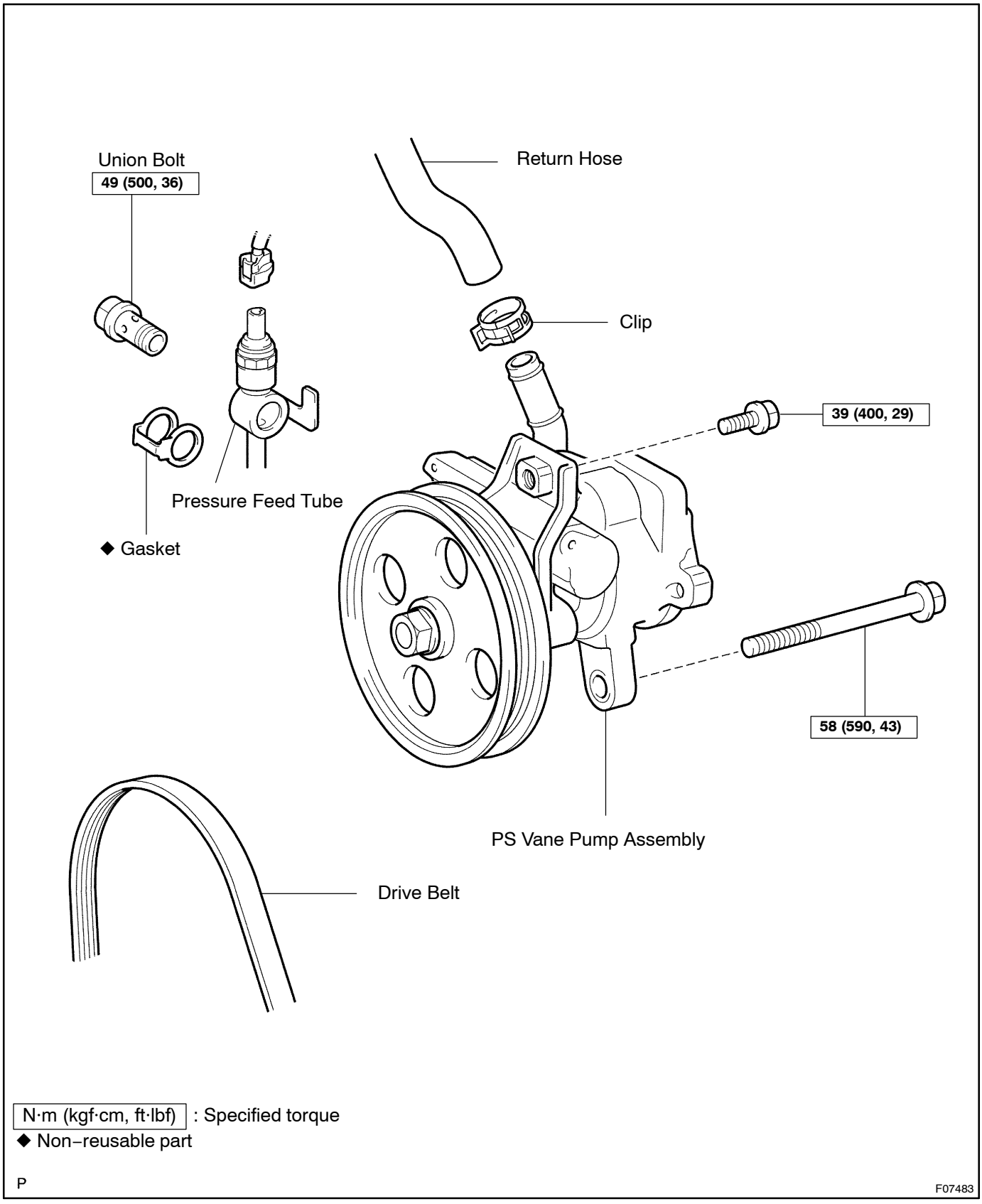
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

14. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP

COMPONENTS

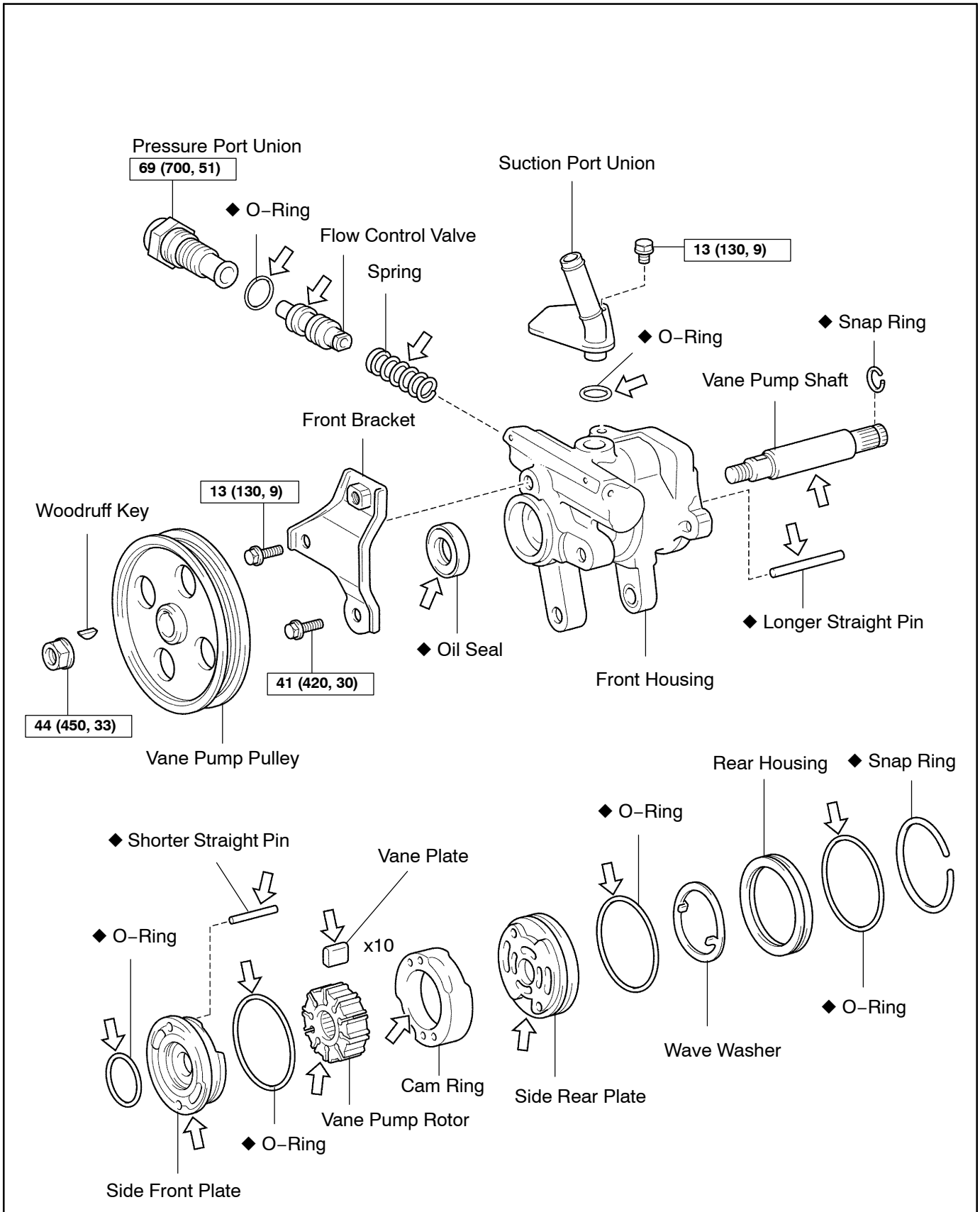
SR0UB–01



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

P

F07483



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⇦ Power steering fluid

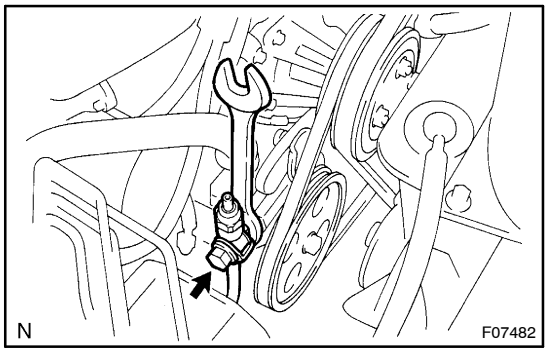
P F07484

SR0UC–01

REMOVAL

1. DISCONNECT RETURN HOSE

Remove the clip and disconnect the return hose.



2. DISCONNECT PRESSURE FEED TUBE

(a) Disconnect the oil pressure switch connector.

(b) Using a spanner, hold the pressure port union, then remove the union bolt and gasket, and disconnect the pressure feed tube.

3. REMOVE DRIVE BELT

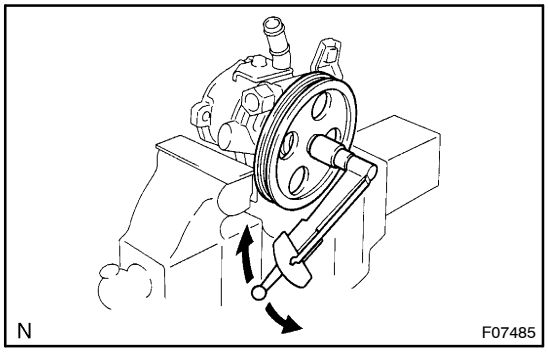
Loosen the 2 pump assembly set bolts and remove the drive belt.

4. REMOVE PS VANE PUMP ASSEMBLY

Remove the 2 pump assembly set bolts and PS vane pump assembly.

SR0UD–01

DISASSEMBLY



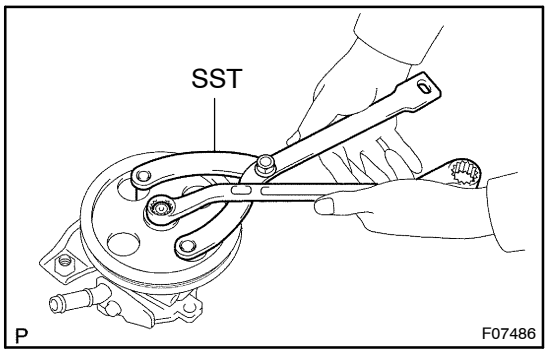
NOTICE:

When using a vise, do not overtighten it.

1. MEASURE POWER STEERING 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 :
0.2 N·m (2.5 kgf·cm, 2.2 in.·lbf) or less



2. REMOVE VANE PUMP PULLEY

(a) Using SST, stop the pulley rotating and loosen the nut.
SST 09960–10010 (09962–01000, 09963–01000)

(b) Remove the nut and vane pump pulley from the vane pump shaft.

(c) Remove the woodruff key from the vane pump shaft.

3. REMOVE FRONT BRACKET

Remove the 2 bolts and front bracket.

4. REMOVE SUCTION PORT UNION

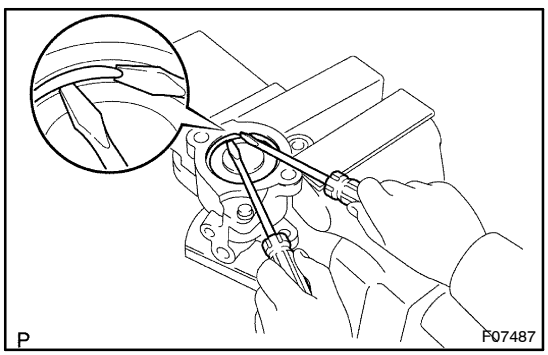
(a) Remove the bolt and suction port union.

(b) Remove the O–ring from the suction port union.

5. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

(a) Remove the pressure port union, flow control valve and spring.

(b) Remove the O–ring from the pressure port union.

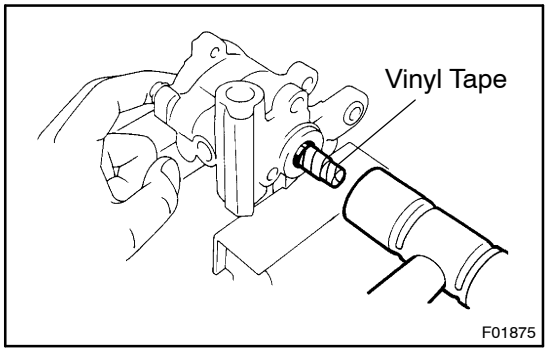


6. REMOVE REAR HOUSING, WAVE WASHER AND SIDE REAR PLATE

(a) Using 2 screwdrivers, remove the snap ring.

NOTICE:

Take care not to damage the housing.



(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the vane pump shaft.
(c) Using a plastic hammer, tap the vane pump shaft to remove the rear housing, wave washer and side rear plate.
(d) Remove the O–ring from the rear housing.
(e) Remove the O–ring from the side rear plate.

7. REMOVE CAM RING AND 10 VANE PLATES

NOTICE:

Be careful not to drop the plate.

8. REMOVE VANE PUMP SHAFT WITH VANE PUMP ROTOR AND SIDE FRONT PLATE

9. REMOVE VANE PUMP ROTOR AND SIDE FRONT PLATE

(a) Using a screwdriver, remove the snap ring from the vane pump shaft.
(b) Remove the vane pump rotor and side front plate.
(c) Remove the 2 O–rings from the side front plate.

10. REMOVE SHORTER STRAIGHT PIN

Using pliers, remove the shorter straight pin from the side front plate.

HINT:

Place a shop rag over the pin to prevent damaging it.

11. REMOVE LONGER STRAIGHT PIN

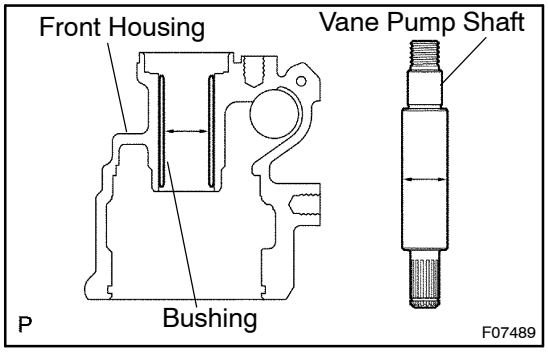
Using pliers, remove the longer straight pin from the front housing.

HINT:

Place a shop rag over the pin to prevent damaging it.

SR0R2–03

INSPECTION

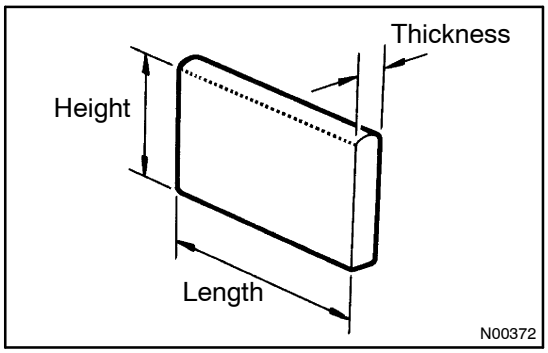


1. MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

Using a micrometer and a caliper gauge, measure the oil clearance.

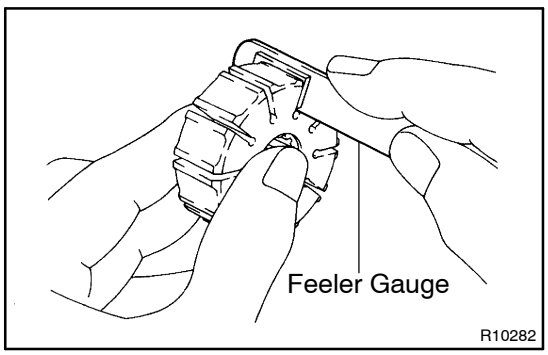
Standard clearance:
0.01 – 0.03 mm (0.0004 – 0.0012 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the front housing and vane pump shaft.

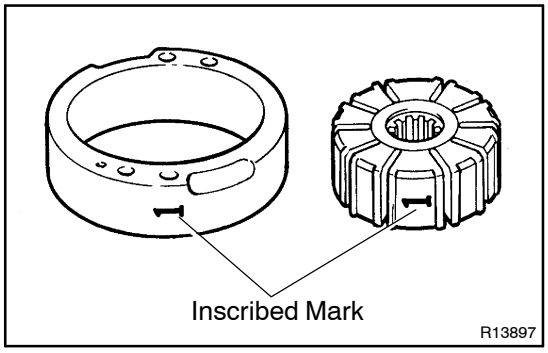


2. INSPECT VANE PUMP ROTOR AND VANE PLATES

(a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.
Minimum height: 8.1 mm (0.319 in.)
Minimum thickness: 1.797 mm (0.0707 in.)
Minimum length: 14.988 mm (0.5901 in.)



(b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.
Maximum clearance: 0.03 mm (0.0012 in.)



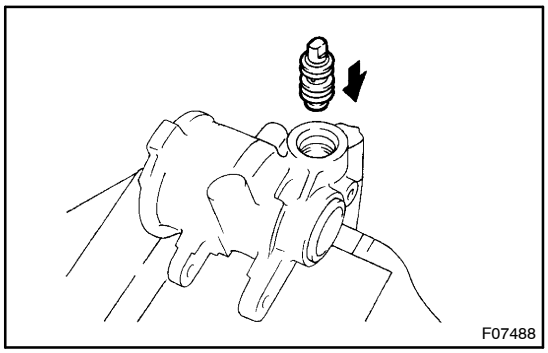
If it is more than the maximum, replace the vane plate and/or vane pump rotor with the one having the same mark stamped on the cam ring.

Inscribed mark: 1, 2, 3, 4 or None

HINT:

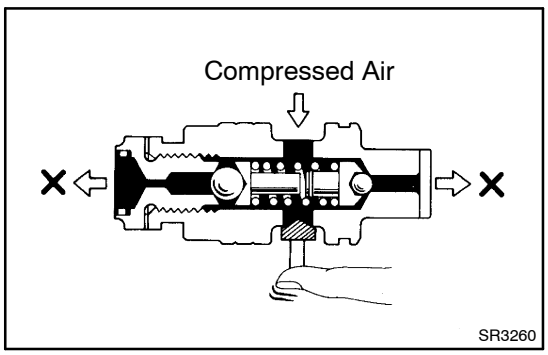
There are 5 vane plate lengths with the following vane pump rotor and cam ring marks:

Vane pump rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345–12010	14.996 – 14.998 (0.59039 – 0.59047)
1	44345–12020	14.994 – 14.996 (0.59032 – 0.59039)
2	44345–12030	14.992 – 14.994 (0.59024 – 0.59032)
3	44345–12040	14.990 – 14.992 (0.59016 – 0.59024)
4	44345–12050	14.988 – 14.990 (0.59008 – 0.59016)

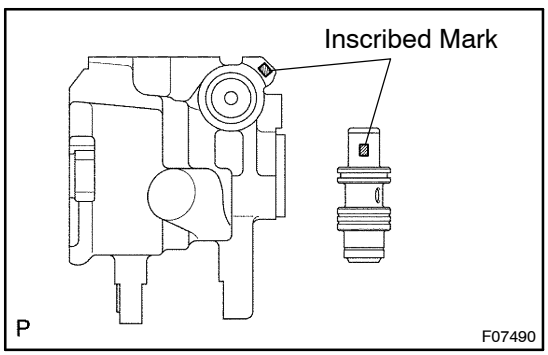


3. INSPECT FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the valve hole of the front housing by its own weight.

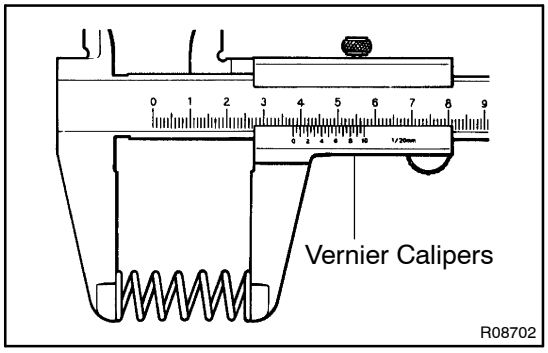


(b) Check the flow control valve for leakage. Close one of the holes and apply compressed air 392 – 490 kPa (4 – 5 kgf/cm^2, 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end hole.



If necessary, replace the flow control valve with the one having the same letter as inscribed on the front housing.

Inscribed Mark: A, B, C, D, E or F



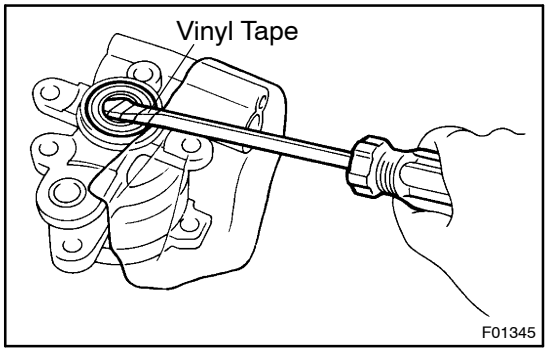
4. INSPECT SPRING

Using vernier calipers, measure the free length of the spring.

Minimum free length: 36.0 mm (1.417 in.)

If it is not within the specification, replace the spring.

SR0R3–03



REPLACEMENT

NOTICE:

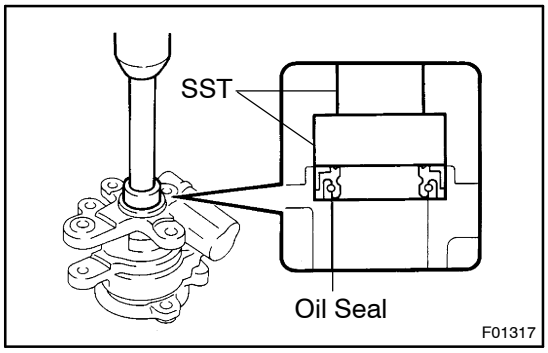
When using a vise, do not overtighten it.

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 bushing of 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 (09951–00320),
09950–70010 (09951–07100)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

SR0UE–01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR–25)

2. INSTALL LONGER STRAIGHT PIN

Using a plastic hammer, tap in a new longer straight pin to the front housing.

NOTICE:

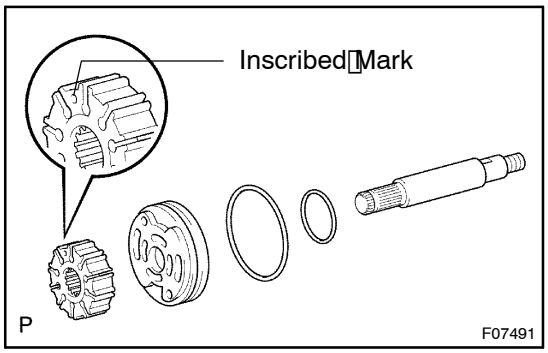
Be careful not to damage the pin.

3. INSTALL SHORTER STRAIGHT PIN

Install a new shorter straight pin to the side front plate.

NOTICE:

Be careful not to damage the pin.



4. INSTALL SIDE FRONT PLATE AND VANE PUMP ROTOR

(a) Coat 2 new O–rings with power steering fluid and install them to the side front plate.

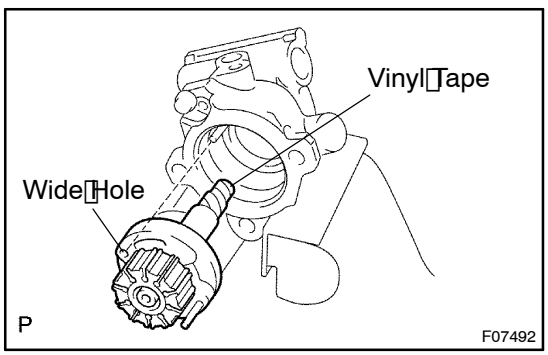
(b) Install the side front plate to the vane pump shaft.

(c) Install the vane pump rotor to the vane pump shaft with the inscribed mark facing outward.

NOTICE:

Make sure that the side front plate is installed facing in the correct direction.

(d) Using snap ring pliers, install a new snap ring to the vane pump shaft.



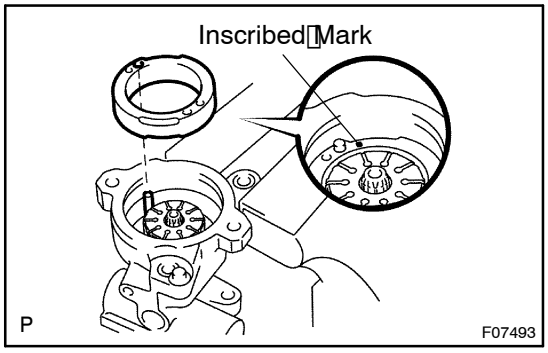
5. INSTALL VANE PUMP SHAFT WITH VANE PUMP ROTOR AND SIDE FRONT PLATE

(a) Wind vinyl tape to the control valve shaft.

(b) Align the wide hole of the side front plate and longer straight pin, and tap in the vane pump shaft with a plastic hammer.

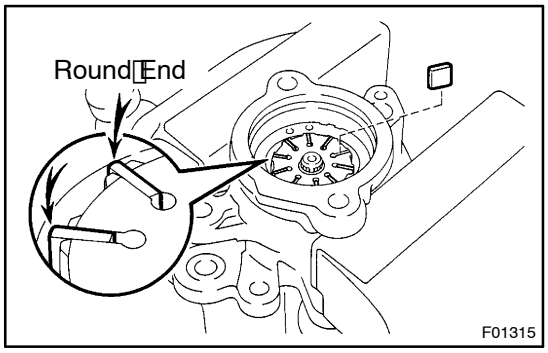
NOTICE:

Be careful not to damage the oil seal and O–rings.



6. INSTALL CAM RING

Align the holes of the cam ring and 2 straight pins and install the cam ring with the inscribed mark 1 facing outward.



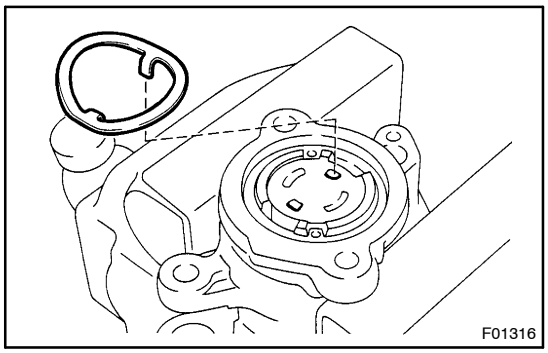
7. INSTALL 10 VANE PLATES

Install the 10 vane plates with the round end 1 facing outward.

8. INSTALL SIDE REAR PLATE

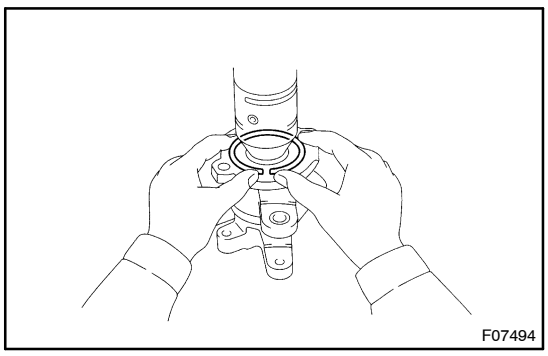
(a) Coat a new O–ring with power steering fluid and install it to the plate.

(b) Align the holes of the plate and 2 straight pins, and install the side rear plate.



9. INSTALL WAVE WASHER

Install the wave washer so that its protrusions 1 fit into the slots in the side rear plate.



10. INSTALL REAR HOUSING

(a) Coat a new O–ring with power steering fluid and install it to the rear housing.

(b) Apply just enough pressure to compress the wave washer, and install a new snap ring to the front housing.

11. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

(a) Install the spring.

(b) Install the flow control valve facing in the correct direction (See page SR–25).

(c) Coat a new O–ring with power steering fluid and install it to the pressure port union.

(d) Install the pressure port union.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

12. INSTALL SUCTION PORT UNION

(a) Coat a new O–ring with power steering fluid and install it to the suction port union.

(b) Install the suction port union with the bolt.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

13. INSTALL FRONT BRACKET

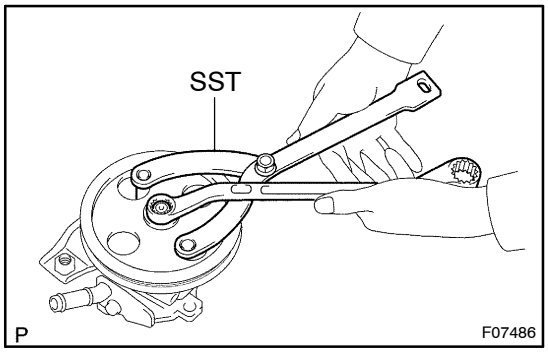
Install the front bracket with the 2 bolt.

Torque:
Upper side: 13 N·m (130 kgf·cm, 9 ft·lbf)
Lower side: 41 N·m (420 kgf·cm, 30 ft·lbf)

14. INSTALL VANE PUMP PULLEY

(a) Install the woodruff key to the vane pump shaft.

(b) Install the vane pump pulley and nut to the vane pump shaft.



(c) Using SST, stop the pulley rotating and torque the nut.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

15. MEASURE PS VANE PUMP ROTATING TORQUE
(See page SR–28)

SR0UF–01

INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

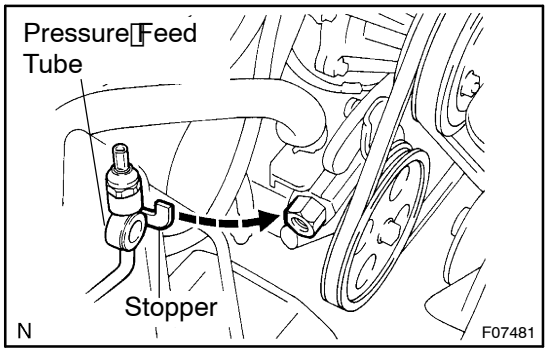
Temporarily install the PS vane pump assembly with the 2 pump assembly set bolts.

2. INSTALL DRIVE BELT

(a) Install the drive belt and adjust the drive belt tension (See page SR–3).

(b) Torque the 2 pump assembly set bolts.

Torque:
Upper side: 39 N·m (400 kgf·cm, 29 ft·lbf)
Lower side: 58 N·m (590 kgf·cm, 43 ft·lbf)



3. CONNECT PRESSURE FEED TUBE

(a) Install a new gasket, then connect pressure feed tube with the union bolt.

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

HINT:

Make sure that the stopper of the pressure feed tube touches the pressure port union as shown in the illustration, then torque the union bolt.

(b) Connect the oil pressure switch connector.

4. CONNECT RETURN HOSE

Connect the return hose with the clip.

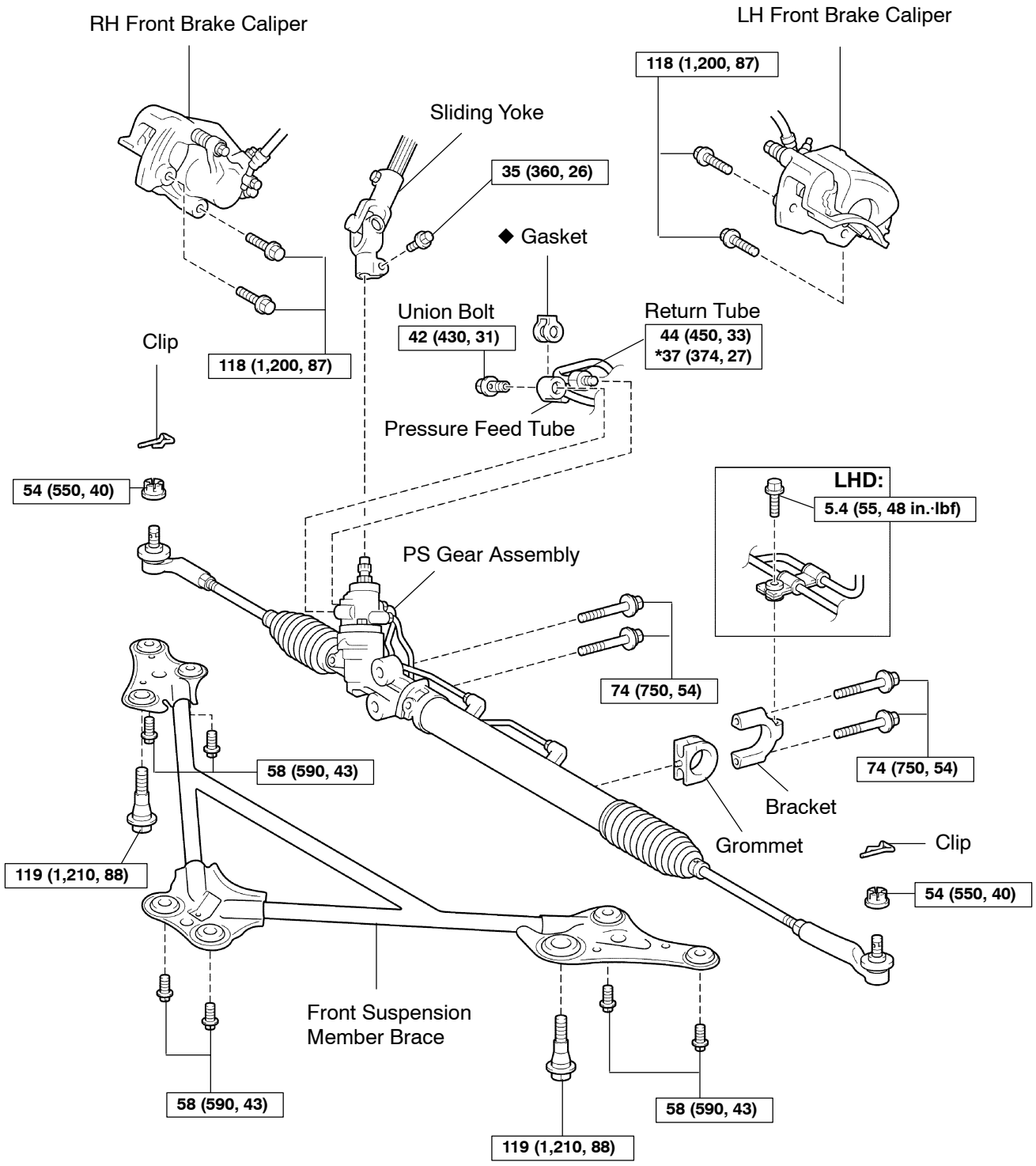
5. BLEED POWER STEERING SYSTEM

(See page SR–5)

POWER STEERING GEAR

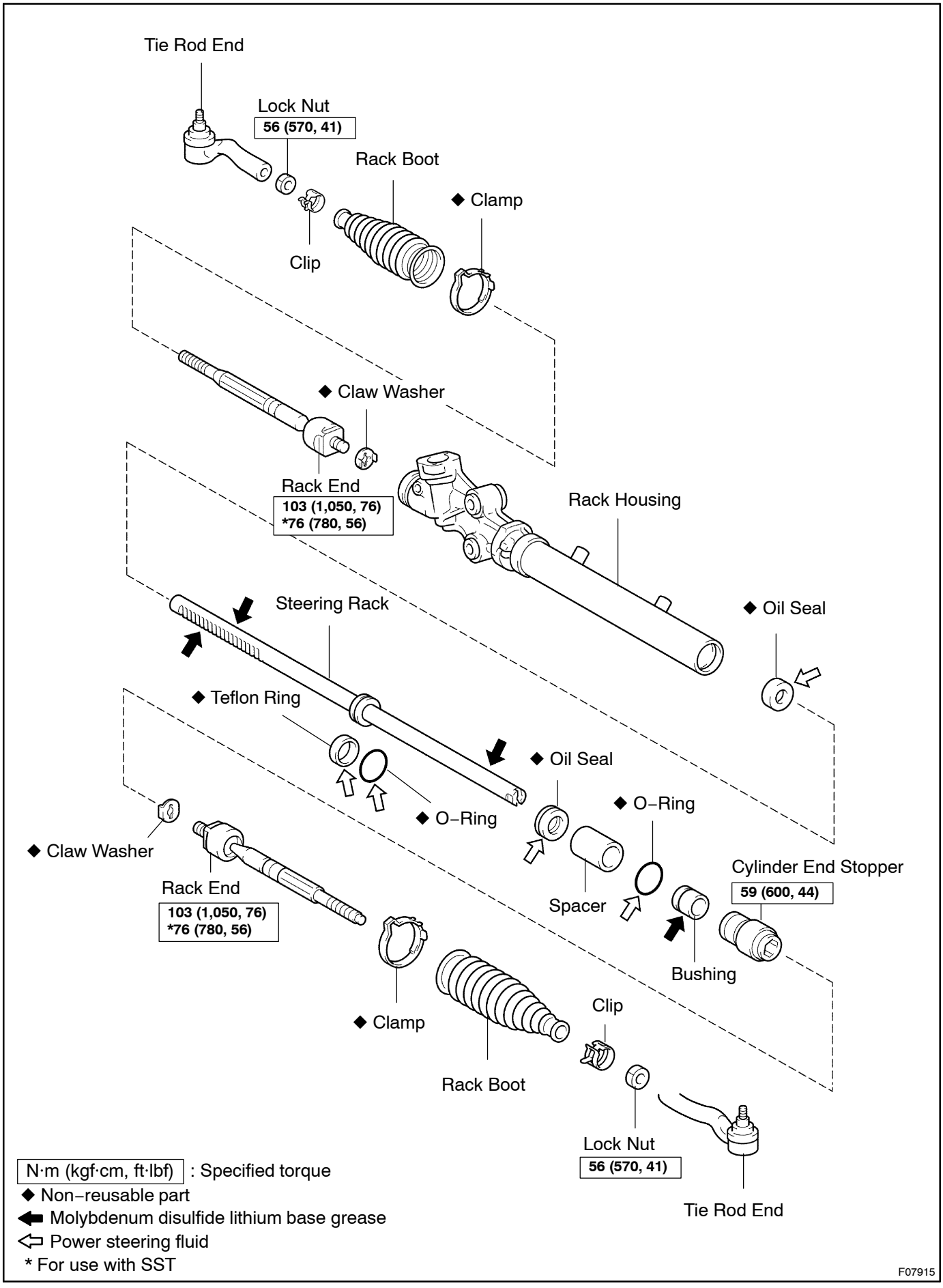
COMPONENTS

SR03V–03



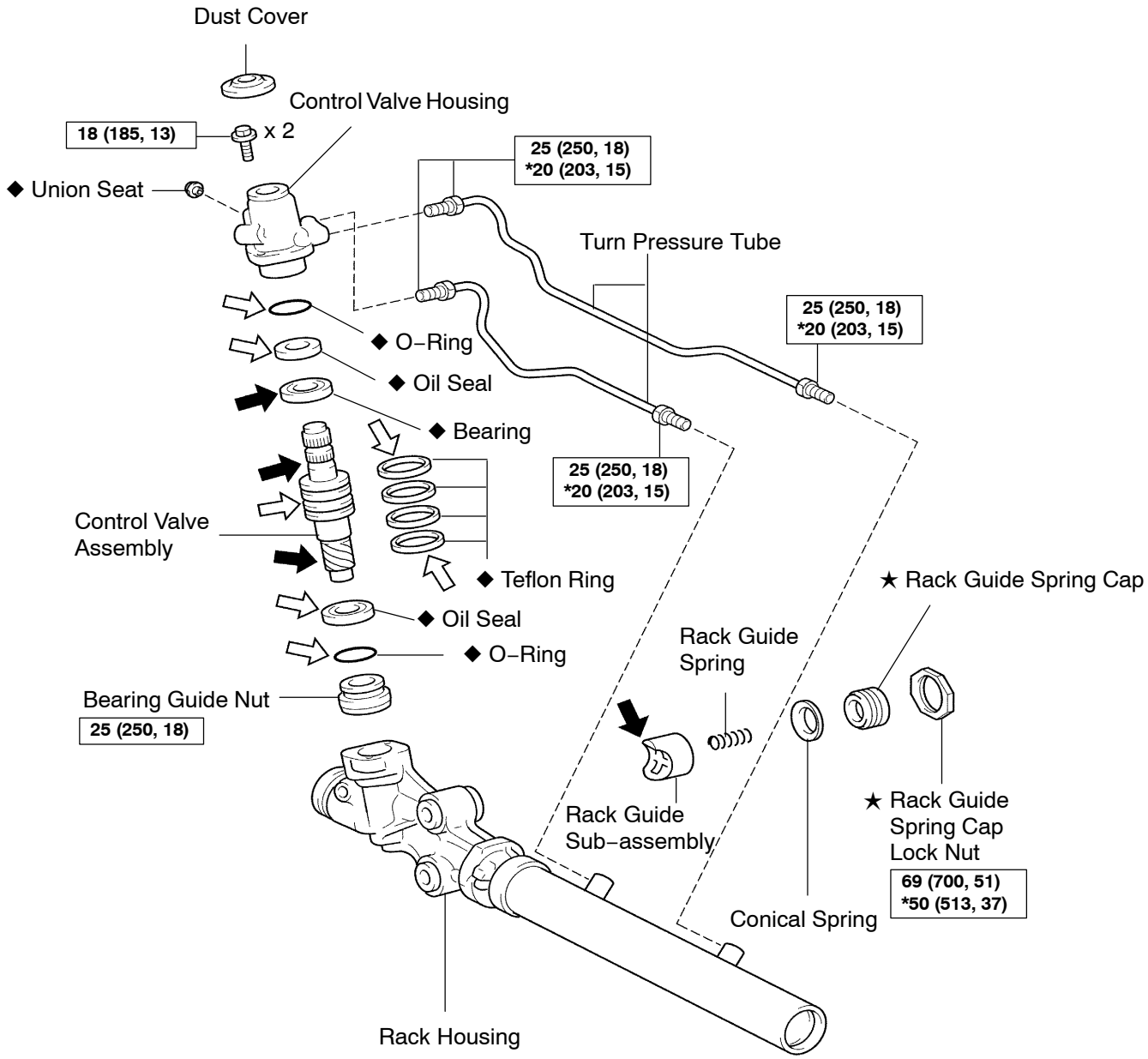
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
* For use with SST

F07497



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⬅ Molybdenum disulfide lithium base grease
⇦ Power steering fluid
* For use with SST

F07915



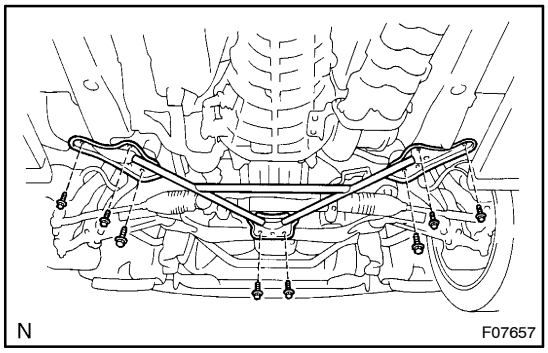
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
⬅ Molybdenum disulfide lithium base grease
⇦ Power steering fluid
* For use with SST

F07916

SR0UG–01

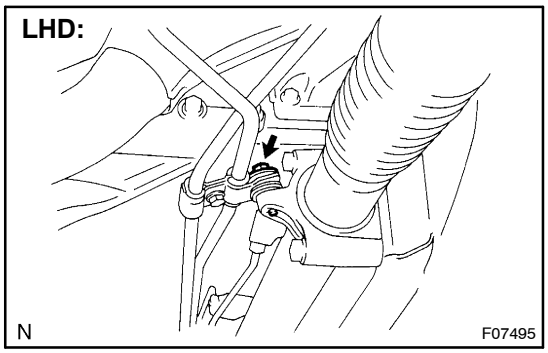
REMOVAL

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD (See page SR–12)
3. REMOVE STEERING WHEEL (See page SR–12)
4. REMOVE RH AND LH FRONT BRAKE CALPERS (See page BR–26)
5. DISCONNECT RH AND LH TIE ROD ENDS (See page SA–32)
6. DISCONNECT SLIDING YOKE (See page SR–12)



7. REMOVE FRONT SUSPENSION MEMBER BRACE

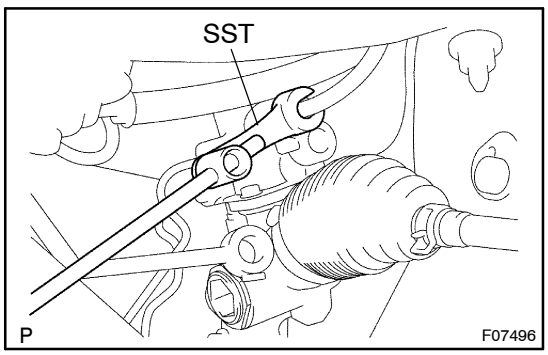
Remove the 7 bolts and front suspension member brace.



8. DISCONNECT PRESSURE FEED TUBE

(a) LHD:
Remove the bolt and disconnect the pressure feed tube clamp.

(b) Remove the union bolt and gasket, and disconnect the pressure feed tube.



9. DISCONNECT RETURN TUBE

Using SST, disconnect the rerurn tube.

SST 09631–22020

10. REMOVE PS GEAR ASSEMBLY, BRACKET AND GROMMET

Remove the 4 bolts, PS gear assembly, bracket and grommet.

SR0UH–01

DISASSEMBLY

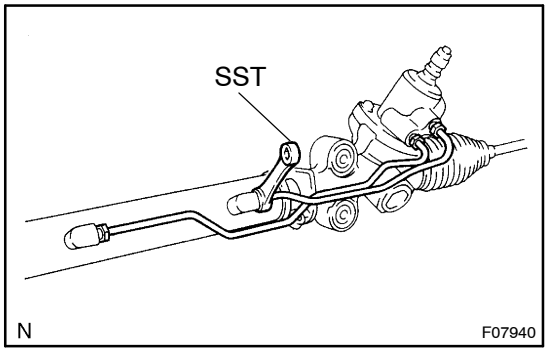
NOTICE:

When using a vise, do not overtighten it.

1. REMOVE 2 TURN PRESSURE TUBES

Using SST, remove the 2 turn pressure tubes.

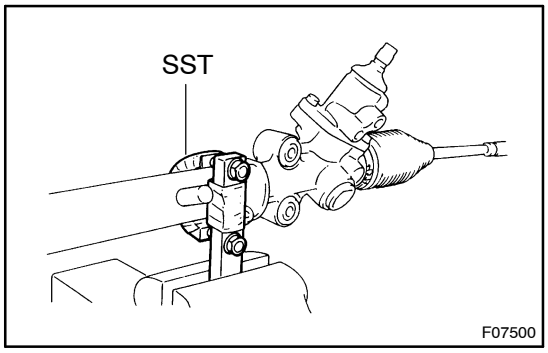
SST 09633–00020



2. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the PS gear assembly in a vise.

SST 09612–00012

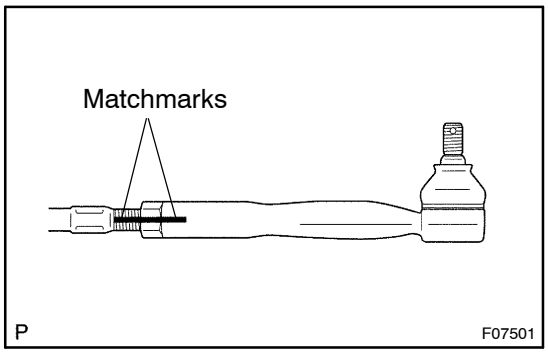


3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Place matchmarks on the tie rod end and rack end.

(b) Loosen the lock nut, and remove the tie rod end and lock nut.

(c) Employ the same manner described above to the other side.



4. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

(a) Using pliers, loosen the clamp as shown in the illustration.

(b) Remove the clamp, clip and rack boot.

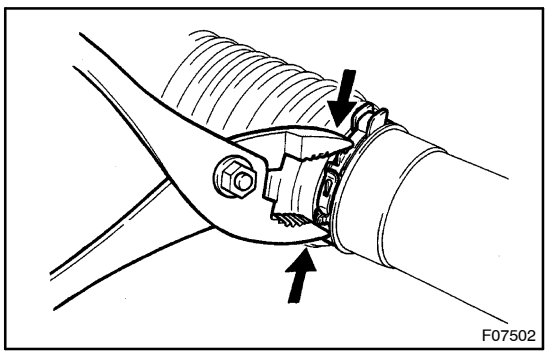
NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH rack boots.

(c) Employ the same manner described above to the other side.

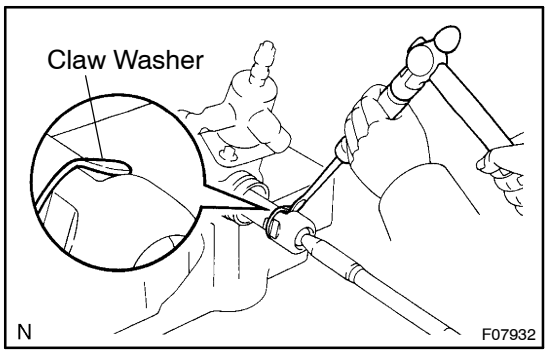


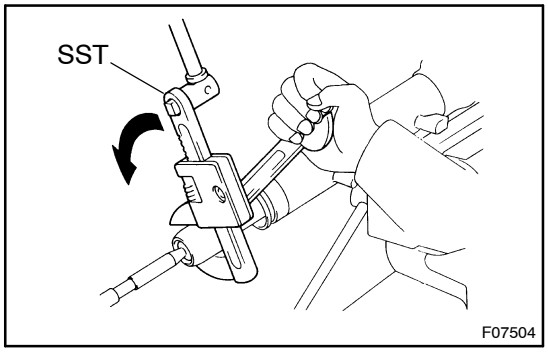
5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

(a) Using a screwdriver and a hammer, unstake the washer.

NOTICE:

Avoid any impact on the steering rack.



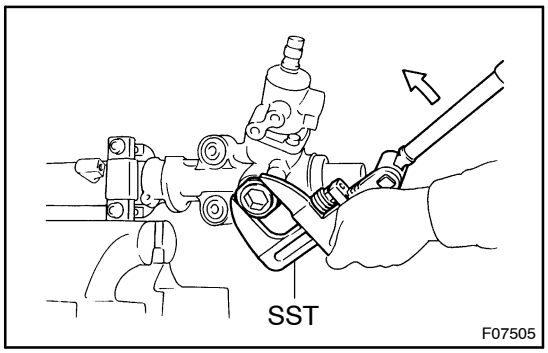


(b) Using a spanner, hold the steering rack steadily and using SST, remove the rack end.
SST 09922–10010

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Mark the RH and LH rack ends.

(c) Remove the claw washer.
(d) Employ the same manner described above to the other side.



6. REMOVE RACK GUIDE SPRING CAP LOCK NUT

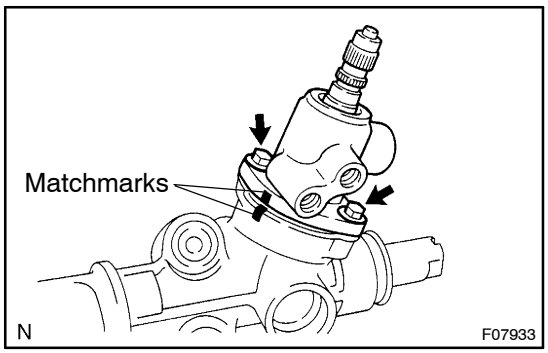
Using SST, remove the rack guide spring cap lock nut.
SST 09922–10010

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

7. REMOVE RACK GUIDE SPRING CAP, CONICAL SPRING, RACK GUIDE SPRING AND RACK GUIDE SUB–ASSEMBLY

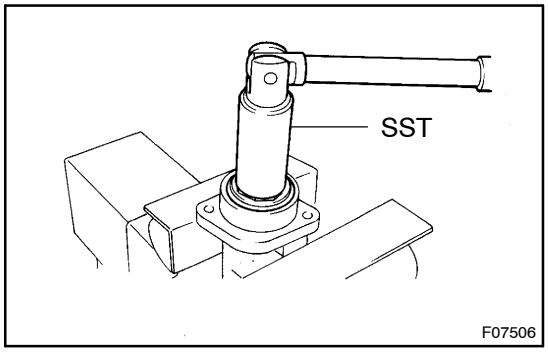
(a) Using a hexagon wrench (24 mm), remove the rack guide spring cap.
(b) Remove the conical spring, rack guide spring and rack guide sub–assembly.

8. REMOVE DUST COVER



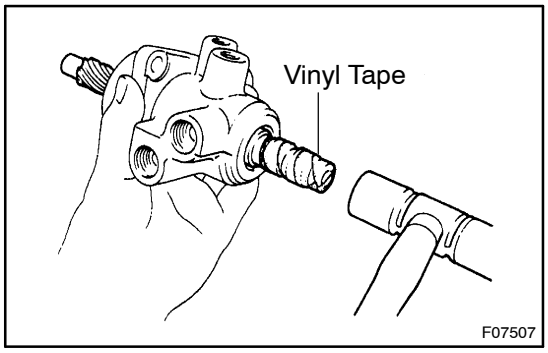
9. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Place matchmarks on the control valve housing and rack housing.
(b) Remove the 2 bolts and pull out the control valve housing with control valve assembly.
(c) Remove the O–ring from the control valve housing.



10. REMOVE BEARING GUIDE NUT AND CONTROL VALVE ASSEMBLY

(a) Using SST, loosen the bearing guide nut.
SST 09631–20060



(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.

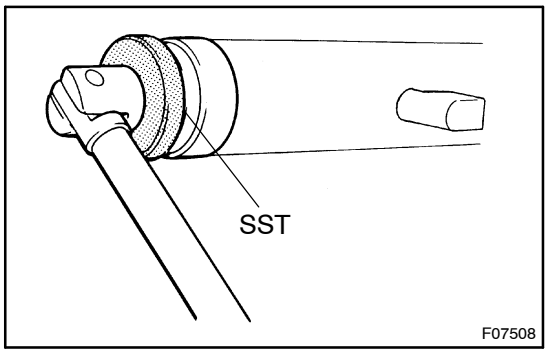
(c) Using a plastic hammer, tap out the control valve assembly with the bearing guide nut from the control valve housing.

NOTICE:

Be careful not to damage the oil seal lip

(d) Remove the bearing guide nut from the control valve assembly.

(e) Remove the O–ring from the bearing guide nut.

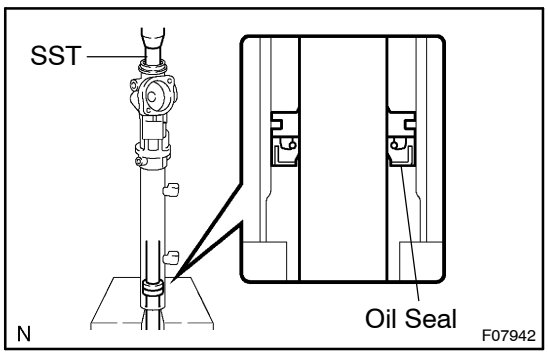


11. REMOVE CYLINDER END STOPPER AND SPACER

(a) Using SST, remove the cylinder end stopper.
SST 09631–20090

(b) Remove the O–ring from the cylinder end stopper.

(c) Remove the spacer.



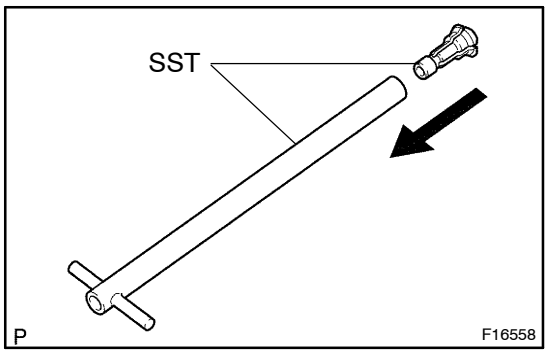
12. REMOVE STEERING RACK WITH OIL SEAL

(a) Using SST, press out the steering rack with the oil seal.
SST 09950–70010 (09951–07200)

NOTICE:

Take care not to drop the steering rack.

(b) Remove the oil seal from the steering rack.

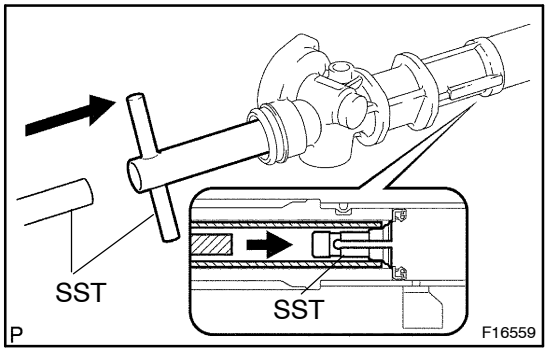


13. REMOVE OIL SEAL

(a) Install SST (09612–07130) on SST (09612–07210).
SST 09612–70100 (09612–07130, 09612–07210)

NOTICE:

- **Before using them, apply a small dab of grease to the inside wall of SST (09612–07210, 09612–07130).**
- **To prevent the inside of the housing from being damaged securely install SST 09612–07130) on SST (09612–07210).**

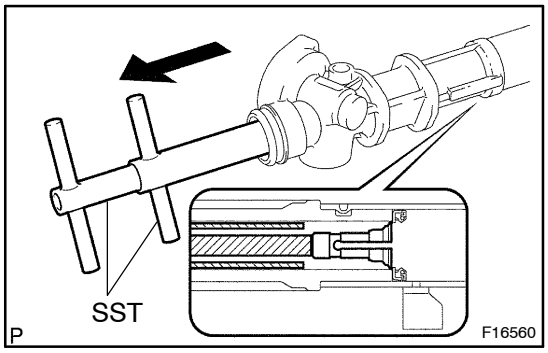


(b) Diagonally insert SST (09612–07210) into the housing until it contacts with the oil seal, and then insert the SST (09612–07210) until the tip of SST (09612–07220) contacts with SST (09612–07130).

SST 09612–70100 (09612–07130, 09612–07210, 09612–07220)

NOTICE:

Do not damage the inside of the housing.



(c) Secure SST (09612–07220), and pull SST (09612–07210) to place SST (09612–07130) in the housing.

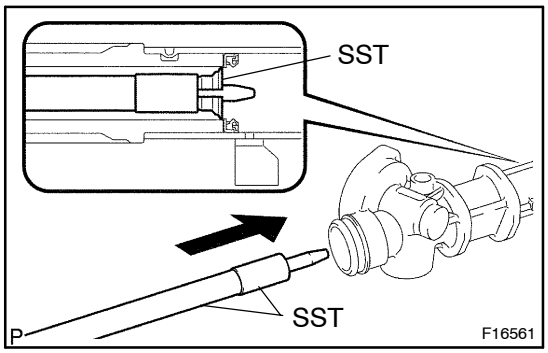
SST 09612–70100 (09612–07130, 09612–07210, 09612–07220)

HINT:

Place SST on the chamfering position between the oil seal and rack housing.

(d) Remove the SST (09612–07210, 09612–07220).

SST 09612–70100 (09612–07210, 09612–07220)

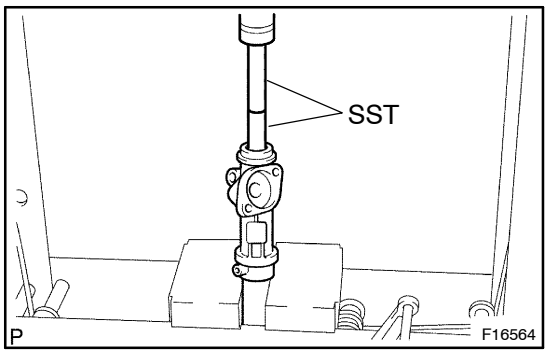


(e) After installing SST (09612–07240) on SST (09612–07210), insert the tip of SST (09612–07230) in the service hole of SST (09612–07130).

SST 09612–70100 (09612–07130, 09612–07230, 09612–07240)

NOTICE:

- **Before using them, apply a small dab of grease to the tip of SST (09612–07230).**
- **To prevent SST (09612–07130) from being damaged, be sure to install SST (09612–07240).**
- **Do not damage the inside of the rack housing.**



(f) Install SST (09951–07100) on SST (09612–07230) and remove the oil seal using a press.

SST 09612–70100 (09612–07130, 09612–07230, 09612–07240), 09950–70010 (09951–07100)

NOTICE:

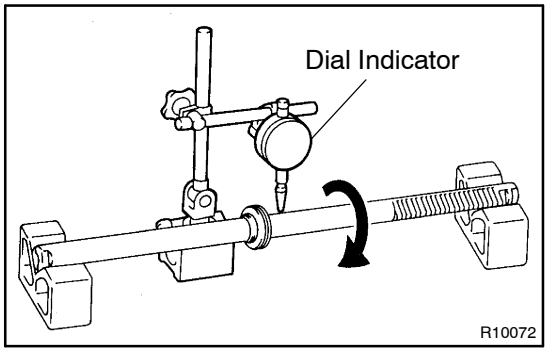
Do not damage the rack housing.

HINT:

Replace SST (09951–07100) with SST that is different in length in the set, if necessary.

SR0UI–01

INSPECTION

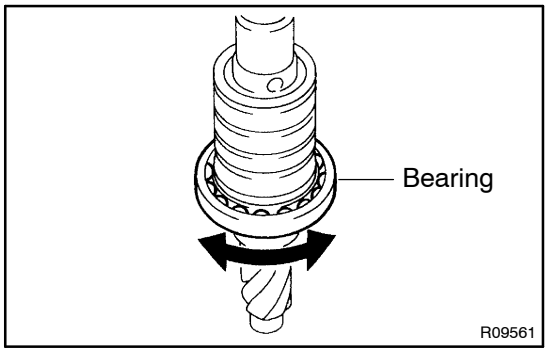


1. INSPECT STEERING RACK

(a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

Maximum runout: 0.15 mm (0.0059 in.)

(b) Check the back surface for wear and damage.



2. INSPECT BEARING

(a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the control valve assembly.

(b) Coat the bearing with molybdenum disulfide lithium base grease.

SR0UJ–01

REPLACEMENT

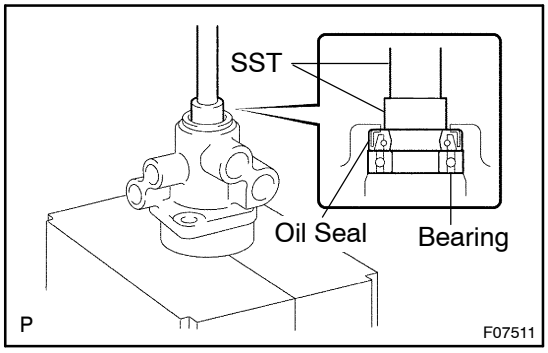
NOTICE:

When using a vise, do not overtighten it.

1. IF NECESSARY, REPLACE OIL SEAL AND BEARING

(a) Using SST, press out the bearing and oil seal from the control valve housing.

SST 09950–60010 (09951–00240), 09950–70010 (09951–07100)



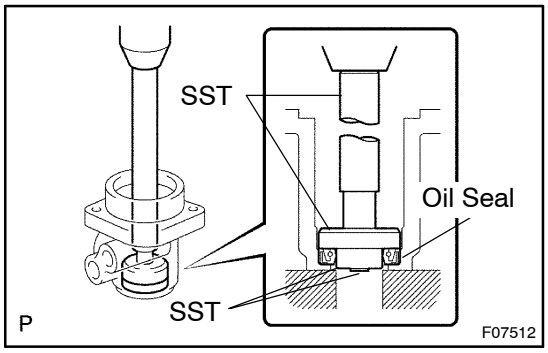
(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00180, 09951–00320, 09952–06010), 09950–70010 (09951–07150)

NOTICE:

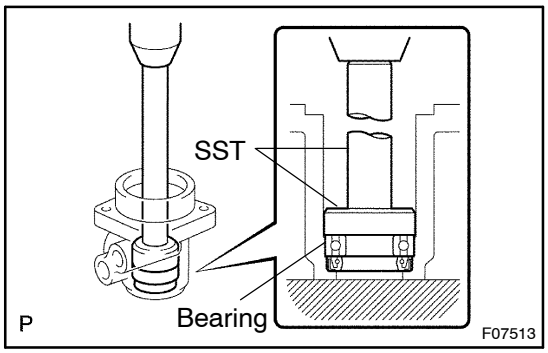
Make sure that the oil seal is installed facing in the correct direction.



(d) Coat a new bearing with molybdenum disulfide lithium base grease.

(e) Using SST, press in the bearing.

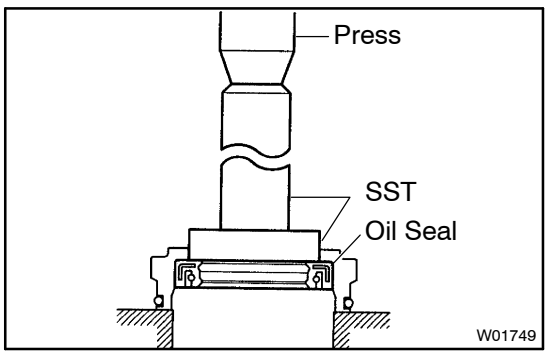
SST 09950–60010 (09951–00340), 09950–70010 (09951–07150)



2. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST, press out the oil seal from the bearing guide nut.

SST 09950–60010 (09951–00310), 09950–70010 (09951–07100)



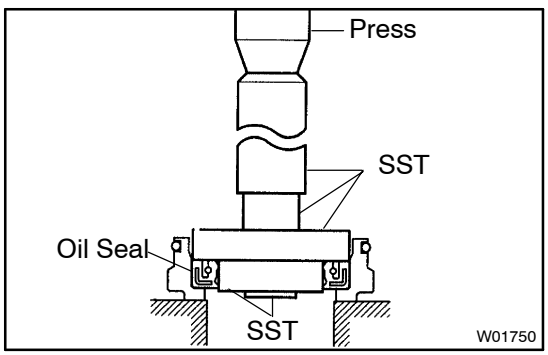
(b) Coat a new oil seal lip with power steering fluid.

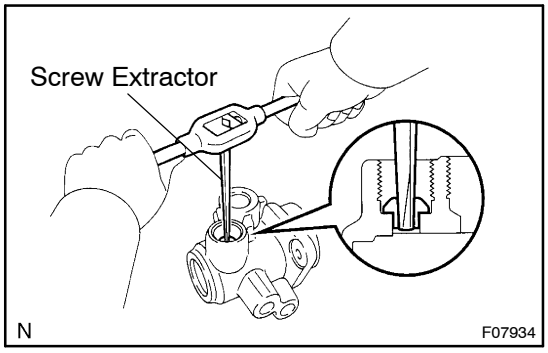
(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00250, 09951–00360, 09952–06010), 09950–70010 (09951–07100)

NOTICE:

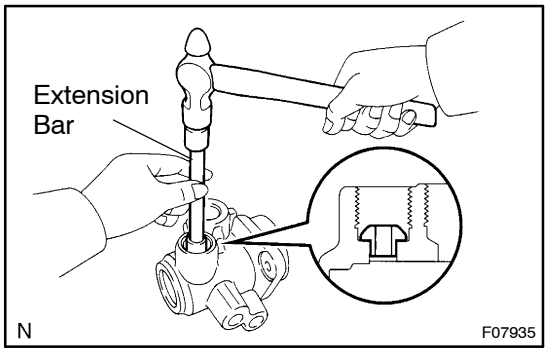
Make sure that the oil seal is installed facing in the correct direction.



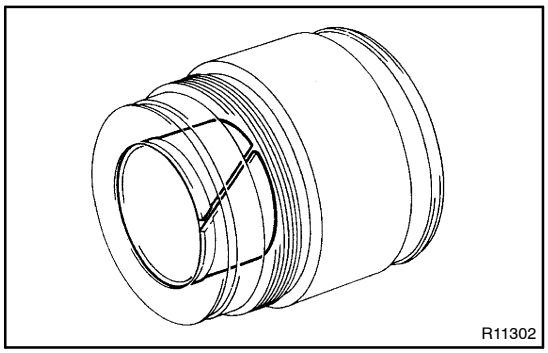


3. IF NECESSARY, REPLACE UNION SEAT

(a) Using a screw extractor, remove the union seat from the control valve housing.



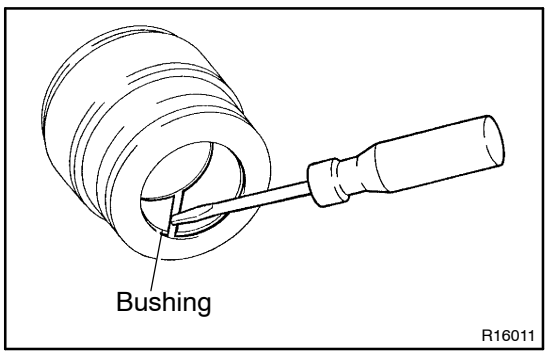
(b) Using a plastic hammer and extension bar, lightly tap in a new union seat.



4. INSPECT BUSHING

(a) Check the inside of the bushing of the cylinder end stopper for cracks. If faulty, replace the bushing.

(b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.



5. IF NECESSARY, REPLACE BUSHING

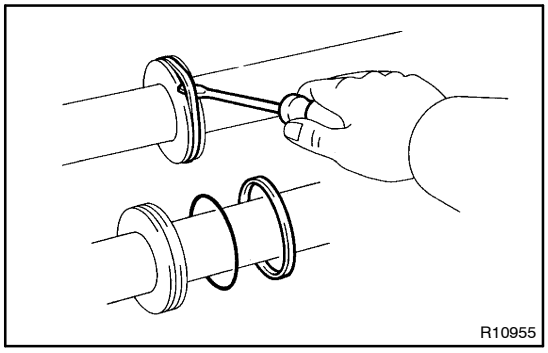
(a) Using a screwdriver, remove the bushing from the cylinder end stopper.

NOTICE:

Be careful not to damage the cylinder end stopper.

(b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.

(c) Install the bushing.



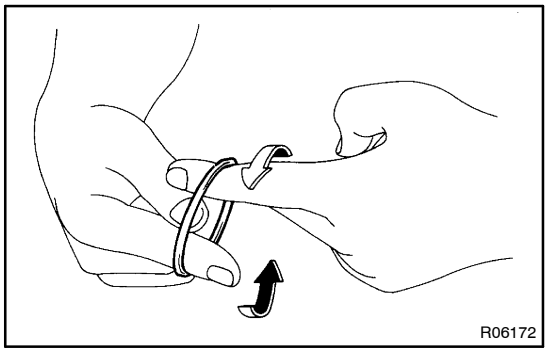
6. IF NECESSARY, REPLACE TEFLON RING AND O–RING

(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.

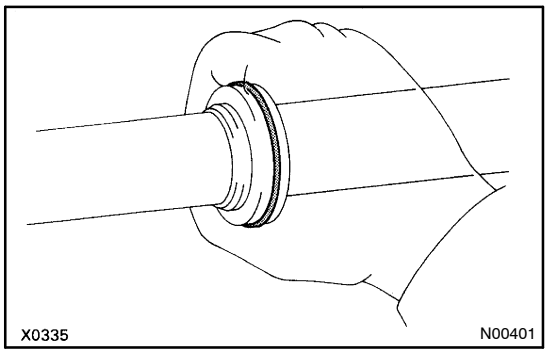
(b) Coat a new O–ring with power steering fluid and install it to the steering rack.



(c) Expand a new teflon ring with your fingers.

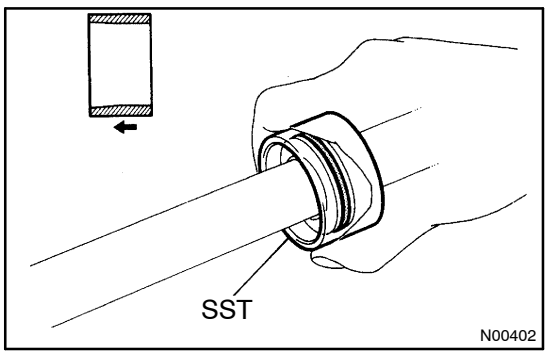
NOTICE:

Be careful not to overexpand the teflon ring.



(d) Coat the teflon ring with power steering fluid.

(e) Install the teflon ring to the steering rack and settle it down with your fingers.

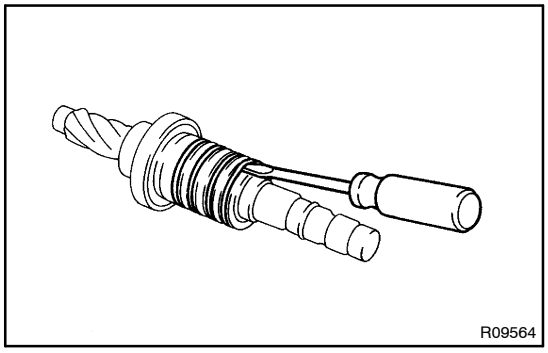


(f) Carefully slide the tapered end of SST over the teflon ring until it fits to the steering rack.

SST 09630–24014 (09620–24051)

NOTICE:

Be careful not to damage the teflon ring.



7. IF NECESSARY, REPLACE 4 TEFLON RINGS

(a) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the teflon ring.

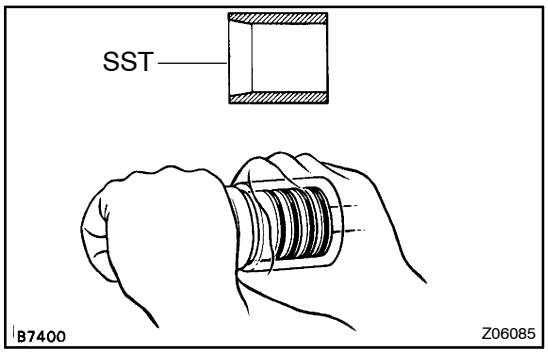
(b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon ring.

(c) Coat the teflon rings with power steering fluid.

(d) Install the teflon rings to the control valve assembly, and settle them down with your fingers.



(e) Carefully slide the tapered end of SST over the teflon rings until they fit to the control valve assembly.

SST 09631–20081

NOTICE:

Be careful not to damage the teflon rings.

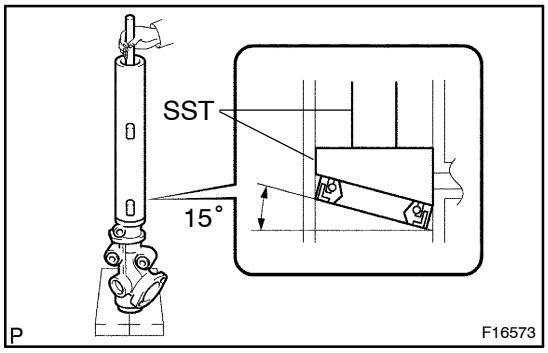
SR0UK–01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR–38)



2. INSTALL OIL SEAL

(a) Apply power steering fluid to a new oil seal, and install the oil seal on the rack housing at an angle.

NOTICE:

Install the oil seal in the correct direction.

HINT:

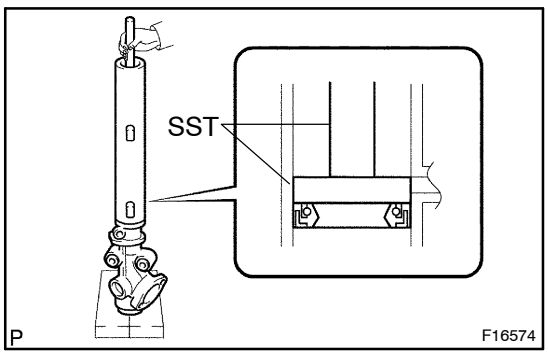
Install the oil seal so that the port faces downward with approx. 15 degrees.

(b) Using SST, push in the oil seal by hand until it passes through the 2 ports.

SST 09631–00180, 09950–70010 (09951–07360)

NOTICE:

Do not turn SST when inserting the oil seal.

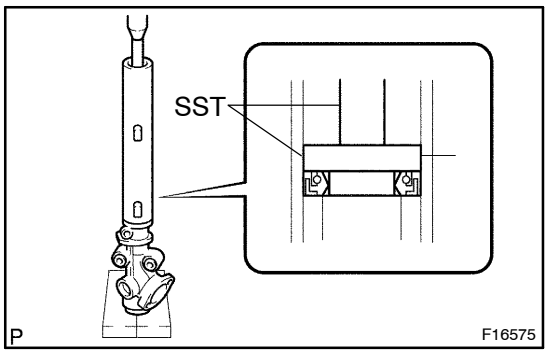


(c) After the oil seal has passed through the ports, push in the oil seal by hand until it becomes level, using SST.

SST 09950–60010 (09951–00430), 09950–70010 (09951–07360)

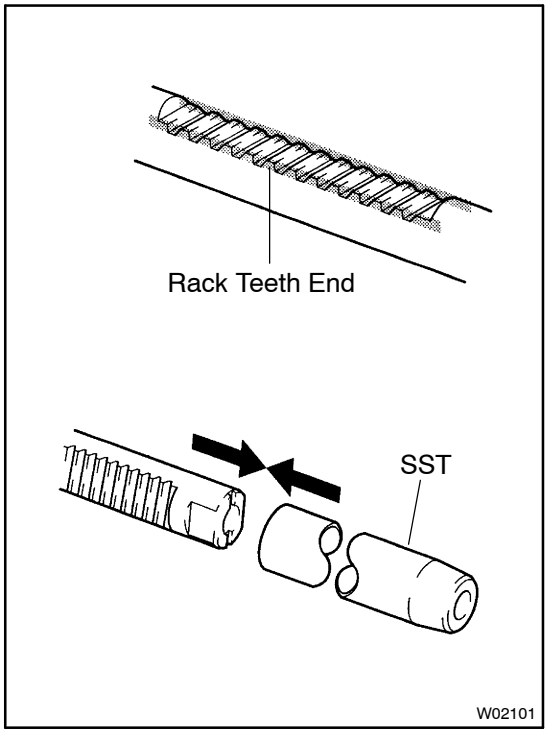
NOTICE:

When SST is set, do not damage the inside surface of the rack housing.



(d) After the oil seal has become level, using SST and press, install the oil seal.

SST 09950–60010 (09951–00430), 09950–70010 (09951–07360)



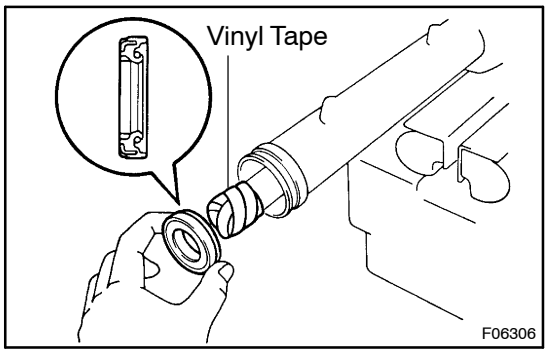
3. INSTALL STEERING RACK

(a) Install SST to the rack.
SST 09631–33010

HINT:

If necessary, scrape the burrs off the rack teeth end and burnish.

(b) Coat SST with power steering fluid.
(c) Install the steering rack into the rack housing.
(d) Remove the SST.
SST 09631–33010

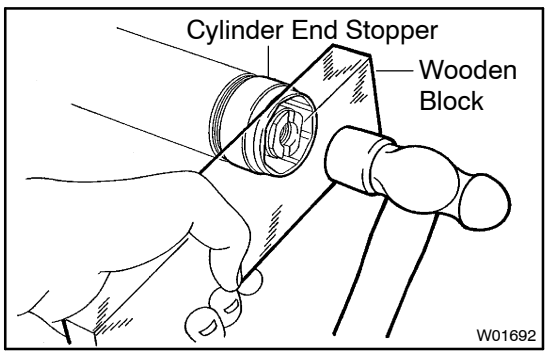


4. INSTALL OIL SEAL

(a) Coat a new oil seal lip with power steering fluid.
(b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
(c) Install the oil seal by pushing it into the rack housing without tilting.

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

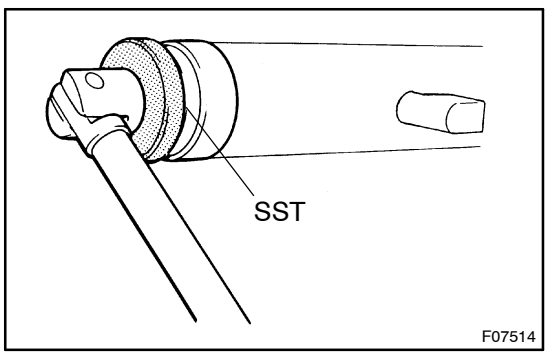


5. INSTALL CYLINDER END STOPPER AND SPACER

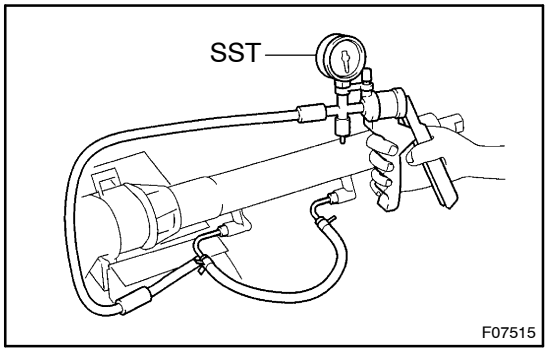
(a) Install the spacer.
(b) Coat a new O–ring with power steering fluid and install it to the cylinder end stopper.
(c) Using a wooden block and hammer, drive in the cylinder end stopper until it is tightly installed.

NOTICE:

Be careful not to damage the O–ring.



(d) Using SST, torque the cylinder end stopper.
SST 09631–20090
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)



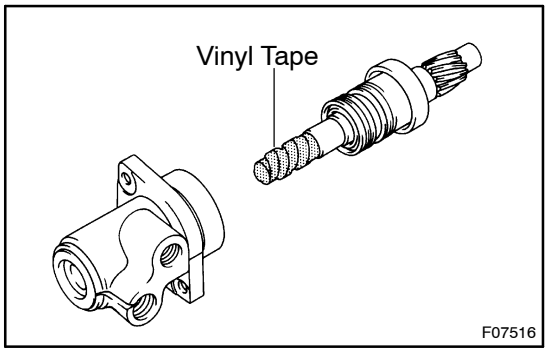
6. AIR TIGHTNESS TEST

(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 a change in the vacuum, check the installation of the oil seals.



7. INSTALL CONTROL VALVE ASSEMBLY

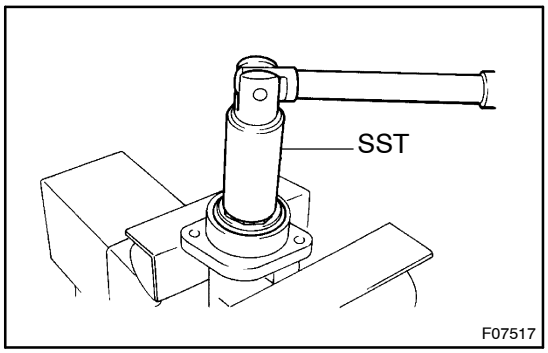
(a) Coat the teflon rings with power steering fluid.

(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.

(c) Push the control valve assembly into the control valve housing.

NOTICE:

Be careful not to damage the teflon rings and oil seal lip.



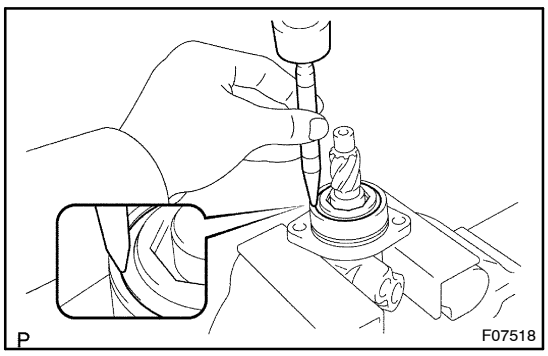
8. INSTALL BEARING GUIDE NUT

(a) Coat a new O–ring with power steering fluid, and install it to the bearing guide nut.

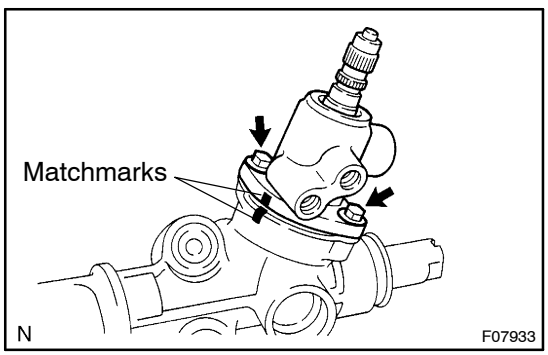
(b) Using SST, install the bearing guide nut.
SST 09631–20060
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:

Be careful not to damage the oil seal lip.



(c) Using a punch, stake the bearing guide nut.



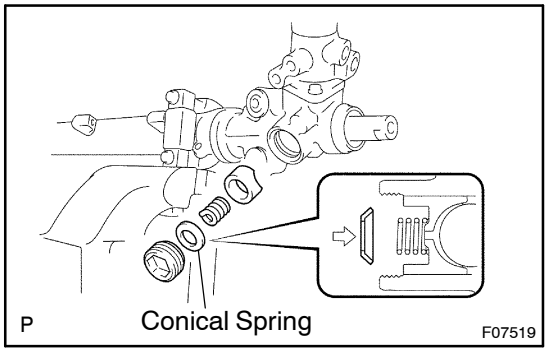
9. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Coat a new O–ring with power steering fluid, and install it to the control valve housing.

(b) Align the matchmarks on the valve housing and rack housing.

(c) Install the 2 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

10. INSTALL DUST COVER



11. INSTALL RACK GUIDE SUB–ASSEMBLY, RACK GUIDE SPRING, CONICAL SPRING AND RACK GUIDE SPRING CAP

(a) Install the rack guide sub–assembly, rack guide spring and conical spring.

NOTICE:

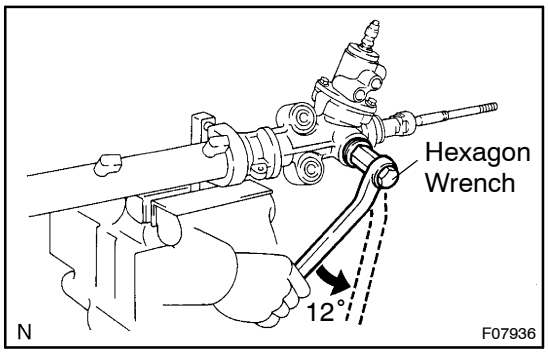
Make sure that the conical spring is installed facing in the correct direction.

(b) Apply sealant to 2 or 3 threads of the rack guide spring cap.

Sealant:

Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Temporarily install the rack guide spring cap.



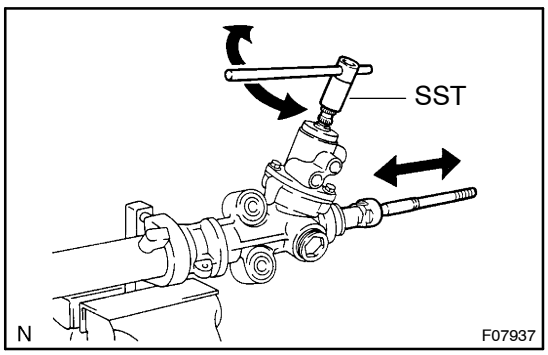
12. ADJUST TOTAL PRELOAD

(a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.

(b) Using a hexagon wrench (24 mm), torque the rack guide spring cap.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

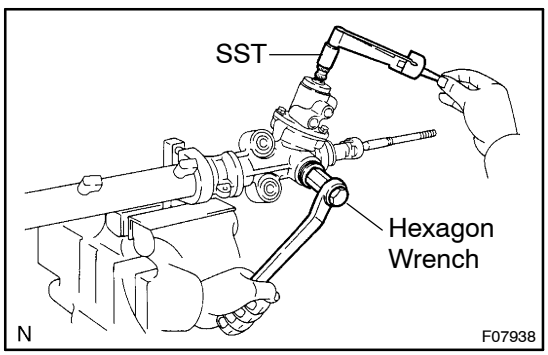
(c) Using a hexagon wrench (24 mm), return the rack guide spring cap 12°.



(d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616–00010

(e) Using a hexagon wrench (24 mm), loosen the rack guide spring cap until the rack guide spring is not functioning.

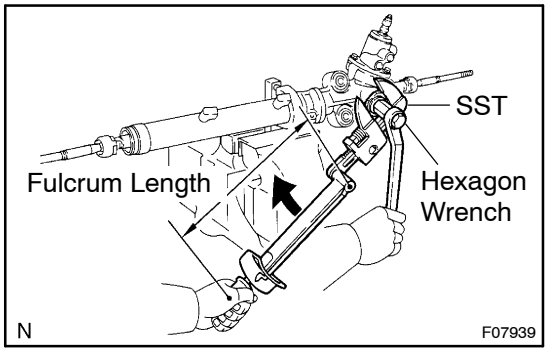


(f) Using SST, a torque wrench and hexagon wrench (24 mm), tighten the rack guide spring cap until the preload is within the specification.

SST 09616–00010

Preload (turning):

1.15 – 1.95 N·m (11.7 – 19.9 kgf·cm, 10.2 – 17.3 in.·lbf)



13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the rack guide spring cap lock nut.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Temporarily install the rack guide spring cap lock nut.

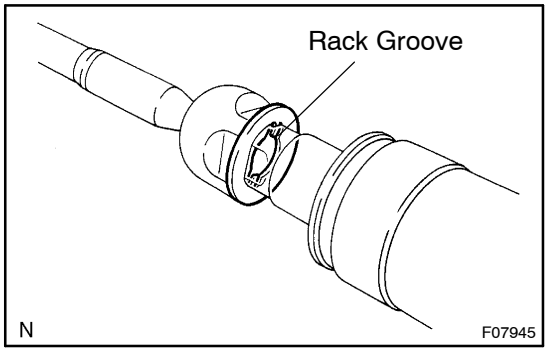
(c) Using a hexagon wrench (24 mm), hold the rack guide spring cap and using SST, torque the rack guide spring cap lock nut.
SST 09922–10010
Torque: 50 N·m (513 kgf·cm, 37 ft·lbf)

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.).

(d) Recheck the total preload.
Preload (turning):
1.15 – 1.95 N·m (11.7 – 19.9 kgf·cm, 10.2 – 17.3 in.·lbf)

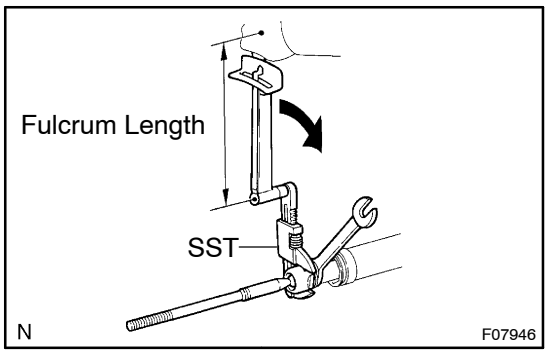
(e) Remove the RH and LH rack ends.



14. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

(a) Install a new claw washer, and temporarily install the rack end.

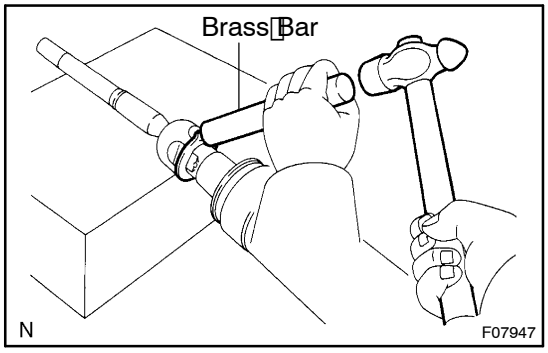
HINT:
Align the claws of the claw washer with the steering rack grooves.



(b) Using a spanner, hold the steering rack steadily and using SST, torque the rack end.
SST 09922–10010
Torque: 76 N·m (780 kgf·cm, 56 ft·lbf)

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).

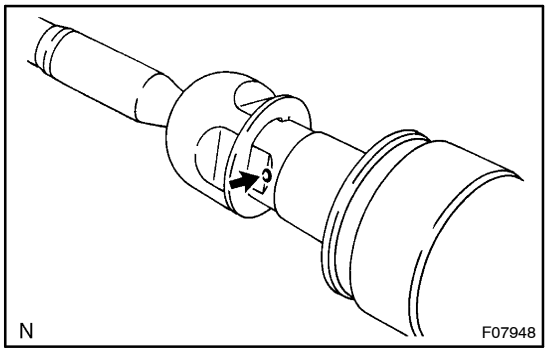


(c) Using a brass bar and a hammer, stake the washer.

NOTICE:

Avoid any impact on the steering rack.

(d) Employ the same manner described above to the other side.



15. 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.

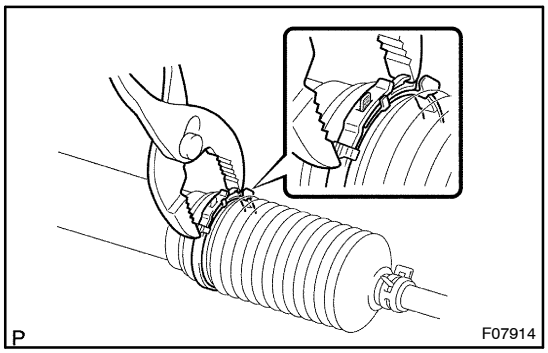
(b) Install the boot, clip and a new clamp.

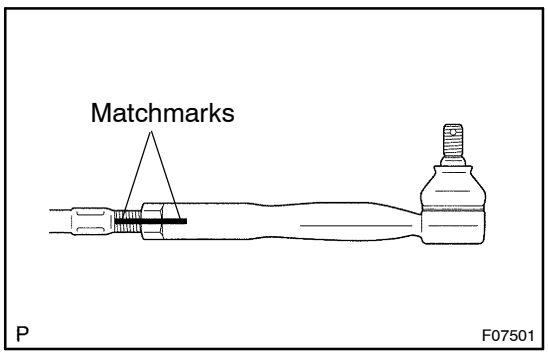
NOTICE:

Be careful not to damage or twist the boot.

(c) Tighten the clamp as shown in the illustration.

(d) Employ the same manner described above to the other side.





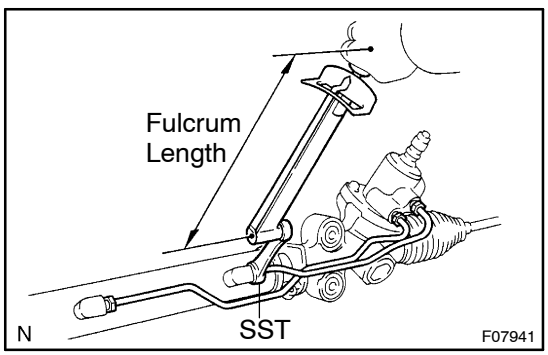
16. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

(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–5).

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(c) Employ the same manner described above to the other side.



17. INSTALL 2 TURN PRESSURE TUBES

Using SST, install the 2 turn pressure tubes.

SST 09633–00020

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.

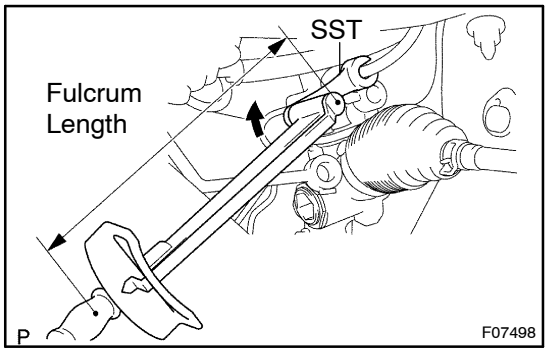
SR0UL–01

INSTALLATION

1. INSTALL GROMMET, BRACKET AND PS GEAR ASSEMBLY

Install the grommet, bracket and PS gear assembly with the 4 bolts.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



2. CONNECT RETURN TUBE

Using SST, connect the return tube.

SST 09631–22020

Torque: 37 N·m (374 kgf·cm, 27 ft·lbf)

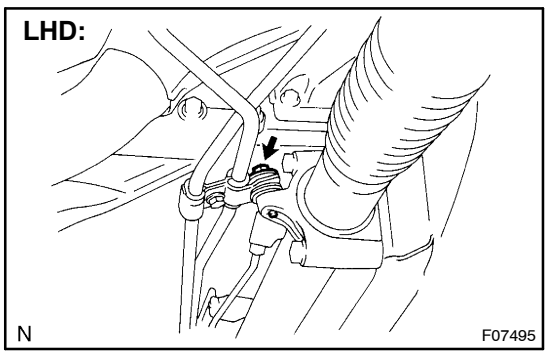
HINT:

- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

3. CONNECT PRESSURE FEED TUBE

(a) Install a new gasket, then connect the pressure feed tube with the union bolt.

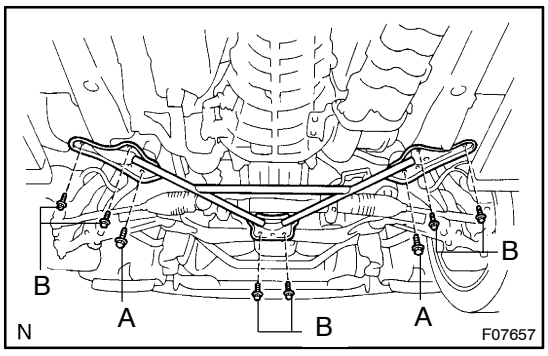
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



(b) LHD:

Connect the pressure feed tube clamp with the bolt.

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



4. INSTALL FRONT SUSPENSION MEMBER BRACE

Install the front suspension member with the 7 bolts.

Torque:

Bolt A: 119 N·m (1,210 kgf·cm, 88 ft·lbf)

Bolt B: 58 N·m (590 kgf·cm, 43 ft·lbf)

5. CONNECT SLIDING YOKE (See page SR–23)

6. CONNECT RH AND LH TIE ROD ENDS (See page SA–34)

7. INSTALL RH AND LH FRONT BRAKE CALIPERS (See page BR–30)

8. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

9. CENTER SPIRAL CABLE (See page SR–23)

10. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and steering column main shaft.

(b) Temporarily tighten the steering wheel set nut.

(c) Connect the connector.

11. BLEED POWER STEERING SYSTEM (See page SR–5)

12. CHECK STEERING WHEEL CENTER POINT

13. TORQUE STEERING WHEEL SET NUT

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

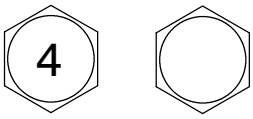
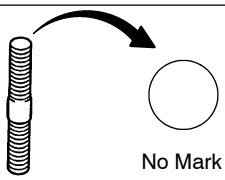
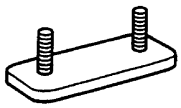
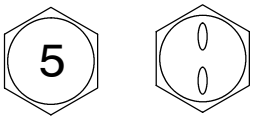
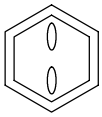
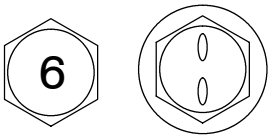
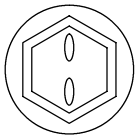
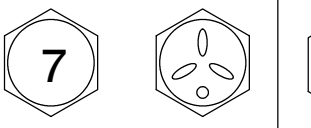
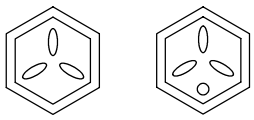
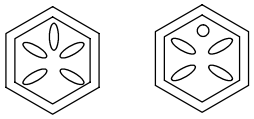
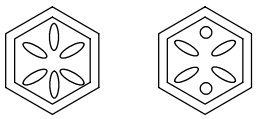
14. INSTALL STEERING WHEEL PAD (See page SR–23)

15. CHECK FRONT WHEEL ALIGNMENT (See page SA–5)

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS0ZS–01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
 No Mark	No Mark	 No Mark		4T
				5T
 w/ Washer	 w/ Washer			6T
				7T
				8T
				9T
				10T
				11T

B06431

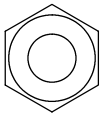
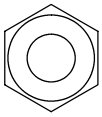
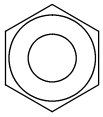
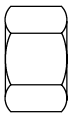
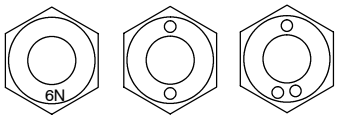
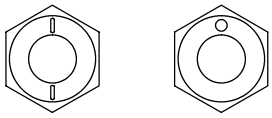
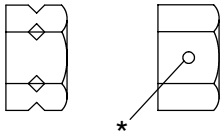
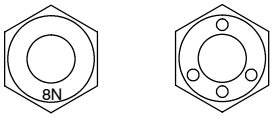
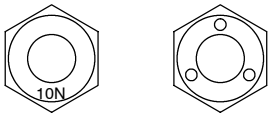
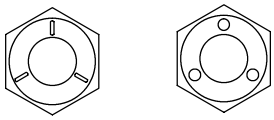
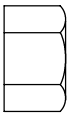
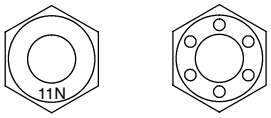
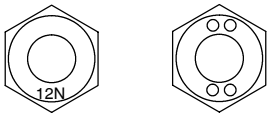
SS0ZT–01

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

SS0ZU–01

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
 6N			6N
		 *	7N (5T)
 8N			8N
 10N		 No Mark	10N (7T)
 11N			11N
 12N			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

MAINTENANCE

SERVICE DATA

SS0IE–01

Chassis	Front wheel alignment Side slip	 3.0 mm/m (0.118 in./3.3 ft) or less

ENGINE MECHANICAL

SERVICE DATA

SS0OQ–05

CO/HC	Idle CO concentration	0 – 0.5 %
Compression pressure	at 250 rpm STD	1,255 kPa (12.8 kgf/cm^2, 182 psi) or more
	Minimum	981 kPa (10.0 kgf/cm^2, 142 psi)
	Difference of pressure between each cylinder	98 kPa (1.0 kgf/cm^2, 14 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.)
	Valve lifter (for repair part) No.06	5.060 mm (0.1992 in.)
	No.08	5.080 mm (0.2000 in.)
	No.10	5.100 mm (0.2008 in.)
	No.12	5.120 mm (0.2016 in.)
	No.14	5.140 mm (0.2024 in.)
	No.16	5.160 mm (0.2031 in.)
	No.18	5.180 mm (0.2039 in.)
	No.20	5.200 mm (0.2047 in.)
	No.22	5.220 mm (0.2055 in.)
	No.24	5.240 mm (0.2063 in.)
	No.26	5.260 mm (0.2071 in.)
	No.28	5.280 mm (0.2079 in.)
	No.30	5.300 mm (0.2087 in.)
	No.32	5.320 mm (0.2094 in.)
	No.34	5.340 mm (0.2102 in.)
	No.36	5.360 mm (0.2110 in.)
	No.38	5.380 mm (0.2118 in.)
	No.40	5.400 mm (0.2126 in.)
	No.42	5.420 mm (0.2134 in.)
	No.44	5.440 mm (0.2142 in.)
	No.46	5.460 mm (0.2150 in.)
	No.48	5.480 mm (0.2157 in.)
	No.50	5.500 mm (0.2165 in.)
	No.52	5.520 mm (0.2173 in.)
	No.54	5.540 mm (0.2181 in.)
	No.56	5.560 mm (0.2189 in.)
	No.58	5.580 mm (0.2197 in.)
	No.60	5.600 mm (0.2205 in.)
	No.62	5.620 mm (0.2213 in.)
	No.64	5.640 mm (0.2220 in.)
	No.66	5.660 mm (0.2228 in.)
	No.68	5.680 mm (0.2236 in.)
	No.70	5.700 mm (0.2244 in.)
	No.72	5.720 mm (0.2252 in.)
	No.74	5.740 mm (0.2260 in.)
Ignition timing	w/ Terminals TC and E1 connected of check connector	8 –12° BTDC @ idle
Idle speed	–	650 ± 50 rpm

Cylinder head	Warpage		
	Cylinder block side	Maximum	0.20 mm (0.0079 in.)
	Intake manifold side	Maximum	0.20 mm (0.0079 in.)
	Exhaust manifold side	Maximum	0.30 mm (0.0118 in.)
	Valve seat		
	Refacing angle	Intake	30°, 45°, 60°
		Exhaust	15°, 45°, 60°
	Contacting angle		45°
	Contacting width		1.0 – 1.4 mm (0.039 – 0.055 in.)
	Protrusion height		6.8 – 7.2 mm (0.268 – 0.3283in.)
	Cylinder head bolt outside diameter	STD	8.7 – 8.8 mm (0.343 – 0.346 in.)
		Minimum	8.6 mm (0.339 in.)
Valve guide bushing	Inside diameter		5.010 – 5.030 mm (0.1972 – 0.1980 in.)
	Outside diameter (for repair part)	STD	9.727 – 9.738 mm (0.3830 – 0.3834 in.)
		O/S 0.05	9.777 – 9.788 mm (0.3849 – 0.3854 in.)
Valve	Valve overall length	STD Intake	91.75 mm (3.6122 in.)
		Exhaust	91.79 mm (3.6138 in.)
		Minimum Intake	91.25 mm (3.5925 in.)
		Exhaust	91.29 mm (3.5941 in.)
	Valve face angle		44.5°
	Stem diameter	Intake	4.970 – 4.985 mm (0.1957 – 0.1963 in.)
		Exhaust	4.965 – 4.980 mm (0.1955 – 0.1961 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 Intake	0.8 mm (0.315 in.)
		Exhaust	1.0 mm (0.394 in.)
		Minimum	0.5 mm (0.020 in.)
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length		47.3 mm (1.862 in.)
	Installed tension at 33.5 mm (1.319 in.)		188 – 204 N (19.2 – 20.8 kgf·cm, 42.3 – 45.9 lbf)
Valve lifter	Lifter diameter		30.966 – 30.976 mm (1.2191 – 2.2195 in.)
	Lifter bore diameter		31.000 – 31.025 mm (1.2205 – 1.2215 in.)
	Oil clearance	STD	0.024 – 0.059 mm (0.0009 – 0.0023 in.)
		Maximum	0.08 mm (0.0031 in.)
Camshaft	Thrust clearance	STD Intake	0.045 – 0.100mm (0.0018 – 0.0039 in.)
		Exhaust	0.045 – 0.110 mm (0.0012 – 0.0043 in.)
	Journal oil clearance	STD	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
		Maximum	0.08 mm (0.0031 in.)
	Journal diameter		26.959 – 26.975 mm (1.0614 – 1.0620 in.)
	Circle runout		0.06 mm (0.0024 in.)
	Cam lobe height	STD Intake	46.75 – 46.85 mm (1.8405 – 1.8445 in.)
		Exhaust	46.27 – 46.37 mm (1.8216 – 1.8256 in.)
		Minimum Intake	46.6 mm (1.8346 in.)
		Exhaust	46.1 mm (1.8150 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		17.6 – 18.2 mm (0.693 – 0.717 in.)
Exhaust manifold	Warpage	Maximum	0.70 mm (0.0276 in.)

Cylinder block	Cylinder head surface warpage	Maximum	0.05 mm (0.0020 in.)
	Cylinder bore diameter	STD	75.010 – 75.023 mm (2.9531 – 2.9537 in.)
		Maximum	94.231 mm (3.7099 in.)
	Main journal bore diameter (Reference)	Mark 1	59.026 – 59.032 mm (2.3239 – 2.3241 in.)
		Mark 2	59.032 – 59.038 mm (2.3241 – 2.3243 in.)
		Mark 3	59.038 – 59.044 mm (2.3243 – 2.3246 in.)
Piston and piston ring	Piston diameter	STD	74.93 – 74.94 mm (2.9500 – 2.9504 in.)
		O/S 0.50	75.43 – 75.44 mm (2.9697 – 2.9701 in.)
	Piston oil clearance	STD	0.070 – 0.093 mm (0.0028 – 0.0037 in.)
		Maximum	0.11 mm (0.0043 in.)
	Piston ring groove clearance	No.1	0.030 – 0.080 mm (0.0012 – 0.0031 in.)
		No.2	0.030 – 0.070 mm (0.0012 – 0.0028 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 – 0.0178 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	0.200 – 0.402 mm (0.0079 – 0.0158 in.)
		Maximum	0.45 mm (0.0188 in.)
	Connecting rod oil clearance	STD STD	0.016 – 0.047 mm (0.0006 – 0.0019 in.)
		Maximum	0.07 mm (0.0028 in.)
	Connecting rod bearing center wall thickness (Reference)	Mark 3	1.488 – 1.492 mm (0.0586 – 0.0587 in.)
		Mark 4	1.492 – 1.496 mm (0.0587 – 0.0589 in.)
		Mark 5	1.496 – 1.500 mm (0.0589 – 0.0591 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.)
Crankshaft	Thrust clearance	STD	0.020 – 0.221 mm (0.0008 – 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		1.940 – 1.990 mm (0.0764 – 0.0783 in.)
	Main journal oil clearance	STD No.4 STD	0.032 – 0.050 mm (0.0013 – 0.0020 in.)
		Others STD	0.020 – 0.038 mm (0.0008 – 0.0015 in.)
		Maximum	0.08 mm (0.0031 in.)
	Main journal diameter	STD No.4 STD	54.970 – 54.988 mm (2.1641 2.1649 in.)
		Others STD	54.982 – 55.000 mm (2.1646 2.1654 in.)
	(Reference)	STD No.4 Mark 0	54.982 – 54.988 mm (2.1646 2.1649 in.)
		Mark 1	54.976 – 54.982 mm (2.1644 2.1646 in.)
		Mark 2	54.970 – 54.976 mm (2.1642 2.1644 in.)
		Others Mark 0	54.994 – 55.000 mm (2.1651 2.1654 in.)
		Mark 1	54.988 – 54.994 mm (2.1649 2.1651 in.)
		Mark 2	54.982 – 54.988 mm (2.1646 2.1649 in.)
	Main bearing center wall thickness (Reference)		
		Mark 1	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
		Mark 2	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
		Mark 3	2.006 – 2.009 mm (0.0790 – 0.0791 in.)
		Mark 4	2.009 – 2.012 mm (0.0791 – 0.0792 in.)
		Mark 5	2.012 – 2.015 mm (0.0792 – 0.0793 in.)
	Crank pin diameter	STD	43.985 – 44.000 mm (1.7317 – 1.7322 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.)

SS0OR–06

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
No.1 idler pulley (Timing belt tensioner) x Timing belt case	42.5	425	31
No.2 timing belt cover x No.1 camshaft bearing cap	6	60	52 in.·lbf
No.2 timing belt cover x Timing belt case	6	60	52 in.·lbf
Air cleaner inlet duct bracket x Cylinder head	18.5	190	14
No.3 water bypass pipe x Cylinder head	8.5	85	74 in.·lbf
No.2 cylinder head cover x Air cleaner inlet duct bracket	6.5	65	56 in.·lbf
No.2 cylinder head cover x No.1 camshaft bearing cap	8.5	85	74 in.·lbf
Fan pulley (spacer) x Water pump	18.5	185	13
Air cleaner assembly x Intake manifold	7.5	75	65 in.·lbf
Air cleaner assembly x Air cleaner inlet duct bracket	7.5	75	65 in.·lbf
Air cleaner inlet x Radiator fan shroud	5	50	43 in.·lbf
Fan shroud x Radiator assembly	5.5	50	43 in.·lbf
Oil pump pulley x Oil pump	27	270	20
Timing belt plate x Timing belt case	9	90	78 in.·lbf
No.2 idler pulley x Timing belt case	37	370	27
Camshaft timing pulley x Camshaft 1st 2nd	35 Turn 90°	350 Turn 90°	25 Turn 90°
No.1 idler pulley (timing belt tensioner) x Timing belt case	42.5	425	31
Crankshaft pulley x Crankshaft	220	2,200	159
A/C compressor bracket x Cylinder block	46.5	475	34
A/C compressor bracket x Timing belt case	46.5	475	34
A/C compressor x A/C compressor bracket	24.5	250	18
Camshaft position sensor x Cylinder head	9	90	78 in.·lbf
Water temperature switch x Cylinder head	20	200	14
Water outlet x Cylinder head	29	290	21
Cylinder head x Cylinder block 1st 2nd	50 Turn 90°	500 Turn 90°	36 Turn 90°
Water bypass outlet x Cylinder head	9	90	78 in.·lbf
Delivery pipe x Cylinder head	18.5	185	13
No.1 fuel pipe (Fuel pressure pulsation damper) x Delivery pipe for SST	30 27	320 270	23 20
No.1 fuel pipe x Cylinder head	8.5	85	74 in.·lbf
No.1 fuel pipe x LH engine mounting bracket	35	350	25
Intake manifold x Cylinder head	28	280	20
No.1 intake chamber stay x Intake manifold	18.5	185	13
No.1 intake chamber stay x Cylinder block	18.5	185	13
No.2 intake chamber stay x Intake manifold	18.5	185	13
No.2 intake chamber stay x Engine mounting bracket	18.5	185	13
Camshaft bearing cap x Cylinder head	15	150	11
No.1 oil pipe x No.1 camshaft bearing cap	64.5	645	47
No.1 oil pipe x Cylinder block	64.5	645	47
No.1 oil pipe x Cylinder head	8.5	85	74 in.·lbf
Oil dipstick guide x Intake manifold	5.5	55	48 in.·lbf
Cylinder head cover x Cylinder head	15	150	11

Exhaust manifold x Cylinder head		40	410	30
Heat insulator x Exhaust manifold		18.5	190	14
Front exhaust pipe x Exhaust manifold		43	440	32
Exhaust manifold stay x Transmission		40	410	30
No.1 engine hanger x Cylinder head		25	250	18
No.2 engine hanger x Cylinder head		25	250	18
Stiffener plate x Transmission		37	380	27
Stiffener plate x Cylinder block		37	380	27
Transmission x Cylinder block	14 mm head	37	380	27
	17 mm head	72	730	53
Starter x Transmission		37	380	27
Rear engine mounting member x Frame crossmember		25.5	260	19
Rear engine mounting member x Rear engine mount insulator		13.5	135	10
Front engine mounting insulator x Front suspension		53	540	39
Clutch release cylinder x Transmission		12	120	9
PS vane pump x PS vane pump bracket	Pivot bolt	58	459	43
	Adjusting bolt	39	400	29
Propeller shaft x Differential		74	750	54
Sliding yoke x Intermediate shaft		35	360	26
Sliding yoke x Control valve shaft		35	360	26
Fuel inlet hose x Fuel support		29	300	22
Main bearing cap x Cylinder block		60	600	43
Connecting rod cap x Connecting rod		50	500	36
Rear oil seal retainer x Cylinder block		8.5	85	74 in.·lbf
Timing belt case x Cylinder block	12 mm head	18.5	185	13
	14 mm head	37.5	375	27
PS vane pump bracket x Timing belt case		19	195	14
PS vane pump bracket x Cylinder block		39	400	29
Engine mounting bracket x Cylinder block		35	350	25
No.2 heater water outlet pipe x Cylinder block		9.5	95	82 in.·lbf
No.2 heater water outlet pipe x Timing belt case		9.5	95	82 in.·lbf
Engine coolant drain union x Cylinder block		25	250	18
Oil filter union x Cylinder block		30	300	22
Drive plat (A/T) x Cylinder block		75	750	54
Flywheel (M/T) x Cylinder block		75	750	54
Front exhaust pipe x Exhaust manifold		43	440	32
Center exhaust pipe x Front exhaust pipe		43	440	32
Tailpipe x Center exhaust pipe		43	440	32
Exhaust manifold stay x Transmission		40	410	30
Oxygen sensor (Bank 1 sensor 2) x Center exhaust pipe		44	450	32

EMISSION CONTROL

TORQUE SPECIFICATION

SS0FJ–04

Part tightened	N·m	kgf·cm	ft·lbf
RH/ rear drive shaft x Differential	83	850	61
Rear suspension member brace x Rear suspension member	50	510	37
Oxygen sensor x Exhaust manifold	45	450	33
Exhaust manifold x Cylinder head	40	408	30
Front exhaust pipe x Exhaust manifold	43	440	32
Pipe support bracket x Transmission	43	440	32

ELECTRONIC FUEL INJECTION

SS0FK–06

SERVICE DATA

Fuel pressure regulator	Fuel pressure		304 – 343 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	at 20°C (68°F)	13.4 – 14.2 Ω 47 – 58 cm^3 (2.9 – 3.6 cu in.) per 15 sec. 11 cm^3 (0.7 cu in.) or less 1 drop or less per 27 minutes
Throttle body	Throttle body fully closed angle		4°
Throttle control motor	Motor (M+ – M–) Clutch (CL+ – CL–)	at 20°C (68°F) at 20°C (68°F)	0.3 – 100 Ω 4.4 – 5.0 Ω
Throttle position sensor	Resistance (VC – E2) Throttle valve opening percentage	at 20°C (68°F) STD	1.2 – 3.2 kΩ 15.2 ± 0.8 %
Accelerator pedal position sensor	Resistance (VC – E2) Accelerator pedal position voltage	at 20°C (68°F) STD	1.2 – 3.2 kΩ 0.3 – 0.9 V
Camshaft timing oil control valve	Resistance	at 20°C (68°F)	5.5 – 12 Ω
VSV for EVAP	Resistance	at 20°C (68°F)	27 – 33 Ω
VSV for acoustic control induction system (ACIS)	Resistance	at 20°C (68°F)	38.5 – 44.5 Ω
Water temperature sensor	Resistance	at –20°C (–4°F) 0°C (32°F) 20°C (68°F) 40°C (104°F) 60°C (140°F) 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
Oxygen sensor	Heater coil resistance	at 20°C (68°F) at 800°C (1472°F)	11 – 16 Ω 23 – 32 Ω
Fuel cut rpm		Fuel return rpm	1,000 rpm
Vacuum Sensor	Power source voltage		4.5 – 5.5 V

SS0FL–07

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fuel line for union bolt	29	300	22
Fuel line for flare nut (for using SST)	38 (30)	387 (310)	28 (22)
Fuel tank vent tube set plate x Fuel tank	4.0	40	35 in.·lbf
Fuel inlet hose x Body	9.0	90	80 in.·lbf
Delivery pipe x Cylinder head	18.5	185	13
Air cleaner assembly x Intake manifold	7.5	75	65 in.·lbf
Air cleaner assembly x Air cleaner inlet duct bracket	7.5	75	65 in.·lbf
Air cleaner inlet x Radiator fan shroud	5	5.0	43 in.·lbf
Fuel pressure pulsation damper x No.1 fuel pipe (for using SST)	32 (27)	320 (270)	23 (20)
Throttle position sensor x Throttle body	2.0	20	17 in.·lbf
Throttle control motor x Throttle body	3.7	37.5	33 in.·lbf
Throttle body x Intake manifold	21	210	15
Throttle body x VSV and bracket assembly	7.5	75	66 in.·lbf
Intake manifold x VSV and bracket assembly	7.5	75	66 in.·lbf
Accelerator pedal position sensor x Throttle pedal position housing	2.0	20	17 in.·lbf
Accelerator pedal position housing x Throttle body	5.4	55	48 in.·lbf
Camshaft timing oil control valve x No.1 camshaft bearing cap	8.0	80	71 in.·lbf
No.2 cylinder head cover x Air cleaner inlet duct bracket	6.5	65	56 in.·lbf
No.2 cylinder head cover x No.1 camshaft bearing cap	8.5	85	74 in.·lbf
Water temperature sensor x Cylinder head	19.6	200	14
Knock sensor x Cylinder block	45	450	33
Oxygen sensor x Exhaust manifold	44	450	32
Oxygen sensor x Center exhaust pipe	44	450	32

COOLING

SERVICE DATA

SS0SD–02

Thermostat	Valve opening temperature		80 – 84°C (176 – 183°F)
	Valve lift	at 95°C (203°F)	8 mm (0.31 in.) or more
Radiator cap	Relief valve opening pressure	STD	93 – 123 kPa (0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi)
		Minimum	78 kPa (0.8 kgf/cm^2, 11.4 psi)
Electric cooling fan	Rotating amperage	at 20°C (68°F) No.1	7.8 – 11.8 A
		No.2	5.1 – 8.1 A

SS0SE–02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Drain plug x Union on cylinder block		13	130	9
Water pump x Timing belt case	10 mm head	9.0	90	78 in.·lbf
	12 mm head	18.5	185	13
PS vane pump bracket x Cylinder block		39	400	29
PS vane pump bracket x Timing belt case		19	195	14
PS vane pump bracket x Water pump		19	195	14
PS vane pump x PS vane pump bracket	Pivot bolt	58	590	43
	Adjusting bolt	39	400	29
Water inlet x Timing belt case		9.0	90	78 in.·lbf
Oil cooler x Radiator lower tank		8.3	85	74 in.·lbf
Oil cooler pipe x Oil cooler		14.7	150	11
Electric cooling fan x Radiator		5.0	50	44 in.·lbf
Upper radiator support Body		15.2	155	11

LUBRICATION

SERVICE DATA

SS0SF–02

Oil pressure		at idle speed	49 kPa (0.5 kgf/cm^2, 7.3 psi) or more
		at 3,000 rpm	284 – 441 kPa (2.9 – 4.5 kgf/cm^2, 46 – 64 psi)
Oil pump	Tip clearance	STD	0.04 – 0.16 mm (0.0016 – 0.0063 in.)
		Maximum	0.20 mm (0.0079in.)
	Body clearance	STD	0.10 – 0.16 mm 0.0039 – 0.0063 in.)
		Maximum	0.20 mm (0.0079 in.)
	Side clearance	STD	0.03 – 0.09 mm (0.0012 – 0.0035 in.)
		Maximum	0.15 mm (0.0059 in.)

SS0SG–02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
No.2 intake chamber stay x Intake manifold		18.5	185	13
No.2 intake chamber stay x Engine mounting bracket		18.5	185	13
Oil pan x Drain plug		37.5	375	27
Relief valve plug x Oil pump body		36.8	375	27
Oil strainer x Cylinder block,	for Bolt	8.5	85	74 in.·lbf
	for Nut	18.5	185	13
Oil pan x Cylinder block		5.5	55	48 in.·lbf
Oil pan x Timing belt case		5.5	55	48 in.·lbf
Oil pan x Rear oil seal retainer		5.5	55	48 in.·lbf
Stiffener plate x Cylinder block		37	380	27
Stiffener plate x Transmission		37	380	27
Oil level sensor x Oil pan		5.4	55	48 in.·lbf
Oil pump x Timing belt case	10 mm head	9	90	78 in.·lbf
	12 mm head	18.5	185	13
	14 mm head	37	375	27
Oil cooler x Cylinder block	Union bolt	80	800	58
No.1 intake chamber stay x Intake manifold		18.5	185	13
No.1 intake chamber stay x Cylinder block		18.5	185	13

IGNITION

SS0IM–02

SERVICE DATA

Spark plug	Recommended spark plug	DENSO	SK20R11
		NGK	IFR6A11
	Correct electrode gap for new spark plug		1.1 mm (0.043 in.)
	Maximum electrode gap for used spark plug		1.2 mm (0.047 in.)
Camshaft position sensor	Resistance	Cold	835 – 1,400 Ω
		Hot	1,060 – 1,645 Ω
Crankshaft position sensor	Resistance	Cold	1,630 – 2,740 Ω
		Hot	2,065 – 3,225 Ω

SS0IN–02

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	17.5	180	13
Ignition coil with igniter x Cylinder head cover	7.5	80	66 in.·lbf
Camshaft position sensor x Cylinder head	9.0	90	80 in.·lbf
Crankshaft position sensor x Timing belt case	9.0	90	80 in.·lbf

STARTING

SERVICE DATA

SS0FQ–07

Starter (Planetary type)	Rated voltage and output power		12 V 0.8 kW, 12 V 1.0 kW
	No–load characteristics	Current	90 A or less at 11.5 V
		rpm	3,000 rpm or more
	Center bearing oil clearance	STD	0.01 – 0.06 mm (0.0004 – 0.0024 in.)
		Maximum	0.2 mm (0.0078 in.)
	Brush length	STD	14.0 mm (0.551 in.)
		Minimum	9.0 mm (0.354 in.)
	Spring installed load	STD	13.7 – 17.6 N (1.4 – 1.8 kgf, 3.1 – 4.0 lbf)
		Minimum	8.8 N (0.9 kgf, 2.0 lbf)
	Commutator		
	Diameter	STD	28.0 mm (1.102 in.)
		Minimum	27.0 mm (1.063 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.)

SS0FR–06

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Starter x Transmission	37	380	27
Commutator end frame x Brush holder	1.5	15	13 in.·lbf
Lead wire x Terminal C of starter	9.8	100	87 in.·lbf
Field frame x Armature assembly	5.9	60	52 in.·lbf
Starter housing x Magnetic switch	8.3	85	73 in.·lbf
End cover x Field frame	1.5	15	13 in.·lbf
Terminal nut x Terminal 30 of starter	7.85 – 11.8	80 – 120	69 in.·lbf – 8.7
Terminal nut x Terminal C of starter	9.8	100	87 in.·lbf
Magnetic switch end cover x Magnetic switch	2.5	26	22 in.·lbf

CHARGING

SS0E6–05

SERVICE DATA

Battery	Voltage (Maintenance–free battery)	at 20˚C (68˚F)	12.5 – 12.9 V
	Specific gravity (Except maintenance–free battery)	at 20˚C (68˚F)	1.25 – 1.29 V
Alternator	Rated output		12 V 100 A
	Rotor coil resistance	at 20˚C (68˚C)	2.8 – 3.0 Ω
	Slip ring diameter	STD	14.2 – 14.4 mm (0.559 – 0.567 in.)
		Minimum	12.8 mm (0.504 in.)
	Brush exposed length	STD	9.5 –11.5 mm (0.374 –0.453 in.)
		Minimum	1.5 mm (0.059 in.)
IC regulator	Regulating voltage		13.2 – 14.8 V

SS0E7–05

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Alternator x Water pump		55	561	41
Alternator x Cylinder block		13	133	10
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
Wire clip x Rectifier end frame		5.4	55	48 in.·lbf
Alternator pulley x Rotor		110.5	1,125	81
Rectifier holder x Coil lead on rectifier end frame		2.9	30	26 in.·lbf
IC regulator x Rectifier end frame		2.0	20	18 in.·lbf
IC regulator x Rectifier holder		2.0	20	18 in.·lbf
Brush holder x Rectifier holder		2.0	20	18 in.·lbf
Brush holder x Voltage regulator		2.0	20	18 in.·lbf
Rear end cover x Rectifier holder		4.4	45	39 in.·lbf
Plate terminal x Rectifier holder	Nut	4.4	45	39 in.·lbf
	Bolt	3.9	40	35 in.·lbf
Terminal insulator x Rectifier holder		4.1	42	36 in.·lbf

CLUTCH

SS07M–02

SERVICE DATA

Pedal height from asphalt sheet	RHD	161.0 – 171.0 mm (6.34 – 6.73 in.)
	LHD	154.0 – 164.0 mm (6.06 – 6.46 in.)
Pedal freeplay		5.0 – 15.0 mm (0.197 – 0.591 in.)
Push rod play at pedal top		1.0 – 5.0 mm (0.039 – 0.197 in.)
Clutch release point from pedal full stroke end position		25 mm (0.98 in.) or more
Slotted spring pin protrusion		1.5 – 3.5 mm (0.059 – 0.138 in.)
Disc rivet head depth	Min.	0.3 mm (0.012 in.)
Disc runout	Max.	0.8 mm (0.031 in.)
Flywheel runout	Max.	0.3 mm (0.012 in.)
Diaphragm spring finger wear	Max. depth	0.6 mm (0.024 in.)
Diaphragm spring finger wear	Max. width	5.0 mm (0.197 in.)
Diaphragm spring tip non–alignment	Max.	0.5 mm (0.020 in.)

SS07N–02

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Clutch line union	15	155	11
Clutch line clamp	4.9	50	43 in.·lbf
Master cylinder installation nut	13	130	9
Bleeder plug	12	120	8
Release cylinder installation bolt	13	130	9
Clutch cover x Flywheel	19	195	14
Release fork suppor	39	400	29
Flywheel set bolt	107	1,070	79

MANUAL TRANSMISSION

SS134–01

SERVICE DATA

Counter 6th gear thrust clearance	STD	0.10 – 0.40 mm (0.0039 – 0.0157 In.)
Counter 6th gear oil clearance	STD	0.015 – 0.068 mm (0.00059 – 0.00027 in.)
Synchronizer ring No. 3 to gear spine end clearance	MIn.	0.8 mm (0.031 In.)
Output shaft 1ST gear thrust clearance	STD	0.15 – 0.40 mm (0.0059 – 0.0157 in.)
Output shaft 2nd gear thrust clearance	STD	0.10 – 0.45 mm (0.0039 – 0.0177 in.)
Output shaft radial clearance	STD	0.015 – 0.066 mm (0.00059 – 0.00260 in.)
Synchronizer ring to 1ST and 2nd gear clearance	Inner STD Middle STD Outer STD	0.98 – 1.62 mm (0.039 – 0.064 in.) 0.068 – 1.92 mm (0.027 – 0.076 in.) 0.88 – 1.72 mm (0.035 – 0.068 in.)
Output shaft 1st gear journal outer diameter	MIn.	31.984 – 32.000 mm (1.259 – 1.260 in.)
Output shaft 2nd gear journal outer diameter	MIn.	42.984 – 43.000 mm (1.6922 – 1.693 in.)
Output shaft reverse gear journal outer diameter	MIn.	40.984 – 41.000 mm (1.6135 – 1.6141 in.)
Output shaft shaft runout	Max.	0.3 mm (0.0012 in.)
1st gear bearing inner race outer diameter	Max.	40.284 – 40.300 mm (1.586 – 1.587 in.)
Hub sleeve No. 1and No. 3 clearance	STD Max.	7.9 – 8.0 mm (0.311 – 0.315 in.) 0.15 – 0.35 mm (0.311 – 0.315 in.)
3rd and 4th gear thrust clearance	STD	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
3rd gear radial clearance	STD	0.015 – 0.068 mm (0.00059 – 0.00268 in.)
4th gear radial clearance	STD	0.065 – 0.115 mm ’(0.00256 – 0.00453 in.)
Hub sleeve No. 2 clearance	Max.	0.15 – 0.35 mm (0.0059 – 0.138 in.)
Synchronizer ting No. 1 to 3rd gear clearance	STD	0.9 – 1.7 mm (0.0354 – 0.0669 in.)
Counter 3rd gear journal outer diameter	STD	39.284 – 39.300 mm (1.5466 – 1.5472 in.)
Counter 4th gear journal outer diameter	STD	37.984 – 28.000 mm (1.495 – 1.496 in.)
Counter 6th gear journal outer diameter	STD	24.987 – 25.000 mm (0.9837 – 0.9842 in.)
Counter shaft runout	Max.	0.3 mm (0.0012 in.)
3rd gear inner diameter	STD	43.015 – 43.04 mm (1.6935 – 1.6945 in.)
4th gear inner diameter	STD	46.315 – 46.34 mm (1.8234 – 1.8244 in.)
4th gear bearing inner race outer diameter	STD	46.225 – 46.250 mm (1.8199 – 1.8207 in.)
Reverse idler gear radial clearance	STD	0.040 – 0.082 mm (0.00157 – 0.00232 in.)
Reverse idler gear shaft outer diameter	STD	0.04 – 0.082 mm (0.00157 – 0.00323 in.)
Output shaft snap ring thickness Clutch hub No. 4		
	Mark A Mark B Mark C Mark D Mark E Mark F	2.80 mm (0.1102 In.) 2.85 mm (0.1122 in.) 2.90 mm (0.1142 in.) 2.95 mm (0.1162 in.) 3.00 mm (0.1181 in.) 3.05 mm (0.1201 in.)
Input shaft snap ring thickness Front bearing		
	Mark 0 Mark 1 Mark 2 Mark 3 Mark 4 Mark 5	1.95 mm (0.077 In.) 2.00 mm (0.079 in.) 2.05 mm (0.081 in.) 2.10 mm (0.083 in.) 2.15 mm (0.085 in.) 2.20 mm (0.087 in.)

Output shaft snap ring thickness Clutch hub No. 3	
Mark A	1.80 mm (0.0709 In.)
Mark B	1.85 mm (0.0728 in.)
Mark C	1.90 mm (0.0748 in.)
Mark D	1.95 mm (0.0768 in.)
Mark E	2.00 mm (0.0787 in.)
Mark F	2.05 mm (0.0807 in.)
Output shaft snap ring thickness Clutch hub No. 3	
Mark A	2.67 mm (0.1051 in.)
Mark B	2.73 mm (0.1075 in.)
Mark C	2.79 mm (0.1098 in.)
Mark D	2.85 mm (0.1122 in.)
Mark E	2.91 mm (0.1146 in.)
Mark F	2.97 mm (0.1169 in.)
Mark G	3.03 mm (0.1192 in.)
Mark H	3.09 mm (0.1217 in.)
Mark J	3.15 mm (0.1240 in.)
Mark K	3.21 mm (0.1263 in.)
Mark L	3.27 mm (0.1287 in.)
Counter shaft snap ring thickness 4th washer retainer	
Mark A	3.75 mm (0.1476 in.)
Mark B	3.80 mm (0.1496 in.)
Mark C	3.85 mm (0.1516 in.)
Mark D	3.90 mm (0.1535 in.)
Mark E	3.95 mm (0.1555 in.)
Mark F	4.00 mm (0.1575 in.)
Mark G	4.05 mm (0.1594 in.)
Mark H	4.10 mm (0.1614 in.)
Counter shaft snap ring thickness Clutch hub No. 3	
Mark A	1.80 mm (0.0709 In.)
Mark B	1.85 mm (0.0728 in.)
Mark C	1.90 mm (0.0748 in.)
Mark D	1.95 mm (0.0768 in.)
Mark E	2.00 mm (0.0787 in.)
Mark F	2.05 mm (0.0807 in.)
Counter shaft snap ring thickness Front bearing	
Mark 1	2.05 mm (0.081 in.)
Mark 2	2.10 mm (0.083 in.)
Mark 3	2.15 mm (0.085 in.)
Mark 4	2.20 mm (0.087 in.)
Mark 5	2.25 mm (0.886 in.)
Mark 6	2.30 mm (0.0906 in.)
Front bearing retainer oil seal drive in depth	11.5 ± 0.4 mm (0.453 ± 0.016 in.)

SS135–01

TORQUE SPECIFICATION

Part tightened	kgf·cm	kgf·cm	ft·lbf
Engine rear mounting x Transmission	25	250	18
Rear engine mounting member x Body	25	250	18
Rear engine mounting member x Engine rear mounting	13	135	9
Starter x Transmission	42	420	30
Stiffener plate x Engine	37	380	27
Stiffener plate x Transmission	37	380	27
Clutch release cylinder x Transmission	12	120	9
Clutch line clamp x Transmission	4.9	50	43 in.·lbf
Exhaust manifold stay x Transmission	40	408	29
Exhaust front pipe x Exhaust rear pipe	43	440	32
Exhaust front pipe x Exhaust manifold	43	440	32
Transmission shift lever x Transmission	7.8	801	69 in.·lbf
Shift detente ball plug x Clutch housing	17	170	12
Idler gear shaft set bolt	28	290	21
Front bearing retainer x Clutch housing	29	290	21
5th shift arm pivot bolt	39	390	29
Transmission case x Clutch housing	29	290	21
Head straight screw plug No. 1	19	190	14
Select lever stopper bolt	14	145	10
Shift interlock plate bolt	31	320	23
Output shaft rear bearing retainer x Transmission	30	305	22
Shift lever housing set bolt	30	305	22
Extension housing oil receiver pipe No. 1 x Extension housing	8.5	85	74 in.·lbf
Oil protect plate x Extension housing	8.5	85	74 in.·lbf
Select stopper block x Extension housing	21	210	15
Reverse restrict pin	37	380	27
Extension housing x Transmission case	29	300	22
Head straight screw plug No. 2	25	250	18
Floor shift lever housing set bolt	38	390	28
Back–up switch x Transmission case	44	450	33
Control shift lever retainer x Extension housing	29	300	27
	19.5	195	14
Clutch release fork support	39	400	29
Vehicle speed sensor x Transmission case	14	140	10
Propeller shaft x Body	49	500	36
Propeller shaft x Differential	49	500	36

AUTOMATIC TRANSMISSION

SERVICE DATA

SS138–01

Line pressure (Wheel locked)		
	Engine idling	
	D range	392 – 461 kPa (4.0 – 4.7 kgf/cm^2, 57 – 67 psi)
	R range	569 – 657 kPa (5.8 – 6.7 kgf/cm^2, 83 – 95 psi)
	at stall (Throttle valve fully opened)	
	D range	1,147 – 1,402 kPa (11.7 – 14.3 kgf/cm^2, 166 – 203 psi)
	R range	1,530 – 1,882 kPa (15.6 – 19.2 kgf/cm^2, 222 – 273 psi)
Engine stall revolution	D and R ranges	2,500 ± 150 rpm
Engine idle speed		
(A/C OFF)	N range	750 ± 50 rpm
Time lag	N → D range	Less than 1.2 seconds
	N → R range	Less than 1.5 seconds
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter runout	Max.	0.30 mm (0.0118 in.)
Torque converter installation distance		
Shift schedule		
D range		
(Throttle valve fully opened)	1 → 2	57 – 64km/h (35 – 40 mph)
	2 → 3	104 – 115 km/h (65 – 71 mph)
	3 → 4	156 – 169 km/h (97 – 105 mph)
	4 → 3	152 – 166 km/h (94 – 103 mph)
	3 → 2	98 – 109 km/h (61 – 68 mph)
	2 → 1	43 – 49 km/h (27 – 30 mph)
(Throttle valve fully closed)	3 → 4	42 – 48 km/h (26 – 30 mph)
	4 → 3	19 – 23 km/h (12 – 14 mph)
3 range		
(Throttle valve fully opened)	1 → 2	57 – 64 km/h (35 – 40 mph)
	2 → 3	104 – 115 km/h (65 – 71 mph)
	4 → 3	163 – 177 km/h (101 – 110 mph)
	3 → 2	98 – 109 km/h (61 – 68 mph)
	2 → 1	49 – 55 km/h (30 – 34 mph)
(Throttle valve fully closed)	4 → 3	163 – 177 km/h (101 – 110 mph)
2 range		
(Throttle valve fully opened)	1 → 2	57 – 64 km/h (35 – 40 mph)
	3 → 2	106 – 117 km/h (66 – 73 mph)
	2 → 1	49 – 55 km/h (30 – 34 mph)
L range		
(Throttle valve fully opened)	2 → 1	55 – 62 km/h (34 – 39 mph)

Lock up point	Throttle valve opening 5 %	
D or 3 range		
3rd gear (3 range only)	Lock–up ON	106 – 117 km/h (66 – 73 mph)
	Lock–up OFF	100 – 112 km/h (62 – 70 mph)
4th gear	Lock–up ON	57 – 64 km/h (35 – 40 mph)
	Lock–up OFF	56 – 62 km/h (35 – 39 mph)
Flex lock–up point		
D or 3 range		
Throttle valve opening 3 %		
3rd gear (Australia only)	Lock–up ON	27 – 32 km/h (17 – 20 mph)
	Lock–up OFF	25 – 30 km/h (16 – 19 mph)
4th gear	Lock–up ON	40 – 45 km/h (25 – 28 mph)
	Lock–up OFF	38 – 43 km/h (24 – 27 mph)
Throttle valve fully closed (A/C OFF)		
3 rd gear	Lock–up ON	84 – 95 km/h (52 – 59 mph)
	Lock–up OFF	21 – 36 km/h (13 – 22 mph)
4 th gear	Lock–up ON	84 – 95 km/h (52 – 59 mph)
	Lock–up OFF	29 – 43 km/h (18 – 27 mph)
Throttle valve fully closed (A/C ON)		
3rd gear	Lock–up ON	84 – 95 km/h (52 – 59 mph)
	Lock–up OFF	21 – 36 km/h (13 – 22 mph)
4th gear	Lock–up ON	84 – 95 km/h (52 – 59 mph)
	Lock–up OFF	29 – 47 km/h (18 – 29 mph)

SS139–01

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Extension housing x Transmission case		36	370	27
Transmission mounting bracket x Extension housing		12	120	9
Engine rear support member x Frame		25	260	19
Engine rear support member x Transmission mounting bracket		14	135	10
Transmission output speed sensor		5.4	55	48 in.·lbf
Transmission input speed sensor		5.4	55	48 in.·lbf
Solenoid connector		5.4	55	48 in.·lbf
Drain plug		20	205	15
Transmission control shaft lever		16	160	12
Neutral start switch x Transmission case	Bolt	5.4	55	48 in.·lbf
	Nut	6.9	70	60 in.·lbf
No. 1 and No. 2 solenoid valve set bolt		10	100	7
SLU and SLT solenoid valve set bolt		10	100	7
Valve body x Transmission case		10	100	7
ATF temp. sensor and solenoid wiring set bolt		10	100	7
Oil pan x Transmission case		4.4	45	39 in.·lbf
Oil strainer x Valve body		10	100	7
Parking lock pawl bracket x Transmission case		7.4	75	65 in.·lbf
No. 1 floor sfift gear shifting rod x Shift lever		13	130	9
Shift lever set bolt		8.3	85	73 in.·lbf
Shift control lever		13	130	9
Shift lever guide housing x Shift lever plate		4.9	50	43 in.·lbf
Air cleaner inlet No. 1 set bolt		5.4	55	48 in.·lbf
Air cleaner assembly set bolt		7.5	75	66 in.·lbf
Oil cooler pipe clamp bolt		5.4	55	48 in.·lbf
Oil cooler pipe union nut		44	450	33
Transmission x Engine	14 mm head	37	380	27
	17 mm head	72	730	53
Stater x Transmission		39	400	29
Stater nut		10	100	7
Filler pipe set bolt		13	130	9
Exhaust pipe assembly x Exhaust manifold		43	440	32
Heated oxygen sensor x Exhaust pipe		44	450	33
Torque converter x Drive plate		41	420	30
Propeller shaft x Differential		74	750	54
Propeller shaft x Body		49	500	36

PROPELLER SHAFT

SERVICE DATA

SS132–01

Shaft runout Max.	0.8 mm (0.031 in.)
Joint angle (No. 2 joint)	– 1° 21' ± 30'
Joint angle (No. 3 joint)	2° 18' ± 30'
Center support bearing adjusting washer thickness	2.0 mm (0.079 in.) 4.5 mm (0.177 in.) 6.5 mm (0.256 in.) 9.0 mm (0.354 in.) 11.0 mm (0.433 in.) 13.5 mm (0.531 in.)

SS133–01

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Propeller shaft x Differential		74	750	54
Propeller shaft x Intermediate shaft		74	750	54
Intermediate shaft x Center support bearing x Universal joint flange	1st	181	1,850	134
	2nd	Loosen nut		
	3rd	69	700	51
Center support bearing x Body		49	500	36
Exhaust pipe assembly x Exhaust manifold		43	440	32
Heated oxygen sensor x Exhaust pipe assembly		44	450	33

SUSPENSION AND AXLE

SERVICE DATA

SS0FD–03

Cold tire inflation pressure (Europe)	Up to 4 passengers		
	Tire size		
	215/45ZR17	Front*1	250 kPa (2.5 kgf/cm^2, 36 psi)
		Rear*1	260 kPa (2.6 kgf/cm^2, 38 psi)
		Front*2	240 kPa (2.4 kgf/cm^2, 35 psi)
		Rear*2	240 kPa (2.4 kgf/cm^2, 35 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
	205/55R16 89V	Front*1	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*1	240 kPa (2.4 kgf/cm^2, 35 psi)
		Front*2	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*2	230 kPa (2.3 kgf/cm^2, 33 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
	5 passengers		
	Tire size		
	215/45ZR17	Front*1	260 kPa (2.6 kgf/cm^2, 38 psi)
		Rear*1	340 kPa (3.4 kgf/cm^2, 49 psi)
		Front*2	250 kPa (2.5 kgf/cm^2, 36 psi)
		Rear*2	280 kPa (2.8 kgf/cm^2, 41 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	240 kPa (2.4 kgf/cm^2, 35 psi)
	205/55R16 89V	Front*1	240 kPa (2.4 kgf/cm^2, 35 psi)
		Rear*1	310 kPa (3.1 kgf/cm^2, 45 psi)
		Front*2	240 kPa (2.4 kgf/cm^2, 35 psi)
		Rear*2	270 kPa (2.7 kgf/cm^2, 39 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
Cold tire inflation pressure (Others)	Up to 4 passengers		
	Tire size		
	215/45ZR17	Front*4	280 kPa (2.8 kgf/cm^2, 41 psi)
		Rear*4	280 kPa (2.8 kgf/cm^2, 41 psi)
		Front*5	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*5	230 kPa (2.3 kgf/cm^2, 33 psi)
	205/55R16 89V	Front*4	270 kPa (2.7 kgf/cm^2, 39 psi)
		Rear*4	270 kPa (2.7 kgf/cm^2, 39 psi)
		Front*5	220 kPa (2.2 kgf/cm^2, 32 psi)
		Rear*5	220 kPa (2.2 kgf/cm^2, 32 psi)

Cold tire inflation pressure (Others)	5 passengers		
	Tire size		
	215/45ZR17	Front*4	290 kPa (2.9 kgf/cm^2, 42 psi)
		Rear*4	320 kPa (3.2 kgf/cm^2, 46 psi)
		Front*5	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*5	240 kPa (2.4 kgf/cm^2, 35 psi)
	205/55R16 89V	Front*4	280 kPa (2.8 kgf/cm^2, 41 psi)
		Rear*4	310 kPa (3.1 kgf/cm^2, 45 psi)
		Front*5	220 kPa (2.2 kgf/cm^2, 32 psi)
		Rear*5	220 kPa (2.2 kgf/cm^2, 32 psi)
Front wheel alignment	Vehicle height	Front: B*7 – A*6	66 mm (2.60 in.)
		Rear: C*8 – D*9	66 mm (2.60 in.)
	Camber		–0°21' ± 30' (–0.35° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Caster		5°46' ± 30' (5.77° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Steering axis inclination		9°16' ± 30' (9.27° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Toe–in (total)		0°06' ± 12' (0.1° ± 0.2°, 1 ± 2 mm, 0.04 ± 0.08 in.)
		Rack end length difference	1.5 mm (0.059 in.) or less
	Wheel angle	Inside wheel	41°02' (39°02' – 42°02') 41.03° (39.03° – 42.03°)
		Outside wheel: Reference	33°30' 33.5°
Rear wheel alignment	Camber		–0°23' ± 30' (–0.38° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Toe–in (total)		0°12' ± 12' (0.2° ± 0.2°, 2 ± 2 mm, 0.08 ± 0.08 in.)
		Right and left length difference	4.0 mm (0.157 in.) or less
Front axle	Wheel bearing backlash	Maximum	0.05 mm (0.0020 in.)
	Axle hub deviation	Maximum	0.05 mm (0.0020 in.)
Front suspension	Upper ball joint turning torque		1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.·lbf)
	Lower ball joint excessive play	Maximum	0.9 mm (0.035 in.)
	Lower ball joint turning torque		0.5 – 3.0 N·m (5 – 30 kgf·cm, 0.4 – 26 in.·lbf)
	Stabilizer bar link ball joint turning torque		0.05 – 1.9 N·m (0.5 – 20 kgf·cm, 0.4 – 16 in.·lbf)
Rear axle	Wheel bearing backlash	Maximum	0.05 mm (0.0020 in.)
	Axle hub deviation	Maximum	0.07 mm (0.0028 in.)

*1: For driving at 210 km/h (131 mph) or over
*2: For driving at 160 km/h (100 mph) to 210 km/h (131 mph)
*3: For driving under 160 km/h (100 mph)
*4: For driving at 140 km/h (88 mph) or over
*5: For driving under 140 km/h (88 mph)
*6: Ground clearance of the front No .1 lower suspension arm mounting bolt center.
*7: Ground clearance of the front wheel center.
*8: Ground clearance of the rear wheel center.
*9: Ground clearance of the No. 2 lower suspension arm mounting bolt (Suspension member side) tail center.

Rear drive shaft	Drive shaft standard length Europe, Taiwan, Australia (M/T), New Zealand (M/T) Hong Kong (M/T), Thai Land (M/T)	RH: 604.3 ± 5.0 mm (23.791 ± 0.197 in.) LH: 558.3 ± 5.0 mm (21.980 ± 0.197 in.)
	Drive shaft standard length Others	RH: 603.3 ± 5.0 mm (23.752 ± 0.197 in.) LH: 558.3 ± 5.0 mm (21.980 ± 0.197 in.)
Rear suspension	Upper ball joint turning torque	1.0 – 2.9 N·m (10 – 30 kgf·cm, 9 – 26 in.·lbf)
	Toe control link ball joint turning torque	1.0 – 2.5 N·m (10 – 25 kgf·cm, 9 – 22 in.·lbf)
	Stabilizer bar link ball joint turning torque	0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 9.0 in.·lbf)
Rear differential	Companion flange vertical runout Maximum	0.09 mm (0.0035 in.)
	Companion flange lateral runout Maximum	0.09 mm (0.0035 in.)
	Ring gear runout Maximum	0.07 mm (0.0028 in.)
	Ring gear backlash Maximum	0.13 – 0.18 mm (0.0051 – 0.0071 in.)
	Drive pinion bearing (at starting) New bearing Reused bearing	1.4 – 2.0 N·m (14 – 20 kgf·cm, 12.4 – 17.7 in.·lbf) 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)
	Total preload (at starting)	Drive pinion preload plus 0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)
	Side gear backlash (2 pinion differential)	0.05 – 0.20 mm (0.0020 – 0.0079 in.)
	Differential case runout Maximum	0.07 mm (0.0028 in.)
	Pinion gear backlash	0.05 – 0.20 mm (0.0020 ± 0.0079 in.)
	Side gear shaft oil seal drive in depth	0.50 ± 0.45 mm (0.0200 ± 0.0177 in.)
	Front oil seal drive in depth	2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)
	Right and left side gear shafts standard distance Europe, Taiwan, Australia (M/T), New Zealand (M/T) Hong Kong (M/T), Thai Land (M/T)	2 pinion differential: 244.74 (9.6354 in.) or less LSD: 244.30 (9.6181 in.) or less
	Right and left side gear shafts standard distance Others	246.74 (9.1742 in.) or less
	Pinion gear backlash adjusting thrust washer	1.0 mm (0.039 in.) 1.1 mm (0.043 in.) 1.2 mm (0.047 in.) 1.3 mm (0.051 in.)

Rear differential	Side bearing adjusting washer thickness	2.58 mm (0.1016 in.) 2.60 mm (0.1024 in.) 2.62 mm (0.1031 in.) 2.64 mm (0.1039 in.) 2.66 mm (0.1047 in.) 2.68 mm (0.1055 in.) 2.70 mm (0.1063 in.) 2.72 mm (0.1071 in.) 2.74 mm (0.1079 in.) 2.76 mm (0.1087 in.) 2.78 mm (0.1094 in.) 2.80 mm (0.1102 in.) 2.82 mm (0.1110 in.) 2.84 mm (0.1118 in.) 2.86 mm (0.1126 in.) 2.88 mm (0.1134 in.) 2.90 mm (0.1142 in.) 2.92 mm (0.1150 in.) 2.94 mm (0.1157 in.) 2.96 mm (0.1165 in.) 2.98 mm (0.1173 in.) 3.00 mm (0.1181 in.) 3.02 mm (0.1189 in.) 3.04 mm (0.1197 in.) 3.06 mm (0.1205 in.) 3.08 mm (0.1213 in.) 3.10 mm (0.1220 in.) 3.12 mm (0.1228 in.) 3.14 mm (0.1236 in.) 3.16 mm (0.1244 in.) 3.18 mm (0.1252 in.) 3.20 mm (0.1260 in.) 3.22 mm (0.1268 in.) 3.24 mm (0.1276 in.)
	Drive pinion bearing adjusting washer thickness	1.70 mm (0.0669 in.) 1.73 mm (0.0681 in.) 1.76 mm (0.0693 in.) 1.79 mm (0.0704 in.) 1.82 mm (0.0717 in.) 1.85 mm (0.0729 in.) 1.88 mm (0.0740 in.) 1.91 mm (0.0752 in.) 1.94 mm (0.0764 in.) 1.97 mm (0.0776 in.) 2.00 mm (0.0787 in.) 2.03 mm (0.0799 in.) 2.06 mm (0.0811 in.) 2.09 mm (0.0822 in.) 2.12 mm (0.0835 in.) 2.15 mm (0.0847 in.) 2.18 mm (0.0858 in.) 2.21 mm (0.0870 in.) 2.24 mm (0.0882 in.) 2.27 mm (0.0894 in.) 2.30 mm (0.0906 in.) 2.33 mm (0.0918 in.)

SS0FE–03

TORQUE SPECIFICATION

Part tighten	N·m	kgf·cm	ft·lbf
FRONT AXLE			
Hub nut	103	1,050	76
Brake caliper x Steering knuckle	118	1,200	87
ABS speed sensor x Steering knuckle	8.0	82	71 in.·lbf
Steering knuckle x Upper suspension arm	65	660	50
Steering knuckle x Lower ball joint	113	1,150	83
Brake dust cover x Steering knuckle	8.3	85	74 in.·lbf
Tie rod end lock nut	56	570	41
Axle hub lock nut	147	1,500	108
FRONT SUSPENSION			
ABS speed sensor wire harness x Shock absorber	5.0	55	48 in.·lbf
Stabilizer bar x Stabilizer bar link	49	500	36
Shock absorber x Shock absorber bracket	64	650	47
Piston rod x Suspension support	34	350	25
Suspension support x Body	35	360	26
Upper suspension arm x Body	59	600	44
No. 1 lower suspension arm x Front suspension member	184	1,880	136
Steering gear housing bracket x Front suspension member	74	750	55
Front suspension member brace x No. 2 lower suspension arm x Body	119	1,210	88
Front suspension member brace x Body	58	590	43
Front suspension member brace x Front suspension member	58	590	43
Stabilizer bar link x Shock absorber bracket	95	970	70
No. 1 lower suspension arm x No. 2 lower suspension arm	245	2,500	180
No. 1 lower suspension arm x Lower ball joint	123	1,250	91
Shock absorber bracket x No. 1 lower suspension arm	25	250	18
Tie rod end x Lower ball joint	54	550	40
Stabilizer bar bracket x Body	18	180	13

Part tighten		N·m	kgf·cm	ft·lbf
REAR AXLE				
Hub nut		103	1,050	76
Brake caliper x Axle carrier		104	1,065	77
Axle carrier x Upper suspension arm		108	1,100	80
Backing plate x Axle carrier		59	600	43
No.2 lower suspension arm x Axle carrier		110	1,120	81
No.1 lower suspension arm x Axle carrier		75	765	55
Toe control link x Axle carrier		49	500	36
ABS speed sensor x Axle carrier		8.0	82	71 in.·lbf
Parking brake cable x Backing plate		7.8	80	69 in.·lbf
REAR DRIVE SHAFT				
Drive shaft x Axle hub		289	2,950	213
Drive shaft x Differential side gear shaft		56	570	41
REAR DIFFERENTIAL				
Differential drain plug		49	500	39
Differential filler plug		49	500	39
Differential mounting bolt	Front	95	970	70
	Rear	142	1,450	105
Ring gear set bolt		97	985	71
Companion flange lock nut		See page SA–84		
Differential carrier cover set bolt		47	475	34
Breather plug		21	210	15
Rear suspension member brace set bolt		50	510	37
Center exhaust pipe x Tailpipe		43	440	32
Front exhaust pipe x Exhaust pipe assembly		43	440	32
Heated oxygen sensor		44	450	33
Propeller shaft center support bearing set bolt		49	500	36
Propeller shaft assembly x Rear differential		74	750	54
Differential carrier x Bearing cap		85	870	63
Oil deflector x Differential carrier cover		8.0	82	71 in.·lbf
Rear suspension member x Body		127	1,300	94
Rear suspension member stopper x Body		19	195	14
Rear suspension member lower brace x Body		19	195	14
Parking brake cable x Body		7.8	80	69 in.·lbf
REAR SUSPENSION				
Suspension support x Body	Upper side	64	650	47
	Lower side	18	185	13
Piston rod x Suspension support		28	280	21
Upper suspension arm x Body	Front side	88	900	65
	Rear side	74	755	55
No. 1 lower suspension arm x Body		75	765	55
No. 2 lower suspension arm x Stabilizer bar link		30	305	22
No. 2 lower suspension arm x Shock absorber		110	1,120	81
No. 2 lower suspension arm x Rear suspension member		110	1,120	81
ABS speed sensor wire harness x Toe control link		5.0	51	44 in.·lbf

Part tighten	N·m	kgf·cm	ft·lbf
Toe control link x Rear suspension member	49	500	36
Stabilizer bar x Stabilizer bar link	44	449	33
Stabilizer bar bracket x Suspension member	18	185	13

BRAKE

SERVICE DATA

SS062–10

Brake pedal height (from asphalt sheet)		154.0 – 164.0 mm (6.063 – 6.457 in.)
Brake pedal freeplay		2.0 – 4.5 mm (0.08 – 0.18 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)		More than 99 mm (3.90 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	32.0 mm (1.260 in.)
Front brake disc thickness	Minimum	30.0 mm (1.181 in.)
Front brake disc runout	Maximum	Europe: 0.035 mm (0.0014 in.) Other: 0.05 mm (0.0020 in.)
Rear brake pad thickness	STD	10.5 mm (0.413 in.)
Rear brake pad thickness	Minimum	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	12.0 mm (0.472 in.)
Rear brake disc thickness	Minimum	10.5 mm (0.413 in.)
Rear brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake disc inside diameter	STD	190 mm (7.48 in.)
Rear brake disc inside diameter	Maximum	191 mm (7.52 in.)
Parking brake shoe lining thickness for rear disc brake	STD	2.5 mm (0.098 in.)
Parking brake shoe lining thickness for rear disc brake	Minimum	1.0 mm (0.039 in.)
Parking brake pedal lever at 196 N (20 kgf, 44.1 lbf)		5 – 8 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.)

SS063–10

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Master cylinder x Brake booster	13	130	9
Master cylinder x Piston stopper bolt	10	102	7
Brake line union nut	15	155	11
Brake booster clevis lock nut	25	260	19
Brake booster x Pedal bracket	13	130	9
Bleeder plug (Brake caliper)	11	110	8
Bleeder plug (ABS & TRC actuator)	8.3	85	74 in.·lbf
Brake pedal x pedal bracket	39	400	29
Reservoir set screw	1.8	18	16 in.·lbf
Front brake caliper installation bolt	34	350	25
Front disc brake caliper x Flexible hose	30	310	22
Front disc brake torque plate x Steering knuckle	118	1,200	87
Rear disc brake caliper x Flexible hose	30	310	22
Rear disc brake caliper x Rear axle carrier	104	1,065	77
ABS & TRC Actuator x Actuator Bracket	5.4	55	48 in.·lbf
ABS & TRC Actuator Assembly x Body	19	195	14
Front speed sensor installation bolt	8.0	82	71 in.·lbf
Front speed sensor harness clamp bolt	5.0	51	44 in.·lbf
Rear speed sensor installation bolt	8.0	82	71 in.·lbf
Rear speed sensor harness x Body	5.0	51	44 in.·lbf
Rear speed sensor harness x Toe control link	5.0	51	44 in.·lbf

STEERING

SERVICE DATA

SS0MY–06

DRIVE BELT		
Drive belt deflection	New belt	5.5 – 7.0 mm (0.217 – 0.276 in.)
	Used belt	7.0 – 9.0 mm (0.276 – 0.354 in.)
*Drive belt tension	New belt	441 – 539 N (45 – 55 kgf)
	Used belt	196 – 343 N (20 – 35 kgf)
POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed	Minimum	6,374 kPa (65 kgf/cm^2, 925 psi)
STEERING WHEEL		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering effort at idle speed		4.2 – 5.4 N·m (43 – 55 kgf·cm, 37 – 48 in.lbf)
POWER STEERING VANE PUMP		
Vane pump rotating torque		0.2 N·m (2.5 kgf·cm, 2.2 in.·lbf) or less
Vane pump shaft and front housing bushing oil clearance	STD	0.01 – 0.03 mm (0.0004 – 0.0012 in.)
	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.1 mm (0.319 in.)
Vane plate thickness	Minimum	1.797 mm (0.0707 in.)
Vane plate length	Minimum	14.988 mm (0.5901 in.)
Vane plate and vane pump rotor groove clearance	Maximum	0.03 mm (0.0012 in.)
Vane plate length	Pump rotor and cam ring mark	
	None	14.996 – 14.998 mm (0.59039 – 0.59047 in.)
	1	14.994 – 14.996 mm (0.59032 – 0.59039 in.)
	2	14.992 – 14.994 mm (0.59024 – 0.59032 in.)
	3	14.990 – 14.992 mm (0.59016 – 0.59024 in.)
	4	14.988 – 14.990 mm (0.59008 – 0.59016 in.)
Spring free length	Minimum	36.0 mm (1.417 in.)
POWER STEERING GEAR		
Steering rack runout	Maximum	0.15 mm (0.0059 in.)
Total preload	Turning	1.15 – 1.95 N·m (11.7 – 19.9 kgf·cm, 10.2 – 17.3 in.·lbf)

* For use with belt tension gauge

SS136–01

TORQUE SPECIFICATION

Part tighten		N·m	kgf·cm	ft·lbf
TILT STEERING COLUMN				
Tilt steering shaft		20	210	15
Turn signal bracket set bolt		2.9	30	26 in.·lbf
Column protector set bolt		6.1	62	54 in.·lbf
Column tube support x Column tube		15	150	11
No. 2 intermediate shaft assembly x Main shaft assembly		35	360	26
Steering column assembly set nut		26	260	19
Sliding yoke x No. 2 intermediate shaft assembly		35	360	26
Sliding yoke x Control valve shaft		35	360	26
Steering wheel set nut		35	360	26
Steering wheel pad set screw (Torx screw)		8.8	90	78 in.·lbf
POWER STEERING VANE PUMP				
Pressure port union		69	700	51
Suction port union set bolt		13	130	9
Front bracket set bolt	Upper side	13	130	9
	Lower side	41	420	30
Vane pump pulley set nut		44	450	33
Vane pump assembly set bolt	Upper side	39	400	29
	Lower side	58	590	43
Pressure feed tube x PS vane pump assembly		49	500	36
POWER STEERING GEAR				
Cylinder end stopper		59	600	44
Bearing guide nut		25	250	18
Control valve housing x Rack housing		18	185	13
Rack guide spring cap lock nut		50 (69)	513 (700)	37 (51)
Rack x Rack end		76 (103)	780 (1,050)	56 (76)
Tie rod end lock nut		56	570	41
Turn pressure tube union nut		20 (25)	203 (250)	15 (18)
PS gear assembly set bolt		74	750	54
Return tube x PS gear assembly		37 (44)	374 (450)	27 (33)
Pressure feed tube x PS gear assembly		42	430	31
Pressure feed tube clamp set bolt		5.4	55	48 in.·lbf
Front suspension member brace	Bolt A	119	1,210	88
	Bolt B	58	590	43
Sliding yoke x Control valve shaft		35	360	26
Tie rod end x Steering knuckle		54	550	40
Front brake caliper x Steering knuckle		118	1,200	87
Steering wheel set nut		35	360	26

( ): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

SS061–25

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	35	360	26
Steering wheel pad	8.8	90	78 in.·lbf
Front passenger airbag assembly x Instrument panel	5.4	55	48 in.·lbf
Front passenger airbag assembly x Instrument panel reinforcement	20	205	15
Front seat installation bolt	37	375	27
Seatback assembly x Seat cushion assembly	43	440	32
Front seat airbag door x Seat back assembly	4.7	48	42 in.·lbf
Airbag sensor assembly	20	205	15
Front airbag sensor	20	205	15
Side airbag sensor assembly	20	205	15

BODY ELECTRICAL

SERVICE DATA

SS0CN–14

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 voltage
5 – Ground (Constant)	Battery voltage
8 – Ground (Engine Stop)	No voltage
8 – Ground (Engine Running)	Battery voltage
9 – Ground (Constant)	No voltage
9 – Ground (Ground terminal 3)	Battery voltage
11 – Ground (Constant)	No voltage
11 – Ground (Ground terminal 3)	Battery voltage
12 – Ground (Constant)	Battery voltage
14 – Ground (Constant)	No voltage
14 – Ground (Ground terminal 5)	Battery voltage
AUTOMATIC LIGHT CONTROL SENSOR	
(Connector disconnected)	
4 – Ground (Ignition switch position LOCK or ACC)	No voltage
4 – Ground (Ignition switch position ON)	5.2 – 9.0 V
(Connector connected)	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON)	9.5 V or more
TURN SIGNAL FLASHER	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON)	Battery voltage
4 – Ground (Constant)	Battery voltage
LIGHT FAILURE RELAY (Wire Harness Side)	
3 – Ground (Taillight or Headlight OFF)	No voltage
3 – Ground (Taillight or Headlight ON)	Battery voltage
8 – Ground (Ignition switch position LOCK or ACC)	No voltage
8 – Ground (Ignition switch position ON)	Battery voltage
4 – Ground (Ignition switch position LOCK or ACC)	No voltage
4 – Ground (Ignition switch position ON)	Battery voltage
7 – Ground (Stop light switch position OFF)	No voltage
7 – Ground (Stop light switch position ON)	Battery voltage
SPEEDOMETER (ON–VEHICLE)	
Standard indication (mph) Europe Models	Allowable range (mph)
20	20 – 24.5
40	40 – 46.5
60	60 – 68.5
80	80 – 90.5
100	100 – 112.5
Standard indication (km/h) Europe Models	Allowable range (km/h)
20	20 – 26
40	40 – 48

60	60 – 70
80	80 – 92
100	100 – 114
120	120 – 136
140	140 – 158
160	160 – 180
Standard indication (km/h) Australia	Allowable range (km/h)
40	36 – 44
60	54 – 66
80	72 – 88
100	90 – 110
120	108 – 132
140	126 – 154
160	144 – 176
Speedometer	Resistance (Ω)
A – B	160 Ω
C – D	160 Ω
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
Tachometer	Resistance (Ω)
A – B	160 Ω
C – D	160 Ω
FUEL RECEIVER GAUGE	Resistance (Ω)
A – B	160 Ω
C – D	160 Ω
FUEL MAIN SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 22.9 (0.90) ± 3 (0.12)	Approx. 2.0 ± 1.0
1/2: Approx. 58.3 (2.30) ± 3 (0.12)	Approx. 26.7 ± 3.0
E: Approx. 133.6 (5.26) ± 3 (0.12)	Approx. 55.0 ± 1.0
FUEL SUB SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 29.1 (1.15) ± 3 (0.12)	Approx. 2.0 ± 1.0
1/2: Approx. 65.8 (2.59) ± 3 (0.12)	Approx. 33.0 ± 3.0
E: Approx. 169.5 (6.67) ± 3 (0.12)	Approx. 61.3 ± 1.0
WATER TEMPERATURE RECEIVER GAUGE (Resistance)	Resistance (Ω)
A – B	160 Ω
C – D	160 Ω

VOLTAGE GAUGE (Resistance)	Resistance (Ω)
A – B	160
C – D	160
SPECIFIC FUEL CONSUMPTION GAUGE (Resistance)	Resistance (Ω)
A – B	160
C – D	160
WIRELESS DOOR LOCK CONTROL RECEIVER	
(Connector disconnected)	
5 – Ground (Constant)	Battery voltage
(Connector connected)	
3 – Ground (All door closed, Transmitter OFF → ON)	0 – 6 V → ON
3 – Ground (All door closed, Transmitter OFF → ON)	0 – 6 V → ON
POWER AMPLIFIER	
B1 – Ground (Constant)	Battery voltage
A16 – Ground (Ignition switch position LOCK)	No voltage
A16 – Ground (Ignition switch position ACC or ON)	Battery voltage
RADIO RECEIVER	
A4 – Ground (Constant)	Battery voltage
A3 – Ground (Ignition switch position LOCK)	No voltage
A3 – Ground (Ignition switch position ACC or ON)	Battery voltage

BODY

TORQUE SPECIFICATION

SS137–01

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER			
Front bumper cover x Front fender panel	5.4	55	48 in.·lbf
Front bumper mounting bracket x Front bumper reinforcement	5.4	55	48 in.·lbf
REAR BUMPER			
Rear bumper cover x Side mounting bracket	5.4	55	48 in.·lbf
Rear bumper cover x Rear fender panel	5.4	55	48 in.·lbf
Rear bumper cover x Body Nut	8.3	85	74 in.·lbf
HOOD			
Hood x Hood hinge	13	133	10
Hood lock x Body	8.0	82	71 in.·lbf
FRONT DOOR			
Outside handle x Key cylinder	5.0	51	44 in.·lbf
Outside handle x Door panel	5.5	56	49 in.·lbf
Door lock x Door panel	5.5	56	49 in.·lbf
Window regulator x Door panel	11	112	8
Door glass x Window regulator	8.0	82	71 in.·lbf
Outside rear view mirror x Door panel	8.0	82	71 in.·lbf
Front No.2 speaker x Body	8.0	82	71 in.·lbf
Door hinge x Body	26	265	19
Door hinge x Door panel	27	275	20
Door check x Door panel	5.0	51	44 in.·lbf
REAR DOOR			
Outside handle x Door panel	5.5	56	49 in.·lbf
Door lock x Door panel	5.5	56	49 in.·lbf
Window regulator x Door panel	11	112	8
Door hinge x Body	26	265	19
Door hinge x Door panel	27	275	20
Door check x Door panel	5.5	56	49 in.·lbf
LUGGAGE COMPARTMENT DOOR AND HINGE			
Door lock striker x Body	5.5	56	49 in.·lbf
Luggage compartment door x Hinge	7.0	71	62 in.·lbf
Luggage compartment door lock x Body	5.5	56	49 in.·lbf
Luggage compartment door hinge x Body	5.5	56	49 in.·lbf
FRONT WIPER AND WASHER			
Wiper motor x Wiper link	5.4	55	48 in.·lbf
Wiper link assembly x Body	5.5	56	49 in.·lbf
Wiper arm x Wiper link assembly	26	265	19
SLIDING ROOF			
Sliding roof housing x Body	5.5	56	49 in.·lbf
Sliding roof bracket x Body	5.5	56	49 in.·lbf
Sliding roof bracket x Sliding roof housing	5.5	56	49 in.·lbf
Sliding roof glass assembly x Drive cable	5.5	56	49 in.·lbf

INSTRUMENT PANEL			
Front passenger airbag assembly x Reinforcement	20	205	15
Front passenger airbag assembly x Instrument panel	5.5	56	49 in.·lbf
ROOF HEADLINING			
Inner rear view mirror x Body	5.5	56	49 in.·lbf
FRONT SEAT			
Seatback assembly x Seat track	43	440	32
Seat cushion assembly x Seat track	21	210	15
Seat track x Body	38	387	28
REAR SEAT			
Seatback assembly x Body	7.8	80	69 in.·lbf
SEAT BELT			
Front seat outer belt:			
Shoulder anchor x Adjuster anchor	41	420	30
Floor anchor x Body	41	420	30
Retractor x Body Upper bolt	7.8	80	69 in.·lbf
Lower bolt	41	420	30
Adjustable anchor x Body	41	420	30
Front seat inner belt:			
Inner belt x Seat track	41	420	30
Rear seat outer belt:			
Shoulder anchor x Body	41	420	30
Floor anchor x Body	41	420	30
Rear seat inner belt:			
Inner belt x Body	41	420	30
Rear seat center belt:			
Shoulder anchor x Body	41	420	30
Floor anchor x Body	41	420	30

AIR CONDITIONING

SERVICE DATA

SS0F5–03

Refrigerant volume		600 ± 50 g (21.16 ± 1.76 oz.)
Idle Speed	Magnetic clutch not engaged	650 ± 50 rpm
	Magnetic clutch engaged	650 ± 50 rpm
Magnetic clutch clearance		0.5 ± 0.15 mm (0.020 ± 0.0059 in.)
Drive belt deflection (apply load of 98N)	New belt	7.0 – 8.0 mm (0.28 – 0.31 in.)
	Used belt	9.0 – 10.0 mm (0.35 – 0.39 in.)
*Drive belt tension	New belt	520 – 755 N (53 – 77 kgf)
	Used belt	294 – 392 N (30 – 40 kgf)

*:For use with belt tension gauge

SS0F6–03

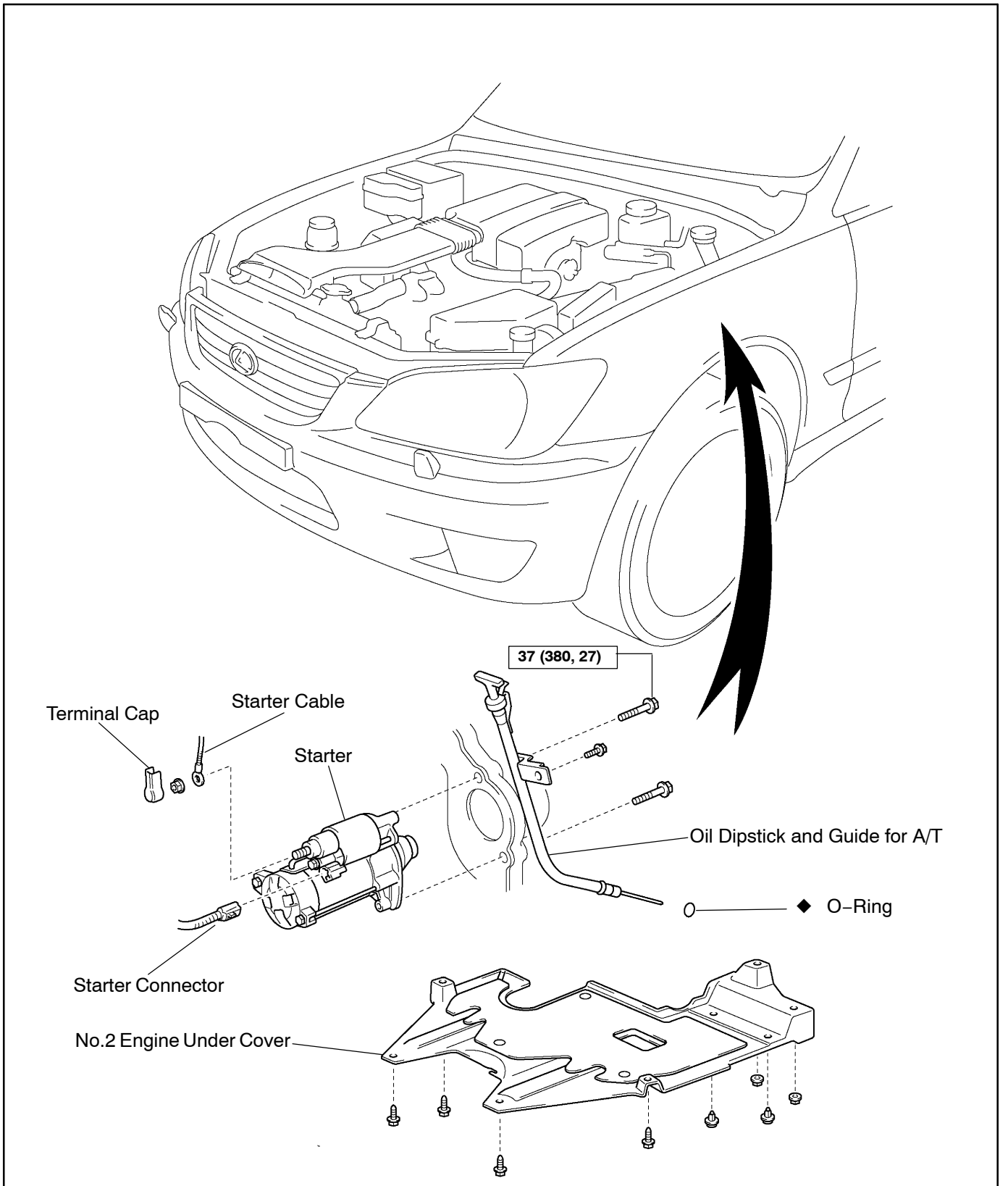
TORQUE SPECIFICATION

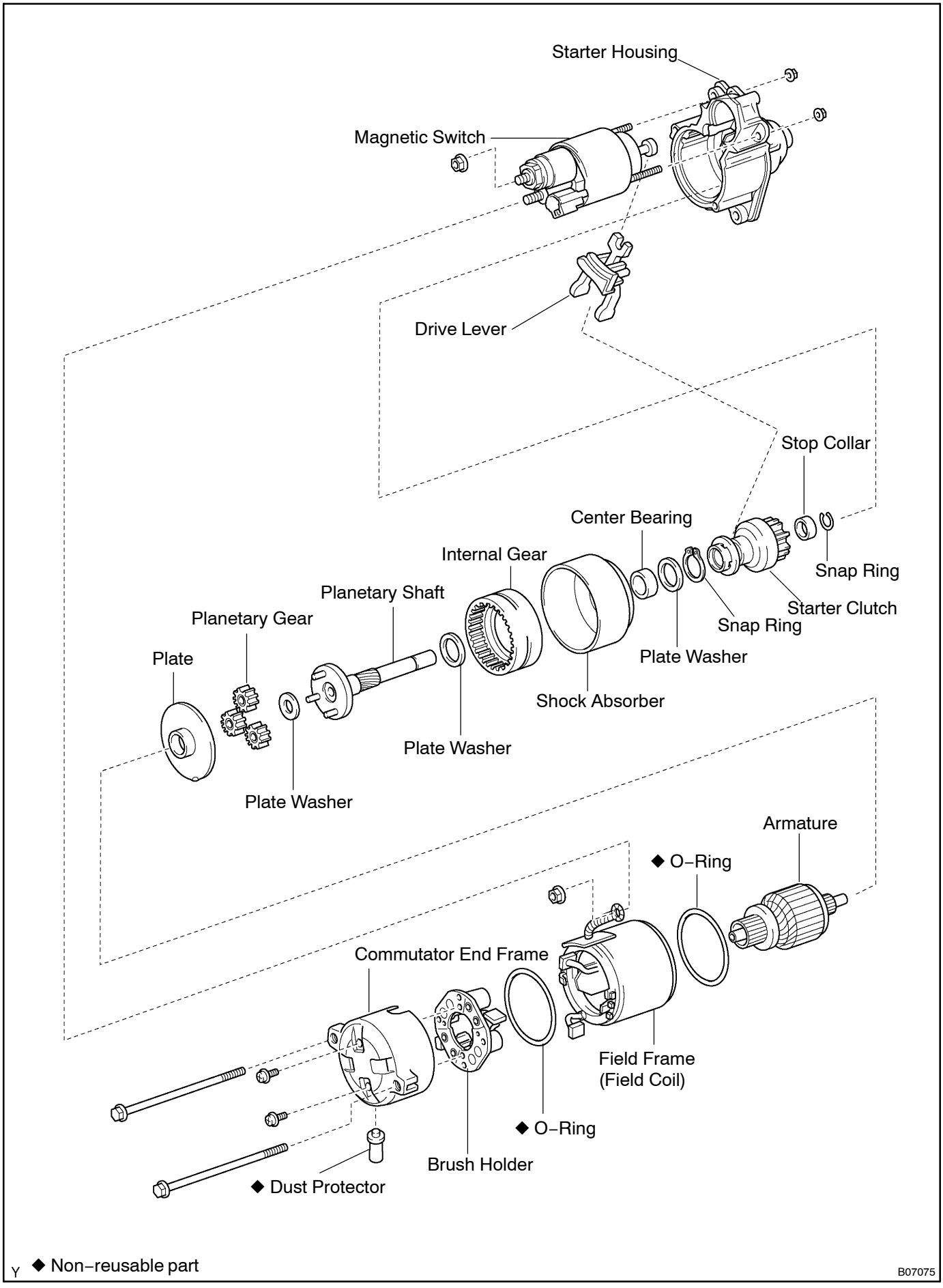
Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Compressor x Engine	24.5	250	18
Pressure plate x Compressor	13.2	135	9
A/C unit x Liquid and suction tube	10	100	7
Evaporator x Tube and accessory	4.1	42	36 in.·lbf
Expansion valve x Tube and accessory	4.1	42	36 in.·lbf
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	10	100	7
Pressure switch x Liquid tube	10	100	7
Water temperature switch x Radiator	7.4	75	65 in.·lbf
Suction line	10	100	7
Cap	12.3	125	9

STARTER

COMPONENTS

ST0GC–01




Starter Housing
Magnetic Switch
Drive Lever
Stop Collar
Center Bearing
Internal Gear
Snap Ring
Planetary Shaft
Starter Clutch
Planetary Gear
Snap Ring
Plate
Plate Washer
Shock Absorber
Plate Washer
Plate Washer
Armature
◆ O–Ring
Commutator End Frame
Field Frame
(Field Coil)
◆ O–Ring
Brush Holder
◆ Dust Protector
◆ Non–reusable part
B07075

ST0GD–01

REMOVAL

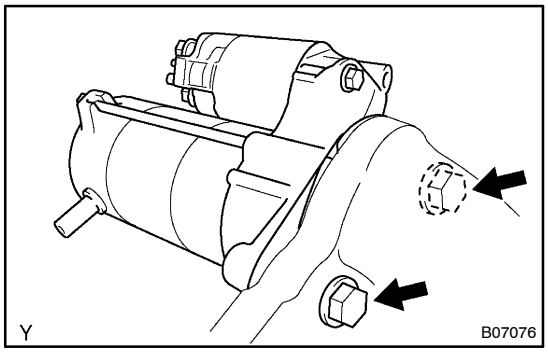
1. REMOVE NO.2 ENGINE UNDER COVER

2. REMOVE OIL DIPSTICK AND GUIDE FOR A/T

3. REMOVE STARTER

(a) Remove the terminal cap and nut, and disconnect the starter cable.

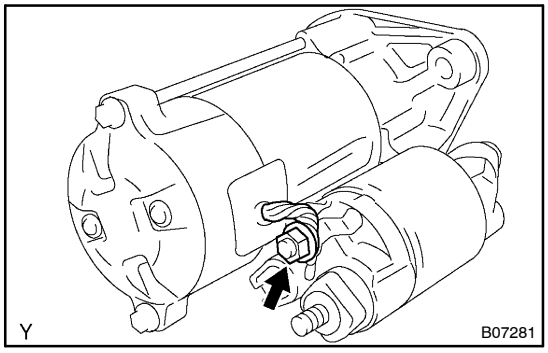
(b) Disconnect the starter connector.



(c) Remove the 2 bolts and starter.

ST06O–04

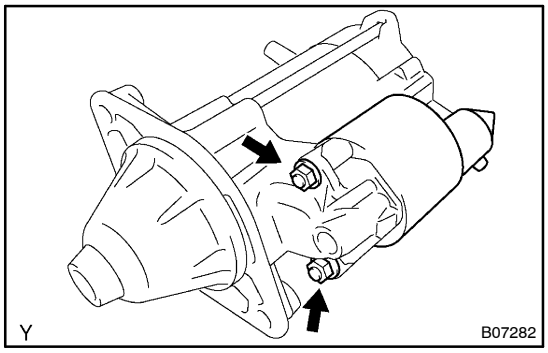
DISASSEMBLY



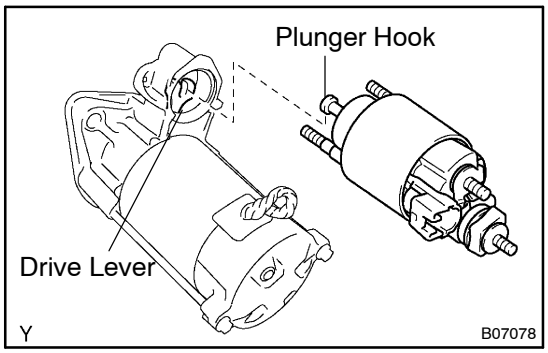
1. REMOVE DUST PROTECTOR

2. REMOVE MAGNETIC SWITCH

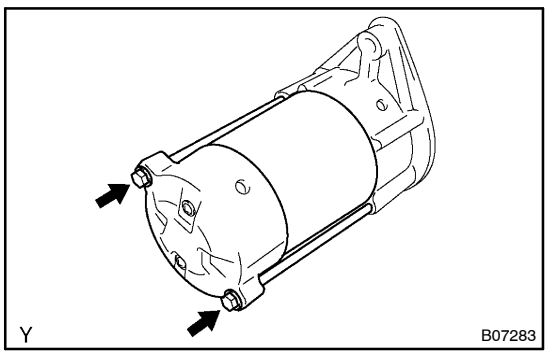
(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.



(b) Remove the 2 nuts holding the magnetic switch to the starter housing.



(c) Pull the magnetic switch, and disconnect the plunger hook from the drive lever and remove the magnetic switch.

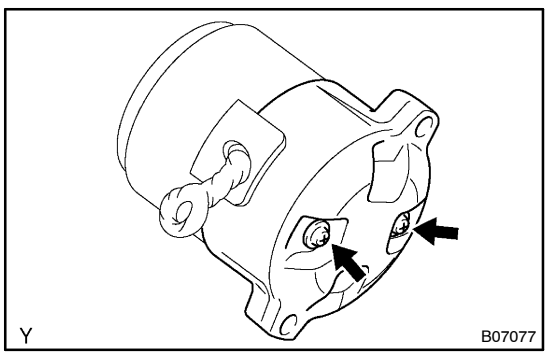


3. REMOVE FIELD FRAME, ARMATURE, STARTER CLUTCH, SHOCK ABSORBER AND DRIVE LEVER

(a) Remove the 2 through bolts.

(b) Remove the field frame with the armature, the starter clutch, shock absorber assembly and drive lever.

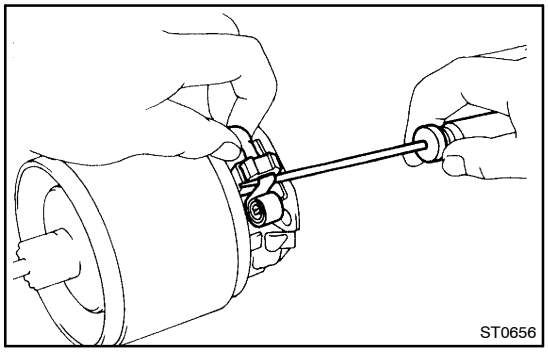
(c) Remove the O–ring from the field frame.



4. REMOVE COMMUTATOR END FRAME

(a) Remove the 2 screws, and commutator end frame.

(b) Remove the O–ring from the field frame.



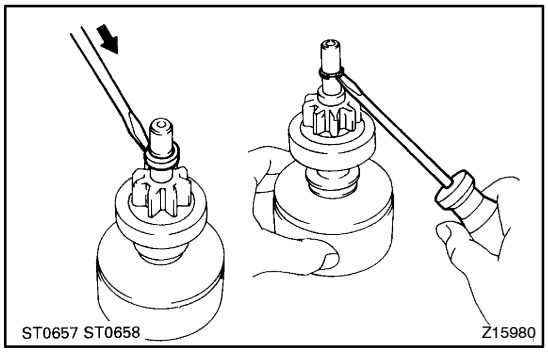
5. REMOVE BRUSH HOLDER

Using a screwdriver, hold the spring back and disconnect the brush holder disconnect the 4 brushes, and remove the brush holder.

6. REMOVE ARMATURE FROM FIELD FRAME

7. REMOVE PLANETARY GEARS

Remove the plate, 3 planetary gears and plate washer from the shock absorber.

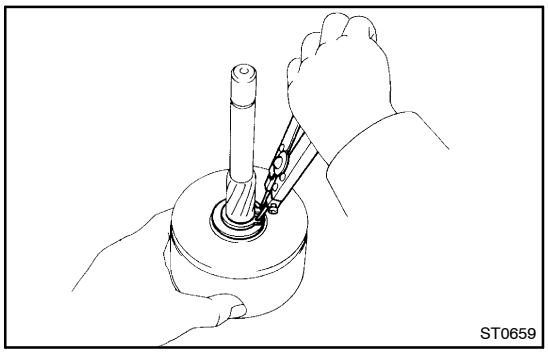


8. REMOVE STARTER CLUTCH

(a) Using a screwdriver, tap in the stop collar towards the starter clutch.

(b) Using a screwdriver, pry off the snap ring.

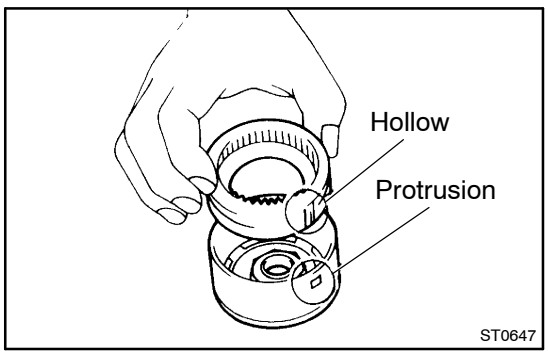
(c) Remove the stop collar and starter clutch from the planetary shaft.



9. REMOVE PLANETARY SHAFT AND INTERNAL GEAR

(a) Using snap ring pliers, remove the snap ring and plate washer.

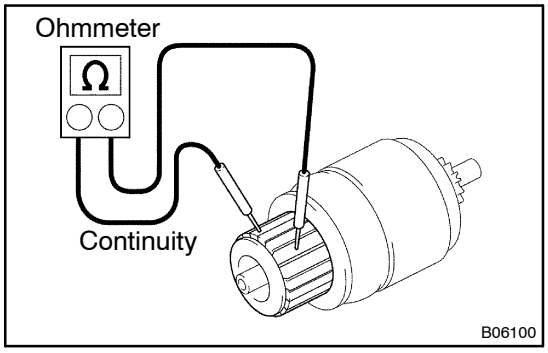
(b) Remove the planetary shaft and plate washer.



(c) Align the hollow of the internal gear with the protrusion inside the shock absorber, and remove the internal gear.

ST06U–05

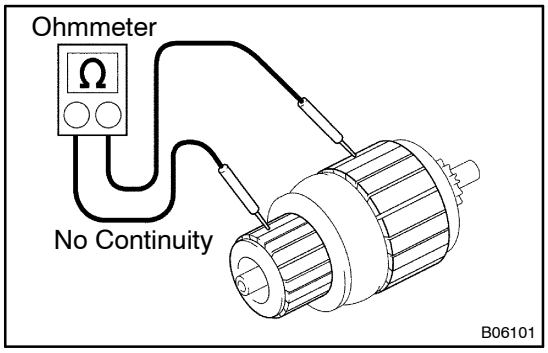
INSPECTION



1. INSPECT ARMATURE COIL

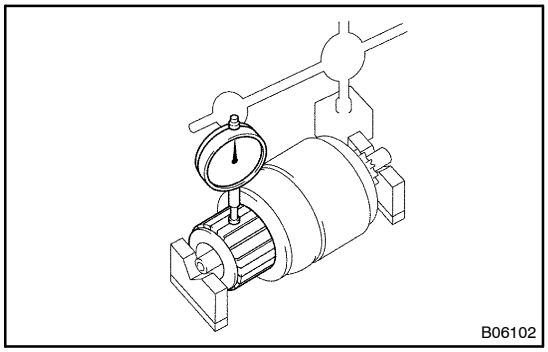
(a) Check the commutator for open circuit.
Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segments, replace the armature.



(b) Check the 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.



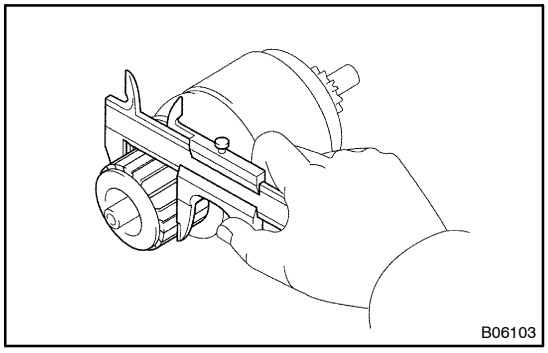
2. INSPECT COMMUTATOR

(a) Check the commutator for the dirty and burnt surface.

If the surface is dirty or burnt, correct with sandpaper (No.400) or a lathe.

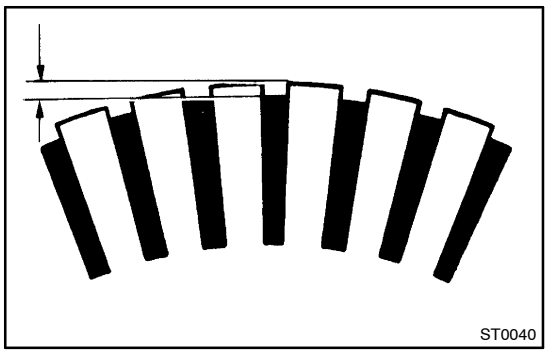
(b) Check for the commutator circuit runout.
(1) Place the commutator on V–blocks.
(2) Using a dial indicator, measure the circle runout.
Maximum circle runout: 0.05 mm (0.0020 in.)

If the circle runout is greater than maximum, correct it on a lathe.



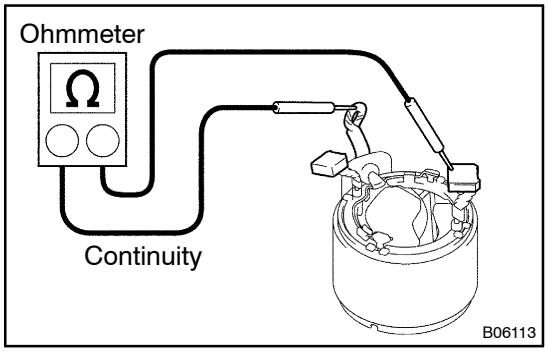
(c) Using vernier calipers, measure the commutator diameter.
Standard diameter: 28.0 mm (1.102 in.)
Minimum diameter: 27.0 mm (1.063 in.)

If the diameter is less than minimum, replace the armature.



(d) 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.

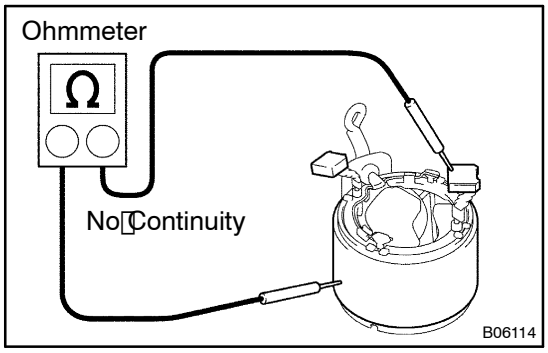


3. INSPECT FIELD COIL (FIELD FRAME)

(a) Check the field coil for open circuit.

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

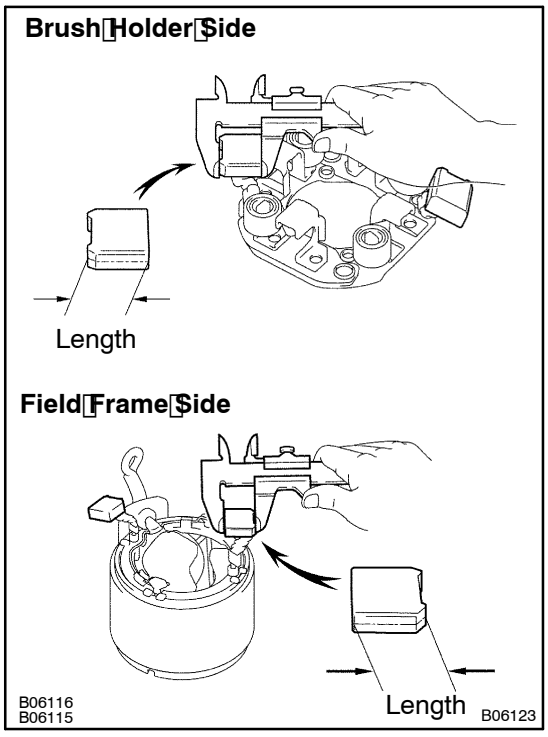
If there is no continuity, replace the field frame.



(b) Check the 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.



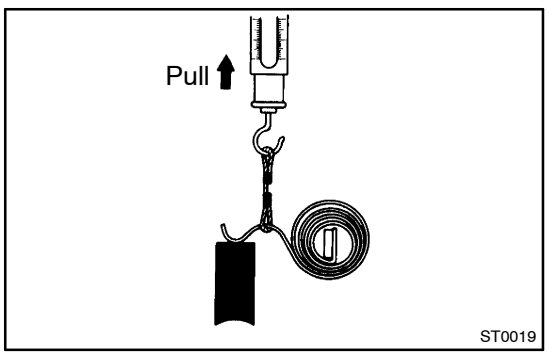
4. INSPECT BRUSH LENGTH

Using vernier calipers, measure the brush length.

Standard length: 14.0 mm (0.551 in.)

Minimum length: 9.0 mm (0.354 in.)

If the length is less than minimum, replace the brush (field frame side) (see page ST–10) or brush holder, and dress with an emery cloth.



5. INSPECT BRUSH SPRINGS

Check the brush spring load. Take the pull scale reading the instant the brush spring separates from the brush.

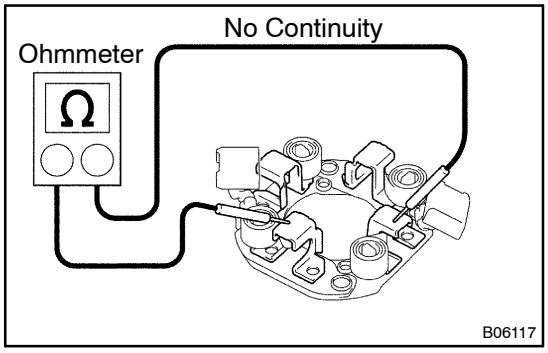
Standard spring installed load:

13.7 – 17.6 N (1.4 – 1.8 kgf, 3.1 – 4.0 lbf)

Minimum spring installed load:

8.8 N (0.9 kgf, 2.0 lbf)

If the installed load is less than minimum, replace the brush springs.



6. INSPECT BRUSH HOLDER

Check the brush holder insulator.

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

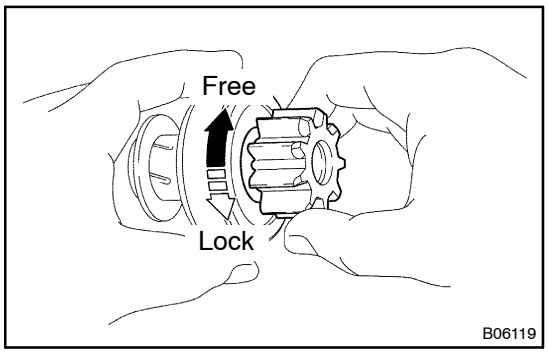
If there is continuity, repair or replace the brush holder.

7. INSPECT CLUTCH AND GEAR

(a) Check the gear teeth on the planetary gear, internal gear and starter clutch for wear or damage.

If the gear is damaged, replace it.

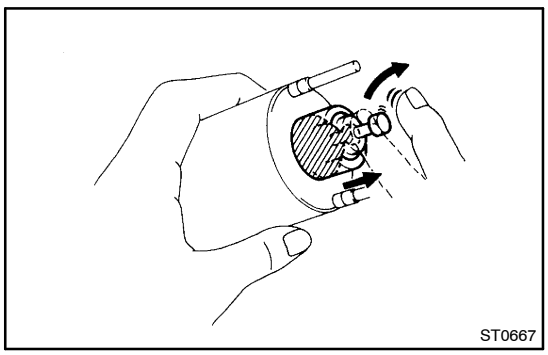
If damaged, replace the gear or clutch assembly. If damaged, also check the drive plate ring gear for wear or damage.



(b) Check the starter clutch.

Rotate the clutch pinion gear clockwise and check that it turns freely. Try to rotate the clutch pinion gear counterclockwise and check that it locks.

If necessary, replace the starter clutch.

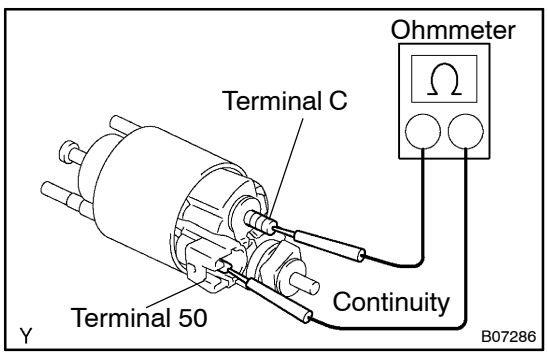


8. INSPECT MAGNETIC SWITCH

(a) Check the plunger.

Push in the plunger and check that it returns quickly to its original position.

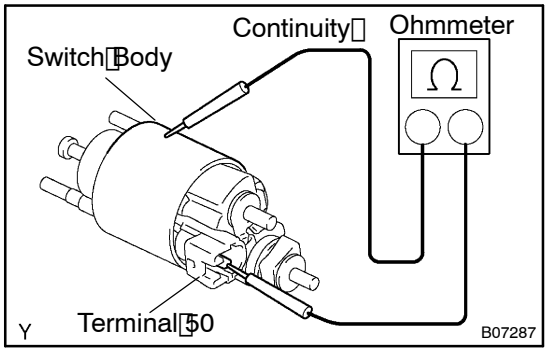
If necessary, replace the magnetic switch.



(b) Check the pull–in coil for open circuit.

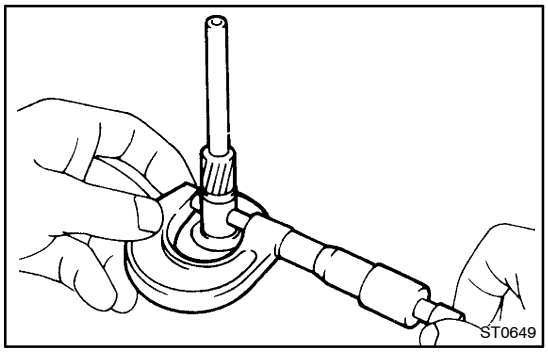
Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, replace the magnetic switch.



(c) Check the hold–in coil for open circuit.
Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

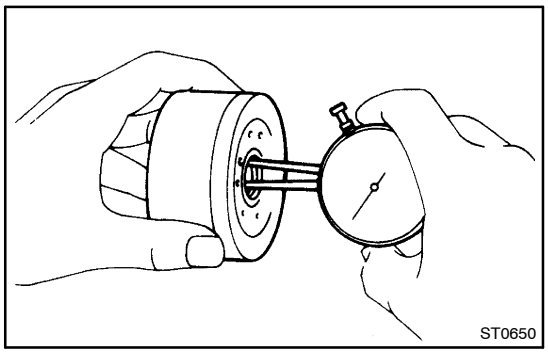
If there is no continuity, replace the magnetic switch.



9. INSPECT PLANETARY SHAFT AND CENTER BEARING

(a) Using a micrometer, measure the outer diameter of the surface in contact with the center bearing of the planetary shaft.

Planetary shaft outer diameter:
14.980 – 15.000 mm (0.5898 – 0.5906 in.)



(b) Using a caliper gauge, measure the inside diameter of the center bearing.

Center bearing inside diameter:
15.008 – 15.050 mm (0.5909 – 0.5925 in.)

(c) Subtract the planetary shaft diameter from the bearing inside diameter measurement.

Standard center bearing oil clearance:
0.01 – 0.06 mm (0.0004 – 0.0024 in.)
Maximum center bearing oil clearance:
0.2 mm (0.008 in.)

If the clearance is greater than maximum, replace the planetary shaft and center bearing. (See page ST–10)

ST06Q–04

REPLACEMENT

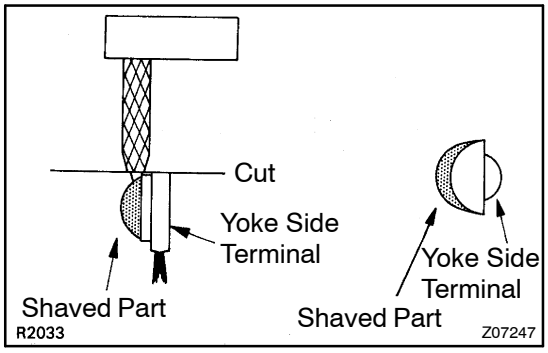
1. REPLACE BRUSHES (FIELD FRAME SIDE)

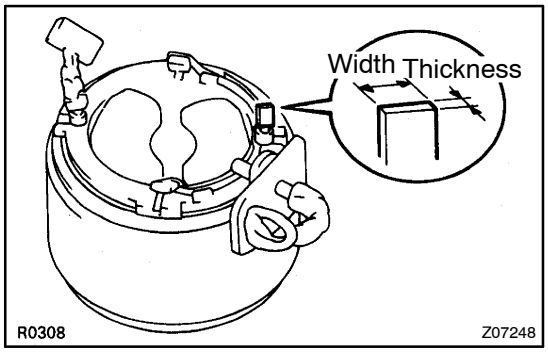
HINT:

Only the 2 brushes of the positive (+) side (field frame side) are exchangeable, negative (–) side brush must be changed in the body with the brush holder.

(a) Cut the brush lead wire at the terminal side.

(b) Shave welded mark of the brush lead wire with sandpaper etc., and correct the terminal to the specified.



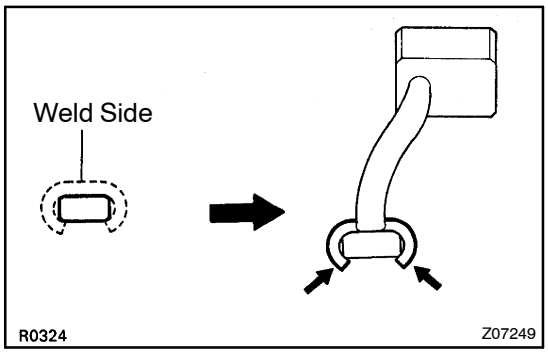


NOTICE:

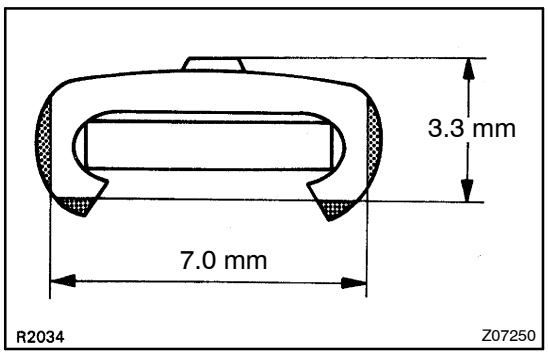
Part to be shaved is so narrow that you should take care not to harm the field coil.

Specified width: 5.0 mm (0.197 in.)

Specified thickness: 1.6 mm (0.063 in.)



(c) Press the plate of the supply brush on the welded side of the terminal lead wire.



(d) Solder the pressed part, and shave to the specified measures with the sandpaper etc.

Specified width: 7.0 mm (0.276 in.)

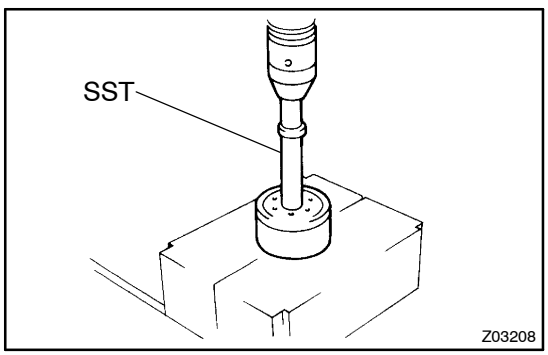
Specified thickness: 3.3 mm (0.130 in.)

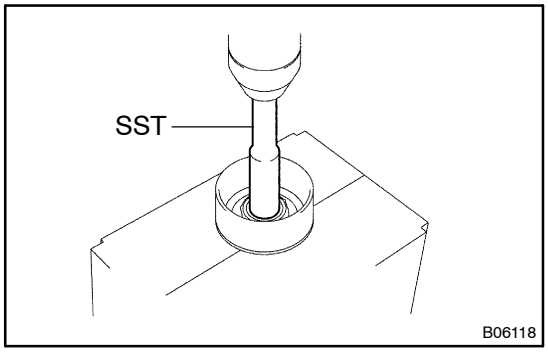
HINT:

- Heat the soldered part well, and flow the solder inside the plate, take care not to flow it into the inside lead wire.
- Take care not to flow the solder into the field.

2. REPLACE CENTER BEARING

(a) Using SST and a press, press out the center bearing.
SST 09221–25026 (09221–00090)





(b) Using SST and a press, press in a new center bearing.
SST 09221–25026 (09221–00071)

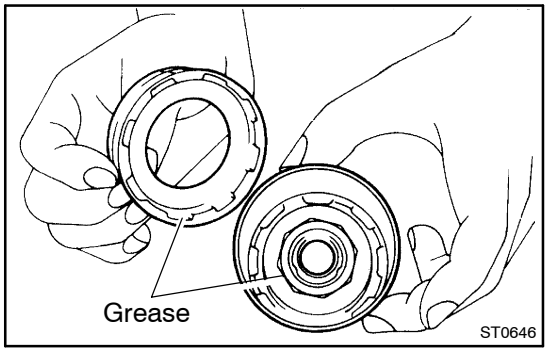
ST06R–04

REASSEMBLY

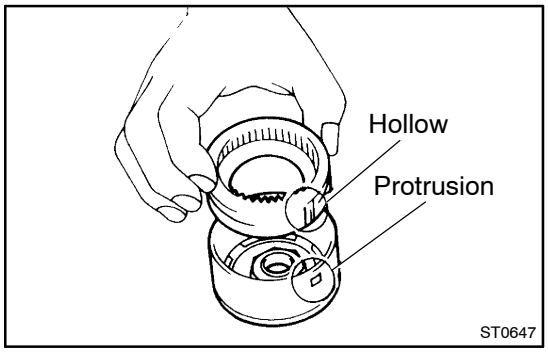
HINT:
Use high temperature–resistant grease to lubricate the bearings and sliding parts when assembling the starter.

1. INSTALL INTERNAL GEAR AND PLANETARY SHAFT

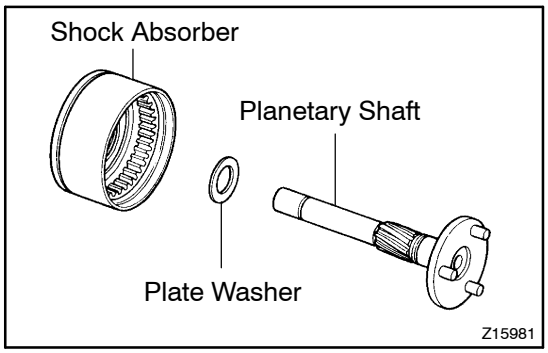
(a) Apply grease to the internal gear touching the sock absorber and planetary gears.



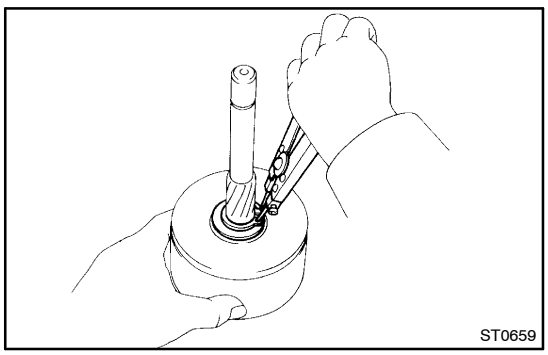
(b) Align the hollow of the internal gear with the protrusion inside the shock absorber.
(c) Insert and turn the internal gear so that it interlocks with the shock absorber.



(d) Apply turbane oil with additives to the center bearing.
(e) Apply grease to the plate washer, and install it to the planetary shaft.
(f) Install the planetary shaft to the shock absorber.

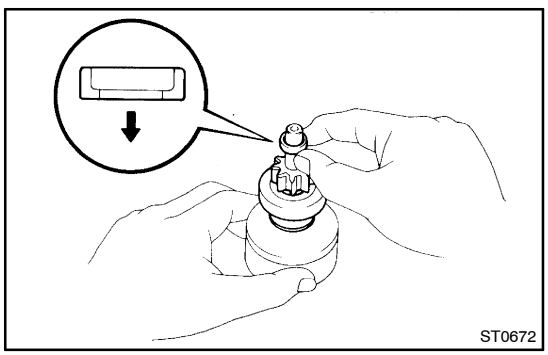


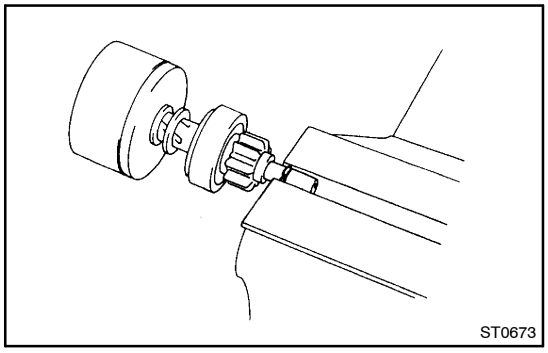
(g) Using snap ring pliers, install the plate washer and snap ring.



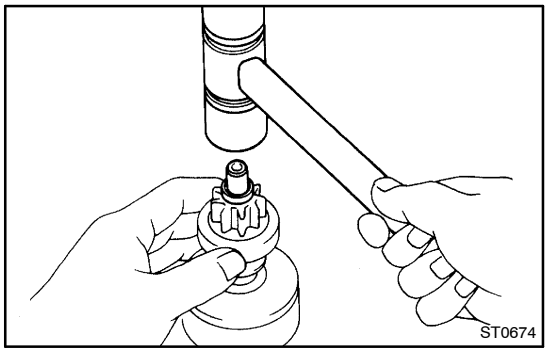
2. INSTALL STARTER CLUTCH

(a) Apply grease to the bushing and spline of the starter clutch and stop collar.
(b) Place the starter clutch and stop collar on the planetary shaft.

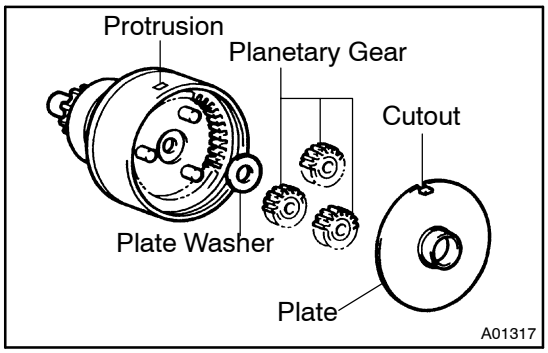




(c) Apply grease to the snap ring, and install it to the planetary shaft groove.
(d) Using a vise, compress the snap ring.

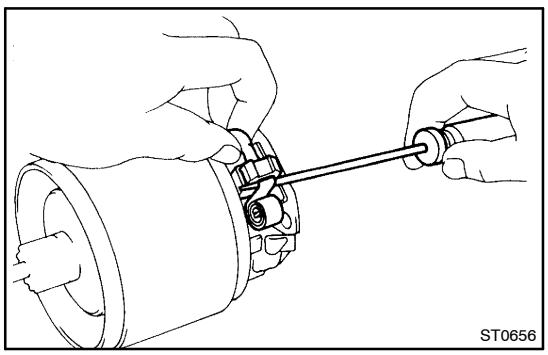


(e) Hold the starter clutch, tap the planetary shaft and install the stop collar onto the snap ring with a plastic–faced hammer.



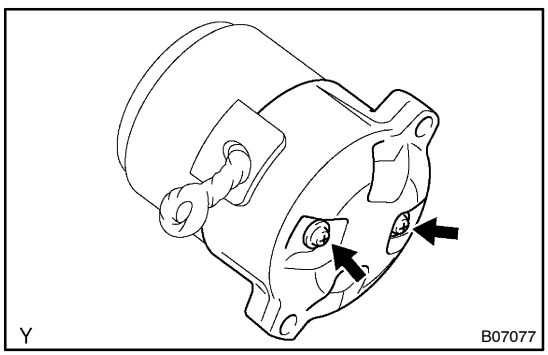
3. INSTALL PLANETARY GEARS
(a) Apply grease to the planetary gears and flange pin parts of the planetary shaft.
(b) Install the plate washer and 3 planetary gears.
(c) Align the cutout of the plate with the protrusion inside the shock absorber, and install the plate.

4. PLACE ARMATURE INTO FIELD FRAME

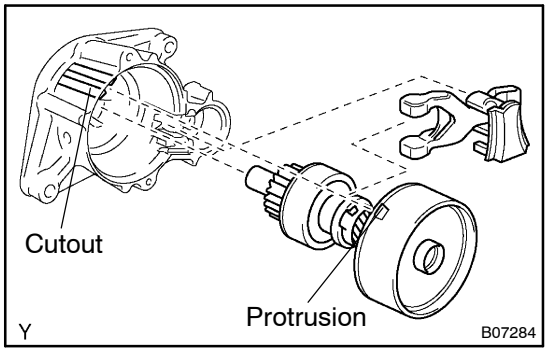


5. INSTALL BRUSH HOLDER
(a) Place the brush holder in position on the armature.
(b) Using a screwdriver, hold the brush spring back, and connect the brush into the brush holder.
Connect the 4 brushes.

NOTICE:
Check that positive (+) lead wires are not grounded.



6. INSTALL COMMUTATOR END FRAME
(a) Install a new O–ring to the groove of the field frame.
(b) Apply turbine oil with additives to the bearing of the end frame.
(c) Install the end frame with the 2 screws.
Torque: 1.5 N·m (15 kgf·cm, 13 in.·lbf)



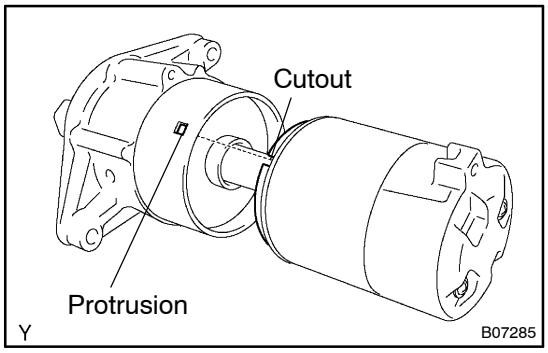
7. INSTALL DRIVE LEVER AND STARTER CLUTCH WITH SHOCK ABSORBER

(a) Apply turbine oil with additives to the bearing of the starter housing.

(b) Apply grease to the drive lever touching the starter pivot part of the drive lever.

(c) Install the drive lever to the starter clutch.

(d) Align the protrusion of the shock absorber with the cutout of the starter housing and install them.



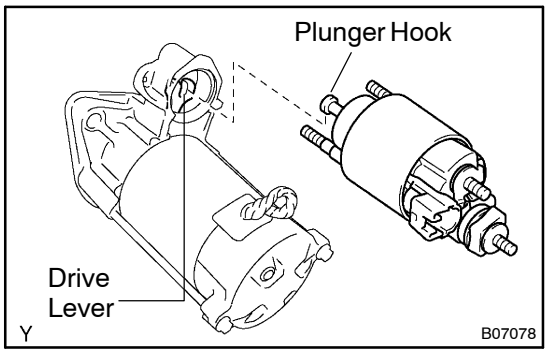
8. INSTALL FIELD FRAME AND ARMATURE ASSEMBLY

(a) Install a new O–ring to the groove of the field frame.

(b) Align the cutout of the field frame with the protrusion of the shock absorber.

(c) Install the field frame and armature assembly with the 2 through bolts.

Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

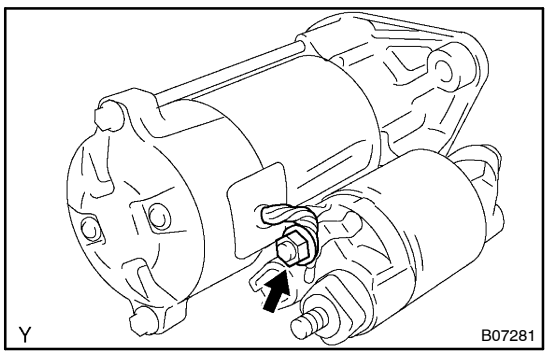


9. INSTALL MAGNETIC SWITCH

(a) Hang the plunger hook of the magnetic switch to the drive lever.

(b) Install the magnetic switch with the 2 nuts.

Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)



(c) Connect the lead wire to the terminal with the nut.

Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

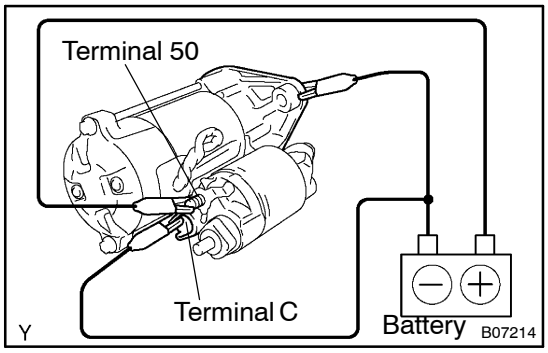
10. INSTALL NEW DUST PROTECTOR

ST06S–04

TEST

NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

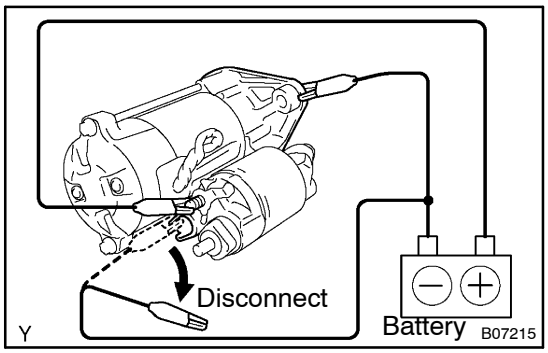


1. DO PULL–IN TEST

(a) Disconnect the field coil lead from terminal C.

(b) Connect the battery to the magnetic switch as shown. Check that the clutch pinion gear moves outward.

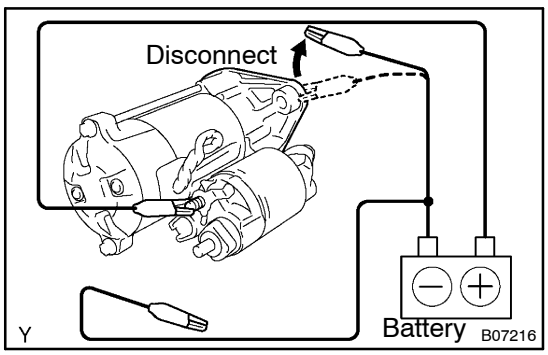
If the clutch pinion gear does not move, replace the magnetic switch.



2. DO HOLD–IN TEST

With the battery connected as above and with the clutch pinion gear out, disconnect the negative (–) lead from terminal C. Check that the clutch pinion gear remains out.

If the clutch pinion gear returns inward, replace the magnetic switch.

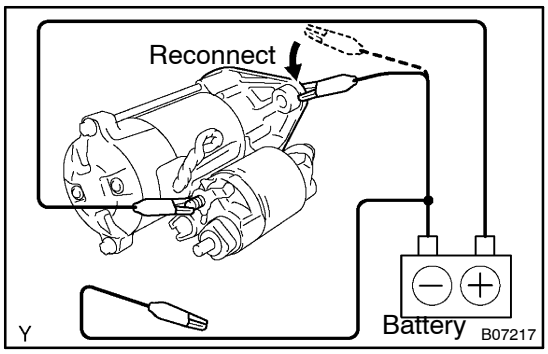


3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (–) lead from the starter housing.

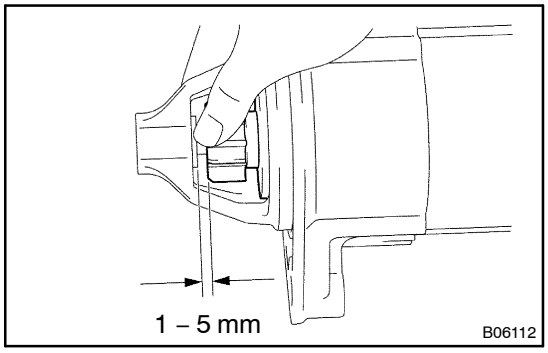
Check that the clutch pinion gear returns inward.

If the clutch pinion gear does not return, replace the magnetic switch.

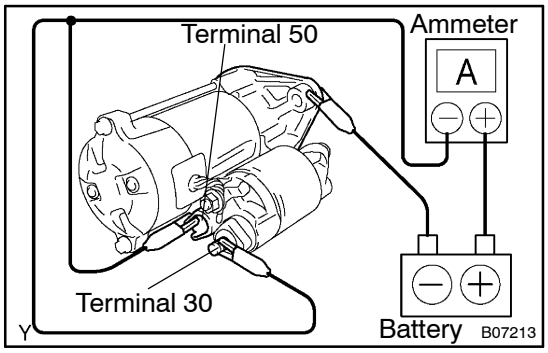


4. INSPECT CLUTCH PINION GEAR CLEARANCE

(a) Reconnect the negative (–) lead to the starter housing.



(b) Move the pinion gear toward the armature to remove slack and measure the clearance between the pinion gear end and stop collar.
Standard clearance: 1 – 5 mm (0.04 – 0.20 in.)



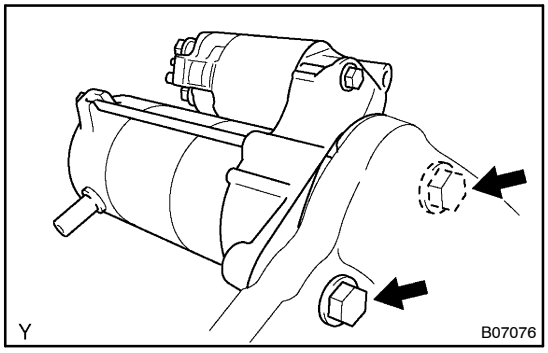
5. DO NO–LOAD PERFORMANCE TEST

(a) Connect the field coil lead to terminal C. Make sure the lead is not grounded.

(b) Connect the battery and ammeter to the starter as shown.

(c) Check that the starter rotates smoothly and steadily with the clutch pinion gear moving out. Check that the ammeter reads the specified current.
Specified current: 90 A or less at 11.5 V

ST0GE–01



INSTALLATION

1. INSTALL STARTER

(a) Install the starter with the 2 bolts.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

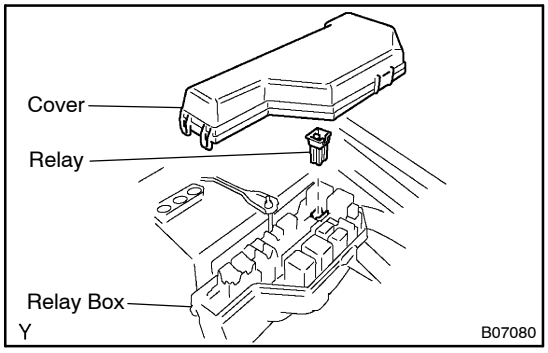
(b) Connect the starter connector.

(c) Connect the starter cable with the nut.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

(d) Install the terminal cap.

2. INSTALL OIL DIPSTICK AND GUIDE FOR A/T

3. INSTALL NO.2 ENGINE UNDER COVER

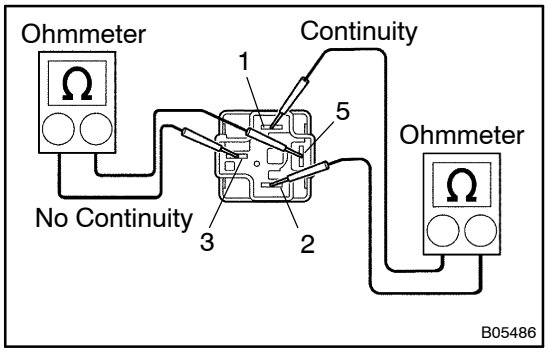


STARTER RELAY

ST088–04

INSPECTION

1. **REMOVE RELAY BOX COVER**
2. **REMOVE STARTER RELAY**



3. **INSPECT STARTER RELAY**

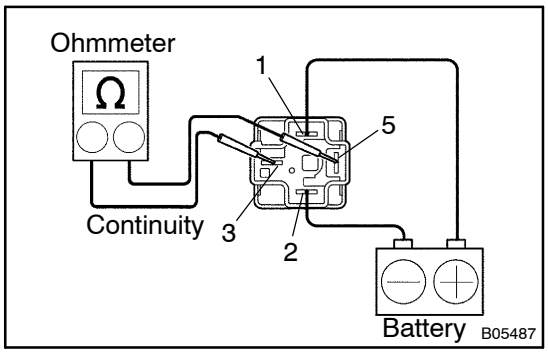
(a) Inspect the relay continuity.

(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.



(b) Inspect the 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.

4. **REINSTALL STARTER RELAY**
5. **REINSTALL RELAY BOX COVER**