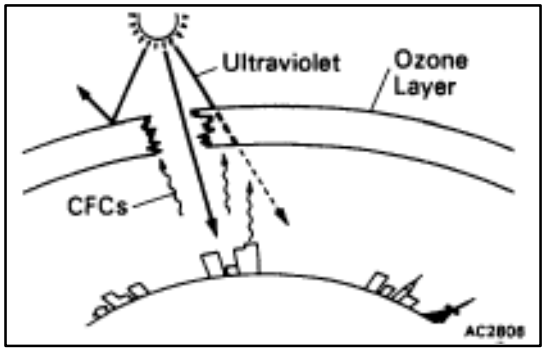
AIR CONDITIONING SYSTEM



GENERAL INFORMATION

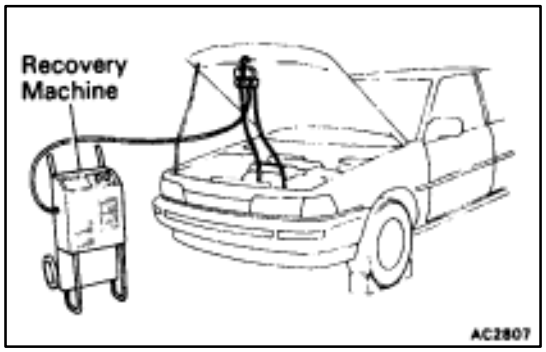
REFRIGERATION SYSTEM

AC002–01

Prevention of Refrigerant Release and Excessive Quantities

Refrigerant (CFCs) for automobile air conditioning is believed to cause harm by depleting the ozone layer which helps to protect us from the ultraviolet rays of the sun.

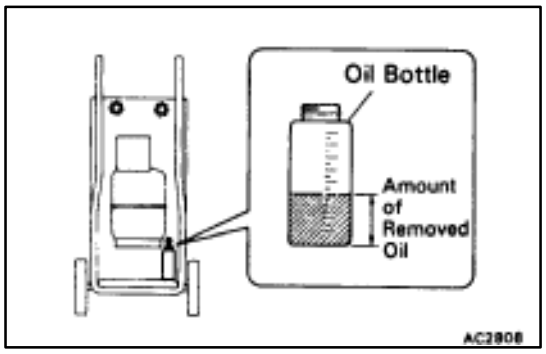
Therefore, it is necessary to prevent release of refrigerant to the atmosphere and to use the minimum amount when servicing the air conditioning.



1. USE RECOVERY MACHINE TO RECOVER REFRIGERANT

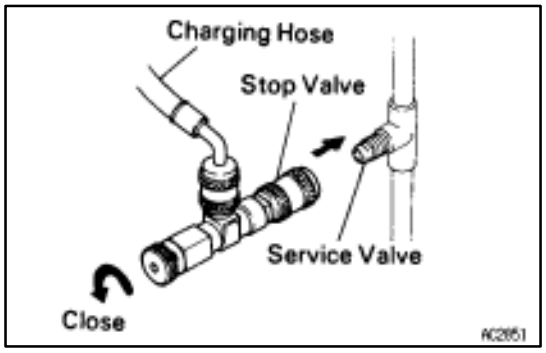
When discharging refrigerant from the system as follows, use a recovery machine to recover the refrigerant.

- Before replacing parts on the refrigerant line.
- When moisture or air gets in the refrigerant line.
- When excess refrigerant is charged.



NOTICE:

- **When handling the recovery machine, always follow the directions given in the instruction manual.**
- **After recovery, the amount of compressor oil removed must be measured and the same amount added to the system.**



2. USE CHARGING HOSES WITH STOP VALVE WHEN INSTALLING MANIFOLD GAUGE SET

To prevent release of refrigerant, using charging hoses with a stop valve when installing the manifold gauge set to the service valves on the refrigerant line.

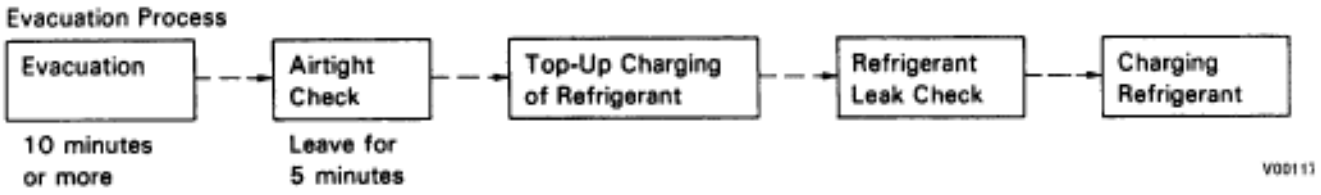
3. TIGHTEN CONNECTION PARTS SECURELY

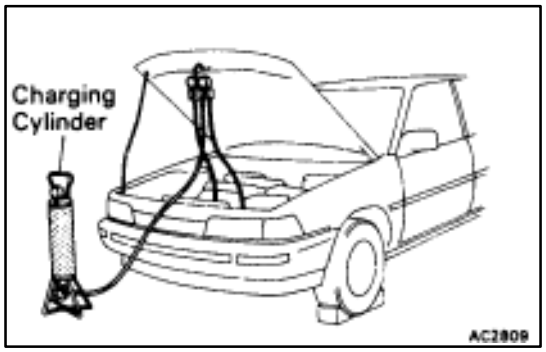
Follow the notices about tightening connecting parts in step 6 on page AC–4.

4. PROPERLY EVACUATE AIR FROM REFRIGERANT SYSTEM

To prevent release and wasteful use of refrigerant, evacuate air with care from refrigeration system as follows:

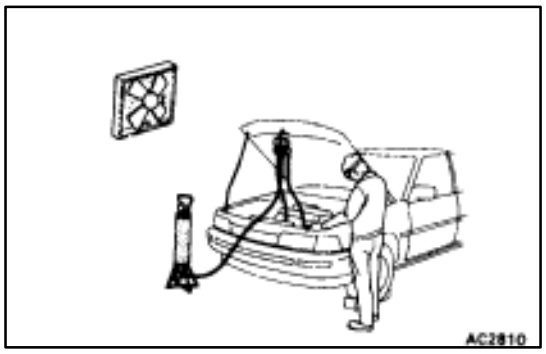
- Do not evacuate before recovering refrigerant in system.
- Do not perform repeat evacuation of system.





5. USE CHARGING CYLINDER TO CHARGE PROPER AMOUNT OF REFRIGERANT

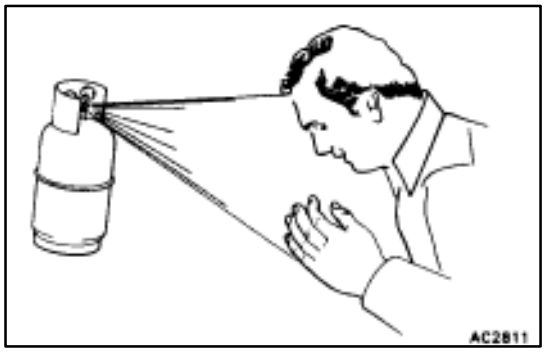
To prevent excessive use of refrigerant due to overcharging, use a charging cylinder to charge the proper amount of refrigerant.



Handling Precautions for refrigerant

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

2. ALWAYS WEAR EYE PROTECTION



3. BE CAREFUL THAT LIQUID REFRIGERANT DOES NOT GET 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.

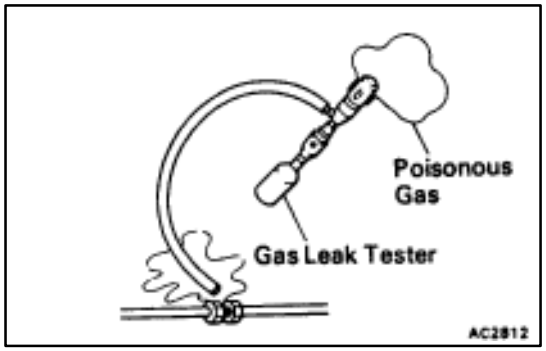
(b) Apply clean petroleum jelly to the skin.

(c) Go immediately to a physician or hospital for professional treatment.
CAUTION: Do not attempt to treat yourself.

Handling Precautions For Refrigerant Container

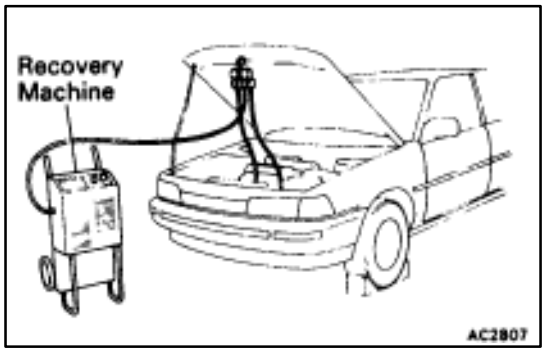
1. NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME

2. BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPLY PHYSICAL SHOCKS TO IT



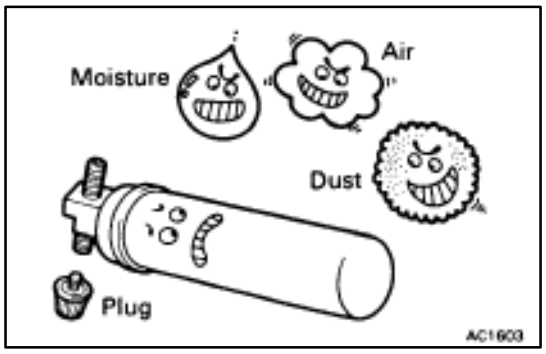
Handling Precautions for Gas–Cylinder Type Gas Leak Tester

1. **BEFORE USING TESTER MAKE SURE THAT THERE ARE NO FLAMMABLE SUBSTANCES NEARBY**
2. **BE CAREFUL NOT TO INHALE POISONOUS GAS**
   If refrigerant gas comes in contact with flame, a poisonous gas is produced. During leak tests, do not inhale any gas.



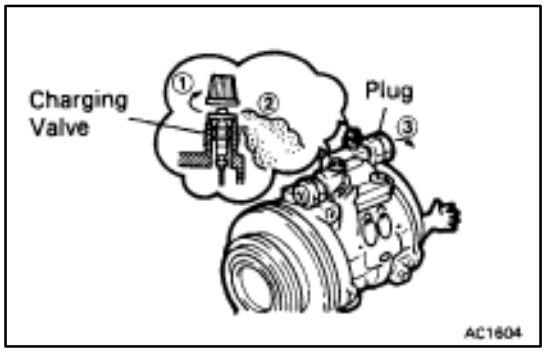
Precautions When Replacing Parts In Refrigerant Line

1. **RECOVER REFRIGERANT IN SYSTEM BEFORE REMOVING PARTS**
   Using a recovery machine, recover refrigerant in system before removing the parts.
   NOTICE: Do not release refrigerant to atmosphere.

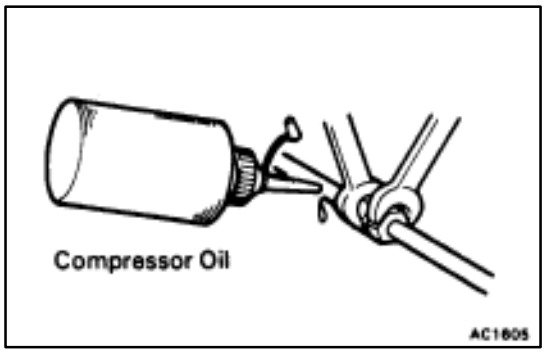


2. **INSERT PLUG IMMEDIATELY IN DISCONNECTED PARTS**
   Insert a plug immediately in the disconnected parts to prevent the entry of moisture and dust.
3. **DO NOT REMOVE PLUG FROM NEW PARTS UNTIL IMMEDIATELY BEFORE INSTALLATION**
4. **DO NOT USE BURNER FOR BENDING OR LENGTHENING OPERATIONS ON TUBE**

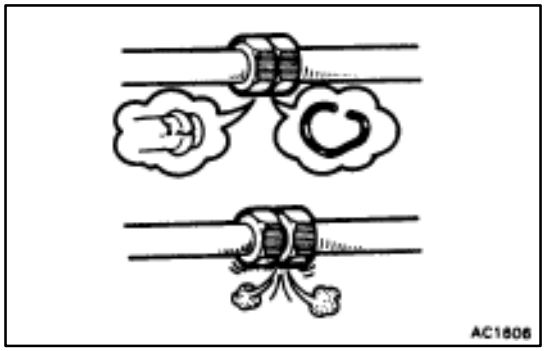
   If the tubes are heated with a burner, a layer of oxidation forms inside the tube, causing the same kind of trouble as an accumulation of dust.



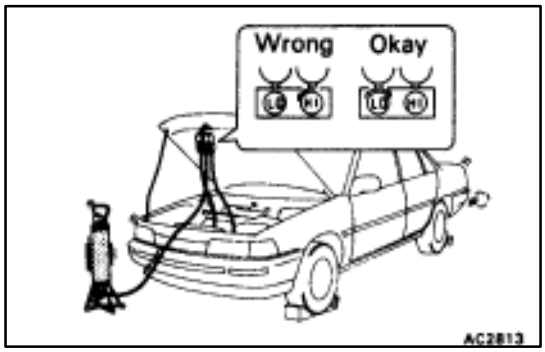
5. **DISCHARGE GAS IN NEW COMPRESSOR FROM CHARGING VALVE BEFORE INSTALLING IT**
   If the gas in new compressor is not discharged first, compressor oil will spray out with gas when the plug is removed.



6. **TIGHTEN CONNECTING PARTS SECURELY**
   Securely tighten the connecting parts to prevent leaking of refrigerant gas.
   - Apply a few drops of compressor oil to O–ring fittings for easy tightening and to prevent leaking of refrigerant gas.
   - Tighten the nuts using two wrenches to avoid twisting the tube.



- Tighten the O–ring fittings or the bolted type fittings to the specified torque.



Precautions When Charging Refrigerant

1. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT CYCLE**
   If there is not enough refrigerant in the refrigerant cycle, oil lubrication will be insufficient and compressor burnout may occur, so takecare to avoid this.
2. **DO NOT OPEN HIGH PRESSURE VALVE OF MANIFOLD WITH COMPRESSOR OPERATING**
   If the high pressure valve is opened, refrigerant flows in the reversedirection and could cause the charging cylinder to rupture, so open and close the low pressure valve only.
3. **BE CAREFUL NOT TO OVERCHARGE WITH REFRIGERANT IN SYSTEM**
   If refrigerant is overcharged, it causes trouble such as insufficient cooling, poor fuel economy, engine overheating etc.

ELECTRICAL PARTS

AC003–01

Before removing and inspecting the electrical parts, set the ignition switch to the LOCK position and disconnect the negative (–) terminal cable from battery.

CAUTION: Work must not be started until after at least 30 seconds or longer from the time the negative (–) terminal cable is disconnected.

SRS AIRBAG SYSTEM

AC004–01

Failure to carry out service operations in the correct sequence could cause the airbag system to deploy, possibly leading to a service accident. When removal or installation of the parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the AB section before performing the operation.

DESCRIPTION

FEATURES

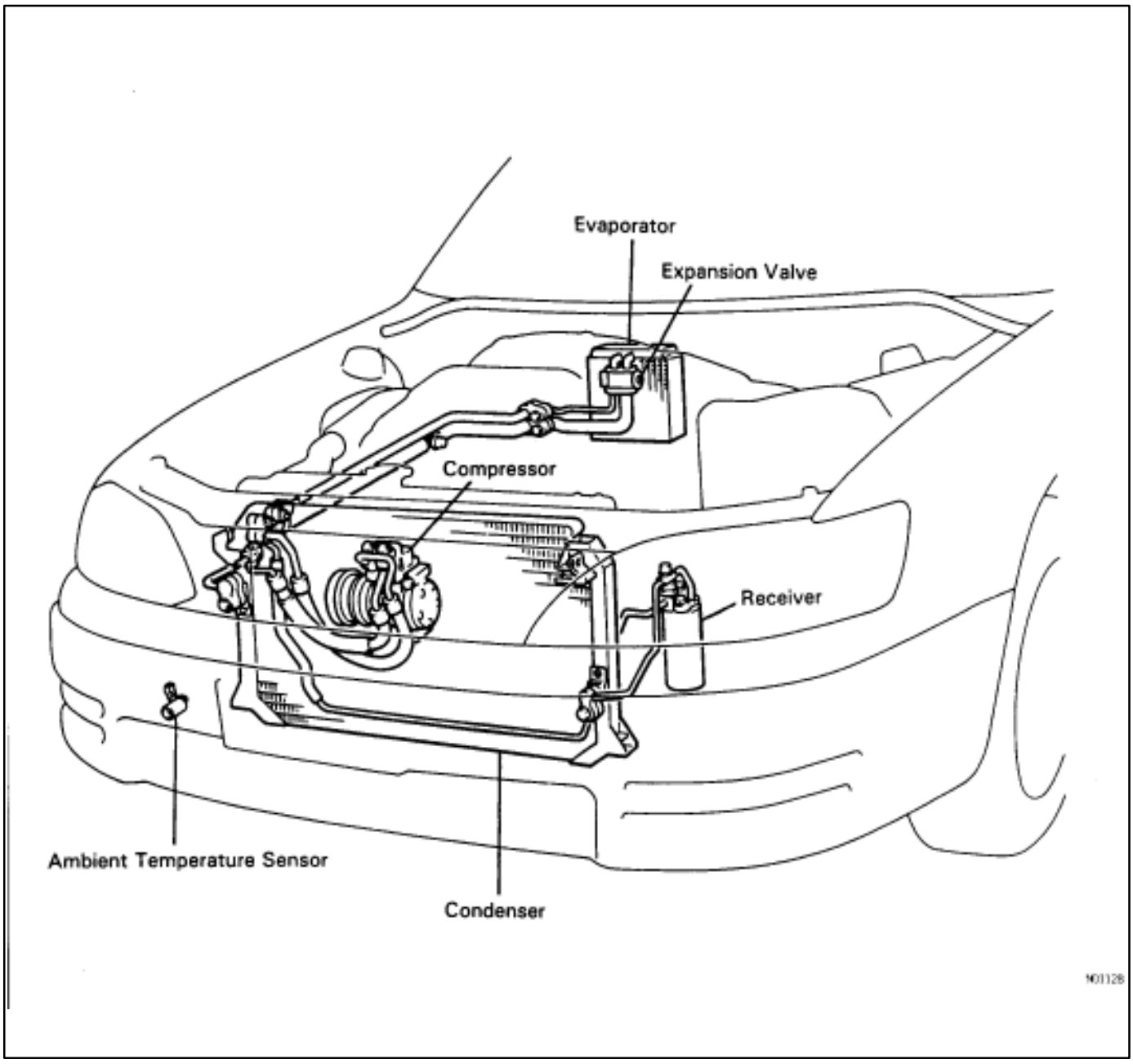
AC05K–01

The microprocessor controlled automatic air conditioning is a system which controls the cabin air conditioning automatically using a microcomputer.

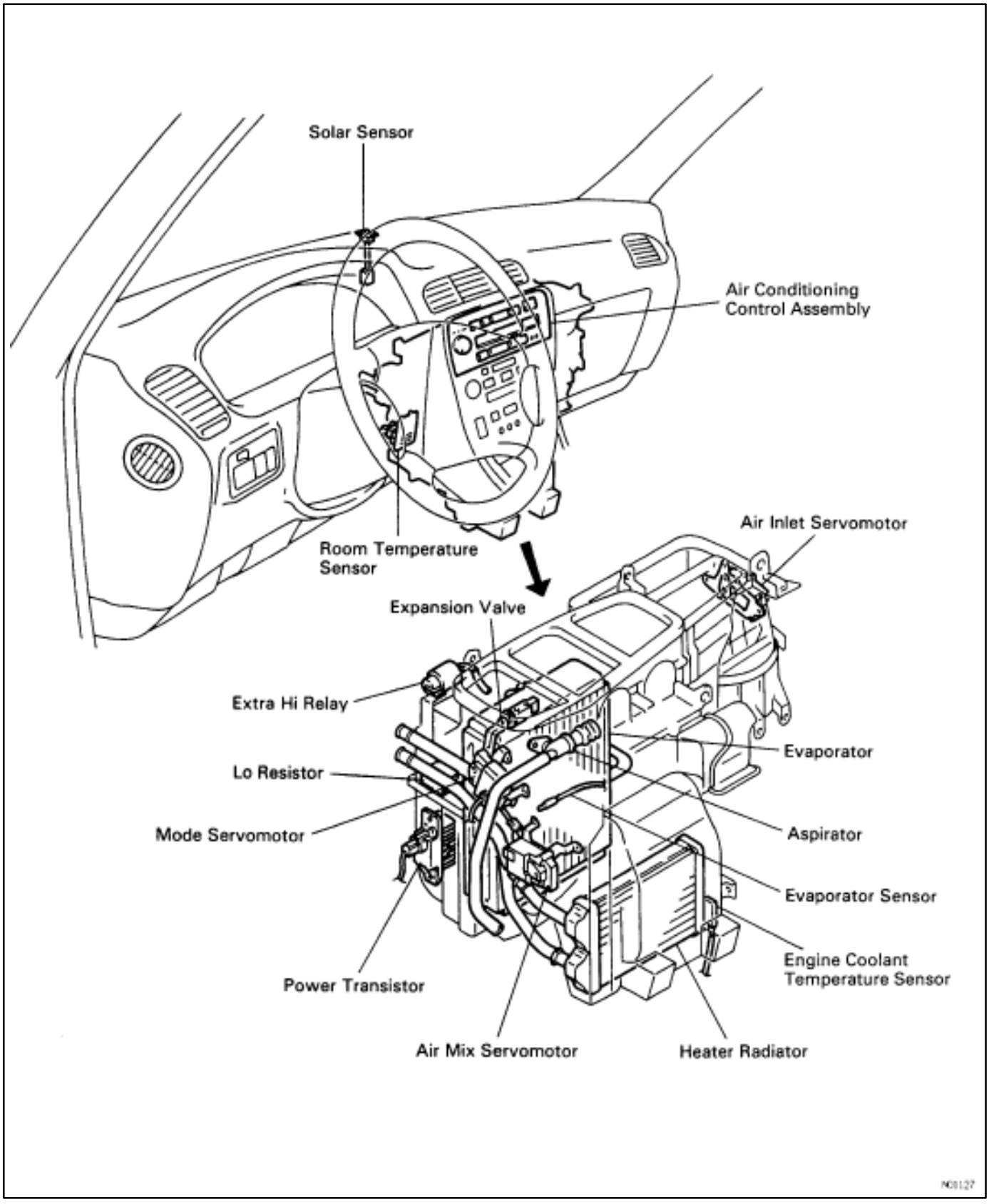
The microcomputer senses the air temperature outside and inside the cabin, the amount of sunlight, the compressor operating condition and temperature setting, etc. and maintains the optimum blower air temperature and air flow at the intakes and outlets automatically.

PARTS LOCATION

AC05L–01

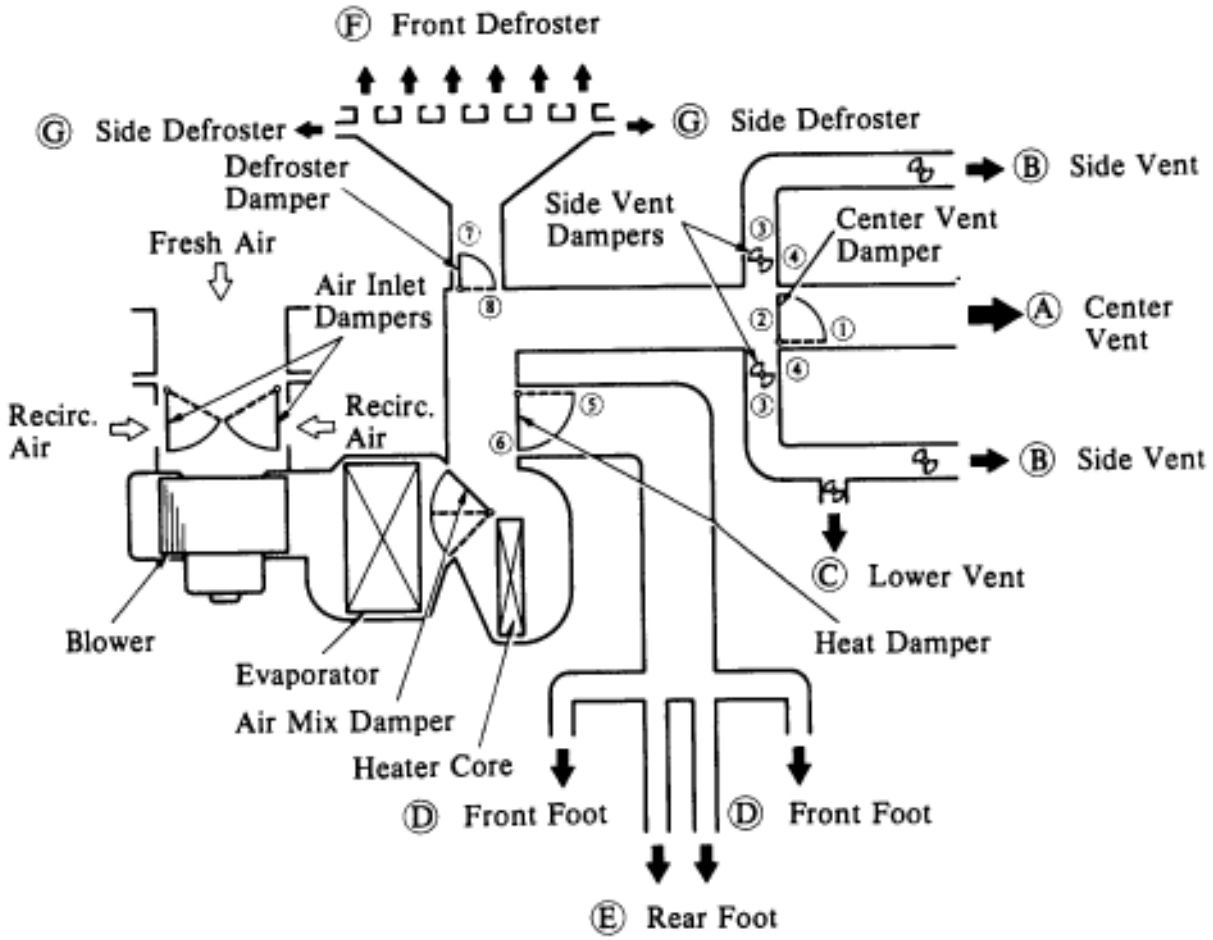


PARTS LOCATION (CONT'D)



OPERATION OF DAMPERS

AC05M–01



Air Outlet Mode		Mode Control Damper Position	Vent			Foot		Defroster	
			Ⓐ Center	Ⓑ Side	Ⓒ Lower	Ⓓ Front	Ⓔ Rear	Ⓕ Front	Ⓖ Side
Face		① ③ ⑥ ⑧	◯	◯	○				
Bi-level		① ③ ⑤ ⑧	○	○	○	○	○		
Foot		② ④ ⑤ ⑧		○	○	◯	○	○	○
Foot/ Defroster		② ④ ⑤ ⑦		○	○	○	○	○	○
Defroster		② ④ ⑥ ⑦		○	○			◯	○

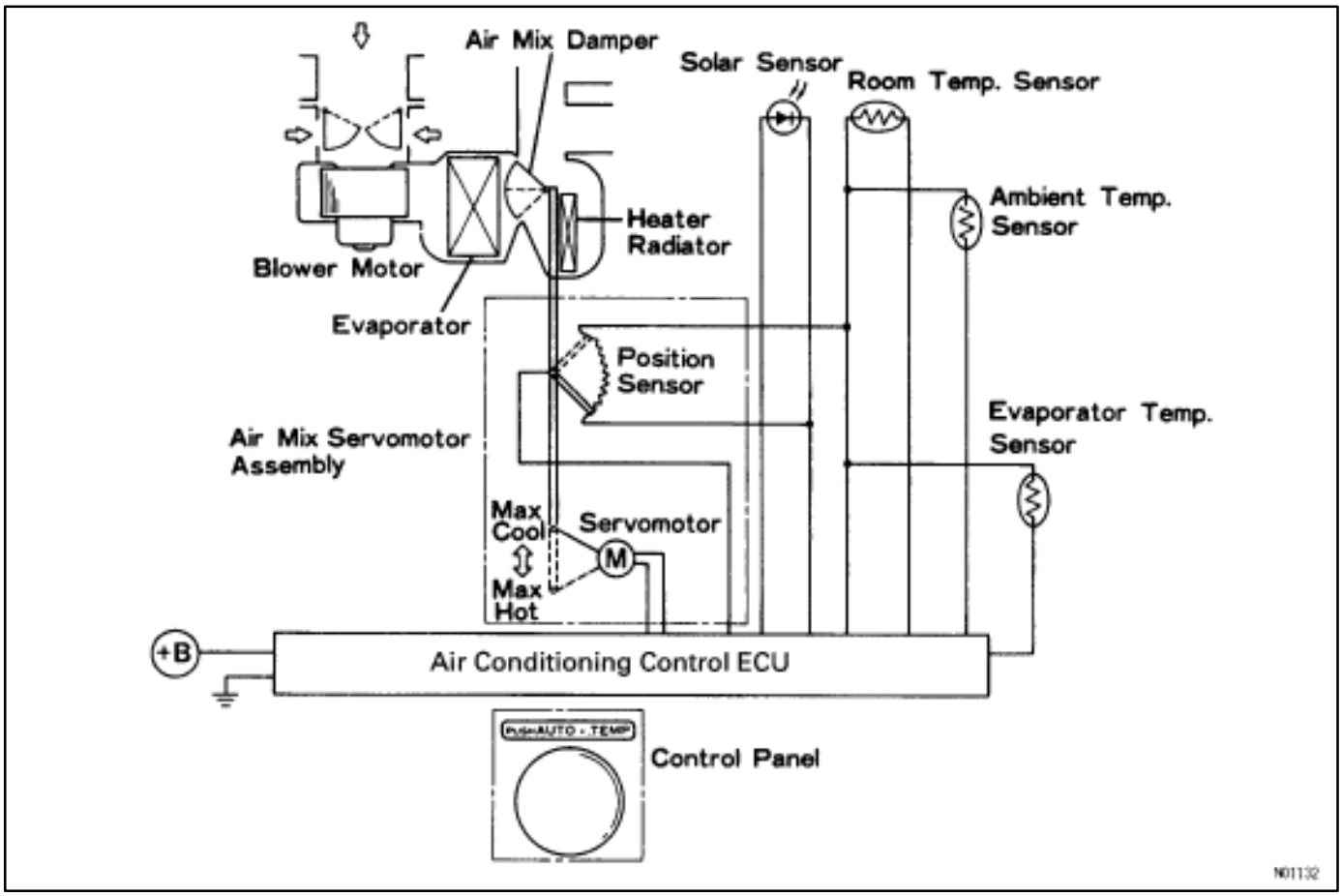
The size of the circle ○ indicates the proportion of air flow volume.

N01883

CONTROL FUNCTIONS

AC05N–01

Interior Room Temperature Control System



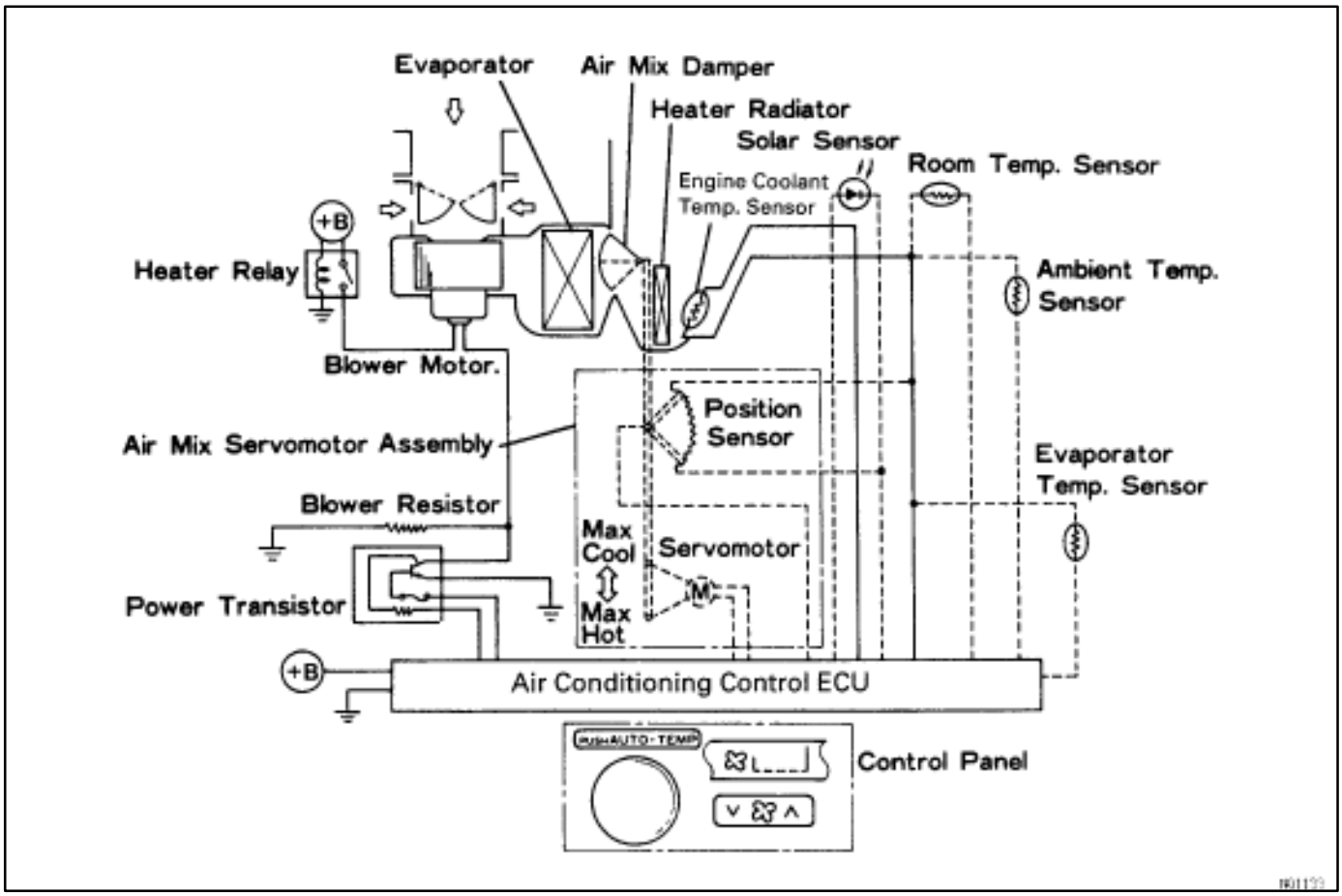
(a) The desired temperature is set using the TEMP switch.

(b) From the input signals (room temperature sensor, ambient temperature sensor, evaporator temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air flow volume and outputs signals to the air mix servomotor.

(c) When it receives signals from the ECU, the air mix servomotor opens or closes the air mix damper to change the air flow temperature. When the temperature reaches the specified temperature, it is detected by the air mix damper position sensor and the ECU stops the servomotor.

HINT: if the desired temperature setting is MAX COLD, the ECU forcedly sets the air mix damper to the Max Cool position. If it is set at MAX HOT, the ECU forcedly sets the air mix damper to the Max Hot position.

Blower Fan Speed Control System



(When AUTO Switch is ON)

(a) The desired temperature is set using the TEMP switch.

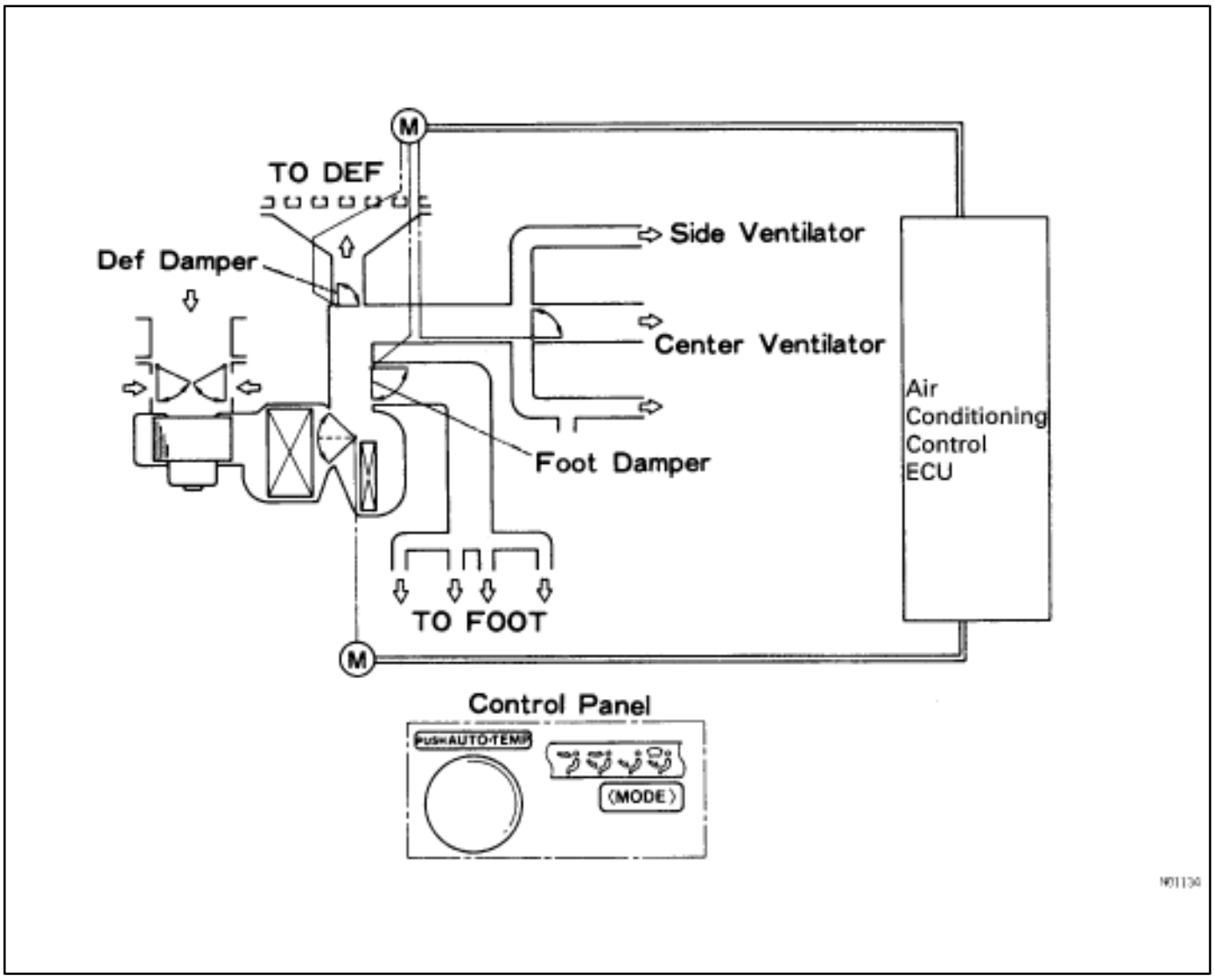
(b) From the input signals (room temperature sensor, ambient temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air flow volume and outputs signals to the power transistor.

(c) When it receives signals from the ECU, the power transistor increases or reduces the blower motor speed to control the air flow volume.

(When Manual Switch is selected)

The ECU turns the power transistor increasing or reducing the blower motor speed and fixing the air flow volume in accordance with the position of the Manual switch.

Air Flow Mode Control System



(When the AUTO Switch is ON)

(a) The desired temperature is set using the TEMP switch.

(b) From the input signals (room temperature sensor, ambient temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air flow mode and outputs signals to the mode servomotor and max cool servomotor.

(c) When it receives signals from the ECU, the servomotors open or close each of the dampers to change the air flow mode.

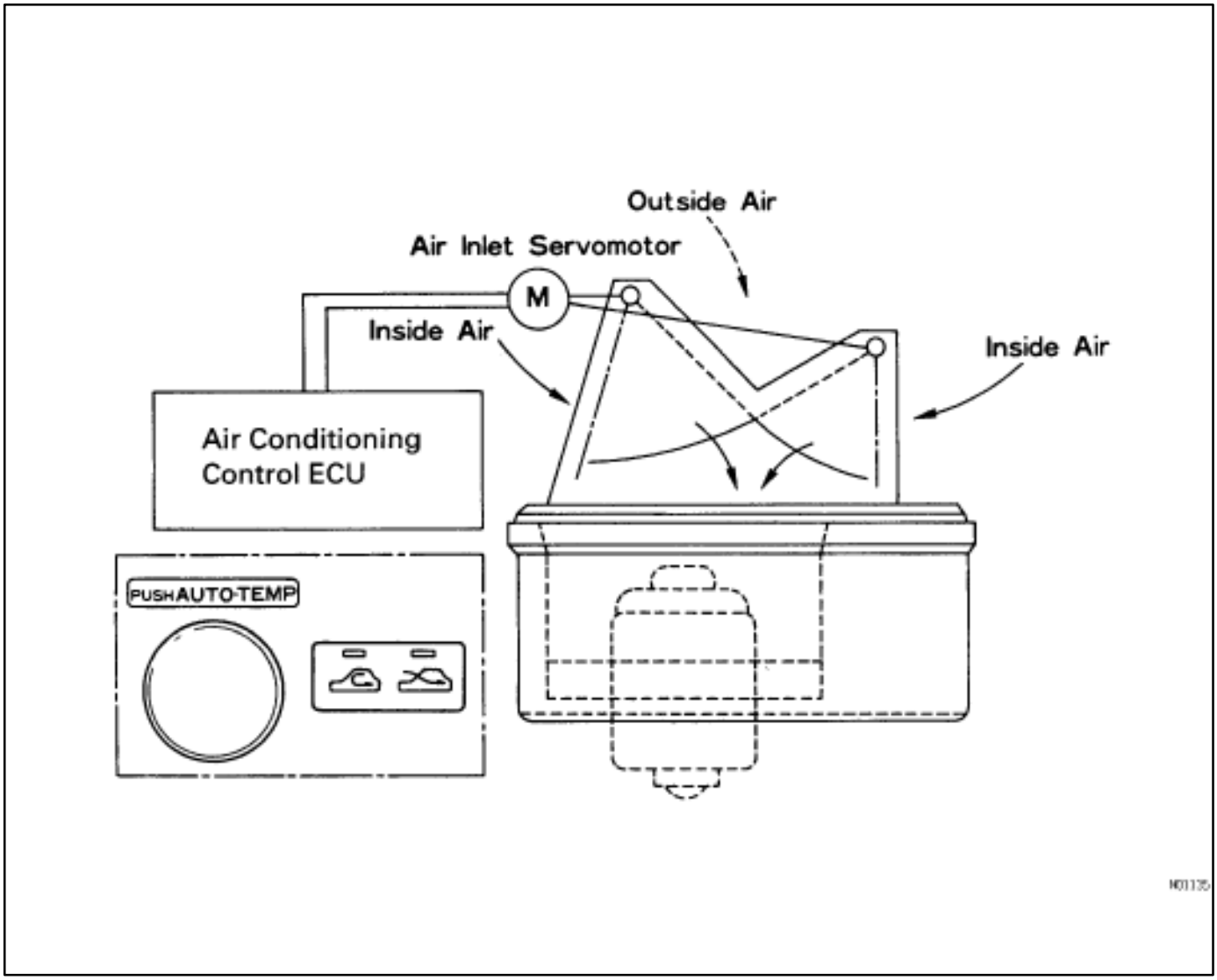
(When Manual Switch is selected)

The ECU fixes the air flow mode in accordance with the Manual switch position.

(When the Engine is Cold)

If the Mode is set on B/L or FOOT, the ECU forcedly changes the air vent to DEF if cold signals are input from the engine coolant temperature sensor.

Air Inlet Control System



(When the AUTO Switch is ON)

(a) The desired temperature is set using the TEMP switch.

(b) From the input signals (room temperature sensor, ambient temperature sensor and solar sensor) and the temperature setting, the air conditioning control ECU determines the air inlet and outputs signals to the air inlet servomotor assembly.

(c) When it receives signals from the ECU, the air inlet servomotor opens or closes the damper to change the air inlet. When the air inlet is changed to the desired setting, it is detected by the sir inlet damper position sensor and the ECU stops the servomotor.

(When Manual Switch is selected)

The ECU fixes the air inlet according to the position of the manual switch.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

AC02B–01

	07110–58011	Air Conditioning Service Tool Set	
	(07117–58010)	Refrigerant Dram Service Valve	
	(07117–78011)	Refrigerant Charging Gauge	
	(07117–88013)	Refrigerant Charging Hose	Green color
	(07117–88022)	Refrigerant Charging Hose	Blue color
	(07117–88040)	Refrigerant Charging Hose	Orange color
	(–––––––)	Stop Valve	
	07110–58040	Charging Hose Kit With Stio Valve	If you require a stop valve, plea se order this kit.
	07112–66040	Magnetic Clutch Remover	
	07112–76060	Magnetic Clutch Stopper	
	07114–84020	Snap Ring Pliers	
	07117–48050	Vaccum Pump Assy	Rated voltage AC220V

RECOMMENDED TOOLS

AC008–01

	09082–00015 TOYOTA Electrical Tester	

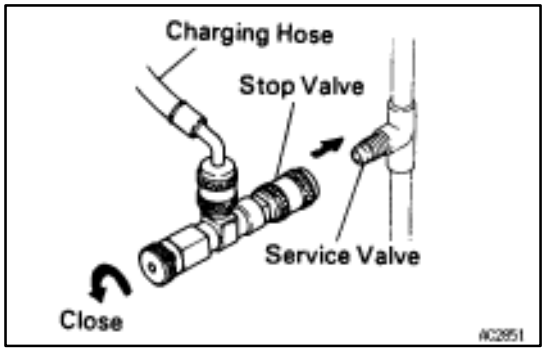
EQUIPMENT

AC009–01

Part Name	Note
Voltmeter	Measures voltage
Ammeter	Measures current
Ohmmeter	Measures resistance

LUBRICANT

Item	Capacity		Classification
	cm	fl. oz	
Compressor oil			ND OIL 6.
When replacing receiver	15	0.5	SUNISO No. 5GS or equivalent
When replacing condenser	35	1.2	
When replacing evaporator	45	1.6	
When replacing compressor	–100	–3.5	

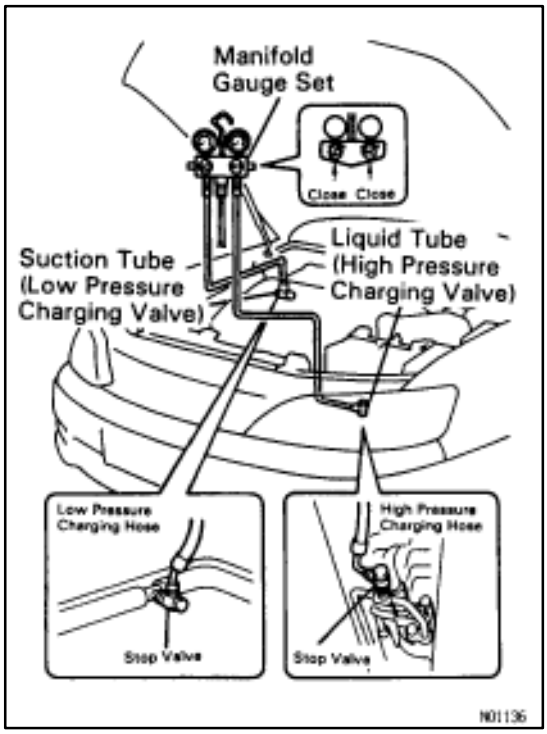


USE OF MANIFOLD GAUGE SET

MANIFOLD GAUGE SET INSTALLATION

AC00B–01

HINT: To prevent releasing refrigerant, use charging hoses with a stop valve when installing the manifold gauge set to service valves on the refrigerant line.

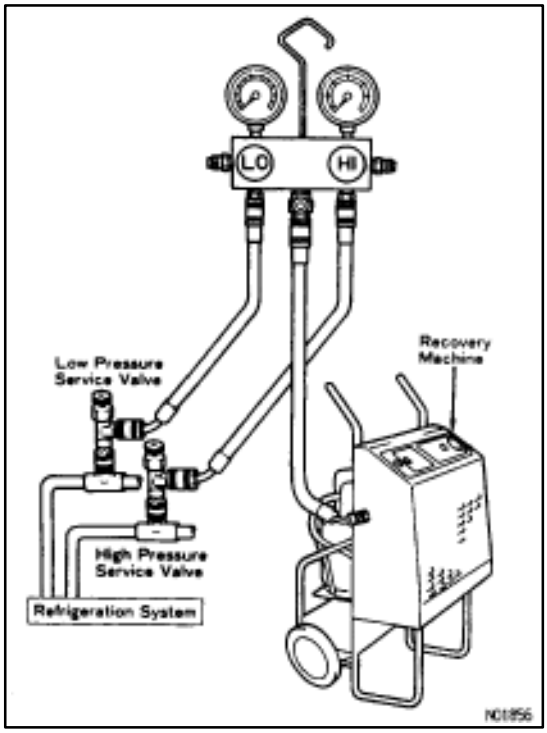


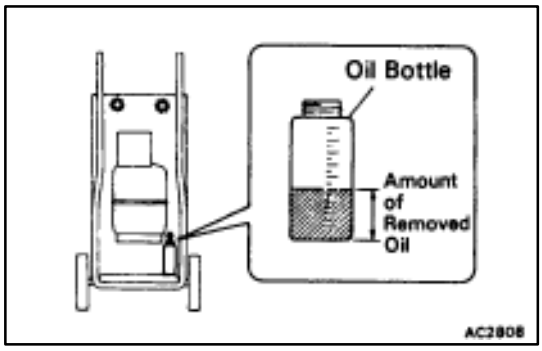
1. **CONNECT CHARGING HOSES WITH A STOP VALVE TO MANIFOLD GAUGE SET**
   Tighten the nuts by hand.
   CAUTION:
   - **Do not connect the wrong hoses to the high pressure and the low pressure side.**
   - **To prevent loosening the nuts, do not apply compressor oil to seat of the connection.**
2. **CLOSE HAND VALVES OF BOTH STOP VALVES**
3. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
4. **REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINE**
5. **CONNECT STOP VALVES TO SERVICE VALVES**
   Tighten the nuts by hand.
   CAUTION:
   - **Do not connect the wrong hoses to the high pressure and the low pressure sides.**
   - **To prevent loosening the nuts, do not apply compressor oil to seat of the connection.**
6. **OPEN HAND VALVES OF BOTH STOP VALVES**

MANIFOLD GAUGE SET REMOVAL

AC00C–01

1. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
2. **CLOSE HAND VALVES OF BOTH STEP VALVES**
3. **DISCONNECT STOP VALVES FROM SERVICE VALVES ON REFRIGERANT LINE**
4. **INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE**





USE OF REFRIGERANT RECOVERY MACHINE

RECOVERING OF REGRIGERANT IN REFRIGERANT SYSTEM

AC00D–01

When discharging refrigerant from the system as follows, use a recovery machine to recover the refrigerant.
Before replacing parts on the refrigerant line.
When moisture or air gets in the refrigerant line.
When excess refrigerant is charged.

NOTICE:

- **When handling the recovery machine, always follow the directions given in instruction manual.**
- **After recovery, the amount of compressor oil removed must bemeasured and same amount added into the system.**

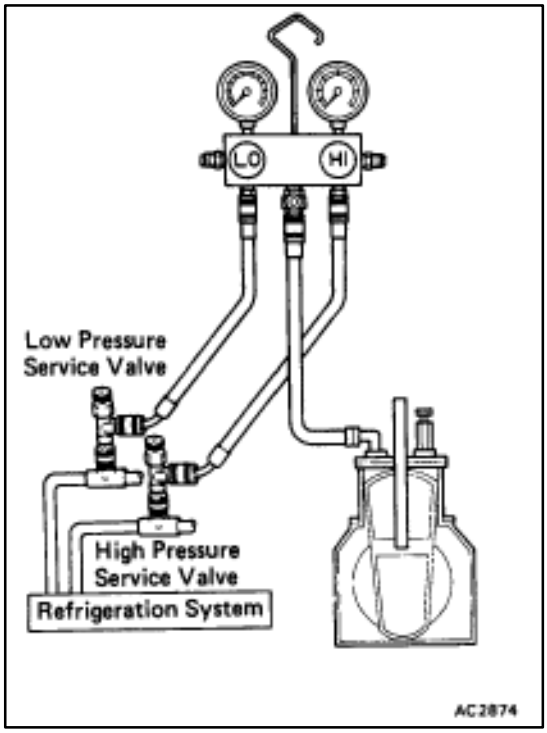
1. INSTALL MANIFOLD GAUGE SET TO SERVICE VALVES

2. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

(a) Connect the center hose to recovery machine.
(b) Operate the recovery machine.
(c) Open both high and low hand valves of manifold gauge set.

3. STOP RECOVERY MACHINE WHEN RECOVERING HAS FINISHED

4. REMOVE MANIFOLD GAUGE SET FROM SERVICE VALVES



EVACUATING AIR IN REFRIGERATION SYSTEM AND CHARGING WITH REFRIGERANT

AC05Q–01

HINT: Before charging the system with refrigerant, be sure carry out a complete evacuation of the system.

1. INSTALL MANIFOLD GAUGE SET TO SERVICE VALVES (See page AC–15)

2. EVACUATE AIR IN REFRIGERATION SYSTEM

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

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

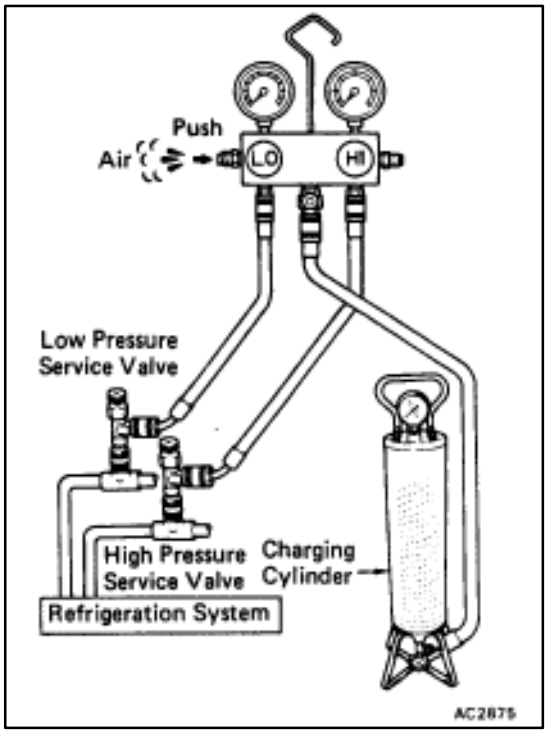
HINT: If opening the low pressure hand valve pulls the high pressure gauge into the vacuum range, there is no blokage in the system.

(c) Afer ten minutes or more, check that the low pressure gauge indicates 99.99 KPa (750 mmHg, 29.53 in. Hg) or more of vacuum.

HINT: If the reading is not 99.99 KPa (750 mmHg, 29.53 in. Hg) or more of vacuum, close both the high and low hand valves of the manifold gauge set and stop vacuum pump. Then, check the system for leaks and repair as necessary.

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

(e) Leave the system in this condition for five minutes or longer and check that there is no change in the gauge indicator.



3. INSTALL CHARGING CYLINDER

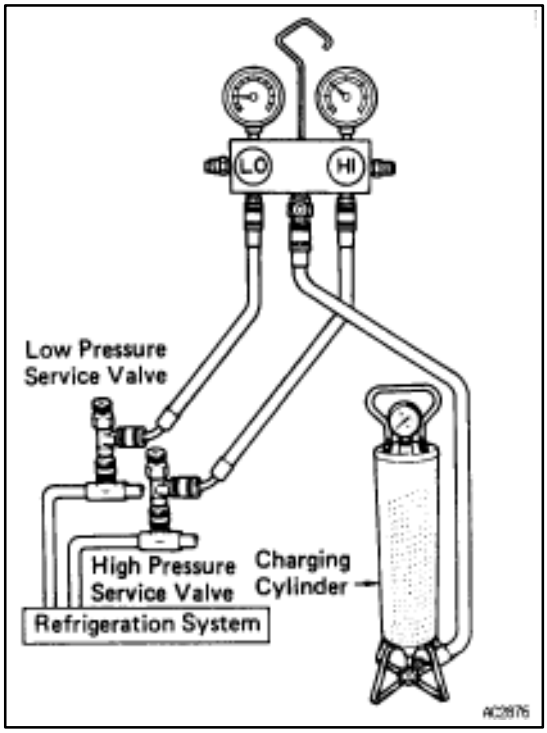
NOTICE: When handling the charging cylinder, always follow the directions given in the instruction manual.

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

(b) Connect the center hose to charging cylinder.

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

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



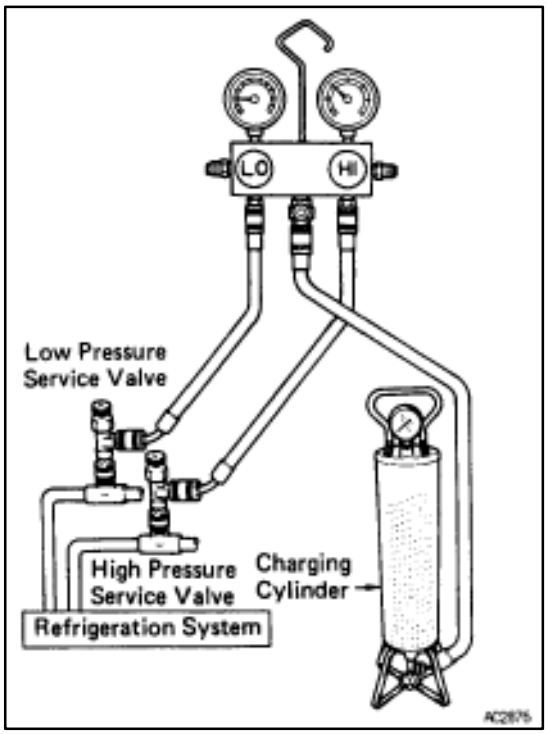
4. INSPECT REFRIGERATION SYSTEM FOR LEAKS

HINT: After evacuating the air in system, check the system for leakage.

(a) Open the high pressure hand valve to charge the system with refrigerant.

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

(c) Using a gas leak tester, check the system for leakage.
If leak is found, repair the faulty component or connection.



5. CHARGE EMPTY REFRIGERATION SYSTEM WITH REFRIGERANT (LIQUID)

HINT: This step is used to charge an empty system through the high pressure side with refrigerant in a liquid state.

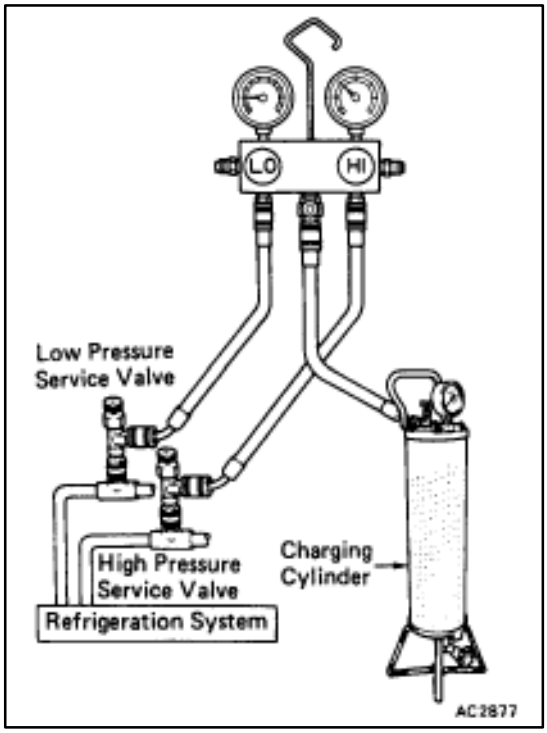
NOTICE:

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

(a) Open the high pressure hand valve fully.

(b) Charge the system with 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.**
- **If the low pressure gauge does not show a reading the system is clogged and must be repaired.**



6. CHARGE PARTIALLY REFRIGERATION SYSTEM WITH REFRIGERANT (VAPOR)

HINT: This step is used to charge the system through the low pressure side with refrigerant in a vapor state.

NOTICE: Do not open the high pressure hand valve when running the engine.

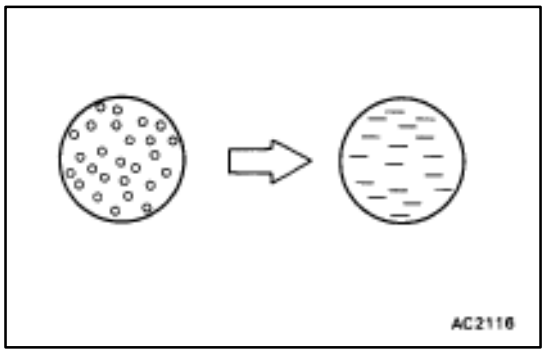
(a) Run the engine at ideling speed and operate the air conditioner.

(b) Open the low pressure hand valve.

NOTICE: Adjust the hand valve so that the low pressure gauge does not indicate over limited pressure of charging cylinder.

(c) Close the low pressure hand valve when the sight glass is free of any bubbles and stop the engine.

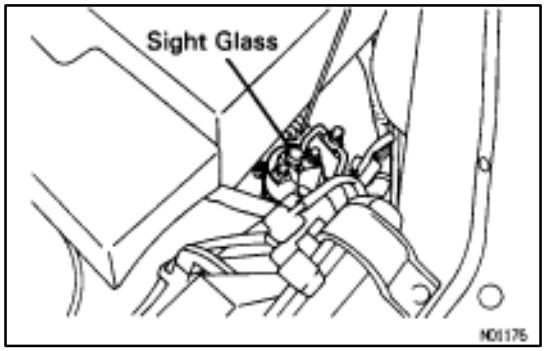
NOTICE: Be careful not to overcharge the system with refrigerant as it may cause of troubles.



7. REMOVE MANIFOLD GAUGE SET FROM SERVICE VALVES

(See page AC–15)

–MEMO–



REFRIGERANT VOLUME

REFRIGERANT VOLUME INSPECTION

AC00G–01

1. **RUN ENGINE AT IDLE SPEED**
2. **OPERATE A/C AT MAXIMUM COOLING FOR A FEW MINUTES**
3. **INSPECT AMOUNT OF REFRIGERANT**
   Observe the sight glass on the liquid tube.

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

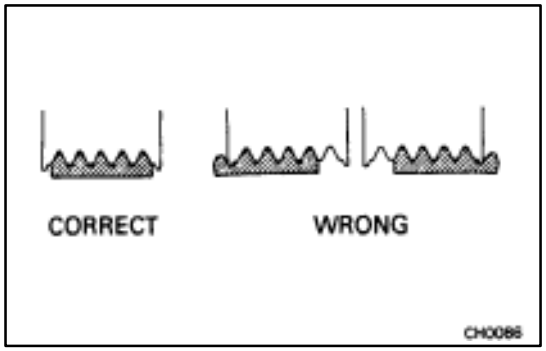
***: Bubbles in the sight glass with ambient temperatuers higher can be considered normal if cooling is sufficient.**

REFRIGERANT CHARGE VOLUME

AC00H–01

Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)



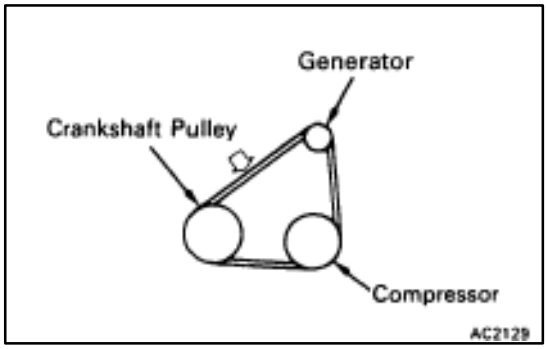
DRIVE BELT TENSION

DRIVE BELT TENSION INSPECTION

AC05R–01

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

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



2. INSPECT DRIVE BELT TENSION

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

Belt tension gauge:

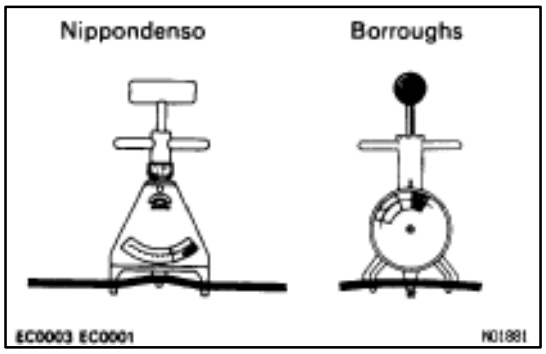
Nippondenso BTG–20 (95506–00020) or

Borroughs No. TB–33–73F

Drive belt tension:

New belt 165 ± 26 lb

Used belt 88 ± 22 lb



HINT:

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

IDLE–UP SPEED

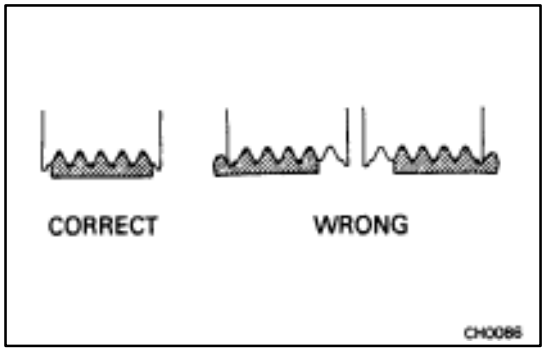
IDLE UP SPEED INSPECTION

AC05P–01

1. WARM UP ENGINE

2. INSPECT IDLE SPEED

Magnetic clutch condition	Standard idle speed (rpm)
No engaged	Approx. 700
Engaged	Approx. 700



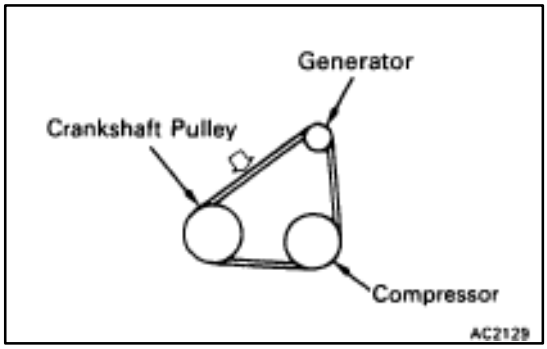
DRIVE BELT TENSION

DRIVE BELT TENSION INSPECTION

AC05R–01

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

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



2. INSPECT DRIVE BELT TENSION

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

Belt tension gauge:

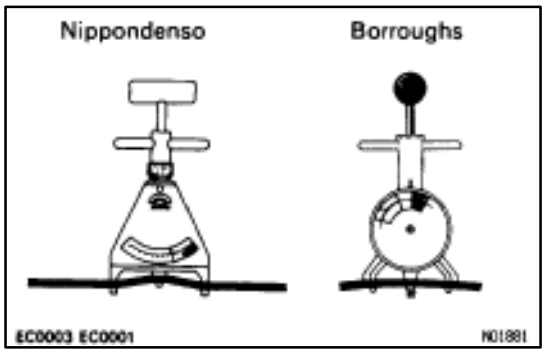
Nippondenso BTG–20 (95506–00020) or

Borroughs No. TB–33–73F

Drive belt tension:

New belt 165 ± 26 lb

Used belt 88 ± 22 lb



HINT:

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

IDLE–UP SPEED

IDLE UP SPEED INSPECTION

AC05P–01

1. WARM UP ENGINE

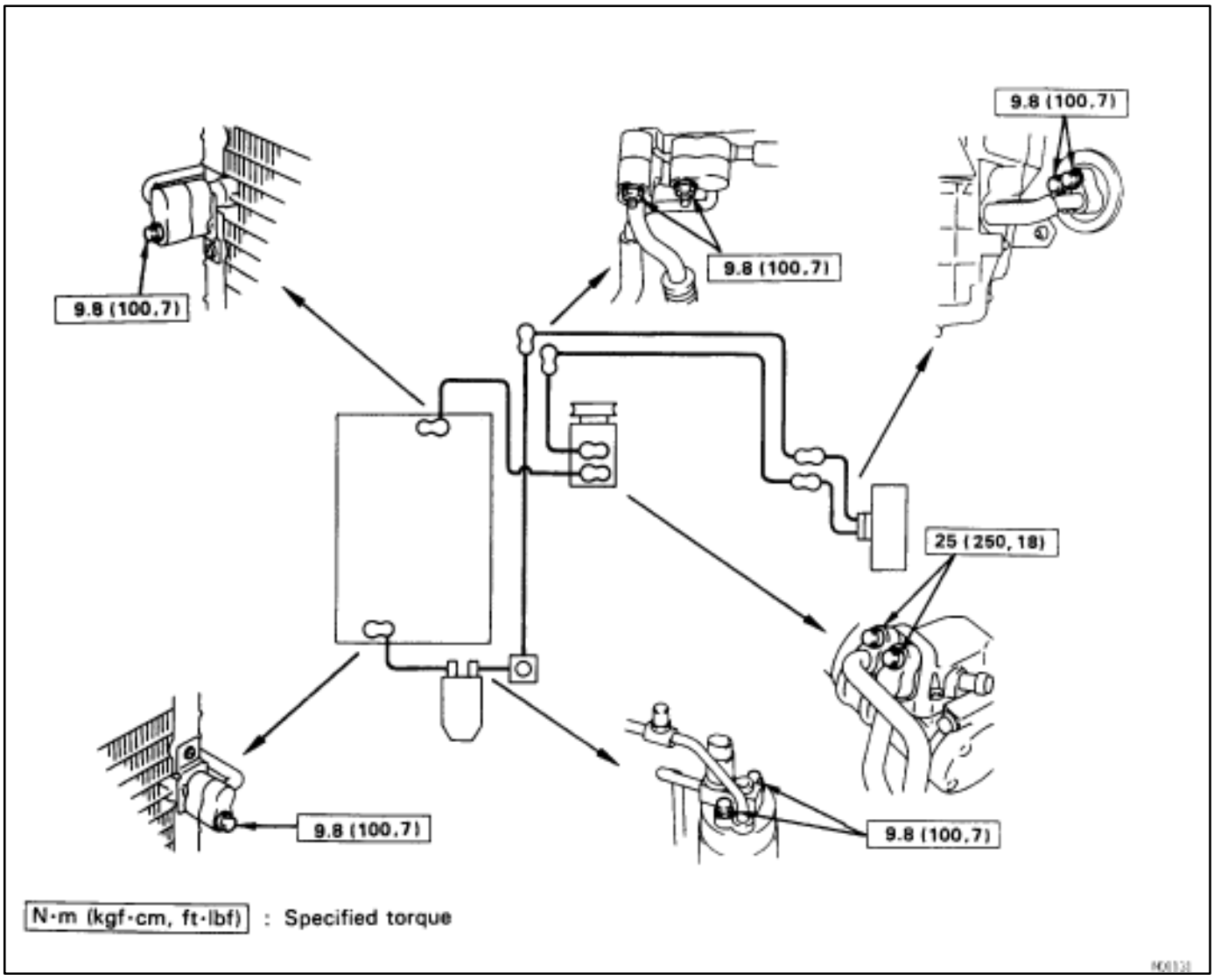
2. INSPECT IDLE SPEED

Magnetic clutch condition	Standard idle speed (rpm)
No engaged	Approx. 700
Engaged	Approx. 700

REFRIGERANT LINES

TIGHTENING TORQUE OF REFRIGERATION LINES

AC00L–01



ON–VEHICLE INSPECTION

AC00M–01

1. INSPECTION HOSE AND TUBE CONNECTIONS FOR LOOSENESS

2. INSPECT HOSES AND TUBES FOR LEAKAGE

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

REFRIGERANT LINES REPLACEMENT

AC00N–01

1. RECOVER REFRIGERANT IN REFRIGERATION SYSTEM

2. REPLACE FAULTY TUBE OR HOSE

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

3. TORQUE CONNECTIONS TO SPECIFIED TORQUE

NOTICE: Connections should not be torque tighter than the specified torque.

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50g (33.51 ± 1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

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

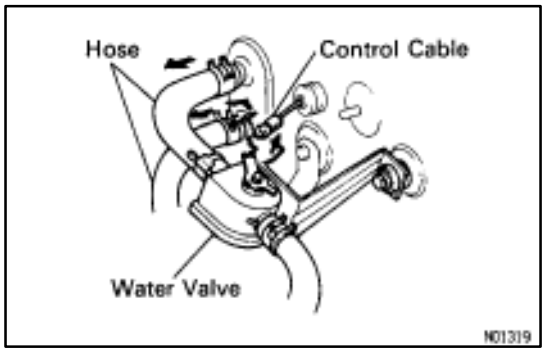
6. INSPECT AIR CONDITIONING OPERATION

AIR CONDITIONING UNIT

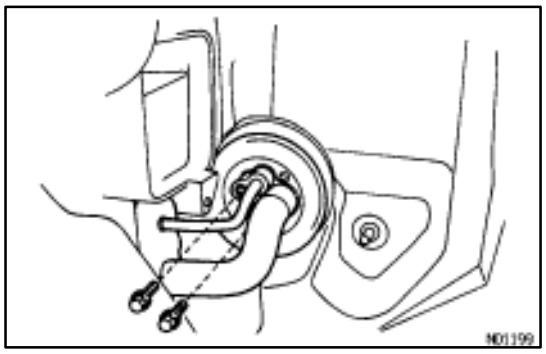
A/C UNIT REMOVAL

AC00P–01

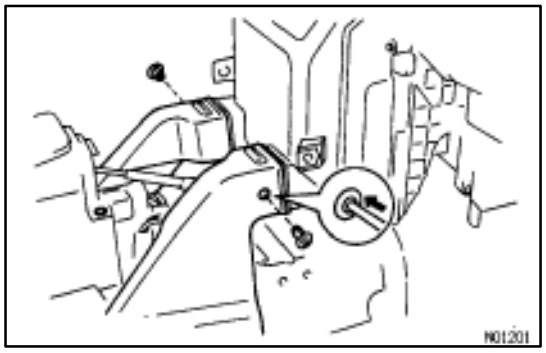
1. **RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM**
2. **DRAIN ENGINE COOLANT FROM RADIATOR**
   HINT: It is not necessary to drain out all the coolant.



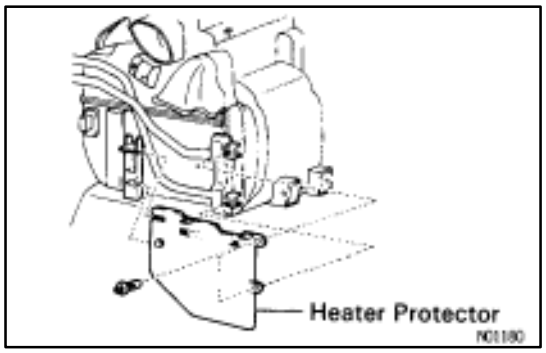
3. **DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE**
4. **DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES**
5. **REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See pages BO–109 to 115)**
6. **REMOVE BLOWER UNIT (See page AC–101)**



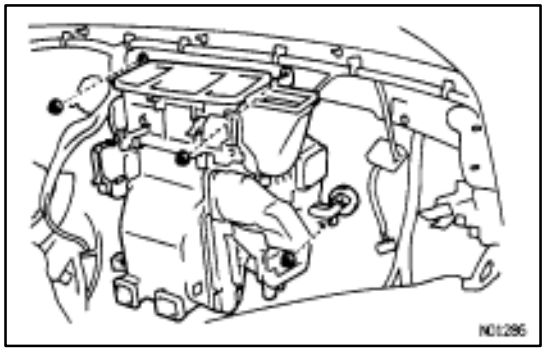
7. **DISCONNECT LIQUID AND SUCTION TUBE FROM BLOCK JOINT**
   Remove two bolts and both tubes.



8. **REMOVE REAR AIR DUCTS**
   Remove the clip and the air duct.



9. **REMOVE HEATER PROTECTOR**
   Remove the two clips and the heater protector.



10. REMOVE A/C UNIT

(a) Disconnect connectors from the unit.

(b) Remove the three nuts and the A/C unit.

A/C UNIT INSTALLATION

1. INSTALL A/C UNIT

(a) Install the A/C unit with the three nuts.

(b) Connect connectors.

2. INSTALL HEATER PROTECTOR

3. INSTALL REAR AIR DUSTS

4. CONNECT LIQUID AND SUCTION TUBE TO BLOCK JOINT

5. INSTALL BLOWER UNIT

6. INSTALL INSTRUMENT PANEL AND REINFORCEMENT

7. CONNECT WATER HOSES TO HEATER RADIATOR PIPES

8. CONNECT WATER VALVE CONTROL CABLE TO WATER VALVE

(See step 3 on page AC–116)

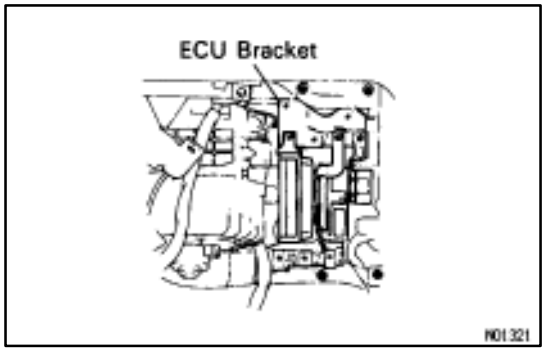
9. REFILL WITH ENGINE COOLANT

10. EVACUATE AIR FROM REFRIGERATION SYSTEM

11. CHARGE SYSTEM WITH REFRIGERANT AND INSPECT FOR LEAKAGE OF REFRIGERANT

Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)

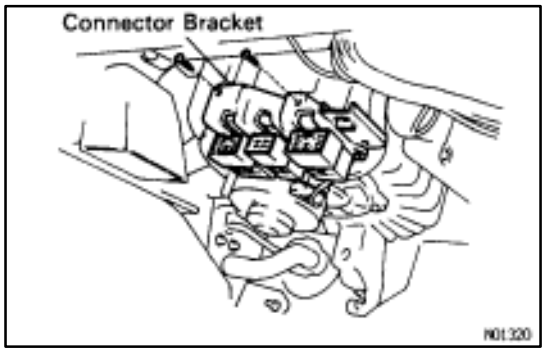


BLOWER UNIT

BLOWER UNIT REMOVAL

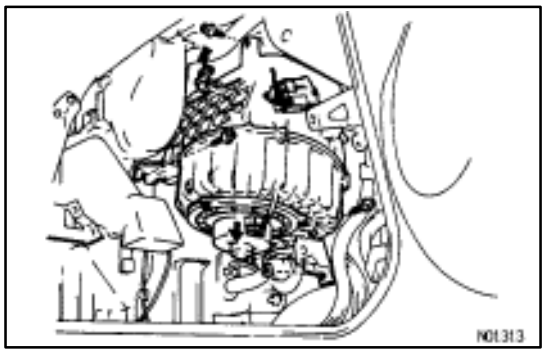
AC05S–01

1. **REMOVE GLOVE COMPARTMENT**
   (See page BO–111)
2. **REMOVE ECU AND ECU BRACKET**



3. **REMOVE CONNECTOR BRACKET**

(a) Disconnect the connector from the connector bracket.
(b) Remove the two screws and the bracket.



4. **REMOVE BLOWER UNIT**

(a) Disconnect the connectors from the blower unit.
(b) Remove the three screws, one nut and the blower unit.

BLOWER UNIT INSTALLATION

1. **INSTALL BLOWER UNIT**

(a) Install the blower unit with the three screws an one nut.
(b) Connect the connectors.

2. **INSTALL CONNECTOR BRACKET**

3. **INSTALL ECU BRACKET AND ECU**

4. **INSTALL GLOVE COMPARTMENT**
   (See page BO–111)

COMPRESSOR

ON–VEHICLE INSPECTION

AC00R–01

(Magnetic Clutch)

1. MAKE THE FOLLOWING VISUAL CHECKS

(a) Leakage of grease from the clutch bearing.

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

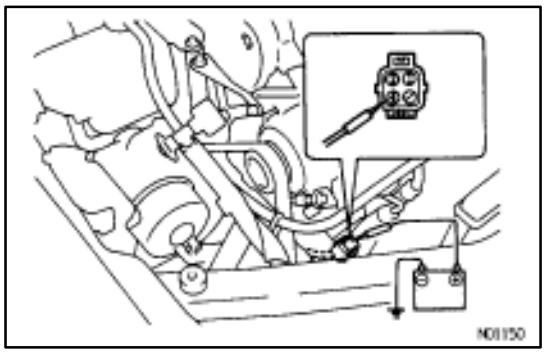
Repair or replace, as necessary.

2. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

(a) Start engine.

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

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



3. INSPECT MAGNETIC CLUTCH

(a) Disconnect the connector from the magnetic clutch.

(b) Connect the positive (+) lead from the battery to the 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.

(Compressor)

1. INSTALL MANIFOLD GAUGE SET

(See page AC–15)

2. START ENGINE

3. INSPECT COMPRESSOR FOR METALLIC SOUND

Check that there is a metallic sound from the compressor when the A/C switch is turn on.

If metallic sound is heard, replace the compressor assembly.

4. INSPECT PRESSURE OF REFRIGERATION SYSTEM

See “Refrigerant System Inspection with Manifold Gauge Set” on page AC–92.

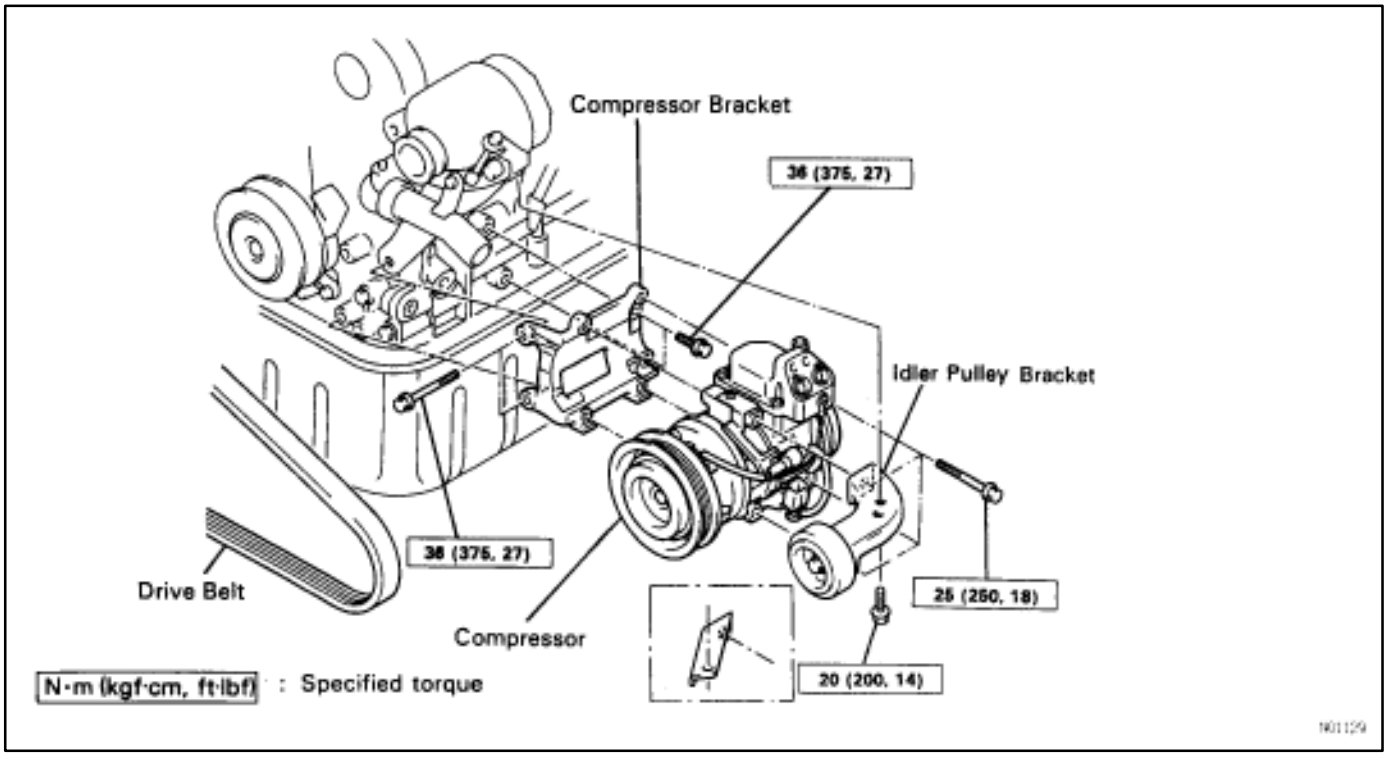
5. STOP ENGINE

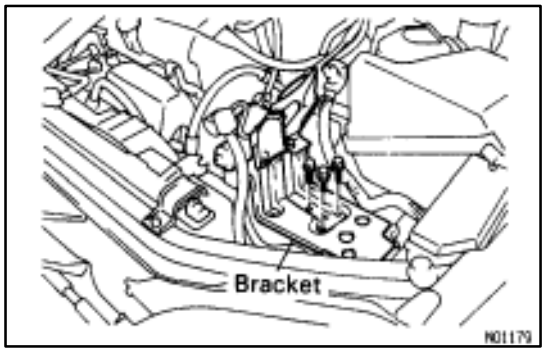
6. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT FROM SAFETY SEAL

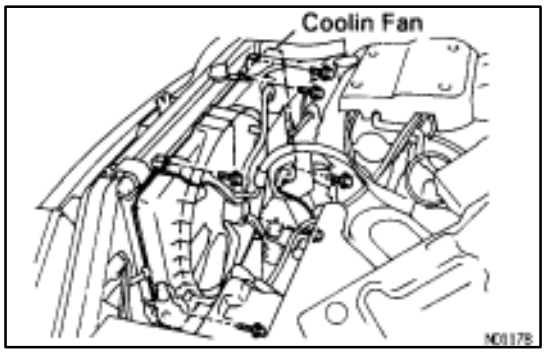
If there is any leakage, replace the compressor assembly.

COMPRESSOR REMOVAL

AC05T–01







1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX TEN MINUTES

2. STOP ENGINE

3. REMOVE BATTERY AND BRACKET

4. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

5. REMOVE COOLING FAN
(See page EG–225)

6. DISCONNECT DISCHARGE HOSE AND SUCTION HOSE FROM COMPRESSOR

7. DISCONNECT CONNECTOR FROM MAGNETIC CLUTCH

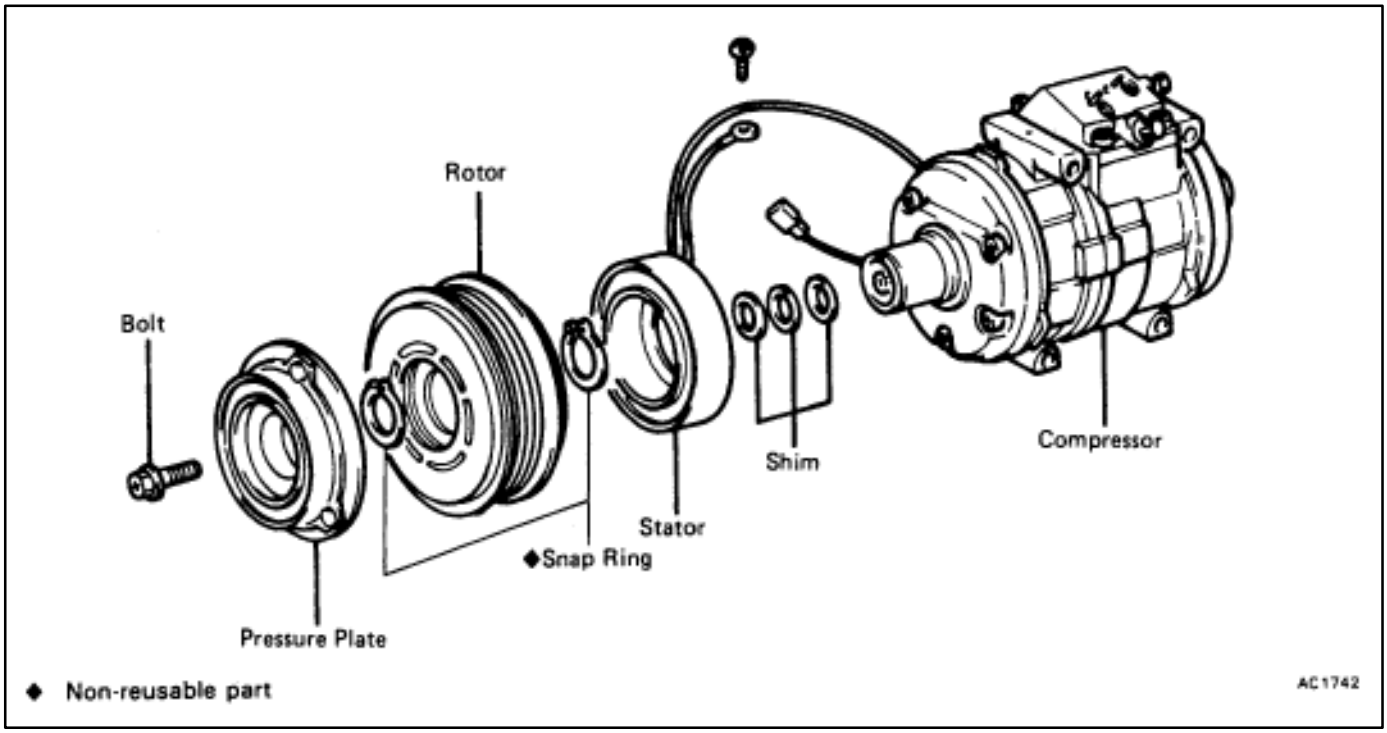
8. REMOVE COMPRESSOR

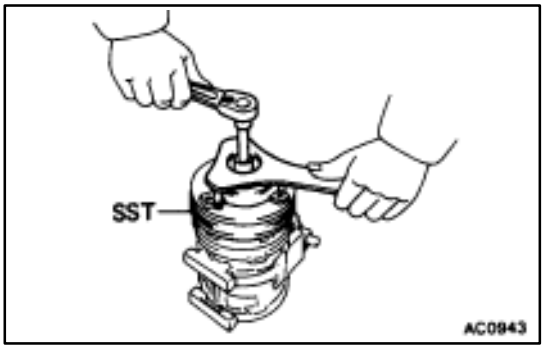
(a) Loosen the drive belt.

(b) Remove four bolts and compressor.

MAGNETIC CLUTCH DISASSEMBLY

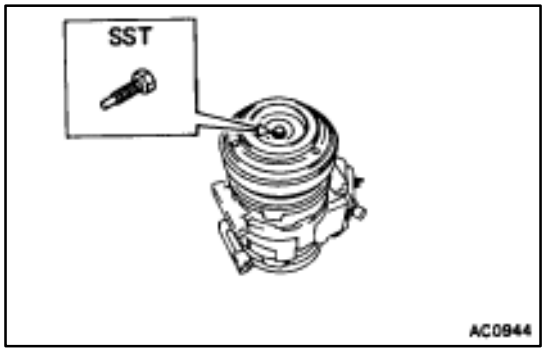
AC00T–01



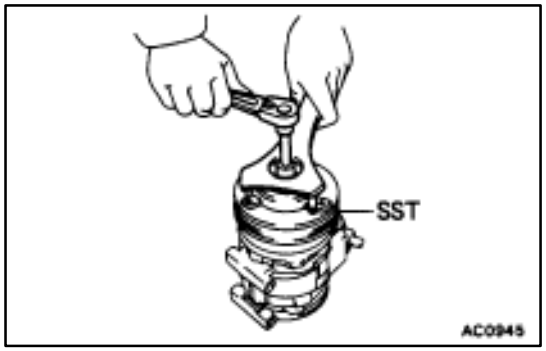


1. REMOVE PRESSURE PLATE

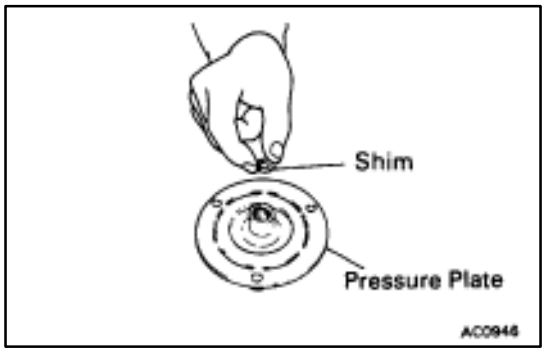
(a) Using a SST and socket wrench, remove the shaft bolt.
SST 07112–76060



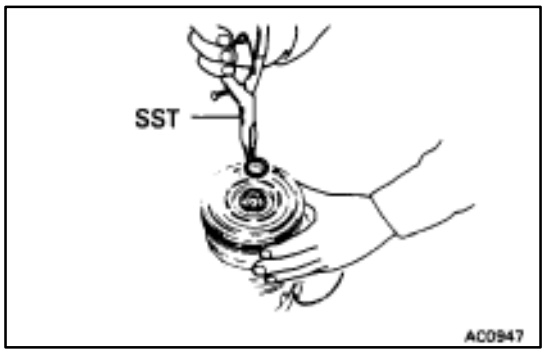
(b) Install a SST on the pressure plate.
SST 07112–66040



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

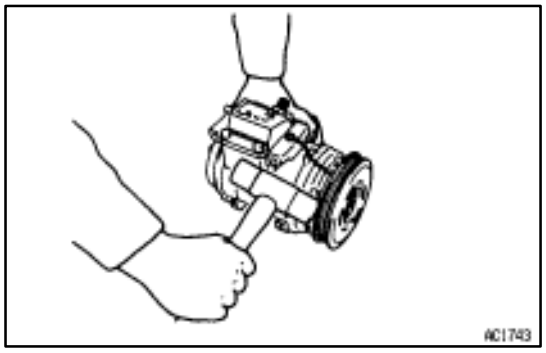


(d) Remove the shims from the pressure plate.

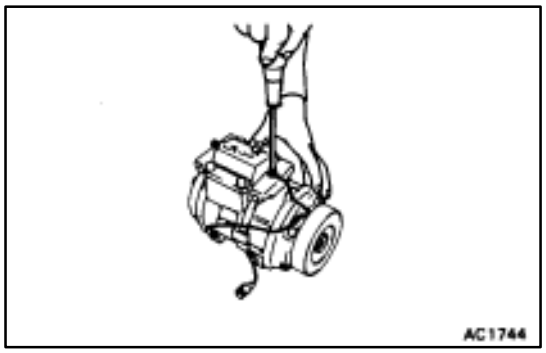


2. REMOVE ROTOR

(a) Using a SST remove the snap ring.
SST 07114–84020
CAUTION: Do not spread the point of SST widely.
Max width:
23.1 mm

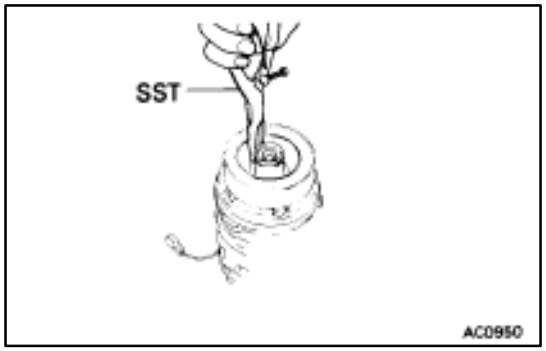


(b) Using a plastic hammer, tap the rotor off the shaft.
NOTICE: Be careful not to damage the pulley when tapping on the rotor.

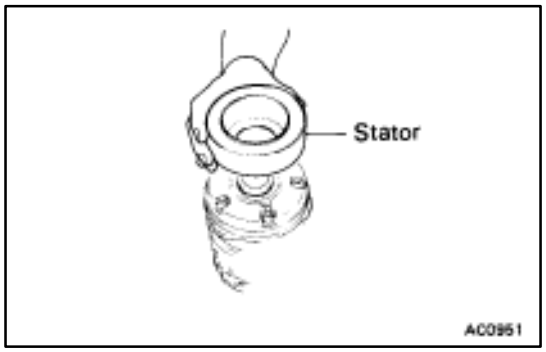


3. REMOVE STARTER

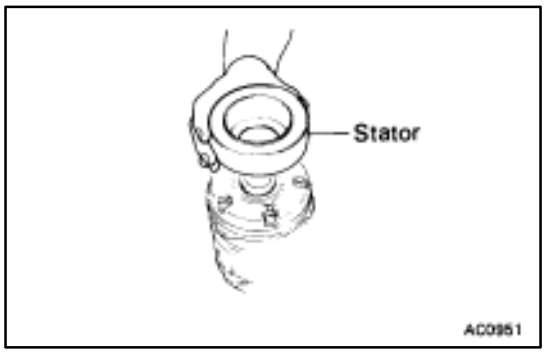
(a) Disconnect the stator lead wire from the compressor housing.



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



(c) Remove the stator.

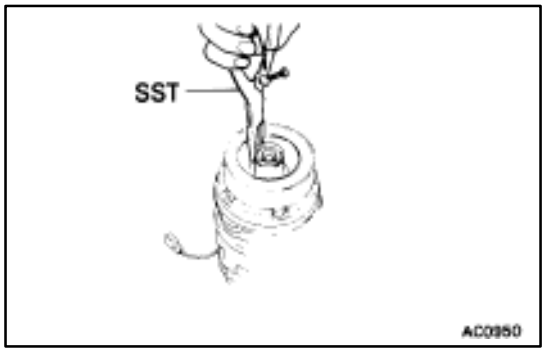


MAGNETIC CLUTCH ASSEMBLY

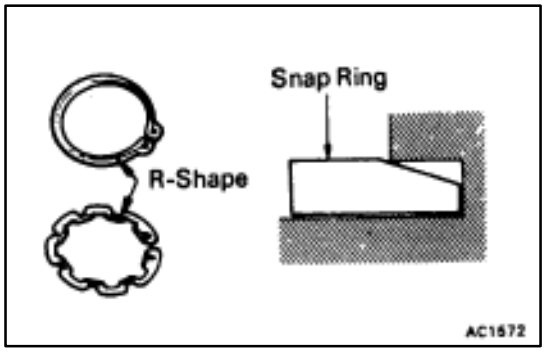
AC00U–01

1. INSTALL STATOR

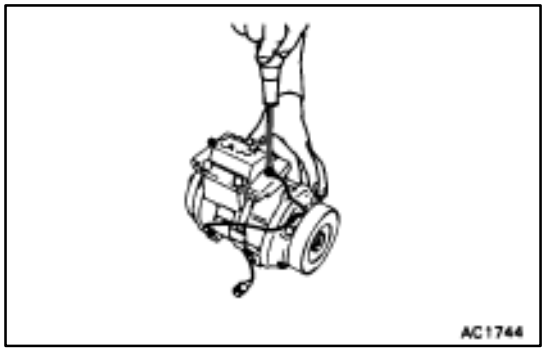
(a) Install the stator on the compressor.



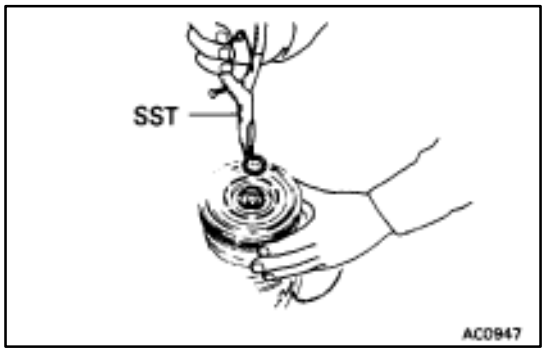
(b) Using a SST, install the new snap ring.
SST 07114–84020



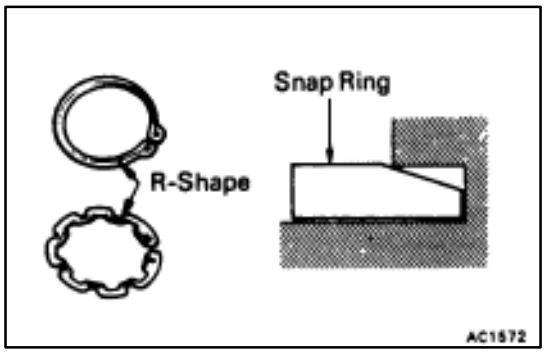
NOTICE: The snap ring should be installed so that its beveled side faces up.



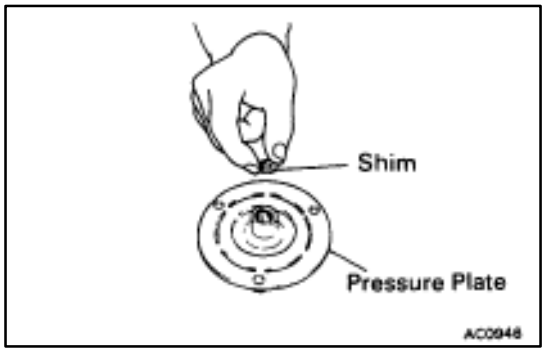
(c) Using a SST and torque wrench, fasten the magnetic clutch lead wire to the cylinder block.
Torque: 3.4 N·m (35 kgf·cm, 30 in.·lbf)
SST 07110–61050



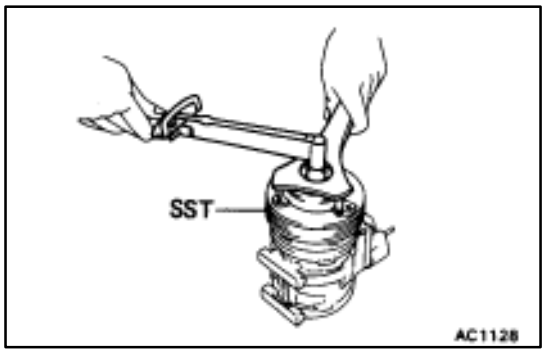
2. INSTALL ROTOR
(a) Install the rotor on the compressor shaft.
(b) Using a SST, install the new snap ring.
SST 07114–84020
CAUTION: Do not spread the point of SST widely.
Max width:
23.1 mm



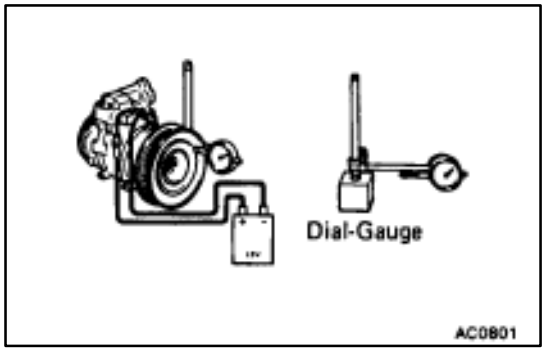
NOTICE: The snap ring should be installed so that its beveled side faces up.



3. INSTALL PRESSURE PLATE
(a) Put the shims on the pressure plate.



(b) Using a SST and torque wrench, install the shaft bolt.
SST 07112–76060
Torque: 13 N·m (135 kgf·cm, 10 ft·lbf)



4. CHECK CLEARANCE OF MAGNETIC CLUTCH

(a) Set the dial–gauge 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, whenconnect the negative (–) terminal of the battery.

Standard clearance:

0.5 ± 0.15 mm (0.020 ± 0.059 in.)

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

COMPRESSOR INSTALLATION

AC02C–01

1. INSTALL COMPRESSOR

(a) Install compressor with four bolts.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Install drive belt.

2. CONNECT CONNECTOR TO MAGNETIC CLUTCH

3. CONNECT DISCHARGE HOSE AND SUCTION HOSE TO COMPRESSOR

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

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

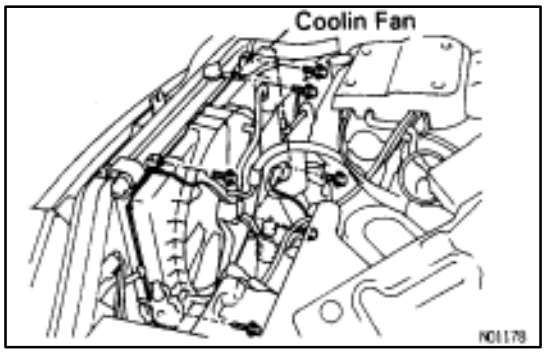
Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

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

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

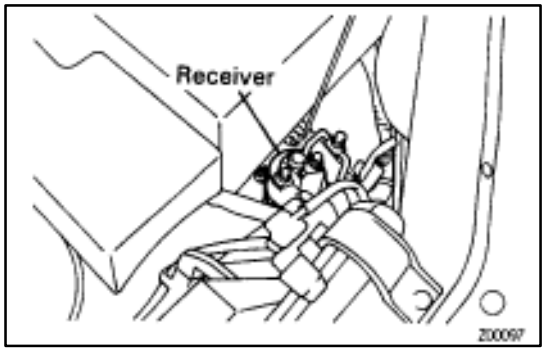


6. INSTALL COOLING FAN
(See page EG–261 and 265)

7. INSTALL BRACKET

8. INSTALL BATTERY

9. INSPECT A/C OPERATION



RECEIVER
ON–VEHICLE INSPECTION

AC00W–01

INSPECT FITTINGS FOR LEAKAGE

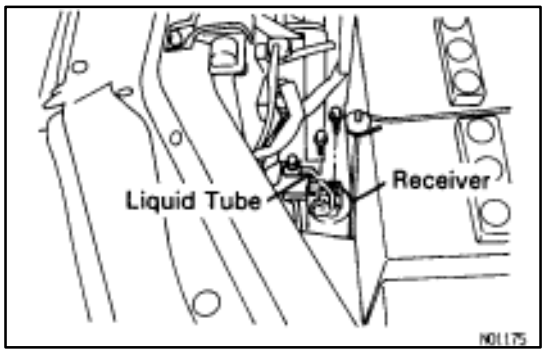
Using a gas leak tester, check for leakage.

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

RECEIVER REMOVAL

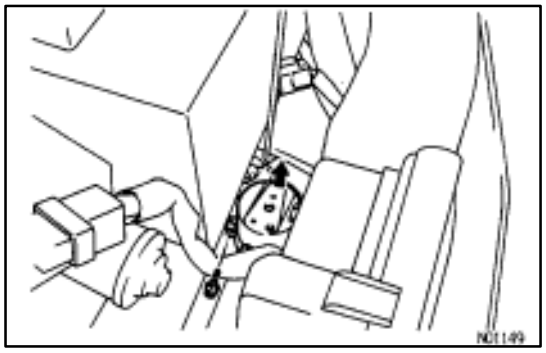
AC00X–01

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM



2. REMOVE TWO LIQUID TUBES FROM RECEIVER

Remove two bolts and both tubes from the receiver.



3. REMOVE RECEIVER FROM RECEIVER HOLDER

Remove the bolt, then remove the receiver from receiver holder.

NOTICE: Cap the open fittings immediately to keeps moisture out of the system.

RECEIVER INSTALLATION

AC00Y–01

1. INSTALL RECEIVER INTO RECEIVER HOLDER

Install the receiver into the receiver, holder with the bolt.

2. INSTALL TWO LIQUID TUBES TO RECEIVER

Install two liquid tubes to the receiver with two bolts.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE: Do not remove the caps until the tubes are connected.

3. REPLENISH COMPRESSOR OIL IF RECEIVER HAS BEEN REPLACED

Add 15 cm (0.5 fl.oz.)

Compressor oil:

ND OIL 6

SUNISO NO. 5 GS or equivalent

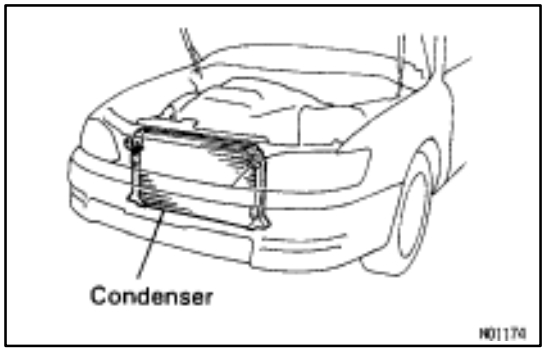
4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50 g (33.51 ± 1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

6. INSPECT A/C OPERATION



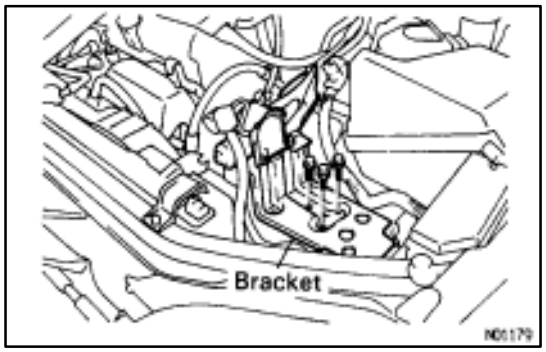
CONDENSER

ON–VEHICLE INSPECTION

AC05U–01

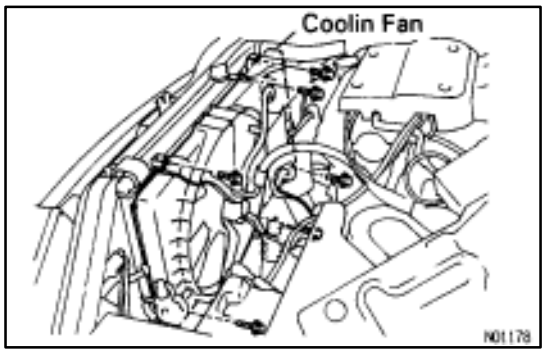
1. **INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE**
   If the fins are clogged, wash them with water and dry with compressed air.
   NOTICE: Be careful not to damage the fins.
   If the fins are bent straighten them with a screwdriver or pliers.

2. **INSPECT CONDENSER AND FITTINGS FOR LEAKAGE**
   Using a gas leak tester, check for leakage.
   If there is leakage, check the tightening torque at the joints.

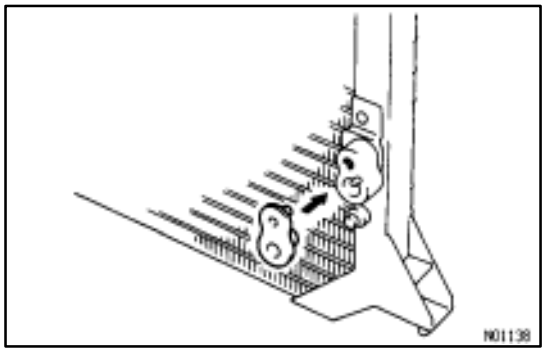


CONDENSER REMOVAL

1. **REMOVER REFRIGERANT FROM REFRIGERATION SYSTEM**

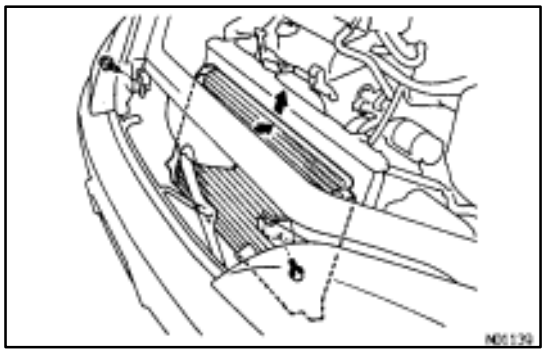


2. **REMOVE BATTERY**
3. **REMOVE UPPER COVER**
4. **REMOVE BRACKET**
5. **REMOVE COOLING FAN**
   (See page EG–255)
6. **REMOVE UPPER SUPPORT**
   Remove two bolts and two upper supports.

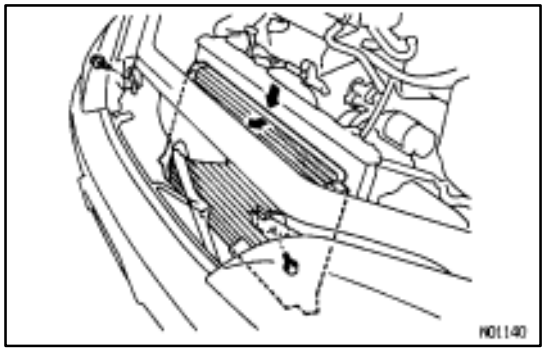


7. **REMOVE LIQUID TUBES**
   Remove two bolts and two tubes.
   NOTICE: Cap the open fittings immediately to keep moisture out of the system.

8. **REMOVE HEADLIGHTS ON THE BOTH SIDES**



9. **REMOVE CONDENSER**
   Remove two bolts and lean the radiator backward, then remove the condenser.



CONDENSER INSTALLATION

AC011–02

1. INSTALL CONDENSER

Install the condenser with two bolt.

2. INSTALL LIQUID TUBES

Install both tubes with two bolts.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE: Do not remove caps until the tube is installed.

3. INSTALL COOLING FAN

(See page EG–261 and 265)

4. REPLENISH COMPRESSOR OIL IF CONDENSER HAS BEEN REPLACED

Add 35 cm (1.2 fl.oz.)

Compressor Oil:

ND OIL 6

SUNISO NO. 5 GS or equivalent

5. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50g (33.51 ± 1.76 oz)

6. INSPECT FOR LEAKAGE OF REFRIGERANT

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

7. INSTALL REMOVAL PARTS

Install the removal parts in reverse order of removal procedure.

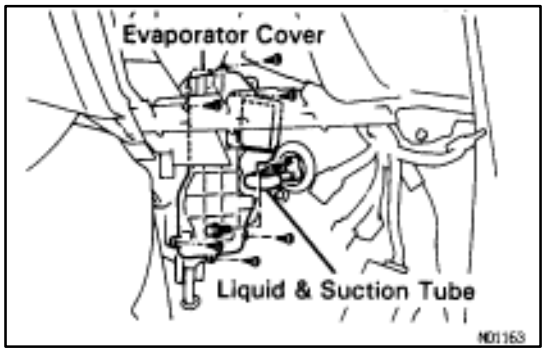
EVAPORATOR

EVAPORATOR REMOVAL

AC012–01

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

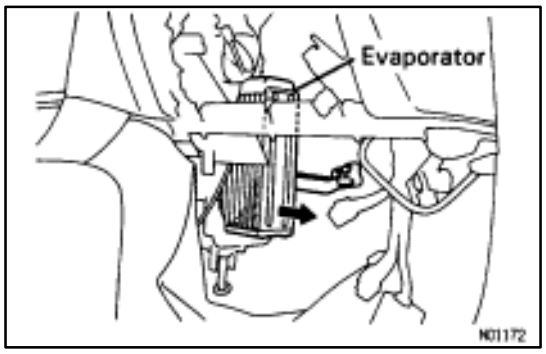
2. REMOVE BLOWER UNIT
(See page AC–101)



3. REMOVE EVAPORATOR COVER

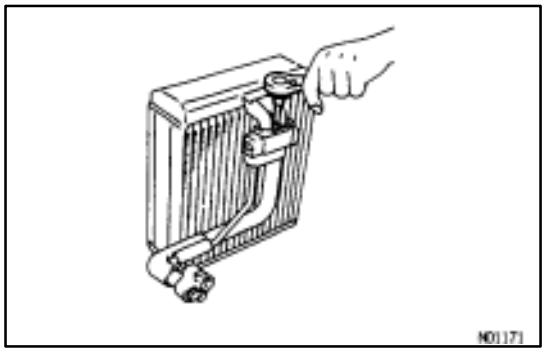
(a) Remove two bolts for the liquid and suction tube.

(b) Remove eight screws and evaporator cover.



4. REMOVE EVAPORATOR

(a) Pull and remove the evaporator.



(b) Remove two bolts using a hexagon wrench and separate the evaporator and expansion valve.

EVAPORATOR INSPECTION

AC013–01

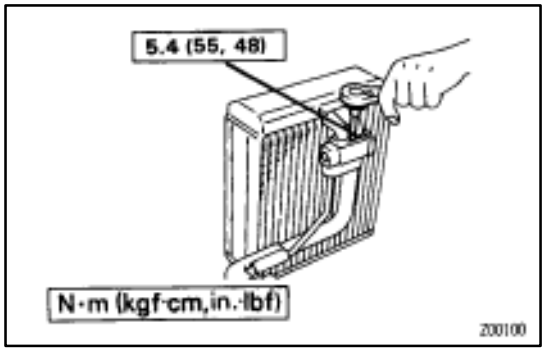
1. INSPECT FINS FOR BLOCKAGE

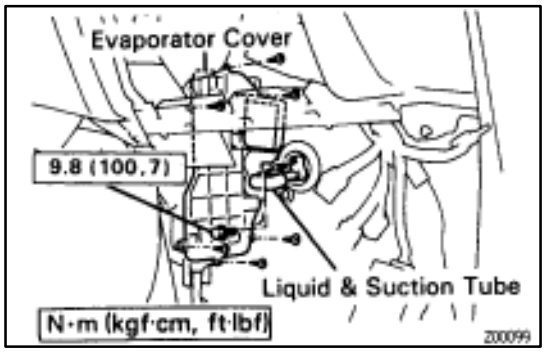
If the fins are clogged, clean them with compressed air.

NOTICE: Never use water to clean the evaporator.

2. INSPECT FITTINGS FOR CRACKS OR SCRATCHES

Repair as necessary.





EVAPORATOR INSTALLATION

AC014–01

1. INSTALL REMOVAL PARTS

Install the removal parts in reverse order of removal procedure.

HINT:

- The tightening torque for the bolt used to install the expantion valve on the evaporator is shown below.

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

- The tightening torque for the bolts used to install the liquid and suction tube is shown below.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

2. REPLENISH COMPRESSOR OIL IF EVAPORATOR HAS BEEN REPLACED

Add 45 cm (1.6 fl.oz)

Compressor oil:

ND OIL 6

SUNISO No. 5 GS or equivalant

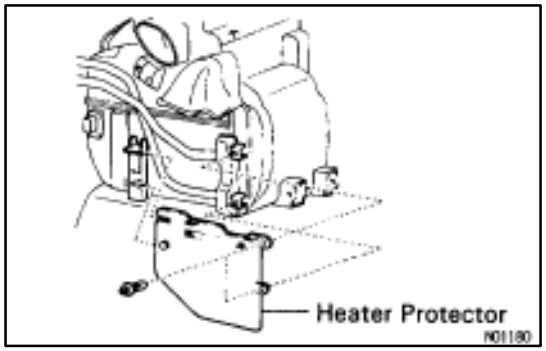
3. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

950 ± 50g (33.51 ± 1.76 oz)

4. INSPECT FOR LEAKAGE OF REFRIGERANT

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



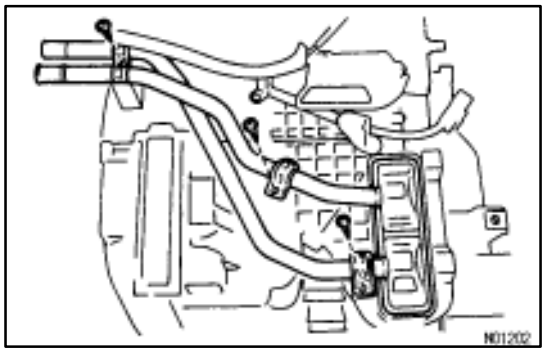
HEATER RADIATOR

HEATER RADIATOR REMOVAL

AC015–01

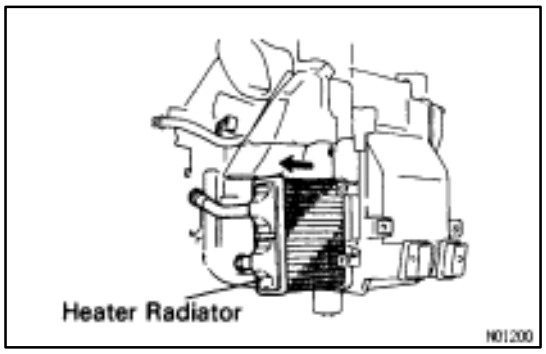
1. REMOVE HEATER PROTECTOR

Remove the two clips and the heater protector.



2. REMOVE HEATER RADIATOR

(a) Remove the three screws and the three clamps.



(b) Disconnect the heater pipes.

(c) Pull the heater radiator out.

HEATER RADIATOR INSPECTION

INSPECT FINS FOR BLOCKAGE

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

HEATER RADIATOR INSTALLATION

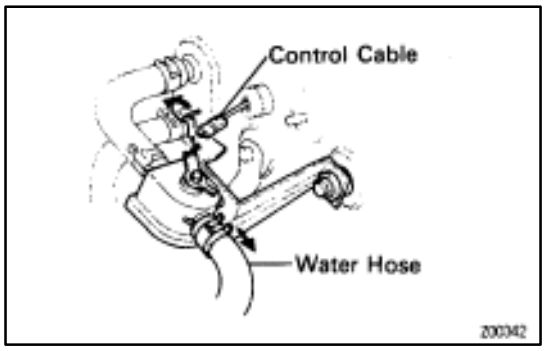
1. INSTALL HEATER RADIATOR TO A/C UNIT

(a) Put the radiator in the A/C UNIT

(b) Connect the heater pipes.

(c) Install the three clamps with three screws.

2. INSTALL HEATER PROTECTOR



WATER VALVE

WATER VALVE REMOVAL

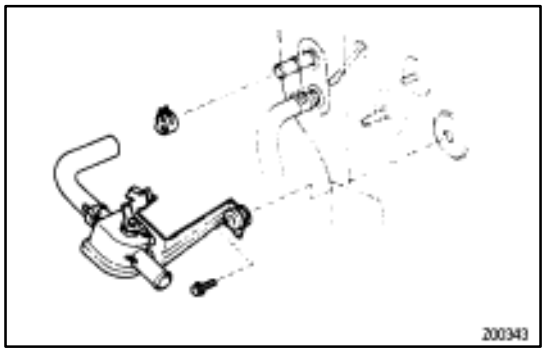
AC016–01

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT: It is not necessary to drain out all the coolant.

2. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE

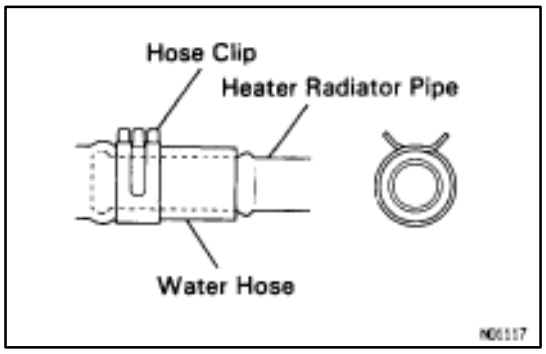
3. DISCONNECT WATER HOSE FROM WATER VALVE



4. REMOVE WATER VALVE

(a) Disconnect the water hose from the heater radiator pipe.

(b) Remove the bolt and the water valve



WATER VALVE INSTALLATION

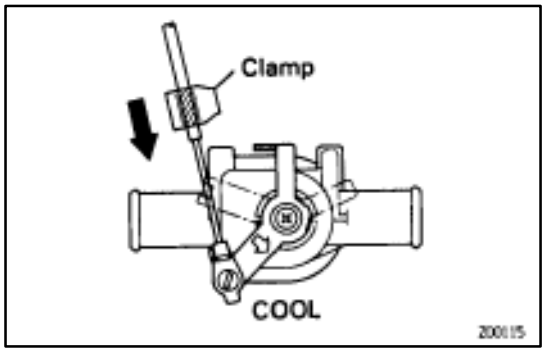
AC017–01

1. INSTALL WATER VALVE

(a) Push the water hose onto the heater radiator pipe as far as rige on the pipe and install the hose clip.

(b) Install water valve with the one bolt.

2. CONNECT HEATER HOSE TO WATER VALVE



3. CONNECT WATER VALVE CONTROL CABLE TO WATER VALVE

(a) Set the temperature control switch to “COOL”.

(b) Set the water valve lever to “COOL”, install the control cable and lock the clamp.

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

EXPANSION VALVE

ON–VEHICLE INSPECTION

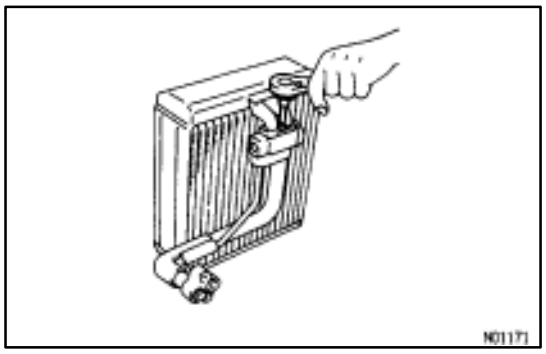
AC018–01

1. **CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE**

2. **INSTALL MANIFOLD GAUGE SET**

3. **RUN ENGINE**
   Run the engine at 2,000 rpm for at least 5 minutes. Then check that the high pressure reading is 1,275–1,471 kPa (13–15 kgf/cm , 185–213 psi).

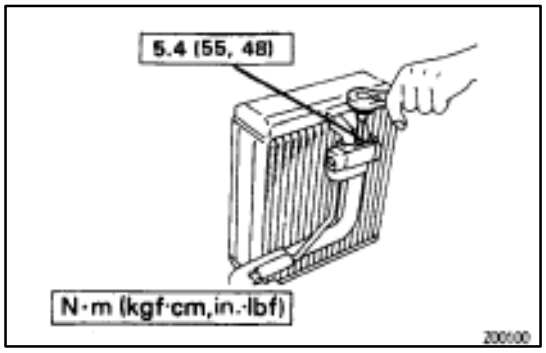
4. **CHECK EXPANSION VALVE**
   If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm , 0 psi).
   HINT: When the low pressure drops to 0 kPa (0 kgf/ cm , 0 psi), feel the receiver's IN and OUT sides for no temperature difference.



EXPANSION VALVE REMOVAL

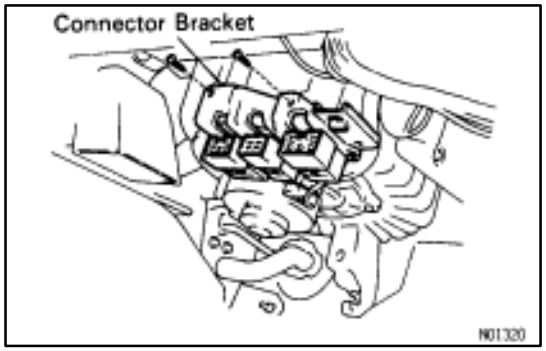
AC019–01

1. **REMOVE EVAPORATOR**
   (See page AC–113)
2. **REMOVE EXPANSION VALVE**
   (See page AC–113)



EXPANSION VALVE INSTALLATION

1. **INSTALL EXPANSION VALVE**
   (See page AC–114)
2. **INSTALL EVAPORATOR**
   (See page AC–114)

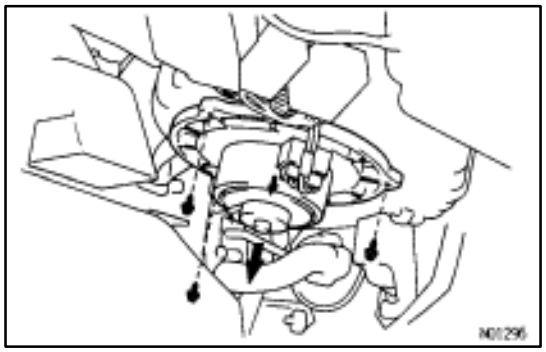


BLOWER MOTOR

BLOWER MOTOR REMOVAL

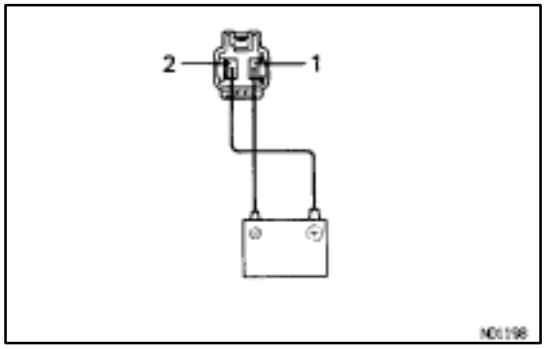
AC01C–01

1. **REMOVE INSTRUMENT LOWER PANEL AND UNDER COVER NO. 2**
   (See page BO–110)
2. **REMOVE CONNECTOR BRACKET**
   Remove the two screws and the bracket



3. **REMOVE MOTOR**

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



BLOWER MOTOR INSPECTION

AC01D–01

INSPECT BLOWER MOTOR OPERATION

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

BLOWER MOTOR INSTALLATION

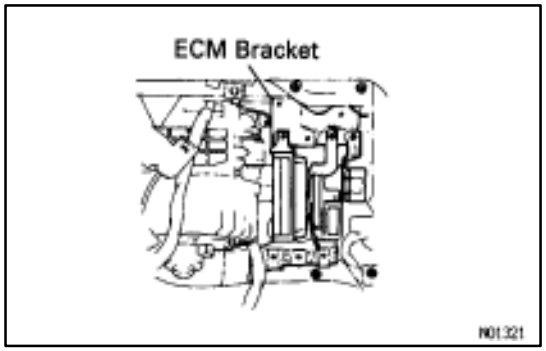
AC01E–01

1. **INSTALL MOTOR**

(a) Install the motor with three screws.
(b) Connect the connector.

2. **INSTALL CONNECTOR BRACKET**

3. **INSTALL INSTRUMENT LOWER PANEL AND UNDER COVER NO. 2**

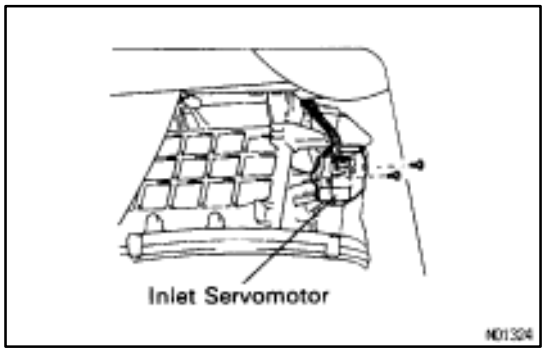


AIR INLET SERVOMOTOR

AIR INLET SERVOMOTOR REMOVAL

AC01G–01

1. **REMOVE GLOVE COMPARTMENT**
   (See page BO–111)
2. **REMOVE ECU AND ECU BRACKET**



3. **REMOVE SERVOMOTOR**

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

AIR INLET SERVOMOTOR INSPECTION

AC05V–01

(See page AC–64)

AIR INLET SERVOMOTOR INSTALLATION

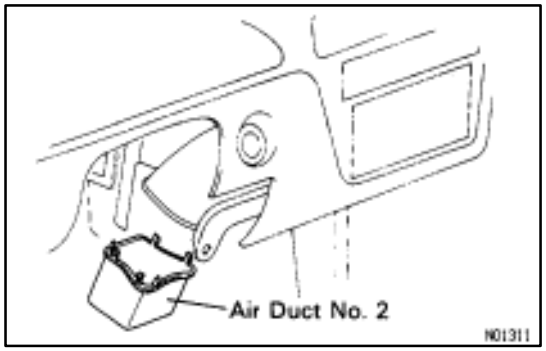
AC01J–01

1. **INSTALL SERVOMOTOR**

(a) Install the servomotor with two screws.
(b) Connect the connector.

2. **INSTALL ECU AND ECU BRACKET**

3. **INSTALL GLOVE COMPARTMENT**

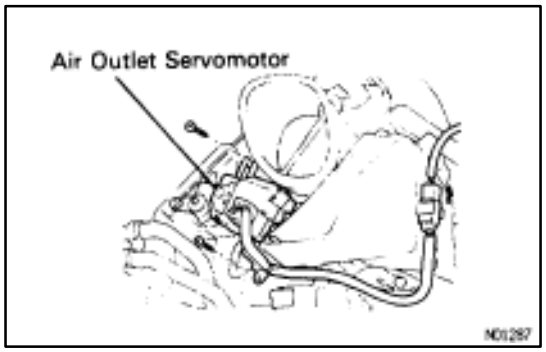


AIR OUTLET SERVOMOTOR

AIR OUTLET SERVOMOTOR REMOVAL

AC01K–01

1. **REMOVE INSTRUMENT LOWER FINISH PANEL AND AIR DUCT**
   (See pages BO–110 and 113)
2. **REMOVE AIR DUCT NO. 2**



3. **REMOVE SERVOMOTOR**

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

AIR OUTLET SERVOMOTOR INSPECTION

AC05W–01

(See page AC–66)

AIR OUTLET SERVOMOTOR INSTALLATION

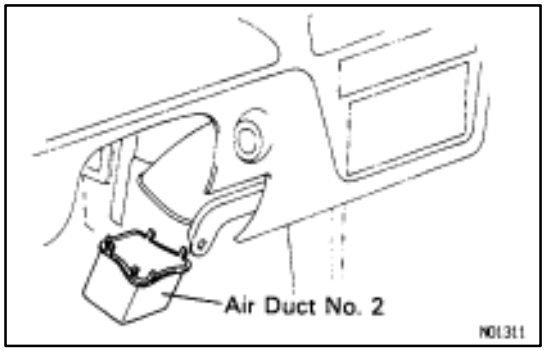
AC01M–02

1. **INSTALL SERVOMOTOR**

(a) Install the servomotor with two screws.
(b) Connect the connector.

2. **INSTALL HEATER DUCT**

3. **INSTALL LOWER FINISH PANEL**

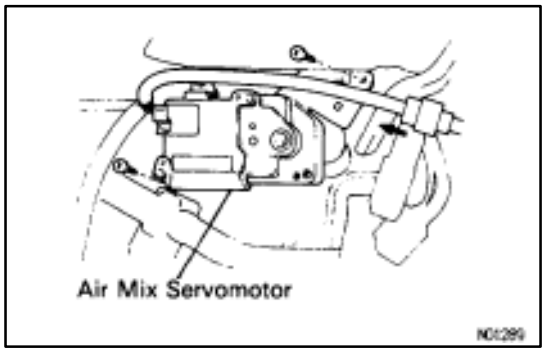


AIR MIX SERVOMOTOR

AIR MIX SERVOMOTOR REMOVAL

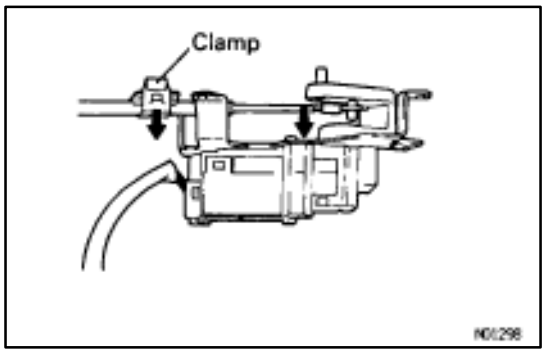
AC05X–01

1. **REMOVE INSTRUMENT LOWER FINISH PANEL, SAFETY RAD NO 2. AND AIR DUCT**
   (See pages BO–110 and 113)
2. **REMOVE AIR DUCT NO 2.**



3. **REMOVE SERVOMOTOR**

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



(c) Disconnect the control cable.

AIR MIX SERVOMOTOR INSPECTION

AC05Y–01

(See page AC–60)

AIR MIX SERVOMOTOR INSTALLATION

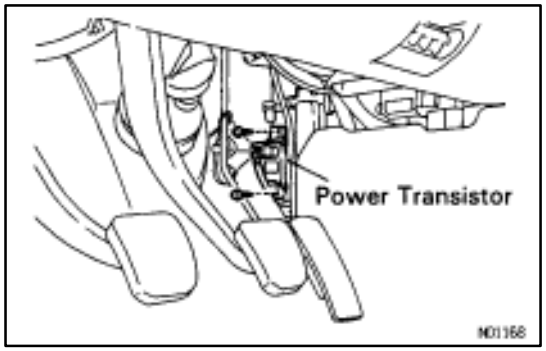
AC05Z–01

1. **INSTALL SERVOMOTOR**

(a) Connect the control cable.
(b) Install the servomotor with two screws.
(c) Connect the connector.

2. **INSTALL HEATER DUCT**

3. **INSTALL INSTRUMENT LOWER FINISH PANEL**



POWER TRANSISTOR

POWER TRANSISTOR REMOVAL

AC060–01

1. REMOVE INSTRUMENT LOWER FINISH PANEL, SAFETY PAD NO 2. AND AIR DUCT
(See pages BO–110 and 113)

2. REMOVE POWER TRANSISTOR

(a) Disconnect the connector.

(b) Remove the two screws and the power transistor.

POWER TRANSISTOR INSPECTION

AC061–01

(See page AC–76)

POWER TRANSISTOR INSTALLATION

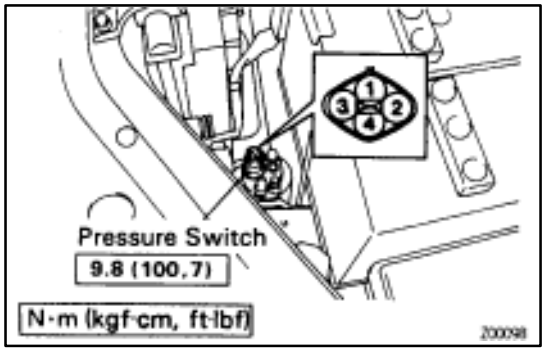
AC062–01

1. INSTALL POWER TRANSISTOR

(a) Install power transistor with tow screws.

(b) Connect the connector.

2. INSTALL AIR DUCT, INSTRUMENT LOWER FINISH PANEL AND SAFETY PAD NO 2.



PRESSURE SWITCH

PRESSURE SWITCH REMOVAL

AC01S–02

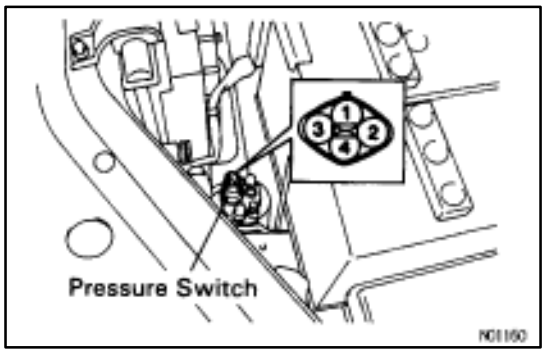
1. RECOVER REFRIGERANT IN REFRIGERATION SYSTEM

2. REMOVE PRESSURE SWITCH

(a) Disconnect the connector.

(b) Remove the pressure switch from the liquid tube.

HINT: Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and remove the switch.



PRESSURE SWITCH INSTALLATION

AC01T–01

1. INSTALL PRESSURE SWITCH

(a) Install the pressure switch to the liquid tube.

Torque: 9.8 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 install the switch.

(b) Connect the connector.

2. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount:

750 ± 50 g (33.51 ± 1.76 oz)

3. INSPECT FOR LEAKAGE OF REFRIGERANT

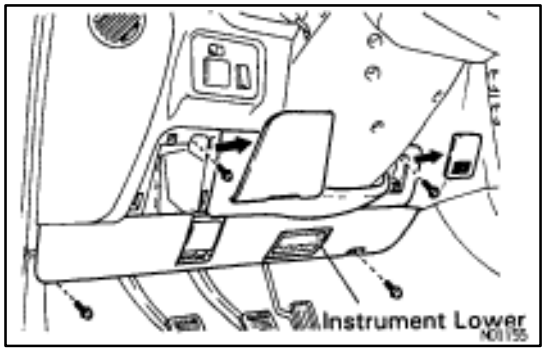
Using a gas leak tester, check for leakage of refrigerant from the pressure switch mount.

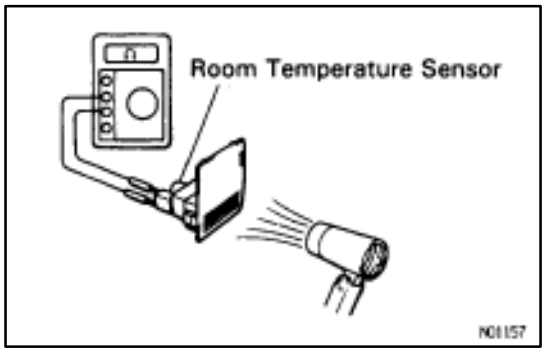
4. INSPECT A/C OPERATION

PRESSURE SWITCH INSPECTION

AC063–01

(See page AC–56)





ROOM TEMPERATURE SENSOR

ROOM TEMPERATURE SENSOR REMOVAL

AC064–01

1. **REMOVE LOWER PANEL**
   Disconnect room temperature sensor connector.
2. **REMOVE ROOM TEMPERATURE SENSOR FROM LOWER PANEL**

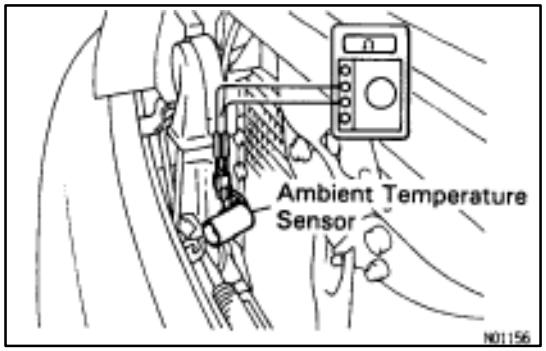
ROOM TEMPERATURE SENSOR INSPECTION

(See page AC–44)

ROOM TEMPERATURE SENSOR INSTALLATION

INSTALL ROOM TEMPERATURE SENSOR

Install room temperature sensor in reverse order of removal procedure.



AMBIENT TEMPERATURE SENSOR

AMBIENT TEMPERATURE SENSOR REMOVAL

AC065–01

REMOVE AMBIENT TEMPERATURE SENSOR

(a) Disconnect the connector.
(b) Remove the ambient temperature sensor.

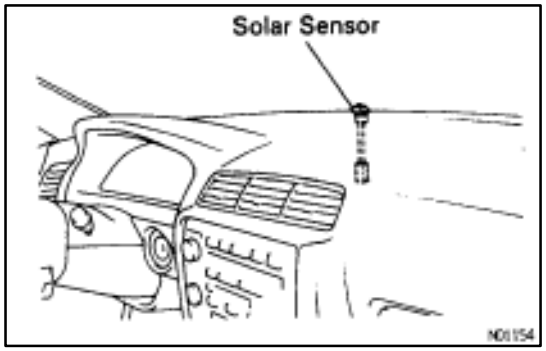
AMBIENT TEMPERATURE SENSOR INSPECTION

(See page AC–46)

AMBIENT TEMPERATURE SENSOR INSTALLATION

INSTALL AMBIENT TEMPERATURE SENSOR

Install ambient temperature sensor in reverse order of removal procedure.



SOLAR SENSOR

SOLAR SENSOR REMOVAL

AC066–01

REMOVE SOLAR SENSOR FROM DASHBOARD

(a) Remove solar sensor form dashboard.
(b) Disconnect solar sensor connector.

SOLAR SENSOR INSPECTION

(See page AC–52)

SOLAR SENSOR INSTALLATION

INSTALL SOLAR SENSOR

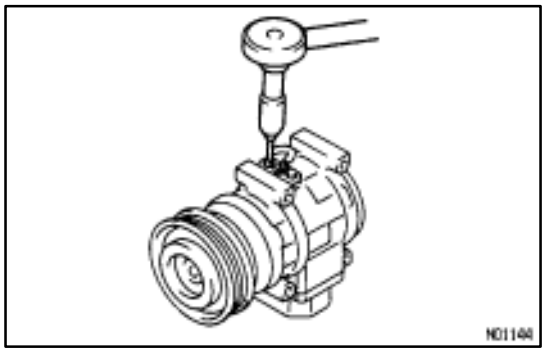
Install solar sensor in reverse order of removal procedure.

REVOLUTION DETECTING SENSOR

ON–VEHICLE INSPECTION

AC067–01

(See page AC–54)



REVOLUTION DETECTING SENSOR REMOVAL

AC01Y–01

1. **REMOVE COMPRESSOR**
   (See page AC–103)
2. **REMOVE REVOLUTION DETECTING SENSOR**

(a) Remove two bolts.

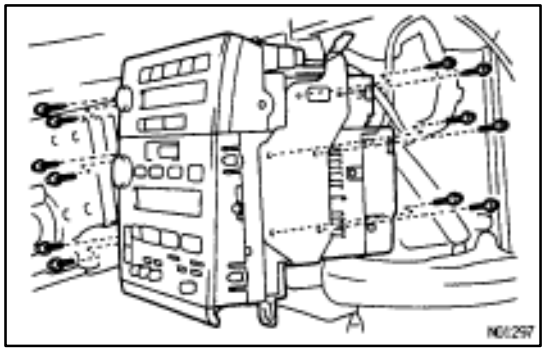
(b) Remove the revolution detecting sensor.

REVOLUTION DETECTING SENSOR INSTALLATION

AC01Z–01

1. **INSTALL REVOLUTION DETECTING SENSOR**
   Using a torque wrench, tighten the bolts.
   Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

2. **INSTALL COMPRESSOR**
   (See page AC–108)



AIR CONDITIONING CONTROL ASSEMBLY

ACO68–01

A/C CONTROL ASEMBLY REMOVAL

1. **REMOVE RADIO AND A/CCONTROL ASSEMBLY**
   (See page BO–112)

2. **REMOVE A/C CONTROL ASSEMBLY**
   Remove four screws, eight bolts and the A/C control assembly.

A/C CONTROL ASSEMBLY INSPECTION

AC069–01

Jadge whether the system is satisfactory or not based on the Troubleshooting procedure on page AC–22.

A/C CONTROL ASSEMBLY INSTALLATION

AC06A–01

1. **INSTALL A/C CONTROL ASSEMBLY TO RADIO**

2. **INSTALL RADIO AND A/C CONTROL ASSEMBLY**
   (See page BO–112)

SERVICE SPECIFICATIONS

SERVICE DATA

AC029–03

Refrigerant charge volume	950 ± 50 g 33.51 ± 1.76 oz
Drive belt tention	–
New belt	165 ± 26 lb
Used belt	88 ± 22 lb
Idle speed	–
Magnetic clutch no engaged	Approx. 700 rpm
Magnetic clutch engaged	Approx. 700 rpm
Magnetic clutch clearance	0.5 ± 0.15 mm (0.020 ± 0.006 in.)

TORQUE SPECIFICATIONS

AC02A–01

Part tightened	N·m	kgf·cm	ft·lbf
Suction hose X Compressor	25	250	18
Discharge hose X Compressor	25	250	18
Compressor X Engine	25	250	18
Liquid X Receiver	9.8	100	7
Lequid X Condensor	9.8	100	7
Expansion valve X Evaporator	5.4	55	48 in.·lbf
Suction tube X A/C unit	9.8	100	7
Liquid tube X A/C unit	9.8	100	7
Pressure switch X Liquired tube	9.8	100	7

TROUBLESHOOTING

How to Proceed with Troubleshooting

Perform troubleshooting in accordance with the procedure on the following page.

CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem. A subjective complaint such as “poor air conditioning efficiency” is also considered in the air conditioning complaints.

Therefore, in “Customer Problem Analysis” and “Problem Symptom Confirmation”, check carefully to determine whether the level of performance is the actual (normal) level or whether it is abnormal. Then perform troubleshoot accordingly.

[2] **CHECK AND CLEAR THE DIAGNOSTIC TROUBLE CODES (PRECHECK)**

First check the diagnostic trouble codes to see if there are any malfunction codes stored in memory.
If there are malfunction codes, make a note of them, then clear them and proceed to “5 Problem Symptom Confirmation”.

5 **PROBLEM SYMPTOM CONFIRMATION, ° SYMPTOM SIMULATION**

Confirm the problem symptoms. If the problem does not reappear, be sure to simulate the problem by mainly checking the circuits indicated by the diagnostic trouble code in step [2], using “Problem Simulation Method”.

• **DIAGNOSTIC TROUBLE CODE CHECK**

Check the diagnostic trouble codes. Check for problems with the sensors or the wire harness.

[6] **DIAGNOSTIC TROUBLE CHART**

If a malfunction code is confirmed in the diagnostic trouble code check, proceed to the check procedure indicated by the matrix chart for each diagnostic trouble code.

[7] **MATRIX CHART OF PROBLEM SYMPTOMS**

If the normal code is confirmed in the diagnostic trouble code check, perform inspection in accordance with the inspection order in the matrix chart of problem symptoms.

[8] **CIRCUIT INSPECTION**

Proceed with diagnosis of each circuit in accordance with the inspection order cofirmed in [6] and [7].
Determine whether the cause of the problem is in the sensor, actuators, wire harness and connectors, or the ECU.

[9] **ACTUATOR CHECK**

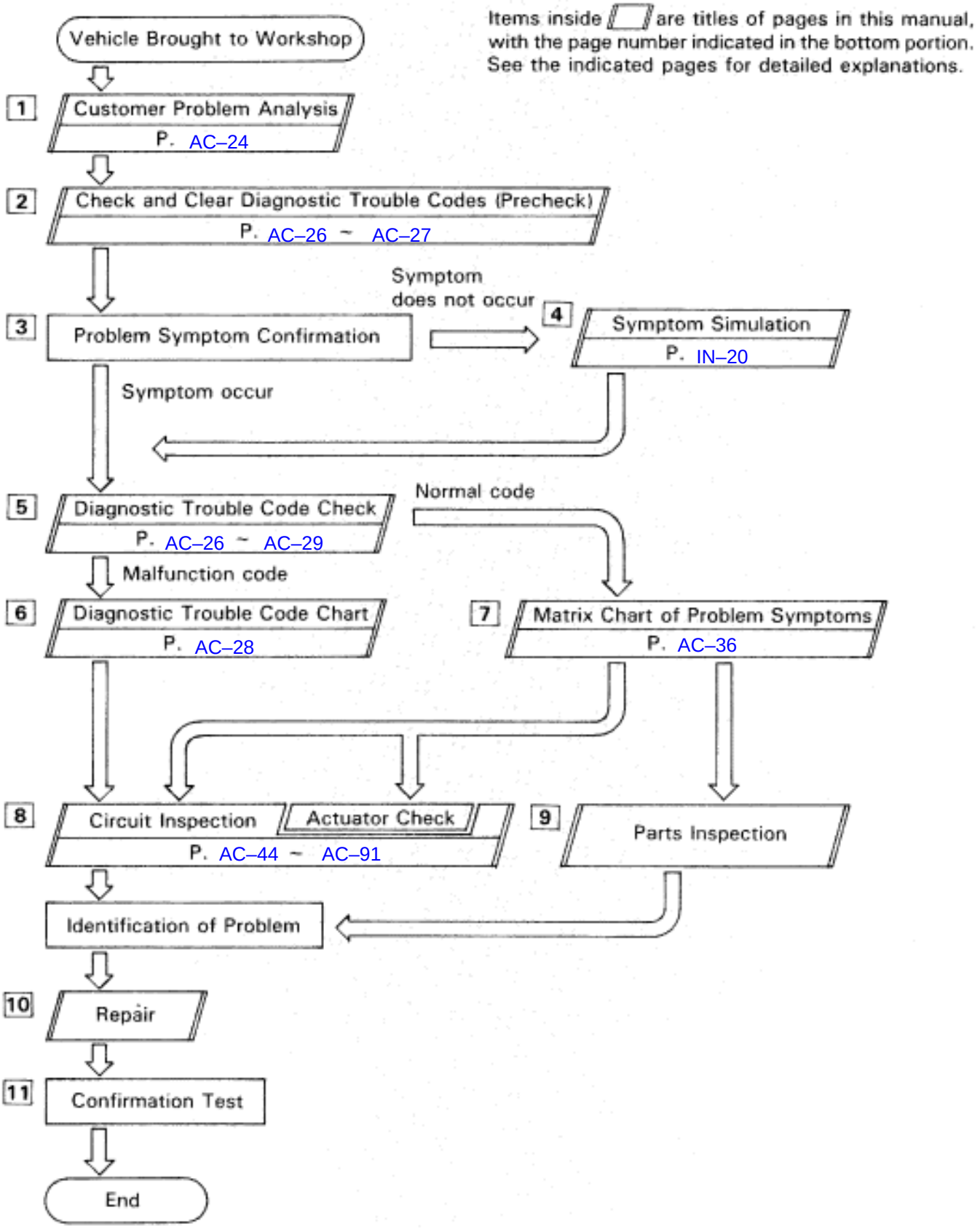
Check actuators for proper operation. Instructions for this diagnosis are given in the flow chart for each circuit.

[10] **REPAIRS**

After the cause of the problem is located, perform repairs by following the inspection and replacement procedures in this manual.

11 CONFIRMATION TEST

After completing repairs, confirm not only that the malfunction is eliminated, but also perform diagnostic trouble check and actuator check, etc. again to make sure the entire air conditioning system is operating correctly.


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.
Vehicle Brought to Workshop
1 Customer Problem Analysis
P. AC–24
2 Check and Clear Diagnostic Trouble Codes (Precheck)
P. AC–26 ~ AC–27
3 Problem Symptom Confirmation
Symptom does not occur
4 Symptom Simulation
P. IN–20
Symptom occur
5 Diagnostic Trouble Code Check
P. AC–26 ~ AC–29
Normal code
Malfunction code
6 Diagnostic Trouble Code Chart
P. AC–28
7 Matrix Chart of Problem Symptoms
P. AC–36
8 Circuit Inspection
Actuator Check
P. AC–44 ~ AC–91
9 Parts Inspection
Identification of Problem
10 Repair
11 Confirmation Test
End

CUSTOMER PROBLEM ANALYSIS

AIR CONDITIONING SYSTEM Check Sheet

Inspector's Name :

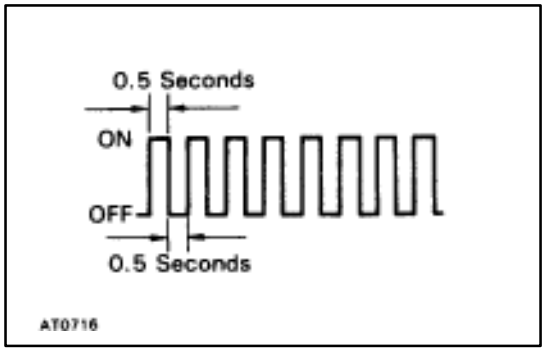
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Miles

Conditions of Problem Occurrence	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 operate ☐ 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)
	Air Outlet Control is Faulty	☐ Air outlet mode will not change ☐ Will not enter the desired air outlet mode

Diagnostic Trouble Code Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

–MEMO–



DIAGNOSIS SYSTEM

Warning for A/C compressor lock

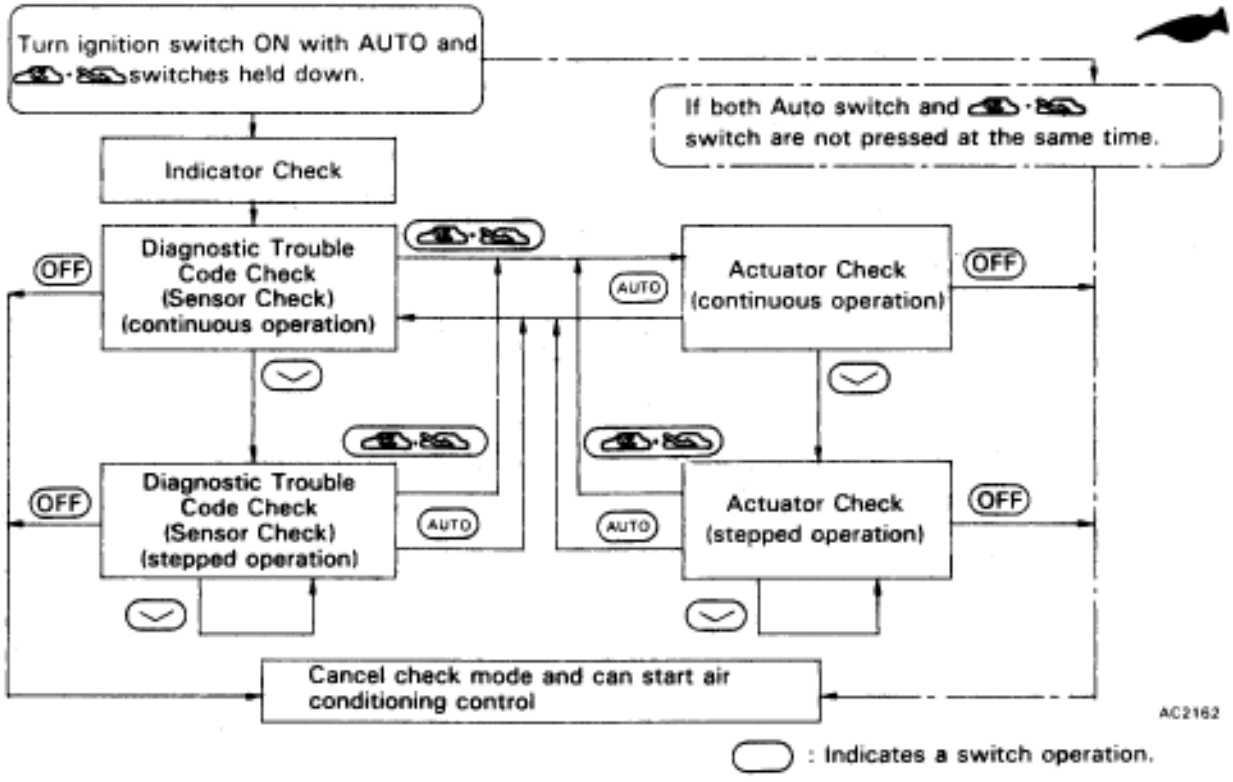
If compressor lock occurs during air conditioning operation, the A/C switch indicator on the air conditioning control assembly starts blinking to warn the driver.

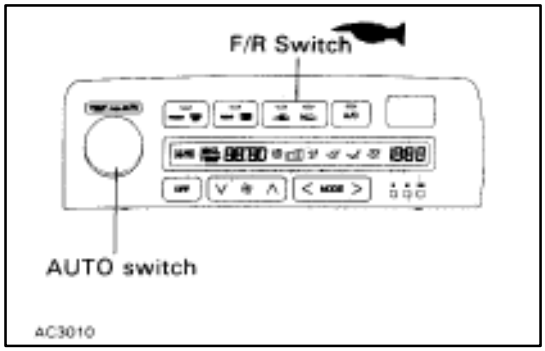
When this occurs, check for compressor lock (code 22) using diagnostic trouble code check then proceed to inspect the circuit or the component.

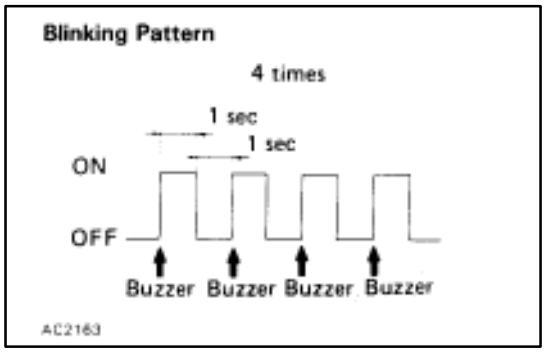
Compressor lock sensor circuit page AC–54

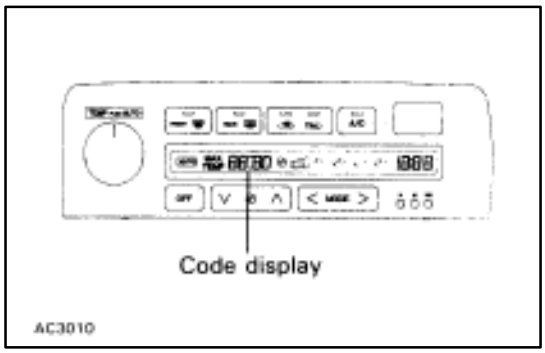
LIST OF OPERATION METHODS

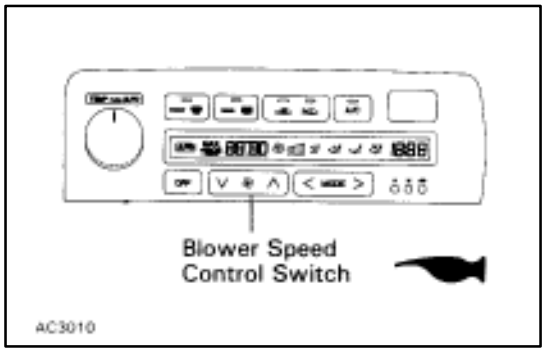
By operating each of the air conditioning control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.

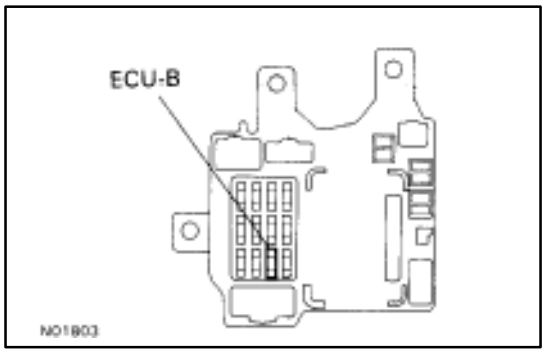












INDICATOR CHECK

1. Turn the ignition switch on while pressing the air conditioning control AUTO switch and fan simultaneously.

2. Check that all the indicators light up and go off at 1 second intervals 4 times in succession.
3. Check that the buzzer sounds when the indicators light up in 2.

HINT:

- After the indicator check is ended, the diagnostic trouble code check begins automatically.
- Press the OFF switch when desiring to cancel the check mode.

DIAGNOSTIC TROUBLE CODE CHECK (SENSOR CHECK)

1. Perform an indicator check. After the indicator check is completed, the system enters the diagnostic trouble code check mode automatically.
2. Read the code displayed on the panel. Refer to the list of codes on page AC–28 when reading the codes. (Codes are output at the temperature display.)

If the slower display is desired, press the switch and change it to stepped operation. Each time the switch is pressed, the display changes by 1 step.

HINT:

- If the buzzer sounds when a code is being read, it means the trouble indicated by that code continues to occur.
- If the buzzer does not sound when a code is being read, it means the trouble indicated by that code occurred earlier (such as poor connector contacts, etc.).

CLEARING DIAGNOSTIC TROUBLE CODES

1. Pull out the ECU–B fuse in Junction Block No. 1 for 10 sec. or longer to clear the memory of diagnostic trouble codes.
2. After reinserting the fuse, check that the normal code is output.

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the diagnostic trouble code check (sensor check), check the circuit listed for that code in the table below (Proceed to the page given for that circuit.)

Code No.	Diag. Trouble Code Detection Condition
00	• Normal
11*	• Open or short in room temperature sensor circuit.
12	• Open or short in ambient temperature sensor circuit.
13	• Open or short in evaporator temperature sensor circuit.
14	• Open or short in engine coolant temperature sensor circuit.
21	• Open in solar sensor circuit.
	• Short in solar sensor circuit.
22	• All conditions below are detected for 3 secs. or more. (a) Engine rpm: 450 rpm or more. (b) Ratio between engine and compressor rpm diviates 20% or more in comparison to normal operation.
23	• Open in pressure sensor circuit. • Abnormal refrigerant pressure below 207 KPa, 2.1 kgf/cm° over 2660 KPa, 27 kgf/cm°
31	• Short to ground or power source circuit in Air Mix Damper position sensor circuit.
32	• Short to ground or power source circuit in Air Inlet Damper position sersor circuit.
41	• Air mix damper position sensor value does not change even if ECU operates air mix servomotor.
42	• Air inlet damper position sensor value does not change even if ECU operates air inlet servomotor.

HINT: *1 If the room temp. is approx. –20°C (–4°F) or lower code 11 may be output even though the system is normal.

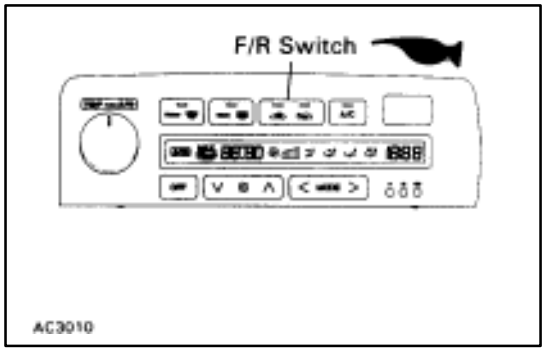
*2 If the ambient temperature is approx. –50°C (–58°F) or lower, a malfunction code may be output even though the system is normal

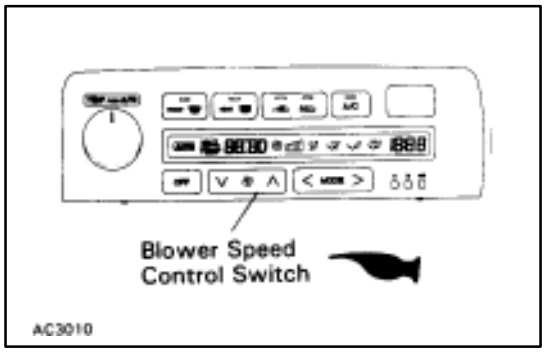
*3 If the check is being performed in a dark place, diagnostic trouble code 21 (solar sensor circuit abnormal) could be displayed.
In this case, perform diagnostic trouble code check again while shining a light, such as an inspection light, on the solar sensor.
If code 21 is still displayed, there could be trouble in the solar sensor circuit.

Trouble Area	Memory*5	See page
–	–	–
• Room temp. sensor • Harness or connector between room temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–44
• Ambient temp. sensor • Harness or connector between ambient temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–46
• Evaporator temp. sensor • Harness or connector between evaporator temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–48
• Engine coolant temp. sensor • Harness or connector between engine coolant temp. sensor and ECU • ECU	O (8.5 min. or more)	AC–50
• Solar sensor • Harness or connector between sensor and ECU • ECU	– O (8.5 min. or more)	AC–52
• Compressor drive belt • Compressor lock sensor • Compressor • Harness and connector between ECU and compressor, compressor lock sensor • ECU	–	AC–54
• Pressure switch • Harness or connector between pressure switch and ECU • Refrigerant pipe line • ECU	–	AC–56
• Air mix damper position sensor • ECU • Harness or connector between air mix damper position sensor and ECU	O (1 min. or more)	AC–58
• Air inlet damper position sensor • ECU • Harness or connector between air inlet damper position sensor and ECU	O (1 min. or more)	AC–62
• Air mix servomotor • Air mix damper position sensor • Harness or connector between air mix damper, servomoter and ECU • ECU	O (15 sec. Or more)	AC–60
• Air inlet servomotor • A/I damper position sensor • Harness or connector between air inlet damper, servomotor and ECU • ECU	O (15 sec. Or more)	AC–64

*4 Compressor lock (DTC 22) is indicated only for a currently occuring malfunction. (see page AC–54)
To confirm diagnostic trouble code 22, perform the following steps.
(1) With the engine ON, enter the diagnostic trouble code check mode.
(2) Press the switch to enter actuator check mode, and set the operation to Step No. 3.
(3) Press the switch to return to diagnostic trouble code check mode.
(4) The diagnostic trouble code is displayed after approx. 3 secs.

*5 The ECU memorizes the DTC of the respective malfunction it has occurred for the period of the time indicated in the brackets.





ACTUATOR CHECK

1. After entering the diagnostic trouble code check mode (sensor check mode) press the
2. Since each damper, motor and relay automatically operates at 1 second intervals beginning in order from 20 in the temperature display, check the temperature and air flow visually and by hand.

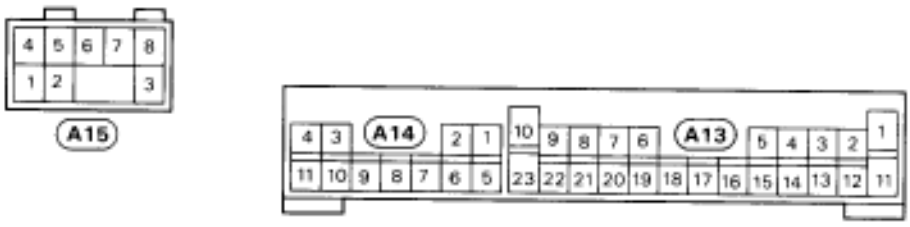
If the slower display is desired, press the switch and change it to step operation. Each time the switch is pressed, the display changes by 1 step.

HINT:

- The buzzer sounds when the display code changes.
- Codes are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the OFF switch.

Step No.	Display code	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnet clutch	Air mix damper
1	20	OFF	FACE	FRESH	OFF	Cool side (0% open)
2	21	①	↑	↑	↑	↑
3	22	③	↑	↑	ON	↑
4	23	↑	↑	F/R	↑	↑
5	24	↑	↑	RECIRC	↑	Cool/Hot (50% open)
6	25	↑	BI-LEVEL	↑	↑	↑
7	26	↑	FOOT	↑	↑	Hot side (100% open)
8	27	↑	↑	↑	↑	↑
9	28	↑	F/D	↑	↑	↑
10	29	⑤	DEF	↑	↑	↑

Terminals of ECU



AC3001

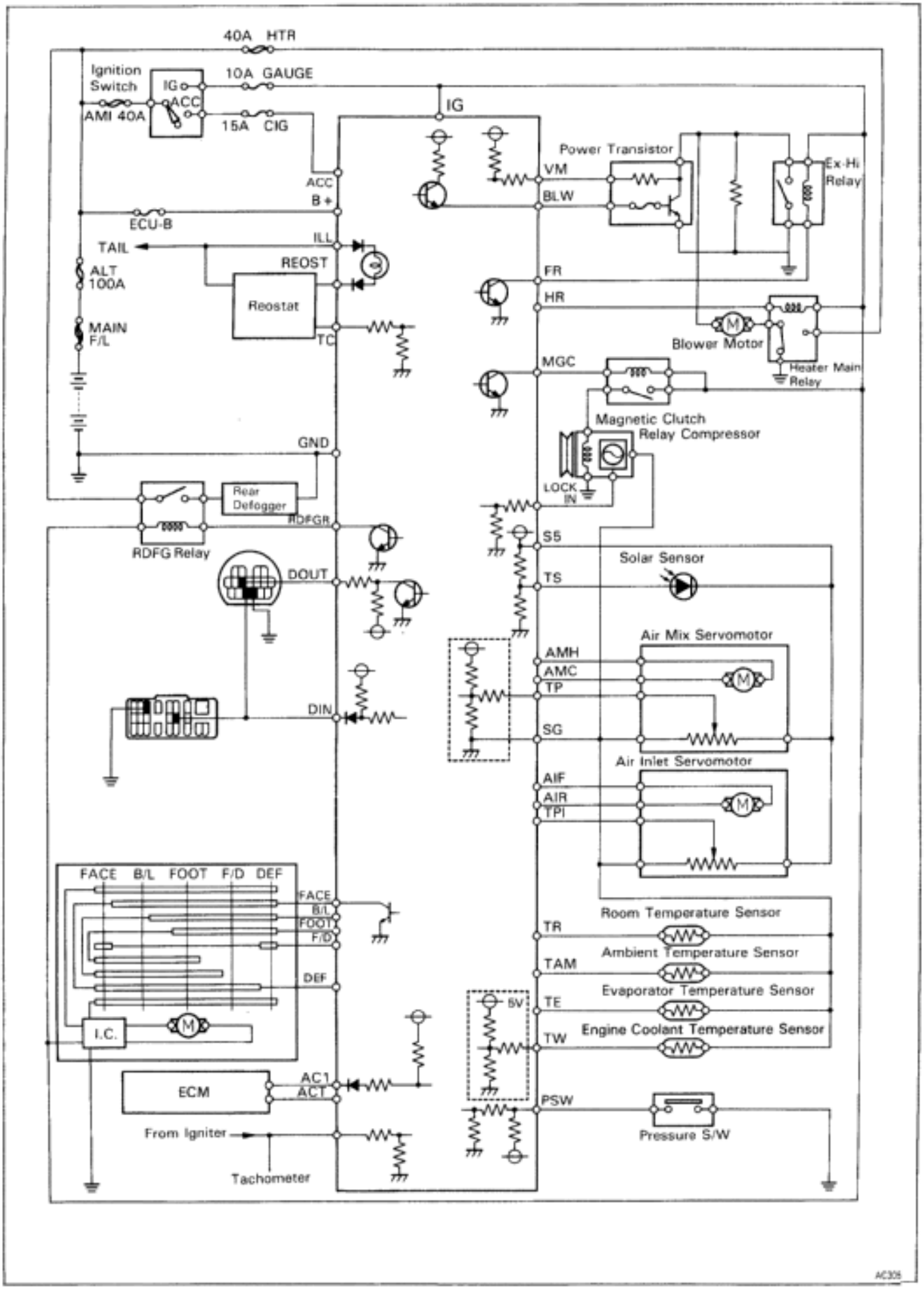
Terminal No.	Symbol	Connection/Terminal Name	Terminal No.	Symbol	Connection/Terminal Name
A13-1	AMH	Air Mix Servomotor	A13-22	DIN	DCL2, DCL1
A13-2	AMC	Air Mix Servomotor	A13-23	DOUT	DCL2
A13-3	AIF	Air Inlet Servomotor	A14-1	S5	Sensor Power Source
A13-4	AIR	Air Inlet Servomotor	A14-2	TR	Room Temperature Sensor
A13-5	RDFGR	Defogger Relay	A14-3	TAM	Ambient Temperature Sensor
A13-6	HR	Heater Relay	A14-4		
A13-7	FR	Extra-Hi Relay	A14-5	SG	Sensor Ground
A13-8	VM	Power Transister	A14-6	TE	Evaporator Temperature Sensor
A13-9	BLW	Power Transister	A14-7	TW	Engine Coolant Temp. Sensor
A13-10	MGC	Magnetic Clutch Relay	A14-8	TS	Solar Sensor
A13-11	FACE	Air Outlet Servomotor	A14-9	TP	Air Mix Damper Position Sensor
A13-12	B/L	Air Outlet Servomotor	A14-10	TPI	Air Inlet Damper Position Sensor
A13-13	FOOT	Air Outlet Servomotor	A14-11		
A13-14			A15-1	B+	Back-up Power Source
A13-15	F/D	Air Outlet Servomotor	A15-2	ACC	Power Source
A13-16	DEF	Air Outlet Servomotor	A15-3	REOST	Rheostat
A13-17	PSW	Pressure Switch	A15-4	GND	E.C.U. Ground
A13-18	AC1	ECM	A15-5	IG+	E.C.U. Power Source
A13-19	ACT	ECM	A15-6		
A13-20	LOCK IN	Lock Sensor	A15-7	ILL	Tail Relay
A13-21	IGN	No. 1 Igniter	A15-8	TC	Rheostat

Standard Value of ECU Terminal

Terminals	Symbols	Wiring Color	Condition		Standard Value
A13–1↔A13–2	AMH↔AMC	O↔P	IG OFF		13~19 Ω
A13–3↔A13–4	AIF↔AIR	RL↔R	IG OFF		13~19 Ω
A13–5↔A15–4	RDFGR↔GND	L–O↔W–B	IG ON	Rear Defogger Switch ON	Below 1 V
				Rear Defogger Switch OFF	10~14 V
A13–6↔A15–4	HR↔GND	L–W↔W–B	IG ON	Turn the Blower Motor	Below 1 V
				Do Not Turn the Blower Motor	10~14 V
A13–7↔A15–4	FR↔GND	W–G↔W–B	IG ON	Blower Level Hi or Set Temp: Max Hot or Max Cool	Below 1 V
				Blower Level OFFMedium	10~14 V
A13–8↔A15–4	VM↔GND	B–W↔W–B	IG ON	Push Blower Switch to Change the Blower Speed from 1 to 5	Speed ① 9.6 V ↓ Speed ⑤ below 1.5 V
A13–9↔A15–4	BLW↔GND	Y–W↔W–B	IG ON	Turn the Blower Motor	Below 1.5 V
A13–10↔A15–4	MGC↔GND	L–Y↔W–B	Start the Engine and Push Auto Switch	A/C Switch ON	Below 1 V
				A/C Switch OFF	10~14 V
A13–17↔A15–4	PSW↔GND	R–L↔W–B	IG ON		Below 1 V
A13–18↔A15–4	AC1↔GND	B–Y↔W–B	Start the Engine	Operate the Compressor	Below 1 V
				Do Not Operate the Compressor	1 V or More
A13–19↔A15–4	ACT↔GND	LG–R↔W–B	Start the Engine (Idling)	A/C Switch ON	10~14 V
				A/C Switch OFF	Below 1.5 V
A13–20↔A15–4	LOCK ↔GND IN	W–L↔W–B	IG OFF	at 20 °C (68 °F)	540 ~ 950 Ω
				at 100 °C (212 °F)	690 ~ 1230 Ω
A13–21↔A15–4	IGN↔GND	B↔W–B	Start the Engine		10 ~ 14 V
A13–22↔A15–4	DIN↔GND	LG–R↔W–B	IG ON	Connect Tc and E of DCL2 or DLC1	Below 1 V
				Other Than Above Condition	10~14 V
A14–1↔A14–5	S5↔SG	L↔W–R	IG ON		4~6 V
A14–1↔A14–8	S5↔TS	L–W	IG ON	Sensor Subjected to Electrical Light	Below 4 V
				Sensor Covered by a Cloth	4~4.5 V
A14–2↔A14–5	TR↔SG	G–Y↔W–R	IG ON	Cabin Temperature: 25 °C (77 °F)	1.8~2.2 V
				Cabin Temperature: 40 °C (104 °F)	1.2~1.6 V
A14–3↔A14–5	TAM↔SG	B–R↔W–R	IG ON	Ambient Temperature: 25 °C (77 °F)	1.35~1.75 V
				Ambient Temperature: 40 °C (104 °F)	0.85~1.25 V

Terminals	Symbols	Wiring Color	Condition		Standard Value
A14-5↔Body Ground	SG↔Body Grounds	W-R↔Body Ground	Always		1 Ω or less
A14-6↔A14-5	TE↔SG	L-W↔W-R	IG ON	Evaporator Temp.: 0 °C (32 °F)	2.0 – 2.4 V
				Evaporator Temp.: 15 °C (77 °F)	1.4 ~ 1.8 V
A14-7↔A14-5	TW↔SG	Y-B↔W-R	IG ON	Engine Coolant Temp.: 0 °C (32 °F)	2.8 – 3.2 V
				Engine Coolant Temp.: 40 °C (104 °F)	1.8 – 2.2 V
				Engine Coolant Temp.: 70 °C (158 °F)	0.9 ~ 1.3 V
A14-8↔A14-5	TS↔SG	W↔W-R	IG ON	Sensor Subjected to Electrical Light	1 V or more
				Sensor Covered by Cloth	Below 1 V
A14-9↔A14-5	TP↔SG	B-Y↔W-R	IG ON	Set Temp.: Max Cool	3.5 – 4.5 V
				Set Temp.: Max Hot	0.5 ~ 1.8 V
A14-10↔A14-5	TPI↔SG	L-Y↔W-R	IG ON	Push Recircu Switch	3.5 ~ 4.5 V
				Push Fresh Switch	0.5 – 1.8 V
A15-1↔A15-4	B + ↔GND	L-Y↔W-B	IG OFF		10 – 14 V
A15-2↔A15-4	ACC↔GND	L-R↔W-B	Turn Ignition Switch ACC		10 ~ 14 V
A15-4↔Body Ground	GND↔Body Ground	W-B↔Body Ground	Always		1 Ω or less
A15-5↔A15-4	IG + ↔GND	R-L↔W-B	IG ON		10 – 14 V
A15-3↔A15-4	REOST↔GND	B↔W-B	Light Control Switch :Tail Position	Rheostat Volume:Most Upward	Below 1 V
				Rheostat Volume: Most Downward	10 ~ 14 V
A15-7↔A15-4	ILL↔GND	G↔W-B	Turn the Light Control Switch to Tail Position		10 ~ 14 V
A15-8↔A15-4	TC↔GND	R-L↔W-B	Light Control Switch :Tail Position	Pheostat Volume: Most Upward	Below 1 V
				Rheostat Volume: Most Downward	10 ~ 14 V

Wiring Diagram



–MEMO–

MATRIX CHART OF PROBLEM SYMPTOMS

If a normal code is displayed during the diagnostic code check (sensor check) but the trouble still occurs (reappears), perform out troubleshooting for each problem symptom, checking the circuits for each symptom in the order given in the table below (Proceed to the page given for each circuit).

Symptom \ Suspect Area		Room temp. sensor circuit	Ambient temp. sensor circuit	Evaporator temp. sensor circuit	Engine Coolant temp. sensor circuit	Solar sensor circuit	Compressor lock sensor circuit	Pressure switch circuit	Air mix damper position sensor circuit	Air mix servomotor circuit	Air inlet damper position sensor circuit	Air inlet servomotor circuit
See Page		AC–44	AC–46	AC–48	AC–50	AC–52	AC–54	AC–56	AC–58	AC–60	AC–62	AC–64
Whole functions of the A/C system does not operate												
Air Flow Control	No blower operation				3							
	No blower control											
	Insufficient air flow											
Temperature Control	No cool air comes out	10	11				4	6	9	8		
	No warm air comes out	4	3	5					2	1		
	Output air is warmer or colder than the set temperature or response is slow	4	5	6	9	7			8	10		
	No temperature control (only Max. cool or Max. warm)								1	2		
No air inlet control											1	2
No air outlet control												
Engine idle up does not occur, or is continuous												
Blinking of A/C indicator							1					
Set temp. value displayed does not much up with operation of temp. control switch												
Brightness does not changes when rheostat volume or light control switch it turned.												
Unable to access the diagnosis mode.												
Diagnostic trouble code not recorded. Set mode is cleared when IG switch is turned off.												

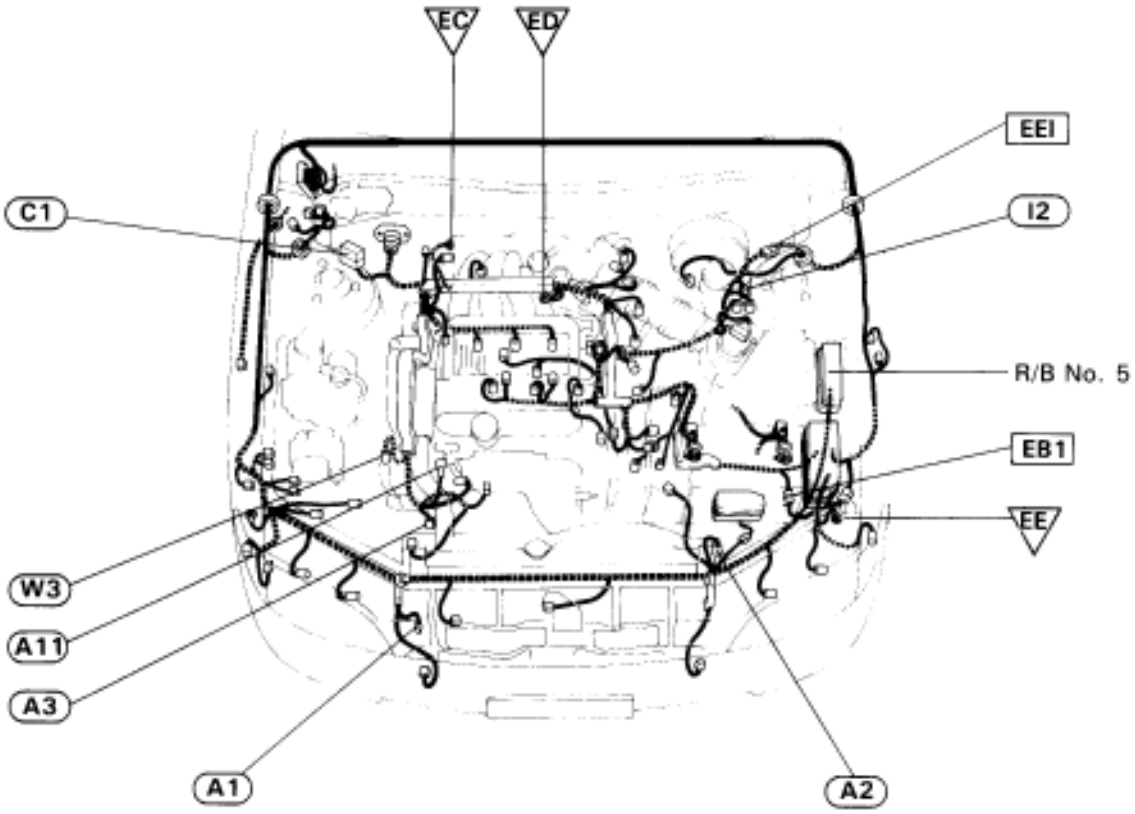
HINT:

- If the instruction “Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with te next highest number in the table to continue the check.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check or replace the air conditioning control assembly (contains the ECU).

Air outlet servomotor circuit	IG power source circuit	Acc power source circuit	Backup power source circuit	Heater main relay circuit	Power transistor circuit	Blower motor circuit	Extra-Hi relay circuit	Igniter circuit	Compressor circuit	Illumination light system	Diagnosis circuit	ECU (A/C control assy)	Inspect refrigeration system with manifold gauge set	Volume of refrigerant	Drive belt tension	Cooling fan system	Compressor	Condenser	Receiver	Evaporator	Radiator (in heater unit)	Expansion valve
AC–66	AC–68	AC–70	AC–72	AC–74	AC–76	AC–78	AC–80	AC–82	AC–84	BE–77	AC–90	IN–32	AC–92	AC–95	AC–96	EG–240	AC–102	AC–111	AC–169	AC–113	AC–115	AC–117
	1	2										3										
	4	5		1		2						6										
	4			5	2	1	3															
						1	2															
								7	5			12	3	1	2							
												6									7	
												18	3	1	2	4	11	12	13	14	15	16
												3										
												3										
1												3										
								2	1			3										
												2										
												1										
												2										
											1	2										
			1									2										

LOCATION OF CONNECTORS

Location of Connectors in Engine Compartment



A1

Ambient
Temp. Sensor

le-2-1-S

A2

Pressure Switch

le-4-1

A3

A/C Compressor
Lock Sensor

le-4-1-A

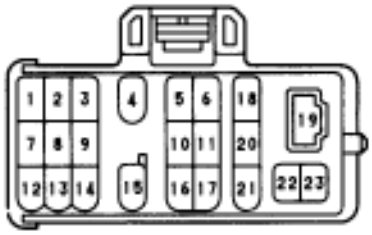
A11

Generater

X-142

C1

DCL 1



le-23-1

I2

Igniter

le-5-1

W3

Engine Coolant
Temp. Sensor

le-2-1-h

EB1

lef-8-1

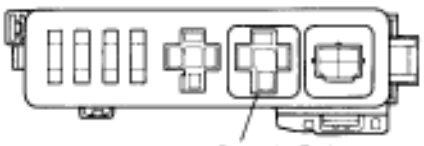
lef-8-2

EE1

lfg-4-1

lfg-4-2

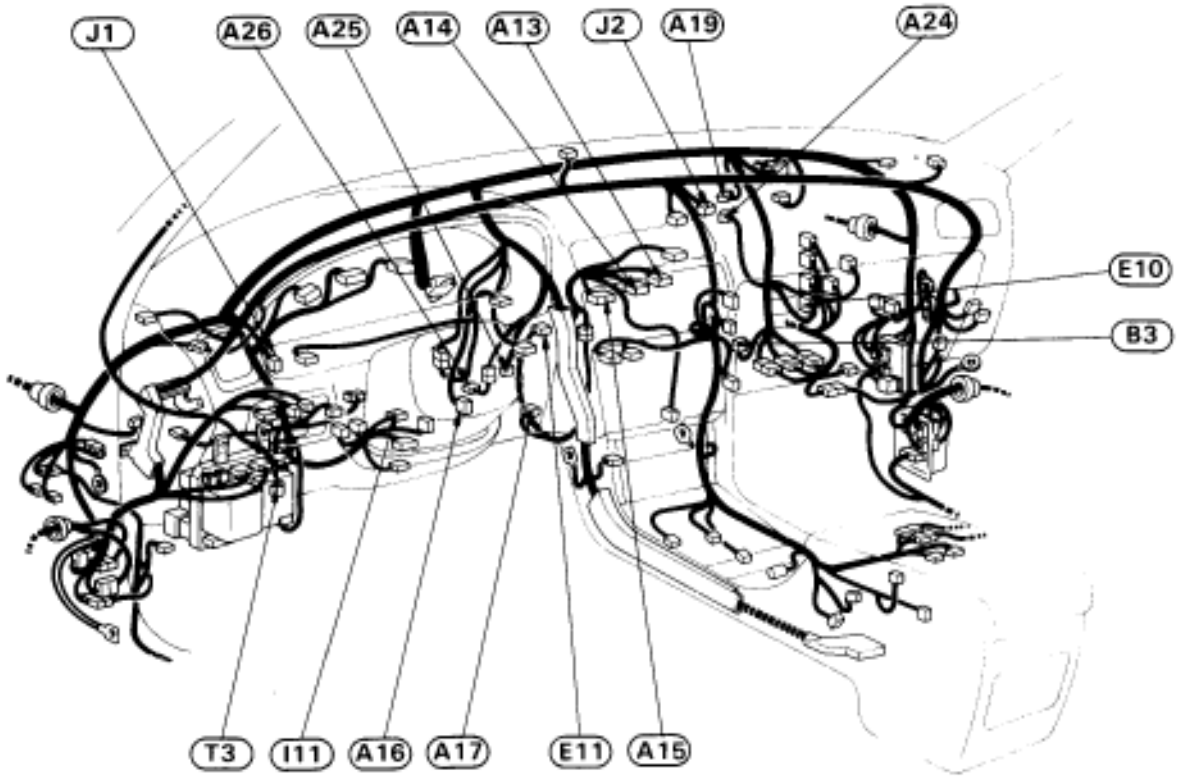
R/B No. 5



A/C Magnetic Clutch Relay

BE6669

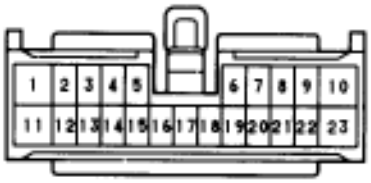
Location of Connectors in Instrument Panel



BE6661

A13

A/C
Control Assembly



eh-23-1

A14

A/C
Control Assembly

h-11-1-A

A15

A/C
Control Assembly

e-8-1

A16

Room Temp. Sensor

e-2-1

A17

Power Transister

H-4-1

A18

Solar Sensor

e-2-2-J

A19

Evaporator
Temp. Sensor

e-2-1

A25

Air Mix
Surbomotor Assembly

e-6-1

A26

Air Outlet
Servomotor

e-8-1

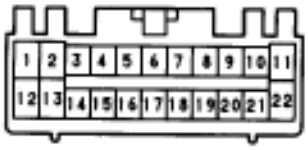
B3

Blower Motor

1-2-1

E10

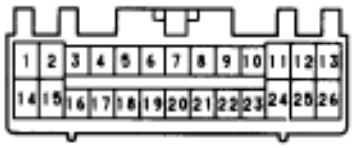
ECM



Vd-22-1

E11

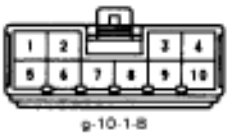
Extra-Hi Relay



Vd-26-1

I11

Ignition Switch



p-10-1-B

J1

Junction Connector

e-22-1-A

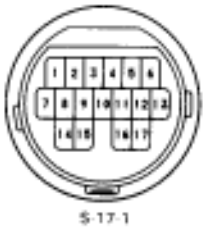
J2

Junction Connector

e-14-1-A

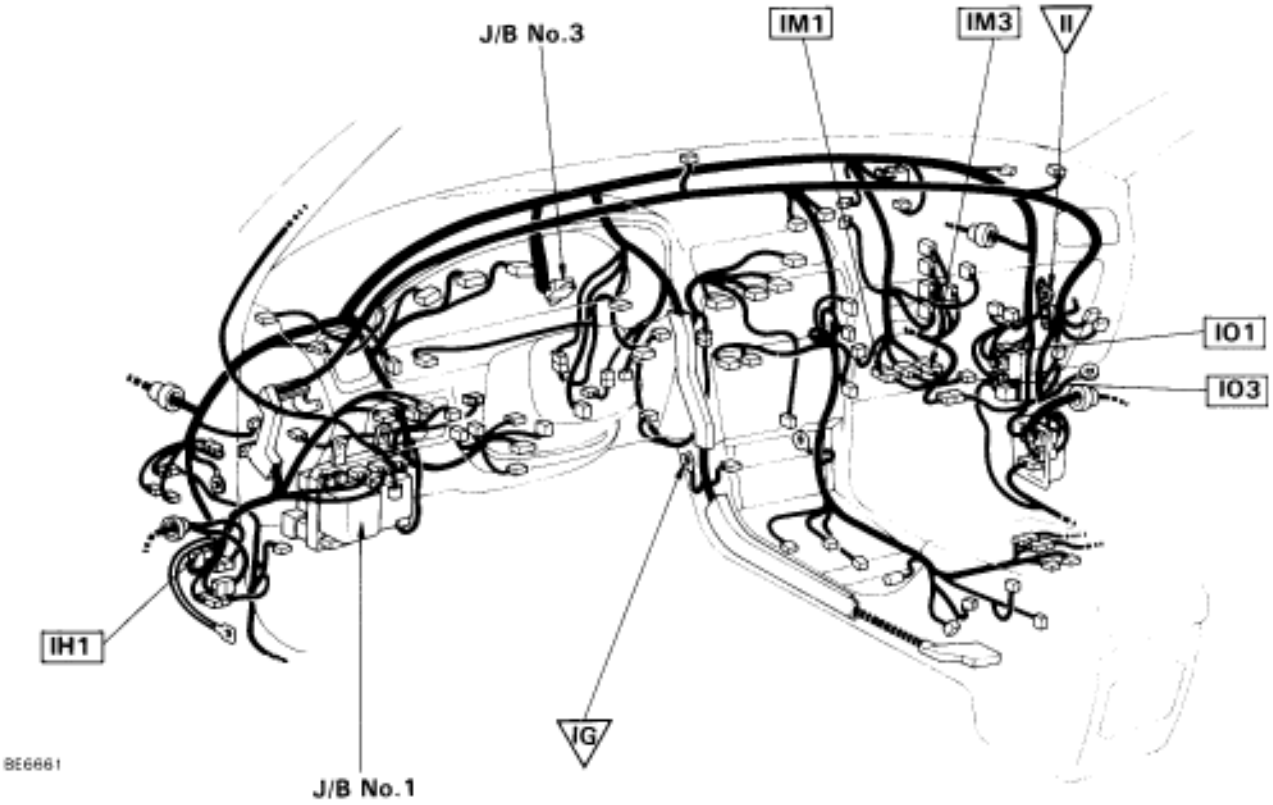
T3

DCL 2



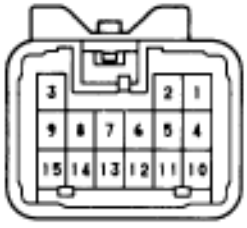
S-17-1

Location of Connectors in Instrument Panel

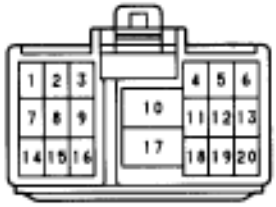


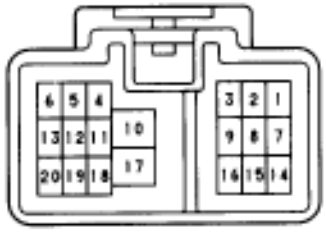
IH1

e-15-1


e-15-2

IM1


e-20-1-B

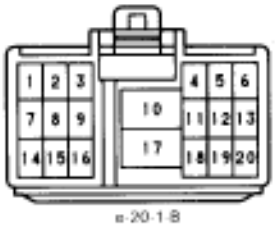

e-20-2-B

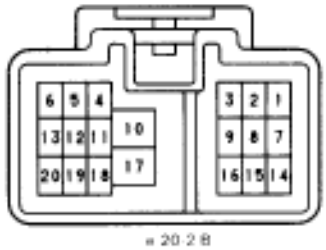
IM3

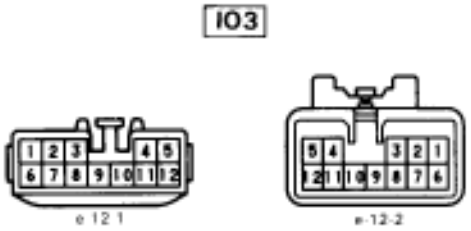
ef-19-1

ef-19-2

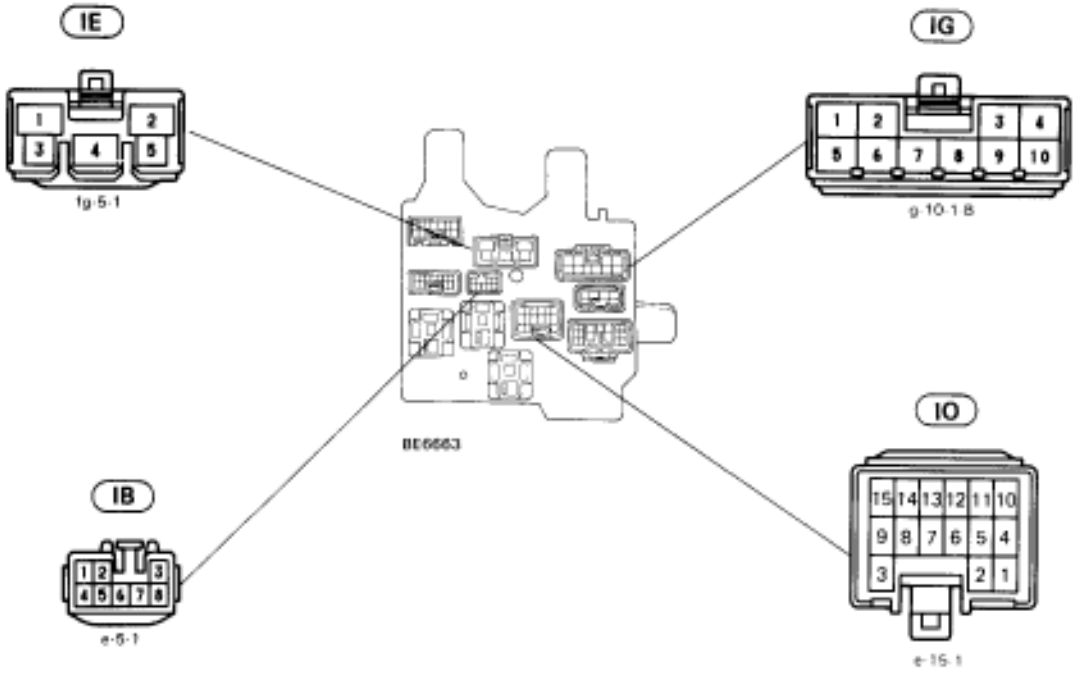
IO1


e-20-1-B

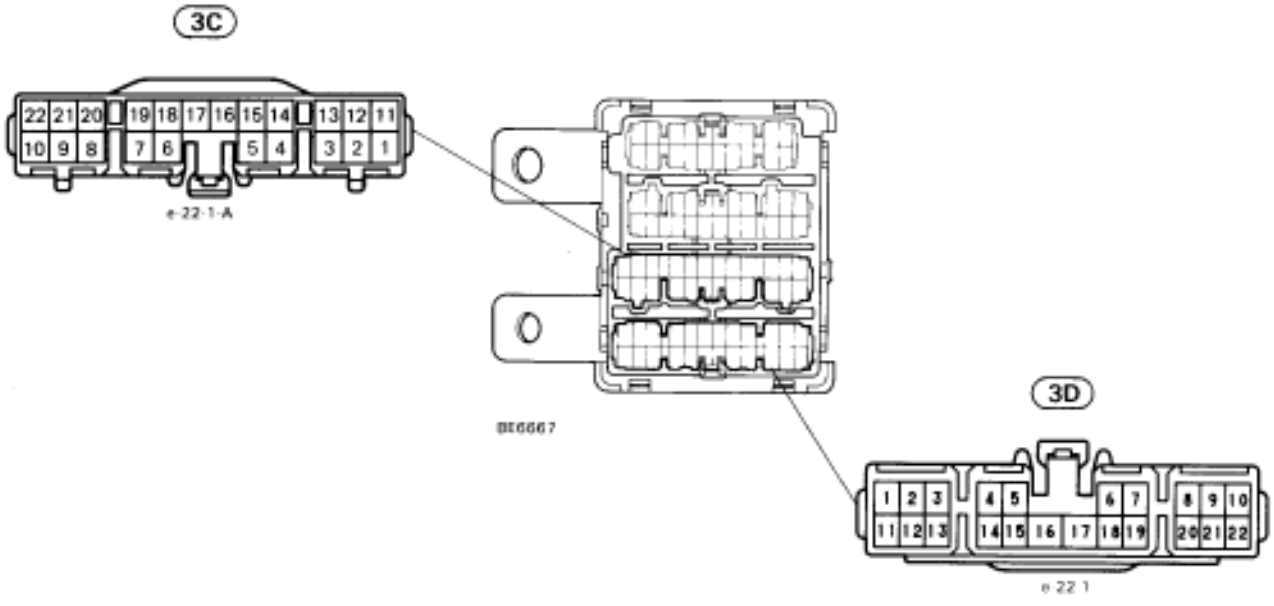

e-20-2-B


IO3
e-12-1
e-12-2

J/B No.1


IE
IG
IO
IB
fg-5-1
g-10-18
BE6663
e-5-1
e-15-1

J/B No.3


3C
3D
e-22-1-A
BE6667
e-22-1

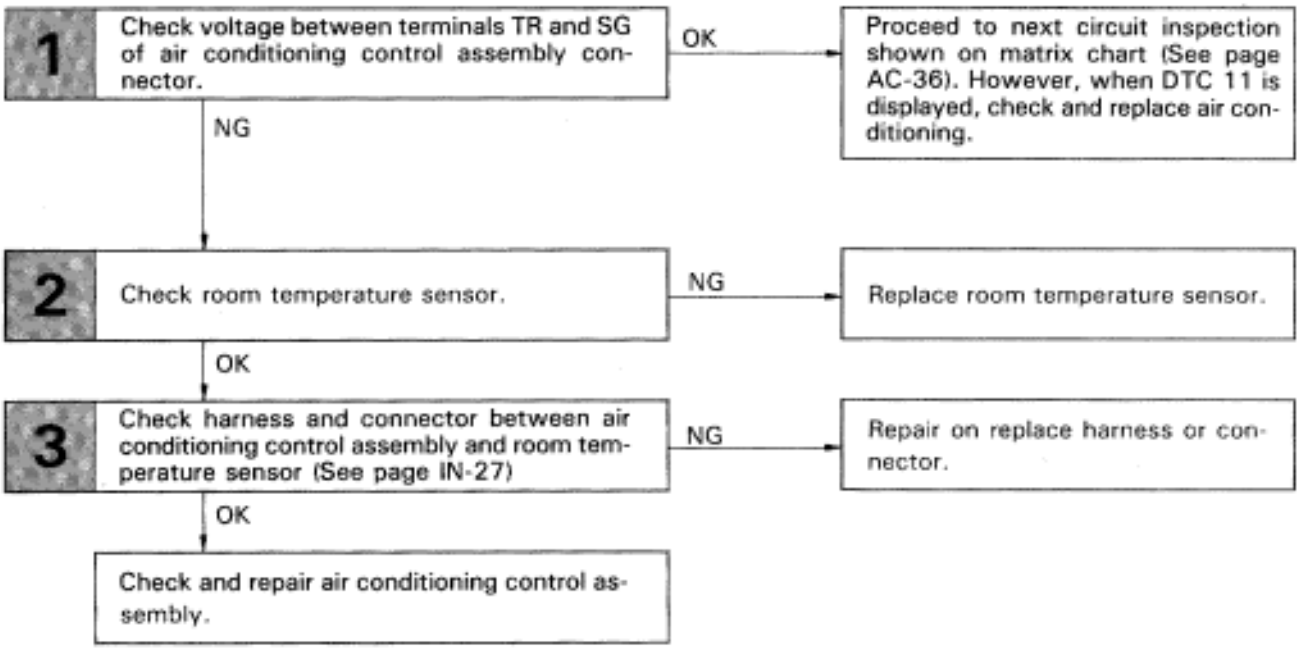
DTC 11 Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

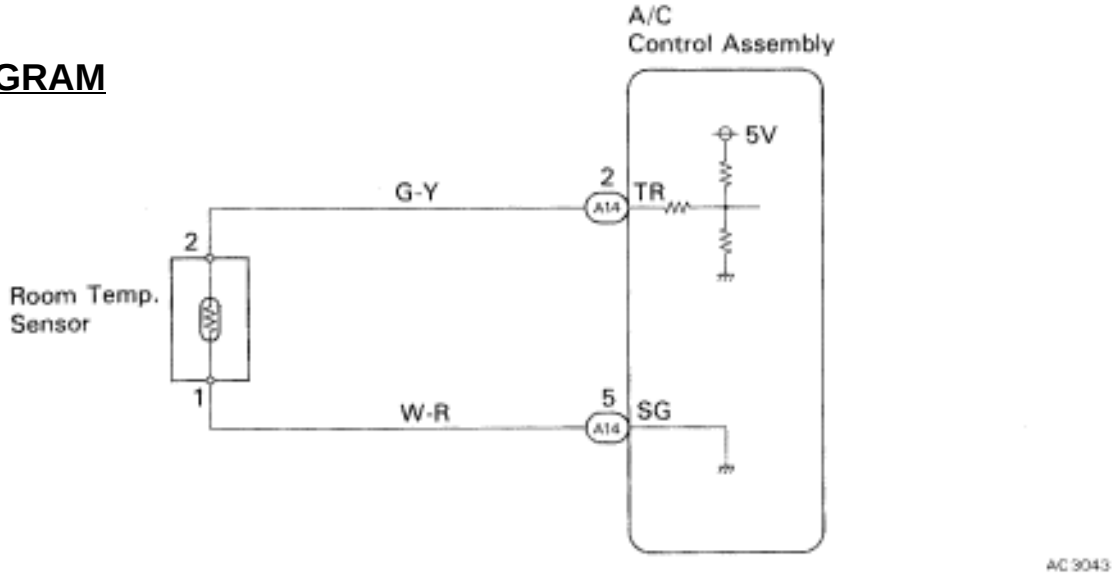
This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C ECU.

Code No.	DTC Detection Condition	Trouble Area
11	Open or short in room temperature sensor circuit.	5 Room temperature sensor. 5 Harness or connector between room temp. sensor and A/C ECU. 5 A/C ECU.

DIAGNOSTIC CHART

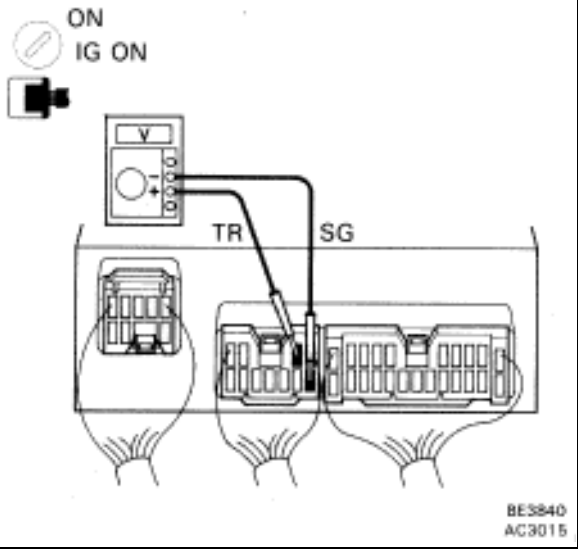


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TR and SG of air conditioning control assembly connector.**



P
3. Remove A/C control assembly with connectors still connected. (See page BO–112.)
4. Turn ignition switch ON.

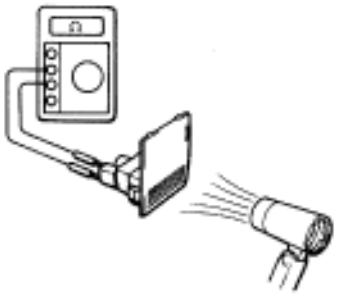
C Check voltage between terminals TR and SG of air conditioning control assembly connector at each temperature.

OK **Voltage:**
at 25°C (77°F) : 1.8 – 2.2 V
at 40°C (104°F) : 12 – 1.6 V
In addition, as the temperature increases, check and replace air conditioning control assembly.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 11 is displayed, check and replace air conditioning control assembly.**

2 **Check room temperature sensor.**



P
1. Remove room temperature sensor from safety pad No. 2.
2. Disconnect room temperature sensor connector.

C Check resistance between terminals 1 and 2 of room 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
In addition, as the temperature increases, the resistance decreases gradually.

OK

NG **Replace room temperature sensor.**

3 **Check harness and connector between air conditioning control assembly and room temperature sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and repair air conditioning control assembly.

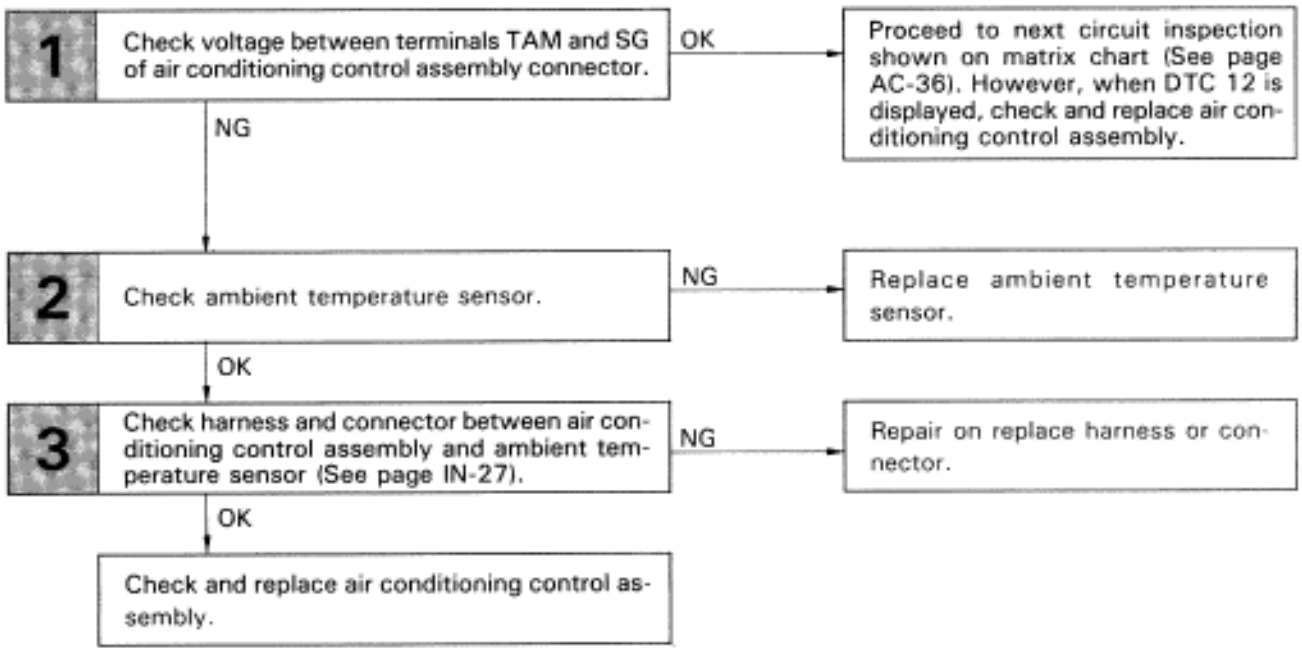
DTC 12 Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

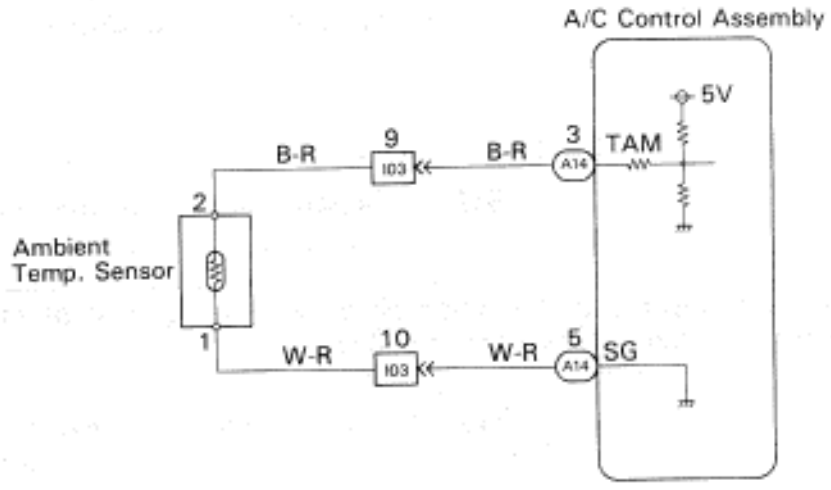
This sensor detects the ambient temperature and sends the appropriate signals to the ECU.

DTC No.	DTC Detecting Condition	Trouble Area
12	Open or short in ambient temperature sensor circuit.	5 Ambient temperature sensor. 5 Harness or connector between ambient temperature sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

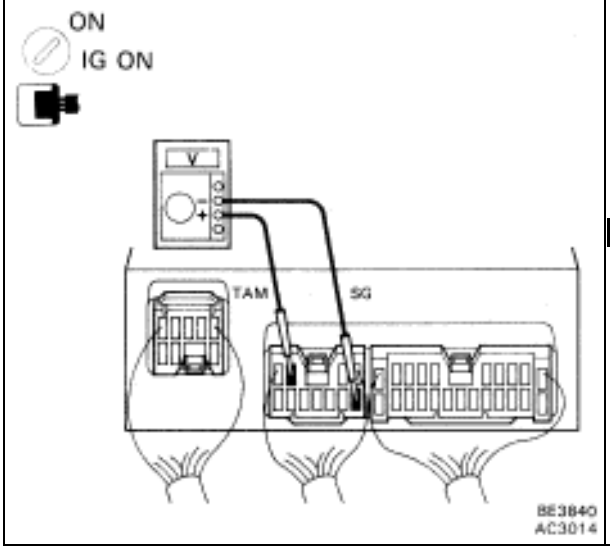


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TAM and SG of air conditioning control assembly connector.**



P
1. Remove the A/C control assembly with connectors still connected. (See page BO–112.)
2. Turn ignition switch ON.

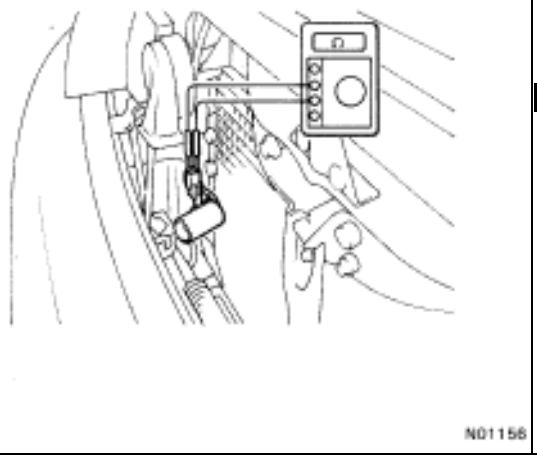
C Check voltage between terminals TAM and SG of air conditioning assembly connector at each temperature.

OK **Voltage:**
at 25°C (77°F) : 1.35 – 1.75 V
at 40°C (104F) : 0.85 – 1.25 V
In addition, as the temperature increases, the voltage decreases gradually.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 12 is displayed, check and replace air conditioning control assembly.**

2 **Check ambient temperature sensor.**



P Disconnect ambient temperature sensor connector.

C
1. Check resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.

OK **Resistance:**
at 25°C (77°F) : 1.6 – 1.8 kΩ
at 50°C (122°F) : 0.5 – 0.7 kΩ
In addition, as the temperature increases, the resistance decreases gradually.

OK

NG **Replace ambient temperature sensor.**

3 **Check harness and connector between air conditioning control assembly and ambient temperature sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioner control assembly.

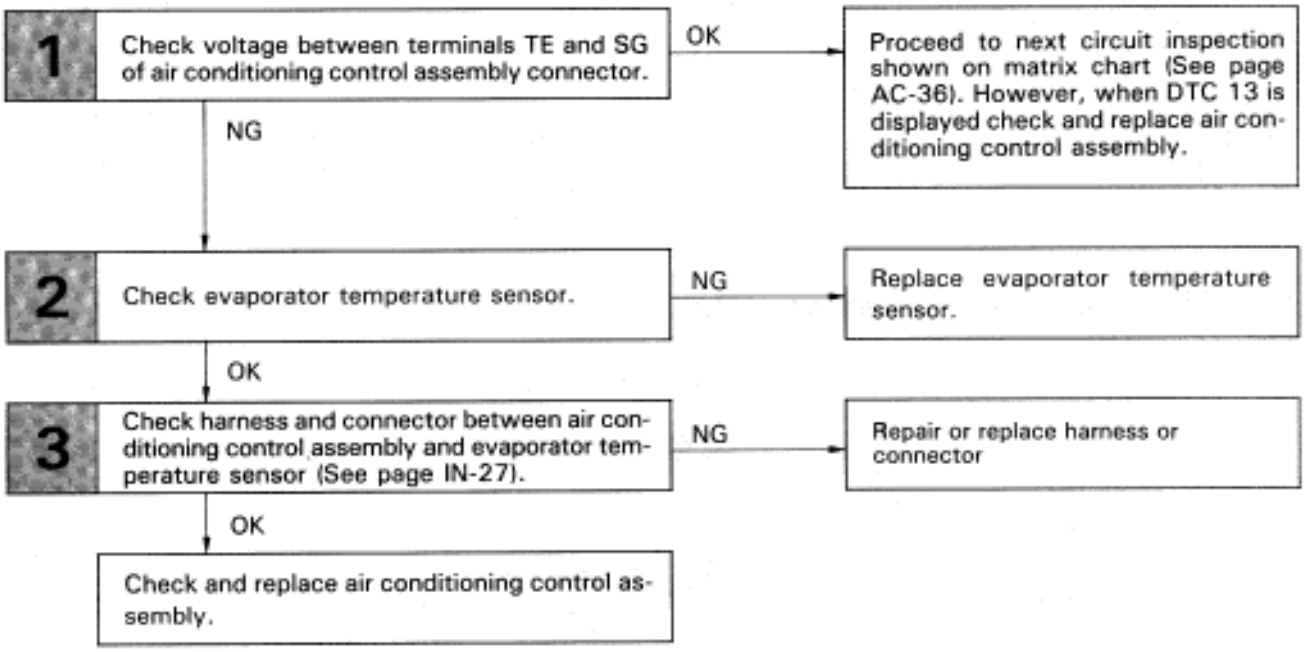
DTC 13 Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

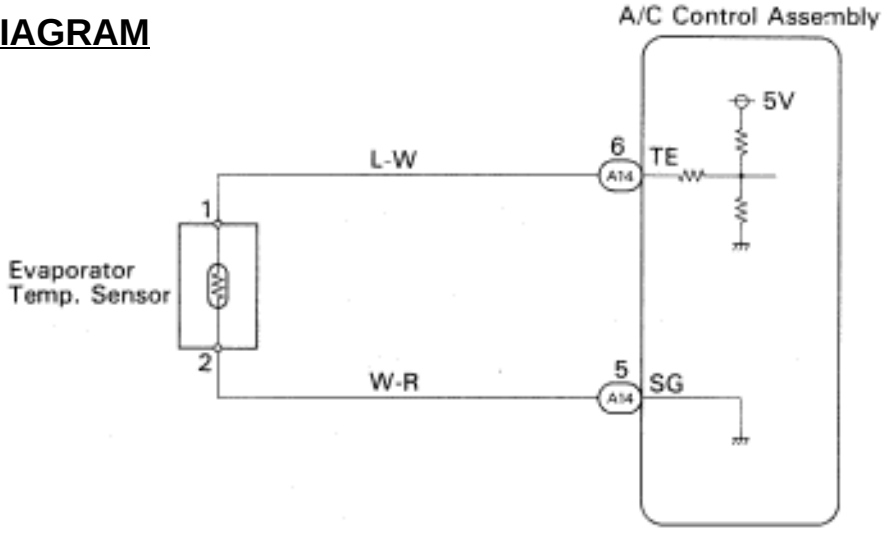
This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the air conditioning control assembly.

DTC No.	DTC Detecting Condition	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	5 Evaporator temperature sensor. 5 Harness or connector between evaporator temperature sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

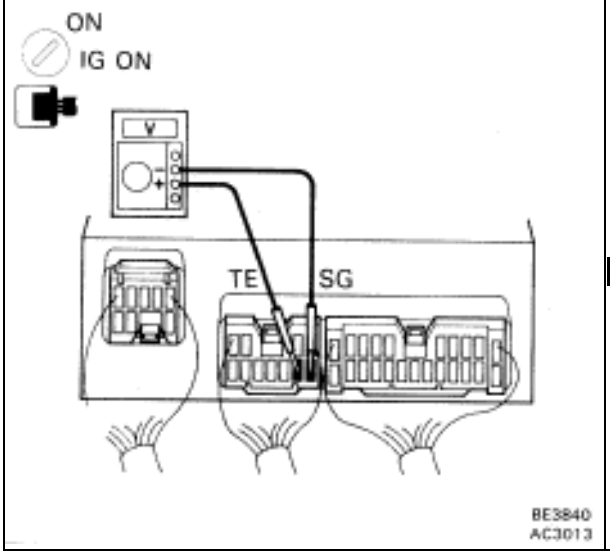


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TE and SG of air conditioning control assembly connector.**



P 1. Remove A/C control assembly with connectors still connected. (See page BO–112)

2. Turn ignition switch ON.

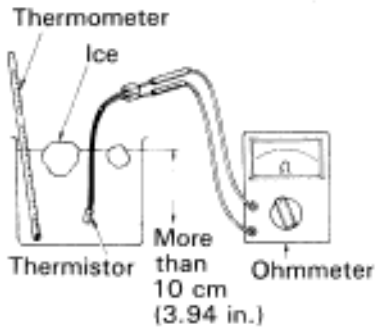
C Measure voltage between terminals TE and SG of air conditioning control assembly connector at each temperature.

OK **Voltage:**
at 0°C (32°F) : 2.0 – 2.4 V
at 15°C (59°F) : 1.4 – 1.8 V
In addition, as the temperature increases, the voltage decreases gradually.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 13 is displayed, check and replace air conditioning control assembly.**

2 **Check evaporator temperature sensor.**



P Remove evaporator temperature sensor (See page AC–37).

C Check resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.

OK **Resistance:**
at 0°C (32°F) : 4.6 – 5.1 kΩ
at 15°C (59°F) :2.1 – 2.6 kΩ
In addition, as the temperature increases, the resistance decreases gradually.

OK

NG **Replace evaporator temperature sensor.**

3 **Check harness and connector between air conditioner control assembly and evaporator temperature sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

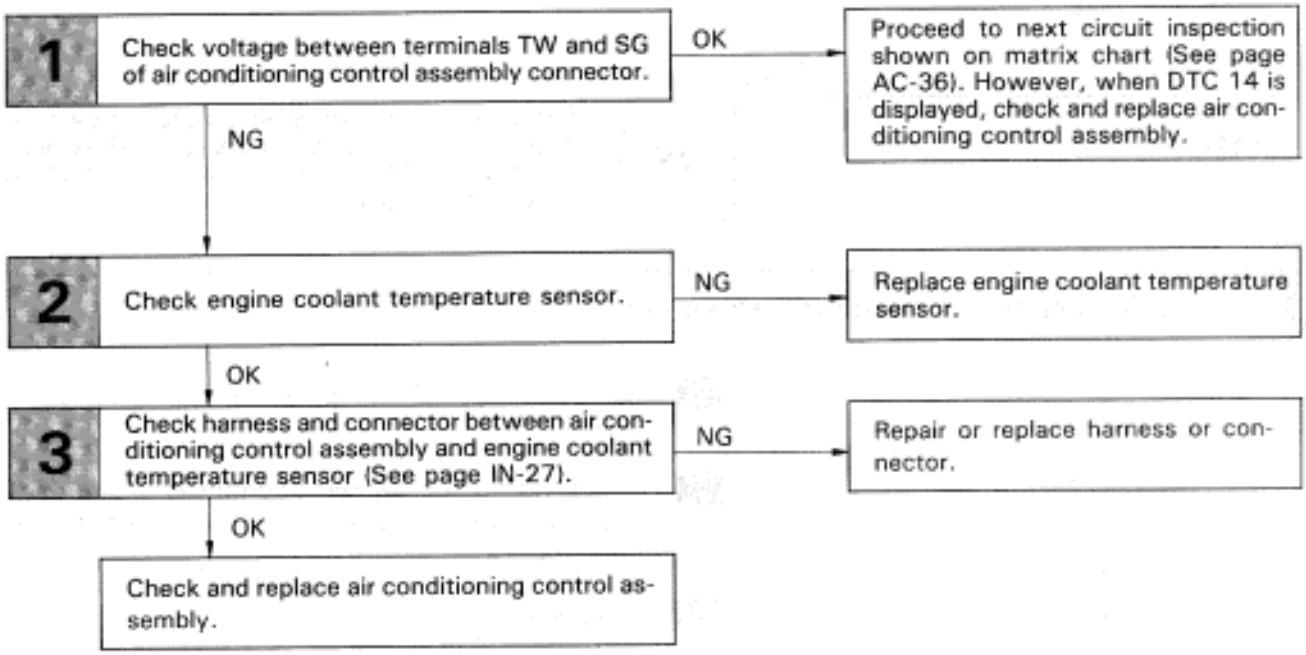
DTC 14 Engine Coolant Temperature Sensor Circuit

CIRCUIT DESCRIPTION

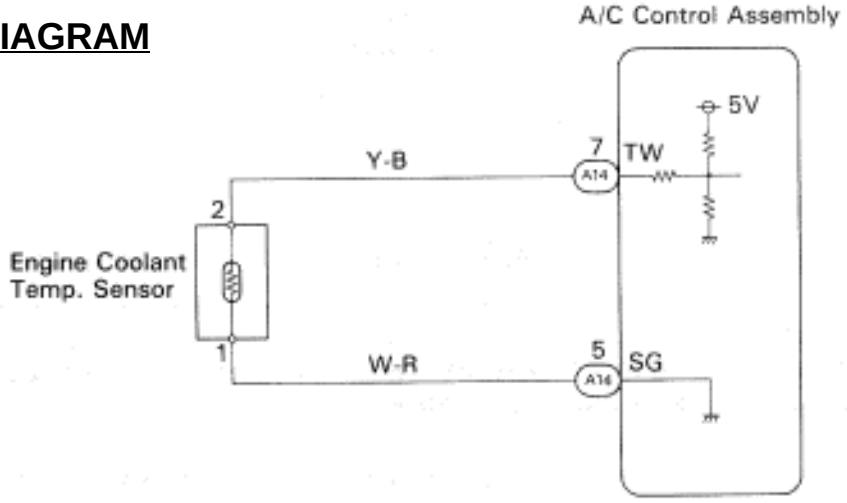
This sensor detects the engine coolant temperature and sends the appropriate signals to the air conditioning control assembly. These signals are used for warm up control when the engine is cold.

DTC No.	DTC Detecting Condition	Trouble Area
14	Open or short in engine coolant temperaturesensor circuit.	5 Engine coolant temperature sensor. 5 Harness or connector between engine coolant temperature sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART



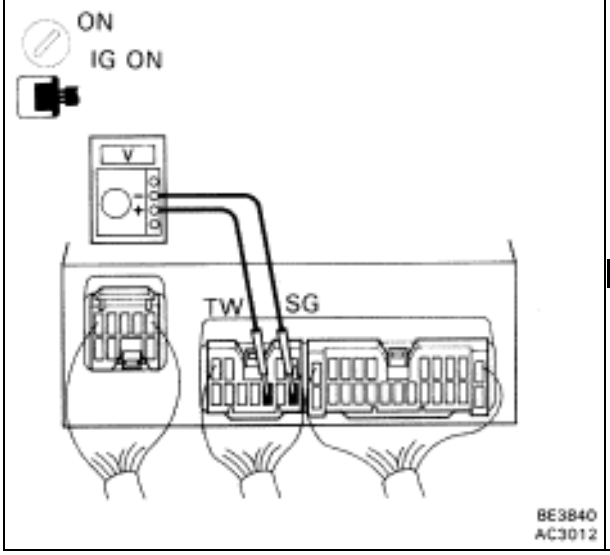
WIRING DIAGRAM



AC3039

INSPECTION PROCEDURE

1 **Check voltage between terminals TW and SG of air conditioning control assembly connector.**



P
1. Remove A/C control assembly with connectors still connected. (See page BO–112)
2. Turn ignition switch ON.

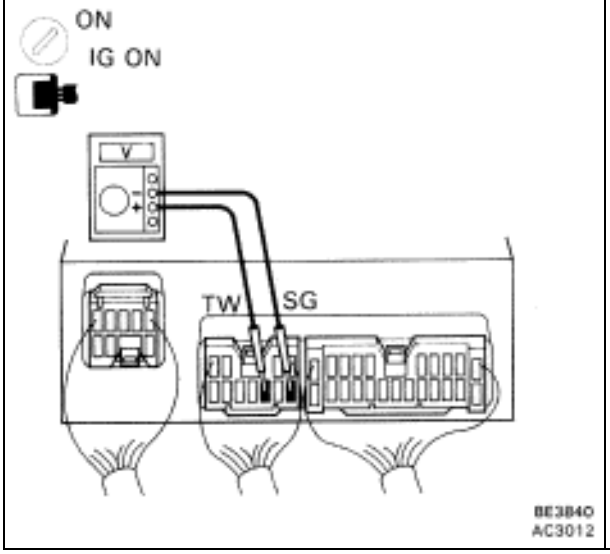
C Measure voltage between terminals TW and SG of air conditioning control assembly connector at each temperature.

OK **Voltage:**
at 0°C (32°F) : 2.8 – 3.2 V
at 40°C (104°F) : 1.8 – 2.2 V
at 70°C (158°F) : 0.9 – 1.3 V
In addition, as the temperature increases, the voltage decreases gradually.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 14 is displayed, check and repair air conditioning control assembly.**

2 **Check engine coolant temperature sensor.**



P
1. Remove heater unit.
2. Remove engine coolant temperature sensor.

C Measure resistance between terminals 1 and 2 of engine coolant temperature sensor connector at each temperature.

OK **Resistance:**
at 0°C (32°F) : 48.5 – 51.5 kΩ
at 40°C (104°F) : 2.5 – 2.7 kΩ
at 100°C (212°F) : 1.9 – 2.1 kΩ
In addition, as the temperature increases, the voltage decreases gradually.

OK

NG **Replace engine coolant temperature sensor.**

3 **Check harness and connector between air conditioning control assembly and engine coolant temperature sensor (See page IN–27).**

OK

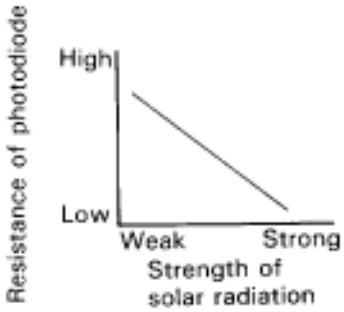
NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

DTC 21 Solar Sensor Circuit

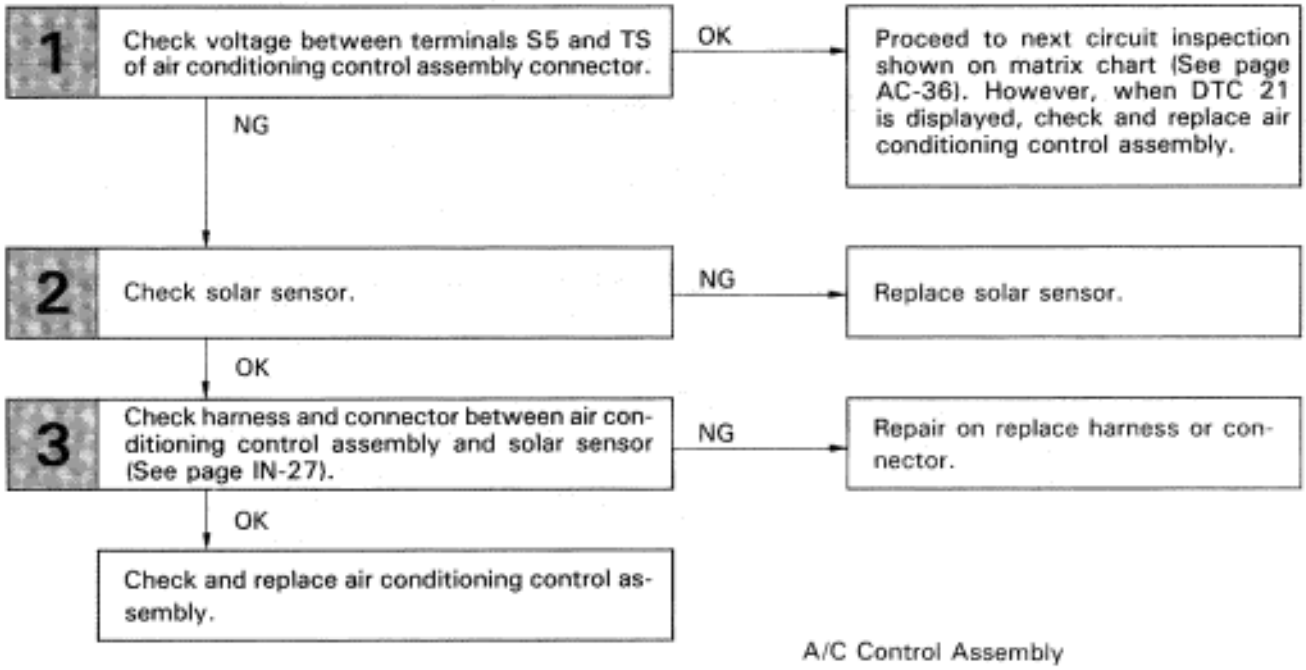
CIRCUIT DESCRIPTION

A photo diode in the solar sensor detects solar radiation and sends signals to the air conditioning control assembly.

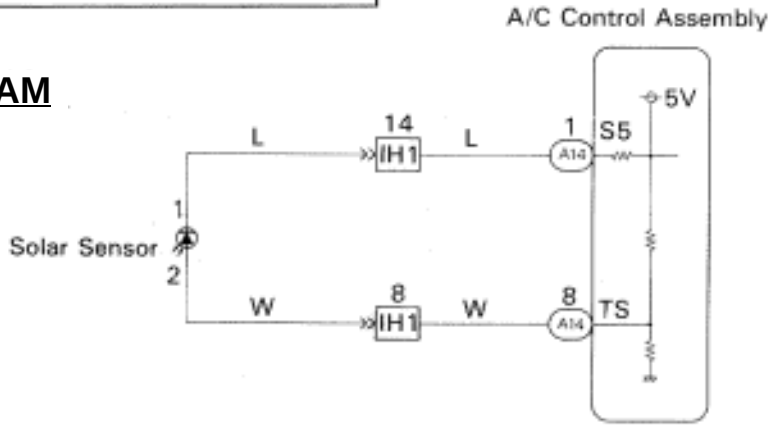


DTC No.	DTC Detecting Condition	Trouble Area
21	Open or short in solar sensor circuit. (Please note that display of diagnostic troublecode 21 is not abnormal when the sensor isnot receiving solar radiation.)	5 Solar sensor. 5 Harness or connector between solar sensor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

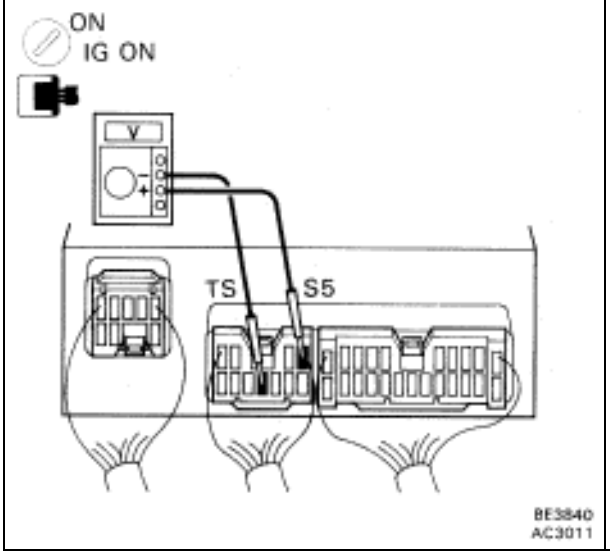


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals S5 and TS of air conditioning control assembly connector.**



P 1. Remove A/C control assembly with connectors still connected. Turn ignition switch ON.

C Measure voltage between terminals S5 and TS of air conditioning control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

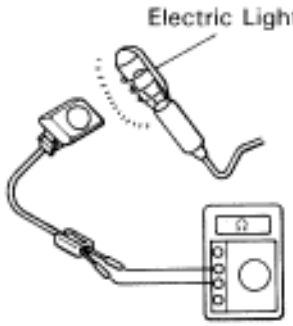
OK

Condition	Voltage
Sensor subjected to electric light	Below 4 V
Sensor covered by a cloth	4–4.5 V

In addition, when the inspection light is gradually moved away from the sensor, the voltage increases.

OK → **OK** → **Proceed to next circuit inspection shown on matrix chart (See page AC–78). However, when DTC 21 is displayed, check and replace air conditioning control assembly.**

2 **Check solar sensor.**



P 1. Remove solar sensor from dashboard.
2. Disconnect solar sensor connector.

C 1. Cover the sensor by a cloth.
2. Measure resistance between terminals 1 and 2 of solar sensor connector.

Hint Connect positive ⊕ lead of ohmmeter to terminal 2 and negative ⊖ lead to terminal 1 of the solar sensor.

OK **Resistance: ∞Ω (no continuity)**

P 1. Remove the cloth from the solar sensor and subject the sensor to electric light.
2. Measure resistance.

OK **Resistance: Below 10 kΩ (continuity).**
In addition, as the electric light is moved gradually away from the sensor the resistance increases.

OK → **NG** → **Replace solar sensor.**

3 **Check harness and connector between air conditioning control assembly and solar sensor (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

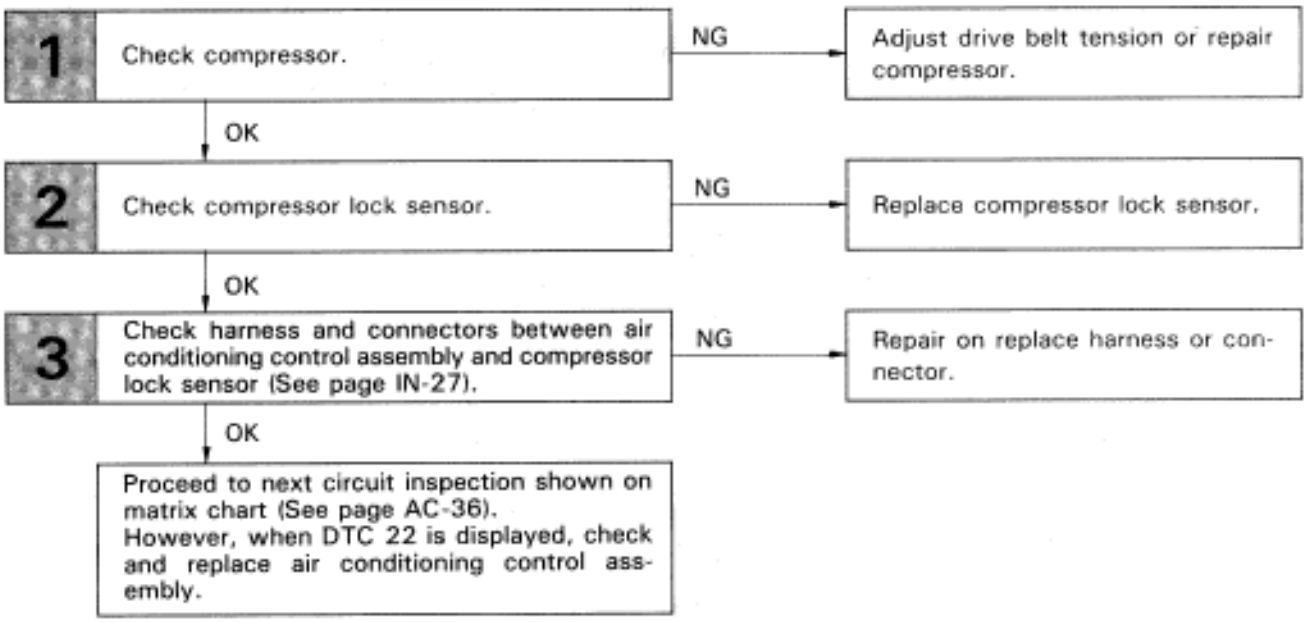
DTC 22 Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

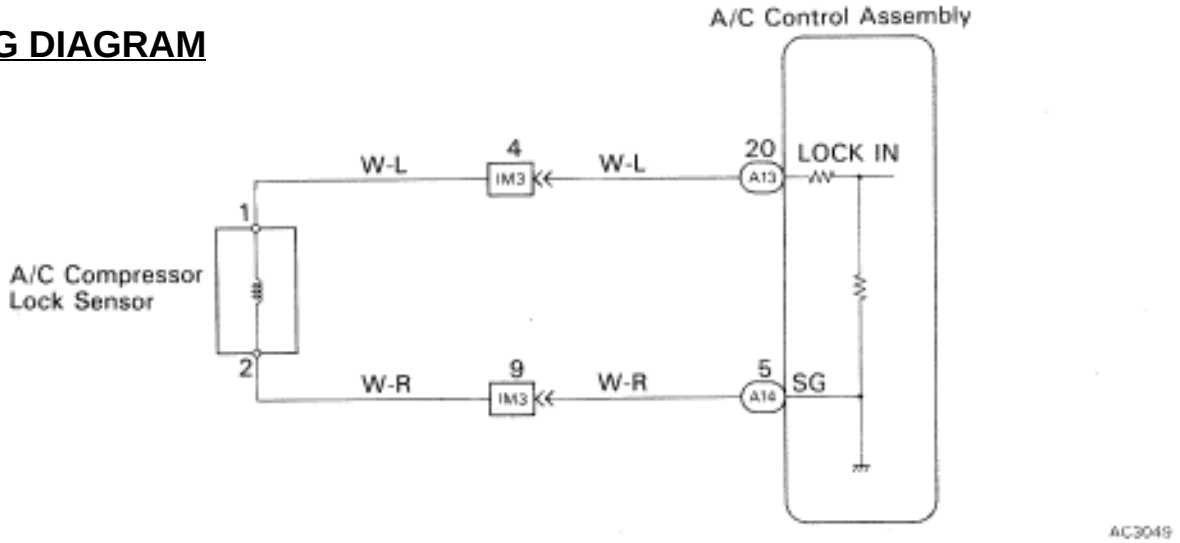
This sensor sends 4 pulses per engine revolution to the air conditioning control assembly. If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the air conditioning control assembly turns the compressor off. And, the indicator flashes at about 1 second intervals.

DTC No.	DTC Detecting Condition	Trouble Area
22	All conditions below are detected for 3 secs.or more. (a) Engine rpm; 450 rpm or more (b) Ratio between engine and compressorrpm deviates 20 % or more in compari–son to normal operation.	5 Compressor 5 Compressor drive belt. 5 Compressor lock sensor. 5 Harness and connector between compressor and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

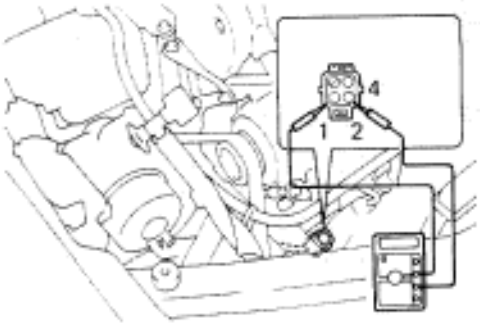
1 **Check compressor.**

P
1. Check compressor drive belt tension (See page AC–96).
2. Check if the compressor does not lock during operation with engine started and blower switch and A/C switch ON.

OK → **2**

NG → **Adjust drive belt tension or repair compressor.**

2 **Check compressor lock sensor.**

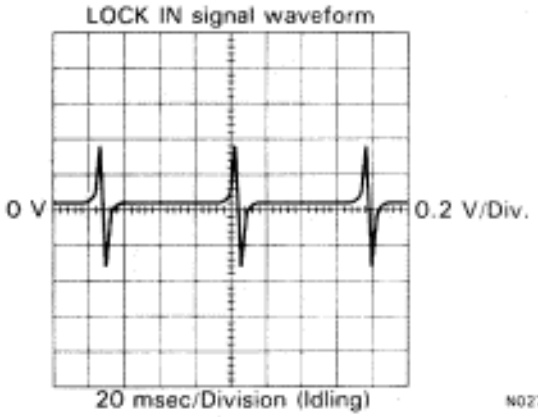


P Disconnect compressor lock sensor connector.

C Measure resistance between terminals 1 and 2 of compressor lock sensor connector.

OK **Resistance: at 20°C (68°F): 65 – 125Ω**

Reference **INSPECTION USING OSCILLOSCOPE**



- During cranking or idling, measure voltage between terminals LOCK IN and SG of A/C control assembly.

HINT: The correct wavefoam appears as shown in the illustration on the left.

OK → **3**

NG → **Replace compressor lock sensor.**

3 **Check harness and connector between air conditioning control assembly and compressor lock sensor (See page IN–27).**

OK → **Proceed to next circuit inspection shown on matrix chart (See page AC–78). However, when DTC 22 is displayed, chech and replace air conditioning control assembly.**

NG → **Repair or replace harness or connector.**

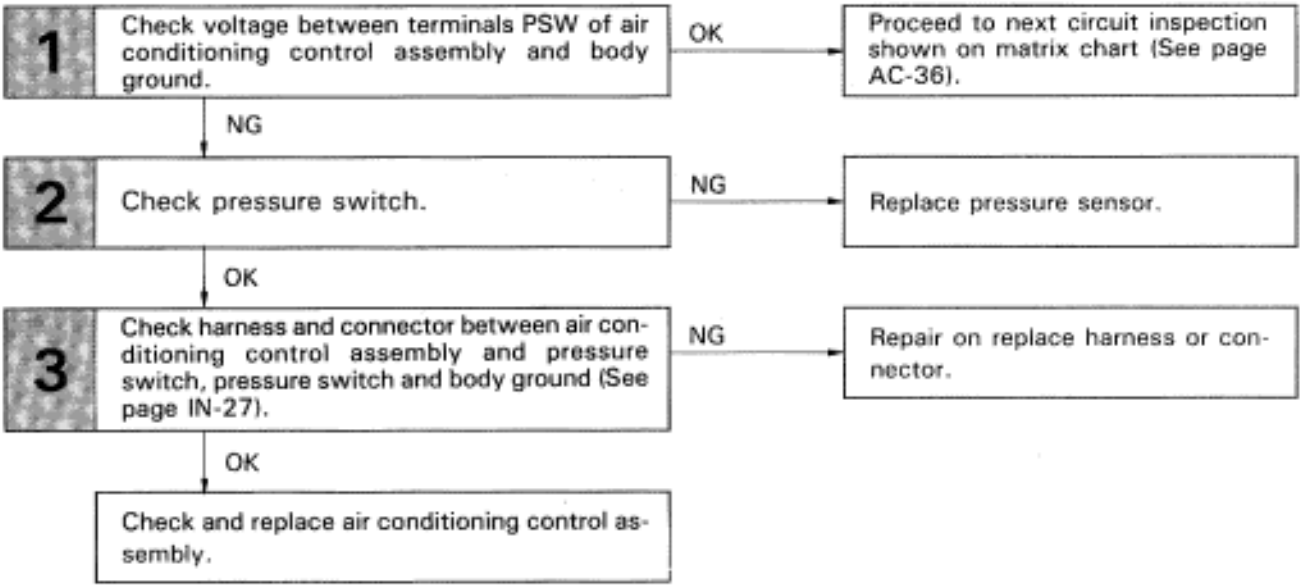
DTC 23 Pressure Switch Circuit

CIRCUIT DESCRIPTION

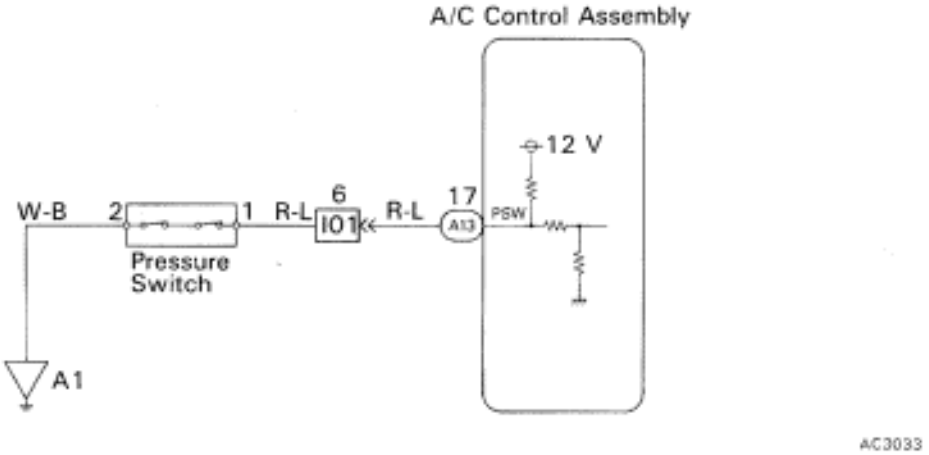
This pressure switch sends the appropriate signals to the air conditioning control assembly when the air conditioning refrigerant pressure drops too low or rises too high. When the air conditioning control assembly receives these signals, it outputs signals via the ECM to switch off the compressor relay and turns the magnet clutch off.

DTC No.	DTC Detecting Condition	Trouble Area
23	◦ Open in pressure sensor circuit. ◦ Abnormal refrigerant pressure. below 207 kPa. 2.1 kgf/cm5, over 2660 kPa, 27 kgf/cm5	◦ Pressure switch ◦ Harness or connector between pressure switch and ECU. ◦ Refrigerant pipe line. ◦ ECU.

DIAGNOSTIC CHART

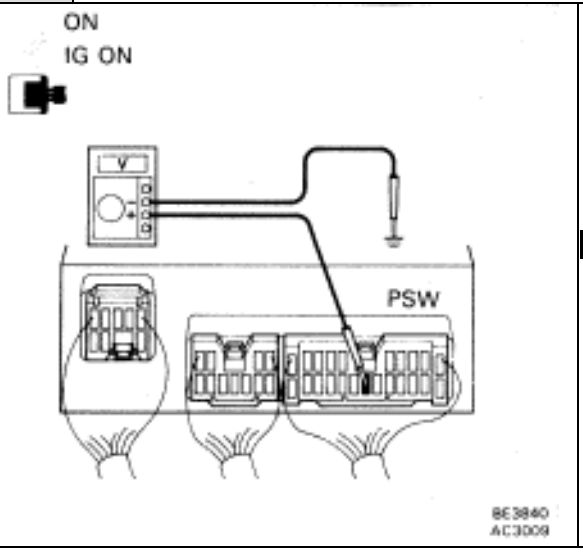


WIRING DIAGRAM



INSPECTION PROCEDURE

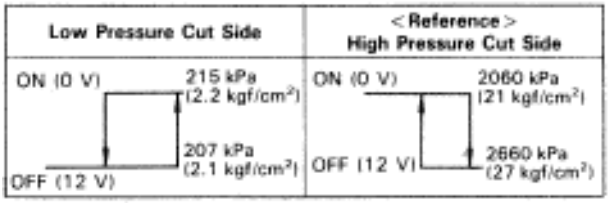
1 **Check voltage between terminals PSW of air conditioning control assembly and body ground.**



P 1. Install the manifold gauge set. (See page AC–15)
2. Turn ignition switch ON.

C Check voltage between terminals PSW of air conditioning control assembly connector and body ground when air conditioning gas pressure is changed.

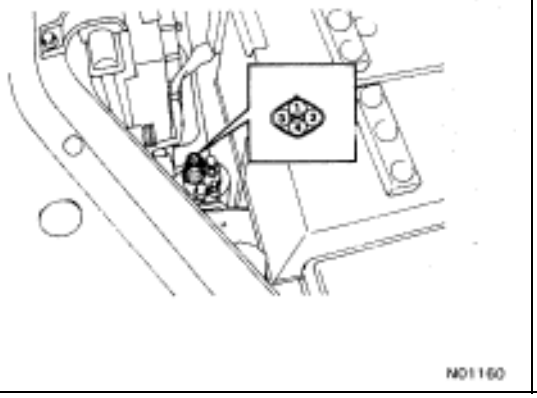
OK **The voltage changes with gas pressure, as shown in the diagram below.**



NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

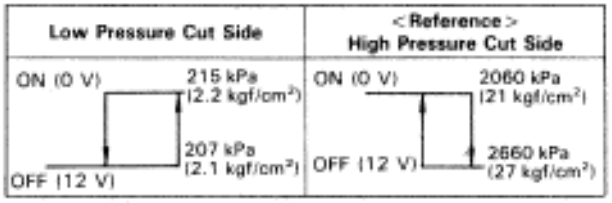
2 **Check pressure switch.**



P Disconnect pressure switch connector.

C Check continuity between terminals 1 and 4 of pressure switch when air conditioning gas pressure is changed.

OK **The continuity changes with gas pressure as shown below.**



OK

NG **Replace pressure switch.**

3 **Check harness and connector between air conditioning control assembly and pressure switch, pressure switch and body ground (See page IN–27).**

OK

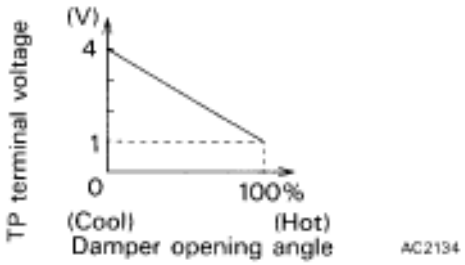
NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

DTC 31, 41 Air Mix Damper Position Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the position of the air mix damper and sends the appropriate signals to the air conditioning control assembly.
The position sensor is built into the air mix servomotor assembly.



Code No.	DTC Detection Condition	Trouble Area
31	Short to ground or power source circuit in airmix damper position sensor circuit.	5 Air mix damper position sensor. 5 Harness of connector between air mix servomotor assembly and A/C control assembly. 5 A/C control assembly.
41	Air mix damper position sensor value does not change even if ECM operates air mix servomotor.	

DIAGNOSTIC CHART

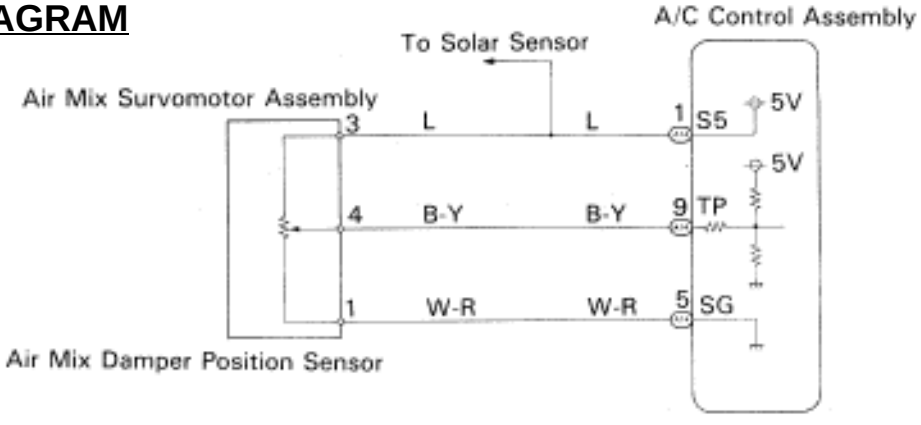
1 Check voltage between terminals TP and SG of air conditioning control assembly connector.
- OK → Proceed to next circuit inspection shown on matrix chart (See page AC-36). However, when DTC 31 or 41 is displayed, check and replace air conditioning control assembly.
- NG

2 Check air mix damper position sensor.
- NG → Replace air mix servomotor assembly.
- OK

3 Check harness and connector between air conditioning control assembly and air mix servomotor assembly (See page IN-27).
- NG → Repair or replace harness or connector.
- OK

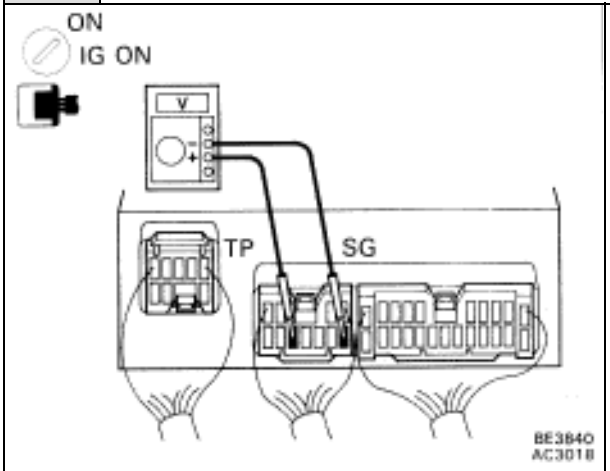
Check and replace air conditioning control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TP and SG of air conditioning control assembly connector.**



P
1. Remove A/C control assembly with connectors still connected.
2. Turn ignition switch ON.

C Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SG of air conditioning control asesembly connector each time when the set temperature is changed.

OK

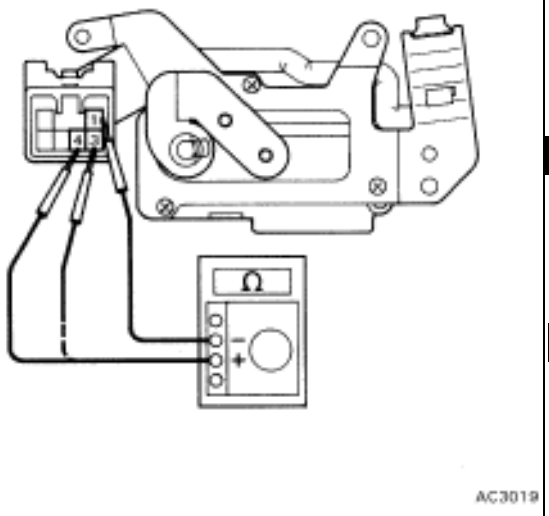
Set Temperature	Voltage
Max. cool	3.5 – 4.5 V
Max. hot	0.5 – 1.8 V

In addition, as the set temperature increases the voltage decreases gradually without interruption.

NG

OK **Proceed to next circuit in spection shown on matrix chart (See page AC–36). However, when DTC 31 or 41 is displayed, check and replace air conditioning control assembly.**

2 **Check air mix damper position sensor.**



P
1. Remove A/C unit. (See page AC–99)
2. Disconnect air mix servomotor assembly connector.

C Measure resistance between terminals 3 and 1 of air mix servomotor assebly connector.

OK **Resistance: 4.7 – 7.2 kΩ**

C While operating air mix servomotor as in the procedure on page AC–61, measure resistance between terminals 4 and 1 of air mix servomotor assembly connector.

OK

Position	Resistance
Max. cool	3.8 – 5.8 kΩ
Max. warm	0.95 – 1.45 kΩ

As the air mix servomotor moves from cool side to warm side, the resistance decreases gradually without interruption.

OK

NG **Replace air mix servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air mix servomotor assembly (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

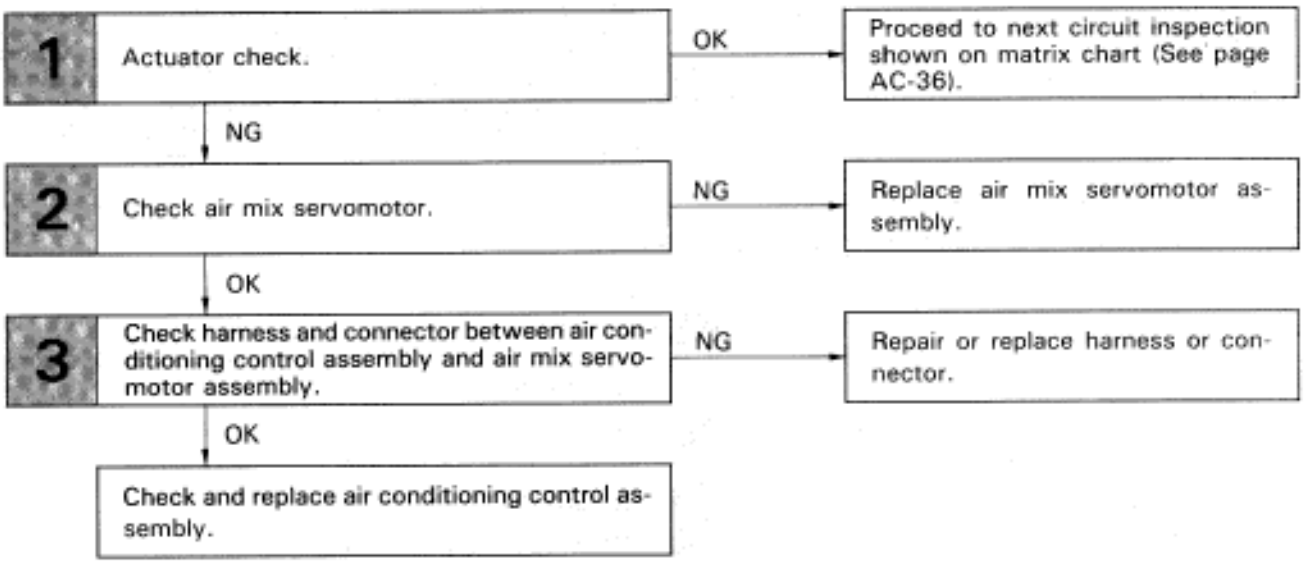
DTC 41 Air Mix Servomotor Circuit

CIRCUIT DESCRIPTION

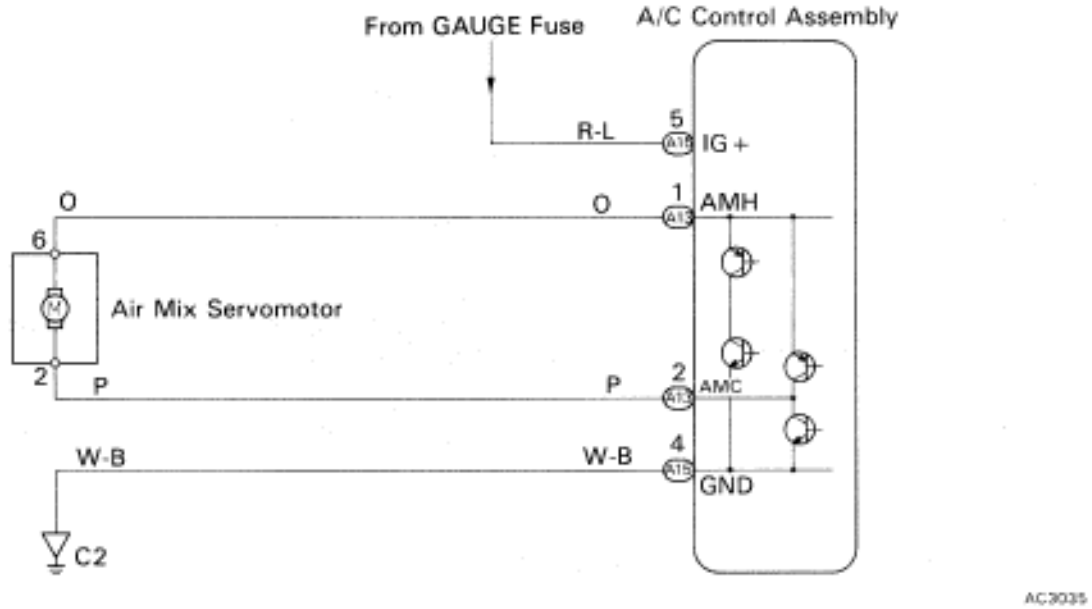
The air mix servomotor is controlled by the ECU and moves the air mix damper to the desired position.

Code No.	DTC Detection Condition	Trouble Area
41	Air mix damper position sensor value does not change even if ECU operates air mix servomotor.	5 Air mix servomotor. 5 Air mix damper position sensor 5 Harness or connector between ECU and A/M servomotor, A/M damper position sensor 5 ECU

DIAGNOSTIC CHART

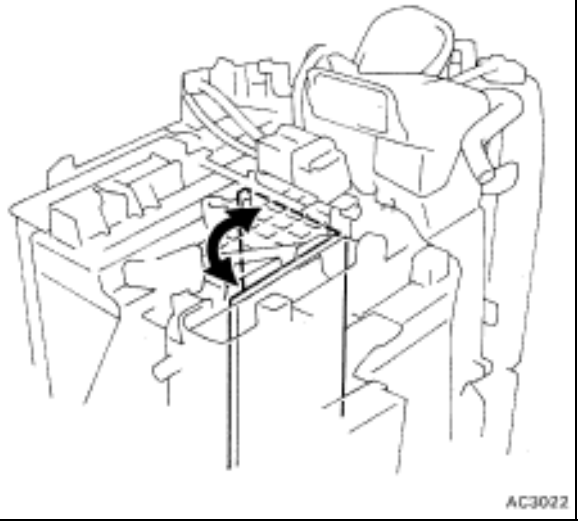


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Actuator check.**



P
1. Warm up the engine.
2. Set to the actuator check mode (See page AC–30).
3. Press the mode switch and change it to step operation.

C Press the mode switch and check the operatiion of the air mix damper and the condition of the blower.

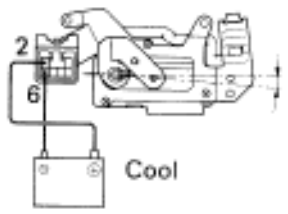
OK

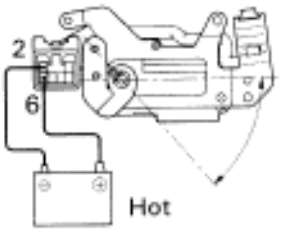
Display Code	Air Mix Damper	Condition
20 – 23	0% (Fully closed)	Cool air comes out
24 – 25	50%	
26 – 29	100% (Fully opened)	Warm air comes out

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check air mix servomotor.**





AC3020
AC3021

P Remove heater unit.

C Connect positive ∞ lead to terminal 2 and negative ⊕ lead to terminal 6.

OK **The lever turns smoothly to cool side.**

C Connect negative ⊕ lead to terminal 2 and positive ∞ lead to terminal 6.

OK **The lever turns smoothly to Hot side.**

OK

NG **Replace air mix servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air mix servomotor assembly (See page IN–27).**

OK

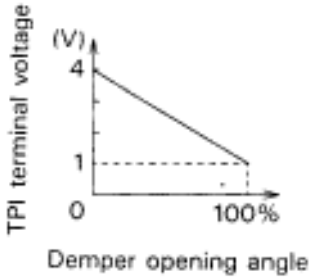
NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

DTC 32,42 Air Inlet Damper Position Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the position of the air inlet damper and sends the appropriate signals to the air conditioning control assembly.
The position sensor is built into the air mix servomotor assembly.



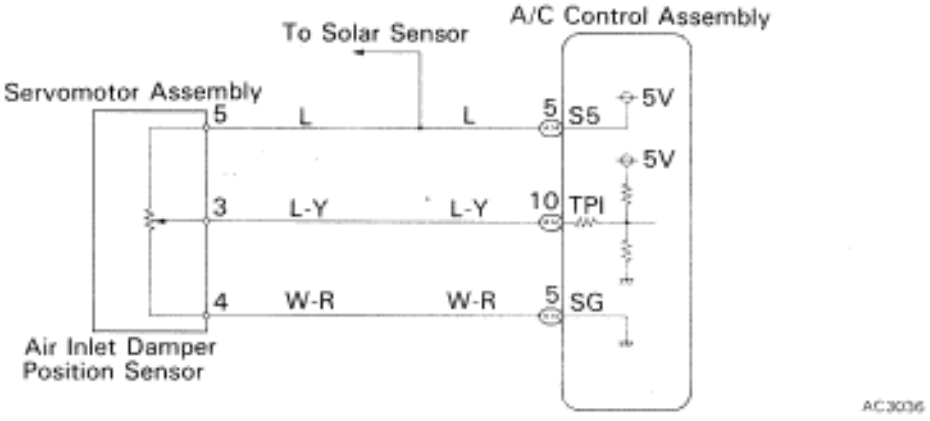
Code No.	DTC Detection Condition	Trouble Area
32	Short to ground or power source circuit in airinlet damper position sensor circuit.	5 Air inlet damper position sensor. 5 Harness or connector between air inlet servomotor assembly and A/C control assembly. 5 A/C control assembly.
42	Air inlet damper position sensor value does not change even if ECU operates air inlet ser– .	

DIAGNOSTIC CHART

1. Check voltage between terminals TPI and SG of air conditioning control assembly connector.
   - OK → Proceed to next circuit inspection shown on matrix chart (See page AC-36). However, when DTC 32 or 42 is displayed, check and replace air conditioning control assembly.
   - NG ↓
2. Check air inlet damper position sensor.
   - NG → Replace air inlet servomotor assembly.
   - OK ↓
3. Check harness and connectors between air conditioning control assembly and air inlet servomotor assembly (See page IN-27).
   - NG → Repair or replace harness or connector.
   - OK ↓

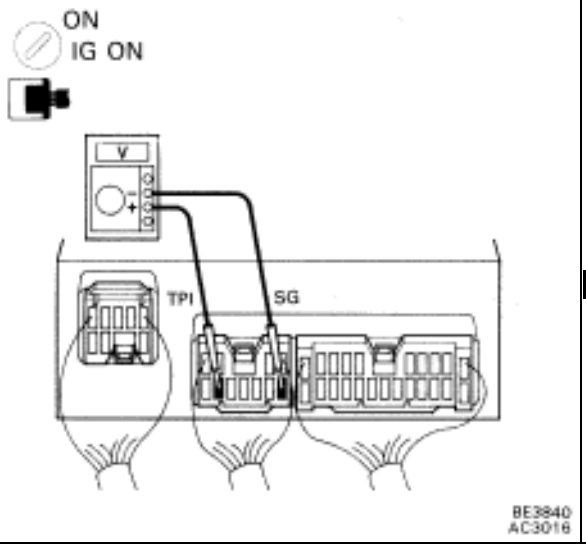
Check and replace air conditioning control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals TPI and SG of air conditioning control assembly connector.**



P
1. Remove A/C control assembly with connectors still connected.
2. Turn ignition switch ON.

C Press REC/FRS switch to change air inlet between fresh and recirculation air, and measure voltage between terminals TPI and SG of air conditioning control assembly when the air inlet servomotor operates.

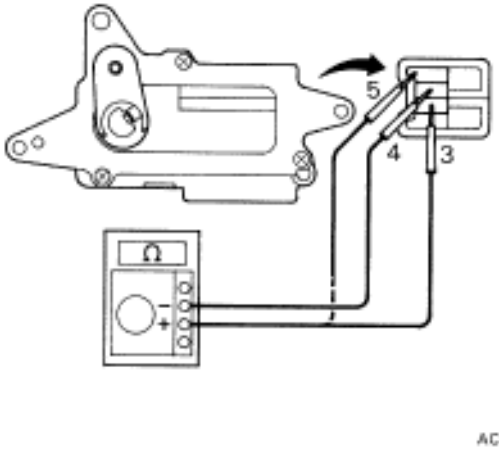
OK

FRS-REC Switch	Voltage
REC	3.5 ~ 4.5 V
FRS	0.5 ~ 1.8 V

In addition, as the air inlet servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

OK → **Proceed to next circuit inspection shown on matrix chart (See page AC–36). However, when DTC 32 or 42 is displayed, check and replace air conditioning control assembly.**

2 **Check air inlet damper position sensor.**



P
1. Remove A/C unit. (See page AC–99)
2. Disconnect air inlet servomotor assembly connector.

C Measure resistance between terminals 4 and 5 of air inlet servomotor assembly connector.

OK **Resistance: 4.7 ~ 7.2 kΩ**

C While operating air inlet servomotor as in the procedure on page AC–65, measure resistance between terminals 3 and 5 of air inlet servomotor assembly connector.

OK **Resistance:**

Damper Position	Resistance
REC side	3.8 ~ 5.8 kΩ
FRS side	0.95 ~ 1.45 kΩ

As the air inlet servomotor moves from REC side to FRS side, the resistance decreases gradually without interruption.

OK → **NG** → **Replace air inlet servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air inlet servomotor assembly (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

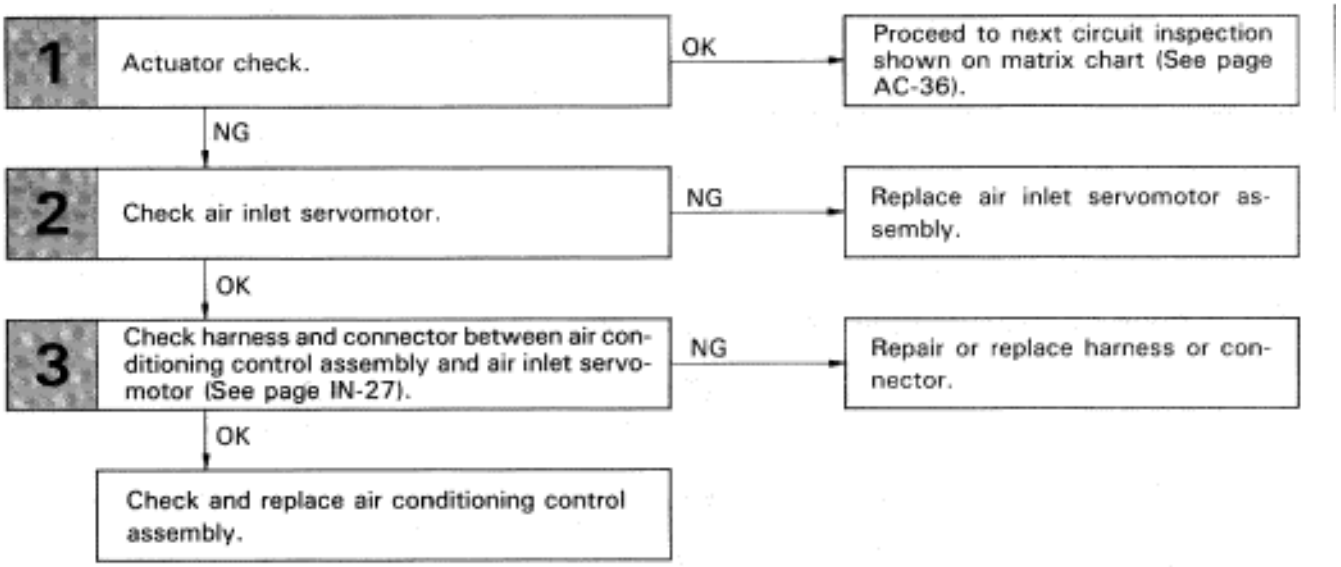
DTC 42 Air Inlet Servomotor Circuit

CIRCUIT DESCRIPTION

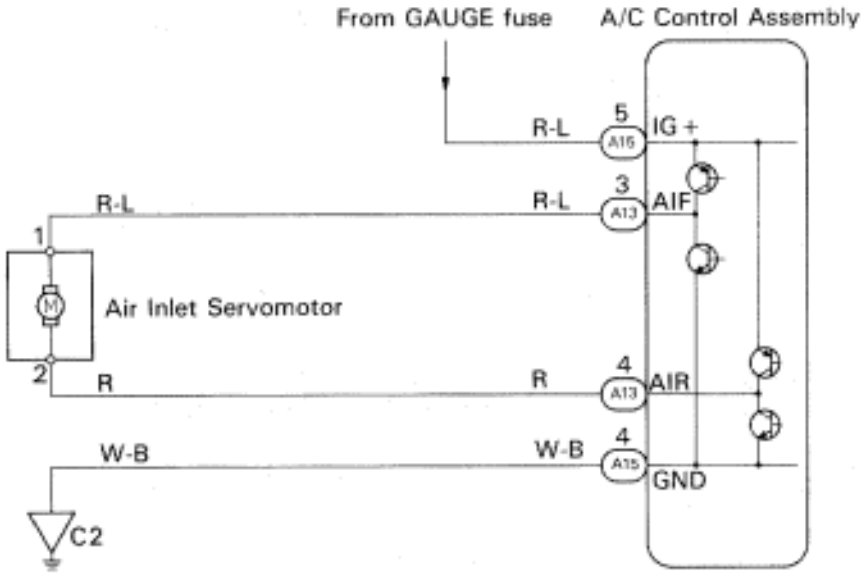
The air inlet servomotor is controlled by the air conditioning control assembly and moves the air inlet damper to the desired position.

Code No.	DTC Detection Condition	Trouble Area
42	Air inlet damper position sensor value does not change even if ECU operates air inlet servomotor.	5 Air inlet damper position sensor. 5 Harness or connector between air inlet servomotor assembly and A/C control assembly. 5 A/C control assembly.

DIAGNOSTIC CHART

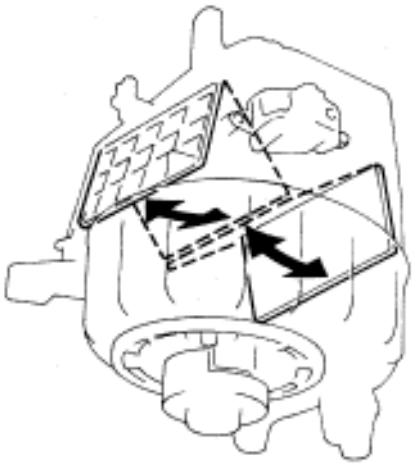


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Actuator check.**



P 1. Remove glove box to see and check the air inlet damper operation.
2. Set to the actuator check mode (See page AC–30).
3. Press the switch and change it to step operation.

C Press the switch and check the operation air inlet damper.

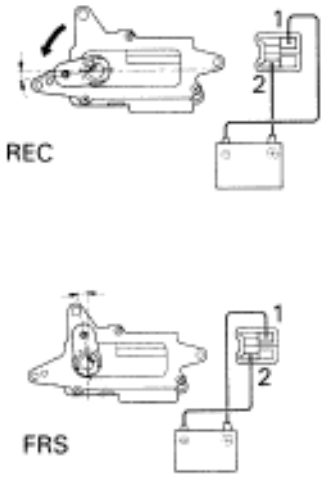
OK

Display Code	Air Inlet Damper
20 ~ 22	FRS
23	F/R
24 ~ 29	REC

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check air inlet servomotor.**



P Remove cooling unit.

C Connect positive ∞ lead to terminal 2 and negative ⊕ lead to terminal 1.

OK **The lever moves smoothly to REC position.**

C Connect negatives ⊕ lead to terminal 2 and positive ∞ lead to terminal 1.

OK **The lever moves smoothly to FRS position.**

OK

NG **Replace air inlet servomotor assembly.**

3 **Check harness and connector between air conditioning control assembly and air inlet servomotor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

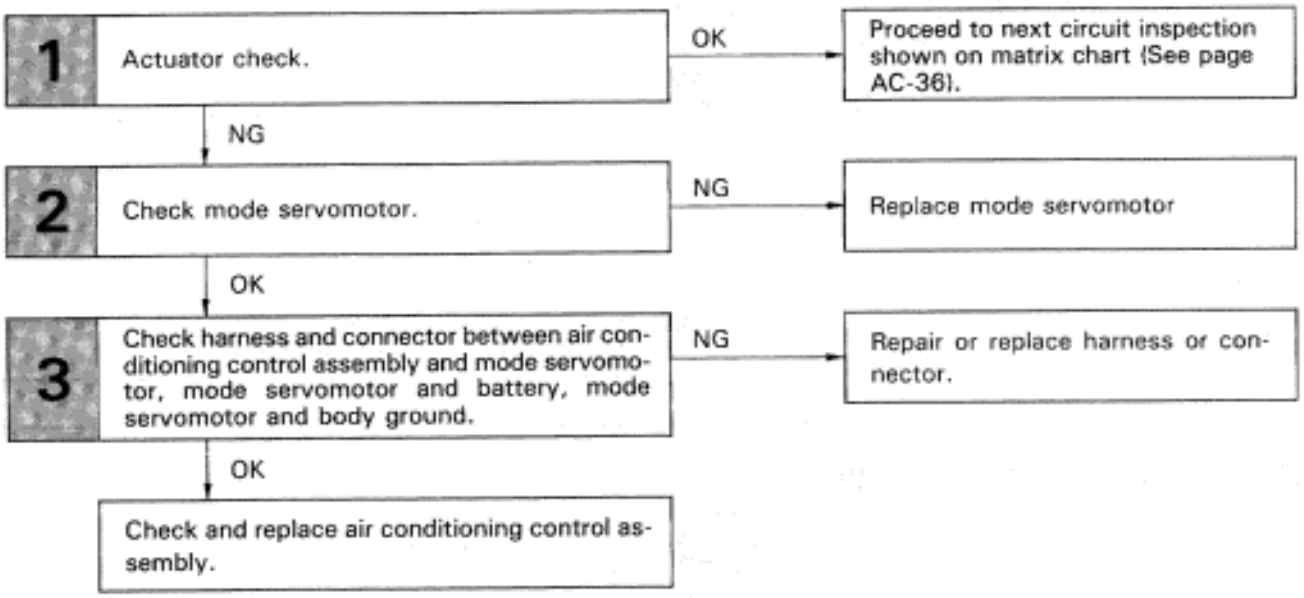
Check and replace air conditioning control assembly.

Air Outlet Servomotor Circuit

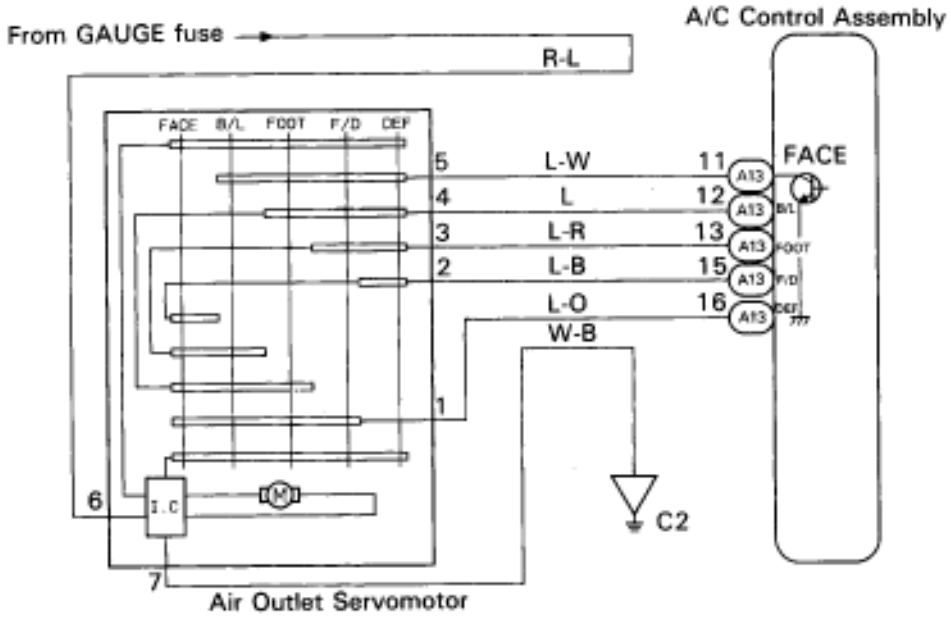
CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by signals from the ECU. When the AUTO switch is on, the ECU changes the mode automatically between (FACE), (BI–LEVEL) and (FOOT) according to the temperature setting.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Actuator check.**

Display Code	Air Flow Mode
20 ~ 24	FACE
25	BI-LEVEL
26 ~ 27	FOOT
28	FOOT DEF
29	DEF

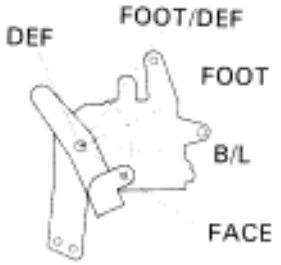
P 1. Set to the actuator check mode (See page AC–30).
2. Press the mode (<) switch and change to step operation.

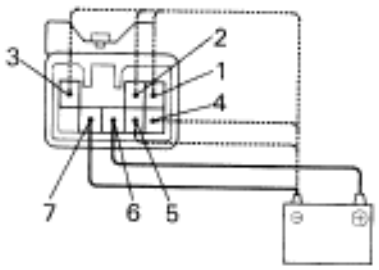
C Press the mode (<) switch in order and check the condition of air flow mode.

OK **The mode changes with the change in the temperature display as shown in the table.**

OK → **NG** → **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check mode servomotor.**





N01283
N01285

P Remove heater unit (See page AC–99).

C 1. Connect positive ∞ lead to terminal 6 and negative ⊕ lead to terminal 7.
2. Check the lever operation when the negative ⊕ lead is connected to the terminals shown below.

OK **The lever moves smoothly to the position for each mode.**

Ground Terminals	Mode
5	FACE
4	BI-LEVEL
3	FOOT
2	FOOT DEF
1	DEF

OK → **NG** → **Replace mode servomotor.**

3 **Check harness and connector between air conditioning control assembly and mode servomotor mode servomotor and battery, mode servomotor and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

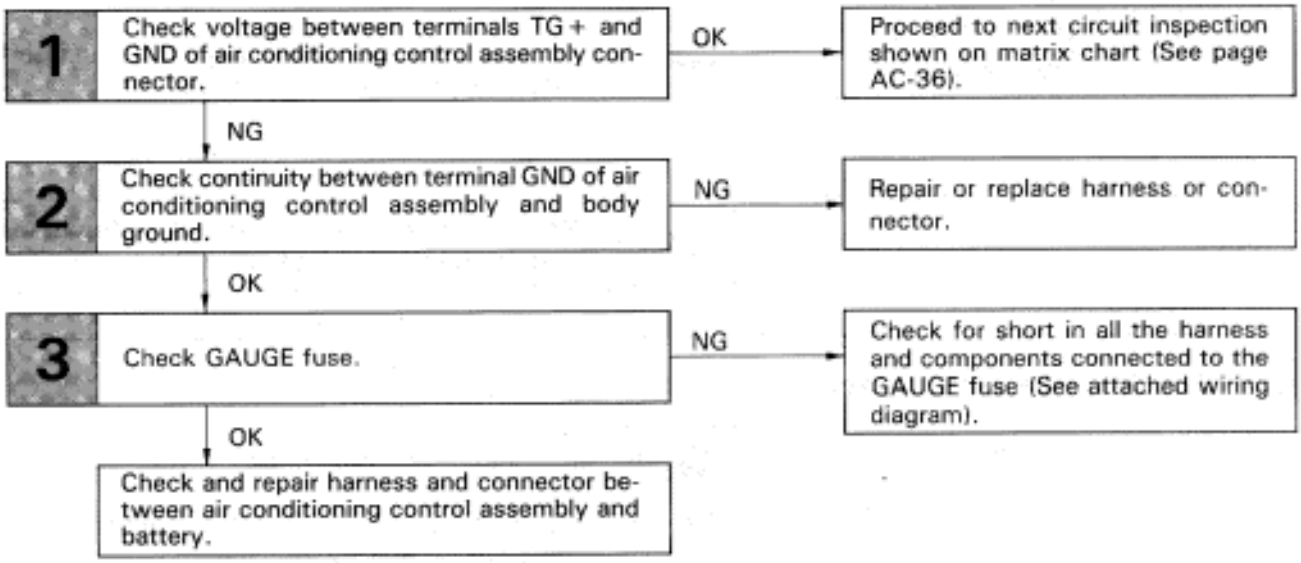
Repair or replace air conditioning control assembly.

IG Power Source Circuit

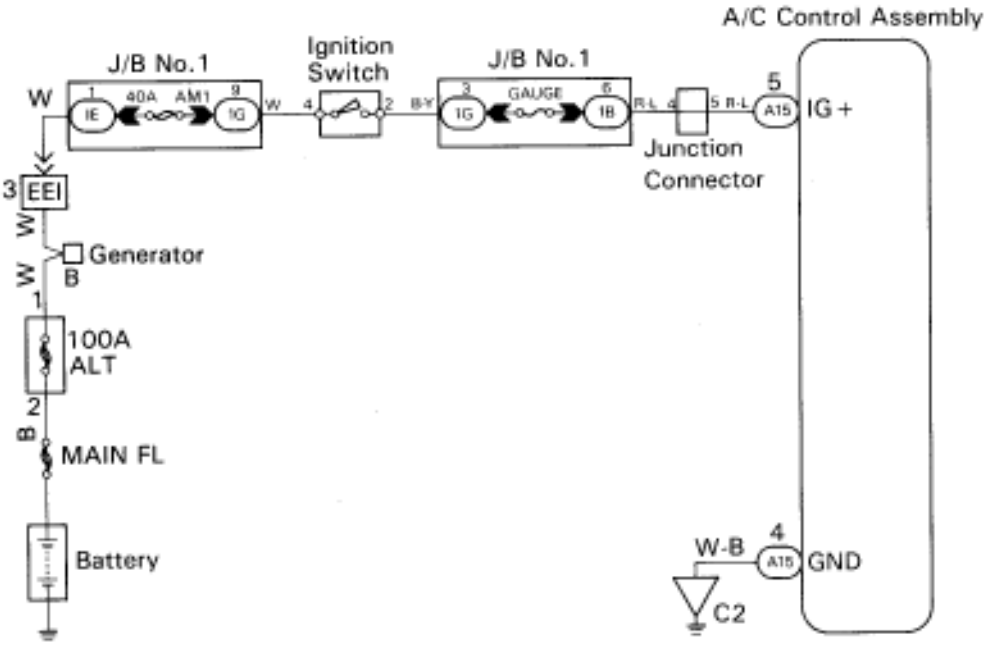
CIRCUIT DESCRIPTION

This is the power source for the air conditioning control assembly (contains the ECU) and servomotors, etc.

DIAGNOSTIC CHART

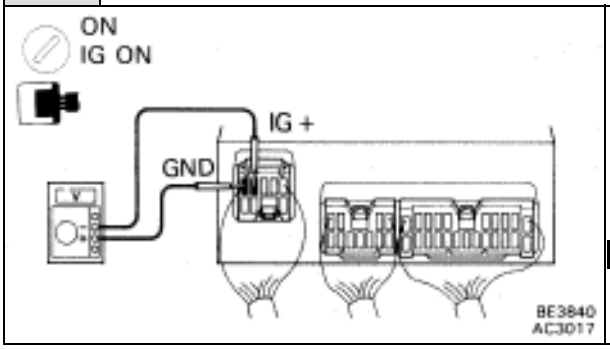


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals IG+ and E of air conditioning control assembly connector.**



P 1. Remove console upper panel. (See page BO–112)
2. Remove A/C ECU with connectors still connected.
3. Turn ignition switch ON.

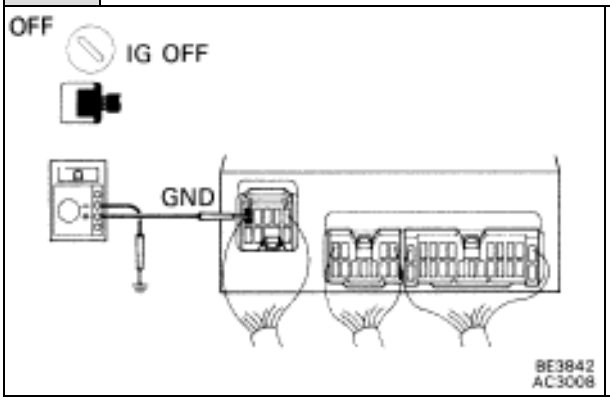
C Measure voltage between terminals IG+ and GND of air conditioning control assembly.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check continuity between terminal E of air conditioning control assembly and body ground.**



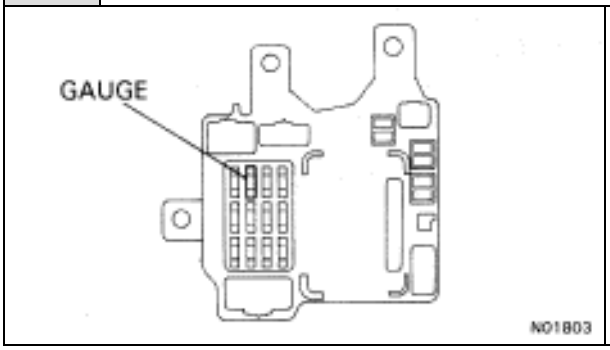
P Measure resistance between terminal GND of air conditioning control assembly and body ground

OK **Resistance: Below 1 Ω**

OK

NG **Repair or replace harness or connector.**

3 **Check HEATER fuse.**



P Remove GAUGE fuse J/B No.1.

C Check continuity of gauge fuse.

OK **Continuity.**

OK

NG **Check for short in all the harness and components connected to the GAUGE fuse (See attached wiring diagram).**

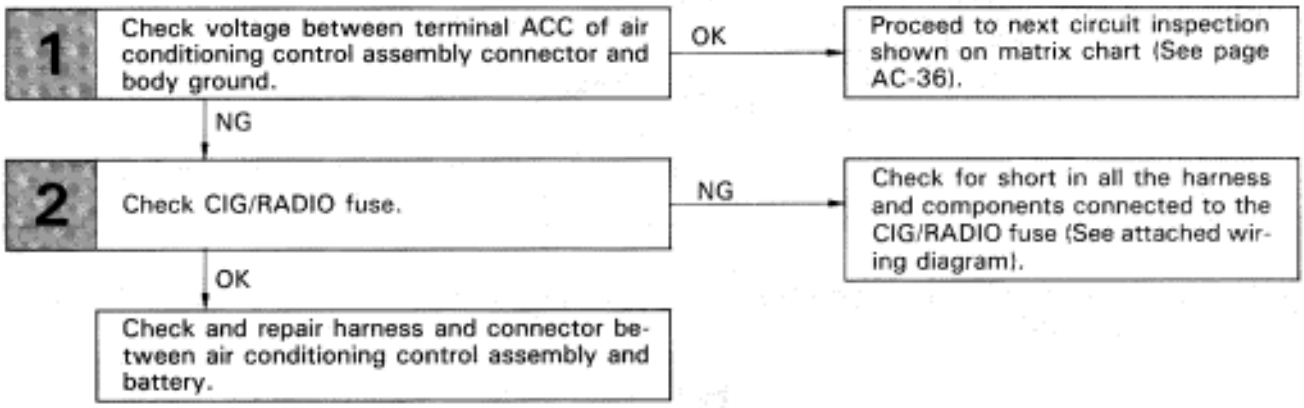
Check and repair harness and connector between air conditioning control assembly and battery.

ACC Power Source Circuit

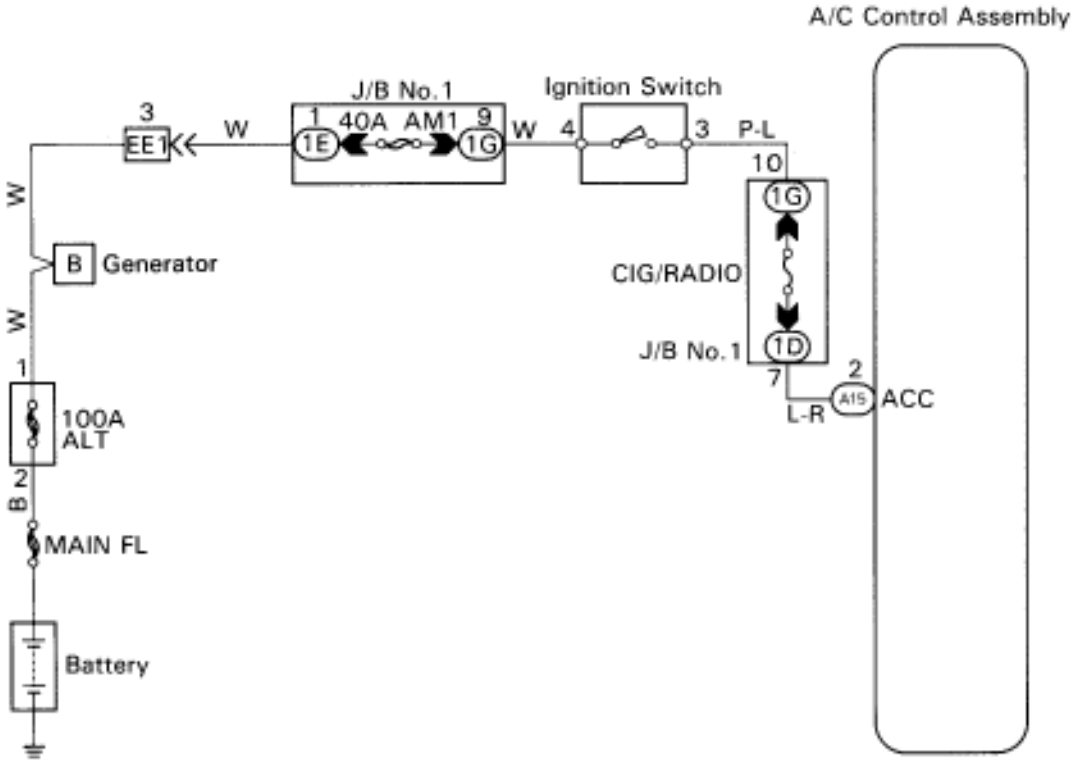
CIRCUIT DESCRIPTION

This circuit supplies power to the air conditioning control assembly (contains the ECU).

DIAGNOSTIC CHART

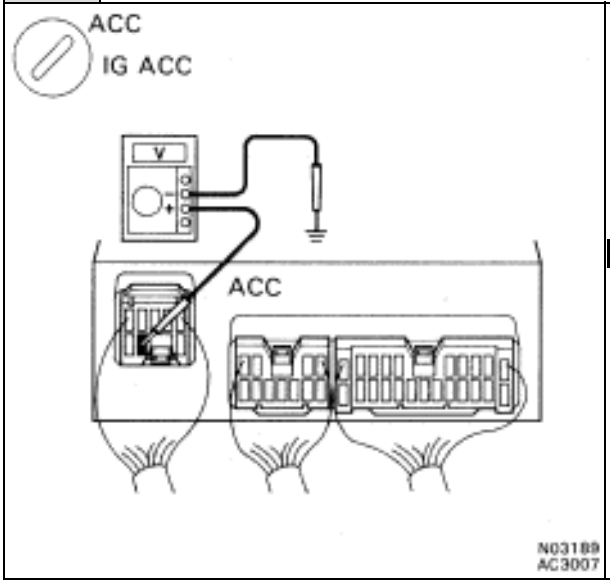


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal ACC of air conditioning control assembly connector and body ground.**



P 1. Remove console upper panel. (See page BO–112)
2. Remove A/C ECU with connectors still connected.
3. Turn ignition switch ON.

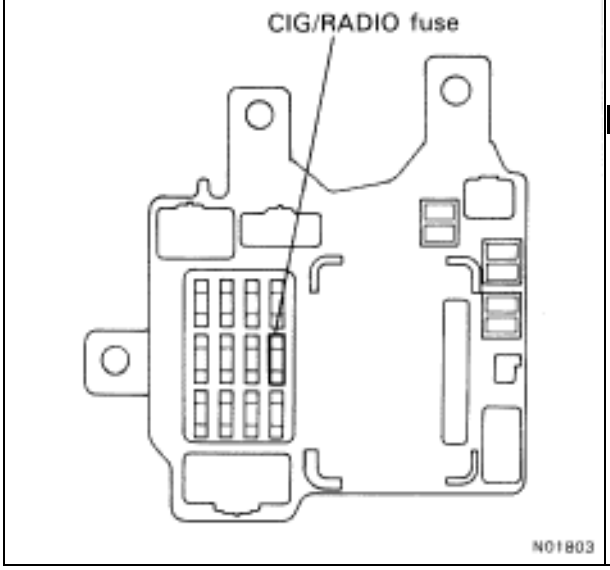
C Measure voltage between terminal ACC of air conditioning control assembly connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check RADIO No.2 fuse.**



P Remove CIG/RADIO fuse from J/B No.1.

C Check continuity of CIG/RADIO fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the CIG/RADIO fuse (See attached wiring diagram).**

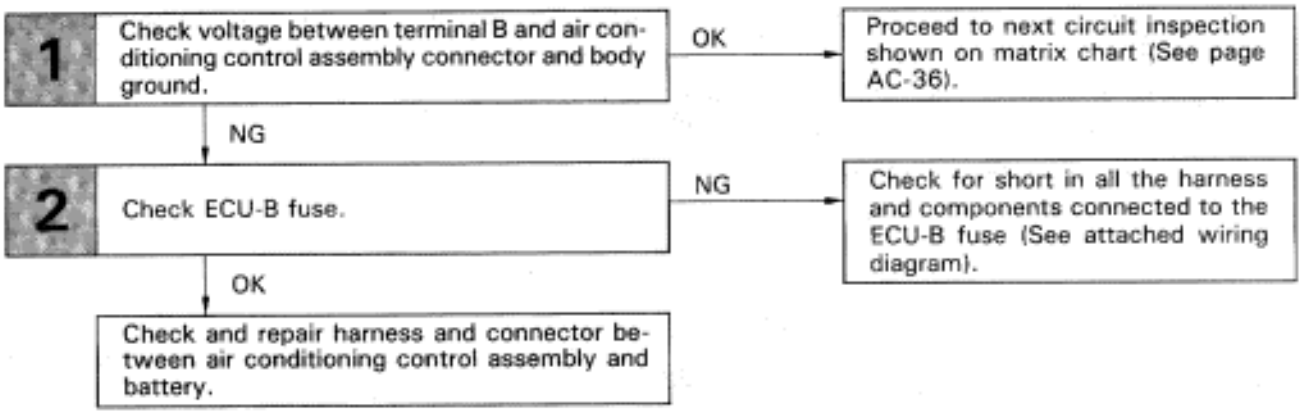
Check and repair harness and connector between air conditioning control assembly and battery.

Back–up Power Source Circuit

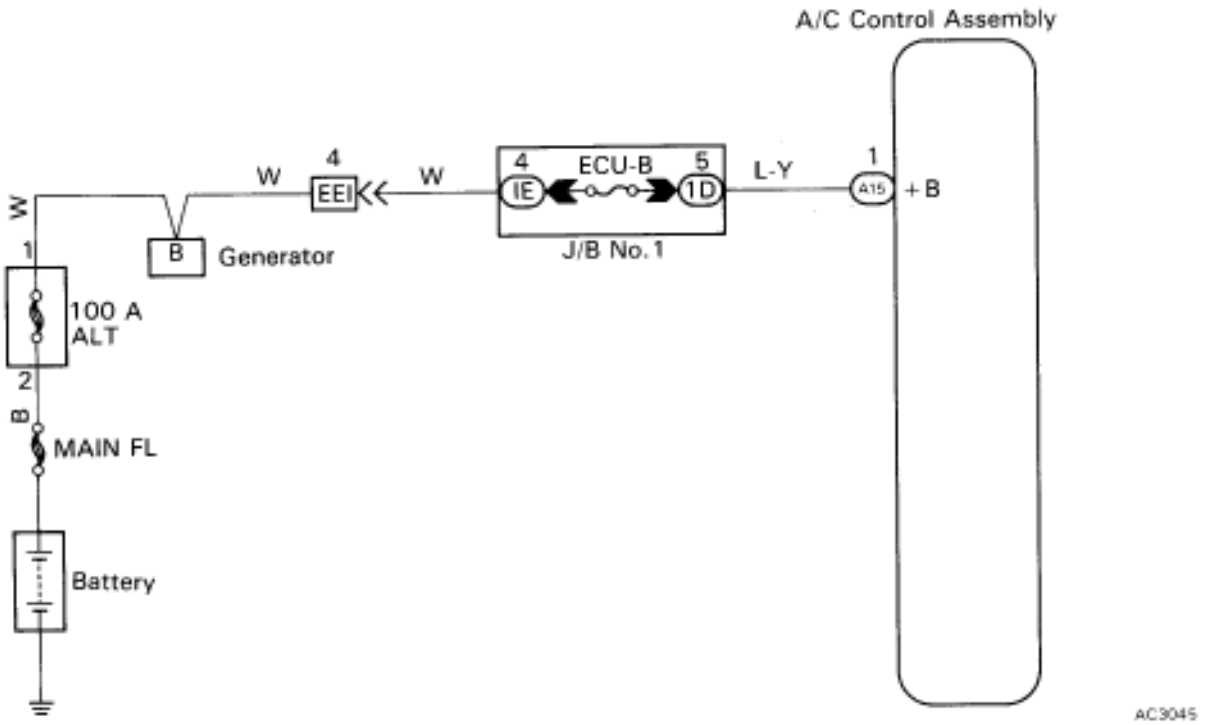
CIRCUIT DESCRIPTION

This is the backup power source for the air conditioning control assembly. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

DIAGNOSTIC CHART

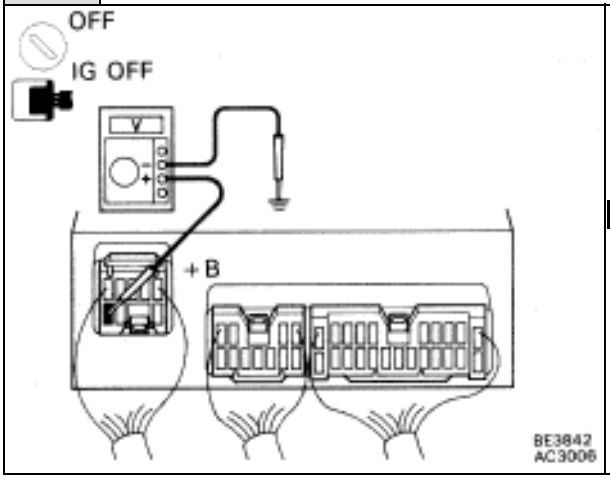


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal B+ of air conditioning control assembly connector and body ground.**



P 1. Remove console upper panel. (See page BO–112.)
2. Remove A/C ECU with connectors still connected.

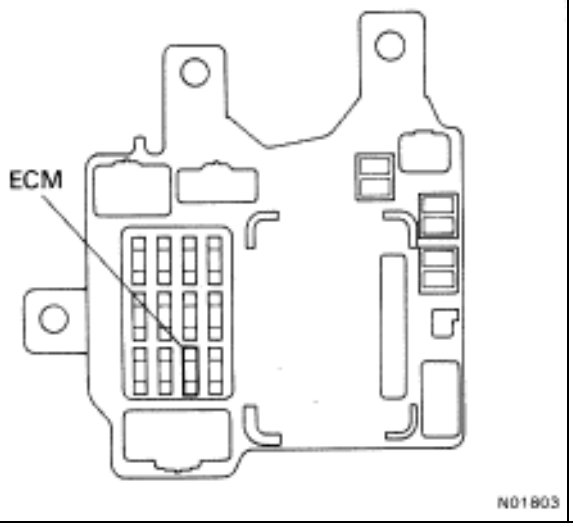
C Measure voltage between terminal B+ of air conditioning control assembly connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check DOME fuse.**



P Remove ECU–B fuse from J/B No.1.

C Check continuity of ECU–B fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the DOME fuse (See attached wiring diagram).**

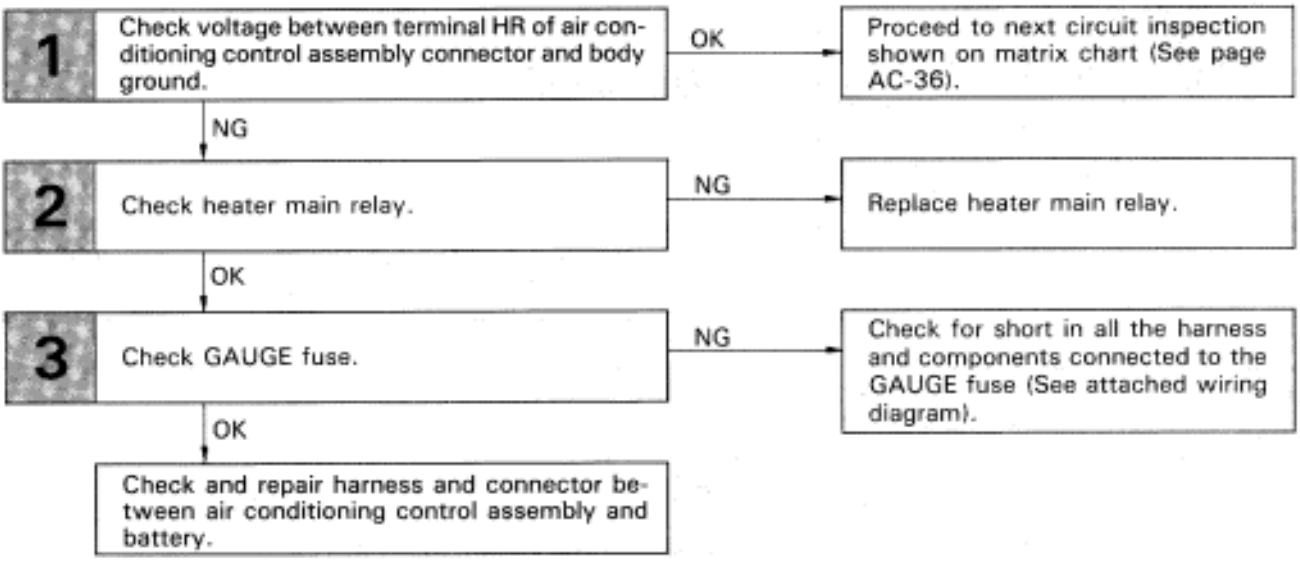
Check and repair harness and connector between air conditioning control assembly and battery.

Heater Main Relay Circuit

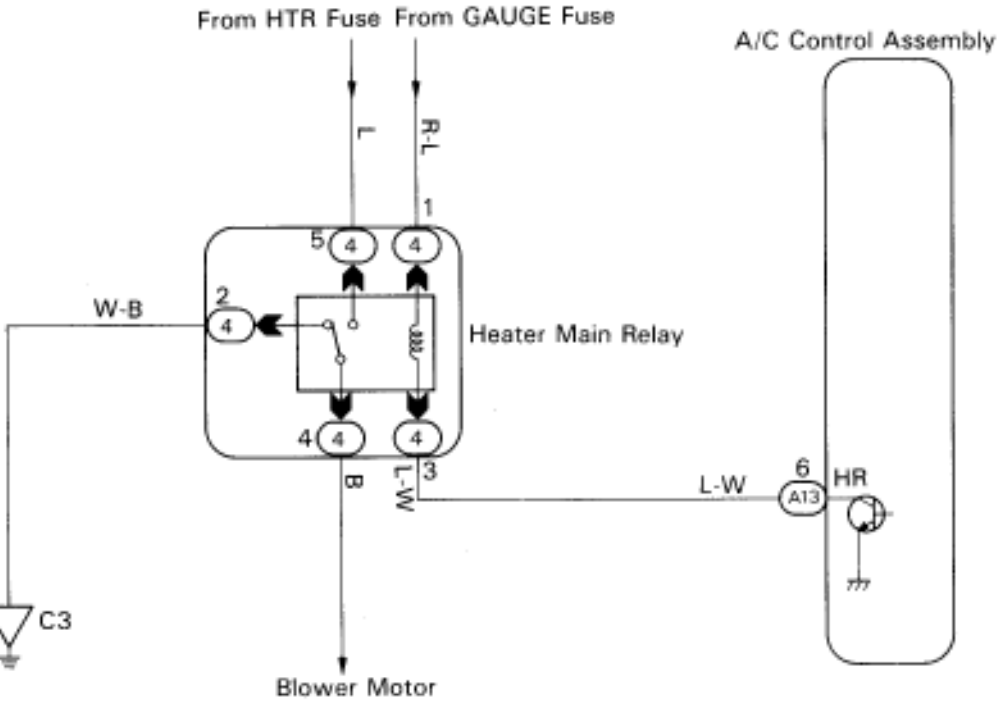
CIRCUIT DESCRIPTION

The heater main relay is switched on by signals from the air conditioning control assembly.
It supplies power to the blower motor.

DIAGNOSTIC CHART

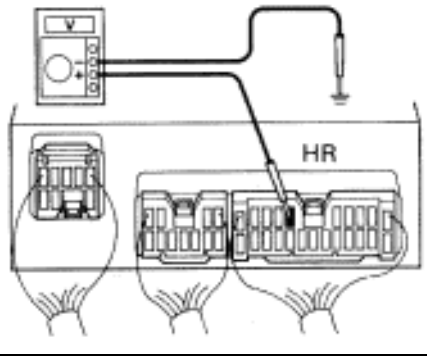


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal HR of air conditioning control assembly connector and body ground.**



P Remove A/C control assembly with connectors still connected.

C 1. Measure voltage between terminal HR of air conditioning control assembly and body ground when ignition switch is on and off.

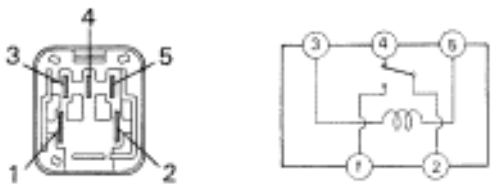
OK

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check heater main relay.**



C Check continuity between each pair of terminals of heater main relay shown below.

OK

Terminals 1 and 4	Open
Terminals 2 and 4	Continuity
Terminals 3 and 5	Continuity (62.5 ~ 90.9 Ω)

P 1. Apply battery positive voltage between terminals 3 and 5.

2. Check continuity between each pair of terminal shown below.

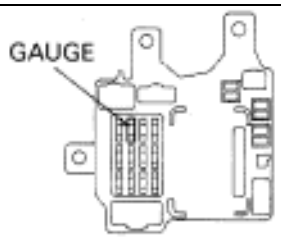
OK

Terminals 1 and 2	Continuity
Terminals 2 and 4	Open

OK

NG **Replace heater main relay.**

3 **Check GAUGE fuse.**



P Remove GAUGE fuse.

C Check continuity of GAUGE fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the GAUGE fuse (See attached wiring diagram).**

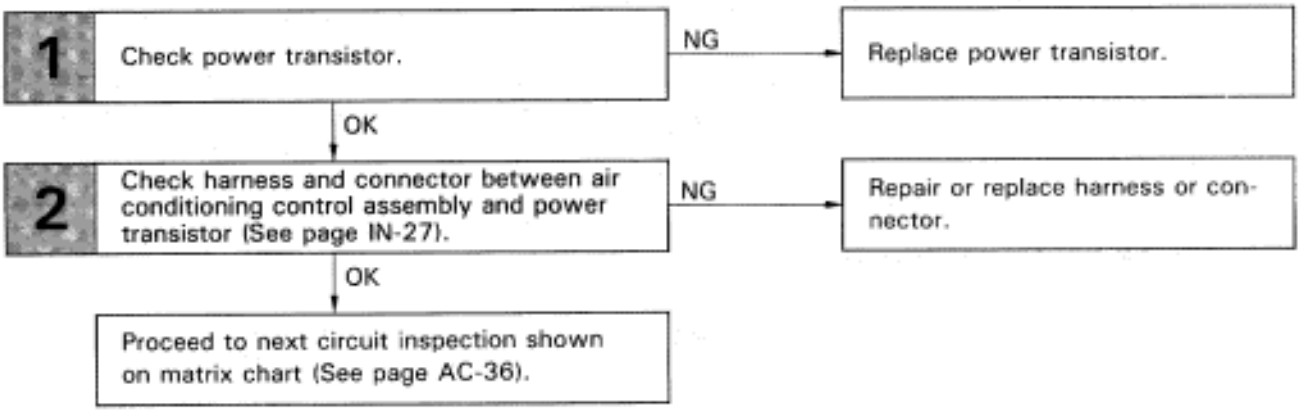
Check and repair harness and connector between air conditioning control assembly and battery.

Power Transistor Circuit

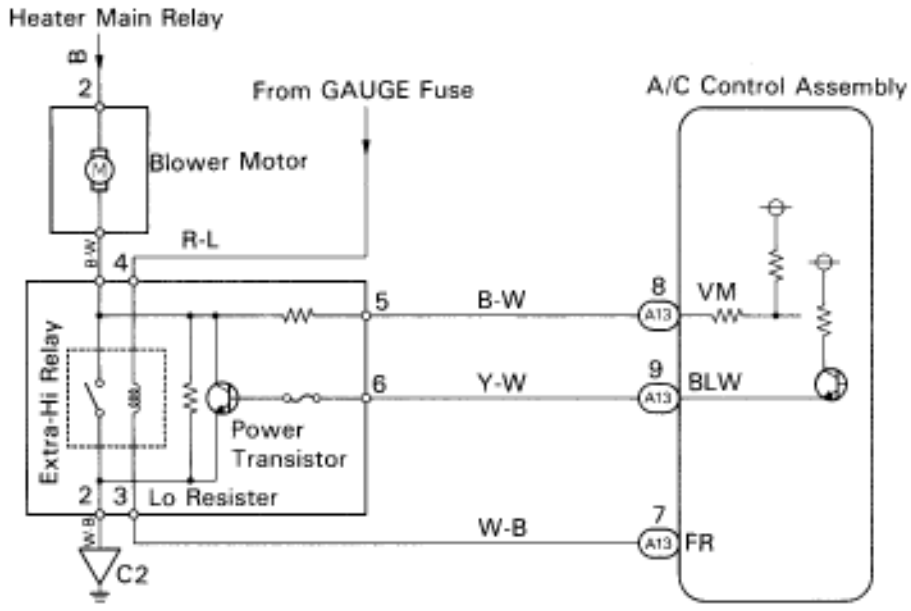
CIRCUIT DESCRIPTION

The air conditioning control assembly controls the blower speed by varying the voltage at terminal BLW which applies the base current to the power transistor.
The air conditioning control assembly also monitors the power transistor collector voltage at terminal, VM to control blower air volume precisely.

DIAGNOSTIC CHART

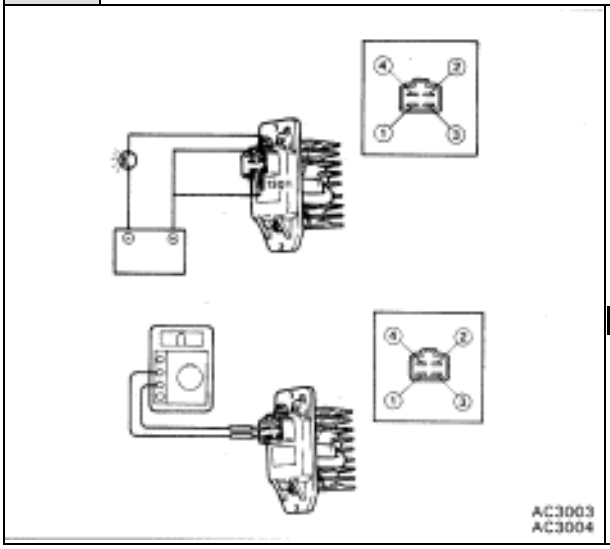


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check power transistor.**



P
1. Remove A/C unit (See page AC–99).
2. Disconnect power transistor connector. (See page AC–7)

C
1. Check test bulb lights up when battery and resistor are connected to power transistor connects as left illustration shows.
2. Measure resistance between terminal 1 and 4.

OK
1. **The bulb lights up.**
2. **2.0 – 2.4 kΩ**

OK → **NG** → **Replace power transistor.**

2 **Check Lo–resister.**

P
1. Remove Lo–resister (See page AC–7).
2. Disconnect Lo–resister connector.

C
1. Measure resistance between terminal 1 and 2.

OK
1. **Resistance: 1.8 – 2.2 Ω**

OK → **NG** → **Replace Lo–resister.**

3 **Check harness and connector between air conditioning control assembly and power transistor (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

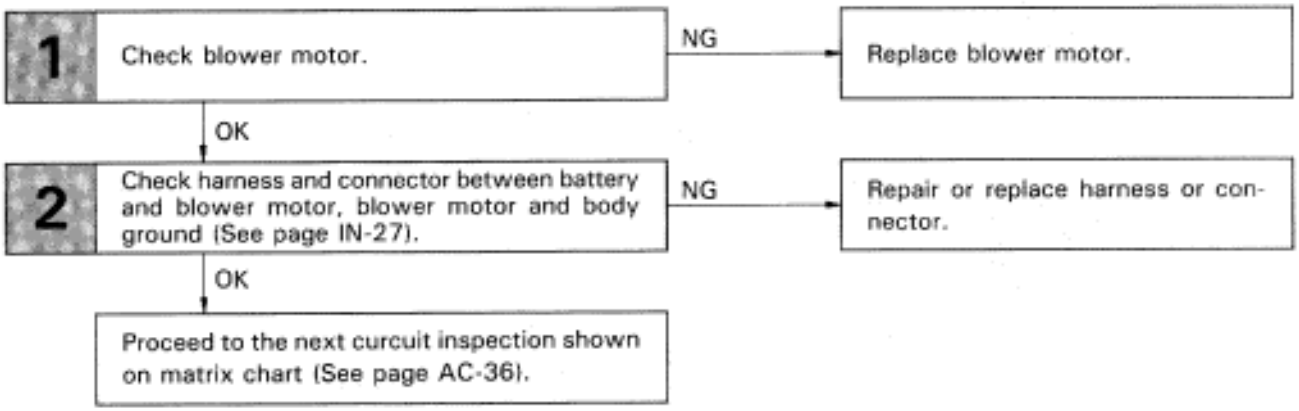
Proceed to next circuit inspection shown on matrix chart (See page AC–36).

Blower Motor Circuit

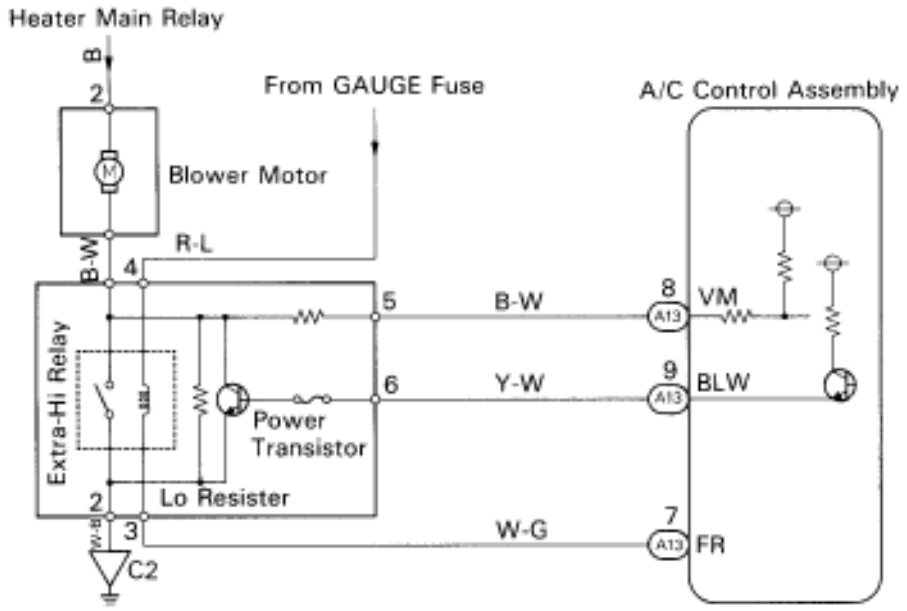
CIRCUIT DESCRIPTION

This is the power source for the blower motor.

DIAGNOSTIC CHART

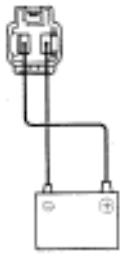


WIRING DIAGRAM



AC3037

1	Check blower motor.



P Remove blower motor (See page AC–118).

C Connect positive ∞ lead connected to terminal 2 of blower motor connector, negative ⊕ lead to terminal 1.

OK **Blower motor operates smoothly.**

OK → **2** Check harness and connector between battery and blower motor, blower motor and body ground (See page IN–27).

NG → **Replace blower motor.**

OK → **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

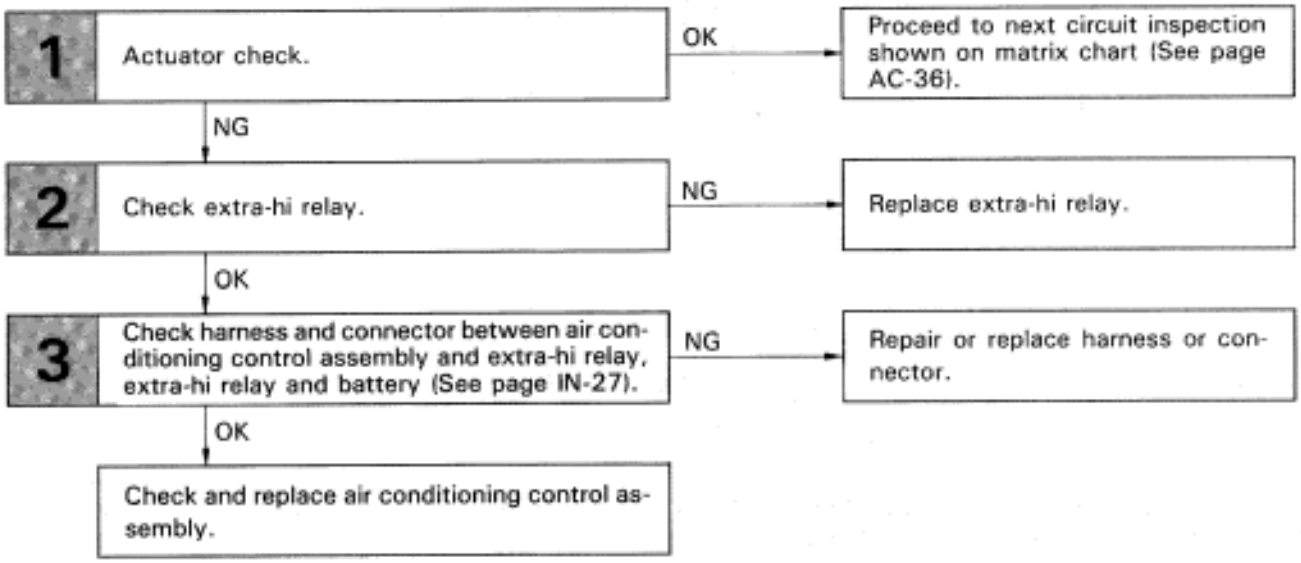
NG → **Repair or replace harness or connector.**

Extra–Hi Relay Circuit

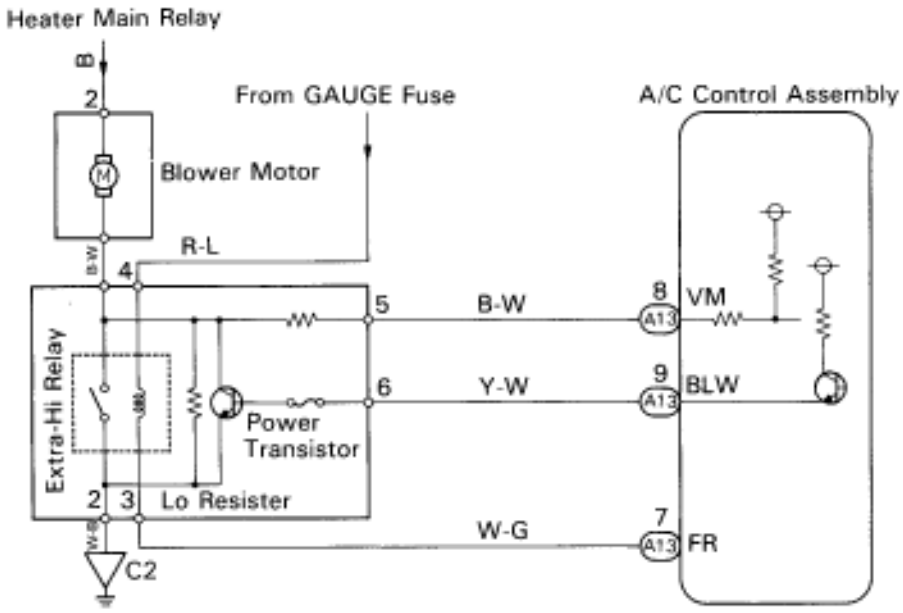
CIRCUIT DESCRIPTION

The extra–Hi relay is switched on by signals from the air conditioning control assembly.

DIAGNOSTIC CHART



WIRING DIAGRAM



AC3037

INSPECTION PROCEDURE

1 **Actuator check.**

Display Code	Blower
21	Low
22 ~ 28	Med
29	Hi

P 1. Set to the actuator check mode (See page AC–30).
2. Press the mode (<) switch and change it to step operation.

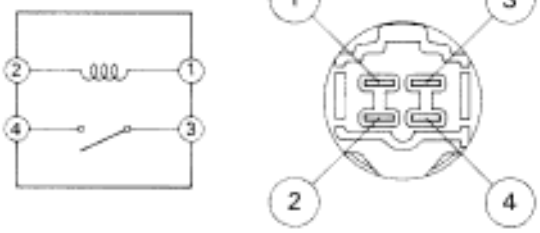
C Press the mode (<) switch in order and check the condition of the blower.

OK **Blower speed changes from Low to Hi as shown in the table when the display code is changed from 21 to 29.**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check extra–hi relay.**



P Remove extra–hi relay.

C Check continuity between each pair of terminal shown below of extra–hi relay.

OK

Terminals 1 and 2	Continuity (55.8 ~ 88.9 Ω)
Terminals 3 and 4	Open

P 1. Apply battery positive voltage between terminals 1 and 2.
2. Check continuity between terminals 3 and 4.

OK

Terminals 3 and 4	Continuity

OK

NG **Replace extra–hi relay.**

3 **Check harness and connector between air conditioning control assembly and extra–hi relay, extra–hi relay and battery (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

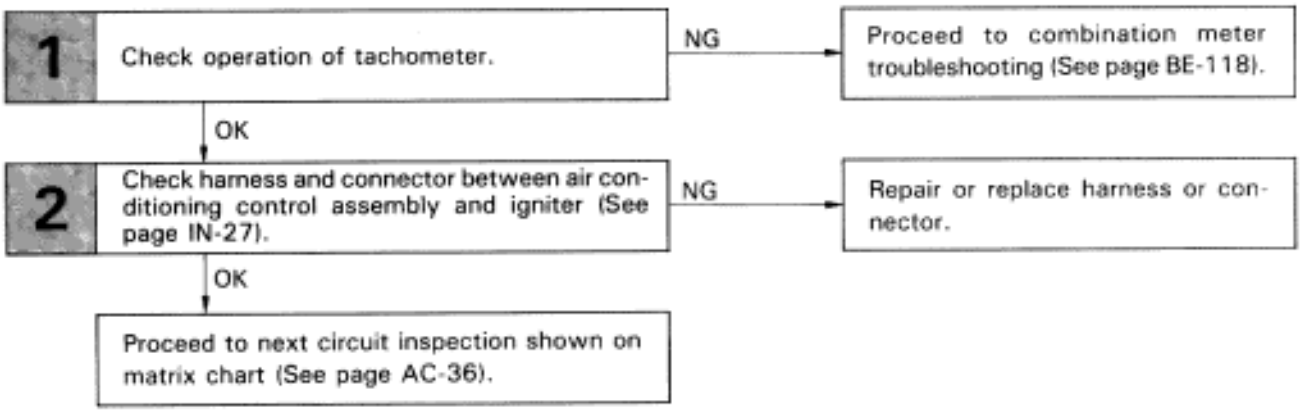
Check and replace air conditioning control assembly.

Igniter Circuit

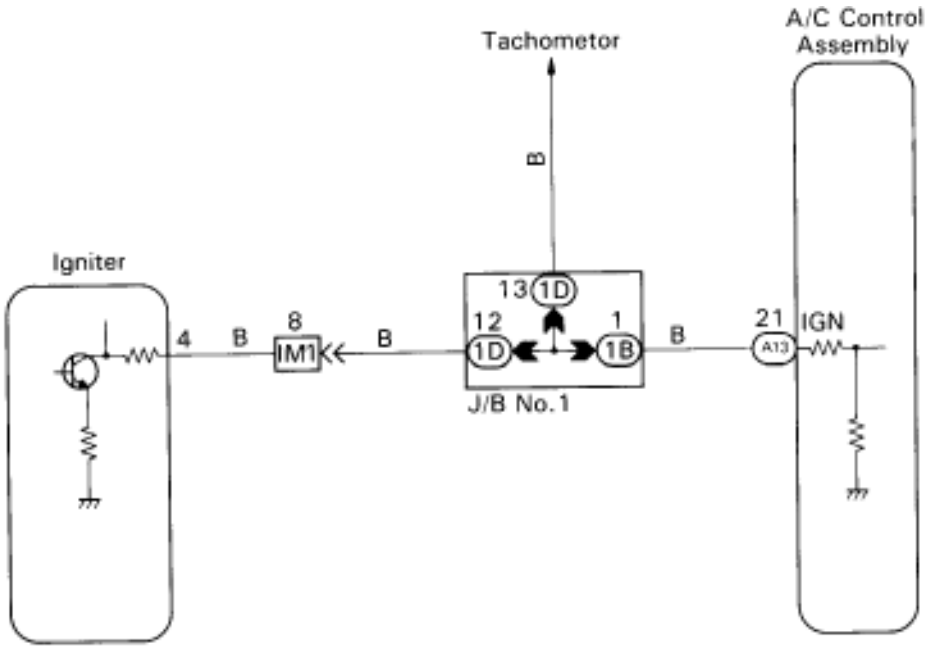
CIRCUIT DESCRIPTION

This air conditioning control assembly monitors the engine speed through signals sent from the igniter. The air conditioning control assembly uses these signals and compressor speed signals to detect the compressor lock condition.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of tachometer.**
P	Check that the tachometer operates normally.

OK

NG **Proceed to combination meter troubleshooting (See page BE–118).**

2	**Check harness and connector between air conditioning control assembly and igniter (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page AC–36).

Compressor Circuit

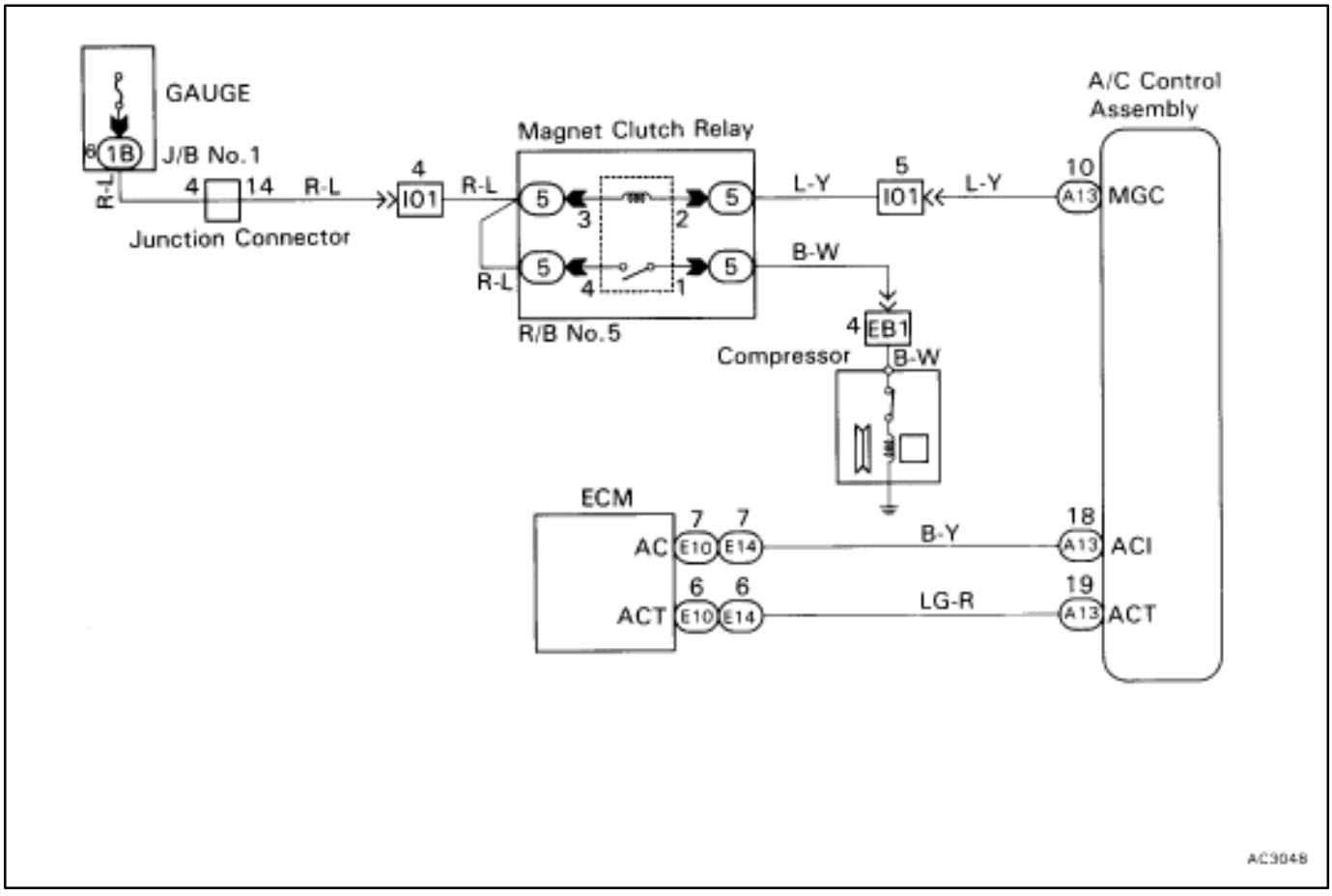
CIRCUIT DESCRIPTION

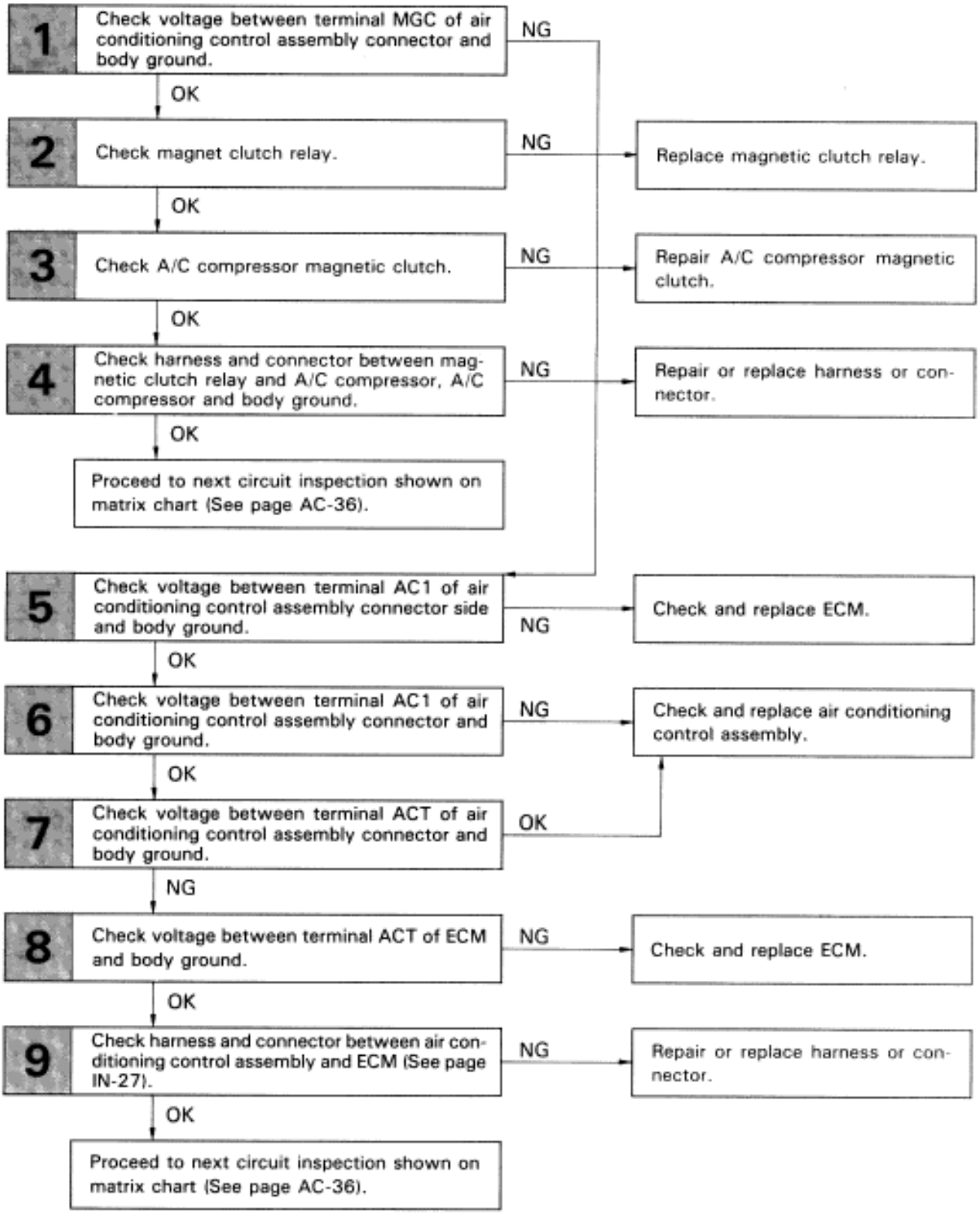
The air conditioning control assembly outputs the magnetic clutch ON signal from terminal AC1 to the ECM. When the ECM & TCM receives this signal, it sends a signal from terminal ACT and switches the air conditioning magnetic clutch relay on, thus turning on the air conditioning compressor magnetic clutch.

DIAGNOSTIC CHART

See next page for the Diagnostic Chart.

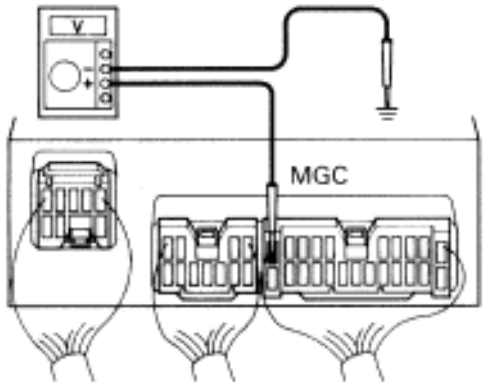
WIRING DIAGRAM




1
Check voltage between terminal MGC of air conditioning control assembly connector and body ground.
NG
OK
2
Check magnet clutch relay.
NG
Replace magnetic clutch relay.
OK
3
Check A/C compressor magnetic clutch.
NG
Repair A/C compressor magnetic clutch.
OK
4
Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground.
NG
Repair or replace harness or connector.
OK
Proceed to next circuit inspection shown on matrix chart (See page AC-36).
5
Check voltage between terminal AC1 of air conditioning control assembly connector side and body ground.
NG
Check and replace ECM.
OK
6
Check voltage between terminal AC1 of air conditioning control assembly connector and body ground.
NG
Check and replace air conditioning control assembly.
OK
7
Check voltage between terminal ACT of air conditioning control assembly connector and body ground.
OK
NG
8
Check voltage between terminal ACT of ECM and body ground.
NG
Check and replace ECM.
OK
9
Check harness and connector between air conditioning control assembly and ECM (See page IN-27).
NG
Repair or replace harness or connector.
OK
Proceed to next circuit inspection shown on matrix chart (See page AC-36).

INSPECTION PROCEDURE

1 **Check voltage between terminal MGC of air conditioning control assembly connector and body ground.**



P
1. Remove A/C control assembly with connectors still connected. (See page BO–112).
2. Start the engine and push AUTO switch.

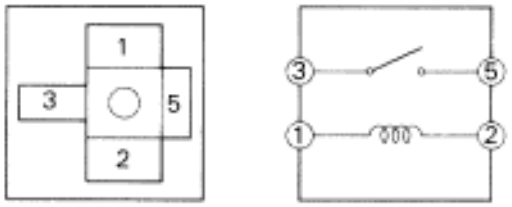
C Check voltage between terminal MGC of air conditioning control assembly connector and body ground when magnetic clutch is on and off by A/C switch.

OK

A/C switch	Voltage
ON	Below 1 V
OFF	10 – 14 V

OK → **NG** → **Go to step 5.**

2 **Check magnetic clutch relay.**



P Remove magnetic clutch relay from R/B No. 5.

C Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK

Terminals 1 and 2	Continuity (62.5 ~ 90.9 Ω)
Terminals 3 and 5	Open

P
1. Apply battery positive voltage between terminals 1 and 2.
2. Check continuity between terminals 3 and 5.

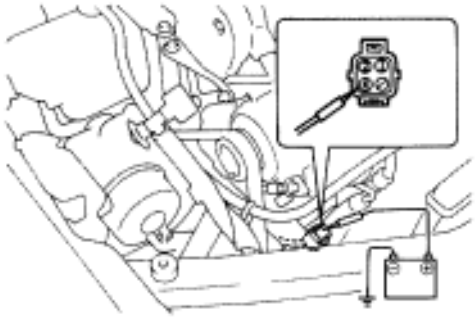
OK

Terminals 3 and 5	Continuity

OK → **NG** → **Replace magnetic clutch relay.**

Go to step 3 .

3	Check air compressor magnetic clutch.



P Disconnect clutch connector.

C Connect positive ∞ lead connected to battery to magnetic clutch connector terminal 4.

OK **Magnetic clutch is energized.**

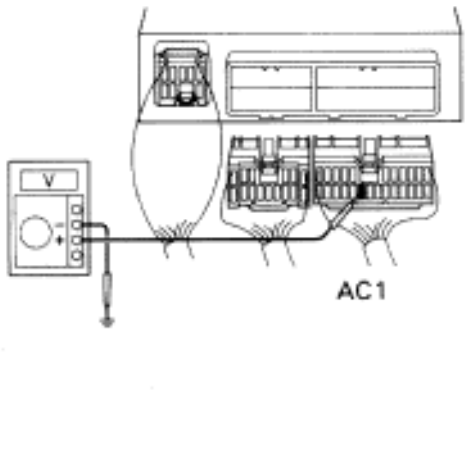
OK → **NG** → **Repair A/C compressor magnetic clutch.**

4	Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground.

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on a matrix chart (See page AC–36).

5	Check voltage between terminal AC1 of air conditioning control assembly connector side and body ground.



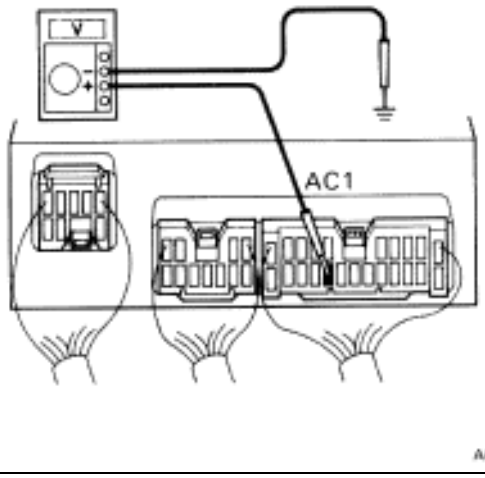
P
1. Disconnect air conditioner control connector.
2. IG S/W ON.

C Check voltage between terminal AC1 of air conditioning control assembly harness side connector and body ground.

OK **10 – 14 V**

OK → **NG** → **Check and replace ECM.**

6 **Check voltage between terminal AC1 of air conditioning control assembly connecter and body ground.**



P
1. Remove A/C control assembly with connectors still connected. (See page BO–112)
2. Start the engine and push AUTO switch.

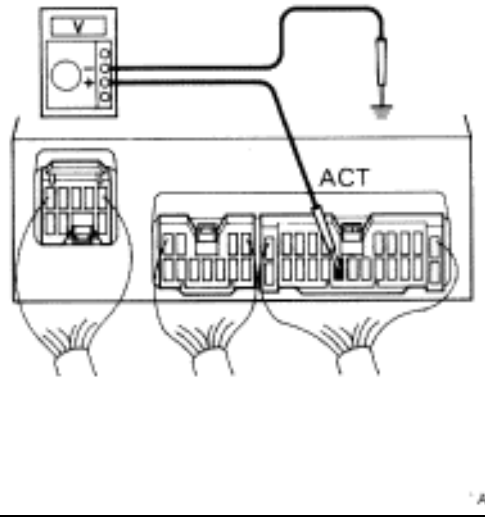
C Check the voltage between terminal AC1 of air conditioning control assembly connector4 and body ground when magnetic clutch is on and off by A/C switch.

OK

Magnetic clutch	Voltage
ON	Below 1 V
OFF	10 – 14V

OK → **NG** → **Check and replace air condition control assembly.**

7 **Check voltage between terminal ACT of air conditioning control assembly and body ground.**



P
1. Remove A/C control assembly with connectors still connected.
2. Start the engine and push AUTO switch.

C Check the voltage between terminal ACT of air conditioning control assembly and body ground.

OK

A/C switch	Voltage
ON	10 – 14 V
OFF	Below 1.5 V

NG → **OK** → **Check and replace A/C control assembly.**

8 **Check voltage between terminal ACT of ECM connector and body ground (See page EG–450).**

OK → **NG** → **Check and replace ECM.**

9	Check harness and connector between air conditioning control assembly and ECM.

OK

NG → Repair or replace harness or connector.

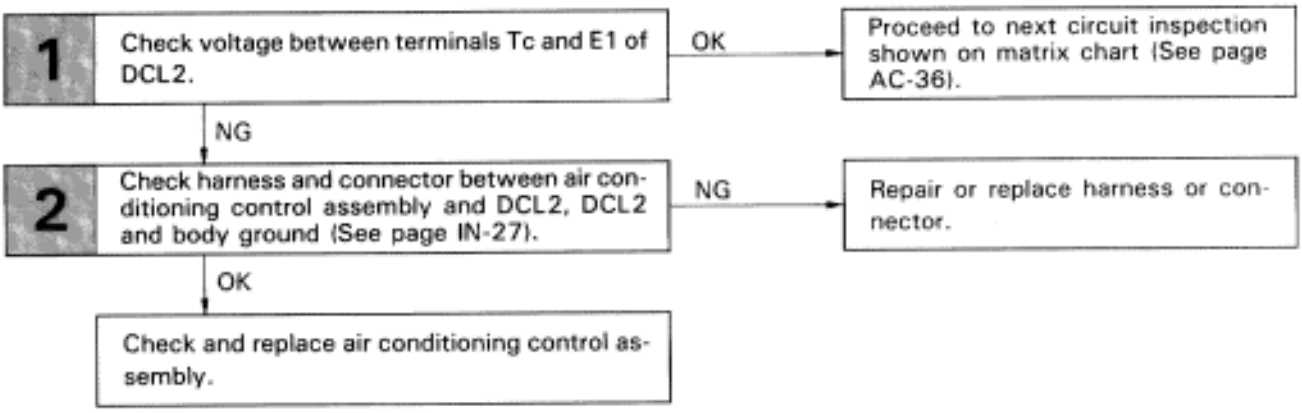
Proceed to next circuit inspection shown on a matrix chart (See page–36).

Diagnostic Circuit

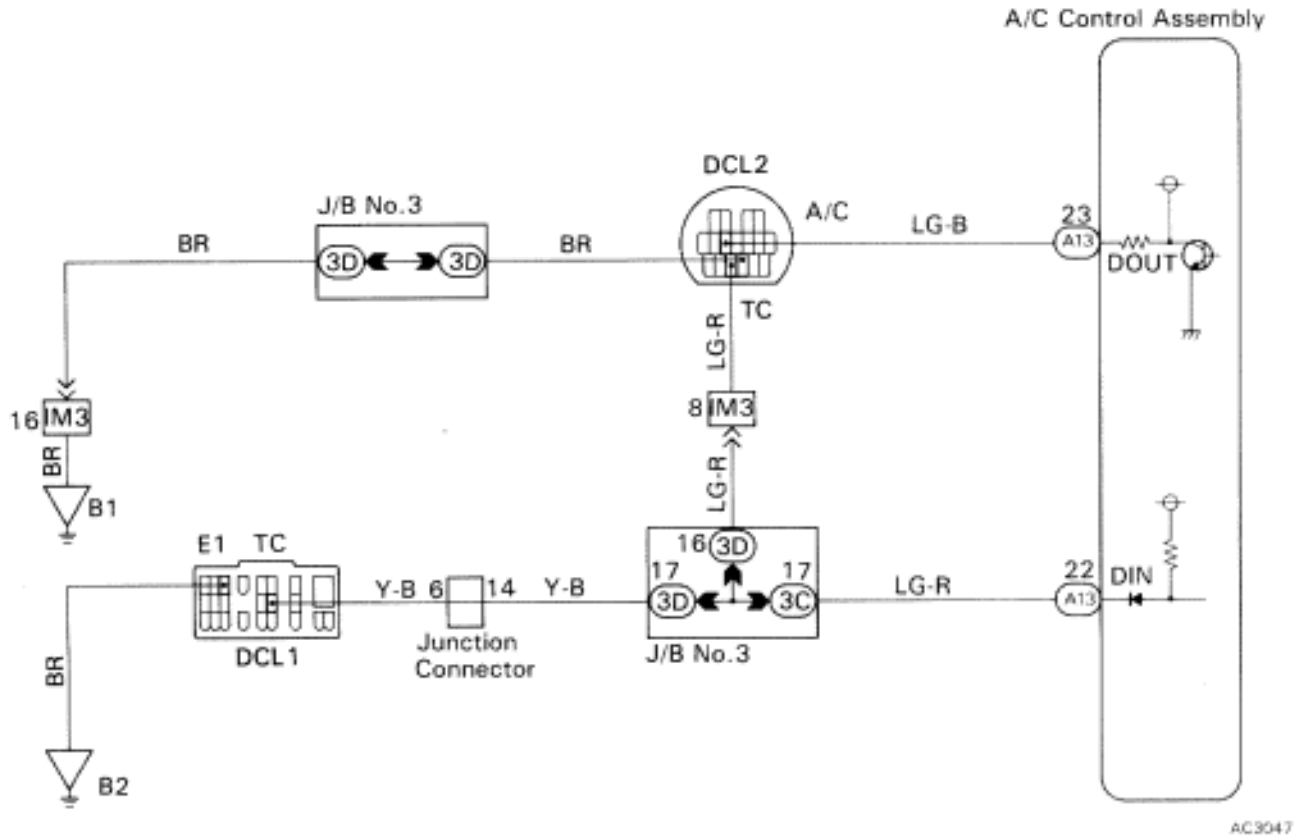
CIRCUIT DESCRIPTION

This circuit sends signals to the ECU requesting output of diagnostic trouble codes.

DIAGNOSTIC CHART

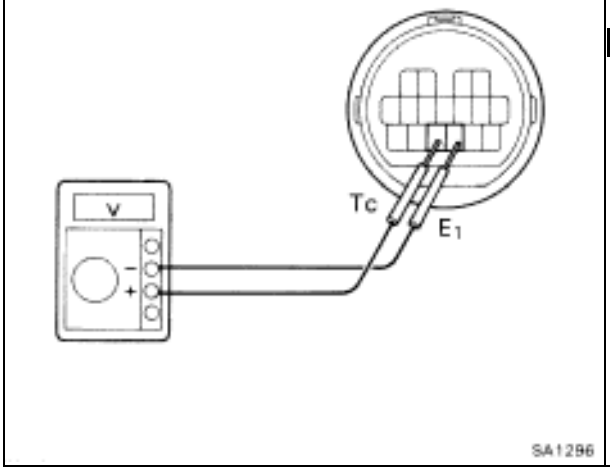


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals Tc and E1 of DCL2.**



P
1. Turn ignition switch on.
2. Check voltage between terminals Tc and E1 of DCL2.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AC–36).**

2 **Check harness and connector between air conditioning control assembly and DCL2, DCL2 and body ground (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace air conditioning control assembly.

Inspection of Refrigeration System with Manifold Gauge Set

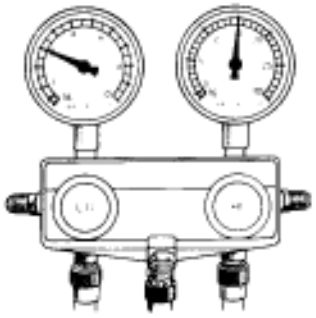
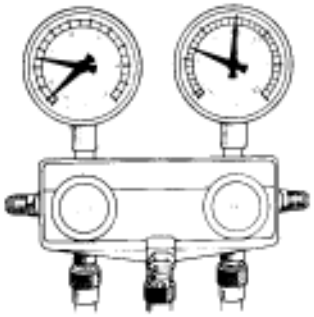
This is a method in which the trouble is located by using a manifold gauge set. (See “Use of Manifold Gauge Set” on page AC–15) Read the manifold gauge pressure when the following conditions are established.

(a) Temperature at the air inlet with the switch set at RECIRC is 30–35 C (86–95 F)
(b) Engine running at 2,000 rpm
(c) Blower fan speed control switch set at high speed
(d) Temperature control switch set at max. cool side

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

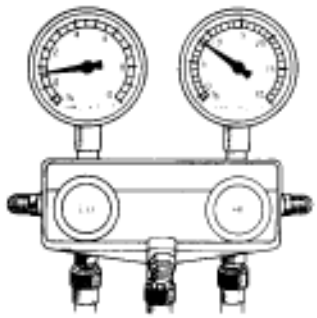
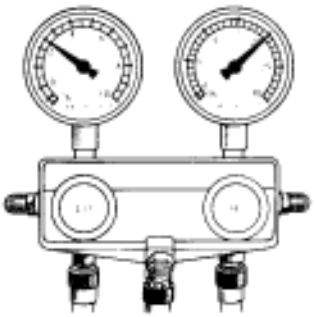
NOTICE:

- **Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.**
- **Evacuate air and charge proper amount of purified refrigerant after installing the parts the parts in the refrigerant line.**

No.	Gauge reading kPa (kgf/cm², psi)	Condition	Probable cause	Remedy
1	LO: 147 – 196 (1.5 – 2.0, 21 – 28) HI: 1,422 – 1,471 (14.5 – 15.0, 206 – 213)  AC0067	Normal cooling	Normally functioning system	
2	During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal  AC0068	Periodically cools and then fails to cool	Moisture present in refrigeration system	(1) Replace receiver (2) Remove moisture is system through repeatedly evacuating air

NOTICE:

- **Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.**
- **Evacuate air and charge proper amount of purified refrigerant after installing the parts in the refrigerant line.**

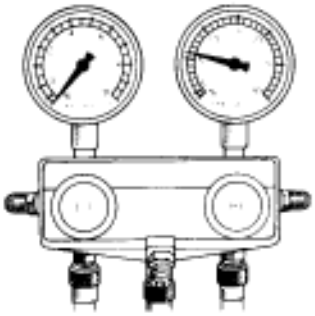
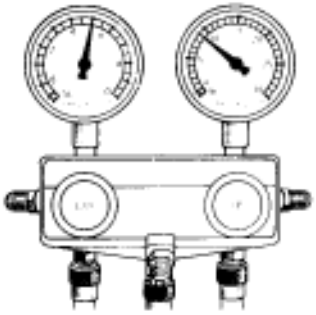
No.	Gauge reading kPa (kgf/cm², psi)	Condition	Probable cause	Remedy
3	Pressure low at both low and high pressure sides  AC0069	• Insufficient cooling • Bubbles seen in sight glass	Insufficient refrigerant	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
		• Insufficient cooling • Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Replace receiver
4	Pressure too high at both low and high pressure sides  AC0070	Insufficient cooling	Insufficient cooling of condenser	(1) Clean condenser (2) Check fan motor operation
5			Refrigerant overcharged	(1) Check amount of refrigerant If refrigerant is overcharged (2) Recover refrigerant (3) Evacuate air and charge proper amount of purified refrigerant
6			Air present in system	(1) Replace receiver (2) Check compressor oil to see if dirty (3) Remove air in system through repeatedly evacuating air
7		• Insufficient cooling • Frost or Large amount of dew on piping at low pressure side	Expansion valve improperly mounted, heat sensing tube defective (Opens too wide)	(1) Check heat sensing tube installation condition If (1) is normal (2) Check expansion valve and replace if defective

HINT at 6:

These gauge indication are for when the refrigeration system has been opened and the refrigerant charged without evacuating air.

NOTICE:

- **Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.**
- **Evacuate air and charge proper amount of purified refrigerant after installing the parts in the refrigerant line.**

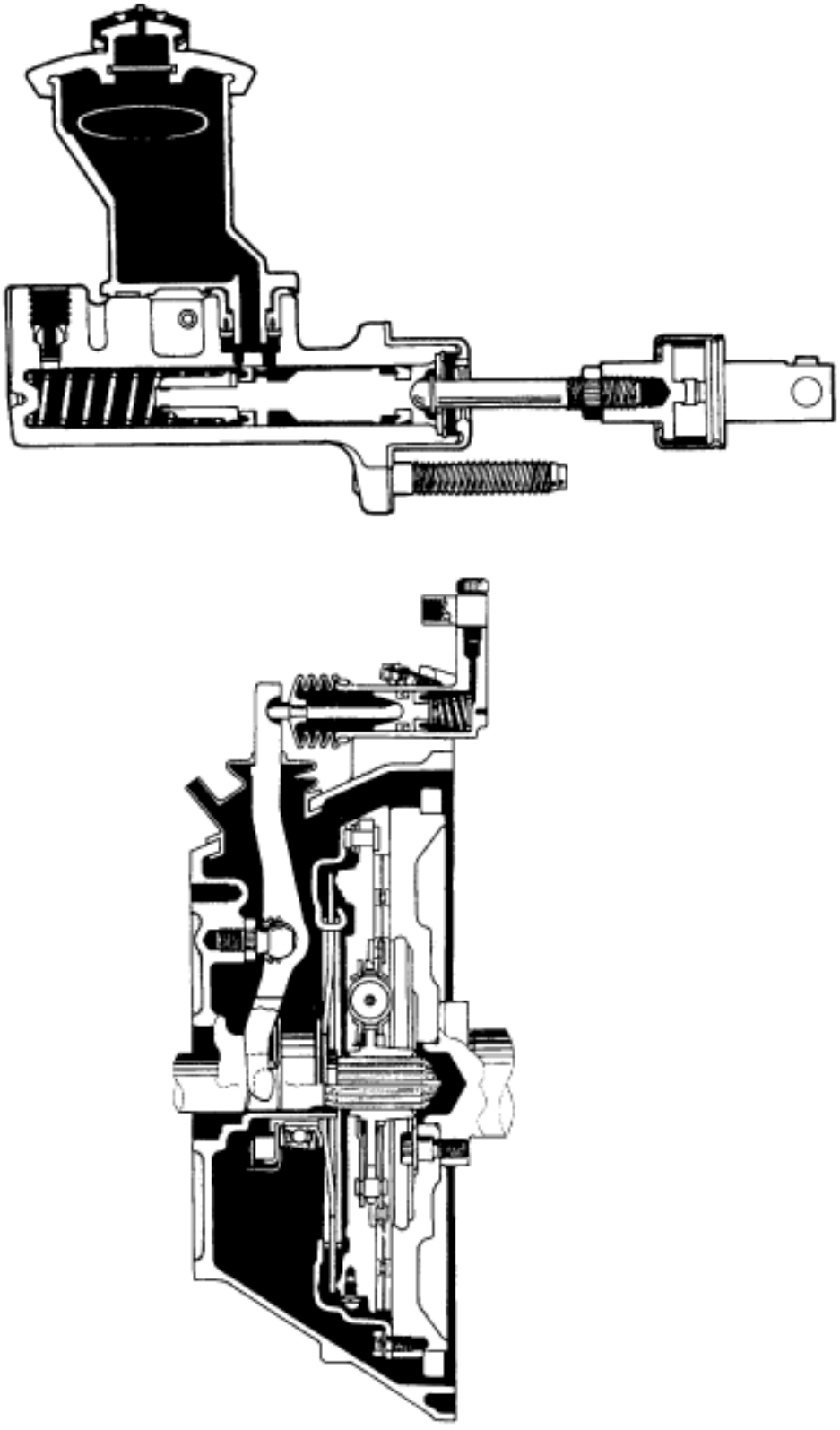
No.	Gauge reading kPa (kgf/cm², psi)	Condition	Probable cause	Remedy
8	Vacuum indicated at low pressure side, very low pressure indicated at high pressure  AC0156	• Does not cool (Cools from time to time in some cases) • Frost or dew seen on piping before and after receiver or expansion valve	Refrigerant does not circulate	(1) Check heat sensing tube for gas leakage and replace expansion valve if defective If (1) is normal (2) Clean out dirt in expansion valve by blowing with air if not able to remove dirt, replace expansion valve (3) Replace receiver
9	Pressure too high at low pressure side, pressure too low at high pressure side  AC0157	Does not cool	Insufficient compression	Repair or replace compressor

CLUTCH

DESCRIPTION

CL002–01

The diaphragm spring turnover type clutch providing lighter release performance.



G00301
G00304

2005

PREPARATION

SST (SPECIAL SERVICE TOOLS)

CL003–03

	09023–00100 Brake Tube Union Nut 10mm Wrench	Clutch line tube
	09301–00220 Clutch Guide Tool	
	09333–00013 Clutch Diaphragm Spring Aligner	

RECOMMENDED TOOLS

CL00S–01

	09082–00015 TOYOTA Electrical Tester	
	09905–00013 Snap Ring Pliers	

EQUIPMENT

CL004–01

Calipers	
Dial indicator	
Torque wrench	

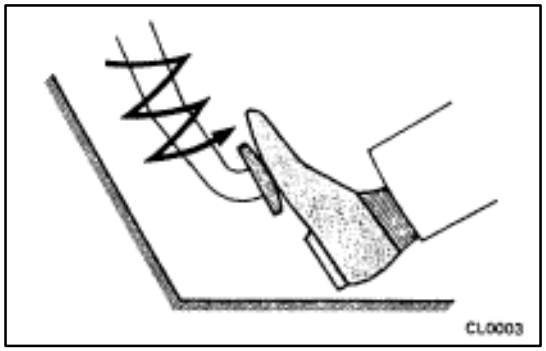
TROUBLESHOOTING

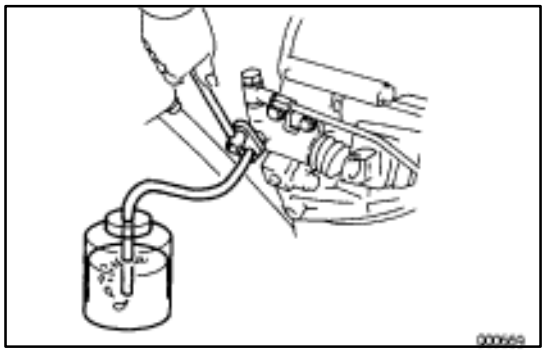
CL005–01

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the priority of the probable cause of trouble. Check each part in the order shown. If necessary, repair or replace the part.

See Page / Parts Name / Trouble	Clutch pedal (Freeplay out of adjustment)	Clutch line (Air in line)	Master cylinder cup (Damaged)	Release cylinder cup (Damaged)	Engine mounting (Loosen)	Release bearing (Worn, dirty or damaged)	Input shaft bearing (Worn or damaged)	Clutch disc (Out of true)	Clutch disc (Runout is excessive)	Clutch disc (Lining broken)	Clutch disc (Dirty or burred)	Clutch disc (Oily)	Clutch disc (Worn out)	Clutch disc torsion rubber (Damaged)	Clutch disc (Harden)	Clutch disc (Lack of spline grease)	Diaphragm spring (Damaged)	Diaphragm spring (Out of tip alignment)	Pressure plate (Distortion)	Flywheel (Distortion)
See Page	CL–6	CL–5	CL–8	CL–11	-	CL–17	MX–35	CL–17	CL–17	CL–17	CL–17	CL–17	CL–17	CL–17	CL–17	CL–20	CL–17	CL–19	CL–17	-
Clutch grabs/chatters					1				2			2	2	2	2			2		
Clutch pedal spongy		1	2	2																
Clutch noisy						1	2							3						
Clutch slips	1											2	2				3		4	5
Clutch does not disengage	1	2	3	4			5	6	6	6	6	6				6	7	7	8	

U0003





CLUTCH SYSTEM BLEEDING

CL006–02

HINT: If any work is done on the clutch system or if air is suspected in the clutch lines, bleed the system of air.

NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. FILL CLUTCH RESERVOIR WITH BRAKE FLUID

Check the reservoir frequently. Add fluid if necessary.

2. CONNECT VINYL TUBE TO BLEEDER PLUG

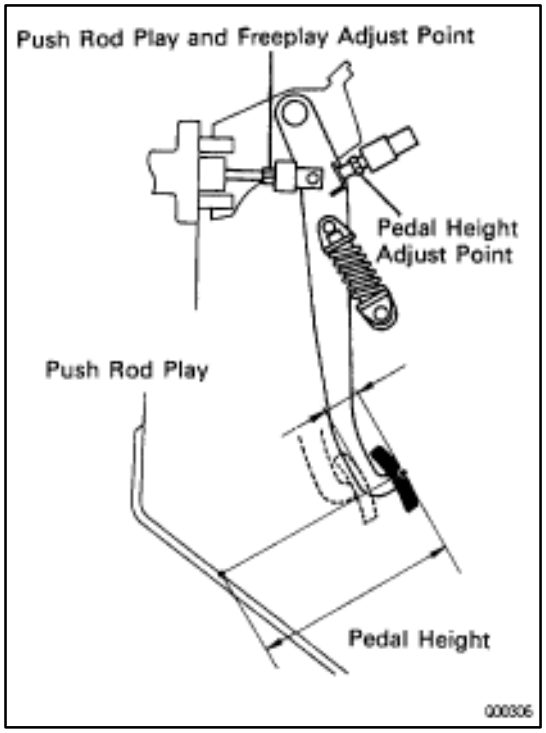
Insert the other end of the tube in a half–full container of brake fluid.

3. BLEED CLUTCH LINE

(a) Slowly pump the clutch pedal several times.

(b) While pressing on the pedal, loosen the bleeder plug until the fluid starts to run out. Then close the bleeder plug.

(c) Repeat this procedure until there are no more air bubbles in the fluid.



CLUTCH PEDAL

CLUTCH PEDAL CHECK AND ADJUSTMENT

CL007–03

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from asphalt sheet:

164.7–174.7 mm (6.48–6.88 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

Loosen the lock nut and turn the clutch switch until the height is correct. Tighten the lock nut.

3. CHECK THAT PEDAL FREEPLAY AND PUSH ROD PLAY ARE CORRECT

(Pedal freeplay)

Push in on the pedal until the beginning of clutch resistance is felt.

Pedal freeplay:

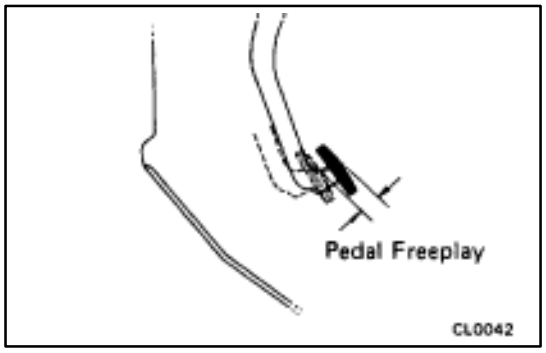
5.0–15.0 mm (0.197–0.591 in.)

(Push rod play)

Push in on the pedal with a finger softly until the resistance begins to increase a little.

Push rod play at pedal top:

1.0–5.0 mm (0.039–0.197 in.)

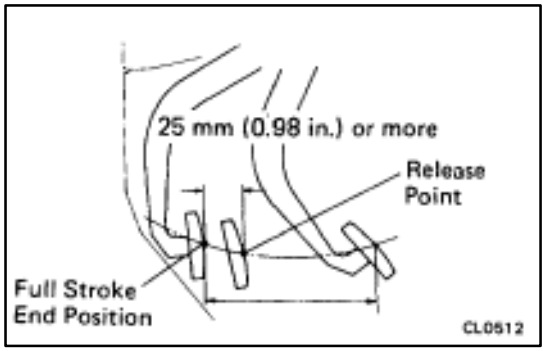


4. IF NECESSARY, ADJUST PEDAL FREEPLAY AND PUSH ROD PLAY

(a) Loosen the lock nut and turn the push rod until the freeplay and push rod play are correct.

(b) Tighten the lock nut.

(c) After adjusting the pedal freeplay, check the pedal height.



5. 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 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.

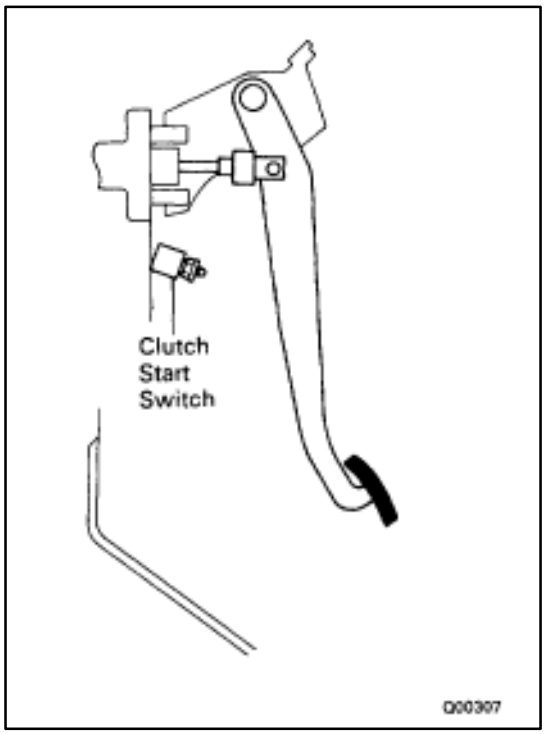
Standard distance:

25 mm (0.98 in.) or more

(From pedal stroke end position to release point)

If the distance not as specified, perform the following operation.

- Inspect pedal height.
- Inspect push rod play and pedal freeplay.
- Bleed the clutch line.
- Inspect the clutch cover and disc.

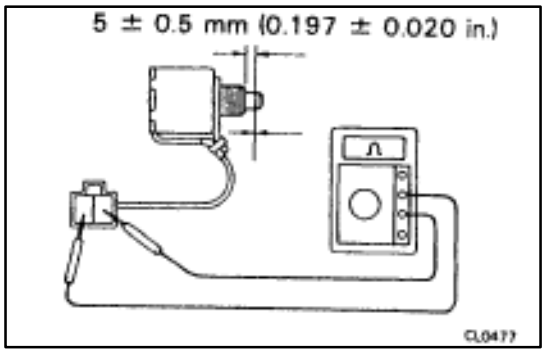


6. CHECK CLUTCH START SYSTEM

(a) Check that the engine does not start when the clutch pedal is released.

(b) Check that the engine starts when the clutch pedal is fully depressed.

If necessary, adjust or replace the clutch start switch.



7. INSPECT CONTINUITY OF CLUTCH START SWITCH

(a) Check that there is continuity between terminals when the switch is ON (pushed).

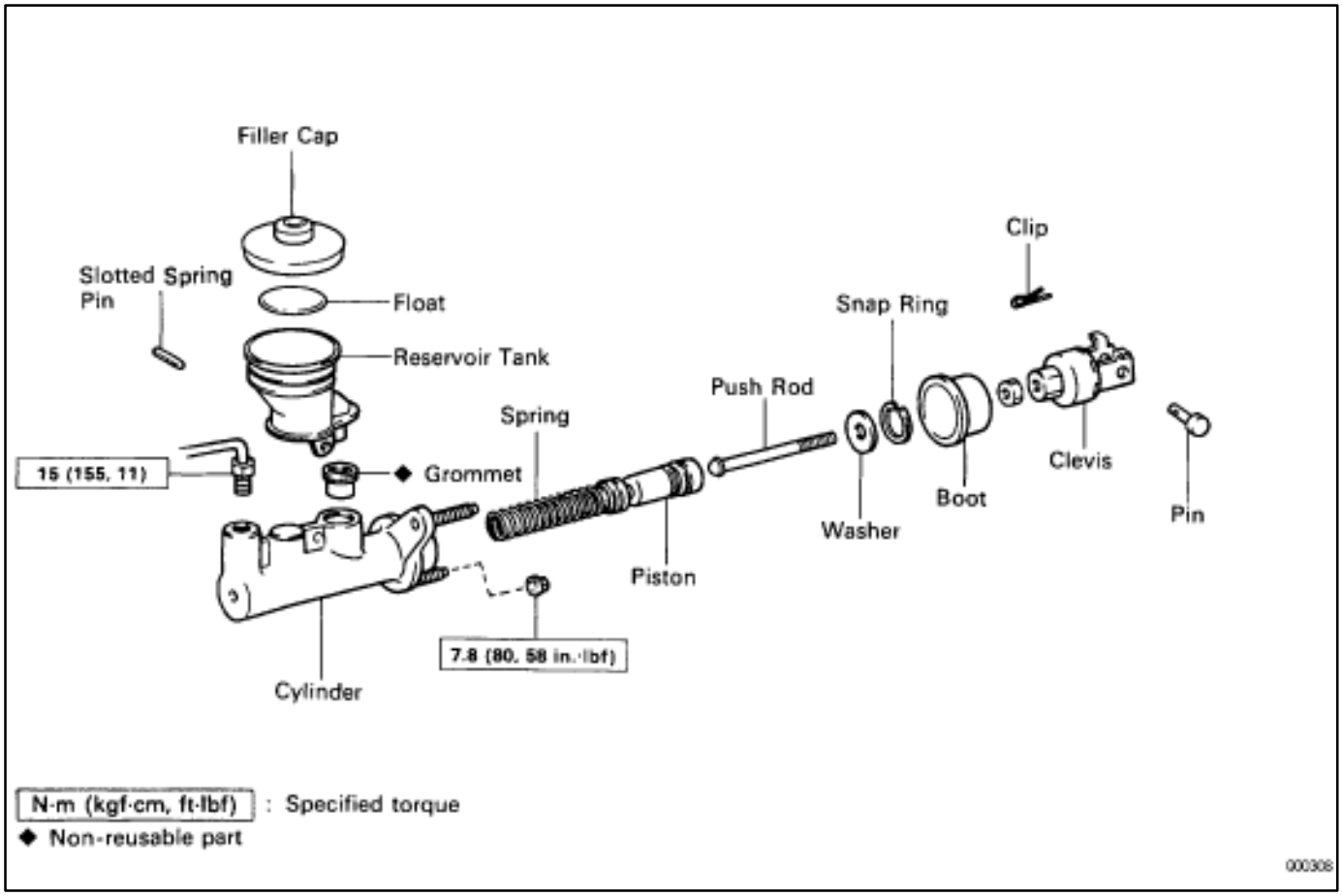
(b) Check that there is no continuity between terminals when the switch is OFF (free).

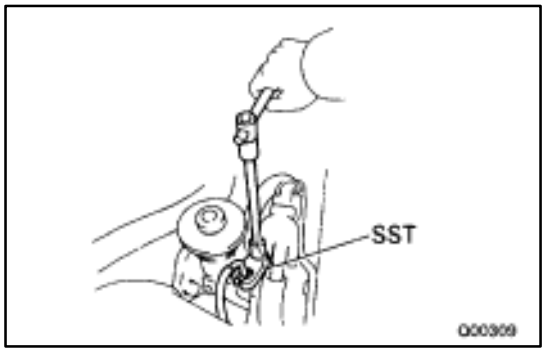
If continuity is not as specified, replace the switch.

CLUTCH MASTER CYLINDER

COMPONENTS

CL008–02

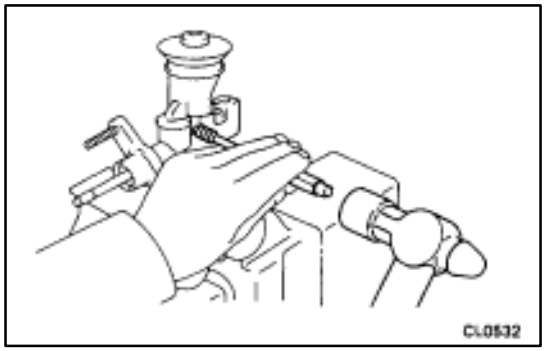




MASTER CYLINDER REMOVAL

CL009–02

1. **DRAW OUT FLUID WITH SYRINGE**
2. **DISCONNECT CLUTCH LINE TUBE**
   Using SST, disconnect the tube. Use a container to catch the brake fluid.
   SST 09023–00100
3. **REMOVE CLIP AND CLEVIS PIN**
4. **REMOVE MOUNTING NUTS AND PULL OUT MASTER CYLINDER**



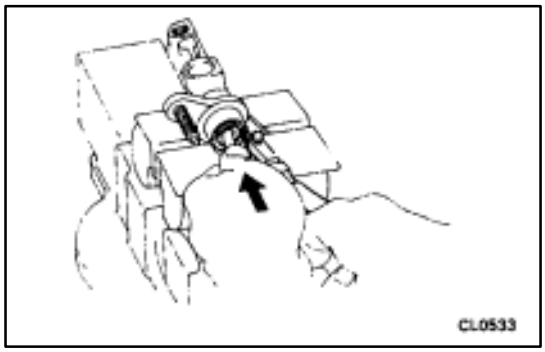
MASTER CYLINDER DISASSEMBLY

CL00A–02

1. REMOVE RESERVOIR TANK

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

(b) Remove the reservoir tank and grommet.



2. REMOVE PUSH ROD

Pull back the boot, and using snap ring pliers, remove the snap ring.

3. REMOVE PISTON

MASTER CYLINDER INSPECTION

CL00B–01

HINT: Clean the disassembled parts with compressed air.

1. INSPECT MASTER CYLINDER BORE FOR SCORING OR CORROSION

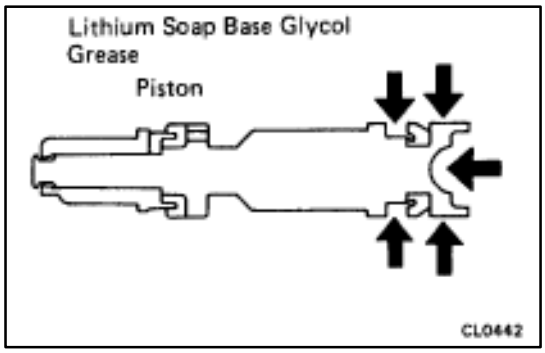
If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

If either one requires replacement, use the parts from the cylinder kit.

3. INSPECT PUSH ROD FOR WEAR OR DAMAGE

If necessary, replace the push rod.



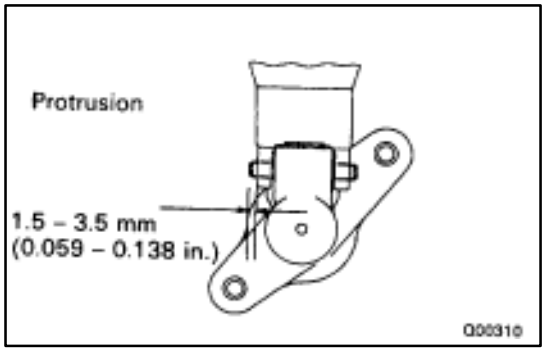
MASTER CYLINDER ASSEMBLY

CL00C–02

1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN

2. INSERT PISTON INTO CYLINDER

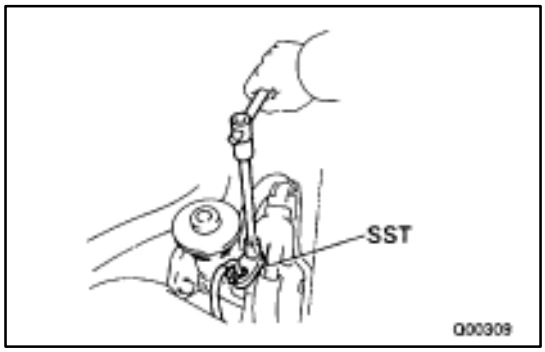
3. INSTALL PUSH ROD ASSEMBLY WITH SNAP RING



4. INSTALL RESERVOIR TANK

(a) Install the reservoir tank and new grommet.

(b) Using a pin punch and a hammer, drive in the slotted spring pin.



MASTER CYLINDER INSTALLATION

CL00D–03

1. INSTALL MASTER CYLINDER

Install the mounting nuts, and torque them.

Torque: 7.8 N·m (80 kgf·cm, 58 in·lbf)

2. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

3. CONNECT PUSH ROD AND INSTALL PIN

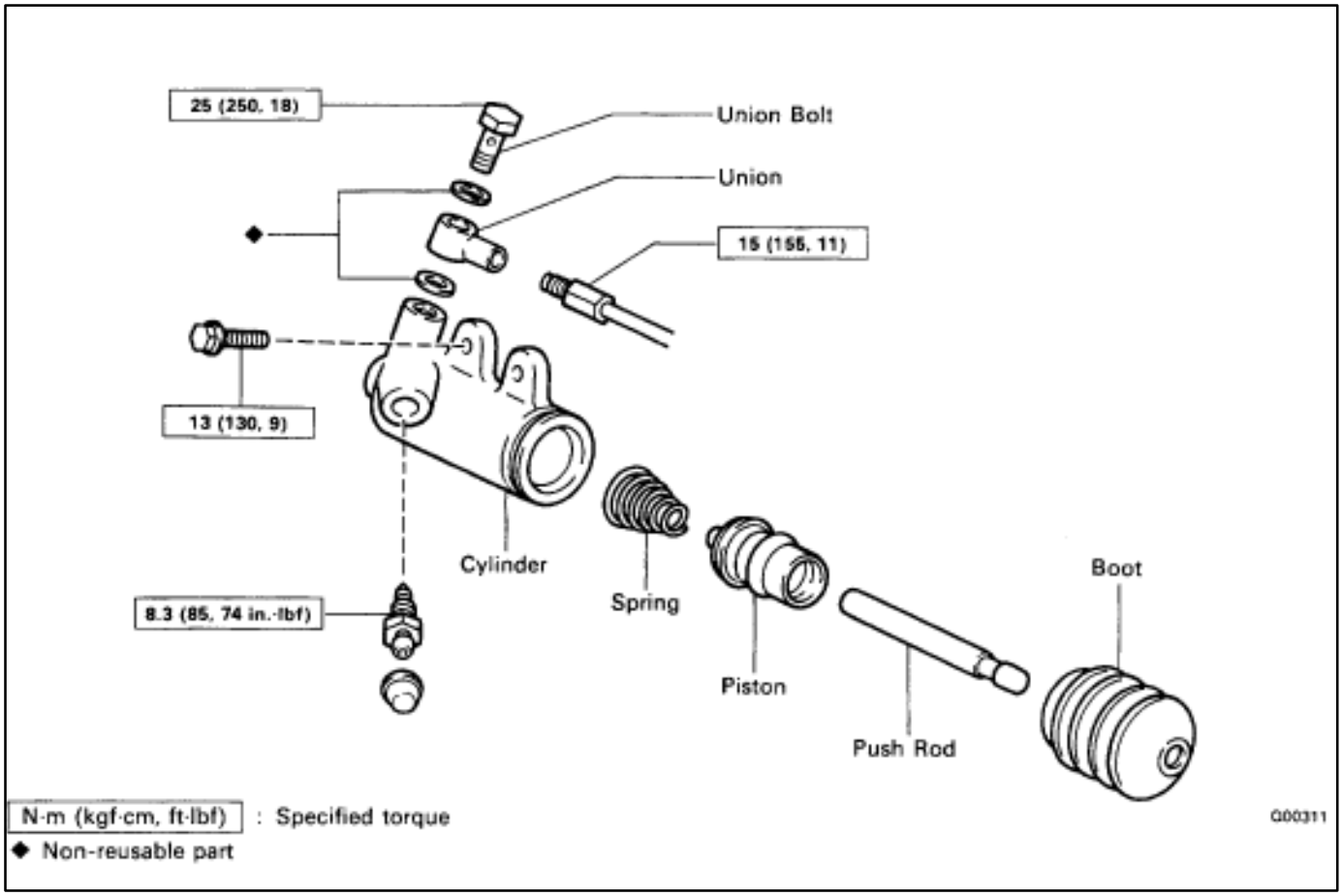
Install the clip in the push rod pin.

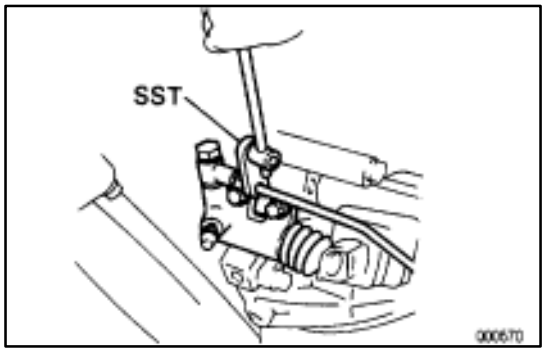
4. BLEED SYSTEM AND ADJUST CLUTCH PEDAL

CLUTCH RELEASE CYLINDER

COMPONENTS

CL00E–02

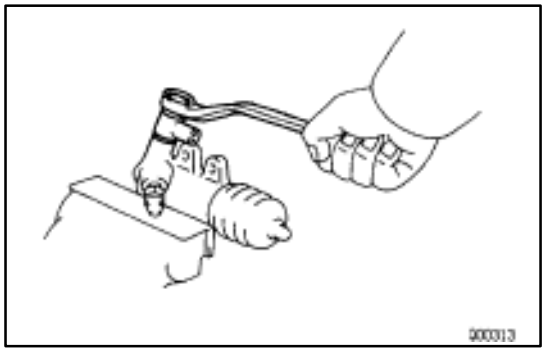




RELEASE CYLINDER REMOVAL

CL00F–02

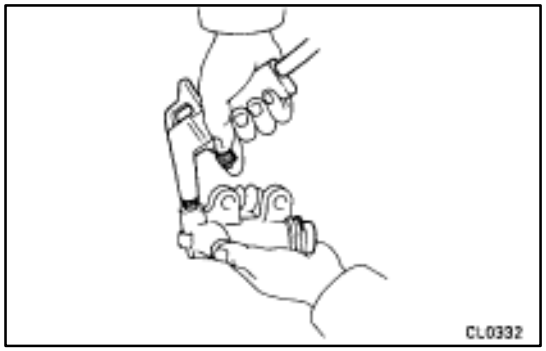
1. **DISCONNECT CLUTCH LINE TUBE**
   Using SST, disconnect the tube. Use a container to catch the brake fluid.
   SST 09023–00100
2. **REMOVE TWO BOLTS AND PULL OUT RELEASE CYLINDER**



RELEASE CYLINDER DISASSEMBLY

CL00T–01

1. **REMOVE UNION FROM RELEASE CYLINDER**
   Remove the union bolt, two gaskets and union from the release cylinder.



2. PULL OUT BOOT WITH PUSH ROD

3. REMOVE PISTON

Using compressed air, remove the piston with the spring from the cylinder.

RELEASE CYLINDER INSPECTION

CL00U–01

HINT: Clean the disassembled parts with compressed air.

1. INSPECT RELEASE CYLINDER BORE FOR SCORING OR CORROSION

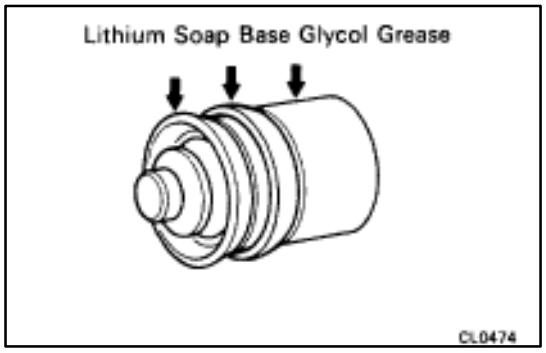
If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

If either one requires replacement, use the parts from the cylinder kit.

3. INSPECT PUSH ROD FOR WEAR OR DAMAGE

If necessary, replace the push rod.



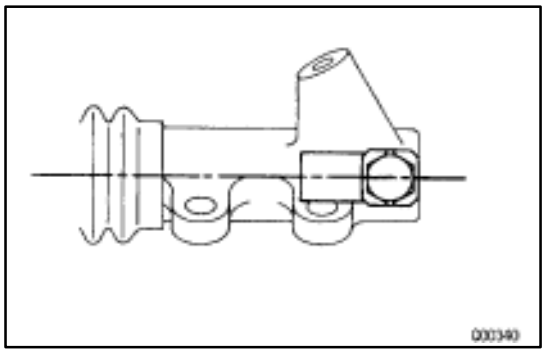
RELEASE CYLINDER ASSEMBLY

CL00V–01

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

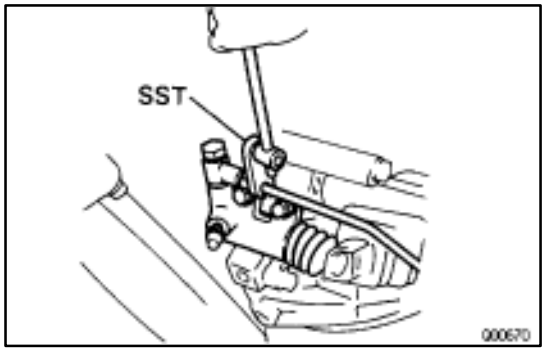


4. INSTALL UNION TO RELEASE CYLINDER

(a) Adjust the center line of the union is in parallel with the release cylinder.

(b) Install the union bolt.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



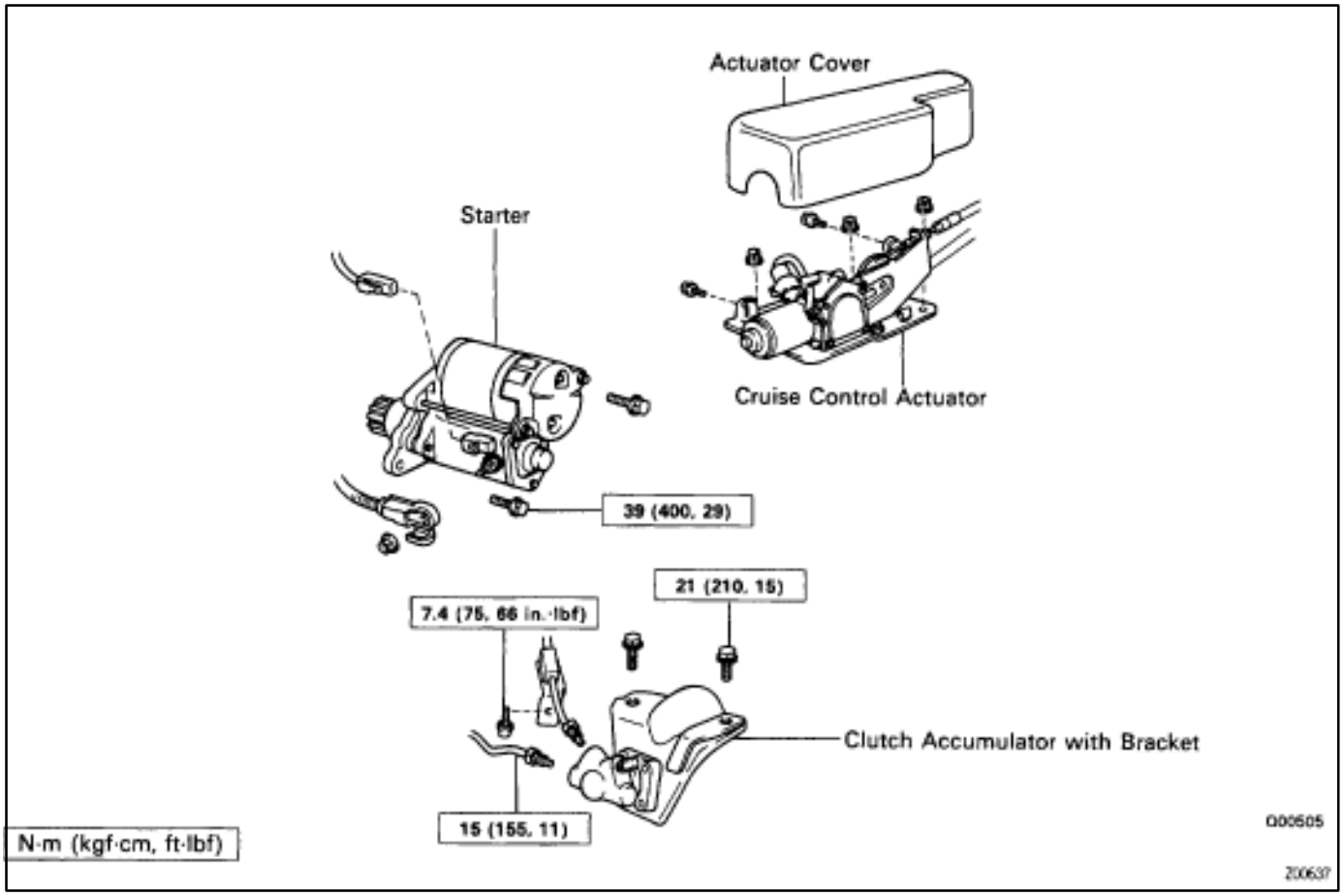
RELEASE CYLINDER INSTALLATION

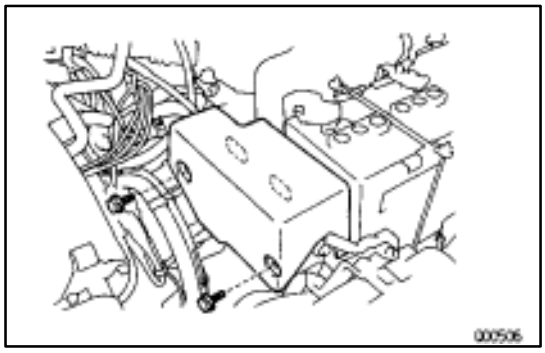
CL00J–03

1. **INSTALL RELEASE CYLINDER WITH TWO BOLTS**
   Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
2. **CONNECT CLUTCH LINE TUBE**
   Using SST, connect the tube.
   SST 09023–00100
   Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
3. **FILL CLUTCH RESERVOIR WITH BRAKE FLUID AND BLEED CLUTCH SYSTEM**
4. **CHECK FOR LEAKS**

CLUTCH ACCUMULATOR
COMPONENTS

CL00Z–01



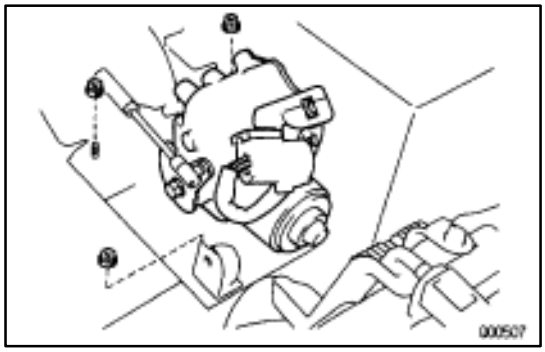


CLUTCH ACCUMULATOR REMOVAL

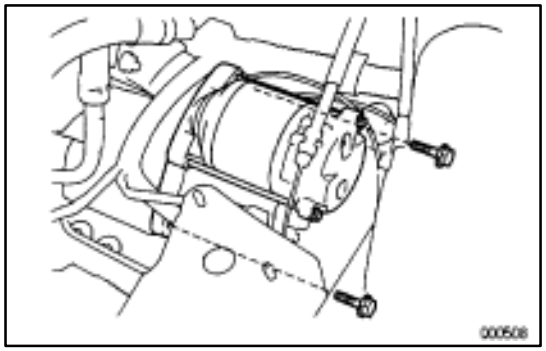
CL00X–02

1. REMOVE CRUISE CONTROL ACTUATOR

(a) Remove the two bolts and actuator cover.



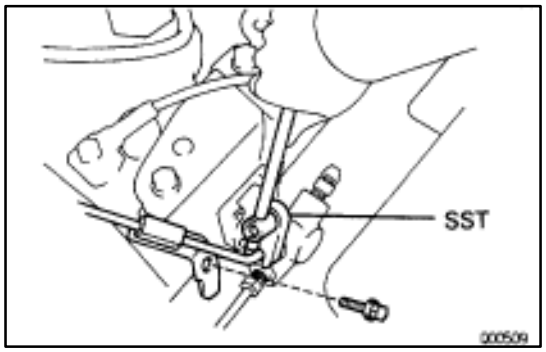
(b) Remove the three nuts and actuator.



2. REMOVE STARTER

(a) Disconnect the connector and wire from the starter.

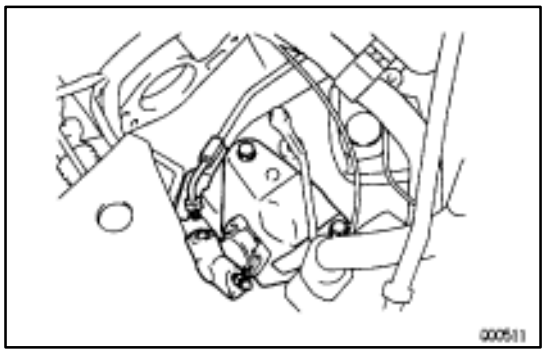
(b) Remove the two bolts and starter.



3. REMOVE CLUTCH ACCUMULATOR WITH BRACKET

(a) Remove the bolt and clamp.

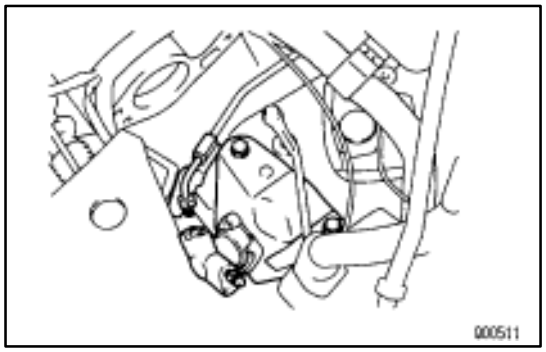
(b) Using SST, disconnect the clutch line unions from the clutch accumulator.
SST 09023–00100



(c) Remove the two bolts and clutch accumulator.

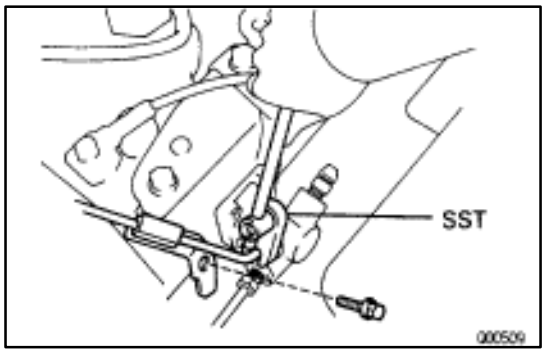
CLUTCH ACCUMULATOR INSTALLATION

CL00Y–02



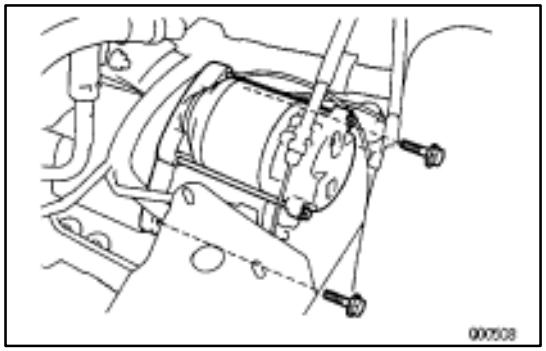
1. INSTALL CLUTCH ACCUMULATOR WITH BRACKET

(a) Install the clutch accumulator with the two bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



(b) Using SST, connect the clutch line unions to the clutch accumulator.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
SST 09023–00100

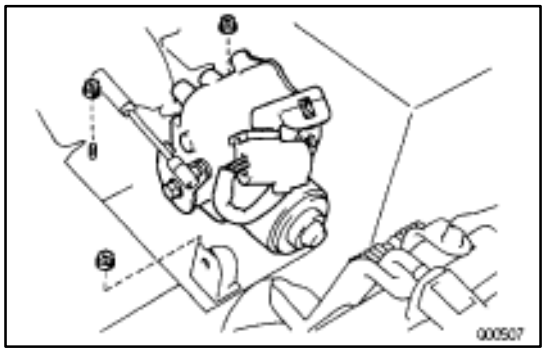
(c) Install the clamp with the bolt.
Torque: 7.4 N·m (75 kgf·cm, 66 in·lbf)



2. INSTALL STARTER

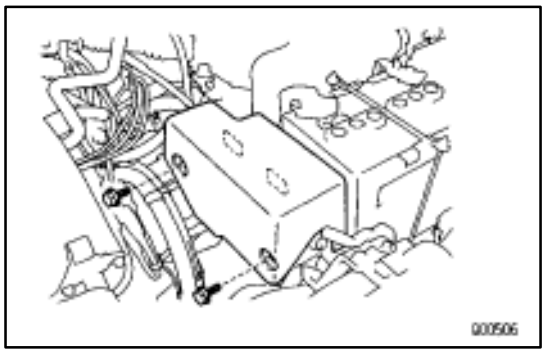
(a) Install the starter with the two bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Connect the connector and wire harness to the starter.



3. INSTALL CRUISE CONTROL ACTUATOR

(a) Install the actuator with the three nuts.



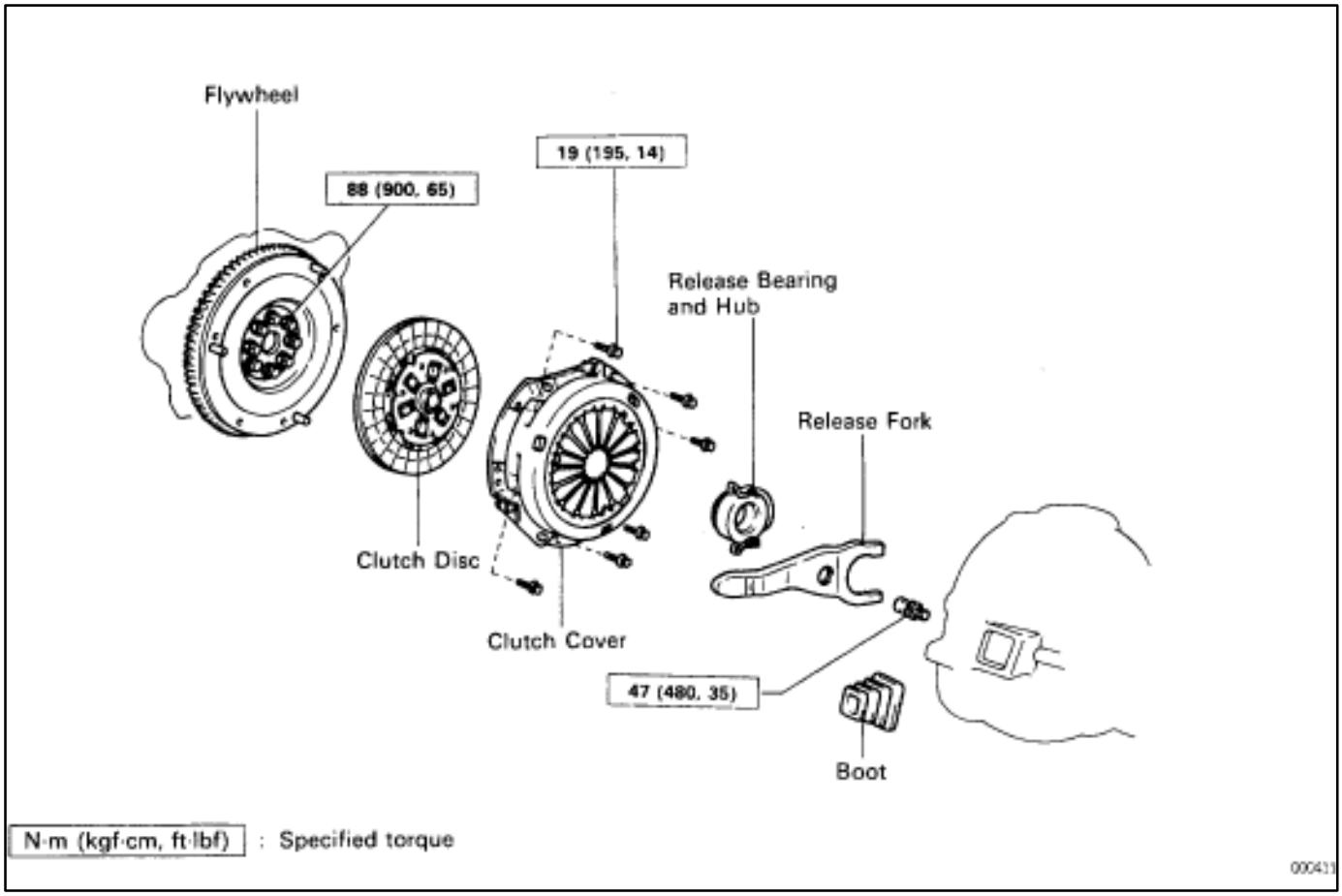
(b) Install the actuator cover with the two bolts.

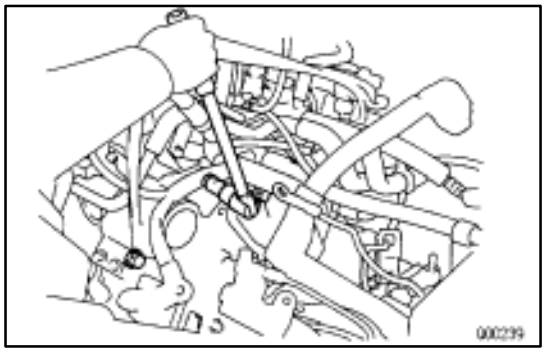
4. FILL CLUTCH RESERVOIR WITH BRAKE FLUID AND BLEED CLUTCH SYSTEM

5. CHECK FOR LEAKS

CLUTCH UNIT
COMPONENTS

CL00K–02

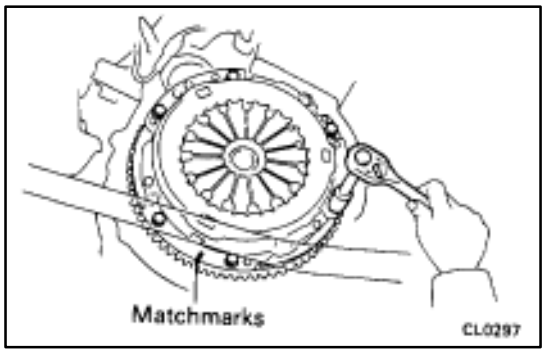




CLUTCH UNIT REMOVAL

CL00L–02

1. REMOVE TRANSAXLE FROM ENGINE (See MX section)



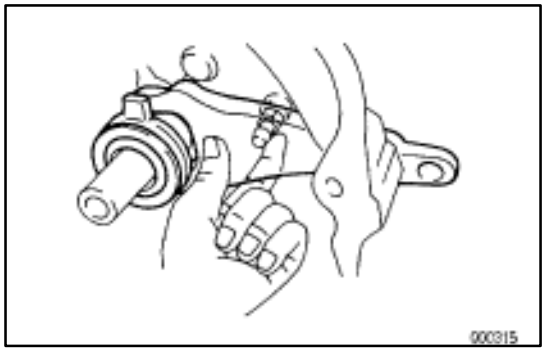
2. REMOVE CLUTCH COVER AND DISC

(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.



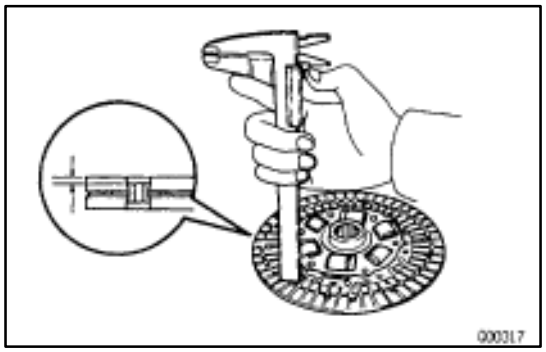
3. REMOVE RELEASE BEARING AND FORK FROM TRANSAXLE

(a) Remove the release bearing together with the fork and then separate them.

(b) Remove the boot.

CLUTCH PARTS INSPECTION

CL00M–02



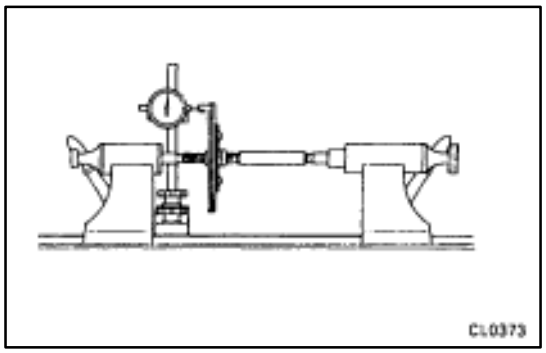
1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calipers, measure the rivet head depth.

Minimum rivet depth:

0.3 mm (0.012in.)

If a problem is found, replace the clutch disc.



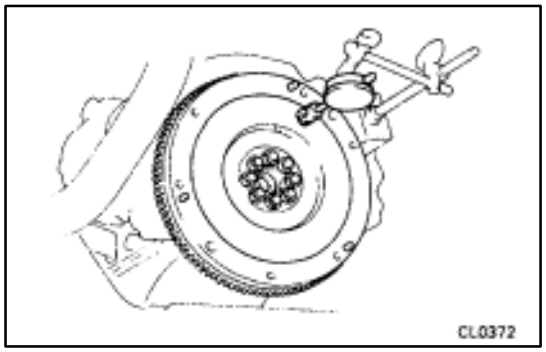
2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout:

0.8 mm (0.031 in.)

If runout is excessive, replace the clutch disc.



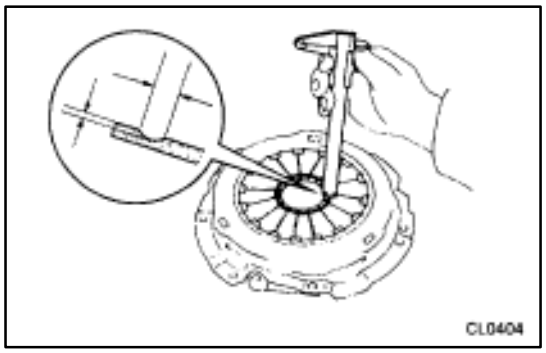
3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout:

0.1 mm (0.004 in.)

If runout is excessive, replace the flywheel.



4. INSPECT DIAPHRAGM SPRING FOR WEAR

Using calipers, measure the diaphragm spring for depth and width of wear.

Maximum:

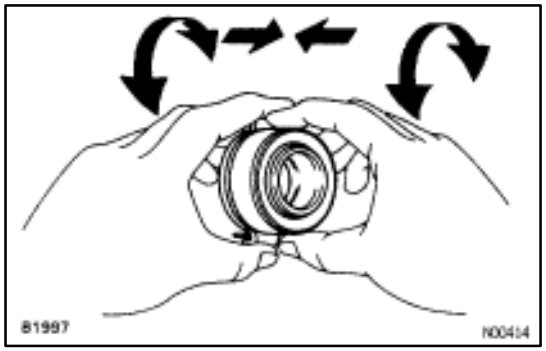
Depth

0.6 mm (0.024 in.)

Width

5.0 mm (0.197 in.)

If necessary, replace the clutch cover.



5. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the axial direction.

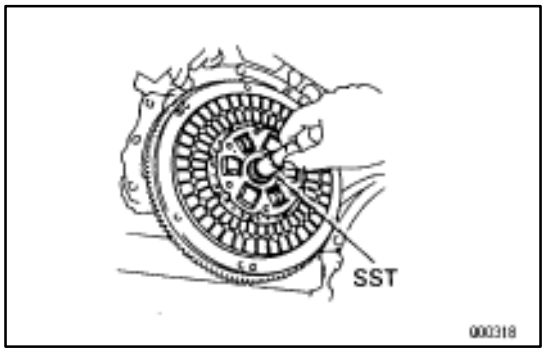
HINT: The bearing is permanently lubricated and requires no cleaning or lubrication.

If a problem is found, replace the bearing.

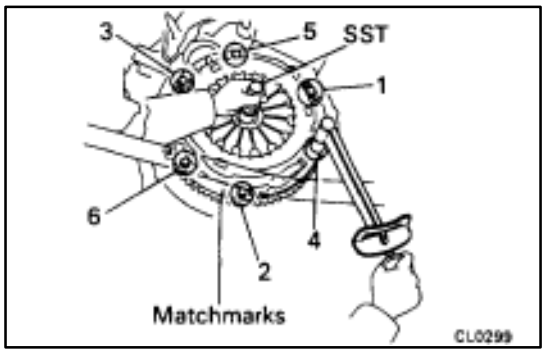
CLUTCH UNIT INSTALLATION

CL00W–02

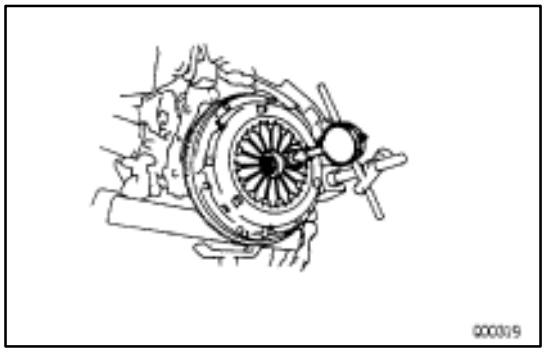
1. INSTALL CLUTCH DISC AND CLUTCH COVER ON FLYWHEEL



(a) Insert the SST in the clutch disc, and then set them and the clutch cover in position.
SST 09301–00220



(b) Align the matchmarks on the clutch cover and flywheel.
(c) Temporarily tighten the topmost bolt from the three near the knock pins.
HINT: Temporarily tighten the No.3 bolt.
(d) Torque the bolts on the clutch cover in the order shown.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

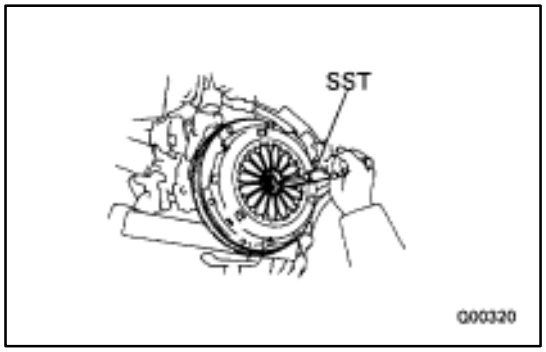


2. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

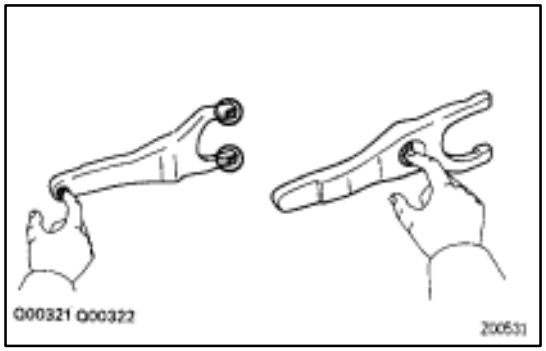
Using a dial indicator with roller instrument, check the diaphragm spring tip alignment.

Maximum non–alignment:

0.5 mm (0.020 in.)

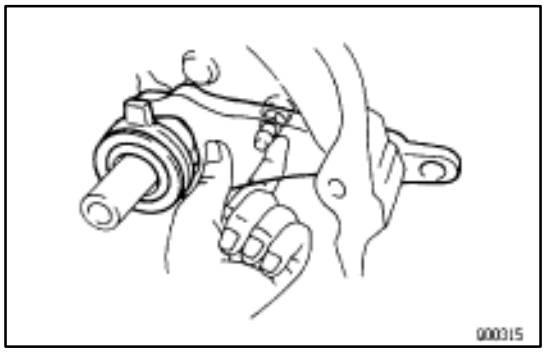


If alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.
SST 09333–00013



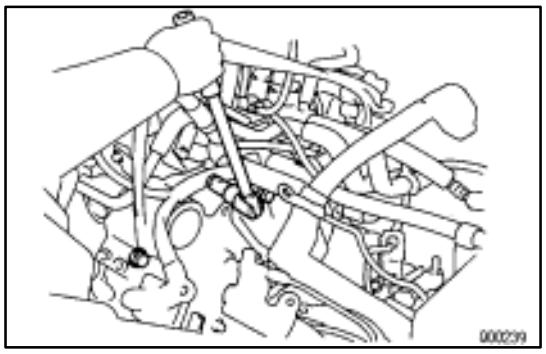
3. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2) TO FOLLOWING PARTS

- Release fork and hub contact point
- Release fork and push rod contact point
- Release fork pivot point
- Clutch disc spline



4. INSTALL RELEASE BEARING AND FORK TO TRANSAXLE

Install the bearing to the release fork, and then install them to the transaxle.



5. INSTALL TRANSAXLE TO ENGINE
(See MX section)

SERVICE SPECIFICATIONS

SERVICE DATA

CL00P–06

Pedal height from asphalt sheet	164.7–174.7 mm (6.48–6.88in.)
Push rod play at pedal top	1.0–5.0mm (0.039–0.197in.)
Pedal freeplay	5.0–15.0mm (0.197–0.591 in.)
Clutch release point from pedal full stroke end position	25 mm (0.98in.) or more
Disc rivet head depth (Minimum)	0.3mm (0.012in.)
Disc runout (Maximum)	0.8mm (0.031in.)
Diaphragm spring tip non–alignment (Maximum)	0.5mm (0.020in.)
Diaphragm spring finger wear (Maximum depth)	0.6mm (0.024in.)
Diaphragm spring finger wear (Maximum width)	5.0mm (0.197in.)
Flywheel runout (Maximum)	0.1mm (0.004in.)

TORQUE SPECIFICATIONS

CL00Q–05

Part tightened	N·m	kgf·cm	ft·lbf
Master cylinder installation nut	7.8	80	58 in·lbf
Release cylinder installation bolt	13	130	9
Union bolt	25	250	18
Clutch line union	15	155	11
Bleeder plug	8.3	85	74 in·lbf
Clutch accumulator installation bolt	21	210	15
Release fork support	47	480	35
Clutch cover x Flywheel	19	195	14
Flywheel set bolt	88	900	65

MANUAL TRANSAXLE

DESCRIPTION

MX01Q–01

PRECAUTIONS

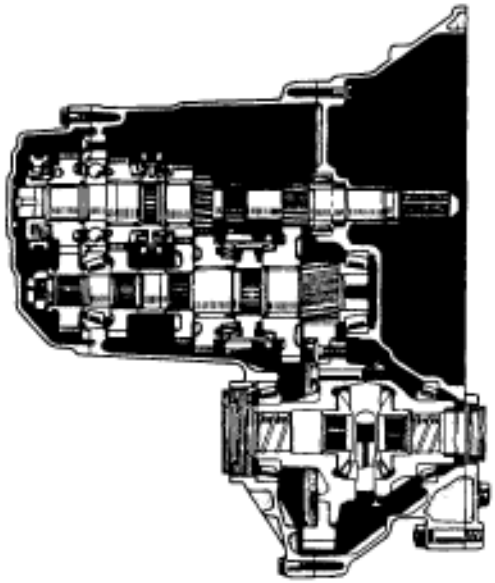
When working with FIPG materials, you must be observe the following.

- ⁎ Using a razor blade and gasket scraper, remove all the old sealant(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 the sealant in approx. 1 mm (0.04 in.) bead along the sealing surface.
- ⁎ Part must be assembled within 10 minutes of application. Otherwise, the sealant (FIPG) material must be removed and reapplied.

DESCRIPTION

MX01R–01

- ⁎ The gear and shaft layout is the same as the E52 manual transaxle.
- ⁎ A triple–cone type synchromesh mechanism is used in the second gear and a double–cone type synchromesh mechanism is used in the third gear to improve the shift feeling characteristics. This helps to reduce the shifting effort, provide smoothly shifting.
- ⁎ A reverse synchromesh mechanism is used to suppress gear engagement noise in reverse gear shifting while providing smoothly shifting.



OD0028

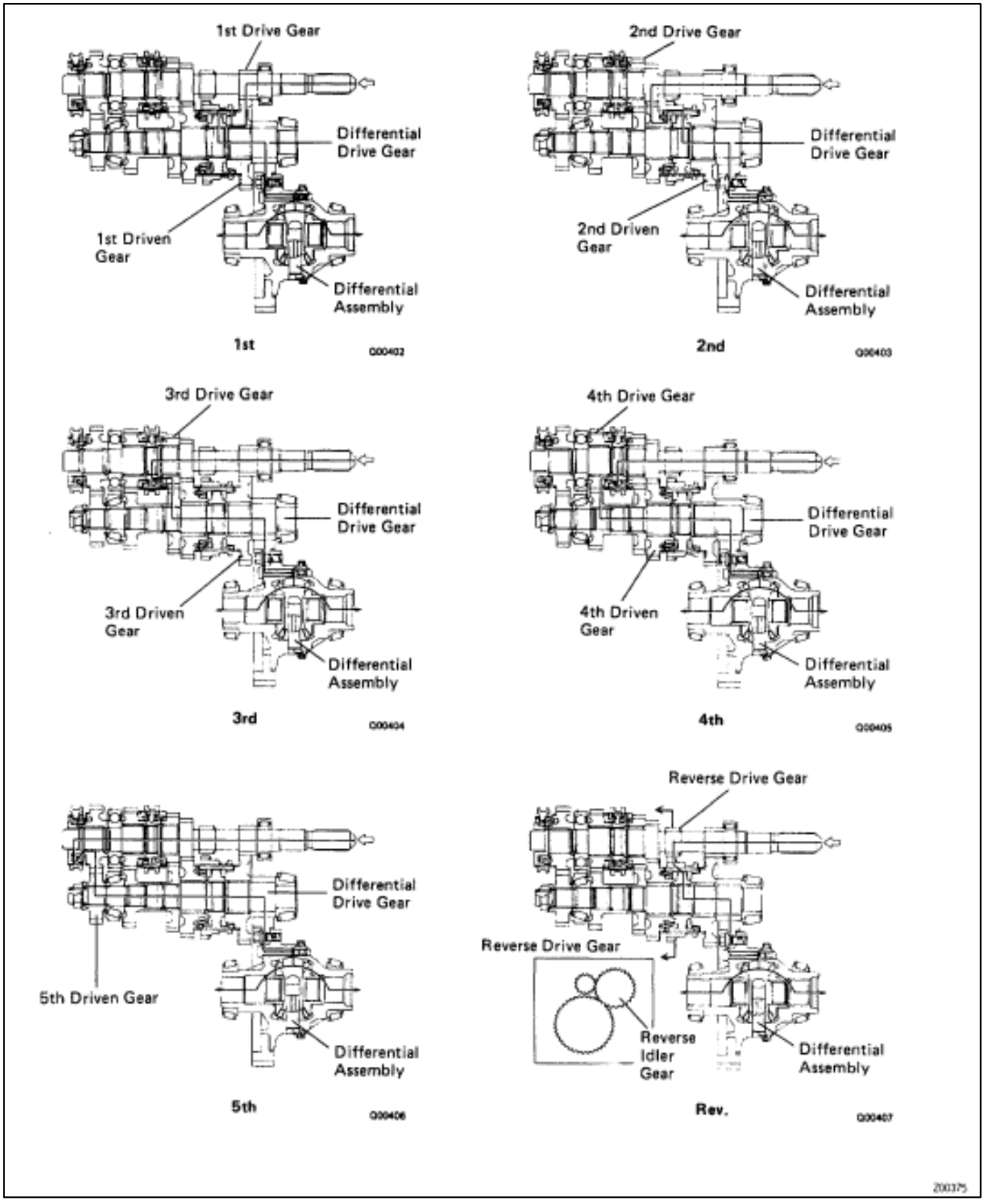
Type of Transaxle		E53
Type of Engine		3VZ-FE
Gear Ratio	1st	3.583
	2nd	2.045
	3rd	1.333
	4th	1.028
	5th	0.820
	Reverse	3.583
Differential Gear Ratio		3.625
Oil Capacity		4.2 liters (4.4 US qts, 3.6 Imp. qts)
Oil Viscosity		SAE 75W-90 or 80W-90
Oil Grade		API GL-4 or GL-5

Z00374

OPERATION

MX00E–02

✳ The illustrations below show the engagements of transaxle gears.



PREPARATION

MX01S–01

SST (SPECIAL SERVICE TOOLS)

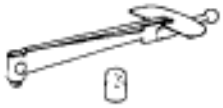
	09223–15010	Crankshaft Rear Oil Seal Replacer	Differential case oil seal
	09308–00010	Oil Seal Puller	
	09310–17010	Transaxle Gear Remover & Replacer	
	(09310–07010)	Plate	
	(09310–07020)	Center Bolt	
	(09310–07030)	Set Bolt	
	(09310–07040)	Claw	
	(09310–07050)	Adaptor	
	09313–30021	Detent Ball Plug Socket	
	09316–20011	Transfer Bearing Replacer	Input shaft bearing Side bearing
	09316–60010	Transmission & Transfer Bearing Replacer	No.1 hub sleeve Differential case taper roller bearing outer race Transaxle case cover oil seal
	(09316–00010)	Replacer Pipe	
	(09316–00020)	Replacer "A"	

	(09316–00040)	Replacer "C"	
	(09316–00070)	Replacer "F"	
	09506–30012	Differential Drive Pinion Rear Bearing Cone Replacer	Output shaft rear bearing
	09506–35010	Differential Drive Pinion Rear Bearing Replacer	No.2 hub sleeve Side bearing Input shaft bearing
	09608–12010	Front Hub & Drive Pinion Bearing Replacer Set	Input shaft oil seal
	(09608–00020)	Remover & Replacer Handle	
	(09608–00060)	Drive Pinion Front Bearing Cup Replacer	
	(09608–00080)	Replacer	
	09612–65014	Steering Worm Bearing Puller	Input shaft bearing Differential taper roller bearing outer race
	09620–30010	Steering Gear Box Replacer Set	Control shaft cover oil seal
	(09627–30010)	Steering Sector Shaft Bushing Replacer	
	(09631–00020)	Handle	
	09921–00010	Spring Tension Tool	Speedometer driven gear oil seal
	09950–00020	Bearing Remover	

	09950–00030 Bearing Remover Attachment	
	09950–20017 Universal Puller	

RECOMMENDED TOOLS

MX01T–01

	09025–00010 Small Torque Wrench	Differential preload
	09031–00030 Pin Punch	
	09042–00040 Torx Socket T50	
	09042–00050 Torx Socket T45	
	09905–00012 Snap Ring No. 1 Expander	

EQUIPMENT

MX01U–01

Dial indicator with magnetic base	
Feeler gauge	
Micrometer	
Straight edge	
Torque wrench	

LUBRICANT

MX013–01

Item	Capacity	Classification
Manual transaxle oil (w/Differential oil)	4.2 liters (4.4 US qts, Imp. qts)	API GL–4 or GL–5 SAE 75W–90 or 80W–90

SSM(SPECIAL SERVICE MATERIALS)

MX01V–01

08826–00090	Seal Packing 1281, Three bond 1281 or equivalent	Transaxle case X Case cover Transmission case X Transaxle case Transmission case X Case cover
08833–00080	Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	Transaxle case cover bolt Straight screw plug Control shaft cover bolt

TROUBLESHOOTING

MX00D–01

You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in troubles. Check each part in order. If necessary, replace these parts.

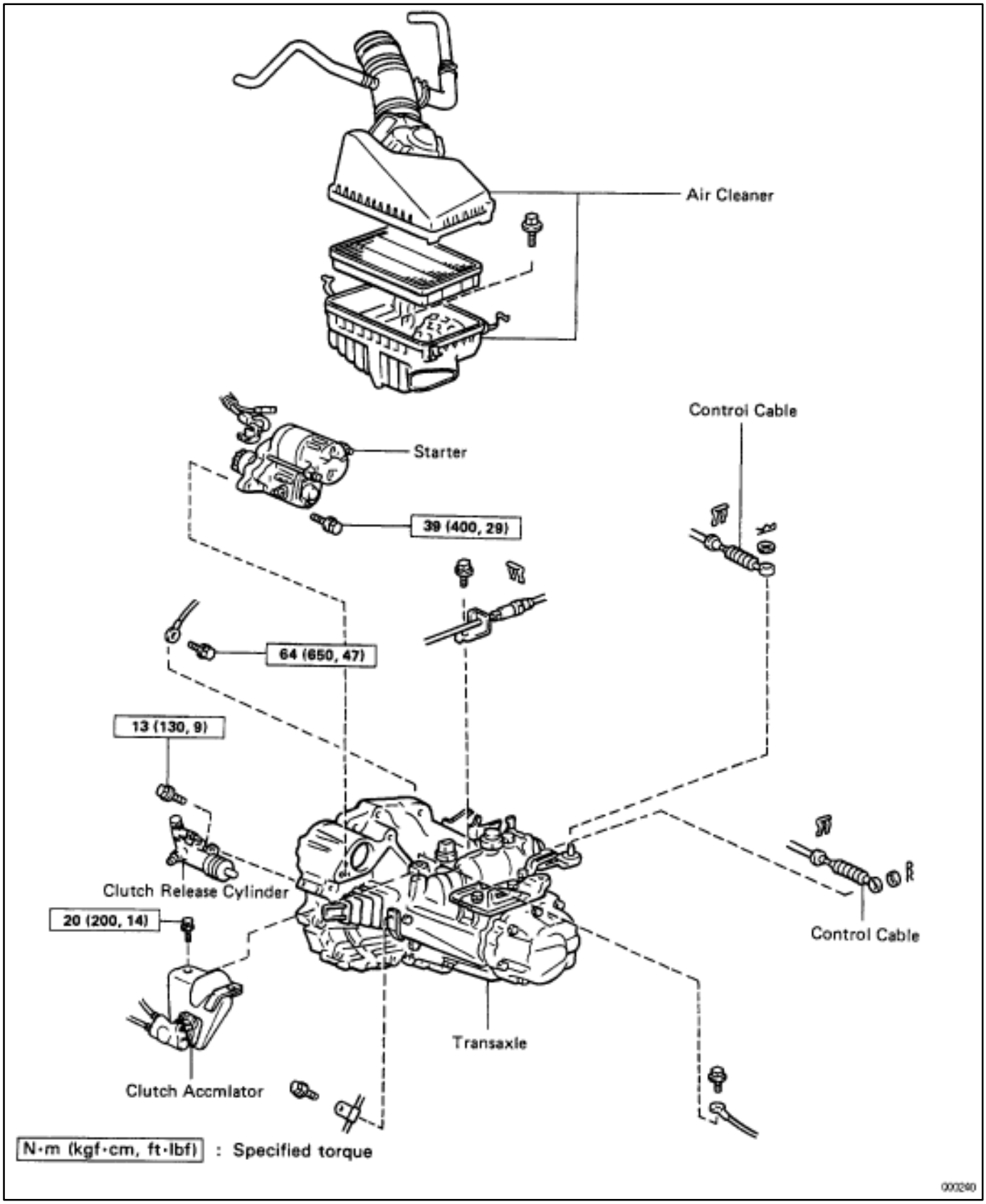
See Page / Parts Name / Trouble	-	MX–2	-	MX–23	MX–23	MX–23	MX–89	MX–23	MX–23	MX–23	MX–23	MX–40, 46	MX–40, 46			
	Oil (Level low)	Oil (Wrong)	Oil (Level too high)	Gasket (Damaged)	Oil seal (Worn or damaged)	O-Ring (Worn or damaged)	Control cable (Faulty)	Locking ball spring (Damaged)	Shift fork (Worn)	Gear (Worn or damaged)	Bearing (Worn or damaged)	Synchronizer ring (Worn or damaged)	Shifting key spring (Damaged)			
Noise	1	2								3	3					
Oil leakage			1	2	2	3										
Hard to shift or will not shift							1					2	3			
Jumps out of gear								1	2	3	3					

v00300

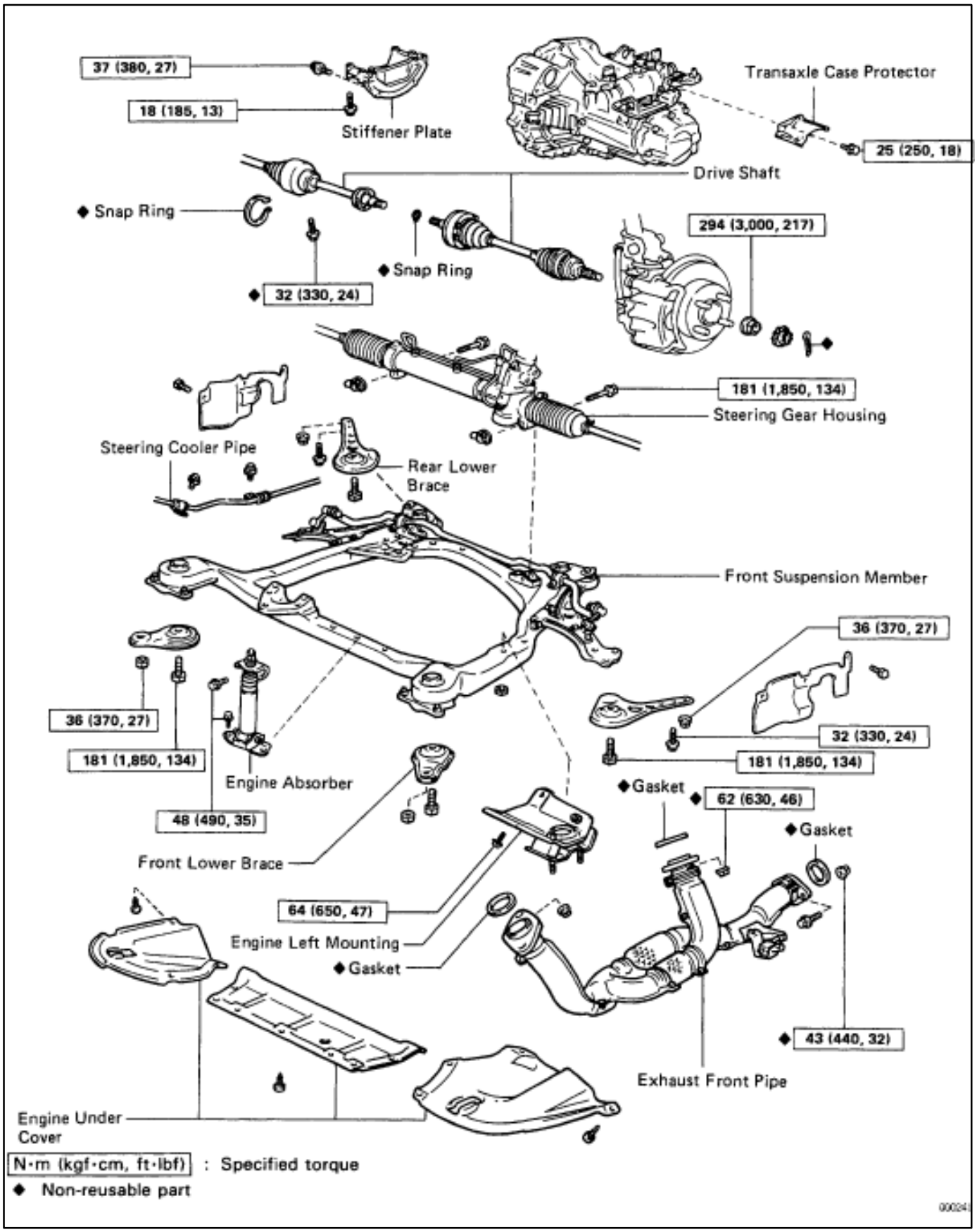
ASSEMBLY REMOVAL AND INSTALLATION

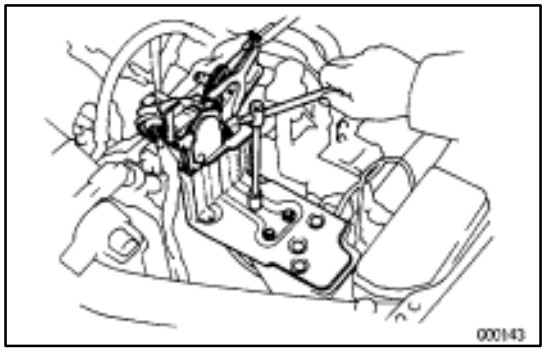
MX01W–01

Removal and installation the parts as shown below.



Removal and installation the parts as shown below.





TRANSAXLE REMOVAL

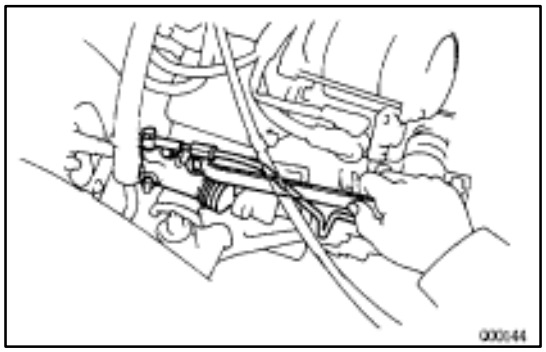
MX01X–01

1. REMOVE NEGATIVE BATTERY CABLE

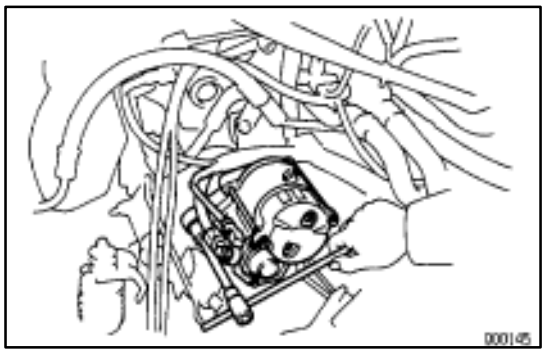
2. REMOVE AIR CLEANER CASE ASSEMBLY WITH AIR HOSE

3. REMOVE CRUISE CONTROL ACTUATOR

(a) Remove the cruise control actuator cover.
(b) Disconnect the connector.
(c) Remove the three bolts and cruise control actuator with bracket.

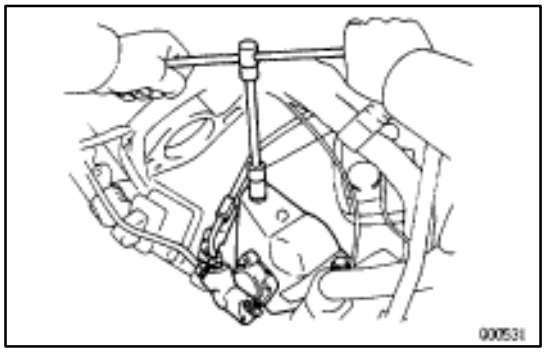


4. REMOVE CLUTCH RELEASE CYLINDER



5. REMOVE STARTER

(a) Disconnect the connector and wire from the starter.
(b) Remove the two bolts and starter.

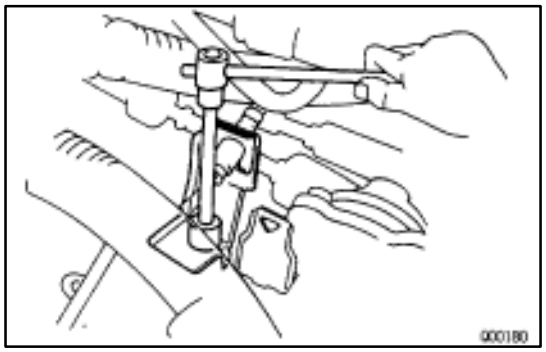


6. REMOVE CLUTCH ACCUMLATOR AND TUBE CLAMP

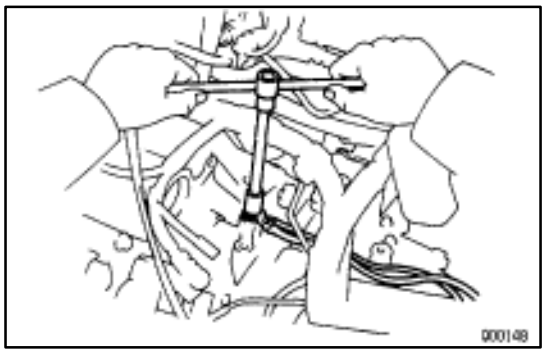
(a) Remove the two bolts and clutch accumlator with bracket.
(b) Remove the bolt and clutch tube clamp.

7. DISCONNECT BACK–UP LIGHT SWITCH CONNECTOR

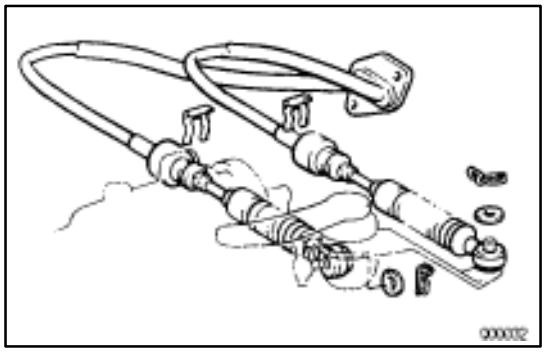
8. DISCONNECT WIRES CLAMPS



9. REMOVE CLUTCH RELEASE CYLINDER BRACKET



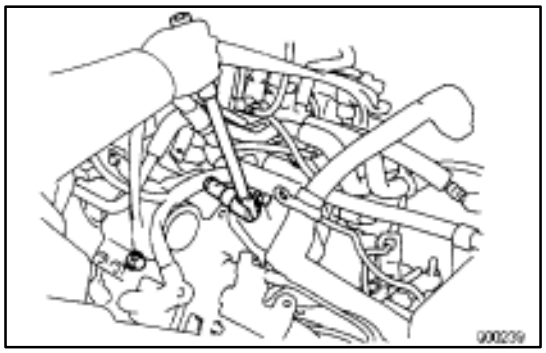
10. REMOVE EARTH CABLES



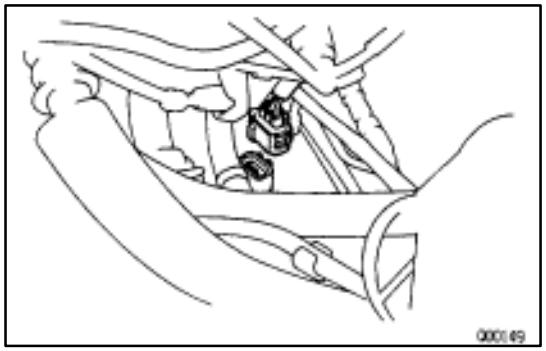
11. DISCONNECT CONTROL CABLES

(a) Remove the clips and washers.

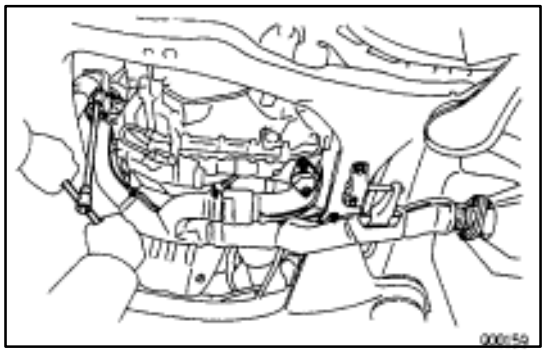
(b) Remove the retainer from the cables.



12. REMOVE TRANSAXLE MOUNTING THREE BOLTS OF TRANSAXLE CASE UPPER SIDE



13. DISCONNECT SPEED SENSOR CONNECTOR



14. REMOVE FRONT WHEEL

15. RAISE VEHICLE

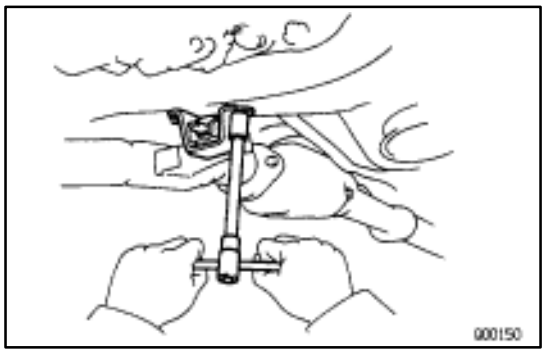
NOTICE: Be sure the vehicle is securely supported.

16. REMOVE UNDER COVERS AND SIDE COVERS

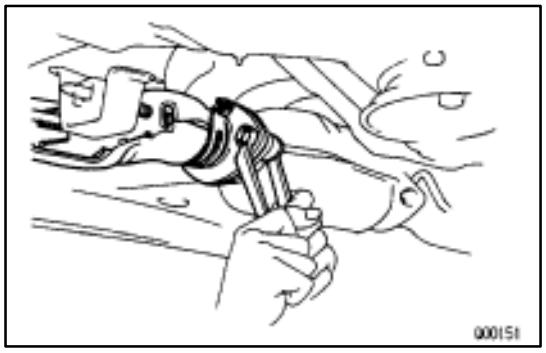
17. DRAIN TRANSAXLE OIL

18. REMOVE EXHAUST FRONT PIPE

(a) Remove the four nuts.

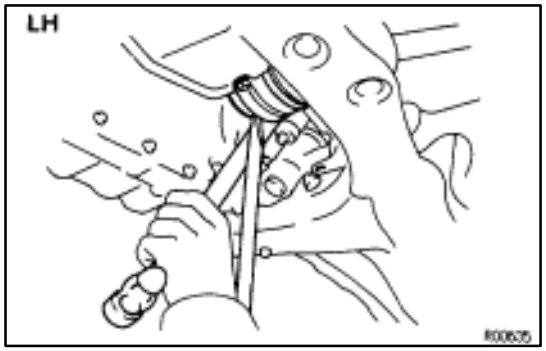


(b) Remove the two bolts and front pipe support.

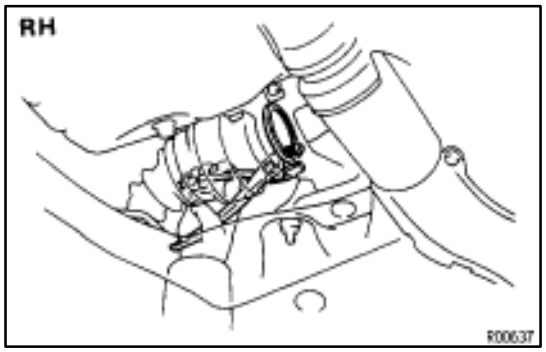


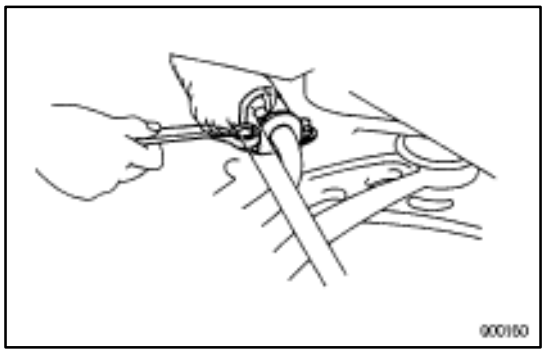
(c) Remove the two bolts and nuts.

(d) Remove the front pipe.



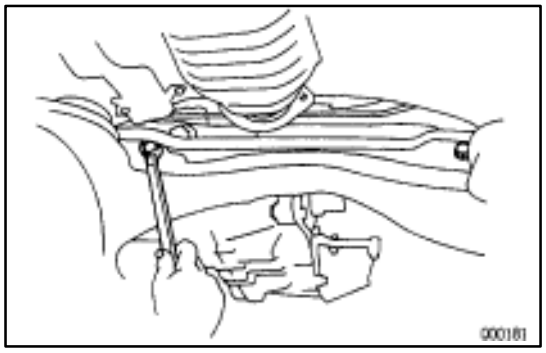
19. REMOVE DRIVE SHAFT
(See page SA–20)



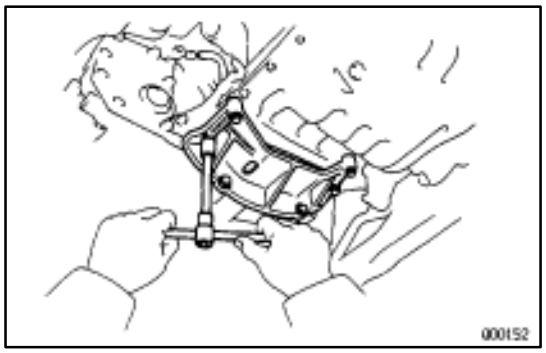


20. DISCONNECT STEERING GEAR HOUSING FROM FRONT SUSPENSION MEMBER

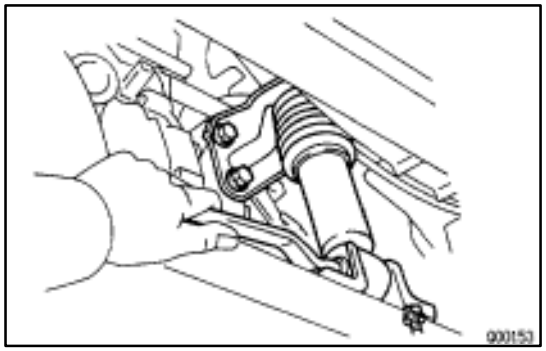
(a) Remove the four bolts.
(b) Remove the stabilizer bar bushing bracket.



(c) Remove the two set bolts and nuts.
(d) Disconnect the steeling gear housing from the front suspension member.
HINT: Suspend the steering gear housing with cord.

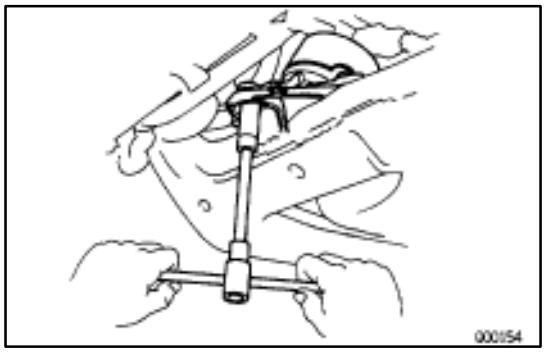


21. REMOVE STIFFENER PLATE



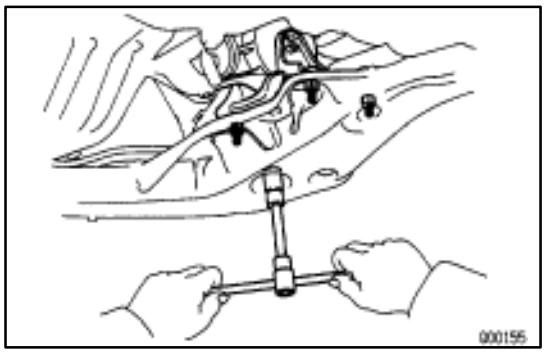
22. REMOVE ENGINE ABSORBER

Remove the four bolts and engine absorber.



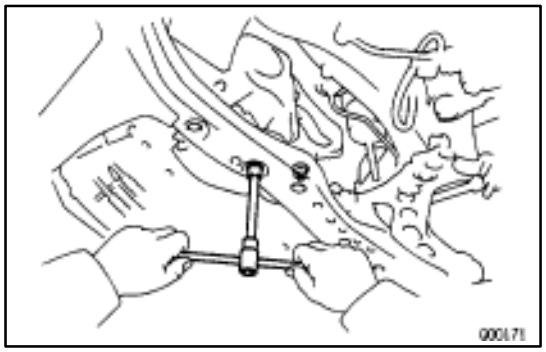
23. REMOVE ENGINE FRONT MOUNTING SET BOLTS AND NUT

Remove the two bolts and a nut.



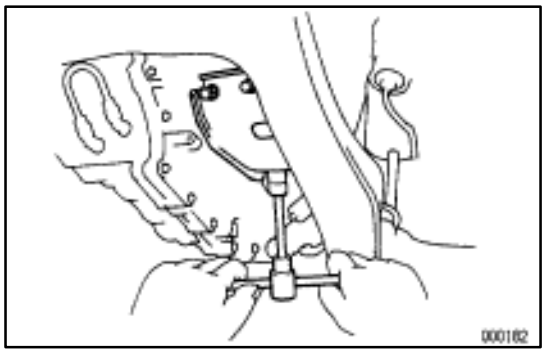
24. REMOVE ENGINE REAR MOUNTING SET NUTS

(a) Remove the two hole plugs.
(b) Remove the four nuts.

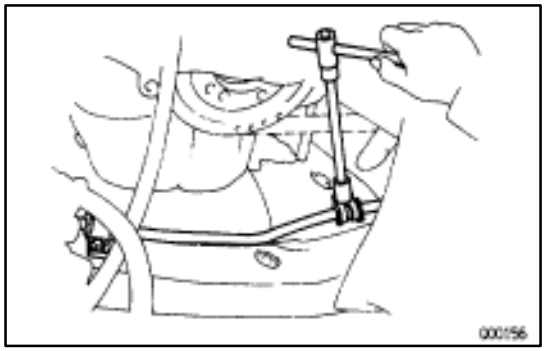


25. REMOVE ENGINE LEFT MOUNTING

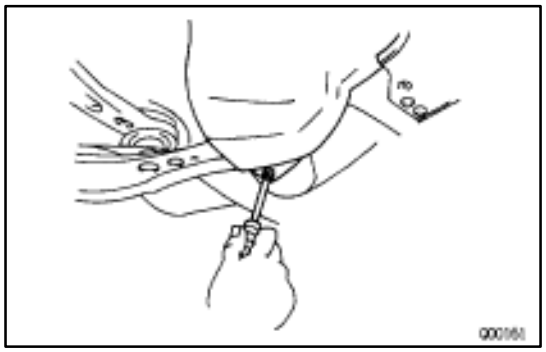
(a) Raise the transaxle and engine slightly with a jack and wooden block in between.
(b) Remove the two hole plugs and nuts.



(c) Remove the three bolts and engine left mounting.

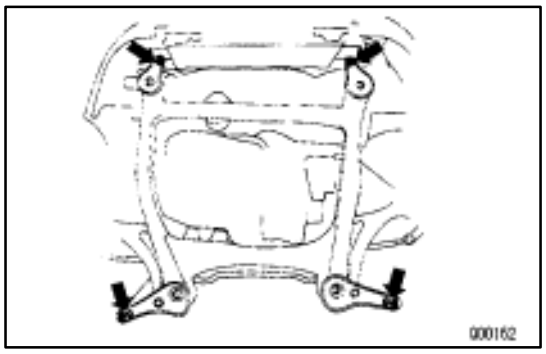


26. REMOVE STEERING COOLER PIPE SET BOLTS

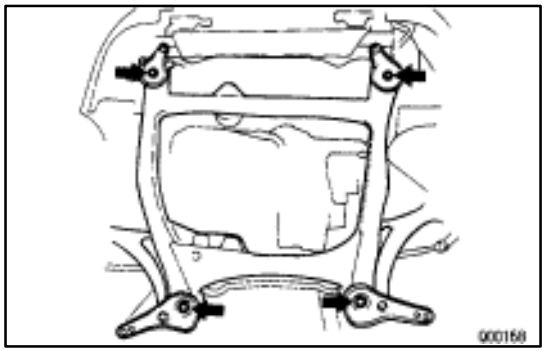


27. REMOVE FRONT SUSPENSION MEMBER

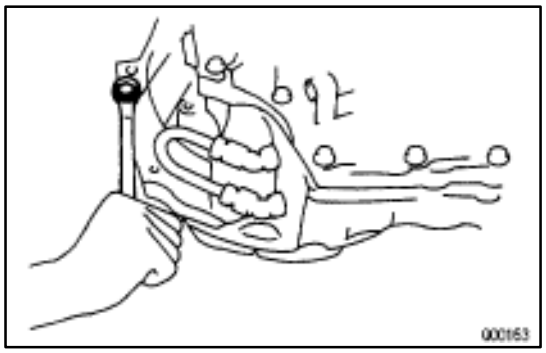
(a) Remove the left and right fender liner set screws.



(b) Remove the two bolts and four nuts.

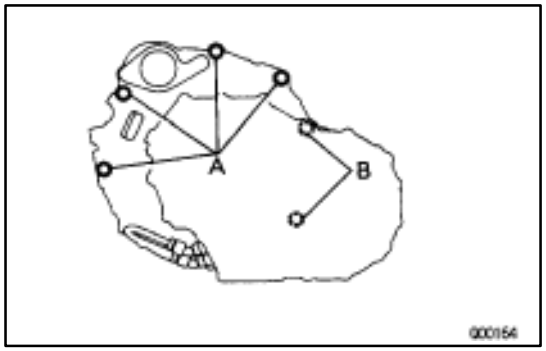


(c) Remove the four bolts.
(d) Remove the two front lower braces, rear lower braces and front suspension member.



28. REMOVE TRANSAXLE

(a) Remove the transaxle mounting bolts from the engine.
(b) Lower the engine left side and remove the transaxle from the engine.



TRANSAXLE INSTALLATION

MX01Z–01

(See pages MX–9, 10)

1. INSTALL TRANSAXLE TO ENGINE

(a) Align the input shaft spline with the clutch disc and install the transaxle to the engine.

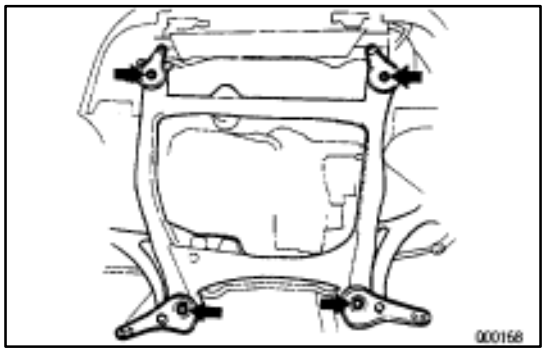
(b) Torque the bolts.

Bolt A

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

Bolt B

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

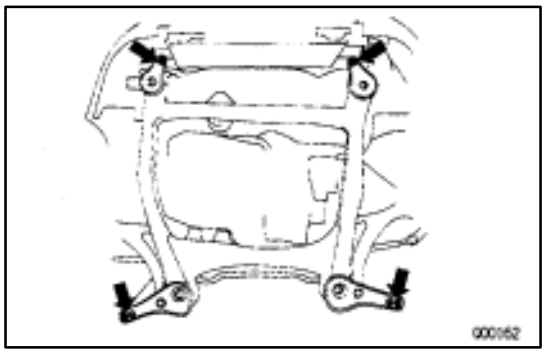


2. INSTALL FRONT SUSPENSION MEMBER

(a) Install the front suspension member, rear lower brace, front lower brace and four bolts.

(b) Torque the four bolts.

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



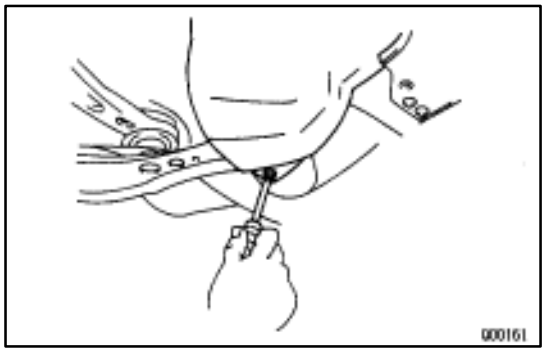
(c) Install and torque the two bolts and four nuts.

Bolt

Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)

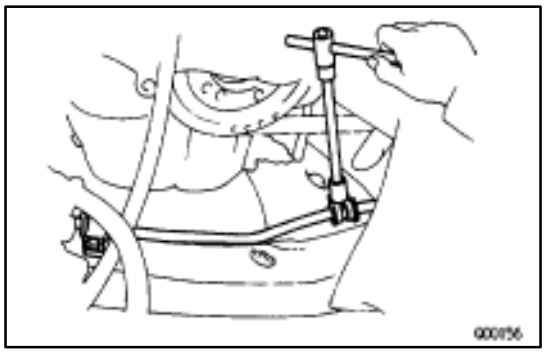
Nut

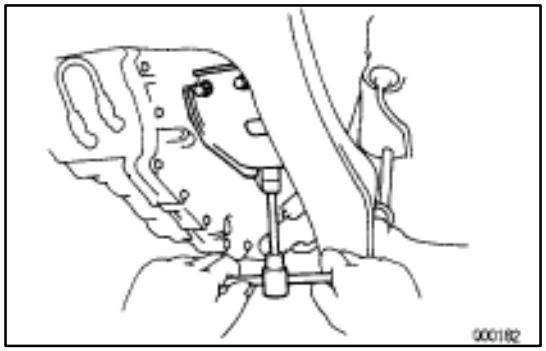
Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)



(d) Install the left and right fender liner set screws.

3. INSTALL STEERING COOLER PIPE SET BOLTS

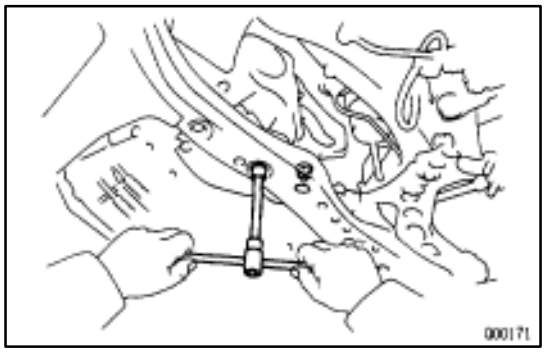




4. INSTALL ENGINE LEFT MOUNTING

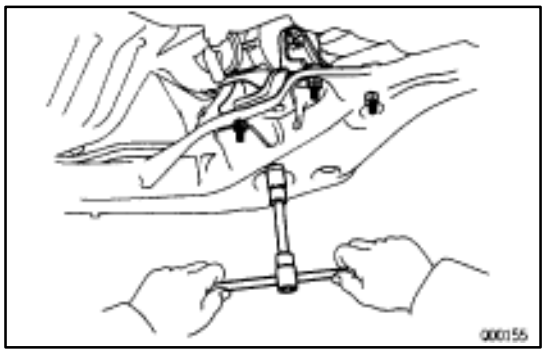
(a) Install the engine left mounting.

(b) Install and torque the three bolts.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



(c) Install and torque the two nuts.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

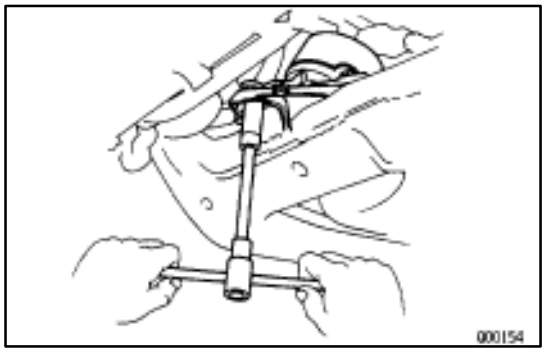
(d) Install the two hole plugs.



5. INSTALL ENGINE REAR MOUNTING SET NUTS

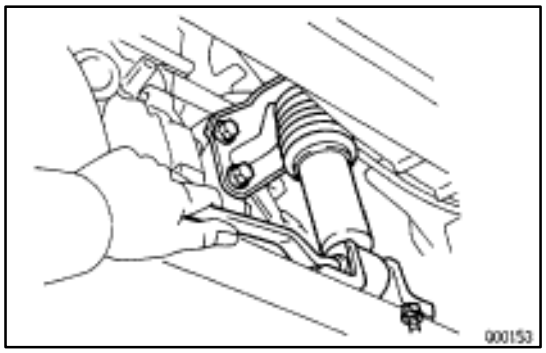
(a) Install and torque the four nuts.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

(b) Install the two hole plugs.



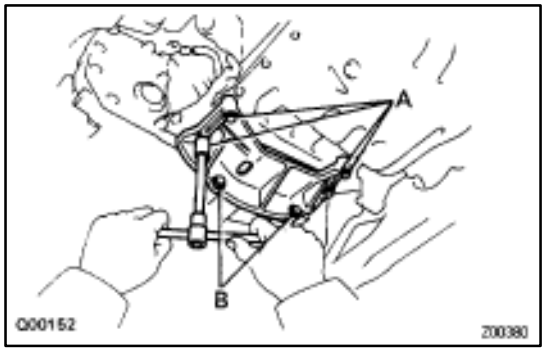
6. INSTALL ENGINE FRONT MOUNTING SET BOLTS AND NUT

Install and torque the two bolts and a nut.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



7. INSTALL ENGINE ABSORBER

Install and torque the four bolts.
Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)



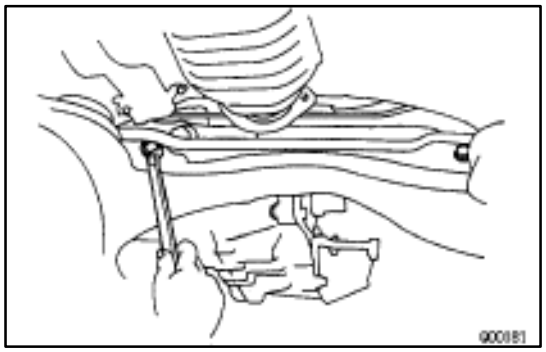
8. INSTALL STIFFENER PLATE

Bolt A

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

Bolt B

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

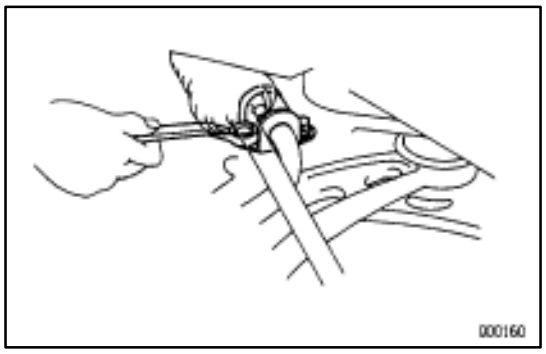


9. CONNECT STEERING GEAR HOUSING TO FRONT SUSPENSION MEMBER

(a) Connect the steering gear housing to the front suspension member.

(b) Install and torque the two set bolts and nuts.

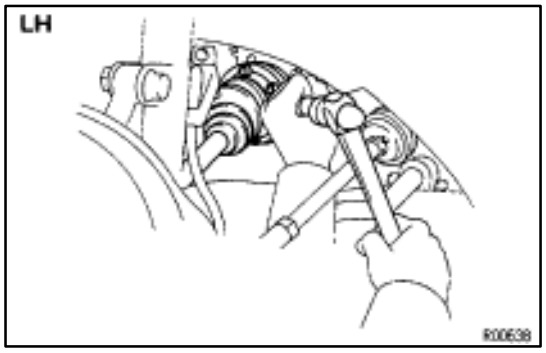
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)



(c) Install the stabilizer bar bushing bracket.

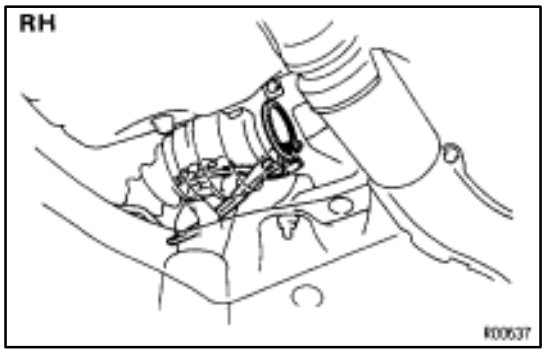
(d) Install and torque the four bolts.

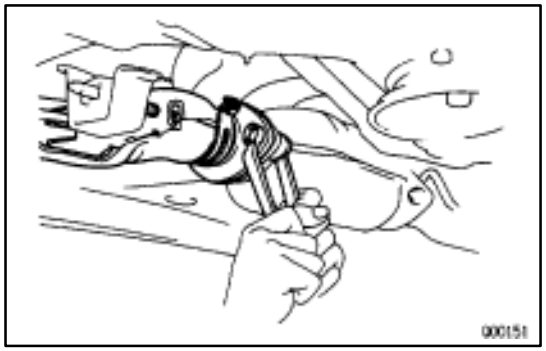
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



10. INSTALL DRIVE SHAFT

(See page SA–23)





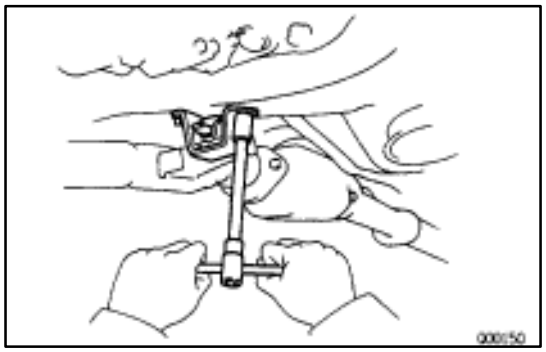
11. INSTALL EXHAUST FRONT PIPE

(a) Install a new gasket.

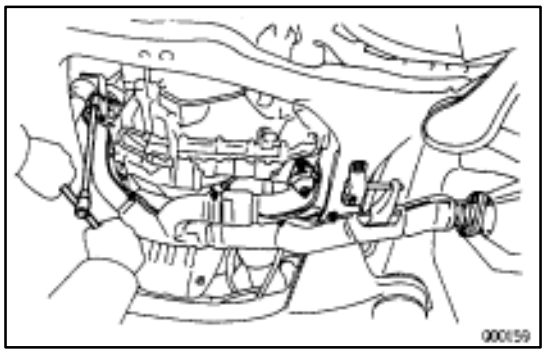
(b) Install the exhaust front pipe.

(c) Install and torque the two bolt and new nuts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



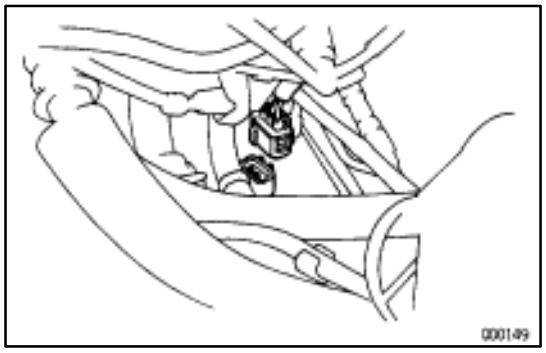
(d) Install the exhaust front pipe support and two bolts.



(e) Install two new gaskets.

(f) Install and torque four new nuts.

Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)



12. FILL TRANSAXLE WITH GEAR OIL

Oil:

Gear oil super (08885–02106) or equivalent

Recommended oil

Oil grade:

API GL–4 or GL–5

Viscosity:

SAE 75W–90 or 80W–90

Above–18°C (0°F) SAE 90

Below–18°C (0°F) SAE 80W

Capacity:

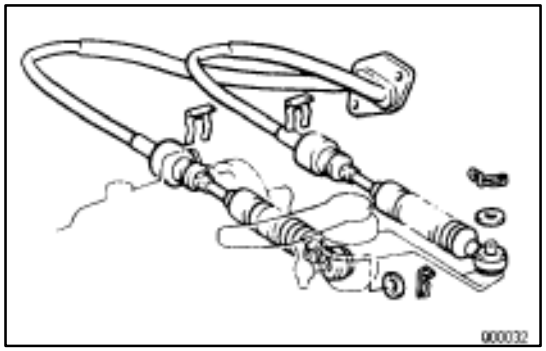
4.2 Litters (4.4 US qts, 3.7 Imp. qts)

13. INSTALL UNDER COVERS AND SIDE COVERS

14. INSTALL FRONT WHEEL AND LOWER VEHICLE

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

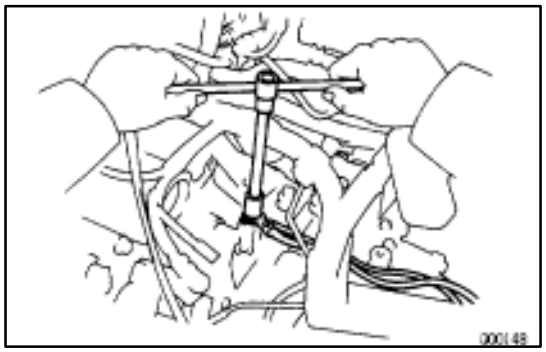
15. CONNECT SPEEDOMETER SENSOR CONNECTOR



16. CONNECT CONTROL CABLES

(a) Install the retainer to the cables.

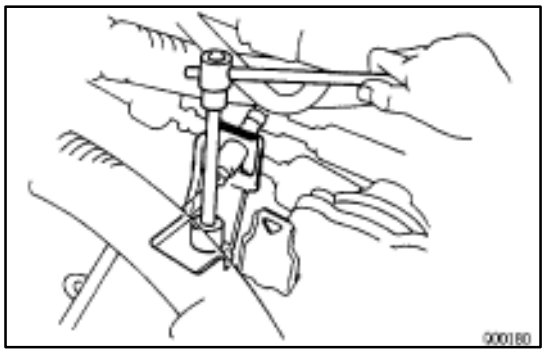
(b) Connect the cables to the linkage with the washers and clips.



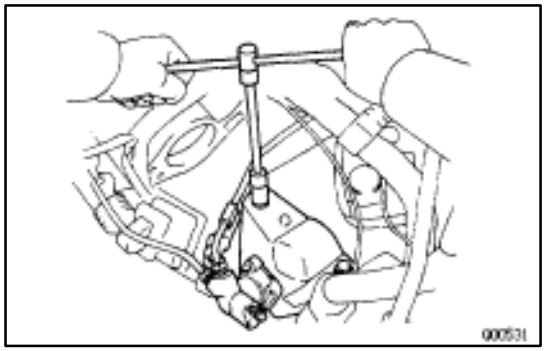
17. INSTALL EARTH CABLES

18. CONNECT WIRES CLAMPS

19. CONNECT BACK–UP LIGHT SWITCH CONNECTOR



20. INSTALL CLUTCH RELEASE CYLINDER BRACKET

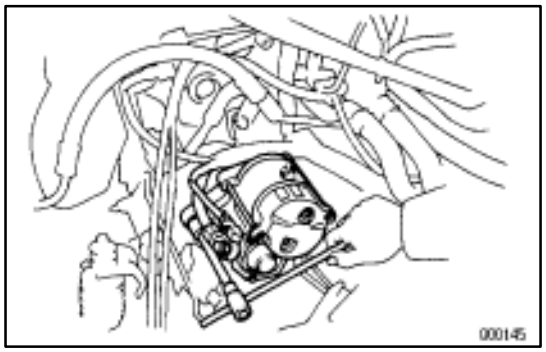


21. INSTALL CLUTCH ACCUMLATORAND TUBE CLAMP

(a) Install the tube clamp and bolt.

(b) Install and torque the two bolts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



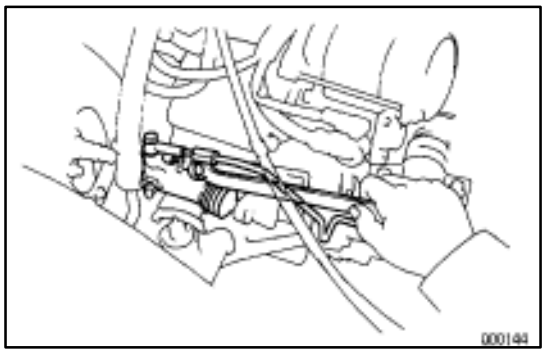
22. INSTALL STARTER

(a) Install the starter.

(b) Install and torque the two bolts.

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

(c) Connect the connector and wire to the starter.

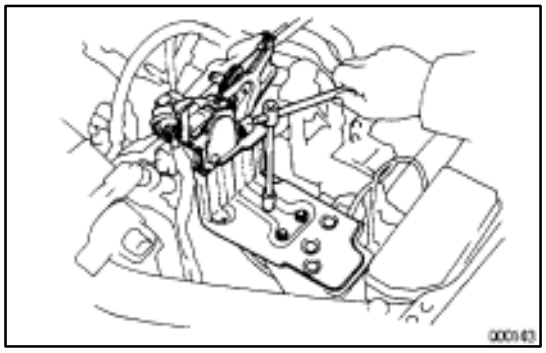


23. INSTALL CLUTCH RELEASE CYLINDER AND TUBE CLAMP

(a) Place the release cylinder and torque the two bolts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(b) Install the tube clamp bolt.



24. INSTALL CRUISE CONTROL ACTUATOR

(a) Install the cruise control actuator with bracket the three bolts.

(b) Connect the connector.

(c) Install the cruise control actuator cover.

25. INSTALL AIR CLEANER CASE ASSEMBLY WITH AIR HOSE

26. INSTALL NEGATIVE BATTERY CABLE

27. INSPECT FRONT WHEEL ALIGNMENT

(See page SA–3)

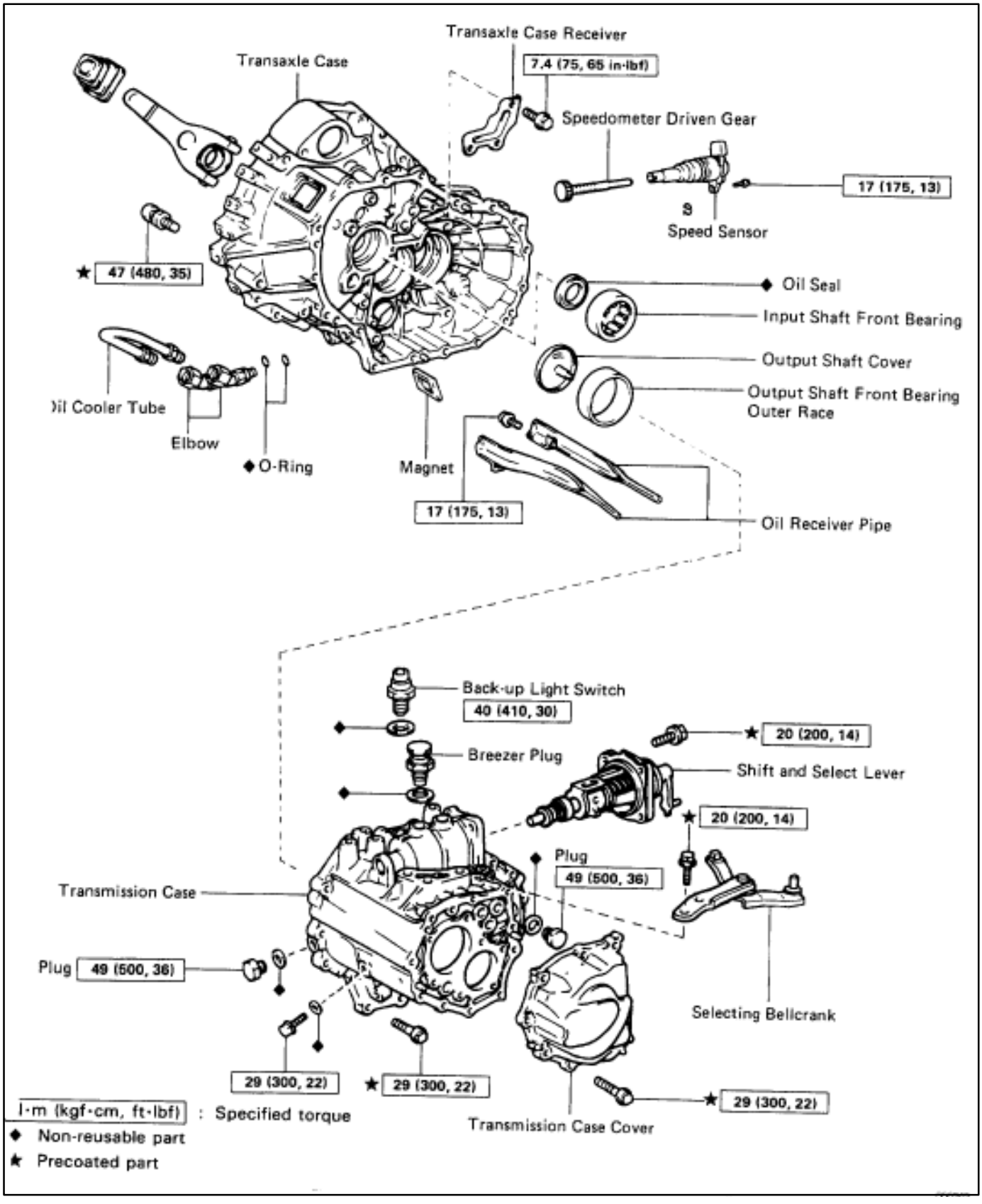
28. PERFORM ROAD TEST

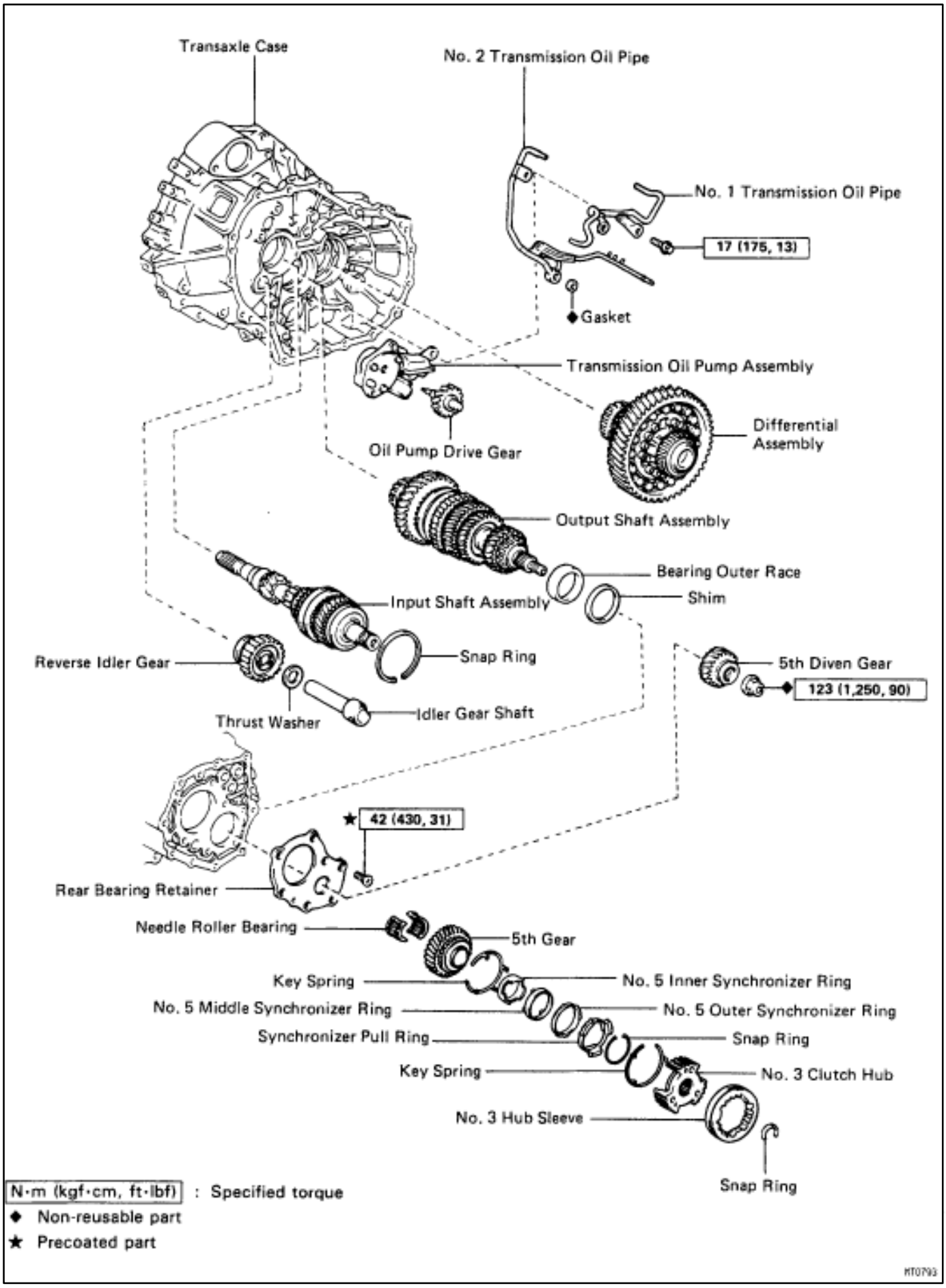
Check for abnormal noise and smooth shifting.

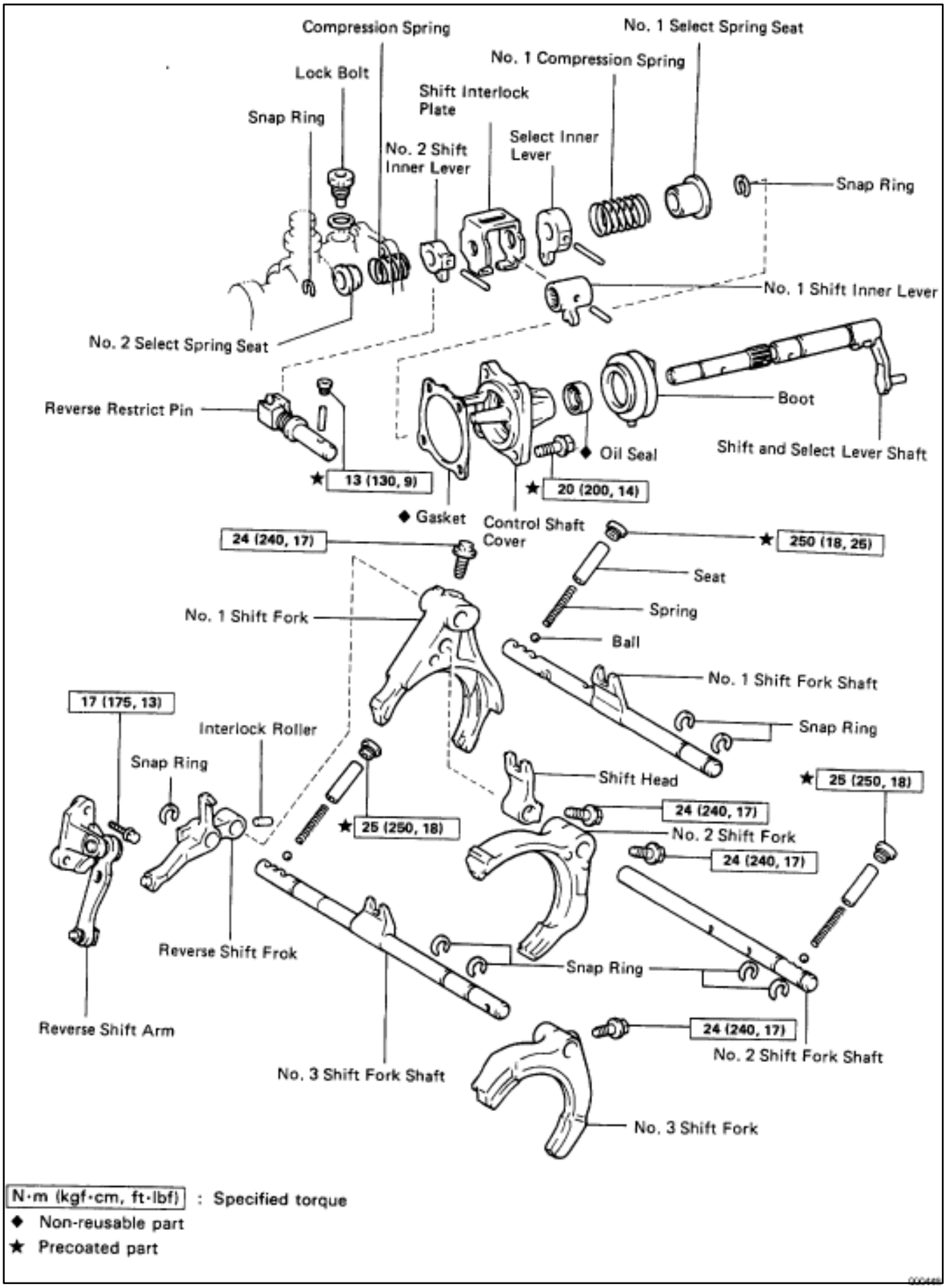
COMPONENT PARTS REMOVAL

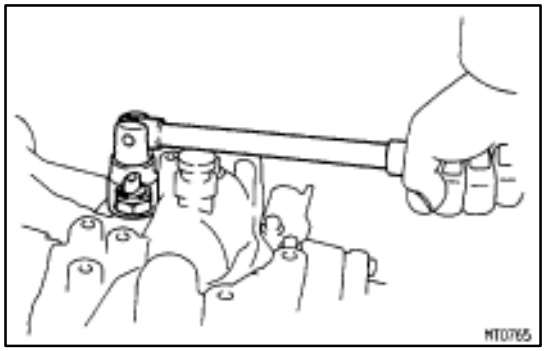
MX014–01

COMPONENTS




Transaxle Case
No. 2 Transmission Oil Pipe
No. 1 Transmission Oil Pipe
17 (175, 13)
◆Gasket
Transmission Oil Pump Assembly
Oil Pump Drive Gear
Differential Assembly
Output Shaft Assembly
Bearing Outer Race
Shim
Input Shaft Assembly
Snap Ring
Reverse Idler Gear
5th Diven Gear
123 (1,250, 90)
Thrust Washer
Idler Gear Shaft
★ 42 (430, 31)
Rear Bearing Retainer
Needle Roller Bearing
5th Gear
Key Spring
No. 5 Inner Synchronizer Ring
No. 5 Middle Synchronizer Ring
No. 5 Outer Synchronizer Ring
Synchronizer Pull Ring
Snap Ring
Key Spring
No. 3 Clutch Hub
No. 3 Hub Sleeve
Snap Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part
MT0793


Compression Spring
No. 1 Select Spring Seat
No. 1 Compression Spring
Lock Bolt
Shift Interlock Plate
Snap Ring
No. 2 Shift Inner Lever
Select Inner Lever
Snap Ring
No. 1 Shift Inner Lever
No. 2 Select Spring Seat
Reverse Restrict Pin
Boot
Oil Seal
Shift and Select Lever Shaft
★ 13 (130, 9)
★ 20 (200, 14)
◆ Gasket
Control Shaft Cover
24 (240, 17)
★ 250 (18, 25)
Seat
Spring
No. 1 Shift Fork
Ball
No. 1 Shift Fork Shaft
17 (175, 13)
Interlock Roller
Snap Ring
Snap Ring
Shift Head
★ 25 (250, 18)
24 (240, 17)
★ 25 (250, 18)
No. 2 Shift Fork
24 (240, 17)
Reverse Shift Frok
Snap Ring
Reverse Shift Arm
24 (240, 17)
No. 2 Shift Fork Shaft
No. 3 Shift Fork Shaft
No. 3 Shift Fork
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part

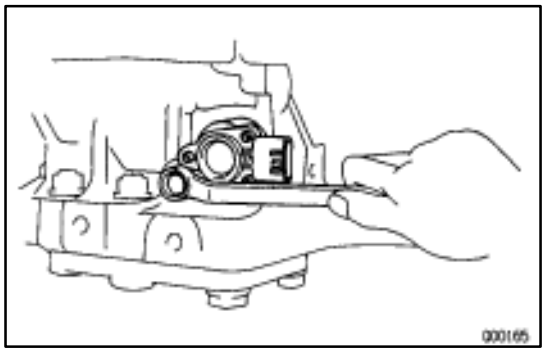


BASIC SUBASSEMBLY SEPARATION

MX01Y–01

(See pages MX–23 to 25)

1. **REMOVE RELEASE FORK AND BEARING**
2. **REMOVE BACK–UP LIGHT SWITCH**

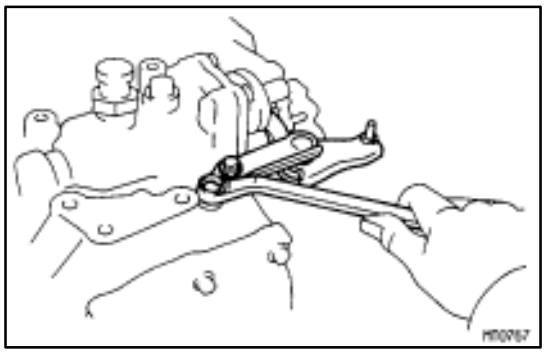


3. **REMOVE SPEED SENSOR**

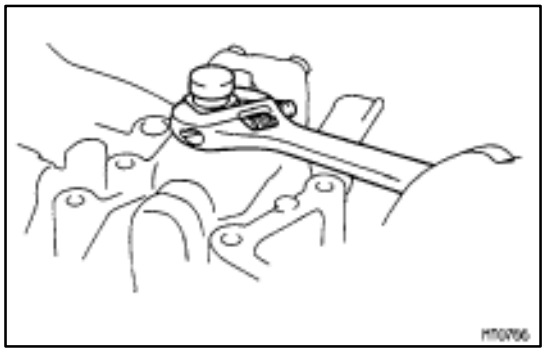
(a) Remove the set bolt and lock plate.

(b) Remove the speed sensor.

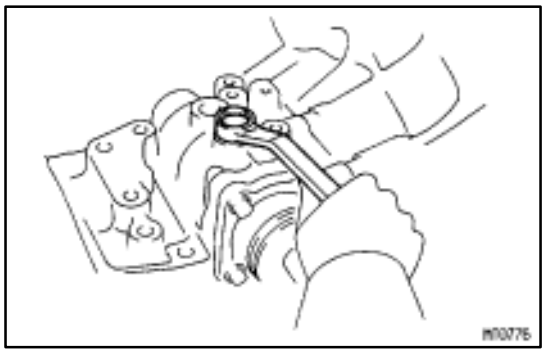
4. **REMOVE THREE BOLTS AND SHIFT CONTROL BRACKET**



5. **REMOVE SELECTING BELLCRANK ASSEMBLY**

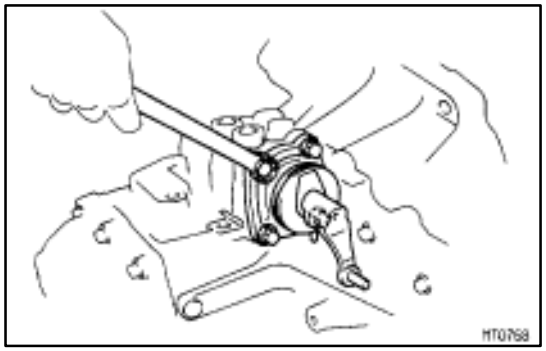


6. **REMOVE BREATHER PLUG**

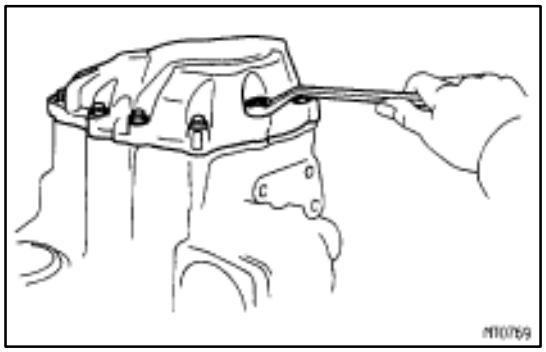


7. **REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY**

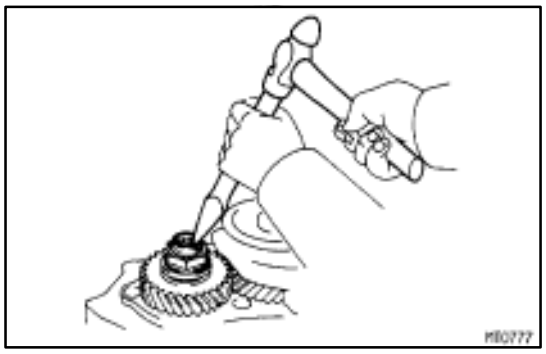
(a) Remove the lock bolt.



(b) Remove the four bolts and pull out the shift and select lever shaft assembly.

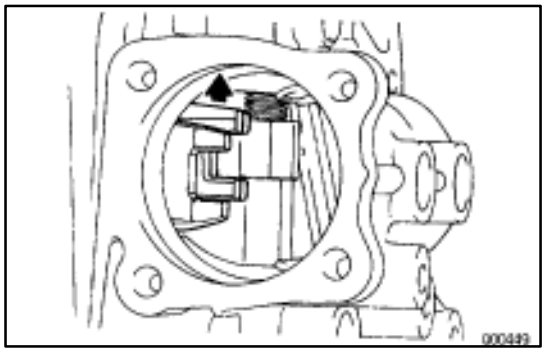


8. REMOVE TRANSMISSION CASE COVER

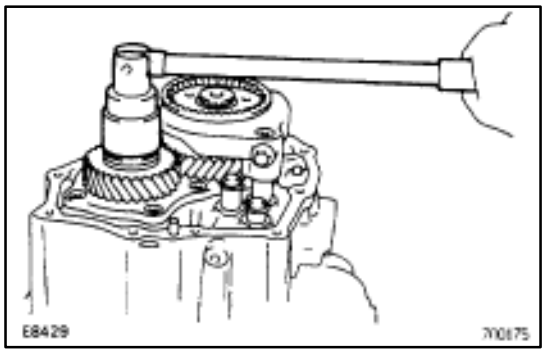


9. REMOVE LOCK NUT

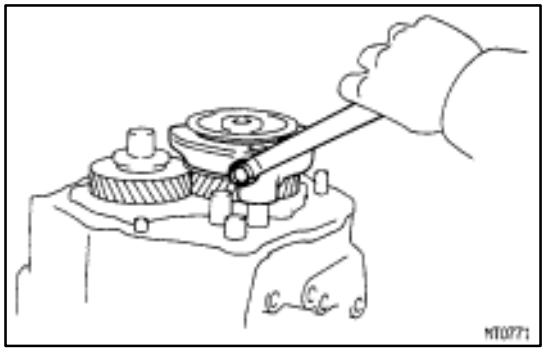
(a) Unstake the lock nut.



(b) Engage the gear double meshing.

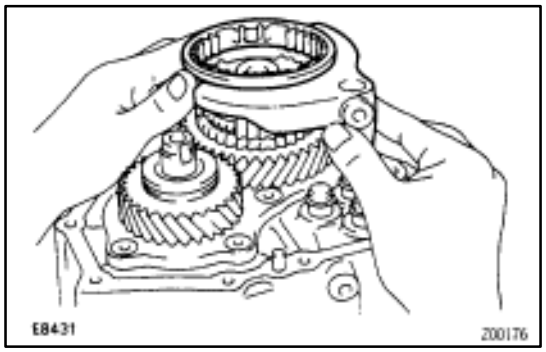


(c) Remove the lock nut.
(d) Disengage the gear double meshing.

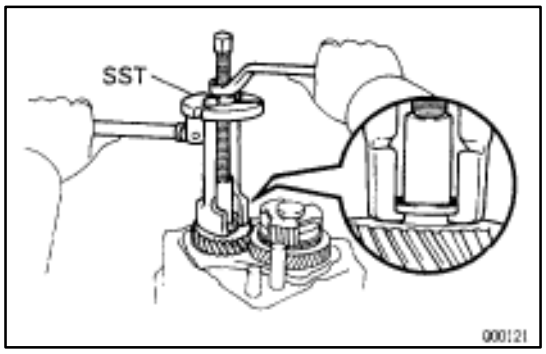


10. REMOVE NO. 3 HUB SLEEVE AND NO. 3 SHIFT FORK

(a) Remove the No.3 shift fork set bolt.

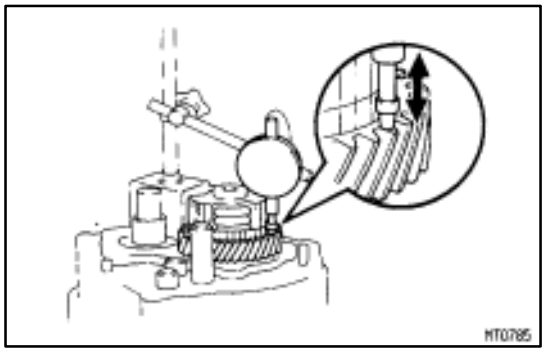


(b) Remove the No.3 hub sleeve and No.3 shift fork.



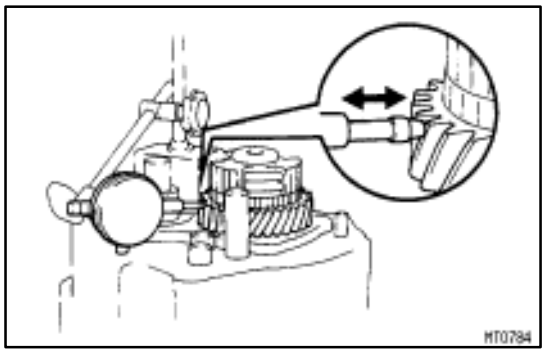
11. REMOVE FIFTH DRIVEN GEAR

Using SST, remove the 5th driven gear.
SST 09310–17010 (09310–07010, 09310–07020, 09310–07040, 09310–07050)

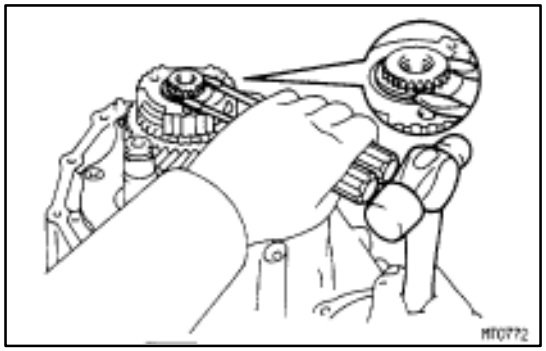


12. MEASURE FIFTH GEAR THRUST CLEARANCE AND OIL CLEARANCE

(a) Using a dial indicator, measure the thrust clearance.
Standard clearance:
0.10–0.57 mm (0.0039–0.0224 in.)
Maximum clearance:
0.65 mm (0.0256 in.)

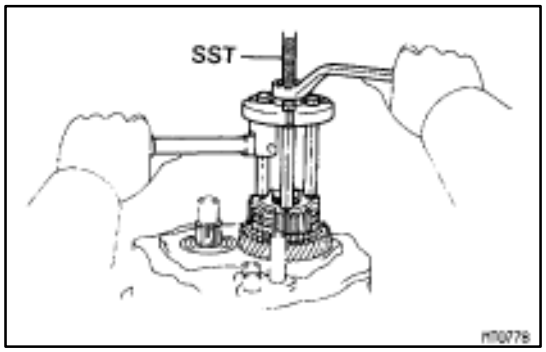


(b) Using a dial indicator, measure the oil clearance.
Standard clearance:
0.009–0.050 mm (0.0004–0.0020 in.)
Maximum clearance:
0.070 mm (0.0028 in.)



13. REMOVE NO.3 CLUTCH HUB AND FIFTH GEAR

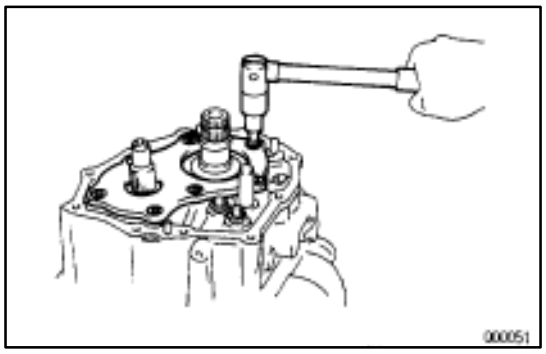
(a) Using two screwdrivers and a hammer, tap out the snap ring.



(b) Using SST, remove the No.3 clutch hub with synchronizer ring and 5th gear.
SST 09310–17010 (09310–07010, 09310–07020, 09310–07040, 09310–07050)

(c) Remove the 5th gear.

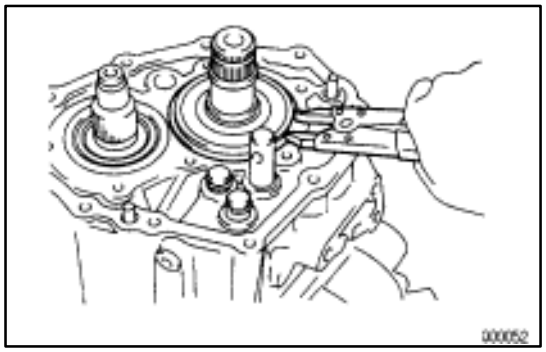
14. REMOVE NEEDLE ROLLER BEARING



15. REMOVE REAR BEARING RETAINER

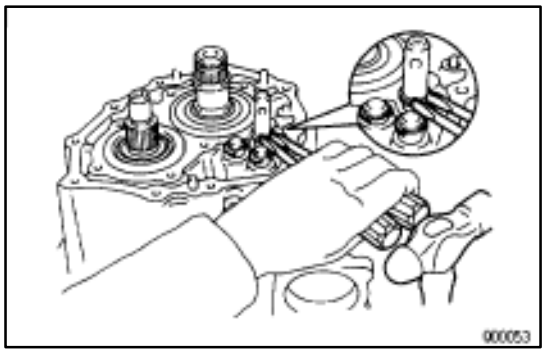
(a) Using a torx wrench, remove the seven torx screws and bearing retainer.
Torx wrench T45 09042–00050

(b) Remove the adjust shim.

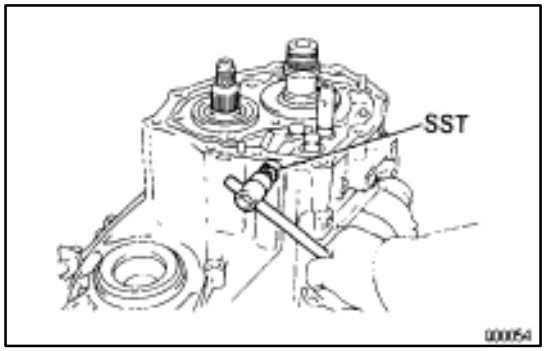


16. REMOVE SNAP RING

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

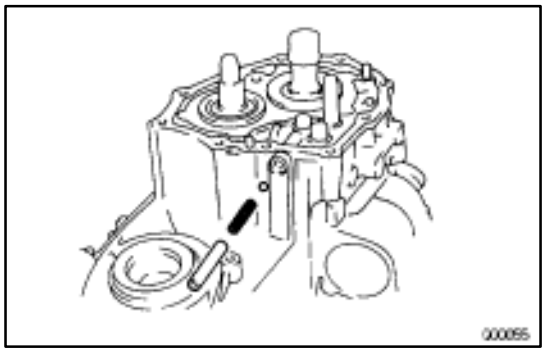


(b) Using two screwdriver and a hammer, remove the three snap rings.

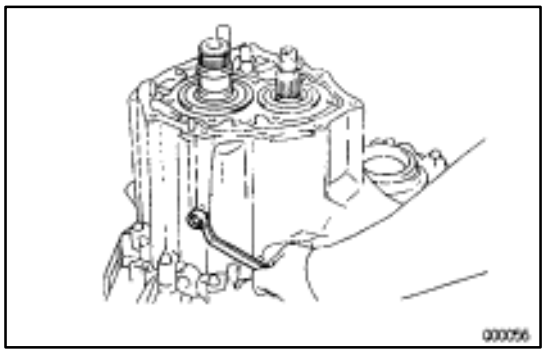


17. REMOVE PLUG, SEAT, SPRING AND LOCKING BALL

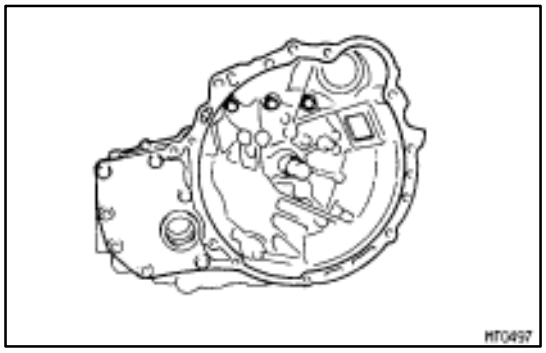
(a) Using SST, remove the plug.
SST 09313–30021



(b) Using a magnetic finger, remove the seat, spring and locking ball.

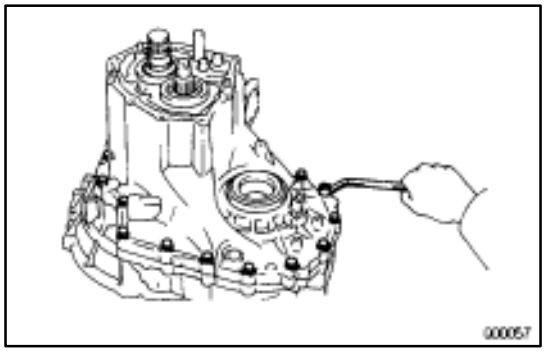


18. REMOVE REVERSE IDLER GEAR SHAFT RETAINING BOLT

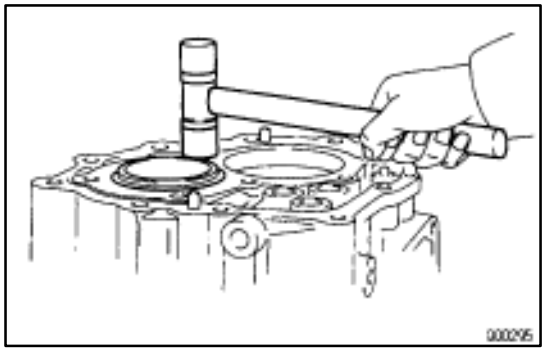


19. REMOVE TRANSMISSION CASE

(a) Remove the three bolts from transaxle case side.

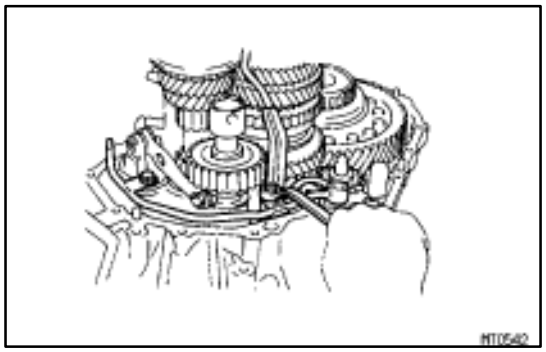


(b) Remove the fourteen bolts from the transmission case side and tap off the case with a plastic hammer.



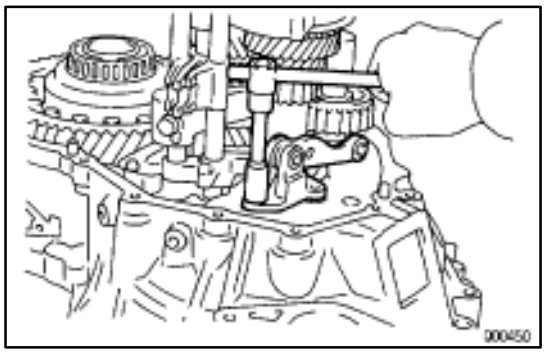
20. REMOVE OUTPUT SHAFT REAR TAPERED ROLLER BEARING OUTER RACE

Using a plastic hammer, tap out the outer race.



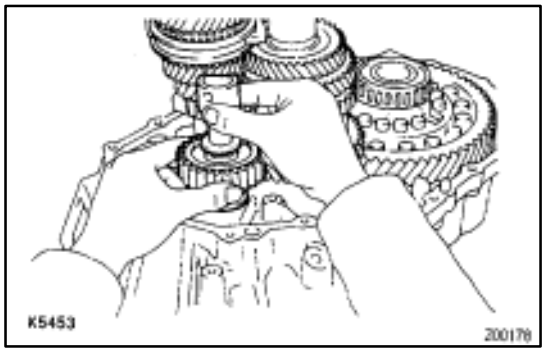
21. REMOVE NO.2 OIL PIPE

(a) Remove the gasket.
(b) Remove the two bolts and oil pipe.



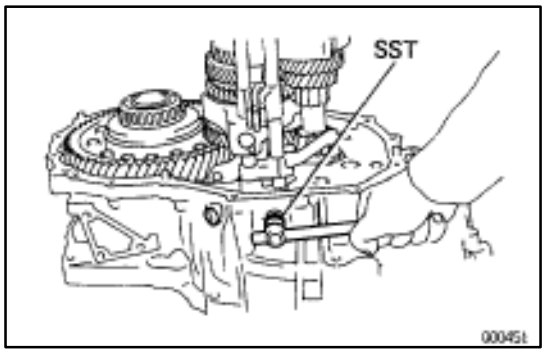
22. REMOVE REVERSE SHIFT ARM BRACKET

Remove the bolt and pull off the bracket.



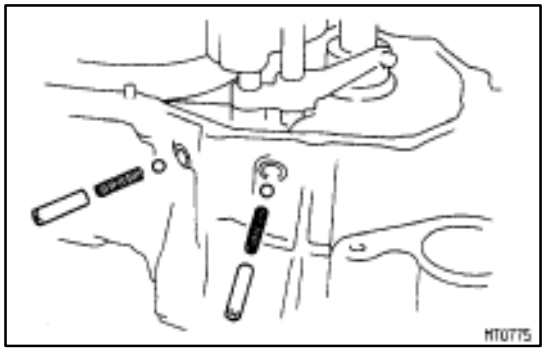
23. REMOVE REVERSE IDLER GEAR AND SHIFT

Pull out the shift, remove the reverse idler gear and thrust washer.

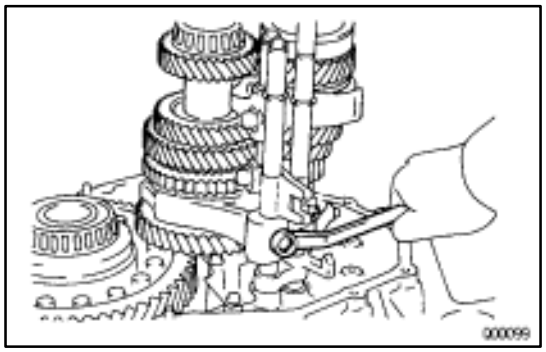


24. REMOVE TWO PLUGS, LOCKING BALLS AND SPRINGS

(a) Using SST, remove the two plugs.
SST 09313–30021

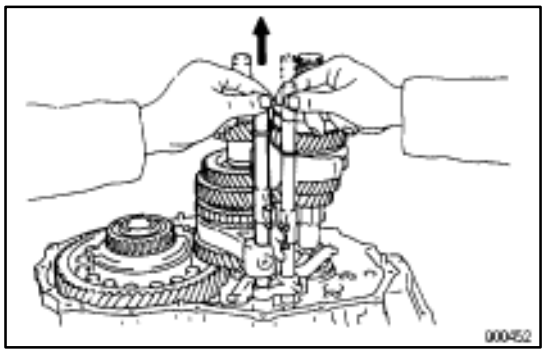


(b) Using a magnetic finger, remove the two spring seats, springs and balls.

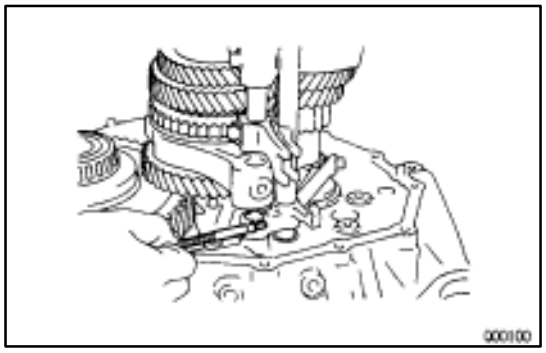


25. REMOVE NO.1 SHIFT FORK SHAFT

(a) Remove the set bolt.

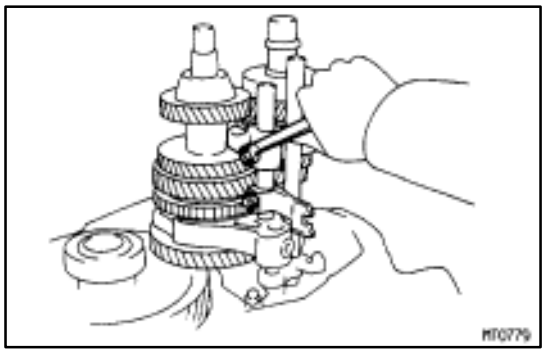


(b) Pull up the No.3 shift fork shaft, remove the No.1 shift fork shaft.



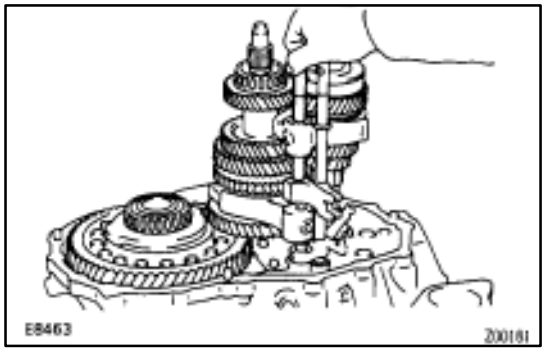
26. REMOVE INTERLOCK ROLLER

Using a magnetic finger, remove the interlock roller from the reverse shift fork.

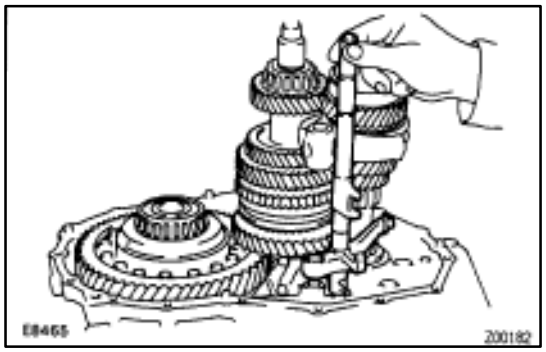


27. REMOVE NO.2 SHIFT FORK SHAFT, SHIFT HEAD AND NO.1 SHIFT FORK

(a) Remove the two set bolts.

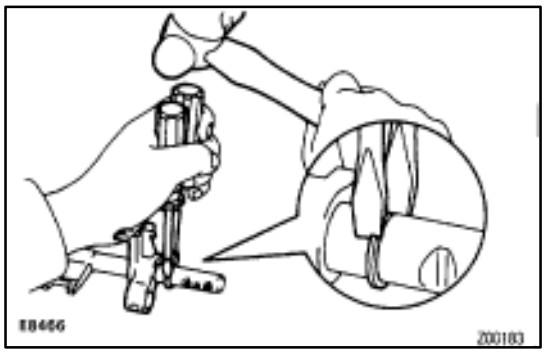


(a) Pull out the No.2 shift fork shaft.
(b) Remove the shift head and No.1 shift fork.



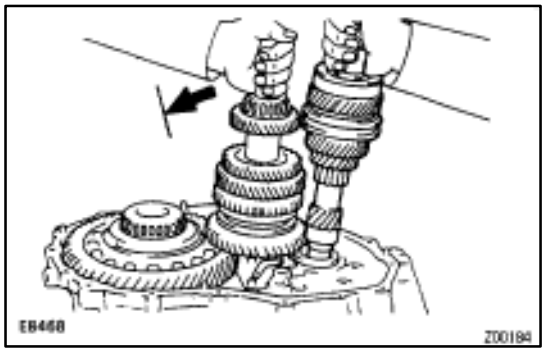
28. REMOVE NO.3 SHIFT FORK SHAFT WITH REVERSE SHIFT FORK AND NO.2 SHIFT FORK

(a) Pull out the No.3 shift fork shaft with reverse shift fork.
(b) Remove the No. 2 shift fork.



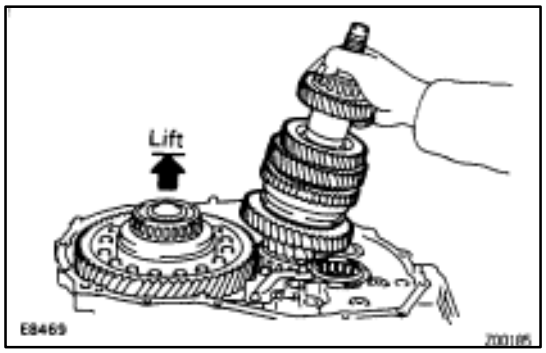
29. REMOVE SNAP RINGS

(a) Using two screwdriver and a hammer, remove the snap ring and reverse shift fork from the No.3 shift fork shaft.
(b) Using two screwdriver and a hammer, remove the snap rings from the No.1, No.2 and No.3 shift fork shaft.

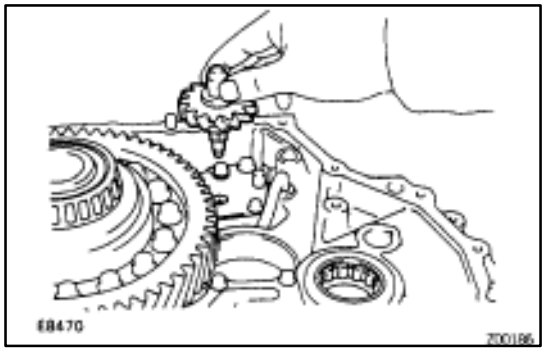


30. REMOVE INPUT AND OUTPUT SHAFT ASSEMBLY

(a) Leaning the output shaft to the differential side remove the input shaft assembly.

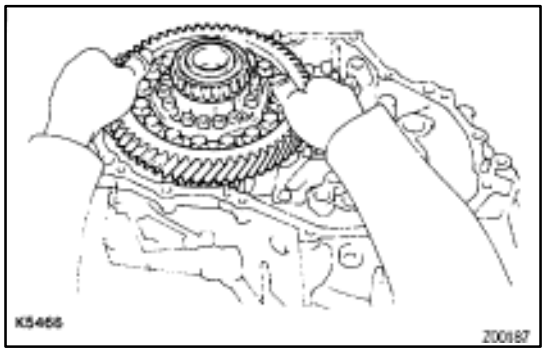


(b) Lift up the differential case assembly, remove the output shaft.

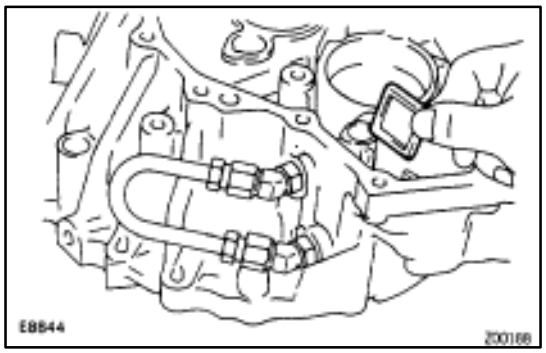


31. REMOVE DIFFERENTIAL ASSEMBLY

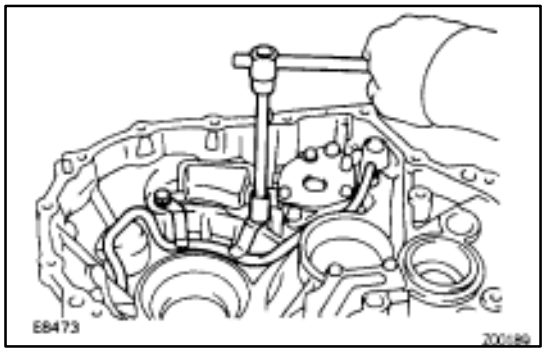
(a) Remove the oil pump drive gear.



(b) Remove the differential case assembly.

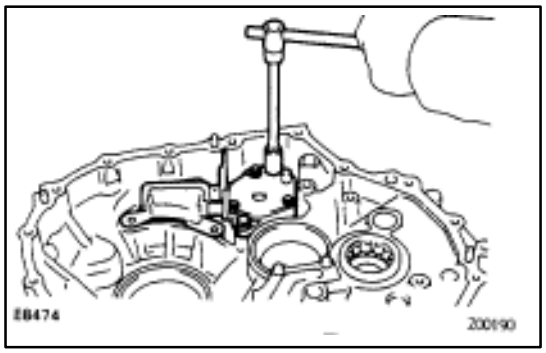


32. REMOVE MAGNET FROM TRANSAXLE CASE

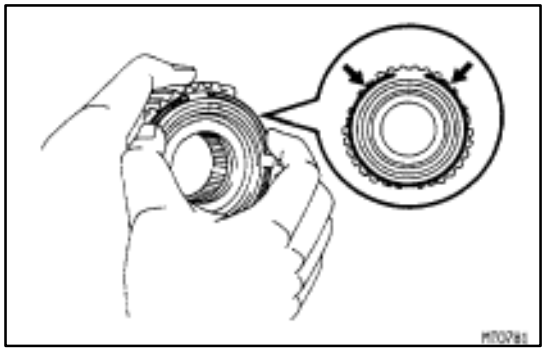


33. REMOVE OIL PUMP ASSEMBLY

(a) Remove the two bolts and oil pipe.

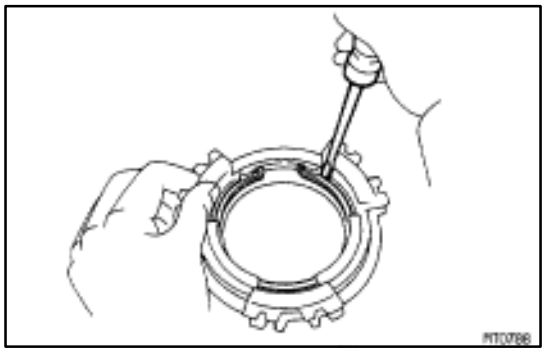


(b) Remove the two bolts and oil pump.



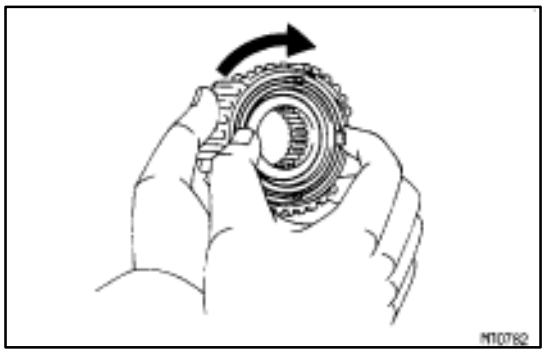
34. REMOVE NO.5 SYNCHRONIZER RING WITH KEY SPRING FROM NO.3 CLUTCH HUB

(a) Remove the No.5 synchronizer ring with key spring from No.3 clutch hub.



(b) Using a screwdriver, remove the snap ring.
HINT: Wrap vinyl tape on the screwdriver to prevent damaging the synchronizer ring.

(c) Remove the synchronizer rings.



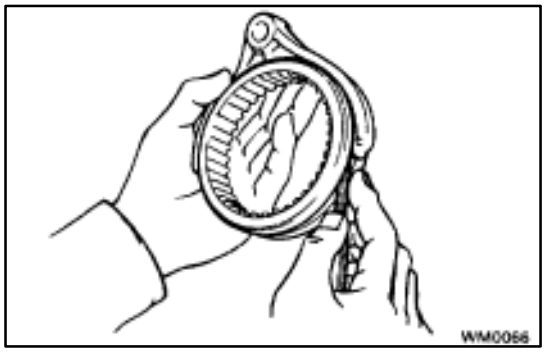
COMPONENT PARTS INSPECTION

MX015–01

1. INSPECT NO.5 SYNCHRONIZER RINGS

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring.
Turn the middle No.5 synchronizer ring in one direction while pushing it to the outer No.5 synchronizer ring and check that the ring is locked.
If the braking effect is insufficient, replace the synchronizer ring.



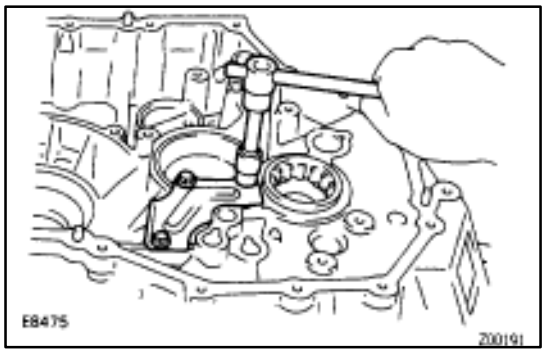
2. MEASURE CLEARANCE OF SHIFT FORKS AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance:

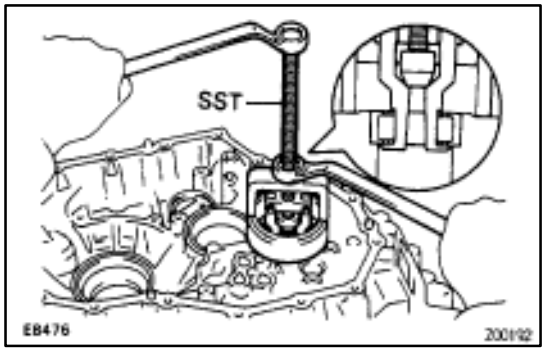
1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.

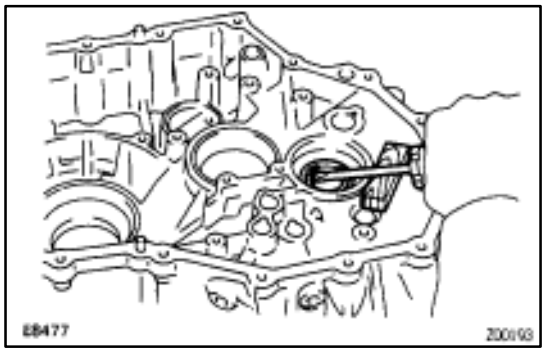


3. IF NECESSARY, REPLACE INPUT SHAFT BEARING AND OIL SEAL

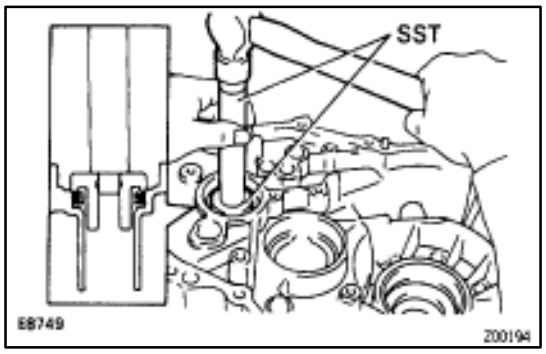
(a) Remove the three bolts and transaxle case receiver.



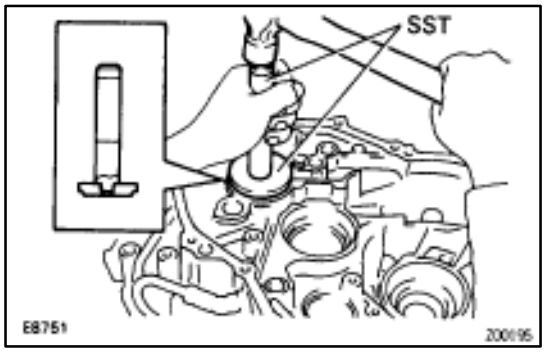
(b) Using SST, pull out the bearing.
SST 09612–65014



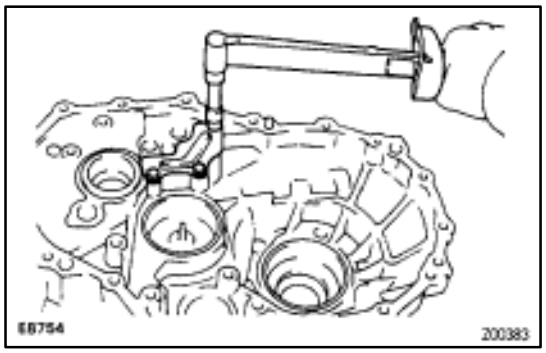
(c) Using a screwdriver, remove the oil seal.



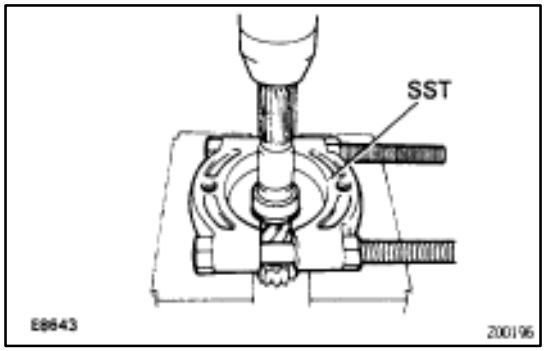
(d) Using SST, drive in a new oil seal.
SST 09608–12010 (09608–00020, 09608–00080)
(e) Coat the lip of seal with MP grease.



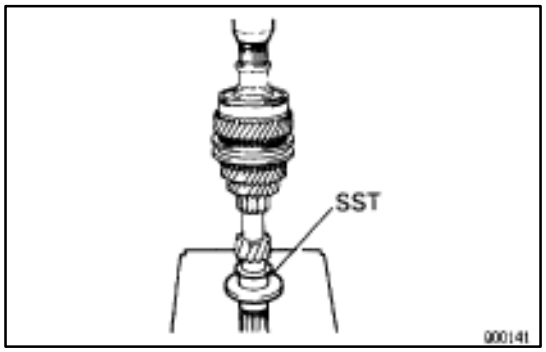
(f) Using SST, drive in a new bearing.
SST 09608–12010 (09608–00020, 09608–00060)



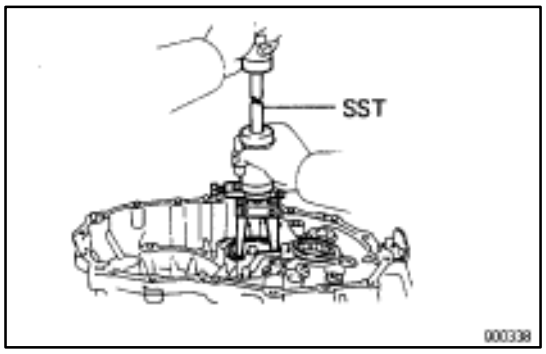
(g) Install the transaxle case receiver.
(h) Install and torque the three bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



(i) Using SST and a press, remove the inner race.
SST 09950–00020



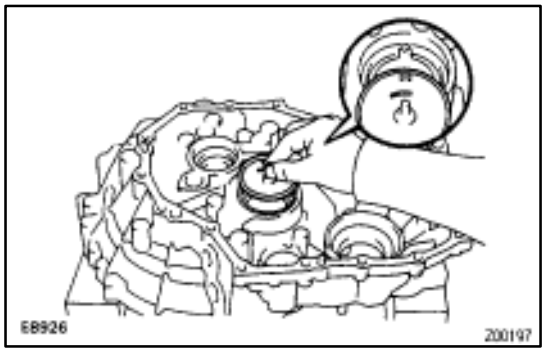
(j) Using SST and a press, install a new input shaft front bearing inner race.
SST 09316–60010 (09316–00020)



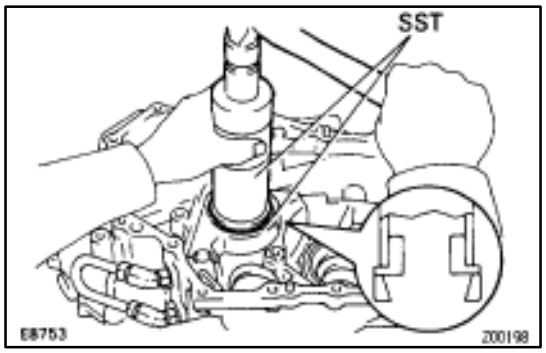
4. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING AND OUTPUT SHAFT FRONT COVER

(a) Using SST, pull out the output shaft front bearing outer race.
SST 09308–00010

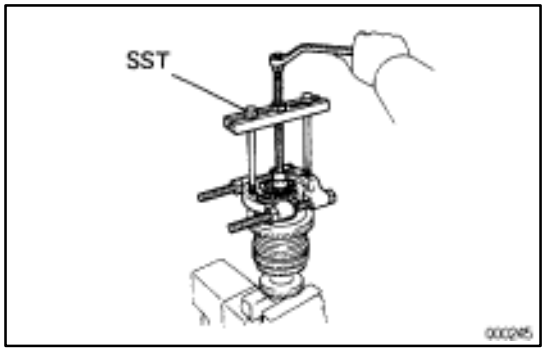
(b) Remove the output shaft front cover.



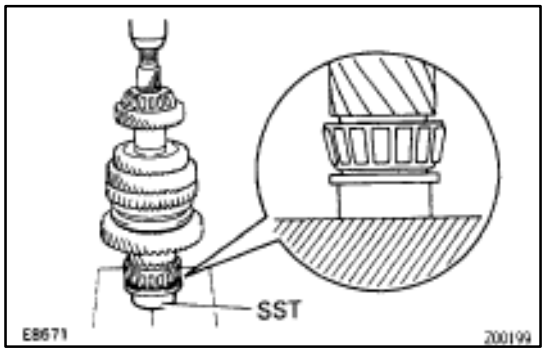
(c) Install a new output shaft front cover.
HINT: Install the output shaft front cover projection into the case side groove.



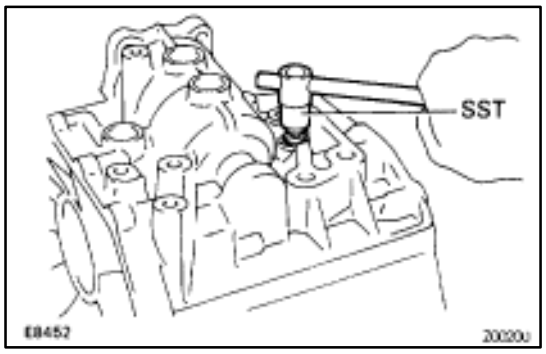
(d) Using SST and a hammer, drive in a new output shaft front bearing outer race.
SST 09316–60010 (09316–00010, 09316–00020)



(e) Using SST and a socket wrench, remove the output shaft front bearing.
SST 09950–00020, 09950–00030

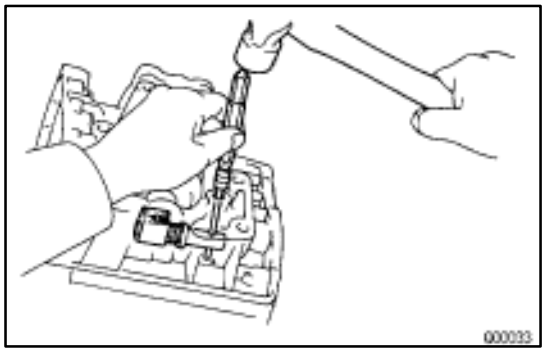


(f) Using SST and a press, install a new output shaft front bearing.
SST 09316–60010 (09316–00070)

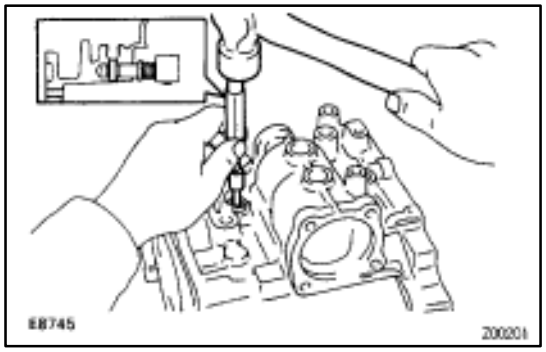


5. IF NECESSARY, REPLACE REVERSE RESTRICT PIN

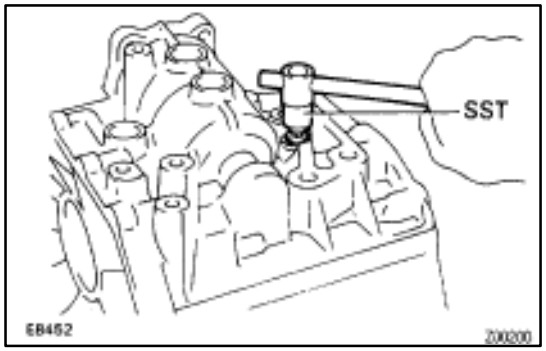
(a) Using SST, remove the screw plug.
SST 09313–30021



(b) Using a pin punch and hammer, drive out the slotted spring pin.



(c) Replace the reverse restrict pin.
(d) Using a pin punch, drive in the slotted spring pin.



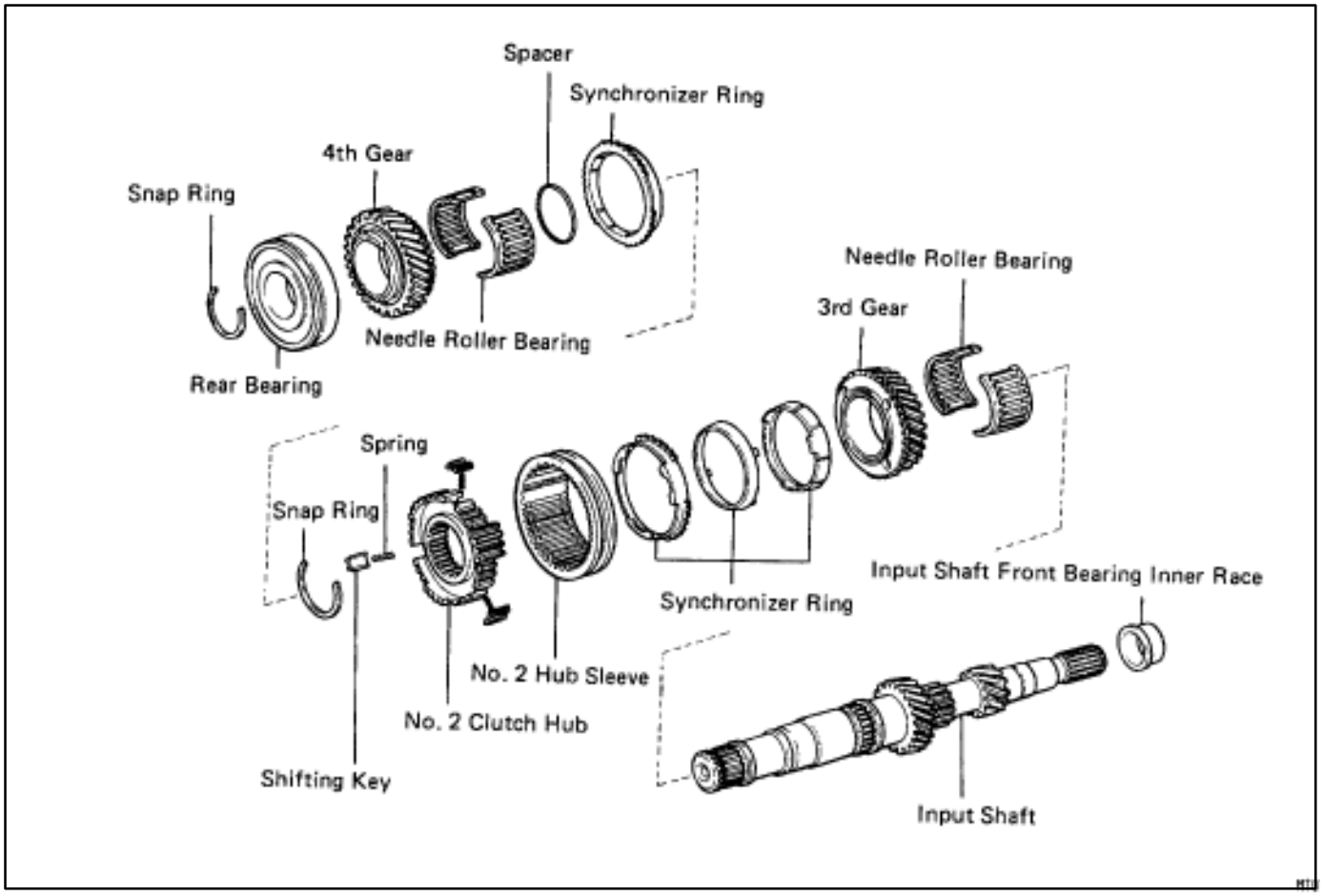
(e) Apply sealant to the screw plug threads.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

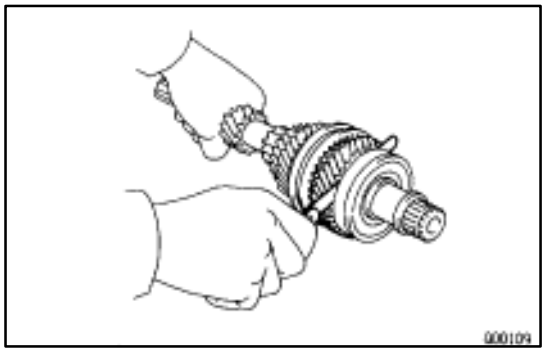
(f) Using SST, install the screw plug.
SST 09313–30021

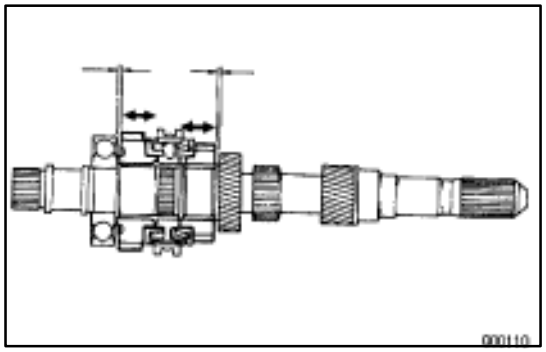
INPUT SHAFT

MX016–01

COMPONENTS







INPUT SHAFT DISASSEMBLY

MX017–01

1. MEASURE THIRD AND FOURTH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:

3rd gear

0.10–0.45 mm (0.0039–0.0177 in.)

4th gear

0.10–0.55 mm (0.0039–0.0217 in.)

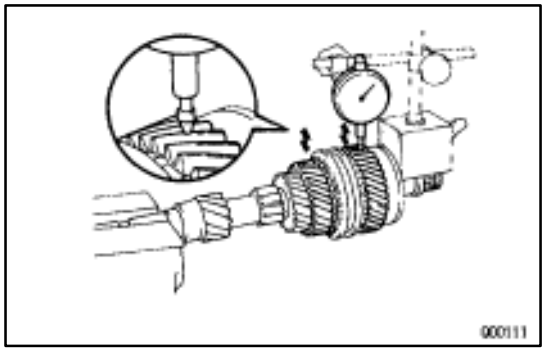
Maximum clearance:

3rd gear

0.50 mm (0.0197 in.)

4th gear

0.60 mm (0.0236 in.)



2. CHECK OIL CLEARANCE OF THIRD AND FORTH GEAR

Using dial indicator, measure the oil clearance between the gear and shaft.

Standard clearance:

3rd gear

0.009–0.053 mm (0.0004–0.0021 in.)

4th gear

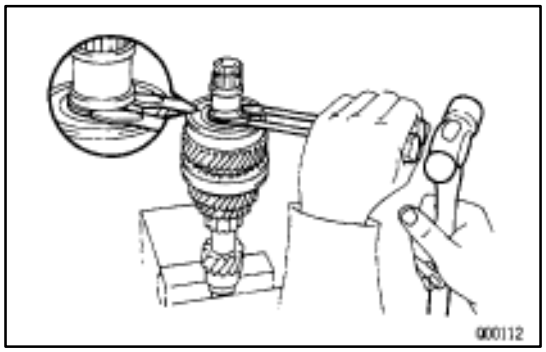
0.009–0.051 mm (0.0004–0.0020 in.)

Maximum clearance:

3rd and 4th gear

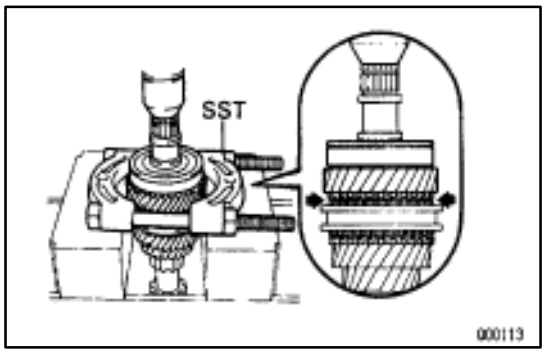
0.070 mm (0.0028 in.)

If clearance exceeds the limit, replace the gear, needle roller bearing or shaft.



3. REMOVE SNAP RING

Using two screwdriver and a hammer, tap out the snap ring.

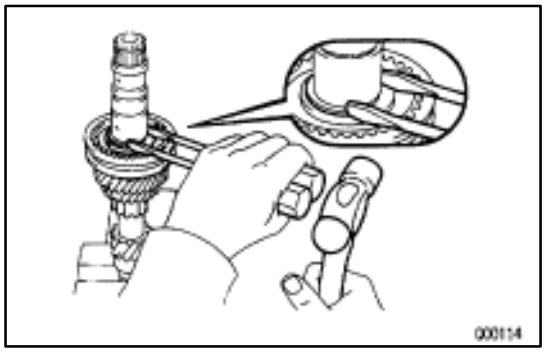


4. REMOVE RADIAL BALL BEARING AND FOURTH GEAR

Using SST and a press, remove the radial bearing.

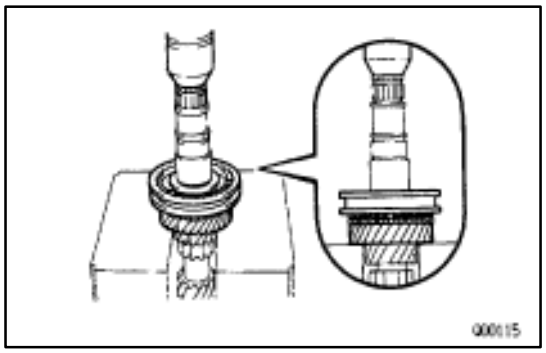
SST 099650–00020

5. REMOVE NEEDLE ROLLER BEARINGS, SPACER AND SYNCHRONIZER RING



6. REMOVE SNAP RING

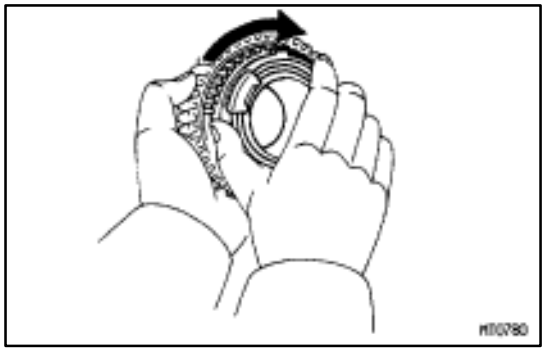
Using two screwdrivers and a hammer, tap out the snap ring.

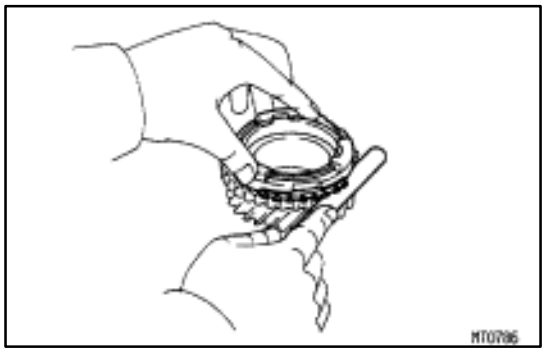


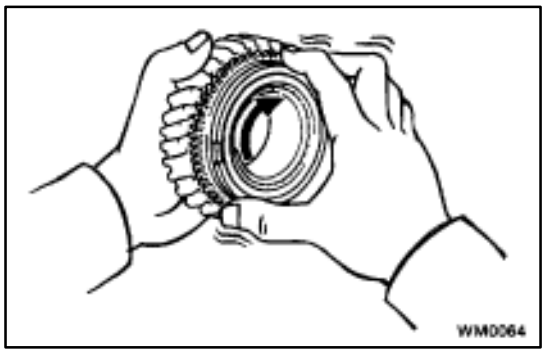
7. REMOVE NO.2 CLUTCH HUB ASSEMBLY, SYNCHRONIZER RING AND THIRD GEAR

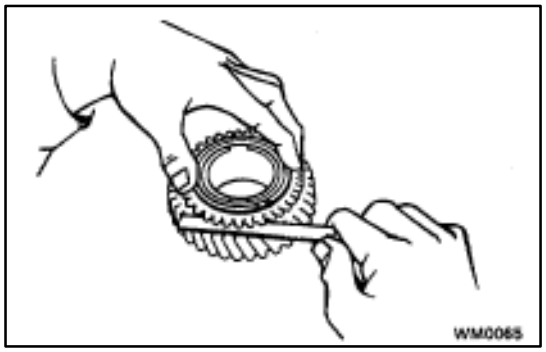
Using a press, remove No.2 hub sleeve, 3rd gear, synchronizer ring and needle roller bearings.

8. REMOVE NEEDLE ROLLER BEARING









INPUT SHAFT COMPONENT PARTS INSPECTION

MX018–01

1. INSPECT SYNCHRONIZER RING FOR THIRD GEAR

(a) Check for wear damage.

(b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone and check that the ring is locked.

If the braking effect is insufficient, replace the synchronizer ring.

(c) Measure the clearance between the synchronizer ring back and gear spline end.
Minimum clearance:
0.7 mm (0.028 in.)
If the clearance is less than the limit, replace the synchronizer ring.

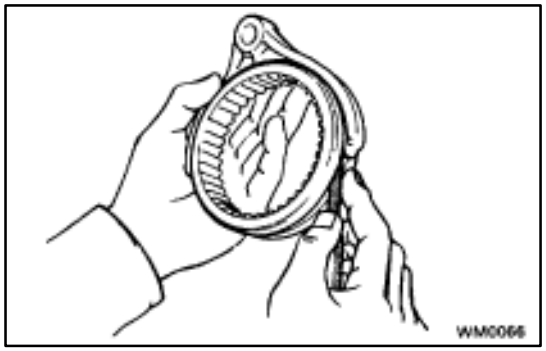
2. INSPECT SYNCHRONIZER RING FOR FOURTH GEAR

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone and check that the ring is locked.
If the braking effect is insufficient, lightly rub the synchronizer ring and gear cone by applying a small amount of fine lapping compound.

NOTICE:
- **Wash off completely the fine lapping compound after rubbing.**
- **Check again the braking effect of the synchronizer ring.**

(c) Measure the clearance between the synchronizer ring back and spline end.
Minimum clearance:
0.6 mm (0.024 in.)
If the clearance is less than the limit, replace the synchronizer ring and gear cone by applying a small amount of fine lapping compound.
NOTICE: Wash off completely, the fine lapping compound after rubbing.



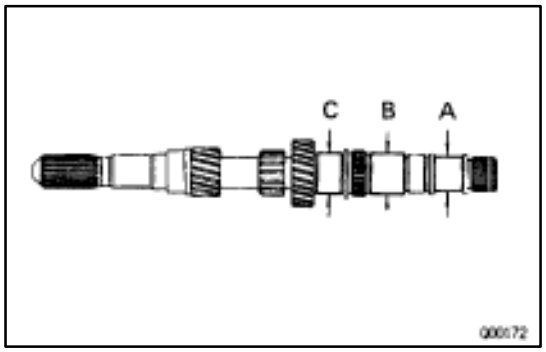
3. MEASURE CLEARANCE OF NO.2 SHIFT FORK AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance:

1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.



4. INSPECT INPUT SHAFT

(a) Check the input shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

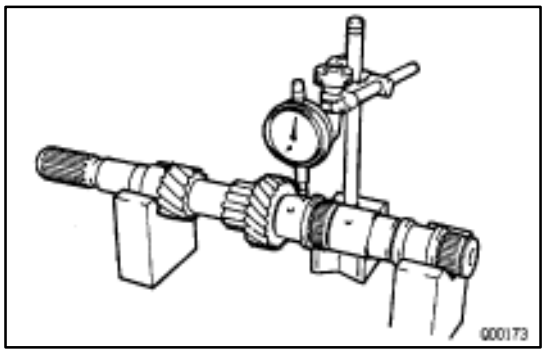
Maximum clearance:

Part A

27.950 mm (1.1004 in.)

Part B and C

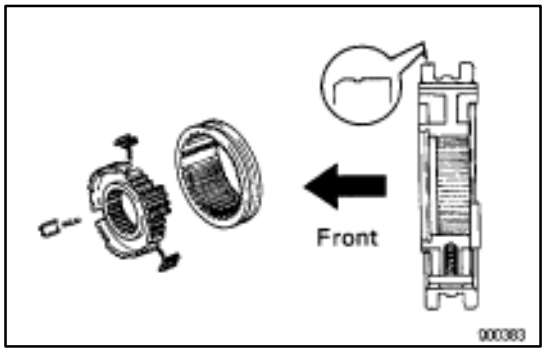
35.950 mm (1.4154 in.)



(c) Using a dial indicator, check the shaft runout.

Maximum clearance:

0.05 mm (0.0020 in.)



INPUT SHAFT ASSEMBLY

MX019–01

(See page MX–40)

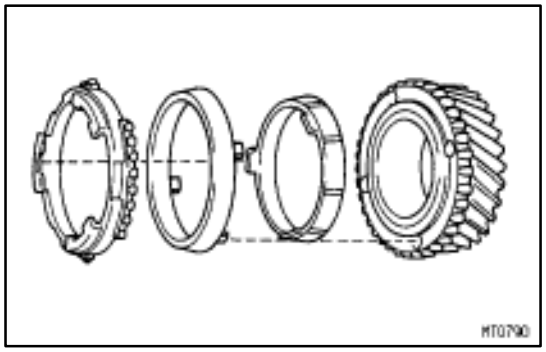
HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

1. INSTALL NO.2 CLUTCH HUB INTO HUB SLEEVE

(a) Install the three springs and shifting keys to the clutch hub.

(b) Install the hub sleeve to the clutch hub.

HINT: Direct identification groove of the hub sleeve to front of the transmission.

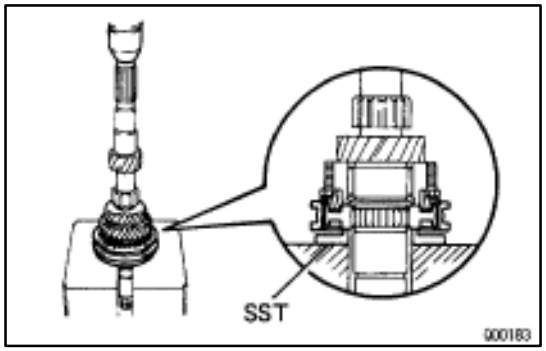


2. INSTALL NEEDLE ROLLER BEARING, THIRD GEAR, SYNCHRONIZER RINGS AND NO.2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

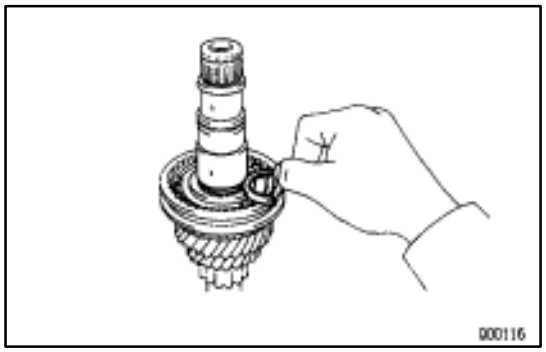
(a) Apply MP grease to the needle roller bearing.

(b) Assembly the needle roller bearings into the 3rd gear.

(c) Place the synchronizer rings on the gear and align the ring slots with the shifting keys.



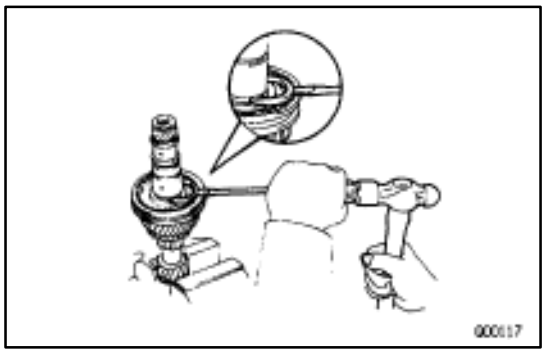
(d) Using SST and a press, install the 3rd gear and No.2 hub sleeve.
SST 09506–35010



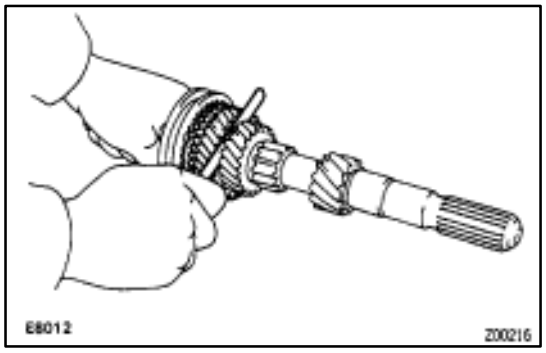
3. INSTALL SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
H	2.30 (0.0906)	M	2.50 (0.0984)
J	2.35 (0.0925)	N	2.55 (0.1004)
K	2.40 (0.0945)	P	2.60 (0.1024)
L	2.45 (0.0965)		



(b) Using a screwdriver and hammer, tap in the snap ring.

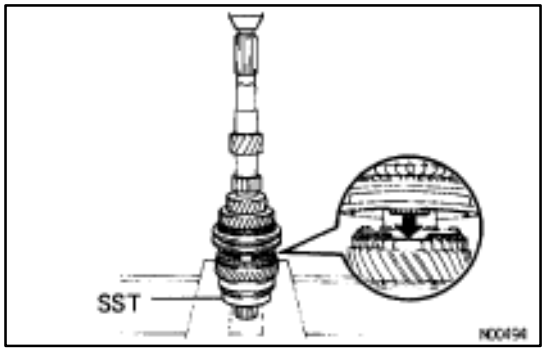


4. MEASURE THIRD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 3rd gear thrust clearance.

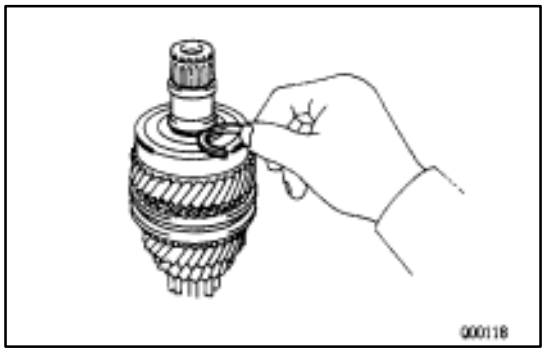
Standard clearance:

0.10 – 0.45 mm (0.0039 – 0.0177 in.)



5. INSTALL SPACER, SYNCHRONIZER RING, NEEDLE ROLLER BEARINGS, FOURTH GEAR AND RADIAL BALL BEARING

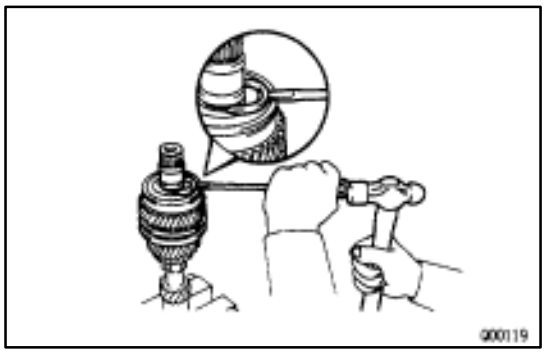
(a) Install the spacer.
(b) Apply MP grease to the needle roller bearings.
(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.
(d) Install the 4th gear.
(e) Using SST and a press, install the radial ball bearing.
SST 09506–35010



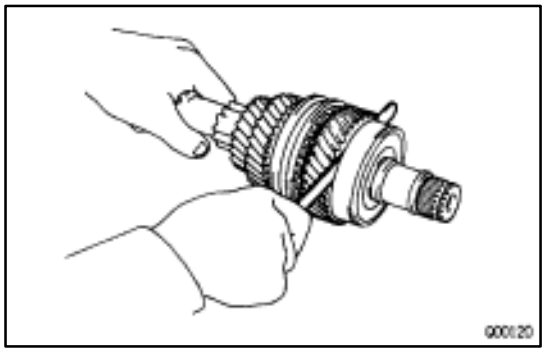
6. INSTALL SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	2.35 (0.0925)	5	2.55 (0.1004)
2	2.40 (0.0945)	6	2.60 (0.1024)
3	2.45 (0.0965)	7	2.65 (0.1043)
4	2.50 (0.0984)	8	2.70 (0.163)



(b) Using a screwdriver and hammer, tap in the snap ring.

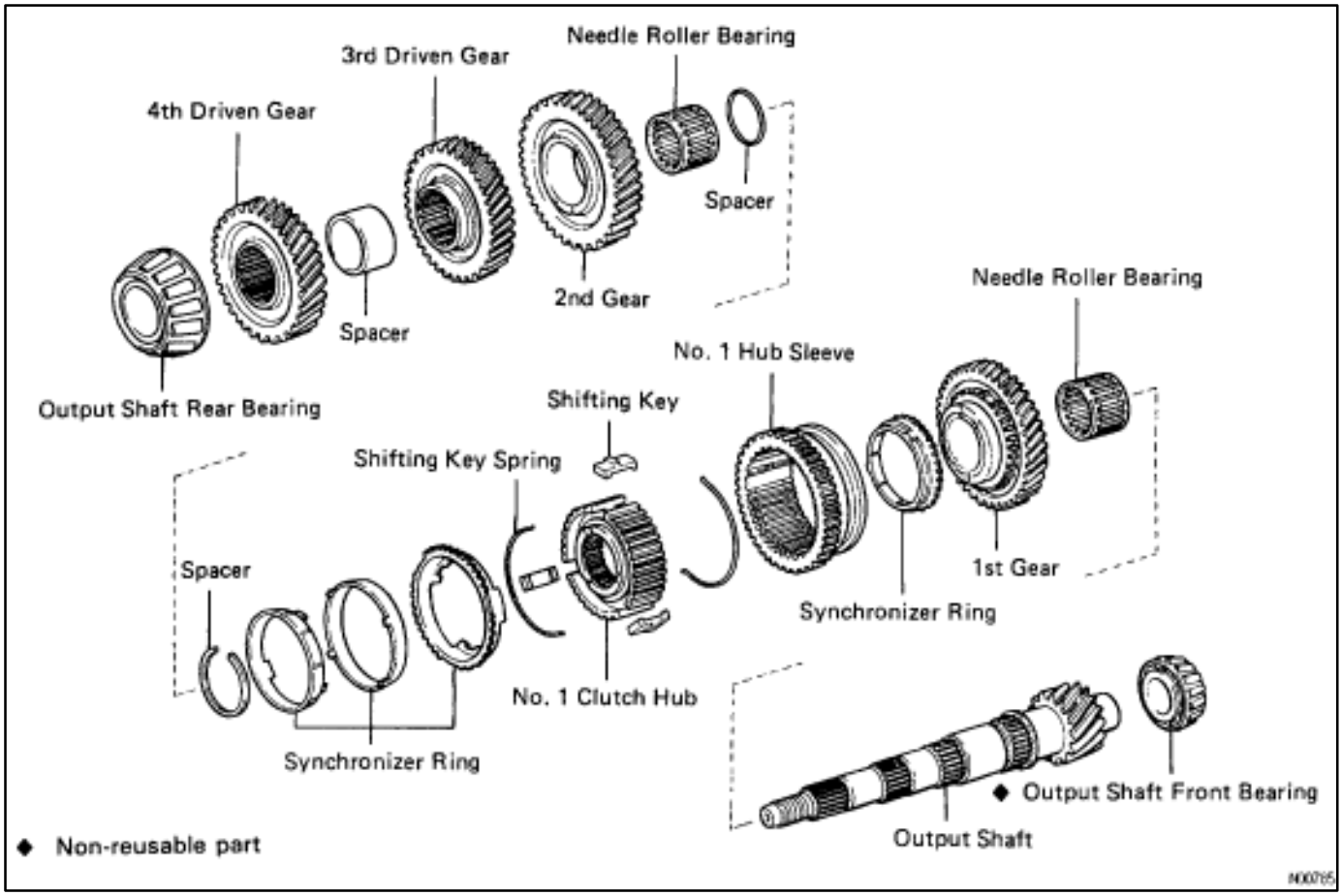


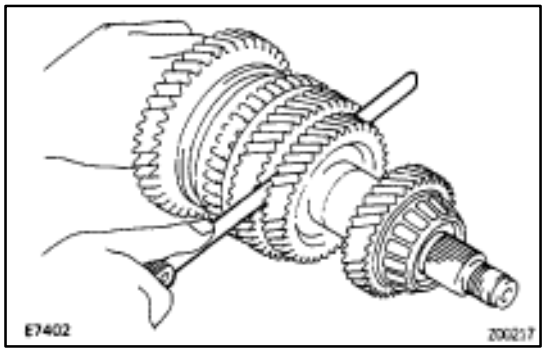
7. MEASURE FOURTH GEAR THRUST CLEARANCE

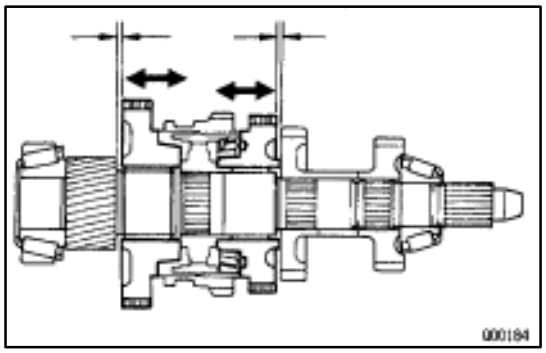
Using a feeler gauge, measure the 4th gear thrust clearance.
Maximum clearance:
0.10 – 0.55 mm (0.0039 – 0.0217 in.)

OUTPUT SHAFT
COMPONENTS

MX01A–01







OUTPUT SHAFT DISASSEMBLY

MX01B–01

1. MEASURE FIRST AND SECOND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:

1st gear

0.10 – 0.35 mm (0.0039 – 0.0138 in.)

2nd gear

0.10 – 0.45 mm (0.0039 – 0.0177 in.)

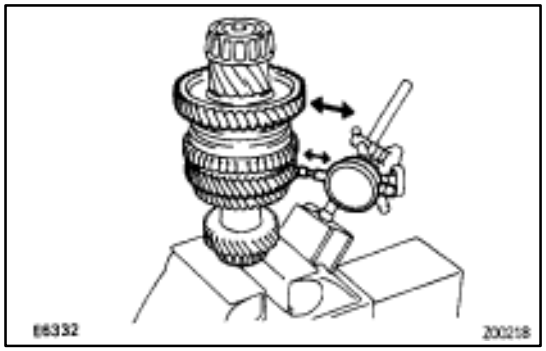
Maximum clearance:

1st gear

0.40 mm (0.0157 in.)

2nd gear

0.50 mm (0.0197 in)



2. CHECK OIL CLEARANCE OF FIRST AND SECOND GEAR

Using a dial indicator, measure the oil clearance between the gear and shaft.

Standard clearance:

1st gear

0.009 – 0.051 mm (0.0004 – 0.0020 in.)

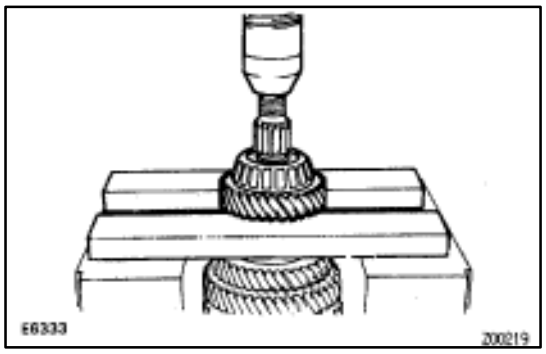
2nd gear

0.009 – 0.053 mm (0.0004 – 0.0021 in.) Maximum clearance:

1st and 2nd gear

0.070 mm (0.0028 in.)

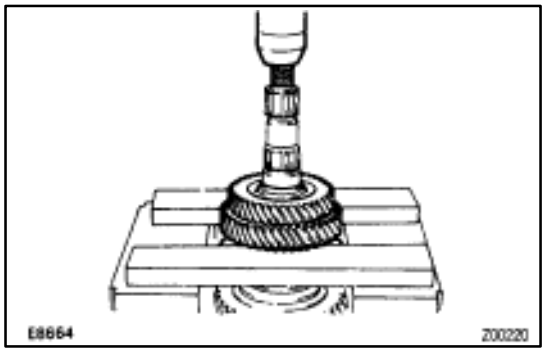
If the clearance exceeds the limit, replace the gear, needle roller bearing or shaft.



3. REMOVE OUTPUT SHAFT REAR BEARING, FOURTH DRIVEN GEAR AND SPACER

(a) Using a press, remove the bearing and 4th driven gear.

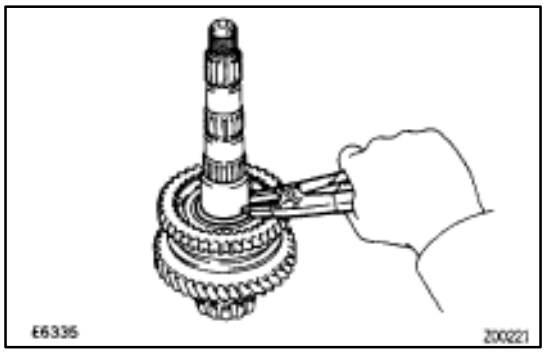
(b) Remove the spacer.



4. REMOVE THIRD DRIVEN GEAR AND SECOND GEAR

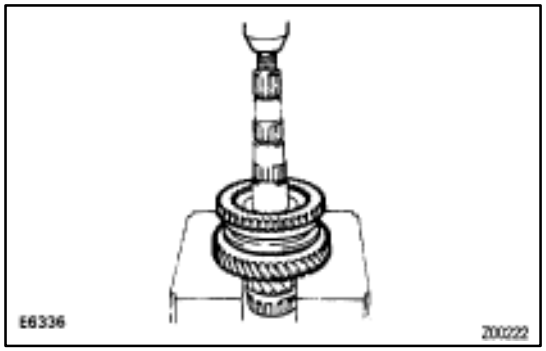
Using a press, remove the 3rd driven gear and 2nd gear.

5. REMOVE NEEDLE ROLLER BEARING SPACER AND SYNCHRONIZER RINGS



6. REMOVE SNAP RING

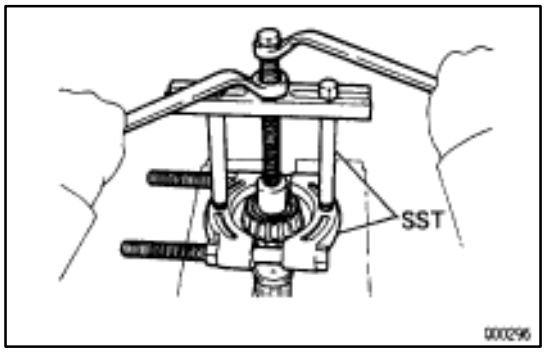
Using a snap ring expander, remove the snap ring.



7. REMOVE NO. 1 HUB SLEEVE ASSEMBLY AND FIRST GEAR

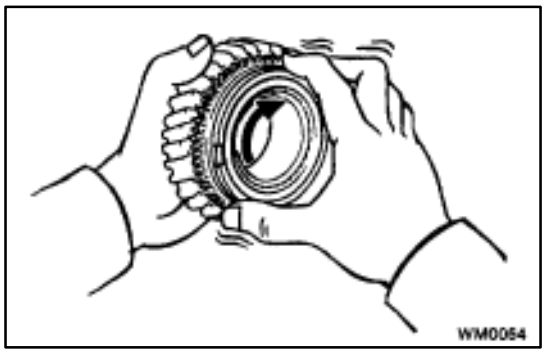
Using a press, remove the NO.1 hub sleeve and 1st gear.

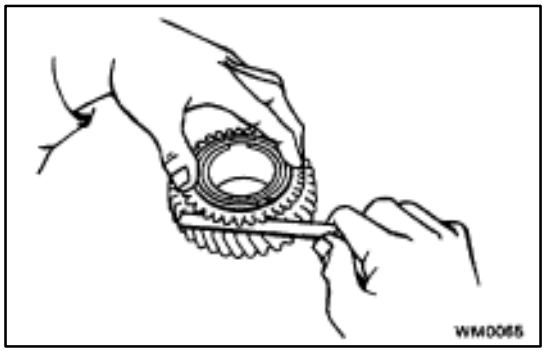
8. REMOVE SYNCHRONIZER RING AND NEEDLE ROLLER BEARINGS



9. REMOVE OUTPUT SHAFT FRONT BEARING

Using SST, remove the output shaft front bearing.
SST 09950–00020, 09950–00030





OUTPUT SHAFT COMPONENT PARTS INSPECTION

MX01C–01

1. INSPECT SYNCHRONIZER RING FOR FIRST GEAR

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone and check that the ring is locked.

If the braking effect is insufficient, lightly rub the synchronizer ring and gear cone by applying a small amount of fine lapping compound.

NOTICE:

- **Wash off completely the fine lapping compound after rubbing.**
- **Check again the braking effect of the synchronizer ring.**

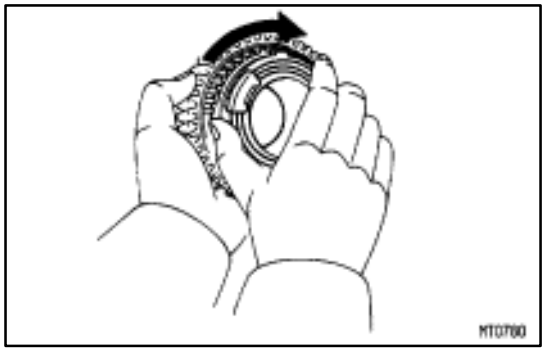
(c) Measure the clearance between the synchronizer ring back and gear spline end.

Maximum clearance:

0.6 mm (0.024 in.)

If the clearance is less than the limit, replace the synchronizer ring and gear cone by applying a small amount of fine lapping compound.

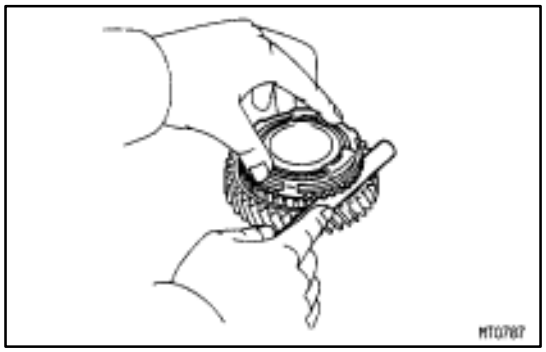
NOTICE: Wash off completely the fine lapping compound after rubbing.



2. INSPECT SYNCHRONIZER RING FOR SECOND GEAR

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer direction while pushing it to the gear cone and check that the ring is locked. If the braking effect is insufficient, replace the synchronizer ring.

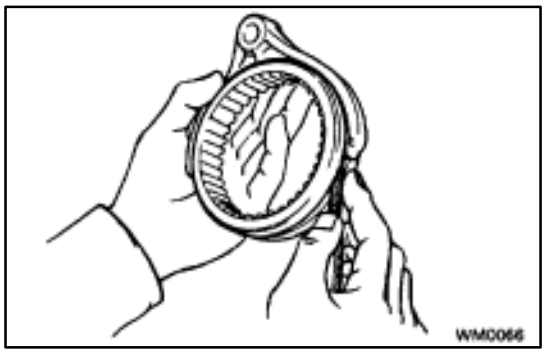


(c) Measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance:

0.7 mm (0.028 in.)

If the clearance is less than the limit, replace the synchronizer ring.



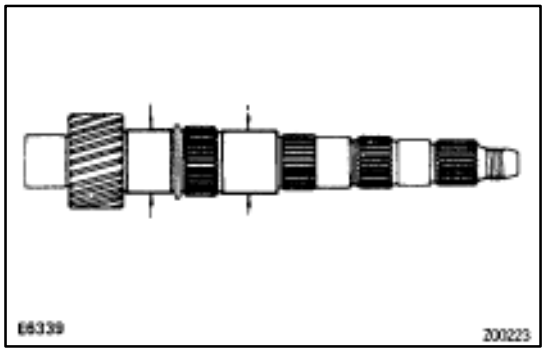
3. MEASURE CLEARANCE OF NO.1 SHIFT FORK AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance:

1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.



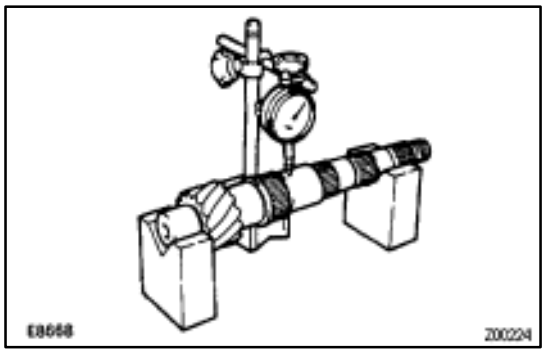
4. INSPECT OUTPUT SHAFT

(a) Check the output shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the output shaft journal surface.

Minimum clearance:

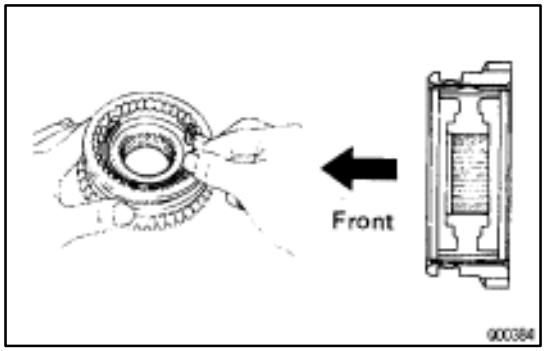
38.950 mm (1.5335 in.)



(c) Using a dial indicator, check the shaft runout.

Maximum clearance:

0.06 mm (0.0024 in.)



OUTPUT SHAFT ASSEMBLY

MX01D–01

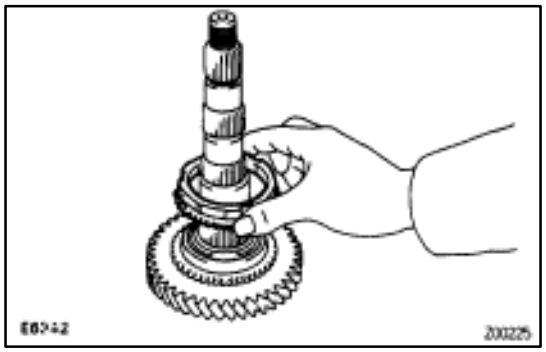
(See page MX–46)

HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

1. INSPECT NO.1 CLUTCH HUB INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.



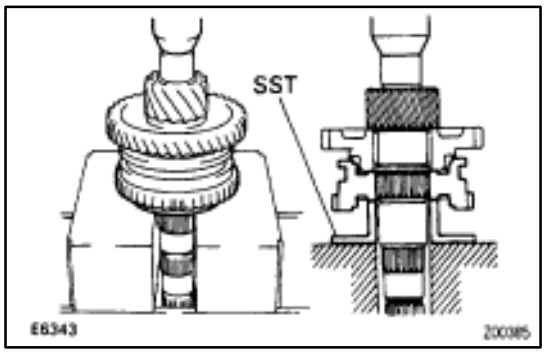
NOTICE: Install the key springs positioned so that their end not in line.

2. INSTALL NEEDLE ROLLER BEARING, FIRST GEAR, SYNCHRONIZER RING AND NO.1 HUB SLEEVE TO OUTPUT SHAFT

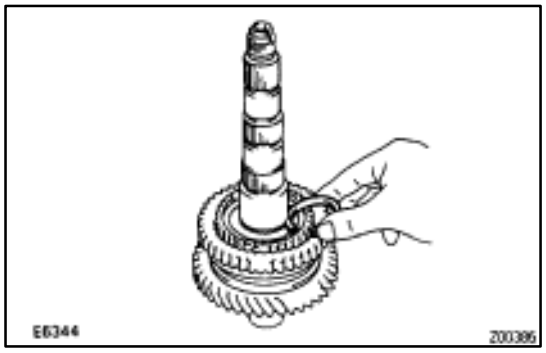
(a) Apply MP grease to the needle roller bearings.

(b) Install the 1st gear.

(c) Place the synchronizer ring (for 1st gear) on the gear and align the ring slots with the shifting keys.



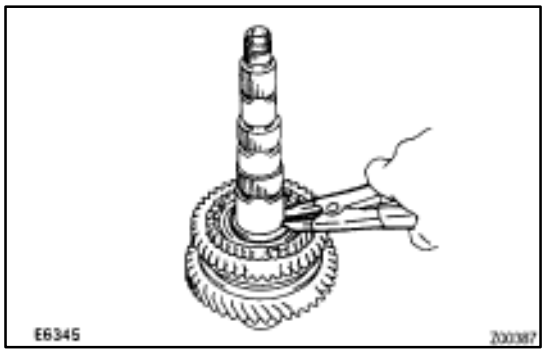
(d) Using SST and a press, install the 1st gear and No.1 hub sleeve.
SST 09316–60010 (09316–00040)



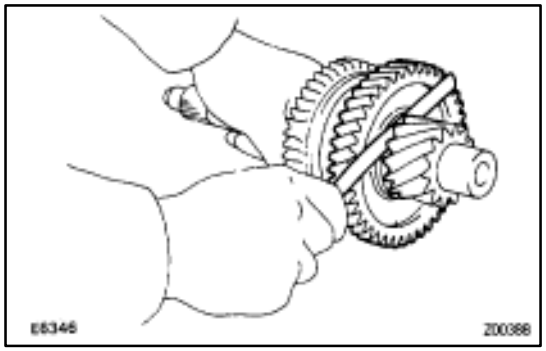
3. INSTALL SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.80 (0.1102)	E	3.00 (0.1181)
B	2.85 (0.1122)	F	3.05 (0.1201)
C	2.90 (0.1142)	G	3.10 (0.1220)
D	2.95 (0.1161)		



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

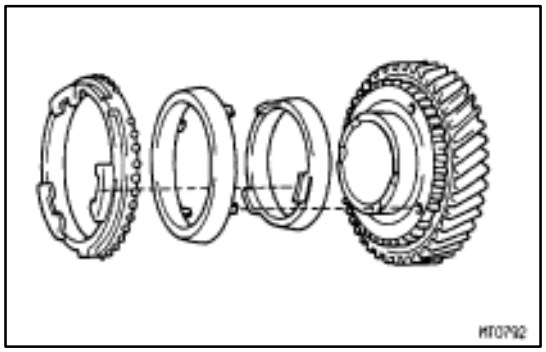


4. MEASURE FIRST GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 1st gear thrust clearance.

Standard clearance:

0.10 – 0.35 mm (0.0039 – 0.0138 in.)



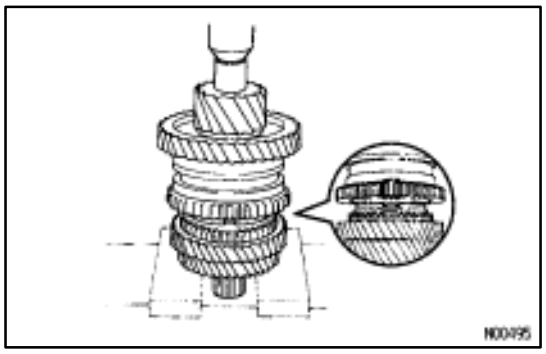
5. INSTALL SPACER, NEEDLE ROLLER BEARING, SYNCHRONIZER RINGS, SECOND GEAR AND THIRD DRIVEN GEAR

(a) Install the spacer.

(b) Apply MP grease to the needle roller bearing.

(c) Place the synchronizer rings (for 2nd gear) on the gear.

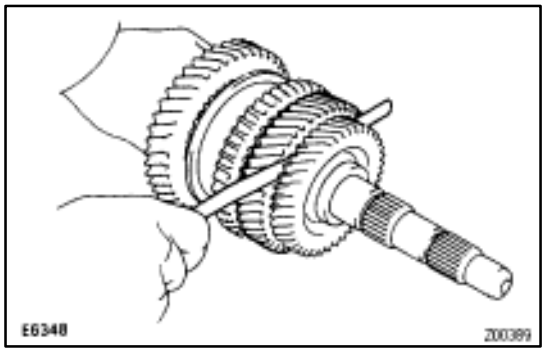
NOTICE: Do not install the synchronizer ring for 1st gear.



(d) Install the 2nd gear.

(e) Using a press, install the 3rd driven gear.

NOTICE: Align the clutch hub grooves with the projections on the synchronizer ring.

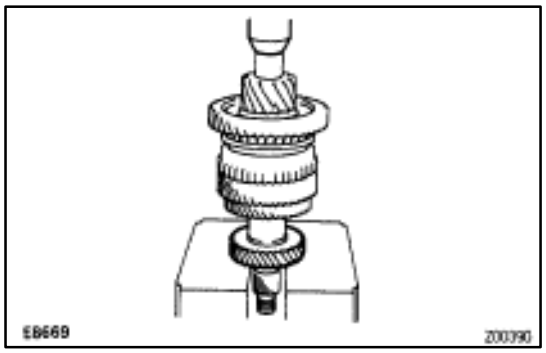


6. MEASURE SECOND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 2nd gear thrust clearance.

Maximum clearance:

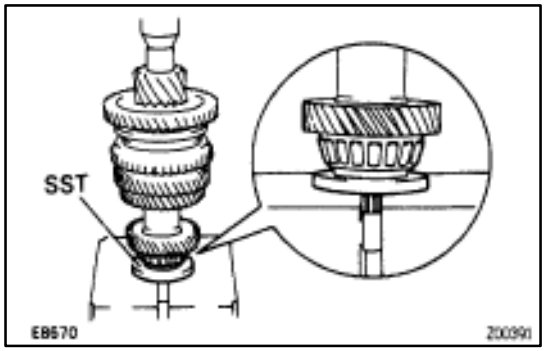
0.10 – 0.45 mm (0.0039 – 0.0177 in.)



7. INSTALL SPACER AND FOURTH DRIVEN GEAR

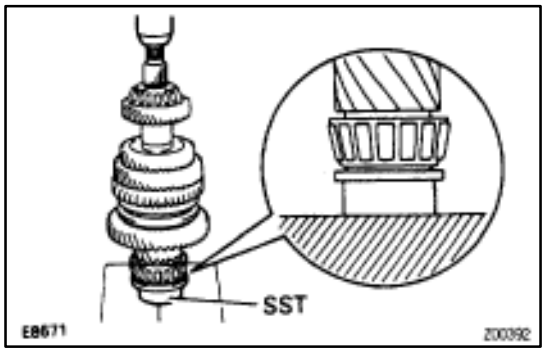
(a) Install the spacer.

(b) Using a press, install the 4th driven gear.



8. INSTALL OUTPUT SHAFT REAR BEARING

Using SST and a press, install the bearing.
SST 09506–30012

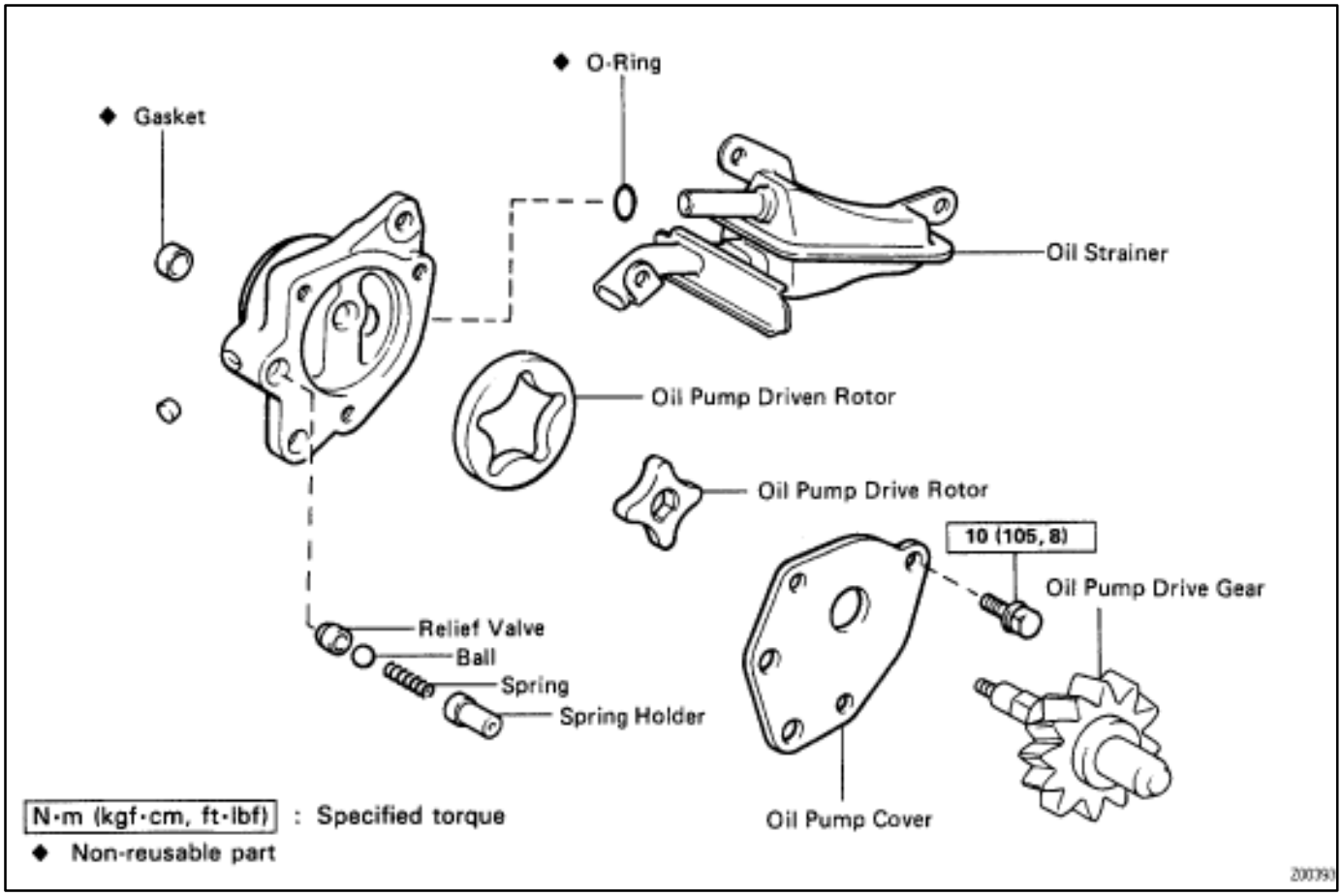


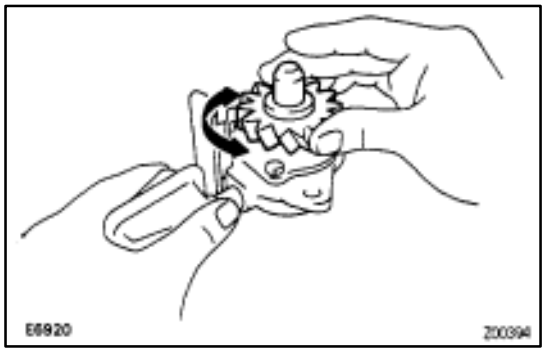
9. INSTALL OUTPUT SHAFT FRONT BEARING

Using SST and a press, install the output shaft front new bearing.
SST 09316–60010 (09316–00070)

OIL PUMP
COMPONENTS

MX01E–01



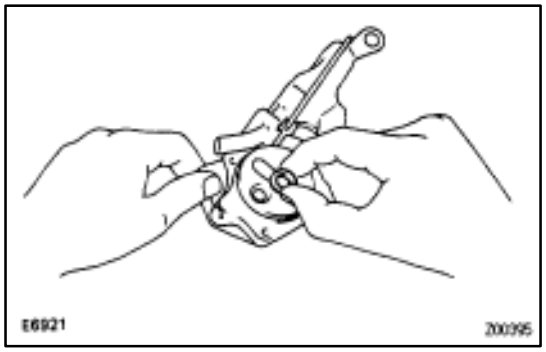


OIL PUMP DISASSEMBLY

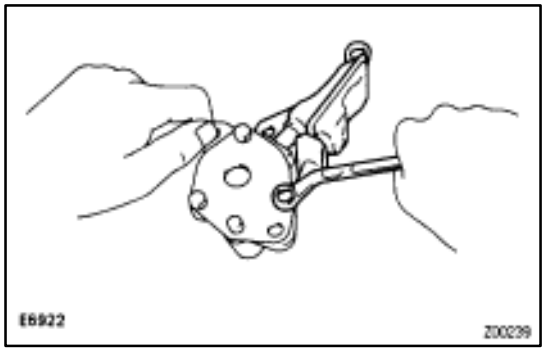
MX01F–01

1. CHECK OPERATION OF OIL PUMP

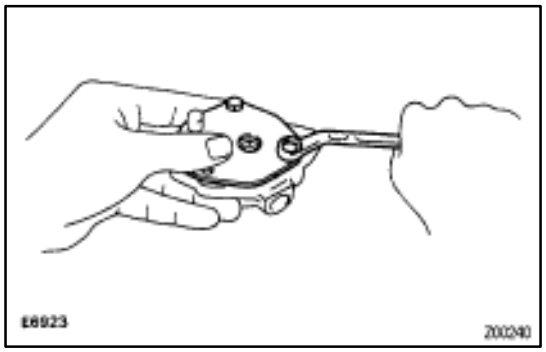
Install the oil pump drive gear to the drive rotor, check that the drive rotor turns smoothly.



2. REMOVE GASKET FROM OIL PUMP CASE

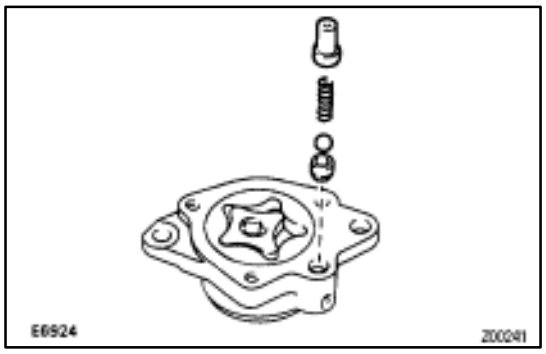


3. REMOVE BOLT AND OIL STRAINER

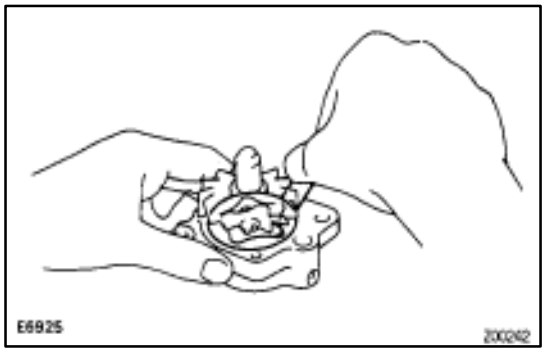


4. REMOVE OIL PUMP COVER

(a) Hold the pump cover, remove the two bolts and a cover.



(b) Remove the spring holder, spring, ball and relief valve seat.



5. CHECK ROTOR BODY CLEARANCE

(a) Install the oil pump drive gear to the drive rotor.

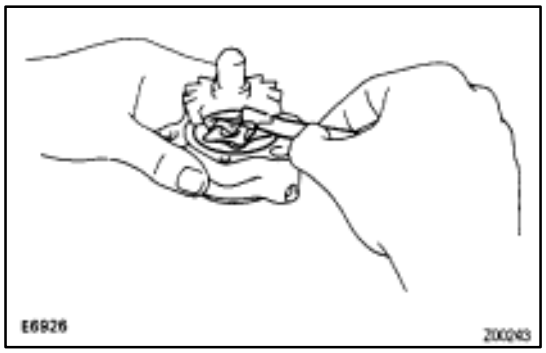
(b) Using a feeler gauge, measure the body clearance between the drive rotor and oil pump case.

Standard clearance:

0.10 – 0.16 mm (0.0039 – 0.0063 in.)

Maximum clearance:

0.30 mm (0.0118 in.)



6. CHECK ROTOR TIP CLEARANCE

(a) Install the oil pump drive gear to the drive rotor.

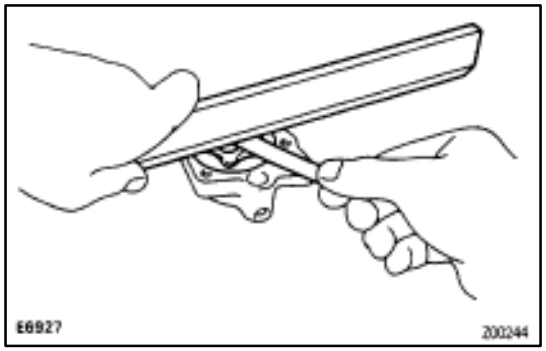
(b) Using a feeler gauge, measure the tip clearance between the drive and driven rotors.

Standard clearance:

0.08 – 0.15 mm (0.0031 – 0.0059 in.)

Maximum clearance:

0.30 mm (0.0118 in.)



7. CHECK SIDE CLEARANCE

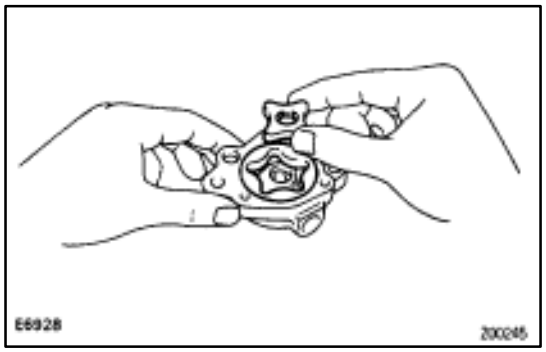
Using a precision straight edge and feeler gauge, measure the side clearance of both rotors.

Standard clearance:

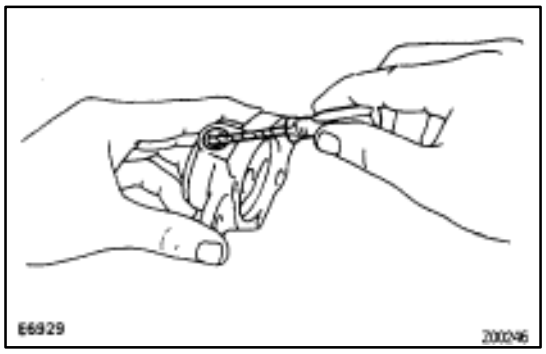
0.03 – 0.08 mm (0.0012 – 0.0031 in.)

Maximum clearance:

0.15 mm (0.0059 in.)

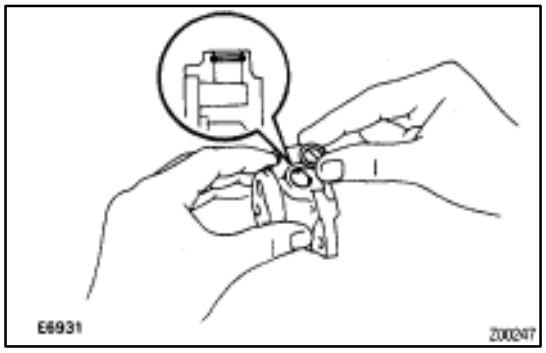


8. REMOVE OIL PUMP DRIVE ROTOR AND DRIVEN ROTOR



9. IF NECESSARY, REPLACE O–RING

(a) Using a screwdriver, remove the O–ring.

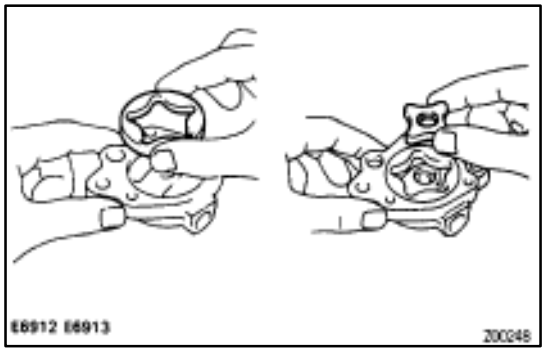


(b) Apply gear oil to the O–ring.

(c) Install the O–ring.

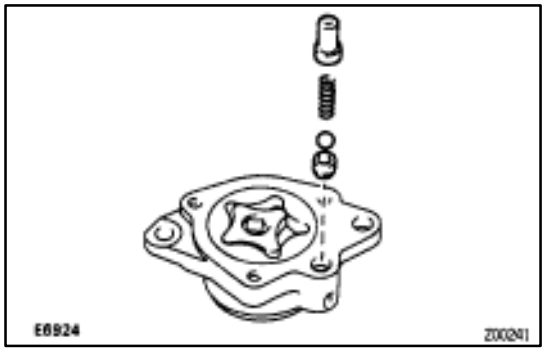
OIL PUMP ASSEMBLY

MX01G–01



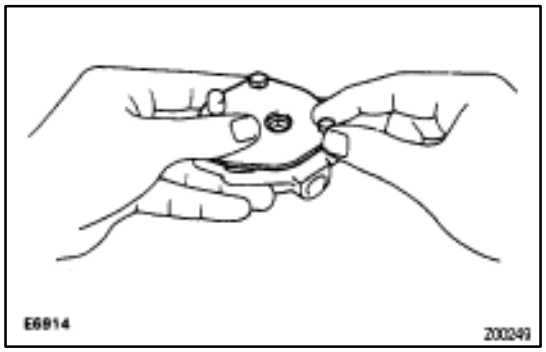
(See page MX–53)

1. INSTALL DRIVEN ROTOR AND DRIVE ROTOR

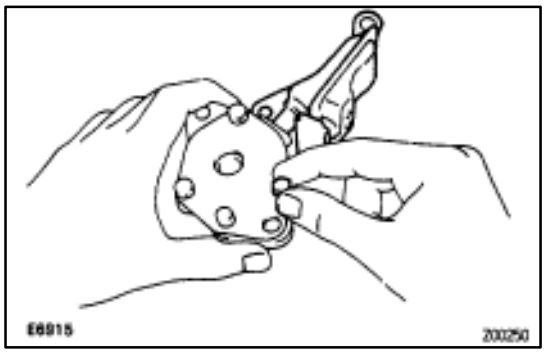


2. INSTALL OIL PUMP COVER

(a) Install the relief valve, ball, spring and spring holder to the oil pump case.

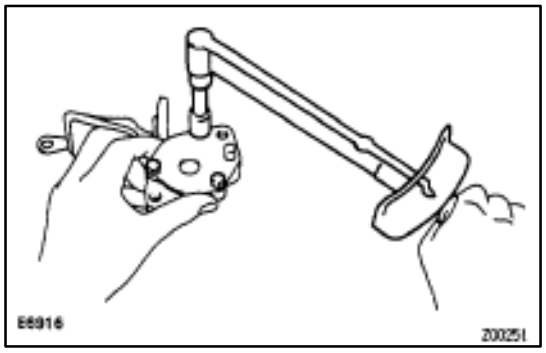


(b) Hold the oil pump cover, temporarily install the two bolts.



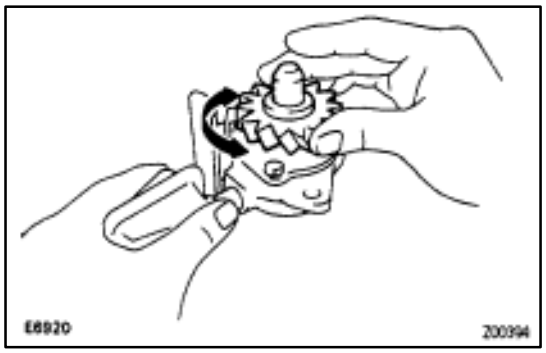
3. INSTALL OIL STRAINER

Install the oil strainer to the oil pump case, temporarily install the bolt.



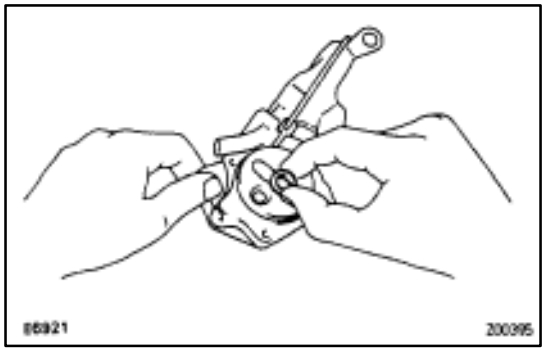
4. TORQUE OIL PUMP COVER BOLTS

Torque the three bolts evenly.
Torque: 10 N·m (105 kgf·cm, 8 ft·lbf)



5. CHECK OPERATION OF OIL PUMP

Install the oil pump drive gear to the drive rotor, check that the drive rotor turns smoothly.



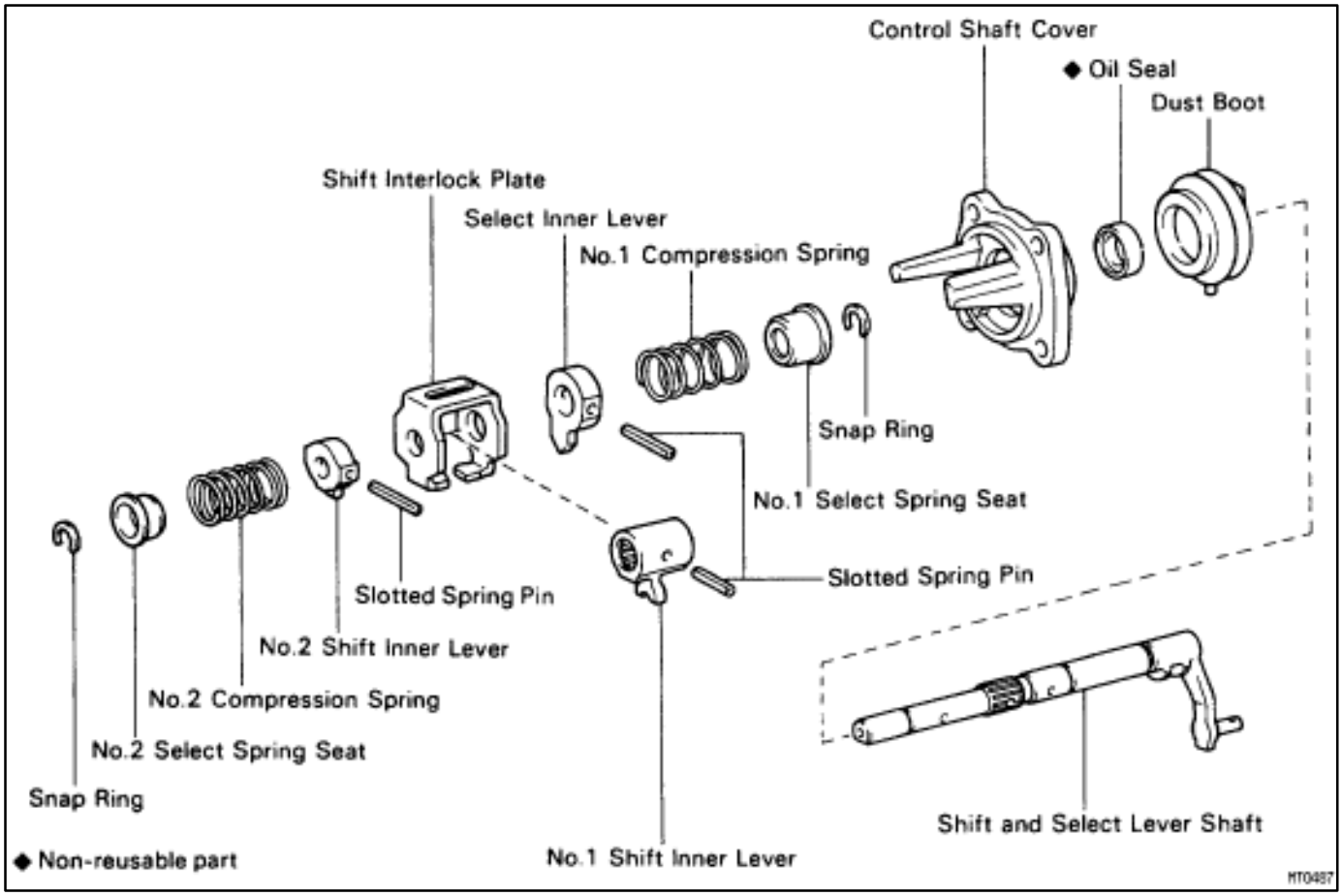
6. INSTALL GASKET

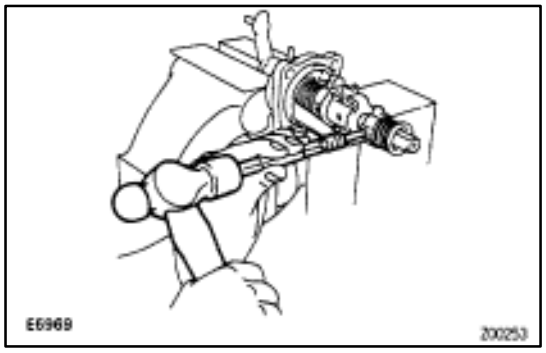
Install a new gasket to the oil pump case.

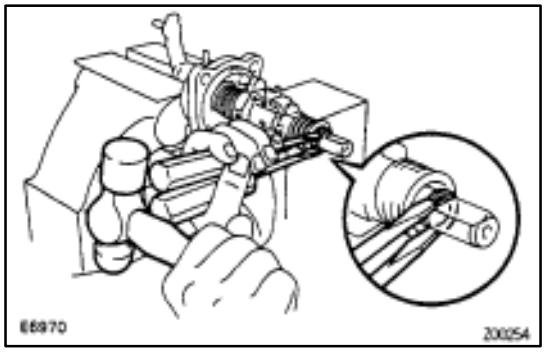
SHIFT AND SELECT LEVER SHAFT

COMPONENTS

MX01H–01







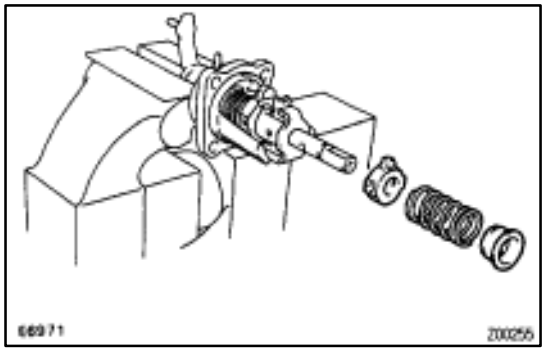
SHIFT AND SELECT LEVER SHAFT DISASSEMBLY

MX01J–01

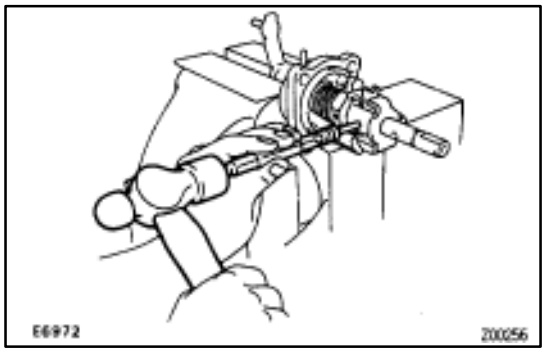
1. REMOVE NO.2 SHIFT INNER LEVER

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

(b) Using two screwdrivers and a hammer, remove the snap ring.

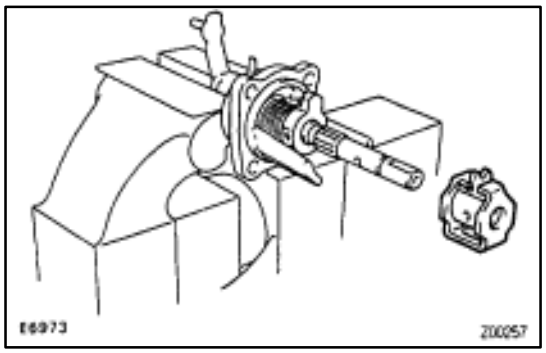


(c) Remove the No.2 select spring seat, No.2 compression spring and No.2 shift inner lever.

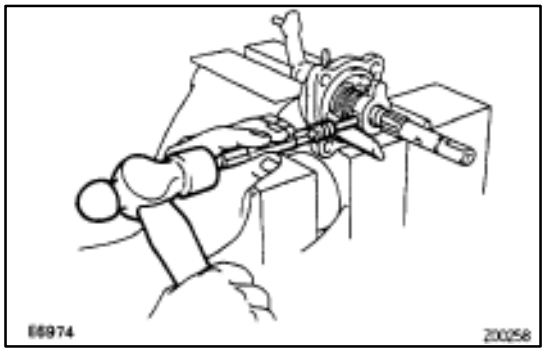


2. REMOVE SHIFT INTERLOCK PLATE AND NO. 1 SHIFT INNER LEVER

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

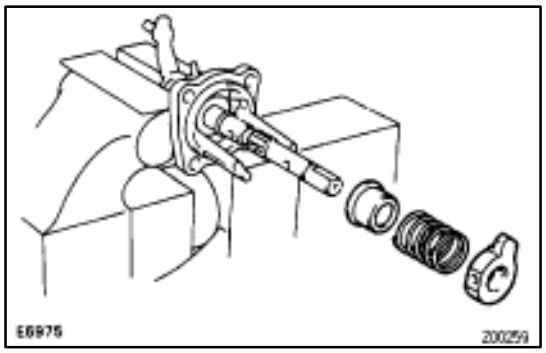


(b) Remove the shift interlock plate and No.1 shift inner lever.

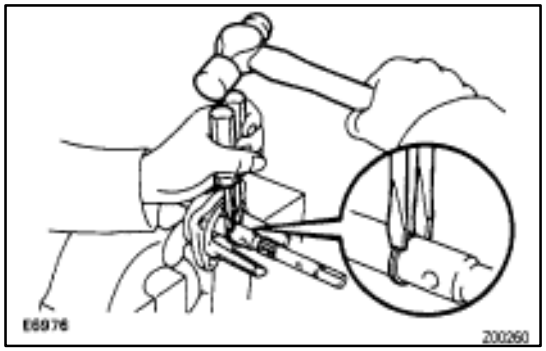


3. REMOVE SELECT INNER LEVER

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

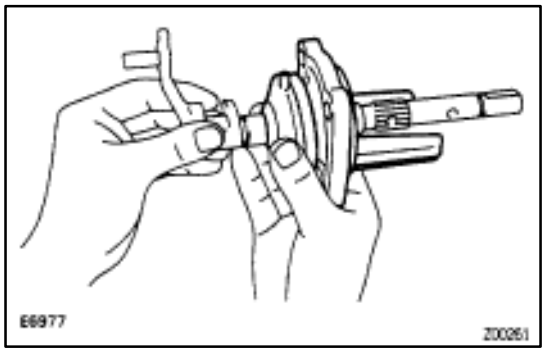


(b) Remove the select inner lever, No. 1 compression spring and No.1 select spring seat.



4. REMOVE SNAP RING

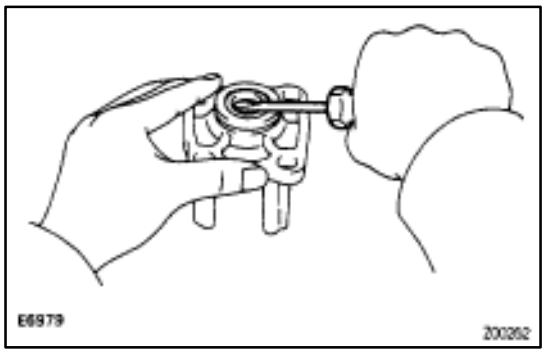
Using two screwdrivers and a hammer, remove the snap ring.



5. REMOVE CONTROL SHAFT COVER AND DUST BOOT

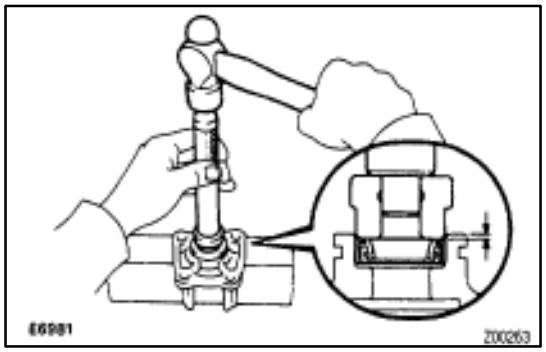
(a) Remove the control shaft with dust boot from the shaft.

(b) Remove the dust boot from the control shaft cover.



6. IF NECESSARY, REPLACE CONTROL SHAFT COVER OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



(b) Using SST and a hammer, drive in a new oil seal.
SST 09620–30010 (09627–30010, 09631–00020)
Drive in depth:
0 – 1.0 mm (0 – 0.039 in.)

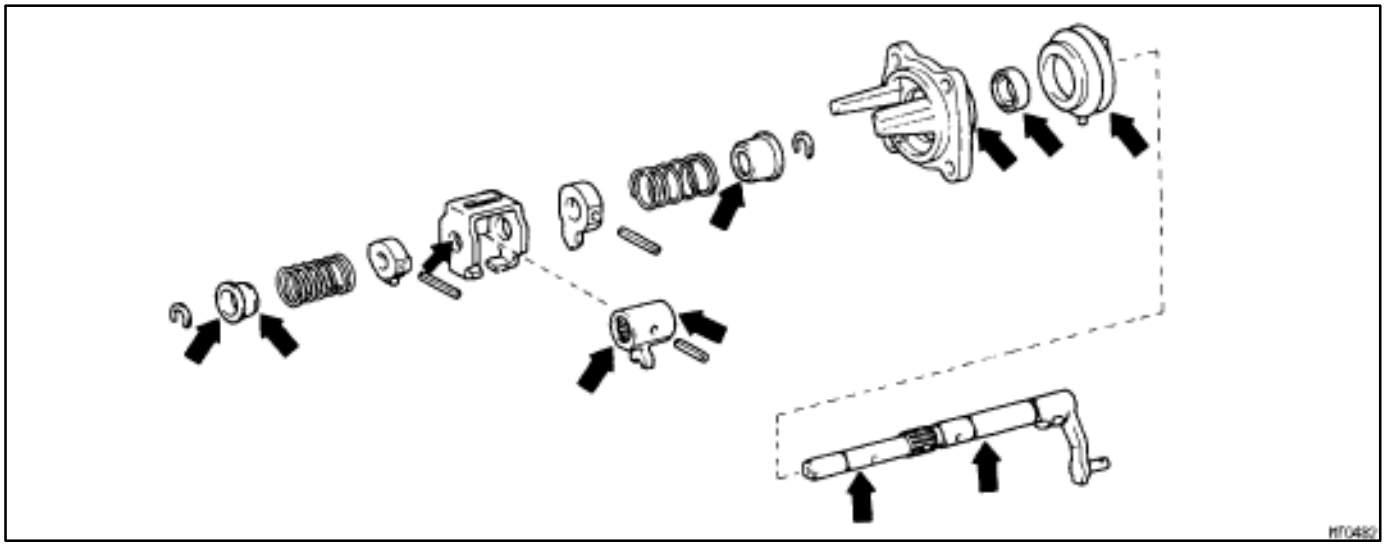
(c) Coat the oil seal lip with MP grease.

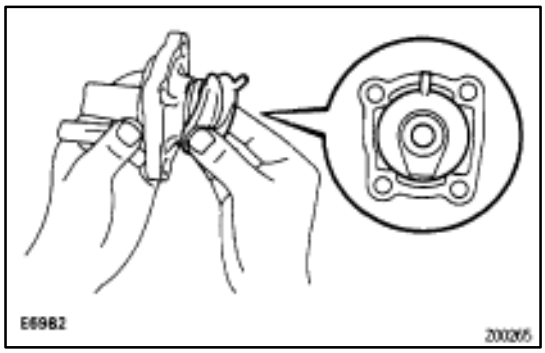
SHIFT AND SELECT LEVER SHAFT ASSEMBLY

MX020–01

(See page MX–58)

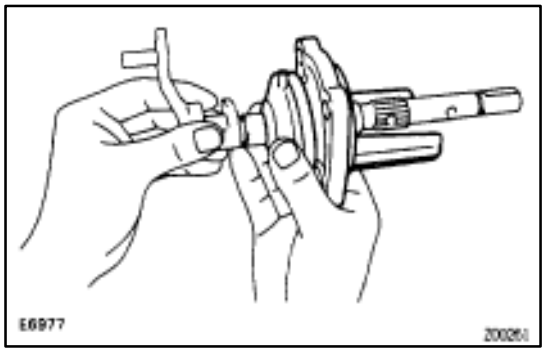
1. COAT SHAFT WITH MP GREASE, AS SHOWN



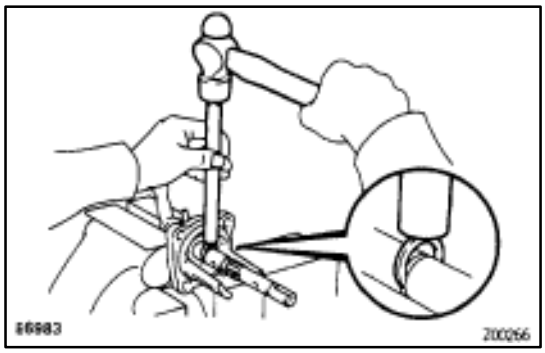


2. INSTALL DUST BOOT AND CONTROL SHAFT COVER

(a) Install the dust boot to the control shaft cover as shown.

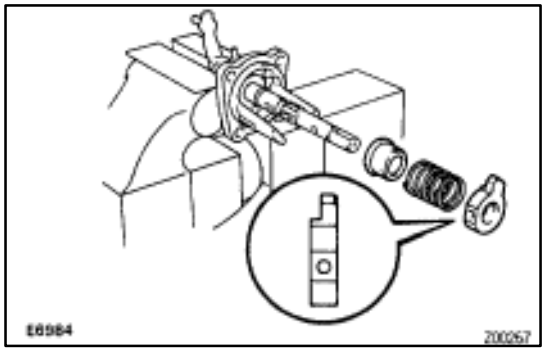


(b) Install the control shaft to the control shaft cover.



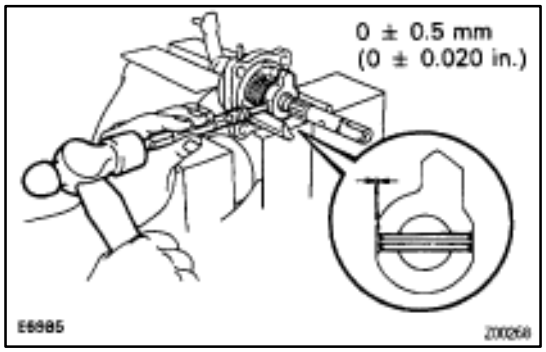
3. INSTALL SNAP RING

Using a brass bar and hammer, install the snap ring.



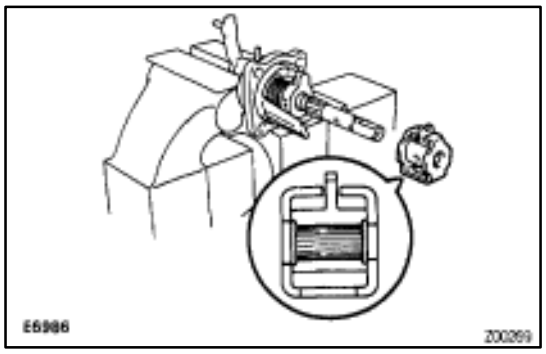
4. INSTALL SELECT INNER LEVER

(a) Install the No.1 select spring seat, No.1 compression spring and select inner lever.



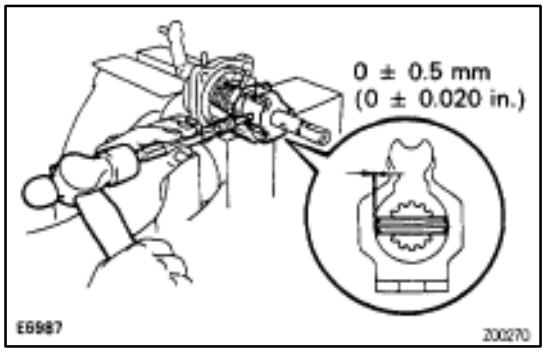
(b) Using a pin punch and hammer, drive in the slotted spring pin.
Drive in depth:
0 ± 0.5 mm (0 ± 0.020 in.)

(c) Check that the No.1 select spring seat slides smoothly.

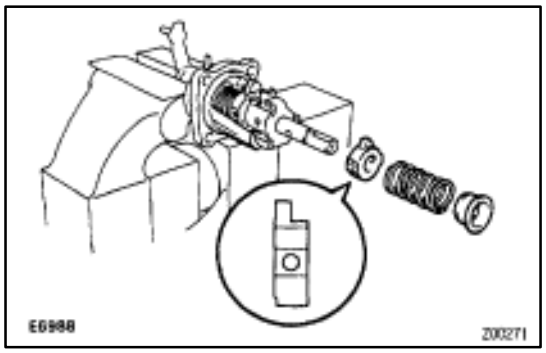


5. INSTALL SHIFT INTERLOCK PLATE AND NO. 1 SHIFT INNER LEVER

(a) Install the shift interlock plate and No.1 shift inner lever as shown.

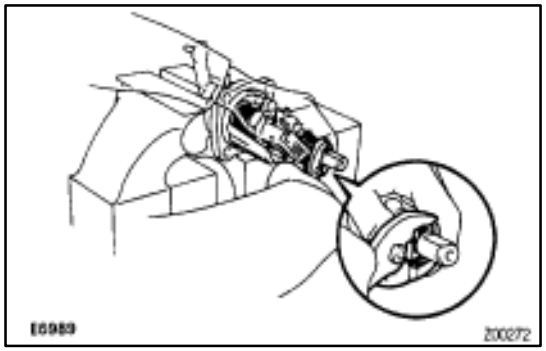


(b) Using a pin punch and hammer, drive in the slotted spring pin.
Drive in depth:
0 ± 0.5 mm (0 ± 0.020 in.)

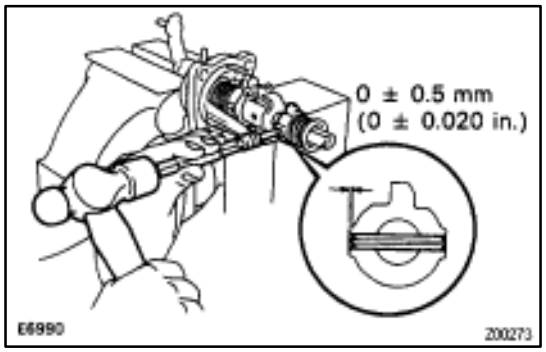


6. INSTALL NO.2 SHIFT INNER LEVER

(a) Install the No.2 shift inner lever, No.2 compression spring and No.2 select spring seat.



(b) Compress the spring and install the snap ring with pliers.



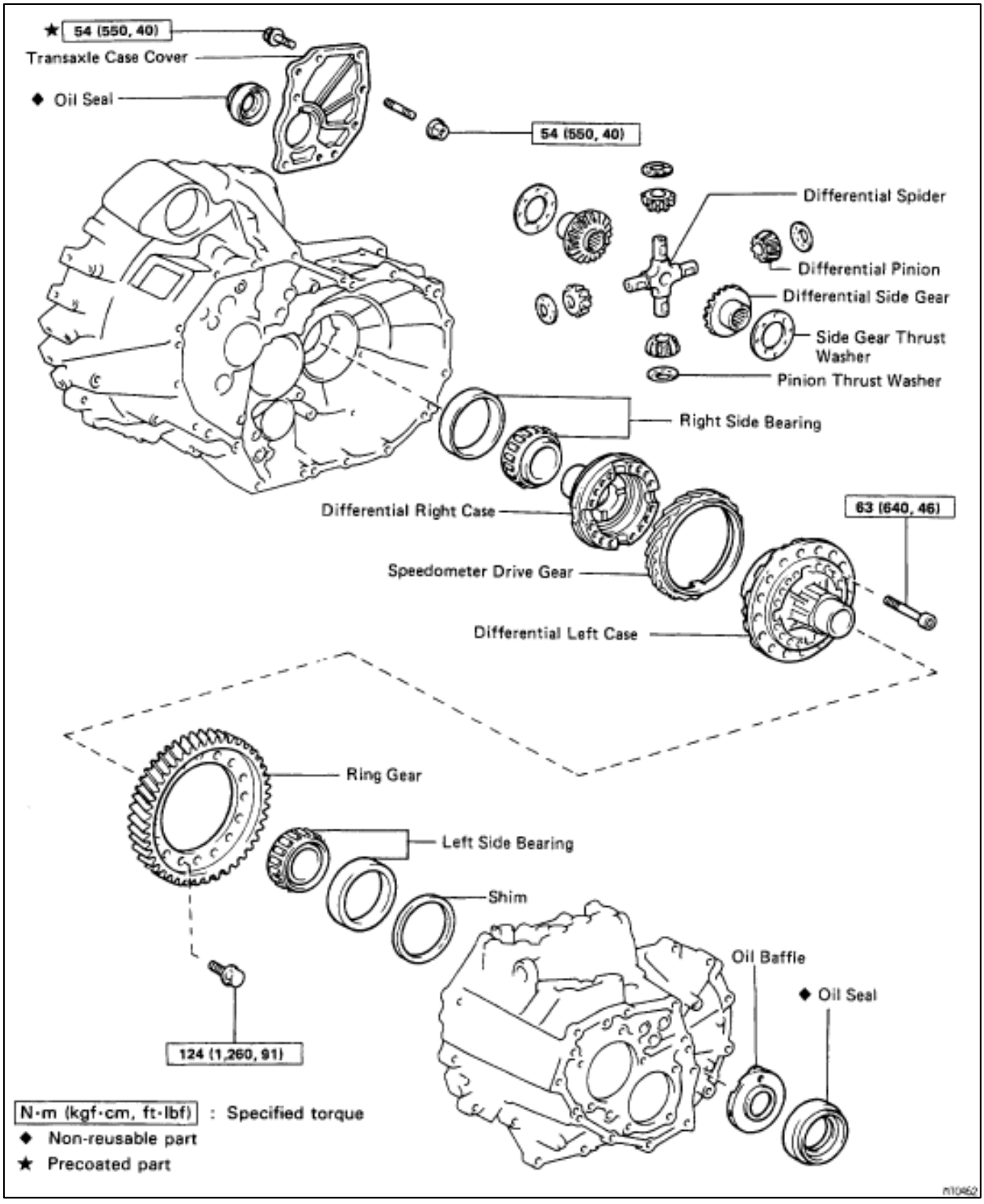
(c) Using a pin punch and hammer, drive in the slotted spring pin.
Drive in depth:
0 ± 0.5 mm (0 ± 0.020 in.)

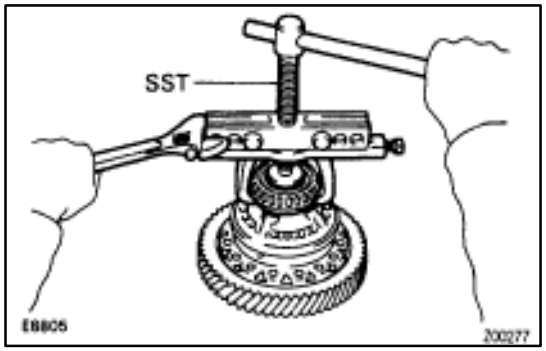
(d) Check that the No.2 select spring seat slides smoothly.

DIFFERENTIAL CASE

COMPONENTS

MX01K–01



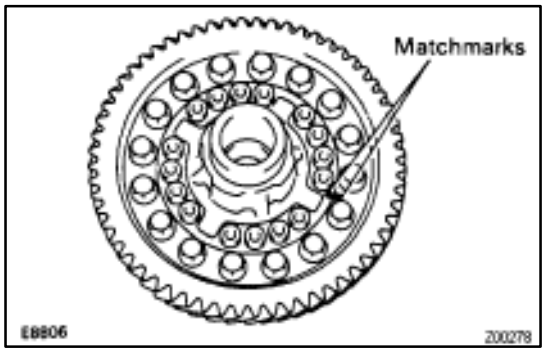


DIFFERENTIAL CASE DISASSEMBLY

MX01L–01

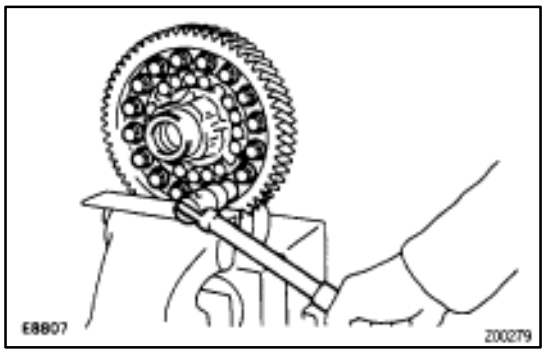
1. REMOVE SIDE BEARING

Using SST, remove the two side bearing.
SST 09950–20017

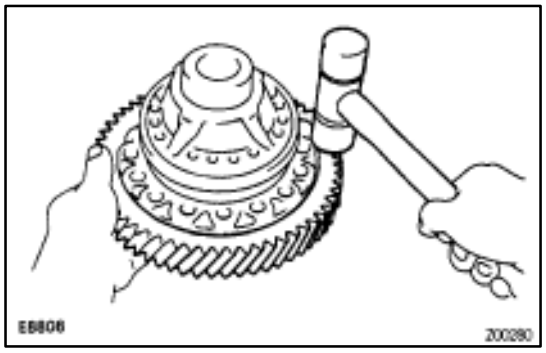


2. REMOVE RING GEAR

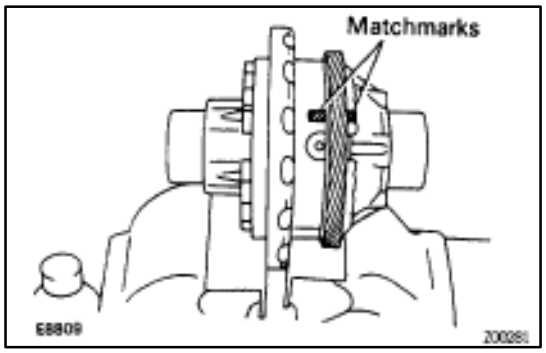
(a) Place the matchmarks on both the differential case and ring gear.



(b) Remove the sixteen bolts.

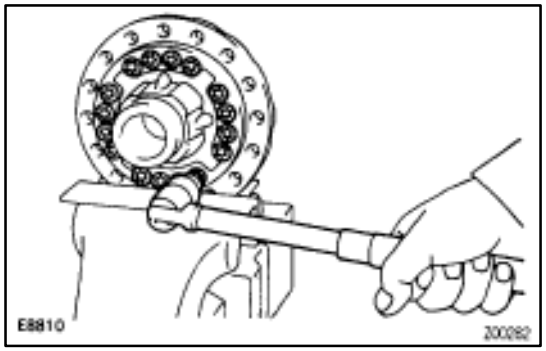


(c) Using a plastic hammer, tap out the ring gear.

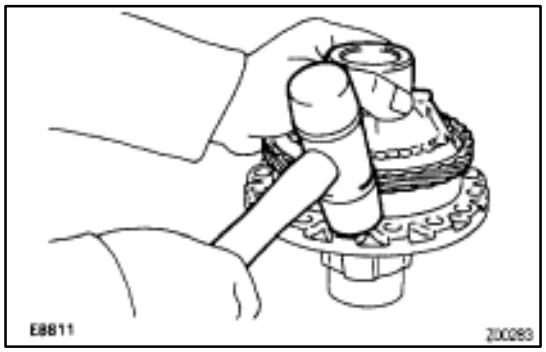


3. DISASSEMBLE DIFFERENTIAL CASE

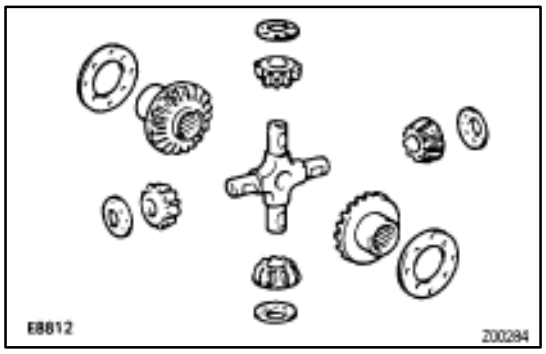
(a) Place the matchmarks on the differential right and left case.



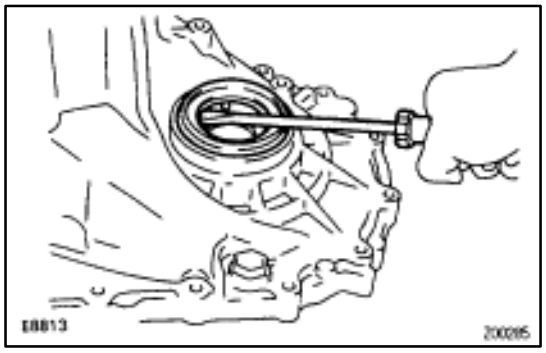
(b) Using a torx wrench, remove the sixteen torx screws.
Torx wrench: T50 09042–00040



(c) Using a plastic hammer, tap out the differential left case.
(d) Remove the speedometer drive gear from the differential right case.

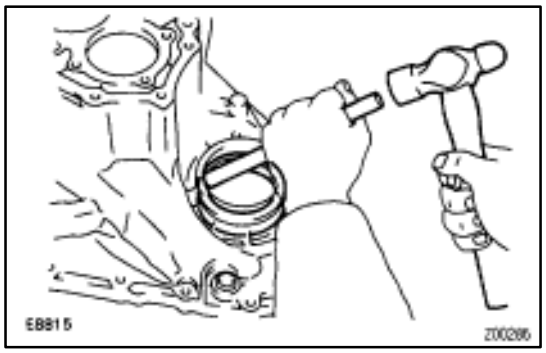


(e) Remove the two differential side gears, two side gear thrust washers, differential pinions and four pinion washers from the differential left case.

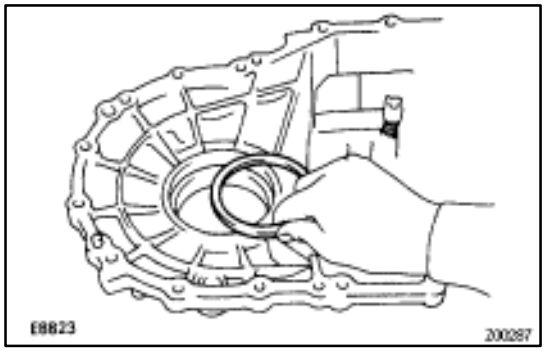


4. (TRANSMISSION CASE SIDE)
IF NECESSARY, REPLACE OIL SEAL AND TAPER ROLLER BEARING OUTER RACE

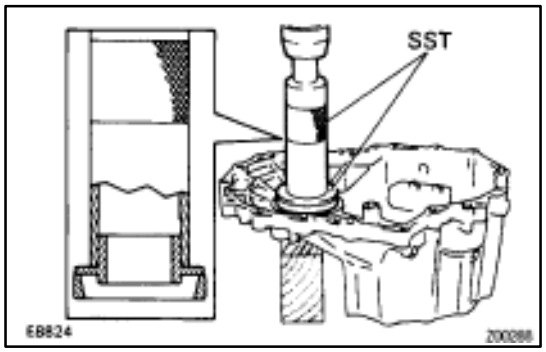
(a) Using screwdriver, remove the oil seal.
(b) Remove the transmission oil baffle.



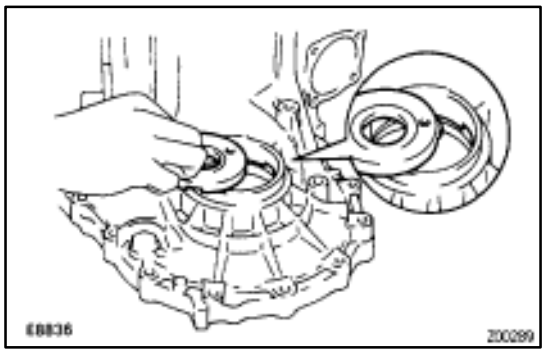
(c) Using a brass bar and hammer, drive out the bearing outer race lightly and evenly.
(d) Remove the shim.



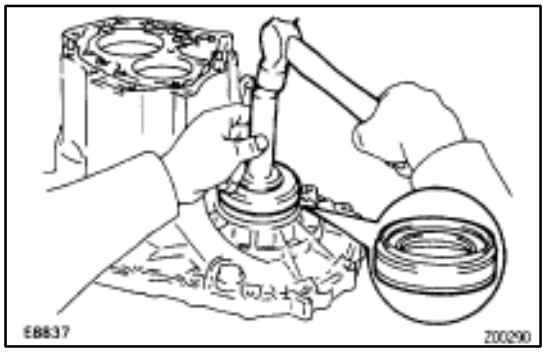
(e) Install the shim.
(See page MX–74)
HINT: First select and install a shim of leaser thickness than before.



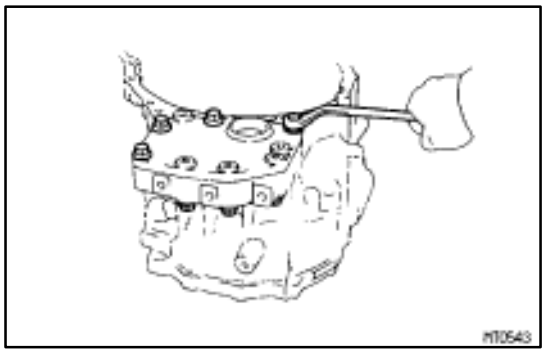
(f) Using SST and a press, install the taper roller bearing outer race.
SST 09316–60010 (09316–00010, 09316–00040)



(g) Install the transmission oil baffle.
HINT: Install the transmission oil baffle projection into the case side cutout.

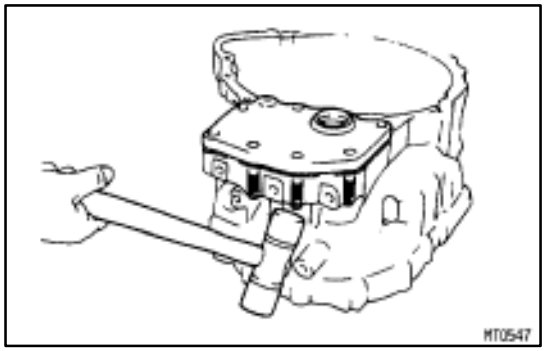


(h) Using SST and a hammer, drive in a new oil seal.
SST 09223–15010
(i) Coat the lip of oil seal with MP grease.

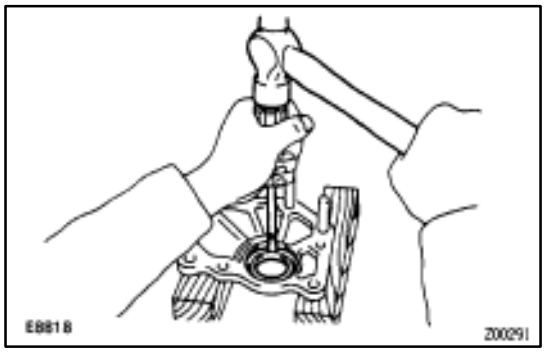


5. (TRANSAXLE CASE SIDE)
IF NECESSARY, REPLACE OIL SEAL AND TAPER ROLLER BEARING OUTER RACE

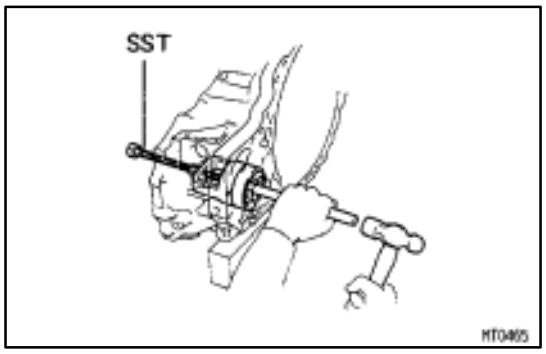
(a) Remove the four bolts and three nuts.



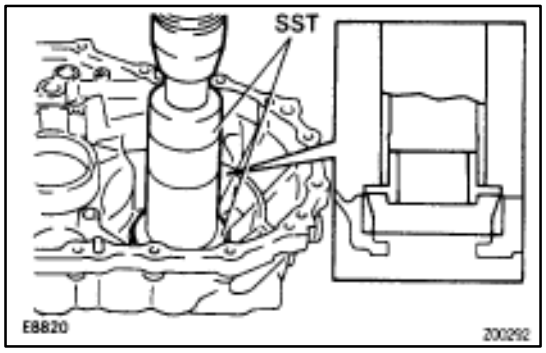
(b) Using a plastic hammer, tap the stud bolt and remove the transaxle case cover.



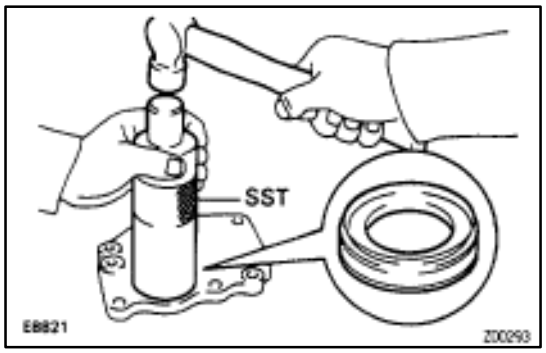
(c) Using a screwdriver and hammer, drive out the oil seal.



(d) Using a SST, brass bar and hammer, remove the taper roller bearing outer race.
SST 09612–65014

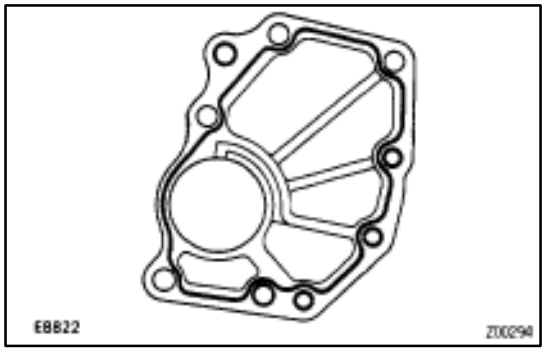


(e) Using SST and a press, install the taper roller bearing.
SST 09316–60010 (09316–00010, 09316–00040)



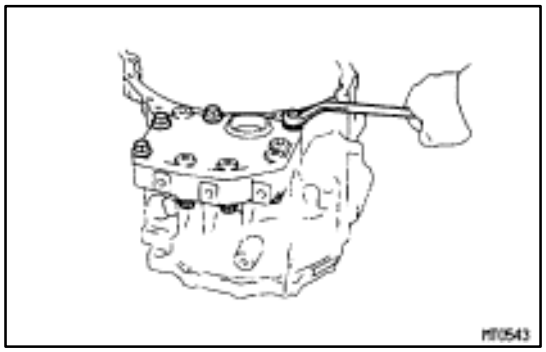
(f) Using SST and a hammer, drive in a new oil seal.
SST 09316–60010 (09316–00010)

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



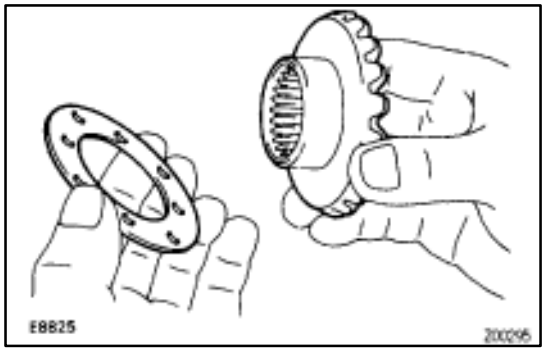
(h) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transaxle case or case cover.

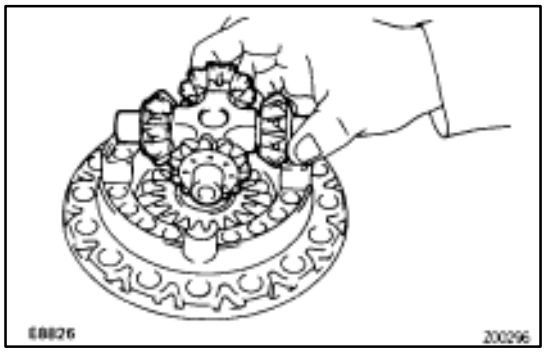
(i) Apply seal packing to the transaxle case cover as shown.
Seal packing:
Part No. 08826–00090, THREE BOND 1281 or equivalent
HINT: Install the transaxle case cover as shown as the seal packing is applied.

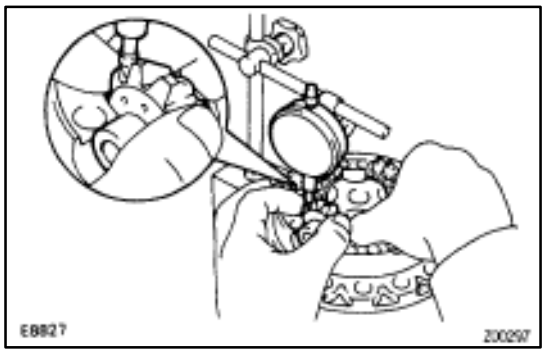


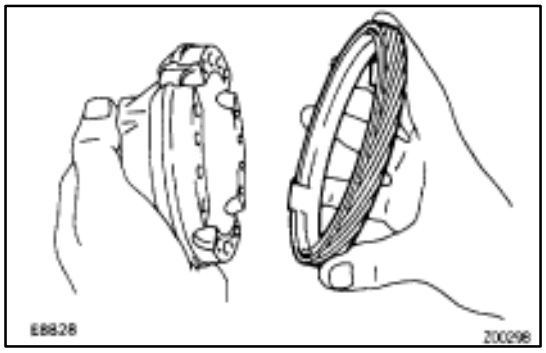
(j) Apply sealant to the bolt threads.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

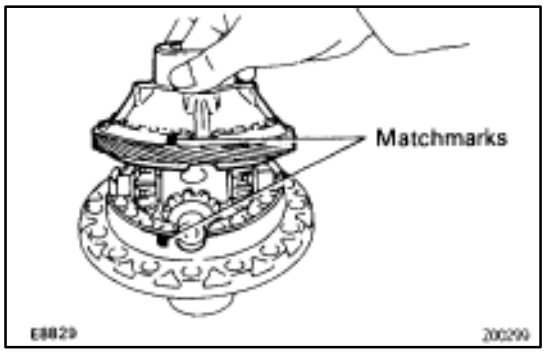
(k) Install and torque the four bolts and three nut.
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)











DIFFERENTIAL CASE ASSEMBLY

MX021–01

(See page MX–64)

1. ASSEMBLE DIFFERENTIAL CASE

HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

(a) Install the thrust washer to the side gear.

(b) Install the four pinions and thrust washers to the spider.

(c) Install the side gear and spider with four pinions to the differential left case.

(d) Using a dial indicator, measure the backlash of one pinion gear while holding the No.2 differential case.

Standard backlash:

0.05–0.20 mm (0.0020–0.0079 in.)

HINT: Push the pinion gear and spider with four pinions to the right side a of the left side of the differential case.

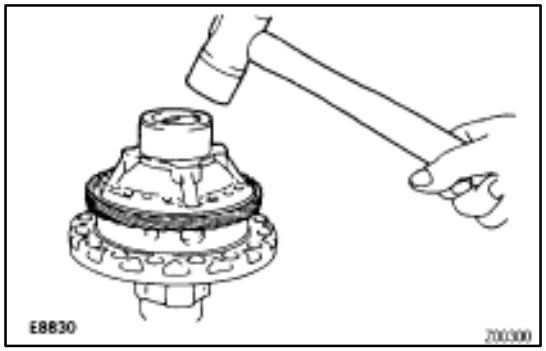
(e) Install the side gear and spider with four pinions to the right side of the differential case. Check the side gear backlash.

(f) Referring to the table below, Select the thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

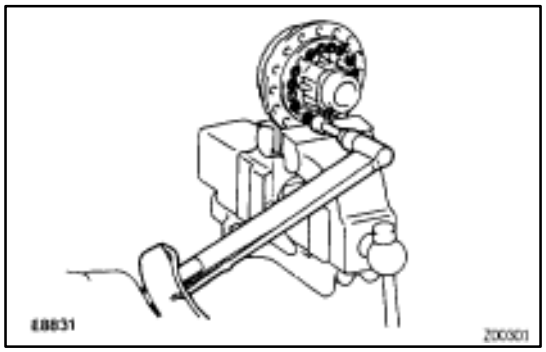
Thickness mm (in.)	Thickness mm (in.)
0.80 (0.0315)	1.20 (0.0472)
0.90 (0.0354)	1.30 (0.0512)
1.00 (0.0394)	1.40 (0.0551)
1.10 (0.0433)	

(g) Install the speedometer drive gear.

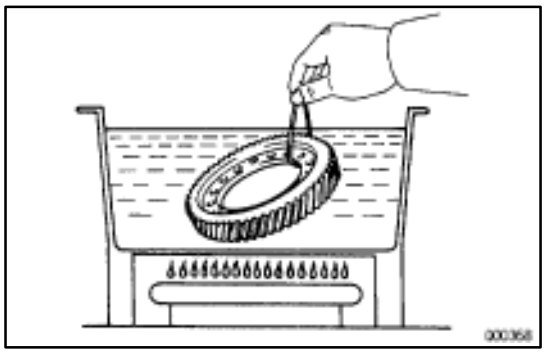
(h) Align the matchmarks on the differential cases.



(i) Using a plastic hammer, carefully tap the differential case to install it.

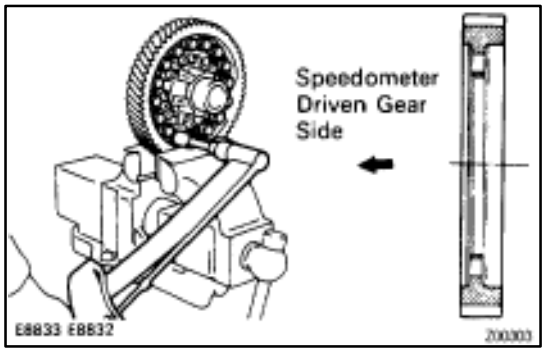


(j) Using a torx wrench, install and torque the sixteen torx screws.
Torx wrench T50 09042–00040
Torque: 63N·m (640 kgf·cm, 46 ft·lbf)

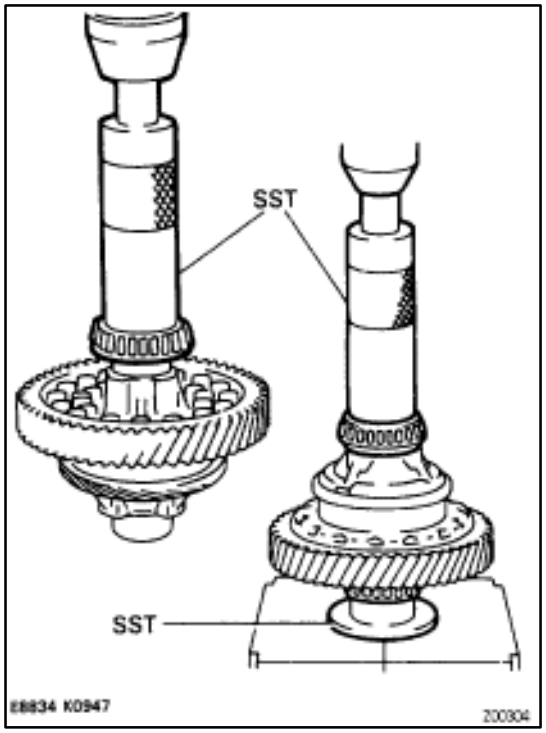


2. INSTALL RING GEAR

(a) Clean the contact surface of the differential case and the threads of the ring gear and differential case.
(b) Hear the ring gear in boiling water.
(c) 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 differential left case and contact the ring gear.
(d) Temporarily install the sixteen bolts.
NOTICE: The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.
(e) After the ring gear has cooled sufficiently, torque the ring gear set bolts.
Torque: 124 N·m (1,260 kgf·cm, 91 ft·lbf)



3. INSTALL SIDE BEARING

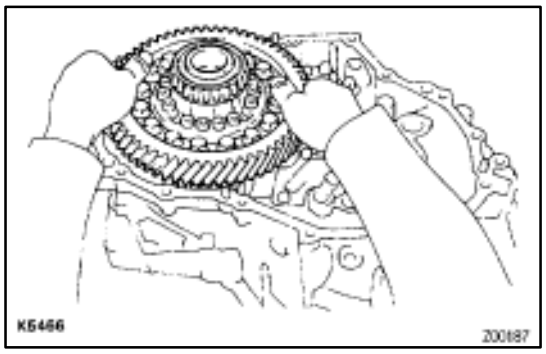
Using SST and a press, install the side bearings onto the differential case.

SST 09316–20011, 09316–60010 (09316–00010)

HINT: Press the bearing on the ring side first.

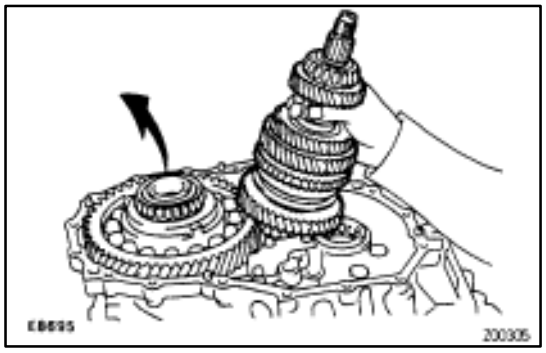
4. ADJUST OUTPUT SHAFT ASSEMBLY PRELOAD

(See pages MX–76 to 78)



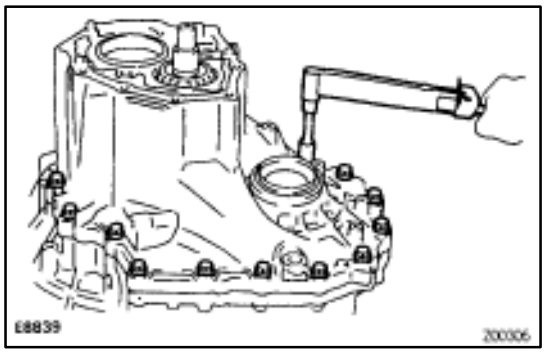
5. INSTALL DIFFERENTIAL CASE ASSEMBLY

Install the differential case assembly to the transaxle case.



6. INSTALL OUTPUT SHAFT ASSEMBLY

Lift up the differential case, install the output shaft assembly.



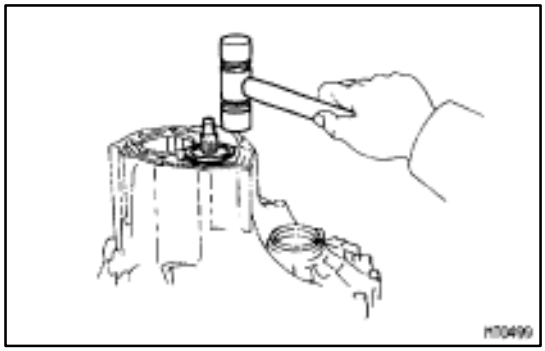
7. INSTALL TRANSMISSION CASE

(a) Install the transmission case.

HINT: If necessary, tap on the case with a plastic hammer.

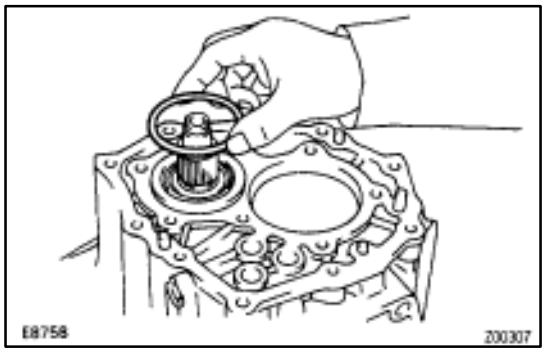
(b) Install and torque the seventeen bolts.

Torque: 29 N·m (300 kgf·cm 22 ft·lbf)



8. INSTALL OUTPUT SHAFT REAR TAPER ROLLER BEARING OUTER RACE

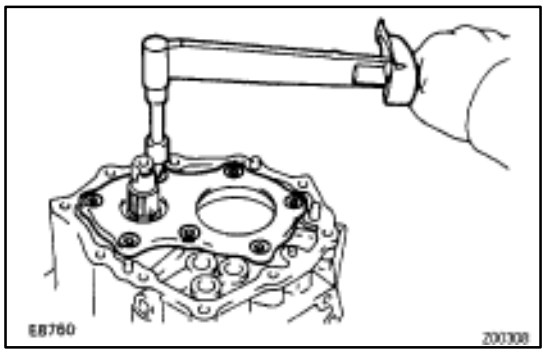
Using a plastic hammer, drive in the outer race.



9. INSTALL SHIM

(See pages MX–76 to 78)

HINT: Install the previously selected shim.

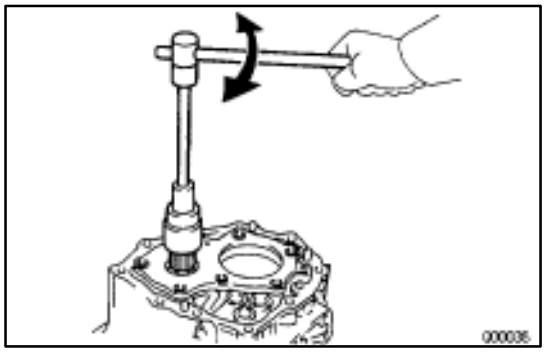


10. INSTALL REAR BEARING RETAINER

Using a torx wrench, install and torque the seven torx screws.

Torx wrench T45 09042–00050

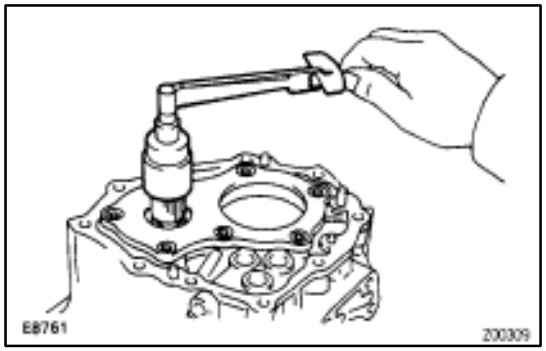
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



11. ADJUST DIFFERENTIAL CASE SIDE BEARING PRELOAD

(a) Install the new lock nut to the output shaft.

(b) Turn the output shaft right and left two or three times to allow the bearings to settle.



(c) Using a small torque wrench, measure the preload.

Preload (at starting):

New bearing (Add output shaft preload)

0.2–0.4 N·m (2.0–4.1 kgf·cm, 1.7–3.6 in.·lbf)

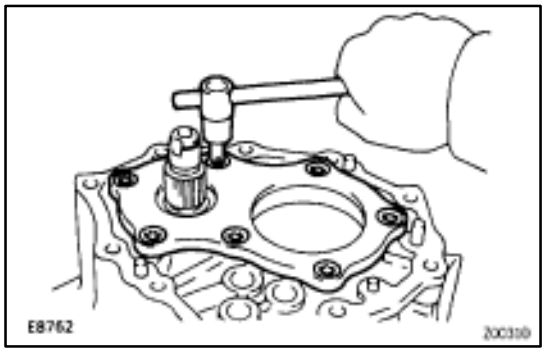
Reused bearing (Add output shaft preload)

0.1–0.2 N·m (1.3–2.5 kgf·cm, 1.1–2.2 in.·lbf)

If the preload is not within specification, select the thrust washers.

HINT: The total preload will change about 0.1–0.2 N·m (1–2 kgf·cm, 0.9–1.7 ft·lbf) with each shim thickness.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)

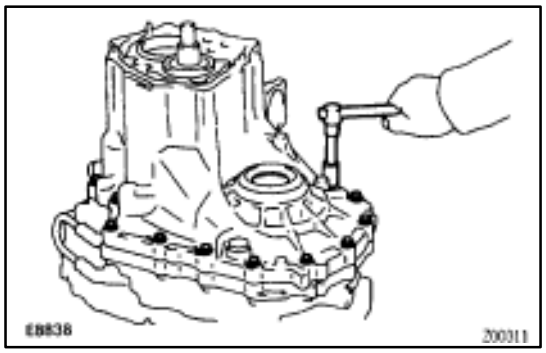


12. REMOVE REAR BEARING RETAINER

Using torx wrench, remove the seven torx screws and rear bearing retainer.

Torx wrench T45 09042–00050

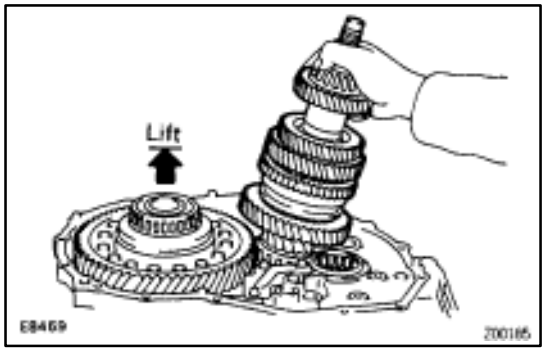
13. REMOVE SHIM



14. REMOVE TRANSMISSION CASE

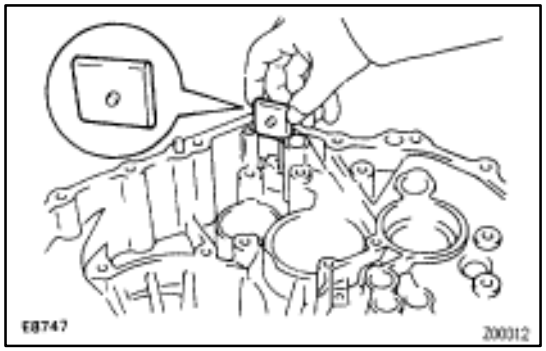
(a) Remove the seventeen bolts.

(b) Using a plastic hammer, tap off the transmission case.



15. REMOVE OUTPUT SHAFT ASSEMBLY

16. REMOVE DIFFERENTIAL CASE ASSEMBLY



COMPONENT PARTS INSTALLATION

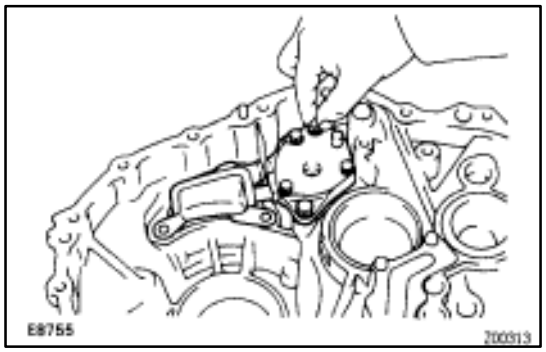
BASIC SUBASSEMBLY REASSEMBLY

MX01M–01

(See pages MX–23 to 25)

HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

1. INSTALL MAGNET TO TRANSAXLE CASE

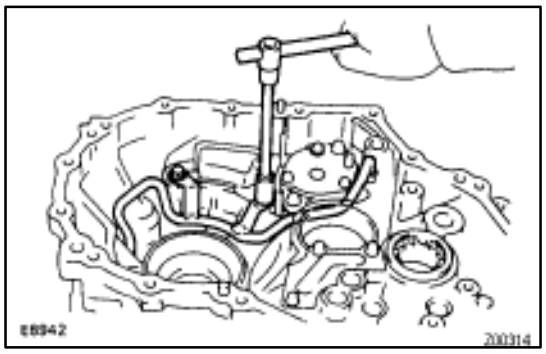


2. INSTALL OIL PUMP ASSEMBLY AND OIL PIPE

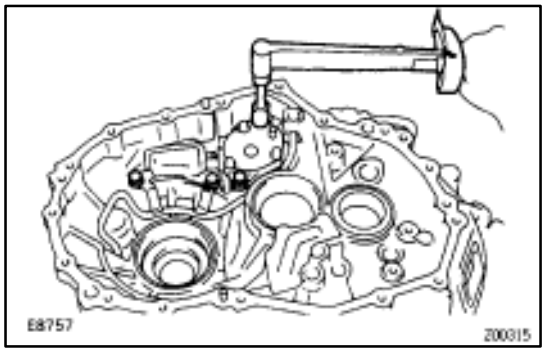
(a) Install the oil pump assembly.

(b) Install the two bolts.

HINT: Be careful not to drop the oil pump gasket.

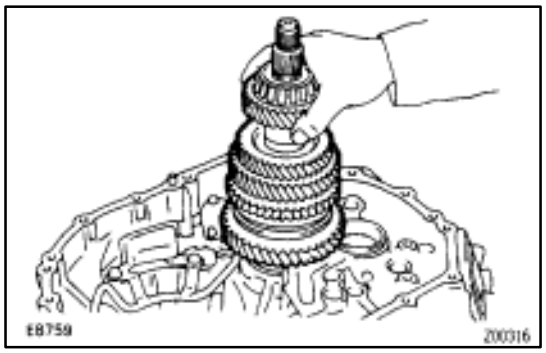


(c) Install the oil pipe and two bolts.



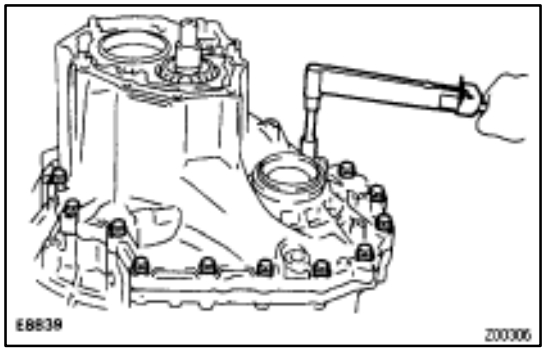
(d) Torque the four bolts.

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

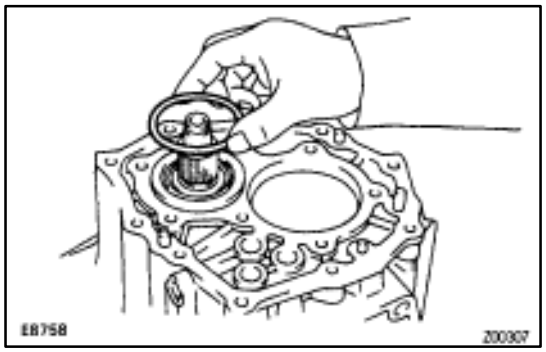


3. ADJUST OUTPUT SHAFT PRELOAD

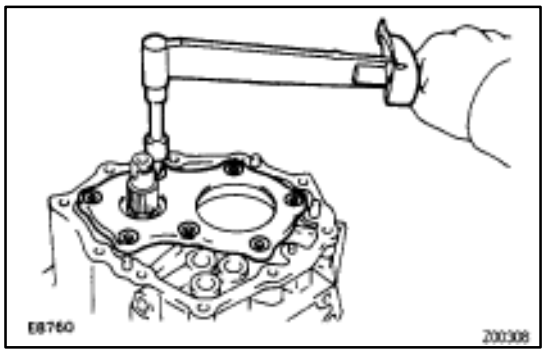
(a) Install the output shaft assembly.



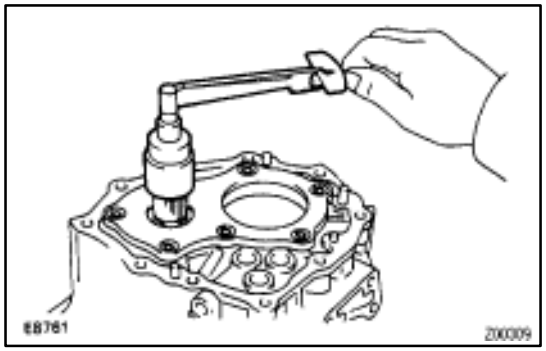
(b) Install the transmission case.
HINT: If necessary, tap on the case with a plastic hammer.
(c) Install and torque the seventeen bolts.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
(d) Install the output shaft rear taper roller bearing outer race.



(e) Install the adjust shim.
HINT: When re–using the output shaft bearing, first install a shim of the same thickness as before. If installing a new tapered roller bearing, first select and install a shim of lesser thickness than before.

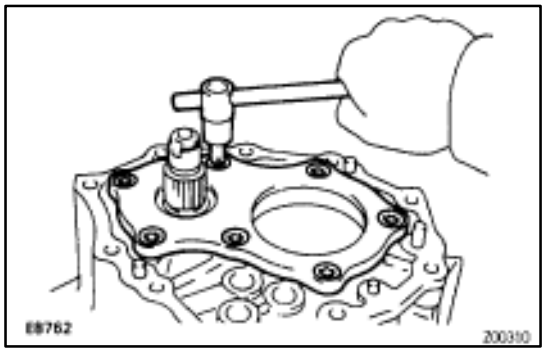


(f) Install the bearing retainer.
(g) Using a torx wrench, install and torque the seven bolts.
Torx wrench T45 09042–00050
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)
(h) Install a new lock nut to the output shaft.
(i) Turn the output shaft right and left two or three times to allow the bearings to settle.

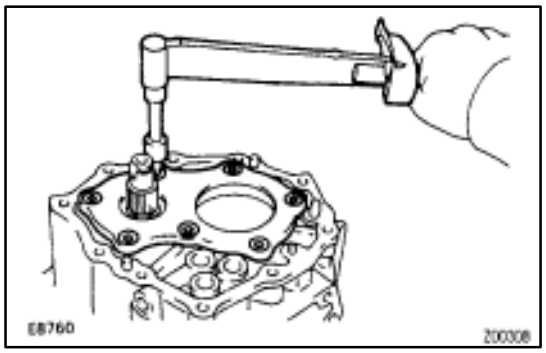


(j) Using a small torque wrench, measure the preload.
Preload (at starting):
New bearing
0.8–1.6 N·m (8–16 kgf·cm, 6.9–13.9 in.·lbf)
Reused bearing
0.5–1.0 N·m (5–10 kgf·cm, 4.3–8.7 in.·lbf)
If the preload is not within specification, select the thrust washers.
HINT: The preload will change about 0.4–0.5 N·m (4–5 kgf-·cm, 3.5–4.3 in.·lbf) with each shim thickness.

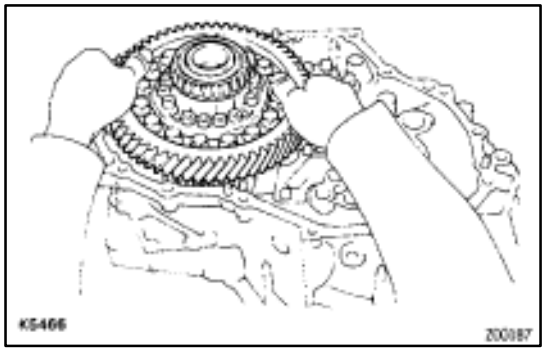
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	1.30 (0.0512)	D	1.95 (0.0768)
1	1.35 (0.0531)	E	2.00 (0.0787)
2	1.40 (0.0551)	F	2.05 (0.0807)
3	1.45 (0.0571)	G	2.10 (0.0827)
4	1.50 (0.0591)	H	2.15 (0.0846)
5	1.55 (0.0610)	J	2.20 (0.0866)
6	1.60 (0.0630)	K	2.25 (0.0886)
7	1.65 (0.0650)	L	2.30 (0.0906)
8	1.70 (0.0669)	M	2.35 (0.0925)
9	1.75 (0.0689)	N	2.40 (0.0945)
A	1.80 (0.0709)	P	2.45 (0.0965)
B	1.85 (0.0728)	Q	2.50 (0.0984)
C	1.90 (0.0748)		



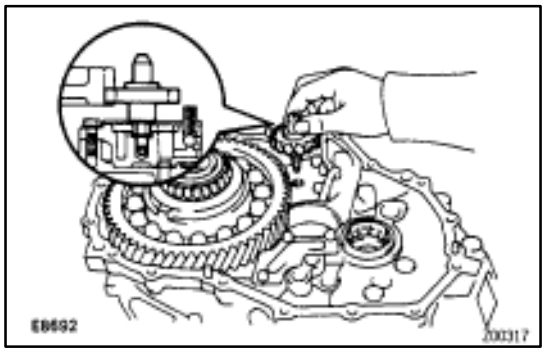
(k) Remove the lock nut.
(i) Using a torx wrench, remove the seven torx screws and rear bearing retainer.
Torx wrench T45 09042–00050



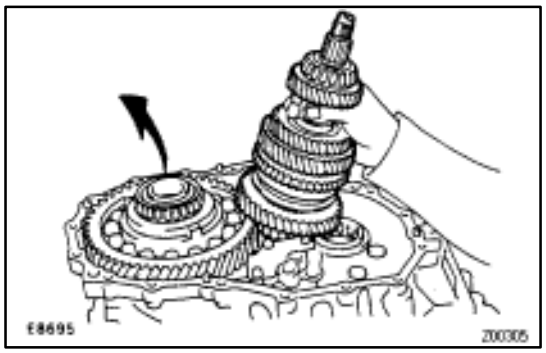
(m) Remove the shim.
(n) Remove the seventeen bolts and transmission case.
(o) Remove the output shaft assembly.



4. INSTALL DIFFERENTIAL CASE ASSEMBLY

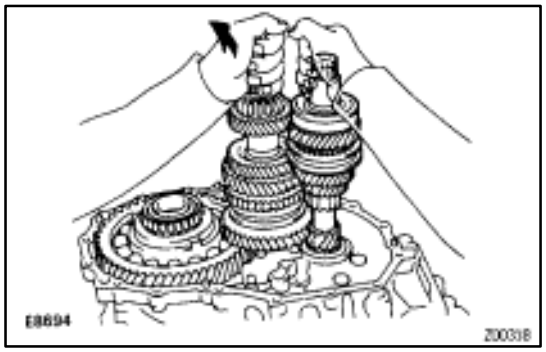


5. INSTALL OIL PUMP DRIVE GEAR

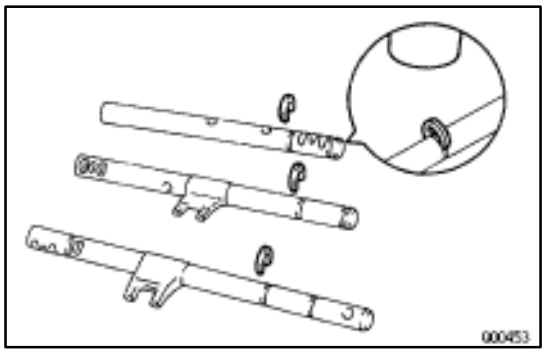


6. INSTALL OUTPUT SHAFT ASSEMBLY

(a) Lift up the differential case, install the output shaft assembly.

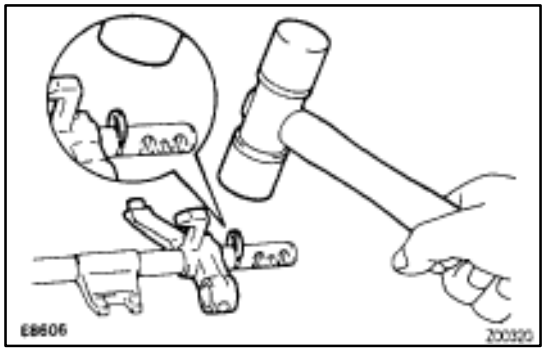


(b) Leaning the output shaft to the differential side, install the input shaft assembly.

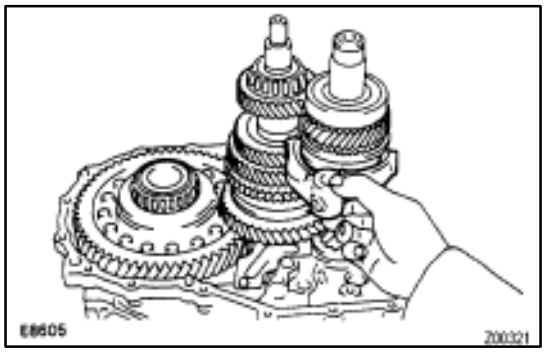


7. INSTALL SNAP RINGS

(a) Using a plastic hammer, install the snap rings to the No.1, No.2 and No.3 shift fork shafts.

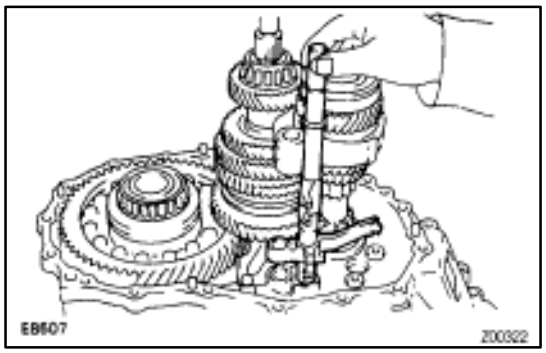


(b) Using a plastic hammer, the reverse shift fork and snap ring to the No.3 shift fork shaft.

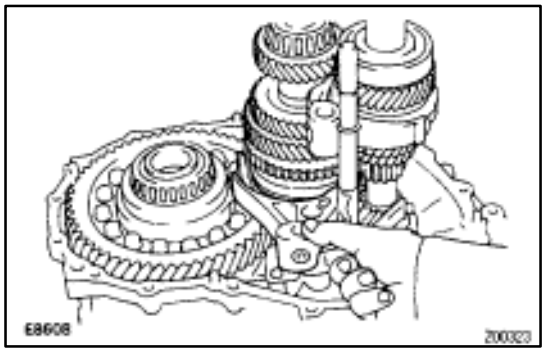


8. INSTALL NO.2 SHIFT FORK AND NO.3 SHIFT FORK SHAFT WITH REVERSE SHIFT FORK

(a) Install the No.2 shift fork to the No.2 hub sleeve.

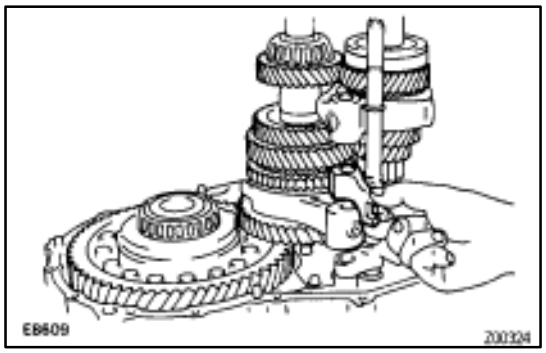


(b) Install the No.3 shift fork shaft with reverse shift fork.

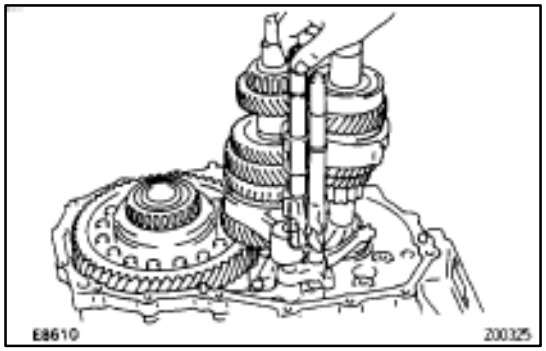


9. INSTALL NO.1 SHIFT FORK, SHIFT HEAD AND NO.2 SHIFT FORK SHAFT

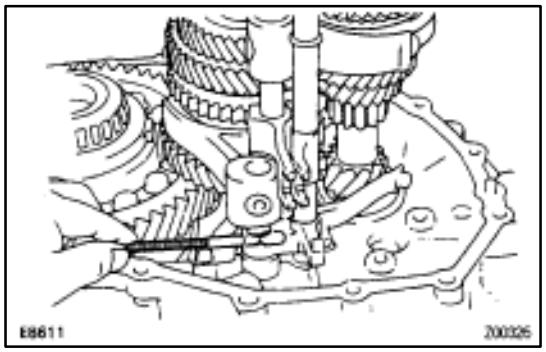
(a) Install the No.1 shift fork to the No.1 hub sleeve.



(b) Put shift head onto the No.1 shift fork.

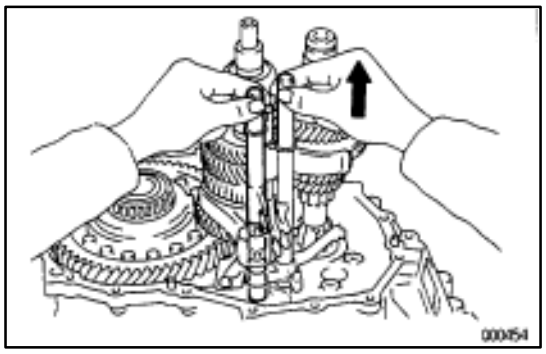


(c) Install the No.2 shift fork shaft to the transaxle case, through the shift head and No.1 shift fork.



10. INSTALL INTERLOCK ROLLER

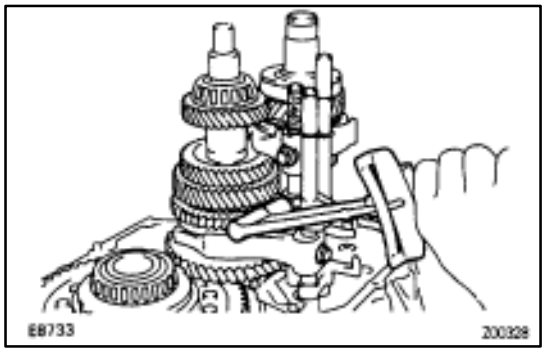
Using a magnetic finger, install the interlock roller to the reverse shift fork.



11. INSTALL NO.1 SHIFT FORK SHAFT

Install the No.1 shift fork shaft to the case, through the No.1 shift fork and reverse shift fork.

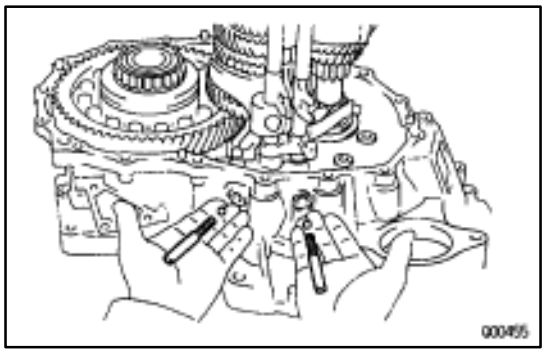
HINT: When it is difficult to the fork shaft through the reverse shift fork, pull up the No.3 shift fork shaft.



12. INSTALL SET BOLTS

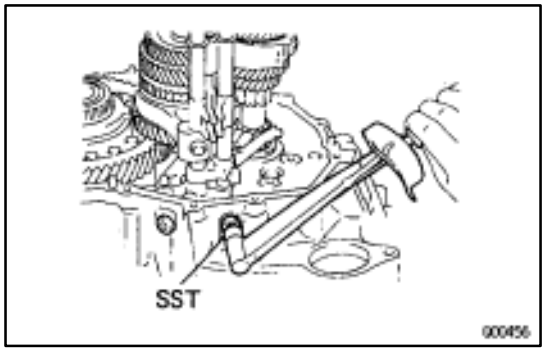
Install and torque the three set bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)



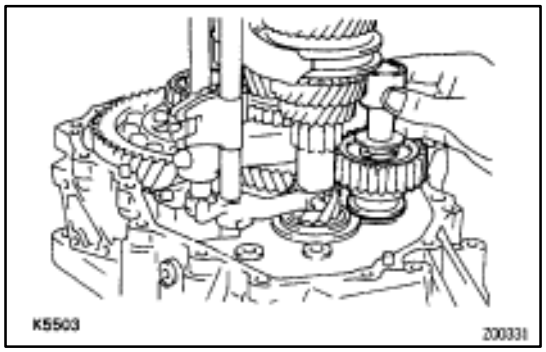
13. INSTALL TWO LOCKING BALLS, SPRINGS, SEATS AND PLUGS

(a) Install the two locking balls, springs and seats.



(b) Apply sealant to the two plugs.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

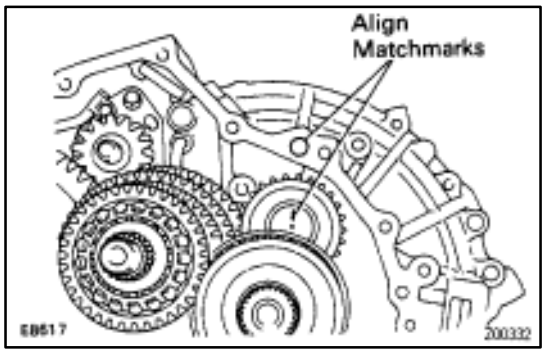
(c) Using SST, install and torque two plugs.
SST 09313–30021
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



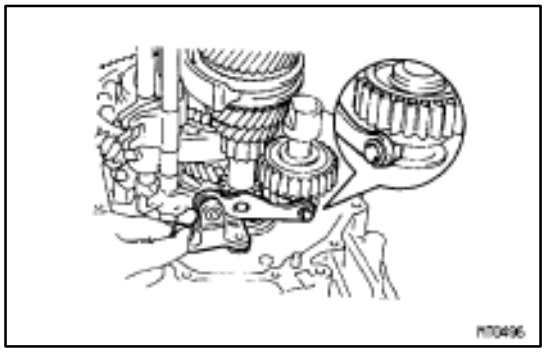
14. INSTALL REVERSE IDLER GEAR AND SHAFT

(a) Install the reverse idler gear shaft and thrust washer to the shaft.

(b) Install the reverse idler gear shaft into the case hole.



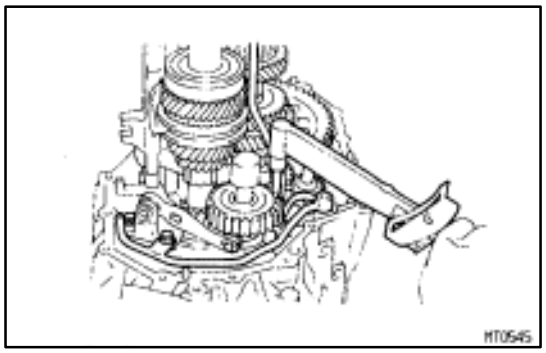
(c) Align matchmarks as shown.



15. INSTALL REVERSE SHIFT ARM BRACKET AND NO.2 OIL PIPE

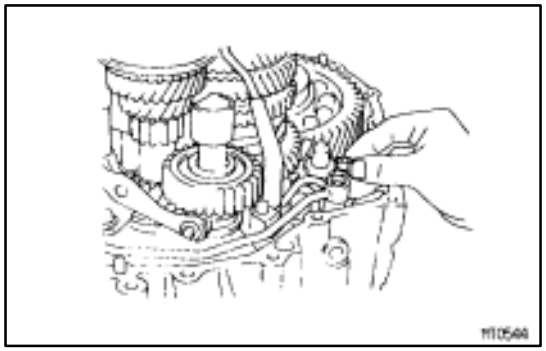
(a) Put the reverse shift fork pivot into the reverse shift arm install the reverse shift arm bracket to the transaxle case.

(b) Install the bolt.

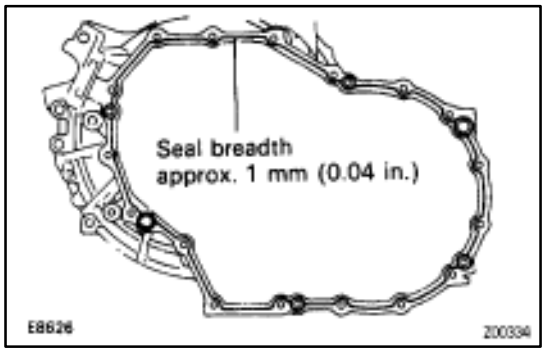


(c) Install the No.2 oil pipe and two bolts.

(d) Torque the reverse shift arm and oil pump bolts.
Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)



(e) Install a new gasket to the No.2 oil pipe.



16. INSTALL TRANSMISSION CASE

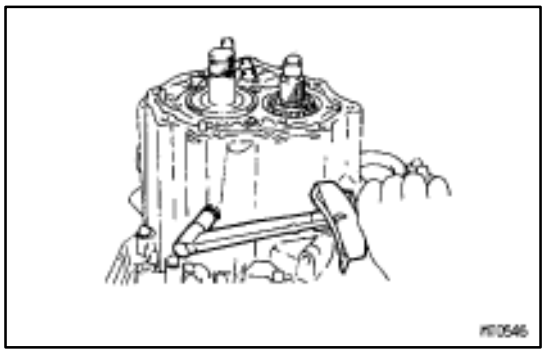
(a) Remove the any packing material and be careful not to drop oil on the contacting surfaces of the transmission case or transaxle case.

(b) Apply seal packing to the transmission case as shown in the figure.

Seal packing:

Part No.08826–00090, THREE BOND 1281 or equivalent

HINT: Install the transmission case as shown as the seal packing is applied.



(c) Install and torque the fourteen bolts to the transmission case side.

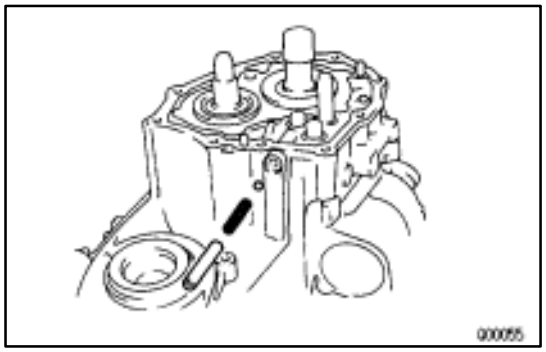
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(d) Install and torque the three bolts to the transaxle case side.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

17 INSTALL AND TORQUE REVERSE IDLER GEAR SHAFT RETAINING BOLT

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



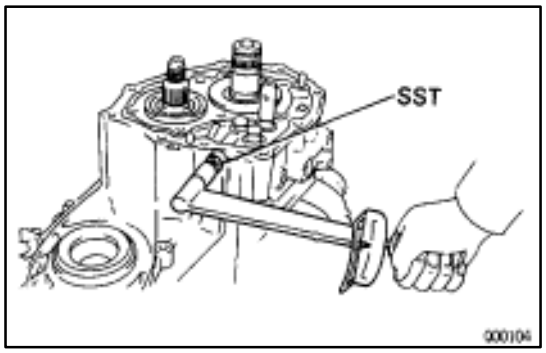
18. INSTALL LOCKING BALL, SPRING, SEAT AND PLUG

(a) Install the locking ball, spring and seat.

(b) Apply sealant to the plug.

Sealant:

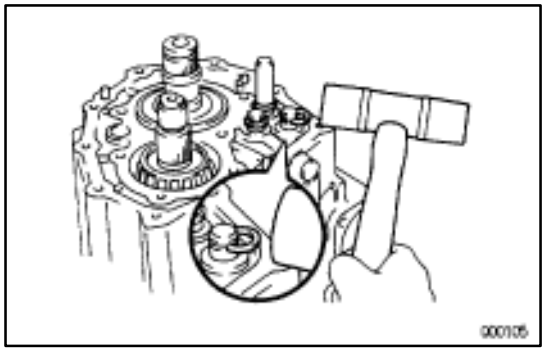
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent



(c) Using SST, install and torque the plug.

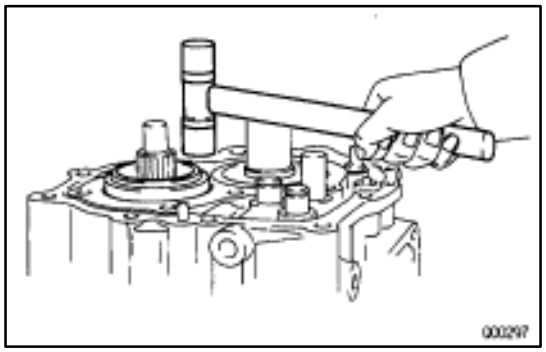
SST 09313–30021

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



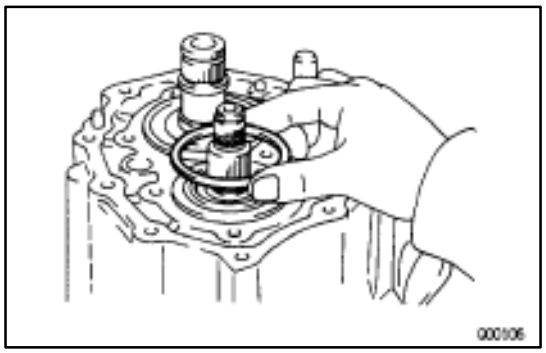
19. INSTALL SNAP RINGS

Using a plastic hammer, install the three snap rings.



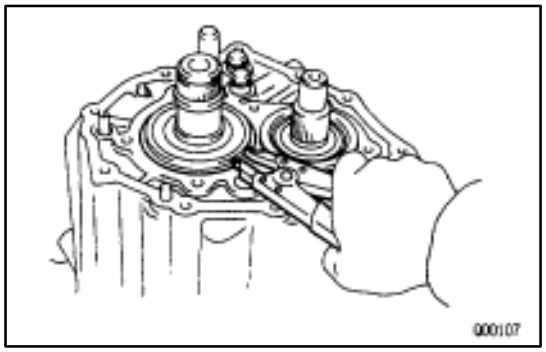
20. INSTALL OUTPUT SHAFT REAR TAPER ROLLER BEARING OUTER RACE

Using a plastic hammer, tap in the outer race.



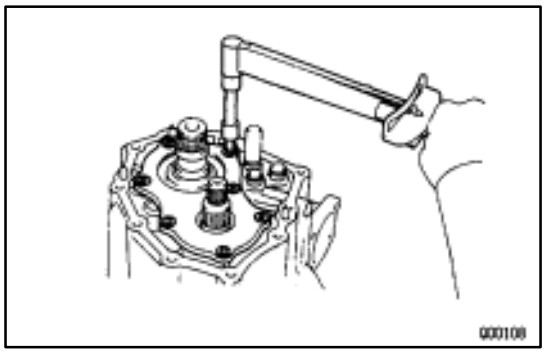
21. INSTALL SHIM

HINT: Install the previously selected.



22. INSTALL SNAP RING

Using a snap ring expander, install the snap ring to the input shaft rear bearing.



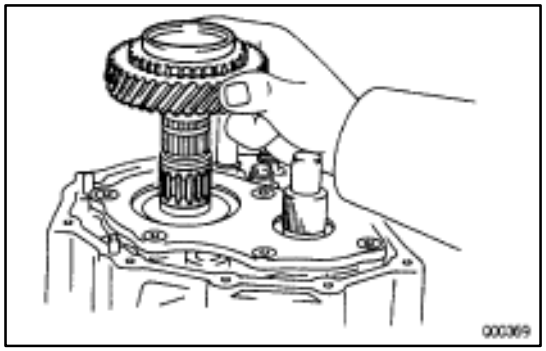
23. INSTALL REAR BEARING RETAINER

(a) Clean the threads of the torx screws.

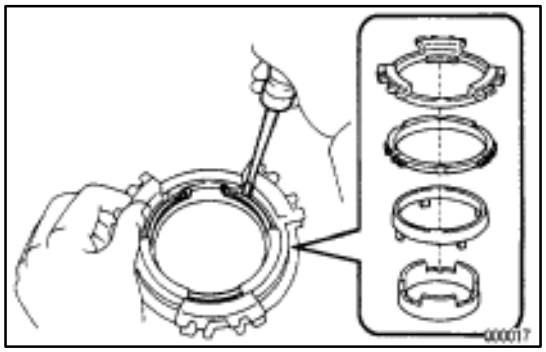
(b) Using a torx wrench, install and torque the seven torx screws.

Torx wrench T45 09042–00050

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

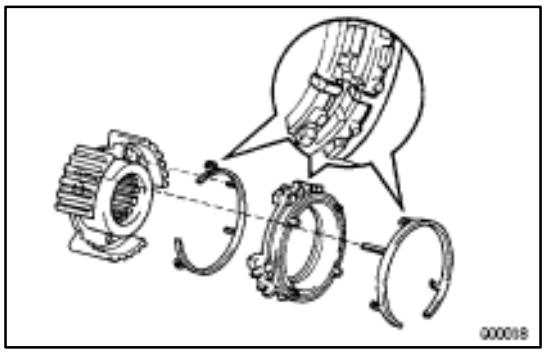


24. INSTALL NEEDLE ROLLER BEARING AND FIFTH GEAR

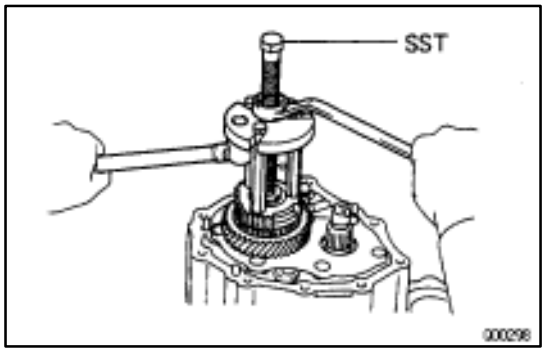


25. INSTALL NO.5 SYNCHRONIZER RINGS WITH KEY SPRING TO NO.3 CLUTCH HUB

(a) Assemble the No.5 synchronizer rings.
(b) Using a screwdriver, install the snap ring.
HINT: Wrap vinyl tape on the screwdriver to prevent damaging the synchronizer ring.

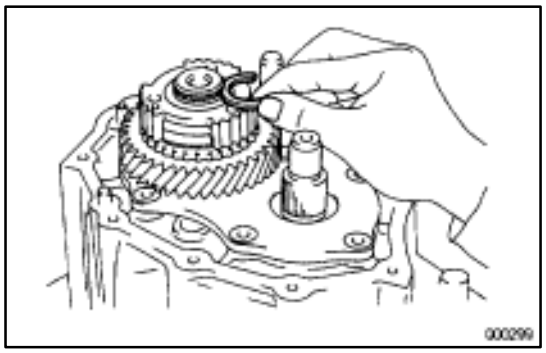


(c) Install the No.5 synchronizer rings with key springs to the No.3 clutch hub.
HINT: Align the holes of the clutch hub with key spring.



26. INSTALL NO.3 CLUTCH HUB

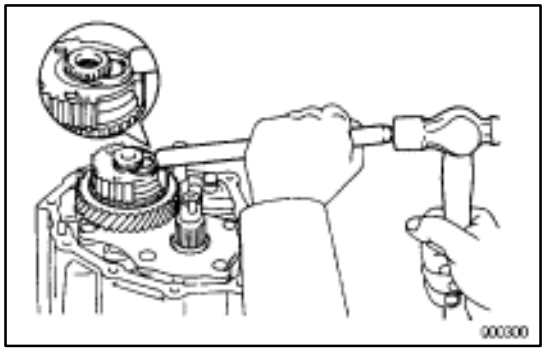
Using SST, install the No.3 clutch hub with synchronizer ring and key spring.
SST 09310–17010 (09310–07010, 09310–07020, 09310–07030)



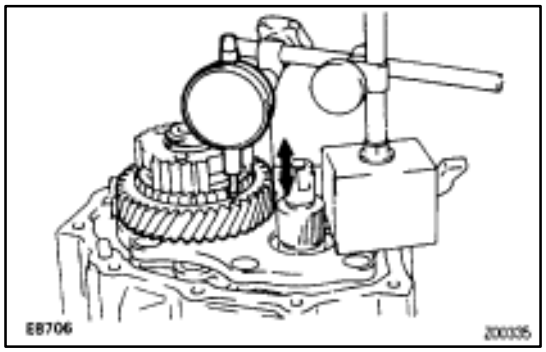
27. INSTALL SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
Q	2.25 (0.0886)	V	2.50 (0.0984)
R	2.30 (0.0906)	W	2.55 (0.1004)
S	2.35 (0.0925)	X	2.60 (0.1024)
T	2.40 (0.0945)	Y	2.65 (0.1043)
U	2.45 (0.0965)		



(b) Using a brass bar and hammer, install the snap ring.

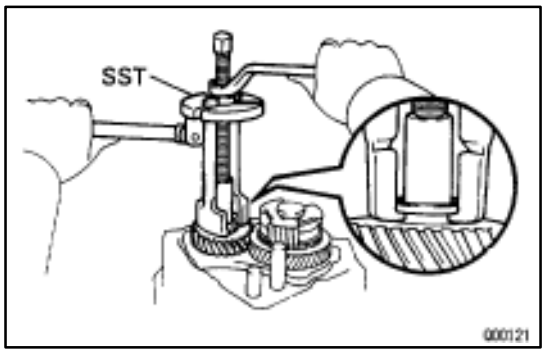


28. INSPECT FIFTH GEAR THRUST CLEARANCE

Using a dial indicator measure the 5th gear thrust clearance.

Standard clearance:

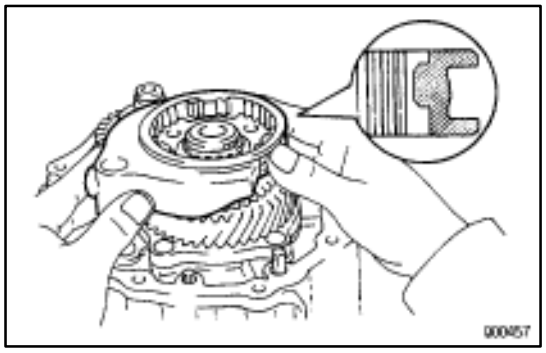
0.10–0.57 mm (0.0039–0.0224 in.)



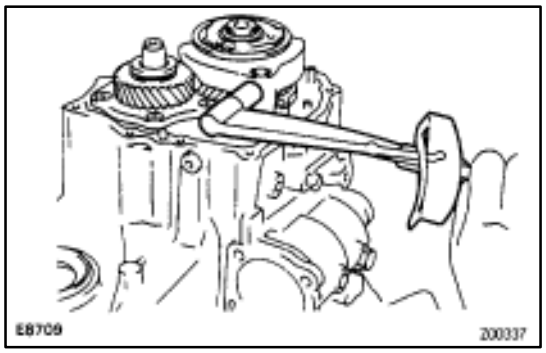
29. INSTALL FIFTH DRIVEN GEAR

Using SST, install the 5th driven gear.

SST 09310–17010 (09310–07010, 09310–07020, 09310–07040, 09310–07050)



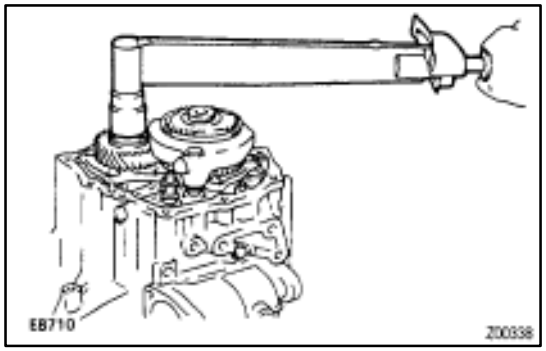
30. INSTALL NO.3 HUB SLEEVE WITH NO.3 SHIFT FORK



31. INSTALL SET BOLT

Install and torque the set bolt.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)



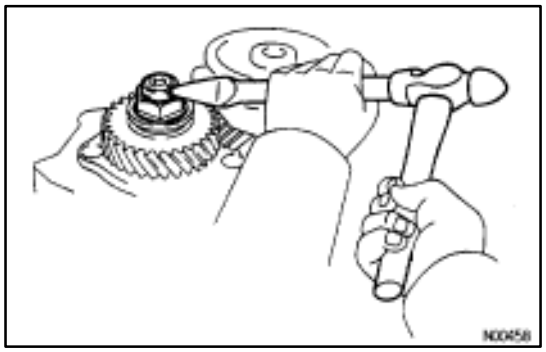
32. INSTALL LOCK NUT

(a) Engage the gear double meshing.

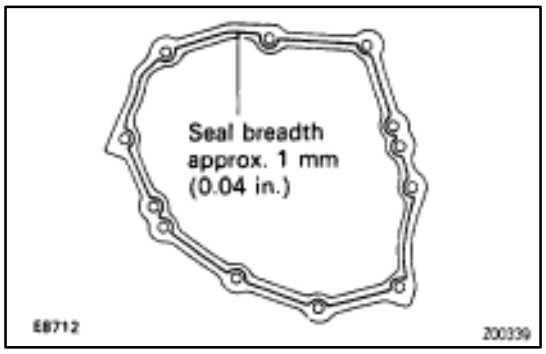
(b) Install and torque the lock nut.

Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

(c) Disengage the gear double meshing.



(d) Stake the lock nut.



33. INSTALL TRANSMISSION CASE COVER

(a) Remove the any packing material and be careful not to drop oil on the contacting surfaces of the transmission case cover.

(b) Apply seal packing to the transmission case as shown in the figure.

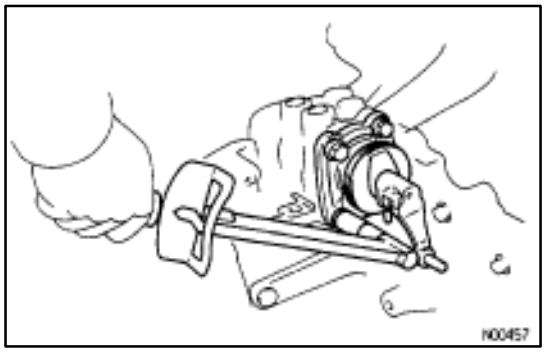
Seal packing:

Part No. 08826–00090, THREE BOND 1281 or equivalent

HINT: Install the transmission case cover as soon as the seal packing is applied.

(c) Install and torque the ten bolts.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



34. INSTALL SHIFT AND SELECT LEVER SHAFT ASSEMBLY

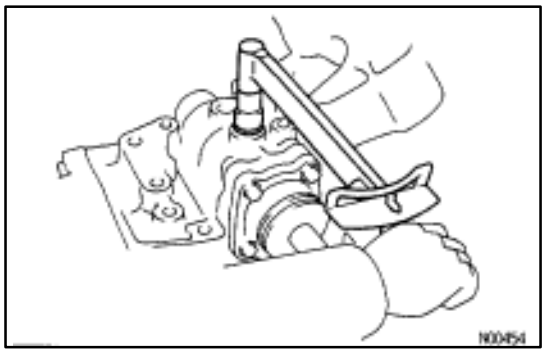
(a) Place a new gasket in position on the control shaft cover.

(b) Install the control shaft cover.

(c) Apply sealant to the bolt threads.

Sealant:

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

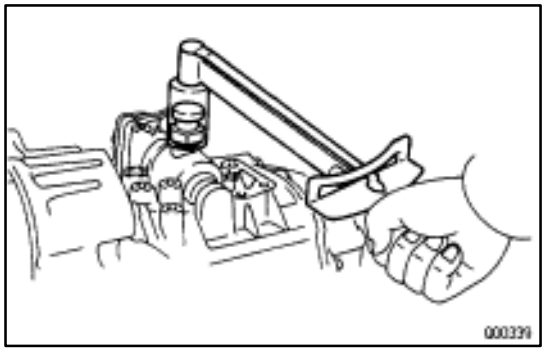


(d) Install and torque the four bolts.

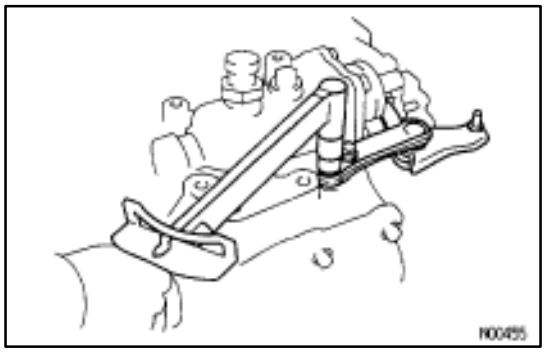
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

35. INSTALL AND TORQUE LOCK BOLT

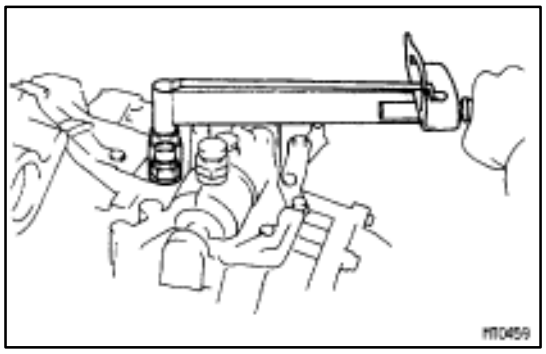
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



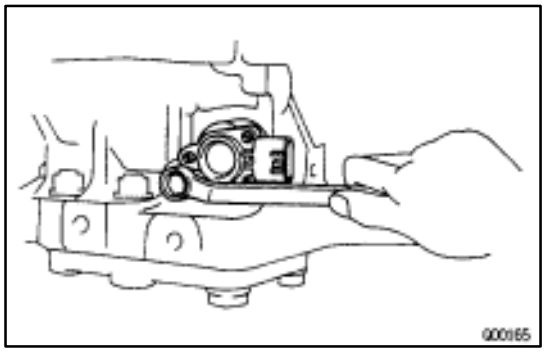
36. INSTALL BREATHER PLUG
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



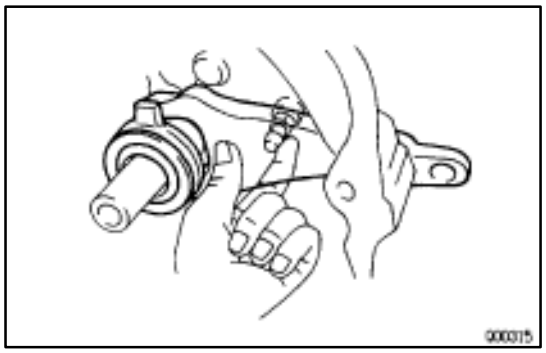
37. INSTALL AND TORQUE SELECTING BELLCRANK ASSEMBLY
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



38. INSTALL BACK–UP LIGHT SWITCH
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)



39. INSTALL SPEEDOMETER DRIVEN GEAR
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

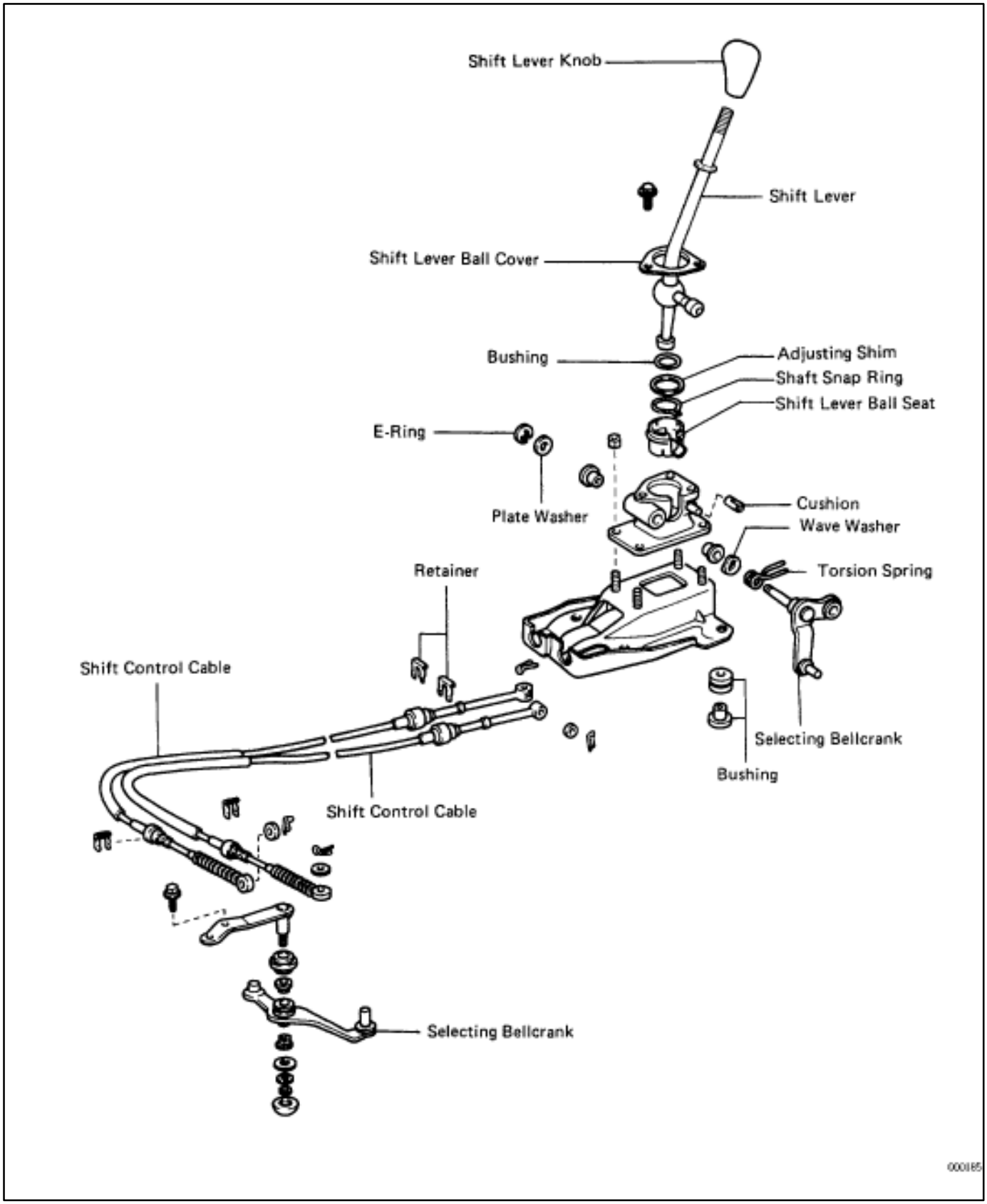


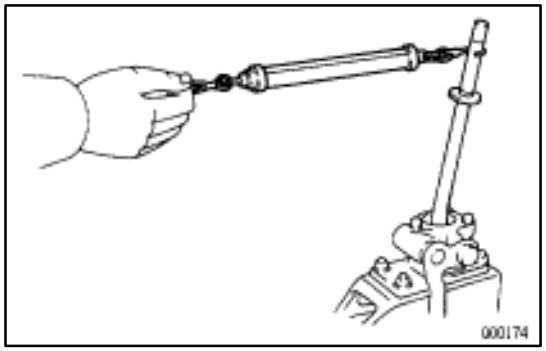
40. INSTALL RELEASE FORK AND BEARING
Apply molybdenum disulphide lithium base grease to the following parts:
- Input shaft spline
- Release fork contact surface

SHIFT LEVER AND CONTROL CABLE

COMPONENTS

MX01N–01





INSPECTION OF SHIFT LEVER

MX01P–01

INSPECT SHIFT LEVER PRELOAD

(a) Remove the shift lever ball cover, selecting bellcrank and torsion spring.

(b) Install and torque the shift lever ball cover.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(c) Selecting shim of a thickness that allow a preload of 0.49–14.7 N (60–150 kgf, 0.1–0.3 lbf) at the top of lever and install it in the shift lever seat.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	0.5 (0.020)	H	1.2 (0.047)
B	0.6 (0.024)	J	1.3 (0.051)
C	0.7 (0.028)	K	1.4 (0.055)
D	0.8 (0.031)	L	1.5 (0.059)
E	0.9 (0.035)	M	1.6 (0.063)
F	1.0 (0.039)	N	1.7 (0.067)
G	1.1 (0.043)		

SERVICE SPECIFICATIONS

SERVICE DATA

MX00Z–01

Input shaft 3rd and 4th gear journal diameter			
	Limit	35.950 mm	1.4154 in.
Input shaft 5th gear journal diameter			
	Limit	27.950 mm	1.1004 in.
Input shaft runout			
	Limit	0.05 mm	0.0020 in.
Output shaft 1st and 2nd gear journal diameter			
	Limit	38.950 mm	1.5335 in.
Output shaft runout			
	Limit	0.06 mm	0.0024 in.
Gear thrust clearance 1st			
	STD	0.10–0.35 mm	0.0039–0.0138 in.
	Limit	0.40 mm	0.0157 in.
Gear thrust clearance 2nd			
	STD	0.10–0.45 mm	0.0039–0.0177 in.
	Limit	0.50 mm	0.0197 in.
Gear thrust clearance 3rd			
	STD	0.10–0.45 mm	0.0039–0.0177 in.
	Limit	0.50 mm	0.0197 in.
Gear thrust clearance 4th			
	STD	0.10–0.55 mm	0.0039–0.0217 in.
	Limit	0.60 mm	0.0236 in.
Gear thrust clearance 5th			
	STD	0.10–0.57 mm	0.0039–0.0224 in.
	Limit	0.65 mm	0.0256 in.
Gear oil clearance 1st			
	STD	0.009–0.051 mm	0.0004–0.0020 in.
	Limit	0.070 mm	0.00280in
Gear oil clearance 2nd			
	STD	0.009–0.053 mm	0.0004–0.0021 in.
	Limit	0.070 mm	00028 in
Gear oil clearance 3rd			
	STD	0.009–0.053 mm	0.0004–0.0021 in.
	Limit	0.070 mm	0.0028 in
Gear oil clearance 4th			
	STD	0.009–0.051 mm	0.0004–0.0020 in.
	Limit	0.070 mm	0.0028 in.
Gear oil clearance 5th			
	STD	0.009–0.050 mm	0.0004–0.0020 in.
	Limit	0.070 mm	0.0028 in.
Shift fork to hub sleeve clearance			
	Limit	1.0 mm	0.039 in.
Synchronizer ring to gear clearance 1st, 4th and 5th			
	Limit	0.6 mm	0.024 in.
Synchronizer ring to gear clearance 2nd and 3rd			
	Limit	0.7mm	0.028 in.

Input shaft snap ring thickness			
No.2 clutch hub	Mark H	2.30 mm	0.0906 in.
No.2 clutch hub	Mark J	2.35 mm	0.0925 in.
No.2 clutch hub	Mark K	2.40 mm	0.0945 in.
No.2 clutch hub	Mark L	2.45 mm	0.0965 in.
No.2 clutch hub	Mark M	2.50 mm	0.0984 in.
No.2 clutch hub	Mark N	2.55 mm	0.1004 in.
No.2 clutch hub	Mark P	2.60 mm	0.1024 in.
No.3 clutch hub	Mark Q	2.25 mm	0.0886 in.
No.3 clutch hub	Mark R	2.30 mm	0.0906 in.
No.3 clutch hub	Mark S	2.35 mm	0.0925 in.
No.3 clutch hub	Mark T	2.40 mm	0.0945 in.
No.3 clutch hub	Mark U	2.45 mm	0.0965 in.
No.3 clutch hub	Mark V	2.50 mm	0.0984 in.
No.3 clutch hub	Mark W	2.55 mm	0.1004 in.
No.3 clutch hub	Mark X	2.60 mm	0.1024 in.
No.3 clutch hub	Mark Y	2.65 mm	0.1043 in.
Output shaft snap ring thickness			
No.1 clutch hub	Mark A	2.80 mm	0.1102 in.
No.1 clutch hub	Mark B	2.85 mm	0.1122 in.
No.1 clutch hub	Mark C	2.90 mm	0.1142 in.
No.1 clutch hub	Mark D	2.95 mm	0.1161 in.
No.1 clutch hub	Mark E	3.00 mm	0.1181 in.
No.1 clutch hub	Mark F	3.05 mm	0.1201 in.
No.1 clutch hub	Mark G	3.10 mm	0.1220 in.
Oil pump body clearance			
	STD	0.10–0.16 mm	0.004–0.006 in.
	Limit	0.30 mm	0.012 in.
Oil pump tip clearance			
	STD	0.08–0.15 mm	0.003–0.006 in.
	Limit	0.30 mm	0.012 in.
Oil pump side clearance			
	STD	0.03–0.08 mm	0.001–0.003 in.
	Limit	0.15 mm	0.006 in.
Control shaft cover oil seal drive in depth		0–1.0 mm	0–0.039 in.

Differential pinion to side gear backlash		0.05–0.20 mm	0.0020–0.0079 in.	
Differential side gear thrust washer thickness				
	None Mark	0.80 mm	0.0315 in.	
	None Mark	0.90 mm	0.0354 in.	
	None Mark	1.00 mm	0.0394 in.	
	None Mark	1.10 mm	0.0433 in.	
	None Mark	1.20 mm	0.0472 in.	
	None Mark	1.30 mm	0.0512 in.	
	None Mark	1.40 mm	0.0551 in.	
Differential case side bearing preload (at starting)				
New bearing (add output shaft preload)		0.2–0.4 N·m	2.0–4.1 kgf·cm	1.7–3.6 in.·lbf
Reused bearing (add output shaft preload)		0.1–0.2 N·m	1.3–2.5 kgf·cm	1.1–2.2 in.·lbf
Differential side bearing adjusting shim thickness				
	Mark 0	2.00 mm	0.0787 in.	
	Mark 1	2.05 mm	0.0807 in.	
	Mark 2	2.10 mm	0.0827 in.	
	Mark 3	2.15 mm	0.0846 in.	
	Mark 4	2.20 mm	0.0866 in.	
	Mark 5	2.25 mm	0.0886 in.	
	Mark 6	2.30 mm	0.0906 in.	
	Mark 7	2.35 mm	0.0925 in.	
	Mark 8	2.40 mm	0.0945 in.	
	Mark 9	2.45 mm	0.0965 in.	
	Mark A	2.50 mm	0.0984 in.	
	Mark B	2.55 mm	0.1004 in.	
	Mark C	2.60 mm	0.1024 in.	
	Mark D	2.65 mm	0.1043 in.	
	Mark E	2.70 mm	0.1063 in.	
	Mark F	2.75 mm	0.1083 in.	
	Mark G	2.80 mm	0.1102 in.	
	Mark H	2.85 mm	0.1122 in.	
Output shaft bearing preload (at starting)				
New bearing		0.8–1.6 N·m	8–16 kgf·cm	6.9–13.9 in.·lbf
Reused bearing		0.5–1.0 N·m	5–10 kgf·cm	4.3–8.7 in.·lbf

Output shaft rear bearing adjusting shim thickness				
	Mark 0	1.30 mm	0.0512 in.	
	Mark 1	1.35 mm	0.0531 in.	
	Mark 2	1.40 mm	0.0551 in.	
	Mark 3	1.45 mm	0.0571 in.	
	Mark 4	1.50 mm	0.0591 in.	
	Mark 5	1.55 mm	0.0610 in.	
	Mark 6	1.60 mm	0.0630 in.	
	Mark 7	1.65 mm	0.0650 in.	
	Mark 8	1.70 mm	0.0669 in.	
	Mark 9	1.75 mm	0.0689 in.	
	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.	
	Mark G	2.10 mm	0.0827 in.	
	Mark H	2.15 mm	0.0846 in.	
	Mark J	2.20 mm	0.0866 in.	
	Mark K	2.25 mm	0.0886 in.	
	Mark L	2.30 mm	0.0906 in.	
	Mark M	2.35 mm	0.0925 in.	
	Mark N	2.40 mm	0.0945 in.	
	Mark P	2.45 mm	0.0965 in.	
	Mark Q	2.50 mm	0.0984 in.	
Shift lever preload		0.49–1.47 N	60–150 kgf	0.1–0.3 lbf
Shift lever preload adjusting shim thickness				
	Mark A	0.5 mm	0.020 in.	
	Mark B	0.6 mm	0.024 in.	
	Mark C	0.7 mm	0.028 in.	
	Mark D	0.8 mm	0.031 in.	
	Mark E	0.9 mm	0.035 in.	
	Mark F	1.0 mm	0.039 in.	
	Mark G	1.1 mm	0.043 in.	
	Mark H	1.2 mm	0.047 in.	
	Mark J	1.3 mm	0.051 in.	
	Mark K	1.4 mm	0.055 in.	
	Mark L	1.5 mm	0.059 in.	
	Mark M	1.6 mm	0.063 in.	
	Mark N	1.7 mm	0.067 in.	

TORQUE SPECIFICATIONS

MX010–01

Part tightened	N·m	kgf·cm	ft·lbf
Transaxle X Engine			
12 mm bolt	64	650	47
10 mm bolt	46	470	34
Front suspension member X Body	181	1,850	134
Front lower brace X Body	36	370	27
Rear lower brace X Body			
Bolt	32	330	24
Nut	36	370	27
Engine rear mounting X Front suspension member	80	820	59
Engine front mounting X Front suspension member	80	820	59
Engine absorber lock bolt	48	490	35
Engine X Stiffener plate	18	185	13
Transaxle X Stiffener plate	37	380	27
Steering gear housing X Front suspension member	181	1,850	134
Stabilizer bar bushing bracket lock bolt	19	195	14
Exhaust front pipe X Catalytic converter	43	440	32
Exhaust front pipe X Exhaust manifold	62	630	46
Transaxle X Clutch accumulator bracket	20	200	14
Transaxle X Starter	39	400	29
Transaxle X Clutch release cylinder	13	130	9
Transaxle X Transaxle case receiver	7.4	75	65 in.·lbf
Oil pump X Cover	10	105	8
Transaxle case X Transaxle case cover	54	550	40
Differential right case X Differential left case	63	640	46
Differential ring gear X Differential case	124	1,260	91
Transaxle case X Oil pump	17	175	13
Transaxle case X Transmission case	29	300	22
Reverse idler gear lock bolt	29	300	22
Transmission case X Rear bearing retainer	42	430	31
5th driven gear lock nut	123	1,250	90
Transmission case X Transmission case cover	29	300	22
Shift and select lever shaft lock bolt	20	200	14
Shift lever lock bolt	49	500	36
Breather plug	49	500	36
Selecting bellcrank lock bolt	20	200	14
Back–up light switch	40	410	30
Speed sensor lock bolt	7.4	75	65 in.·lbf
Shift lever ball cover lock bolt	5.0	50	43 in.·lbf

AUTOMATIC TRANSAXLE

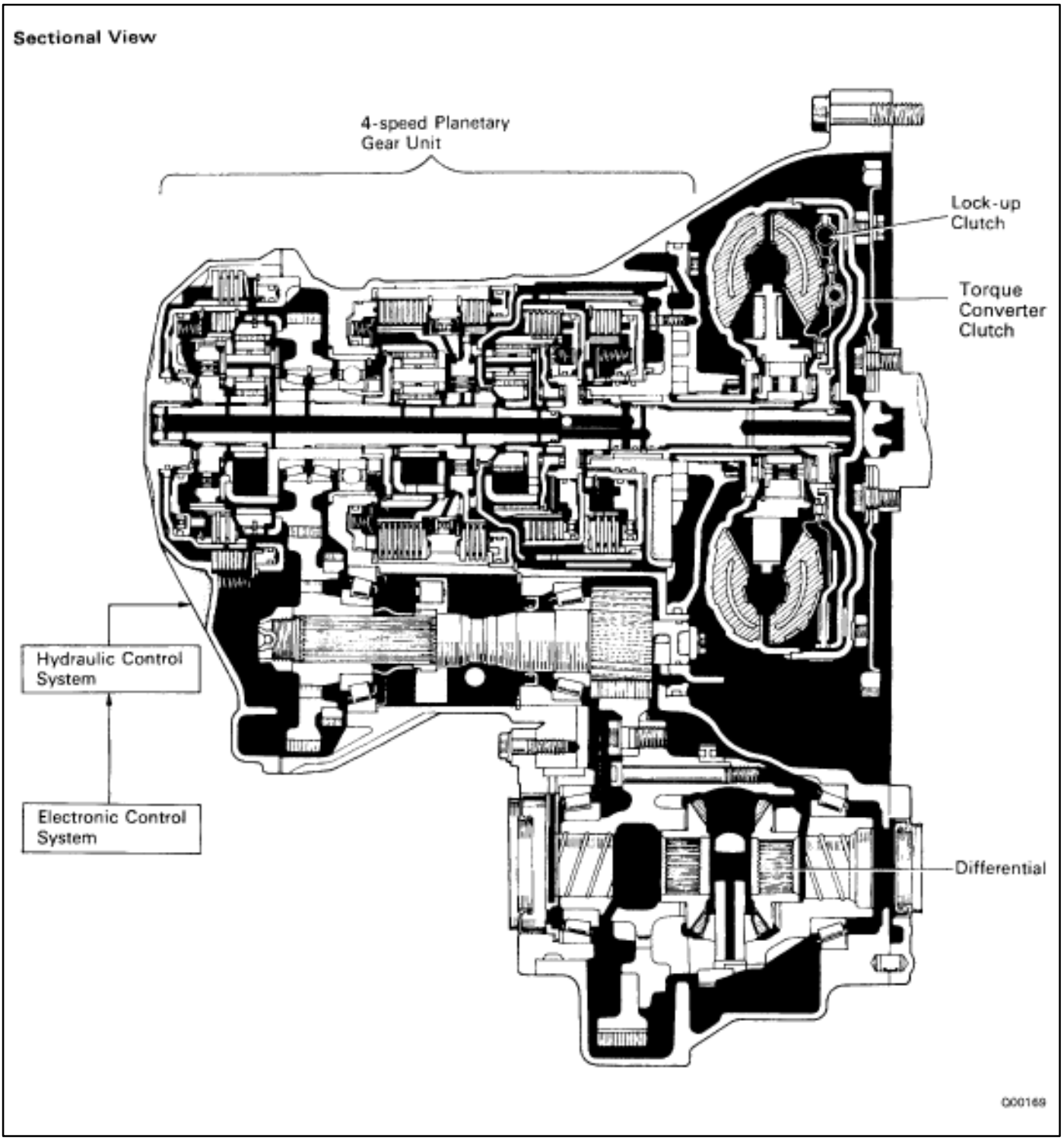
DESCRIPTION

GENERAL DESCRIPTION

AX016–01

The A540E is a 4–speed Electronic Controlled Transaxle (hereafter called ECT) developed exclusively for use with a transversely–mounted engine. A lock–up is built into the torque converter.

The A540E transaxle is mainly composed of the torque converter clutch, the 4–speed planetary gear unit, the differential, the hydraulic control system and the electronic control system.



SPECIFICATIONS

AX017–01

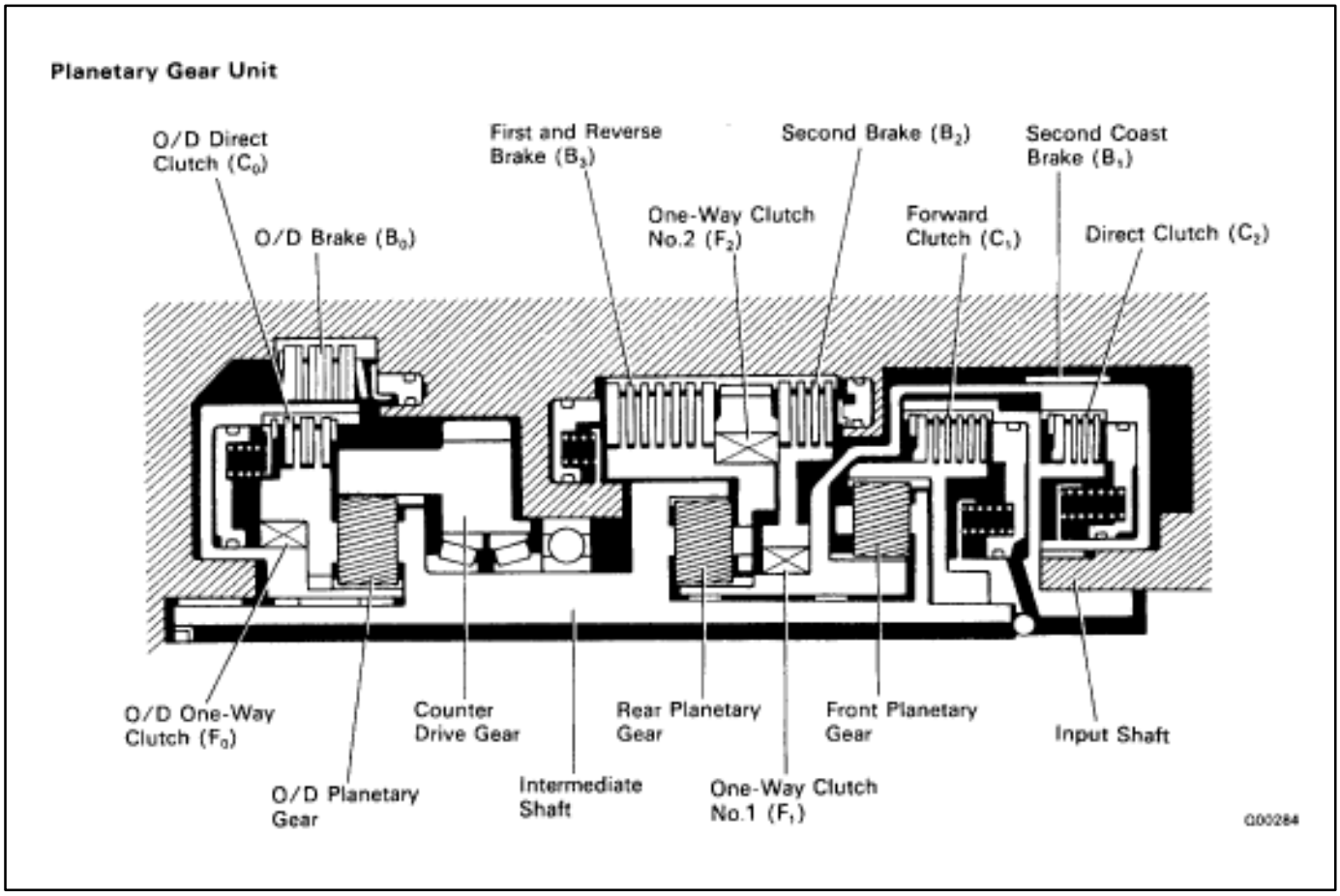
Type of Transmission				A540E
Type of Engine				3VZ–FE
Torque Converter Clutch	Stall Torque Ratio			1.9 : 1
	Lock–Up Mechanism			Equipped
Gear Ratio	1st Gear			2.810
	2nd Gear			1.549
	3rd Gear			1.000
	O/D Gear			0.734
	Reverse Gear			2.296
Number of Discs and Plates (Disc/Plate)	C_0	O/D Direct Clutch		2/2
	C_1	Forward Clutch		5/5
	C_2	Direct Clutch		3/3
	B_2	2nd Brake		3/3
	B_3	First & Reverse Brake		7/7
	B_0	O/D Brake		3/3
B_1 Band Width			mm (in.)	38 (1.50)
ATF	Type			ATF DEXRON® II
	Capacity liter		A/T	6.5 (6.9, 5.7)
	(US qts, Imp. qts)		D/F	0.8 (0.8, 0.7)

V00334

OPERATION

MECHANICAL OPERATION

AX018–01



O ... Operating

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

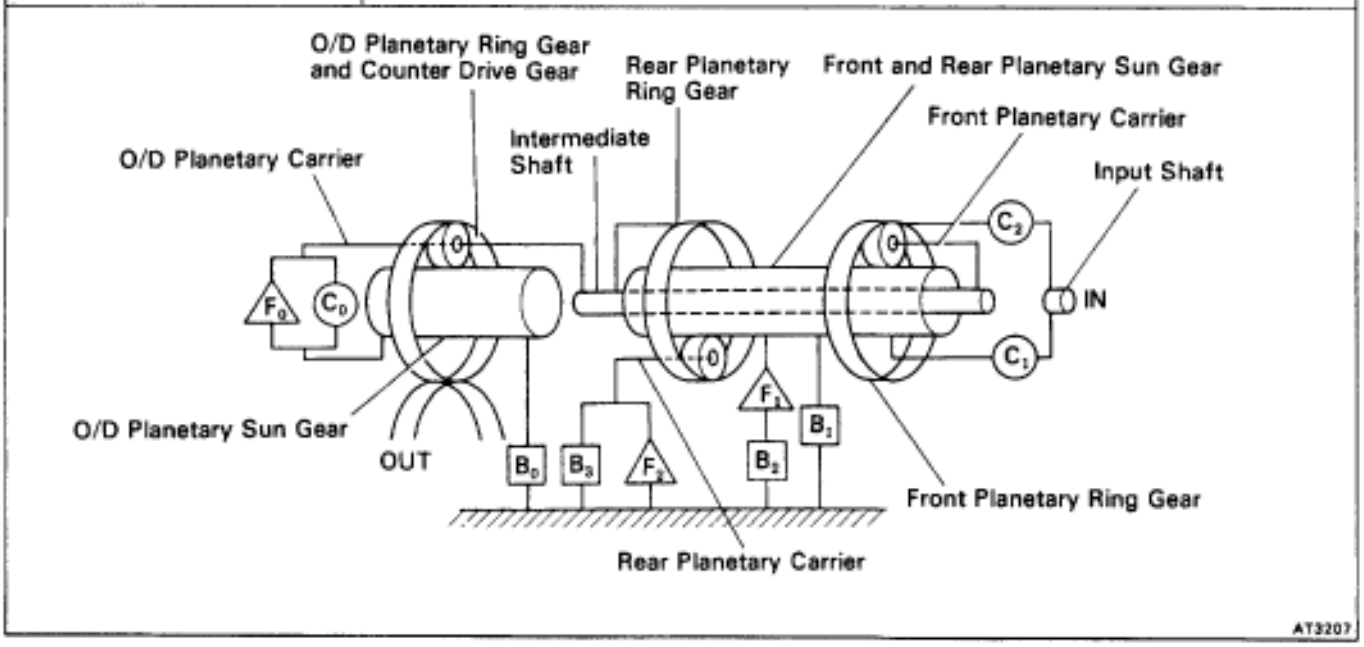
* Down–shift–no up–shift

V00337

FUNCTION OF COMPONENTS

AX019–01

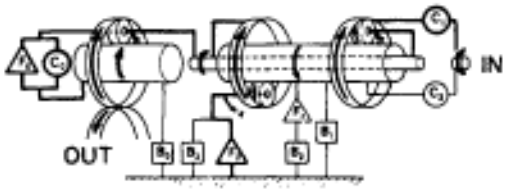
NOMENCLATURE		OPERATION
Forward Clutch	C_1	Connects input shaft and front planetary ring gear
Direct Clutch	C_2	Connects input shaft and front & rear planetary sun gear
2nd Coast Brake	B_1	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise
2nd Brake	B_2	Prevents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



V00341

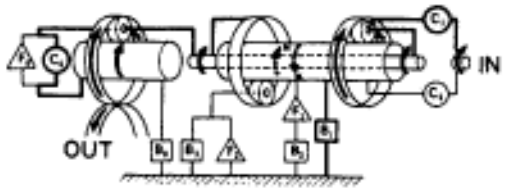
Power from the engine transmitted to the input shaft via the torque converter clutch is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one–way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution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

D or 2 Range 1st Gear



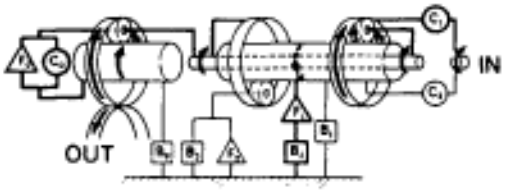
AT1097

2 Range 2nd Gear



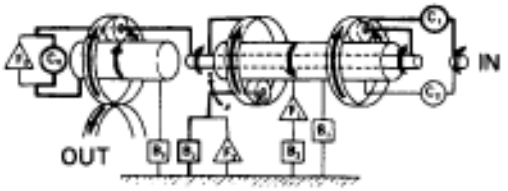
AT1102

D Range 2nd Gear



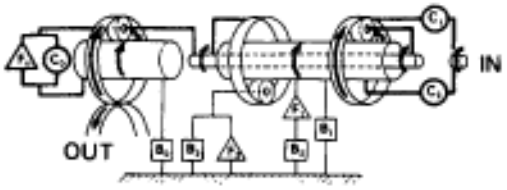
AT1098

L Range 1st Gear



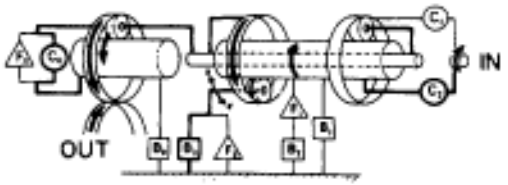
AT1103

D Range 3rd Gear



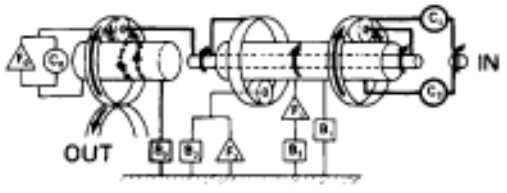
AT1099

R Range Reverse Gear



AT1101

D Range O/D Gear



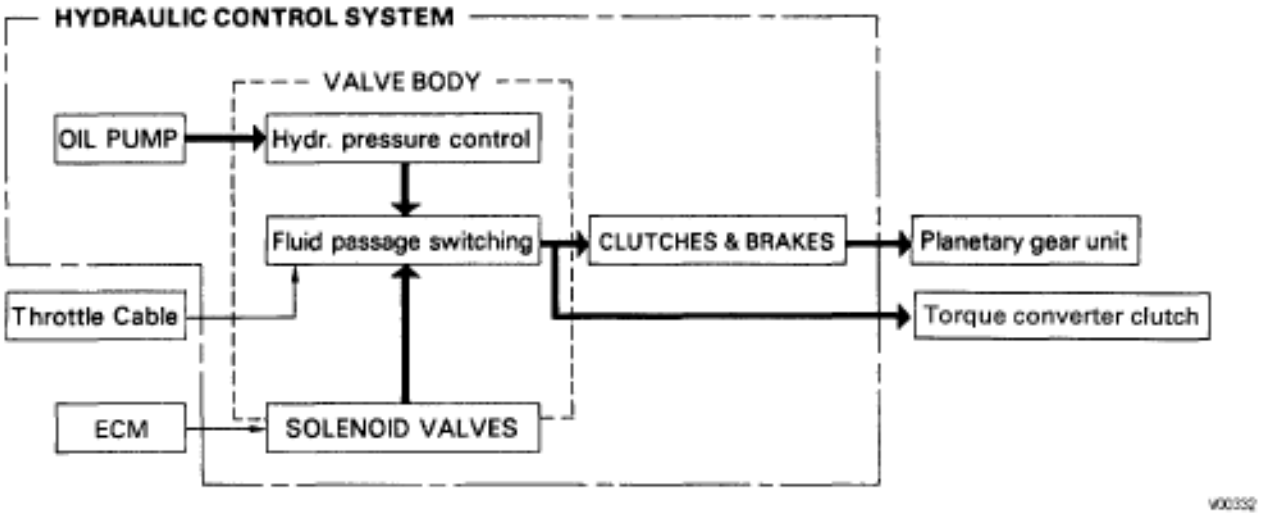
AT1100

V00342

HYDRAULIC CONTROL SYSTEM

AX01A–01

The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes as well as the fluid passages which connect all of these components.
Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.
There are three solenoid valves on the valve body.
The No. 1 and No. 2 solenoid valves are turned on and off by signals from the ECM to operate the shift valves and change the gear shift position.
The SL solenoid valve is operated by signals from the ECM to engage or disengage the lock–up clutch of the torque converter (clutch).



ELECTRONIC CONTROL SYSTEM

AX01B–01

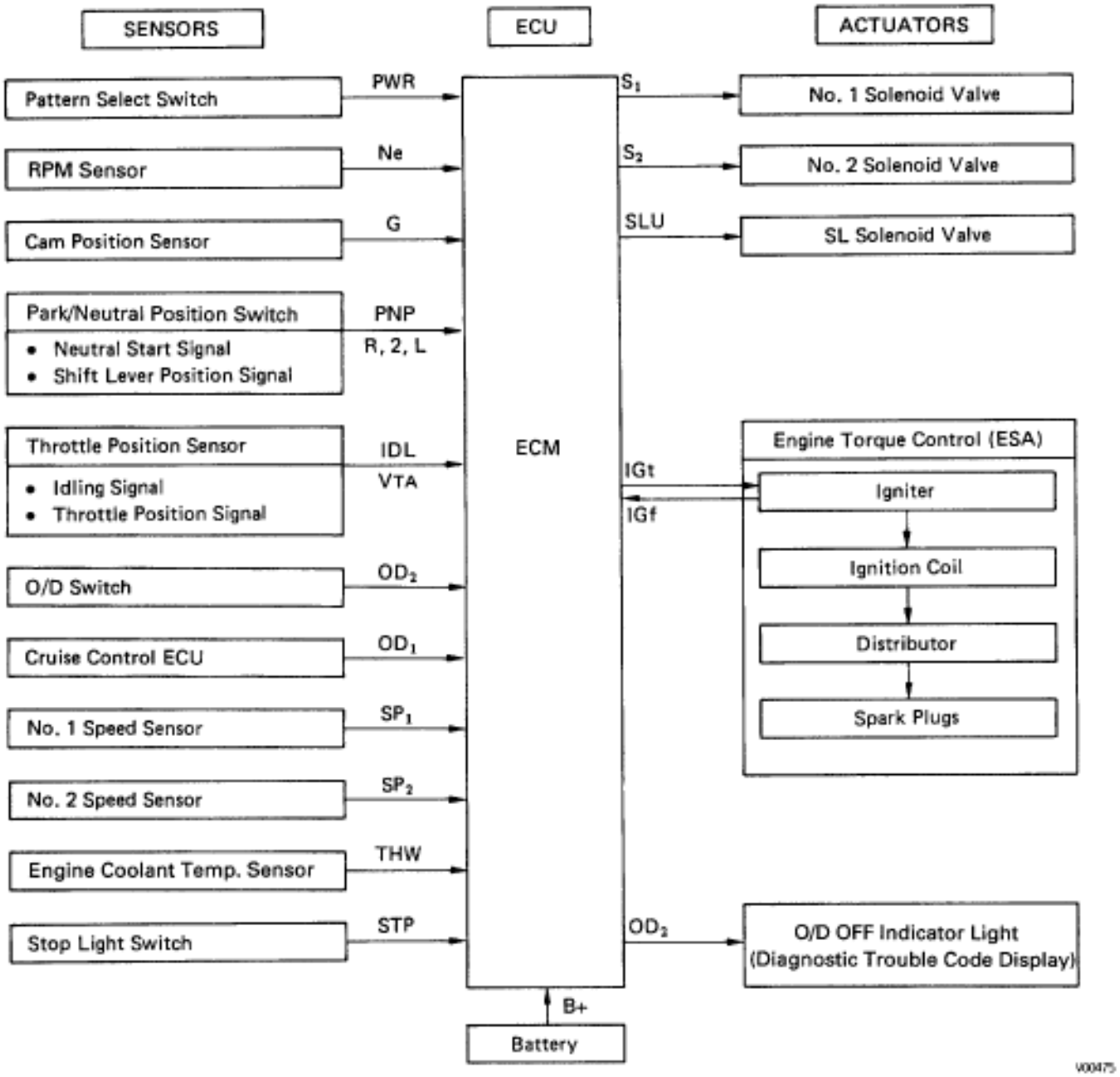
GENERAL

The electronic control system for the A540E automatic transaxle provides extremely precise control of the gear shift timing and lock–up timing in response to driving condition as sensed by various sensors located throughout the vehicle and in response to the engine's running condition. At the same time, the ECM control reduces vehicle squat when the vehicle starts out and gear shift shock.

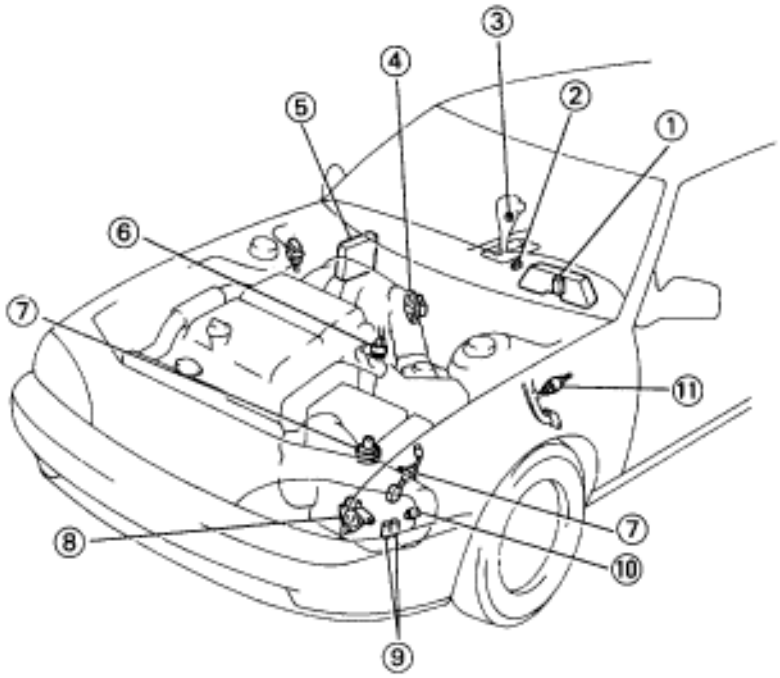
The electronic control system is also equipped with a self diagnosis system which diagnoses malfunctions of electronically controlled components and warns the driver, and a fail–safe system which makes it possible for the vehicle to continue functioning when a malfunction occurs.

CONSTRUCTION

The electronic control system can be broadly divided three groups; the sensors, ECM, and actuators.



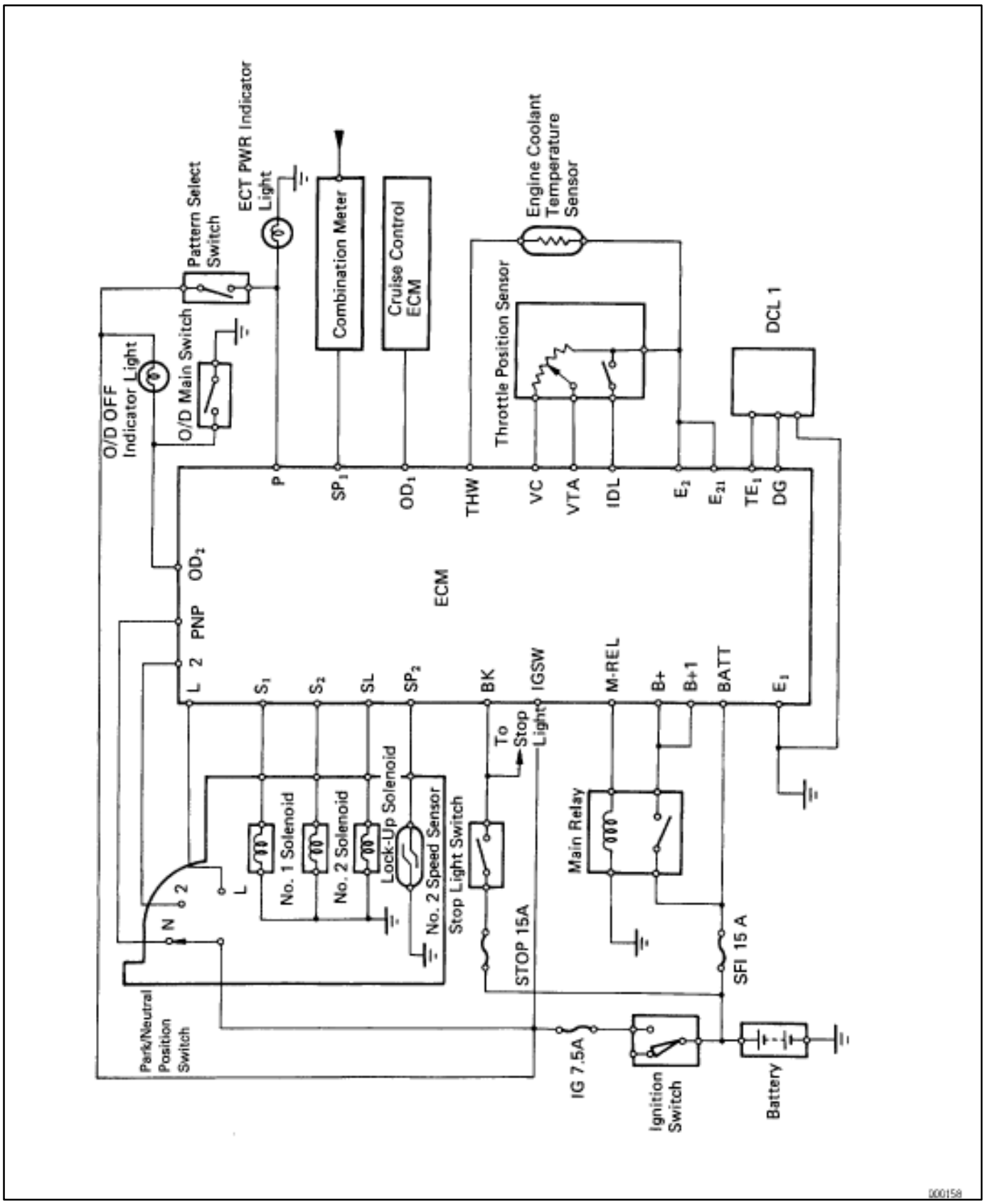
ARRANGEMENT OF COMPONENTS



No.	Components	Functions
①	O/D OFF Indicator Light	Blinks and warns the driver, while the O/D main switch is pushed in, when the electronic control circuit is malfunctioning.
②	Pattern Select Switch	Selects the Power mode or the Normal mode for shift and lock-up timing.
③	O/D Switch	Prevents up shift to the O/D gear if the O/D switch is off.
④	Throttle Position Sensor	Detects the throttle valve opening angle.
⑤	ECM	Controls the engine and transmission actuators based on signals from each sensor.
⑥	Engine Coolant Temp. Sensor	Detects the engine coolant temperature.
⑦	No. 1 and No. 2 Speed Sensors	Detect the vehicle speed. Ordinarily, ECT control uses signals from the No. 2 speed sensor, and the No. 1 speed sensor is used as a back-up
⑧	Park/Neutral Position Switch	Detects the shift lever position.
⑨	No. 1 and No. 2 Solenoid Valves	Control the hydraulic pressure applied to each shift valve, and control the gear shift position and timing.
⑩	No. 3 Solenoid For lock-up control pressure modulation	Controls the hydraulic pressure applied to the lock-up clutch and controls lock-up timing.
⑪	Stop Light Switch	Detects if the brake pedal is depressed.

V00476

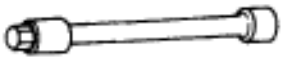
SYSTEM DIAGRAM



PREPARATION

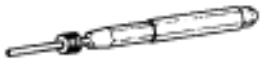
SST (SPECIAL SERVICE TOOLS)

AX01C–01

	09043–38100	Hexagon 10 mm Wrench	Remove and install oil pan drain plug.
	09223–15010	Crankshaft Rear Oil Seal Replacer	
	09308–00010	Oil Seal Puller	Remove side gear shaft oil seal.
	09316–60010	Transmission & Transfer Bearing Replacer	Install RH side bearing to differential case.
	(09316–00010)	Replacer Pipe	Install right sid, gear shaft oil seal.
	09350–32014	TOYOTA Automatic Transmission Tool Set	
	(09351–32010)	One–way Clutch Test Tool	
	(09351–32020)	Stator Stopper	
	09843–18020	Diagnosis Check Wire	
	09992–00094	Automatic Transmission Oil Pressure Gauge Set	Line pressure

RECOMMENDED TOOLS

AX01D–01

	09031–00030 Pin Punch	Pin diameter 3mm(0.12in.)
	09082–00015 TOYOTA Electrical Tester	

EQUIPMENT

AX01E–01

Straight edge	Check torque converter clutch installation.
Vernier calipers	Check torque converter clutch installation.
Dial indicator or dial indicator with magnetic base	Measure drive plate runout.
Torque wrench	

LUBRICANT

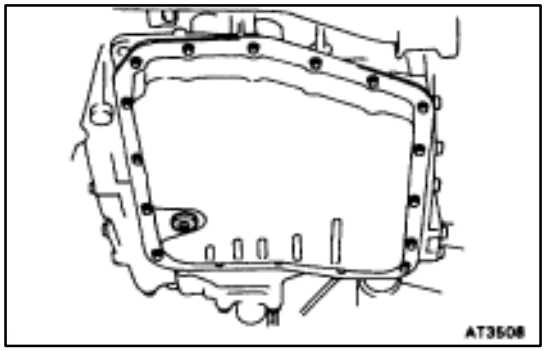
AX01Q–02

Item	Capacity	Classification
Automatic transaxle fluid (w/o differential oil) Dry fill Drain and refill	 6.5 liters (6.9 US qts, 5.7 Imp. qts) 2.9 liters (3.1 US qts, 2.6 Imp. qts)	ATF DEXRON® II
Differential oil (w/Differential oil)	0.8 liters (0.8 US qts, 0.7 Imp. qts)	ATF DEXRON® II

SSM (Special Service Materials)

AX01F–01

08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Torque converter clutch mounting bolt

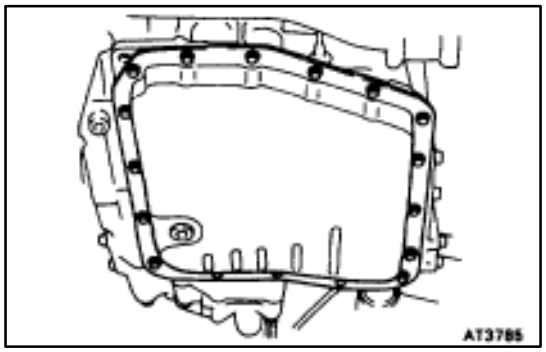


ON–VEHICLE REPAIR
VALVE BODY REMOVAL

AX02C–01

1. CLEAN TRANSMISSION EXTERIOR

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



2. DRAIN TRANSMISSION FLUID

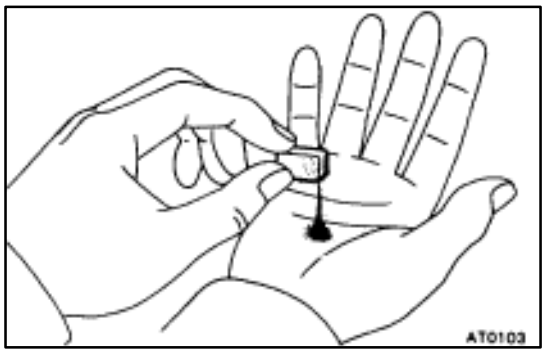
Using SST, remove the drain plug and the fluid into suitable container.

SST 09043–38100

3. REMOVE OIL PAN AND GASKET

NOTICE: Some fluid will remain in the oil pan.

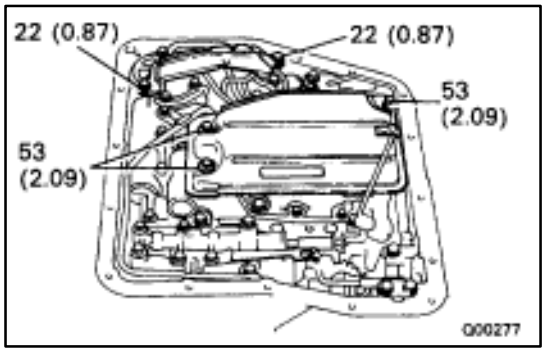
Remove all pan bolts, and carefully remove the pan assembly. Discard the gasket.



4. EXAMINE PARTICLES IN PAN

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

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

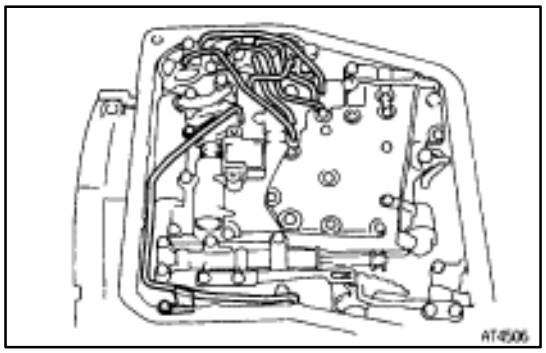


5. REMOVE OIL STRAINER AND APPLY TUBE BRACKET

(a) Remove the three bolts and the oil strainer.

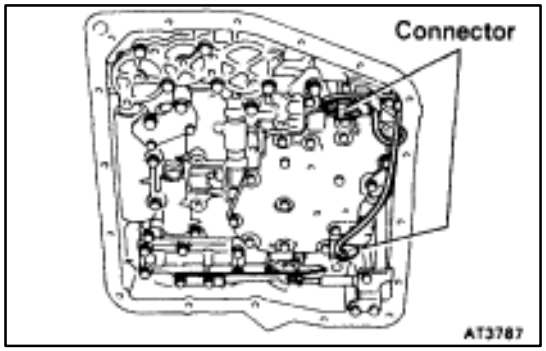
NOTICE: Be careful as shown oil will come out with the strainer.

(b) Remove the two bolts and the apply tube bracket.

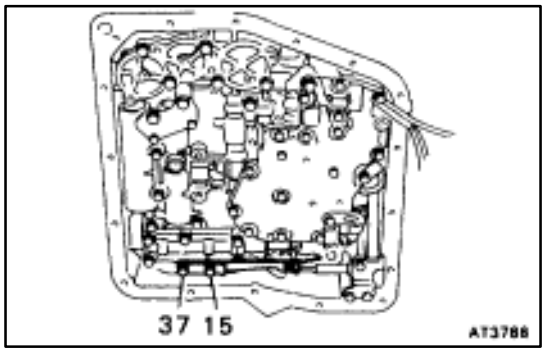


6. REMOVE OIL TUBES

Pry up both tube ends with a large screwdriver and remove the seven tubes.

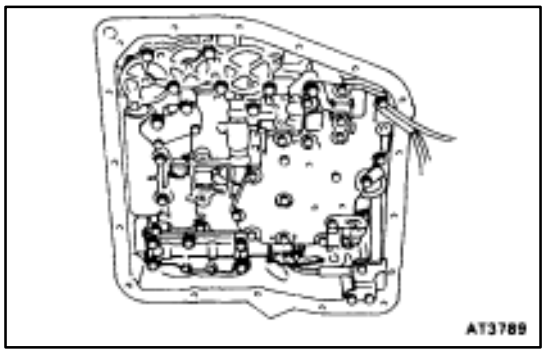


7. DISCONNECT SOLENOID CONNECTORS

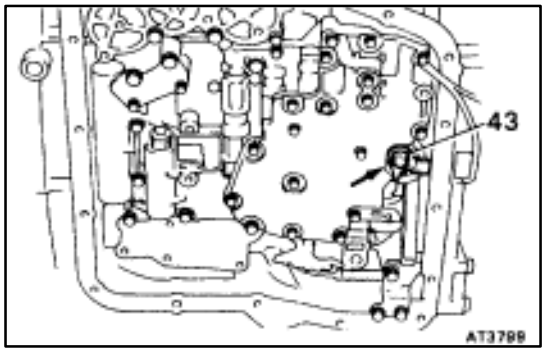


8. REMOVE MANUAL VALVE BODY

(a) Remove the two bolts and detent spring.

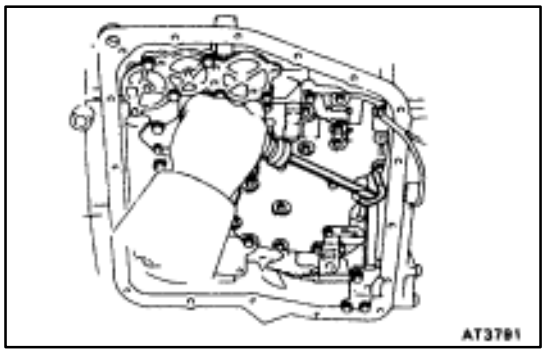


(b) Remove the five bolts and manual valve body.

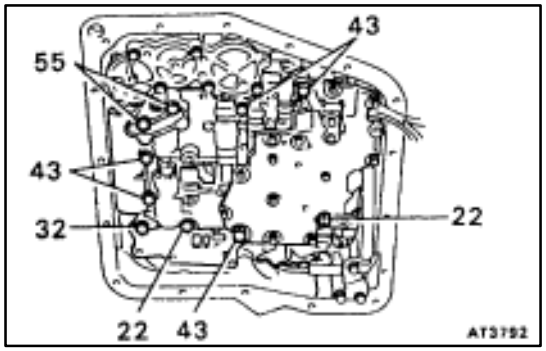


9. REMOVE B_3 APPLY TUBE

(a) Remove the tube retainer.

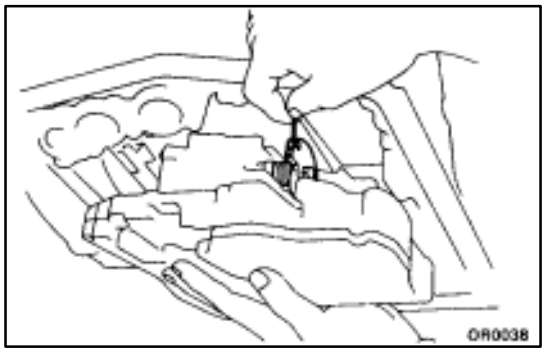


(b) Pry up the tube with a screwdriver and remove the tube.

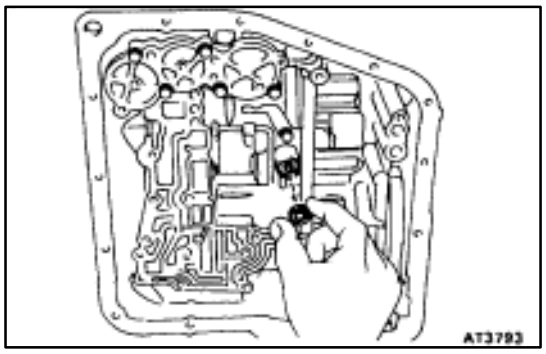


10. REMOVE VALVE BODY

(a) Remove the ten bolts and connector clamp.



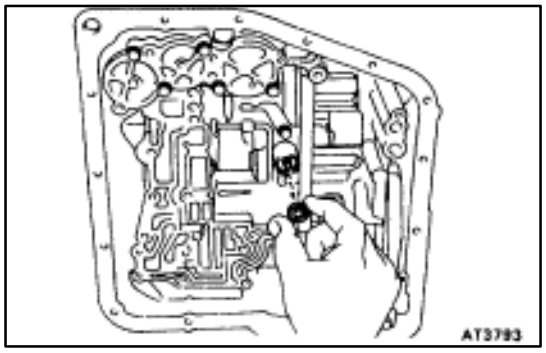
(b) Disconnect the throttle cable from cam and remove the valve body.



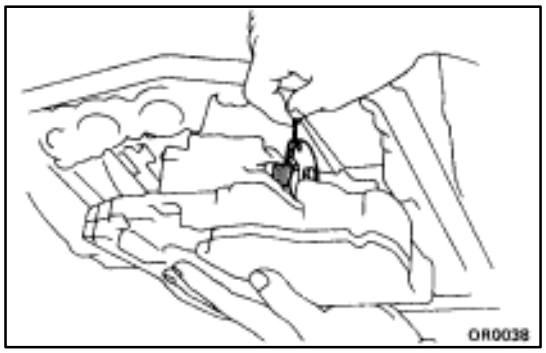
11. REMOVE SECOND BRAKE APPLY GASKET

VALVE BODY INSTALLATION

AX02D–01



1. INSTALL NEW SECOND BRAKE APPLY GASKET

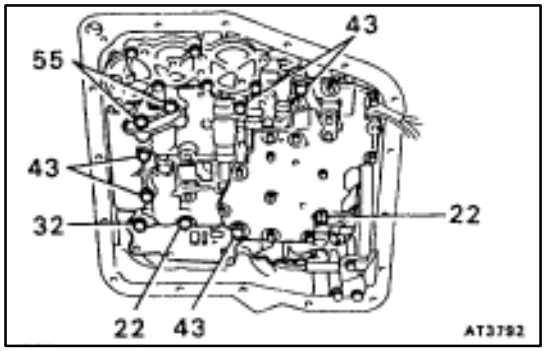


2. INSTALL VALVE BODY

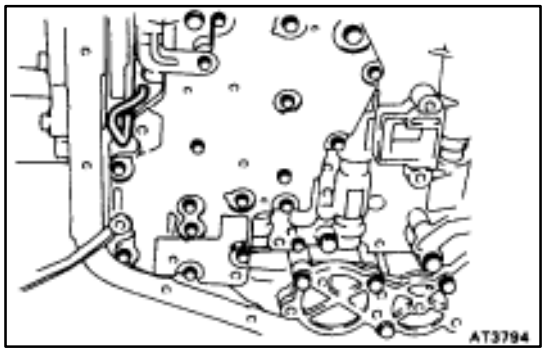
(a) While holding the cam down with your hand, slip the cable end into the slot.

(b) Bring valve body into place.

NOTICE: Be careful not to entangle the solenoid wire.

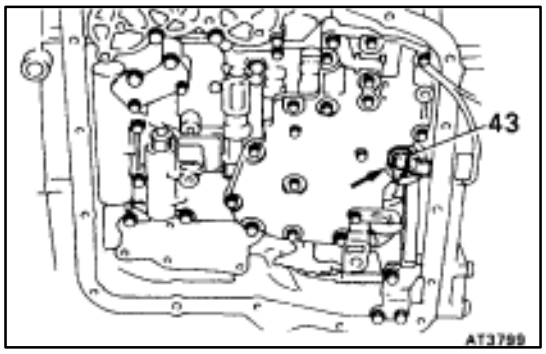


(c) Finger tighten all bolts first. Then tighten them with a torquewrench.
HINT: Each bolt length (mm) is indicated in the figure.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

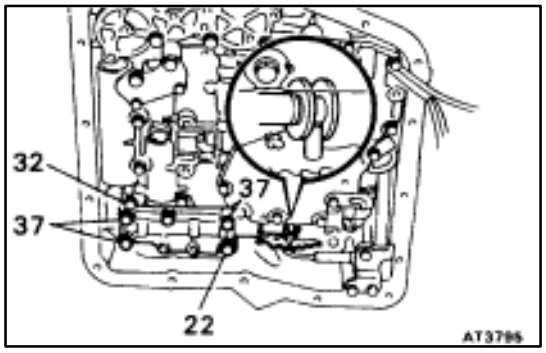


3. INSTALL B3 APPLY TUBE

(a) Install the tube.
NOTICE: Be careful not to bend of damage the tube.

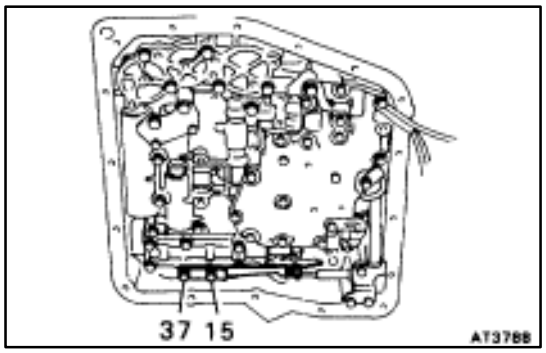


(b) Install the tube retainer.
HINT: The bolt length (mm) is indicated in the figure.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



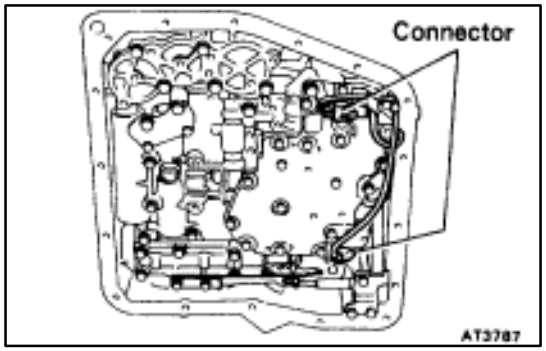
4. INSTALL MANUAL VALVE BODY

(a) Align the manual vale with the pin on the manual valve lever.
(b) Install the valve body into place.
(c) Finger tighten the five bolts first. Then tighten them with a torque wrench.
HINT: Each bolt length (mm) is indicated in the figure.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

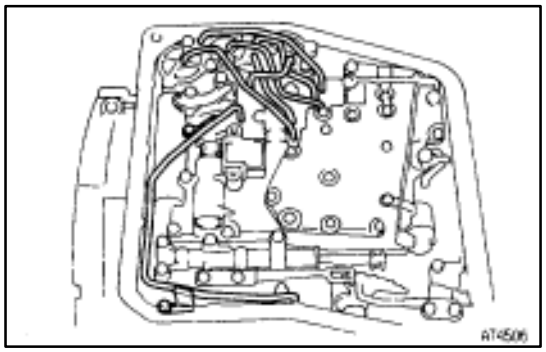


(d) Install the detent spring.
HINT: Each bolt length (mm) is indicated in the figure.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

(e) Check that the manual valve lever is in contact with the center of the roller at the tip of the detent spring.

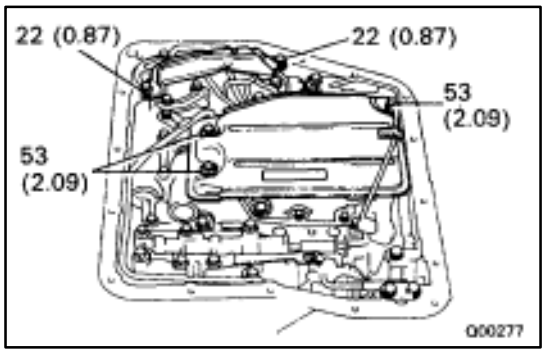


5. CONNECT SOLENOID CONNECTORS



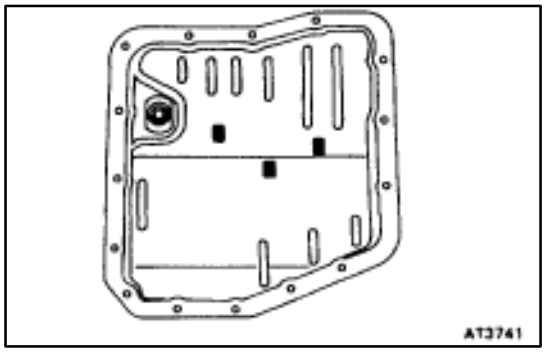
6. INSTALL OIL TUBES

(a) Using a plastic hammer, install the tubes into the positions indicated in the figure.
Torque: 5.4 N·m (55 kgf·cm, 48 ft·lbf)
HINT: Bolt length (mm (in.)) is indicated in the figure.
NOTICE: Be careful not to bend or damage the tubes.



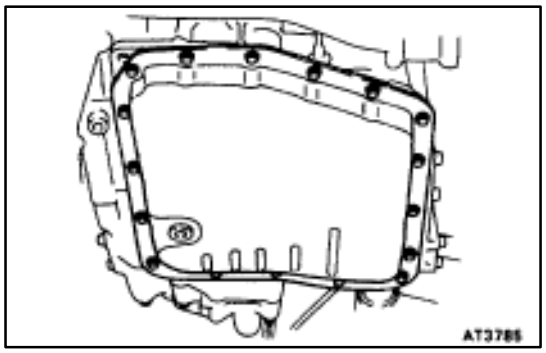
7. INSTALL OIL STRAINER AND APPLY TUBE BRACKET

Oil strainer
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
Tube bracket
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
HINT: Each bolt length (mm) is indicated in the figure.



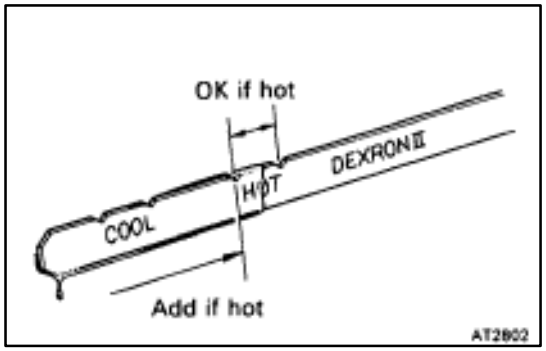
8. INSTALL MAGNET IN PLACE AS SHOWN

NOTICE: Make sure that the magnet does not interfere with the oil tubes.



9. INSTALL OIL PAN

(a) Install a new gasket and oil pan.
(b) Install and torque new seventeen bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 ft·lbf)

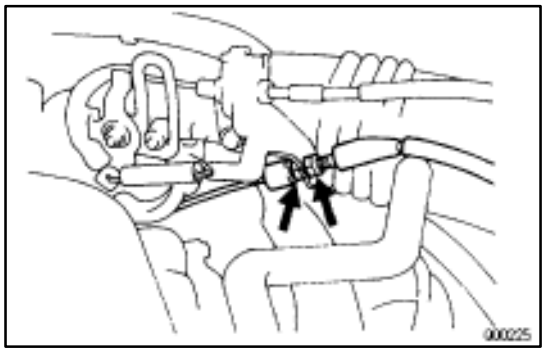


10. FILL TRANSMISSION WITH ATF
NOTICE: Do not overfill.
Fluid type:
ATF DEXRON® II

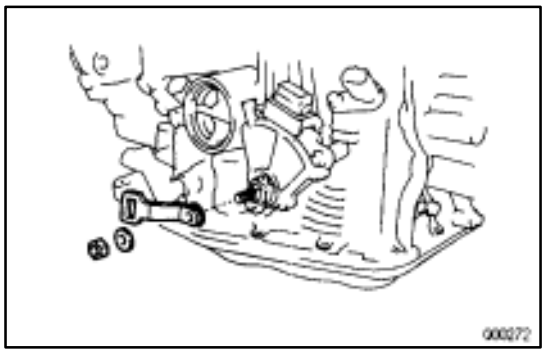
11. CHECK FLUID LEVEL (See page AX–56)

THROTTLE CABLE REMOVAL

AX01G–01

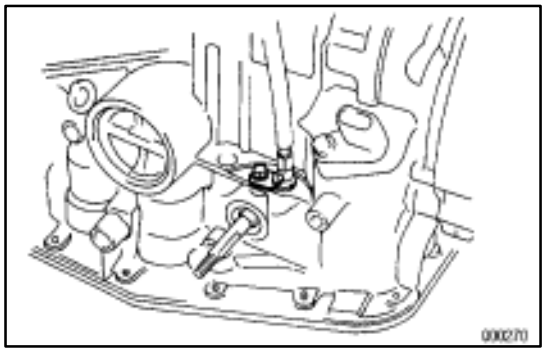


1. DISCONNECT THROTTLE CABLE FROM ENGINE
Disconnect the cable from the throttle linkage.



2. REMOVE PARK/NEUTRAL POSITION SWITCH
(a) Disconnect the transaxle control cable from the transaxle control shaft lever.
(b) Remove the transaxle control shaft lever.
(c) Remove the park/neutral position switch.

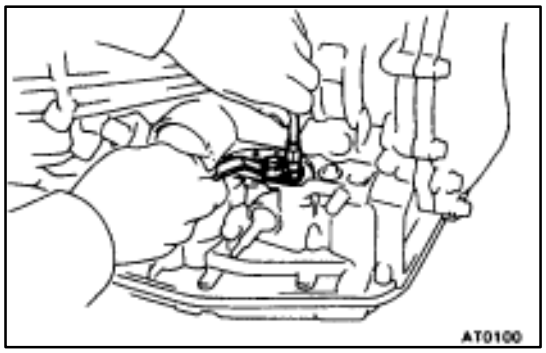
3. REMOVE VALVE BODY (See page AX–13)



4. REMOVE THROTTLE CABLE
(a) Remove the bolt and retaining plate.
(b) Pull out the cable from the transaxle case.

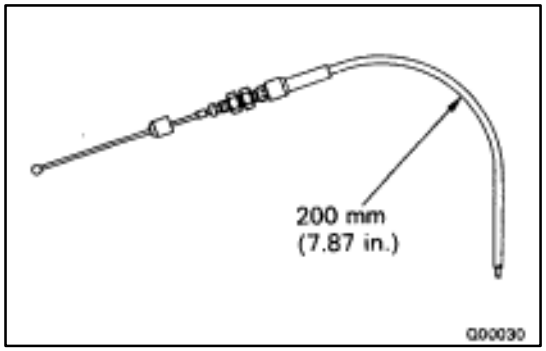
THROTTLE CABLE INSTALLATION

AX02E–01



1. INSTALL CABLE INTO TRANSAXLE CASE
(a) Be sure to push it in all the way.
(b) Install the retaining plate and bolt.

2. INSTALL VALVE BODY (See page AX–15)

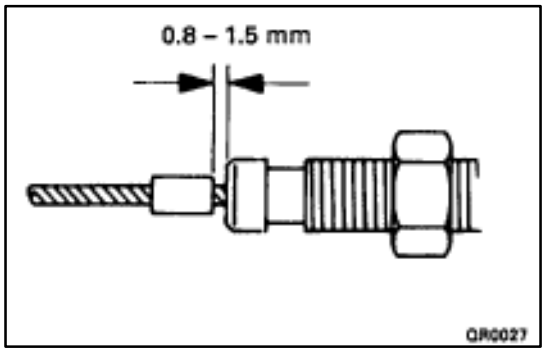


3. IF THROTTLE CABLE IS NEW, STAKE STOPPER OR PAINT MARK ON INNER CABLE

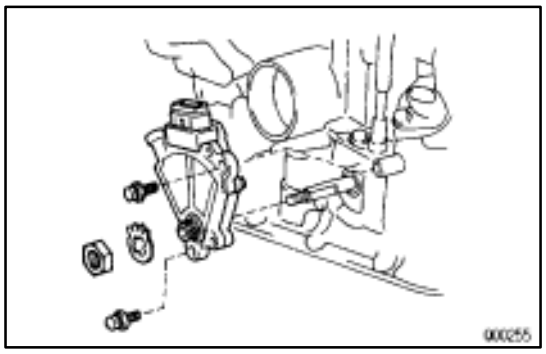
HINT: New cables do not have a staked cable stopper.

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

(b) Pull the inner cable lightly until a light resistance is felt, and hold it in position there.



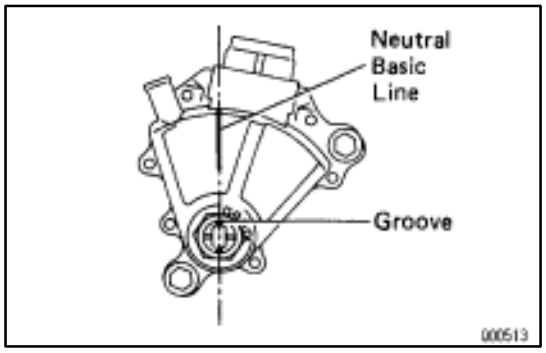
(c) Stake the stopper, 0.8–1.5 mm (0.031–0.059 in.) from the end of outer cable.



4. CONNECT THROTTLE CABLE TO ENGINE

5. ADJUST THROTTLE CABLE

(See page AX–58)



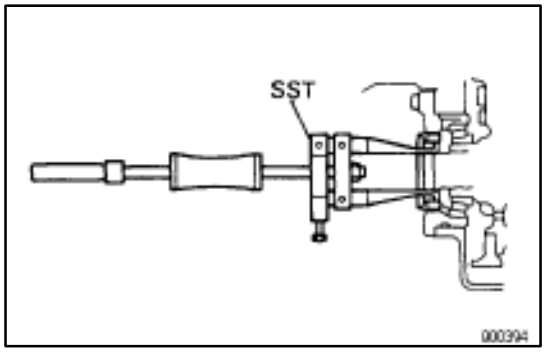
6. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch.

(b) Adjust the park/neutral position switch. (See page AX–58)

(c) Install the transaxle control shaft lever.

7. TEST DRIVE VEHICLE



SIDE GEAR SHAFT OIL SEAL REPLACEMENT

AX01H–01

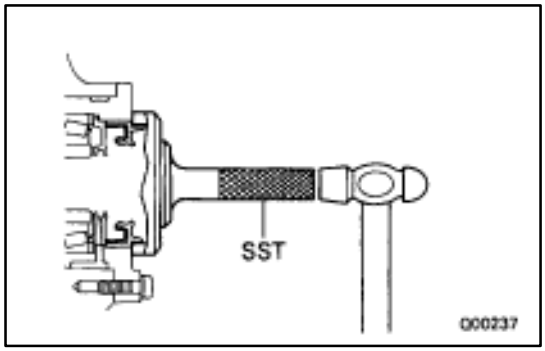
1. REMOVE BOTH DRIVE SHAFTS

(See page SA–20)

2. REMOVE BOTH SIDE GEAR SHAFT OIL SEALS

Using SST, pull out the oil seal.

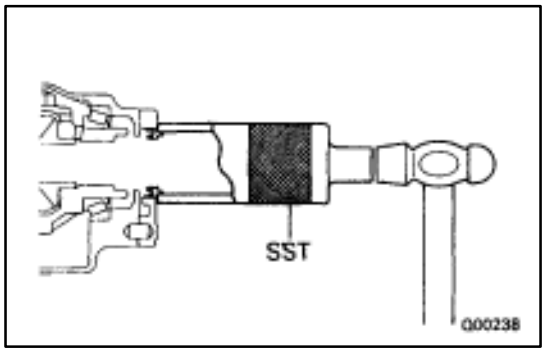
SST 09308–00010



3. INSTALL LEFT SIDE GEAR SHAFT OIL SEAL

(a) Using SST, drive in a new oil seal.
SST 09223–15010
Oil seal depth:
0±0.5 mm (0±0.02 in.)

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



4. INSTALL RIGHT SIDE GEAR SHAFT OIL SEAL

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

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

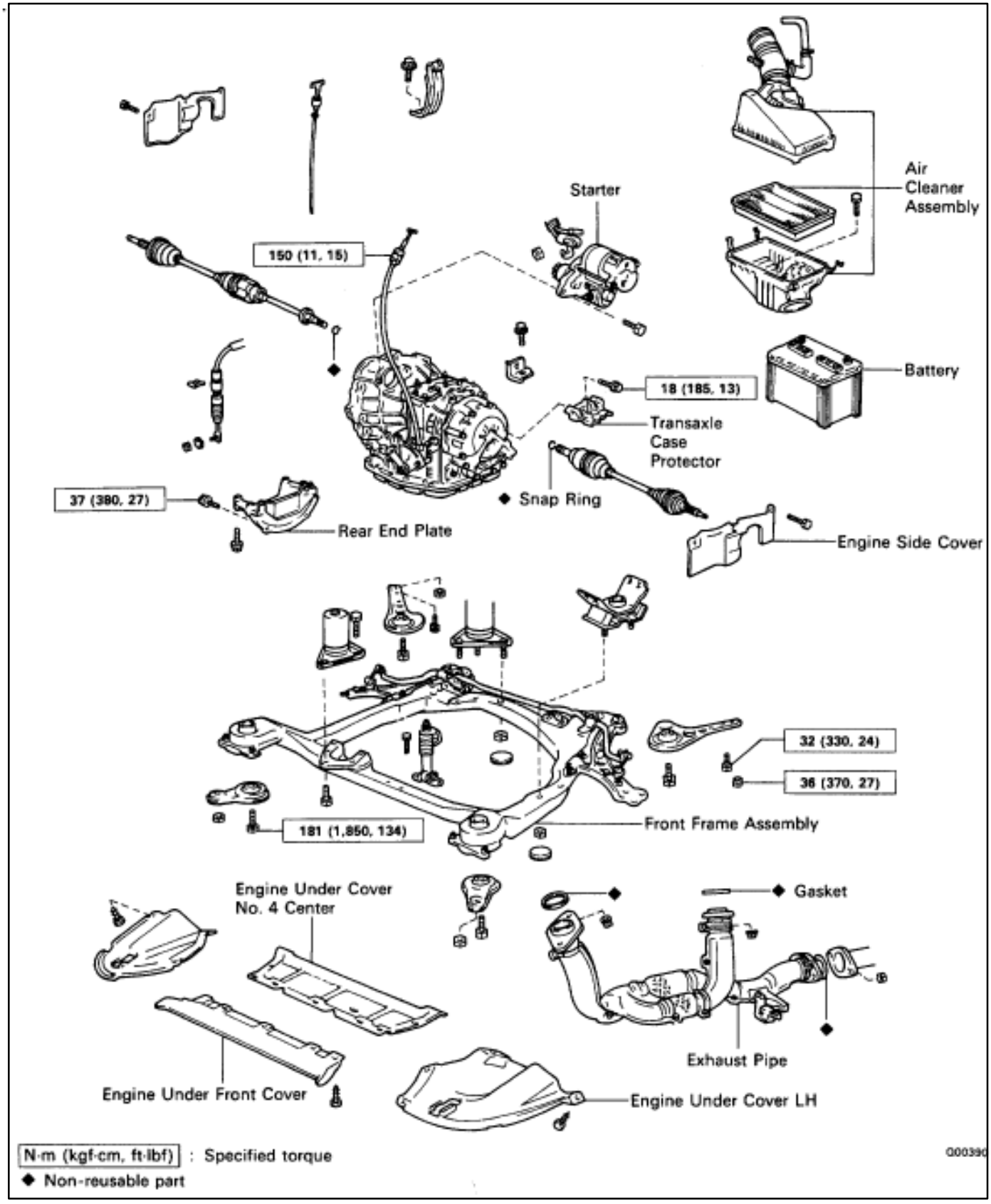
5. INSTALL BOTH DRIVE SHAFTS
(See page SA–23)

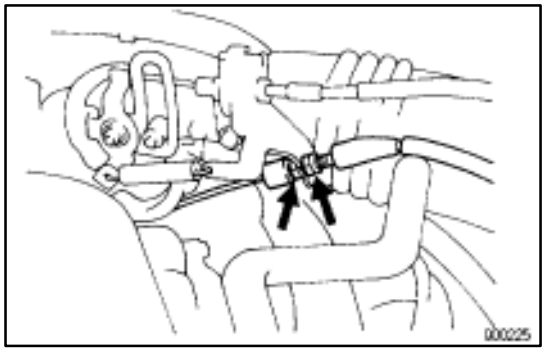
6. CHECK TRANSAXLE FLUID LEVEL
(See page AX–56)

ASSEMBLY REMOVAL AND INSTALLATION

AX01J–01

Remove and install the parts as shown.

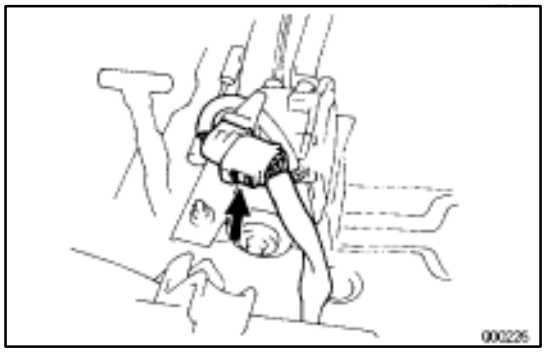




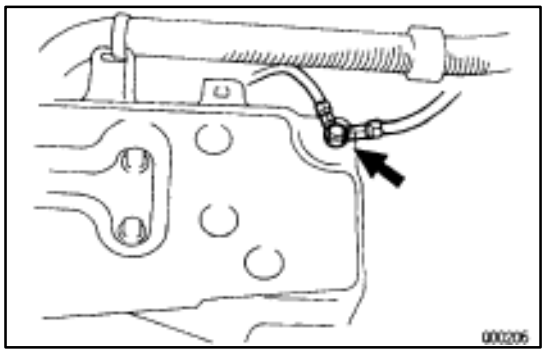
TRANSAXLE REMOVAL

AX02F–01

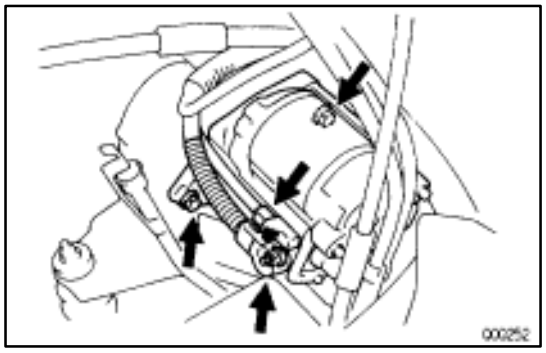
1. DISCONNECT AND REMOVE BATTERY
2. REMOVE AIR CLEANER ASSEMBLY
3. REMOVE THROTTLE CABLE FROM ENGINE



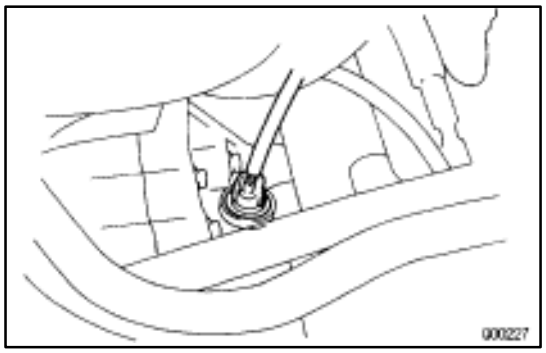
(w/ Cruise Control System)
4. REMOVE CRUISE CONTROL ACTUATOR COVER
5. DISCONNECT CONNECTOR FROM CRUISE CONTROL ACTUATOR



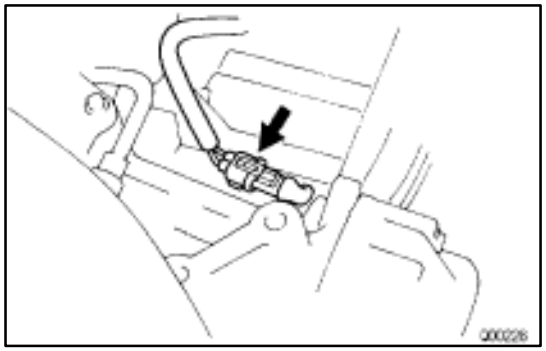
6. REMOVE GROUND EARTH TERMINAL



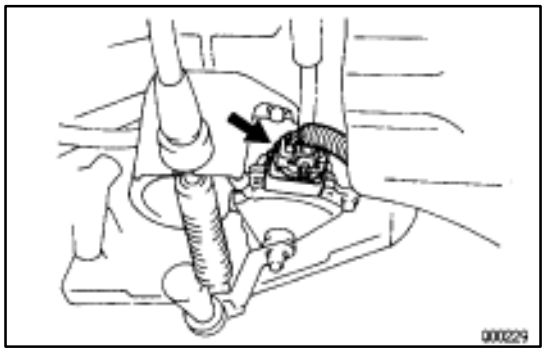
7. REMOVE STARTER
(a) Disconnect the connector and remove the nut.
(b) Remove the two bolts and the starter.



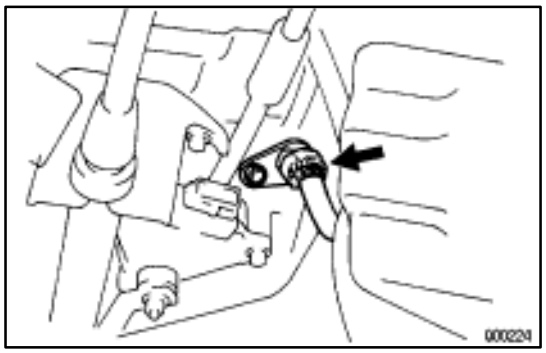
8. DISCONNECT NO.1 SPEED SENSOR CONNECTOR



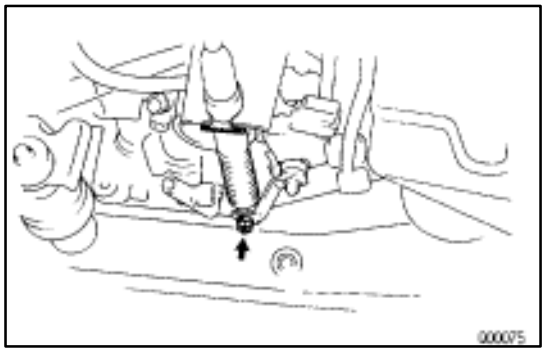
9. DISCONNECT NO.2 SPEED SENSOR CONNECTOR



10. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR



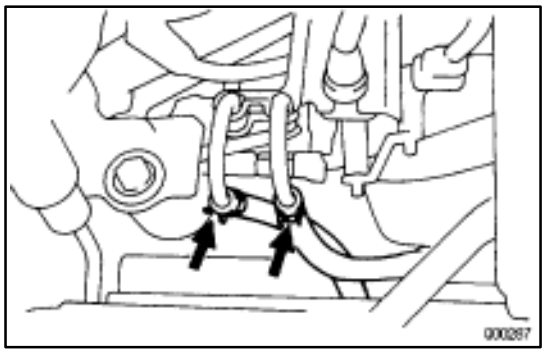
11. DISCONNECT SOLENOID CONNECTOR



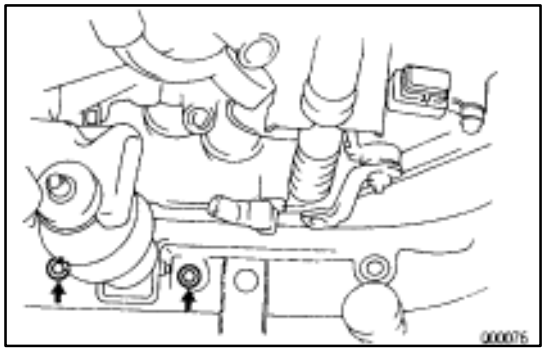
12. DISCONNECT SHIFT CONTROL CABLE

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

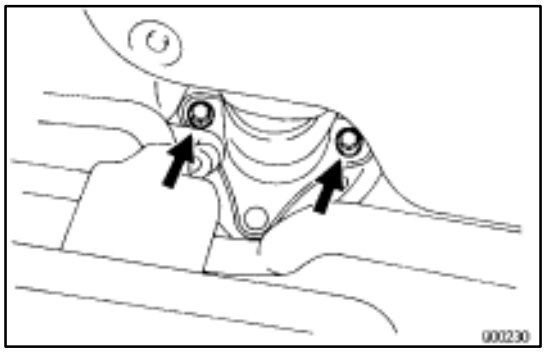
(b) Remove the unit.



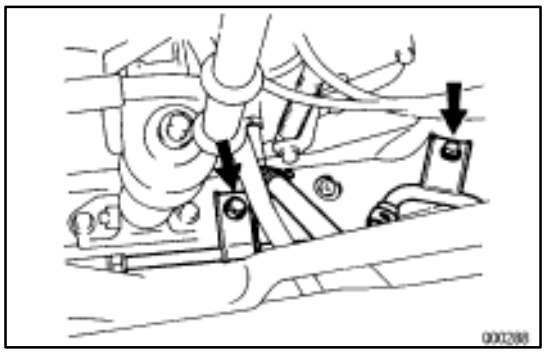
13. DISCONNECT OIL COOLER HOSE



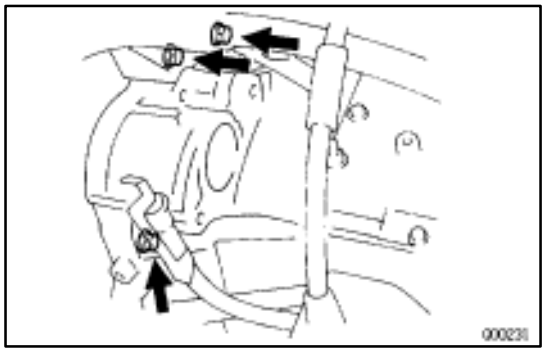
14. REMOVE TWO FRONT SIDE TRANSAXLE MOUNTING BOLTS



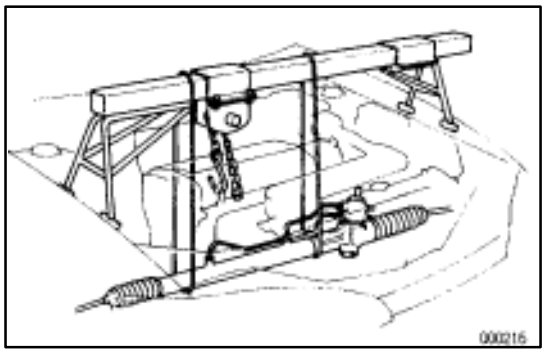
15. REMOVE TWO FRONT SIDE ENGINE MOUNTING BOLTS



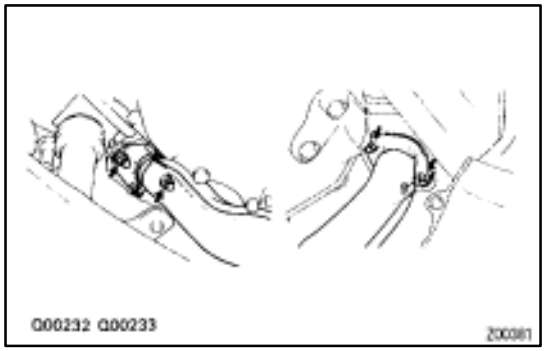
16. REMOVE OIL COOLER CLAMPING BOLTS FROM FRONT FRAME ASSEMBLY



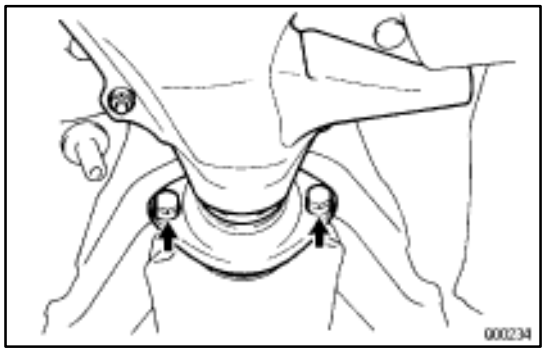
17. REMOVE THREE UPPER TRANSAXLE–TO–ENGINE BOLTS



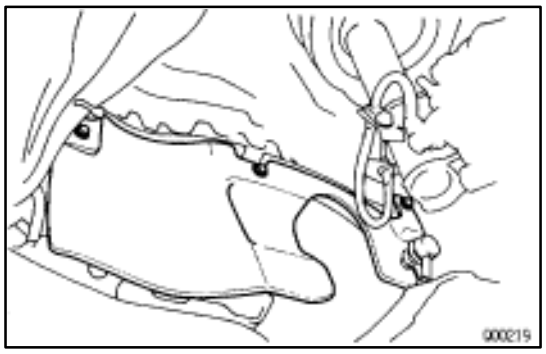
18. INSTALL ENGINE SUPPORT FIXTURE
19. TIE STEERING GEAR HOUSING TO ENGINE SUPPORT FIXTURE BY CORD OR EQUIVALENT



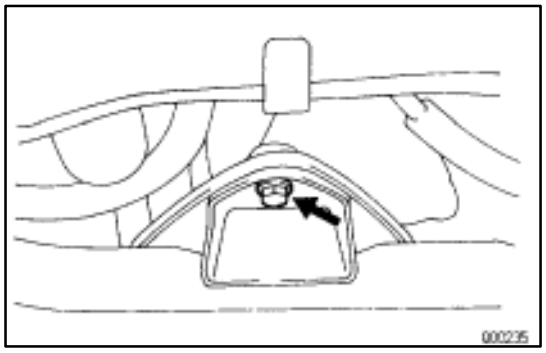
20. RAISE AND SUITABLY SUPPORT VEHICLE
21. REMOVE FRONT WHEEL
22. REMOVE EXHAUST PIPE
(a) Remove four nuts.



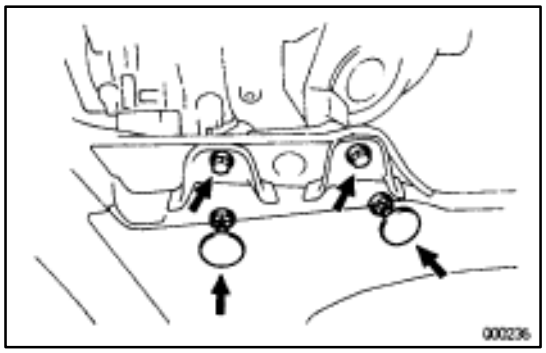
(b) Remove the two bolts and nuts from the rear exhaust pipe.
23. REMOVE DIFFERENTIAL FLUID DRAIN PLUG AND GASKET
24. DRAIN DIFFERENTIAL FLUID INTO A SUITABLE CONTAINER



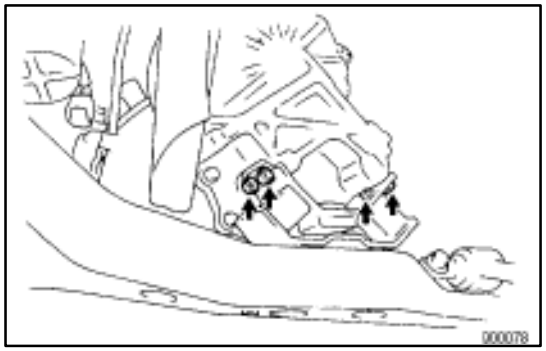
25. REMOVE RIGHT AND LEFT ENGINE SIDE COVER NO.2
26. REMOVE ENGINE UNDER FRONT COVER NO.1 AND NO.2



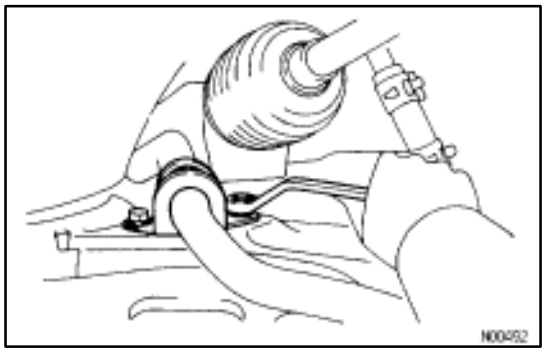
27. REMOVE DRIVE SHAFT
(See page SA–20)
28. REMOVE FRONT SIDE ENGINE MOUNTING NUT



29. REMOVE REAR SIDE ENGINE MOUNTING BOLTS
(a) Remove two hole plugs.
(b) Remove two bolts and nuts.

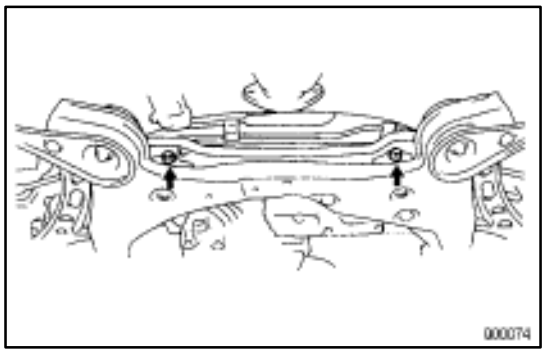


30. REMOVE FOUR LEFT SIDE TRANSAXLE MOUNTING BOLTS

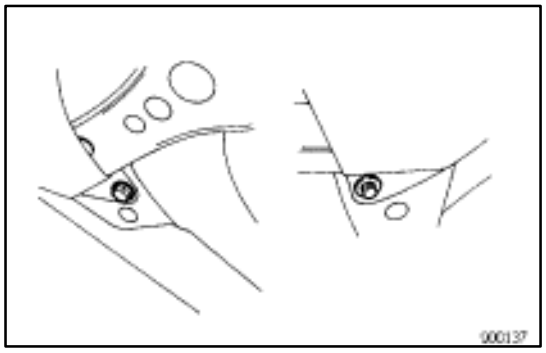


31. REMOVE STEERING GEAR HOUSING

(a) Remove the four bolts and disconnect the stabilizer bar bush bracket from the front frame assembly.

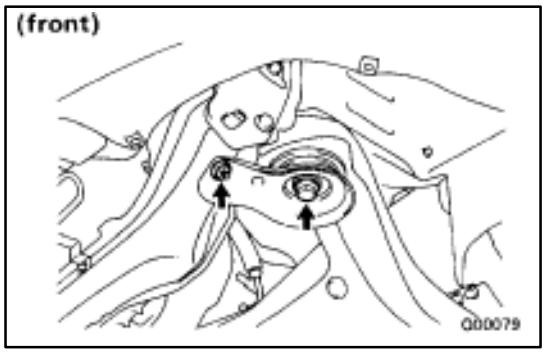


(b) Remove two bolts and nuts from the steering gear housing.
(c) Remove the steering gear housing.

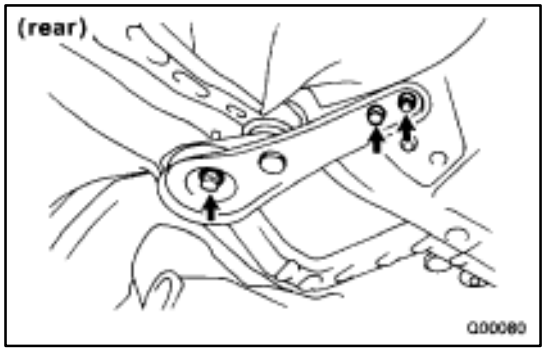


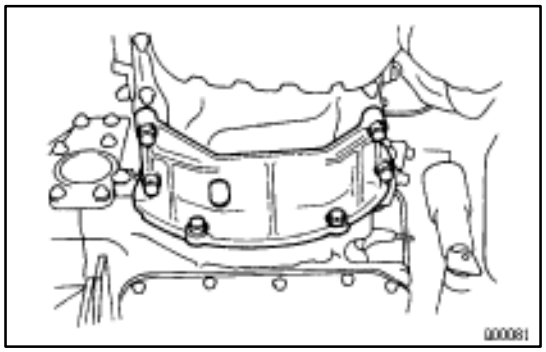
32. REMOVE FRONT FRAME ASSEMBLY

(a) Hold the front frame assembly with a jack.
(b) Remove two set screws from the right and left fender liners.



(c) Remove six bolts and four nuts.
(d) Remove the front frame assembly.



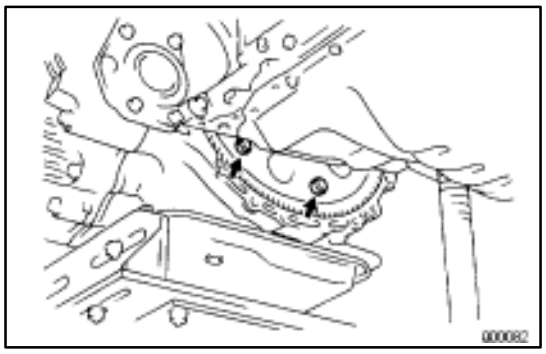


33. HOLD TRANSAXLE WITH A JACK

34. REMOVE REAR END PLATE

(a) Remove six bolts.

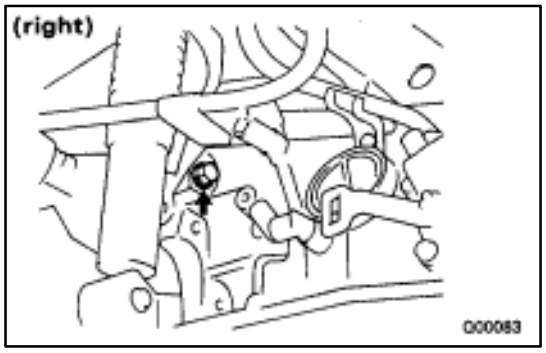
(b) Remove the rear end plate.



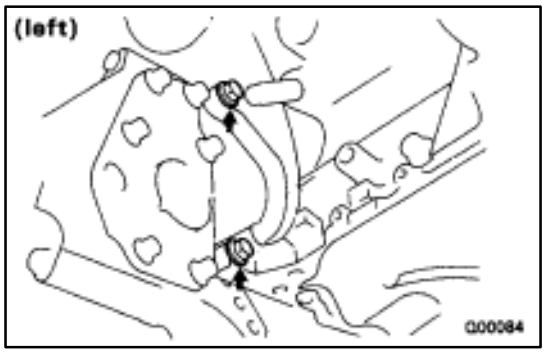
35. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLTS

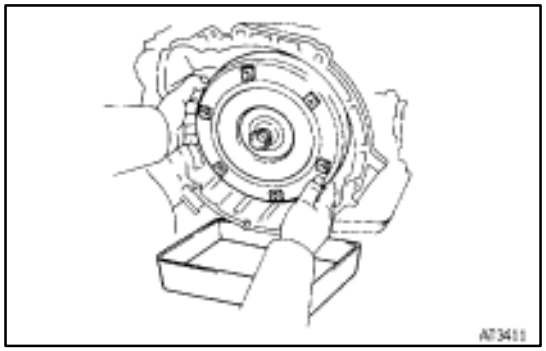
(a) Turn the crankshaft to gain access to each bolt.

(b) Hold the crankshaft pulley nut with a wrench and remove the six bolts.



36. REMOVE TRANSAXLE TO ENGINE BOLTS



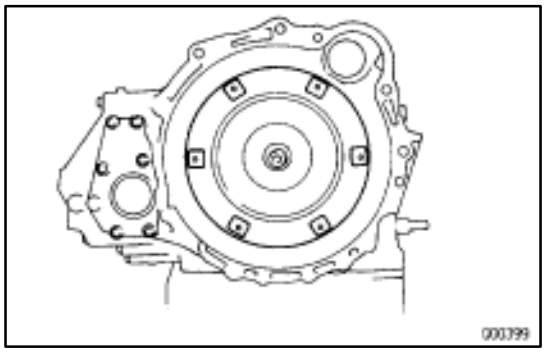


37. REMOVE TRANSAXLE ASSEMBLY

Separate transaxle and engine, and lower the transaxle.

38. REMOVE TORQUE CONVERTER CLUTCH FROM TRANSAXLE

TRANSAXLE INSTALLATION

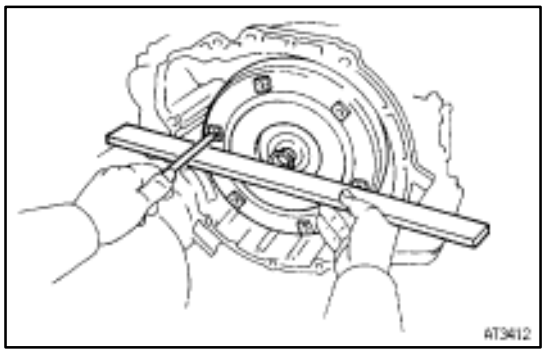


1. INSTALL TORQUE CONVERTER CLUTCH IN TRANSAXLE

If the torque converter clutch has been drained and washed, refill with new ATF.

Fluid type:

ATF DEXRON® II

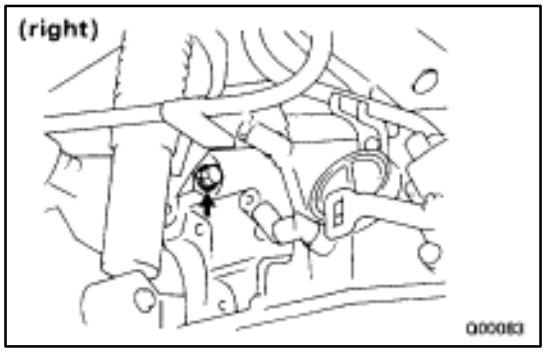


2. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure from the installed surface to the front surface of the transmission housing.

Correct distance:

More than 13.7 mm (0.539 in.)



3. ALIGN TRANSAXLE AT INSTALLATION POSITION

(a) Align the two knock pins on the block with the converter housing.

(b) Temporarily install one bolt.

4. INSTALL TRANSAXLE TO ENGINE BOLTS

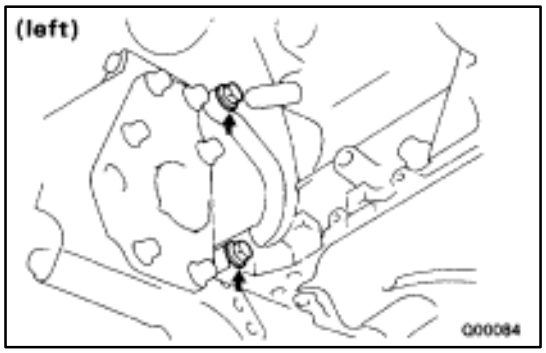
Install the transaxle–to–engine bolts.

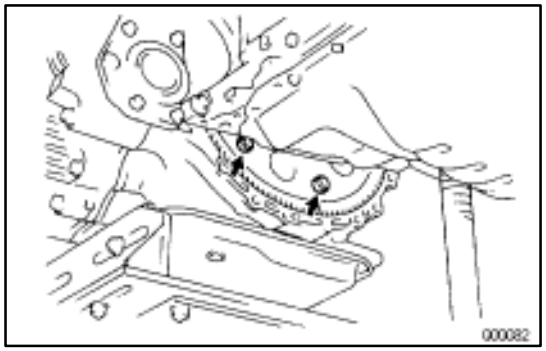
12 mm head bolt

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

10 mm head bolt

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





5. INSTALL TORQUE CONVERTER CLUTCH MOUNTING BOLTS

(a) Clean the threads of the bolts with gasoline.

(b) Coat the threads of the bolts with sealer.

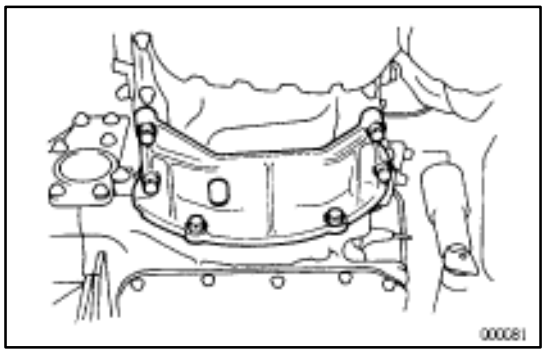
Sealer:

Part No. 08833–00070, THREE BOND 1324 or equivalent

(c) Tighten the bolts evenly.

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

HINT: First install dark green colored bolt and then the five bolts.

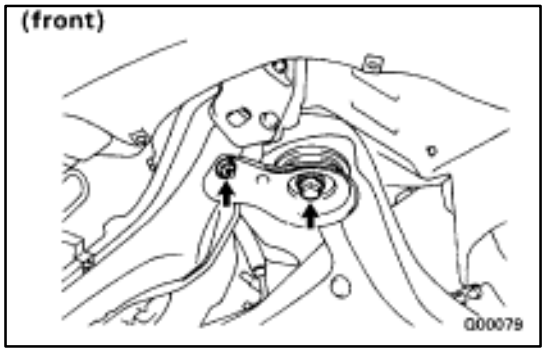


6. INSTALL REAR END PLATE

(a) Install the rear end plate with the six bolts.

(b) Torque the six bolts.

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



7. INSTALL FRONT FRAME ASSEMBLY

(a) Hold the front frame assembly.

(b) Install the six bolts and four nuts.

(c) Torque the bolts and nuts.

19 mm head bolt

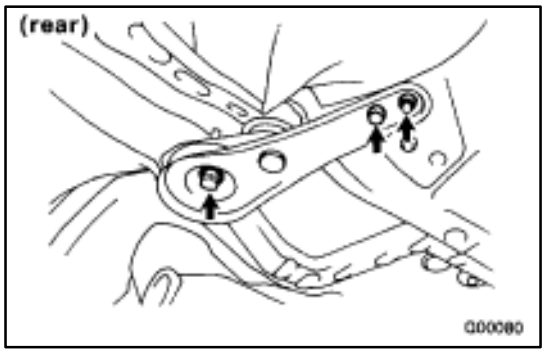
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

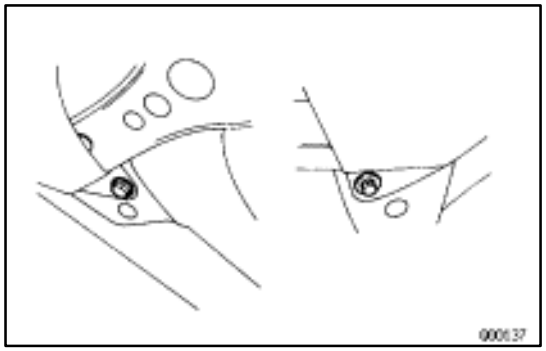
12 mm head bolt

Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)

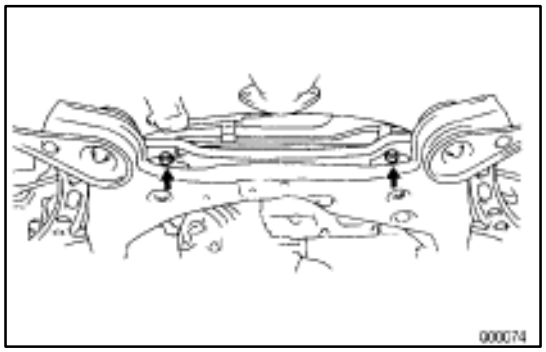
Nut

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





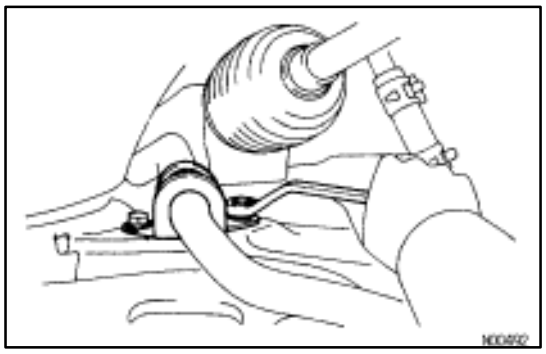
(d) Install the two set screws in the right and left fender liners.



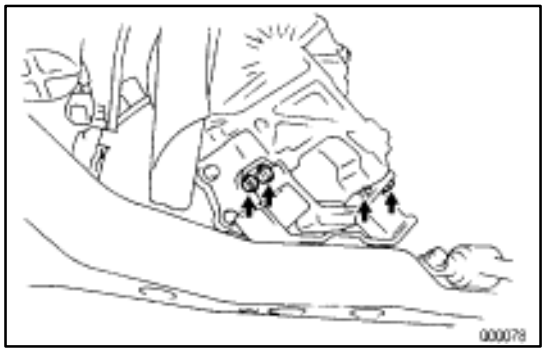
8. INSTALL STEERING GEAR HOUSING

(a) Install the steering gear housing to the front frame assembly.

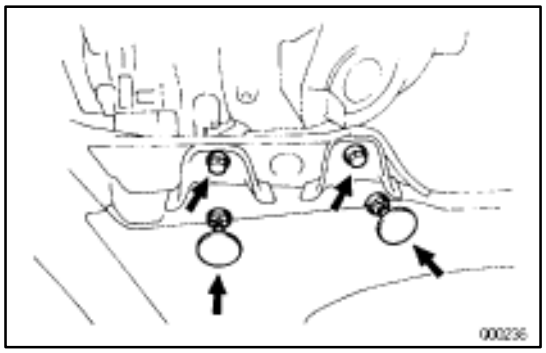
(b) Install and torque the two bolts and nuts.
Torque 181 N·m (1,850 kgf·cm, 134 ft·lbf)



(c) Connect the stabilizer bar bush bracket with the four bolts.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



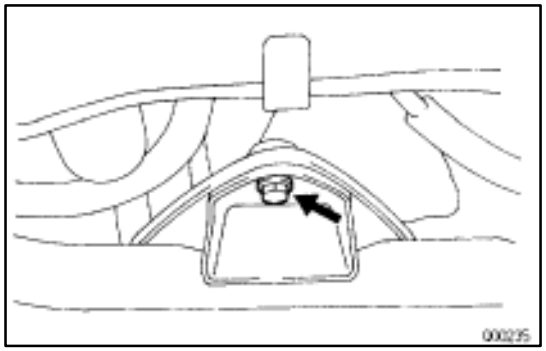
9. INSTALL FOUR LEFT SIDE TRANSAXLE MOUNTING BOLTS
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



10. INSTALL REAR SIDE MOUNTING BOLTS AND NUTS

(a) Install and torque the two bolts and nuts.
Torque: 66 N·m (670 kgf·cm, 48 ft·lbf)

(b) Install two hole plugs.

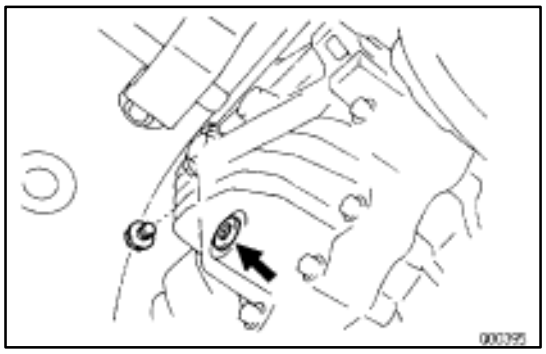


11. INSTALL FRONT SIDE ENGINE MOUNTING NUT
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

12. INSTALL DRIVE SHAFT
(See page SA–23)

14. INSTALL RIGHT AND LEFT ENGINE SIDE COVER NO.2

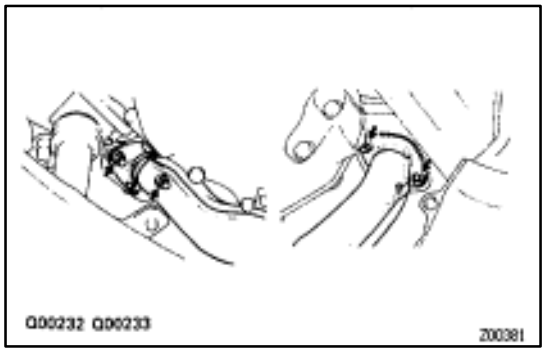
15. INSTALL ENGINE UNDER FRONT COVER NO.1 AND NO.2



16. INSTALL DIFFERENTIAL FLUID DRAIN PLUG WITH A NEW GASKET

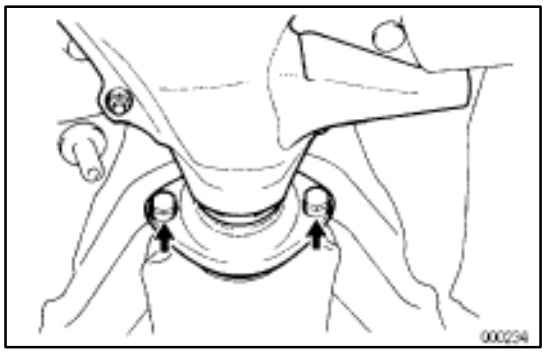
17. FILL DIFFERENTIAL
Fluid Type:
ATF DEXRON® II
Capacity:
Differential 0.8 liters (0.8 US qts, 0.7 Imp. qts)

18. CHECK DIFFERENTIAL FLUID LEVEL



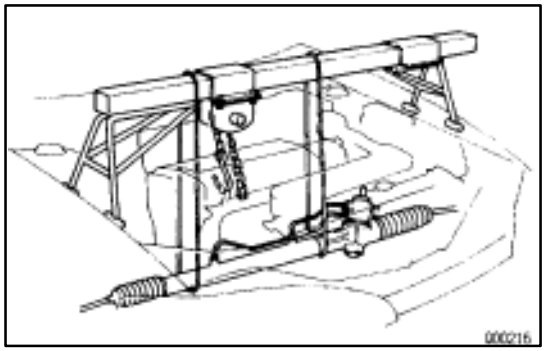
19. INSTALL EXHAUST PIPE

(a) Install and torque the four nuts.
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

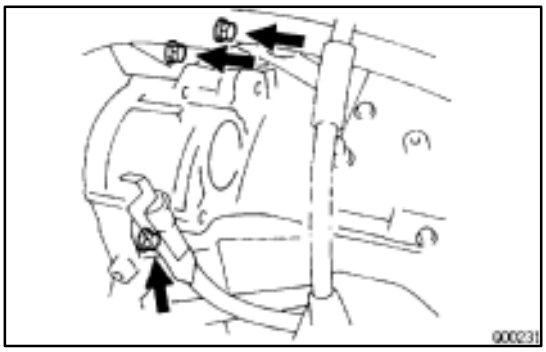


(b) Install the rear exhaust pipe with the two bolts and nuts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

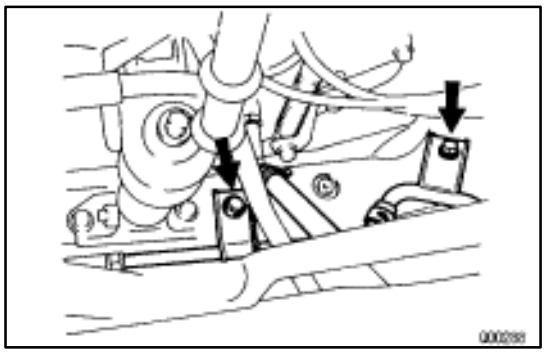
20. INSTALL FRONT WHEEL AND LOWER VEHICLE
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



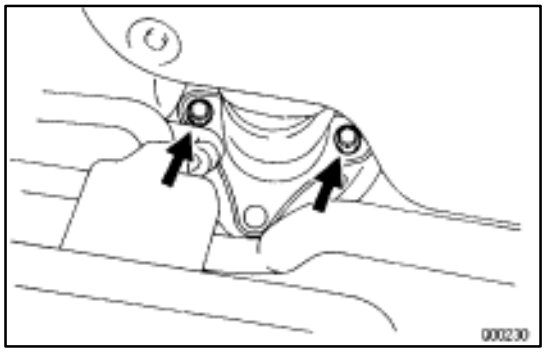
21. UNTIE STEERING GEAR HOUSING TO ENGINE SUPPORT FIXTURE BY CORD OR EQUIVALENT REMOVE ENGINE SUPPORT FIXTURE



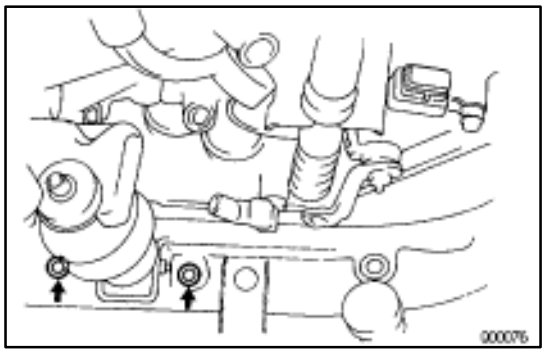
22. INSTALL THREE UPPER TRANSAXLE–TO–ENGINE BOLTS
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



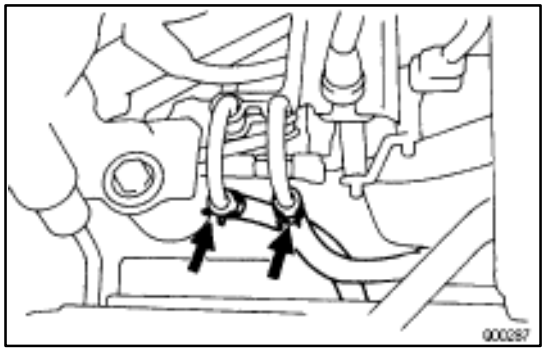
23. INSTALL OIL COOLER CLAMPING BOLTS TO FRONT FRAME ASSEMBLY



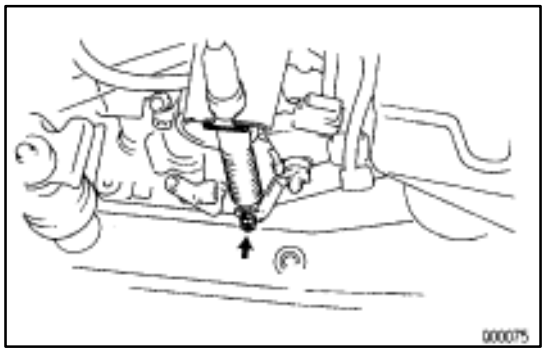
24. INSTALL TWO FRONT SIDE ENGINE MOUNTING BOLTS
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



25. INSTALL TWO FRONT SIDE TRANSAXLE MOUNTING BOLTS
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

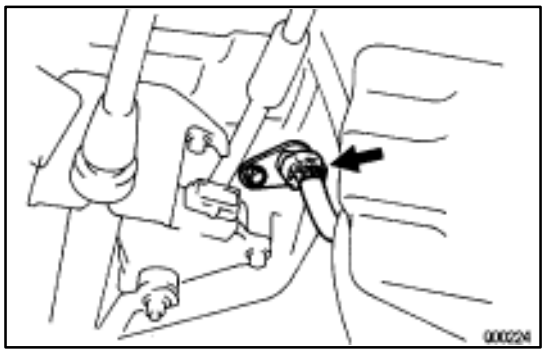


26. CONNECT OIL COOLER HOSE

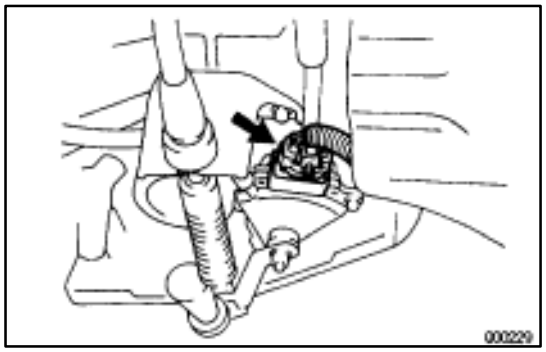


27. CONNECT SHIFT CONTROL CABLE

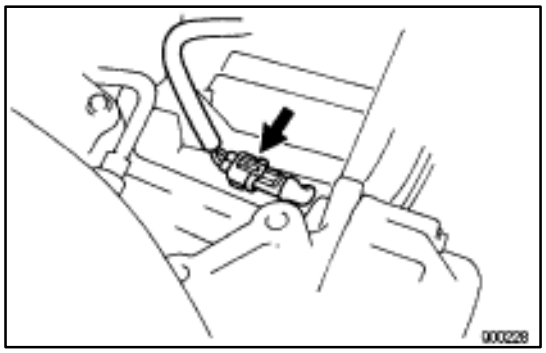
(a) Install the clip from the shaft control cable.
(b) Install and torque the nut.
(c) Adjust the shift control cable.
(See page AX–58)



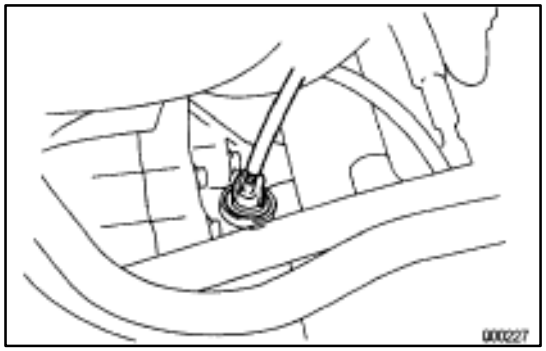
28. CONNECT SOLENOID CONNECTOR



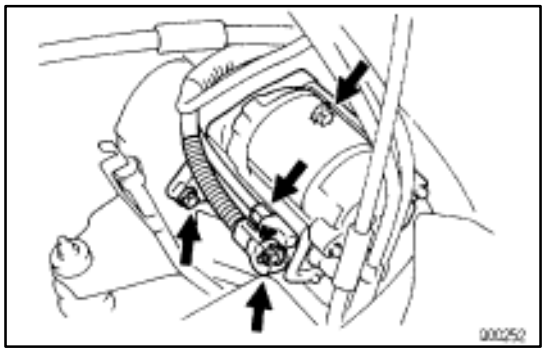
29. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR



30. CONNECT NO.2 SPEED SENSOR CONNECTOR



31. CONNECT NO.1 SPEED SENSOR CONNECTOR



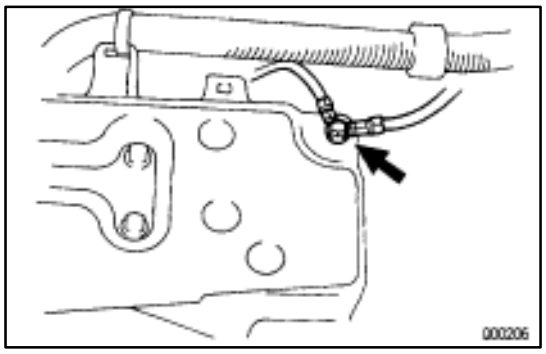
32. INSTALL STARTER

(a) Install the starter with the two bolts.

(b) Torque the two bolts.

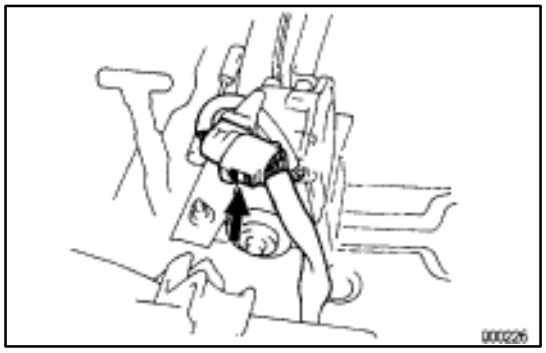
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(c) Connect the connector and install the nut.



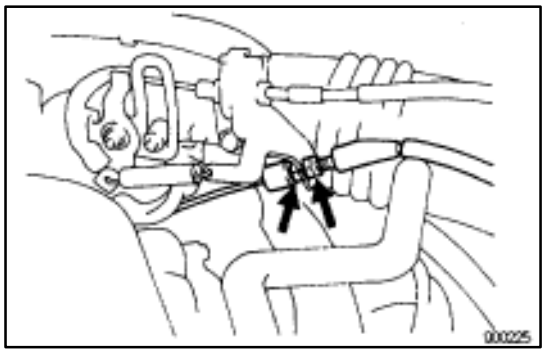
33. INSTALL GROUND EARTH TERMINAL

(w/ Cruise Control System)



34. CONNECT CONNECTOR TO CRUISE CONTROL ACTUATOR

35. INSTALL CRUISE CONTROL ACTUATOR COVER



36. INSTALL THROTTLE CABLE TO ENGINE

(a) Torque the nuts.

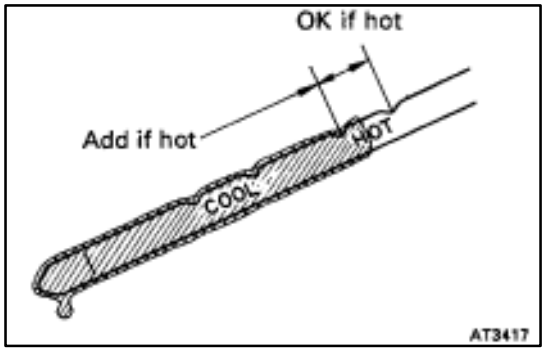
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(b) Adjust the throttle cable

(See page AX–58)

37. INSTALL AIR CLEANER ASSEMBLY

38. INSTALL BATTERY



39. CHECK FLUID LEVEL (See page AX–56)

40. INSPECT FRONT WHEEL ALIGNMENT (See page SA–3)

41. PERFORM ROAD TEST

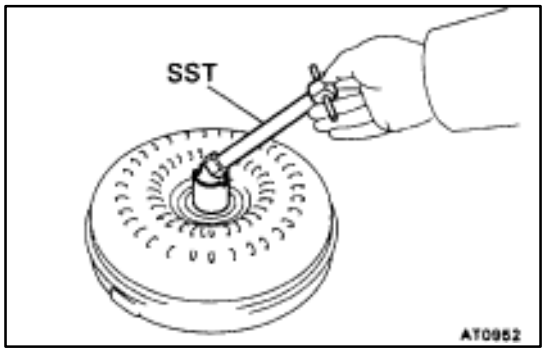
Check for abnormal noise and smooth shifting.

TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

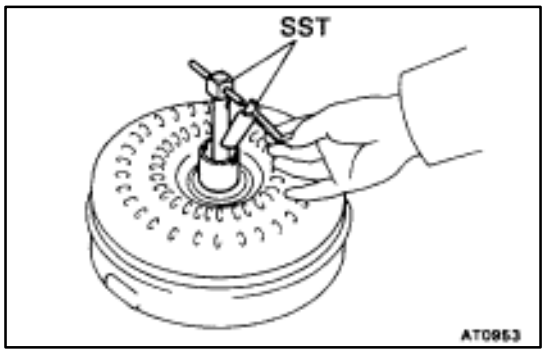
AX01K–01

1. INSPECT ONE–WAY CLUTCH

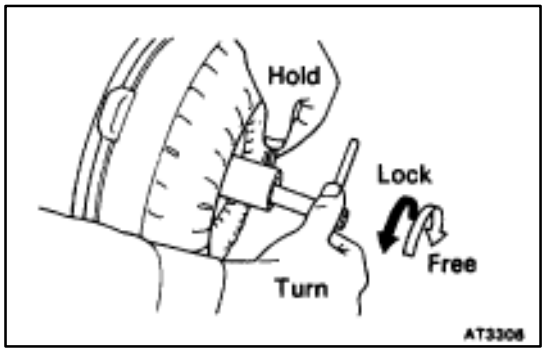
(a) Install SST into the inner race of the one–way clutch.
SST 09350–32014(09351–32020)



(b) Install SST so that is fits in the notch of the converter hub and outer race of the one–way clutch.
SST 09350–32014(09351–32020)

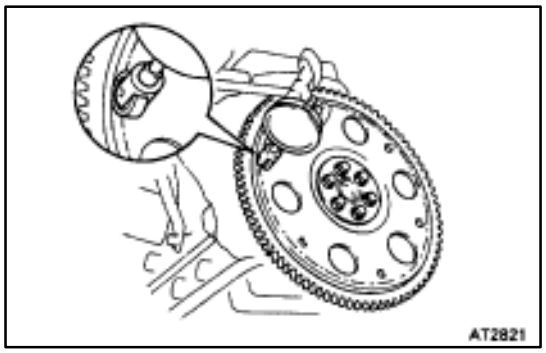


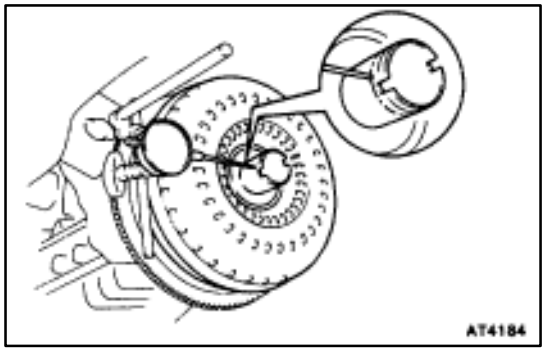
(c) With the torque converter clutch standing on its side, the clutch locks when turned counterclockwise, and rotates freely and smoothly clockwise.
If necessary, clean the converter and retest the clutch. Replace the converter if the clutch still fails the test.



2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.
If runout exceeds 0.20 mm (0.0079 in.) or if the 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 CLUTCH SLEEVE RUNOUT

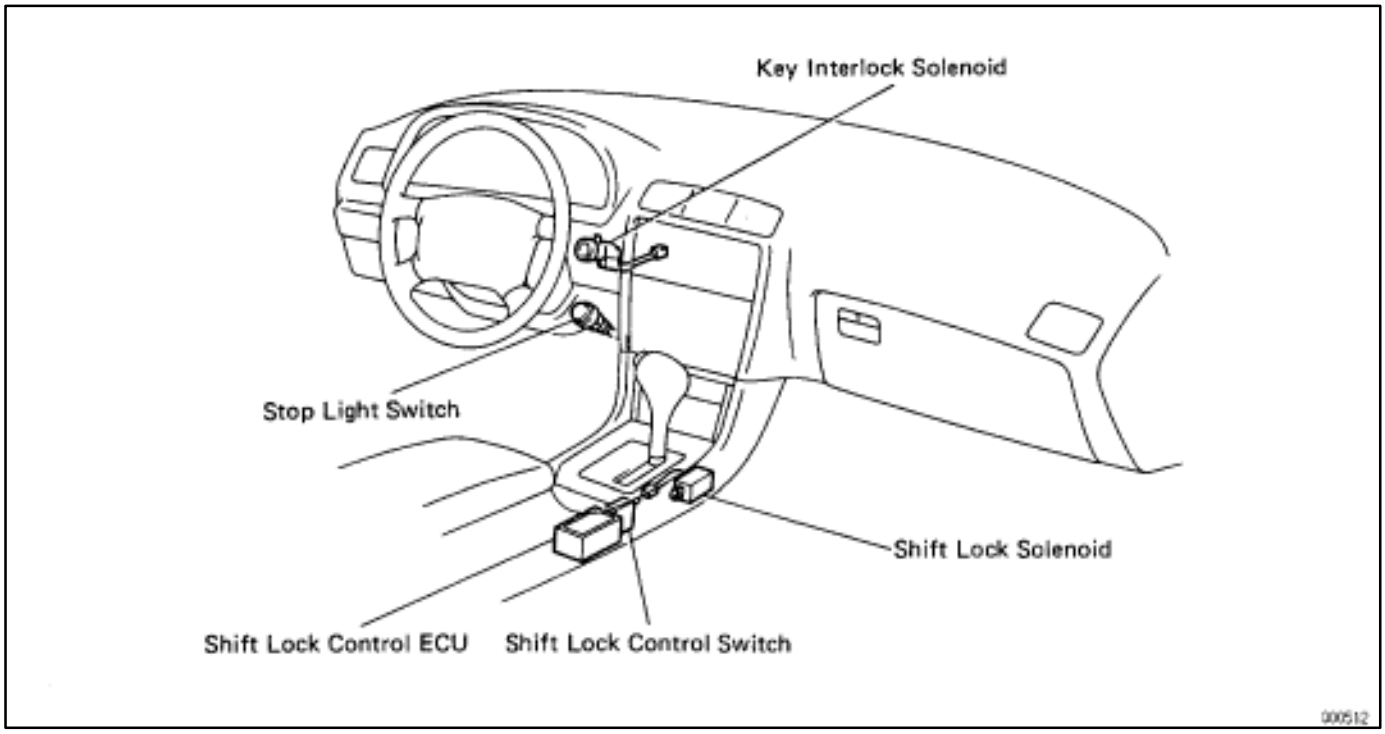
(a) Temporarily mount the torque converter clutch to the drive plate. Set up a dial indicator.
If runout exceeds 0.30 mm (0.0118 in.), try to correct by reorienting the installation of the converter. If excessive runout cannot be corrected replace the torque converter.
HINT: Mark the position of the converter to ensure correct installation.

(b) Remove the torque converter clutch.

SHIFT LOCK SYSTEM

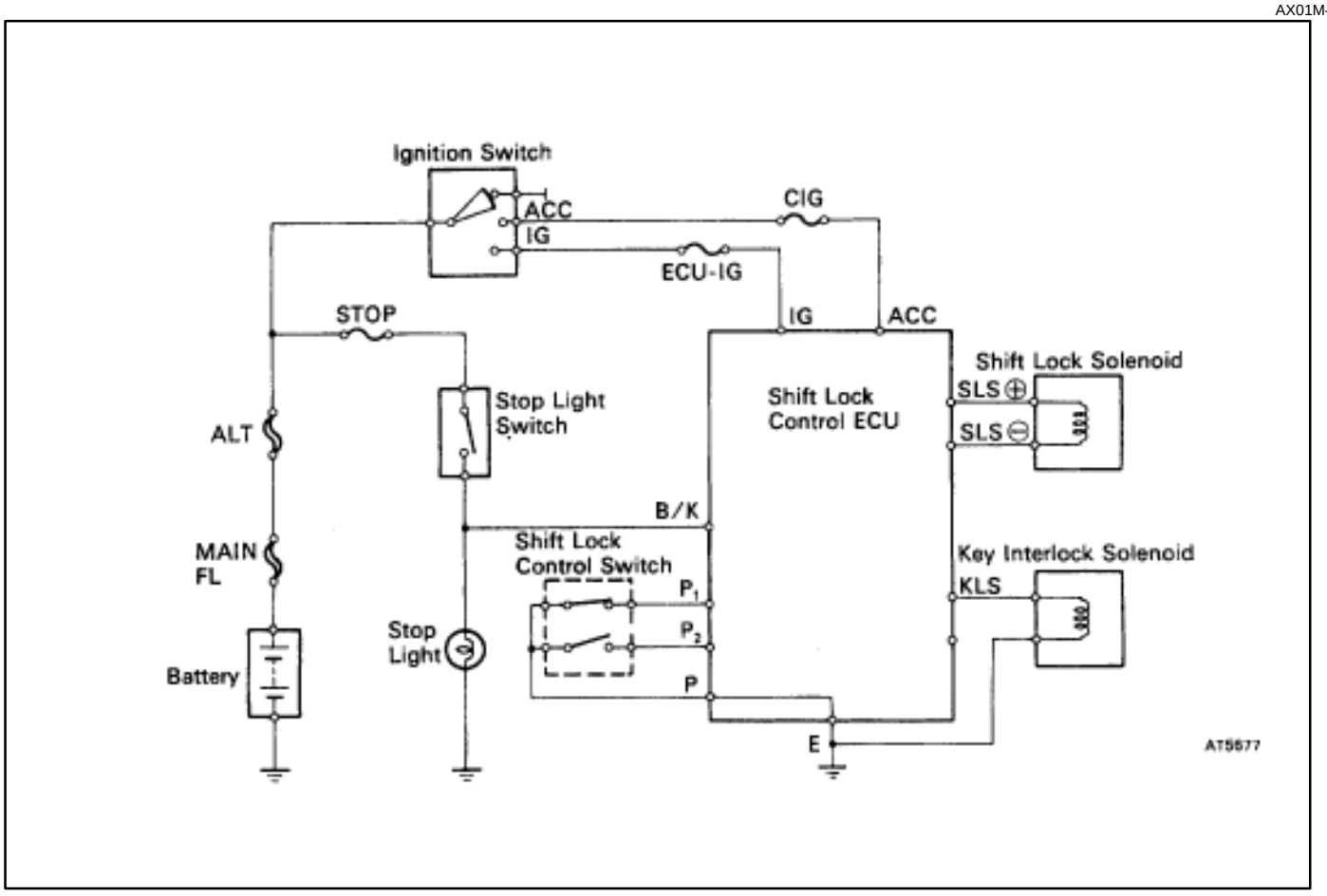
COMPONENT PARTS LOCATION

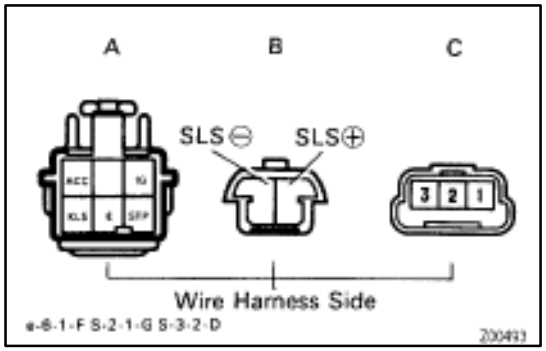
AX01L–01



WIRING DIAGRAM

AX01M–01





ELECTRIC CONTROL COMPONENTS INSPECTION

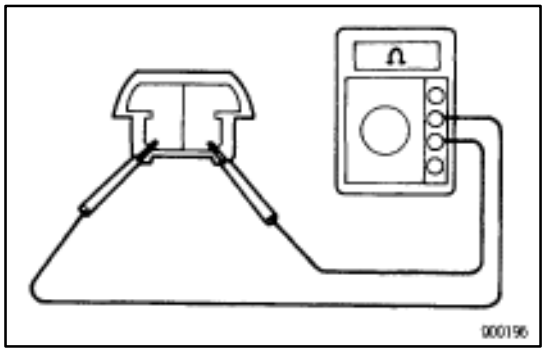
AX02H–01

1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.
HINT: Do not disconnect the computer connector.

Connector	Terminal	Measuring condition	Voltage(V)
A	ACC–E	Ignition switch ACC position	10–14
	IG–E	Ignition switch ON position	10–14
	B/K–E	Depress brake pedal	10–14
	KLS–E	① Ignition switch ACC position and P range	0
		② Ignition switch ACC position and except P range	10–14
		③ (Approx–after one second)	6–9
B	SLS + – SLS–	① Ignition switch ON position and P range	0
		② Depress brake pedal	8.5–13.5
		③ (Approx–after 20 seconds)	5.5–9.5
		④ Except P range	0
C	P_1–P	① Ignition switch ON, P range and depress brake pedal	0
		② Shift except P range under conditions above	9–13.5
	P_2–P	① Ignition switch ACC position and P range	9–13.5
		② Shift except P range under condition above	0

V00369



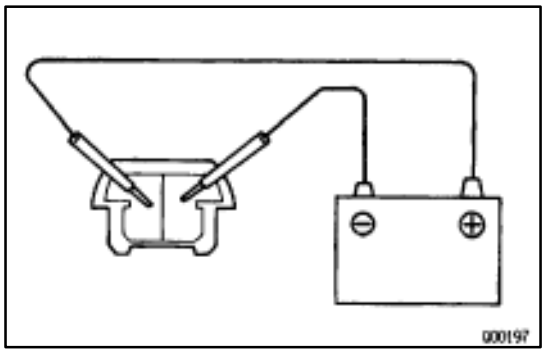
2. INSPECT SHAFT LOCK SOLENOID

(a) Disconnect the solenoid connector.

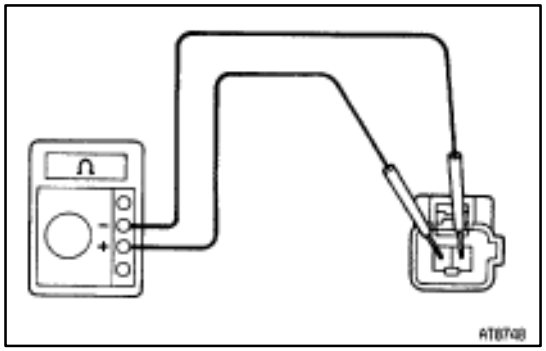
(b) Using an ohmmeter, measure the resistance between terminals.

Standard resistance:

21–27



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



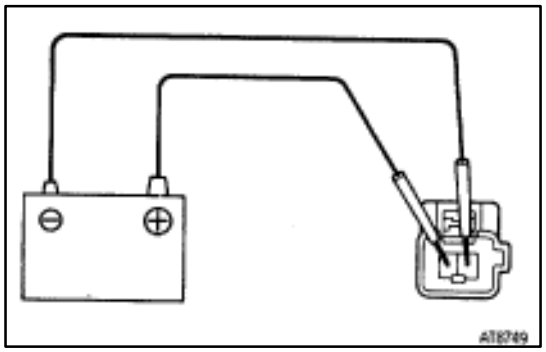
3. INSPECT KEY INTERLOCK SOLENOID

(a) Disconnect the solenoid connector.

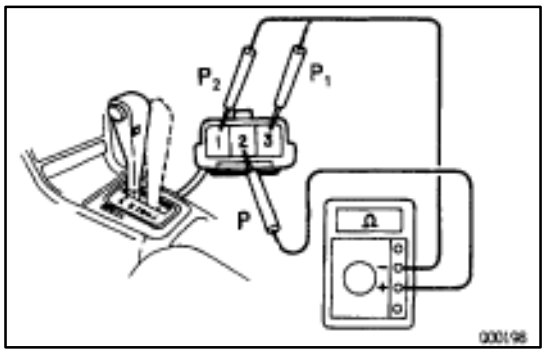
(b) Using an ohmmeter, measure the resistance between terminals.

Standard resistance:

12.5–16.5



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



4. INSPECT SHIFT LOCK CONTROL SWITCH

Inspect that there is continuity between each terminal.

Terminal / Shift Position	P	P_1	P_2
P Range (Release button is not pushed)	○——	——○	
P Range (Release button is pushed)	○——	——○	——○
R, N, D, 2, L Range	○——	——	——○

–MEMO–

TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

For troubleshooting using a volt/ohm meter, see page AX–42 ~ 44.
For troubleshooting using both volt/ohm meter and ECT checker, see page AX–45 ~ 46.

HOW TO PROCEED WITH TROUBLESHOOTING USING VOLT/OHM METER

✳ CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem.

2 CHECK AND CLEAR THE DIAGNOSTIC TROUBLE CODES (PRECHECK)

Before confirming the problem symptom, first check the diagnostic trouble code if there are any trouble codes stored in memory. When there are trouble codes, make a note of them, then clear them and proceed to "3 Problem Symptom Confirmation".

3 PROBLEM SYMPTOM CONFIRMATION, 4 SYMPTOM SIMULATION,

Confirm the problem symptoms. If the problem does not reappear, be sure to simulate the problem by mainly checking the circuits indicated by the diagnostic trouble code in step 2, using "Problem Simulation method".

5 DIAGNOSTIC TROUBLE CODE CHECK

Check the diagnostic trouble codes. Check if there is abnormality in the sensors or the wire harness.
If a malfunction code is output, proceed to "6 Diagnostic Trouble Code Chart".
If the normal code is output, proceed to "7 Matrix Chart of Problem Symptoms".
Be sure to proceed to "6 Diagnostic Trouble Code Chart" after the steps 2 and 3 are completed.
If troubleshooting is attempted only by following the malfunction code stored in the memory is output, errors could be made in the diagnosis.

6 DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is confirmed in the diagnostic trouble code check, proceed to the inspection procedure indicated by the matrix chart for each diagnostic trouble code.

7 PRELIMINARY CHECK

Carry out a preliminary check of the transmission oil level, throttle cable adjustment, etc.

8 SHIFT POSITION SIGNAL CHECK

Carry out the shift position signal check when the transaxle gears do not upshift, downshift, or lockup.
This is to check the signal output condition from the ECU to each solenoid. If the results are NG, then it is likely that the trouble is in the electrical system (particularly in the sensors or the ECU). Proceed to Part 1 (Electrical System) under [11] "Matrix Chart of Problem Symptoms". If all the circuits specified in Part 1 are OK, check the ECU and replace it.

9 MECHANICAL SYSTEM TEST

(Stall Test, Time Lag Test, Line Pressure Test)

If the malfunction is found in the stall test, time lag test, line pressure test, check the parts indicated in the respective tests.

10 MANUAL SHIFTING TEST

If the results of the manual driving test are NG, it is likely that the trouble is in the mechanical system or hydraulic system. Proceed to Part 2 (Mechanical System) under the Matrix Chart of Problem Symptoms.

[11] MATRIX CHART OF PROBLEM SYMPTOMS

If the normal code is confirmed in the diagnostic trouble code check, perform inspection according to the inspection order in the matrix chart of problem symptoms. Perform diagnosis of each circuit or part in the order shown in the Matrix Chart. The Matrix Chart contains 3 chapters, Electronically Controlled Circuits in Chapter 1, On–vehicle Inspection in Chapter 2 and Off–vehicle Inspection in Chapter 3. If all the circuits indicated in Chapter 1 are normal, proceed to Chapter 2. If all the parts indicated in Chapter 2 are normal, proceed to Chapter 3. If all the circuits and parts in Chapter 1–Chapter 3 are normal and the trouble still occurs, check and replace the ECU.

[12] CIRCUIT INSPECTION

Perform diagnosis of each circuit in accordance with the inspection order confirmed in 6 and [11].
Judge whether the cause of the problem is in the sensor, actuators, wire harness and connectors, or the ECU. In some cases, the Flow Chart instructs that a throttle signal check, brake signal check (in test mode) be performed. These are diagnosis functions used to check if signals are being input correctly to the ECU.

[13] PART INSPECTION

Check the individual parts of the mechanical system and hydraulic system in the order of the numbers indicated in the Matrix Chart.

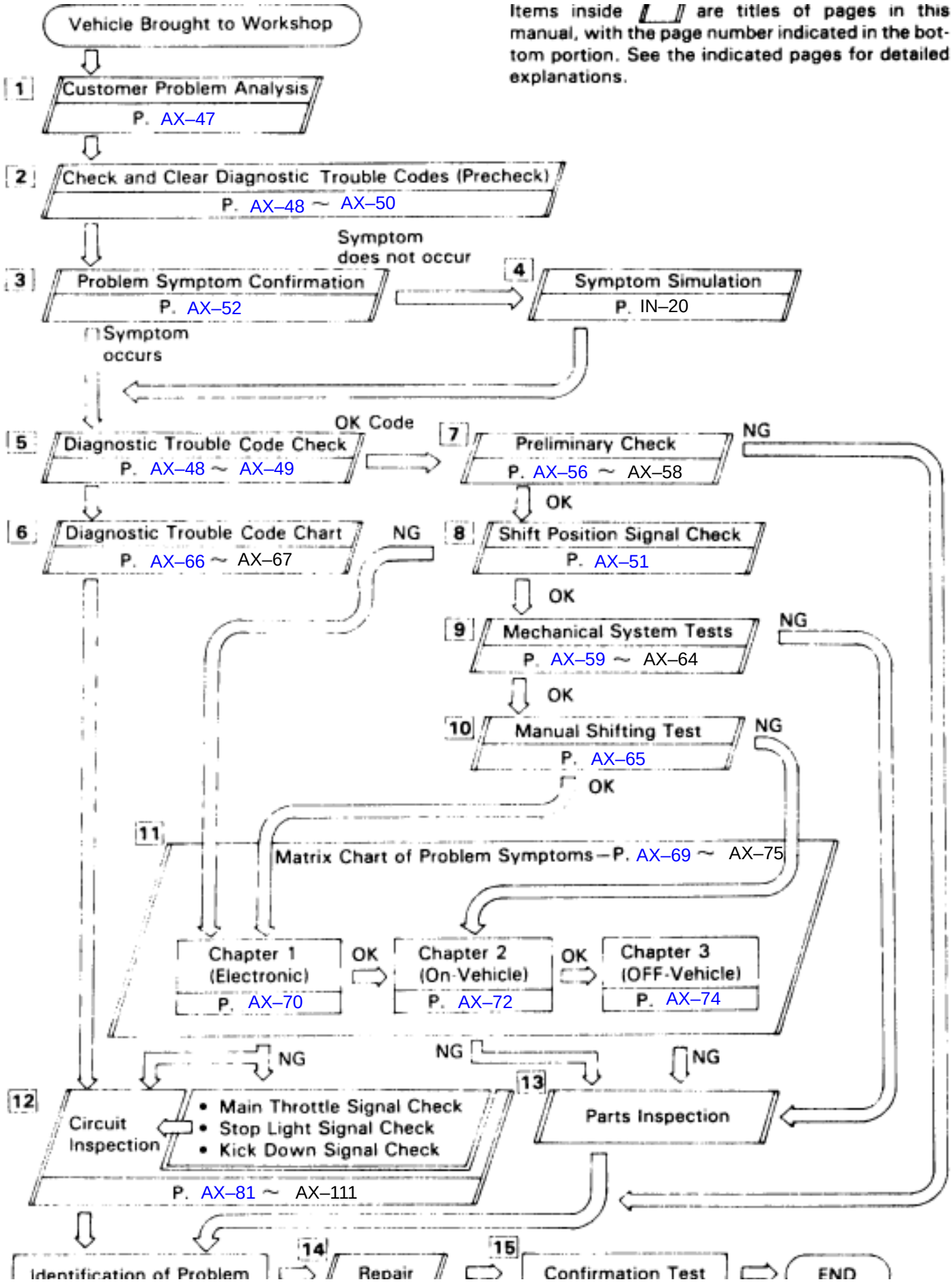
[14] REPAIRS

After the cause of the problem is located, perform repairs by following the inspection and replacement procedures in this manual or ‘92 A540E Automatic Transaxle repair manual (Pub No. RM 245U).

[15] CONFIRMATION TEST

After completing repairs, confirm not only that the malfunction is eliminated, but also conduct a test drive, etc., to make sure the entire ECT system is operating correctly.

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.

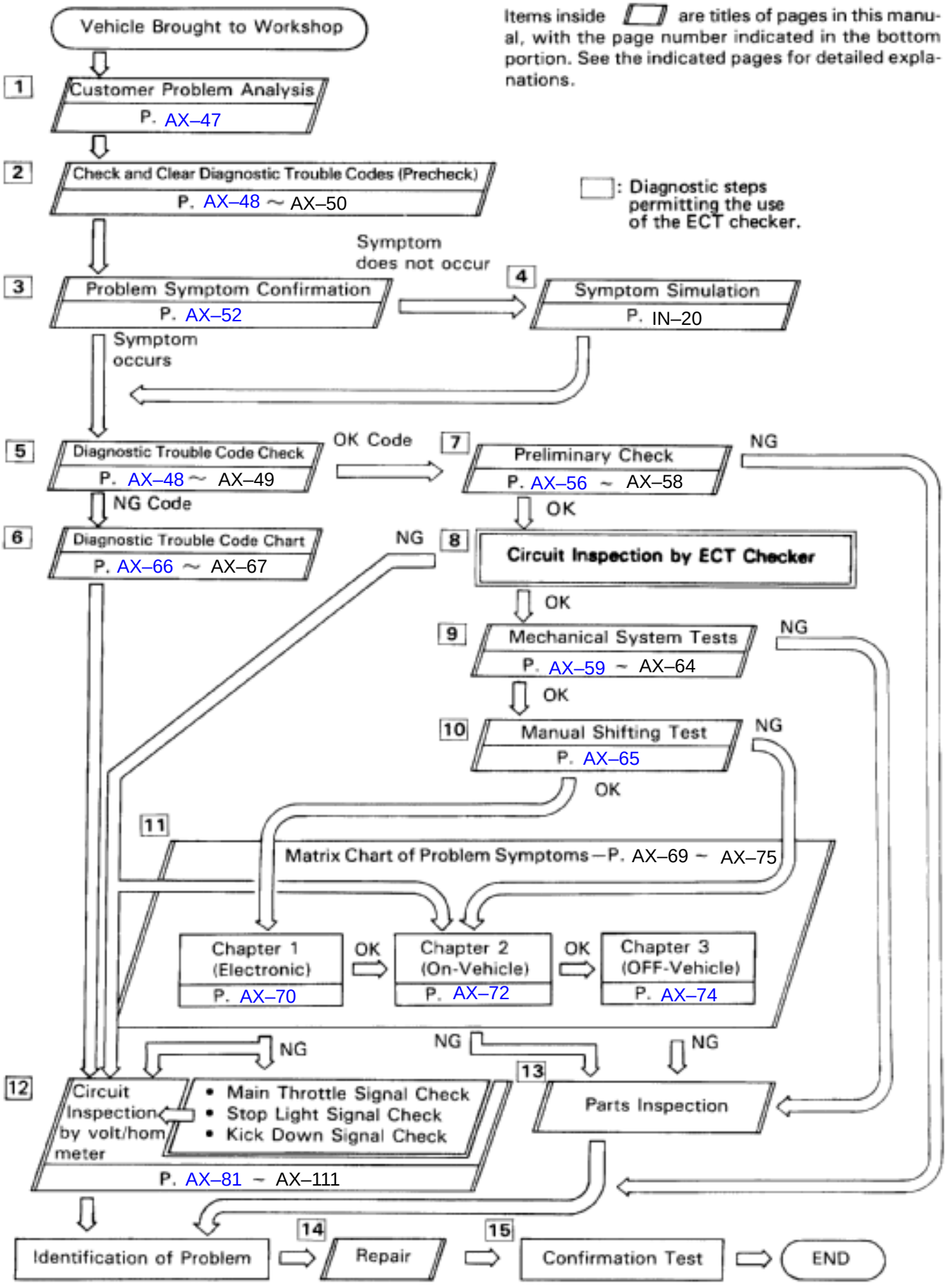


HOW TO PROCEED WITH TROUBLESHOOTING USING VOLT/OHM METER AND ECT CHECKER

For the explanation of steps ✳~7 and 9~[15], see the explanation of steps with the same title on page AX–42.

8 CIRCUIT INSPECTION BY CHECKER

Connect ECT checker to the vehicle and check all the circuits which can be inspected using the checker. If the malfunctioning circuit can be defected using the checker, proceed to [11] Matrix chart of Problem Symptoms–Part 2 (on Vehicle) or [12] Circuit Inspection by Volt/ohm meter and perform troubleshooting. For instructions on how to connect the checker to the vehicle and how to use the checker, please refer to the Instruction Manual for ECT checker.


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.
Vehicle Brought to Workshop
1 Customer Problem Analysis
P. AX–47
2 Check and Clear Diagnostic Trouble Codes (Precheck)
P. AX–48 ~ AX–50
▭: Diagnostic steps permitting the use of the ECT checker.
3 Problem Symptom Confirmation
P. AX–52
Symptom does not occur
4 Symptom Simulation
P. IN–20
Symptom occurs
5 Diagnostic Trouble Code Check
P. AX–48 ~ AX–49
OK Code
7 Preliminary Check
P. AX–56 ~ AX–58
NG
NG Code
6 Diagnostic Trouble Code Chart
P. AX–66 ~ AX–67
NG
8 Circuit Inspection by ECT Checker
OK
9 Mechanical System Tests
P. AX–59 ~ AX–64
NG
OK
10 Manual Shifting Test
P. AX–65
NG
OK
11 Matrix Chart of Problem Symptoms – P. AX–69 ~ AX–75
Chapter 1 (Electronic)
P. AX–70
OK
Chapter 2 (On-Vehicle)
P. AX–72
OK
Chapter 3 (OFF-Vehicle)
P. AX–74
NG
NG
NG
12 Circuit Inspection by volt/hom meter
• Main Throttle Signal Check
• Stop Light Signal Check
• Kick Down Signal Check
P. AX–81 ~ AX–111
13 Parts Inspection
Identification of Problem
14 Repair
15 Confirmation Test
END

CUSTOMER PROBLEM ANALYSIS

ECT Check Sheet

Inspector's Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Mile

Condition of Problem Occurrence	Date of Problem Occurence	/ /
	How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

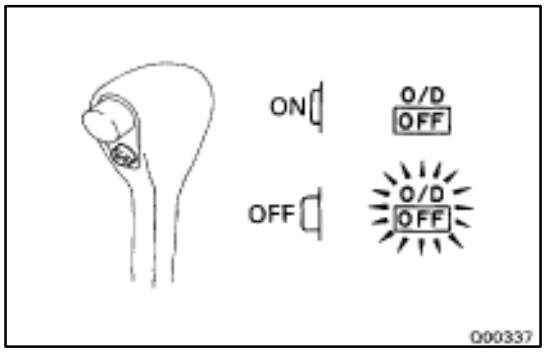
Symptoms	☐ Vehicle does not move. (☐ Any range ☐ Particular range)
	☐ No up-shift (☐ 1st→2nd ☐ 2nd→3rd ☐ 3rd→OD)
	☐ No down-shift (☐ OD→3rd ☐ 3rd→2nd ☐ 2nd→1st)
	☐ Lock-up malfunction
	☐ Shift point too high or too low.
	☐ Harsh engagement (☐ N→D ☐ Lock-up ☐ Any drive range)
	☐ Slip or shudder
	☐ No kick-down
	☐ No pattern select
	☐ Others ( )

Check Item	Check engine warning light	☐ Normal ☐ Remains ON

Diagnostic Trouble Code Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

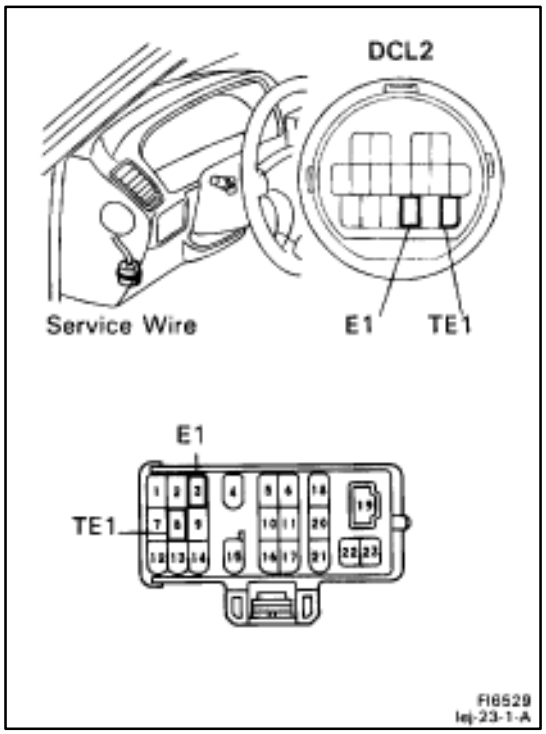
DIAGNOSIS SYSTEM

The ECT system has built–in self–diagnostic functions. If the malfunction occurs in the system, the ECU stores the malfunction code in memory and the O/D OFF (Overdrive OFF) indicator light blinks to inform the driver. The diagnostic trouble code stored in memory can be read out by the following procedure.



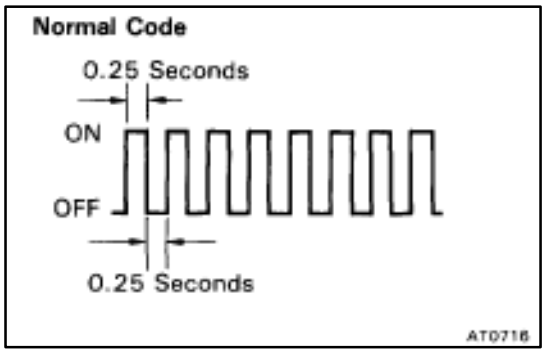
O/D OFF INDICATOR LIGHT INSPECTION

1. Turn the ignition switch to ON.
2. Check if the O/D OFF indicator light lights up when the O/D main switch is pushed out to OFF and goes off when the O/D main switch is pushed in to ON.
   HINT:
   - If the O/D OFF indicator light does not light up or stay on all the time, carry out the check for “O/D OFF Indicator Light Circuit” on page AX–101.
   - If the O/D OFF indicator light blinks, a malfunction code is stored in the ECU memory.

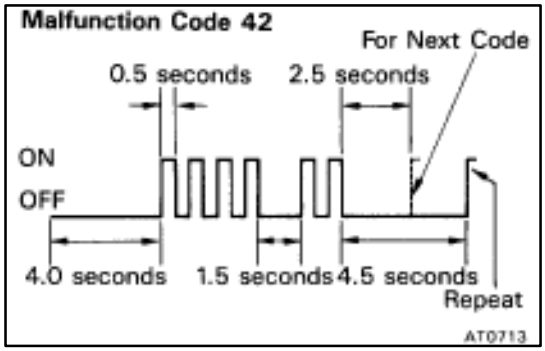


DIAGNOSTIC TROUBLE CODE CHECK

1. Turn the ignition switch ON, but do not start the engine.
2. Push in the O/D main switch to ON.
   HINT: Warning and diagnostic trouble codes can be read only when the overdrive switch is ON. If it is OFF, the overdrive OFF light will light up continuously and will not blink.
3. Using SST, connect terminals TE1 and E1 of the DCL2 or DCL1.
   SST 09843–18020



4. Read the diagnostic trouble code indicated by the number of times the O/D OFF indicator light blinks (See next page).
   HINT: If the system is operating normally, the light will blink 2 times per second.



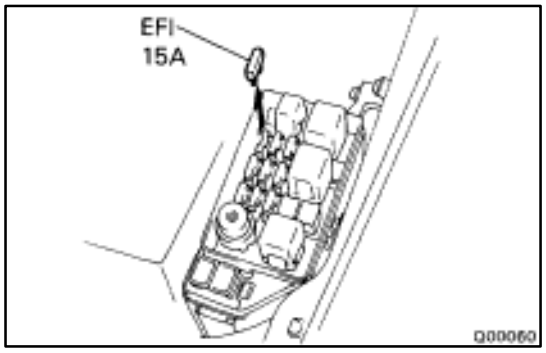
The malfunction code is indicated as shown in the illustration at left (Diagnostic trouble code “42” is shown as an example).
HINT: When 2 or more malfunction codes are stored in memory, the lower–numbered code is displayed first.
If no diagnostic trouble code is output, or if a diagnostic trouble code is output even though no diagnostic trouble code output operation is performed, check the TE1 terminal circuit on page AX–109.

DIAGNOSTIC CODE

Code No.	Blinking Pattern	Diagnosis	Trouble Area
42	BE3934	No. 1 speed sensor signal malfunction	• No. 1 speed sensor • Harness or connector of No.1 speed sensor • ECU
61	BE3935	No. 2 speed sensor signal malfunction	• No. 2 speed sensor • Harness or connector of No.2 speed sensor • ECU
62	BE3936	Open or short circuit in No.1 solenoid valve	• No.1 or No.2 solenoid valve • Harness or connector of No.1 or No.2 solenoid valve • ECU
63	BE3936	Open or short circuit in No.2 solenoid valve	
64	BE3936	Open or short circuit in No.3 solenoid valve	• No.3 solenoid valve • Harness or connector of No.3 solenoid valve • ECU

HINT:

- If the malfunction returns to normal while a malfunction warning is being output, the O/D OFF indicator light stops blinking and goes off. However, the malfunction code is retained in memory until it is cleared from memory.
- If the diagnosis system outputs a malfunction code even though the O/D OFF indicator was not blinking, there is intermittent trouble. Check all the connections in the circuits corresponding to that code.
- If speed sensors No.1 and No.2 happen to fail simultaneously, the ECU will neither alert the driver by blinking the O/D OFF indicator nor record any diagnostic trouble code. It will, however, decide that the vehicle can be driven only in 1st and none of the other gears; shifting upward will then be prohibited.
- Codes 62, 63 and 64 are limited to short or open circuits in the electrical system comprised of the solenoids, wire harness, and connectors. The ECU is unable to detect mechanical trouble (sticking, for example) in the solenoid valves.
- If No.3 solenoid valve (for lock–up clutch control) fails, the ECU will not blink the O/D OFF indicator to alert the driver. It will, however, record the failure as code 64, which may be displayed during troubleshooting.



CANCELLING DIAGNOSTIC TROUBLE CODE

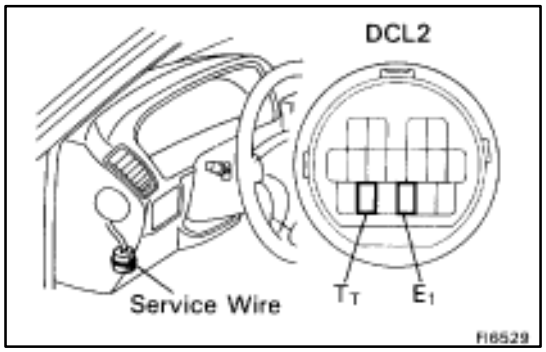
After repair of the trouble area, the diagnostic trouble code retained in the ECU memory must be cancelled out by removing the SFI fuse for 10 seconds or more, with the ignition switch off. Check that the normal code is output after connecting the fuse.

CHECK TERMINAL T_T OUTPUT VOLTAGE

When a voltmeter is connected to the DCL2, the following items can be checked.

1. Throttle position sensor signal
2. Brake signal
3. Shift position signal

1. VOLTMETER CONNECTION

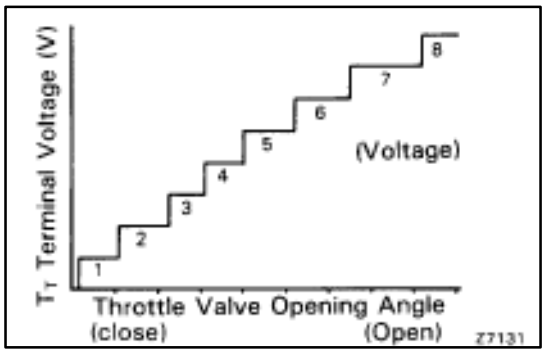


Connect the (+) positive probe of the voltmeter to terminal T_T and the negative (–) probe to terminal E_1 of the DCL2 connector.

HINT: If a voltmeter with small internal resistance is used, the correct voltage will not be indicated, so use a voltmeter with an internal resistance of at least 10 k .

2. TURN IGNITION SWITCH TO ON (DO NOT START THE ENGINE)

3. CHECK THROTTLE POSITION SENSOR SIGNAL



Check if the voltage changes from approximately 0 V to approximately 8 V when the accelerator pedal is gradually depressed from the fully closed position.

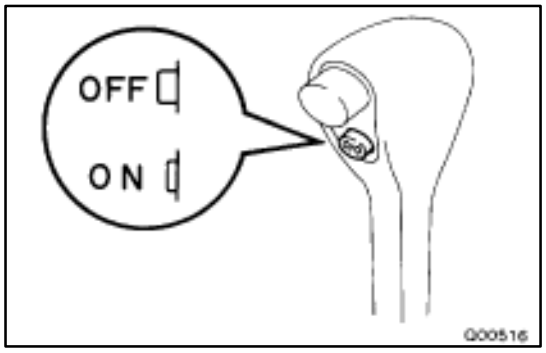
4. CHECK BRAKE SIGNAL (LOCK–UP CUT SIGNAL)

(a) Open the throttle valve fully to apply approximately 8 V to terminal T_T.

(b) In this condition, check terminal T_T voltage when the brake pedal is depressed and released.

When brake pedal is depressed: 0 V
When brake pedal is released: 8 V

5. INSPECT EACH UP–SHIFT POSITION



(a) Warm up the engine.
Engine coolant temperature: 176°F (80°C)

(b) Turn the O/D switch to “ON”.

(c) Place the pattern select switch in “Normal” and the shift lever into the D range.

(d) During a road test (above 10 km/h or 6 mph) check that voltage at the TT terminal is as indicated below for each up–shift position.

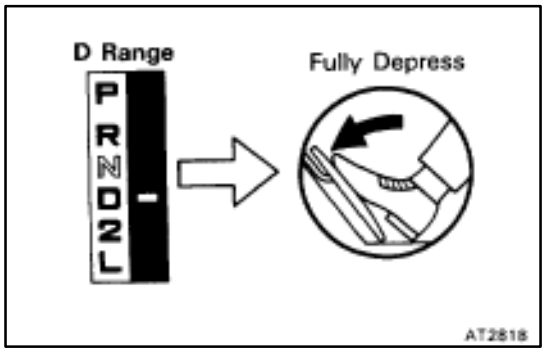
If the voltage rises from 0 V to 7 V in the sequence shown, the control system is okay.

The chart on the left shows the voltmeter reading and corresponding gears.HINT: Determine the gear position by a light shock or change in engine rpm when shifting. The lock–up clutch will turn ON only infrequently during normal 2nd and 3rd gear operation. To trigger this action, press the accelerator pedal to 50% or more of its stroke. At less than 50%, the voltage may change in the sequence 2 V–4 V–6 V –7 V.

T_T terminal (V)	Gear position
Below 0.5	1st
1.5 ~ 2.6	2nd
2.5 ~ 3.6	2nd Lock-Up
3.5 ~ 4.6	3rd
4.5 ~ 5.6	3rd Lock-Up
5.5 ~ 6.6	O/D
6.5 ~ 7.6	O/D Lock-Up

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 transaxle does not up–shift, does not downshift, or the shift point is too high or too low, conduct the following road test for the automatic shift schedule and simulate the problem symptoms.



ROAD TEST

NOTICE: Perform the test at normal operating fluid temperature (50–80°C or 122–176°F).

1. D RANGE TEST IN NORM AND PWR PATTERN RANGES

Shift into the D range and keep the accelerator pedal at the full throttle valve opening position.

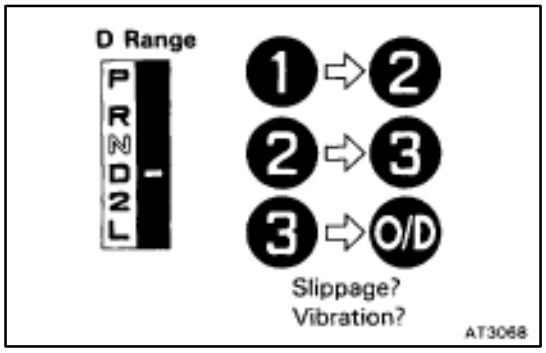
Check the following:

(a) Check that 1–2, 2–3 and 3–O/D up–shift takes place, at the shift point shown in the automatic shift schedule. (See page AX–55)

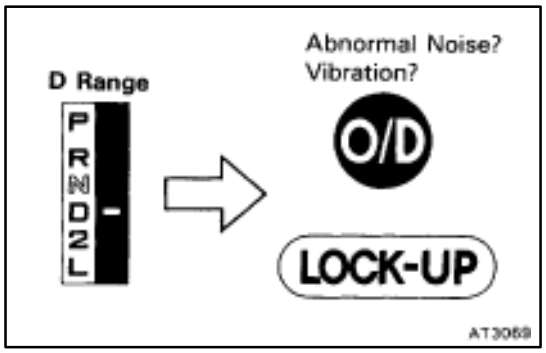
Conduct the test for both Normal and Power patterns.

HINT:

- There is no O/D up–shift and lock–up when the engine coolant temp. is below 60°C (140°F).
- When the engine coolant temp. is below 60°C (140°F), the shift point is lower than specified in the automatic shift schedule.

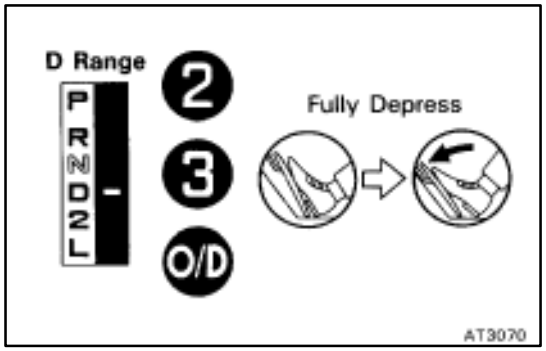


(b) Check for shift shock and slip at the 1 2, 2 3 and 3 O/D up–shifts.



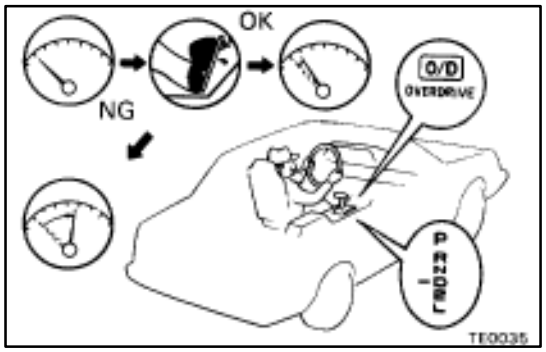
(c) Check for abnormal noise and vibration at the D range lockup or O/D gear and check for abnormal noise and vibration.

HINT: The check for the cause of abnormal noise and vibration must be performed very thoroughly as it could also be due to loss of balance in the drive shaft, tire, torque converter clutch, etc.



(d) Check kickdown operation while running in the D range, 2nd, 3rd and O/D gears, check to see that the possible kickdown vehicle speed limits for 2 1, 3 2 and O/D 3 kickdowns conform to those indicated on the automatic shift schedule. (See page AX–55)

(e) Check for abnormal shock and slip at kick–down.

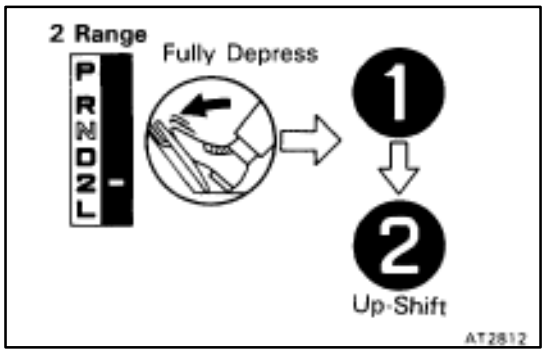


(f) Check for the lock–up mechanism.

(1) Drive in D range, O/D gear, at a steady speed (lockup ON) of about 56 km/h (35 mph) in “NORM” pattern or 65 km/h (40 mph) in “PWR” pattern.

(2) Lightly depress the accelerator pedal and check that the engine rpm does not change abruptly.

If there is a big jump in engine rpm, there is no lock–up.

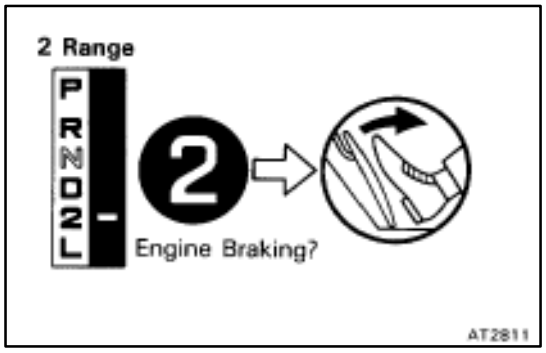


2. 2 RANGE TEST

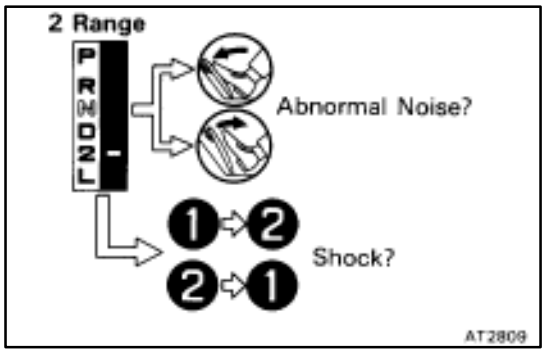
Shift into the 2 range and, while driving with the accelerator pedal held constantly at the full throttle valve opening position, push in one of the pattern selectors and check on the following points.

(a) Check up–shift operation, check to see that the 1 2 upshift takes place and that the shift point conforms to the automatic shift schedule. (See page AX–55)

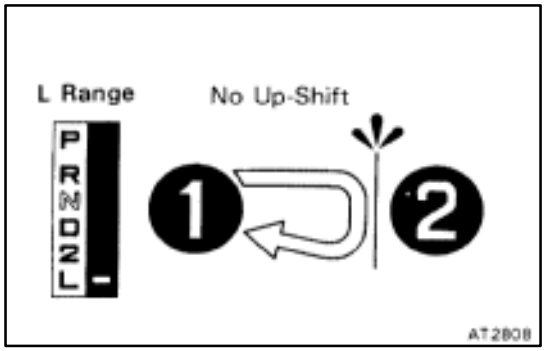
HINT: There in no O/D up–shift and lock–up in the 2 range.



(b) Check engine braking while running in the 2 range and 2nd gear, release the accelerator pedal and check the engine braking effect.



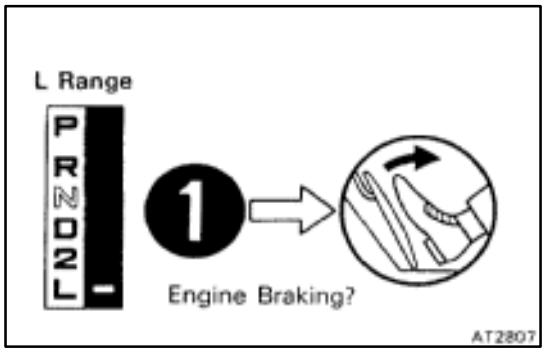
(c) Check for abnormal noise at acceleration and deceleration, and for shock at up–shift and down–shift.



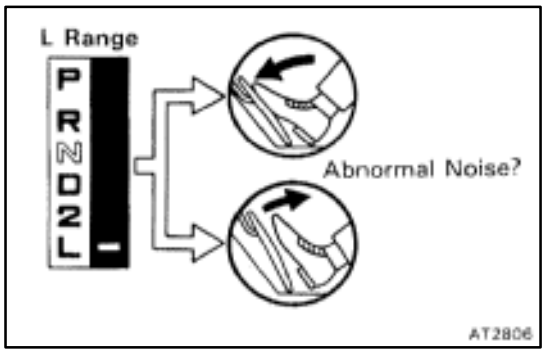
3 L RANGE TEST

Shift into the L range an d while driving with the accelerator pedal held constantly at the full throttle valve opening position, push in one of the pattern selectors and check the following points:

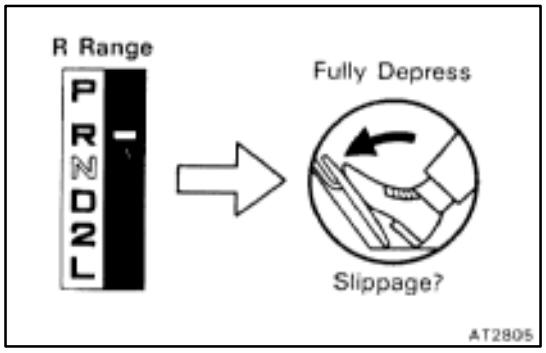
(a) Check no up–shift while running in the L range, check that there is no up–shift to 2nd gear.



(b) Check engine braking while running in the L range, release the accelerator pedal and check the engine braking effect.
If there is a big jump in engine rpm, there is no lock–up.

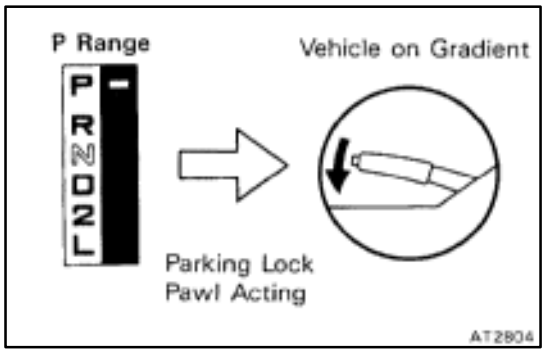


(c) Check for abnormal noise during acceleration and deceleration.



4. R RANGE TEST

Shift into the R range and while starting at full throttle, check for slipping.



5. P RANGE TEST

Stop n the vehicle on a gradient (more than 5%) and after shifting into the P range, release the parking brake.
Then check to see that the parking brake lock pawl holds the vehicle in place.

AUTOMATIC SHIFT SCHEDULE

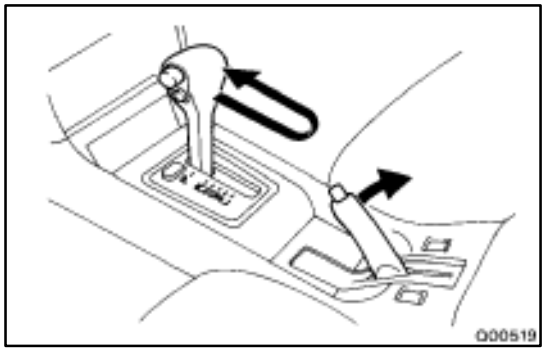
Shift range	Shift pattern	Throttle valve fully open [fully closed] km/h (mph)							
		1 2	2 3	3 O/D	[3 O/D]	O/D 3]	O/D 3	3 2	2 1
D range	NORM	51–61 (32–38)	97–105 (60–65)	153–164 (95–102)	36–41 (22–25)	19–23 (12–24)	149–160 (92–99)	92–100 (57–62)	42–47 (26–29)
	PWR	↑	↑	↑	↑	↑	↑	↑	↑
2 range	NORM PWR	↑	—	—	—	—	—	111–120 (69–75)	↑
L range	NORM PWR	—	—	—	—	—	—	97–105 (60–65)	49–55 (30–34)

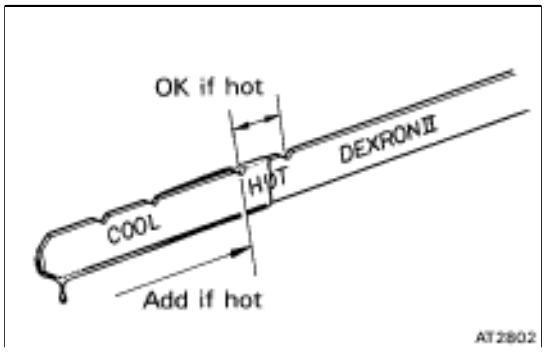
Shift Range		Throttle valve opening 5% km/h (mph)					
		Lock–up ON			Lock–up OFF		
	2nd	2nd	*3rd	O/D	2nd	*3rd	O/D
D range	NORM	—	73–80 (45–49)	53–59 (33–37)	—	65–71 (40–44)	48–53 (30–33)
	PWR	—	↑	62–68 (39–42)	—	↑	59–65 (37–40)

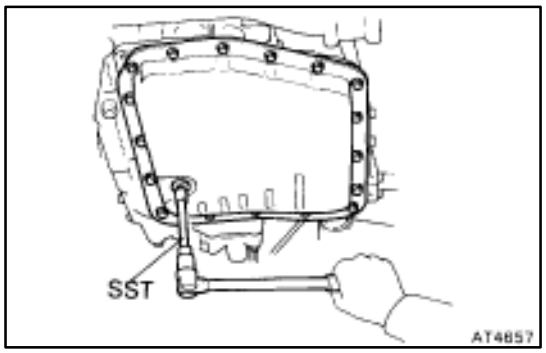
*: O/D main switch OFF

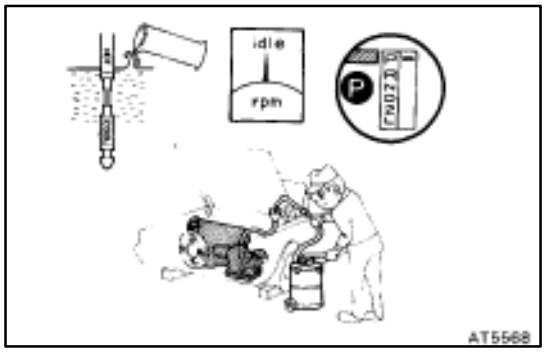
HINT:

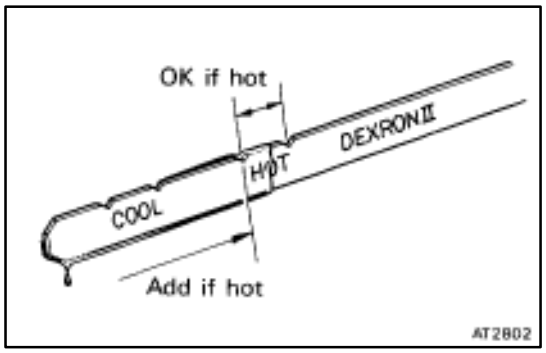
1. Lock–up will not occur in 2nd gear.
2. There is no lock–up in the 2 and L ranges.
3. In the following cases, the lock–up will be released regardless of the lock–up pattern.
   - When the throttle is completely closed.
   - When the brake light switch is ON.











PRELIMINARY CHECK

1. CHECK FLUID LEVEL

HINT:

- Drive the vehicle so that the engine and transaxle are at normal operating temperature.
  (Fluid temperature: 70 – 80°C or 158 – 176°F)
- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.

(a) Park the vehicle on a level surface and set the parking brake.

(b) With the engine idling, and the brake pedal depressed, shift the shift lever into all positions from P to L position and return to P position.

(c) Pull out the transaxle dipstick and wipe it clean.

(d) Push it back fully into the tube.

(e) Pull it out and check that the fluid level is in the HOT range. If the level is at the low side, add fluid.

Fluid type: ATF DEXRON® II

NOTICE: Do not overfill.

2. CHECK FLUID CONDITION

If the fluid smells burnt or is black, replace it.

3. REPLACE TRANSAXLE FLUID

(a) Using SST, remove the drain plug and drain the fluid.
SST 09043–38100

(b) Reinstall the drain plug securely with new gasket.

(c) With the engine OFF, add new fluid through the oil filler tube.

Fluid type: ATF DEXRON® II

Capacity:

Total: 6.5 liters (6.9 US qts, 5.7 Imp. qts)

Drain and refill: 2.9 liters
(3.1 US qts, 2.6 Imp. qts)

(d) Start the engine and shift the shift lever into all positions from P to L position and then shift into P position.

(e) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.

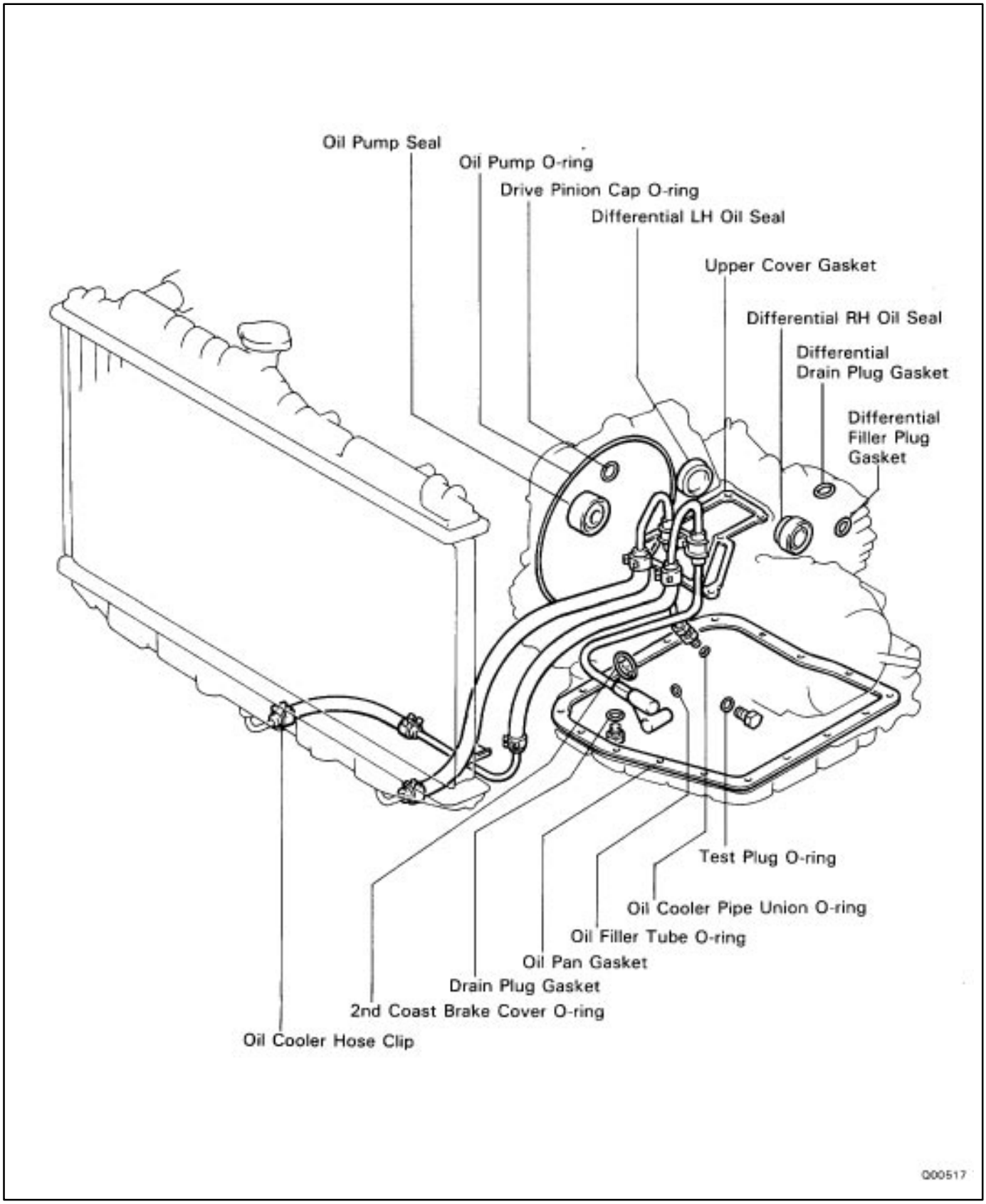
(f) Check the fluid level with the normal operating temperature (70–80°C or 158–176°F) and add as necessary.

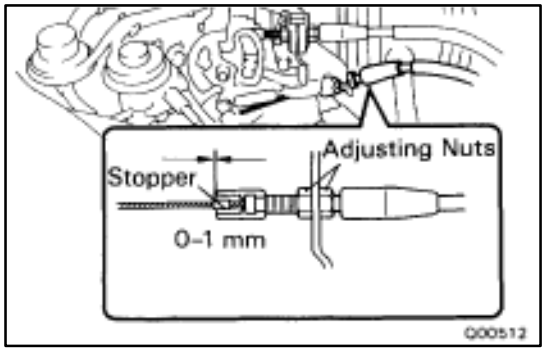
NOTICE: Do not overfill.

4. CHECK FLUID LEAKS

Check for leaks in the transaxle as shown below.

If there are leaks, it is necessary to repair or replace O–rings, seal packings, oilseals, plugs or other parts.





5. INSPECT AND ADJUST THROTTLE CABLE

(a) Check that the accelerator pedal is fully released.

(b) Check that the inner cable is not slack.

(c) Measure the distance between the outer cable end and stopper on the cable.

Standard Distance:

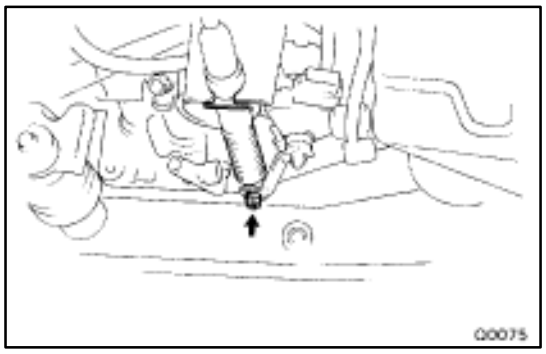
0–1 mm (0–0.04 in.)

If the distance is not standard, adjust the cable by the adjusting nuts.

6. INSPECT AND ADJUST SHIFT CABLE

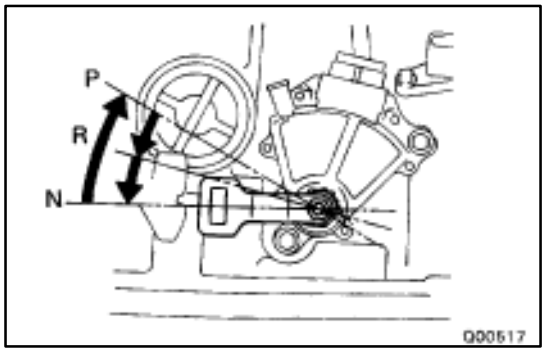
When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator correctly indicates the position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures.



(a) Loosen the swivel nut on the manual shift lever.

(b) Push the manual lever fully toward the right side of the vehicle.



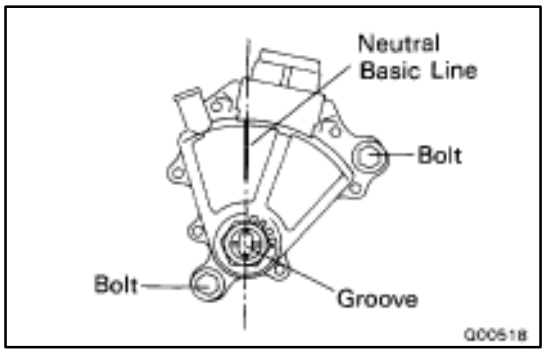
(c) Return the lever two notches to NEUTRAL position.

(d) Set the shift lever to N.

(e) While holding the lever lightly toward the R range side, tighten the swivel nut.

7. INSPECT PARK/NEUTRAL POSITION SWITCH

Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.



If not as stated above, carry out the following adjustment procedures.

(a) Loosen the park/neutral start switch bolt and set the shift lever to the N position.

(b) Align the groove and neutral basic line.

(c) Hold in position and tighten the bolt.

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

8. INSPECT IDLE SPEED (N RANGE)

Idle speed: 650–750 rpm

MECHANICAL SYSTEM TEST
STALL TEST

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.

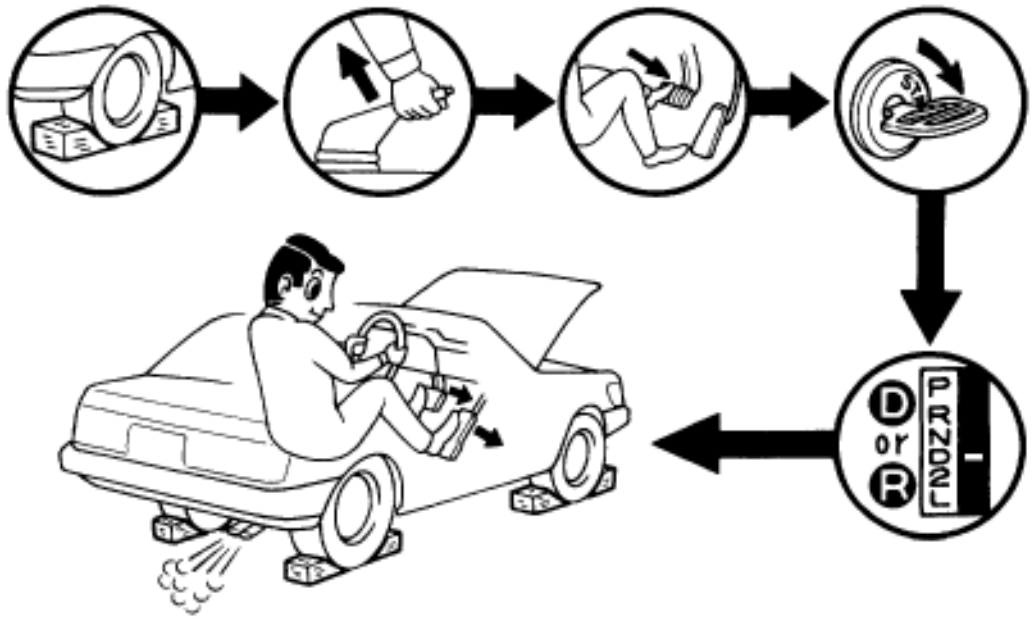
CAUTION:

- **Perform the test at normal operation fluid temperature (50–80°C or 122–176°F).**
- **Do not continuously run this test longer than 5 seconds.**
- **To ensure safety, conduct this test in a wide, clear, level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.**

MEASURE STALL SPEED

(a) Check the front and rear wheels.
(b) Connect a tachometer to the engine.
(c) Fully apply the parking brake.
(d) Press down strongly on the brake pedal with your left foot.
(e) Start the engine.
(f) Shift into the D range. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.
Stall speed: 2,400 ± 150 rpm
(g) Perform the same test in R range.

STALL TEST



AT5343

EVALUATION

Problem		Possible cause
(a)	Stall speed low in D and R ranges	3Engine output may be insufficient 3Stator one–way clutch is not operating properly HINT: If more than 600 rpm below the specified value, the torque converter clutch could be faulty.
(b)	Stall speed high in D range	3 Line pressure too low 3Forward clutch slipping 3No.2 one–way clutch not operating properly 3O/D one–way clutch not operating properly
(c)	Stall speed high in R range	3Line pressure too low 3Direct clutch slipping 3First and reverse brake slipping 3O/D one–way clutch not operating properly
(d)	Stall speed high in D and R ranges	3Line pressure too low 3Improper fluid level 3O/D one–way clutch not operating properly

TIME LAG TEST

If 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, direct clutch and first and reverse brake.

NOTICE:

- **Perform the test at normal operating fluid temperature (50–80°C or 122–176°F).**
- **Be sure to allow a one minute interval between tests.**
- **Make three measurements and take the average value.**

MEASURE TIME LAG

(a) Fully apply the parking brake.

(b) Start the engine and check the idle speed.

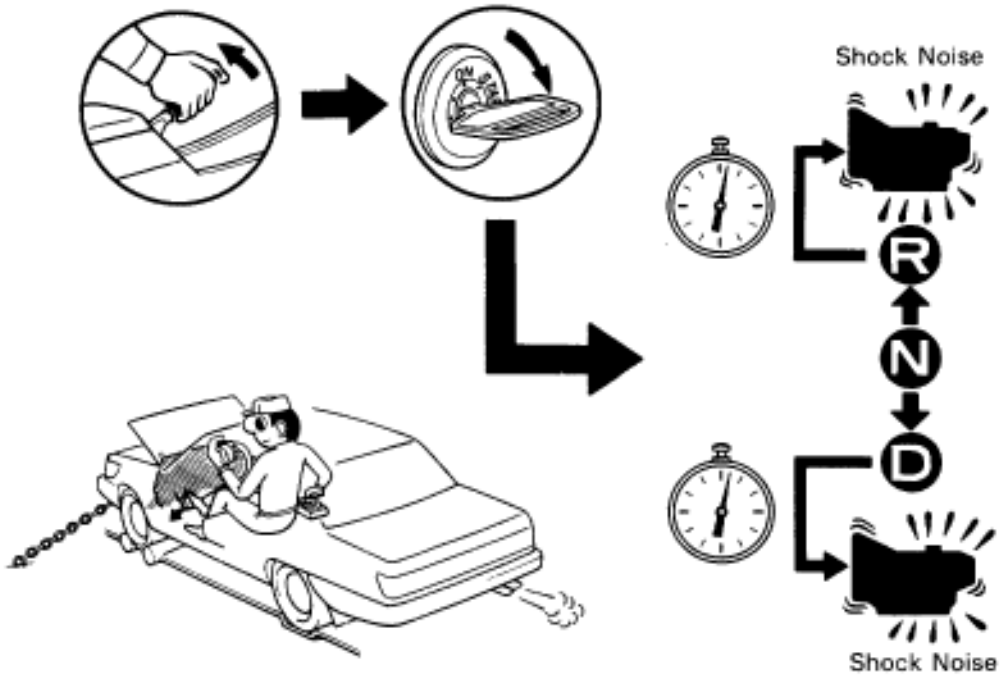
Idle speed (N range): 650–750 rpm

(c) Shift the shift lever from N to D position. Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.

In the same manner, measure the time lag for NR.

Time lag	N D	Less than 1.2 seconds
	N R	Less than 1.5 seconds

TIME LAG TEST



EVALUATION

If N D or N R time lag are longer than specified:

Problem	Possible cause
If N D time lag is longer than specified:	3Line pressure too low 3Forward clutch worn 3O/D one–way clutch not operating properly
If N R time lag is longer than specified:	3Line pressure too low 3Direct clutch worn 3First and reverse brake worn 3O/D one–way clutch not operating properly

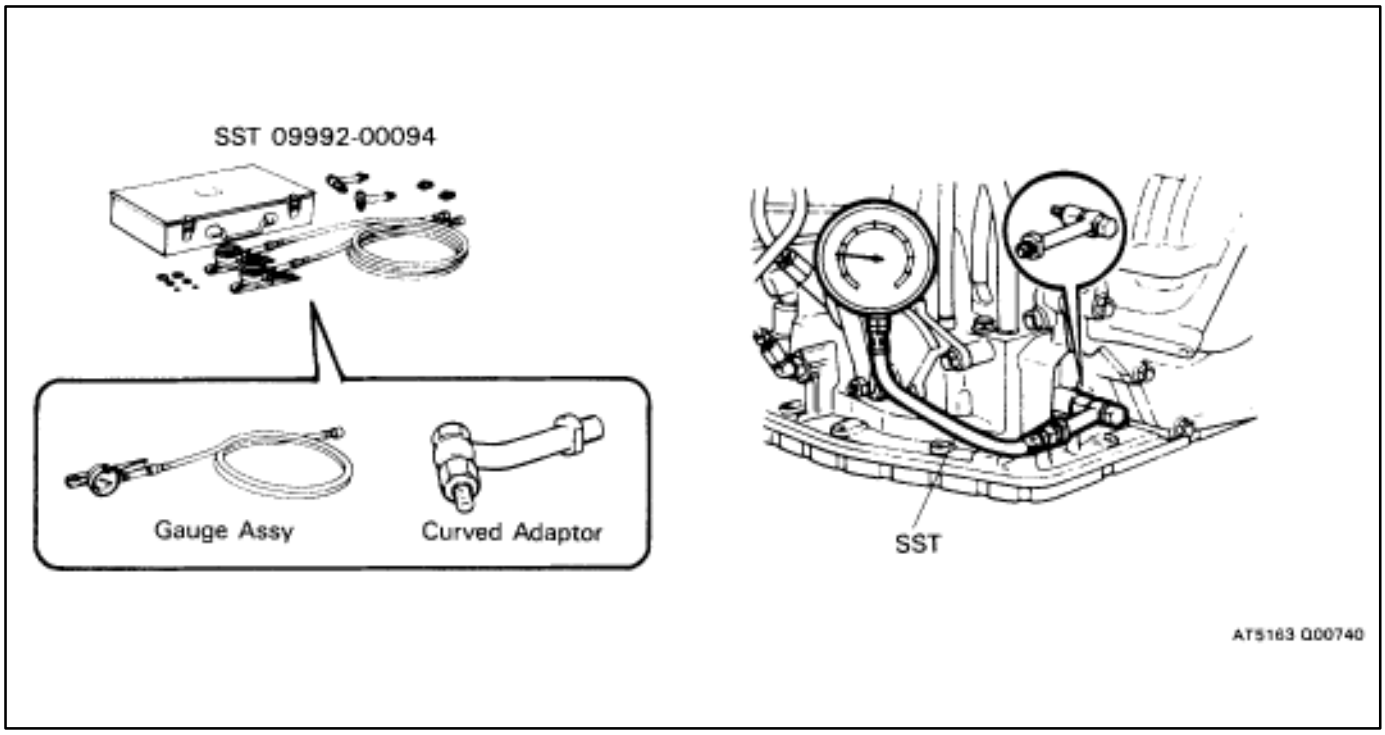
HYDRAULIC TEST
MEASURE LINE PRESSURE

NOTICE:

- **Perform the test at normal operating fluid temperature (50–80°C or 122–176°F).**
- **This line pressure test should always be carried out in pairs. One technician should observe the condition of wheels or wheel stoppers outside the vehicle while the other is performing the test.**

(a) Warm up the transaxle fluid.

(b) Remove the test plug on the transaxle case and connect the hydraulic pressure gauge. (SST)
SST 09992–00094 (Oil pressure Gauge)



(a) Fully apply the parking brake and chock the four wheels.

(b) Start the engine and check idling rpm.

(c) Press strongly on the brake pedal with your left foot and shift into D range.

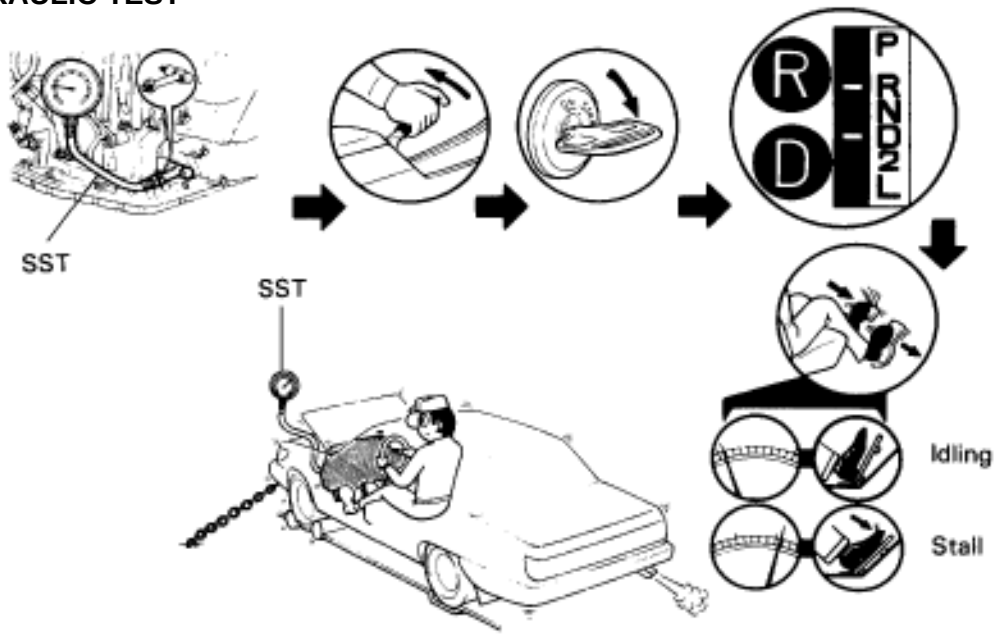
(d) Measure the line pressure when the engine is idling.

(e) Press the accelerator pedal all the way down. Quickly read the highest line pressure when reaches stall speed.

(f) In the same manner, perform the test in R range.

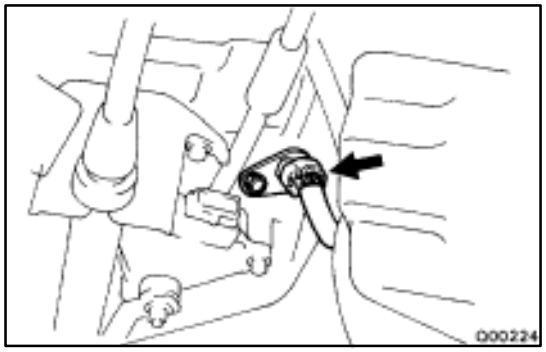
Range	D range		R range	
Engine speed	Idling	Stall	Idling	Stall
Line pressure kPa (kgf/cm^2, psi)	353–412 (3.6–4.2, 51–60)	892–1,040 (9.1–10.6, 129–151)	637–745 (6.5–7.6, 92–108)	1,608–1,837 (16.4–19.1, 233–272)

HYDRAULIC TEST



EVALUATION

Problem	Possible cause
If the measured values at all ranges are higher.	3Throttle cable out of adjustment 3Throttle valve defective 3Regulator valve defective
If the measured values at all ranges are lower	3Throttle cable out of adjustment 3Throttle valve defective 3Regulator valve defective 3Oil pump defective 3O/D direct clutch defective
If pressure is low in the D range only.	3D range circuit fluid leakage 3Forward clutch defective
If pressure is low in the R range only.	3R range circuit fluid leakage 3Direct clutch defective 3First and reverse brake defective



MANUAL SHIFTING TEST

HINT: With this test, it can be determined whether the trouble lies within the electrical circuit or is a mechanical problem in the transaxle.

1. **DISCONNECT SOLENOID WIRE**
2. **INSPECT MANUAL DRIVING OPERATION**

Check that the shift and gear positions correspond with the table below.

Shift position	D range	2 range	L range	R range	P range
Gear position	O/D	O/D	1st	Reverse	Pawl Lock

HINT: If the L, 2 and D range gear positions are difficult to distinguish, perform the following road test.

- While driving, shift through the L, 2 and D ranges. Check that the gear change corresponds to the shift position.

If any abnormality is found in the above test, the problem lies in the transaxle itself.

3. **CONNECT SOLENOID WIRE**
4. **CANCEL OUT DIAGNOSTIC TROUBLE CODE**

(See page AX–50)

REFERENCE: Possible gear positions in accordance with solenoid operating conditions.

	NORMAL			NO.1 SOLENOID MALFUNCTIONING			NO.2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING		
	Solenoid Valve		Gear	Solenoid Valve		Gear	Solenoid Valve		Gear	Solenoid Valve		Gear
Range	No.1	No.2	Position	No.1	No.2	Position	No.1	No.2	Position	No.1	No.2	Position
D range	ON	OFF	1st	x	ON (OFF)	3rd (O/D)	ON	x	1st	x	x	O/D
	ON	ON	2nd	x	ON	3rd	OFF (ON)	x	O/D (1st)	x	x	O/D
	OFF	ON	3rd	x	ON	3rd	OFF	x	O/D	x	x	O/D
	OFF	OFF	O/D	x	OFF	O/D	OFF	x	O/D	x	x	O/D
2 range	ON	OFF	1st	x	ON (OFF)	3rd (O/D)	ON	x	1st	x	x	O/D
	ON	ON	2nd	x	ON	3rd	OFF (ON)	x	O/D (1st)	x	x	O/D
	OFF	ON	3rd	x	ON	3rd	OFF	x	O/D	x	x	O/D
L range	ON	OFF	1st	x	OFF	1st	ON	x	1st	x	x	1st
	ON	ON	2nd	x	ON	2nd	ON	x	1st	x	x	1st

( ): No fail–safe function x: Malfunctions

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code in the table below and proceed to the page given:

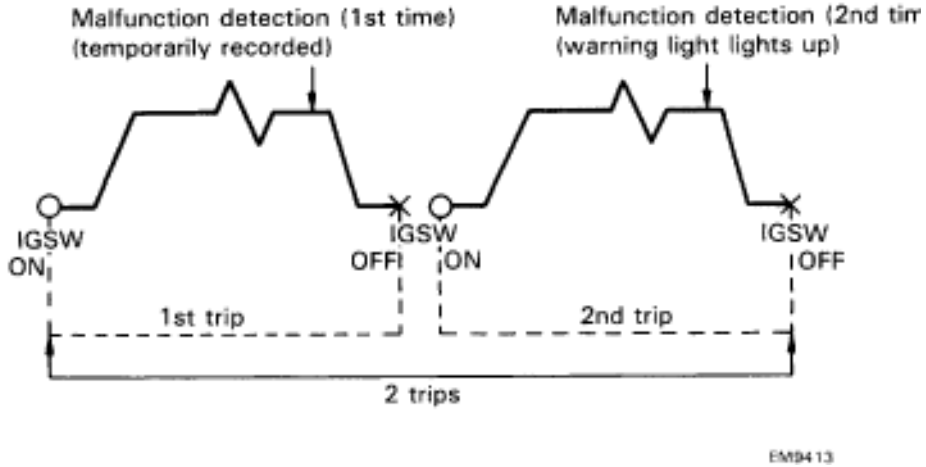
The circuits indicated by * on the code chart can be inspected using the ECT checker.

Code No.	Blinking Pattern	Circuit	Diag. Trouble Code Detection Condition
42	BE3934	No.1 speed Sensor	All conditions below are detected for 4 secs. or more (2-trip detection logic)*3 (a) No No.1 speed sensor signal in 16 pulses of No.2 speed sensor signal. (b) Vehicle speed: 9 km/h (5.6 MPH) or more (c) Park/neutral position switch: OFF (other than P or N range)
61	BE3935	No.2 Speed Sensor	All conditions below are detected for 4 sec. or more (2-trip detection logic)*3 (a) No No.2 speed sensor signal in 4 pulses of No.1 speed sensor signal. (b) Vehicle speed: 9 km/h (5.6 MPH) or more (c) Park/neutral position switch: OFF (other than P or N range)
62	BE3936	No.1 Solenoid Valve	(1) Solenoid resistance is 8 Ω or less when No.1 solenoid is energized 8 times or more. (2) Solenoid resistance is 100 kΩ or more when No.1 solenoid is energized 8 times or more.
63	BE3936	No.2 Solenoid Valve	(1) Solenoid resistance is 8 Ω or less when No.2 solenoid is energized 8 times or more. (2) Solenoid resistance is 100 kΩ or more when No.2 solenoid is energized 8 times or more.
64	BE3936	SL Solenoid Valve	(1) Solenoid resistance is 8 Ω or less when No.3 solenoid is energized once or more (2) Solenoid resistance is 100 kΩ or more when No.3 solenoid is energized once or more

*1: "O" mark means "O/D OFF" light blinks once per two seconds.
"X" mark means "O/D OFF" light never blinks.

*2: "O" mark means the ECU memorizes the malfunction code if the ECU detects the diag. trouble code detection condition.

*3: This indicates items for which "2 trip detection logic" is used. With this logic, when a logic malfunction is first detected, the malfunction is temporarily stored in the ECU memory. If the same malfunction is detected again during the second drive test, this second detection causes the "O/D OFF" light to blink.
The 2 trip repeats the same mode a 2nd time. (However, the IG switch must be turned OFF between the 1st trip and 2nd trip.)



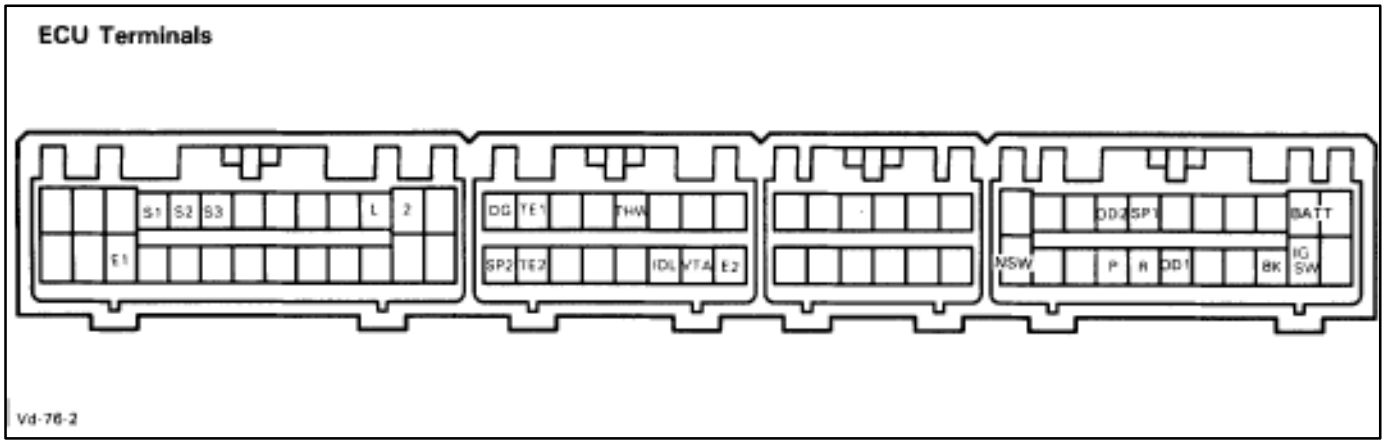
EM9413

Trouble Area	O/D OFF Light Blinks*1	Memory*2	See Page
Harness or connector between No.1 speed sensor and ECU No.1 speed sensor Combination meter ECU	O	O	AX–81
Harness or connector between No.2 speed sensor and ECU No.2 Speed Sensor ECU	O	O	AX–83
Harness or connector between No.1 solenoid and ECU No.1 solenoid ECU	O	O	AX–85
Harness or connector between No.2 solenoid and ECU No.2 solenoid ECU	O	O	AX–85
Harness or connector between No.3 solenoid and ECU No.3 solenoid ECU	x	O	AX–89

HINT: If the malfunction returns to normal while a malfunction warning is being output, the “O/D OFF” indicator light stops blinking and goes off.
However, the malfunction code is retained in memory until it is cleared from memory.

- If the diagnosis system outputs a malfunction code even though the ”O/D OFF” indicator was not blinking, there is intermittent trouble.
- Check all the connectors in the circuits corresponding to that code.
- If speed sensors No.1 and No.2 happen to fail simulaneously, the ECU will neither alert the driver by blinking the “O/D OFF” indicator none record any diagnostic trouble code. It will, however, decide that the vehicle can be driven only in 1st and none of the other gears, so shifting upward will be prohibited.
- Codes 46, 62, 63 and 64 are limited to short or open circuits in the electrical system comprised of the solenoids, wire harnesses and connectors. The ECU is unable to detect mechanical trouble (sticking, for example) in the solenoid valves.

STANDARD VALUE OF ECU TERMINAL



Symbols	Wiring Color	Condition		Standard Value
S_1–E_1	LG BR	IG OFF		11–15
		IG ON		10–14 V
		Vehicle driving under 2nd gear position		10–14 V
S_2–E_1	W–R BR	IG OFF		11–15
		IG ON		Below 1 V
		Vehicle driving under 2nd gear position		10–14 V
SL–E_1	LG BR	IG OFF		11–15
		IG ON		Below 1 V
		Vehicle driving under lock–up position		10–14 V
P–E	L–R BR	IG ON	Pattern select SW: PWR	10–14 V
			Pattern select SW: NORM	Below 1 V
BK–E_1	G–W BR	IG ON	Brake pedal is depressed	10–14 V
			Brake pedal is released	Below 1 V
THW–E_2	G BR	IG ON	Engine coolant temp. 176°F (80°C)	0.1–1.0 V
IDL–E_2	L BR	IG ON	Accel. pedal is released	Below 1 V
			Accel. pedal is depressed	10–14 V
VTA–E_2	B BR	IG ON	Accel. pedal is released	Below 1.5 V
			Accel. pedal is depressed	3–5.5 V
OD_1–E_1	Y–B BR	IG ON		10–14 V
OD_2–E_1	G–O BR	IG ON	OD main SW: ON	10–14 V
			OD main SW: OFF	Below 1 V
SP_1–E_1	V–Y BR	IG ON Disconnect following connectors: ⋇Cruise control ECU ⋇PPS ECU	Standing still	Below 1 V
			Turn the one front wheel slowly.	Plus signal is output Below 1 V 4 ~ 5 V
SP_2–E_1	LG BR	IG ON	Standing still	Below 1 V or 4 ~ 5 V
			Turn the one front wheel slowly	Puls signal is output Below 1 V 4 ~ 5 V
R–E_1	R–B BR	IG ON	R range	10–14 V
			Except R range	Below 1 V
NSW–E_1	B–W BR	IG ON	P or N range	10–14 V
			P and N range	Below 1 V
2–E	O BR	IG ON	2 range	10–14 V
			Except 2 range	Below 1 V
L–E_1	Y–L BR	IG ON	L range	10–14 V
			Except L range	Below 1 V

MATRIX CHART OF PROBLEM SYMPTOMS

If a normal code is displayed during the diagnostic trouble code check but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

Chapter 1: Electronic Circuit Matrix Chart.

Chapter 2: On–vehicle Repair Matrix Chart.

Chapter 3: Off–vehicle Repair Matrix Chart.

When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to Chapter 2 or 3, proceed as instructed.

1. 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.
2. If the trouble still occurs even through there are no abnormalities in any of the other circuits, then check or replace the ECM.
3. The circuits indicated by “⁎” on the Chapter 1 matrix chart can be inspected using the ECT checker.

Chapter 1. Electronic Circuit

See page / Suspect Area / Symptom		AX–81 AX–83	AX–85	AX–89	AX–91	EG–412	AX–93	AX–95
		No.1, No.2 speed sensor circuit	No.1, No.2 solenoid circuit	No.3 Solenoid circuit	Throttle position sensor circuit	IDL switch circuit	Park/neutral position switch circuit	Stop light circuit
Vehicle does not move in any forward range and reverse range								
Vehicle does not move in particular range or ranges								
No up-shift	1st → 2nd	3	2		1			
	2nd → 3rd	3	2		1			
	3rd → O/D	4	3					
No down-shift	O/D → 3rd	2	1					
	3rd → 2nd	2	1		3			
	2nd → 1st	2	1		3			
No lock-up		3		1	2			5
No lock-up off				1	2	3		4
Shift point too high or too low		2		3	1			
Up-shifts to 2nd while in L range Up-shifts to 3rd while in L range							1	
Up-shifts to O/D from 3rd while O/D switch is OFF								
Up-shifts to O/D from 3rd while engine is cold								
Harsh engagement	N → D							
	Lock-up			1				
	Any driving range							
Slip or Shudder	Forward and reverse							
	Particular range							
No engine braking								
Poor acceleration		2	1					
No kick-down		2	1					
No pattern select		2						
Large shift shock or Engine stalls when starting off or stopping.								

Pattern select switch circuit AX–97	O/D switch and O/D OFF indicator switch circuit AX–101	O/D cancel signal circuit AX–107	Engine Coolant Temperature sensor circuit EG–374	ECM IN–32	On-Vehicle repair matrix chart AX–72	OFF-Vehicle repair matrix chart AX–74
					1	2
					1	2
				4	5	6
				4	5	6
	1	2	5	6	7	8
		3		4	5	–
				4	5	–
				4	5	6
		4	6	7	8	9
			5	6	7	8
5		4		6	–	–
				2	–	–
	1			2	–	–
			1	2	3	4
					1	2
				2	3	4
					1	2
					1	2
					1	2
					1	2
				3	–	4
				3	4	–
1				3	–	–
					–	1

Chapter 2. On–Vehicle Repair

See page / Suspect Area / Symptom		AX–13	★	★	★	★	★	★	★
		Oil strainer	Parking lock pawl	Manual valve	1–2 shift valve	2–3 shift valve	3–4 shift valve	C_1 accumulator	B_2 accumulator
Vehicle does not move in R range					1	2			
Vehicle does not move in any forward range or reverse range				1					
No lock-up									
No lock-up OFF									
No kick-down					1	2	3		
No engine braking	1st								
	2nd								
No up-shift	1st → 2nd				1				
	2nd → 3rd					1			
	3rd → O/D						1		
No down-shift	O/D → 3rd						1		
	3rd → 2nd					1			
	2nd → 1st				1				
Harsh engagement	N → R								
	N → D							1	
	N → L								
	1st → 2nd (D range)								1
	1st → 2nd (2 range)								
	1st → 2nd → 3rd								
	1st → 2nd → 3rd → O/D								
	2nd → 3rd								
	3rd → O/D								
	O/D → 3rd								
	3rd → 2nd								1
Sliper shudder in forward and reverse (Directry after E/G start)		2							

*: Refer to '92 A540E Automatic Transaxle Repair Manual (Pub. No. RM245U)

*	*	*	*	*	*	*	*	*	AX–74
C_2 accumulator	B_0 accumulator	C_0 accumulator	No.1 and No.2 accumulator control valve	Low coast modulator valve	2nd coast modulator valve	Throttle modulator valve	Lock-up relay valve	Pressure relief valve	OFF-Vehicle repair matrix chart
									3
									2
							1		2
							1		2
				1					2
					1				2
									2
									2
									2
									2
			1						2
									2
				1					
									2
					1				
			2			1			
			1						
1									
	1								2
	2	1							
	3	2			4				5
								1	3

Chapter 3. Off–Vehicle Repair

Suspect Area / Symptom	See page	Torque converter clutch	Parking lock pawl	O/D direct clutch (C_0)	Forward clutch (C_1)	Direct clutch (C_2)	O/D brake (B_0)
	AX–35	★	★	★	★	★	★
Vehicle does not move in any forward range					1	6	
Vehicle does not move in reverse range				5		4	
Vehicle does not move in any forward range and reverse range			1	3			4
No lock-up		1					
No lock-up OFF		1					
Large shock during lock-up		1					
E/G stalls when starting off and stopping		1					
No up-shift	1st → 2nd						
	2nd → 3rd					1	
	3rd → O/D						1
No down shift 2nd → 1st							
Harsh engagement	N → R					1	
	N → D				1		
	1st → 2nd (D range)						
	2nd → 3rd						
	3rd → O/D			1			2
Slip on shudder	Forward and reverse (After warm-up)	1		3			
	Forward and reverse (Directly after E/G start)	1					
	R range			2		1	
	1st				1		
	2nd						
	2nd → 3rd (Up-shift)					1	
	3rd					1	
	O/D						1
No engine braking	1st ~ 3rd			1			
	1st						
	2nd						
Poor acceleration	All ranges	1					
	O/D			1			
	Other than O/D						1
	Other than 2nd						
	1st and 2nd						1
	1st and R range						
	R range				1		

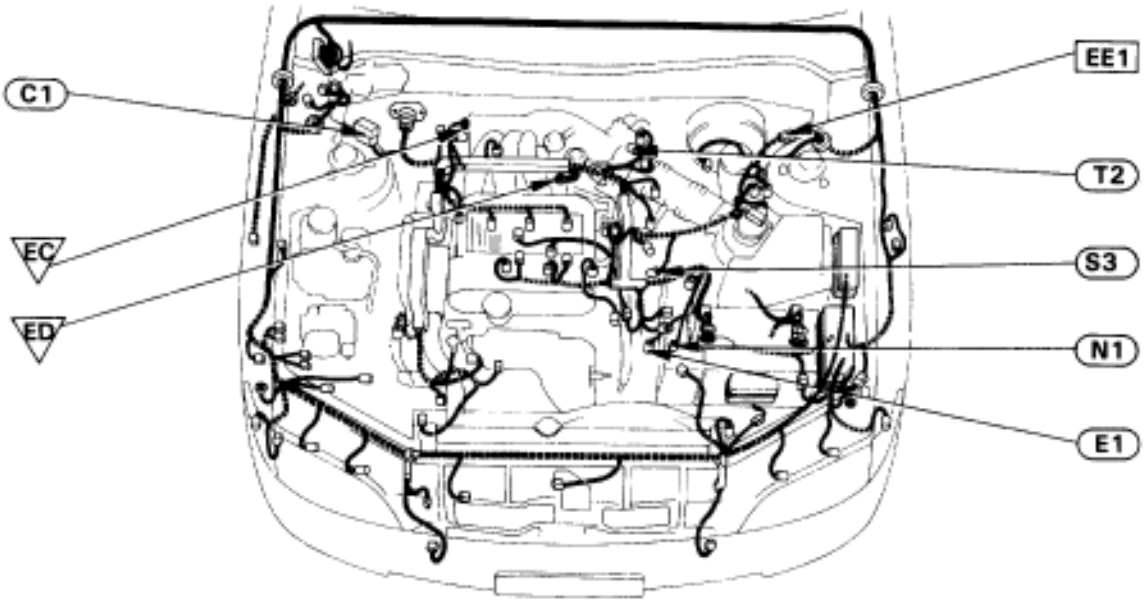
* :

Refer to '92 A540E Automatic Transaxle Repair Manual (Pub. No. RM245U)

★	★	★	★	★	★	★	★	★
2nd coast brake (B_1)	Second brake (B_2)	1st and reverse brake (B_3)	O/D one-way clutch (F_0)	No.1 one-way clutch (F_1)	No.2 one-way clutch (F_2)	O/D planetary gear	Front planetary gear	Rear planetary gear
4	5	3			2			
1		6					2	3
			2			7	5	6
	1			2				
1								
		2						
		1						
1								
						3		
				2				
			3					
					2			
	1			2				
		1						
1								
						2		
						2		
1	2							
		1						

CONNECTORS LOCATION

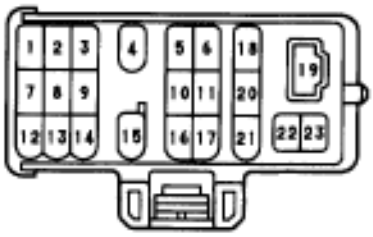
Connectors Location in Engine Compartment



BE6660

C1

DCL1



loj-23-1-A

E1

ECT Solenoid

le-3-1-G

N1

Park/Neutral Start Switch

SH-9-1-A

S3

No.2 Speed Sensor

IS-2-1-A

T2

Throttle Position Sensor

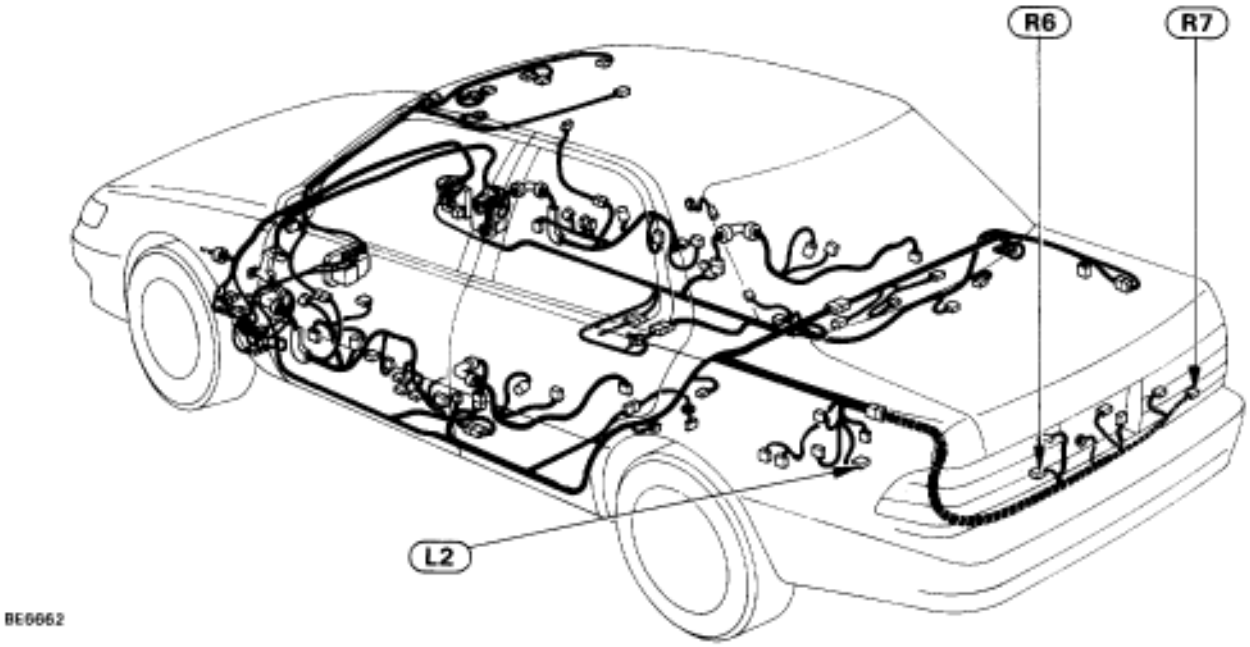
IS-4-1-C

EE1

lfg-4-1

lfg-4-2

Connectors Location in Body



L2

Light Failure Sensor

e-12-1

R6

Stop Light LH

e-6-2

R7

Stop Light RH

e-6-2

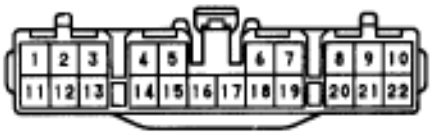
O4

O/D Main Switch

s-4-2-B

J1

Junction Connector



e-22-1-A

J2

Junction Connector

e-14-1-A

S14

Stop Light Switch

eg-4-1

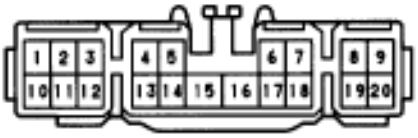
T3

DCL2

s-17-1

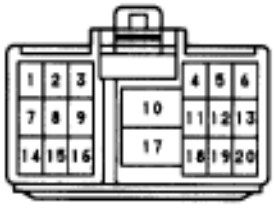
T4

Theft Deterrent and Door Lock ECU

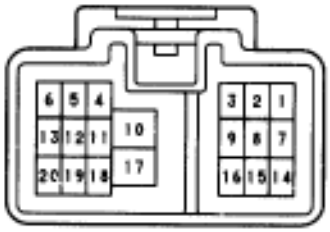


e-20-1

IH2

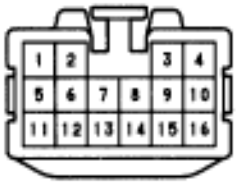


e-20-1-B

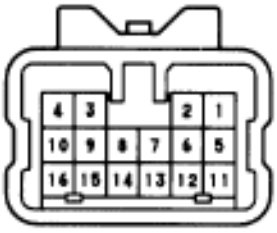


e-20-2-B

IH3

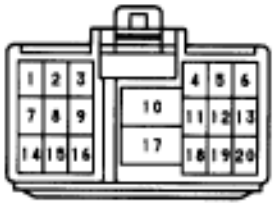


e-16-1

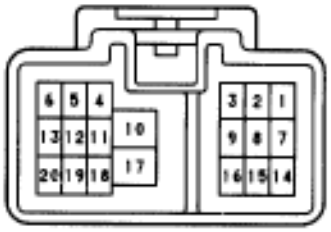


e-16-2

IM1



e-20-1-B



e-20-2-B

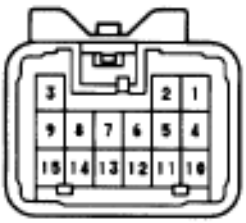
IM3

ef-19-1

ef-19-2

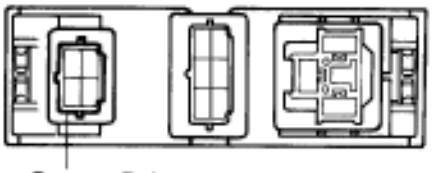
IN1

e-15-1



e-15-2

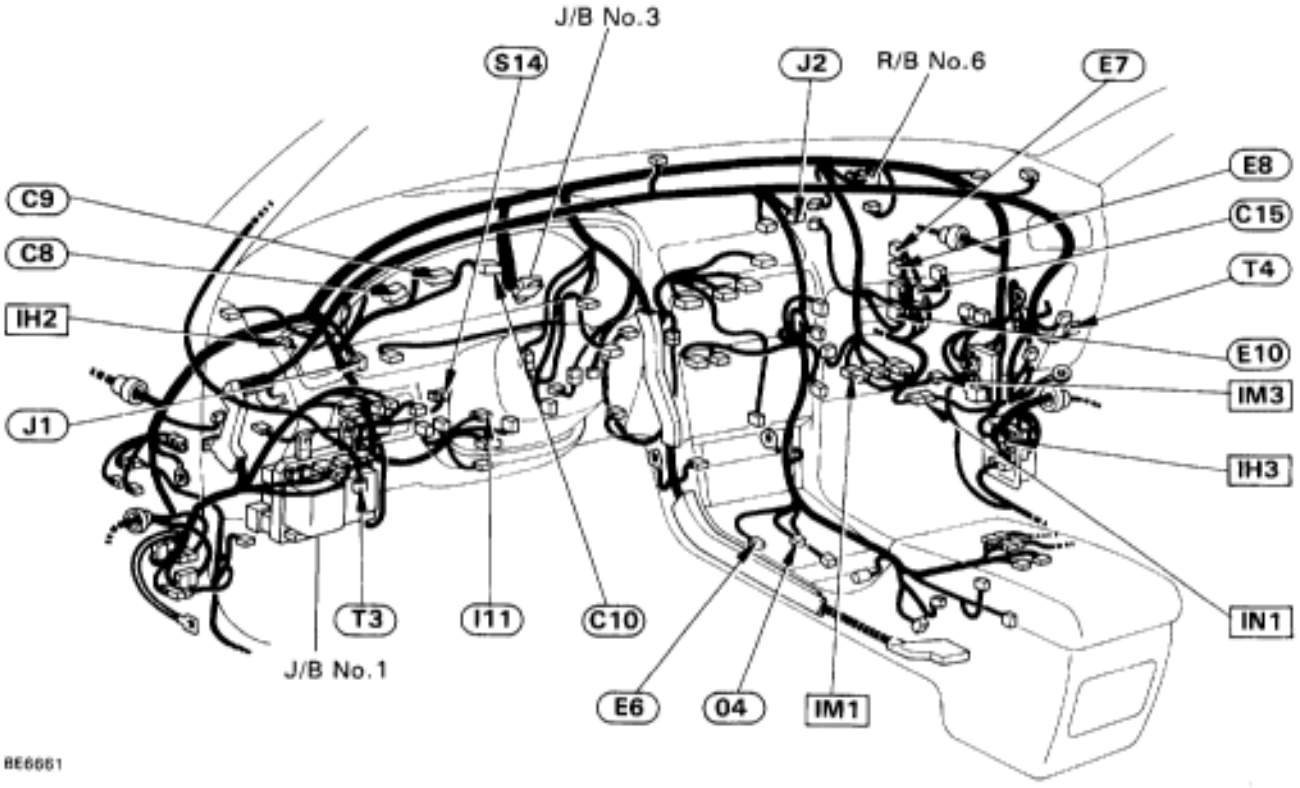
R/B No.6



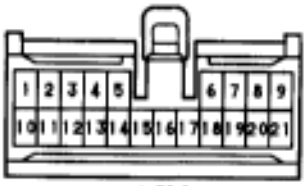
Starter Relay

BE6670

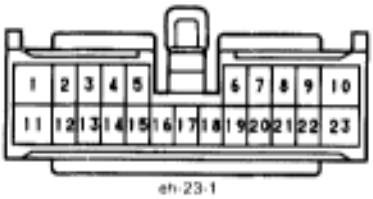
Connectors Location in Instrument Panel



C8
Combination Meter

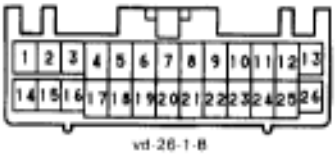


C9
Meter Assembly



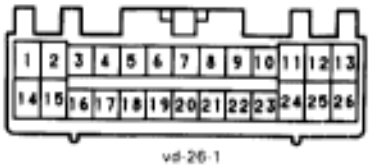
C10
Combination Meter

C15
Cruise Control ECU

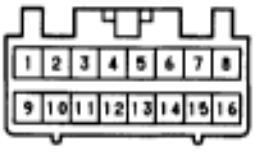


E6
Pattern
Select Switch

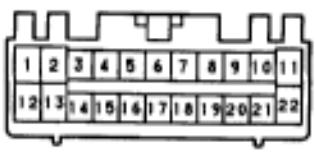
E7
ECM



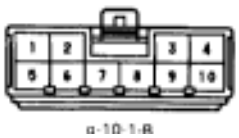
E8
ECM



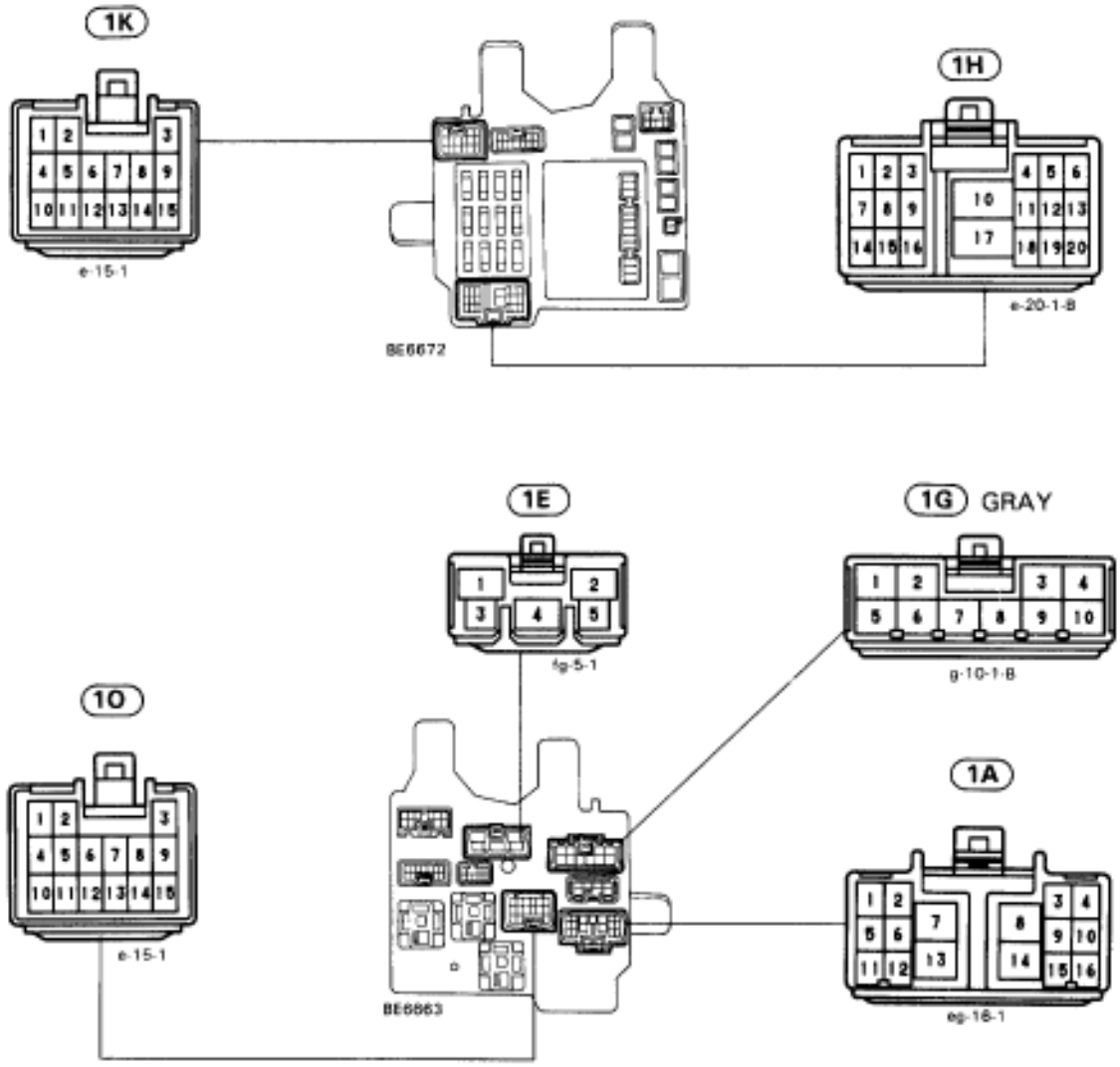
E10
ECM



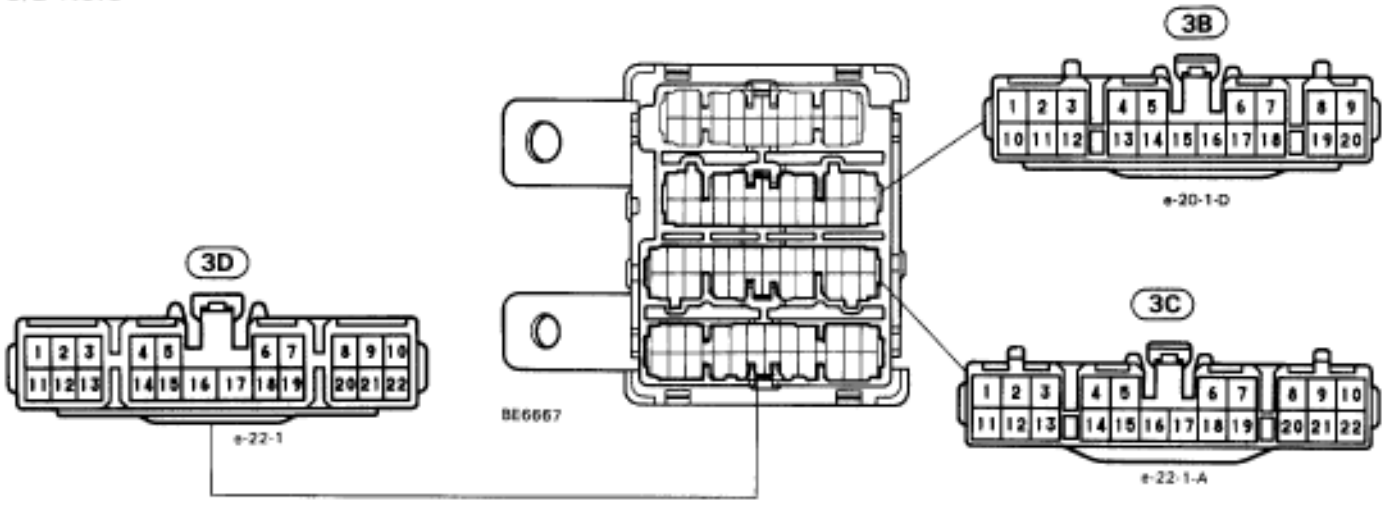
I11
Ignition Switch



J/B No.1


1K
e-15-1
BE6672
1H
e-20-1-B
1E
fg-5-1
1G GRAY
g-10-1-B
1O
e-15-1
BE6663
1A
eg-16-1

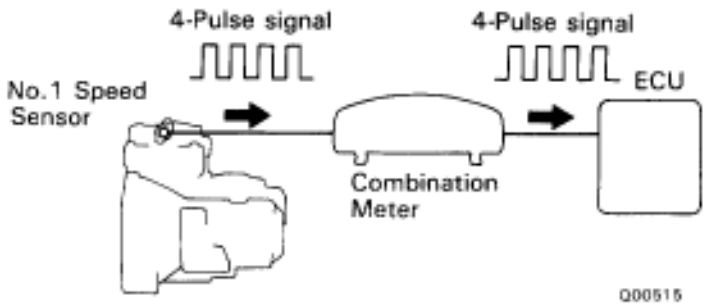
J/B No.3

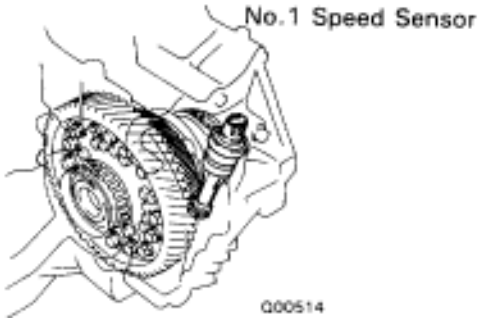

3B
e-20-1-D
3D
e-22-1
BE6667
3C
e-22-1-A

DTC	42	No. 1 Speed Sensor Circuit (Back–up Sensor)

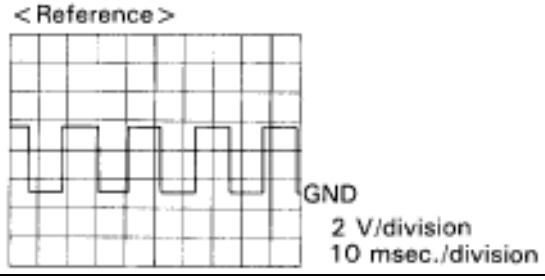
CIRCUIT DESCRIPTION

The No. 1 speed sensor outputs a 4–pulse signal for every revolution of the differential case.
After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the engine and TCM.



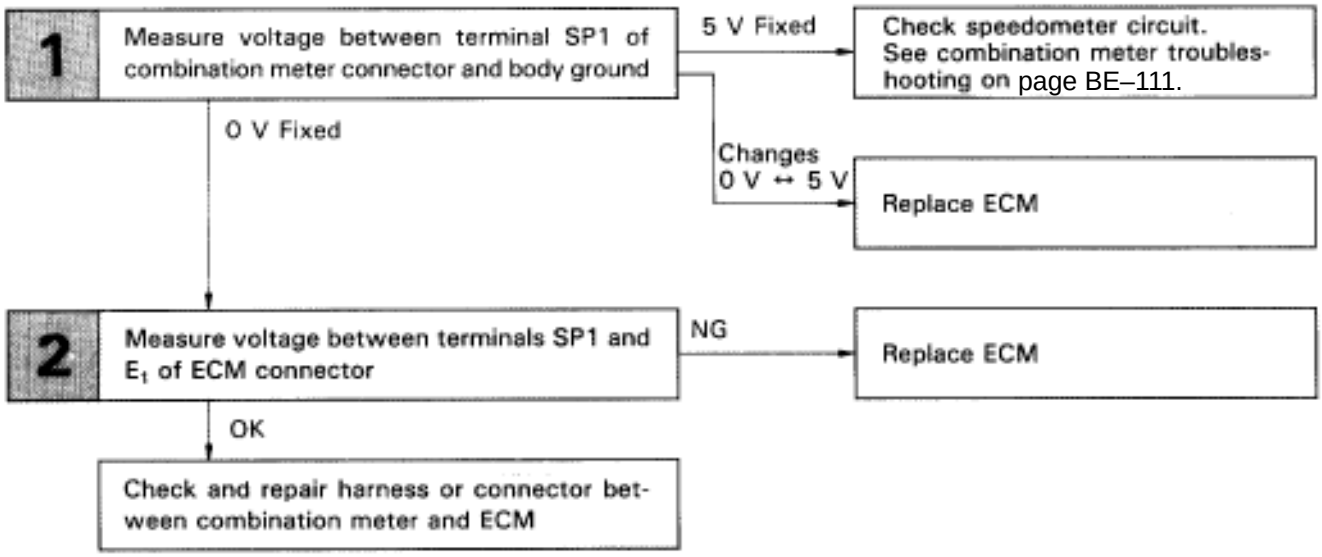


Code No.	Diag. Trouble Code Detection Condition	Trouble Area
42	All conditions below are detected for 4 secs. or more (2 trip detection logic)* (c) No No. 1 speed sensor signal in 16 pulses of No. 2 speed sensor signal. (d) Vehicle speed: 9 km/h (5.6 MPH) or more (e) Park/neural position switch: OFF (Other than P or N range)	⋊No. 1 speed sensor ⋊Combination meter ⋊Harness or connector between No. 1 speed sensor and ECU ⋊ECU



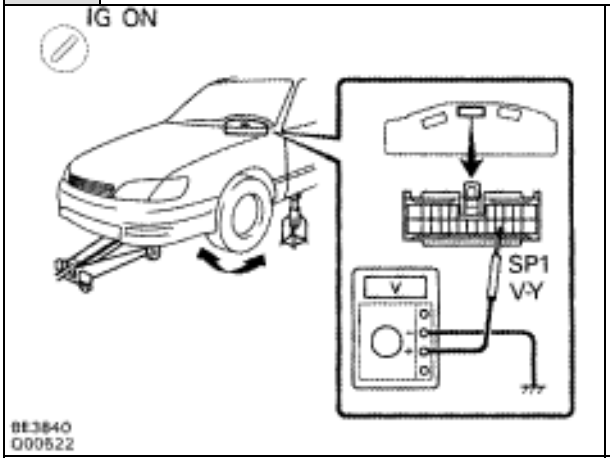
⋊Waveform between terminals SP1 and E_1, when vehicle speed is about 60 k/h (37 MPH).
HINT: The greater the vehicle speed, the greater the number of SP1 signals is produced.

DIAGNOSTIC CHART



INSPECTION PROCEDURE

1 **Measure voltage between terminal SP1 of combination meter connector and body ground.**



P (a) Shift the shift lever to N range.
(b) Jack up the front wheel on one side.
(c) Disconnect the cruise control ECU and PPS connectors.
(d) Turn IG switch ON.

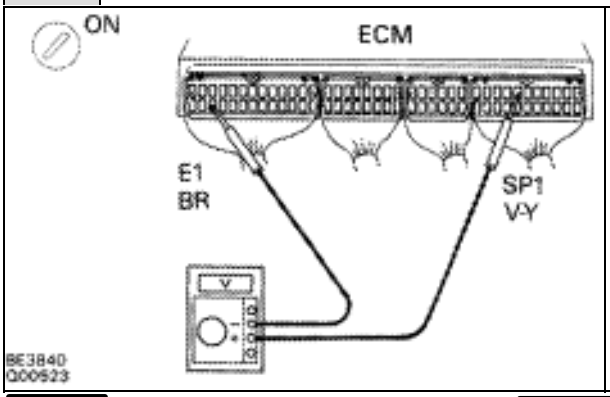
C Measure voltage between terminal SP1 of combination meter connector and body ground then turn the one front wheel slowly.

Voltage: **Constantly 0 V ..... Go to Next Step**
Constantly 4 – 6 V ... Go to NG1
Changes 0 V 4 6 V .. Go to NG2

NG1 **Check combination meter circuit. See combination meter troubleshooting on page BE–111.**

NG2 **Replace ECM**

2 **Measure voltage between terminals SP1 and E_1 of engine and ECT ECU**



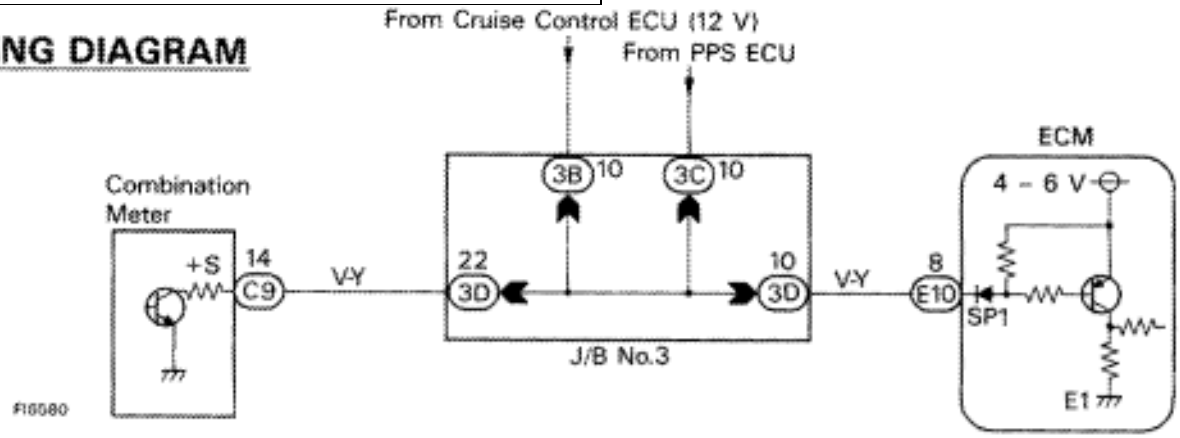
P 3. Disconnect combination meter and cruise control computer connections.
4. Turn IG switch ON.
5. Measure voltage between terminals SP1 and E_1 of ECM connector.

OK **Voltage:** **4 – 6 V**

OK → **Replace ECM**

NG → **Check and repair harness or connector between combination meter and ECM.**

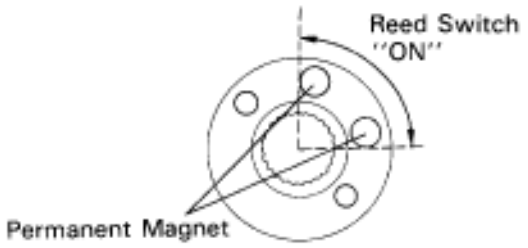
WIRING DIAGRAM

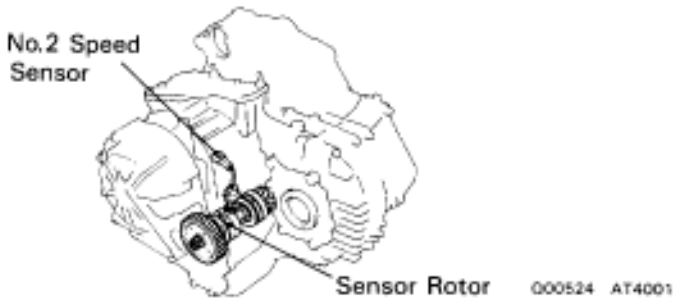


DTC 61 No. 2 Speed Sensor Circuit (Main Sensor)

CIRCUIT DESCRIPTION

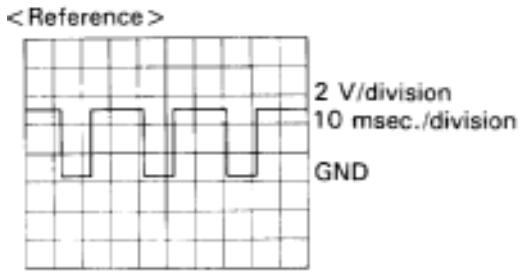
A rotor with built in permanent magnet is mounted on the differential drive pinion. Every time the differential drive pinion (and thus the rotor) makes one complete revolution, the permanent magnet activates the reed switch, which is built into the No.2 speed sensor, causing it to generate a signal. This signal, which corresponds to the governor pressure in a conventional automatic transaxle, is sent to the ECM, which uses it in controlling the shift points and the operation of the lock–up clutch. This sensor outputs one pulse for every one revolution of the differential drive pinion.





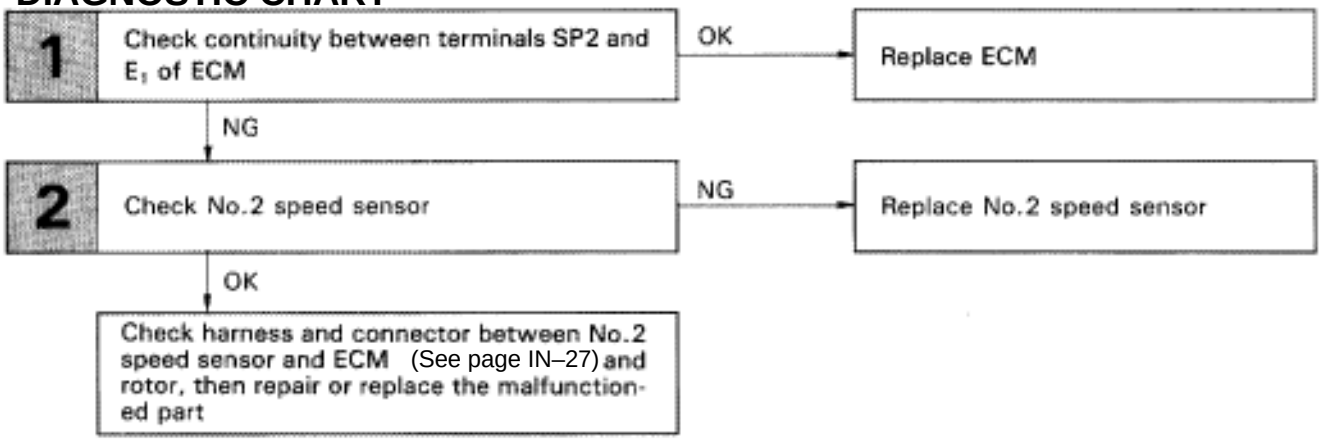
Code No.	Diag. Trouble Code Detection Condition	Trouble Area
61	All conditions below are detected for 4 secs. or more (2 trip detection logic)* (a) No No.2 speed sensor signal in 4 pulses of No.1 speed sensor signal (b) Vehicle speed: 9 km/h (5.6 MPH) or more (c) Park/neutral position switch OFF (other than P or N range)	⋊No. 2 speed sensor ⋊Harness or connector between No. 2 speed sensor and ECU ⋊ECU

* See page AX–66



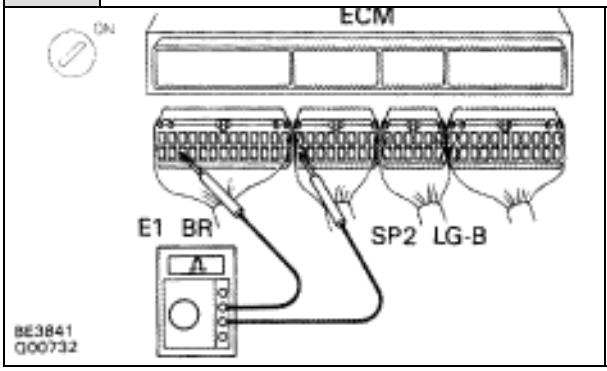
⋊Waveform between terminals SP2 and E_1 when vehicle speed is approx. 60 km/h (37 MPH).

DIAGNOSTIC CHART



INSPECTION PROCEDURE

1 **Check continuity between terminals SP2 and E_1 of ECM connector.**



P 1. Disconnect connector (16P) from the ECM.
2. Shift the shift lever to N range.
3. Jack up the front wheel on one side.

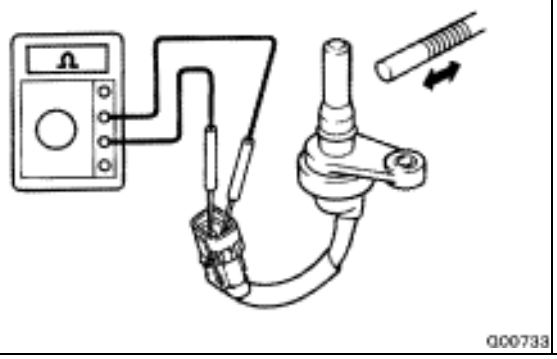
C Check that there is continuity between terminals between SP2 and E_1 of the ECM connector (16P) while slowly turning the jacked–up wheel by hand.

OK Resistance changes between 0 and ∞

NG

OK → **Replace ECM**

2 **Check No. 2 speed sensor**



P Remove No. 2 speed sensor from transaxle.

C Check that there is continuity between terminals of No. 2 speed sensor connector when a magnet is put close to is as shown in the illustration.

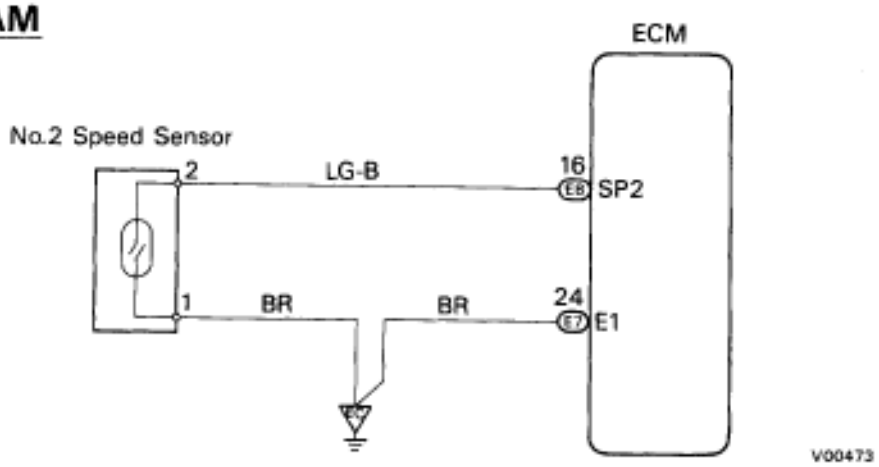
OK Resistance changes between 0 and ∞

OK

NG → **Replace No. 2 speed sensor.**

Check harness and connector between No. 2 speed sensor and ECM (See page IN–27) and rotor, then repair or replace the malfunctioned part.

WIRING DIAGRAM



DTC 62, 63 No. 1, No. 2 Solenoid Valve Circuit

— CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with ON and OFF of the No.1 and No.2 solenoid valves controlled by the ECU. If an open or short circuit occurs in either of the solenoid valves, the ECU controls the remaining normal solenoid to allow the vehicle to be operated smoothly (Fail safe function).

Fail Safe Function

If either of the solenoid valve circuits develops a short or an open, the ECU turns the other solenoid ON and OFF to shift to the gear positions shown in the table below. The ECU also turns the lock–up solenoid valve OFF at this time. If both solenoids malfunction, hydraulic control cannot be performed electronically and must be done manually.

Manual shifting as shown in the following table must be done. (In the case of a short circuit, the ECU stops sending current to the short circuited solenoid).

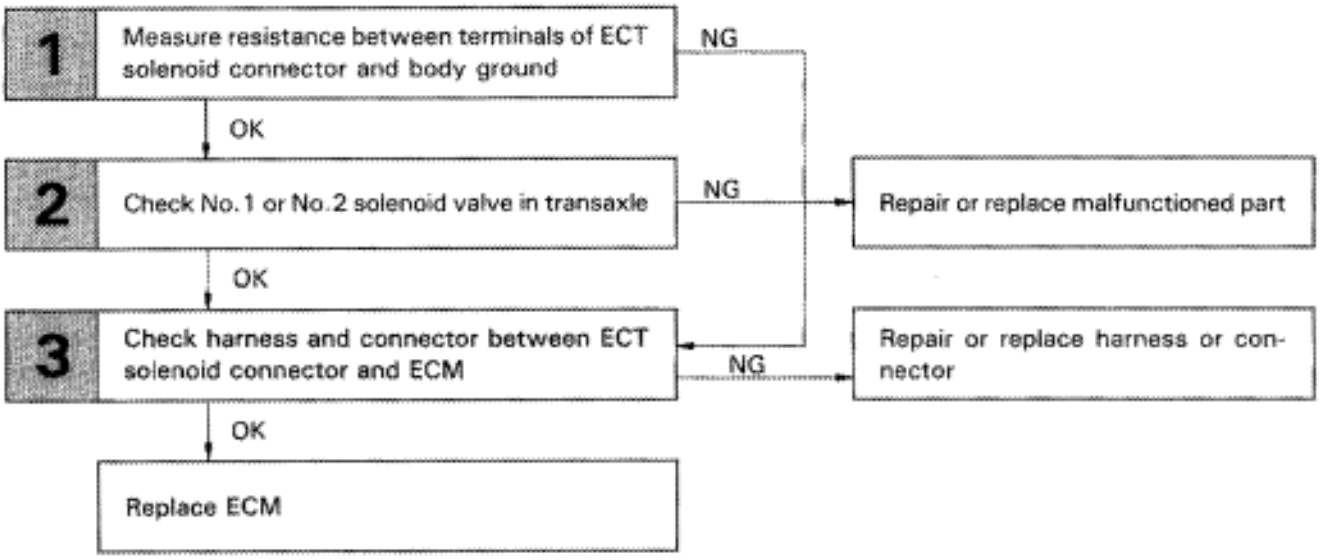
Range	NORMAL			No.1 SOLENOID MALFUNCTIONING			No.2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	No.1	No.2		No.1	No.2		No.1	No.2		
D	ON	OFF	1st	x	ON	3rd	ON	x	1st	O/D
	ON	ON	2nd	x	ON	3rd	OFF	x	O/D	O/D
	OFF	ON	3rd	x	ON	3rd	OFF	x	O/D	O/D
	OFF	OFF	O/D	x	OFF	O/D	OFF	x	O/D	O/D
2	ON	OFF	1st	x	ON	3rd	ON	x	1st	O/D
	ON	ON	2nd	x	ON	3rd	OFF	x	O/D	O/D
	OFF	ON	3rd	x	ON	3rd	OFF	x	O/D	O/D
L	ON	OFF	1st	x	OFF	1st	ON	x	1st	1st
	ON	ON	2nd	x	ON	2nd	ON	x	1st	1st

x: Malfunctions

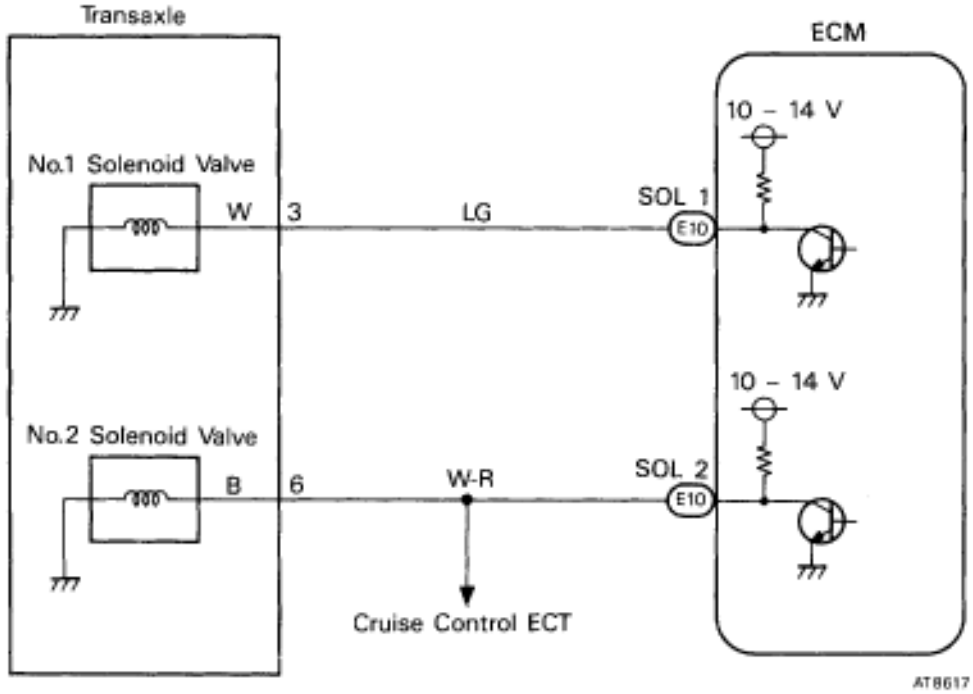
Check the No.1 solenoid when diagnostic trouble code 62 is output and check the No.2 solenoid when diagnostic trouble code 63 is output.

Code No.	Diag. Trouble Code Detection Condition	Trouble Area
62, 63	(a) Solenoid resistance is 8 or lower (short circuit) when solenoid is energized. (b) Solenoid resistance is 100 k or higher (open circuit) when solenoid is not energized. The ECU checks for an open or short circuit in the No. 1 and No. 2 solenoid circuit when it changes gear position. The ECU records diag. trouble code 62 or 63 if condition (a) or (b) is detected once, but it does not blink the O/D OFF indicator light. After the ECU detects condition (a) or (b) continuously 8 times or more in one–trip*, it causes the O/D OFF indicator light to blink until condition (a) or (b) disappears. After that, if the ECU detects condition (a) or (b) once, it starts blinking the O/D OFF indicator light again. *One–trip (See page AX–66)	No. 1 or No. 2 solenoid valve Harness or connector between No. 1 and No. 2 solenoid valve and ECM connector ECU

DIAGNOSTIC CHART

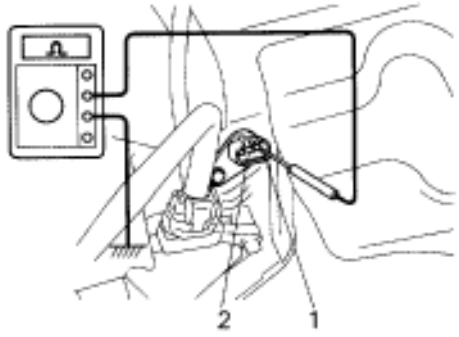


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Measure resistance between terminals of ECT solenoid connector and body ground.**



P Disconnect ECT solenoid connector.

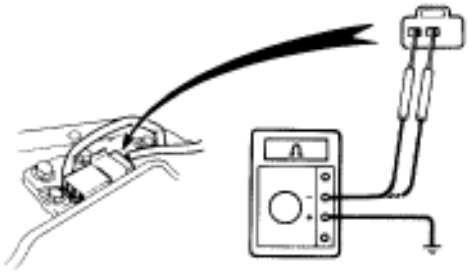
C Measure resistance between terminals of ECT solenoid connector and body ground as shown in the illustration.

OK **Resistance: 1, 2 – Body ground 11 – 15 Ω**

NG

OK → **Go to step ✳**

2 **Check No. 1 or No. 2 solenoid in transaxle**



P
1. Jack up the vehicle.
2. Remove oil pan.

C
1. Check connector connection of No. 1 and No. 2 solenoids.
2. Measure resistance between No. 1 and No. 2 solenoid connector terminals and body ground.

OK **Resistance: 11 – 15 Ω**

C Check for operation sound of solenoids sound when you apply battery positive voltage to No. 1 and No. 2 solenoid connector terminals and body ground.

C Check continuity of solenoid wire.

OK **Continuity (Below 1 Ω)**

OK

NG → **Repair or replace malfunctioned part**

3 **Check harness and connector among ECT solenoid connector, ECM connector and cruise control computer**

OK

NG → **Repair or replace harness or connector.**

Replace ECM

–MEMO–

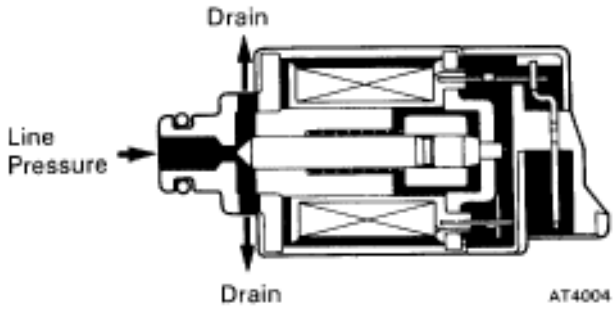
DTC 64 No. 3 Solenoid Valve Circuit

CIRCUIT DESCRIPTION

The No.3 solenoid valve is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock–up relay valve, which then controls operation of the lock up clutch.If a malfunction occurs in this circuit and diagnostic trouble code 64 is stored in memory, the O/D OFF indicator light does not blink.

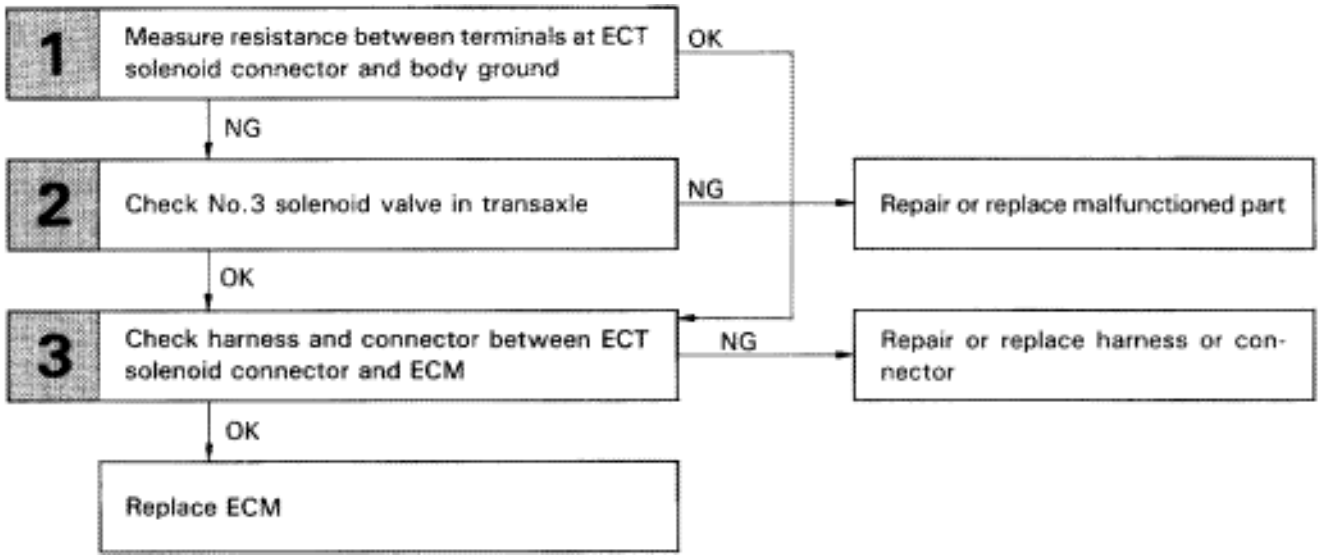
Fail Safe Function

If the ECU detects a malfunction, it turns the lock–up solenoid valve OFF.

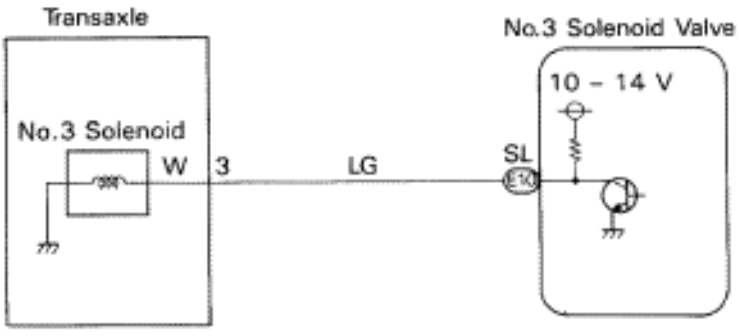


Code No.	Diag. Trouble Code Detection Condition	Trouble Area
64	(a) Solenoid resistance is 8 or lower (short circuit) when solenoid energized. (b) Solenoid resistance is 100 k or higher (open circuit) when solenoid is not energized. ECU memorizes diag. code 64 is above (a) or (b) condition is detected once or more, but ECU does not start O/D OFF indicator light blinking.	1 No. 3 solenoid valve 2 Harness or connector between No. 3 solenoid valve and ECU 3 ECU

DIAGNOSTIC CHART

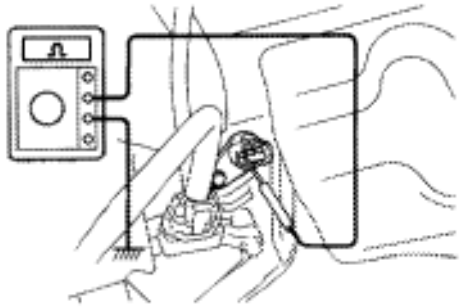


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Measure resistance between terminals of ECT solenoid connector and body ground.**



P Disconnect ECT connector

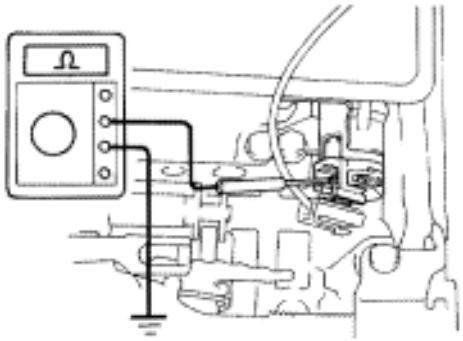
C Measure resistance between terminals of ECT solenoid connector terminal 3 and body ground.

OK **Resistance: 3 – Body ground 11 – 15 Ω**

NG

OK → **Go to step ✳**

2 **Check No. 3 solenoid valve in transaxle**



P
1. Jack up the vehicle
2. Remove oil pan

C
1. Check No. 3 solenoid connector connection
2. Measure resistance between No. 3 solenoid connector terminals and body ground

OK **Resistance: 11 – 15 Ω**

C Check that No. 3 solenoid valve makes operation sound when apply battery positive voltage to No. 3 solenoid connector terminal and body ground.

C Check continuity of solenoid wire

OK **Continuity (Below 1 Ω)**

OK

NG → **Repair or replace malfunctioned part**

3 **Check harness and connector between ECT solenoid connector and ECM.**

OK

NG → **Repair or replace harness or connector.**

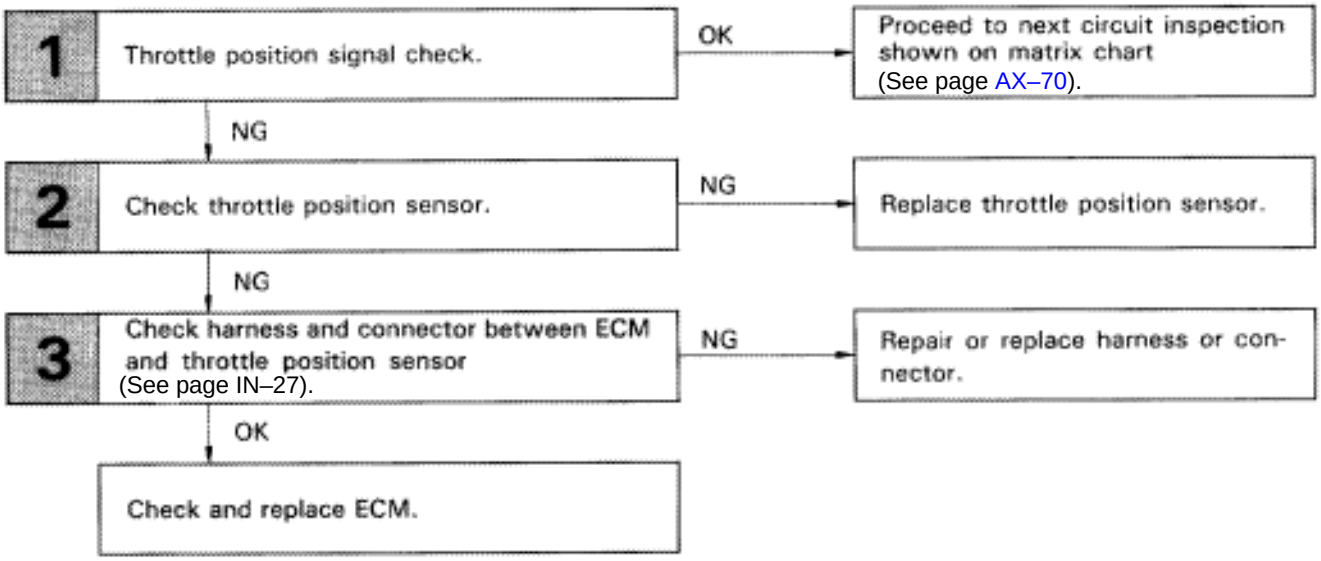
Replace ECM

Throttle Position Sensor Circuit

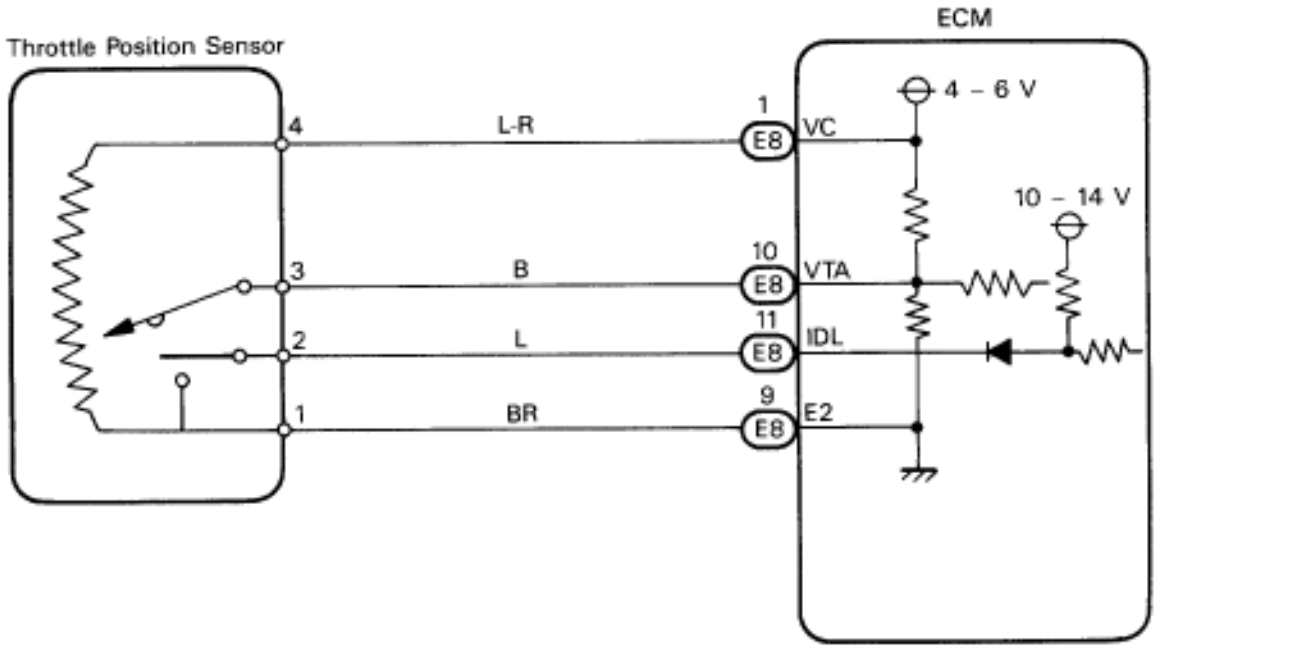
CIRCUIT DESCRIPTION

The throttle position sensor detects the throttle valve opening angle and sends signals to the ECU.

DIAGNOSTIC CHART

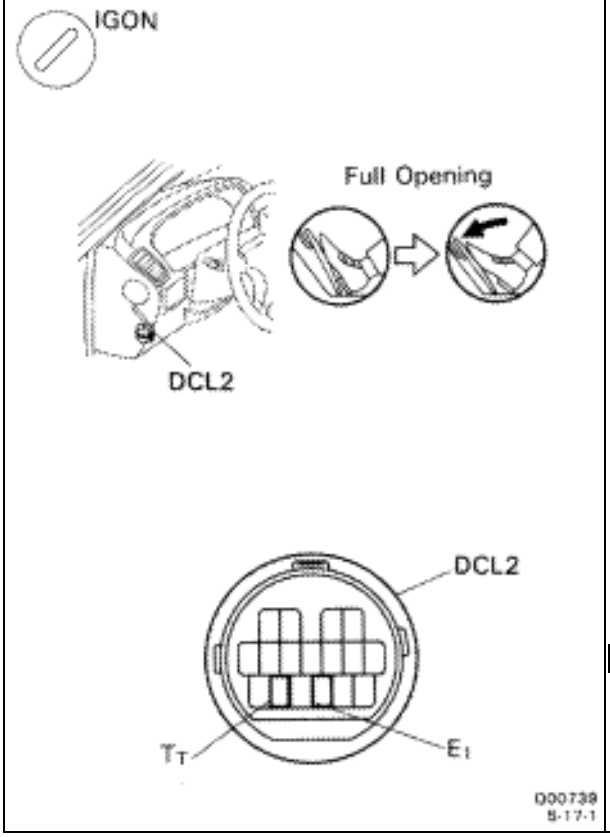


WIRING DIAGRAM



INSPECTION PROCEDURE

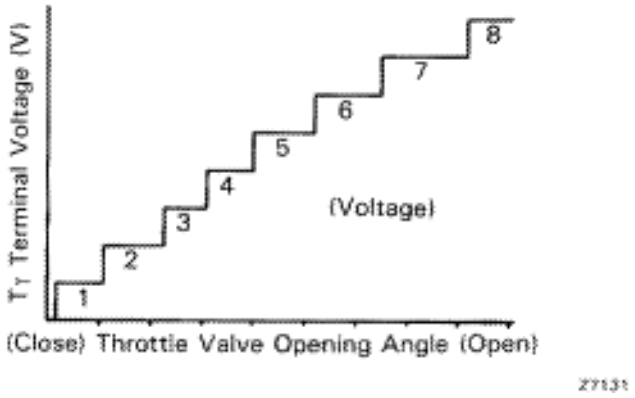
1 **Throttle position signal check.**



P Turn ignition switch ON (Do not start the engine).

C Check voltage at terminal T_T of the DCL2 while gradually depressing the accelerator pedal from the fully closed position to the fully opened position.

OK **Voltage changes from 0 V to 8 V by stages.**



Hint Do not depress the brake pedal during this test. The voltage will stay at 0 V if it is depressed.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AX–70).**

2 **Check throttle position sensor.**

See engine troubleshooting section on page EG–392.

OK

NG **Replace throttle position sensor.**

3 **Check harness and connector between ECM and throttle position sensor (See page IN–27)**

OK

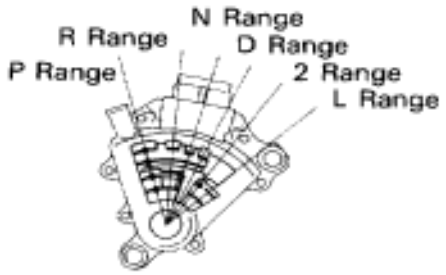
NG **Repair or replace harness or connector.**

Check and replace ECM

Park/Neutral Position Switch

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECU.
The ECU receives signals (R, PNP, 2 and L) from the park/neutral position switch. When the signal is not sent to the ECM from the park/neutral position switch, the ECU judges that the shift lever is in the D range.

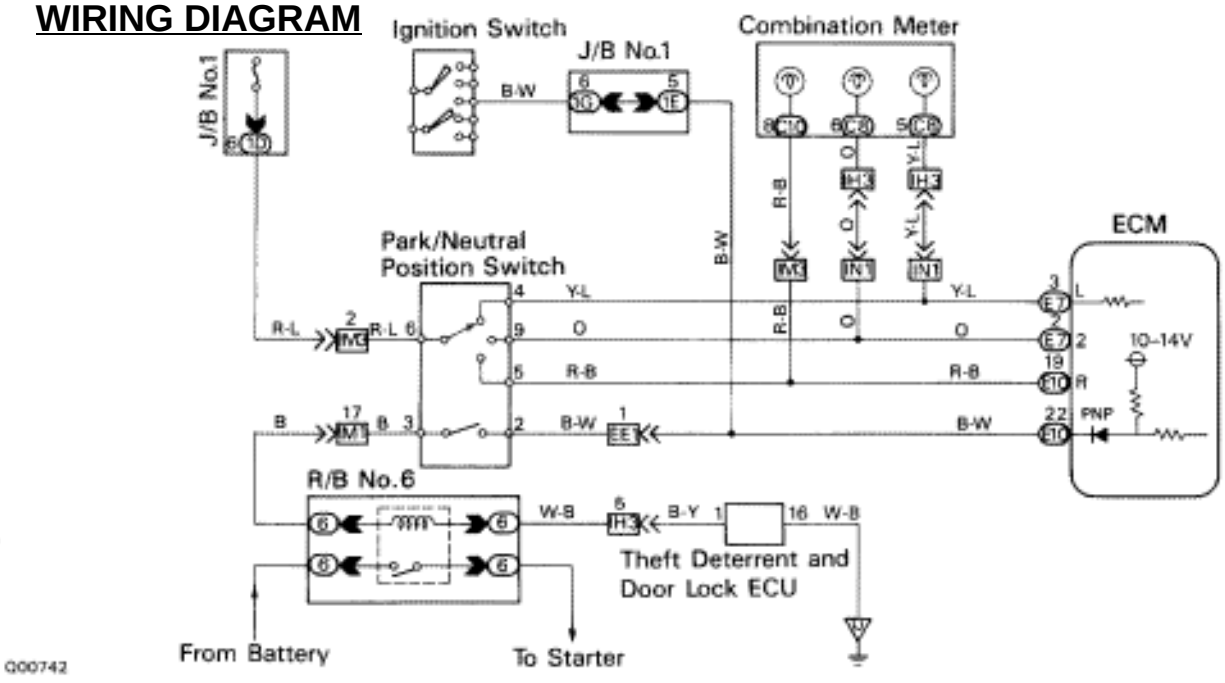


DIAGNOSTIC CHART

1. Check voltage between terminals R, NSW, 2, L of engine & TCM connector and body ground.
   - OK → Proceed to next circuit inspection shown on matrix chart (See page AX–70).
   - NG →
2. Check park/neutral position switch.
   - NG → Replace park/neutral position switch.
   - OK →
3. Check harness and connector between ECM and park/neutral position switch, park/neutral position switch and battery (See page IN–27).
   - NG → Repair or replace harness or connector.
   - OK →

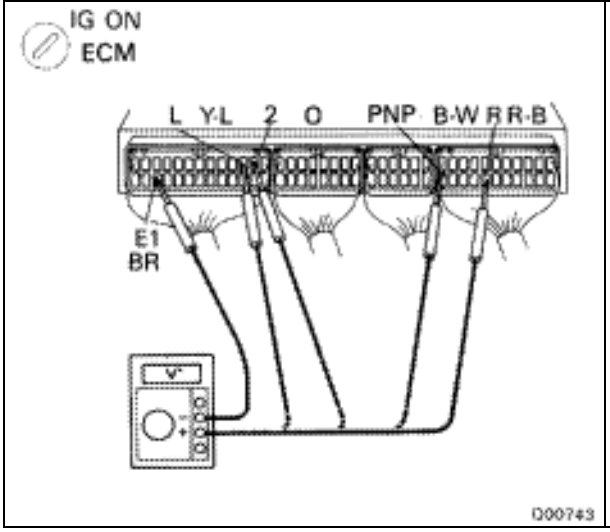
Check and replace ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals R, PNP, 2, L of ECM connector.**



P Turn ignition switch ON.

C Measure voltage between terminals R, PNP, 2, L of ECM connector and body ground when the shift lever is put in the following ranges.

OK

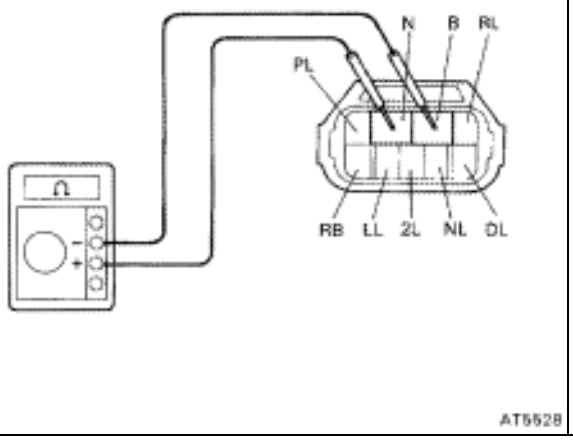
Range	R-body ground	NSW-body ground	2-body ground	L-body ground
P,N	Below 1 V	Below 1 V	Below 1 V	Below 1 V
R	10–14 V*	10–14 V*	Below 1 V	Below 1 V
D	Below 1 V	10–14 V	Below 1 V	Below 1 V
2	Below 1 V	10–14 V	10–14 V	Below 1 V
L	Below 1 V	10–14 V	Below 1 V	10–14 V

*: The voltage will drop slightly due to lighting up of the back up light.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AX–70).**

2 **Check park/neutral position switch.**



P Remove park/neutral position switch.

C Check continuity between each terminal shown below when the shift lever is put in each range.

Shift Position \ Terminal	B	N	RB	PL	RL	NL	DL	2L	LL
P	○	○	○	○					
R			○		○				
N	○	○	○			○			
D			○				○		
2			○					○	
L			○						○

OK

NG **Replace park/neutral position switch.**

3 **Check harness and connector between ECM and park/neutral position switch, park/neutral position switch and battery (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

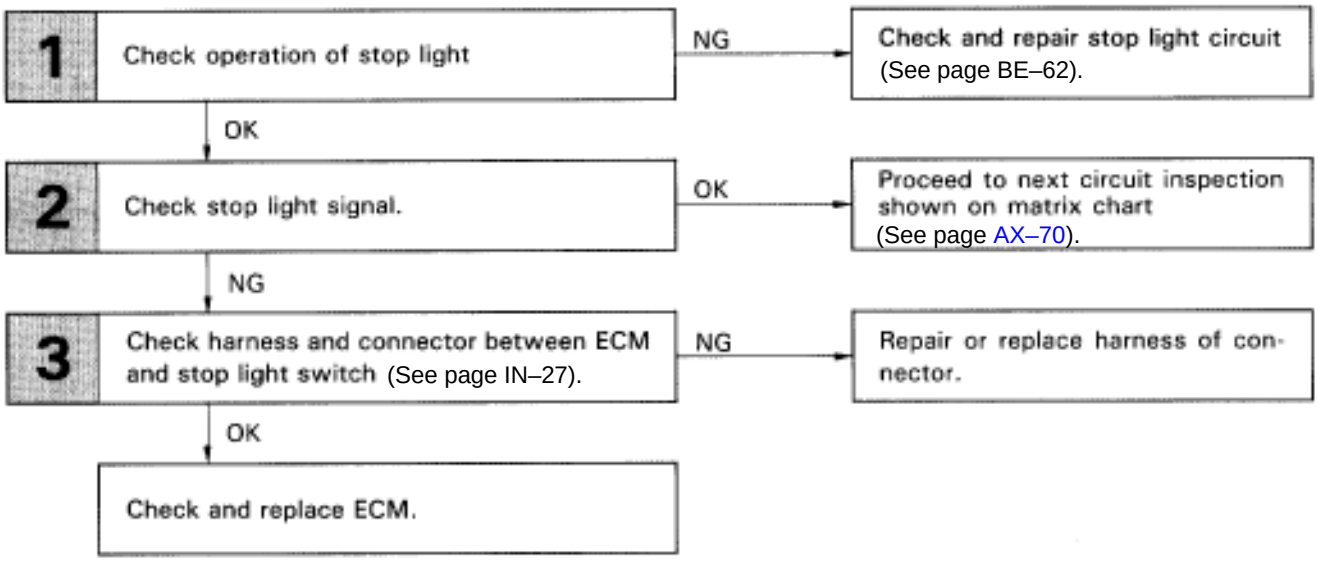
Check and replace ECM.

Stop Light Circuit

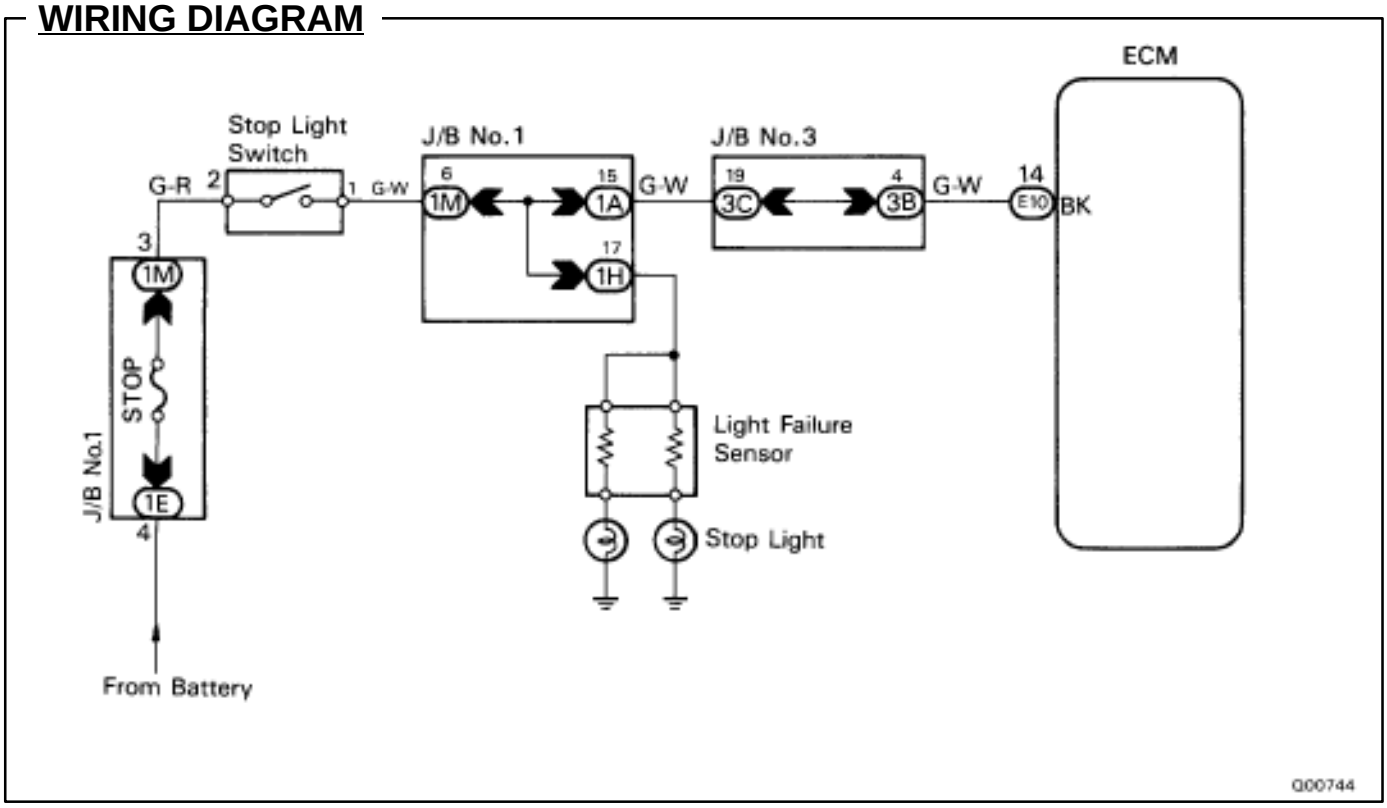
CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling when the brakes are suddenly applied while driving in lock–up condition.
When the brake pedal is operated, this switch sends a signal to the ECU. Then the ECU cancels operation of the lock–up clutch while braking is in progress.

DIAGNOSTIC CHART



WIRING DIAGRAM

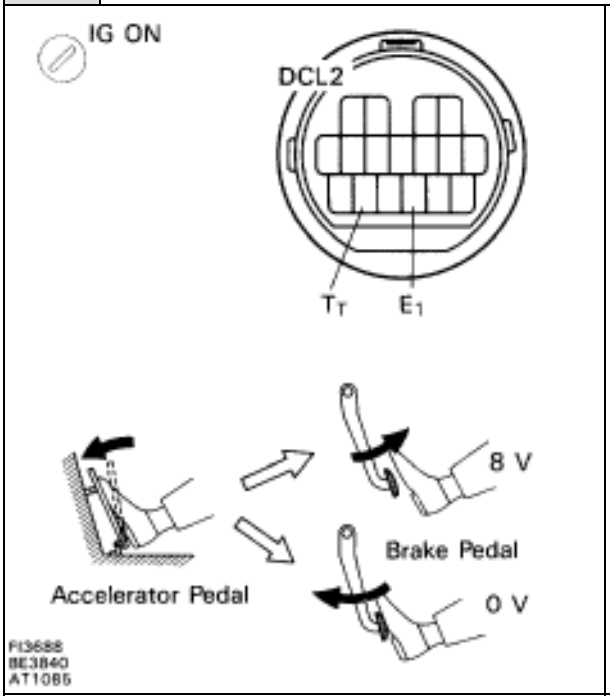


INSPECTION PROCEDURE

1	Check operation of stop light.
C	Check if the stop light goes on and off normally when the brake pedal is depressed and released.

NG → **Check and repair stop light circuit (See page BE–62)**

2	Check stop light signal.



C
1. Connect voltmeter to terminals T_T and E_1 of the DCL2.
2. Turn ignition switch ON (Do not start the engine.)
3. Fully depress the accelerator pedal until the voltmeter indicates 8 V and hold it.
4. Depress and release the brake pedal and check the voltage.

OK

Brake pedal	Voltage
Depressed	0 V
Released	8 V

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page AX–70)**

3	Check harness and connector between ECM and stoplight switch (See page IN–27).

OK

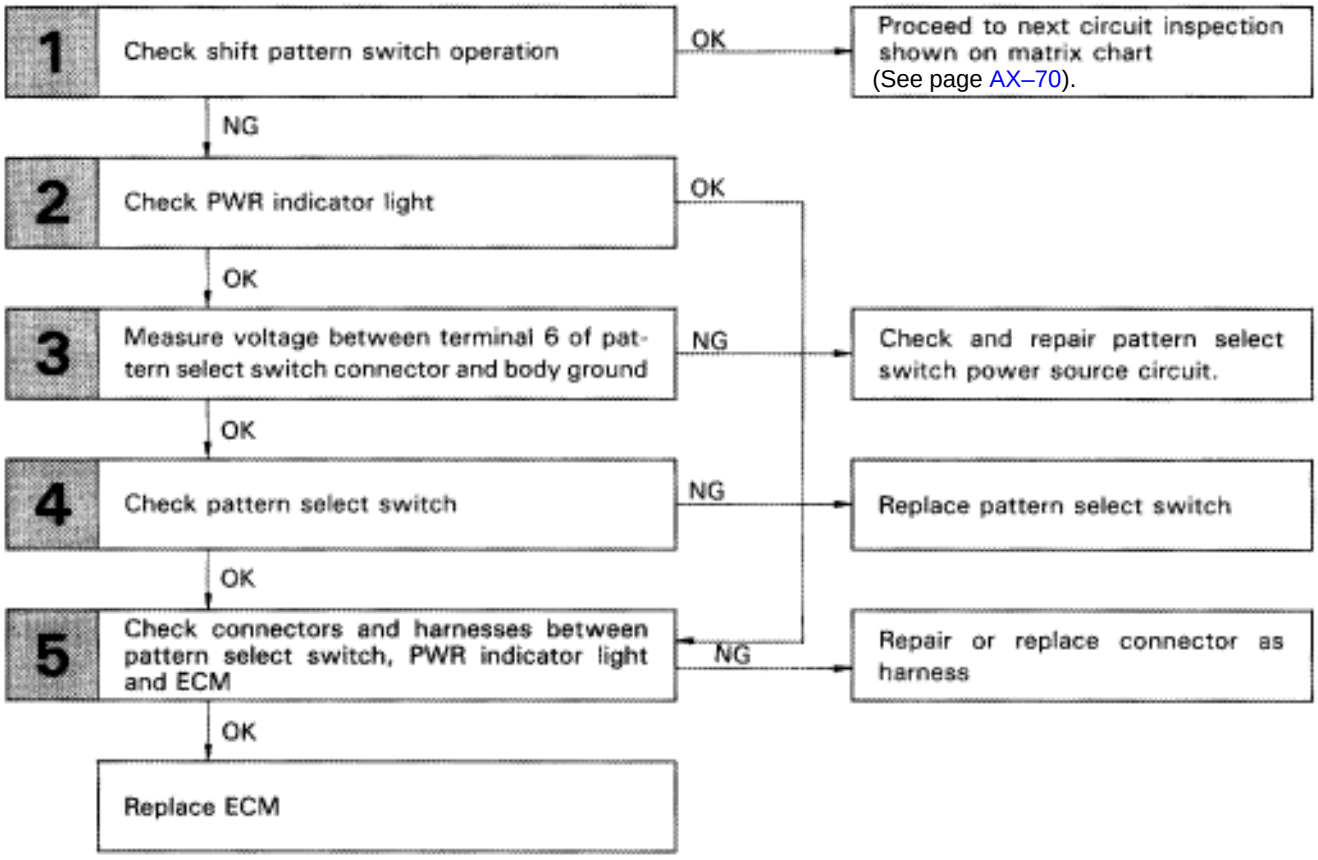
NG → **Repair or replace harness or connector.**

Check and replace ECM.

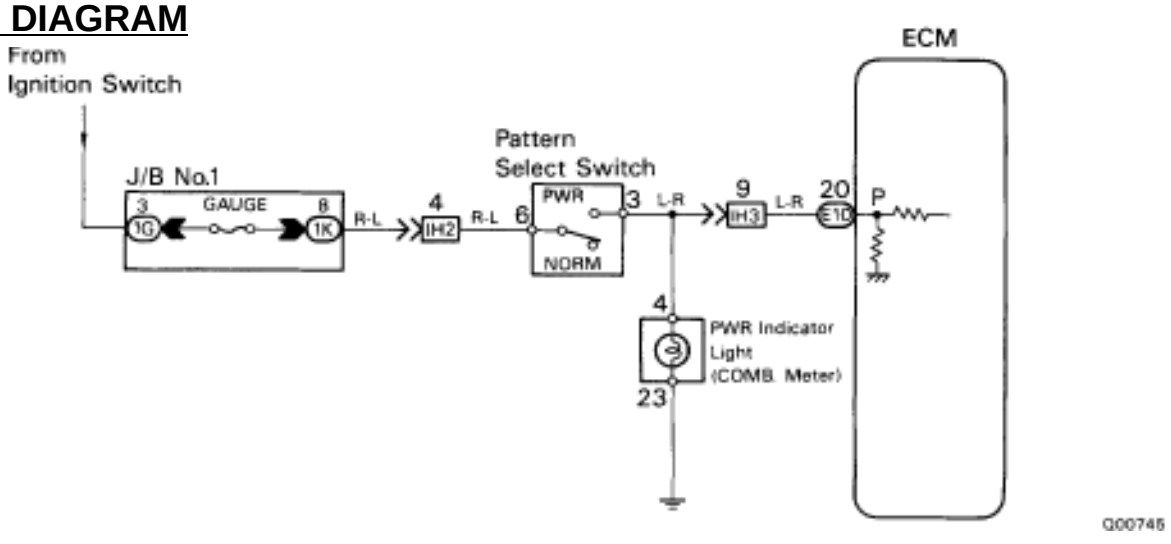
Pattern Select Switch Circuit

The ECM has stored in its memory the gear shift patterns for D range, 2nd range and L range, and also the lock–up pattern for D range. Two types of gear shifting pattern and lock–up pattern are recorded for D range; for POWER use and NORMAL use. The ECM & TCM selects the D range gear shift pattern and lock–up pattern in accordance with the signal from the pattern select switch.

DIAGNOSTIC CHART



WIRING DIAGRAM



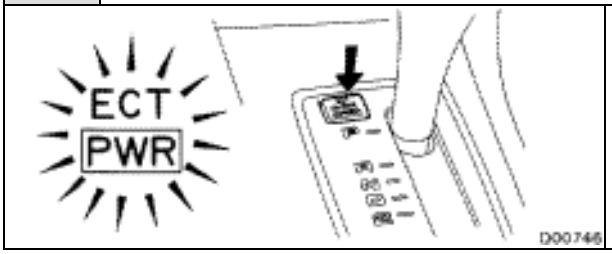
INSPECTION PROCEDURE

1	Check shift pattern switch operation.
C	Check that the shift point changes when the pattern select switch is operated.

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page AX–70).**

2	Check PWR indicator light



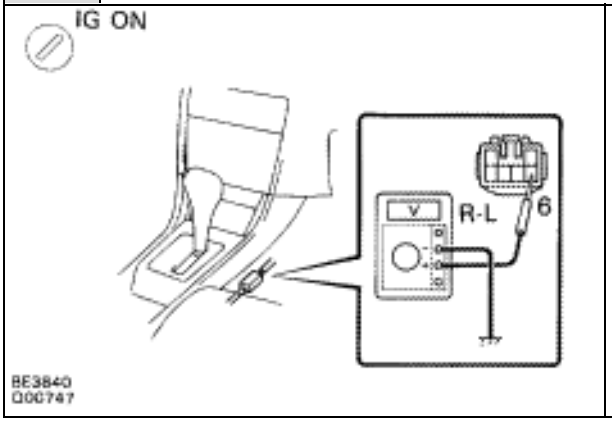
P Turn IG switch on.

C Check that the PWR indicator light lights up when you push the pattern select switch to PWR.

NG

OK → **Go to step ✳**

3	Measure voltage between terminal 6 of pattern select switch and body ground.



P
1. Push pattern select switch to NORMAL.
2. Turn IG switch on

C Measure voltage between terminal 6 of pattern select switch connector and body ground.

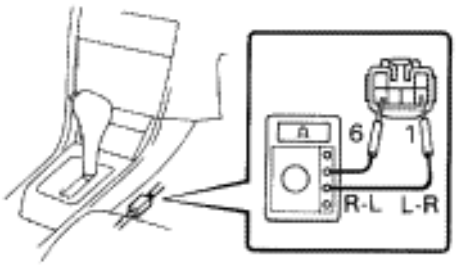
OK **Voltage: 10 – 14 V**

OK

NG → **Check and repair pattern select switch power source circuit.**

INSPECTION PROCEDURE

4 **Check pattern select switch.**



Q00748

P Disconnect pattern select switch connector.

C Measure resistance between terminals 3 and 6 of pattern select switch connector when the select switch is set to PWR and NORMAL positions.

OK

Pattern	Resistance
PWR	0 Ω (continuity)
NORM	∞ Ω (open)

OK → **5** **Check connector and harness between patter select switch, PWR indicator light and ECM**

NG → **Replace pattern select switch.**

OK → **Replace ECM**

NG → **Repair or replace harness or connector,**

–MEMO–

O/D Main Switch and O/D Off Indicator LIght Circuit

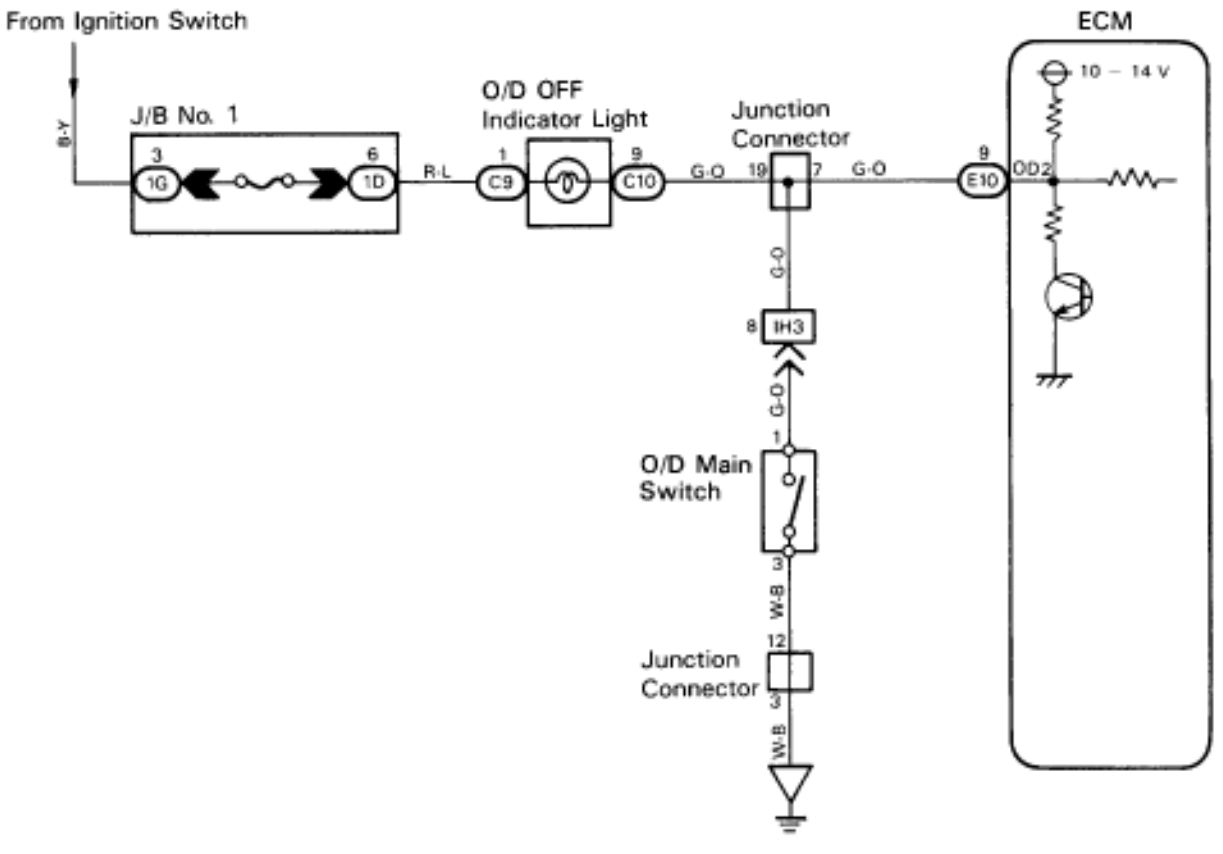
CIRCUIT DESCRIPTION

The O/D main switch contacts go off when the switch is pushed in and come on when it is pushed out. In O/D main switch OFF position, the O/D OFF indicator lights up, and the ECM prohibits shifting to overdrive. The ECM also causes the O/D OFF indicator light to blink when a malfunction is detected. However, when the O/D main switch is OFF, the O/D indicator light does not blink, but stays on. In this case, connecting the terminals in the DCL2 or DCL1 can display the malfunction code.

DIAGNOSTIC CHART

See next page.

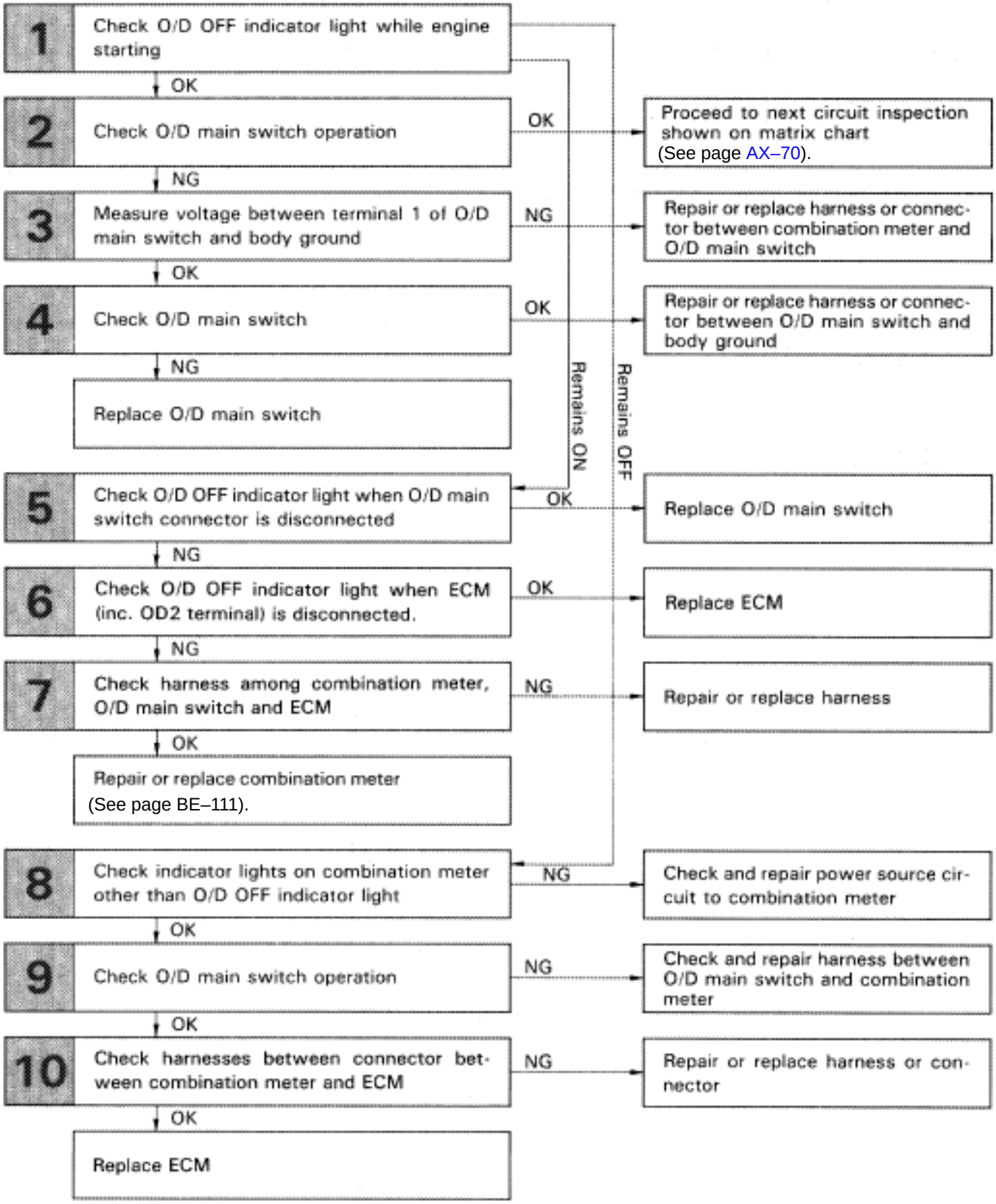
WIRING DIAGRAM



(*) O/D Main Switch
Contacts go off with switch pushed in.
Contacts go on with switch pushed out.

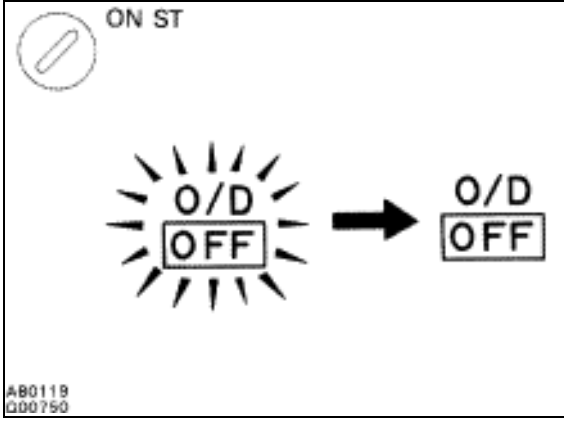
G00749

DIAGNOSTIC CHART



INSPECTION PROCEDURE

1 Check O/D OFF indicator light when starting the engine.



P When starting the engine, check the operating condition of the O/D OFF indicator light.

OK **O/D OFF indicator light immediately after the engine is started.**
Remains ON NG1
Remains OFF ...NG2

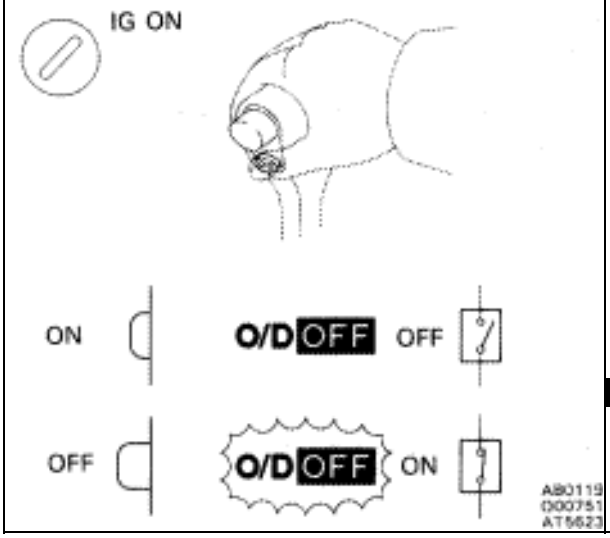
Hint If the O/D OFF indicator light keeps blinking, check the diag. trouble code and repair the problem.

OK

NG1 **Go to step ✳**

NG2 **Go to step** 3

2 Check O/D main switch operation



C 1. Turn ignition switch ON.
2. Check “O/D OFF” light when O/D main switch is pushed in to ON.
3. Start the engine.

OK **“O/D OFF” light goes off.**

C 4. Check “O/D OFF” light when O/D main switch is pushed again, to OFF.

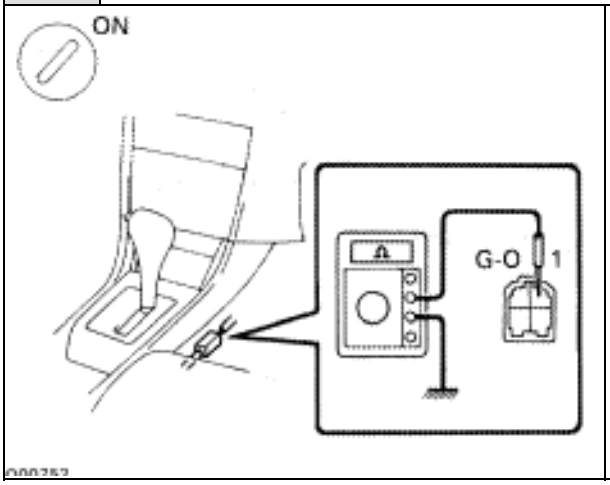
OK **“O/D OFF” light lights up.**

Hint If the “0/D OFF” light blinks when the O/D main switch is pushed in to ON, a malfunction is occurring in the system.
Check the diagnostic trouble code.

OK

NG **Proceed to next circuit inspection shown on matrix chart (See page AX–70).**

3	Measure voltage between terminal 1 of O/D main switch connector and body ground



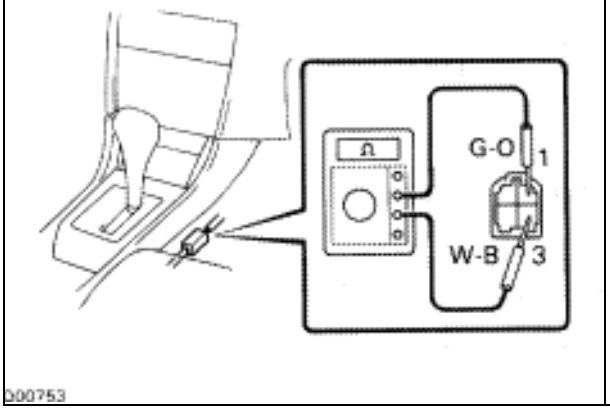
P 1. Disconnect O/D main switch connector.
2. Turn IG switch ON.

C Measure voltage between terminal 1 of O/D main switch harness side connector and body ground.

OK **Voltage: 10 – 14 V**

OK → **NG** → **Repair or replace harness or connector between combination meter and O/D main switch.**

4	Check continuity of O/D main switch



P Disconnect O/D main switch connector.

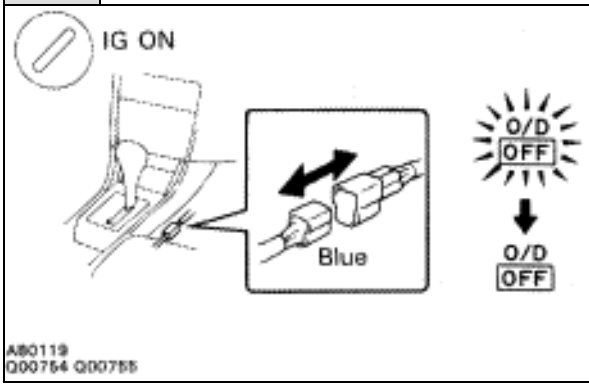
C Check continuity between terminals 1 and 3 of O/D main switch connector.

OK **ON Position: No continuity (More than 10kΩ)**
OFF Position: Continuity (Below 1 Ω)

OK → **NG** → **Replace O/D main switch**

Repair or replace harness or connector between O/D main switch and body ground.

5	Check O/D OFF indicator light when you disconnect O/D main switch connector.

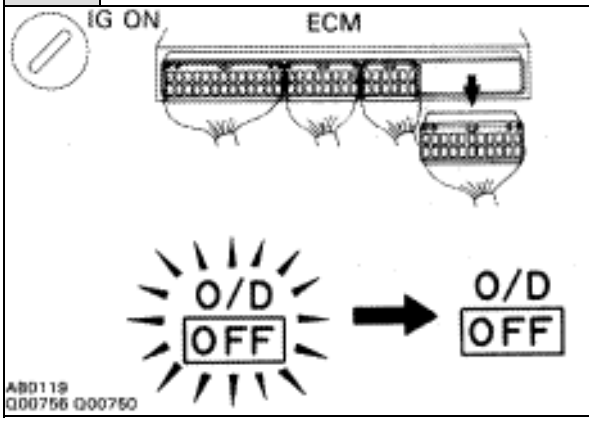


P Turn IG switch ON

C Check that the O/D OFF indicator light goes off when you disconnect the O/D main switch connector.

OK → **NG** → **Replace O/D main switch.**

6	Check O/D OFF indicator light when you disconnect ECM connector (inc. OD2 terminal).



P Turn IG switch ON.

C Check that the O/D OFF indicator light goes off when you disconnect the ECM connector (inc. OD2 terminal)

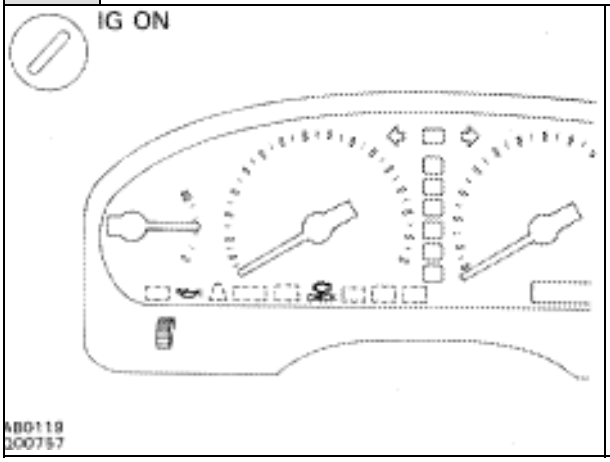
NG → **OK** → **Replace ECM**

7	Check harness between combination meter, O/D main switch and ECM.

OK → **NG** → **Repair or replace harness**

Repair or replace combination meter (See page BE–111).

8	Check indicator lights on combination meter other than O/D OFF indicator light



P Turn IG switch ON

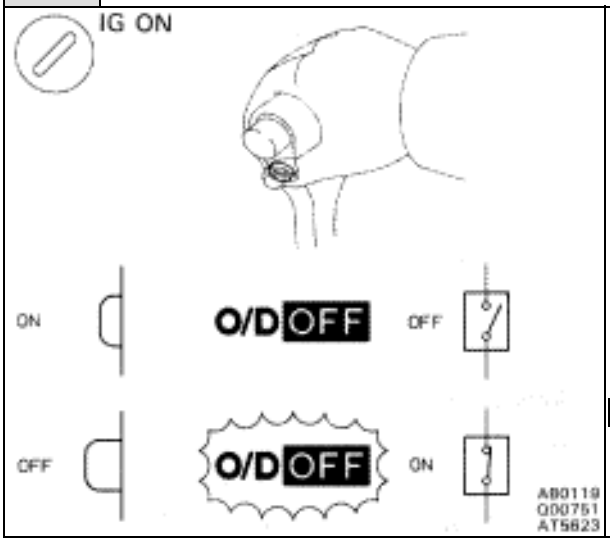
C Check the following indicator lights on combination meter:

- Check Engine Light
- Low Oil Pressure Warning Light
- ABS Warning LIght etc.

OK **Above indicator lights light up.**

OK → **NG** → **Check and repair power source circuit to combination meter, or combination meter**

9	Check O/D main switch operation



C 1. Turn switch ON.
2. Check “O/D OFF” light when O/D main switch is pushed in to ON.
3. Start the engine.

OK **“O/D OFF” light goes off.**

C 4. Check “O/D OFF” light when O/D main switch is pushed again, to OFF.

OK **“O/D OFF” light lights up.**

Hint If the “O/D OFF” light blinks when the O/D main switch is pushed into ON, a malfunction is occurring in the system.
Check the diagnostic trouble code.

OK → **NG** → **Check and repair harness between O/D main switch and combination meter.**

10	Check harness and connector between combination meter and ECM.

OK → **NG** → **Repair or replace harness or connector.**

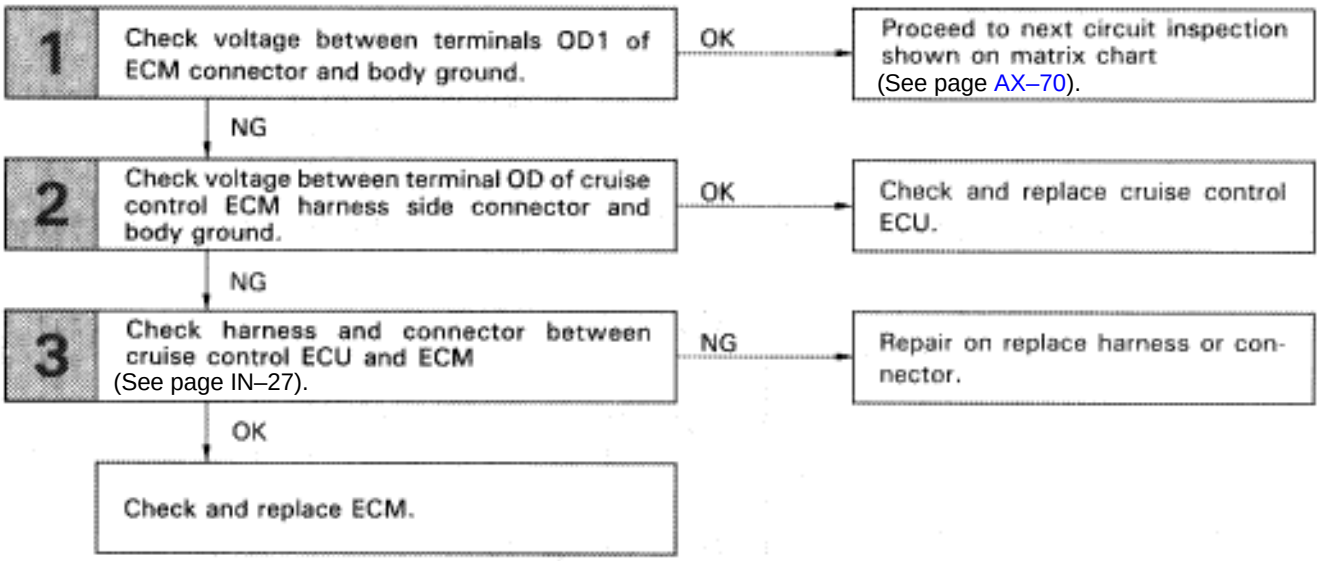
Replace ECM.

O/D Cancel Signal Circuit

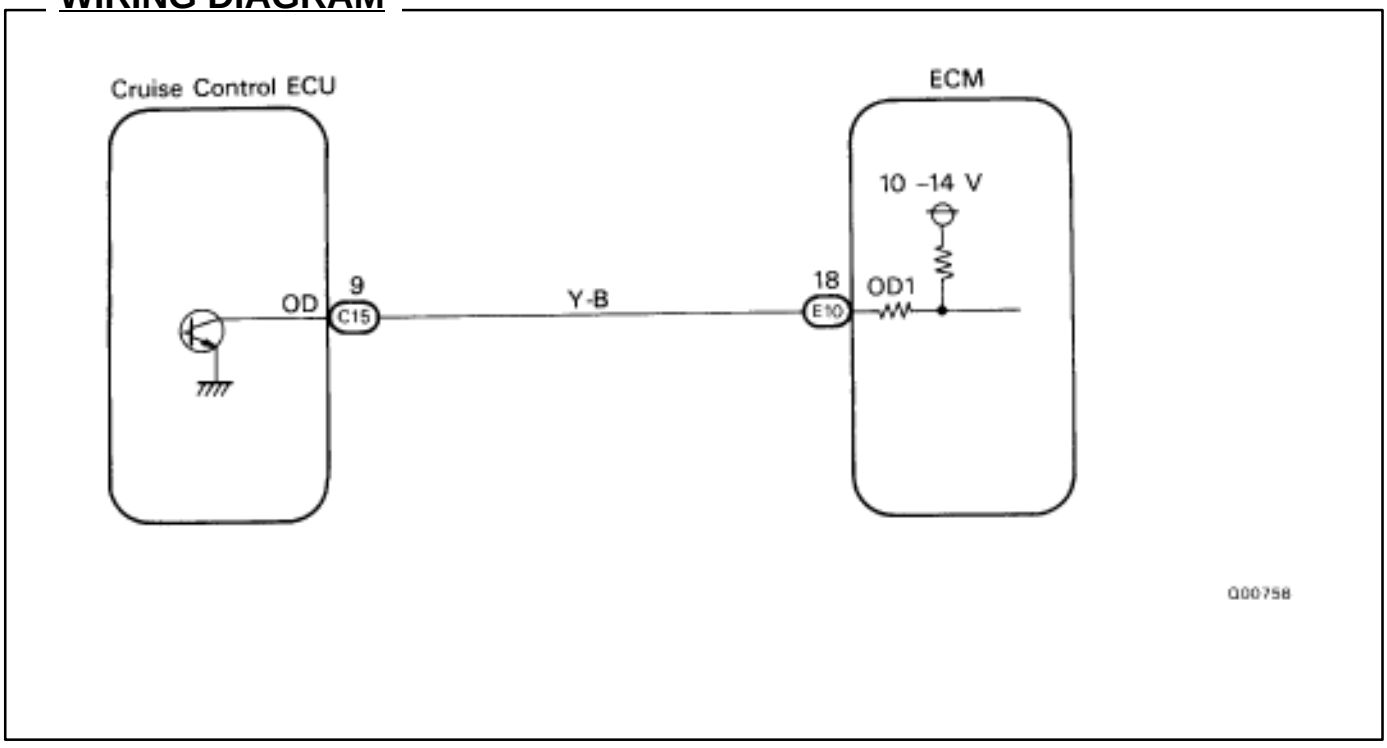
CIRCUIT DESCRIPTION

While driving with cruise control activated, in order to minimize gear shifting and provide smooth cruising uphill, overdrive may be prohibited temporarily in some conditions.
The cruise control ECM sends OD cut signals to the ECM as necessary and the ECM cancels overdrive shifting until these signals are discontinued.
(For details, see the Cruise Control section, page BE–390).

DIAGNOSTIC CHART

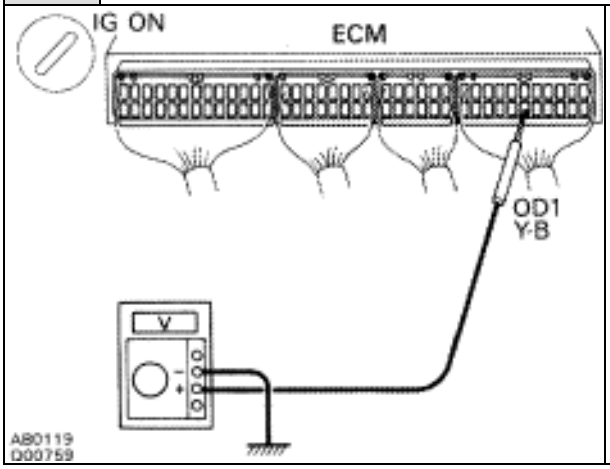


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal OD1 of ECM connector and body ground.**



P Turn ignition switch ON.

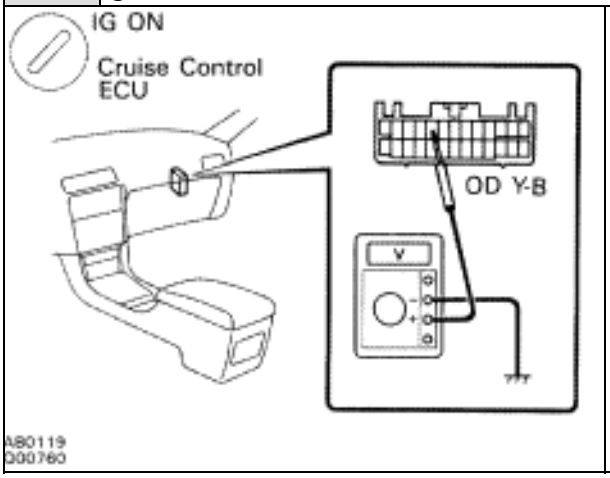
C Measure voltage between terminal OD1 of ECM connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AX–70).**

2 **Check voltage between terminal OD of cruise control ECU harness side connector and body ground.**



P
1. Disconnect cruise control ECU connector.
2. Turn ignition switch ON.

C Measure voltage between terminal OD of cruise control ECU harness side connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Check and replace cruise control ECU.**

3 **Check harness or connector between cruise control ECU and ECM (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

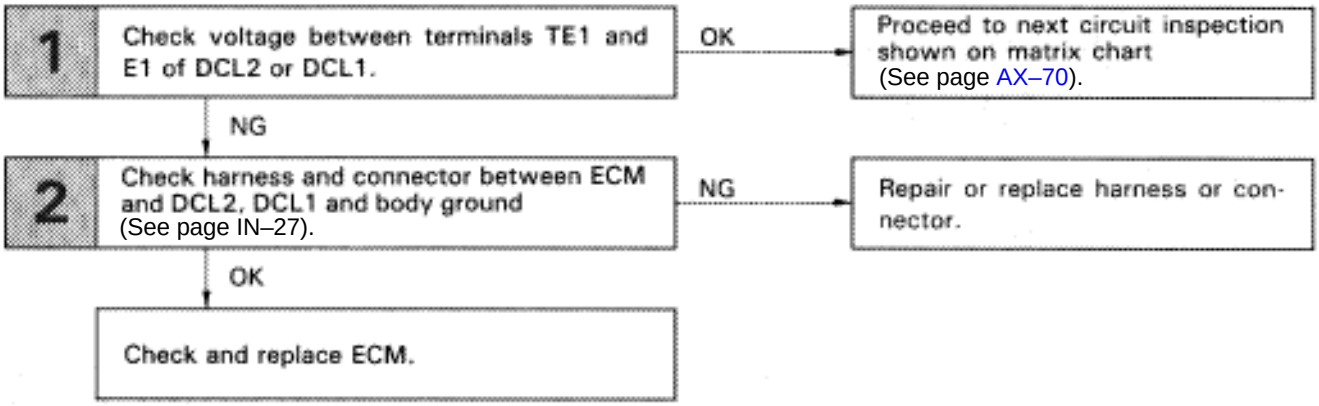
Check and replace ECM.

TE1 Terminal Circuit

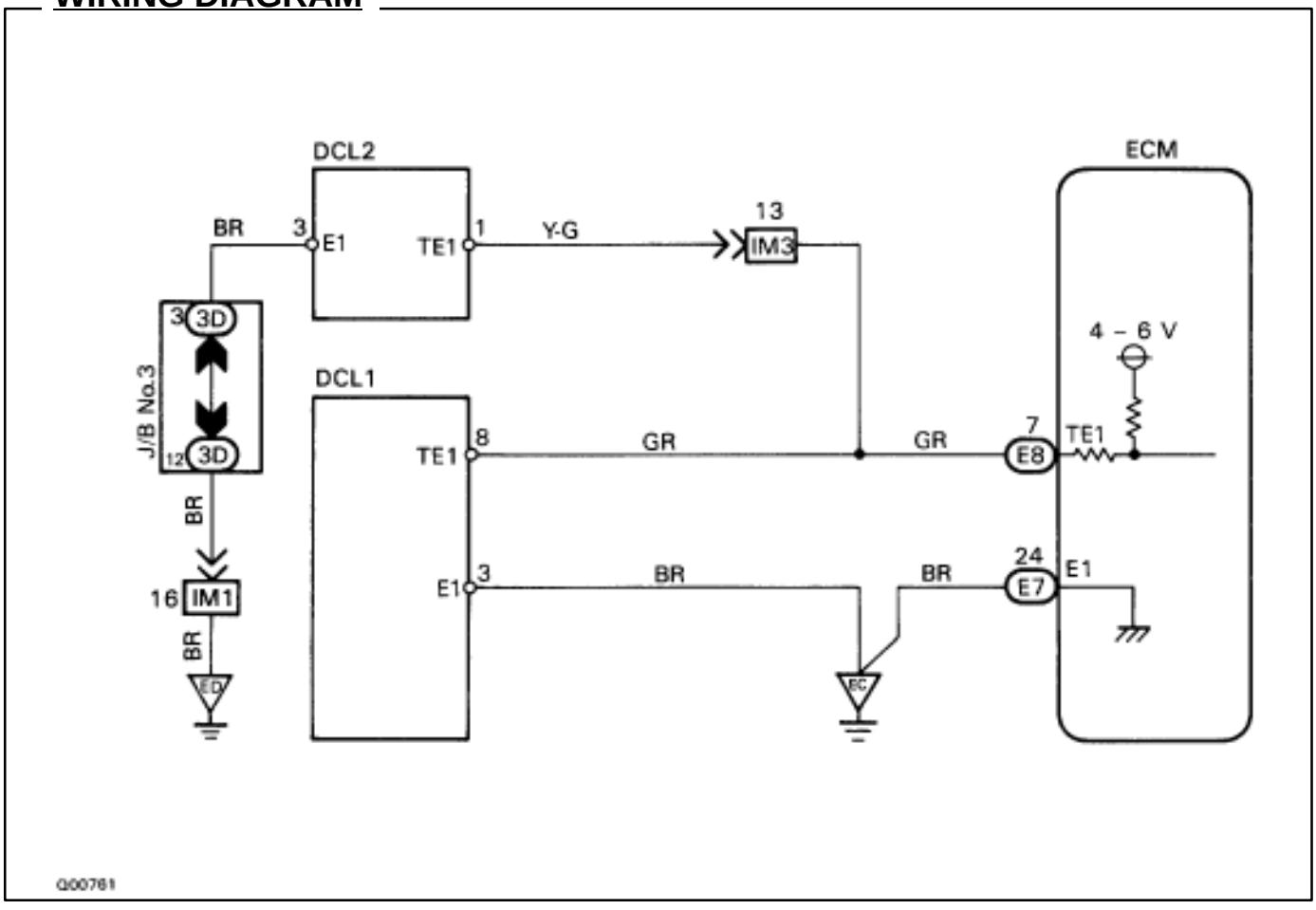
CIRCUIT DESCRIPTION

The ECU displays diagnostic trouble codes using the O/D OFF indicator light when terminals TE 1 and E 1 of the DCL 2 or DCL 1 are connected.

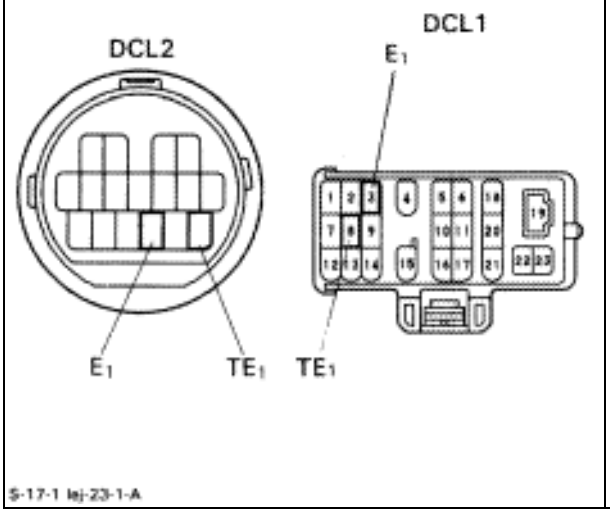
DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TE_1 and E_1 of DCL2 or DCL1.
 S-17-1 lej-23-1-A	C Measure voltage between terminals TE_1 and E_1 of DCL2 or DCL1. OK **Voltage: 4 – 6 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page AX–70).**

2	Check harness and connector between ECM and DCL2, DCL1 and body ground (See page IN–27).

OK

NG **Repair or replace harness or connector.**

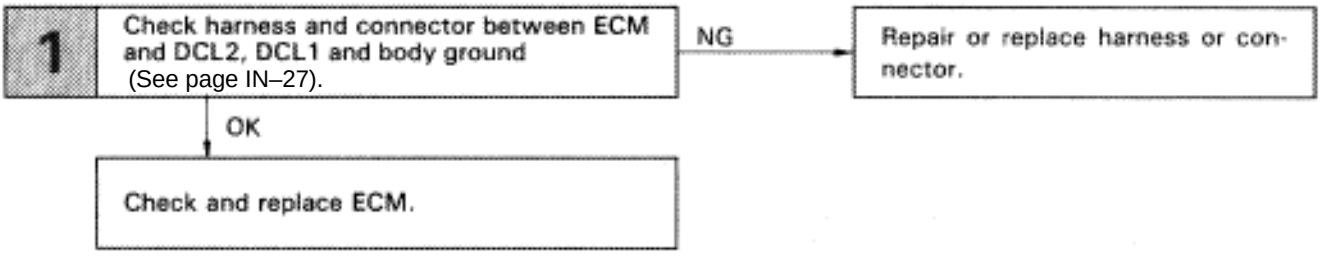
Check and replace ECM.

T_T Terminal Circuit

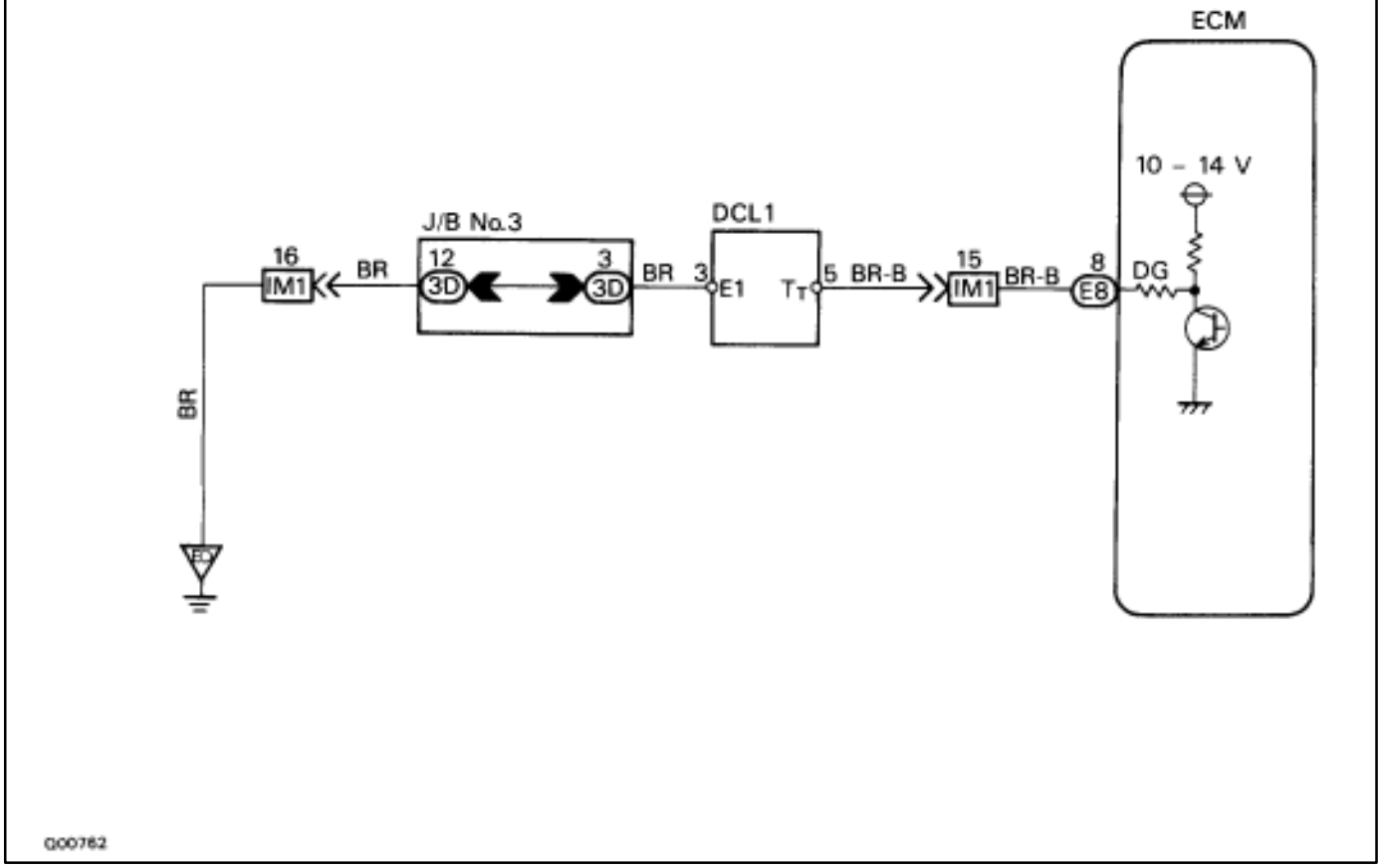
CIRCUIT DESCRIPTION

Checks of ECM input and output signals related to the throttle position sensor, brakes, shift position and other circuits can be performed by measuring the voltages at terminal T_1 of the DCL 1.

DIAGNOSTIC CHART



WIRING DIAGRAM



SERVICE SPECIFICATIONS

SERVICE DATA

AX01N–01

Line pressure (wheel locked)				
Engine idling		D range	353–412 kPa 3.6–4.2 kgf/cm^2 51 – 60 psi	
		R range	637–745 kPa 6.5–7.6 kgf/cm^2 92–108 psi	
AT stall		D range	892–1,040 kPa 9.1–10.6 kgf/cm^2 129–151 psi	
		R range	1,608–1,873kPa 16.4–19.1 kgf/cm^2 233–272 psi	
Engine stall revolution			2,400 ± 150 rpm	
Time lag	N range → D range		Less than 1.2 seconds	
	N range → R range		Less than 1.5 seconds	
Engine idle speed (Cooling fan and A/C OFF)				
	N range		700 rpm	
Throttle cable adjustment				
Throttle valve fully opened			Between boot end face and inner cable stopper	
			0–1 mm	0–0.04 in.
Torque converter runout		Limit	0.30 mm	0.0118 in.
Drive plate runout		Limit	0.20 mm	0.0079 in.

Shift point km/h(mph)			Throttle valve fully open [fully closed]							
			1 → 2	2 → 3	3 → O/D	[3→ O/D]	[O/D→ 3]	O/D → 3	3 → 2	2 → 1
	D range	NORM	51–56 (32–35)	97–105 (60–65)	153–164 (95–102)	36–41 (22–25)	19–23 (12–14)	149–160 (93–99)	92–100 (57–62)	42–47 (26–29)
		PWR	—	—	—	—	—	—	—	—
	2 range	NORM PWR	—	–	–	–	–	–	111–120 (69–75)	—
	L range	NORM PWR	–	–	–	–	–	–	97–105 (60–65)	49–55 (30–34)

Lock–up point km/h (mph)			Throttle valve opening 5%					
			Lock–up ON			Lock–up OFF		
			2nd	*3rd	O/D	2nd	*3rd	O/D
	D range	NORM	–	73–80 (45–50)	53–59 (33–37)	–	65–71 (40–44)	48–53 (30–33)
		PWR	–	—	62–68 (39–42)	–	—	59–65 (37–40)

* O/D switch OFF

V00520

TORQUE SPECIFICATIONS

AX05C–01

Part tightened	N·m	kgf·cm	ft·lbf
Engine front mounting bracket X Front suspension member	80	820	59
Engine rear mounting bracket X Front suspension member	66	670	48
LH transaxle mounting	52	530	38
Transaxle X Engine 12mm bolt	64	650	47
Transaxle X Engine 10mm bolt	46	470	34
Torque converter clutch X Drive plate	27	280	20
Valve body X Transaxle case	11	110	8
Oil strainer	11	110	8
Oil pan	4.9	50	43 in.·lbf
Oil pan drain plug	49	500	36
Testing plug	7.4	75	65 in.lb
Transaxle rear cover X Transaxle case	37	380	27
Park/neutral position switch X Transaxle case (bolt)	5.4	55	48 in.·lbf
Park/neutral position switch (nut)	6.9	70	61 in.·lbf
B3 apply tube retainer	11	110	8
Manual valve body	11	110	8
Detent spring	11	110	8
Oil tube	5.4	55	43 in.·lbf
Oil tube bracket	10	100	7
Steering gear housing X Front suspension Member	181	1850	134
Stabilizer bar bracket	19	195	14

FOREWORD

This repair manual covers Disassembly, Inspection and Assembly procedures for the following Automatic Transaxle:

Automatic Transaxle	Applicable Model
A540E	’93 Lexus ES300

For On-vehicle Servicing (Inspection, Adjustment, Troubleshooting, Removal and Installation) of Automatic Transaxle, refer to the repair manual for the applicable vehicle model.

Pub. Name	Pub. No.
’93 LEXUS ES300 Repair Manual	RM318U1

All information contained in this manual is the most up-to-date at the time of publication. However, specifications and procedures are subject to change without notice.

TOYOTA MOTOR CORPORATION

○**1992 TOYOTA MOTOR CORPORATION**
All rights reserved. This book may not be reproduced or copied, in whole or in part, without the written permission of Toyota Motor Corporation.

HOW TO USE THIS MANUAL

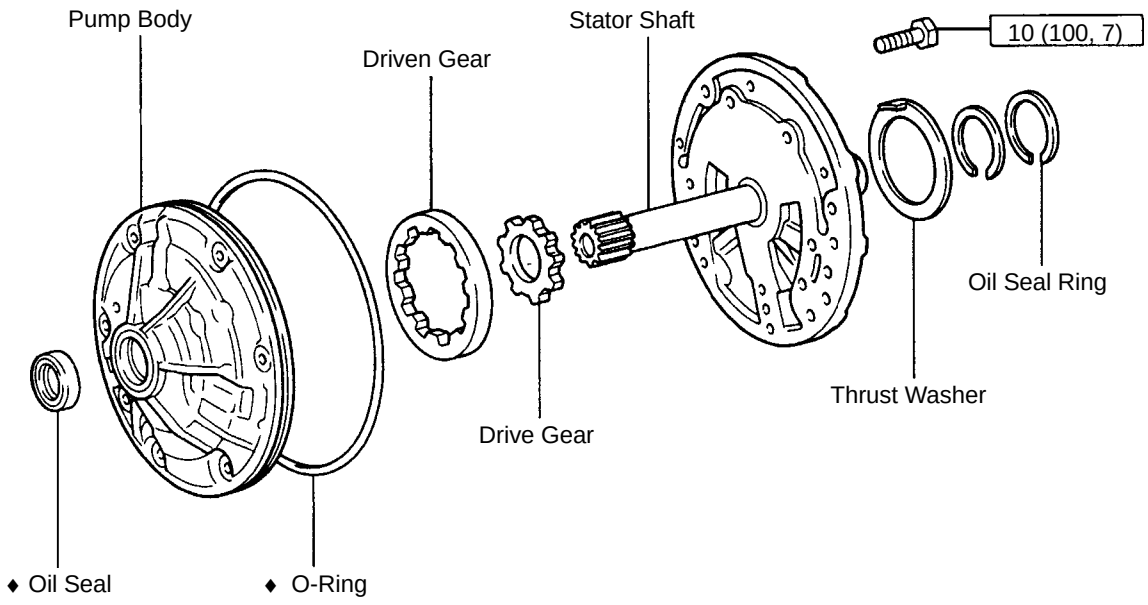
To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

PREPARATION

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

REPAIR PROCEDURES

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



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

AT8669

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.

Detail 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.

REFERENCES

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

SPECIFICATIONS

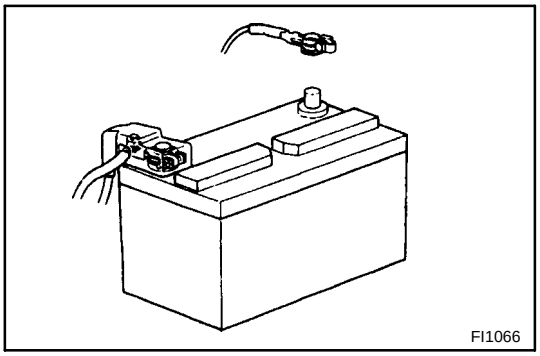
Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found at the back of AX section, for quick reference.

CAUTIONS, NOTICES, HINTS:

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

SI UNIT

The UNITS given in this manual are primarily expressed according to with the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.
Example:
Torque: 30 N-m (310 kgf-cm, 22 ft-lbf)


FI1066

GENERAL REPAIR INSTRUCTIONS

1. Use fender, seat and floor covers to keep the vehicle clean and prevent damage.

2. During disassembly, keep parts in the appropriate order to facilitate reassembly.

3. Observe the following:

(a) Before performing electrical work, disconnect the negative cable from the battery terminal.

(b) If it is necessary to disconnect the battery for inspection or repair, always disconnect the cable from the negative (-) terminal which is grounded to the vehicle body.

(c) To prevent damage to the battery terminal post, loosen the terminal nut and raise the cable straight up without twisting or prying it.

(d) Clean the battery terminal posts and cable terminals with a clean shop rag. Do not scrape them with a file or other abrasive objects.

(e) Install the cable terminal to the battery post with the nut loose, and tighten the nut after installation. Do not use a hammer to tap the terminal onto the post.

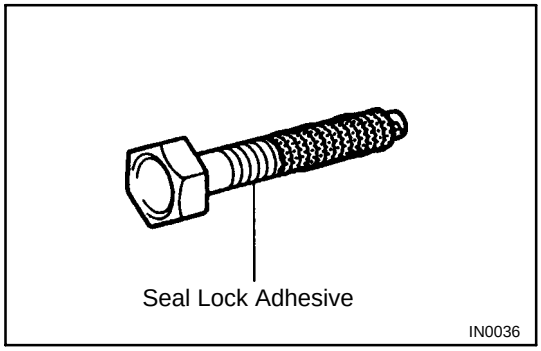
(f) Be sure the cover for the positive (+) terminal is properly in place.

4. Check hose and wiring connectors to make sure that they are secure and correct.

5. Non-reusable parts

(a) Always replace cotter pins, gaskets, O-rings and oil seals etc. with new ones.

(b) Non-reusable parts are indicated in the component illustrations by the "♦ " symbol.



IN0036

6. Precoated parts

Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.

(a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

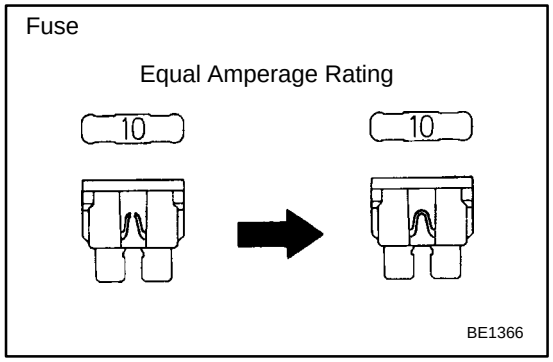
(b) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

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

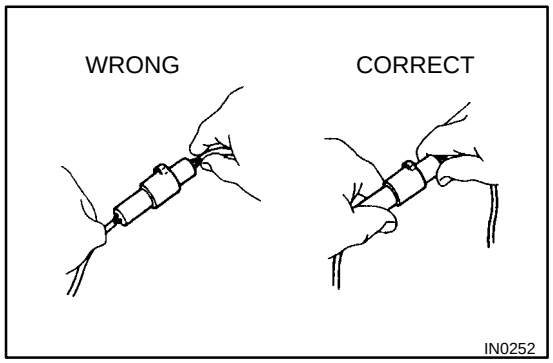
7. When necessary, use a sealer on gaskets to prevent leaks.

8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the preparation of AX section.



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



11. To pull apart electrical connectors, pull on the connector itself, not the wires.

12. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.

(a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.

(b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

GLOSSARY OF SAE AND TOYOTA TERMS

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

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

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

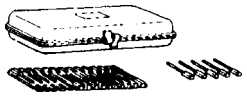
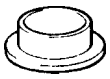
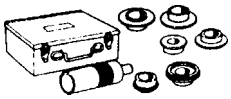
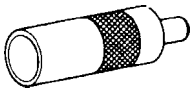
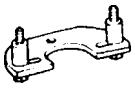
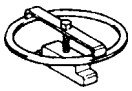
TVV	Thermal Vacuum Valve	Bimetal Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalyst (TWC) CC_{RO}
TWC + OC	Three-Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator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

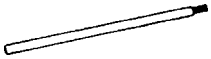
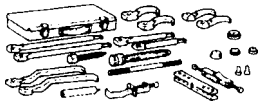
ABBREVIATIONS USED IN THIS MANUAL

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

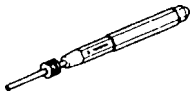
PREPARATION

SST (SPECIAL SERVICE TOOLS)

	09240 - 00020	Wire Gauge Set	
	09316 - 20011	Transfer Bearing Replacer	
	09316 - 60010	Transmission & Transfer Bearing Replacer	
	(09316 - 00010)	Replacer Pipe	
	09350 - 32014	TOYOTA Automatic Transmission Tool Set	
	09308 - 10010	Oil Seal Puller	
	(09351 - 32032)	Counter Driven Gear Holding Tool	
	(09351 - 32040)	No. 1 Piston Spring Compressor	
	(09351 - 32050)	Snap Ring Expander	
	(09351 - 32061)	Oil Pump Puller	
	(09351 - 32070)	No. 2 Piston Spring Compressor	
	(09351 - 32080)	Lock Nut Wrench	
	(09351 - 32100)	Drive Pinion Bearing Replacer	

	(09351 - 32120) Overdrive Bearing Replacer	
	(09351 - 32140) Oil Seal Replacer	
	(09351 - 32150) Oil Seal Replacer	
	(09351 - 32190) Measure Terminal	
	(09351 - 32200) No. 3 Piston Spring Compressor	
	09612 - 65014 Steering Worm Bearing Puller	Remove pinion shaft Bearing outer race
	09950 - 20017 Universal Puller	

RECOMMENDED TOOL

	09031 - 00030 Pin Punch	

EQUIPMENT

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

LUBRICANT

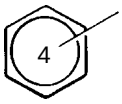
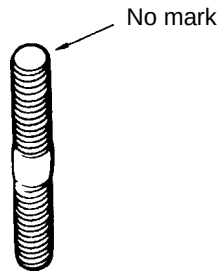
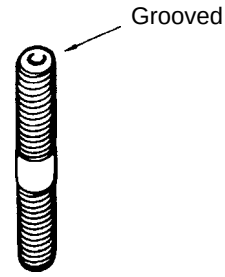
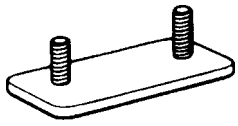
Item	Capacity	Classification
Automatic transaxle fluid Dry fill Drain and refill	 6.5 liters (6.9 US qts, 5.7 Imp. qts) 2.5 liters (2.6 US qts, 2.2 Imp. qts)	 ATF DEXRON○ II
Differential oil	0.8 liter (0.8 US qts, 0.7 Imp. qts)	ATF DEXRON○ II

SSM (SPECIAL SERVICE MATERIALS)

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

STANDARD BOLT TORQUE SPECIFICATIONS

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 4- 5- 6- 7- 8- 9- 10- 11-	4T 5T 6T 7T 8T 9T 10T 11T	Stud bolt		4T
	No mark	4T			
Hexagon flange bolt w/ washer hexagon bolt	No mark	4T			6T
Hexagon head bolt	Two protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	Two protruding lines	6T	Welded bolt		4T
Hexagon head bolt	Three protruding lines	7T			
Hexagon head bolt	Four protruding lines	8T			

SPECIFIED TORQUE FOR STANDARD BOLTS

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

SERVICE SPECIFICATIONS

SERVICE DATE

Second Coast Brake

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

Oil Pump

Body clearance	STD	0.07 - 0.15 mm	0.0028 - 0.0059 in.
	Maximum	0.3 mm	0.012 in.
Tip clearance	STD	0.11 - 0.14 mm	0.0043 - 0.0055 in.
	Maximum	0.3 mm	0.012 in.
Side clearance	STD	0.02 - 0.05 mm	0.0008 - 0.0020 in.
	Maximum	0.1 mm	0.004 in.
Pump body bushing inside diameter	Maximum	38.18 mm	1.5031 in.
Stator shaft bushing inside diameter			
Front side	Maximum	21.57 mm	0.8492 in.
Rear side	Maximum	27.07 mm	1.0657 in.

Direct Clutch

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

Forward Clutch

Piston stroke	1.79 - 2.21 mm	0.0705 - 0.0870 in.
Flange thickness	2.30 mm	0.0906 in.
	2.70 mm	0.1063 in.

Front Planetary Gear

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

Rear Planetary Gear

Planetary pinion gear thrust clearance	Maximum	0.61 mm	0.024 in.

First and Reverse Brake

Pack clearance	0.85 - 2.05 mm	0.033 - 0.081 in.

Overdrive Unit

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

Valve Body Spring

Spring	Free length / Coil outer diameter mm (in.)	Total No. of coils / Color
(Upper valve body)		
Second coast modulator valve	27.5 (1.083) / 8.9 (0.350)	14.6 / Brown
B_1 orifice control valve	24.8 (0.976) / 8.0 (0.315)	12.0 / White
Down shift plug	29.8 (1.173) / 8.7 (0.343)	13.5 / Yellow
Throttle valve	30.7 (1.209) / 9.2 (0.6.2)	9.5 / Purple
Throttle modulator valve	21.7 (0.854) / 9.5 (0.374)	9.5 / Orange
Cut-back valve	21.8 (0.858) / 6.0 (0.236)	13.5 / Red
No. 1 accumulator control valve	28.1 (1.106) / 10.6 (0.417)	13.0 / Yellow
Lock-up relay valve	26.6 (1.047) / 10.2 (0.402)	11.5 / Green
(Lower valve body)		
Pressure relief valve	11.2 (0.441) / 6.4 (0.252)	7.5 / None
2 - 3 shift valve	28.0 (1.102) / 9.4 (0.370)	10.3 / None
Low coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
Check valve	19.9 (0.783) / 11.0 (0.433)	8.5 / None
Secondary regulator valve	38.5 (1.516) / 8.4 (0.331)	17.0 / Purple
Second lock valve	20.7 (0.815) / 6.1 (0.240)	12.0 / Orange
No. 2 accumulator control valve	23.0 (0.906) / 6.3 (0.248)	12.0 / Gray
1 - 2 shift valve	29.2 (1.150) / 8.9 (0.350)	12.0 / Light Green
3 - 4 shift valve	29.2 (1.150) / 8.9 (0.350)	12.0 / Light Green
Primary regulator valve	64.2 (2.528) / 18.6 (0.732)	12.5 / None

Valve Body Key

Key	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
(Upper valve body)			
Lock-up relay valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
Throttle modulator valve	6.5 (0.453)	5.0 (0.197)	3.2 (0.126)
Second coast modulator valve	6.5 (1.142)	5.0 (0.197)	3.2 (0.126)
Cut-back valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
No. 1 accumulator control valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
B_1 orifice control valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
(Lower valve body)			
Primary regulator valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Secondary regulator valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
No. 2 accumulator control valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
1 - 2 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
2 - 3 shift valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
3 - 4 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
Second lock valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
Low coast modulator valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)

Accumulator Spring

Spring	Free length mm (in.)	Color
C_1	71.2 (2.803)	Blue / Green
C_2	55.2 (2.173)	Yellow / Purple
B_0	67.7 (2.665)	Pink
B_2	68.6 (2.701)	Blue / Yellow

Differential Assembly

Drive pinion preload (at Starting)				
New bearing		1.0 - 1.6 N-m	10 - 16 kgf-cm	8.7 - 13.9 in.-lbf
Reused bearing		0.5 - 0.8 N-m	5 - 8 kgf-cm	4.3 - 6.9 in.-lbf
Total preload (at starting)		Add drive pinion preload		
New bearing		0.3 - 0.4 N-m	2.8 - 4.4 kgf-cm	2.4 - 3.8 in.-lbf
Reused bearing		0.1 - 0.2 N-m	1.4 - 2.2 kgf-cm	1.2 - 1.9 in.-lbf
Pinion to side gear backlash		0.05 - 0.20 mm	0.0020 - 0.0079 in.	
Side gear thrust washer thickness		0.80 mm	0.0315 in.	
		0.90 mm	0.0354 in.	
		1.00 mm	0.0394 in.	
		1.10 mm	0.0433 in.	
		1.20 mm	0.0472 in.	
		1.30 mm	0.0512 in.	
		1.40 mm	0.0551 in.	
Side bearing adjusting shim thickness	Mark			
	0	2.00 mm	0.0787 in.	
	1	2.05 mm	0.0807 in.	
	2	2.10 mm	0.0827 in.	
	3	2.15 mm	0.0846 in.	
	4	2.20 mm	0.0866 in.	
	5	2.25 mm	0.0886 in.	
	6	2.30 mm	0.0906 in.	
	7	2.35 mm	0.0925 in.	
	8	2.40 mm	0.0945 in.	
	9	2.45 mm	0.0965 in.	
	A	2.50 mm	0.0984 in.	
	B	2.55 mm	0.1004 in.	
	C	2.60 mm	0.1024 in.	
	D	2.65 mm	0.1043 in.	
	E	2.70 mm	0.1063 in.	
	F	2.75 mm	0.1083 in.	
	G	2.80 mm	0.1102 in.	
	H	2.85 mm	0.1122 in.	

TORQUE SPECIFICATIONS

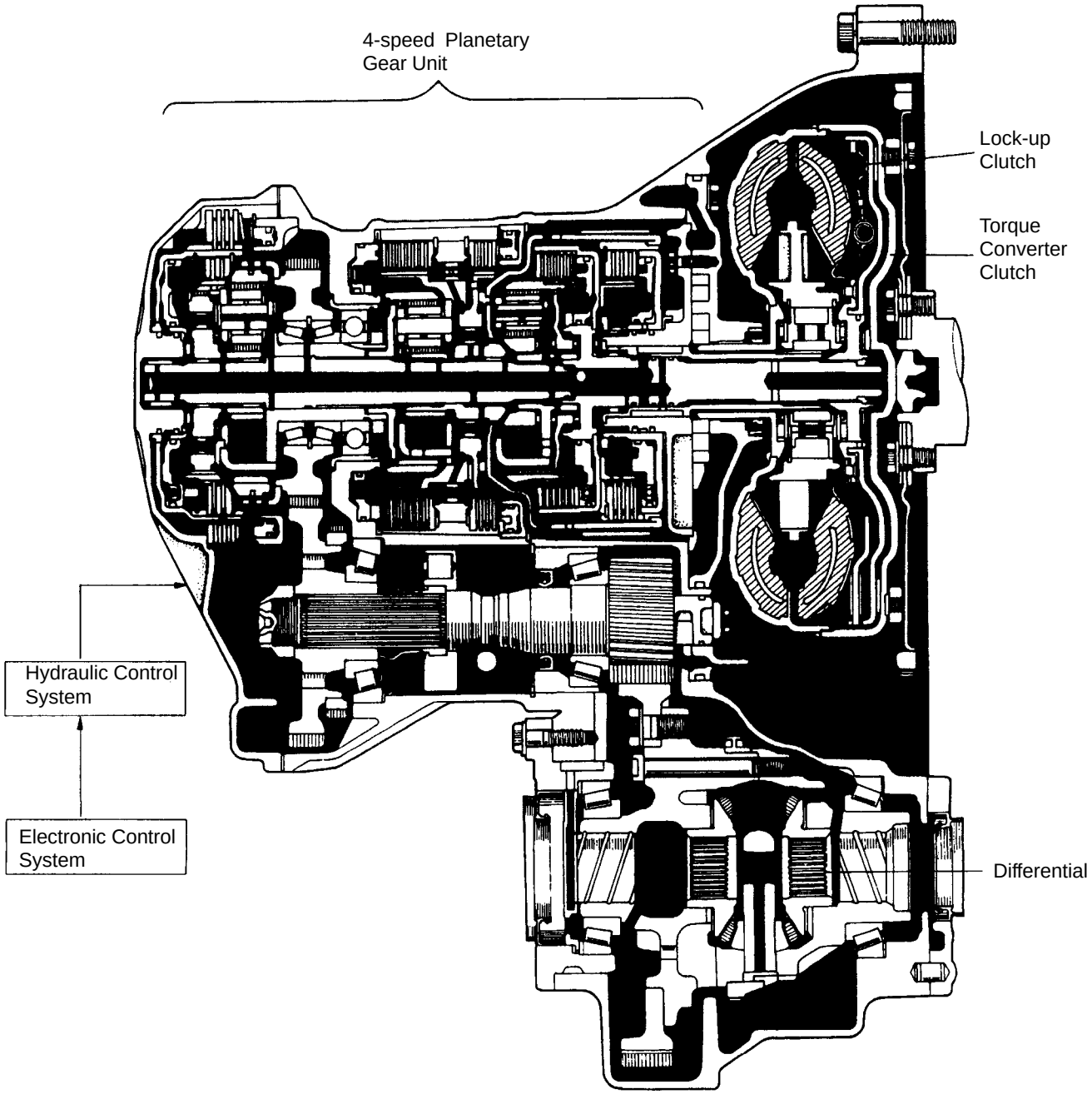
Part tightened	N-m	kgf-cm	ft-lbf
Oil cooler pipe union	27	275	20
Oil pan	4.9	50	43 in.-lbf
Valve body × Transaxle case	11	110	8
Accumulator × Cover	10	100	7
Oil pump × Transaxle case	22	225	16
O/D case × Transaxle case	25	250	18
Differential LH side bearing retainer	19	195	14
Differential RH retainer	19	195	14
Differential carrier cover	39	400	29
Oil pump body × Stator shaft	10	100	7
Upper valve body × Lower valve body	6.6	67	58 in.-lbf
Differential left case × Right case	63	640	46
Ring gear × Differential case	124	1,260	91
Upper valve body × Lower valve body	6.6	67	58 in.-lbf
Accumulator cylinder × Valve body	6.6	67	58 in.-lbf
Solenoid × Valve body	6.6	67	58 in.-lbf
Differential LH case × Differential RH case	63	640	46
Differential case × Ring gear	124	1,260	91
Counter drive gear lock nut	206	2,100	152
Carrier cover × Transaxle case	39	400	29
LH bearing retainer × Transaxle case	19	195	14
RH bearing retainer × Transaxle case	19	195	14
Parking lock pawl bracket	7.4	75	65 in.-lbf
Oil strainer × Transaxle case	11	110	8

DESCRIPTION

GENERAL DESCRIPTION

The A540E is a 4-speed, Electronically Controlled Transaxle developed exclusively for use with transversely-mounted engines. A lock-up is built into the torque converter clutch.
The A540E transaxle is mainly composed of a torque converter clutch, a 4-speed planetary gear unit, a differential, a hydraulic control system and an electronic control system.

Sectional View



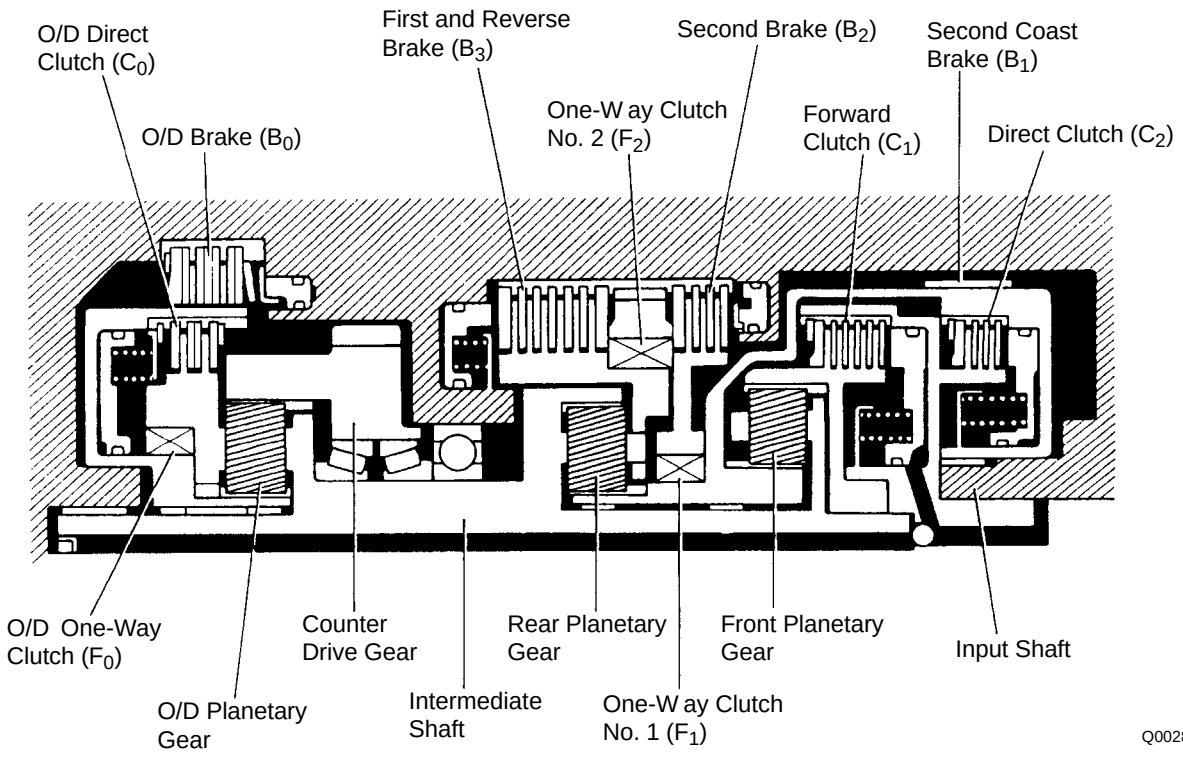
Q00169

GENERAL SPECIFICATION

Type of Transaxle		A540E
Type of Engine		3VZ-FE
Torque Converter Clutch Stall Torque Ratio		1.9 : 1
Lock-up Mechanism		Equipped
Gear Ratio	1st Gear	2.810
	2nd Gear	1.549
	3rd Gear	1.000
	O/D Gear	0.734
	Reverse Gear	2.296
Number of Discs and Plates	(Disc and Plate)	
	O/D Direct Clutch (C_0)	2/2
	Forward Clutch (C_1)	5/5
	Direct Clutch (C_2)	3/3
	2nd Brake (B_2)	3/3
	First and Reverse Brake (B_3)	7/7
	O/D Brake (B_0)	3/3
B_1 Band Width	mm (in.)	38 (1.50)
ATF Type		ATF DEXRON○ II
Capacity (US qts, Imp. qts)	A/T	6.5 (6.9, 5.7)
	D/F	0.8 (0.8, 0.7)

OPERATION

Planetary Gear Unit



○ ... Operating

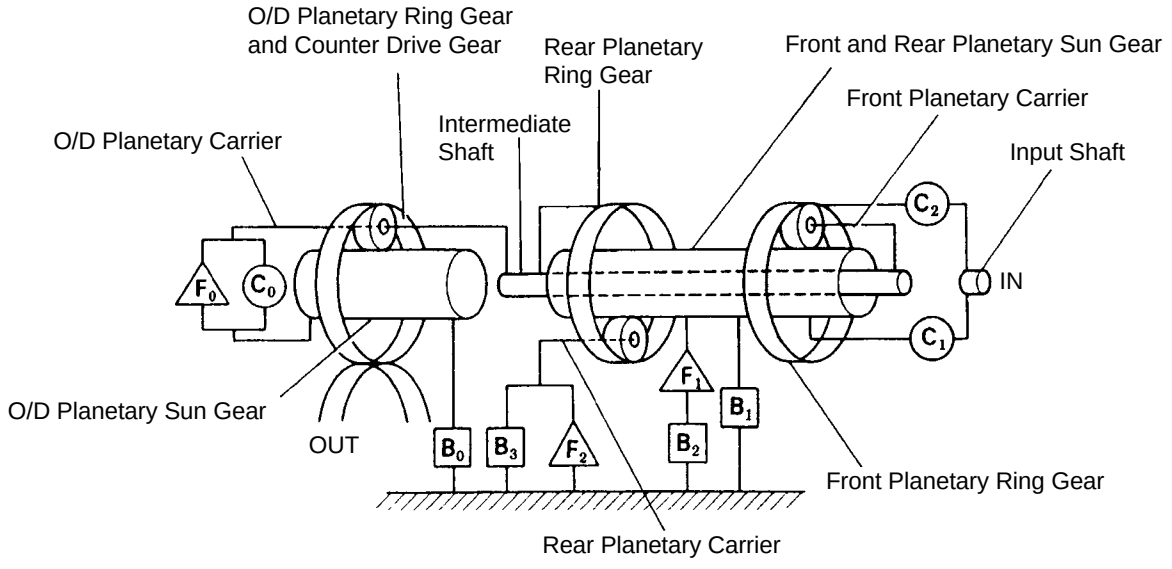
Shift lever position	Gear position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	○									
R	Reverse	○		○				○			
N	Neutral	○									
D	1st	○	○						○		○
	2nd	○	○				○		○	○	
	3rd	○	○	○			○		○		
	O/D		○	○	○		○				
2	1st	○	○						○		○
	2nd	○	○			○	○		○	○	
	*3rd	○	○	○			○		○		
L	1st	○	○					○	○		○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

*Down-shift - no up-shift

V00337

1. FUNCTION OF COMPONENTS

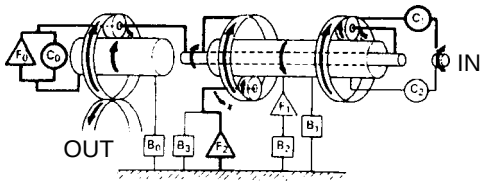
COMPONENT		FUNCTION
Forward Clutch	C_1	Connects input shaft and front planetary ring gear
Direct Clutch	C_2	Connects input shaft and front & rear planetary sun gear
2nd Coast Brake	B_1	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise
2nd Brake	B_2	Prevents outer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



V00341

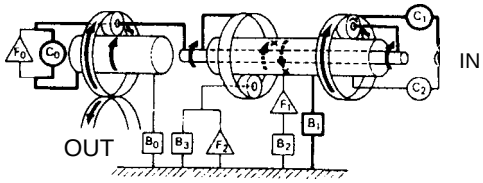
Power from the engine transmitted to the input shaft via the torque converter clutch is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one-way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution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

D or 2 Position 1st Gear



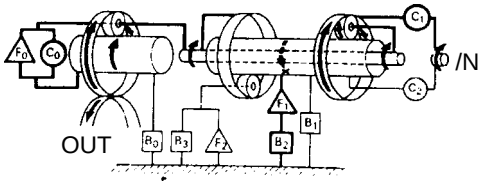
AT1097

2 Position 2nd Gear



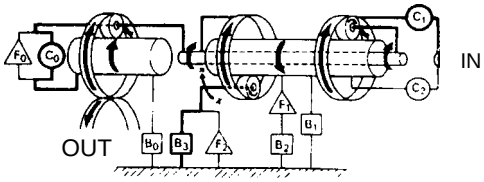
AT1102

D Position 2nd Gear



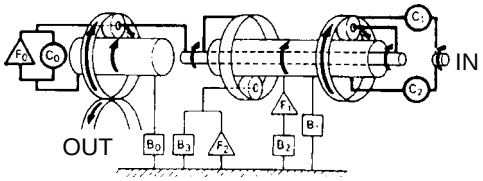
AT1098

L Position 1st Gear



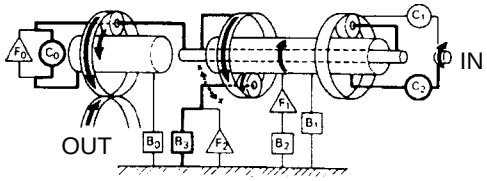
AT1103

D Position 3rd Gear



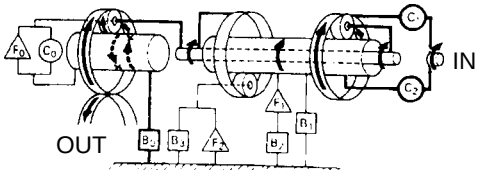
AT1099

R Position Reverse Gear



AT1101

D Position O/D Gear



AT1100

V02644

2. HYDRAULIC CONTROL SYSTEM

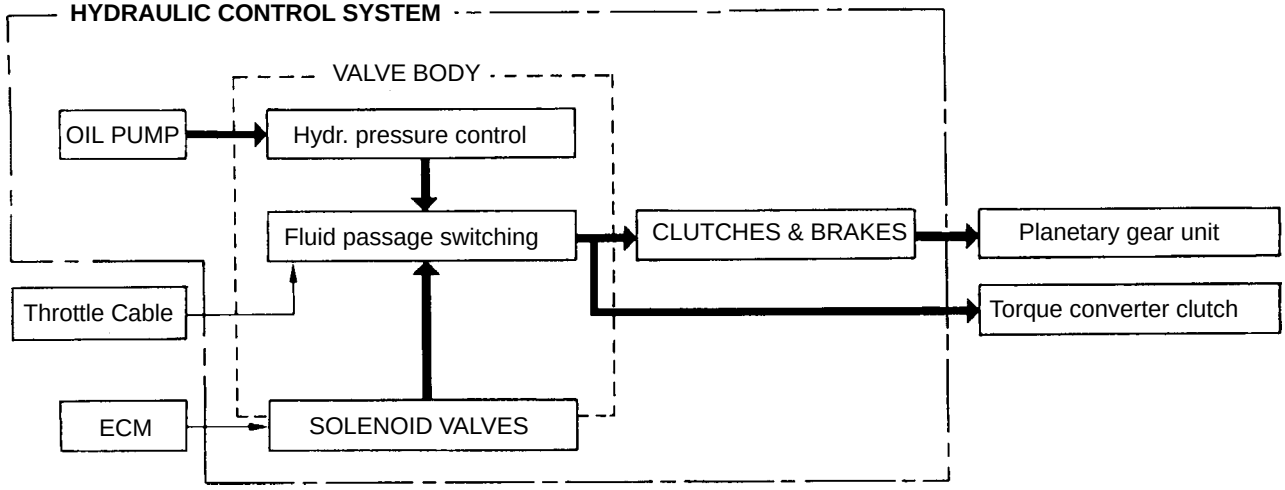
The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes as well as the fluid passages which connect all of these components.

Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.

These are three solenoid valves on the valve body.

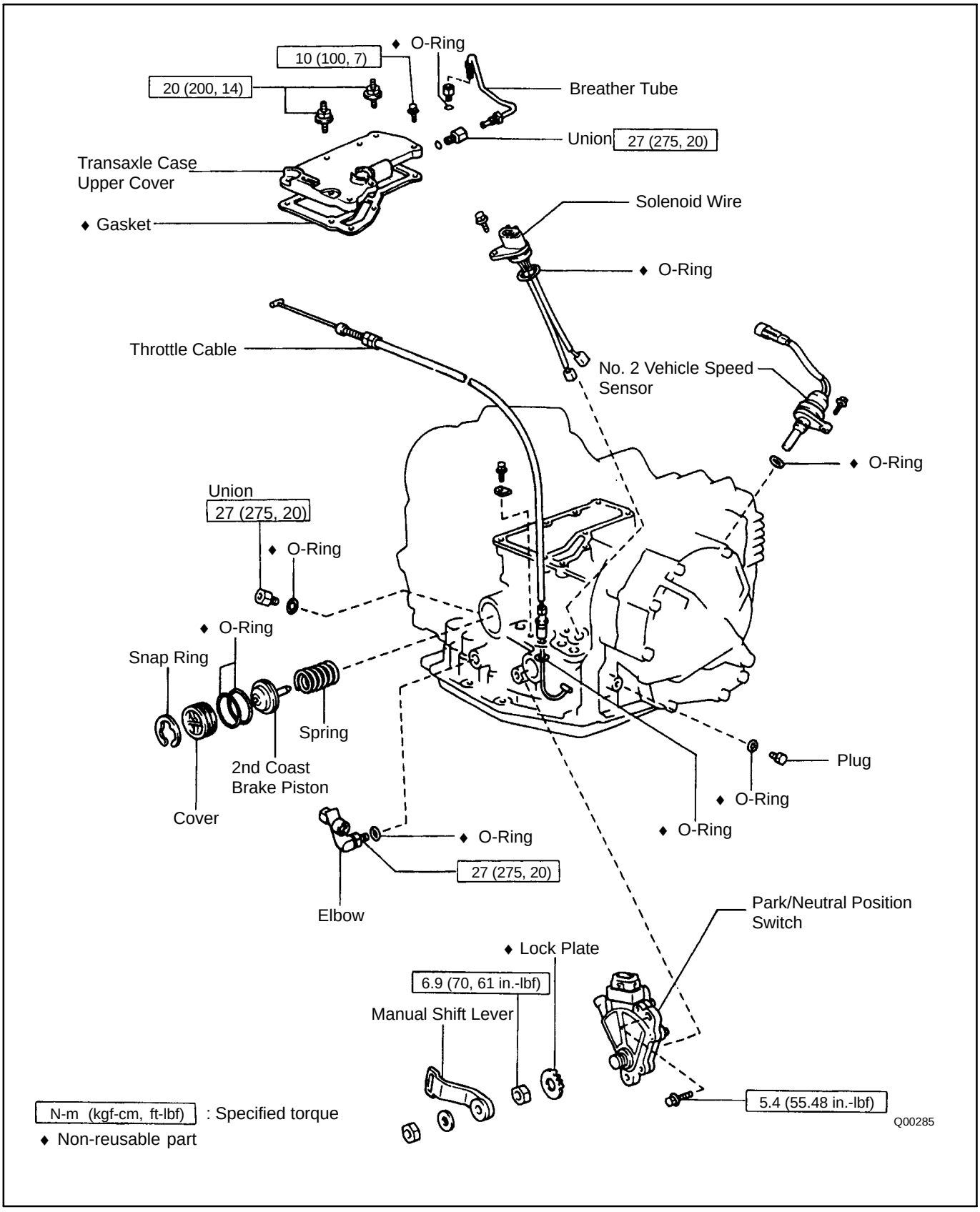
The No. 1 and No. 2 solenoid valves are turned on and off by signals from ECM to operate the shift valves and change the gear shift position.

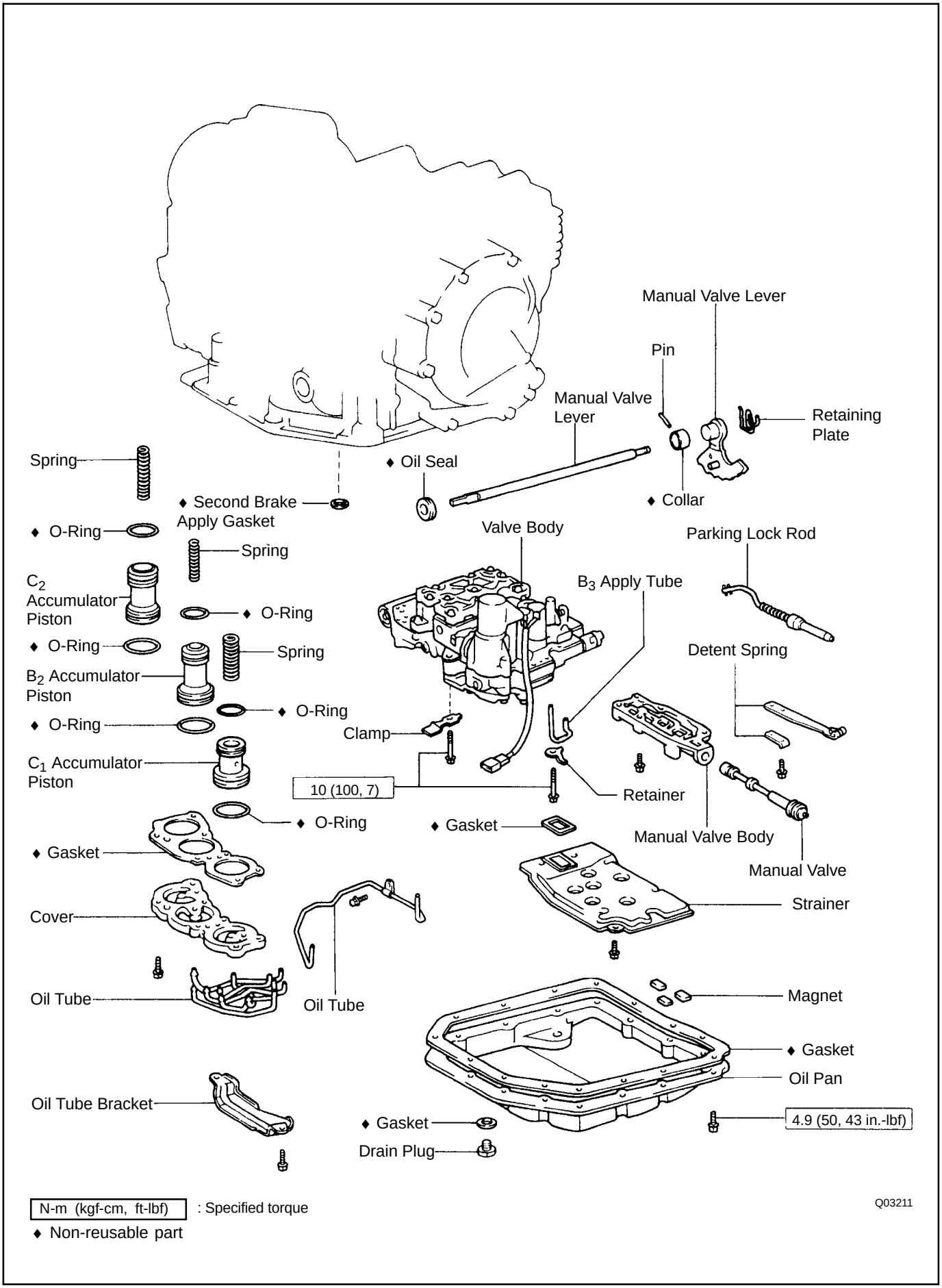
The No. 3 solenoid valve is operated by signals from the ECM to engage or disengage the lockup clutch of the torque converter clutch.



COMPONENT PARTS REMOVAL

COMPONENTS

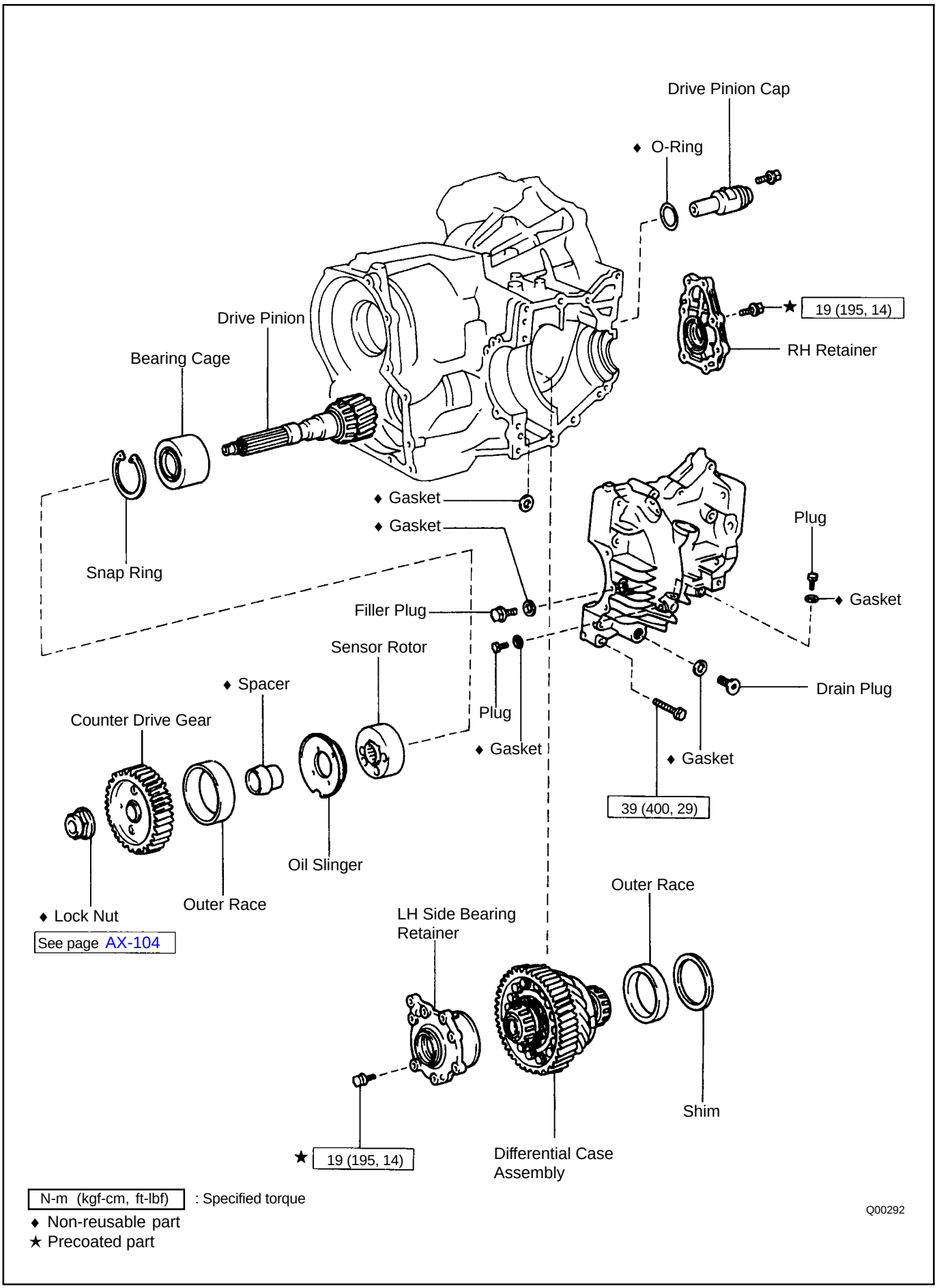




N-m (kgf-cm, ft-lbf) : Specified torque

♦ Non-reusable part

Q03211

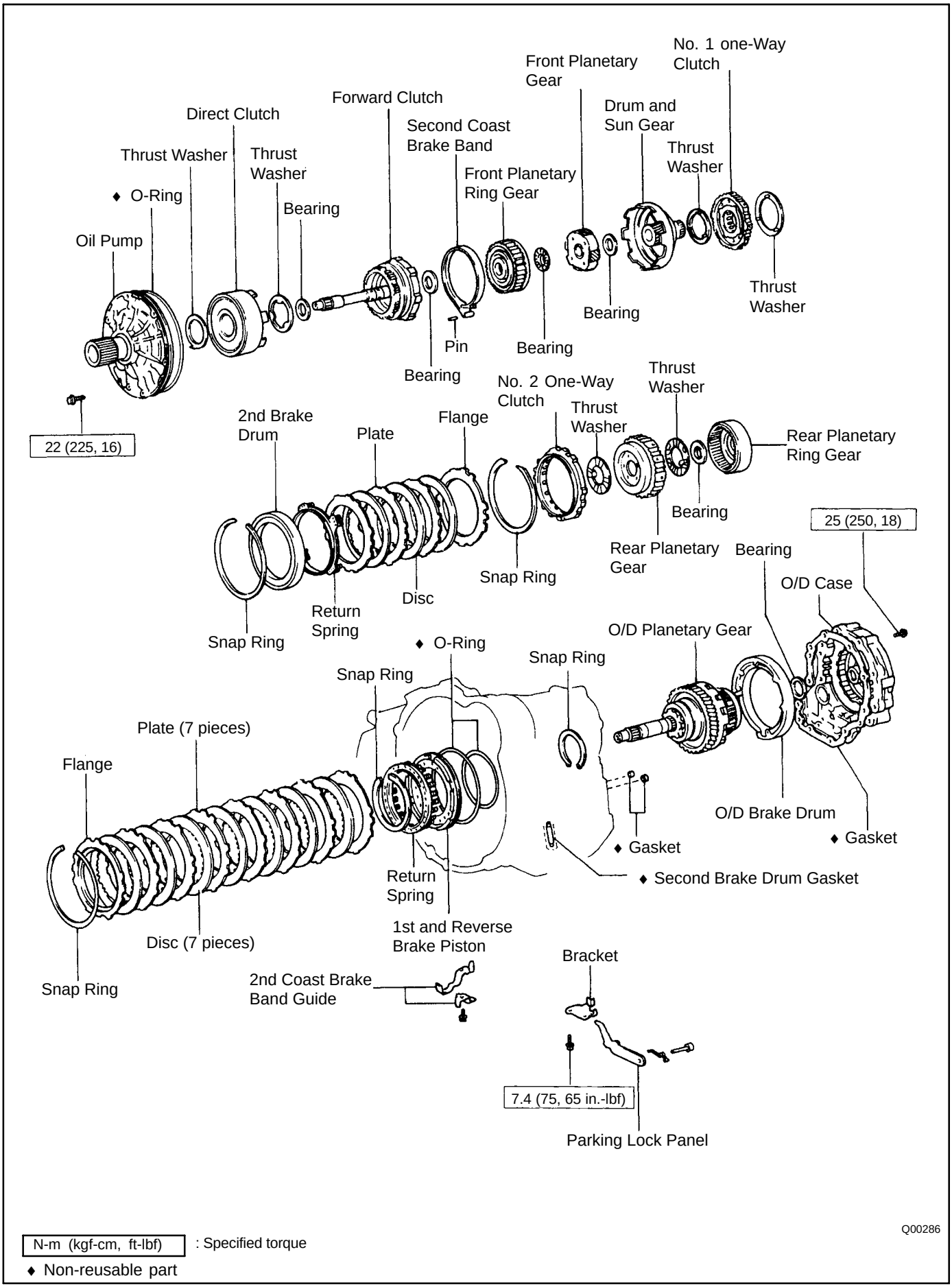


N-m (kgf-cm, ft-lbf) : Specified torque

♦ Non-reusable part

★ Precoated part

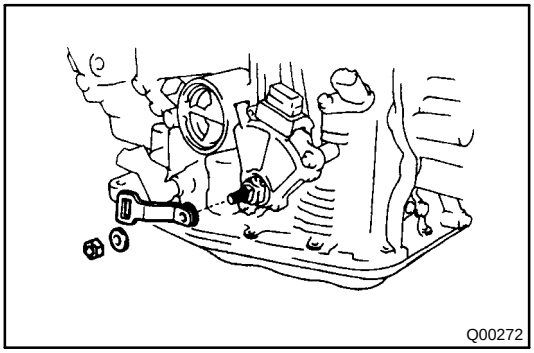
Q00292



Q00286

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

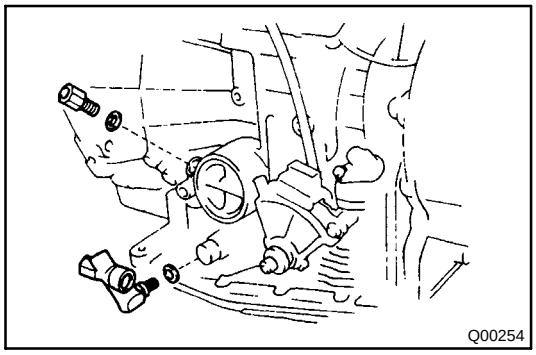
♦ Non-reusable part


Q00272

SEPARATE BASIC SUBASSEMBLY

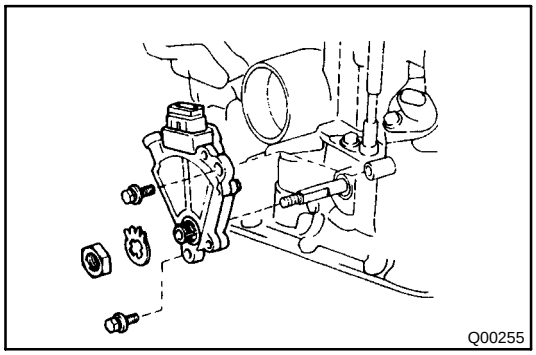
1. REMOVE UNION AND ELBOW

(a) Remove the manual shift lever.


Q00254

(b) Using the open and wrench, remove the union and elbow.

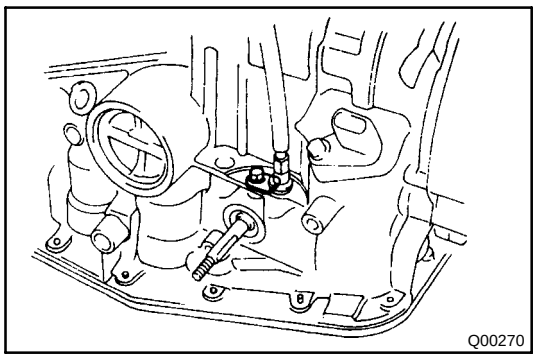
(c) Remove the O-rings from the union and elbow.


Q00255

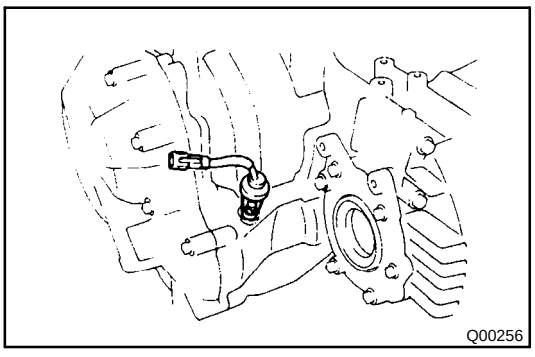
2. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Pry off the lock washer and remove the manual valve shaft nut.

(b) Remove the two bolts and pull out the park/neutral position switch.


Q00270

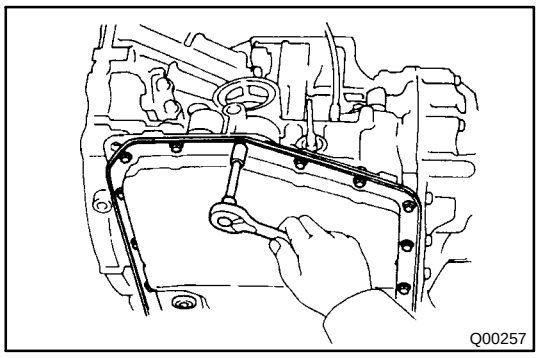
3. REMOVE THROTTLE CABLE RETAINING BOLT AND PLATE


Q00256

4. REMOVE NO. 2 VEHICLE SPEED SENSOR

(a) Remove the bolt and pull out the vehicle speed sensor.

(b) Remove the O-ring from the vehicle speed sensor.



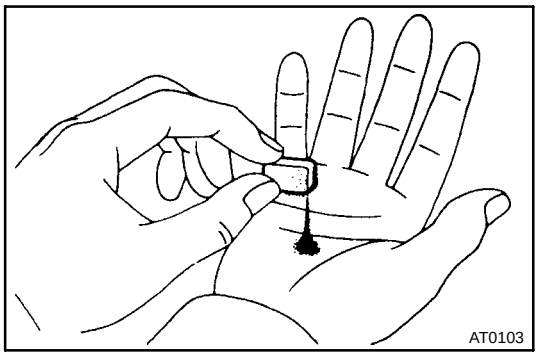
5. REMOVE OIL PAN AND GASKET

(a) Remove the seventeen bolts.

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

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

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

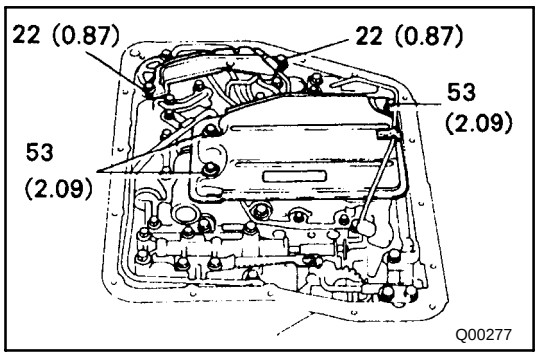


6. EXHAUST PARTICLES IN PAN

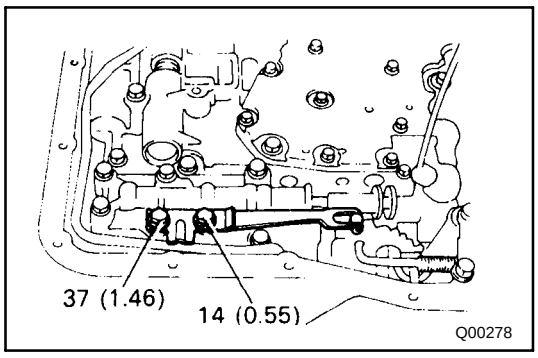
Remove the magnet and use it to collect any steel chips.

Lock carefully at the chips and particles in the oil pan and on magnet to anticipate what type of wear you will find in the transaxle.

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

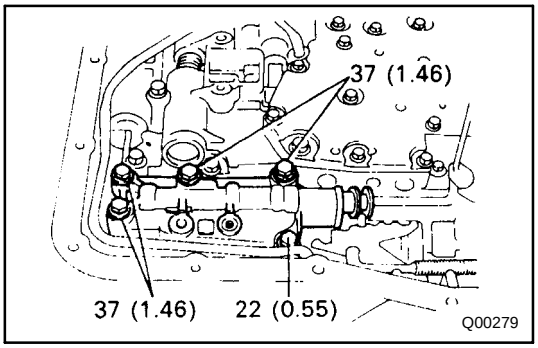


7. REMOVE OIL TUBE BRACKET AND STRAINER



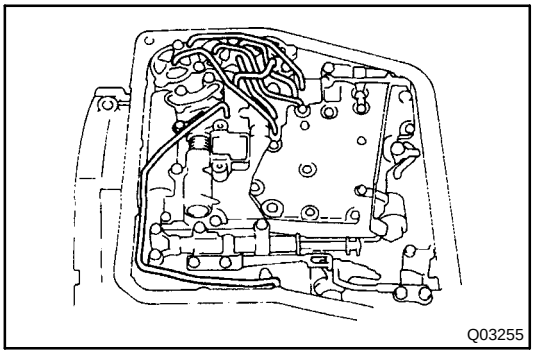
8. REMOVE MANUAL VALVE BODY

(a) Remove the two bolts and detent spring.



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

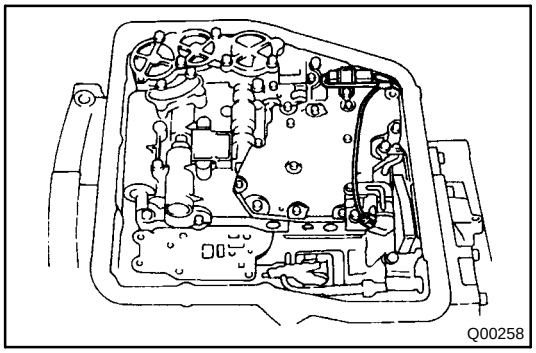
(c) Remove the manual valve from the manual valve body.


Q03255

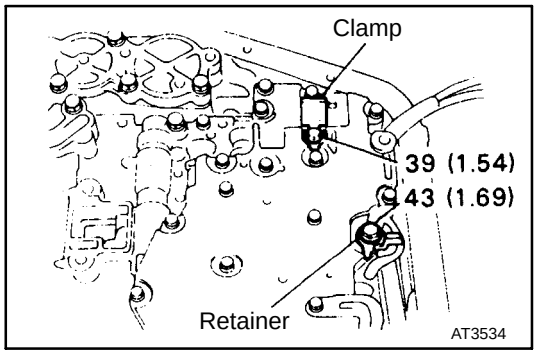
9. REMOVE OIL TUBES

(a) Remove the bolt.

(b) Pry up both tube ends with a large screwdriver and remove the seven tubes.

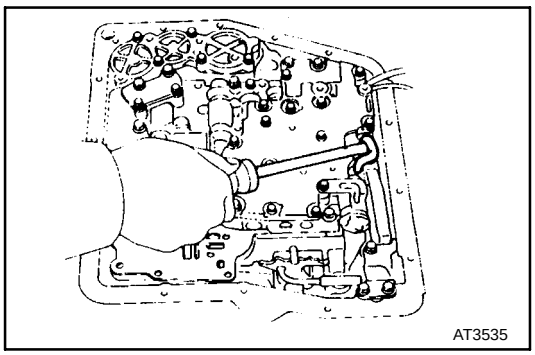

Q00258

10. DISCONNECT SOLENOID CONNECTORS



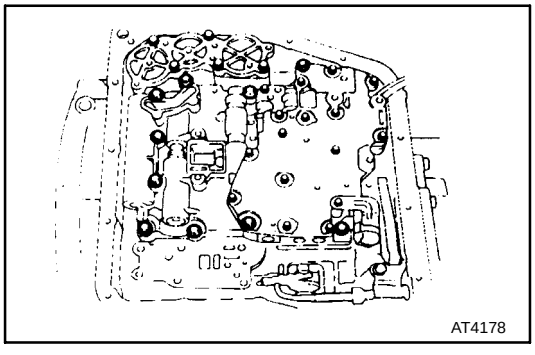
AT3534

11. REMOVE CONNECTOR CLAMP AND TUBE RETAINER


AT3535

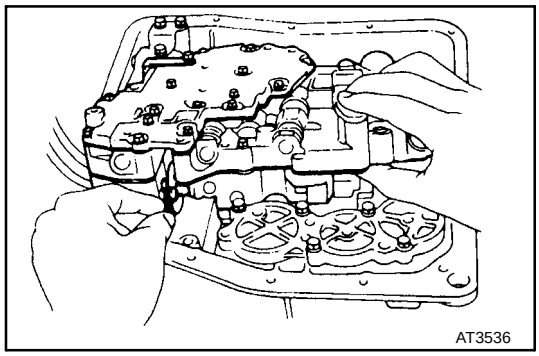
12. REMOVE B_3 APPLY TUBE

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

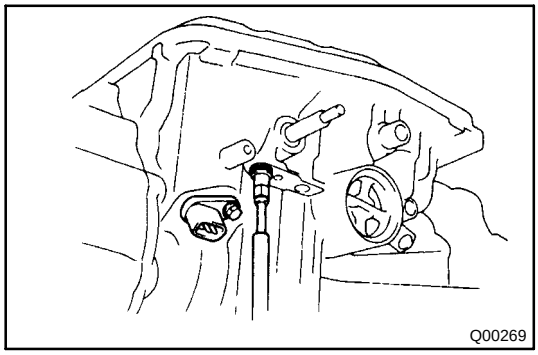

AT4178

13. REMOVE VALVE BODY

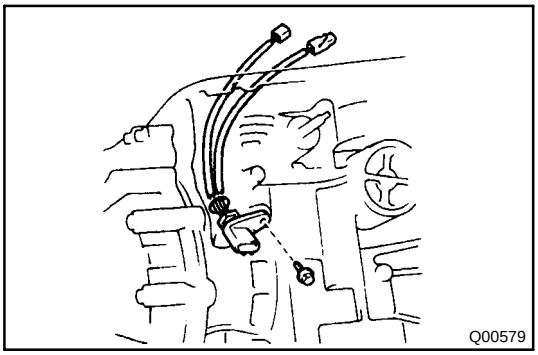
(a) Remove the ten bolts.



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

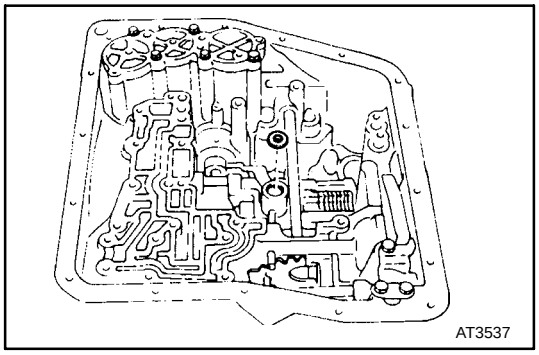


14. REMOVE THROTTLE CABLE

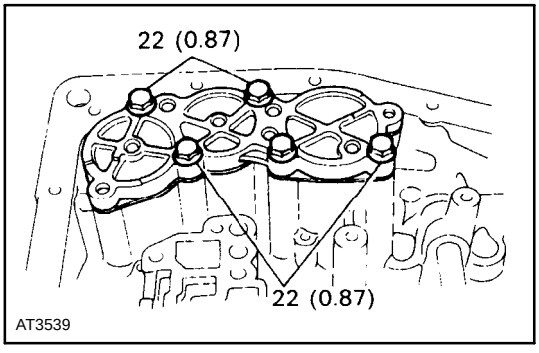


15. REMOVE SOLENOID WIRING

Remove the bolt and the solenoid wiring.



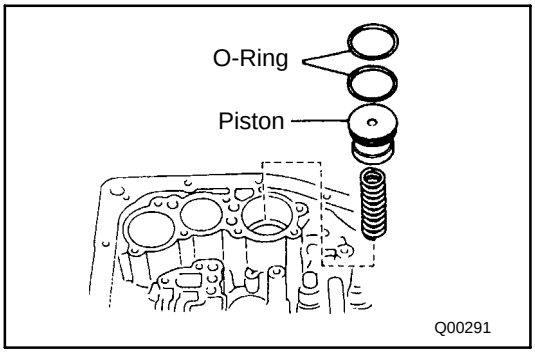
16. REMOVE SECOND BRAKE APPLY GASKET



17. REMOVE ACCUMULATOR PISTONS AND SPRINGS

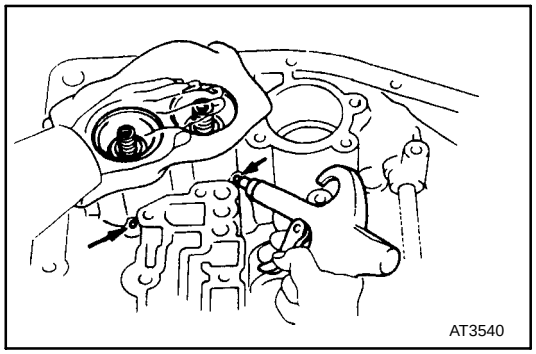
(a) Loosen the five bolts one turn at a time until the spring tension is released.

(b) Remove the cover and gasket.



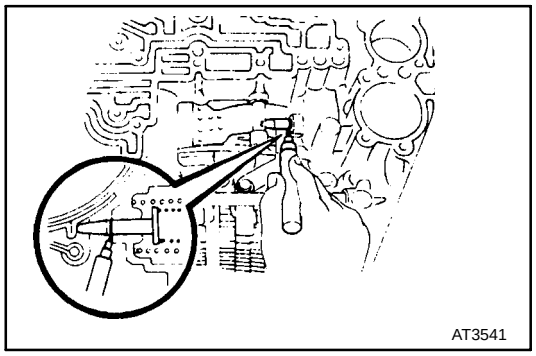
(c) Remove the C_1 accumulator piston and spring.

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



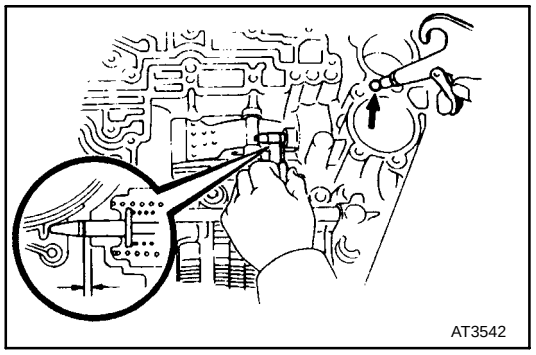
(e) Pop out pistons for C and B_2 into a rag, using low-pressure compressed air (98 kPa, 1 kgf/cm^2, 14 psi). Force air into the holes shown and remove the pistons and springs.

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



18. MEASURE PISTON STROKE SECOND COAST BRAKE

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



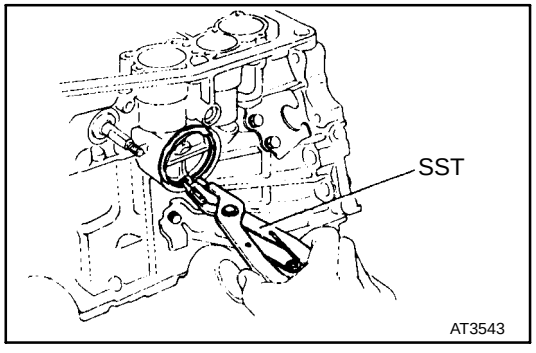
(b) Using SST, measure the piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm^2, 57 - 114 psi), as shown.

SST 09240-00020

Maximum thrust clearance:

2.0 - 3.5 mm (0.079 - 0.138 in.)

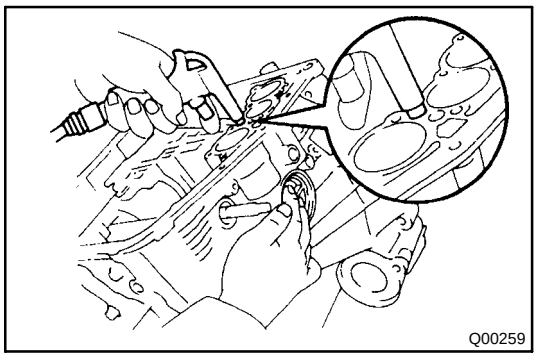
If the piston stroke exceeds the limit, inspect the second coast brake band (See page AX-37).



19. REMOVE SECOND COAST BRAKE PISTON

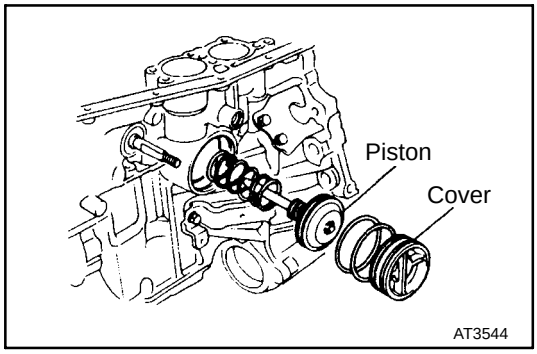
(a) Using SST, remove the snap ring.

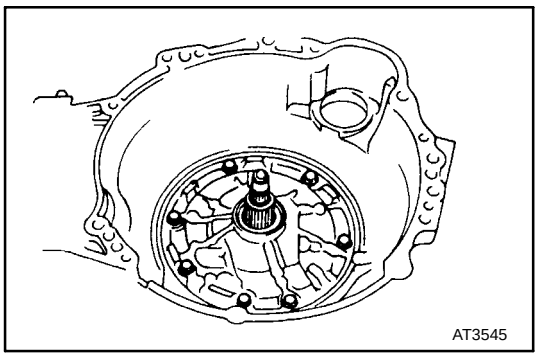
SST 09350-32014



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

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



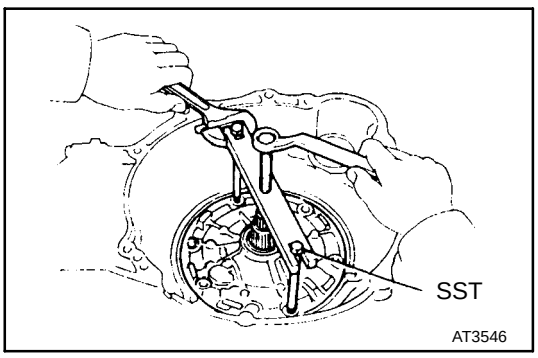


20. STAND TRANSAXLE ENGINE SIDE UPWARD

21. REMOVE OIL PUMP

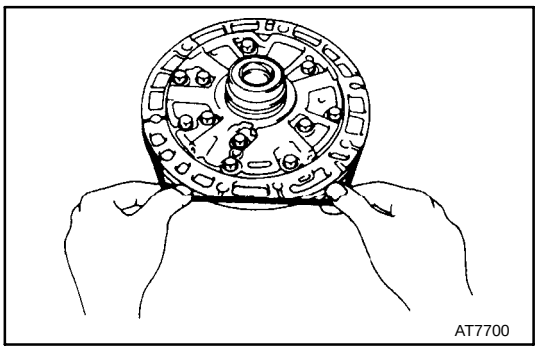
NOTICE: Before removing the oil pump, remove the second coast brake piston.

(a) Remove the seven bolts.

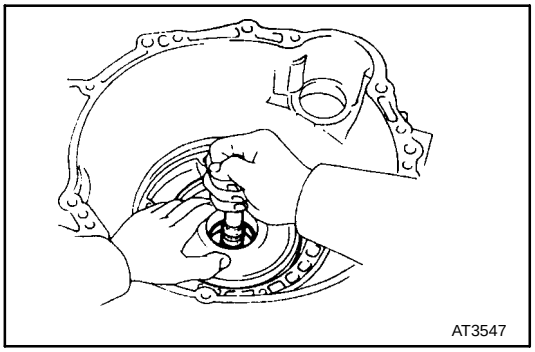


(b) Using SST, pull out the oil pump from the transaxle case.

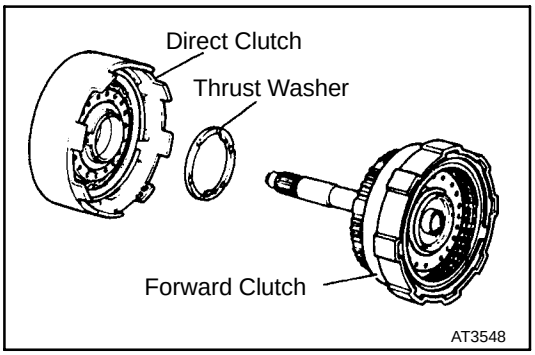
SST 09350-32014



22. REMOVE O-RING FROM OIL PUMP



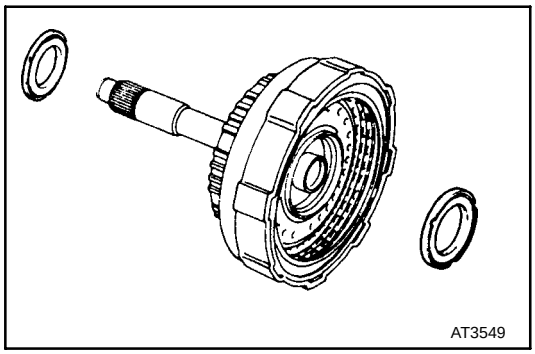
23. REMOVE DIRECT CLUTCH AND FORWARD CLUTCH



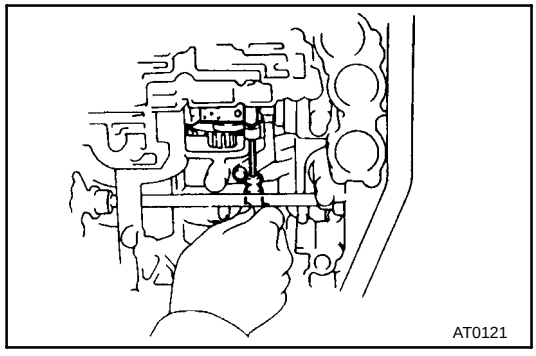
24. SEPARATE DIRECT CLUTCH AND FORWARD CLUTCH

(a) Separate the direct clutch and forward clutch.

(b) Remove the thrust washer from direct clutch.



25. REMOVE BEARING FROM FORWARD CLUTCH

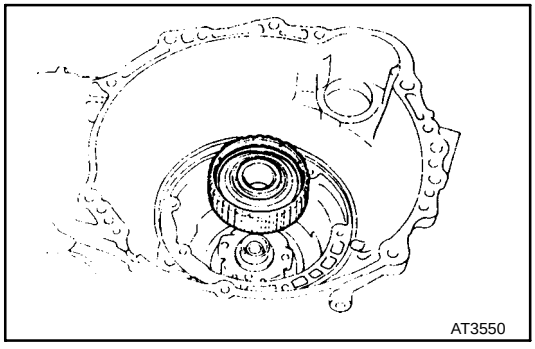


26. REMOVE SECOND COAST BRAKE BAND

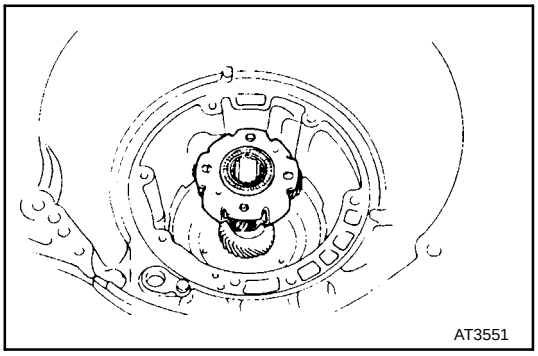
(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

(b) Remove the brake band.

HINT: For the method of inspection, refer to page AX-37 .

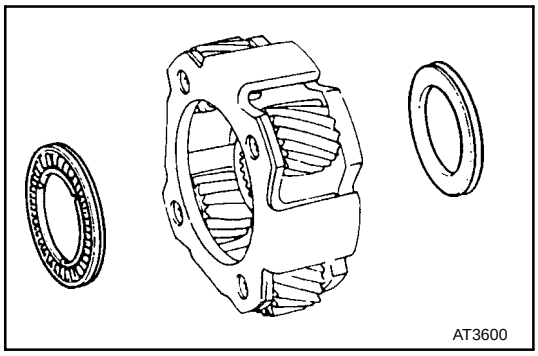


27. REMOVE FRONT PLANETARY RING GEAR

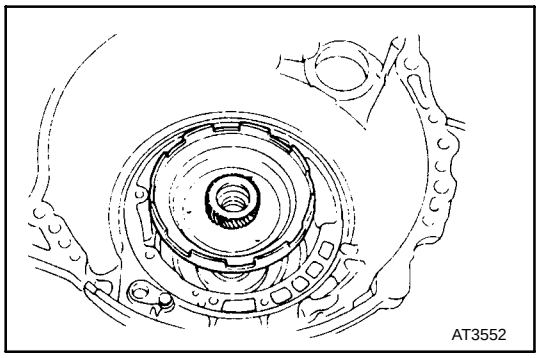


28. REMOVE FRONT PLANETARY GEAR

(a) Remove the front planetary gear.

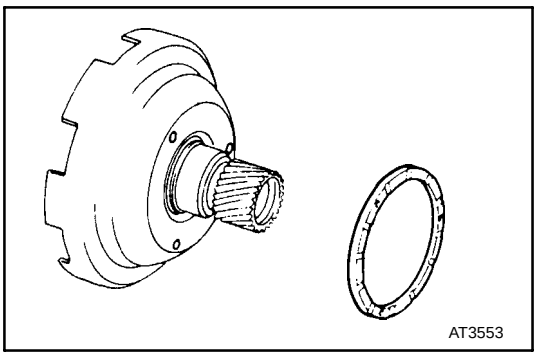


(b) Remove the two bearings from the planetary gear.

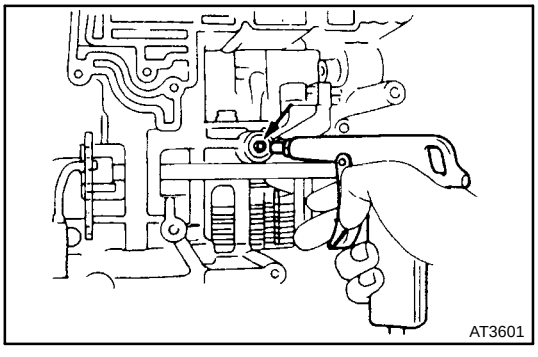


29. REMOVE SUN GEAR AND SUN GEAR INPUT DRUM

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

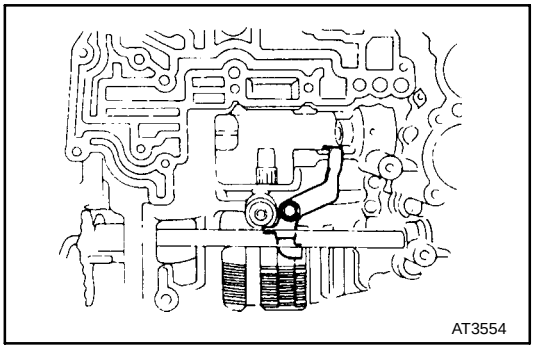


(b) Remove the thrust washer from sun gear input drum.

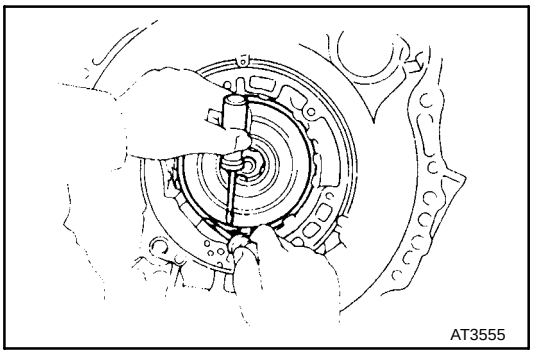


30. CHECK OPERATION OF SECOND BRAKE PISTON

Apply compressed air into the case passage and confirm that the piston moves.
If the piston does not move, disassembly and inspect.

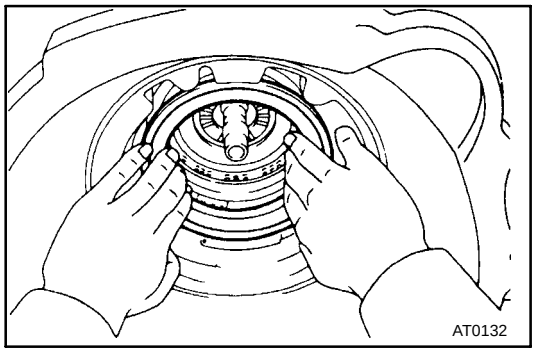


31. REMOVE SECOND COAST BRAKE BAND GUIDE

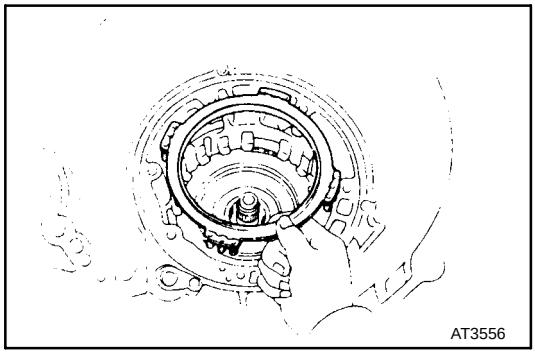


32. REMOVE SECOND BRAKE DRUM

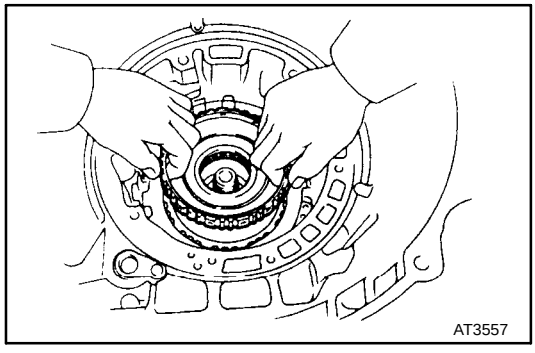
(a) Remove the snap ring.



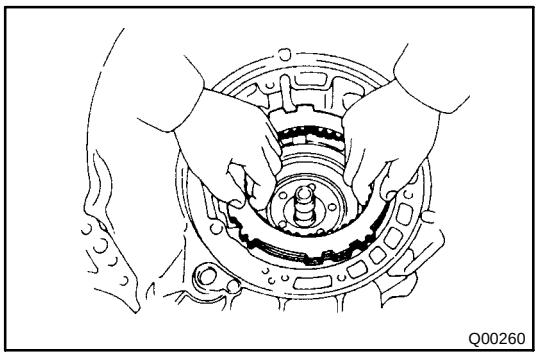
(b) Remove the second brake drum.



33. REMOVE SECOND BRAKE PISTON RETURN SPRING

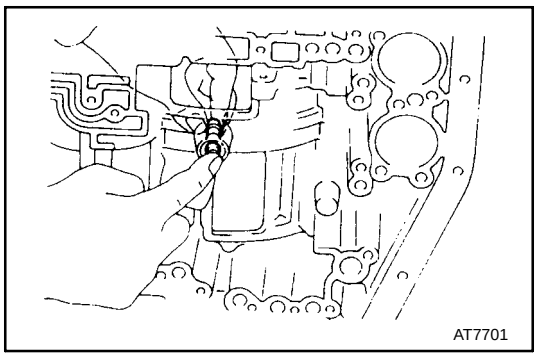


34. REMOVE NO. 1 ONE-WAY CLUTCH



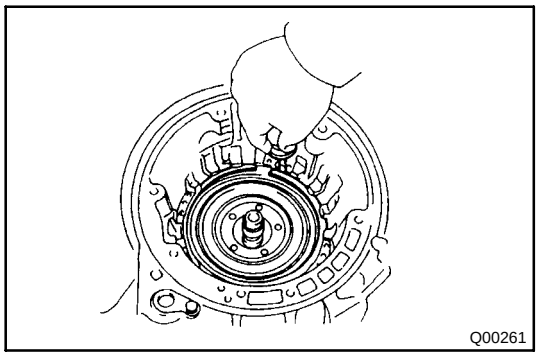
35. REMOVE PLATES, DISCS AND FLANGE

HINT: For the method of inspection, refer to page AX-57 .



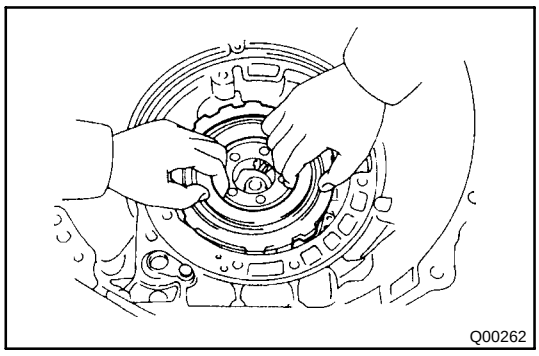
36. REMOVE SECOND BRAKE DRUM GASKET

Remove the gasket.

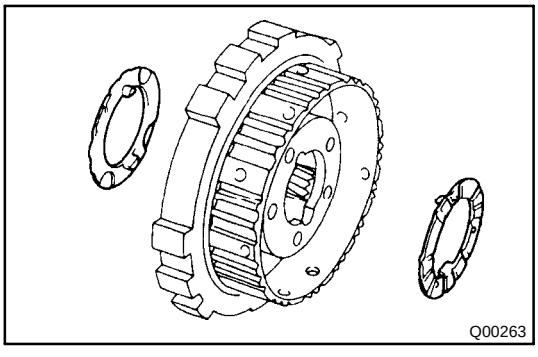


37. REMOVE NO. 2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR

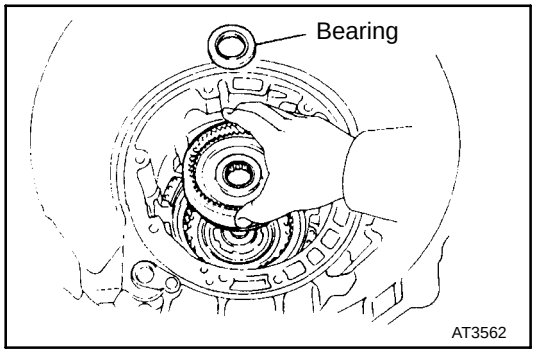
(a) Remove the snap ring.



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



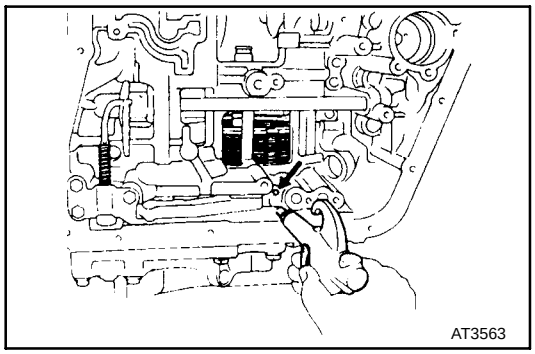
(c) Remove two thrust washers from the rear planetary gear.



38. REMOVE REAR PLANETARY RING GEAR

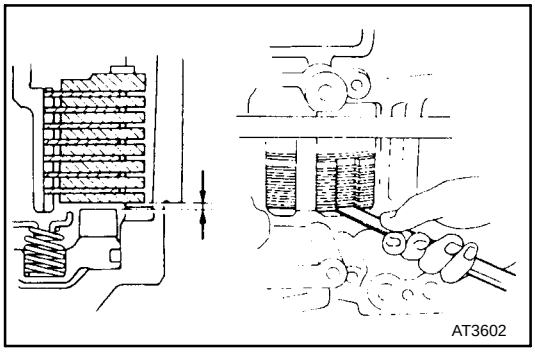
(a) Remove the rear planetary ring gear.

(b) Remove the bearing from the ring gear.



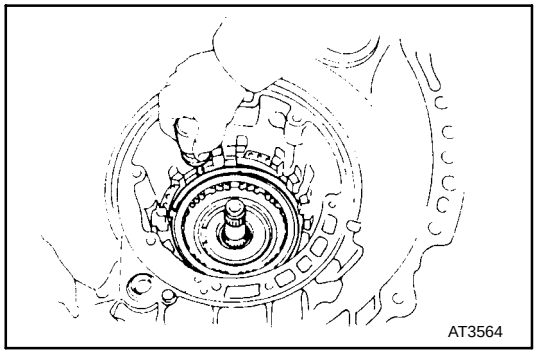
39. CHECK FIRST AND REVERSE BRAKE

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



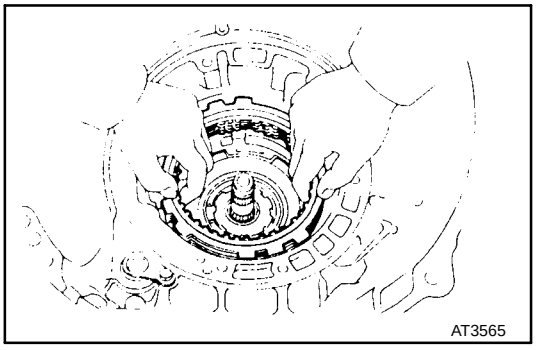
(b) Using a filler gauge, check the pack clearance of the first and reverse brake.

Clearance:
0.85 - 2.05 mm (0.033 - 0.081 in.)



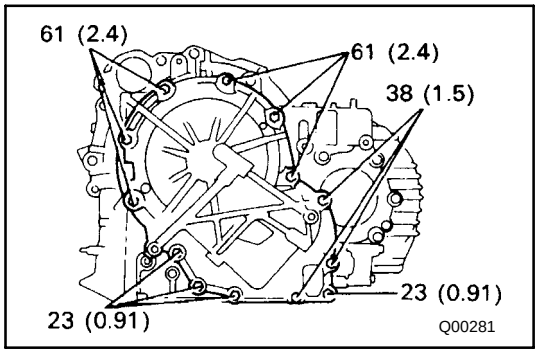
40. REMOVE FLANGE, DISCS AND PLATES OF FIRST AND REVERSE BRAKE

(a) Remove the snap ring.



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

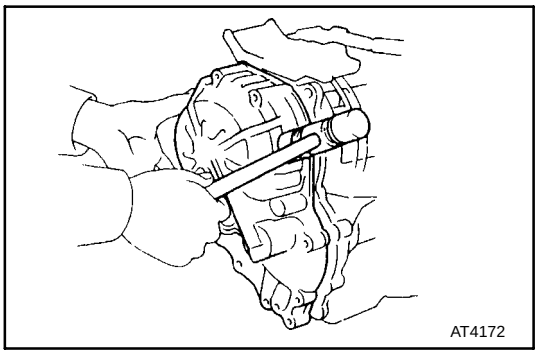
HINT: For the method of inspection, refer to AX-61 .



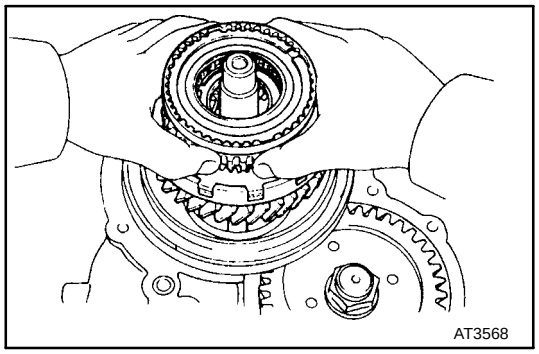
41. TURN TRANSAXLE CASE AROUND

42. REMOVE OVERDRIVE UNIT

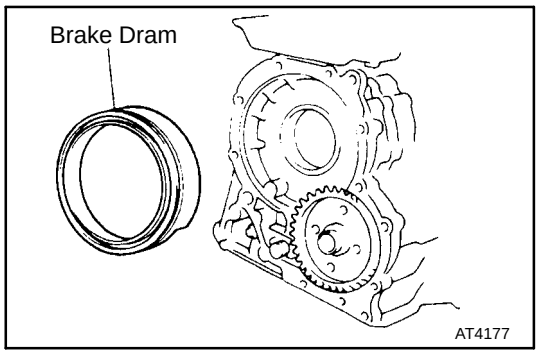
(a) Remove the thirteen bolts.



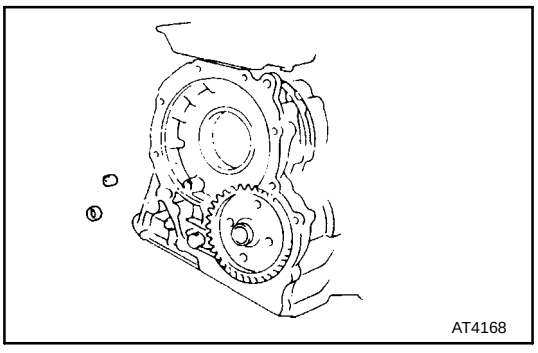
(b) Tap on the circumference of the overdrive case with a plastic hammer to remove the overdrive case and gasket.



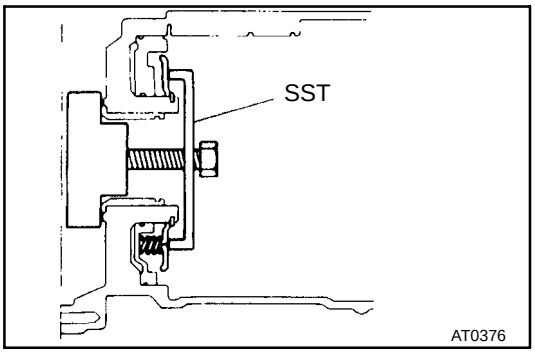
(c) Remove the overdrive planetary gear from transaxle case.



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



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

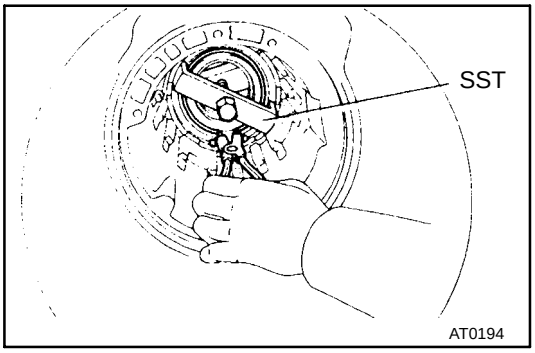


43. REMOVE FIRST AND REVERSE BRAKE PISTON

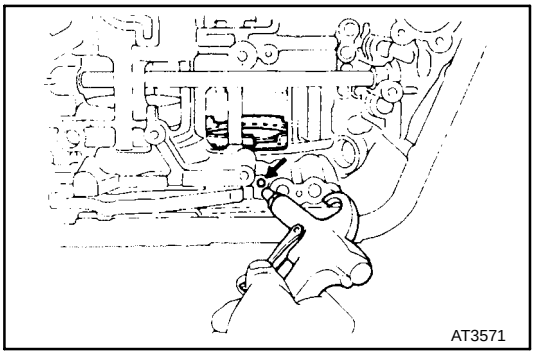
(a) Remove the piston return spring.

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

SST 09350-32014 (09351-32040)

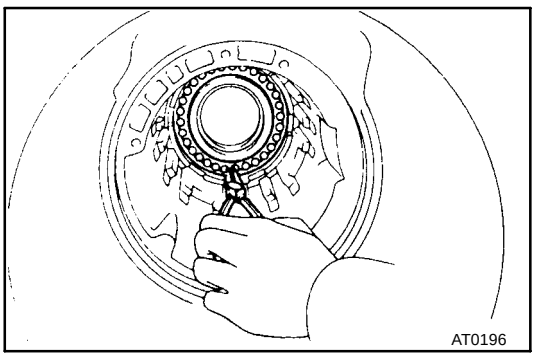


Using snap ring pliers, remove the snap ring.
Remove SST.
Remove the return spring from the case.

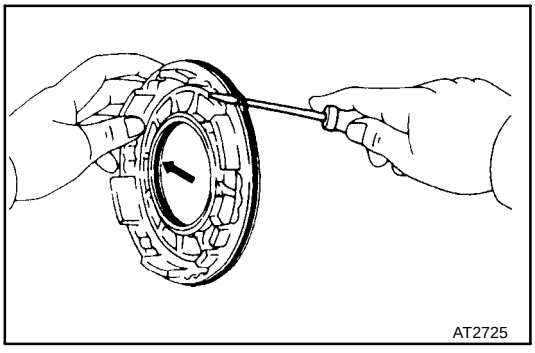


(b) Apply compressed air into the passage of the case to remove the piston.

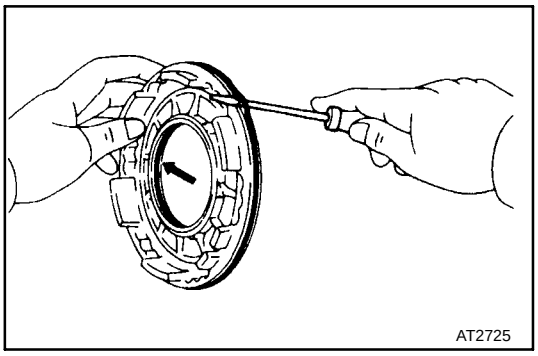
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.



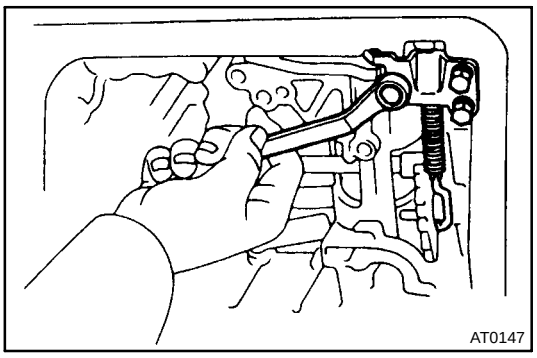
(c) If the piston does not pop out with compressed air, use needle-nose pliers to remove it.



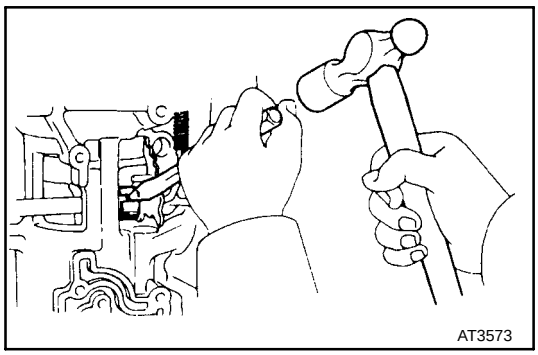
(d) Remove the two O-rings from the piston.



44. REMOVE SNAP RING FROM TRANSAXLE CASE

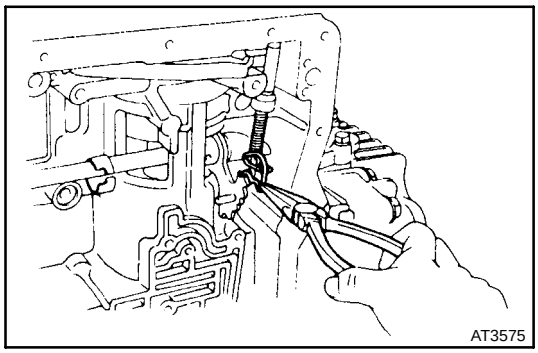


45. REMOVE PARKING LOCK PAWL BRACKET

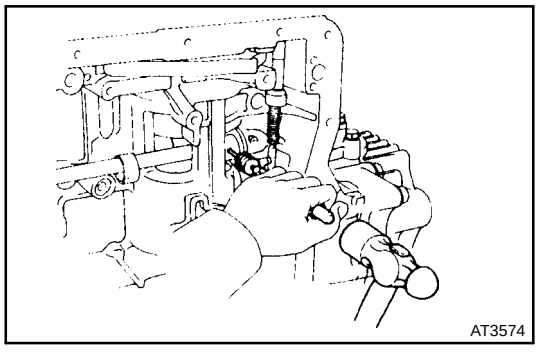


46. REMOVE MANUAL VALVE SHAFT

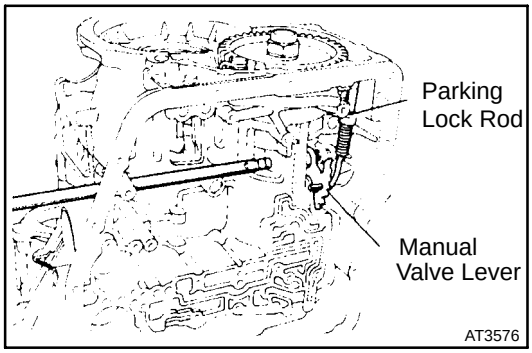
(a) Using a cold chisel and hammer, cut the collar.



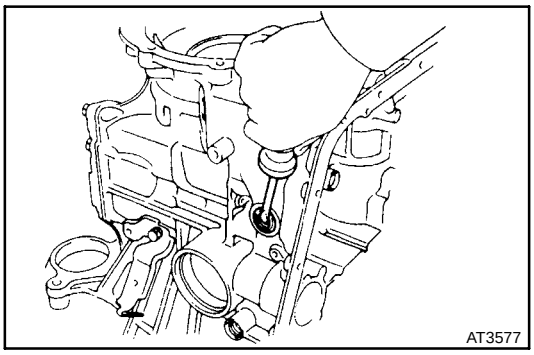
(b) Remove the retaining spring.



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

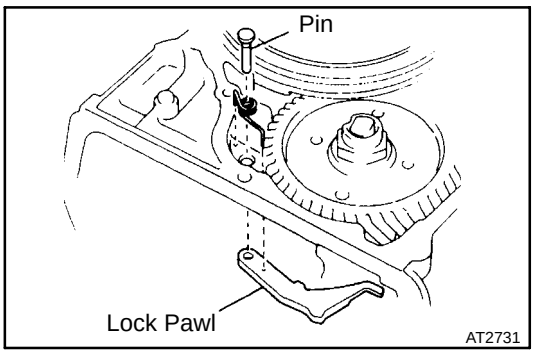


(d) Slide out the shaft from the transaxle case and remove the manual valve lever and parking lock rod.

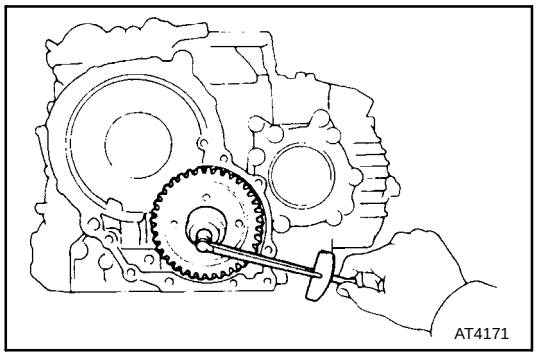


47. REMOVE MANUAL VALVE SHAFT OIL SEAL

Using a screwdriver, remove the oil seal.



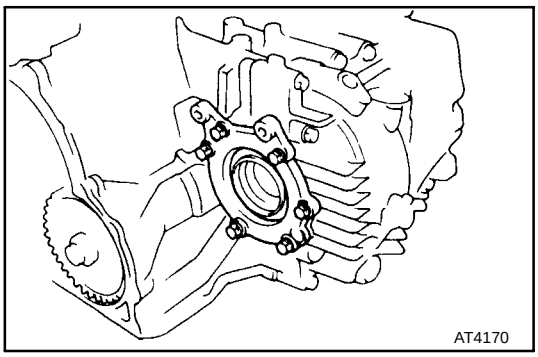
48. REMOVE PIN, SPRING AND PARKING LOCK PAWL


AT4171

DIFFERENTIAL COMPONENT PARTS REMOVAL

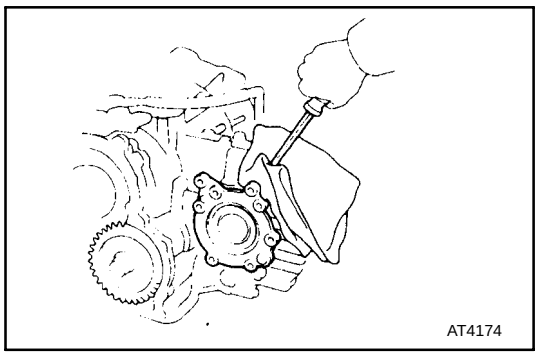
1. MEASURE DIFFERENTIAL TOTAL PRELOAD

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


AT4170

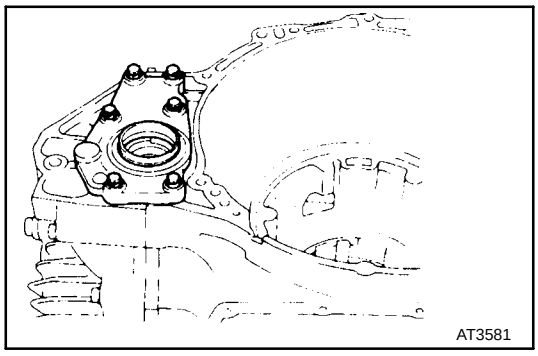
2. REMOVE LH BEARING RETAINER

(a) Remove the six bolts.


AT4174

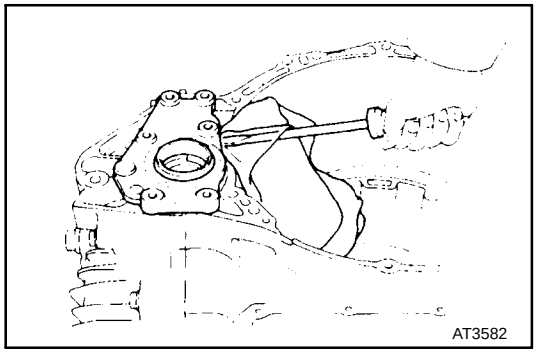
(b) Using a large screwdriver, remove the LH bearing retainer.

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


AT3581

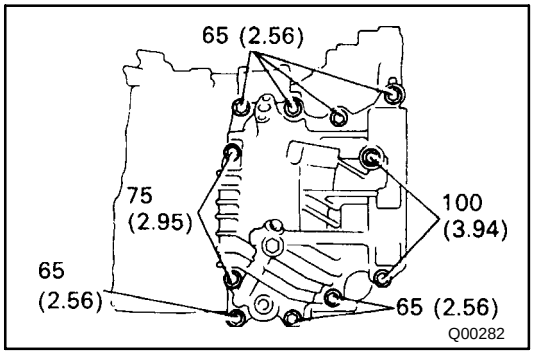
3. REMOVE RH RETAINER

(a) Remove the six bolts.


AT3582

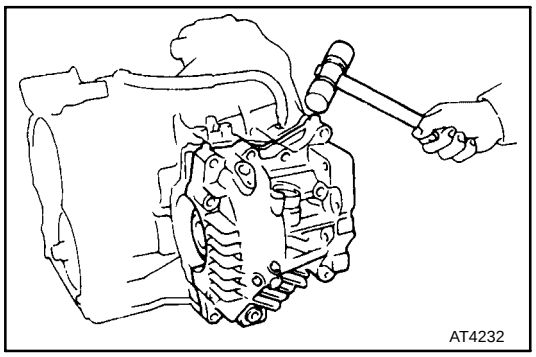
(b) Using a large screwdriver, remove the RH retainer.

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

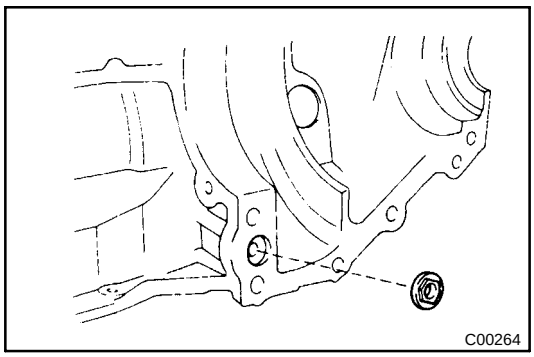


4. REMOVE CARRIER COVER

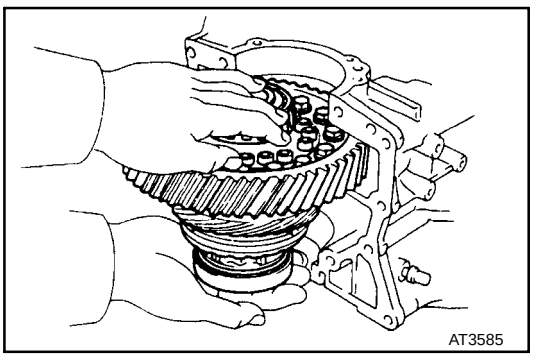
(a) Remove the eleven bolts.



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

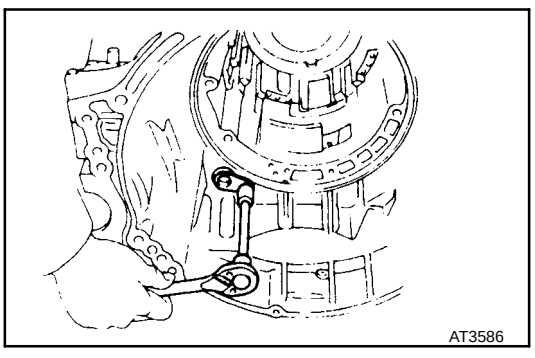


(c) Remove the apply gasket.



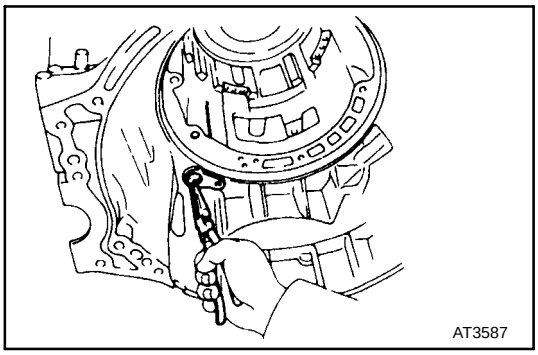
5. REMOVE DIFFERENTIAL CASE

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



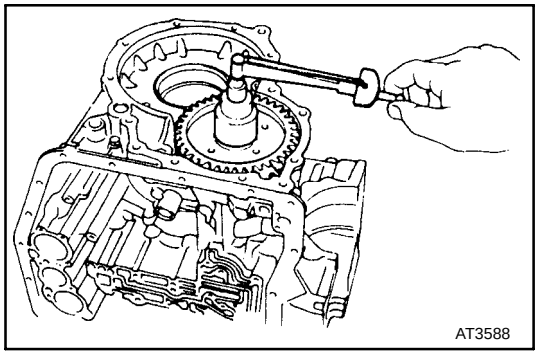
6. REMOVE DRIVE PINION CAP

(a) Remove the bolt.



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

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



7. MEASURE DRIVE PINION PRELOAD

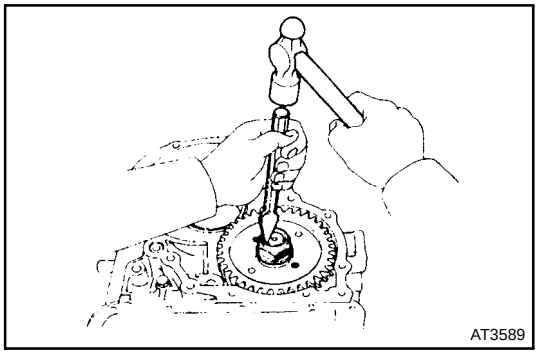
Using a torque meter, measure the drive pinion preload.

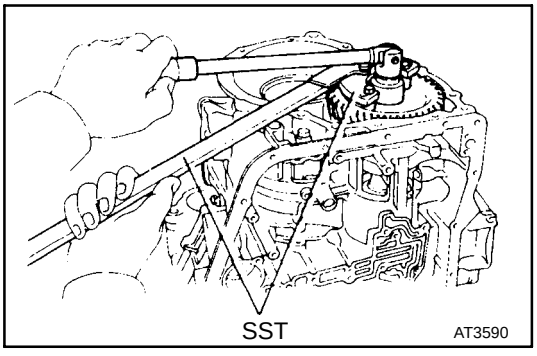
Preload (at starting):
Reused bearing
0.5 - 0.8 N-m (5 - 8 kgf-cm, 4.3 - 6.9 in.-lbf)

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

8. REMOVE COUNTER DRIVEN GEAR

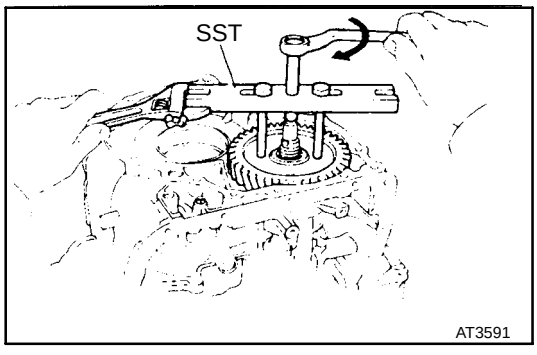
(a) Using a chisel, loosen the staked part of the nut.





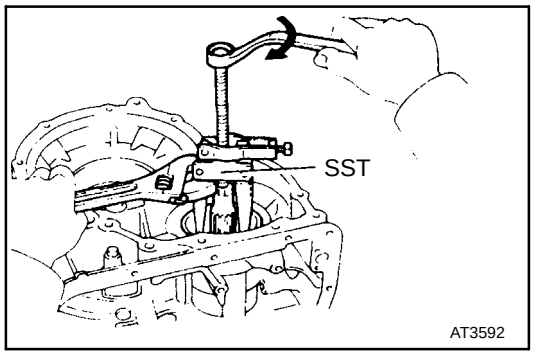
(b) Using SST to hold the gear, remove the nut.

SST 09330-00021, 09350-32014 (09351-32032)



(c) Using SST, remove the gear and bearing.

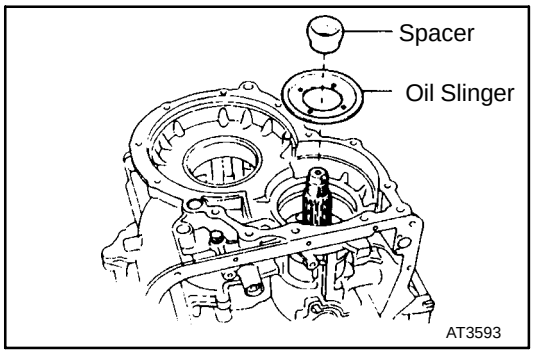
SST 09350-32014 (09351-32061)



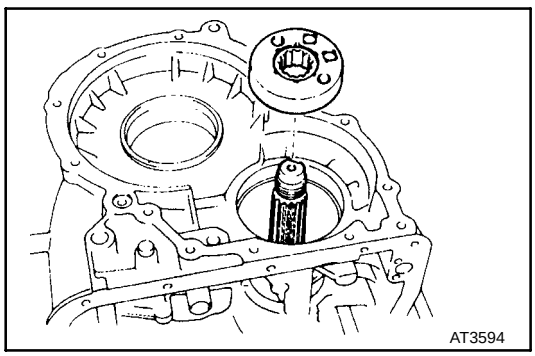
9. REMOVE OUTER RACE, SPACER AND OIL SLINGER

(a) Using SST, remove the outer race.

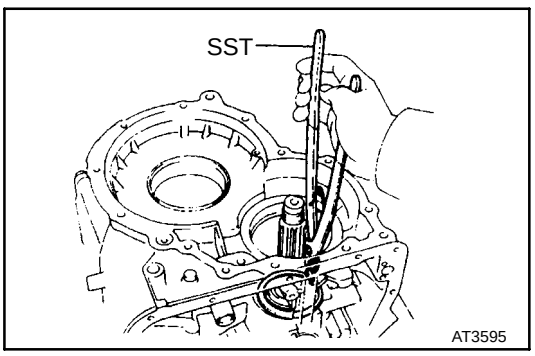
SST 09350-32014 (09308-10010)



(b) Remove the spacer and oil slinger.



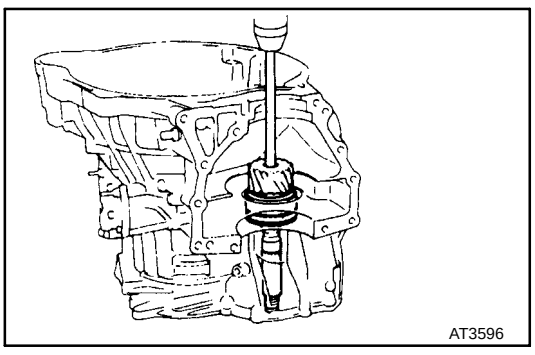
10. REMOVE SENSOR ROTOR



11. REMOVE DRIVE PINION

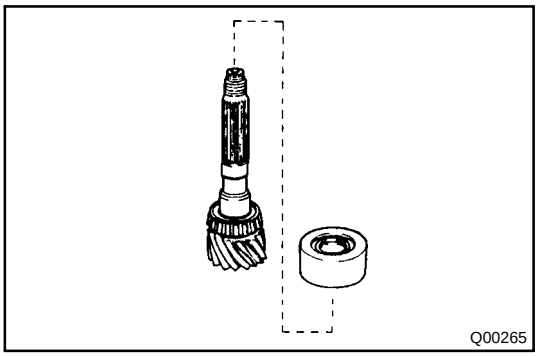
(a) Using SST, remove the snap ring.

SST 09350-32014 (09351-32050)



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

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



(d) Remove the bearing cage from drive pinion.

GENERAL NOTES

The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion from similar-looking parts of different subassemblies being on your workbench at the same time.
The component groups are inspected and repaired from the converter housing side.
As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group can not be assembled because parts are being ordered, be sure to keep all parts off that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.
Recommended fluid for the automatic transaxle:
ATF DEXRON® II

1. GENERAL CLEANING NOTES:

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

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

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

2. PARTS ARRANGEMENT:

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

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

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

3. GENERAL ASSEMBLY:

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

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

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

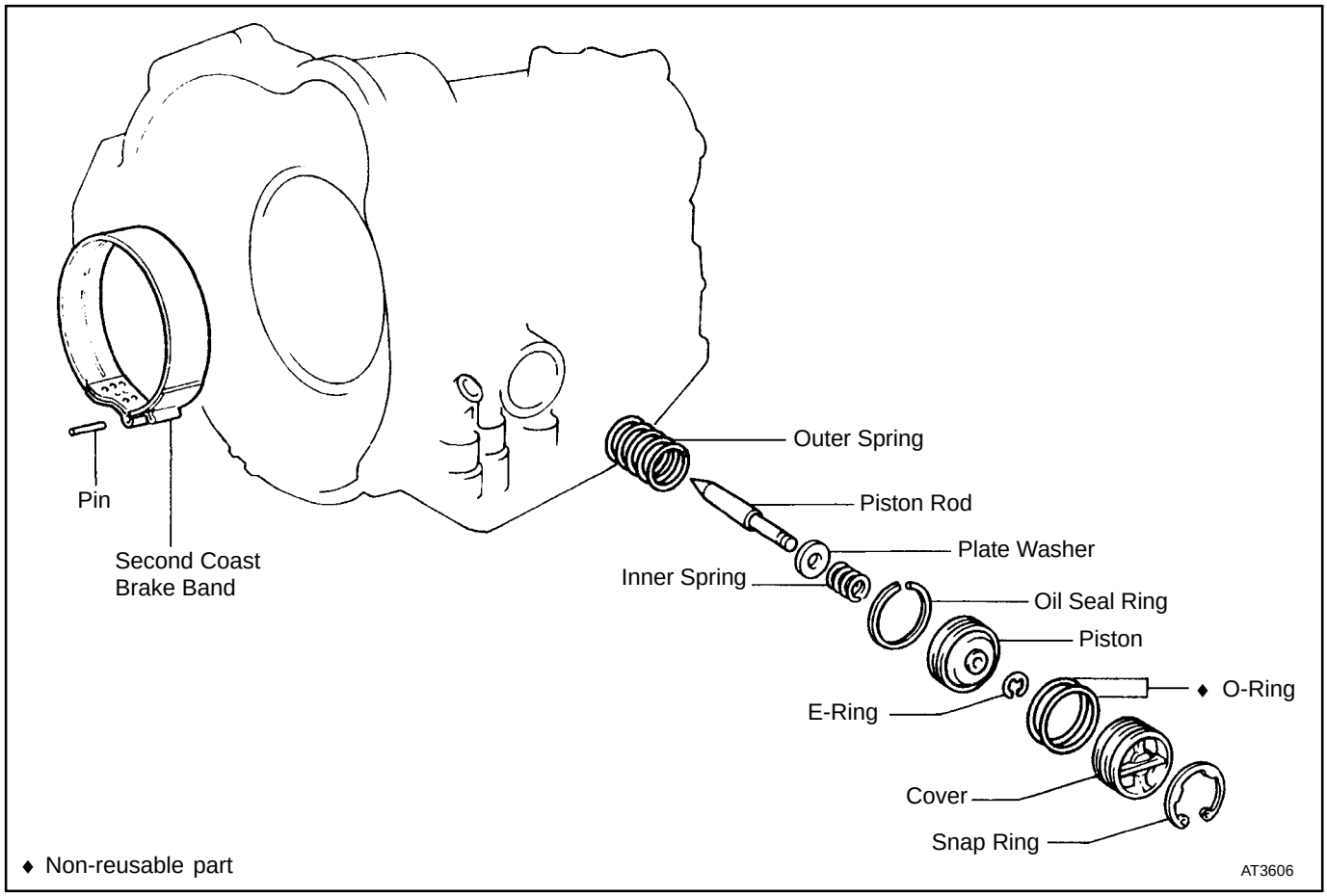
(d) If a worn bushing is to be replaced, the subassembly containing that bushing must be replaced.

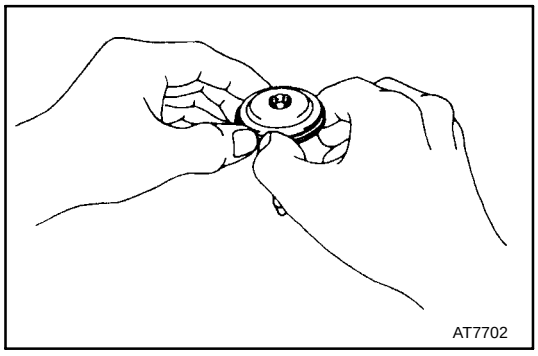
(e) Check thrust bearings and races for wear or damage. Replace if necessary.

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

SECOND COAST BRAKE

COMPONENTS

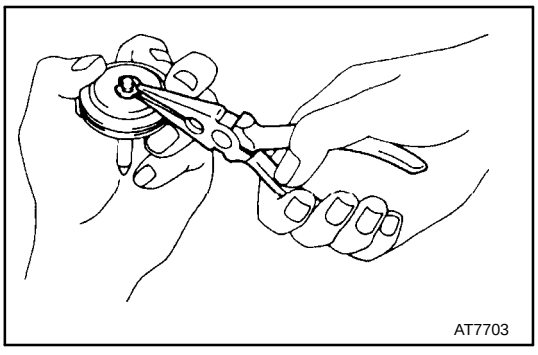




SECOND COAST BRAKE PISTON DISASSEMBLY

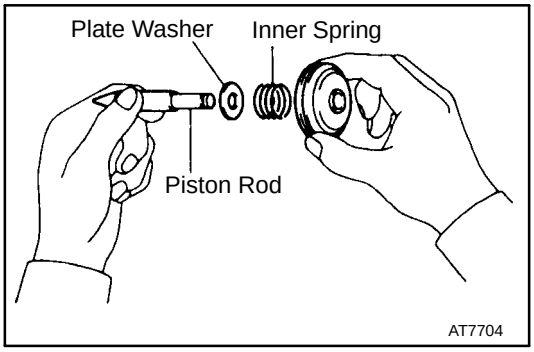
1. REMOVE OIL SEAL RING

Remove the oil seal ring from the piston.

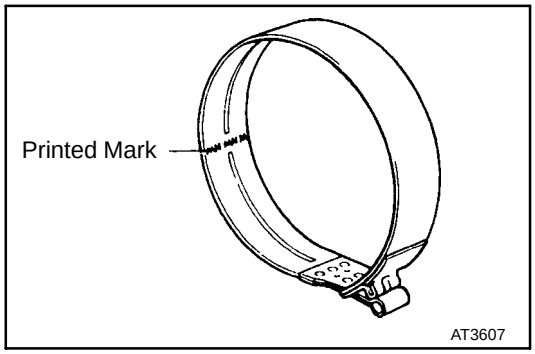


2. REMOVE PISTON ROD

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

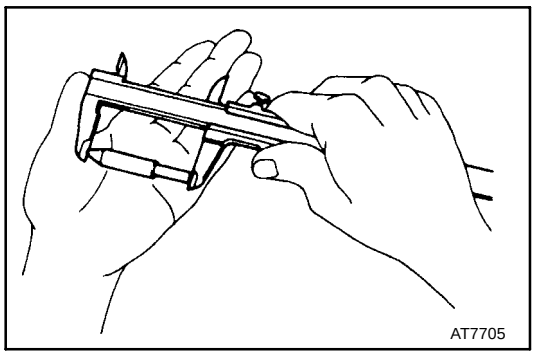


(b) Remove the inner spring, plate washer and piston rod.



SECOND COAST BRAKE COMPONENT INSPECTION

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



SECOND COAST BRAKE PISTON ASSEMBLY

1. SELECT PISTON ROD

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

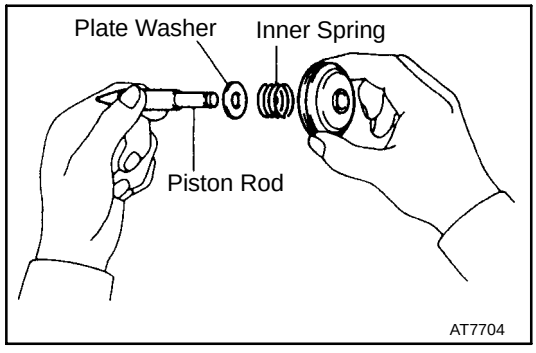
Piston stroke:

2.0 - 3.5 mm (0.079 - 0.138 in.)

There are two lengths of piston rod.

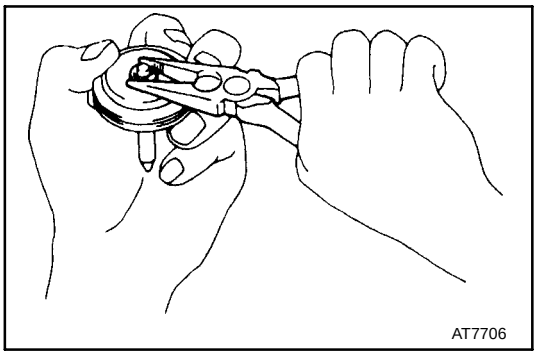
Piston rod length:

95.2 mm (3.748 in.)
96.3 mm (3.791 in.)

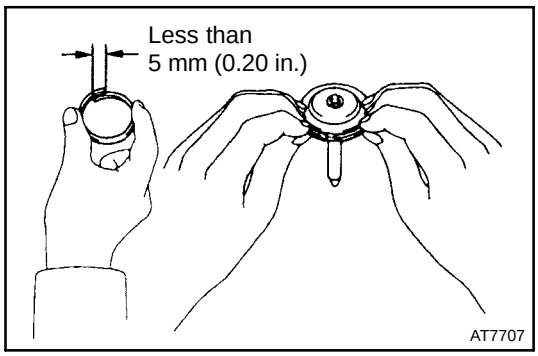


2. INSTALL PISTON ROD

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



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



3. INSTALL OIL SEAL RING

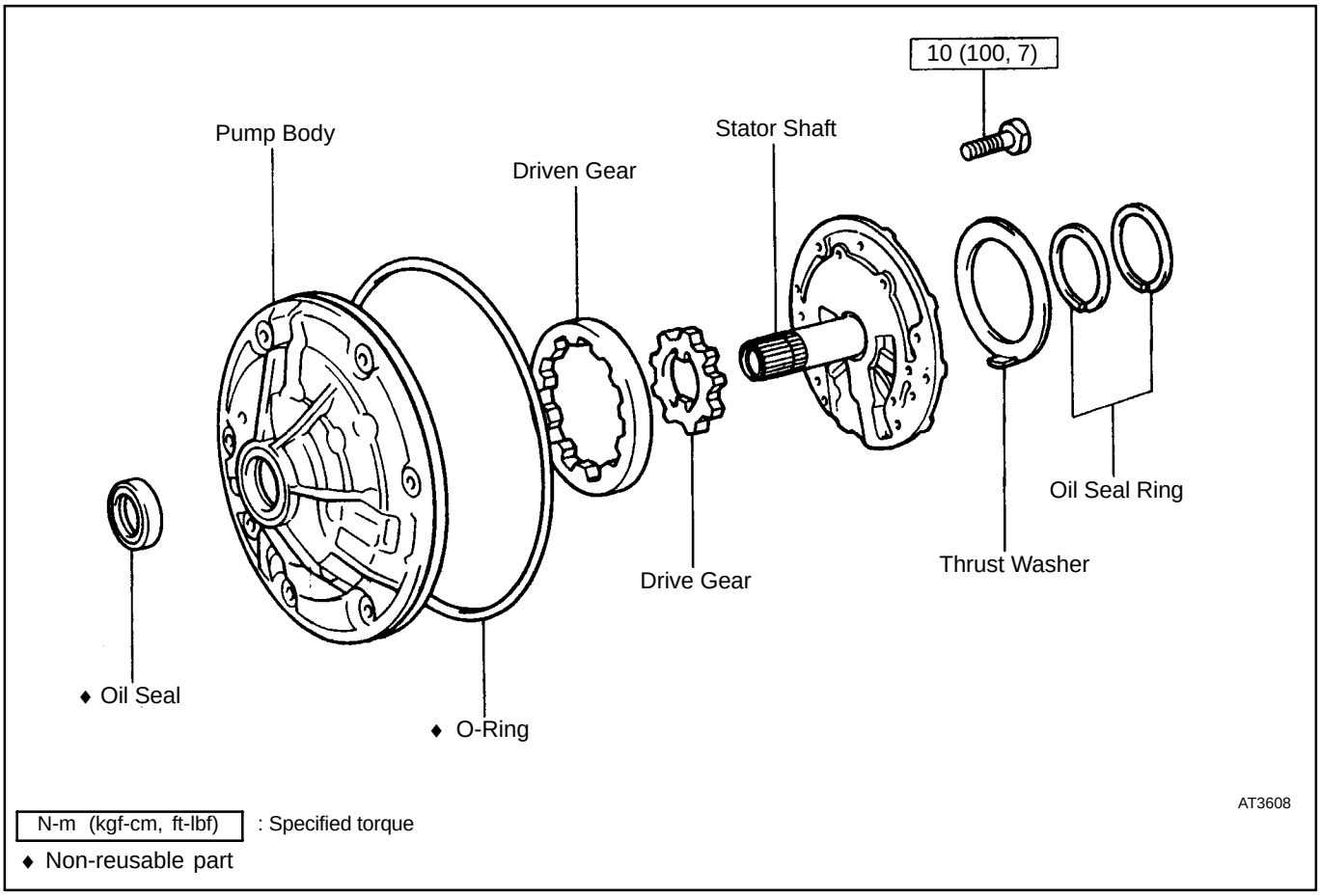
(a) Apply ATF to the oil seal ring.

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

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

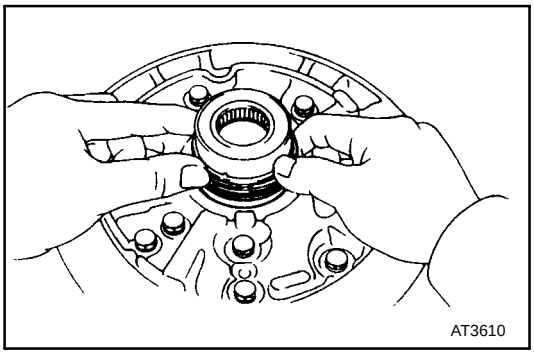
OIL PUMP

COMPONENTS



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

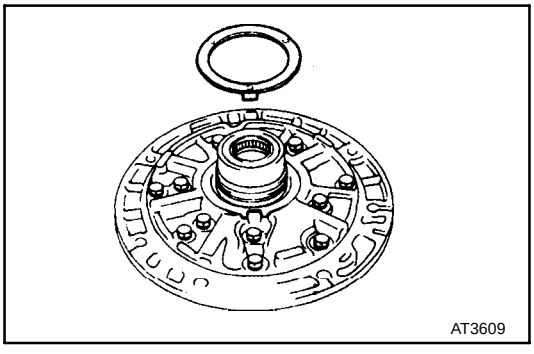
♦ Non-reusable part



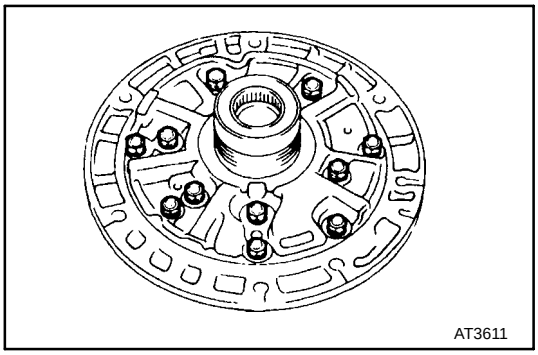
OIL PUMP DISASSEMBLY

1. REMOVE OIL SEAL RINGS

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

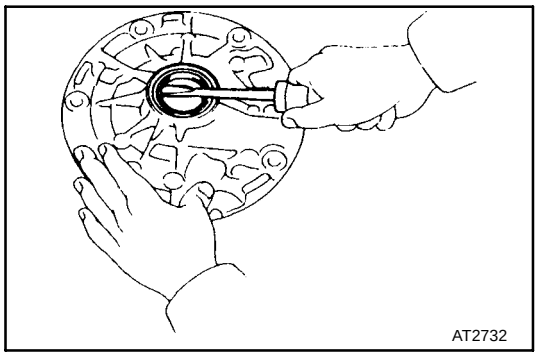


2. REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE



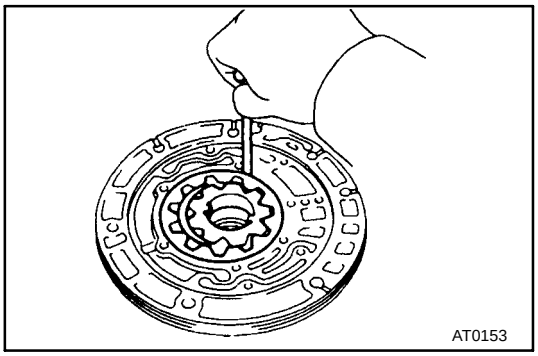
3. REMOVE STATOR SHAFT

Remove the eleven bolts and stator shaft.
HINT: Keep the gears in assembly order.



4. REMOVE FRONT OIL SEAL

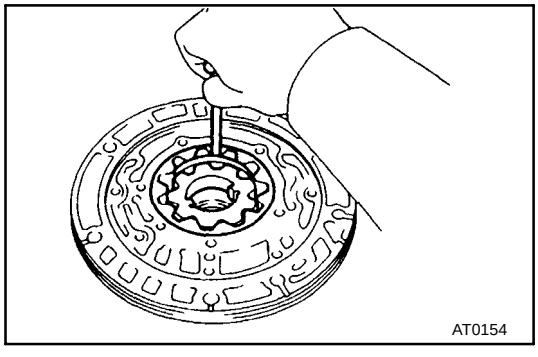
Pry off the oil seal with a screwdriver.



OIL PUMP BUSHING INSPECTION

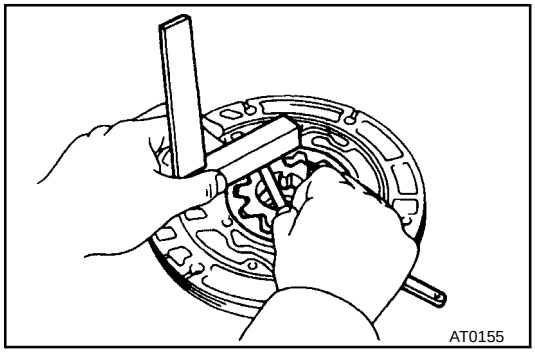
1. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body.
Using a feeler gauge, measure the clearance.
Standard body clearance:
0.07 - 0.15 mm (0.0028 - 0.0059 in.)
Maximum body clearance:
0.3 mm (0.012 in.)
If the body clearance is greater than the maximum, replace the oil pump body subassembly.



2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure between the driven gear teeth and the crescent-shaped part of the pump body.
Standard tip clearance:
0.11 - 0.14 mm (0.0043 - 0.0055 in.)
Maximum tip clearance:
0.3 mm (0.012 in.)
If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



3. CHECK SIDE CLEARANCE OF BOTH GEARS

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

Standard side clearance:

0.002 - 0.005 mm (0.0008 - 0.0020 in.)

Maximum side clearance:

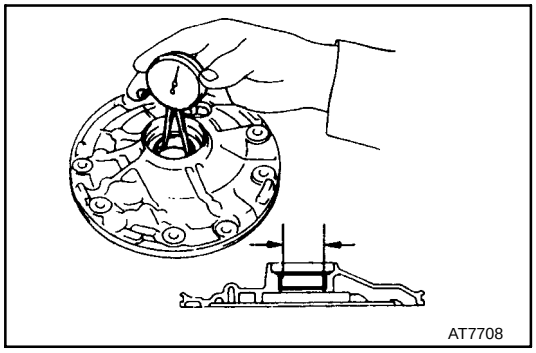
0.1 mm (0.004 in.)

There are three different thickness for drive and driven gears.

Drive and driven gear thickness:

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

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



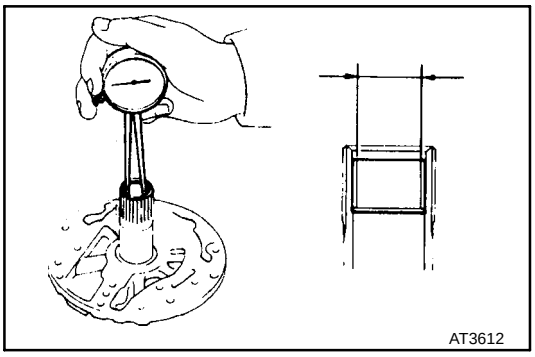
4. CHECK OIL PUMP BODY BUSHING

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

Maximum inside diameter:

38.18 mm (1.5031 in.)

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



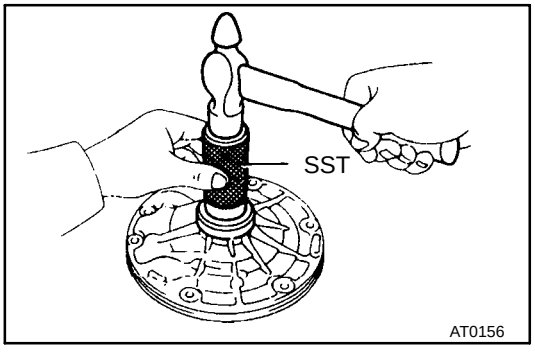
5. CHECK STATOR SHAFT BUSHING

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

Maximum inside diameter:

21.57 mm (0.8492 in.)

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

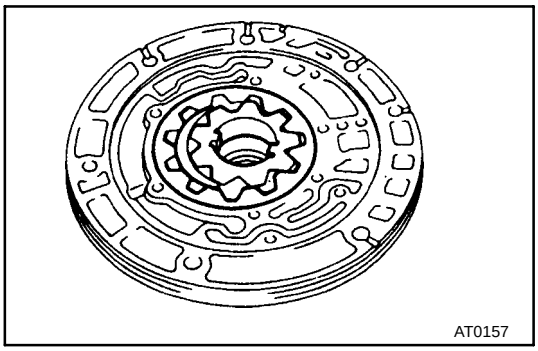


OIL PUMP ASSEMBLY

1. INSTALL FRONT OIL SEAL

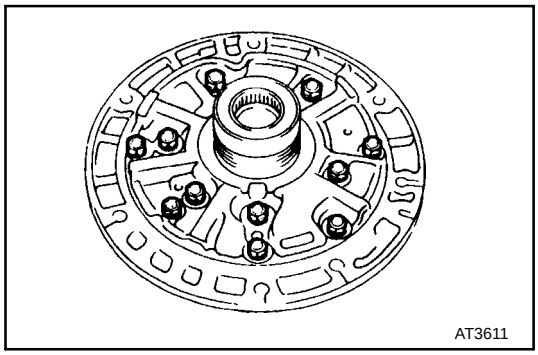
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350-32014 (09351-32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

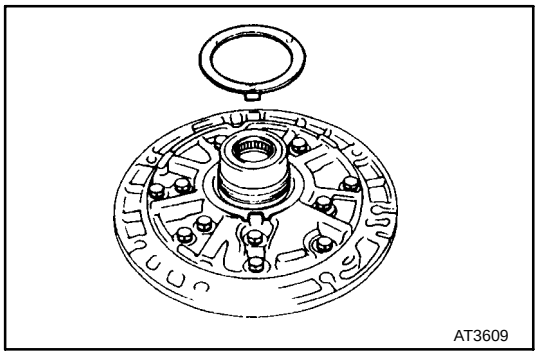


3. INSTALL STATOR SHAFT TO PUMP BODY

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

(b) Torque the eleven bolts.

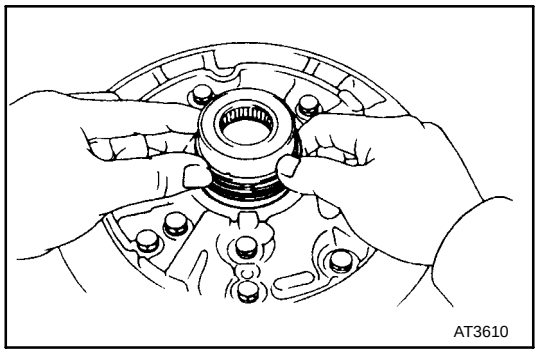
Torque: 10 N-m (100 kgf-cm, 7 ft-lbf)



4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

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

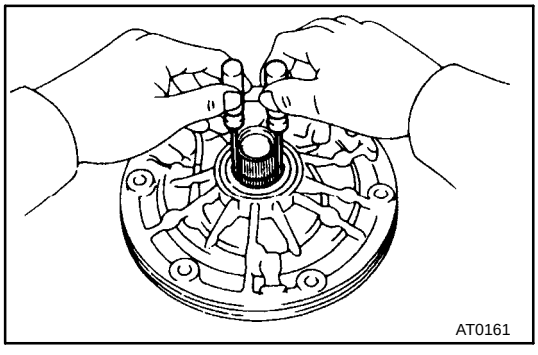


5. INSTALL OIL SEAL RINGS

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

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

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



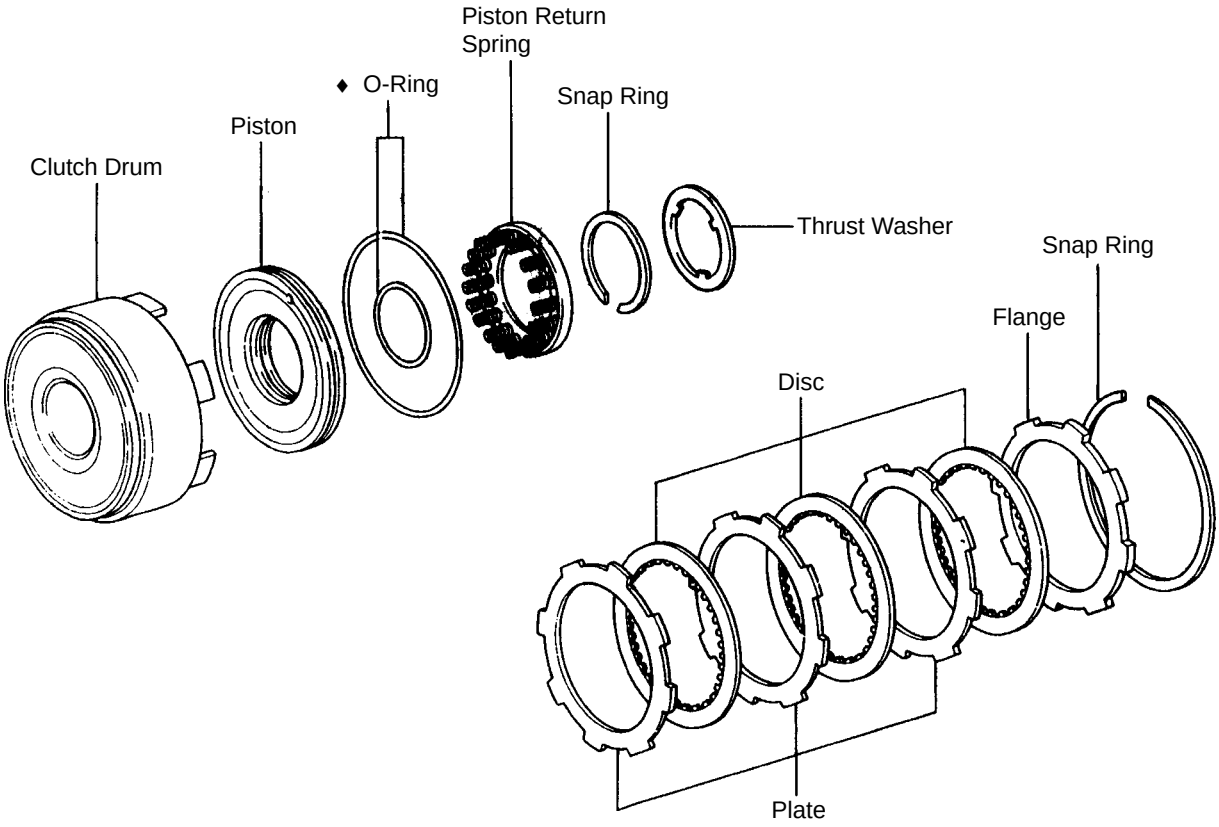
6. CHECK PUMP DRIVE GEAR ROTATION

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

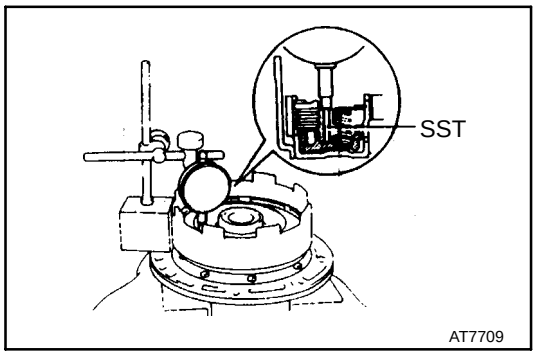
NOTICE: Be careful not to damage the oil seal lip.

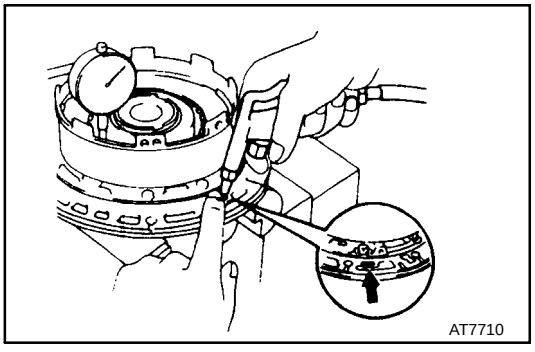
DIRECT CLUTCH

COMPONENTS



♦ Non-reusable part





DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

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

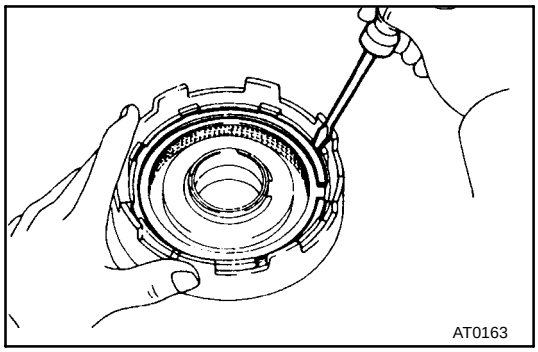
(b) Using a dial indicator (long type pick or SST), measure the direct clutch piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kg/cm^2, 57-114 psi), as shown.

SST 09350-32014 (09351-32190)

Piston stroke:

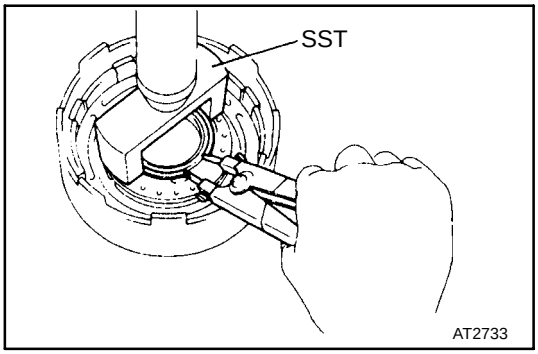
0.91 - 1.35 mm (0.0358 - 0.0531 in.)

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



2. REMOVE SNAP RING FROM CLUTCH DRUM

3. REMOVE FLANGE, DISCS AND PLATES

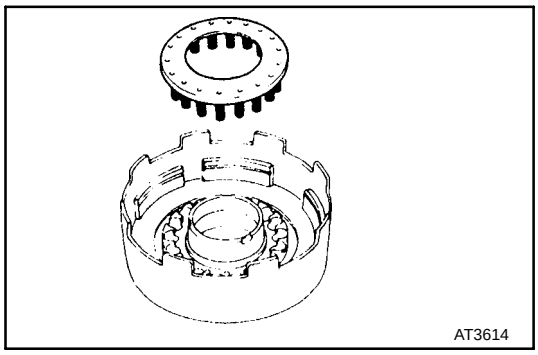


4. REMOVE PISTON RETURN SPRING

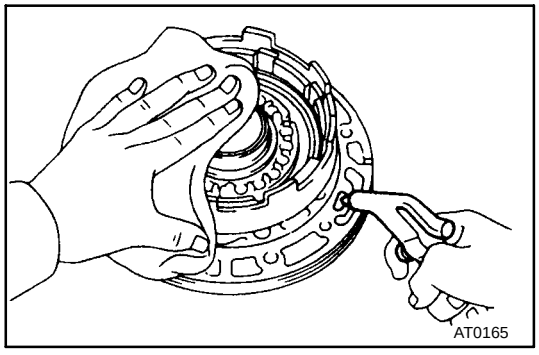
(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

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



(c) Remove the piston return spring.

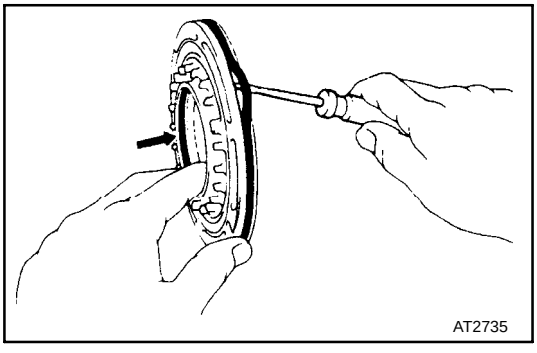


5. REMOVE CLUTCH PISTON

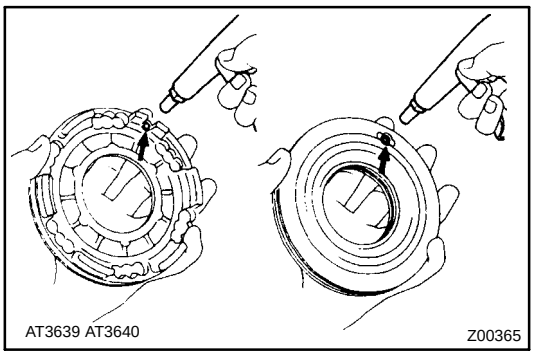
(a) Install the direct clutch onto the oil pump.

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

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



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

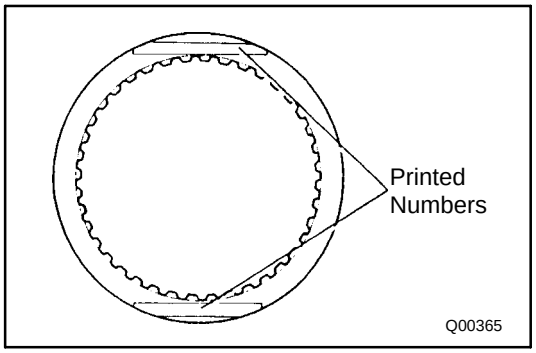


DIRECT CLUTCH INSPECTION

1. INSPECT CLUTCH PISTON

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

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

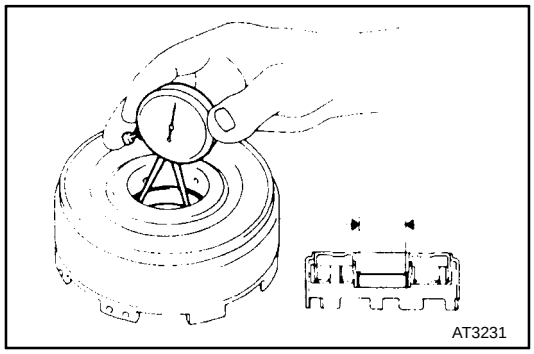


2. INSPECT DISCS, PLATES AND FLANGE

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

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

® Before assembling new discs, soak them in ATF for at least fifteen minutes.



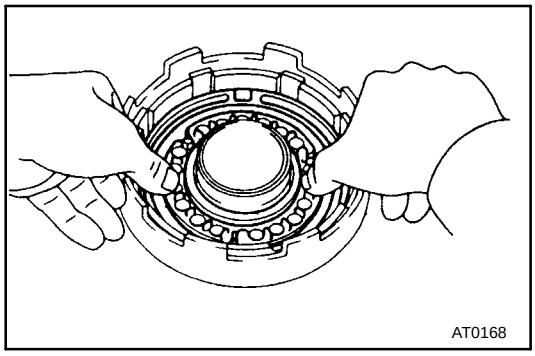
3. CHECK DIRECT CLUTCH BUSHING

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

Maximum inside diameter:

48.27 mm (1.9004 in.)

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

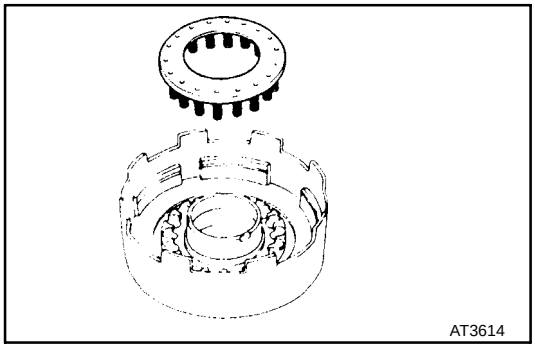


DIRECT CLUTCH ASSEMBLY

1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM

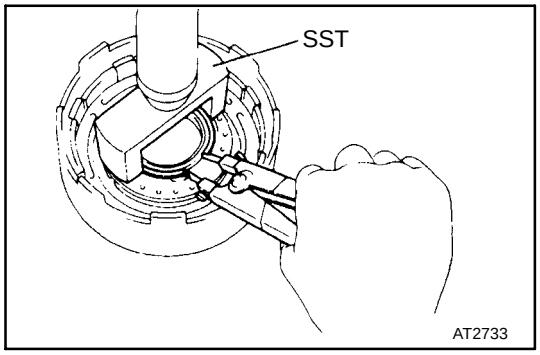
(a) Install new O-rings to the piston. Coat the O-rings with ATF.

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



2. INSTALL PISTON RETURN SPRING

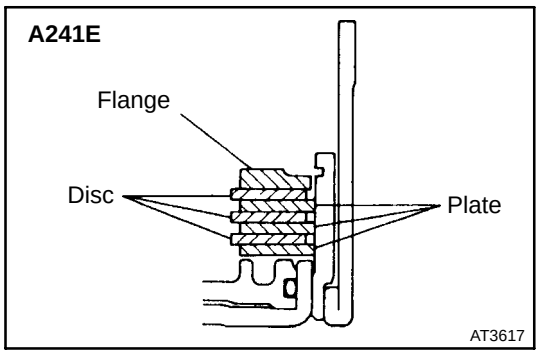
(a) Place the return spring and snap ring onto the piston.



(b) Place SST on the spring retainer, and compress the return spring with a shop press.

SST 09350-32014 (09351-32070)

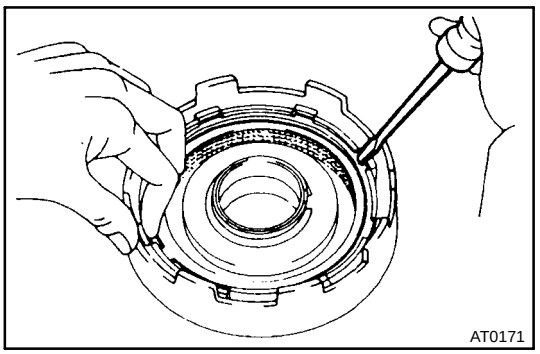
(c) Install the snap ring using snap ring pliers. Be sure the end gap of snap ring is aligned with the spring retainer claw.



3. INSTALL PLATES, DISCS AND FLANGE

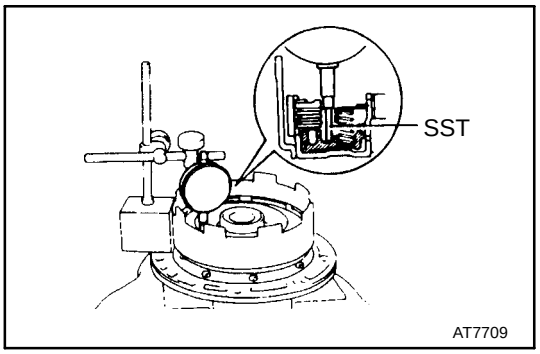
(a) Install plates and discs.
Install in order:
P = Plate D=Disc
P-D-P-D-P-D

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



4. INSTALL SNAP RING

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



5. RECHECK PISTON STROKE OF DIRECT CLUTCH

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

(b) Using a dial indicator (long type pick or SST), measure the direct clutch piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm^2, 57-114 psi), as shown.

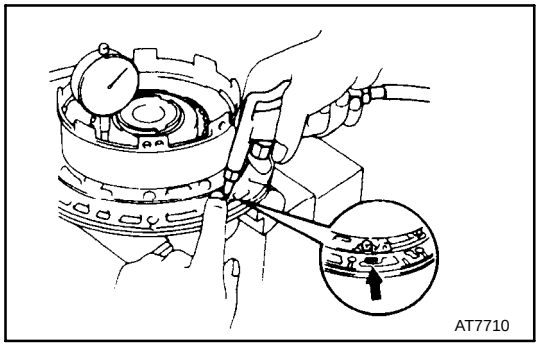
SST 09350-32014 (09351-32190)

Piston stroke:
0.91 - 1.35 mm (0.0358 - 0.0531 in.)

If the piston stroke is nonstandard, select another flange.

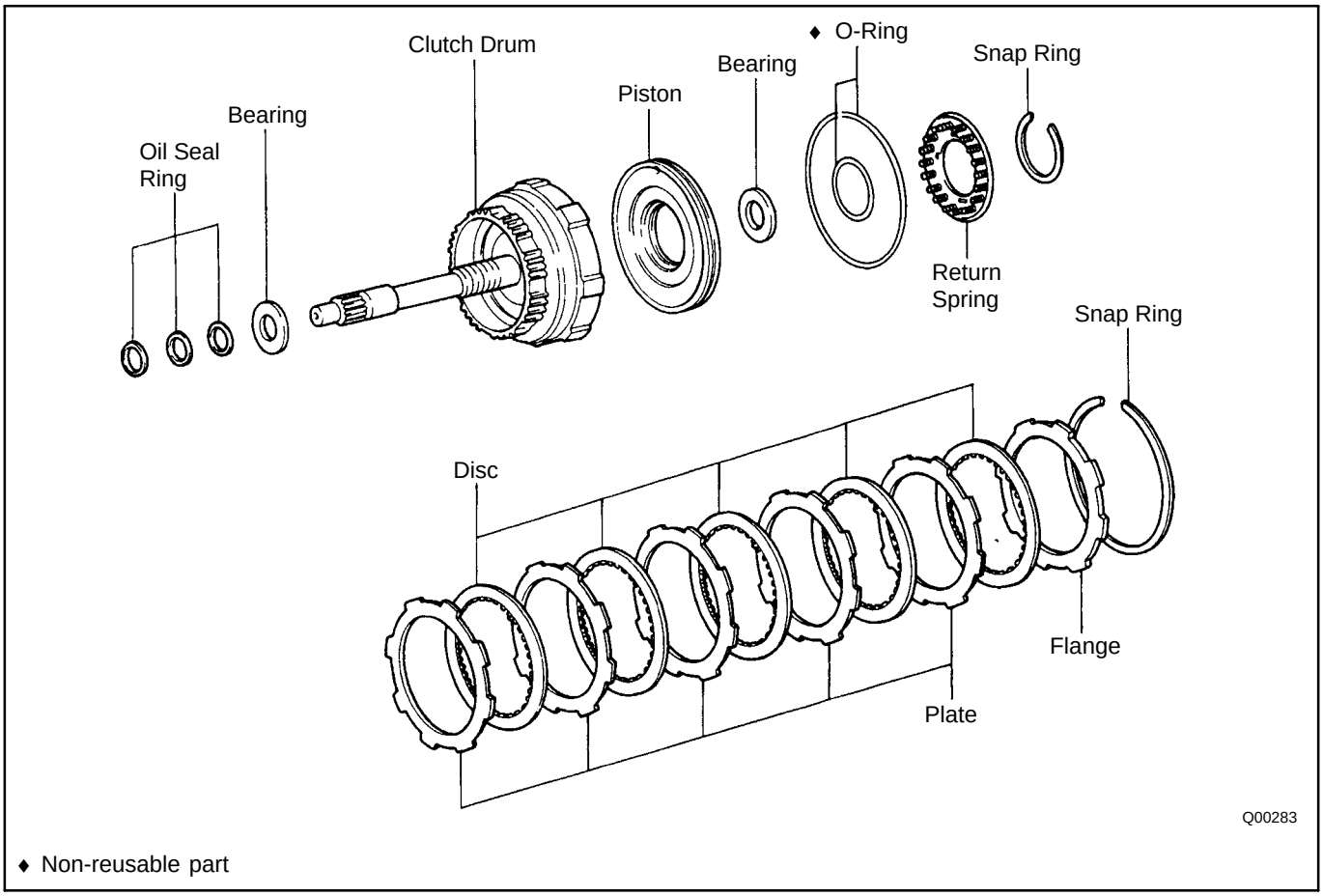
HINT: There are two different thickness for the flange.

Flange thickness:
2.70 mm (0.1063 in.)
3.00 mm (0.1181 in.)

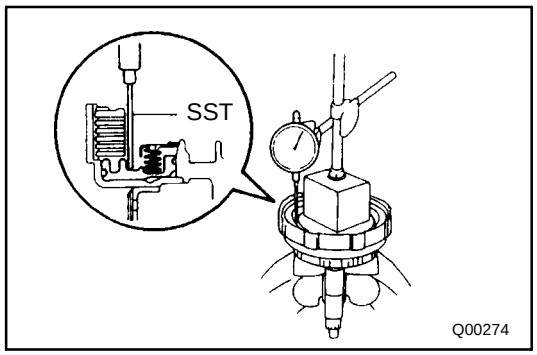


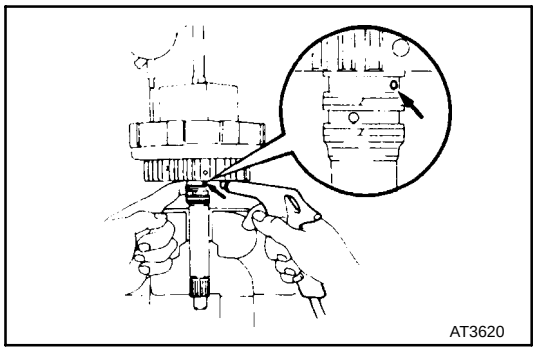
FORWARD CLUTCH

COMPONENTS



♦ Non-reusable part





FORWARD CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF FORWARD CLUTCH

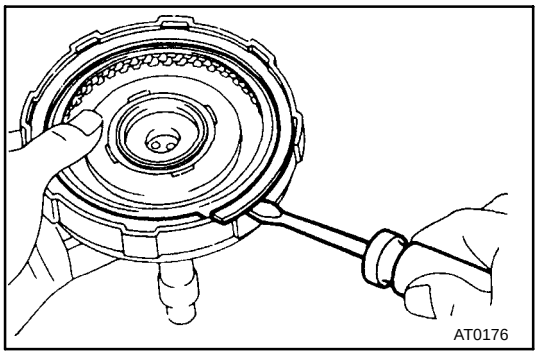
Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm^2, 57 - 114 psi), as shown.

SST 09350-32014 (09351-32190)

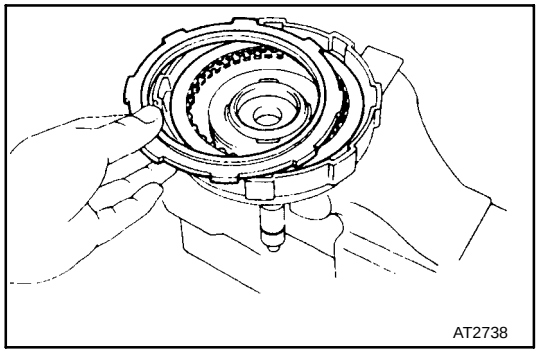
Piston stroke:

1.79 - 2.21 mm (0.0705 - 0.0870 in.)

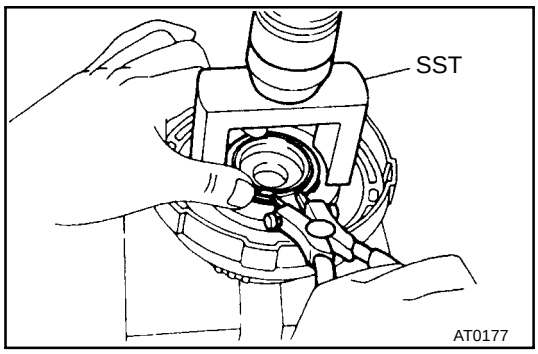
If the piston stroke is greater than the maximum, inspect each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM



3. REMOVE FLANGE, DISCS AND PLATES

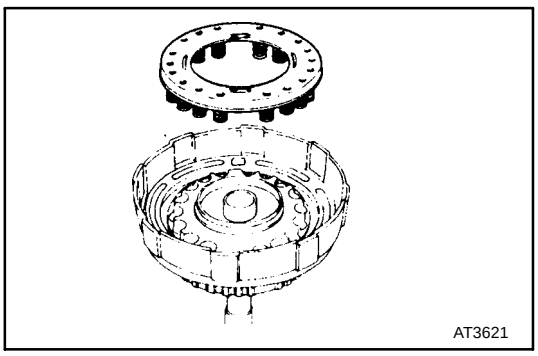


4. REMOVE RETURN SPRING

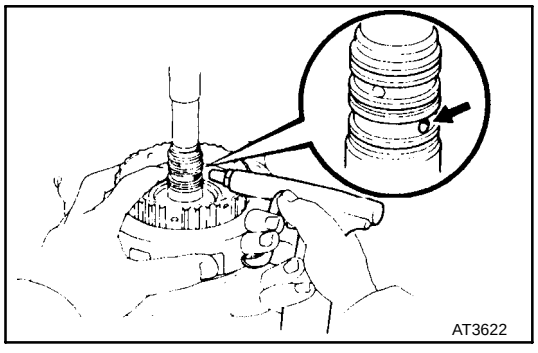
(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

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

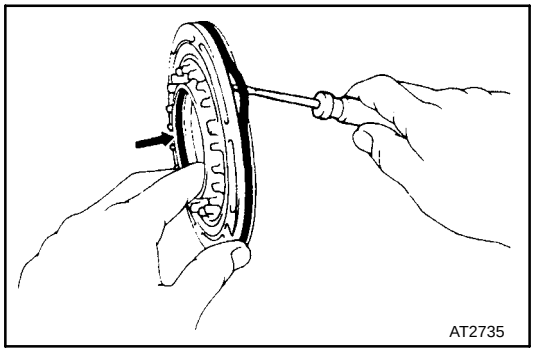


(c) Remove the return spring.

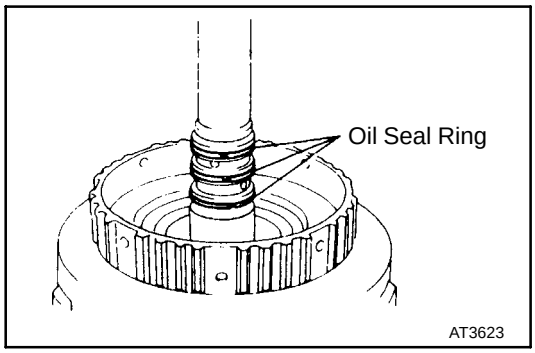


5. REMOVE CLUTCH PISTON

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



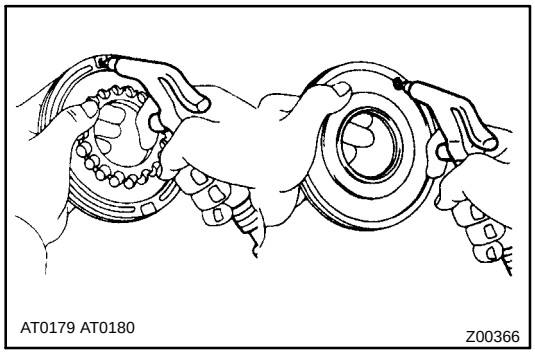
(b) Remove the two O-rings from the piston.



6. IF NECESSARY, REMOVE OIL SEAL RINGS

Remove the three oil seal rings from the shaft.

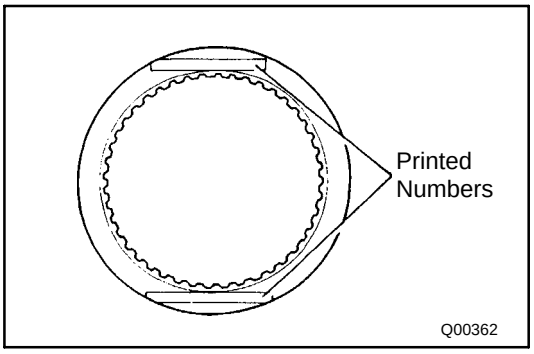
FORWARD CLUTCH INSPECTION



1. INSPECT CLUTCH PISTON

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

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



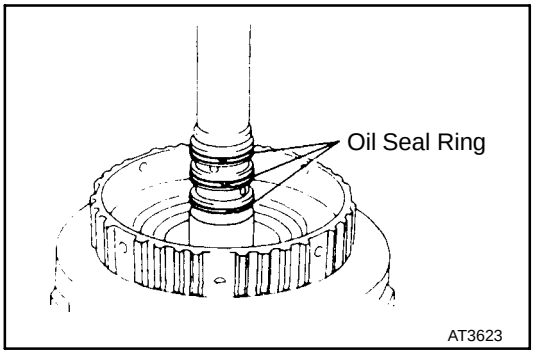
2. INSPECT DISCS, PLATES AND FLANGE

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

HINT:

- If the lining of the disc is peeling off or discolored, or even a part of the printed numbers are defaced, replace all discs.
- Before assembling new disc, soak them in ATF for at least fifteen minutes.

FORWARD CLUTCH ASSEMBLY

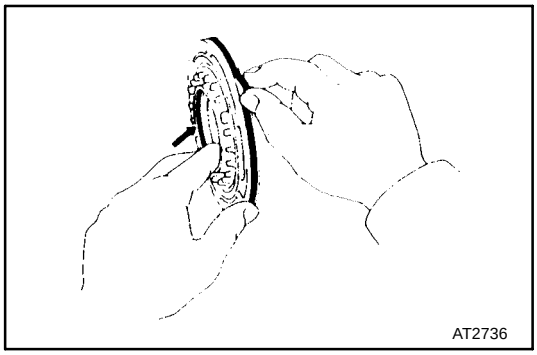


1. INSTALL OIL SEAL RINGS

Install the three oil seal rings to the shaft.

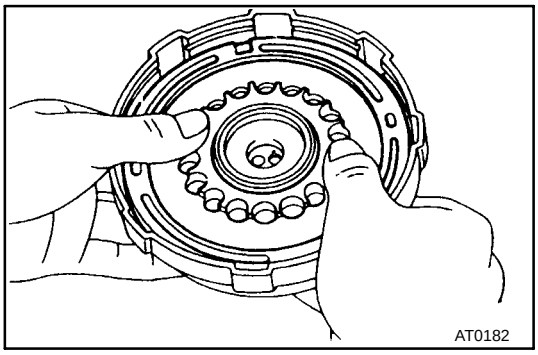
NOTICE: Do not spread the ring ends more than necessary.

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



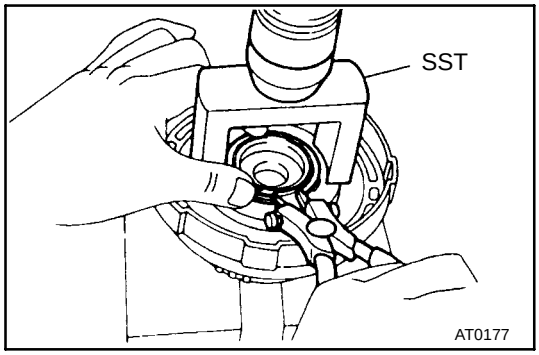
2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

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



(b) Coat the O-ring with ATF.

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



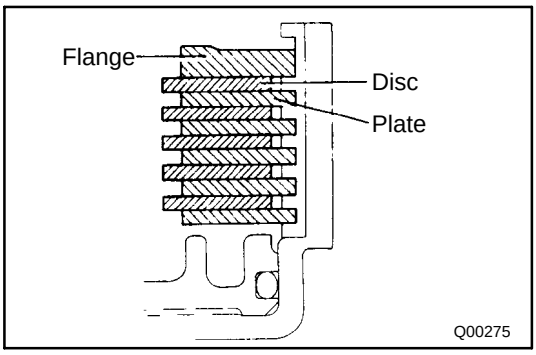
3. INSTALL PISTON RETURN SPRINGS

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

(b) Place SST on the spring retainer, and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

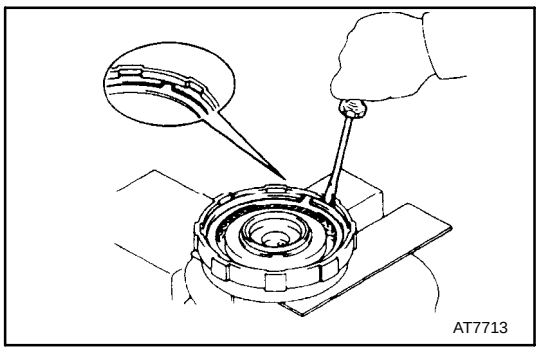
(c) Install the snap ring with snap ring pliers.
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



4. INSTALL PLATES, DISCS AND FLANGE

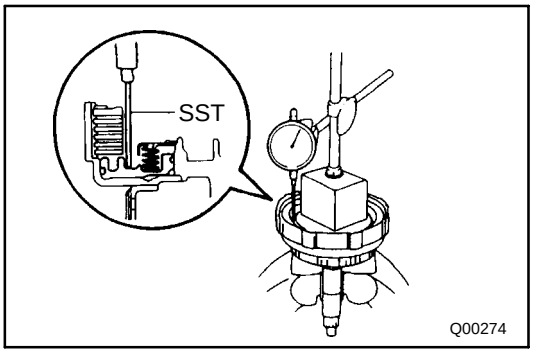
(a) Install the plates and discs.
Install in order:
P = Plate D = Disc
P-D-P-D-P-D-P-D-P-D

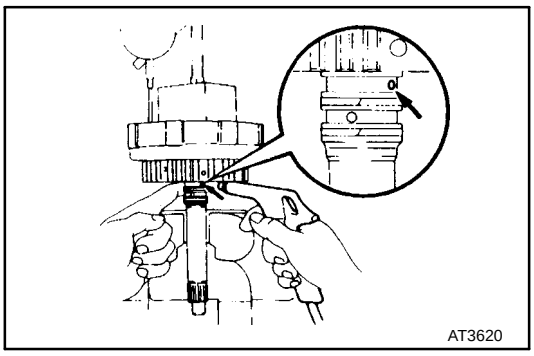
(b) Install the flange with the flat end facing downward.



5. INSTALL SNAP RING

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





6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm^2, 57 - 114 psi), as shown.

SST 09350-32014 (09351-32190)

Piston stroke:

1.79 - 2.21 mm (0.0705 - 0.0870 in.)

If the piston stroke is nonstandard, select another flange.

HINT: There are two different thicknesses for the flange.

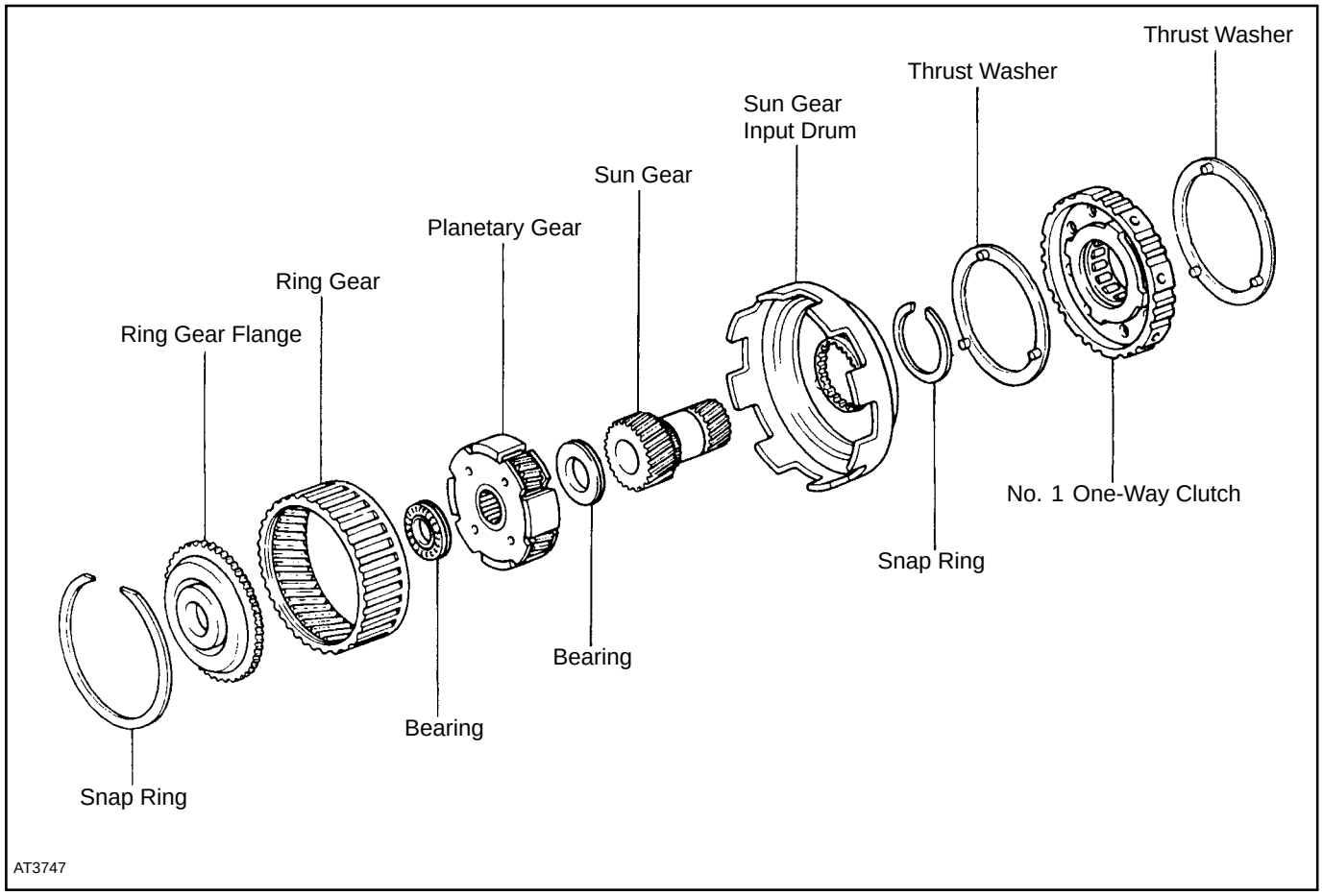
Flange thickness:

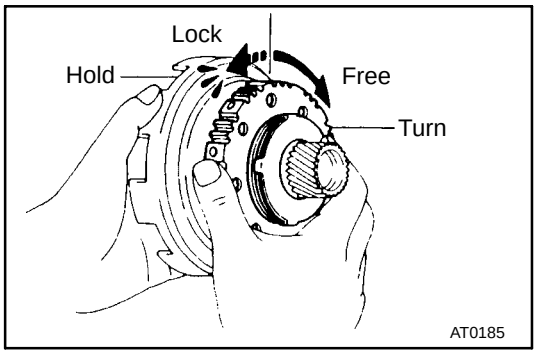
2.30 mm (0.0906 in.)

2.70 mm (1.0630 in.)

FRONT PLANETARY GEAR

COMPONENTS

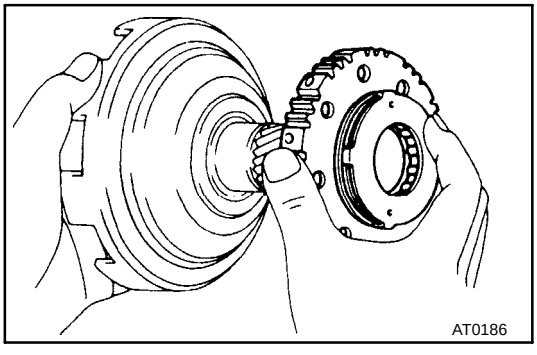




NO. 1 ONE-WAY CLUTCH AND SUN GEAR DISASSEMBLY

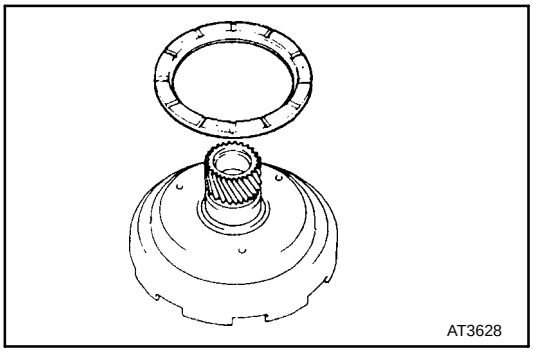
1. CHECK OPERATION OF NO. 1 ONE-WAY CLUTCH

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

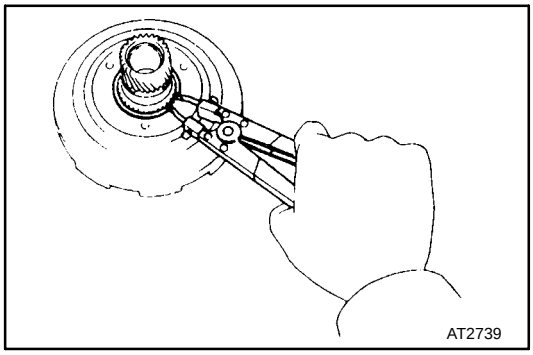


2. REMOVE NO. 1 ONE-WAY CLUTCH FROM SUN GEAR

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



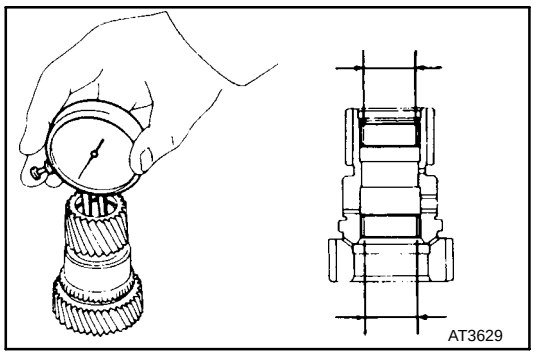
3. REMOVE THRUST WASHER FROM SUN GEAR INPUT DRUM



4. REMOVE SUN GEAR FROM DRUM

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

(b) Remove the sun gear from the drum.



5. CHECK SUN GEAR BUSHINGS

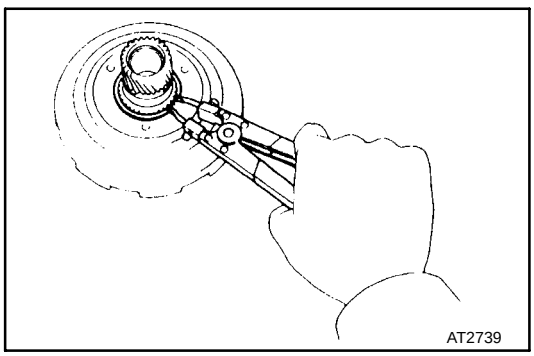
Using a dial indicator, measure the inside diameter of the sun gear bushings.

Maximum inside diameter:

22.59 mm (0.08894 in.)

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

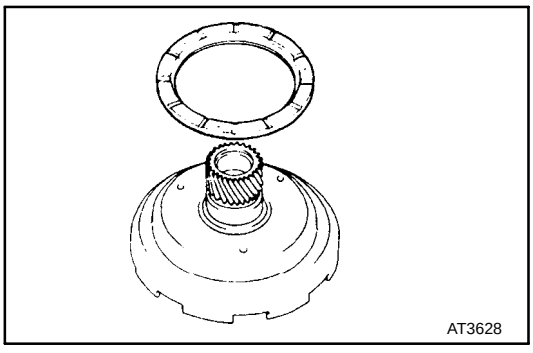
NO. 1 ONE-WAY CLUTCH AND SUN GEAR ASSEMBLY



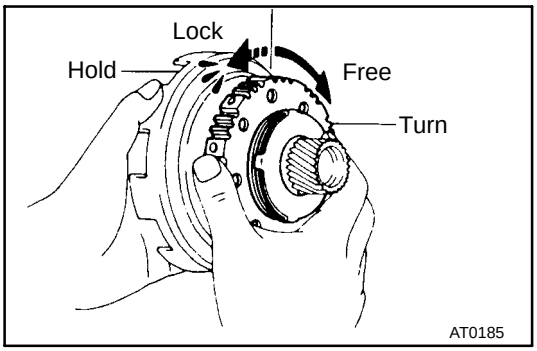
1. INSTALL SUN GEAR TO DRUM

(a) Install the sun gear to the drum.

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



2. INSTALL THRUST WASHER TO SUN GEAR INPUT DRUM

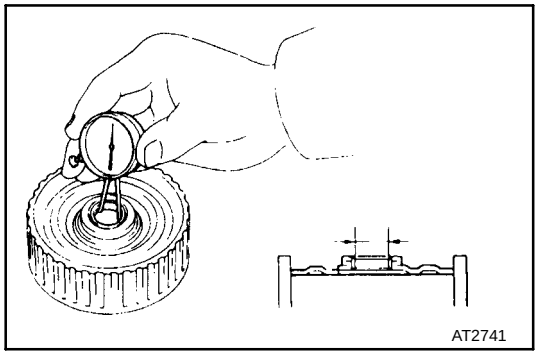


3. INSTALL NO. 1 ONE-WAY CLUTCH ON SUN GEAR

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

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

PLANETARY RING GEAR INSPECTION



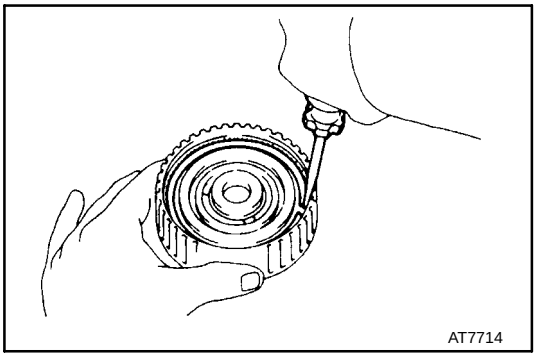
1. INSPECT RING GEAR FLANGE BUSHING

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

Maximum inside diameter:

30.08 mm (1.1842 in.)

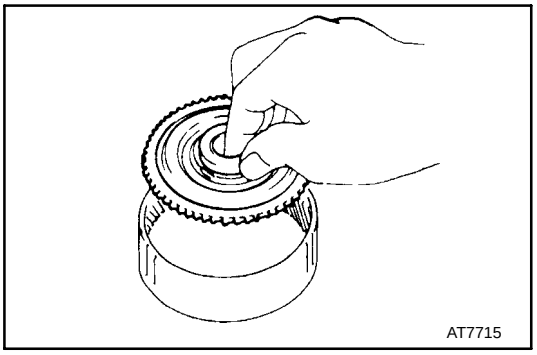
If the inside diameter is greater then the maximum, replace the flange.



2. REMOVE RING GEAR FLANGE

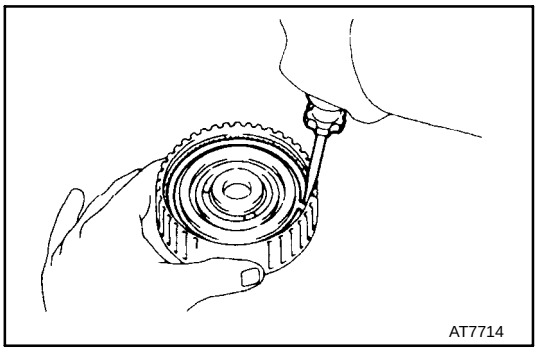
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange from the ring gear.

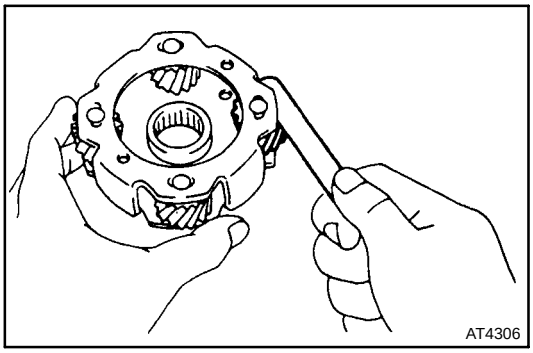


3. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.



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



FRONT PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

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

Standard clearance:

0.16 - 0.56 mm (0.0063 - 0.0220 in.)

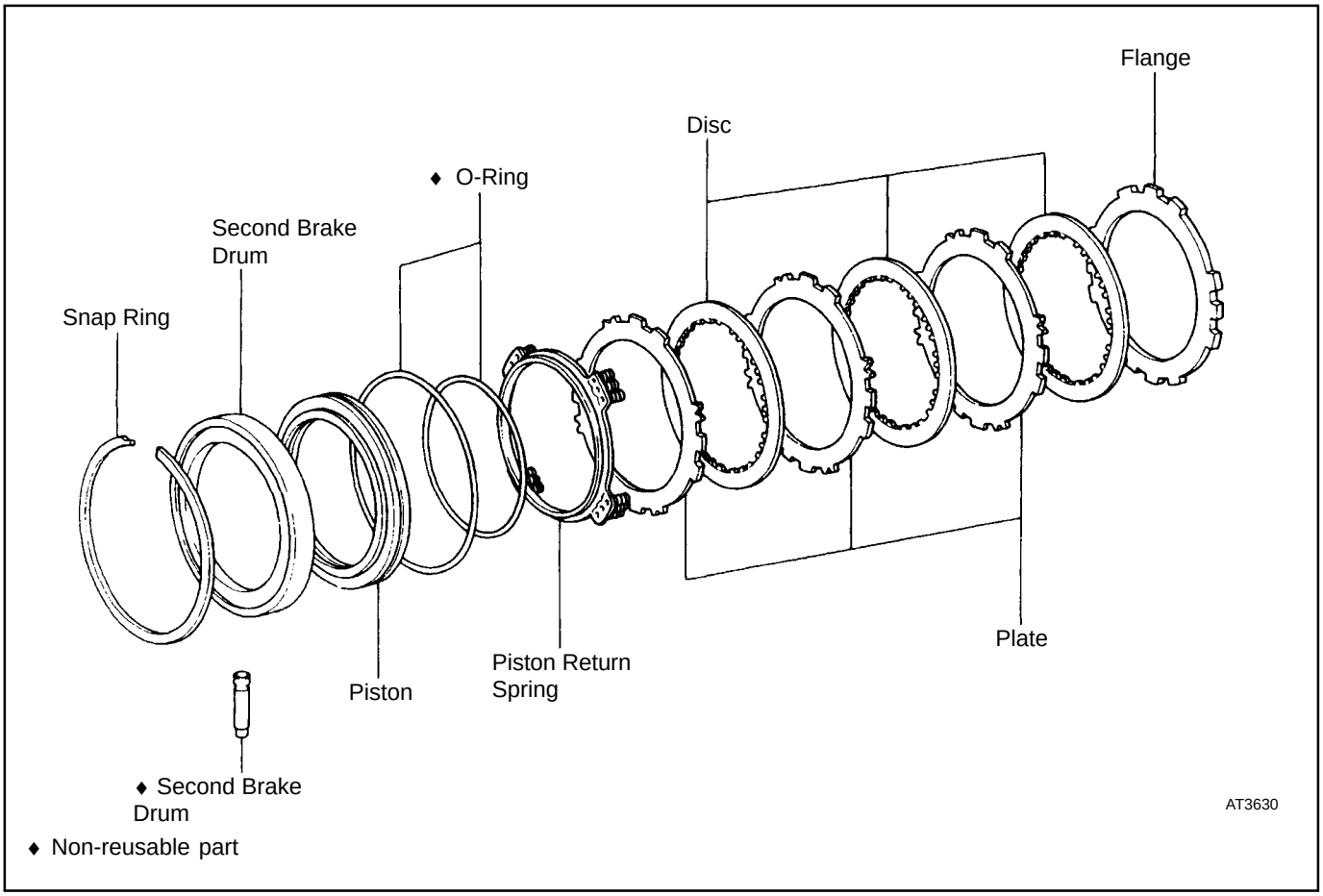
Maximum clearance:

0.61 mm (0.0240 in.)

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

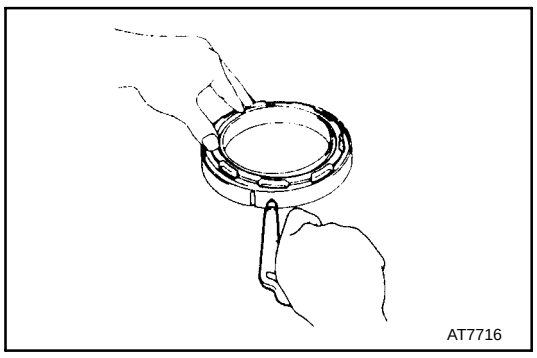
SECOND BRAKE

COMPONENTS

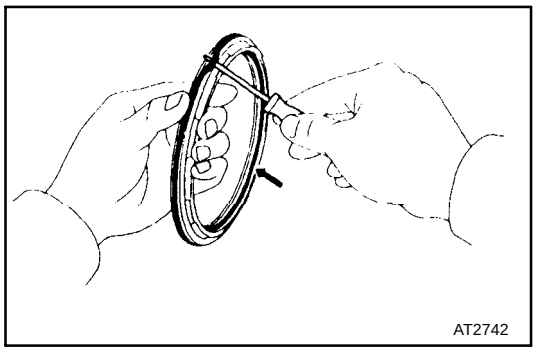


SECOND BRAKE PISTON DISASSEMBLY

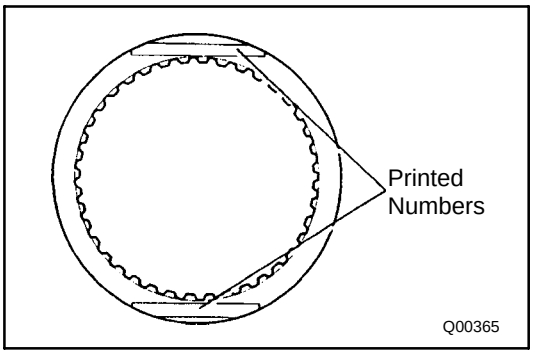
REMOVE SECOND BRAKE PISTON



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



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

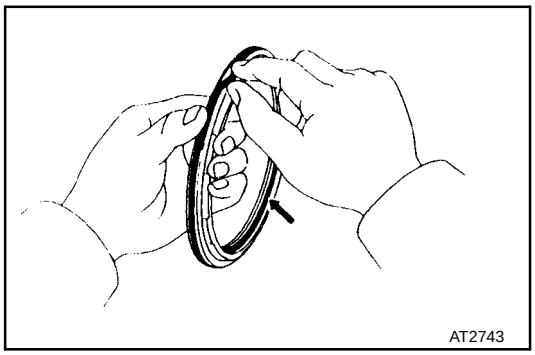


SECOND BRAKE COMPONENT INSPECTION

INSPECT DISCS, PLATES AND FLANGE

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

- ® If the lining of the disc is peeling off or discolored, or even a part of the printed numbers are defaced, replace all discs.
- ® Before assembling new discs, soak them in ATF for at least fifteen minutes.

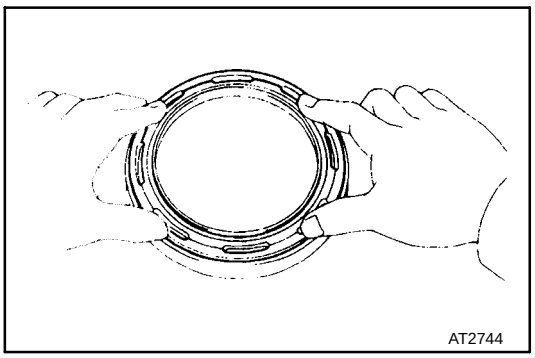


SECOND BRAKE PISTON ASSEMBLY

INSTALL PISTON

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

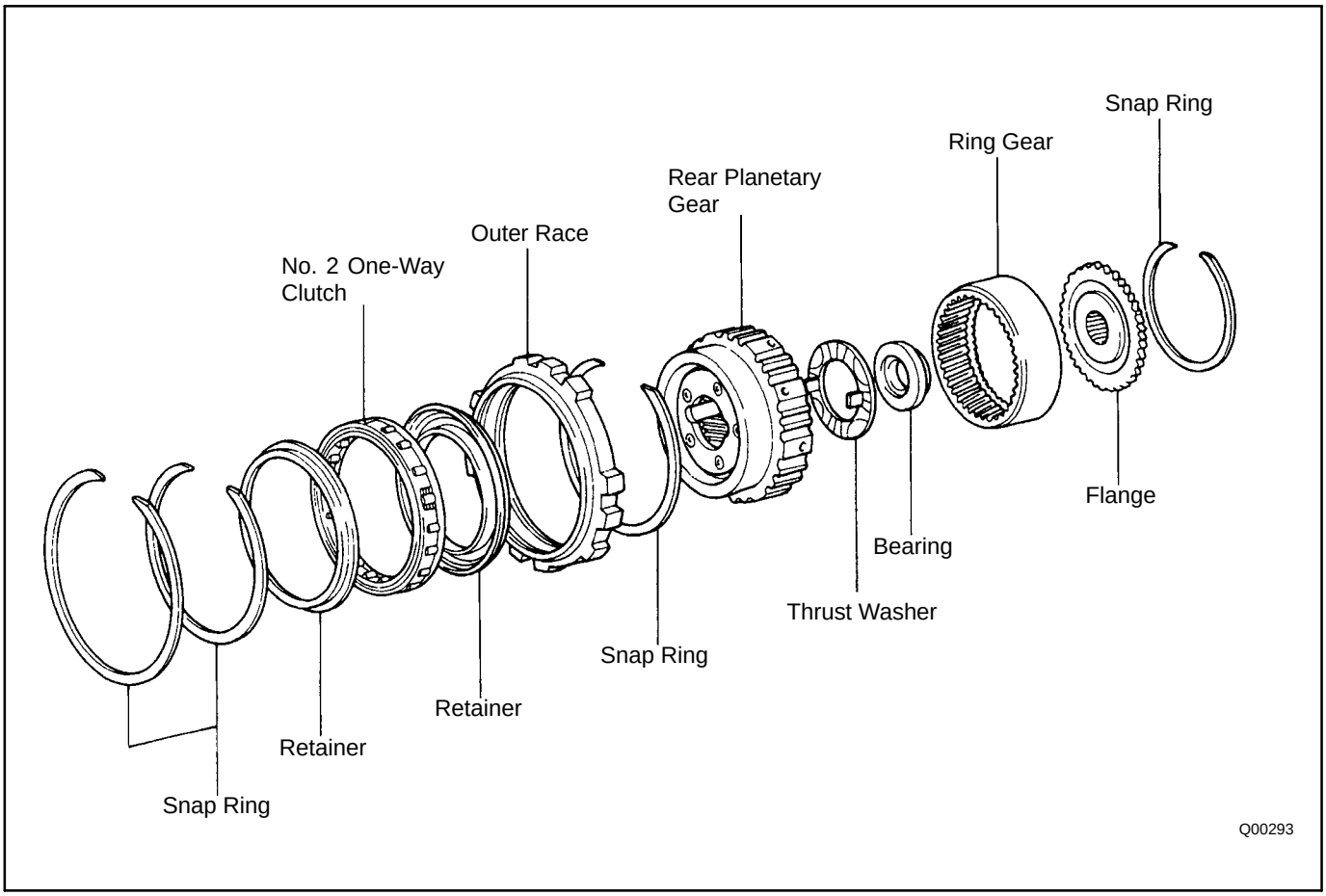
(b) Install the two O-rings on the piston.

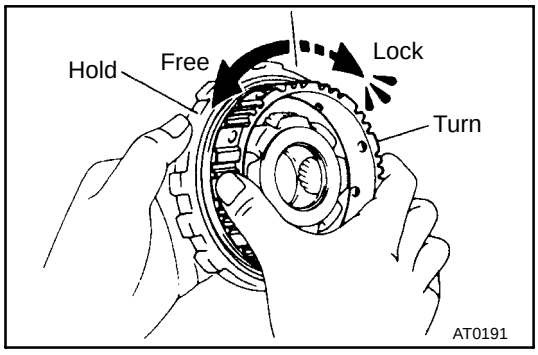


(c) Press the piston into the drum, being careful not to damage the O-rings.

REAR PLANETARY GEAR

COMPONENTS

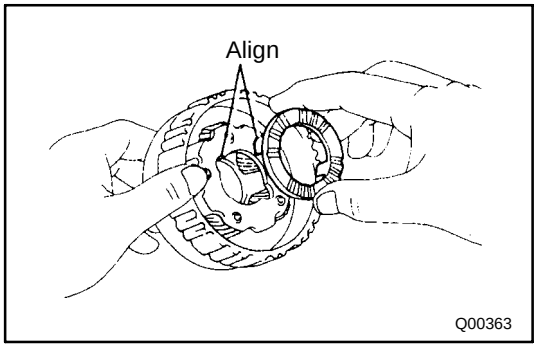




NO. 2 ONE-WAY CLUTCH DISASSEMBLY

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

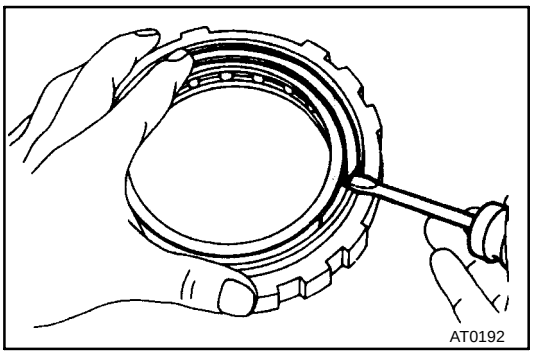
Hold the outer race and turn the rear planetary gear. The rear planetary gear should turn freely counter-clockwise and should lock clockwise.



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

3. REMOVE THRUST WASHER

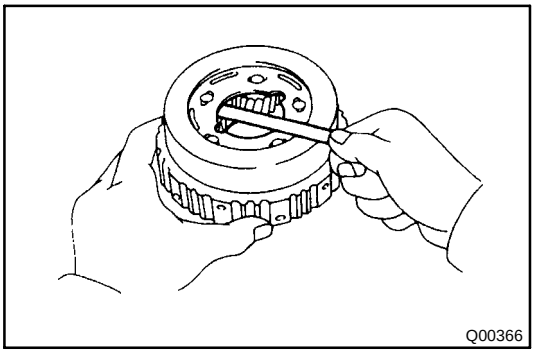
Remove the thrust washer from the rear side of planetary gear.



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

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

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



REAR PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

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

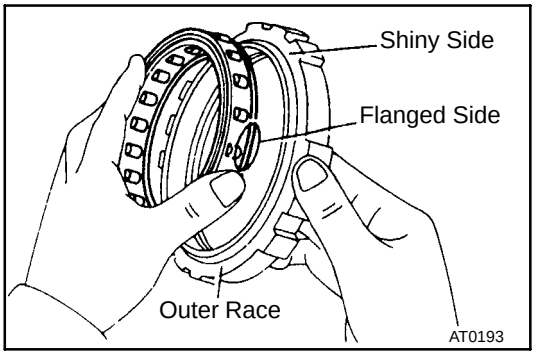
Standard clearance:

0.16 - 0.56 mm (0.0063 - 0.0220 in.)

Maximum clearance:

0.61 mm (0.0240 in.)

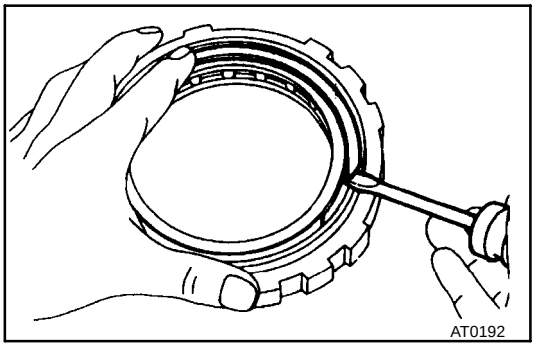
If the clearance is greater than the maximum, replace the planetary gear assembly.



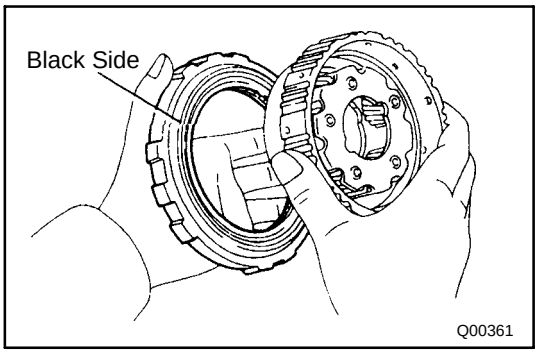
NO. 2 ONE-WAY CLUTCH ASSEMBLY

1. INSTALL ONE-WAY CLUTCH

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

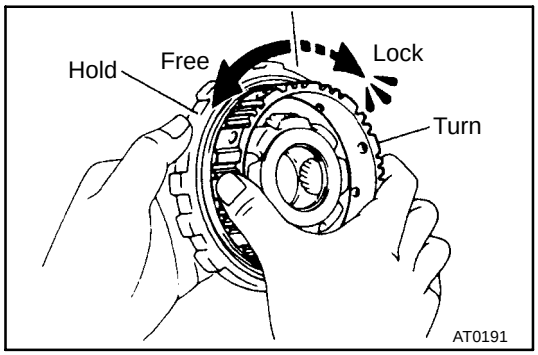


(b) Install the two retainers and snap rings to both sides.

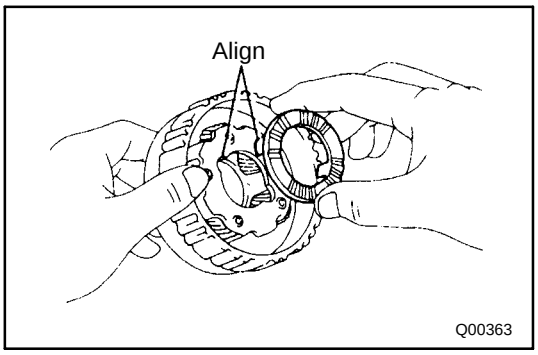


2. INSTALL PLANETARY GEAR INTO NO. 2 ONE-WAY CLUTCH

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



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

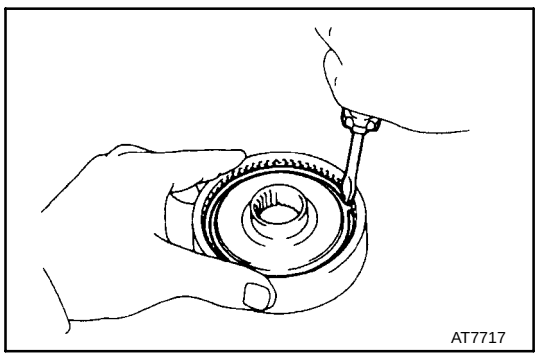


4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

(b) Align the tab of the washer with the hollows of the carrier.

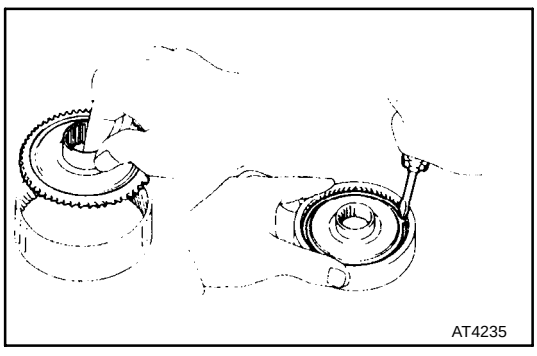
RING GEAR FLANGE REPLACEMENT



1. REMOVE RING GEAR FLANGE

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

(b) Remove the flange from the ring gear.



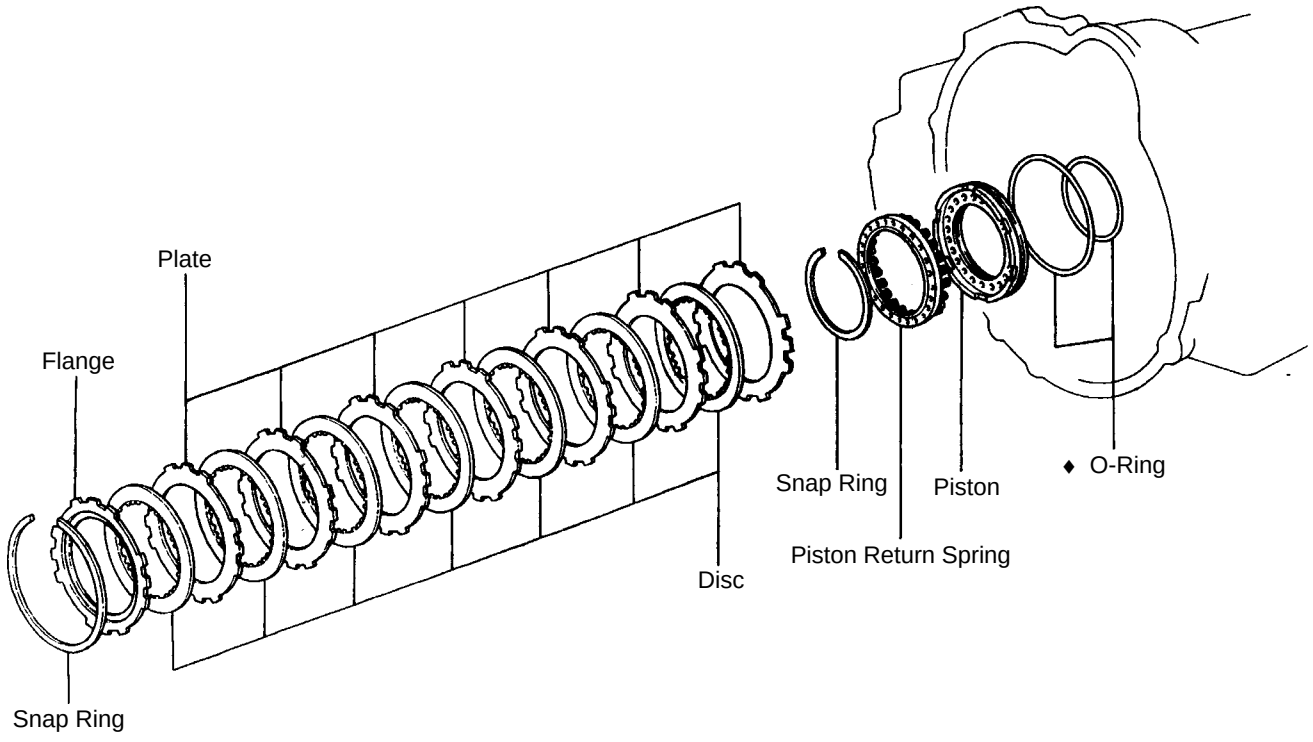
2. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.

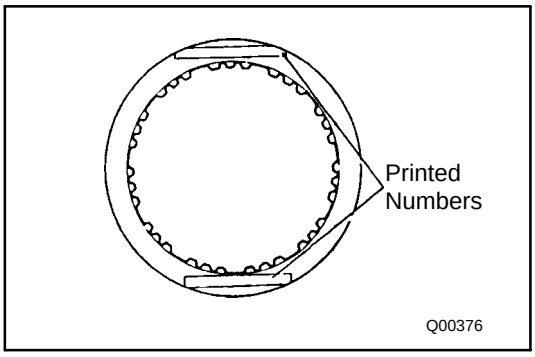
(b) Using a screwdriver, install the snap ring.

FIRST AND REVERSE BRAKE

COMPONENTS



♦ Non-reusable part



FIRST AND REVERSE BRAKE COMPONENTS INSPECTION

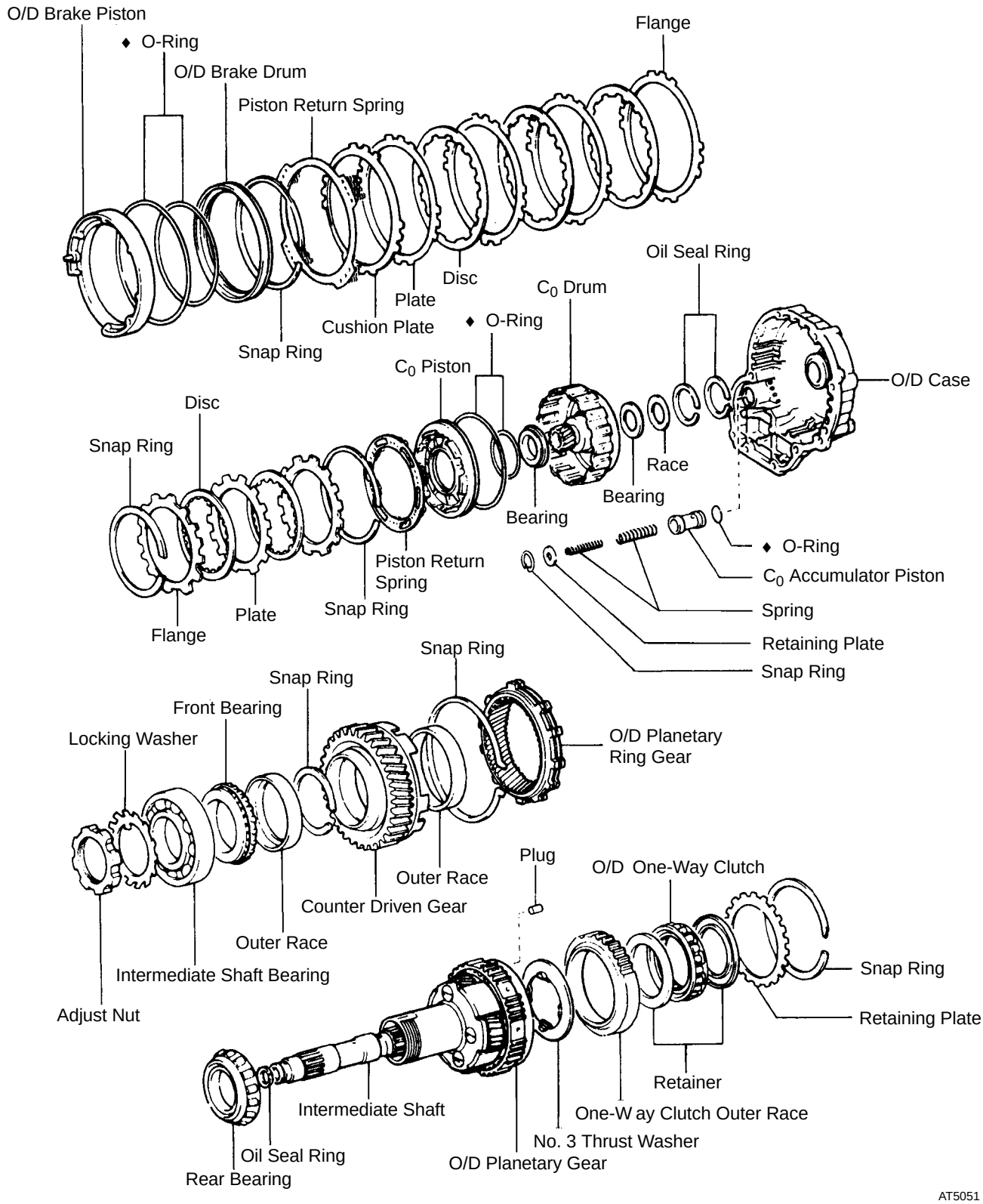
INSPECT DISCS, PLATES AND FLANGES

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

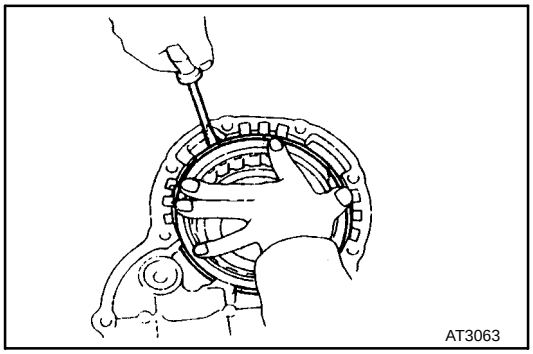
- ® If the lining of the disc is peeling off or discolored, or even a part of the printed numbers are defaced, replace all discs.
- ® Before assembling new discs, soak them in ATF for at least fifteen minutes.

OVERDRIVE UNIT

COMPONENTS



♦ Non-reusable part

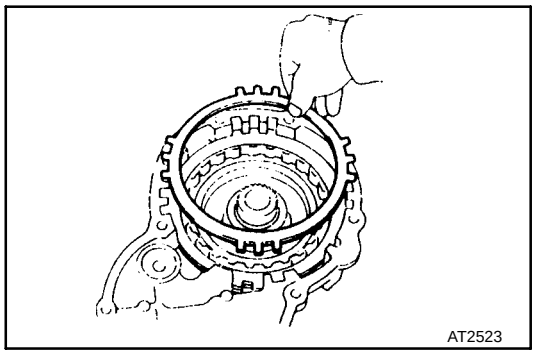


OVERDRIVE BRAKE DISASSEMBLY

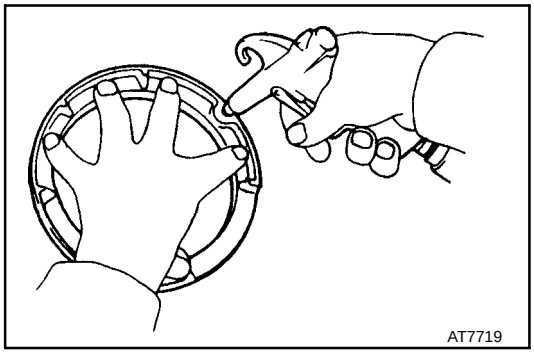
1. REMOVE PISTON RETURN SPRING

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

(b) Remove the piston return spring.

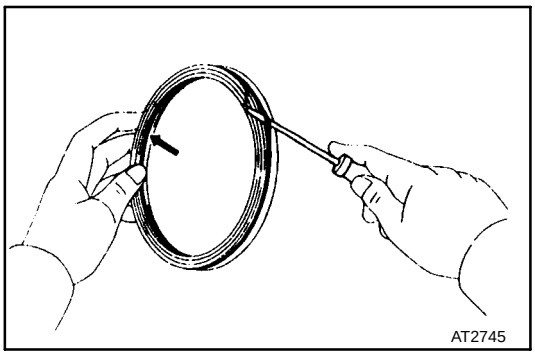


2. REMOVE PLATES, DISCS AND FLANGE



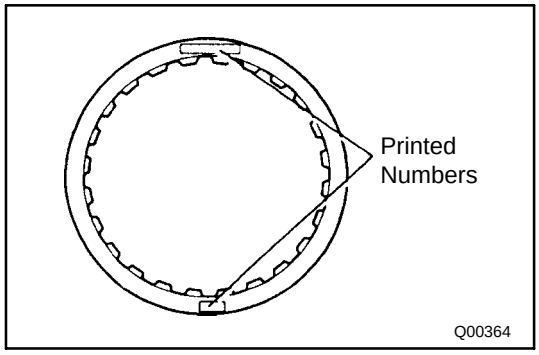
3. REMOVE PISTON FROM DRUM

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



4. REMOVE O-RINGS

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



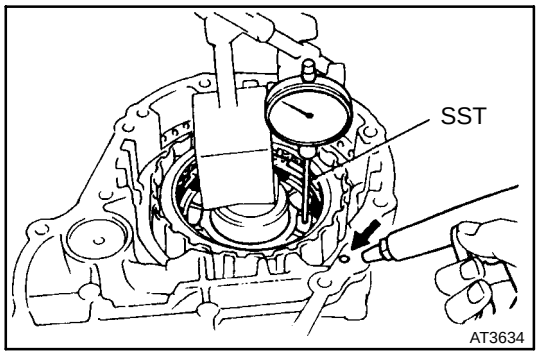
OVERDRIVE BRAKE INSPECTION

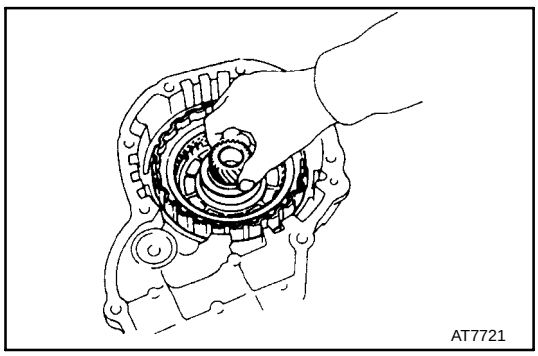
INSPECT DISCS, PLATES AND FLANGE

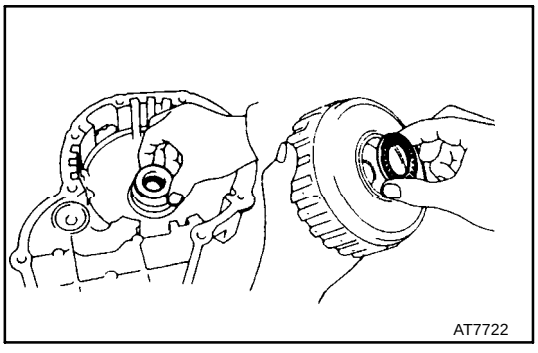
Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

- If the lining of the disc is peeling off or discolored, or even a part of the printed numbers are defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least fifteen minutes.







OVERDRIVE DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

Using a dial indicator, measure the piston stroke while applying and releasing the compresses air (392 - 785 kPa, 5 - 8 kgf/cm^2, 57 - 114 psi), as shown.

Piston stroke:

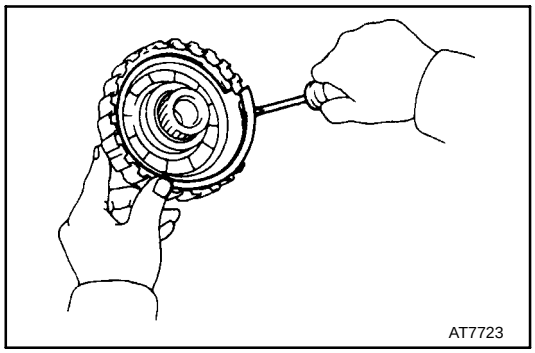
1.75 - 2.49 mm (0.0689 - 0.0980 in.)

SST 09350-32014 (09351-32190)

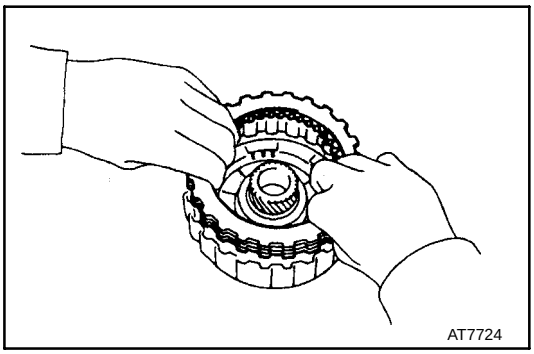
If the piston stoke is greater than the maximum, inspect each component.

2. REMOVE OVERDRIVE DIRECT CLUTCH FROM CASE

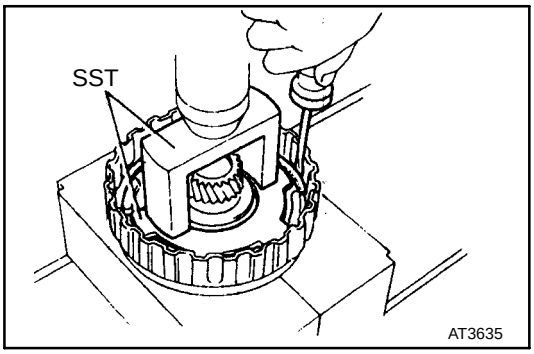
3. REMOVE BEARING AND RACE FROM CLUTCH DRUM AND CASE



4. REMOVE SNAP RING WITH SCREWDRIVER



5. REMOVE FLANGES, DISCS AND PLATES

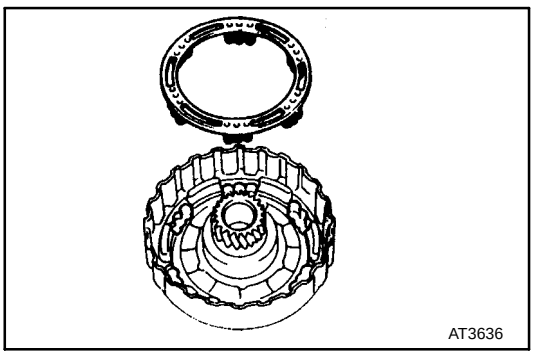


6. REMOVE PISTON RETURN SPRING

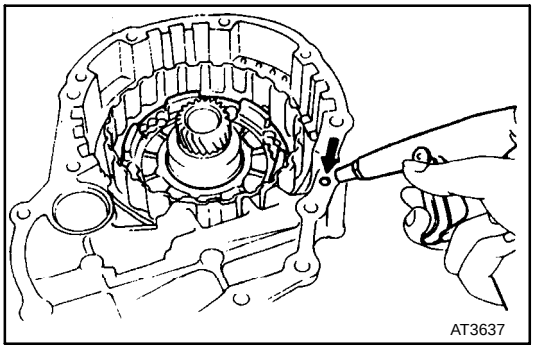
(a) Place SST on the spring retainer and compress the spring with a shop press.

SST 09350-32014 (09351-32070, 09351-32200)

(b) Remove the snap ring.



(c) Remove the piston return spring.



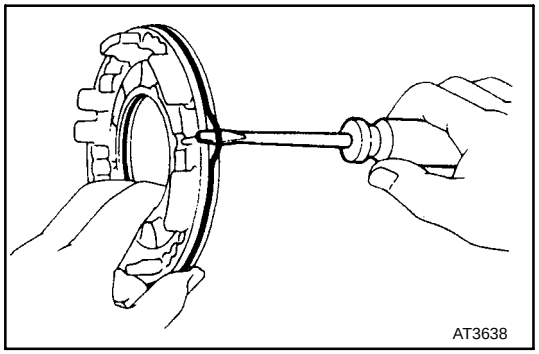
7. REMOVE PISTON FROM CLUTCH DRUM

(a) Install the clutch drum on the case.

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

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

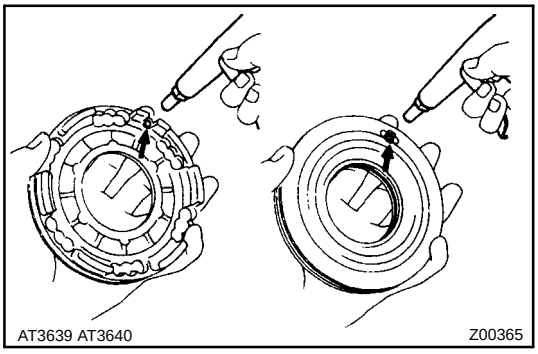
(d) Remove the clutch drum from the case.



8. REMOVE O-RINGS

Remove the two O-rings from the piston.

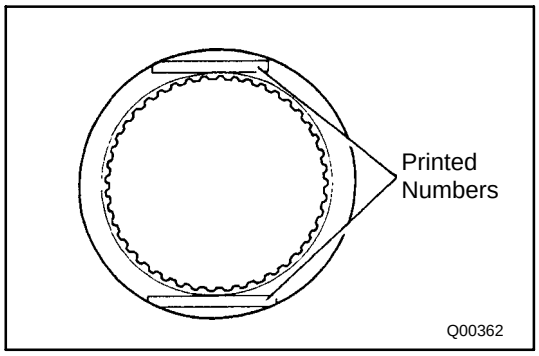
OVERDRIVE DIRECT CLUTCH INSPECTION



1. INSPECT OVERDRIVE DIRECT CLUTCH

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

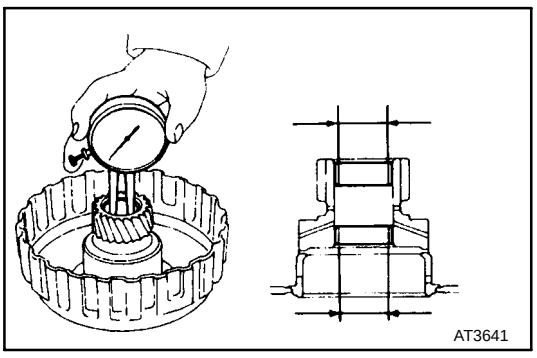
(b) Check that the valve does not leak by applying low-pressure compressed air.



2. INSPECT DISCS, PLATES AND FLANGES

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

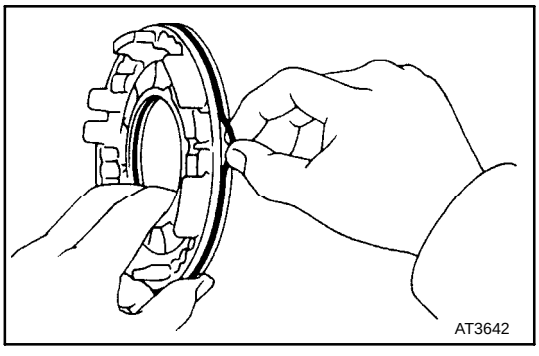
- If the lining of the disc is peeling off or discolored, or even a part of the printed numbers are defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least fifteen minutes.



3. CHECK DIRECT CLUTCH BUSHING

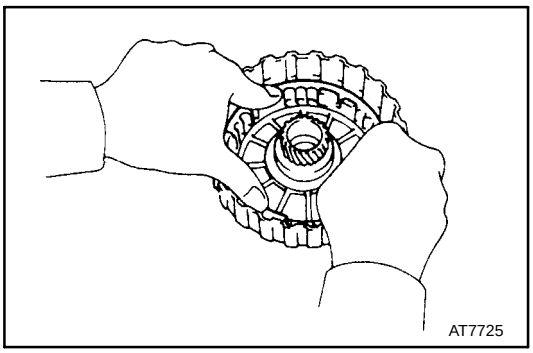
Using a dial indicator, measure the inside diameter of the two direct clutch bushings.
Maximum inside diameter:
22.13 mm (0.8713 in.)
If the inside diameter is greater than the maximum, replace the direct clutch drum.

OVERDRIVE DIRECT CLUTCH ASSEMBLY

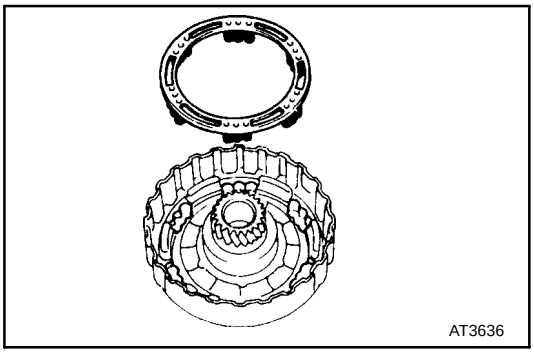


1. INSTALL CLUTCH PISTON

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

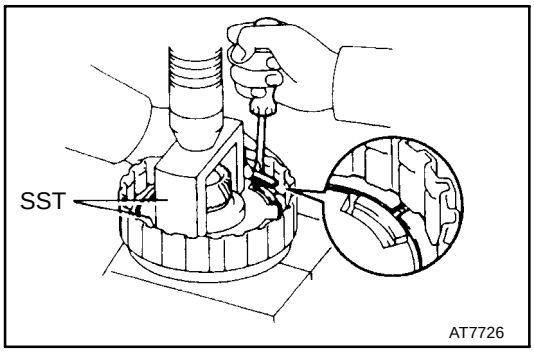


(b) Press the piston into the drum with the cup side up, being careful not to damage the O-ring.



2. INSTALL PISTON RETURN SPRING

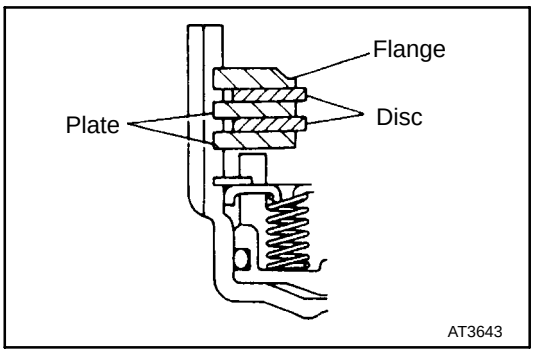
(a) Install the return spring and seat snap ring in place.



(b) Place SST on the spring retainer, and compress the spring with a shop press.

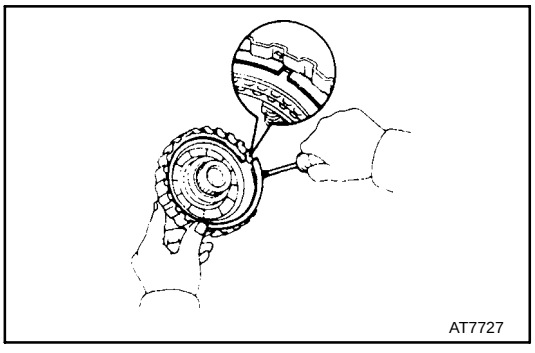
SST 09350-32014 (09351-32070, 09351-32200)

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



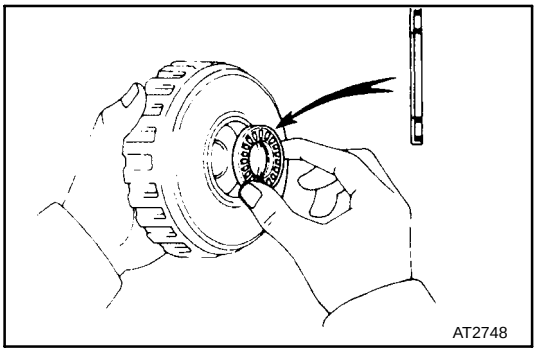
3. INSTALL PLATES, DISCS AND FLANGE

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



4. INSTALL SNAP RING

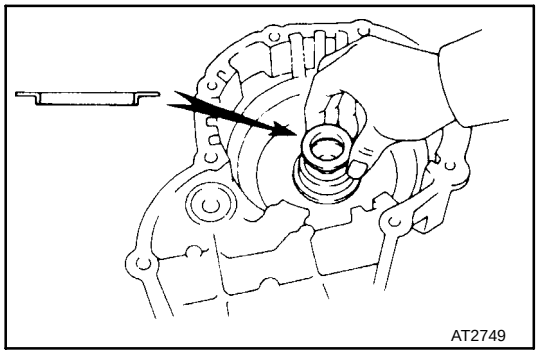
Be sure end gap of the snap ring is not aligned with the groove of the clutch drum.



5. INSTALL BEARING AND RACE

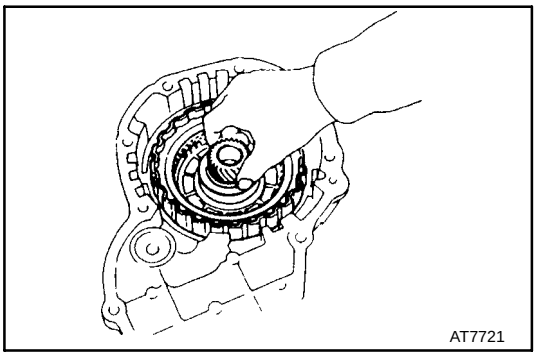
(a) Coat the bearing with petroleum jelly and install it facing the race side downward to the clutch drum.

Bearing outer diameter:
46.3 mm (1.823 in.)
Bearing inner diameter:
26.2 mm (1.031 in.)

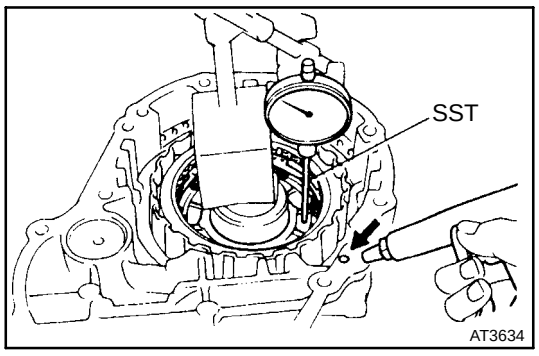


(b) Coat the race with petroleum jelly and install it to the case.

Race outer diameter:
43.0 mm (1.693 in.)
Race inner diameter:
24.5 mm (0.965 in.)



6. INSTALL DIRECT CLUTCH ON CASE

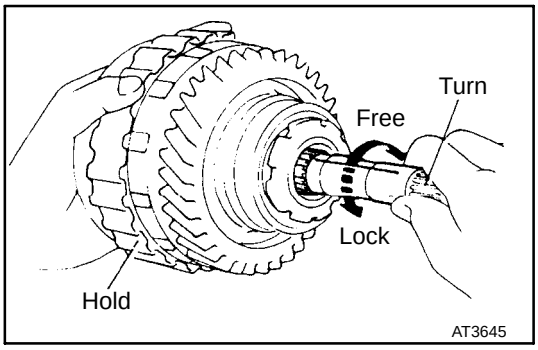


7. RECHECK PISTON STROKE OF DIRECT CLUTCH

Using a dial indicator, measure the piston stroke while applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm^2, 57 - 114 psi), as shown.

Piston stroke:
1.75 - 2.49 mm (0.0689 - 0.0980 in.)

SST 09350-32014 (09351-32190)



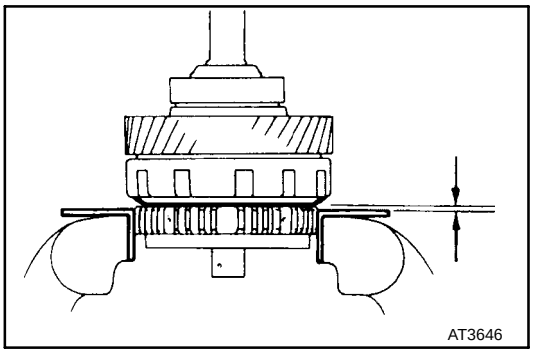
COUNTER DRIVE GEAR DISASSEMBLY

1. CHECK OPERATION OF ONE-WAY CLUTCH

(a) Install the overdrive direct clutch into the one-way clutch.

(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.

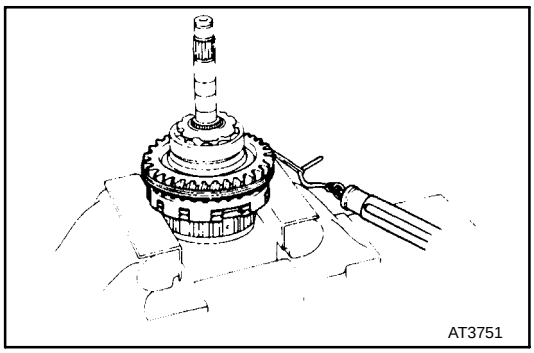
(c) Remove the overdrive direct clutch.


AT3646

2. CHECK COUNTER DRIVE GEAR PRELOAD

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

HINT: Do not let the counter drive gear touch the vise.

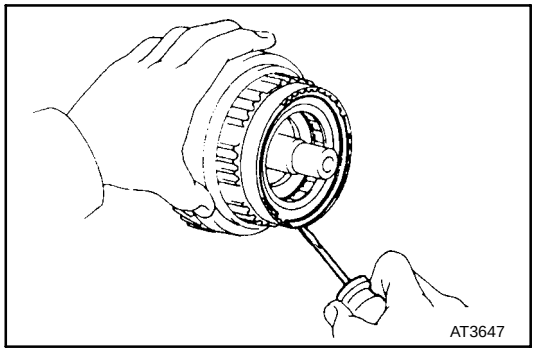

AT3751

(b) Using a tension gauge, measure the preload.

Preload (at starting):

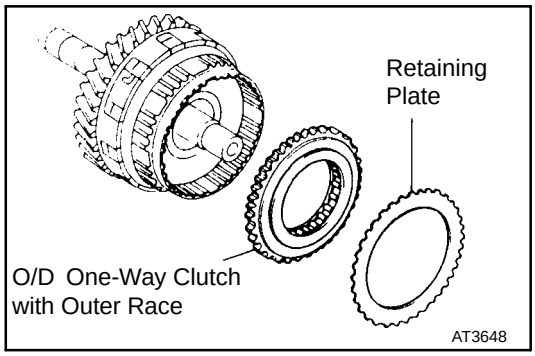
9.2 - 15.3 N (940 - 1,560 g, 2.1 - 3.4 lb)

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


AT3647

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

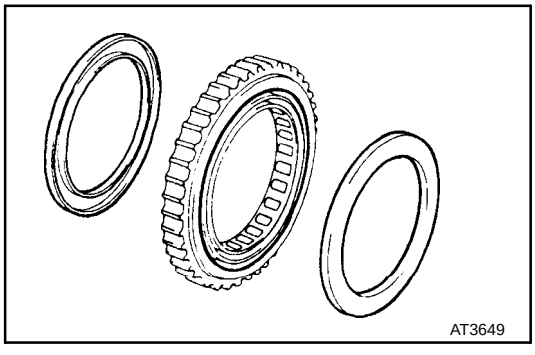
(a) Remove the snap ring.



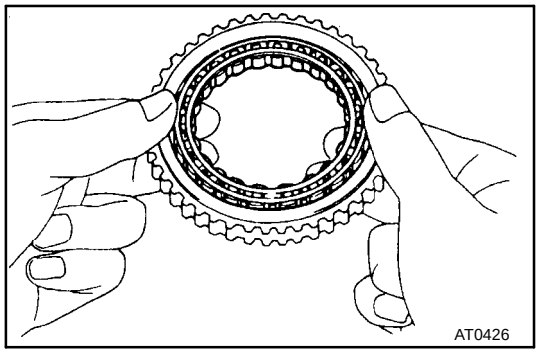
AT3648

(b) Remove the retaining plate.

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

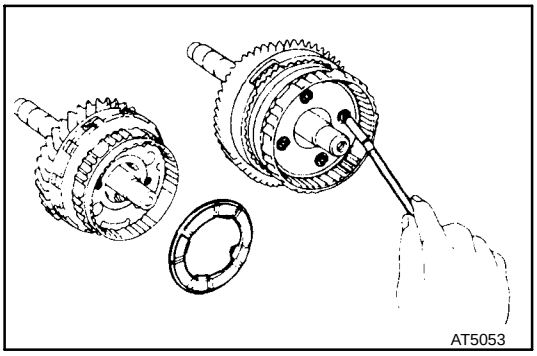

AT3649

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



(e) Remove the O/D one-way clutch from the outer race.

HINT: Note the direction of the one-way clutch.

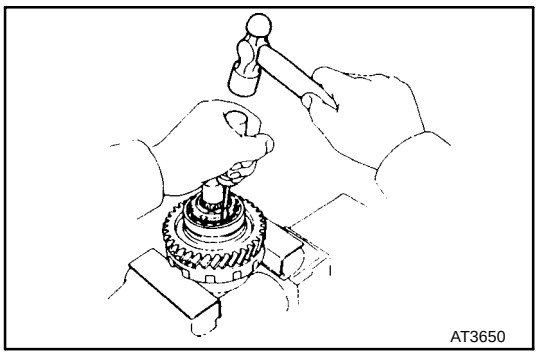


4. REMOVE NO. 3 PLANETARY THRUST WASHER

5. REMOVE PLUGS FROM PLANETARY GEAR

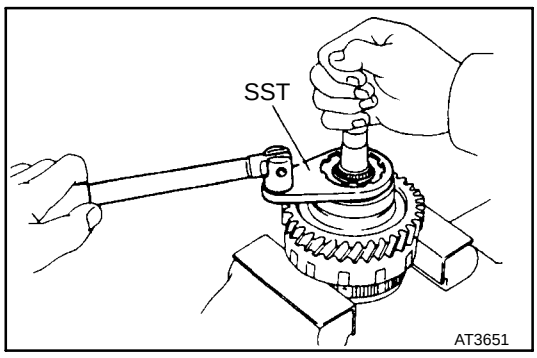
Remove the four plugs with a magnetic finger.

HINT: Be careful not to lose them.



6. REMOVE ADJUSTING NUT AND LOCKING WASHER

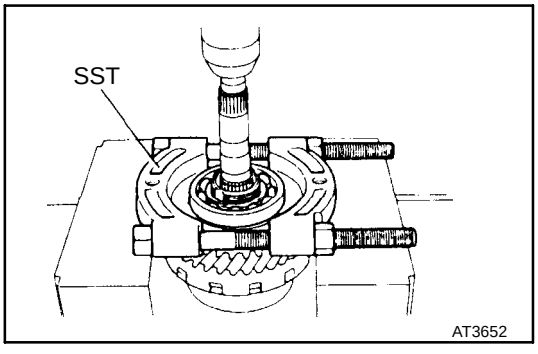
(a) Pry off the locking washer.



(b) Using SST, loosen the adjusting nut.

SST 09350-32014 (09351-32080)

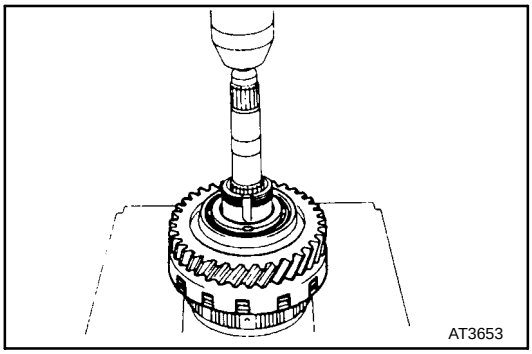
(c) Remove the adjusting nut and locking washer.



7. REMOVE INTERMEDIATE SHAFT BEARING

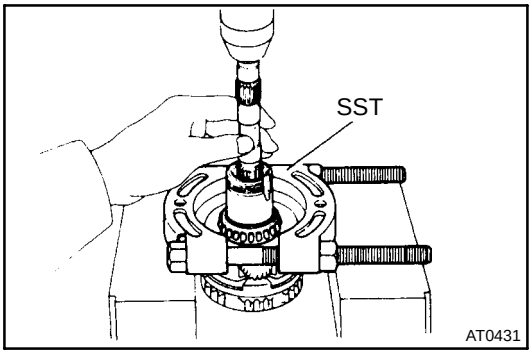
Using SST, press out the bearing from the shaft.

SST 09950-00020



8. REMOVE COUNTER DRIVE GEAR AND FRONT BEARING

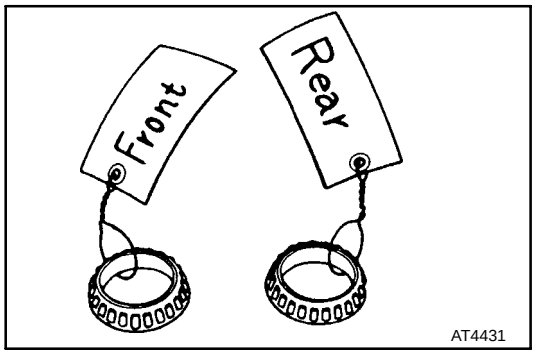
Press out the gear and bearing together.



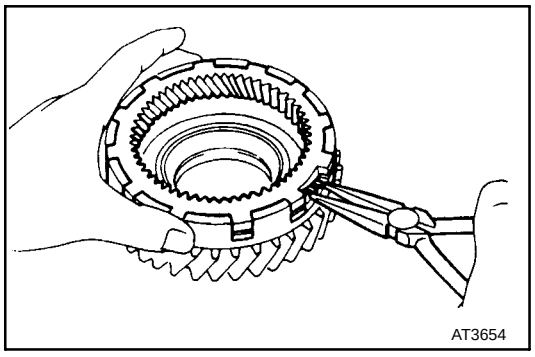
9. REMOVE REAR BEARING

(a) Using SST, press out the bearing.

SST 09950-00020



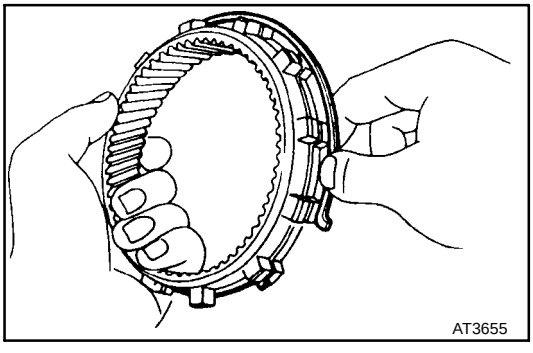
(b) Tag the bearings to show the location for reassembly.



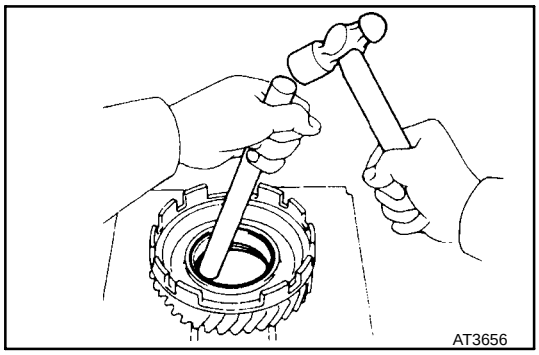
10. REMOVE OVERDRIVE PLANETARY RING GEAR FROM COUNTER DRIVE GEAR

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

(b) Remove the ring gear from the counter drive gear.

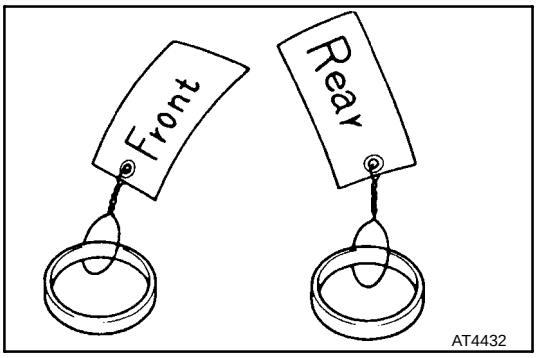


(c) Remove the snap ring from the ring gear.

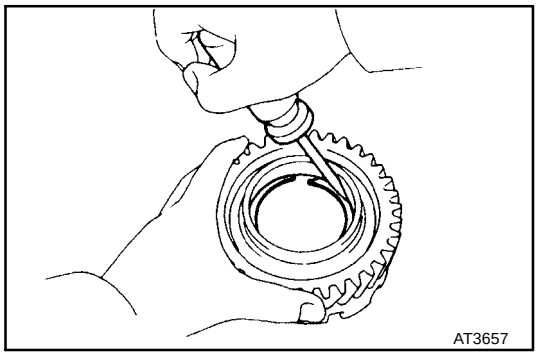


11. REMOVE OUTER RACES FROM COUNTER DRIVE GEAR

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

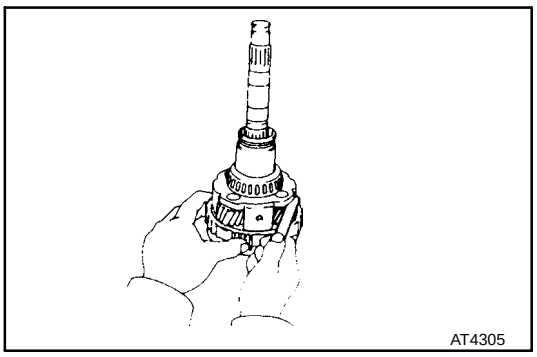


(b) Tag the races to show the location for reassembly.



12. REMOVE SNAP RING FROM COUNTER DRIVE GEAR

Using a screwdriver, remove the snap ring.



OVERDRIVE PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

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

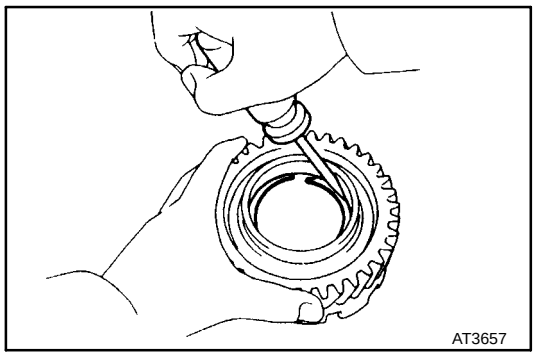
Standard clearance:

0.16 - 0.56 mm (0.0063 - 0.0220 in.)

Maximum clearance:

0.61 mm (0.0240 in.)

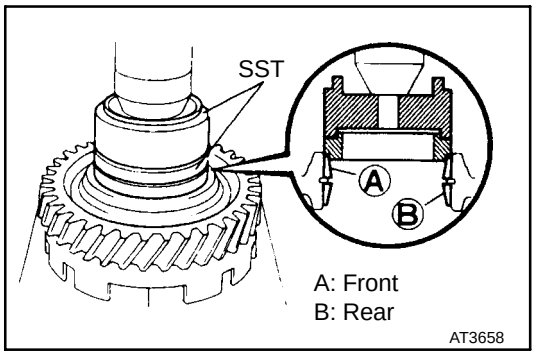
If the clearance is greater then the maximum, replace the planetary gear assembly.



COUNTER DRIVE GEAR ASSEMBLY

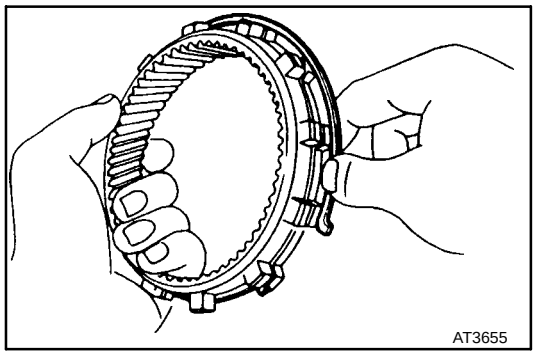
1. INSTALL SNAP RING INTO COUNTER GEAR

Install the snap ring with a screwdriver.



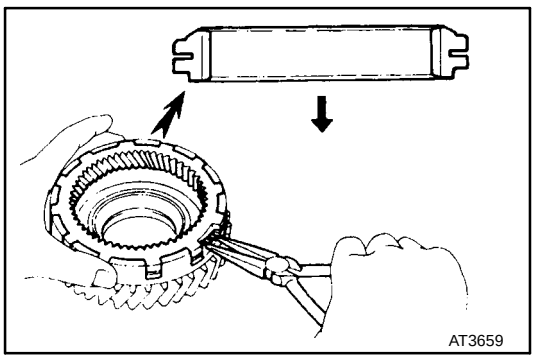
2. INSTALL OUTER RACES INTO COUNTER DRIVE GEAR

Using SST, press in the two outer races to both sides of the gear.
SST 09350-32014 (09351-32120, 09351-32150)
HINT: Press in the two outer races until they touch the snap ring. Tap the races in straight, so that they do not tilt.

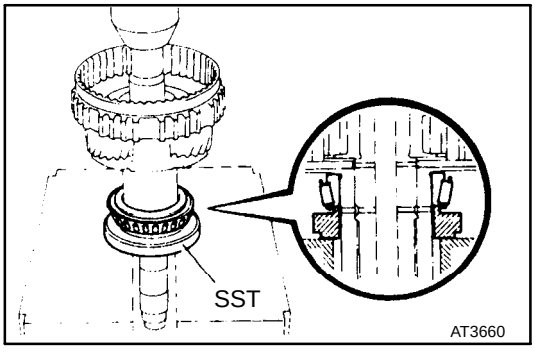


3. INSTALL OVERDRIVE PLANETARY RING GEAR INTO COUNTER DRIVE GEAR

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

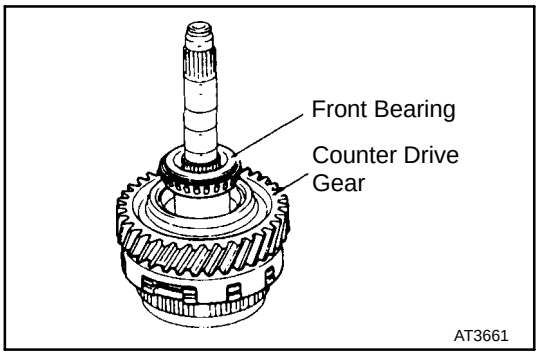


(b) While pushing down the ring gear, squeeze the snap ring and with needle-nose pliers, and install it into the groove.



4. INSTALL REAR BEARING

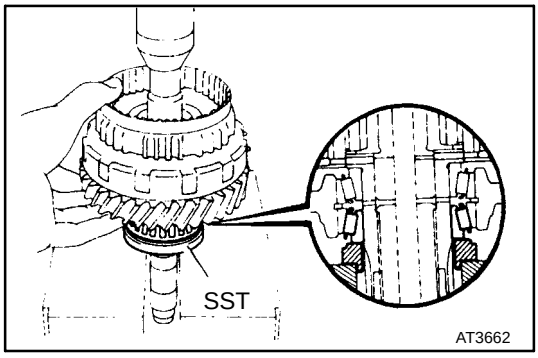
Using SST, press in the bearing onto the shaft.
SST 09350-32014 (09351-32120)
HINT: Press in the bearing until the side surface of the inner race touches the planetary carrier.



5. INSTALL COUNTER DRIVE GEAR AND FRONT BEARING

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

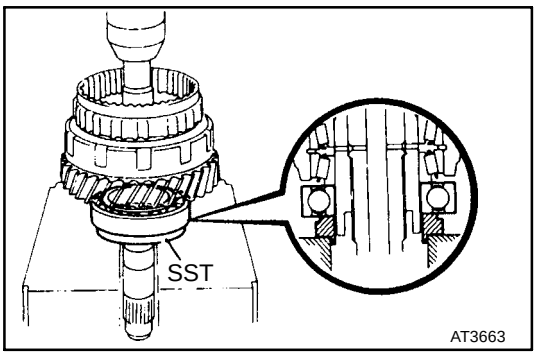
(b) Place the front bearing on to the shaft.



(c) Using SST, press in the bearing until slightly play between the bearings.

SST 09350-32014 (09351-32120)

HINT: Hold the ring gear to prevent it from falling.

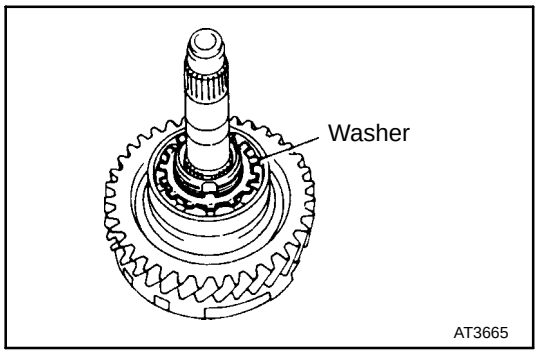


6. INSTALL INTERMEDIATE SHAFT BEARING

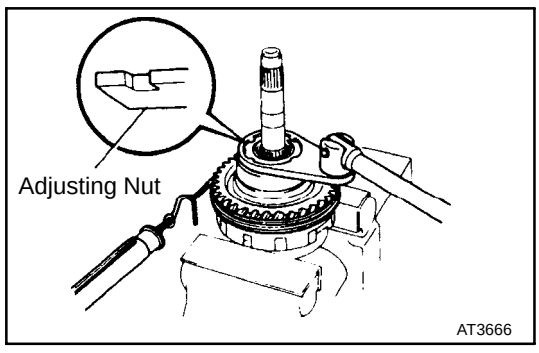
Using SST, press in the bearing until it slightly touches the front bearing of the counter drive gear.

SST 09350-32014 (09351-32120)

HINT: The counter drive gear can be turned lightly.



7. PLACE NEW LOCKING WASHER



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

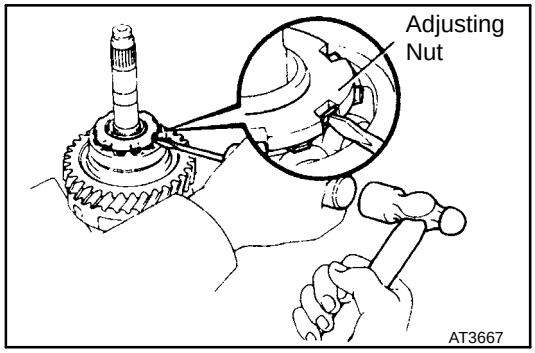
(a) Hold the overdrive planetary gear in a vise with soft jaws.

(b) Using SST, tighten the adjusting nut until the following gear starting load is reached on the tension gauge.

SST 09350-32014 (09351-32080)

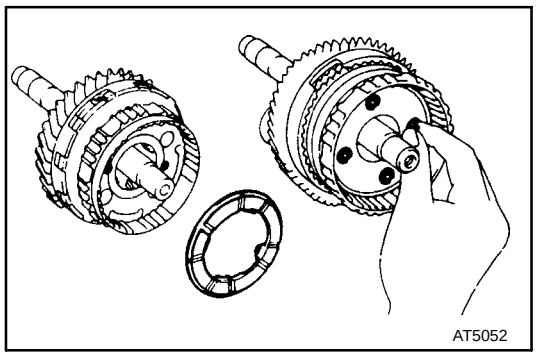
Preload (at starting):

9.2 - 15.3 N (940 - 1,560 g, 2.1 - 3.4 lb)



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

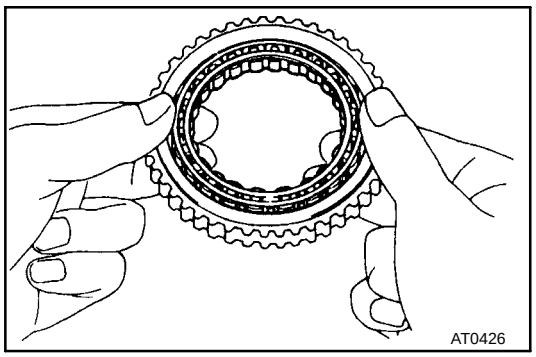
(c) Lock the adjusting nut with one tab on locking washer. Bend the locking washer tab until it is even with the adjusting nut groove.



9. INSTALL NO. 3 OVERDRIVE PLANETARY THRUST WASHER

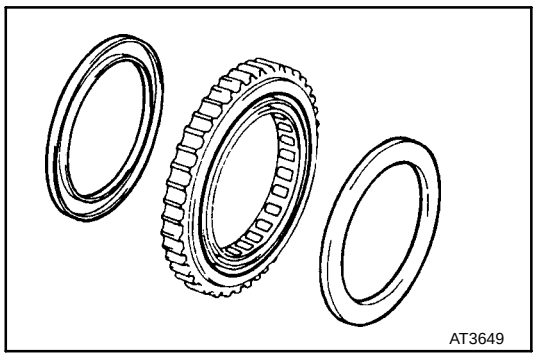
10. INSTALL PINION SHAFT PLUGS

Install the four plugs into the pinion shaft.

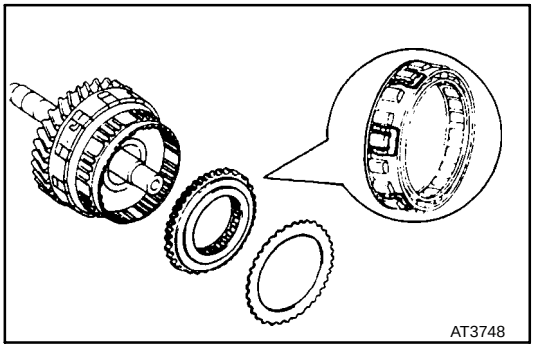


11. INSTALL OVERDRIVE ONE-WAY CLUTCH AND RETAINING PLATE

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



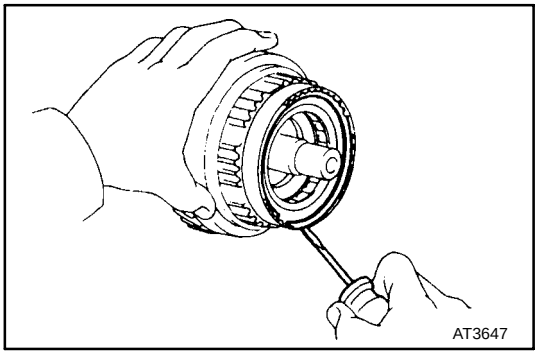
(b) Install the two retainer on both sides of the one-way clutch.



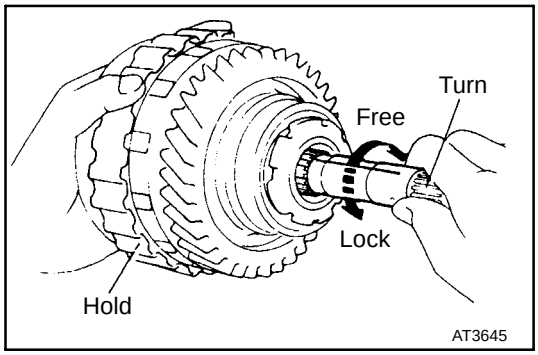
(c) Install the one-way clutch into the overdrive planetary gear.

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

(d) Install the retaining plate.



(e) Install the snap ring.



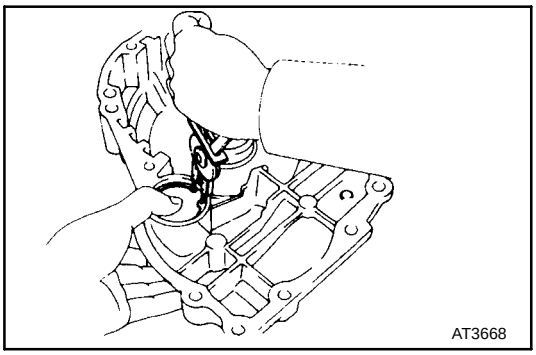
12. CHECK OPERATION OF O/D ONE-WAY CLUTCH

(a) Install the overdrive direct clutch into the one-way clutch.

(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.

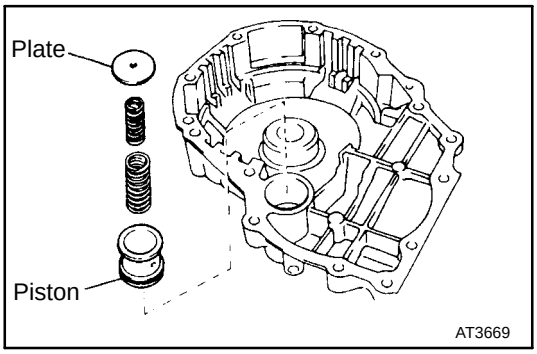
(c) Remove the overdrive direct clutch.

OVERDRIVE CASE DISASSEMBLY



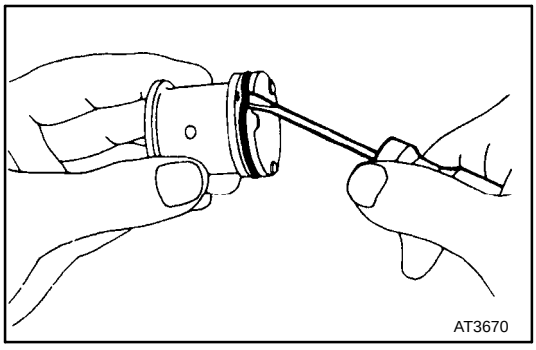
1. REMOVE C0 ACCUMULATOR PISTON FROM OVERDRIVE CASE

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

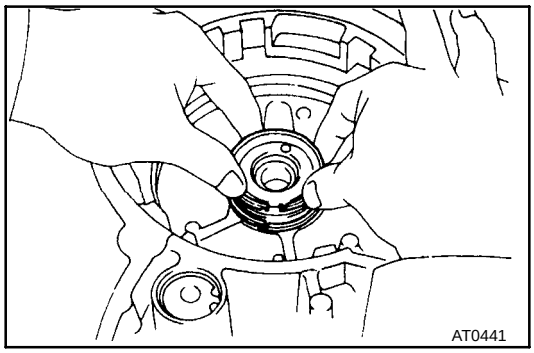


(b) Remove the retaining plate and two springs.

(c) Remove the accumulator piston.



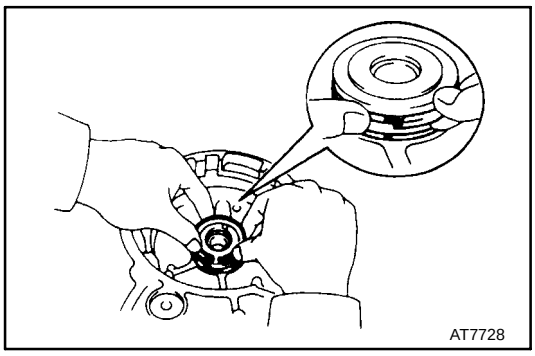
(d) Remove the O-ring from the piston.



2. REMOVE OIL SEAL RINGS

Spread the two rings apart and remove them.

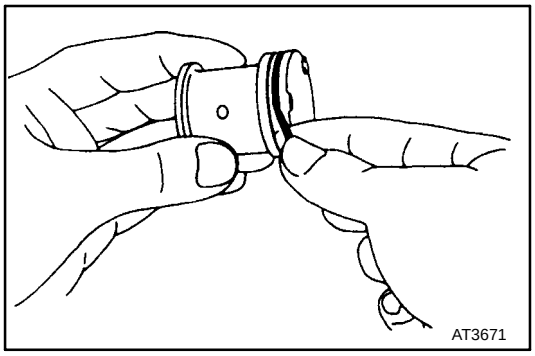
OVERDRIVE CASE ASSEMBLY



1. INSTALL OIL SEAL RINGS ON OVERDRIVE CASE

Spread the two rings apart and install them into the groove.

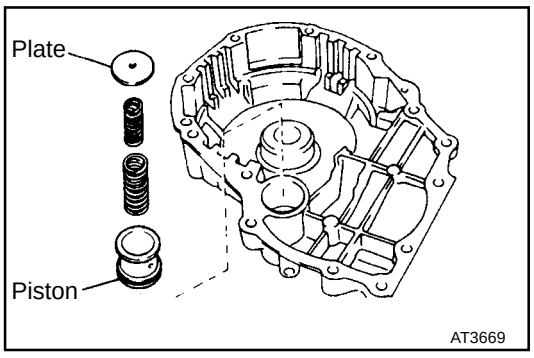
HINT: After installing the oil seal rings, check that they move smoothly.



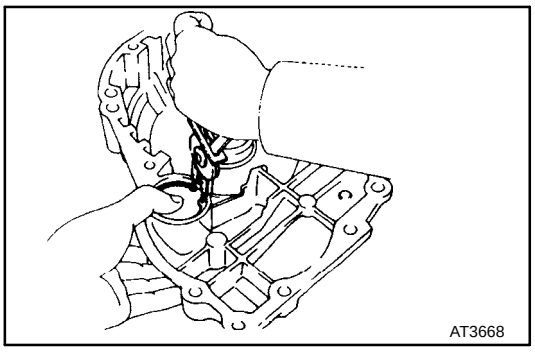
2. INSTALL C0 ACCUMULATOR PISTON TO OVERDRIVE CASE

(a) Install a new O-ring to the accumulator piston.

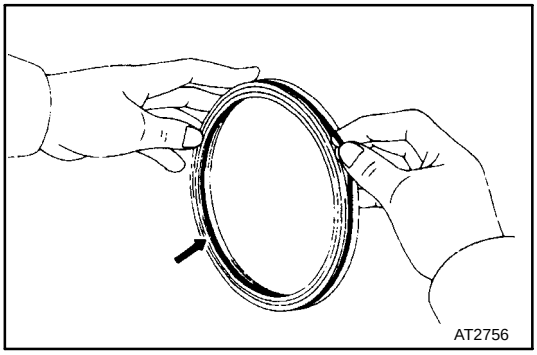
(b) Coat the O-ring with ATF.



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



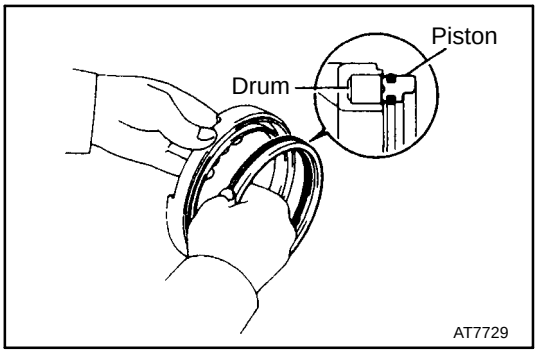
(d) Using snap ring pliers, install the snap ring.



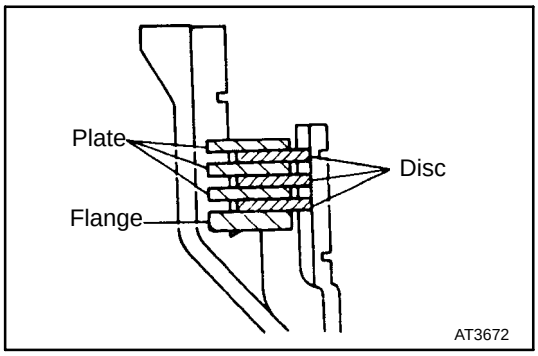
OVERDRIVE BRAKE ASSEMBLY

1. INSTALL PISTON INTO DRUM

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

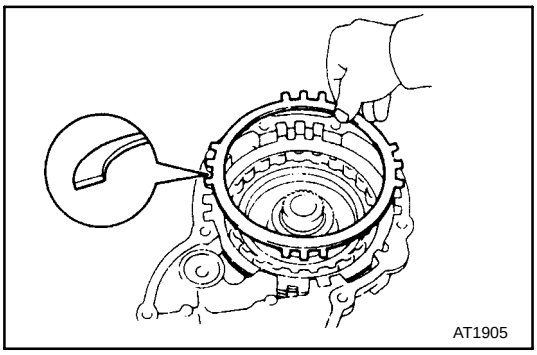


(b) Press the piston into the drum, being careful not to damage the O-rings.

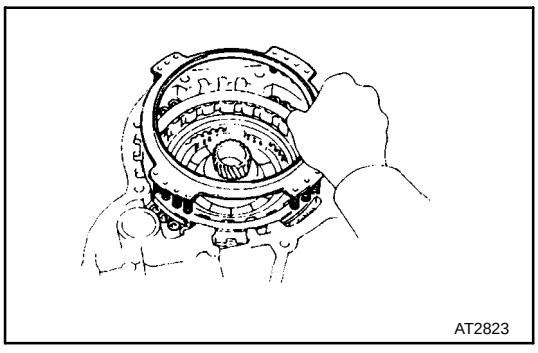


2. INSTALL FLANGE, DISCS AND PLATES

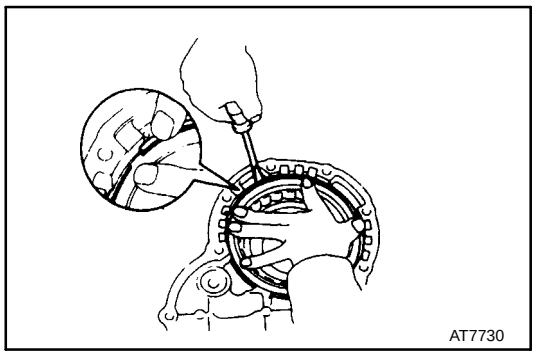
(a) Install the flange, discs and plates.
Install in order:
P = Plate D = Disc
Flange-D-P-D-P-D-P



(b) Install the cushion plate with the rounded end facing upward.

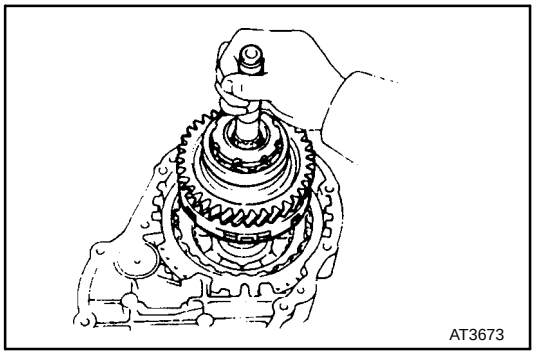


3. POSITION PISTON RETURN SPRING



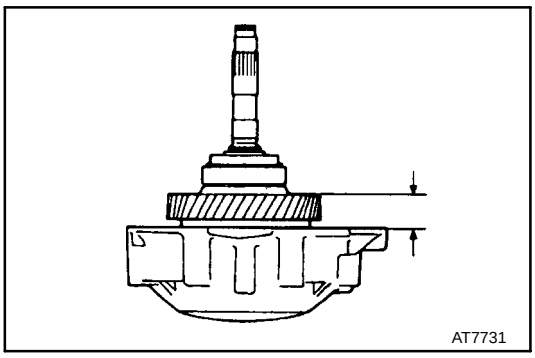
4. INSTALL SNAP RING INTO CASE

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



5. INSTALL OVERDRIVE PLANETARY GEAR ONTO OVERDRIVE DIRECT CLUTCH

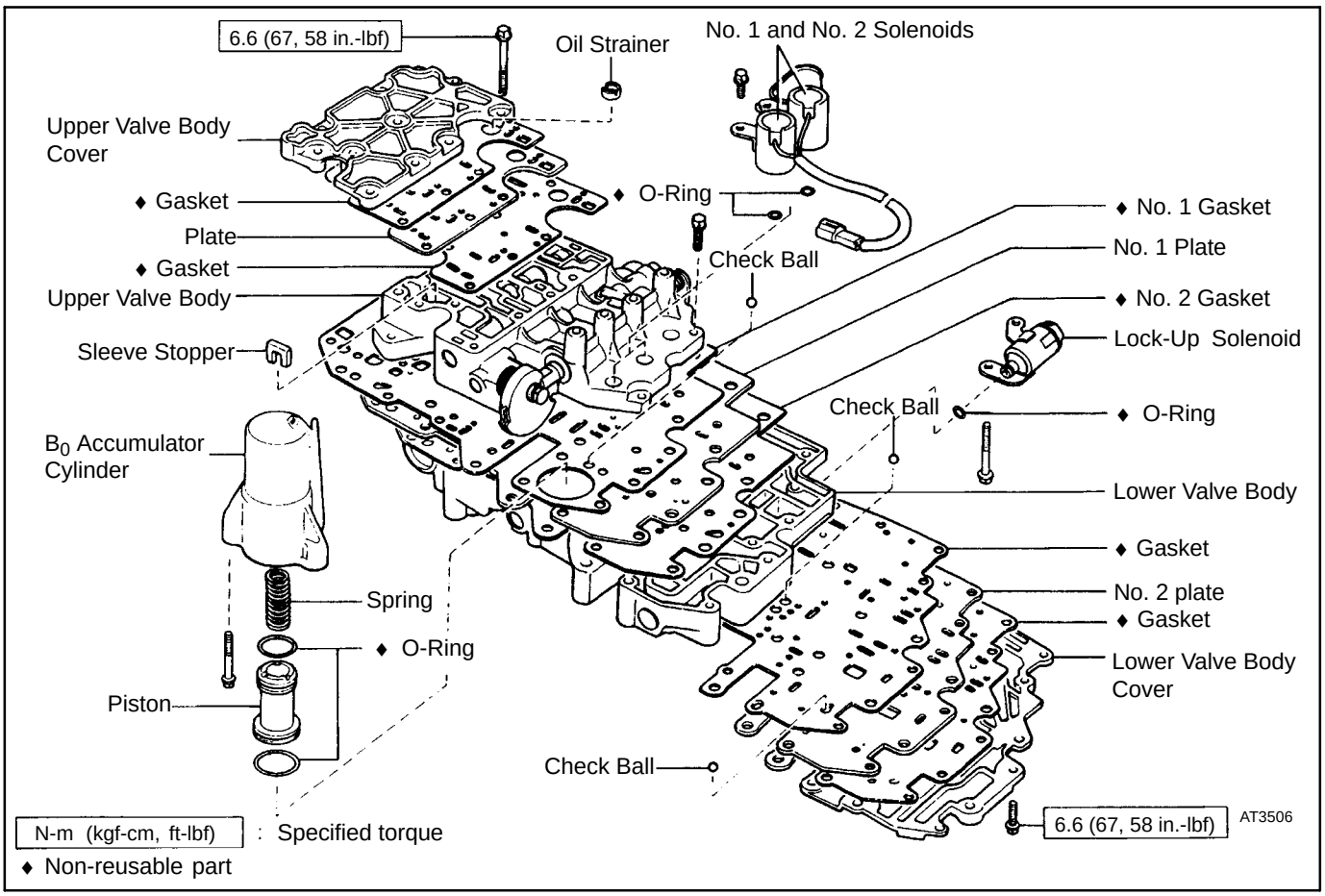
While turning the overdrive planetary gear clockwise, install it onto the overdrive direct clutch.

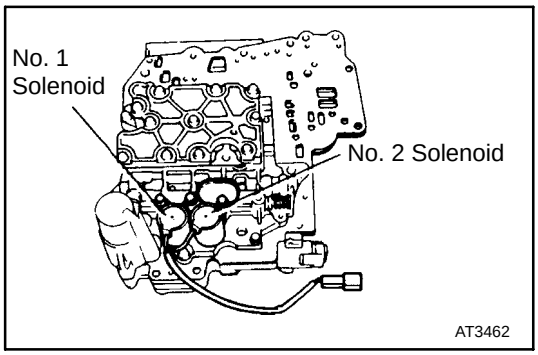


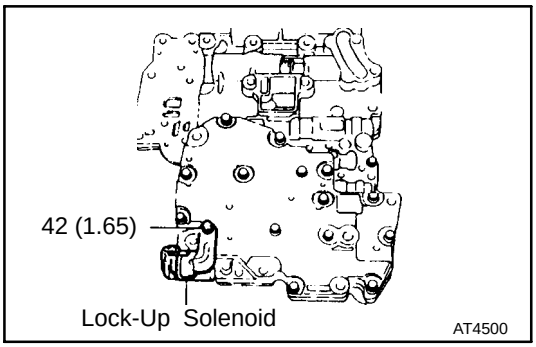
HINT: If the overdrive planetary gear is properly installed onto the direct clutch, the counter drive gear height from the overdrive case will be about 24 mm (0.94 in.).

VALVE BODY

COMPONENTS







VALVE BODY DISASSEMBLY

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

1. REMOVE SOLENOIDS

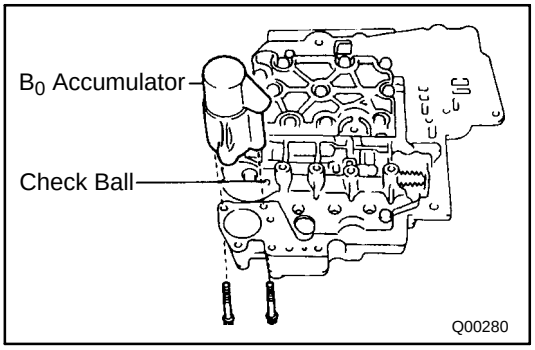
(a) Remove No. 1 and No. 2 solenoids.

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

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

(c) Remove the lock-up solenoid.

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

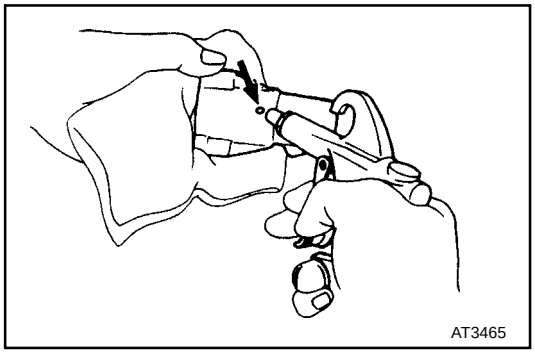


2. REMOVE B_0 ACCUMULATOR ASSEMBLY

(a) Remove the two bolts.

(b) Remove the B_0 accumulator assembly.

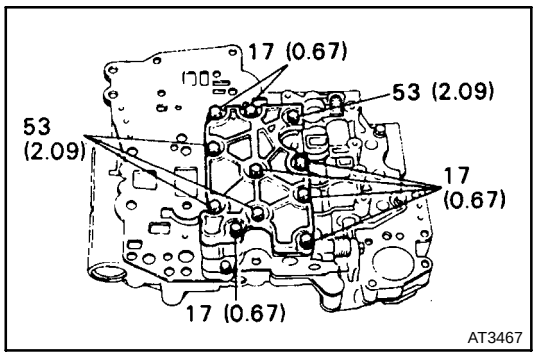
(c) Remove the check ball on No. 1 plate.



3. DISASSEMBLY B_0 ACCUMULATOR ASSEMBLY

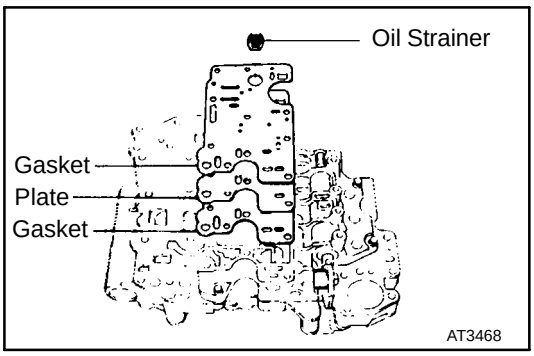
(a) Applying compressed air to the cylinder hole, remove the piston and spring.

(b) Remove the two O-ring from the piston.



4. REMOVE UPPER AND BODY COVER

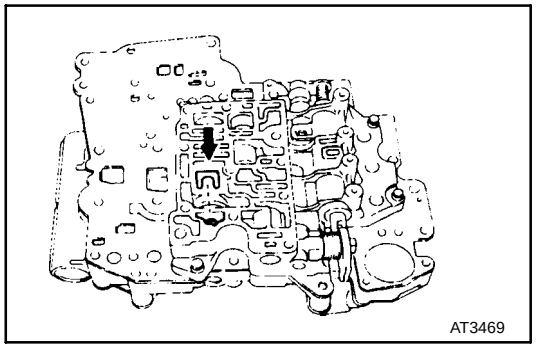
Remove the eleven bolts and upper and body cover.



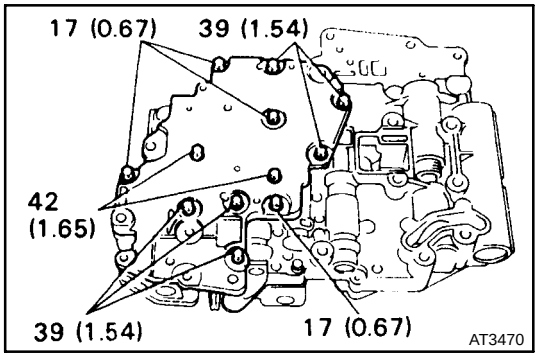
5. REMOVE OIL STRAINER, UPPER VALVE BODY COVER GASKETS AND PLATE

(a) Remove the oil strainer on the gasket.

(b) Remove the two gaskets and plate from the upper valve body.

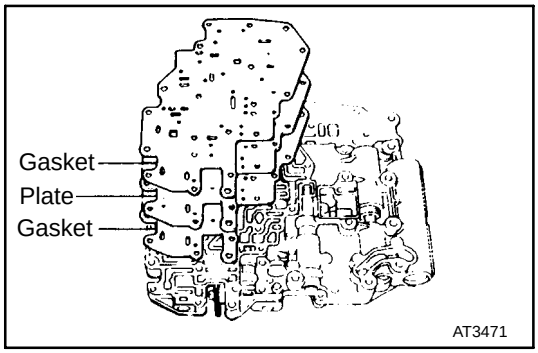


6. REMOVE LOCK-UP RELAY VALE SLEEVE STOPPER

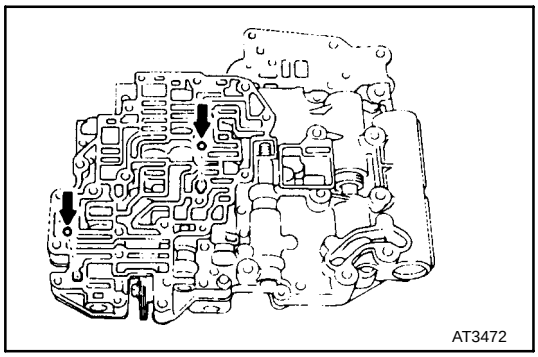


7. REMOVE LOWER VALVE BODY COVER

Remove the twelve bolts and lower valve body cover.

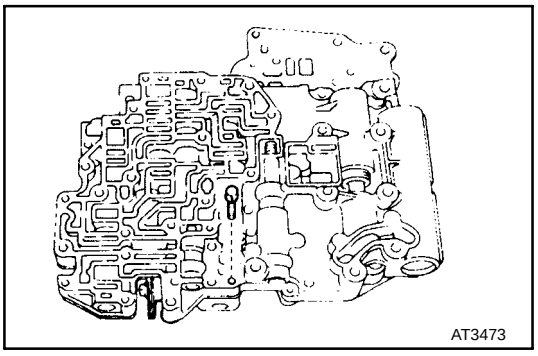


8. REMOVE LOWER VALVE BODY COVER GASKETS AND NO. 2 PLATE

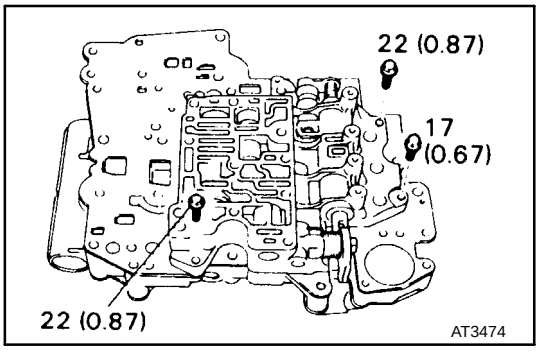


9. REMOVE CHECK BALLS

Remove the two check balls from the lower valve body.

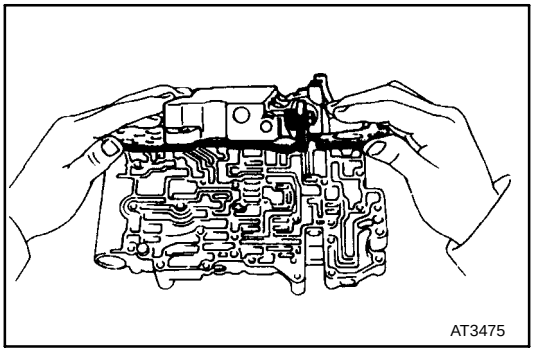


10. REMOVE BOLT FROM LOWER VALVE BODY



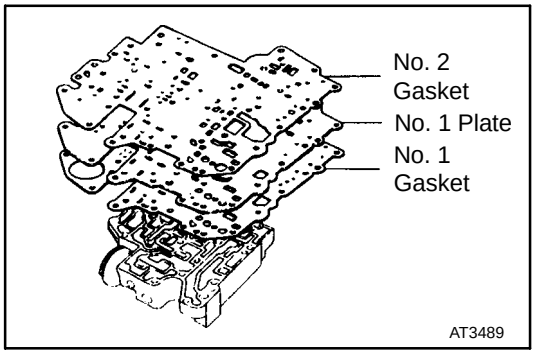
11. REMOVE BOLTS FROM UPPER VALVE BODY

Remove the three bolts.


AT3475

12. LIFT OFF UPPER VALVE BODY AND NO. 1 PLATE AS A SINGLE UNIT

Hold No. 1 plate to the upper valve body and lift off the upper valve body.
HINT: Be careful that the check balls and oil strainer do not fall out:

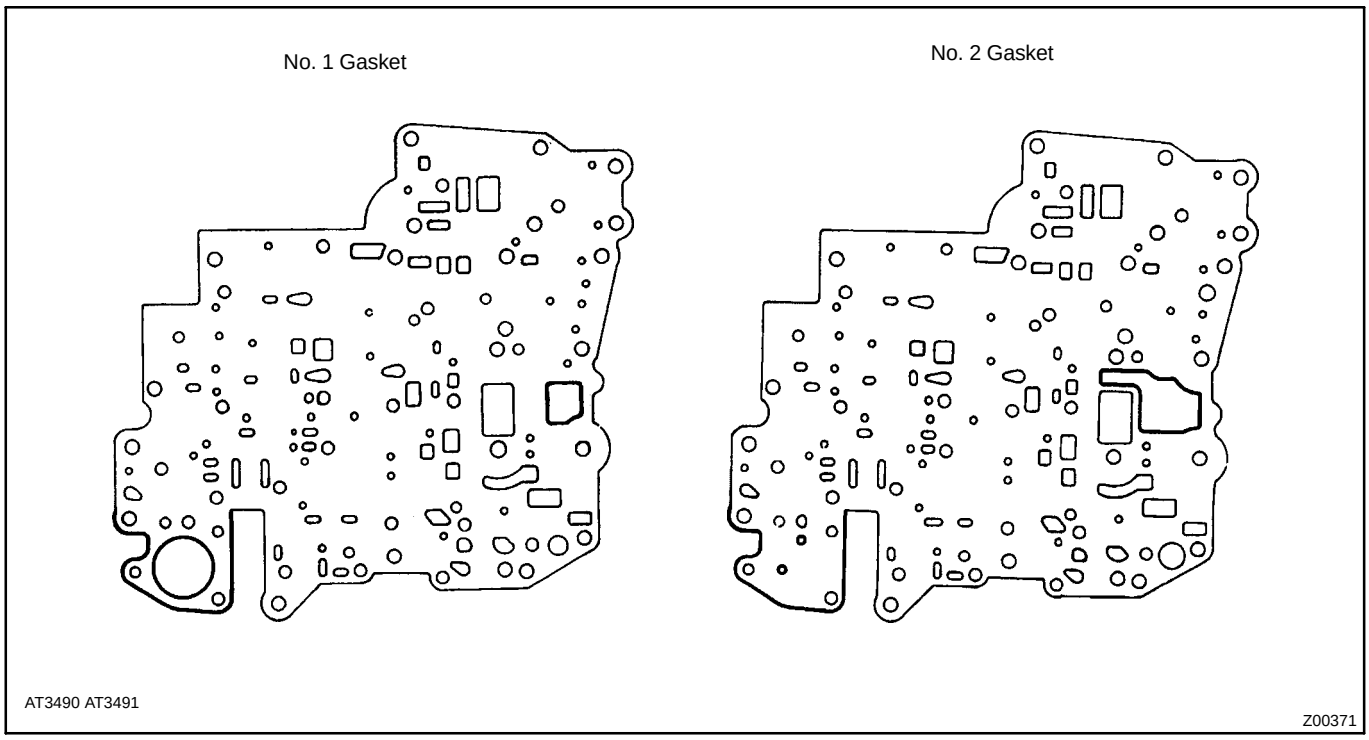


AT3489

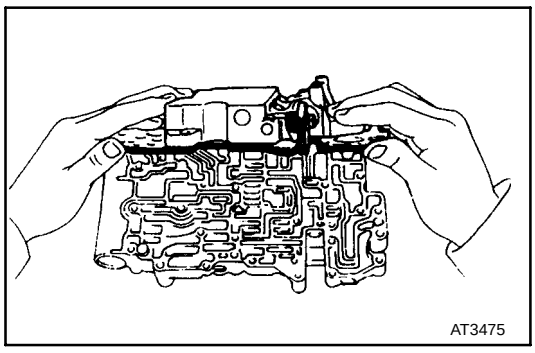
VALVE BODY ASSEMBLY

1. POSITION NO. 1 PLATE AND NEW GASKETS ON UPPER VALVE BODY

Position new No. 1 gasket, No. 1 plate and then new No. 2 gasket on the upper valve body.
HINT: Since No. 1 gasket and No. 2 gasket are similar, use the illustration below to discriminate between them.

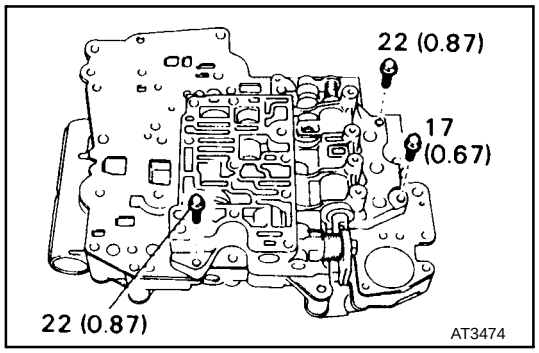


AT3490 AT3491
Z00371


AT3475

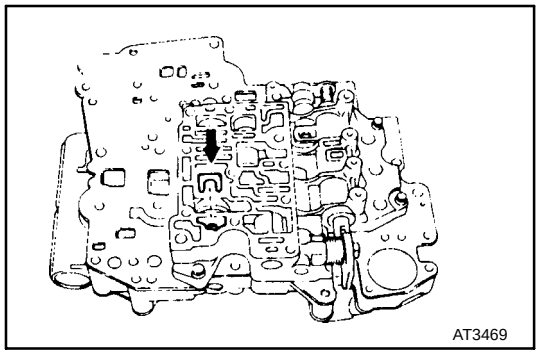
2. PLACE UPPER VALVE BODY WITH NO. 1 PLATE AND GASKETS ON LOWER VALVE BODY

Hold the upper valve body, No. 1 plate and gaskets securely so they do not separate.
Align each bolt hole in the valve bodies with the gaskets and plate.

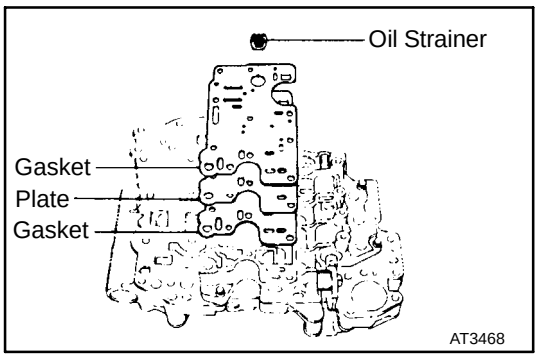


3. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY TO SECURE LOWER VALVE BODY

Install and finger tighten the three bolts.
HINT: Each bolt length (mm, in.) is indicated in the illustration.



4. INSTALL LOCK-UP RELAY VALVE SLEEVE STOPPER

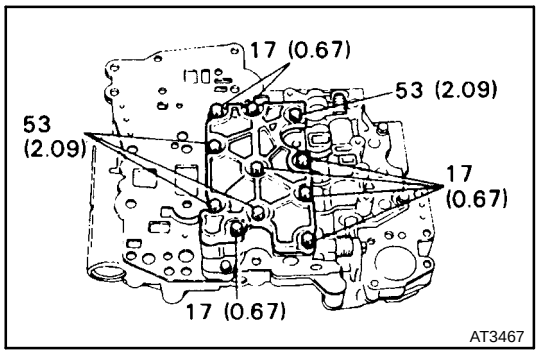


5. INSTALL UPPER VALVE BODY COVER GASKETS, PLATE AND THROTTLE MODULATOR OIL STRAINER

(a) Position a new gasket and plate and then another new gasket.

HINT: Both gasket are same one.

(b) Install the oil strainer onto the gasket.

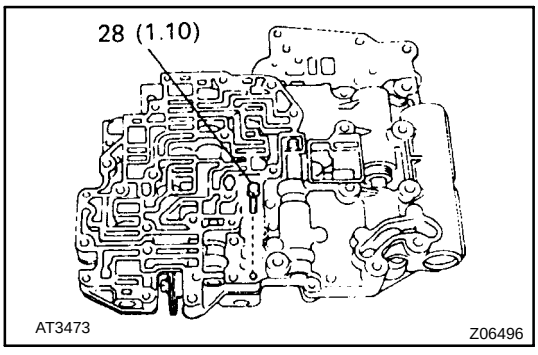


6. INSTALL UPPER VALVE BODY COVER

(a) Position the upper valve body cover.

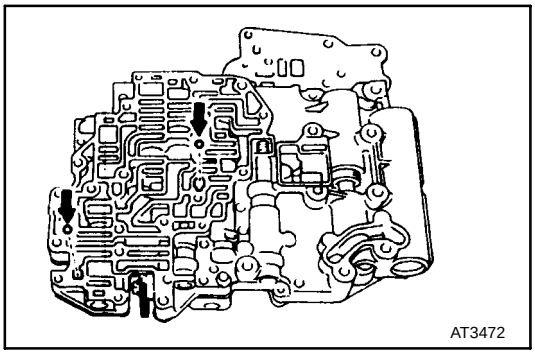
(b) Install and finger tighten the eleven bolts.

HINT: Each bolt length (mm, in.) is indicated in the illustration.



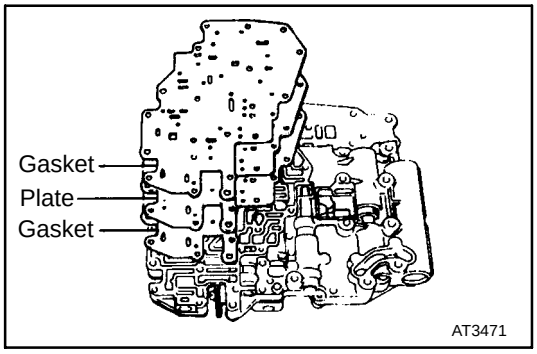
7. INSTALL AND FINGER TIGHTEN BOLT LOWER VALVE BODY

HINT: Bolt length (mm, in.) is indicated in the illustration.



8. INSTALL CHECK BALLS

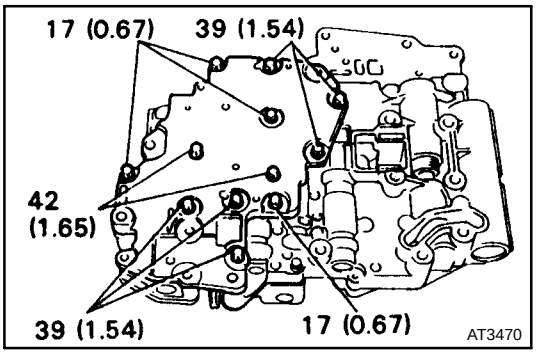
Install the two check balls into the lower valve body.



9. INSTALL LOWER VALVE BODY COVER GASKETS AND NO. 2 PLATE

Position a new gasket and plate and then another new gasket.

HINT: Both gaskets are same one.

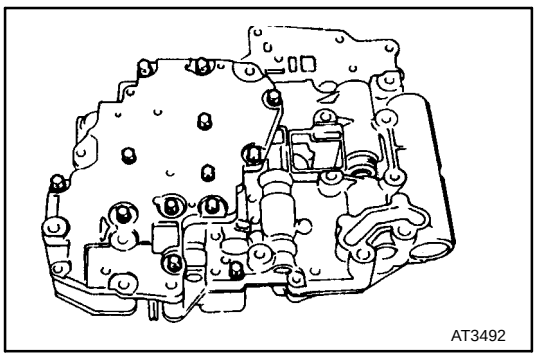


10. INSTALL LOWER VALVE BODY COVER

(a) Position the lower valve body cover.

(b) Install and finger tighten the twelve bolts.

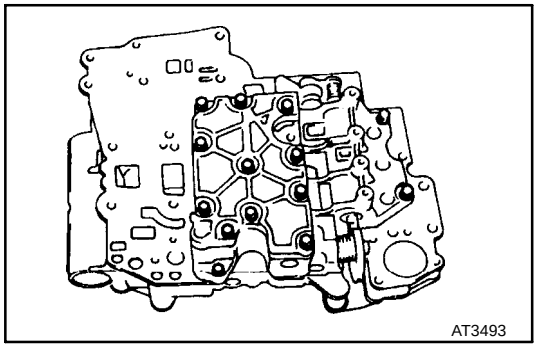
HINT: Each bolt length (mm, in.) is indicated in the illustration.



11. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

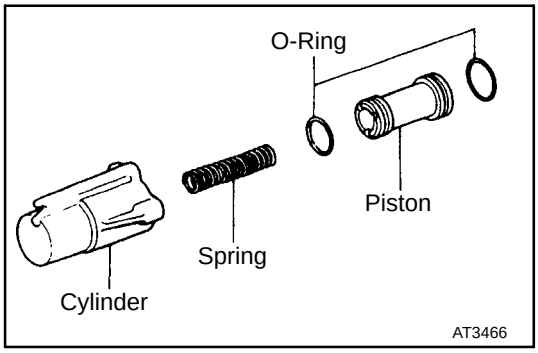
(a) Tighten the thirteen bolts in the lower valve body.

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



(b) Tighten the fourteen bolts in the upper valve body.

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

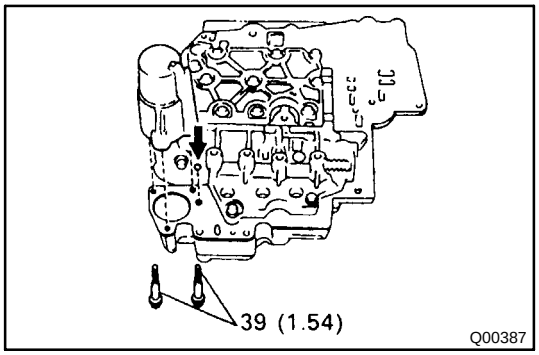


12. INSTALL B_0 ACCUMULATOR ASSEMBLY

(a) Coat new O-rings with ATF and install them to the piston.

(b) Install the spring and piston into the cylinder.

Free length mm (in.)	Coil outer diameter mm (in.)	Color
67.7 (2.665)	14.0 (0.551)	Pink



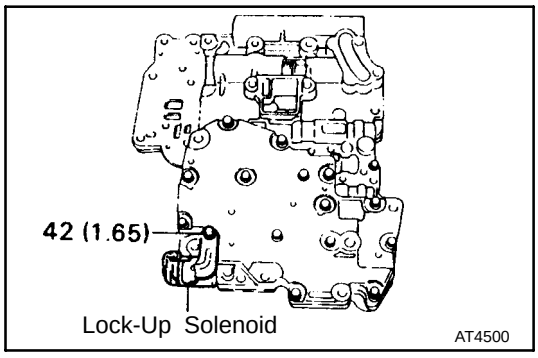
(c) Plate the check ball on No. 1 gasket.

(d) Install the B_0 accumulator assembly.

(e) Install the torque the two bolts.

HINT: Each bolt length (mm, in.) is indicated in the illustration.

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



13. INSTALL SOLENOIDS

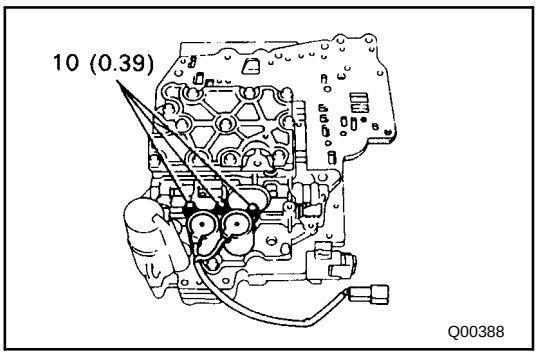
(a) Coat new O-rings with ATF and install them to the solenoids.

(b) Install the lock-up solenoid.

(c) Install and torque the bolt.

HINT: Bolt length (mm, in.) is indicated in the illustration.

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



(d) Install No. 1 and No. 2 solenoids.

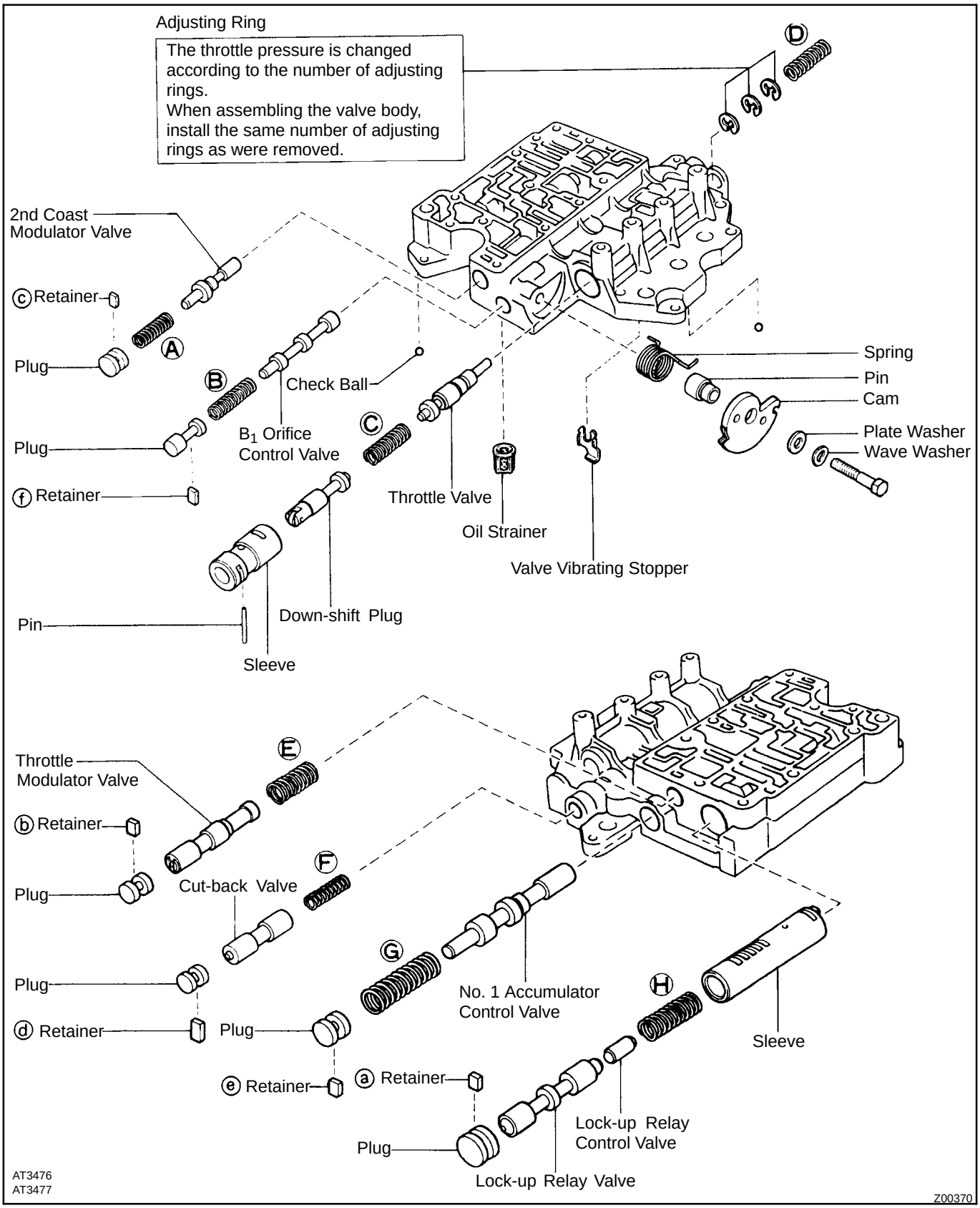
(e) Install and torque the three bolts.

HINT: Each bolt length (mm, in.) is indicated in the illustration.

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

UPPER VALVE BODY

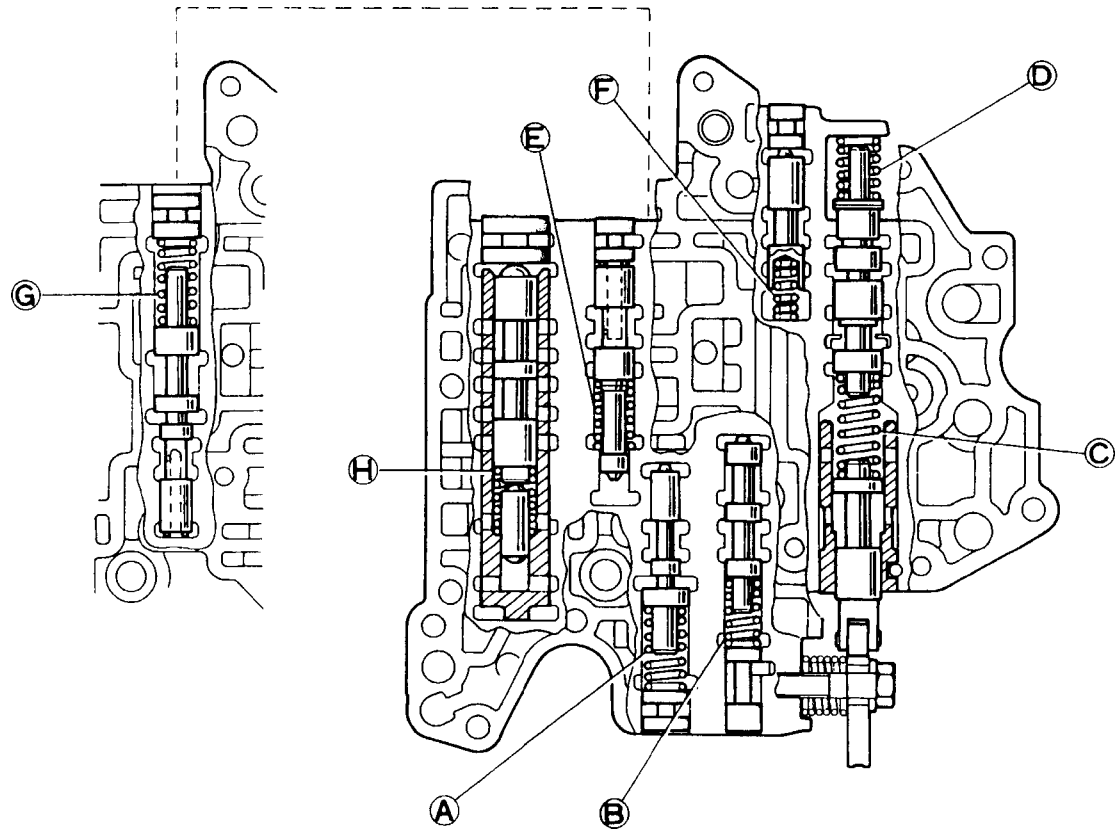
COMPONENTS



VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate the different springs.

Sectional View

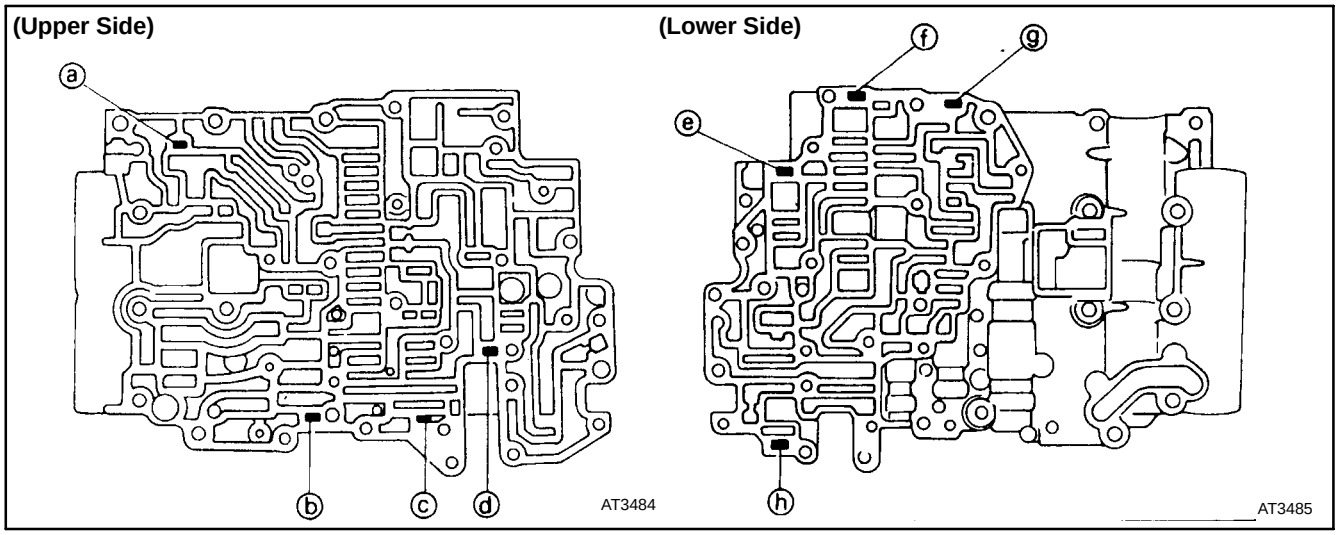


AT3603

Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
Ⓐ	Second Coast Modulator Valve (Brown)	27.5 (1.083) / 8.9 (0.350)	14.6
Ⓑ	B_1 Orifice Control Valve (White)	24.8 (0.976) / 8.0 (0.315)	12.0
Ⓒ	Down-Shift Plug (Yellow)	25.7 (1.012) / 6.7 (0.246)	9.65
Ⓓ	Throttle Valve (Purple)	30.7 (1.209) / 9.2 (0.362)	9.5
Ⓔ	Throttle Modulator Valve (Orange)	21.7 (0.854) / 9.5 (0.374)	9.5
Ⓕ	Cut-Back Valve (Red)	21.8 (0.858) / 6.0 (0.236)	13.5
Ⓖ	No. 1 Accumulator Control Valve (Yellow)	28.1 (1.106) / 10.6 (0.417)	13.0
Ⓗ	Lock-Up Relay Valve (Green)	26.6 (1.047) / 10.2 (0.402)	11.5

RETAINERS, PIN, STOPPER, CHECK BALL AND STRAINER LOCATION

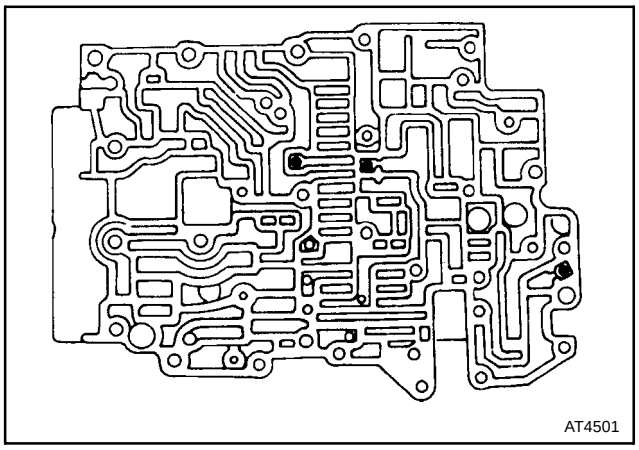
1. RETAINER



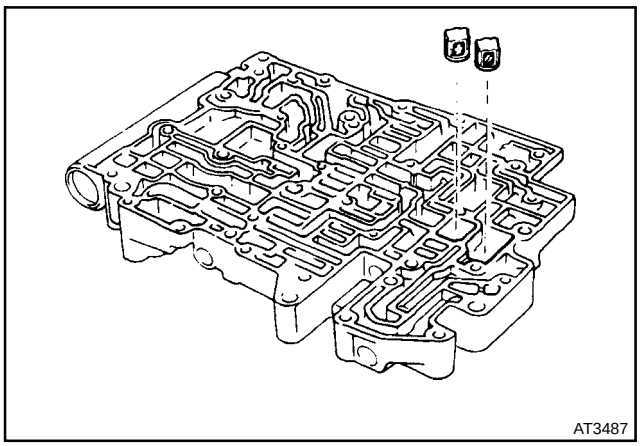
V02459

Mark	Name	Height / Width / Thickness mm (in.)
Ⓘ	Primary Regulator Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
Ⓙ	Secondary Regulator Valve	15.0 (0.591) / 5.0 (0.197) / 3.2 (0.126)
Ⓚ	No. 2 Accumulator Control Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
Ⓛ	Second Lock Valve	11.5 (0.453) / 5.0 (0.197) / 3.2 (0.126)
Ⓜ	Low Coast Modulator Valve	11.5 (0.453) / 5.0 (0.197) / 3.2 (0.126)
Ⓝ	1 - 2 Shift Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
Ⓞ	2 - 3 Shift Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
Ⓟ	3 - 4 Shift Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALL



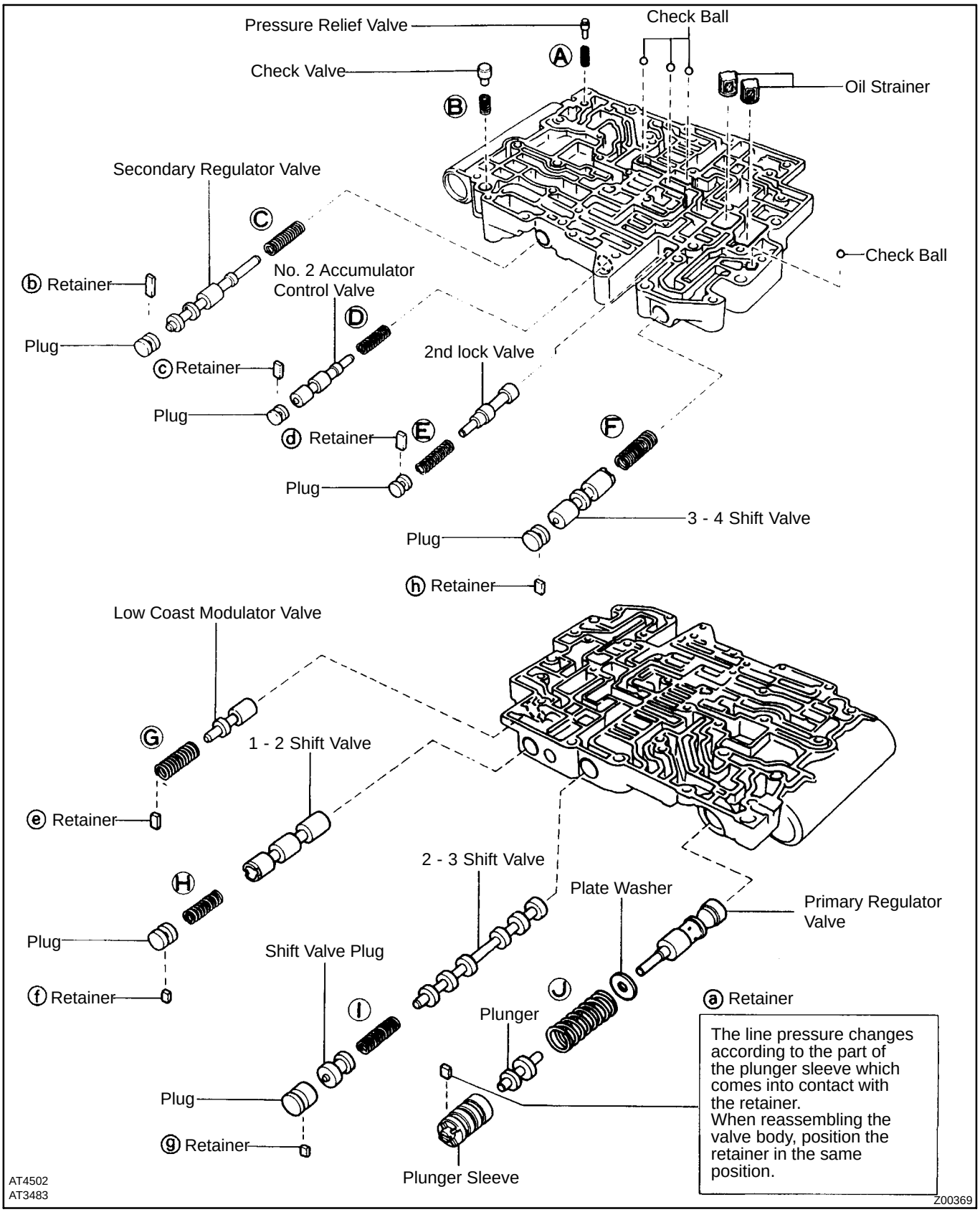
3. STRAINER



V02460

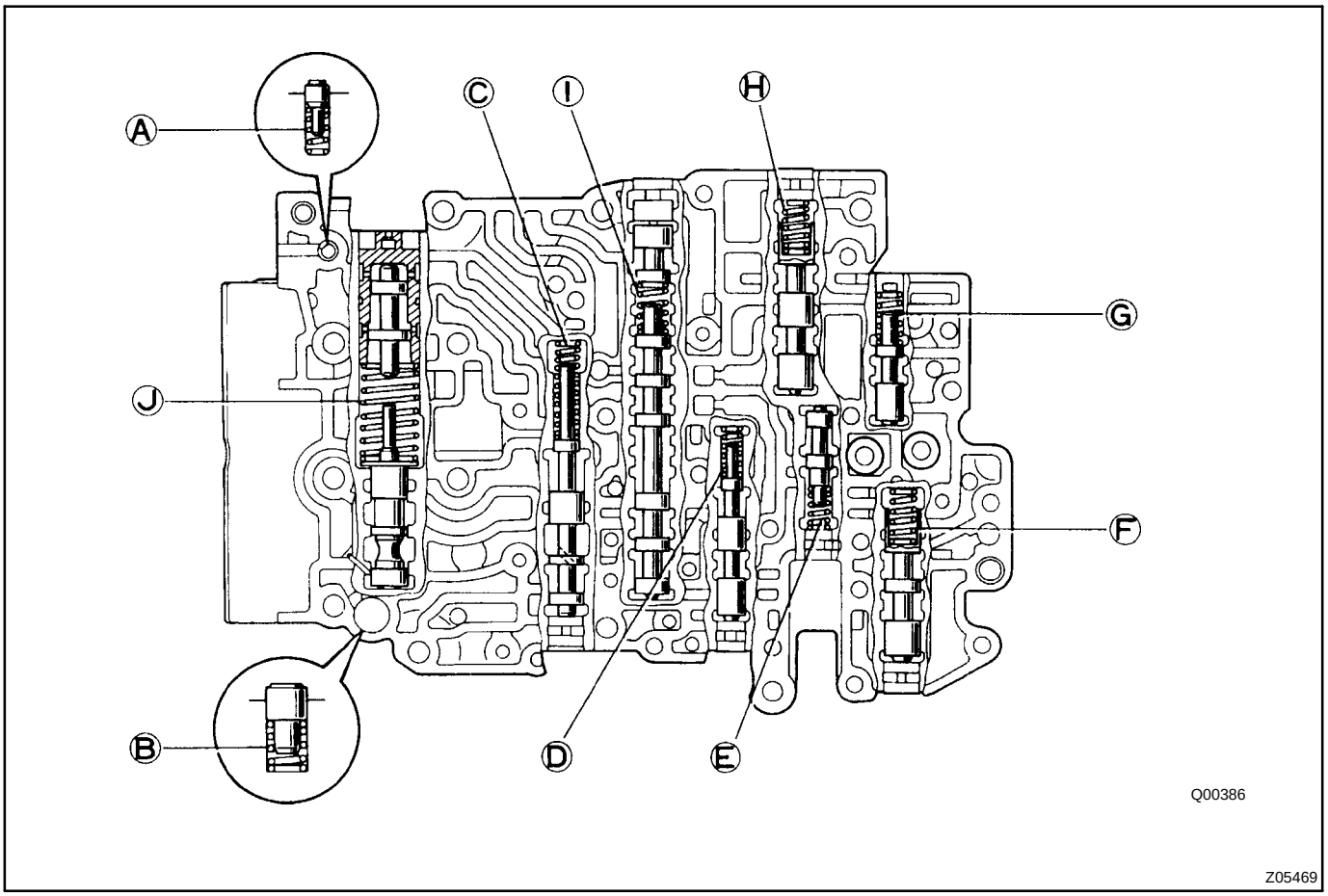
LOWER VALVE BODY

COMPONENTS



VALVE BODY SPRINGS SPECIFICATIONS

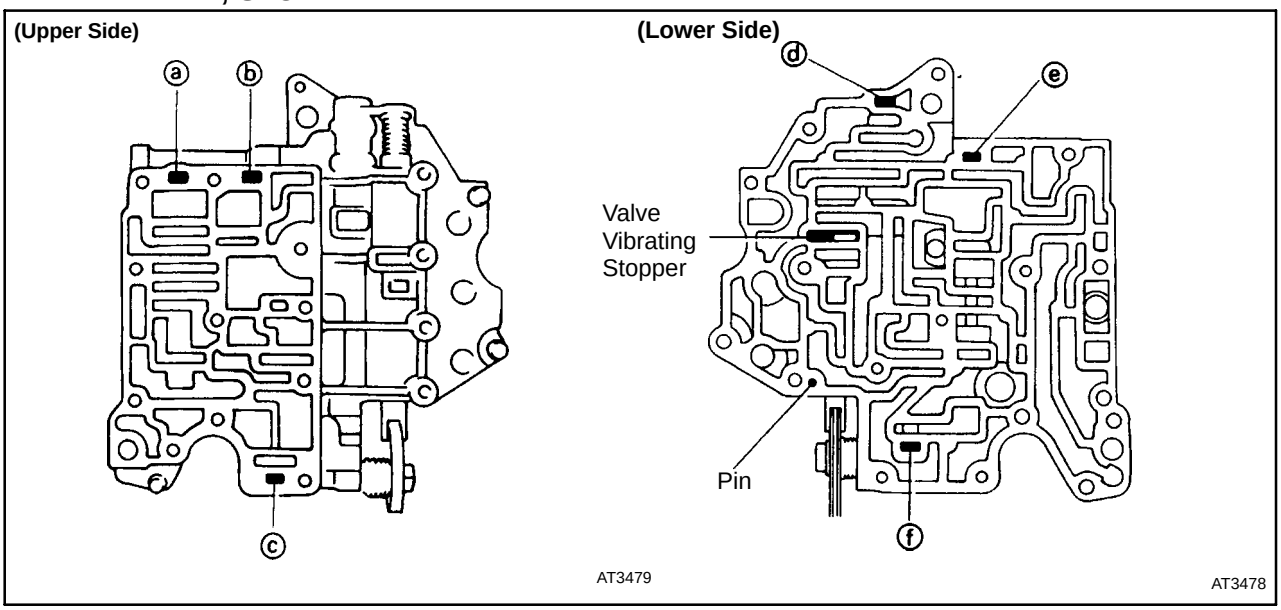
HINT: During reassembly please refer to the spring specifications above to help discriminate the different springs.



Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
Ⓐ	Pressure Relief Valve (None)	11.2 (0.441) / 6.4 (0.252)	7.5
Ⓑ	Check Valve (None)	19.9 (0.783) / 11.0 (0.433)	8.5
Ⓒ	Secondary Regulator Valve (Purple)	38.5 (1.516) / 8.4 (0.331)	17.0
Ⓓ	No. 2 Accumulator Control Valve (Gray)	23.0 (0.906) / 6.3 (0.248)	12.0
Ⓔ	Second Lock Valve (Orange)	20.7 (0.815) / 6.1 (0.240)	12.0
Ⓕ	3 - 4 Shift Valve (Light Green)	29.2 (1.150) / 8.9 (0.350)	12.0
Ⓖ	Low Coast Modulator Valve (Purple)	20.2 (0.975) / 7.9 (0.311)	11.9
Ⓗ	1 - 2 Shift Valve (None)	33.5 (1.319) / 8.9 (0.350)	12.0
Ⓘ	2 - 3 Shift Valve (None)	28.0 (1.102) / 9.4 (0.370)	10.3
Ⓙ	Primary Regulator Valve (None)	64.2 (2.528) / 18.6 (0.732)	12.5

RETAINERS, CHECK BALLS AND STRAINERS LOCATION

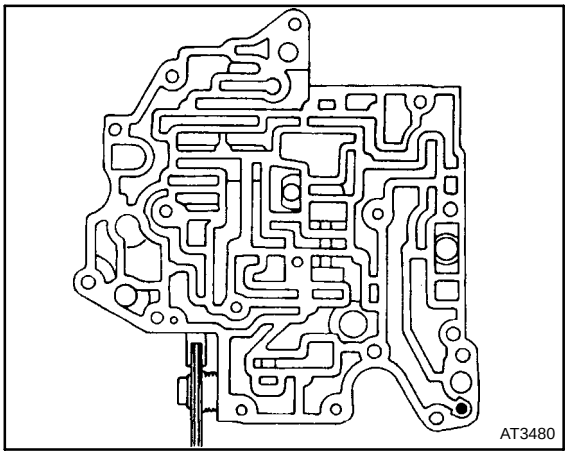
1. RETAINER, STOPPER AND PIN



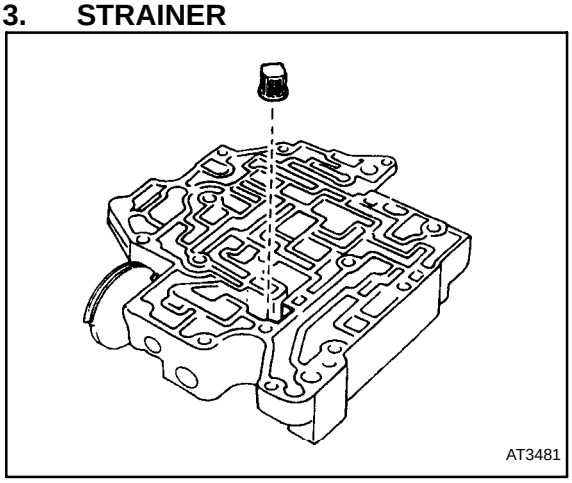
V02463

Mark	Name	Height / Width / Thickness mm (in.)
Ⓚ	Lock-Up Relay Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
Ⓛ	Throttle Modulator Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
Ⓜ	Second Coast Modulator Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
Ⓝ	Cut-Back Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
Ⓞ	No. 1 Accumulator Control Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
Ⓟ	B_1 Orifice Control Valve	11.5 (0.453) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALL



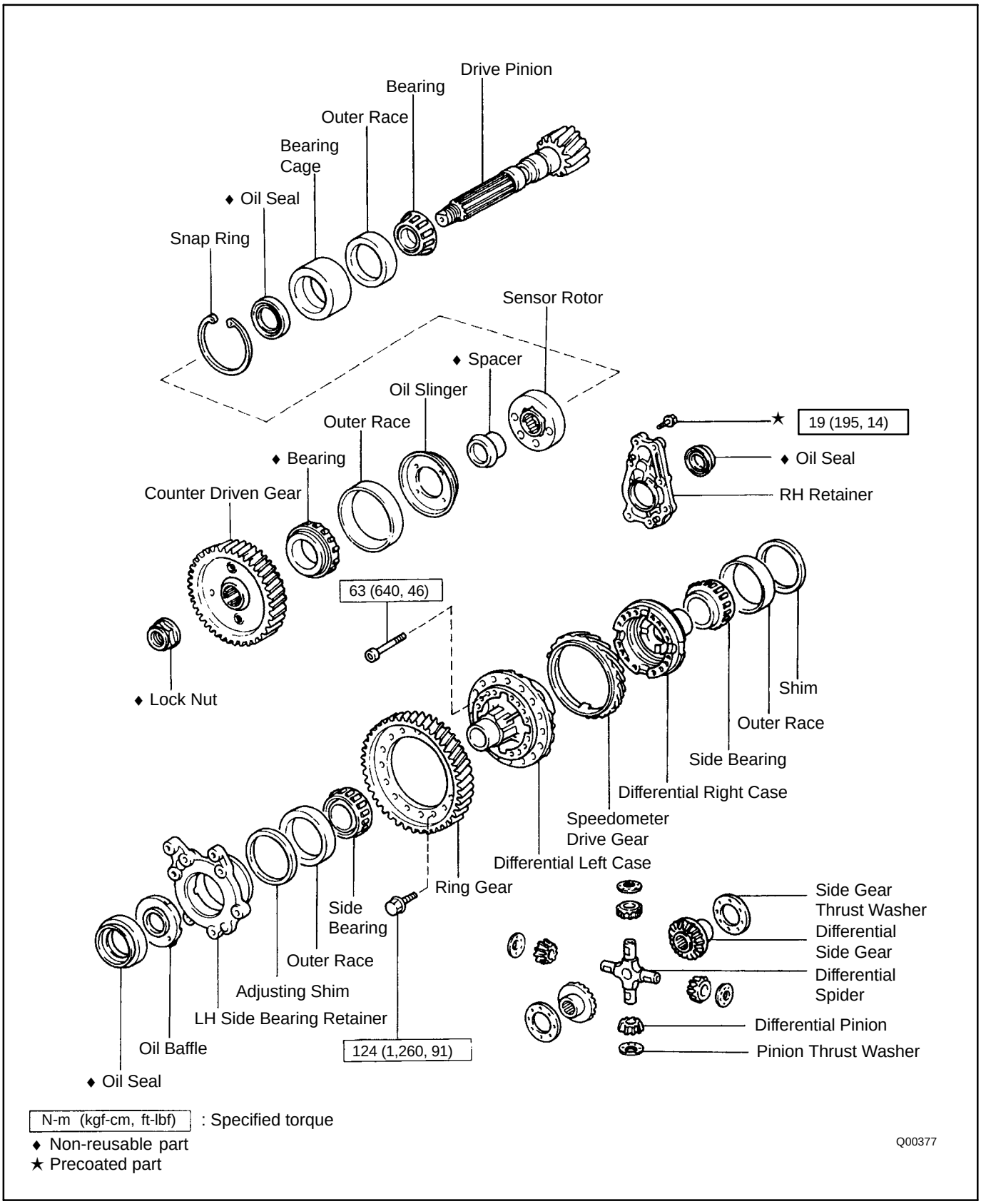
3. STRAINER



V02464

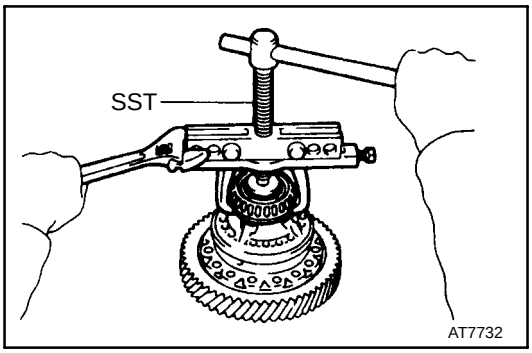
DIFFERENTIAL ASSEMBLY

COMPONENTS



N-m (kgf-cm, ft-lbf) : Specified torque
♦ Non-reusable part
★ Precoated part

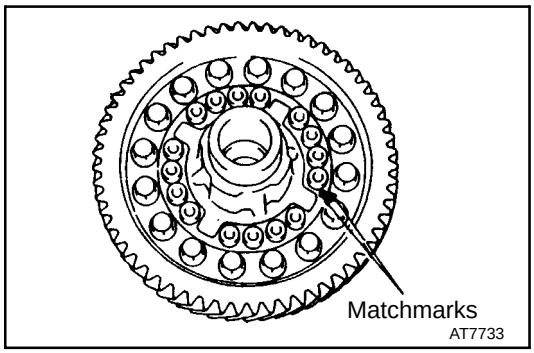
Q00377



DIFFERENTIAL CASE DISASSEMBLY

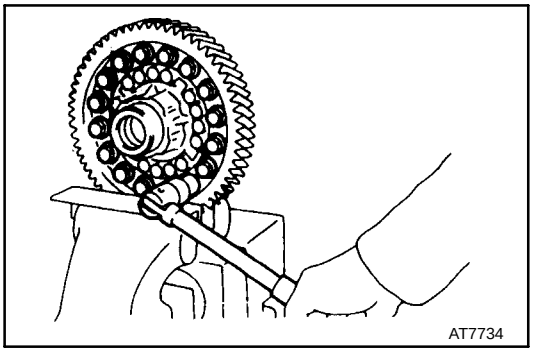
1. REMOVE SIDE BEARING

Using SST, remove the two side bearings.
SST 09550-20017

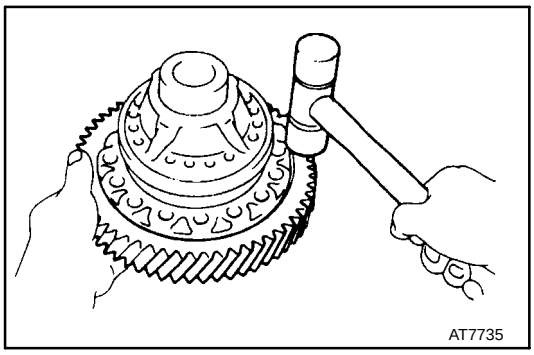


2. REMOVE RING GEAR

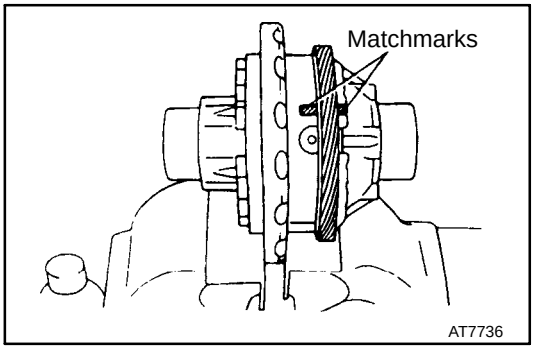
(a) Place the matchmarks on both the differential case and ring gear.



(b) Remove the sixteen bolts.

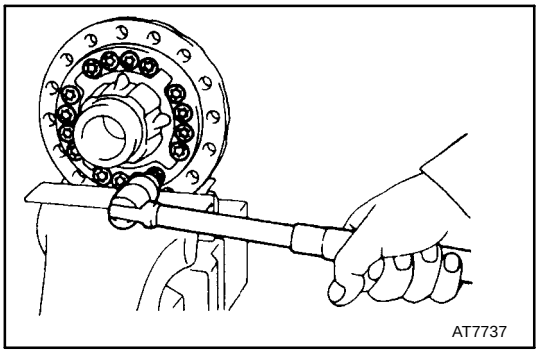


(e) Using a plastic hammer, tap out the ring gear.

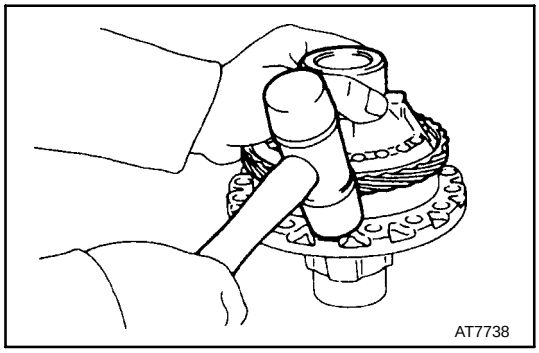


3. DISASSEMBLY OF DIFFERENTIAL CASE

(a) Place the matchmarks on the differential right and left case.

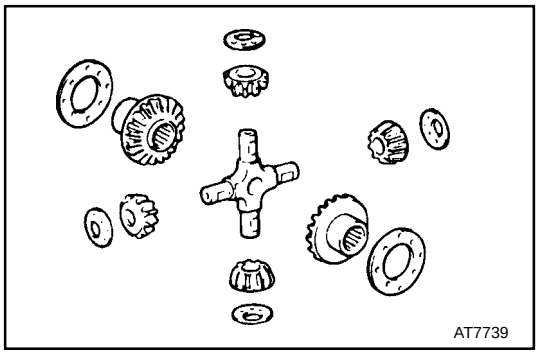


(b) Using a torx wrench, remove the sixteen torx screws.

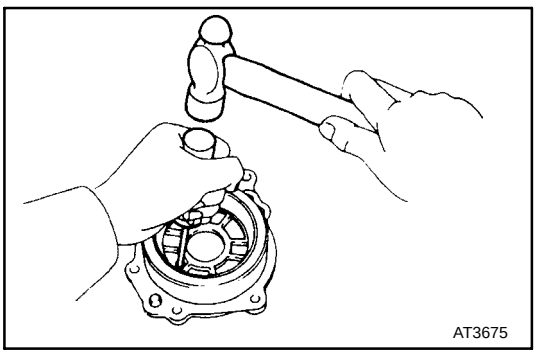


(c) Using a plastic hammer, tap out the differential left case.

(d) Remove the speedometer drive gear from the differential right case.



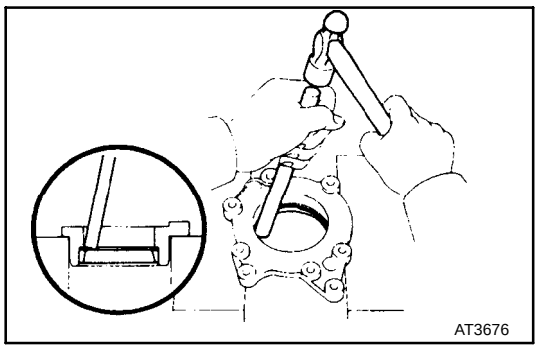
(e) Remove the two differential side gears, two side thrust washers, differential spider, four differential pinions and four pinion washers from the differential left case.



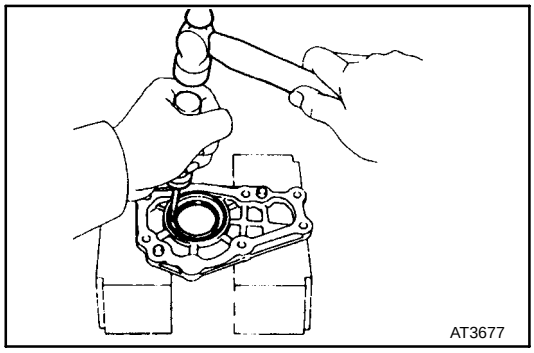
4. DISASSEMBLY LH BEARING RETAINER

(a) Using a hammer and screwdriver, remove the oil seal.

(b) Remove the oil baffle from the LH bearing retainer.



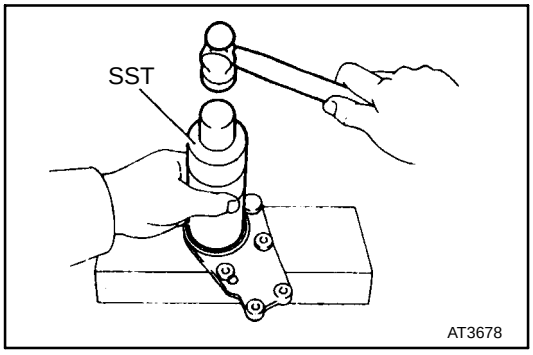
(c) Using a hammer and brass bar, drive out the outer race and adjusting shim from LH bearing retainer.



5. REMOVE RH OIL SEAL FROM RH RETAINER

Using a hammer and screwdriver, drive out the oil seal.

DIFFERENTIAL CASE ASSEMBLY

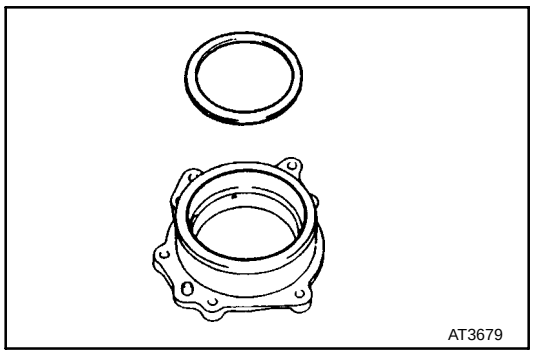


1. INSTALL RH OIL SEAL TO RH RETAINER

(a) Using SST, drive in a new oil seal until its surface is flush with the surface of RH retainer.

SST 09316-60010 (09316-00010)

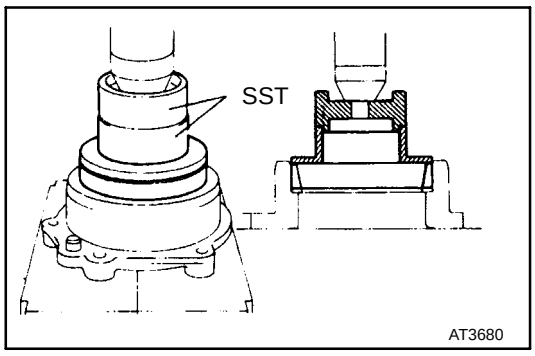
(b) Coat the oil seal lip with MP grease.



2. INSTALL ADJUSTING SHIM AND BEARING OUTER RACE TO LH BEARING RETAINER

(a) Place the adjusting shim into the LH bearing retainer.

HINT: Use either the shim which was removed or one 2.40 mm (0.0945 in.).

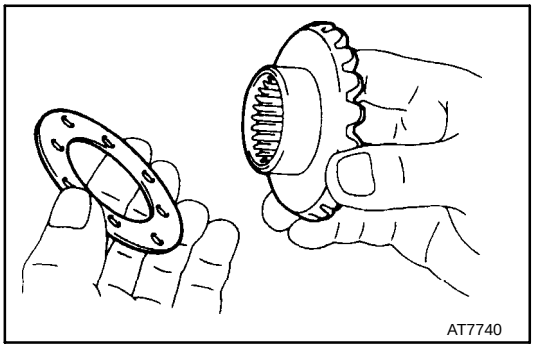


(b) Using SST, press the outer race into the LH retainer.

SST 09316-2001 1, 09350-32014 (09351-32150)

HINT: Install the oil baffle and oil seal after adjusting the differential side bearing preload.

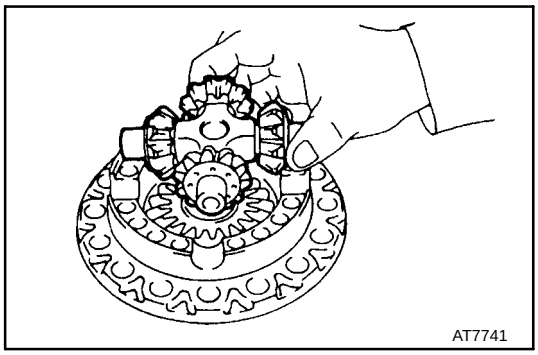
(See page AX-106)



3. ASSEMBLE DIFFERENTIAL CASE

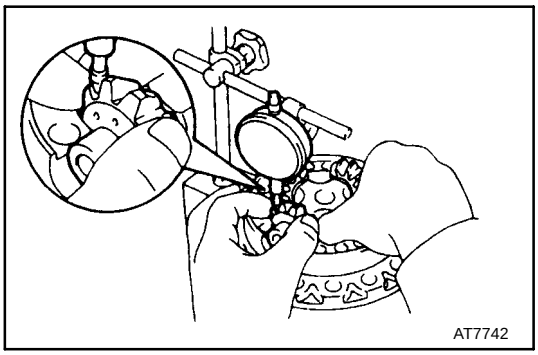
HINT: Coat all of the sliding and rotating surface with ATF before assembly.

(a) Install the thrust washer to the side gear.



(b) Install the four pinions and thrust washers to the spider.

(c) Install the side gear and spider with four pinions to the differential left case.



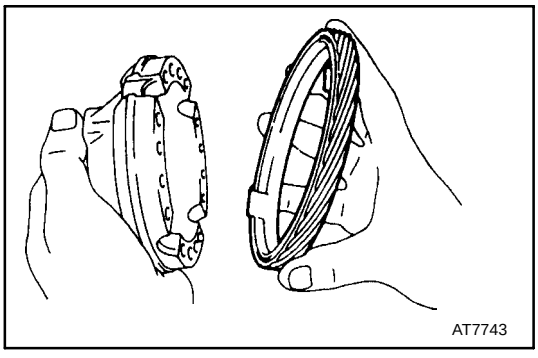
(d) Using a dial indicator, measure the backlash of one pinion gear while holding the side gear.

Standard backlash:
0.05 - 0.20 mm (0.0020 - 0.0079 in.)

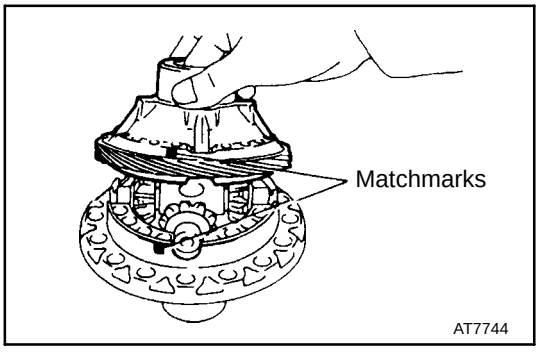
(e) Install the side gear and spider with four pinions to the right side of the differential case. And check the pinion gear backlash.

(f) Referring to the table below, select the side gear thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

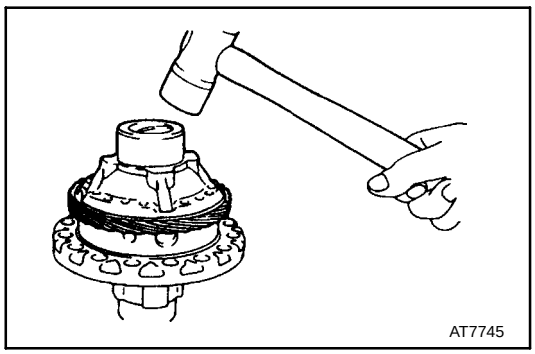
Thickness mm (in.)	Thickness mm (in.)
0.80 (0.0315)	1.20 (0.0472)
0.90 (0.0354)	1.30 (0.0512)
1.00 (0.0394)	1.40 (0.0551)
1.10 (0.0433)	



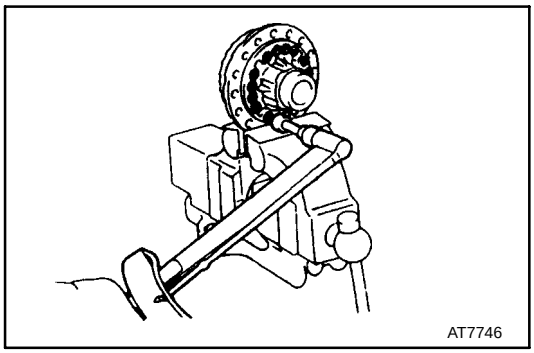
(g) Install the speedometer drive gear.



(h) Align the matchmarks on the differential cases.

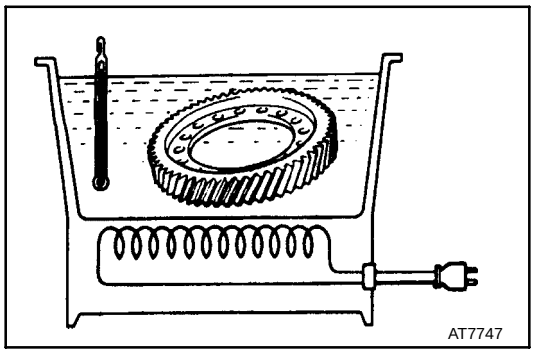


(l) Using a plastic hammer, carefully tap the differential right case.



(j) Using a torx wrench, install and torque the sixteen torx screws.

Torque: 63 N-m (640 kgf-cm, 46 ft-lbf)



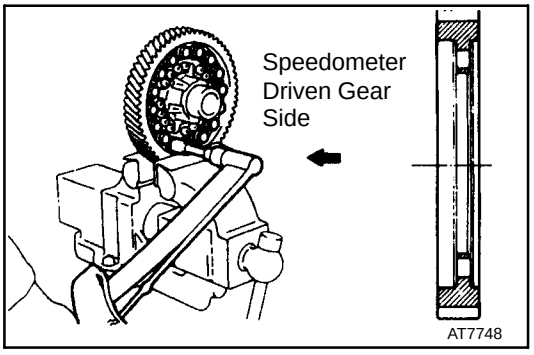
4. INSTALL RING GEAR

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 100˚C (212˚F) in an oil bath.

NOTICE: Do not heat the ring gear above 110˚C (230˚F).

(c) Clean the contact surface of the ring gear with cleaning solvent.

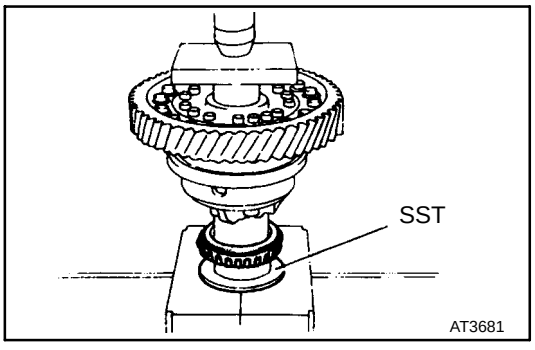


(d) Quickly install the ring gear on the differential case. Install the sixteen bolts.

HINT: Align the matchmarks on the differential left case and contact the ring gear.

(e) Tighten the set bolts uniformly and a little at a time. Torque the bolts.

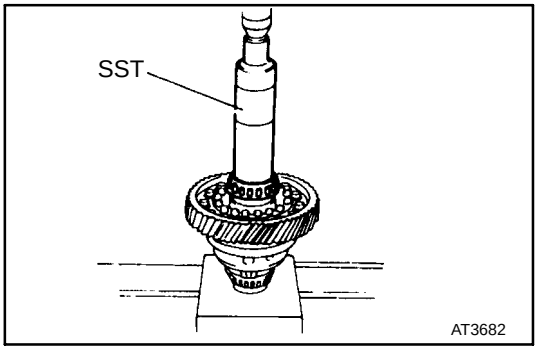
Torque: 124 N-m (1,260 kgf-cm, 91 ft-lbf)



5. INSTALL SIDE BEARINGS

(a) Using SST and a press, install the RH side bearing to the differential case.

SST 09361-2001 1



(b) Using SST and a press, install the LH side bearing.
SST 09316-60010 (09316-00010)

COMPONENT PARTS INSTALLATION

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. Before assembly, make sure, again, that all component groups are assembled correctly.
If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.
Recommended ATF:
DEXRON® II

GENERAL INSTALLATION NOTES:

(a) The automatic transaxle is composed of highly precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.

(b) Before assembling new clutch discs, soak them in automatic transaxle fluid for at least fifteen minutes.

(c) Apply automatic transaxle fluid on the, sliding or rotating surfaces of parts before assembly.

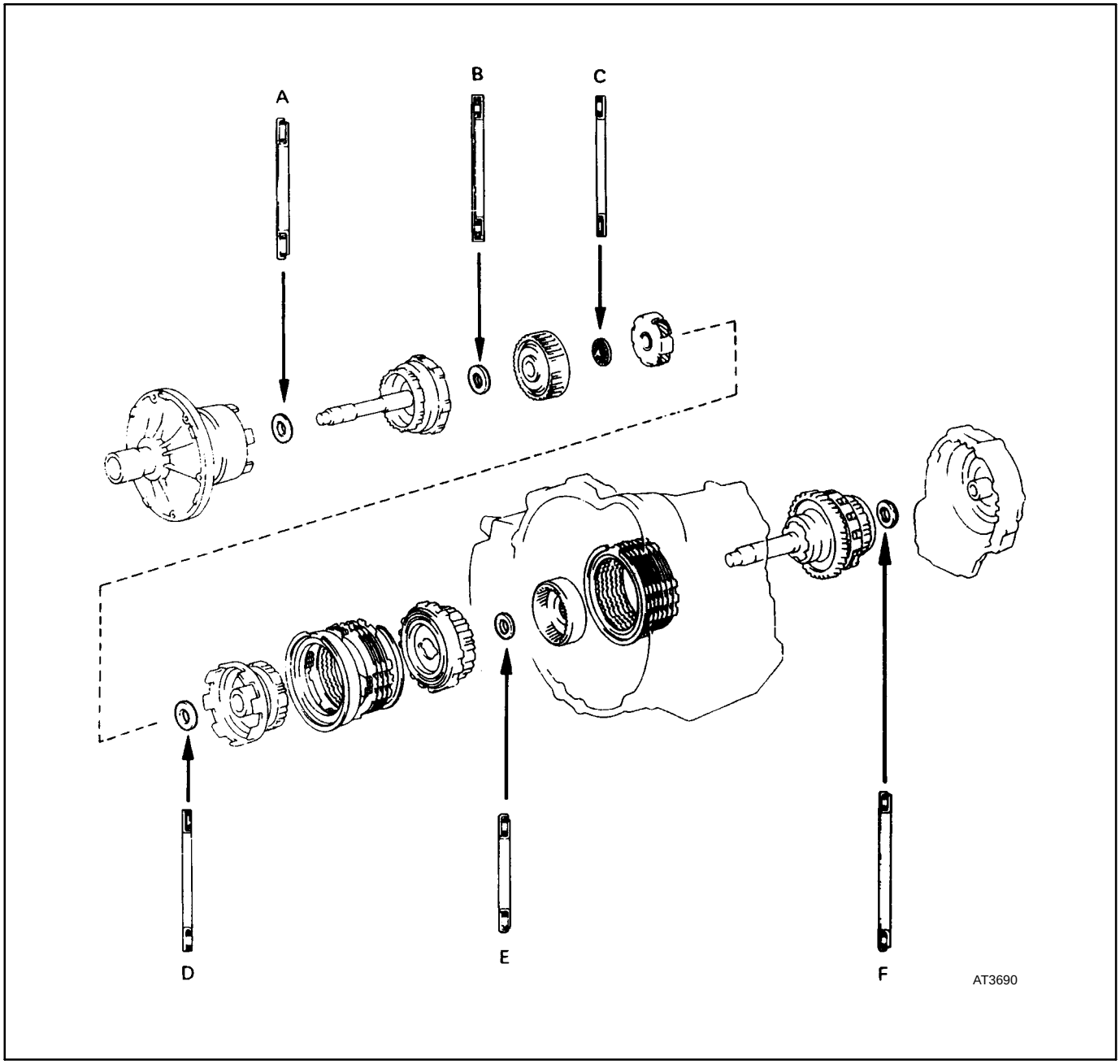
(d) Use petroleum jelly to keep small parts in their places.

(e) Do not use adhesive cements on gaskets and similar parts.

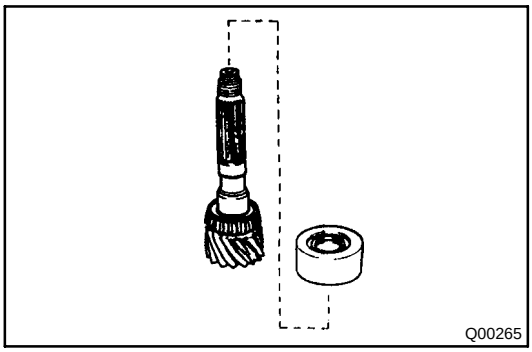
(f) When assembling the transaxle, be sure to use new gaskets and O-rings.

(g) Dry all parts with compressed air - never use shop rags.

(h) Be sure to install the thrust bearings and races in the correct direction and position.



Mark	Thrust Bearing Outside Diameter mm (in.)	Thrust Bearing Inside Diameter mm (in.)
A	See page AX-118	27.7 (1.091)
B	47.6 (1.874)	31.4 (1.236)
C	45.5 (1.791)	30.1 (1.185)
D	45.5 (1.791)	30.1 (1.185)
E	38.7 (1.524)	22.6 (0.890)
F	46.3 (1.823)	28.6 (1.126)

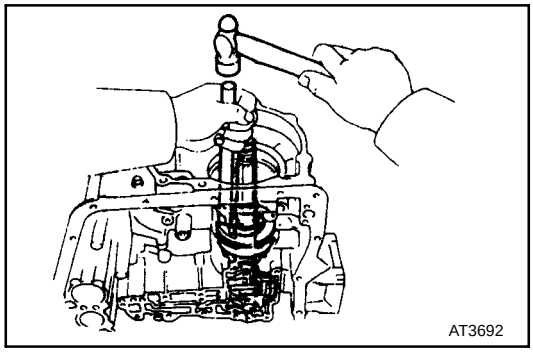


DIFFERENTIAL AND DRIVE PINION INSTALLATION

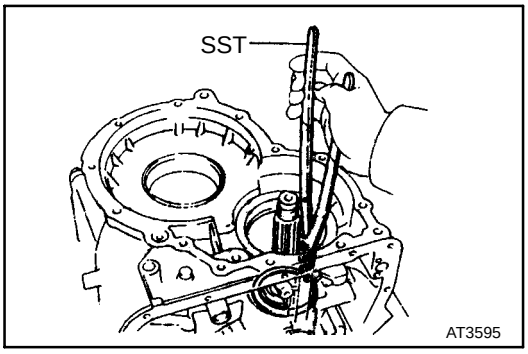
1. INSTALL DRIVE PINION INTO TRANSAXLE CASE

(a) Place the bearing cage onto the drive pinion shaft.

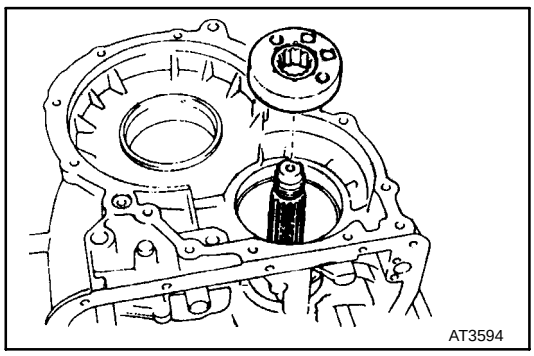
NOTICE: Be careful not to damage the oil seals with the pinion shaft.



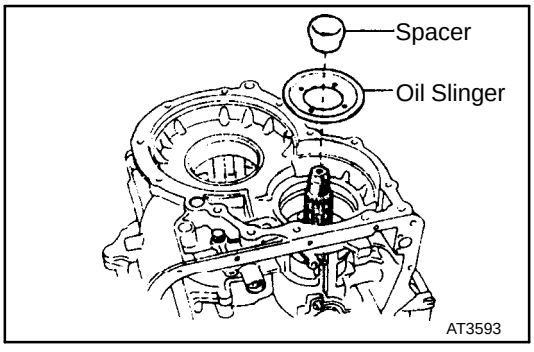
(b) Using a hammer and brass bar, slightly tap the bearing cage into the transaxle case until the snap ring groove in the bore can be seen.



(a) Using SST, install snap ring into the bore.
SST 09350-32014 (09351-32050)

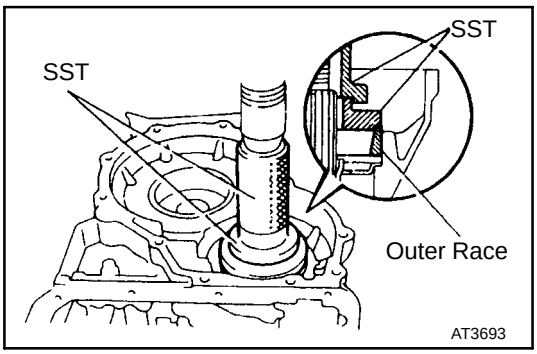


2. PLACE SENSOR ROTOR ONTO DRIVE PINION SHAFT



3. PLACE OIL SLINGER AND NEW SPACER

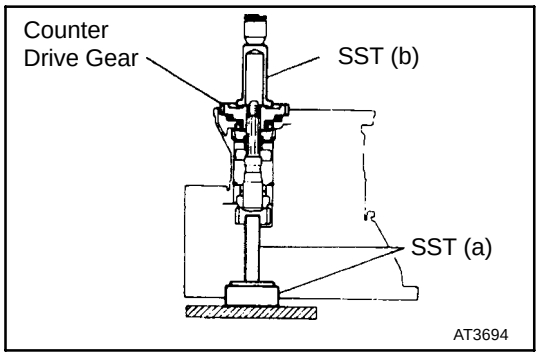
HINT: Install the spacer with the small end downward.



4. INSTALL OUTER RACE TO TRANSAXLE CASE

Using SST, press in the outer race.

SST 09350-32014 (09351-32100, 09351-32140)



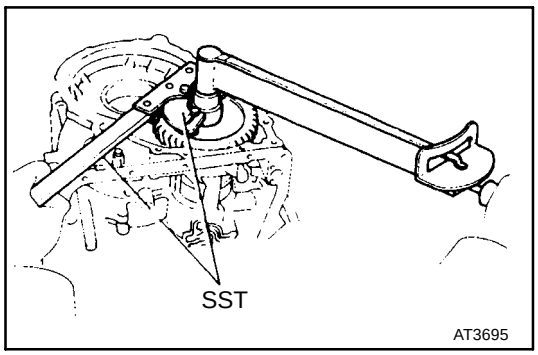
5. INSTALL COUNTER DRIVE GEAR

(a) Place SST into the transaxle hole to hold the drive pinion shaft.

SST 09350-32014 (09351-32130, 09351-32150)

(a) Using SST, press in the counter driven gear until slightly thickness between the counter driven gear bearing and outer race.

SST 09350-32014 (09351-32140)



6. INSTALL NEW LOCK NUT AND ADJUST DRIVE PINION PRELOAD

(a) Install the new lock nut.

(b) Using SST to hold the gear, tighten the nut.

Torque: 206 N-m (2,100 kgf-cm, 152 ft-lbf)

SST 09330-00021, 09350-32014 (09351-32032)

(c) Turn the gear counterclockwise and clockwise several times.

(d) Using a torque meter, measure the preload of the drive pinion.

Drive pinion preload (at starting):

New bearing

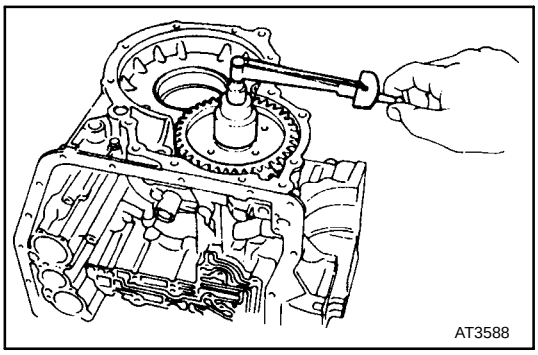
1.0 - 1.6 N-m (10 - 16 kgf-cm, 8.7 - 13.9 in.-lbf)

Reused bearing

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

If the preload is greater than specified, replace the bearing spacer.

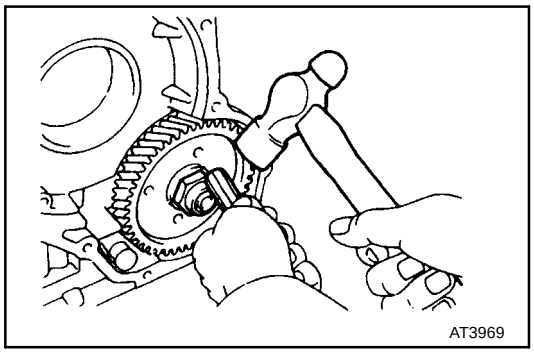
If the preload is less then specified, retighten the nut 13 N-m (130 kgf-cm, 9 ft-lbf) at a time until the specified preload is reached.



If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

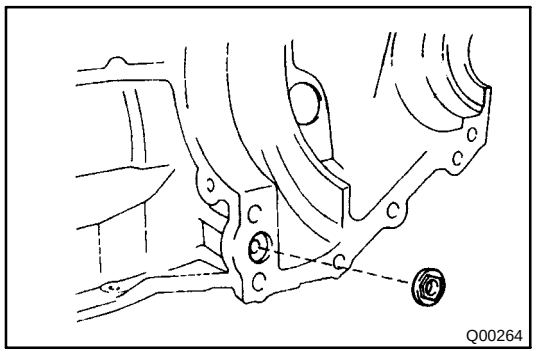
Do not back off the nut to reduce the preload.

Maximum torque: 353 N-m (3,600 kgf-cm, 260 ft-lbf)

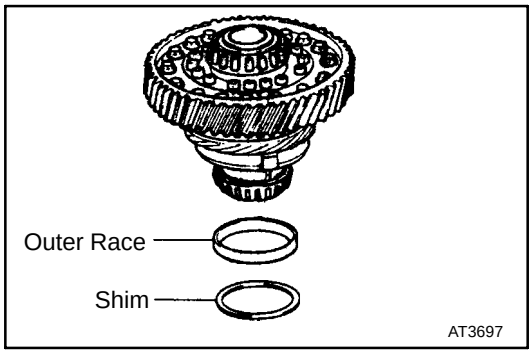


(e) If the preload is adjusted within specification, make a note of it.

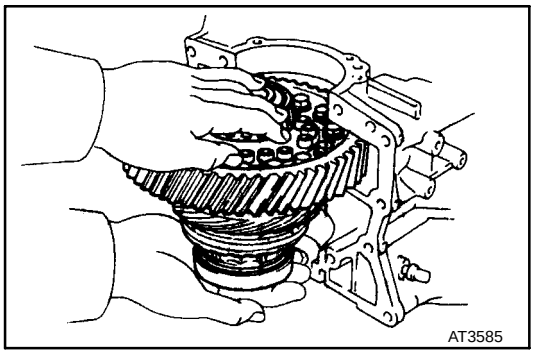
(f) Stroke the lock nut.



7. INSTALL APPLY GASKET

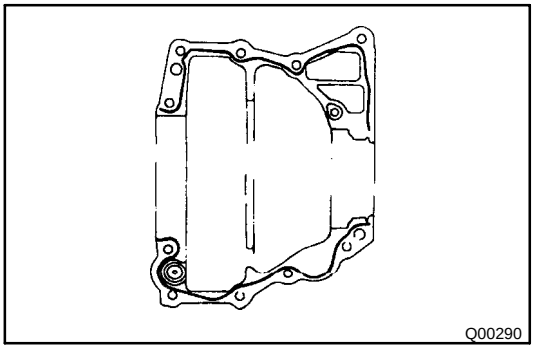


8. PLACE OUTER RACE AND SHIM ONTO RH SIDE BEARING



8. PLACE DIFFERENTIAL CASE INTO TRANAXLE CASE

Be sure to install the shim and outer race into place.



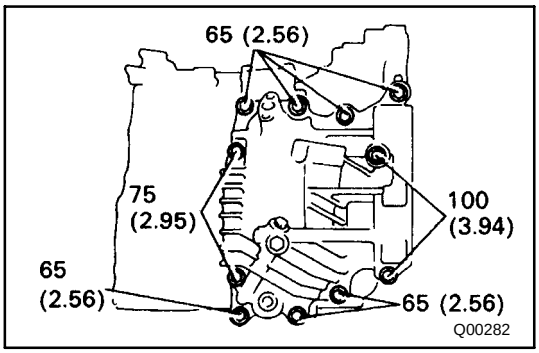
10. INSTALL CARRIER COVER

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the carrier cover and transaxle case.

(b) Apply seal packing to the carrier cover, as shown.

Seal packing:
Part No. 08826 - 00090, THREE BOND 1281 or equivalent

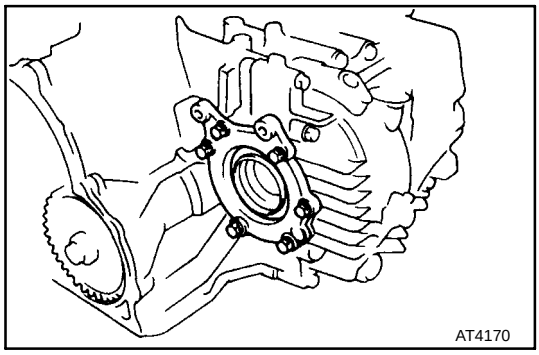
HINT: Install the carrier cover within ten minutes after applying seal packing.



(c) Install and torque the eleven bolts.

Torque: 39 N-m (400 kgf-cm, 29 ft-lbf)

HINT: Each bolt length (mm, in.) is indicated in the illustration.



11. ADJUST SIDE BEARING PRELOAD

(a) Remove any packing material on the contacting surfaces of the LH bearing retainer and transaxle case.

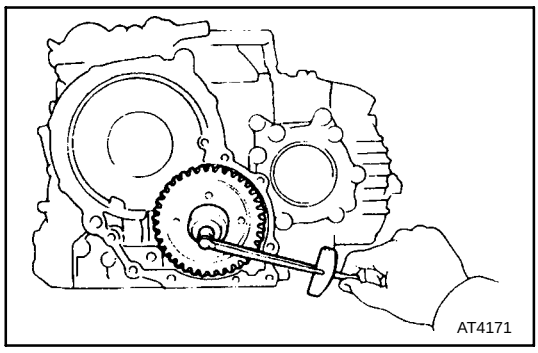
HINT: Do not apply seal packing yet.

(b) Install the LH bearing retainer and torque the six bolts.

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

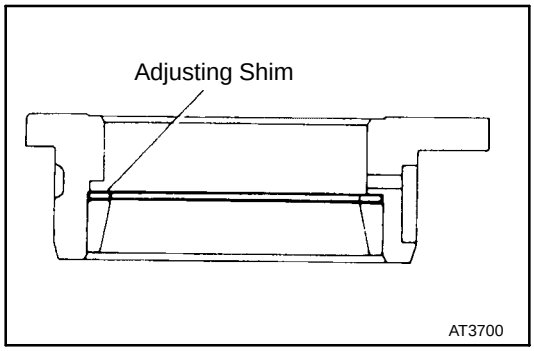
(c) Snap down the bearings by turning the differential case several times.

(d) Using a torque meter, measure the differential total preload.



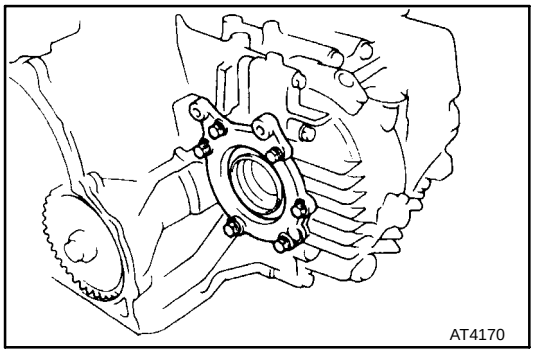
Total preload (at starting):
Add drive pinion preload
New bearing
0.2 - 0.4 N-m (2.5 - 5.1 kgf-cm, 2.2 - 3.6 in.-lbf)
Reused bearing
0.1 - 0.2 N-m (1.3 - 2.0 kgf-cm, 1.1 - 1.7 in.-lbf)

If the preload is not within specification, replace the adjusting shim in the LH bearing retainer with another thickness one.



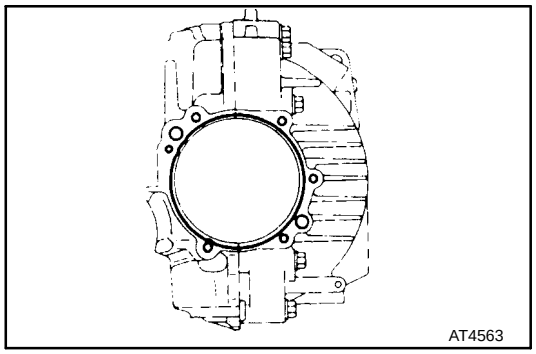
Adjusting shim thickness:

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



12. INSTALL LH BEARING RETAINER

(a) Remove the six bolts and LH bearing retainer.



(b) Remove any packing material on the contacting surfaces of LH bearing retainer, transaxle case and carrier cover.

(c) Apply the seal packing to the transaxle case and carrier cover, as shown.

Seal packing:
Part No. 08826 - 00090, THREE BOND 1281 or equivalent

HINT: Install the LH bearing retainer with ten minutes after applying seal packing.

(d) Install the LH bearing retainer.

(e) Coat the threads of bolts with sealer.

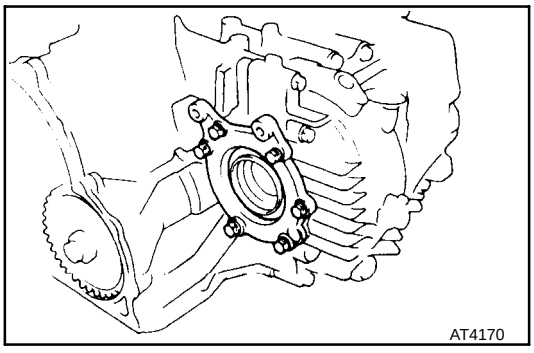
Sealer:
Part No. 08833 - 00070, THREE BOND 1324 or equivalent

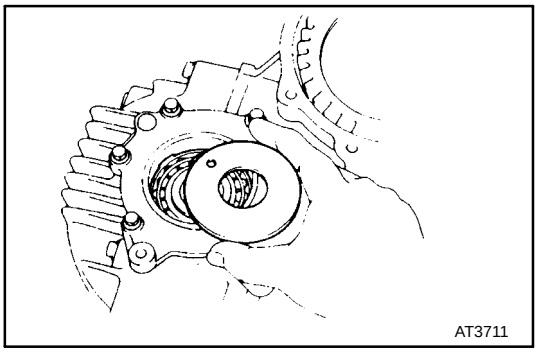
(f) Tighten the bolts.

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

(g) Snap down the bearings.

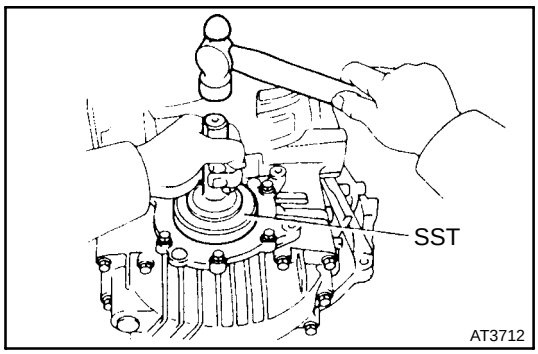
(h) Recheck the differential total preload.





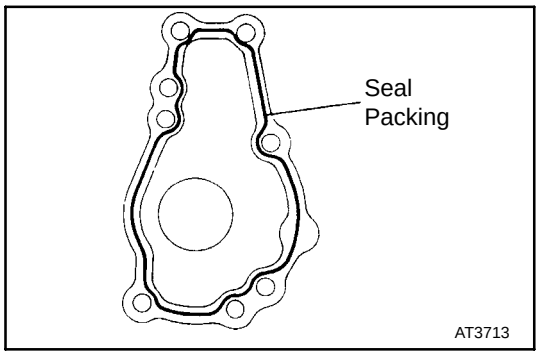
13. INSTALL NEW OIL SEAL

(a) Place the oil baffle onto the LH bearing retainer.



(b) Using SST, driven in a new oil seal unit its end is flush with surface of the LH bearing retainer.

SST 09223-15010



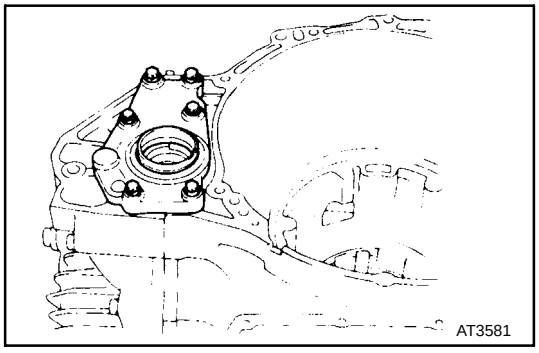
14. INSTALL RH RETAINER

(a) Remove any packing material on the contacting surfaces of RH retainer and transaxle case.

(b) Apply the seal packing to the RH retainer, as shown.

Seal packing:
Part No. 08826 - 00090, THREE BOND 1281 or equivalent

HINT: Install the RH retainer within ten minutes after applying seal packing.

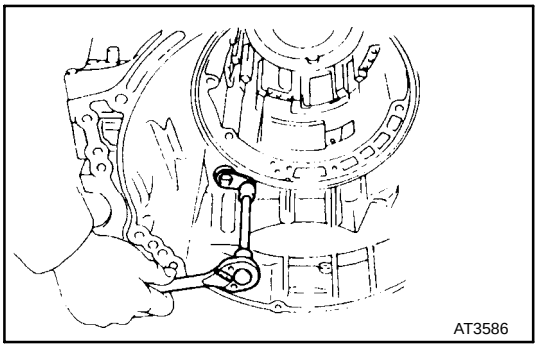


(c) Coat the threads of bolts with sealer.

Sealer:
Part No. 08833 - 00070, THREE BOND 1324 or equivalent

(d) Tighten the bolts.

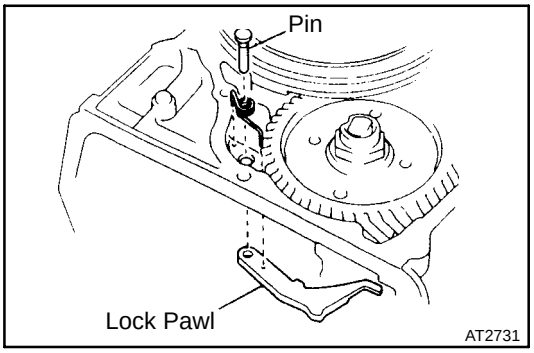
Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)



15. INSTALL DRIVE PINION CAP

(a) Install a new O-ring to the cap.

(b) Install the drive pinion cap to the transaxle case.

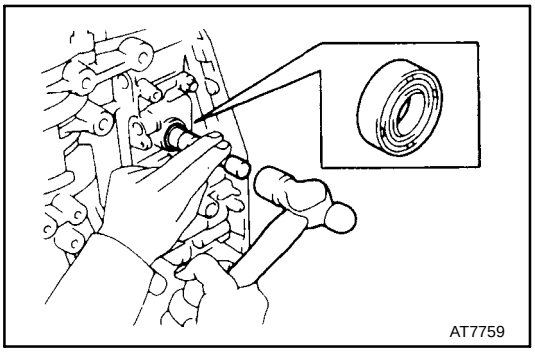


4-SPEED GEAR UNIT INSTALLATION

1. INSTALL PARKING LOCK PAWL

(a) Place the parking lock pawl onto the case. Hook the spring ends to the case and pawl.

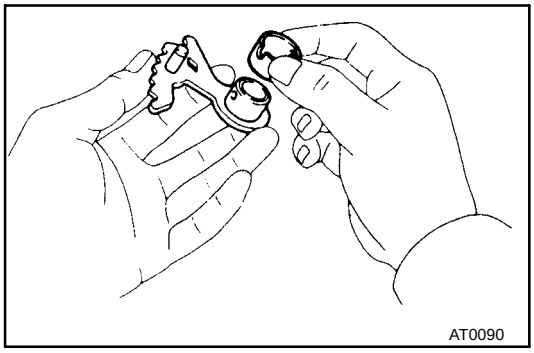
(b) Instal the pin into the hole of the case through the spring and pawl.



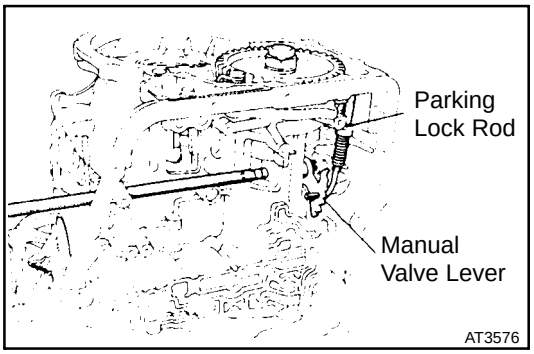
2. INSTALL MANUAL VALVE SHAFT

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

(b) Install the manual valve shaft oil seal to the case.

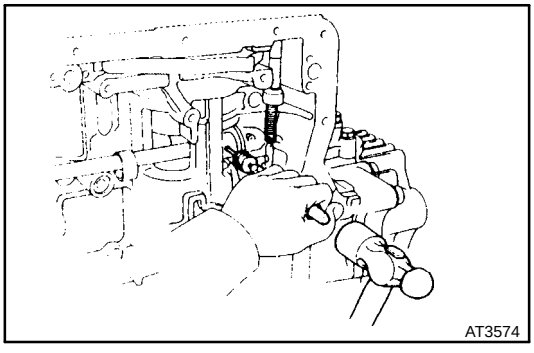


(c) Assembly a new collar to the manual valve lever.

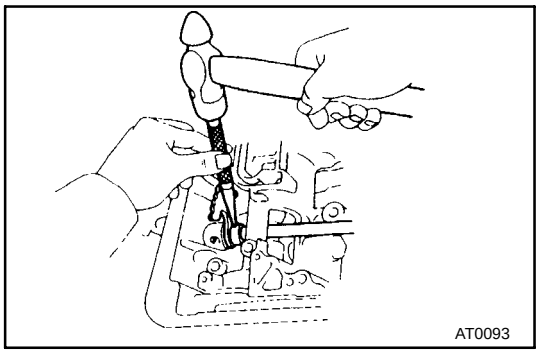


(d) Install the manual valve shaft to the transmission case through the manual lever.

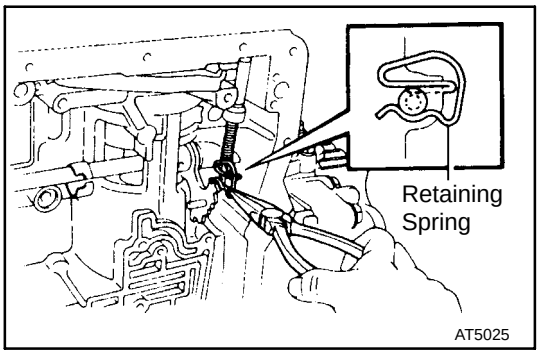
(e) Install the parking lock rod.



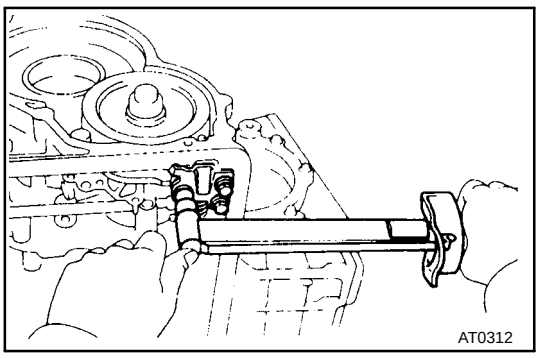
(f) Using a pin punch, drive in the roll pin until its surface is flush with the manual valve lever surface.



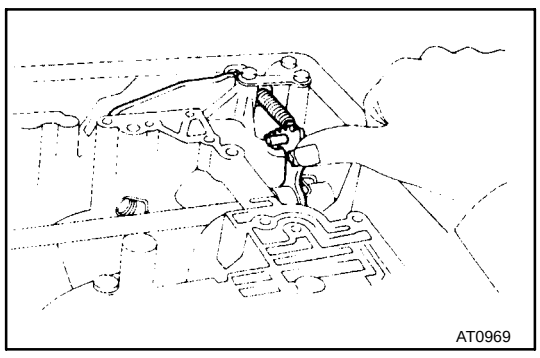
(g) Match the collar hole to the lever calking hollow and calk the collar to the lever.



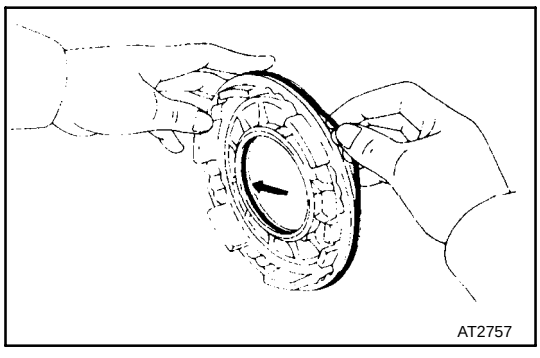
(h) Install the retaining spring.



3. INSTALL PARKING LOCK PAWL BRACKET
Torque: 7.4 N-m (75 kgf-cm, 65 in.-lbf)



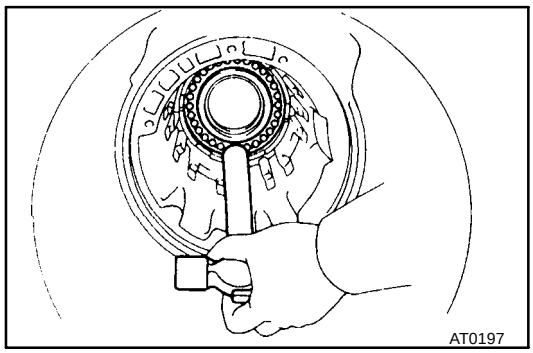
4. CHECK OPERATION OF PARKING LOCK PAWL
Make sure the counter driven gear is locked when the manual valve lever is in the P position.



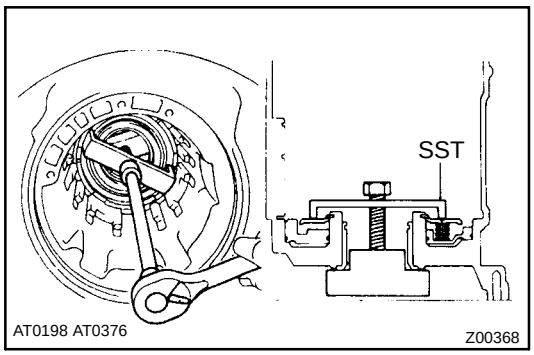
5. INSTALL FIRST AND REVERSE BRAKE PISTON TO TRANSMISSION CASE

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

(b) Install the two O-rings on the piston.



(c) Push the piston into the bore of the case, facing the spring seat upward.

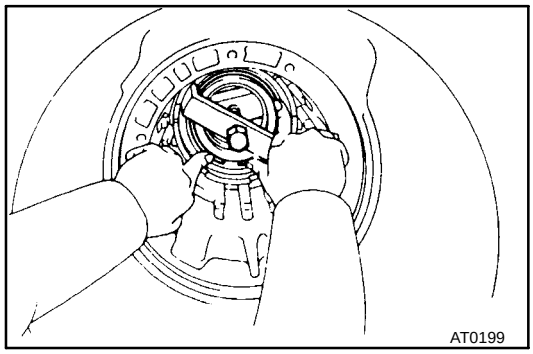


6. INSTALL PISTON RETURN SPRING

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

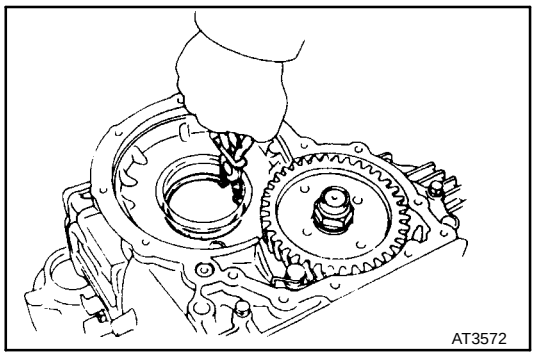
(b) Place SST, and compress the return spring evenly by tightening the bolt gradually.

SST 09350-32014 (09351-32040)

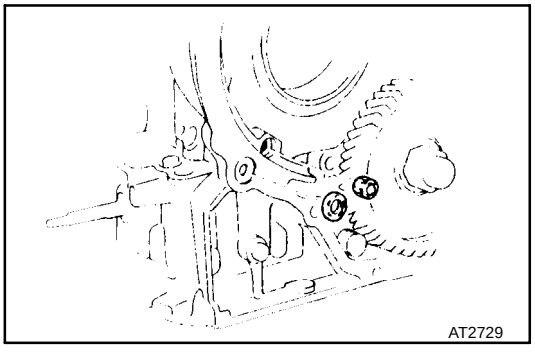


(c) Install snap ring. Visually check to make sure it is fully seated and centered by the three lugs on the spring retainer.
Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(d) Remove the SST.

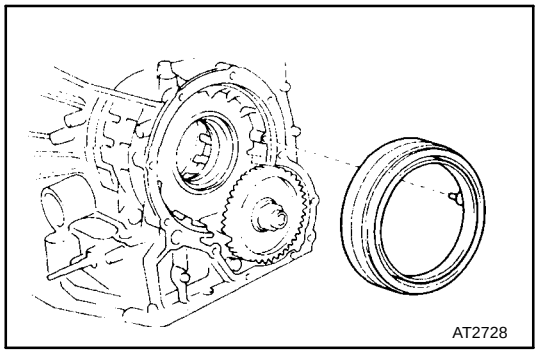


7. INSTALL SNAP RING TO TRANSAXLE CASE



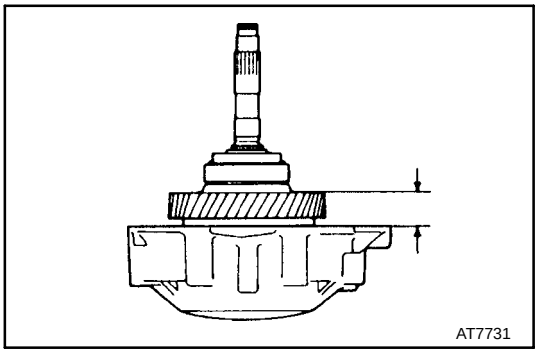
8. INSTALL OVERDRIVE UNIT

(a) Install the overdrive brake apply gasket and overdrive clutch apply gasket.

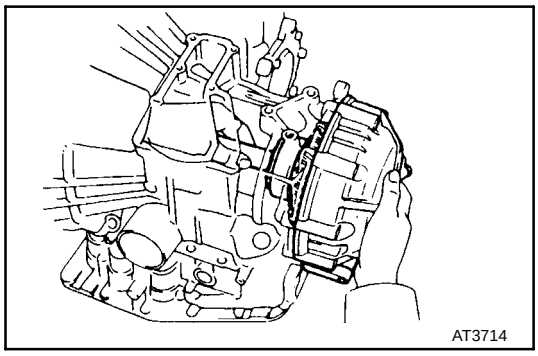


(b) Install the overdrive brake drum to the case.

(c) Install the new case gasket to the case.

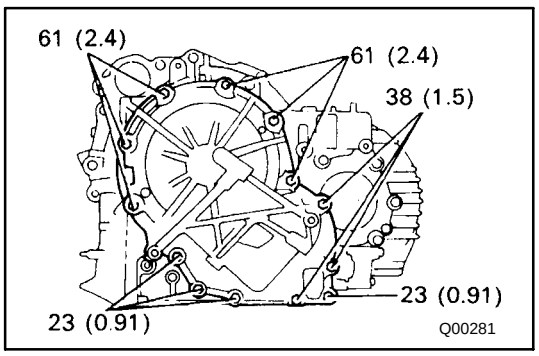


(d) Make sure that the length from the top surface of the case to the counter driven gear surface should be about 24 mm (0.94 in.).



(e) Place the new gasket onto the transaxle case.

(f) Install the overdrive assembly with overdrive case to the transaxle case.



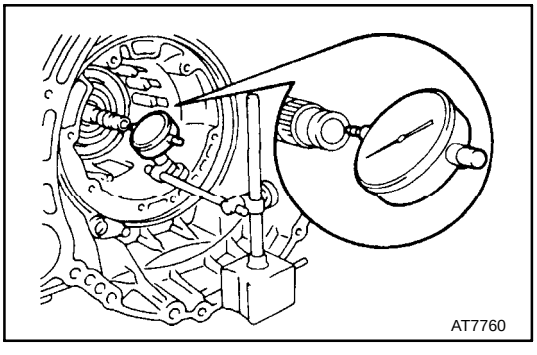
(g) Coat the threads of 23 mm (0.91 in.) bolts with sealer.

Sealer:

Part No. 08833 - 00070, THREE BOND 1324 or equivalent

(h) Install and tighten the thirteen bolts.

HINT: Each bolt length (mm, in.) is indicated in the illustration.



9. CHECK INTERMEDIATE SHAFT END PLAY

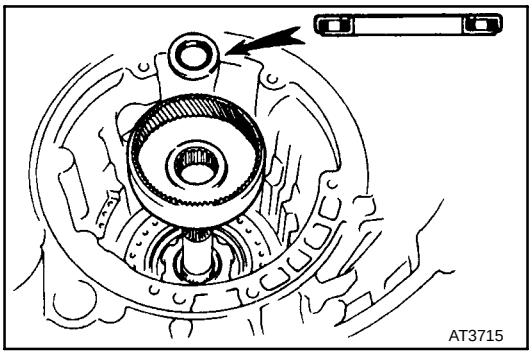
(a) Make sure that the intermediate shaft as thrust play in axial direction.

Thrust play:

0.47 - 1.50 mm (0.0185 - 0.0591 in.)

If the thrust play is not within specification, check the installation of intermediate shaft.

(b) Make sure that the intermediate shaft turns smoothly.

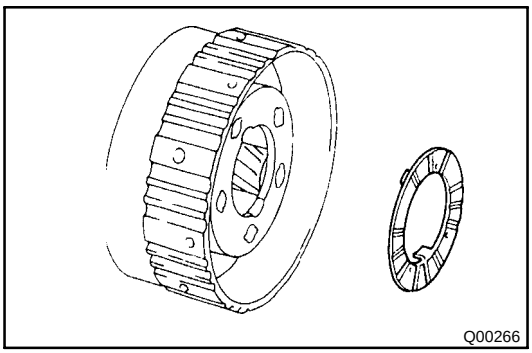


10. INSTALL REAR PLANETARY GEAR

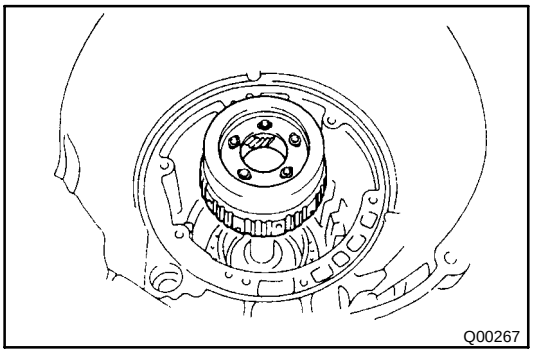
(a) Install the rear planetary ring gear.

(b) Place the bearing onto the ring gear.

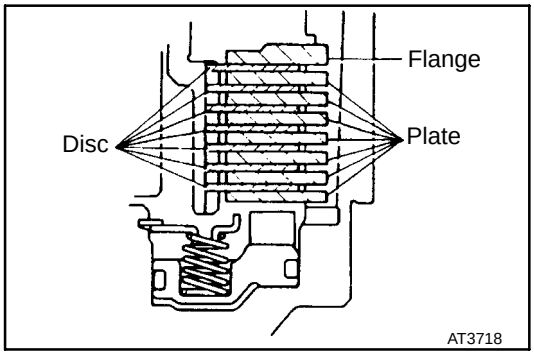
Bearing outer diameter:
38.7 mm (1.524 in.)
Bearing inner diameter:
22.6 mm (0.890 in.)



(c) Coat the thrust washer with petroleum jelly and place it onto the rear planetary gear.



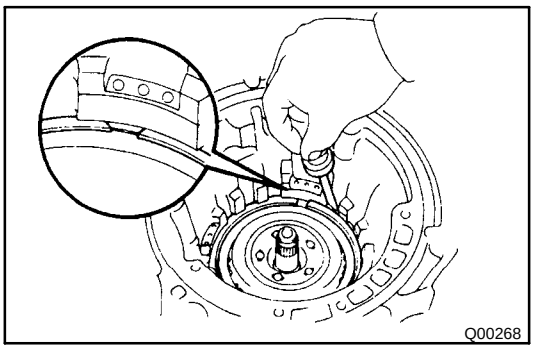
(d) Install the rear planetary gear.



11. INSTALL DISCS, PLATES AND FLANGE OF FIRST AND REVERSE BRAKE

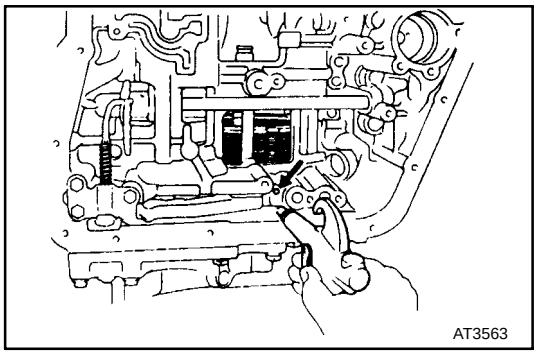
(a) Install the seven plates and seven discs.
Install in order:
P = Plate D = Disc
P-D-P-D-P-D-P-D-P-D-P-D-P-D

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



(c) Install the snap ring.

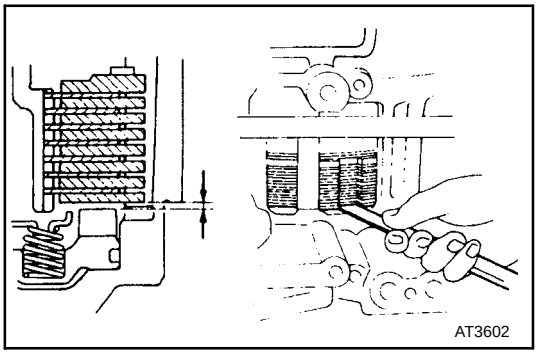
HINT: Be sure that the end gap of the snap ring is not aligned with one of cutouts.



12. CHECK FIRST AND REVERSE BRAKE

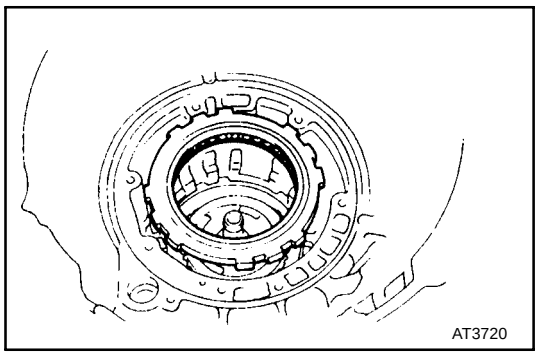
(a) Check the operation of the first and reverse brake piston.

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



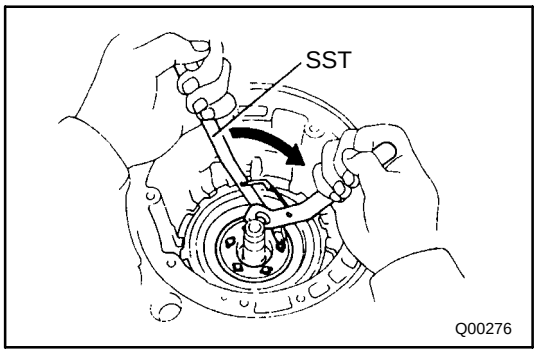
(b) Using a filler gauge, check that pack clearance of the first and reverse brake.

Clearance:
0.85 - 2.05 mm (0.033 - 0.081 in.)



13. INSTALL NO. 2 ONE-WAY CLUTCH INTO CASE

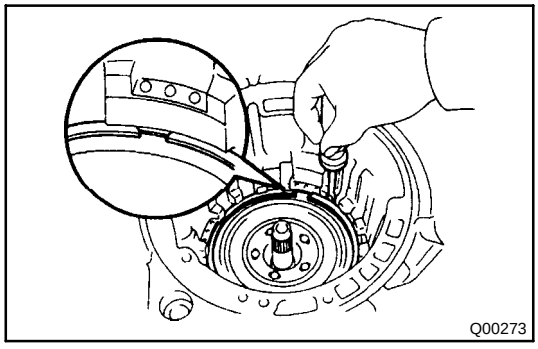
(a) Place the No. 2 one-way clutch with the shiny side of flange upward.



(b) Install the one-way clutch while turning the planetary gear clockwise with SST.

SST 09350-32014 (09351-32050)

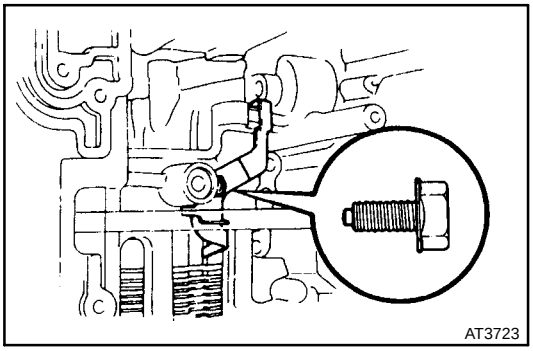
If can not turn the planetary gear clockwise, check the installation of the one-way clutch.



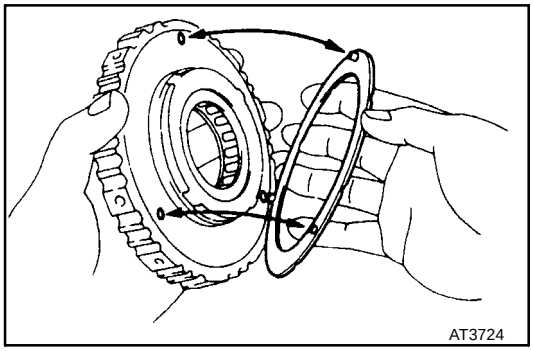
(c) Install the snap ring.

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

(d) Coat the thrust washer with petroleum jelly and install it onto the rear planetary gear.

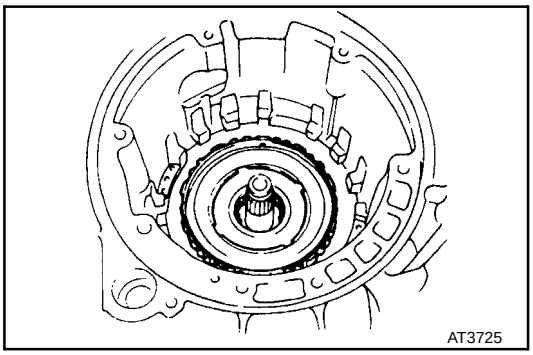


14. INSTALL SECOND COAST BRAKE BAND GUIDE

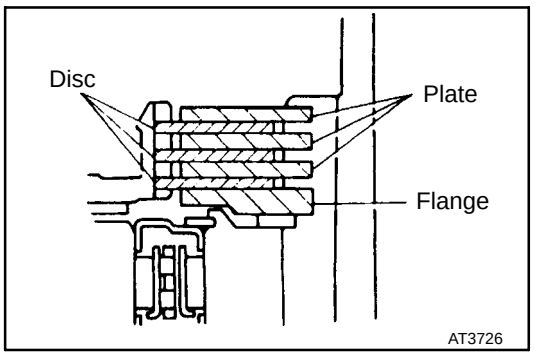


15. PLACE NO. 1 ONE-WAY CLUTCH

(a) Coat the thrust washer with petroleum jelly and install it on the No. 1 one-way clutch.



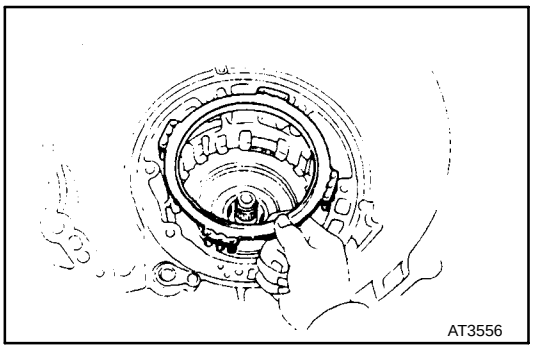
(b) Place the No. 1 one-way clutch onto the rear planetary gear.



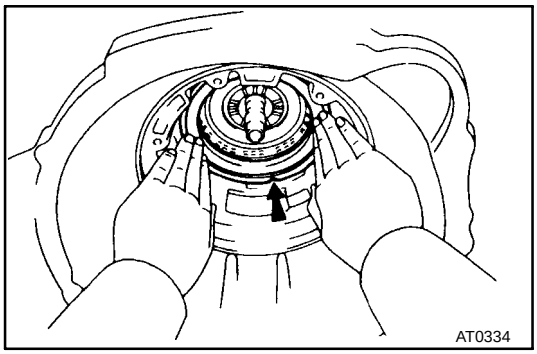
16. INSTALL SECOND BRAKE

(a) Install the flange, facing the flat end upward.

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

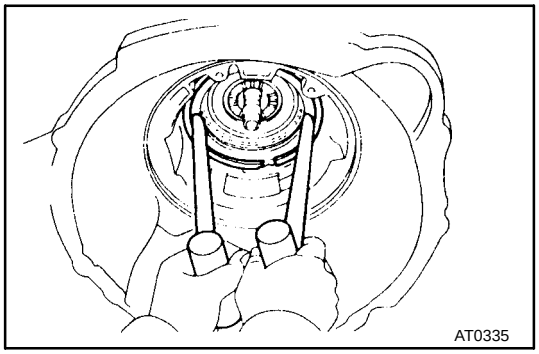


(c) Place the piston return spring into the case.



(d) Place the second brake drum into the case.

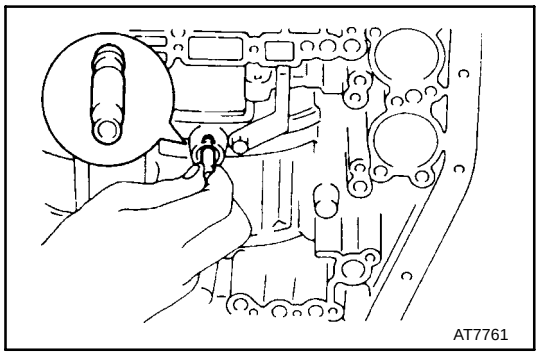
HINT: Align the groove of the drum with the bolt.



(e) Place the snap ring into the case so that end gap is installed into the groove.

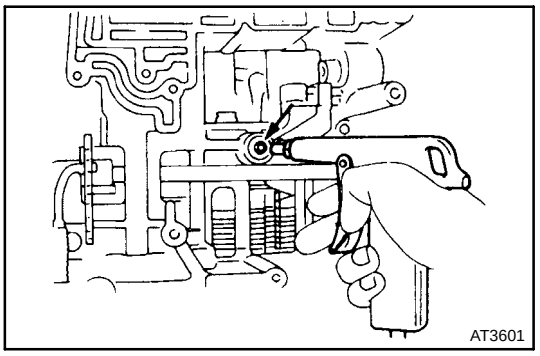
(f) While compressing the piston return spring over the drum with hammer handles, install the snap ring into the groove.

(g) Be sure that the end gap of the snap ring is not aligned with one of cutouts.



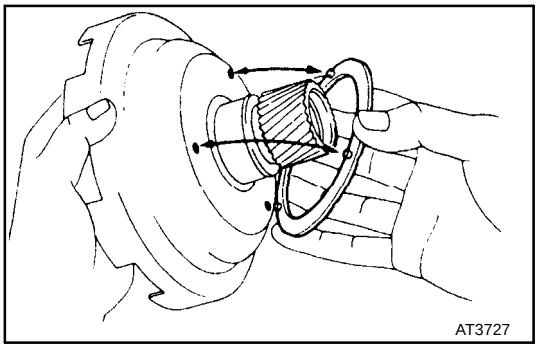
17. INSTALL NEW SECOND BRAKE GASKET

Install a new gasket until it makes contact with the second brake drum.



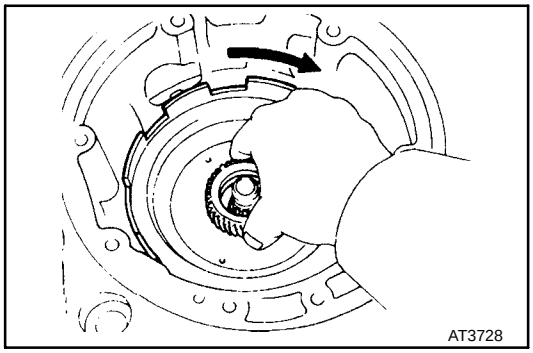
18. CHECK OPERATION OF SECOND BRAKE

Apply compressed air into the second brake gasket and confirm that the piston moves.

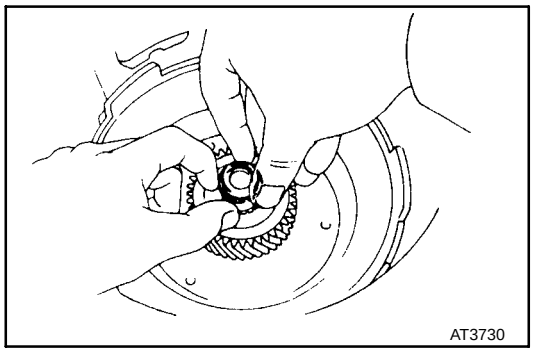


19. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

(a) Coat the thrust washer with petroleum jelly and install it on the sun gear input drum.

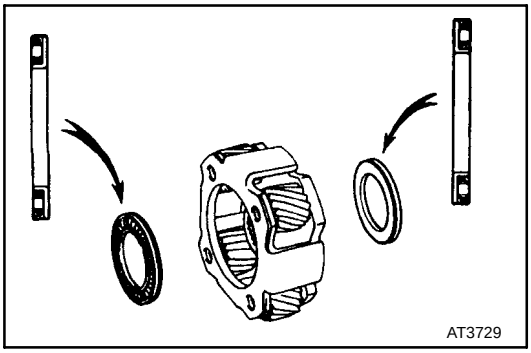


(b) While turning the sun gear clockwise, install it into the No. 1 one-way clutch.



20. INSTALL OIL SEAL RING TO INTERMEDIATE SHAFT

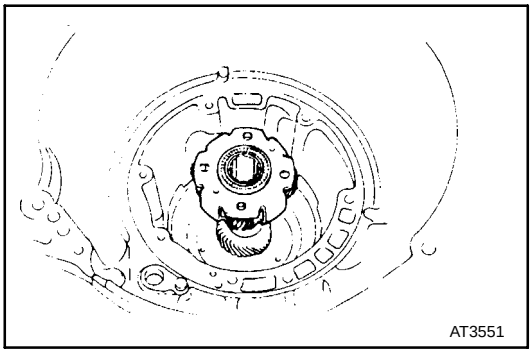
HINT: After installing the oil seal ring, check that it moves smoothly.



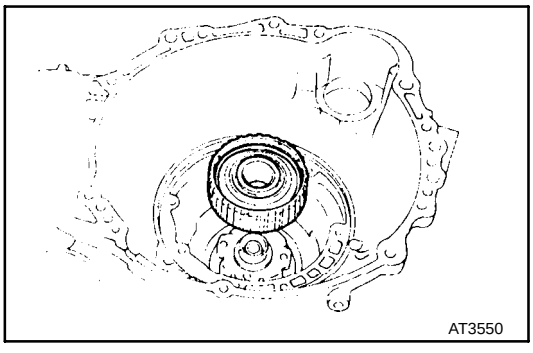
21. INSTALL FRONT PLANETARY GEAR

(a) Coat the bearings with petroleum jelly, and install them onto the both sides of planetary gear.

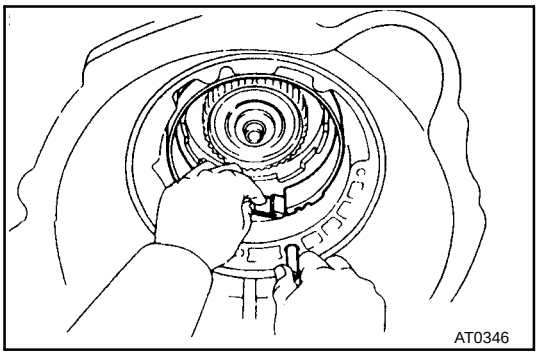
Bearing outer diameter:
45.5 mm (1.791 in.)
Bearing inner diameter:
30.1 mm (1.185 in.)



(b) Install the planetary gear onto the sun gear.



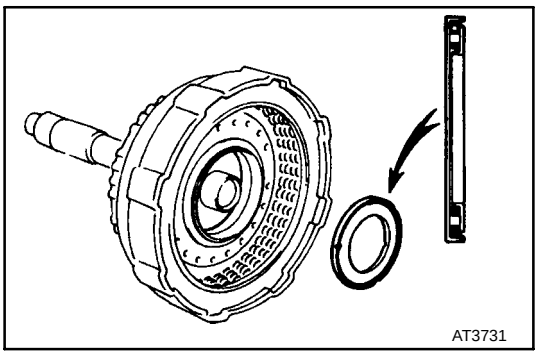
22. INSTALL FRONT PLANETARY RING GEAR



23. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

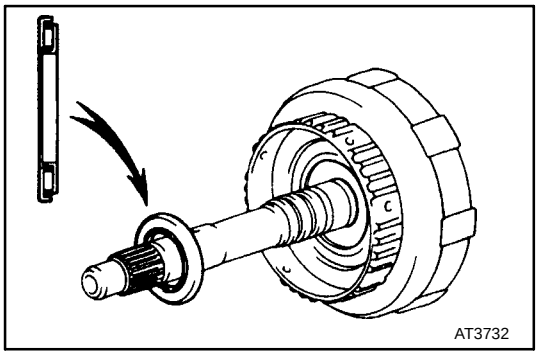
(b) Install the pin through the oil pump mounting bolt hole.



24. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

(a) Coat the bearing with petroleum jelly and install it onto rear side of the forward clutch.

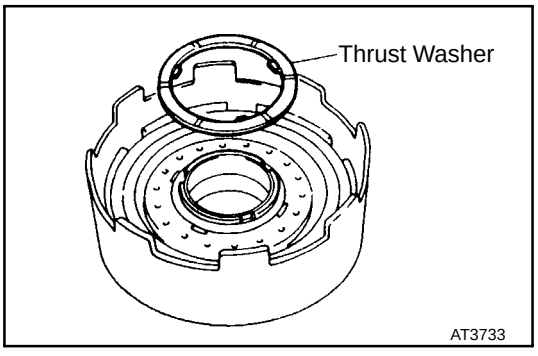
Bearing outer diameter:
47.6 mm (1.874 in.)
Bearing inner diameter:
31.4 mm (1.236 in.)



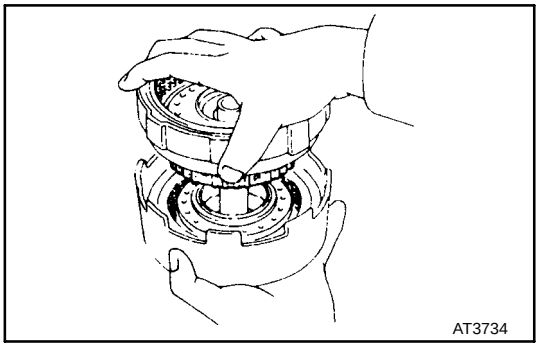
(b) Coat the bearing with petroleum jelly and install it onto front side of the forward clutch.

HINT: There are two different-thick bearings for adjustment of the input shaft thrust play.

Thickness mm (in.)	Outer diameter mm (in.)	Inner diameter mm (in.)
3.60 (0.1417)	45.9 (1.807)	27.7 (1.091)
4.19 (0.1650)	47.1 (1.854)	27.7 (1.091)

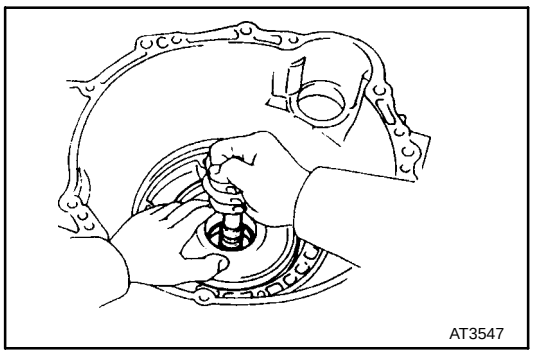


(c) Coat the thrust washer with petroleum jelly and install it with the oil groove facing upward onto the direct clutch drum.



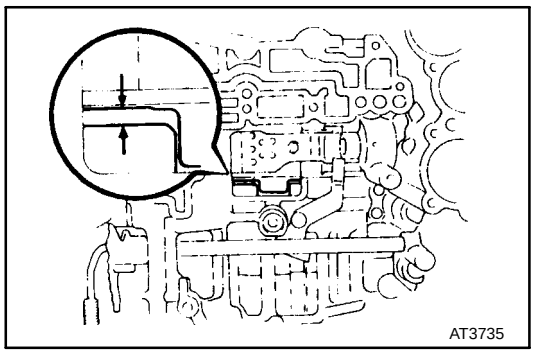
(d) Mesh the hub of the forward clutch flukes of the direct clutch discs.

HINT: Be careful that the bearing and thrust washer do not get out of place.



(e) Install the direct clutch and forward clutch into the case.

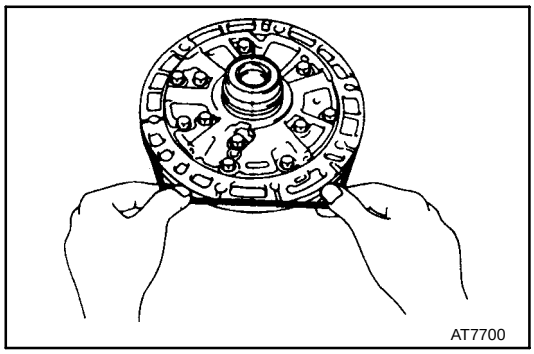
HINT: Hold the direct clutch toward the forward clutch to prevent the thrust washer from getting out of place.



(f) Check the distance between the direct clutch drum and the sun gear input drum.

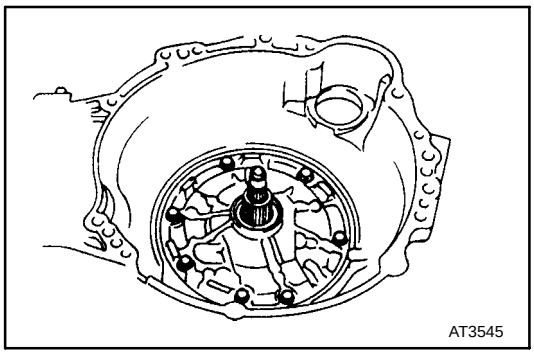
Distance:

Approx. 3 mm (0.12 in.)



25. INSTALL OIL PUMP INTO CASE

(a) Coat a new O-ring with ATF and install it to the oil pump.



(b) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

NOTICE: Do not push on the oil pump strongly or the oil seal ring will stick to the direct clutch drum.

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

26. MEASURE THRUST PLAY OF INPUT SHAFT

Measure the thrust play with a dial gauge.

Thrust play:

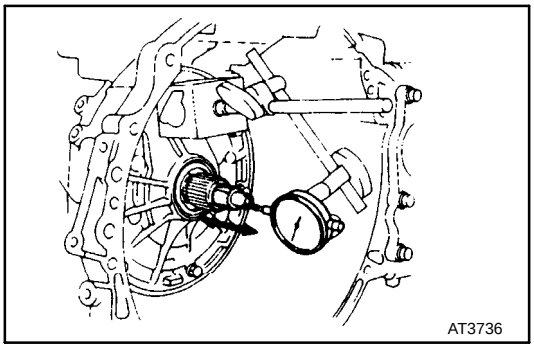
0.25 - 0.90 mm (0.0098 - 0.0354 in.)

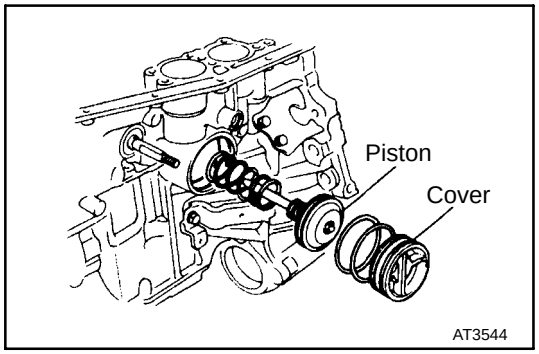
HINT: There are two different - thick bearings for end of stator shaft. If the thrust play is in excess of standard, select one of them.

Bearing thickness:

3.60 mm (0.1417 in.)

4.19 mm (0.1650 in.)





27. CHECK INPUT SHAFT ROTATION

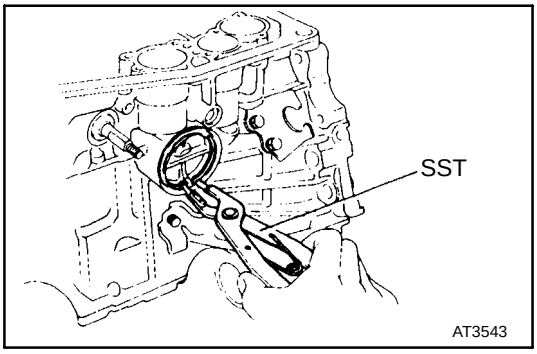
Make sure that the input shaft rotates smoothly.

28. INSTALL SECOND COAST BRAKE PISTON

(a) Coat the new O-rings with ATF and install it to the cover.

(b) Install the outer spring with the piston.

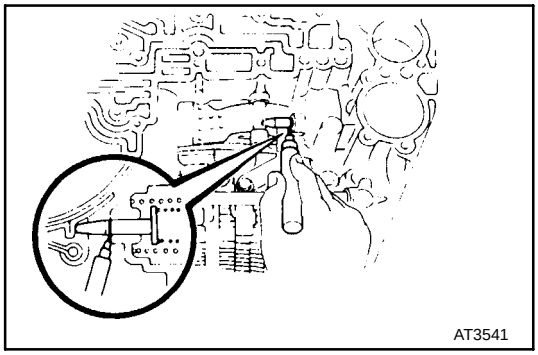
(c) Place the cover into the bore.



(d) Using SST, install the snap ring while pressing the cover.

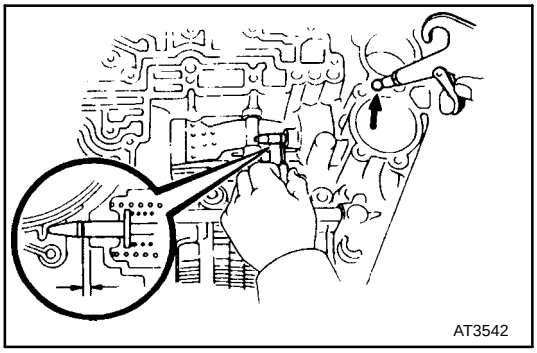
SST 09350-32014 (09351-32050)

(e) Check that the front end of the piston rod contacts the center of the second brake band depression.



29. CHECK SECOND COAST BRAKE PISTON STROKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case, as shown in the illustration.



(b) Using SST, measure the piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm^2, 57 - 114 psi), as shown.

SST 09240-00020

Piston stroke:

2.0 - 3.5 mm (0.079 - 0.138 in.)

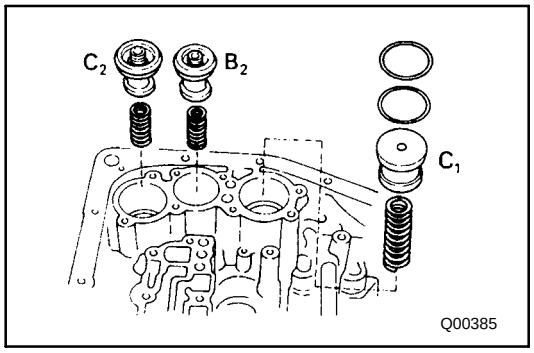
If the stroke is more than specified, replace the piston rod with a longer one.

Piston rod length:

9.52 mm (3.748 in.)

96.3 mm (3.791 in.)

If the still more than standard value, replace the brake band with a new one.



HYDRAULIC CONTROL UNIT INSTALLATION

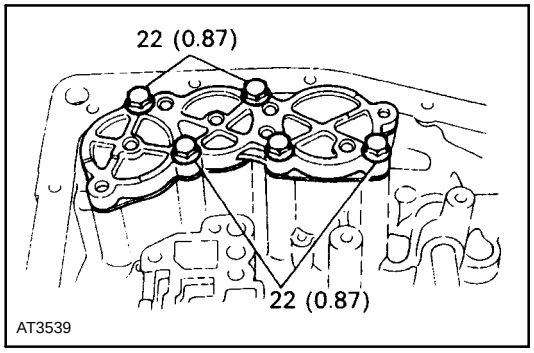
1. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Install the new O-rings to the pistons.

(b) Install the springs and pistons into the bores.

Spring	Free length mm (in.)	Outer diameter mm (in.)	Color
C_2	55.2 (2.173)	18.0 (0.709)	Yellow + Purple
B_2	68.6 (2.701)	16.3 (0.642)	Blue + White
C_1	71.2 (2.803)	25.2 (0.992)	Blue + Green

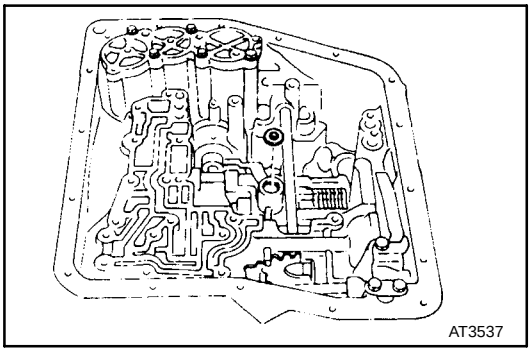
V00519



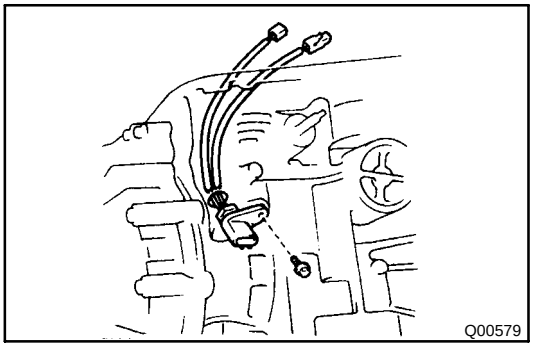
(c) Place the cover with a new gasket and gradually tighten the bolts a little a time in sequence.

HINT: Each bolt length (mm, in.) is indicated in the illustration.

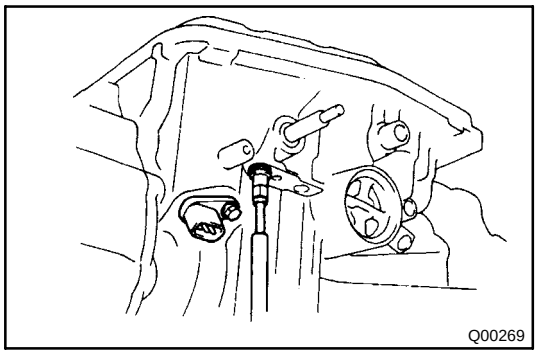
Torque: 10 N-m (100 kgf-cm, 7 ft-lbf)



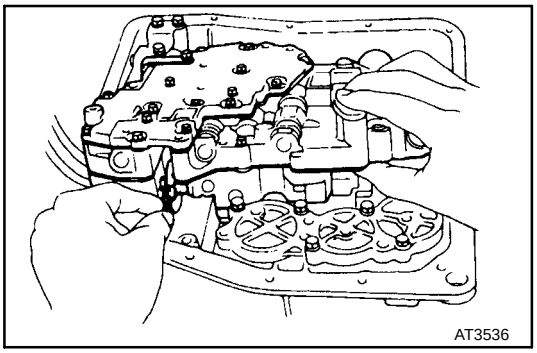
2. PLACE NEW SECOND BRAKE APPLY GASKET



3. INSTALL SOLENOID WIRE



4. INSTALL THROTTLE CABLE

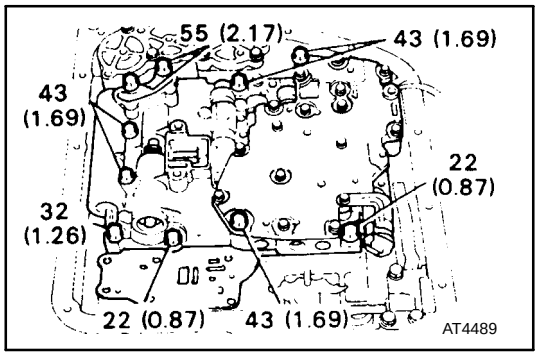


5. INSTALL VALVE BODY TO TRANSAXLE CASE

(a) While holding the cam down with your hand, slip the cable end into the slot.

(b) Lower the valve body into place.

NOTICE: Do not entangle the solenoid wire.



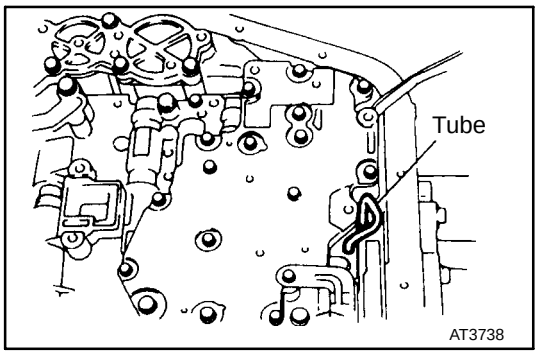
(c) Install and tighten the ten bolts.

HINT:

Each bolt length (mm, in.) is indicated in the illustration.

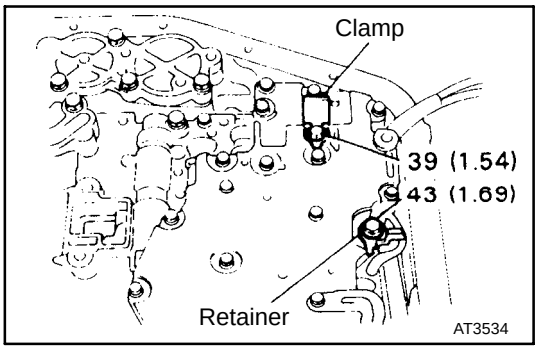
Hand tighten the ten bolts first, then torque with a torque wrench.

Torque: 11 N-m (110 kgf-cm, 8 ft-lbf)



6. INSTALL B_3 APPLY TUBE

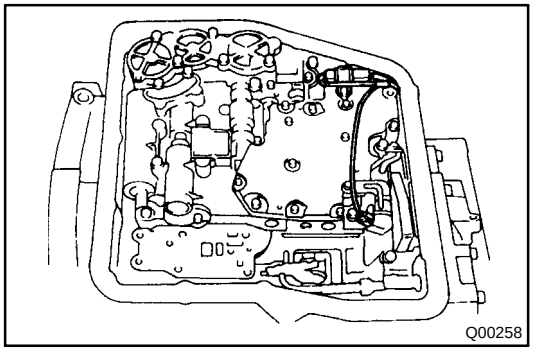
NOTICE: Be careful not to bend or damage the tube.



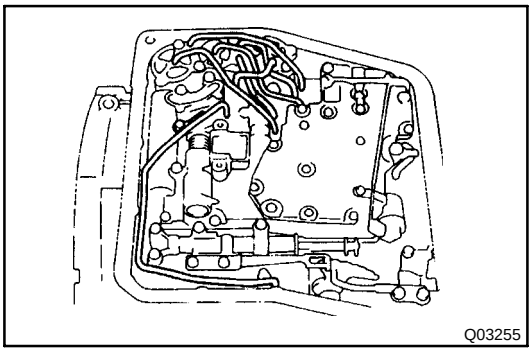
7. INSTALL CONNECTOR CLAMP AND TUBE RETAINER

HINT: Each bolt length (mm, in.) is indicated in the illustration.

Torque: 11 N-m (110 kgf-cm, 8 ft-lbf)



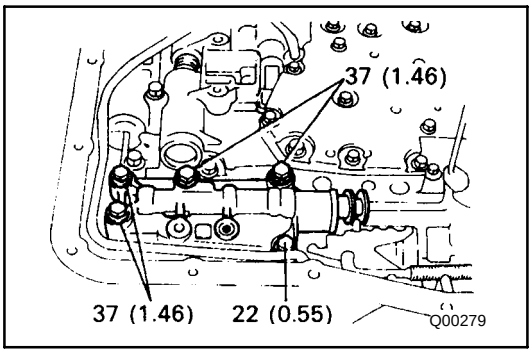
8. CONNECT SOLENOID CONNECTORS

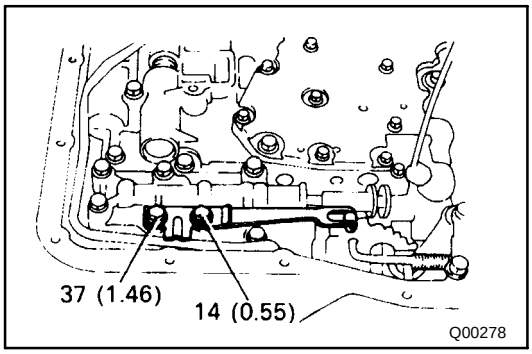


9. INSTALL OIL TUBES

Using a plastic hammer, install the tubes into the positions indicated in the illustration.

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





10. INSTALL MANUAL VALVE BODY AND DETENT SPRING

HINT: Each bolt length (mm, in.) is indicated in the illustration.

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

(b) Lower the manual valve body into place.

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

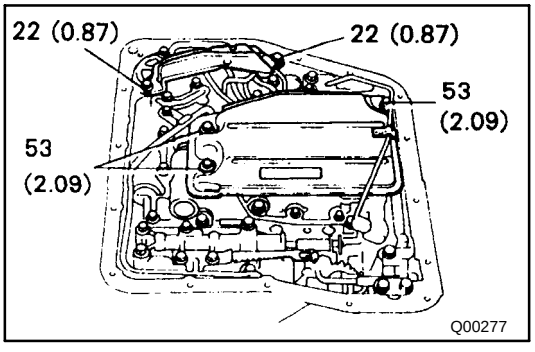
Torque: 11 N-m (110 kgf-cm, 8 ft-lbf)

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

Torque: 11 N-m (110 kgf-cm, 8 ft-lbf)

HINT: Each bolt length (mm, in.) is indicated in the illustration.

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



11. INSTALL TUBE BRACKET AND OIL STRAINER

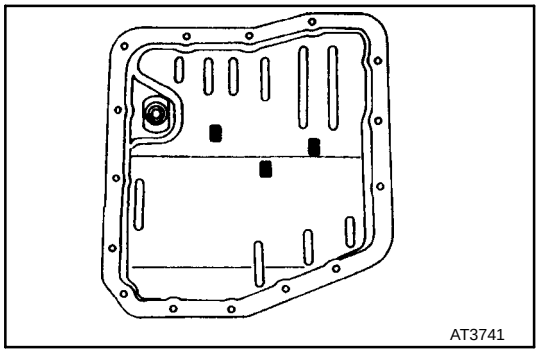
Each bolt length (mm, in.) is indicated in the illustration.

Tube bracket

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

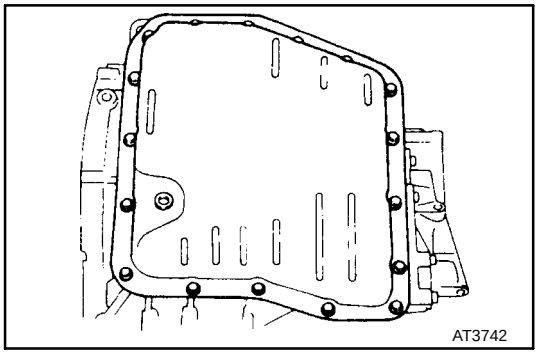
Oil strainer

Torque: 11 N-m (110 kgf-cm, 8 ft-lbf)



12. INSTALL MAGNETS IN PLACE AS SHOWN

NOTICE: Make sure that the magnets do not interfere with the oil tubes.

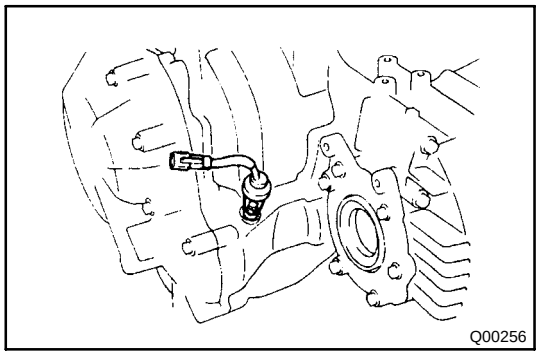


13. INSTALL OIL PAN WITH NEW GASKET

(a) Install a new gasket and oil pan.

(b) Install and torque new seventeen bolts.

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



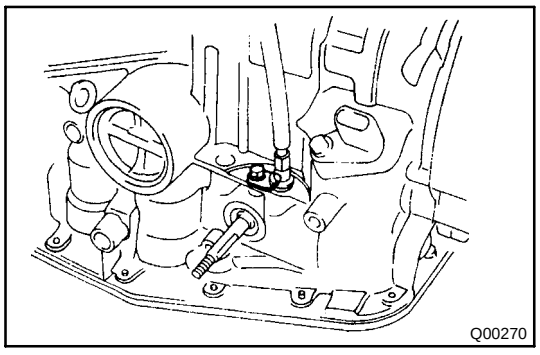
14. INSTALL NO. 1 VEHICLE SPEED SENSOR

(a) Install a new O-ring to the vehicle speed sensor.

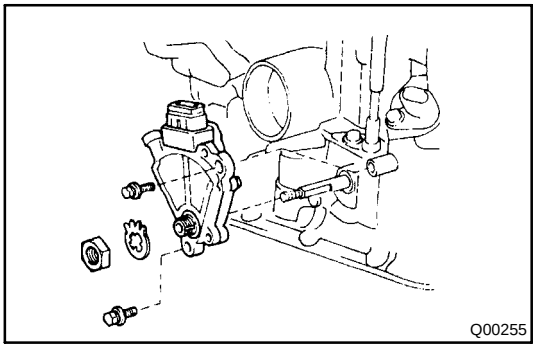
(b) Install the vehicle speed sensor to the transaxle case.

(c) Tighten the bolt.

(d) Connect the sensor connector.



15. INSTALL THROTTLE CABLE RETAINING PLATE



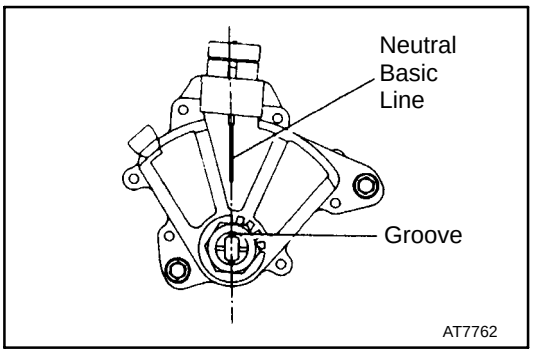
16. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch to the manual valve shaft.

(b) Place the new locking plate and tighten the nut.

(c) Stake the nut with locking plate.

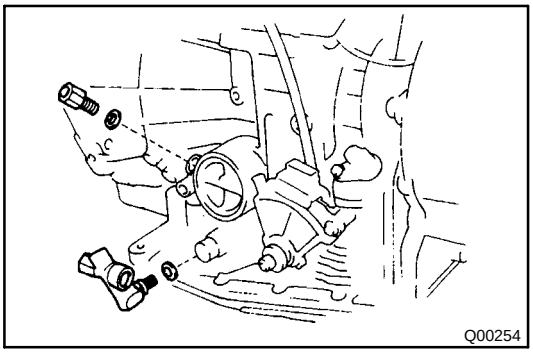
(d) Install the two bolts.



(e) Adjust the park/neutral position switch.

HINT: Align the groove and neutral basic line.

(f) Tighten the two bolts.

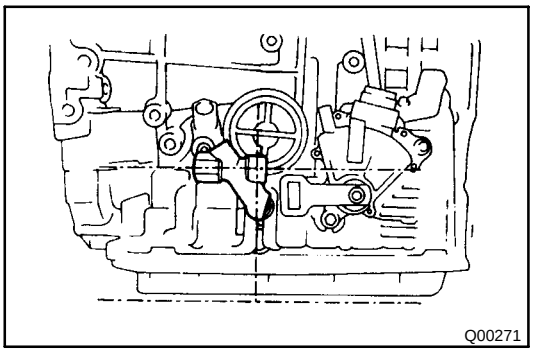


17. INSTALL UNION AND ELBOW

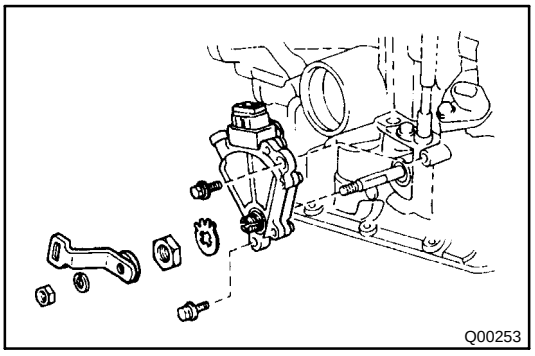
(a) Install the new O-rings to the union and elbow.

(b) Install the union elbow to the transaxle case.

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

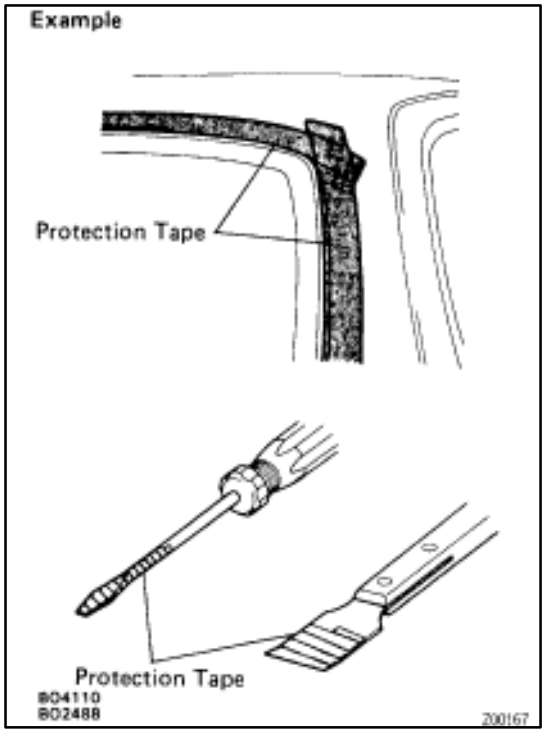


HINT: Install the elbow, as shown in the illustration.



18. INSTALL MANUAL SHAFT LEVER

BODY



GENERAL INFORMATION
HANDLING PRECAUTIONS

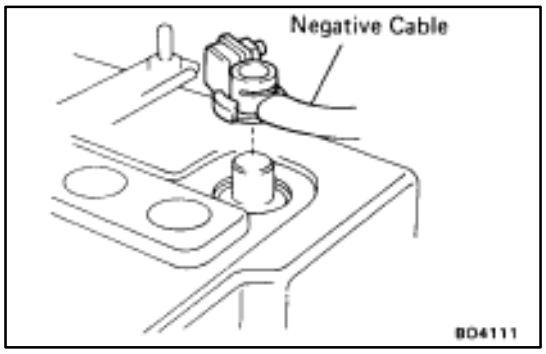
BO01M–01

Taping

When it is possible that the body or parts may be scratched during the operation, apply protection tape before starting work.

Example:

1. Before starting work, apply protection tape to body surfaces around parts to be removed and installed.
2. Before prying parts loose with a screwdriver or scraper etc., apply protection tape to the tip of the tool to avoid scratching parts or painted surfaces of the body.



Battery

In order to prevent a short circuit while doing work on the electrical circuit such as disconnecting a connector, first turn off the ignition switch and disconnect the negative cable from the battery terminal before starting work.

HINT: When battery voltage is required for operation of a functioning part, connect the cable to the battery when needed, and promptly disconnect it when no longer necessary.

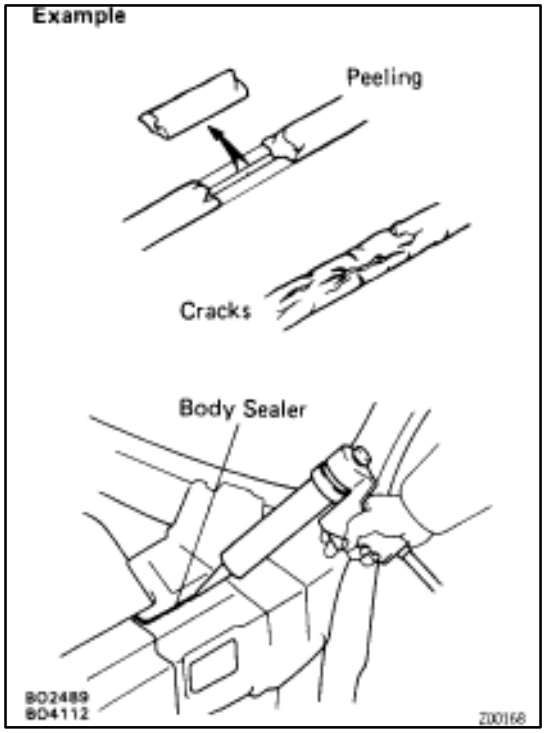
CAUTION:

- **Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
- **To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.**

Fitting Adjustments

When removing and installing body panels which have a preload value, after the installation refer to the page containing the installation adjustment methods, and make adjustments according to the required specifications.

HINT: When making adjustments, do not completely loosen the bolts and nuts of the part being adjusted. Tighten them appropriately, and move the panels by hand to align them.



ANTI–RUST TREATMENT

BO01N–01

Anti–rust treatment used on the vehicle body includes body sealer, undercoat, rust inhibitor and paint.

HINT: Refer to the Body Collision Damage Repair Manual for details of which parts have received antirust treatment.

Body Sealer

If the body sealer is damaged (peeling, cracks, etc.) during the operation, replace it with new body sealer.

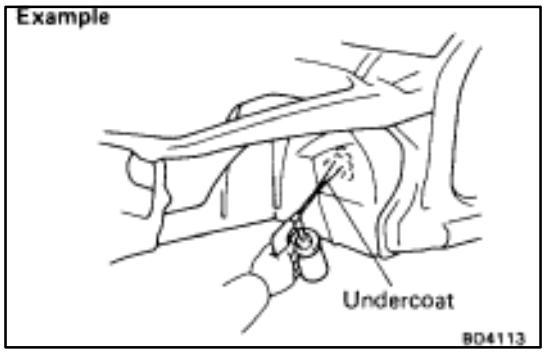
HINT: If body sealer gets on other parts, promptly wipe it off with a clean cloth dipped in a grease, wax and silicone remover.

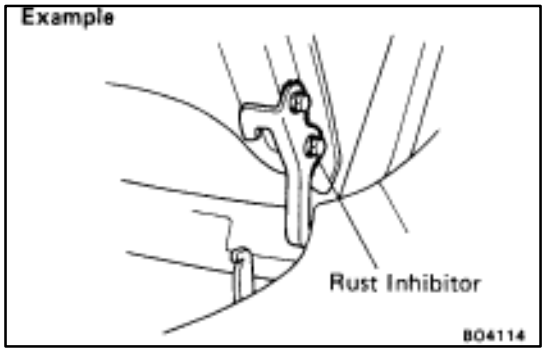
Undercoat

If the undercoat is damaged during the operation, apply new undercoat.

HINT:

- Cover the surrounding area with masking paper to avoid applying undercoat where it is not needed.
- Do not apply undercoat to high temperature parts such as the tailpipe, or to drive parts such as the drive shaft.

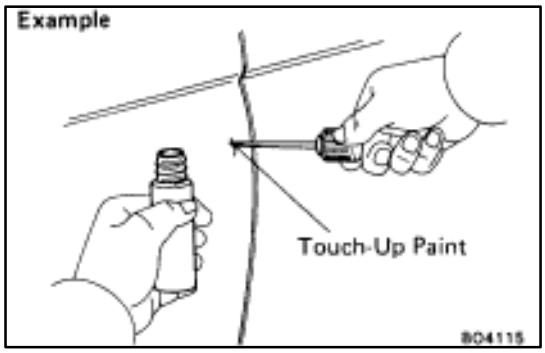




Rust Inhibitor

After removing and re–installing hinges and outer panel parts, apply rust inhibitor to the parts.

HINT: If rust inhibitor gets spilled on other parts, promptly wipe it off with a clean cloth dipped in a grease, wax and silicon remover.



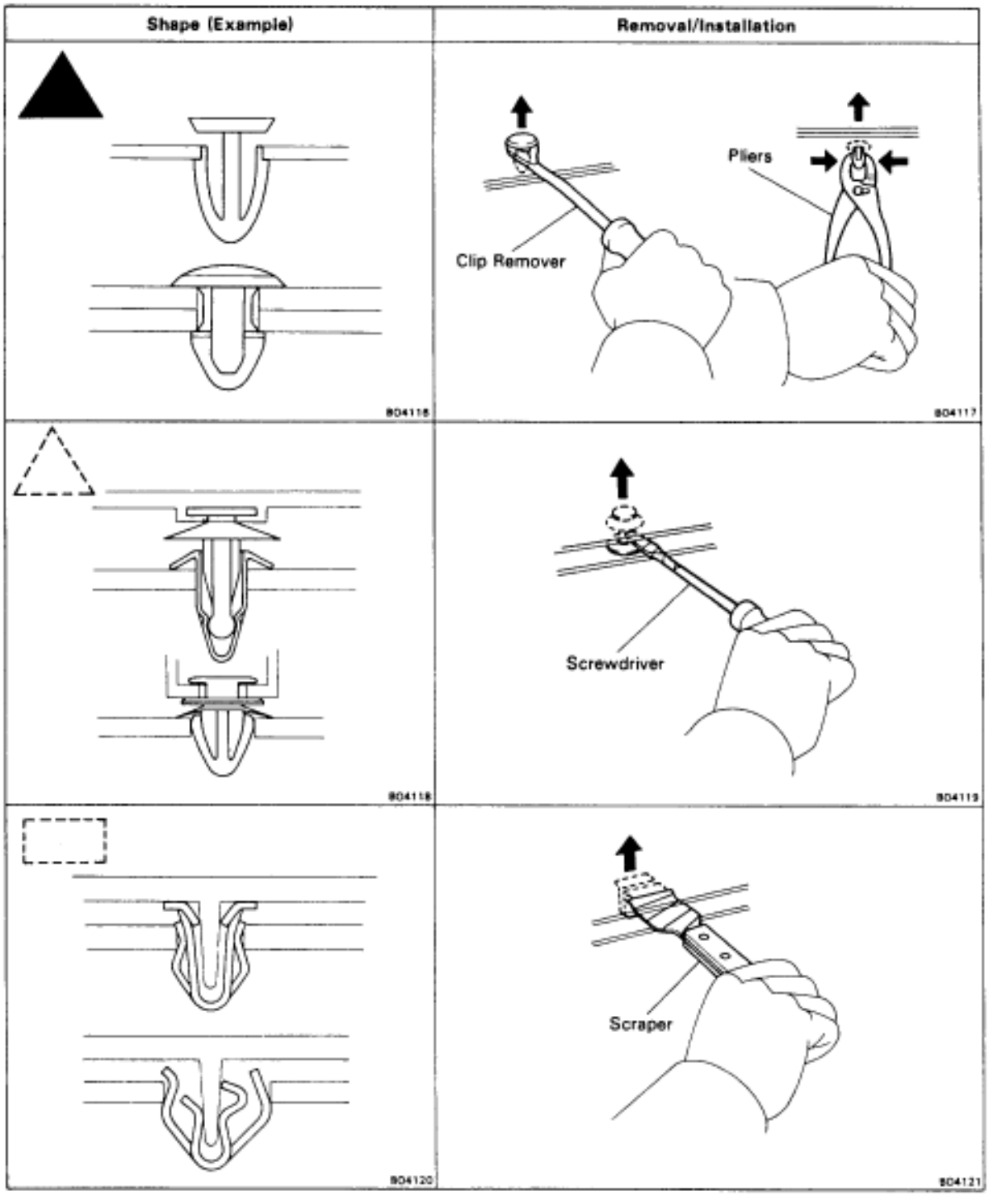
Touch–Up Paint

If a small scratch is made in the body surface, correct the scratch using touch–up paint the same color as the body color.

CLIPS

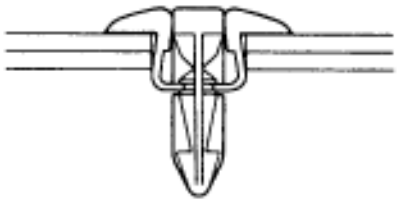
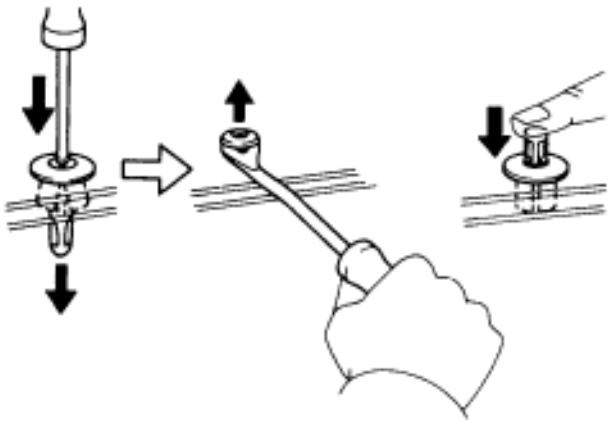
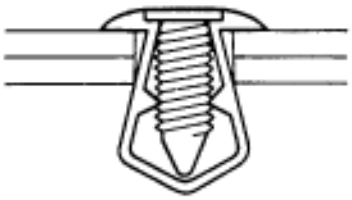
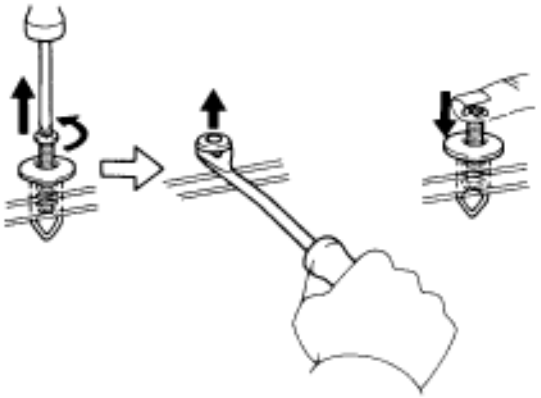
BO01P–01

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.



V03005

CLIPS (Cont'd)

Shape (Example)	Removal/Installation
 B04122	 B04123
 B04124	 B04125

V00012

HOW TO USE THIS SECTION

BO076–01

Components

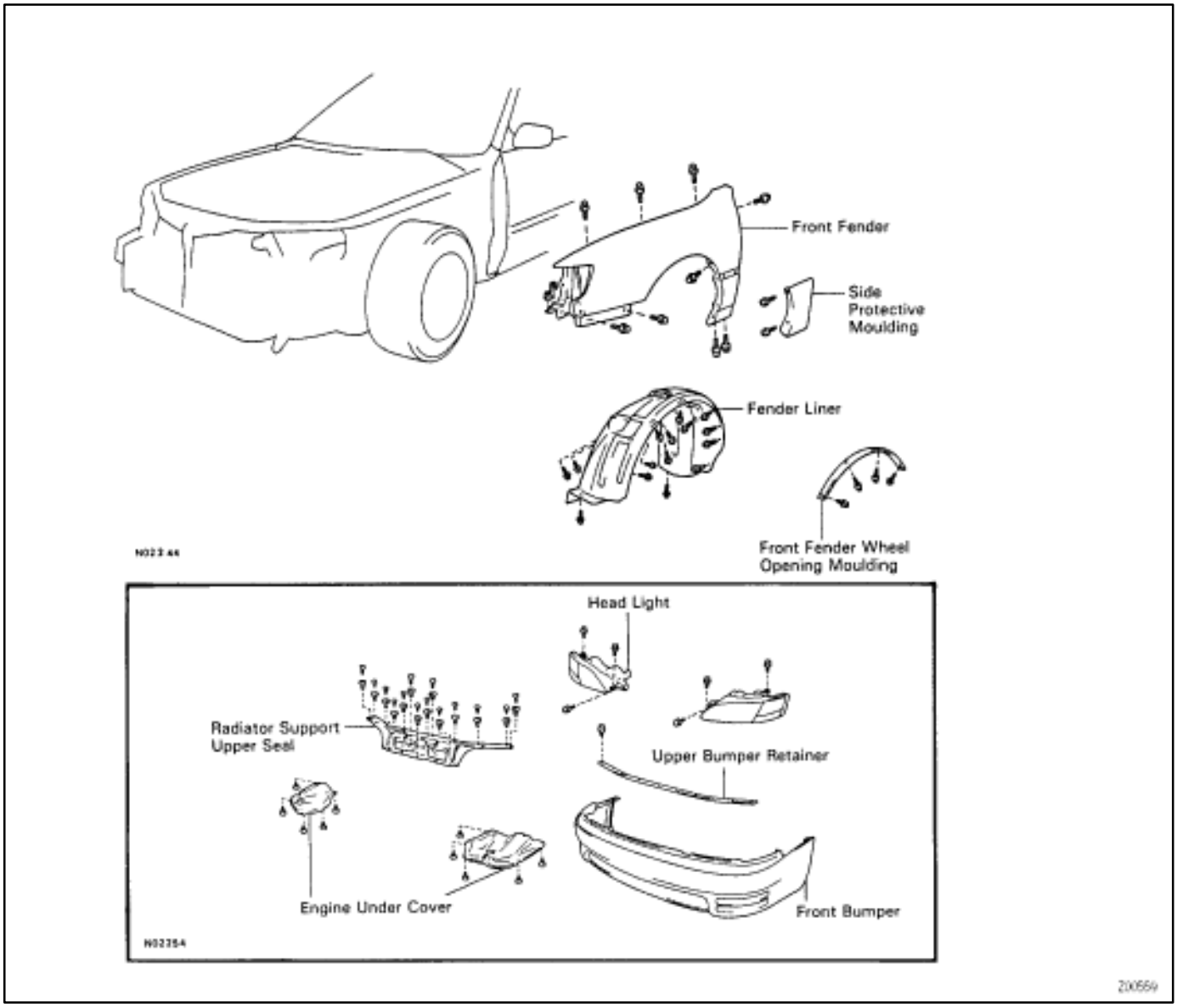
When the removal and reassembly of a second system is also required in order to remove and disassemble a certain system, the components are laid out in the component diagram as follows.

1. When it is necessary to remove and reassemble almost all the parts of the second system:

The component diagram of the second system is reduced in size and included inside the larger component diagram within its own separate frame.

HINT: For more detail than is given in the second component diagram in the separate frame, refer to the component diagram of the applicable system.

Example:

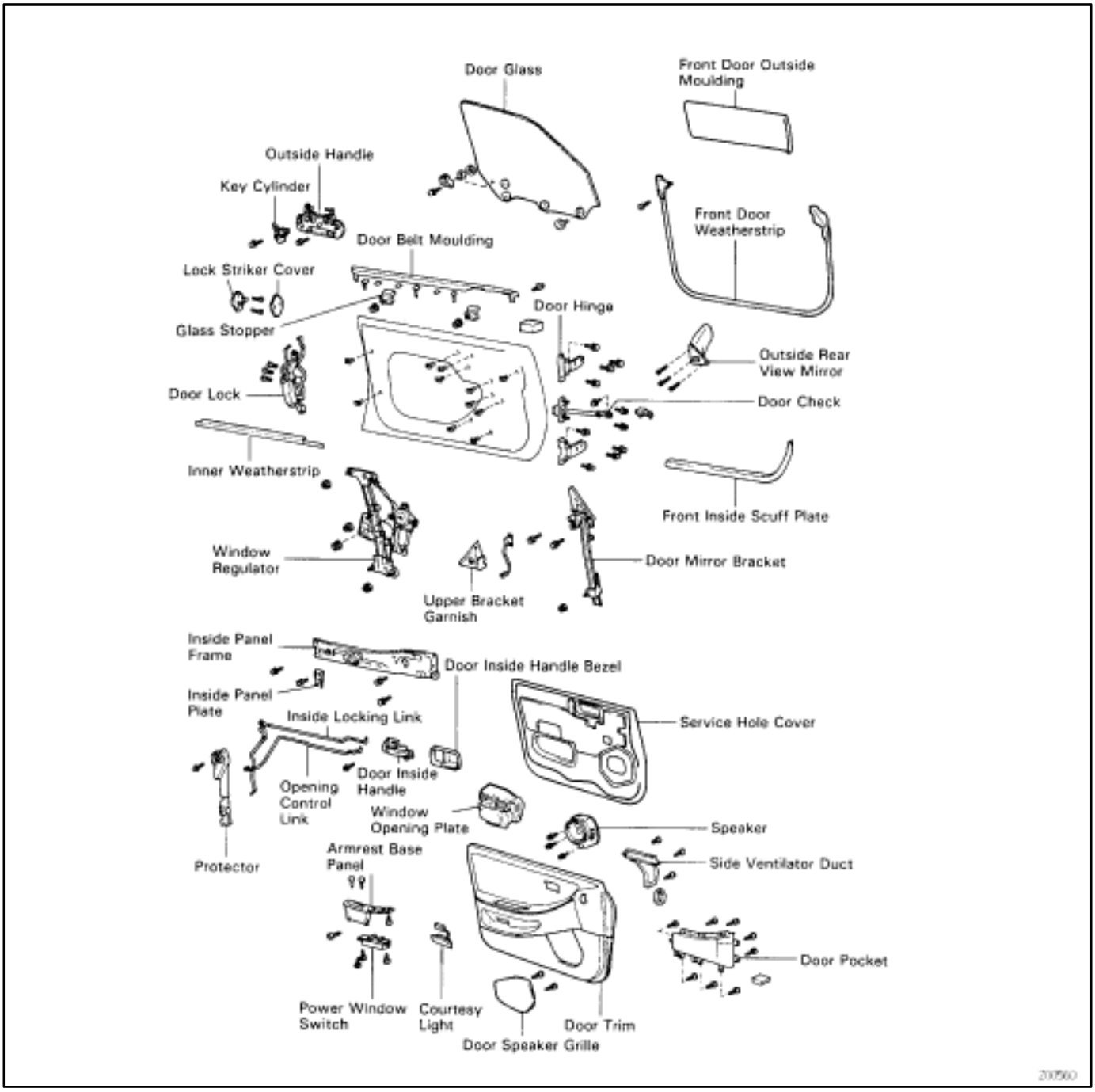


2. When the components of the second system which need to be removed are few in number and can be removed as a unit:

An abbreviated diagram of the parts and the name of the second system are included inside the larger component diagram.

HINT: For more detail than is given in the abbreviated diagram, refer to the component diagram on the page number referred to by the "See page" next to the diagram title.

Example:



SRS AIRBAG

BO01Q–02

(See page AB–2)

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) airbag.
Failure to carry out service operations in the correct sequence could cause the airbag system to deploy, possibly leading to a serious accident.
When removal or installation of airbag parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the AB section before perorming the operation.

- Work must be started after 30 seconds or longer from the time the ignition switch is set to the LOCK position and the negative (–) terminal cable is disconnected from the battery.
  (The airbag system is equipped with a back–up power source so that if work is started within 30 seconds of disconnecting the negative (–) terminal cable of the battery, the airbag may be deployed.)
- To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.
- Before repairs, remove the airbag sensors if shocks are likely to be applied to the sensors during repaires.
- The front airbag sensor set bolt has been anti–rust treated. When the sensor is removed, always replace the set bolt with a new one.
- If the front airbag sensors, center airbag sensor or steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.
- Do not expose the front airbag sensors, center airbag sensor or steering wheel pad directly to hot air or flames.
- The airbag system's wire harness is integrated with the cowl wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the airbag system wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page AB–13.
- 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 page AB–15 of this manual concerning correct steering wheel installation.
- When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up. In this case, the twin–lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)
- Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
- Store the steering wheel pad where the ambient temperature remains below 935C (2005F), without high humidity and away from electrical noise.
- Information labels are attached to the periphery of the airbag components. Follow the notices.
- When the ignition switch is at ACC or ON and the airbag warning light remains on, the center airbag sensor assembly has detected a malfunction code. (See page AB–23)

PREPARATION

SST (SPECIAL SERVICE TOOLS)

BO01R–01

	09812–00010 Door Hinge Set Bolt Wrench	
	09804–24010 Luggage Compartment Door Torsion Bar Tool	

B004V–01

RECOMMENDED TOOLS

BO04V–01

	09070–20010 Moulding Remover	

B004W–01

EQUIPMENT

BO04W–01

Clip remover	
Torque wrench	
Hexagon Wrench (6 mm)	
Torx driver	
Hog ring pliers	
Drill	
Drill bit, diam. 3.2mm(0.126in.)	
Hand riveter	
Tape	For applying to the tip of the to ols to avoid scratching parts or
Adhesive tape	For applying to the body surface around the parts to avoid scratch
Double–stick tape	
Adhesive	
Cleaner	

EQUIPMENT (Cont'd)

Shop rag	
Knife	
Sealer gun	
Brush	
Putty spatura	
Glass plate or like object	For mixing the adhesive on
Wooden block or like object	For typing both piano wire ends
Plastic sheet	For placing between the piano wir e and the safety pad to avoid scr

LUBRICANT

Item	Capacity	Classification
MP grease	–	–

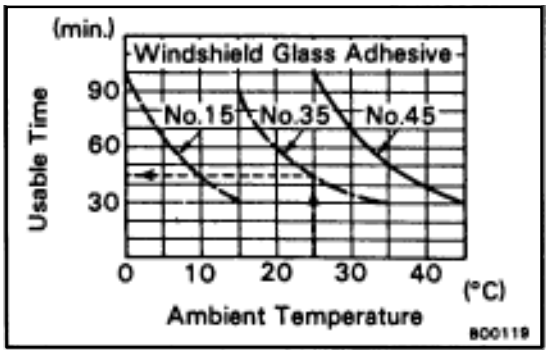
SSM (SPECIAL SERVICE MATERIALS)

08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Front Door Rear Door Power Seat Regulator
08850–00070	Windshield glass adhesive set No.15 or equivalent	Windshield Back Window Glass (0–15°C or 32–59°F)
08850–00080	Windshield glass adhesive set No.35 or equivalent	Windshield Back Window Glass (15–35°C or 59–95°F)
08850–00090	Windshield glass adhesive set No.45 or equivalent	Windshield Back Window Glass (35–45°C or 95–113°F)
08833–00030	Auto glass sealer or equivalent	Windshield Moulding Back Window Moulding Windshield Back Window Moulding

1. CHOOSE SUITABLE ADHESIVE SET

Use an adhesive set suitable for the ambient temperature.

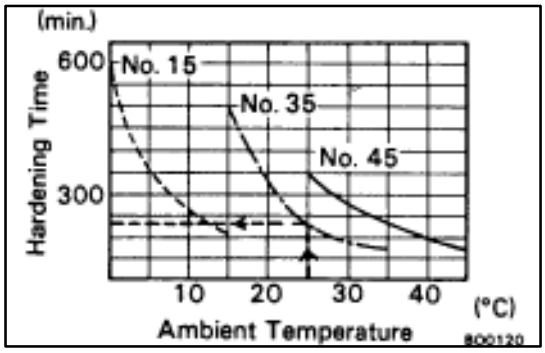
Ambient temperature	Part No.	Part Name
0–15°C (32–59°F)	08850–00070	Windshield glass adhesive set No. 15
15–35°C (59–95°F)	08850–00080	Windshield glass adhesive set No. 35
35–45°C (95–113°F)	08850–00090	Windshield glass adhesive set No. 45



2. CHECK ADHESIVE USABLE TIME

After mixing main and hardening agents, finish glass installation within the specified time as shown.

Example: For glass installation in an ambient temperature of 25°C (77°F), apply adhesive set No. 35 within 45 minutes.



3. CHECK ADHESIVE HARDENING TIME

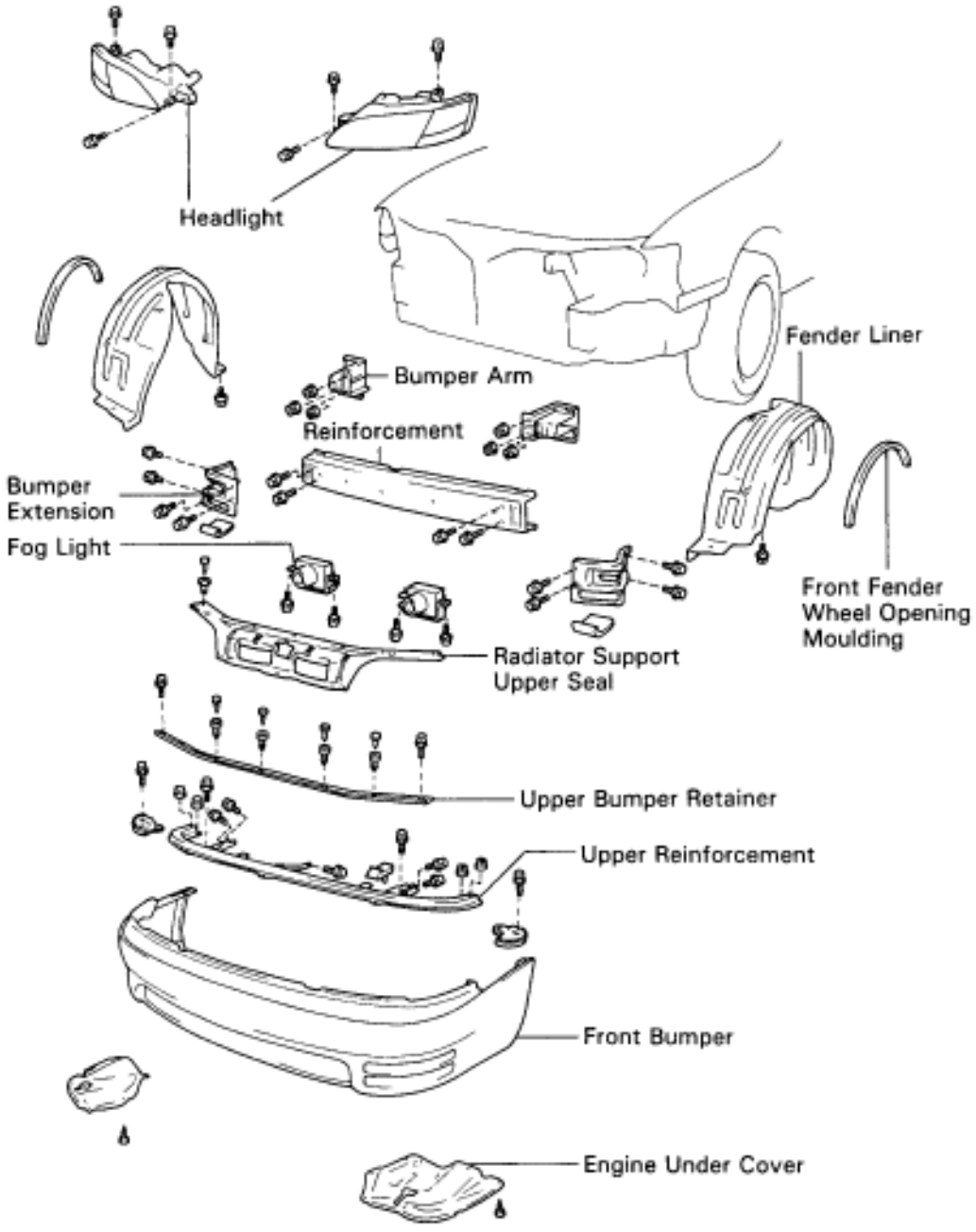
After main and hardening agents are mixed, leak tests should be made only after the hardening time has elapsed.

Example: The hardening time for adhesive set No. 35 with an ambient temperature of 25°C (77°F) is 2 1/2 hours.

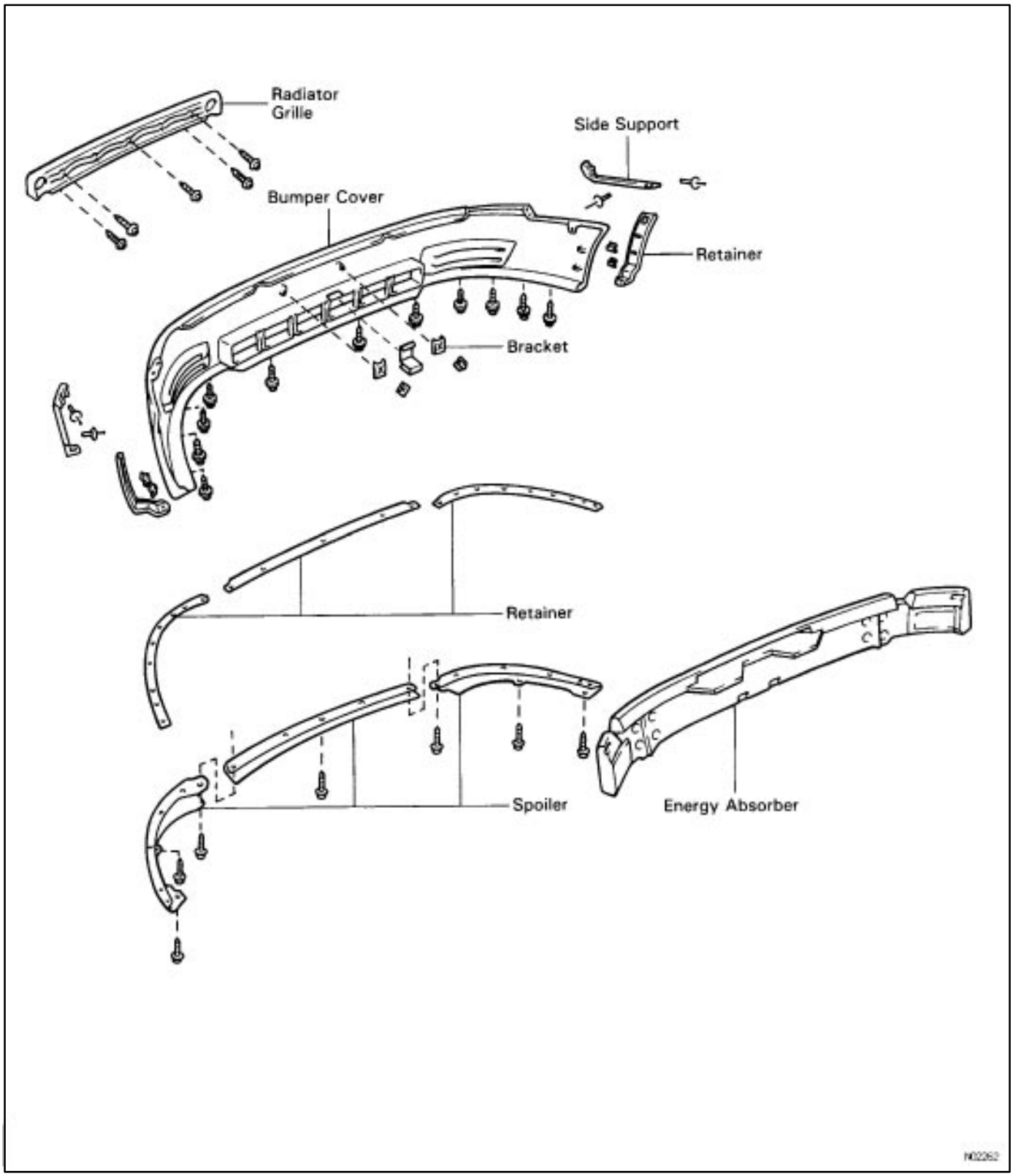
NOTICE: Do not drive the vehicle until at least double the hardening time has elapsed.

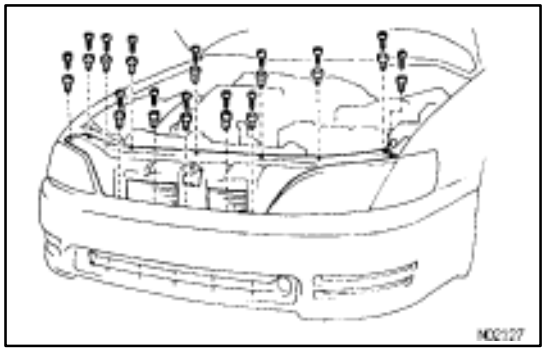
FRONT BUMPER
COMPONENTS

BO077–01



COMPONENTS (Cont'd)





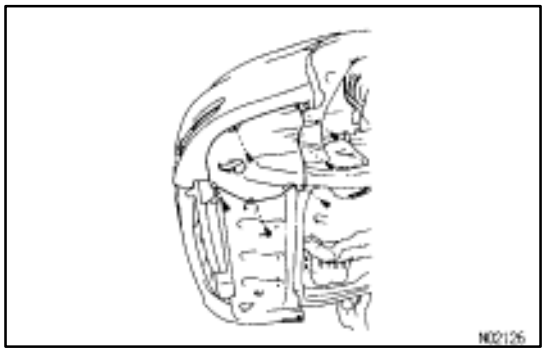
FRONT BUMPER REMOVAL

BO04Y–01

(See page BO–12)

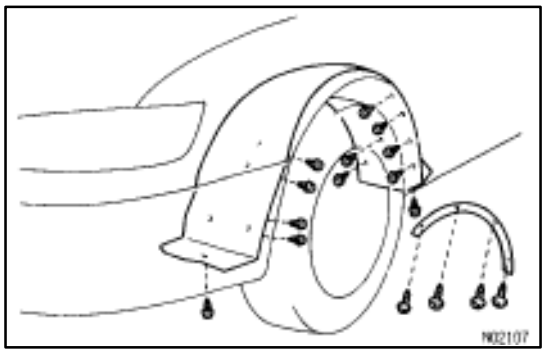
1. REMOVE RADIATOR SUPPORT UPPER SEAL

Using a screwdriver, remove ten clips and the seal.



2. REMOVE ENGINE UNDER COVER

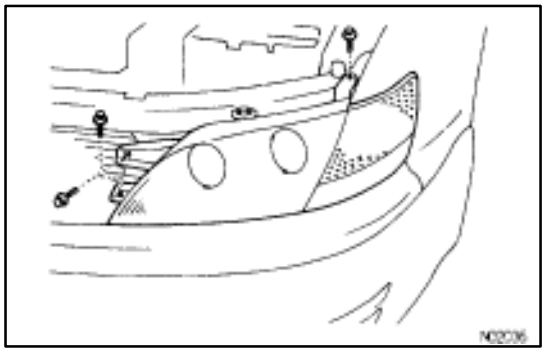
Remove six screws and the cover.



3. REMOVE FENDER LINER

(a) Remove four screws and the front fender wheel opening Moulding.

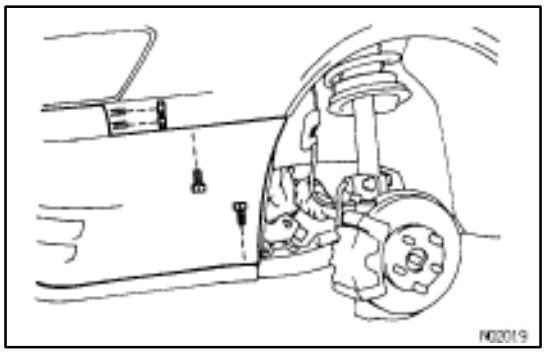
(b) Remove twelve screws and the liner.



4. REMOVE HEADLIGHT

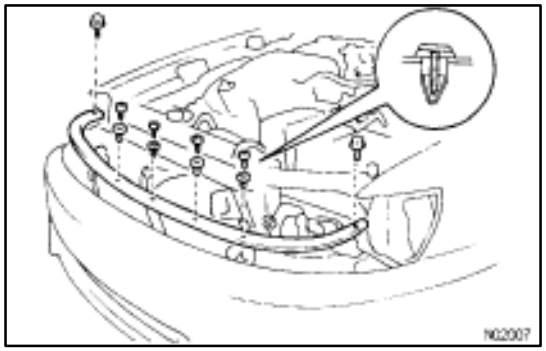
(a) Remove three bolts and the headlight.

(b) Disconnect the connectors.

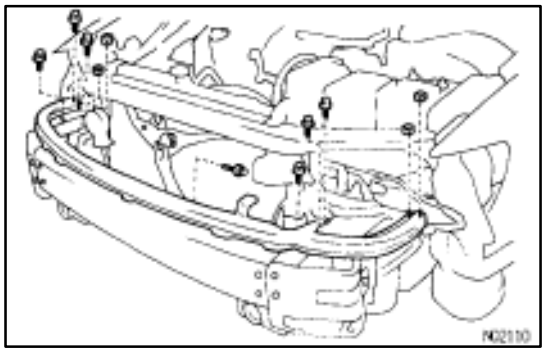


5. REMOVE BUMPER AND UPPER BUMPER RETAINER

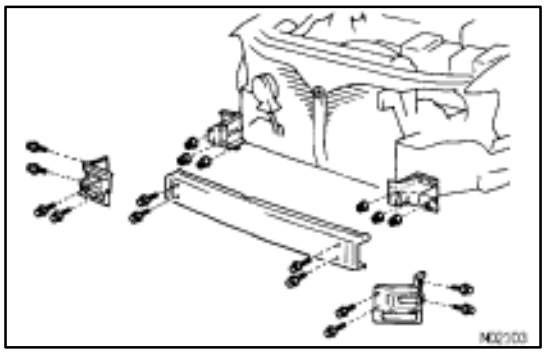
(a) Remove two nuts and two bolts.



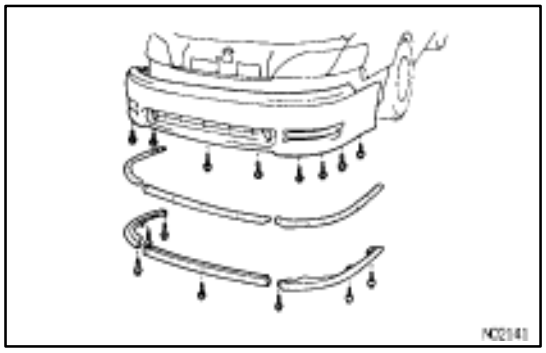
(b) Using a screwdriver, remove four clips, two bolts and the retainer.
(c) Disconnect the connection at the bumper rear end, then pull the bumper forward to remove it.



6. REMOVE UPPER REINFORCEMENT
Remove four nuts, seven bolts and the reinforcement.
7. REMOVE FOG LIGHT
(a) Disconnect the connector.
(b) Remove two bolts and the light.



8. REMOVE REINFORCEMENT
(a) Remove four bolts and the bumper extension.
(b) Remove four bolts and the reinforcement.
(c) Remove three nuts and the bumper arm.

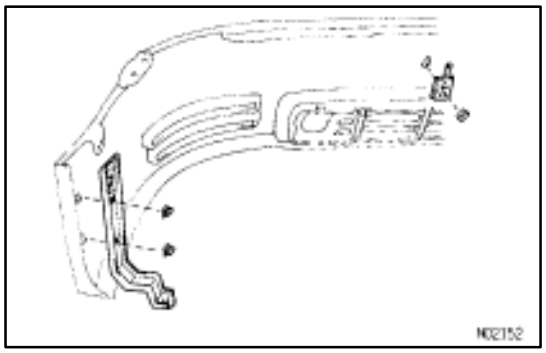


FRONT BUMPER DISASSEMBLY

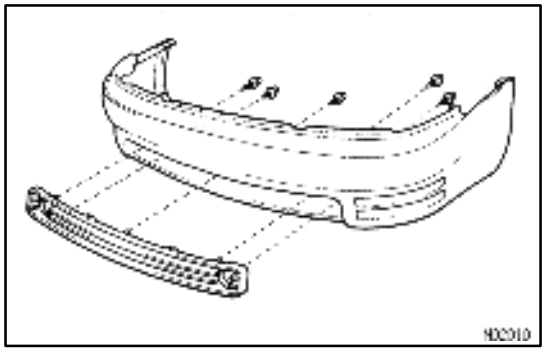
BO04Z–01

(See page BO–13)

1. REMOVE REINFORCEMENT
2. REMOVE SPOILER
(a) Remove seven screws and the spoiler.
(b) Remove eleven screws and the retainer.

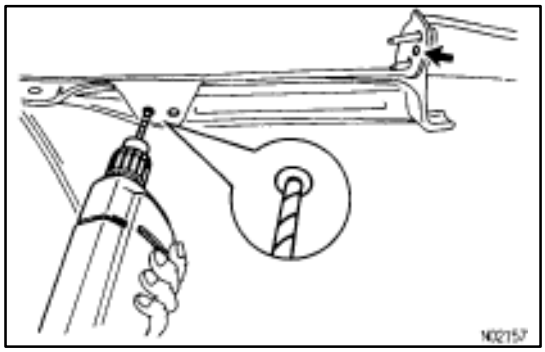


3. REMOVE BUMPER END RETAINER AND LICENSE PLATE BRACKET
(a) Remove two clips and the retainer.
(b) Remove the clip and the bracket.



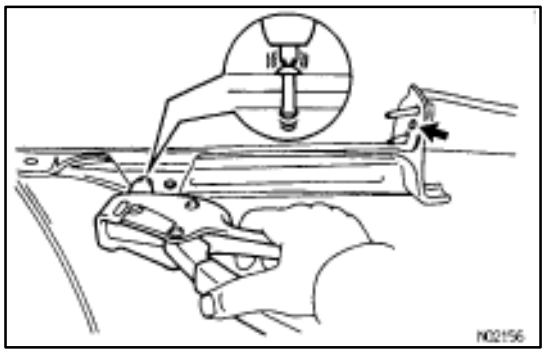
4. REMOVE RADIATOR GRILLE

Remove five screws and the grille.



5. REMOVE SIDE SUPPORT

(a) Using about 3.2 mm (0.126 in.) drill, drill out the rivet heads.
(b) Remove the support.



FRONT BUMPER ASSEMBLY

BO050–01

(See page BO–13)

ASSEMBLE FRONT BUMPER PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE

INSTALL SIDE SUPPORT

(a) Place the support in the bumper.
(b) Using a riveter, install the rivet.

FRONT BUMPER INSTALLATION

BO051–01

(See page BO–12)

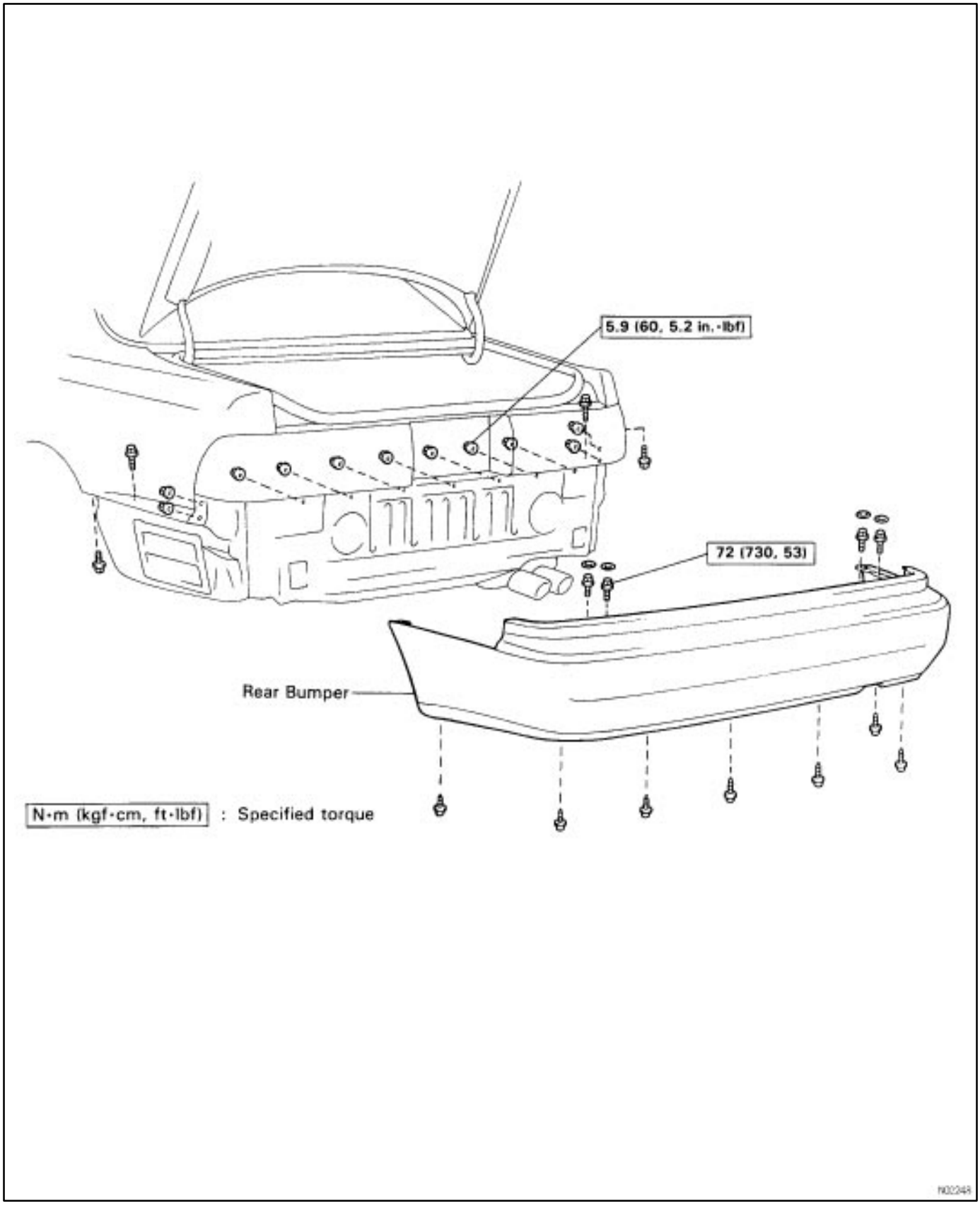
INSTALL FRONT BUMPER PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

HINT:

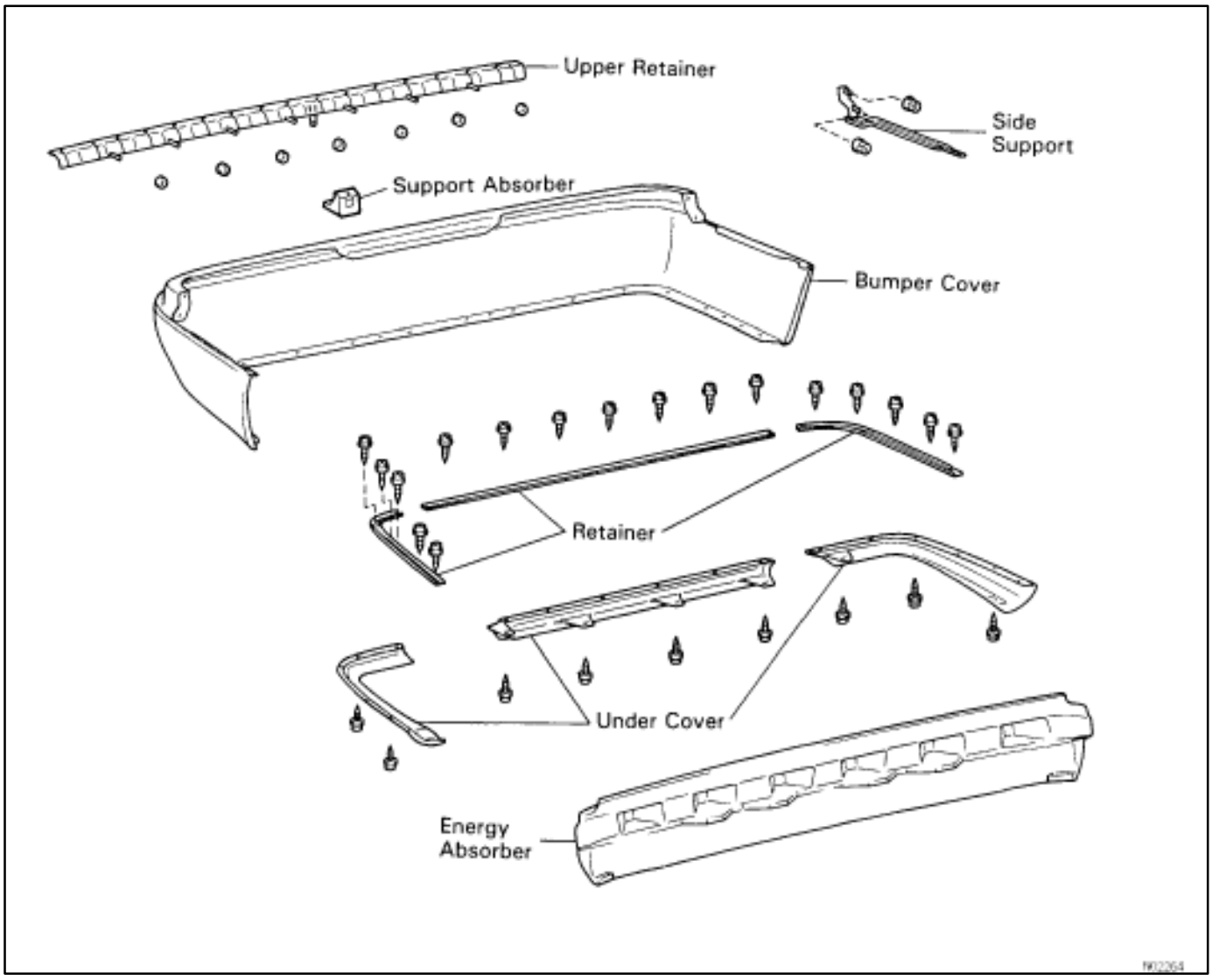
- When installing the bumper on the body, be careful not to damage the serrated part of side bolts.
- At installing the stay, place the retainer in hole, then push in the head of the clip and install it.
- After installing the headlight, adjust the light aiming. (See page BE–44)

REAR BUMPER
COMPONENTS

BO078–01



COMPONENTS (Cont'd)



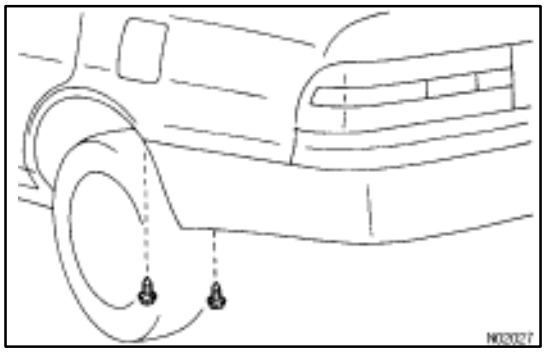
REAR BUMPER REMOVAL

BO052–01

(See page BO–17)

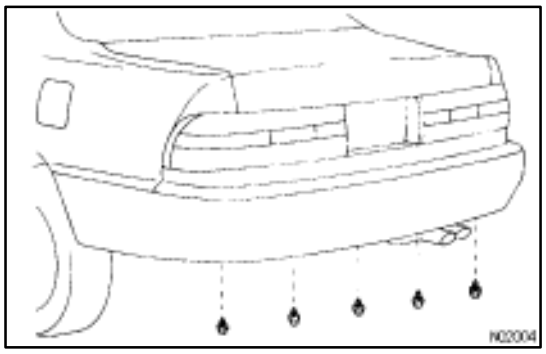
1. REMOVE FOLLOWING PARTS:

(a) Floor mat
(b) Door striker cover
(c) Trim rear cover
(d) Trim front cover
(e) LH side cover
(f) RH side cover

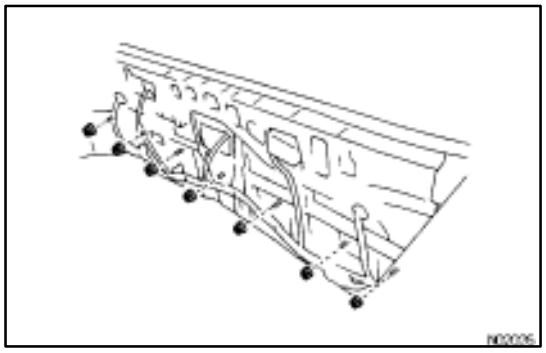


2. REMOVE BUMPER

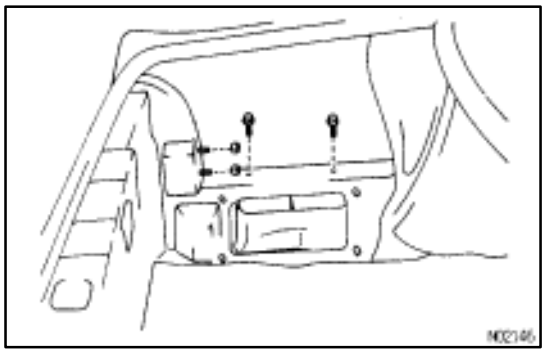
(a) Remove two screws.



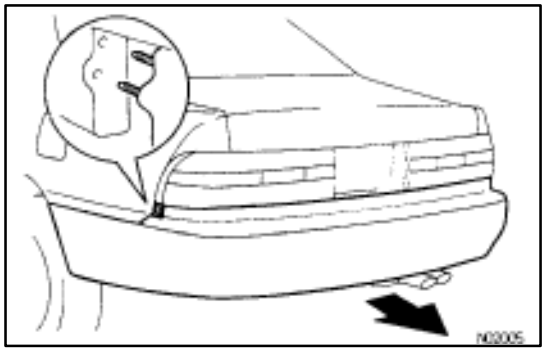
(b) Remove five screws.



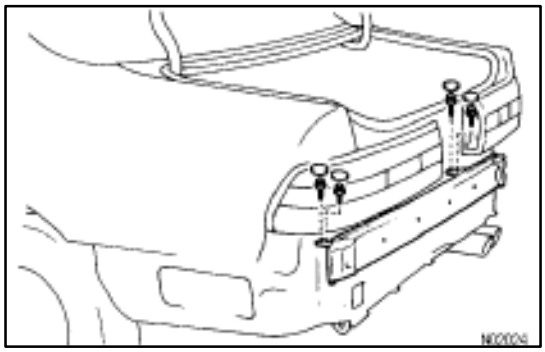
(c) Remove seven nuts.



(d) Remove two bolts and two nuts



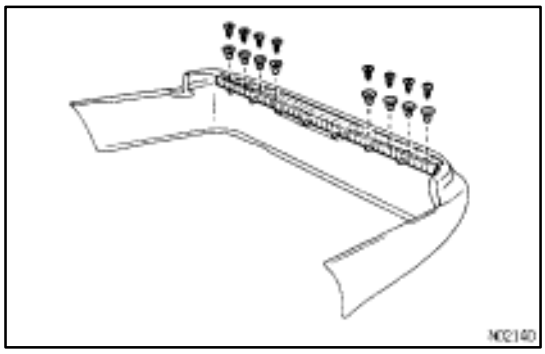
(e) Release the join at both sides of the vehicle and pull out the bumper backward to remove it.



3. REMOVE REINFORCEMENT

(a) Remove four caps.

(b) Remove four bolts and the reinforcement.



REAR BUMPER DISASSEMBLY

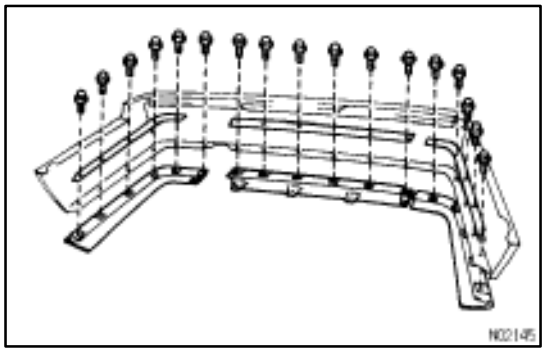
BO053–01

(See page BO–18)

1. REMOVE UPPER RETAINER

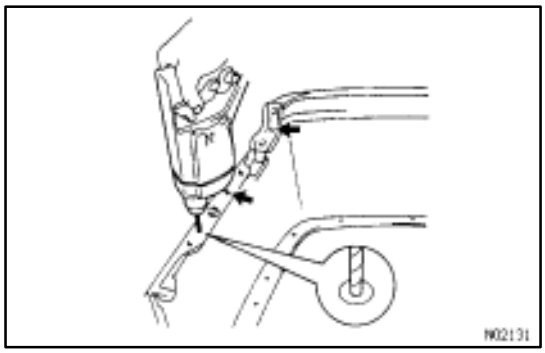
Remove eight clips.

2. REMOVE ENERGY ABSORBER



3. REMOVE UNDER COVER

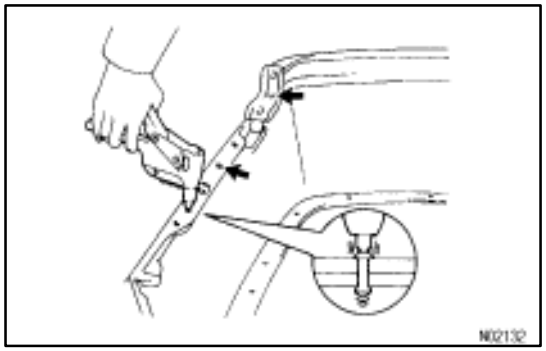
Remove seventeen bolts and the covers.



4. REMOVE SIDE SUPPORT

(a) Using about 3.2 mm (0.126 in.) drill, drill out the rivet heads.

(b) Remove support.



REAR BUMPER ASSEMBLY

BO054–01

(See page BO–18)

ASSEMBLE REAR BUMPER PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE

INSTALL SIDE SUPPORT

(a) Place the support in the bumper cover.

(b) Using a riveter, install the rivets.

REAR BUMPER INSTALLATION

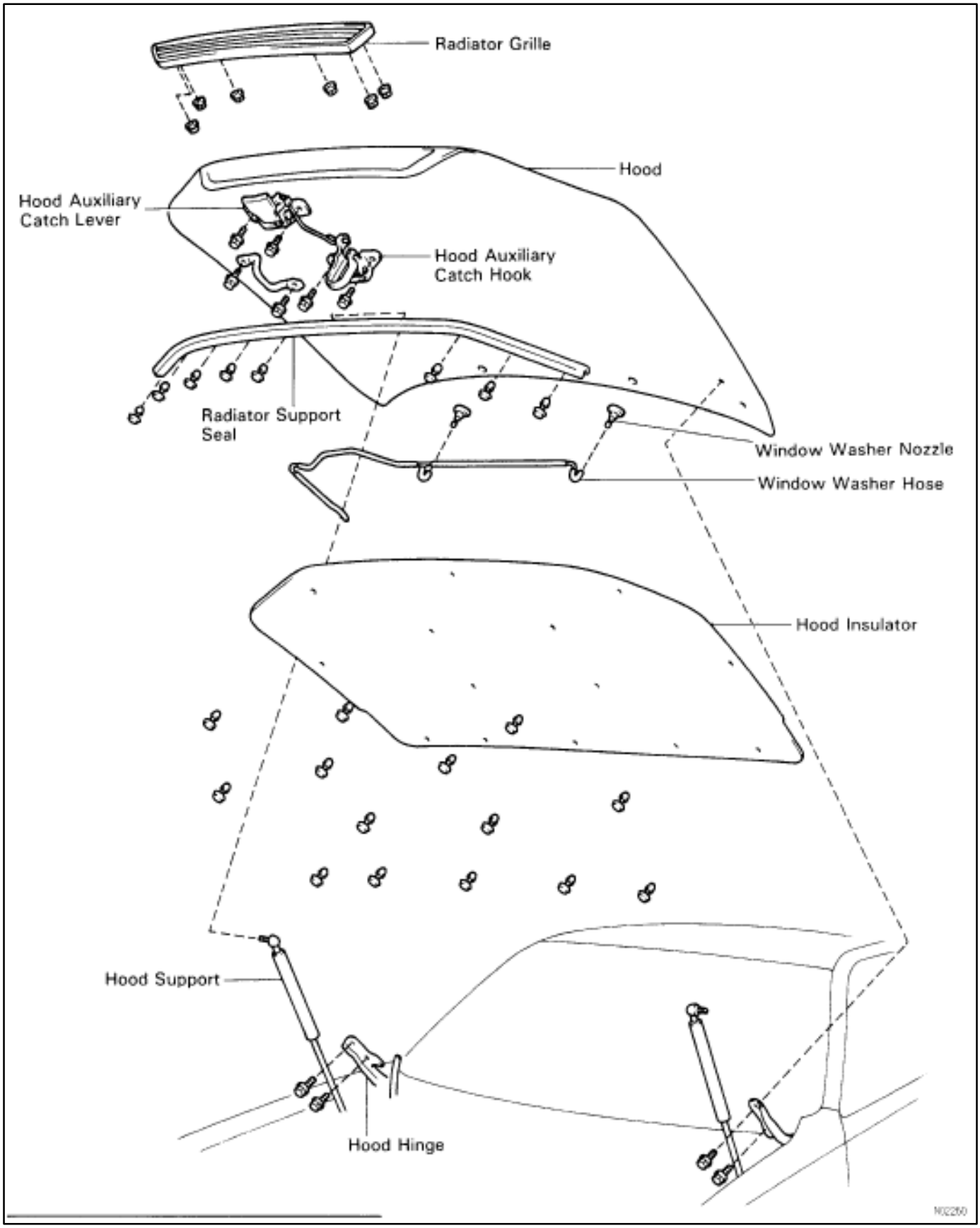
BO055–01

(See page BO–17)

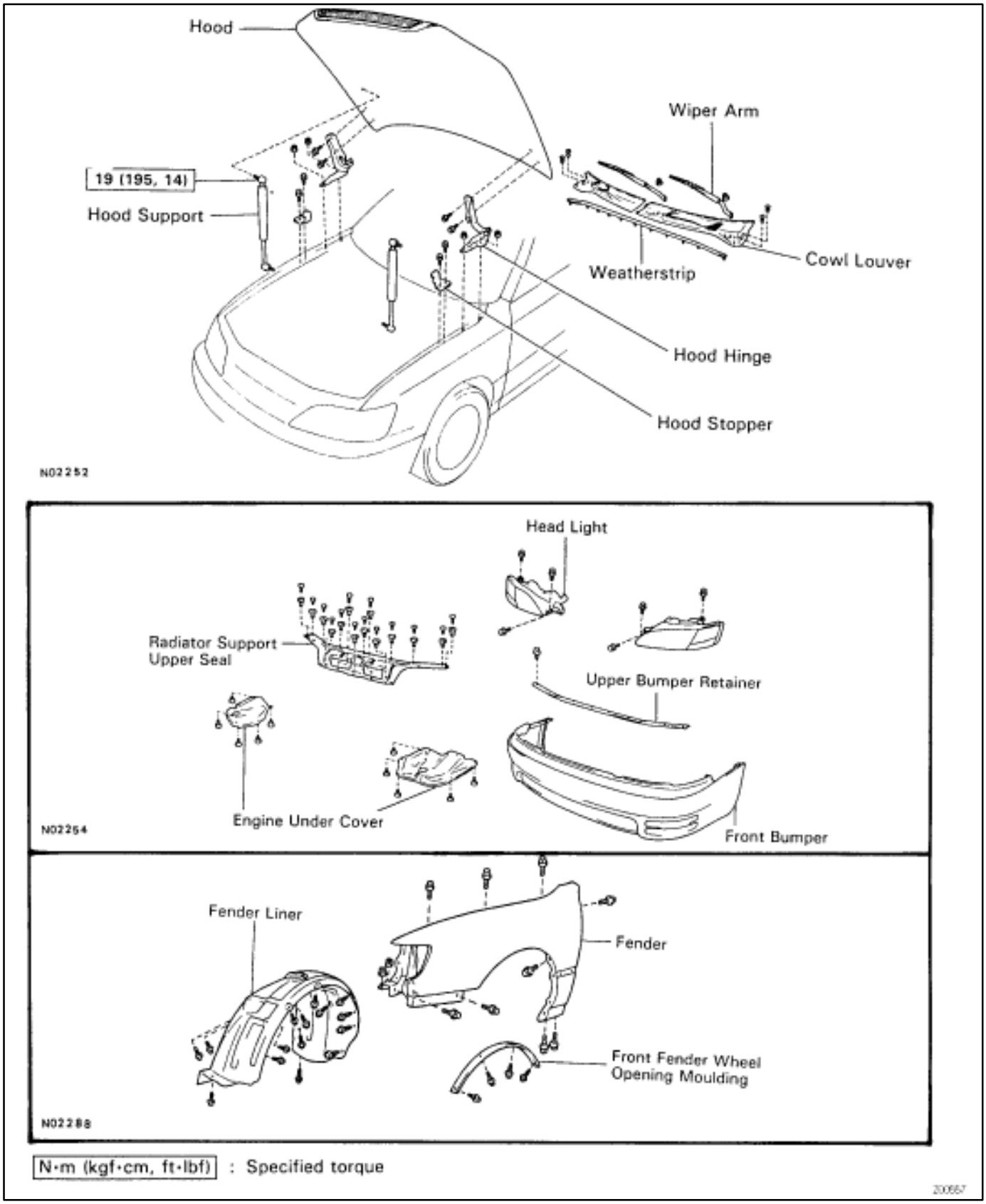
INSTALL REAR BUMPER PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

HOOD
COMPONENTS

BO079–01

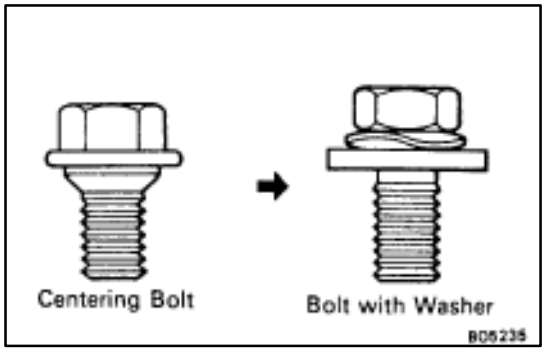


COMPONENTS (Cont'd)



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

20067

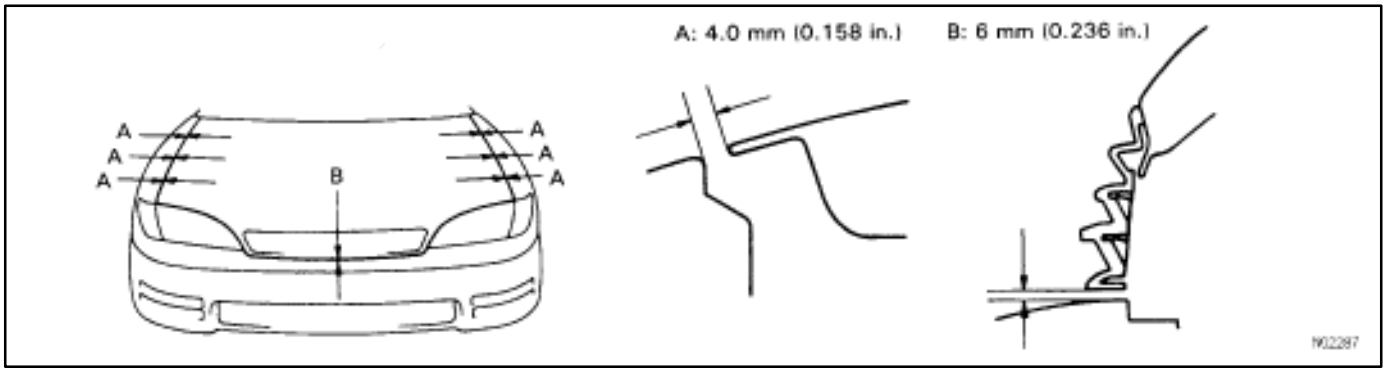


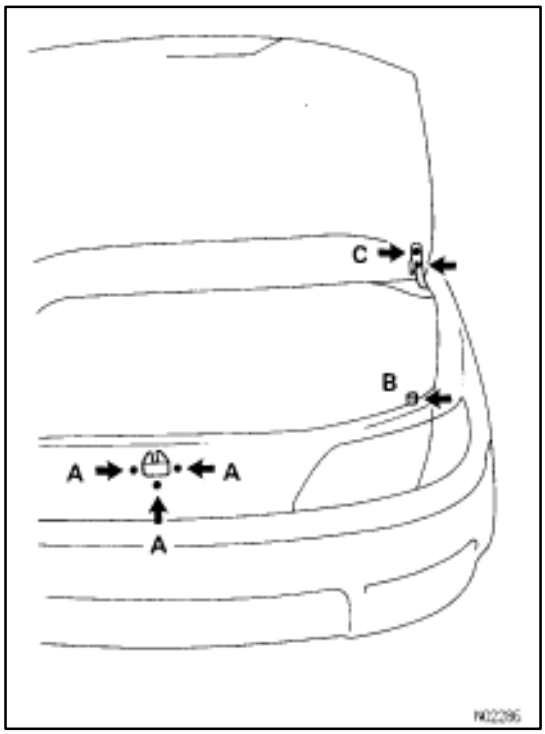
HOOD ADJUSTMENT

BO07A–01

1. SUBSTITUTE BOLT WITH WASHER FOR CENTERING BOLT

Since the centering bolt is used as the hood hinge set bolt, the hood cannot be adjusted with it on. Substitute the bolt with washer for the centering bolt.





HINT: Adjust the hood according to the following method.

2. ADJUST HOOD IN FORWARD / REARWARD AND LEFT/RIGHT DIRECTIONS

Adjust the hood by loosening the C bolts.

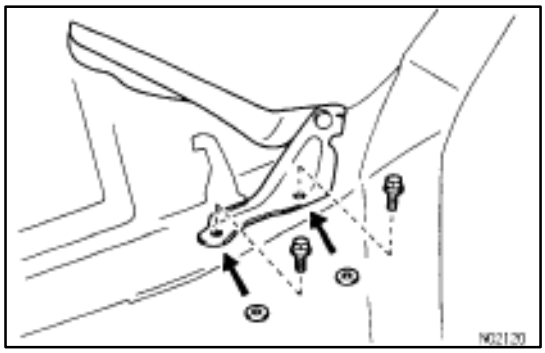
3. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the B cushions.

4. ADJUST HOOD LOCK

Adjust the grille or lock by loosening the A bolts.

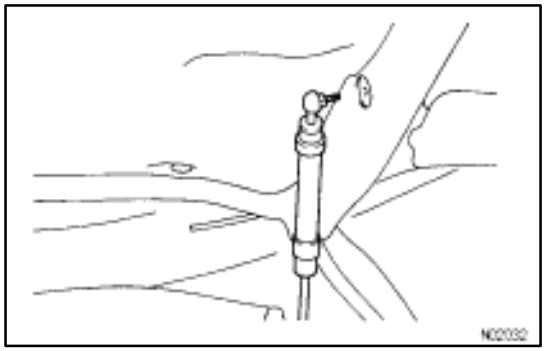
HINT: If not removing the grille or lock, do not adjust them.



5. ADJUST REAR EDGE OF HOOD IN VERTICAL DIRECTION

(a) Remove the fender. (See page BO–33)

(b) Adjust the hood by increasing or decreasing the number of shims as shown.



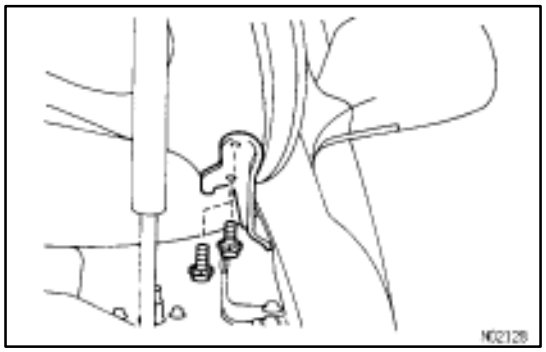
HOOD REMOVAL

BO056–01

(See page. BO–22)

1. REMOVE HOOD SUPPORT FROM HOOD

Remove the bolt and disconnect the support from hood.



2. REMOVE HOOD

(a) Disconnect the windshield washer hose from the body side.

(b) Remove four bolts from hood hinge and remove the hood.

HINT: Be careful not to damage the body or glass with the hood end.

HOOD DISASSEMBLY

BO07B–01

(See page BO–23)

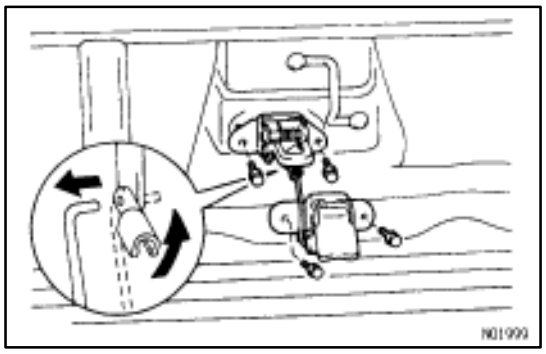
1. REMOVE HOOD AUXILIARY CATCH HOOK AND LEVER

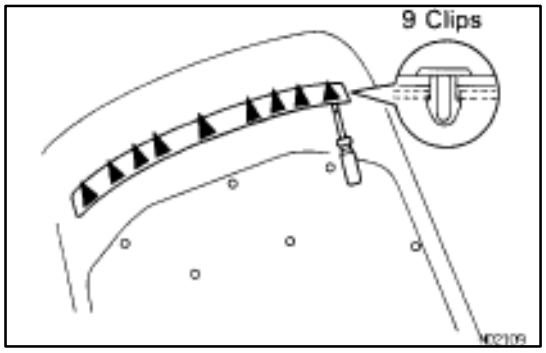
(a) Disconnect the link from the hook.

(b) Remove two bolts and the hook.

(c) Remove two bolts and the lever.

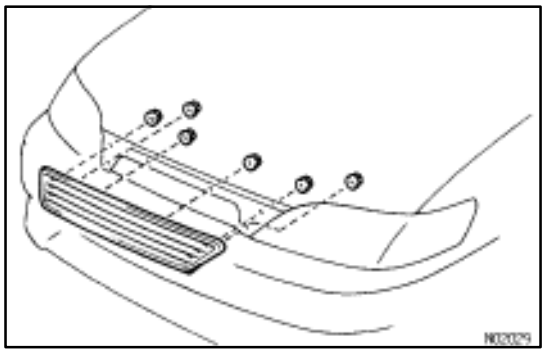
2. REMOVE HOOD LOCK





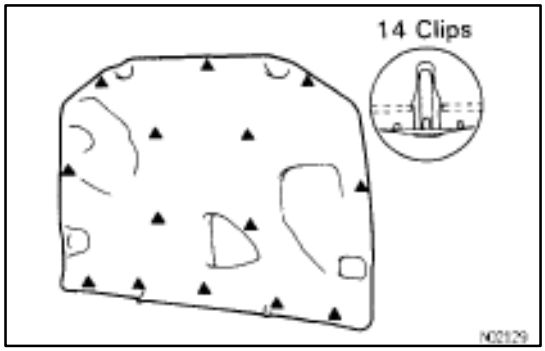
3. REMOVE HOOD TO RADIATOR SUPPORT SEAL

Using a clip remover, remove the seal.



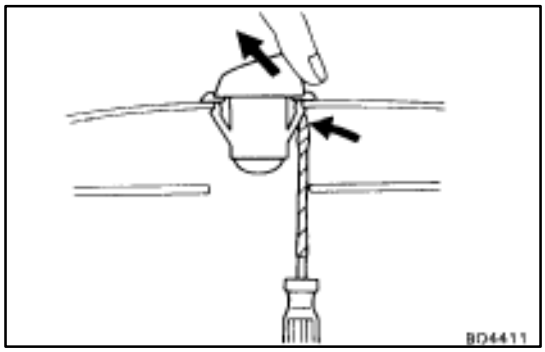
4. REMOVE RADIATOR GRILLE

Remove six nuts and the grille.



5. REMOVE HOOD INSULATOR
Using a clip remover, remove fourteen clips and insulator.

6. REMOVE WINDOW WASHER HOSE



7. REMOVE WINDOW WASHER NOZZLE
Using a screwdriver, remove the nozzle.
HINT: Tape the screwdriver tip before use.

HOOD ASSEMBLY

BO057–01

(See page BO–23)

ASSEMBLE HOOD PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE
HINT: When re–using the headlight cover seal, replace the double–sided tape.

HOOD INSTALLATION

BO058–01

(See page BO–22)

1. INSTALL HOOD
(a) Place the hood on the hood hinge and install four bolts temporarily.
(b) Connect the windshield washer hose to the body side.

2. INSTALL HOOD SUPPORT TO HOOD
Install the bolt and connect the support to hood.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

3. ADJUST HOOD
(See page BO–24)

HOOD HINGE REMOVAL AND INSTALLATION

BO059–01

(See page BO–22)

HINT: Install the hinge by following removal sequence in reverse.

1. REMOVE HOOD

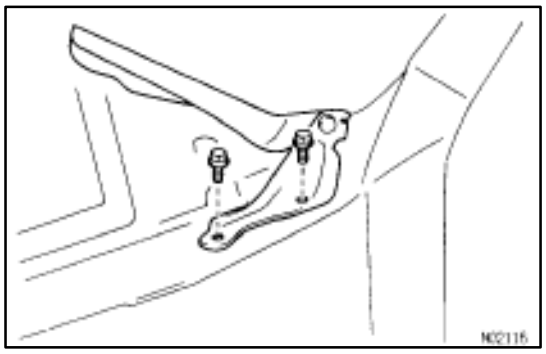
Removal: (See steps 1 to 2 on page BO–25)
Installation: (See steps 1 to 3 on page BO–26)

2. REMOVE FRONT BUMPER

Removal: (See steps 1 to 5 on page BO–14)
Installation: (See page BO–16)

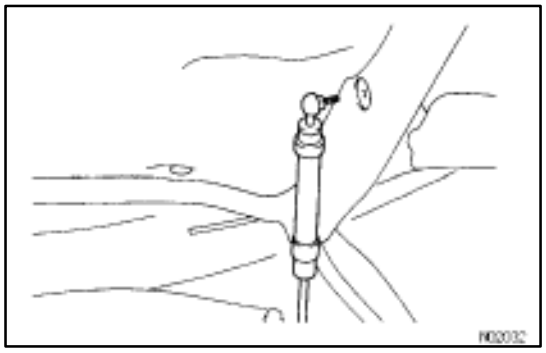
3. REMOVE FRONT FENDER

Removal: (See steps 1 to 4 on page BO–33)
Installation: (See steps 1 to 2 on page BO–33)



4. REMOVE HOOD HINGE

Remove two bolts and the hinge.



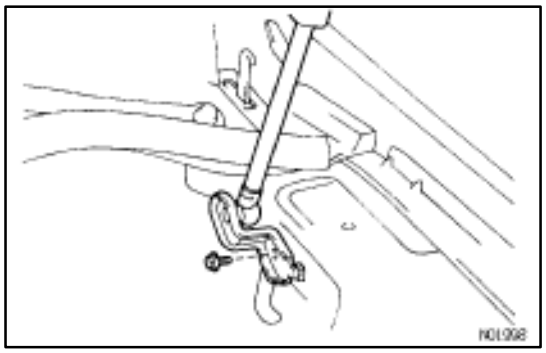
HOOD SUPPORT REMOVAL AND INSTALLATION

BO05A–01

(See page BO–22)

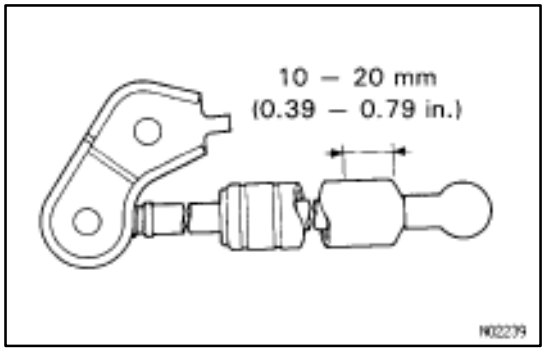
1. REMOVE SUPPORT FROM HOOD

Remove the bolt and the support from hood.
HINT: While supporting the hood with your hand, remove the hood.



2. REMOVE SUPPORT FROM BODY

Remove the bolt and the support.



3. IF NECESSARY, REPLACE HOOD SUPPORT

NOTICE: Handling the damper.

(a) Do not disassemble the damper as the cylinder is filled with pressurized gas.

(b) If the damper is to be replaced, drill a 2.0–3.0 mm (0.079–0.118 in.) hole in the bottom of the removed damper cylinder to completely release the high pressure gas before disposing of it.

(c) When drilling, chips may fly out so work carefully.

(d) The gas is colorless, odorless and non–toxic.

(e) When working, handle the damper carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.

(f) Do not turn the piston rod and cylinder with the damper fully extended.

4. INSTALL HOOD SUPPORT

Install the support.

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

HOOD STOPPER REMOVAL AND INSTALLATION

BO05B–01

(See page BO–22)

HINT: Install the stopper by following removal sequence in reverse.

1. REMOVE HOOD

Removal: (See steps 1 to 2 on pages BO–25)

Installation: (See steps 1 to 3 on pages BO–26)

2. REMOVE FRONT BUMPER

Removal: (See steps 1 to 5 on pages BO–14)

Installation: (See page BO–16)

3. REMOVE FRONT FENDER

Removal: (See steps 1 to 4 on page BO–33)

Installation: (See steps 1 to 2 on page BO–33)

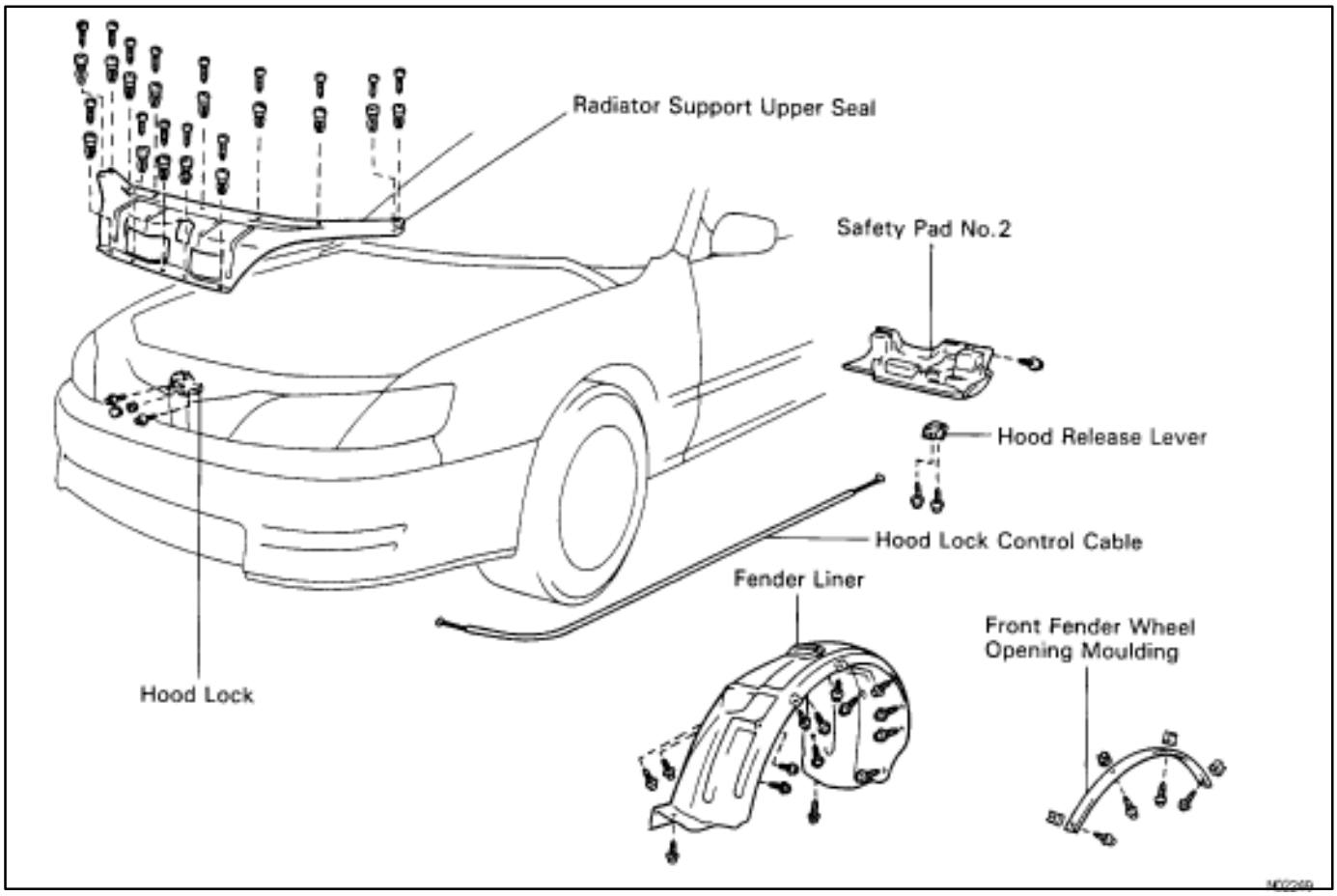
4. REMOVE HOOD STOPPER

Remove the bolt and the stopper.

HOOD LOCK CONTROL

COMPONENTS

BO07C–01



HOOD LOCK CONTROL REMOVAL

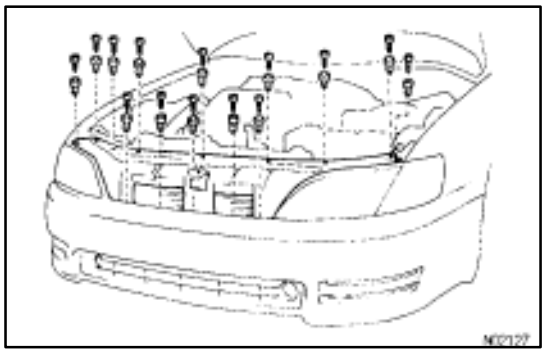
BO07D–01

1. REMOVE FOLLOWING PARTS:

(a) LH front fender wheel opening moulding
(See step 2 on page BO–33)

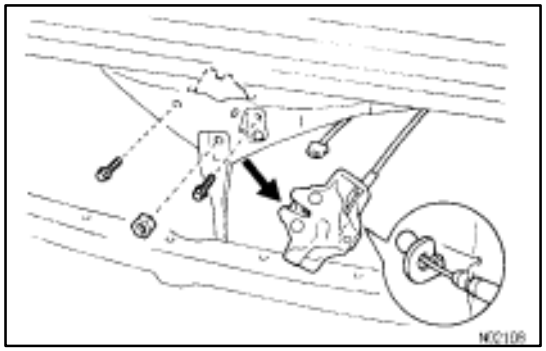
(b) LH fender liner

(c) Hood release lever



2. REMOVE RADIATOR SUPPORT UPPER SEAL

Using a screw driver, remove fourteen clips and the seal.

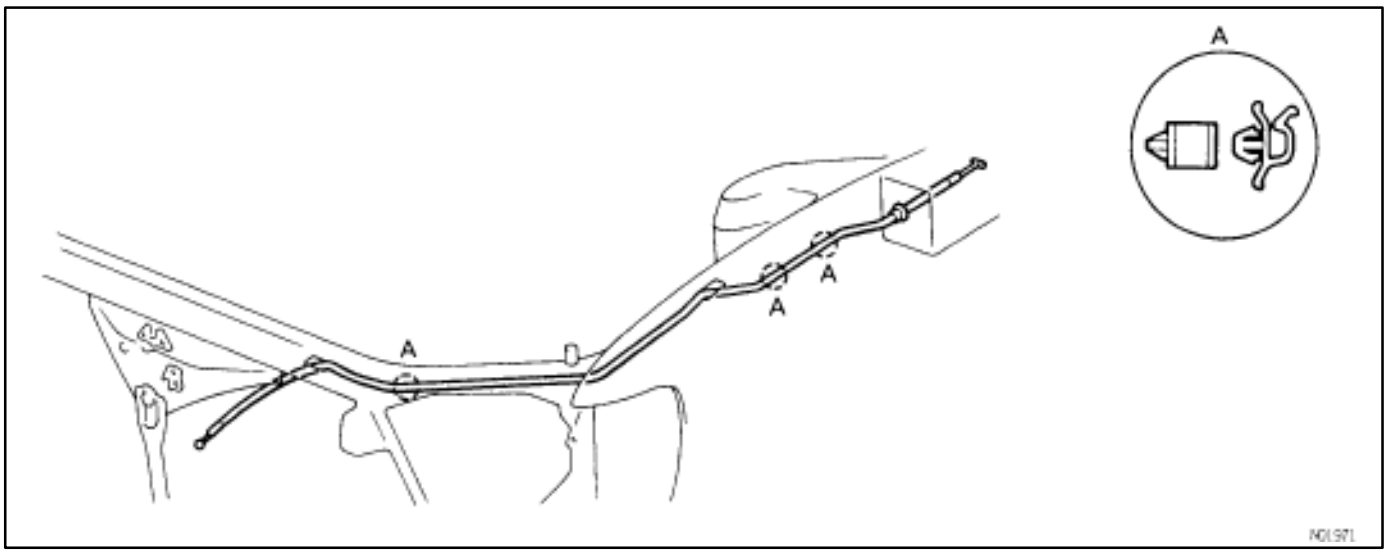


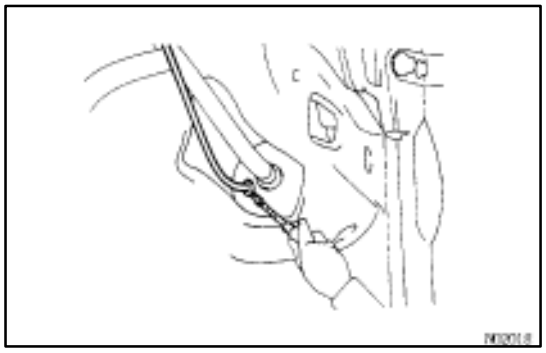
3. REMOVE HOOD LOCK

(a) Remove two bolts, the nut and the hood lock.
(b) Disconnect the connector.
(c) Disconnect the link from the lock.

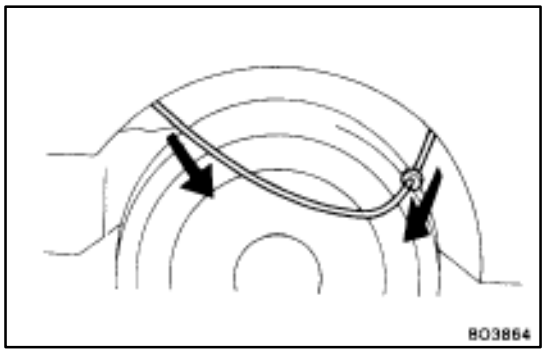
4. REMOVE HOOD LOCK CONTROL CABLE

(a) Using the screwdriver, disconnect the cable from clamps.

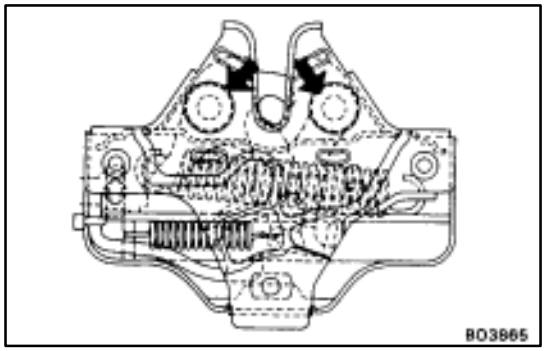




(b) Using the screwdriver, pry out the cable stopper from grommet.
HINT: Do not damage the grommet with the screwdriver.



(c) Pull the cable from front wheel housing to remove it.



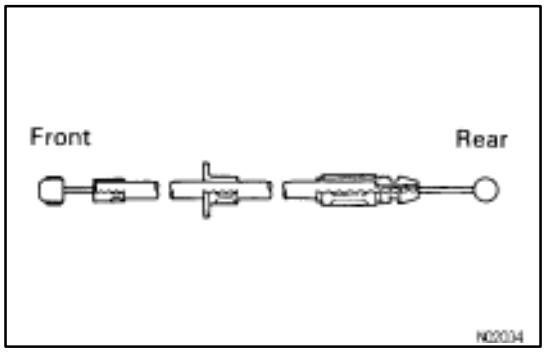
HOOD LOCK CONTROL INSTALLATION

BO07E–01

(See page BO–29)

1. BEFORE INSTALLING PARTS, COAT LOCK WITH MP GREASE

Apply MP grease to the sliding surface of the lock.



2. INSTALL HOOD LOCK CONTROL CABLE

(a) Push the rear side cable through the grommet.

(b) Using the screwdriver, push the cable stopper into the grommet.

HINT: Do not damage the grommet with the screwdriver.

(c) Pass the front side cable through the upper radiator support.

(d) Install the cable with clamps.

3. INSTALL HOOD RELEASE LEVER

4. INSTALL HOOD LOCK TEMPORARILY

5. CHECK HOOD LOCK CONTROL FOR PROPER OPERATION

After checking for proper operation, tighten the nut and two bolts to install the lock.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

6. INSTALL FOLLOWING PARTS:

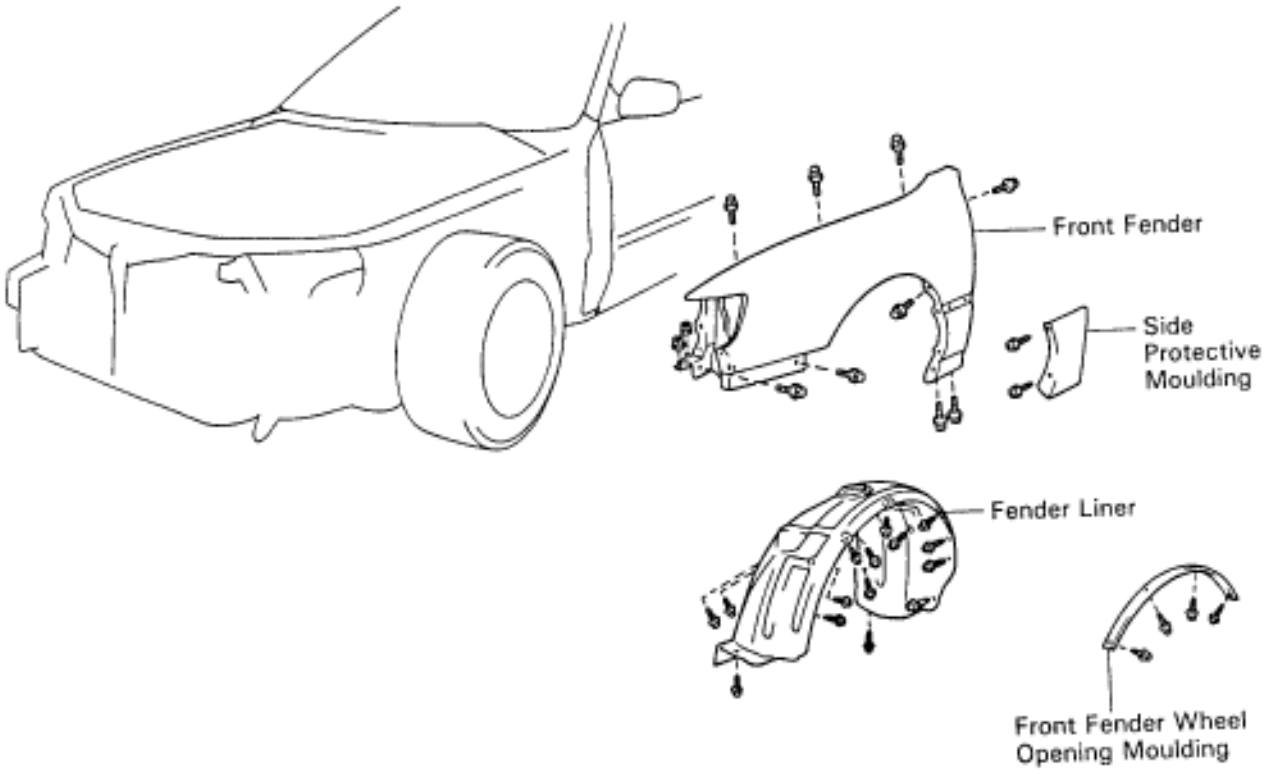
(a) Hood release lever

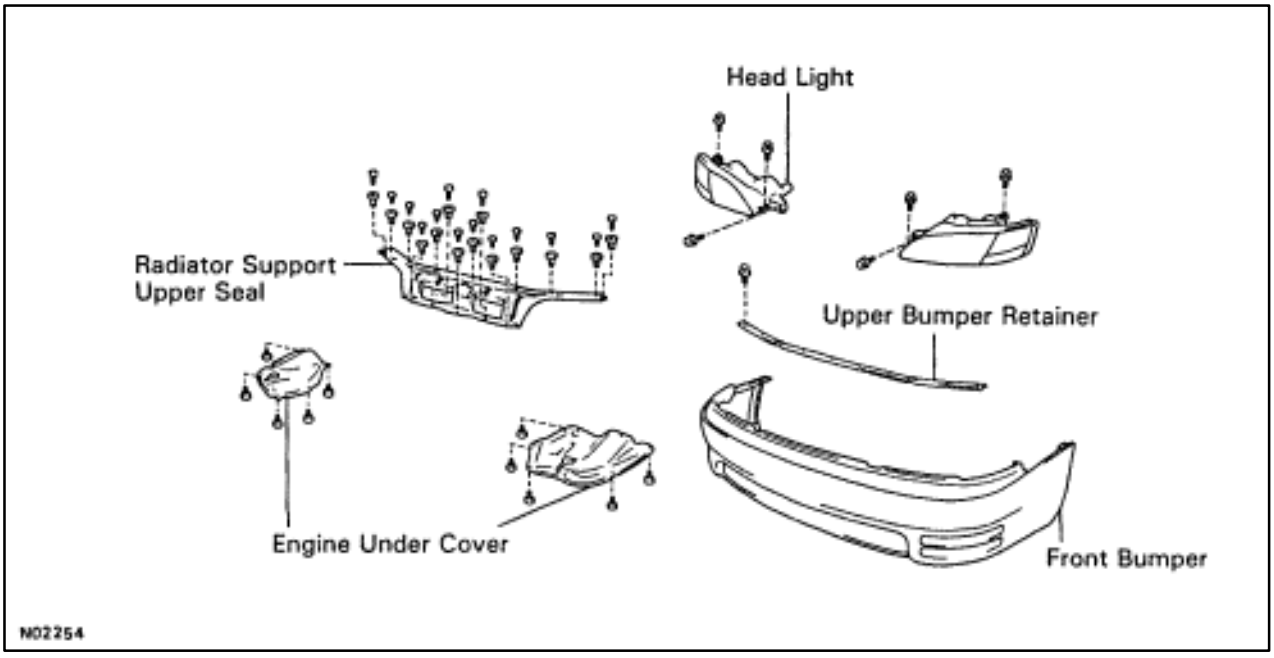
(b) LH fender liner

(c) LH front fender wheel opening moulding

FRONT FENDER
COMPONENTS

BO07F–01



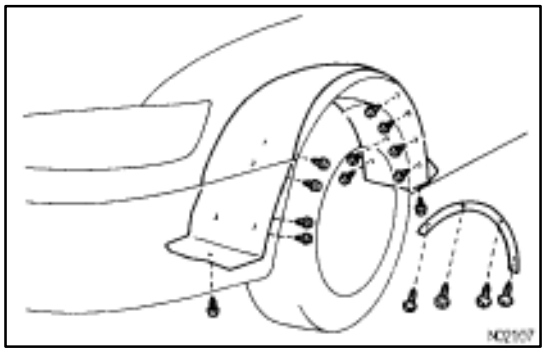


FRONT FENDER REMOVAL

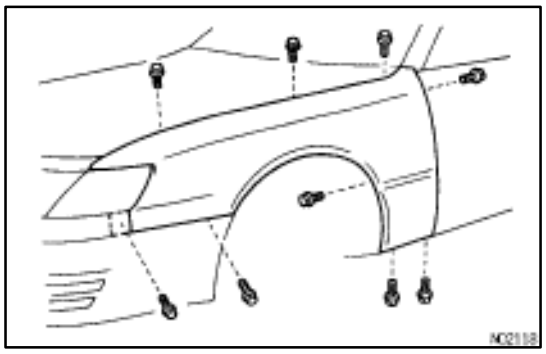
BO05C–01

(See page BO–32)

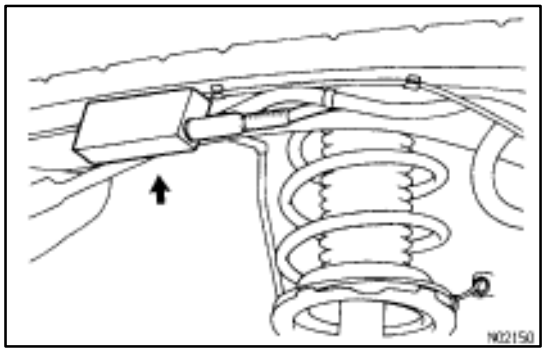
1. **REMOVE FRONT BUMPER**
   (See page BO–14)
2. **REMOVE FRONT FENDER WHEEL OPENING MOULDING**
   Remove four screws and the moulding.



3. **REMOVE FENDER LINER**
   Remove twelve screws and the liner.



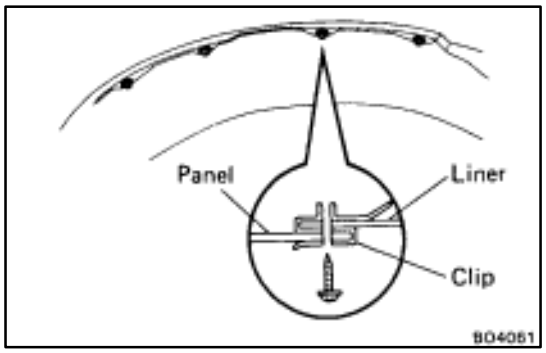
4. **REMOVE FRONT FENDER**
   Remove nine bolts and the fender.



CAUTION: Do not damage or shock the front airbag sensor at all.

FRONT FENDER INSTALLATION

BO07G–01



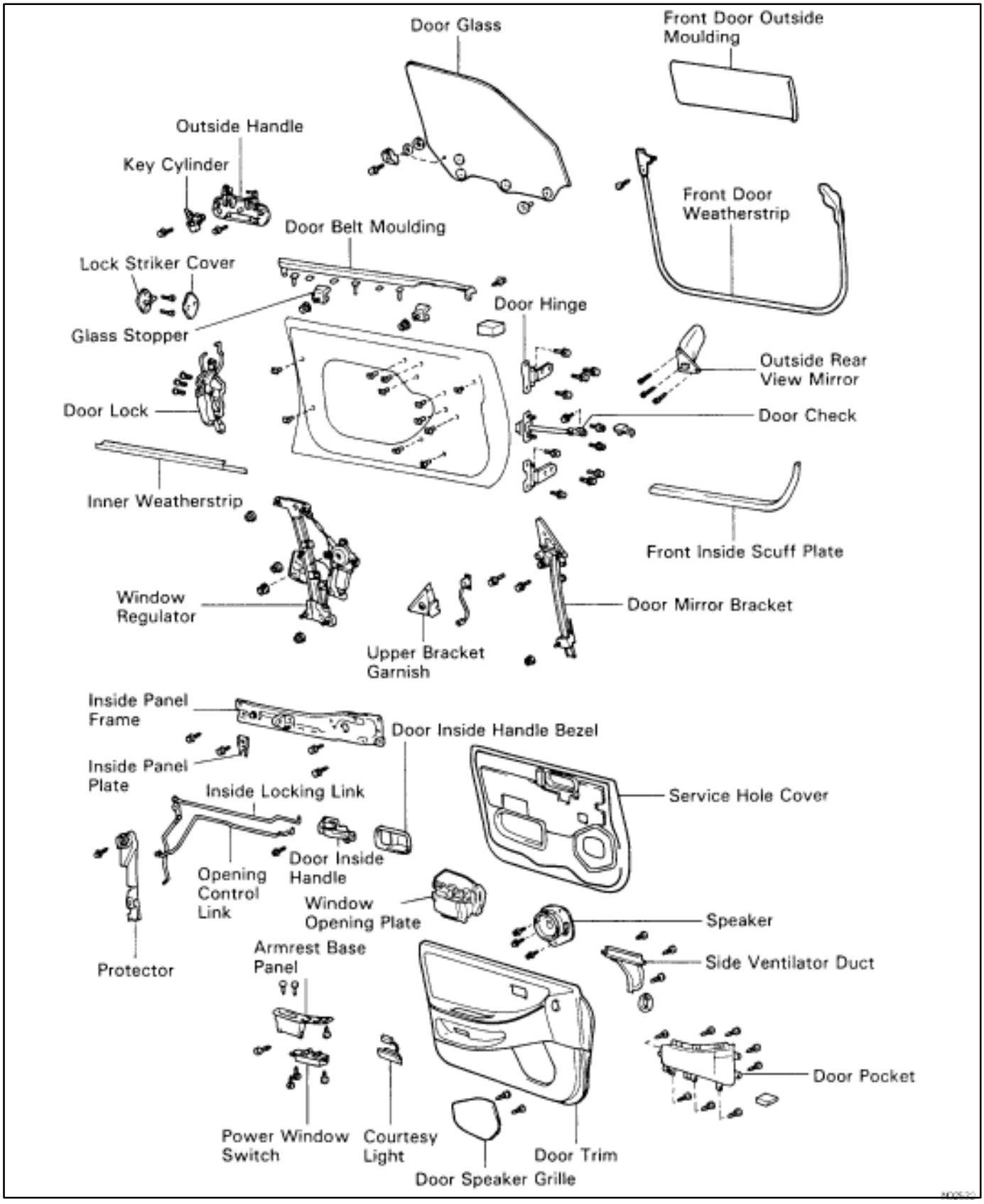
1. **INSTALL FRONT FENDER**
   Install the fender with nine bolts.
2. **INSTALL FENDER LINER**

(a) Install three clips so that the screw can be inserted in the manner shown in the drawing.

(b) Install fifteen screws and the liner.

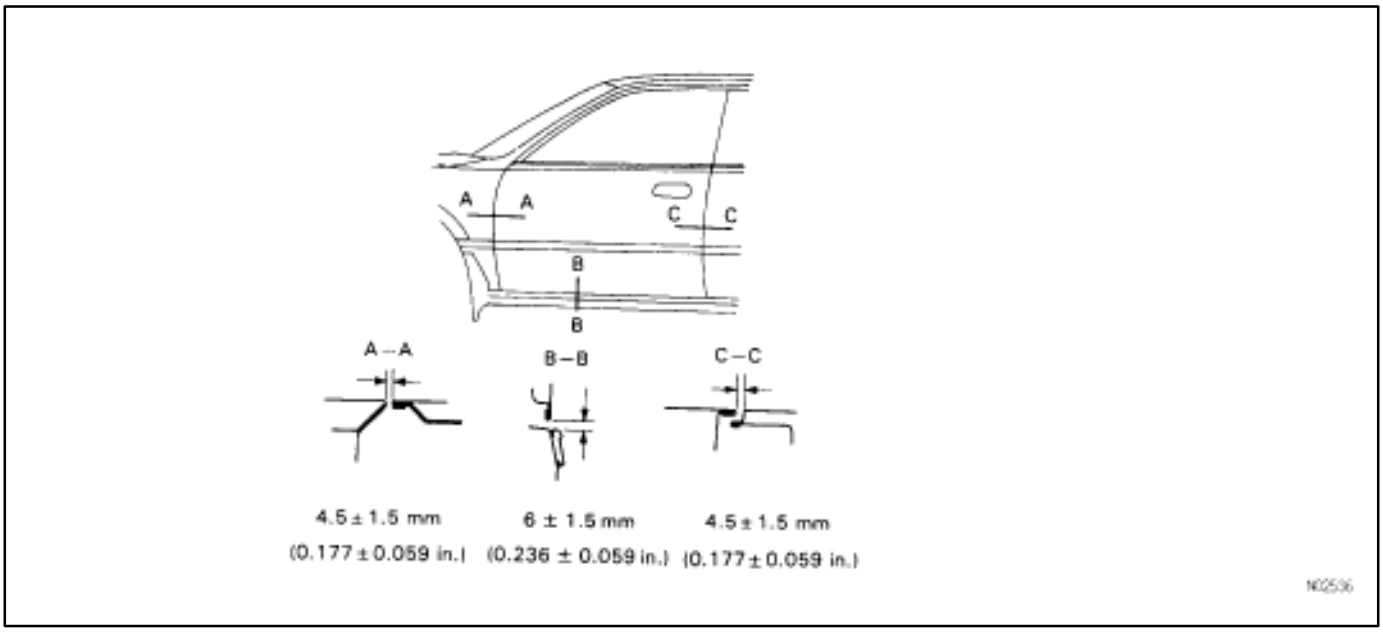
FRONT DOOR
COMPONENTS

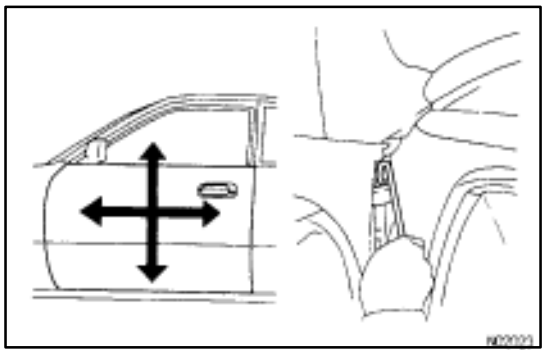
BO07H–01



FRONT DOOR ADJUSTMENT

BO07J–01



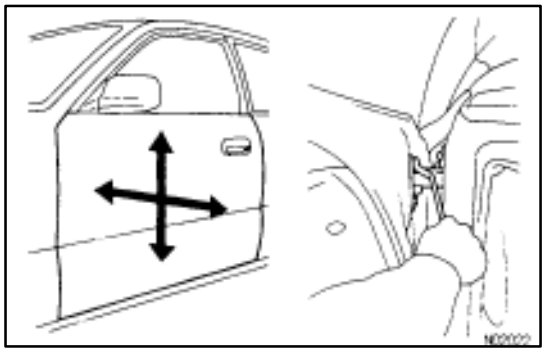


HINT: Adjust the door panel according to the following method.

1. ADJUST FRONT DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

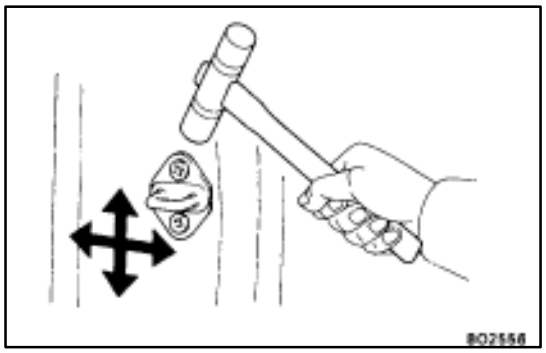
Using SST, adjust the door by loosening the body side hinge nuts.

SST 09812–00010



2. ADJUST FRONT DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

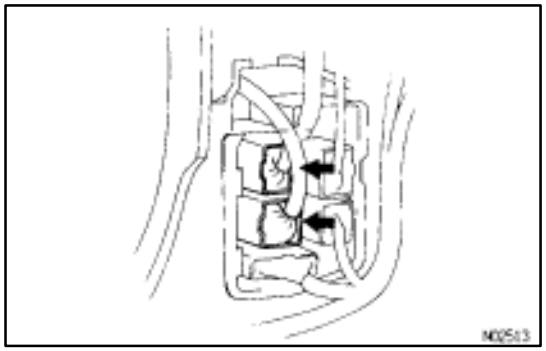
Loosen the door side hinge bolts to adjust.



3. ADJUST FRONT 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. Tighten the striker mounting screws again.



FRONT DOOR REMOVAL

BO07K–01

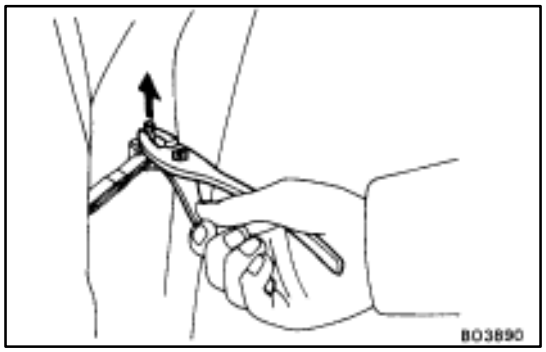
(See page BO–34)

1. REMOVE FRONT SCUFF PLATE
(See step 5 on page BO–141)

2. DISCONNECT CONNECTORS

(a) Disconnect the front corner of the floor carpet.

(b) Disconnect two connectors as shown.



3. DISCONNECT DOOR CHECK FROM BODY

(a) Using a screwdriver, remove the door check cover.
HINT: Tape the screwdriver tip before use.

(b) Using the pliers, push out the arm pin and disconnect the door check from body.

4. REMOVE DOOR
While supporting the door, remove four door side hinge bolts to remove the door.
HINT: When removing the door, do not damage the connectors with the hole of the panel.

DOOR HINGE REPLACEMENT

BO05D–01

1. REMOVE DOOR HINGE
Remove two bolts and the hinge.

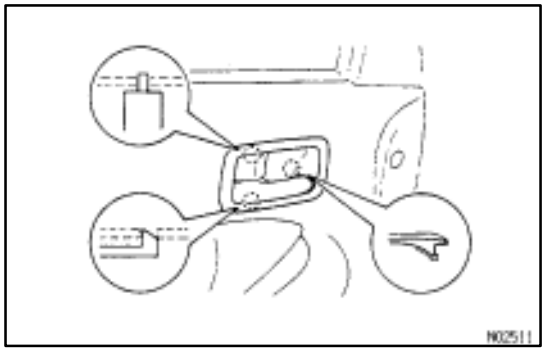
2. INSTALL DOOR HINGE
Install two bolts and the hinge.
Torque: 68 N·m (690 kgf·cm, 50 ft·lbf)

FRONT DOOR INSTALLATION

BO05E–01

(See page BO–34)

INSTALL DOOR PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE
HINT: After installing the door, adjust the door.
(See page BO–35)



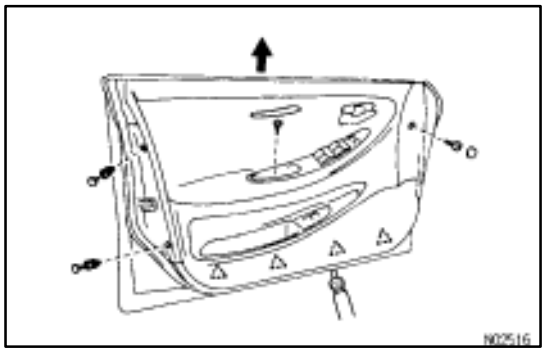
FRONT DOOR DISASSEMBLY

BO05F–01

(See page BO–34)

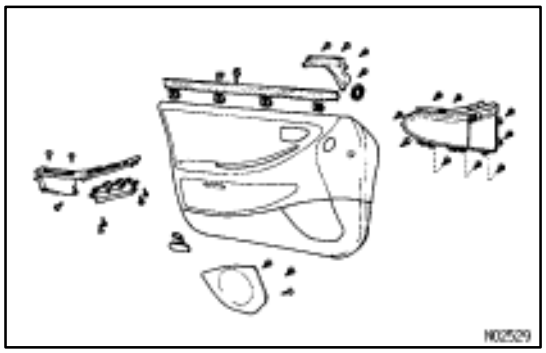
1. REMOVE DOOR INSIDE HANDLE BEZEL

(a) Using a screwdriver, pry out the bezel.
HINT: Tape the screwdriver tip before use.
(b) Pull the bezel rearwards to remove it.

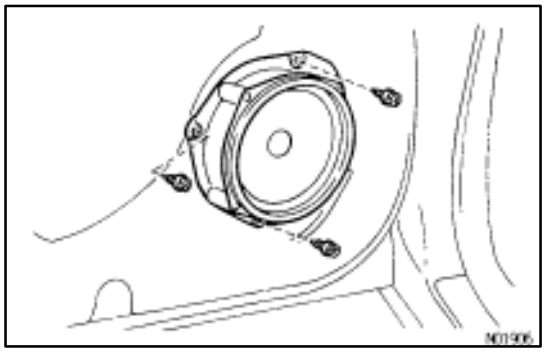


2. REMOVE DOOR TRIM

(a) Remove the armrest cover.
(b) Remove a cap.
(c) Remove two screws.
(d) Remove two clips.
(e) Insert the screwdriver between the panel and the trim and remove the clips.
(f) Pull the trim upwards to remove it.
(g) Disconnect the connectors.

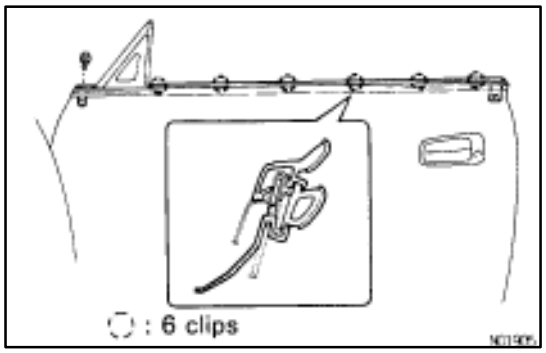


(h) Remove four screws and the side ventilator duct.
(i) Remove ten screws and the door pocket.
(j) Remove three screws and the speaker grill.
(k) Remove three screws and the armrest base panel.
(l) Remove courtesy light.



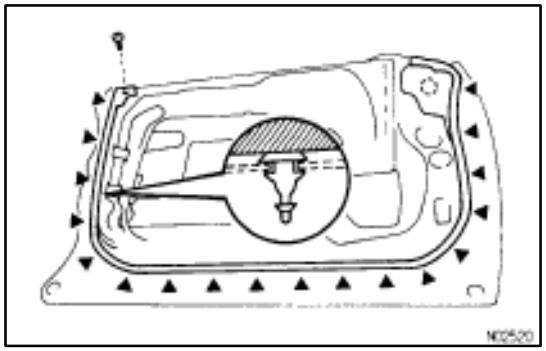
3. REMOVE SPEAKER

(a) Remove three screws and the speaker.
(b) Disconnect the connector.



4. REMOVE DOOR BELT MOULDING

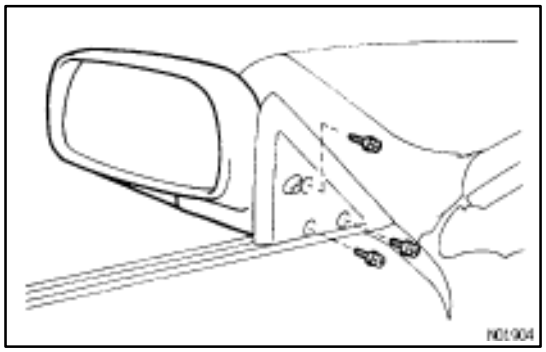
(a) Remove the screw from the front edge of the moulding.
(b) Pry loose the clips from the edge of the panel and remove the moulding.



5. REMOVE DOOR WEATHERSTRIP

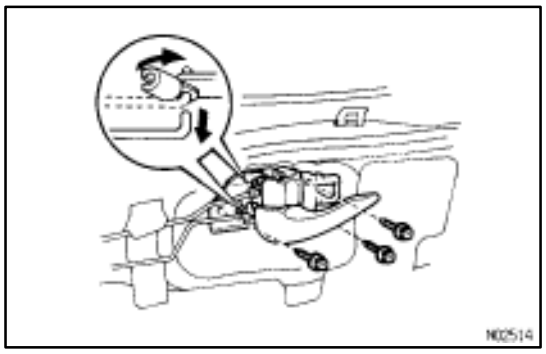
While pulling the weatherstrip by hand, remove the eighteen clips using a clip remover.

HINT: Do not pull strongly on the weatherstrip as it may tear.



6. REMOVE OUTSIDE REAR VIEW MIRROR

(a) Remove the upper bracket garnish.
(b) Remove the screw and the speaker.
(c) Remove two screws and the mirror.
(d) Disconnect the connector.



7. REMOVE DOOR INSIDE HANDLE

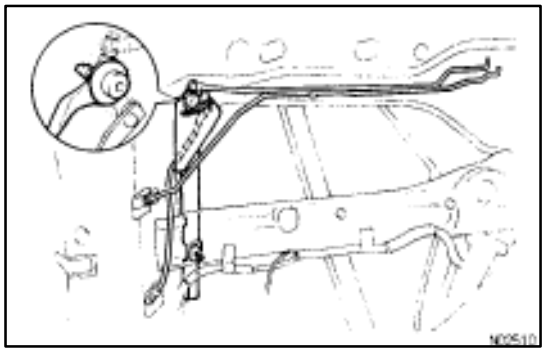
(a) Remove three screws.
(b) Disconnect the two links from the handle.

8. REMOVE WINDOW OPENING PLATE

9. REMOVE SERVICE HOLE COVER

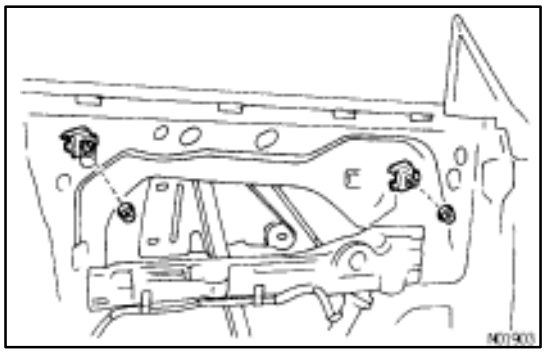
Remove the cover by pulling at the edge by hand.

HINT: Do not tear the cover.



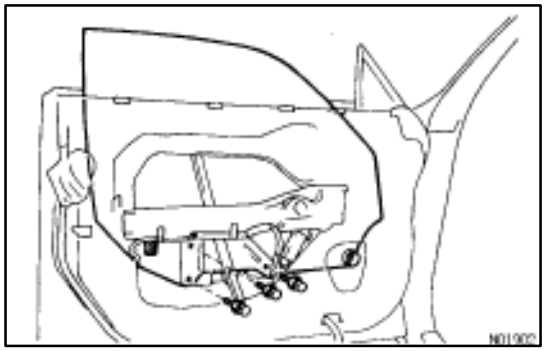
10. DISCONNECT OPENING CONTROL LINK AND INSIDE LOCKING LINK

(a) Using a clip remover, remove the clip.
(b) Disconnect the opening control link and the inside locking link.



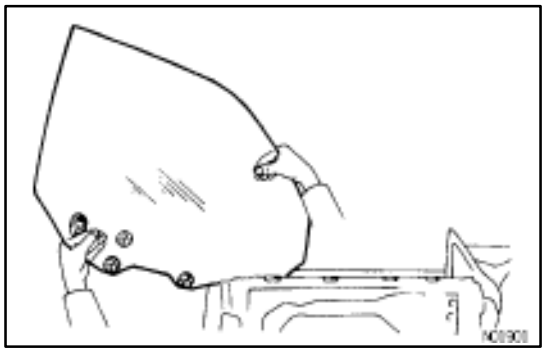
11. REMOVE DOOR GLASS STOPPERS

Remove two nuts and two stoppers.

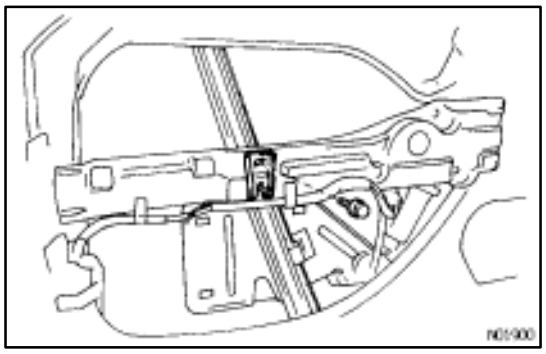


12. REMOVE DOOR GLASS

(a) Remove three bolts.

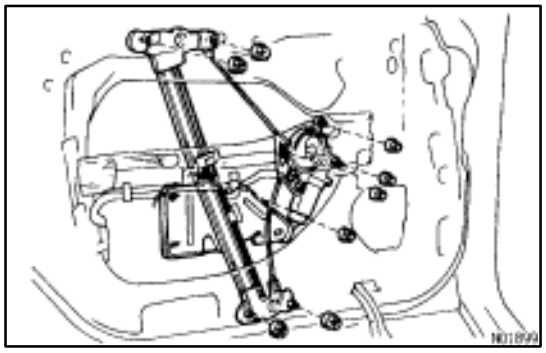


(b) Pull the door glass out of the panel carefully.



13. REMOVE DOOR INSIDE PANEL PLATE

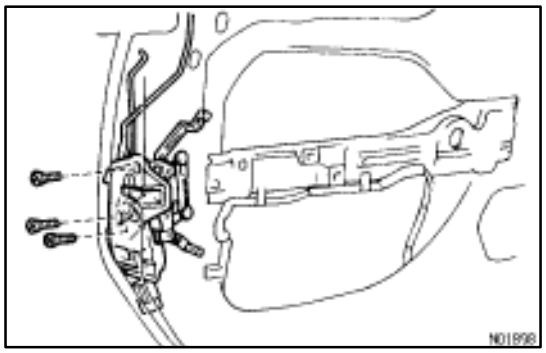
Remove the bolt and the plate.



14. REMOVE WINDOW REGULATOR

(a) Remove eight nuts and the regulator.

(b) Disconnect the connector.

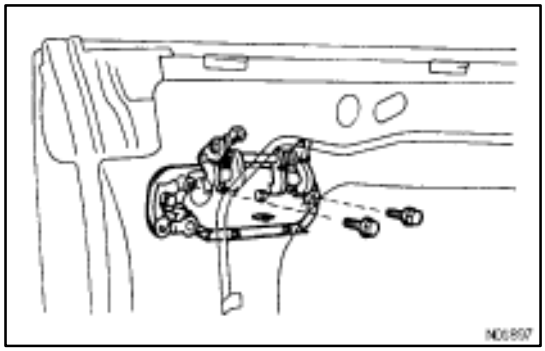


15. REMOVE DOOR LOCK

(a) Disconnect the two links from the outside handle and key cylinder.

(b) Disconnect the connector.

(c) Remove three screws and the door lock.



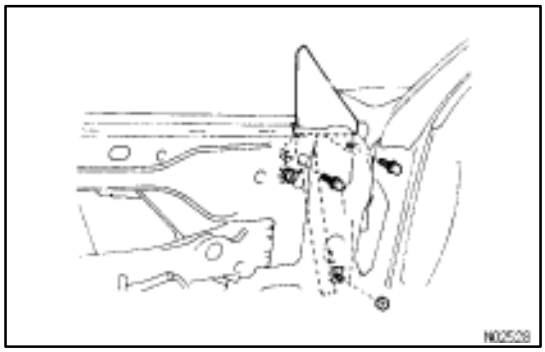
16. REMOVE OUTSIDE HANDLE AND KEY CYLINDER

(a) Remove two bolts and the handle

(b) Remove the bolt and the key cylinder from the handle.

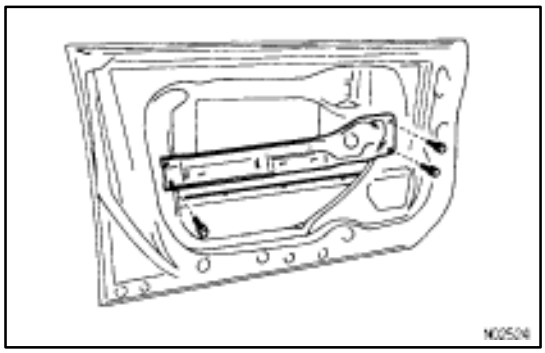
17. REMOVE SIDE PROTECTION MOULDING

(See page BO–78)



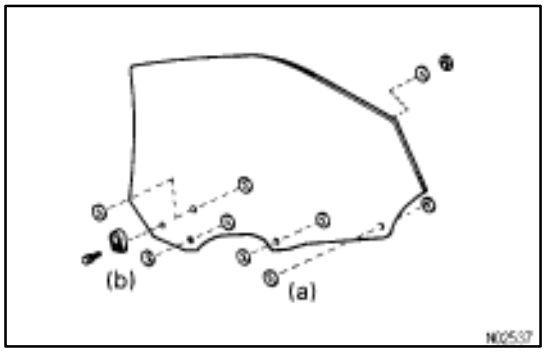
18. REMOVE FRONT DOOR MIRROR BRACKET

Remove two bolts, the nut and the bracket.



19. REMOVE DOOR INSIDE PANEL FRAME

Remove three screws and the frame



DOOR GLASS REPLACEMENT

BO05G–01

1. REMOVE FOLLOWING PARTS:

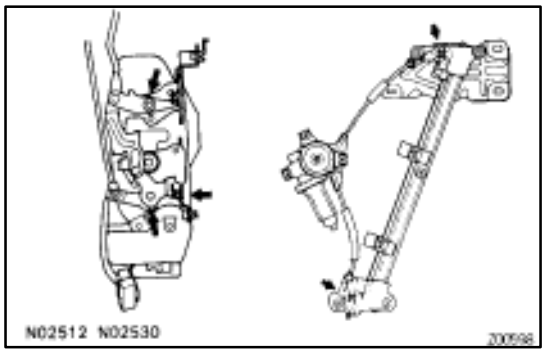
(a) Nut

(b) Stabilizers

2. REPLACE DOOR GLASS

3. INSTALL DOOR GLASS PARTS

Install the parts by following removal sequence in reverse.



FRONT DOOR ASSEMBLY

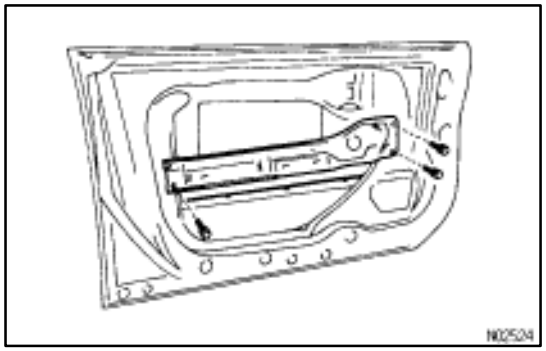
BO07L–01

(See page BO–34)

1. BEFORE INSTALLING PARTS, COAT THEM WITH MP GREASE

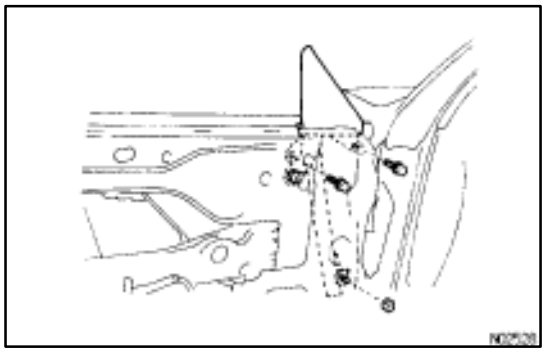
Apply MP grease to the sliding surface and gears of the window regulator.

NOTICE: Do not apply MP grease to the spring of the window regulator.



2. INSTALL DOOR INSIDE PANEL FRAME

Install the frame with three screws.

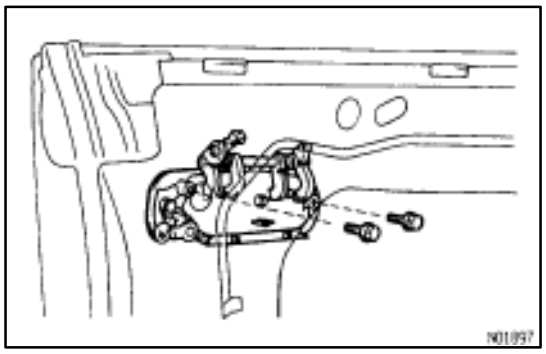


3. INSTALL FRONT DOOR MIRROR BRACKET

Install the bracket with two bolts and the nut.

4. INSTALL SIDE PROTECTION MOULDING

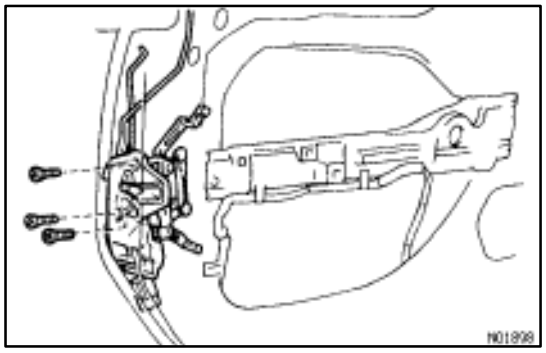
(See page BO–78)



5. INSTALL OUTSIDE HANDLE AND KEY CYLINDER

(a) Install the key cylinder to the outside handle with the bolt.

(b) Install the handle with two bolts.



6. INSTALL DOOR LOCK

(a) Apply adhesive to three screws.

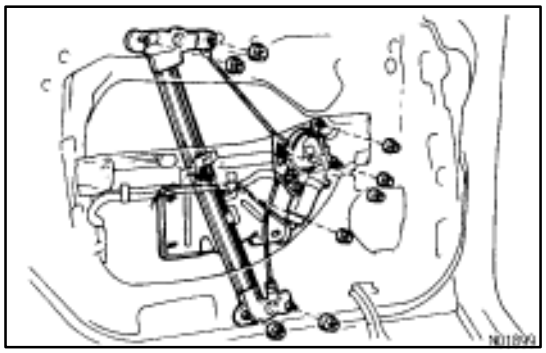
Part No.08833–00070, THREE BOND 1324 or equivalent

(b) Install the door lock with three screws.

(c) Install the two links to the outside handle and key cylinder.

(d) Connect the connector.

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

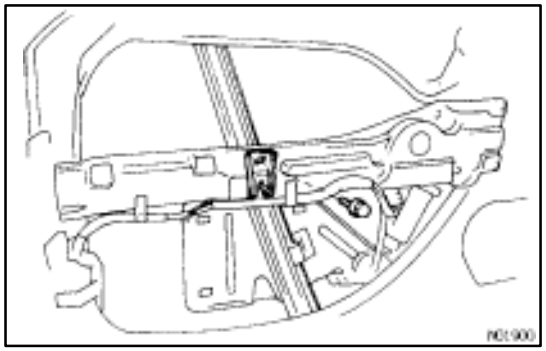


7. INSTALL WINDOW REGULATOR

(a) Install the regulator with eight nuts.

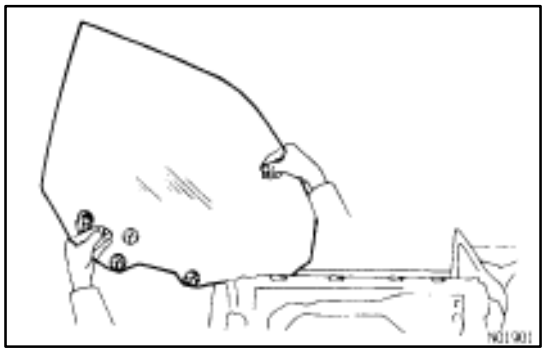
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Connect the connector.



8. INSTALL DOOR INSIDE PANEL PLATE

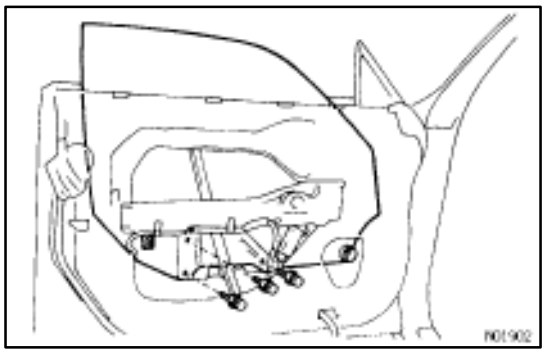
Install the plate with the bolt.



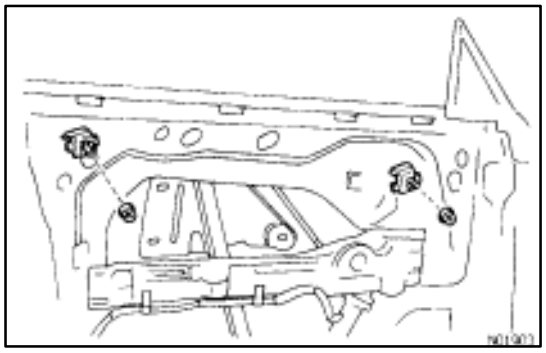
9. INSTALL DOOR GLASS

(a) Insert the glass inside the door panel.

HINT: Insert a shop rag inside the panel to prevent scratching the glass.

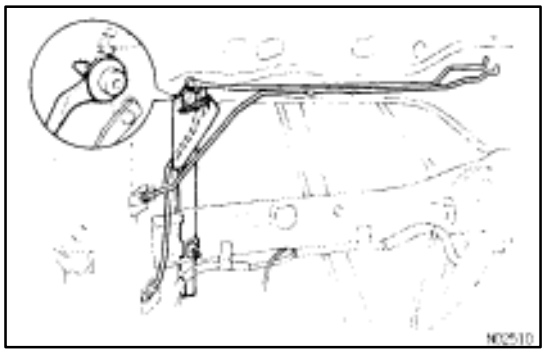


(b) Temporarily tighten three bolts.



10. INSTALL DOOR GLASS STOPPERS

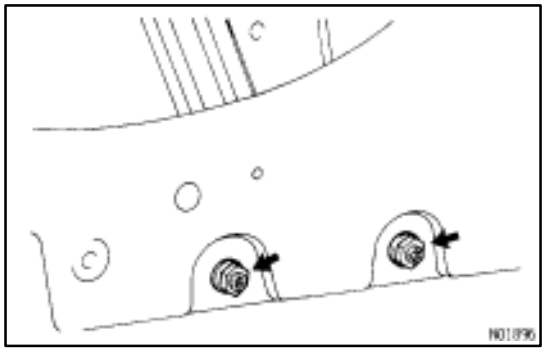
Install two stoppers with two bolts.



11. CONNECT OPENING CONTROL LINK AND INSIDE LOCKING LINK.

(a) Connect the opening control link and the inside locking link with the door lock.

(b) Install the clip.

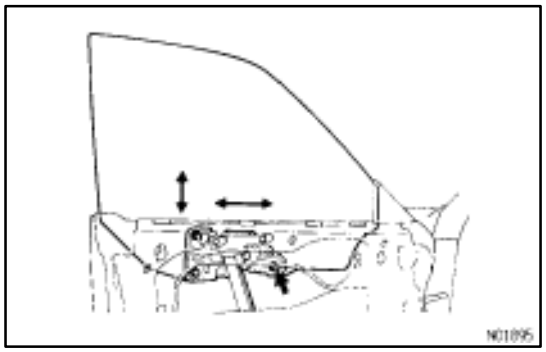


12. ADJUST DOOR GLASS

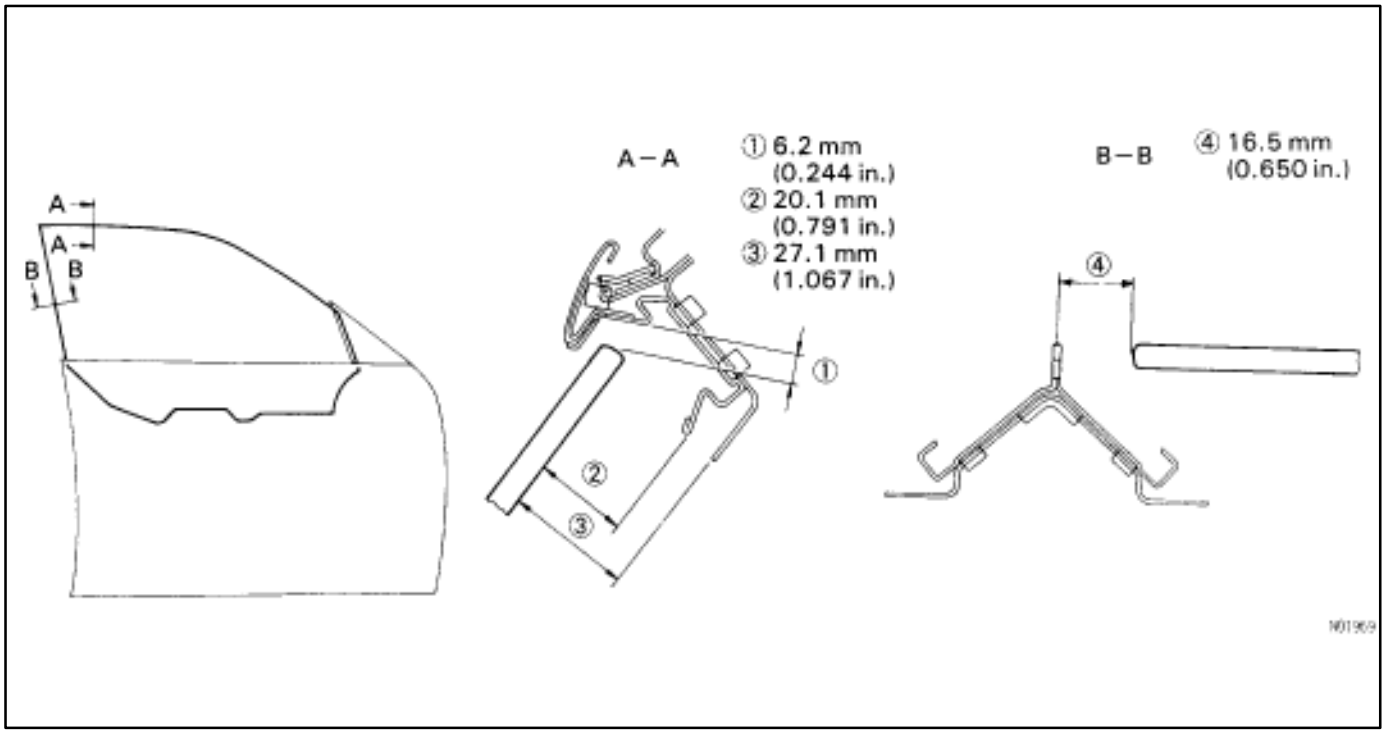
(a) Adjust lateral position of upper part of door glass.
Loosen the two nuts, then adjust the stud bolts using a hexagon wrench.

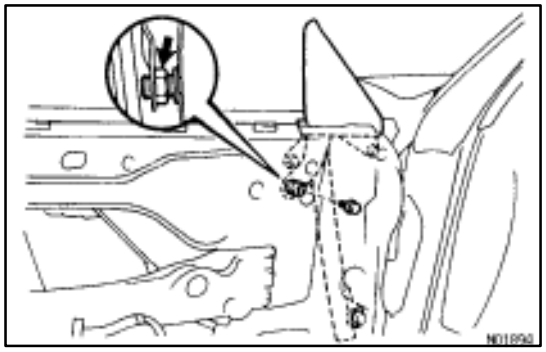
(b) Adjust the front/rear position and the horizontal inclination of the door glass. Loosen the three nuts, then adjust the door glass.

(c) After adjustment is performed, check the following items:



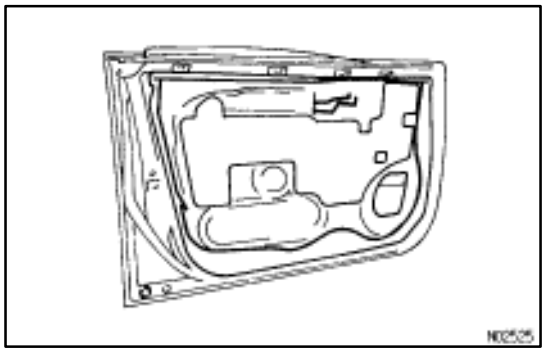
- **When the door is closed with the door glass then fully closed or else the door glass is fully closed with the door then closed, check that cross–section A–A and B–B are as specified in the illustration.**
- **When the door glass is fully closed and the door then closed, check that the weatherstrip is not pinched and that the door glass is not in contact with the roof drip moulding.**
- **When the door glass is fully closed, check that the outside edge of the door glass is in contact with the weatherstrip at the front pillar and roof side and that the edge of the glass cannot be seen.**
- **Check that the door glass is not loose when it is half open.**
- **When the door glass is rising up, check that the door glass and roof side weatherstrip are parallel and that the door glass contacts the two upper plates.**
- **Check that the door glass moves up and down smoothly over all areas.**





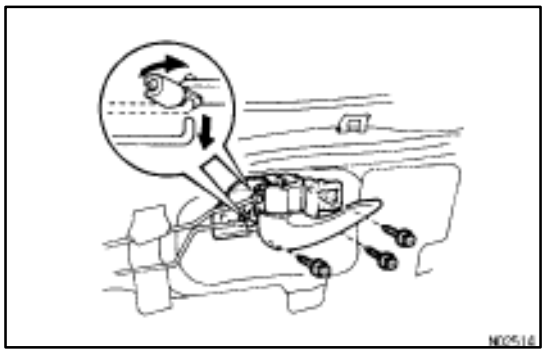
13. ADJUST FRONT DOOR MIRROR BRACKET

(a) Remove the bolt.
(b) Rotate the nut and adjust the lateral position of the mirror bracket.
(c) Check that the bracket is aligned with the angle of the door glass.



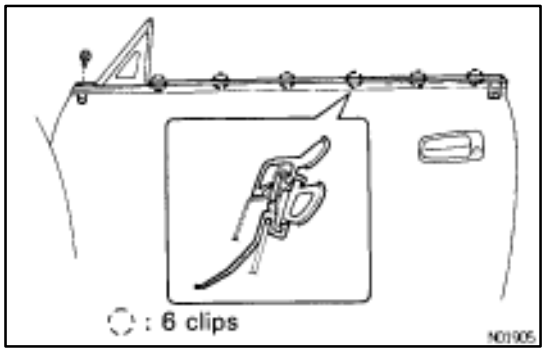
14. INSTALL SERVICE HOLE COVER

Seal the service hole cover with adhesive.
HINT: Bring out the links through the service hole cover.



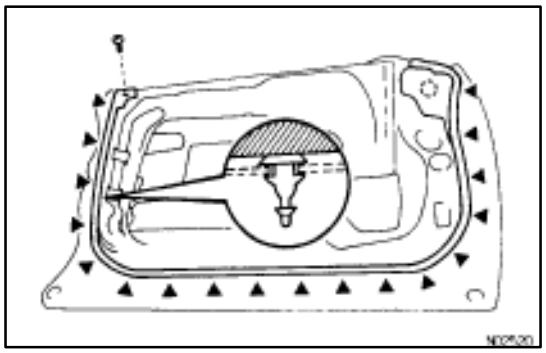
15. INSTALL DOOR INSIDE HANDLE

(a) Install the handle with three screws.
(b) Connect two links.



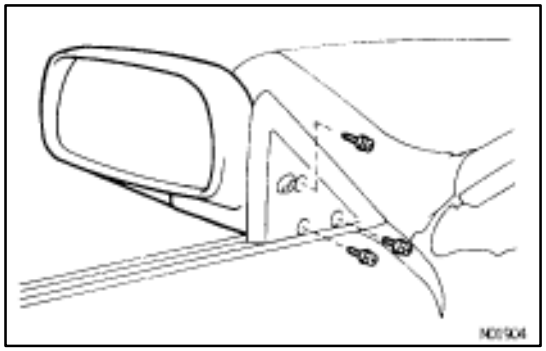
16. INSTALL DOOR BELT MOULDING

(a) Install the claw of the clips into the upper panel slit and push the moulding onto the panel.
(b) Install the screw to the moulding.



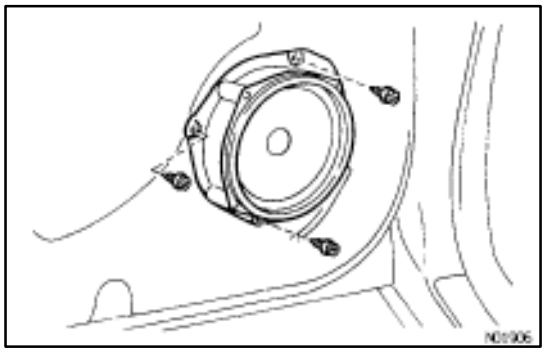
17. INSTALL DOOR WEATHERSTRIP

Push down on the eighteen clips and install the weatherstrip.



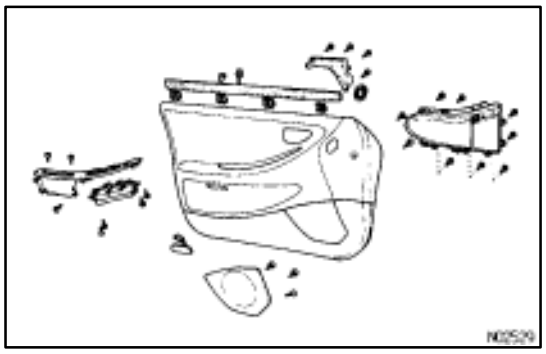
18. INSTALL OUTSIDE REAR VIEW MIRROR

(a) Connect the connector.
(b) Install the mirror with two screws.
(c) Install the speaker with the screw.
(d) Install the upper bracket garnish.



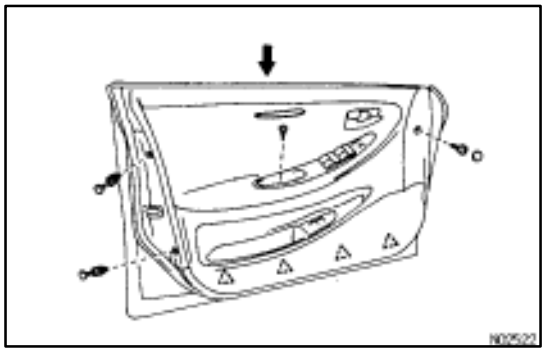
19. INSTALL SPEAKER

(a) Connect the connector.
(b) Install the speaker with three screws.

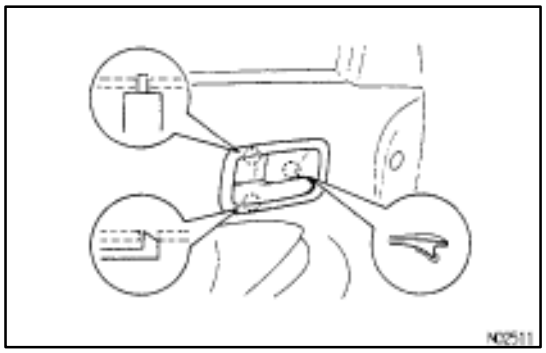


20. INSTALL DOOR TRIM

(a) Install courtesy light.
(b) Install the armrest base panel with three screws.
(c) Install the speaker grill with three screws.
(d) Install the door pocket with ten screws.
(e) Install the side ventilator duct with four screws.



(f) Insert the upper edge of the trim from above, tap the trim by hand fix it in place with the clips, then connect the connectors.
(g) Install two clips.
(h) Install two screws and the cap.
(i) Install the armrest cover.

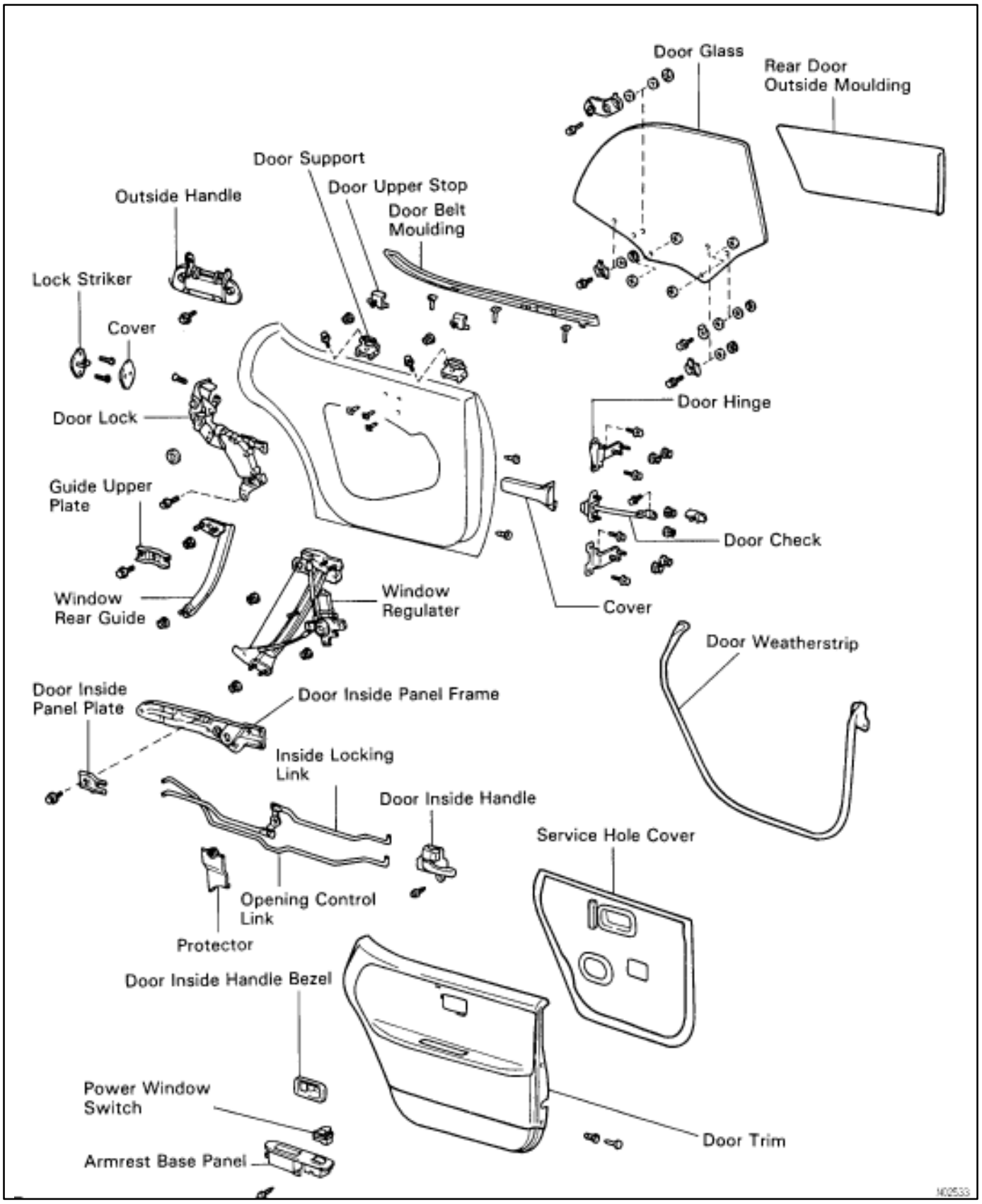


21. INSTALL DOOR INSIDE HANDLE BEZEL

Install the door inside handle bezel.

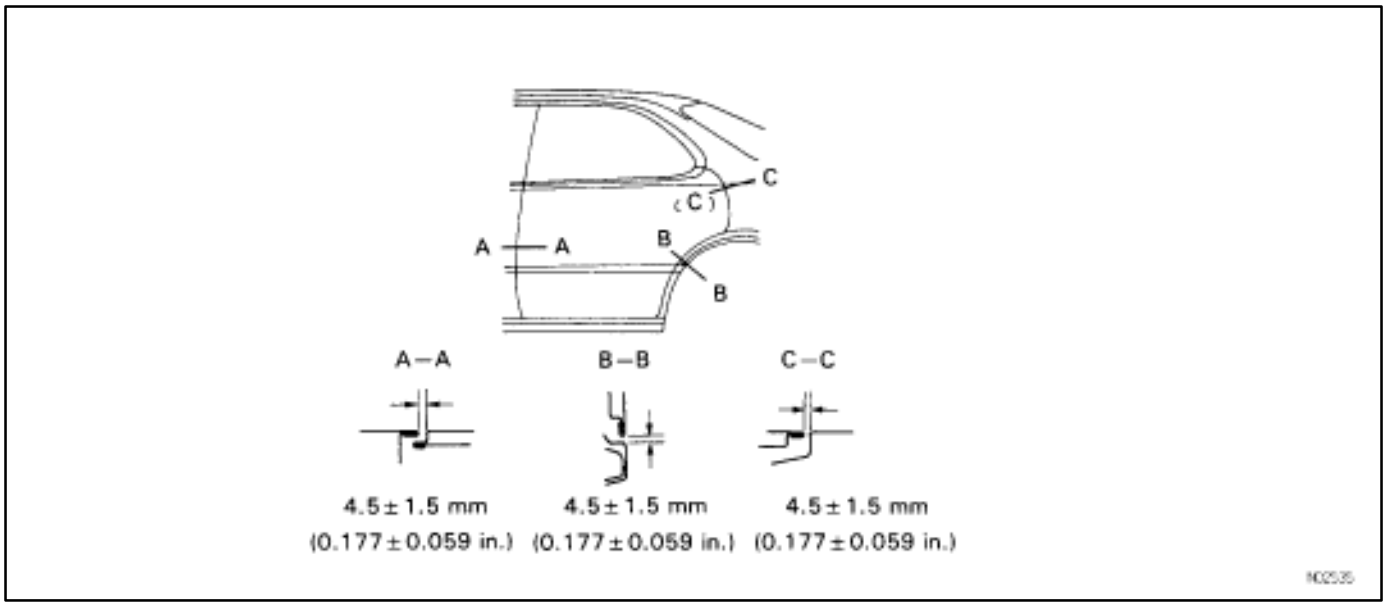
REAR DOOR
COMPONENTS

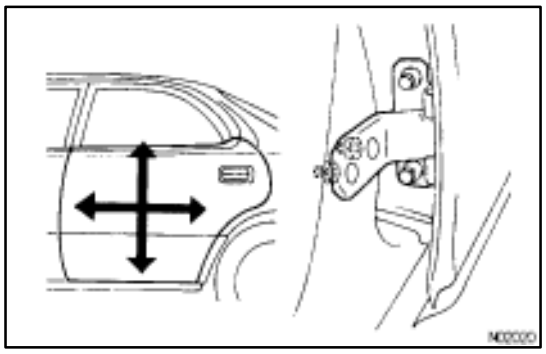
BO07M–01



REAR DOOR ADJUSTMENT

BO08E–01

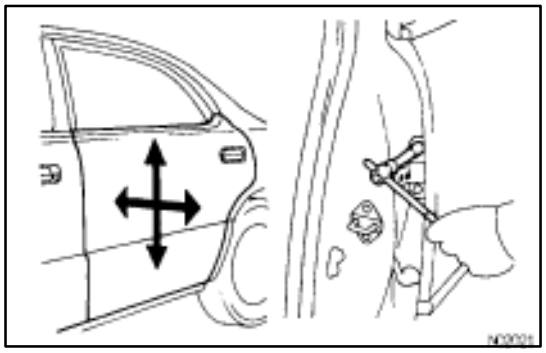




1. ADJUST REAR DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

(a) Remove center pillar garnish.

(b) Using a wrench, loosen two body side upper hinge nuts.

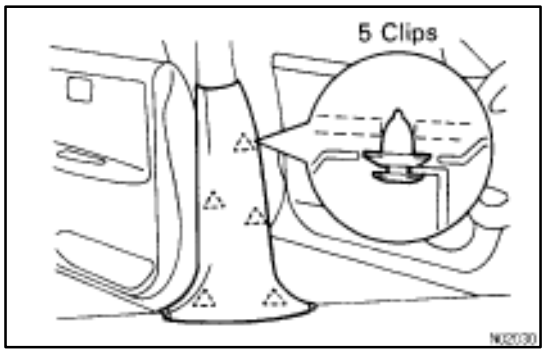


2. ADJUST REAR DOOR IN LEFT/RIGHT VERTICAL DIRECTIONS

Using a wrench, loosen the door side hinge bolts.

3. ADJUST REAR DOOR LOCK STRIKER

Adjust the rear striker in the same manner as the front.



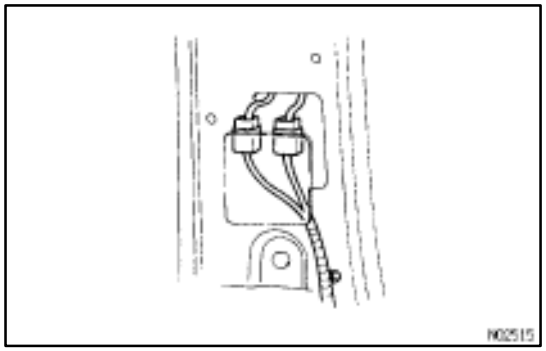
REAR DOOR REMOVAL

BO07N–01

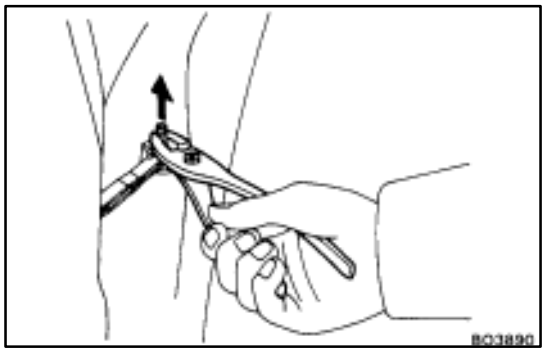
(See page BO–46)

1. REMOVE LOWER CENTER PILLAR GARNISH

(See page BO–142)



2. DISCONNECT CONNECTOR
Disconnect the connectors as shown.



3. DISCONNECT DOOR CHECK FROM BODY
(a) Remove the door check cover.
(b) Using pliers, push out the arm pin and disconnect the door check from body.

4. REMOVE DOOR
While supporting the door, remove the four door side hinge nuts to remove the door.
HINT: When removing the door, do not damage the connectors by the hole of the panel.

DOOR HINGE REPLACEMENT

BO05H–01

1. REMOVE DOOR HINGE
Remove two nuts and the hinge.

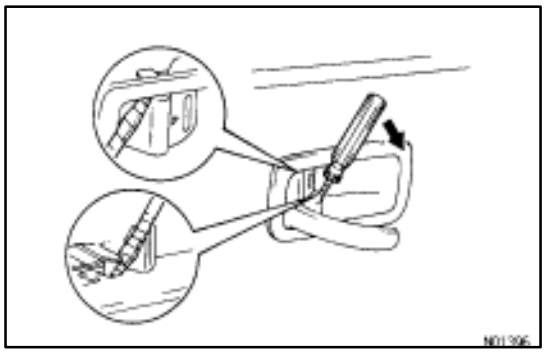
2. INSTALL DOOR HINGE
Install two nuts and the hinge.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

REAR DOOR INSTALLATION

BO05J–01

(See page BO–46)

INSTALL REAR DOOR PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE
HINT: After installing the door, adjust door.

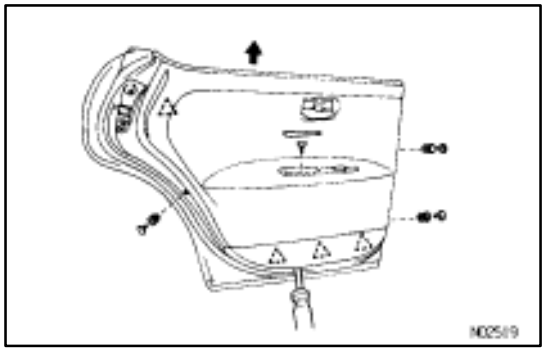


REAR DOOR DISASSEMBLY

BO05K–01

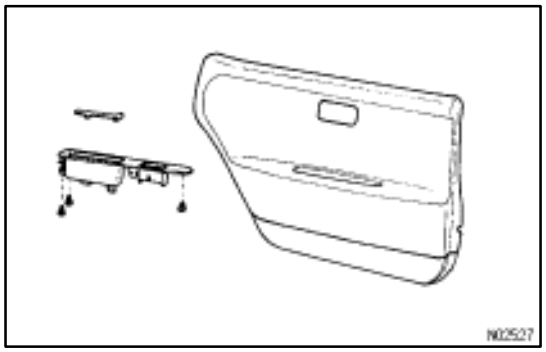
(See page BO–46)

1. REMOVE DOOR INSIDE HANDLE BEZEL
(a) Using a screwdriver, pry out the bezel.
HINT: Tape the screwdriver tip before use.
(b) Pull the bezel rearwards to remove it.



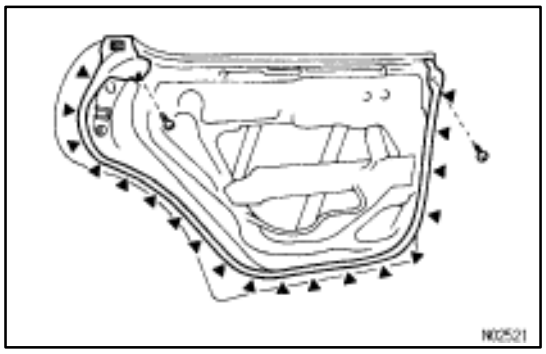
2. REMOVE DOOR TRIM

(a) Remove the armrest cover and the screw.
(b) Remove three clips.
(c) Insert the screwdriver between the panel and the trim remove the clips.
(d) Pull the trim upwards to remove it.
(e) Disconnect the connector.



(f) Remove three screws and the armrest base panel.

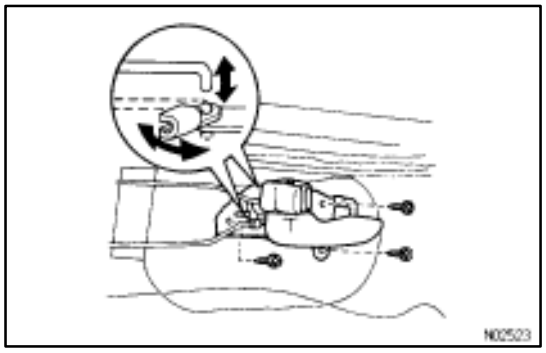
3. REMOVE DOOR BELT MOULDING
(See page BO–76)



4. REMOVE DOOR WEATHERSTRIP

(a) Remove two clips.
(b) While pulling the weatherstrip by hand, remove the eighteen clips using a clip remover.
HINT: Do not pull strongly on the weatherstrip as it may tear.

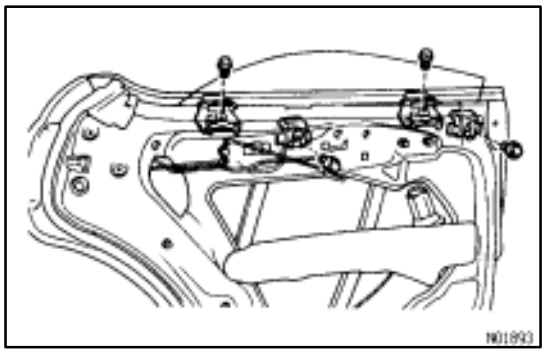
5. REMOVE SIDE PROTECTION MOULDING
(See page BO–78)



6. REMOVE DOOR INSIDE HANDLE

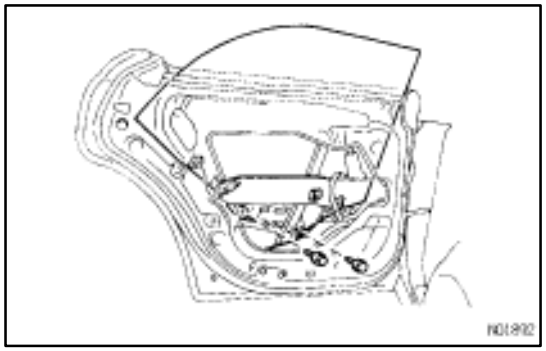
(a) Remove three screws.
(b) Disconnect the two links from the handle.

7. REMOVE SERVICE HOLE COVER



8. REMOVE REAR DOOR UPPER STOP
Remove two bolts and the stops.

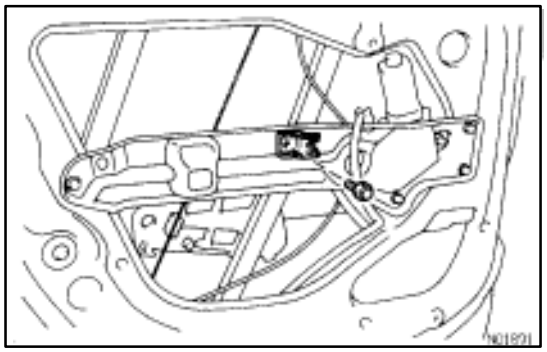
9. REMOVE REAR DOOR SUPPORT
Remove two bolts and the support.



10. REMOVE DOOR GLASS

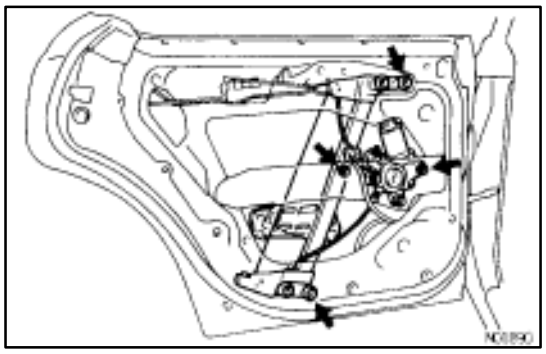
HINT: Insert a shop rag inside the panel to prevent scratching the glass.

(a) Remove two glass mounting bolts.
(b) Remove the door glass by pulling it upward.



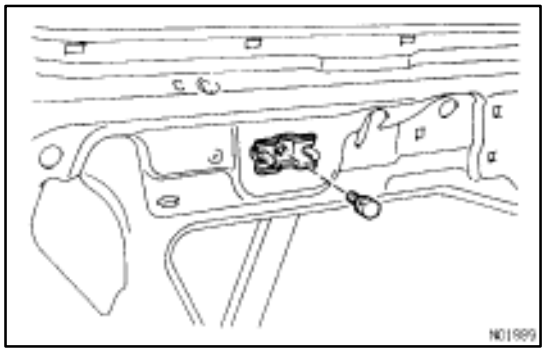
11. REMOVE DOOR INSIDE PANEL PLATE

Remove the bolt and the plate.



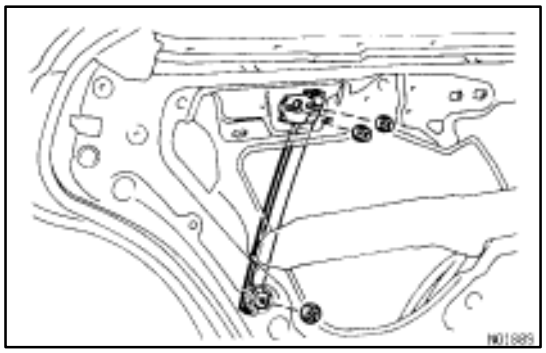
12. REMOVE WINDOW REGULATOR

(a) Remove eight nuts and the regulator.
(b) Disconnect the connector.



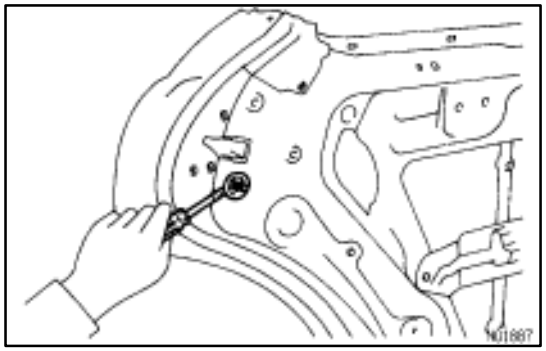
13. REMOVE GUIDE UPPER PLATE

Remove the bolt and the plate.



14. REMOVE WINDOW REAR GUIDE

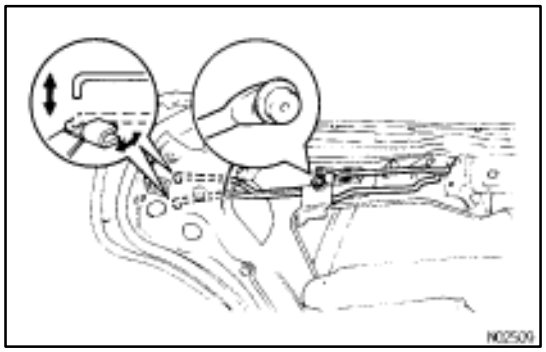
Remove three nuts and the guide.



15. REMOVE CHILD PROTECTOR LOCK LEVER KNOB

Using a screwdriver, remove the knob.

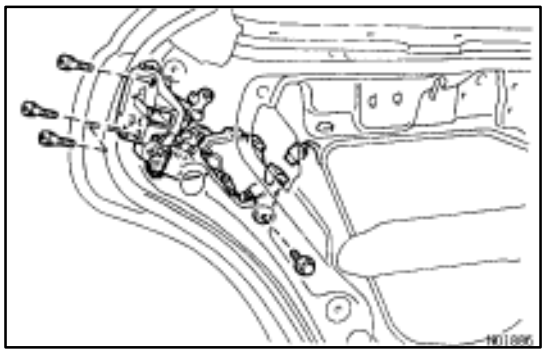
HINT: Tape the screwdriver tip before use.



16. REMOVE OPENING CONTROL LINK AND INSIDE LOCKING LINK

(a) Remove the clip and the protect cover.

(b) Disconnect two links from the door lock and remove two links.

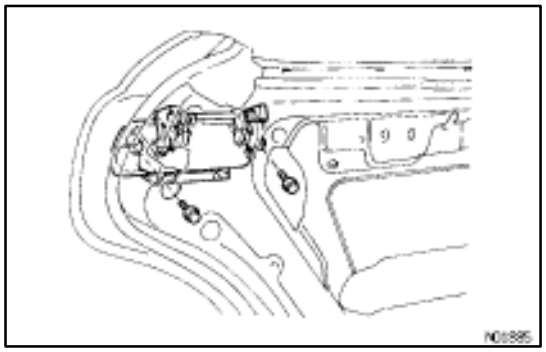


17. REMOVE DOOR LOCK

(a) Remove four screws.

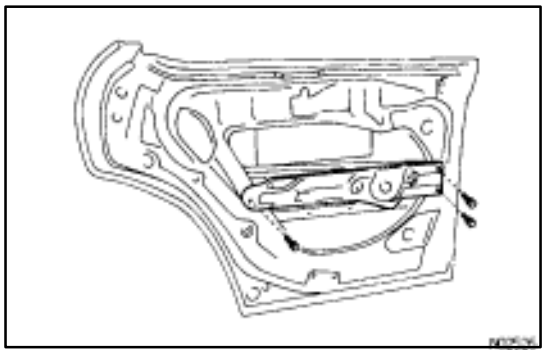
(b) Disconnect the connector.

(c) Remove the door lock through the service hole.



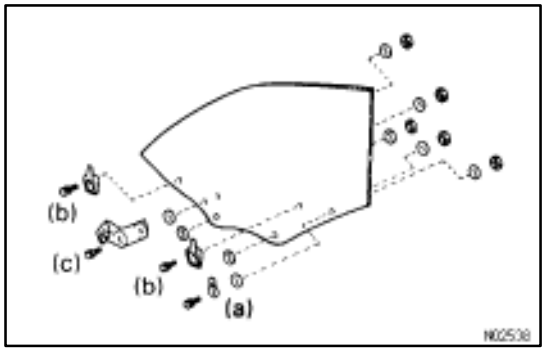
18. REMOVE OUTSIDE HANDLE

Remove two bolts and the outside handle.



19. REMOVE DOOR INSIDE PANEL FRAME

Remove three screws and the frame.



DOOR GLASS REPLACEMENT

BO05L–01

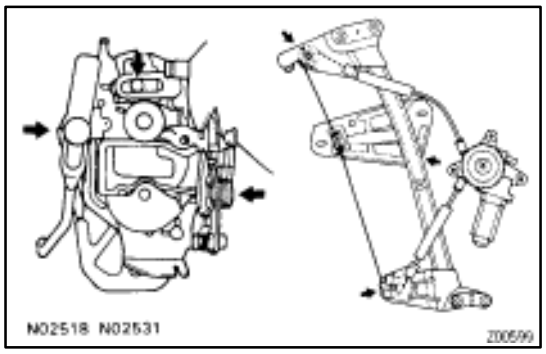
1. REMOVE FOLLOWING PARTS:

(a) Stopper
(b) Stabilizers
(c) Bracket

2. REPLACE DOOR GLASS

3. INSTALL DOOR GLASS PARTS

Install the parts by following removal sequence in reverse.



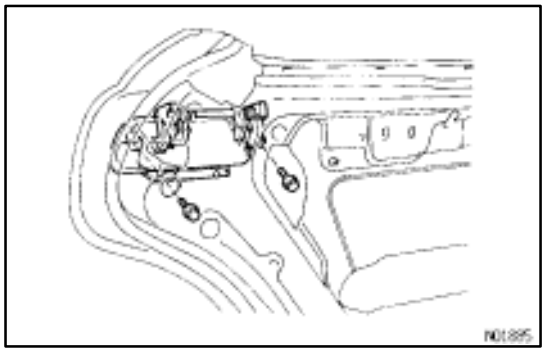
REAR DOOR ASSEMBLY

BO07P–01

(See page BO–46)

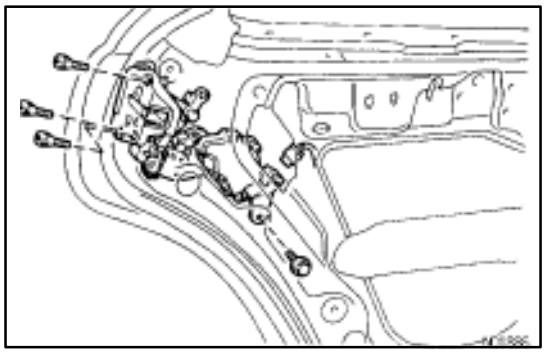
1. BEFORE INSTALLATION PARTS, COAT THEM WITH MP GREASE

(a) Apply MP grease to the sliding surface and gears of the window regulator.
(b) Apply MP grease to the sliding surface of the door lock.



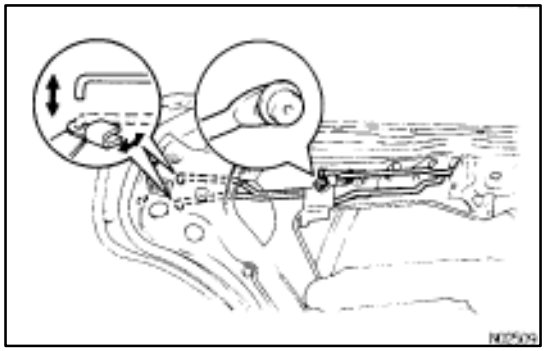
2. INSTALL OUTSIDE HANDLE

Install the handle with two bolts.



3. INSTALL DOOR LOCK

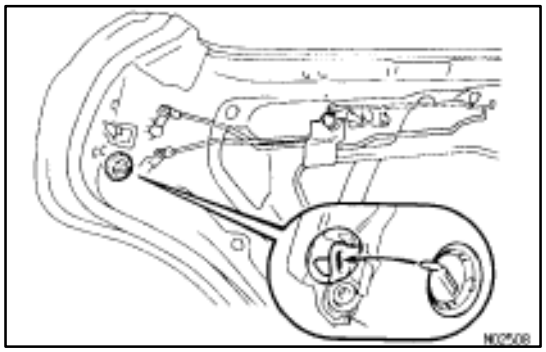
(a) Apply adhesive to three screws.
Part No.08833–00070, THREE BOND 1324 or equivalent
(b) Install the door lock with three screws.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(c) Install the bolt.
(d) Connect the connector.



4. INSTALL OPENING CONTROL LINK AND INSIDE LOCKING LINK

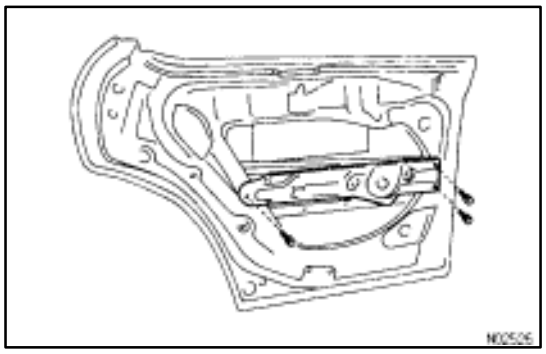
(a) Connect two links to the door lock.

(b) Install the clip and the protector.



5. INSTALL CHILD PROTECTOR LOCK LEVER KNOB

Install the knob.

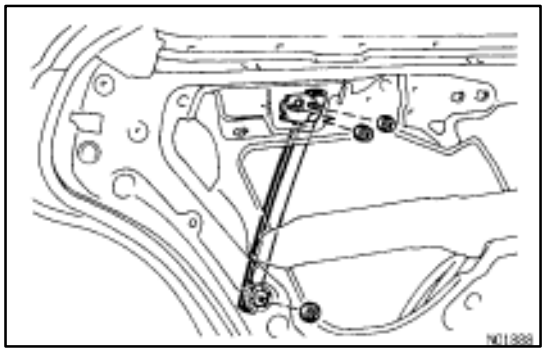


6. INSTALL DOOR INSIDE PANEL FRAME

Install the frame with three screws.

7. INSTALL DOOR INSIDE PANEL PLATE

Install the plate with the bolt.

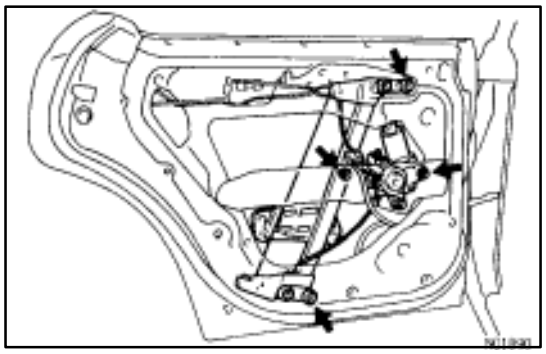


8. INSTALL WINDOW REAR GUIDE

Install the guide with three nuts.

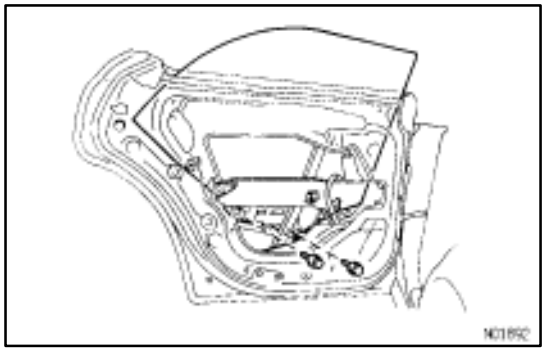
9. INSTALL GUIDE UPPER PLATE

Install the plate with the bolt.



10. INSTALL WINDOW REGULATOR

Install the regulator with eight nut.

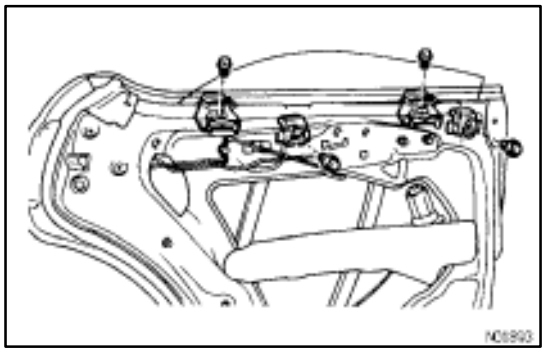


11. INSTALL DOOR GLASS

HINT: Insert a shop rag inside the panel to prevent scratching the glass.

(a) Insert the glass to the frame.

(b) Temporarily tighten two glass mounting bolts.



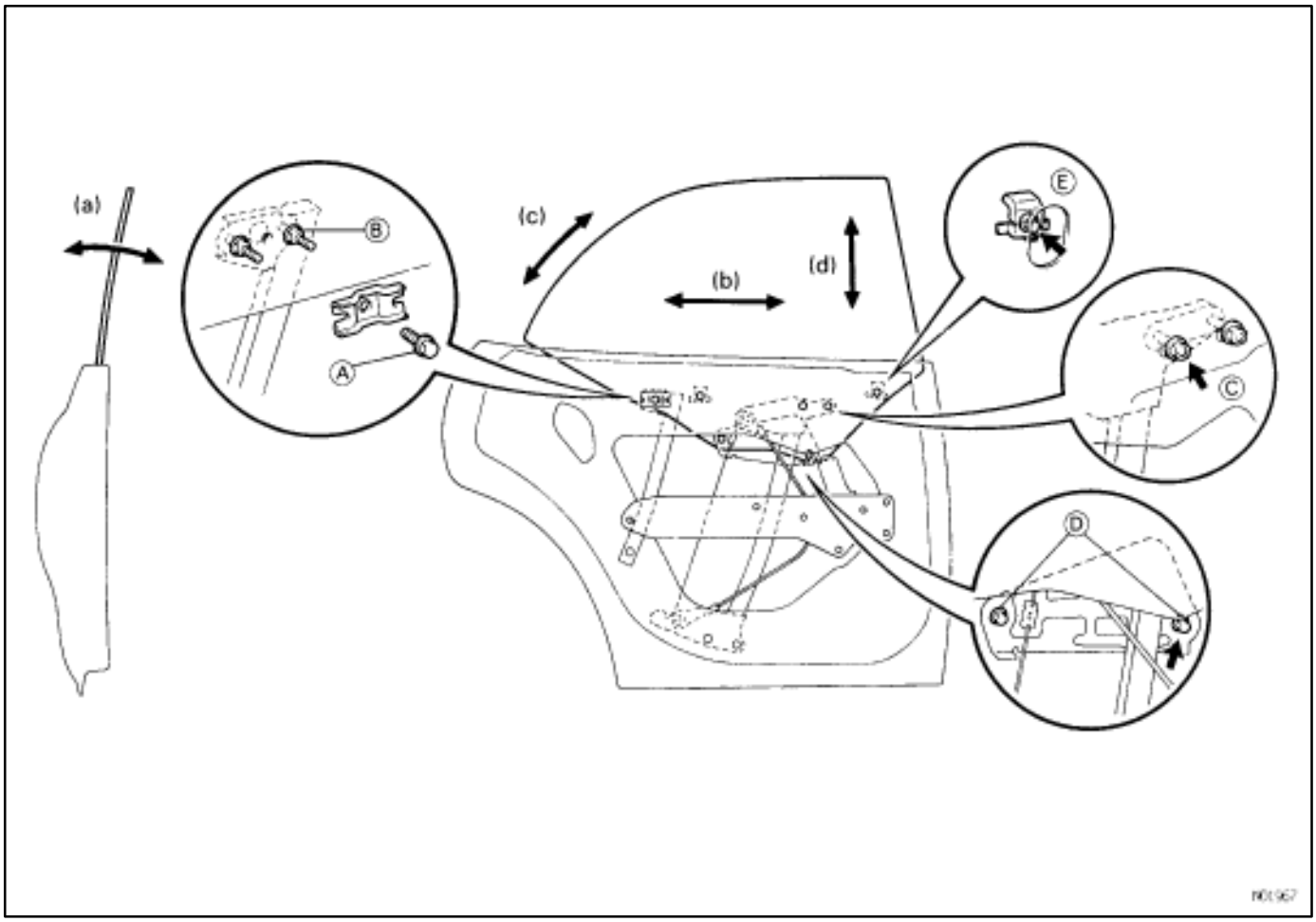
12. INSTALL REAR DOOR SUPPORT

Install the support with the bolt.

13. INSTALL DOOR UPPER STOP

Install the stop with the bolt.

14. ADJUST REAR DOOR GLASS



(a) Adjust lateral position of upper part of door glass.
- Remove bolt A and remove upper plate.
- Loosen two nuts B.
- Loosen two nuts C, then adjust the stud bolts using a hexagon wrench.

(b) Adjust the front/ rear position of the door glass.
- Loosen the two bolts D, then adjust the door glass.

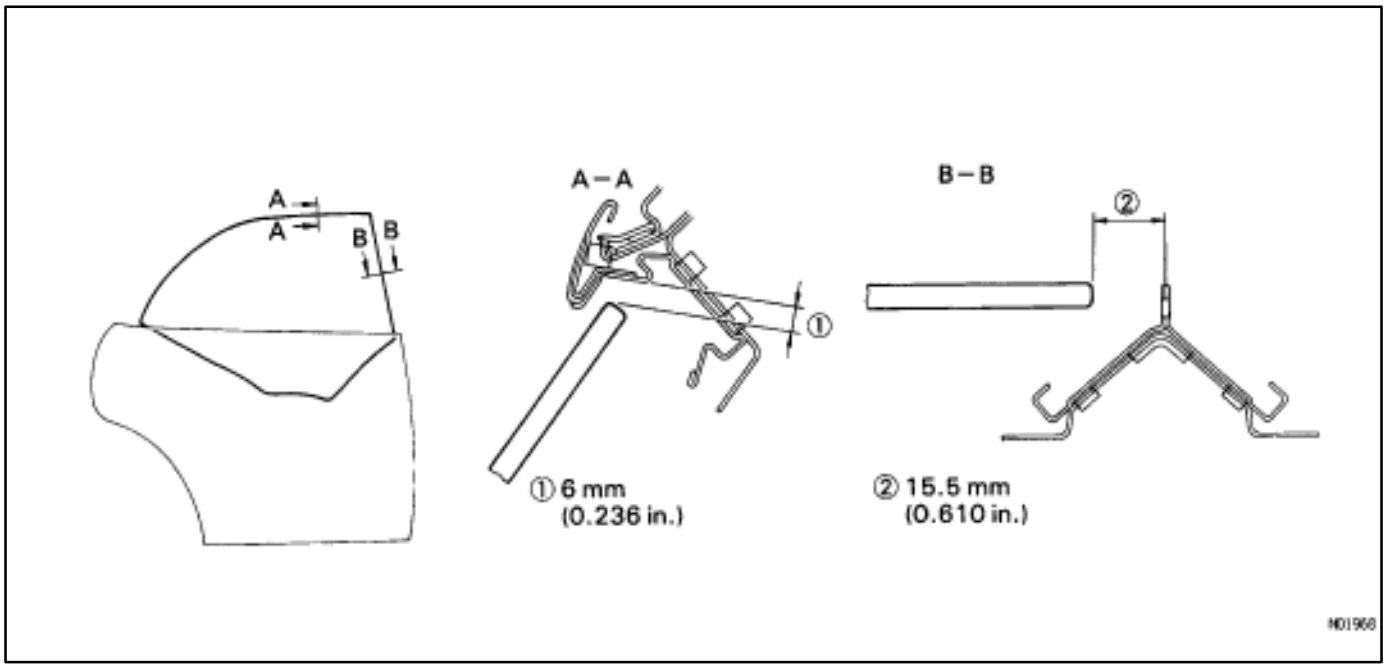
(c) Adjust the inclination of the rear end of the door glass.
- Loosen the two bolts D.

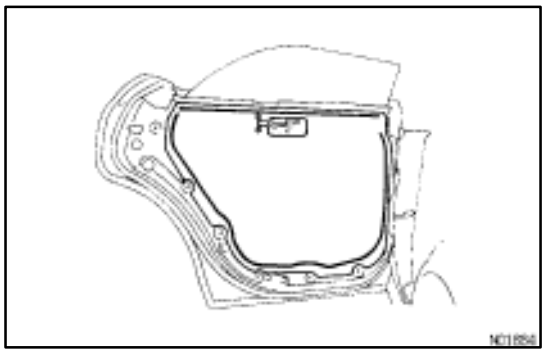
(d) Adjust the glass in the vertical direction.
- Loosen the two bolts E and adjust the upper stopper vertically.

(e) Tighten the two nuts B until they touch the panel.

(f) Install the upper plate with the bolt.

(g) After adjustment is performed, check the following items:
- When the door is closed with the door glass then fully closed or else the door glass is fully closed with the door then closed, check that cross–section A–A and B–B are as specified in the illustration.
- When the door glass is fully closed and the door then closed, check that the weatherstrip is not pinched and that the door glass is not in contact with the roof drip moulding.
- When the door glass is fully closed, check that the outside edge of the door glass is in contact with the weatherstrip at the front pillar and roof side and that the edge of the glass cannot be seen.
- Check that the door glass is not loose when it is half open.
- When the door glass is rising up, check that the door glass and roof side weatherstrip are parallel and that the door glass contacts the two upper plates.
- Check that the door glass moves up and down smoothly over all areas.



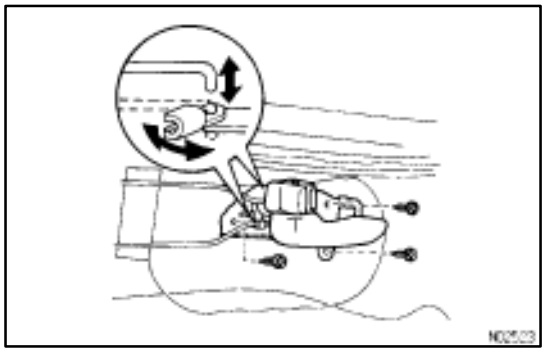


15. INSTALL SERVICE HOLE COVER

Seal the service hole cover with adhesive.

16. INSTALL SIDE PROTECTION MOULDING

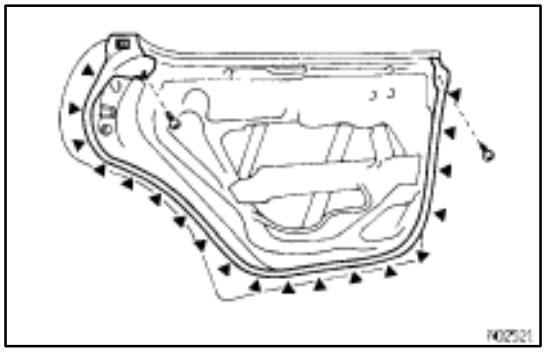
(See page BO–78)



17. INSTALL DOOR INSIDE HANDLE

(a) Connect two links with the handle.

(b) Install the handle with three screws.



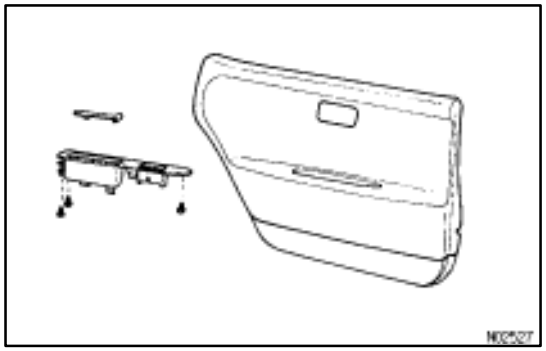
18. INSTALL DOOR WEATHERSTRIP

(a) Push down on the nineteen clips and install the weatherstrip.

(b) Install two clips.

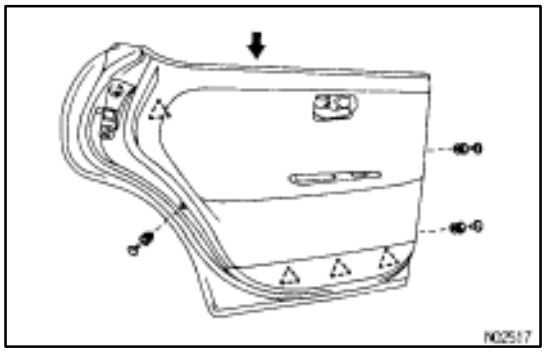
19. INSTALL DOOR BELT MOULDING

(See page BO–76)



20. INSTALL DOOR TRIM

(a) Install the armrest base panel with three screws.



(b) Insert the upper edge of the trim from above, tap the trim by hand fix it in place the clips, then connect the connectors.

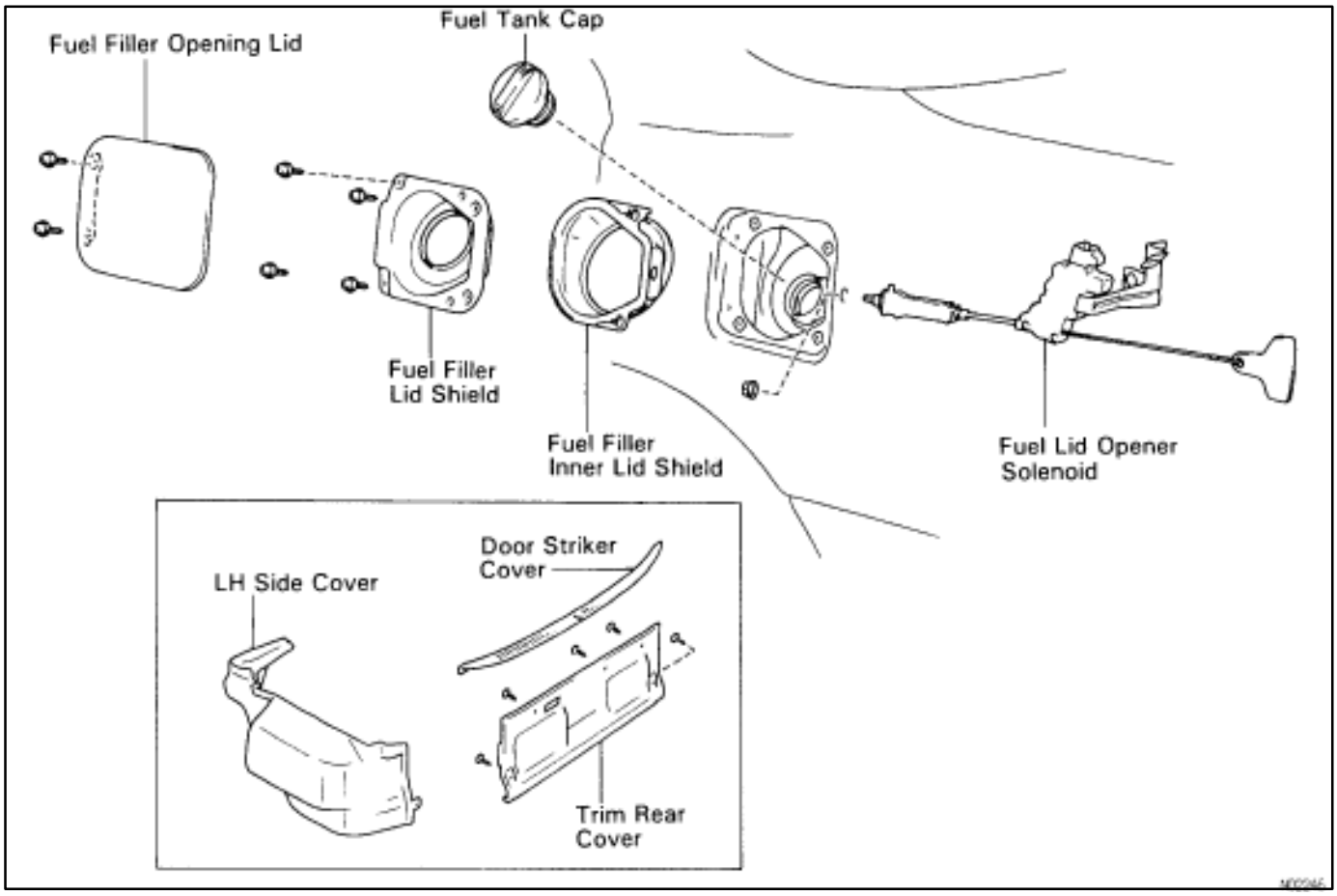
(c) Install three clips.

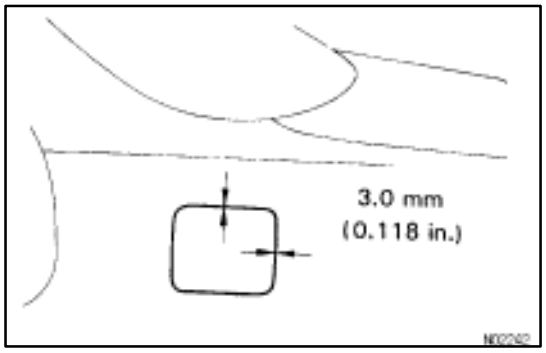
21. INSTALL DOOR INSIDE HANDLE BEZEL

Tap the bezel to install it.

FUEL LID
COMPONENTS

BO05M–01

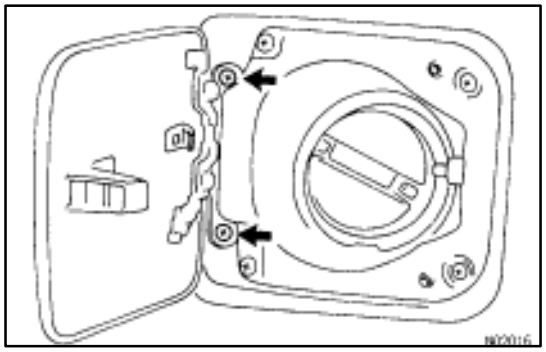




FUEL LID ADJUSTMENT

BO08G–01

HINT: Adjust the fuel lid according to the following method.



FUEL FILLER OPENING LID ADJUST

Loosen the two screws and adjust the lid as shown.

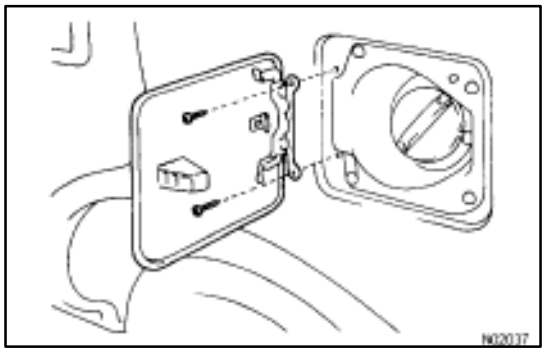
FUEL LID REMOVAL

BO05N–01

(See page BO–58)

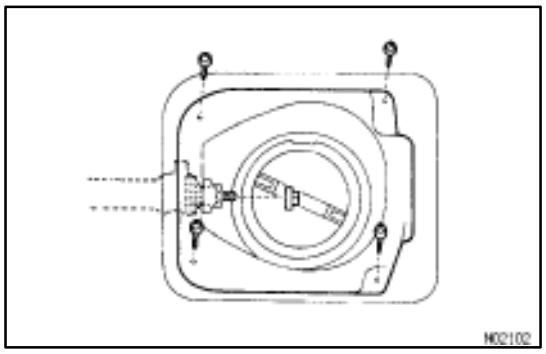
1. REMOVE FOLLOWING PARTS:

(a) Floor mat
(b) Door striker cover (See step 2 on page BO–62)
(c) Trim rear cover (See step 3 on page BO–62)
(d) LH side cover (See step 5 on page BO–63)



2. REMOVE FUEL FILLER OPENING LID

Remove two screws and the lid.



3. REMOVE FUEL FILLER LID SHIELD

(a) Remove the nut, washer and fuel lid opener solenoid.
(b) Disconnect the connector from the solenoid.
(c) Remove four screws.
(d) Remove the fuel tank cap and the lid shield.

CAUTION: Always keep the tank cap closed when it is not required to be open. Keep all fire away during the operation.

(e) Remove the inner lid shield.
(f) Install the cap quickly.

FUEL LID INSTALLATION

BO05P–01

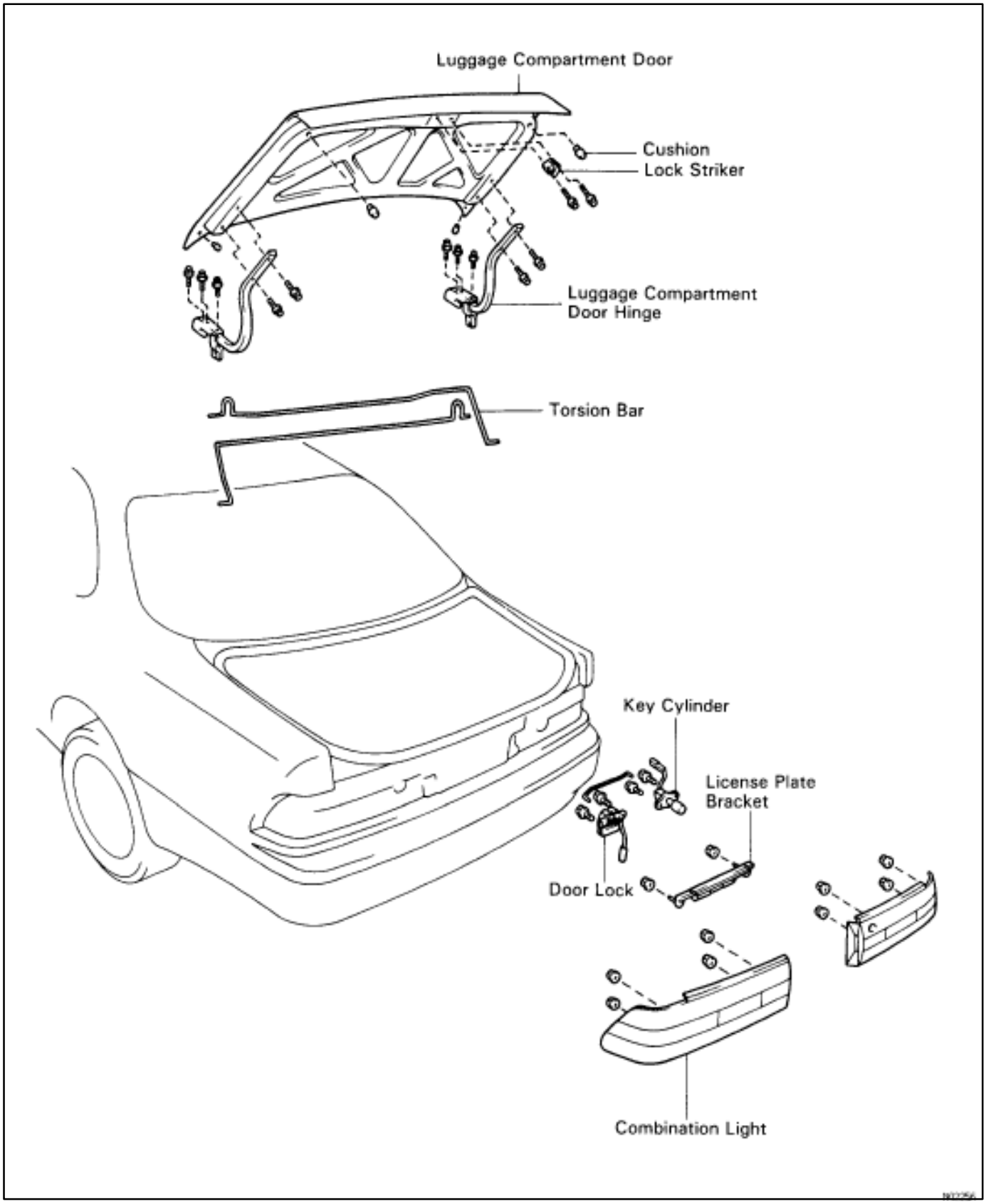
(See page BO–58)

INSTALL FUEL LID PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

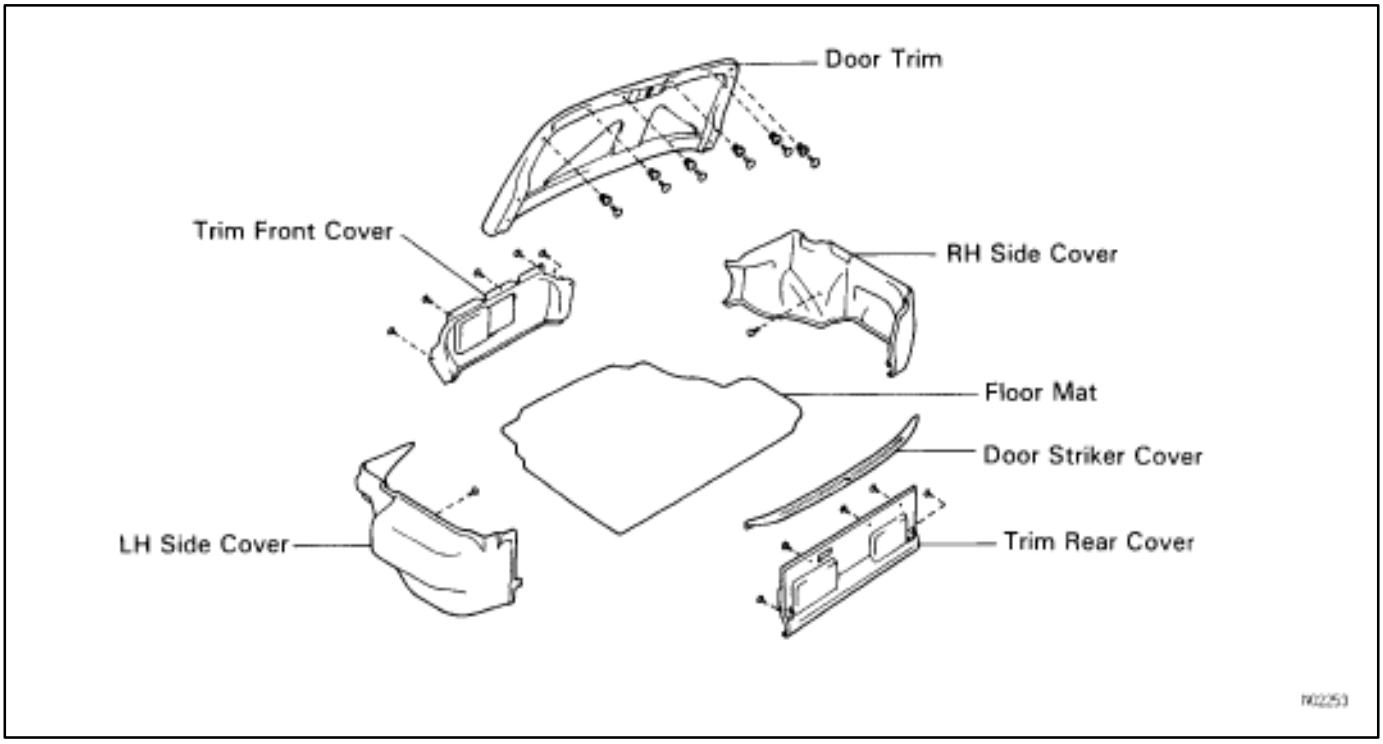
HINT: When installing the fuel filler opening lid, adjust the lid. (See page BO–58)

LUGGAGE COMPARTMENT
COMPONENTS

BO05Q–01

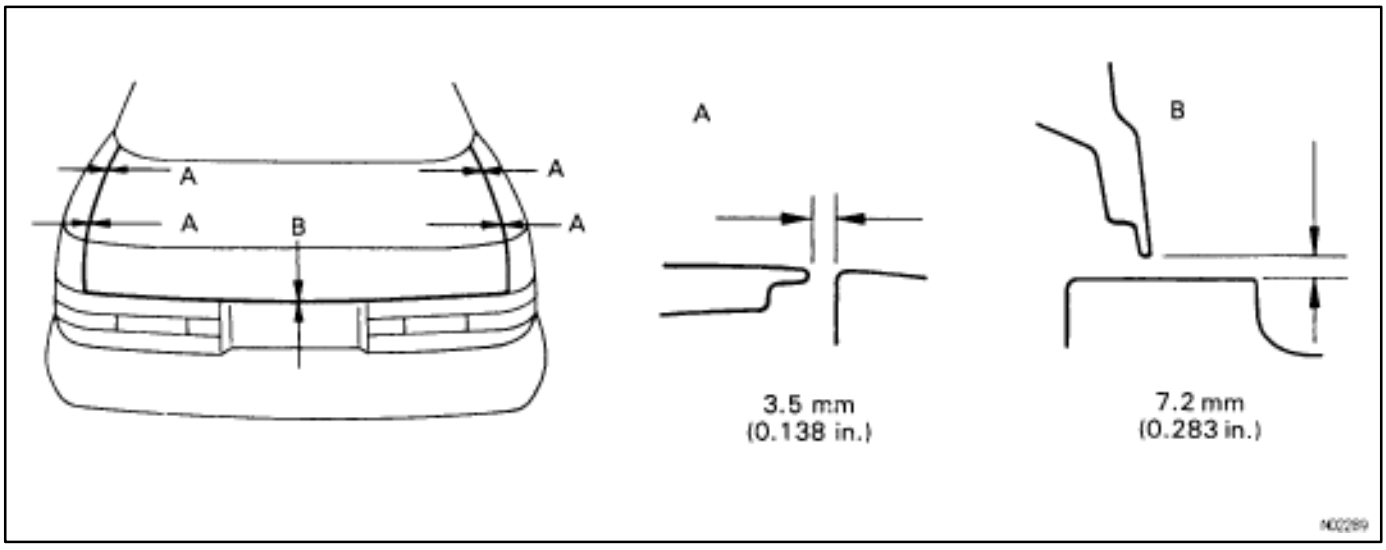


COMPONENTS (Cont'd)

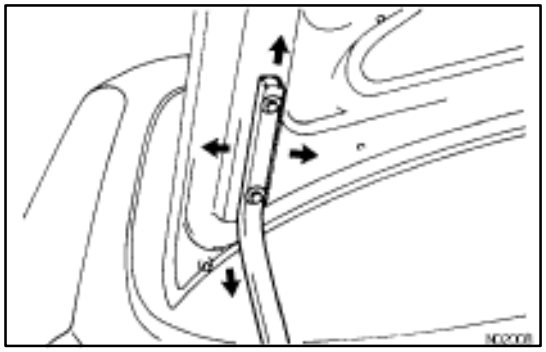


LUGGAGE COMPARTMENT DOOR ADJUSTMENT

BO07Q–01



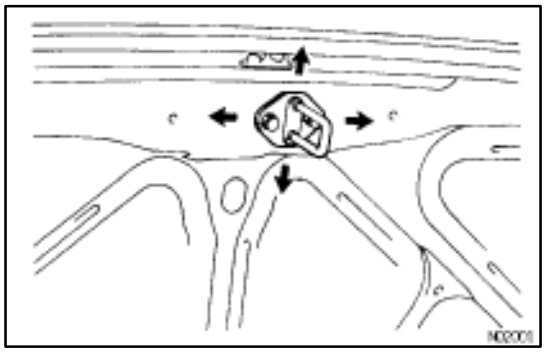
HINT: Adjust the door panel according to the following method.



1. ADJUST LUGGAGE COMPARTMENT

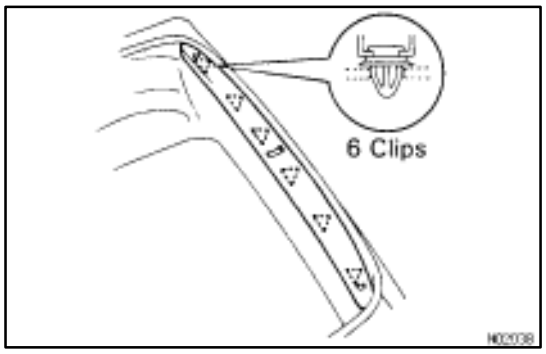
(a) For forward / rearward and left / right adjustments loosen the bolts.

(b) For vertical adjustment of front end of the door, increase or decrease the number of washers between the hinge and the door.



2. ADJUST LOCK STRIKER

Using a hammer and brass bar, tap the striker to adjust it.



LUGGAGE COMPARTMENT DOOR REMOVAL

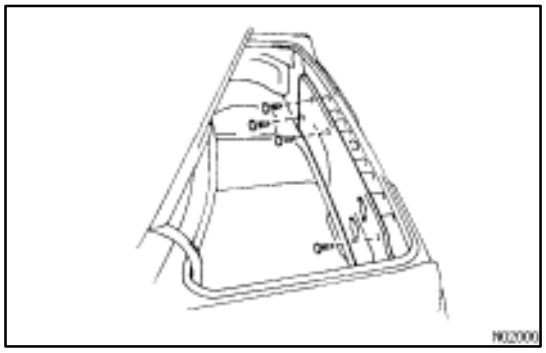
BO06H–01

1. REMOVE FLOOR MAT

2. REMOVE DOOR STRIKER COVER

(a) Using a screwdriver, pry loose the clips.
HINT: Tape the screwdriver tip before use.

(d) Pull up the cover and remove it.

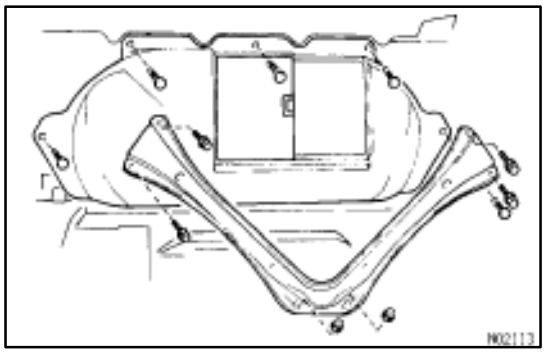


3. REMOVE TRIM REAR COVER

(a) Using a clip remover, remove six clips.

(b) Remove luggage light cover.

(c) Remove the cover.



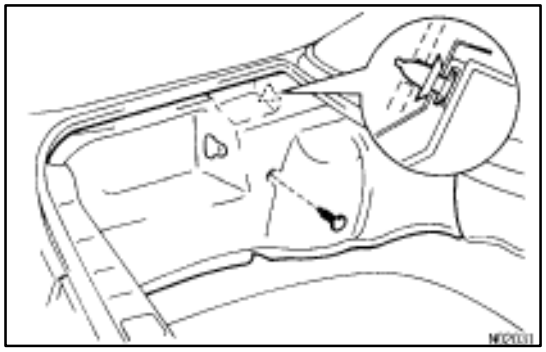
4. REMOVE TRIM FRONT COVER

(a) Remove rear seat cushion and back.
(See page BO–129)

(b) Remove two nuts, four clips four bolts and room partition panel.

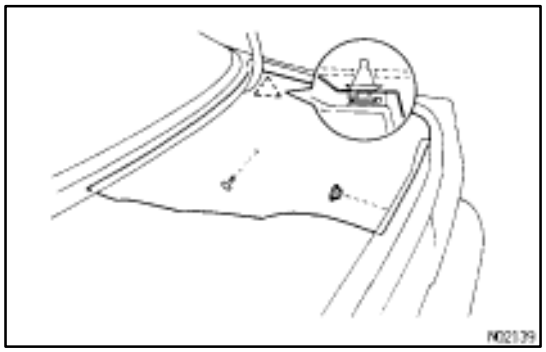
(c) Using a clip remover, remove five clips.

(d) Remove the cover.



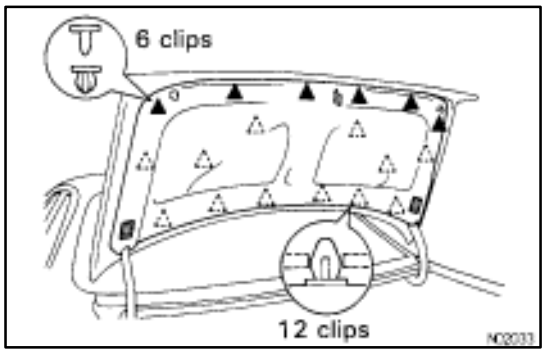
5. REMOVE LH SIDE COVER

(a) Push the plate through to the back of the cover.
(b) Using a clip remover, remove the clip.
(c) Pull the trim to remove it.



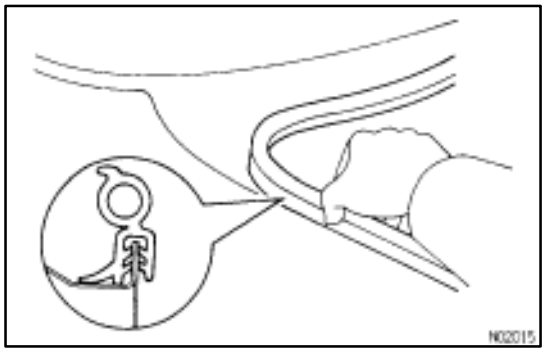
6. REMOVE RH SIDE COVER

(a) Using a clip remover, remove the clip.
(b) Remove the cap.
(c) Pull the trim to remove it.



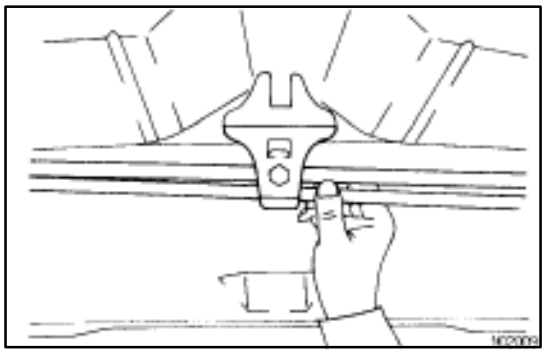
7. REMOVE DOOR TRIM

(a) Using a clip remover, remove six clips.
(b) Insert the screwdriver between the panel and the trim and remove the clips.
(c) Remove the trim by pulling all of the trim.



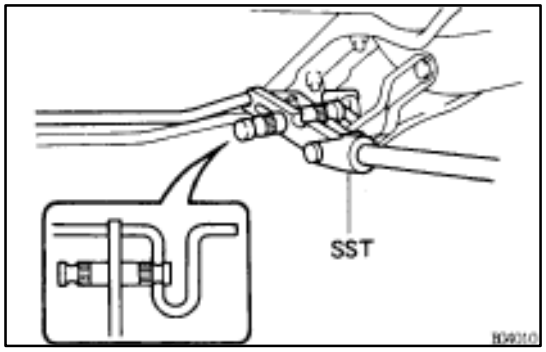
8. REMOVE WEATHERSTRIP

Pull out the weatherstrip by hand and remove it.

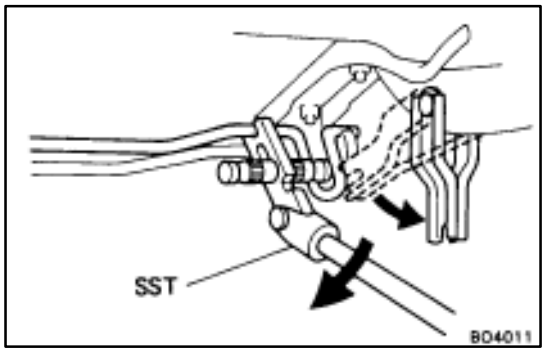


9. REMOVE TORSION BAR

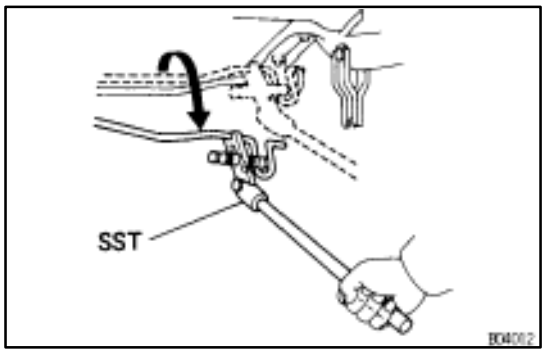
(a) Remove the torsion bar from center bracket.



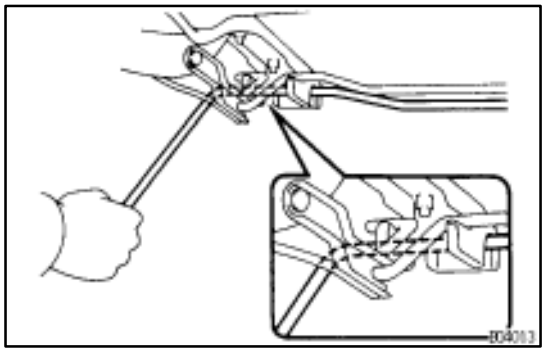
(b) Install SST to the torsion bar on the hinge side.
SST 09804–24010



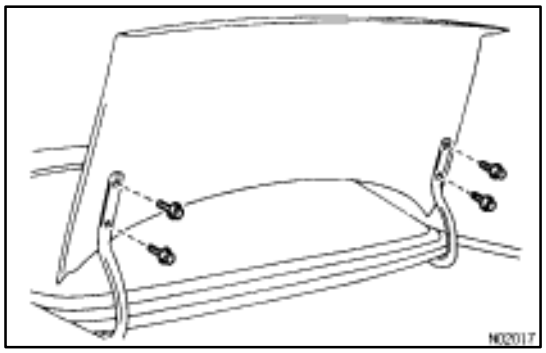
(c) Push down on SST, and pull the luggage compartment door hinge from the torsion bar.



(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) Do the same for the other side.



10. REMOVE LUGGAGE COMPARTMENT DOOR
Remove four bolts and the door.

LUGGAGE COMPARTMENT DOOR HINGE REPLACEMENT

BO05R–01

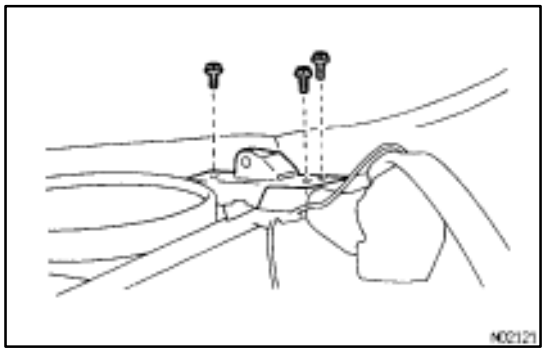
(See page BO–60)

1. REMOVE FOLLOWING PARTS:

(a) Rear seat cushion and back
(See steps 1 to 2 on page BO–129)

(b) Roof side inner garnish

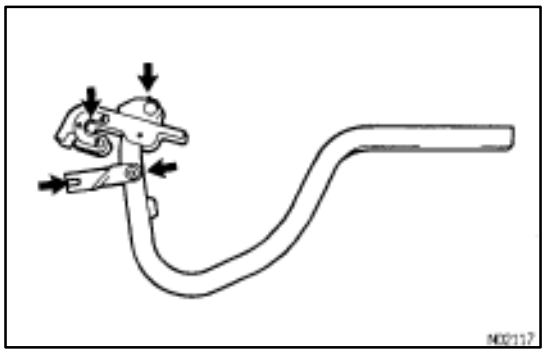
(c) Package tray trim



2. REMOVE LUGGAGE COMPARTMENT DOOR HINGE

(a) Remove two bolts from luggage compartment side.

(b) Remove three bolts from room side to remove the hinge.



3. INSTALL LUGGAGE COMPARTMENT DOOR HINGE

HINT: Before installation, coat MP grease to bracket. Install six bolts and the hinge.

LUGGAGE COMPARTMENT DOOR INSTALLATION

BO08D–01

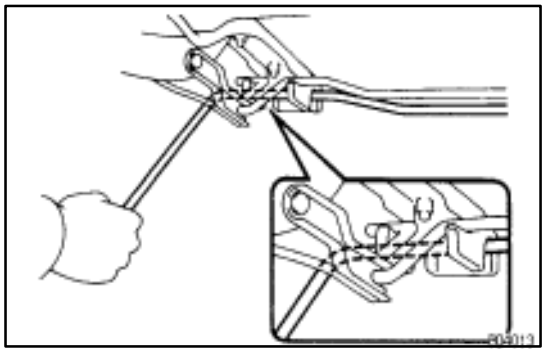
(See page BO–60)

1. INSTALL LUGGAGE COMPARTMENT DOOR

2. ADJUST LUGGAGE COMPARTMENT DOOR
(See page BO–62)

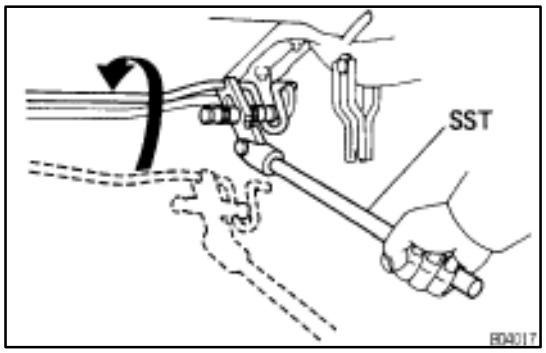
3. INSTALL TORSION BAR

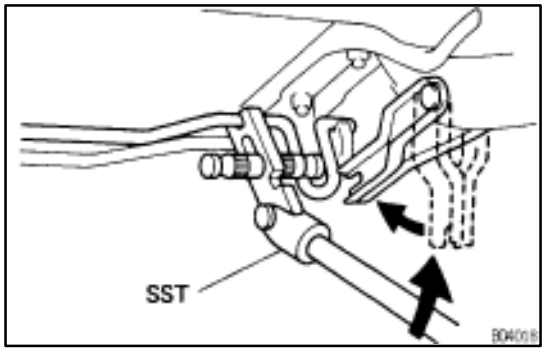
(a) Insert the torsion bar into the bracket as shown.



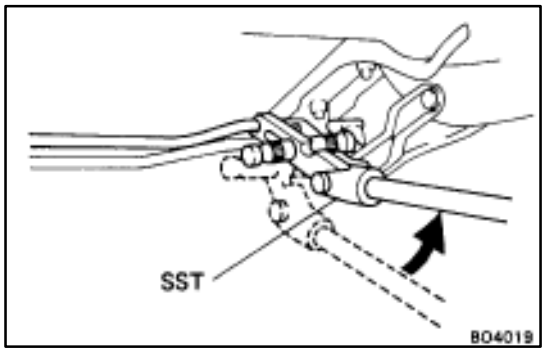
(b) Install SST to the torsion bar of the hinge side.
SST 09804–24010

(c) Slowly lift the torsion bar with SST and place on the torsion bar bracket.



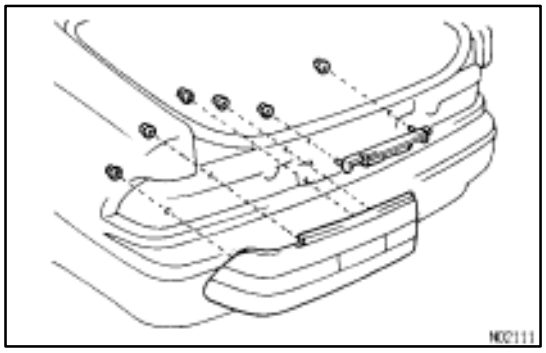


(d) Slowly push down SST, and install the torsion bar to the luggage compartment door hinge.



(e) Slowly lift SST, and install the torsion bar.
(f) Install the torsion bar to center bracket.
(g) Do the same for the other side.

4. INSTALL FOLLOWING PARTS:
(See steps 1 to 7 on pages BO–62 to 63)
(a) Door trim
(b) Trim front cover
(c) RH and LH side covers
(d) Trim rear cover
(e) Door striker cover
(f) Floor mat

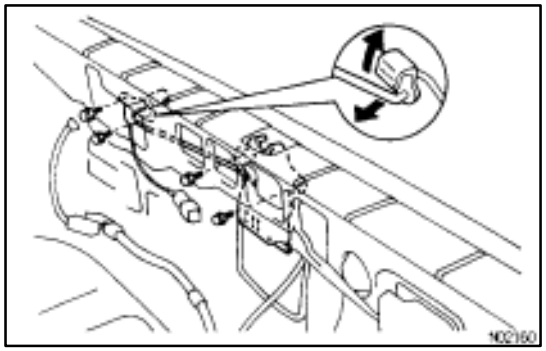


REAR COMBINATION LIGHT REMOVAL AND INSTALLATION

BO05S–01

(See page BO–60)
1. REMOVE TRIM REAR COVER
(See page BO–62)
2. REMOVE REAR COMBINATION LIGHT
(a) Remove four nuts and disconnect the connector.
(b) Remove the light.
3. REMOVE LICENSE PLATE BRACKET
Remove two nuts and the bracket.

4. INSTALL LICENSE PLATE BRACKET
Install the bracket with two nuts.
5. INSTALL REAR COMBINATION LIGHT
Install the light with four nuts, connect the connector.
6. INSTALL TRIM REAR COVER



KEY CYLINDER AND DOOR LOCK REMOVAL AND INSTALLATION

BO05T–01

(See page BO–60)

1. REMOVE KEY CYLINDER AND DOOR LOCK

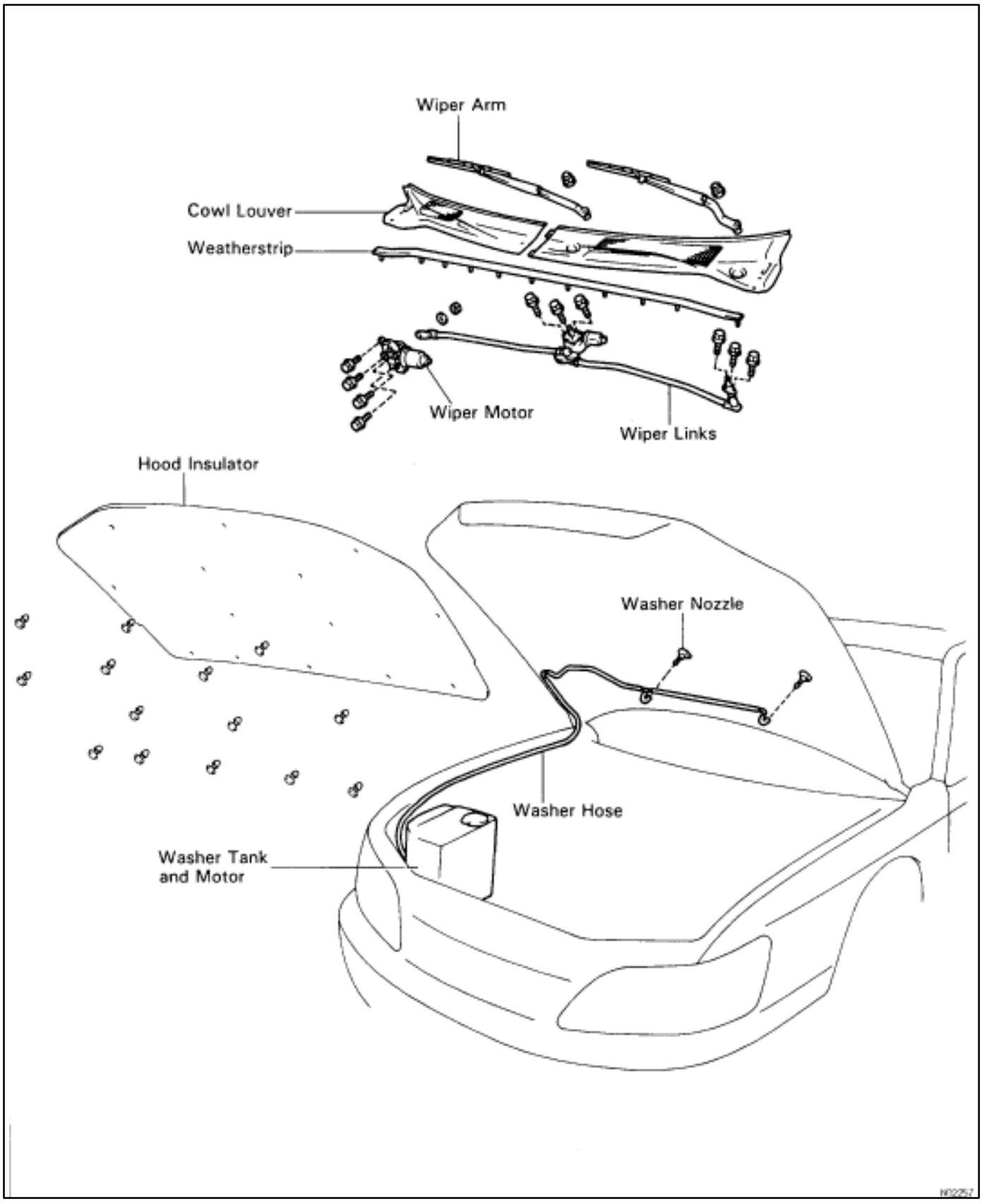
(a) Disconnect the link from the key cylinder.
(b) Remove two bolts and the key cylinder.
(c) Remove two bolts and the lock.

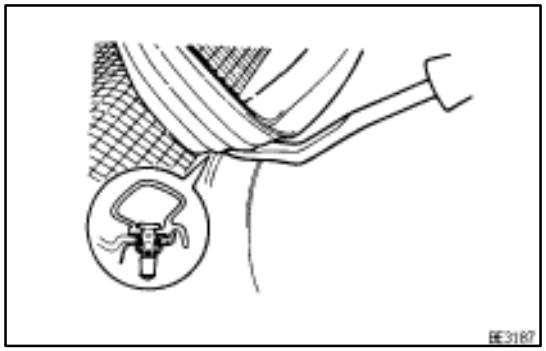
2. INSTALL KEY CYLINDER AND DOOR LOCK

(a) Install the lock with two bolts.
(b) Install the key cylinder with two bolts.
(c) Connect the link to the key cylinder.

WIPER AND WASHER
COMPONENTS

BO05U–01





WIPER MOTOR AND LINK ASSEMBLY REMOVAL

BO07R–01

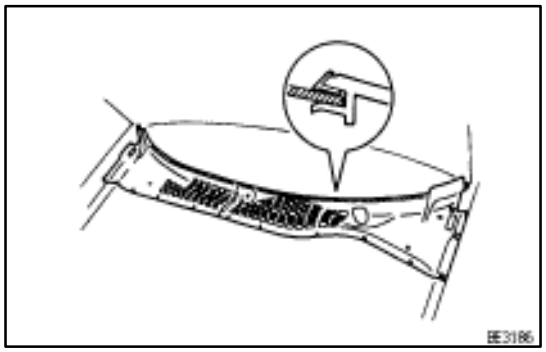
(See page BO–68)

1. REMOVE WIPER ARM AND BLADE ASSEMBLY

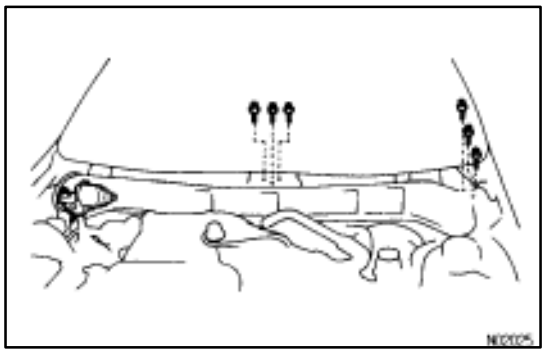
2. REMOVE COWL LOUVER

(a) Using a clip remover, remove eleven clips and the weatherstrip.

(b) Using a clip remover, remove two clips.

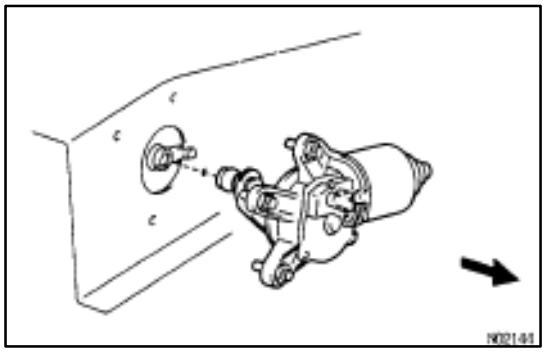


(c) Pull out the cowl louver forward as shown.



3. REMOVE WIPER MOTOR AND LINK ASSEMBLY

(a) Remove six bolts.

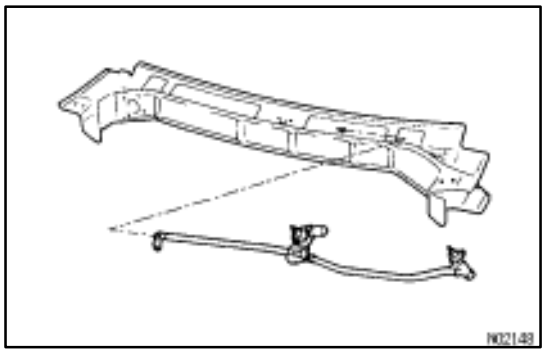


(b) Disconnect the connector, then unfasten four bolts.

(c) Connect the claw of the wiper link to the panel.

(d) Disconnect the motor from the wiper link and remove it.

(e) Remove the wiper link through the service hole.



WIPER MOTOR AND LINK ASSEMBLY INSTALLATION

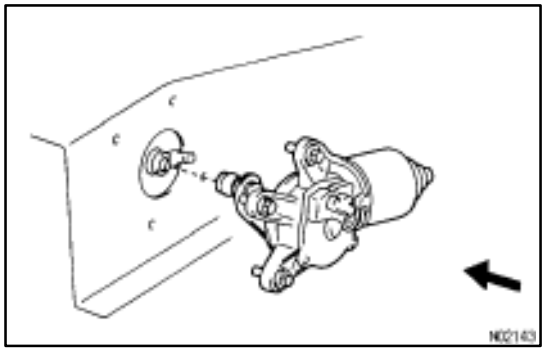
BO05V–01

(See page BO–68)

1. INSTALL WIPER MOTOR AND LINK ASSEMBLY

(a) Place the link through the service hole.

(b) Install six bolts.

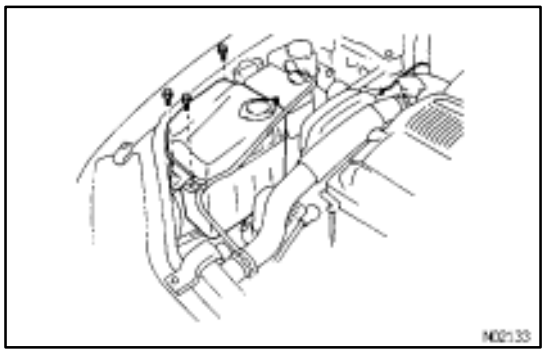


(c) Install the wire protector.
(d) Connect the claw of the wiper link to the panel.
(e) Connect the motor to the wiper link.
(f) Install four bolts.

2. INSTALL COWL LOUVER AND THE WEATHERSTRIP

3. INSTALL WIPER ARM AND BLADE ASSEMBLY

(a) Install the wiper arms and blades, and operate the wipers once and turn the wiper switch OFF.
(b) Adjust the installation positions of the wiper arms and blades to the positions.
(c) Torque the nuts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



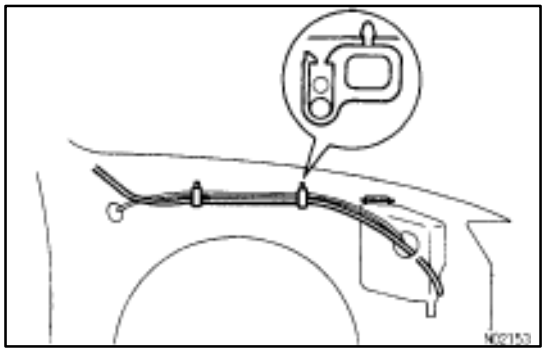
WASHER TANK HOSE AND NOZZLE REMOVAL AND INSTALLATION

BO05W–01

(See page BO–68)

1. REMOVE WASHER TANK AND WASHER MOTOR.

(a) Remove three bolts and the tank.
(b) Disconnect connector and hose.
(c) Separate the tank and the washer motor.

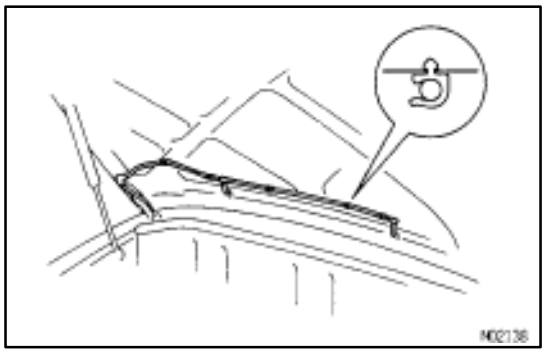


2. INSTALL WASHER TANK AND MOTOR

For installation follow the removal procedure in reverse.

3. REMOVE WASHER HOSE

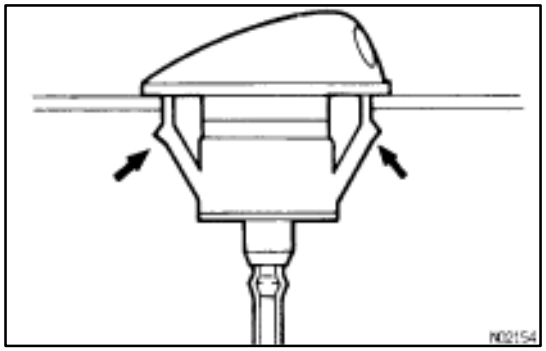
(a) Remove fender liner.
(b) Disconnect washer hose from washer motor.
(c) Remove the hose clamps as shown.
HINT: When installing or removing the hose clamp on the underside of the engine hood, remove the clip on the underside of the silencer.



(d) Remove service hole grommet and disconnect the hose from washer nozzle.

4. INSTALL WASHER HOSE

For installation follow the removal procedure in reverse.
HINT: During assembly, the washer hose should be passed under neath the engine hood hinge on the body side.



5. REMOVE WASHER NOZZLE

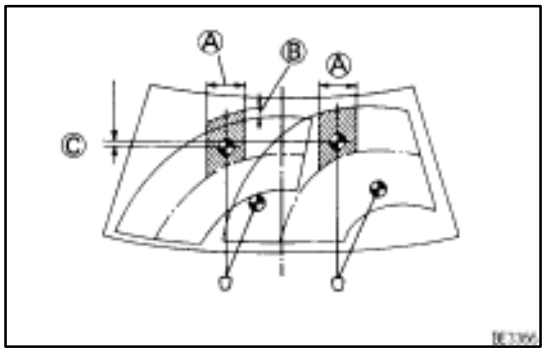
(a) Remove service hole grommet.

(b) Disconnect washer hose from nozzle.

(c) Press on the claw on the underside of the nozzle and remove it from above.

6. INSTALL WASHER NOZZLE

For installation follow the removal procedure in reverse.



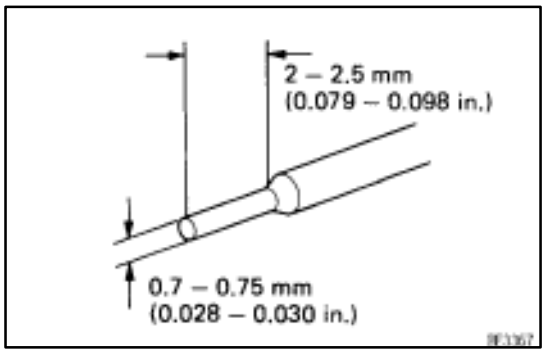
WASHER NOZZLE ADJUSTMENT

BO07S–01

1. INSPECT WASHER NOZZLE

(a) While operating the washer, check whether the upper point where the washer fluid hits the windshield and the up surge area are within the range indicated by the hatched line.

A Approx. 150 mm (5.91 in.)
B Approx. 50 mm (1.99 in.)
C Approx. 0–50 mm (0–1.99 in.)



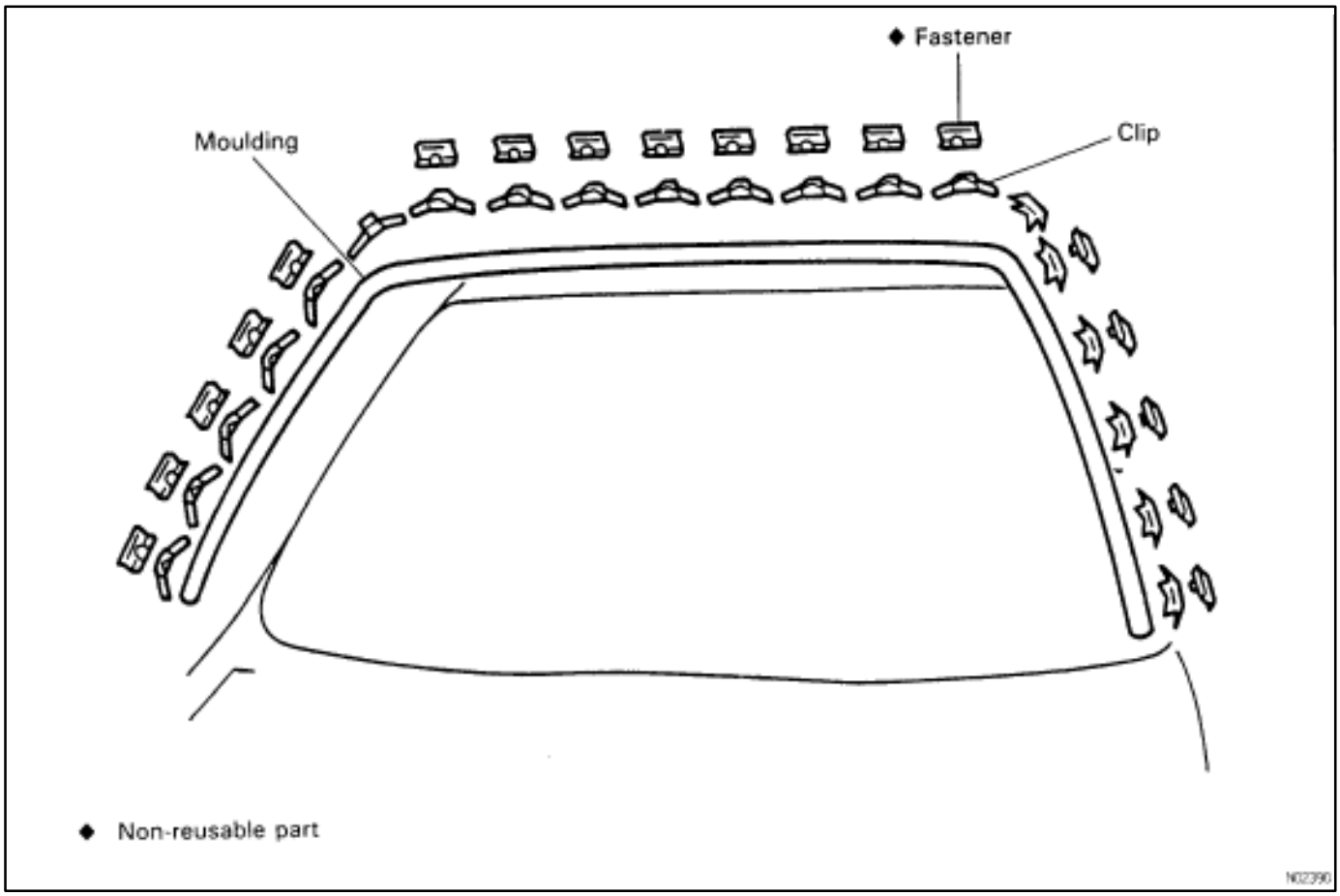
(b) Check if the lower point where the washer fluid hits the windshield is within the range of the wiping pattern (the area of the glass which is wiped by the wiper blades.

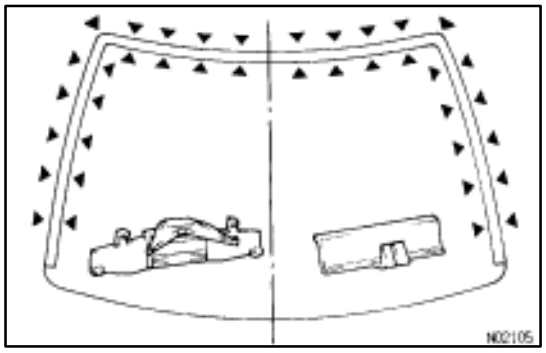
2. ADJUST WASHER NOZZLE

Using a tool like that shown in the figure, change the direction of the nozzle hole to adjust the point where washer fluid strikes the windshield.

WINDSHIELD MOULDING
COMPONENTS

BO07T–01

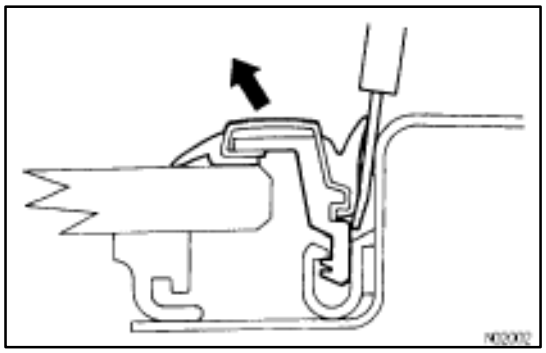




WINDSHIELD MOULDING REMOVAL

BO07U–01

Location of clips and fasteners are as shown. Carefully apply adhesive tape to protect the body.

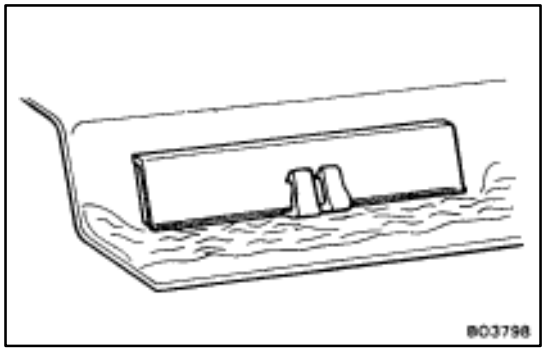


1. REMOVE MOULDING

(a) Insert the top of scraper between the body and moulding.
HINT: Tape the scraper tip before use.

(b) Pry up the scraper to loosen the moulding from the claw of the clips and fasteners.

(c) Remove the moulding.



FASTENER REPLACEMENT

BO05X–01

REPLACE FASTENER

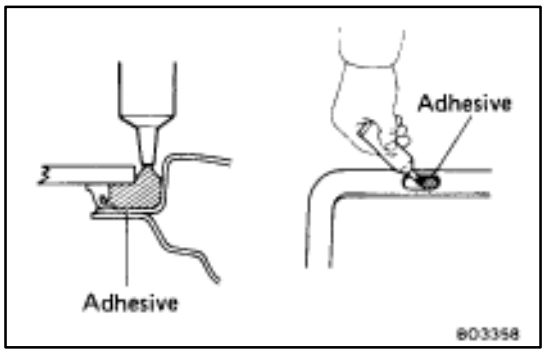
(a) Remove the damaged fastener.
(b) Cut off the old adhesive around the fastener installation area.
HINT: Be careful not to damage the body.
(c) Clean the installation area.
(d) Install a new fastener onto the body.

WINDSHIELD MOULDING INSTALLATION

BO05Y–01

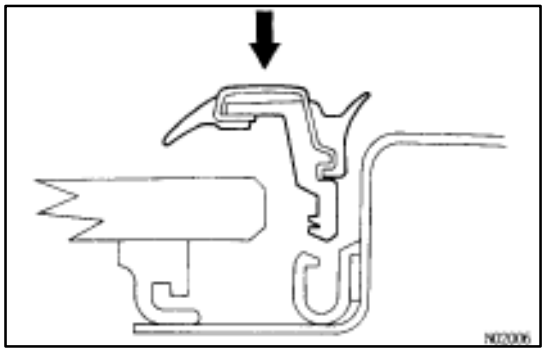
1. INSTALL NEW CLIP INTO MOULDING

Install the clip to the appropriate place on the moulding, where the clip would engage with the fastener.



2. APPLY ADHESIVE AT NEW CLIP INSTALLATION AREA

(a) When the clip being engaged with the moulding is removed, cut out the old adhesive around the clip installation area.
NOTICE: Do not damage the body and fastener.
(b) Apply adhesive at the clip installation area so water does not collect there.



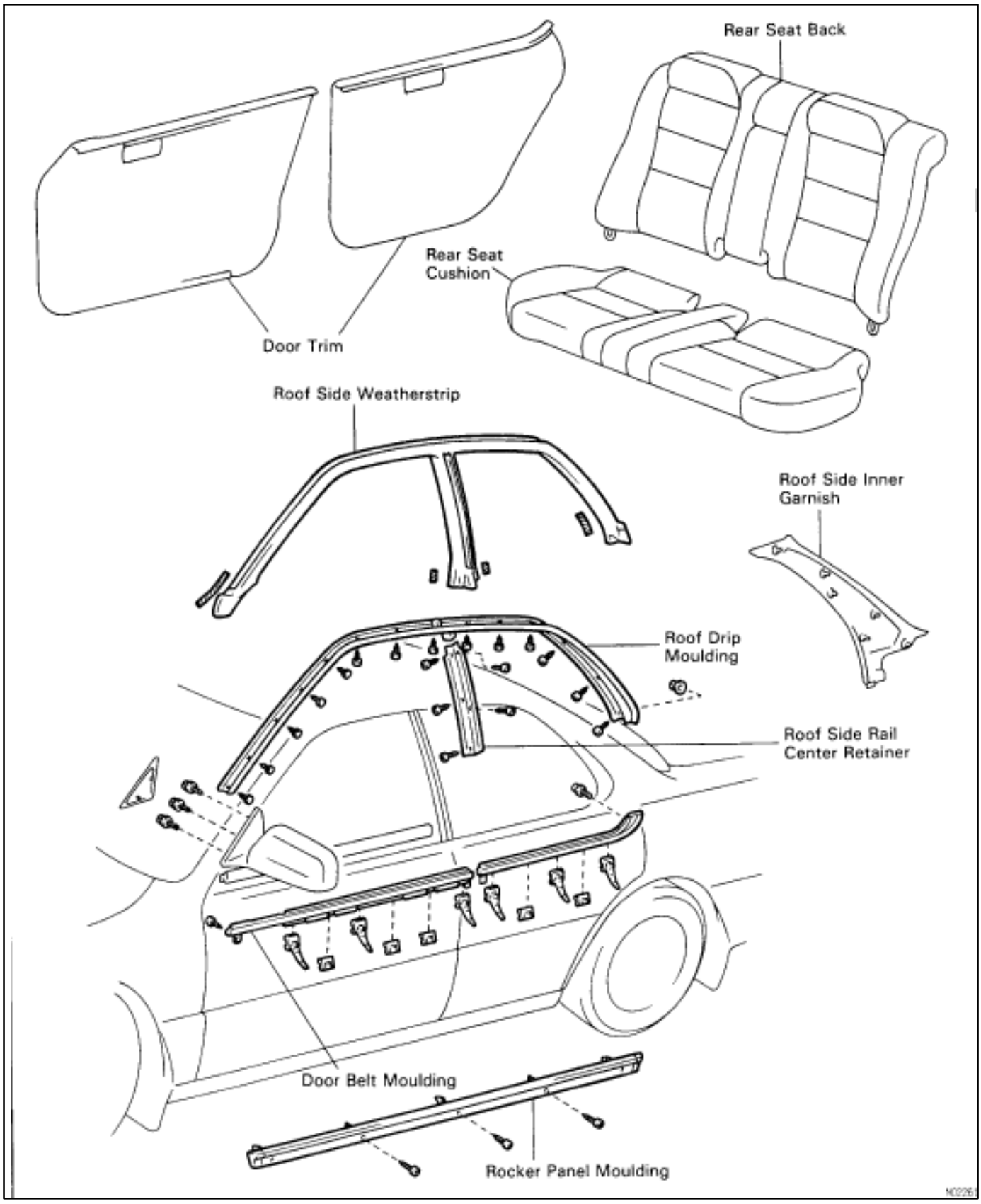
3. INSTALL UPPER MOULDING

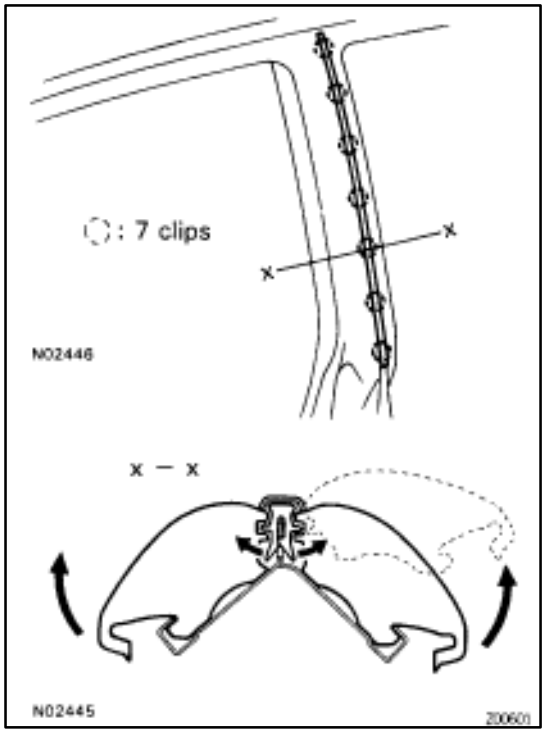
(a) Place the moulding onto the body.
(b) Tap the moulding with your hand to fasten the clips at the glass edge. At the same time, install the fastener, by tapping them by hand.

BODY OUTSIDE MOULDING

COMPONENTS

BO07V–01





ROOF DRIP MOULDING REMOVAL

BO07W–01

(See page BO–74)

1. REMOVE FOLLOWING PARTS:

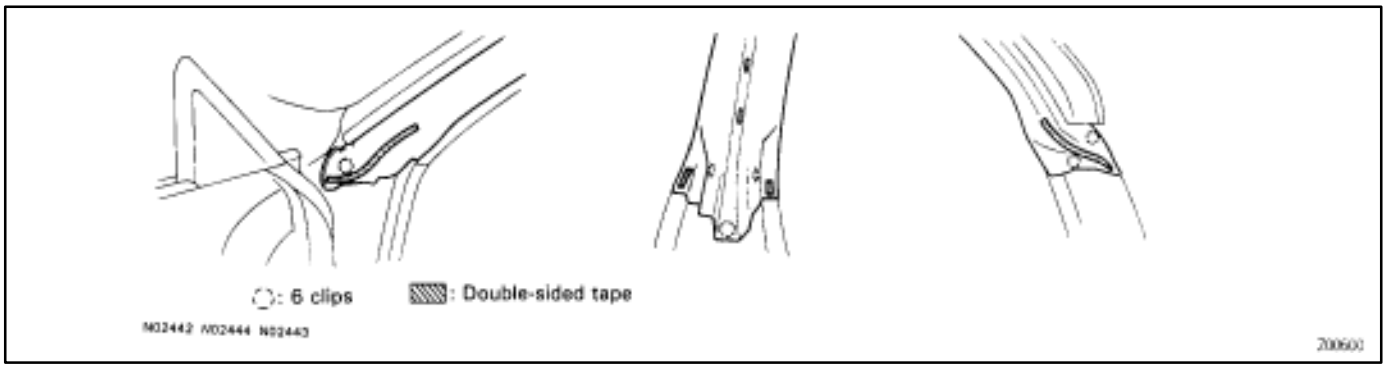
(a) Rear seat cushion.
(b) Rear seat back.
(c) Roof side inner garnish.

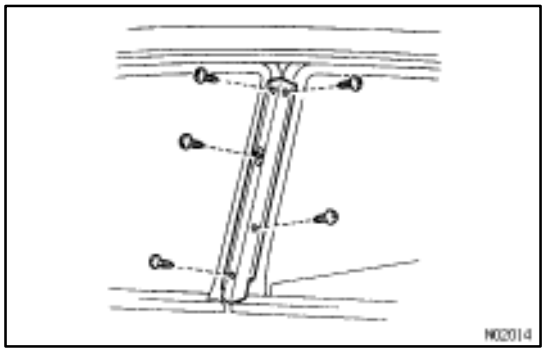
2. REMOVE CENTER PILLAR GARNISH

Remove the garnish as shown.

3. REMOVE ROOF SIDE WEATHERSTRIP

(a) Using a clip remover, remove six clips.
(b) Pull off the weatherstrip.



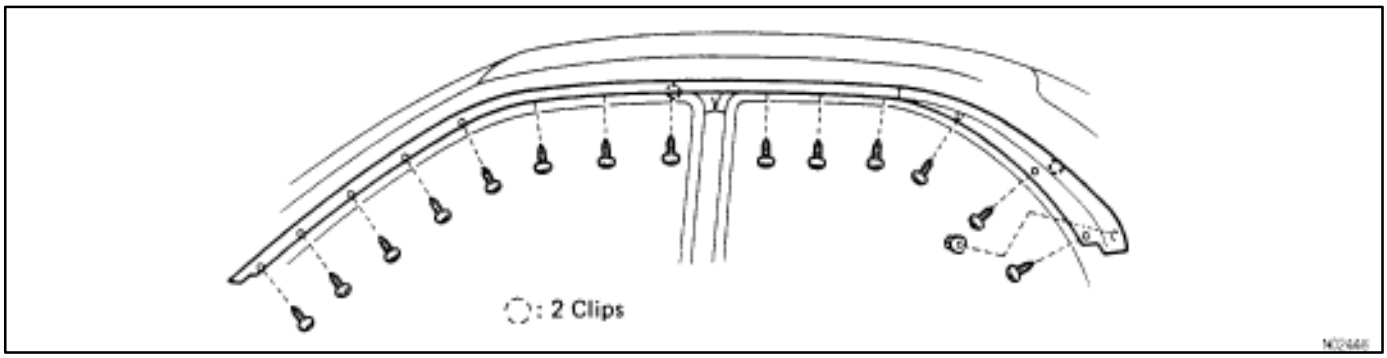


4. REMOVE ROOF SIDE RAIL CENTER RETAINER

Remove five screws and the retainer.

5. REMOVE ROOF DRIP MOULDING

(a) Remove fourteen screws.
(b) Remove the nut.
(c) Using a screwdriver, pry out the retainer.
(d) Remove the moulding.

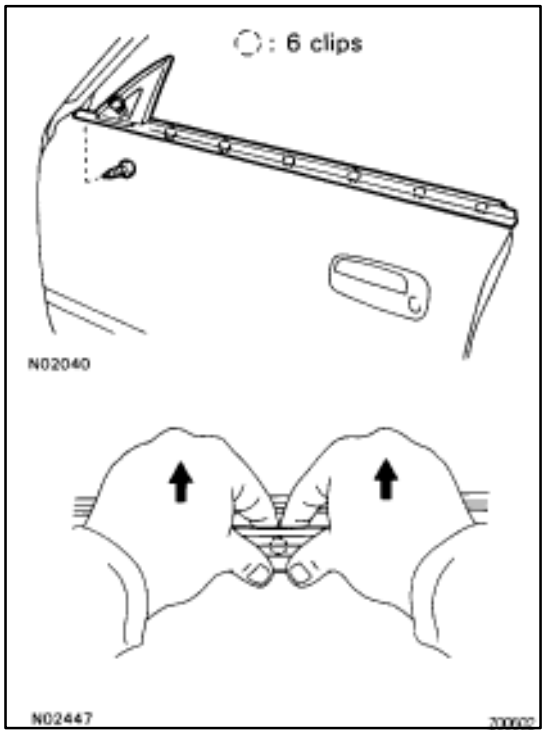


ROOF DRIP MOULDING INSTALLATION

BO05Z–01

(See page BO–74)

INSTALL ROOF DRIP MOULDING PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE



DOOR BELT MOULDING REMOVAL

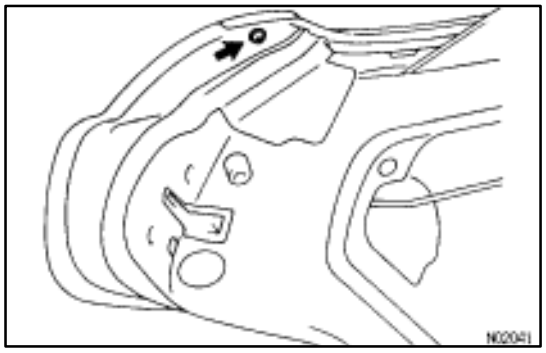
BO07X–01

(See page BO–74)

1. REMOVE OUTER REAR VIEW MIRROR
   (See page BO–138)
2. REMOVE FRONT DOOR TRIM
   (See page BO–37)
3. REMOVE FRONT DOOR INNER WEATHERSTRIP
4. REMOVE FRONT DOOR BELT MOULDING

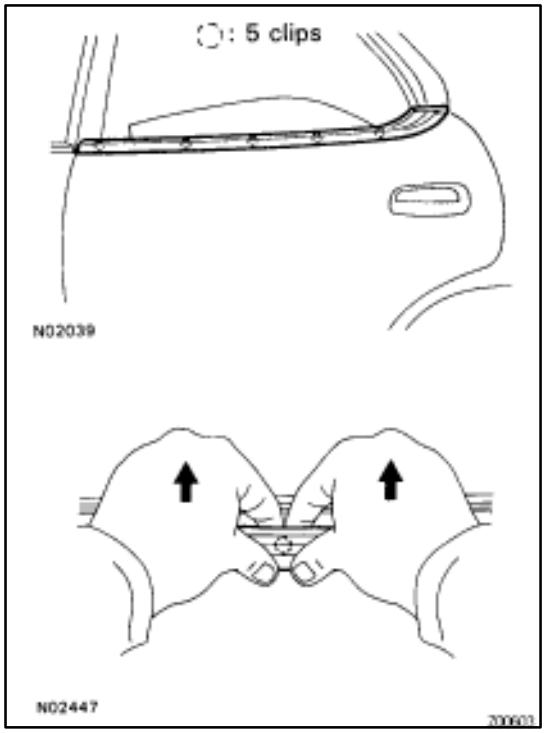
(a) Remove the screw.

(b) Pry loose the clips from the edge of the panel and remove the front door belt moulding.



5. REMOVE REAR DOOR TRIM
   (See page BO–49)
6. REMOVE REAR DOOR BELT MOULDING

(a) Remove the screw.



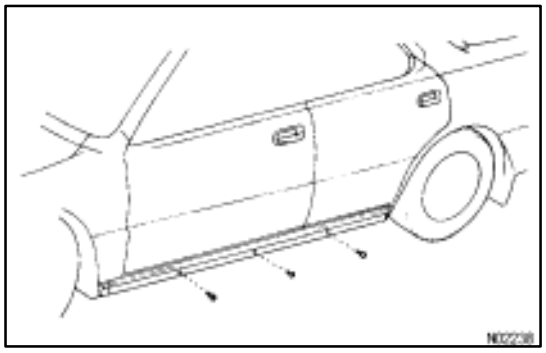
(b) Pry loose the clips from the edge of the panel and remove the rear door belt moulding.

DOOR BELT MOULDING INSTALLATION

BO060–01

(See page BO–74)

INSTALL DOOR BELT MOULDING PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE



ROCKER PANEL MOULDING REMOVAL AND INSTALLATION

BO07Y–01

(See page BO–74)

1. REMOVE ROCKER PANEL MOULDING

(a) Remove three screws.

(b) Using a screwdriver, pry loose five clips and remove the moulding.

HINT: Tape the screwdriver tip before use.

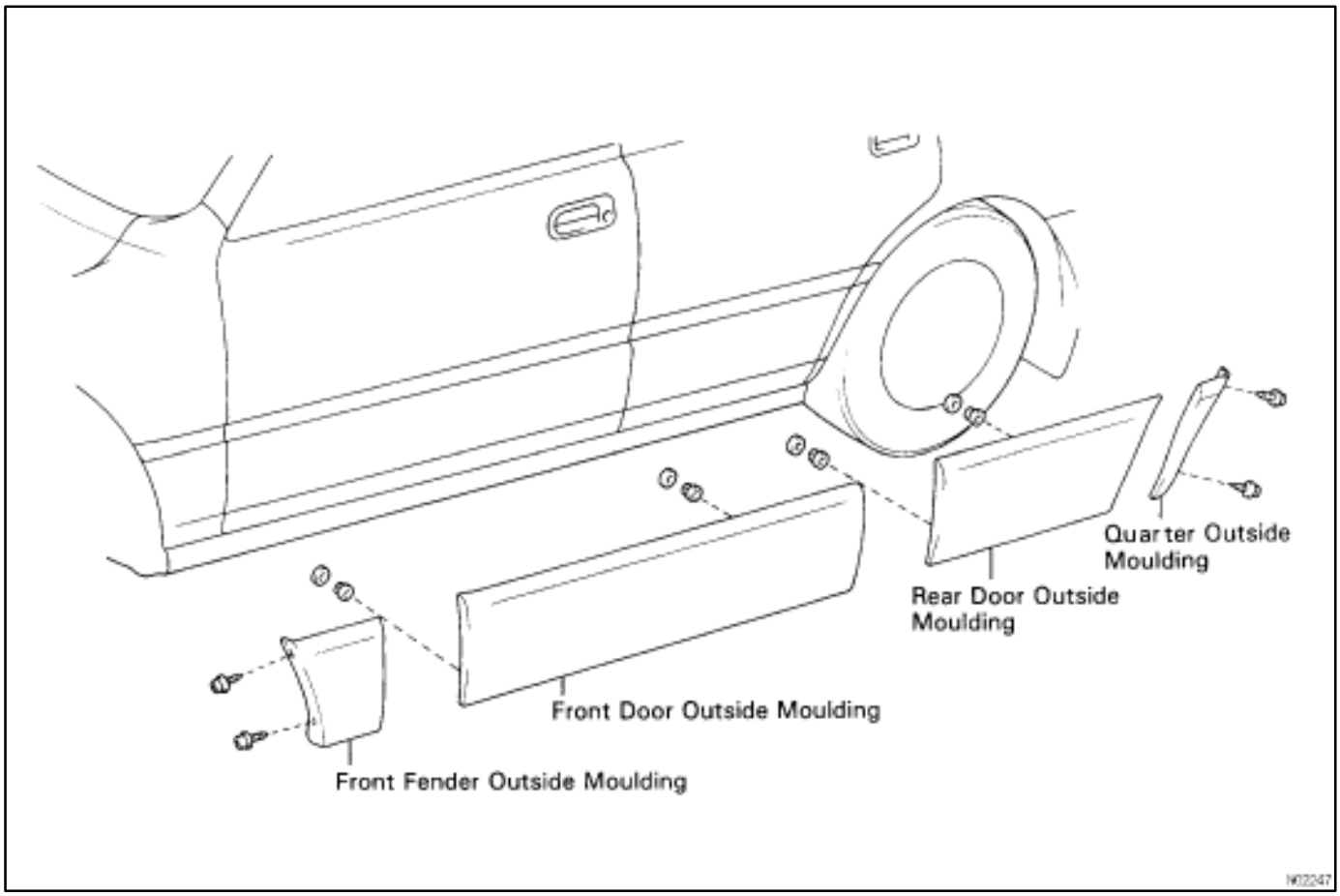
2. INSTALL ROCKER PANEL MOULDING

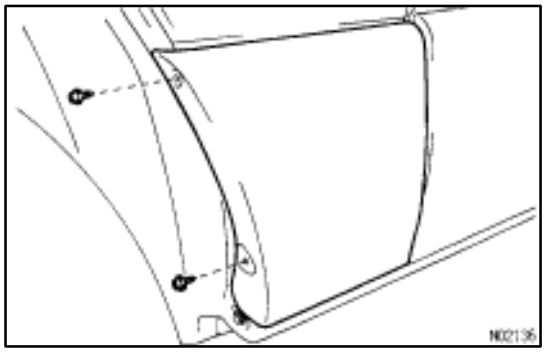
(a) Install the top of clips into the panel hole and push the moulding onto the panel.

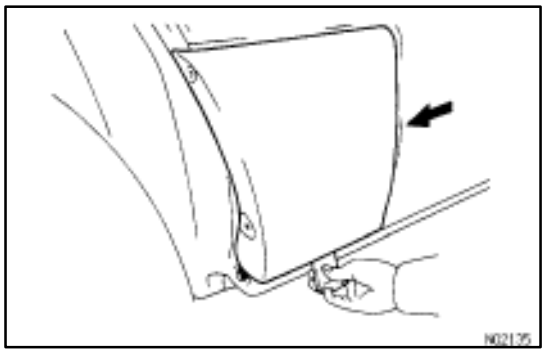
(b) Install three screws.

SIDE PROTECTION MOULDING
COMPONENTS

BO07Z–01







FRONT FENDER OUTSIDE MOULDING REMOVAL AND INSTALLATION

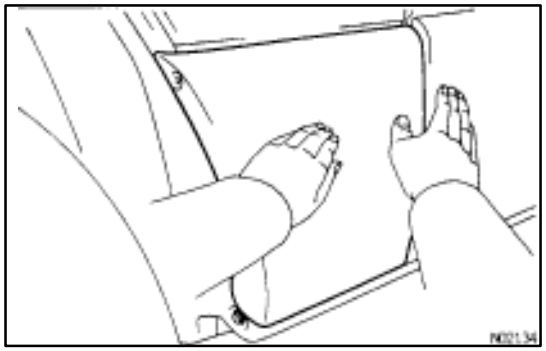
BO061–01

1. REMOVE FRONT FENDER OUTSIDE MOULDING

(a) Remove two screws.

(b) Using a moulding remover, pry out from the lower side to remove the moulding.

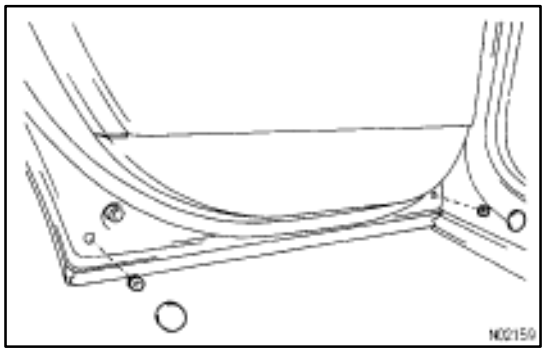
(c) Remove the pad.



2. INSTALL FENDER OUTSIDE MOULDING

HINT: Before installing the new moulding, peel off the backing papers on the moulding.

(a) Install the pad.
(b) Align the clips and the retainer with the holes of door panel.
(c) Tap the moulding by hand to install it.
(d) Install two screws.



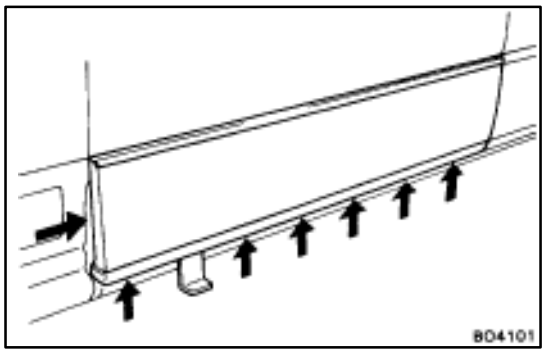
DOOR OUTSIDE MOULDING REMOVAL AND INSTALLATION

BO080–01

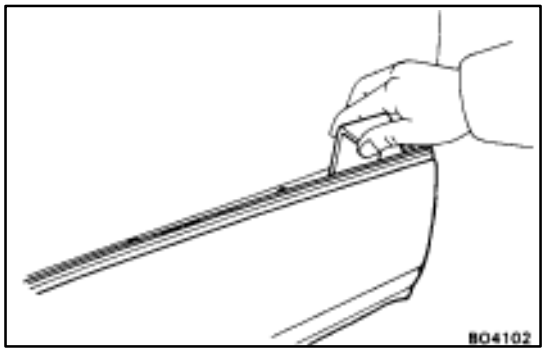
(See page BO–78)

1. REMOVE DOOR OUTSIDE MOULDING

(a) Remove two caps and two nuts.



(b) Using a moulding remover, pry out the moulding from the lower side.

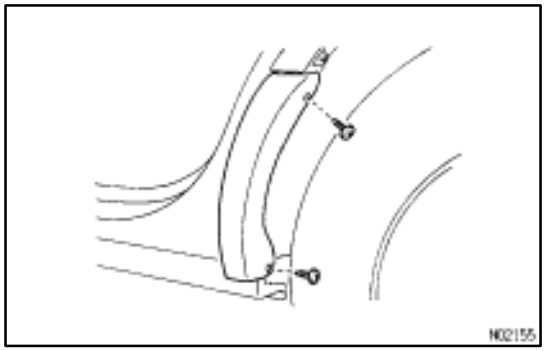


(c) Using a moulding remover, pry out the moulding upper side.
(d) If the clip or the retainer remains on body, remove it with a clip remover.
(e) Remove the pad.

2. INSTALL DOOR OUTSIDE MOULDING

HINT: Before install the new moulding, peel off the backing papers on the moulding.

(a) Install the pad.
(b) Align the clips and the retainer with the holes of door panel.
(c) Tap the moulding by hand to install it.
(d) Install two nuts and two caps.



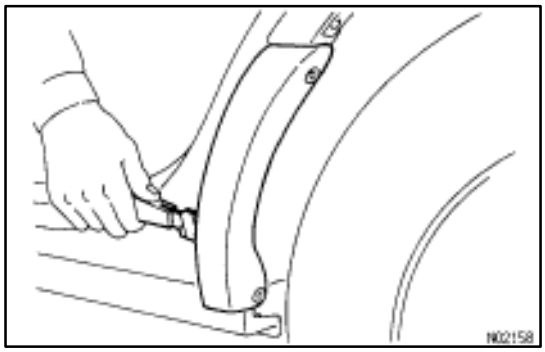
QUARTER OUTSIDE MOULDING REMOVAL AND INSTALLATION

BO062–01

(See page BO–78)

1. REMOVE QUARTER OUTSIDE MOULDING

(a) Remove two screws.



(b) Using the scraper, pry out the moulding.
HINT: Tape the scraper tip before use.

(c) If the clip remains on body, remove the clip with a clip remover.

2. INSTALLATION QUARTER OUTSIDE MOULDING

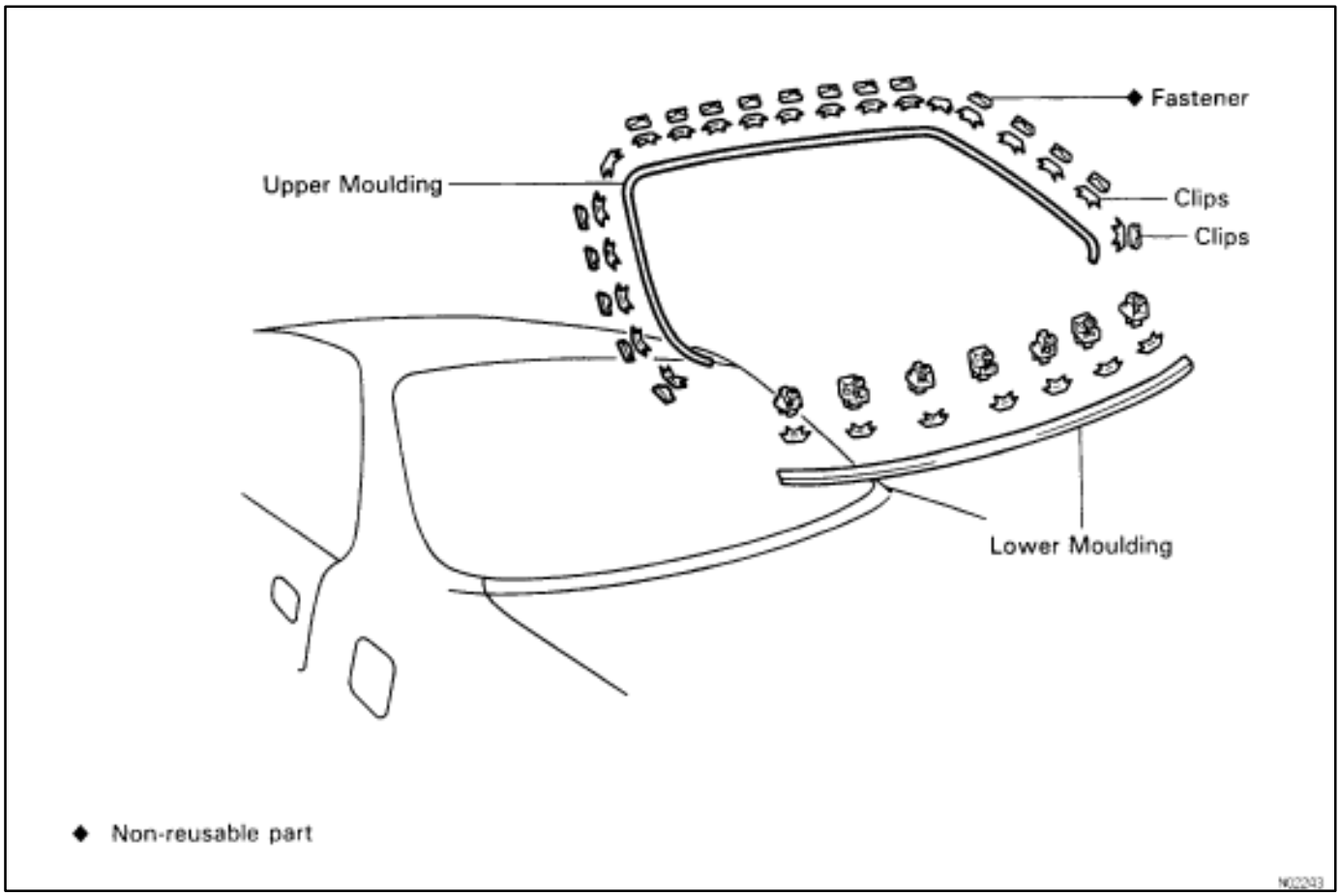
HINT: Before installing the new moulding, peel off the backing papers on the moulding.

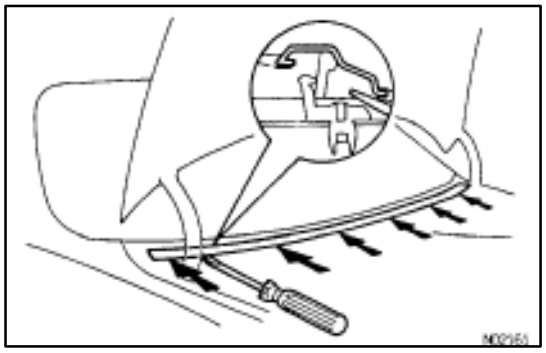
(a) Align clips with the body holes, tap the moulding by your hand to install it.

(b) Install two screws.

BACK WINDOW MOULDING
COMPONENTS

BO081–01



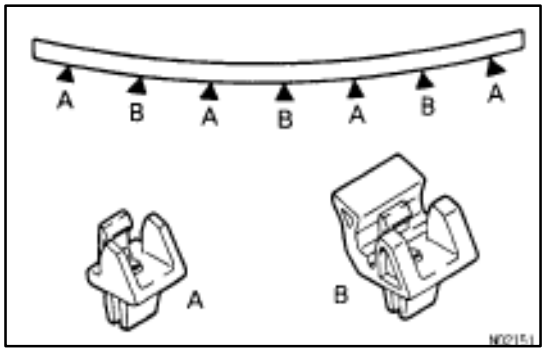


BACK WINDOW MOULDING REMOVAL AND INSTALLATION

BO063–01

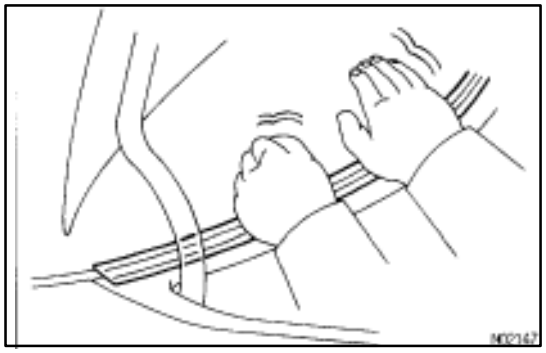
1. REMOVE LOWER MOULDING

Using the screw driver, pry off the moulding from the seven clips and remove the moulding.



2. IF NECESSARY, REPLACE LOWER MOULDING CLIPS

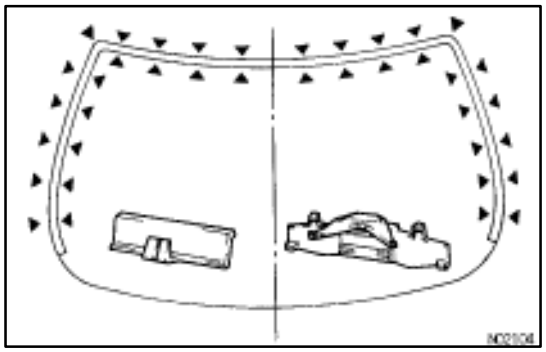
HINT: There two types of clips for moulding installation. Location of these clips is as shown.



3. INSTALL LOWER MOULDING

(a) Place the moulding onto the body.

(b) Tap the moulding by your hand to install the moulding.



BACK WINDOW UPPER MOULDING REMOVAL AND INSTALLATION

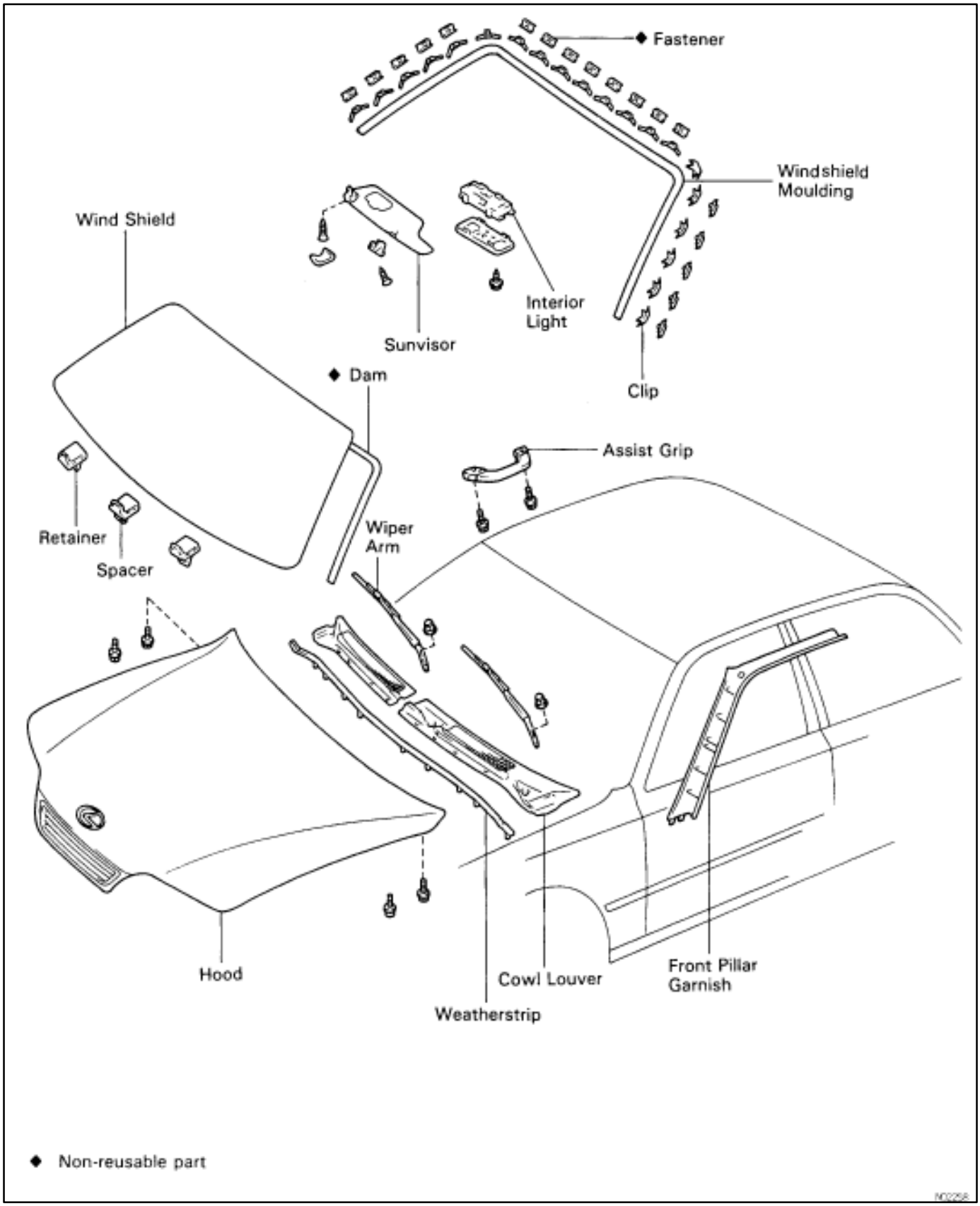
BO082–01

Location of clips and fasteners are as shown, carefully apply adhesive tape to protect the body.

HINT: Do the same manner as the windshield moulding.

WINDSHIELD
COMPONENTS

BO083–01



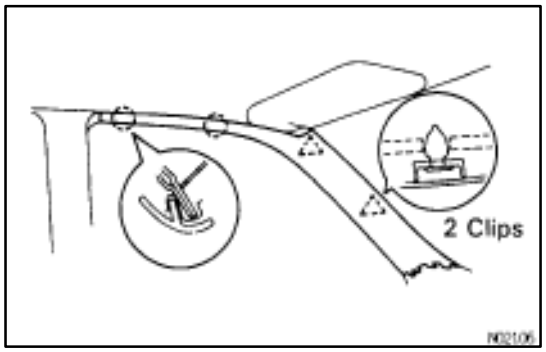
WINDSHIELD REMOVAL

BO064–01

(See page BO–83)

1. REMOVE FOLLOWING PARTS:

(a) Sunvisors and holders
(b) Front assist grip
(c) Interior light



2. REMOVE FRONT PILLAR GARNISH

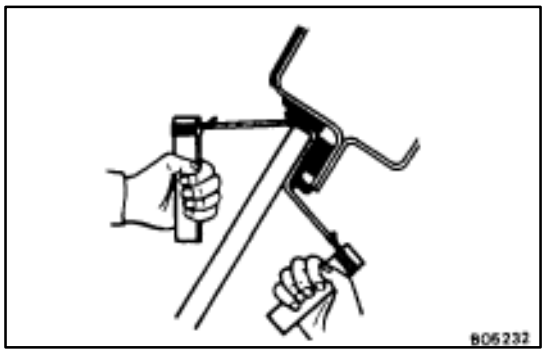
(a) Remove the clips by your hand.
(b) Pull the garnish rearwards to remove it.

3. REMOVE HOOD

4. REMOVE FOLLOWING PARTS:
(See page BO–69)

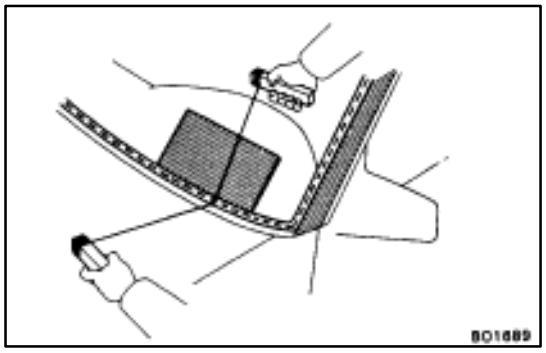
(a) Wiper arms
(b) Cowl louver

5. REMOVE WINDSHIELD MOULDING
(See page BO–72)



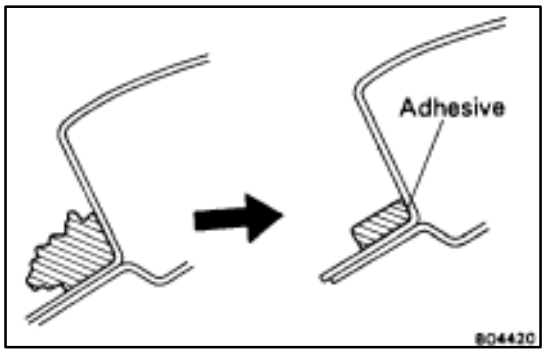
6. REMOVE WINDSHIELD GLASS

(a) Push piano wire through from the interior.
(b) Tie both wire ends to a wooden block or like object.
HINT: Apply adhesive tape to the outer surface to keep the surface from being scratched.



NOTICE: When separating the glass, take care not to damage the paint and interior and exterior ornaments. To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.

(c) Cut the adhesive by pulling the piano wire around it.
(d) Remove the glass.
NOTICE: Leave as much of the adhesive on the body as possible when cutting off the glass.



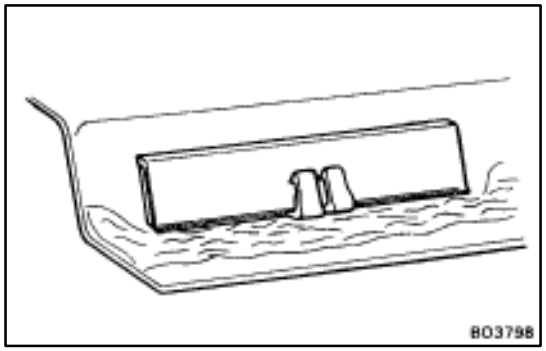
WINDSHIELD INSTALLATION

BO02X–02

(See page BO–83)

1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

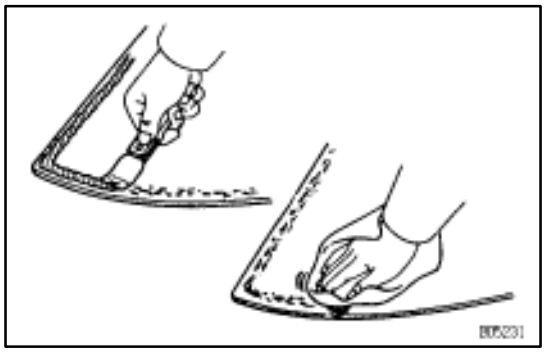
(a) Using a knife, cut away any rough areas on the body.
HINT: Leave as much of the adhesive on the body as possible.
(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.



HINT: Even if all the adhesive has been removed, clean the body.

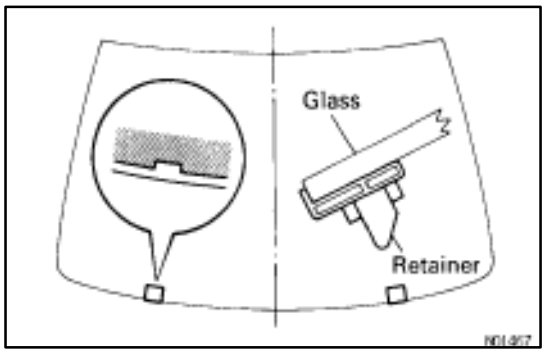
2. REPLACE FASTENER

(a) Remove the damaged fastener.
(b) Cut off the old adhesive around the fastener installation area.
HINT: Be careful not to damage the body.
(c) Clean the installation area.
(d) Install a new fastener onto the body.



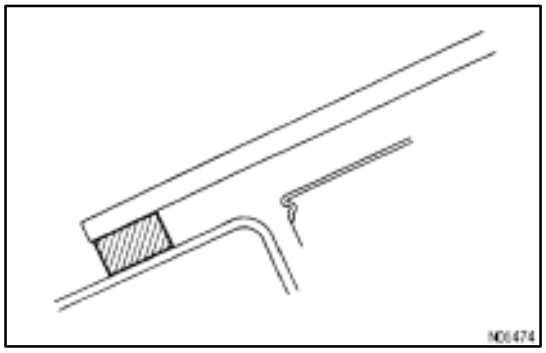
3. CLEAN REMOVED GLASS

(a) Using a scraper, remove the adhesive sticking to the glass.
(b) Clean the glass with cleaner.
NOTICE: Do not touch the glass after cleaning it.

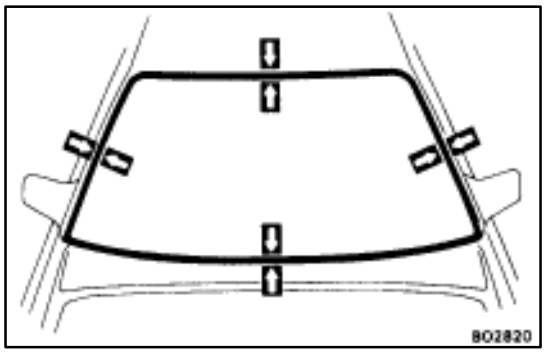


4. INSTALL RETAINER

Install the retainers as shown.

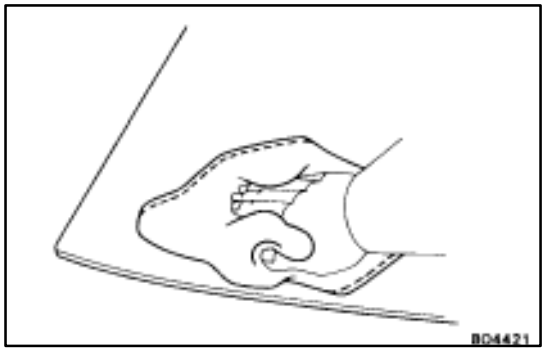


5. INSTALL SPACER



6. POSITION GLASS

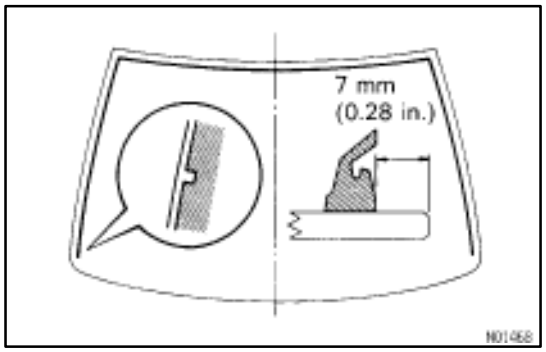
(a) Place glass in correct position.
(b) Check that all contacting parts of the glass rim are perfectly even and do not make contact with the fasteners.
(c) Place reference marks between the glass and body.
(d) Remove the glass.



7. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface black–colored area around the entire glass rim.

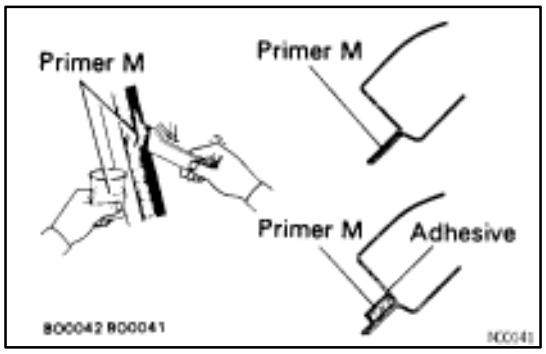
NOTICE: Do not touch the glass face after cleaning it.



8. INSTALL DAM

Install the dam with double–stick tape as shown in the drawing.

NOTICE: Do not touch the glass face after cleaning it.

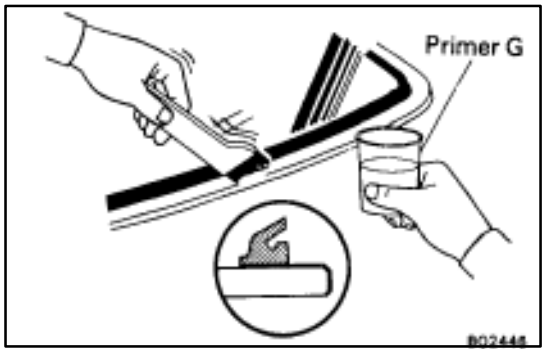


9. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat the contact surface on the body with Primer M.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat to the adhesive.**
- **Do not keep any of the opened primer M and G for later use.**

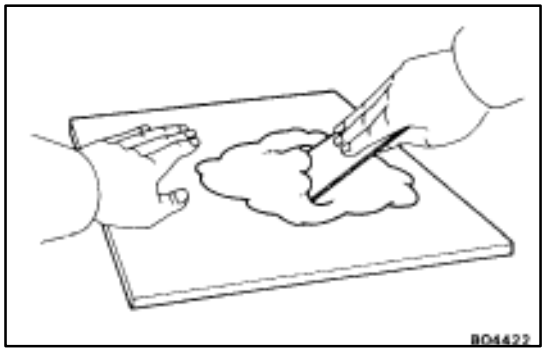


10. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.

(b) Before the Primer dries, wipe it off with a clean shop rag.

NOTICE: Let the primer coating cry for 3 minutes or more.

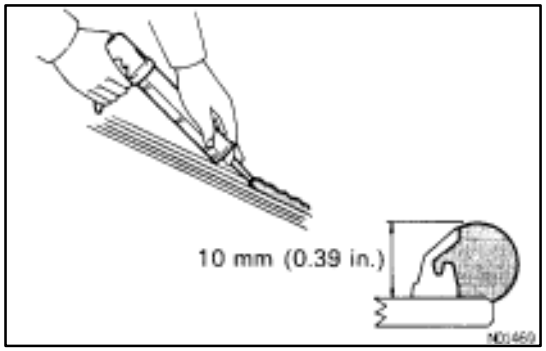


11. MIX ADHESIVE COATING

NOTICE:

- **Be sure that installation of the moulding is finished within usable time. (See step 3 on page BO–11)**
- **The mixture should be made in 5 minutes or less.**

(a) Thoroughly clean the glass plate and putty spatula with solvent.



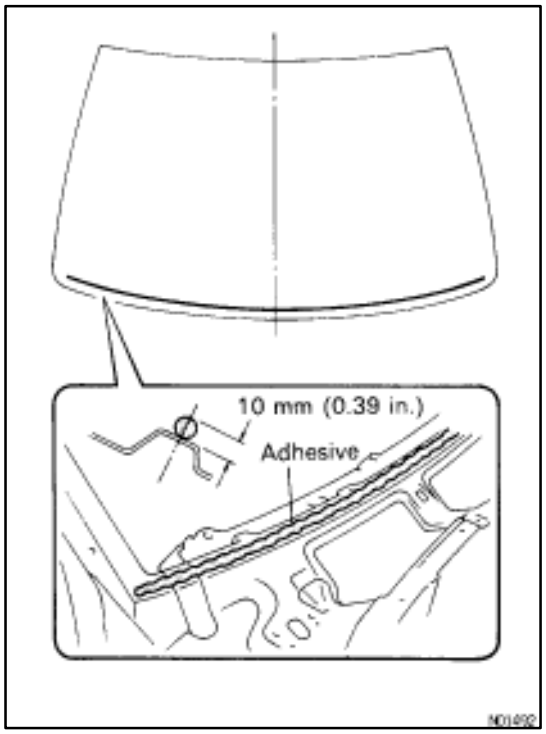
(b) Thoroughly mix 500 g (17.64 oz.) of the main agent and 75 g (2.65 oz.) of the hardening agent on a glass plate or like object with a putty spatula.

12. APPLY ADHESIVE

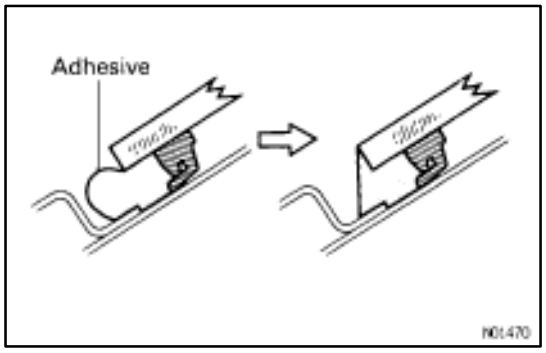
(a) Cut off the tip of the cartridge nozzle. Fill the cartridge with adhesive.

(b) Load the cartridge into the sealer gun.

(c) Coat the glass with adhesive as shown.

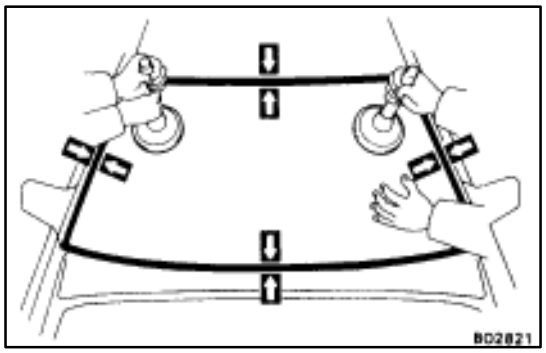


(d) Coat the body with adhesive as shown.



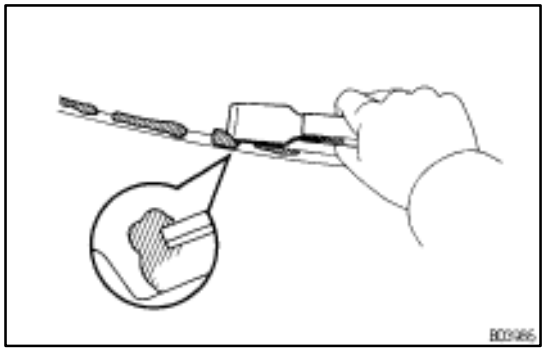
13. INSTALL GLASS

HINT: Confirm that the dam is attached the body panel as shown in the drawing.



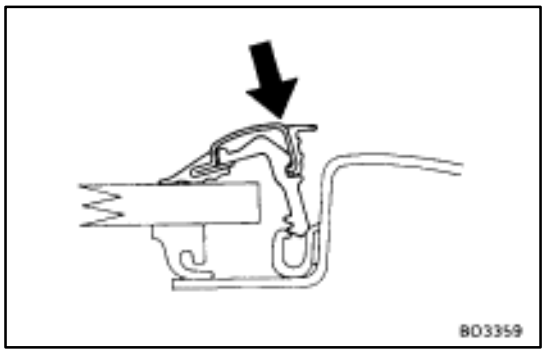
(a) Position the glass so that the reference marks are lined up, and press in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.



(c) Use a scraper to remove any excess or protruding adhesive.
(d) Fasten glass securely until the adhesive sets.

14. INSPECT FOR LEAKS AND REPAIR
(a) Perform a leak test after the hardening time has elapsed.
(b) Seal any leak with auto glass sealer.
Part No. 08833–00030



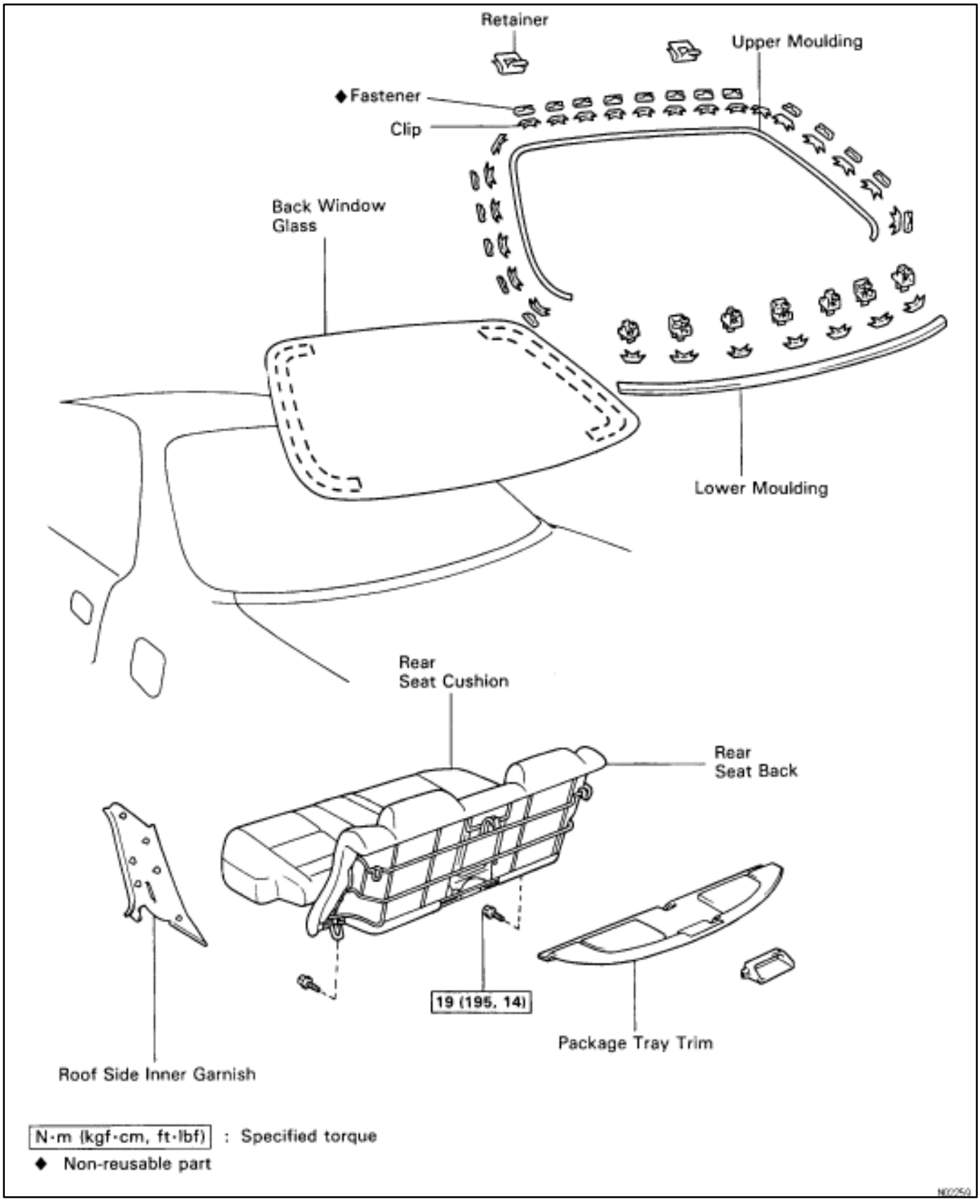
15. INSTALL WINDSHIELD UPPER MOULDING
(a) Place the moulding onto the body.
(b) Tap the moulding with your hand to fasten the clips at the glass edge.
At the same time, install the fastener, by tapping them by hand.

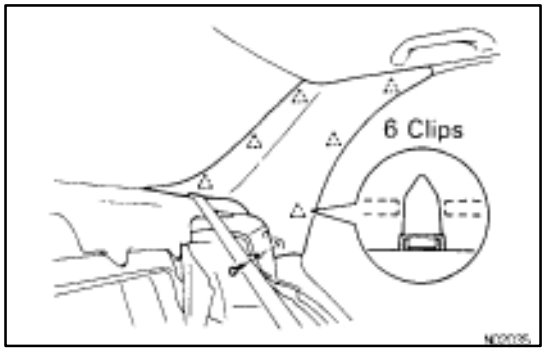
16. INSTALL WINDSHIELD OUTSIDE MOULDING
17. INSTALL WEATHERSTRIP

18. INSTALL FOLLOWING PARTS:
(a) Cowl louver
(b) Wiper arms
(c) Hood
(d) Front pillar garnish
(e) Interior light
(f) Front assist grip
(g) Sunvisors and holders

BACK WINDOW GLASS
COMPONENTS

BO084–01





BACK WINDOW GALSS REMOVAL

BO08J–01

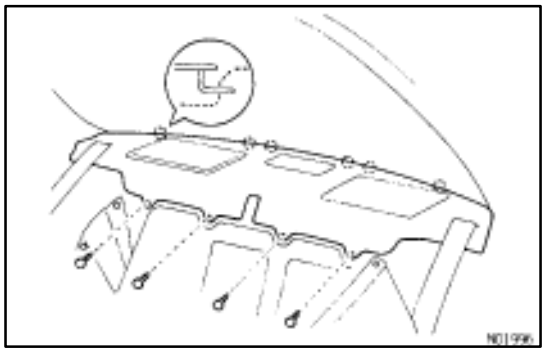
(See page BO–89)

1. REMOVE REAR SEAT CUSHION AND SEAT BACK
(See page BO–129)

2. REMOVE ROOF SIDE INNER GARNISH

(a) Using a clip remover, remove the clip.

(b) Using a screwdriver, pry loose and remove the garnish.



3. REMOVE PACKAGE TRAY TRIM

(a) Remove the high mount stop light.

(b) Using a clip remover, remove four clips.

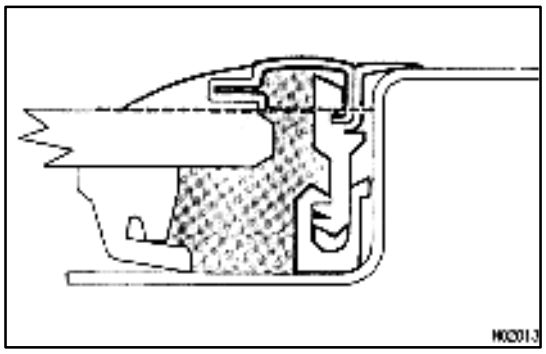
(c) Pull the trim forward to remove it.

4. REMOVE FOLLOWING PARTS:

(a) Assist grips

(b) Rear side of roof headlining

5. DISCONNECT DEFOGGER WIRE CONNECTORS



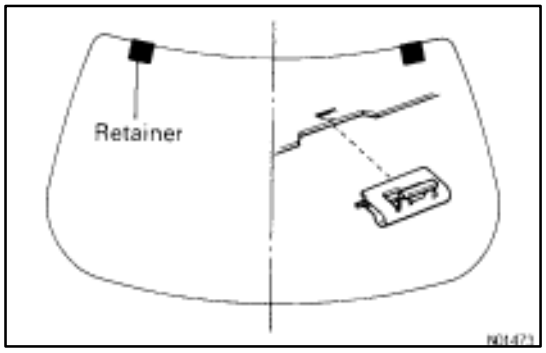
6. REMOVE BACK WINDOW MOULDING

Using a knife, cut off the moulding as shown.

NOTICE: Do not damage the body with the knife.

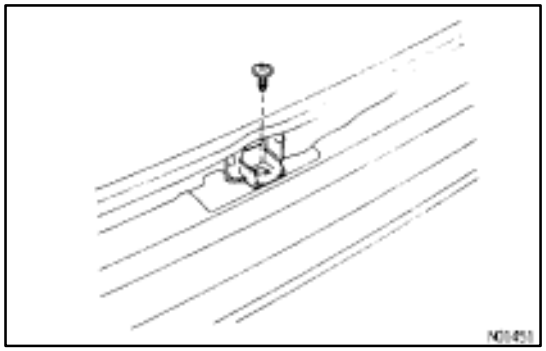
7. REMOVE BACK WINDOW GLASS

Remove the glass in the same manner as windshield.
(See step 6 on page BO–84)



8. REMOVE RETAINERS

Remove retainers from the body.



BACK WINDOW GLASS INSTALLATION

BO065–01

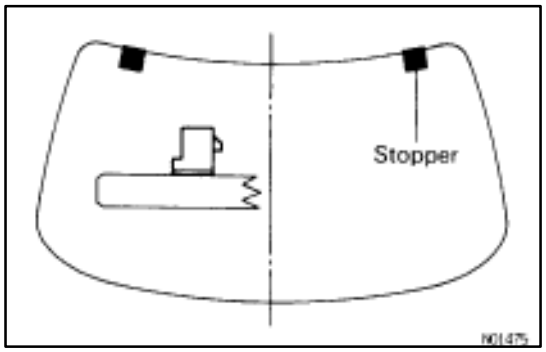
(See page BO–89)

1. **CLEAN AND SHAPE CONTACT SURFACE OF BODY**
   (See step 1 on page BO–84)
2. **REPLACE LOWER MOULDING CLIP**

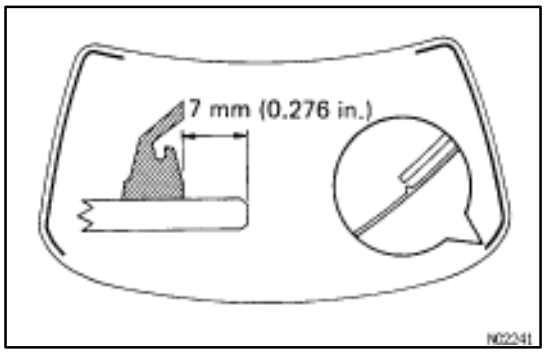
(a) Remove the screw and the damaged clip.

(b) Install the new clip with the screw.

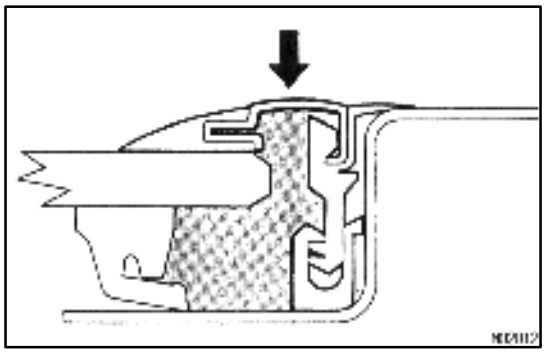
3. **CLEAN REMOVED GLASS**
   (See step 3 on page BO–85)



4. **REMOVE STOPPERS**
   Using a knife, remove the stoppers.
5. **POSITION GLASS**
   (See step 6 on page BO–85)
6. **CLEAN CONTACT SURFACE OF GLASS**
   (See step 7 on page BO–86)



7. **INSTALL DAM**
   Install the dam with double–stick tape as shown in the drawing.
   NOTICE: Do not touch the glass face after cleaning it.
8. **COAT CONTACT SURFACE OF BODY WITH PRIMER ”M”**
   (See step 9 on page BO–86)
9. **COAT CONTACT SURFACE OF GLASS WITH PRIMER ”G”**
   (See step 10 on page BO–86)
10. **MIX ADHESIVE COATING**
    (See step 11 on page BO–81)
11. **APPLY ADHESIVE**
    (See step 12 on page BO–87)
12. **INSTALL GLASS**
    (See step 13 on page BO–87)



13. **INSTALL BACK WINDOW MOULDING**
    Place the moulding onto the body and tap it by hand.

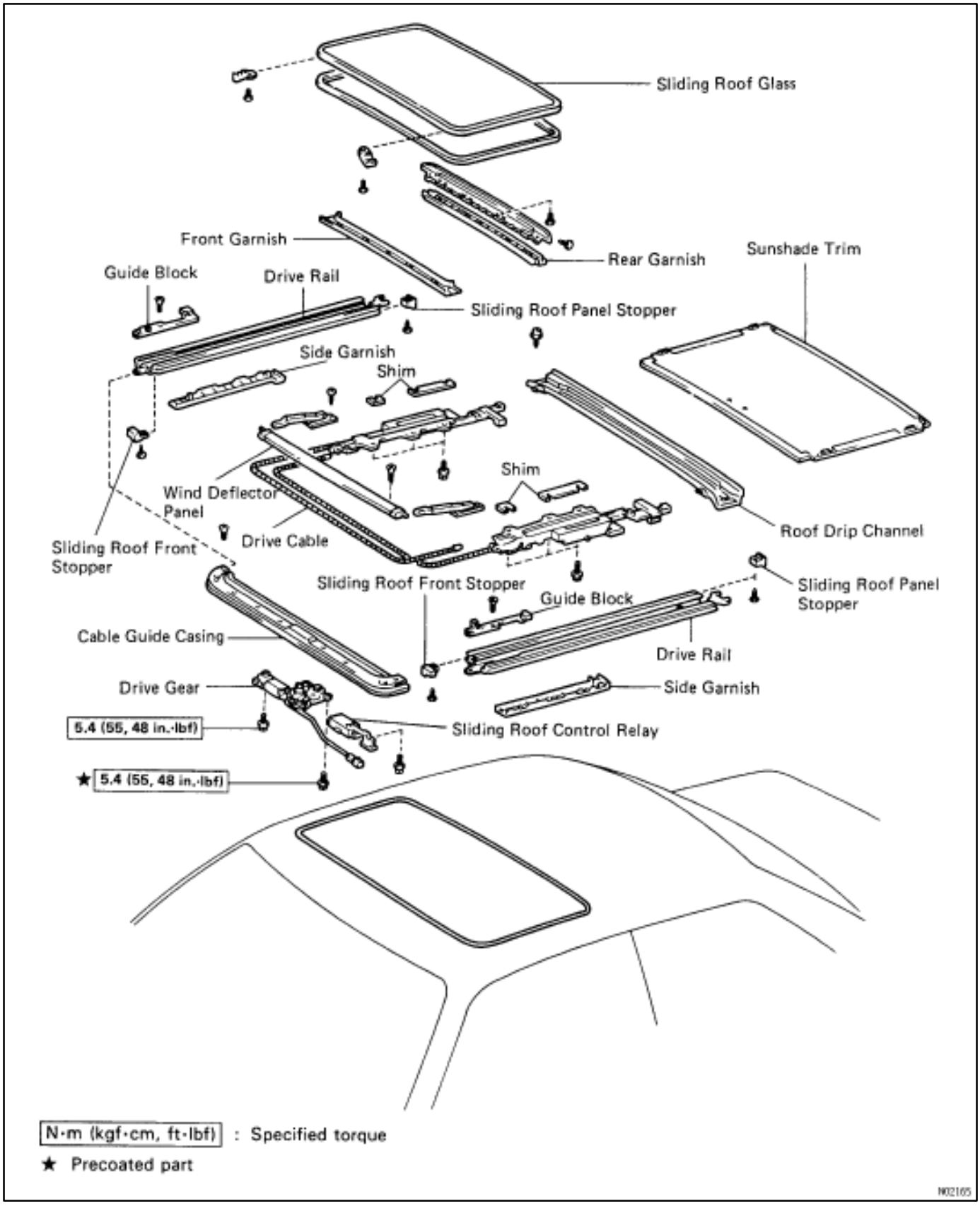
14. INSPECT FOR LEAKS AND REPAIR
(See step 14 on page BO–88)

15. CONNECT DEFOGGER WIRE CONNECTORS

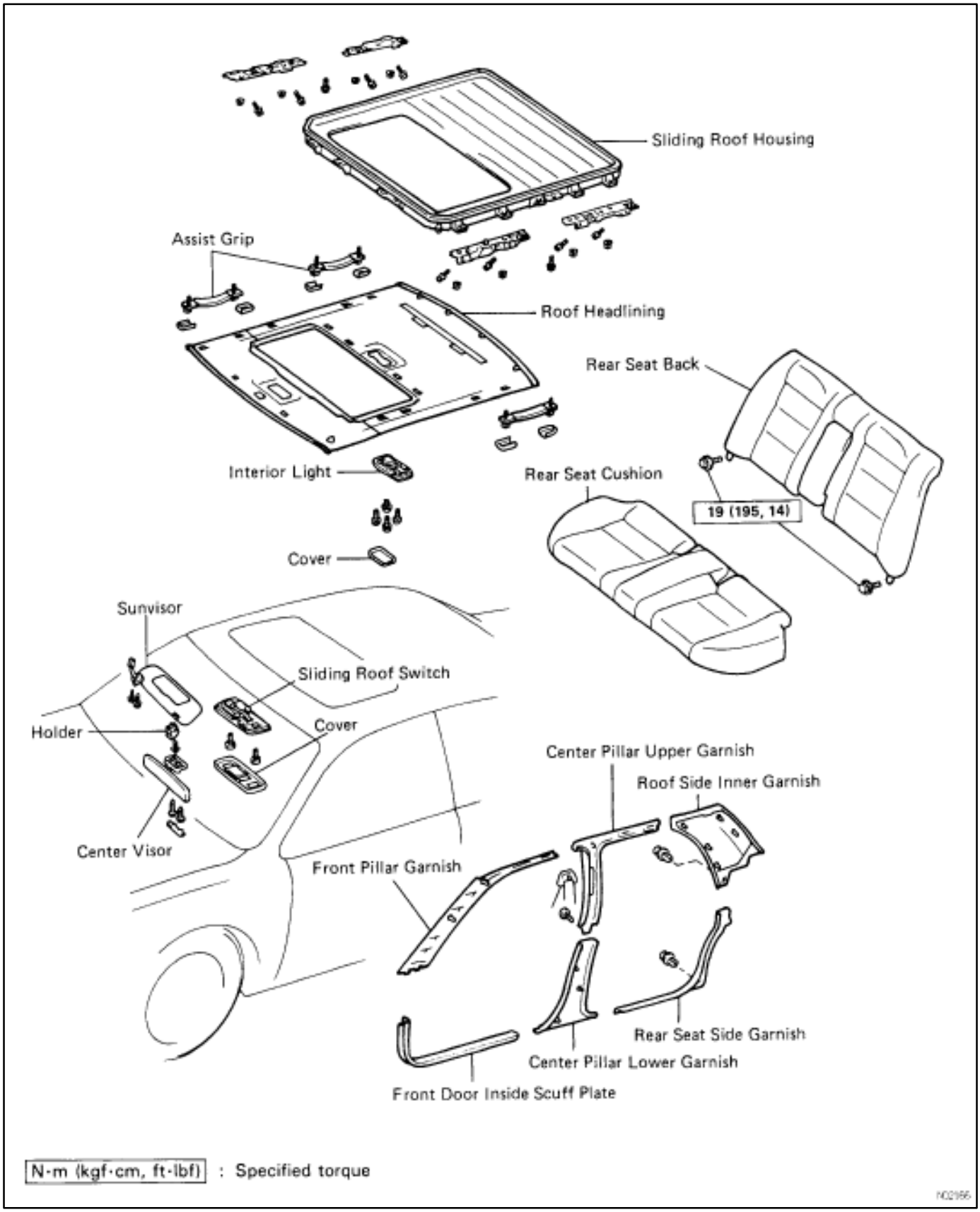
16. INSTALL FOLLOWING PARTS:
(a) Rear side of roof headlining
(b) Assist grips
(c) Package tray trim
(d) Roof side inner garnish
(e) Rear seat back and seat cushion
(See page BO–129)
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

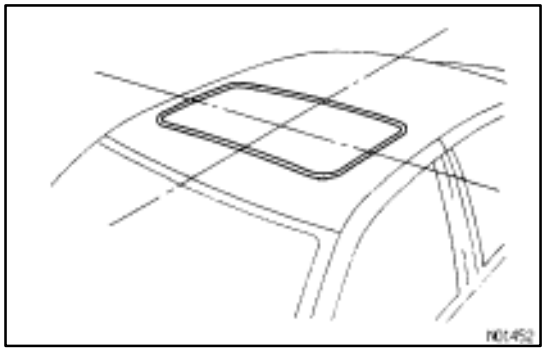
SLIDING ROOF
COMPONENTS

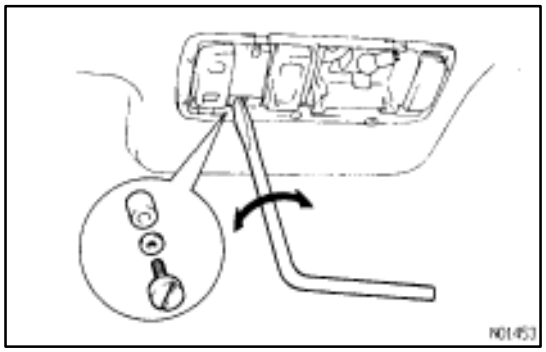
BO066–01



COMPONENTS (Cont'd)







ON–VEHICLE INSPECTION

BO032–01

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.

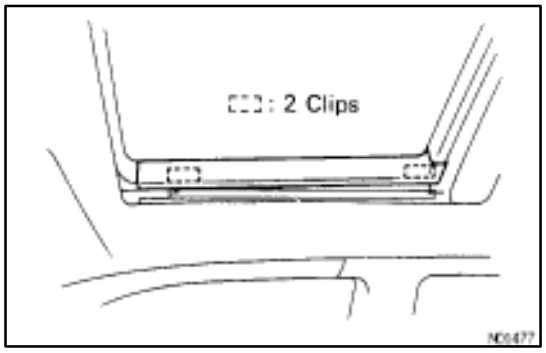
(c) With the sliding roof fully closed, check for water leakage.

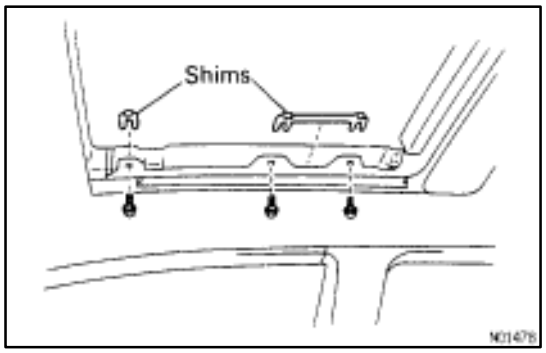
(d) Check for a difference in level between the sliding roof weatherstrip and roof panel.
Front end:
1±1 mm (0.039±0.039 in.)
Rear end:
0±1 mm (0±0.039 in.)
If the sliding roof does not operate:

(e) Remove the control switch cover.

(f) Remove the large screw inside.
NOTICE: Be careful not to lose the spring washer or shim.

(g) Manually operate the moon roof by inserting a special crank–shaped screwdriver into the hole and turning the drive shaft.





SLIDING ROOF ADJUSTMENT

BO033–01

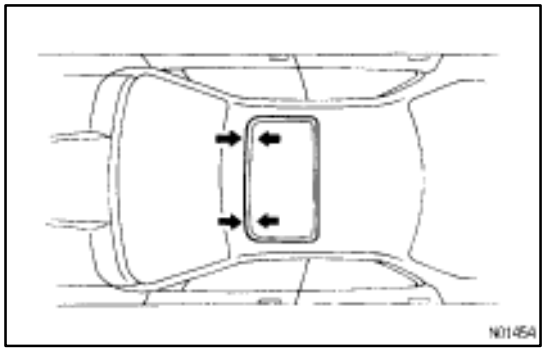
1. REMOVE SLIDING ROOF GARNISHES

Before making adjustments, remove the left and right sliding roof garnishes.

HINT: After adjustment, reinstall the sliding roof garnishes.

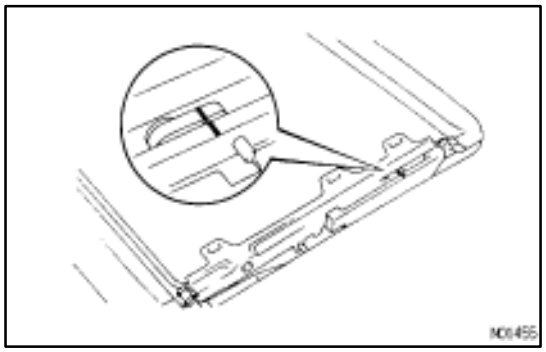
2. TO ADJUST LEVEL DIFFERENCE

Adjust by increasing or decreasing the number of shims between the bracket and sliding roof.



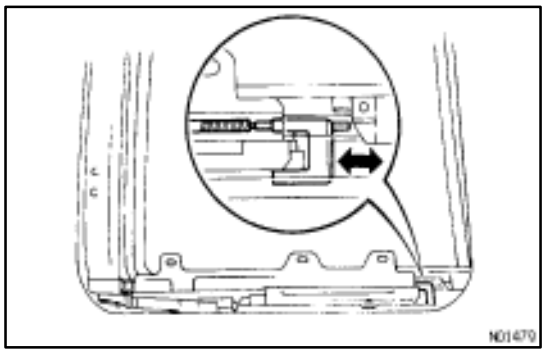
3. TO ADJUST FORWARD OR REARWARD

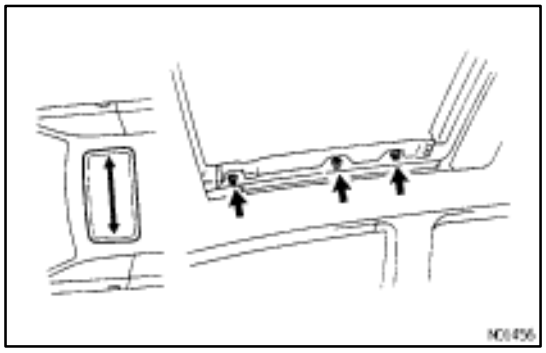
(a) Adjust by loosening the sliding roof installation nuts, and move the sliding roof bracket forwards and backwards.



(b) When the front or rear alignment is not correct, remove the glass and adjust the drive rail.

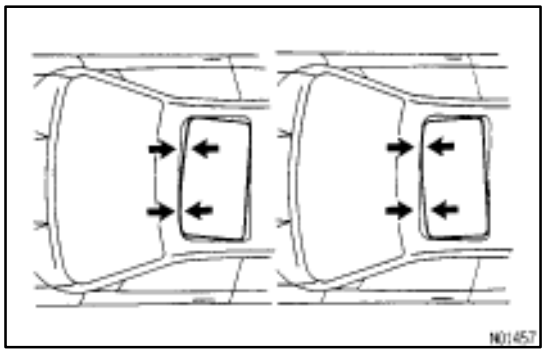
(c) Using a screwdriver, slide the link forwards or backwards to align the two marks as shown.



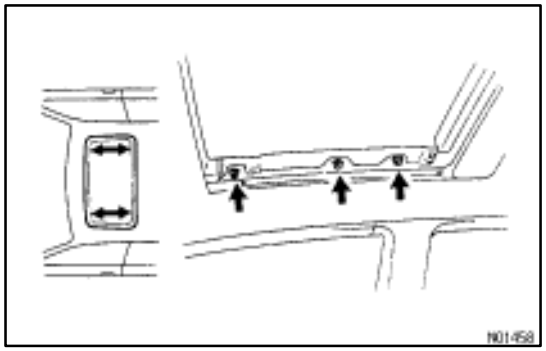


4. TO ADJUST RIGHT OR LEFT

Adjust by loosening the sliding roof rear shoe installation nuts, and move the sliding roof to the right and left.



5. TO ADJUST CLEARANCE
(Difference in left and right clearance)



Adjust by loosening the sliding roof installation nuts and readjust the sliding roof to the proper position.

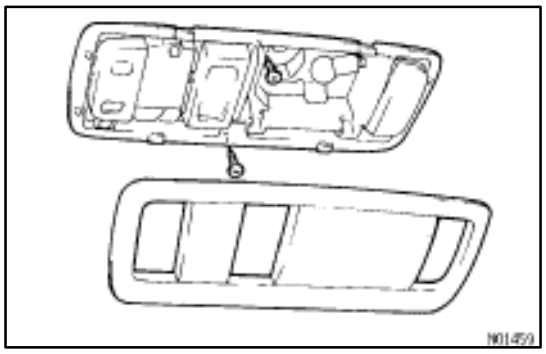
SLIDING ROOF REMOVAL

BO067–01

(See page BO–93)

1. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL

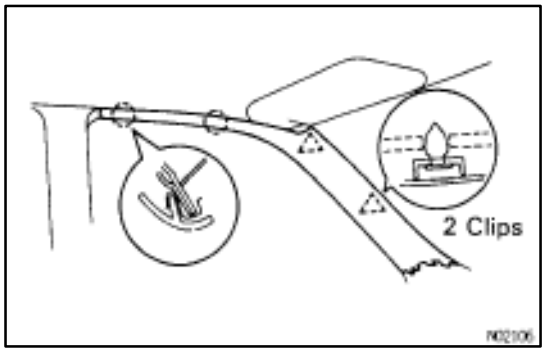
CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.



2. REMOVE SLIDING ROOF SWITCH

(a) Using a screwdriver, remove the cover.
HINT: Tape the screwdriver tip before use.

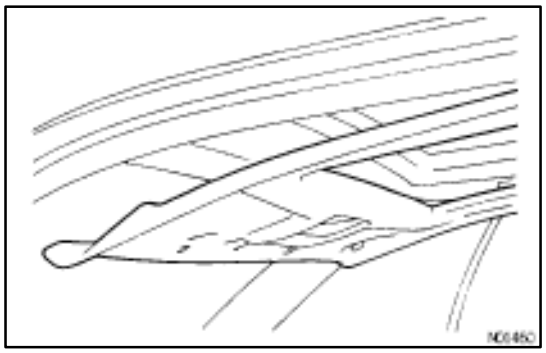
(b) Remove two screws and the switch, then disconnect the connector.



3. REMOVE FOLLOWING PARTS:

(See step 1 to 3 and 14 on pages BO–141 and 143)

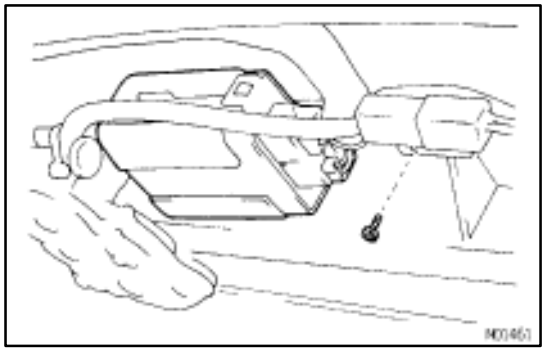
(a) Front pillar garnish
(b) Sunvisors and holders
(c) Center visor
(d) Front assist grip



4. REMOVE FRONT SIDE OF ROOF HEADLINING

(a) Disconnect the front side of headlining from the front side of housing.

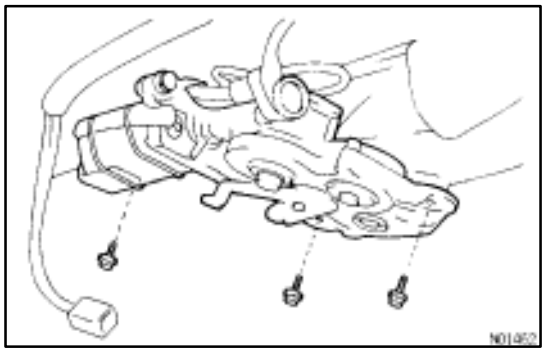
(b) Pull down the front side of roof headlining by hand.



5. REMOVE SLIDING ROOF CONTROL RELAY

(a) Disconnect the connector.

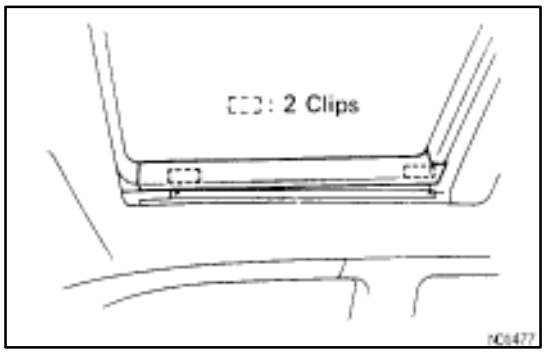
(b) Remove the bolt, the connector and the relay.



6. REMOVE DRIVE GEAR

(a) Disconnect the connectors.

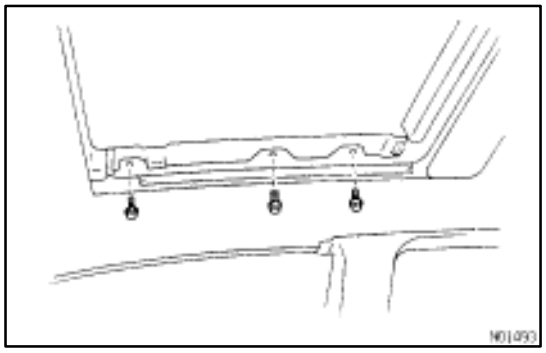
(b) Remove three bolts and the drive gear.



7. REMOVE SIDE GARNISH

Using a screwdriver, remove the garnishes.

HINT: Tape the screwdriver tip before use.

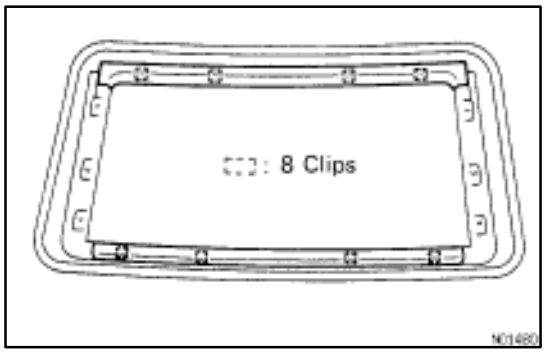


8. REMOVE SLIDING ROOF GLASS

(a) Remove six nuts and shims.

HINT: Make sure of the number of shims.

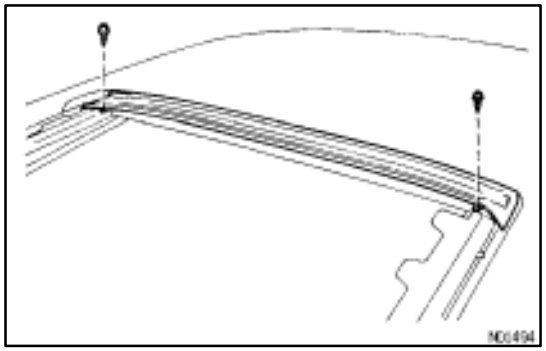
(b) Pull the glass upwards to remove it.



9. REMOVE FRONT AND REAR GARNISH

Using a screwdriver, remove the garnishes.

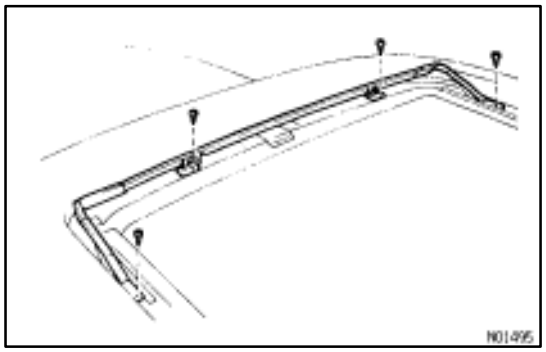
HINT: Tape the screwdriver tip before use.



10. REMOVE ROOF DRIP CHANNEL

(a) Remove two screws.

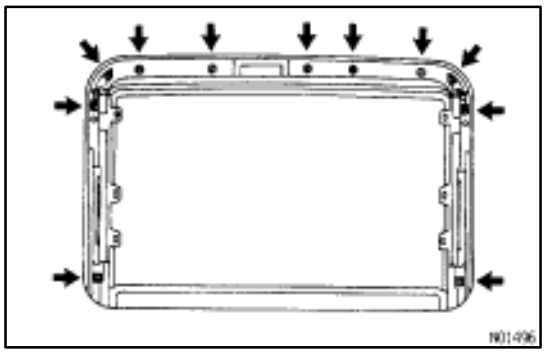
(b) Pull the channel forwards to remove it.



11. REMOVE WIND DEFLECTOR PANEL

(a) Slide the drive cable backwards.

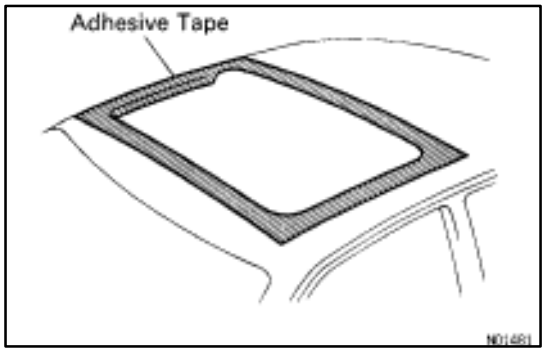
(b) Remove four screws and the panel.



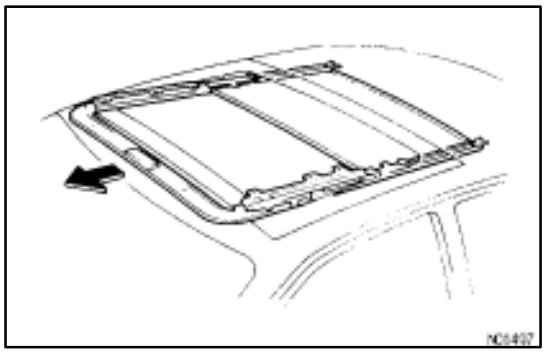
12. REMOVE CABLE GUIDE CASING ASSEMBLY

(a) Slide the drive cable forwards.

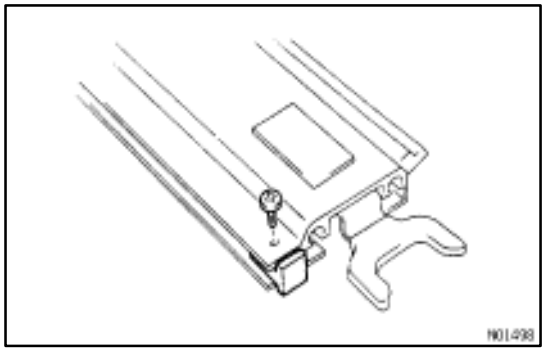
(b) Remove eleven screws.



(c) Apply adhesive tape to protect the body.



(d) Pull the cable guide casing assembly forwards to remove it.



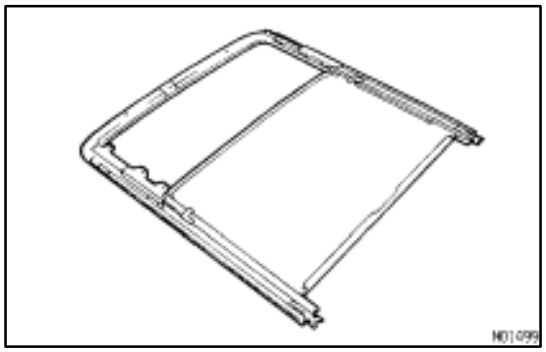
SLIDING ROOF DISASSEMBLY

BO068–01

(See page BO–94)

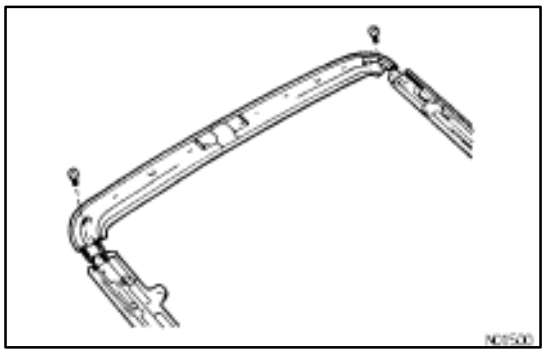
1. REMOVE SLIDING ROOF PANEL STOPPER

Remove the screw and the stopper.



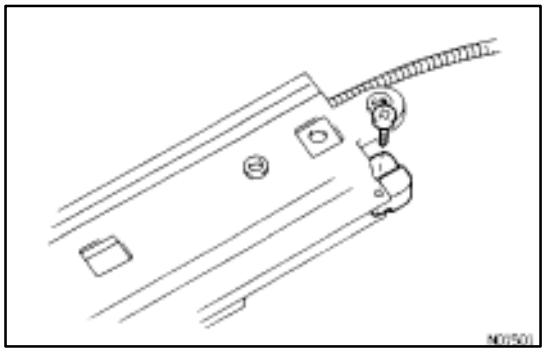
2. REMOVE SUNSHADE TRIM

Pull the trim rearwards to remove it.



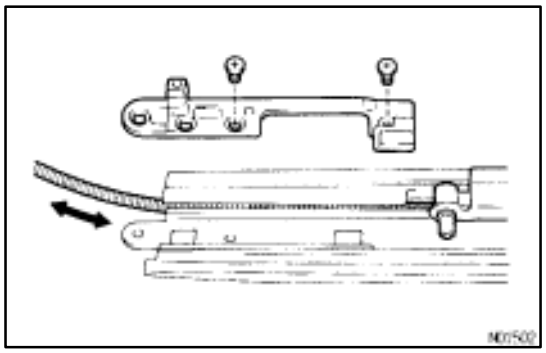
3. REMOVE CABLE GUIDE CASING

Remove two screws and the casing.



4. REMOVE SLIDING ROOF FRONT STOPPER

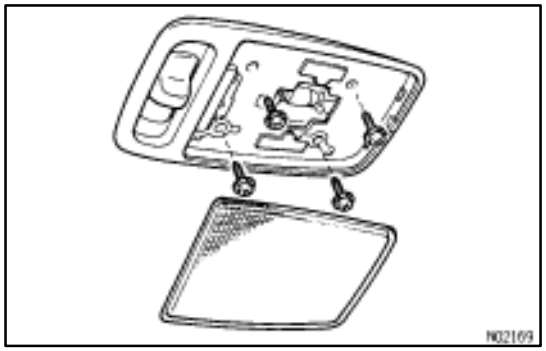
Remove the screw and the stopper.



5. REMOVE DRIVE CABLE

(a) Remove two screws and the cable guide block.

(b) Pull the drive cable from the guide rail.



SLIDING ROOF HOUSING REMOVAL

BO069–01

(See page BO–94)

1. REMOVE INTERIOR LIGHT

(a) Using a screwdriver, remove the cover.
HINT: Tape the screwdriver tip before use.

(b) Remove four screws and the light, then disconnect the connector.

2. REMOVE REAR SEAT CUSHION AND REAR SEAT BACK
(See page BO–129)

3. REMOVE FOLLOWING PARTS:
(See steps 5, 7, 8, 9, 11 and 14 on pages BO–141 to 142)

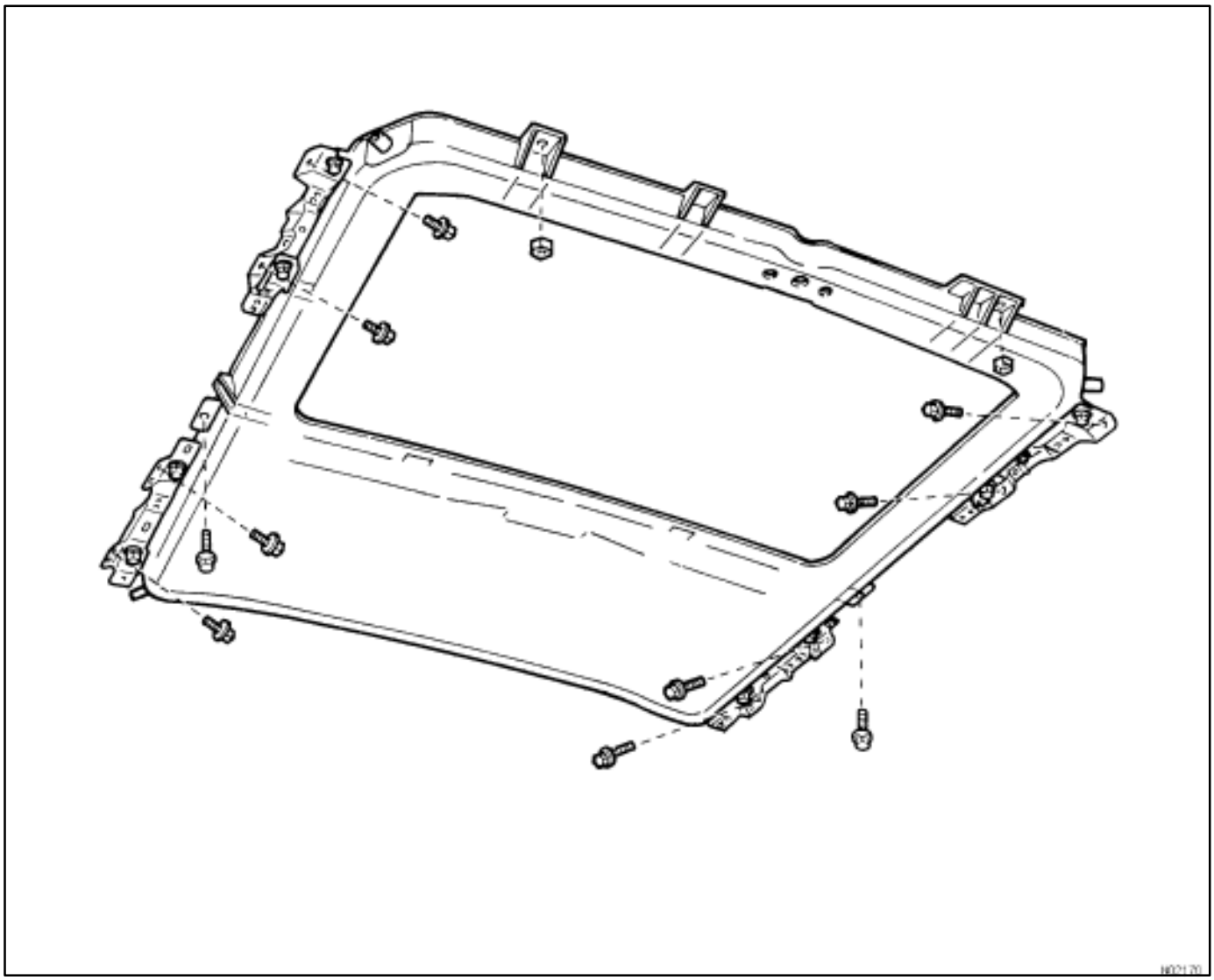
(a) Front inside scuff plate
(b) Roof side inner garnish
(c) Rear seat side garnish
(d) Center pillar lower garnish
(e) Center pillar upper garnish
(f) Rear assist grips

4. REMOVE ROOF HEADLINING
(See step 2 on page BO–145)

5. REMOVE SLIDING ROOF HOUSING

(a) Disconnect four drain hoses from the housing.

(b) Remove two nuts, ten bolts and the housing.



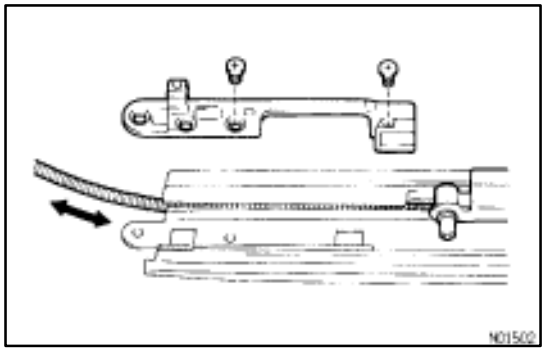
SLIDING ROOF HOUSING INSTALLATION

BO06A–01

(See page BO–94)

1. INSTALL SLIDING ROOF HOUSING PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

2. INSTALL REAR SEAT BACK AND REAR SEAT CUSHION
(See page BO–129)
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



SLIDING ROOF ASSEMBLY

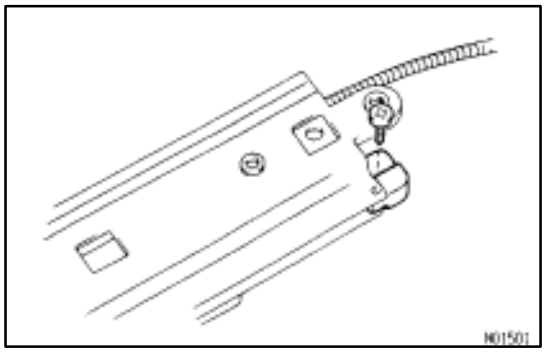
BO06B–01

(See page BO–93)

1. INSTALL DRIVE CABLE

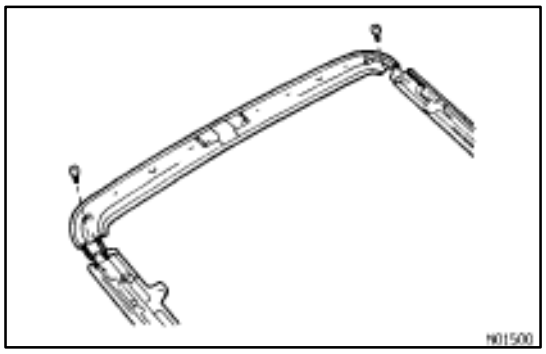
(a) Insert the drive cable to the drive rail.

(b) Install the cable guide block with two screws.



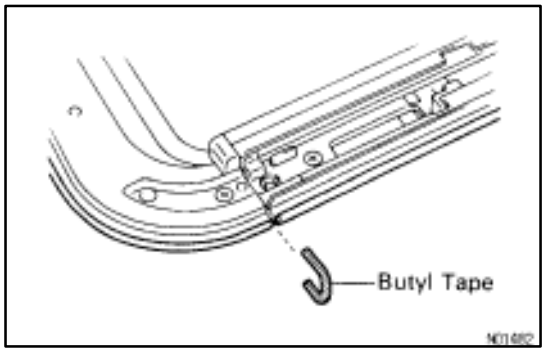
2. INSTALL SLIDING ROOF FRONT STOPPER

Install the stopper with the screw.



3. INSTALL CABLE GUIDE CASING

(a) Install the casing with two screws.

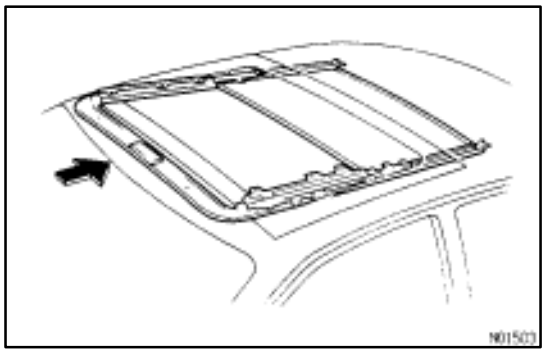


(b) Use butyl tape to cover the cut position of the weatherstrip at the connection between the guide casing and the guide rail.

4. INSTALL SUNSHADE TRIM

5. INSTALL SLIDING ROOF PANEL STOPPER

Install the stopper with the screw.



SLIDING ROOF INSTALLATION

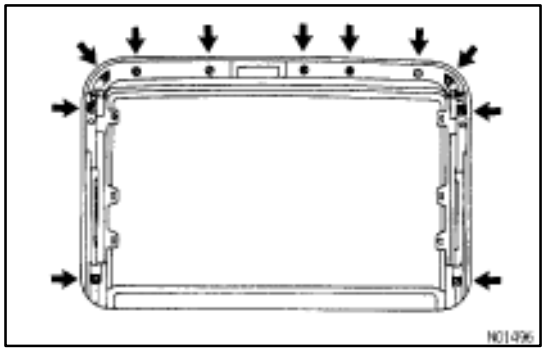
BO06C–01

(See page BO–93)

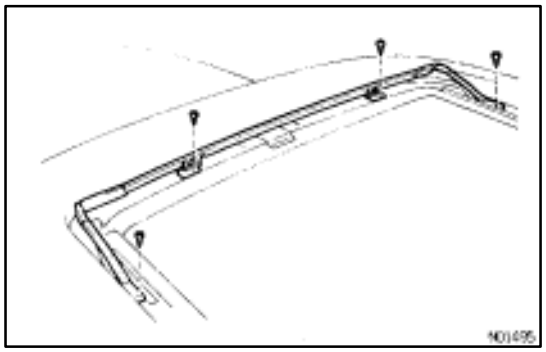
1. INSTALL CABLE GUIDE CASING ASSEMBLY

(a) Apply adhesive tape to protect the body.

(b) Push the cable guide casing assembly rearwards to remove it.

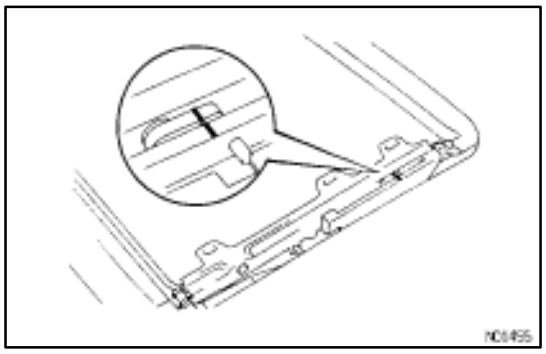


(c) Install eleven screws.



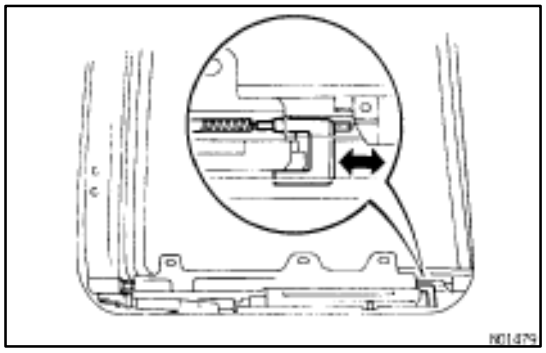
2. INSTALL WIND DEFLECTOR PANEL

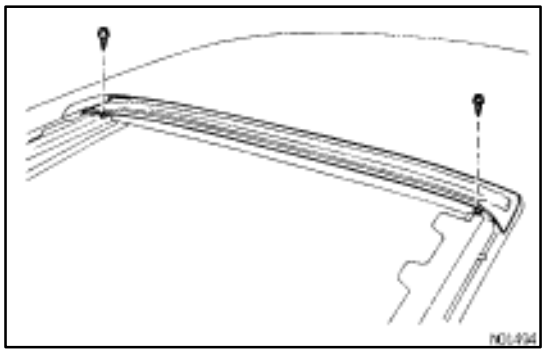
Install the panel with four screws.



3. ADJUST DRIVE RAIL

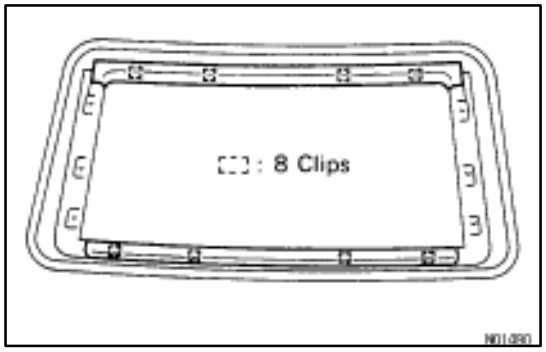
HINT: Adjust the drive rail to a closed and tilted down position. Using a screwdriver, slide the link forward or rearwards to align the two works as shown.





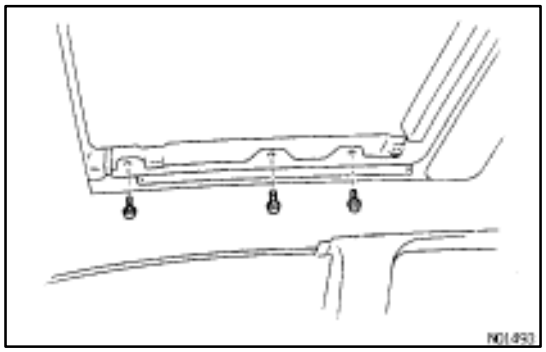
4. INSTALL ROOF DRIP CHANNEL

(a) Push the channel rearwards to install it.
(b) Install two screws.



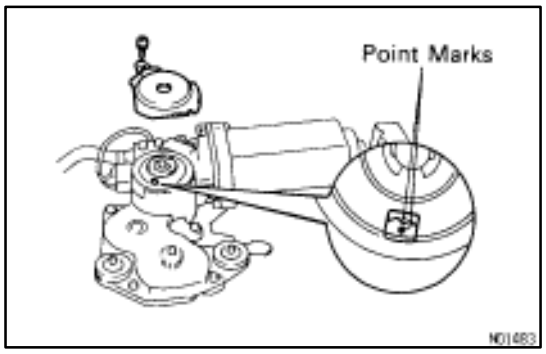
5. INSTALL FRONT AND REAR GARNISH

Tap the garnishes to install it.



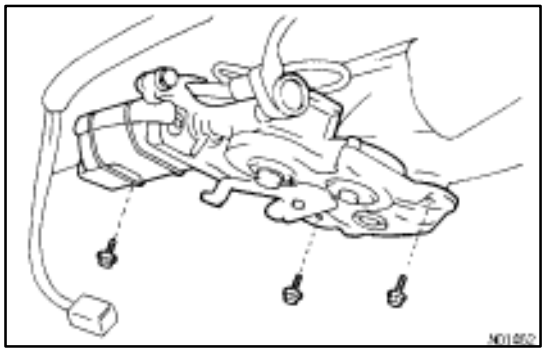
6. INSTALL SLIDING ROOF GLASS

Install the glass and the shims with six bolts.

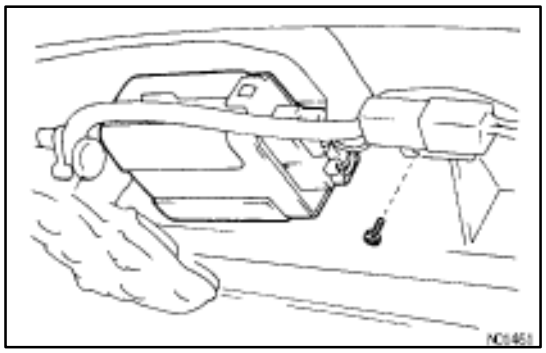


7. INSTALL DRIVE GEAR

(a) Remove the screw and cam plate cover.
(b) Remove the large screw, washers and shims.
(c) Turn the drive shaft by screwdriver to align the housing and gear point mark as shown.
(d) Install the cam plate cover with the screw.



(e) Apply adhesive to two gear side bolts.
Part No.08833–00070, THREE BOND 1324 or equivalent
(f) Install the drive gear with three bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(g) Connect the connectors.



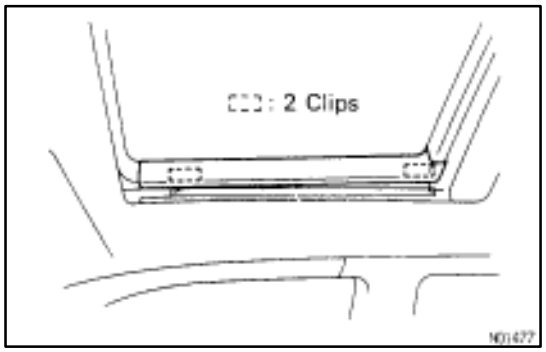
8. INSTALL SLIDING ROOF CONTROL RELAY

(a) Install the relay with the bolt.
(b) Connect the connector.

9. INSTALL FOLLOWING PARTS:

(a) Front side of headlining
(b) Front assist
(c) Center visor
(d) Sunvisors and holders
(e) Front pillar garnish
(f) Sliding roof switch

10. INSPECT AND ADJUST SLIDING ROOF
(See pages BO–95 to 96)

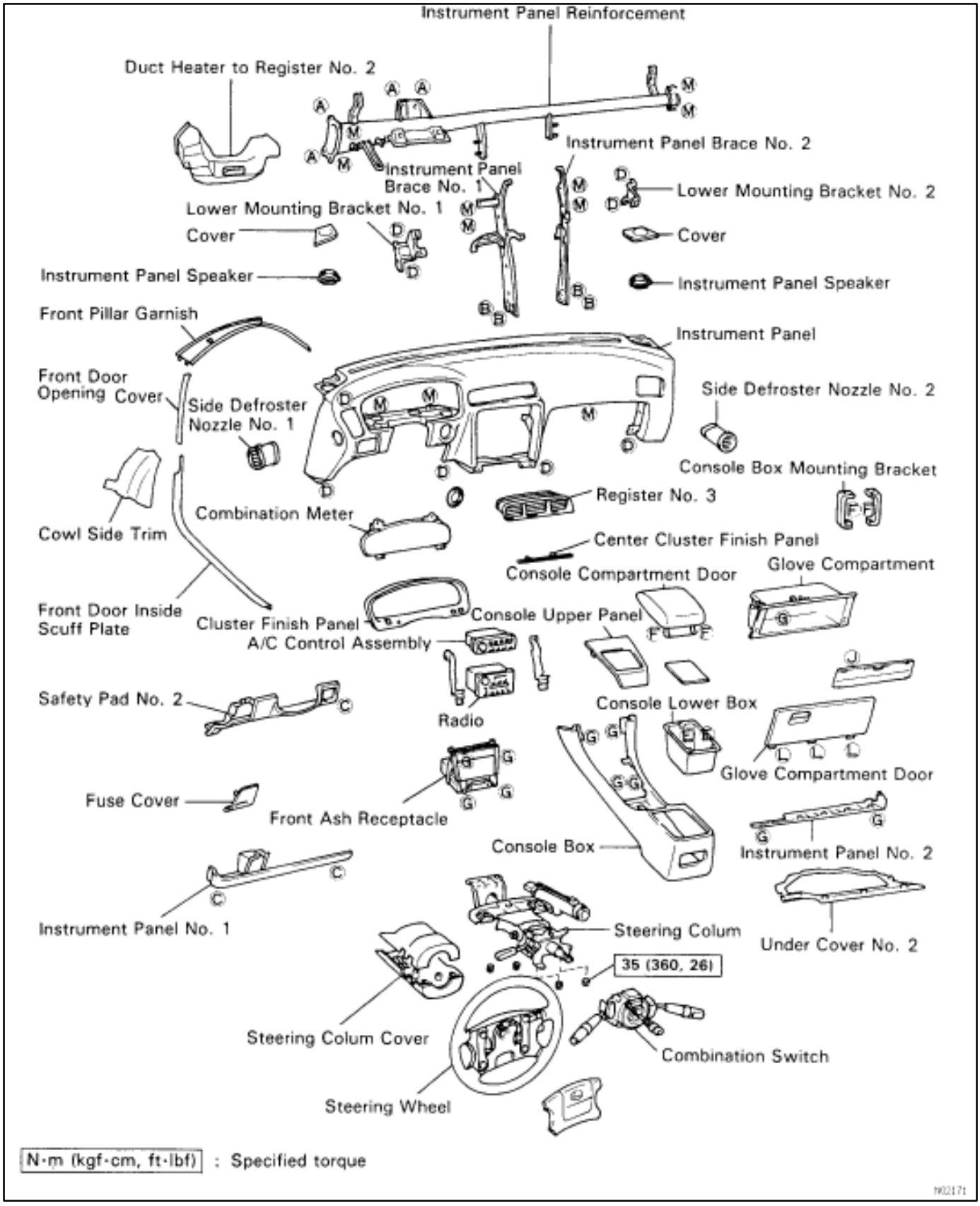


11. INSTALL SIDE GARNISH
Tap the garnish to install it.

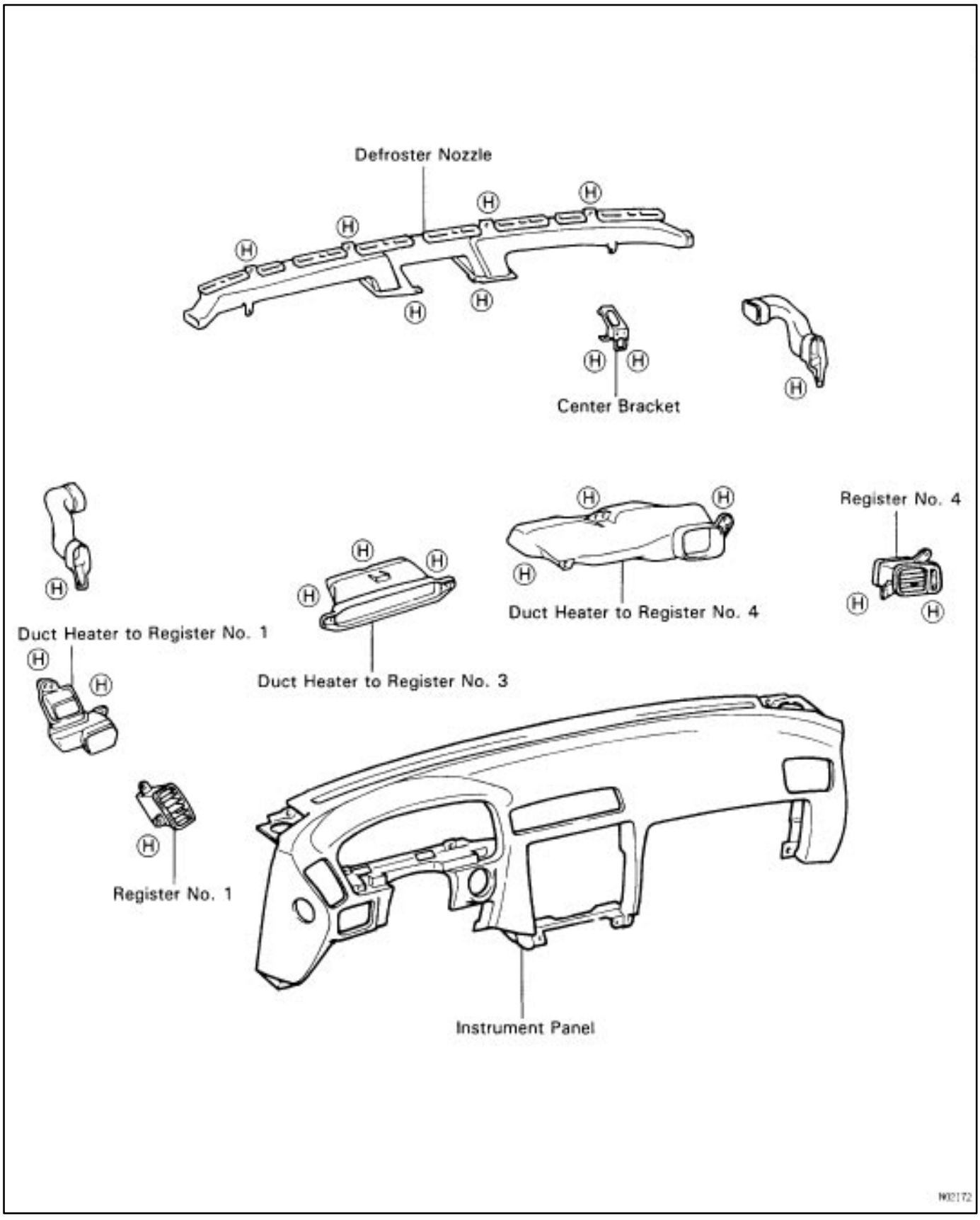
12. CONNECT BATTERY CABLE TO NEGATIVE TERMINAL

INSTRUMENT PANEL
COMPONENTS

BO06D–01



COMPONENTS (Cont'd)



HINT: Screw sizes in the illustration on the previous page are indicated using the code below for removal and installation of instrument panel.

Code	Shape	Size	Code	Shape	Size	Code	Shape	Size
A		ϕ = 8 (0.31) L = 20 (0.79)	B		ϕ = 8 (0.31) L = 15 (0.59)	C		ϕ = 6 (0.24) L = 20 (0.79)
D		ϕ = 6 (0.24) L = 20 (0.79)	E		ϕ = 6 (0.24) L = 16 (0.63)	F		ϕ = 6 (0.24) L = 16 (0.63)
G		ϕ = 5.22 (0.2055) L = 16 (0.63)	H		ϕ = 5 (0.20) L = 14 (0.55)	I		ϕ = 5 (0.20) L = 14 (0.55)
J		ϕ = 4 (0.16) L = 12 (0.47)	K		ϕ = 4 (0.16) L = 10 (0.39)	L		–
M		–						

V00418

INSTRUMENT PANEL REMOVAL

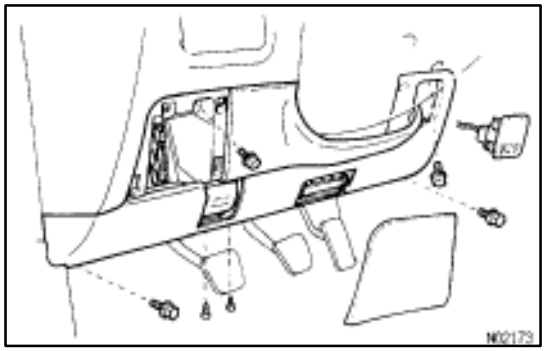
BO06E–01

(See page BO–107)

1. **DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL**

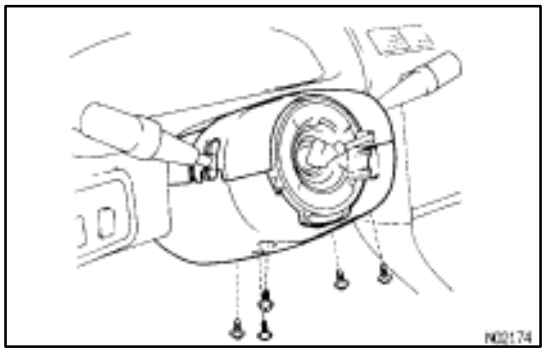
   CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. **REMOVE FOLLOWING PARTS:**
   (See steps 1 to 5 on page BO–141)
   (a) Front pillar garnish
   (b) Front inside scuff plate
   (c) Front door opening cover
3. **REMOVE COWL SIDE TRIM**
   (See step 2 on page BO–147)
4. **REMOVE STEERING WHEEL**
   (See page SR–5)



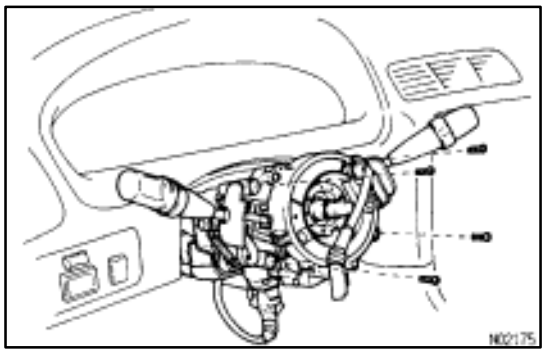
5. REMOVE SAFETY PAD NO.2

(a) Remove two screws and the hood lock release lever.
(b) Remove the fuse cover.
(c) Remove room temperature sensor, then disconnect the connector.
(d) Remove four bolts and the safety pad No.2.



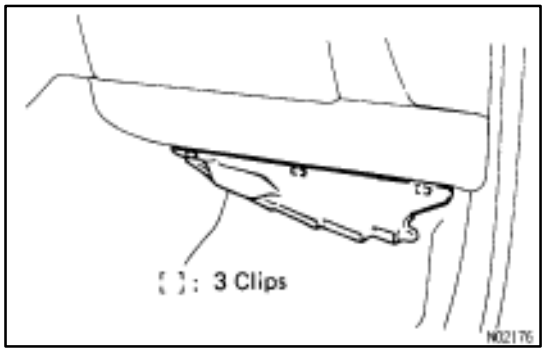
6. REMOVE STEERING COLUMN COVER

Remove five screws and the covers.



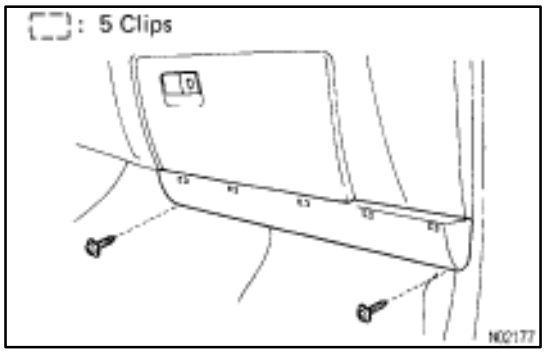
7. REMOVE COMBINATION SWITCH

(a) Disconnect the connectors.
(b) Remove four screws and the combination switch.



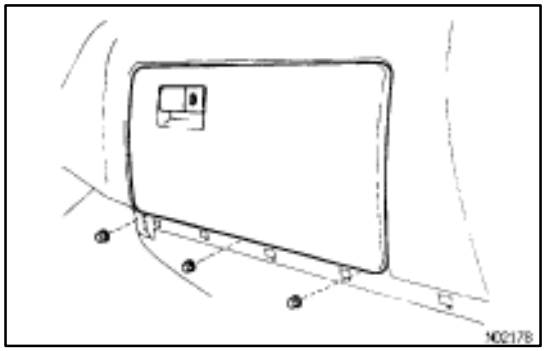
8. REMOVE UNDER COVER NO.2

Remove the under cover No.2 by pulling.



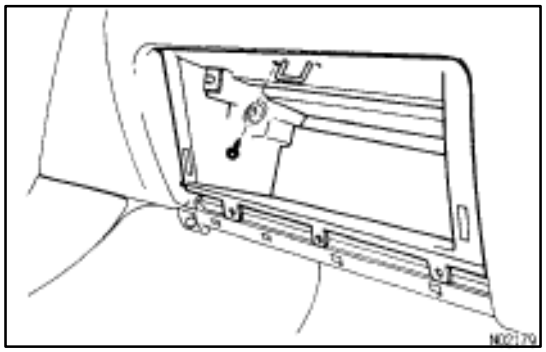
9. REMOVE INSTRUMENT PANEL NO.2

(a) Remove two screws.
(b) Remove the lower panel by pulling.



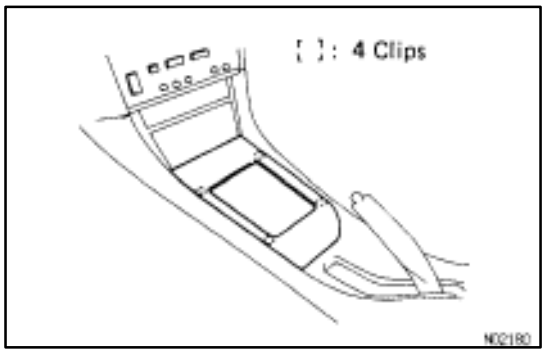
10. REMOVE GLOVE COMPARTMENT DOOR

(a) Disconnect the damper ring from the door check arm.
(b) Remove three nuts.
(c) Remove the door.



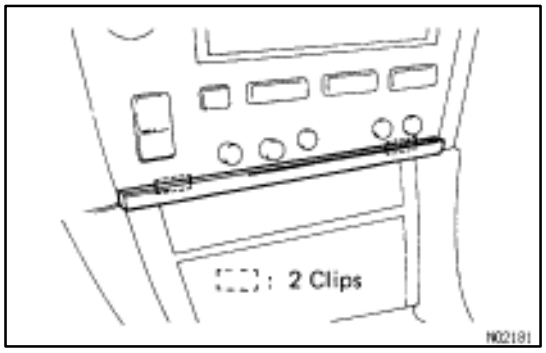
11. REMOVE GLOVE COMPARTMENT

(a) Remove the screw.
(b) Remove the lower panel by pulling.



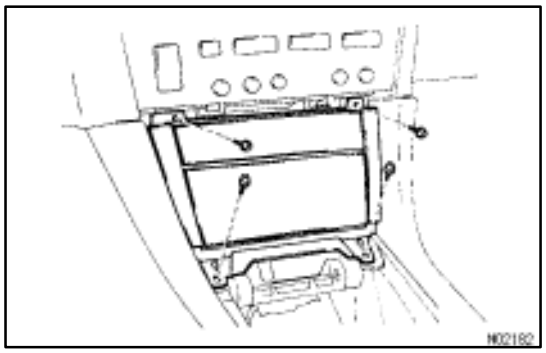
12. REMOVE CONSOLE UPPER PANEL

Using a screwdriver, remove the panel.
HINT: Tape the screwdriver tip before use.



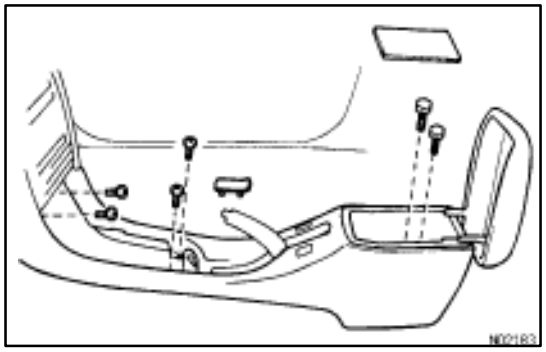
13. REMOVE CENTER CLUSTER FINISH PANEL

Using a screwdriver, remove the panel.
HINT: Tape the screwdriver tip before use.



14. REMOVE FRONT ASH RECEPTACLE

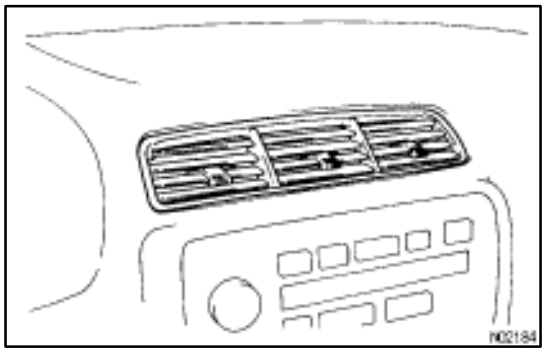
(a) Apply adhesive tape to protect the radio.
(b) Remove four screws and the ash receptacle.



15. REMOVE CONSOLE BOX

(a) Remove the cover.

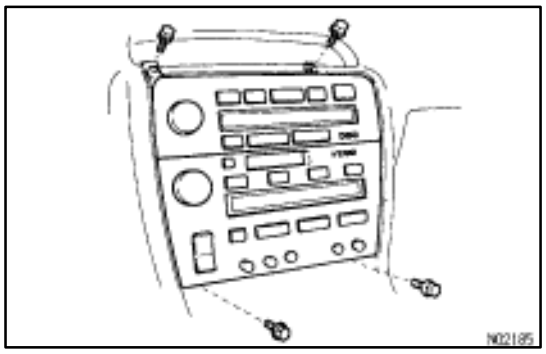
(b) Remove two bolts, four screws and the box.



16. REMOVE REGISTER NO.3

Using a screwdriver, remove the register No.3.

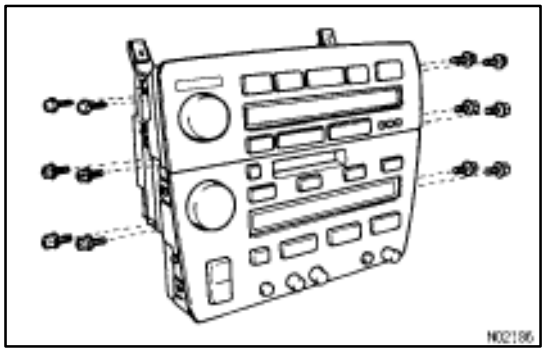
HINT: Tape the screwdriver tip before use.



17. REMOVE RADIO WITH A/C CONTROL ASSEMBLY

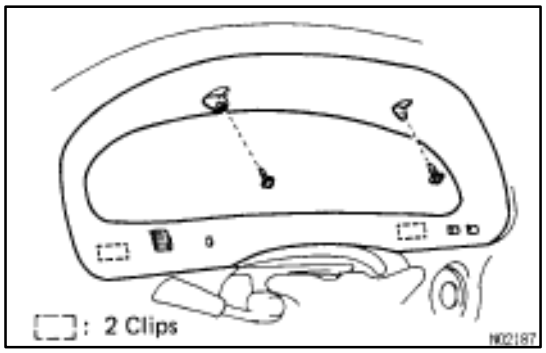
(a) Remove four bolts.

(b) Remove the radio with A/C control assembly then disconnect the connectors.



(c) Remove four screws, eight bolts and the brackets.

(d) Remove the A/C control from the radio.



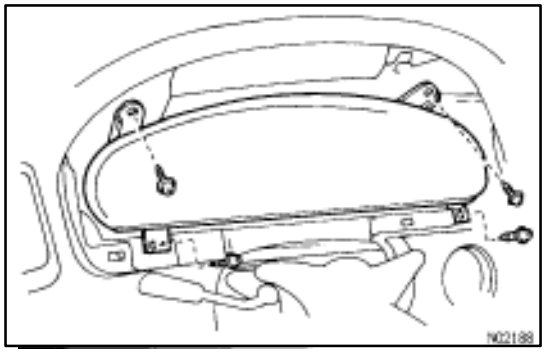
18. REMOVE CLUSTER FINISH PANEL

(a) Remove two screws.

(b) Using a screwdriver, remove the panel.

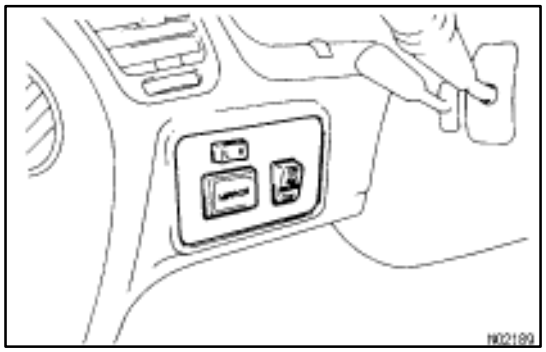
HINT: Tape the screwdriver tip before use.

(c) Disconnect the connectors.



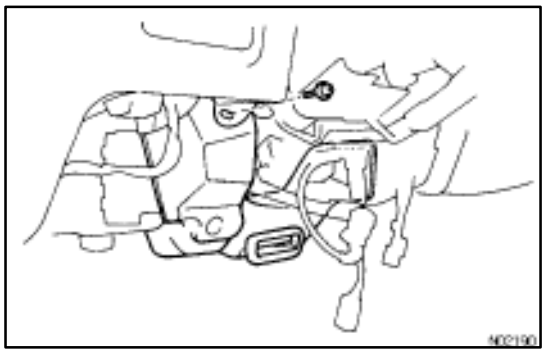
19. REMOVE COMBINATION METER

Remove four screws and the meter, then disconnect the connectors.



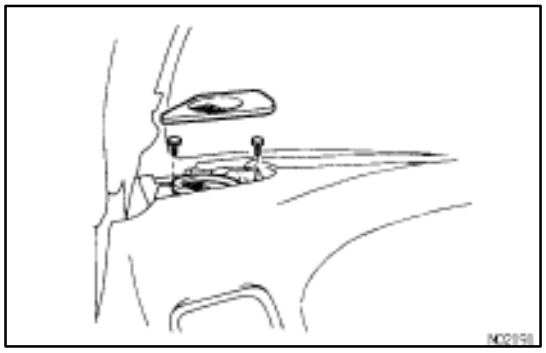
20. REMOVE REMOTE CONTROL MIRROR SWITCH ASSEMBLY

(a) Using a screwdriver, remove the switch.
HINT: Tape the screwdriver tip before use.
(b) Disconnect the connectors.



21. REMOVE DUCT HEATER TO REGISTER NO.2

Remove the screw and the register No.2.

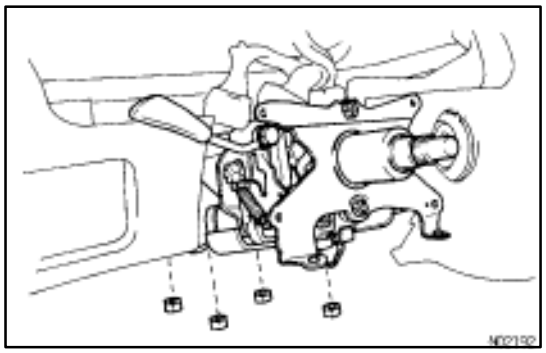


22. REMOVE INSTRUMENT PANEL SPEAKER

(a) Using a screwdriver, remove the speaker cover.
HINT: Tape the screwdriver tip before use.
(b) Remove two screws and the speaker, then disconnect the connector.

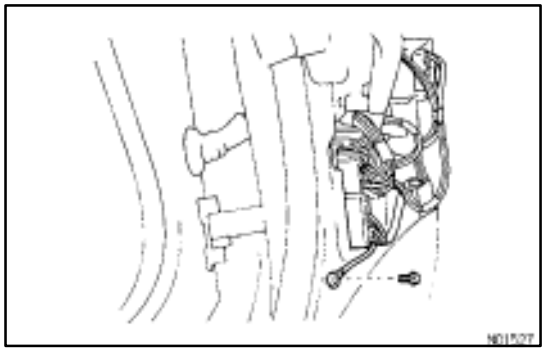
23. REMOVE SIDE DEFROSTER NOZZLE

Using a screwdriver, remove the nozzle No.1 and No.2.
HINT: Tape the screwdriver tip before use.



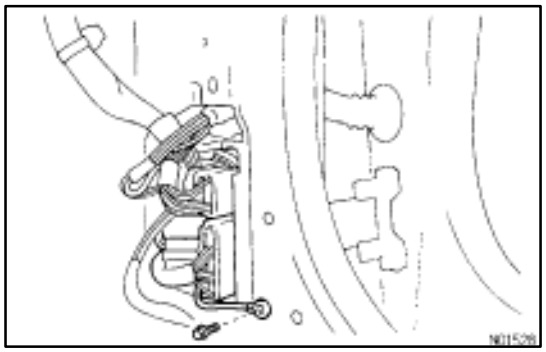
24. REMOVE STEERING COLUMN

(a) Disconnect the spring from the brake pedal.
(b) Remove four nuts and the steering column.



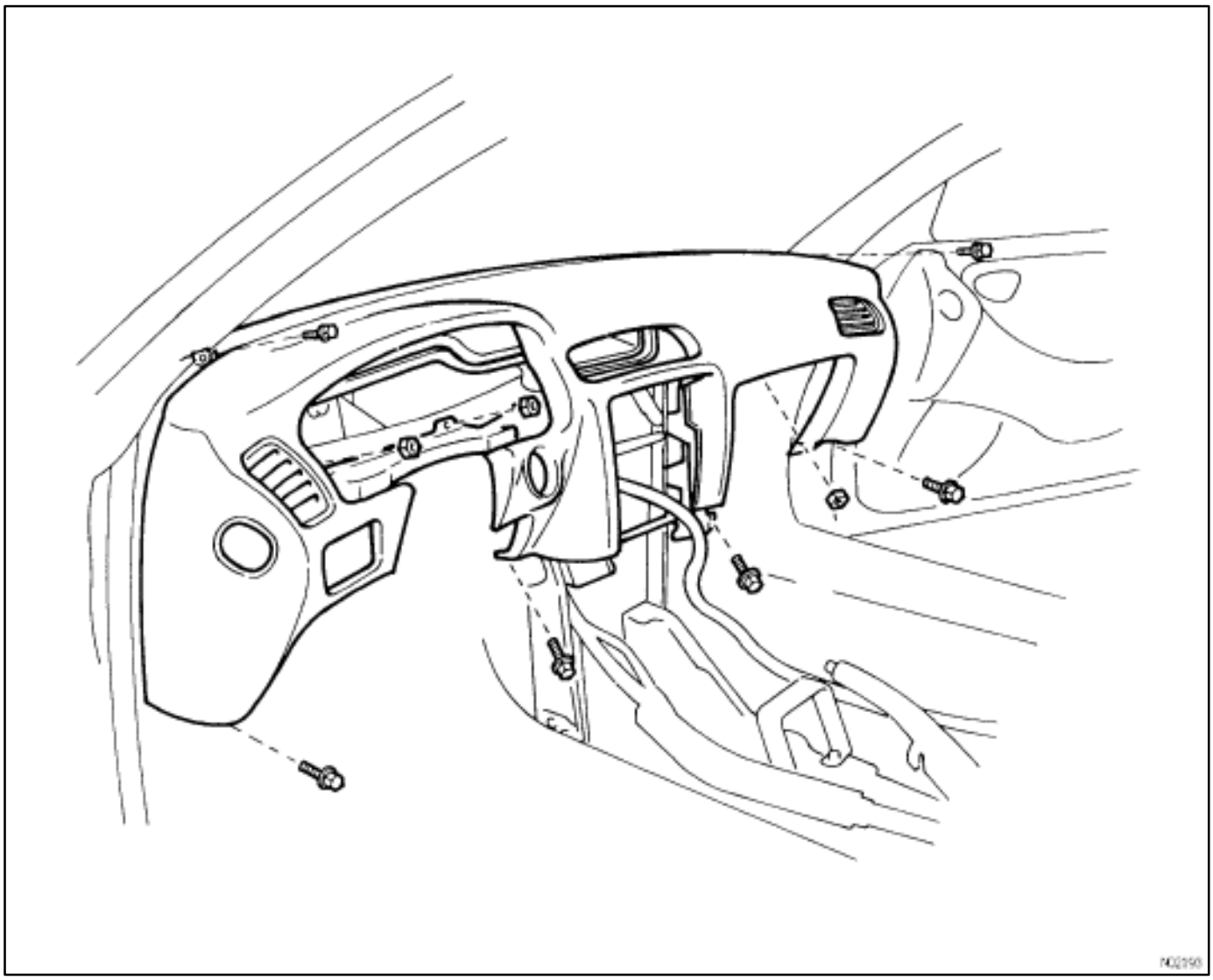
25. REMOVE INSTRUMENT PANEL

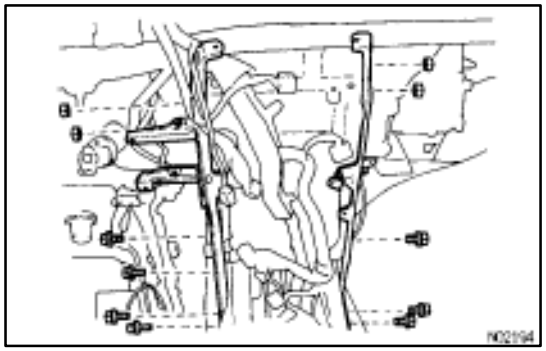
(a) Disconnect the connectors.
(b) Remove the bolt.
(c) Remove the connector holder.



(d) Disconnect the connectors.
(e) Remove the bolt.
(f) Remove the connector holder.

(g) Remove six bolts, three nuts and the instrument panel.





26. REMOVE INSTRUMENT PANEL BRACE NO.1

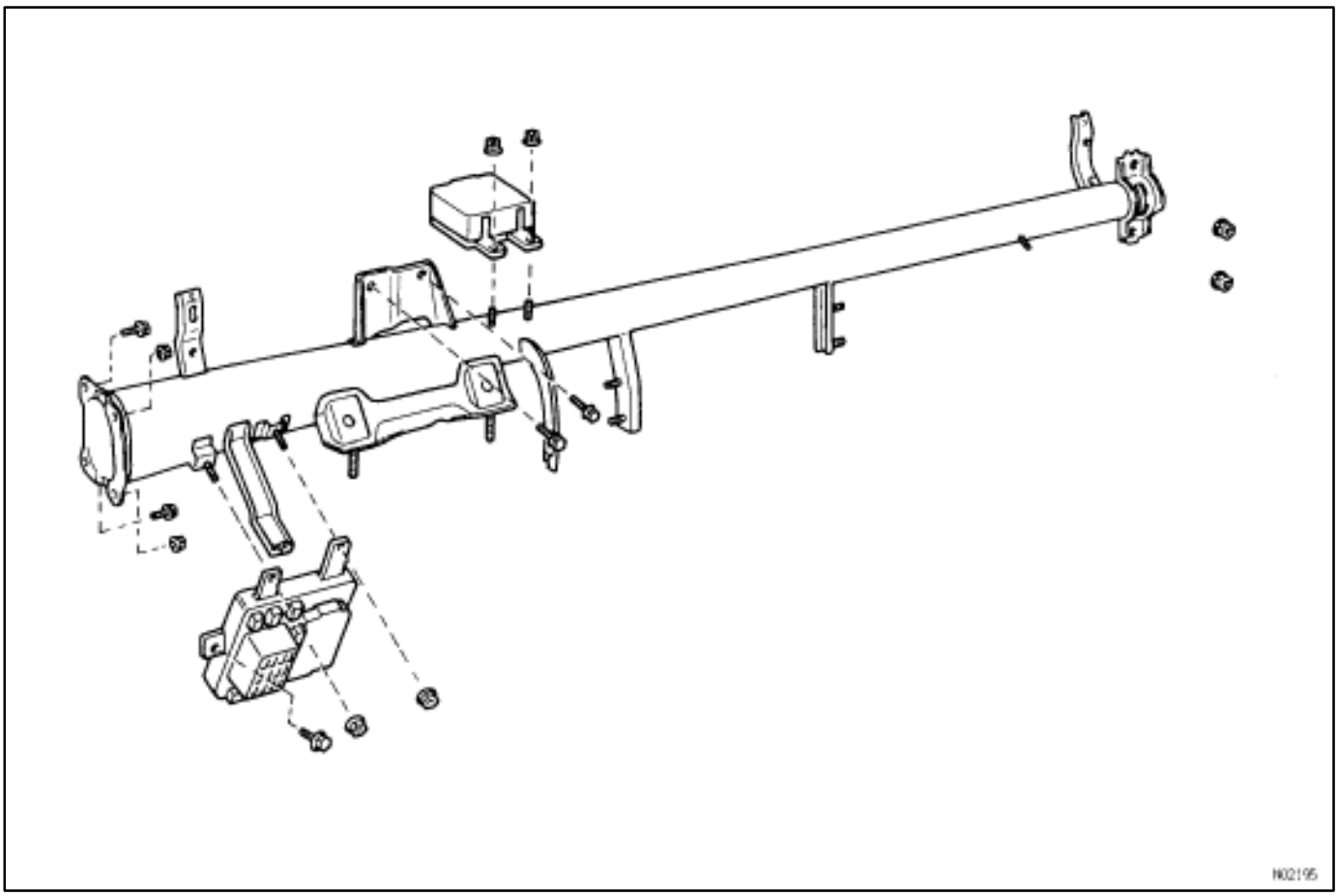
Remove three bolts, two nuts and the brace No.1.

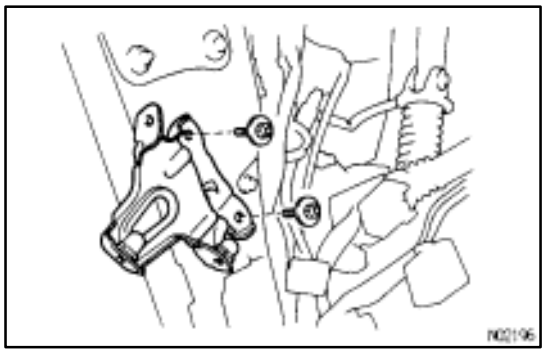
27. REMOVE INSTRUMENT PANEL BRACE NO.2

Remove three bolts, two nuts and the brace No.2.

28. REMOVE INSTRUMENT PANEL REINFORCEMENT

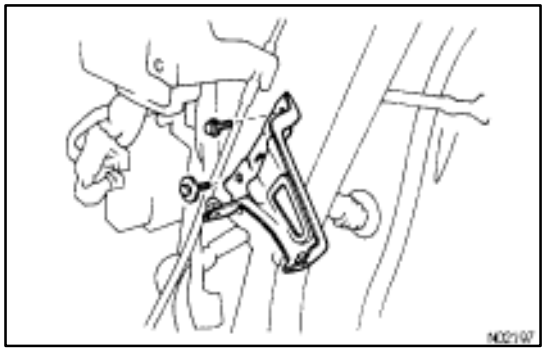
(a) Remove the bolt, two nuts and the J/B No.1.
(b) Remove two bolts and the J/B No.3.
(c) Remove two screws and the J/B No.6.
(d) Remove four bolts, four nuts and the reinforcement.





29. REMOVE LOWER MOUNTING BRACKET NO.1

Remove two bolts and the bracket No.1.



30. REMOVE LOWER MOUNTING BRACKET NO.2
Remove two bolts and the bracket No.2.

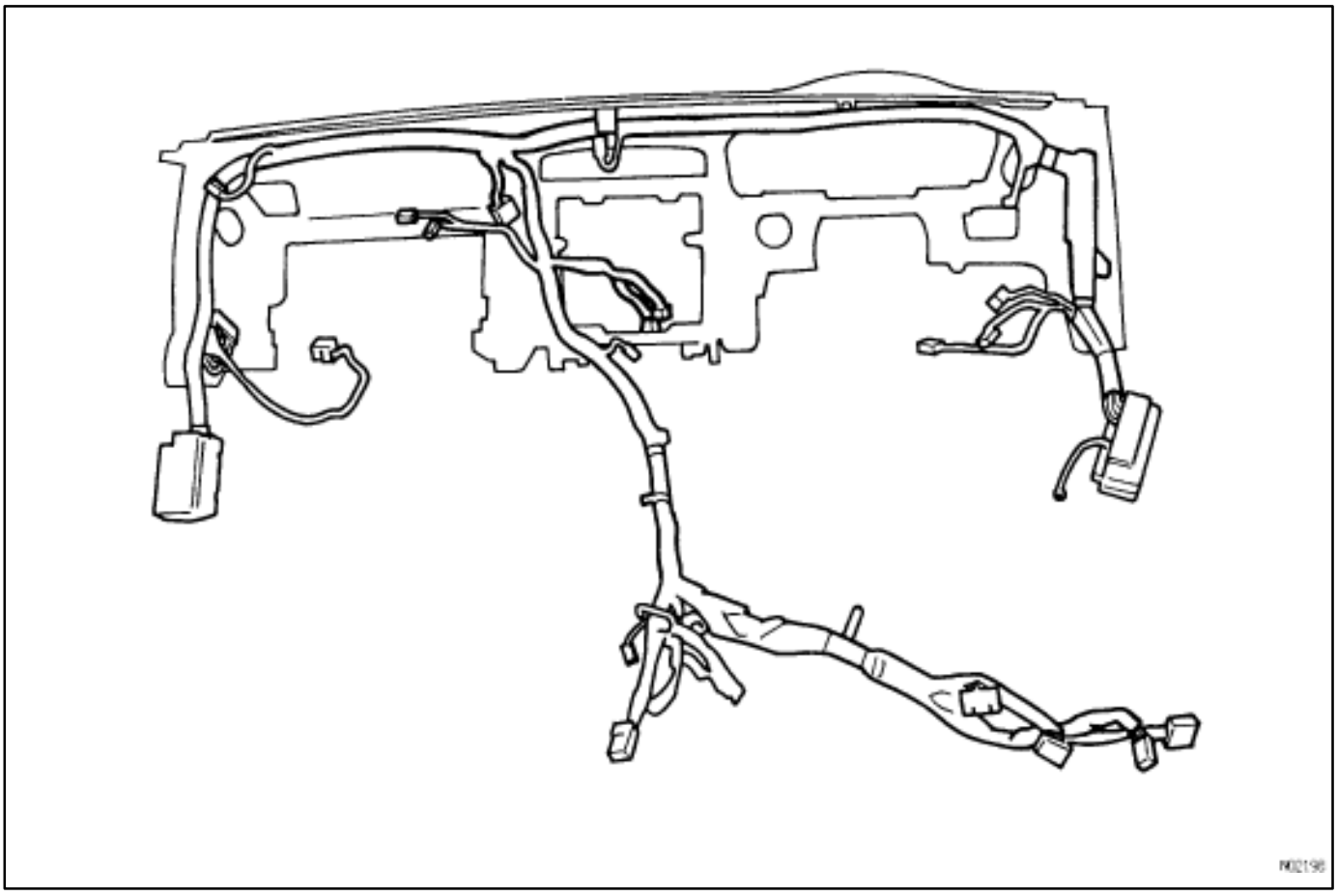
INSTRUMENT PANEL DISASSEMBLY

BO06F–01

(See page BO–107)

1. REMOVE FOLLOWING PARTS:
(a) Duct heater to register No.3
(b) Defroster nozzle
(c) Duct heater to register No.1
(d) Register No.1
(e) Duct heater to register No.4
(f) Register No.2
(g) Center bracket

2. REMOVE INSTRUMENT PANEL WIRE
Remove the screws, the clips and the wire.



INSTRUMENT PANEL ASSEMBLY

BO06G–01

(See page BO–107)

ASSEMBLE INSTRUMENT PANEL PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE

INSTRUMENT PAMEL INSTALLATION

BO06H–01

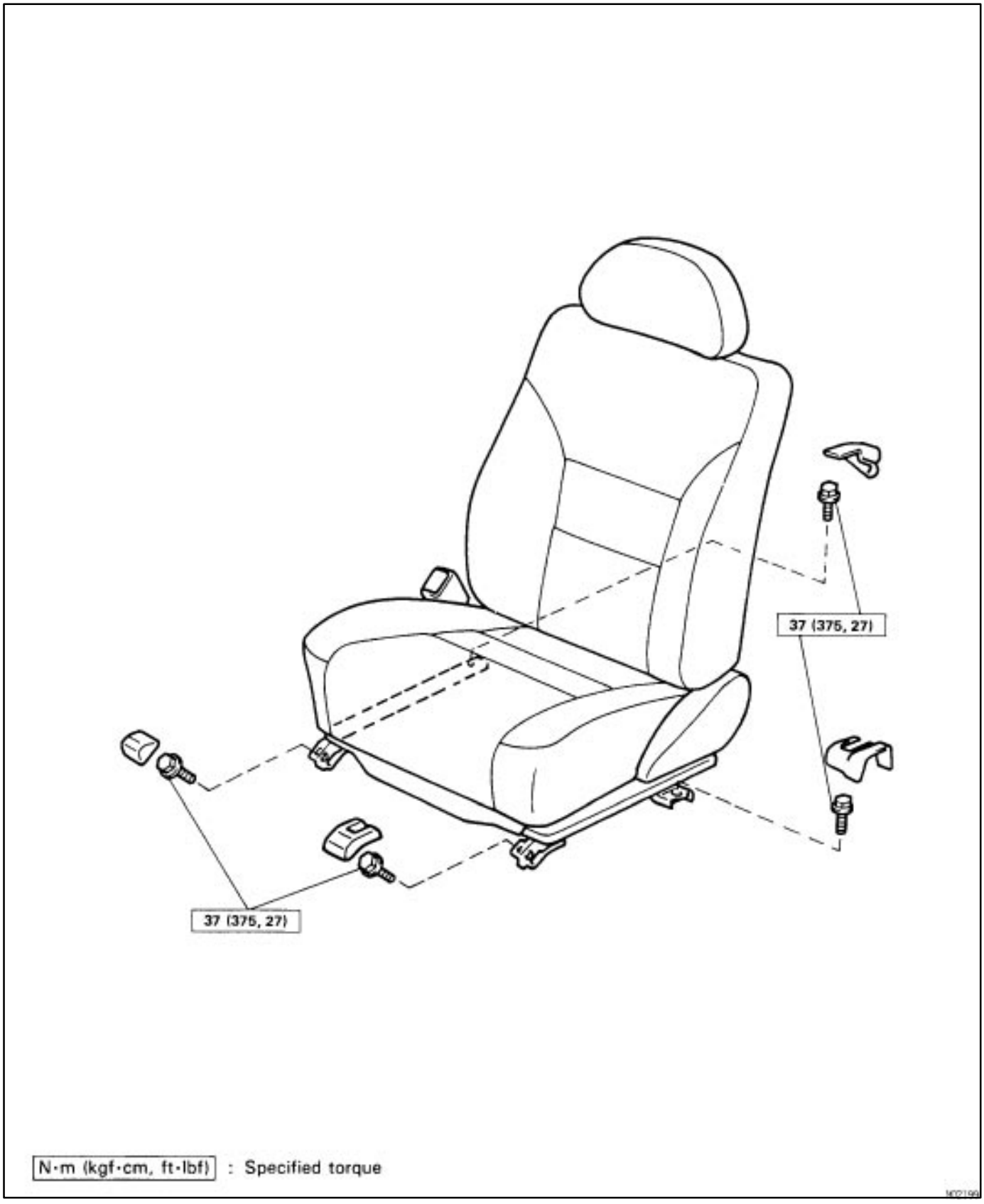
(See page BO–107)

INSTALL INSTRUMENT PANEL PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

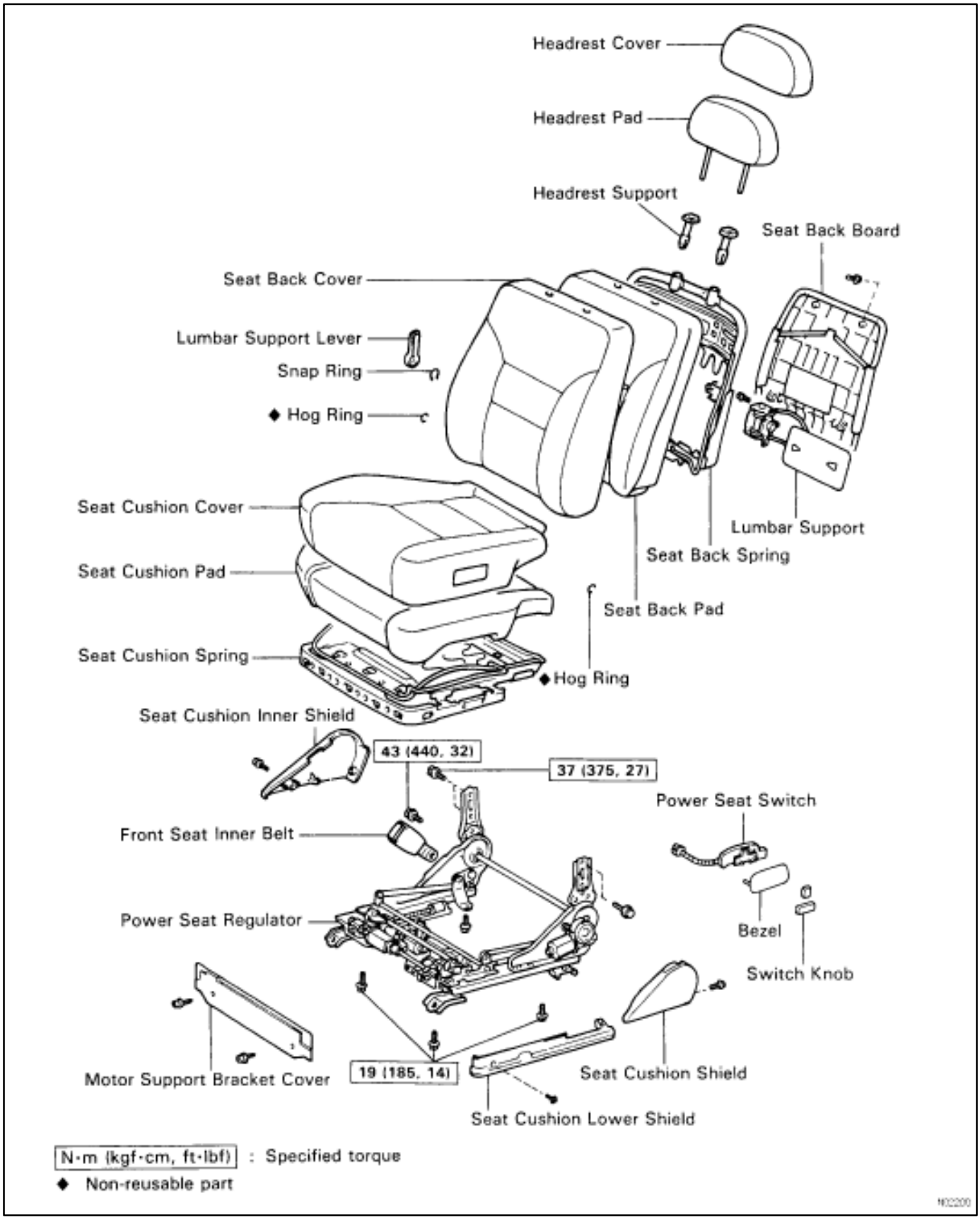
FRONT SEAT

BO06J–01

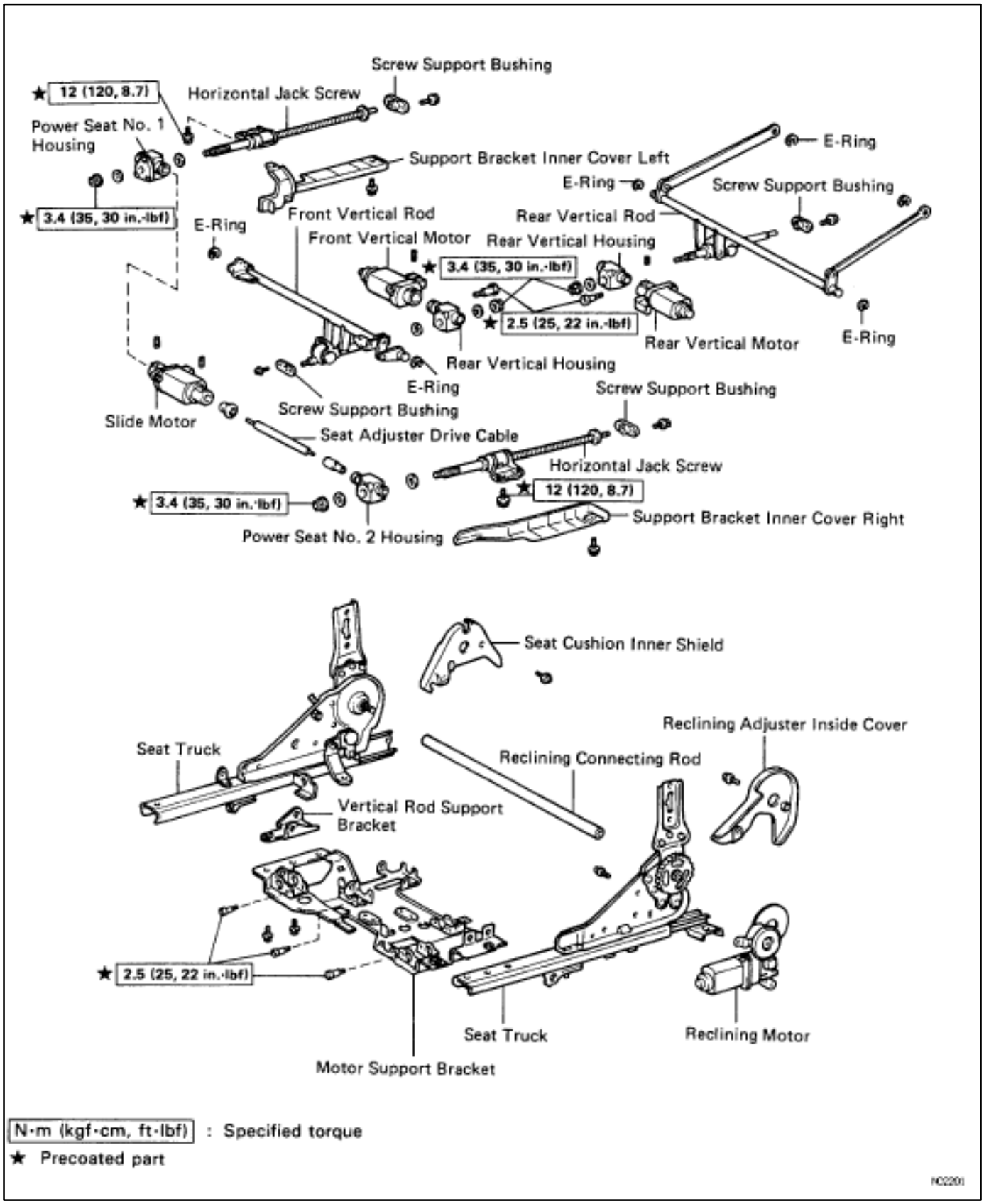
COMPONENTS



COMPONENTS (Cont'd)



COMPONENTS (Cont'd)



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

★ Precoated part

NC2201

FRONT SEAT REMOVAL

BO06K–01

(See page BO–118)

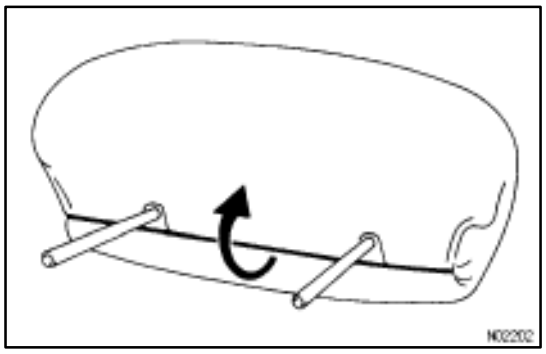
1. **REMOVE SEAT TRUCK COVER**
   Using a screwdriver, pry out four covers.
   HINT: Tape the screwdriver tip before use.
2. **REMOVE FRONT SEAT**
   Remove four bolts and the seat, then disconnect the connector.

FRONT SEAT DISASSEMBLY

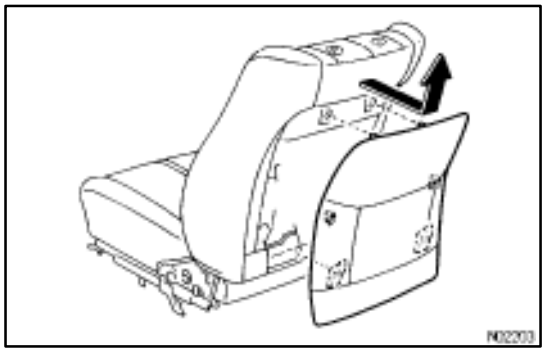
BO06L–01

(See page BO–119)

1. **REMOVE FOLLOWING PARTS:**
(a) Seat cushion lower shield
(b) Seat cushion shield
(c) Seat cushion inner shield
(d) Motor support bracket cover
(e) Front seat inner belt

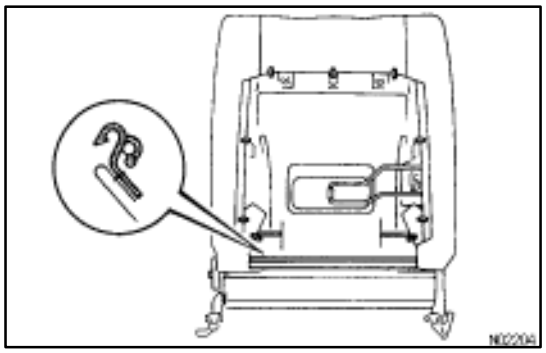


2. **REMOVE HEADREST COVER**
(a) Remove the headrest from the seat.
(b) Remove the headrest cover.

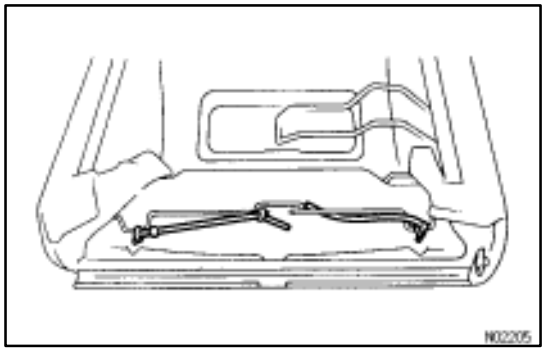


3. **REMOVE SEAT BACK BOARD**
(a) Disconnect two clips.
(b) Slide the board upwards to remove it.

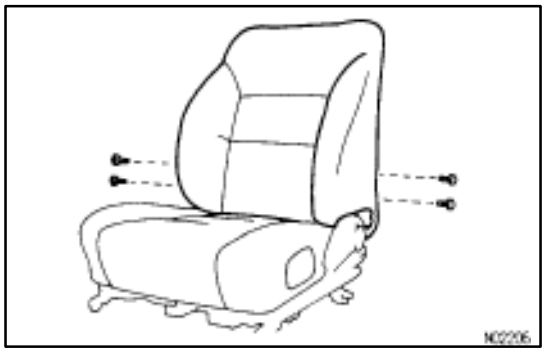
4. **REMOVE LUMBAR SUPPORT LEVER**
   Pull off the snap ring with a shop rag and remove the lever.



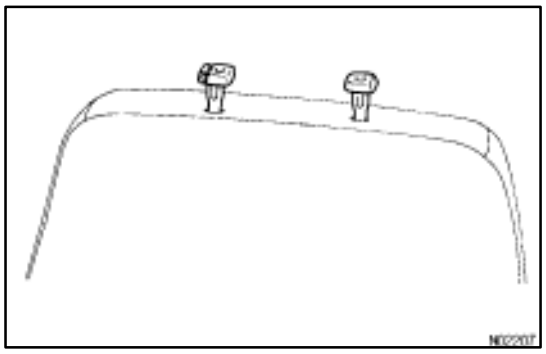
5. **REMOVE SEAT BACK**
(a) Disconnect the hock.
(b) Using a screwdriver, remove nine hog rings.
   HINT: Tape the screwdriver tip before use.



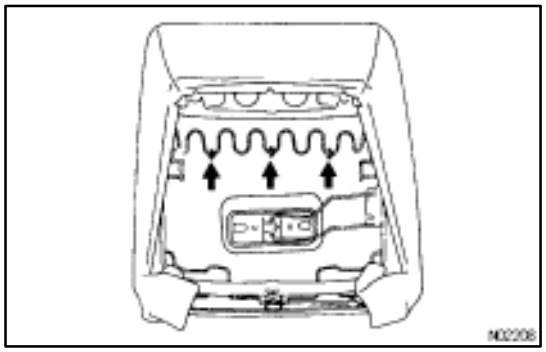
(c) Using a screwdriver, remove three hog rings.
HINT: Tape the screwdriver tip before use.



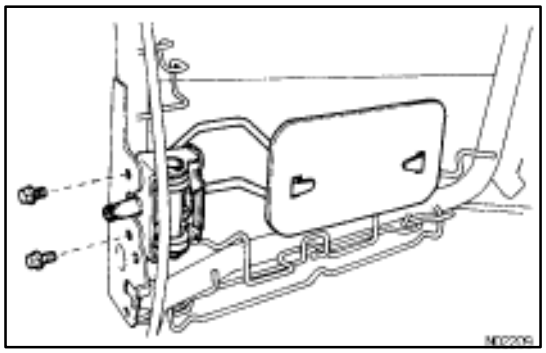
(d) Remove four bolts and the seat back.



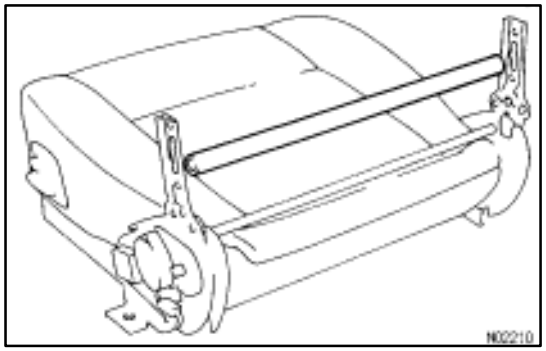
6. REMOVE HEADREST SUPPORT
Pull the headrest support to remove it.



7. REMOVE SEAT BACK COVER
(a) Using a screwdriver, remove three hog rings.
HINT: Tape the screwdriver tip before use.
(b) Remove the seat back spring.
(c) Remove the seat back cover.
(d) (w/ Seat Heater)
Remove the seat heater.

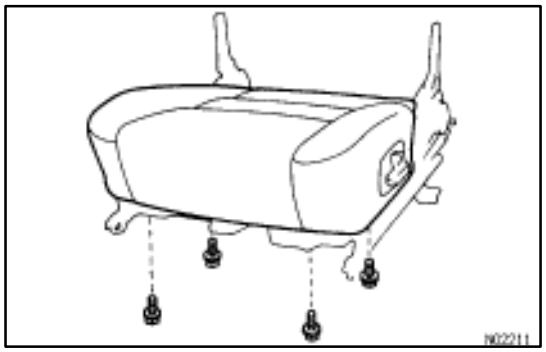


8. REMOVE LUMBAR SUPPORT
Remove two bolts and the lumbar support.



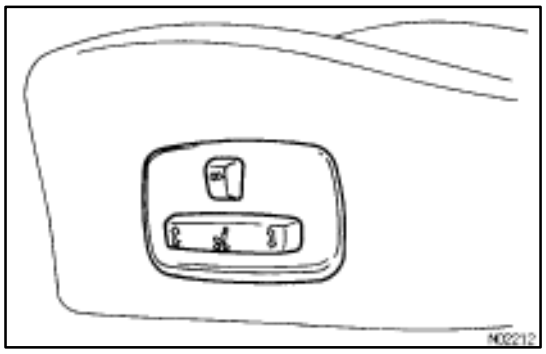
9. REMOVE RECLINING CONNECTING ROD

(a) Disconnect the connecting rod from the seat truck.
(b) Remove the connecting rod.



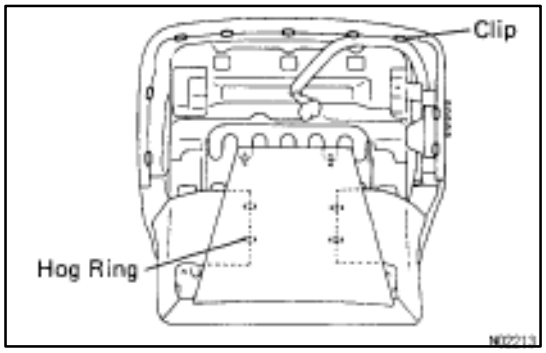
10. REMOVE SEAT CUSHION

Remove four bolts and the seat cushion.



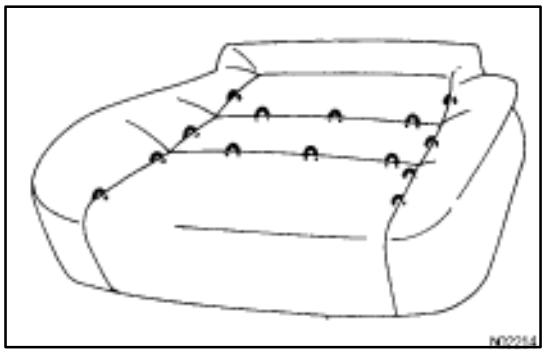
11. REMOVE POWER SEAT SWITCH KNOB

(a) Remove two switch knobs.
(b) Using a screwdriver, remove the bezel.
HINT: Tape the screwdriver tip before use.

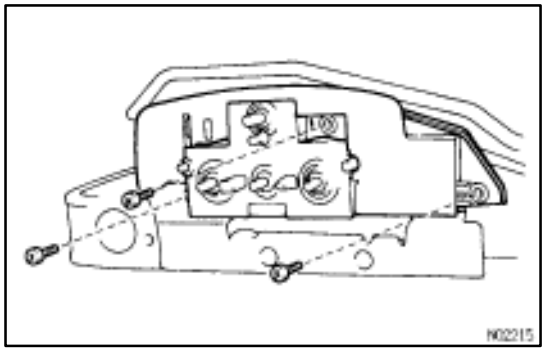


12. REMOVE SEAT CUSHION COVER

HINT: Tape the screwdriver tip before use.
(a) Using a screwdriver, remove nine clips.
(b) Using a screwdriver, remove six hog rings.



(c) Using a screwdriver, remove fourteen hog rings.
(d) Remove the seat cushion spring.
(e) Remove the seat cushion cover.
(f) (w/ Seat Heater)
Remove the seat heater.



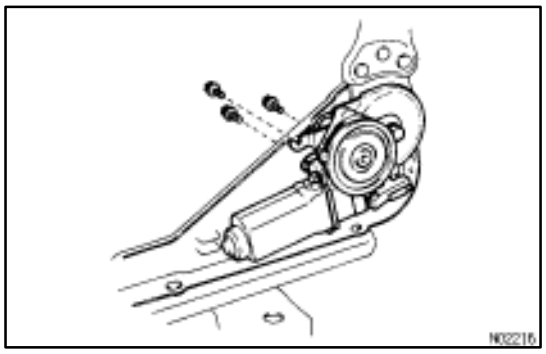
13. REMOVE POWER SEAT SWITCH
Remove three screws and the switch.

POWER SEAT REGULATOR DISASSEMBLY

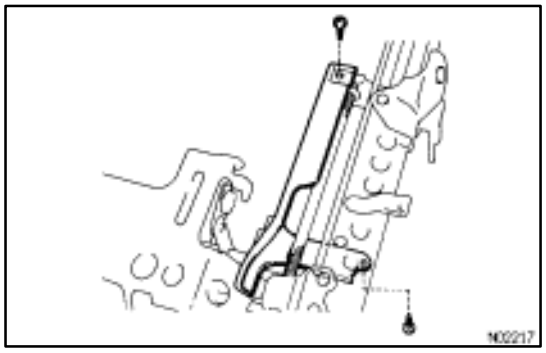
BO06M–01

(See page BO–120)

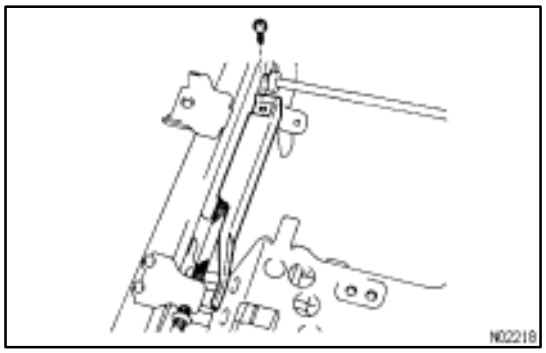
1. REMOVE FOLLOWING PARTS:
(a) Seat cushion inner shield
(b) Reclining adjuster inside cover



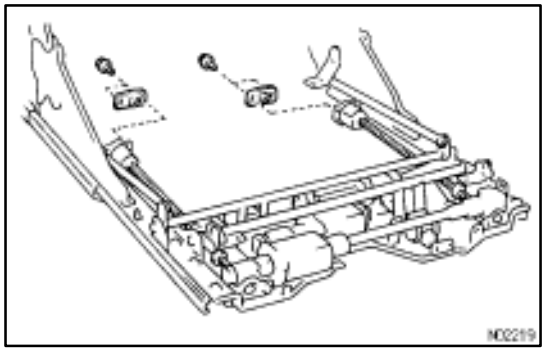
2. REMOVE RECLINING MOTOR
Remove three screws and the motor.



3. REMOVE SUPPORT BRACKET INNER COVER RIGHT
Remove two screws and the cover.

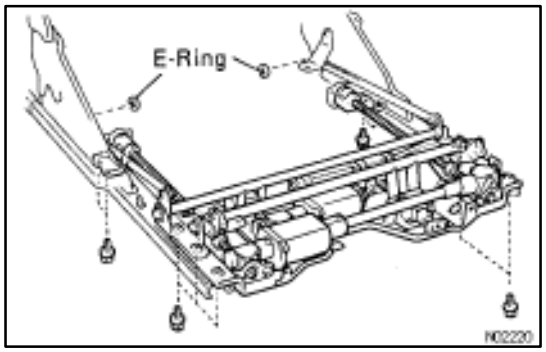


4. REMOVE SUPPORT BRACKET INNER COVER LEFT
Remove two screws and the cover.



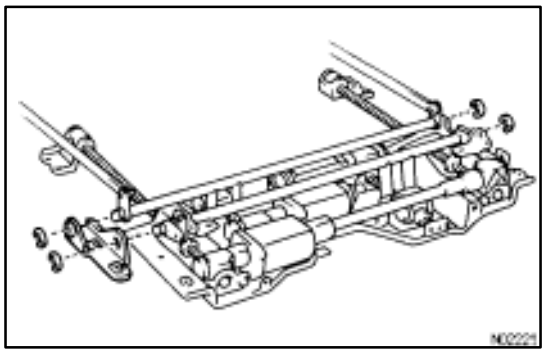
5. REMOVE SCREW SUPPORT BUSHING

Remove four screws and two bushings.

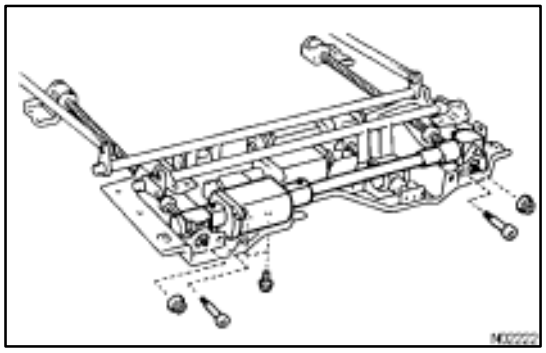


6. REMOVE SEAT TRUCK

(a) Remove nine bolts.
(b) Remove two E–rings.

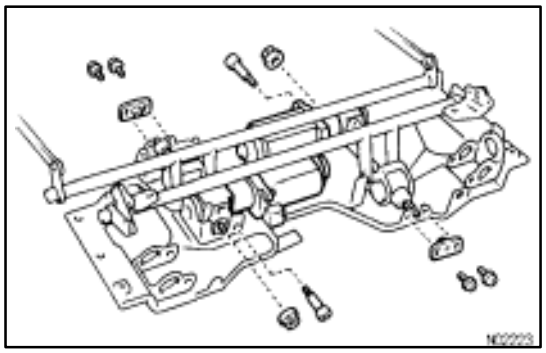


(c) Remove four E–rings.
(d) Remove vertical rod support bracket.
(e) Remove the seat trucks.



7. REMOVE HORIZONTAL JACK SCREW

(a) Remove two nuts.
(b) Using a 6 mm hexagon wrench, remove two screws.
(c) Remove two screws and the slide motor assembly.
(d) Remove two horizontal jack screws.



8. REMOVE POWER SEAT MOTOR WITH VERTICAL HOUSING

(a) Remove two nuts.
(b) Using a 6 mm hexagon wrench, remove two screws.
(c) Remove four screws and two screw support bushings.
(d) Remove two screws and the front vertical rod assembly.
(e) Remove two screws and the rear vertical rod assembly.

POWER SEAT REGULATOR ASSEMBLY

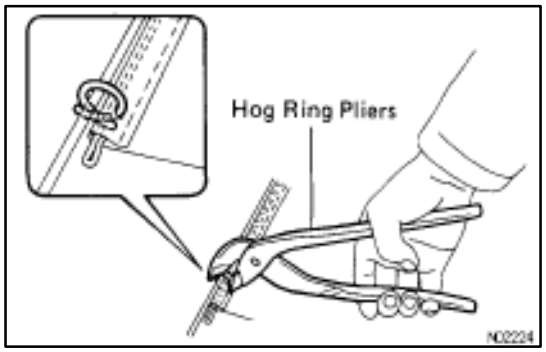
BO06N–01

(See page BO–120)

ASSEMBLE POWER SEAT REGULATOR PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE

HINT: Apply sealant to precoated parts while refering to the components diagram in BO–120.

Part No. 08833–00070, THREE BOND 1324 or equivalent



FRONT SEAT ASSEMBLY

BO06P–01

(See page BO–119)

ASSEMBLE FRONT SEAT PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE

HINT:

- Using hog ring pliers, install the new hog ring.
- Before installing the reclining adjuster, align the match marks.
- If creases occur in the front seat, stretch out the creases by heating them with a dryer, etc.
  If the creases still cannot be removed, spray them lightly with a vaporizer before applying the hair dryer again.

FRONT SEAT INSTALLATION

BO06Q–01

(See page BO–118)

1. INSTALL FRONT SEAT

(a) Connect the connector.

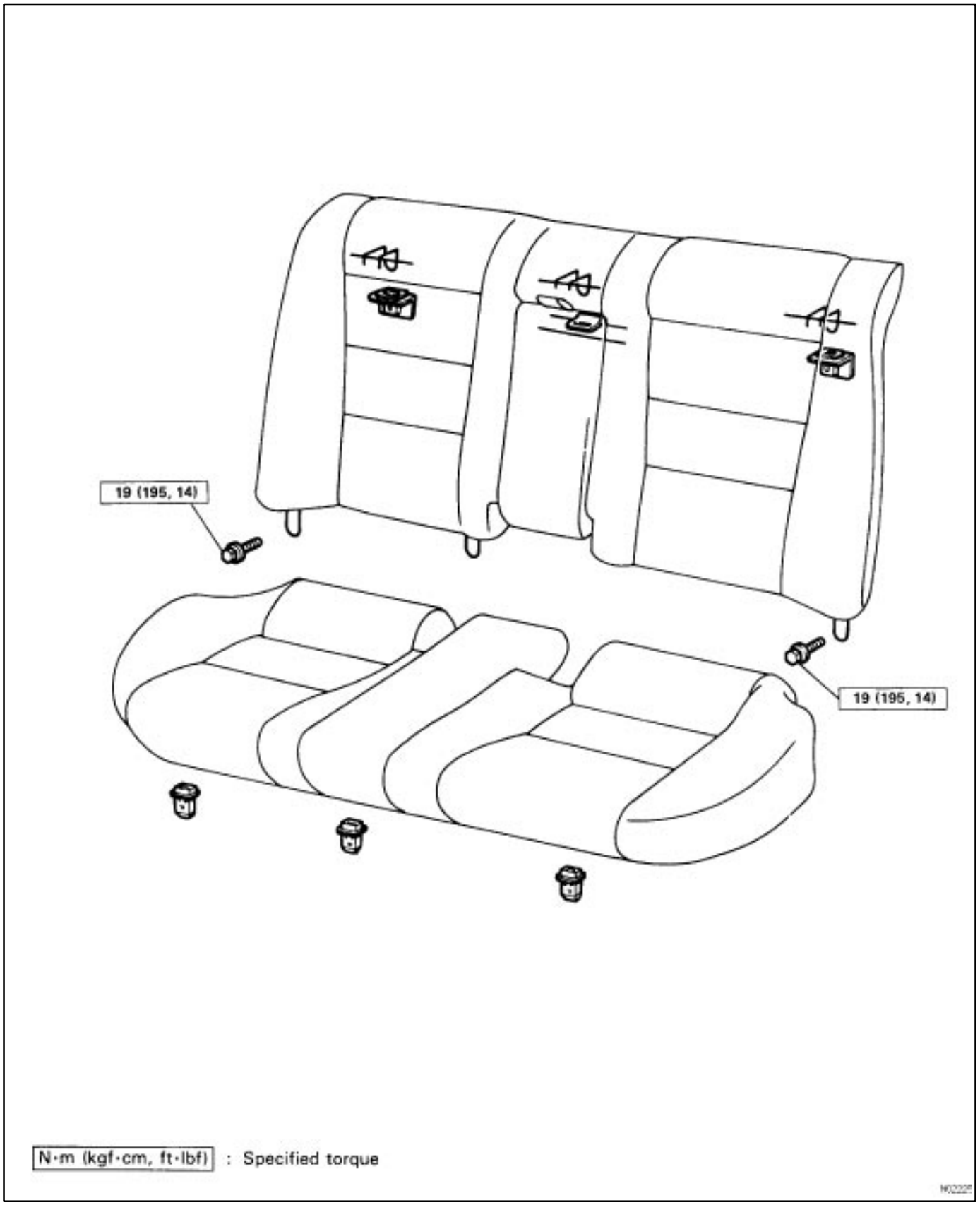
(b) Install four bolts and the front seat.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

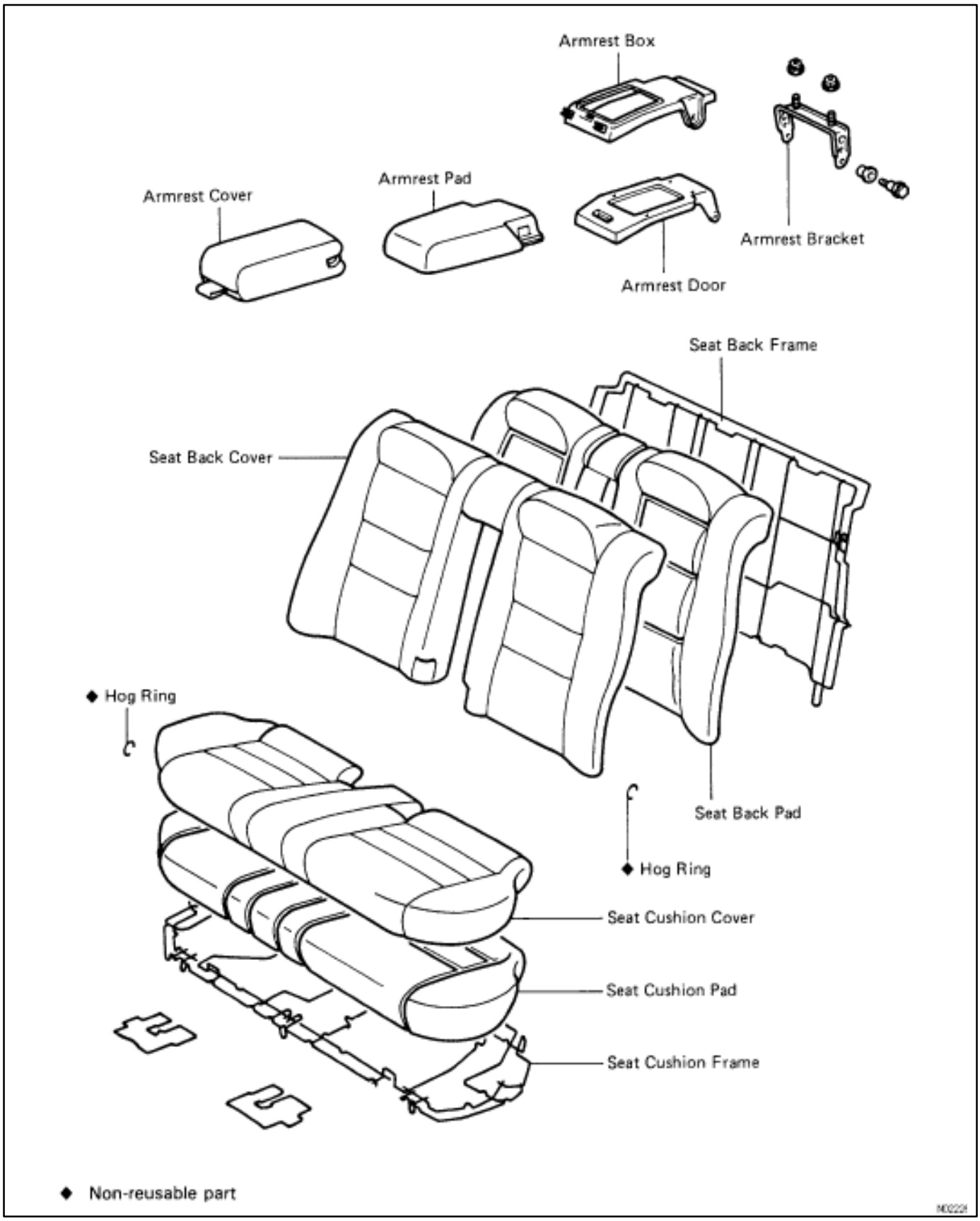
2. INSTALL SEAT TRUCK COVERS

REAR SEAT
COMPONENTS

BO06R–01



COMPONENTS (Cont'd)



BO06S–01

REAR SEAT REMOVAL

(See page BO–127)

1. REMOVE REAR SEAT CUSHION

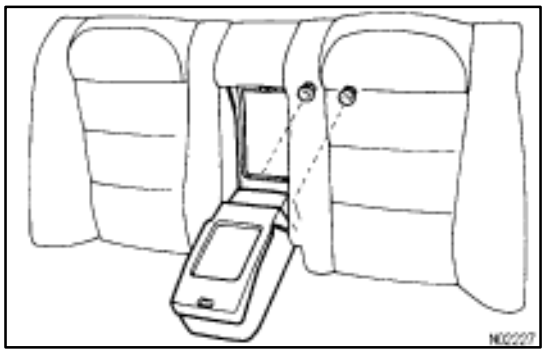
(a) Pull up the front of seat cushion to disconnect three hooks.

(b) Remove the seat cushion.

2. REMOVE REAR SEAT BACK

(a) Remove two bolts.

(b) Pull up the seat back to remove it.



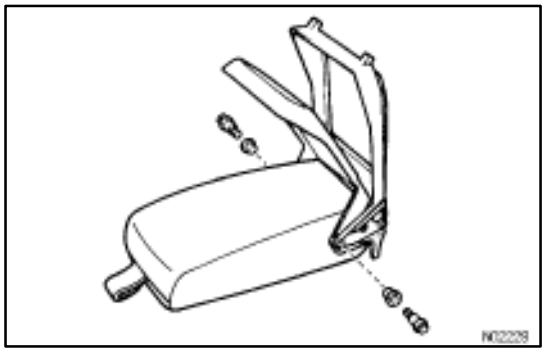
REAR SEAT DISASSEMBLY

BO06T–01

(See page BO–128)

1. REMOVE CENTER ARMREST ASSEMBLY

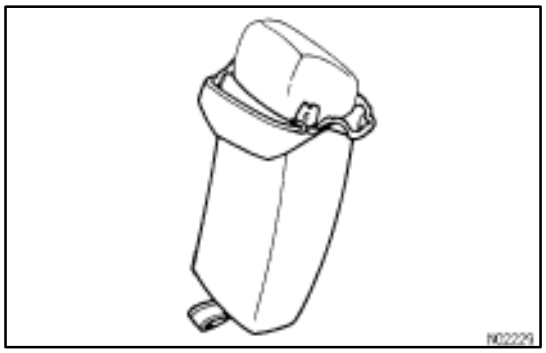
Remove two nuts and the armrest assembly.



2. REMOVE CENTER ARMREST

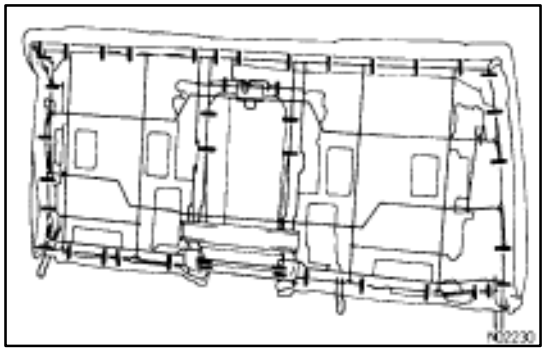
(a) Remove two bolts and two bushings.

(b) Remove the armrest bracket, the armrest box and the armrest door from the armrest.



3. REMOVE CENTER ARMREST COVER

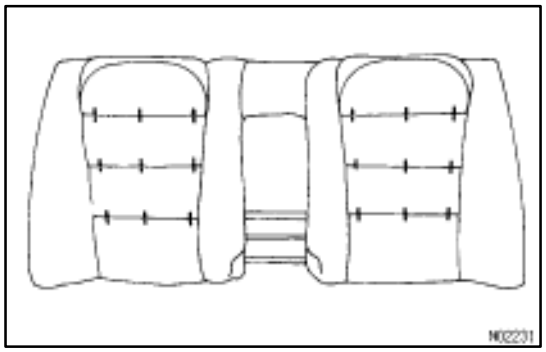
Remove the armrest cover.



4. REMOVE SEAT BACK FRAME

(a) Using a screwdriver, remove forty–four hog rings.
HINT: Tape the screwdriver tip before use.

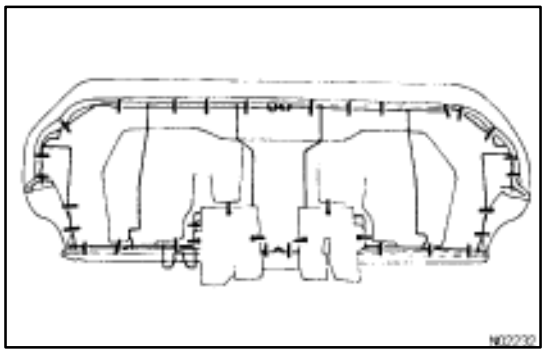
(b) Remove the seat back frame.



5. REMOVE SEAT BACK COVER

(a) Using a screwdriver, remove eighteen hog rings.
HINT: Tape the screwdriver tip before use.

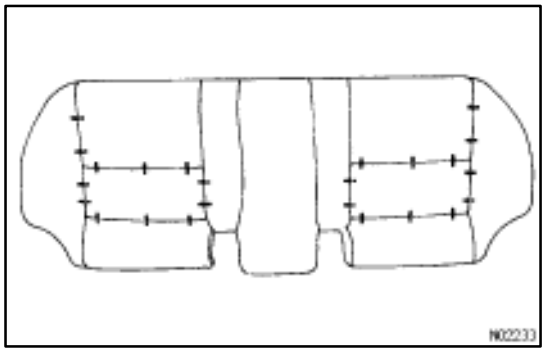
(b) Remove the seat back cover.



6. REMOVE SEAT CUSHION FRAME

(a) Using a screwdriver, remove thirty–four hog rings.
HINT: Tape the screwdriver tip before use.

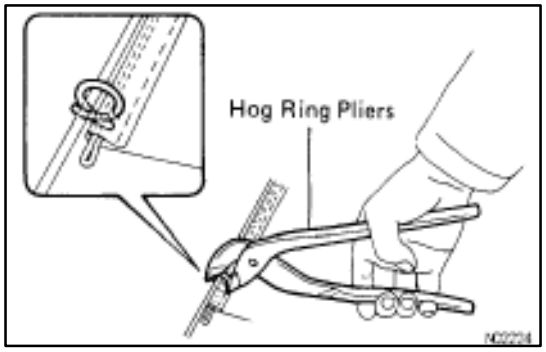
(b) Remove the seat cushion frame.



7. REMOVE SEAT CUSHION COVER

(a) Using a screwdriver, remove twenty–four hog rings.
HINT: Tape the screwdriver tip before use.

(b) Remove the seat cushion cover.



REAR SEAT ASSEMBLY

BO06U–01

(See page BO–128)

ASSEMBLE THE REAR SEAT PARTS BY FOLLOWING DISASSEMBLY SEQUENCE IN REVERSE

HINT:

- Using a hog ring pliers, install the new hog ring.
- If creases occur in the front seat, stretch out the creases by heating them with a dryer, etc.
  If the creases still cannot be removed, spray them lightly with a vaporizer before applying the hair dryer again.

REAR SEAT INSTALLATION

BO06V–01

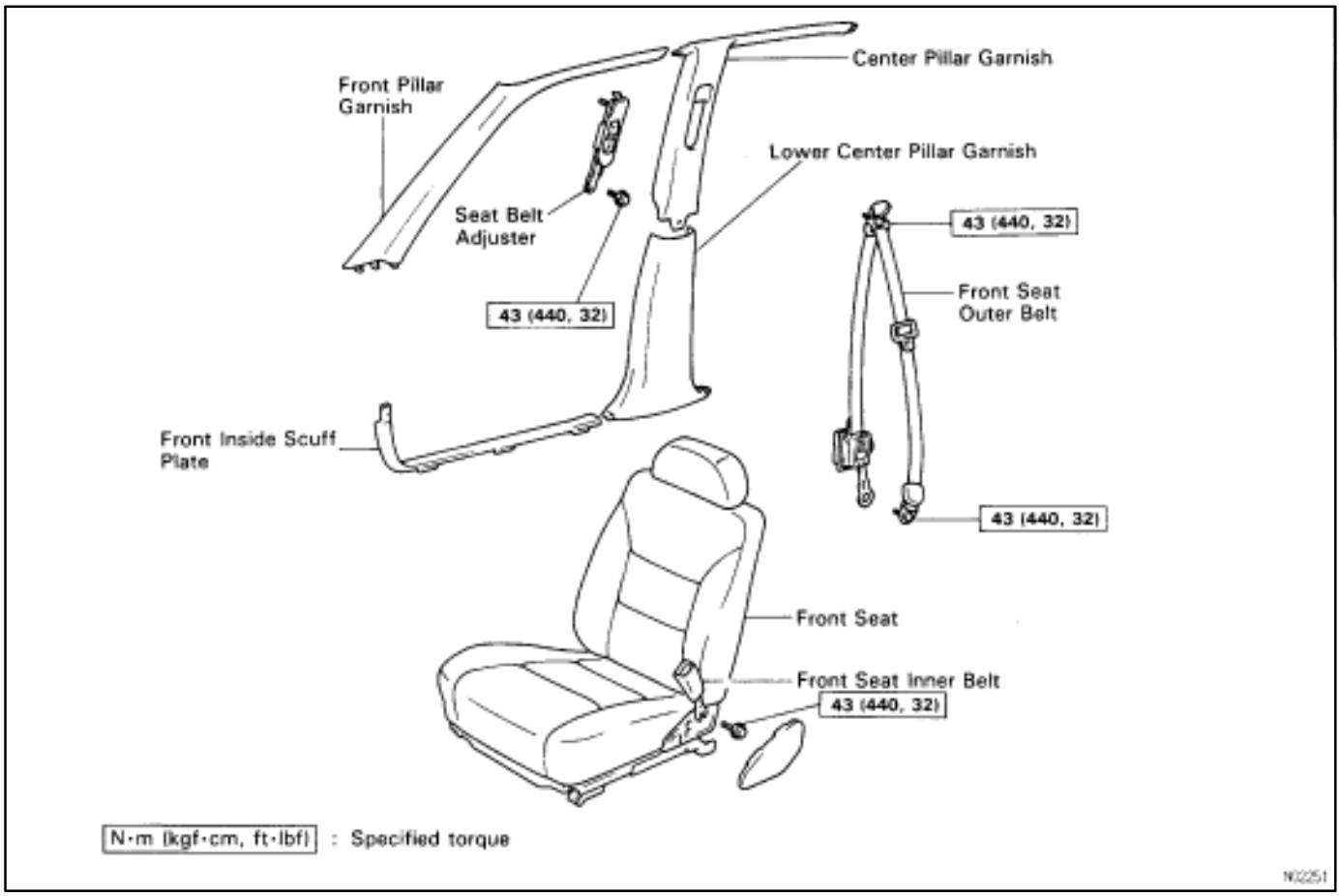
(See page BO–127)

1. **INSTALL REAR SEAT BACK**
   Push down the seat back and install two bolts.
   Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

2. **INSTALL REAR SEAT CUSHION**
   Push down the seat cushion to install it.
   HINT: Confirm that the seat is installed firmly.

FRONT SEAT BELT
COMPONENTS

BO08F–01

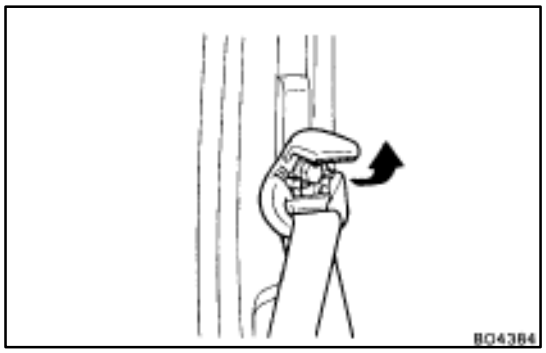


FRONT SEAT BELT REMOVAL

BO085–01

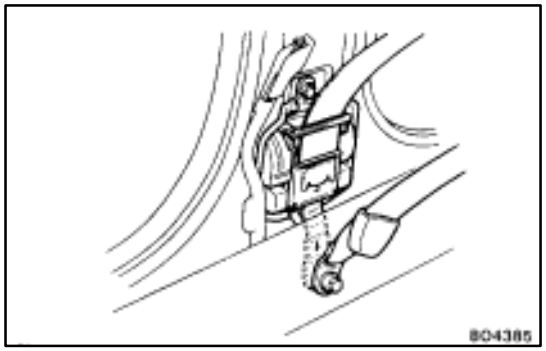
1. REMOVE FOLLOWING PARTS:

(a) Front seat
(b) Front inside scuff plate
(c) Center pillar garnish
(d) Lower center pillar garnish

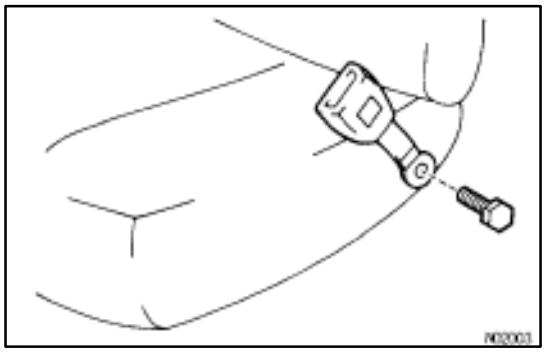


2. REMOVE FRONT SEAT OUTER BELT

(a) Using a screwdriver, pry out the front seat belt anchor bolt cover.
HINT: Tape the screwdriver tip before use.
(b) Remove the front seat belt anchor bolt.



(c) Disconnect the connector.
(d) Remove two bolts and the outer belt.



3. REMOVE FRONT SEAT INNER BELT
(a) Disconnect the connector.
(b) Remove a bolt and the inner belt.

4. REMOVE SEAT BELT ADJUSTER
(a) Remove the front pillar garnish.
(See step 1 on page BO–141)
(b) Remove two bolts and the adjuster.

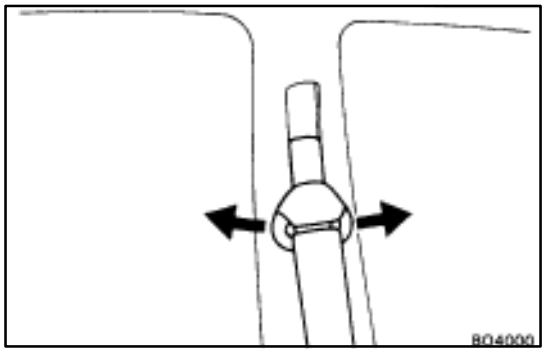
FRONT SEAT BELT INSTALLATION

BO086–01

(See page BO–132)

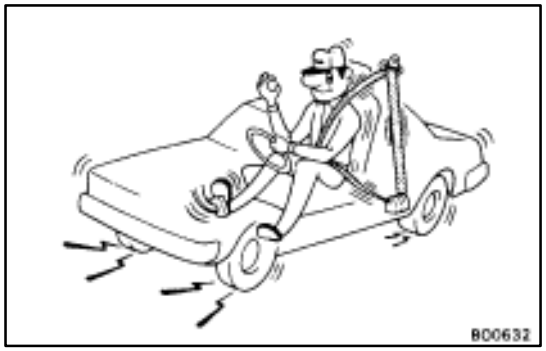
1. INSTALL SEAT BELT ADJUSTER
(a) Install two bolts and the adjuster.
(b) Install the front pillar garnish.

2. INSTALL FRONT SEAT INNER BELT
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



3. INSTALL FRONT SEAT OUTER BELT
Torque:
Retractor bolt 7.8 N·m (80 kgf·cm, 69 in.·lbf)
Shoulder anchor bolt 43 N·m (440 kgf·cm, 32 ft·lbf)
Outer belt anchor bolt 43 N·m (440 kgf·cm, 32 ft·lbf)
HINT: After installing the anchor bolt, check that the anchor turns smoothly.

4. INSTALL FOLLOWING PARTS:
(a) Lower center pillar garnish
(b) Center pillar garnish
(c) Front inside scuff plate
(d) Front seat



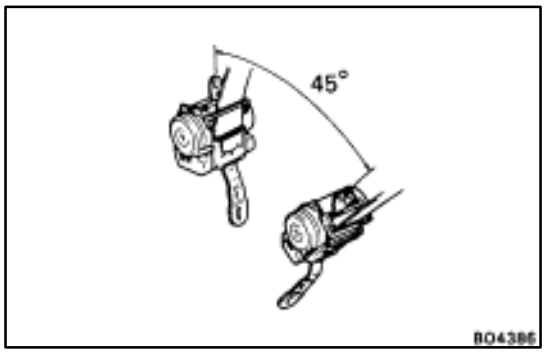
FRONT SEAT BELT INSPECTION

BO087–01

[Emergency Locking Retractor (ELR) Type]

1. RUNNING TEST (IN SAFE AREA)

(a) Fasten the front seat belt.
(b) Drive the car at 10 mph (16 km/h) and make a very hard stop.
(c) Check that the belt is locked 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.

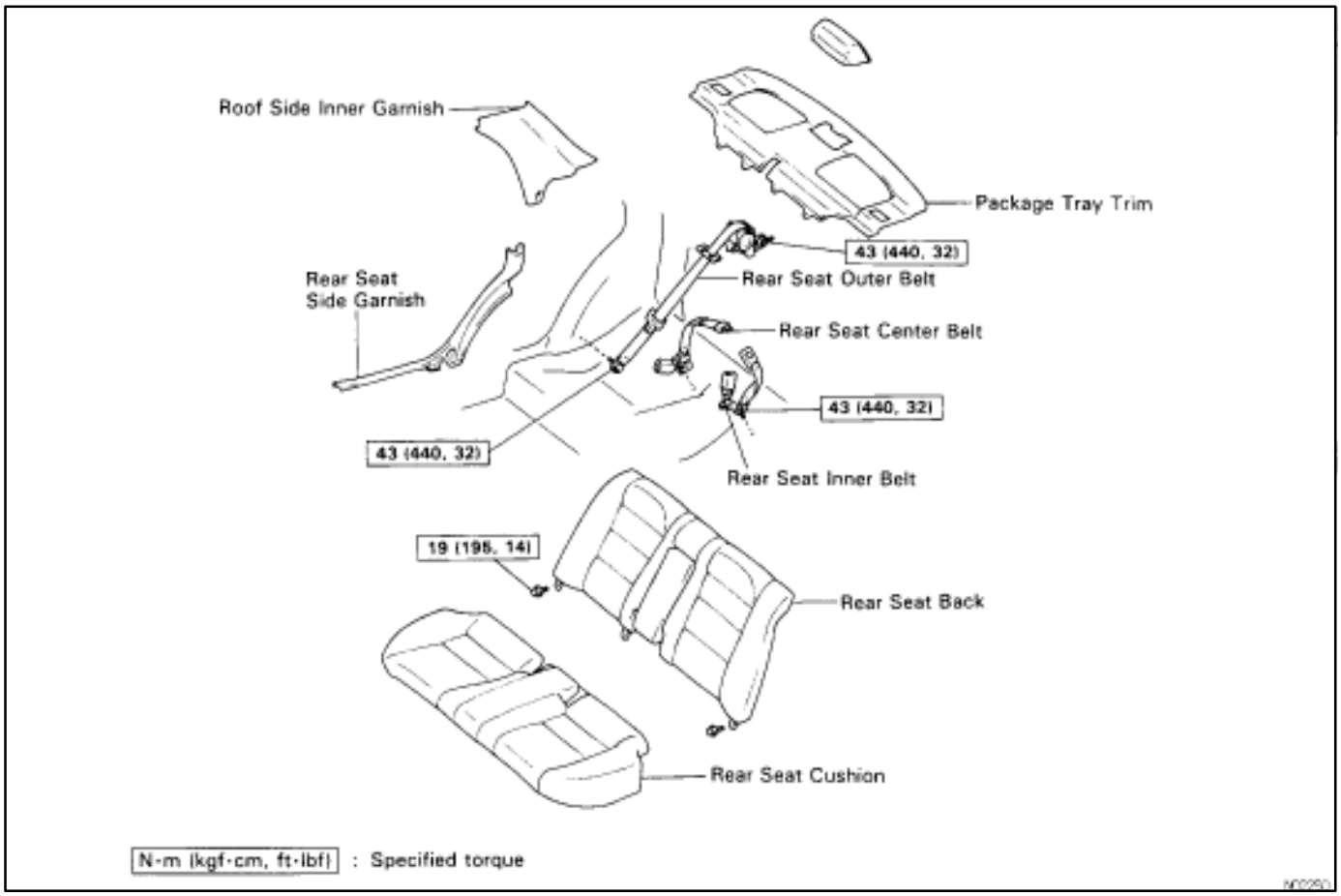


2. STATIC TEST

(a) Remove the locking retractor assembly.
(b) Tilt the retractor slowly.
(c) Verify 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.

REAR SEAT BELT
COMPONENTS

BO06W–01



REAR SEAT BELT REMOVAL

BO06X–01

1. REMOVE FOLLOWING PARTS:

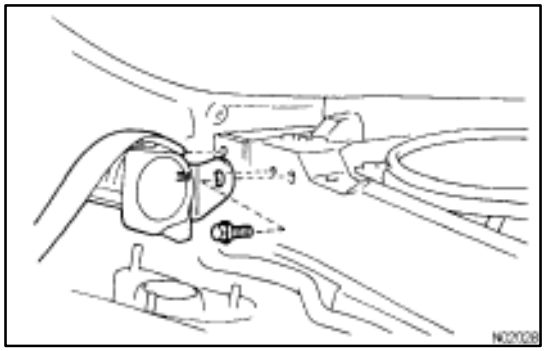
(a) Rear seat back and cushion
(b) Roof side inner garnish
(c) Package tray trim

2. REMOVE REAR SEAT OUTER BELT

(a) Remove the outer belt floor anchor belt.
(b) Remove two bolts and the retractor.

3. REMOVE REAR SEAT INNER BELT

4. REMOVE REAR SEAT CENTER BELT



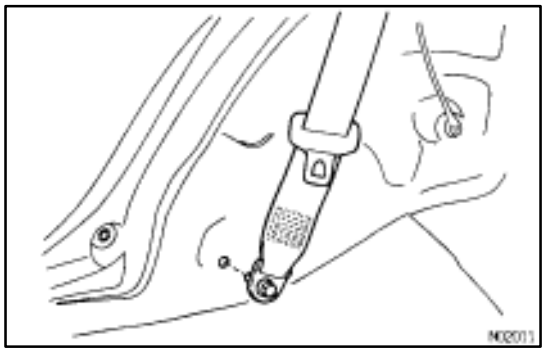
REAR SEAT BELT INSTALLATION

BO06Y–01

(See page BO–135)

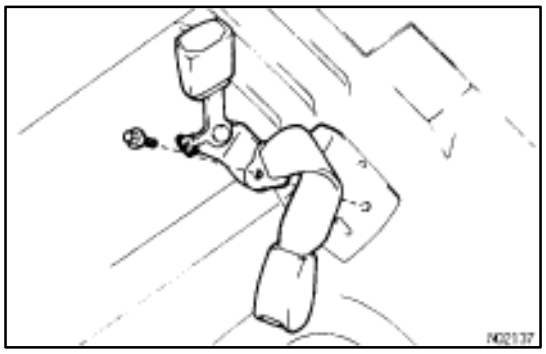
1. INSTALL REAR SEAT OUTER BELT

(a) Place the claw of retractor bracket to body hole and install the bolts and the retractor.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

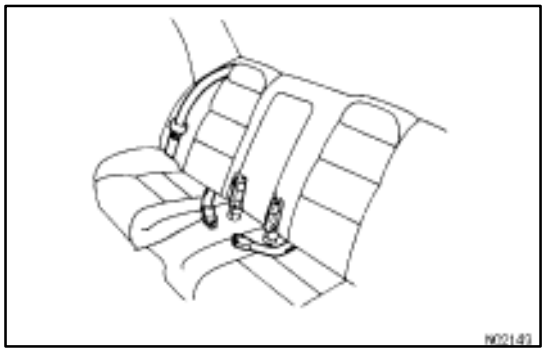


(b) Through the floor anchor plate to the package tray trim.
(c) Install the floor anchor plate and the bolt.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

2. INSTALL PACKAGE TRAY TRIM
(See page BO–143)



3. INSTALL REAR SEAT INNER BELT
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



4. INSTALL REAR SEAT BACK AND CUSHION
HINT: After installation, check that the seat belts are positioned as shown.

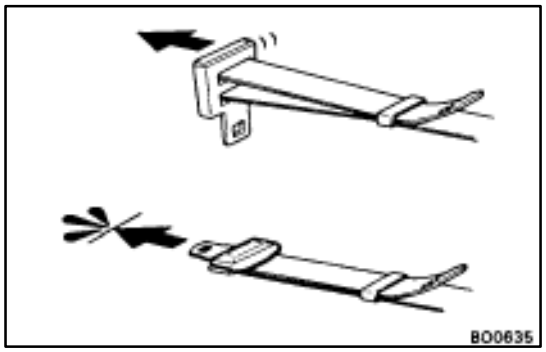
REAR SEAT BELT INSPECTION

BO088–01

[Emergency Locking Retractor (ELR) Type]

1. RUNNING TEST (IN SAFE AREA)
(See page BO–134)

2. STATIC TEST



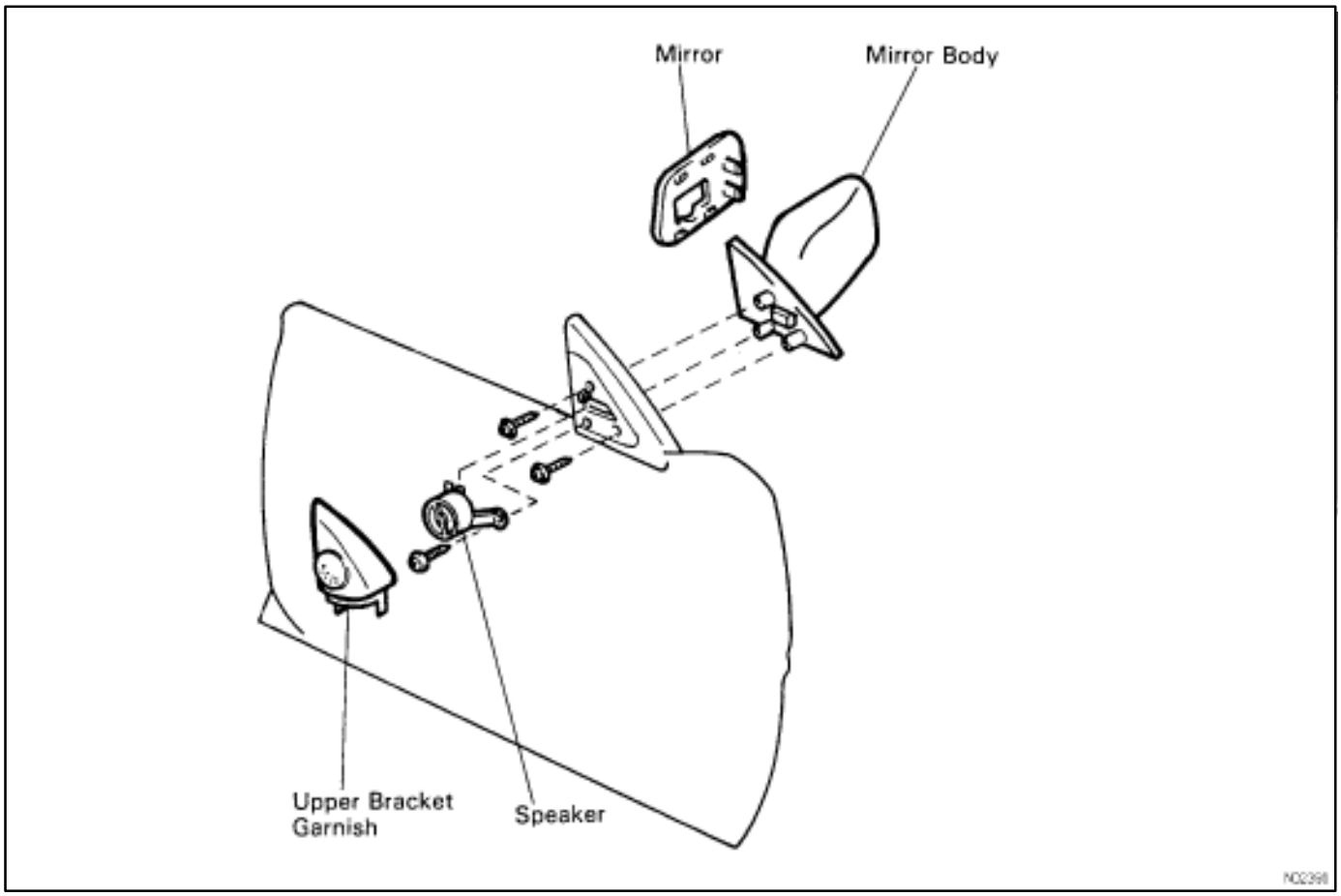
(Manual Type)

TESTING

(a) Adjust the belt to the proper length.
(b) Apply a firm load to the belt.
(c) Verify that the belt does not extend.

OUTSIDE REAR VIEW MIRROR
COMPONENTS

BO089–01



OUTSIDE REAR VIEW MIRROR REMOVAL AND INSTALLATION

BO06Z–01

HINT: Install the mirror by following the removal sequence in reverse.

1. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL

CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. REMOVE UPPER BRACKET GARNISH

Removal: (See step 6 on BO–38)

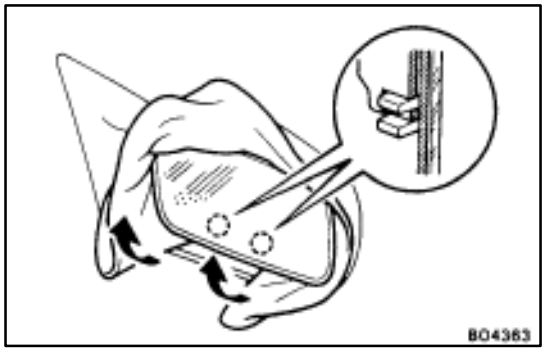
Installation: (See step 18 on BO–45)

3. REMOVE MIRROR

(a) Remove three screws.

(b) Disconnect the connector.

(c) Remove the mirror.



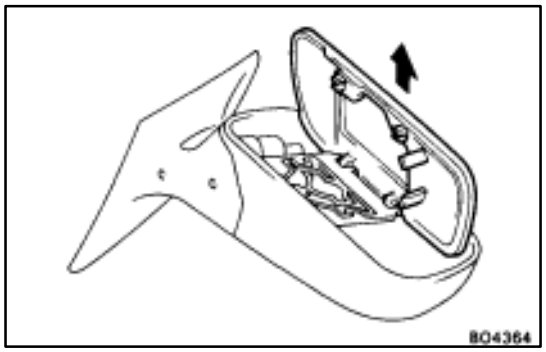
OUTSIDE REAR VIEW MIRROR REPLACEMENT

BO08A–01

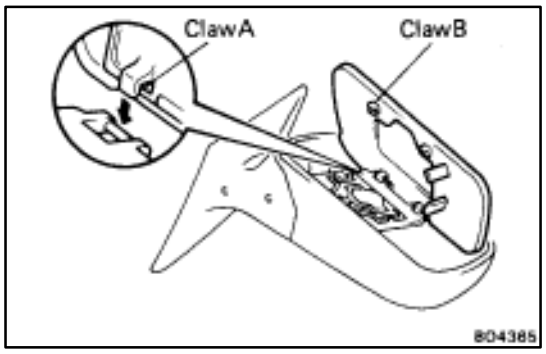
1. IF NECESSARY, DISCONNECT MIRROR

(a) Insert the shop rag between the mirror and the mirror body to wrap up the mirror in the shop rag.

(b) Pull up the lower side of the shop rag to disconnect the mirror joint.



(c) Pull up the mirror and disconnect it.



2. CONNECT MIRROR

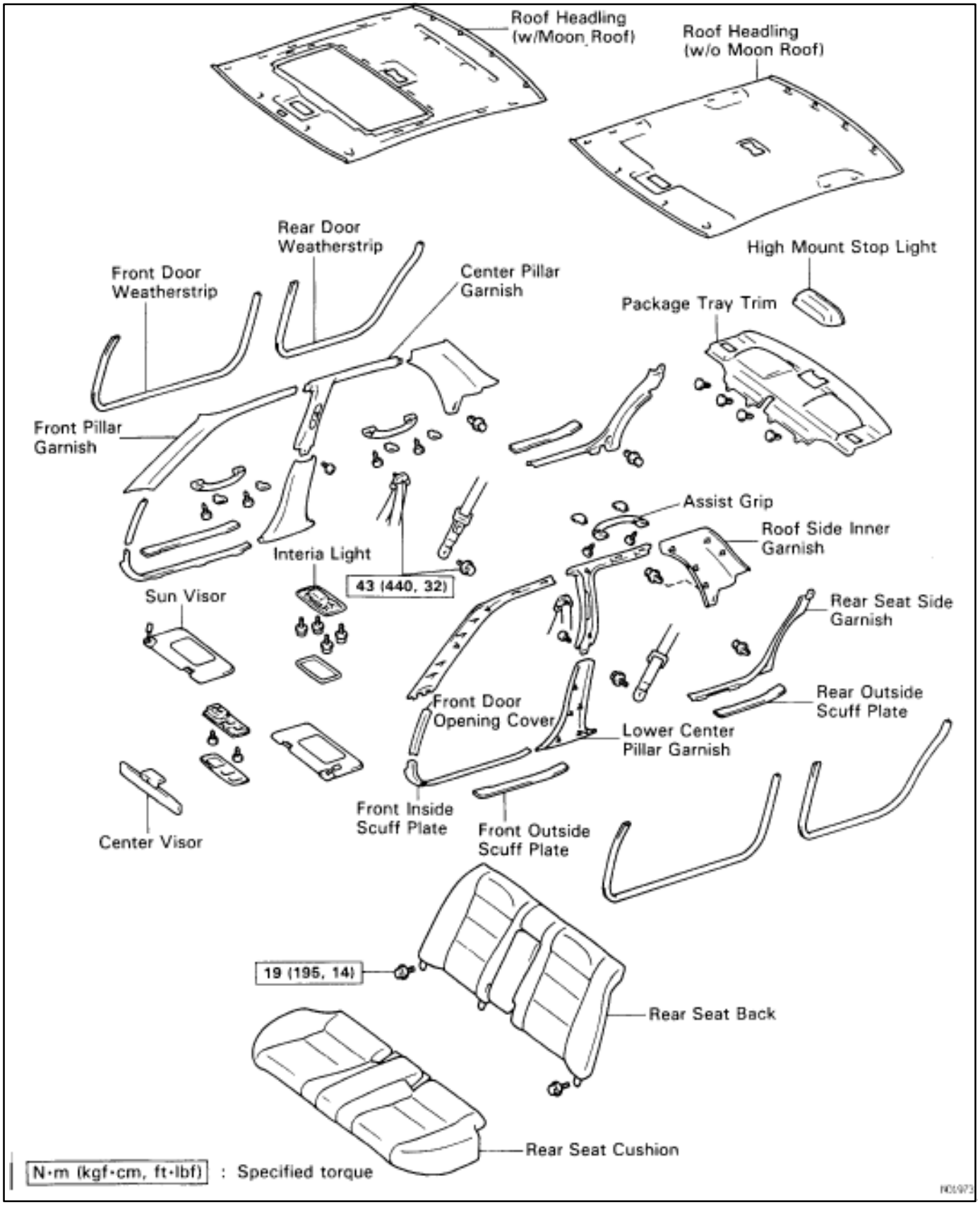
(a) Connect the claws (A) and set the mirror to the mirror body.

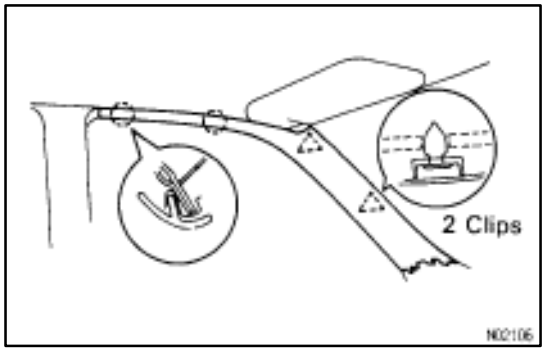
(b) Push the mirror to connect the claws (B) and connect it.

TRIM AND GARNISH

COMPONENTS

BO070–01





TRIM AND GARNISH REMOVAL

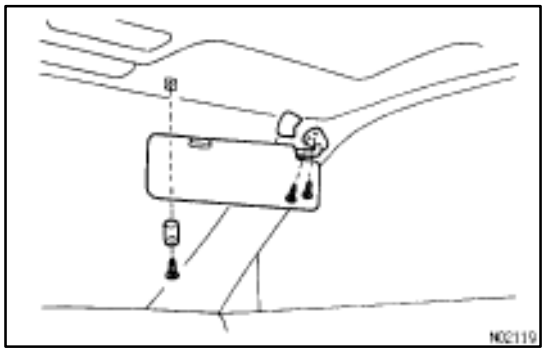
BO08K–01

(See page BO–140)

1. REMOVE FRONT PILLAR GARNISH

(a) Pry out clips by your hand.

(b) Pull the garnish upward to remove it.

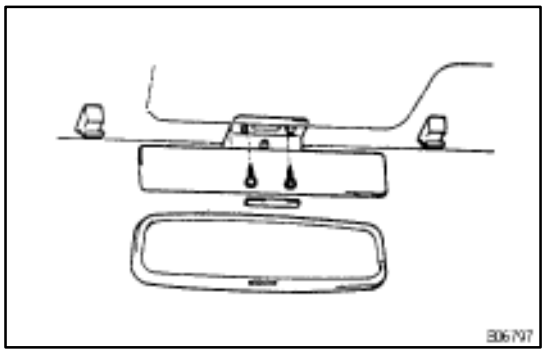


2. REMOVE SUN VISOR

(a) Pry out the cover.

(b) Remove two screws, disconnect the connector and the visor.

(c) Remove the screw and the holder.



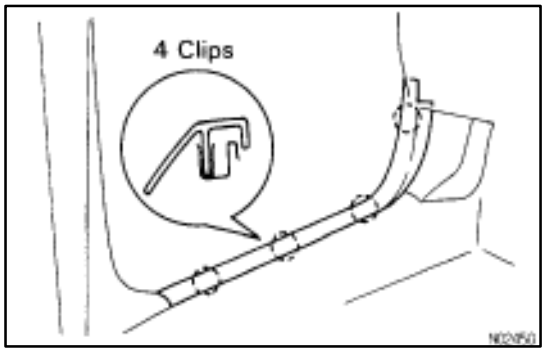
3. REMOVE CENTER VISOR

(a) Pry out the cover.

(b) Remove two screws and the visor.

4. REMOVE FRONT DOOR OPENING COVER

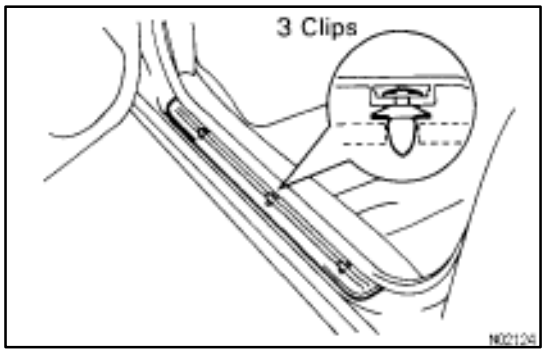
Pull the cover, remove it.



5. REMOVE FRONT INSIDE SCUFF PLATE

Using the screwdriver, pry out the plate.

HINT: Tape the screwdriver tip before use.



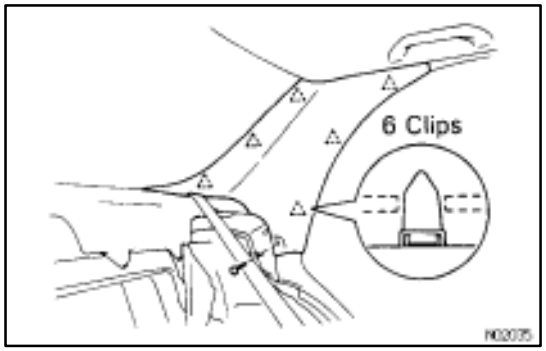
6. REMOVE FRONT OUTSIDE SCUFF PLATE

Using the screwdriver, pry out the plate.

HINT: Tape the screwdriver tip before use.

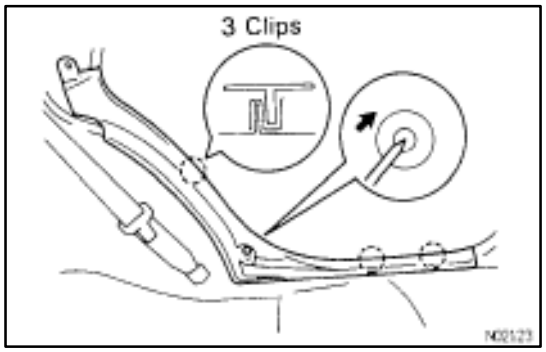
7. REMOVE REAR SEAT CUSHION AND BACK

(See page BO–129)



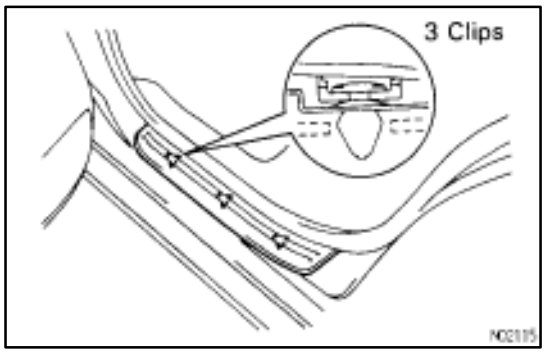
8. REMOVE ROOF SIDE INNER GARNISH

(a) Using a clip remover, remove the clip.
(b) Using a screwdriver, pry loose and remove the garnish.
HINT: Tape the screwdriver tip before use.



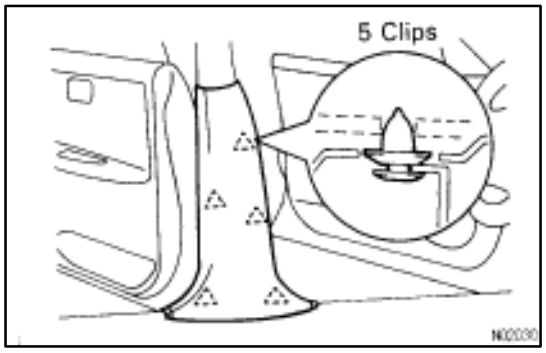
9. REMOVE REAR SEAT SIDE GARNISH

(a) Using a screwdriver, push in the top of clip and remove the clip.
(b) Pry loose and remove the garnish.



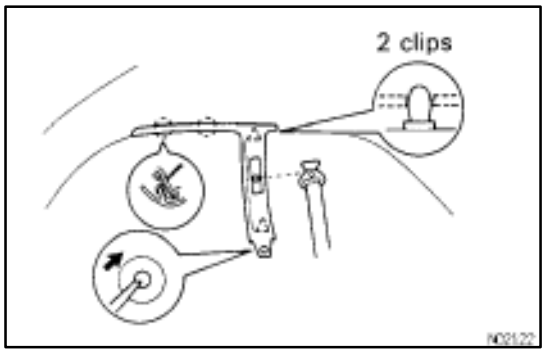
10. REMOVE REAR OUTSIDE SCUFF PLATE

Using the screwdriver, pry out the plate.
HINT: Tape the screwdriver tip before use.



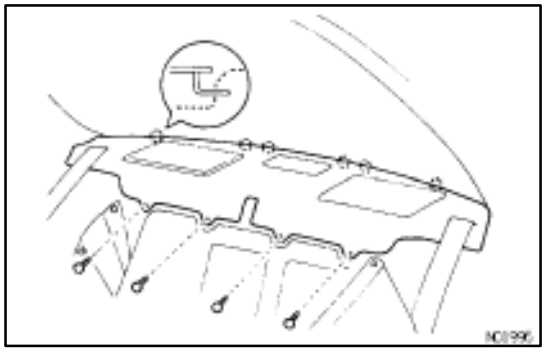
11. REMOVE LOWER CENTER PILLAR GARNISH

Using the screwdriver, pry out the plate.
HINT: Tape the screwdriver tip before use.



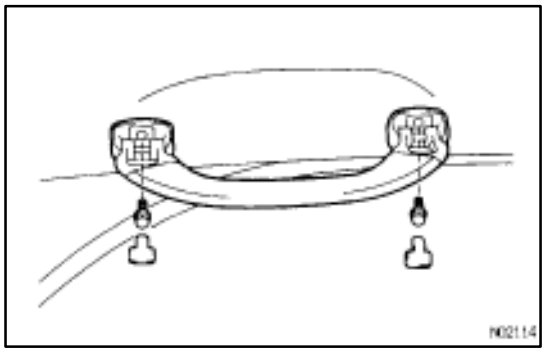
12. REMOVE CENTER PILLAR GARNISH

(a) Remove the front seat belt anchor bolt.
(b) Using a screwdriver, push in the top of clip and remove the clip.
(c) Pry out the garnish.



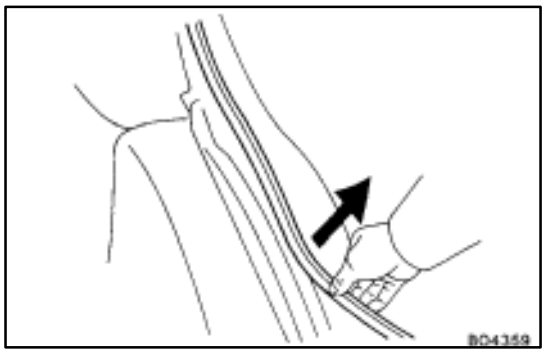
13. REMOVE PACKAGE TRAY TRIM

(a) Remove the high mount stop light and disconnect the connector.
(b) Remove the seat belt hole cover.
(c) Using a hollo, remove four clips from the trim.
(d) Pull the trim forward to remove it.



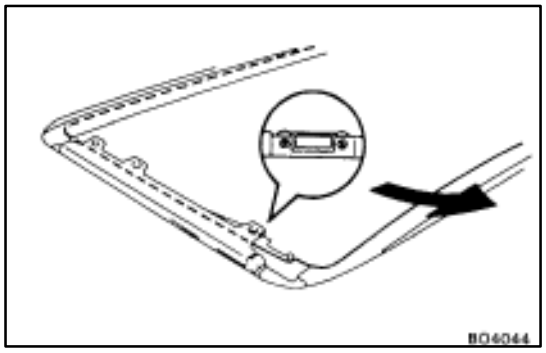
14. REMOVE ASSIST GRIP

(a) Remove two caps.
(b) Remove two screws and the grip.



15. REMOVE FRONT AND REAR DOOR OPENING TRIMS

Pull the trim with your hand and remove it.



16. (W/ Sliding Roof)
REMOVE SUN SHADE TRIM

TRIM AND GARNISH INSTALLATION

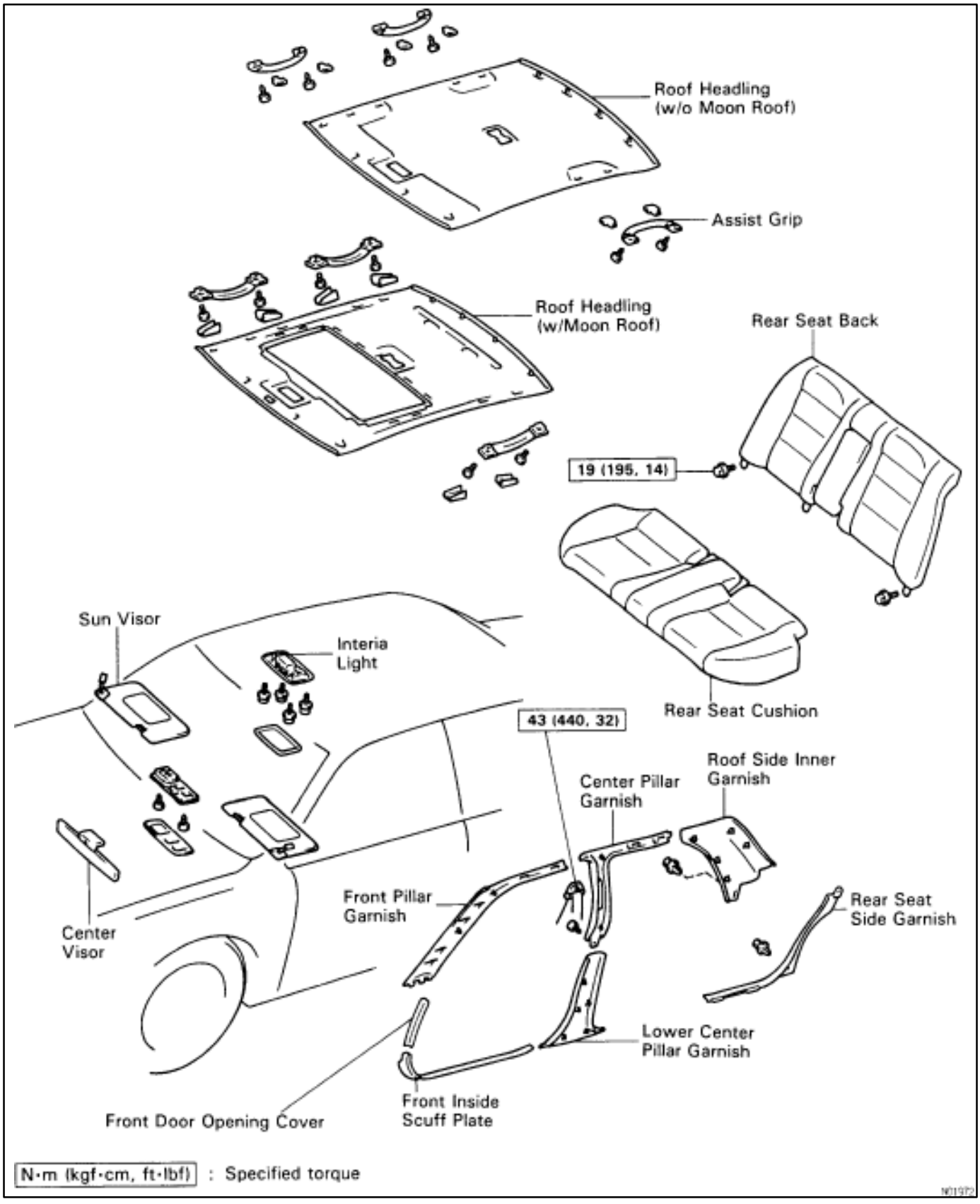
BO071–01

(See page BO–140)

INSTALL TRIM AND GARNISH PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

ROOF HEADLINING
COMPONENTS

BO072–01



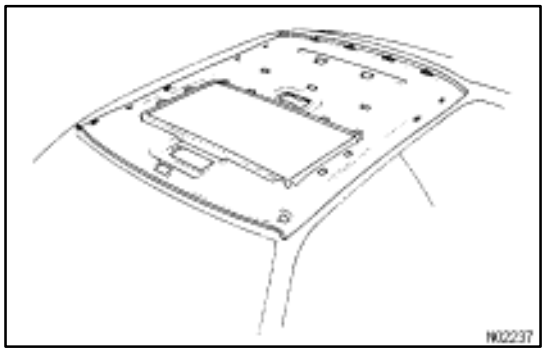
ROOF HEADLINING REMOVAL

BO08L–01

(See page BO–144)

1. REMOVE FOLLOWING PARTS:

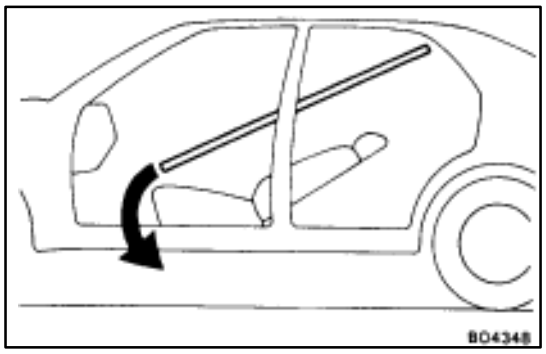
(a) Rear seat back and cushion
(b) Assist grip
(c) Front pillar garnish
(d) Center pillar garnish
(e) Roof side inner garnish
(f) Sun visor



(g) Interior light
(h) Center visor

2. REMOVE ROOF HEADLINING

(a) Disconnect four clips from the roof panel rear end.
(b) Release the fastener tapes and remove the headlining.



(c) Fully recline the front seat back.
(d) Bring out the headlining as shown.
NOTICE: Do not fold down the headlining.

ROOF HEADLINING INSTALLATION

BO073–01

(See page BO–144)

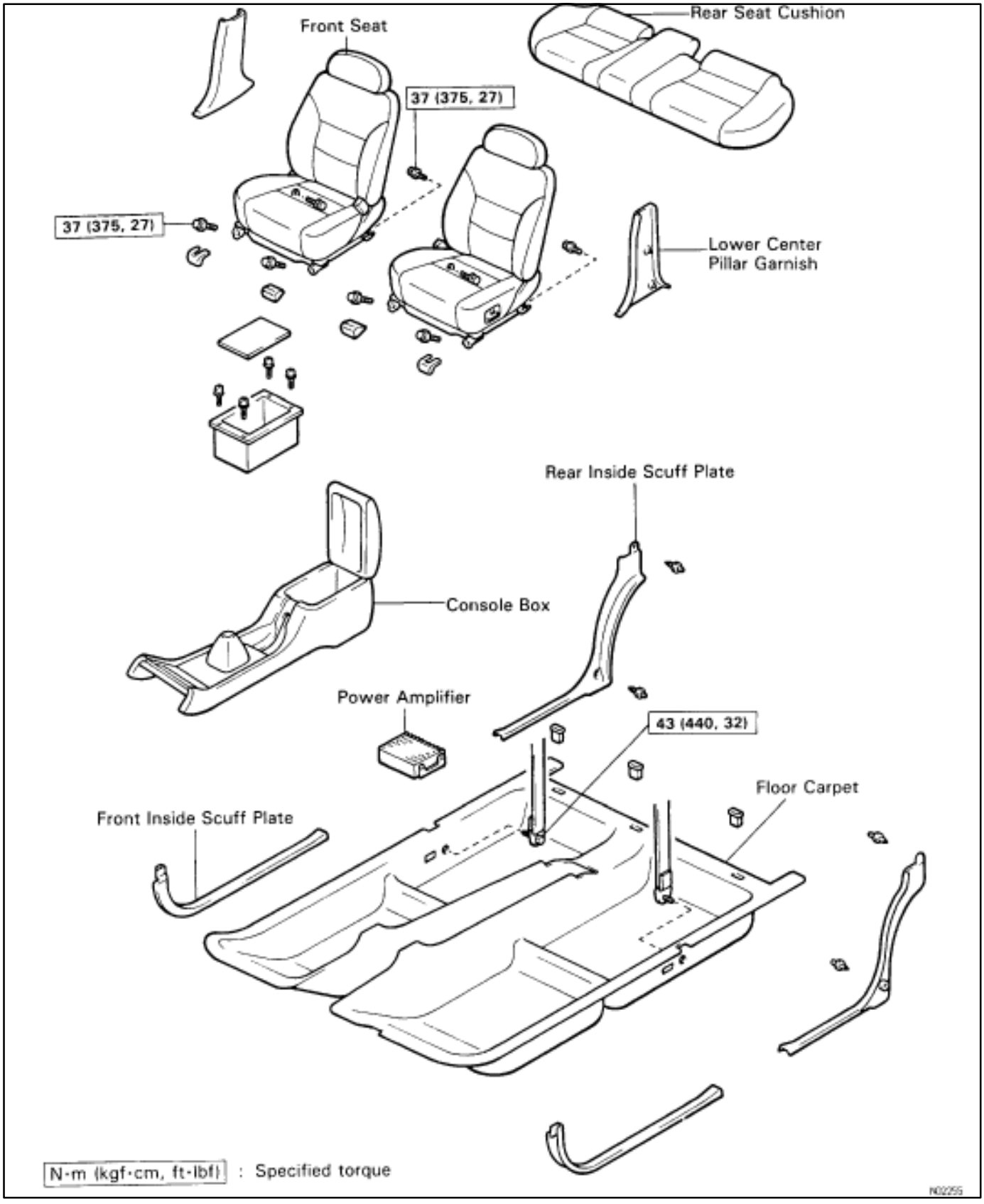
INSTALL ROOF HEADLINING PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

HINT: Torque following parts:

(a) Rear seat back
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)
(b) Front seat belt shoulder anchor bolt
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

FLOOR CARPET
COMPONENTS

BO08B–01



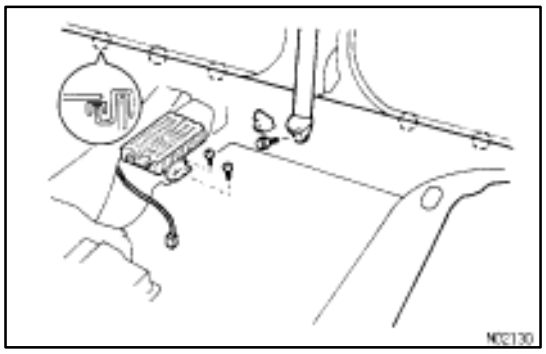
FLOOR CARPET REMOVAL

BO08M–01

(See page BO–146)

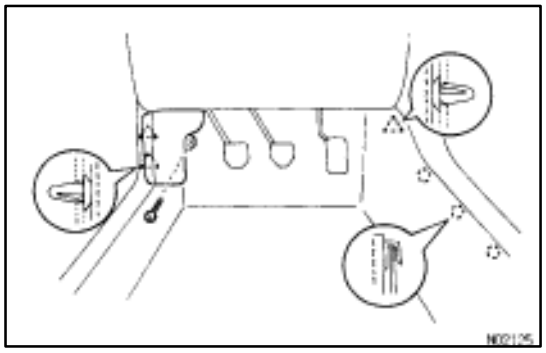
1. REMOVE FOLLOWING PARTS:

(a) Front seat
(b) Rear seat
(c) Front Inside Scuff Plate
(d) Rear inside scuff plate
(e) Rear seat side garnish
(f) Lower center pillar garnish
(g) Console box
(h) Cowl side trim



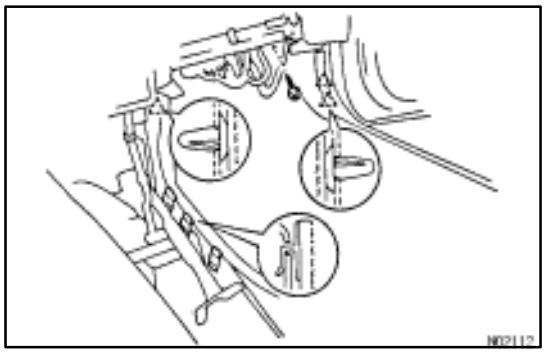
2. REMOVE FLOOR CARPET

(a) Remove the front seat belt lower bolt.
(b) Remove two bolts and the power amprifire.
(c) Disconnect the connector.



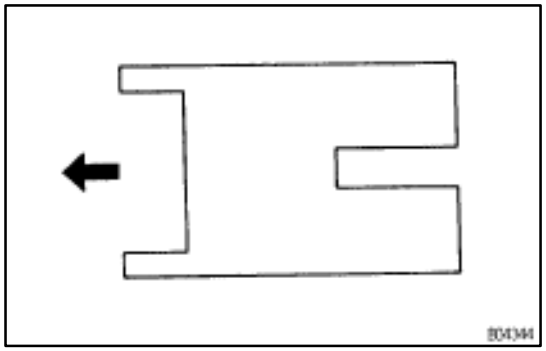
[Driver's Side]

(c) Remove the screw and the cowl side trim.
(d) Using a clip remover, remove the clips.
(e) Raise the end of the carpet and disconnect the hook.



[Passenger's Side]

(f) Using a clip remover, remove the clips.
(g) Raise the end of the carpet and disconnect the hook.



(h) Slide the carpet backward and remove it.

FLOOR CARPET INSTALLATION

BO074–01

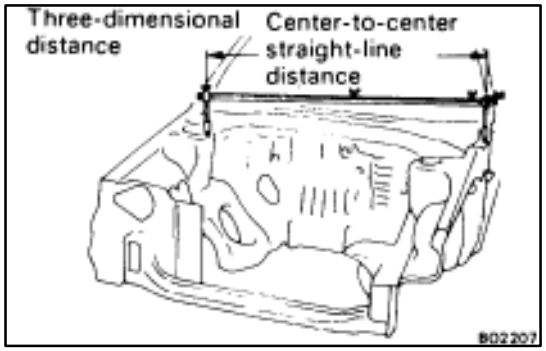
(See page BO–146)

INSTALL FLOOR CARPET PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

HINT: Torque following parts

(a) Front seat belt lower anchor bolt.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Front Seat
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

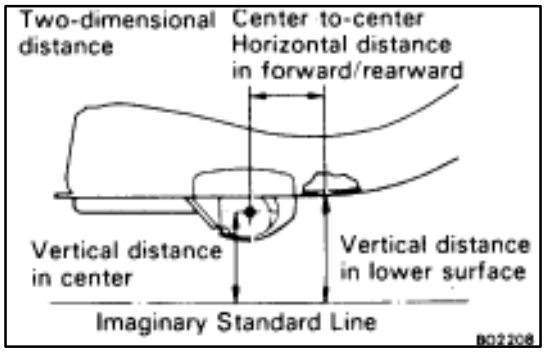


BODY DIMENSIONS
GENERAL INFORMATION

BO03G–01

1. BASIC DIMENSIONS

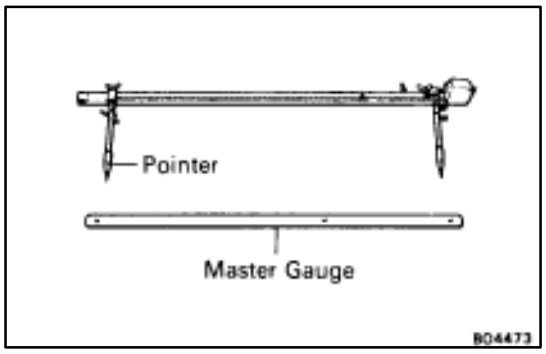
(a) There are two types of dimensions in the diagram.
(Three–dimensional distance)
- Straight–line distance between the centers of two measuring points.



(Two–dimensional distance)
- Horizontal distance in forward / rearward between the centers of two measuring points.
- The height format imaginary standard line.

(b) In cases in which only one dimension is given, left and right are symmetrical.

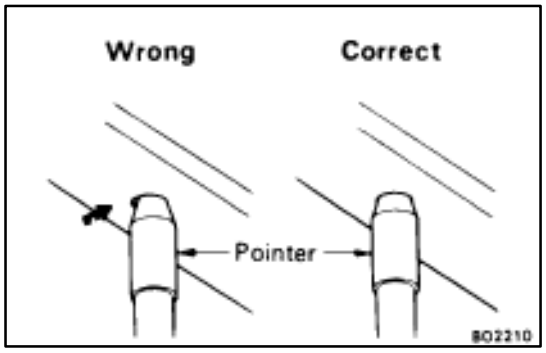
(c) The dimensions in the following drawing indicate actual distance. Therefore, please use the dimensions as a reference.



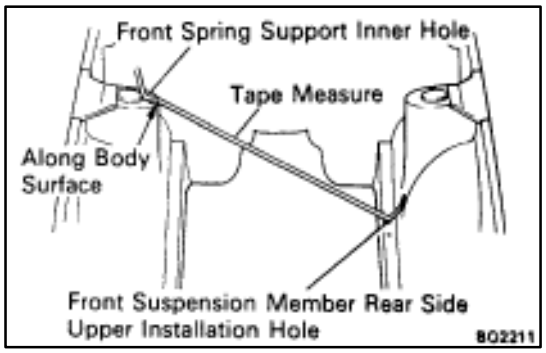
2. MEASURING

(a) Basically, all measurements are to be done with a tacking gauge. For portions where it is not possible to use a tracking gauge, a tape measure should be used.

(b) Use only a tracking gauge that has no looseness in the body, measuring plate, or pointers.



HINT:
1. The height of the left and right pointers must be equal.
2. Always calibrate the tracking gauge before measuring or after adjusting the pointer height.
3. Take care not to drop the tracking gauge or otherwise shock it.
4. Confirm that the pointers are securely in the holes.



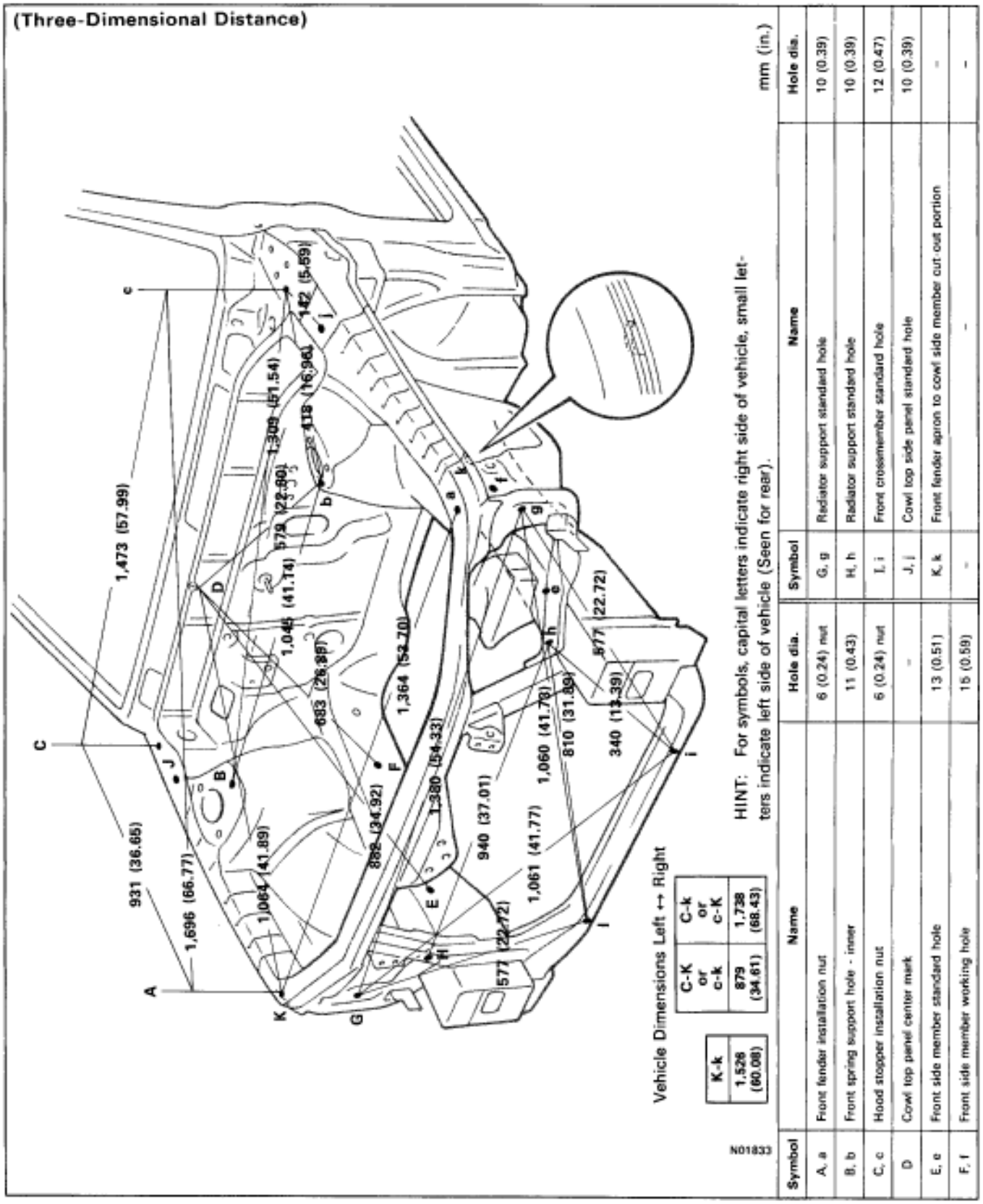
(c) When using a tape measure, avoid twists and bends in the tape.

(d) When tracking a diagonal measurement from the front spring support inner hole to the suspension member upper rear installation hole, measure along the front spring support panel surface.

BODY DIMENSIONS

BO03H–01

ENGINE COMPARTMENT

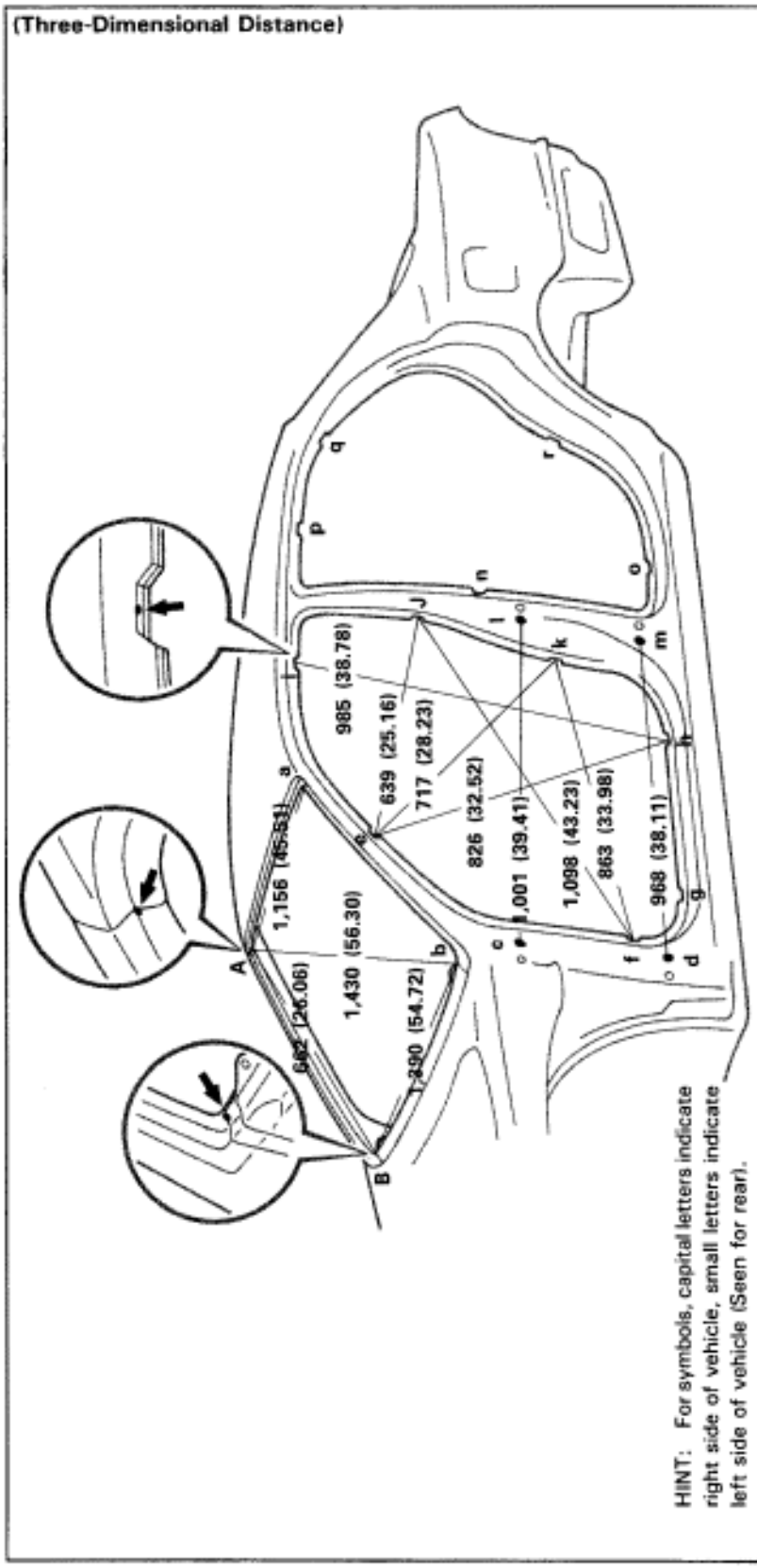


Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Front fender installation nut	6 (0.24) nut	G, g	Radiator support standard hole	10 (0.39)
B, b	Front spring support hole - inner	11 (0.43)	H, h	Radiator support standard hole	10 (0.39)
C, c	Hood stopper installation nut	6 (0.24) nut	I, i	Front crossmember standard hole	12 (0.47)
D	Cowl top panel center mark	-	J, j	Cowl top side panel standard hole	10 (0.39)
E, e	Front side member standard hole	13 (0.51)	K, k	Front fender apron to cowl side member cut-out portion	-
F, f	Front side member working hole	16 (0.59)	-	-	-

V00172

BODY OPENING AREAS (Side View: Front)

(Three-Dimensional Distance)



HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen for rear).

Vehicle Dimensions Left ↔ Right

E-e	F-f	G-g	H-h	I-i	J-j	K-k
1,300 (51.18)	1,468 (57.80)	1,492 (58.74)	1,492 (58.74)	1,104 (43.46)	1,388 (54.65)	1,462 (57.56)

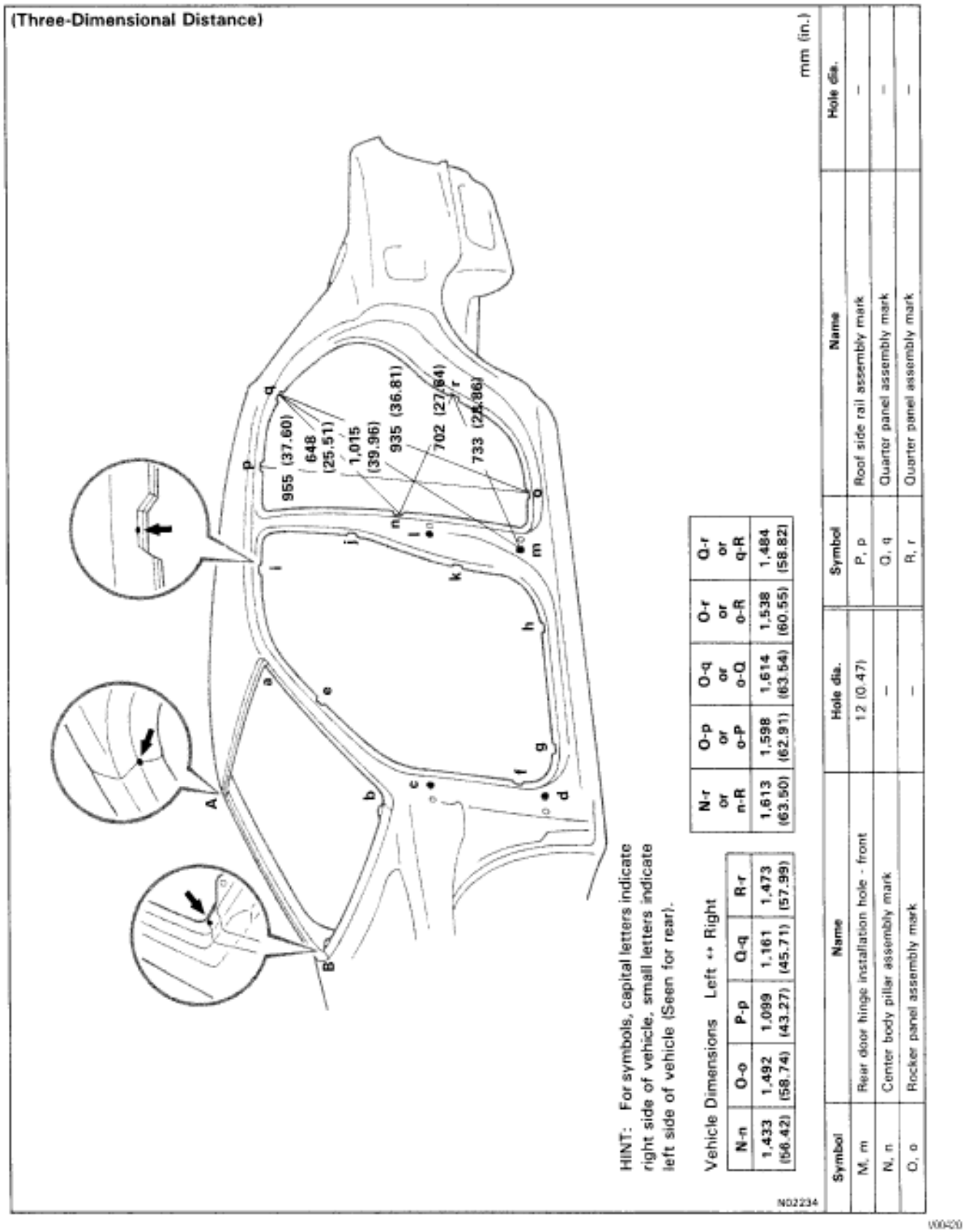
E-f or e-F	E-h or e-H	E-j or e-J	F-j or f-J	F-k or f-K	H-i or h-I	H-j or h-J
1,542 (60.71)	1,619 (66.57)	1,488 (58.58)	1,801 (70.91)	1,700 (66.93)	1,618 (63.70)	1,635 (64.37)

Symbol	Name	Hole dia.
A, a	Roof panel/front body pillar adjoining portion	–
B, b	Cowl top panel/front body pillar adjoining portion	–
C, c	Front door hinge installation nut - rear	10 (0.39) nut
D, d	Front door hinge installation nut - rear	10 (0.39) nut
E, e	Front body pillar assembly mark	–
F, f	Front body pillar assembly mark	–
G, g	Rocker panel assembly mark	–

Symbol	Name	Hole dia.
H, h	Rocker panel assembly mark	–
I, i	Roof side rail assembly mark	–
J, j	Center body pillar assembly mark	–
K, k	Center body pillar assembly mark	–
L, l	Rear door hinge installation hole - front	12 (0.47)
M, m	Rear door hinge installation hole - front	12 (0.47)
–	–	–

V00419

BODY OPENING AREAS (Side View: Rear)



Vehicle Dimensions Left ↔ Right

N-n	O-o	P-p	Q-q	R-r
1,433 (56.42)	1,492 (58.74)	1,099 (43.27)	1,161 (45.71)	1,473 (57.99)

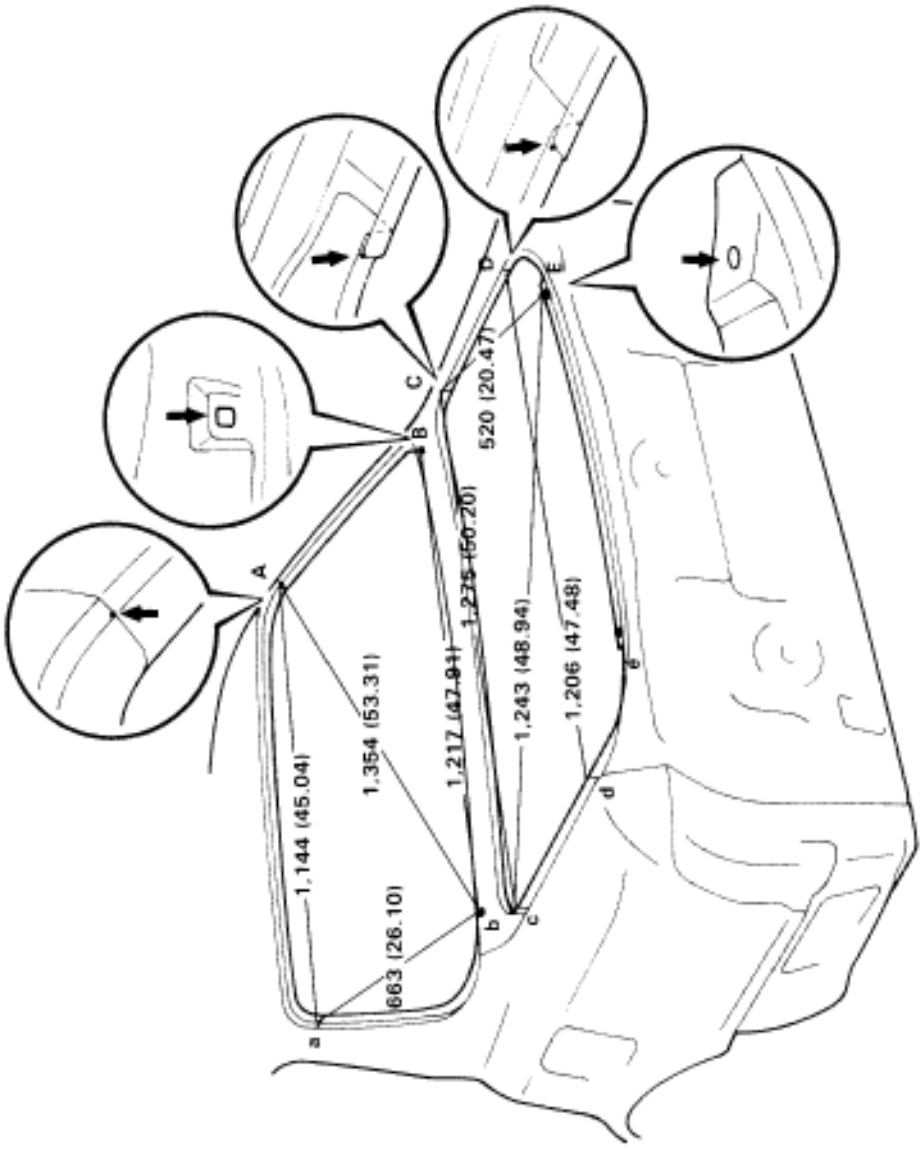
N-r or n-R	O-p or o-P	O-q or o-Q	O-r or o-R	Q-r or q-R
1,613 (63.50)	1,598 (62.91)	1,614 (63.54)	1,538 (60.55)	1,484 (58.82)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
M, m	Rear door hinge installation hole - front	12 (0.47)	P, p	Roof side rail assembly mark	–
N, n	Center body pillar assembly mark	–	Q, q	Quarter panel assembly mark	–
O, o	Rocker panel assembly mark	–	R, r	Quarter panel assembly mark	–

V00420

BODY OPENING AREA (Rear View)

(Three-Dimensional Distance)



mm (in.)

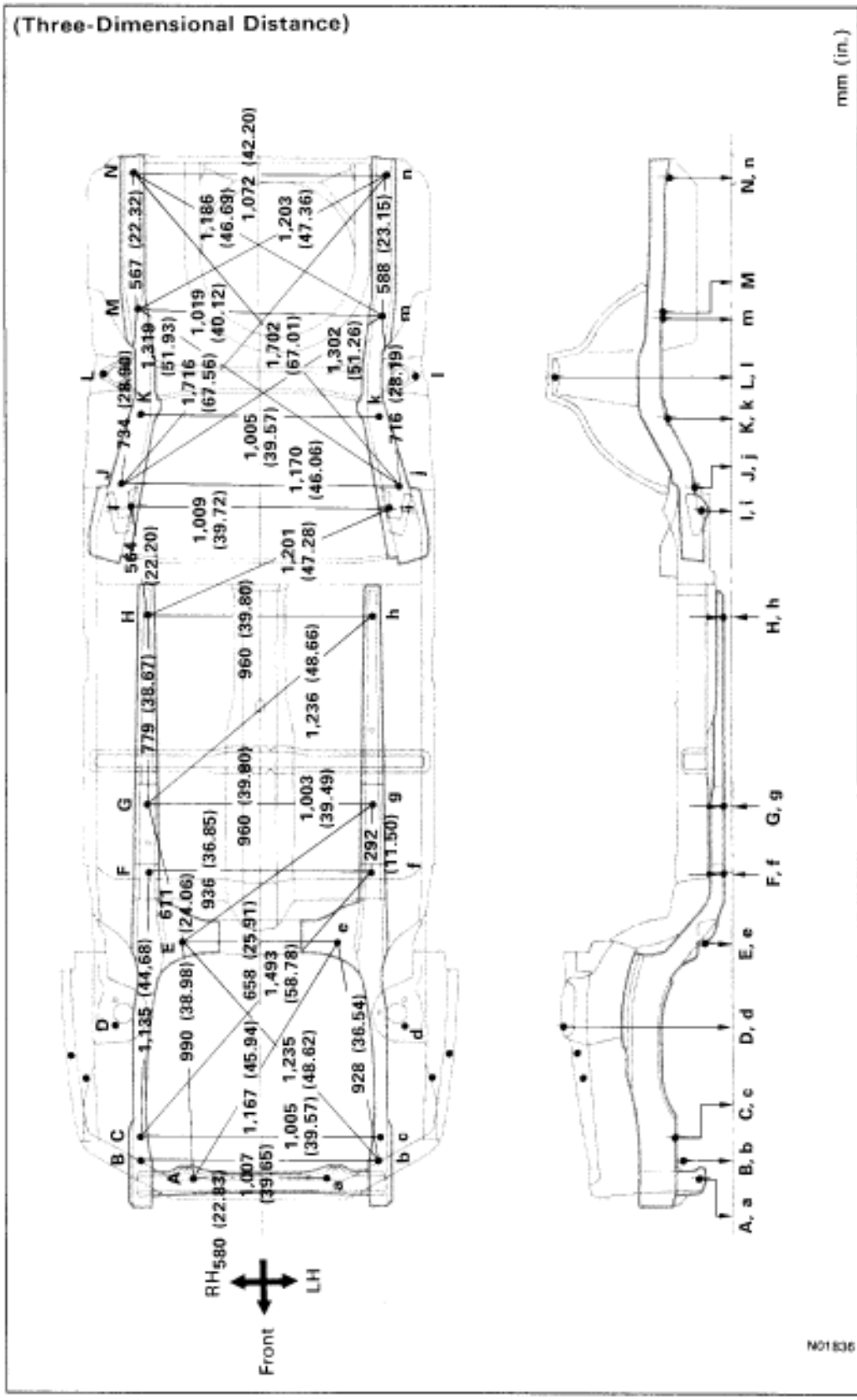
Symbol	Name	Hole dia.
A, a	Roof panel/quarter panel adjoining portion	–
B, b	Back window moulding installation hole	11 × 7 (0.43 × 0.28)
C, c	Quarter panel/upper back panel adjoining portion	–

Symbol	Name	Hole dia.
D, d	Luggage opening trough/Quarter panel adjoining portion	–
E, e	Rear lower finish plate installation hole	8.5 (0.335)
–	–	–

N02235

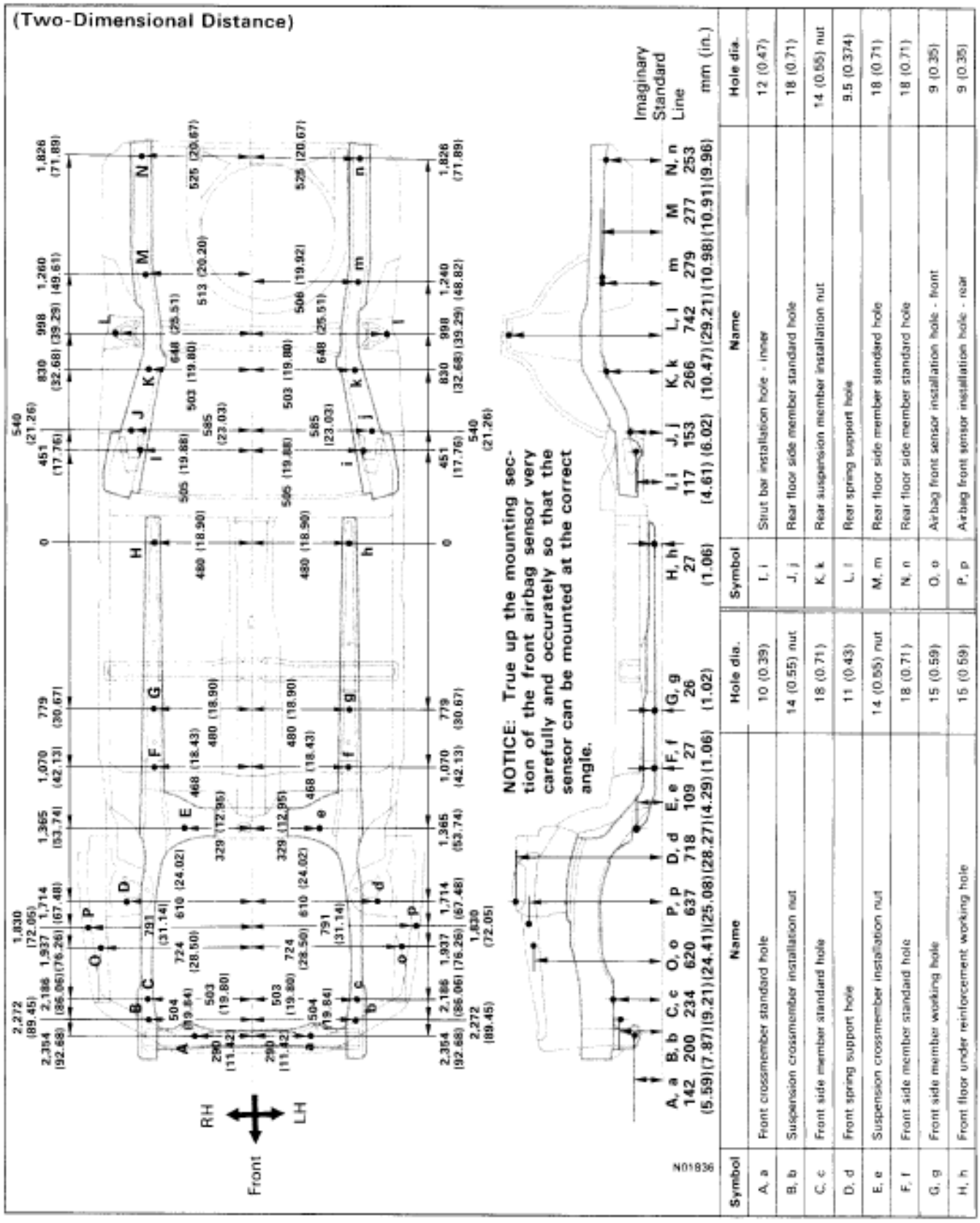
V00421

UNDER BODY



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Front crossmember standard hole	10 (0.39)	H, h	Front floor under reinforcement working hole	15 (0.59)
B, b	Suspension crossmember installation nut	14 (0.55) nut	I, i	Strut bar installation hole - inner	12 (0.47)
C, c	Front side member standard hole	18 (0.71)	J, j	Rear floor side member standard hole	18 (0.71)
D, d	Front spring support hole	11 (0.43)	K, k	Rear suspension member installation nut	14 (0.55) nut
E, e	Suspension crossmember installation nut	14 (0.55) nut	L, l	Rear spring support hole	9.5 (0.374)
F, f	Front side member standard hole	18 (0.71)	M, m	Rear floor side member standard hole	18 (0.71)
G, g	Front side member working hole	15 (0.59)	N, n	Rear floor side member standard hole	18 (0.71)

UNDER BODY (Cont'd)

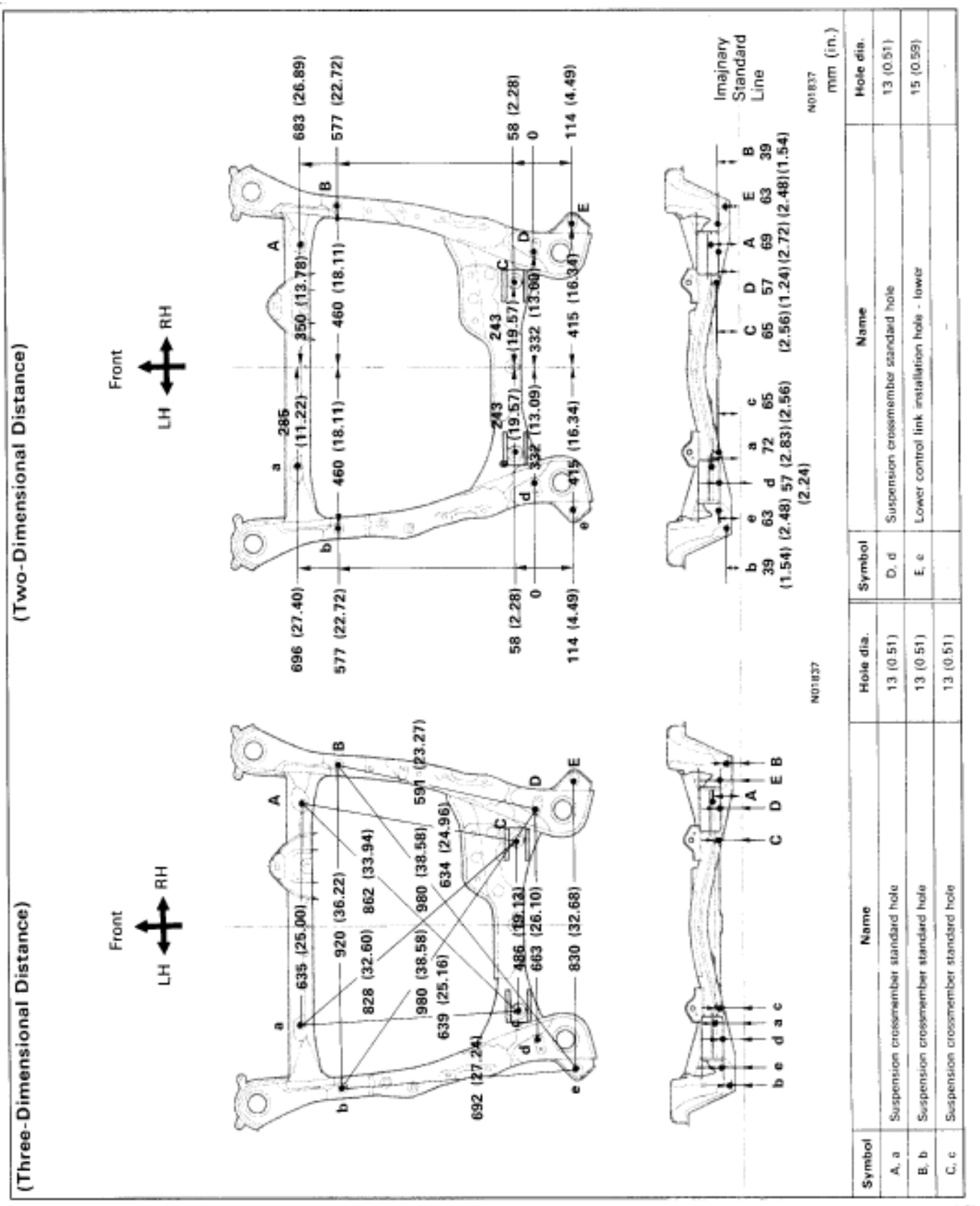


Symbol	Name	Hole dia.
A, a	Front crossmember standard hole	10 (0.39)
B, b	Suspension crossmember installation nut	14 (0.55) nut
C, c	Front side member standard hole	18 (0.71)
D, d	Front spring support hole	11 (0.43)
E, e	Suspension crossmember installation nut	14 (0.55) nut
F, f	Front side member standard hole	18 (0.71)
G, g	Front side member working hole	15 (0.59)
H, h	Front floor under reinforcement working hole	15 (0.59)

Symbol	Name	Hole dia.
I, i	Strut bar installation hole - inner	12 (0.47)
J, j	Rear floor side member standard hole	18 (0.71)
K, k	Rear suspension member installation nut	14 (0.55) nut
L, l	Rear spring support hole	9.5 (0.374)
M, m	Rear floor side member standard hole	18 (0.71)
N, n	Rear floor side member standard hole	18 (0.71)
O, o	Airbag front sensor installation hole - front	9 (0.35)
P, p	Airbag front sensor installation hole - rear	9 (0.35)

V00177

SUSPENSION CROSSMEMBER



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Suspension crossmember standard hole	13 (0.51)	D, d	Suspension crossmember standard hole	13 (0.51)
B, b	Suspension crossmember standard hole	13 (0.51)	E, e	Lower control link installation hole - lower	15 (0.59)
C, c	Suspension crossmember standard hole	13 (0.51)			

SERVICE SPECIFICATIONS
TORQUE SPECIFICATIONS

BO075–01

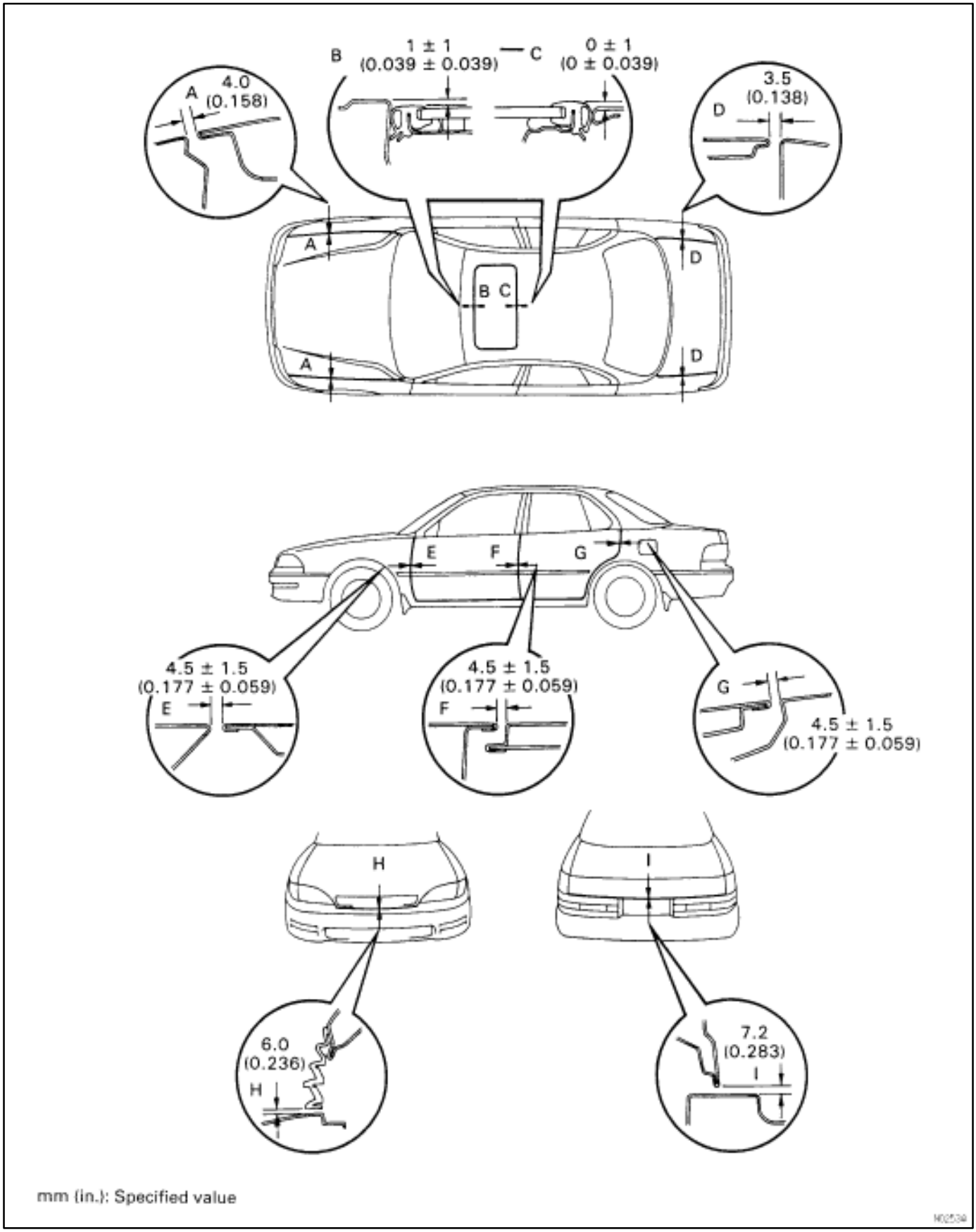
Part tightend	N·m	kgf·cm	ft·lbf
FRONT BUMPER	–	–	–
Front bumper arm X Body	8.8	90	7.8in.·lbf
Front bumper reinforciment X Front bumper arm	8.8	90	7.8in.·lbf
Bumper extension X body	21	210	15
REAR BUMPER	–	–	–
Rear bumper arm X Body	72	730	51
Rear bumper reinforcenent X Rear bumper arm	91	930	67
Rear bumper cover X Body	5.9	60	52in.·lbf
HOOD	–	–	–
Hood hinge X Hood	14	145	10
Hood support X Hood	19	195	14
HOOD LOCK CONTROL	–	–	–
Hood lock X Body	7.8	80	69in.·lbf
FRONT DOOR	–	–	–
Door hinge X Body	68	690	50
Door lock X Door panel	5.4	55	48in.·lbf
Window regulator X Door inside panel frame	5.4	55	48in.·lbf
REAR DOOR	–	–	–
Door hinge X Body	25	260	19
Door lock X Door panel	5.4	55	48in.·lbf
Window regulator X Door inside panel frame	5.4	55	48in.·lbf
LUGGAGE COMPARTMENT	–	–	–
Luggage compartment door hinge X Luggage comparment door	7.8	80	69in.·lbf
WIPER AND WASHER	–	–	–
Wiper arm X Wiper link	19	195	14
SLIDING ROOF	–	–	–
Drive gear X Body	5.4	55	48in.·lbf
INSTRUMENT PANEL	–	–	–
Steering column X Instrument panel reinforcement	35	360	26
FRONT SEAT	–	–	–
Seat back X Body	37	375	27
Power seat regulator X Seat back	37	375	27
Power seat regulator X Seat cushion spring	19	195	14
Horizontal jack screw X Seat truck	12	120	8.7
Motor support bracket X Motor	2.5	25	22in.·lbf
Power seat housing X Horizontal jack screw	3.4	35	30in.·lbf
Vertical housing X Vertical rod	3.4	35	30in.·lbf
REAR SEAT	–	–	–
Seat back X Body	19	195	14

TORQUE SPECIFICATIONS (Cont'd)

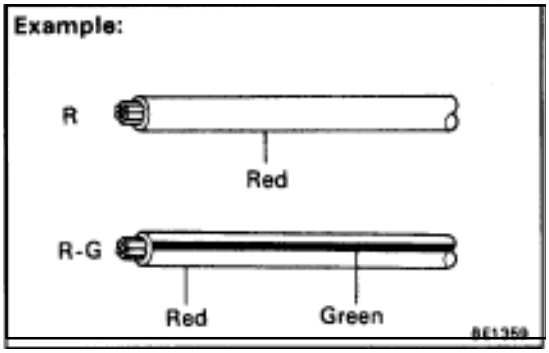
Part tightend	N·m	kgf·cm	ft·lbf
FRONT SEAT BELT	–	–	–
Shoulder anchor X Seat belt adjuster	43	440	32
Outer belt anchor X Body	43	440	32
Retractor X Body	8.0	80	69in.·lbf
Seat belt adjuster X Body	43	440	32
Inner belt X Seat	43	440	32
REAR SEAT BELT	–	–	–
Outer belt anchor X Body	43	440	32
Retractor X Body	43	440	32
Inner belt X Body	43	440	32

SPECIFICATIONS (Fitting Adjustment)

BO08C–01



BODY ELECTRICAL SYSTEM



GENERAL INFORMATION

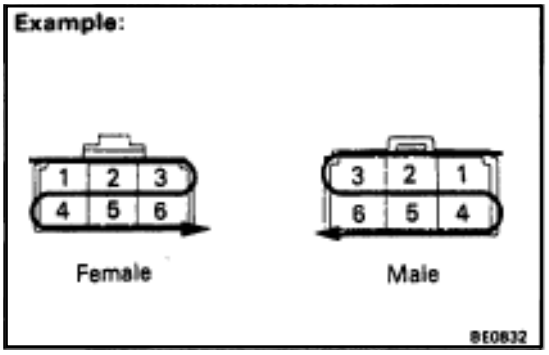
WIRING COLOR CODE

BE0M6–01

Wire colors are indicated by an alphabetical code.

B	=Black	L	=Blue	R	=Red
BR	=Brown	LG	=Light Green	V	=Violet
G	=Green	O	=Orange	W	=White
GR	=Gray	P	=Pink	Y	=Yellow

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

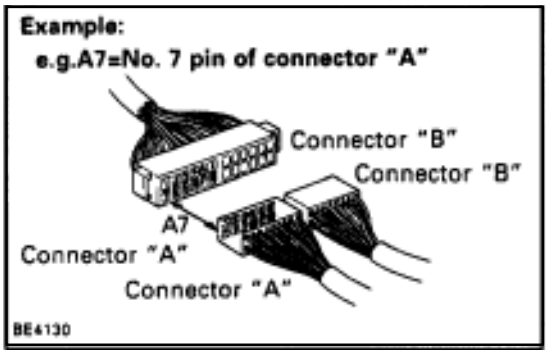


CONNECTOR

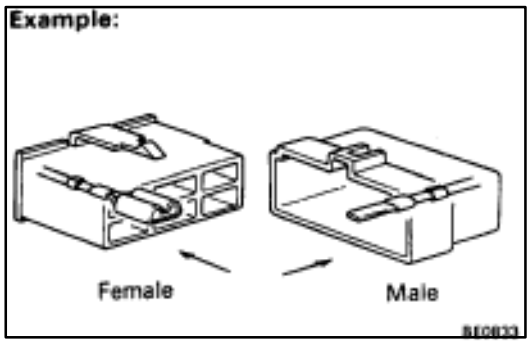
BE0M7–01

1. PIN NUMBERS OF FEMALE CONNECTOR
Numbered in order from upper left to lower right.

2. PIN NUMBERS OF MALE CONNECTOR
Numbered in order from upper right to lower left.



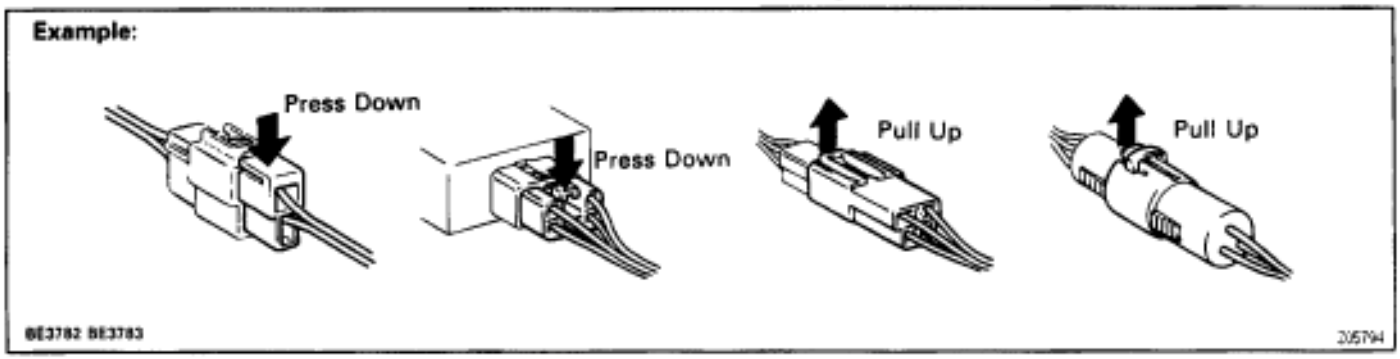
HINT: When connectors with different of the same number of terminals are used with the same parts, each connector name (letter of the alphabet) and pin number is specified.

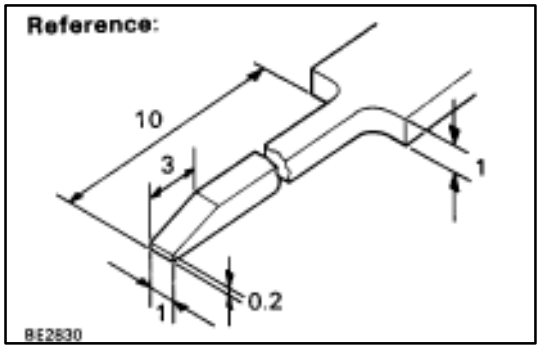


3. DISTINCTION OF MALE AND FEMALE CONNECTORS
Male and female connectors are distinguished by shape of their internal pins.

(a) All connectors are shown from the open end, and the lock is on top.

(b) To pull apart the connectors, pull on the connector itself, not the wires.
HINT: Check to see what kind of connector you are disconnecting before pulling apart.





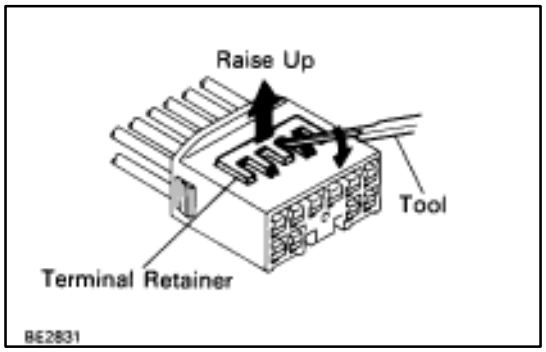
HOW TO REPLACE TERMINAL

(with terminal retainer or secondary locking device)

1. PREPARE THE SPECIAL TOOL

HINT: To remove the terminal from the connector, please construct and use the special tool or like object shown on the left.

2. DISCONNECT CONNECTOR



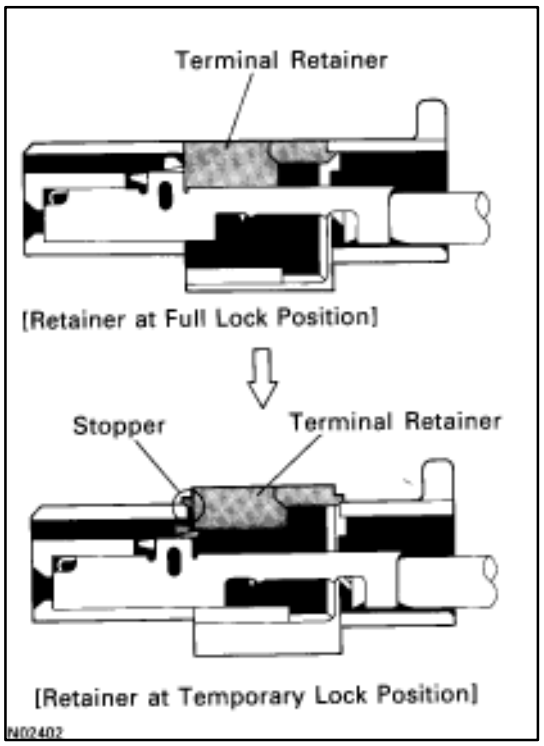
3. DISENGAGE THE SECONDARY LOCKING DEVICE OR TERMINAL RETAINER

(a) Locking device must be disengaged before the terminal locking clip can be released and the terminal removed from the connector.

(b) Use a special tool or the terminal pick to unlock the secondary locking device or terminal retainer.

NOTICE:

Do not remove the terminal retainer from connector body.

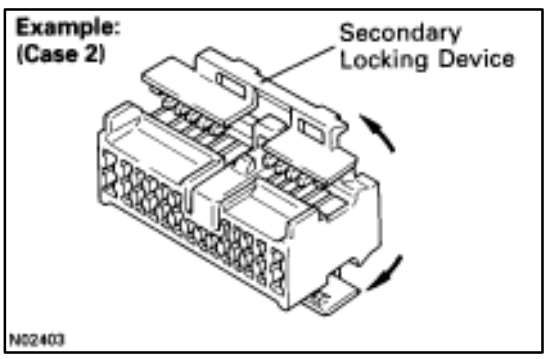


(**A**) For Non–Waterproof Type Connector

HINT: The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

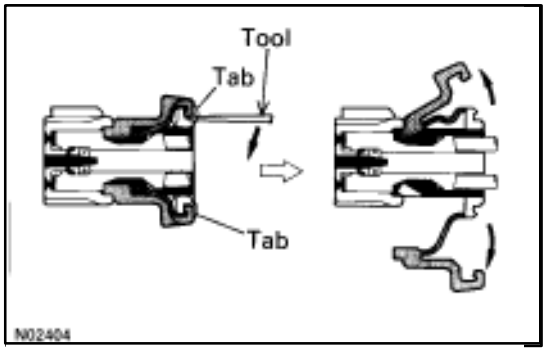
"Case 1"

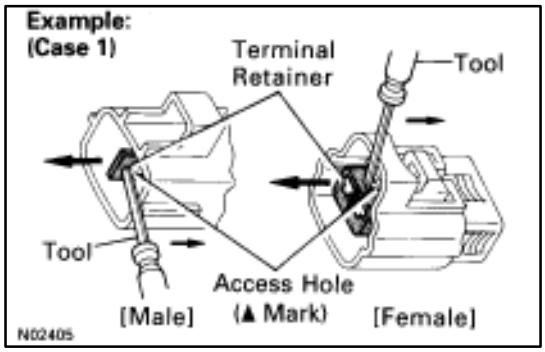
Raise the termlinal retainer up to the temporary lock position.



"Case 2"

Open the secondary locking device



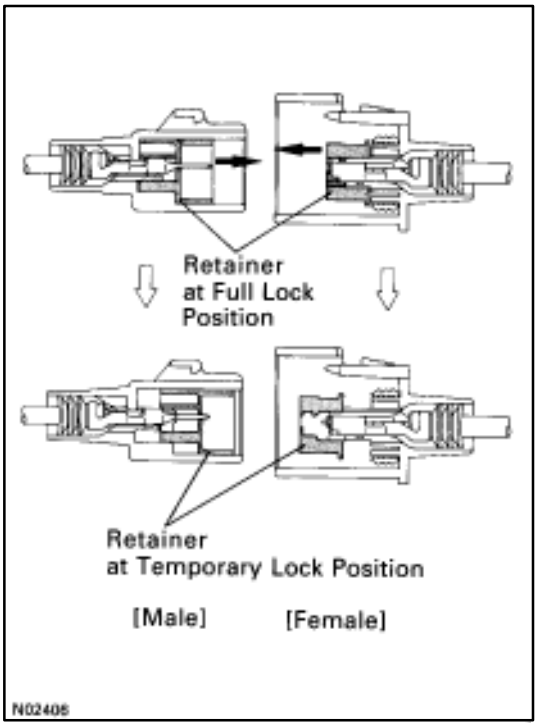


B For Waterproof Type Connector

HINT: Terminal retainer color is different according to connector body.

Example:

Terminal Retainer:	Connector Body
Black or White:	Gray
Black or White:	Dark Gray
Gray or White:	Black

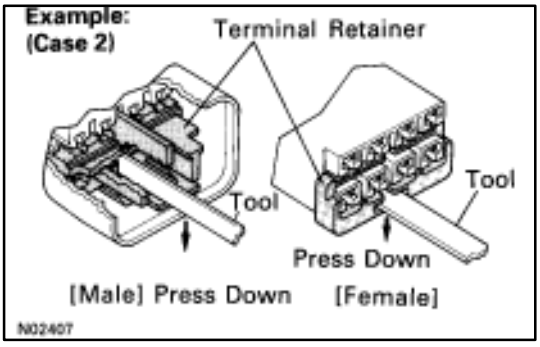


”Case 1”

Type where terminal retainer is pulled up to the temporary lock position (Pull Type).

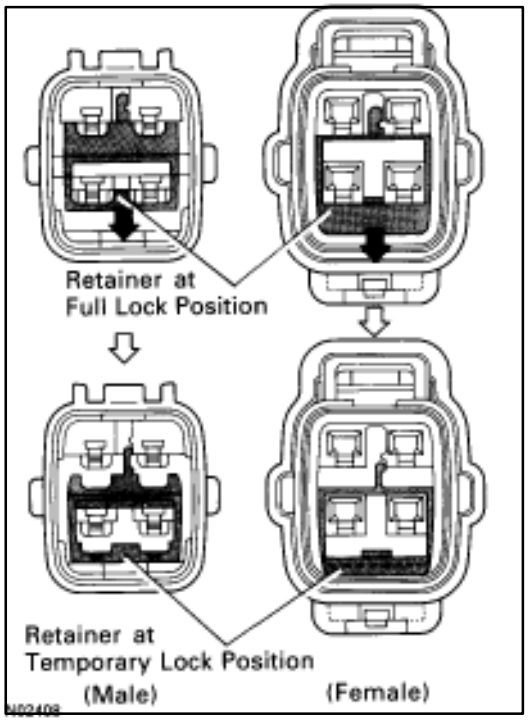
Insert the special tool into the terminal retainer access hole (Mark) and pull the terminal retainer up to the temporary lock position.

HINT: The needle insertion position varies according to the connector’s shape (Number of terminals etc.), so check the position before inserting it.

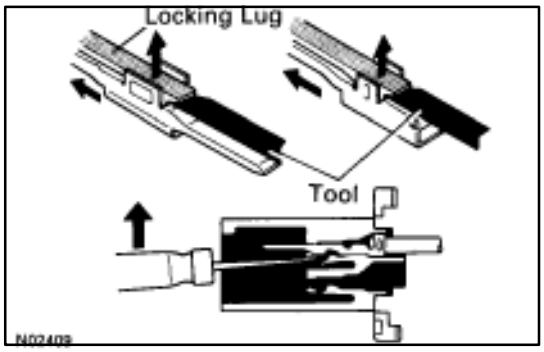


”Case 2”

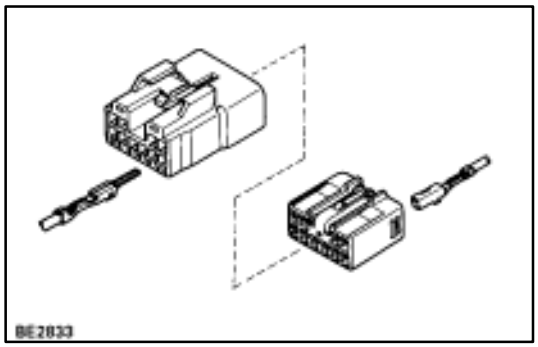
Type which cannot be pulled as far as Power Lock



Insert the tool straight into the access hole of terminal retainer as shown.
Push the terminal retainer down to the temporary lock position.



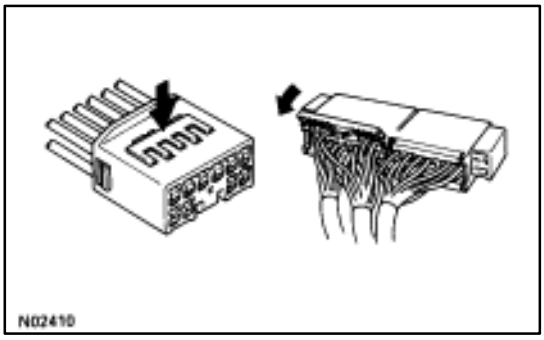
(c) Release the locking lug from terminal and pull the terminal out from rear.



4. INSTALL TERMINAL TO CONNECTOR

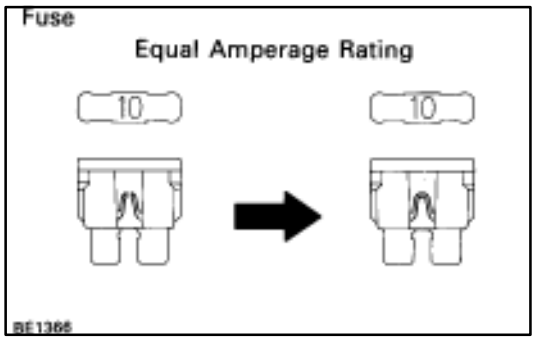
(a) Insert the terminal.

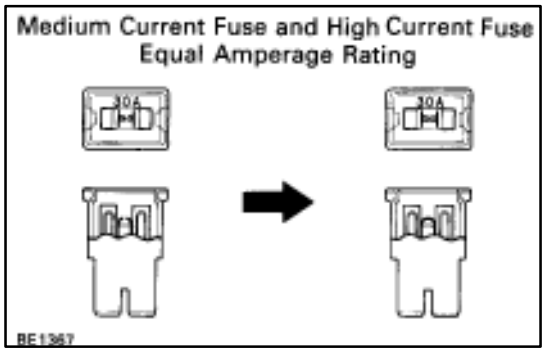
HINT:
1. Make sure the terminal is positioned correctly.
2. Insert the terminal until the locking lug locks firmly.
3. Insert the terminal with terminal retainer in the temporary lock position.

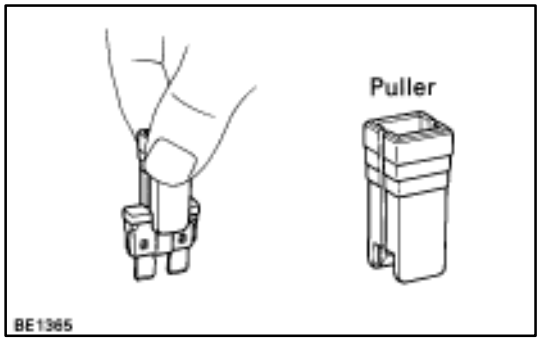


(b) Push the secondary locking device or terminal retainer in to the full lock position.

5. CONNECT CONNECTOR







REPLACEMENT OF FUSE

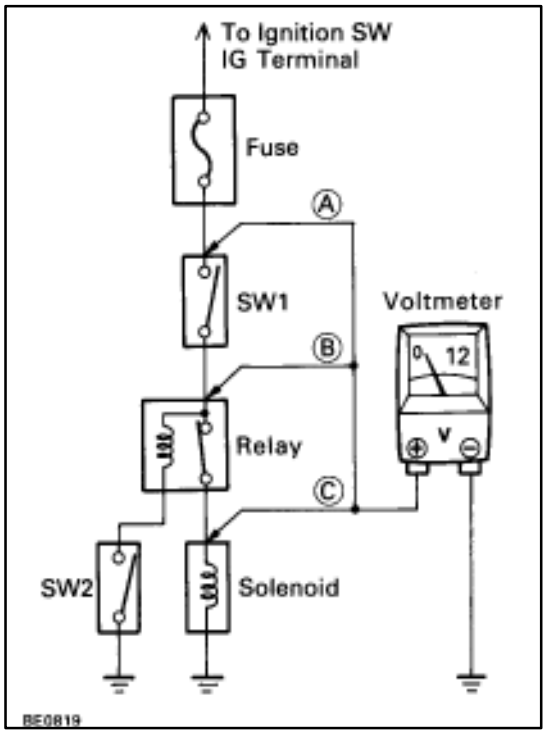
HINT: If replacing the fuse be sure to replace it with a fuse with an equal amperage rating.

NOTICE:

1. **Turn off all electrical components and the ignition switch before replacing a fuse or fusible link. Do not exceed the fuse or fusible link amperage rating.**
2. **Always use a fuse puller for removing and inserting a fuse. Remove and insert straight in and out without twisting. Twisting could force open the terminals too much, resulting in a bad connection.**

If a fuse or fusible link continues to blow, a short circuit is indicated. The system must be checked by a qualified technician.

HINT: The puller is located at Junction Block No.2.



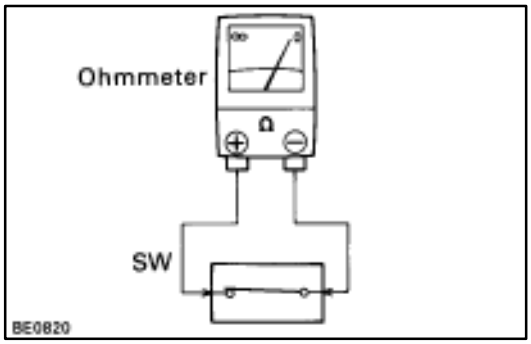
CHECK FOR VOLTAGE

BE0MB–01

(a) Establish conditions in which voltage is present at the check point.

Example:
A–Ignition SW on
B–Ignition SW and SW 1 on
C–Ignition SW, SW 1 and Relay on (SW 2 off)

(b) Using a voltmeter, connect the negative (–) lead to a good ground point or negative (–) battery terminal and the positive (+) lead to the connector or component terminal. This check can be done with a test bulb instead of a voltmeter.

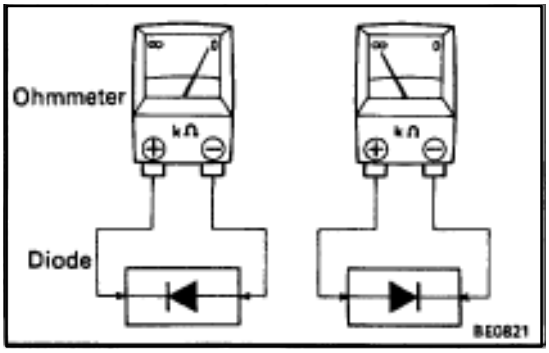


CHECK FOR CONTINUITY AND RESISTANCE

BE0MG–02

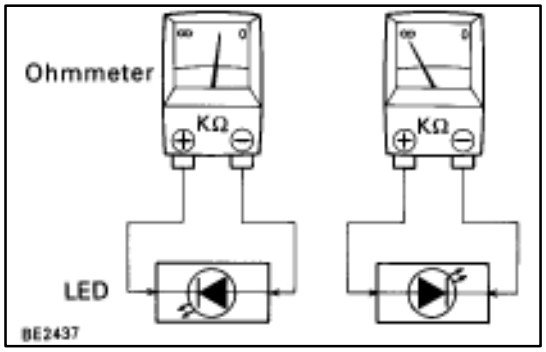
(a) Disconnect the battery terminal or wire so there is no voltage between the check points.

(b) Contact the two leads of an ohmmeter to each of the check points.



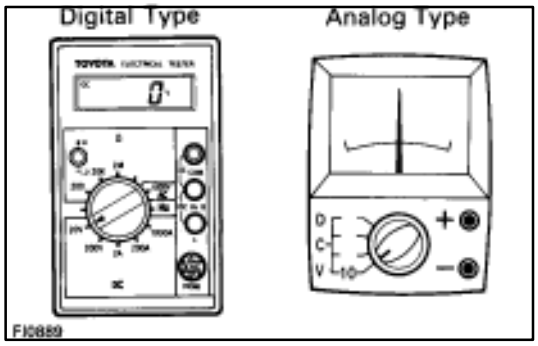
If the circuit has diodes, reverse the two leads and check again.
When contacting the negative (–) lead to the diode positive (+) side and the positive (+) lead to the negative (–) side, there should be continuity. When contacting the two leads in reverse, there should be no continuity.

HINT: Specifications may vary depending on the type of tester, so refer to the tester's instruction manual before performing the inspection.

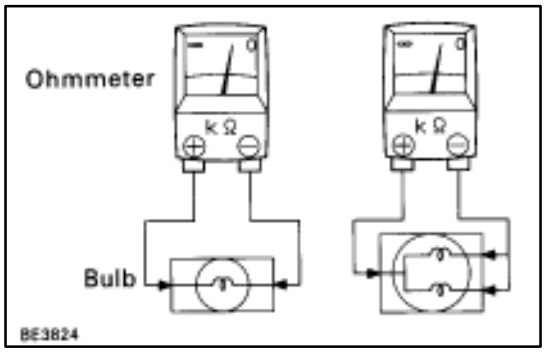


Check LED (Light Emitting Diode) in the same manner as that for diodes.
HINT:

- Use a tester with a power source of 3 V or greater to overcome the circuit resistance.
- If a suitable tester is not available, apply battery positive voltage and check that the LED lights up.



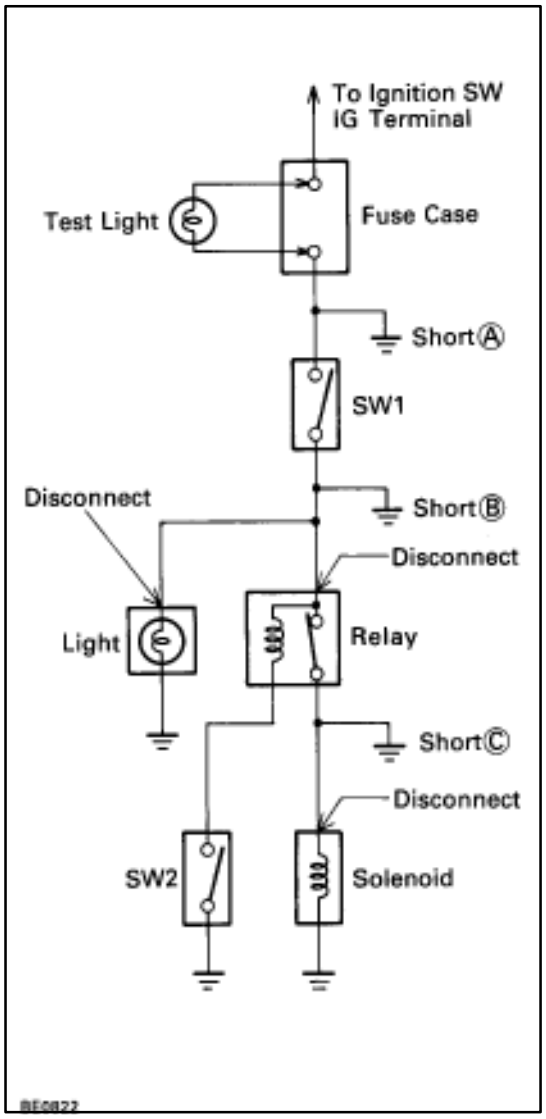
(c) Use a volt/ohmmeter with high impedance (10 k/V minimum) for troubleshooting of the electrical circuit.



CHECK THE BULB

BE0MD–01

(a) Remove the bulb.
(b) There should be continuity between the respective terminals of the bulb together with a certain amount of resistance.
(c) Apply the two leads of the ohmmeter to each of the terminals.
(d) Apply battery positive voltage and check that the bulb light up.



CHECK FOR SHORT CIRCUIT

BE0ME–01

(a) Remove the blown fuse and eliminate all loads from the fuse.
(b) Connect a test bulb in place of the fuse.
(c) Establish conditions in which the test bulb comes on.
Example:
A–Ignition SW on
B–Ignition SW and SW 1 on
C–Ignition SW, SW 1 and Relay on (Connect the Relay) and SW 2 off (or Disconnect SW 2)
(d) Disconnect and reconnect the connectors while watching the test bulb. The short lies between the connector where the test bulb stays lit and the connector where the bulb goes out.
(e) Find the exact location of the short by lightly shaking the problem wire along the body.

PRECAUTIONS

BE0MF–03

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. SRS AIR–BAG SYSTEM

Work must be started approx. 30 seconds after the ignition is set to the Lock position and the negative (–) terminal cable is disconnected from the battery. (See page AB–2)

When disconnecting any of the connectors in the SRS AIR–BAG system, be sure to Lock the ignition switch and disconnect the battery negative (–) terminal first. Since the connectors are twin lock type connectors, disconnect the conncetors only after releasing the first stage lock.

When connecting SRS AIR–BAG system connectors, be sure to lock them securely. (If the connectors are not locked securely, the system may not operate when needed.)

Always store the steering wheel pad with the pad surface facing upward. (Storing the pad with its metallic surface up may lead to a serious accident if the air bag inflates for some reason.)

When installing the spiral cable, be sure the vehicle is in the straight ahead condition and confirm that the spiral cable is in the neutral position when it is installed. (See page BE–46)

INFORMATION LABELS (NOTICE) are attached to the periphery of the air bag components. Follow the NOTICE.

2. AUDIO SYSTEM

If the battery negative (–) terminal is disconnected, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to note the stations and reset them after the battery terminal is reconnected.

If the battery negative (–) terminal is disconnected, the ”ANTI–THEFT SYSTEM” will operate when the terminal 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.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

BEOMG–01

	09213–31021	Crankshaft Pulley Puller	For removing steering wheel

RECOMMENDED TOOLS

BEOMH–03

	09082-00015	TOYOTA Electrical Tester	
	09041-00030	Trox Driver T30	For removing and installing steering wheel pad
	09042-00010	Trox Socket T30	For removing and installing steering wheel pad

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Engine oil level warning switch, Seat heater
Syphon	Brake fluid level warning switch
Oil bath	Engine oil level warning switch
Bulb (3.4 W)	Fuel sender gauge, Seat belt warning relay
Bulb (21 W)	Turn signal flasher relay
Dry cell battery	Fuel sender gauge
Heat light	Seat heater
Torque wrench	
Masking tape	Rear window defogger wire
Tim foil	Rear window defogger wire

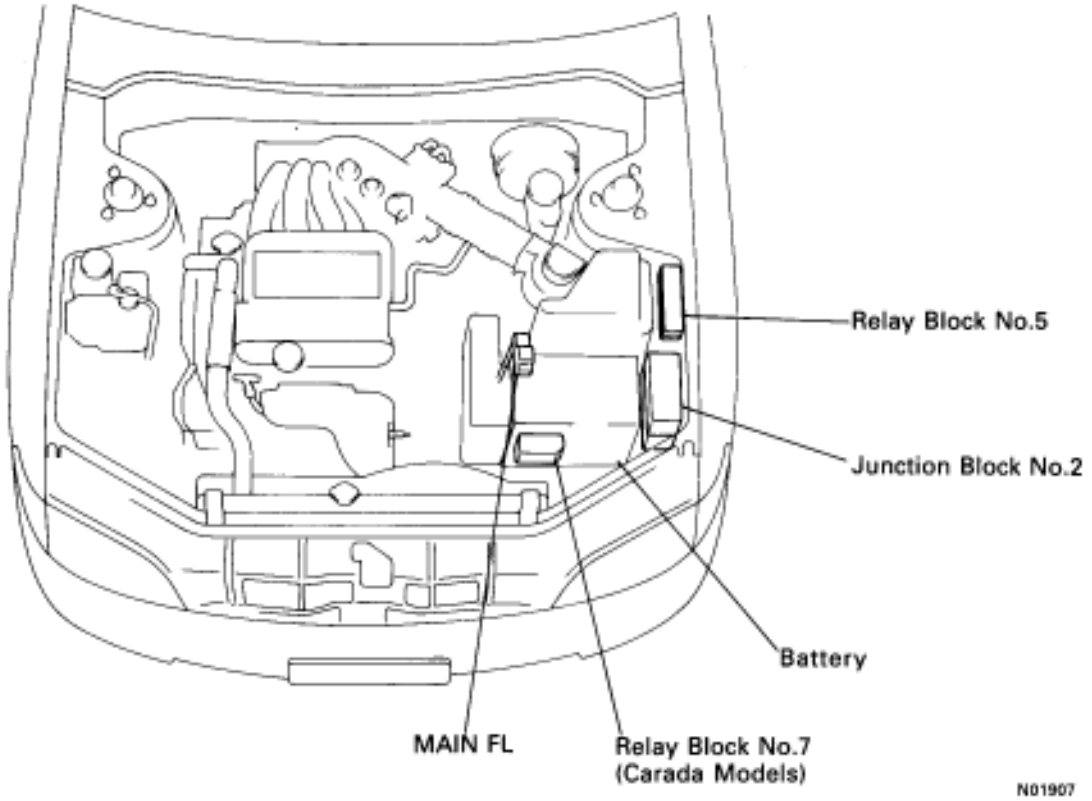
SSM (SPECIAL SERVICE MATERIALS)

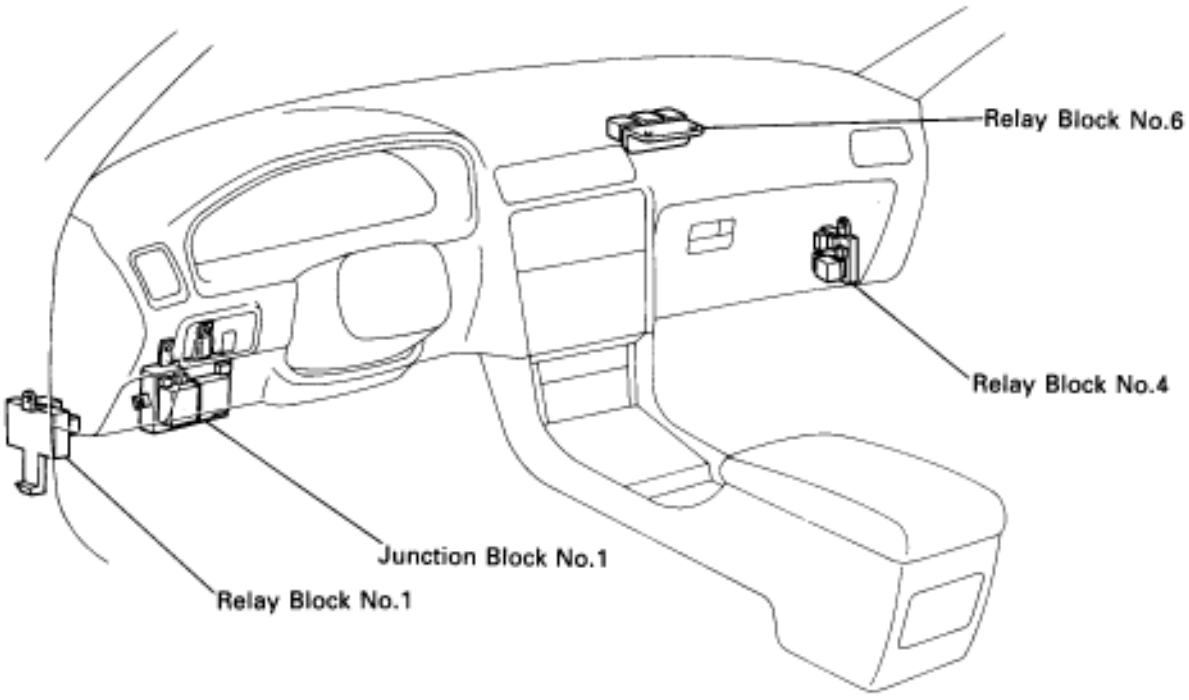
08833–00070	Adhesive 1344 Three bond 1344, Loctite 242 or equivalent	Low oil pressure warning switch Engine coolant temperature sender
–	Dupont paste No.4817	Rear window defogger wire

POWER SOURCE

BE0ML–01

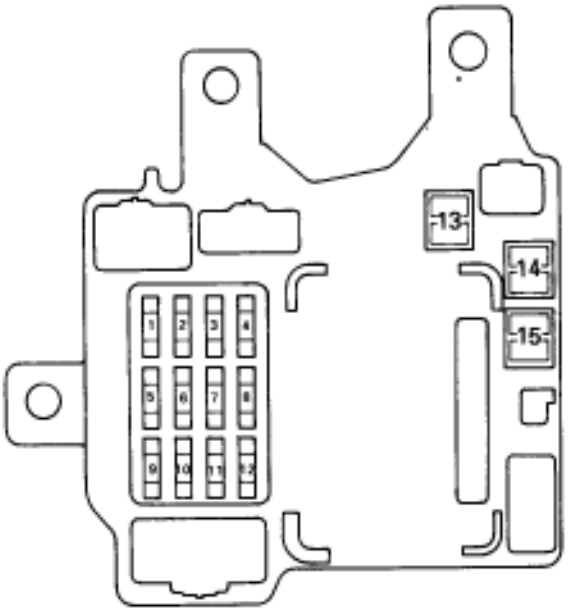
PARTS LOCATION





JUNCTION BLOCK No.1

- **Front Side**



N01803

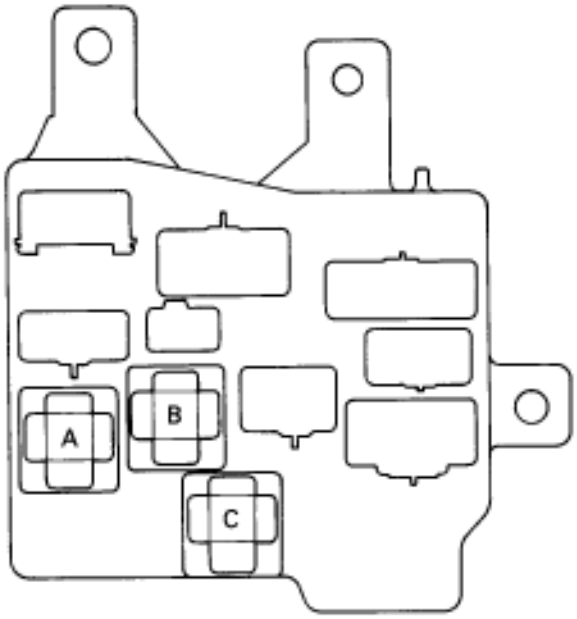
Fuses

1	ECU-IG	15 A
2.	GAUGE	10 A
3.	STOP	25 A
4.	SEAT HTR	15 A
5.	WIPER	20 A
6.	TURN	7.5 A
7.	IG2	7.5 A
8.	CIG/RADIO	15 A
9.	MIR HTR	10 A
10.	TAIL	15 A
11.	ECU-B	15 A
12.	—	

Medium Current Fuses

13.	AMI	40 A
14.	P/W	30 A
15.	DEF	40 A

- **Back Side**

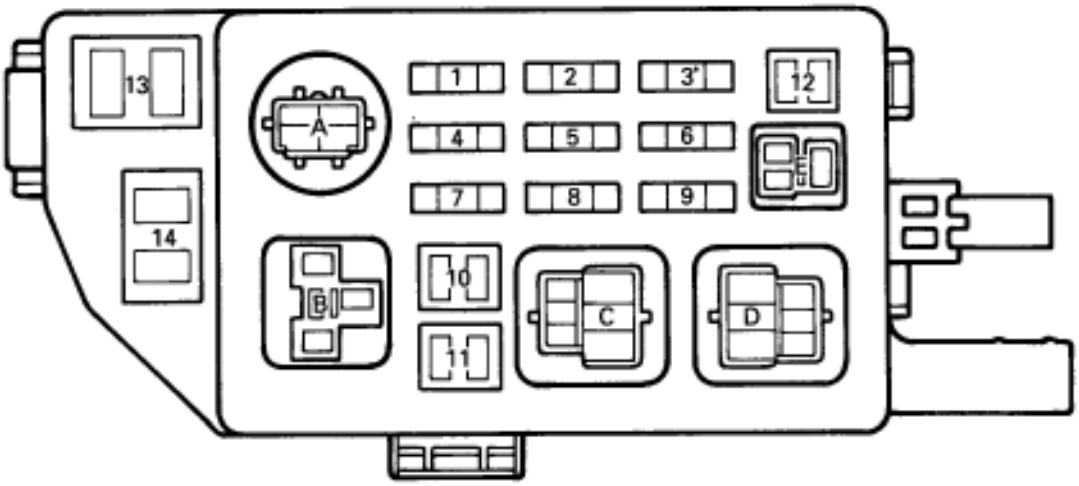


N01804

Relays

A. Power Main
B. Taillight Control
C. Defogger

JUNCTION BLOCK No.2



Fuse

1.	STARTER	10 A
2.	ALT-S	7.5 A
3.	SFI	15 A
4.	HEAD (RH)	15 A [USA]
	HEAD HI (RH)	15 A [Canada]
5.	DOME	20 A
6.	HAZ-HORN	15 A
7.	HEAD (LH)	15 A [USA]
	HEAD HI (LH)	15 A [Canada]
8.	—	
9.	AM2	30 A

Medium Current Fuses

10.	—	
11.	—	
12.	ST MAIN	30 A

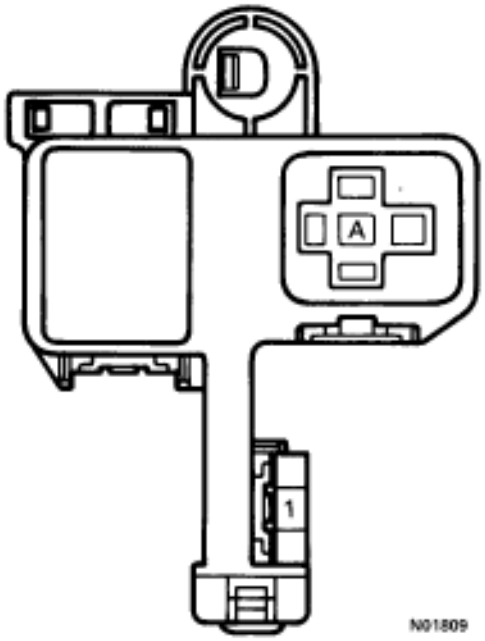
High Current Fuses

13.	ALT	100 A
14.	A.B.S.	60 A

Relays

A. SFI MAIN
B. —
C. —
D. HEAD (Headlight Control)
E. Horn

RELAY BLOCK No.1

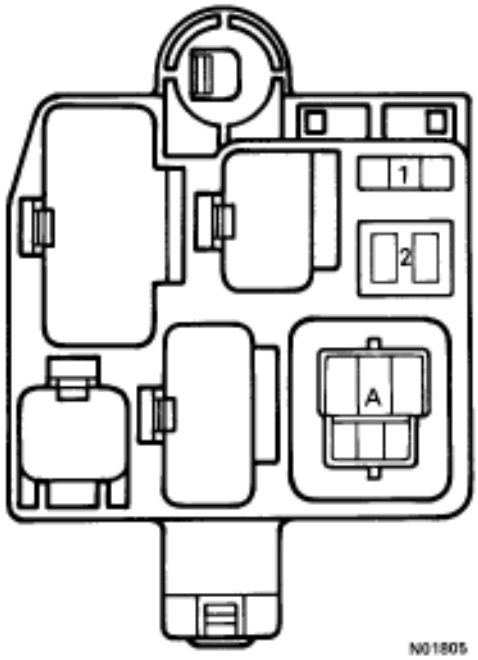


Relay
A. Fog Light

Fuse

1.	FOG	20 A

RELAY BLOCK No.4



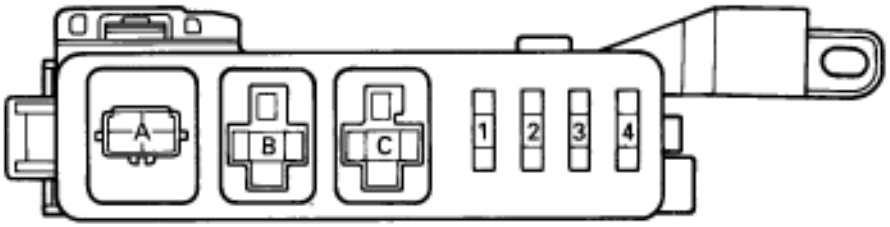
Fuse
1. —

Medium Current Fuse

2.	HTR	40 A

Relay
A. Heater

RELAY BLOCK No.5



N01806

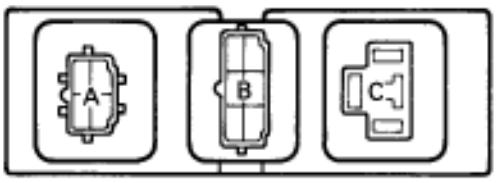
Fuses

1.	RAD	20 A
2.	TEL	15 A
3.	HEAD LO(RH)	15 A [CANADA]
4.	HEAD LO(LH)	15 A [CANADA]

Relays

A. Daytime Running Light No.2 [CANADA]
B. Magnet Clutch
C. —

RELAY BLOCK No.6

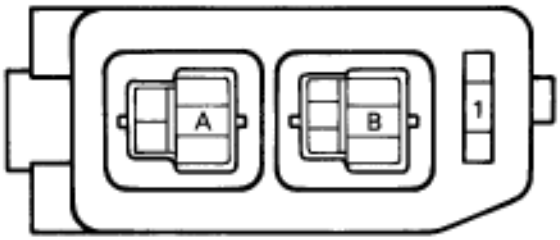


N01807

Relays

A. Starter
B. Circuit Open
C. Turn Signal Flasher

RELAY BLOCK No.7 (Canada models)



N01808

Fuse

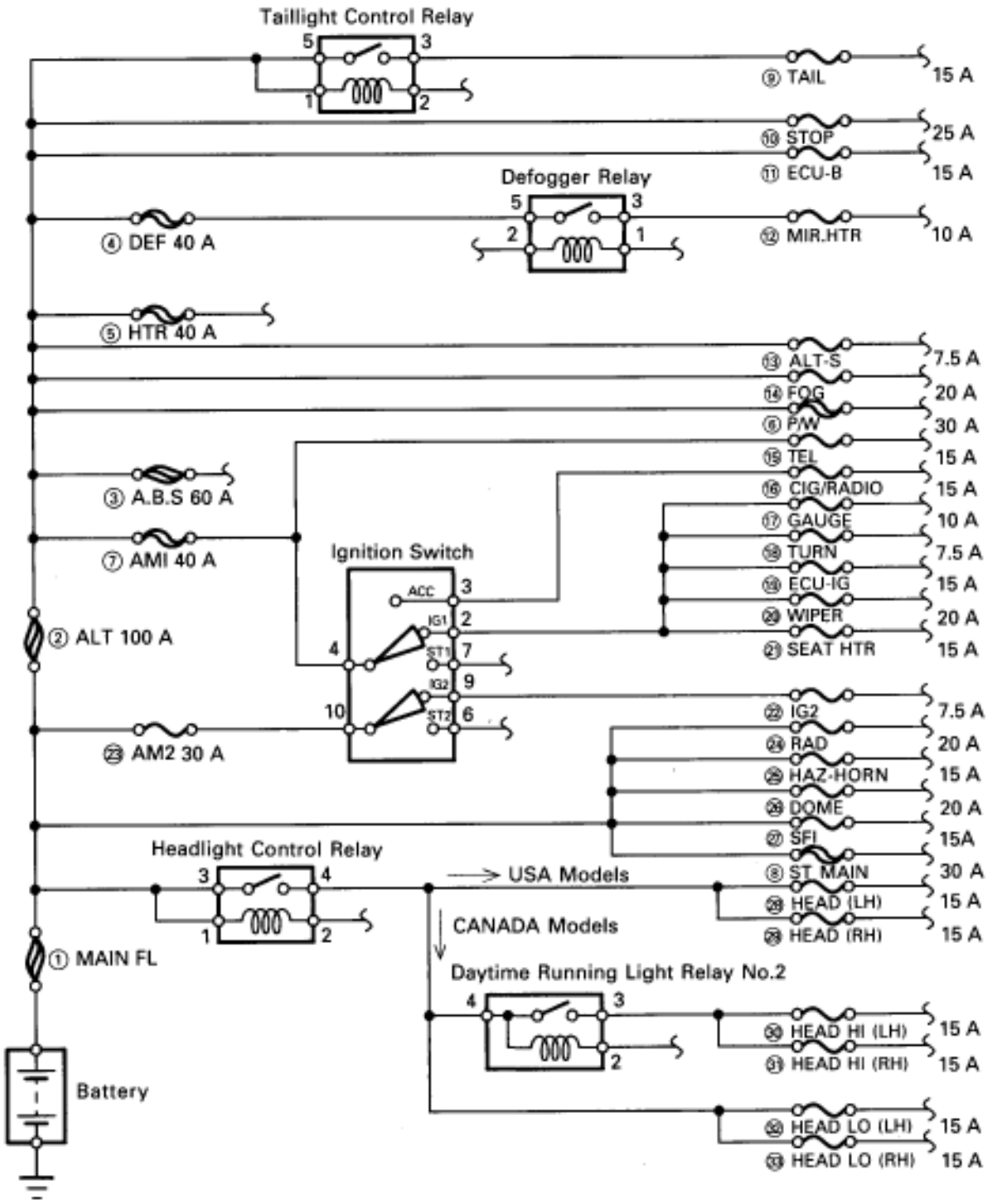
1.	DRL	7.5 A

Relays

A. Daytime Running Light No.4
B. Daytime Running Light No.3

WIRING DIAGRAM

BE0MM–01



DESCRIPTION

The power source supplies power to each of the vehicle's electrical devices.

RELATED SYSTEMS FOR EACH FUSIBLE LINK AND FUSE

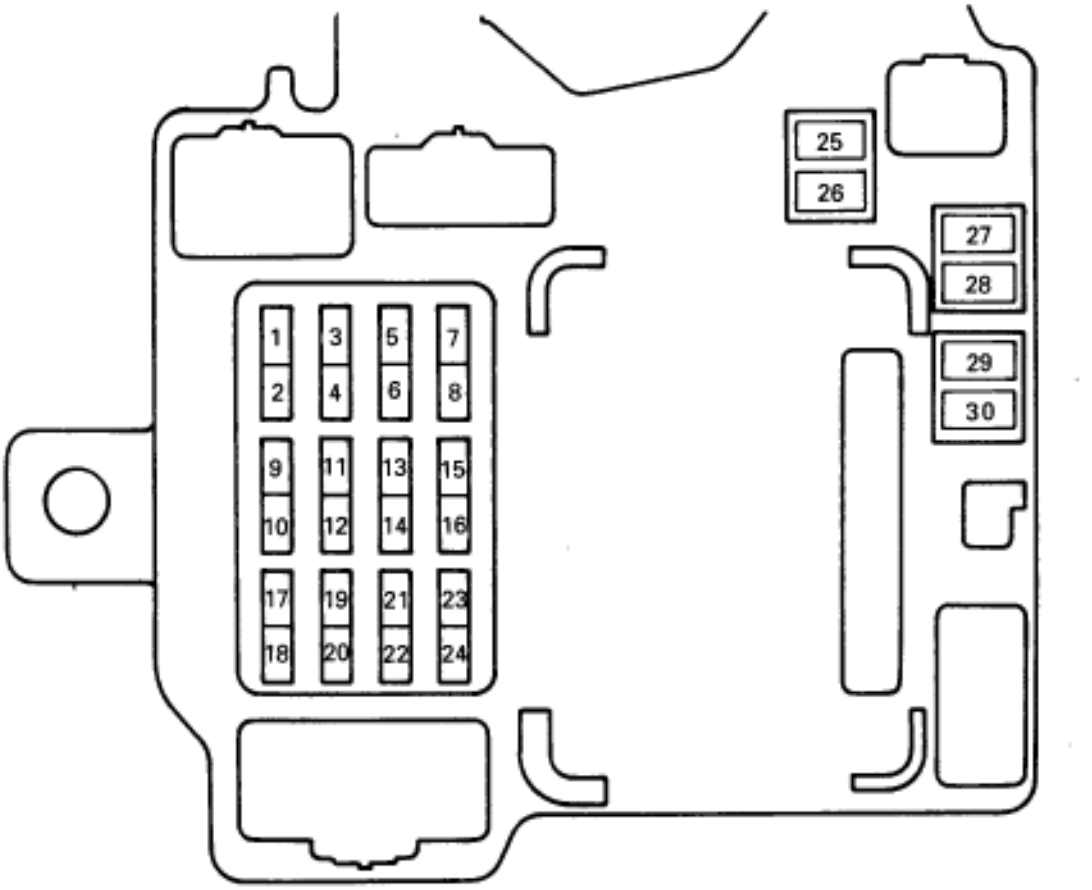
No.	Part Name	Related System or Part	
1	MAIN FL	Headlight System	ST MAIN M–Fuse
		SFI Fuse	DOME Fuse
		HAZ–HORN Fuse	RAD Fuse
		AM2 Fuse	ALT H–Fuse
2	ALT H–Fuse	Charging System	Taillight System
		STOP Fuse	ECU–B Fuse
		DEFOG M–Fuse	HTR M–Fuse
		ALT–S Fuse	FOG Fuse
		P/W M–Fuse	ABS M–Fuse
		AM1 M–Fuse	
3	A.B.S H–Fuse	ABS	
4	DEF M–Fuse	Defogger System	MIR HTR Fuse
5	HTR M–Fuse	Air Conditioning System	
6	P/W M–Fuse	Power Window System	Door Lock Control System
		Theft Deterrent System	Fuel Lid Opener System
		Sliding Roof System	Power Seat Control System
7	AM1 M–Fuse	Ignition Switch	TEL Fuse
8	ST MAIN M–Fuse	Starter System	Theft Deterrent System
9	TAIL Fuse	Taillight System	Illumination System
10	STOP Fuse	Stop Light System	Cruise Control System
11	ECU–B Fuse	ABS	Air Conditioning System
		Combination Meter	Airbag System
12	MIR. HTR Fuse	Mirror Defogger System	
13	ALT–S Fuse	Charging System	
14	FOG Fuse	Fog Light System	
15	TEL Fuse	Cellular Phone	
16	CIG/RADIO Fuse	Cigarette Lighter	Audio System
		Air Conditioning System	Door Lock Control System
		Theft Deterrent System	Airbag System
		Motor Antenna	Power Mirror Control System

No.	Part Name	Related System or Part	
17	GAUGE Fuse	Key Unlock Warning System	Seat Belt Warning System
		Headlight System	Taillight System
		Back–up Light System	Defogger System
		Combination Meter	Illumination System
		Air Conditioning System	
18	TURN Fuse	Turn Signal and Hazard Warning System	
19	ECU–IG Fuse	Cooling Fan System	Cruise Control System
		ABS	Door Lock Control System
		Theft Deterrent System	Motor Antenna
		Celluar Phone	Power Steering
20	WIPER Fuse	Wiper and Washer System	
21	SEAT HTR Fuse	Seat Heater System	
22	IG2 Fuse	SFI System	Combination Meter
		Charging System	Airbag System
23	AM2 Fuse	Ignition Switch	
24	RAD Fuse	Audio System	
25	HAZ–HORN Fuse	Turn Signal and Hazard Warning System	
		Horn System	
26	DOME Fuse	Key Unlock Warning System	Seat Belt Warning System
		Headlight System	Interior Light System
		Combination Meter	Theft Deterrent System
		Door Lock Control System	Sliding Roof System
		Motor Antenna	
		Wireless Door Lock Control System	
27	SFI Fuse	SFI System	
28	HEAD (LH) Fuse	Headlight System	
29	HEAD (RH) Fuse	Headlight System	Fog Light System
30	HEAD HI (LH) Fuse	Headlight System	
31	HEAD HI (RH) Fuse	Headlight System	
32	HEAD LO (LH) Fuse	Headlight System	Fog Light System
33	HEAD LO (RH) Fuse	Headlight System	

POWER SOURCE CIRCUIT

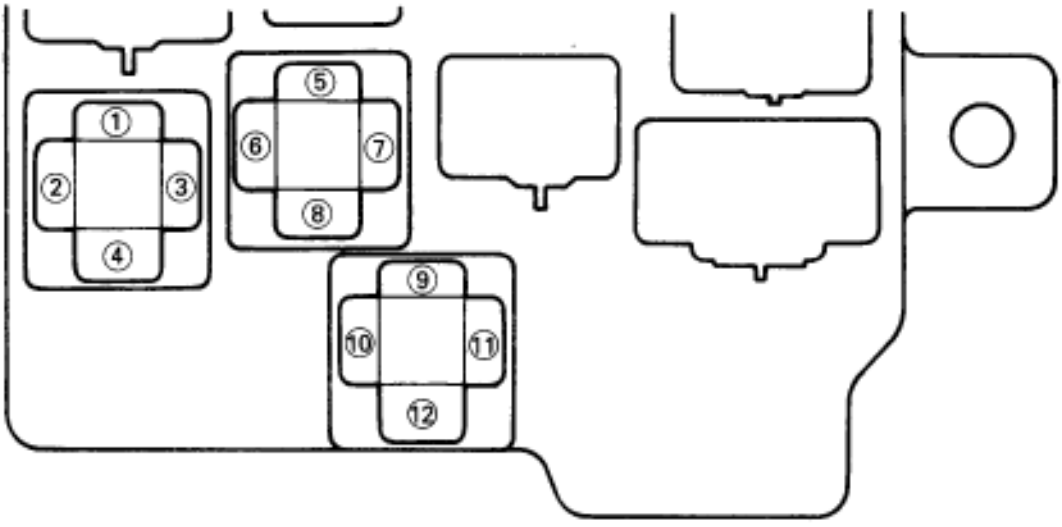
JUNCTION BLOCK NO.1 INSPECTION

- **Front Side**



N01910

- **Rear Side**



N01911

◯: Relay terminal

1. INSPECT FUSE CIRCUIT

Remove the fuse from the junction block and inspect the connector on junction block side as shown.

Fuse	Check for	Tester connection	Condition	Specified value
ECU–IG	Voltage	2–Ground	Ignition switch turned to ON	Battery positive voltage
GAUGE		4–Ground	Ignition switch turned to ON	
STOP		5–Ground	Constant	
SEAT HTR		8–Ground	Ignition switch turned to ON	
WIPER		9–Ground	Ignition switch turned to ON	
TURN		11–Ground	Ignition switch turned to ON	
IG2		13–Ground	Ignition switch turned to ON	
CIG/RADIO		15–Ground	Ignition switch turned to ACC or ON	
MIR.HTR		18–Ground	Defogger switch turned to ON	
TAIL		20–Ground	Light control switch turned to TAIL or HEAD *and Engine running	
ECU–B		21–Ground	Constant	
AM1		25–Ground	Constant	
P/M		28–Ground	Constant	
DEF		29–Ground	Constant	
*: CANADA models				

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

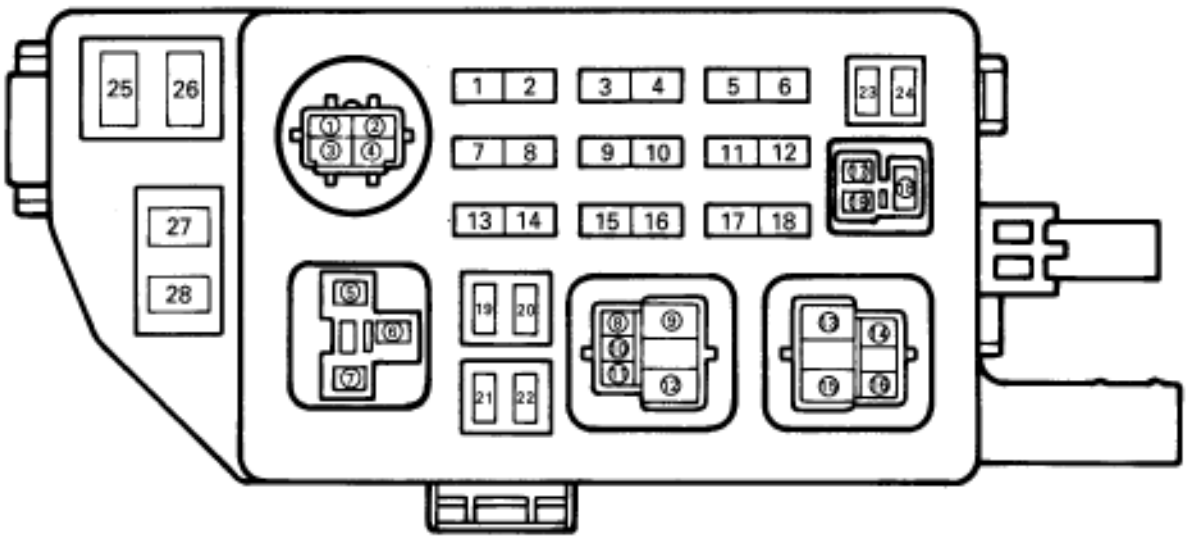
2. INSPECT RELAY CIRCUIT

Remove the relay from the junction block and inspect the connector on junction block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
Power main	Voltage	①–Ground	Constant	Battery positive voltage
	Continuity	②–Ground	Constant	Continuity
Taillight control	Voltage	③–Ground	Constant	Battery positive voltage
		④–Ground	Constant	
Defogger	Voltage	⑨–Ground	Constant	
		⑩–Ground	Ignition Switch turned to ON	

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

JUNCTION BLOCK NO.2 INSPECTION



1. INSPECT FUSE CIRCUIT

Remove the fuse from the junction block and inspect the connector on junction block side as shown.

Fuse	Check for	Tester connection	Condition	Specified value
STARTER	Voltage	2–Ground	Ignition switch turned to START	Battery positive voltage
ALT–S		4–Ground	Constant	
SFI		6–Ground	Constant	
*1 HEAD (RH)		7–Ground	Light control switch turned to HEAD	
*2 HEAD HI (RH)		7–Ground	Light control switch turned to HEAD and headlight dimmer switch turned to High	
DOME		10–Ground	Constant	
HAZ–HORN		11–Ground	Constant	
*1 HEAD (LH)		14–Ground	Light control switch turned to HEAD	
*2 HEAD HI (LH)		14–Ground	Engine running, or light control switch turned to HEAD and headlight dimmer switch turned to High	
AM2		17–Ground	Constant	
ST MAIN		23–Ground	Constant	
ALT		25–Ground	Constant	
A.B.S		28–Ground	Constant	

*1: USA models *2: CANADA models

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

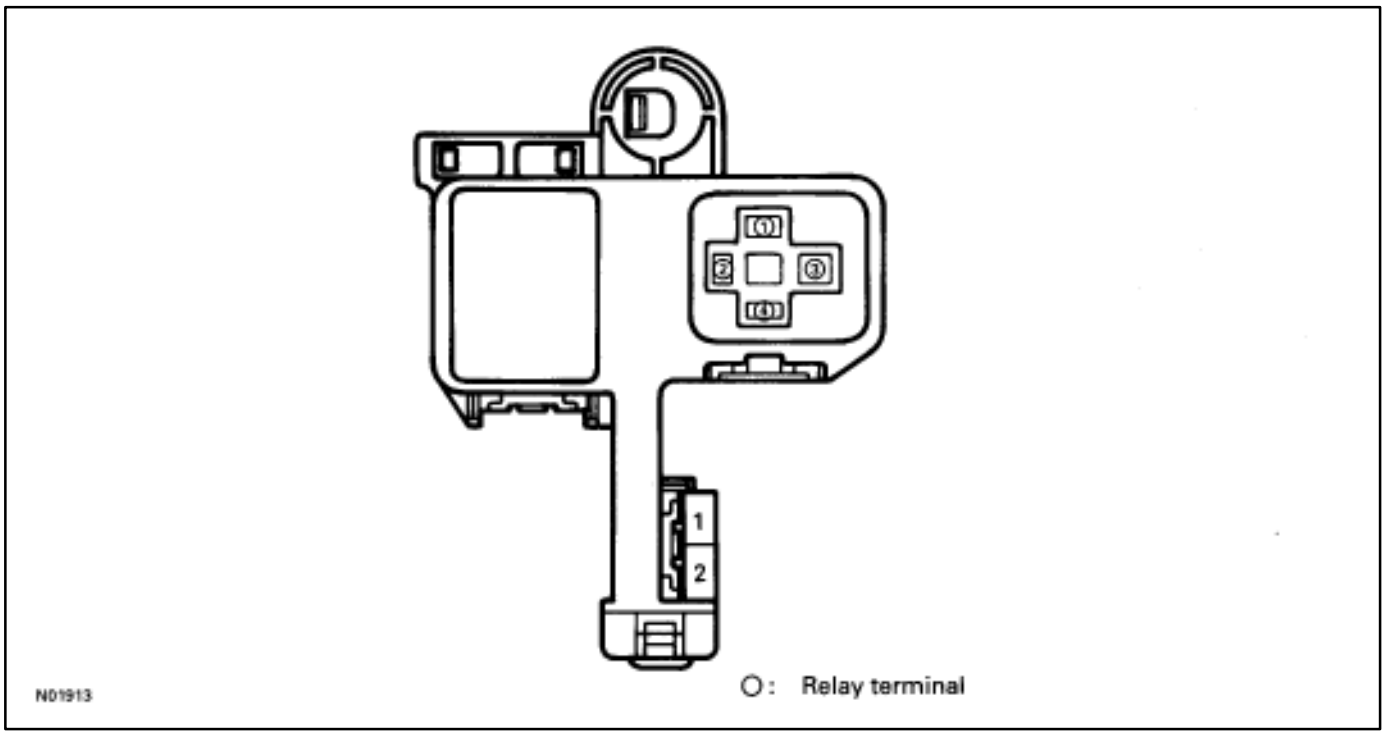
2. INSPECT RELAY CIRCUIT

Remove the relay from the junction block and inspect the connector on junction block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
SFI MAIN	Voltage	(3)–Ground	Constant	Battery positive voltage
	Continuity	(2)–Ground	Constant	Continuity
Headlight Control	Voltage	(13)–Ground	Constant	Battery positive voltage
		(14)–Ground	Constant	
Horn		(17)–Ground	Constant	

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

RELAY BLOCK NO.1 INSPECTION



1. INSPECT FUSE CIRCUIT

Remove the fuse from the relay block and inspect the connector on relay block side as shown.

Fuse	Check for	Tester connection	Condition	Specified value
FOG	Voltage	*1 1 or 2–Ground	Constant	Battery positive voltage

*1: Apply tester to the terminal which was connected to the white (W) wire harness (battery wire harness).
If the circuit is not as specified, refer to BE–17 wiring diagram and inspect circuits connected to other parts.

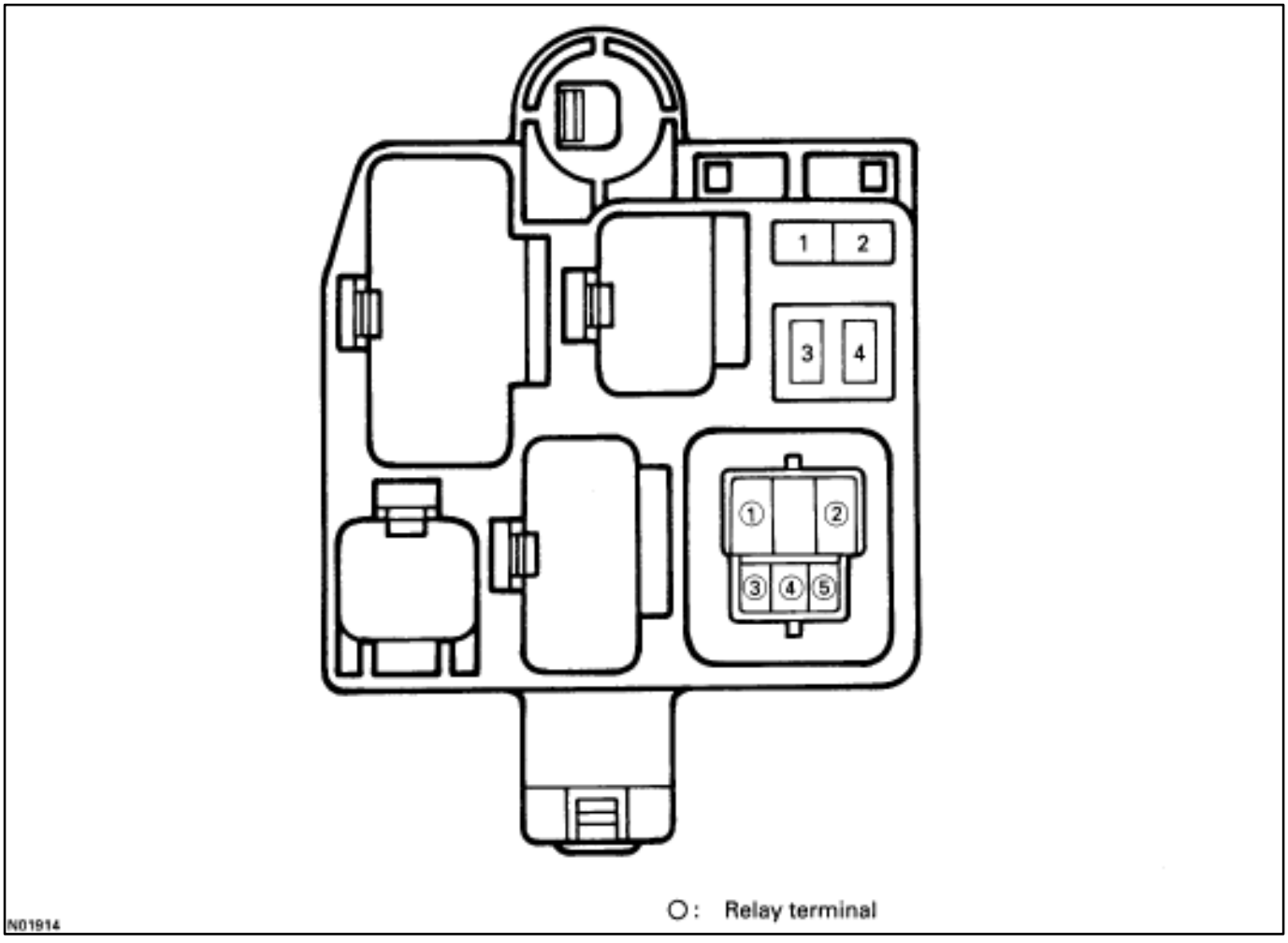
2. INSPECT RELAY CIRCUIT

.Remove the relay from the relay block and inspect the connector on relay block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
Fog Light	Voltage	(1) – Ground	Light control switch turned to HEAD	Battery positive voltage
		(3) – Ground	Constant	

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

RELAY BLOCK NO. 4 INSPECTION



1. INSPECT FUSE CIRCUIT

Remove the fuse from the relay block and inspect the connector on relay block side as shown.

Fuse	Check for	Tester connection	Condition	Specified value
HTR	Voltage	3–Ground	Constant	Battery positive voltage

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect circuits connected to other parts.

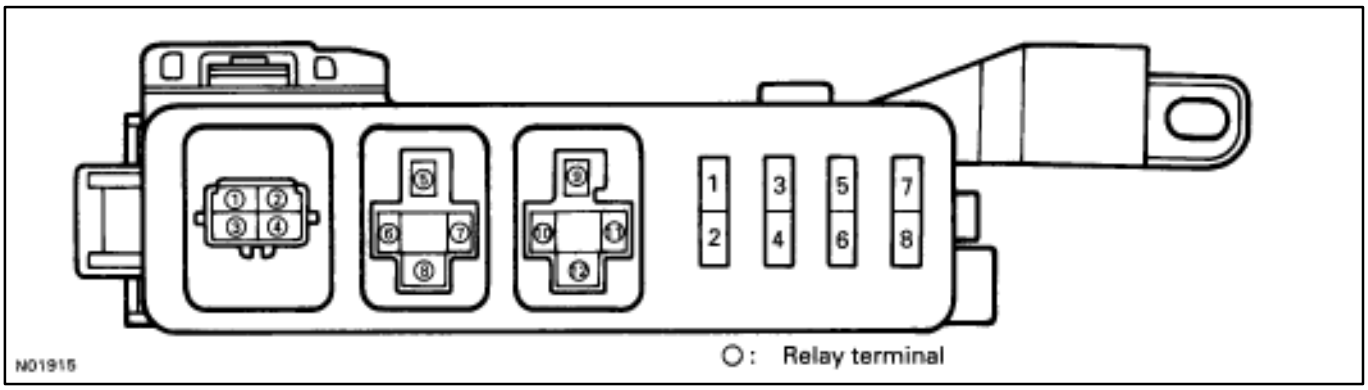
2. INSPECT RELAY CIRCUIT

Remove the relay from the relay block and inspect the connector on relay block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
Heater	Voltage	(1) –Ground	Constant	Battery positive voltage
	Continuity	(4) –Ground	Constant	Continuity
	Voltage	(5) –Ground	Ignition switch turned to ON	Battery positive voltage

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

RELAY BLOCK NO. 5 INSPECTION



1. INSPECT FUSE CIRCUIT

Remove the fuse from the relay block and inspect the connector on relay block side as shown.

Fuse	Check for	Tester connection	Condition	Specified value
RAD	Voltage	2–Ground	Constant	Battery positive voltage
TEL		4–Ground	Constant	
HEAD LO (RH)		6–Ground	Light control switch turned to HEAD	
HEAD LO (LH)		8–Ground	Light control switch turned to HEAD	

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

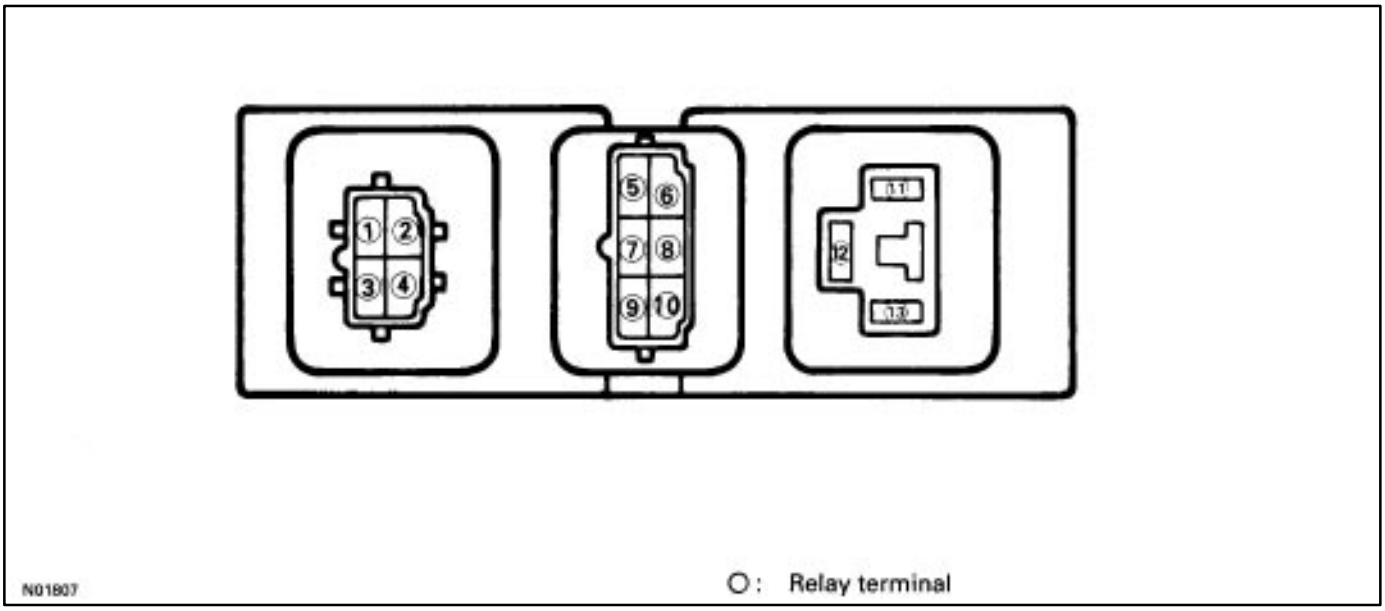
2. INSPECT RELAY CIRCUIT

Remove the relay from the relay block and inspect the connector on relay block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
Daytime Running Lingt No.2	Voltage	(1) –Ground	Constant	Battery positive voltage
Magnet Clutch		(5) – Ground	Ignition switch turned to ON	
		(6) – Ground	Ignition switch turned to ON	

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

RELAY BLOCK NO.6 INSPECTION



INSPECT RELAY CIRCUIT

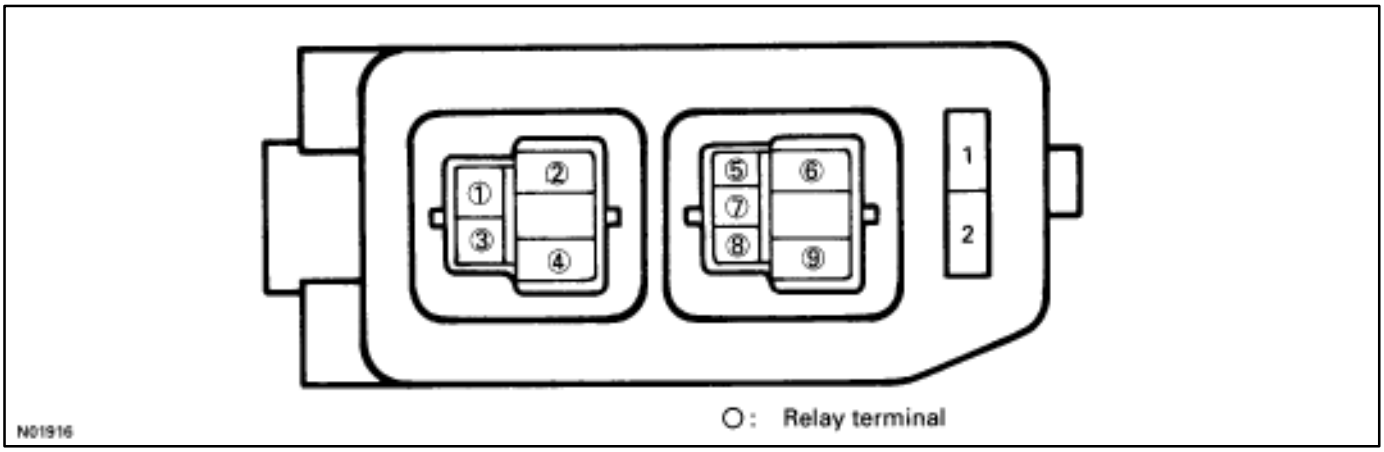
Remove the relay from the relay block and inspect the connector on relay block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
Starter	Voltage	(2)–Ground	*Ignition switch turned to START	Battery positive voltage
		(4)–Ground	Constant	
Circuit open		(7)–Ground	Ignition switch turned to ON	
	Continuity	(9)–Ground	Constant	Continuity
	Voltage	(10)–Ground	*Ignition switch turned to START	Battery positive voltage
Turn signal flasher	Continuity	(11)–Ground	Constant	Continuity
		(13)–Ground	Ignition switch turned to ON, or hazard warning switch turned to ON	Battery positive voltage

*: (M/T) with clutch pedal depressed.
(A/T) with shift lever position is P or N range.

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect circuits connected to other parts.

RELAY BLOCK NO.7 INSPECTION



1. INSPECT FUSE CIRCUIT

Remove the fuse from the relay block and inspect the connector on relay block side as shown.

Fuse	Check for	Tester connection	Condition	Specified value
DRL	Voltage	2–Ground	Light control switch turned to HEAD or headlight dimmer switch turned to flash	Battery positive voltage
	Continuity	1–Ground	Constant	Continuity

If the circuit is not as specified, refer to BE–17 wiring diagram and inspect circuits connected to other parts.

2. INSPECT RELAY CIRCUIT

Remove the relay from the relay block and inspect the connector on relay block side as shown.

Relay	Check for	Tester connection	Condition	Specified value
Daytime Running Light No.4	Continuity	(1)–Ground	Constant	Continuity
		(2)–Ground	Constant	
	Voltage	(3)–Ground	Light control switch turned to HEAD	Battery positive voltage
Daytime Running Light No.3	Continuity	(5)–Ground	Constant	Continuity
		(7)–Ground	Constant	
	Voltage	(8)–Ground	Light control switch turned to HEAD, or headlight dimmer switch turned to flash	Battery positive voltage
		(9)–Ground	Engine running, or light control switch turned to HEAD and headlight dimmer switch turned to HI, or headlight dimmer switch turned to flash	

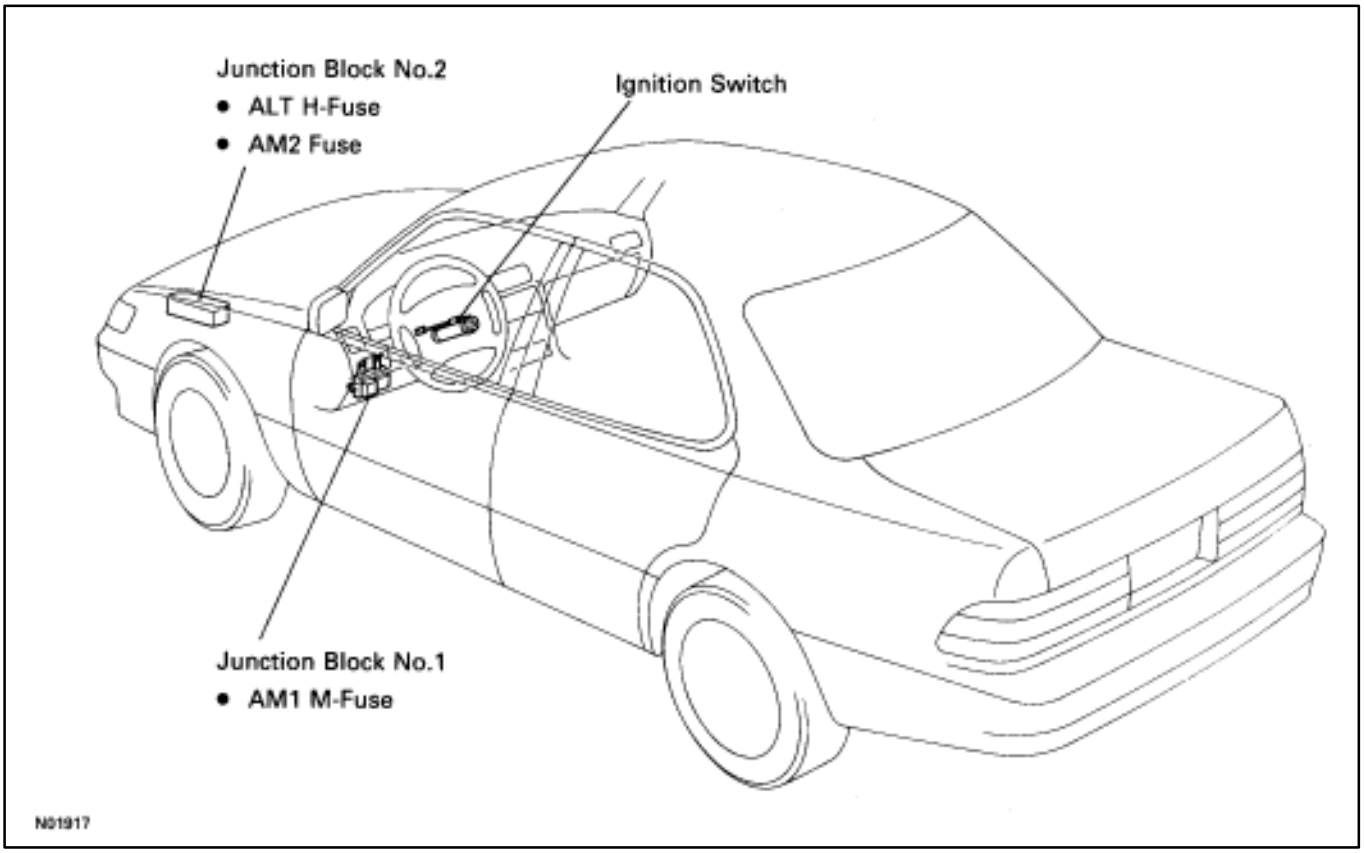
If the circuit is not as specified, refer to BE–17 wiring diagram and inspect the circuits connected to other parts.

IGNITION SWITCH

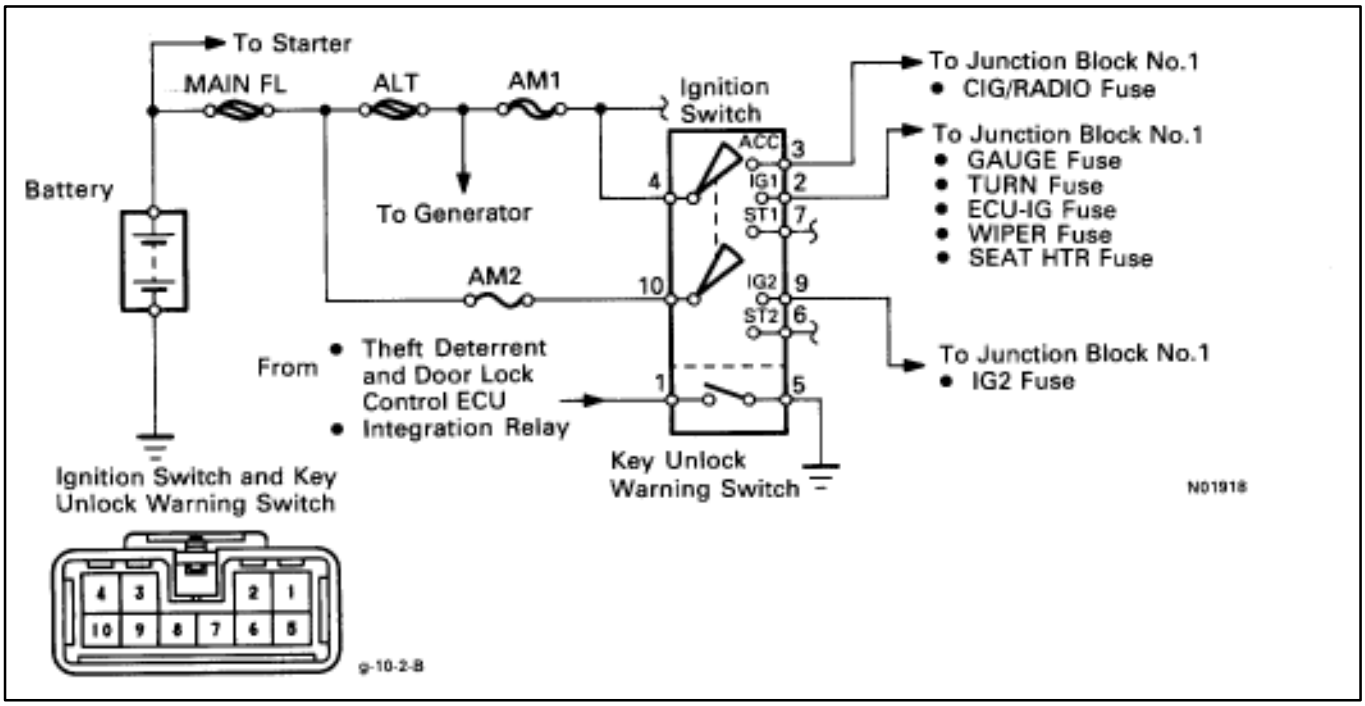
DESCRIPTION

The ignition switch is supplied with power from the battery via a fusible link. Power is supplied to each fuse and relay according to the position of the switch, whether ”ACC” ”ON” or ”START”.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

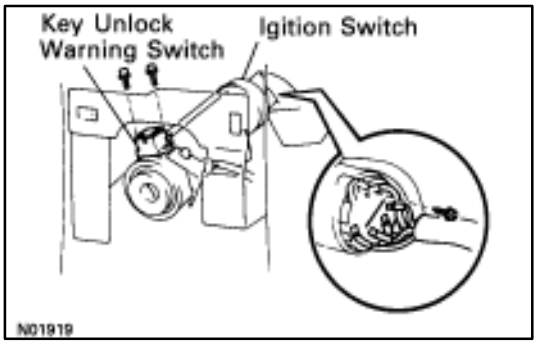
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH REMOVAL AND INSTALLATION

1. DISCONNECT BATTERY TERMINALS

CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and negative (–) terminal cable is disconnected from the battery.

2. REMOVE STEERING COLUMN ASSEMBLY

(See page SR–4)



3. REMOVE IGNITION SWITCH

(a) Disconnect connector.

(b) Remove three screws and the switch from the key cylinder and wire harness clamp.

4. INSTALL IGNITION SWITCH

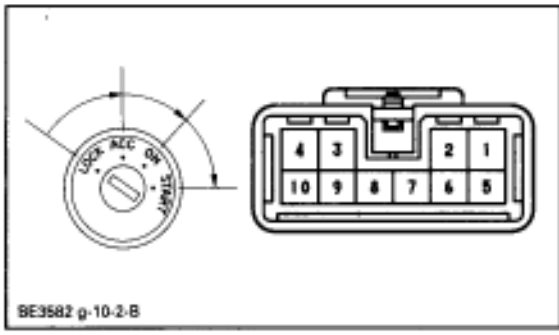
For installation, follow the removal procedure in reverse.

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH INSPECTION

1. INSPECT IGNITION SWITCH

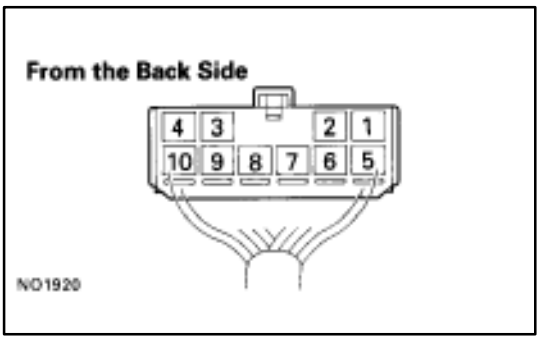
(Switch continuity)

Inspect the switch continuity between terminals.



Terminal / Switch position	2 IG1	3 ACC	4 AM1	6 ST2	7 ST1	9 IG2	10 AM2
LOCK							
ACC		○—○					
ON	○	○—○	○			○—○	
START	○		○	○—○		○—○	

If continuity is not as specified, replace the switch.



(Switch circuit)

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

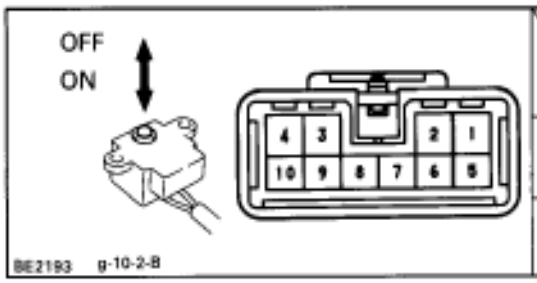
Check for	Tester connection	Condition	Specified value
Voltage	2–Ground	Ignition switch turned to ON	Battery positive voltage
	3–Ground	Ignition switch turned to ACC or ON	
	4–Ground	Constant	
	6–Ground	Ignition switch turned to START	
	9–Ground	Ignition switch turned to ON, START	
	10–Ground	Constant	

If circuit is not as specified, inspect the switch or refer to BE–28 wiring diagram and inspect the circuits connected to other parts.

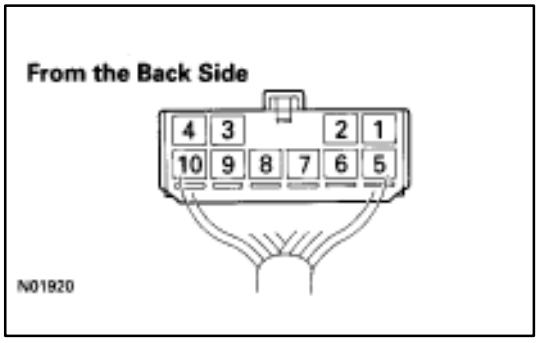
2. INSPECT KEY UNLOCK WARNING SWITCH

(Switch continuity)

Inspect the switch continuity between terminals.



Terminal / Switch position	1	5
OFF (Ignition Key removed)		
ON (Ignition Key set)	o	o



If continuity is not as specified, replace the switch.

(Switch circuit)

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

Check for	Tester connection	Condition	Specified value
Continuity	1–Ground	Ignition key removed	No continuity
		Ignition key set	Continuity
	5–Ground	Constant	Continuity

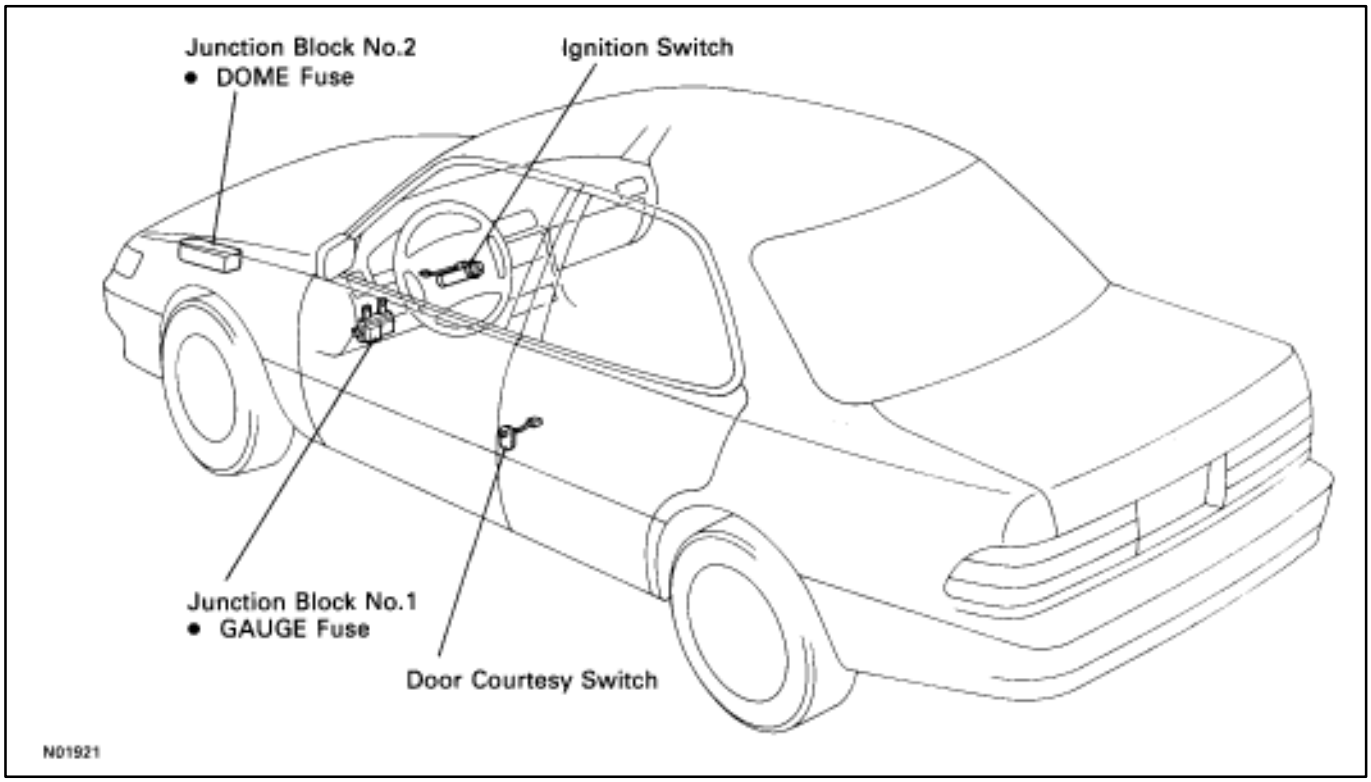
If circuit is not as specified, inspect the switch or wire harness.

KEY UNLOCK WARNING SYSTEM

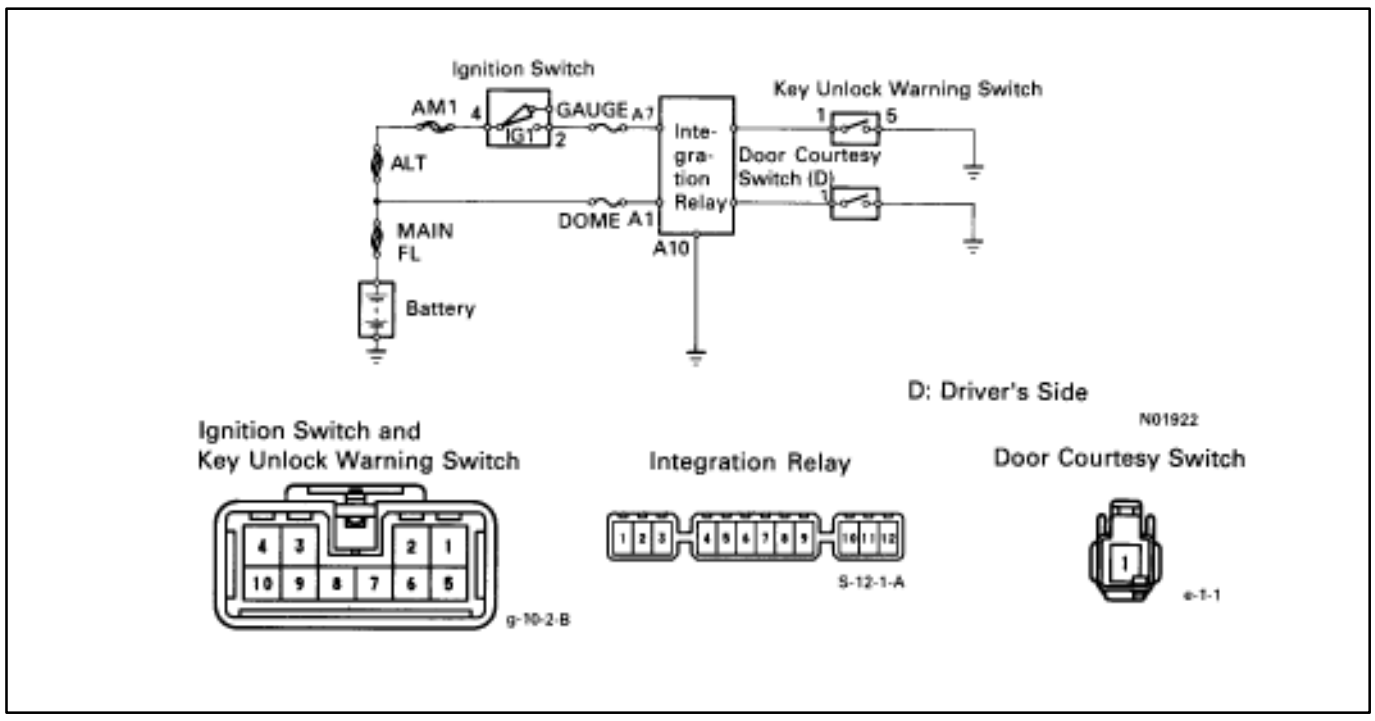
DESCRIPTION

The integration relay receives current from GAUGE and DOME fuses and is connected to the driver's door courtesy switch and the key unlock warning swich. As part of the key unlock warning system, it sounds a chime when the set conditions are fulfilled.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

(See page BE–29)

INTEGRATION RELAY

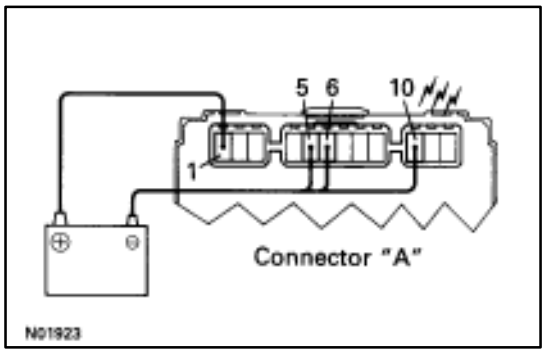
INTEGRATION RELAY REMOVAL AND INSTALLATION

1. REMOVE INTEGRATION RELAY

(a) Remove the LH lower pad.
(b) Remove the junction block No.1
(c) Remove the integration relay from the junction block No.1

2. INSTALL INTEGRATION RELAY

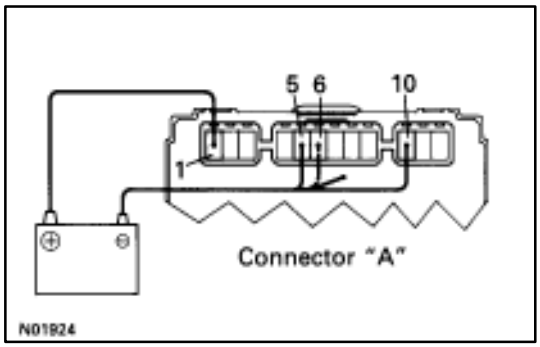
For installation, follow the removal procedure in reverse.



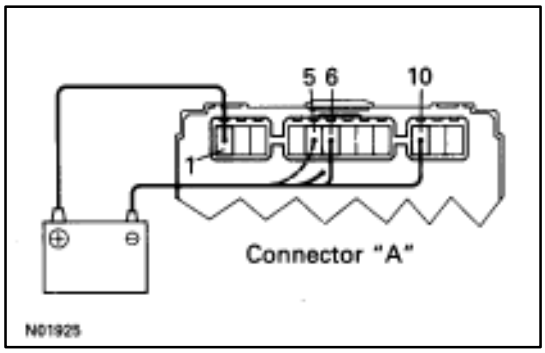
INTEGRATION RELAY INSPECTION

(Operation/Key Unlock Warning)

(a) Connect the positive (+) lead from the battery to terminal A1.
(b) Connect the negative (–) lead from the battery to terminals A5, A6 and A10.
(c) Check the chime sounds.

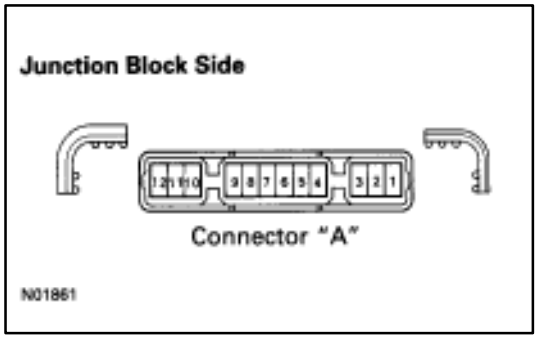


(d) Disconnect the negative (–) lead from the battery to terminals A6.
(e) Check that the chime stops sounding.



(f) Connect the negative (–) lead from the battery to terminals A6.
(g) Disconnect the negative (–) lead from the battery to terminals A5.
(h) Check that the chime stops sounding.

If operation is not as specified, replace the relay.



(Relay Circuit / Key Unlock Warning System)

Remove the relay from the junction block No. 1 and inspect the connectors on the junction block side.

Check for	Tester connection	Condition		Specified value
Continuity	A10–Ground	Constant		Continuity
	A6–Ground	Driver's door courtesy switch	OFF (Door closed)	No continuity
			ON (Door opened)	Continuity
	A5–Ground	Key unlock warning switch	OFF (Key removed)	No continuity
			ON (Key set)	Continuity
Voltage	A7–Ground	Ignition switch position	Lock or ACC	No voltage
			ON	Battery positive voltage
	A1–Ground	Constant		Battery positive voltage

If circuit is as specified, trying replacing the relay with a new one.

Is circuit is not as specified, refer to BE–31 wiring diagram and inspect the circuits connected to other parts.

DOOR COURTESY SWITCH

(See page BE–90)

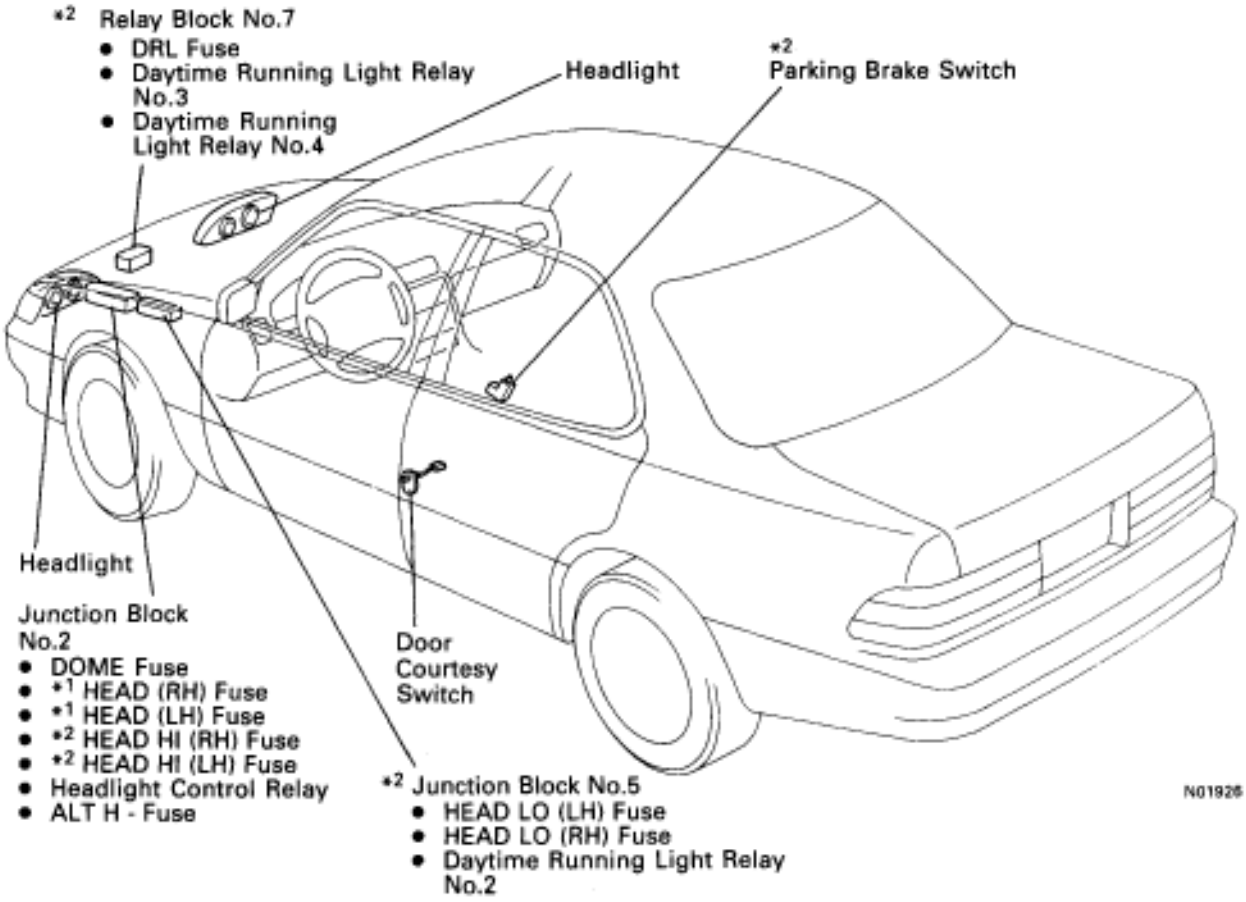
HEADLIGHT SYSTEM

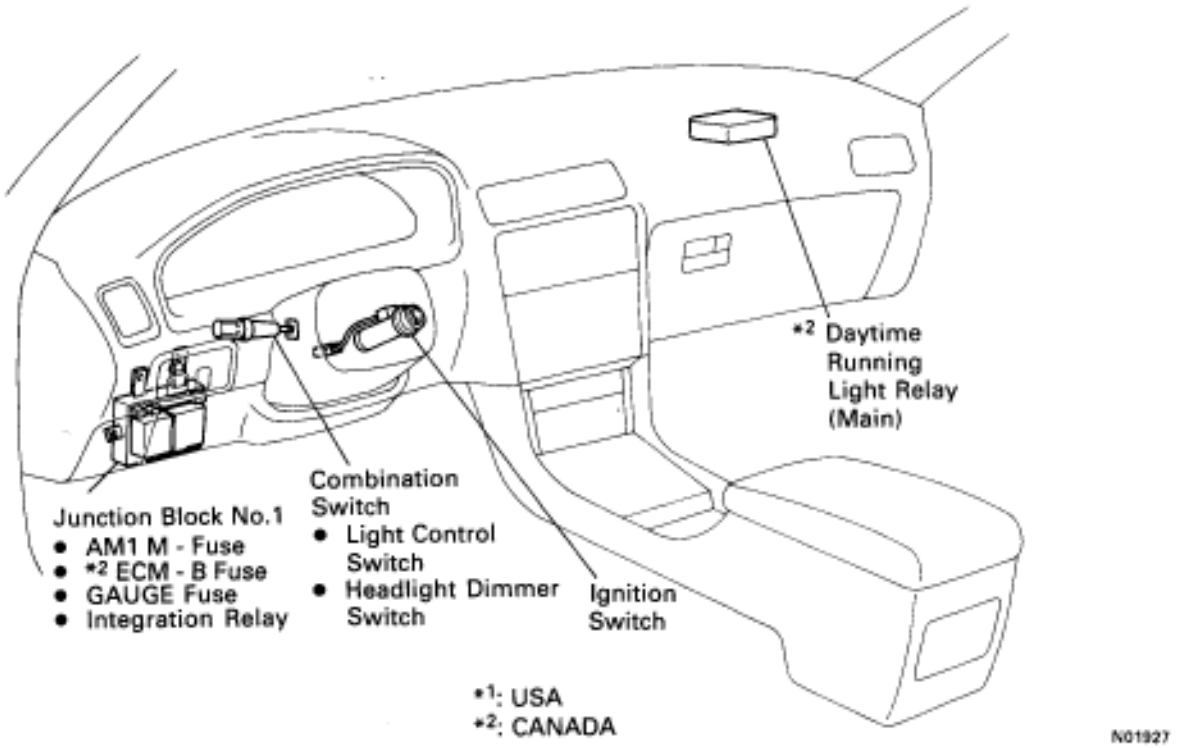
DESCRIPTION

The component parts of this system and their function are described in the following table.

Parts Name	Function
Light Control Switch	(USA) Grounds current from the headlight control relay and taillight control relay via the integration relay, switching each relay and supplying current to the appropriate bulbs in accordance with the switch position. (CANADA) See System Description on BE–36.
Headlight Dimmer Switch	(USA) Grounds current from the headlights in accordance with the switch position, turning on the ”High Beam” lights. In the case of ”FLASH”, it turns the headlight control relay and turns on the ”High Beam” lights. (CANADA) See System Description on BE–36.
Headlight Control Relay	(USA) Turned on by signals from the light control switch and headlight dimmer switch, and supplies current to HEAD–RH and HEAD–LH fuse (CANADA) See System Description on BE–36.
Integration Relay	Carries out ”Light Auto Turn–Off” of the headlights, fog lights and taillights and cuts off current to the light control switch in accordance with signals from the GAUGE fuse and door courtesy switch.
Door Courtesy Switch/Driver’s	Detects when the door is open and sends the appropriate signals to integration relay. (Light Auto Turn–Off System)
Daytime Running Light Relay (CANADA)	See System Description on BE–36.
Parking Brake Switch (CANADA)	Detects when the parking brake lever is released and sends the appropriate signals to daytime running light relay.

PARTS LOCATION

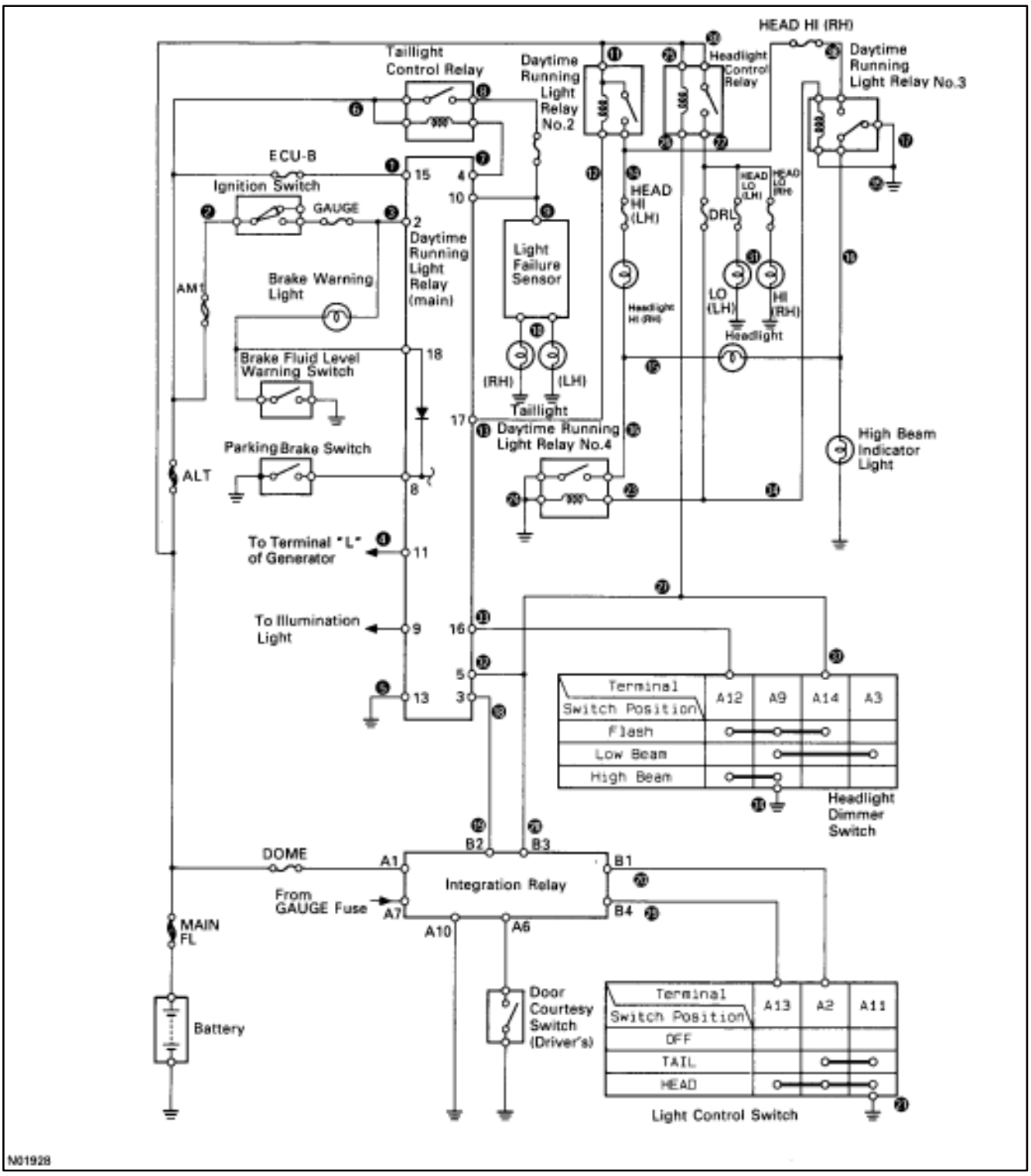




SYSTEM DESCRIPTION (DAYTIME RUNNING LIGHT SYSTEM)

The Daytime Running Light (DRL) system is activated when the engine is started, (but will not light up until brake lever is released. Once the parking brake is released, the DRL light up and will remain on regardless of operation of the parking brake lever.)

In the DRL system of the '92 ES 300, the left and right high beam headlights are connected in series, so the brightness of the DRL system high beam is half the brightness of the high beam headlights in manual operation. The DRL remains on until the ignition switch is turned off.



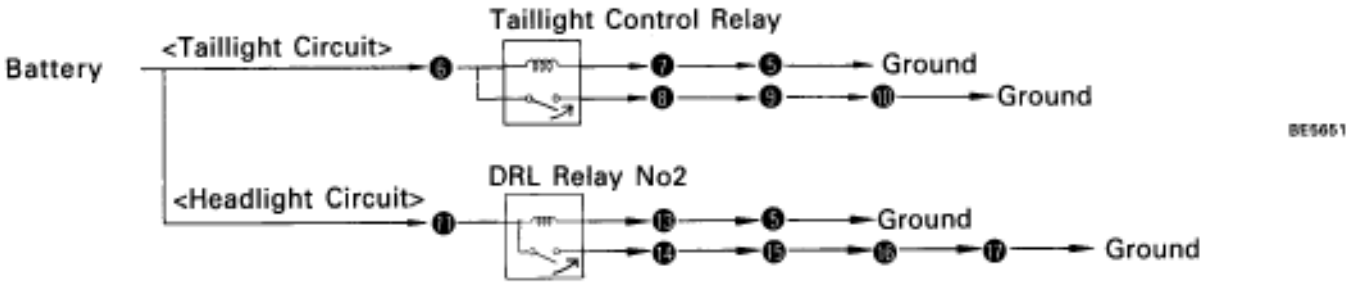
Operation examples (Current flow table)

1. DAYTIME RUNNING LIGHT LIGHTS UP

Switch	Position
Ignition Switch	*ON
Light Control Switch	OFF
Headlight Dimmer Switch	LO or HI

* with Engine running

Condition: Battery positive voltage → **(1)**, Battery positive voltage → **(2)**→**(3)**, Battery positive voltage→**(4)**
Continuity: **(5)** → Ground



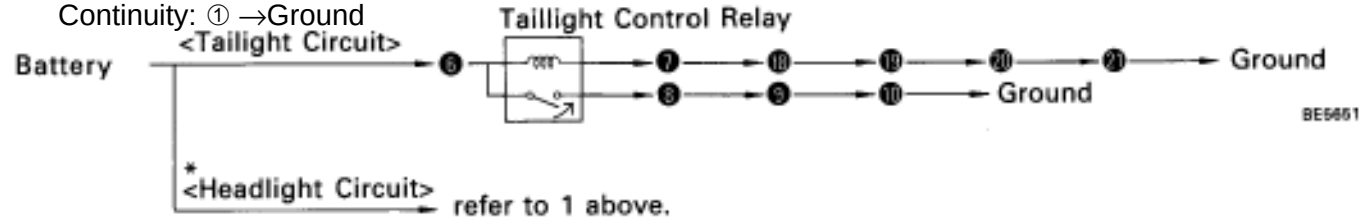
2. TAILLIGHT LIGHTS UP

Switch	Position
Ignition Switch	OFF * or ON
Light Control Switch	TAIL
Headlight Dimmer Switch	LO or HI

N02411

* with Engine running

Condition: Battery positive voltage→ **(1)**, * (Battery positive voltage→ **(2)**→**(3)**, Battery positive voltage→**(4)**)
Continuity: ① →Ground

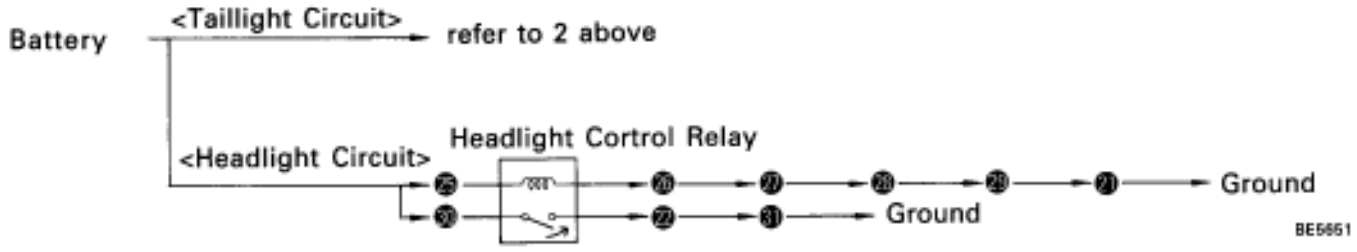


3. HEADLIGHT LOW BEAM LIGHTS UP

Switch	Position
Ignition Switch	OFF * or ON
Light Control Switch	HEAD
Headlight Dimmer Switch	LO

* with Engine running

Condition: Battery positive voltage→ **(1)**, * (Battery positive voltage→ **(2)**→**(3)**, Battery positive voltage→**(4)**)
Continuity: **(5)** →Ground

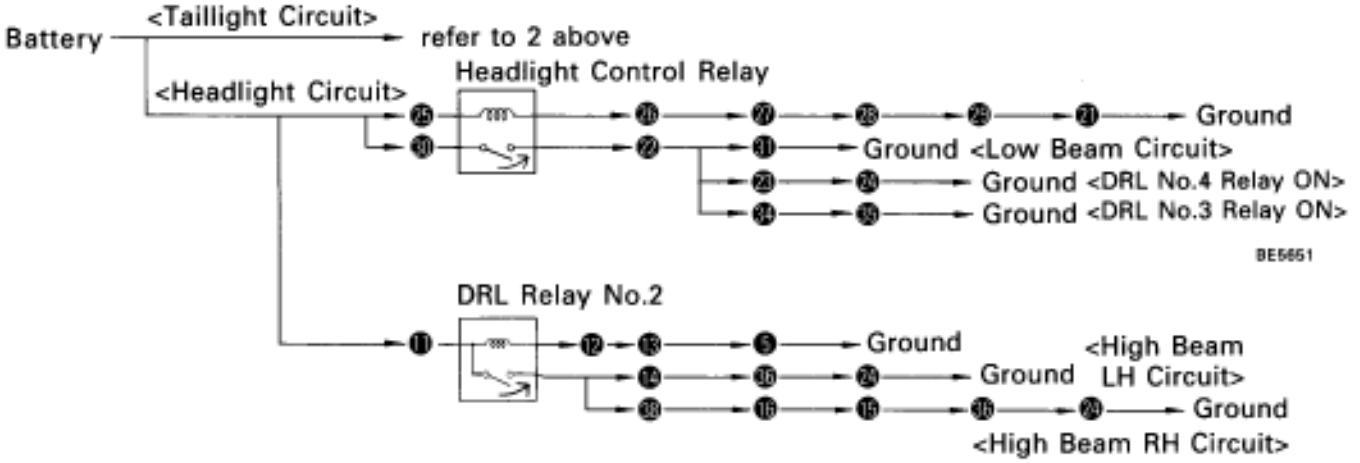


4. HEADLIGHT HIGH BEAM LIGHTS UP

Switch	Position
Ignition Switch	OFF or *ON
Light Control Switch	HEAD
Headlight Dimmer Switch	HI

* with Engine running

Condition: Battery positive voltage→ **(1)**, * (Battery positive voltage→ **(2)**→**(3)**, Battery positive voltage→**(4)**)
Continuity: **(5)** →Ground,**(33)**→**(34)**→Ground

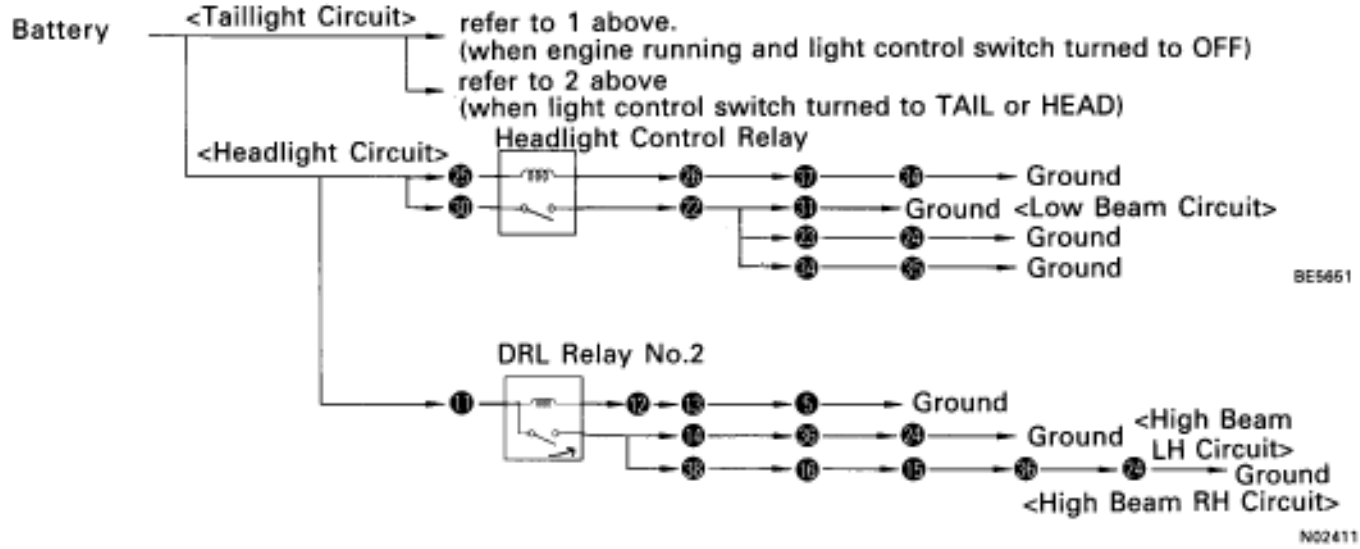


5. HEADLIGHT FLASH

Switch	Position
Ignition Switch	OFF or *ON
Light Control Switch	OFF or TAIL or HEAD
Headlight Dimmer Switch	Flash

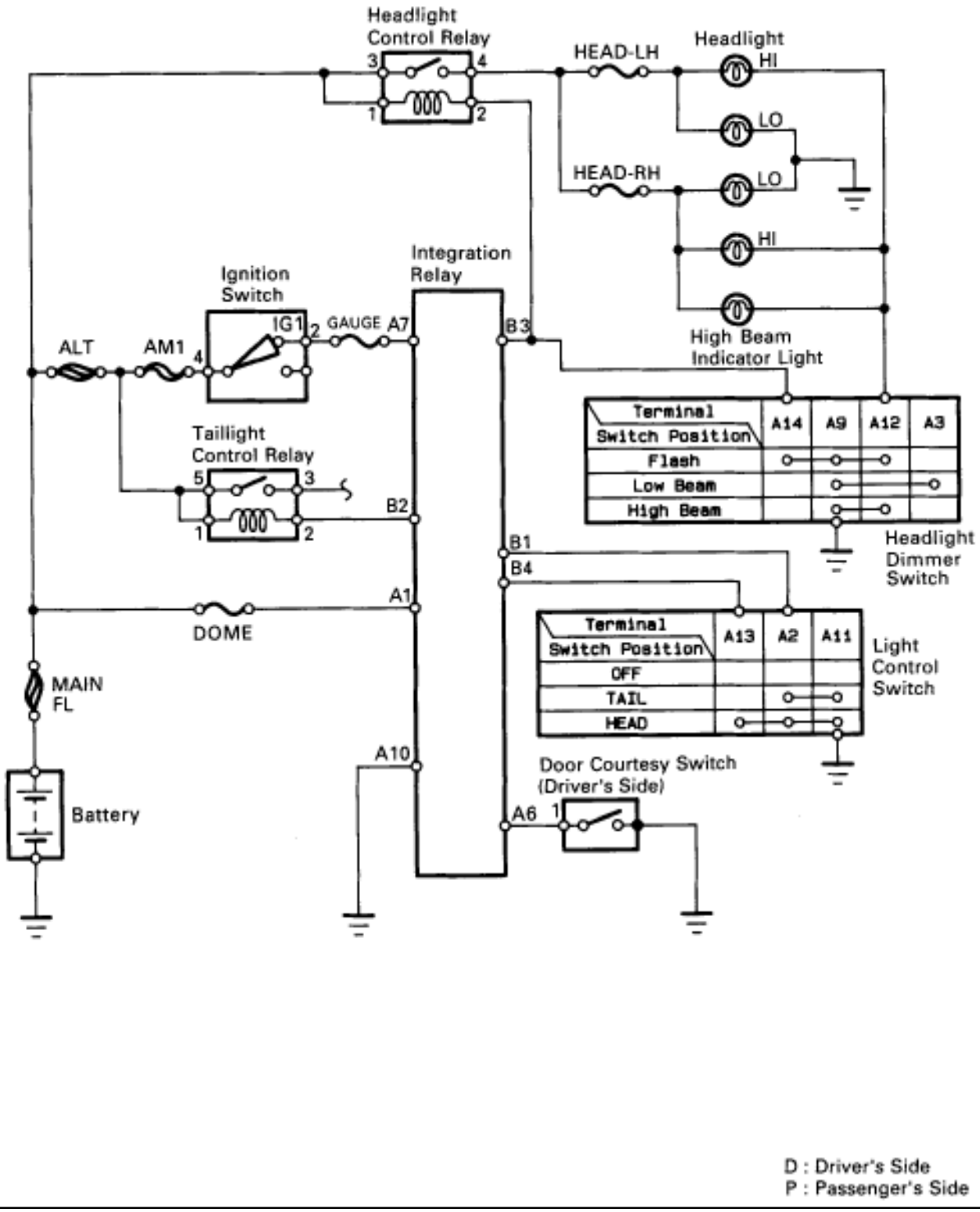
* with Engine running

Condition: Battery positive voltage→ **(1)**, * (Battery positive voltage→ **(2)**→**(3)**, Battery positive voltage→**(4)**)
Continuity: **(5)** → Ground, **(33)**→**(34)**→Ground, **(32)**→**(27)**→**(34)**→Ground

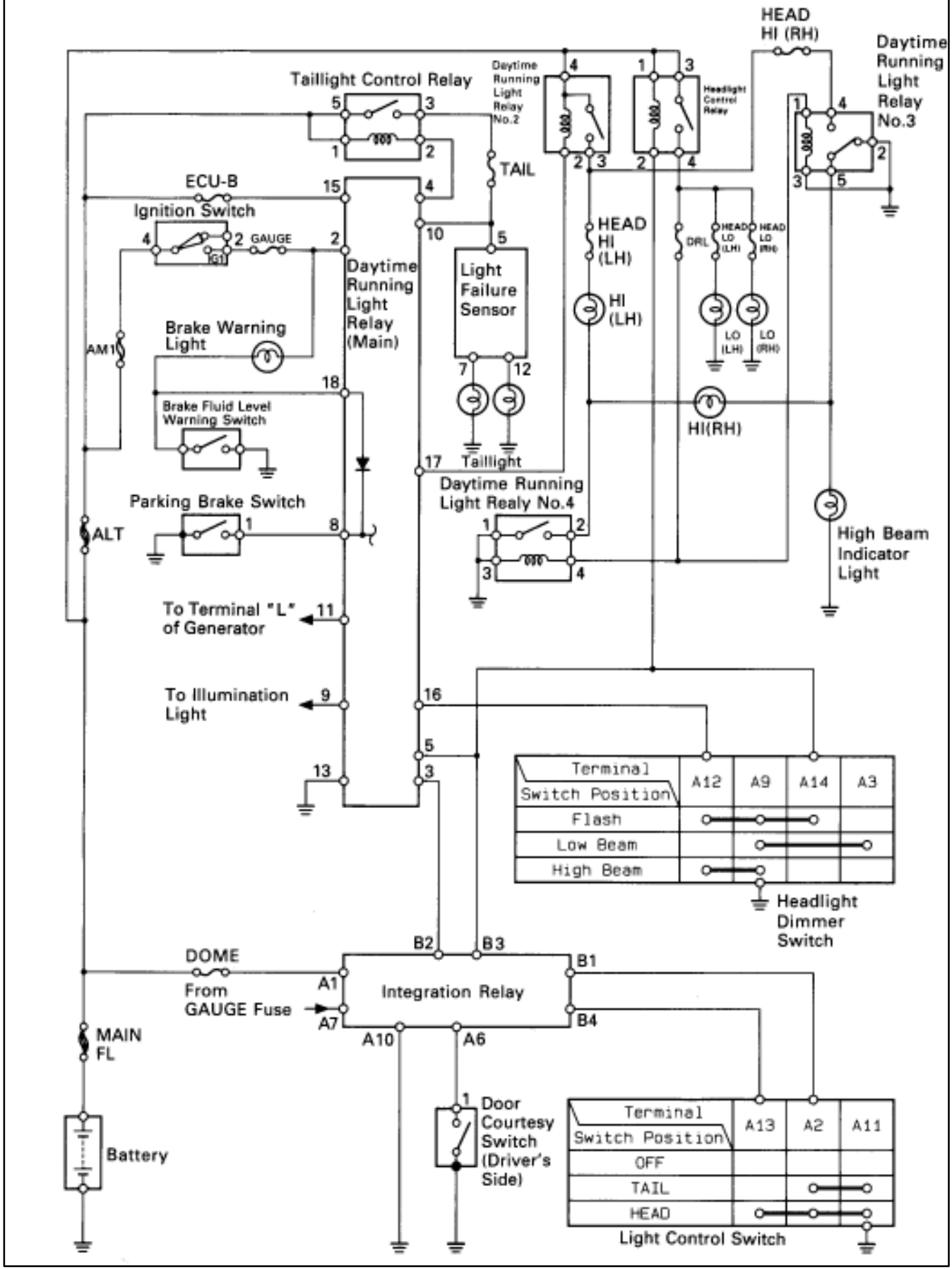


WIRING DIAGRAMS

USA

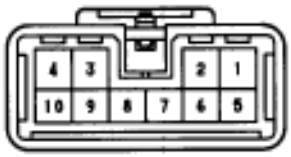


CANADA (Daytime Running Light System)



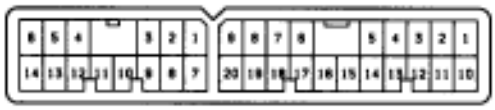
CONNECTOR DIAGRAMS

Ignition Switch



g-10-2-B

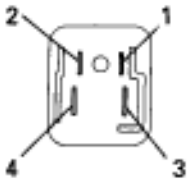
Combination Switch
- Light Control Switch
- Headlight Dimmer Switch



Connector "A" Connector "B"

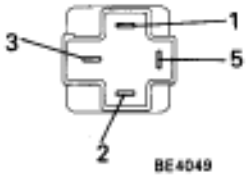
V-34-2

Headlight Control Relay



BE1838

Taillight Control Relay

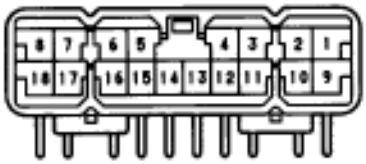


BE4049

Door Courtesy Switch

e-1-1

Daytime Running Light Relay (Main)

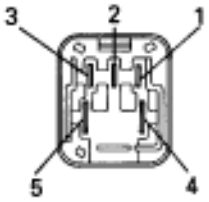


e-18-2-A

Daytime Running Light Relay No.2

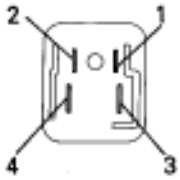
BE1839

Daytime Running Light Relay No. 3



BE1850

Daytime Running Light Relay No.4

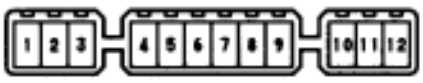


BE1838

Parking Brake Switch

e-1-2

Integration Relay



Connector "A"

S-12-1-A

Connector "B"

h-4-2

TROUBLESHOOTING

You will find the cause of troubles more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

(USA)

See page / Part name / Trouble	-	BE–22, 53	BE–6, 22	BE–51	BE–51	BE–6, 22	BE–54	BE–29	BE–6, 20	BE–90	BE–8	-
	MAIN FL	Headlight Control Relay	HEAD - (LH, RH) Fuse	Headlight Dimmer Switch	Light Control Switch	DOME Fuse	Integration Relay	Ignition Switch	GAUGE Fuse	Door Courtesy Switch (Driver's)	Headlight Bulb	Wire Harness
Headlight does not light.(Taillight is normal.)		1	3								4	2
Headlight does not light. (Taillight does not light.)	1	3	4								5	2
Only one side light does not light.			1								2	3
"LO-Beam" does not light.					3						2	1
"HI-Beam" does not light.				1	3							2
"Flash" does not light.				1								2
"Auto Turn-Off System" does not operate.						6	1	3	2	4		5

(CANADA)

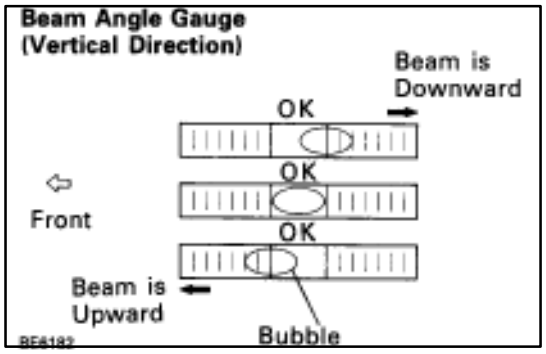
See page / Part name / Trouble	-	MAIN FL	Headlight Control Relay	HEAD LO (LH, RH) Fuse	HEAD HI (LH, RH) Fuse	Headlight Dimmer Switch	Light Control Switch	DOME Fuse	Integration Relay	Ignition Switch	GAUGE Fuse	Door Courtesy Switch (Drivers)	Headlight Bulb	Daytime Running Light Relay (Main)	Daytime Running Light Relay No. 2	Daytime Running Light Relay No. 3	Daytime Running Light Relay No. 4	DRL Fuse	ECU - B Fuse	Wire Harness	Other Parts
	-	BE–53	BE–6, 25	BE–6, 22	BE–51	BE–51	BE–6, 22	BE–54	BE–29	BE–6, 20	BE–90	BE–8	BE–56	BE–25, 53	BE–27, 54	BE–27, 54	BE–6, 27	BE–6, 21	-	-	
Headlight does not light.(Taillight is normal.)																				1	
Headlight does not light. (Taillight does not light.)		1																		2	
Only one side light does not light.				1	1								2							3	
"LO-Beam" does not light.			1	5			2		3				6							4	
"HI-Beam" does not light.					9	7	10		11				10	3	2	4	5	1	6	8	
"Flash" does not light.					9	7							10	3	2	4	5	1	6	8	
"Auto Turn-Off System" does not operate.								6	1	3	2	4								5	
Headlight does not light with engine running and light control SW in OFF					7						1		8	4		5			2	6	*3

*Parking Brake Switch and Terminal L of Generator

HEADLIGHT

HEADLIGHT REPLACEMENT

(See page BO–12)

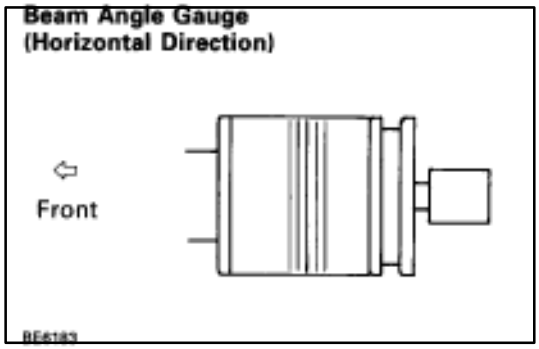


HEADLIGHT AIM INSPECTION

Check the following items before inspection.

- Be sure that 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.

(Vertical Direction)

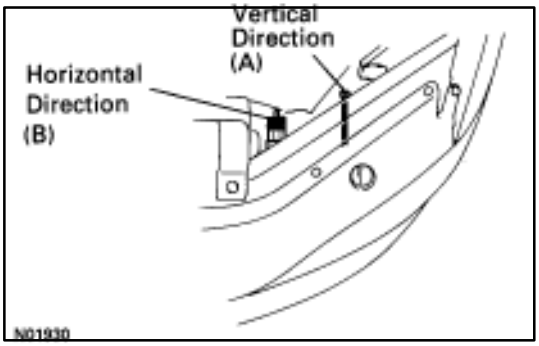


Check that the bubble of the gauge does not deviate from the center of the gauge.

(Horizontal Direction)

Check that the red mark does not deviate for the center of the gauge.

If the error is over the valve specified, adjust headlight aim.



HEADLIGHT AIM ADJUSTMENT

(Vertical Direction)

Turn the bolt A and adjust the bubble of angle gauge to center of the gauge.

HINT: The beam angle will change about 0°19' with one mark.

(Horizontal Direction)

Turn the bolt B and adjust the mark of angle gauge to center of the gauge.

HINT: The beam angle will change about 0°38' with one mark.

NOTICE: The beam angle gauge should only be used when the headlights are correctly installed on the body.

Combination Switch Assembly

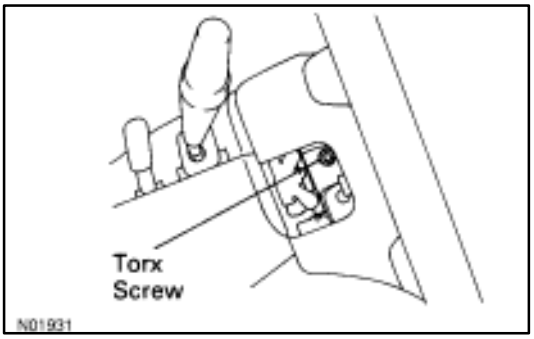
COMBINATION SWITCH ASSEMBLY REMOVAL

1. REMOVE FOLLOWING PARTS:
(See page BO–107)

- Front Pillar Garnish
- Front Inside Scuff Plate
- Front Door Opening Cover
- Cowl Side Trim
- Safety Pad No. 2

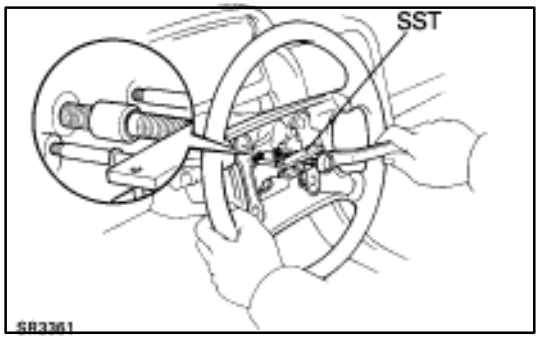
NOTICE:

- **Turn the steering wheel and front wheels to the straight ahead position**
- **Turn the ignition switch to the OFF position, then remove the battery negative terminal.**



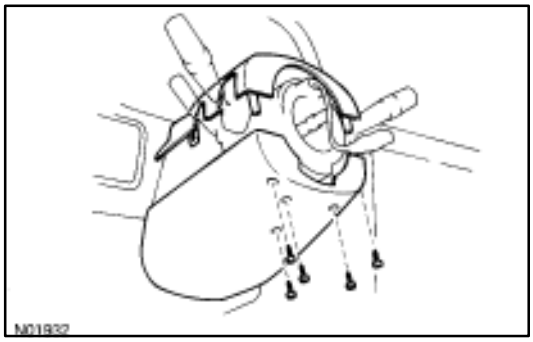
2. REMOVE STEERING WHEEL CENTER PAD

(a) Remove two covers.
(b) Using torx driver or wrench, remove the two torx screws.
Torx wrench T30 (09042–00010)
Torx driver T30 (09041–00030)
(c) Remove center pad and disconnect connector.



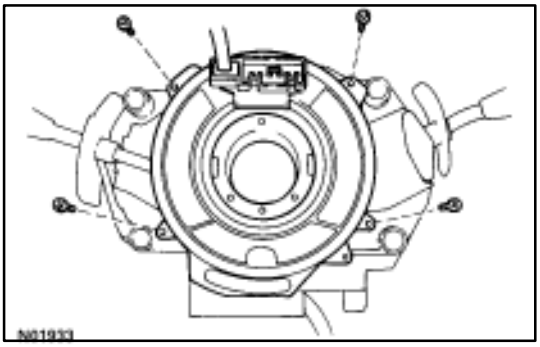
3. REMOVE STEERING WHEEL

(a) Remove the steering nut.
(b) Using SST, remove steering wheel.
SST 09213–31021



4. REMOVE STEERING COLUMN COVER

Remove the five screws and the steering column covers.

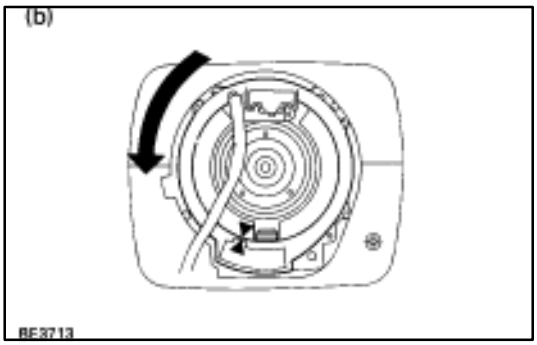


5. REMOVE COMBINATION SWITCH ASSEMBLY

(a) Remove the four screws.

(b) Disconnect connectors. (See page BE–47)
HINT: Since the airbag connector has a 2–stage lock, remove the 1st stage lock, and disconnect the connector.

(c) Remove combination switch assembly from steering column.
HINT: Pull the wire harness spool body to forward and remove wire harness spool body from steering column.



COMBINATION SWITCH INSTALLATION

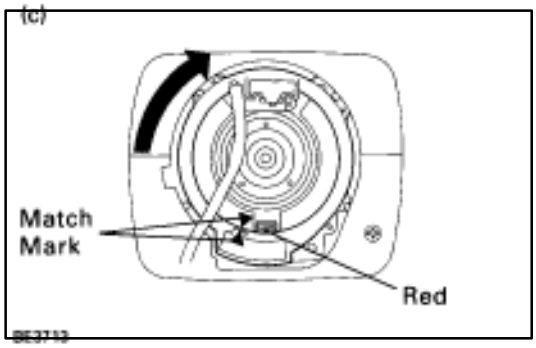
For installation, follow the removal procedure in reverse.

(MAIN POINT OF INSTALLATION)

1. ADJUSTMENT OF SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.

(b) Turn the spiral cable counterclockwise by hand until it becomes harder to turn the cable.



(c) Then rotate the spiral cable clockwise about 3 turns to align the red mark.
HINT:
- The spiral cable will rotate about 3 turns to either left or right of the center.
- The connector should be straight up.

(d) Install the steering wheel so that the match marks will not be misaligned.

2. INSTALL STEERING SET NUT

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

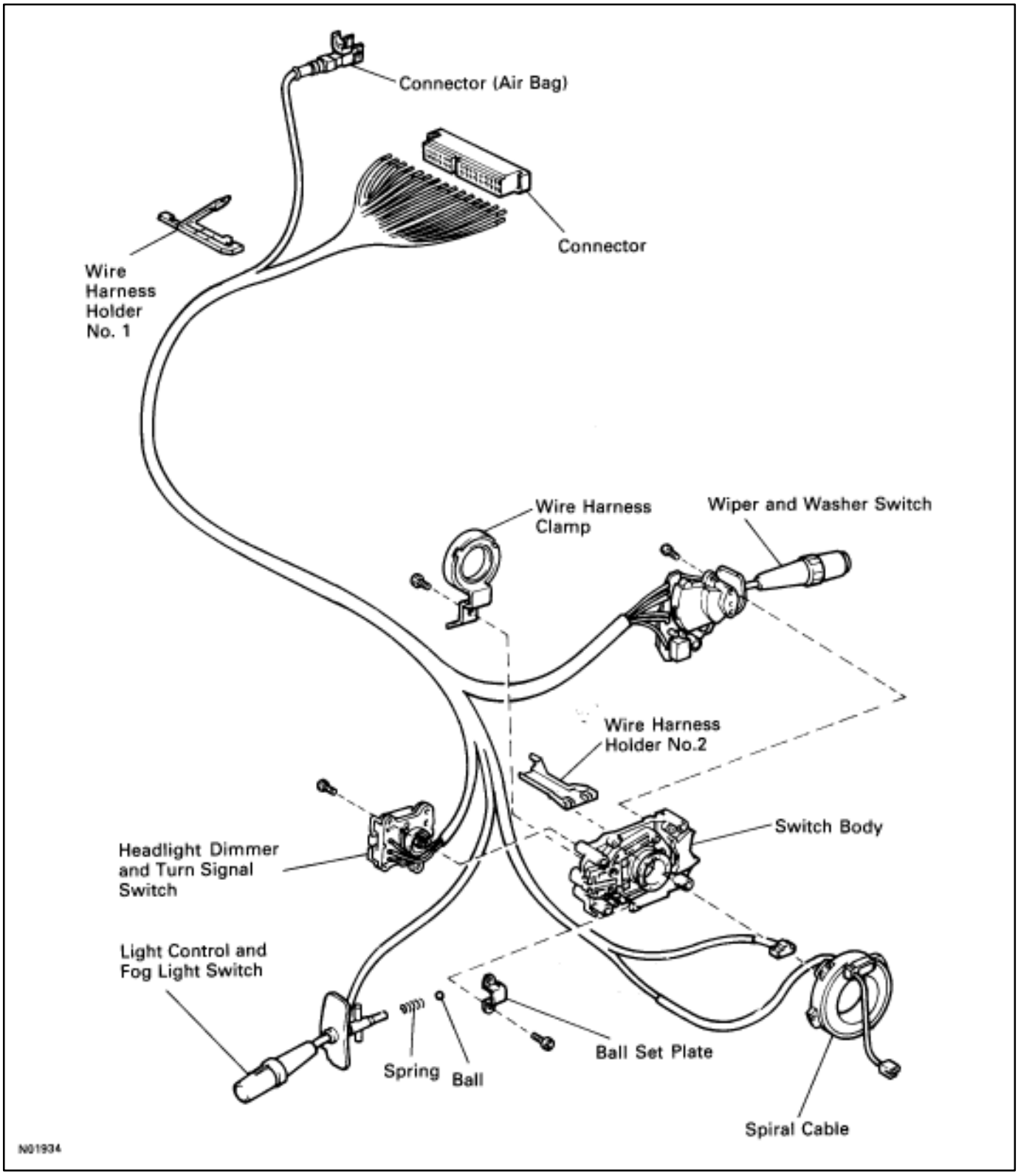
3. INSTALL STEERING WHEEL CENTER PAD

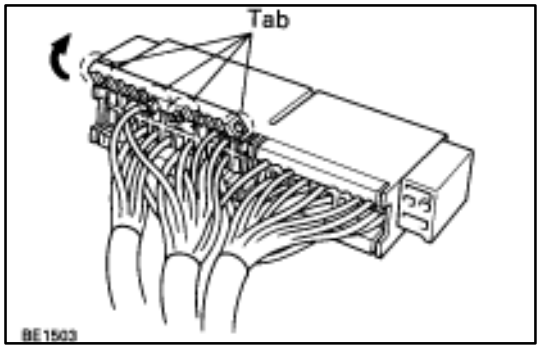
Torque the torx screws.

Torque: 8.8 N·m (90 kgf·cm, 7.8 ft·lbf)

COMBINATION SWITCH ASSEMBLY DISASSEMBLY

(Components)

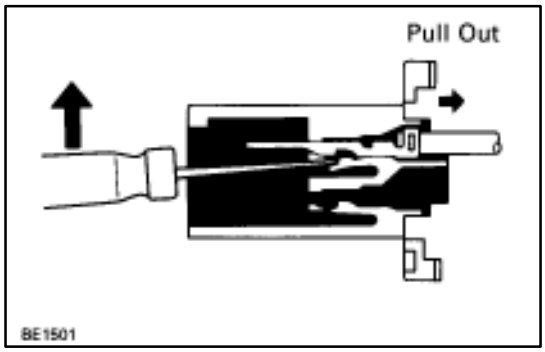




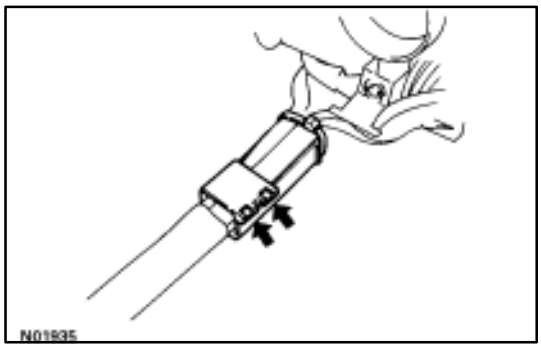
1. REMOVE WIRE HARNESS HOLDER NO. 1

2. REMOVE TERMINALS FROM CONNECTOR

(a) Release four tabs and open the terminal cover.
NOTICE: Do not remove terminal for AIRBAG connector (Yellow).

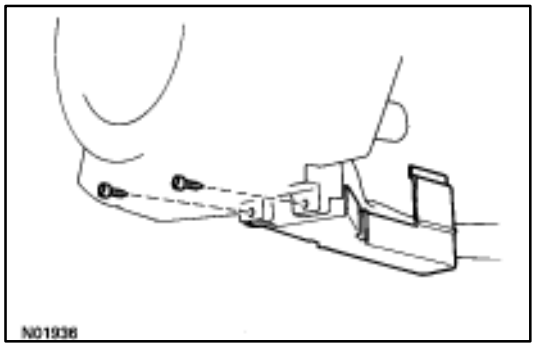


(b) From the open end, insert a miniature screwdriver between the locking lug and terminal.
(c) Pry down the locking lug with the screwdriver and pull the terminal out from the rear.

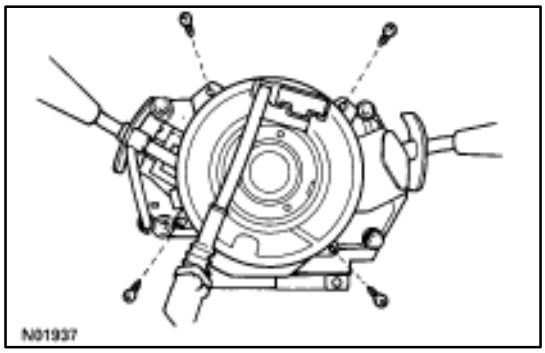


3. REMOVE WIRE HARNESS HOLDER NO. 2

(a) Remove the clamp.
(b) Pry loose two locking lugs

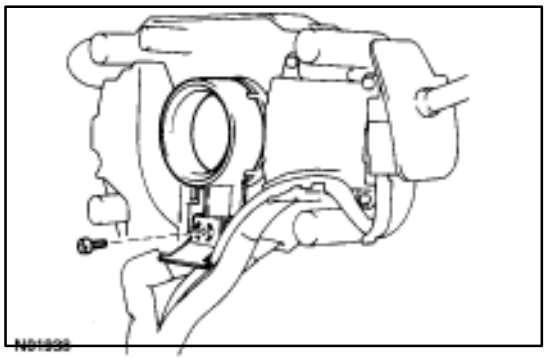


(c) Remove two screws and the wire harness holder No. 2.



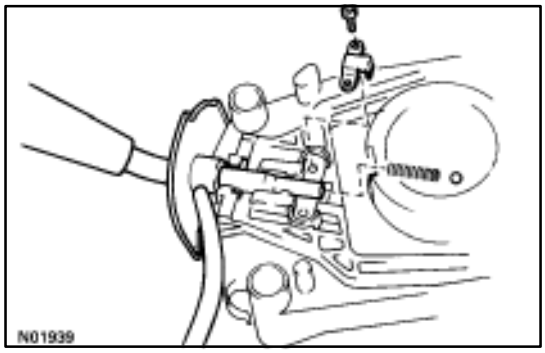
4. REMOVE SPIRAL CABLE SUBASSEMBLY

(a) Disconnect the connector.
(b) Remove the four screws and spiral cable subassembly.



5. REMOVE WIRE HARNESS CLAMP

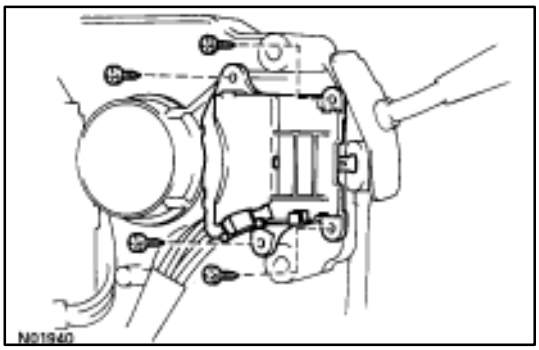
Remove the screw and the wire harness clamp.



6. REMOVE LIGHT CONTROL AND FOG LIGHT SWITCH

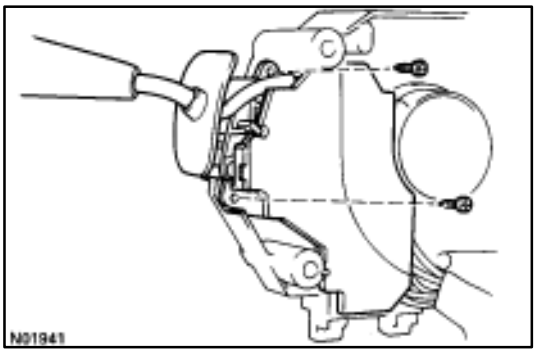
(a) Remove two screws and the ball set plate from the switch body.

(b) Remove the ball and slide out the switch from the switch body with the spring.



7. REMOVE HEADLIGHT DIMMER AND TURN SIGNAL SWITCH

Remove four screws and the headlight dimmer and turn signal switch from the switch body.



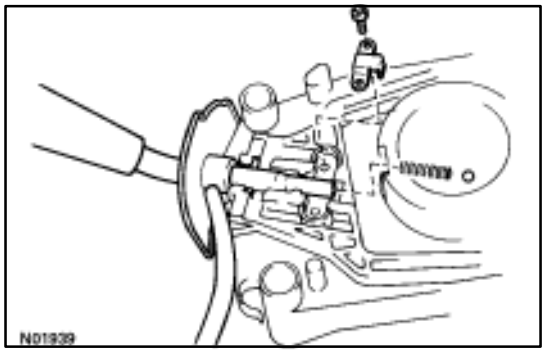
8. REMOVE WIPER AND WASHER SWITCH

Remove two screws and the wiper and washer switch from the switch body.

COMBINATION SWITCH ASSEMBLY

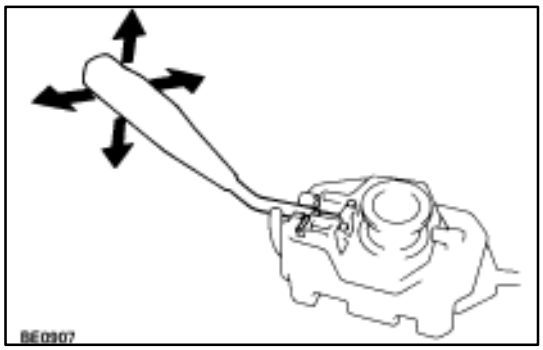
INSTALL PARTS OF COMBINATION SWITCH IN REVERSE SEQUENCE OF DISASSEMBLY

(MAIN POINT OF INSTALLATION)

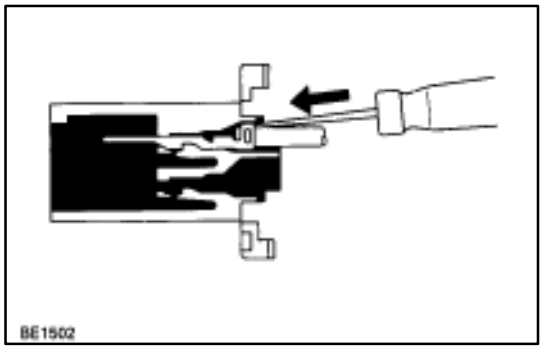


1. INSTALL LIGHT CONTROL SWITCH

(a) Slide the switch and install the switch body.
(b) Set the lever in the HI position, and install the ball and plate.

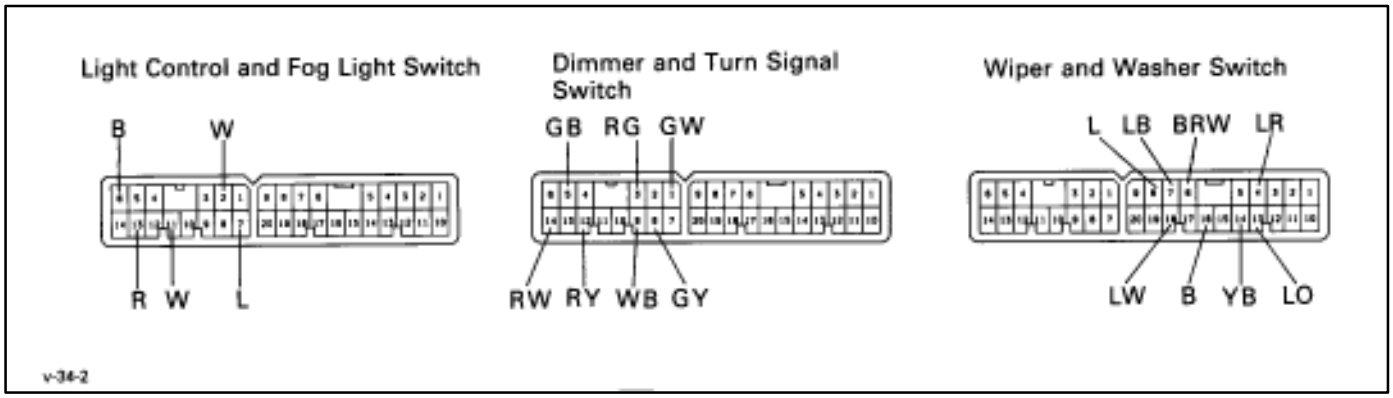


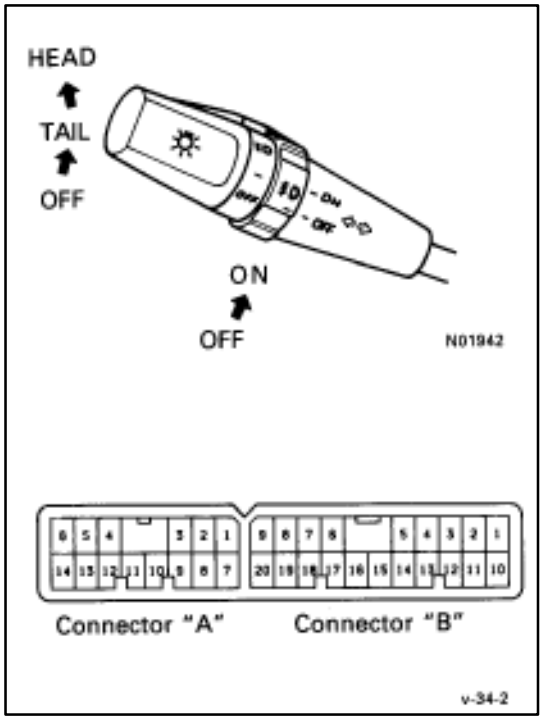
(c) After installing the light control switch to the switch body, insure that the switch operation is smooth.

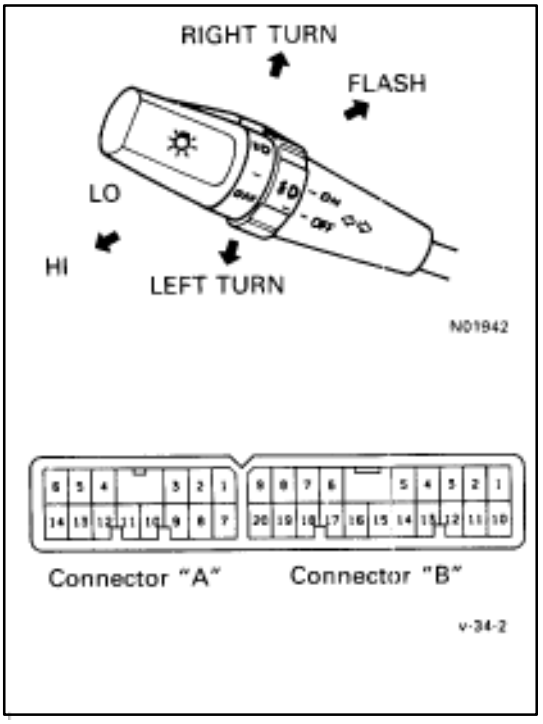


2. INSTALL TERMINALS TO CONNECTOR

- Push in the terminal until it is securely locked in the connector lug.
- Install each switch terminal as shown in the figure.







COMBINATION SWITCH INSPECTION

1. INSPECT LIGHT CONTROL SWITCH (Continuity)

Inspect the switch continuity between terminals.

Terminal / Switch position	A2	A11	A13
OFF			
TAIL	○——	——○	
HEAD	○——	——○	——○

If continuity is not as specified, replace the switch.

2. INSPECT FOG LIGHT SWITCH (Continuity)

Inspect the switch continuity between terminals.

Terminal / Switch position	A6	A7
OFF		
ON	○——	——○

If continuity is not as specified, replace the switch.

3. INSPECT DIMMER SWITCH (Continuity)

Inspect the switch continuity between terminals.

Terminal / Switch position	A3	A9	A12	A14
Flash		○——	——○	——○
Low beam	○——	——○		
High beam		○——	——○	

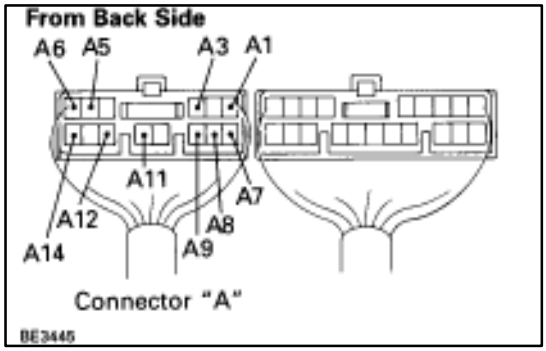
If continuity is not as specified, replace the switch.

4. INSPECT TURN SIGNAL SWITCH (Continuity)

Inspect the switch continuity between terminals.

Terminal / Switch position	A1	A5	A8
Left turn	○——	——○	
Neutral			
Right turn	○——		——○

If continuity is not as specified, replace the switch.



5. INSPECT COMBINATION SWITCH CIRCUIT

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

(Light Control Switch Circuit)

Check for	Tester connection	Condition	Specified value
Continuity	A11–Ground	Constant	Continuity

(Fog Light Switch Circuit)

Check for	Tester connection	Condition		Specified value
Voltage	A6–Ground	Light control switch position	HEAD	Battery positive voltage
			OFF or TAIL	No voltage
Continuity	A7–Ground	Headlight dimmer switch position	Low beam	Continuity
			High beam or flash	No continuity

(Headlight Dimmer Switch Circuit)

Check for	Tester connection	Condition		Specified value
Voltage	A3–Ground	Light control switch HEAD and fog light switch position	ON	Battery positive voltage
			OFF	No voltage
	A12–Ground	Light control switch HEAD and Headlight dimmer switch position	High beam or flash	Battery positive voltage
			Low beam	No voltage
	A14–Ground	Constant		Battery positive voltage
Continuity	A9–Ground	Constant		Continuity

(Turn Signal Switch Circuit)

Check for	Tester connection	Condition		Specified value
Voltage	A1–Ground	Hazard warning switch ON		Battery positive voltage↔OV
		Ignition switch ON and turn signal switch position	Left or Right	Battery positive voltage↔OV
			Neutral	No voltage
Continuity	A5–Ground	Constant		*Continuity
	A8–Ground	Constant		*Continuity
*There is resistance because this circuit is grounded through the bulb.				

If the circuit is not as specified, refer to BE–39,40,69 wiring diagram and inspect the circuits connected to other parts.

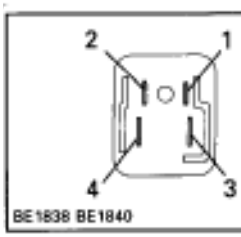
HEADLIGHT CONTROL RELAY

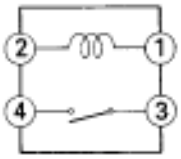
HEADLIGHT CONTROL RELAY INSPECTION

INSPECT HEADLIGHT CONTROL RELAY

(Continuity)

Inspect relay continuity between terminals.





BE1838 BE1840

Terminal / Condition	1	2	3	4
Constant	○	∿	○	
Apply battery positive voltage to terminals 1 and 2.			○	○

If continuity is not as specified, replace the relay.

(Relay Circuit)

(See page BE–22)

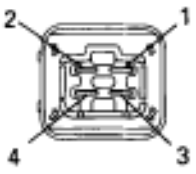
DAYTIME RUNNING LIGHT RELAY NO.2

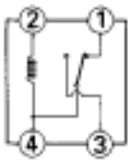
DAYTIME RUNNING LIGHT RELAY NO.2 INSPECTION

INSPECT DAYTIME RUNNING LIGHT RELAY NO.2

(Continuity)

Inspect relay continuity between terminals.





BE1839 BE1842

Terminal / Condition	1	2	3	4
Constant	○	○	∿	○
		○		○
Apply battery positive voltage to terminals 2 and 4.		○		○

If continuity is not as specified, replace the relay.

(Relay Circuit)

(See page BE–25)

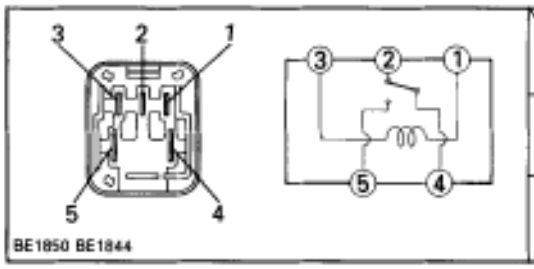
DAYTIME RUNNING LIGHT RELAY NO.3

DAYTIME RUNNING LIGHT RELAY NO.3 INSPECTION

INSPECT DAYTIME RUNNING LIGHT RELAY NO.3

(Continuity)

Inspect relay continuity between terminals.



Terminal / Condition	1	2	3	4	5
Constant	○	○	○	○	
Apply battery positive voltage to terminals 1 and 3.				○	○

If continuity is not as specified, replace the relay.

(Relay Circuit)

(See page BE–27)

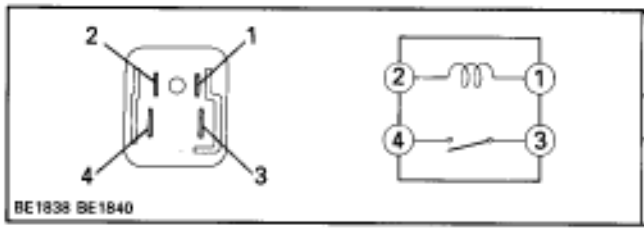
DAYTIME RUNNING LIGHT RELAY NO.4

DAYTIME RUNNING LIGHT RELAY NO.4 INSPECTION

INSPECT DAYTIME RUNNING LIGHT RELAY NO.4

(Continuity)

Inspect relay continuity between terminals.



Terminal / Condition	1	2	3	4
Constant	○	○		
Apply battery positive voltage to terminals 1 and 2.			○	○

If continuity is not as specified, replace the relay.

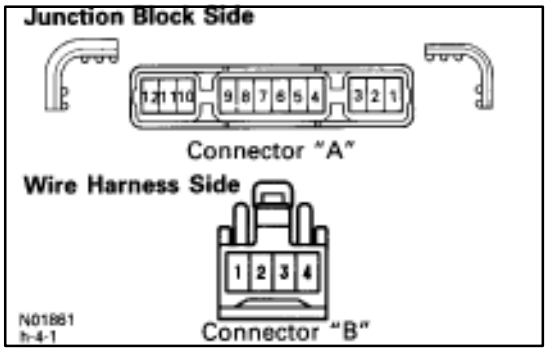
(Relay Circuit)

(See page BE–27)

INTEGRATION RELAY

INTEGRATION RELAY REMOVAL AND INSTALLATION

(See page BE–32)



INTEGRATION RELAY INSPECTION

INSPECT INTEGRATION RELAY

(Relay Circuit/Light Auto Turn Off System)

Remove the relay from junction block and inspect the connectors on the wire harness and junction block side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	B1–Ground	Light control switch position	OFF	No continuity
			TAIL or HEAD	Continuity
	B4–Ground	Light control switch position	OFF or TAIL	No continuity
			HEAD	Continuity
	A10–Ground	Constant		Continuity
	A6–Ground	Driver's door courtesy Switch	OFF (Door closed)	No continuity
			ON (Door opened)	Continuity
Voltage	B2–Ground	Constant		Battery positive voltage
	B3–Ground	Constant		Battery positive voltage
	A7–Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery positive voltage
	A1–Ground	Constant		Battery positivevoltage

If the circuit is as specified, trying replacing the relay with a new one.

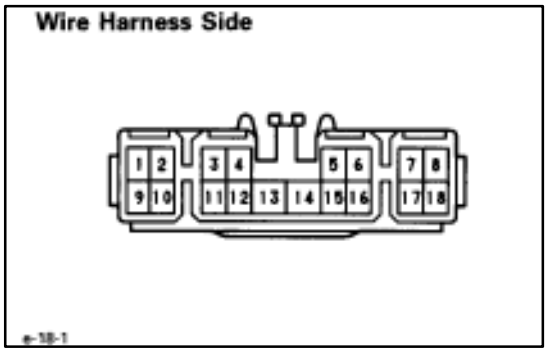
If the circuit is not as specified, refer to BE–39,40 wiring diagram and inspect the circuits connected to other parts.

DAYTIME RUNNING LIGHT RELAY

DAYTIME RUNNING LIGHT RELAY (MAIN) REMOVAL AND INSTALLATION

1. REMOVE DAYTIME RUNNING LIGHT RELAY (MAIN) (See page BO–107)

(a) Remove the safety pad.
(b) Disconnect the connector.
(c) Remove the screw and the relay.



2. INSTALL DAYTIME RUNNING LIGHT RELAY (MAIN)

For installation, follow the removal procedure in reverse.

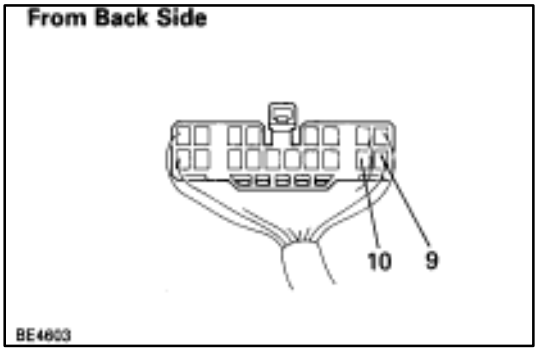
DAYTIME RUNNING LIGHT RELAY (MAIN) INSPECTION

INSPECT DAYTIME RUNNING LIGHT RELAY (MAIN) (Circuit/Wire Harness Side)

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

Check for	Tester connection	Condition		Specified value
Continuity	3–Ground	Light control switchposition	OFF	No continuity
			TAIL or HEAD	Continuity
	5–Ground	Light control switch position	OFF or TAIL	No continuity
			HEAD	Continuity
		Headlight dimmer switch position	Low beam or high beam	No continuity
			Flash	Continuity
	16–Ground	Headlight dimmer switch position	Low beam	No continuity
			Flash or High beam	Continuity
	8–Ground	Parking brake switch position	OFF (Parking brake lever released)	No continuity
			ON (Parking brake lever pulled up)	Continuity
	13–Ground	Constant		Continuity
Voltage	2–Ground 18–Ground	Ignition switch position	LOCK or ACC	No voltage
	4–Ground 15–Ground 17–Ground		ON or START	Battery positive voltage
		Constant		Battery positive voltage
	11–Ground	Engine	Stop	No voltage
			Running	Battery positive voltage

If circuit is as specified, perform the inspection on the following page.
If circuit is not as specified, refer to BE–40 wiring diagram and inspect the circuits.



(Relay Circuit/Connector connected)
Connect the wire harness side connector to the relay and inspect wire harness side connector from the back side as shown.

Check for	Tester connection	Condition		Specified value
Voltage	9–Ground	Light control switch position	OFF	No voltage
			TAIL or HEAD	Battery positive voltage
	10–Ground	Light control switch position	OFF	No voltage
			TAIL or HEAD	Battery positive voltage

If circuit is as specified, trying replacing the relay with a new one.
If circuit is not as specified, refer to BE–40 wiring diagram and inspect the circuits connected to other parts.

TAILLIGHT CONTROL RELAY
(See page BE–61)

DOOR COURTESY SWITCH
(See page BE–90)

PARKING BRAKE SWITCH
(See page BE–166)

IGNITION SWITCH
(See page BE–29)

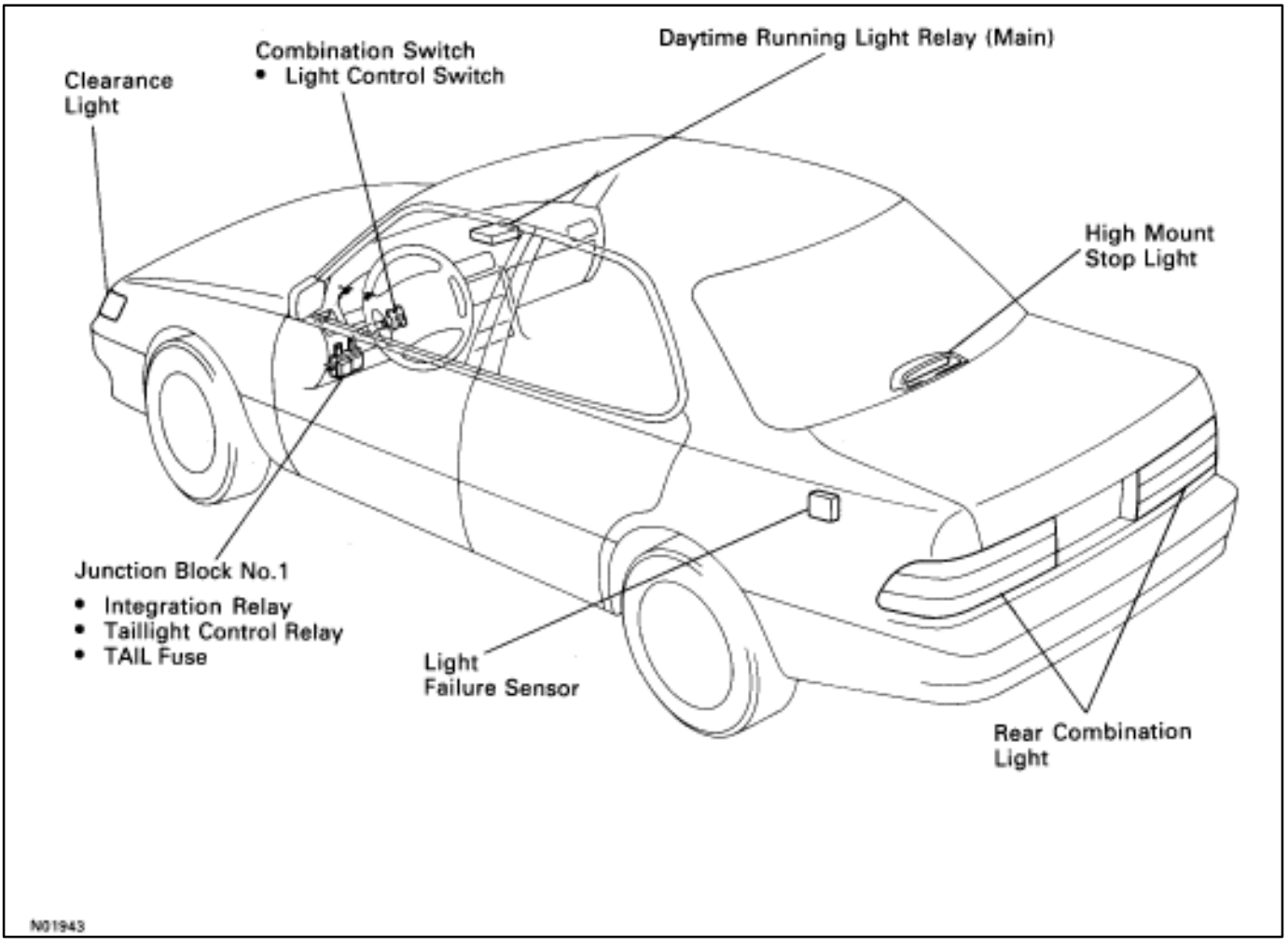
TAILLIGHT SYSTEM

DESCRIPTION

The component parts of this system and their function are as shown in the following table.

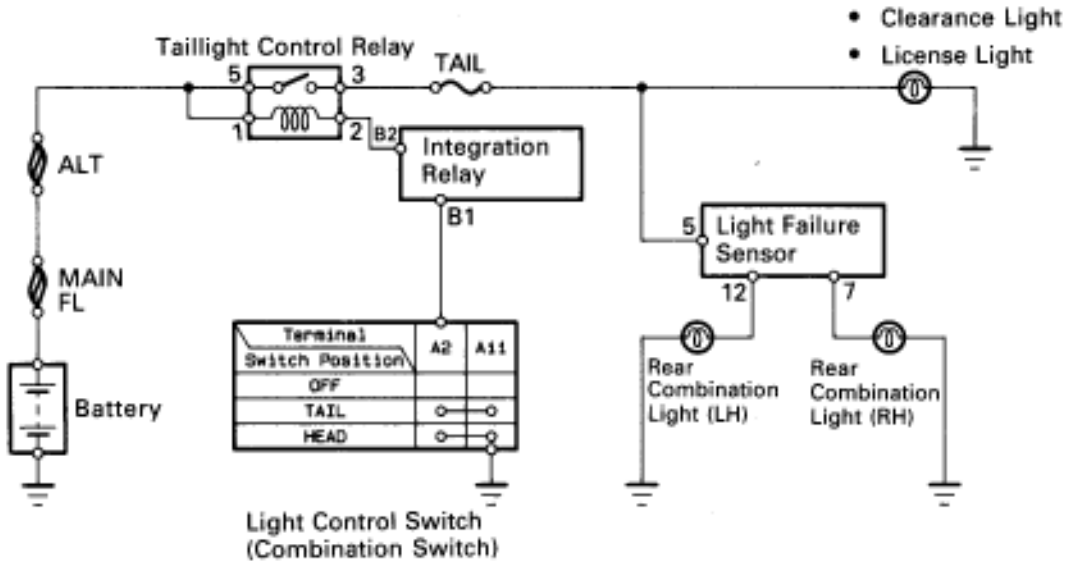
Parts Name	Function
Light Control Switch	Grounds current from the taillight control relay via the integration relay, switching each relay and supplying current to the appropriate bulbs in accordance with the switch position.
Taillight Control Relay	Turned on by signals from the light control switch and supplies current to each bulb.
Integration Relay	Carries out ”Light Auto Turn–Off” of the headlights, fog lights and taillights and cuts off current to the light control switch in accordance with signals from the GAUGE use and door courtesy switch.
Light Failure Sensor	This sensor senses when a bulb in rear combination light is burnt out and lights up a warning light.
Daytime Running Light Relay (CANADA)	Refer to BE–36

PARTS LOCATION



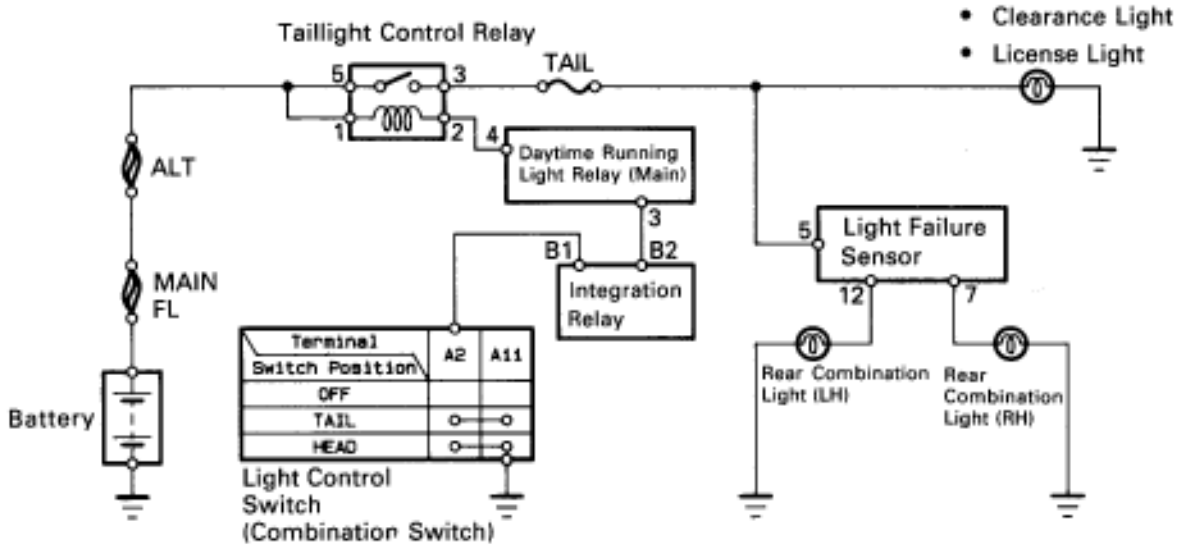
WIRING AND CONNECTOR DIAGRAMS

• USA



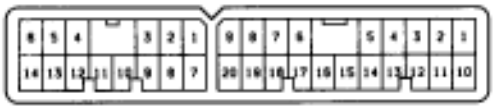
N01944

•CANADA



N01945

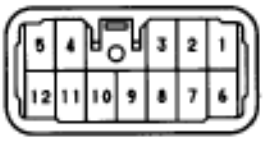
Light Control Switch (Combination Switch)



Connector "A" Connector "B"

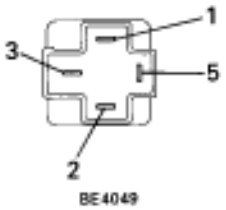
v-34-2

Light Failure Sensor



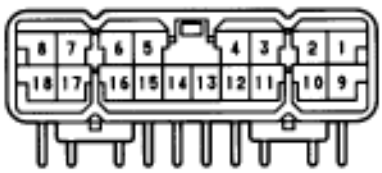
e-12-2-B

Taillight Control Relay



BE4049

Daytime Running Light Relay (Main)



e-18-2-A

Integration Relay

Connector "B"

h-4-2

TROUBLESHOOTING

You will find the cause of troubles more easily using the table well shown below. In this table, the numbers indicate the order priority of the causes in troubles. Check each part in the order shown. If necessary, replace the parts.

	See page	BE–6, 20	BE–20, 61	BE–51	BE–54	BE–66	BE–90	BE–20	BE–56	BE–6, 20	–	BE–8	–
	Part name / Trouble	TAIL Fuse	Taillight Control Relay	Light Control Switch	Integration Relay	Light Failure Sensor	Door Courtesy Switch (Driver's)	GAUGE Fuse	Daytime Running Light Relay(Main)	ECM – B Fuse	Wire Harness	Bulb	Other Parts
USA	Taillight does not light. (Headlight does not light.)			1	2						3		
USA	Taillight does not light. (Headlight is normal.)	1	2	3	4						5		
USA	Only one light does not light.										2	1	
USA	Rear combination light does not light.					2					1	3	
USA	"Light Auto Turn-Off System" does not operate.				1		4	3			2		
CANADA	Taillight does not light. (Headlight does not light.)			1	3				2		4		
CANADA	Taillight does not light. (Headlight is normal.)	1	2	4	5				3		6		
CANADA	Only one light does not light.										2	1	
CANADA	Rear combination light does not light.					2					1	3	
CANADA	"Light Auto Turn-Off System" does not operate.				1		5	2	3		4		
CANADA	Taillight does not light with engine running and light control switch OFF							1	2	3	5		*1 4

*1: Terminal L of Alternator and Parking Brake Switch

Clearance Light

CLEARANCE LIGHT REPLACEMENT
(See page BO–12)

Rear Combination Light

REAR COMBINATION LIGHT REPLACEMENT
(See page BO–60)

Combination Switch Assembly

(See page BE–45)

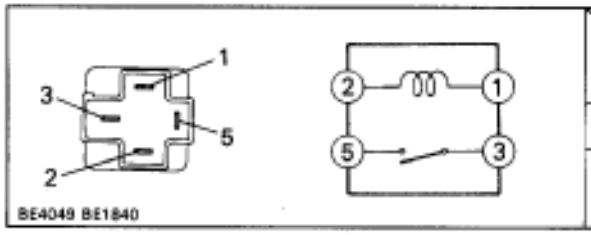
HINT: Inspect the light control switch.

Taillight Control Relay

TAILLIGHT CONTROL RELAY INSPECTION
INSPECT TAILLIGHT CONTROL RELAY

(Continuity)

Inspect relay continuity between terminals.



Terminal / Condition	1	2	3	5
Constant	○—○			
Apply battery positive voltage to terminals 1 and 2.			○—○	

If continuity is not as specified, replace the relay.

(Relay Circuit)
(See page BE–20)

Light Failure Sensor

(See page BE–66)

Integration Relay

(See page BE–54)

HINT: Inspect ”Light Auto Turn–Off System”.

Daytime Running Light Relay (Main)

(See page BE–56)

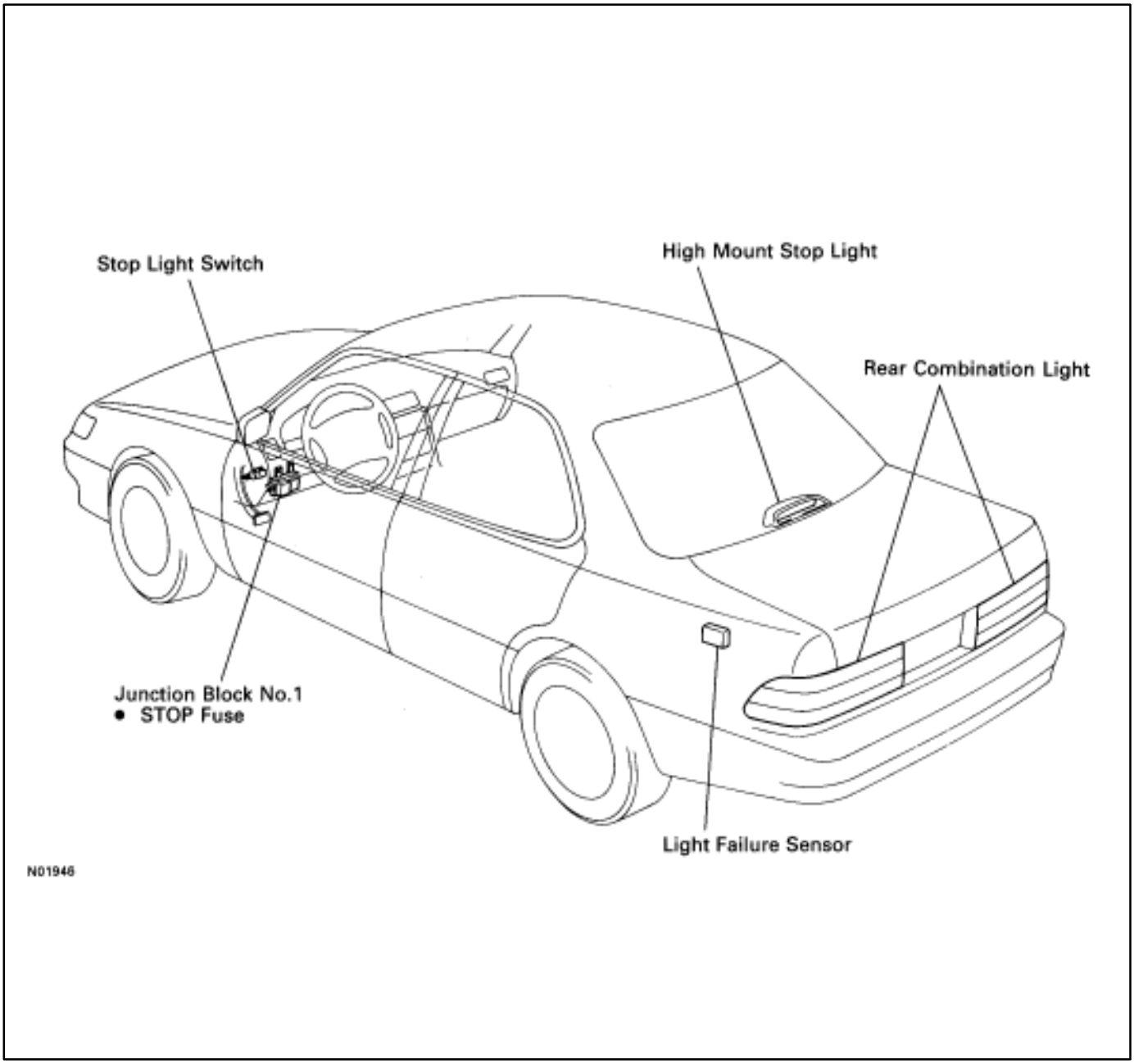
STOP LIGHT SYSTEM

DESCRIPTION

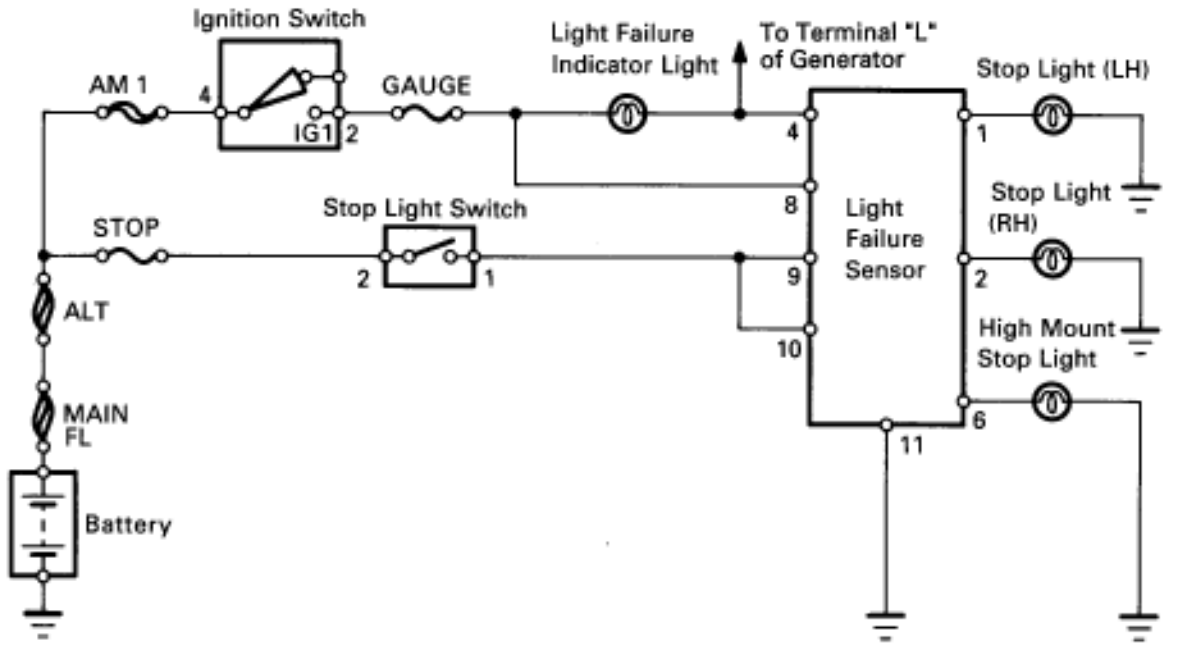
The component parts of this system and their function are as shown in the following table.

Parts Name	Function
Stop Light Switch	Creates a closed circuit for current from the STOP fuse when the brake pedal is depressed, thus turning on the stop lights.
Light Failure Sensor	This sensor senses when a bulb in rear combination light is burnt out and lights up a warning light.

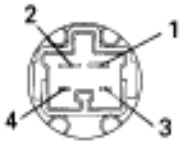
PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



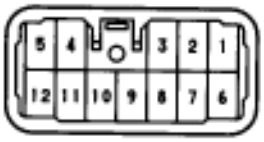
Stop Light Switch



BE6233

BE6234

Light Failure Sensor



e-12-2-B

TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Part name / Trouble	STOP Fuse	Stop Light Switch	Light Failure Sensor	Wire Harness	Bulb
	BE–6, 20	BE–65	BE–66		BE–8
Stop light does not light up.	1	2	3	4	
Stop light always lights up.		1		2	
Only one light always lights up.				1	
Only one light does not light.				2	1

REAR COMBINATION LIGHT

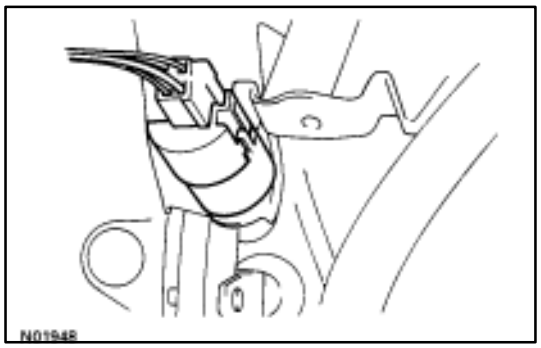
REAR COMBINATION LIGHT REPLACEMENT

(See page BO–60)

HIGH MOUNT STOP LIGHT

HIGH MOUNT STOP LIGHT REPLACEMENT

(See page BO–140)



STOP LIGHT SWITCH

STOP LIGHT SWITCH REMOVAL AND INSTALLATION

1. REMOVE STOP LIGHT SWITCH

(a) Remove instrument panel subassembly cover under No.1 and brake pedal return spring.
(b) Disconnect connector.
(c) Remove a nut and switch.

2. ADJUSTMENT OF STOP LIGHT SWITCH

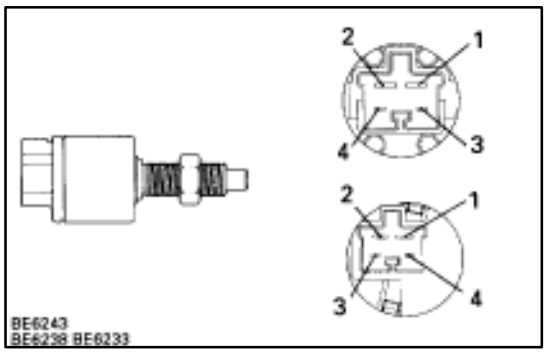
(See step on page BR–8)

3. INSTALL STOP LIGHT SWITCH

For installation, follow the removal procedure in reverse.

STOP LIGHT SWITCH INSPECTION

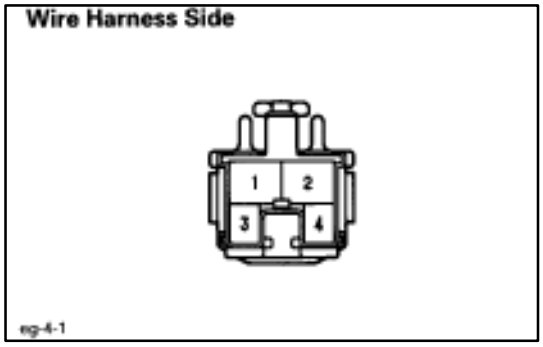
INSPECT STOP LIGHT SWITCH (Continuity)



Inspect the switch continuity between terminals.

Terminals / Switch position	1	2	3	4
Switch pin free (Brake pedal depressed)	○	○		
Switch pin pushed in (Brake pedal released)			○	○

If continuity is not as specified, replace the switch.

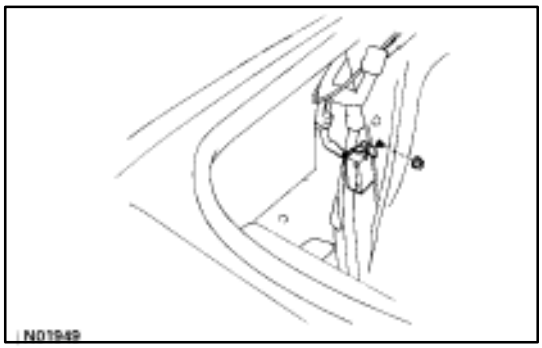


(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Voltage	2–Ground	Constant	Battery positive voltage

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



LIGHT FAILURE SENSOR

LIGHT FAILURE SENSOR REMOVAL AND INSTALLATION

1. REMOVE LIGHT FAILURE SENSOR

(See page **BO–60**)

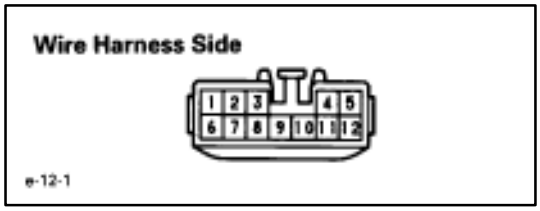
(a) Remove the LH side cover.

(b) Disconnect the connector.

(c) Remove the nut and the light failure sensor.

2. INSTALL LIGHT FAILURE SENSOR

For installation, follow the removal procedure in reverse.



LIGHT FAILURE SENSOR INSPECTION

INSPECT LIGHT FAILURE SENSOR

(Relay Circuit)

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

Check for	Tester connection	Condition		Specified value
Continuity	1–Ground	Constant		*Continuity
	2–Ground	Constant		*Continuity
	6–Ground	Constant		*Continuity
	7–Ground	Constant		*Continuity
	12–Ground	Constant		*Continuity
	11–Ground	Constant		Continuity
Voltage	5–Ground	Light control switch Position	OFF	No voltage
			TAIL or HEAD	Battery positive voltage
	4–Ground	Engine condition	Stop	No voltage
			Running	Battery positive voltage
	9–Ground 10–Ground	Stop light switch position	OFF (brake pedal released)	No voltage
			ON (brake pedal de-pressed)	Battery positive voltage
	8–Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery positive voltage

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

If circuit is as specified, replace the sensor. If the circuit is not as specified, refer to BE–63 wiring diagram and inspect the circuits connected to other parts.

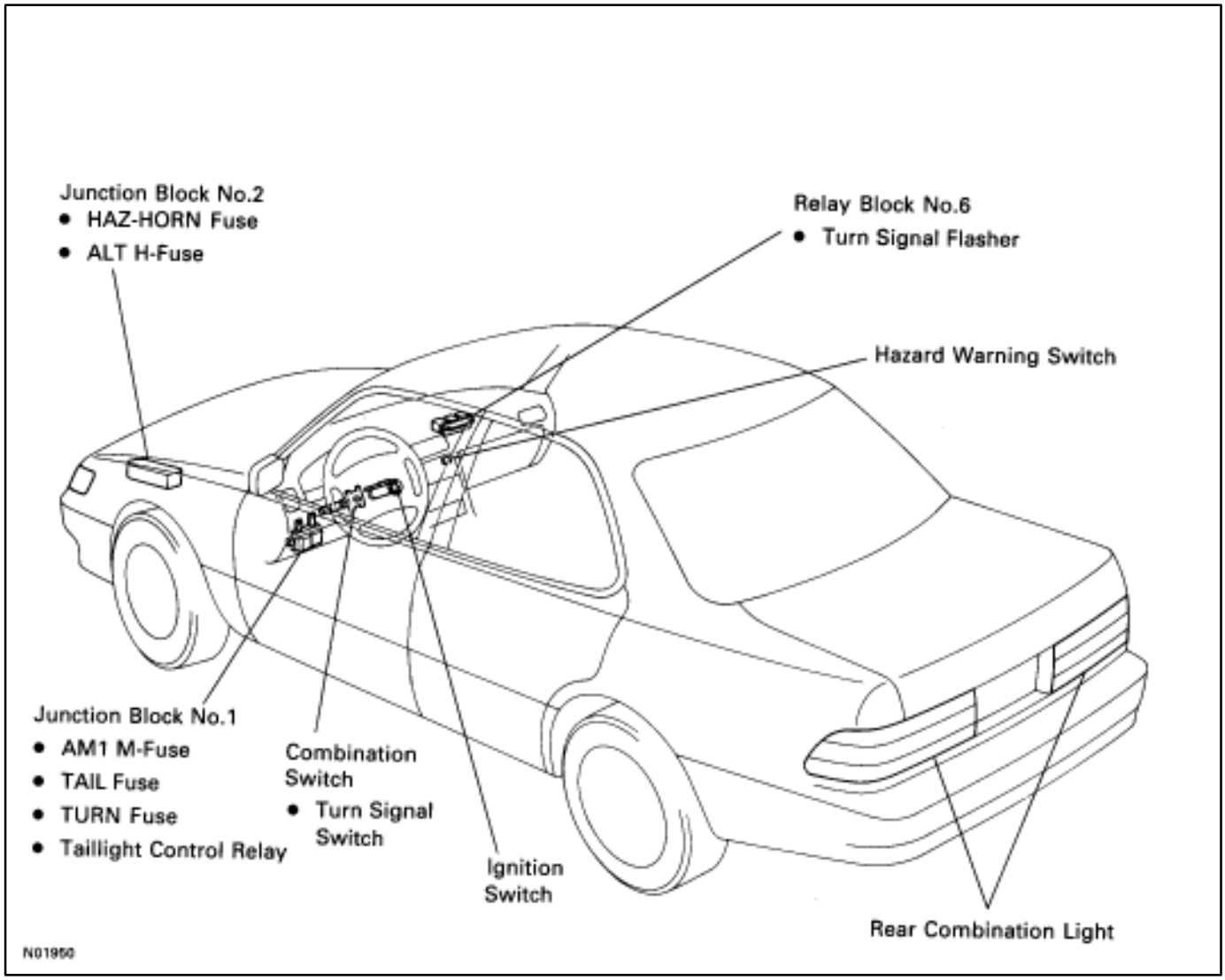
TURN SIGNAL AND HAZARD WARNING SYSTEM

DESCRIPTION

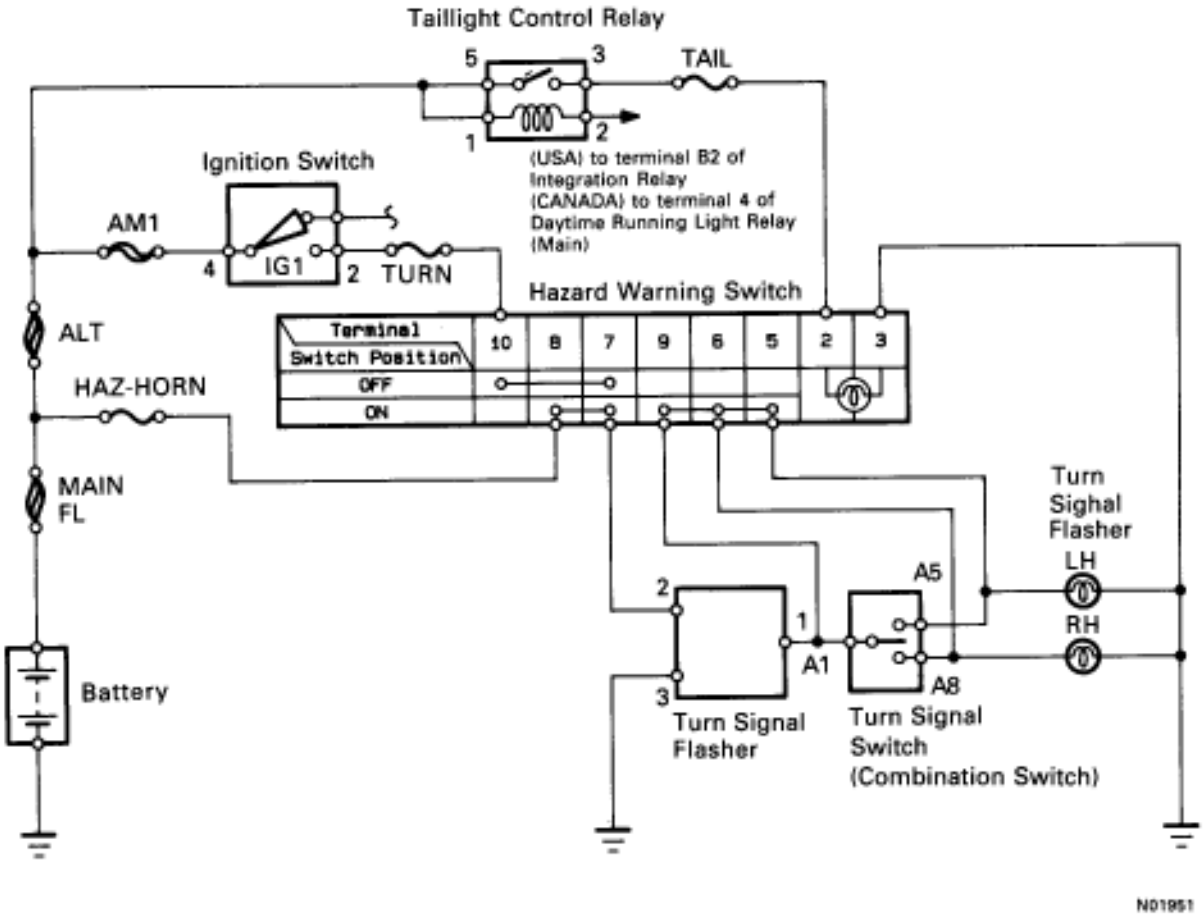
The component parts of this system and their function are as shown in the following table.

Parts Name	Function
Turn Signal Switch	Switches current from the turn signal flasher to the left side or right side.
Hazard Warning Switch	Modifies the circuit to the flasher relay and turn signal switch in accordance with the respective switch positions.
Turn Signal Flasher	Receives current from the hazard warning switch and flashes the turn signal lights by switching the current to the lights ON and OFF.

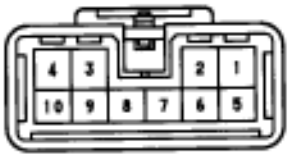
PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



Ignition Switch

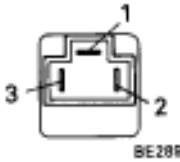


g-10-2-B

Hazard Warning Switch

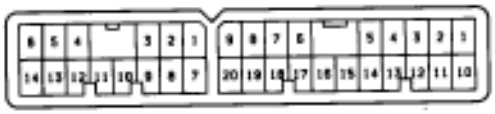
a-10-2

Turn Signal Flasher Relay



BE2896

Turn Signal Switch (Combination Switch)



Connector "A" Connector "B" v-34-2

TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Part name / Trouble	HAZ-HORN Fuse (BE–6, 22)	TURN Fuse (BE–6, 20)	Ignition Switch (BE–29)	Hazard Warning Switch (BE–72)	Turn Signal Flasher (BE–26, 71)	Turn Signal Switch (BE–51)	Wire Harness (–)	Bulb (BE–8)
"Hazard" and "Turn" do not light up.				1	2		3	
The flashing frequency is abnormal.					2		3	1
Hazard warning light does not light up. (Turn is normal.)	1						2	
Hazard warning light does not light up in one direction.				1			2	
*1 Turn signal does not light up.		2	1			3	4	
*2 Turn signal does not light up.		1				2	3	
Turn signal does not light up in one direction.						1	2	
Only one bulb does not light up.							2	1

* : Combination Meter, Wiper and Washer do not operate.
*⁜ Combination Meter, Wiper and Washer are normal.

FRONT TURN SIGNAL LIGHT

FRONT TURN SIGNAL LIGHT REPLACEMENT

(See page BO–12)

REAR COMBINATION LIGHT

REAR COMBINATION LIGHT REPLACEMENT

(See page BO–60)

COMBINATION SWITCH ASSEMBLY

(See page BE–45)

HINT: Inspect turn signal light switch.

TURN SIGNAL FLASHER

TURN SIGNAL FLASHER INSPECTION

INSPECT TURN SIGNAL FLASHER

(Operation)

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

(b) Connect the two turn signal light bulbs parallel to each other to terminals 1 and 3, check that the bulbs flash.

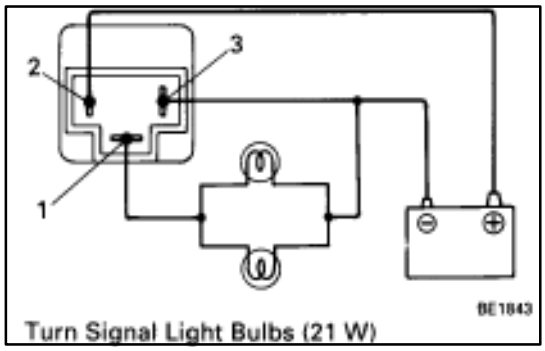
HINT: The turn signal lights should flash 60 to 120 times per minute.

If one of the front or rear turn signal lights has an open circuit, the number of flashes will be more than 140 per minute.

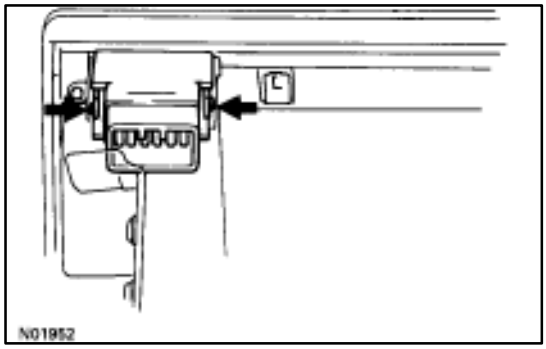
If operation is not as specified, replace the flasher.

(Flasher Circuit)

(See page BE–26)



Turn Signal Light Bulbs (21 W)



HAZARD WARNING SWITCH

HAZARD WARNING SWITCH REMOVAL AND INSTALLATION

1. REMOVE HAZARD WARNING SWITCH
(See page BO–107)

(a) Remove the A/C control panel assembly.

(b) Pry loose the two locking lugs and remove the hazard warning switch.

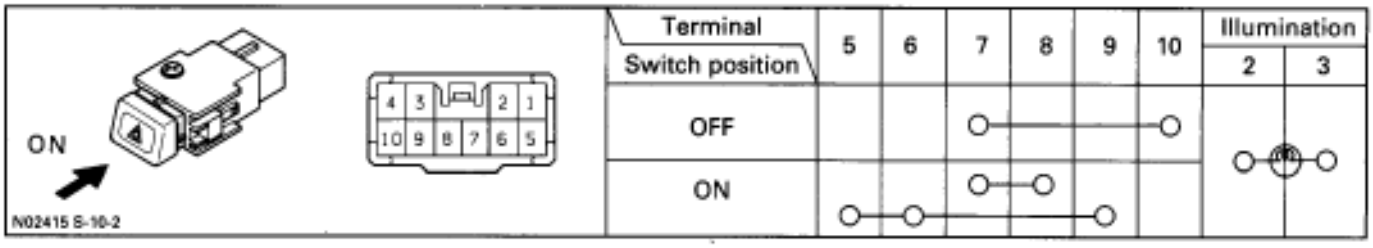
2. INSTALL HAZARD WARNING SWITCH
For installation, follow the removal procedure in reverse.

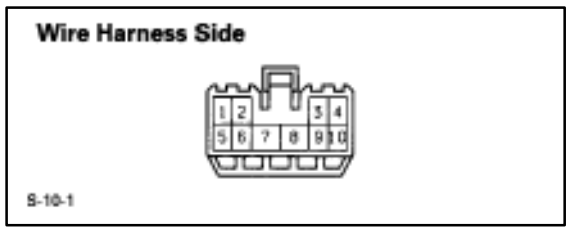
HAZARD WARNING SWITCH INSPECTION

INSPECT HAZARD WARNING SWITCH

(Continuity)

Inspect the switch continuity between terminals.





If continuity is not as specified, replace the switch.

(Switch Circuit)

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

Check for	Tester connection	Condition		Specified value
Voltage	8–Ground	Constant		Battery positive voltage
	10–Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery positive voltage
	*1 2–Ground	Light control switch position	OFF	No voltage
			TAIL or HEAD	Battery positive voltage
Continuity	*1 3–Ground	Constant		Continuity
	5–Ground	Constant		*2Continuity
	6–Ground	Constant		*2Continuity

*1 Illumination
*2 There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, refer to BE–69 wiring diagram and inspect the circuits connected to other parts.

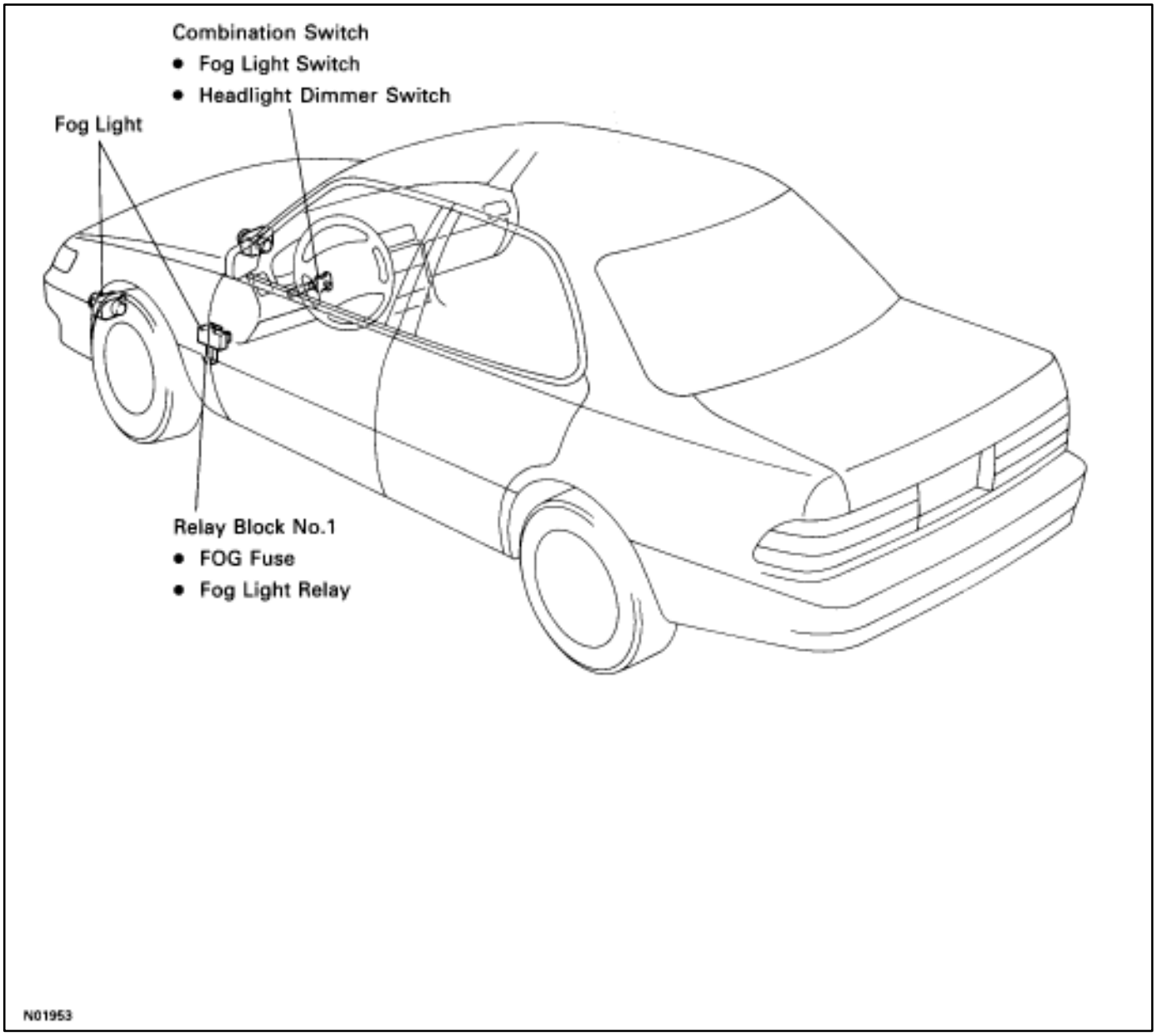
FOG LIGHT SYSTEM

DESCRIPTION

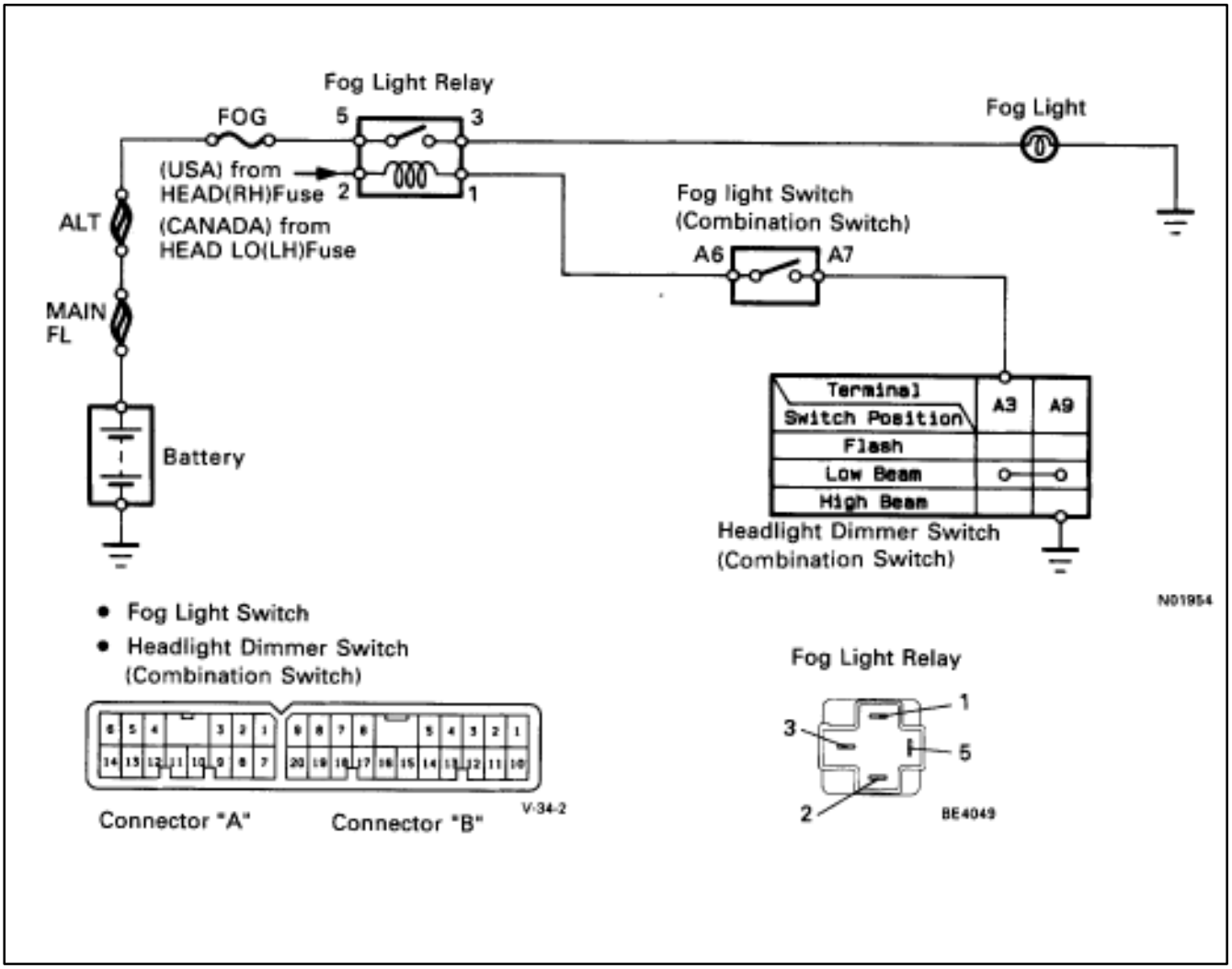
The component parts of this system and their function are as shown in the following table.

Parts Name	Function
Fog Light Switch	Grounds current from the fog light relay, turning the fog light relay ON and turning the fog lights on.
Fog Light Relay	Turned on by signals from the fog light switch and supplies current to fog lights.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



TROUBLESHOOTING

You will find the cause of troubles more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

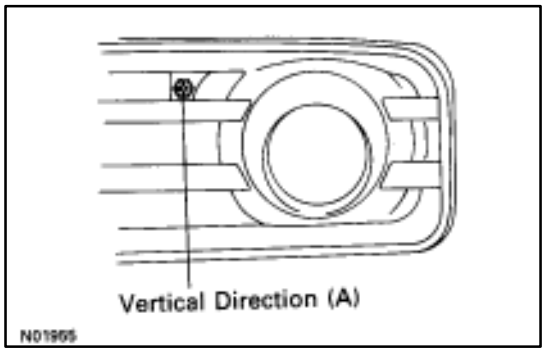
See page / Part name / Trouble	BE–6, 23 FOG Fuse	BE–23, 76 Fog Light Relay	BE–45 Fog Light Switch	BE–8 Bulb	– Wire Harness	– Other Parts
Fog light does not light with light control SW HEAD (Headlight is normal).	1	2	3		4	
Fog light does not light with light control SW HEAD (Headlight does not light).					2	1*1
Only one light does not light.				1	2	

*1: Inspect Headlight System

FOG LIGHT

FOG LIGHT REPLACEMENT

(See page BO–12)



FOG LIGHT AIM ADJUSTMENT

A–bolt: Vertical Direction

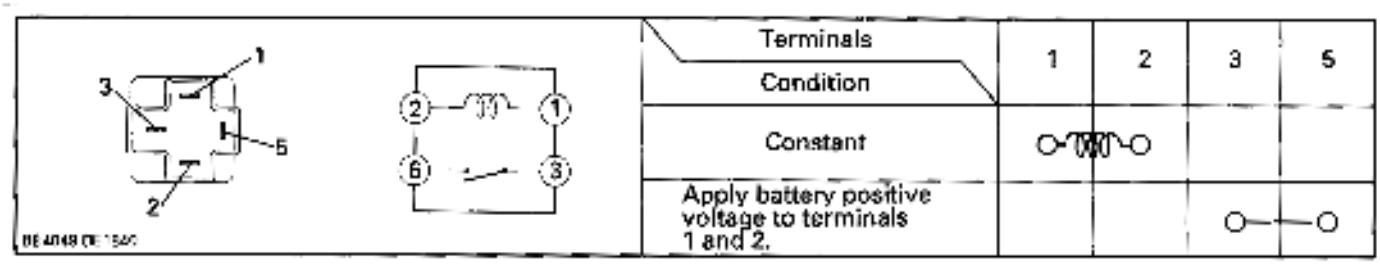
FOG LIGHT RELAY

FOG LIGHT RELAY INSPECTION

INSPECT FOG LIGHT RELAY

(Continuity)

Inspect relay continuity between terminals.



If continuity is not as specified, replace the relay.

(Relay Circuit)

(See page BE–23)

COMBINATION SWITCH ASSEMBLY

(See page BE–45)

HINT: Inspect fog light switch.

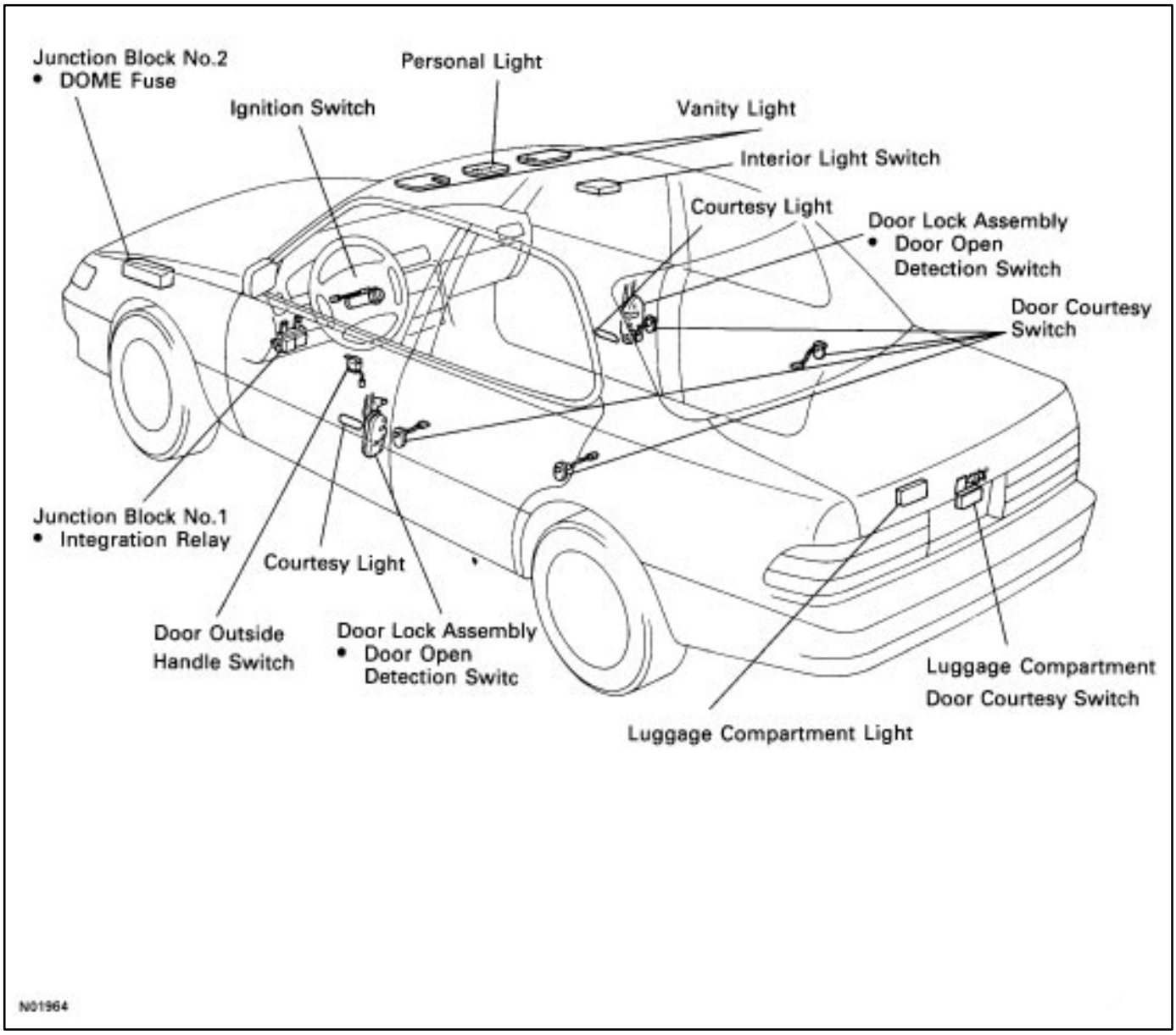
INTERIOR LIGHT SYSTEM

DESCRIPTION

The component parts of this system and their function are as shown in the following table.

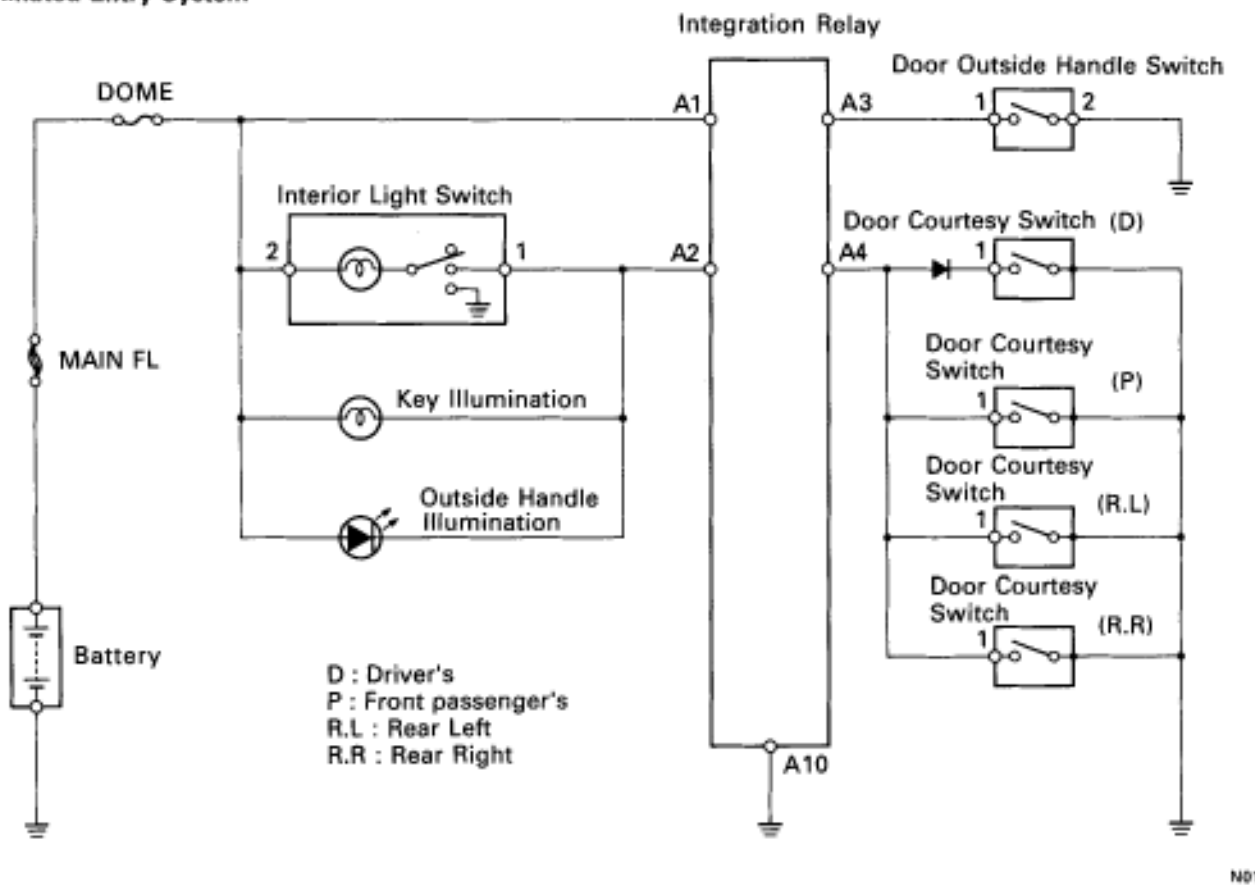
Parts Name	Function
Integration Relay	Fades out some of the interior lights in accordance with signals from the door courtesy switch and outside handle switch. (Illuminated Entry System)
Door Courtesy Switch	Creates a closed circuit when the doors are opened lighting each courtesy light, etc. Also detects when the door is open and sends the appropriate signals to the integration relay.
Door Outside Handle Switch	Detects when the door outside handle is operated and sends the appropriate signals to the integration relay.

PARTS LOCATION

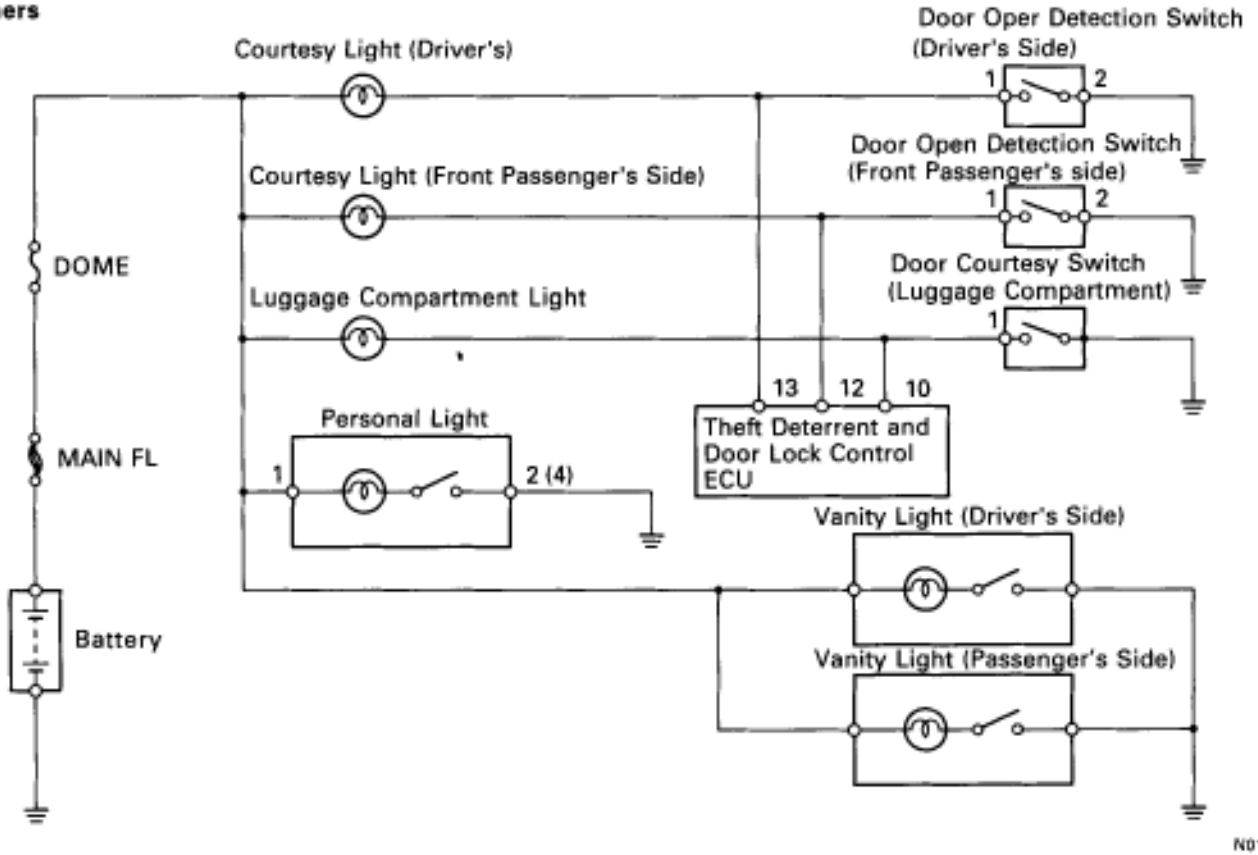


WIRING DIAGRAM

Illuminated Entry System



Others



The number in brackets ( ) applies to vehicles with Sliding Roof System.

CONNECTOR DIAGRAMS

Integration Relay

Connector "A" S-12-1-A

Door Outside handle Switch

lh-2-1

Door Courtesy Switch

e-1-1

Luggage Compartment Door Courtesy Switch

e-1-1

Interior Light Switch

BE5744

Vanity Light

S-2-2-G

Personal Light

(w / o Sliding Roof)

BE5744

(w / Sliding Roof)

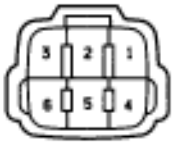
S-6-2-B

Door Open Detection Switch
(in Door Lock Assembly)

(Front Door)

Is-7-2

(Rear Door)



IS-6-2-B

TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Part name / Trouble	BE–6, 22	BE–316	BE–89	BE–89	BE–88	BE–91	BE–92	-	BE–8
	DOME Fuse	Door Open Detection Switch	Door Outside Handle Switch	Integration Relay	Personal Light	Vanity Light	Luggage Compartment Door Courtesy Switch	Wire Harness	Bulb
Only one interior light does not light up.								2	1
Interior light does not light up. (All)	1							2	
"Illuminated Entry System" dose not operate.		2	3	1				4	
Interior light does not light up. (in front personal light)					2			3	1
Front personal light does not light up.					2			3	1
Vanity light does not light up.						2		3	1
Luggage compartment light does not light up.							2	3	1
Courtesy light does not light up.		2						3	1

PERSONAL LIGHT

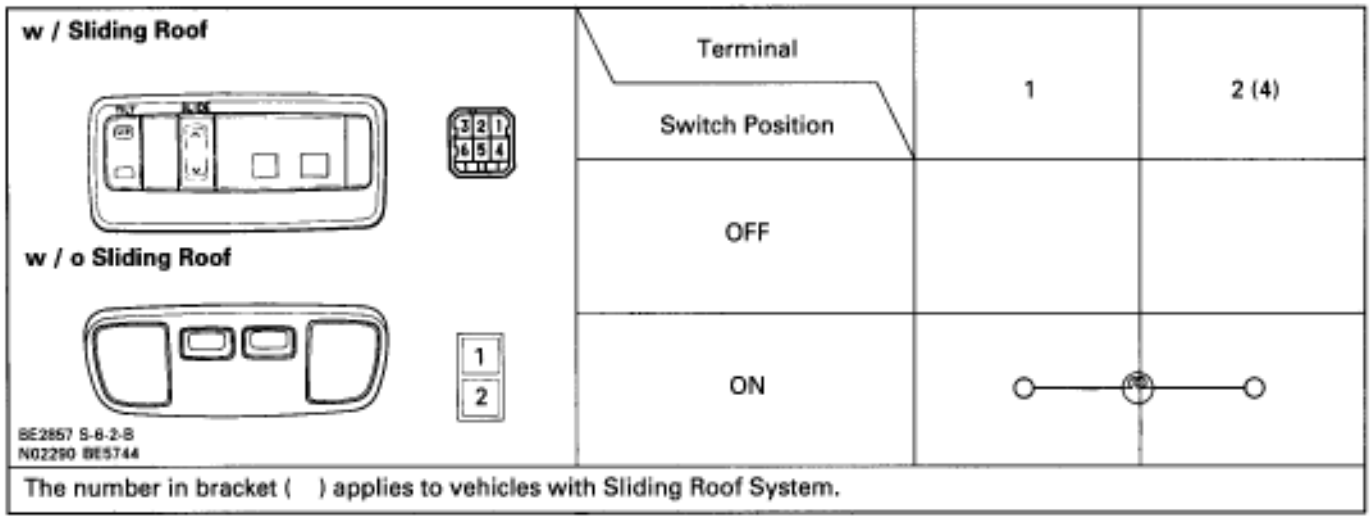
PERSONAL LIGHT REMOVAL AND INSTALLATION

(See page BO–144)

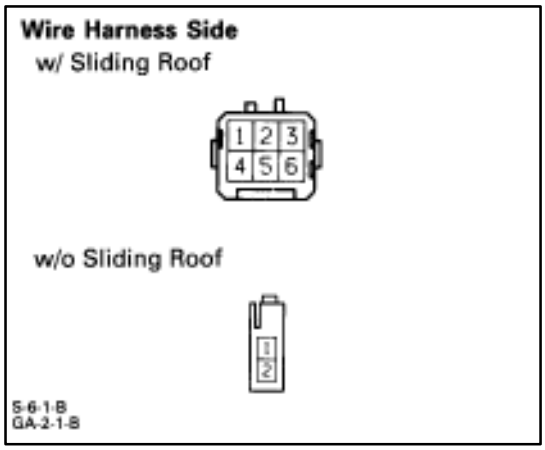
PERSONAL LIGHT INSPECTION

INSPECT PERSONAL LIGHT SWITCH (Continuity)

Inspect the light switch continuity between terminals.



The number in bracket ( ) applies to vehicles with Sliding Roof System.



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

(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Voltage	1–Ground	Constant	Battery positive voltage
Continuity	2 (4)–Ground	Constant	Continuity
The number in bracket ( ) applies to vehicles with Sliding Roof System.			

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

INTEGRATION RELAY

INTEGRATION RELAY REMOVAL AND INSTALLATION

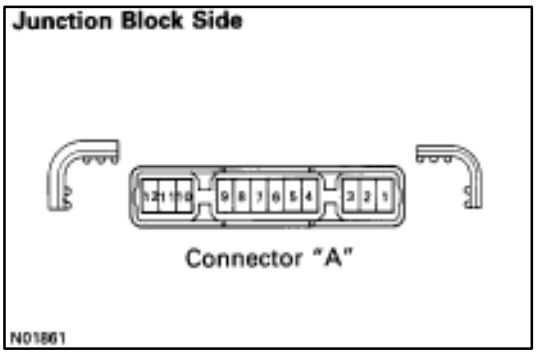
(See page BE–32)

INTEGRATION RELAY INSPECTION

INSPECT INTEGRATION RELAY

(Relay Circuit/Illuminated Entry System)

Remove the relay from junction block and inspect the connector on the junction block side as shown in the chart.



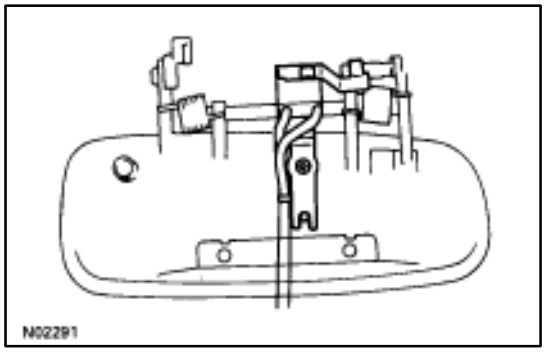
Check for	Tester connection	Condition		Specified value
Continuity	A10–Ground	Constant		Continuity
	A4–Ground	Courtesy Switch Position (except driver's side)	OFF (Door closed)	No continuity
			ON (Door opened)	Continuity
	A3–Ground	Door outside handle Switch Position	OFF	No continuity
			ON	Continuity
Voltage	A2–Ground	Constant		Battery positivevoltage
	A1–Ground	Constant		Battery positivevoltage

If the circuit is as specified, trying replacing the relay with a new one.

If the circuit is not as specified, refer to BE–85 wiring diagram and inspect the circuits connected to other parts.

DOOR OUTSIDE HANDLE SWITCH

DOOR OUTSIDE HANDLE SWITCH REMOVAL AND INSTALLATION

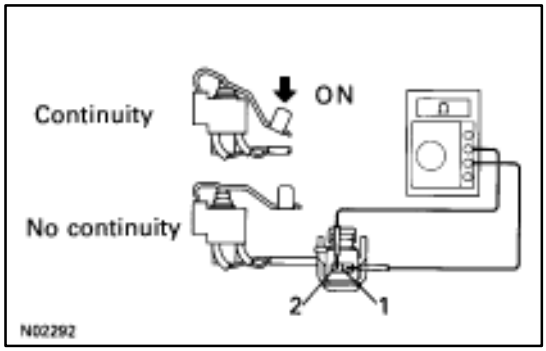


1. **REMOVE DOOR OUTSIDE HANDLE SWITCH**
   (See page BO–34)

(a) Remove the door outside handle.

(b) Remove a screw and separate the switch from door outside handle.

2. **INSTALL DOOR OUTSIDE HANDLE SWITCH**
   For installation, follow the removal procedure in reverse.



DOOR OUTSIDE HANDLE SWITCH INSPECTION

INSPECT DOOR OUTSIDE HANDLE SWITCH

(Continuity)

(a) Check that there is continuity between terminals 1 and 2 when door outside handle is pulled.

(b) Check that there is no continuity between terminals 1 and 2 when door outside handle is released.

If operation is not as specified, replace the switch.

(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Continuity	2–Ground	Constant	Continuity

If the circuit is not as specified, refer to BE–85 wiring diagram and inspect the circuits connected to other parts.

DOOR COURTESY SWITCH
DOOR COURTESY SWITCH REMOVAL AND INSTALLATION

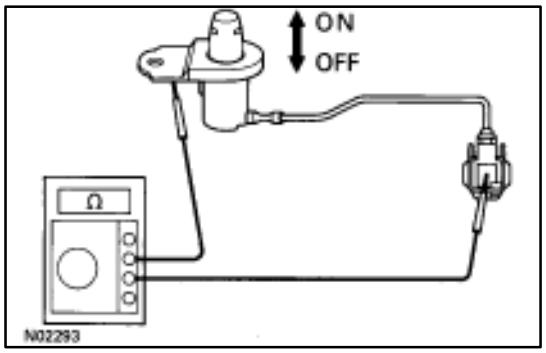
1. REMOVE DOOR COURTESY SWITCH

(a) Remove the courtesy switch.

(b) Disconnect the connector.

2. INSTALL DOOR COURTESY SWITCH

For installation follow the removal procedure in reverse.



DOOR COURTESY SWITCH INSPECTION

INSPECT DOOR COURTESY SWITCH

(a) Check that there is continuity between terminal and switch body with the switch ON (switch pin released).

(b) Check that there is no continuity between terminal and switch body with the switch OFF (switch pin pushed).

If continuity is not as specified, replace the switch.

INTERIOR LIGHT SWITCH

INTERIOR LIGHT SWITCH REMOVAL AND INSTALLATION

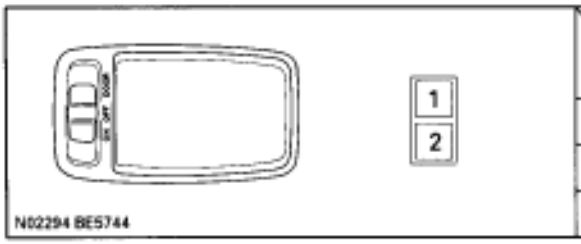
(See page BO–144)

INTERIOR LIGHT SWITCH INSPECTION

INSPECT INTERIOR LIGHT SWITCH

(Continuity)

Inspect the light switch continuity between terminals.

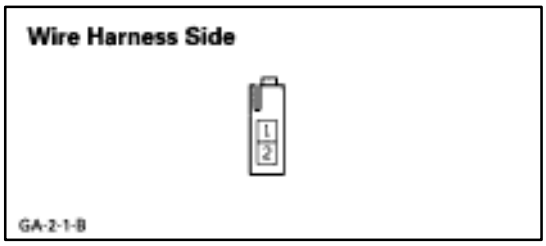


Terminal / Switch position	1	2	Switch Body
DOOR		○—(M)—○	
OFF			
ON	○—(M)—○		

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

(Switch Circuit)

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

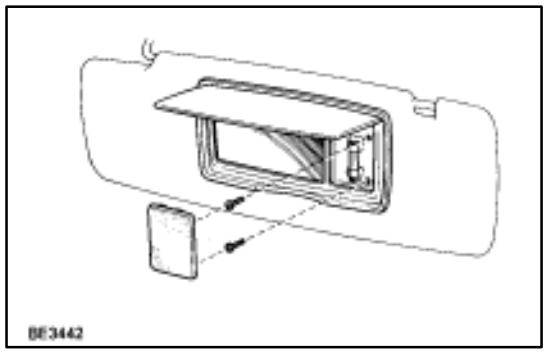


Check for	Tester connection	Condition	Specified value
Voltage	2–Ground	Constant	Battery positive voltage

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

VANITY LIGHT SWITCH

VANITY LIGHT SWITCH REMOVAL AND INSTALLATION



1. REMOVE VANITY LIGHT

(a) Release two tabs and remove the lens.

(b) Remove two screws and separate the vanity light from sun visor.

(c) Disconnect connector and remove vanity light.

2. INSTALL VANITY LIGHT

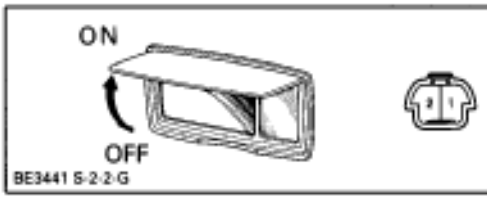
For installation follow the removal procedure in reverse.

VANITY LIGHT INSPECTION

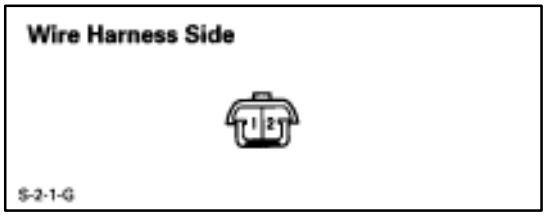
INSPECT VANITY LIGHT SWITCH

(Continuity)

Inspect the vanity light continuity between terminals.



Terminal / Switch position	1	2
OFF (Closed)		
ON (Opened)	○	○



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

(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Voltage	1–Ground	Constant	Battery positive voltage
Continuity	2–Ground	Constant	Continuity

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

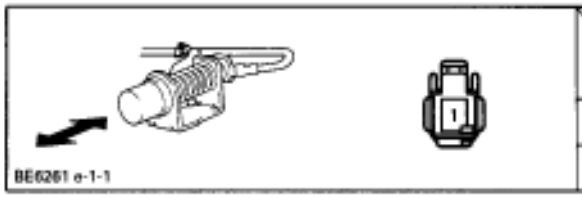
LUGGAGE COMPARTMENT DOOR COURTESY SWITCH

LUGGAGE COURTESY SWITCH INSPECTION

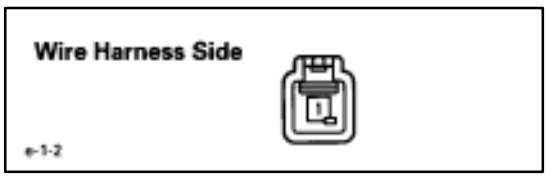
INSPECT LUGGAGE DOOR COURTESY SWITCH

(Continuity)

Inspect the switch continuity between terminal and switch body.



Terminal / Condition	1	Switch body
OFF (Closed)		
ON (Opened)	○	○



If operation is not as specified, replace the switch.

(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Voltage	1–Ground	Constant	Battery positive voltage

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

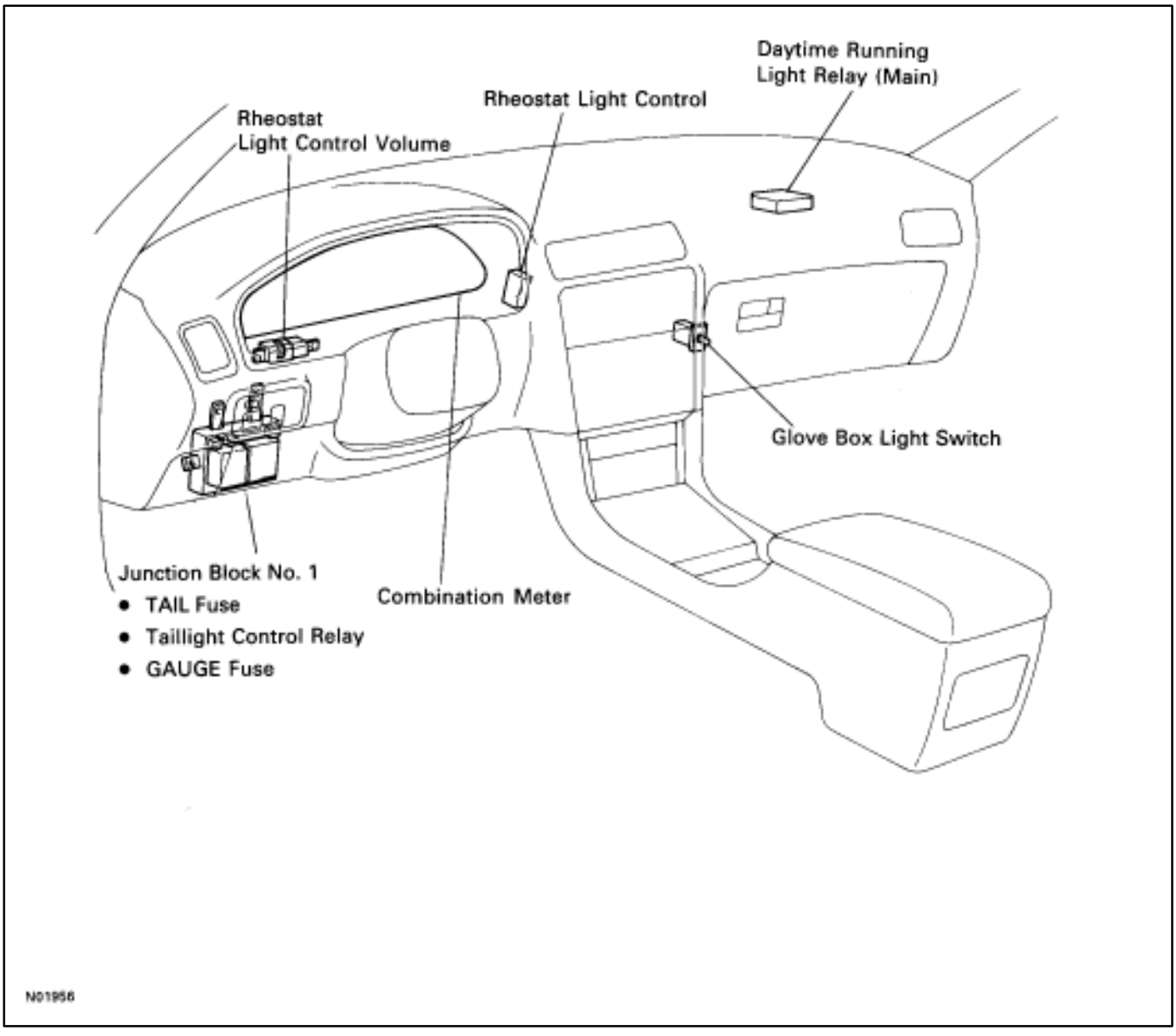
ILLUMINATION LIGHT SYSTEM

DESCRIPTION

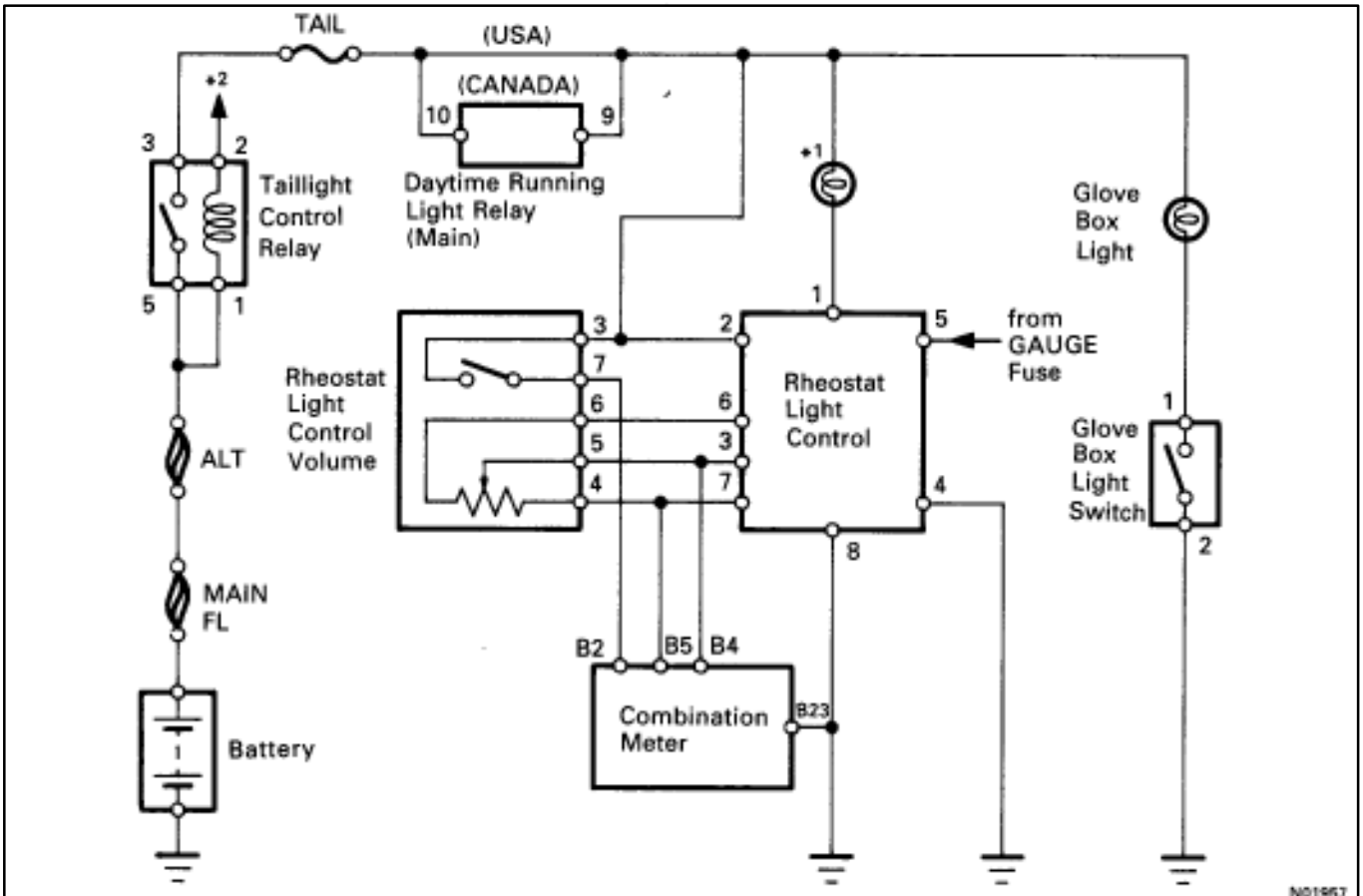
The component parts of this system and their function are described in the following table.

Parts Name	Function
Rheostat Light Control Volume	In order to adjust the degree of illumination light, the resistance value of the built–in variable resistor is sent to the combination meter and rheostat light control.
Rheostat Light Control	This control adjusts the brightness of the illumination light in accordance with the resistance value from the rheostat light control volume.
Daytime Running Light Relay (CANADA)	During daytime running light operation this prevents current flow to the rheostat light control to stop each illumination from lighting up. When the light control switch is at TAIL or HEAD, current is sent to the rheostat light control.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



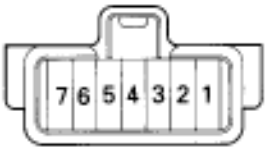
*1
- Audio
- Hazard Warning Switch
- Cigarette Lighter
- A/C Control Panel Assembly
- ECT Pattern Select Switch
- Headlight Cleaner Switch (CANADA)
- Seat Heater Switch

*2 (USA) to terminal B2 of Integration Relay
(CANADA) to terminal 4 of Daytime Running Light Relay

Rheostat Light Control

e-8-2-B

Rheostat Light Control Volume



N01958

Glove Box Light Switch

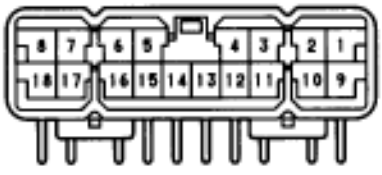
BE3548

Taillight Control Relay

BE4049

Combination Meter

Daytime Running Light Relay



e-18-2-A

TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Part name / Trouble		Taillight Control Relay (BE–20, 61)	TAIL Fuse (BE–6,20)	Rheostat Light Control (BE–80)	Rheostat Light Control Volume (BE–81)	Daytime Running Light Relay (Main) (BE–56)	Combination Meter Assembly (BE–111)	Glove Box Light Switch (BE–82)	Bulb (BE–8)	Wire Harness (–)	Other parts (–)
Illumination lights do not light. (Taillight is normal.)	USA		1							2	
	CANADA		1			2				3	
Illumination lights do not light. (Taillight does not light.)	USA	1	4							3	*2
	CANADA	1	4			5				3	*2
Illumination lights with adjustable brightness do not light.				1	2					3	
Only one light does not light.									1	2	
Brightness does not changes when rheostat volume is turned.	All (See page BE-78)			1	2					3	
	Only Combination Meter						1			2	
Glove box light does not light.								1	2	3	

*: Inspect Taillight System.

RHEOSTAT LIGHT CONTROL

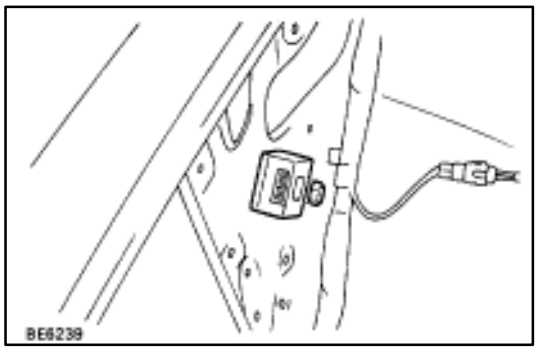
RHEOSTAT LIGHT CONTROL REMOVAL AND INSTALLATION

1. REMOVE RHEOSTAT LIGHT CONTROL
(See page BO–107)

(a) Remove the safety pad.
(b) Disconnect the connector.
(c) Remove the nut and rheostat light control.

2. INSTALL RHEOSTAT LIGHT CONTROL

For installation, follow the removal procedure in reverse.



RHEOSTAT LIGHT CONTROL INSPECTION

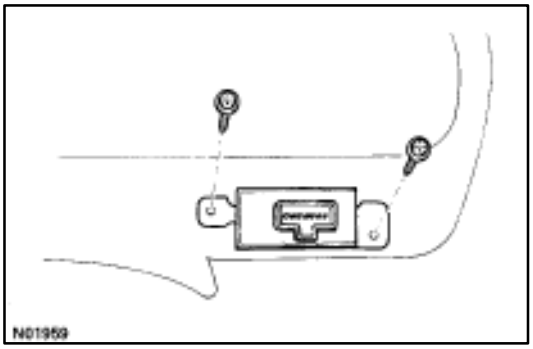
INSPECT RHEOSTAT LIGHT CONTROL

(Circuit)

Disconnect the connector to rheostat light control and inspect connector on wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Voltage	1–Ground 2–Ground	Light control switch position	TAIL or HEAD	Battery positive voltage
			OFF	No voltage
	5–Ground	Ignition switch position	ON	Battery positive voltage
			OFF	No voltage
Continuity	4–Ground 8–Ground	Constant		Continnity
Resistance	3–6	Gradually rotate the switch from most distant position to closest position		Resistance changes From 0 Ω to ↔
	3–7	Gradually rotate the switch from most distant position to closest position		Resistance changes From approx. 10 kΩ to ↔
	6–7	Constant		Approx. 10 kΩ

If circuit is as specified, replace the rheostat light control.
If circuit is not as specified, refer to BE–78 wiring diagrams and inspect the circuits connected to other parts.



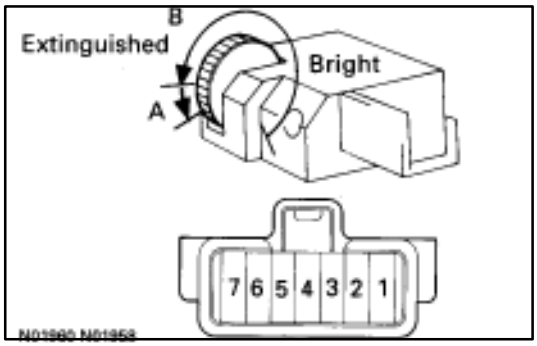
RHEOSTAT LIGHT CONTROL VOLUME

RHEOSTAT LIGHT CONTROL VOLUME REMOVAL AND INSTALLATION

1. REMOVE RHEOSTAT LIGHT CONTROL VOLUME
(See page BO–107)

(a) Remove meter cluster.
(b) Remove the two screws and the rheostat light control volume.

2. INSTALL RHEOSTAT LIGHT CONTROL VOLUME
For installation, follow the removal procedure in reverse.



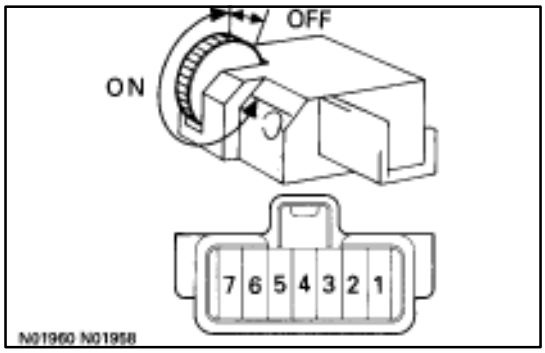
RHEOSTAT LIGHT CONTROL VOLUME INSPECTION

1. INSPECT RHEOSTAT LIGHT CONTROL VOLUME
(Resistance)
Inspect resistance between terminals.

Tester Connection	Condition		Specified value
4–6	Constant		Approx. 10 kΩ
4–5	Gradually rotate the switch from most distant position to closet position.	A	↔
		B	Approx. 10 kΩ 0 Ω

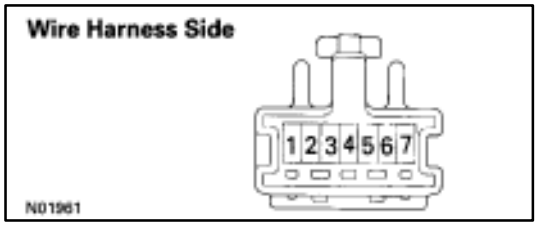
If resistance is not as specified, replace the rheostat light control volume.

(Meter Cancel Switch/Continuity)
Inspect continuity between terminals.



Terminal / Switch position	3	7
OFF (Rotate the switch away from you until it stops)		
ON (Any position other than OFF)	○	○

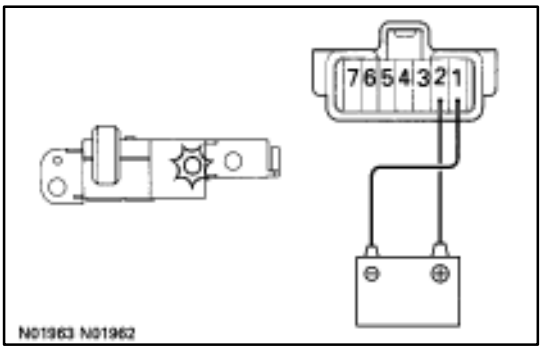
If operation is not as specified, replace the rheostat light control volume.



(Circrit)

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

Check for	Tester connection	Condition		Specified value
Voltage	3–Ground	Light control switch position	OFF	No voltage
			TAIL or HEAD	Battery voltage

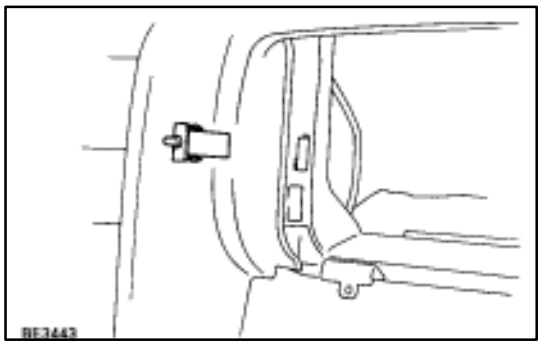


If circuit is as specified, replace the volume. If the circuit is not as specified, refer to BE–78 wiring diagram and inspect the circuits connected to other parts.

2. INSPECT SECURITY WARNING LIGHT

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the warning light lights up.

If the warning light does not light up, replace the rheostat light control volume.



GLOVE BOX LIGHT SWITCH

GLOVE BOX LIGHT SWITCH REMOVAL AND INSTALLATION

1. REMOVE GLOVE BOX LIGHT SWITCH

(See page BO–107)

(a) Remove glove compartment.

(b) Release two tabs and remove switch.

2. INSTALL GLOVE BOX LIGHT SWITCH

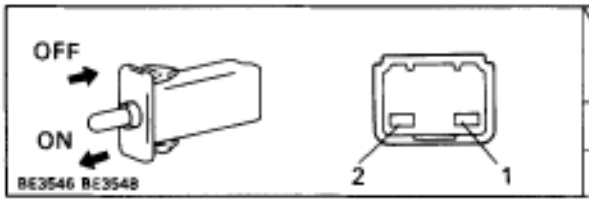
For installation, follow the removal procedure in reverse.

GLOVE BOX LIGHT SWITCH INSPECTION

INSPECT GLOVE BOX LIGHT SWITCH

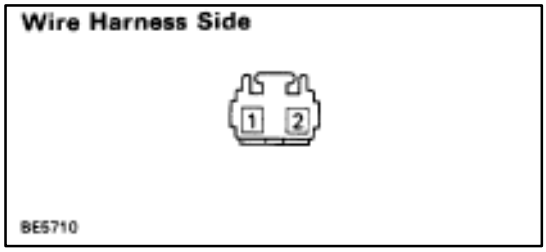
(Continuity)

Inspect the switch continuity between terminals.



Terminal / Switch position	1	2
OFF (Closed)		
ON (Opened)	o	o

If continuity is not as specified, replace the switch.



(Switch Circuit)

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

Check for	Tester connection	Condition		Specified value
Continuity	2–Ground	Constant		Continuity
Voltage	1–Ground	Light control switch position	OFF	No voltage
			TAIL or HEAD	Battery positive voltage

If the circuit is not as specified, refer to BE–78 wiring diagram and inspect the circuits connected to other parts.

DAYTIME RUNNING LIGHT RELAY (MAIN)

(See page BE–56)

TAILLIGHT CONTROL RELAY

(See page BE–61)

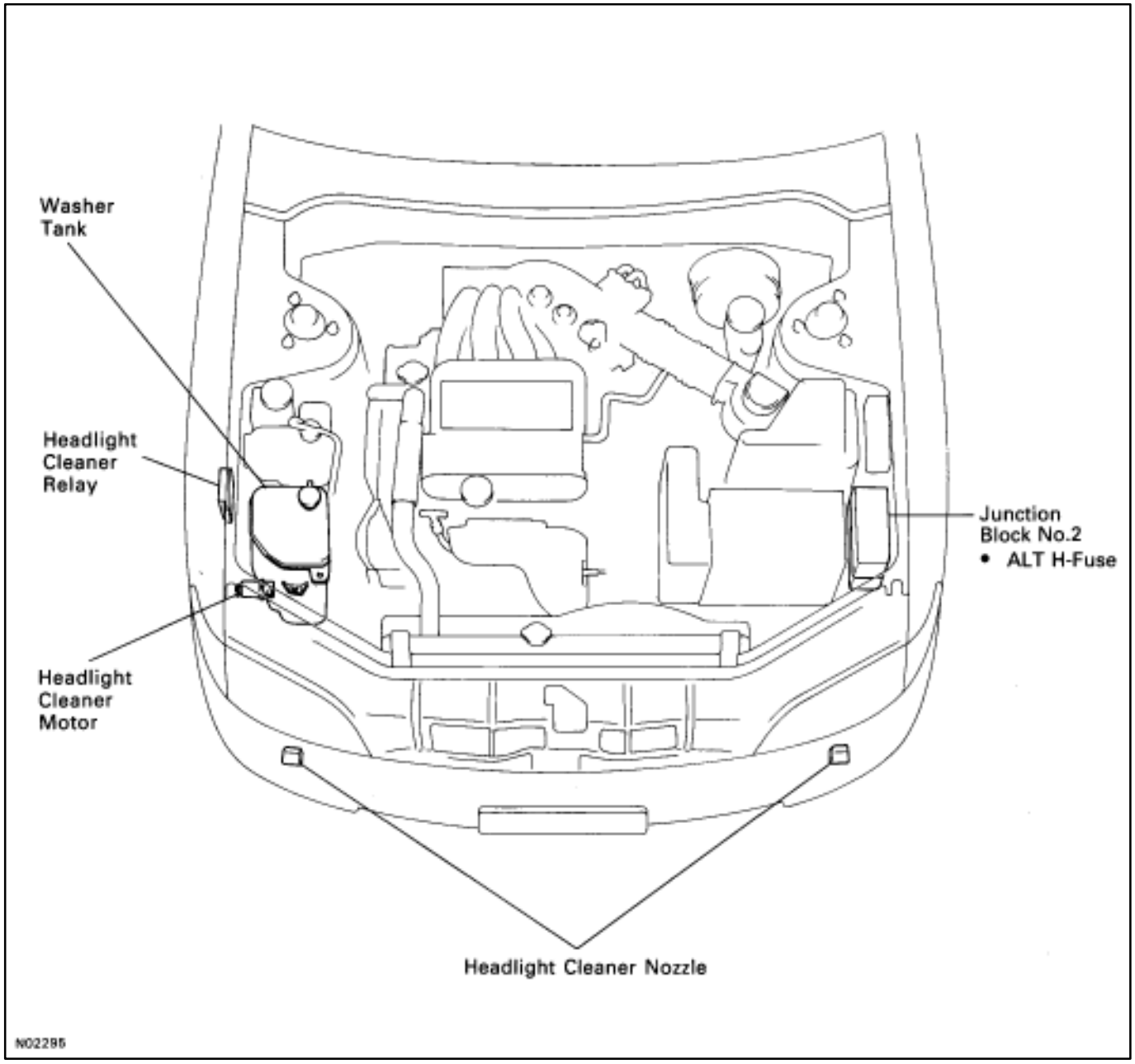
HEADLIGHT CLEANER SYSTEM

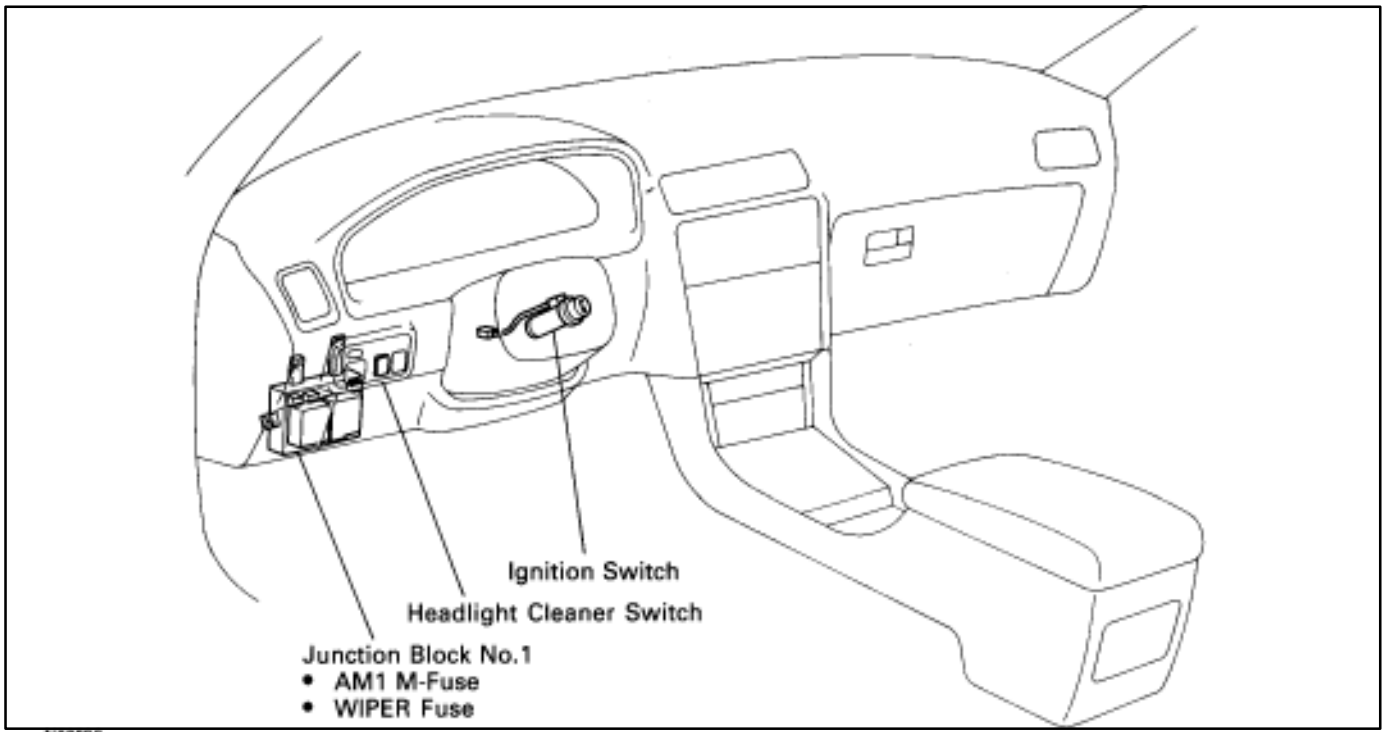
DESCRIPTION

The component parts of this system and their functions are described in the following table.

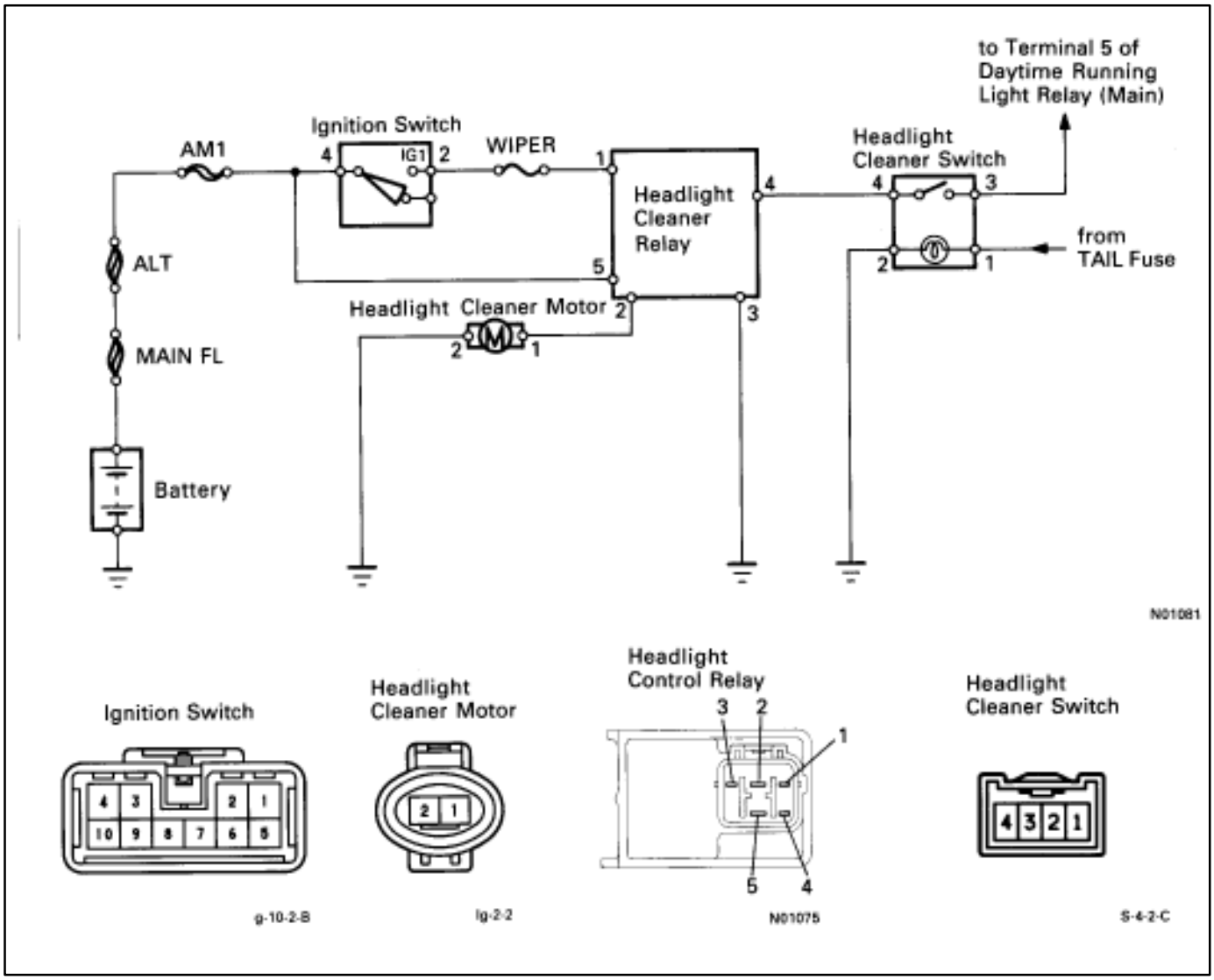
Parts Name	Function
Headlight Cleaner Relay	This receives current from the wiper fuse, the headlight cleaner motor is grounded for a specified period of time (0.4–0.6 seconds) and motor operates–only when the headlights are ON and the headlight cleaner SW is ON.
Headlight Cleaner Switch	The signal from the headlight relay operates the switch, causing ground to be made. (when the headlights are on.)
Headlight Cleaner Motor	An internal centrifugal pump in this motor pumps washer fluid and sprays it out from the Headlight.

PARTS LOCATION





WIRING AND CONNECTOR DIAGRAMS

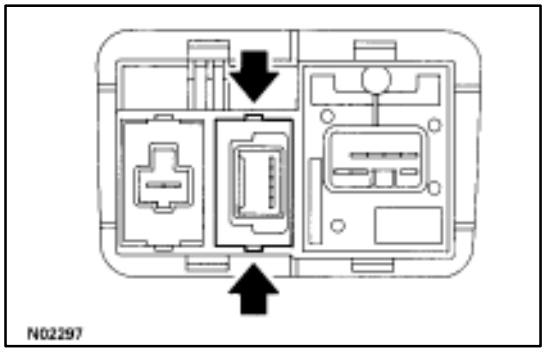


TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the numbers indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Part name / Trouble		BE–6, 20 AM1 M-Fuse	BE–29 Ignition Switch	BE–6, 20 WIPER Fuse	BE–95 Headlight Cleaner Switch	BE–96 Headlight Cleaner Relay	BE–97 Headlight Cleaner Motor	– Headlight Cleaner Nozzle and Hose	BE–45 Combination Switch (Light Control Switch)	BE–54 Integration Relay	BE–56 Daytime Running Light Relay (Main)	– Wire Harness
"Headlight Cleaner System" does not operate.	Using light control switch								1	2		3
	When operating "Running Light System"										1	2
	All	1	3	2	4	5	6	7				8
Washer fluid does not spray.								1				

HEADLIGHT CLEANER SWITCH



HEADLIGHT CLEANER SWITCH REMOVAL AND INSTALLATION

1. REMOVE HEADLIGHT CLEANER SWITCH

(a) Remove the outer mirror switch set.

(b) Pry loose the two locking lugs and remove the headlight cleaner switch from the outer mirror switch set.

2. INSTALL HEADLIGHT CLEANER SWITCH

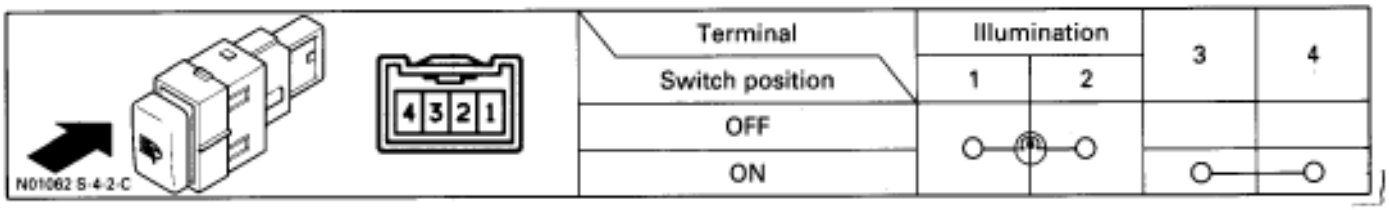
For installation, follow the removal procedure in reverse.

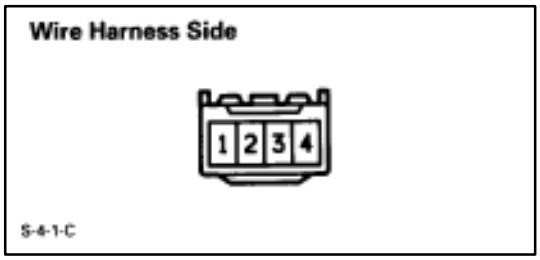
HEADLIGHT CLEANER SWITCH INSPECTION

INSPECT HEADLIGHT CLEANER SWITCH

(Continuity)

Inspect the switch continuity between terminals.





If continuity is not as specified, replace the switch.

(Circuit)

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

Check for	Tester connection	Condition		Specified value
Voltage	1–Ground	Headlight or taillight condition	Light on	Battery positive voltage
			Go out	No voltage
	4–Ground	Ignition Switch position	Lock or ACC	No voltage
			ON	Battery positive voltage
Continuity	2–Ground	Constant		Continuity
	3–Ground	Headlight condition	Light on	Continuity
			Go out	No continuity

If circuit is not as specified, inspect the wire harness or refer to BE–94 wiring diagram and inspect the circuits connected to other parts.

HEADLIGHT CLEANER RELAY

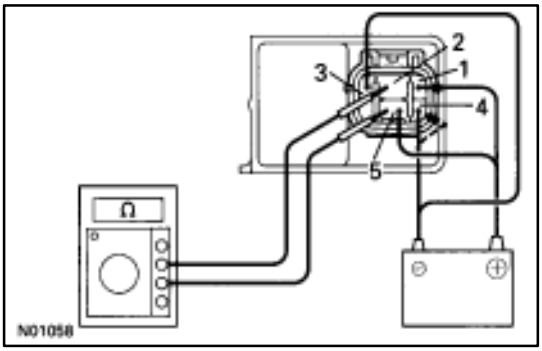
HEADLIGHT CLEANER RELAY REMOVAL AND INSTALLATION

1. REMOVE HEADLIGHT CLEANER RELAY

(a) Remove the fender liner RH.
(b) Disconnect connector.
(c) Remove a bolt and relay.

2. INSTALL HEADLIGHT CLEANER RELAY

For installation, follow the removal procedure in reverse.



HEADLIGHT CLEANER RELAY INSPECTION

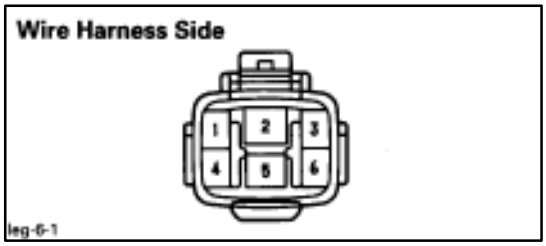
INSPECT HEADLIGHT CLEANER RELAY

(Operation)

(a) Check that there is no continuity 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, check that there is continuity between terminals 2 and 5 for 0.4–0.6 seconds, then there is no continuity.



(Circuit)

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

Check for	Tester connection	Condition		Specified value
Voltage	1–Ground	Ignition switch position	OFF or ACC	No voltage
			ON	Battery positive voltage
	5–Ground	Constant		Battery positive voltage
Continuity	3–Ground	Constant		Continuity
	4–Ground	Ignition switch ON and light control switch turned to HEAD	Cleaner switch ON	Continuity
			Cleaner switch OFF	No continuity

If circuit is not as specified, inspect the wire harness or refer to BE–94 wiring diagram and inspect the circuits connected to other parts.

HEADLIGHT CLEANER MOTOR

HEADLIGHT CLEANER MOTOR REMOVAL AND INSTALLATION

1. REMOVE HEADLIGHT CLEANER MOTOR

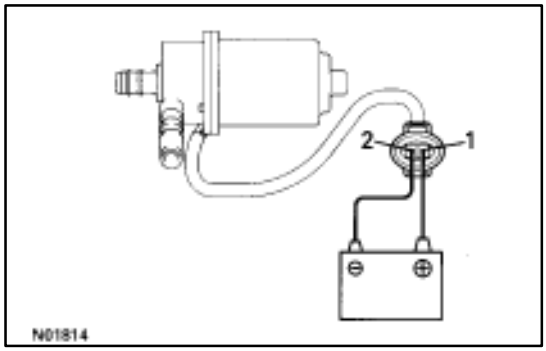
(a) Remove the washer tank.

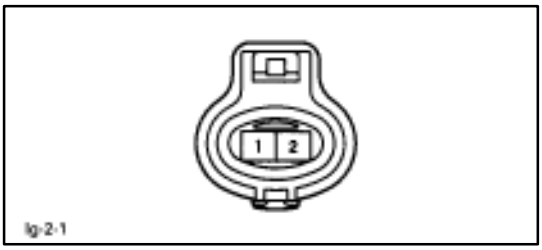
(b) Disconnect the connector and the hose.

(c) Remove the nut and the motor.

2. INSTALL HEADLIGHT CLEANER MOTOR

For installation, follow the removal procedure in reverse.





HEADLIGHT CLEANER MOTOR INSPECTION

INSPECT HEADLIGHT CLEANER MOTOR

(Operation)

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

NOTICE: There tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.

(Circuit)

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

Check for	Tester connection	Condition	Specified value
Continuity	2–Ground	Constant	Continuity

If circuit is not as specified, inspect the wire harness or refer to BE–94 wiring diagram and inspect the circuits connected to other parts.

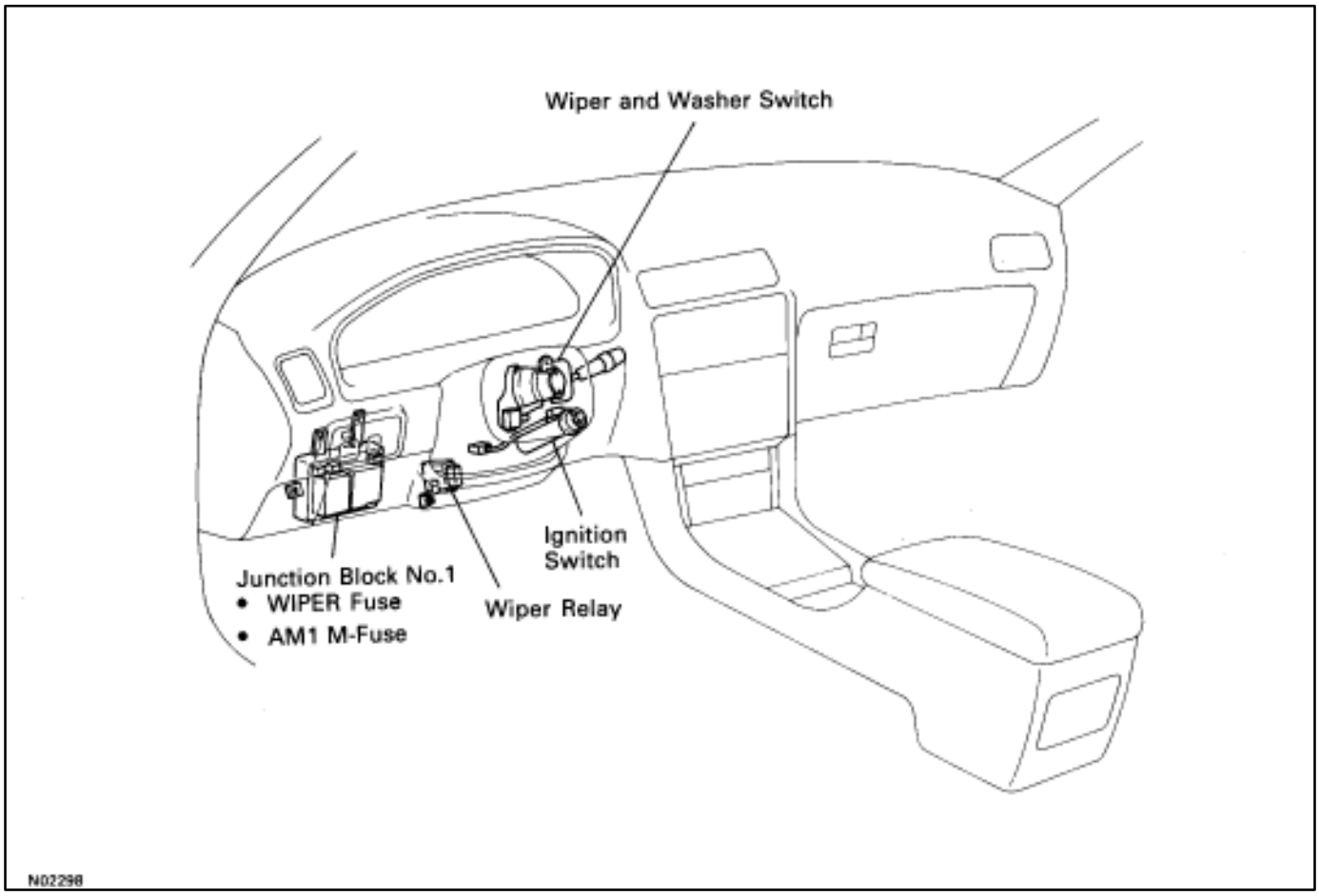
WIPER AND WASHER SYSTEM

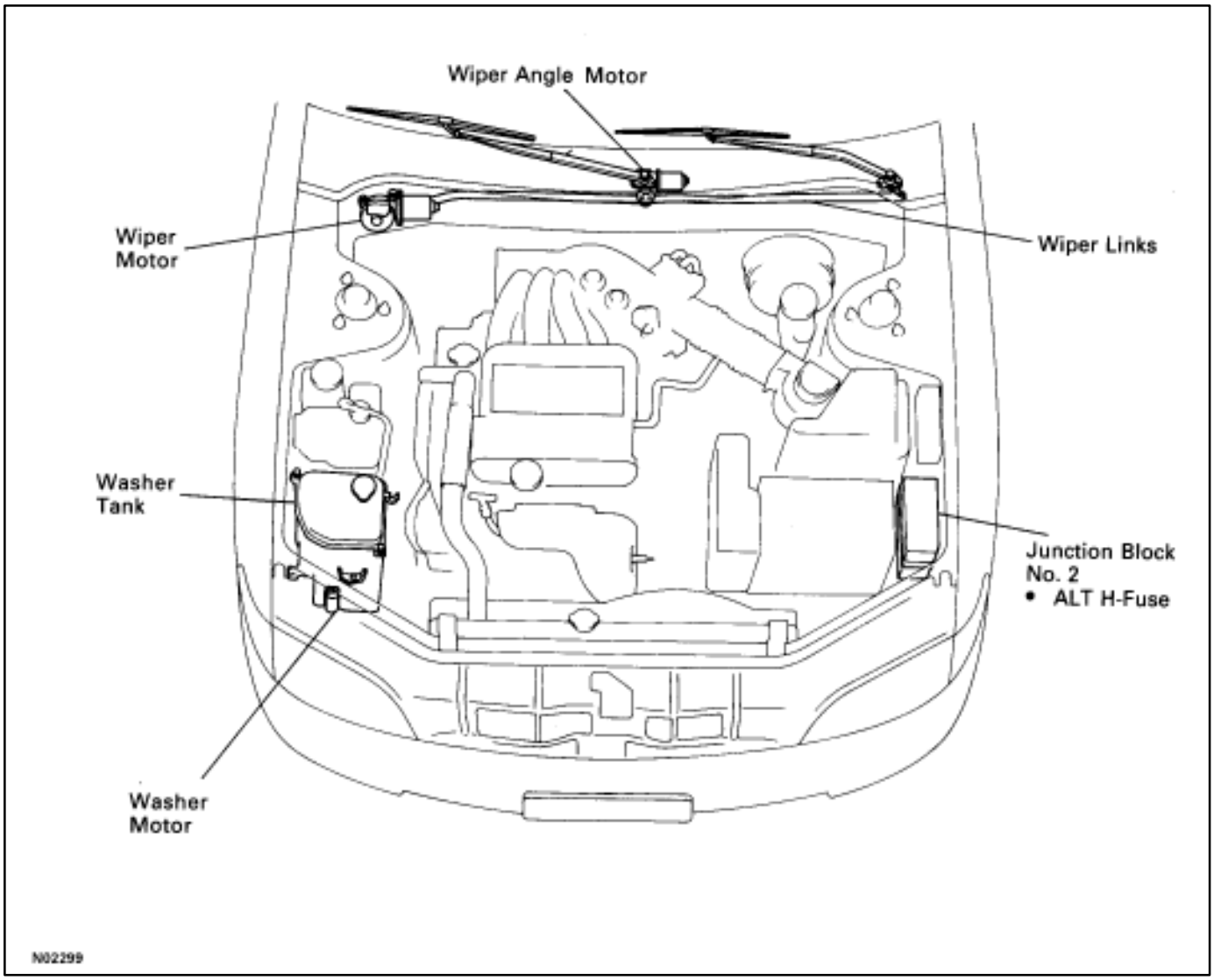
DESCRIPTION

The component parts of this system and their functions are described in the following table.

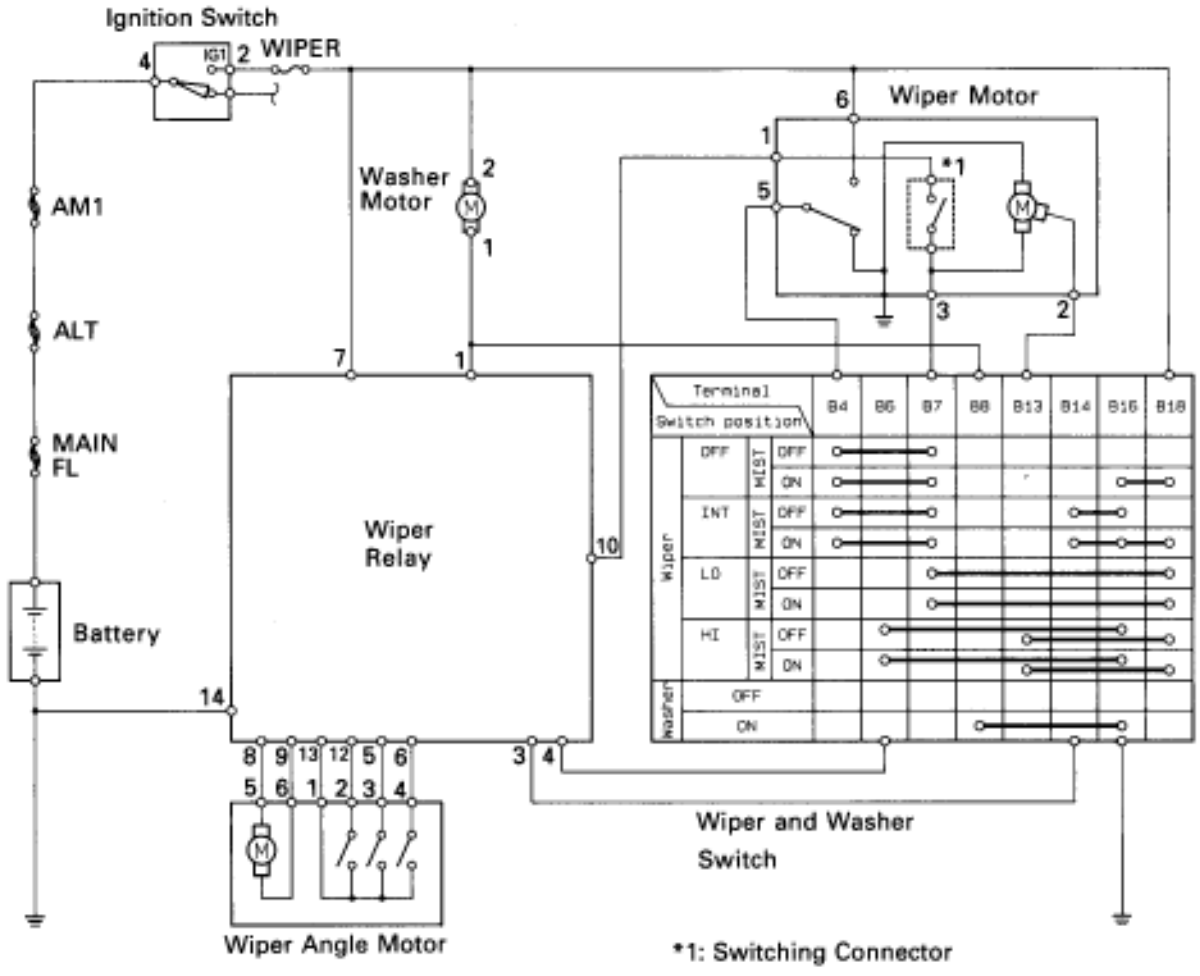
Parts Name	Function
Wiper Switch	This switch turns the current to the wiper motor ON and OFF at intervals and operates the Wipers continuously when the washer switch is ON. A built–in variable resistor is used to adjust the interval for intermittent operation. The switch changes the current from the wiper motor in order to operate the wiper motor at different speeds.
Wiper Relay	This relay operates the wiper angle motor and changes the wiper angle according to the position of the wiper switch.
Wiper Angle Motor	A signal from the wiper relay starts the motor and moves the fulcrum of the link to alter the Wiper angle. (Set position, LO and INT position and HI position)
Wiper Motor	Switching of the current at the wiper switch and wiper relay operates the motor at each speed (HI, LO) and at intervals (INT), thus moving the wiper arms and blades. By disconnecting the switching connector on the wiper motor and reconnecting it with the Sides reversed, the wipers are switched from fully concealed to semi–concealed, or vice–versa.
Washer Switch	By grounding current from the washer motor, this switch operates the washer motor.
Washer Motor	An internal turbine pump in this motor pumps washer fluid and sprays it out from the washer nozzles.

PARTS LOCATION




Wiper Angle Motor
Wiper Motor
Wiper Links
Washer Tank
Junction Block No. 2
• ALT H-Fuse
Washer Motor
N02299

WIRING AND CONNECTOR DIAGRAMS

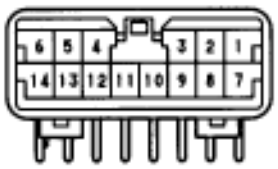


N02300

Wiper Motor

Ie-6-2-F

Wiper Relay



e-14-2-F

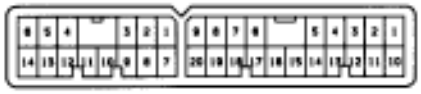
Washer Motor

BE4107

Wiper Angle Motor

Ie-6-2-B

Wiper and Washer Switch (in Combination Switch)



Connector "A" Connector "B"

V-34-2

TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the number indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Parts name / Trouble	BE–6, 20	BE–103	BE–108	BE–105	BE–106	BE–109	BE–103	BO–68	-
	WIPER Fuse	Wiper Switch	Wiper Relay	Wiper Motor	Wiper Angle Motor	Washer Motor	Washer Switch	Washer Hose and Nozzle	Wire Harness
Wipers and washers do not operate.	1	2		3					4
Wipers do not operate in LO, HI or MIST.		1		2					3
Wipers do not operate in INT.		1		2					3
Washer motor does not operate.						2	1		3
Wipers do not operate when washer switch is ON.						1			2
Washer fluid does not spray.								1	
• At wiper switch HI position, the wiper blade is in contact with the body. • When the wiper switch is OFF, the wiper blade does not retract or the retract position wrong.			1*1		2				3

*1 : Inspect wiper arm and blade set position

COMBINATION SWITCH

COMBINATION SWITCH REMOVAL
(See page BE–45)

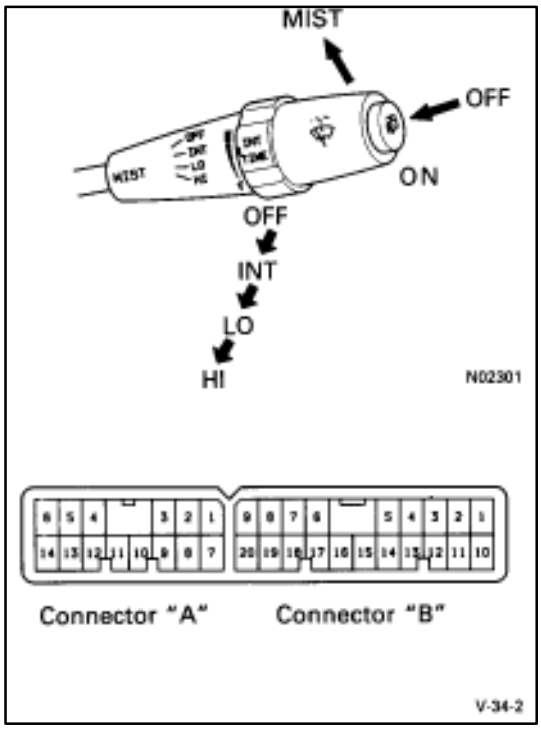
COMBINATION SWITCH INSTALLATION
(See page BE–46)

COMBINATION SWITCH DISASSEMBLY
(See page BE–47)

COMBINATION SWITCH ASSEMBLY
(See page BE–50)

COMBINATION SWITCH INSPECTION
INSPECT WIPER AND WASHER SWITCH
(Continuity)

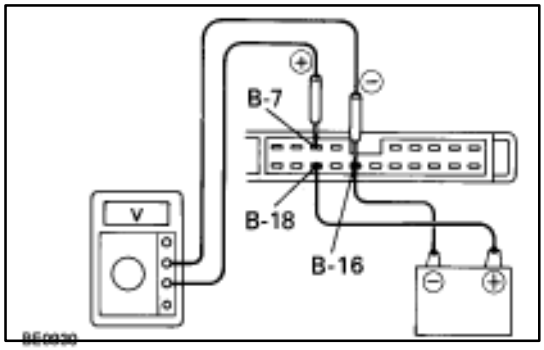
Inspect the switch continuity between terminals.

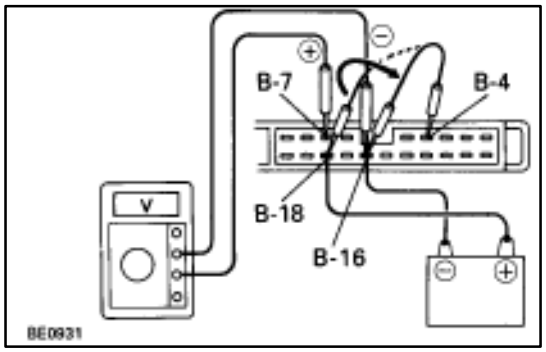


Terminal / Switch position			B4	B6	B7	B8	B13	B14	B16	B18
Wiper	OFF	MIST OFF	○		○					
		MIST ON	○		○				○	○
	INT	MIST OFF	○		○			○	○	
		MIST ON	○		○			○	○	○
	LO	MIST OFF			○					○
		MIST ON			○					○
	HI	MIST OFF		○			○		○	○
		MIST ON		○			○		○	○
Washer	OFF									
	ON					○			○	

Terminal / Condition	B4	B7	B16	B18
*1 Constant	○	○	○	○
*1 Apply battery positive voltage to terminal B16 and B18		○		○
*1: with wiper switch OFF or INT, and MIST ON.				

If continuity is not as specified, replace the switch.



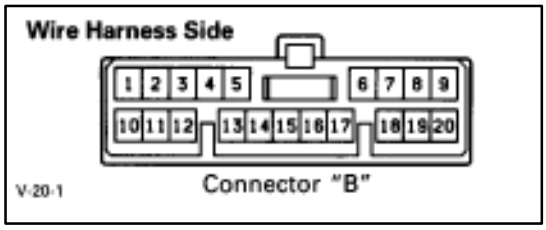


(Intermittent Wiper Operation)

(a) Turn the wiper switch to INT position.
(b) Turn the intermittent time control switch to FAST position.
(c) Connect the positive (+) lead from the battery to terminal B–18 and the negative (–) lead to terminal B–16.
(d) Connect the positive (+) lead from the voltmeter to terminal B–7 and the negative (–) lead to terminal B–16, check that the meter needle indicates battery positive voltage.
(e) After connecting terminal B–4 to terminal B–18, connect to terminal B–16.
Then, check that the voltage rises from 0 V to battery positive voltage within the times as shown in the table.

INT time control switch position	Voltage	
FAST	1.6 ± 1 sec.	Battery positive voltage 0 volts
SLOW	10.7 ± 5 sec.	Battery positive voltage 0 volts

If operation is not as specified, replace the switch.



(Switch Circuit)

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

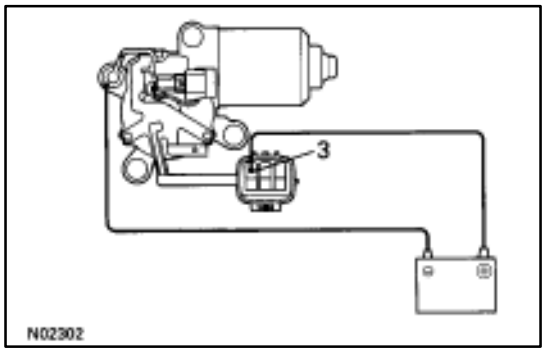
Check for	Tester connection	Condition		Specified value
Continuity	B16–Ground	Constant		Continuity
Voltage	B18–Ground	Ignition switch	LOCK or ACC	No voltage
			ON	Battery positive voltage

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

WIPER MOTOR

WIPER MOTOR REMOVAL AND INSTALLATION

(See page BO–68)



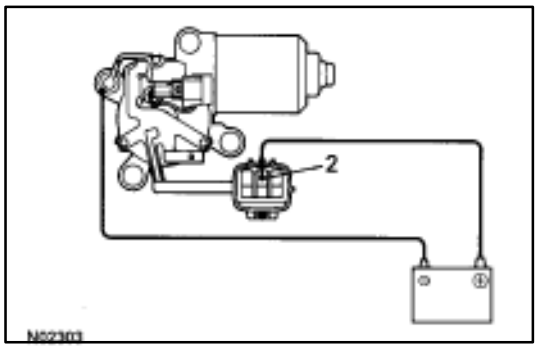
WIPER MOTOR INSPECTION

INSPECT MOTOR

(Operation at Low Speed)

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

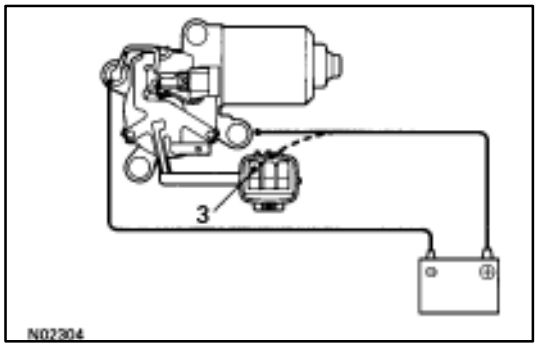
If operation is not as specified, replace the motor.



(Operation at High Speed)

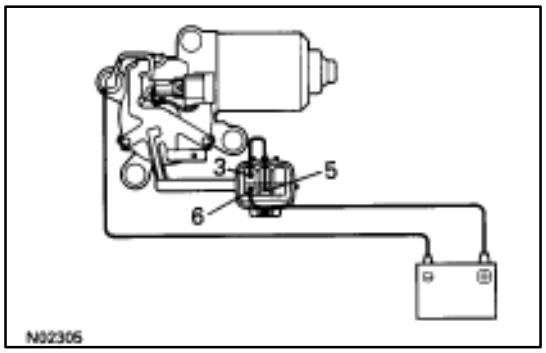
Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to the motor body, check that the motor operates at high speed.

If operation is not as specified, replace the motor.



(Operation, Stopping at Stop Position)

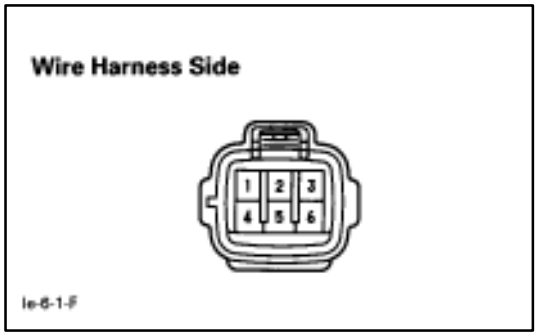
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 3.



(b) Connect terminals 3 and 5.

(c) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to the motor body check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.



(Motor Circuit)

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

Check fo	Tester connection	Condition		Specified value
Voltage	2–Ground	Wiper switch position (Ignition switch ON)	OFF or INT, LOW	No voltage
			HIGH	Battery positive voltage
	3–Ground	Wiper switch position (Ignition switch ON)	OFF or INT, HIGH	No voltage
			LOW	Battery positive voltage
	6–Ground	Ignition switch position	OFF or ACC	No voltage
			ON	Battery positive voltage

If circuit is not as specified, refer to BE–101 wiring diagram and inspect the circuits connected to other parts.

WIPER ANGLE MOTOR

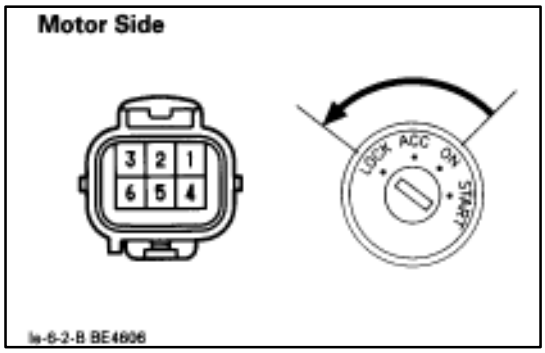
WIPER ANGLE MOTOR REMOVAL AND INSTALLATION (See page BO–68)

WIPER ANGLE MOTOR INSPECTION

INSPECT WIPER ANGLE MOTOR

(Operation at INT and Low position)

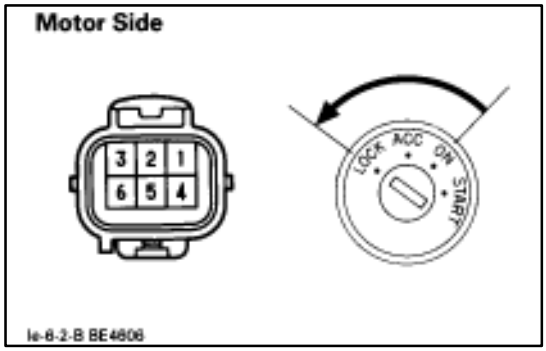
(a) Connect the two connectors.
(b) Turn the ignition switch ON and wiper switch INT or Low position.
(c) Turn the ignition switch LOCK or ACC.



(d) Disconnect the wiper angle motor connector and inspect the motor side as shown.

Terminal	1	2	3	4
Continuity	○	○		○

If operation is not specified, replace the motor or inspect the relay.



(Operation at High position)

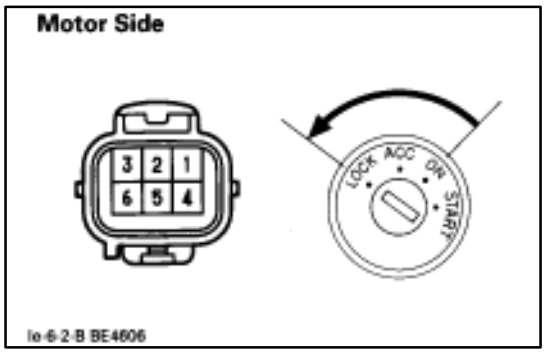
(a) Connect the two connectors.
(b) Turn the ignition switch ON and wiper switch HIGH position.
(c) Turn the ignition switch LOCK or ACC.
(d) Disconnect the wiper angle motor connector and inspect the motor side as shown.

Terminal	1	2	3	4
Continuity	○		○	

If operation is not specified, replace the motor or inspect the relay.

(Operation, Stopping at Stop Position)

(a) Connect the two connector.

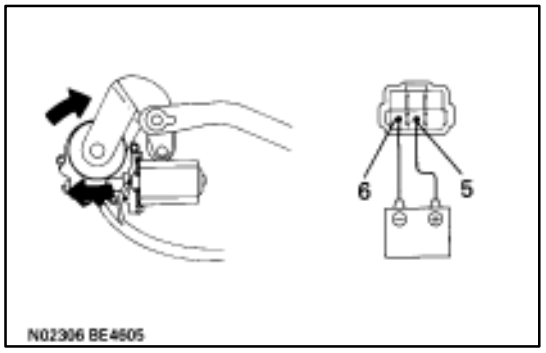


(b) Turn the ignition switch ON and operate the wiper motor once and turn the wiper switch OFF.
(c) Turn the ignition switch OFF.
(d) Disconnect the wiper angle Motor connector and inspect the motor side as shown.

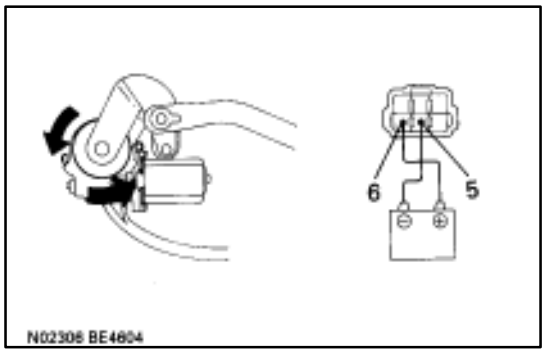
Terminal	1	2	3	4
Continuity	○		○	○

If operation is not as specified, replace the motor or inspect the relay.

(Motor Operation)



(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6, check that the motor turns clockwise.



(b) Reverse the polarity, check that the motor turns counterclockwise.
If operation is not as specified, replace the motor.

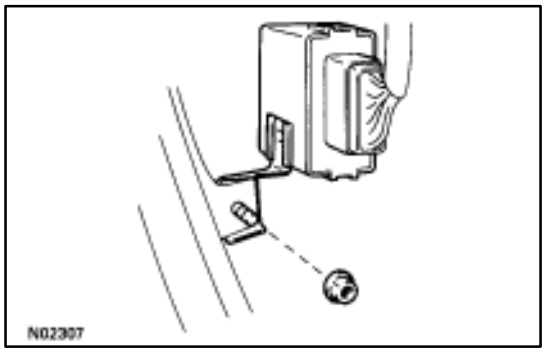
WIPER RELAY

WIPER RELAY REMOVAL AND INSTALLATION

(See page BO–107)

1. REMOVE WIPER RELAY

(a) Remove the safety pad.
(b) Disconnect the connector from the relay.
(c) Remove the nut and the relay from the brake pedal bracket.



2. INSTALL WIPER RELAY

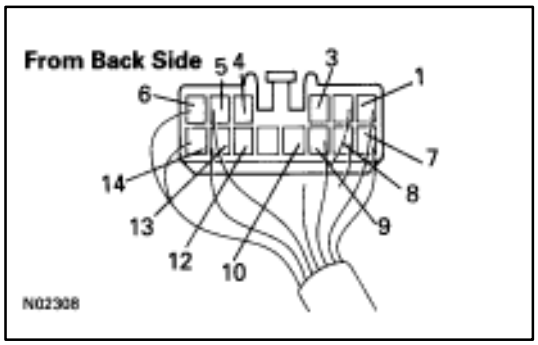
For installation follow the removal procedure in reverse.

WIPER RELAY INSPECTION

INSPECT WIPER RELAY

(Relay Circuit)

Connect the wire harness side connector to the wiper relay and inspect wire harness side connector from the back side as shown.



Check for	Tester connection	Condition		Specified value
Continuity	14 – Ground	*Constant		Continuity
Voltage	1 – Ground	*Washer switch position	ON	No voltage
			OFF	Battery positive voltage
	3 – Ground	*Wiper switch position	INT	No voltage
			OFF or LOW, HIGH	Battery positive voltage
	4 – Ground	*Wiper switch position	HIGH	No voltage
			OFF or INT, LOW	Battery positive voltage
	5 – Ground	*Wiper switch position	OFF, HIGH	No voltage
			INT or LOW	Battery positive voltage
	6 – Ground	*Wiper switch position	OFF or INT, LOW	No voltage
			HIGH	Battery positive voltage
	7 – Ground	Ignition switch position	OFF or ACC	No voltage
			ON	Battery positive voltage
	8 – Ground	*Wiper switch position	OFF → INT or LOW	No voltage → Battery positive voltage
			INT or LOW → HIGH	
	9 – Ground	*Wiper switch position	HIGH → INT or LOW	No voltage → Battery positive voltage
			INT or LOW → OFF	
	10 – Ground	*Wiper switch position	OFF	No voltage
			LOW	Battery positive voltage
	12 – Ground	*Wiper switch position	INT or LOW	No voltage
			OFF or HIGH	Battery positive voltage
	13 – Ground	*Constant		No voltage

* with ignition switch turned to ON

If the circuit is as specified, trying replacing the relay with a new one.

If the circuit is not as specified, refer to BE–101 wiring diagram and inspect the circuits connected to other parts.

WASHER MOTOR

WASHER MOTOR REMOVAL AND INSTALLATION
(See page BO–68)

1. REMOVE WASHER MOTOR

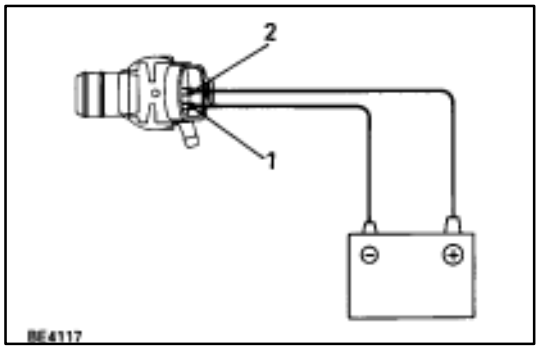
(a) Disconnect the connector and the hose.

(b) Remove the washer tank.

(c) Separate the washer tank and washer motor.

2. INSTALL WASHER MOTOR

For installation follow the removal procedure in reverse.



WASHER MOTOR INSPECTION

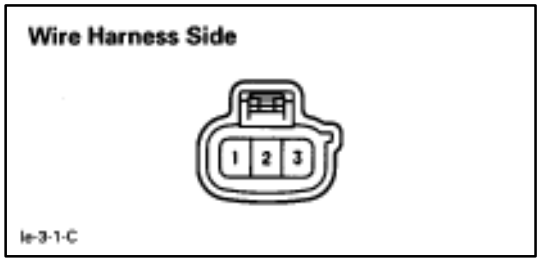
INSPECT WASHER MOTOR

(Operation)

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

NOTICE: There tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



(Circuit)

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

Check for	Tester connection	Condition		Specified value
Continuity	1–Ground	Washer switch position	OFF (released)	No continuity
			ON (pushed in)	Continuity
Voltage	2–Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery positive voltage

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

COMBINATION METER

DESCRIPTION

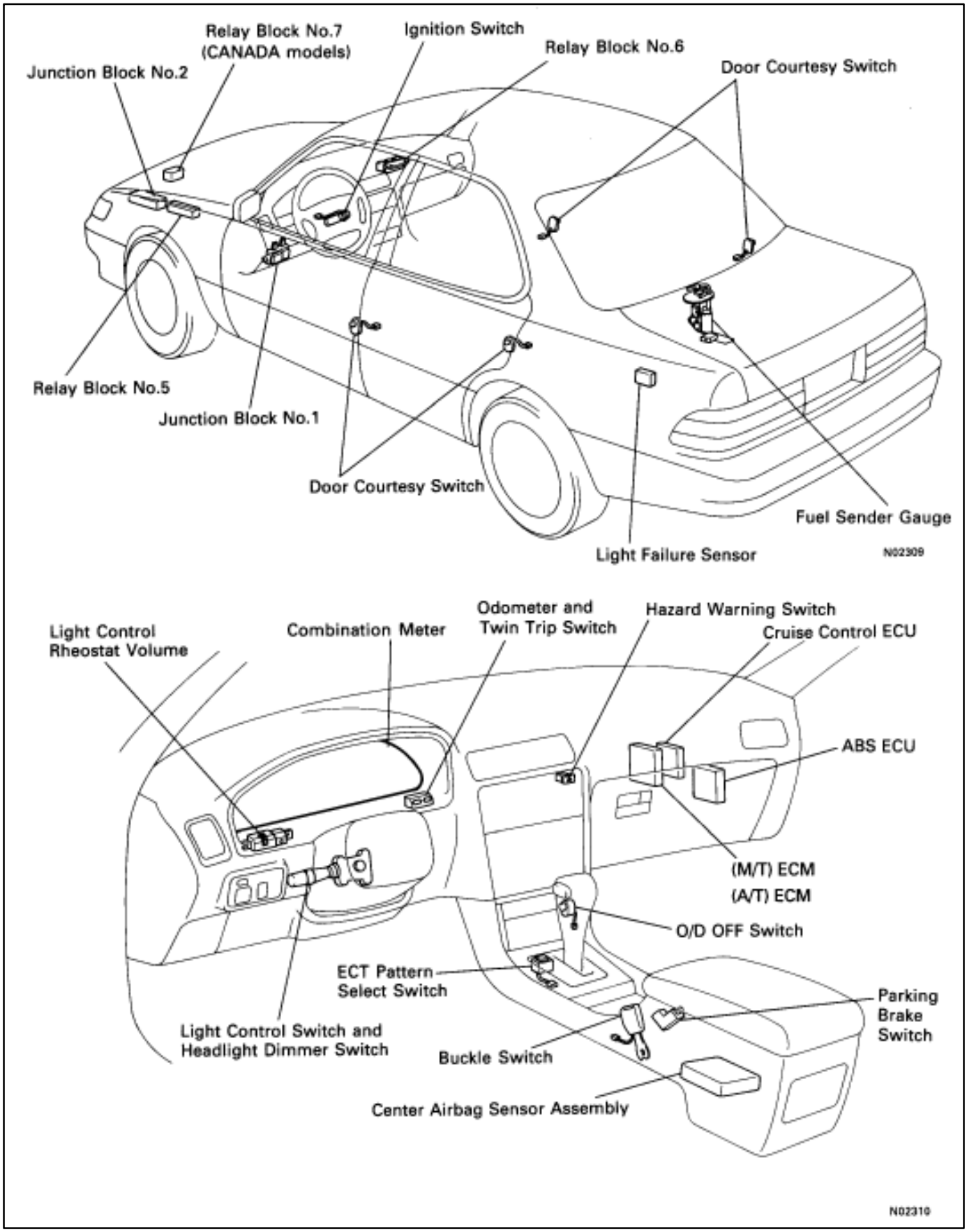
The combination meter has various meters and gauges which show the vehicle's condition, warning lights which monitor abnormalities in the vehicle and inform the driver, indicator lights which inform the driver of the condition of each part of vehicle, and a function for illumination and brightness adjustment of meters and gauges.

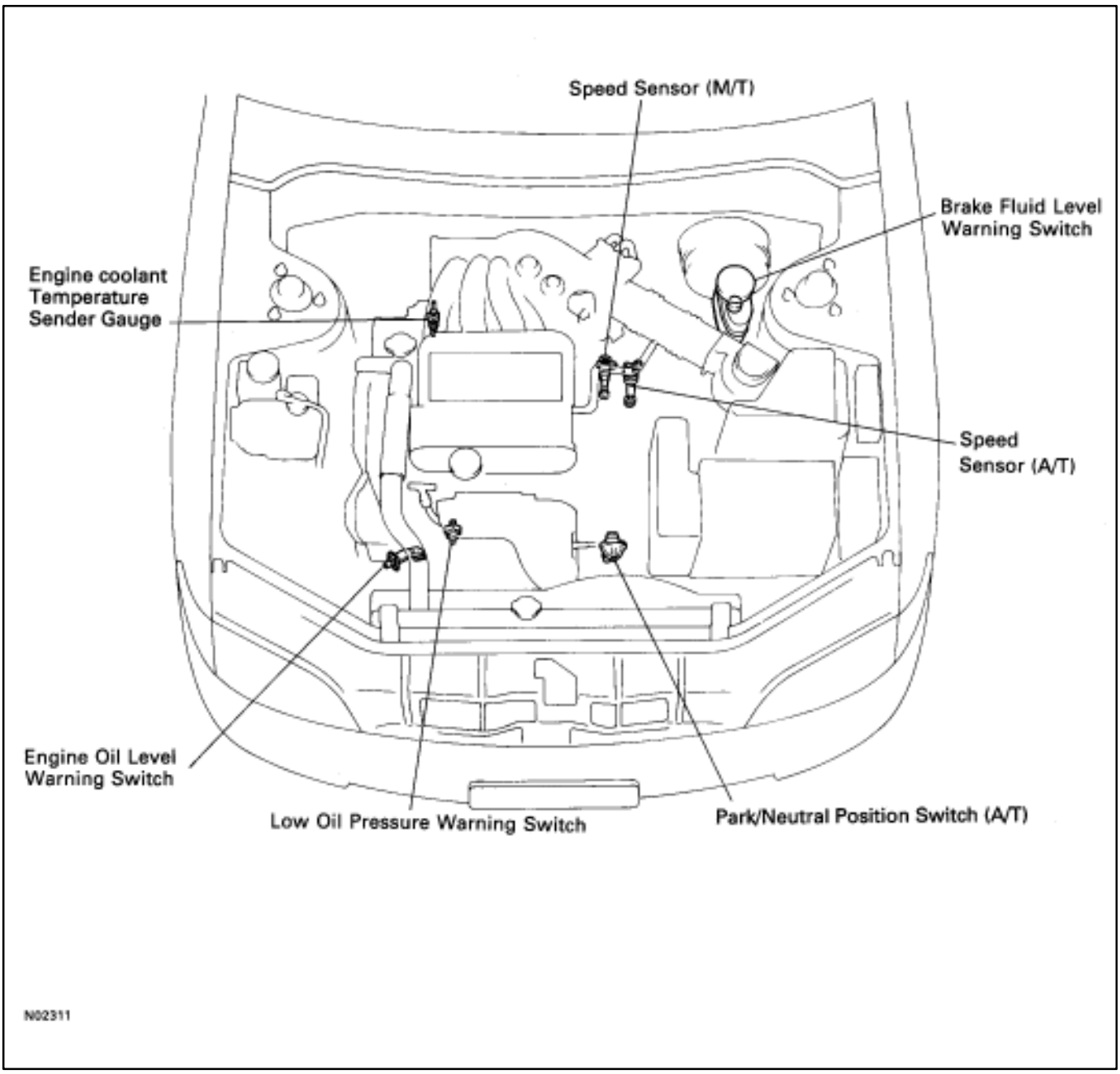
The component parts of this system and their functions are described in the following table.

Parts Name		Function
Combination Meter	Speedometer	The speedometer needle moves in accordance with signals from the speed sensor to indicate the vehicle's speed.
	Tachometer	The tachometer needle moves in accordance with signals from the igniter to indicate the engine's speed.
	Engine Coolant Temperature Gauge	The engine coolant temperature gauge's needle moves in accordance with signals from the sender gauge and indicates the temperature of the engine coolant.
	Fuel Gauge	The fuel gauge needle moves in accordance with signals from the sender gauge, indicating the amount of fuel remaining in the fuel tank.
	Odometer & Twin Trip Meter	The odometer counts the total distance traveled by the vehicle in accordance with pulse signals from the speed sensor. The twin trip meter counts the distance traveled by the vehicle in accordance with pulse signals from the speed sensor. It can be reset using a switch and can be used to switch between trip meters A and B.
Speed Sensor		Mounted in the transmission, this sensor outputs pulse signals to the combination meter in accordance with the speed of the output shaft.
Odometer & Twin Trip Switch		Operation of "ODO/TRIP" switch switches between odometer and twin trip meter. Operation of "TRIP RESET" switch switches between A and B trip meters and sends reset signal to the combination meter.
Engine Coolant Temperature Sender Gauge		This sender converts engine coolant temperatures to a resistance value in signal form to the combination meter.
Fuel Sender Gauge		This sender converts the level of fuel remaining in fuel tank to resistance value and sends the resistance value in signal form to combination meter.
Rheostat Light Control Volume		In order to adjust the degree of illumination of the combination meter, the resistance value of the built-in variable resistor is sent to the combination meter and rheostat light control.
Rheostat Light Control		This control adjusts the brightness of the illumination light in the combination meter in accordance with the resistance value from the rheostat light control volume.
Fuel Level Warning Swith		When the level of fuel remaining falls below a predetermined level, continuity is established with this switch, which is built into the fuel sender gauge, causing a warning light to light up.
Low Oil Pressure Warning Switch		This switch is mounted on the engine block. Continuity is established in this switch when the oil pressure is low, causing a warning light to light up.
Integration Relay		This relay receives current from GAUGE fuse and DOME fuse and is connected to each buckle switch, door courtesy switch, key unlock warning switch and warning light. As part of the seat belt warning system, it sounds a chime and lights a warning light when seat belts are unfastened.

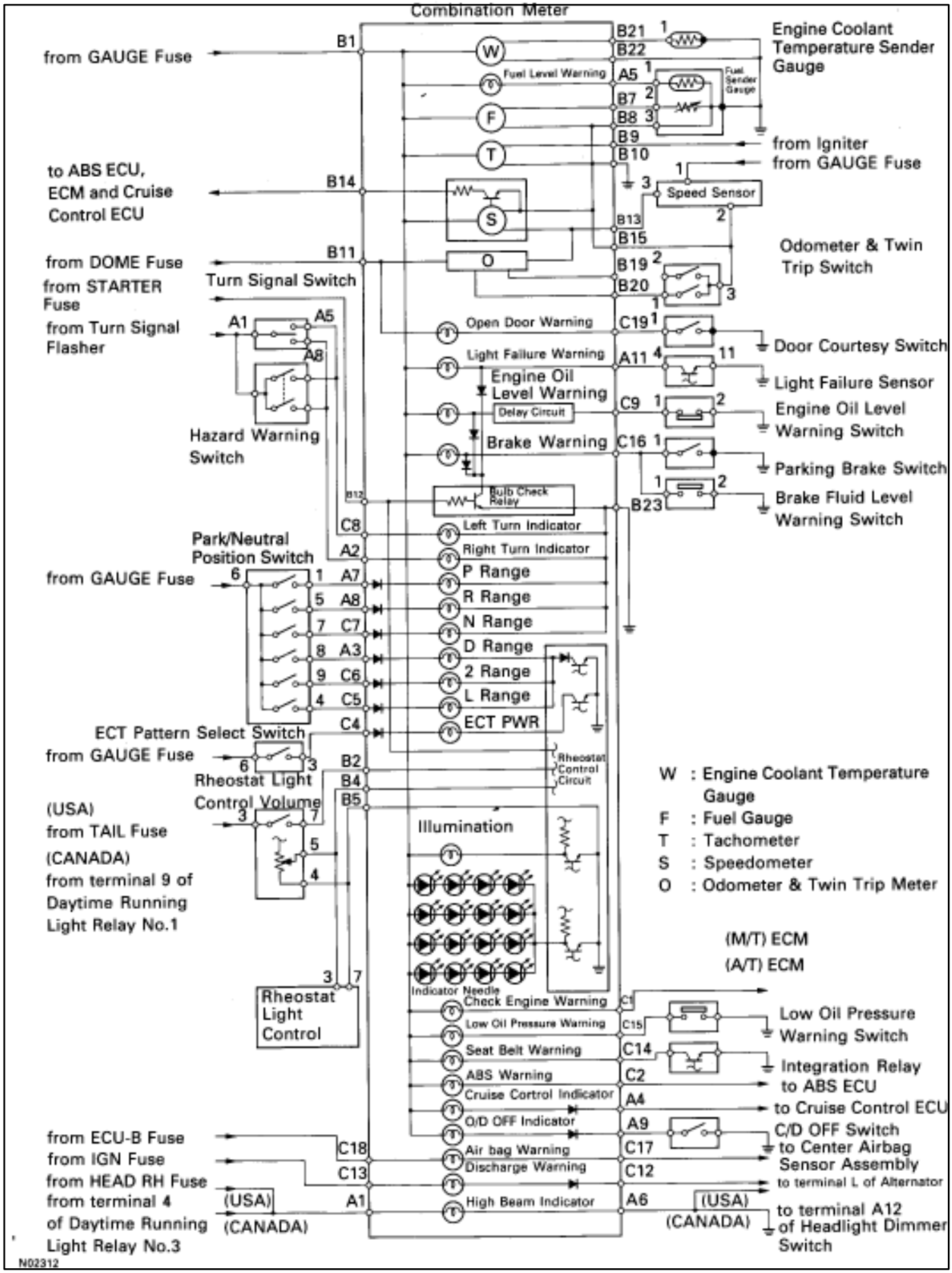
Parts Name	Function
Light Failure Sensor	This sensor senses when a bulb in rear combination light is burnt out and lights up a warning light.
Engine Oil Level Warning Switch	This switch is mounted in the engine oil pan. It lights a warning light when the engine oil level is low.
Brake Fluid Level Warning Switch	This switch is mounted in the brake master cylinder reservoir tank. It lights up a warning light when the brake fluid level is low.
Parking Brake Switch	This switch is on the parking brake lever bracket. Continuity in this switch is established when the lever is released, causing a warning light to light up.
Door Courtesy Switch	Continuity is established in this switch when a door is opened, causing a warning light to light up.
Buckle Switch Warning Lights	Continuity is established in this switch when seat belt is fastened. When an abnormality is detected in the vehicle, current is sent to these lights, or they are grounded, causing them to light up.
Indicator Lights	Current is sent to these lights, or they are grounded, causing them to light up and indicate the vehicle's condition to the driver.

PARTS LOCATION



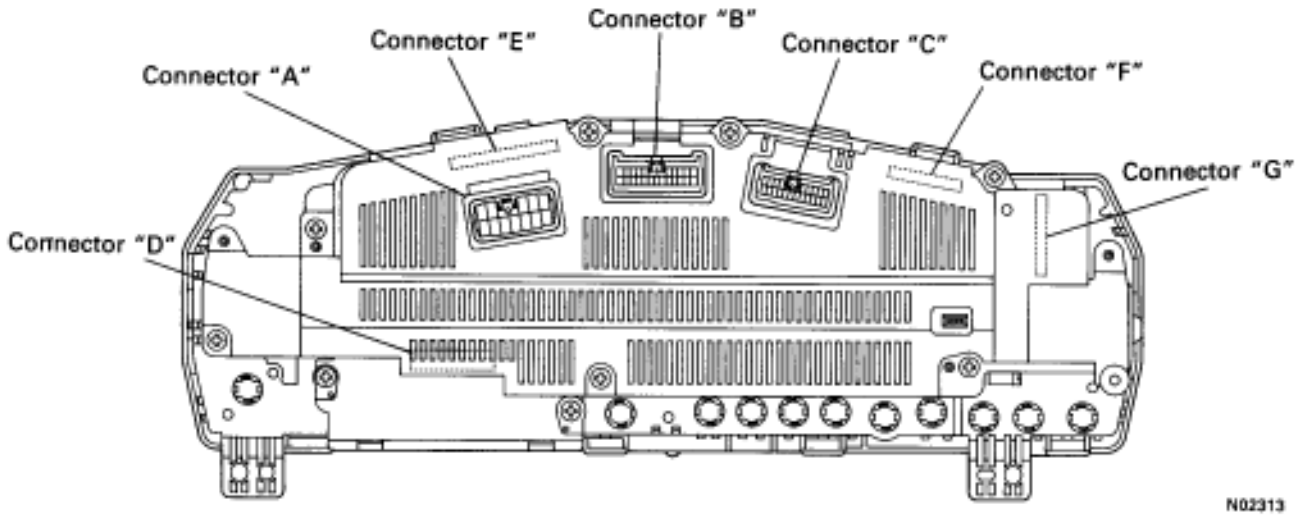

Speed Sensor (M/T)
Brake Fluid Level Warning Switch
Engine coolant Temperature Sender Gauge
Speed Sensor (A/T)
Engine Oil Level Warning Switch
Low Oil Pressure Warning Switch
Park/Neutral Position Switch (A/T)
N02311

WIRING DIAGRAM



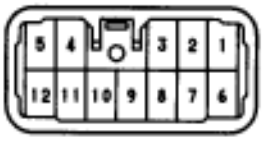
CONNECTOR DIAGRAMS

Combination Meter



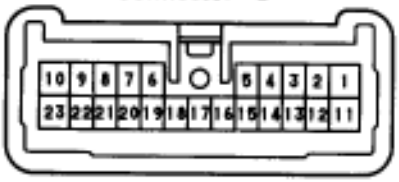
N02313

Connector "A"



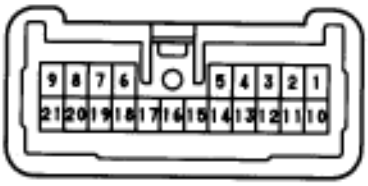
e-12-2-B

Connector "B"



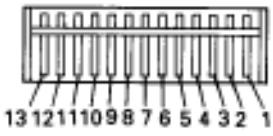
eh-23-2-A

Connector "C"



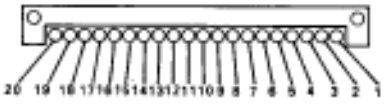
h-21-2

Connector "D"



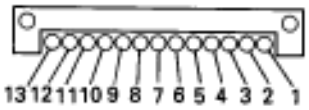
N02314

Connector "E"



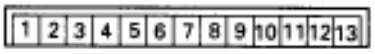
N02315

Connector "F" "G"



N02316

Odometer and Twin Trip Meter



N02317

Speed Sensor

N02331

Odometer and Twin Trip Switch

h-3-2

Fuel Sender Gauge

le-5-2-A

Engine Coolant Temperature Sender Gauge

BE2563

Low Oil Pressure Warning Switch

BE3928

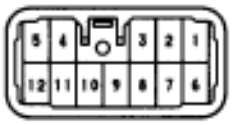
Brake Fluid Level Warning Switch

IS-2-2-0

Parking Brake Switch

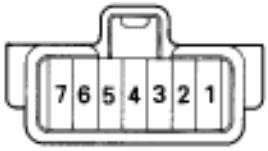
e-1-2

Light Failure Sensor



e-12-2-B

Volume Rheostat Light Control



N01958

Door Courtesy Switch

e-1-1

Engine Oil Level Warning Switch

BE3710

Rheostat Light Control

e-8-2-B

TROUBLESHOOTING

Precaution

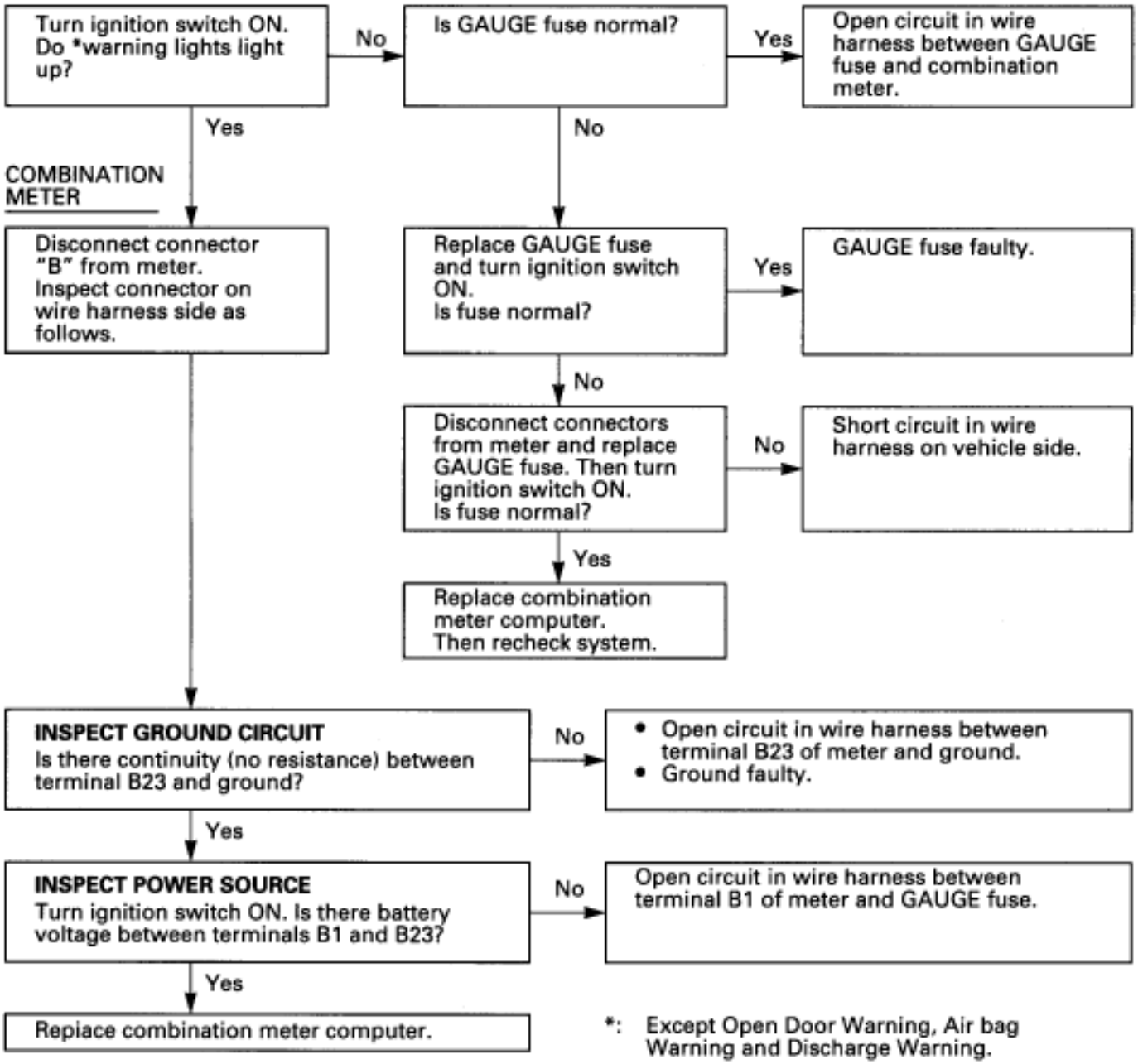
1. **When checking voltage, resistance, etc., use a high impedance type tester (It is impossible with a simple tester).**
2. **When the ignition switch is turned to START, all meters will go out but this is normal.**
3. **When replacing the internal mechanism (computer parts) of the meter, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement parts (spare parts).**
4. **Do not disconnect the battery while the engine is running as this would cause an instant reverse charge, resulting in damage to the components.**
5. **Always disconnect the battery terminals before pulling apart connectors or terminals.**
6. **To prevent damage, handle meters with care.**

Trouble		Refer to
All Meters, Gauges, and Illuminations	No display at all.	1
	The four indicator needles do not light up.	Replace combination meter computer
	One indicator needle does not light up.	2
	The entire character plate is not illuminated at all.	3
	The character plate is not illuminated at one or two locations.	4
	Brightness does not change even when light control switch is operated (OFF TAIL).	5
	Brightness does not change even when rheostat volume is turned.	6
	Remains dimmed when the light control switch is turned OFF.	Replace combination meter computer
	Does not go out while starter running.	7
Speedometer	Speedometer does not operate while driving.	8
	Vehicle speed signal (4P) faulty.	9
Tachometer	Tachometer does not operate while engine running.	10
Fuel Gauge	Does not operate or operation is abnormal.	11
Fuel Level Warning	Warning light does not light up or always lights up.	12
Engine Coolant Temperature Gauge	Does not operate or operation is abnormal.	

Trouble		Refer to
Odometer & Twin Trip Meter	Display does not alter during driving.	14
	Display does not reset when RESET switch pressed.	15
	Display is reset even during driving if RESET switch is not pressed.	15
	Display does not change when ODO/TRIP switch pressed.	15
	Display is reset whenever ignition switch is turned off.	16
	Abnormal display.	Replace odometer & twin trip meter
Low Oil Pressure Warning	Abnormal operation or warning light does not light up.	17
Brake Warning	Abnormal operation or warning light does not light up.	18
Light Failure Warning	Abnormal operation or warning light does not light up.	19
Open Door Warning	Abnormal operation or warning light does not light up.	20
Engine Oil Level Warning	Abnormal operation or warning light does not light up.	21
Seat Belt Warning Chime	Abnormal operation or chime does not operate.	See page BE–170
Seat Belt Warning	Abnormal operation or warning light does not light up.	22
Turn Signal Indicator	Abnormal operation or indicator does not light up.	23
Shift Position Indicator	Abnormal operation or indicator does not light up.	24
ECT PWR Indicator	Abnormal operation or indicator does not light up.	25
Check Engine Warning	Abnormal operation or warning light does not light up.	26
ABS Warning	Abnormal operation or warning light does not light up.	27
CRUISE Indicator	Abnormal operation or indicator does not light up.	28
O/D OFF Indicator	Abnormal operation or indicator does not light up.	29
AIRBAG Warning	Abnormal operation or warning light does not light up.	30
Discharge Warning	Abnormal operation or warning light does not light up.	31
High Beam Indicator	Abnormal operation or indicator does not light up.	32

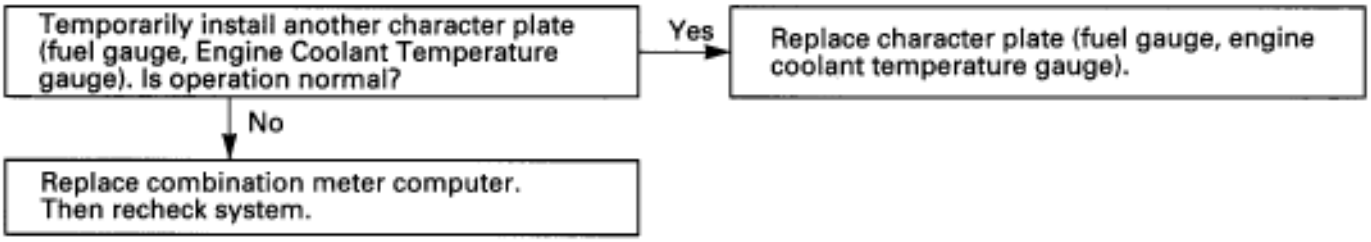
1	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**No display at all.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



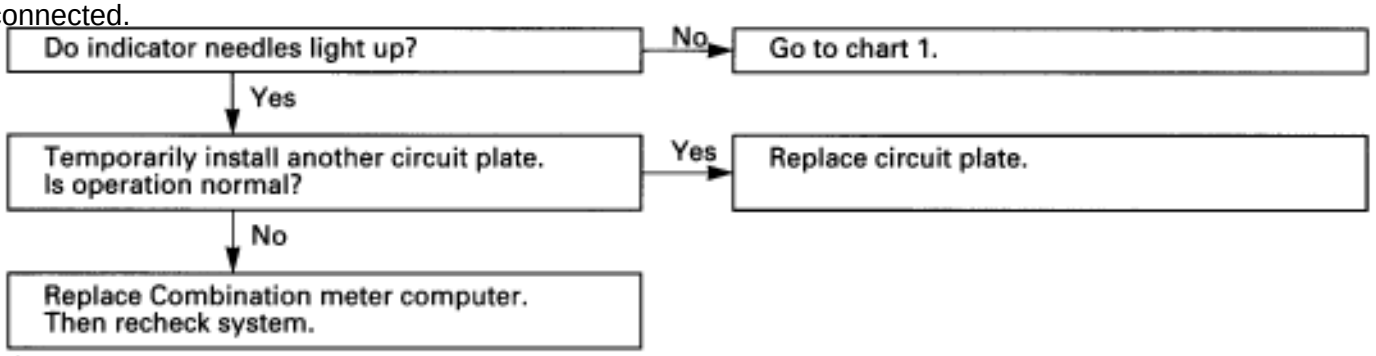
2	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**One indicator needle does not light up.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



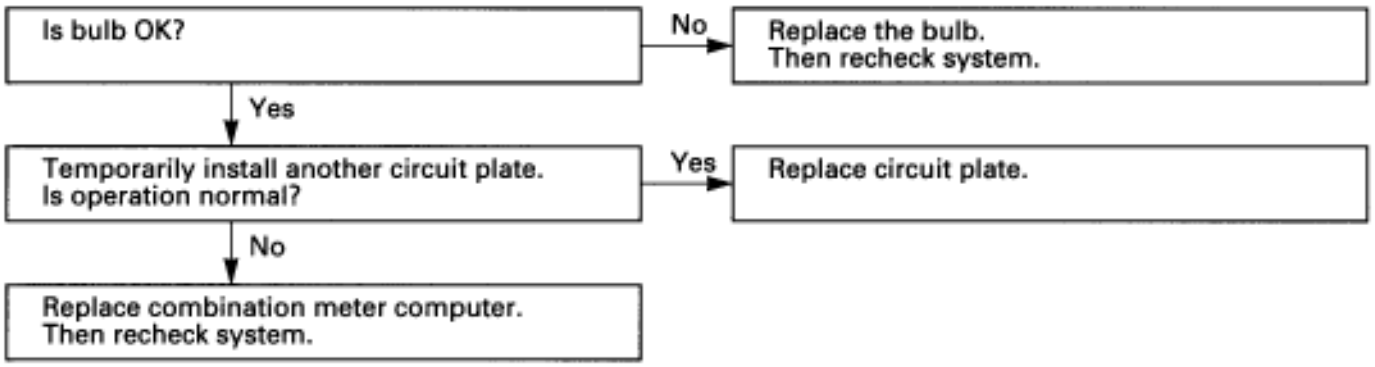
3	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**The entire character plate is not illuminated at all.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



4	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**The character plate is not illuminated at one or two locations.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



5	ALL METERS AND GUAGES AND ILLUMINATIONS	Brightness does not change even when light control switch is operated. (OFF⊕TAIL)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

COMBINATION METER

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT TAILLIGHT SIGNAL CIRCUIT
Does voltage change between terminal B2 and ground as follows?

Condition		Voltage
Light control switch position	OFF	No voltage
	TAIL or HEAD	Battery positive voltage

No → Taillight signal circuit faulty on vehicle side.
Inspect illumination light system.

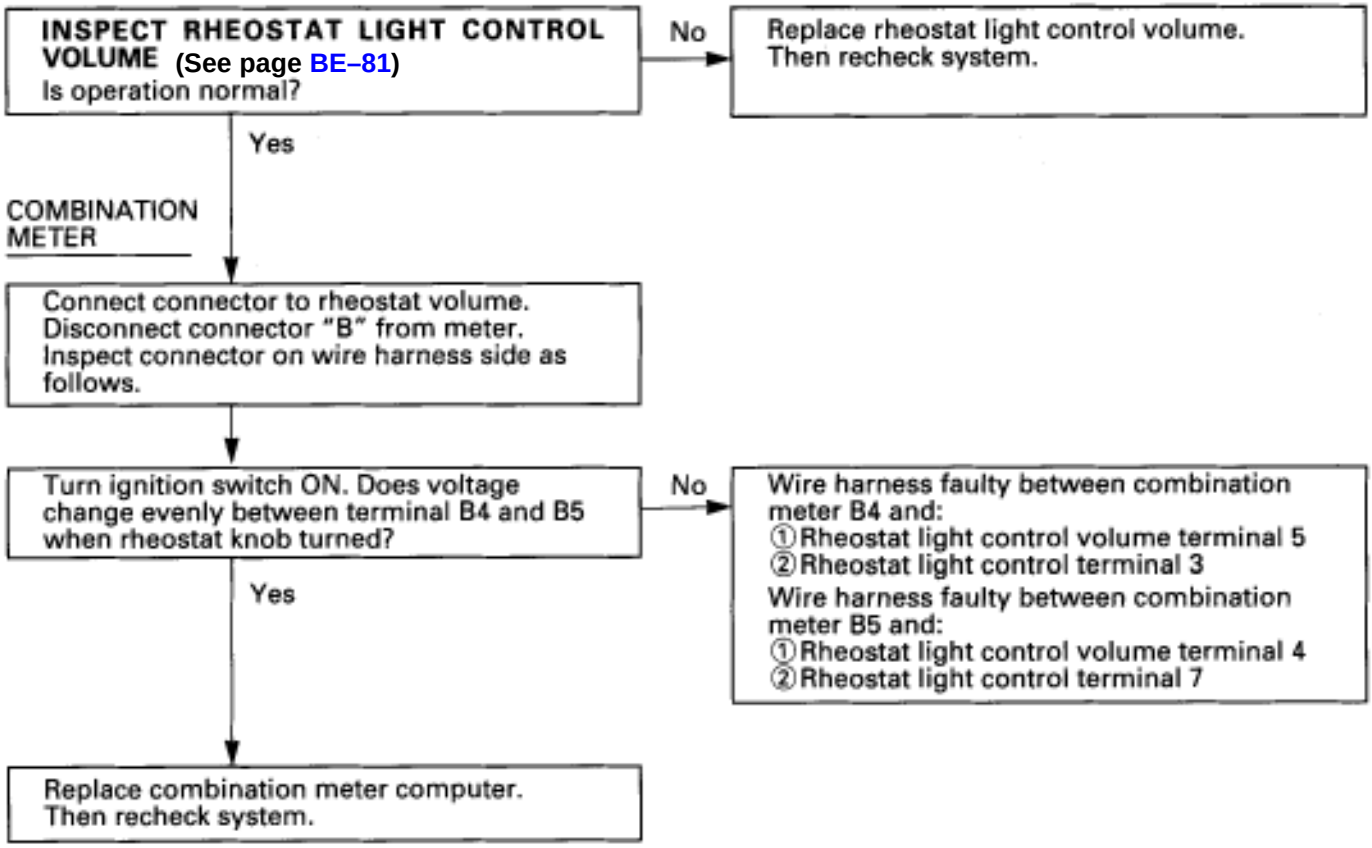
Yes

Replace combination meter computer.
Then recheck system.

6	**ALL METERS AND GUAGES AND ILLUMINATIONS**	**Brightness does not change even when rheostat volume is turned.**

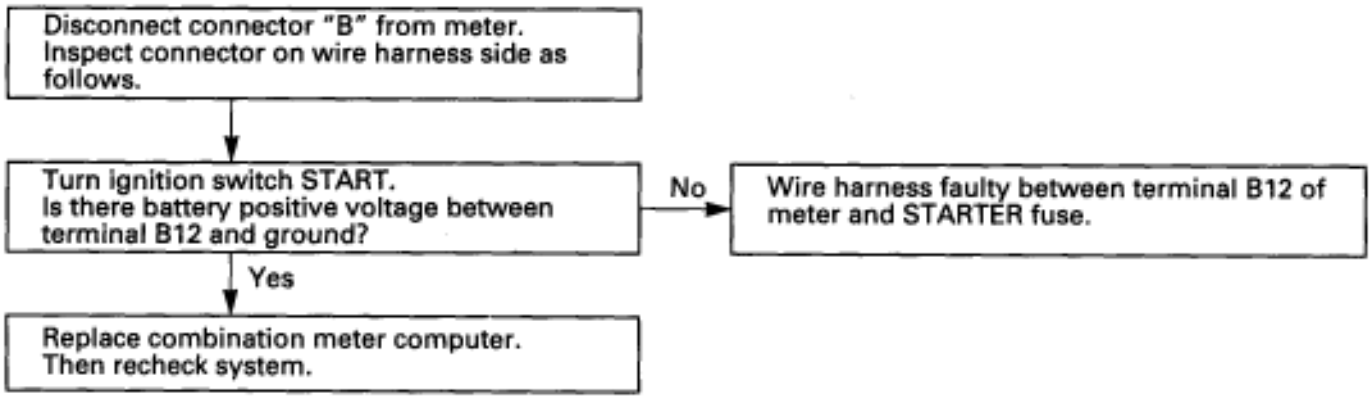
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

RHEOSTAT LIGHT CONTROL VOLUME



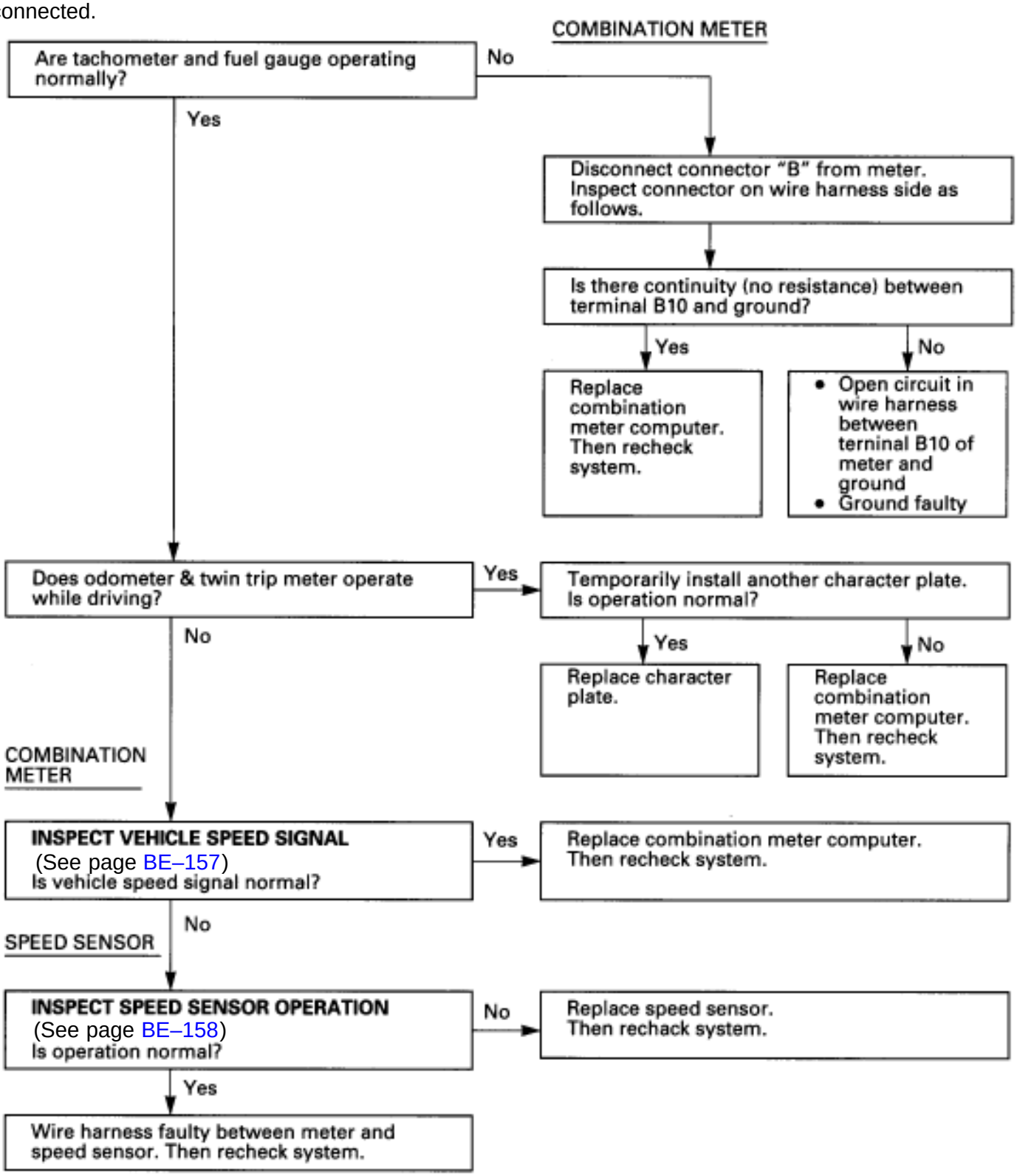
7	**ALL METER, GAUGES, AND ILLUMINATIONS**	**Does not go out while starter running.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



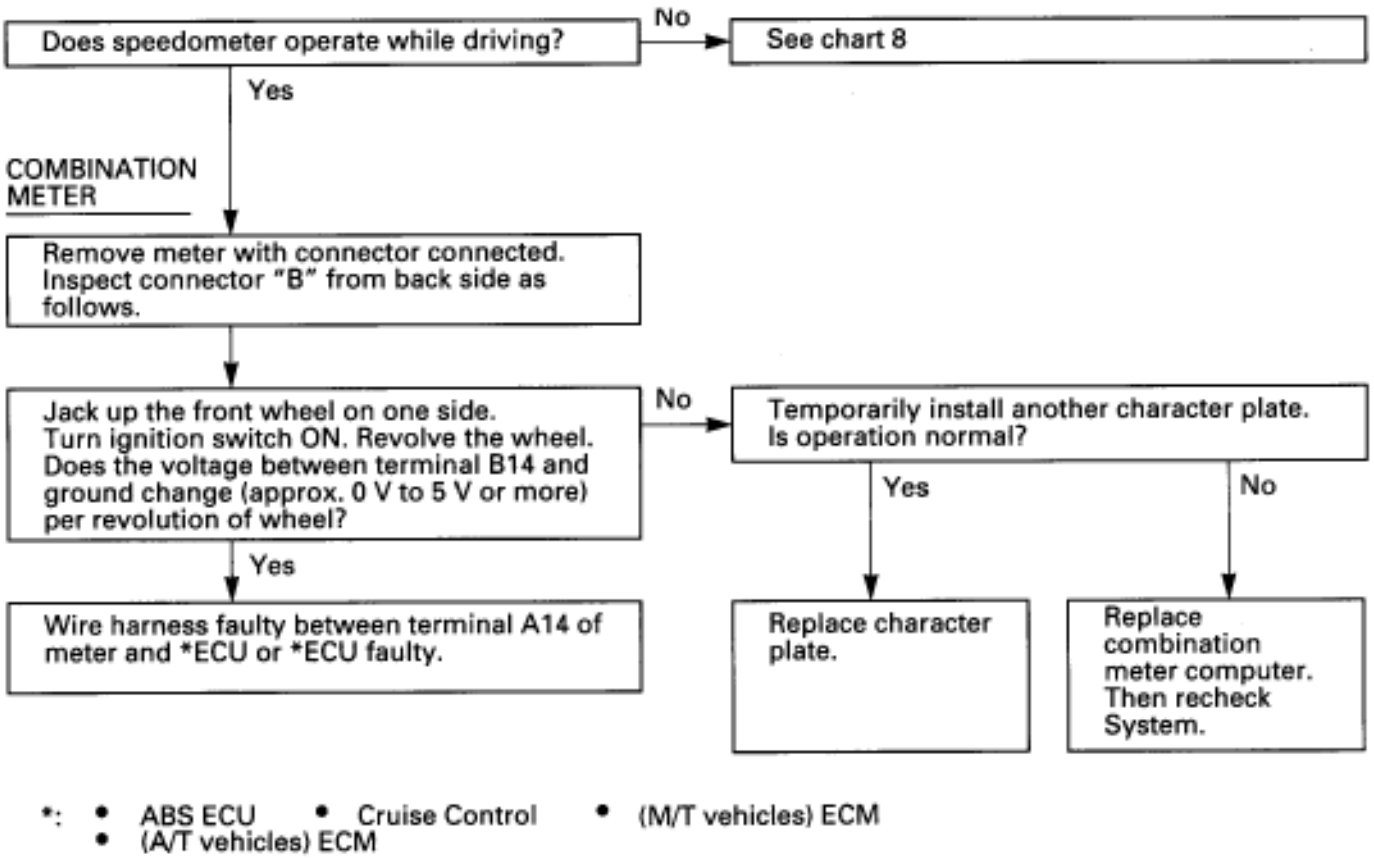
8	SPEEDOMETER	Speedometer does not operate while driving.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



9	SPEEDOMETER	Vehicle speed signal (4P) faulty.

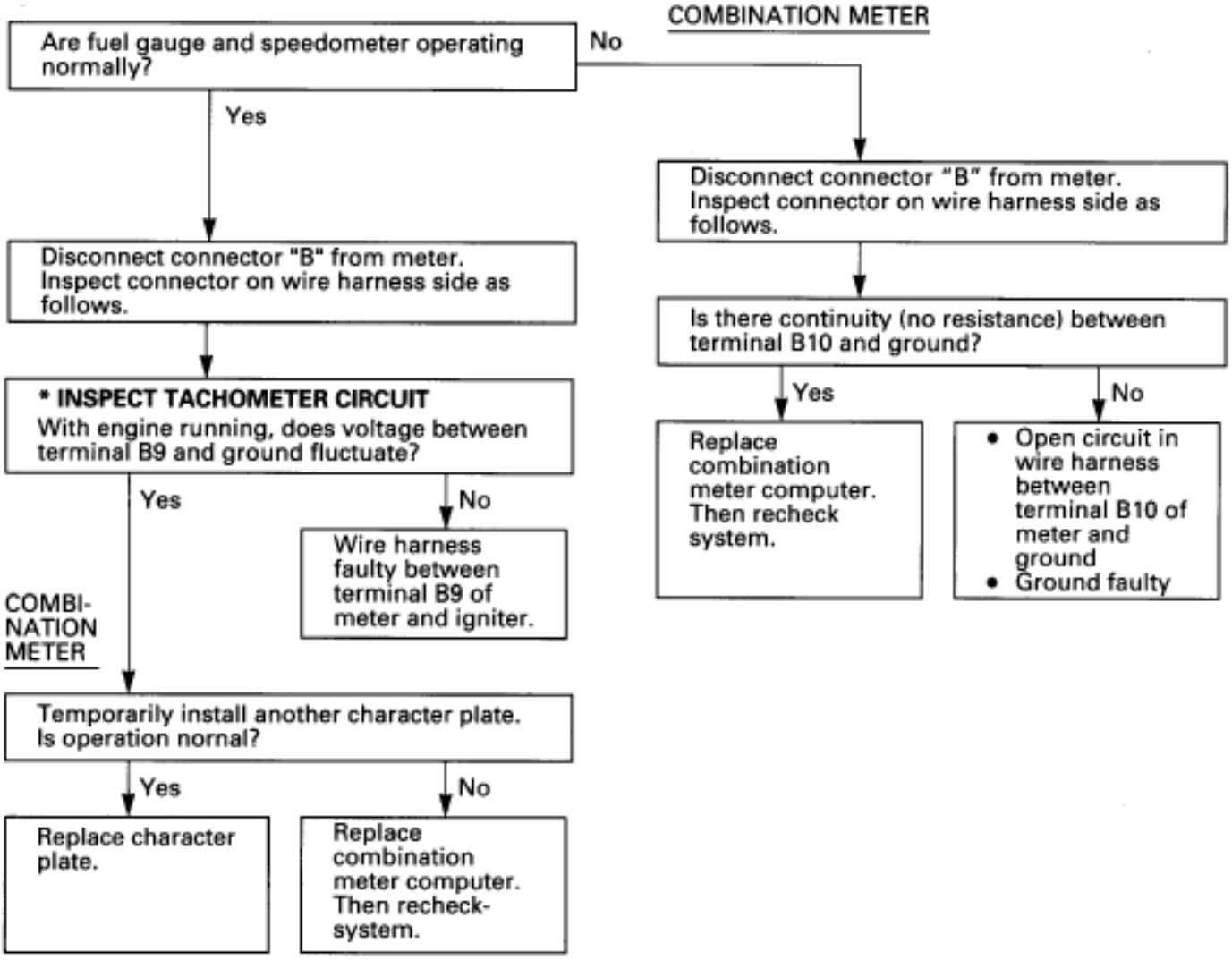
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



*: • ABS ECU • Cruise Control • (M/T vehicles) ECM
• (A/T vehicles) ECM

10	TACHOMETER	Tachometer does not operate while engine running.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

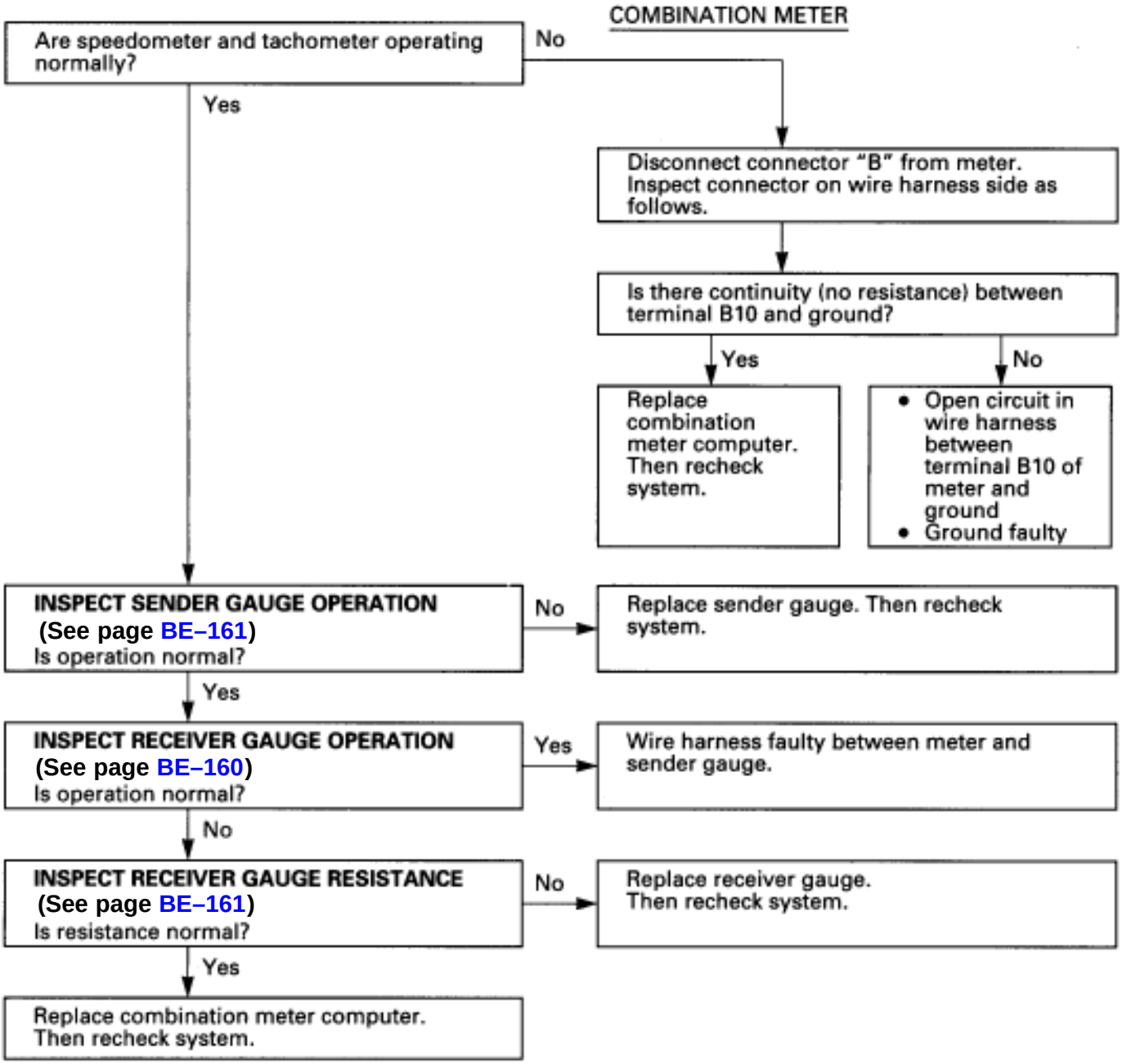


*: An electrical tester with measurements in Hz is necessary for this inspection.

REFERENCE: TOYOTA ELECTRICAL TESTER (09082-00015)

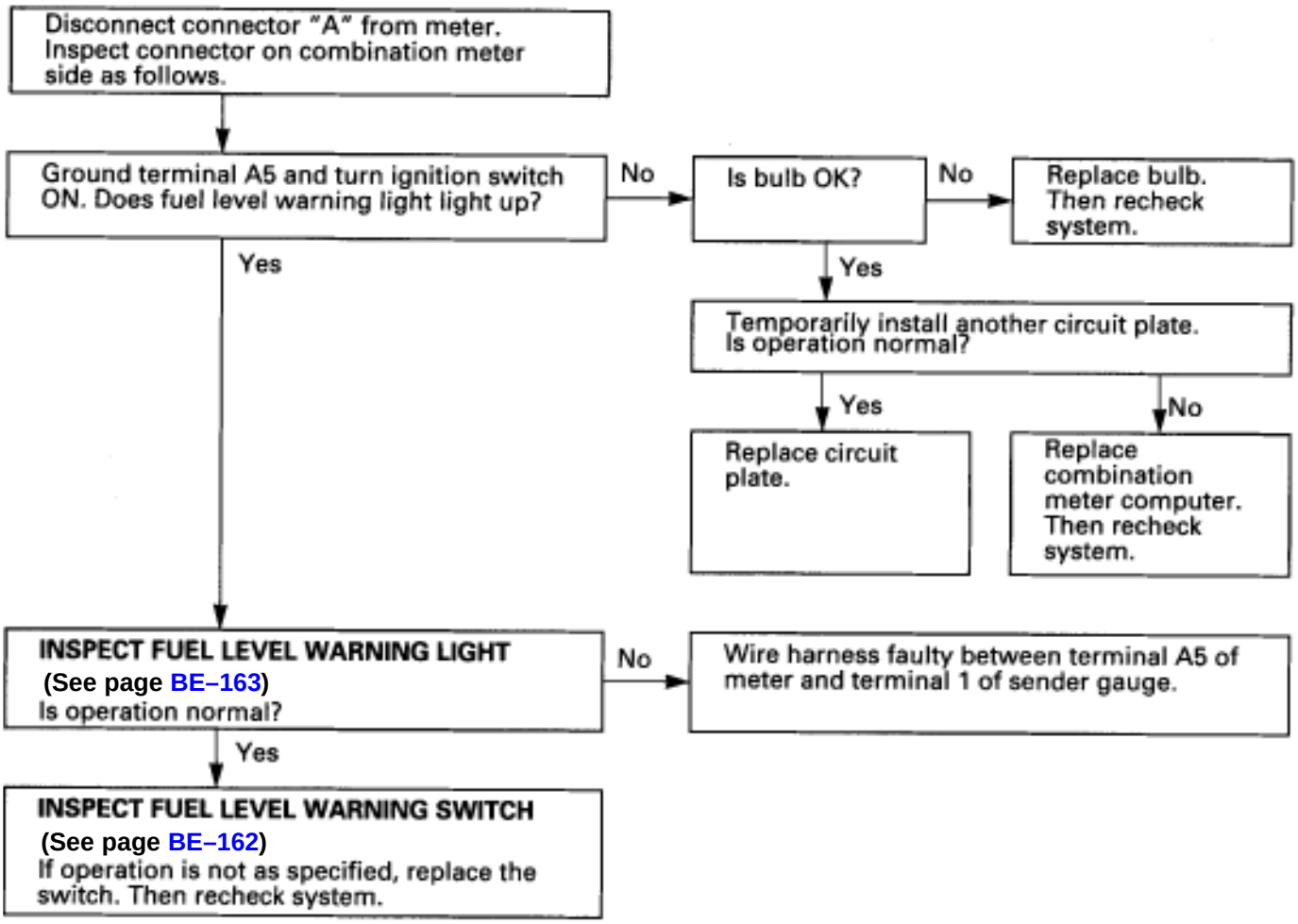
11	FUEL GAUGE	Does not operate or operation is abnormal.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



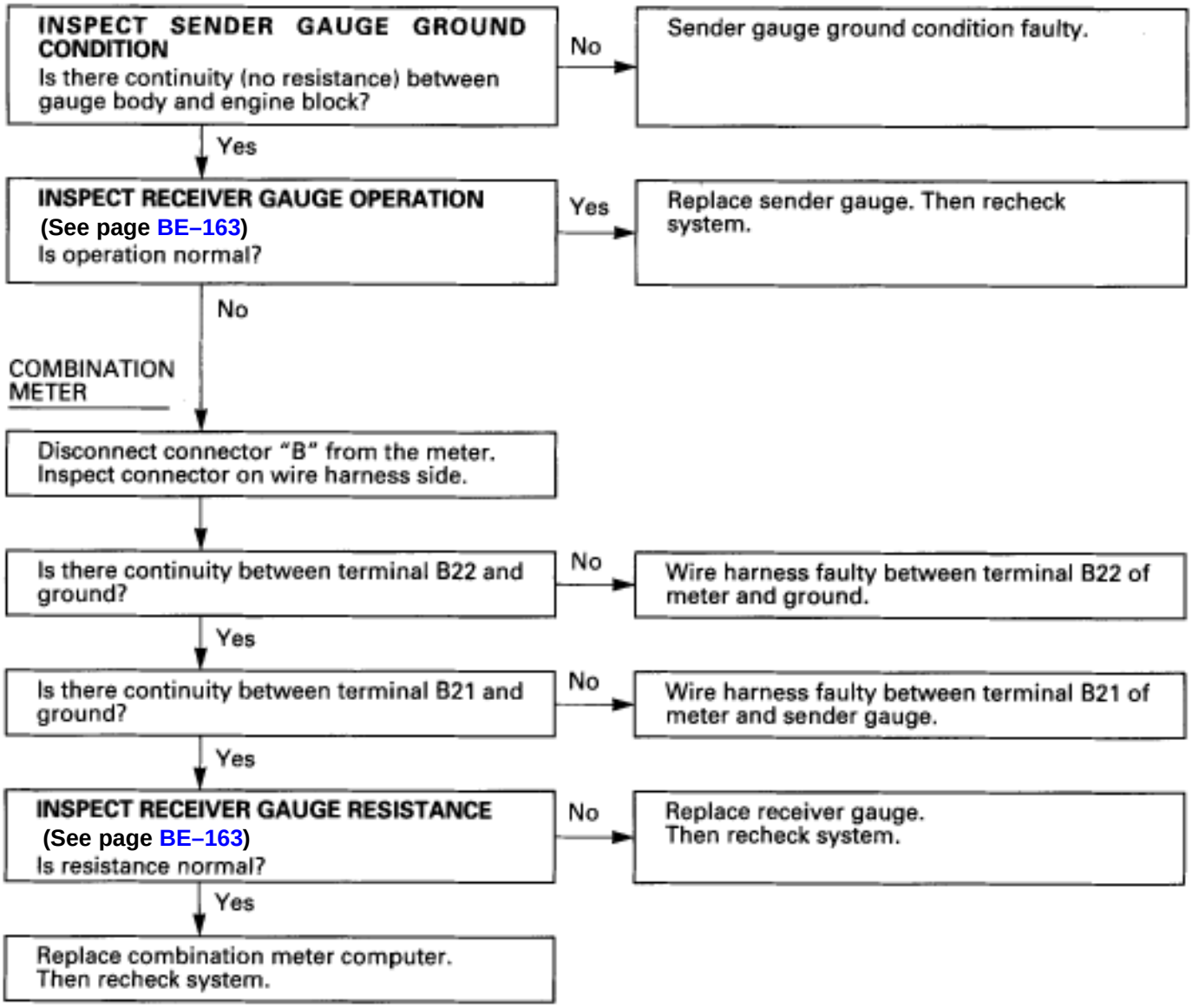
12	FUEL LEVEL WARNING	Warning light does not light up or always lights up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



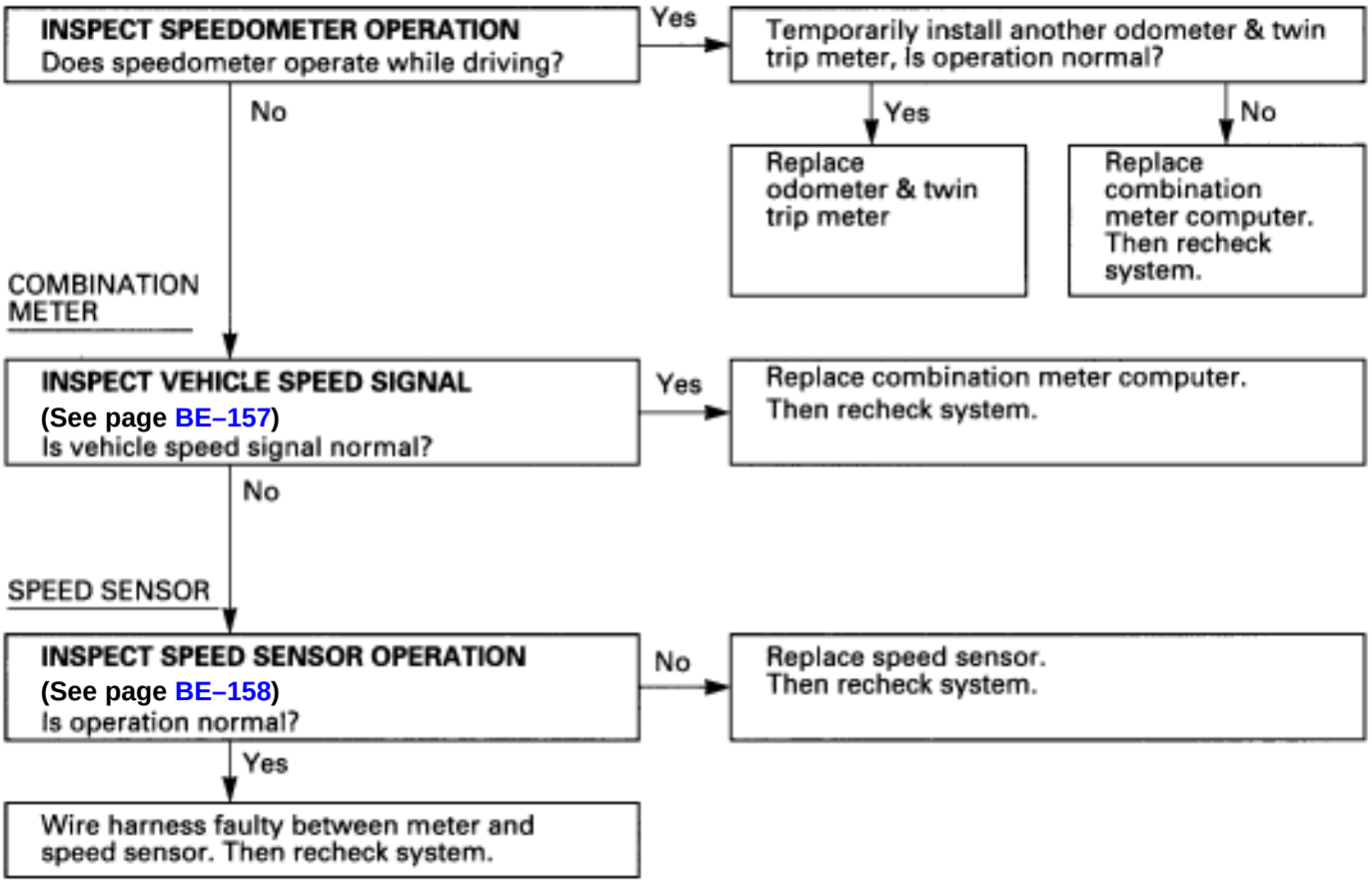
13	ENGINE COOLANT TEMPERATURE GUAGE	Does not operate or operation is abnormal.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



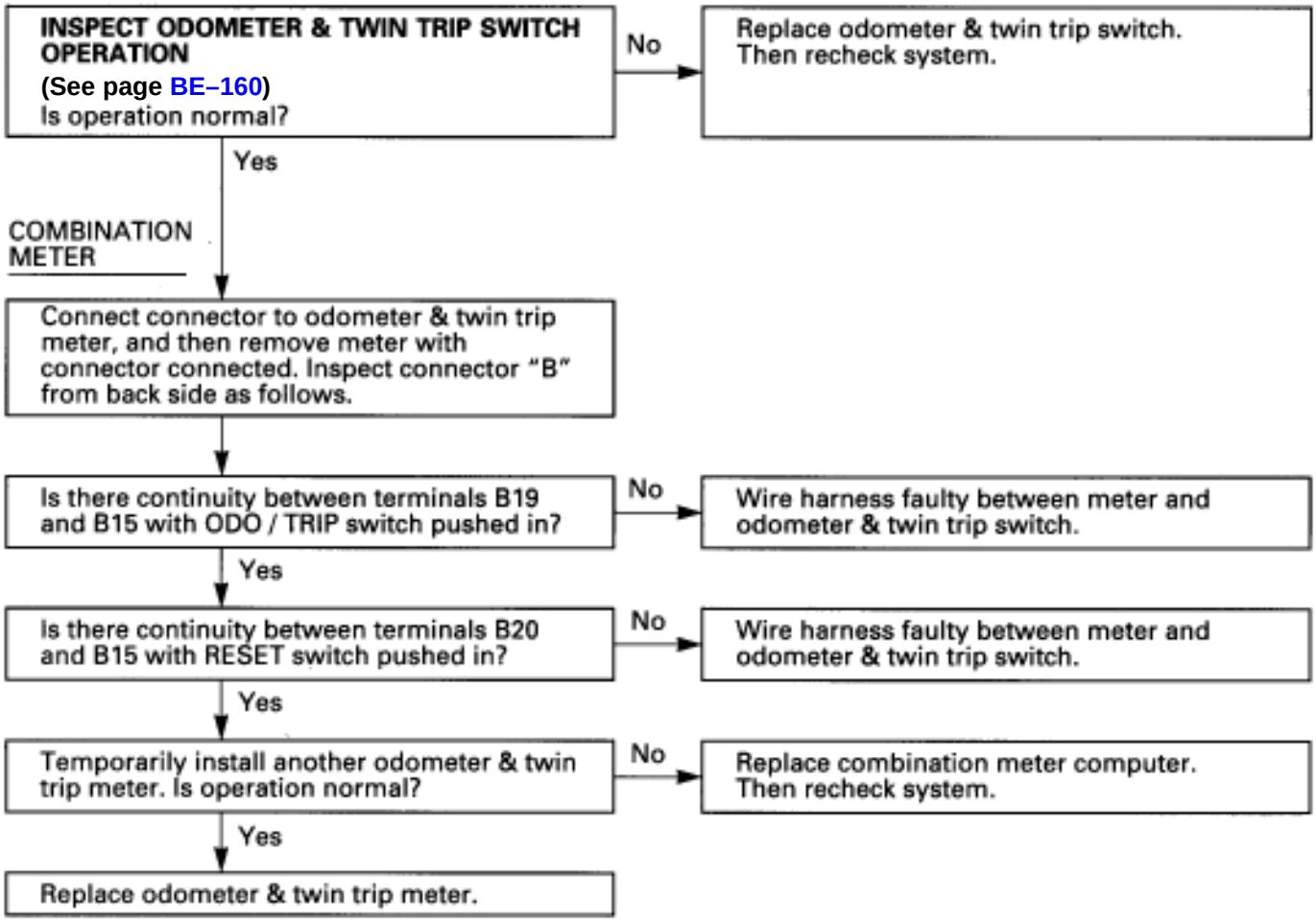
14	ODOMETER & TWIN TRIP METER	Display does not alter during driving.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



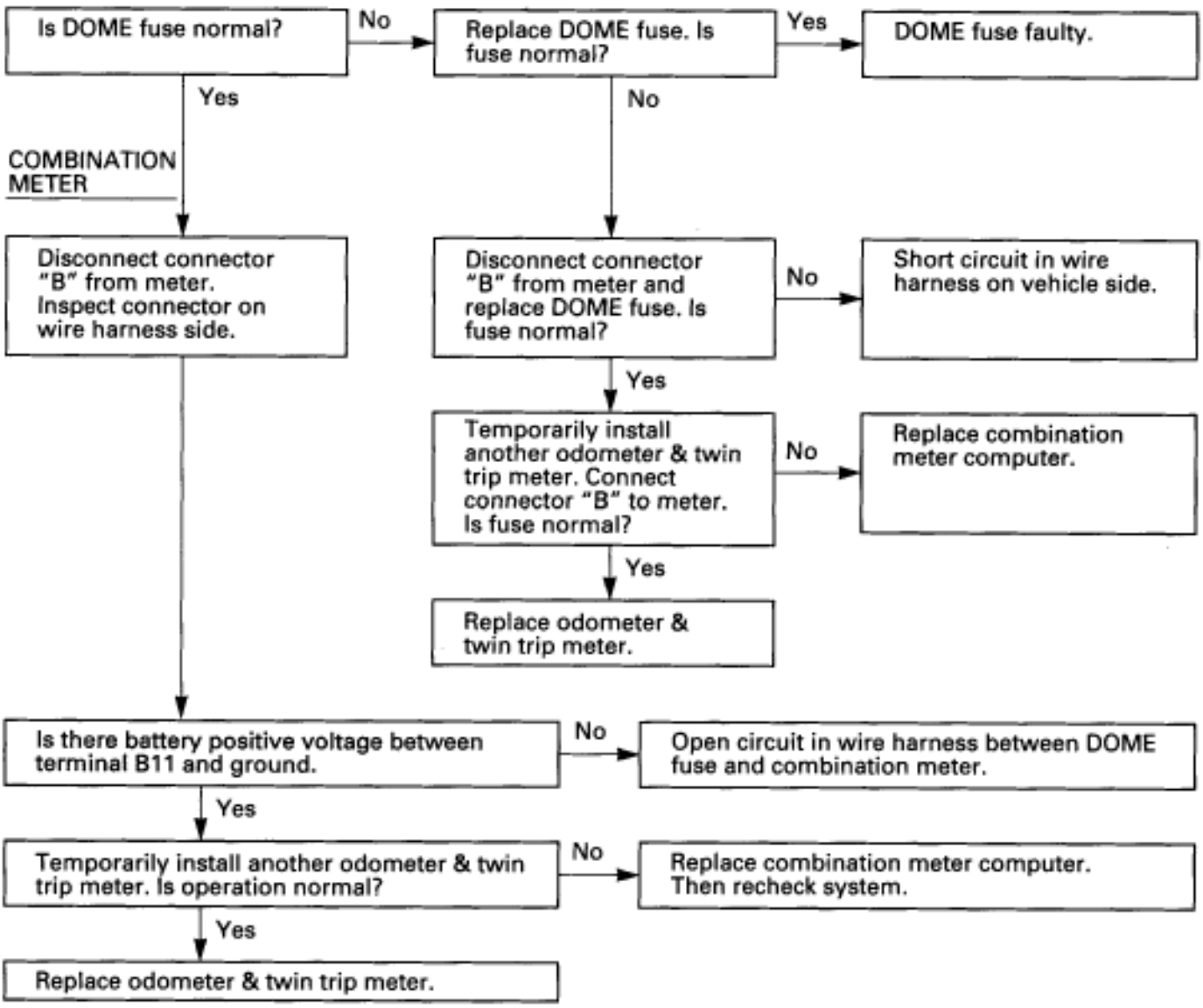
15	ODOMETER & TWIN TRIP METER	Display does not reset when RESET switch pressed. Display is reset even during driving if RESET switch is not pressed. Display does not change when ODO/TRIP pressed.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



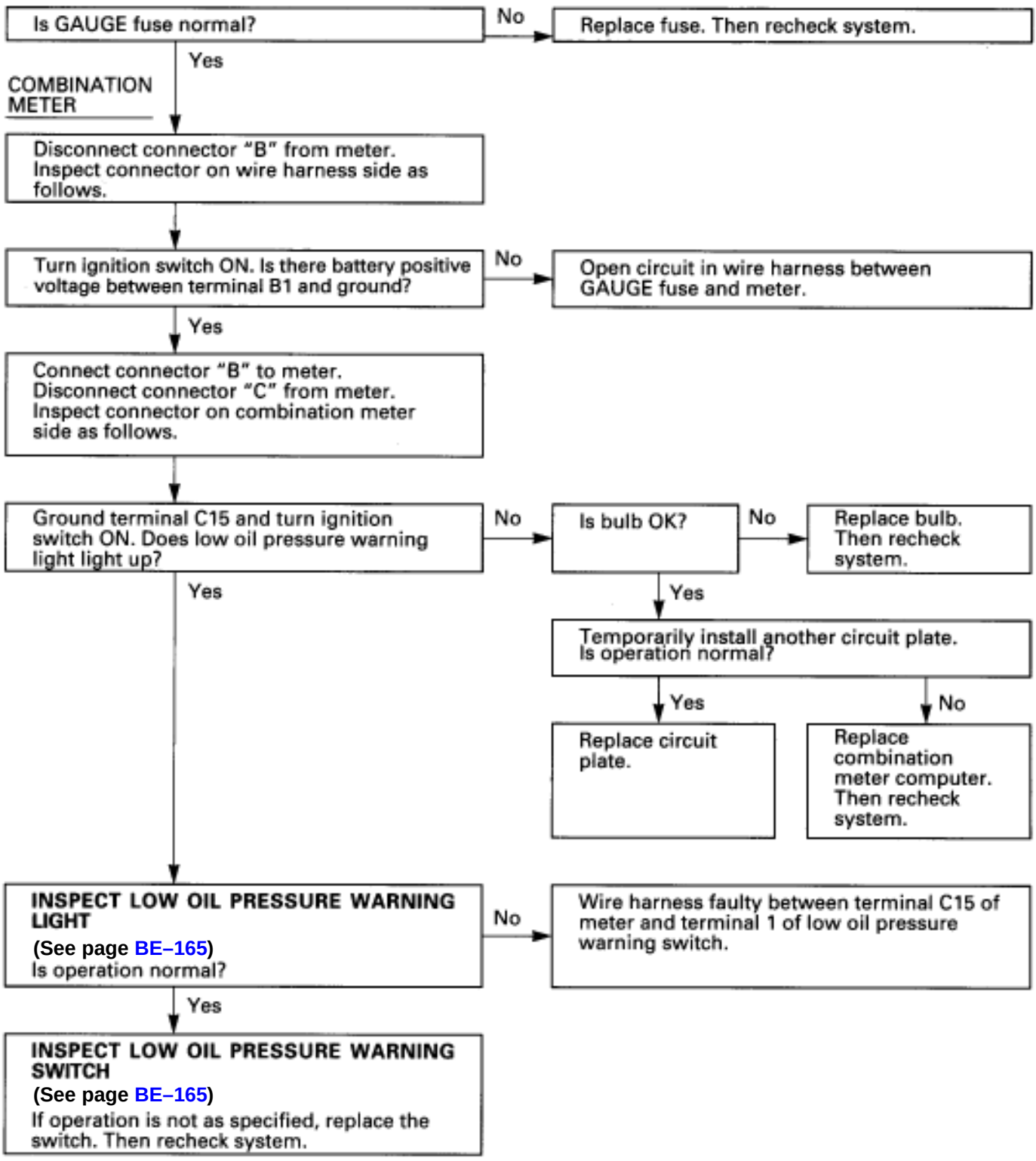
16	ODOMETER & TWIN TRIP METER	Display is reset whenever ignition switch is turned off.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



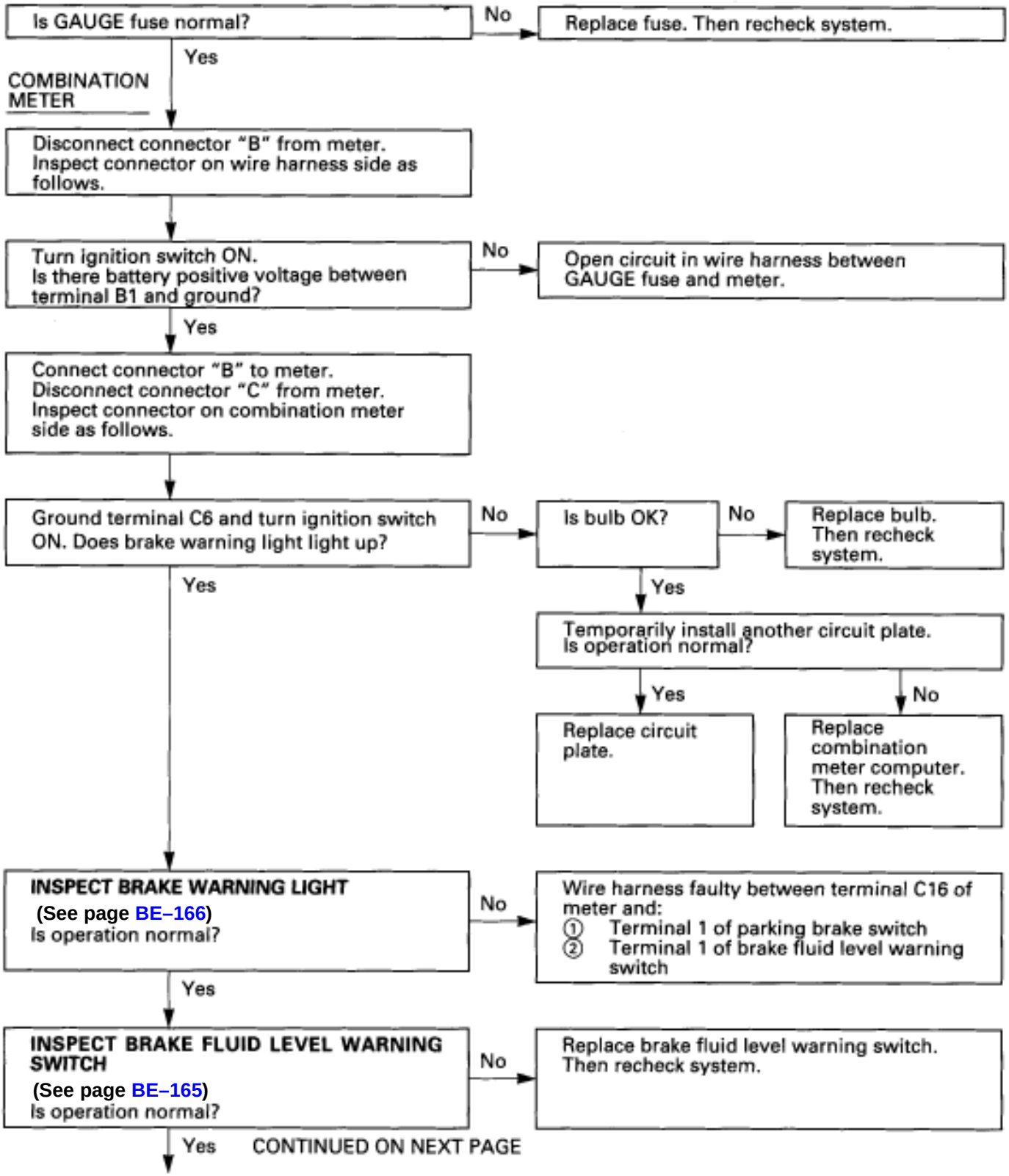
17	LOW OIL PRESSURE WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



18	BRAKE WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

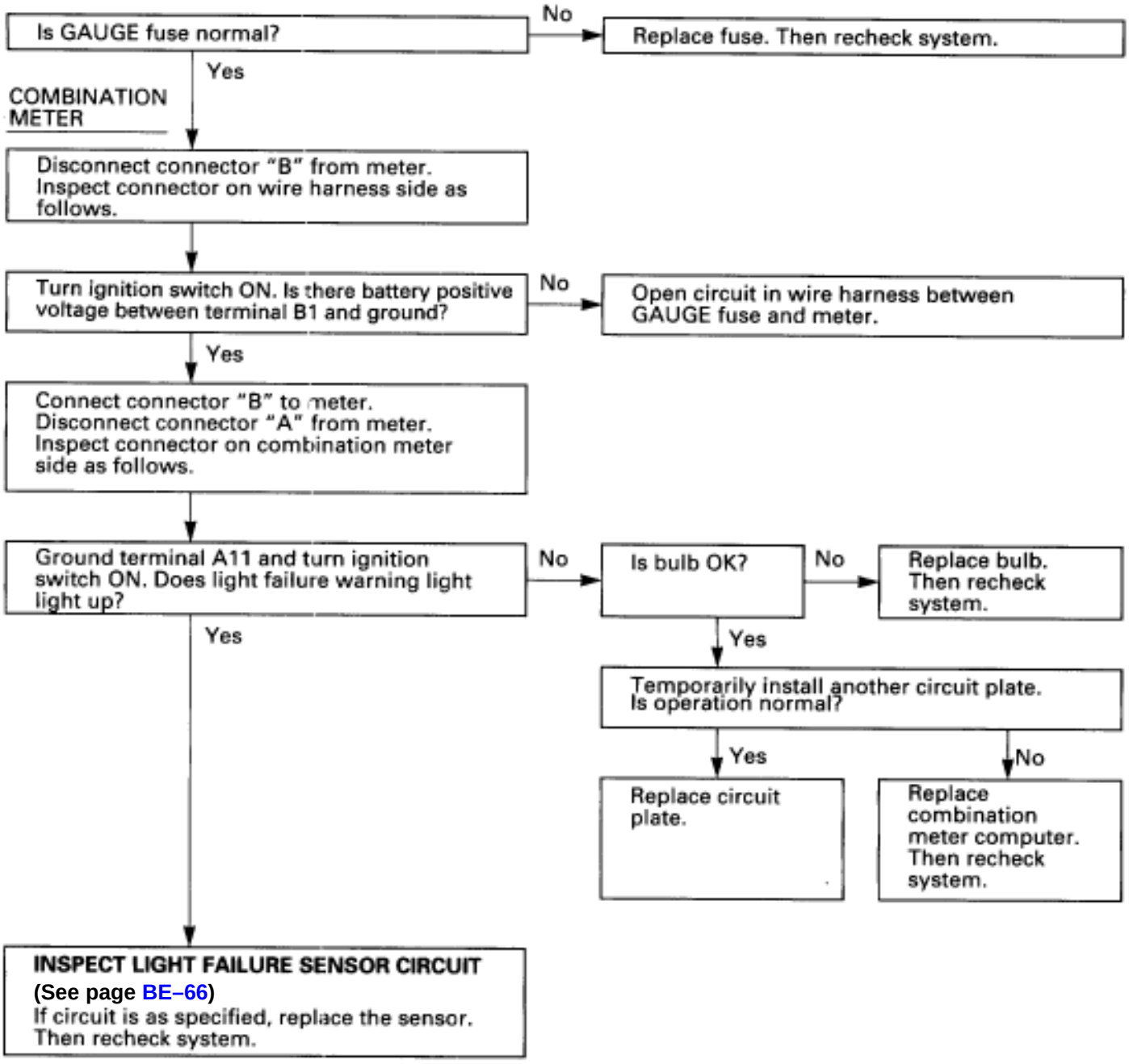


CONTINUED FROM PREVIOUS PAGE

INSPECT PARKING BRAKE SWITCH
(See page BE–166)
If operation is not as specified, replace the switch. Then recheck system.

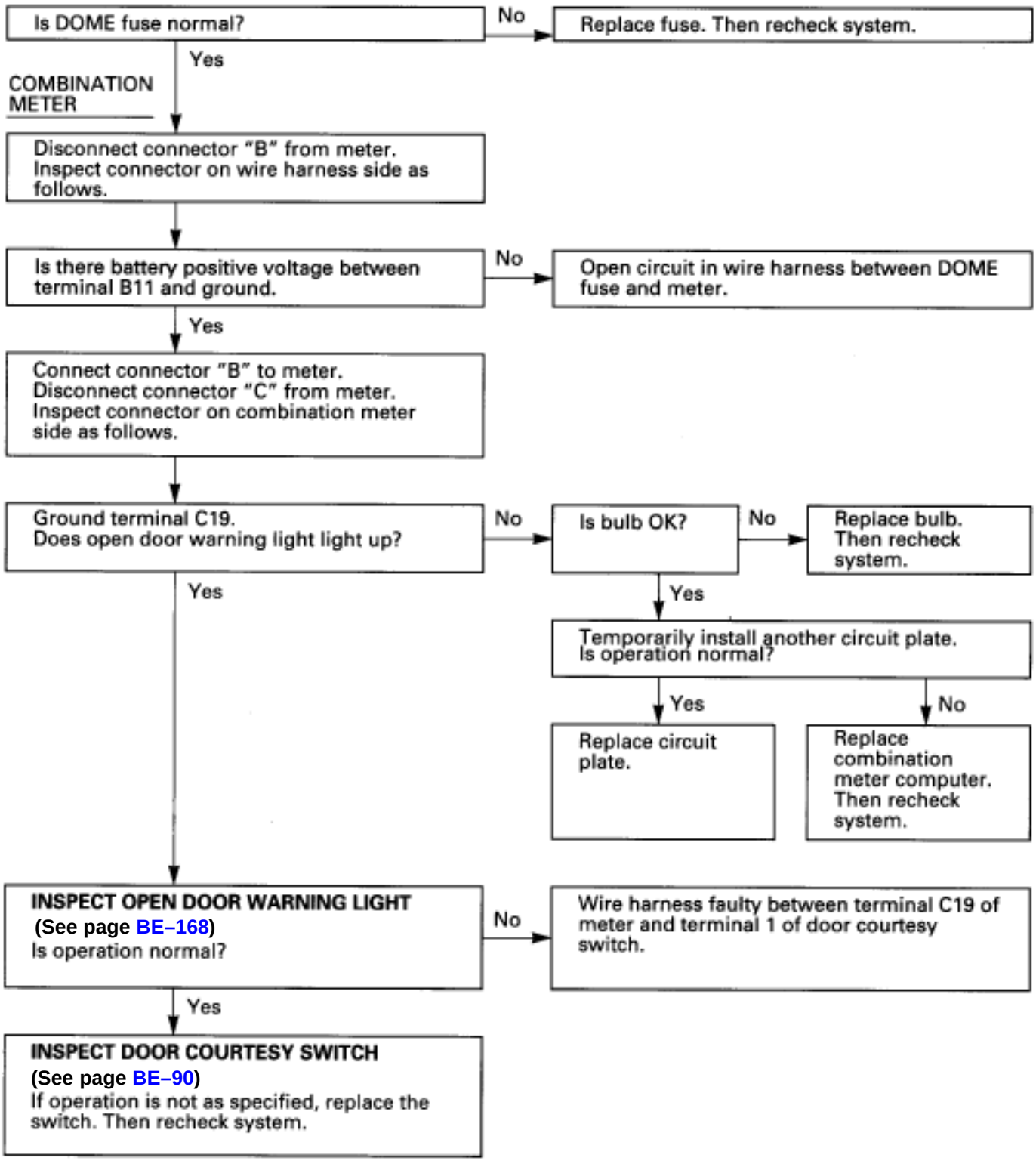
19	LIGHT FAILURE WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



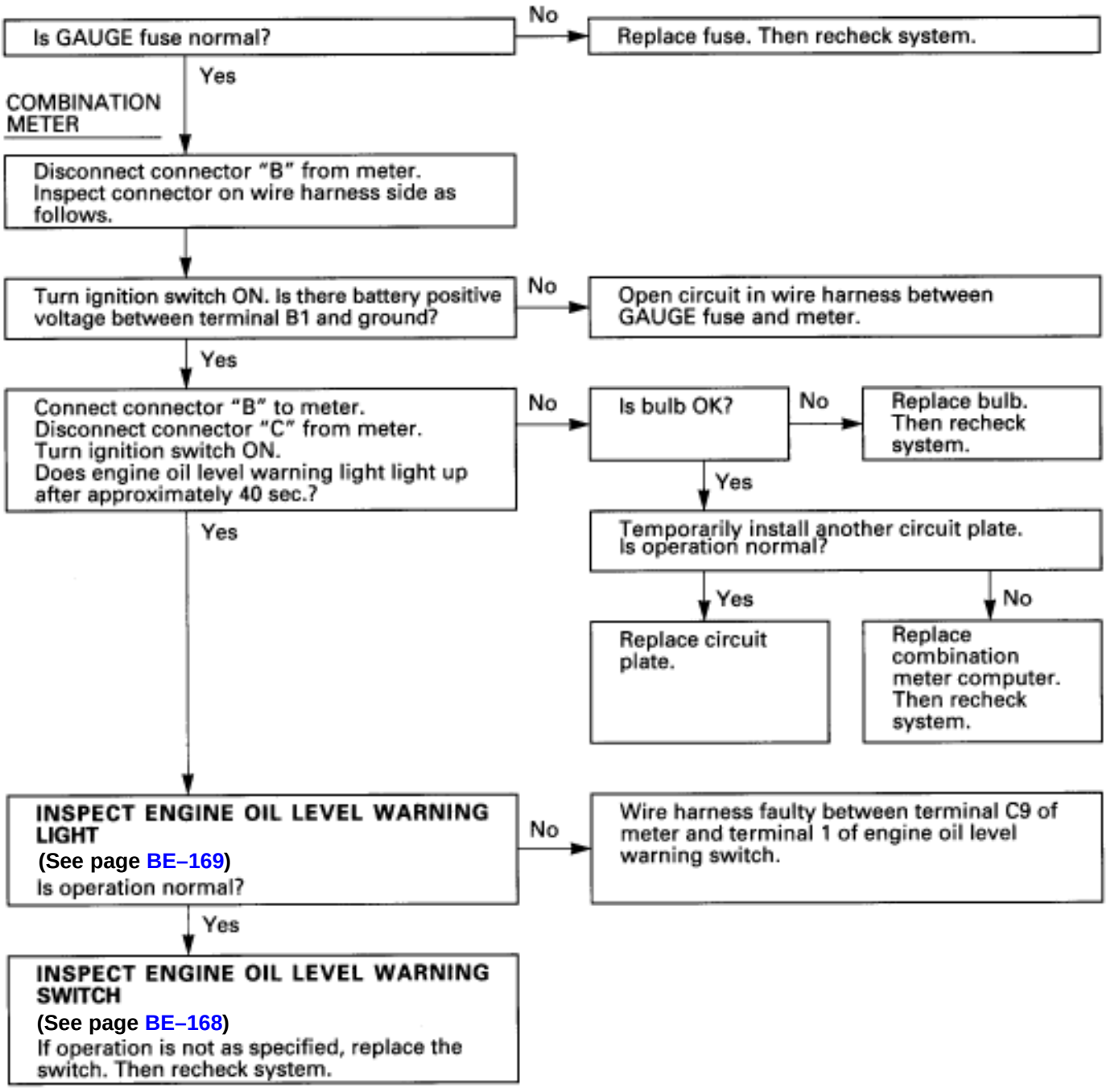
20	OPEN DOOR WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



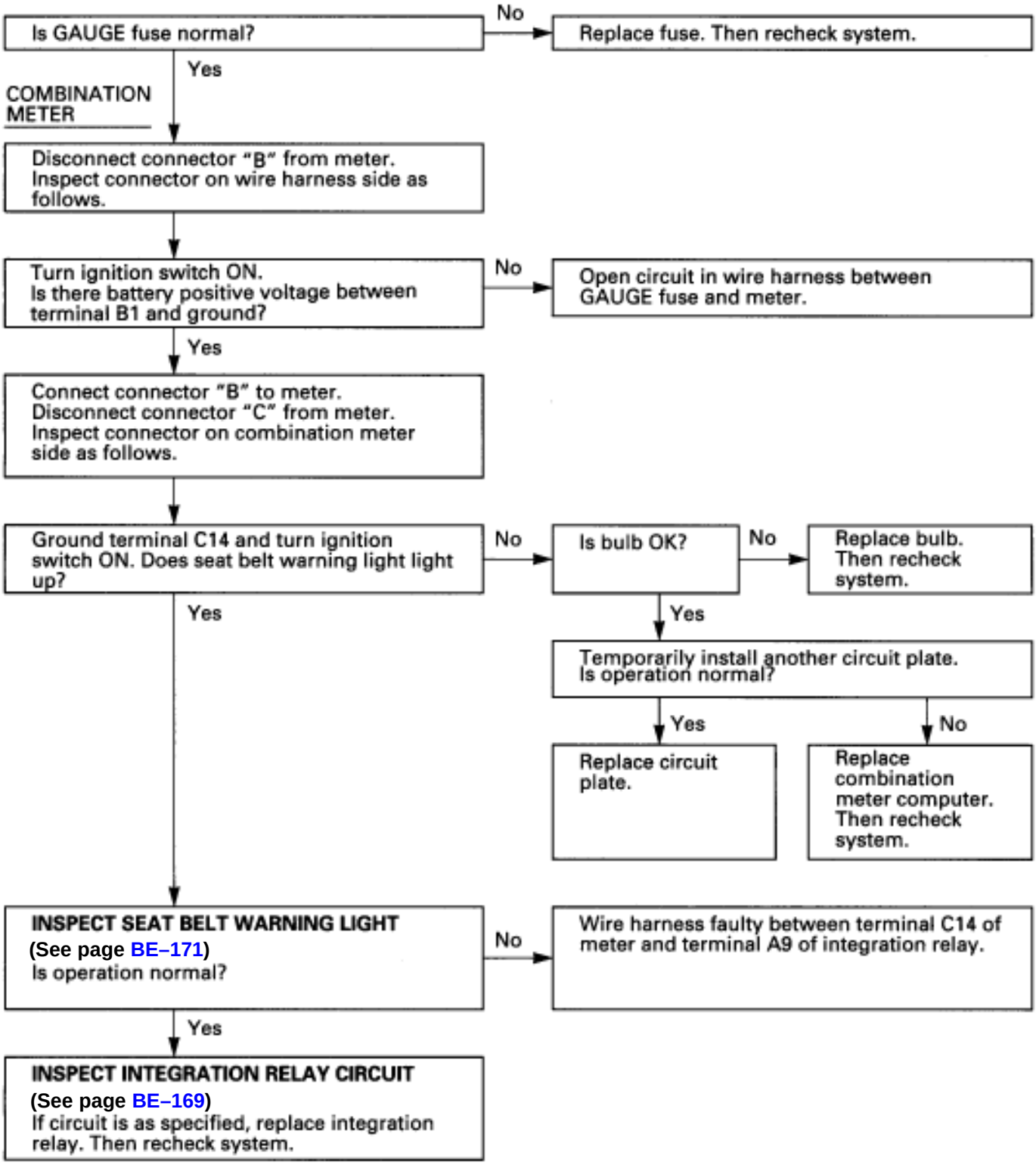
21	ENGINE OIL LEVEL WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



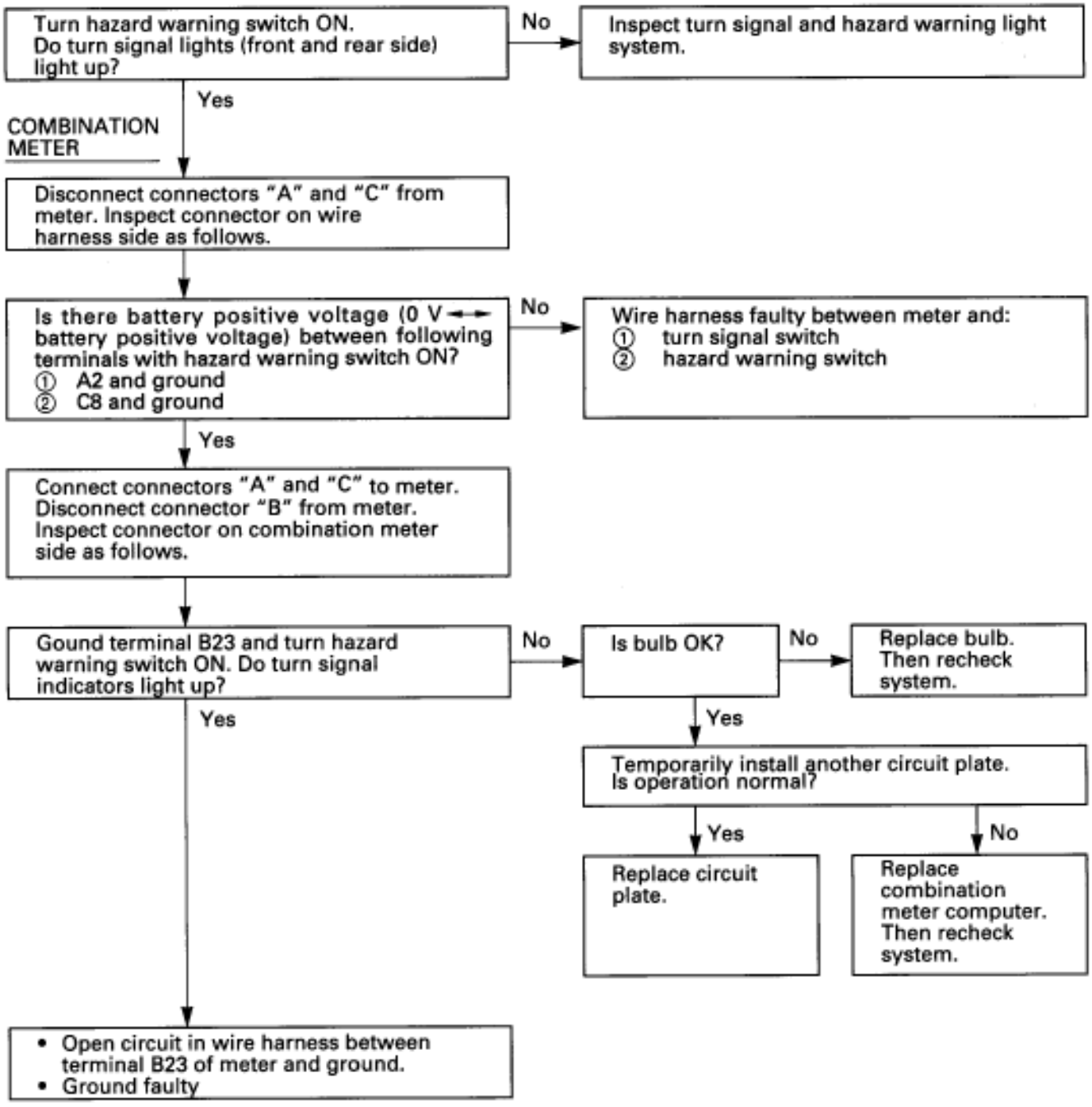
22	SEAT BELT WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



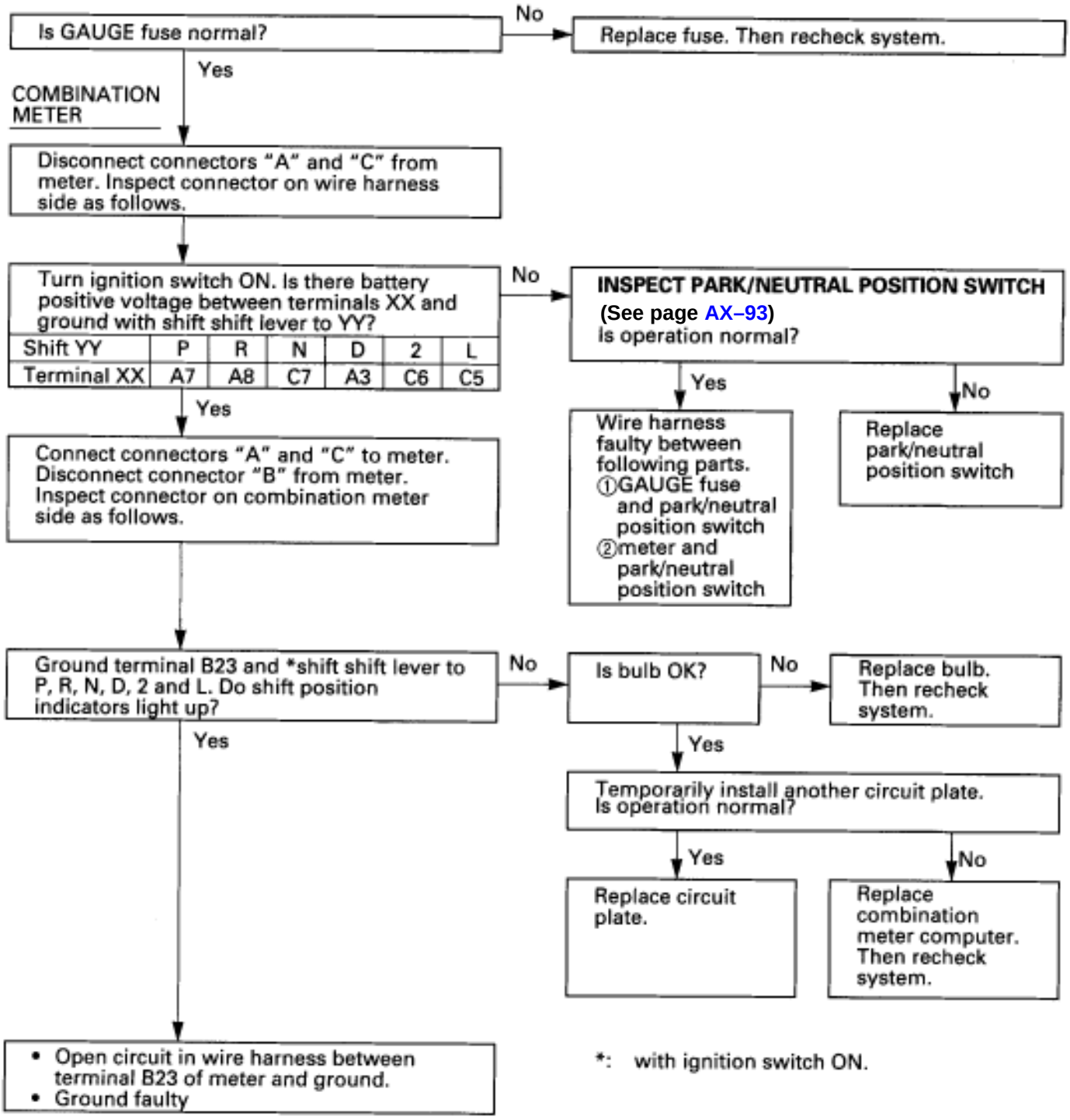
23	TURN SIGNAL INDICATOR	Abnormal operation or indicator does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



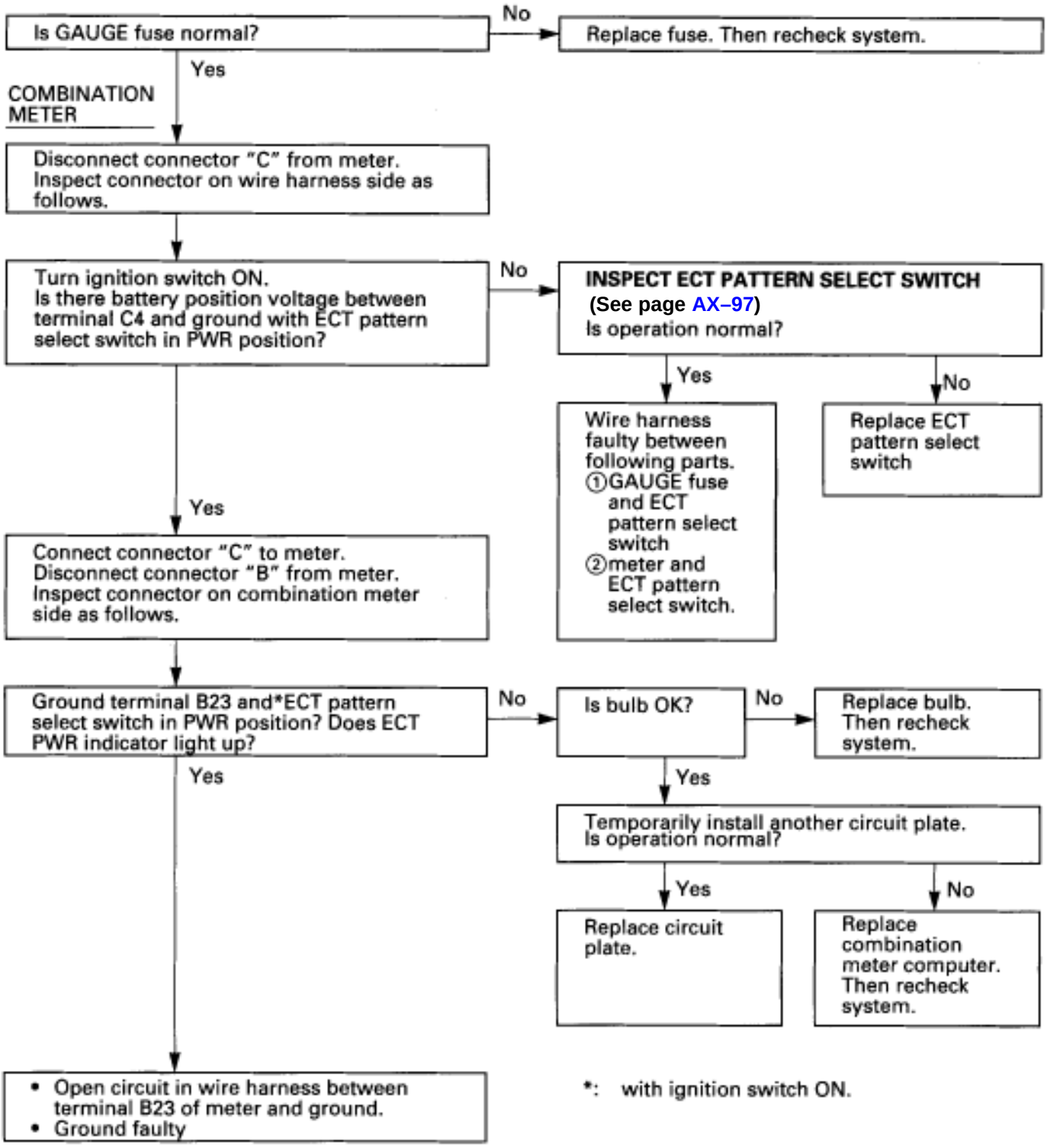
24	SHIFT POSITION INDICATOR	Abnormal operation or indicator does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



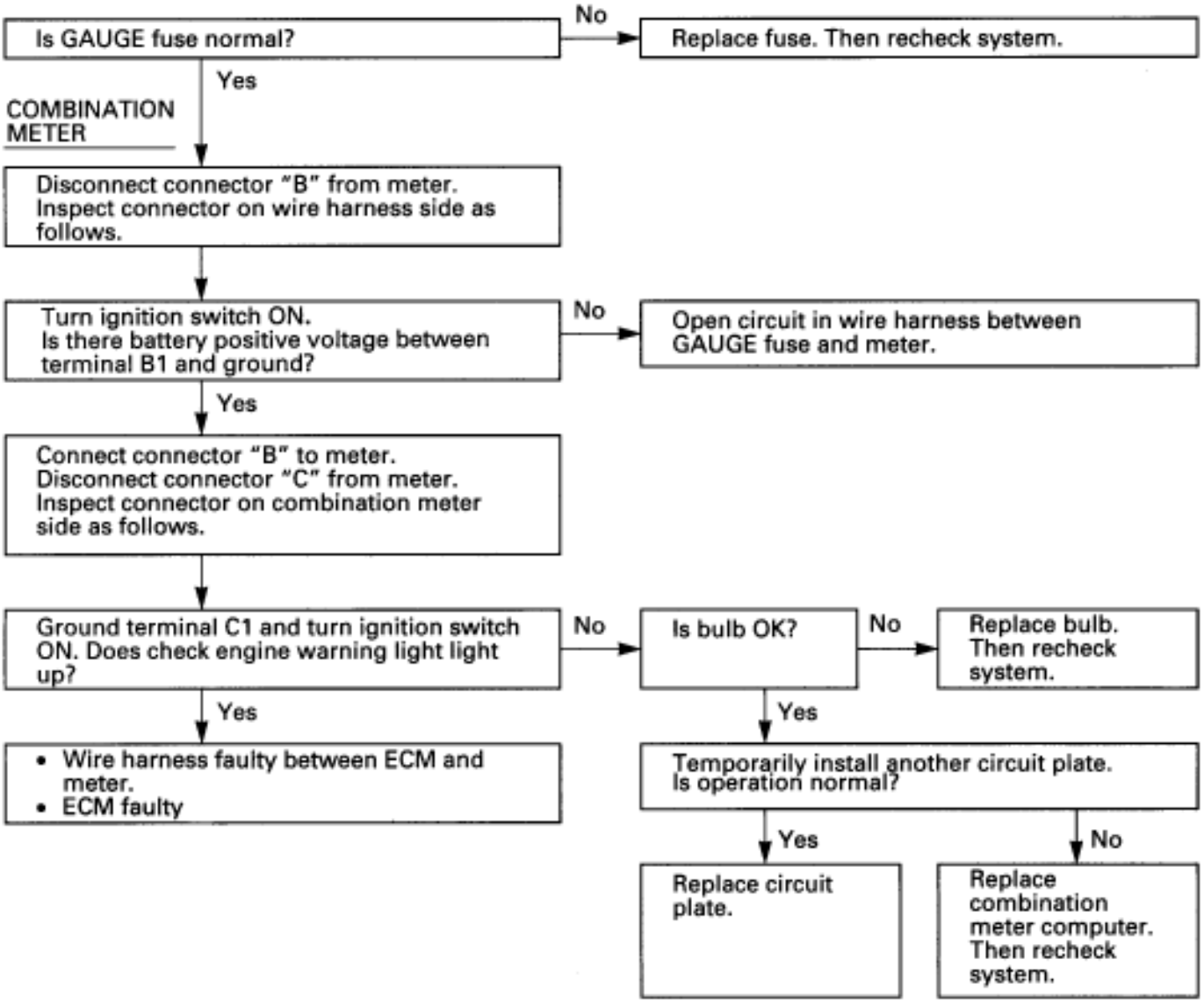
25	ECT PWR INDICATOR	Abnormal operation or indicator does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



27	**ABS WARNING**	**Abnormal operation or warning light does not light up.**

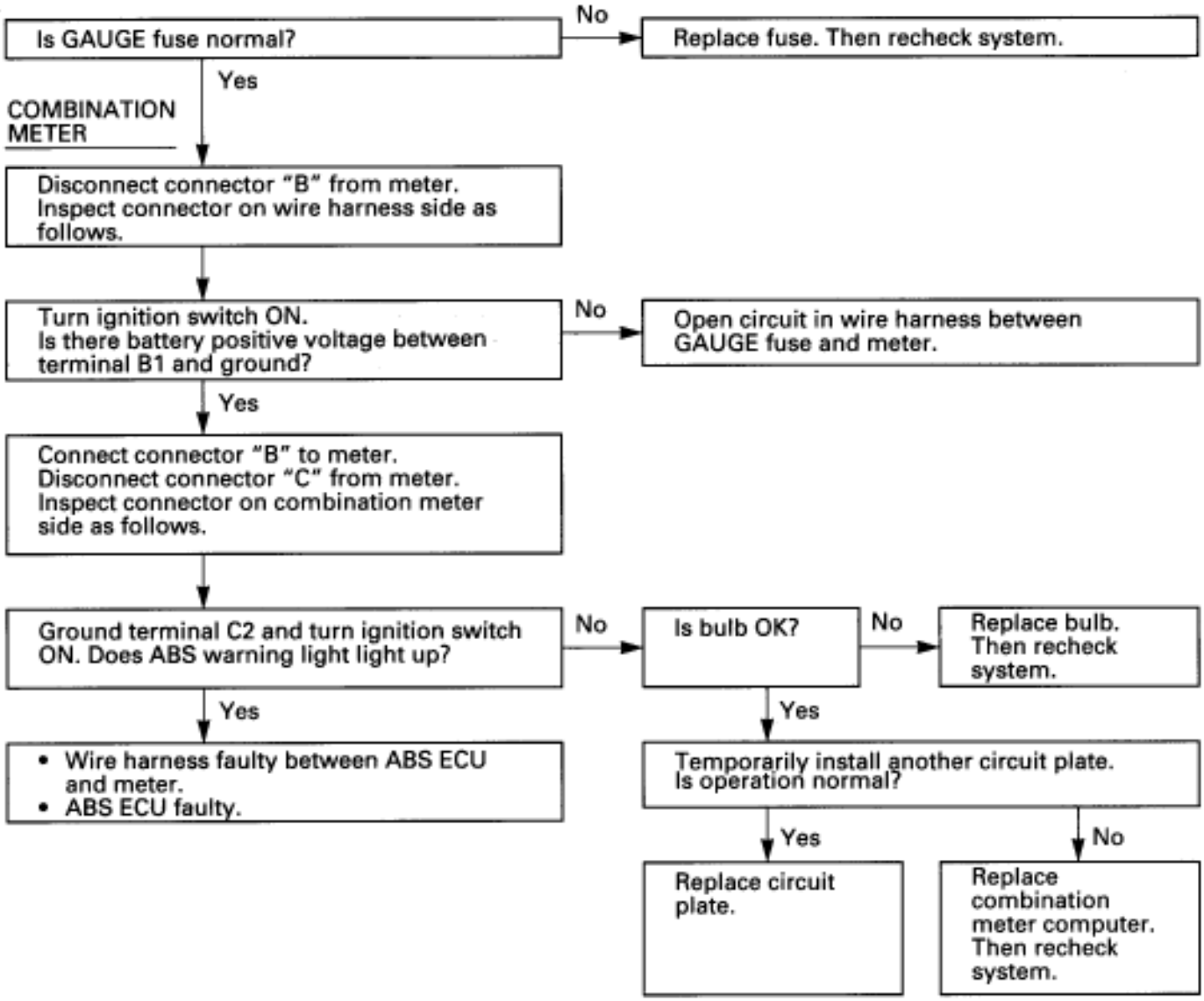
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



*: A/T vehicles.

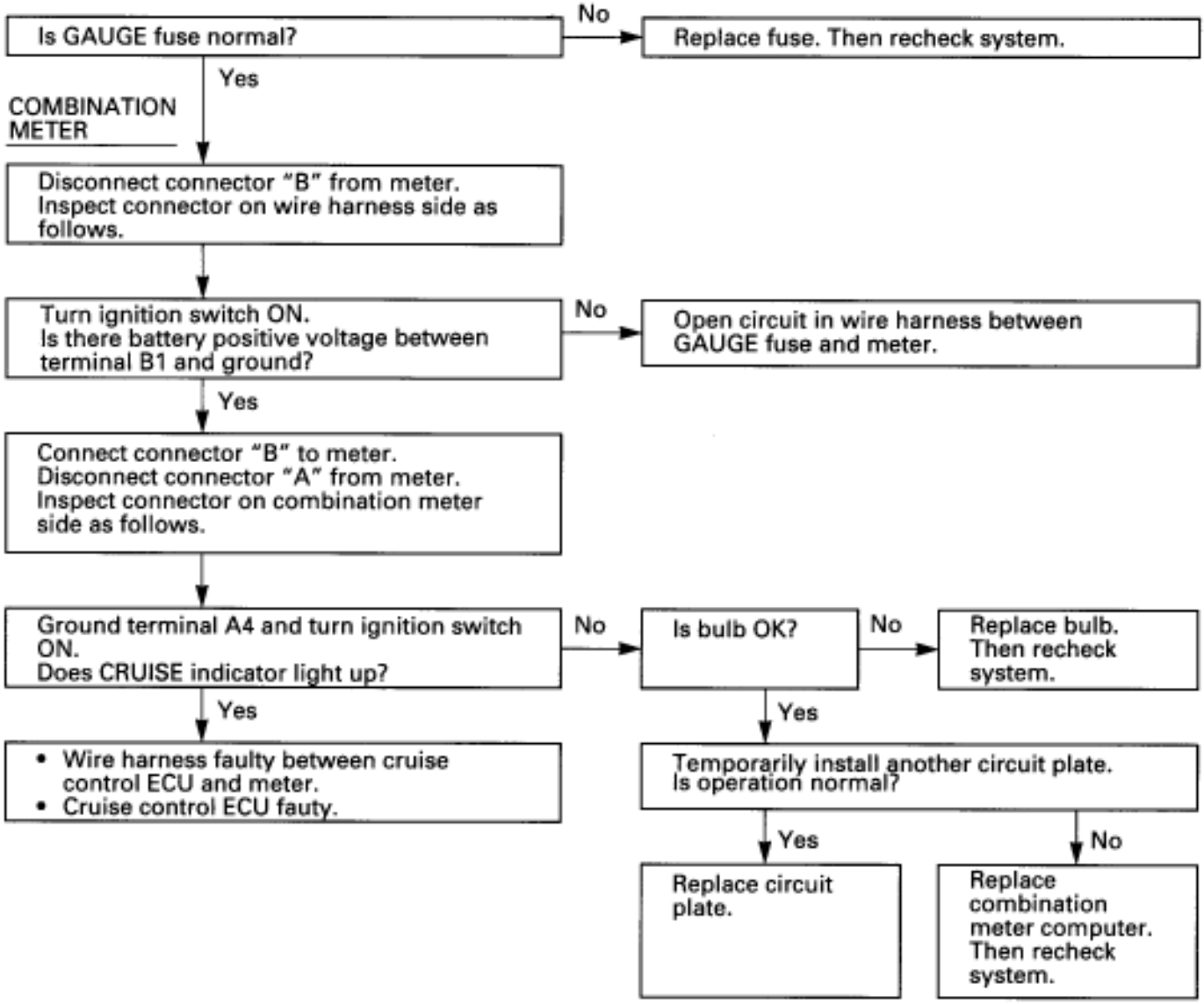
27	**ABS WARNING**	**Abnormal operation or warning light does not light up.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



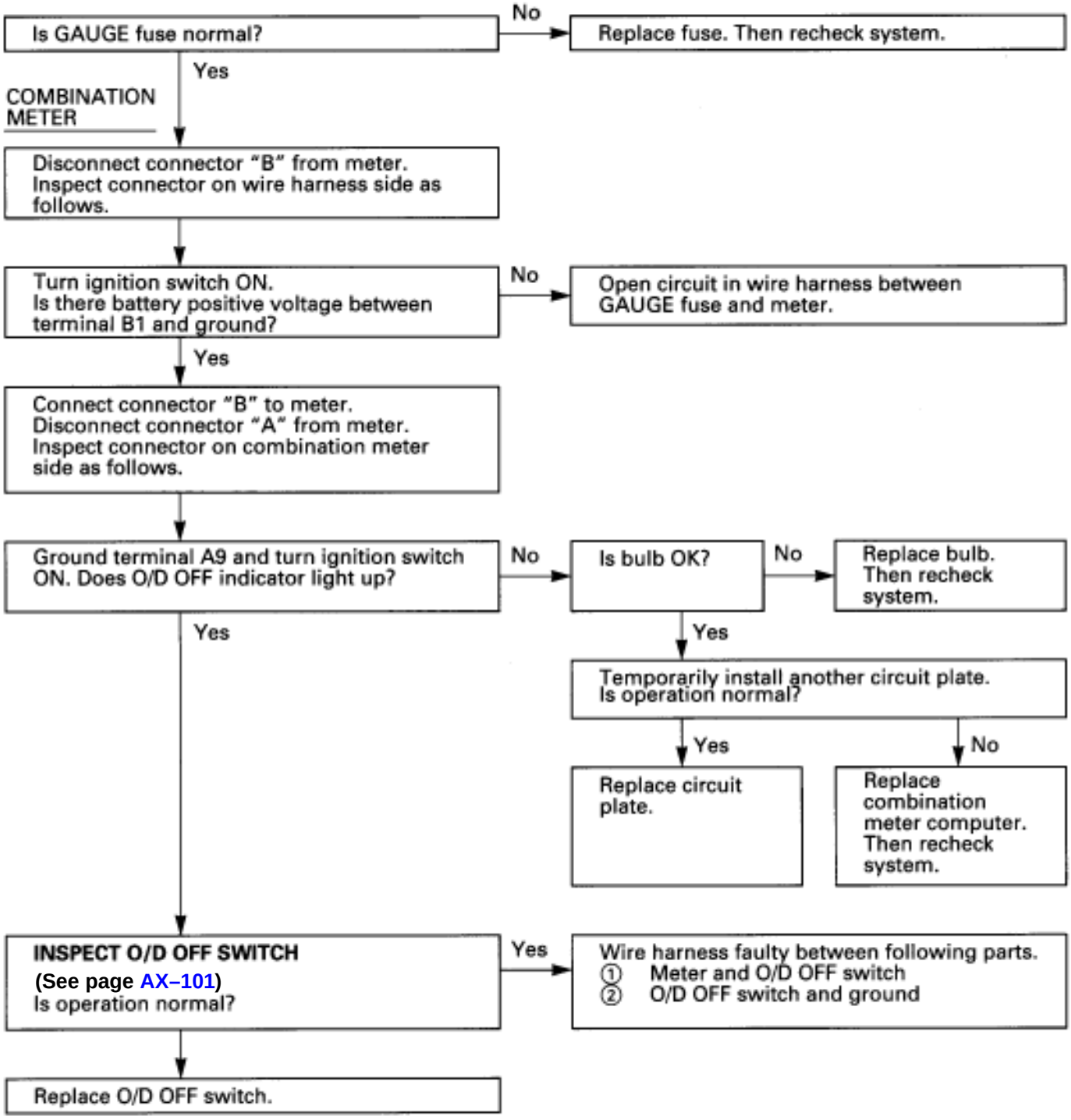
28	CRUISE INDICATOR	Abnormal operation or indicator does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



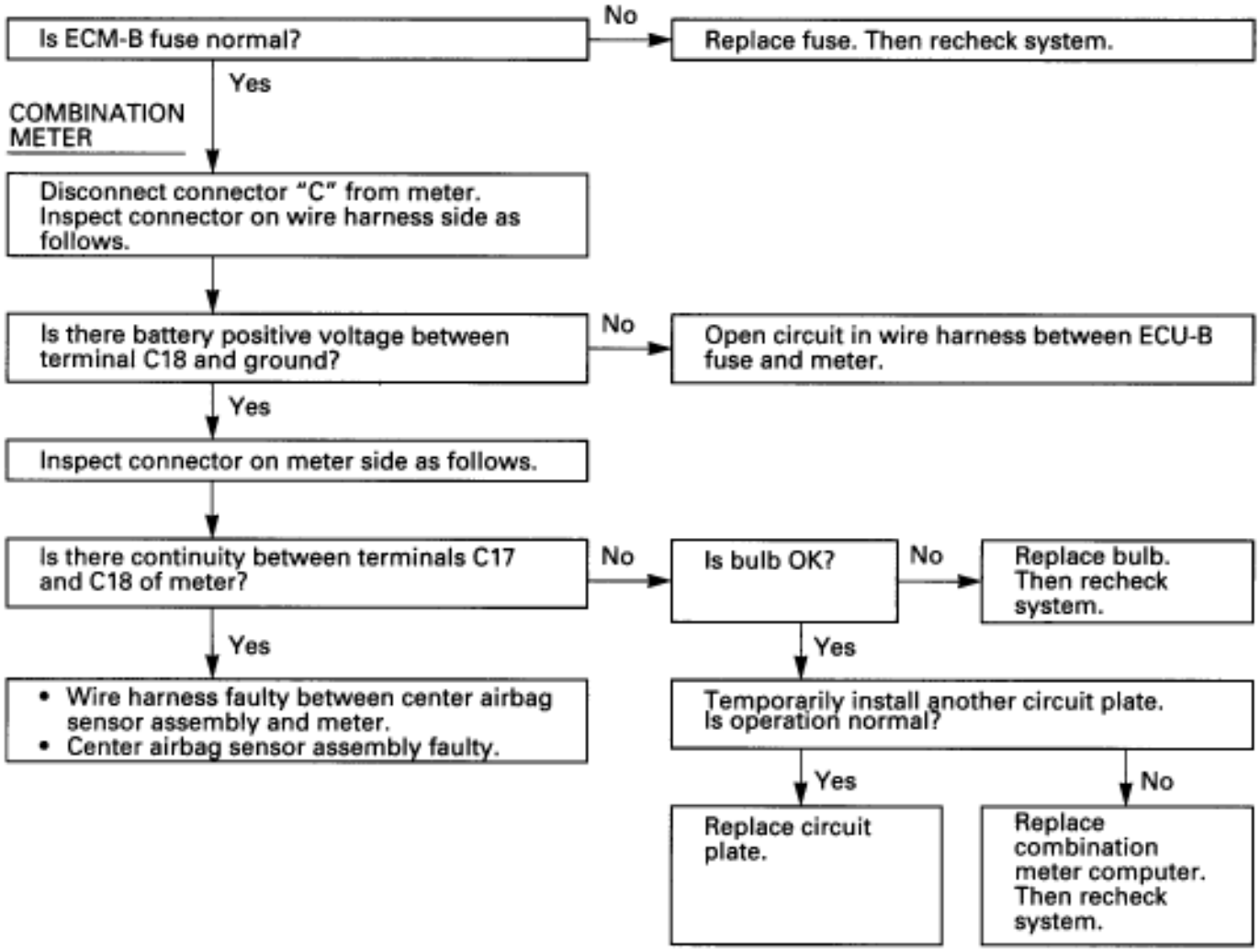
29	O/D OFF INDICATOR	Abnormal operation or indicator does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



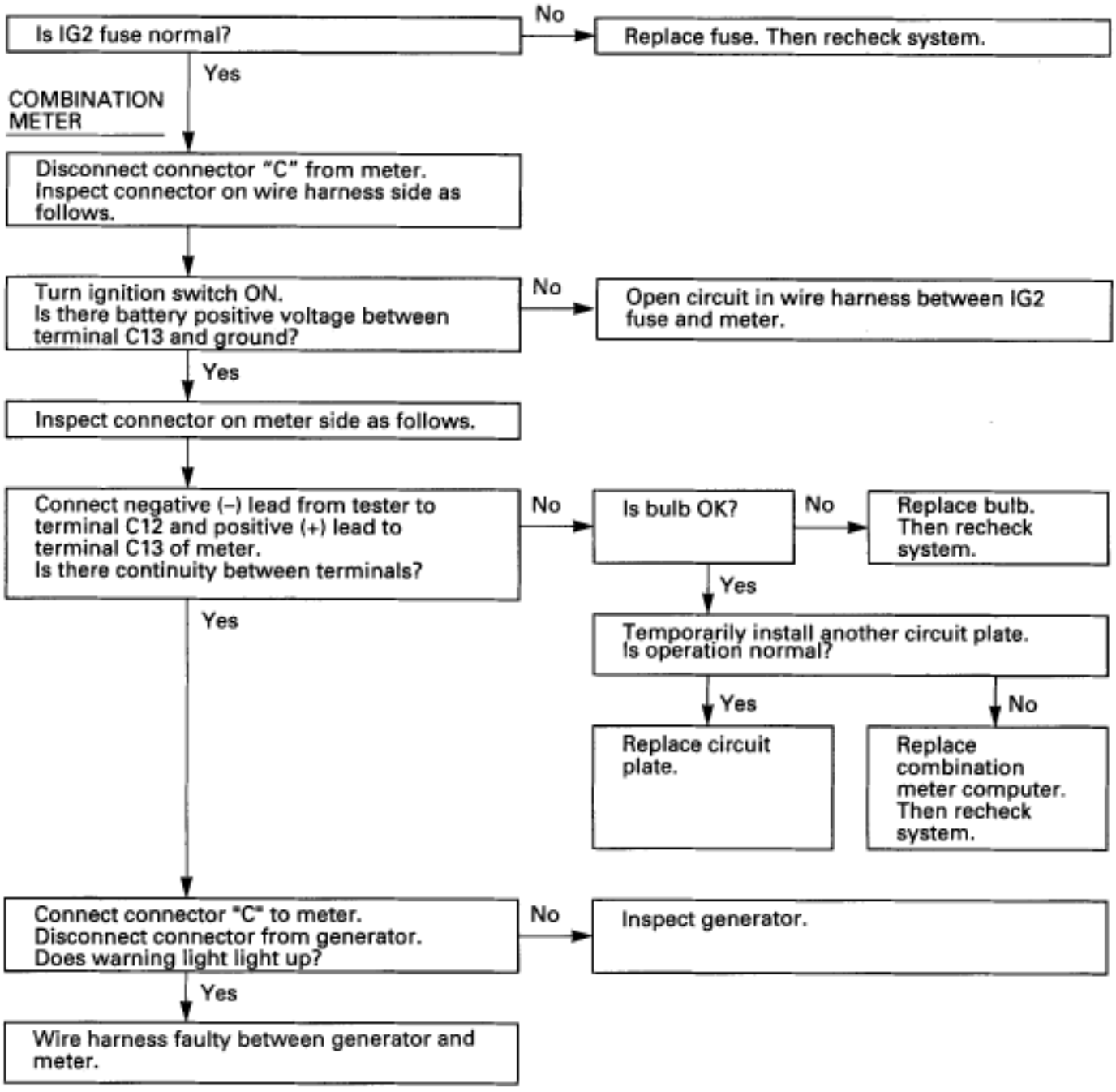
30	**AIRBAG WARNING**	**Abnormal operation or warning light does not light up.**

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



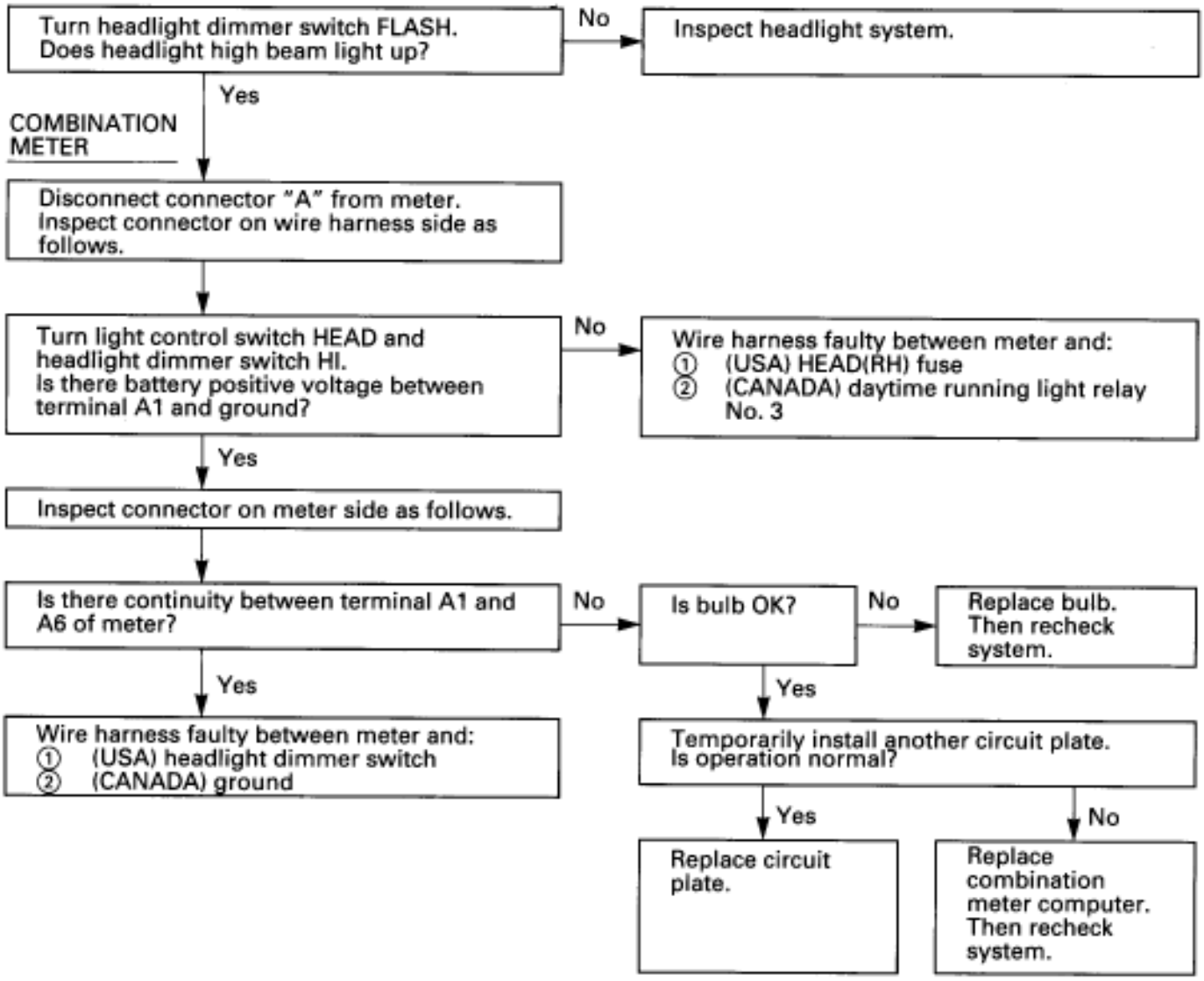
31	DISCHARGE WARNING	Abnormal operation or warning light does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



32	HIGH BEAM INDICATOR	Abnormal operation or indicator does not light up.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



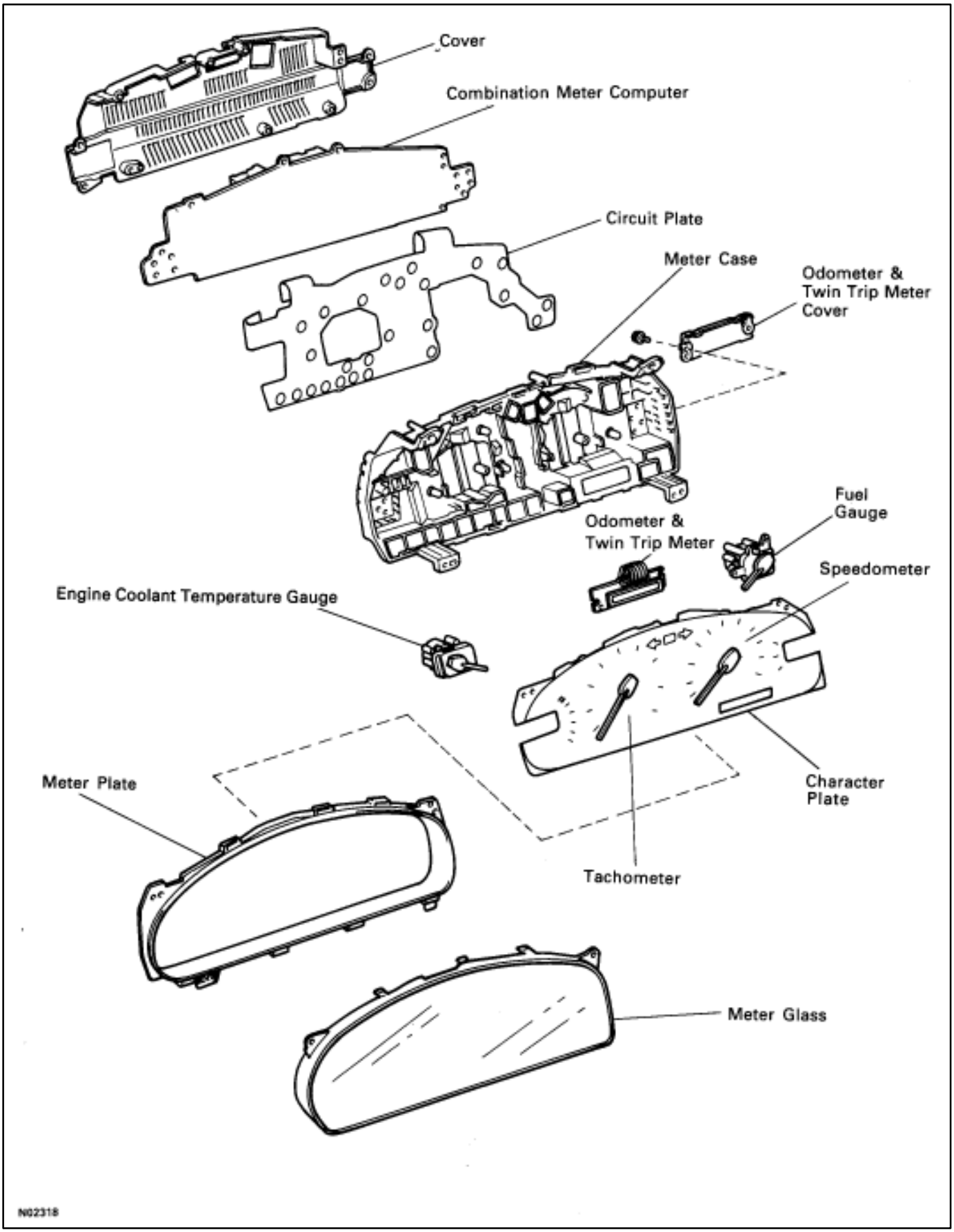
COMBINATION METER ASSEMBLY

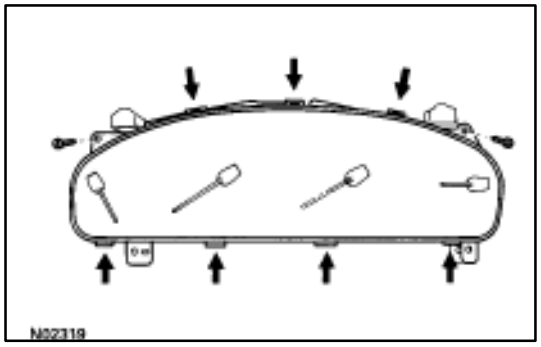
COMBINATION METER ASSEMBLY REMOVAL AND INSTALLATION

(See page BO–107)

COMBINATION METER DISASSEMBLY

(Components)

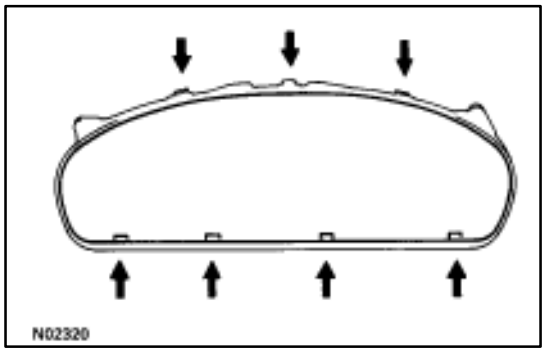




1. REMOVE METER PLATE WITH METER GLASS

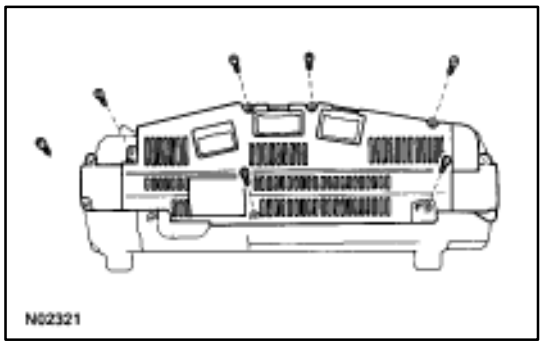
(a) Remove the two screws.

(b) Push down the seven locking lugs and remove the meter plate with the meter glass from the meter case.



2. REMOVE METER GLASS

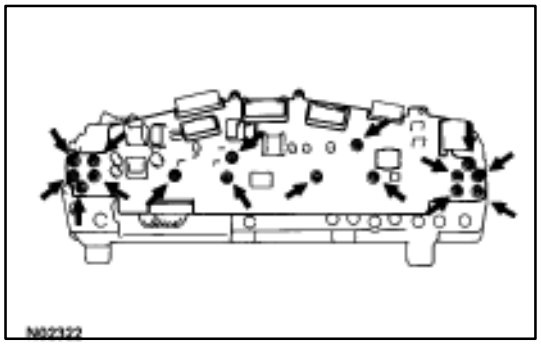
Push down the seven locking lugs and remove the meter glass from the meter plate.



3. REMOVE COVER

(a) Remove the seven screws.

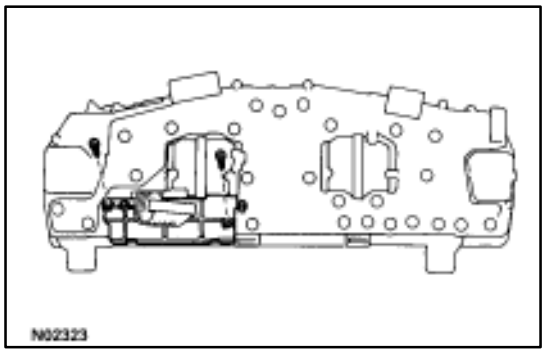
(b) Remove the cover from the meter case.



4. REMOVE COMBINATION METER COMPUTER

(a) Remove the three connectors.

(b) Remove the sixteen screws and the combination meter computer.



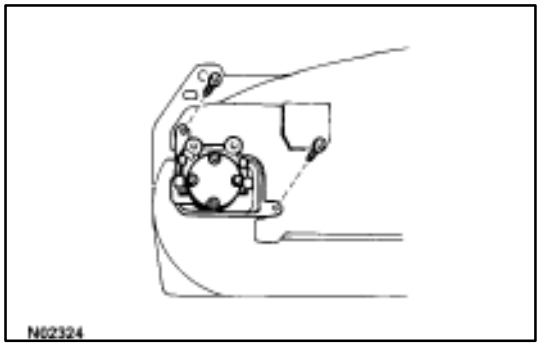
5. REMOVE ODOMETER & TWIN TRIP METER

Remove the two screws and the odometer & twin trip meter.

6. REMOVE CIRCUIT PLATE

(a) Remove the bulbs.

(b) Remove the circuit plate from the case.

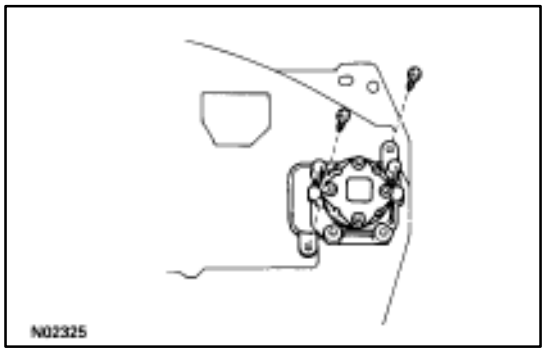


7. REMOVE CHARACTER PLATE

Remove the character plate from the case.

8. REMOVE FUEL GAUGE

Remove the two screws and the fuel gauge.

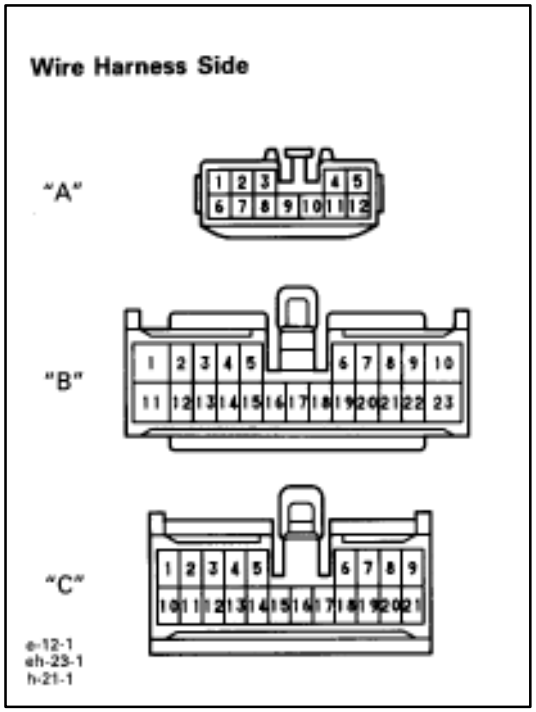


9. REMOVE ENGINE COOLANT TEMPERATURE GAUGE

Remove the two screws and the engine coolant temperature gauge.

COMBINATION METER ASSEMBLY

For installation, follow the removal procedure in reverse.



COMBINATION METER ASSEMBLY INSPECTION

1. INSPECT COMBINATION METER WIRING CIRCUIT

Disconnect connector "A", connector "B" and connector "C" from the combination meter and inspect the connectors on the wire harness side as follows.

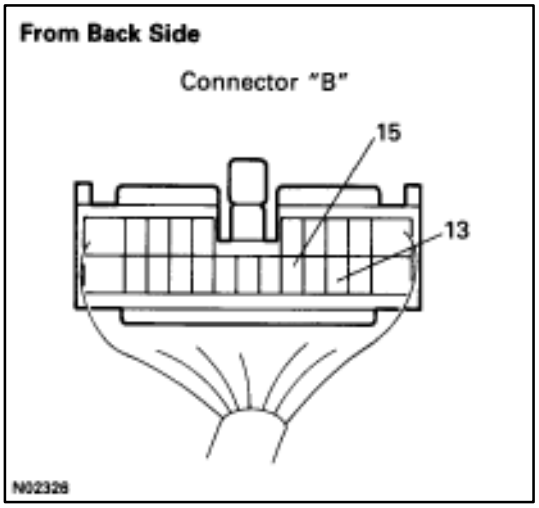
Connection	Check for	Tester connection	Condition		Specified value
*1 HEAD (RH) Fuse	Voltage	A1 – Ground	Light control switch HEAD	Headlight dimmer switch LO	No voltage
				Headlight dimmer switch HI or FLASH	Battery positive voltage
*2 Daytime running light relay No.3	Voltage	A1 – Ground	Light control switch HEAD	Headlight dimmer switch LO	No voltage
				Headlight dimmer switch HI or FLASH	Battery positive voltage
Turn signal switch and hazard warning switch	Voltage	A2 – Ground	Hazard warning switch ON		Battery positive voltage ↔ 0 V
			Ignition switch ON and turn signal switch RIGHT		Battery positive voltage ↔ 0 V
	Voltage	C8 – Ground	Hazard warning switch ON		Battery positive voltage ↔ 0 V
			Ignition switch ON and turn signal switch LEFT		Battery positive voltage ↔ 0 V
Park/neutral position switch	Voltage	A7 – Ground	Ignition switch ON and shift lever position	P	Battery positive voltage
		A8 – Ground		R	Battery positive voltage
		C7 – Ground		N	Battery positive voltage
		A3 – Ground		D	Battery positive voltage
		C6 – Ground		2	Battery positive voltage
		C5 – Ground		L	Battery positive voltage
Fuel sender gauge	Continuity	A5 – Ground	Fuel remainder	Full	No continuity
				Empty	Continuity
	Resistance	B7 – B8	Float position	Full, Approx. 35 mm (1.38 in.)	Approx. 3 Ω
				1/2, Approx. 91 mm (3.58 in.)	Approx. 31 Ω
				Empty, Approx. 157 mm (6.18 in)	Approx. 110 Ω
*1 Headlight dimmer switch	Continuity	A6 – Ground	Headlight dimmer switch position	LO	No continuity
				HI or FLASH	Continuity
*2 Ground	Continuity	A6 – Ground	Constant		Continuity

*1: USA models *2: CANADA models

Connection	Check for	Tester connection	Condition		Specified value
O/D OFF switch	Continuity	A9 – Ground	O/D OFF switch position	ON	Continuity
				OFF	No continuity
GAUGE fuse	Voltage	B1 – Ground	Ignition switch position	Lock or ACC	No voltage
				ON	Battery positive voltage
Rheostat light control volume and Rheostat light control	Voltage	B2 – Ground	Light control switch TAIL or HEAD and rheostat volume switch position	OFF (rotate the switch away from you until it stops)	No voltage
				ON (any position other than OFF	Battery positive voltage
	Voltage	B4 – Ground	Light control switch TAIL or HEAD and rotate rheostat volume switch		Voltage changes from approx. 0 V to 5 V.
Igniter	Voltage	B9 – Ground	Engine running		Voltage fluctuates
Ground	Continuity	B10 – Ground	Constant		Continuity
DOME fuse	Voltage	B11 – Ground	Constant		Battery positive voltage
STARTER fuse	Voltage	B12 – Ground	Ignition switch position	Lock or ACC or ON	No voltage
				START	Battery positive voltage
Odometer & Twin Trip Switch	Continuity	B15 – B19	ODO/TRIP switch position	OFF (switch free)	No continuity
				ON (switch pushed in)	Continuity
	Continuity	B15 – B20	RESET switch position	OFF (switch free)	No continuity
				ON (switch pushed in)	Continuity
Ground	Continuity	B22 – Ground	Constant		Continuity
Ground	Continuity	B23 – Ground	Constant		Continuity
ECT pattern select switch	Voltage	C4 – Ground	Ignition switch ON and ECT pattern select switch position	NORM	No voltage
				PWR	Battery positive voltage
Engine oil level warning switch	Continuity	C9 – Ground	Oil temperature below approx. 55°C(131°F)		Continuity
			Oil temperature above approx. 55°C (131°F) and switch position	ON (float up)	Continuity
				OFF (float down)	No continuity
Generator	Continuity	C12 – Ground	Engine stop		Continuity
	Voltage		Engine running		Battery positive voltage
IG2 fuse	Voltage	C13 – Ground	Ignition switch position	LOCK or ACC	No voltage
				ON	Battery positive voltage
Low oil pressure warning switch	Continuity	C15 – Ground	Engine condition	Running	No continuity
				Stop	Continuity

Connection	Check for	Tester connection	Condition		Specified value
Brake fluid level warning switch and parking brake switch	Continuity	C16 – Ground	Brake fluid level warning switch	ON (float down)	Continuity
				OFF (float up)	No continuity
			Parking brake lever	Pulled up (ON)	Continuity
				Released (OFF)	No continuity
ECM-B fuse	Voltage	C18 – Ground	Constant		Battery positive voltage
Door courtesy switch	Continuity	C19 – Ground	Driver's and passenger's door	Open (ON)	Continuity
				Closed (OFF)	No continuity

If circuit is not as specified, refer to BE–115 wiring diagram and inspect the circuits connected to other parts.



2. INSPECT VEHICLE SPEED SIGNAL

(a) Remove the combination meter with connector connected.
(b) Connect the positive (+) lead from the tester to terminal B13 and the negative (–) lead to terminal B15.
(c) (A/T vehicles)
Shift the shift lever to N range.
(M/T vehicles)
Shift the shift lever to neutral position.
(d) Jack up the front wheel on one side.
(e) Turn ignition switch on.
(f) Revolve the wheel.
(g) Check that there is voltage between terminal B13 and B15 changes from approx. 0 V to 12 V.
If operation is not as specified, inspect speed sensor or wire harness.

(mph/USA)

Standard indication	Allowable range
20	19 – 22
40	39 – 42.5
60	59 – 63
80	79 – 83.5
100	99 – 104
120	119 – 124.5

(km/h/CANADA)

Standard indication	Allowable range
20	19 – 24
40	39 – 43
60	59 – 63.5
80	79 – 84
100	99 – 104
120	119 – 124.5
140	139 – 145
160	159 – 166
180	179 – 187
200	199 – 208

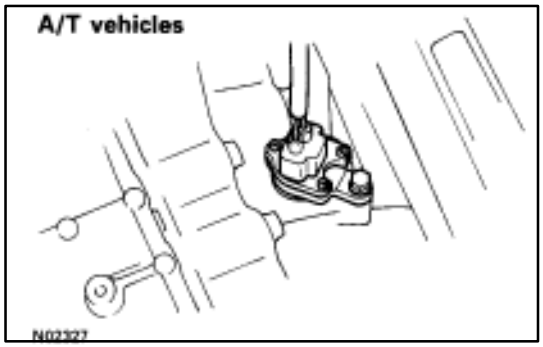
SPEEDOMETER SYSTEM
SPEEDOMETER INSPECTION

(ON–VEHICLE)

Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT: Tire wear and tire over or under inflation will increase the indication error.

If error is excessive, replace the speedometer.



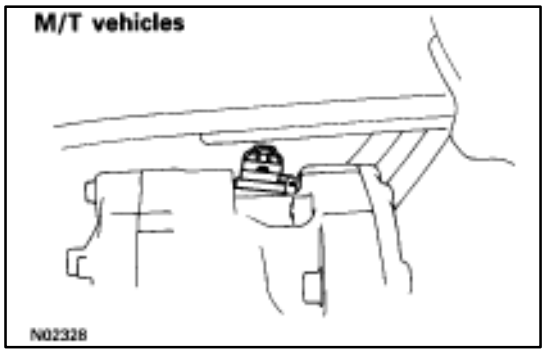
SPEED SENSOR REMOVAL AND INSTALLATION

1. REMOVE SPEED SENSOR

(A/T vehicles)

(a) Disconnect the connector.

(b) Remove a bolt and the sensor.



(M/T vehicles)

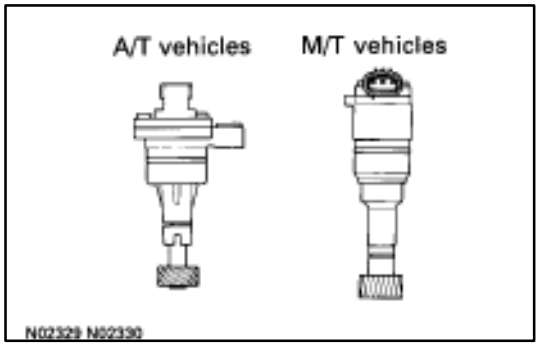
(a) Jack up the vehicle.

(b) Disconnect the connector.

(c) Remove a bolt and the sensor.

2. INSTALL SPEED SENSOR

For installation, follow the removal procedure in reverse.



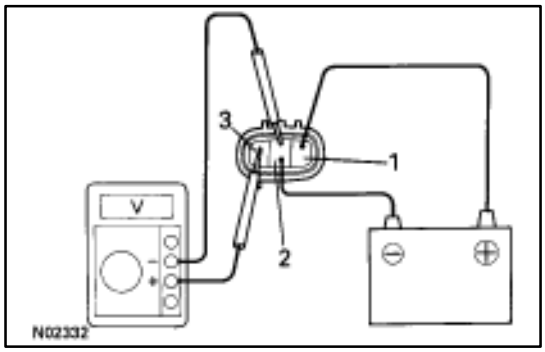
SPEED SENSOR INSPECTION

(Operation)

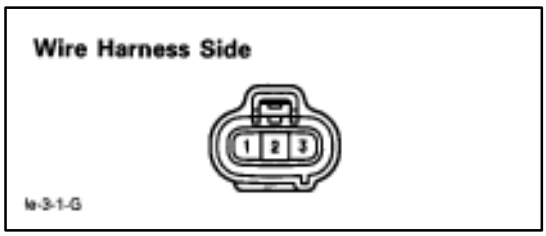
(a) Connect the positive (+) lead from battery to terminal 1 and negative (–) lead to terminal 2.

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

(c) Revolve shaft.



(d) Check that there is voltage change from approx. 0 V to 11 V or more between terminal 2 and 3.
HINT: The voltage change should be 4 times per each revolution of the speed sensor shaft.
If operation is not as specified, replace the sensor.



(Sensor circuit)

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

Check for	Tester connection	Condition		Specified value
Voltage	1–Ground	Ignition switch position	ON	Battery positive voltage
			LOCK or ACC	No voltage

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

DC 13.5 V, 25°C (77°F) rpm	
Standard indication	Allowable range
700	630 – 770
1000	915 – 1115
2000	1920 – 2220
3000	2890 – 3350
4000	3940 – 4400
5000	5025 – 5425
6500	6650 – 6950
7000	7025 – 7625

TACHOMETER SYSTEM

TACHOMETER INSPECTION

(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.

(b) Compare the tester and tachometer indications.
If error is excessive, replace the tachometer.

ODOMETER & TWIN TRIP SYSTEM

ODOMETER & TWIN TRIP SWITCH REMOVAL AND INSTALLATION

1. REMOVE ODOMETER & TWIN TRIP SWITCH
(See page BO–107)

(a) Remove the cluster finish panel

(b) Remove the odometer & twin trip switch from the cluster finish panel.

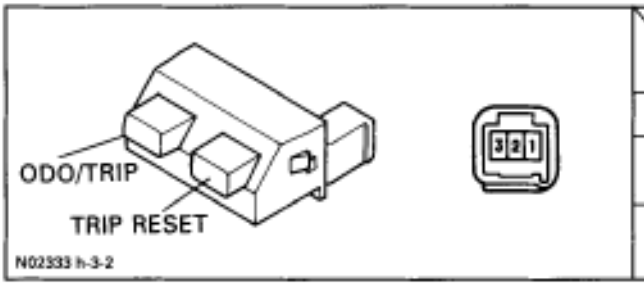
2. INSTALL ODOMETER & TWIN TRIP SWITCH

For installation follow the removal procedure in reverse.

ODOMETER & TWIN TRIP SWITCH INSPECTION

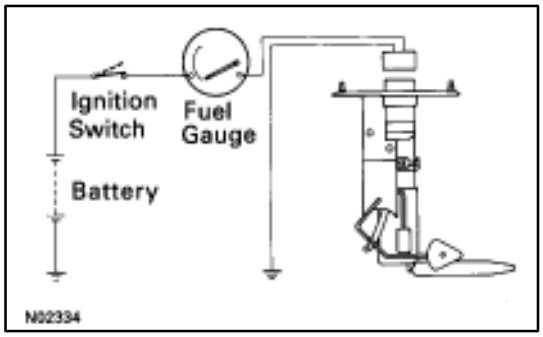
(Continuity)

Inspect continuity between terminals.



Terminals / Switch position	1	2	3
OFF (Switch free)			
ODO/TRIP switch ON (Switch pushed in)		○	○
TRIP RESET switch ON (Switch pushed in)	○		○

If continuity is not as specified, replace the switch.



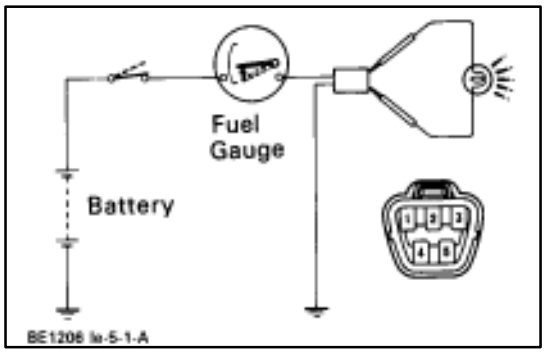
FUEL GAUGE SYSTEM

FUEL RECEIVER GAUGE INSPECTION

(Operation)

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

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

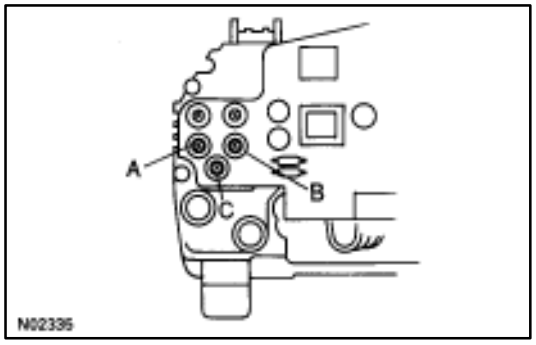


(c) Connect terminals 2 and 3 on the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and receiver gauge needle moves toward the full side.

HINT: Because of the silicon oil in the gauge, it will take a short time for the needle to stabilize.

If operation is not as specified, inspect the receiver gauge resistance.

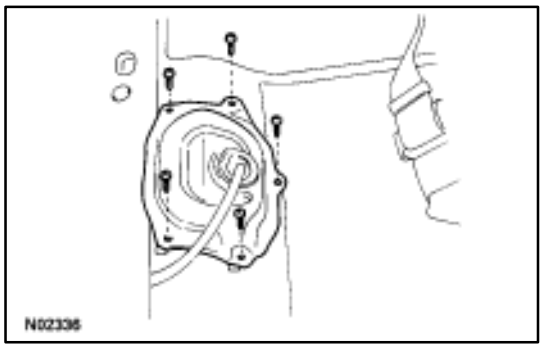


(Resistance)

Measure the resistance between terminals.

Between terminals	Resistance (Ω)
A – B	Approx. 126
A – C	Approx. 102
B – C	Approx. 228

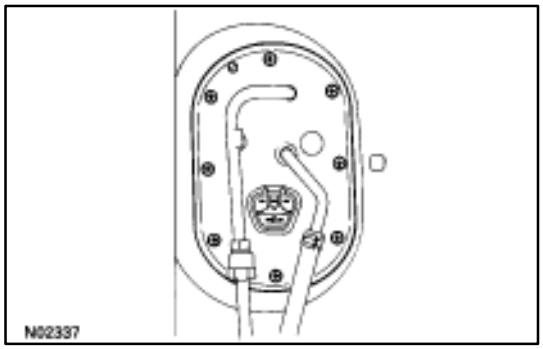
If resistance value is not as specified, replace the fuel receiver gauge.



FUEL SENDER GAUGE REMOVAL AND INSTALLATION

1. REMOVE FUEL SENDER GAUGE

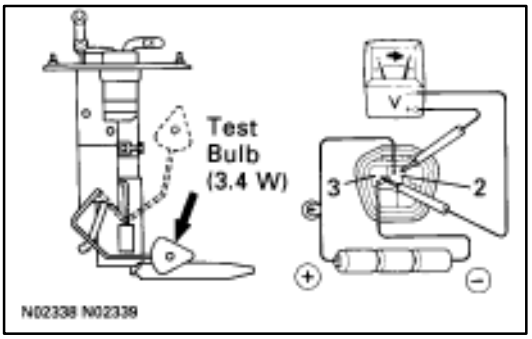
(a) Remove the rear seat.
(b) Remove the five screws and the cover.
(c) Disconnect the connector



(d) Remove the eight screws and the fuel sender gauge assembly.

2. INSTALL FUEL SENDER GAUGE

For installation follow the removal procedure in reverse.



FUEL SENDER GAUGE INSPECTION

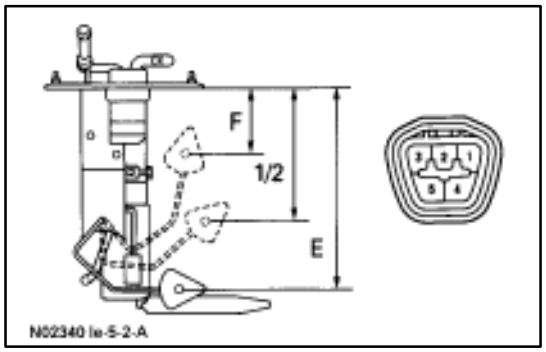
(Operation)

(a) Connect a series of three 1.5 V dry cell batteries.

(b) Connect the positive (+) lead from the dry cell batteries to terminal 2 through a 3.4 W test bulb and the negative (–) lead to terminal 3.

(c) Check that the voltage rises between terminals 2 and 3 as the float is moved from the top to bottom position.

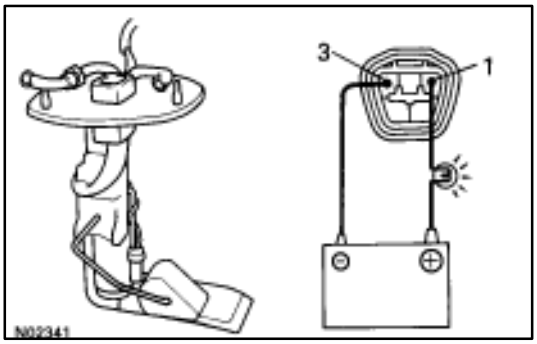
(Resistance)



Measure the resistance between terminals 2 and 3 for each float position.

Float position mm(in.)		Resistance (Ω)
F	Approx. 35 (1.38)	Approx. 3
1/2	Approx. 91 (3.58)	Approx. 31
E	Approx. 157 (6.18)	Approx. 110

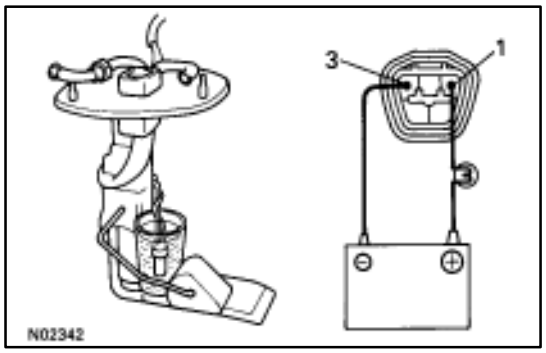
If resistance value is not as specified, replace the sender gauge.



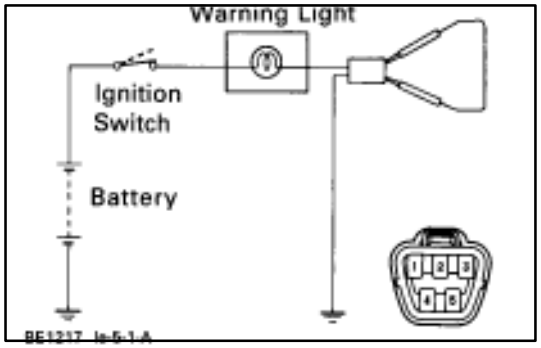
FUEL LEVEL WARNING SYSTEM

FUEL LEVEL WARNING SWITCH INSPECTION

(a) Apply battery voltage between terminals 1 and 3 through a 3.4 W test bulb, check that the bulb lights up.
HINT: It will take a short time for the bulb to light up.

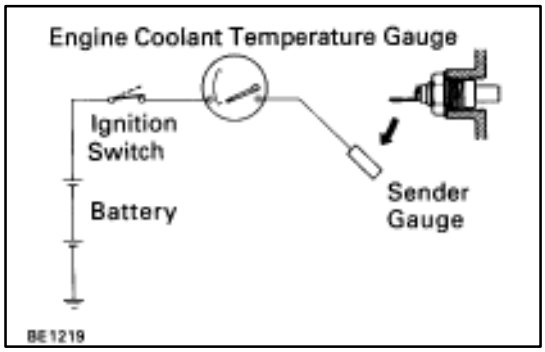


(b) Submerge the switch in fuel, check that the bulb goes out.
If operation is not as specified, replace the sender gauge.



FUEL LEVEL WARNING LIGHT INSPECTION

(a) Disconnect the connector from the sender gauge.
(b) Connect terminals 1 and 3 on the wire harness side connector.
(c) Turn the ignition switch ON, check that the warning light lights up.
If the warning light does not light up, test the bulb or inspect wire harness.

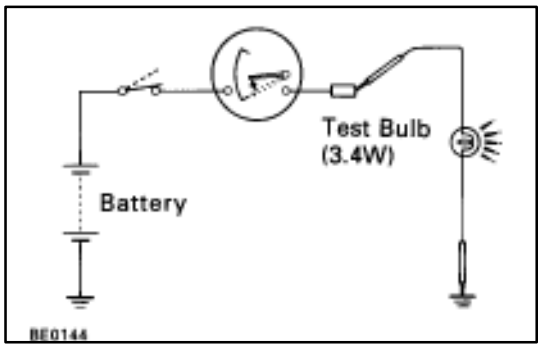


ENGINE COOLANT TEMPERATURE GAUGE SYSTEM

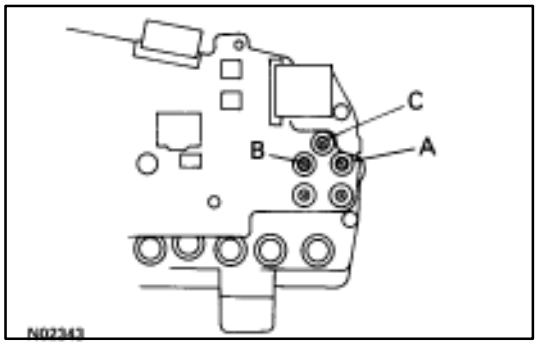
ENGINE COOLANT TEMPERATURE RECEIVER GAUGE INSPECTION

(Operation)

(a) Disconnect the connector from the sender gauge.
(b) Turn the ignition switch ON, check that the receiver gauge needle indicates COOL.



(c) Ground terminal on the wire harness side connector through a 3.4 W test bulb.
(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves toward the hot side.
If operation is as specified, replace the sender gauge. Then recheck the system.
If operation is not as specified, measure the receiver gauge resistance.

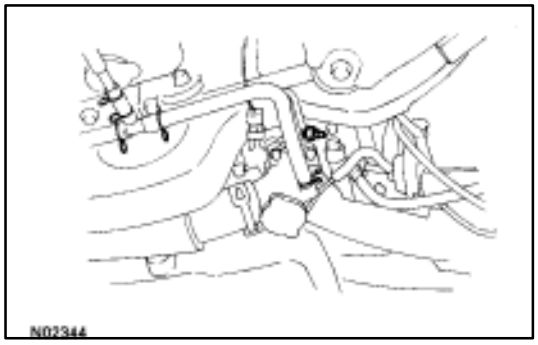


(Resistance)

Measure the resistance between terminals.
HINT: Connect the test leads so that the current from the ohmmeter can flow according to the chart order.

Between terminals	Resistance (Ω)
A – B	Approx. 54
A – C	Approx. 230
B – C	Approx. 176

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



ENGINE COOLANT TEMPERATURE SENDER GAUGE REMOVAL AND INSTALLATION

1. REMOVE ENGINE COOLANT TEMPERATURE SENDER GAUGE

(a) Disconnect the connector from the sender gauge.

(b) Remove the sender gauge.

NOTICE: Do not remove when engine is hot.

2. INSTALL ENGINE COOLANT TEMPERATURE SENDER GAUGE

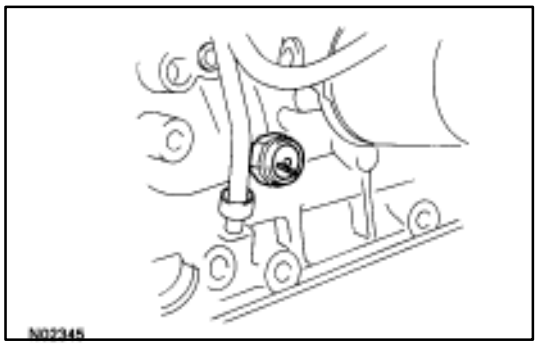
(a) Apply liqued sealant to the bolt threads.

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

(b) Install and torque the sender gauge.

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

(c) Connect the connector.



LOW OIL PRESSURE WARNING SYSTEM

LOW OIL PRESSURE WARNING SWITCH REMOVAL AND INSTALLATION

1. REMOVE LOW OIL PRESSURE WARNING SWITCH

(a) Disconnect the connector from the switch.

(b) Remove the switch.

2. INSTALL LOW OIL PRESSURE WARNING SWITCH

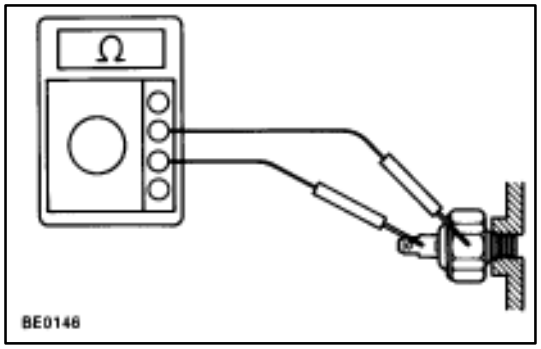
(a) Apply liquid sealant to the bolt threads.

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

(b) Install and torque the switch.

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

(c) Connect the connector.



LOW OIL PRESSURE WARNING SWITCH INSPECTION

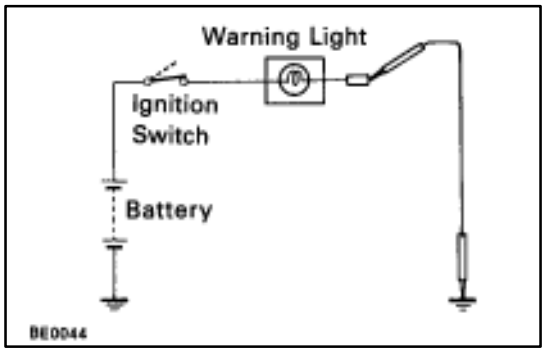
1. INSPECT LOW OIL PRESSURE WARNING SWITCH

(a) Check that there is continuity between terminal and ground with the engine stopped.

(b) Check that there is no continuity between terminal and ground with the engine running.

HINT: Oil pressure should be over 29 kPa (0.3 kg/cm^2, 4.3 psi)

If operation is not as specified, replace the switch.



2. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.

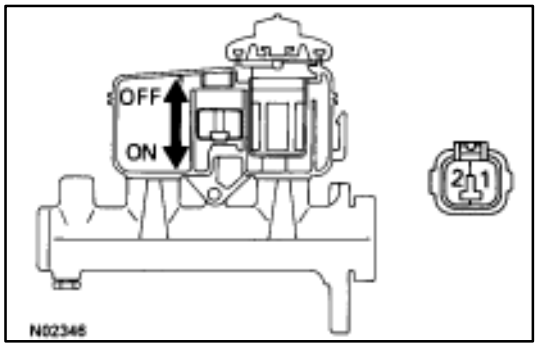
(b) Turn the ingition switch ON, check that the warning light lights up.

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

BRAKE WARNING SYSTEM

BRAKE FLUID LEVEL WARNING SWITCH REMOVAL AND INSTALLATION

(See page BR–12)



BRAKE FLUID LEVEL WARNING SWITCH INSPECTION

1. INSPECT BRAKE FLUID LEVEL WARNING SWITCH

(a) Remove the reservoir tank cap and strainer.

(b) Disconnect the connector.

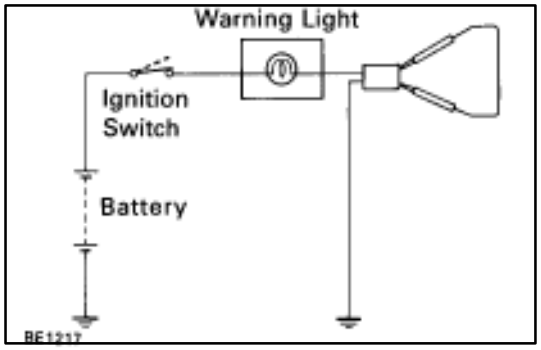
(c) Check that there is no continuity between terminals with the switch OFF (float up).

(d) Use syphon, etc. to take fluid out of the reservoir tank.

(e) Check that there is continuity between terminals with the switch ON (float down).

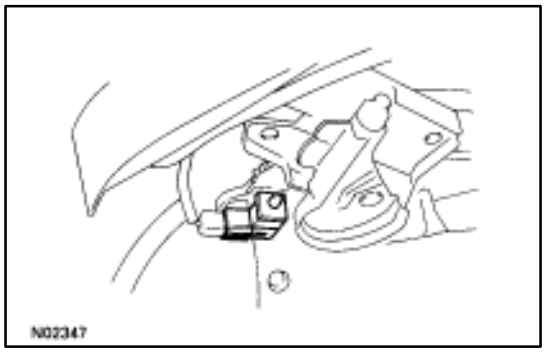
(f) Pour the fluid back in the reservoir tank.

If operation is not as specified, replace the switch.



2. INSPECT BRAKE WARNING LIGHT

(a) Disconnect the connector from the brake fluid warning switch.
(b) Release the parking brake pedal.
(c) Connect 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.



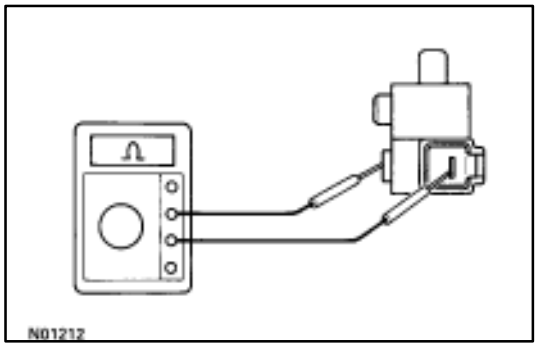
PARKING BRAKE SWITCH REMOVAL AND INSTALLATION

1. REMOVE PARKING BRAKE SWITCH

(a) Remove the console box.
(See page **BO–107**)
(b) Disconnect the connector from the switch.
(c) Remove the screw and the switch.

2. INSTALL PARKING BRAKE SWITCH

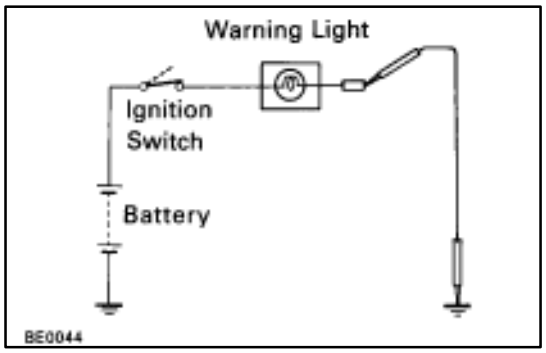
For installation follow the removal procedure in reverse.



PARKING BRAKE SWITCH INSPECTION

1. INSPECT PARKING BRAKE SWITCH

(a) Check that there is continuity between terminal and switch body with the switch ON (switch pin released).
(b) Check that there is no continuity between terminal and switch body with the switch OFF (switch pin pushed in).
If continuity is not as specified, replace the switch or inspect ground point.



2. INSPECT BRAKE WARNING LIGHT

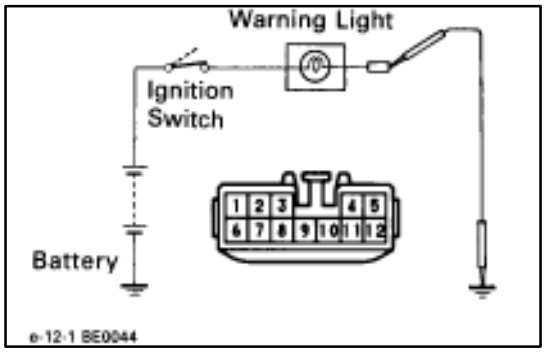
(a) Disconnect the connector from the parking brake switch and the brake fluid warning switch.
(b) Ground terminal on the wire harness side connector.
(c) Start the engine, check that the warning light lights up.
If the warning light does not light up, test the bulb or inspect wire harness.

LIGHT FAILURE WARNING SYSTEM

LIGHT FAILURE SENSOR REMOVAL AND INSTALLATION
(See page BE–66)

LIGHT FAILURE SENSOR INSPECTION

1. INSPECT LIGHT FAILURE SENSOR
(See page BE–67)



2. INSPECT LIGHT FAILURE WARNING LIGHT

(a) Disconnect the connector from the light failure sensor and ground terminal 4 on the wire harness side connector.

(b) Start the engine, check that the warning light lights up.
If the warning light does not light up, test the bulb or inspect wire harness.

METER ILLUMINATION CONTROL SYSTEM

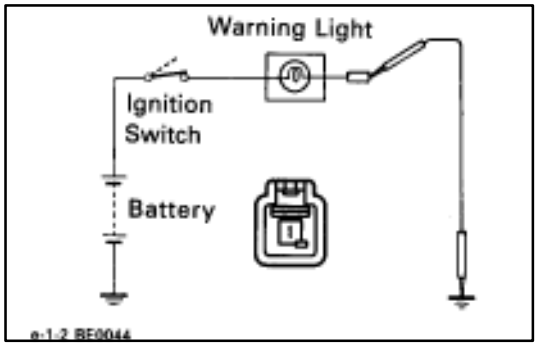
RHEOSTAT LIGHT CONTROL INSPECTION
(See page BE–80)

RHEOSTAT LIGHT CONTROL VOLUME INSPECTION
(See page BE–81)

DOOR COURTESY SWITCH REMOVAL AND INSTALLATION
(See page BE–90)

DOOR COURTESY SWITCH INSPECTION

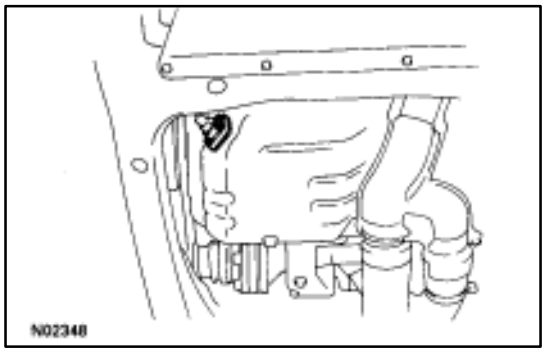
1. INSPECT DOOR COURTESY SWITCH
(See page BE–90)



2. INSPECT OPEN DOOR WARNING LIGHT

Disconnect the connector from the door courtesy switch, and ground terminal 1 on the wire harness side connector and check that the warning light lights up.

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



ENGINE OIL LEVEL WARNING SYSTEM

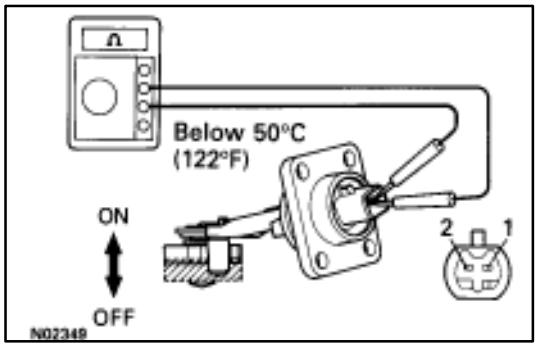
ENGINE OIL LEVEL WARNING SWITCH REMOVAL AND INSTALLATION

1. REMOVE ENGINE OIL LEVEL WARNING SWITCH

(a) Jack up the vehicle.
(b) Disconnect the connector.
(c) Remove four bolts and switch.

2. INSTALL ENGINE OIL LEVEL WARNING SWITCH

(a) Install switch and new gasket.
(b) Install and torque the four bolts.
Torque: 6.9 N·m (70 kgf·cm, 5.1 ft·lbf)
(c) Connect the connector.

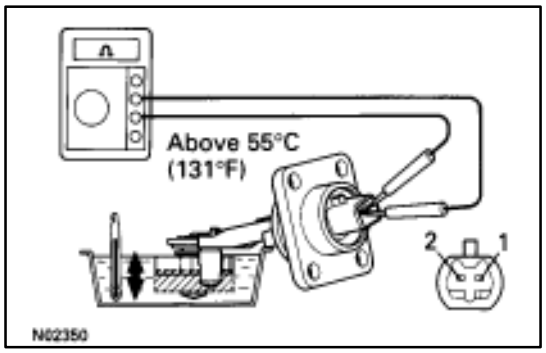


ENGINE OIL LEVEL WARNING SWITCH INSPECTION

1. INSPECT ENGINE OIL LEVEL WARNING SWITCH

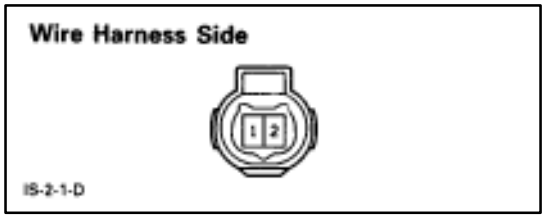
(Continuity)

(a) Check that there is continuity between terminal with the switch each position.
(b) Heat the switch to above 55°C (131°F) in an oil bath.



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

If operation is not as specified, replace the switch.

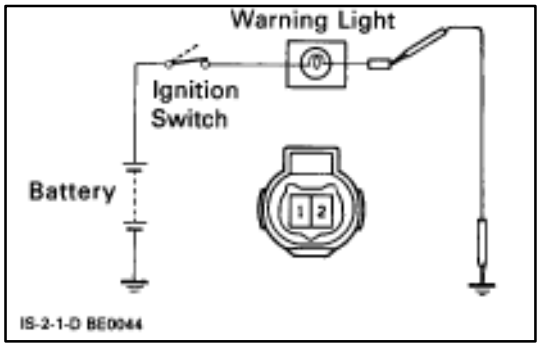


(Circuit)

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

Check for	Tester connection	Condition	Specified value
Continuity	2–Ground	Constant	Continuity

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



2. INSPECT ENGINE OIL LEVEL WARNING LIGHT

(a) Disconnect the connector from the switch.

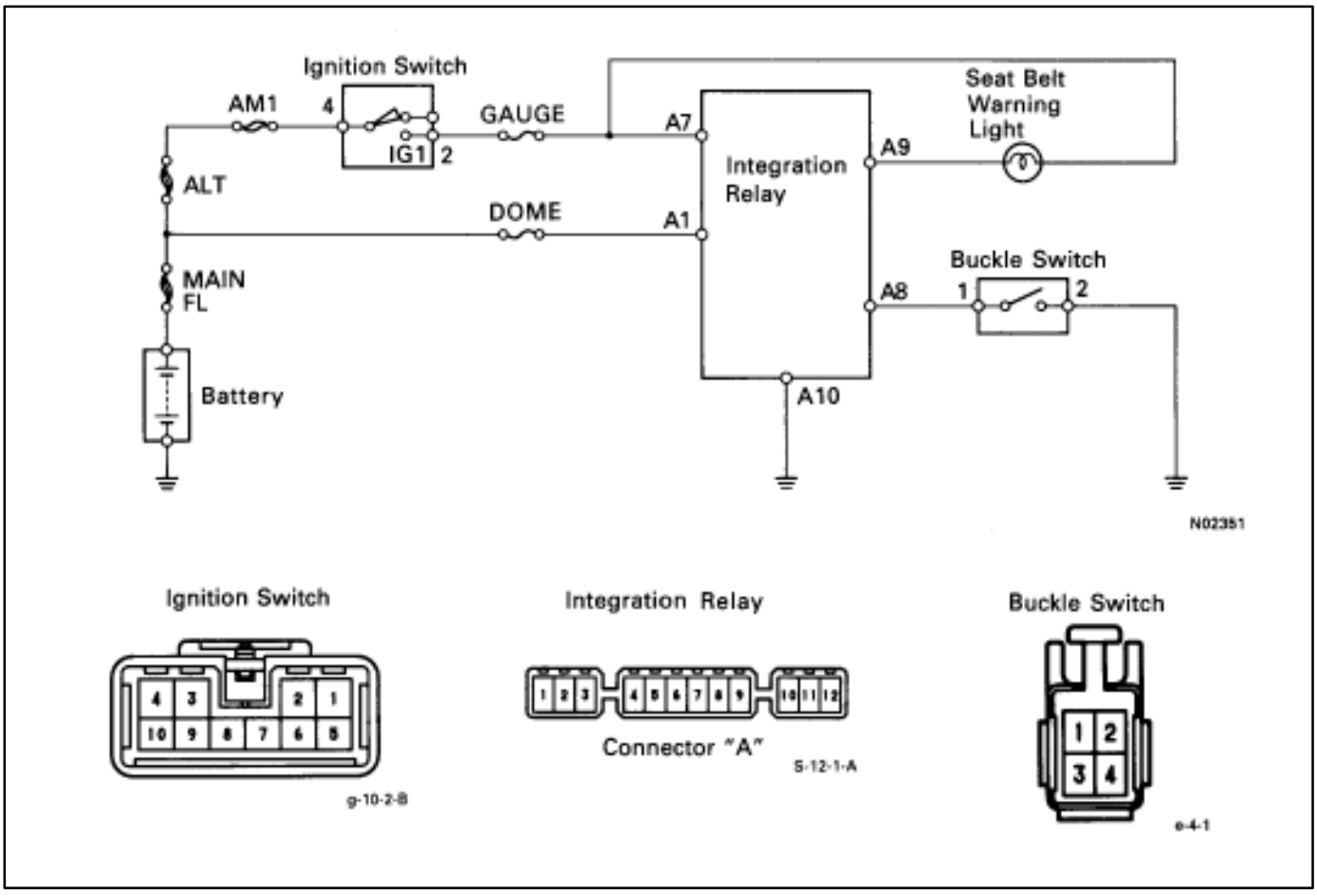
(b) Ground terminal 1 on the wire harness connector.

(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.

SEAT BELT WARNING SYSTEM

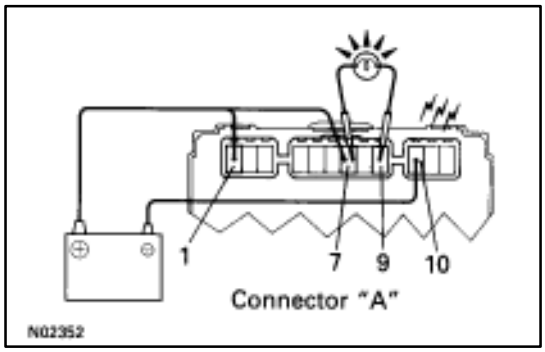
WIRING AND CONNECTOR DIAGRAMS



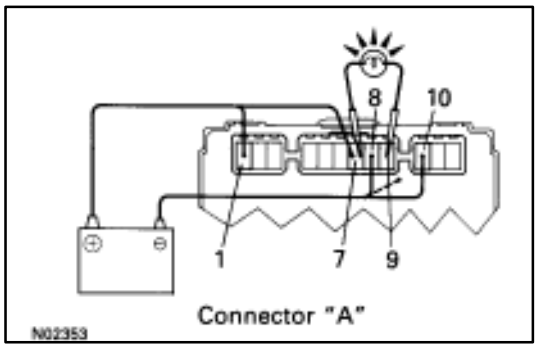
INTEGRATION RELAY REMOVAL AND INSTALLATION
(See page BE–32)

INTEGRATION RELAY INSPECTION

1. INSPECT INTEGRATION RELAY
(Operation/Seat belt warning)

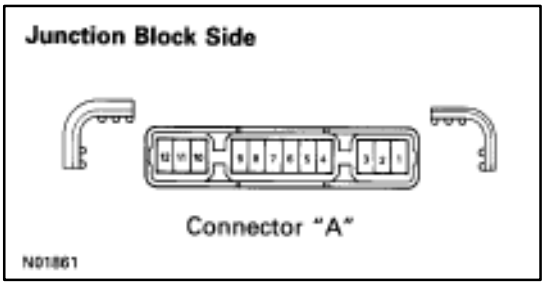


(a) Connect the positive (+) lead from the battery to terminals A1 and A7.
(b) Connect the terminal A7 to terminal A9 through the 3.4 W test bulb.
(c) Connect the negative (–) lead from the battery to terminal A10.
(d) Check that the bulb lights and the chime sounds for 4–8 seconds.
(e) Return to step (a), and operate the chime again.



(f) Connect the negative (–) lead from the battery to terminal A8.
(g) Check that the chime stops sounding.
HINT: Check the chime within a period of 4 to 8 seconds.
If operation is not as specified, replace the relay.

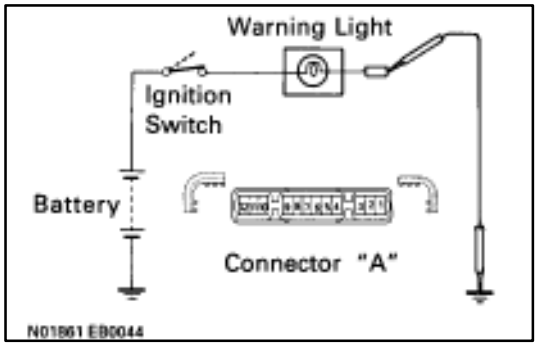
(Relay circuit / Seat belt warning)



Remove the relay from the junction block No.1 and inspect the connectors on the junction block side.

Check for	Tester connection	Condition		Specified value
Continuity	A8–Ground	Driver's buckle switch	OFF (Seat belt unfastened)	No continuity
			ON (Seat belt fastened)	Continuity
	A10–Ground	Constant		Continuity
Voltage	A1–Ground	Constant		Battery positive voltage
	A7–Ground	Ignition switch position	OFF or ACC	No voltage
	A9–Ground		ON	Battery positive voltage

If circuit is as specified, trying replacing the relay with a new one.
Is circuit is not as specified, refer to BE–169 wiring diagram and inspect the circuits connected to other parts.



2. INSPECT SEAT BELT WARNING LIGHT

(a) Remove the integration relay from the junction block No.1.
(b) Ground terminal A9 on the junction block side connector.
(c) Turn the ignition switch ON, check that the warning light lights up.

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

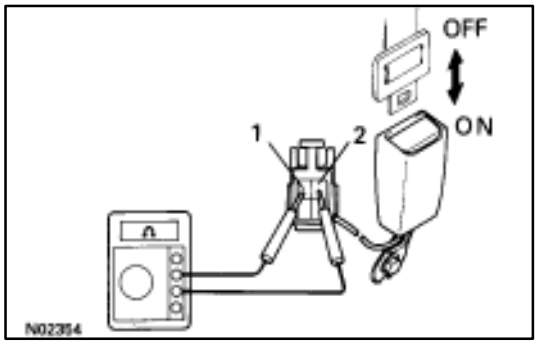
BUCKLE SWITCH REMOVAL AND INSTALLATION

1. REMOVE BUCKLE SWITCH

(a) Remove the driver's seat.
(b) Disconnect buckle switch connector.
(c) Remove seat belt inner belt with buckle switch.

2. INSTALL BUCKLE SWITCH

For installation follow the removal procedure in reverse.



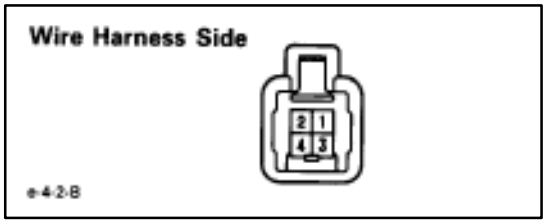
BUCKLE SWITCH INSPECTION

INSPECT BUCKLE SWITCH

(Continuity)

(a) Check that there is continuity between terminals 1 and 2 on the switch side connector with the switch ON (belt fastened).
(b) Check that there is no continuity between terminals 1 and 2 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the seat belt inner belt.



(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Chime operation	–	Turn the ignition switch ON	Chime sounds for 4–8 sec.
		Ground terminal 1 and turn the ignition switch ON	No chime sound
Continuity	2–Ground	Constant	Continuity

If the circuit is not as specified, refer to BE–169 wiring diagram, and inspect the circuits connected to other parts.

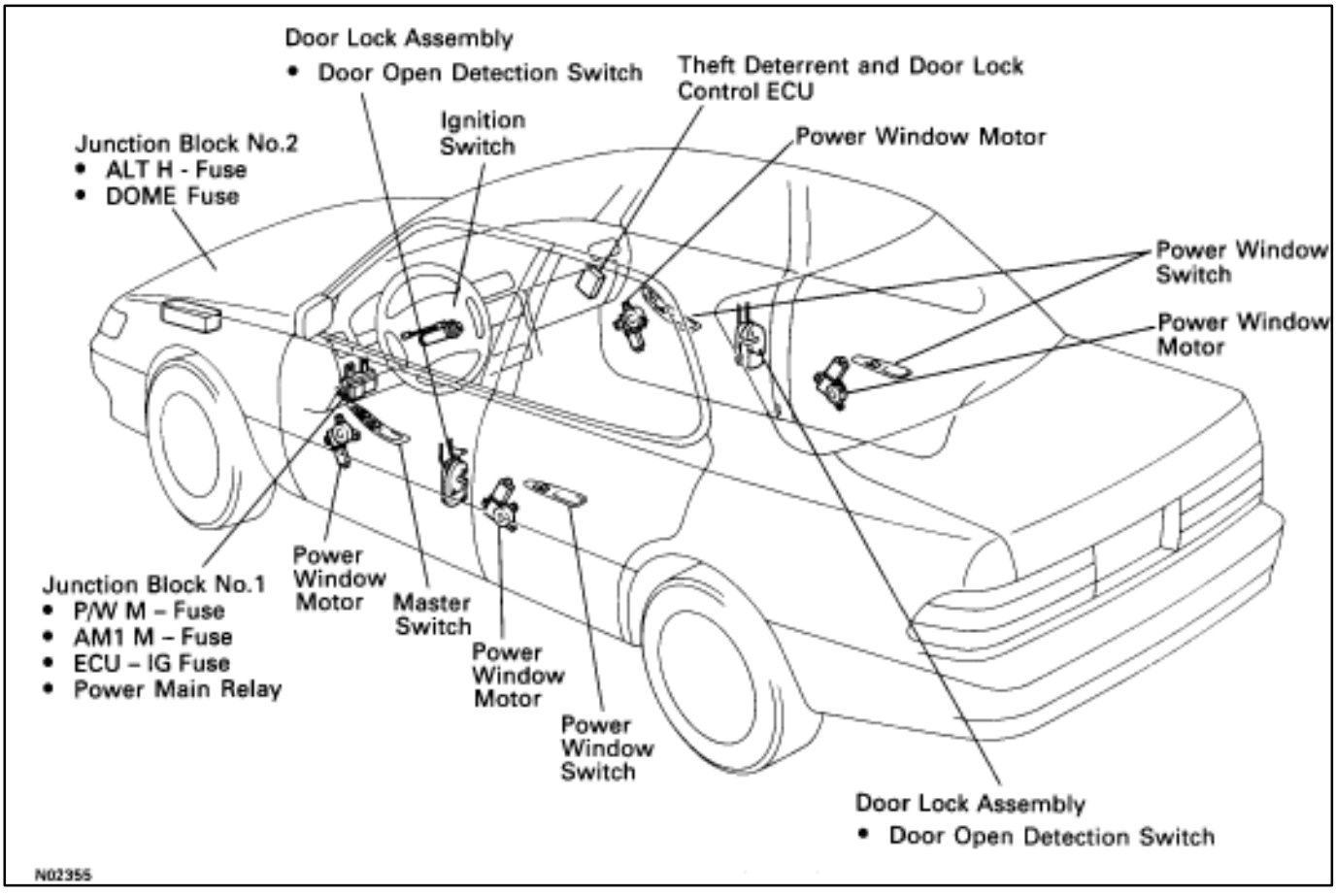
POWER WINDOW CONTROL SYSTEM

DESCRIPTION

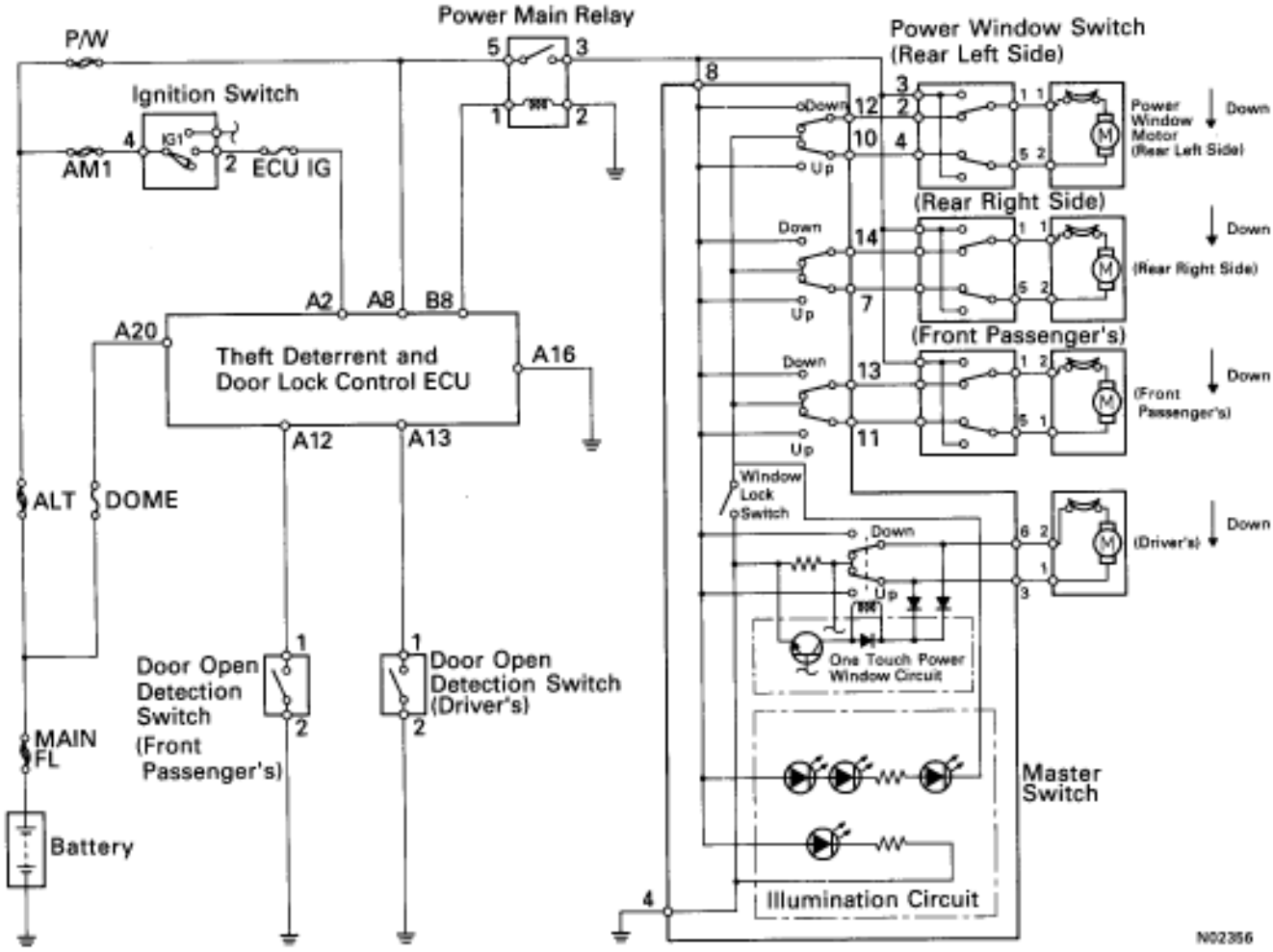
The Power Window System raises and lowers the window glass in each door using electrical power. The component parts of this system and their functions are described in the following table.

Parts Name	Function
P/W M–Fuse	When over current flows in the power window circuit, the P/W M–Fuse breaks the circuit to protect it against damage.
Theft Deterrent and Door Lock Control ECU	Current is sent to the power main relay only when the ignition switch is on or within a specified period after the ignition switch is turned off.
Power Main Relay	Current from the theft deterrent and door lock control ECU to the power main relay switches large current from the master switch ON and OFF.
Master Switch	This switch turns current to each power window motor ON and OFF and switches it. It also includes a circuit for ”One Touch Power Window” use of the driver’s window and a built–in window lock switch which controls the operation of all power window switches.
Power Window Switch	This switch is installed on each door except on the driver’s door. It is supplied with current from the master switch and turns the current to the motor ON and OFF and switches the current. This switch will not operate when the window lock switch inside the master switch is in the LOCK position.
Power Window Motor	This motor moves the window regulator directly when current is supplied to it from the master switch or power window switch. The motor has a built–in circuit breaker.

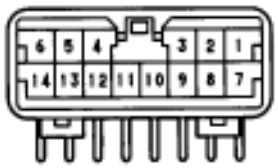
PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS

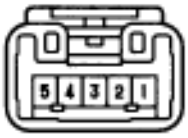


Master Switch



e-14-2-F

Power Window Switch

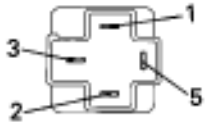


e-5-2

Power Window Motor

IS-2-2-J

Power Window Relay

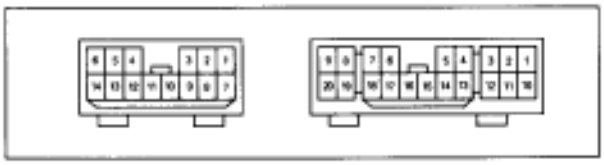


BE4049

Door Open Detection Switch (in Door Lock Assembly)

Ie-7-2

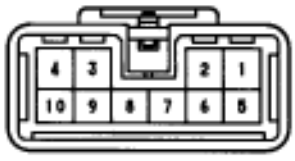
Theft Deterrent and Door Lock Control ECU



Connector "B" Connector "A"

BE5650

Ignition Switch



g-10-2-B

TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See page / Part name / Trouble	ALT H-Fuse	DOME Fuse	P/W M - Fuse	Theft Deterrent and Door Lock Control ECU	Power Main Relay	Power Window Master Switch	Power Window Switch	Power Window Motor	Ignition Switch	Door Open Detection Switch	ECU-IG Fuse	Wire Harness
	BE–6, 22	BE–6, 22	BE–6, 20	BE–355	BE–20, 179	BE–176	BE–178	BE–180	BE–29	BE–388	BE–6, 20	-
*1 Power window does not operate.	1		2	3								4
*2 Power window does not operate.			3	4	5	6			2		1	7
"One Touch Power Window System" does not operate.						1						
Only one window glass does not move.						1	2	3				4
"Window Lock System" does not operate.						1						
"Window Lock Illumination" does not light up.						1						
Key-off power window does not operate.		1		2					4	5	3	6

*1: Dook Lock does not operate.
*2: Dook Lock is normal.

POWER WINDOW MASTER SWITCH

POWER WINDOW MASTER SWITCH REMOVAL AND INSTALLATION

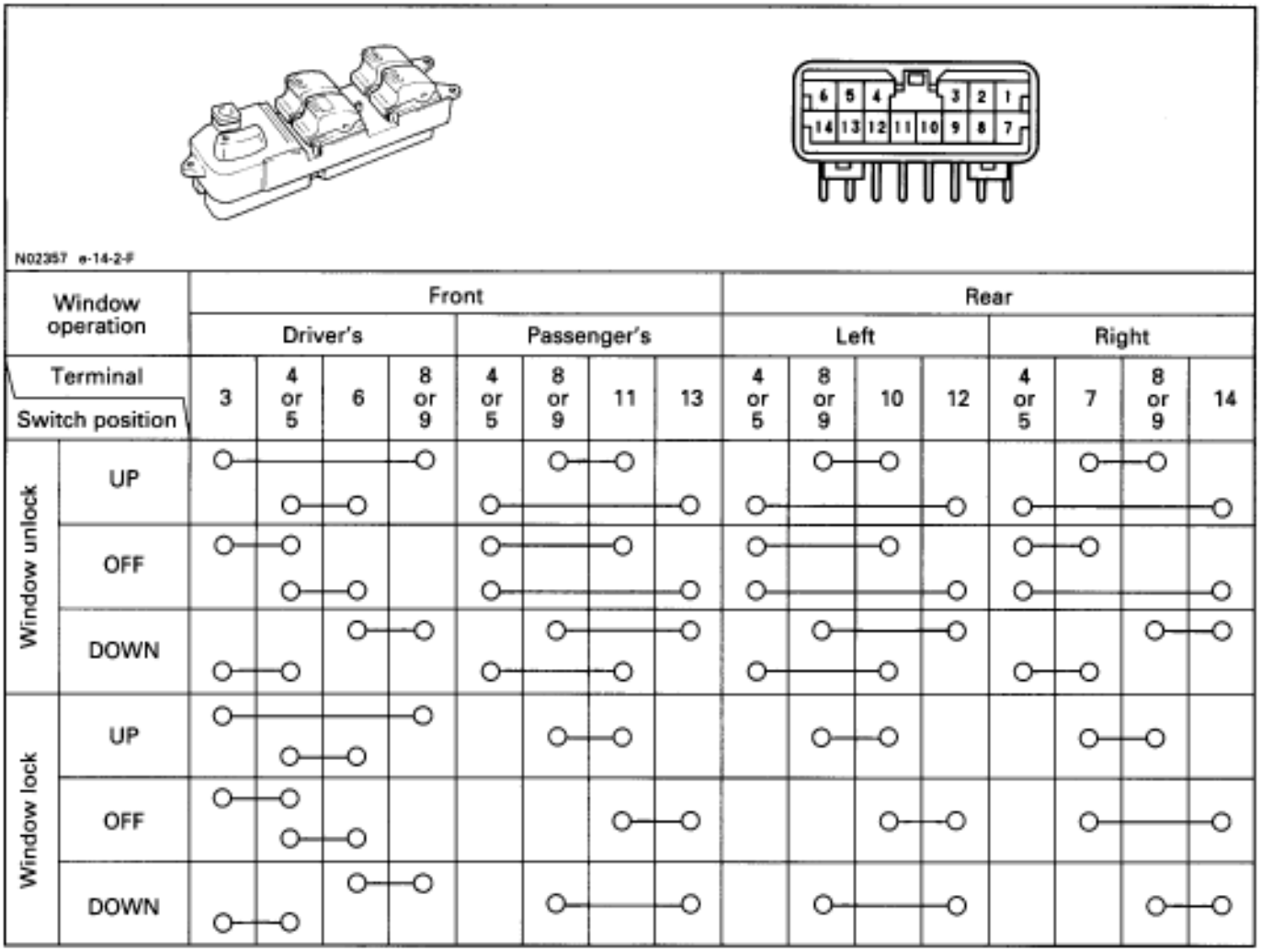
(See page BO–34)

POWER WINDOW MASTER SWITCH INSPECTION

INSPECT POWER WINDOW MASTER SWITCH

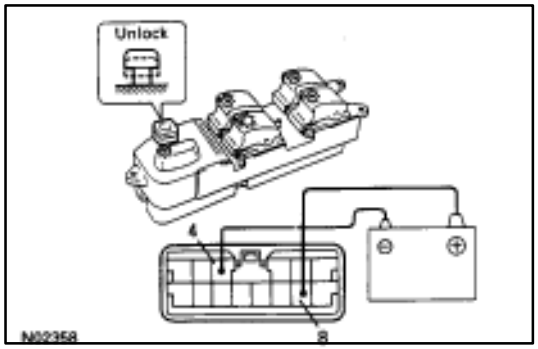
(Continuity)

Inspect the switch continuity between terminals.



Window operation		Front								Rear							
		Driver's				Passenger's				Left				Right			
Terminal / Switch position		3	4 or 5	6	8 or 9	4 or 5	8 or 9	11	13	4 or 5	8 or 9	10	12	4 or 5	7	8 or 9	14
Window unlock	UP	○			○		○	○			○	○			○	○	
			○	○		○			○	○			○	○			○
	OFF	○	○			○	○			○	○			○	○		
			○	○		○			○	○			○	○			○
	DOWN			○	○		○	○			○	○				○	○
		○	○			○			○	○			○	○			
Window lock	UP	○			○		○	○			○	○			○	○	
			○	○													
	OFF	○	○					○	○			○	○		○		○
	DOWN			○	○		○		○		○		○			○	○
		○	○														

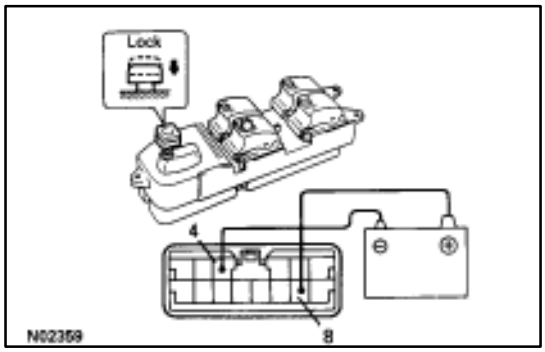
If continuity is not as specified, replace the master switch.



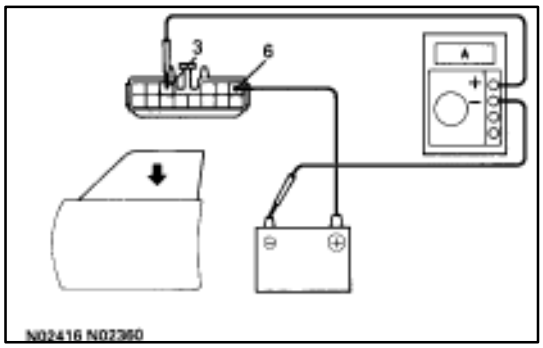
(Illumination)

(a) Set the window lock switch to the unlock position.

(b) Connect the positive (+) lead from the battery to terminal 8 and the negative (–) lead to terminal 4, check that all the illuminations light up.



(c) Set the window lock switch to the lock position, check that all the passenger's power window switch illuminations go out.
If operation is not as specified, replace the master switch.



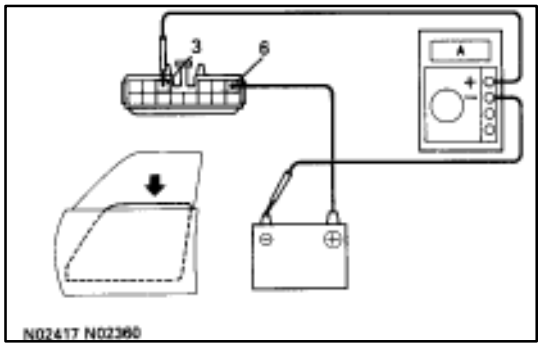
(One Touch Power Window System/Current of Circuit)
Inspection using an ammeter.

(a) Disconnect the connector from the master switch.

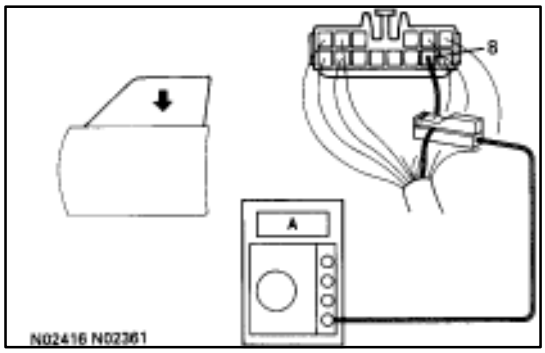
(b) Connect the positive (+) lead from the ammeter to terminal 3 on the wire harness side connector and the negative (–) lead to negative terminal of the battery.

(c) Connect the positive (+) lead from the battery to terminal 6 on the wire harness side connector.

(d) As the window goes down, check that the current flow is approximately 7 A.



(e) Check that the current increases approximately 14.5 A or more when the window stops going down.
HINT: The circuit breaker opens some 4–40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.
If the operation is as specified, replace the master switch.



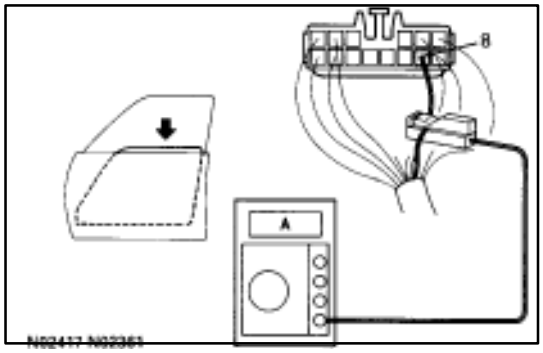
Inspection using an ammeter with a current–measuring probe.

(a) Remove the master switch with connector connected.

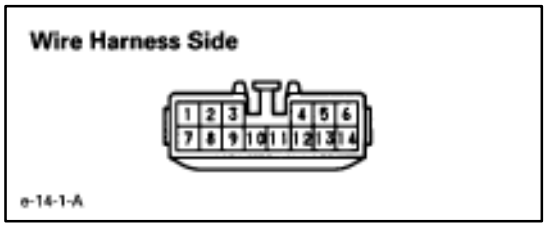
(b) Attach a current–measuring probe to terminal 8 of the wire harness.

(c) Turn the ignition switch ON and set the power window switch in the down position.

(d) As the window goes down, check that the current flow is approximately 7 A.



(e) Check that the current increases approximately 14.5 A or more when the window stops going down.
HINT: The circuit breaker opens some 4–40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.
If operation is as specified, replace the master switch.



(Switch Circuit)
Disconnect the connector from the master switch and inspect the connector on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Voltage	8–Ground	Ignition switch position	LOCK or ACC	*No voltage
			ON	Battery positive voltage
Continuity	4–Ground	Constant		Continuity

*: Exceptions: During 60 second period after ignition switch ON → OFF (ACC) or until driver or passenger door is opened after ignition switch ON → OFF (ACC).
If the circuit is not as specified, refer to BE–174 wiring diagram and inspect the circuits connected to other parts.

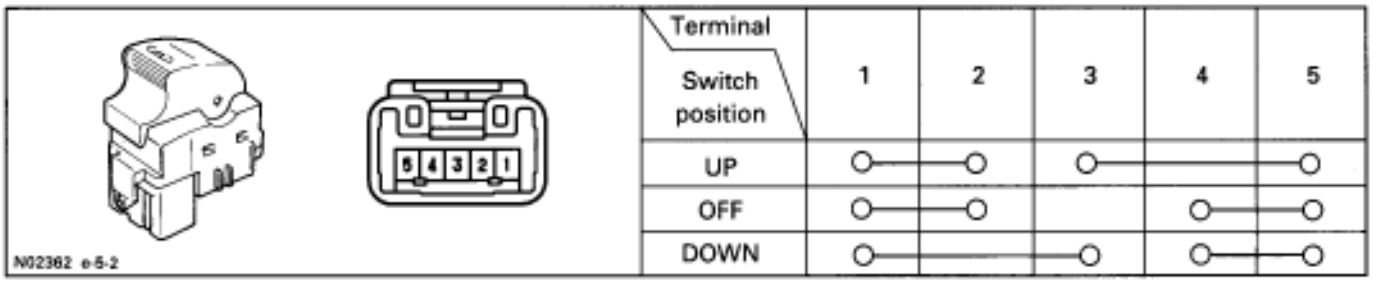
POWER WINDOW SWITCH

POWER WINDOW SWITCH REMOVAL AND INSTALLATION (See pages BO–34, 46)

POWER WINDOW SWITCH INSPECTION

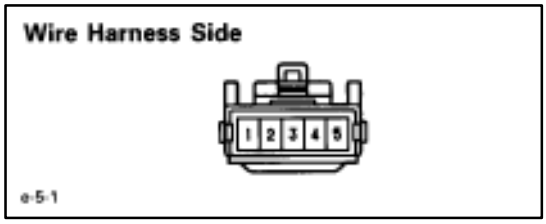
INSPECT POWER WINDOW SWITCH

(Switch Continuity)
Inspect switch continuity between terminals.



Terminal / Switch position	1	2	3	4	5
UP	○	○	○		○
OFF	○	○		○	○
DOWN	○		○	○	○

If continuity is not as specified, replace the switch.



(Switch Circuit)
Disconnect the connector from the switch and inspect the connector on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Voltage	3–Ground	Ignition switch position	LOCK or ACC	*No voltage
			ON	Battery positive voltage
	4–Ground	Ignition switch ON and master switch position	UP	Battery positive voltage
			OFF	No voltage
	2–Ground	Ignition switch ON and master switch position	DOWN	Battery positive voltage
			OFF	No voltage

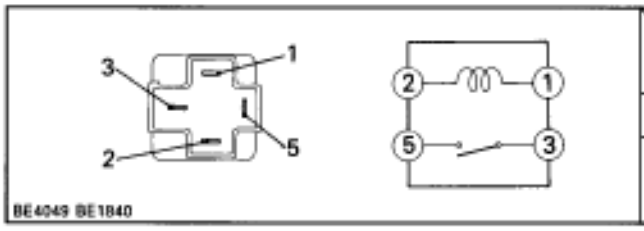
* Exceptions: During 60 second period after ignition switch ON → OFF (ACC) or until driver or passenger door is opened after ignition switch ON → OFF (ACC).
If the circuit is not as specified, refer to BE–174 wiring diagram and inspect the circuits connected to other parts.

POWER MAIN RELAY

POWER MAIN RELAY INSPECTION

INSPECT POWER MAIN RELAY

(Continuity)
Inspect relay continuity between terminals.



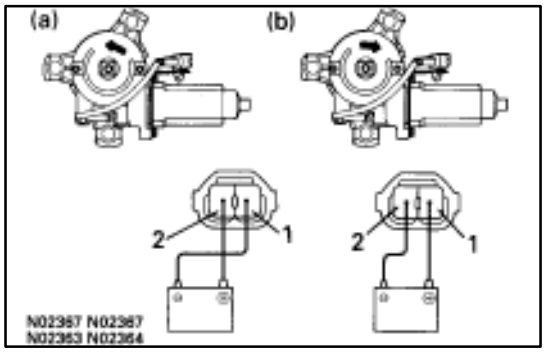
Terminal / Condition	1	2	3	5
Constant	○–∿∿∿–○			
Apply battery positive voltage to terminals 1 and 2.			○–○	

If continuity is not as specified, replace the relay.
(Relay Circuit)
(See page BE–20)

POWER WINDOW MOTOR

POWER WINDOW MOTOR REMOVAL AND INSTALL

(See pages BO–34, 46)



POWER WINDOW MOTOR INSPECTION

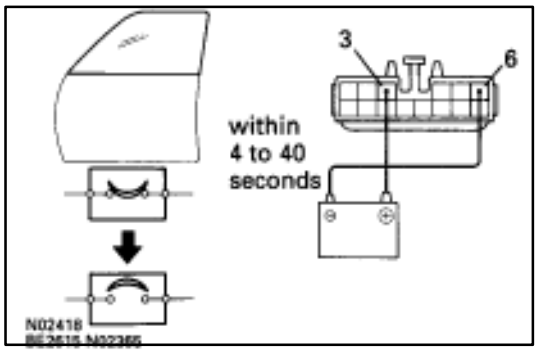
INSPECT POWER WINDOW MOTOR

(Driver's Door Motor / Motor Operation)

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

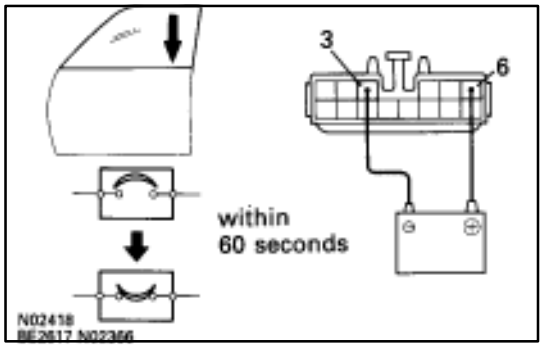


(Driver's Door Motor / Circuit Breaker Operation)

(a) Disconnect the connector from the master switch.

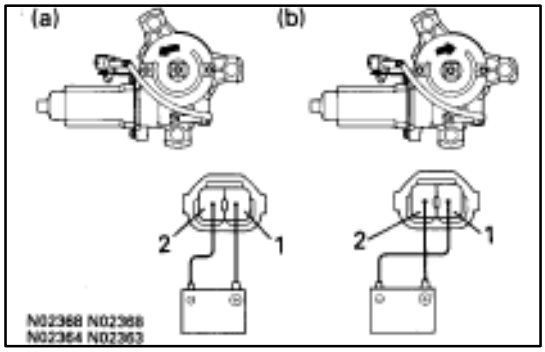
(b) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 6 on the wire harness side connector and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

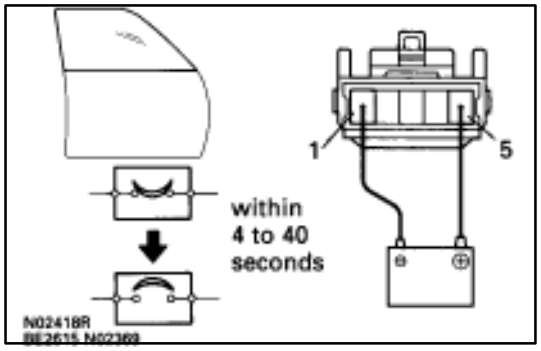


(Front Passenger's Door Motor / Motor Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

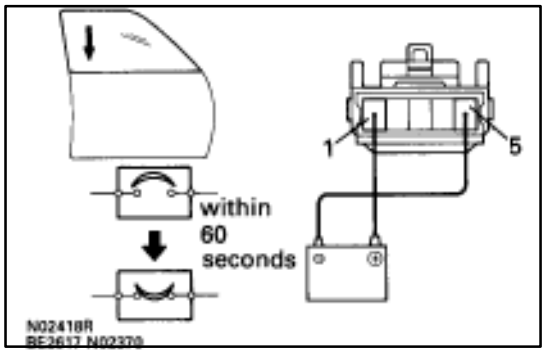
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

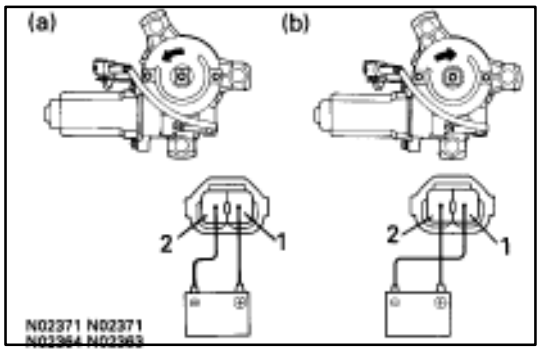


(Front Passenger's Door Motor/Circuit Breaker Operation)

(a) Disconnect the connector from the power window switch.
(b) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 1 on the wire harness side connector, and raise the window to full closed position.
(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.
If operation is not as specified, replace the motor.

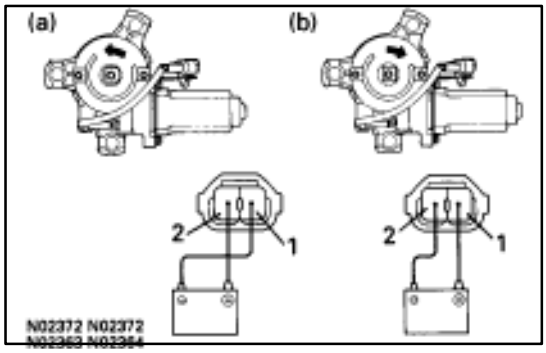


(Rear Left Side Door Motor / Motor Operation)

(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 motor.

(Rear Left Side Door Motor/Circuit Breaker Operation)

See step of Front Passenger Door Motor on page BE–181.

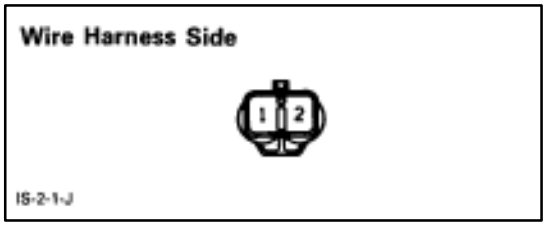


(Rear Right Side Door Motor / Motor Operation)

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.
If operation is not as specified, replace the motor.

(Rear Right Side Door Motor/Circuit Breaker Operation)

See step of Front Passenger Door Motor on page BE–181.



(Circuit)

(a) Disconnect the connector from the motor.

(b) Connect the connector to the master switch and power window switch.

(c) Inspect the connector on the wire harness side as shown.

(Front Door Motor)

Check for	Tester connection	Condition (Ignition Switch ON)		Specified value
Voltage	1–Ground	*Master switchposition(Driver / Front passenger)	UP	Battery positive voltage
			DOWN or OFF	No voltage
		*Power window switch position (Front passenger)	UP	Battery positive voltage
			DOWN or OFF	No voltage
	2–Ground	*Master switch position (Driver/Front passenger)	DOWN	Battery positive voltage
			UP or OFF	No voltage
		*Power window switch position (Front passenger)	DOWN	Battery positive voltage
			UP or OFF	No voltage

(Rear Door Motor)

Check for	Tester connection	Condition (Ignition Switch ON)		Specified value
Voltage	1–Ground	*Master switch position	DOWN	Battery positive voltage
			UP or OFF	No voltage
		*Power window switch position	DOWN	Battery positive voltage
			UP or OFF	No voltage
	2–Ground	*Master Switch position	UP	Battery positive voltage
			DOWN or OFF	No voltage
		*Power window switch position	UP	Battery positive voltage
			DOWN or OFF	No voltage

*: Set the window lock switch to the unlock position. (except driver's door motor)

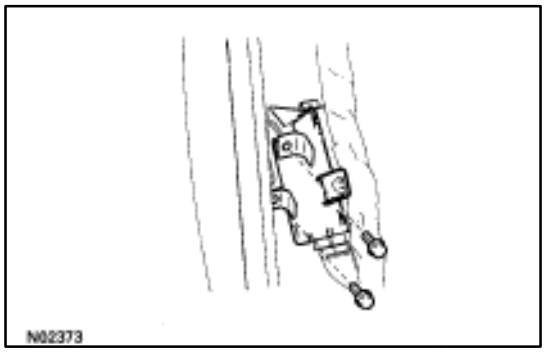
If the circuit is not as specified, refer to BE–174 wiring diagram and inspect the circuits connected to other parts.

THEFT DETERRENT AND DOOR LOCK CONTROL ECU

THEFT DETERRENT AND DOOR LOCK CONTROL ECU REMOVAL AND INSTALLATION

1. REMOVE THEFT DETERRENT AND DOOR LOCK CONTROL ECU

(See page **BO–107**)



(a) Remove the safety pad.

(b) Separate the instrument panel wire from the theft deterrent and door lock control ECU.

(c) Disconnect the two connectors from the theft deterrent and door lock control ECU.

(d) Remove the two bolts and the theft deterrent and door lock control ECU from the safety pad.

2. INSTALL THEFT DETERRENT AND DOOR LOCK CONTROL ECU

For installation, follow the removal procedure in reverse.

THEFT DETERRENT AND DOOR LOCK CONTROL ECU INSPECTION

INSPECT THEFT DETERRENT AND DOOR LOCK CONTROL ECU

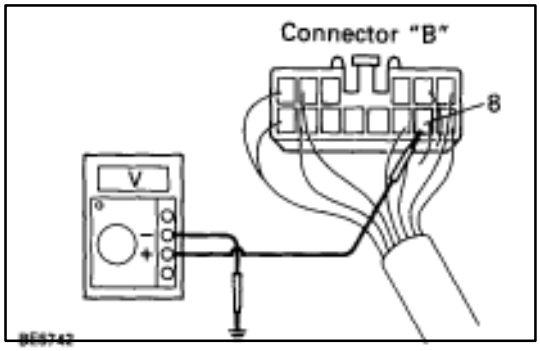
(Circuit)

(a) Inspect ECU Power Source Circuit.
(See page BE–355)

(b) Inspect Actuator Power Source Circuit.
(See page BE–372)

(c) Inspect Ignition Switch Circuit.
(See page BE–310)

(d) Inspect Door Open Detection Switch Circuit
(See page BE–388)
If circuit is as specified, inspect ECU operation.



(Operation)

(a) With the connectors connected, shut all doors.

(b) Check that there is 10 ~ 14 V between terminal B8 and ground when the ignition switch is turned on.

(c) After turning the ignition switch off, check within 60 seconds that there is battery positive voltage between terminal B8 and ground.

(d) Turn the ignition switch on then off, and check that there is 10 ~ 14 V between terminal B8 and ground when the ignition is switched off.

(e) Open the front door within 60 seconds of turning the ignition off and check that there is no voltage between terminal B8 and ground.

(f) Close all the doors and turn the ignition switch on.

(g) When a front door is opened, check that there is battery positive voltage between terminal B8 and ground.

(h) Check that there is no voltage between terminal B8 and ground when the ignition switch is turned to off.
If operation is not as specified, replace the ECU.

DOOR OPEN DETECTION SWITCH

(See page BE–388)

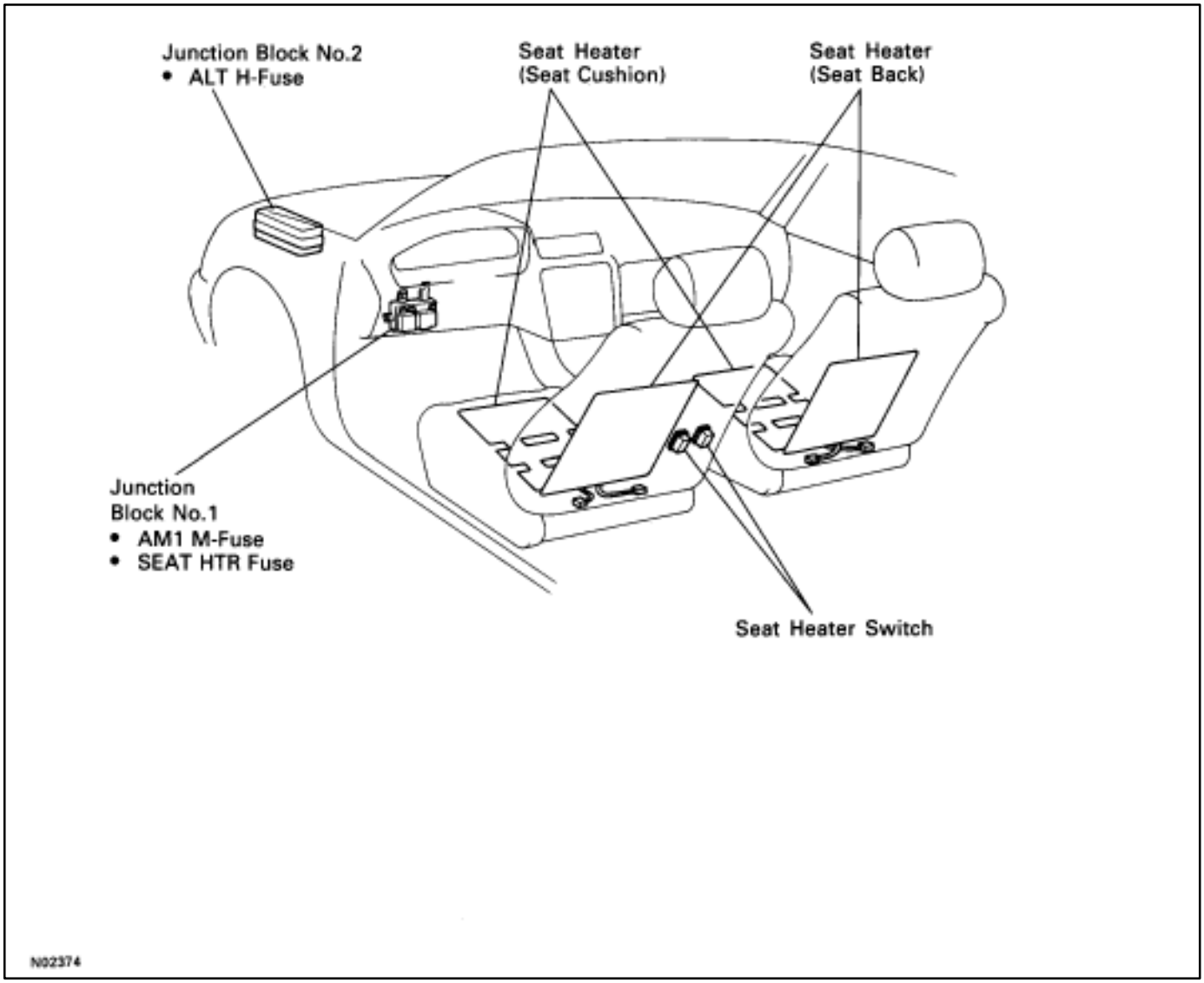
SEAT HEATER SYSTEM

DESCRIPTION

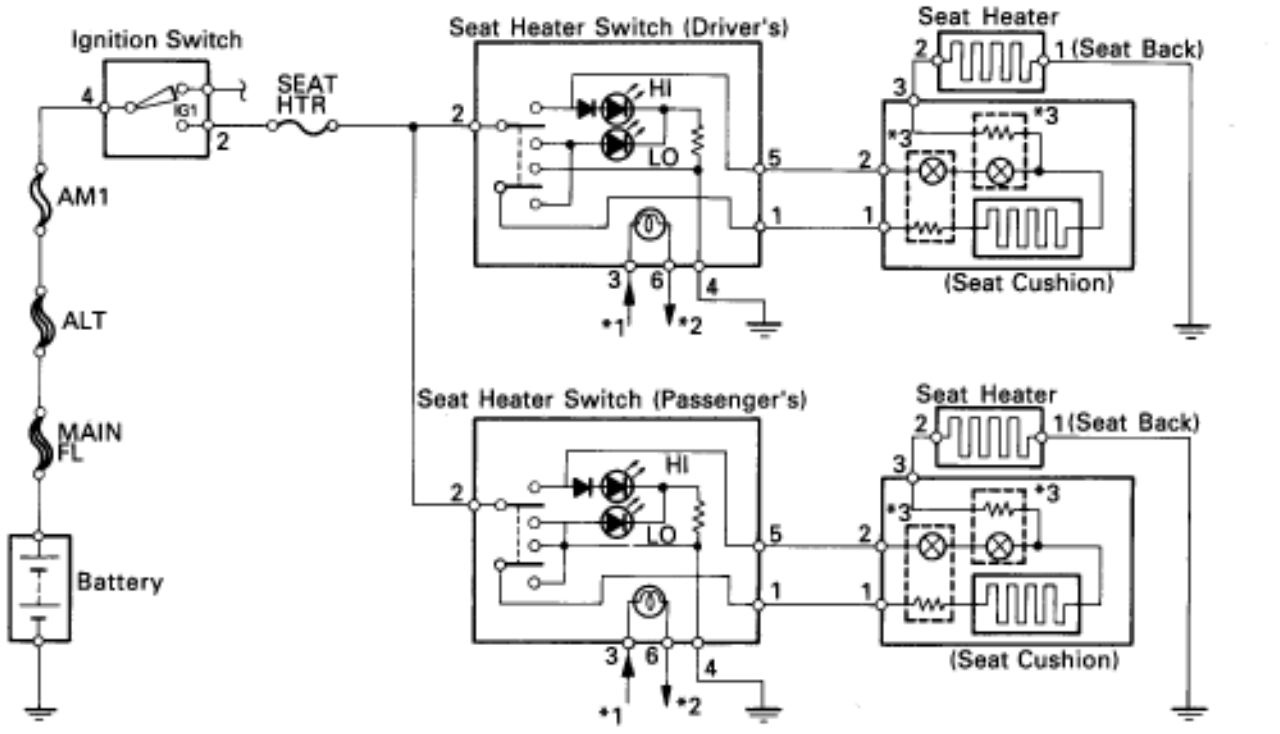
The Seat Heater System utilizes electricity to heat the seat back and cushion of the driver's and front passenger's seat. The component parts of this system and their functions are described in the following table.

Parts Name	Function
Seat Heater Switch	Current from the SEAT HTR fuse is sent to seat heater (seat cushion side).
Seat Heater	These heaters generate heat when current is supplied from the seat heater relays. They contain built–in thermostats which prevent the temperature from rising highter than a set level.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



N02375

*1: (USA)
from TAIL Fuse
(CANADA)
from terminal 9 of Daytime Running Light Relay (Main)

*2: to terminal 1 of Rheostat Light Control

*3: thermostat

Seat Heater Switch

S-6-2-B

Seat Heater (Seat Cushion)

e-3-1

Seat Heater (Seat Back)

e-2-2-H

TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See page / Parts name / Trouble	BE–6, 20	BE–188	BE–188	BE–189	
	SEAT HTR Fuse	Seat Heater Switch (Driver's)	Seat Heater Switch (Passenger's)	Seat Heater	Wire Harness
Seat heaters do not operate. (Driver's and Passenger's)	1				2
Driver's seat heater does not operate.		1		2	3
Passenger's seat heater does not operate.			1	2	3
Seat heater temperature is too hot.				1	

SEAT HEATER SWITCH

SEAT HEATER SWITCH REMOVAL AND INSTALLATION

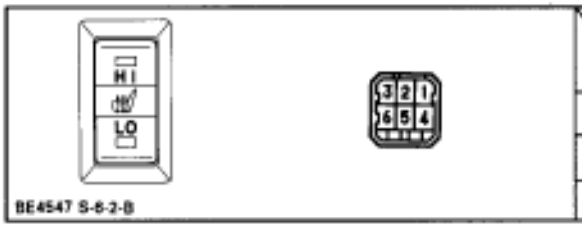
(See page BO–107)

SEAT HEATER SWITCH INSPECTION

INSPECT SEAT HEATER SWITCH

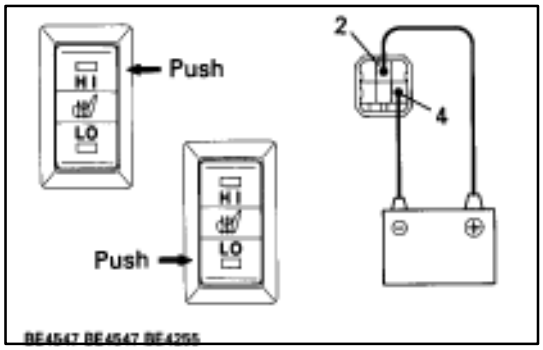
(Continuity)

Inspect the switch continuity between terminals as shown.



Terminal / Switch position	1	4	2	5	Illumination 3	Illumination 6
HI	○——	——○	○——	——○		
OFF					○—(⊕)—○	
LO	○——	——	——○			

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

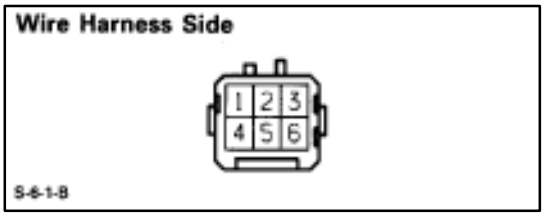


(Indicator)

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

(b) Push the switch to HI or LO, check that the indicator light of the pushed side lights up.

If operation is not as specified, replace the switch.



(Switch Circuit)

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

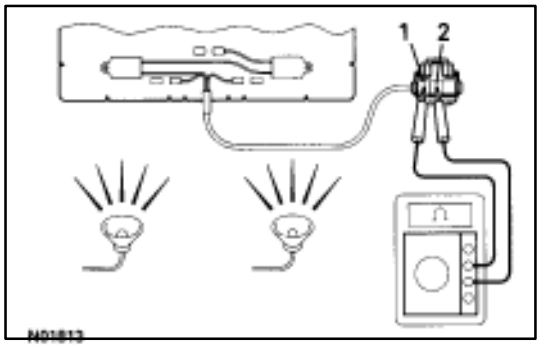
Check for	Tester connection	Condition	Specified value
Continuity	1–Ground	Constant	*Continuity
	4–Ground	Constant	*Continuity
	5–Ground	Constant	Continuity
Voltage	2–Ground	Ignition switch turned to ON.	Battery positive voltage
	3–Ground	Light control switch turned to TAIL or HEAD.	Battery positive voltage
*: There is resistance because this circuit is grounded through the resistance.			

If circuit is not a specified, refer to BE–186 wiring diagram and inspect the circuits connected to other parts.

SEAT HEATER

SEAT HEATER REMOVAL AND INSTALLATION

(See page BO–118)

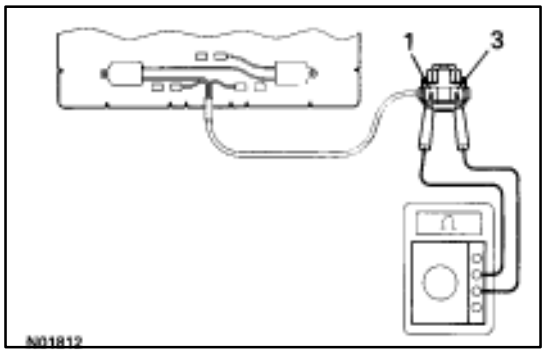


SEAT HEATER INSPECTION

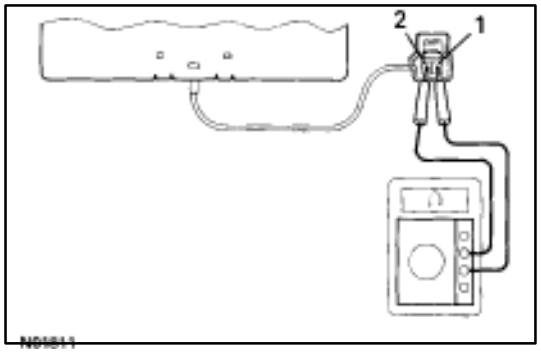
1. INSPECT SEAT HEATER (Continuity/Seat Cushion)

(a) Heat the two thermostats with a light. And check that there is no continuity above 45 C (113 F) between terminal 1 and 2.

(b) Cool the two thermostat below 15 C (59 F). And check that there is continuity between terminals 1 and 2.



(c) Check that there is continuity between terminals 1 and 3. If continuity is not as specified, replace the seat heater.



(Continuity/Seat Back)

Check that there is continuity between terminals 1 and 2.
If continuity is not as specified, replace the seat heater.

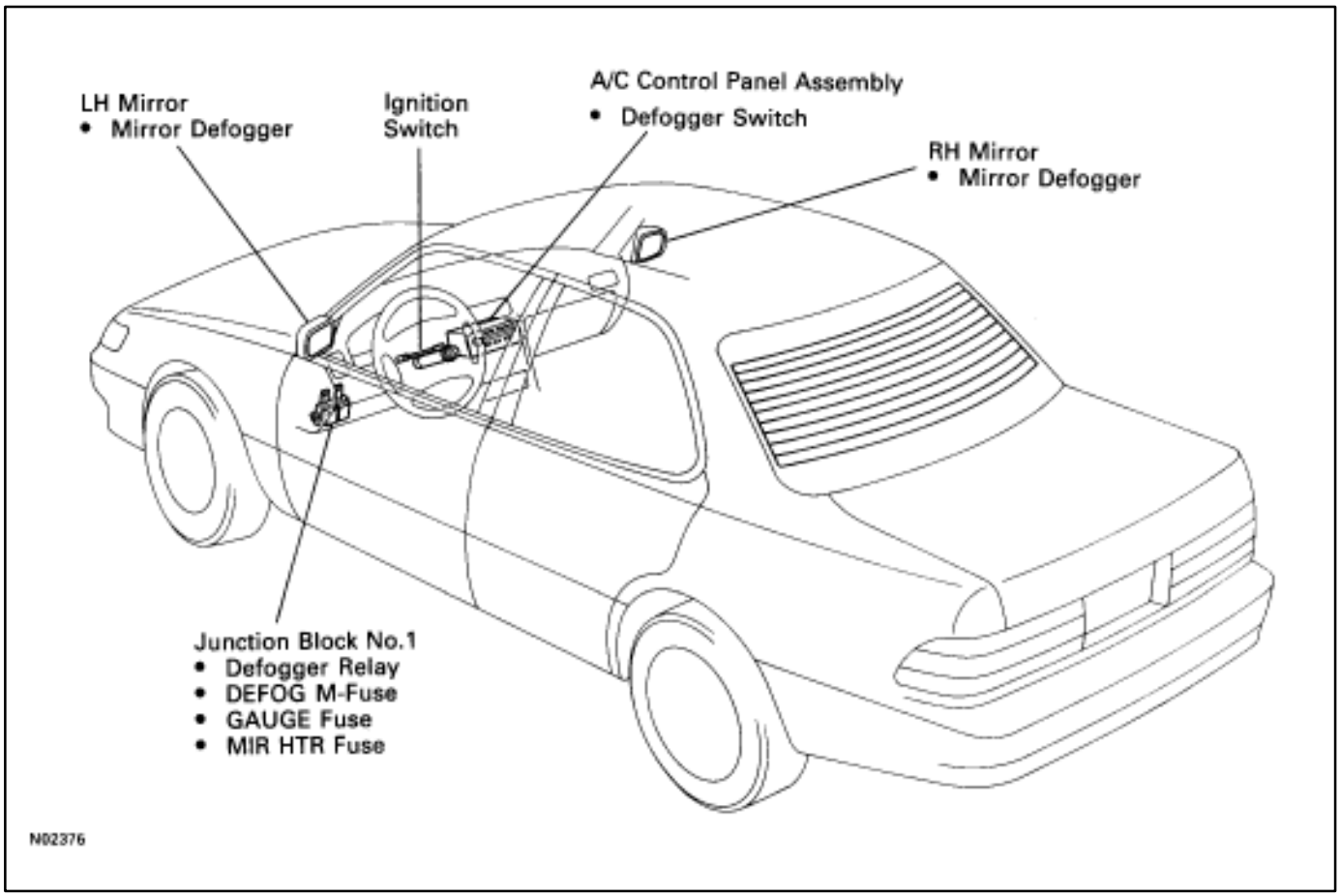
DEFOGGER SYSTEM

DESCRIPTION

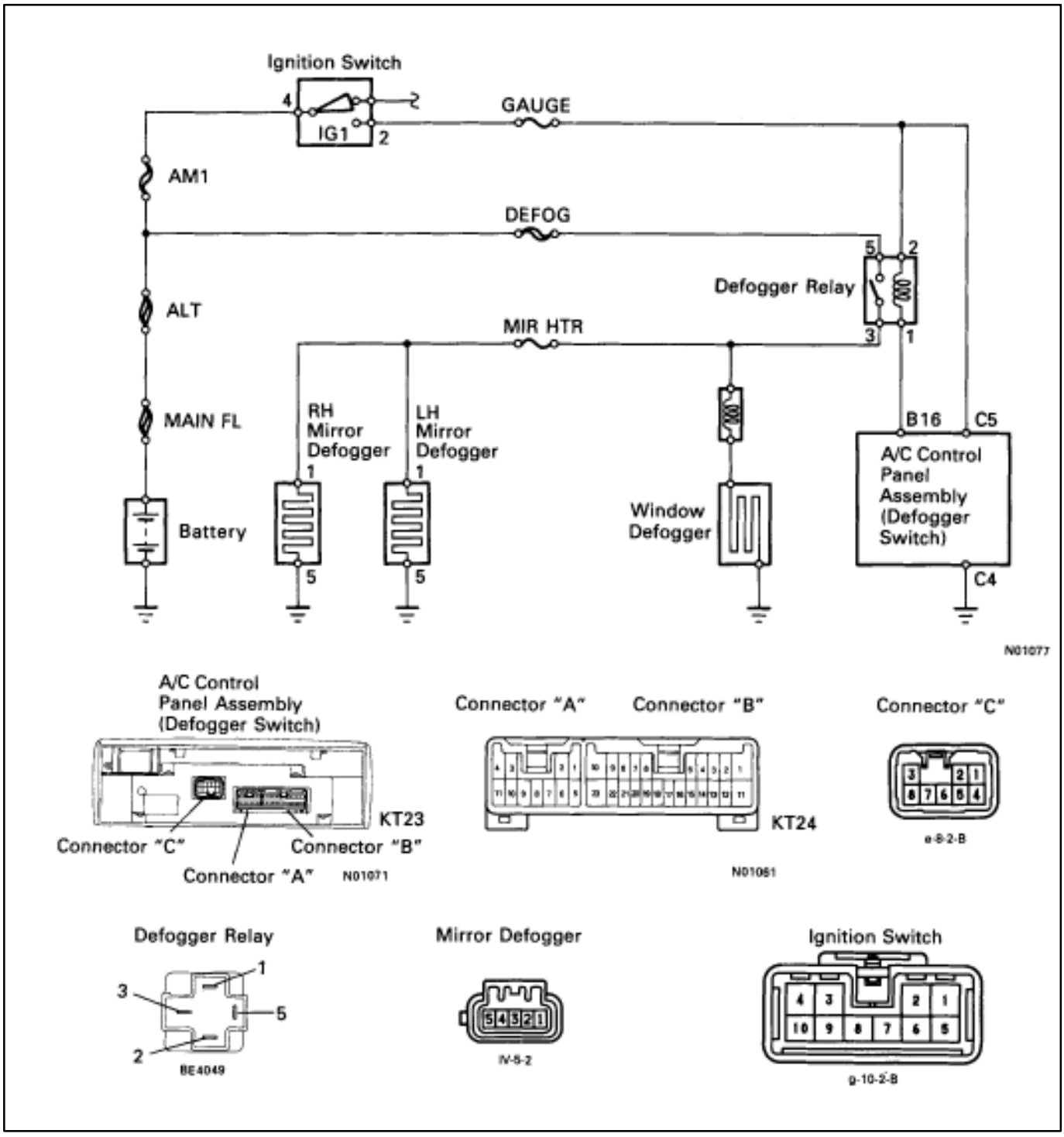
The component parts of this system and their functions are described in the following table.

Parts Name	Function
DEF M–Fuse	When over current flows in the defogger circuit, the DEF M–Fuse breaks the circuit to protect it against damage.
Defogger Relay	This relay is supplied with current from terminal IG1 of ignition switch (Ignition switch ON) and switches large current from the defogger.
A/C Control Panel Assembly Defogger Switch	The defogger switch is built into the A/C Control Panel Assembly. This switch is supplied with current from the relay and GAUGE fuse. Grounds current from the defogger relay, turning the defogger relay ON.
Defogger Rear Window Outer Mirror	These defoggers generate heat when current is supplied from the defogger relay.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



TROUBLESHOOTING

You will find the cause of trouble more easily using the table shown below. In this table, the number indicate the order priority of the causes in trouble. Check each part in the order shown. If necessary, replace the parts.

See page / Part name / Trouble	BE–6, 20 GAUGE Fuse	BE–6, 20 MIR HTR Fuse	BE–6, 20 DEFOG M-Fuse	BE–194 Defogger Switch	BE–20, 195 Defogger Relay	- Wire Harness	BE–195 Defogger Wires	- Choke Coil	BE–196 Mirror Defogger
All defogger systems do not operate	2		1	4	3	5			
Rear window defogger does not operate						3	1	2	
Mirror defogger does not operate		1				3			2

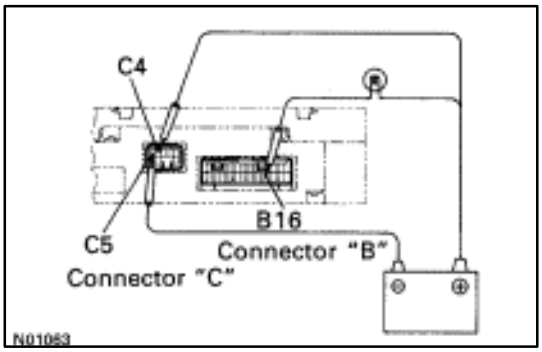
DEFOGGER SWITCH

AIR CONDITIONING CONTROL PANEL ASSEMBLY REMOVAL AND INSTALLATION

(See Instrument Panel on page BO–107)

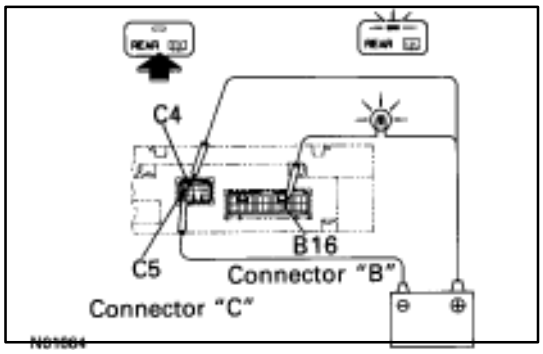
DEFOGGER SWITCH INSPECTION

(Switch Operation)

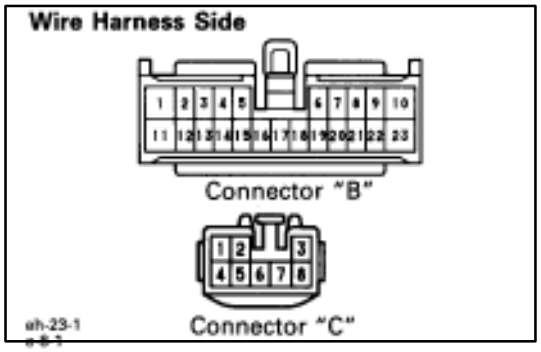


(a) Connect the positive (+) lead from the battery to terminal C5 and negative (–) lead to terminal C4.

(b) Connect the positive (+) lead from the battery to terminal B16 through a 1.4 W test bulb.



(c) Turn the defogger switch ON and check that the test bulb and indicator light turn ON, then turn OFF after about 15 minutes. If operation is not as specified, replace the air conditioning control panel assembly.



(Circuit)

Disconnect two connectors from the air condition control panel assembly and inspect the connectors on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Continuity	C4–Ground	Constant		Continuity
Voltage	B16–Ground	Ignition switch position	OFF or ACC	No voltage
	C5–Ground		ON	Battery positive voltage

If the circuit is not as specified, refer to BE–192 wiring diagram and inspect the circuits connected to other parts.

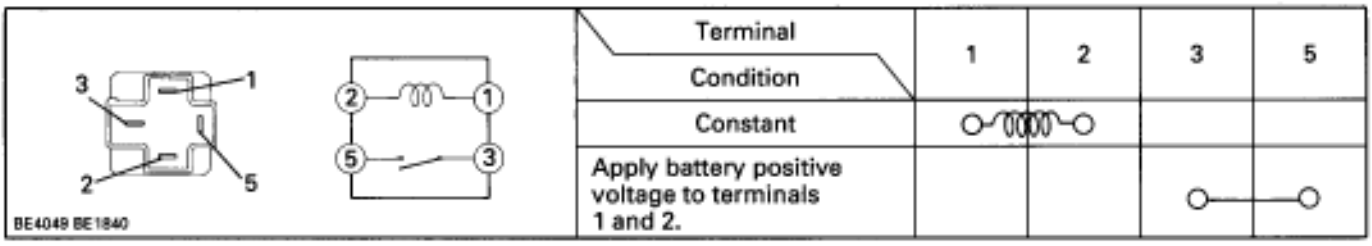
DEFOGGER RELAY

DEFOGGER RELAY INSPECTION

INSPECT DEFOGGER RELAY

(Continuity)

Inspect relay continuity between terminals.



Terminal / Condition	1	2	3	5
Constant	○–∿∿∿–○			
Apply battery positive voltage to terminals 1 and 2.			○ ○	

If continuity is not as specified, replace the relay.

(Relay Circuit)

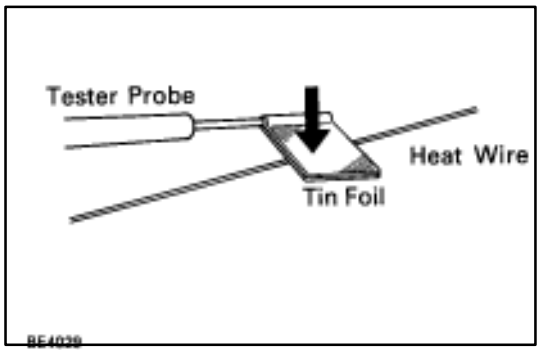
(See page BE–20)

DEFOGGER WIRE

DEFOGGER WIRE INSPECTION

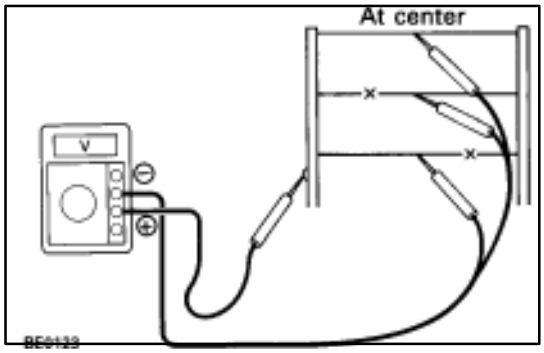
NOTICE:

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



(a) Turn the ignition switch ON.

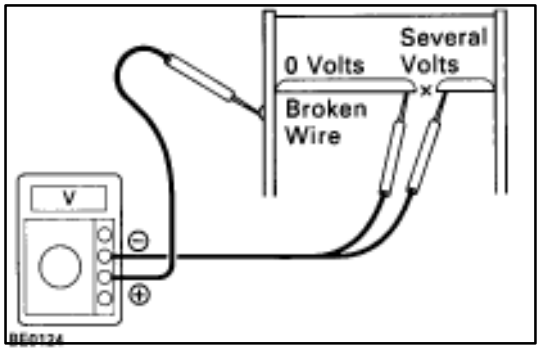
(b) Turn the defogger switch ON.



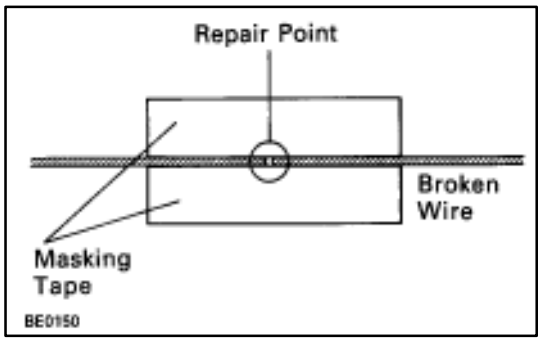
(c) Inspect the voltage at the center of each heat wire as shown.

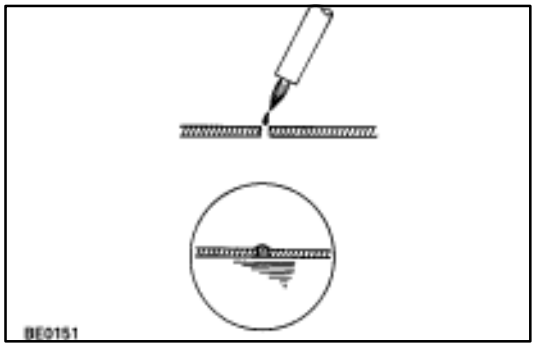
Voltage	Criteria
Approx. 5 V	Okay (No break in wire)
Approx. 10 V or 0 V	Broken wire

HINT: If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.



(d) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.
(e) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.
(f) The point where the voltmeter deflects from zero to several V is the place where the heat wire is broken.
HINT: If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually increases to about 12 V as the meter probe is moved to the other end.



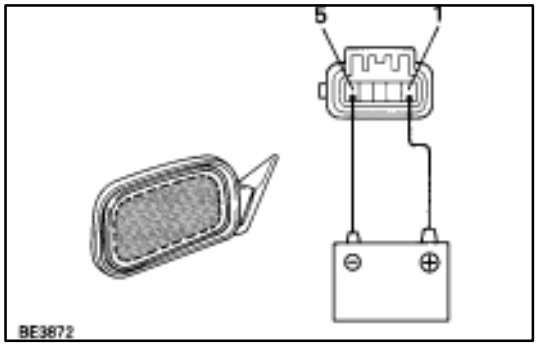


DEFOGGER WIRE REPAIR

(a) Clean the broken wire tips with a grease, wax and silicone remover.
(b) Place the masking tape along both sides of the wire to be repaired.
(c) Thoroughly mix the repair agent (Dupont paste No. 4817).
(d) Using a fine tip brush, apply a small amount to the wire.
(e) After a few minutes, remove the masking tape.
(f) Allow the repair to stand at least 24 hours.

MIRROR DEFOGGER

MIRROR ASSEMBLY REMOVAL AND INSTALLATION
(See Outside Rear View Mirror on page BO–34)



MIRROR DEFOGGER INSPECTION

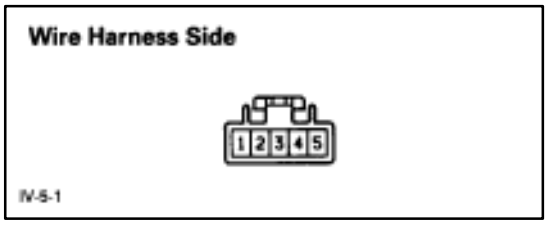
INSPECT MIRROR DEFOGGER

(Mirror Defogger Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 5.

(b) Check that the mirror becomes warm.

HINT: It will take a short time for the mirror to become warm. If the mirror does not become warm, replace the mirror assembly.



(Circuit)

Disconnect the connector from the outside mirror and inspect the connector on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Continuity	5–Ground	Constant		Continuity
Voltage	1–Ground	Ignition switch ON	Defogger switch OFF	No voltage
			Defogger switch ON	Battery positive voltage

If the circuit is not as specified, refer to BE–192 wiring diagram and inspect the circuits connected to other parts.

SLIDING ROOF SYSTEM

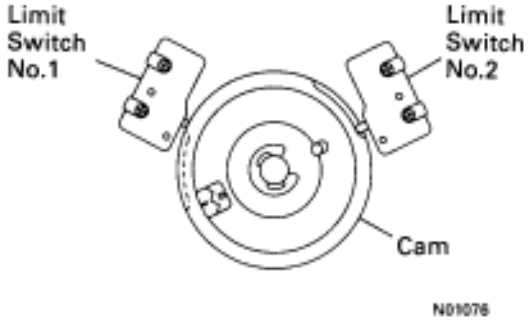
DESCRIPTION

Standby Operation

Current flows from the DOME fuse to terminal 12 of the sliding roof control relay (hereafter called relay). When the ignition switch is ON, the current flows from the power main relay to terminal 6 of the relay.

Operation

1. Limit Switch operation



Roof Position		Fully Open	Momentary Stop		Fully Closed	Down	Up
Function		← Sliding Period →			Idling Period	← Tilting Period →	
Limit Switch No.1	ON						
	OFF						
Limit Switch No.2	ON						
	OFF						
Sliding Roof Control Switch	OPEN	O	O	O	O	×	
	CLOSE	O	O	O	×	×	
	UP	×	×	×	O	O	
	DOWN	×	×	×	×	O	

O: Operational x: Non–operational

2. OPEN operation

When the switch on the ”OPEN” side of the control switch is pushed, continuity is produced between terminal 1 of the relay and body ground. Then the relay operates, the current flows through terminal 6 of the relay → terminal 5 → terminal 1 of the sliding roof motor → terminal 3 → terminal 4 of the relay → terminal 11 → the body ground, and the motor starts to run in order to open the sliding roof.

3. CLOSE operation

When the switch on the ”CLOSE” side of the control switch is pushed, continuity is produced between terminal 2 of the relay and body ground. Then the relay operates, the current flows through terminal 6 of the relay → terminal 4 → terminal 3 of the sliding roof motor → terminal 1 → terminal 5 of the relay → terminal 11 → the body ground, and the motor starts to run in order to close the sliding roof.

Momentary Stop

When the sliding roof reaches about 200 mm (7.87 in.) short of the fully closed position, the limit switch No.1 is turned from ON to OFF, so there is no continuity between terminal 4 of the relay and body ground. As a result, the sliding roof stops at that position.

4. TILT UP operation

When the switch on the ”UP” side of the control switch is pushed, continuity is produced between terminal 3 of the relay and body ground. Then the relay operates, the current flows through terminal 6 of the relay → terminal 4 → terminal 3 of the sliding roof motor → terminal 1 → terminal 5 of the relay → terminal 11 → the body ground, and the motor starts to run in order to tilt up the sliding roof.

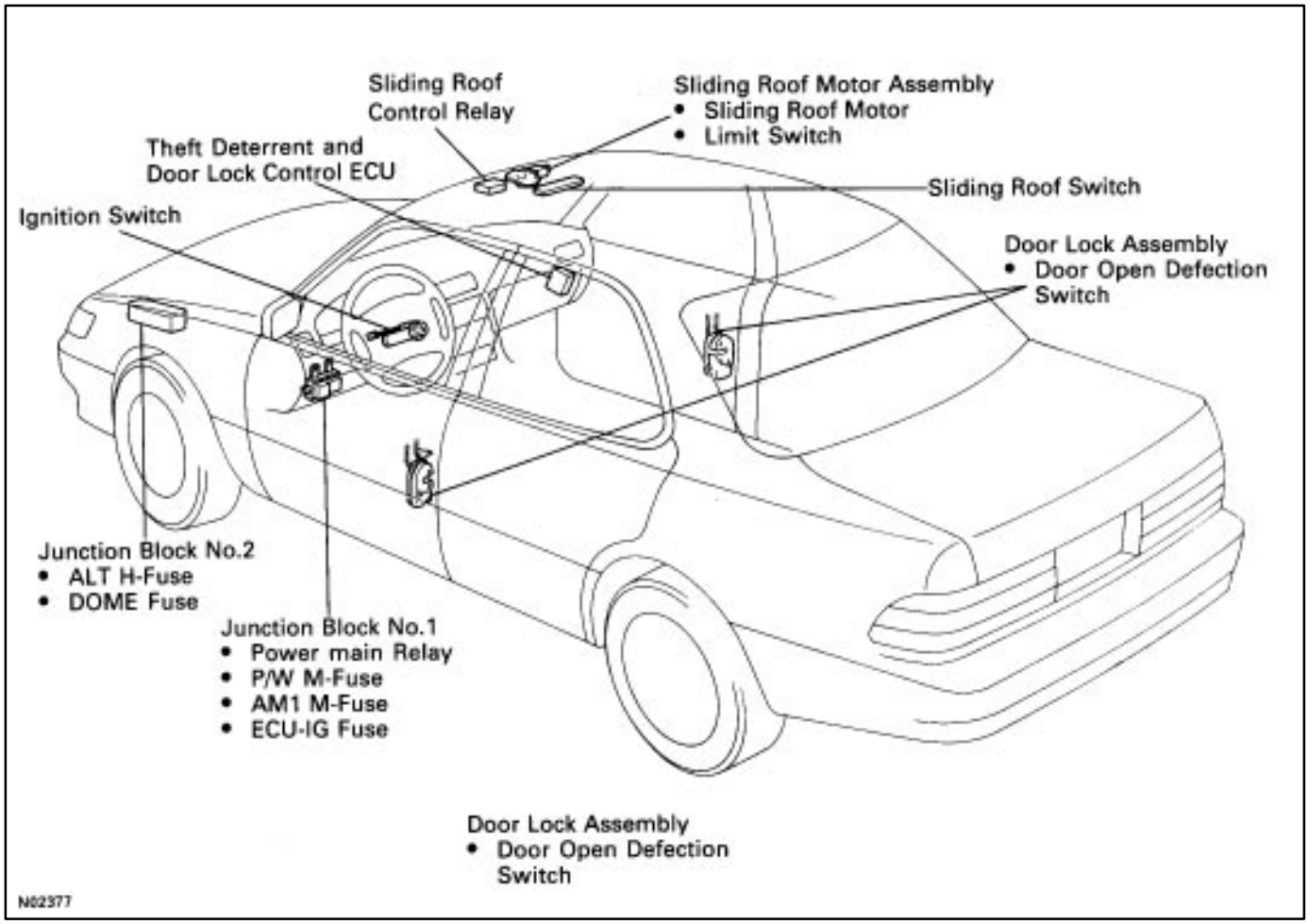
5. TILT DOWN operation

When the switch on the ”DOWN” side of the control switch is pushed, continuity is produced between terminal 7 of the relay and body ground. Then the relay operates, the current flows through terminal 6 of the relay → terminal 5 → terminal 1 of the sliding roof motor → terminal 3 → terminal 4 of the relay → terminal 11 → the body ground, and the motor starts to run in order to tilt down the sliding roof.

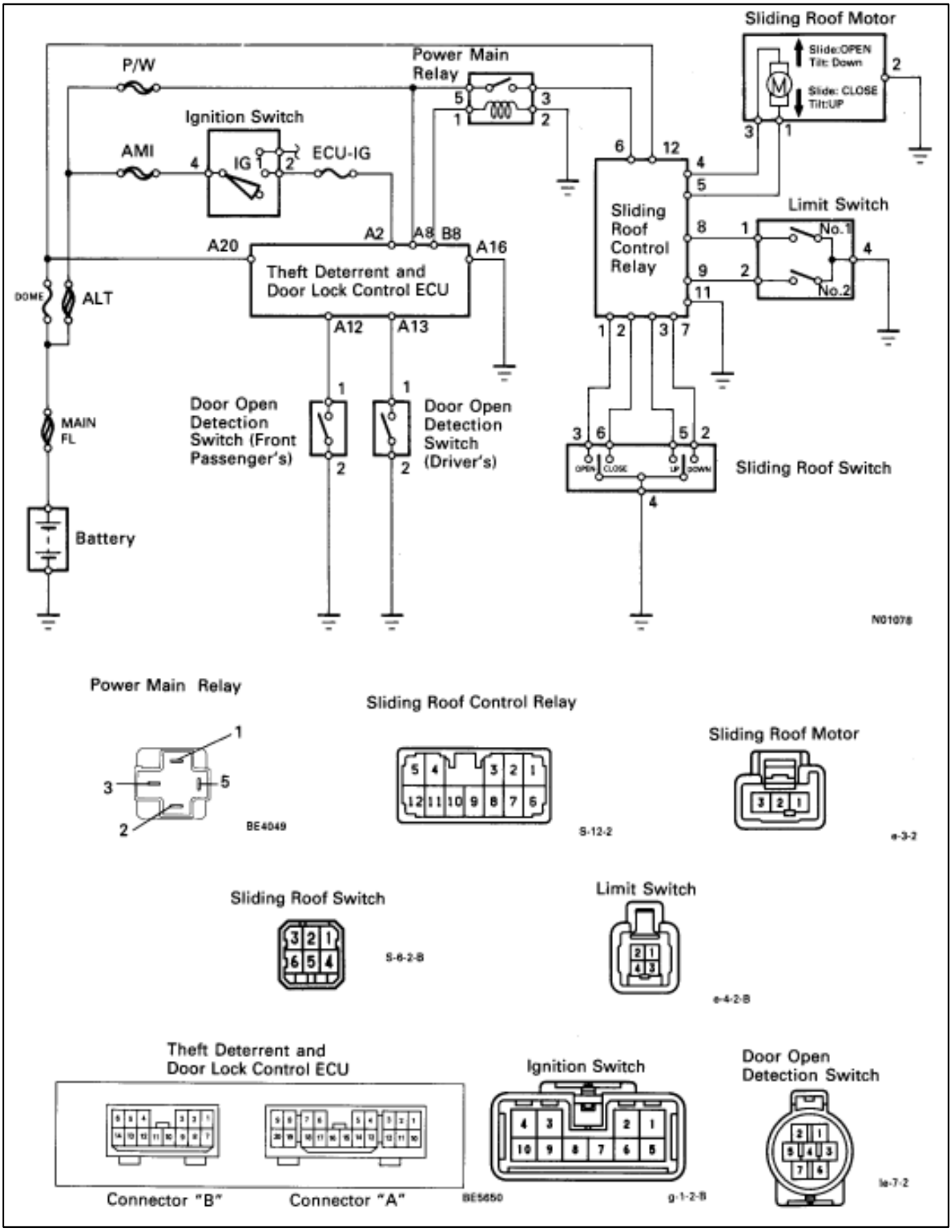
6. TILT UP REMINDER SYSTEM

If the ignition switch is turned from ON to OFF or ACC and the sliding roof remains tilted up, after 60 seconds have elapsed or either the driver or passenger door is opened, a buzzer will sound for approx. 8 seconds as a reminder that the sliding roof is tilted up.

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See page / Part name / Trouble	ALT H-Fuse	DOME Fuse	P/W M-Fuse	Theft Deterrent and Door Lock Control ECU	Power Main Relay	Sliding Roof Control Relay	Sliding Roof Switch	Sliding Roof Motor	Sliding Roof Motor (Stones to foreign material trapped in motor assembly)	Limit Switch	Ignition Switch	Door Open Detection Switch	ECU-IG Fuse	Wire Harness
See page	BE–6, 22	BE–6, 20	BE–6, 20	BE–355	BE–20, 179	BE–204	BE–202	BE–202	-	BE–205	BE–29	BE–388	BE–6, 20	-
*1 Sliding roof system does not operate	1		2	3										4
*2 Sliding roof system does not operate			3	4	5	7	6	8			2		1	9
Sliding roof system operates abnormally						1	3			2				4
Sliding roof system stops operation half way						1	3		4	2				
Buzzer does not sound		1				2								3
Buzzer sounds abnormally						1								
"Key-off Sliding Roof" operation does not operate		1		2							4	5	3	6

*1: Door Lock does not operate
*2: Door Lock is normal

POWER MAIN RELAY

POWER MAIN RELAY INSPECTION

(See Power Main Relay on page BE–179)

SLIDING ROOF SWITCH

SLIDING ROOF SWITCH REMOVAL AND INSTALLATION

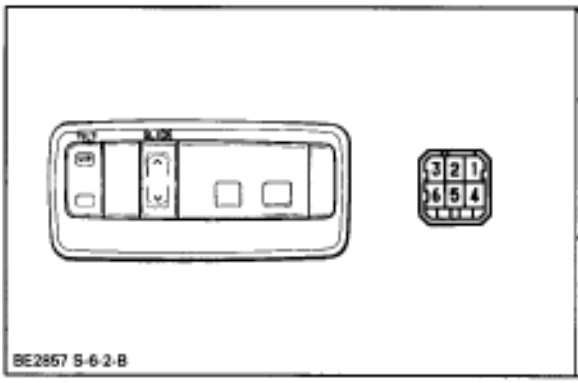
(See Sliding Roof on page BO–93)

SLIDING ROOF SWITCH INSPECTION

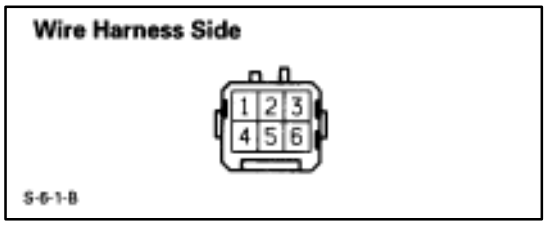
INSPECT SLIDING ROOF SWITCH

(Continuity)

Inspect the switch continuity between terminals.



Switch position		Terminal 2	3	4	5	6
SLIDE	OPEN		○	○		
	OFF					
	CLOSE			○		○
TILT	DOWN	○		○		
	OFF					
	UP			○	○	



If continuity is not as specified, replace the switch.

(Switch Circuit)

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

Check for	Tester connection	Condition	Specified value
Continuity	4–Ground	Constant	Continuity

If the circuit is not as specified, refer to BE–200 wiring diagram and inspect the circuits connected to other parts.

SLIDING ROOF MOTOR

SLIDING ROOF MOTOR REMOVAL AND INSTALLATION

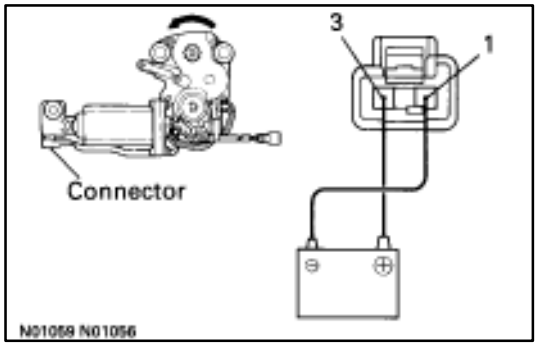
(See Sliding Roof on page BO–93)

SLIDING ROOF MOTOR INSPECTION

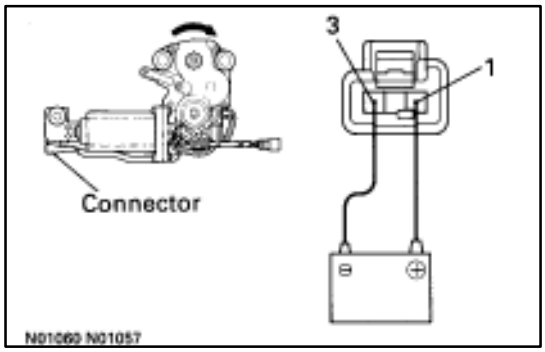
INSPECT SLIDING ROOF MOTOR

(Motor Operation)

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 1, check that the motor turns to counterclockwise (moves to the close side).

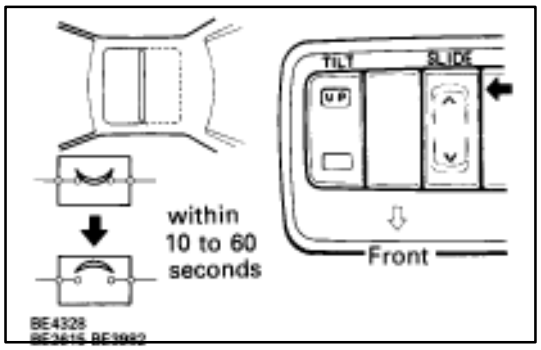


(b) Reverse the polarity, check that the motor turns to clockwise (moves to the open side).
If operation is not as specified, replace the motor.

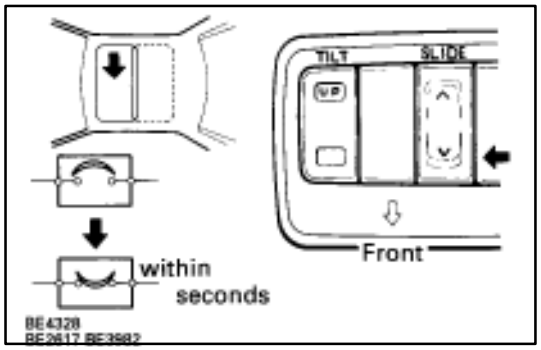


(Circuit Breaker Operation)

(a) With the sliding roof in the fully opened position, hold the sliding roof switch in "OPEN" position and check that there is a circuit breaker operation noise within 10 to 60 seconds.

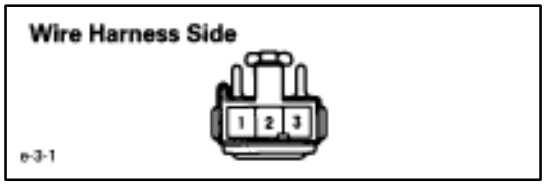


(b) With the sliding roof in fully opened position, hold the sliding roof switch in "CLOSE" position and check that the sliding roof begins to close within 60 seconds.
If operation is not as specified, replace the motor.



(Circuit)

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



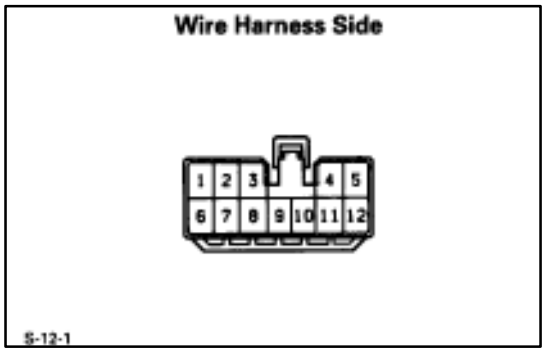
Check for	Tester connection	Condition	Specified value
Continuity	2–Ground	Constant	Continuity

If the circuit is not as specified, refer to BE–200 wiring diagram and inspect the circuits connected to other parts.

SLIDING ROOF CONTROL RELAY

SLIDING ROOF CONTROL RELAY REMOVAL AND INSTALLATION

(See Sliding Roof on page BO–93)



SLIDING ROOF CONTROL RELAY INSPECTION

INSPECT SLIDING ROOF CONTROL RELAY

(Circuit)

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

Check for	Tester connection	Condition		Specified value
Continuity	1 – Ground	Sliding roof control switch position (SLIDE)	OFF or CLOSE	No continuity
			OPEN	Continuity
	2 – Ground	Sliding roof control switch position (SLIDE)	OFF or OPEN	No continuity
			CLOSE	Continuity
	3 – Ground	Sliding roof control switch position (TILT)	OFF or DOWN	No continuity
			UP	Continuity
	4 – Ground	Constant		No continuity
	4 – 5	Constant		Continuity
	5 – Ground	Constant		No continuity
	7 – Ground	Sliding roof control switch position (TILT)	OFF or UP	No continuity
			DOWN	Continuity
	8 – Ground	No. 1 limit switch position	OFF (Sliding roof tilted up or open approx. 200 mm (7.87 in.))	No continuity
			ON (Except for conditions mentioned above)	Continuity
	9 – Ground	No. 2 limit switch position	OFF (Sliding roof closed)	No continuity
			ON (Sliding roof open)	Continuity
	11 – Ground	Constant		Continuity
Voltage	6 – Ground	Ignition switch position	LOCK or ACC	*No voltage
			ON	Battery positive voltage
	12 – Ground	Constant		Battery positive voltage

*: Exceptions: During 60 second period after ignition switch ON OFF (ACC) or until driver or passenger door is opened after ignition switch ON OFF (ACC).

If circuit is as specified, replace the relay.

SLIDING ROOF LIMIT SWITCH

LIMIT SWITCH REMOVAL AND INSTALLATION

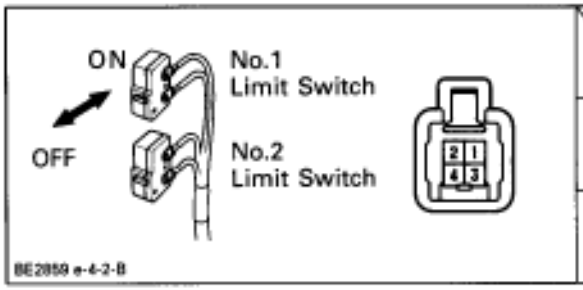
(See Sliding Roof on page BO–93)

LIMIT SWITCH INSPECTION

INSPECT LIMIT SWITCH

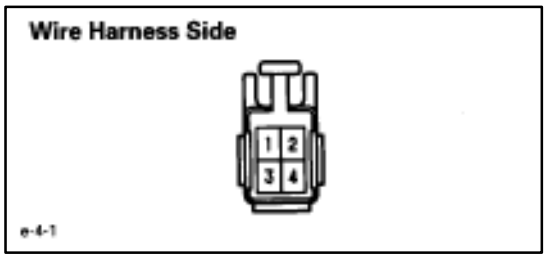
(Continuity)

Inspect the switch continuity between terminals.



Switch position		Terminal 1	Terminal 2	Terminal 4
No.1 limit switch	OFF (SW pin released)			
	ON (SW pin pushed in)	○		○
No.2 limit switch	OFF (SW pin released)			
	ON (SW pin pushed in)		○	○

If continuity is not as specified, replace the switch.



(Circuit)

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

Check for	Tester connection	Condition	Specified value
Continuity	4–Ground	Constant	Continuity

If the circuit is not as specified, refer to BE–200 wiring diagram and inspect the circuits connected to other parts.

THEFT DETERRENT AND DOOR LOCK CONTROL ECU

(See page BE–355)

DOOR OPEN DETECTION SWITCH

(See page BE–388)

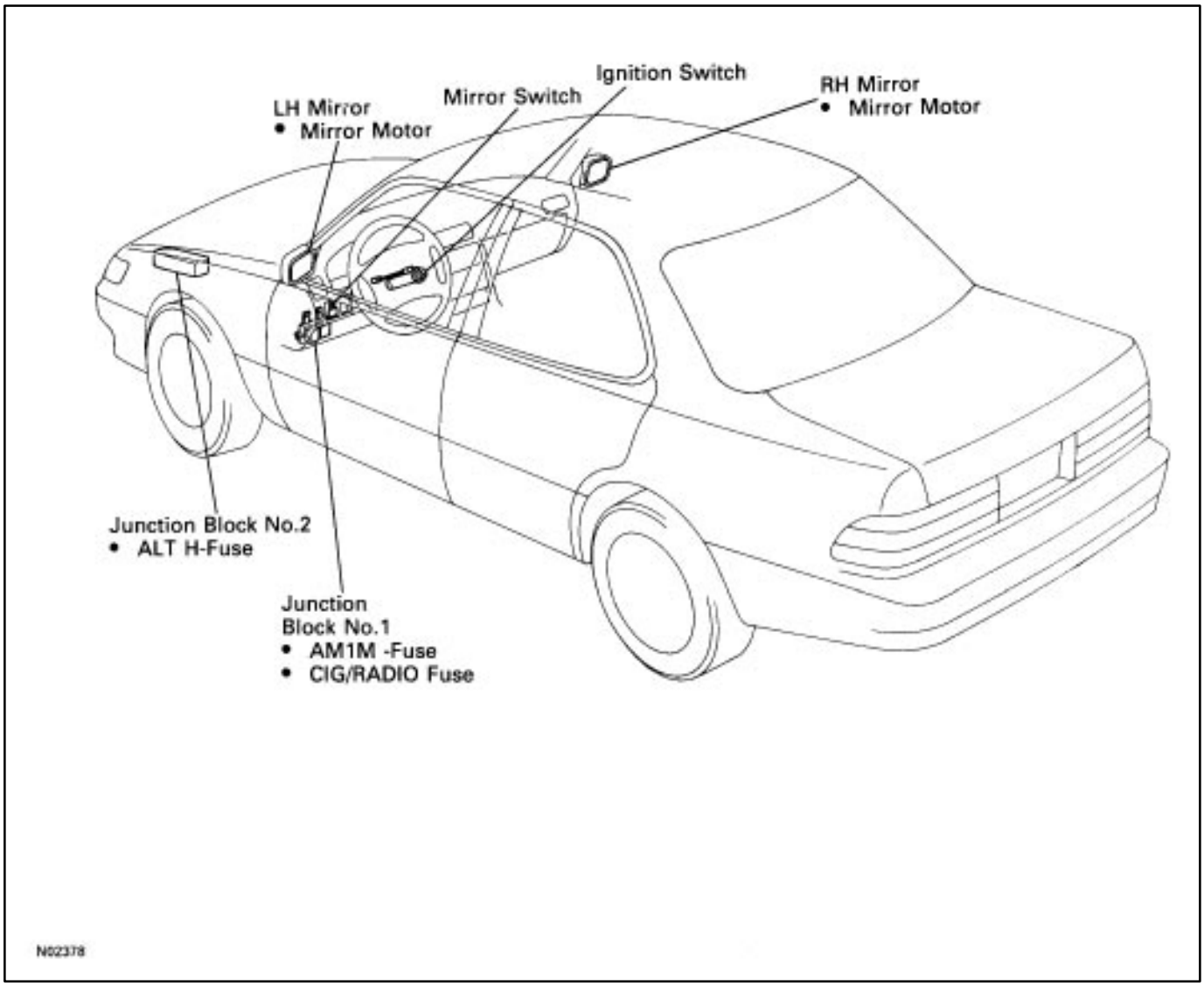
POWER MIRROR CONTROL SYSTEM

DESCRIPTION

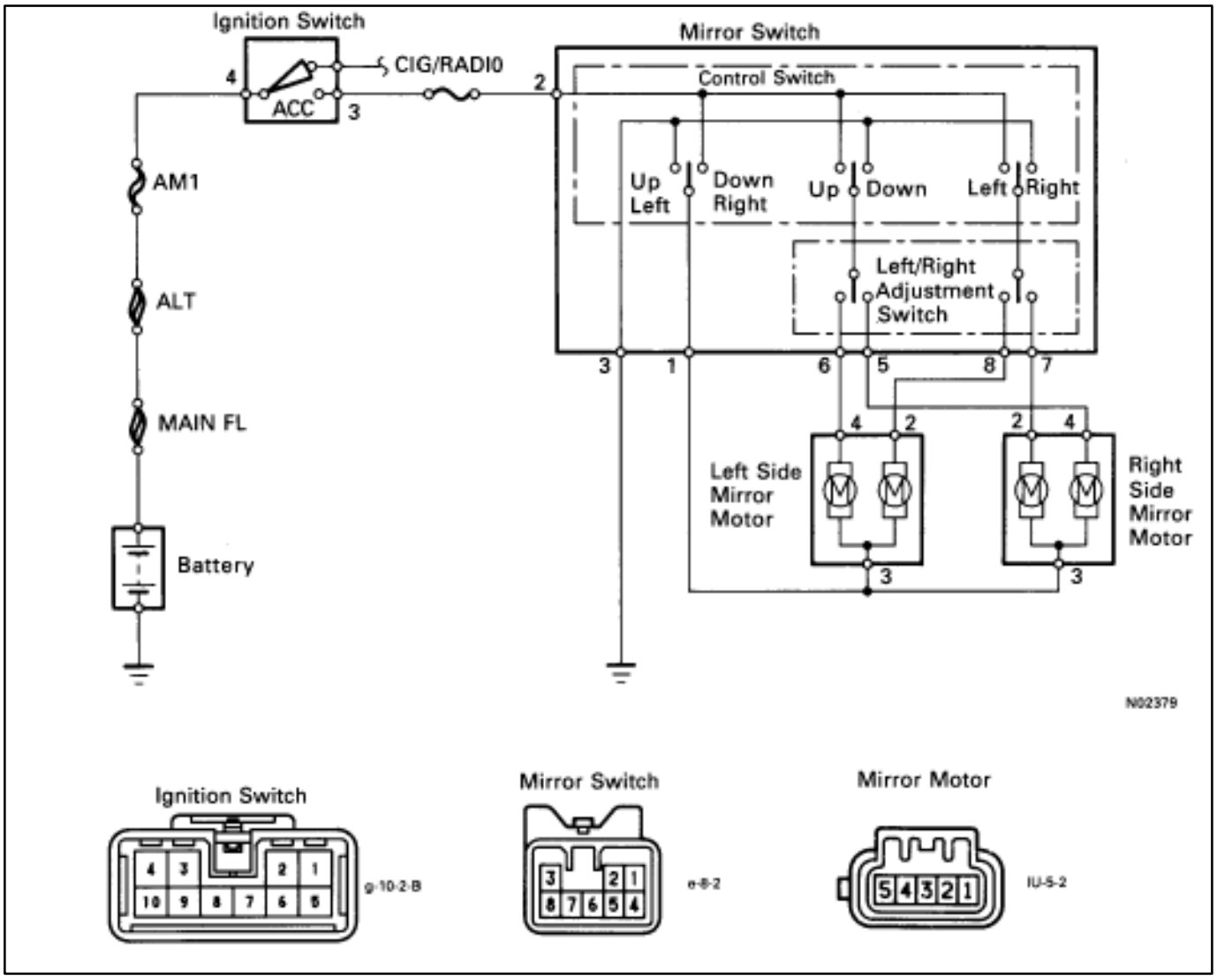
The Power Mirror Control System carries out mirror left/right and up/down adjustments electrically when the Mirror Switch is operated. However, this system has no memory or position return functions. The component parts of this system and their functions are described in the following table.

Parts Name	Function
Mirror Switch	This switch is supplied with current from the CIG/RADIO fuse. It sends current to each motor, controlling the motor's direction of rotation and turning the current ON and OFF.
Mirror Motor	These motors operate on current from the Mirror Switch moving the various parts of the mirror directly.

PARTS LOCATION



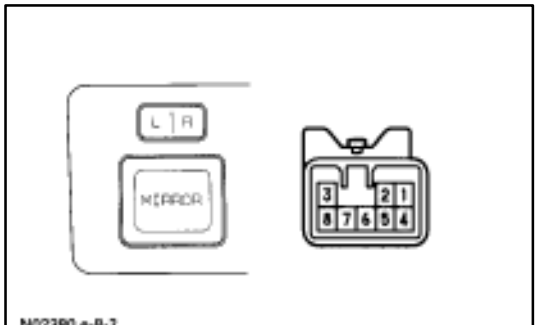
WIRING AND CONNECTOR DIAGRAMS



TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See page / Part name / Trouble	CIG/RADIO Fuse (BE–6, 20)	Mirror Switch (BE–209)	Mirror Motor (BE–209)	Wire Harness
Mirror does not operate	1	2	3	4
Mirror operates abnormally		1	2	3



MIRROR SWITCH

MIRROR SWITCH REMOVAL AND INSTALLATION

(See Instrument Panel on page BO–107)

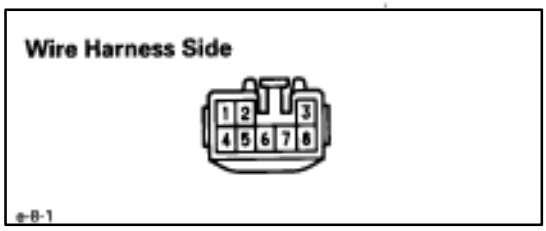
MIRROR SWITCH INSPECTION

INSPECT MIRROR SWITCH

(Continuity)

Inspect the switch continuity between terminals.

Left/Right adjustment switch position	LEFT SIDE					OFF			RIGHT SIDE				
Terminal / Switch position	1	2	3	6	8	1	2	3	1	2	3	5	7
OFF													
UP	○		○			○		○	○		○		
		○		○						○		○	
DOWN	○	○				○	○		○	○			
			○	○							○	○	
LEFT	○		○			○		○	○		○		
		○			○					○			○
RIGHT	○	○				○	○		○	○			
			○		○						○		○



If continuity is not as specified, replace the switch.

(Switch Circuit)

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

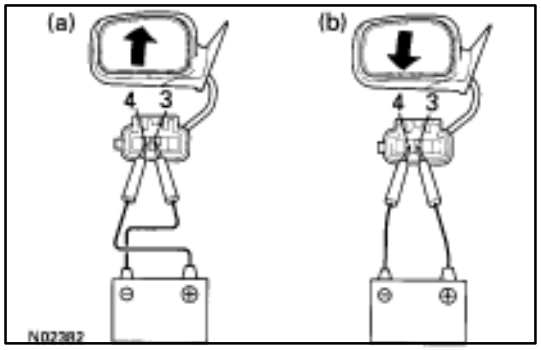
Chack for	Tester connection	Condition		Specified value
Voltage	2–Ground	Ignition switch position	OFF	No voltage
			ACC or ON	Battery positive voltage
Continuity	3–Ground	Constant		Continuity

If the circuit is not as specified, refer to BE–207 wiring diagram and inspect the circuits connected to other parts.

MIRROR MOTOR

OUTSIDE MIRROR ASSEMBLY REMOVAL AND INSTALLATION

(See Outside Rear View Mirror on page BO–34)

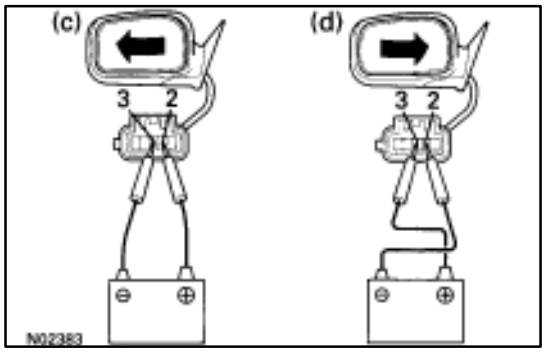


MIRROR MOTOR INSPECTION

1. INSPECT MIRROR MOTOR
(Operation)

(a) Connect the positive (+) lead from the battery to terminal 4 and negative (–) lead to terminal 3, check that the mirror turns upward.

(b) Reverse the polarity, check that the mirror turns to downward.

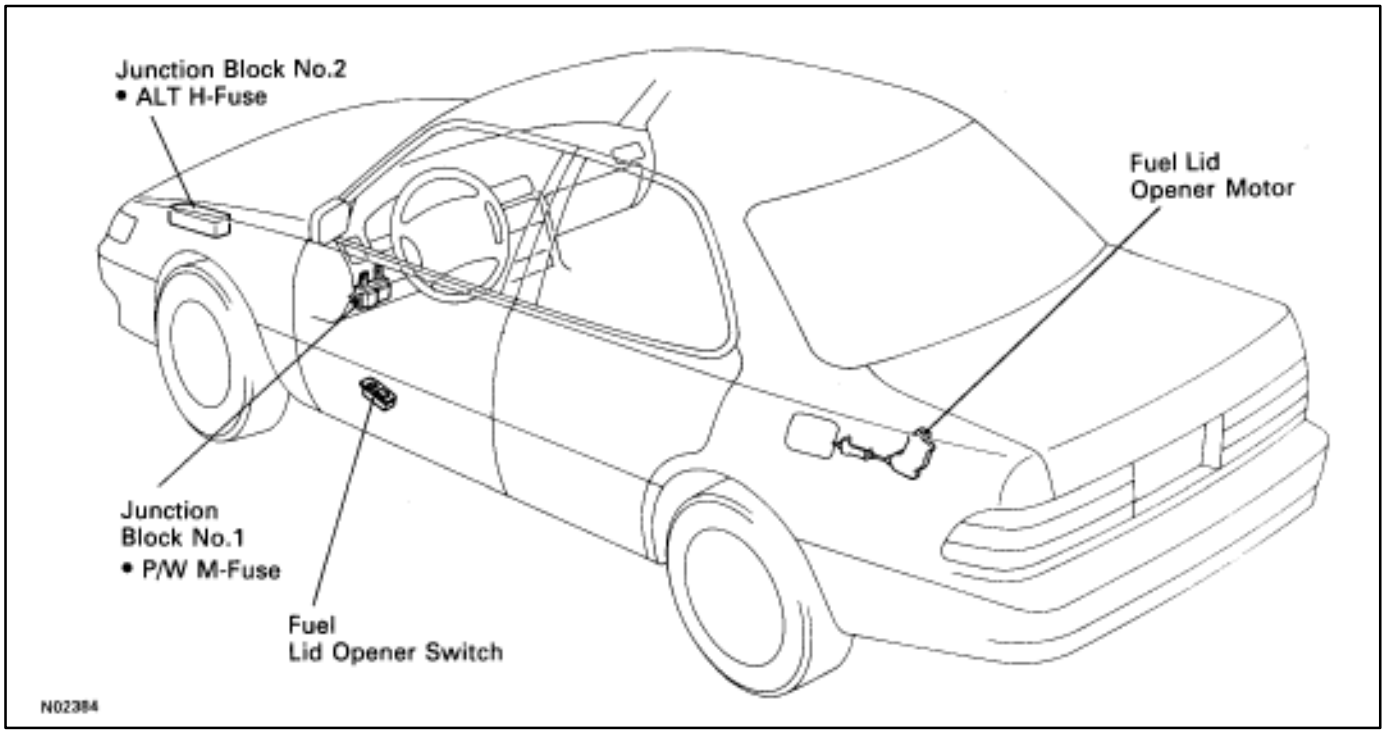


(c) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 3, check that the mirror turns to left side.

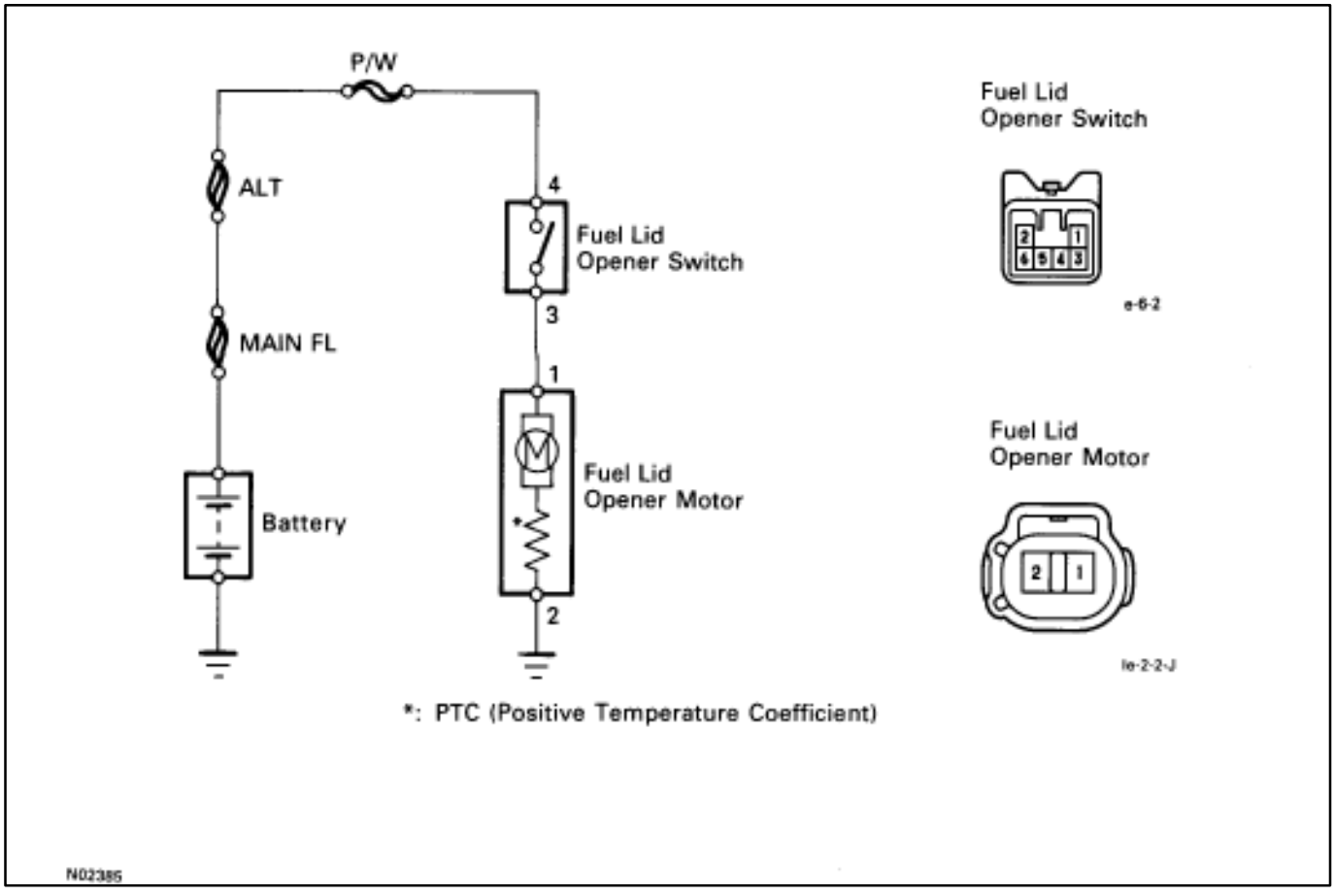
(d) Reverse the polarity, check that the mirror turns to right side. If operation is not as specified, replace the mirror.

FUEL LID OPENER SYSTEM

PARTS LOCATION



WIRING AND CONNECTOR DIAGRAMS



TROUBLESHOOTING

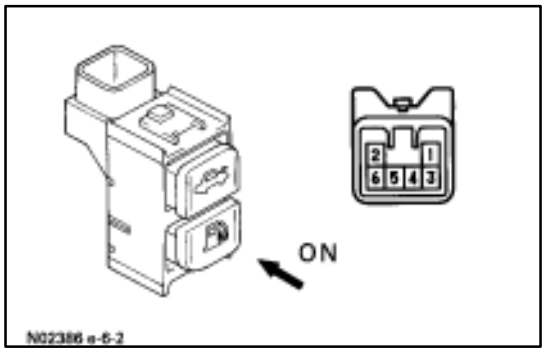
You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See page / Part name / Trouble	BE–6, 20 P/W M–Fuse	BE–213 Fuel Lid Opener Switch	BE–213 Fuel Lid Opener Motor	– Wire Harness
Fuel lid opener system does not operate	1	2	3	4

FUEL LID OPENER SWITCH

FUEL LID OPENER SWITCH REMOVAL AND INSTALLATION

(See page BO–34)



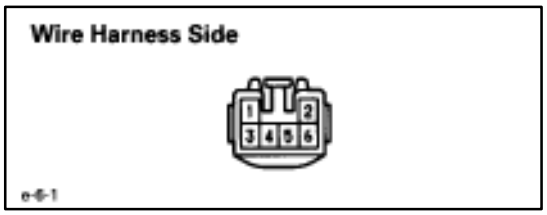
FUEL LID OPENER SWITCH INSPECTION

INSPECT FUEL LID OPENER SWITCH

(Continuity)

(a) Check that there is continuity between terminals 3 and 4 with the switch ON.
(Switch button pushed)

(b) Check that there is no continuity between terminals 3 and 4 with the switch OFF.
(Switch button released)



(Circuit)

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

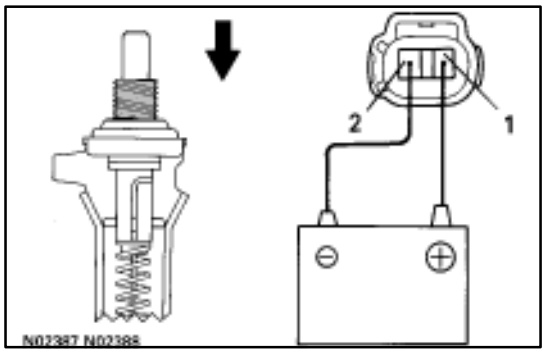
Check for	Tester connection	Condition	Specified value
Voltage	4–Ground	Constant	Battery positive voltage

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

FUEL LID OPENER MOTOR

FUEL LID OPENER MOTOR REMOVAL AND INSTALLATION

(See page BO–58)



FUEL LID OPENER MOTOR INSPECTION

(Operation)

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor operates in the open direction.
If operation is not as specified, replace the motor.

(Motor Circuit)

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

Check for	Tester connection	Condition		Specified value
Continuity	2–Ground	Constant		Continuity
Voltage	1–Ground	Fuel lid opener switch	OFF	No voltage
			ON	Battery positive voltage

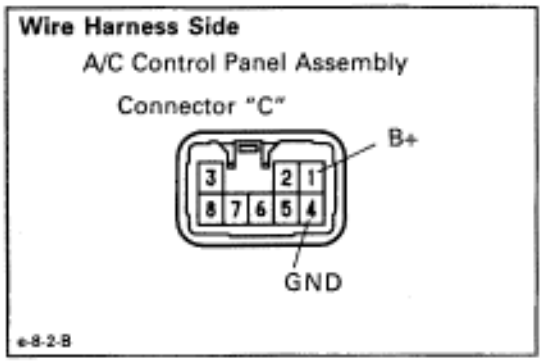
If the circuit is not as specified, refer to BE–211 wiring diagram and inspect the circuits connected to other parts.

CLOCK
TROUBLESHOOTING

HINT: Troubleshoot the clock according to the table below.

Clock will not operate	1
Clock loses or gains time	2

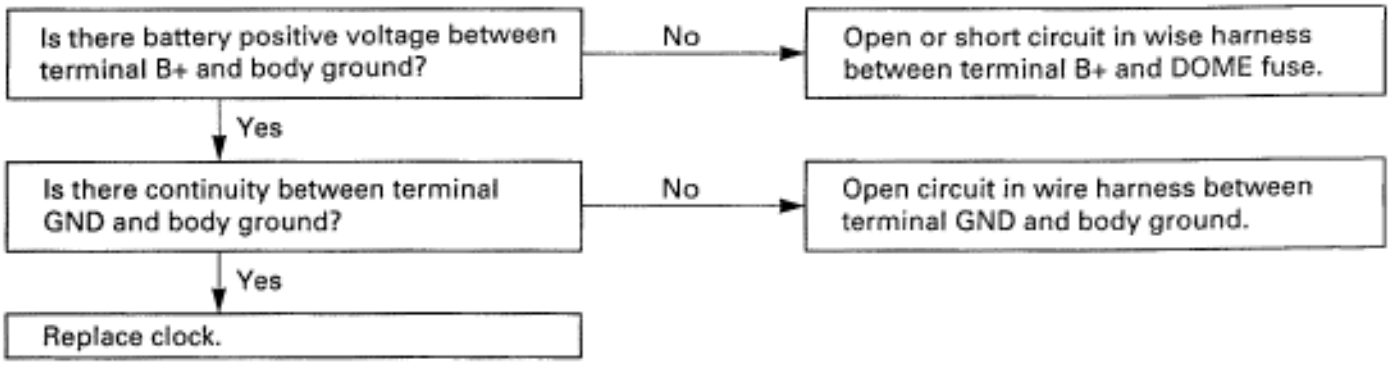
1 CLOCK WILL NOT OPERATE



(a) Check that the battery voltage is 10–16 V.
If voltage is not as specified, replace the battery.

(b) Check that the DOME fuse is 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.



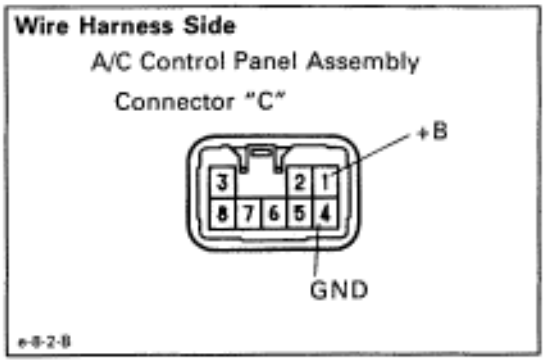
2 CLOCK LOSES OR GAINS TIME

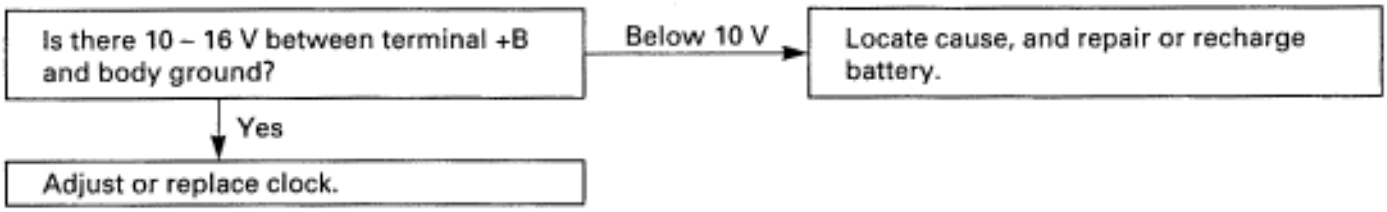
(a) Check that the battery positive voltage is 10–16 V.
If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.
Allowable error (par day): ± 2.0 seconds
If the error exceeds the allowable error, replace the clock.

(c) Check if the clock adjusting button is sticking in position and has failed to return.
If the button has not returned, repair or replace the clock.

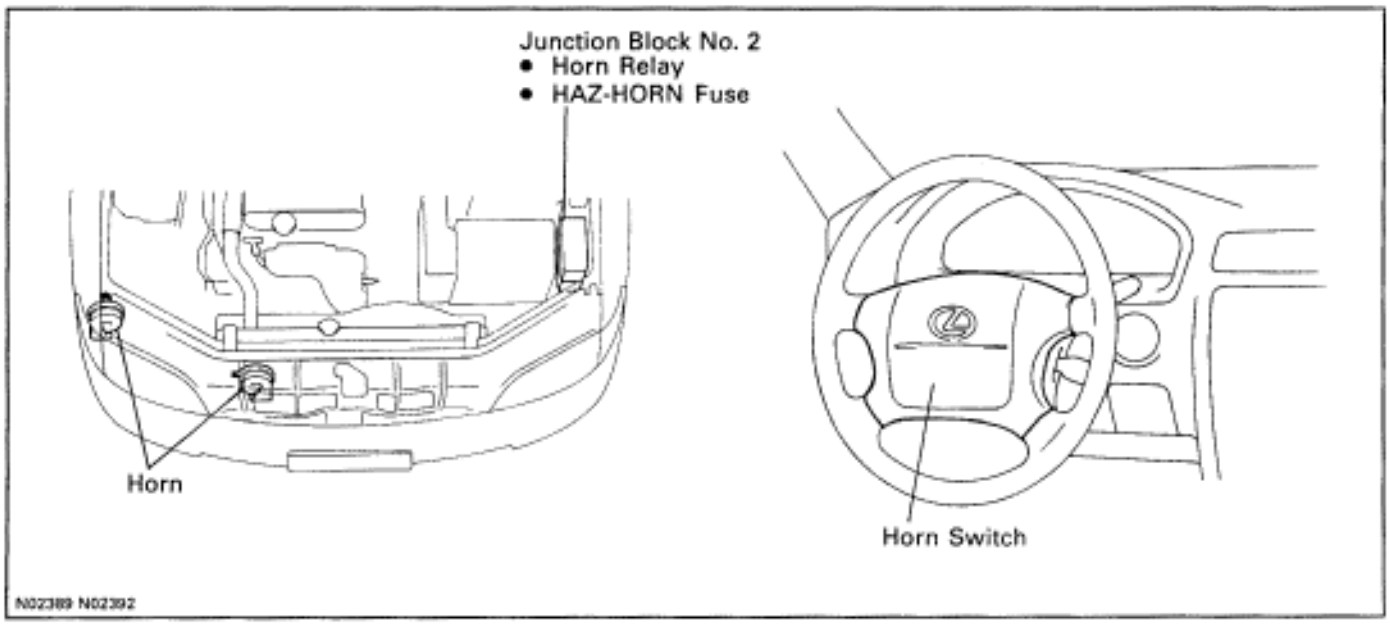
(d) Troubleshoot the clock as follows.
HINT: Inspect the connector on the wire harness side.



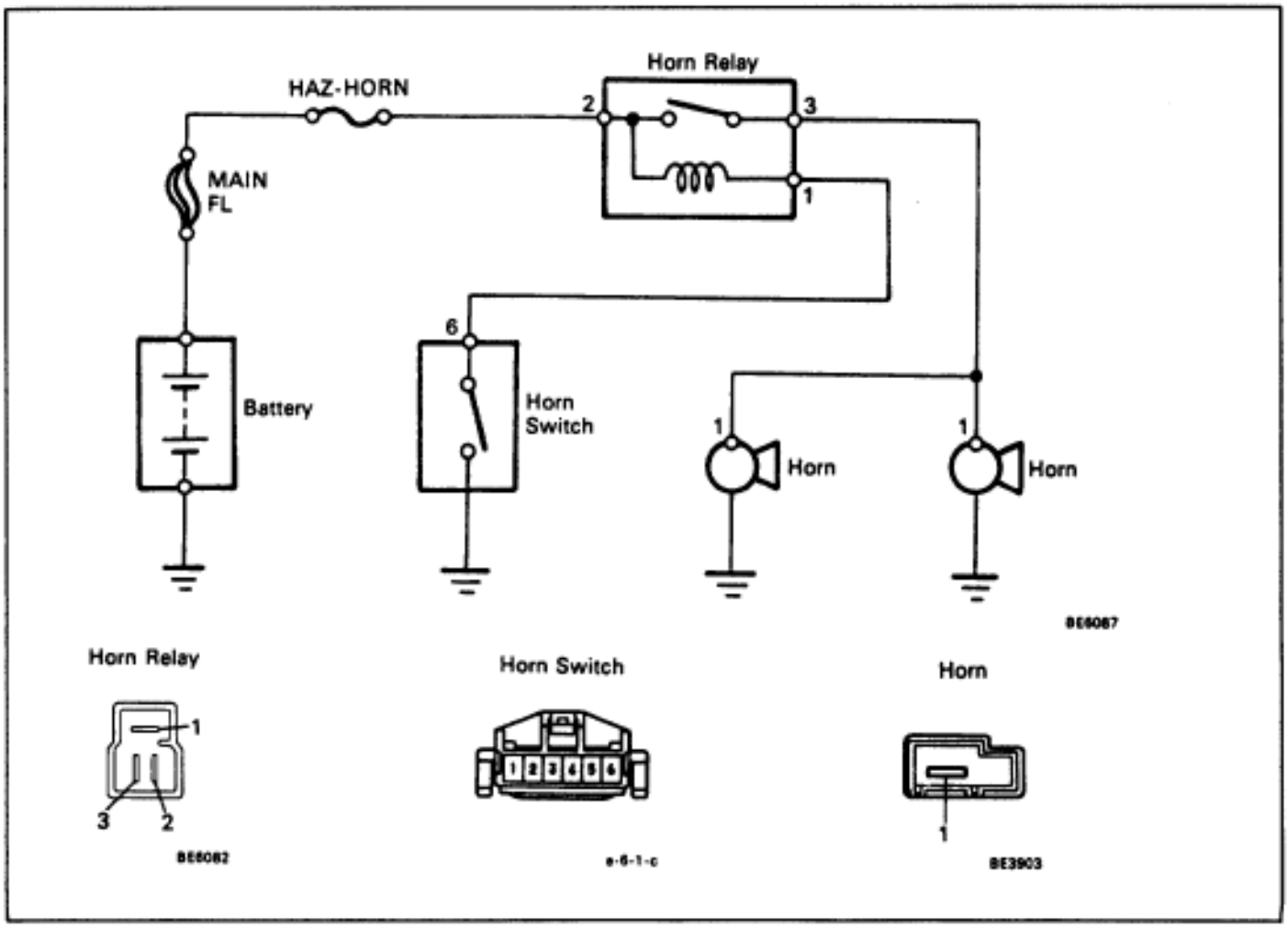


HORN SYSTEM

PARTS LOCATION



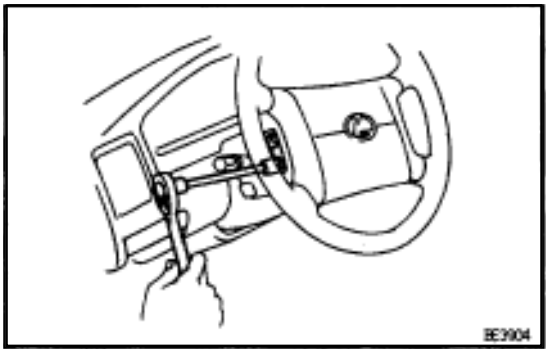
WIRING AND CONNECTOR DIAGRAMS



TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace these parts.

See Page / Part name / Trouble	BE–6, 22 HAZ-HORN Fuse	BE–22, 262 Horn Relay	BE–261 Horn Switch	BE–261 Horn	Wire Harness
Horn system does not operate	1	2	3	4	5
Horns blow all the time		1	2		3
One horn operates but other horn does not operate				1	2
Horns operate abnormally		1		2	3

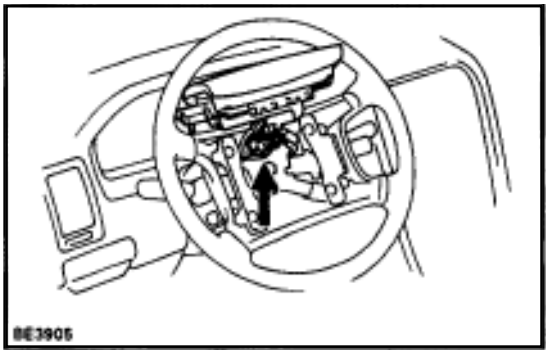


HORN SWITCH

HORN SWITCH INSPECTION

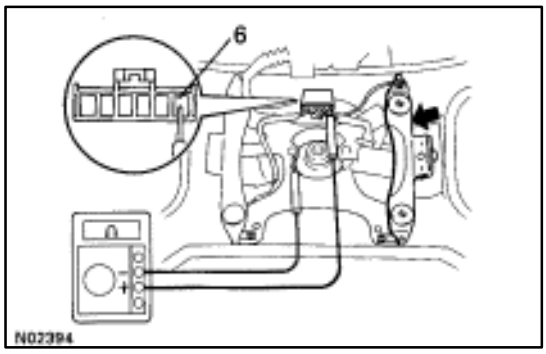
INSPECT HORN SWITCH

(a) Disconnect the negative (–) terminal from the battery.
(b) Remove the left and right covers from the steering wheel.

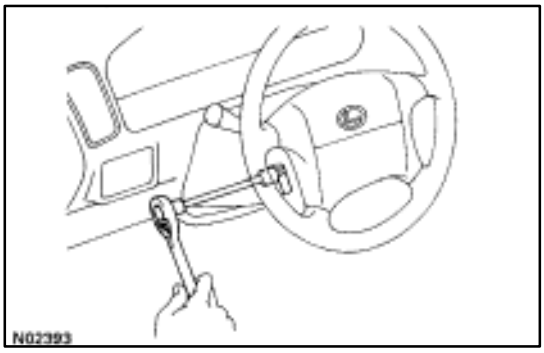


(c) Using a torx wrench, loosen the 4 bolts.

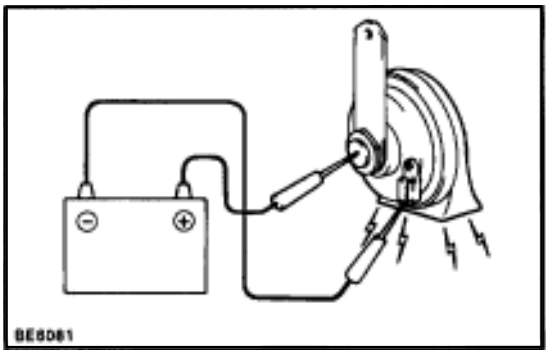
(d) Pull up the horn pad and place it on the steering column, as shown.
HINT: Do not disconnect the connector from the horn pad.
(e) Disconnect the connector from the slip ring.



(f) Check that there is no continuity between terminal 6 of the connector and body ground.
(g) Check that there is continuity 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 wrench, tighten the 4 bolts.
Torque: 7.0 N·m (72 kgf·cm, 5.1 ft.·lbf)
(i) Install the left and right covers.
(j) Connect the negative (–) terminal to the battery.



HORN

HORN INSPECTION

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.

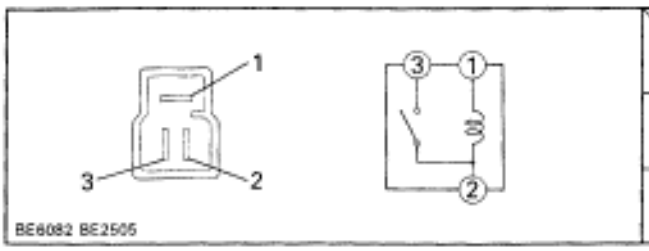
HORN RELAY

HORN RELAY INSPECTION

INSPECT HORN RELAY

(Continuity)

Inspect relay continuity between terminals.



Terminal / Condition	1	2	3
Constant	○–⌇⌇–○		
Apply battery positive voltage to terminals 1 and 2.		○—○	

If operation is not as specified, replace the relay.

If continuity is not as specified, replace the relay.

(Relay Circuit)

(See page BE–22)

POWER SEAT CONTROL SYSTEM

DESCRIPTION

The Power Seat Control System carries out seat slide, front vertical, rear vertical and reclining position adjustments electrically when the Power Seat Switch operated. However, this system has no memory or position return functions. The component parts of this system and their functions are described in the following table.

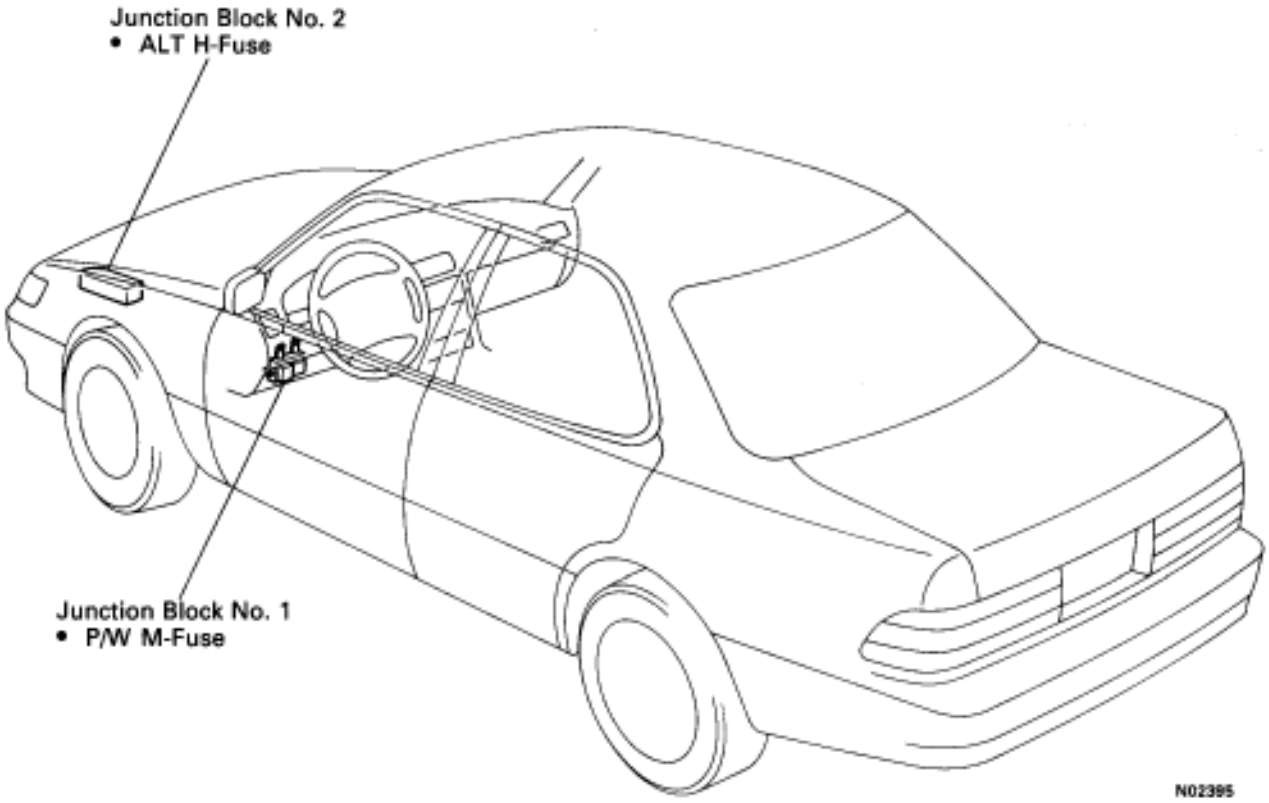
Parts Name	Function
Power Seat Switch	This switch is supplied with current from the P/W M–fuse. It sends current to each motor, controlling the motor's direction of rotation and turning the current ON and OFF.
*Motor	These motors operate on current from the Power Seat Switch, moving the various parts of the seat directly. Each motor has a built–in circuit breaker.

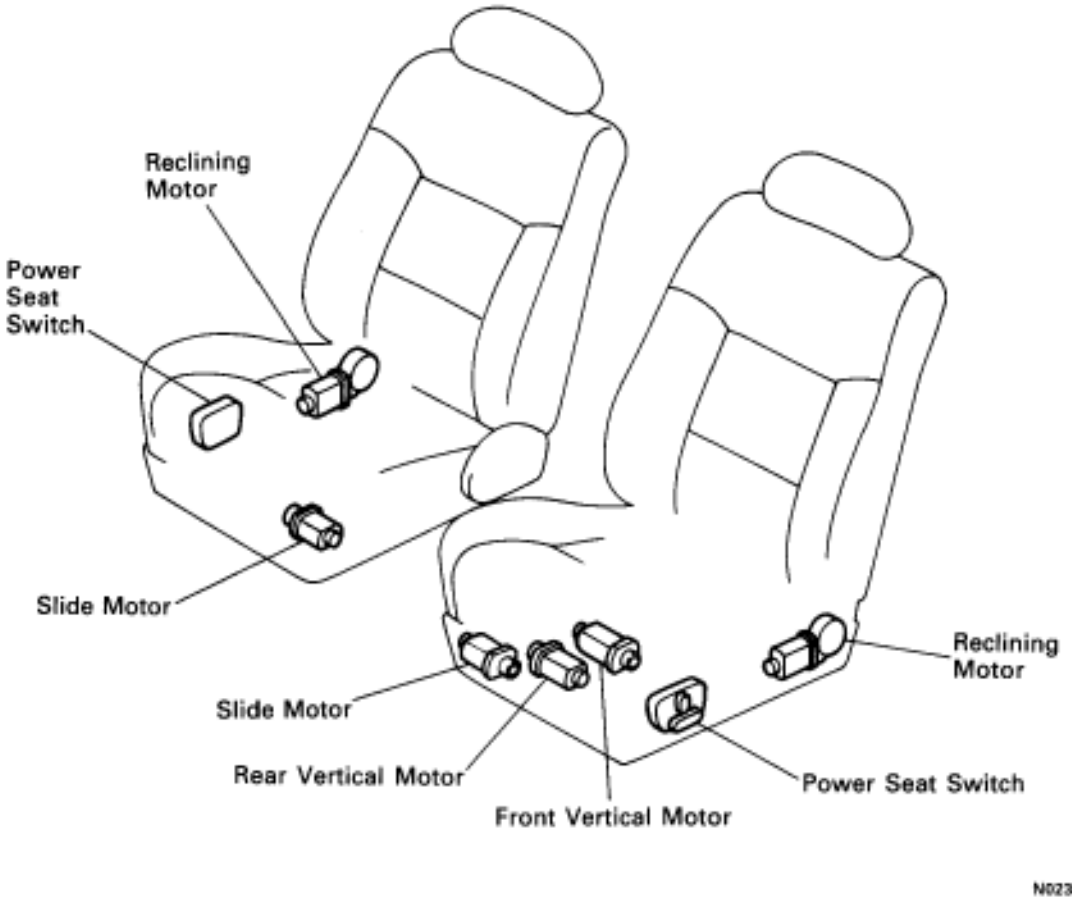
*: Slide, Front Vertical, Rear Vertical

Motors contained in each seat are described in the following table.

Motor / Seat	Slide Motor	Front Vertical Motor	Rear Vertical Motor	Rear Vertical Motor
Driver's Seat				
Passenger's Seat				

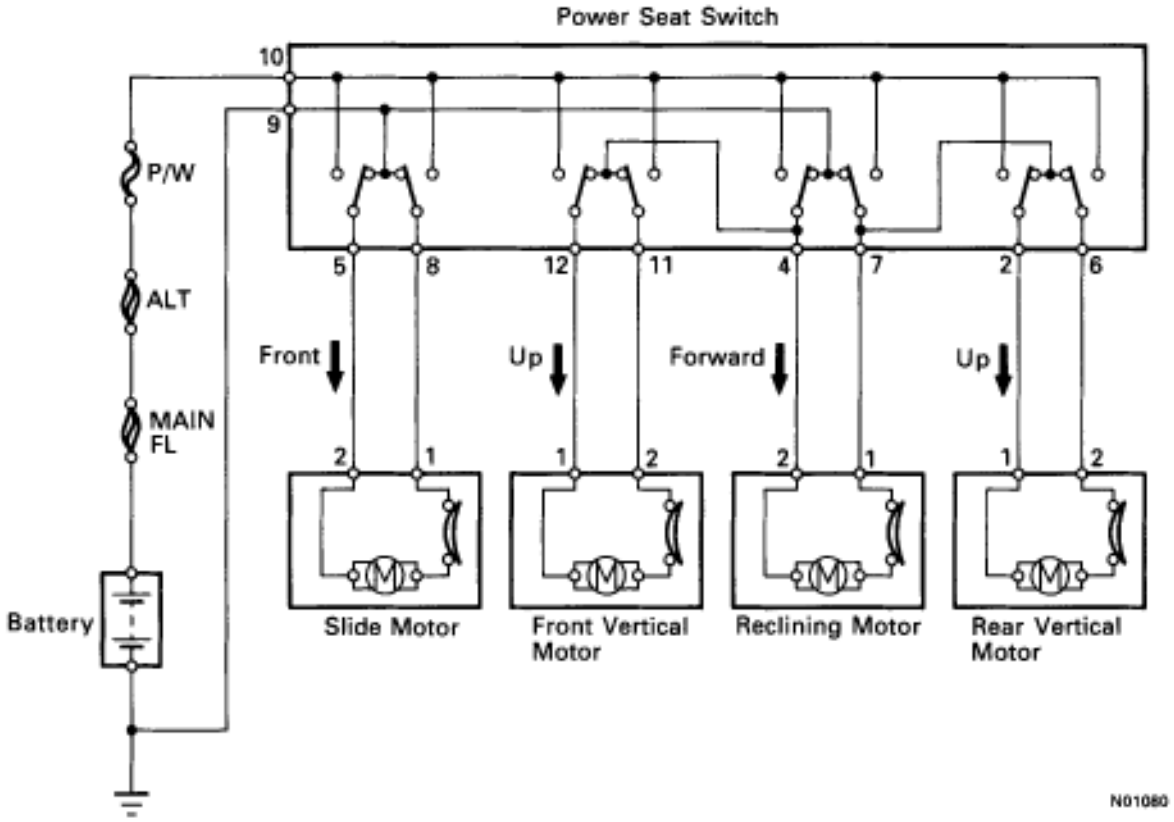
PARTS LOCATION



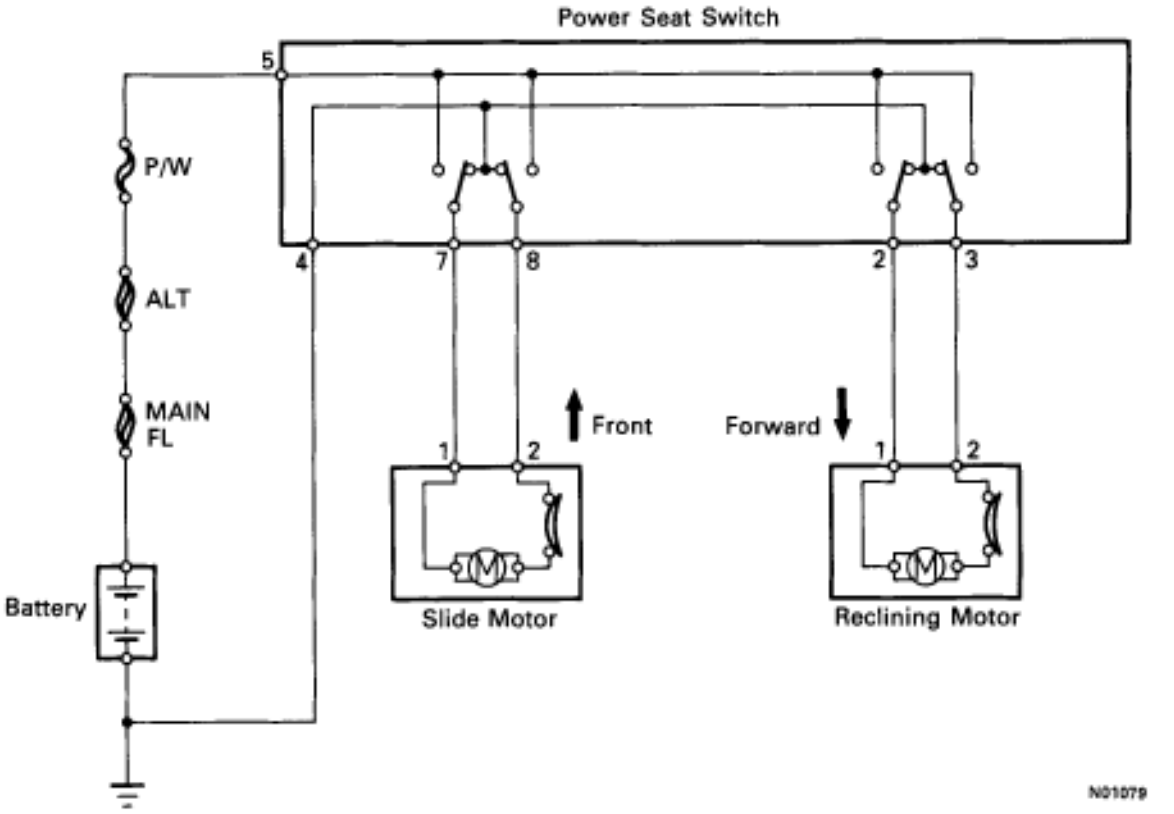


WIRING DIAGRAMS

Driver's Seat



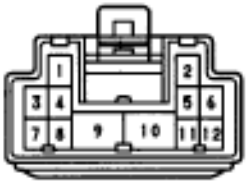
Passenger's Seat



CONNECTOR DIAGRAMS

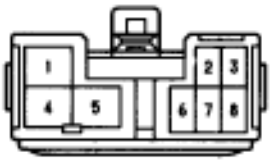
Power Seat Switch

(Driver's Side)



eg-12-1

(Passenger's side)

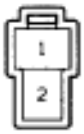


eg-8-1

Reclining Motor

e-2-2-A

Slide Motor, Front Vertical Motor,
Rear Vertical Motor



H-2-2

TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See Page / Part name / Trouble	BE–6, 22	BE–6, 20	BE–268	BE–269	BE–271	BE–273	BE–274	BE–275	
	ALT H-Fuse	P/W M-Fuse	Power Seat Switch (D)	Power Seat Switch (P)	Slide Motor (D, P)	Front Vertical Motor (D)	Rear Vertical Motor (D)	Reclining Motor (D, P)	Wire Harness
Power seat does not operate. (Defogger system does not operate)	1	3							2
Power seat does not operate. (Defogger system is normal)		1	3	3					2
Driver's seat does not operate.			1						2
Passenger's seat does not operate.				1					2
"Slide operation" does not operate.			1	1	3				2
"Front Vertical Operation" does not operate.			1			3			2
"Rear Vertical Operation" does not operate.			1				3		2
"Reclining Operation" does not operate.			1	1				3	2

(D): Driver's Seat
(P): Passenger's Seat

POWER SEAT SWITCH (DRIVER'S SIDE)

POWER SEAT SWITCH REMOVAL AND INSTALLATION

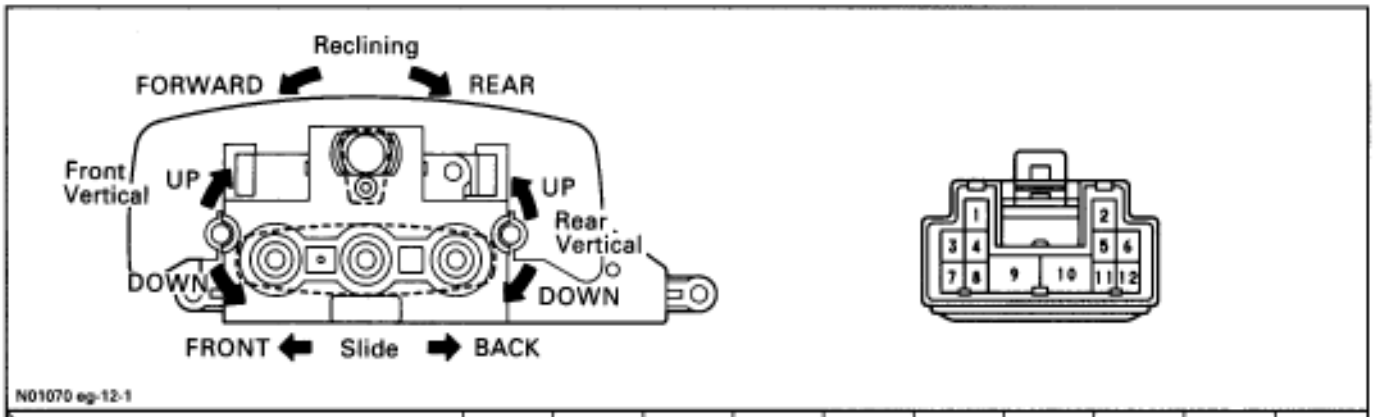
1. **REMOVE POWER SEAT**
   (See page BO–118)
2. **INSTALL POWER SEAT SWITCH**
   For installation follow the removal procedure in reverse.

POWER SEAT SWITCH

INSPECT POWER SEAT SWITCH

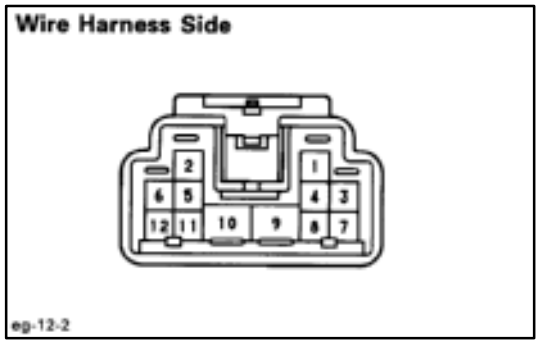
(Continuity)

Inspect the switch continuity between terminals.



Terminal / Switch position		2	4	5	6	7	8	9	10	11	12
Slide Switch	FRONT			○			○	○	○		
	OFF			○			○	○			
	BACK			○			○	○			
Front Vertical Switch	UP		○						○	○	○
	OFF		○							○	○
	DOWN		○						○	○	○
Rear Vertical Switch	UP	○			○	○			○		
	OFF	○			○	○					
	DOWN	○			○	○			○		
Reclining Switch	FORWARD		○			○		○	○		
	OFF		○			○		○			
	REAR		○			○		○	○		

If continuity is not as specified, replace the switch.



(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 as shown.

Check for	Tester connection	Condition	Specified value
Continuity	9–Ground	Constant	Continuity
Voltage	10–Ground	Constant	Battery positive voltage

If circuit is not as specified, refer to BE–265 wiring diagram and inspect the circuits connected to other parts.

POWER SEAT SWITCH (PASSENGER'S SIDE)

POWER SEAT SWITCH REMOVAL AND INSTALLATION

1. REMOVE POWER SEAT

(See page BO–118)

2. INSTALL POWER SEAT SWITCH

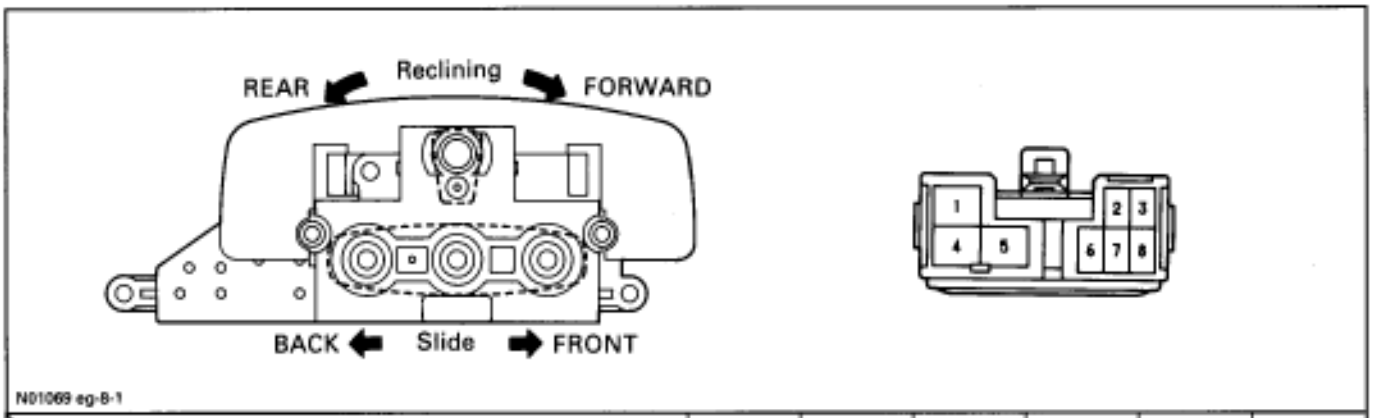
For installation follow the removal procedure in reverse.

POWER SEAT SWITCH INSPECTION

INSPECT POWER SEAT SWITCH

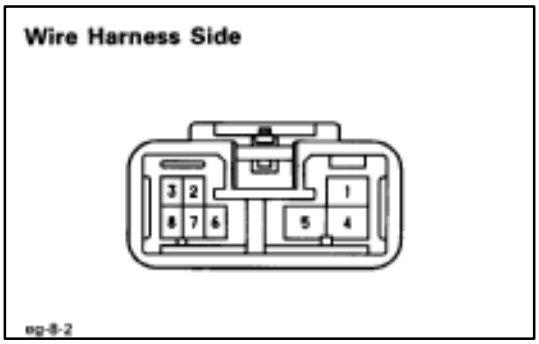
(Continuity)

Inspect the switch continuity between terminals.



Switch position		Terminal 2	3	4	5	7	8
Slide Switch	FRONT			○	○	○	○
	OFF			○		○	○
	BACK			○	○	○	○
Reclining Switch	FORWARD	○	○	○	○		
	OFF	○	○	○			
	REAR	○	○	○	○		

If continuity is not as specified, replace the switch.



(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 as shown.

Check for	Tester connection	Condition	Specified value
Continuity	4–Ground	Constant	Continuity
Voltage	5–Ground	Constant	Battery positive voltage

If circuit is not as specified, refer to BE–265 wiring diagram and inspect the circuits connected to other parts.

SLIDE MOTOR (DRIVER'S SIDE)

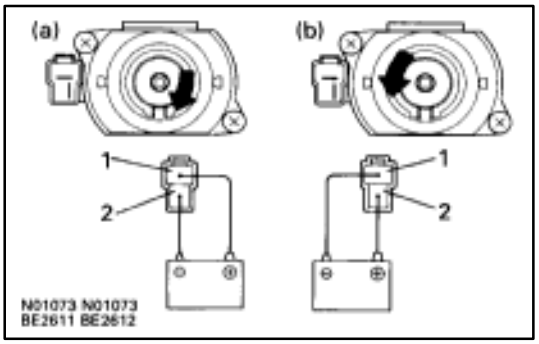
SLIDE MOTOR REMOVAL AND INSTALLATION

(See page BO–118)

INSPECTION SLIDE MOTOR

INSPECT SLIDE MOTOR

(Operation)



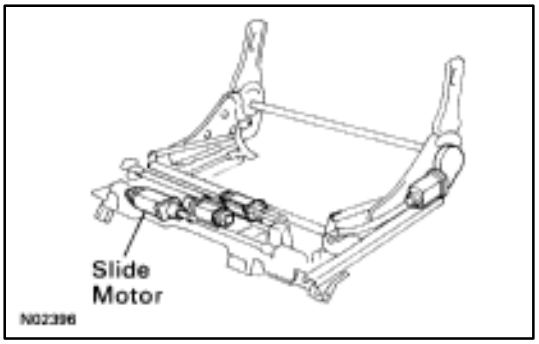
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counterclockwise.

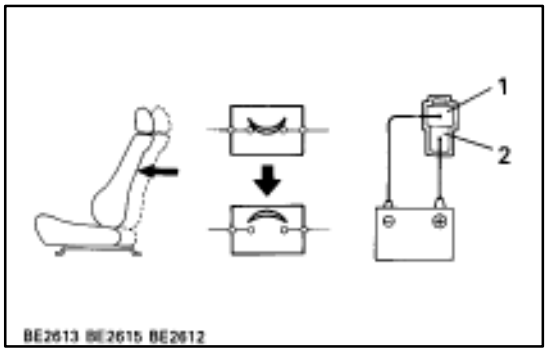
If operation is not as specified, replace the motor.

(Circuit Breaker Operation)

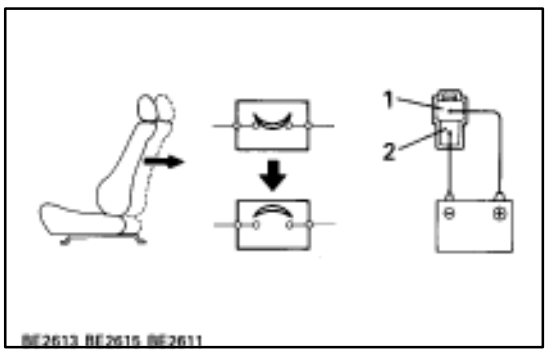
(See page BO–118)



(a) Separate power seat adjuster from front seat.



(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1 on the slide motor connector, and move the seat front end position.



(c) Continue to apply voltage, check that there is a circuit breaker operation noise within 3 to 60 seconds.

(d) Reverse the polarity, check that the seat begins to move backwards within approximately 60 seconds.

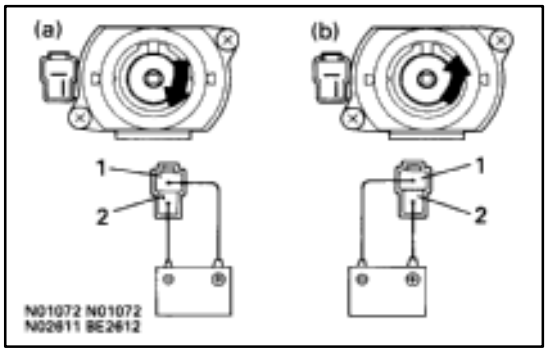
If operation is not as specified, replace the motor.

SLIDE MOTOR (PASSENGER'S SIDE)

SLIDE MOTOR REMOVAL AND INSTALLATION

(See page BO–118)

SLIDE MOTOR INSPECTION



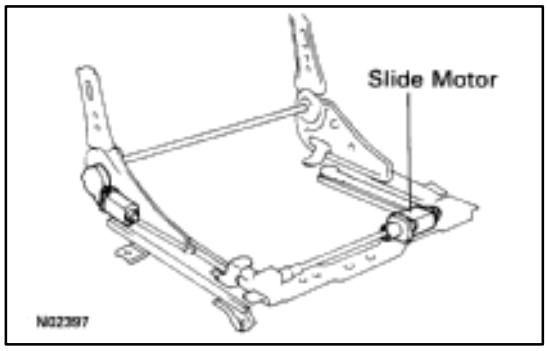
INSPECT SLIDE MOTOR

(Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counterclockwise.

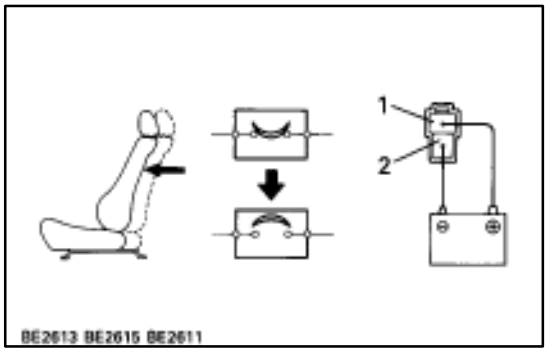
If operation is not as specified, replace the motor.



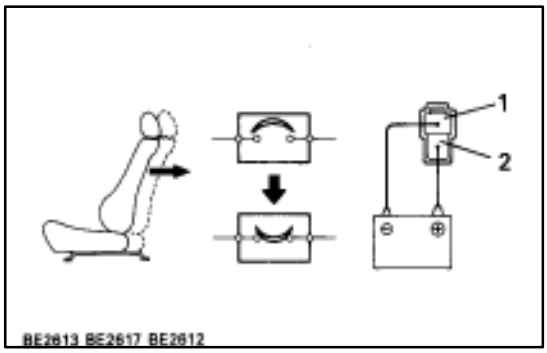
(Circuit Breaker Operation)

(See page BO–118)

(a) Separate power seat adjuster from front seat.



(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2 on the slide motor connector, and move the seat front end position.



(c) Continue to apply voltage, check that there is a circuit breaker operation noise within 3 to 60 seconds.

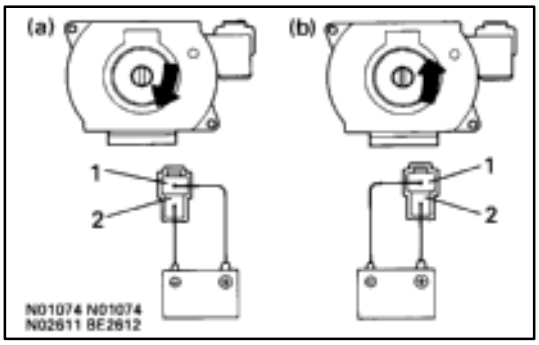
(d) Reverse the polarity, check that the seat begins to move backwards within approximately 60 seconds.

If operation is not as specified, replace the motor.

FRONT VERTICAL MOTOR

FRONT VERTICAL MOTOR REMOVAL AND INSTALLATION

(See page BO–118)



FRONT VERTICAL MOTOR INSPECTION

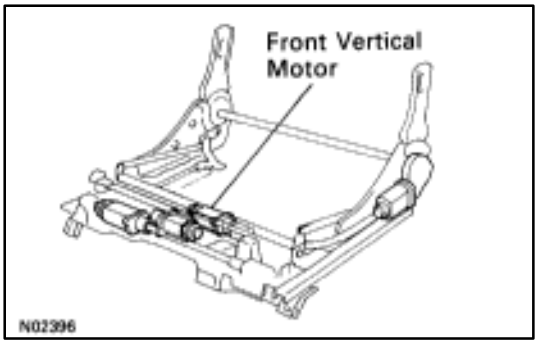
INSPECT FRONT VERTICAL MOTOR

(Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counterclockwise.

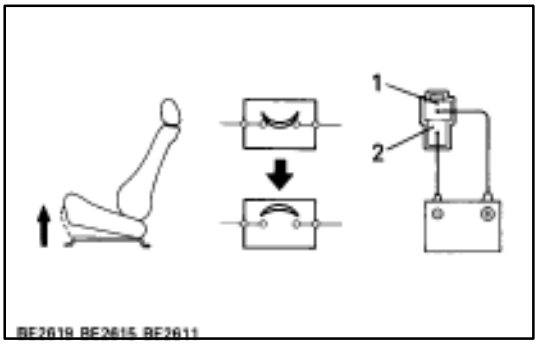
If operation is not as specified, replace the motor.



(Circuit Breaker Operation)

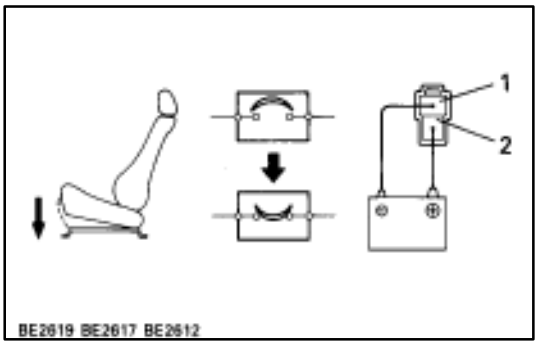
(See page BO–118)

(a) Separate power seat adjuster from front seat.



(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2 on the front vertical motor connector, and move the front edge of seat cushion to the highest position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.



(d) Reverse the polarity, check that the seat cushion begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

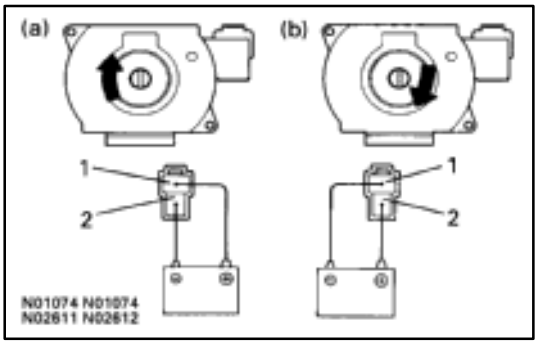
REAR VERTICAL MOTOR

REAR VERTICAL MOTOR REMOVAL AND INSTALLATION

(See page BO–118)

REAR VERTICAL MOTOR INSPECTION

INSPECT REAR VERTICAL MOTOR

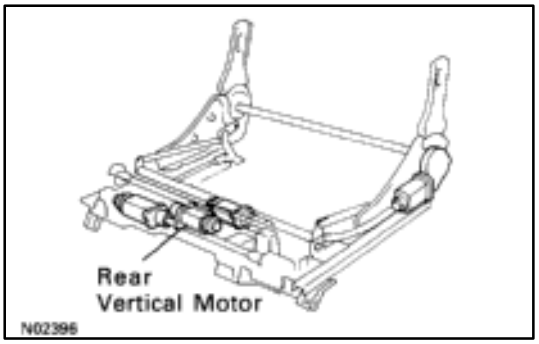


(Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counterclockwise.

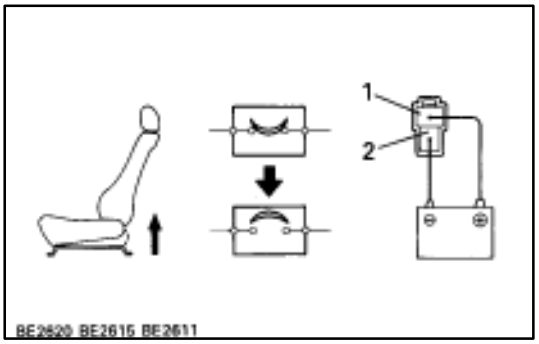
If operation is not as specified, replace the motor.



(Circuit Breaker Operation)

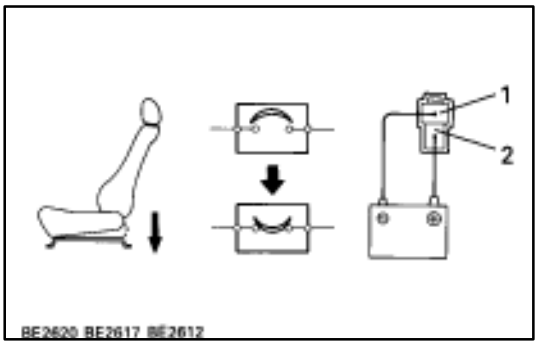
(See page BO–118)

(a) Separate power seat adjuster from front seat.



(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2 on the rear vertical motor connector, and move the rear edge of seat cushion to the highest position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.



(d) Reverse the polarity, check that the seat cushion begins to descend within approximately 60 seconds.

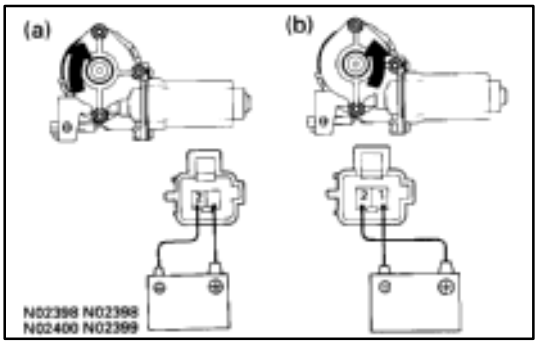
If operation is not as specified, replace the motor.

RECLINING MOTOR (DRIVER'S SIDE)

RECLINING MOTOR REMOVAL AND INSTALLATION

(See page BO–118)

RECLINING MOTOR INSPECTION



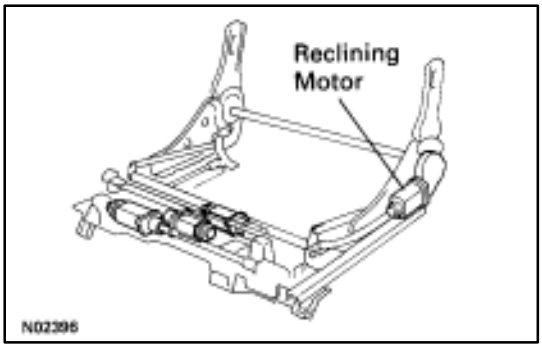
INSPECT SLIDE MOTOR

(Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counterclockwise.

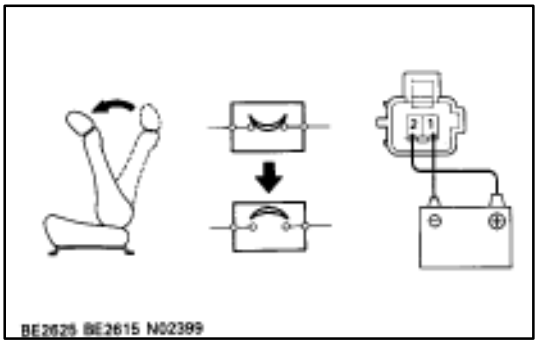
If operation is not as specified, replace the motor.



(Circuit Breaker Operation)

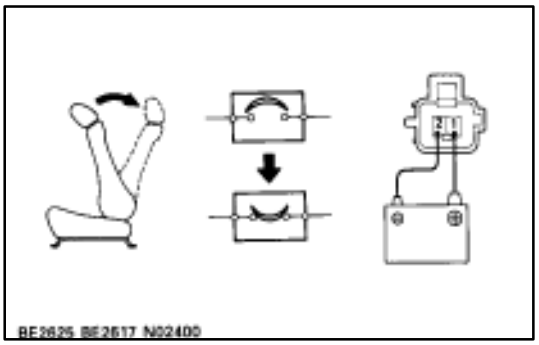
(See page BO–118)

(a) Separate power seat adjuster from front seat.



(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1 on the reclining motor connector, and recline the seat back to the most forward position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 40 seconds.



(d) Reverse the polarity, check that the seat cushion begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

RECLINING MOTOR (PASSENGER'S SIDE)

RECLINING MOTOR REMOVAL AND INSTALLATION

(See page BO–121)

RECLINING MOTOR INSPECTION

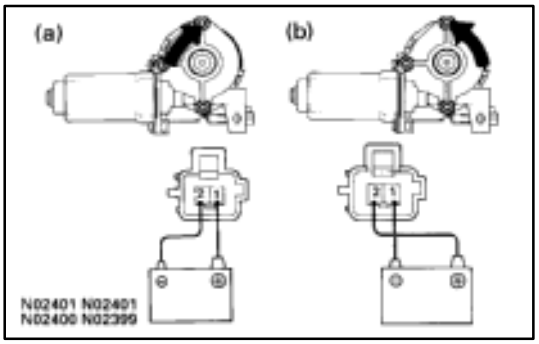
INSPECT SLIDE MOTOR

(Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

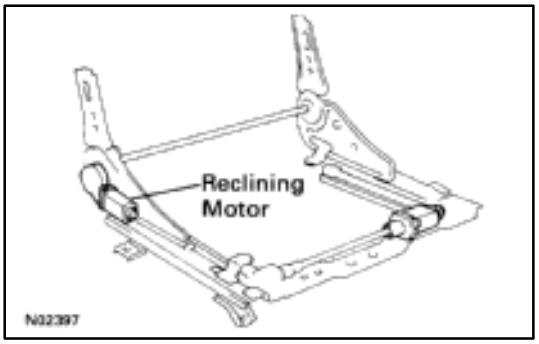
(b) Reverse the polarity, check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.



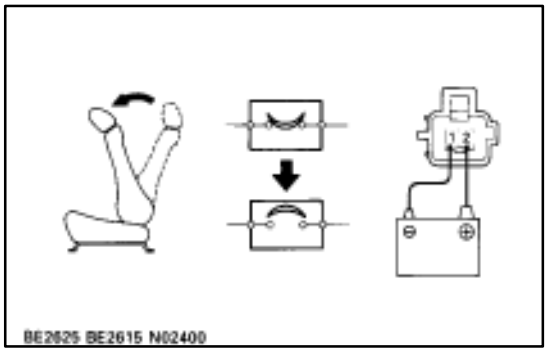
(Circuit Breaker Operation)

(a) Separate power seat adjuster from front seat.



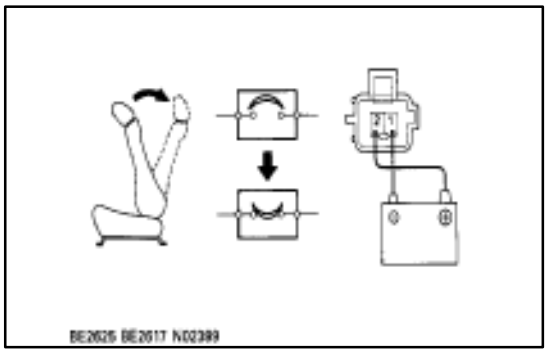
(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2 on the reclining motor connector, and recline the seat back to the most forward position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 40 seconds.

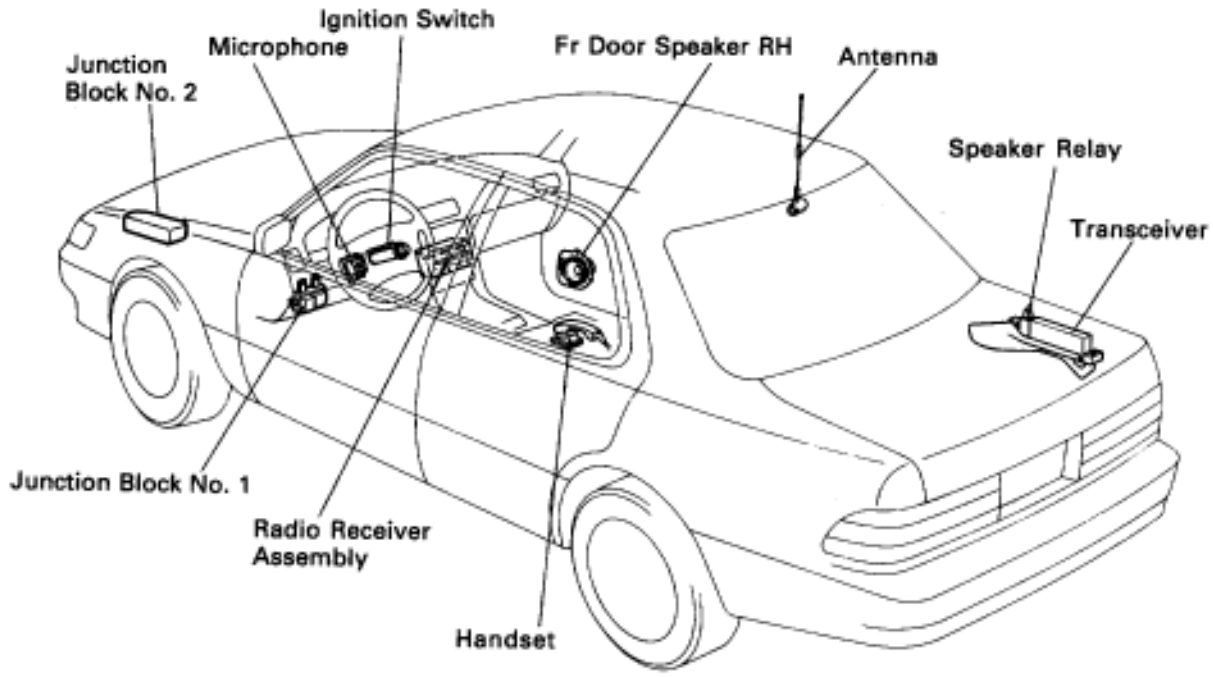


(d) Reverse the polarity, check that the seat back starts to fall backwards within approximately 60 seconds.

If operation is not as specified, replace the motor.

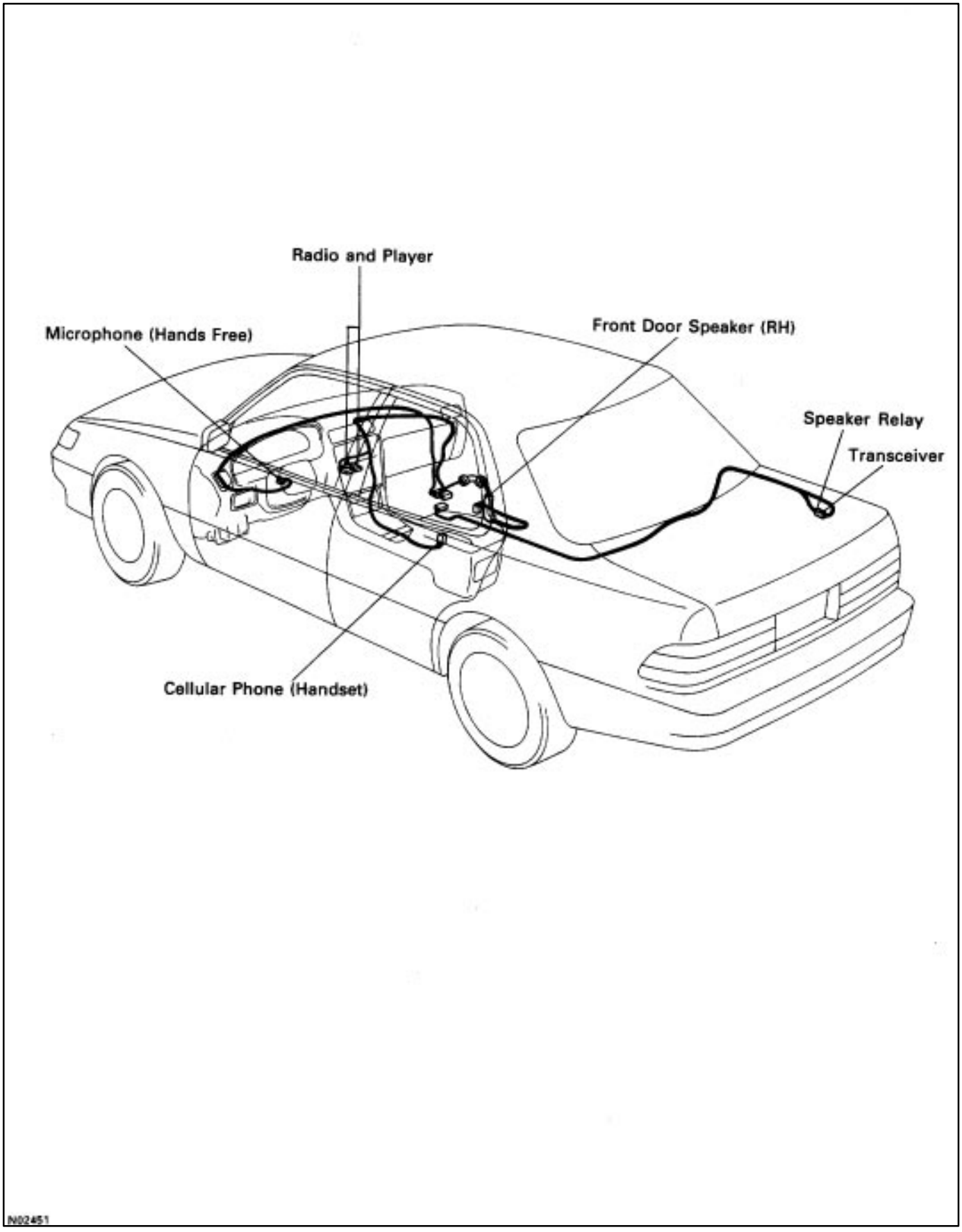


CELLULAR PHONE
PARTS LOCATION

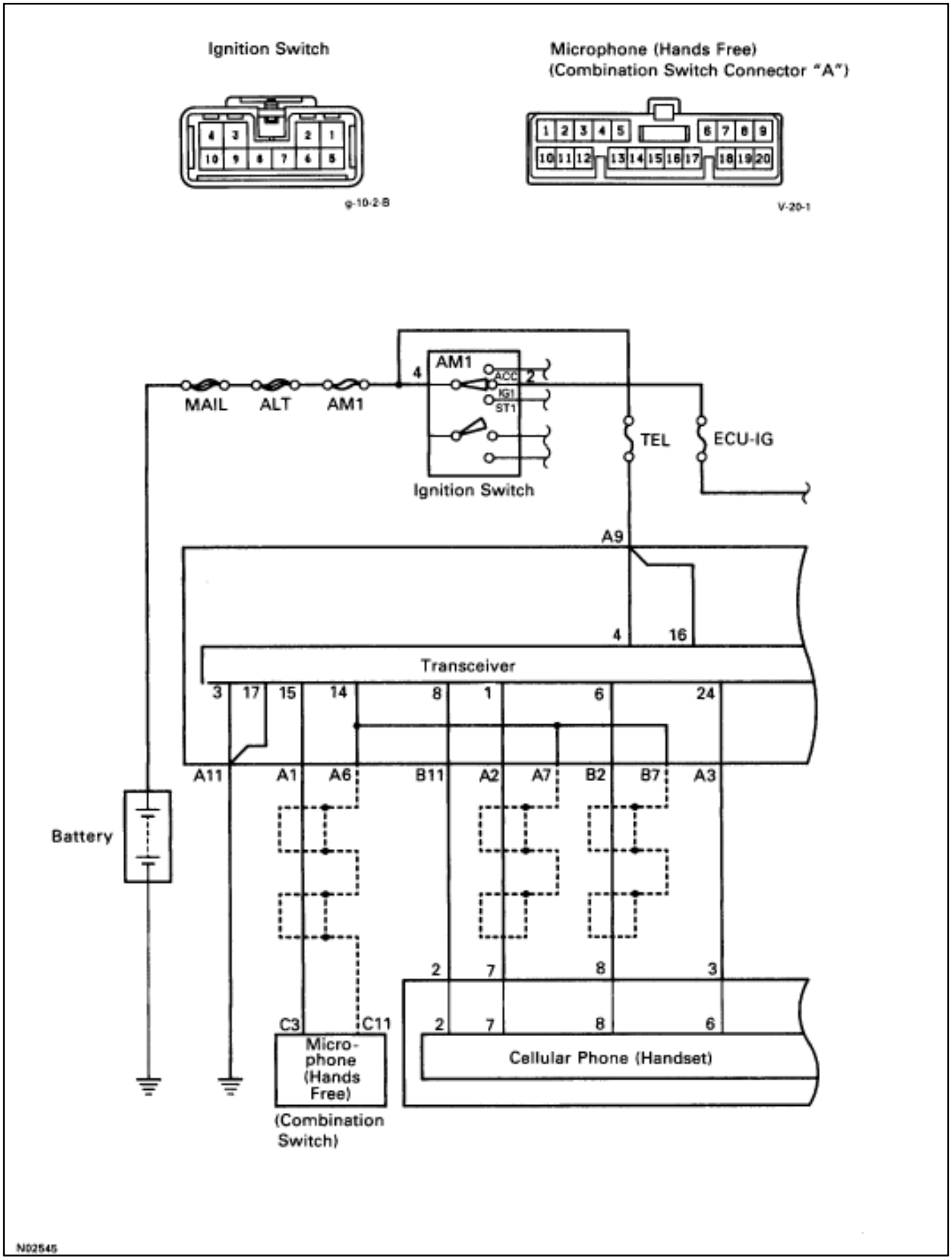


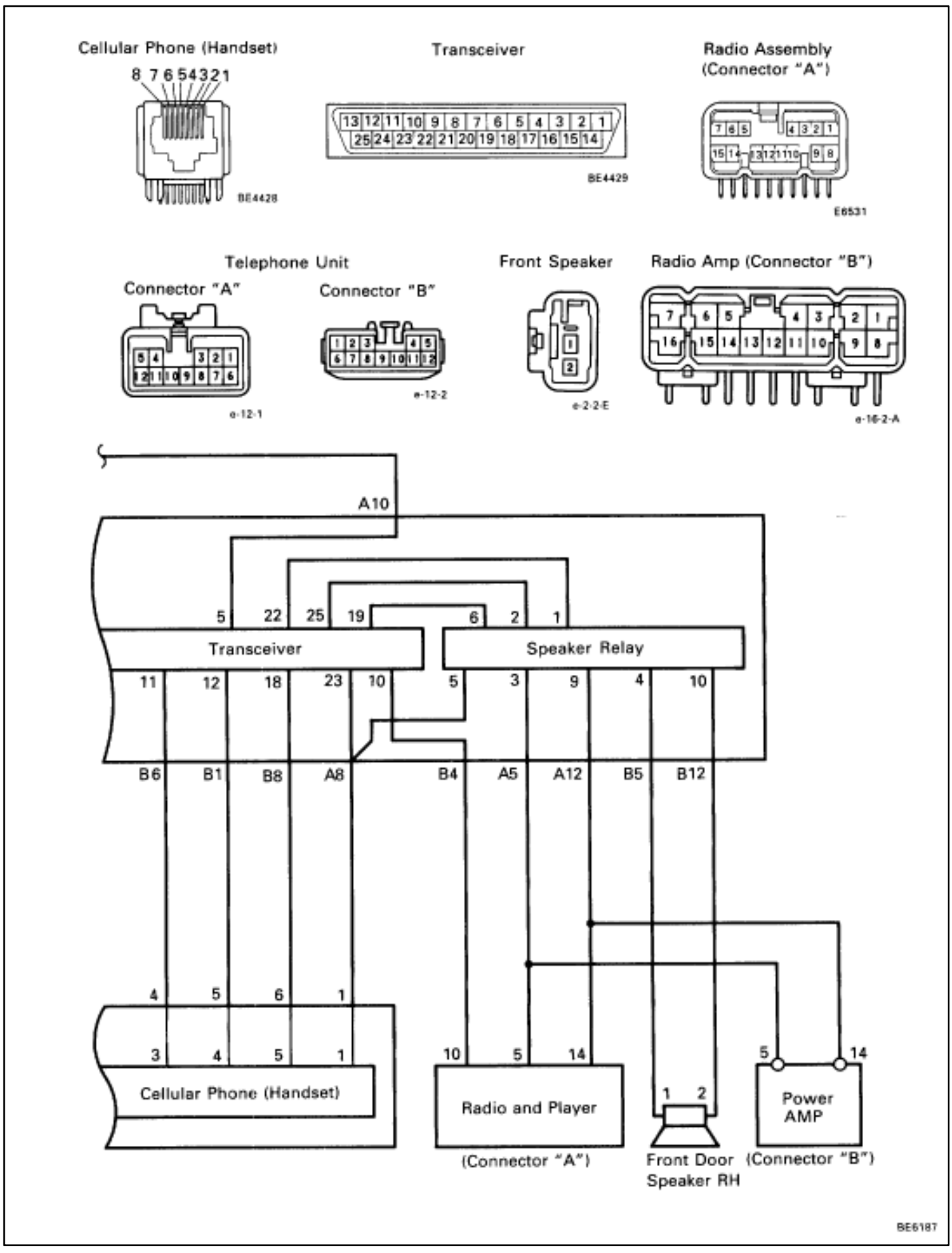
N01981

ELECTRICAL WIRING ROUTING



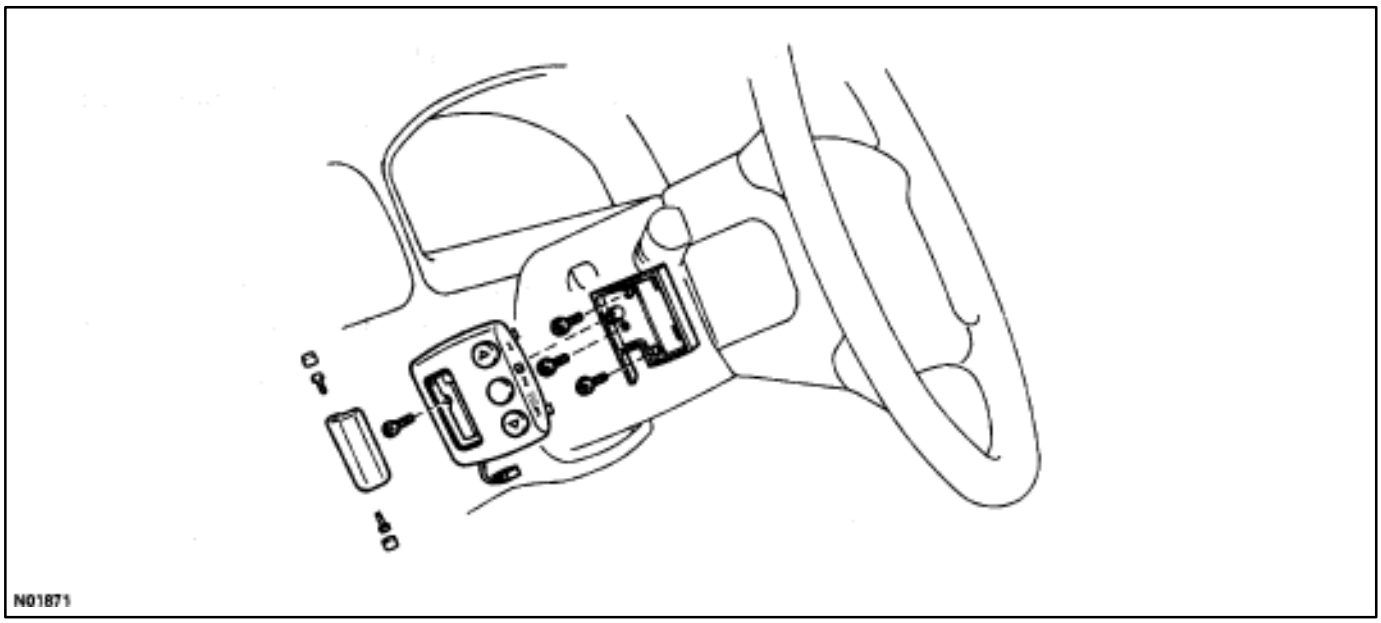
SYSTEM CIRCUIT



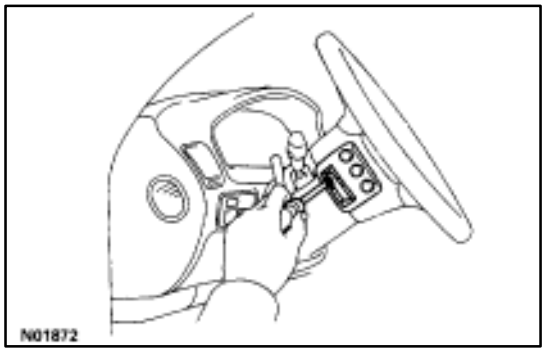

Cellular Phone (Handset)
8 7 6 5 4 3 2 1
BE4428
Transceiver
13 12 11 10 9 8 7 6 5 4 3 2 1
25 24 23 22 21 20 19 18 17 16 15 14
BE4429
Radio Assembly
(Connector "A")
E6531
Telephone Unit
Connector "A"
e-12-1
Connector "B"
e-12-2
Front Speaker
e-2-2-E
Radio Amp (Connector "B")
e-16-2-A
A10
5 22 25 19 6 2 1
Transceiver
Speaker Relay
11 12 18 23 10 5 3 9 4 10
B6 B1 B8 A8 B4 A5 A12 B5 B12
4 5 6 1
3 4 5 1
Cellular Phone (Handset)
10 5 14
Radio and Player
(Connector "A")
1 2
Front Door
Speaker RH
5 14
Power
AMP
(Connector "B")
BE6187

MICROPHONE/HANDS FREE

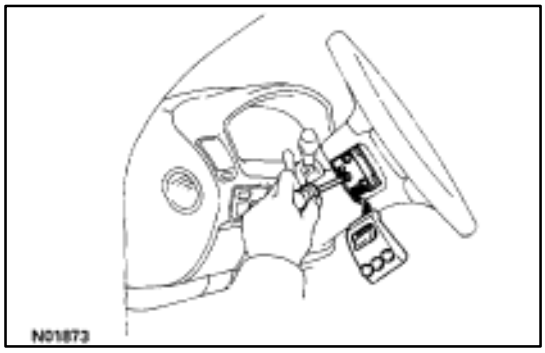
COMPONENTS



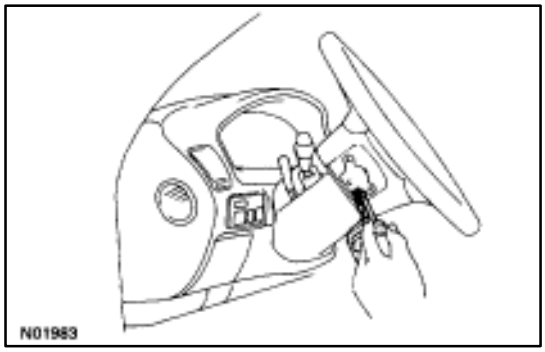
MICROPHONE REMOVAL



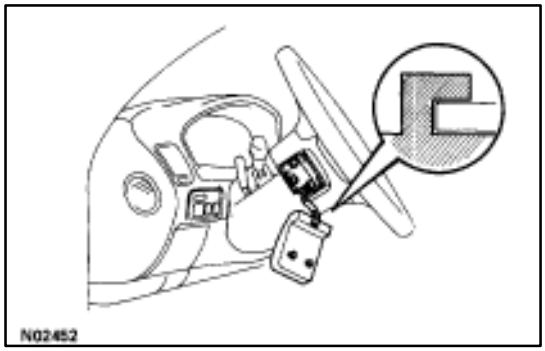
1. **REMOVE CLIP COVER**
2. **REMOVE COMMAND MODULE**
   Remove a screw and separate command module from steering wheel.



3. **REMOVE BASE**
   Remove two screws and base.



4. **DISCONNECT CONNECTOR**
   Using a screw driver, disconnect the connector.



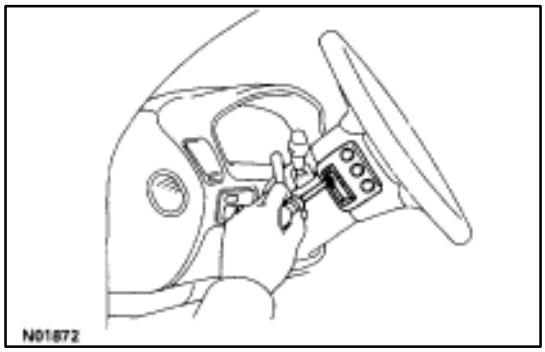
MICROPHONE INSTALLATION

For installation, follow the removal procedure in reverse.

(MAIN POINT OF INSTALLATION)

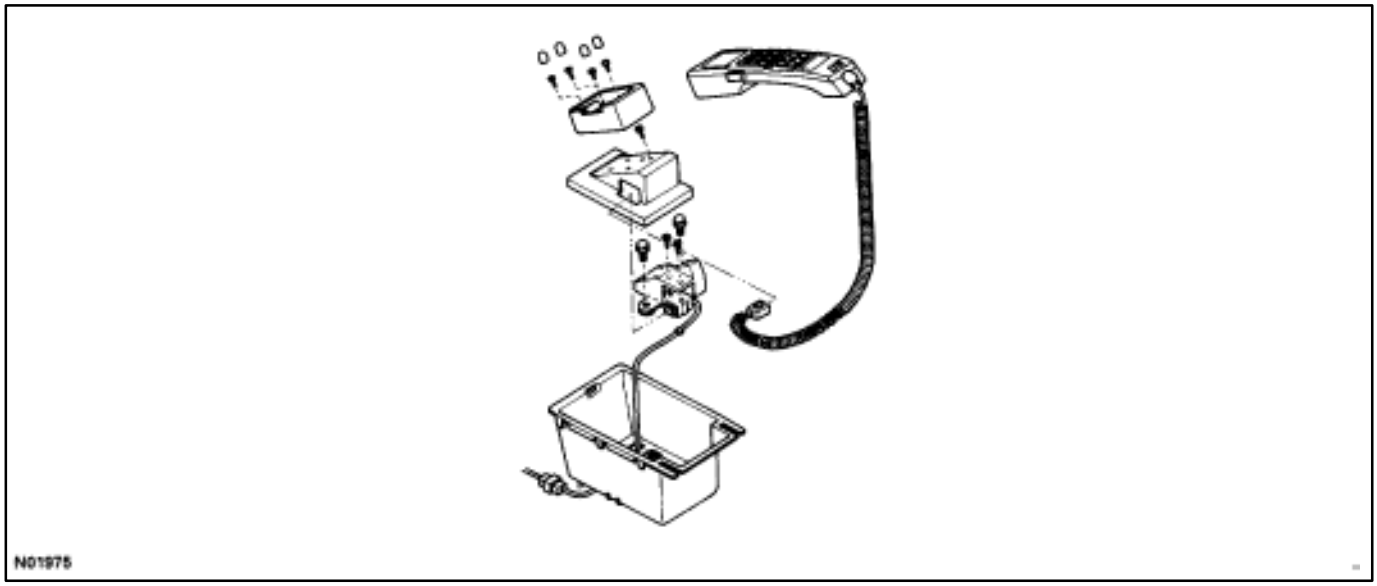
INSTALL COMMAND MODULE

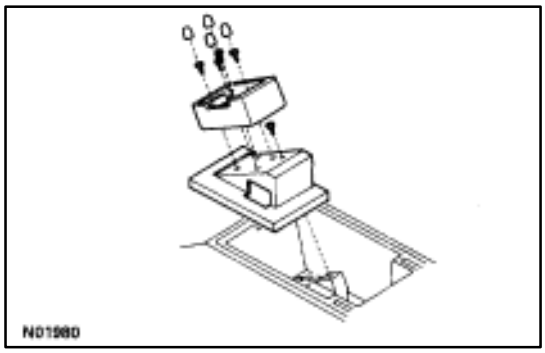
(a) Match the holes in the command module with the 2 projections at the front of base.



(b) Install the command module and a screw.
HINT: Avoid pinching of the wire harness during installation

CELLULAR PHONE/HANDSET COMPONENTS

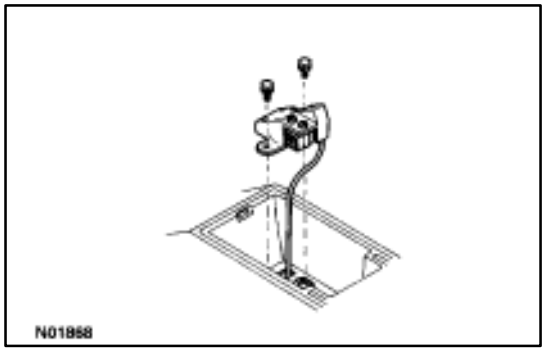




CELLULAR PHONE REMOVAL

1. REMOVE CRADLE AND OUTER BRACKET

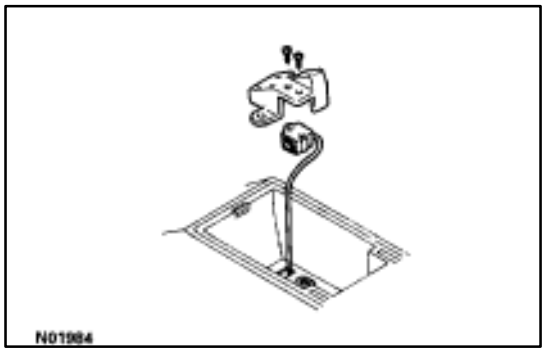
(a) Remove the four screws and cradle.
(b) Disconnect the telephone wire connector.
(c) Remove a screw and bracket.



2. REMOVE INNER BRACKET AND REAR CONSOLE BOX

(a) Remove the two bolts and inner bracket.

(b) Remove the rear console box.



3. REMOVE CONNECTOR

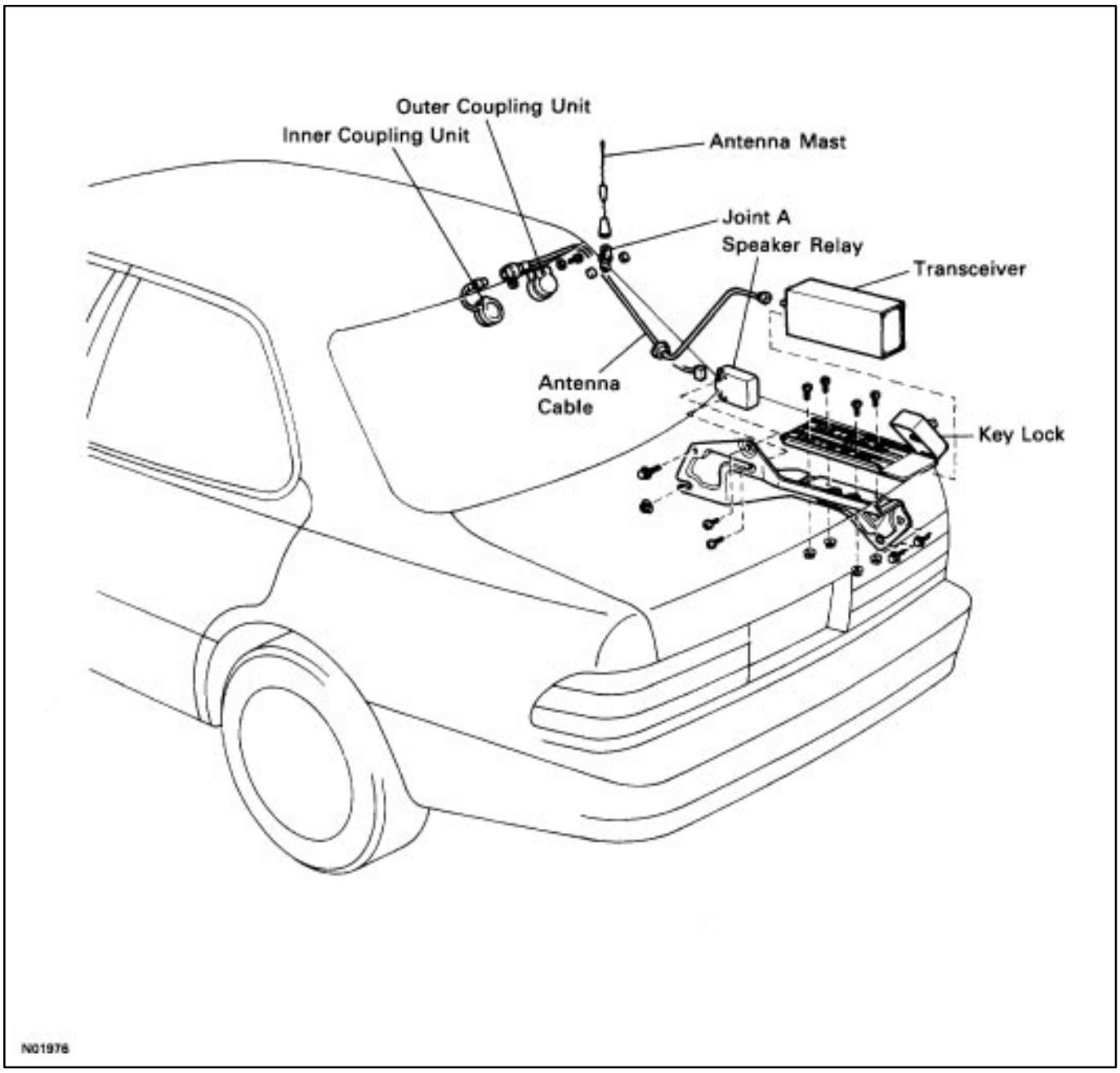
Remove two screws.

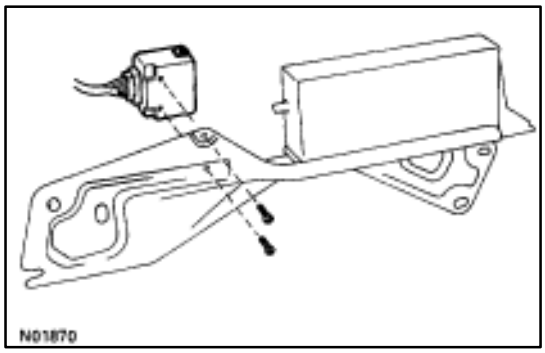
CELLULAR PHONE INSTALLATION

For installation follow the removal procedure in reverse.

ANTENNA, TRANSCEIVER AND SPEAKER RELAY

COMPONENTS

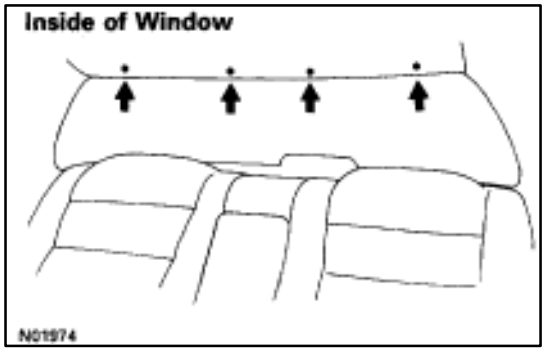




SPEAKER RELAY REMOVAL

REMOVE SPEAKER RELAY

(a) Remove the luggage LH cover.
(b) Disconnect connectors and antenna cable from the transceiver.
(c) Remove the transceiver.
(d) Disconnect connector from speaker relay.
(e) Remove the two screws and speaker relay.



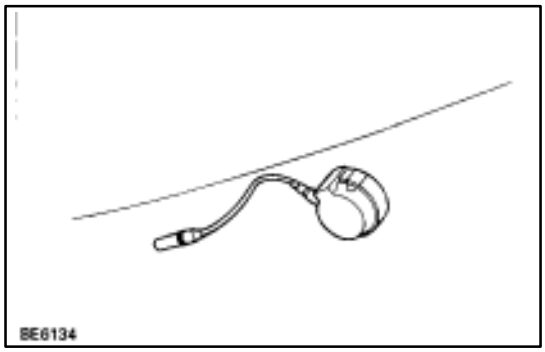
SPEAKER RELAY INSTALLATION

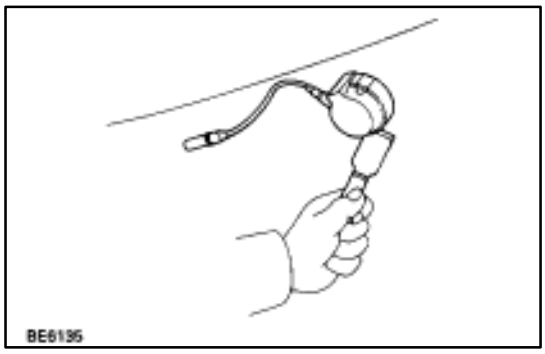
For installation, follow the removal procedure in reverse.

ANTENNA REMOVAL

1. REMOVE INNER COUPLING UNIT

(a) Remove four crips.
(b) Pull out antenna cable from roof head lining.
(c) Disconnect antenna cable from coupling unit.

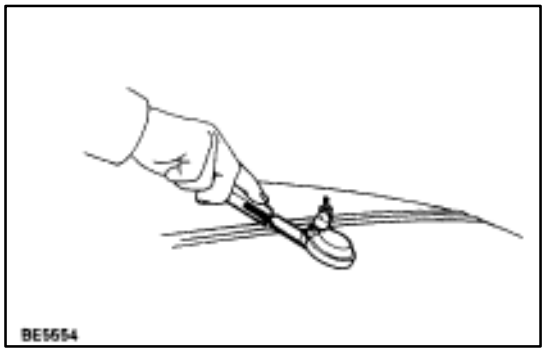




(d) Using a scraper or screw driver, remove inner coupling unit from back window glass.
NOTICE: Take care not to damage the back window glass.

2. REMOVE ANTENNA MAST

(a) Remove a antenna mast from joint A.
(b) Remove a screw, washer and joint A.



3. REMOVE OUTER COUPLING UNIT

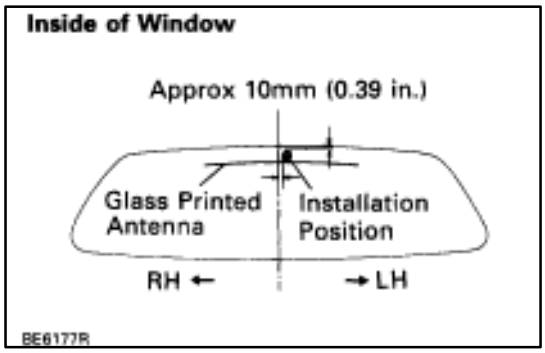
Using a scraper or screw driver, remove outer coupling unit.
NOTICE: Take care not to damage the back window glass.

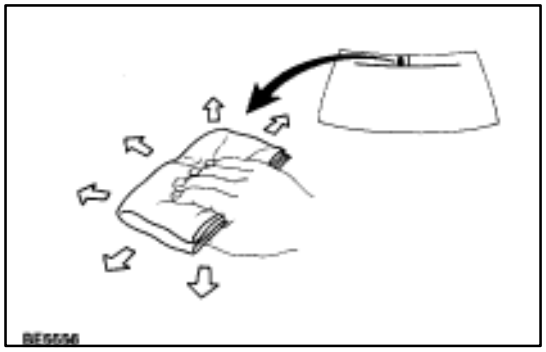
ANTENNA INSTALLATION

1. SELECT ANTENNA INSTALLATION POSITION

Install the antenna in the position shown in the figure.
HINT:

- The antenna must not be touching the glass printed antenna.
- After temporarily positioning the antenna cable and coupling unit against the glass, install the antenna in position opposite where the upper edge of the coupling unit touches the roof head lining.





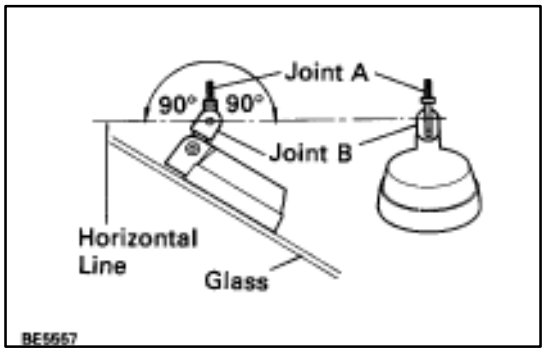
2. CLEAN SURFACE FOR ANTENNA INSTALLATION

(a) Clean the glass surface for installation of the inner coupling unit and outer coupling unit.

(b) Clean the glass again using the window cleaner contained in the kit.

(c) Wipe the glass surface dry using a dry paper towel.

HINT: Wipe the glass radially.



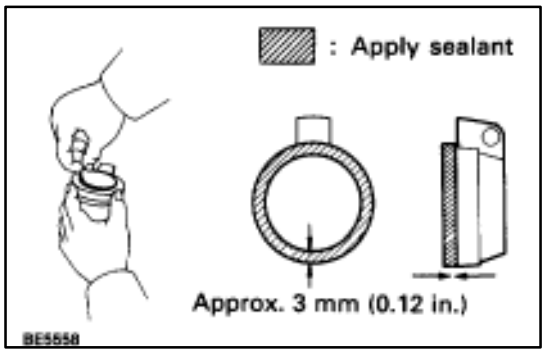
3. INSTALL OUTER COUPLING UNIT ON THE OUTSIDE OF THE WINDOW GLASS

(a) Remove joint A from antenna mast. Install joint A to joint B.

NOTICE: When replace the mast, replace the mast and joint A set.

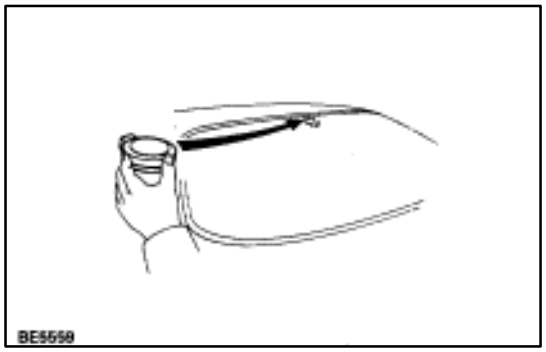
(b) Put the outer coupling unit in the selected location. Make sure it is possible to adjust the joint A and outer coupling unit.

NOTICE: Do not remove the protective paper from the adhesive on the bottom of outer coupling unit.



(c) Remove the protective paper from the outer coupling unit and apply sealant in plenty to the bottom surface of the coupling unit as shown in the figure.

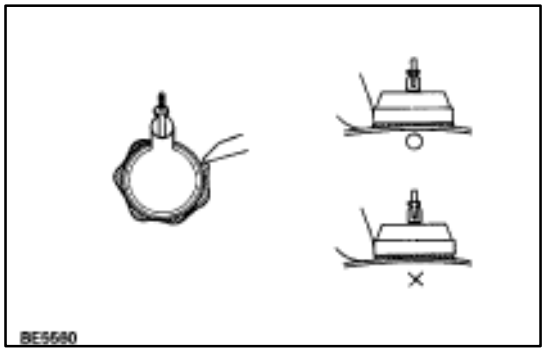
HINT: Use the sealant contained in the kit.



(d) Adhere the outer coupling unit strongly against the installation location until the entire double–sided tape comes in contact with the glass and the sealant comes out.

NOTICE: The adhesive pad will stick to the glass instantly and cannot be removed without having to replace it. Be sure the position of the outer coupling unit is correct before it touches the glass.

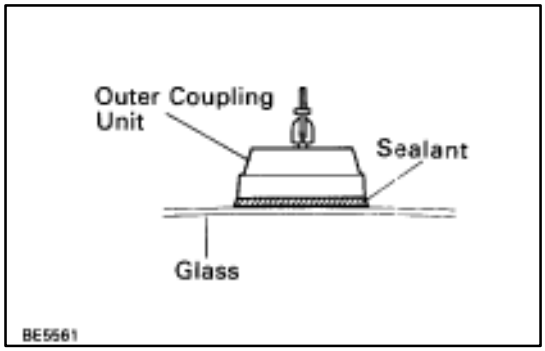
(e) Using a scraper or spatula, remove excess sealant.



HINT: Using a rag, wipe excess sealant which could not be removed by a spatula. When wiping by a rag, care should be taken not to have the rag in between glass and outer coupling unit.

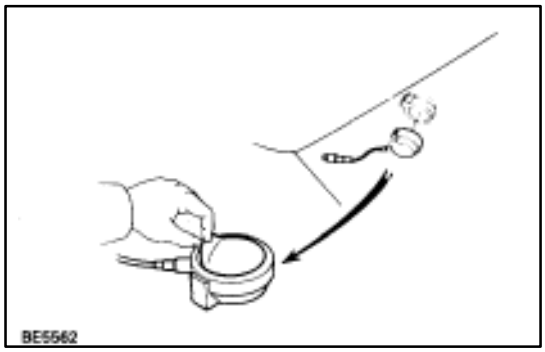
NOTICE:

- **Confirm that the sealant is covering the doublesided tape making it waterproof.**
  If not, reapply sealant and fill up the gap.
- **Keep the antenna mast off for 24 hours until the sealant is completely cured.**



- **Both the tape and silicone adhesives take longer to set and cure when the surfaces are cold. If the installation takes place in an area where temperatures are below 50 F (10 C) let the adhesive cure for least 48 hours before attaching the antenna mast.**

(f) Install the antenna mast to joint A.

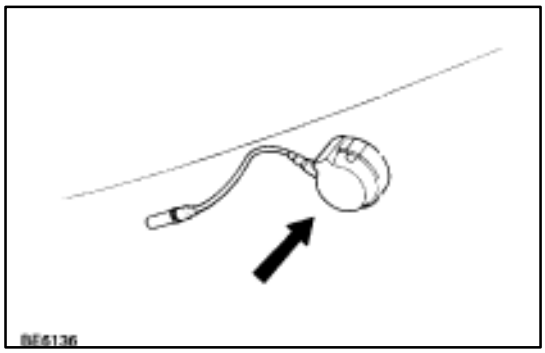


4. INSTALL INNER COUPLING UNIT ON THE INSIDE OF THE WINDOW GLASS

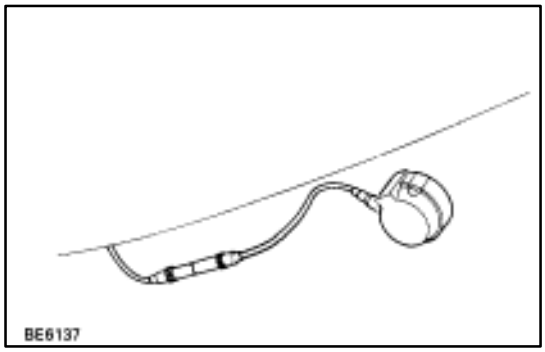
(a) Verify the positioning of the inner coupling unit so that it will be centered over the outer coupling unit on the outside, with the connector positioned horizontally to the right side of the vehicle.

(b) Remove the protective paper from the coupling unit.

NOTICE: The adhesive pad will stick to the glass instantly and cannot be removed without having to replace it. Be sure the position of the coupling unit is correct before it touches the glass.



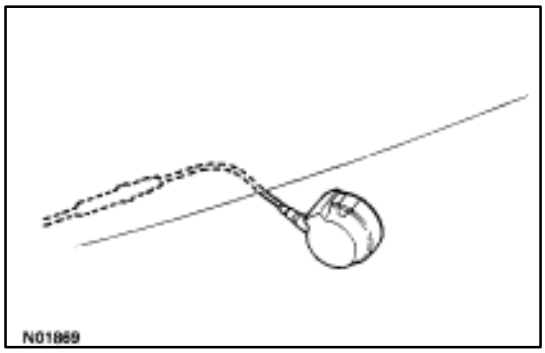
(c) Install the inner coupling unit to the glass.



(d) Connect the antenna cable.

(e) Wrap the sponge round the connector.

HINT: Use the sponge contained in the kit.



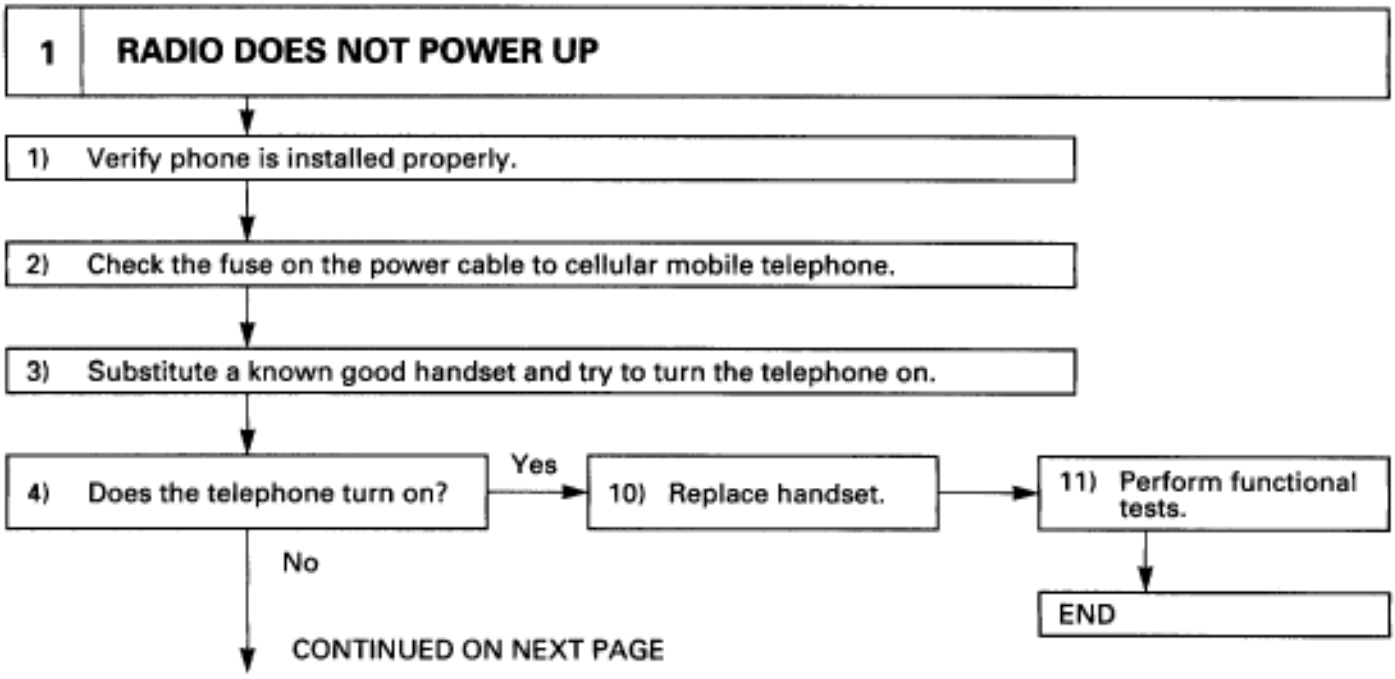
(f) Install the connector back to its original position.

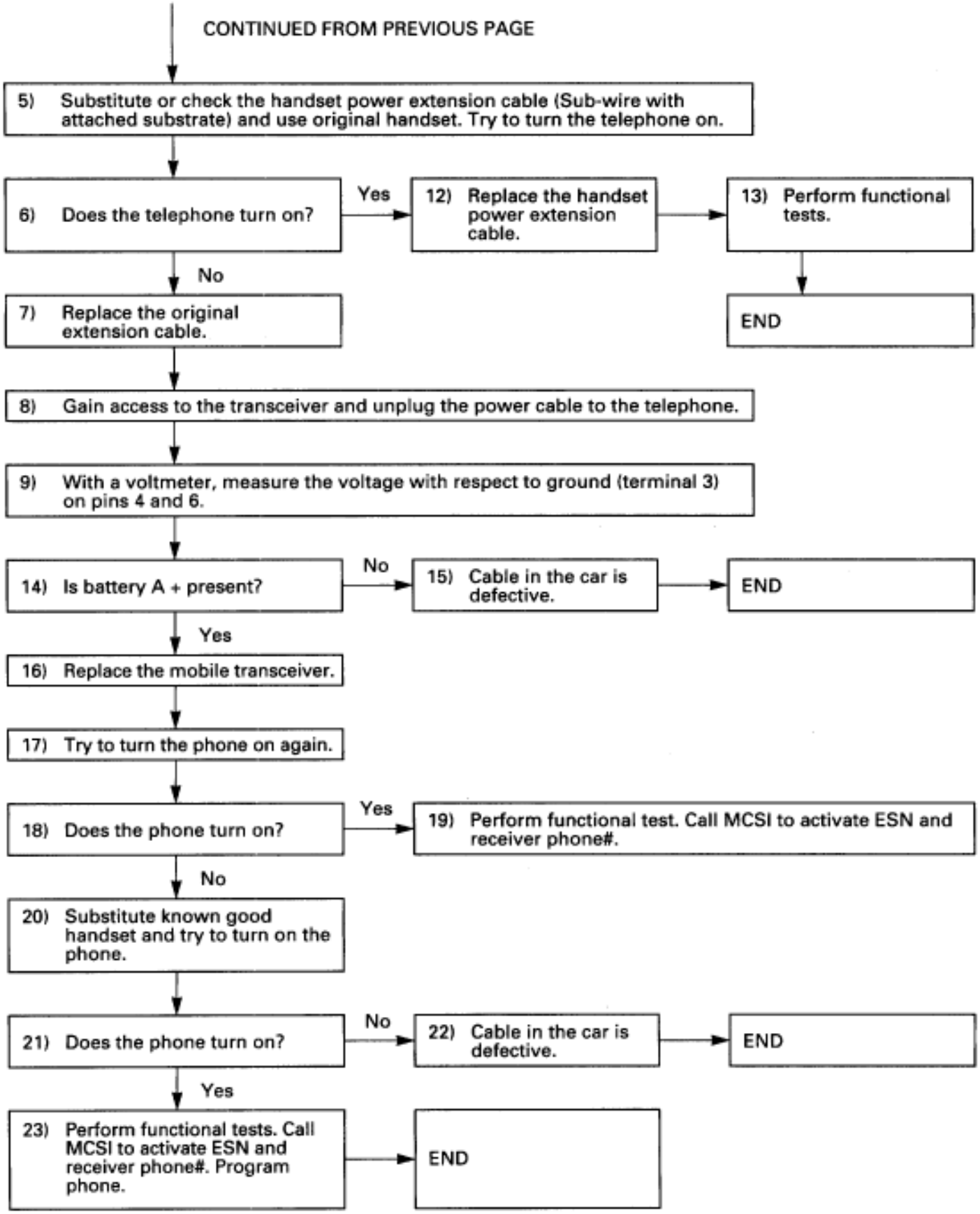
TROUBLESHOOTING

You can easily find the cause of trouble using the table shown below.

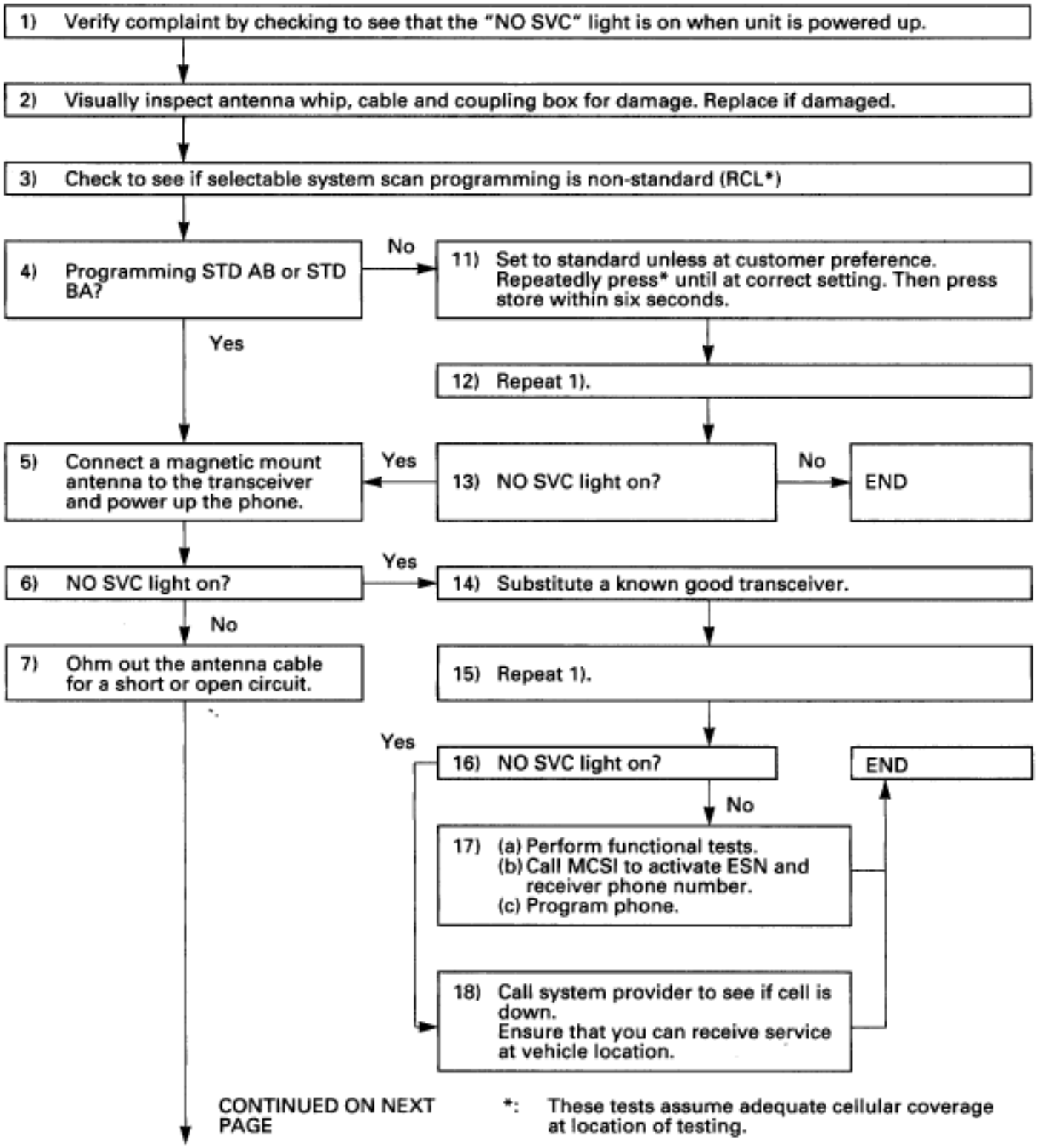
Chart No.	Trouble	See page
1	Radio does not power up.	BE–462
2	*"NO SVC" light stays on.	BE–464
3	*Static during calls/Dropped calls.	BE–466
4	Fast busy signal or recording received when placing calls.	BE–467
5	Dialing problems with controller.	BE–468
6	No hands free transmit audio.	BE–469
7	No hands free audio or tones from right front speaker.	BE–470
8	No AM/FM radio out of right front speaker.	BE–471
9	AM/FM radio does not mute during calls.	BE–472
10	Radio will not go into programming mode.	BE–473

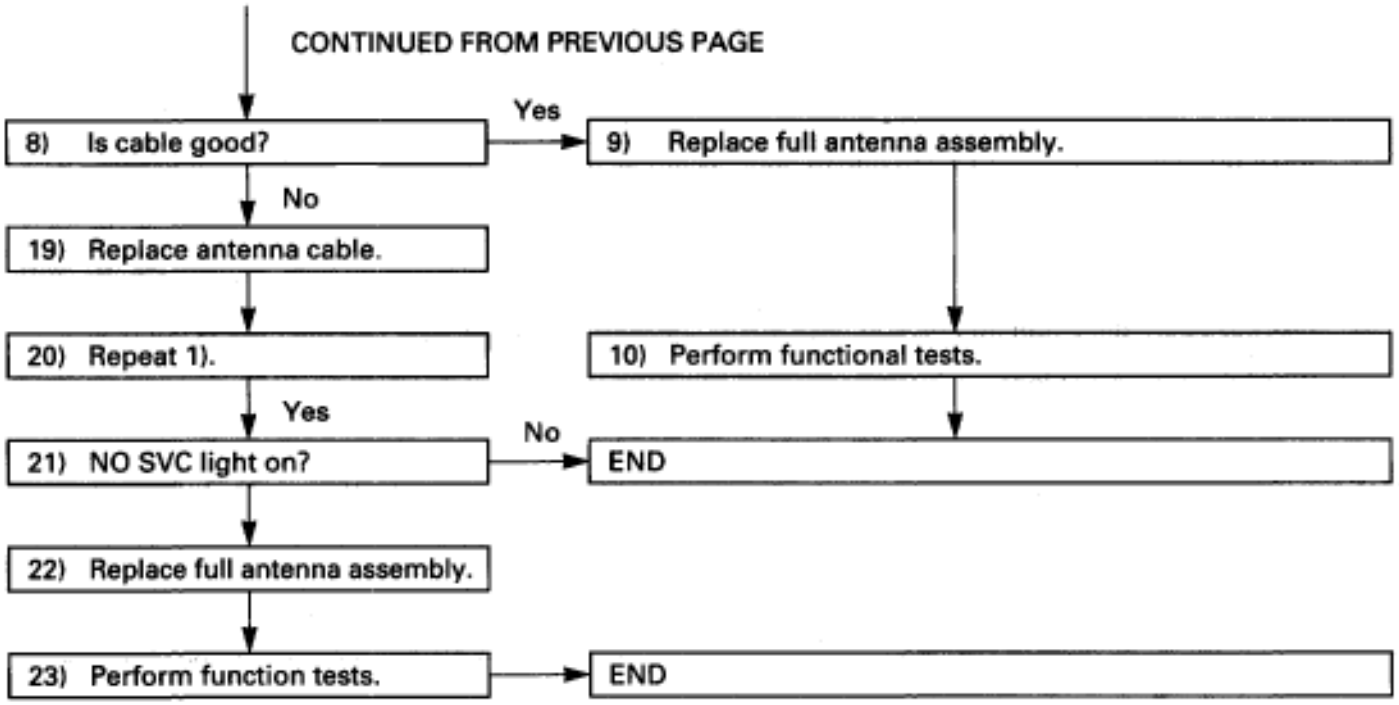
*: These tests assume adequate cellular coverage at location of testing.



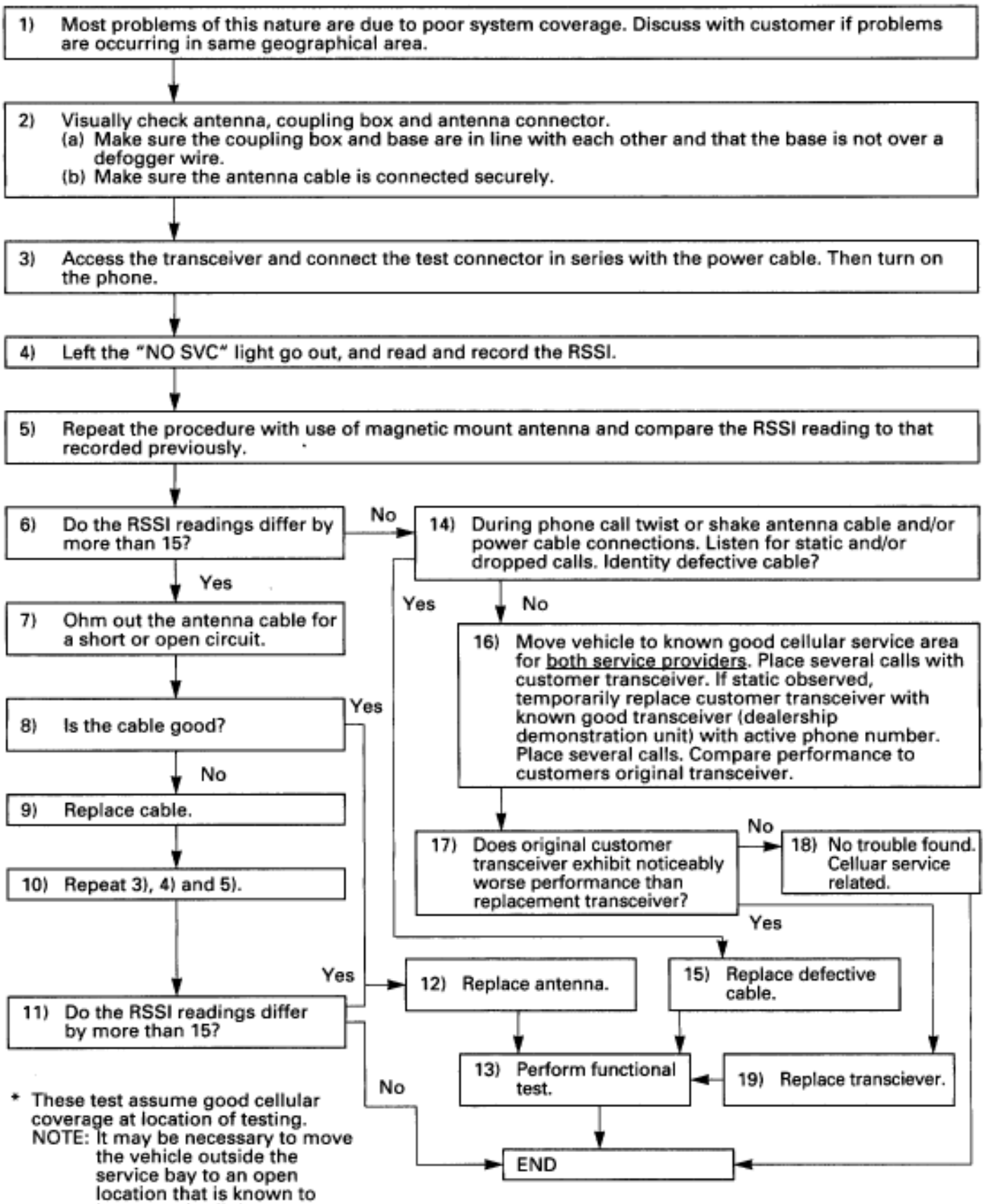

CONTINUED FROM PREVIOUS PAGE
5) Substitute or check the handset power extension cable (Sub-wire with attached substrate) and use original handset. Try to turn the telephone on.
6) Does the telephone turn on?
Yes
12) Replace the handset power extension cable.
13) Perform functional tests.
END
No
7) Replace the original extension cable.
8) Gain access to the transceiver and unplug the power cable to the telephone.
9) With a voltmeter, measure the voltage with respect to ground (terminal 3) on pins 4 and 6.
14) Is battery A + present?
No
15) Cable in the car is defective.
END
Yes
16) Replace the mobile transceiver.
17) Try to turn the phone on again.
18) Does the phone turn on?
Yes
19) Perform functional test. Call MCSI to activate ESN and receiver phone#.
No
20) Substitute known good handset and try to turn on the phone.
21) Does the phone turn on?
No
22) Cable in the car is defective.
END
Yes
23) Perform functional tests. Call MCSI to activate ESN and receiver phone#. Program phone.
END

2 “NO SVC” LIGHT* STAYS ON

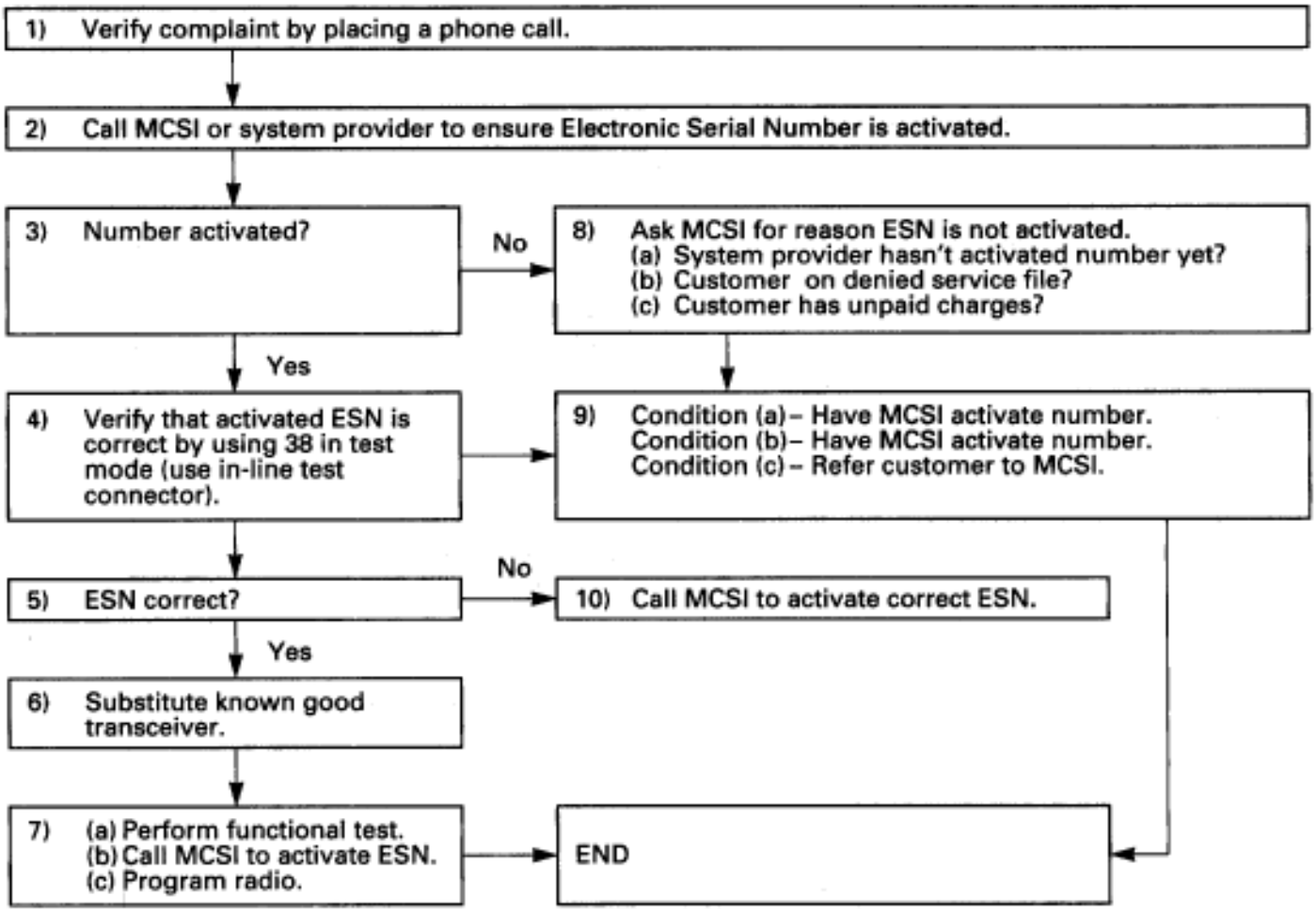



CONTINUED FROM PREVIOUS PAGE
8) Is cable good?
Yes
9) Replace full antenna assembly.
No
19) Replace antenna cable.
20) Repeat 1).
10) Perform functional tests.
Yes
21) NO SVC light on?
No
END
22) Replace full antenna assembly.
23) Perform function tests.
END

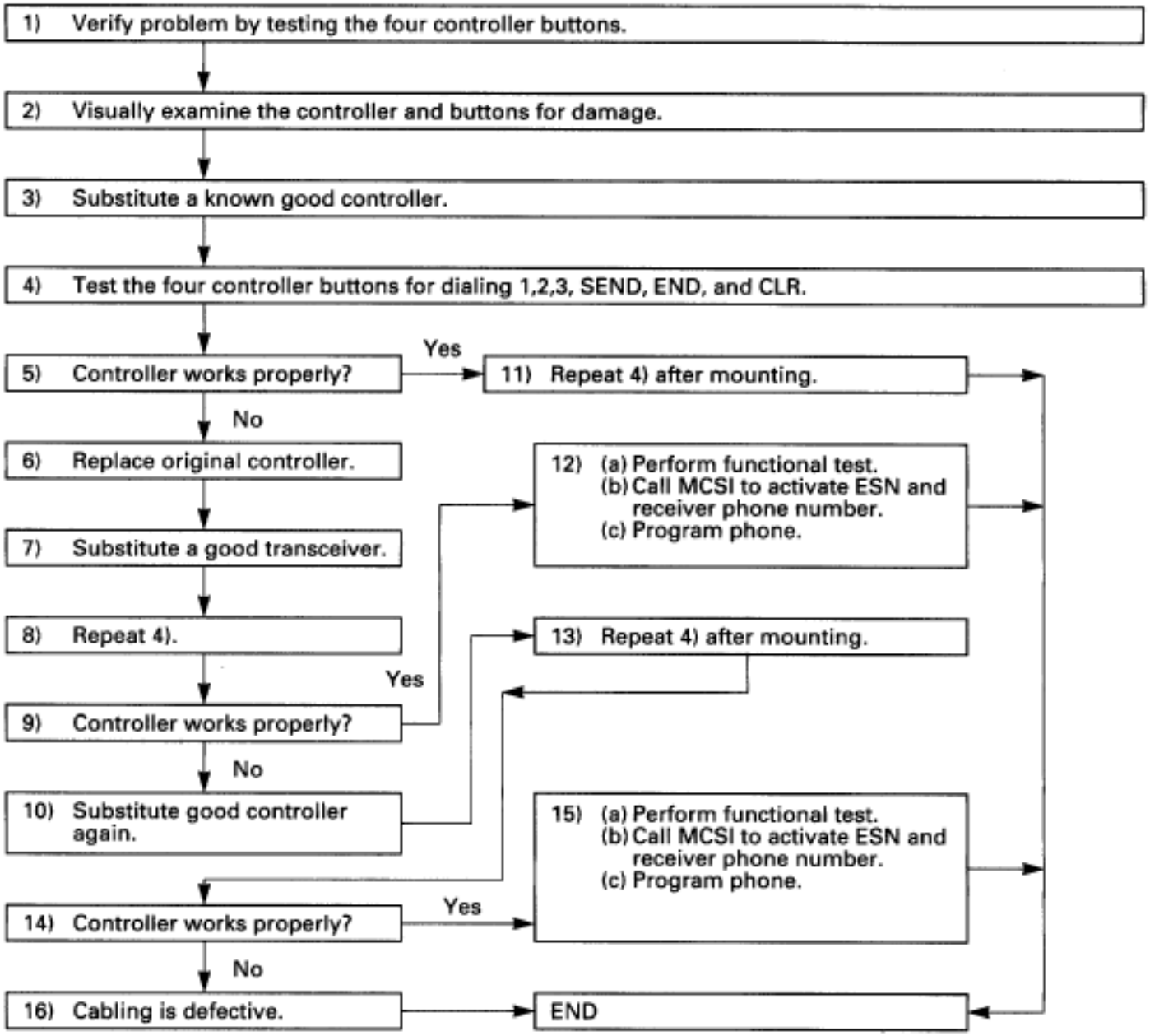
3 * STATIC DURING CALLS/DROPPED CALLS



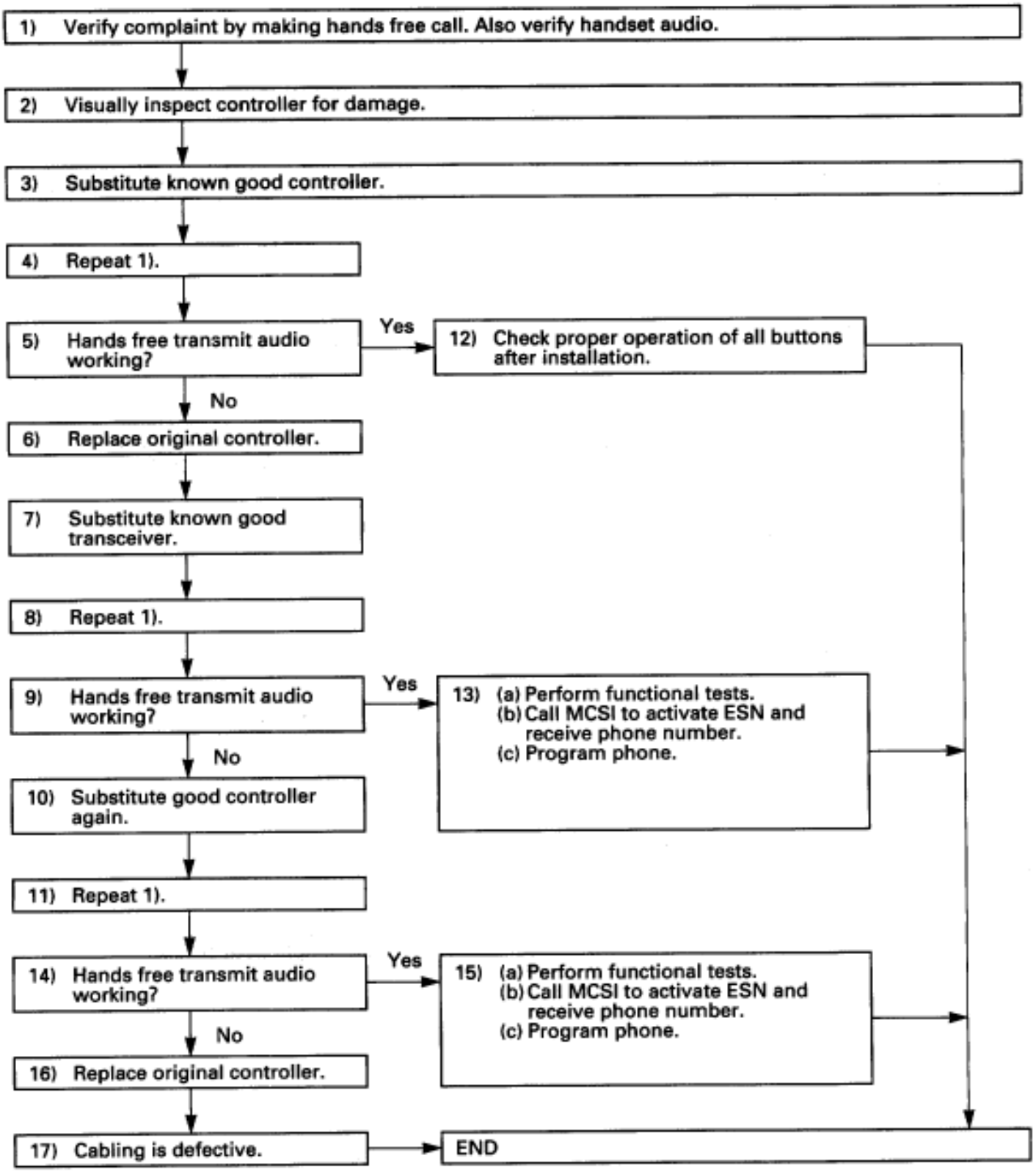
4 FAST BUSY SIGNAL OR RECORDING RECEIVED WHEN PLACING CALLS



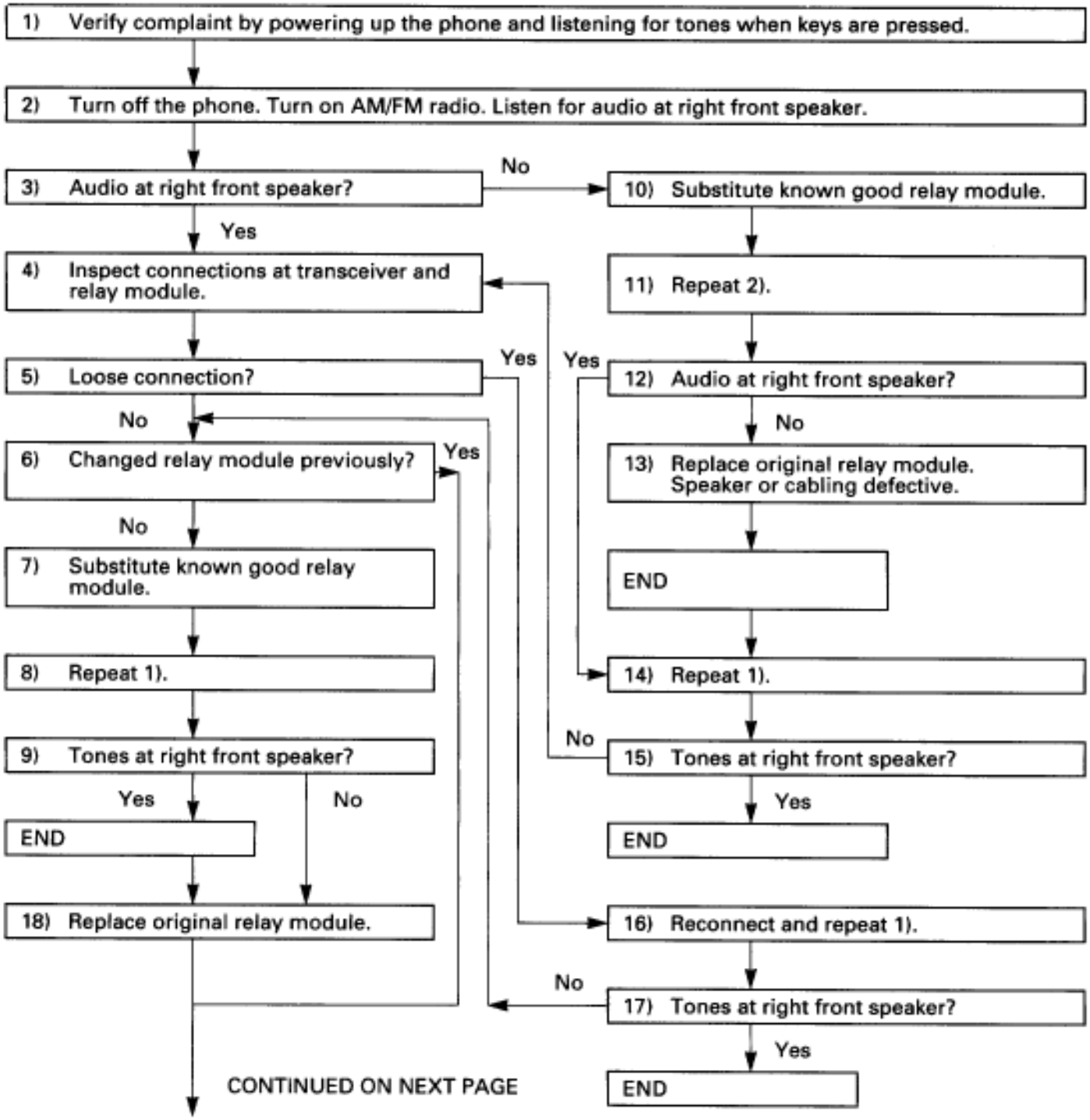
5 DIALING PROBLEMS WITH CONTROLLER

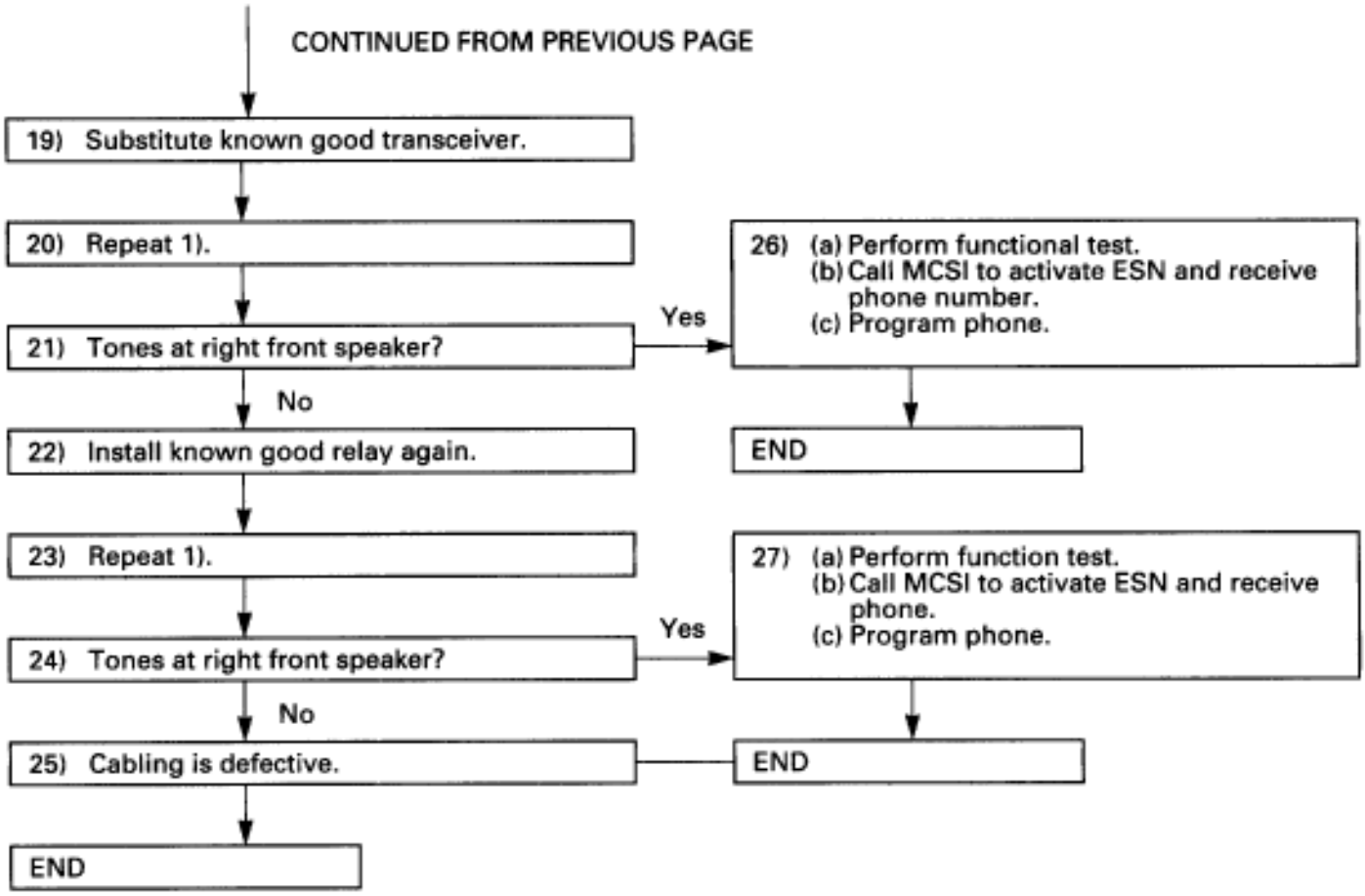


6 NO HANDS FREE TRANSMIT AUDIO

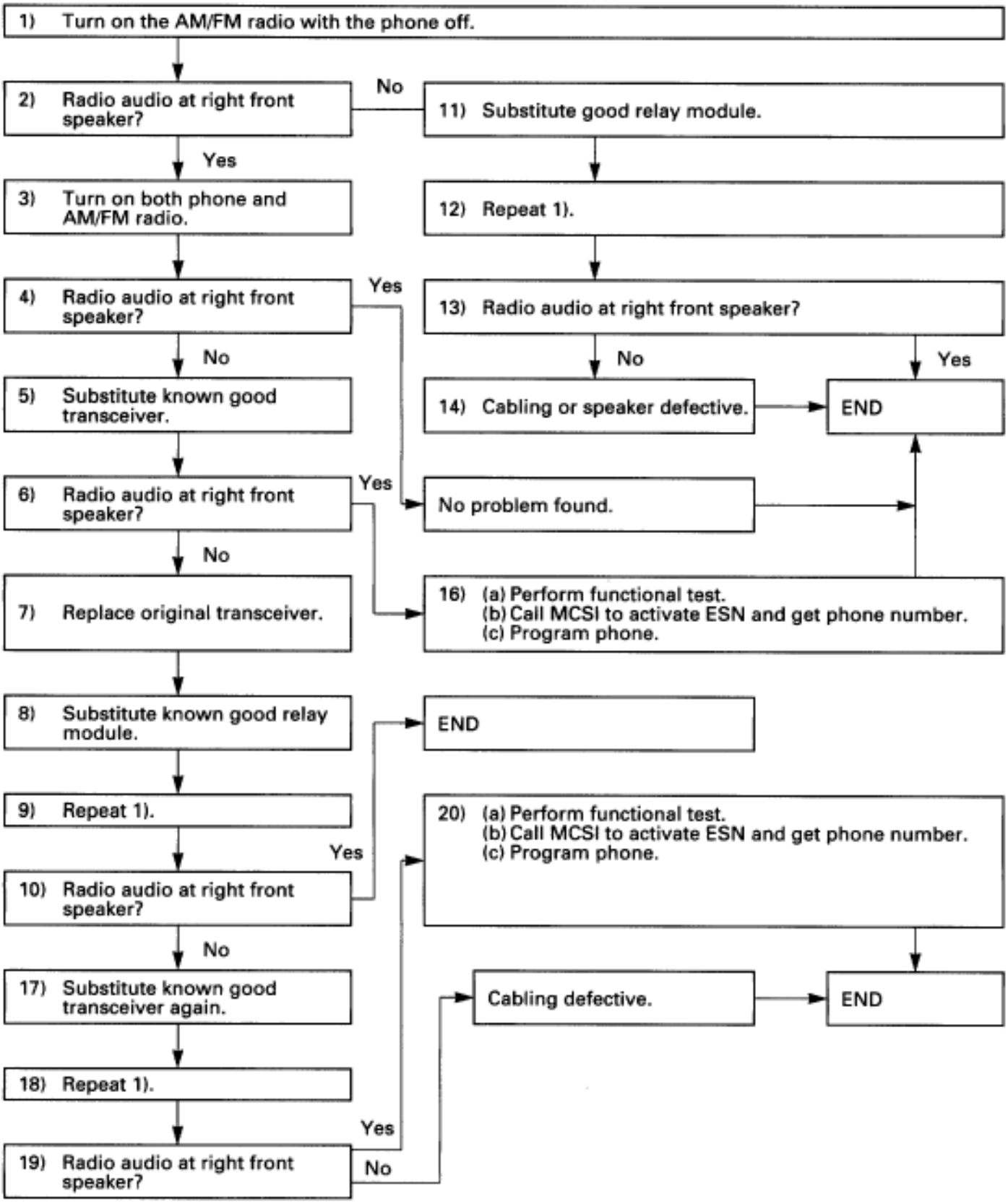


7 NO HANDS FREE AUDIO OR TONES FROM RIGHT FRONT SPEAKER

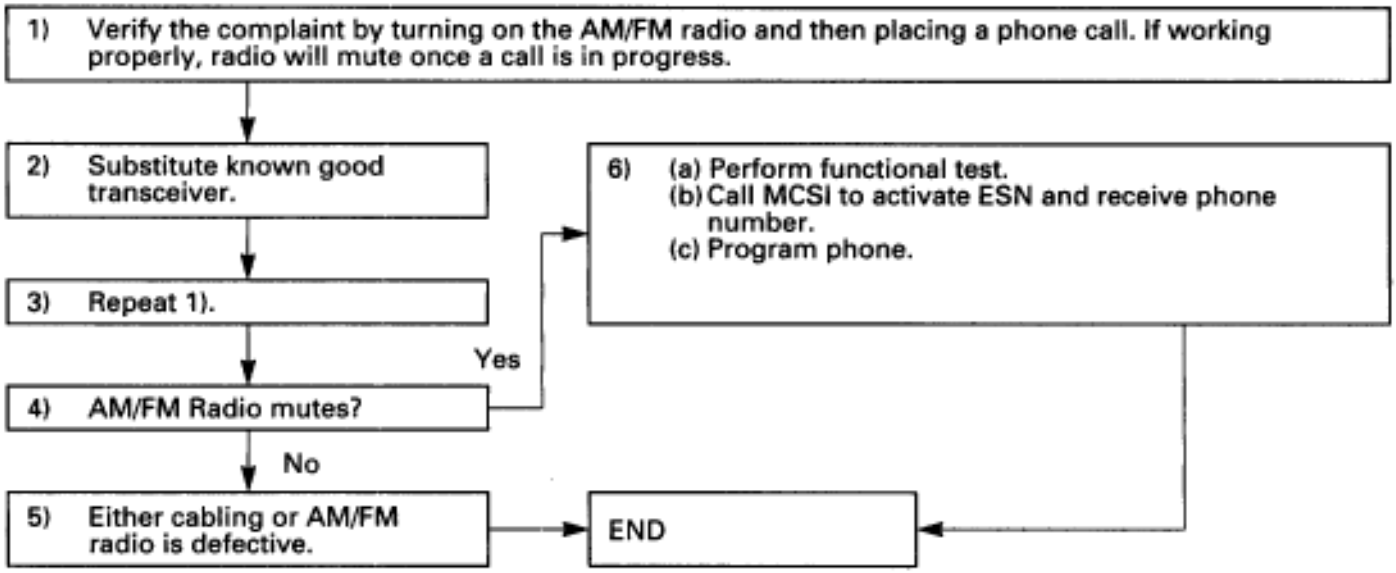



CONTINUED FROM PREVIOUS PAGE
19) Substitute known good transceiver.
20) Repeat 1).
21) Tones at right front speaker?
Yes
26) (a) Perform functional test.
(b) Call MCSI to activate ESN and receive phone number.
(c) Program phone.
END
No
22) Install known good relay again.
23) Repeat 1).
24) Tones at right front speaker?
Yes
27) (a) Perform function test.
(b) Call MCSI to activate ESN and receive phone.
(c) Program phone.
END
No
25) Cabling is defective.
END

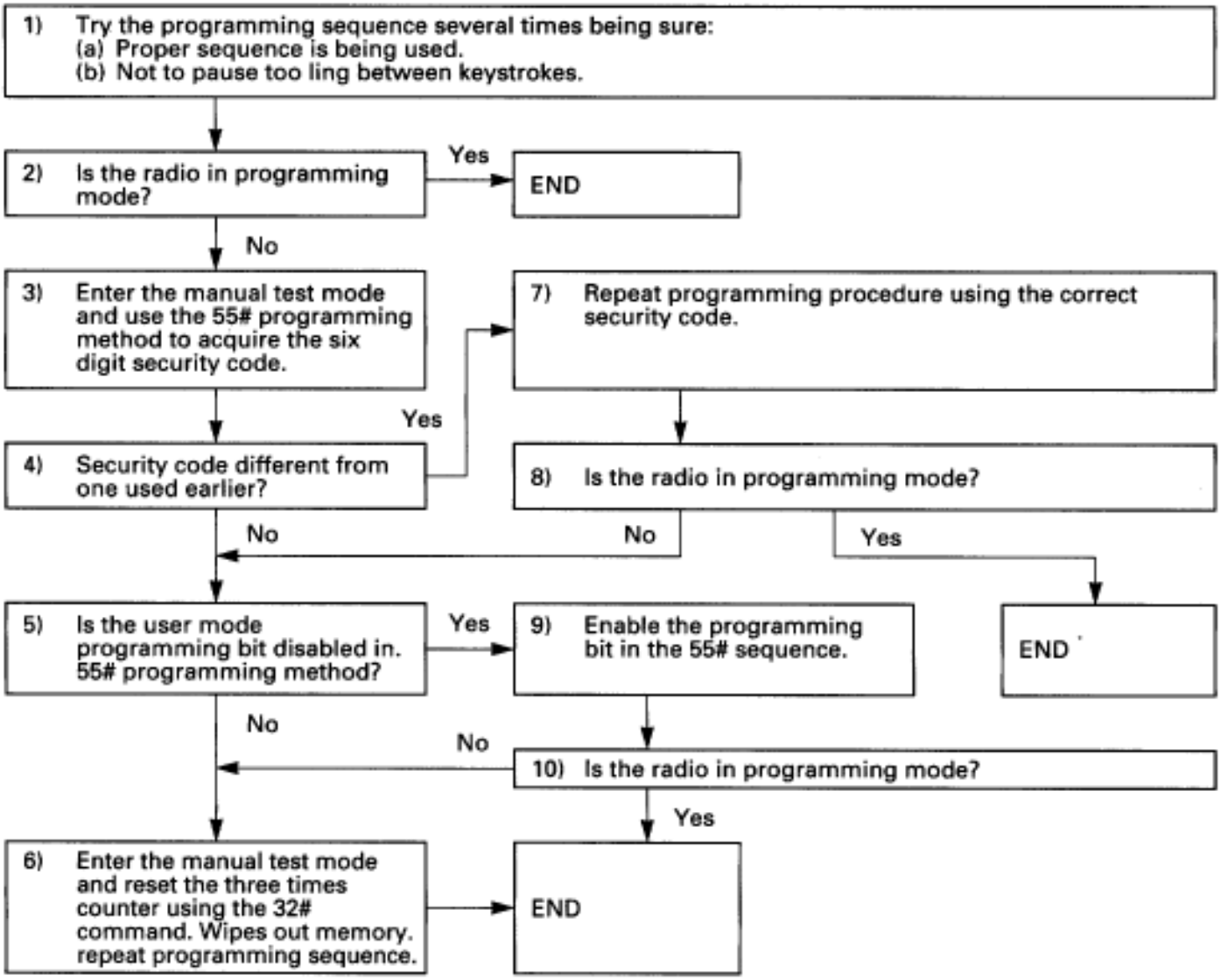
8 NO AM/FM RADIO OUT OF RIGHT FRONT SPEAKER

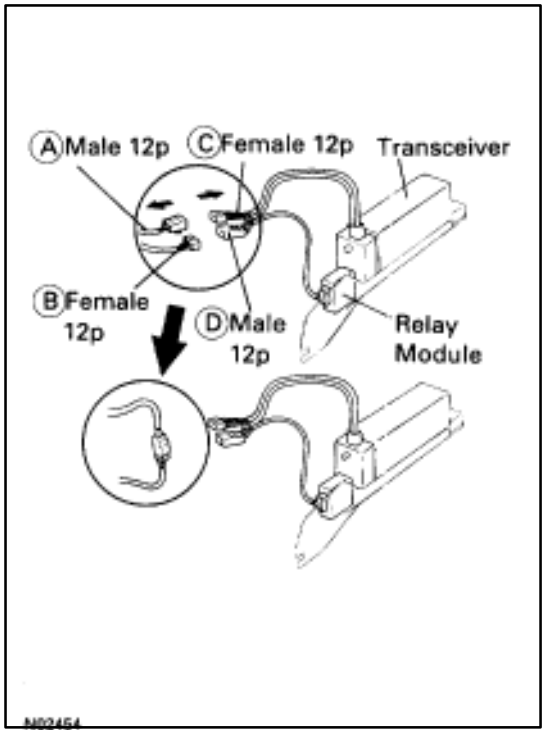


9 AM/FM RADIO DOES NOT MUTE DURING CALLS



10 RADIO WILL NOT GO INTO PROGRAMMING MODE





DIAGNOSIS PROCEDURE FOR CABLING

DIAGNOSIS PROCEDURE

(Step 1)

Disconnect connectors (**A**) and (**C**), (**B**) and (**D**), then connect (**A**) and (**B**).

This method returns the audio connection to the original condition before connection of the receiver and relay module, so that is can be judged whether the rear speaker and vehicle wire are normal or not.

(Step 2)

If the result in step 1 is normal, replace the subwire.

AUDIO SYSTEM
SYSTEM DESCRIPTION

RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

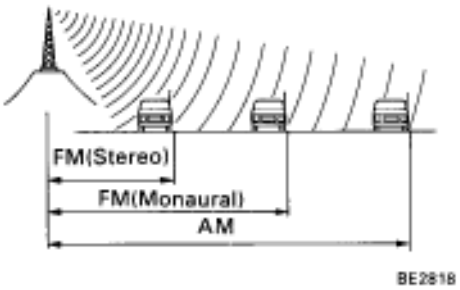
Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ⊕		FM ⊕	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low Frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

SERVICE AREA

There are great differences in the size of the service area for AM, FM monaural, and FM stereo broadcasting. Thus it may happen that FM broadcasts cannot be received even though AM comes 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.



BE2818

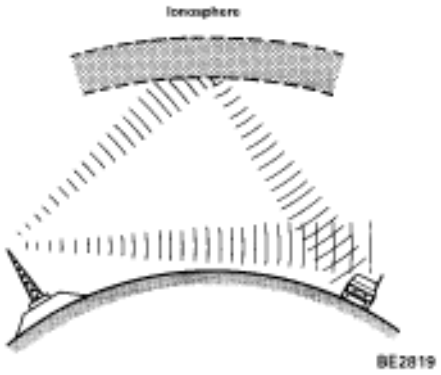
RECEPTION PROBLEMS

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”.

Fading

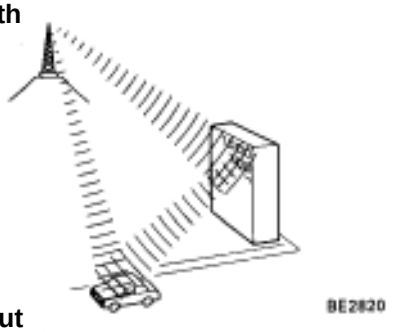


BE2819

Multipath

One type of interference caused by the bouncing of radio waves off of obstructions is called ”multipath”. Multipath occurs when a signal from the broadcast transmitter antenna bounces off of buildings and mountains and interferes with the signal that is received directly.

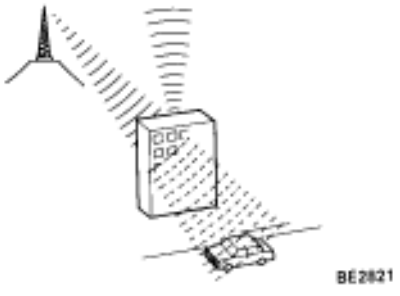
Multipath


BE2820

Fade Out

Because FM radio waves are of higher frequencies than AM radio waves, they bounce off of 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”.

Fade Out


BE2821

MAINTENANCE OF TAPE PLAYER

Head Cleaning

Using a moist–type cleaning tape, clean the head surface, pinch rollers and capstans.

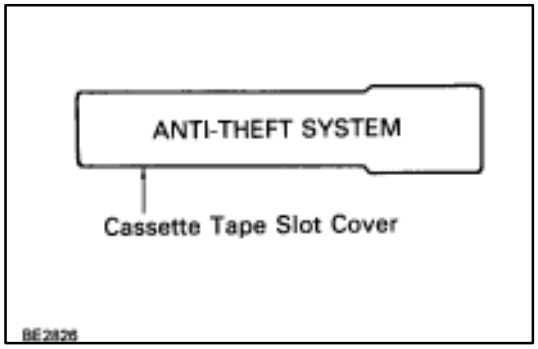
COMPACT DISC PLAYER

Compact Disc (hereafter called ”CD”) players use a laser beam pick–up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. There are 4.7 in. (12 cm) and 3.2 in. (8 cm) CD available, but it is recommended that you do not use 3.2 in. (8 cm) discs in the CD player.

HINT: Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magagine.

NOTICE: CD players use on invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.

ANTI–THEFT SYSTEM



HINT: The words ”ANTI–THEFT SYSTEM” are displayed on the cassette tape slot cover.

For operation instructions for the anti–theft system, please consult the audio system section in the Owner’s Manual (hereafter called O/M).

1. SETTING SYSTEM

The system is in operation once the customer has pushed the required buttons and entered the customer–selected 3–digit ID number.

(Refer to the O/M section, ”Setting the anti–theft system”)

HINT:

When the audio system is shipped the ID number has not been input, so the anti–theft system is not in operation.

If the ID number has not been input, the audio system remains the same as a normal audio system.

2. ANTI–THEFT SYSTEM OPERATION

If the normal electrical power source (connector or battery terminal) is cut off, the audio system becomes inoperable, even if the power supply resumes.

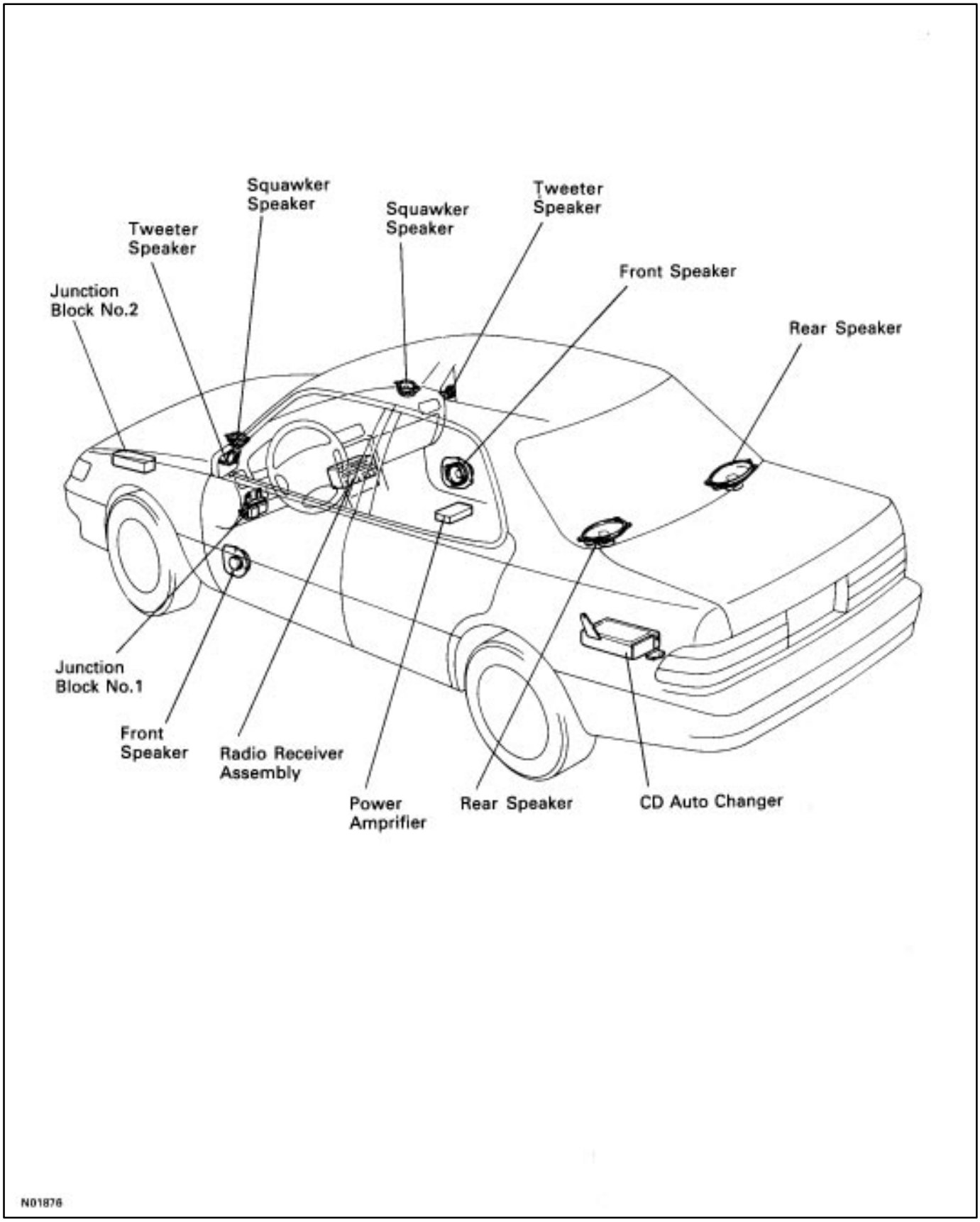
3. CANCELLING SYSTEM

The ID number chosen by the customer is input to cancel the anti–theft system.

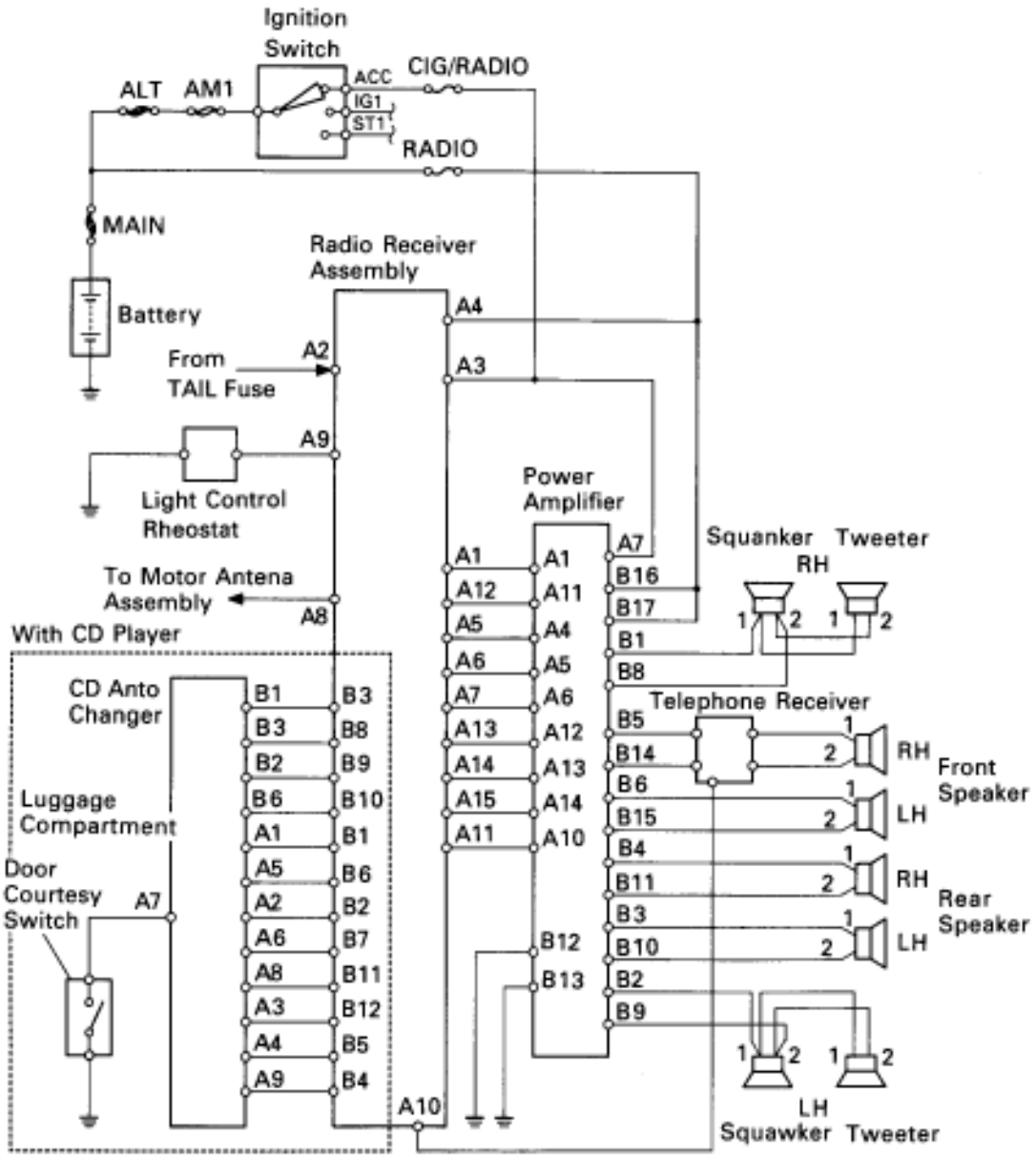
(Refer to the O/M section, ”If the system is activated”)

HINT: To change or cancel the ID number, please refer to the O/M section, ”Cancelling the system”.

PARTS LOCATION

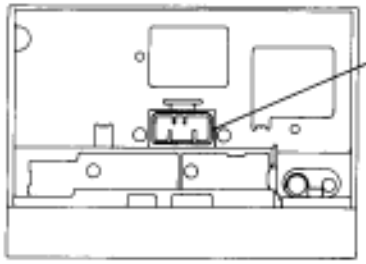


WIRING AND CONNECTOR DIAGRAM



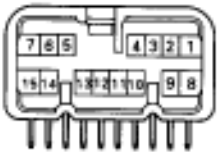
N01985

Radio Receiver Assembly
Without CD player



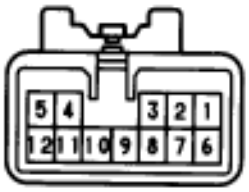
N01877

Connector "A"



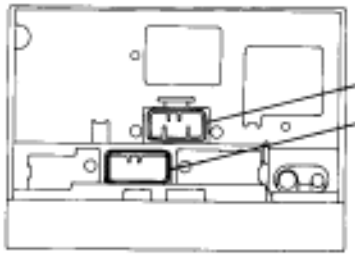
BE6531

Connector "B"



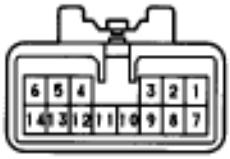
e-12-2

Radio Recerver Assembly
with CD player



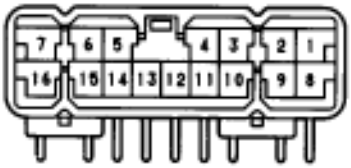
N01879

Connector "A"



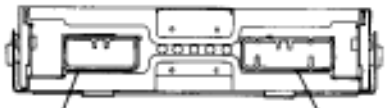
e-14-2-A

Connector "B"



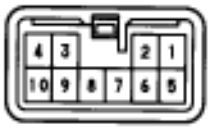
e-16-2-A

Power Amplipier



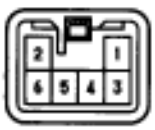
N01878

Connector "A"



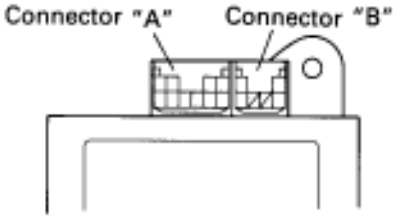
le-10-2

Connector "B"



le-16-2-A

CD Auto Changer



N02453

Front Speaker

e-2-2-E

Tweeter

e-2-1-E

Squawker

g-2-2

Rear Speaker

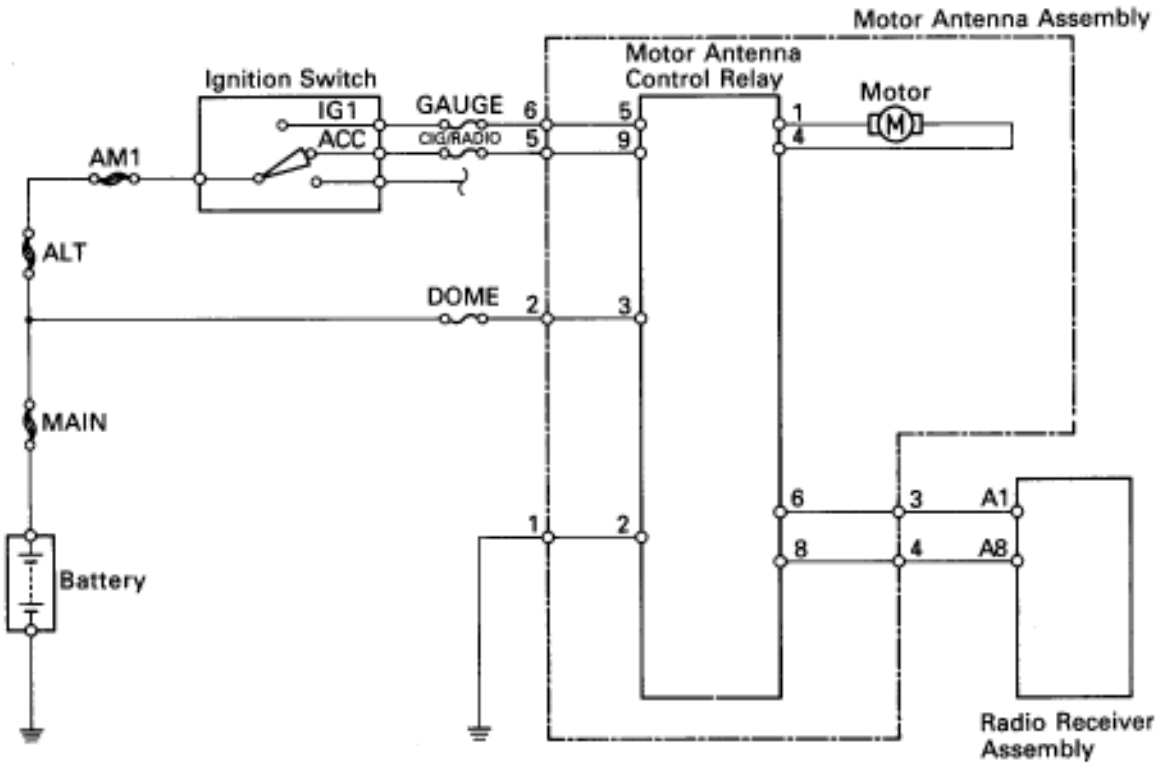
e-2-2

Motor Antenna Assembly

e-6-2

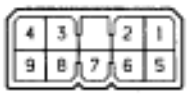
WIRING AND CONNECTOR DIAGRAMS

Motor Antenna



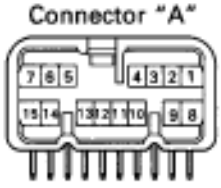
Motor Antenna Assembly

Motor Antenna Control Relay



Radio Receiver Assembly

Connector "A"



RADIO RECEIVER ASSEMBLY

RADIO RECEIVER ASSEMBLY REMOVAL AND INSTALLATION

(See page BO–107)

RADIO RECEIVER ASSEMBLY INSPECTION

INSPECT RADIO RECEIVER ASSEMBLY

(Circuit)

Disconnect the connectors from the radio receiver assembly. And inspect the connector on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Voltage	A4–Ground	Constant		Battery positive voltage
	A3–Ground	Ignition switch position	ACC or ON	Battery positives voltage
			LOCK	No voltage
	A2–Ground	Light Control switch position	TAIL or HEAD	Battery positive voltage
			OFF	No voltage

If circuit is not as specified. Refer to BE–218 wiring diagrams and 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, in accordance with the wiring diagrams in BE–218.

FRONT DOOR SPEAKER

FRONT DOOR SPEAKER REMOVAL AND INSTALLATION

(See page BO–34)

Tweeter

TWEETER REMOVAL AND INSTALLATION

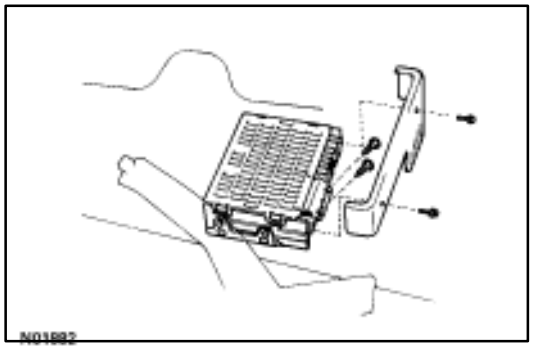
(See page BO–34)

SQUAWKER

SQUAWKER REMOVAL AND INSTALLATION
(See page BO–107)

REAR SPEAKER

REAR SPEAKER REMOVAL AND INSTALLATION
(See page BO–140)

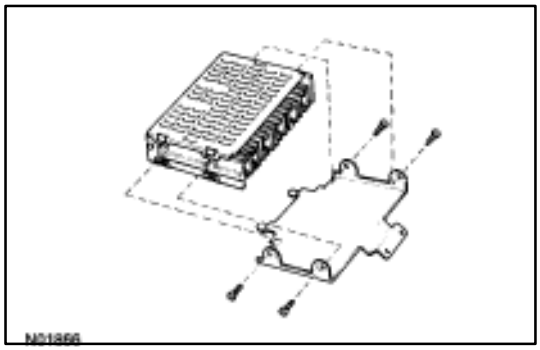


POWER AMPLIFIER

POWER AMPLIFIER REMOVAL AND INSTALLATION

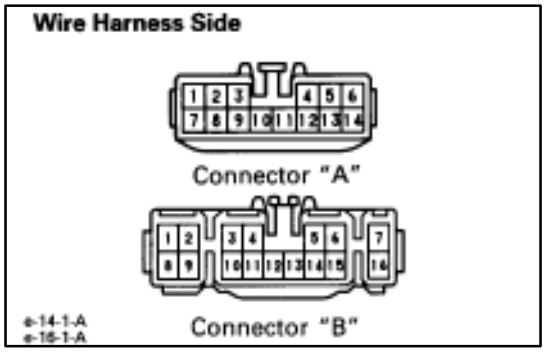
1. REMOVE POWER AMPLIFIER

(a) Remove the LH side front seat.
(b) Disconnect the connector and remove two bolt and the woofer amplifier with the bracket.
(c) Remove four bolts and the woofer amplifier.
HINT: See page BO–118 to remove LH side front seat



2. INSTALL POWER AMPLIFIER

For installation, follow the removal procedure in reverse.



POWER AMPLIFIER INSPECTION

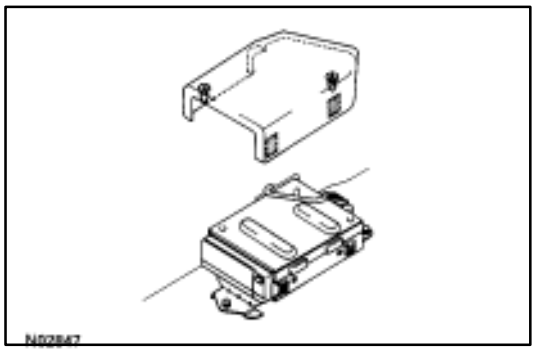
INSPECT POWER AMPLIFIER

(Circuit)

Disconnect the connector from power amplifier and inspect the connector on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Continuity	B–16–Ground B–7–Ground	Constant		Continuity
Voltage	B–12–Ground	Constant		Battery positive voltage
	A7–Ground A1–Ground	Ignition switch position	ACC or ON	Battery positive voltage
			LOCK	No voltage

If circuit is not as specified, refer to BE–218 wiring diagrams and inspect the circuits connected to other parts.

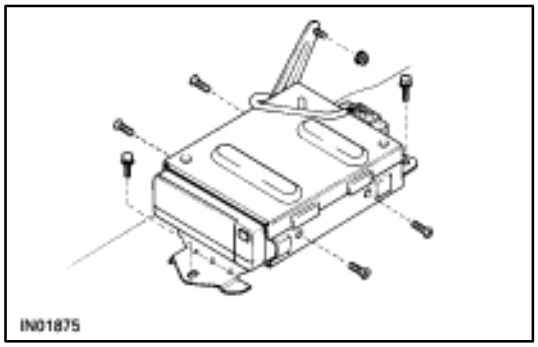


CD AUTO CHANGER

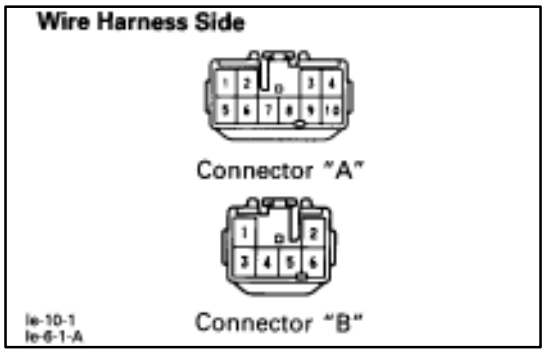
REMOVAL AND INSTALLATION OF CD AUTO CHANGER

1. REMOVE CD AUTO CHANGER

(a) Remove LH side cover.
(b) Remove CD changer cover.



(c) Disconnect two connectors.
(d) Remove four screws and guard plate.
(e) Remove two bolts, one nut and CD auto changer.



INSPECTION OF CD AUTO CHANGER

INSPECT CD AUTO CHANGER

(Circuit)

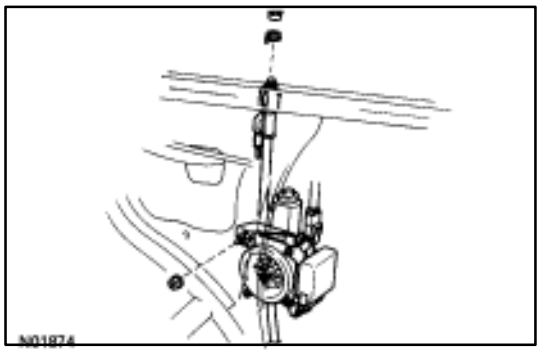
Disconnect connectors from CD auto changer and inspect the connector on the wire harness side as shown.

Check for	Tester connection	Condition		Specified value
Voltage	A4–Ground	Constant		Battery positive voltage
	A3–Ground	Ignition switch position	ACC or ON	Battery positive voltage
			LOCK	No voltage
Continuity	A7–Ground	Luggage compartment door courtesy switch	Push (OFF)	No continuity
			Free (ON)	Continuity

If circuit is not as specified, refer to BE–218 wiring diagrams and inspect the circuits connected to other parts.

HINT:

- Check the wire harness between the radio receiver assembly and the CD auto changer in accordance with the wiring diagrams in BE–218.
- Since the signals to and from the CDL+, CDL, CDR+, CDR, TXM+, TXM, TXS+ and TXS terminals are serial signals, they cannot ordinarily be measured with a tester.



MOTOR ANTENNA

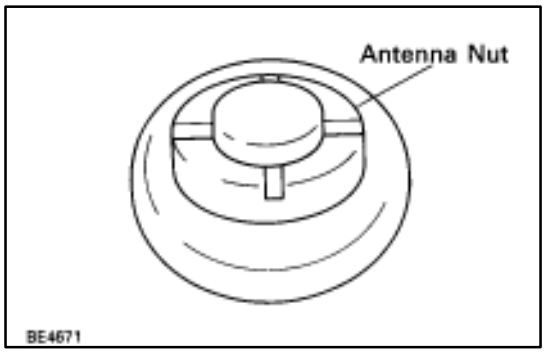
MOTOR ANTENNA REMOVAL AND INSTALLATION

1. REMOVE MOTOR ANTENNA

(a) Remove the antenna nut.
(b) Remove the RH side cover.
(c) Disconnect the motor antenna connector.
(d) Remove the nut and the motor antenna assembly.
(e) Disconnect the antenna cord.
(f) Remove the drain hose.

2. INSTALL MOTOR ANTENNA

(a) Connect the motor antenna connector and the antenna cord.
(b) Install the antenna nut.
(c) Install the nut.
(d) Connect the drain hose.

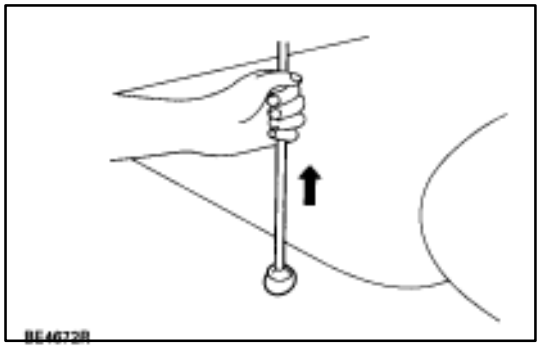


ANTENNA ROD REMOVAL AND INSTALLATION

1. REMOVE ANTENNA ROD

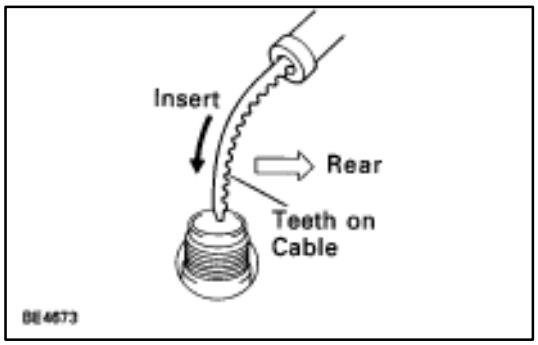
HINT: Perform this operation with the battery negative (–) cable connected to the battery terminal.

(a) Turn the ignition switch to ”LOCK” position.
(b) Remove the antenna nut.



(c) Press the ”AM” or ”FM” button on the radio receiver, and simultaneously turn the ignition switch to ”ACC” position.
HINT:
- The rod will extend fully and be released from the motor antenna.
- After removing the antenna rod, leave the ignition switch at ”ACC”.

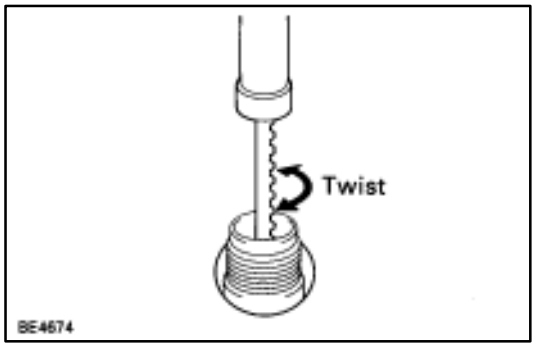
NOTICE: To prevent body damage when the antenna rod is released, hold the rod while it comes out.



2. INSTALL ANTENNA ROD

(a) Insert the cable of the rod until it reaches the bottom.
HINT:
- When inserting the cable, the teeth on the cable must face toward the rear of the vehicle.
- Insert the cable approx. 400 mm.

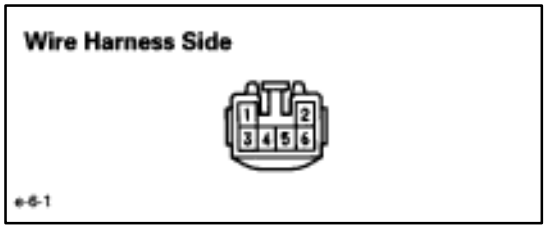
(b) Wind the cable to retract the rod by turning the ignition switch to ”LOCK” position.
HINT:



- If the ignition switch is already in ”LOCK” position, perform step 1 (c) first, then turn the ignition switch to ”ACC” position.
- In case the cable is not wound, twist it as shown in the illustration.
- Even if the rod has not retracted fully, install the antenna nut and inspect the antenna rod operation. It will finally retract fully.

(c) Inspect the antenna rod operation by pushing the radio wave band select buttons.

MOTOR ANTENNA INSPECTION



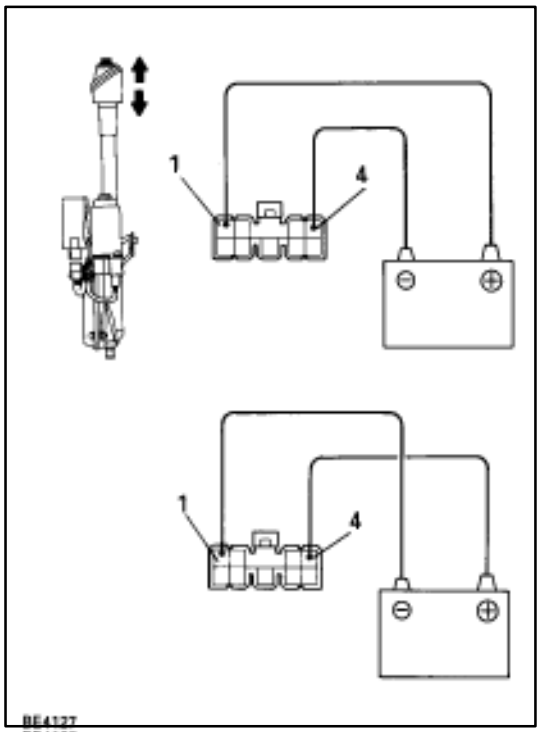
1. INSPECT MOTOR ANTENNA

(Circuit)

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

Check for	Tester connection	Condition		Specified value
Continuity	1–Ground	Constant		Continuity
Voltage	2–Ground	Constant		Battery positive voltage
	6–Ground	Ignition switch position	ACC or ON	Battery positive voltage
			LOCK	No voltage
	5–Ground	Ignition switch position	ON	Battery positive voltage
			ACC or LOCK	No voltage
	4–Ground	Ignition switch ACC or ON	Radio switch ON	Battery positive voltage
			Radio switch OFF	No voltage
	3–Ground	Ignition switch ACC or ON and radio switch ON	AM or FM (87.9–96.0 MHz)	Battery positive voltage
			Others	No voltage

If circuit is not as specified, inspect radio or wire harness.
If circuit is as specified, replace motor antenna.



1. INSPECT ANTENNA MOTOR

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

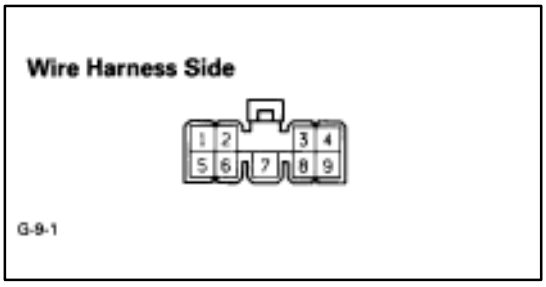
(b) Check that the motor turns (moves upward).

NOTICE: These tests must be performed quickly (within 3–5 seconds) to prevent the coil from burning out.

(c) Then, reverse the polarity, check that the motor turns the opposite way (moves downward).

NOTICE: These tests must be performed quickly (within 3–5 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



2. INSPECT ANTENNA MOTOR CONTROL RELAY (Relay Circuit)

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

Check for	Tester connection	Condition			Specified value
Continuity	1–4	Constant			Continuity
	2–Ground	Constant			Continuity
Voltage	3–Ground	Constant			Battery positive voltage
	5–Ground	Ignition switch position	LOCK		No voltage
			ACC or ON		Battery positive voltage
	6–Ground	Ignition switch position	LOCK		No voltage
			ACC or ON	Radio switch and cassette OFF	No voltage
				Radio switch or cassette ON	Battery positive voltage
	8–Ground	Ignition switch position	LOCK		No voltage
			ACC or ON	Radio switch OFF or cassette ON	No voltage
				Radio switch ON and cassette OFF	Battery positive voltage
	9–Ground	Ignition switch positive	LOCK or ACC		No voltage
			ON		Battery positive voltage

If circuit is as specified, replace the relay.

GLASS PRINTED ANTENNA

GLASS PRINTED ANTENNA INSPECTION

1. INSPECT GLASS PRINTED ANTENNA

(Use same procedure as for ”INSPECT DEFOGGER WIRES” on page BE–195.)

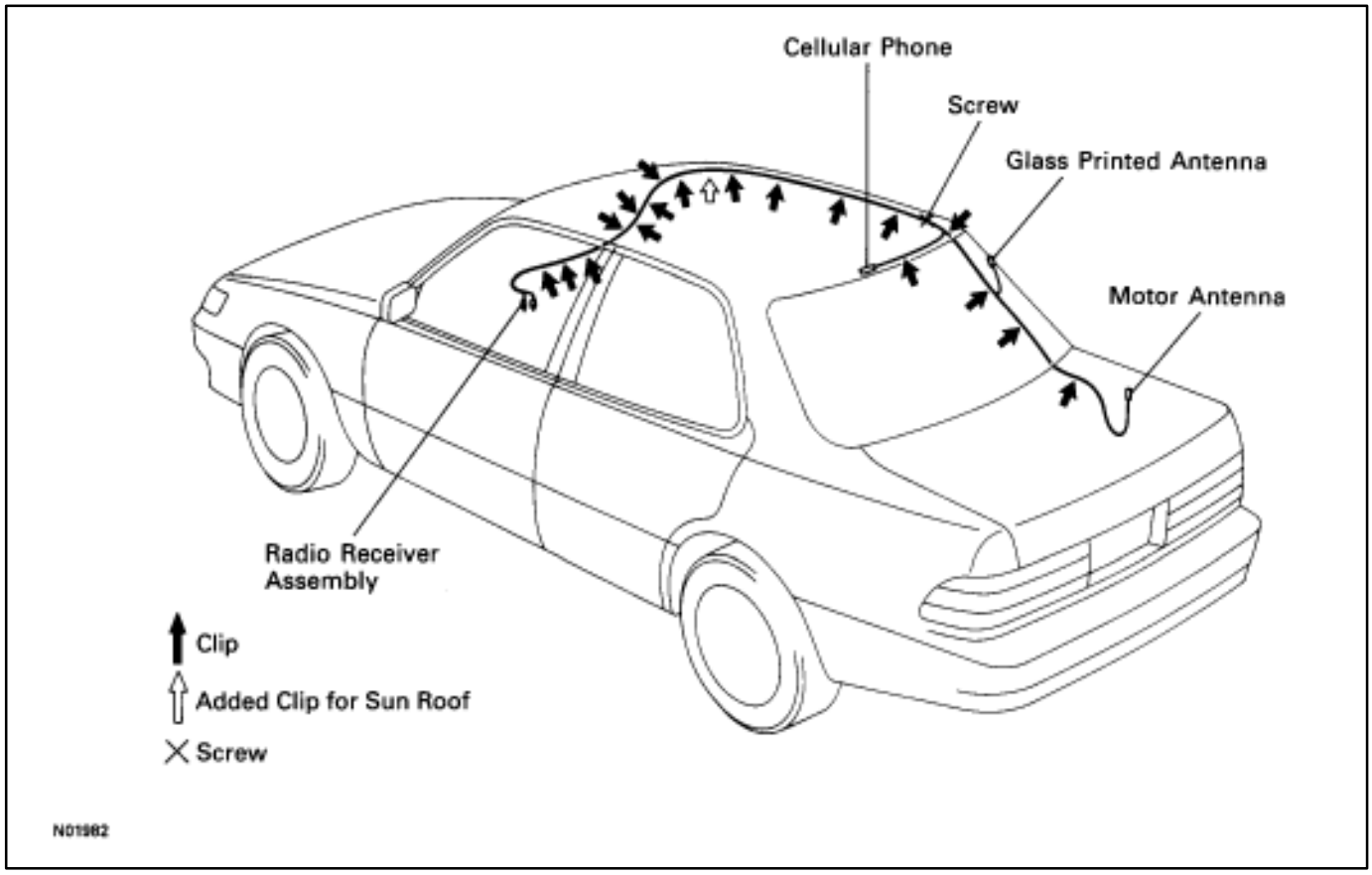
2. REPAIR GLASS PRINTED ANTENNA

(Use same procedure as for ”REPAIR DEFOGGER WIRES” on page BE–195.)

ANTENNA CORD

ANTENNA CORD REMOVAL AND INSTALLATION

1. REMOVE ANTENNA CORD



(a) Remove the following parts:
- Instrument panel assembly
- Right front pillar garnish
- Roof headlining
- Roof side inner garnish
- Right center pillar garnish
- Right rear pillar garnish
- Package tray trim
- Room partition trim
- Luggage compartment LH cover
- Luggage compartment trim front cover

HINT: See BO–section.

(b) Remove antenna cord from motor antenna and glass printed antenna.

(c) Disconnect the connectors shown in the figure.

(d) Remove the clips and antenna cord assembly.

2. INSTALL ANTENNA CORD

For installation follow the removal procedure in reverse.

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 simple troubleshooting which should be carried out on the vehicle during system operation and is based on the assumption that the cause of trouble lies with the system components (excluding 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

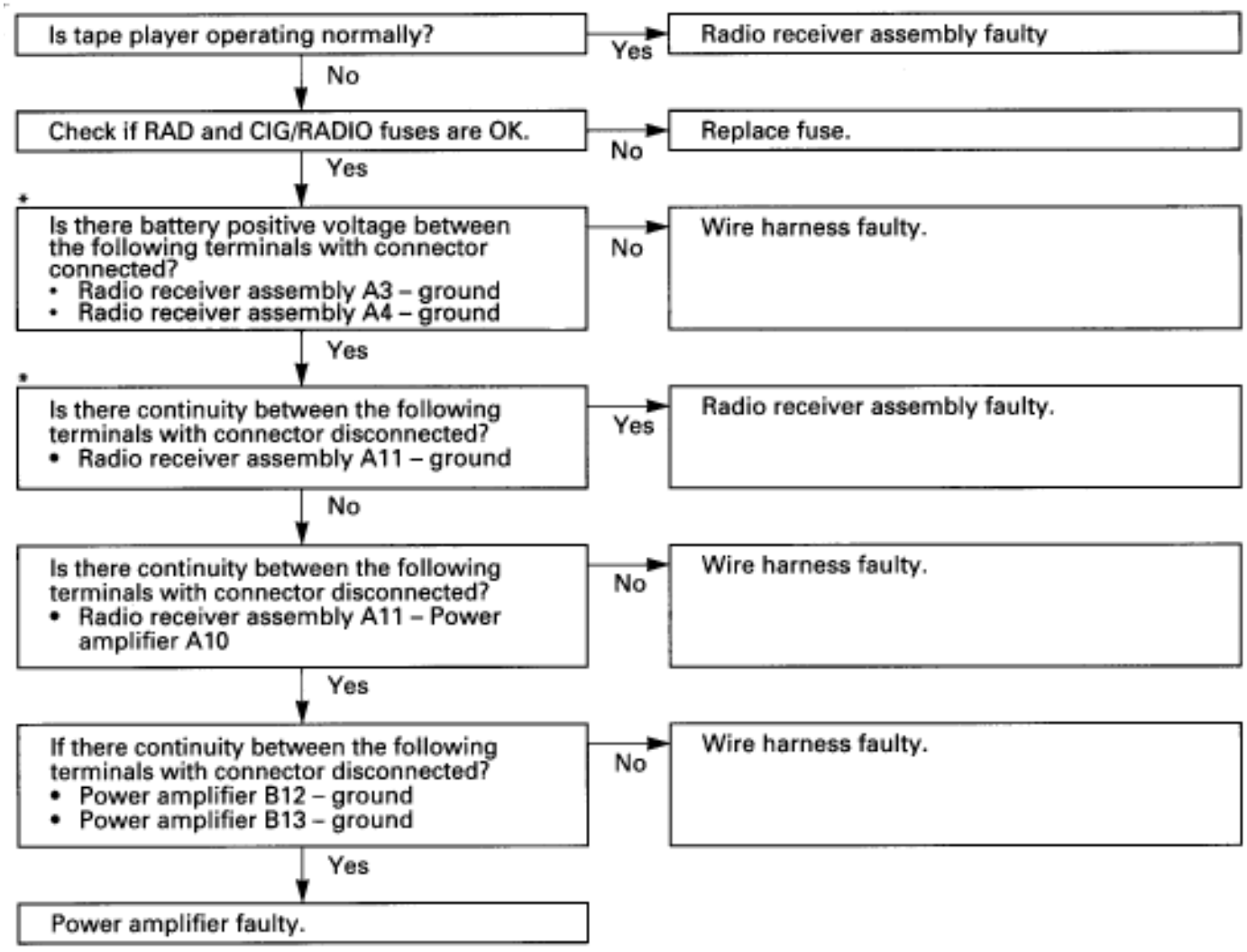
The cassette tape or compact disc itself may be causing the trouble, so when troubleshooting the tape player or CD player, always use a different cassette tape or compact disc first of all to check operation of the tape player or CD player.

For some of problems in the following problem chart, the AUDIO SYSTEM CHECKER can be used to inspect malfunctions of the Radio or Tape Player, and the CD PLAYER CHECKER can be used to inspect the CD player.

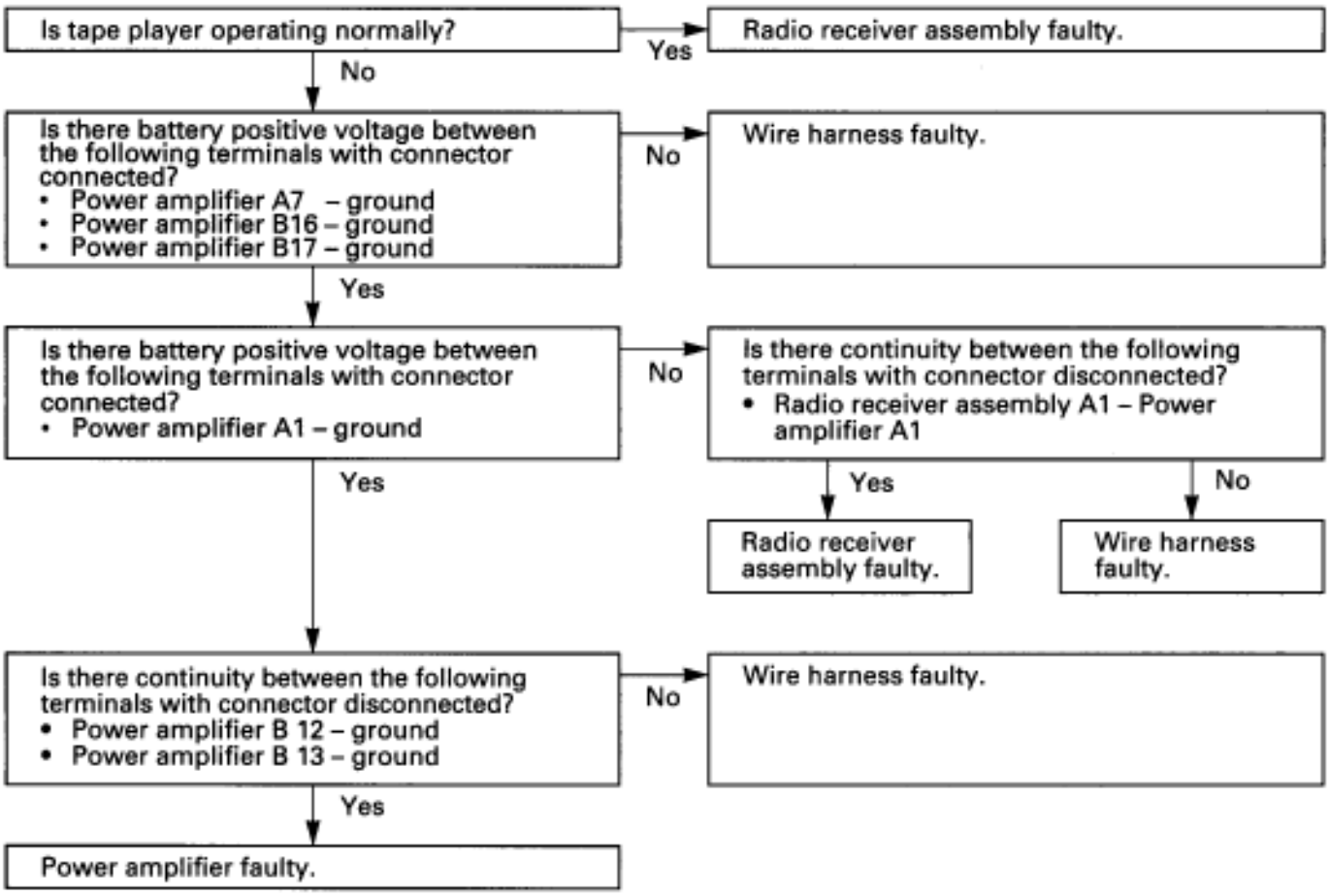
The portions indicated by *on the flow charts on the following pages can be inspected using a CHECKER. For instructions on how to connect the checker to the vehicle and how to use the checker, please refer to the instruction Manual for AUDIO SYSTEM CHECKER or CD PLAYER CHECKER.

Problem		No.
Radio	Radio not operating when power switch turned to ”ON”	1
	Display indicates, but no sound (including ”NOISE”) is produced	2
	Noise present, but AM–FM not operating	3
	Any speaker does not work	4
	Volume faint	5
	Reception poor	6
	Present memory disappears	7
Tape player	Cassette tape cannot be inserted	8
	Cassette tape will not eject	9
	Display indicates, but no sound is produced	10
	Sound quality poor	11
	Volume faint	12
	Any speaker does not work	13
CD player	Magazine cannot be inserted into auto changer	14
	Magazine is inserted, but display does not indicate ”CD”	15
	Display indicates, but no sound is produced	16
	Any speaker does not work	17
	Volum faint	18
	RH channel or LH channel speak volume faint	19
	Sound quality poor	20
Noise	Noise produced by vibration or shock while driving	21
	Noise produced when engine starts	22
Antenna	Antenna–related	23
Anti–theft system	Trouble shooting for ANTI–THEFT SYSTEM	24

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO "ON"



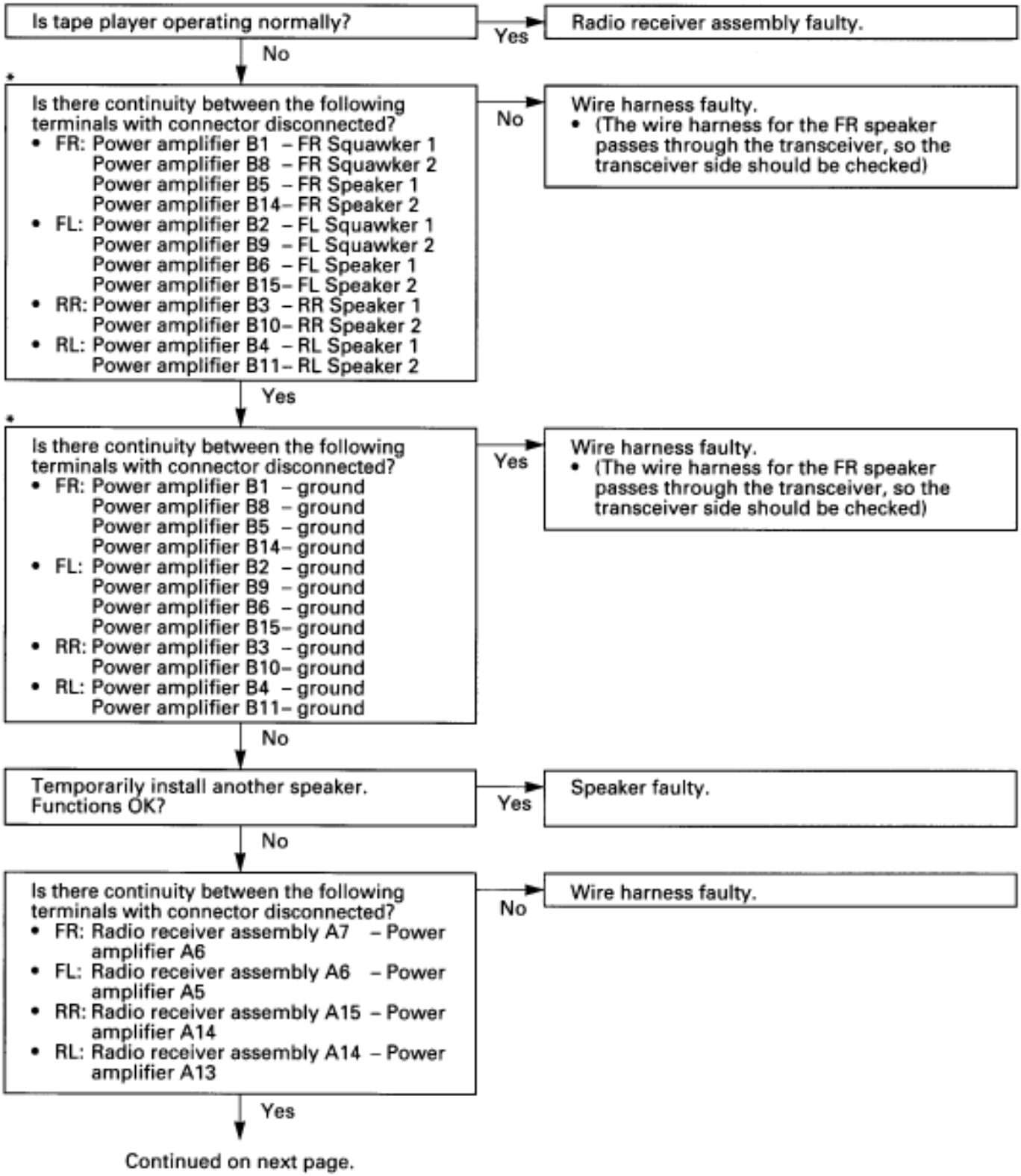
2	Radio	DISPLAY INDICATES, BUT NO SOUND (INCLUDING “NOISE”) IS PRODUCED



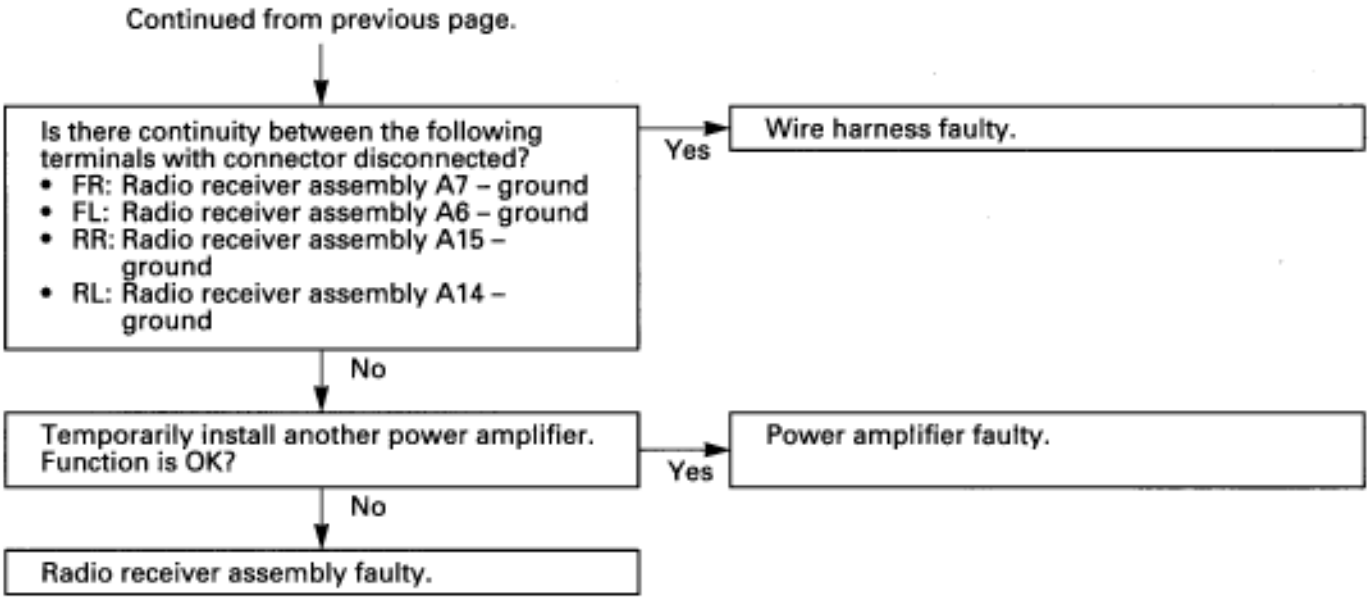
3	Radio	NOISE PRESENT, BUT AM–FM NOT OPERATING

If radio side faulty

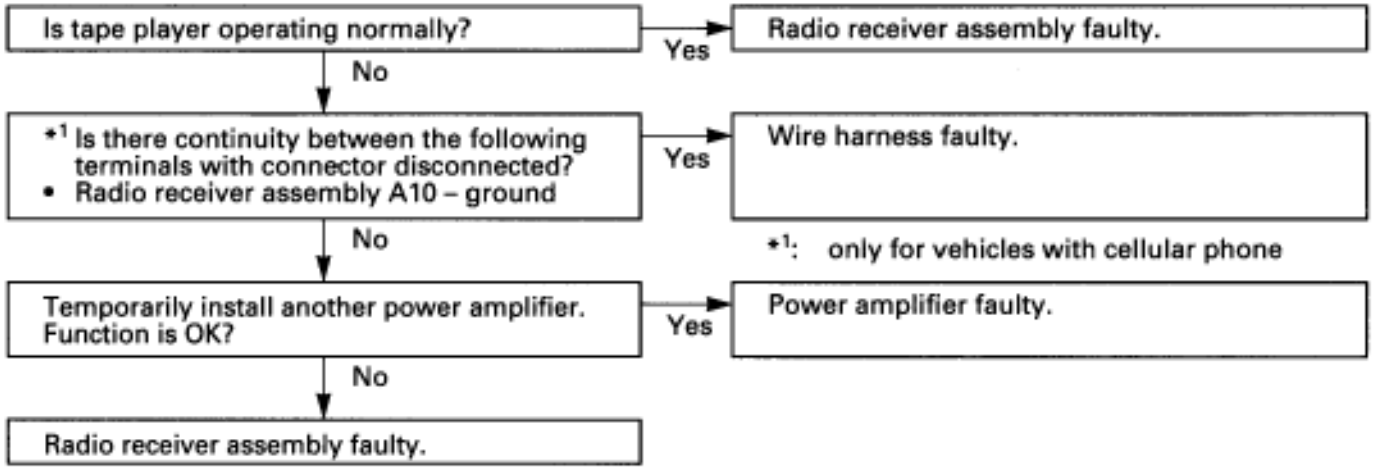
4	Radio	ANY SPEAKER DOES NOT WORK



Continued on next page.

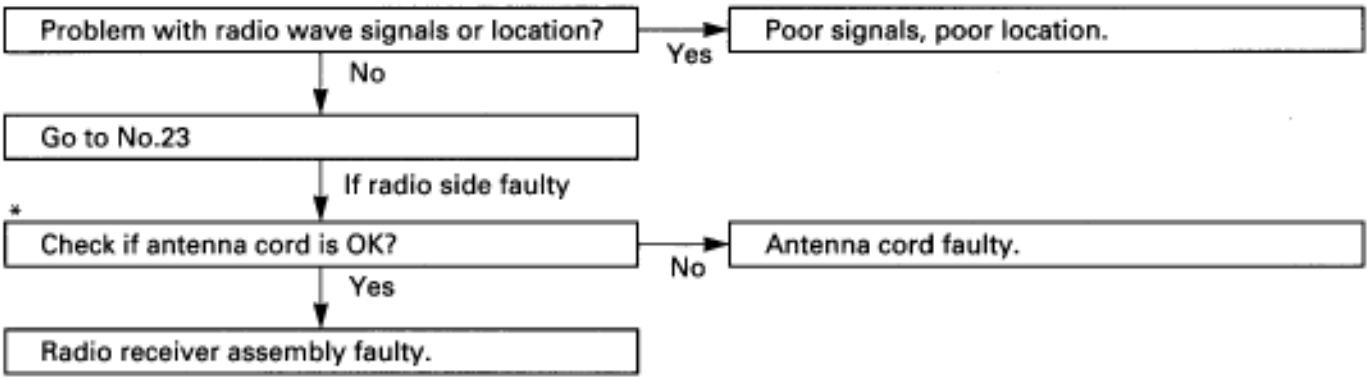

Continued from previous page.
Is there continuity between the following terminals with connector disconnected?
• FR: Radio receiver assembly A7 – ground
• FL: Radio receiver assembly A6 – ground
• RR: Radio receiver assembly A15 – ground
• RL: Radio receiver assembly A14 – ground
Yes
Wire harness faulty.
No
Temporarily install another power amplifier. Function is OK?
Yes
Power amplifier faulty.
No
Radio receiver assembly faulty.

5	Radio	VOLUME FAINT

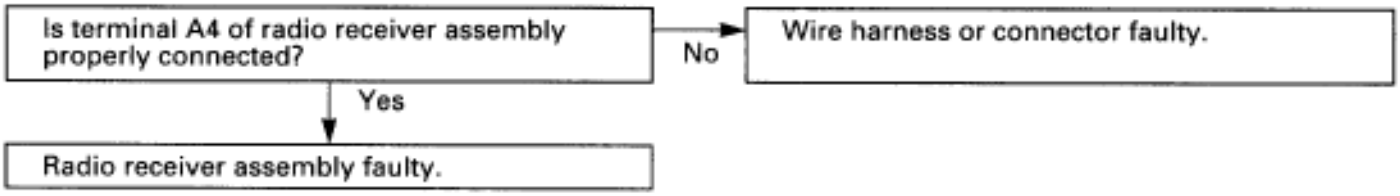


*1: only for vehicles with cellular phone

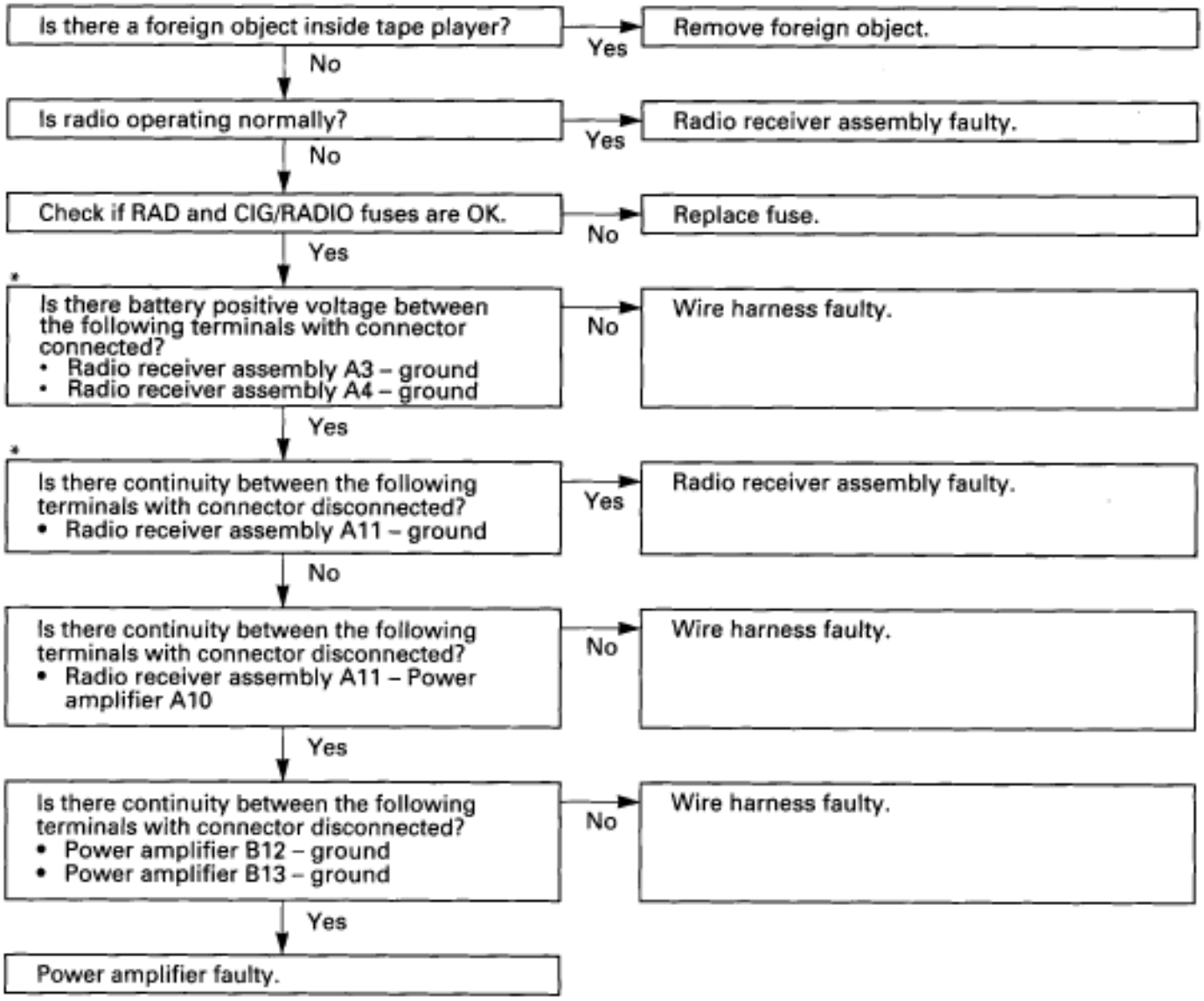
6	Radio	RECEPTION POOR



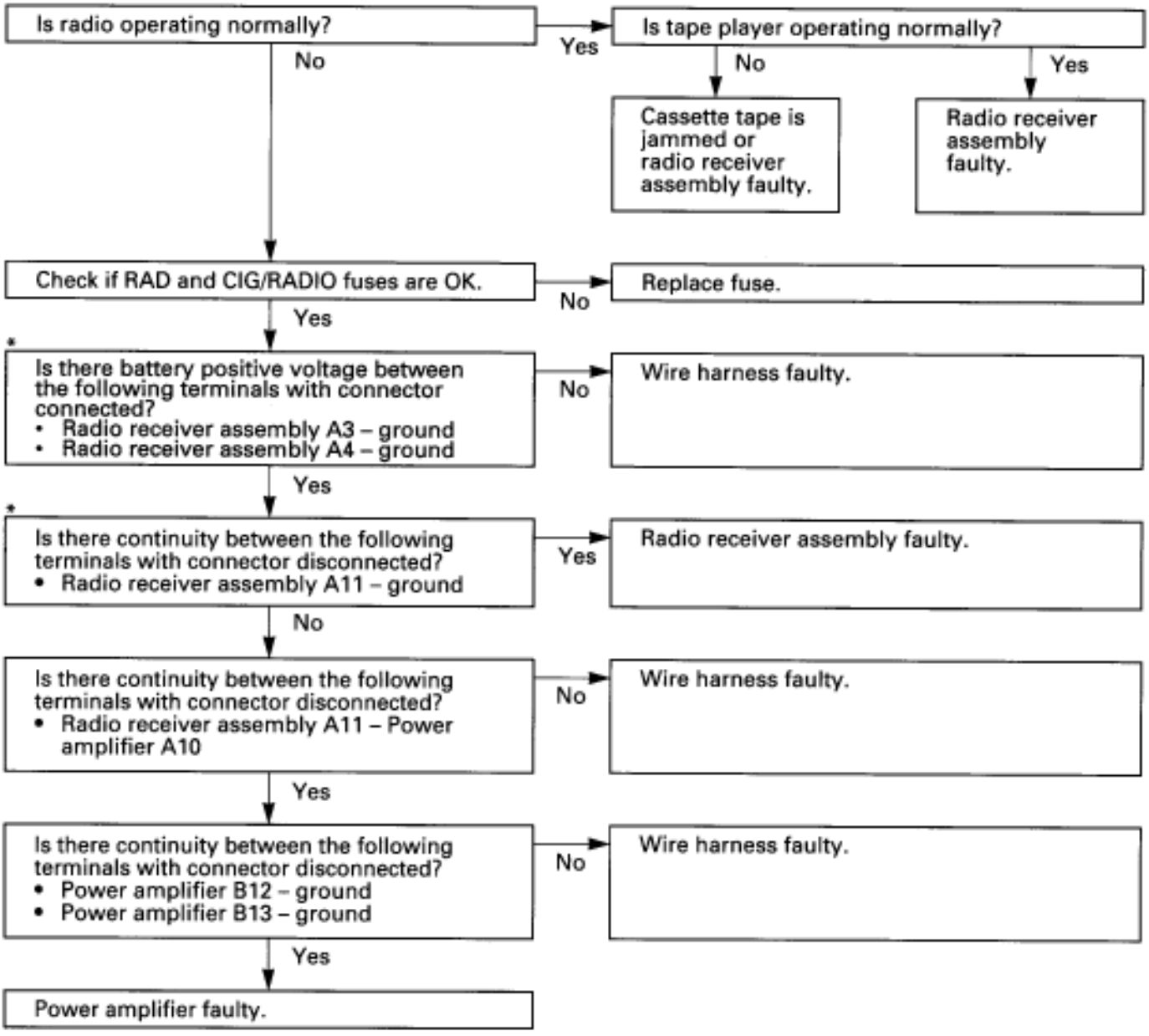
7	Radio	PRESET MEMORY DISAPPEARS



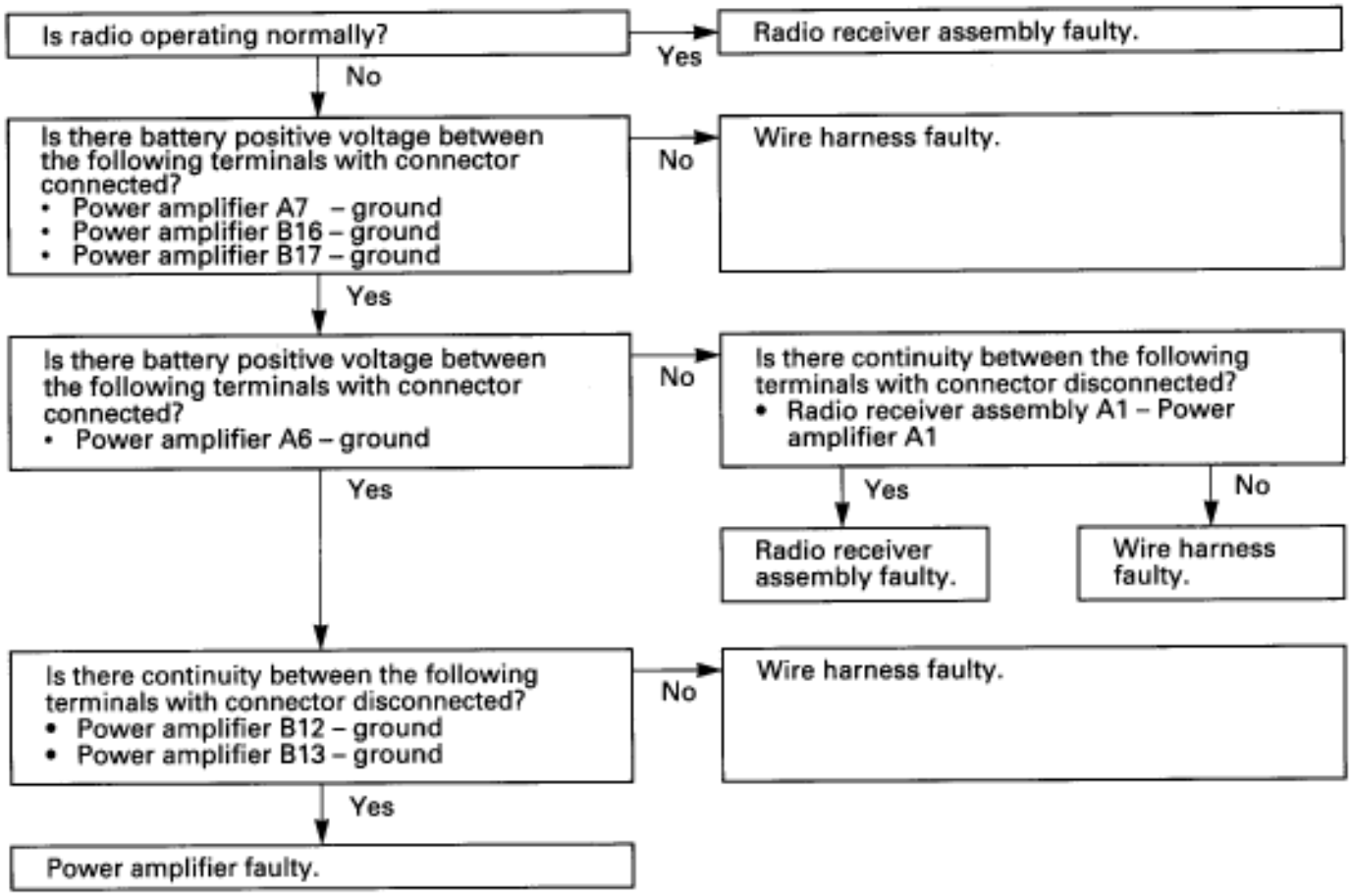
8	Tape player	CASSETTE TAPE CANNOT BE INSERTED



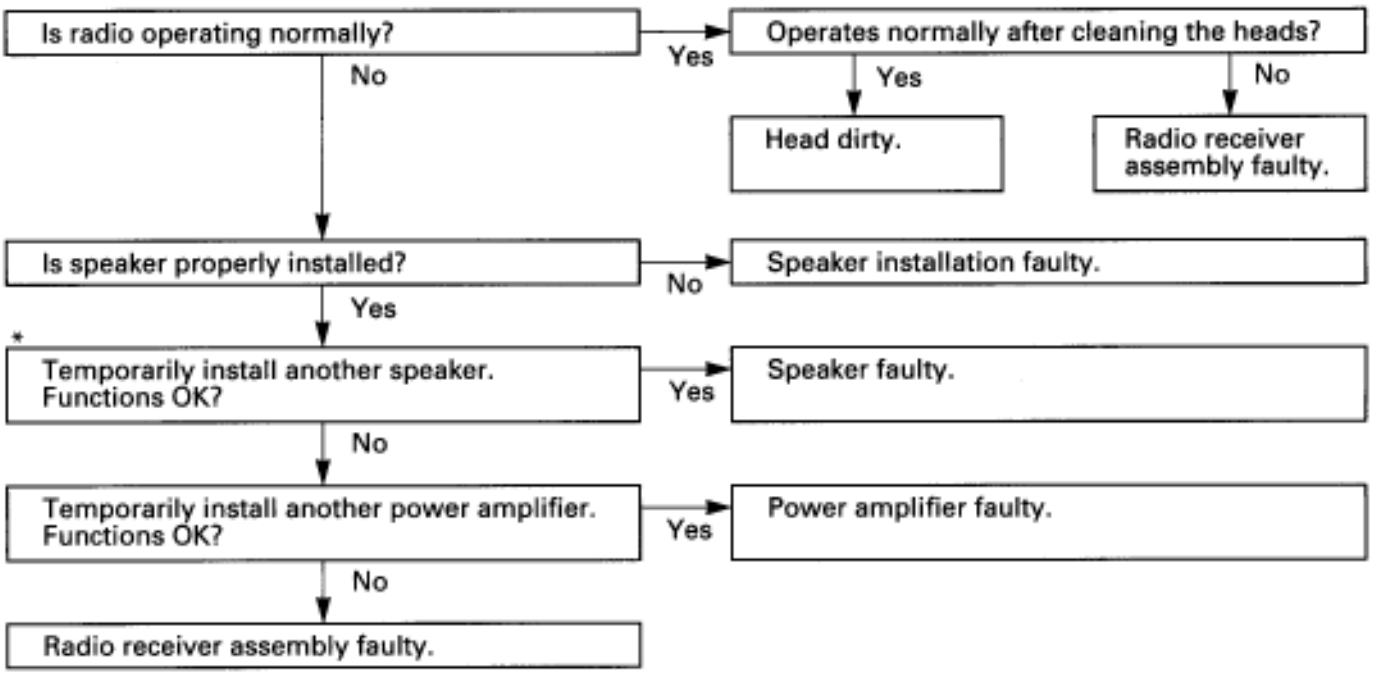
9	Tape player	CASSETTE TAPE WILL NOT EJECT



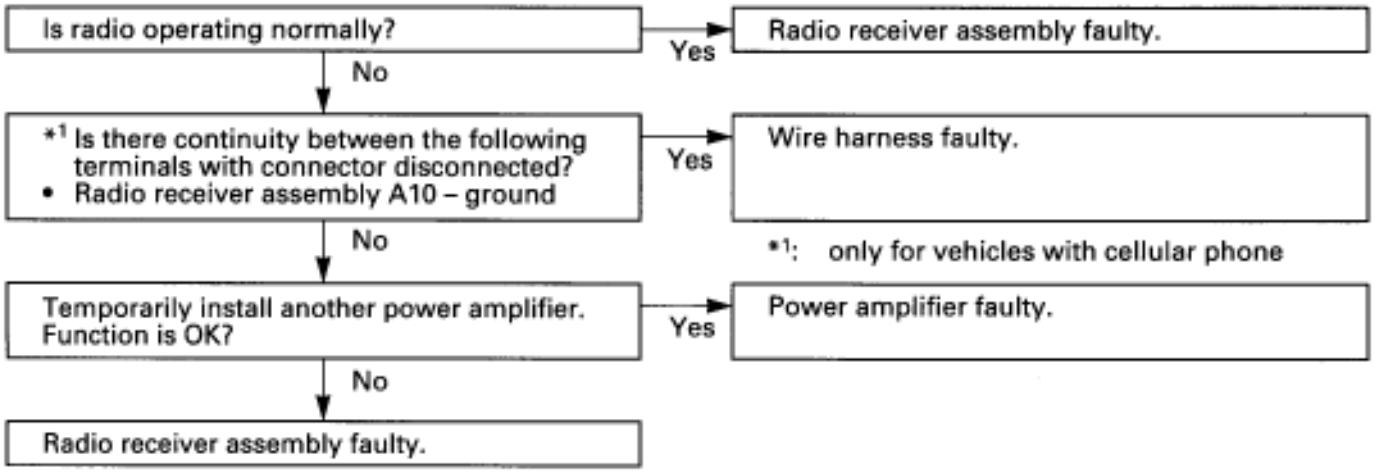
10	Tape player	DISPLAY INDICATES, BUT NO SOUND IS PRODUCED



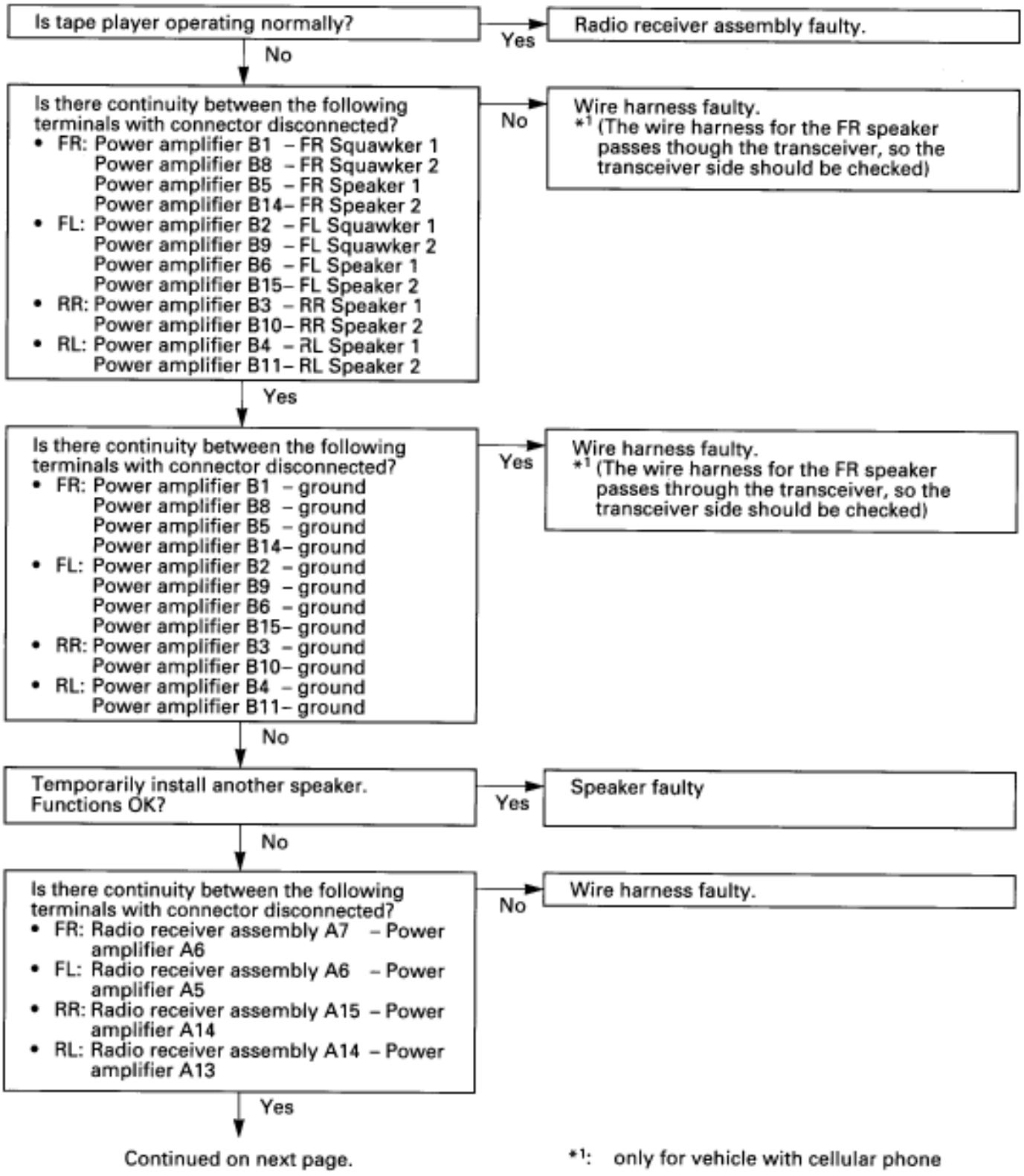
11	Tape player	SOUND QUALITY POOR



12	Tape player	VOLUME FAINT

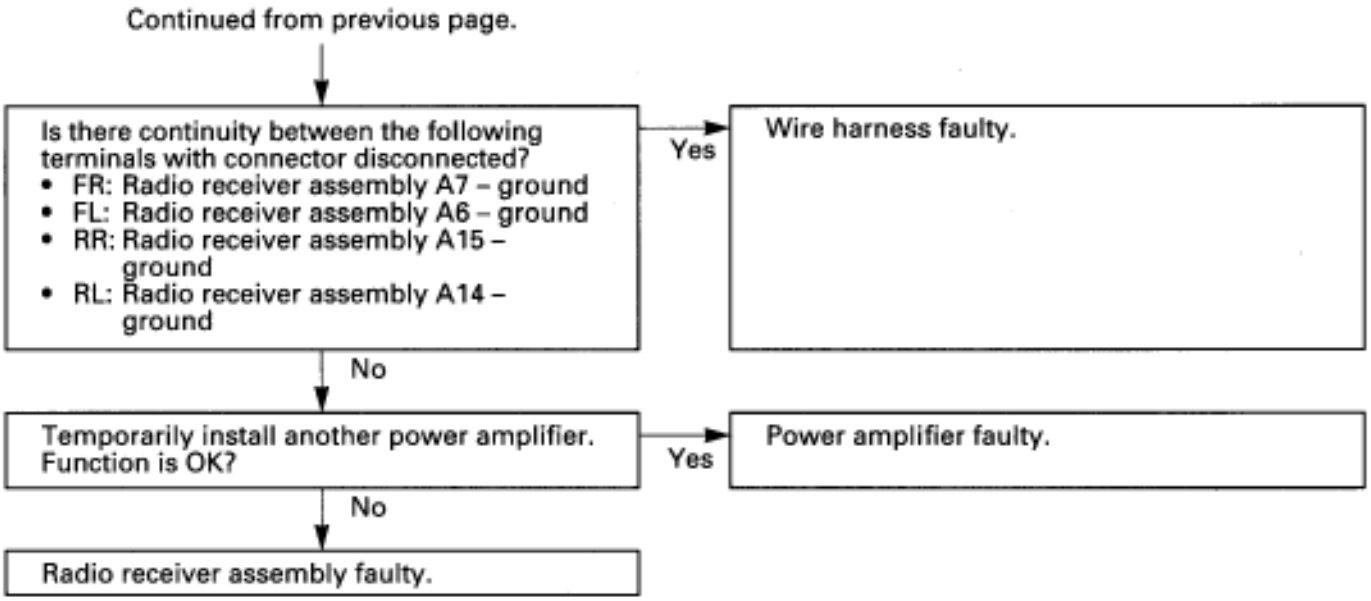


13	Tape player	ANY SPEAKER DOES NOT WORK

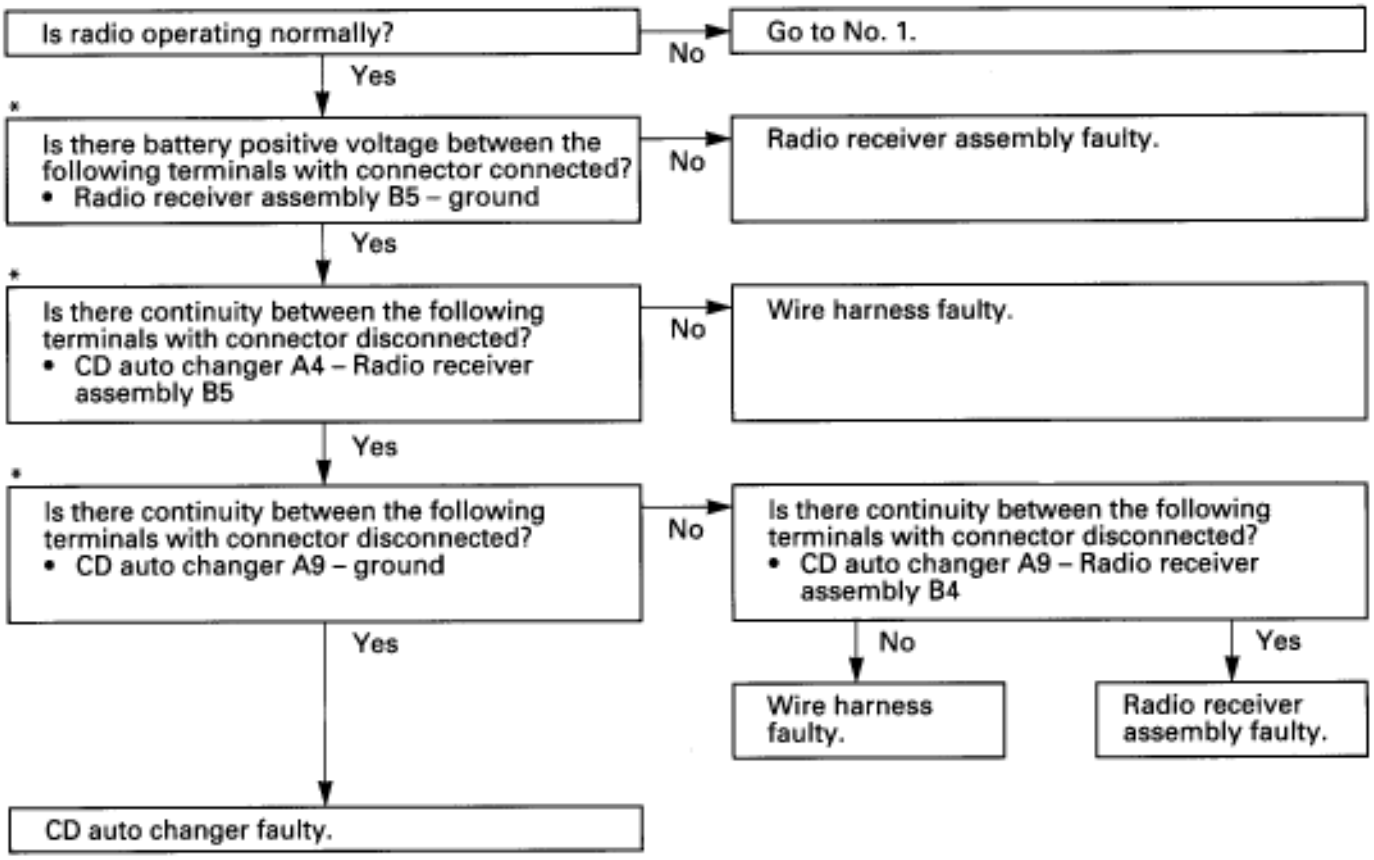


Continued on next page.

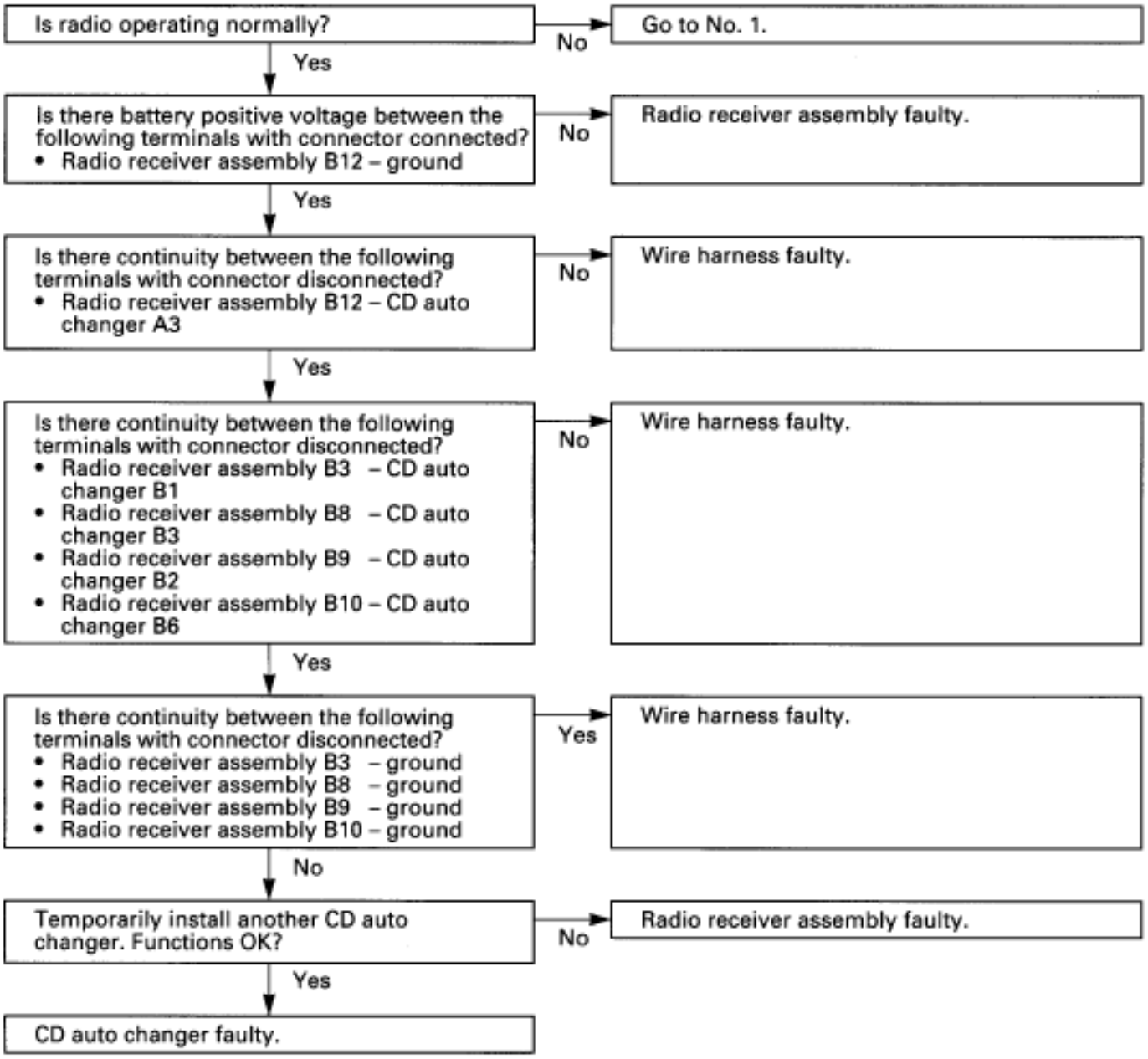
*1: only for vehicle with cellular phone


Continued from previous page.
Is there continuity between the following terminals with connector disconnected?
• FR: Radio receiver assembly A7 – ground
• FL: Radio receiver assembly A6 – ground
• RR: Radio receiver assembly A15 – ground
• RL: Radio receiver assembly A14 – ground
Yes
Wire harness faulty.
No
Temporarily install another power amplifier. Function is OK?
Yes
Power amplifier faulty.
No
Radio receiver assembly faulty.

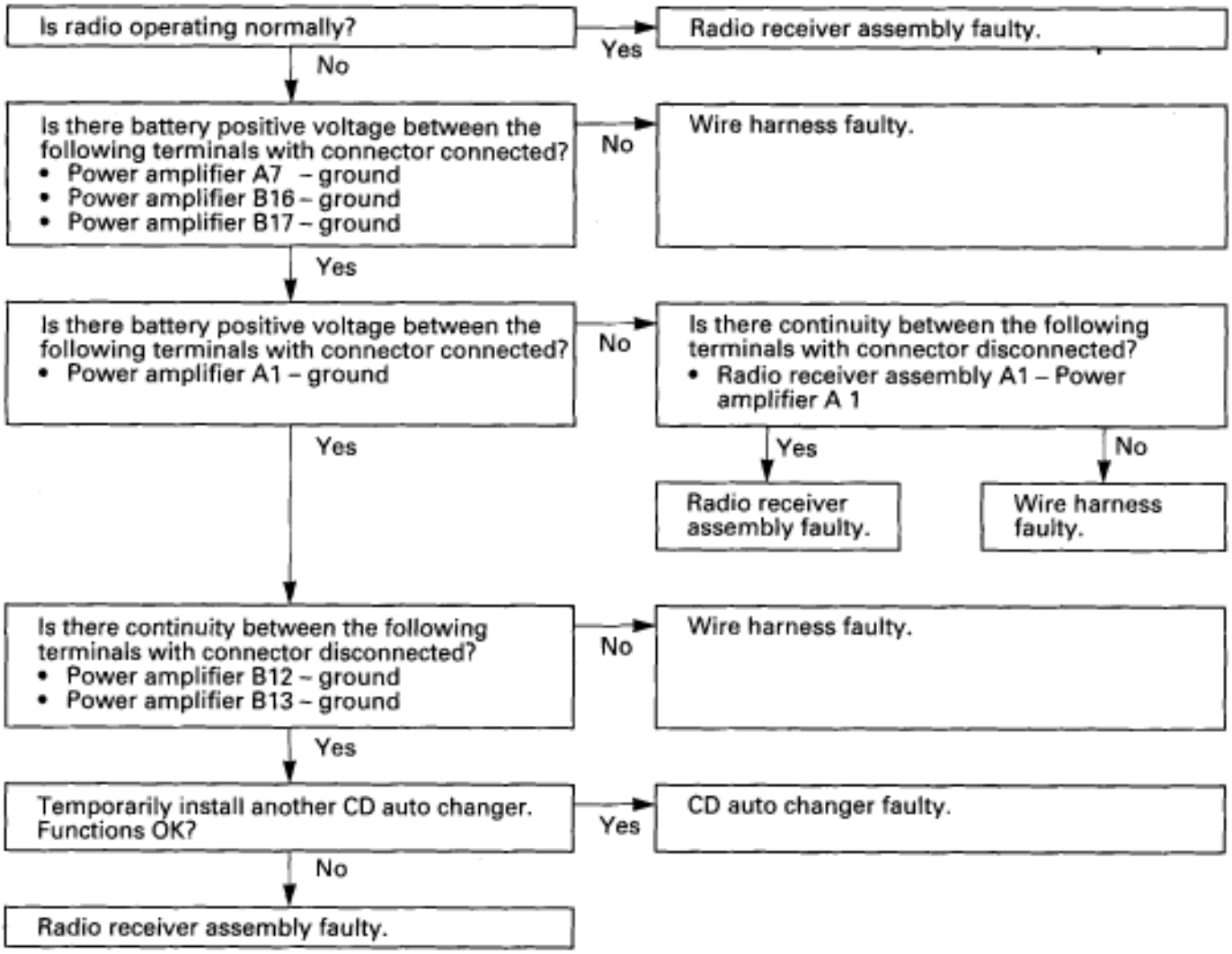
14	CD player	MAGAZINE CANNOT BE INSERTED INTO AUTO CHANGER



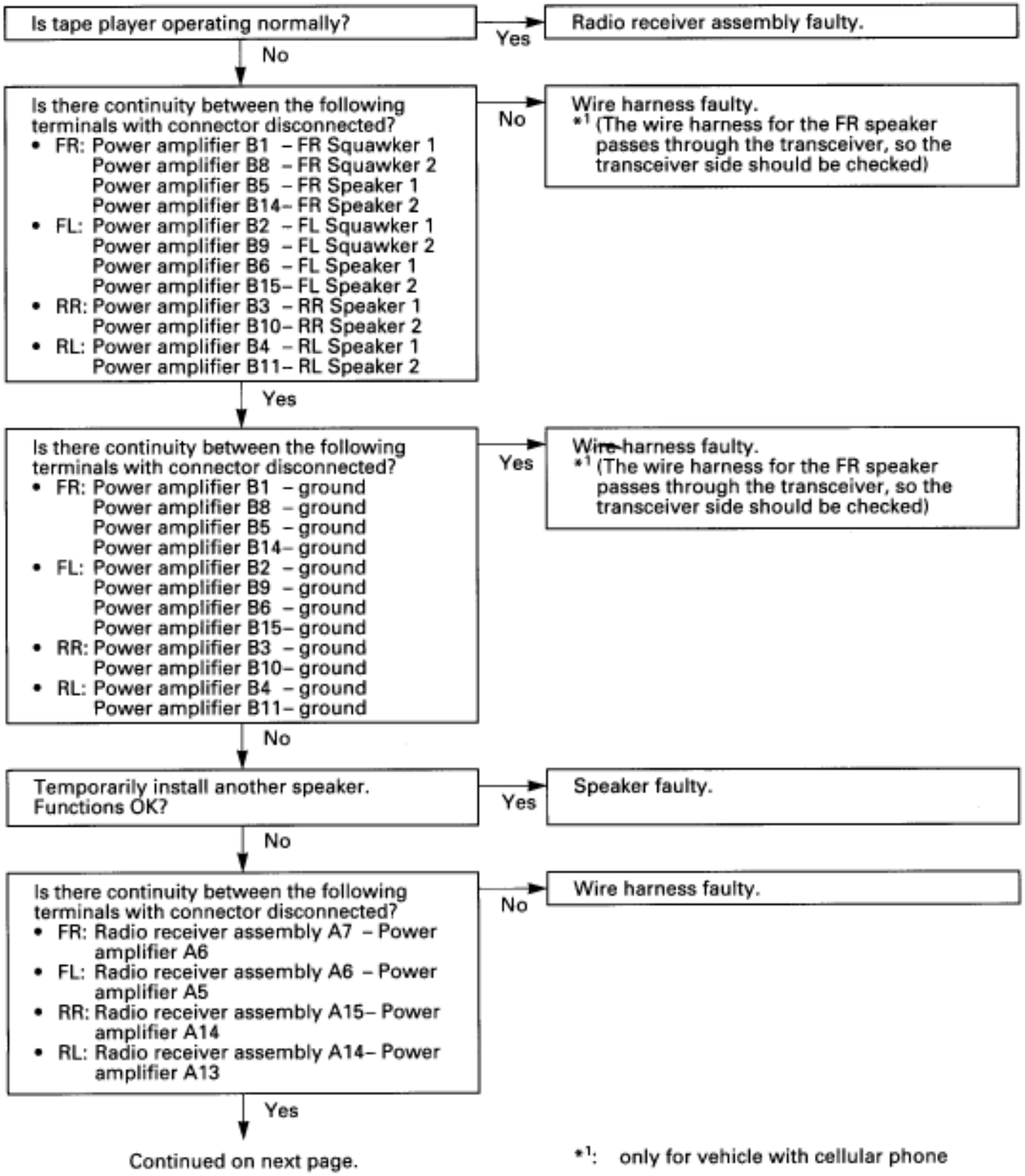
15	CD player	MAGAZINE IS INSERTED, BUT DISPLAY DOES NOT INDICATE "CD"

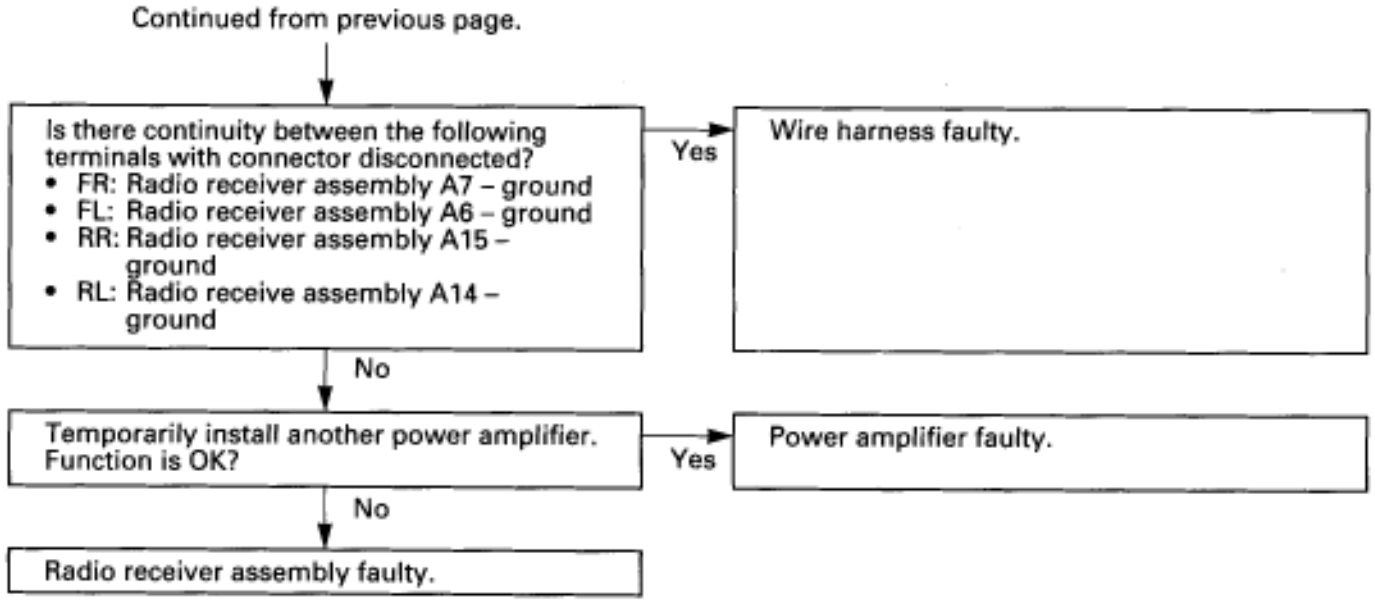


16	CD player	DISPLAY INDICATES, BUT NO SOUND IS PRODUCED

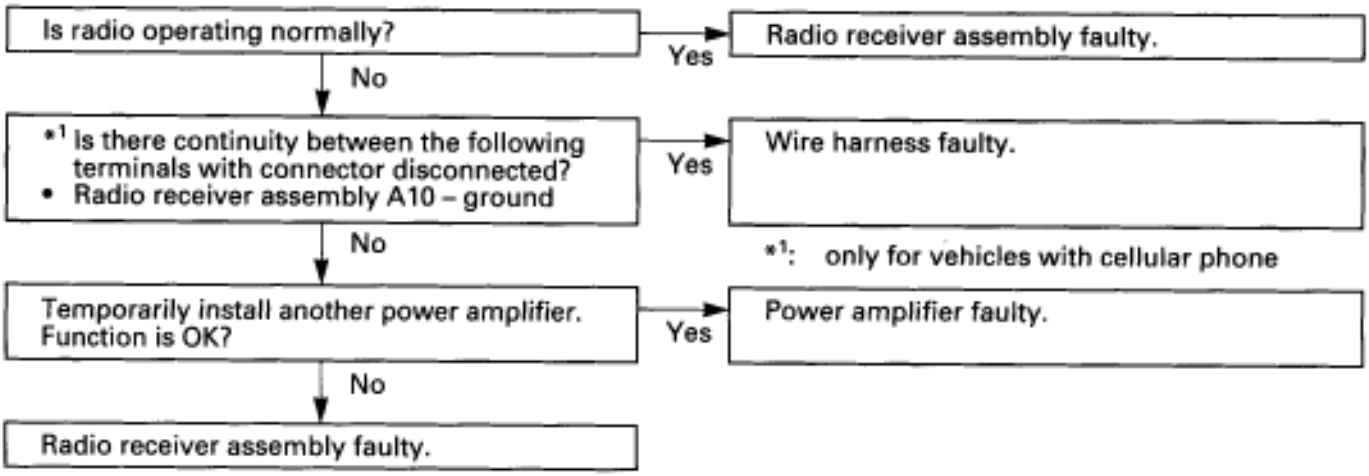


17	CD player	ANY SPEAKER DOES NOT WORK

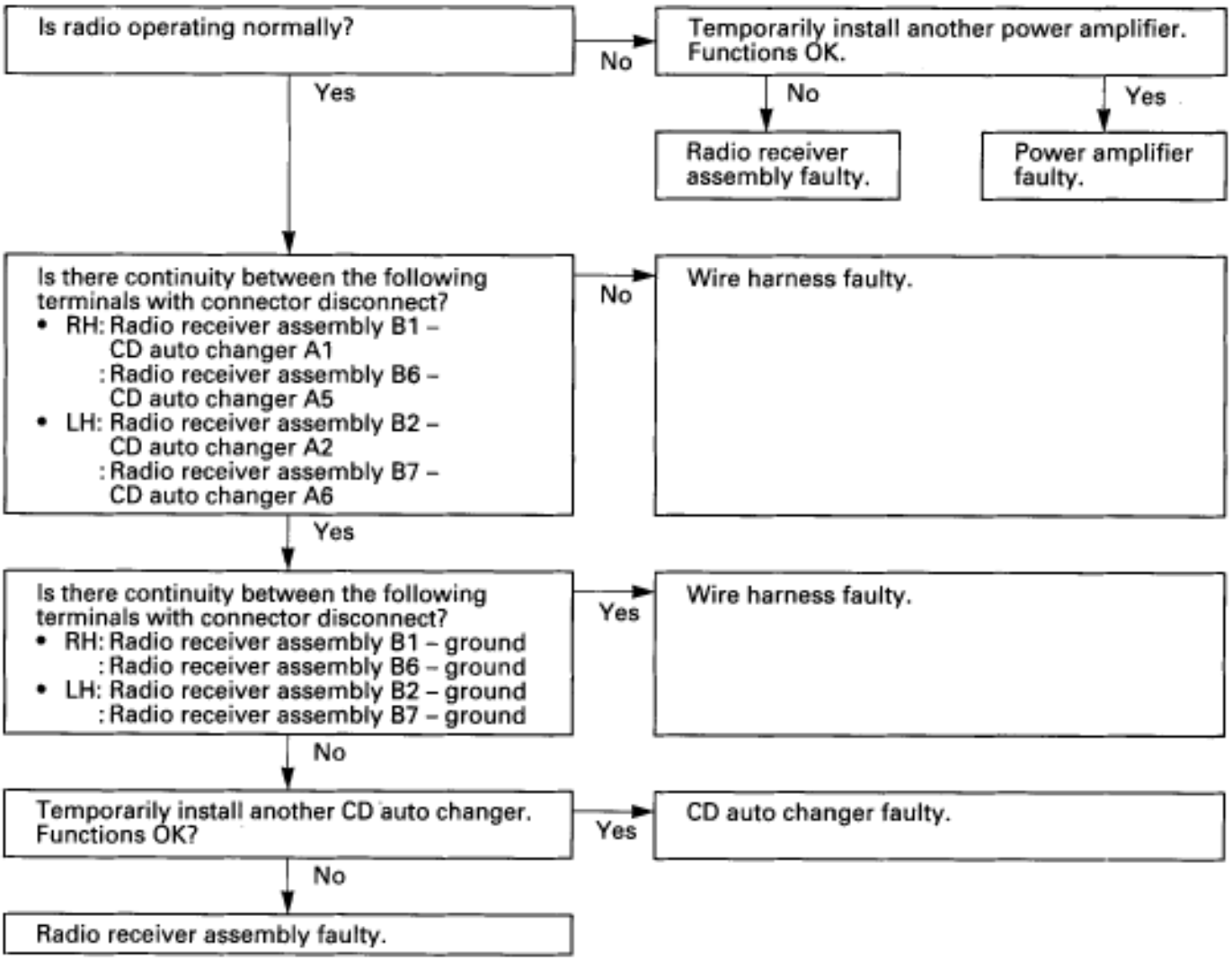




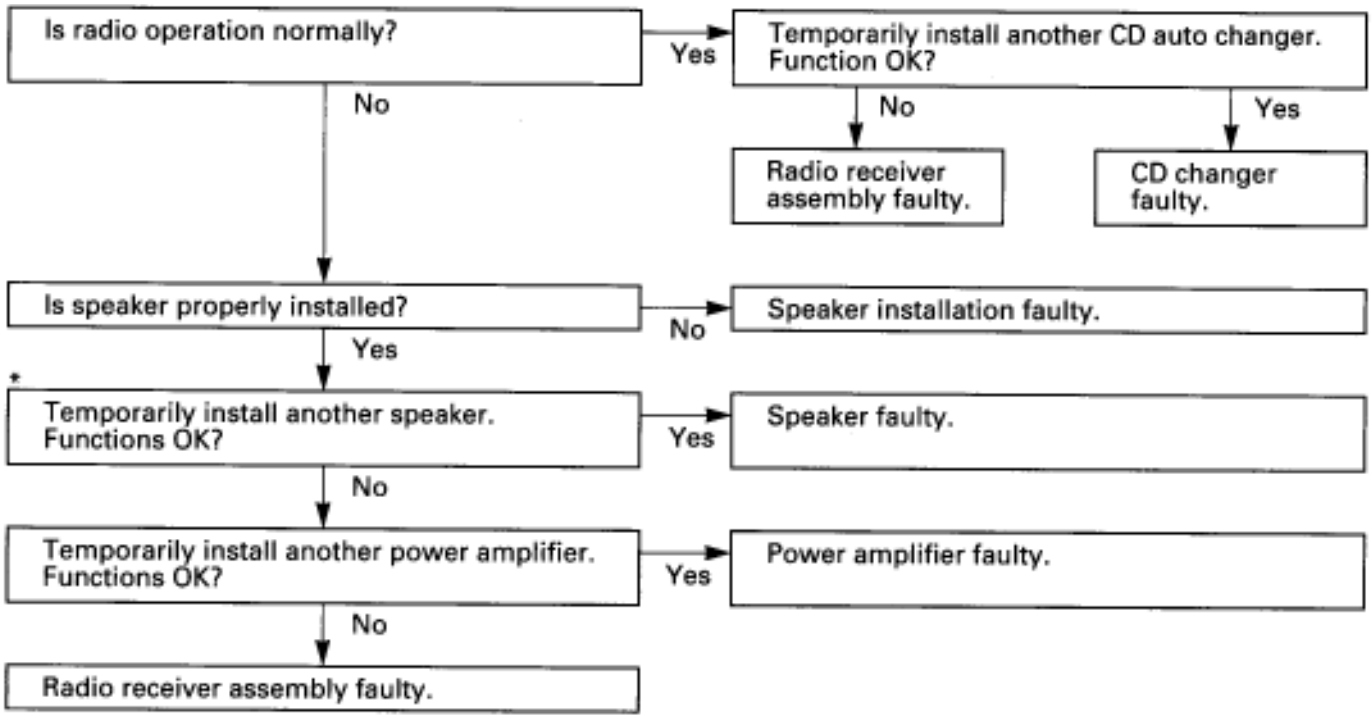
18	CD player	VOLUME FAINT



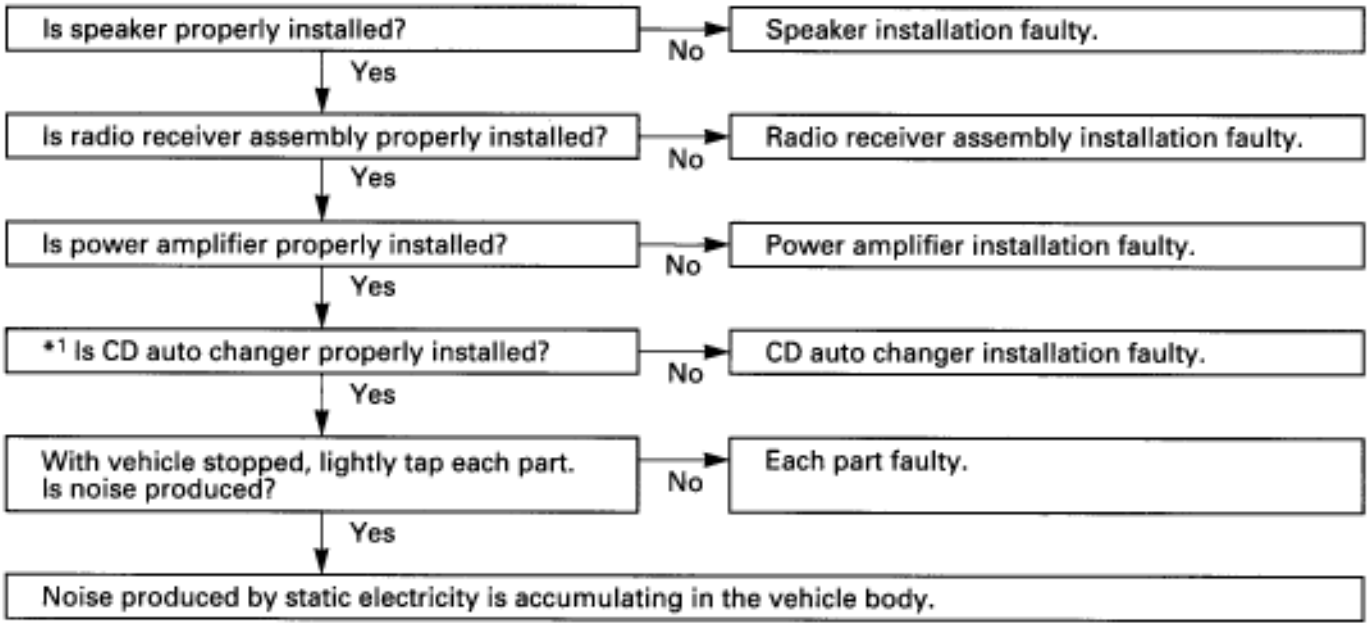
19	CD player	RH CHANNEL OR LH CHANNEL SPEAKER VOLUME FAINT



20	CD player	SOUND QUALITY POOR

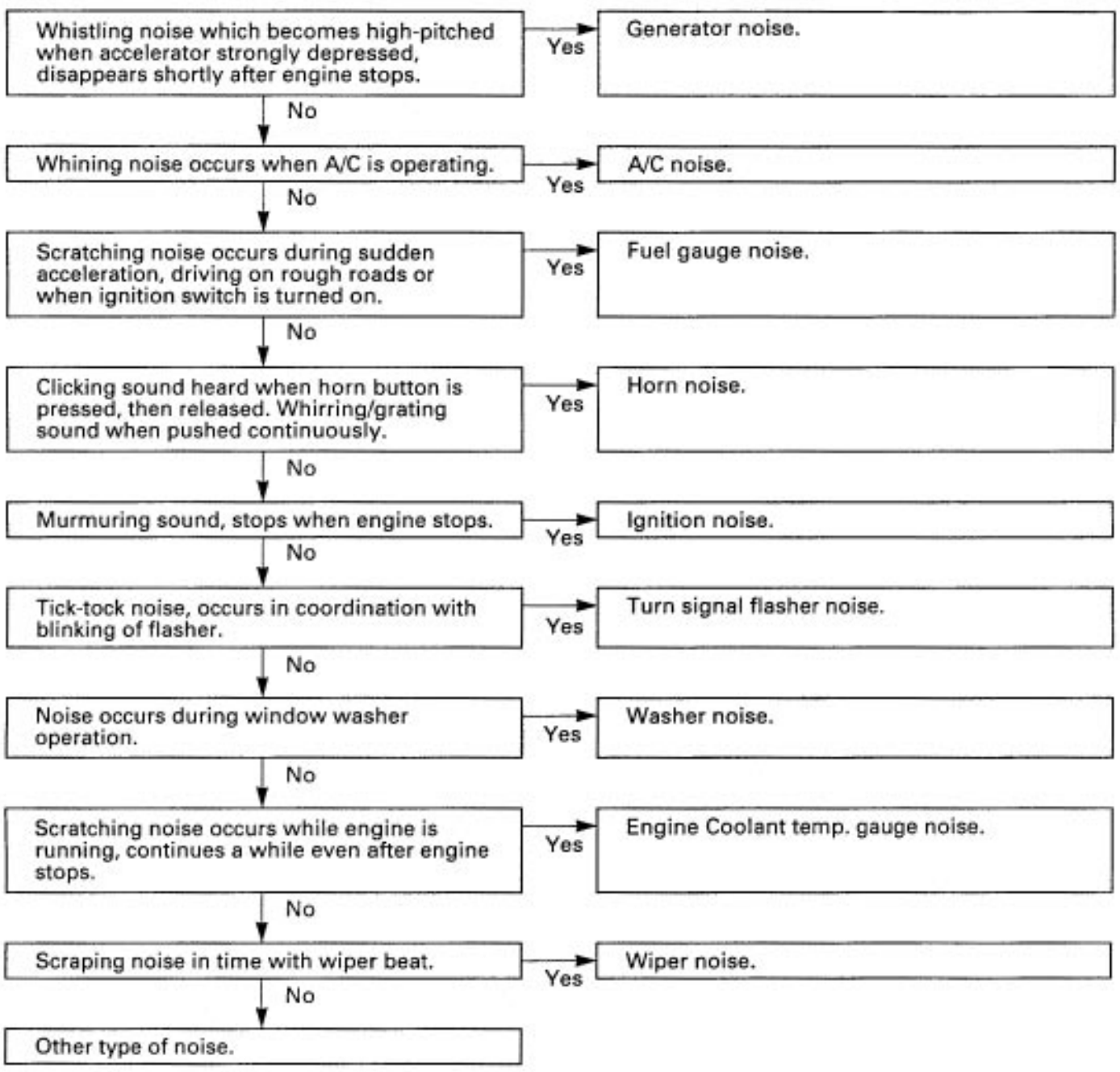


21	Noise	NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING

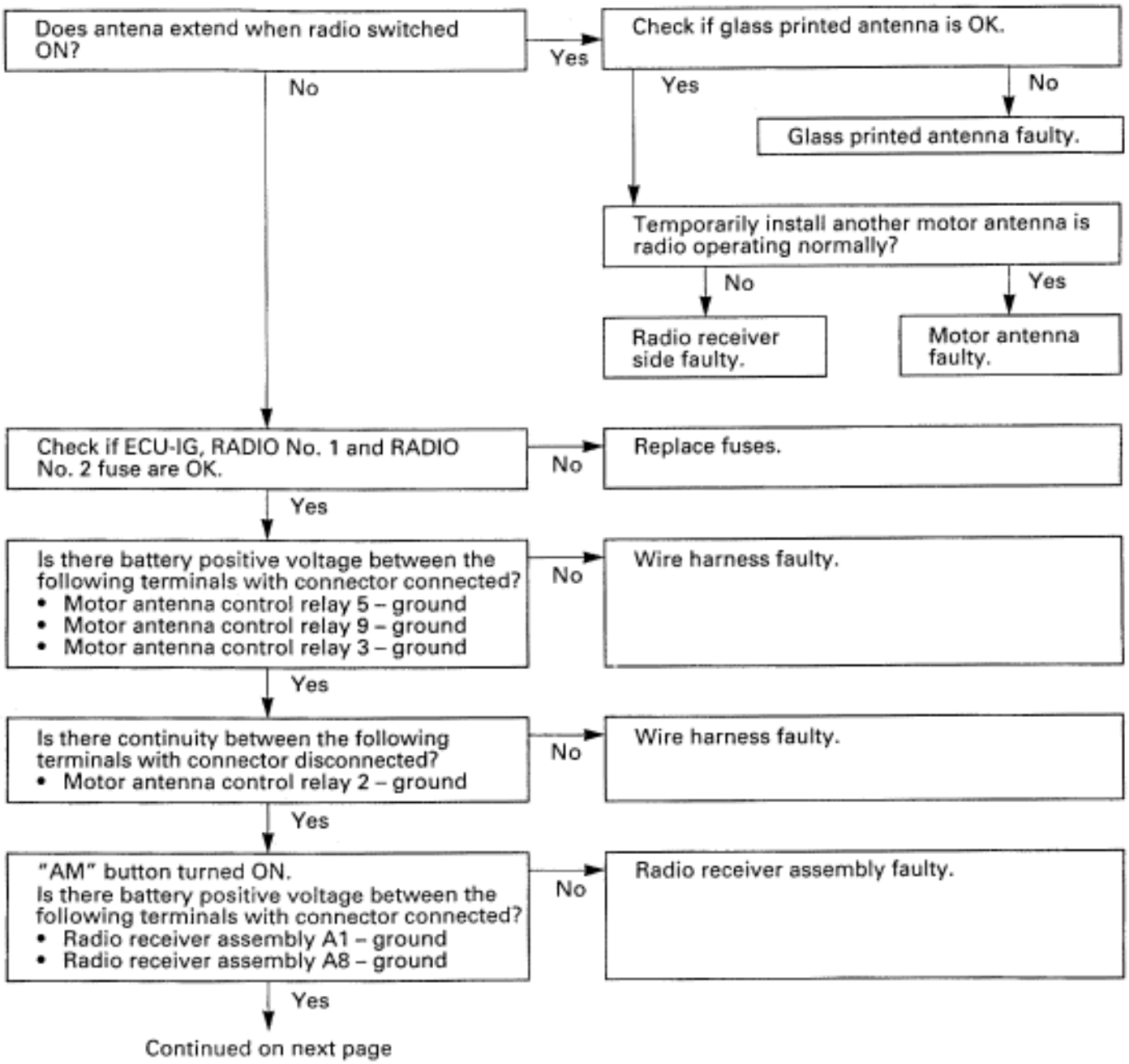


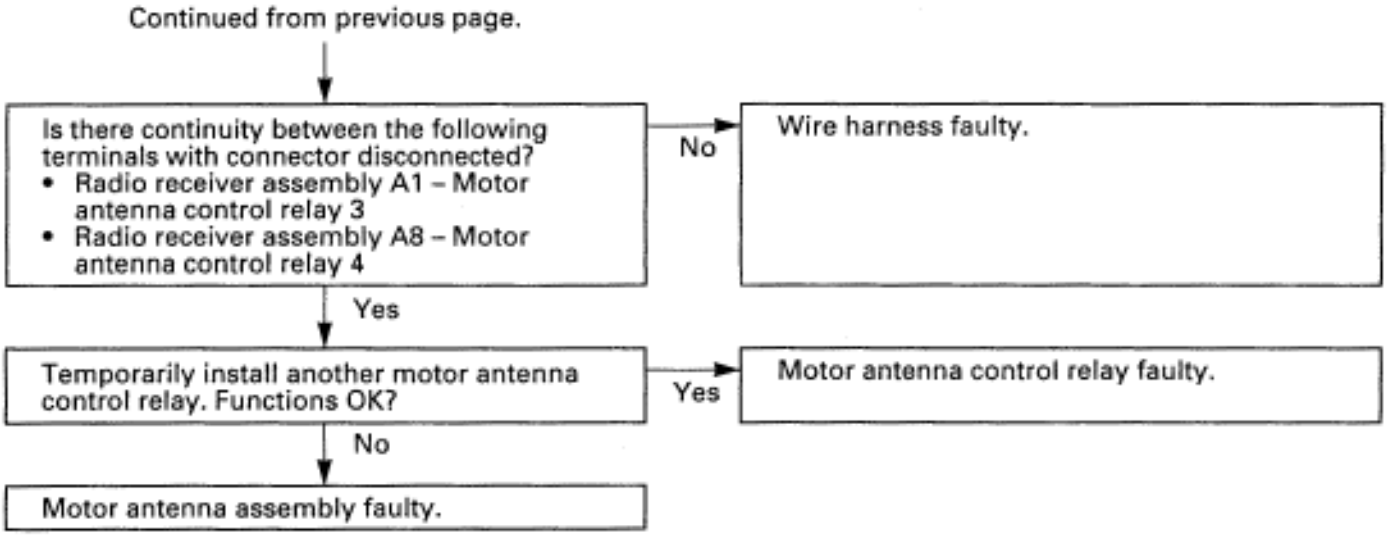
*1: only for vehicles with CD player.

22	Noise	NOISE PRODUCED WHEN ENGINE STARTS

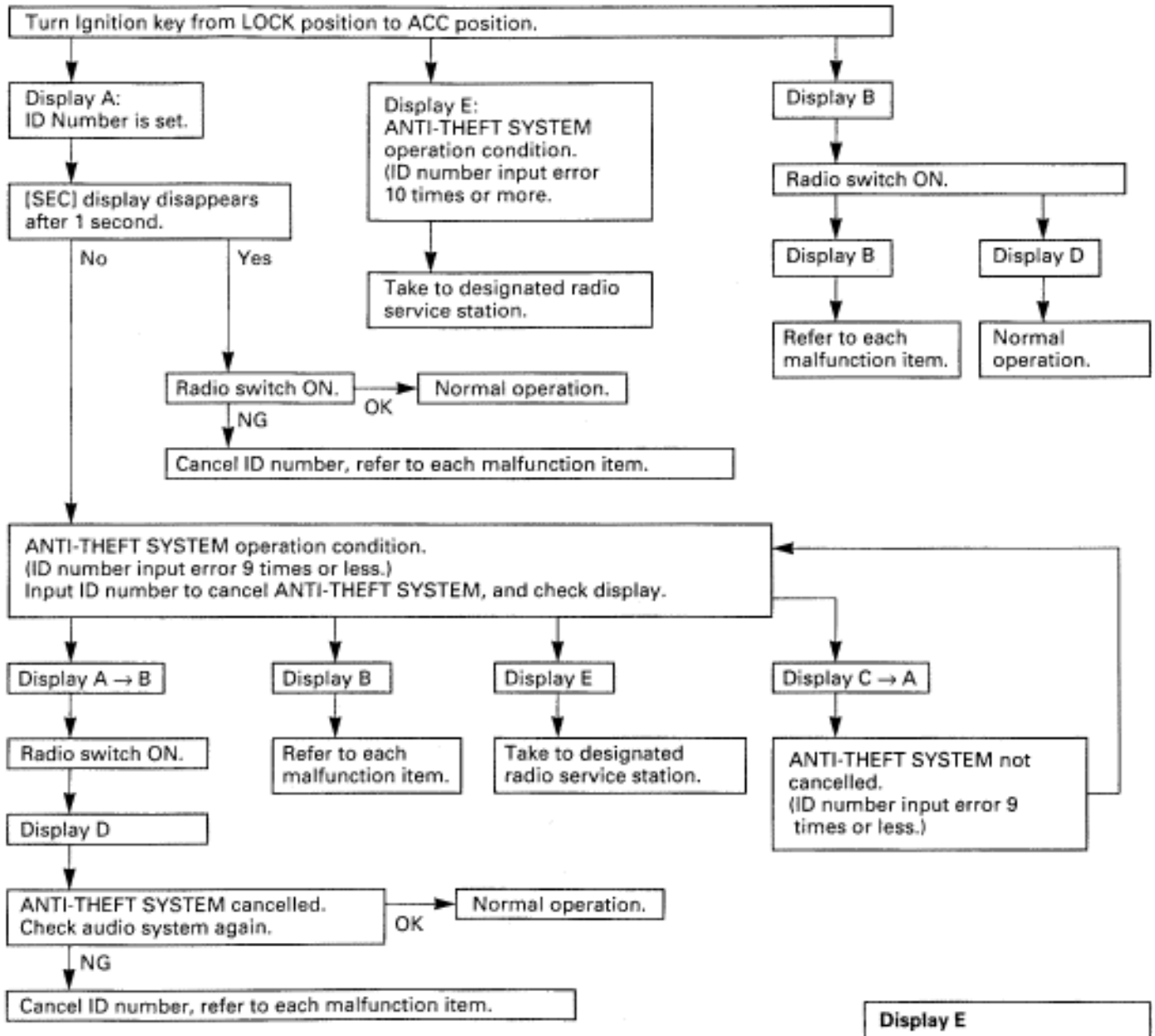


23	Antenna	ANTENNA – RELATED




Continued from previous page.
Is there continuity between the following terminals with connector disconnected?
• Radio receiver assembly A1 – Motor antenna control relay 3
• Radio receiver assembly A8 – Motor antenna control relay 4
No
Wire harness faulty.
Yes
Temporarily install another motor antenna control relay. Functions OK?
Yes
Motor antenna control relay faulty.
No
Motor antenna assembly faulty.

24 Anti–Theft System | TROUBLESHOOTING FOR ANTI–THEFT SYSTEM



(Liquid Crystal Display (LCD) for Audio System)

Display A	Display B	Display C	Display D
SEC (N01977)	Blank, No Illumination	9 Err (N01978) ID number input error time	Radio Display

Display E

HELP (N01979)

HINT:

a) Refer to O/M for operation details of ANTI–THEFT SYSTEM.

b) When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

HINT: Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.
For troubleshooting using a volt/ohm meter, see pages BE–278, 279.
For troubleshooting using both volt/ohm meter and Theft Deterrent System (TDS) checker, see page BE–280.
Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.
Perform troubleshooting in accordance with the procedure on the following page.

How to Proceed with Troubleshooting Using Volt/Ohm Meter

CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem.

9 **PROBLEM SYMPTOM CONFIRMATION, ⁜ SYMPTOM SIMULATION**

Confirm the problem symptoms referring to the system inspection on page BE–289. If the problem does not reappear, be sure to simulate the problem, using the “Problem Simulation Method”.

4 **MATRIX CHART OF PROBLEM SYMPTOMS**

Confirm the order of inspection for each applicable problem symptom on the Matrix Chart.

5 **CIRCUIT INSPECTION**

Proceed with diagnosis of each circuit in accordance with the inspection order confirmed in 4. Judge whether the cause of the problem is in the sensor, actuators, wire harness and connectors, or the ECU.

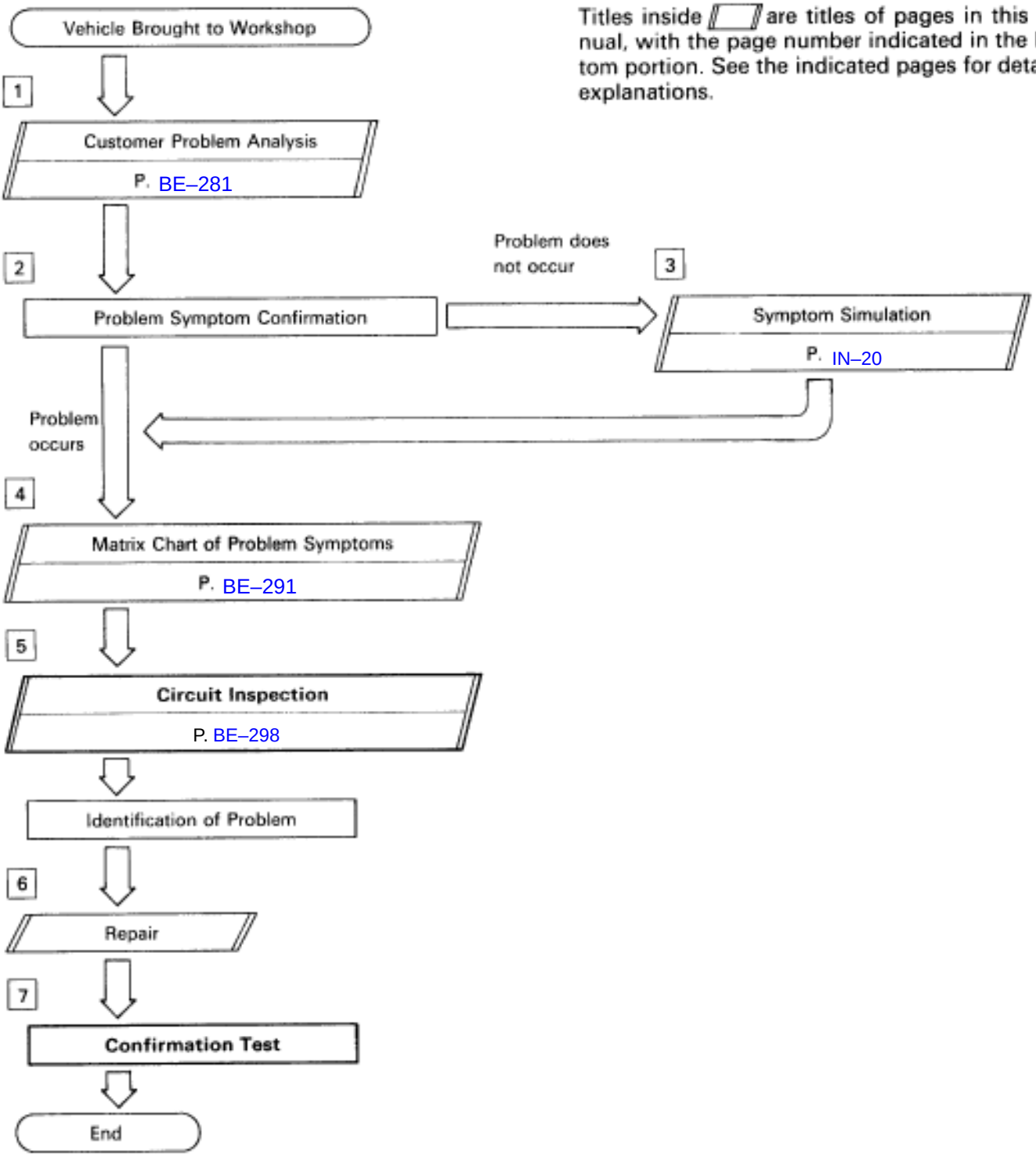
6 **REPAIR**

If the cause of the problem is found in 5, perform repairs.

7 **CONFIRMATION TEST**

After completing repairs, confirm not only that the problem is eliminated but also make sure the theft deterrent system is operating normally in accordance with the system inspection on page BE–289.

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.



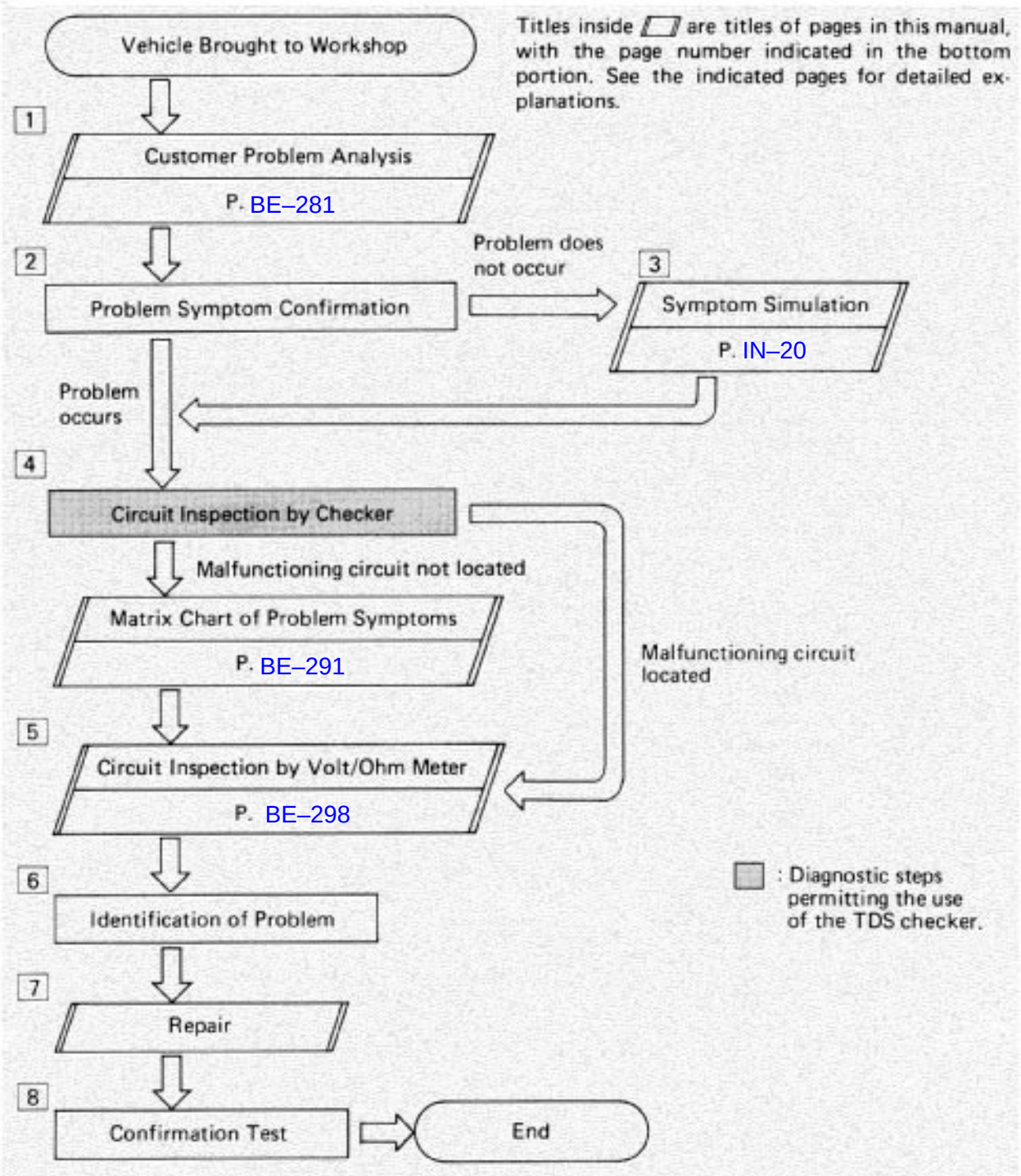
How to Proceed with Troubleshooting Using Theft Deterrent System (TDS) Checker

For the explanation for ✳ and 5 ~ 8 see the explanation for the same titles on page BE–278.

4 CIRCUIT INSPECTION USING A TDS CHECKER

After confirming the symptoms, connect the TDS checker and inspect all the systems which can be checked using the checker. If a malfunction is discovered during this inspection, proceed to Circuit Inspection by Volt/Ohm Meter, and inspect the applicable circuit by volt/ohm meter to find out if the malfunction is in the sensors, actuator, W/H, connector or ECU. If the malfunctioning circuit is not found, proceed to the Matrix Chart of Problem Symptoms and continue troubleshooting.

For instructions on how to connect the checker to the vehicle and how to use the checker, please refer to the Instruction Manual for TDS checker.



CUSTOMER PROBLEM ANALYSIS CHECK SHEET

Theft Deterrent 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		/ /
Frequency of Problem Occurrence		∗Continuous ∗Sometimes(times a day, month) ∗Once Only
Conditions at Time of Problem Occurrence	**Weather**	∗Fine ∗Cloudy ∗Snowy ∗Rainy ∗Various/Others
	Outdoor Temperature	∗Hot ∗Warm ∗Cool ∗Cold (Approx. °F(°C))

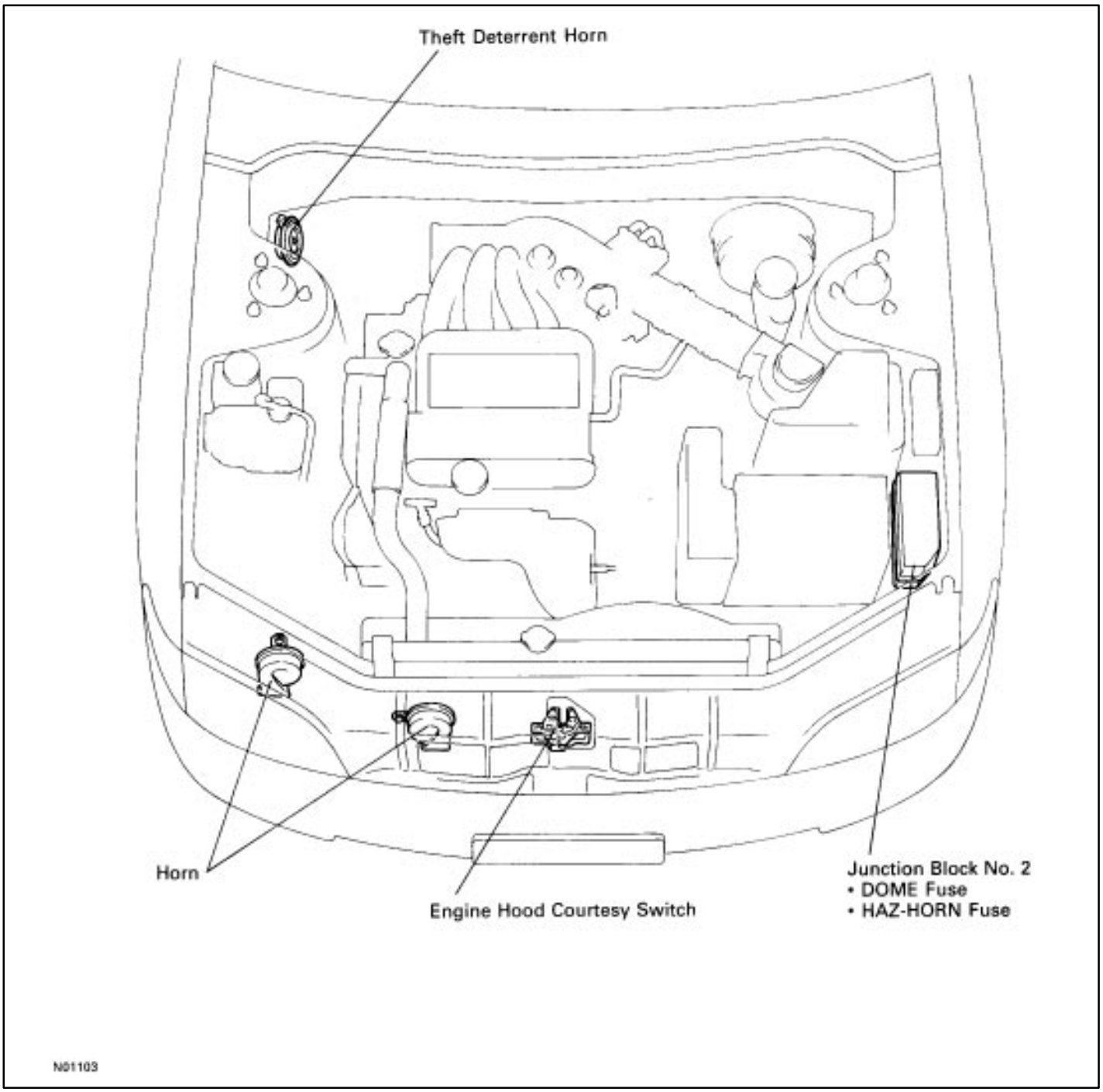
Problem Symptom	∗ Theft deterrent system cannot be set.		
	∗Indicator light does not flash when the theft deterrent system is set. (It stays on or does not light at all.)		
	∗ Theft deterrent system does not operate.	∗ When unlocked using the door lock knob. ∗ When the engine hood is opened.	Malfunction ∗Horns only ∗Theft deterrent horn only ∗Headlights only ∗Taillights only ∗Starter cut only ∗Door lock operation only
	∗ Theft deterrent system does not operate.	∗ When unlocked using the door lock knob. ∗ When the engine hood is opened.	Malfunction ∗Horns only ∗Theft deterrent horn only ∗Headlights only ∗Taillights only ∗Starter cut only ∗Door lock operation only
	∗ System cannot be canceled once set.	∗ When door is unlocked using key or wireless door lock control system. ∗When the key is inserted in the ignition key cylinder and turned to ACC or ON position. (However, only when the system has never operated) ∗When the luggage compartment door is opened with the 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		

Description

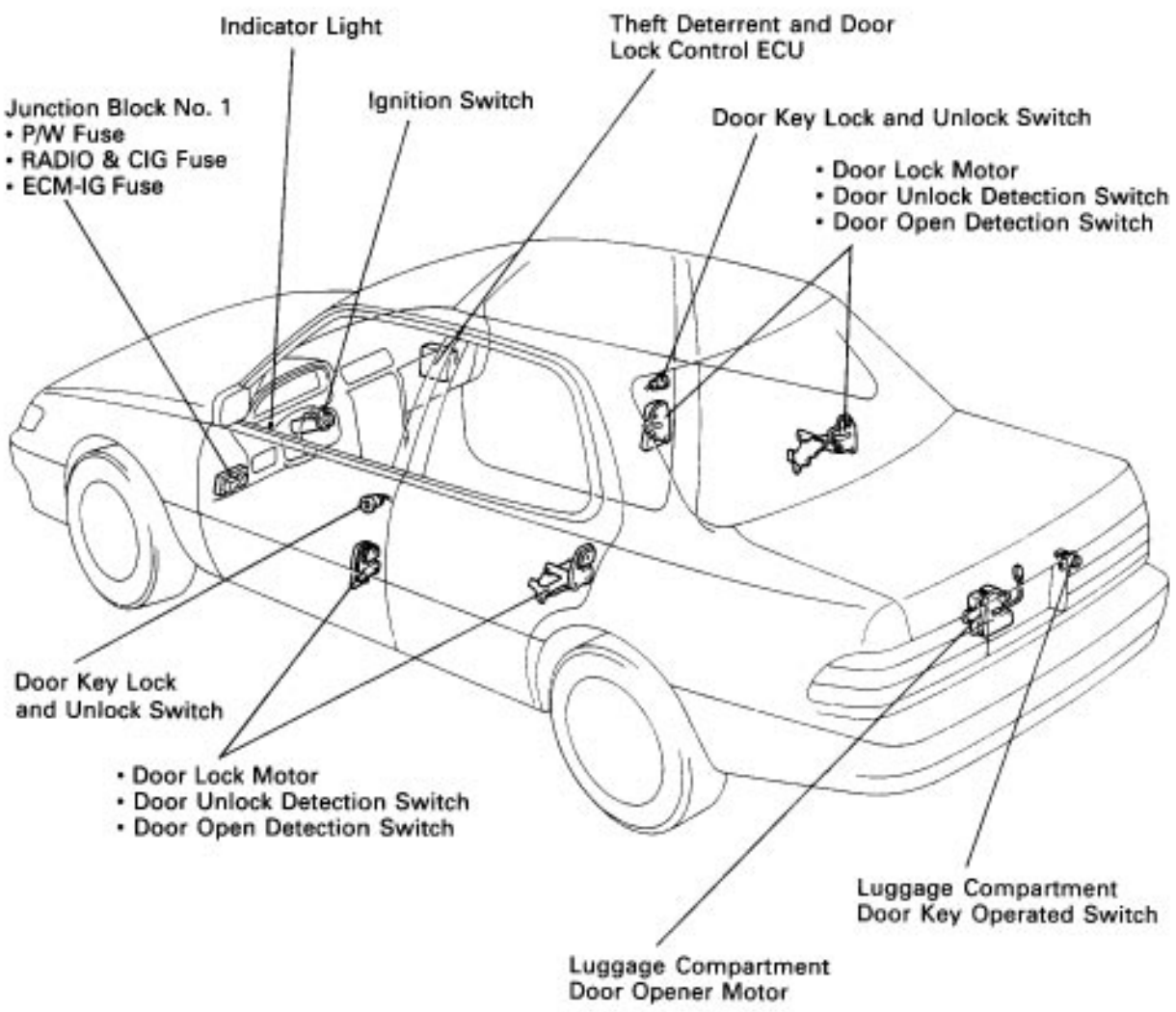
The theft deterrent system uses the door lock control system components and some other parts. When somebody attempts to forcibly enter the vehicle or open the engine hood or luggage compartment door without a key, or when the battery terminals are removed and reconnected, the theft deterrent system sounds the horns and flashes the headlights and taillights for about one minute as an alert. At the same time, it locks all the doors and electrically disconnects the starter.

For the function of component parts of this system, refer to the circuit description in troubleshooting section.

Parts Location



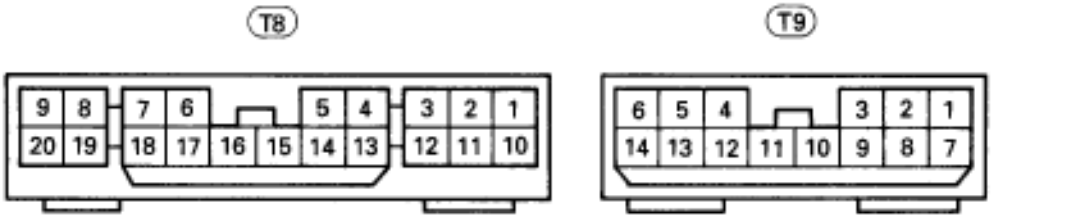
PARTS LOCATION (Cont'd)



N01104

TERMINALS OF ECU

No.	Symbol	Terminal Name	No.	Symbol	Terminal Name
T8–1	SRLY	Ignition Switch ”ST”	T9–1	LUG	Luggage Compartment Door Key Operated Switch
T8–2	IG	Ignition Switch ”ON”	T9–2	LSWR	Door Unlock Detection Switch
T8–3	ACT–	Door Lock Motor	T9–3	CTY	Door open Detection Switch
T8–4	ACT+	Door Lock Motor	T9–4	SH	Theft Deterrent Horn
T8–5	TO	Luggage Compartment Door Opener Motor	T9–5	HEAD	Headlight
T8–6	KSW	Key Unlock Warning Switch	T9–6		
T8–7	LSWP	Door Unlock Detection Switch	T9–7	ACC	Ignition Switch ”ACC”
T8–8	B+2	Power Source	T9–8	PRLY	Power Main Relay
T8–9	IND	Security Indicator Light	T9–9		
T8–10	UL3	Door Key Lock and Unlock Switch	T9–10	DSWL	Luggage Compartment Door Courtesy Switch
T8–11	LSWD	Door Unlock Detection Switch	T9–11	HORN	Horn
T8–12	DSWP	Door Open Detection Switch	T9–12	DSWH	Engine Hood Courtesy Switch
T8–13	DSWD	Door Open Detection Switch	T9–13	TAIL	Taillight
T8–14	L1	Door Key Lock and Unlock Switch	T9–14		
T8–15	UL1	Door Key Lock and Unlock Switch			
T8–16	E	Ground			
T8–17	L2	Door Lock Control Switch (Lock)			
T8–18	UL2	Door Lock Control Switch (Unlock)			
T8–19	TSW	Luggage Compartment Door Opener Switch			
T8–20	B+1	Power Source			

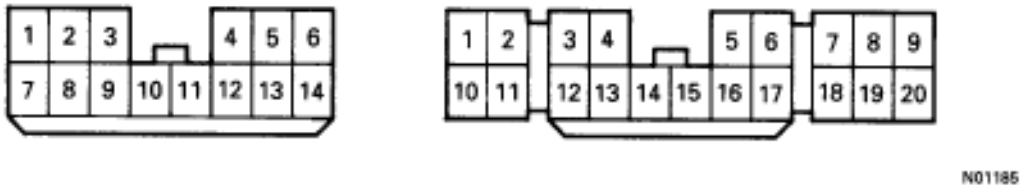


STANDARD VALUE OF ECU TERMINAL

Terminals	Symbols	Wiring color	Condition	Standard Value
T8–1 → ← Ground	SRLY → ← Ground	B–Y	Ignition switch is turned to ST position. (When neutral start switch ”P” range)	10–14 V
T8–2 → ← Ground	IG → ← Ground	B–R	Ignition switch is turned to ”ON” position	10–14 V
T8–3 → ← T8–4	ACT– → ← ACT+	L–B → ← L–R	Ignition switch OFF.	Below 50 Ω
T8–5 → ← T8–16	TO → ← E	L → ← W–B	Luggage compartment door opener switch ”pulled”.	10–14 V
			Luggage compartment door opener switch ”not pulled”.	Below 1 V
T8–6 → ← T8–16	KSW → ← E	L–B → ← W–B	Key unlock warning switch ON. (Key is inserted into key cylinder).	Below 1 Ω
			Key unlock warning switch OFF. (Key is not inserted into key cylinder).	1 MΩ or higher
T8–7 → ← T8–16	LSWP → ← E	Y → ← W–B	Door unlock detection switch ON. (passenger’s)	Below 1 Ω
			Door unlock detection switch OFF.	1 MΩ or higher
T8–8 → ← T8–16	B+2 → ← E	W–L → ← W–B	Always	10–14 V
T8–9 → ← T8–16	IND → ← E	R–Y → ← W–B	Indicator light circuit	Below 1 Ω
T8–10 → ← T8–16	UL3 → ← E	R–L → ← W–B	Door key lock and unlock switch ”unlock” position.	Below 1 Ω
			Door key lock and unlock switch OFF or ”lock” position.	1 MΩ or higher
T8–11 → ← T8–16	LSWD → ← E	P → ← W–B	Door unlock detection switch ON. (driver’s)	Below 1 Ω
			Door unlock detection switch OFF. (driver’s)	1 MΩ or higher
T8–12 → ← T8–16	DSWP → ← E	R–W → ← W–B	Door open detection switch (passenger’s) ON (door opened)	Below 1 Ω
			Door open detection switch (passenger’s) OFF (door closed)	1 MΩ or higher
T8–13 → ← T8–16	DSWD → ← E	R–G → ← W–B	Door open detection switch (driver’s) ON (door opened)	Below 1 Ω
			Door open detection switch (driver’s) OFF (door closed)	1 MΩ or higher
T8–14 → ← T8–16	L1 → ← E	Y–R → ← W–B	Door key lock and unlock switch ”lock” position.	Below 1 Ω
			Door key lock and unlock switch OFF or ”unlock” position.	1 MΩ or higher

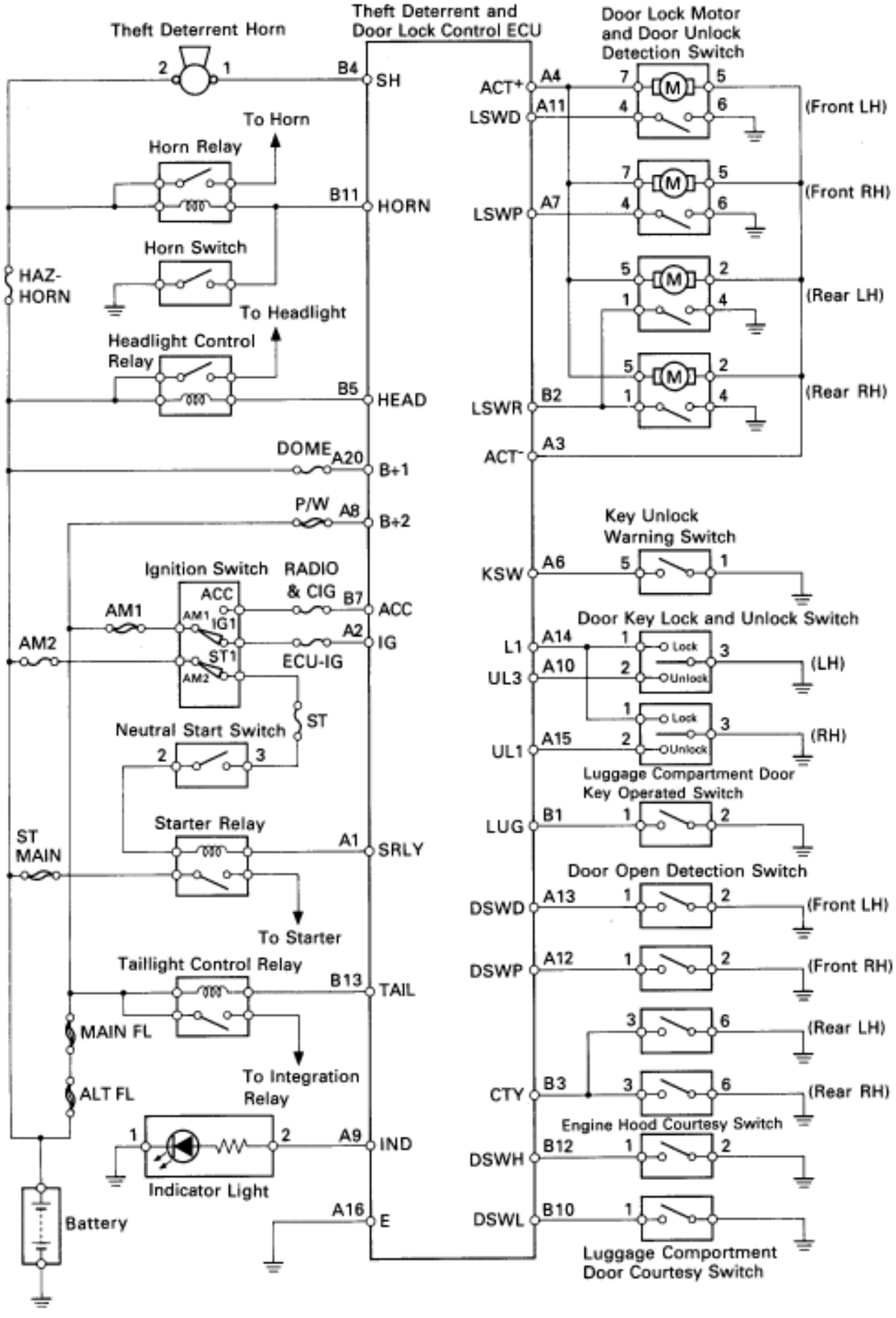
Terminals	Symbols	Wiring color	Condition	Standard Value
T8–15 → ← T8–16	UL1 → ← E	Y–L → ← W–B	Door key lock and unlock switch ”unlock” position.	Below 1 Ω
			Door key lock and unlock switch OFF or ”lock” Position.	1 MΩ or higher
T8–16 → ← Ground	E → ← Ground	W–B	Always	Below 1 Ω
T8–17 → ← T8–16	L2 → ← E	P–B → ← W–B	Door lock control switch ”lock” position.	Below 1 Ω
			Door lock control switch OFF or ”lock” position.	1 MΩ or higher
T8–18 → ← T8–16	UL2 → ← E	G → ← W–B	Door lock control switch ”unlock” position.	Below 1 Ω
			Door lock control switch OFF or ”lock” position.	1 MΩ or higher
T8–19 → ← T8–16	TSW → ← E	L–Y → ← W–B	Luggage compartment door opener switch ON.	Below 1 Ω
			Luggage compartment door opener switch OFF.	1 MΩ or higher
T8–20 → ← T8–16	+B1 → ← E	R → ← W–B	Always	10–14 V
T9–1 → ← T8–16	LUG → ← E	G–W → ← W–B	Luggage compartment door key operated switch ON.	Below 1 Ω
			Luggage compartment door key operated switch OFF.	1 MΩ or higher
T9–2 → ← T8–16	LSWR → ← E	L–Y → ← W–B	Door unlock detection switch ON. (Rear door)	Below 1 Ω
			Door unlock detection switch OFF. (Rear door)	1 MΩ or higher
T9–3 → ← T8–16	CTY → ← E	R–B → ← W–B	Door open detection switch (Rear door) ON (door opened)	Below 1 Ω
			Door open detection switch (Rear door) OFF (door closed)	1 MΩ or higher
T9–4 → ← T8–16	SH → ← E	W–L → ← W–B	Always	10–14 V
T9–5 → ← T8–16	HEAD → ← E	R–B → ← W–B	Light control switch other than ”HEAD” position.	10–14 V
T9–7 → ← T8–16	ACC → ← E	L–R → ← W–B	Ignition switch is turned to ”ACC” position.	10–14 V

Terminals	Symbols	Wiring color	Condition	Standard Value
T9–10 → ← T8–16	DSWL → ← E	R–W → ← W–B	Luggage compartment door courtesy switch ON.	Below 1 Ω
			Luggage compartment door courtesy switch OFF.	1 MΩ or higher
T9–11 → ← T8–16	HORN → ← E	G–B → ← W–B	Horn switch OFF.	10–14 V
T9–12 → ← T8–16	DSWH → ← E	B → ← W–B	Engine hood courtesy switch ON.	Below 1 Ω
			Engine hood courtesy switch OFF.	1 MΩ or higher
T9–13 → ← T8–16	TAIL → ← E	G–R → ← W–B	Light control switch ”TAIL” position	10–14 V



When checking the voltage or resistance of theft deterrent and door lock ECU terminal, disconnect the ECU connector.

Wiring Diagram



SYSTEM INSPECTION

1. SETTING OF THE THEFT DETERRENT SYSTEM

Setting Conditions

(a) Close all the doors.
(b) Close the engine hood and luggage compartment door.
(c) Remove the ignition key out of the ignition key cylinder.

Setting Operation

When any of the following operations (a), (b) or (c) is performed, the theft deterrent indicator light will light up as shown below.

(a) Lock the left or right door using the key
(All doors are locked by key–interlinked lock operation)
(b) Lock all the doors using the wireless door lock control system.
(c) With the rear doors locked and with one of the front doors locked, the other front door without using the key (keyless door lock).

Elapsed time after operation	Indicator light
Within about 30 seconds	Light up
After about 30 seconds	Blinks*1

*1: 1 sec on, 1 sec. off

HINT: When the theft deterrent system is set, doors cannot be locked or unlocked with the door lock control switch and the luggage compartment door cannot be unlocked with the luggage compartment door opener switch.

2. CANCELING OF THE THEFT DETERRENT SYSTEM IN THE SET CONDITION

Check if the theft deterrent indicator light is blinking.

Cancelling Operation

When any of the following operations (a), (b), (c) or (d) is performed, the theft deterrent system is canceled and indicator light will go off.

(a) Unlock the left or right door using the key.
(b) Unlock all the doors using the wireless door lock control system.
(c) Insert the ignition key in the ignition key cylinder and turn it to the ACC or ON position. (This is operative only when the theft deterrent system has never operated.)
(d) Unlock the luggage compartment door with the key.*1

*1: The theft deterrent system is temporarily canceled only while the luggage compartment door is open. Approximately 2 seconds after the luggage compartment door is closed, the theft deterrent system is reset.

3. CHECK OF THE THEFT DETERRENT SYSTEM OPERATION

Check if the theft deterrent indicator light is blinking.

When any of the following operation (a) or (b) is performed, system sounds the horns and theft deterrent horn and flashes the headlights and taillights for about one minute to alert. At the same time, the system disconnects the starter motor circuit and locks all doors (if all doors are not locked, the system repeats door locking operation every 2 seconds during the one minute alert time).

(a) Open the engine hood using the engine hood opener lever.
(b) Unlock any of the front of rear doors without key operation.

4. CANCELING OF THE THEFT DETERRENT SYSTEM IN OPERATING CONDITION

The theft deterrent operation can be canceled when any of the following conditions is met:

No.	Condition	Canceling Operation
1	Unlock left or right door with the key	
2	Unlock doors with wireless door lock control system.	
3	Insert key into ignition key cylinder and turn it to ACC or ON position.	
4	About 1 minute passes after theft deterrent operation begins	Automatic stop*1

*1: In this case, the theft deterrent system resets in about 2 seconds after if all doors are closed.

MATRIX CHART OF PROBLEM SYMPTOMS

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and troubleshoot for each circuit.

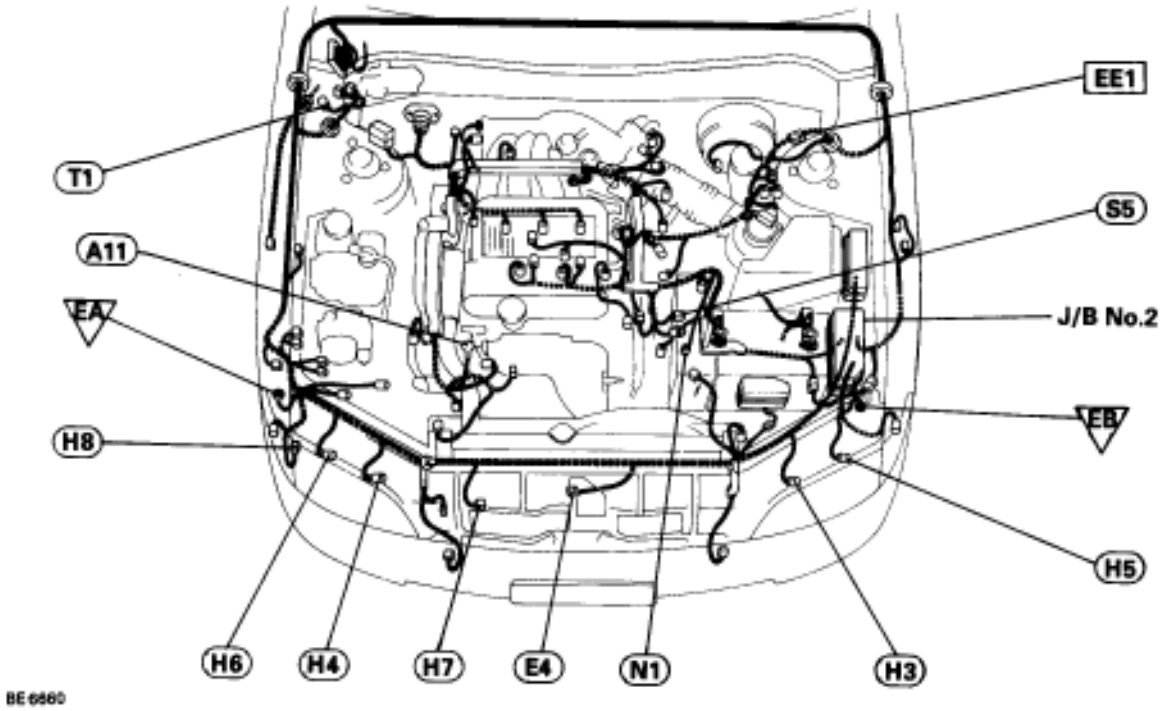
HINT: Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Details of Problem			Inspection Circuit *1	See Page
The theft deterrent system cannot be set			1. Indicator light circuit	BE–298
			2. Luggage compartment door key operated switch circuit	BE–312
			3. Luggage compartment door courtesy switch circuit	BE–314
			4. Door open detection switch	BE–316
			5. Door unlock detection switch circuit	BE–318
			6. Engine hood courtesy switch circuit	BE–320
The indicator light does not blink when system is set			Indicator light circuit	BE–298
When the system is set	When the rear door is unlocked	The system does not operate	Door unlock detection switch circuit (Rear)	BE–318
	When the luggage compartment door is opened by a method other than the key		Luggage compartment door courtesy switch circuit	BE–314
	When the engine hood is opened		Engine hood courtesy switch circuit	BE–320
While the system is in warning operation	Horns do not sound		Horn relay circuit	BE–302
	Theft deterrent horn does not sound		Theft deterrent horn circuit	BE–304
	Headlights do not flash		Headlight control relay circuit	BE–306
	Taillights do not flash		Taillight control relay circuit	BE–308
	The starter cut is not cut off		Starter relay circuit	BE–300
	The rear door lock is not locked in unlock condition		Door unlock detection switch circuit	BE–318
When the system is set	It is not canceled when the ignition key is turned to ACC or ON position		Ignition switch circuit	BE–310
	It still operates when the luggage compartment door is opened with the key		Luggage compartment door key operated switch circuit	BE–312
Even when the system is not set	Horns sound		Horn relay circuit	BE–302
	Theft deterrent horn sounds		Theft deterrent horn circuit	BE–304
	Headlights stay on		Headlight control relay circuit	BE–306
	Taillights stay on		Taillight control relay circuit	BE–308

*1: If numbers are given to the circuit proceed with troubleshooting in the order indicated by those numbers.

CONNECTOR LOCATION

Location of Connector in Engine Compartment



A11 Generator

E4 Engine Hood Courtesy Switch

H3 **H5** Headlight LH

H4 **H6** Headlight RH

H7 Horn LH

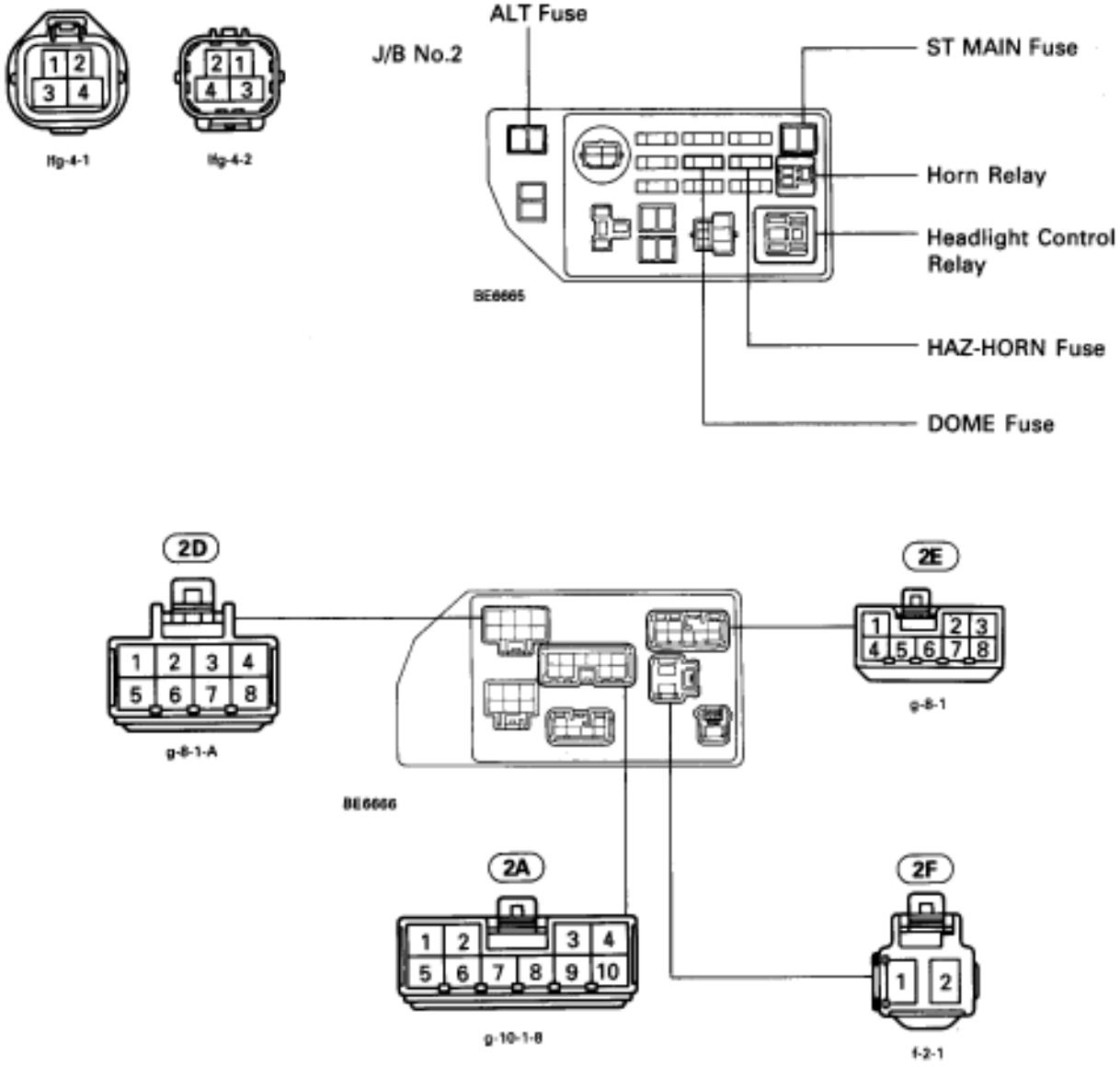
H8 Horn RH

N1 Park/Neutral Position Switch (A/T)

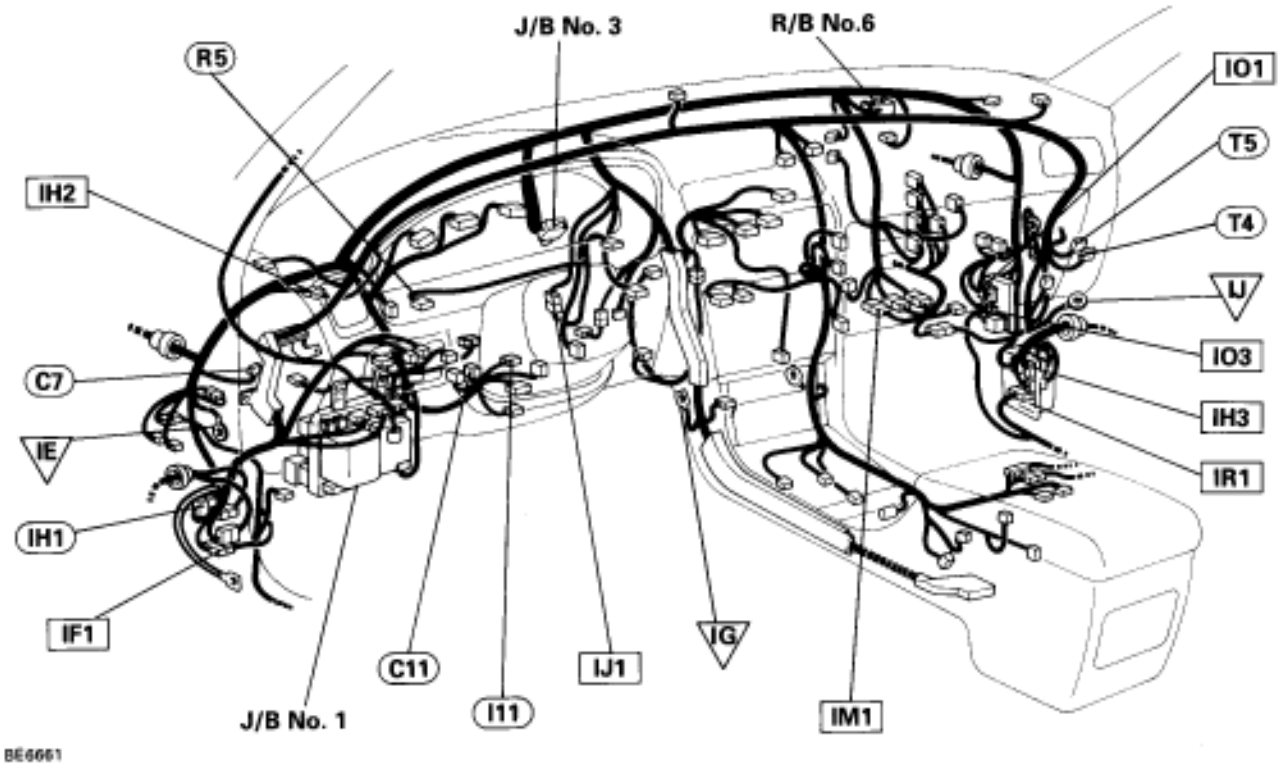
S5 Starter

T1 Theft Deterrent Horn

EE1


1 2
3 4
Hg-4-1
2 1
4 3
Hg-4-2
ALT Fuse
J/B No.2
ST MAIN Fuse
Horn Relay
Headlight Control Relay
HAZ-HORN Fuse
DOME Fuse
BE6665
2D
1 2 3 4
5 6 7 8
g-8-1-A
2E
1 2 3
4 5 6 7 8
g-8-1
BE6666
2A
1 2 3 4
5 6 7 8 9 10
g-10-1-8
2F
1 2
f-2-1

Location of Connectors in Instrument Panel



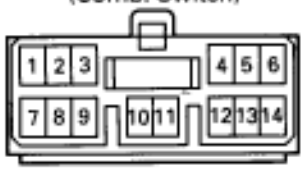
C7

Clutch Start Switch (M/T)

e-2-1

C11

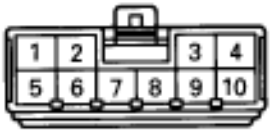
Horn Switch (Comb. Switch)



V-14-1

I11

Ignition Switch



g-10-1-B

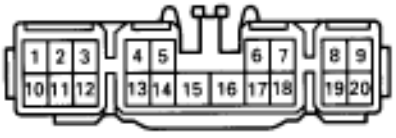
R5

Theft Deterrent Indicator Light

h-7-1

T4 T5

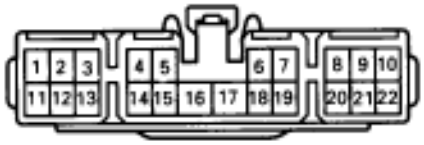
Theft Deterrent and Door Lock ECU



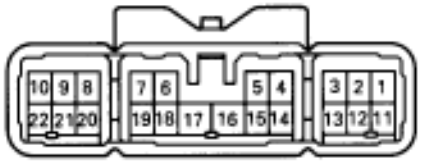
e-20-1

e-14-1-A

IF1

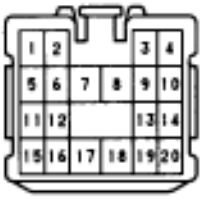


e-22-1

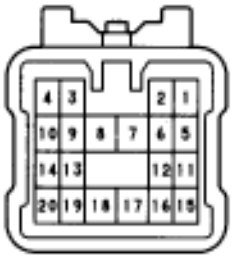


e-22-2

IG1



e-20-1-A



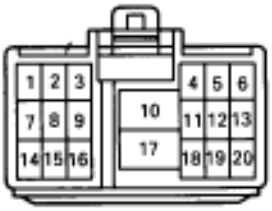
e-20-2-A

IH1

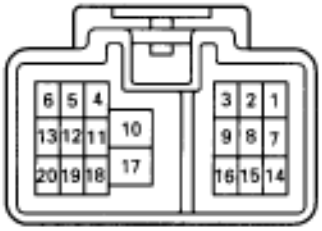
e-15-1

e-15-2

IH2



e-20-1-B



e-20-2-B

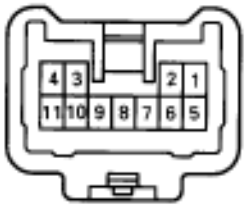
IH3

e-16-1

e-16-2

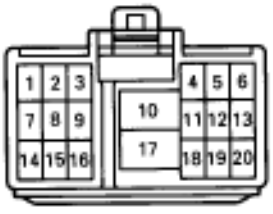
IJ1

h-11-1-A

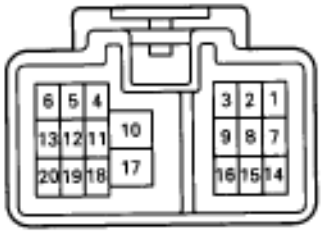


h-11-2-A

IM1



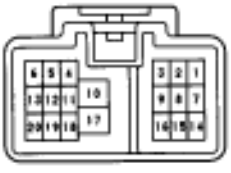
e-20-1-B



e-20-2-B

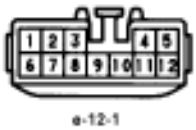
IO1

e-20-1-B

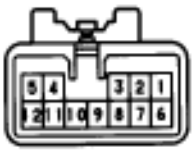


e-20-2-B

IO3



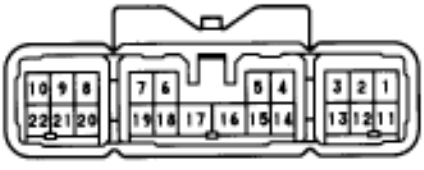
e-12-1



e-12-2

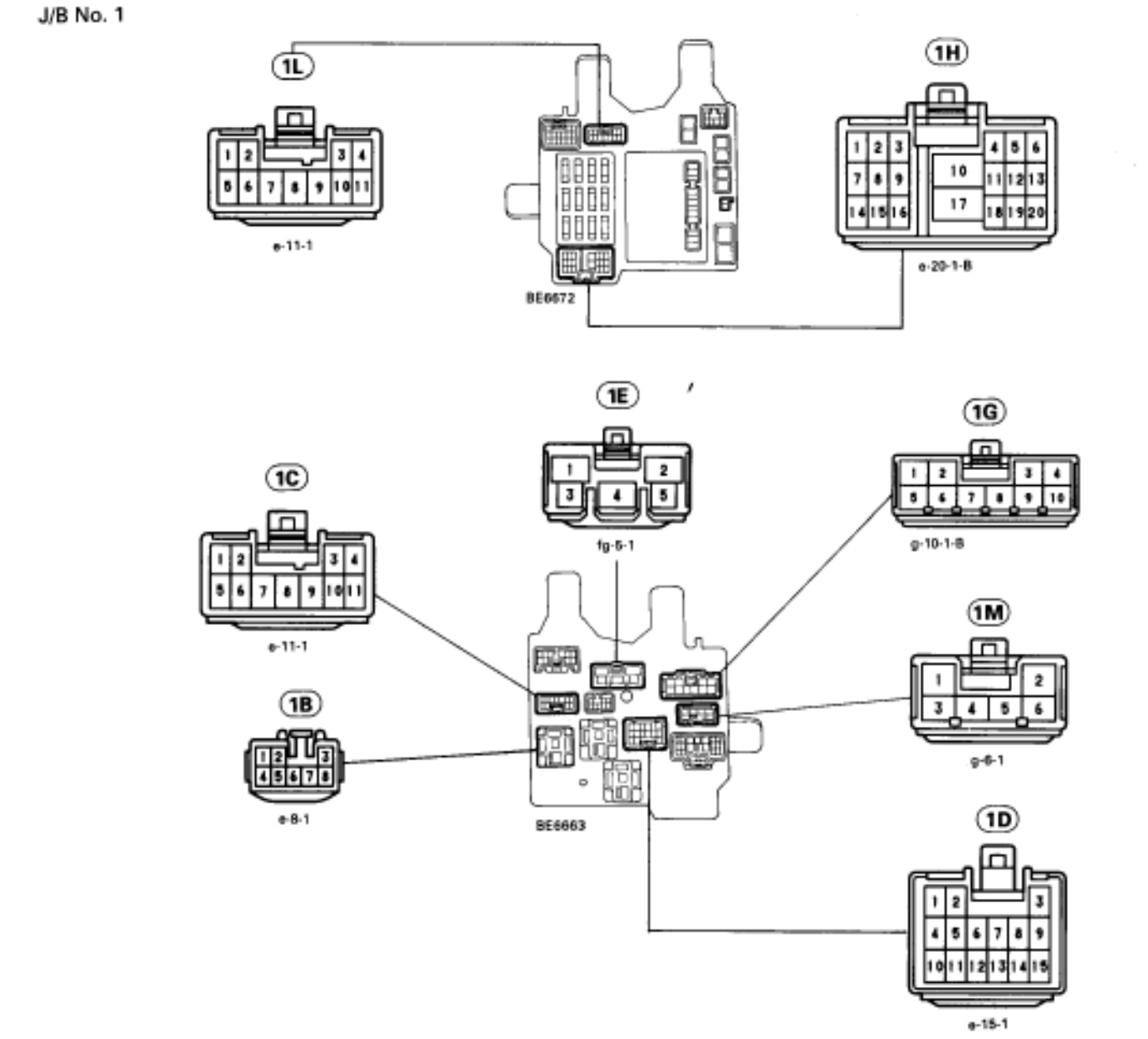
IR1

e-22-1

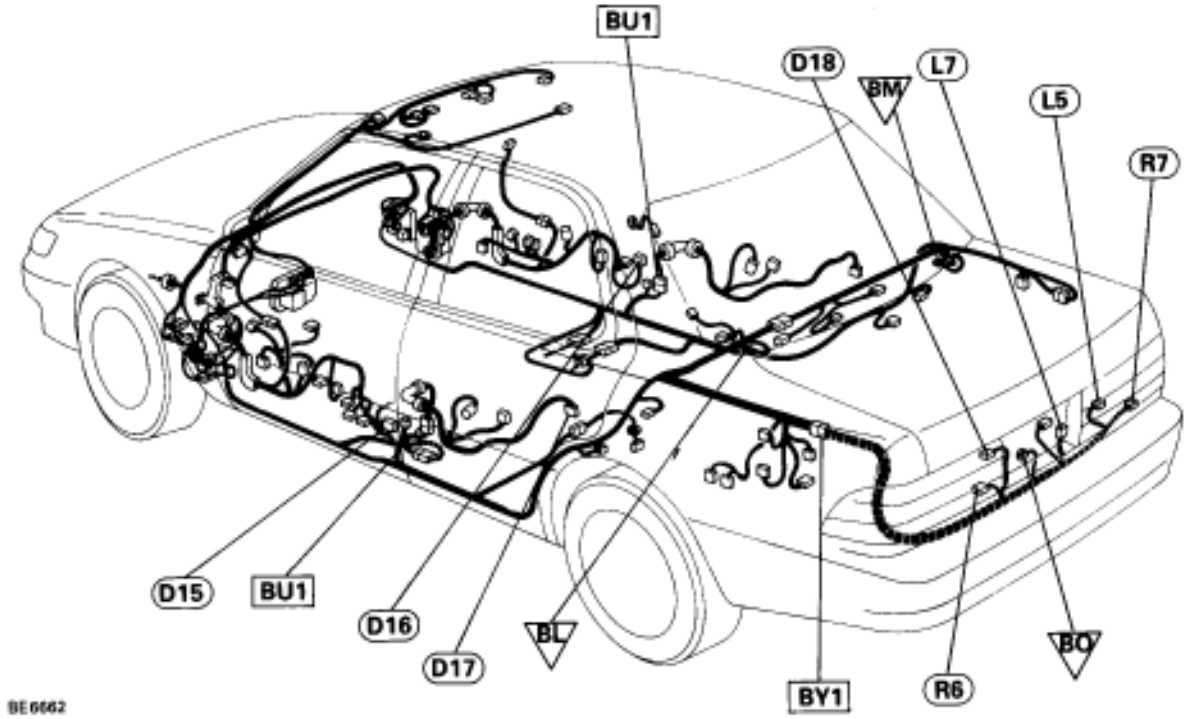


e-22-2

Location of Connector in Instrument Panel



Location of Connector in Body



D15
Door Unlock Detection Switch Front LH

D16
Door Unlock Detection Switch Front RH

D17
Door Unlock Detection Switch Rear LH

D18
Door Unlock Detection Switch Rear RH

L5
Luggage Compartment Door Key Operated Switch

L6
Luggage Compartment Door Courtesy Light

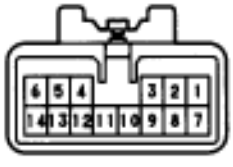
L7
Luggage Compartment Door Courtesy Switch

R6 R7
Taillight LH, RH

BU1

BV1

BY1



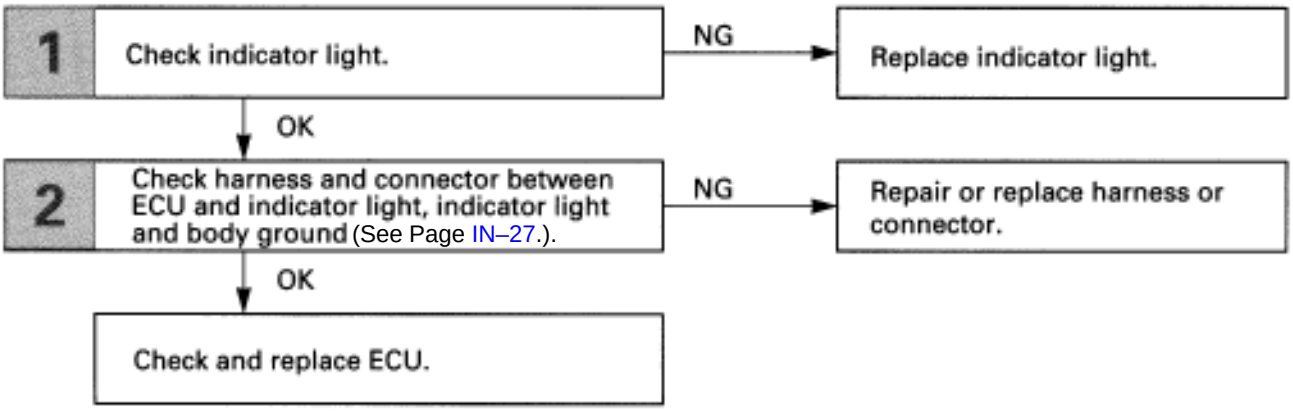
CIRCUIT INSPECTION

Indicator Light Circuit

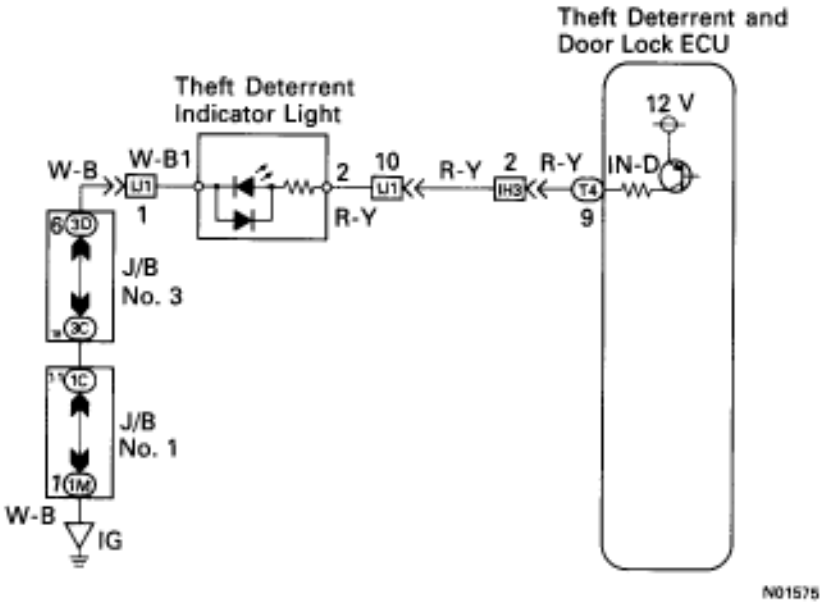
CIRCUIT DESCRIPTION

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.

DIAGNOSTIC CHART



WIRING DIAGRAM



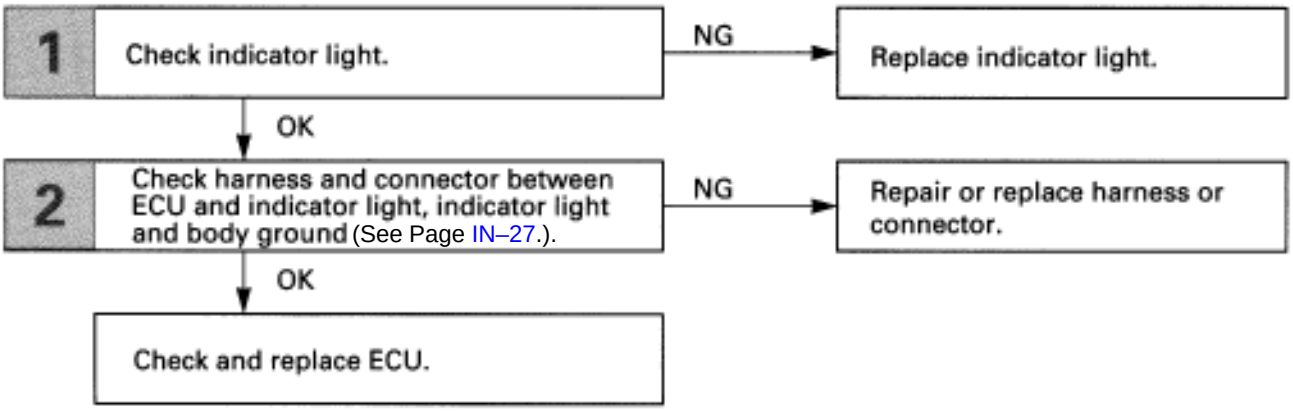
CIRCUIT INSPECTION

Indicator Light Circuit

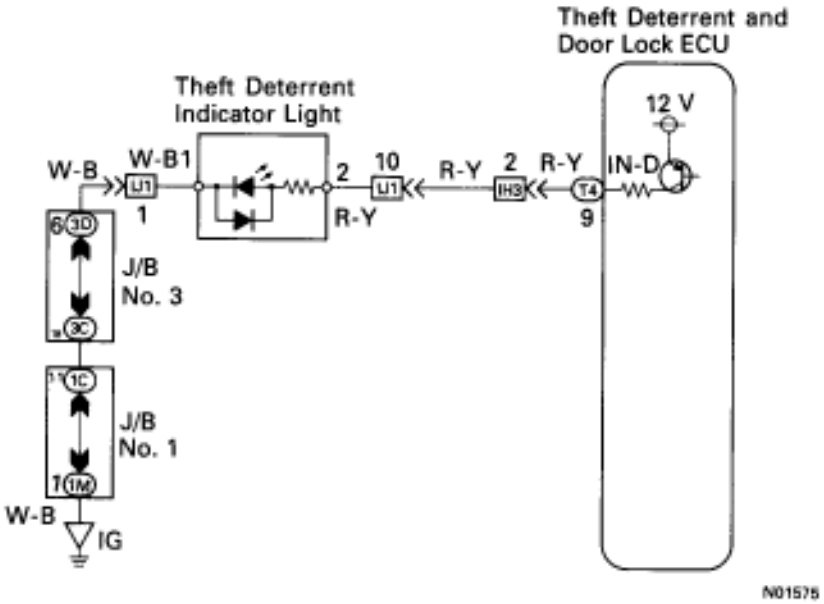
CIRCUIT DESCRIPTION

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.

DIAGNOSTIC CHART

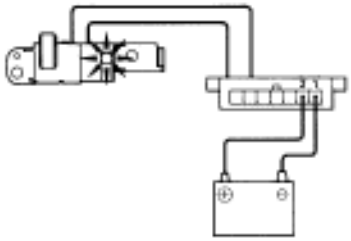


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check indicator light.**



P 1. Remove combination meter cluster (See page BE–153 for removal and installation).

C 2. Disconnect indicator light connector.

OK **Indicator light comes on.**

OK → **NG** → **Replace indicator light.**

2 **Check harness and connector between ECU and indicator light, indicator light and bvody ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace ECU.

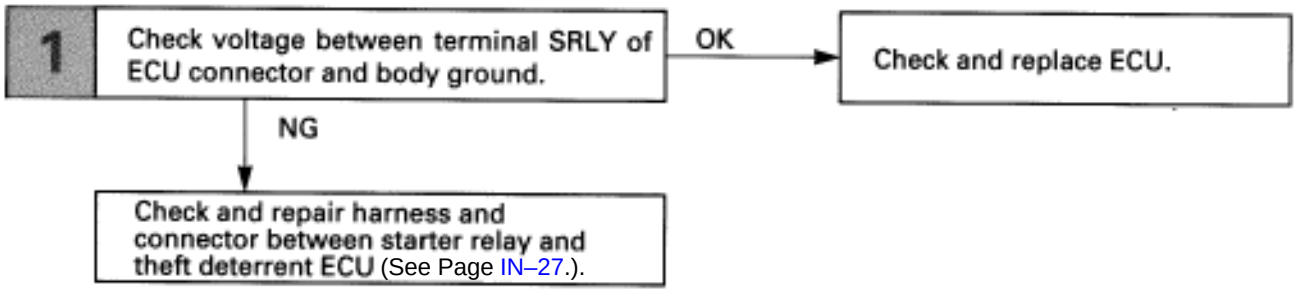
Starter Relay Circuit

CIRCUIT DESCRIPTION

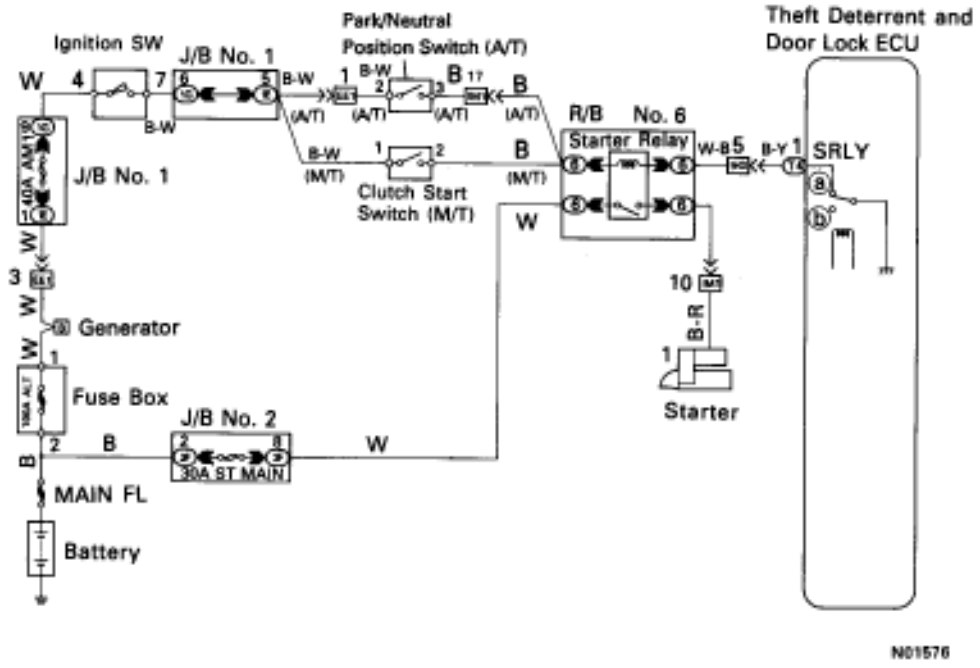
When the theft deterrent system is activated, contact (a) in the ECU becomes open, creating an open circuit in terminal ST circuit and making the starter inoperative (starter cut).
In this condition, if one of the following operations in done, the contact (a) in the ECU is grounded, thus canceling the starter cut:

① Unlock the front LH or RH door with key.
② Unlock the doors with the wireless door lock control system.

DIAGNOSTIC CHART

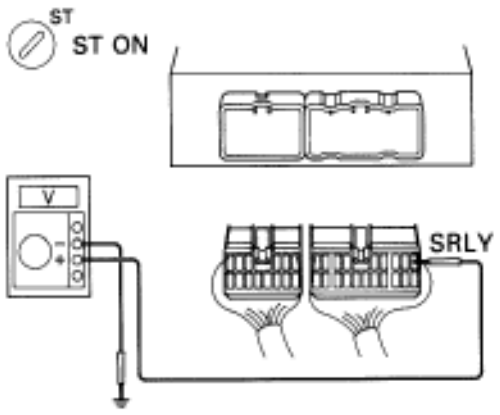


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal SRLY of ECU connector and body ground.**



P
(1.) Remove the glove box.
(2.) Disconnect the ECU connector.
(3.) Transmission in neutral position.

C Measure voltage between terminal SRLY of ECU connector and body ground, when ignition switch is turned to ST position.

OK **Voltage:** **10 ~ 14 V**

NG

Check and repair harness and connector between starter relay and ECU (See page IN–27).

OK

Check and replace ECU.

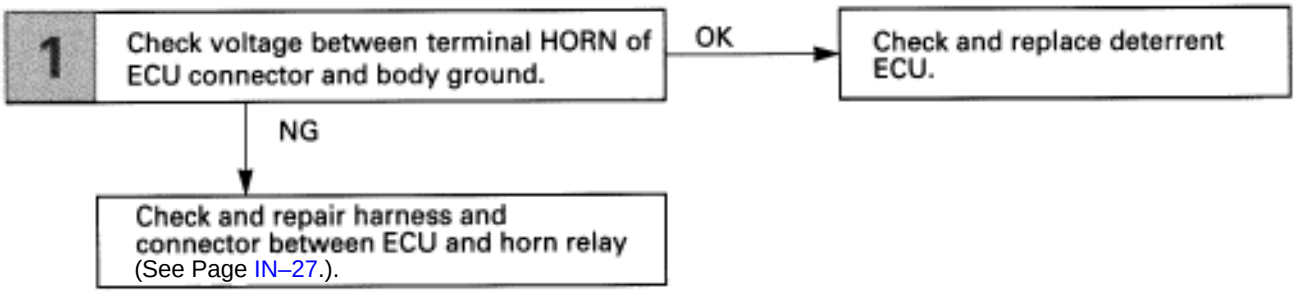
Horn Relay Circuit

CIRCUIT DESCRIPTION

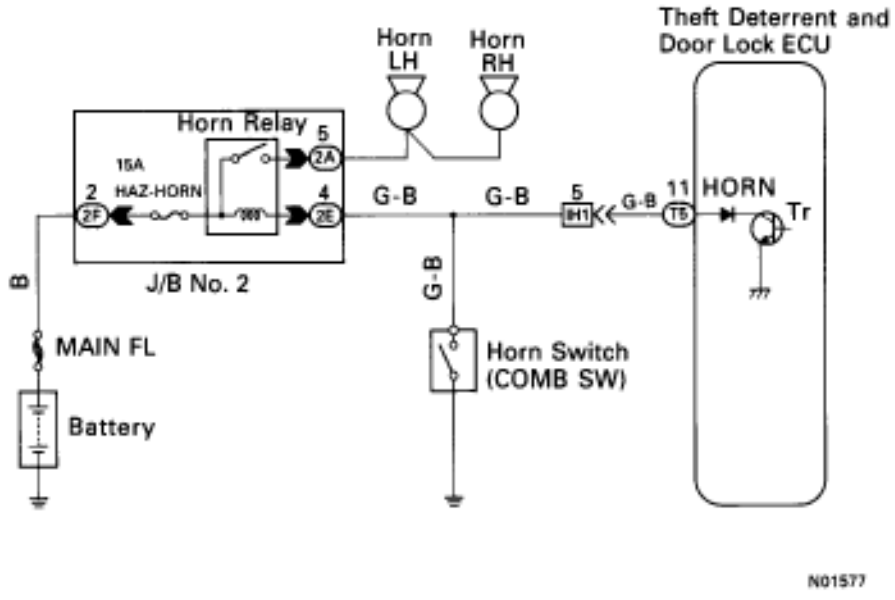
When their theft deterrent system is activated, it causes the Tr in the ECU to switch on and off in approximately 0.4 sec. cycles. This switches the horn relay on and off, thus the horns blow (See the wiring diagram below). In this condition, if any of the following operations is done, the Tr in the ECU goes off and the horn relay switches off, thus stopping the horns blow:

① Unlock the front LH or RH door with key.
② Turn the ignition switch to ACC or ON position.
③ Unlock the doors with the wireless door lock control system.
④ Wait for approximately 1 minute.

DIAGNOSTIC CHART



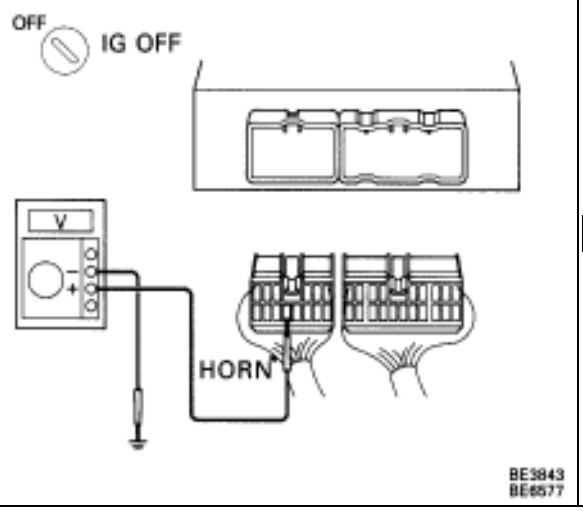
WIRING DIAGRAM



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, proceed to troubleshooting on page BE–260.

1 **Check voltage between terminal HORN of ECU connector and body ground.**



P
1. Remove the glove box.
2. Disconnect the ECU connector.

C Measure voltage between terminal HORN of ECU connector and body ground.

OK **Voltage:** **10 ~ 14 V**

NG

OK **Check and replace theft deterrent ECU.**

Check and repair harness and connector between ECU and horn relay (See page IN–27).

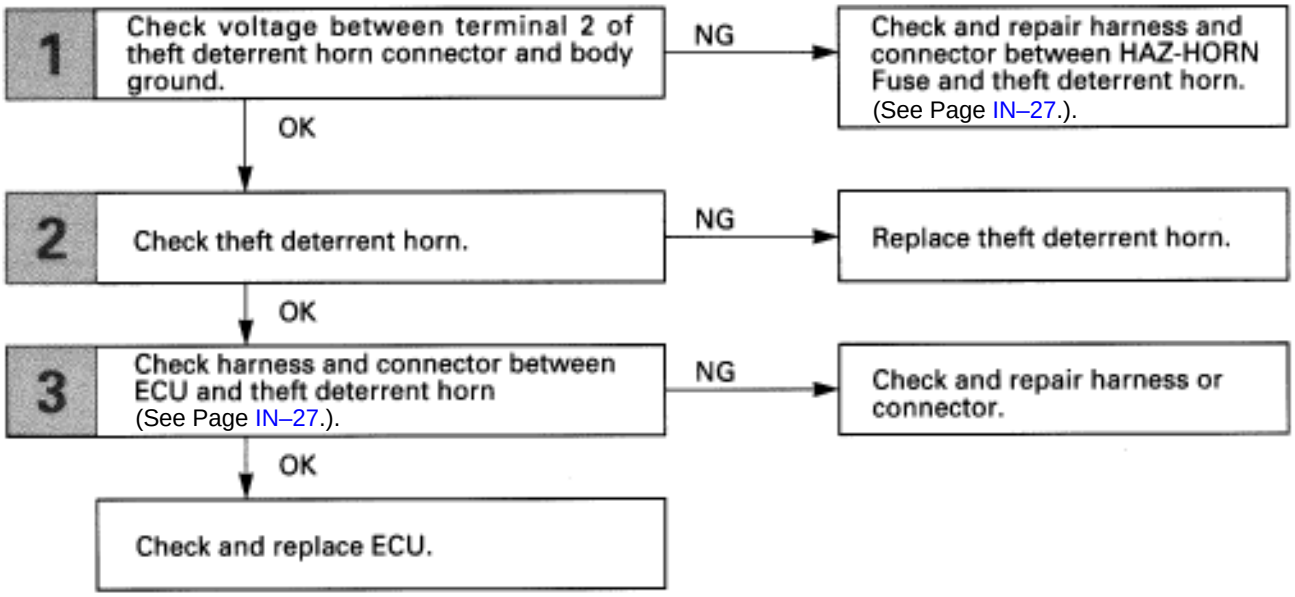
Theft Deterrent Horn Circuit

CIRCUIT DESCRIPTION

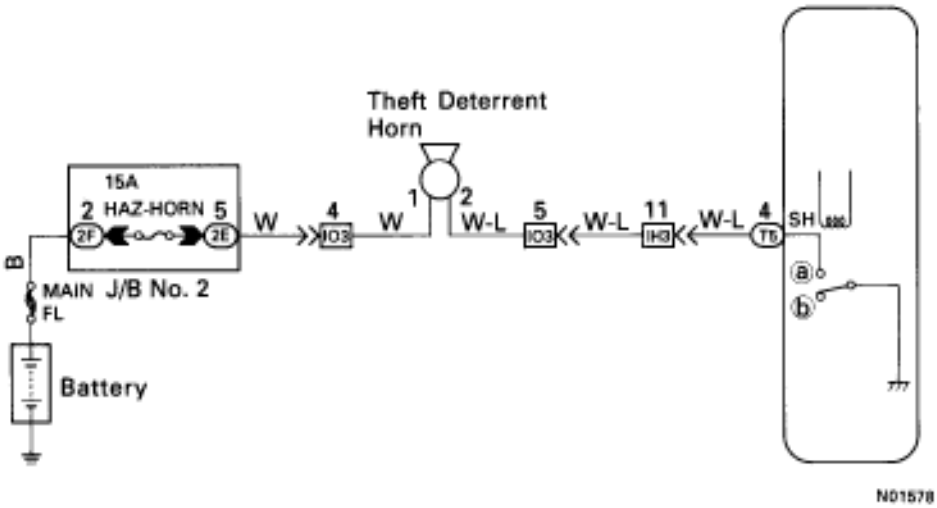
When the theft deterrent system is activated, contact (**a**) and contact (**b**) in the ECU close alternately in cycles of approximately 0.4 sec., causing the theft deterrent horn to blow (See the wiring diagram below).
In this condition, if any of the following operations is done, the contact (**a**) in the ECU opens, thus stopping the theft deterrent horn blow:

① Unlock the front LH or RH door with key.
② Turn the ignition switch to ACC or ON position.
③ Unlock the doors with the wireless door lock control system.
④ Wait for approximately 1 minute.

DIAGNOSTIC CHART

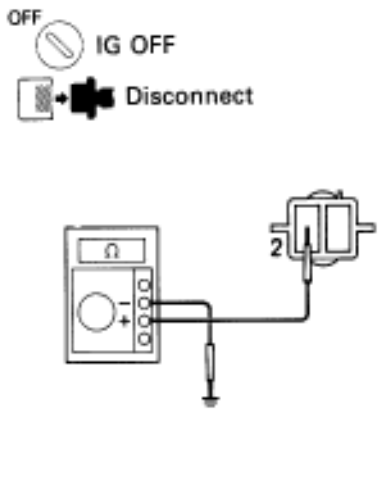


WIRING DIAGRAM



INSPECTION PROCEDURES

1 **Check voltage between terminal 2 of theft deterrent horn connector and body ground.**



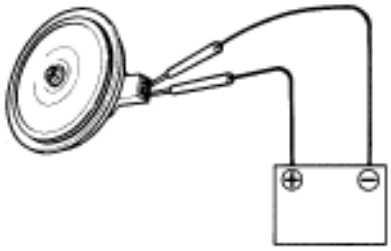
P Remove the theft deterrent horn and disconnect the connector.

C Measure voltage between terminal 2 of theft deterrent horn connector and body ground.

OK **Voltage:** **10 ~ 14 V**

OK → **NG** → **Check and repair harness and connector between HAZ–HORN fuse and theft deterrent horn. (See page IN–27)**

2 **Check theft deterrent horn.**



C Connect positive ⊕ lead to terminal 2 and negative ⊖ lead to terminal 1 of theft deterrent horn connector.

OK **Theft deterrent horn blows.**

OK → **NG** → **Replace theft deterrent horn.**

3 **Check harness and connector between ECU and theft deterrent horn (See page IN–27).**

OK → **NG** → **Check and repair harness or connector.**

Check and replace ECU.

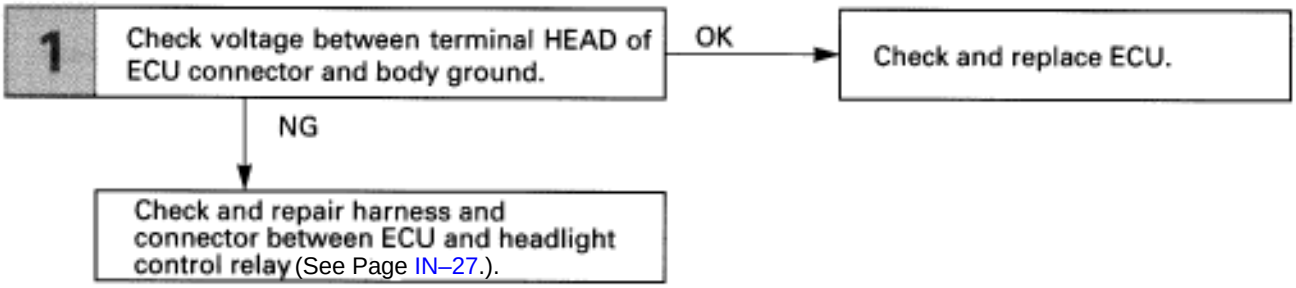
Headlight Control Relay Circuit

CIRCUIT DESCRIPTION

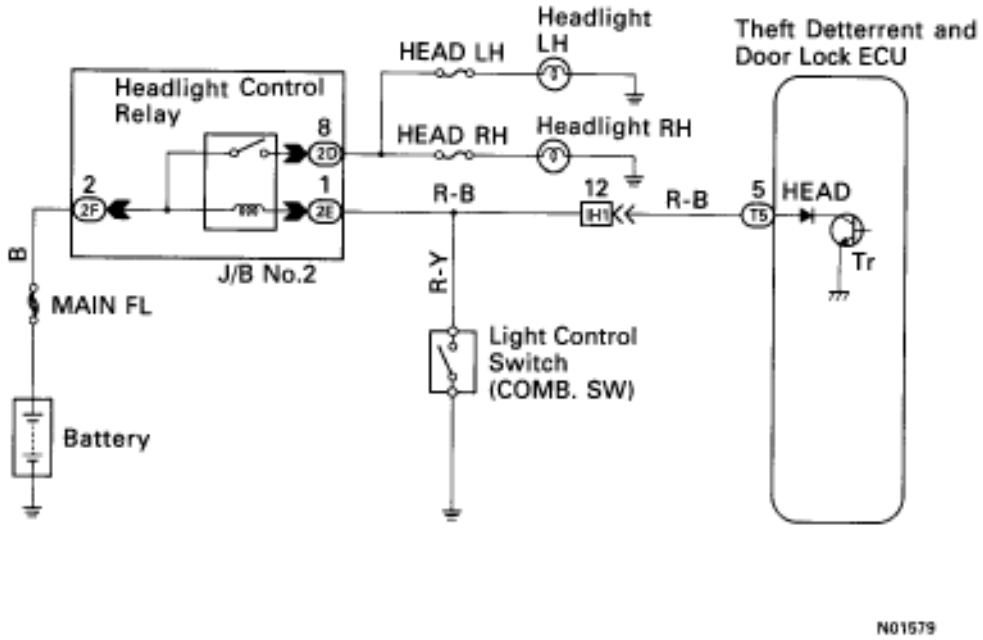
When the theft deterrent system is activated, it causes the Tr in the ECU to switch on and off at approximately 0.4 sec. intervals. This switches the headlight control relay on and off, thus flashing the headlights (See the wiring diagram below).
In this condition, if any of the following operations is done, the Tr in the ECU goes off and the headlight control relay switches off, thus stopping the headlights flashing:

① Unlock the front LH or RH door with key.
② Turn the ignition switch to ACC or ON position.
③ Unlock the doors with the wireless door lock control system.
④ Wait for approximately 1 minute.

DIAGNOSTIC CHART



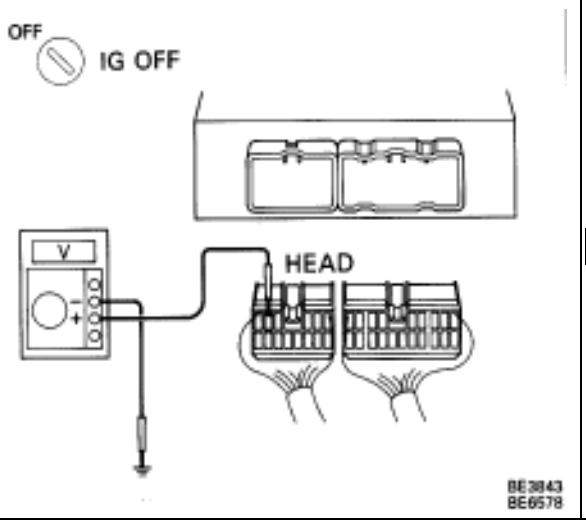
WIRING DIAGRAM



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–42.

1 **Check voltage between terminal HEAD of ECU connector and body ground.**



P
1. Remove the glove box.
2. Disconnect the ECU connector.

C Measure voltage between terminal HEAD of ECU connector and body ground.

OK **Voltage:** **10 ~ 14 V**

NG → **Check and repair harness and connector between ECU and headlight control relay (See page IN–27).**

OK → **Check and replace ECU.**

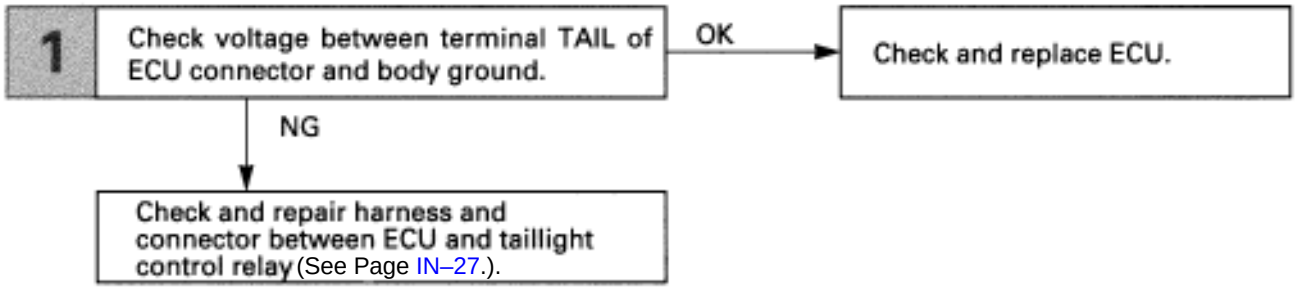
Taillight Control Relay Circuit

CIRCUIT DESCRIPTION

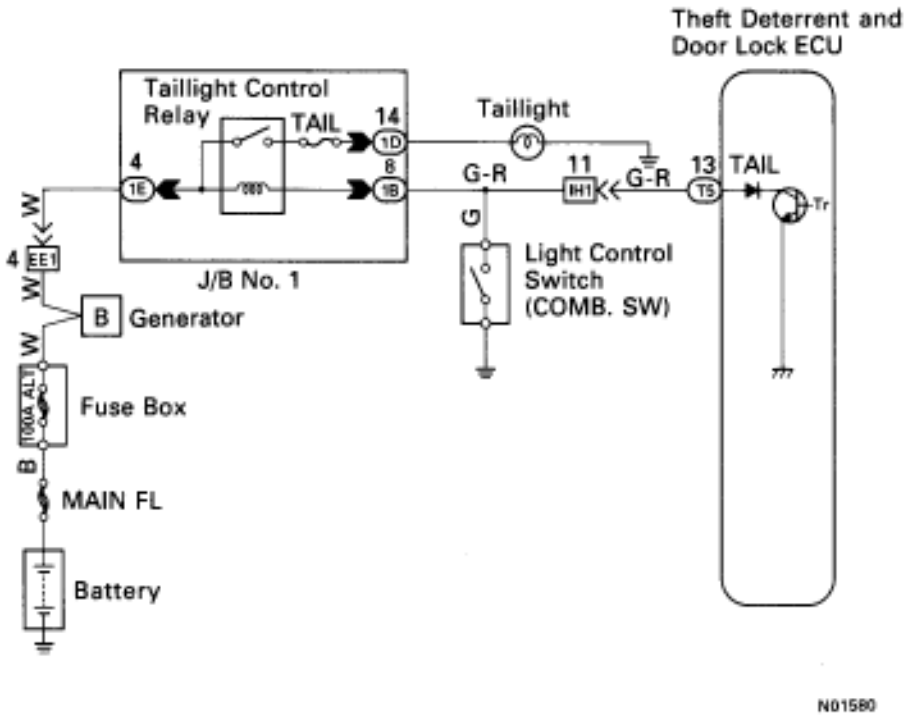
When the theft deterrent system is activated, it causes the Tr in the ECU to switch on and off at approximately 0.4 sec. intervals. This switches the taillight control relay on and off, thus flashing the taillights (See the wiring diagram below).
In this condition, if any of the following operations is done, the Tr in the ECU goes off and the taillight control relay switches off, thus stopping the taillights flashing:

① Unlock the front LH or RH door with key.
② Turn the ignition switch to ACC or ON position.
③ Unlock the doors with the wireless door lock control system.
④ Wait for approximately 1 minute.

DIAGNOSTIC CHART



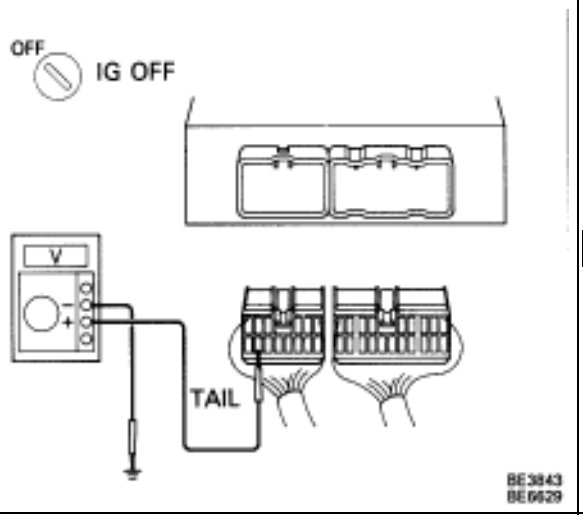
WIRING DIAGRAM



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 trouble-shooting on page BE–60.

1 **Check voltage between terminal TAIL of ECU connector and body ground.**



P
1. Remove the glove box.
2. Disconnect the ECU connector.

C Measure voltage between terminal TAIL of ECU connector and body ground.

OK **Voltage:** **10 ~ 14 V**

NG

Check and repair harness and connector between ECU and taillight control relay (See page IN–27).

OK

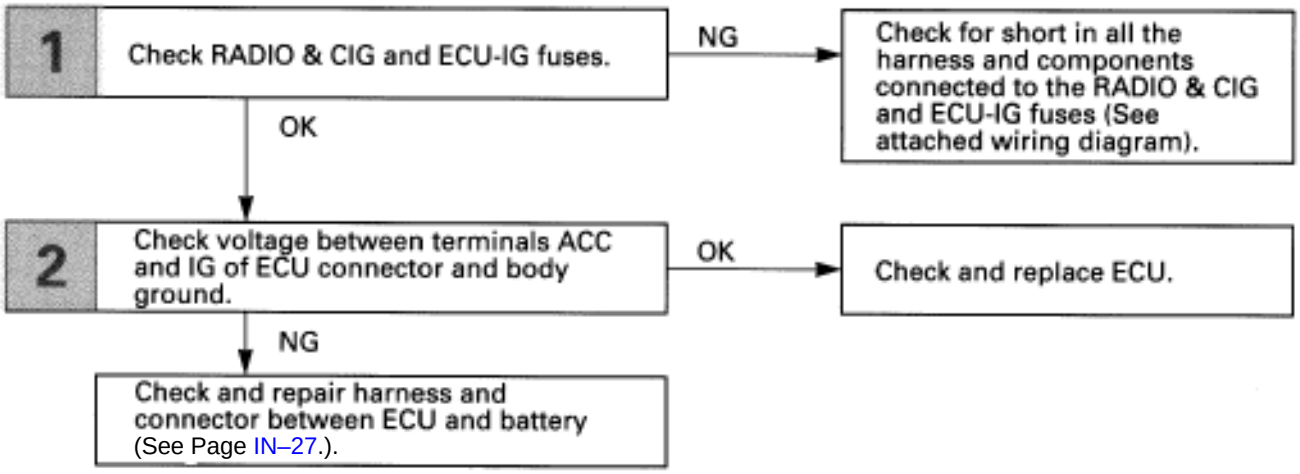
Check and replace ECU.

Ignition Switch Circuit

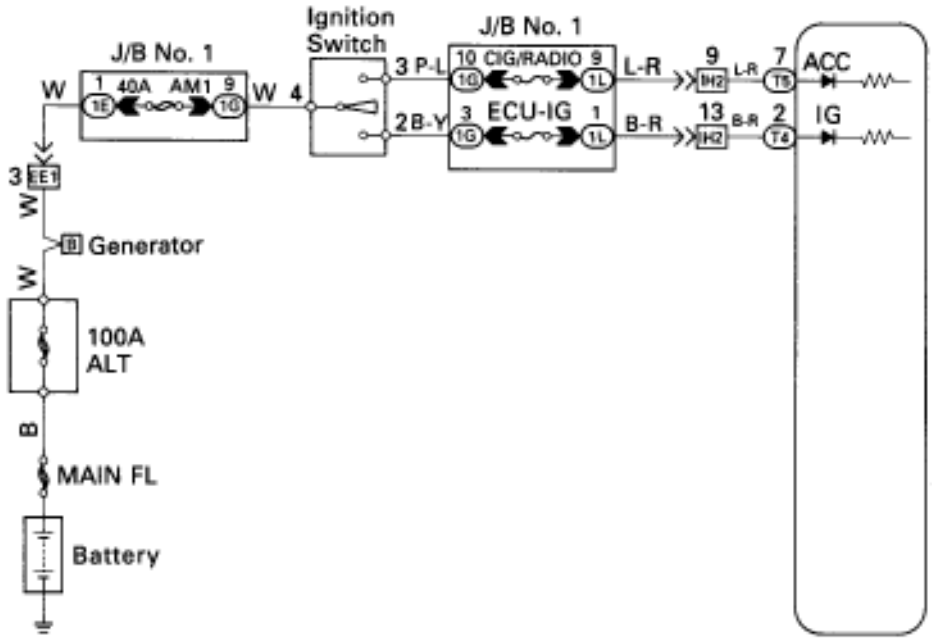
CIRCUIT DESCRIPTION

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 open detection switch, etc.

DIAGNOSTIC CHART



WIRING DIAGRAM



N01581

INSPECTION PROCEDURE

1 **Check RADIO & CIG and ECU–IG fuses.**

N01207

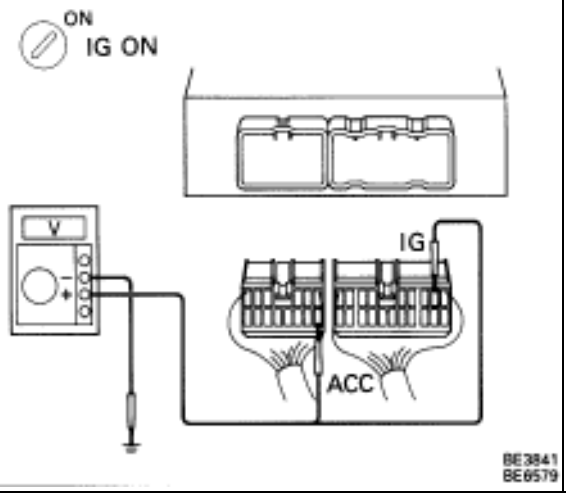
P
1. Remove the front lower panel.
2. Remove the RADIO & CIG and ECU–IG fuses from J/B No. 1.

C Check continuity of RADIO & CIG and ECU–IG fuses.

OK **Continuity**

OK → **NG** → **Check for short in all the harness and components connected to the RADIO & CIG and ECU–IG fuses (See attached wiring diagram).**

2 **Check voltage between terminals IG and ACC of ECU and body ground.**



BE3841
BE6579

P
1. Remove the glove box.
2. Disconnect the ECU connectors.
3. Turn ignition switch on.

C Measure voltage between terminals IG and ACC of ECU connector and body ground.

OK **Voltage:** **10 ~ 14 V**

NG → **OK** → **Check and replace ECU.**

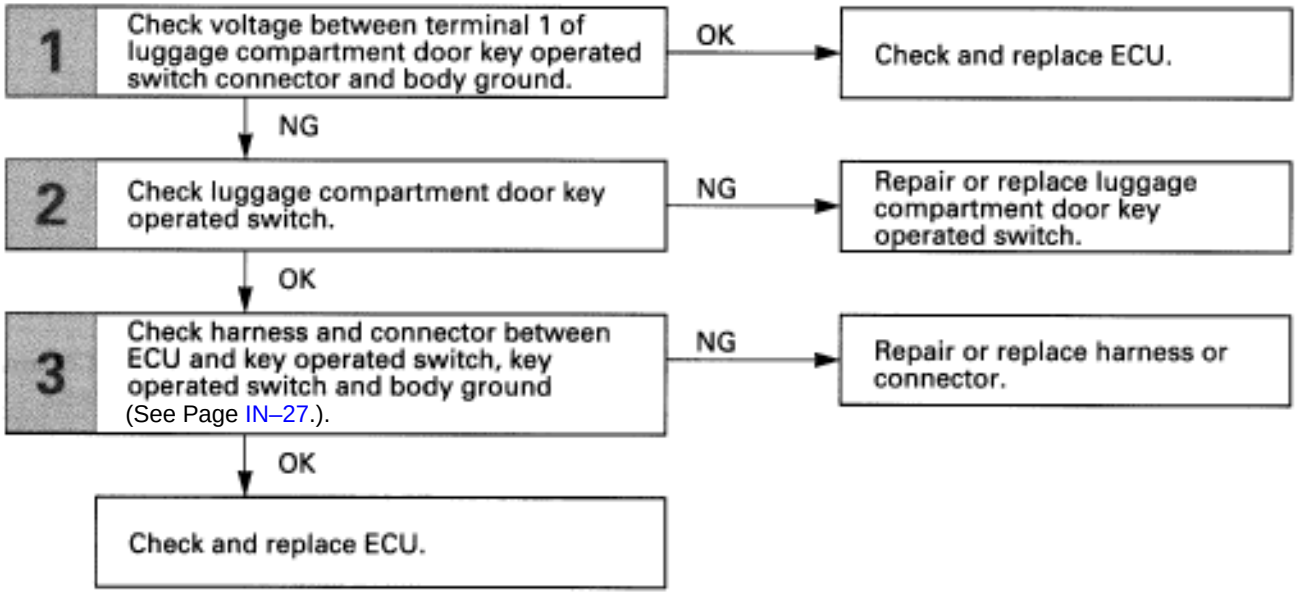
Check and repair harness and connector between ECU and battery (See page IN–27).

Luggage Compartment Door Key Operated Switch Circuit

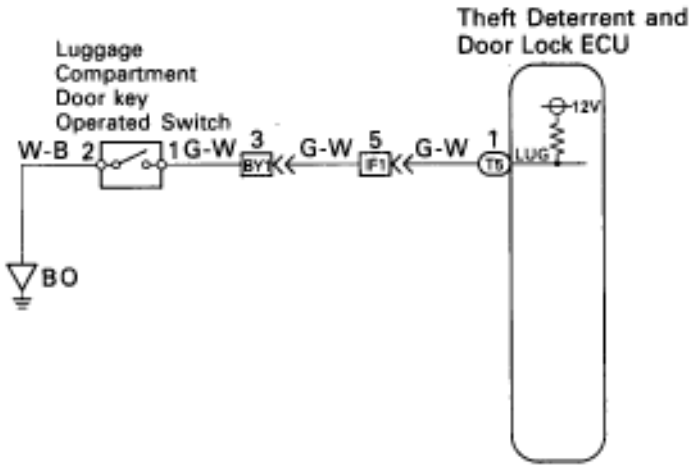
CIRCUIT DESCRIPTION

The luggage compartment door key operated switch goes on when the luggage compartment door key cylinder is turned to the unlock side with the key.

DIAGNOSTIC CHART

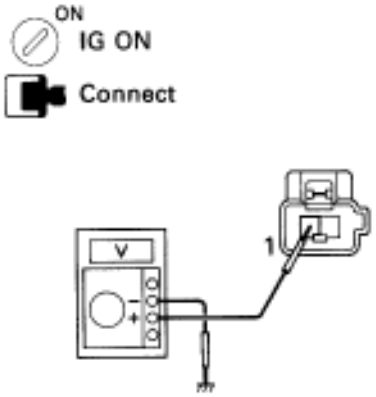


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal 1 of luggage compartment door key operated switch connector and body ground.**



P
1. Remove luggage compartment door trim.
2. Turn ignition switch on.

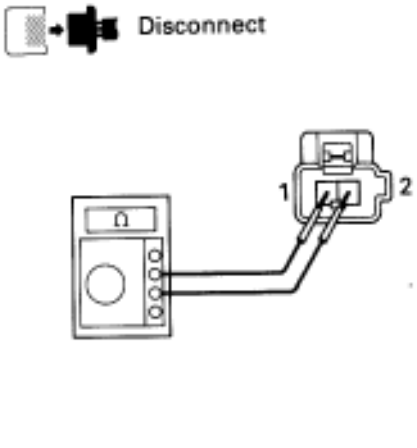
C Measure voltage between terminal 1 of luggage compartment door key operated switch connector and body ground, when the key is turned to the unlock side and not turned.

OK

Key operation	Voltage
Turned to the unlock side	Below 1 V
Not turned	10 ~ 14 V

NG → **OK** → **Check and replace ECU.**

2 **Check luggage compartment door key operated switch.**



P Disconnect luggage compartment door key operated switch connector.

C Check continuity between terminals 1 and 2, when the key is turned to the unlock side and not turned.

OK

Key operation	1	2
Turned to unlock side	○—○ Continuity	
Not turned		

OK → **NG** → **Repair or replace luggage compartment dor key operated switch.**

3 **Check harness and connector between ECU and key operated switch, key operated switch and body ground (See page IN–27).**

OK → **NG** → **Check and repair harness or connector.**

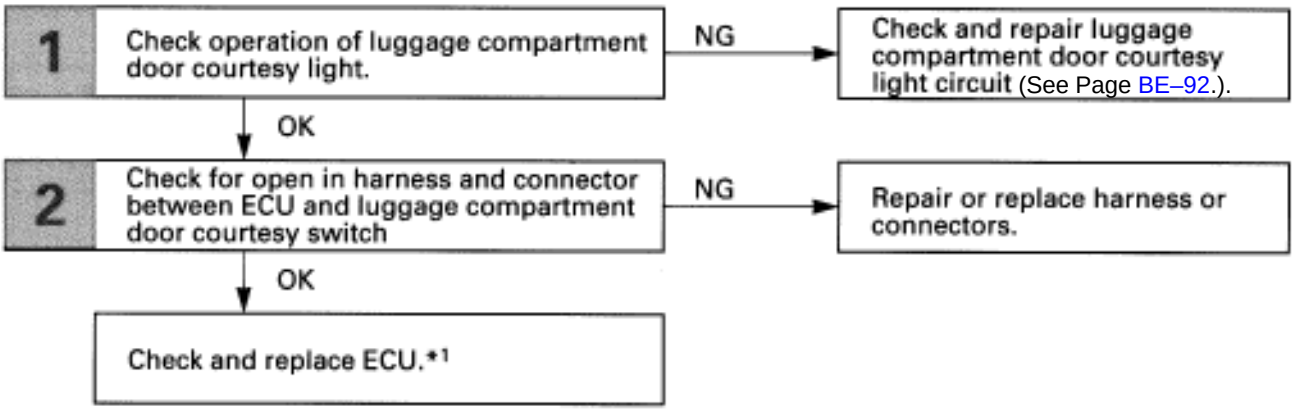
Check and replace ECU.

Luggage Compartment Door Key Operated Switch Circuit

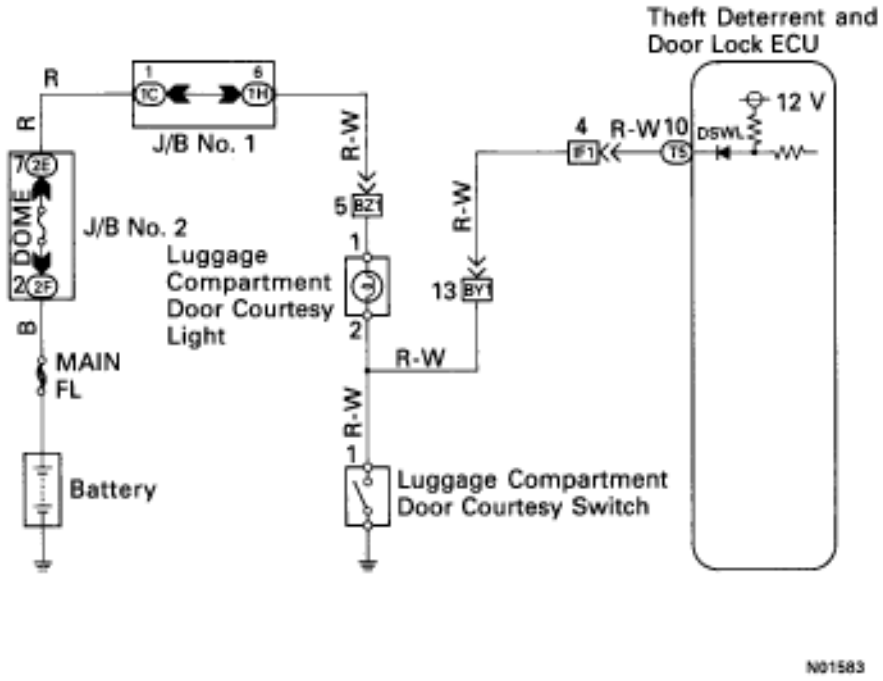
CIRCUIT DESCRIPTION

The luggage compartment door courtesy switch goes on when the luggage compartment door is opened and goes off when the luggage compartment door is closed.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of luggage compartment door courtesy light.**
C	Check that luggage compartment door courtesy light goes off when luggage compartment door courtesy switch is pushed, and comes on when switch is not pushed.

OK

NG → **Check and repair luggage compartment door courtesy light circuit (See page BE–92)**

2	**Check for open in harness and connector between ECU and luggage compartment door courtesy switch (See page IN–27).**

OK

NG → **Repair or replace harness or connectors.**

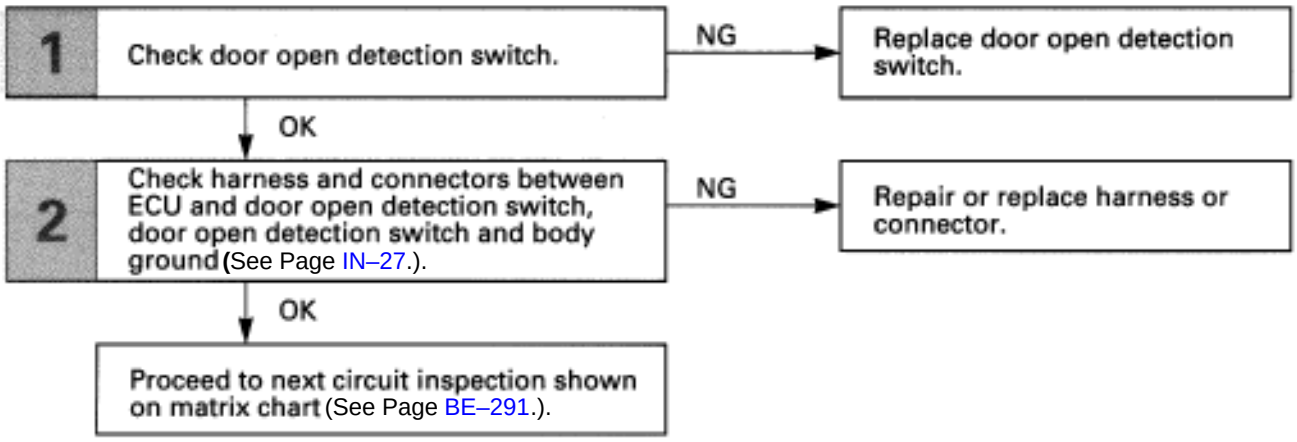
Check and replace ECU.

Door Open Detection Switch Circuit

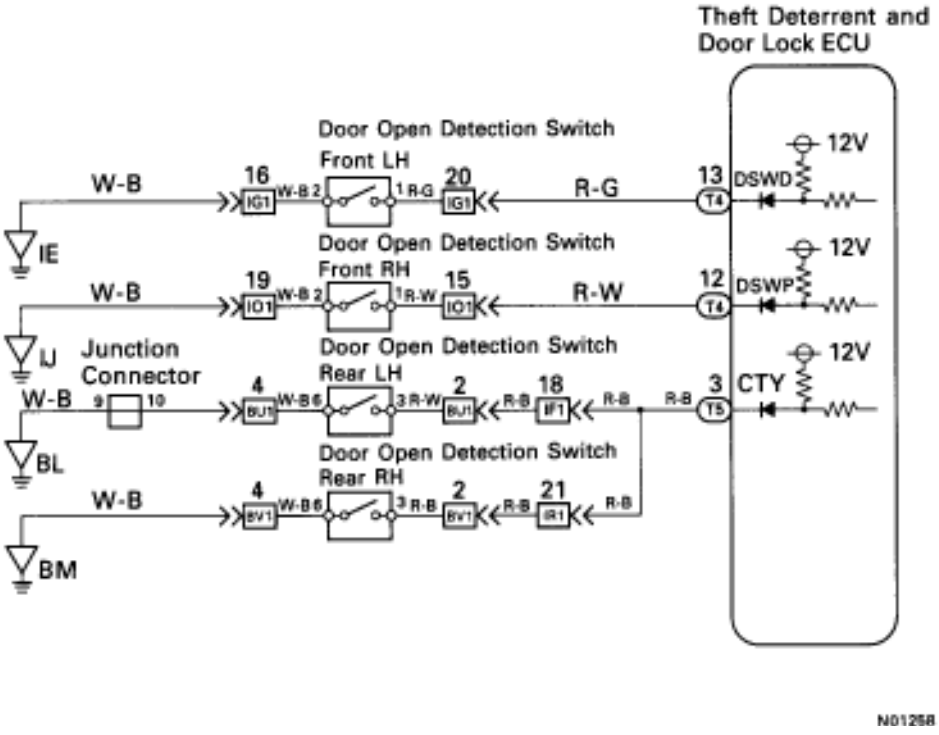
CIRCUIT DESCRIPTION

The door open detection switch is built in the door lock assembly.
It is on when the door is open and off when the door is closed.

DIAGNOSTIC CHART

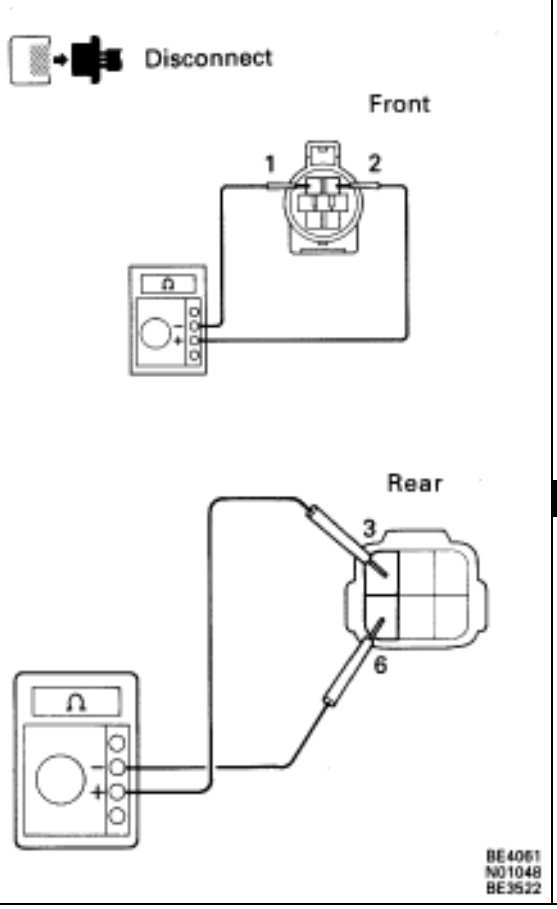


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check door open detection switch.**



P
1. Remove the door trim and service hole cover.
2. Disconnect door open detection switch connector.

C Check continuity between terminals 1 (3) and 2 (6) of door open detection switch connector, when the front door is opened and closed.

OK

Continuity

Switch condition \ Terminal	1 (3)	2 (6)
ON (Door opened)	○	○
OFF (Door closed)		

Hint The terminal number without bracket is for the Front, the number with bracket is for the Rear.

OK → **NG** → **Replace door open detection switch.**

2 **Check harness and connectors between ECU and door open detection switch, door open detection switch and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connectors.**

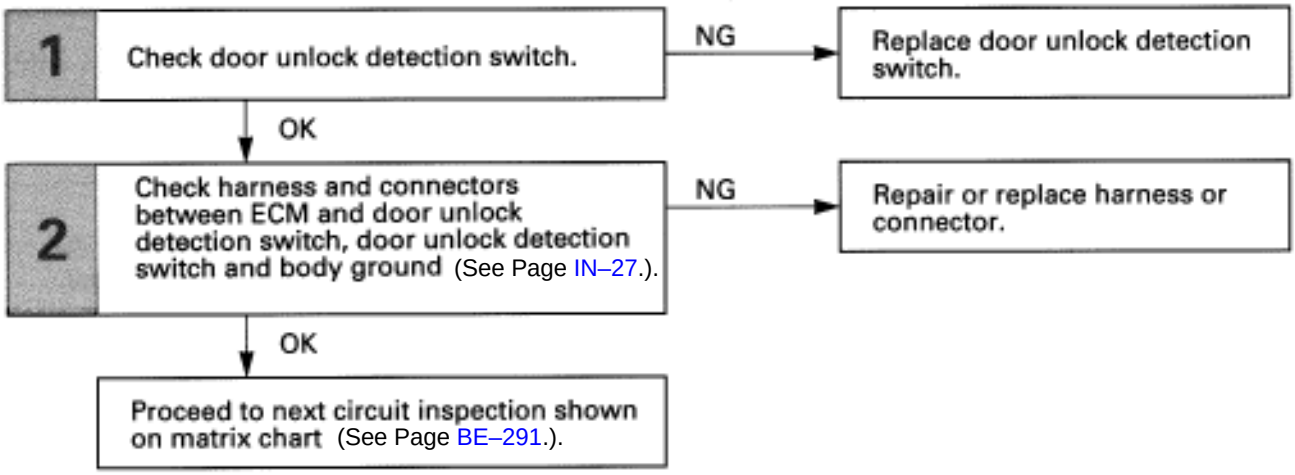
Proceed to next circuit inspection shown on matrix chart (See page BE–291).

Door Unlock Detection Switch Circuit

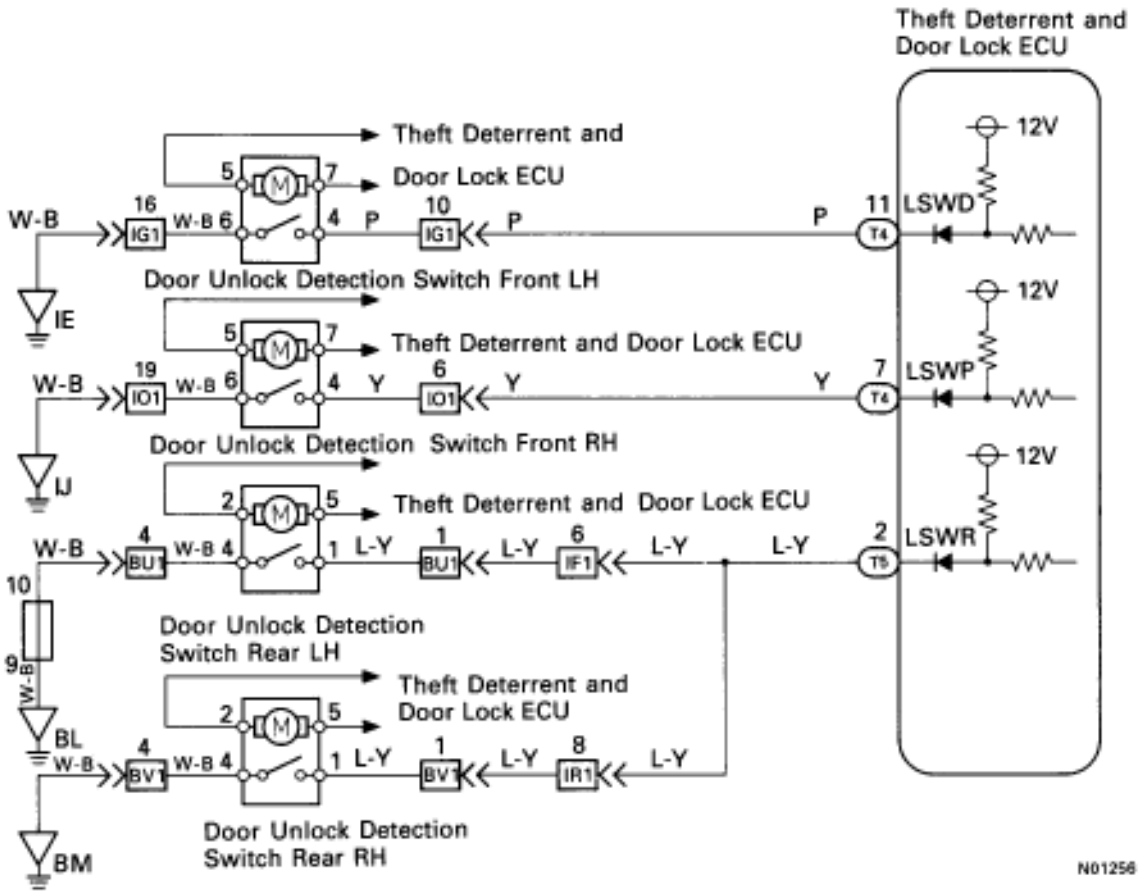
CIRCUIT DESCRIPTION

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 in this circuit. It is used as one of the operating conditions for the key confinement prevention function.

DIAGNOSTIC CHART

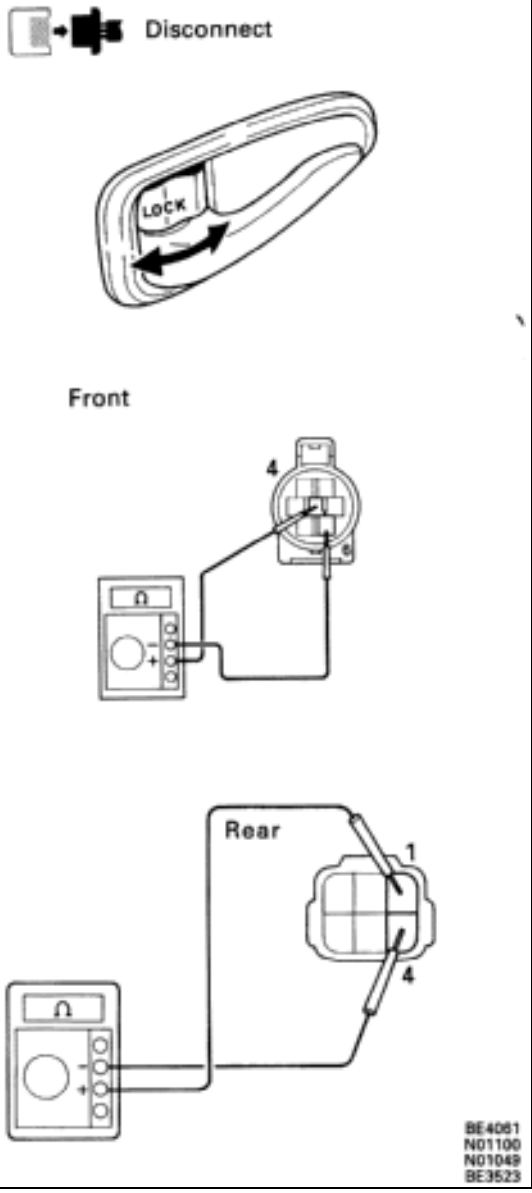


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check Door Unlock Detection Switch.**



P
1. Remove the door trim and service hole cover.
2. Disconnect door unlock detection switch connector.

C Check continuity between terminals 4 (1) and 6 (4) of door unlock detection switch connector, when the door lock knob is operated to the lock side and unlock side.

OK

○—○ Continuity

Switch condition \ Terminal	4 (1)	6 (4)
Door unlock	○	○
Door lock		

Hint The terminal number without bracket is for the Front, the number with bracket is for the Rear.

OK → **2**

NG → **Replace door open detection switch.**

2 **Check harness and connectors between ECU and door open detection switch, door open detection switch and body ground (See page IN–27).**

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–291).**

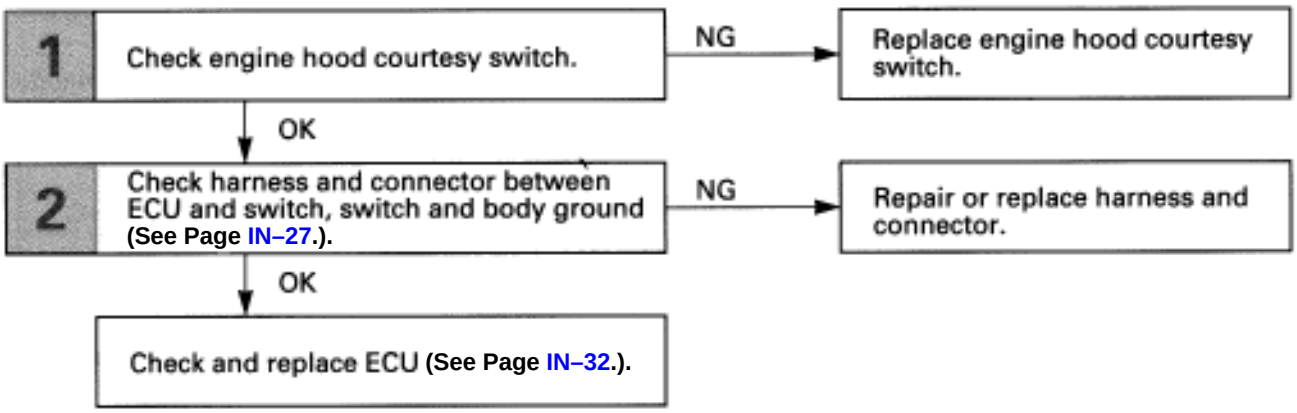
NG → **Repair or replace harness or connectors.**

Engine Hood Courtesy Switch Circuit

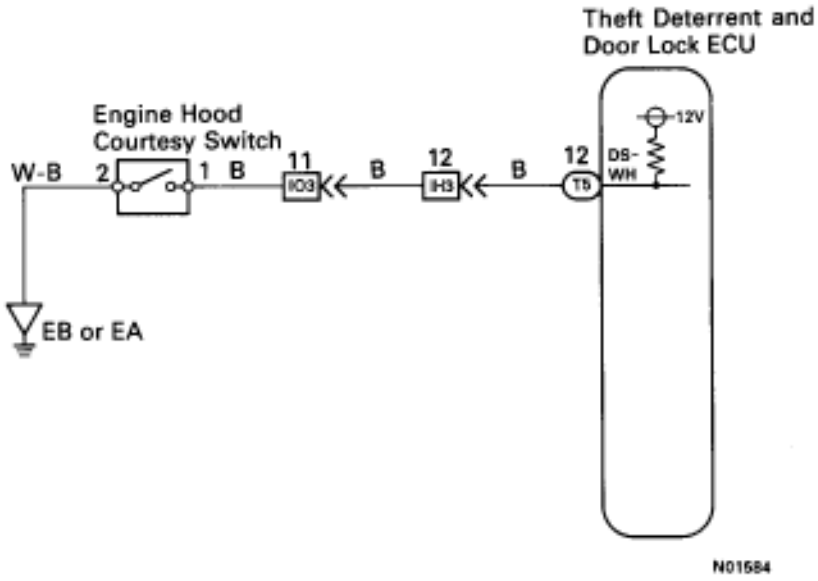
CIRCUIT DESCRIPTION

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.

DIAGNOSTIC CHART

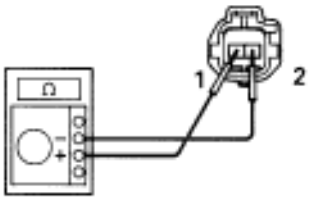


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check engine hood courtesy switch.**



BE4061 N01111

P Disconnect engine hood courtesy switch connector.

C Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK

Continuity

Engine hood lock \ Terminal	1	2
Lock		
Unlock	○——	——○

OK → **NG** → **Replace door open detection switch.**

2 **Check harness and connectors between ECU and door open detection switch, door open detection switch and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace ECU (See page IN–32).

WIRELESS DOOR LOCK CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

HINT: Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system is operating normally.
Perform troubleshooting in accordance with the procedure on the following page.

CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem.

2 PROBLEM SYMPTOM CONFIRMATION, ⁜ SYMPTOM SIMULATION

Confirm the problem symptoms. If the problem does not reappear, be sure to simulate the problem, using the ”Problem Simulation Method”.

At this stage check whether the whole wireless door lock control system fails to operate, or whether only some of the particular functions fail to operate.

4 PRECHECK TYPE I, 5 PRECHECK TYPE II

Using the self diagnosis function of the wireless door lock ECU, perform Precheck Type I to find out if the system is normal (system non–operation due to external noise, etc.) or if the abnormality lies with the vehicle. In Precheck Type II, locate if the cause of problem lies in the transmitter, the antenna or the vehicle.
Perform Precheck Type I when whole wireless door lock control system fails to operate only at a specific locality.

Perform Precheck Type II when whole wireless door lock control system fails to operate no matter where the locality is.

When only some functions of wireless door lock control system do not operate, proceed to 8 on the Matrix Chart of Problem Symptoms.

6 INSPECTION OF TRANSMITTER, 7 INSPECTION OF ANTENNA CIRCUIT

If it is found in Precheck Type II that the cause of the problem is in the transmitter or antenna, proceed to the appropriate pages and start troubleshooting.

8 MATRIX CHART OF PROBLEM SYMPTOMS

Confirm the order of inspection for each applicable problem symptom on the matrix chart.

9 CIRCUIT INSPECTION

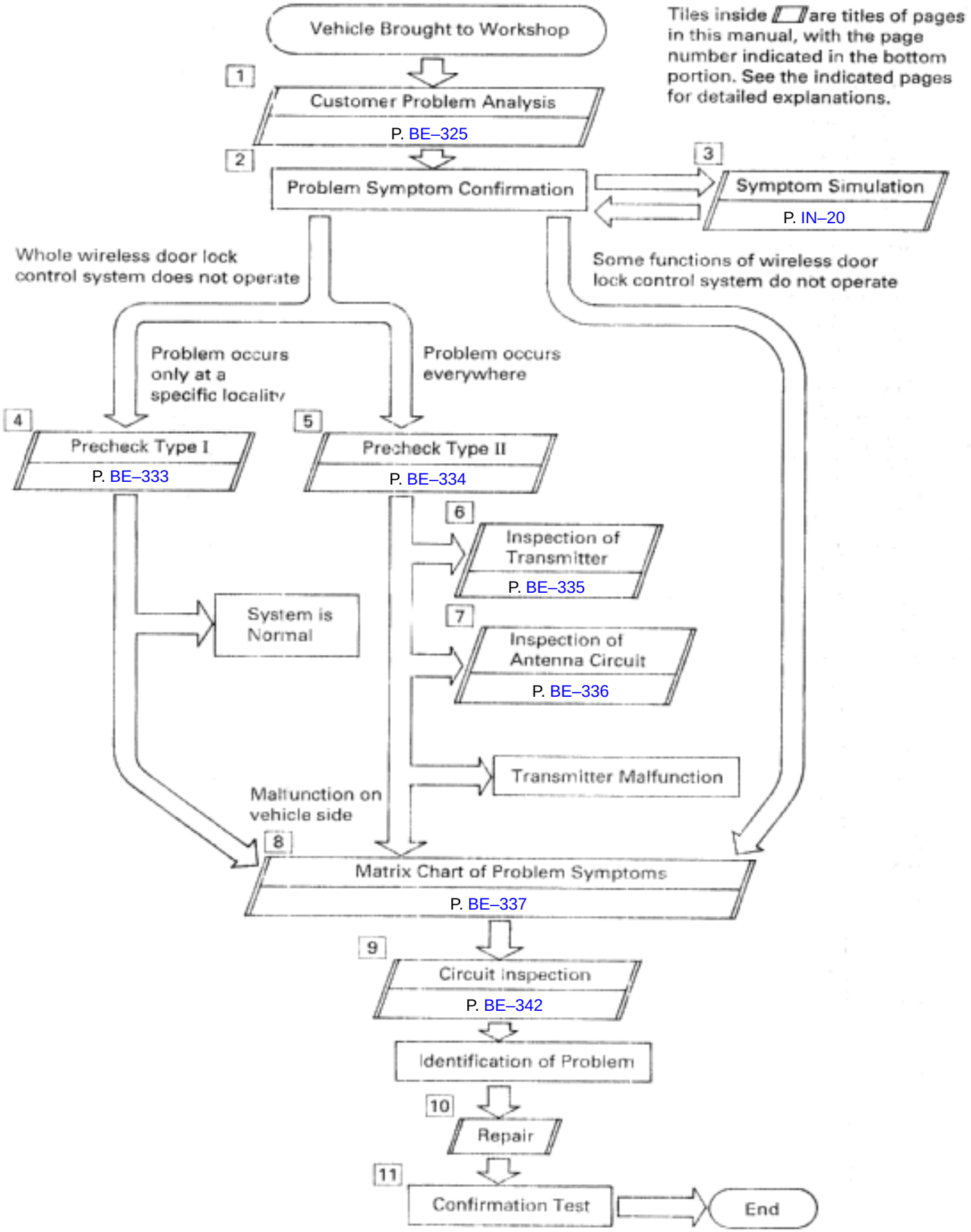
Proceed with diagnosis of each circuit in accordance with the inspection order confirmed in 8. Judge whether the cause of the problem is in the sensor, wire harness and connectors, or the ECU.

10 REPAIR

If the cause of the problem is found in 9 perform repairs.

[11] CONFIRMATION TEST

After completing repairs, confirm that the problem is eliminated and that all functions of the wireless door lock control system are normal.


Vehicle Brought to Workshop
Tiles inside are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.
1
Customer Problem Analysis
P. BE–325
2
Problem Symptom Confirmation
3
Symptom Simulation
P. IN–20
Whole wireless door lock control system does not operate
Some functions of wireless door lock control system do not operate
Problem occurs only at a specific locality
Problem occurs everywhere
4
Precheck Type I
P. BE–333
5
Precheck Type II
P. BE–334
6
Inspection of Transmitter
P. BE–335
System is Normal
7
Inspection of Antenna Circuit
P. BE–336
Transmitter Malfunction
Malfunction on vehicle side
8
Matrix Chart of Problem Symptoms
P. BE–337
9
Circuit Inspection
P. BE–342
Identification of Problem
10
Repair
11
Confirmation Test
End

CUSTOMER PROBLEM ANALYSIS CHECK SHEET

WIRLESS DOORLOCK CONTROL System Check Sheet

Inspector's Name:

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km Miles

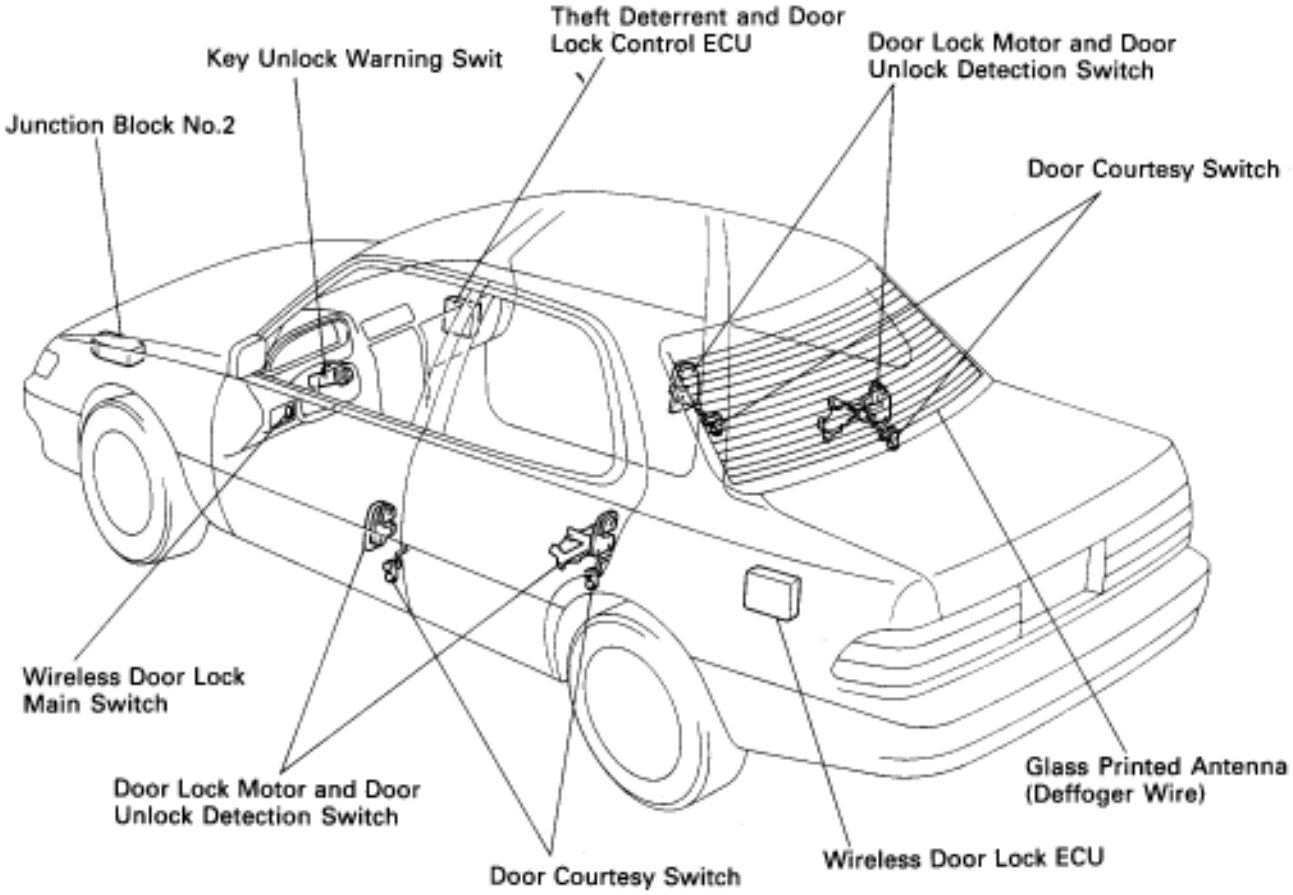
Date of Problem Occurrence		/ /
Frequency of Problem Occurrence		∗Continuous ∗Sometimes(times a day, month) ∗Once Only
Conditions at Time of Problem Occurrence	**Weather**	∗Fine ∗Cloudy ∗Rainy ∗Snowy ∗Various/Others
	Outdoor Temperature	∗Hot ∗Warm ∗Cool ∗Cold (Approx. °F(°C))
	Place	∗Everywhere ∗Specific Locality ( )
Date Transmitter Battery Last Replaced		/ /

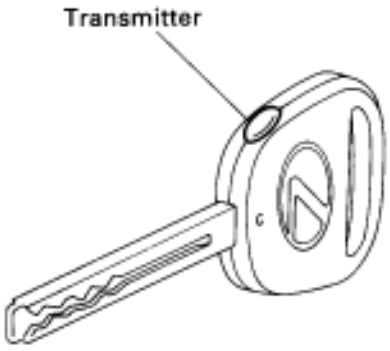
Problem Symptom	∗ Whole wireless door lock control system does not operate.	
	∗Only door unlock operation is not possible	
	∗Only door lock operation is not possible.	
	∗Wireless door lock function operates even when each door is opened.	
	∗Wireless door lock function incorrectly. (Although one door is locked, when the transmitter switch is pressed, all doors unlock.)	∗When Front RH door is unlocked ∗When Front LH door is unlocked ∗When Rear RH door is unlocked ∗When Rear LH door is unlocked
	∗Others	

Description

The wireless door lock control system is to lock and unlock all the doors at a distance, transmitting a weak radio wave from a transmitter contained in the master ignition key.
The weak radio wave (coded differently for each key) is sent to the receiver via the rear window defogger wiring.
For the function of the component parts of this system, refer to the circuit description in the circuit inspection.

Parts Location

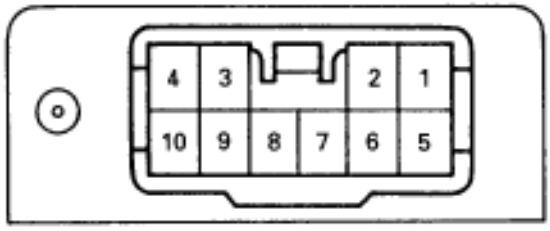




N01208
N01184

TERMINALS OF ECU

Wireless Door Lock ECU

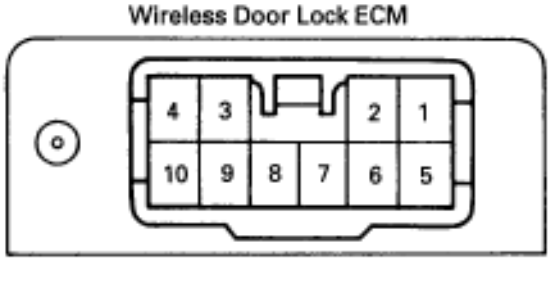


BE6491

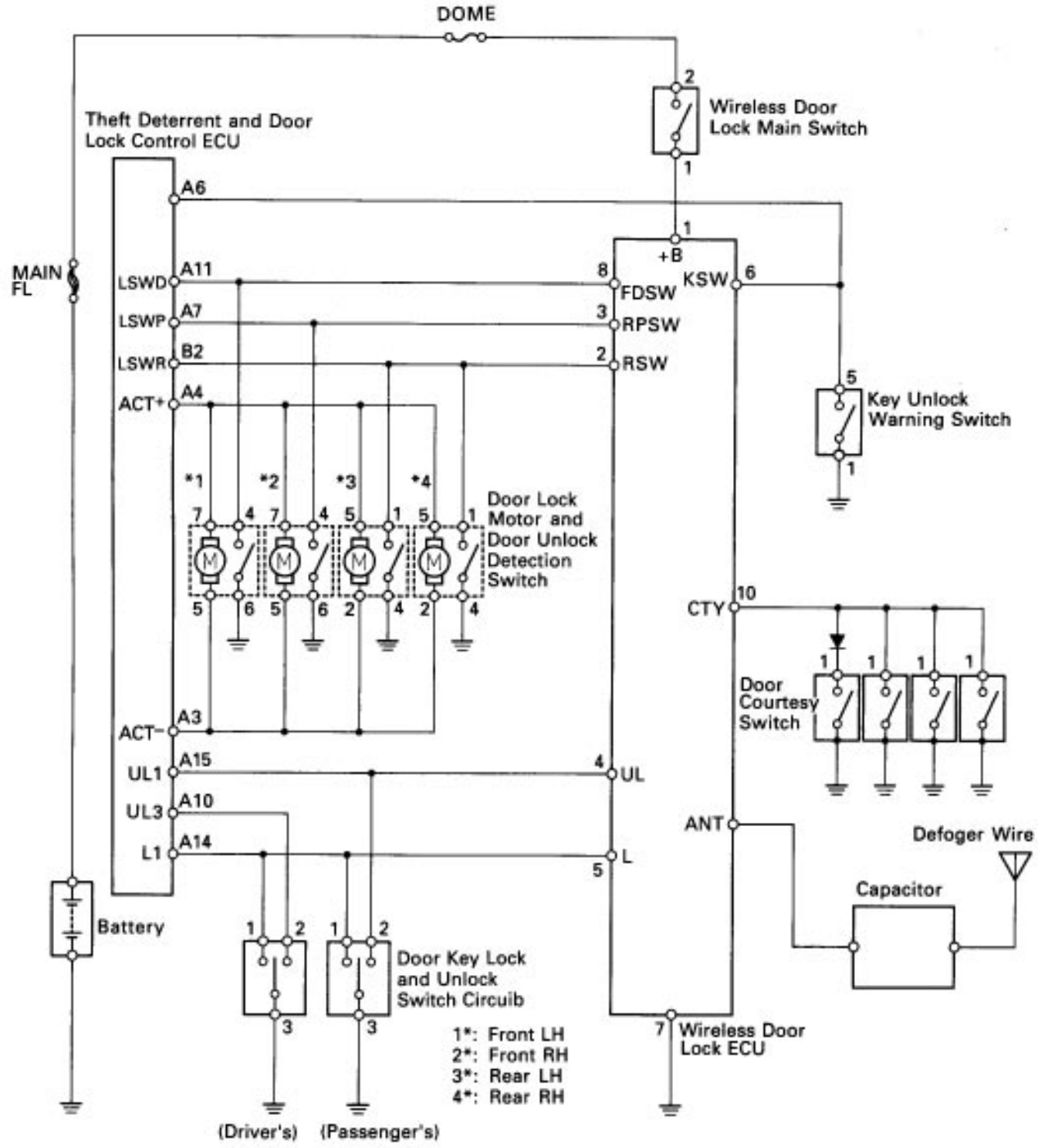
No.	Symbol	Terminal Name	No.	Symbol	Terminal Name
W8–1	B+	Power Source	W8–6	KSW	Key Unlock Warning Switch
W8–2	RSW	Door Lock Motor Rear	W8–7	GND	Ground
W8–3	RPSW	Door Lock Motor Front RH	W8–8	FDSW	Door Lock Motor Front LH
W8–4	UL	Door Key Lock and Unlock Switch	W8–9		
W8–5	L	Door Key Lock and Unlock Switch	W8–10	CTY	Door Courtesy Switch

STANDARD VALUE OF ECU TERMINAL

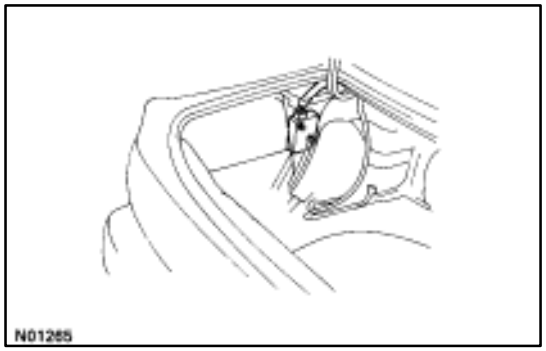
Terminals	Symbols	Wiring Color	Condition	Standard Value
W8–1 → ← W8–7	B+ → ← E	R–Y → ← W–B	Wireless door lock main switch ON	10–14 V
			Wireless door lock main switch OFF	Below 1 V
W8–2 → ← Ground	RSW → ← Ground	L–Y → ← Ground	Door lock knob of rear door LOCK	8–10 V
			Door lock knob of rear door UNLOCK	Below 1 V
W8–3 → ← Ground	RPSW → ← Ground	Y → ← Ground	Door lock knob of passenger's door LOCK	8–10 V
			Door lock knob of passenger's door UNLOCK	Below 1 V
W8–4 → ← Ground	UL → ← Ground	Y–L → ← Ground	Door key lock and unlock switch right UNLOCK	Below 1 V
			Expect above mention	8–10 V
W8–5 → ← Ground	L → ← Ground	Y–R → ← Ground	Door key lock and unlock switch left and right LOCK	Below 1 V
			Door key lock and unlock switch left or right LOCK	
			Expect above mention	8–10 V
W8–6 → ← Ground	KSW → ← Ground	L–B → ← Ground	Ignition key insert key cylinder	Below 1 V
			Ignition key pull out key cylinder	10–14 V
W8–7 → ← Ground	GND → ← Ground	W–B → ← Ground	Always	Below 1 V
W8–8 → ← Ground	FDSW → ← Ground	P → ← Ground	Door lock knob of driver's door LOCK	8–10 V
			Door lock knob of driver's door UNLOCK	Below 1 V
W8–10 → ← Ground	CTY → ← Ground	R–W → ← Ground	Door courtesy switch left and right ON	Below 1 V
			Door courtesy switch left or right ON	
			Door courtesy switch left or right OFF	
			Door courtesy switch left and right OFF	10–14 V



WIRING DIAGRAM



N01087



Parts Replacement

REMOVAL AND INSTALLATION OF WIRELESS DOOR LOCK ECU

1. REMOVE WIRELESS DOOR LOCK ECU

(a) Remove luggage compartment LH side cover.
(b) Remove the two nuts.
(c) Disconnect the connectors.
(d) Remove the ECU.

2. INSTALL WIRELESS DOOR LOCK ECU

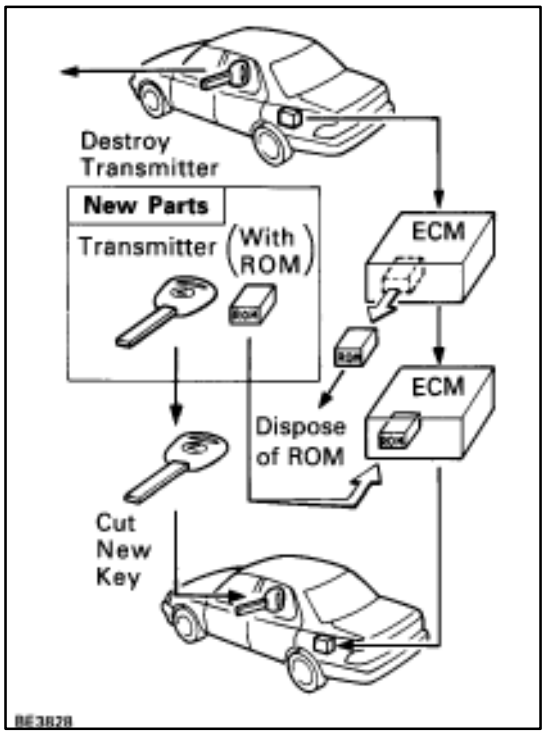
For installation, follow the removal procedure in reverse.

REPLACEMENT OF WIRELESS DOOR LOCK ECU AND TRANSMITTER

Disassembly and assembly of the wireless door lock ECU and transmitter includes details of spare parts and replacement procedure for defective parts found through troubleshooting.

Each part is a precision electronic component so handle with care.

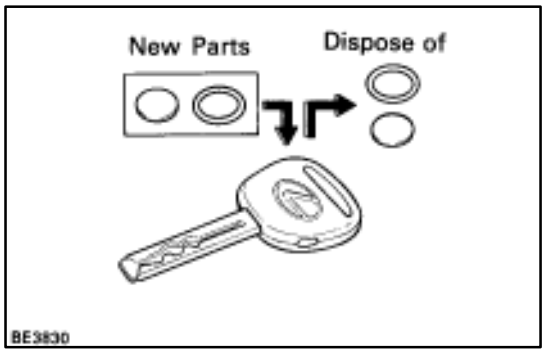
Destroy old ROM and transmitter to prevent reuse.



1. SPARE PARTS AND REPLACEMENT PROCEDURE FOR MALFUNCTIONING PARTS

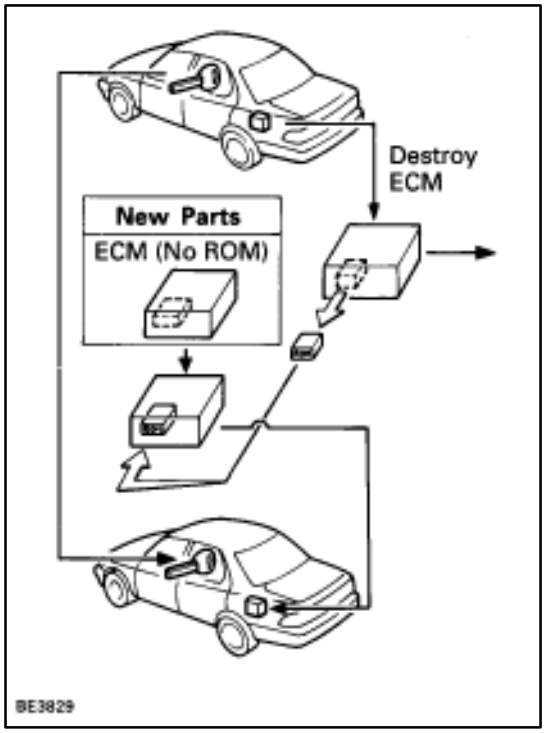
(For malfunctioning transmitter)

(a) Prepare the new transmitter (with ROM).
(b) Remove the ECU form the vehicle.
(c) Remove the ROM form the ECU.
(d) Install the new ROM into the ECU.
(e) Install the ECU into the vehicle.
(f) Check that door lock remote control operation works.
(g) Cut the new key to the shape of the replaced key.



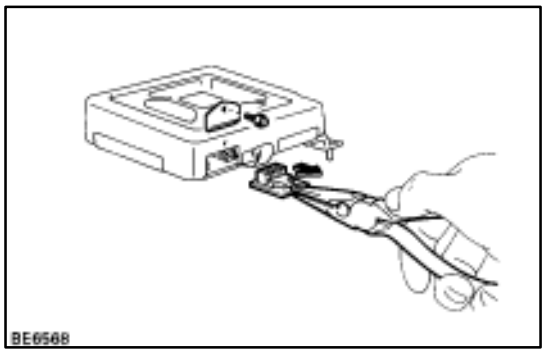
(For non–functioning battery)

(a) Prepare new battery (with O–ring).
(b) Remove battery and O–ring from transmitter.
(c) Install new battery and O–ring into transmitter.



(For malfunctioning ECU)

(a) Prepare the new ECU (without ROM).
(b) Remove the ECU from the vehicle.
(c) Remove the ROM from the ECU.
(d) Install the ROM into the new ECU.
(e) Install the new ECU into the vehicle.

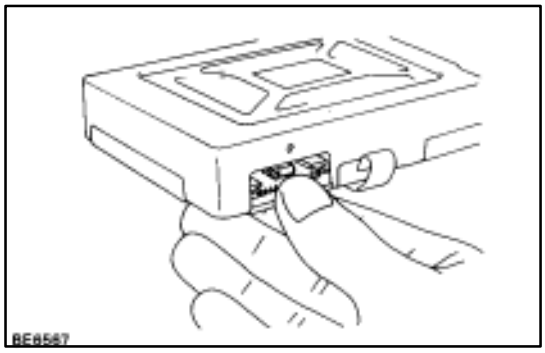


2. REMOVAL OF ROM FROM ECU

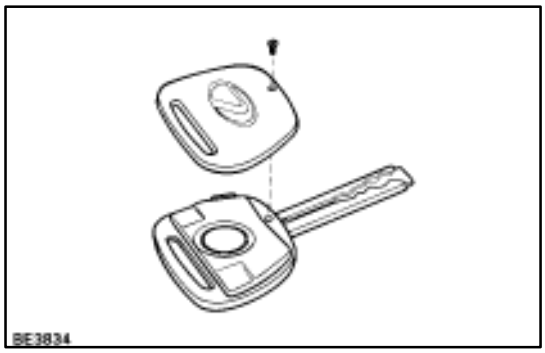
(a) Remove the cover from the hole for ROM insertion.
(b) Using long nosed pliers, grasp the center of the print board (ROM) and remove it.

NOTICE:

- **When replacing the ROM, always disconnect the ECU connector first.**
- **When removing the ROM always grasp the board and do not touch the IC parts or print wiring on the board.**

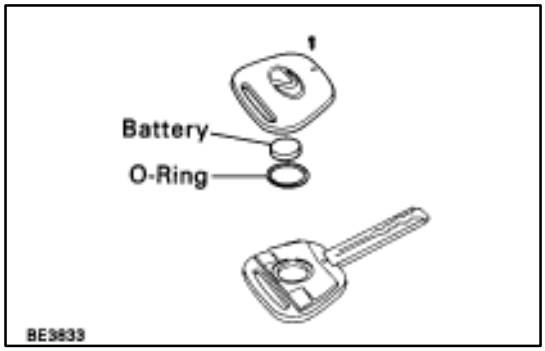


(c) Insert the new print board (ROM) along the rails on both sides and push it in with your finger until the terminal on the end is completely inserted.
(d) Install the cover to the hole for ROM insertion.



3. REPLACEMENT OF BATTERY FOR TRANSMITTER

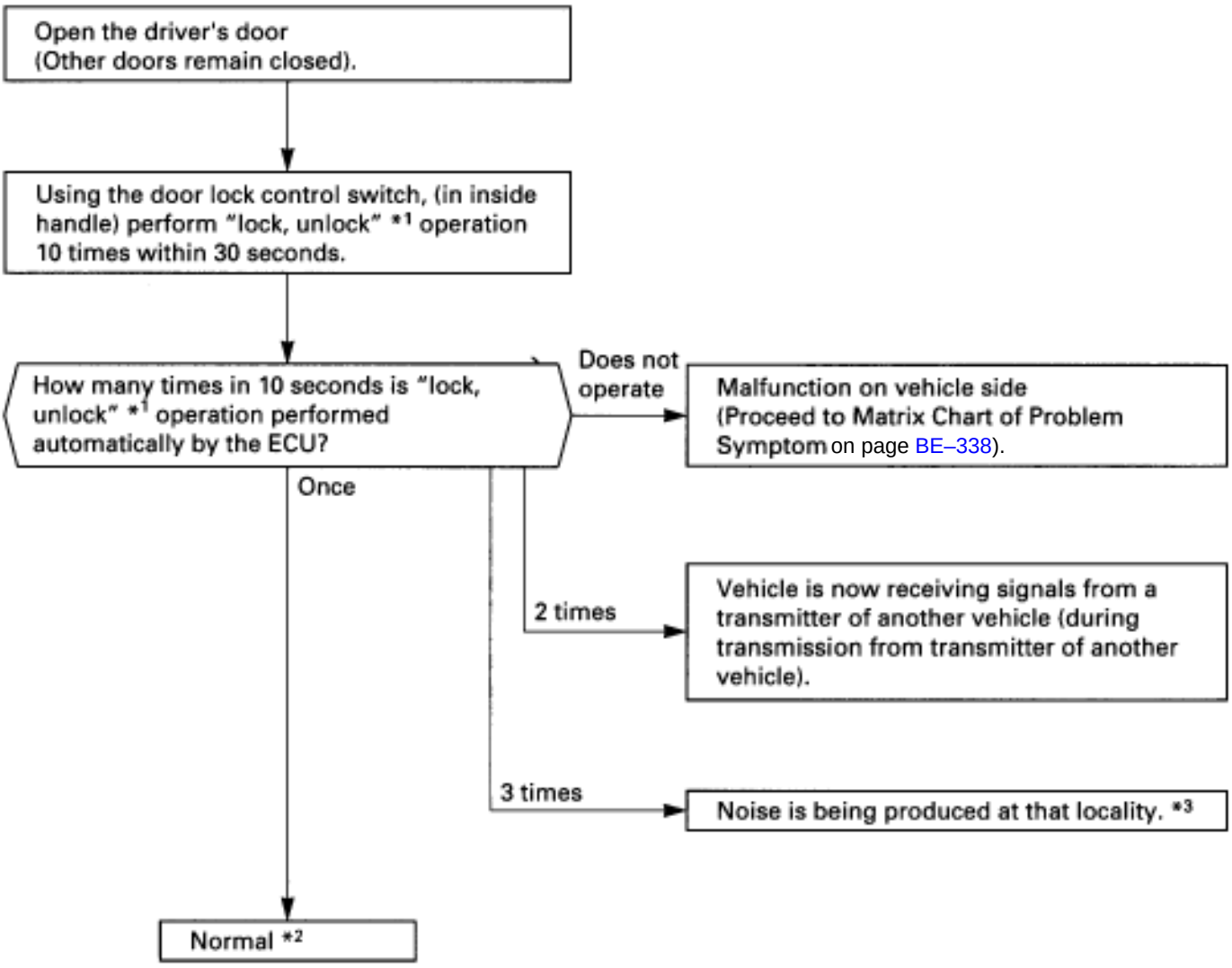
(a) Remove the screw from the transmitter.
(b) Remove the cover.



(c) Remove the O–ring and Battery
(d) Set the new battery and O–ring into the transmitter.
(e) Install the cover to the transmitter body taking care not to twist or displace the O–ring.
(f) Tighten the screw.

PRECHECK TYPE I

In cases where the wireless door lock control system fails to operate only at a specific locality, perform this check at that locality.



*1: Performing lock and unlock once counts as one time.

*2: If noise is not constantly produced at the locality being used and inspection is performed on an occasion when there is no noise, then it may happen that the system is judged normal.

*3: If the conclusion is that noise is produced in the locality the vehicle is used, then transmitter use is limited in that locality. Limitations on usage are described below.

HINT:

Because the transmitter uses weak electromagnetic waves, it is easily affected by noise, so remote control within the normal range becomes difficult.

To reduce the influence of noise, bring the transmitter as close as possible to the back window glass (antenna section), or touch (ground) the grooved key tip of the transmitter to the door key cylinder and then operate the transmitter switch; this should make door lock remote control operation possible.

If door lock remote control operation is still not possible, insert the key in the door key cylinder and press the transmitter switch.

PRECHECK TYPE II

Perform this check in cases where the wireless door lock control system fails to operate anywhere.

Open the driver's door
(Other doors remain closed).

Using the door lock control switch, perform "lock, unlock" *1 operation 10 times with in 30 seconds.

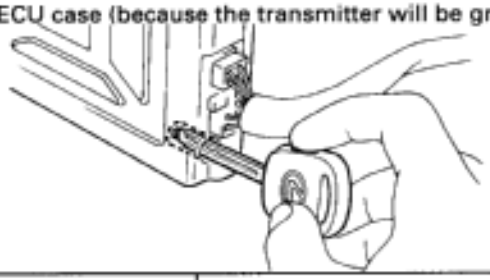
Soon (less than 2 secs.) after performing the above, continue to press the transmitter switch for 10 seconds.

How many times does "lock, unlock" *1 operation of all doors occur during the time the transmitter is operated (approx. 10 secs.)?

- Does not operate → Malfunction on vehicle side (Proceed to Matrix Chart of Problem Symptom on page BE–338).
- 2 times → Wrong transmitter parts (exclusive code does not match). [Replace transmitter and ROM in ECU (See Page BE–330).
- 3 times → Transmitter fault on page BE–335). (Inspect transmitter
- Once

Close all doors.

Disconnect the antenna cable from the ECU, directly insert the transmitter (grooved section of key) and press the transmitter switch. In this case do not let the transmitter come in contact with the ECU case (because the transmitter will be grounded).



Do all doors lock and unlock?

- YES → Malfunction on antenna circuit (Inspect antenna circuit on page BE–336).
- NO

Tune the FM radio to 94.9 MHz.

Is there noise on the radio while the transmitter switch is being pushed ? *2

- YES → Malfunction on vehicle side (Proceed to Matrix Chart of Problem Symptom on page BE–338).
- NO

Inspect transmitter on page BE–335).

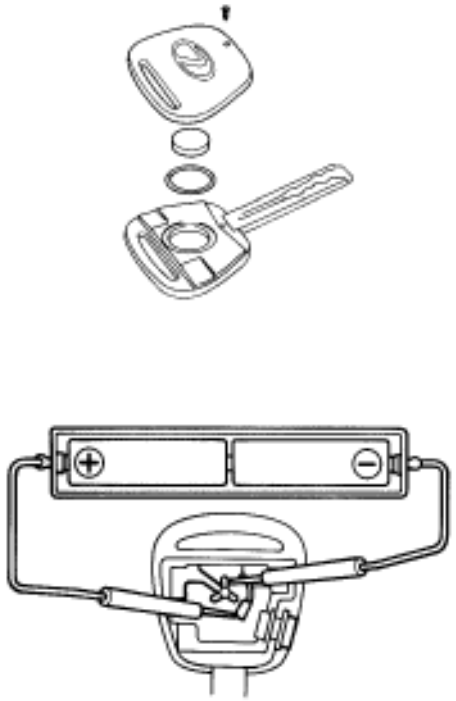
*1: Performing lock and unlock once counts as one time.

*2: In some localities, inspection cannot be carried out because the local FM radio broadcast is also at 94.9 MHz. When this occurs, perform inspection using a portable radio in a place indoors free from the influence of FM broadcasts.

INSPECTION OF TRANSMITTER

HINT: Perform this inspection only when transmitter is judged to be faulty in precheck type II.

1 Transmitter battery capacity check.



HINT:
This inspection is not directly for the purpose of checking the capacity of the transmitter battery, but is performed when remote control operation becomes difficult or impossible, in order to ascertain if this is caused by low battery capacity.

P

1. Remove the transmitter screw.
2. Remove the cover.
3. Remove the O–ring and battery.

C

1. Connect two new 1.5 dry–cell batteries in series. Connect the battery ⊕ terminal to the battery receptacle side terminal and the battery ⊖ terminal to the bottom terminal to provide 3 V to the transmitter.
2. In the condition in (1), push the wireless door lock remote control switch on the side of the transmitter body and operate the door lock by remote control.

OK **Remote Control operation possible.**

NG

Replace transmitter and ROM in ECU (See page BE–330).

OK

Replace the battery for transmitter (See page BE–331).

INSPECTION OF ANTENNA CIRCUIT

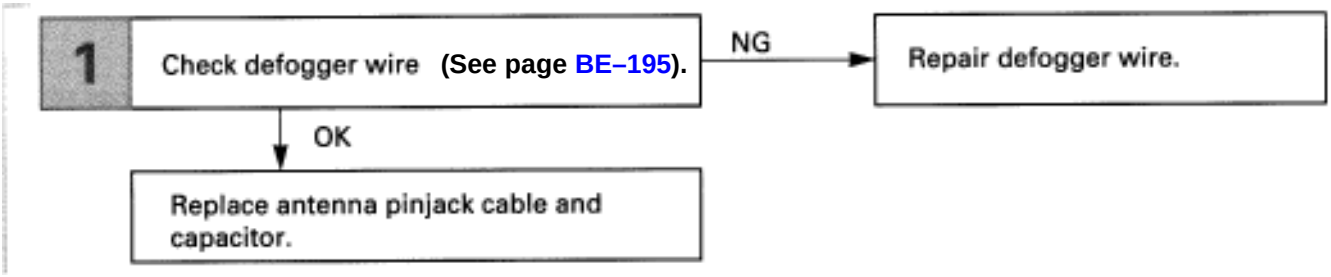
Antenna Circuit

CIRCUIT DESCRIPTION

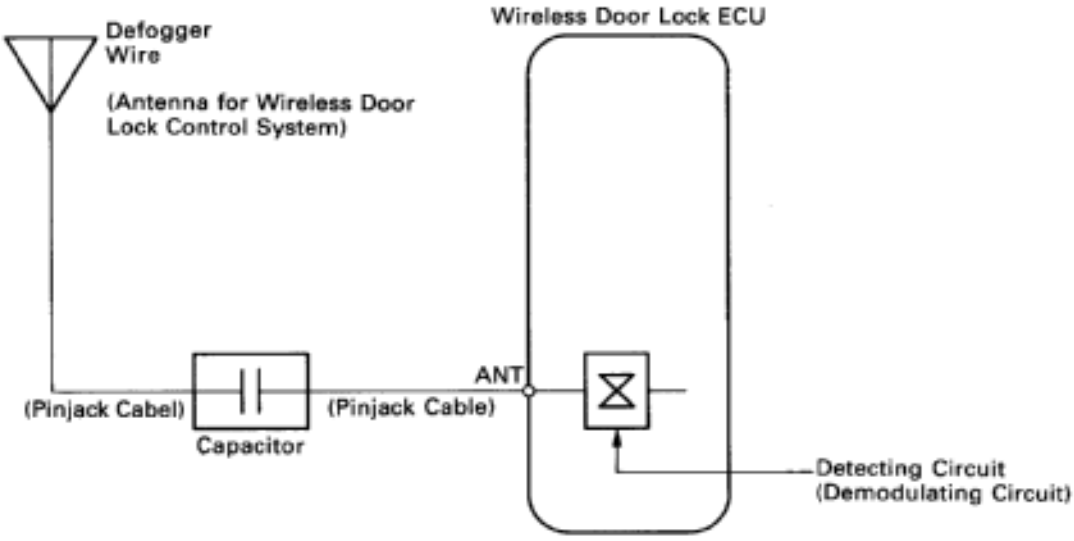
The antenna receives the electromagnetic wave emitted by the transmitter and sends it to the wireless door lock ECU.

DIAGNOSTIC CHART

HINT: Perform this inspection only when vehicle antenna is judged to be faulty in precheck type II.



WIRING DIAGRAM



BE3695

MATRIX CHART OF PROBLEM SYMPTOMS

Perform troubleshooting of the circuits for the applicable problem symptom in the order given in the chart below.

Proceed to the page located for each circuit.

HINT:

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.

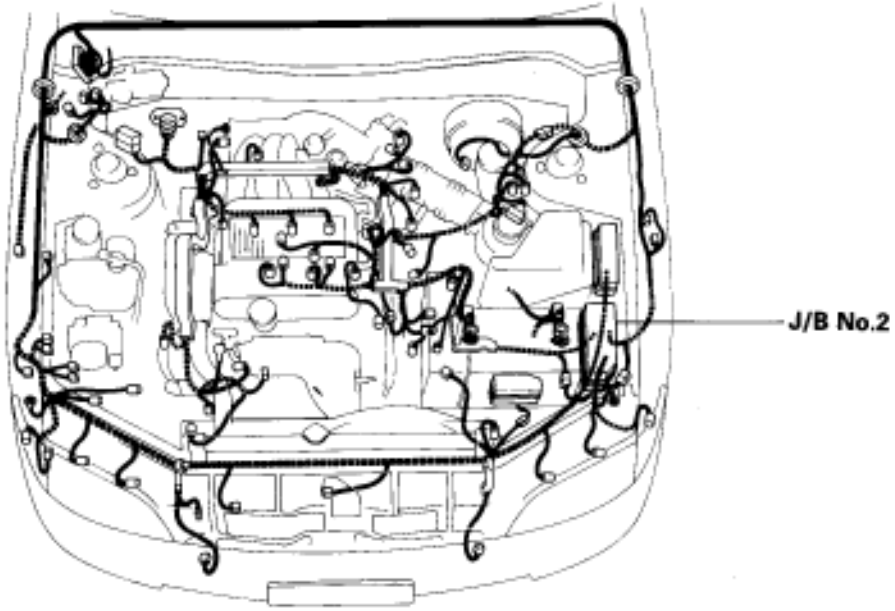
If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.

If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check and replace the Wireless Door Lock ECU as the last step.

See page / Suspect Area / Symptom	BE–342 ECU Power Source Circuit	BE–345 Door Unlock Detection Switch Circuit	BE–347 Door Key Lock and Unlock Switch Circuit (Unlock Side)	BE–349 Door Key Lock and Unlock Switch Circuit (Lock Side)	BE–351 Key Unlock Warning Switch Circuit	BE–353 Door Courtesy Switch Circuit	IN–32 Wireless Door Lock ECU
All functions of wireless door lock control system do not operate.	1		3	4	5	2	6
Only door unlock operation is not possible (Lock operation is possible).		2	1				3
Only door lock operation is not possible (Unlock operation is possible).				1			2
Only transmitter misoperation prevention function is not possible.					1		2
• Wireless door lock function operates even when each door is opened. • 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	2
Wireless door lock functions incorrectly. (Although one door is unlocked, when the transmitter switch is pressed, all doors unlock.)		1					2

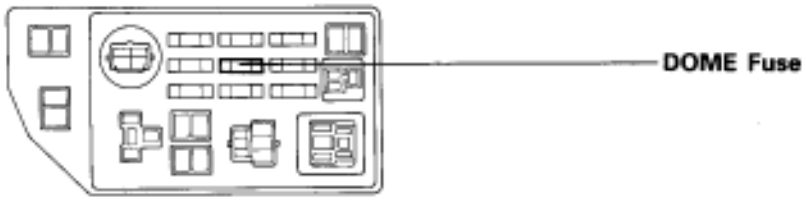
LOCATION OF CONNECTORS

Location of Connectors in Engine Compartment

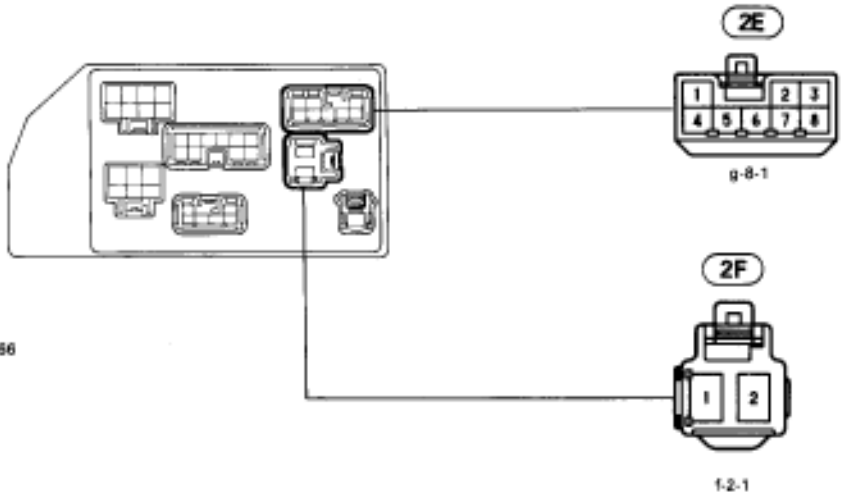


BE6660

J/B No.2

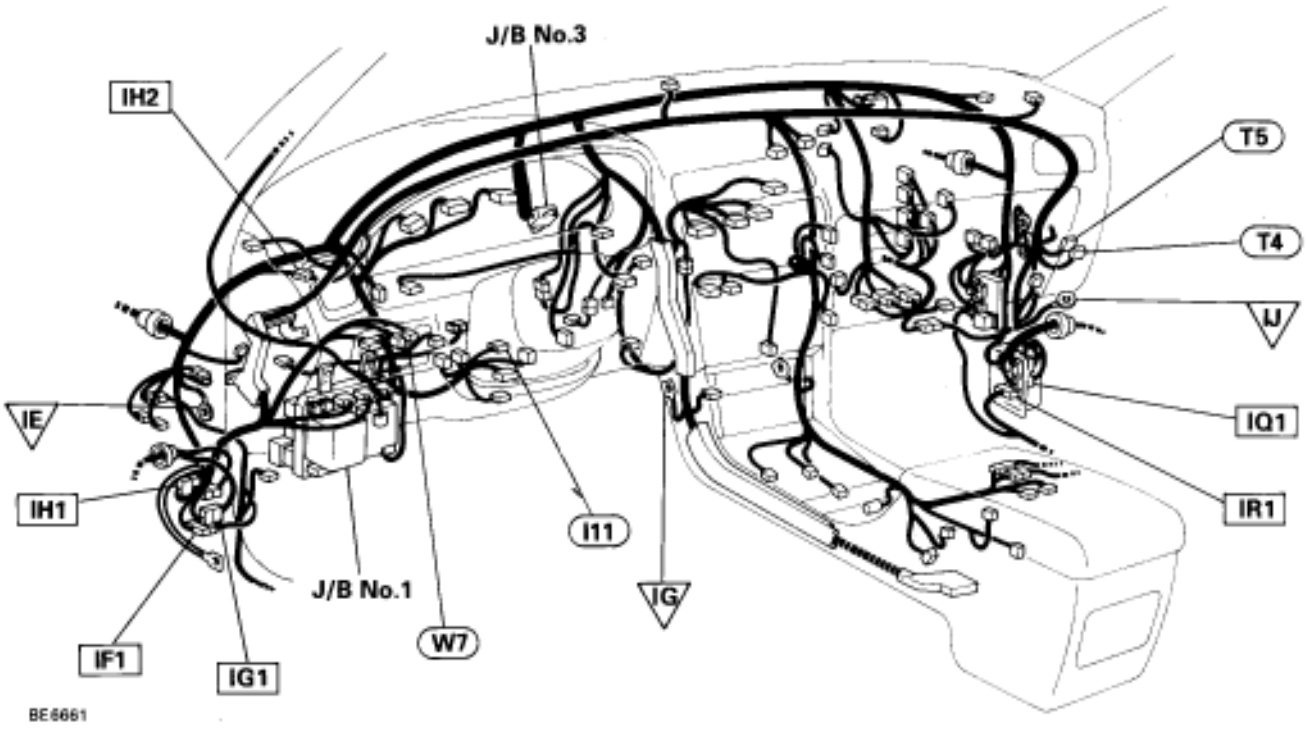


BE6665

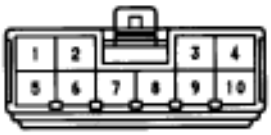


BE6666

Location of Connectors in Instrument Panel



I11
Key Unlock Warning Switch



g-10-1-B

T4
Theft Deterrent and Door Lock ECU

e-20-1

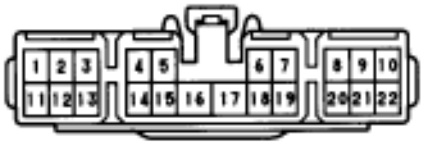
T5
Theft Deterrent and Door Lock ECU

e-14-1-A

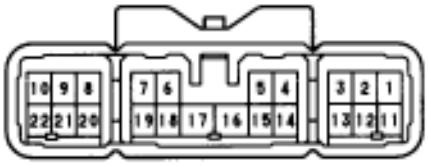
W7
Wireless Door Lock Main Switch

e-2-2-G

IF1

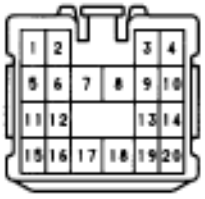


e-22-1

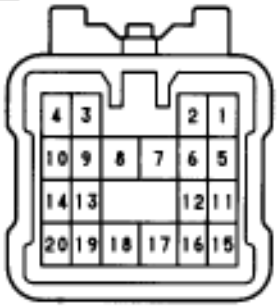


e-22-2

IG1



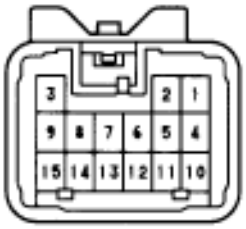
e-20-1-A



e-20-2-A

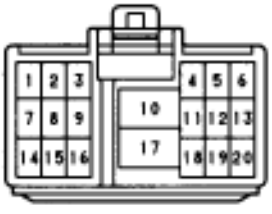
IH1

e-15-1

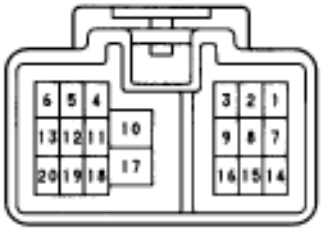


e-15-2

IH2

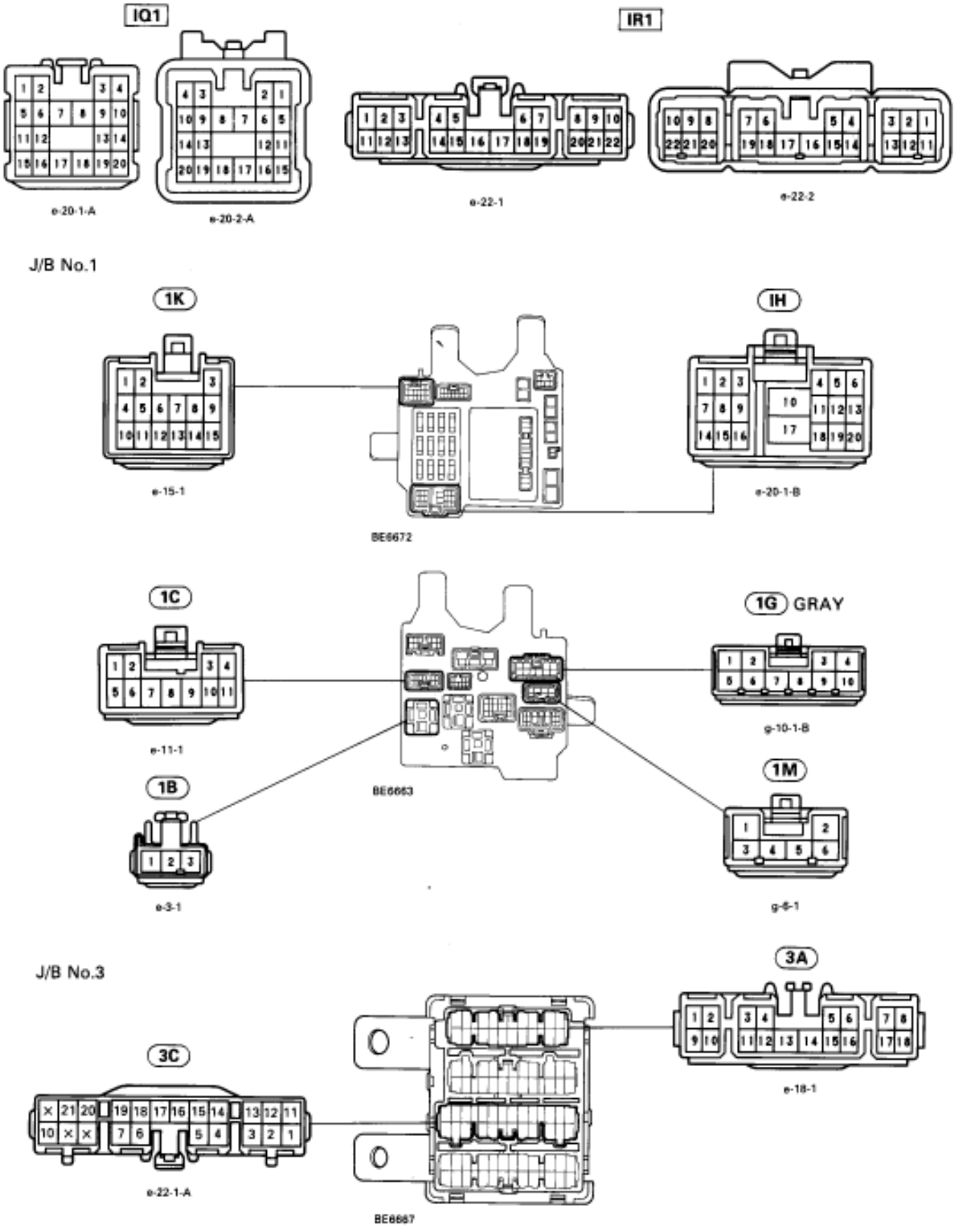


e-20-1-B

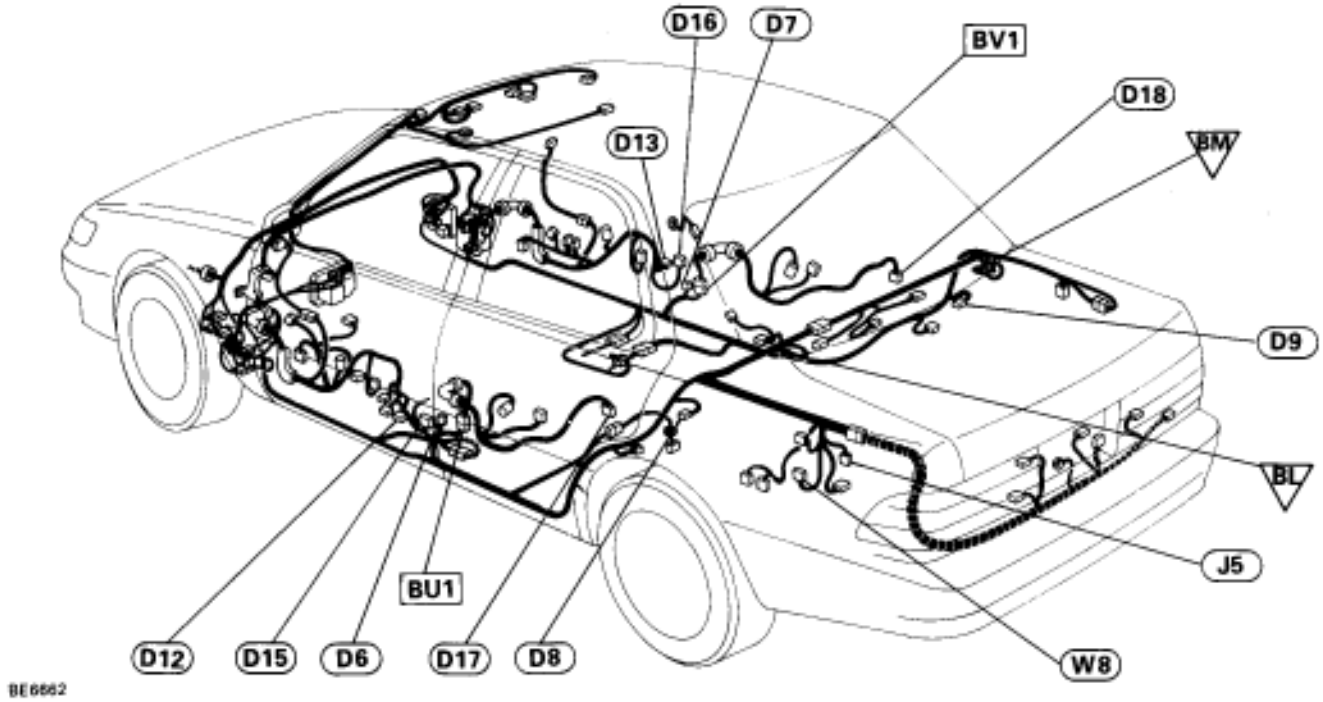


e-20-2-B

Location of Connectors in Instrument Panel



Location of Connectors in Body



D6 Door Courtesy Switch Front LH

e-1-2

D7 Door Courtesy Switch Front RH

e-1-2

D8 Door Courtesy Switch Rear LH

e-1-2

D9 Door Courtesy Switch Rear RH

e-1-2

D12 Door Key Lock and Unlock Switch LH

Ih-3-2

D13 Door Key Lock and Unlock Switch RH

Ih-3-2

D15 Door Unlock Detection Switch Front LH

Ie-7-1

D16 Door Unlock Detection Switch Front RH

Ie-7-1

D17 Door Unlock Detection Switch Rear LH

IS-6-1-B

D18 Door Unlock Detection Switch Rear RH

IS-6-1-B

J5 Junction Connector

e-10-1

W8 Wireless Door Lock ECU

e-10-1

BU1

e-8-1 e-8-2

BV1

e-8-1 e-8-2

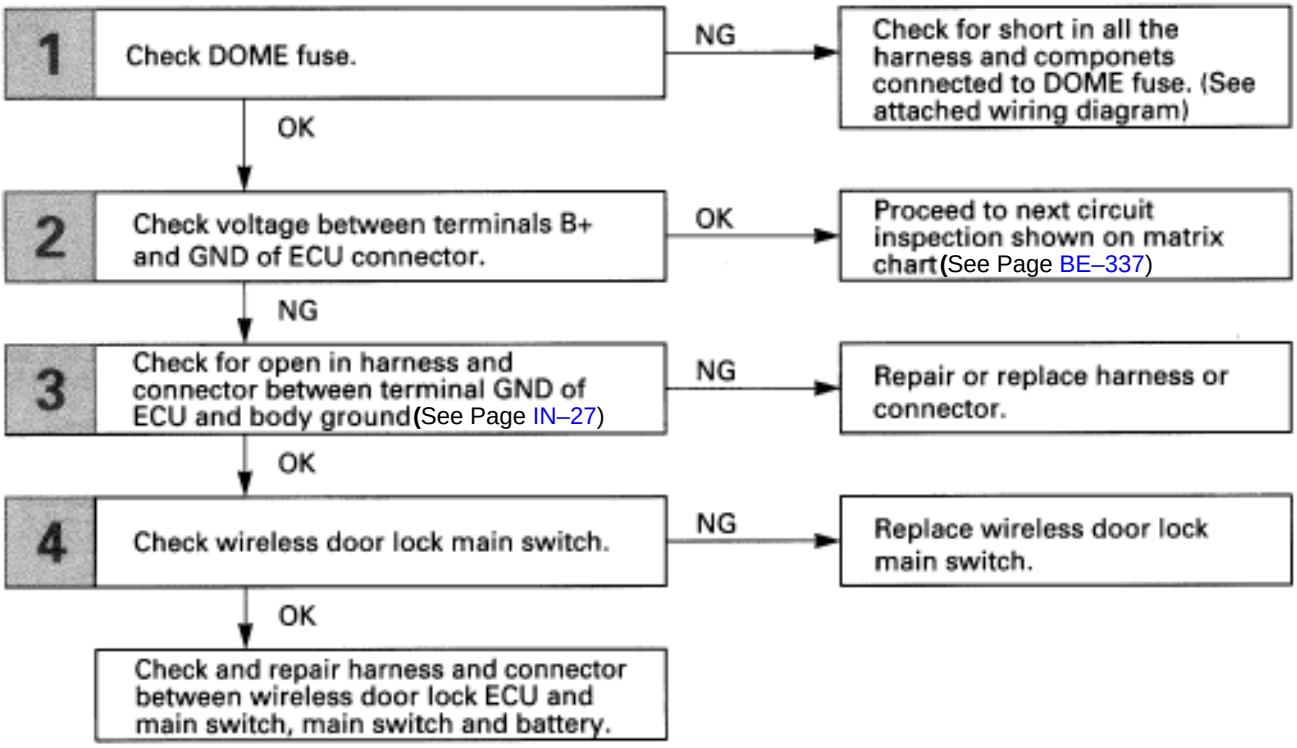
CIRCUIT INSPECTION

ECU Power Source Circuit

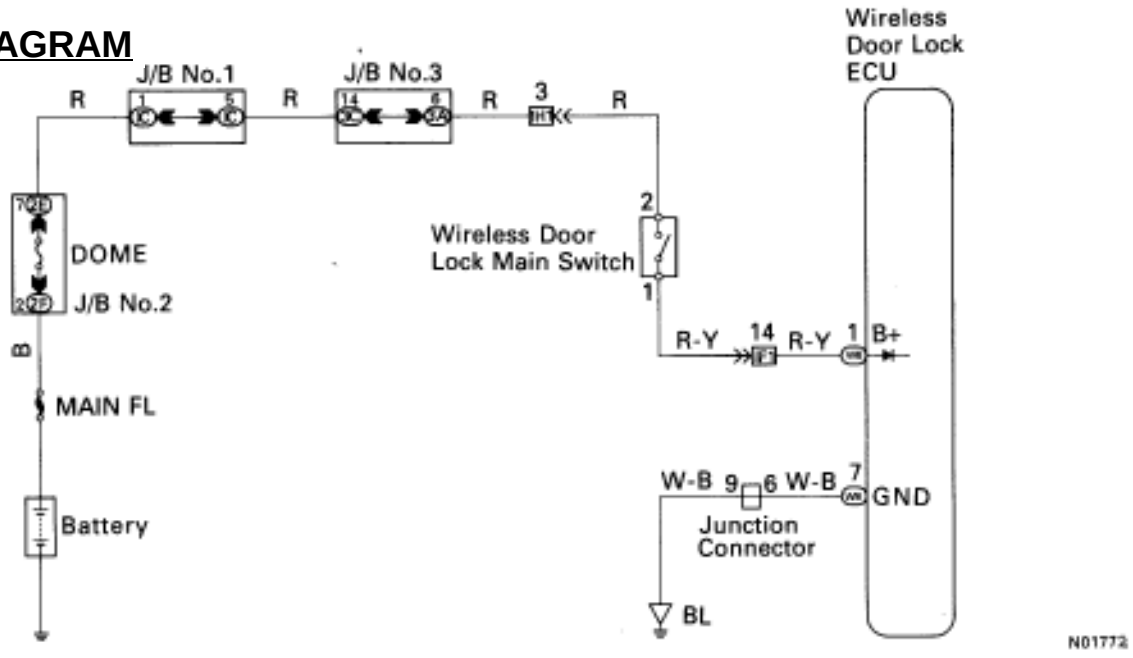
CIRCUIT DESCRIPTION

When the wireless door lock main switch in ON, battery positive voltage is applied to terminal B+ of the wireless door lock ECU, causing the ECU to operate.
When the wireless door lock main switch is OFF, battery positive voltage is not applied to terminal B+ and the ECU does not operate.

DIAGNOSTIC CHART



WIRING DIAGRAM



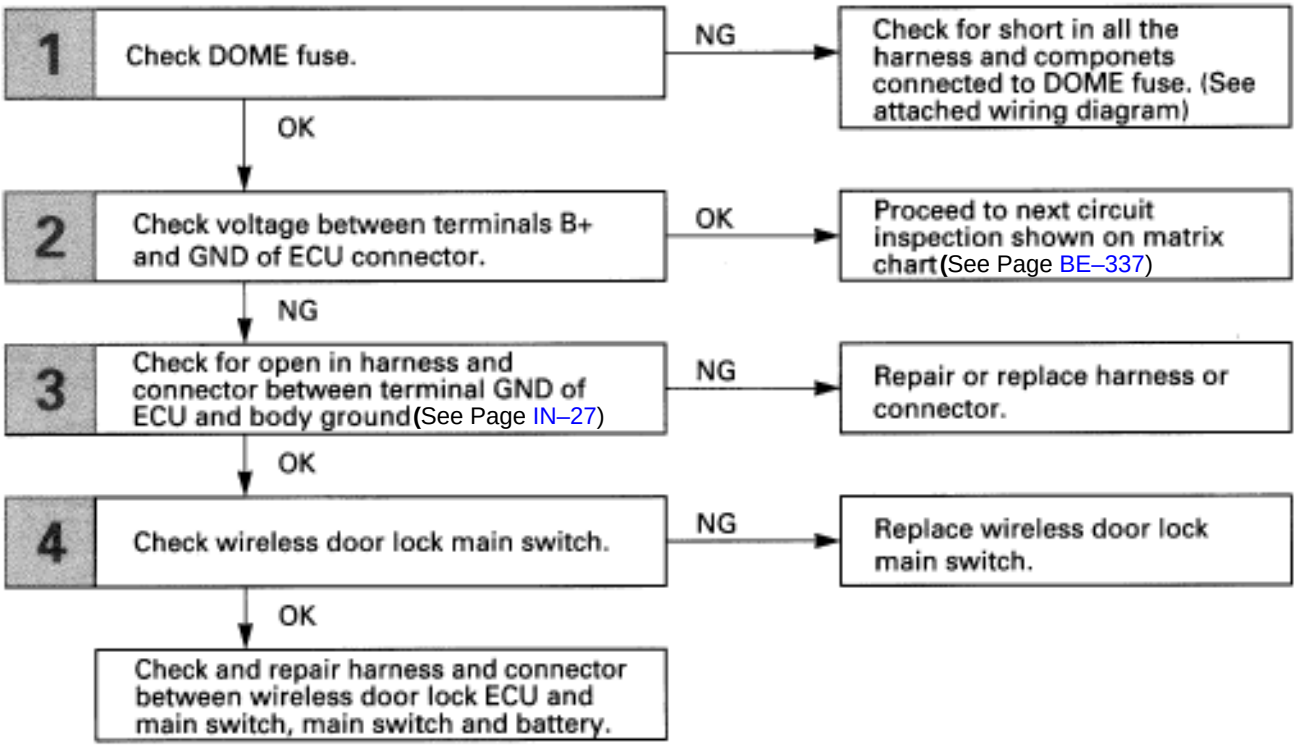
CIRCUIT INSPECTION

ECU Power Source Circuit

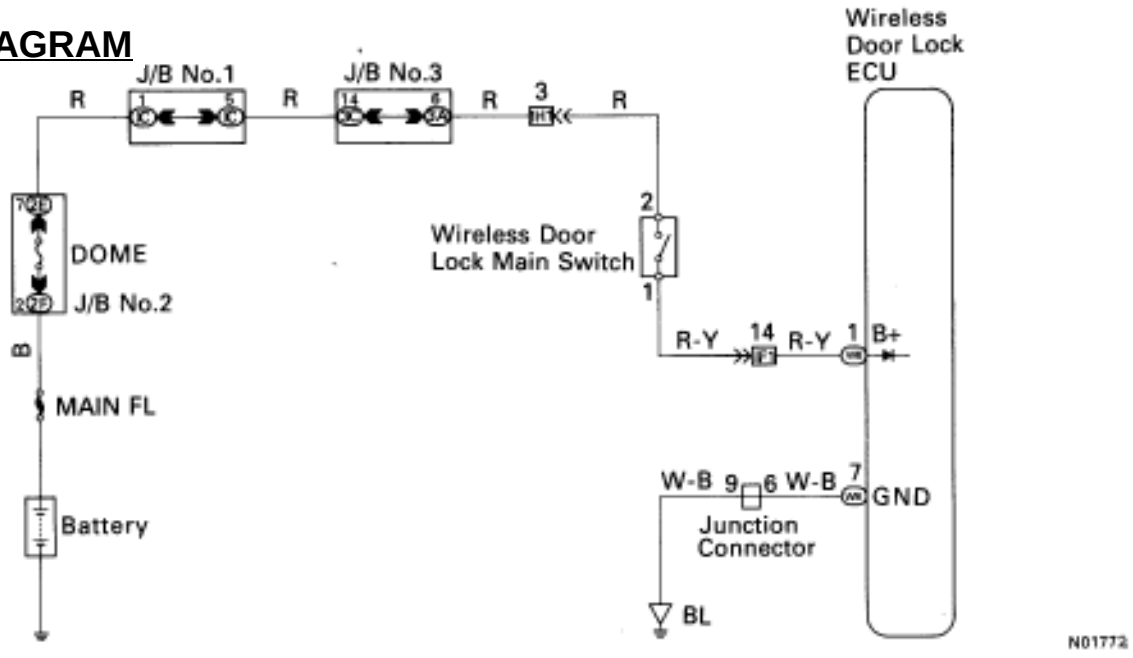
CIRCUIT DESCRIPTION

When the wireless door lock main switch in ON, battery positive voltage is applied to terminal B+ of the wireless door lock ECU, causing the ECU to operate.
When the wireless door lock main switch is OFF, battery positive voltage is not applied to terminal B+ and the ECU does not operate.

DIAGNOSTIC CHART



WIRING DIAGRAM



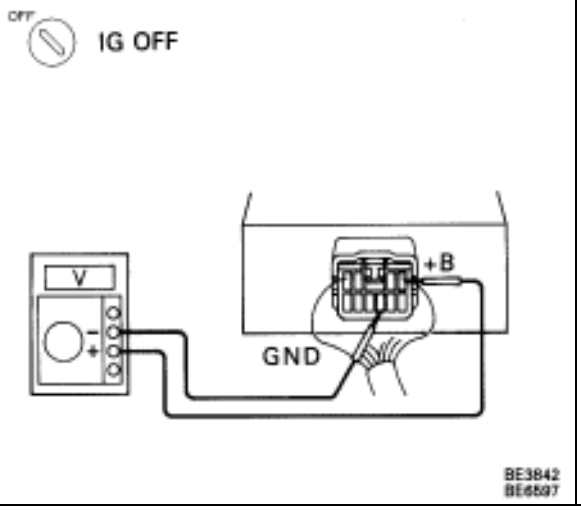
INSPECTION PROCEDURE

1 **Check DOME fuse.**

OK

NG **Check for short in all the harness and components connected to DOME fuse (See attached wiring diagram).**

2 **Check voltage between terminals B+ and GND of ECU connector.**



P
1. Remove DOME fuse from J/B No.2
2. Remove the ECU

C Measure voltage between terminals B+ and of ECU connector, when wireless door lock main switch is on and off.

OK

Wireless door lock main switch	Voltage
ON	10 – 14 V
OFF	Below 1 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–337).**

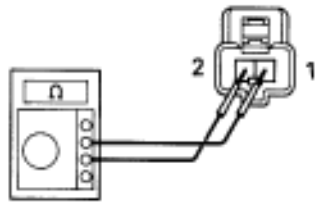
3 **Check for open in harness and connector between terminal GND of ECU and body ground (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Go to step

4 **Check wireless door lock main switch.**



N01116

P
1. Remove the instrument lower finish panel.
2. Remove wireless door lock main switch.
3. Disconnect the connector.

C Measure resistance between terminals of wireless door lock main switch connector, when main switch is on and off.

OK

Wireless door lock main switch	Resistance
ON	Continuity
OFF	1 MΩ or higher

OK

NG **Replace wireless door lock main switch.**

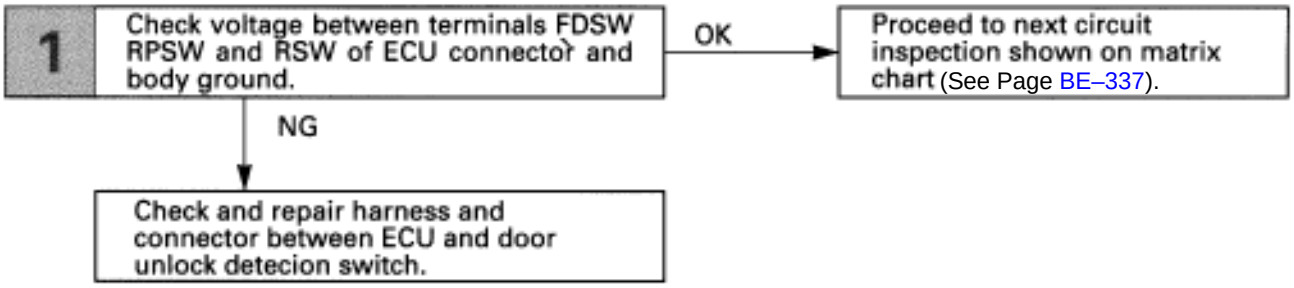
Check and repair harness and connector between ECU and main switch, main switch and battery.

Door Unlock Detection Switch Circuit

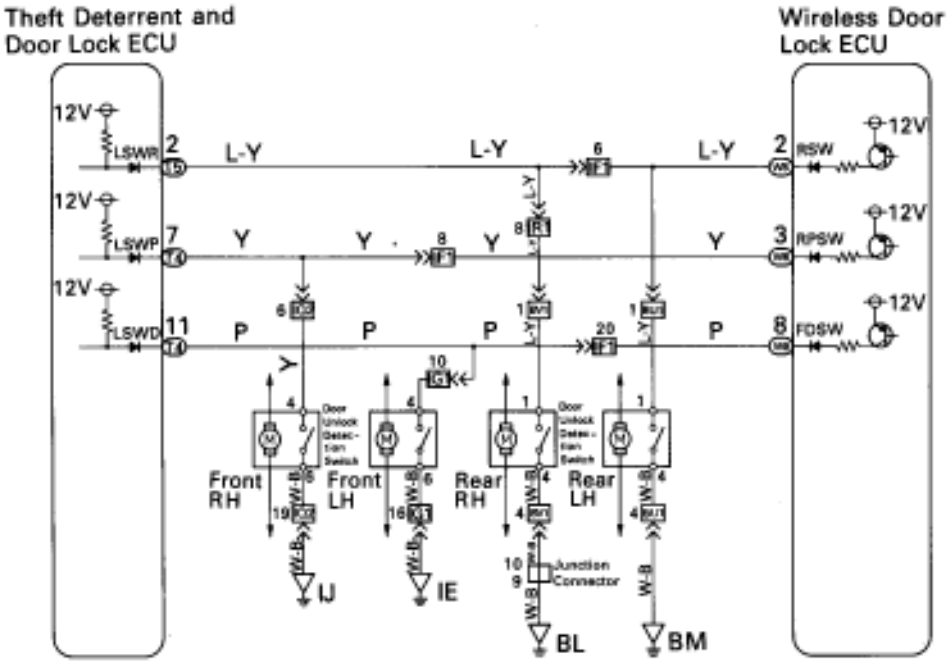
CIRCUIT DESCRIPTION

The door unlock detection switch is built into the door lock motor assembly. The switch is OFF when the door lock knob is in Lock position, and is ON when the knob is in Unlock position.
Furthermore, the door unlock detection switch circuit has terminal B+ connected inside the theft deterrent ECU, when the door unlock detection switch is OFF, battery positive voltage is applied to the terminal of the door unlock detection switch circuit of the wireless door lock ECU.

DIAGNOSTIC CHART



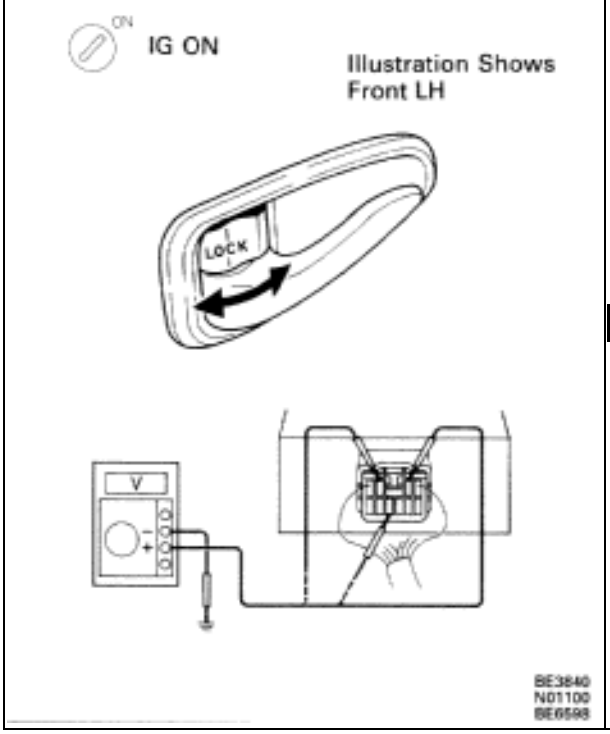
WIRING DIAGRAM



N01773

INSPECTION PROCEDURE

1 **Check voltage between terminals FDSW, RPSW and RSW of ECU connector and body ground.**



P
1. Remove the luggage compartment LH side cover.
2. Remove the ECU
3. Turn ignition switch on.

C Measure voltage between terminals FDSW, RPSW and RSW of ECU connector and body ground, when the respective door lock knob involved is pushed to the lock side.

OK **Voltage:** **8 ~ 10 V**

NG

Check and repair harness and connector between ECU and door unlock detection switch.

OK

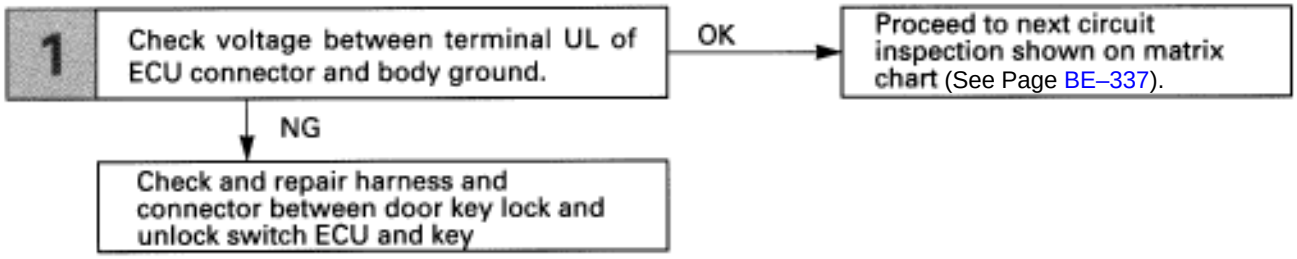
Proceed to next circuit inspection shown on matrix chart (See page BE–337).

Door Key Lock and Unlock Switch Circuit (Unlock Side)

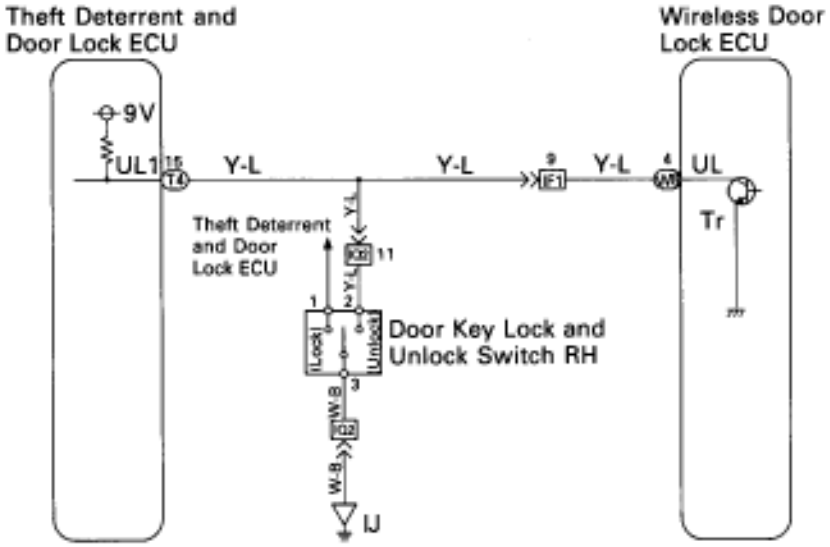
CIRCUIT DESCRIPTION

The door key lock and unlock switch is built into the door key cylinder. When the key is turned to the lock side, the lock terminal of the switch is grounded, and when the key is turned to the unlock side the unlock terminal is grounded.
Furthermore, the door key lock and unlock switch circuit has terminal B+ connected inside the theft deterrent and door lock ECU, when neither the lock or unlock terminal of the door key lock and unlock switch are grounded, battery positive voltage is applied to switch circuit of the wireless door lock ECU. (Tr inside the ECU coming ON causes the wireless door lock ECU to output a signal to unlock all the doors.)

DIAGNOSTIC CHART



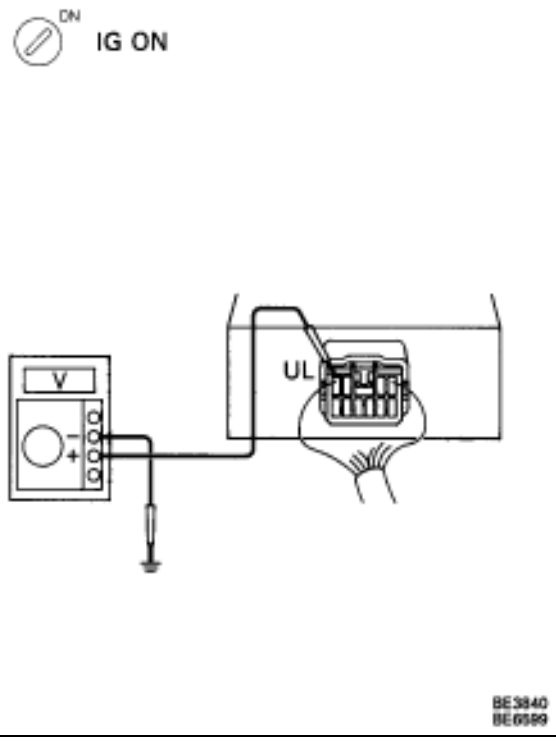
WIRING DIAGRAM



N01774

INSPECTION PROCEDURE

1 **Check voltage between terminal UL of wireless door lock ECU connector and body ground.**



P
1. Remove the luggage compartment LH side cover.
2. Remove the ECU
3. Turn ignition switch on.

C Measure voltage between terminals UL of ECU connector and body ground.

OK **Voltage:** **8 ~ 10 V**

NG

Check and repair harness and connector between ECU and door key lock and unlock switch.

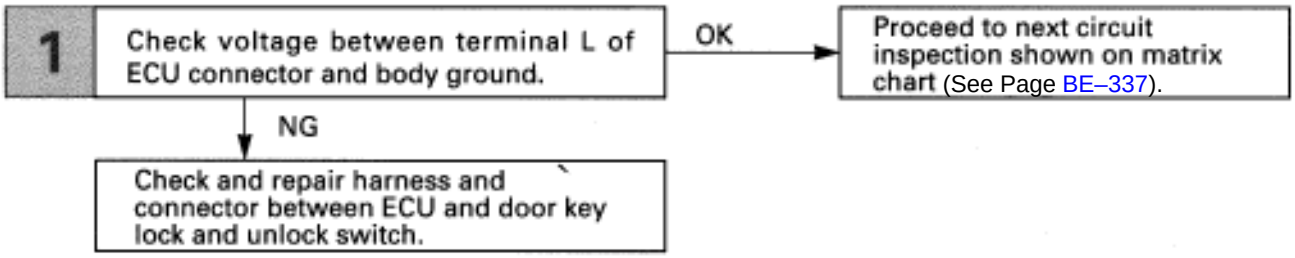
OK **Proceed to next circuit inspection shown on matrix chart (See page BE–337).**

Door Key Lock and Unlock Switch Circuit (Lock Side)

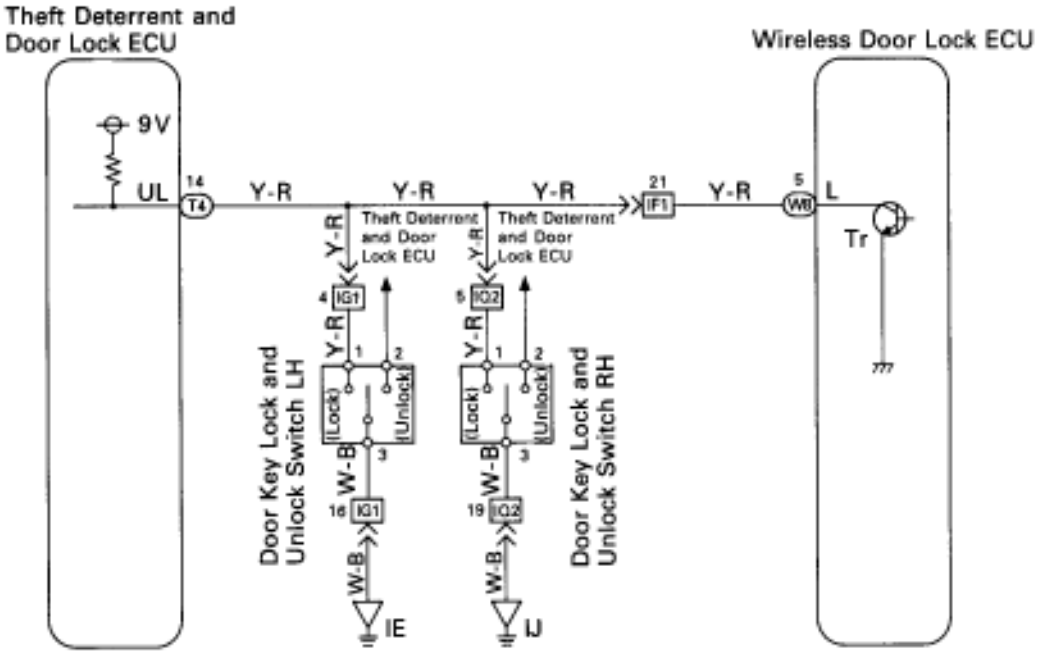
CIRCUIT DESCRIPTION

Refer to page BE–347.
Tr inside the ECU coming ON causes the wireless door lock ECU to output a signal to lock all the doors.

DIAGNOSTIC CHART



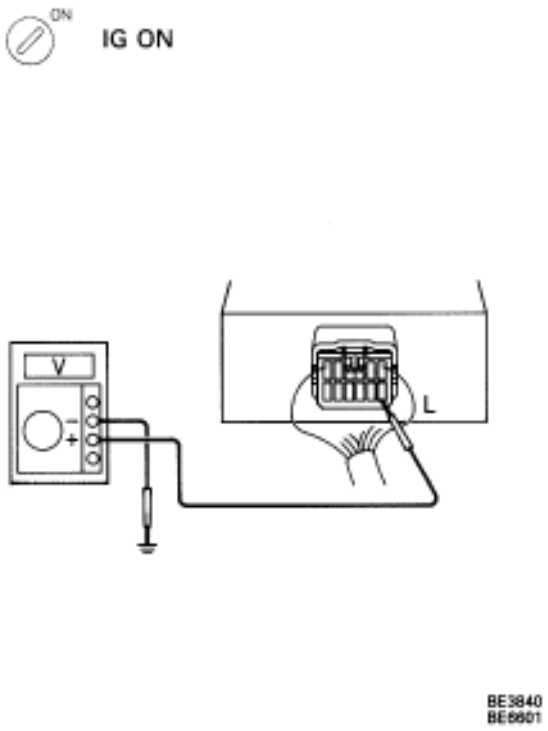
WIRING DIAGRAM



N01775

INSPECTION PROCEDURE

1 **Check voltage between terminal L of wireless door lock ECU connector and body ground.**



P
1. Remove the luggage compartment LH side cover.
2. Remove the ECU
3. Turn ignition switch on.

C Measure voltage between terminals L of ECU connector and body ground.

OK **Voltage: 8 ~ 10 V**

NG

Check and repair harness and connector between ECU and door key lock and unlock switch.

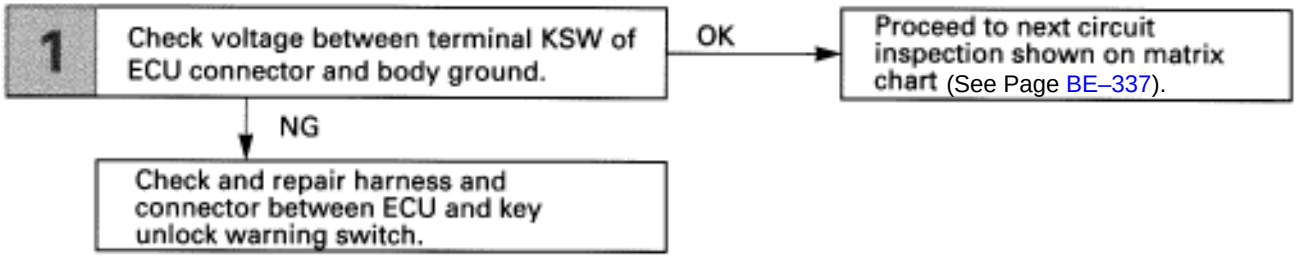
OK **Proceed to next circuit inspection shown on matrix chart (See page BE–337).**

Key Unlock Warning Switch Circuit

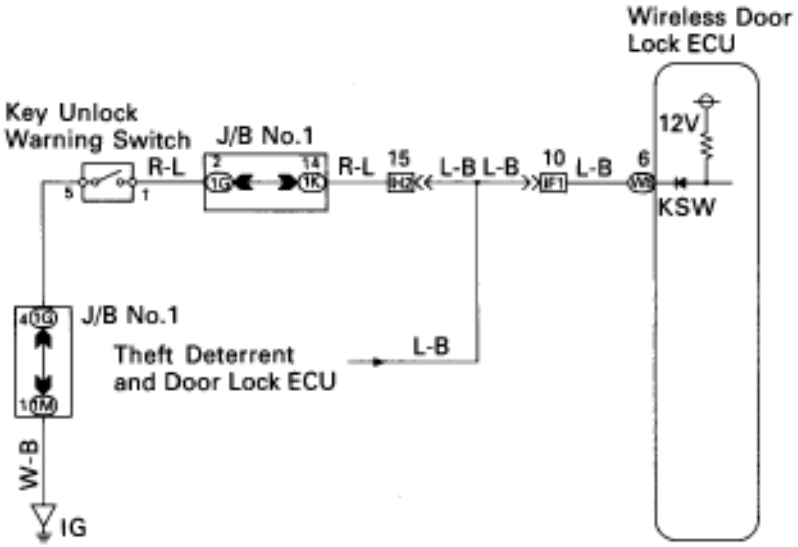
CIRCUIT DESCRIPTION

When the key is inserted in the ignition key cylinder the key unlock warning switch comes ON, and when the key is not inserted the switch is OFF.
When the key unlock warning switch is ON, the ECU operates the transmitter misoperation prevention function.

DIAGNOSTIC CHART



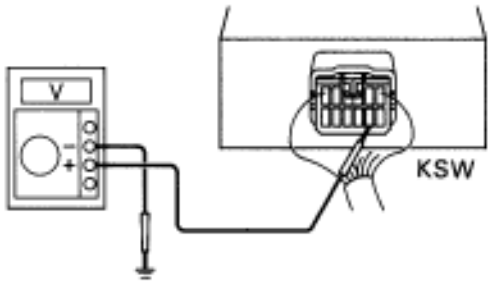
WIRING DIAGRAM



N01776

INSPECTION PROCEDURE

1 **Check voltage between terminal KSW of wireless door lock ECU connector and body ground.**



P
1. Remove the luggage compartment LH side cover.
2. Remove the ECU
3. Disconnect the ECU connector.

C Measure voltage between terminals KSW of ECU connector and body ground, when key plate is not inserted in the key cylinder.

OK **Voltage: 10 ~ 14 V**

NG

Check and repair harness and connector between ECU and key unlock warning switch.

OK

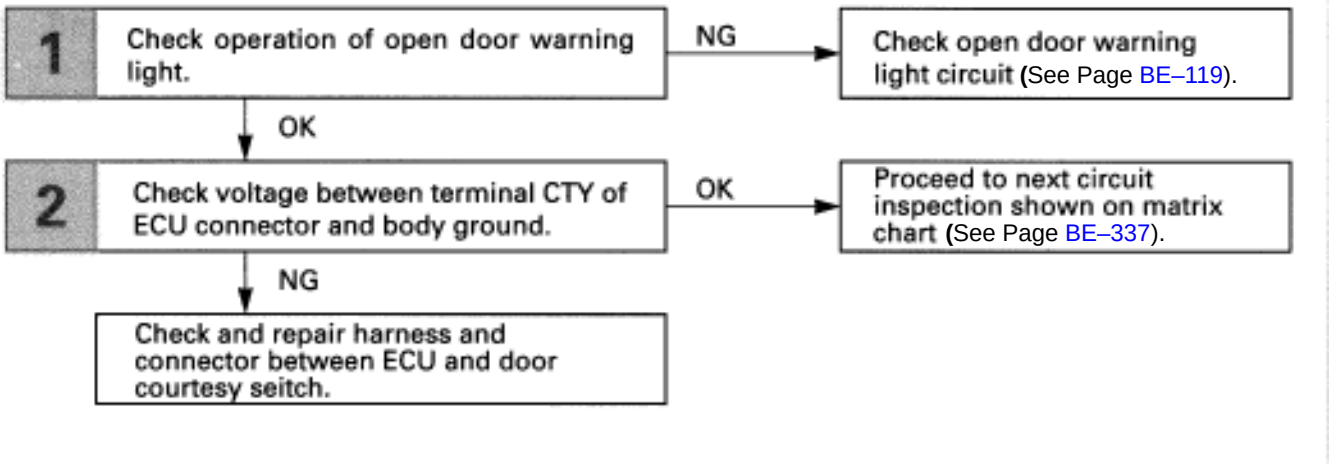
Proceed to next circuit inspection shown on matrix chart (See page BE–337).

Door Courtesy Switch Circuit

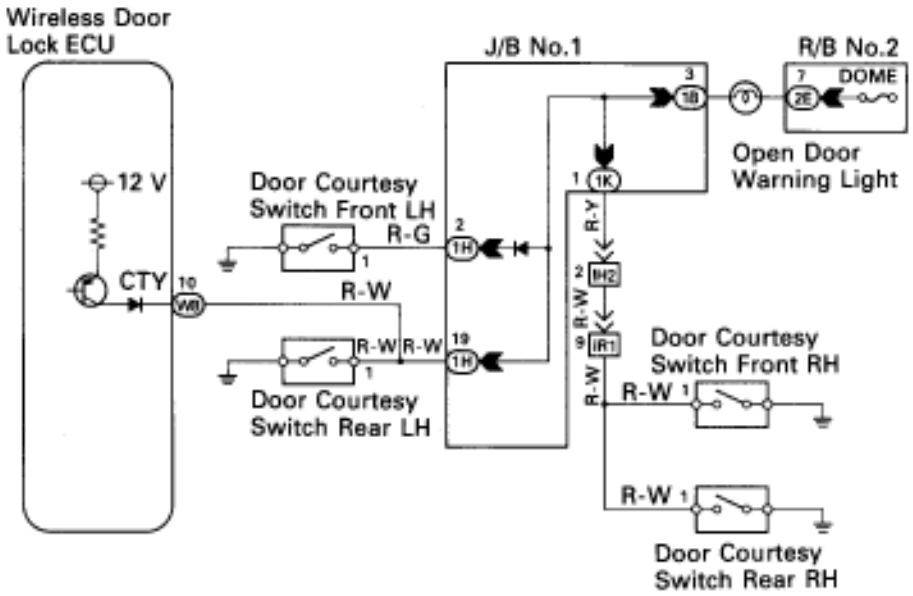
CIRCUIT DESCRIPTION

The door courtesy switch comes ON when the door is opened and goes OFF when the door is closed. Battery positive voltage is applied to terminal CTY of the ECU when all doors are closed, i.e., when the door courtesy switch of all doors are OFF.

DIAGNOSTIC CHART



WIRING DIAGRAM



N01777

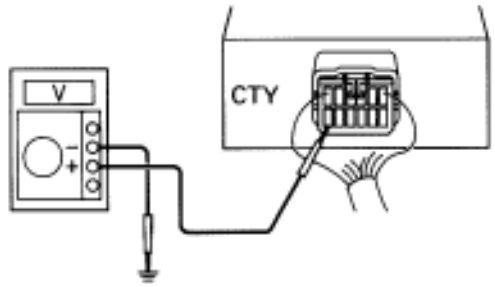
INSPECTION PROCEDURE

1	Check operation of open door warning light.
C	Check that open door warning light comes on when each door is opened, and goes off when all doors are closed.

OK

NG → **Check open door warning light circuit (See page BE–119).**

2	Check voltage between terminal CTY of ECU connector and body ground.



P
1. Remove the luggage compartment LH side cover.
2. Remove the ECU
3. Wireless door lock main switch on.

C Measure voltage between terminal CTY of ECU connector and body ground, when all doors are closed.

OK **Voltage: 10 ~ 14 V**

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–337).**

Check and repair harness and connector between ECU and door courtesy switch.

DOOR LOCK CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.

CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer is as much detail as possible about the problem.

8 **PROBLEM SYMPTOM CONFIRMATION, ⁎ SYMPTOM SIMULATION**

Confirm the problem symptoms. If the problem does not reappear, be sure to simulate the problem using ”Problem Simulation Method”.

For example, if the malfunction involves failure of the door to lock or unlock during operation of the Door Lock Control Switch, check if lock and unlock operation of the door using the key is normal or abnormal, and also check if key confinement prevention function and luggage compartment door opener function are normal or not. And having fully checked the extent of the malfunction.

4 **MATRIX CHART OF PROBLEM SYMPTOMS**

Confirm the order of inspection for each applicable problem symptom on the matrix chart.

5 **CIRCUIT INSPECTION**

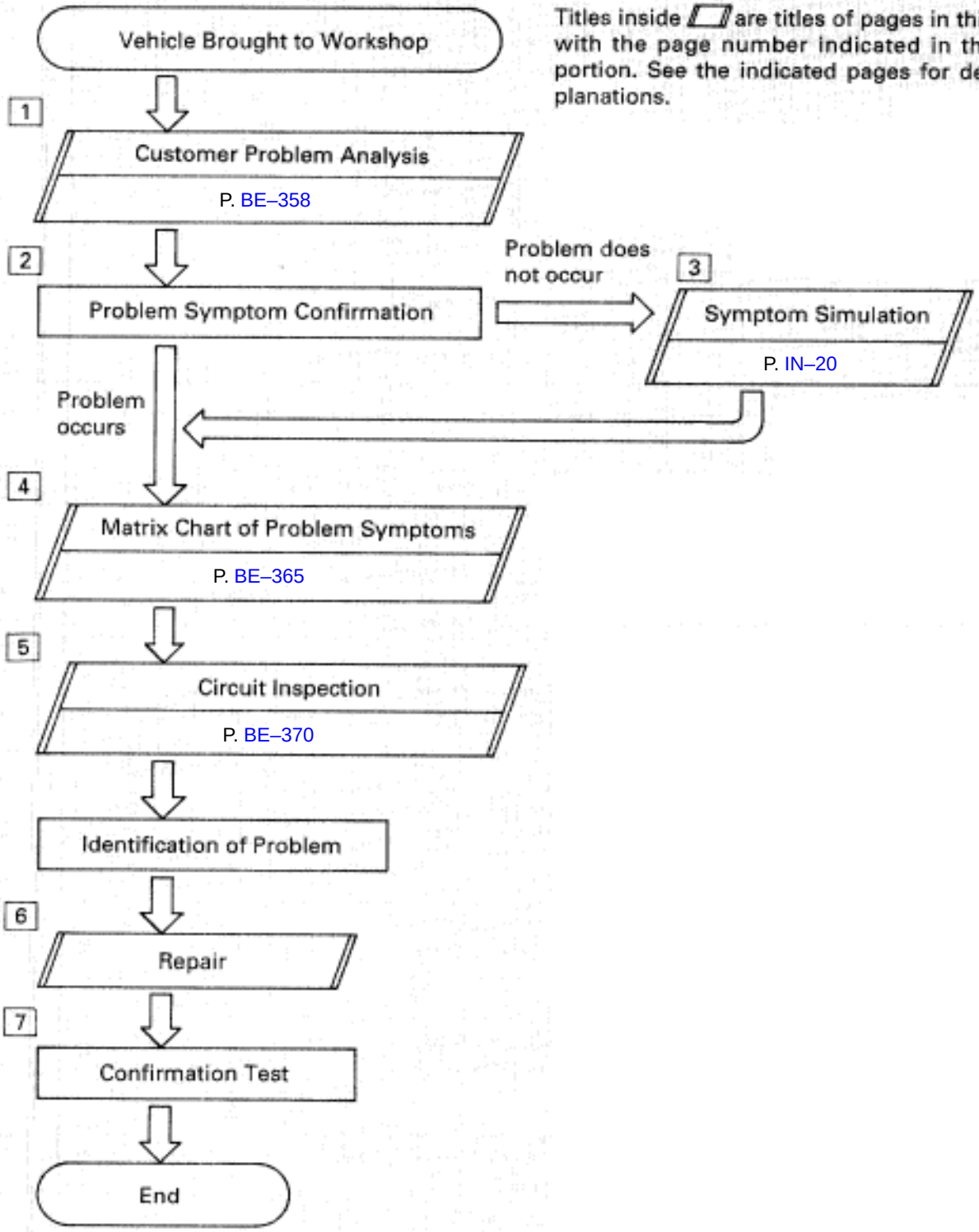
Proceed with diagnosis of each circuit in accordance with the inspection order confirmed in 4. Judge whether the cause of the problem is in the sensor, wire harness and connectors, or the ECU.

6 **REPAIR**

When the cause of the problem is found in 5, perform repairs.

7 **CONFIRMATION TEST**

After completing repairs, confirm that the problem is eliminated and that all functions of the door lock control system are normal.


Vehicle Brought to Workshop
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.
1
Customer Problem Analysis
P. BE–358
2
Problem Symptom Confirmation
Problem does not occur
3
Symptom Simulation
P. IN–20
Problem occurs
4
Matrix Chart of Problem Symptoms
P. BE–365
5
Circuit Inspection
P. BE–370
Identification of Problem
6
Repair
7
Confirmation Test
End

CUSTOMER PROBLEM ANALYSIS CHECK SHEET

DOOR LOCK CONTROL System Check Sheet

Inspector's Name:

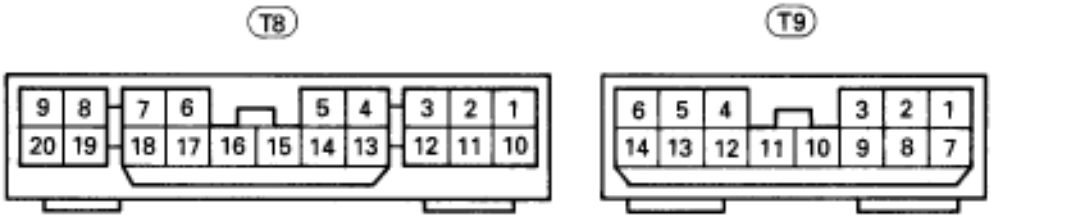
Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km Miles

Date of Problem Occurrence		/ /
Frequency of Problem Occurrence		∗Constant ∗Sometimes(times a day, month) ∗Once Only
Conditions at Time of Problem Occurrence	**Weather**	∗Fine ∗Cloudy ∗Rainy ∗Snowy ∗Various/Others
	Outdoor Temperature	∗Hot ∗Warm ∗Cool ∗Cold (Approx. °F(°C))

Problem Symptom	∗ Malfunction in Door Lock/Unlock Operation Using Door Lock Control Switch.	∗ Driver's door lock control switch	∗Driver's door ∗Passenger's door ∗Rear RH door ∗Rear LH door
		∗ Passenger's door lock control switch	∗Driver's door ∗Passenger's door ∗Rear RH door ∗Rear LH door
	∗ Malfunction in Door Lock/Unlock Operation Using key.	∗ Driver's door key operated switch.	∗Driver's door ∗Passenger's door ∗Rear RH door ∗Rear LH door
		∗ Passenger's door key operated switch	∗Driver's door ∗Passenger's door ∗Rear RH door ∗Rear LH door
		∗ 2–operation unlock function of driver's door key operated switch	
	∗Malfunction in Key Confinement Prevention Function.		
	∗Malfunction in Luggage Compartment Door Opener Function.		
	∗Others		

TERMINALS OF ECU

No.	Symbol	Terminal Name	No.	Symbol	Terminal Name
T8–1	SRLY	Ignition Switch ”ST”	T9–1	LUG	Luggage Compartment Door Key Operated Switch
T8–2	IG	Ignition Switch ”ON”	T9–2	TSWR	Door Unlock Detection Switch
T8–3	ACT–	Door Lock Motor	T9–3	CTY	Door Open Detection Switch
T8–4	ACT+	Door Lock Motor	T9–4	SH	Theft Deterrent Horn
T8–5	TO	Luggage Compartment Door Opener Motor	T9–5	HEAD	Headlight
T8–6	KSW	Key Unlock Warning Switch	T9–6		
T8–7	LSWP	Door Unlock Detection Switch	T9–7	ACC	Ignition Switch ”ACC”
T8–8	IB2	Power Source	T9–8	PRLY	Power Main Relay
T8–9	IND	Security Indicator Light	T9–9		
T8–10	UL3	Door Key Lock and Unlock Switch	T9–10	DSWL	Luggage Compartment Door Courtesy Switch
T8–11	LSWD	Door Unlock Detection Switch	T9–11	HORN	Horn
T8–12	DSWP	Door Open Detection Switch	T9–12	DSWH	Engine Hood Courtesy Switch
T8–13	DSWD	Door Open Detection Switch	T9–13	TAIL	Taillight
T8–14	L1	Door Key Lock and Unlock Switch	T9–14		
T8–15	UL1	Door Key Lock and Unlock Switch			
T8–16	E	Ground			
T8–17	L2	Door Lock Control Switch (Lock)			
T8–18	UL2	Door Lock Control Switch (Unlock)			
T8–19	TSW	Luggage Compartment Door Opener Switch			
T8–20	B+1	Power Source			

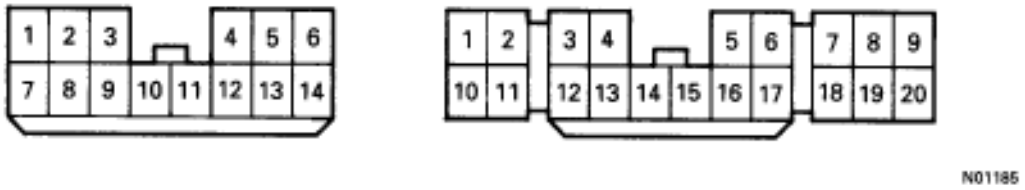


STANDARD VALUE OF ECU TERMINAL

Terminals	Symbols	Wiring color	Condition	Standard Value
T8–1 → ← Ground	SRLY → ← Ground	B–Y	Ignition switch is turned to ST position. (When neutral start switch ”P” range)	10–14 V
T8–2 → ← Ground	IG → ← Ground	B–R	Ignition switch is turned to ”ON” position	10–14 V
T8–3 → ← T8–4	ACT– → ← ACT+	L–B L–R	Ignition switch OFF.	Below 50 Ω
T8–5 → ← T8–16	TO → ← E	L → ← W–B	Luggage compartment door opener switch ”pulled”.	10–14 V
			Luggage compartment door opener switch ”not pulled”.	Below 1 V
T8–6 → ← T8–16	KSW → ← E	L–B → ← W–B	Key unlock warning switch ON. (Key is inserted into key cylinder).	Below 1 Ω
			Key unlock warning switch OFF. (Key is not inserted into key cylinder).	1 MΩ or higher
T8–7 → ← T8–16	LSWP → ← E	Y → ← W–B	Door unlock detection switch ON. (passenger’s)	Below 1 Ω
			Door unlock detection switch OFF.	1 MΩ or higher
T8–8 → ← T8–16	B+2 → ← E	W–L → ← W–B	Always	10–14 V
T8–9 → ← T8–16	IND → ← E	R–Y → ← W–B	Indicator light circuit	Below 1 Ω
T8–10 → ← T8–16	UL3 → ← E	R–L → ← W–B	Door key lock and unlock switch ”unlock” position.	Below 1 Ω
			Door key lock and unlock switch OFF or ”lock” position.	1 MΩ or higher
T8–11 → ← T8–16	LSWD → ← E	P → ← W–B	Door unlock detection switch ON. (driver’s)	Below 1 Ω
			Door unlock detection switch OFF. (driver’s)	1 MΩ or higher
T8–12 → ← T8–16	DSWP → ← E	R–W → ← W–B	Door open detection switch (passenger’s) ON (door opened)	Below 1 Ω
			Door open detection switch (passenger’s) OFF (door closed)	1 MΩ or higher
T8–13 → ← T8–16	DSWD → ← E	R–G → ← W–B	Door open detection switch (driver’s) ON (door opened)	Below 1 Ω
			Door open detection switch (driver’s) OFF (door closed)	1 MΩ or higher
T8–14 → ← T8–16	L1 → ← E	Y–R → ← W–B	Door key lock and unlock switch ”lock” position.	Below 1 Ω
			Door key lock and unlock switch OFF or ”unlock” position.	1 MΩ or higher

Terminals	Symbols	Wiring color	Condition	Standard Value
T8–15 → ← T8–16	UL1 → ← E	Y–L → ← W–B	Door key lock and unlock switch ”unlock” position.	Below 1 Ω
			Door key lock and unlock switch OFF or ”lock” Position.	1 MΩ or higher
T8–16 → ← Ground	E → ← Ground	W–B	Always	Below 1 Ω
T8–17 → ← T8–16	L2 → ← E	P–B → ← W–B	Door lock control switch ”lock” position.	Below 1 Ω
			Door lock control switch OFF or ”unlock” position.	1 MΩ or higher
T8–18 → ← T8–1632	UL2 → ← E	G → ← W–B	Door lock control switch ”unlock” position.	Below 1 Ω
			Door lock control switch OFF or ”lock” position.	1 MΩ or higher
T8–19 → ← T8–16	TSW → ← E	L–Y → ← W–B	Luggage compartment door opener switch ON.	Below 1 Ω
			Luggage compartment door opener switch OFF.	1 MΩ or higher
T8–20 → ← T8–16	B+1 → ← E	R → ← W–B	Always	10–14 V
T9–1 → ← T8–16	LUG → ← E	G–W → ← W–B	Luggage compartment door key operated switch ON.	Below 1 Ω
			Luggage compartment door key operated switch OFF.	1 MΩ or higher
T9–2 → ← T8–16	LSWR → ← E	L–Y → ← W–B	Door unlock detection switch ON. (Rear door)	Below 1 Ω
			Door unlock detection switch OFF. (Rear door)	1 MΩ or higher
T9–3 → ← T8–16	CTY → ← E	R–B → ← W–B	Door open detection switch (Rear door) ON (door opened)	Below 1 Ω
			Door open detection switch (Rear door) OFF (door closed)	1 MΩ or higher
T9–4 → ← T8–16	SH → ← E	W–L → ← W–B	Always	10–14 V
T9–5 → ← T8–16	HEAD → ← E	R–B → ← W–B	Light control switch other than ”HEAD” position.	10–14 V
T9–7 → ← T8–16	ACC → ← E	L–R → ← W–B	Ignition switch is turned to ”ACC” position.	10–14 V

Terminals	Symbols	Wiring color	Condition	Standard Value
T9–10 → ← T8–16	DSWL → ← E	R–W → ← W–B	Luggage compartment door courtesy switch ON.	Below 1 Ω
			Luggage compartment door courtesy switch OFF.	1 MΩ or higher
T9–11 → ← T8–16	HORN → ← E	G–B → ← W–B	Horn switch OFF.	10–14 V
T9–12 → ← T8–16	PSWH → ← E	B → ← W–B	Engine hood courtesy switch ON.	Below 1 Ω
			Engine hood courtesy switch OFF.	1 MΩ or higher
T9–13 → ← T8–16	TAIL → ← E	G–R → ← W–B	Light control switch ”TAIL” position	10–14 V



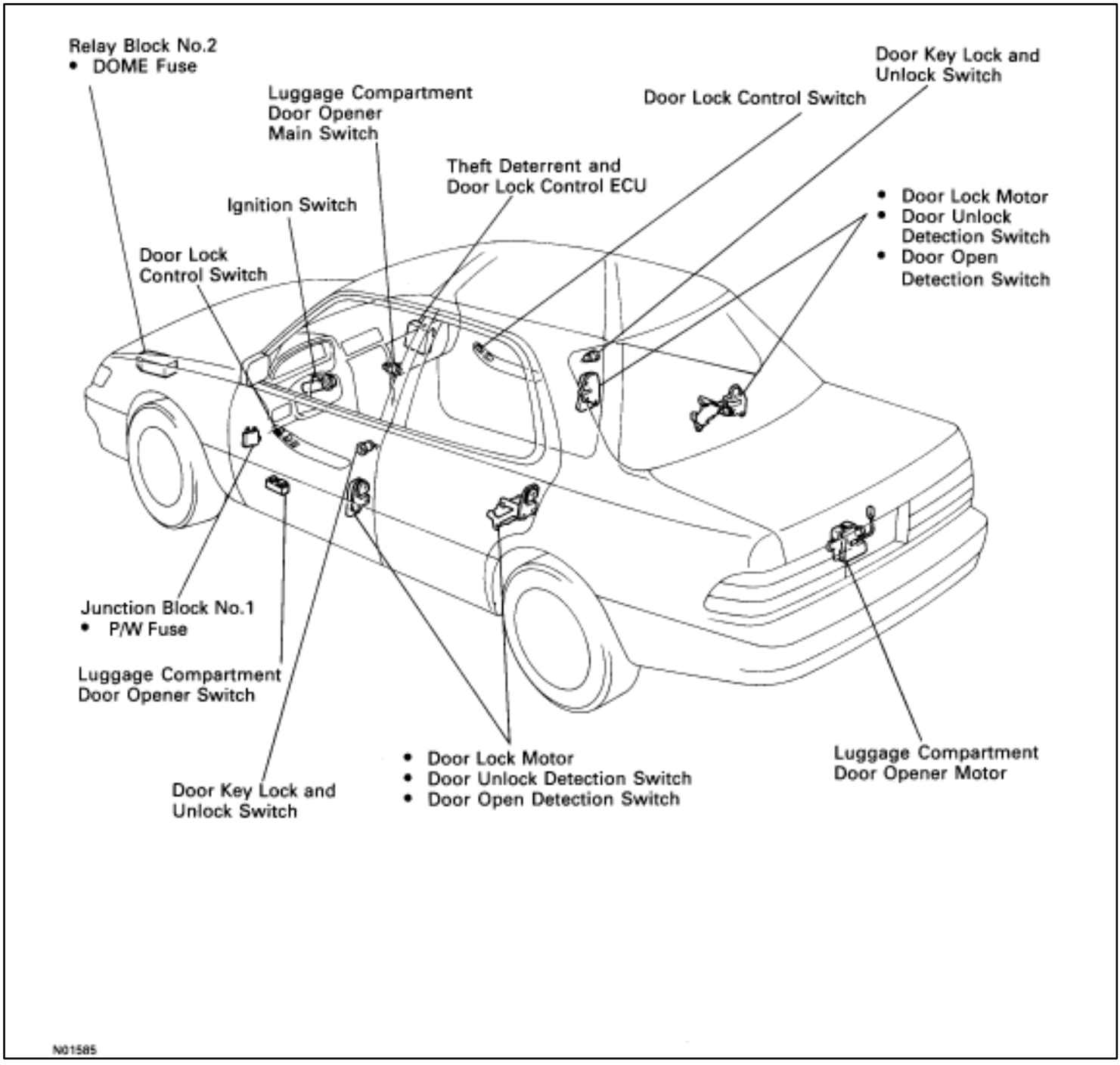
When checking the voltage or resistance of theft deterrent and door lock ECU terminal, disconnect the ECU connector.

Description

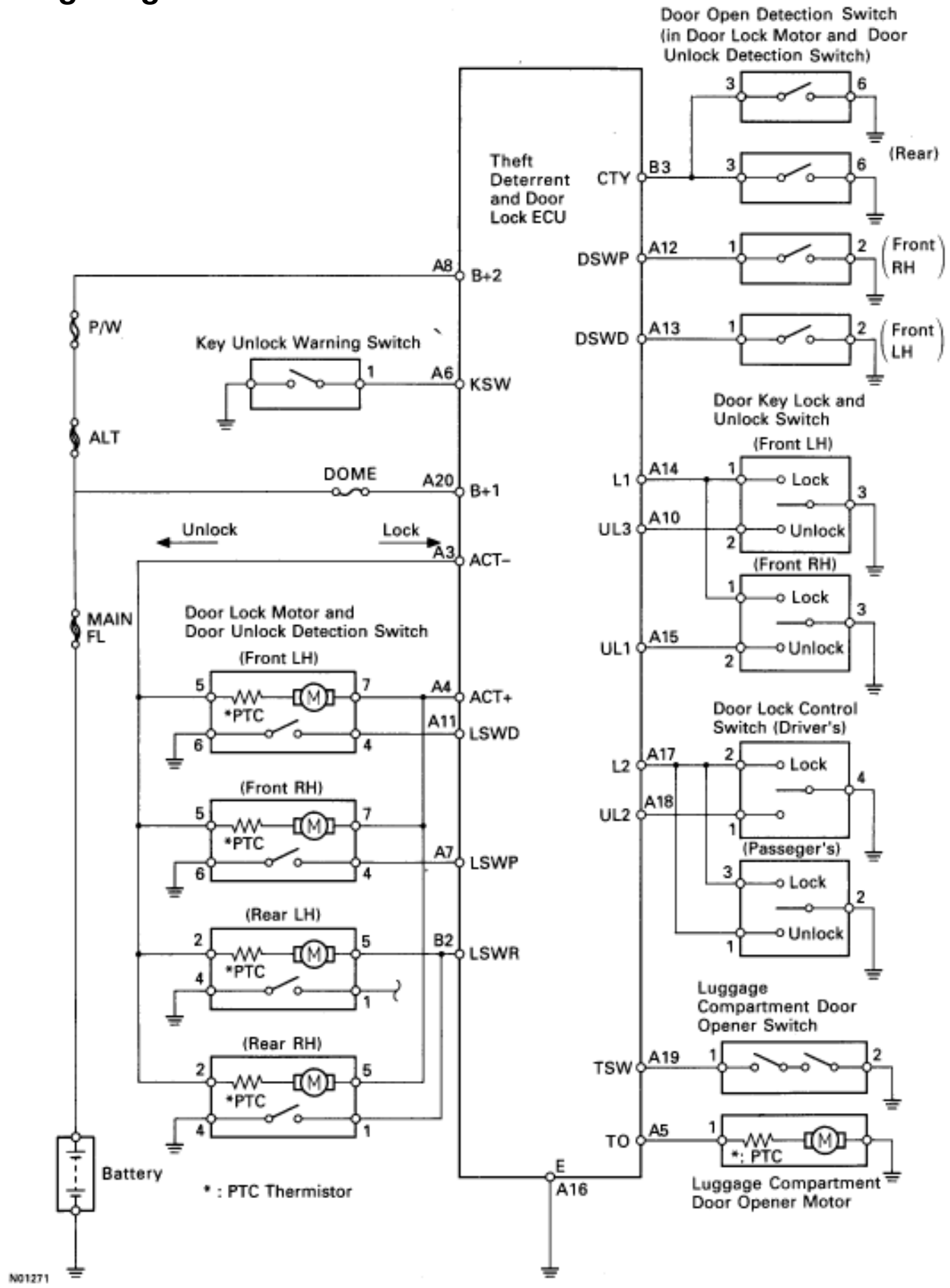
The door lock control system has a key–interlocked door lock and unlock function and a key–confine prevention function. All doors can be locked and unlocked simultaneously by key operation at the front right or left door (the key needs to be operated twice to unlock the doors at the driver's door). If the door lock operation is performed when one of the front doors is open and the ignition key inserted in the key cylinder, doors are unlocked automatically to prevent the ignition key from being left inside the vehicle. The luggage compartment door can be opened by electromagnetic opener.

For the function of component parts of this system, refer to the circuit description in the troubleshooting section.

Parts Location



Wiring Diagram



MATRIX CHART OF PROBLEM SYMPTOMS

Perform troubleshooting of the circuits for the applicable problem symptom in the order given in the chart below. Proceed to the page located for each circuit.

HINT:

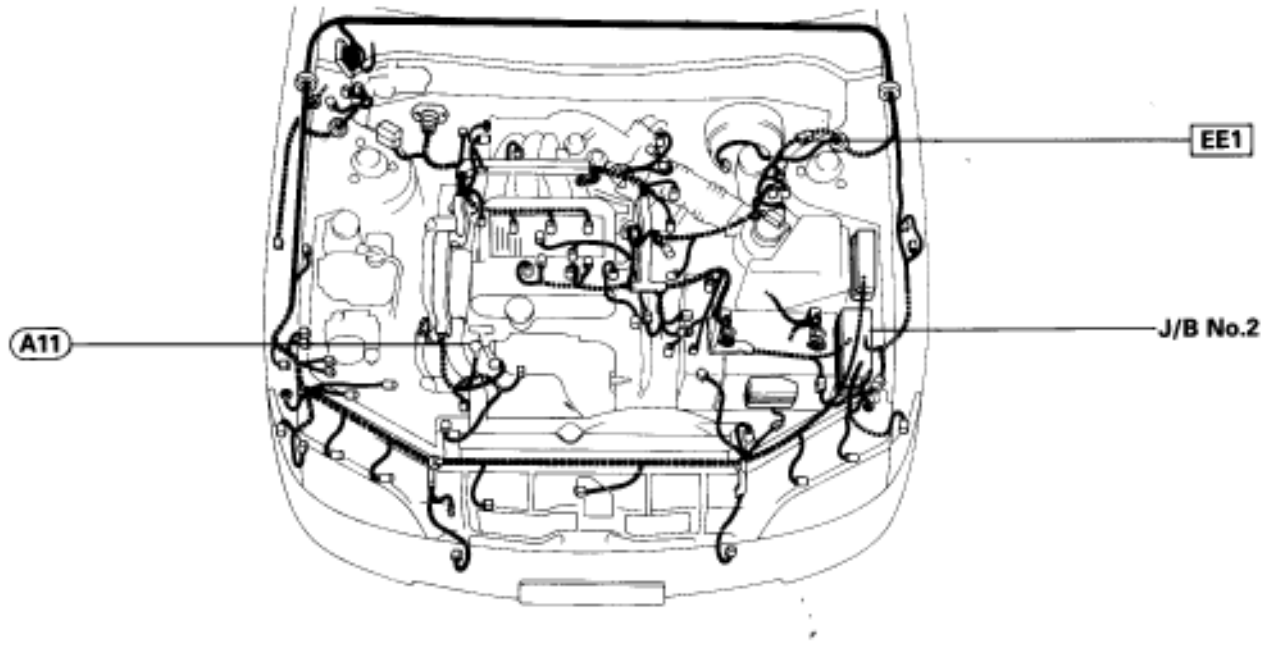
If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.

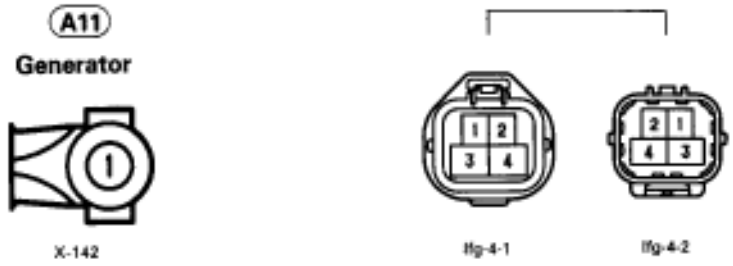
If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check or replace the Theft Deterrent ECU as the last step.

See page / Suspect Area / Symptom	BE–370 ECU Power Source Circuit	BE–372 Actuator Power Source Circuit	BE–374 Door Lock Motor Circuit	BE–376 Luggage Compartment Door Opener Motor Circuit	BE–378 Door Lock Control Switch Circuit	BE–380 Door key Lock and Unlock Switch Circuit	BE–382 Key Unlock Warning Switch Circuit	BE–384 Door Unlock Detection Switch Circuit	BE–386 Luggage Compartment Door Opener Main Switch and Opener Switch Circuit	BE–388 Door Open Detection Switch Circuit	IN–32 Theft Deterrent ECU
Whole functions of the door lock control system does not operate.	1	2	4	3							5
All doors or some doors are not locked and unlocked with the Door Lock Control Switch and Key Operated Switch. (Luggage compartment door opener function normally operate.)			3		1	2					4
Doors cannot be locked or unlocked with the door lock control switch. (Doors lock and unlock normally with the key operated switch.)					1		2			3	4
Doors are not locked or unlocked with the key operated switch. (Doors lock and unlock normally with the door lock control switch.)						1					2
Key confinement prevention function does not operate. (Doors lock and unlock normally with the key operated switch.)							1	2		3	4
Luggage compartment door opener function does not operate.				2					1		3

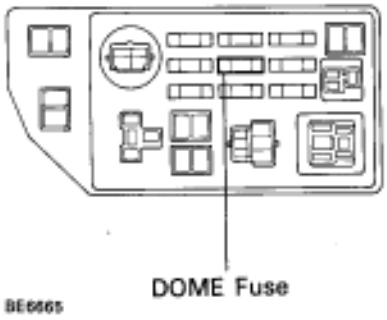
LOCATION OF CONNECTORS

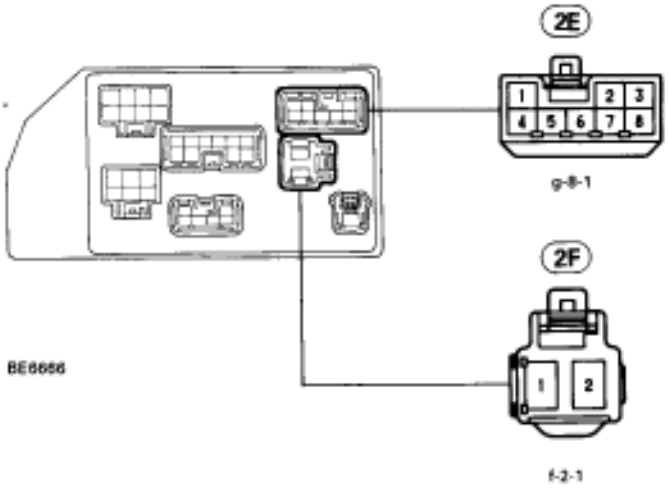
Location of Connectors in Engine Compartment



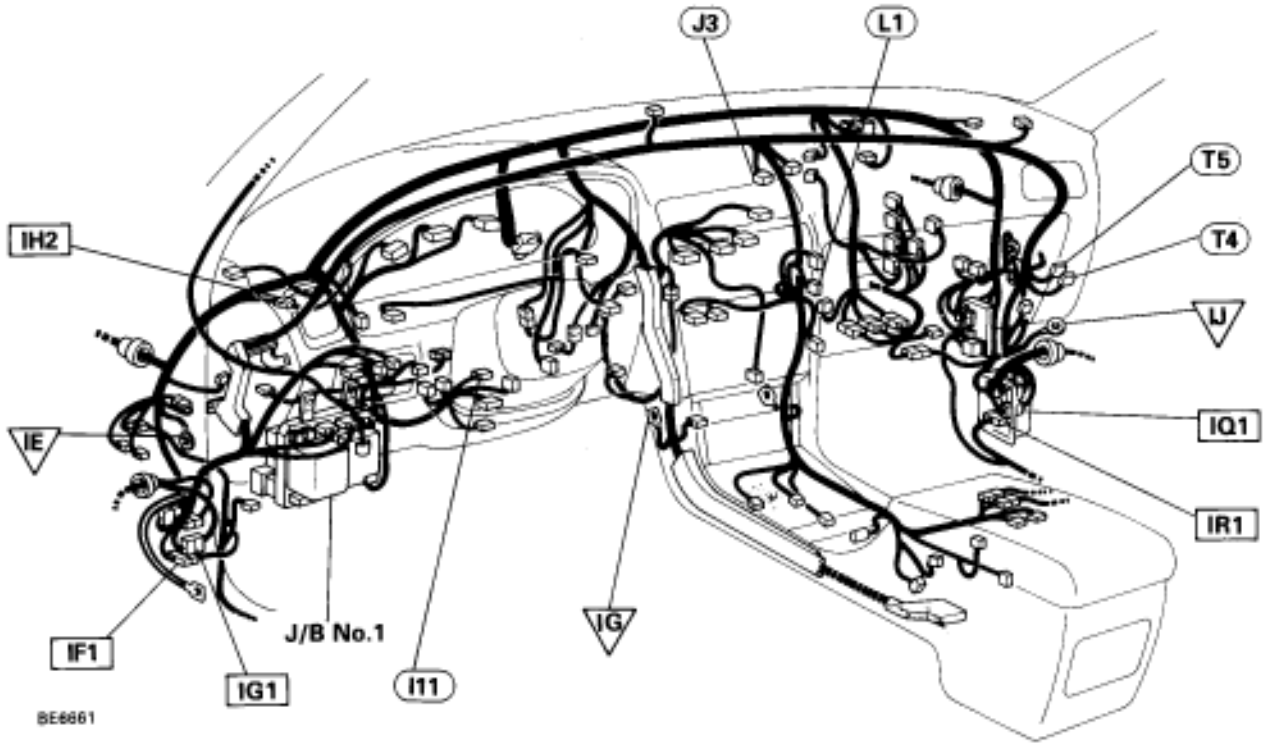


J/B No.2

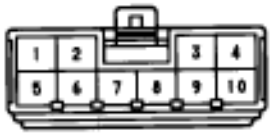




Location of Connectors in Instrument Panel



I11
Key Unlock Warning Switch

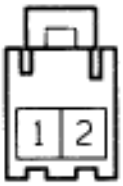


g-10-1-B

J3
Junction Connector

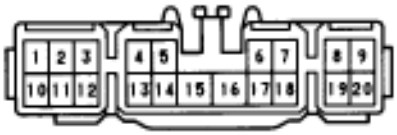
e-14-1-A

L1
Luggage Compartment Door Opener Main Switch



G-2-1

T4
Theft Deterrent and Door Lock ECU



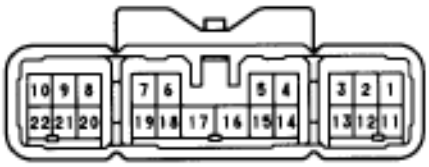
e-20-1

T5
Theft Deterrent and Door Lock ECU

e-14-1-A

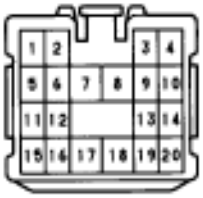
e-22-1

IF1



e-22-2

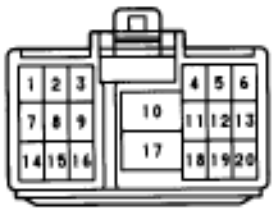
IG1



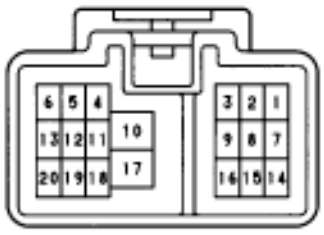
e-20-1-A

e-20-2-A

IH2

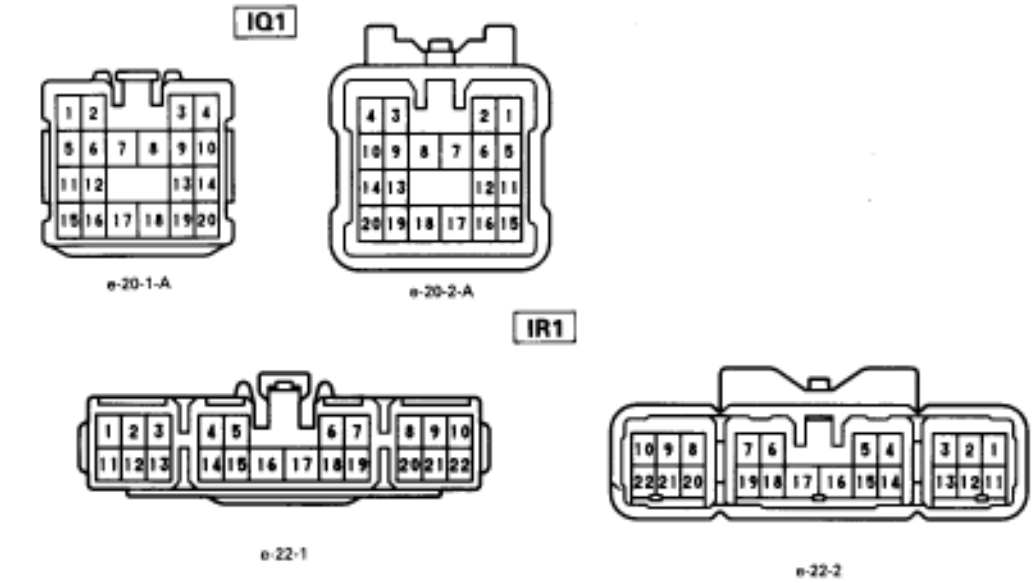


e-20-1-B

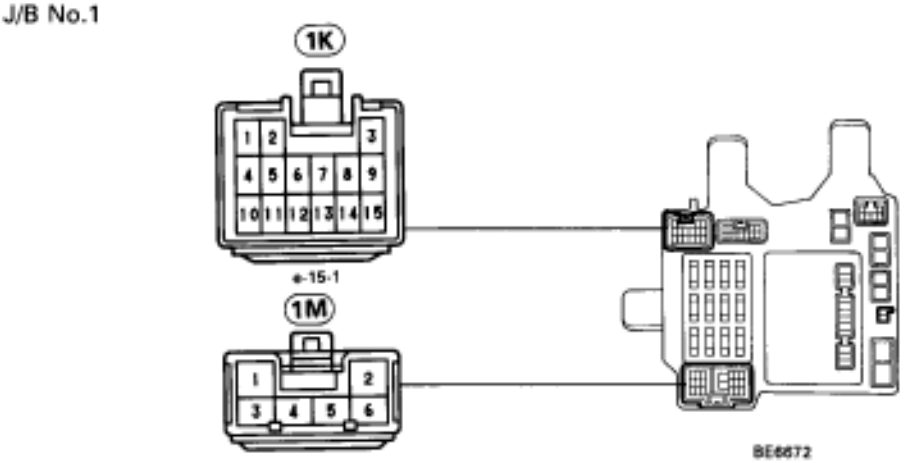


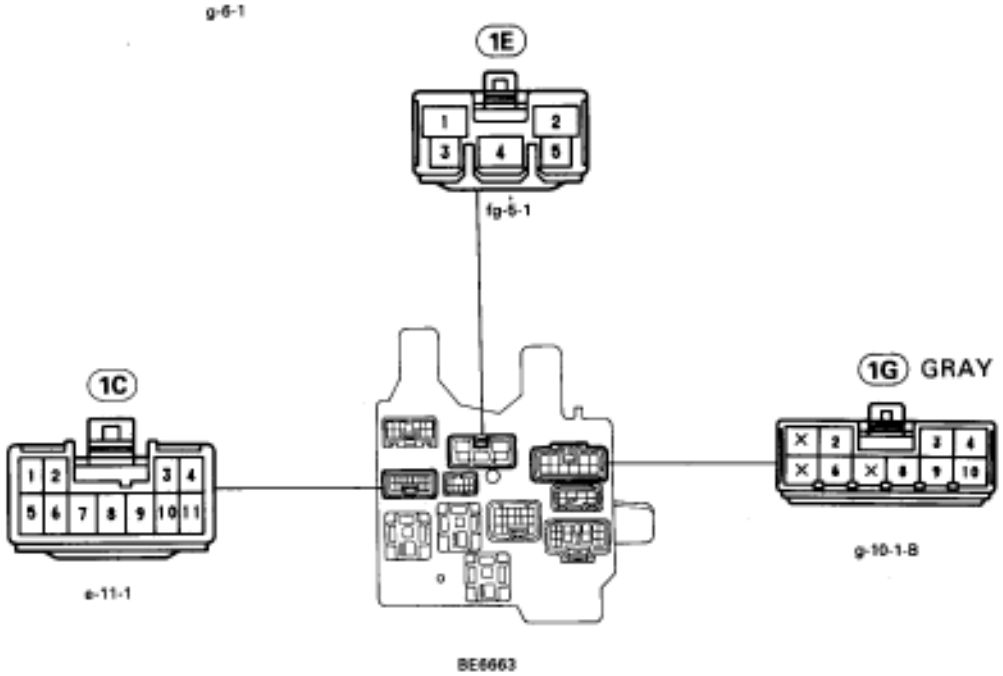
e-20-2-B

Location of Connectors in Instrument Panel

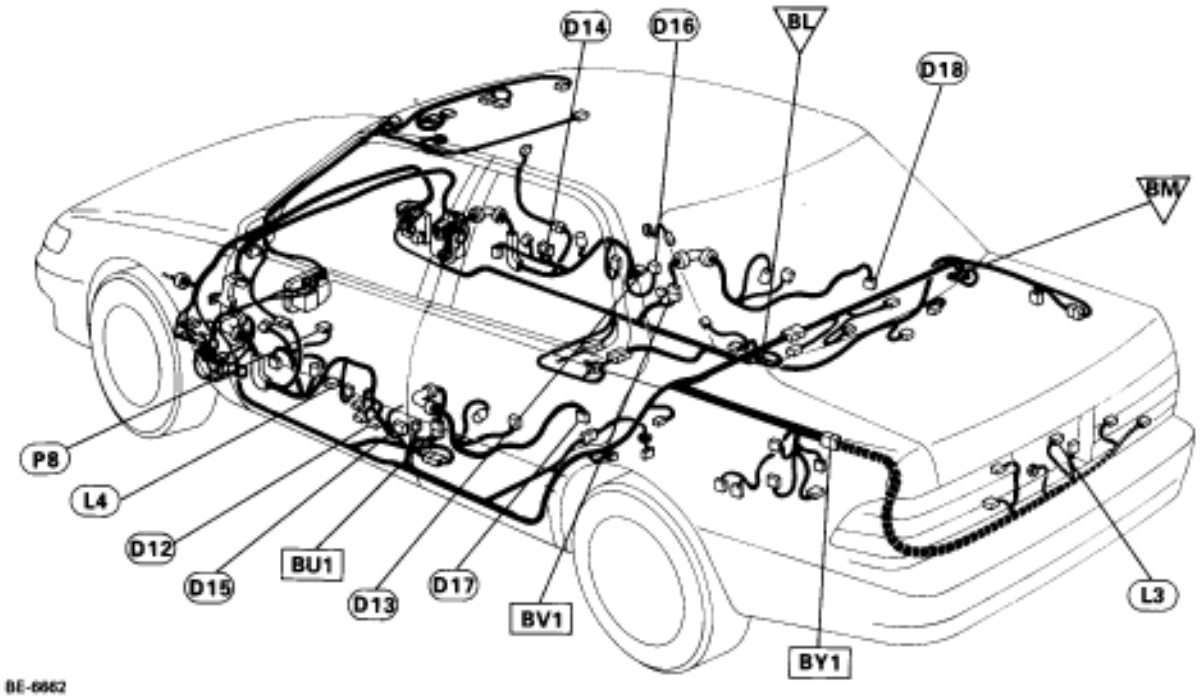


J/B No.1





Location of Connectors in Body



D12 Door Key Lock and Unlock Switch LH

D13 Door Key Lock and Unlock Switch RH

D14 Door Lock Control Switch RH

D15 Door Unlock Detection Switch Front LH

D16 Door Unlock Detection Switch Front RH

D17 Door Unlock Detection Switch Rear LH

D18 Door Unlock Detection Switch Rear RH

L3 Luggage Compartment Door Opener Motor

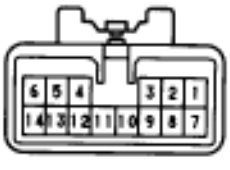
L4 Luggage Compartment Door Opener Switch

P8 Door Lock Control Switch Front LH

BU1

BV1

BY1



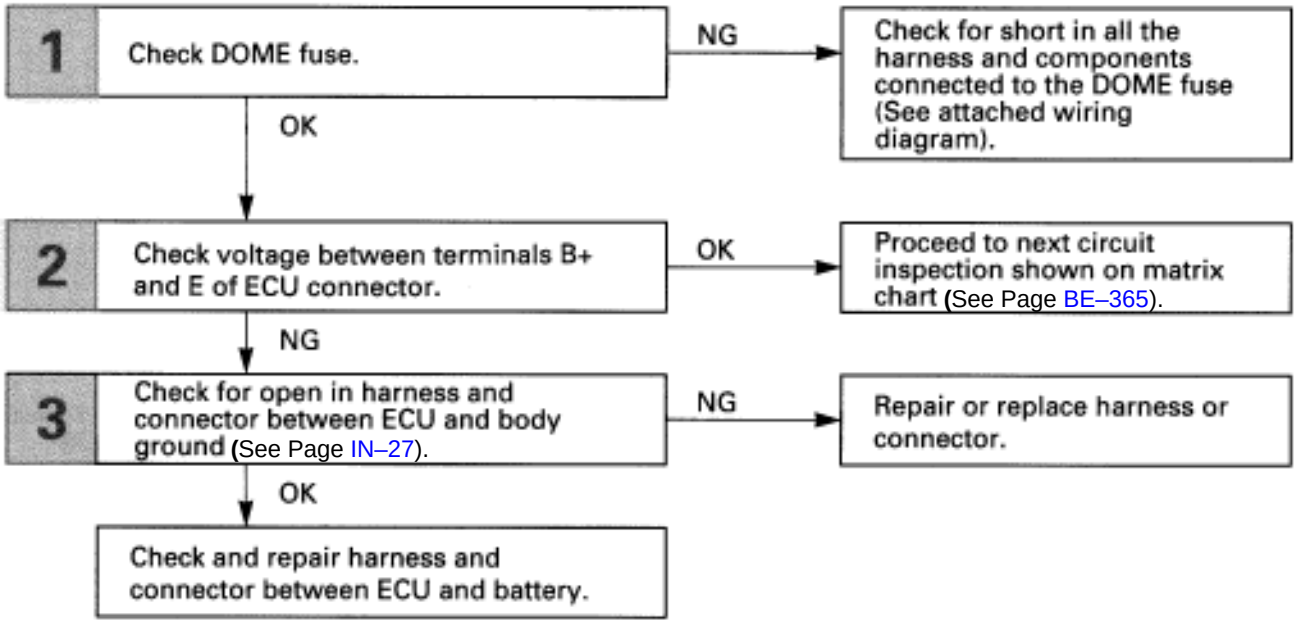
CIRCUIT INSPECTION

ECU Power Source Circuit

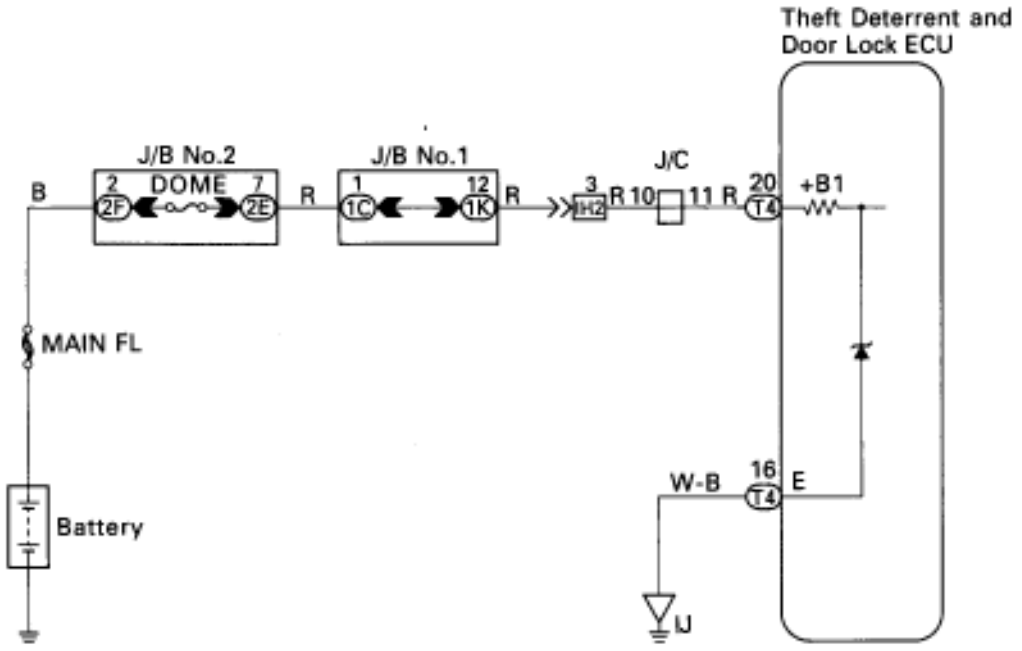
CIRCUIT DESCRIPTION

This circuit provides power to operate the theft deterrent and door lock ECU.

DIAGNOSTIC CHART



WIRING DIAGRAM



N01250

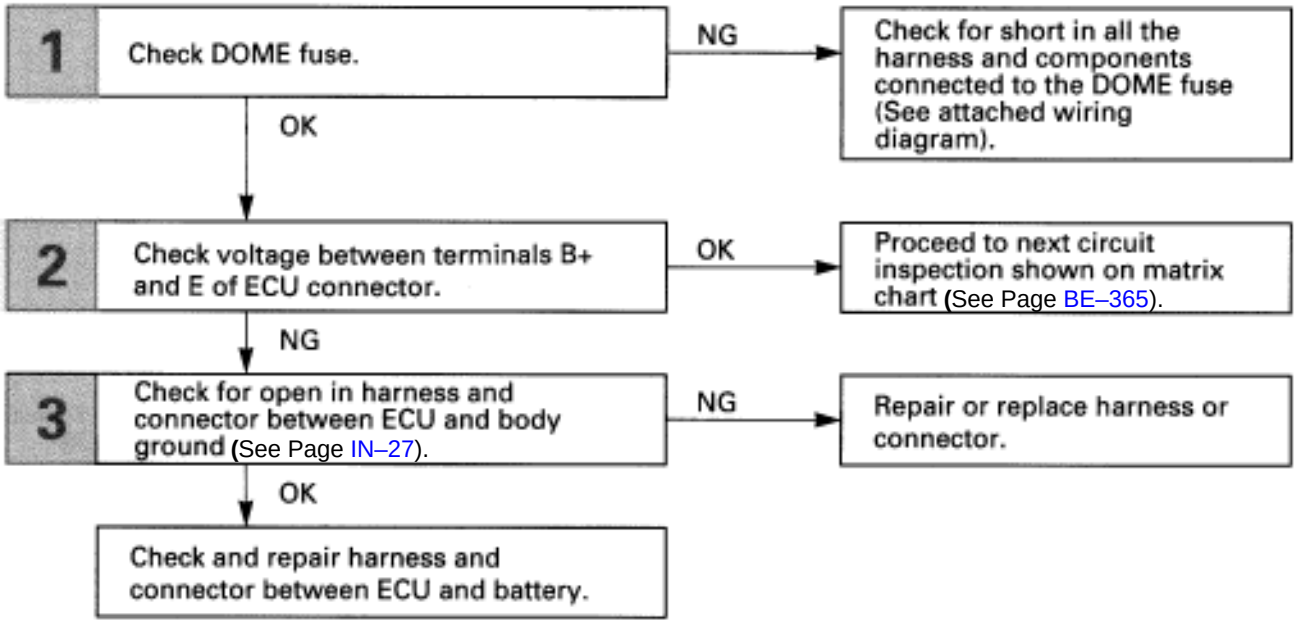
CIRCUIT INSPECTION

ECU Power Source Circuit

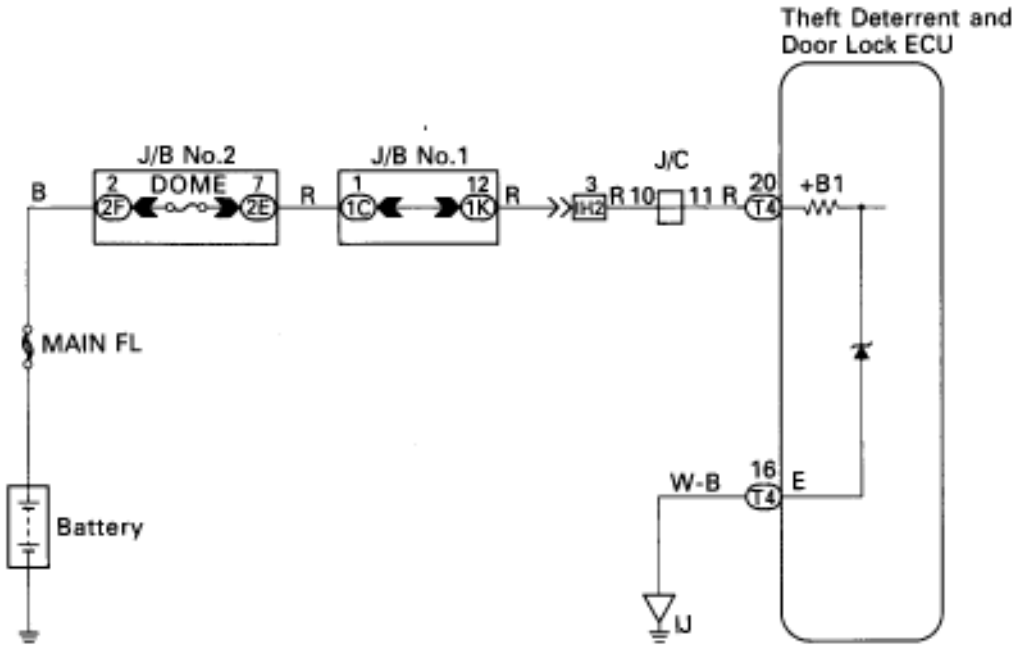
CIRCUIT DESCRIPTION

This circuit provides power to operate the theft deterrent and door lock ECU.

DIAGNOSTIC CHART



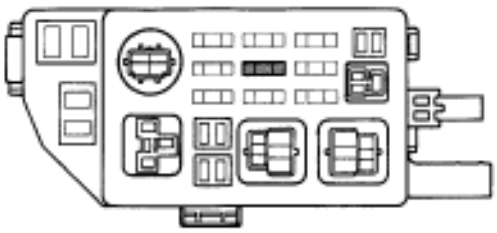
WIRING DIAGRAM



N01250

INSPECTION PROCEDURES

1 **Check DOME fuse.**



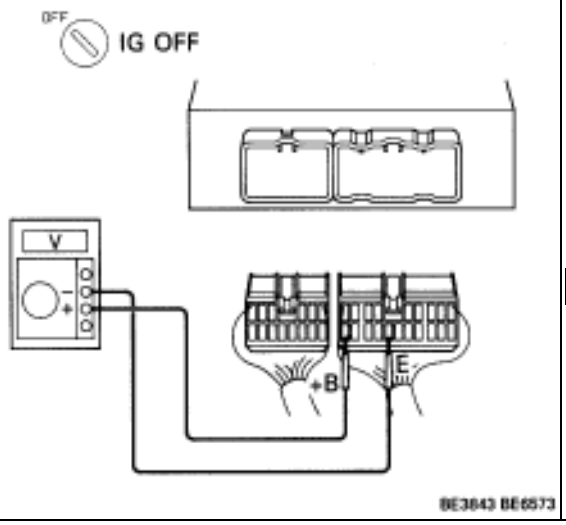
P Remove DOME fuse fro J/B No.2.

C Check continuity of DOME fuse.

OK **Continuity**

OK → **NG** → **Check for short in all the harness and components connected to the DOME fuse (See attached wiring diagram).**

2 **Check voltage between terminals B+ and E of ECU connector.**



P
1. Remove the glove box.
2. Disconnect the theft deterrent and door lock ECU connector.

C Measure voltage between terminals B+ and E of ECU connector.

OK **Voltage:** **10 ~ 14 V**

NG → **OK** → **Proceed to next circuit inspection shown on matrix chart (See page BE–365).**

3 **Check for open in harness and connector between ECU and body ground (See page IN–27).**

OK → **NG** → **Check and repair harness or connector.**

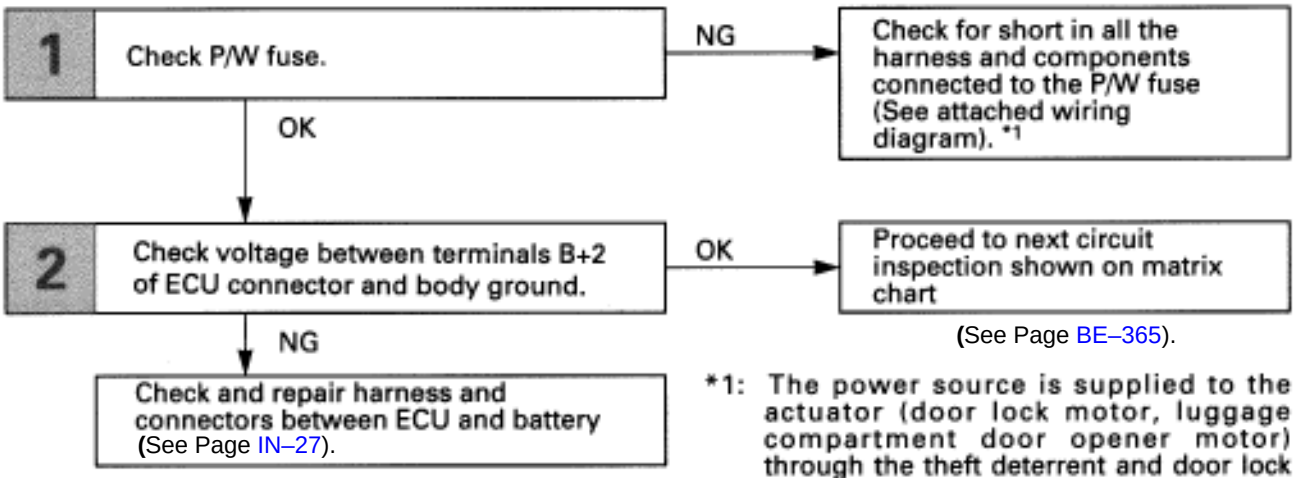
Check and repair harness and connector between ECU and battery.

Actuator Power Source Circuit

CIRCUIT DESCRIPTION

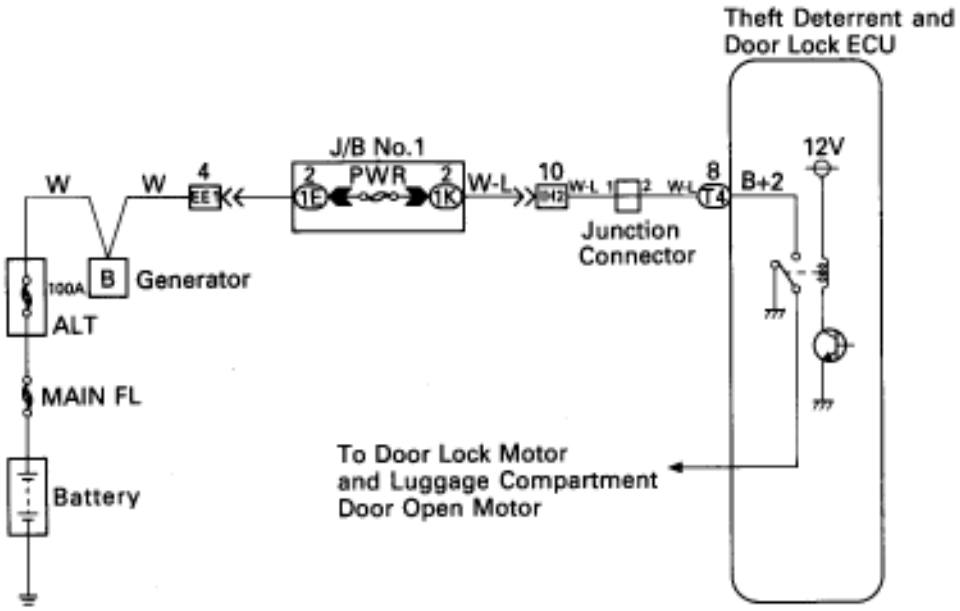
This circuit provides power to drive the door lock motor and the luggage compartment door opener motor.

DIAGNOSTIC CHART



*1: The power source is supplied to the actuator (door lock motor, luggage compartment door opener motor) through the theft deterrent and door lock ECU. Accordingly, if a short circuit of the W/H or actuator occurs in the actuator circuit, the P/W fuse may become OPEN, so also inspect the actuator (door lock motor circuit on page BE–374, and the luggage compartment door opener motor circuit on page BE–376).

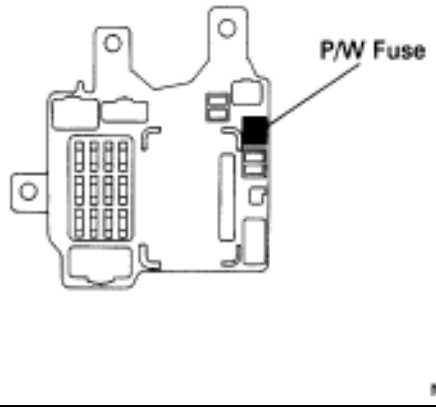
WIRING DIAGRAM



N01251

INSPECTION PROCEDURE

1 **Check P/W fuse.**



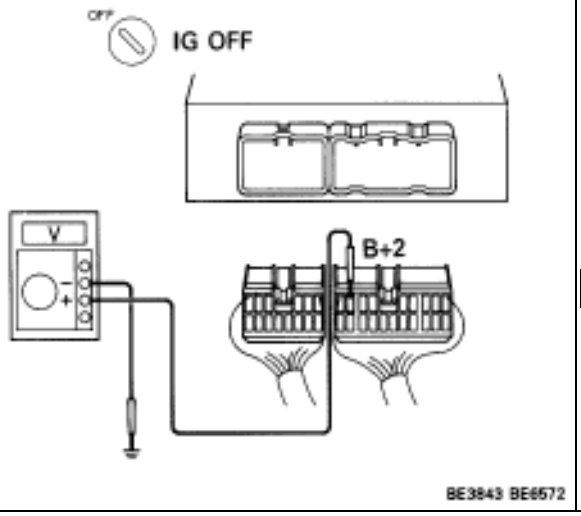
P
1. Remove the front lower panel.
2. Remove P/W fuse from J/B No. 1.

C Check continuity of P/WE fuse.

OK **Continuity**

OK → **NG** → **Check for short in all the harness and components connected to the P/W fuse (See attached wiring diagram).*1**

2 **Check voltage between terminal B+2 of theft deterrent ECU connector and body ground.**



P
1. Remove the glove box.
2. Disconnect the theft deterrent and door lock ECU connector.

C Measure voltage between terminals B+2 of theft deterrent ECU connector and body ground.

OK **Voltage:** **10 ~ 14 V**

NG → **OK** → **Proceed to next circuit inspection shown on matrix chart (See page BE–365).**

Check and repair harness and connector between ECU and battery (See page IN–27).

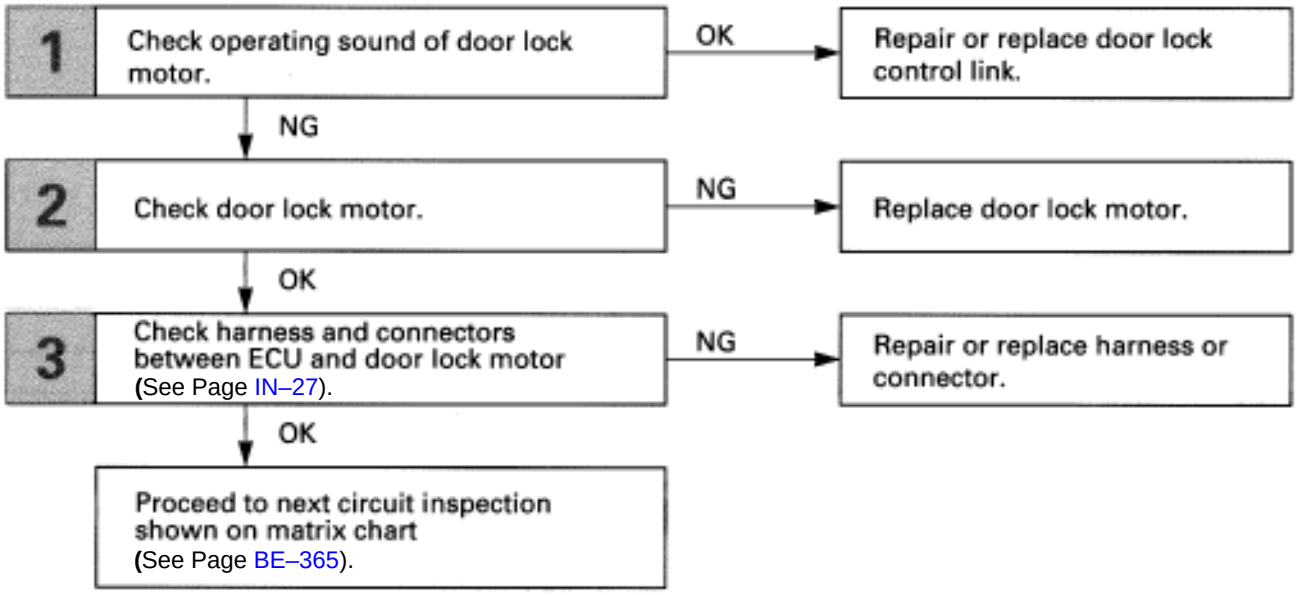
Door Lock Motor Circuit

CIRCUIT DESCRIPTION

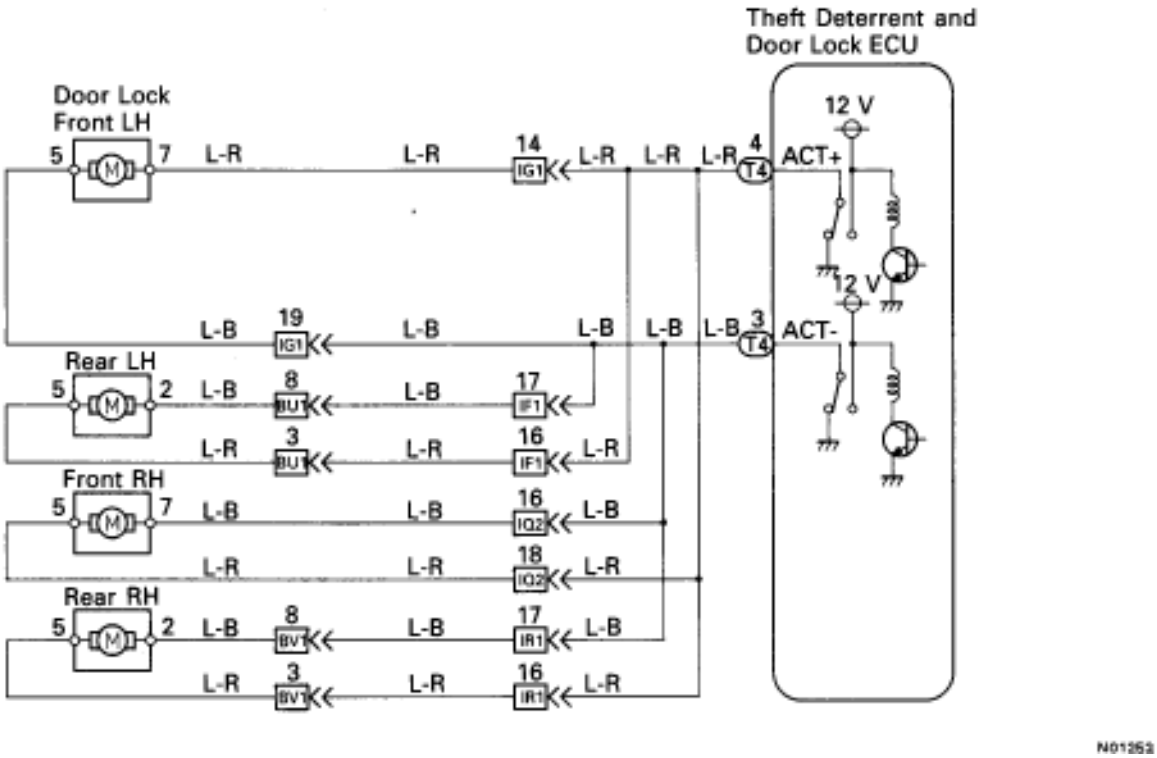
The door lock motor locks and unlocks the door in accordance with signals from the ECU.

DIAGNOSTIC CHART

HINT: Inspect the door which is malfunctioning.

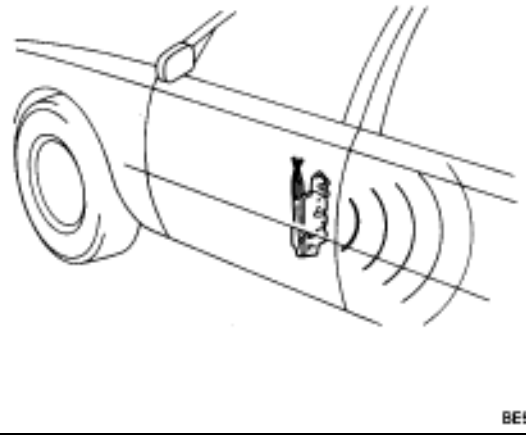


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check operating sound of door lock motor.**



C Check operating sound of door lock motor, when door lock control switch is pushed to the lock side and unlock side.

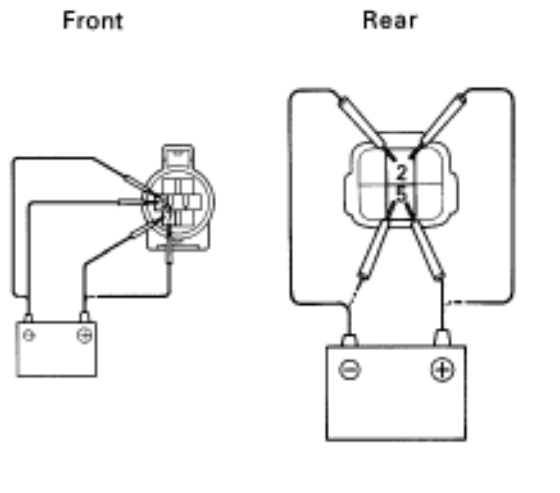
OK **Can hear operating sound of door lock motor.**

Hint Inspect the door which is malfunctioning.

NG

OK **Repair or replace door lock control link.**

2 **Check door lock motor.**



P
1. Remove the door trim and service hole cover.
2. Disconnect the door lock motor connector.

C
1. Connect positive ⊕ lead to terminal 7(5) and negative ⊖ lead to terminal 5(2) of door lock motor connector.
2. Connect positive ⊕ lead to terminal 5(2) and negative ⊖ lead to terminal 7(5) of door lock motor connector.

OK
1. **Door lock motor locks door.**
2. **Door lock motor unlocks door.**

Hint Perform inspection in a short time (within 2 seconds). The terminal number without bracket is for the Front, the number with bracket is for the Rear.

OK

NG **Replace door lock motor.**

3 **Check harness and connector between ECU and door lock motor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

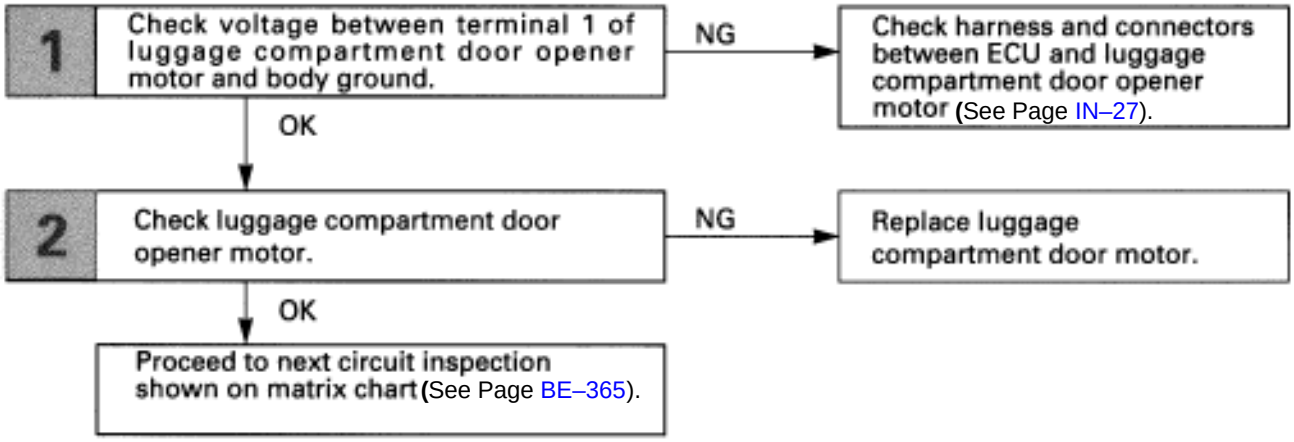
Proceed to next circuit inspection shown on matrix chart (See page BE–365).

Luggage Compartment Door Opener Motor Circuit

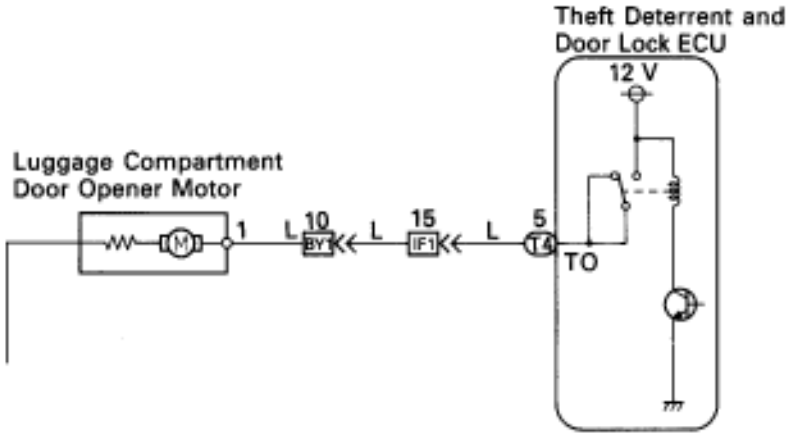
CIRCUIT DESCRIPTION

This circuit unlocks the luggage compartment door when the ECU sends signals to the luggage compartment door opener motor.

DIAGNOSTIC CHART



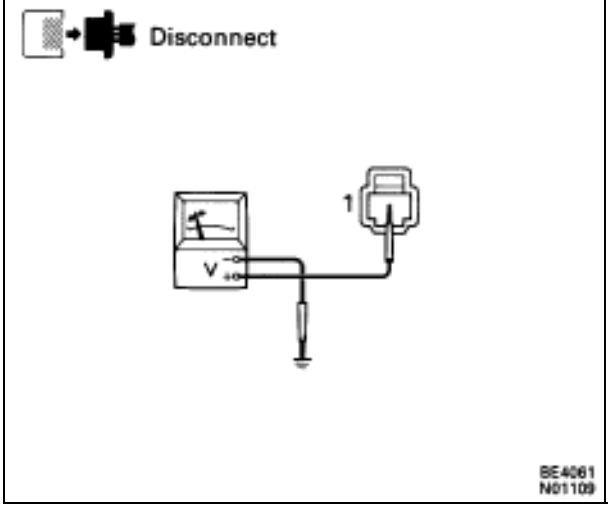
WIRING DIAGRAM



N01253

INSPECTION PROCEDURE

1 **Check voltage between terminal 1 of luggage compartment door opener motor and body ground.**



P
1. Remove the door trim rear cover.
2. Disconnect the opener motor connector.

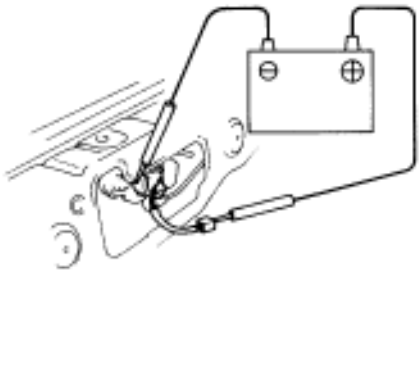
C Measure voltage between terminal 1 of luggage compartment door opener motor and body ground, when opener switch is pulled and not pulled.

OK

Opener switch	Voltage
Pulled	5 – 14 V
Not pulled	Below. 1V

OK → **NG** → **Check harness and connectors between ECU and luggage compartment door opener Motor (See page IN–27)**

2 **Check luggage compartment door opener motor.**



C Connect positive ⊕ lead to opener motor connector and negative ⊖ lead to the body of the opener motor.

OK Operated motor shaft and gear.

Hint Perform inspection in a short time (within1 second).

OK → **NG** → **Replace luggage compartment door opener motor.**

Proceed to next circuit inspection shown on matrix chart (See page BE–365).

Door Lock Control Switch Circuit

CIRCUIT DESCRIPTION

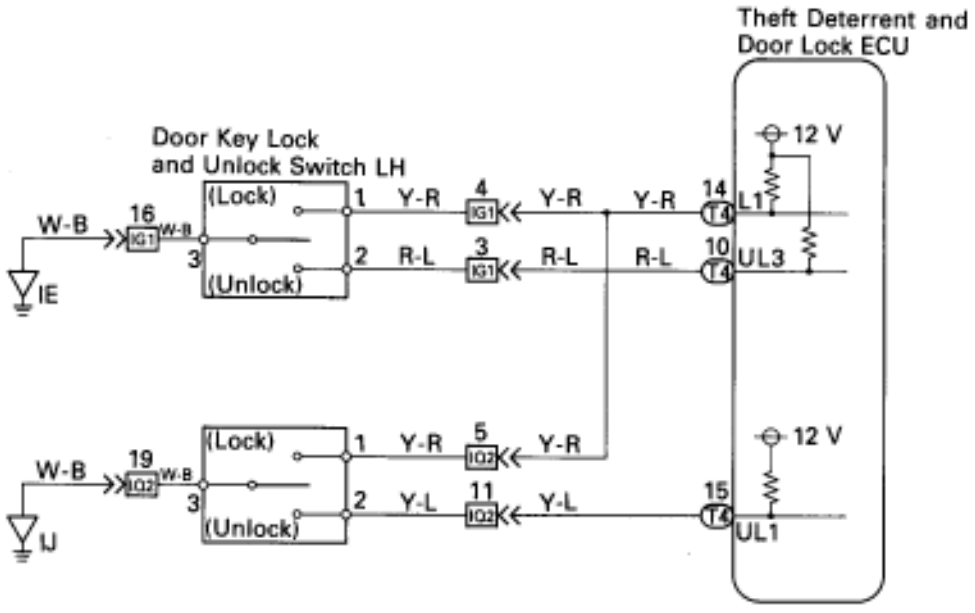
When the door lock control switch is pushed to the lock side. Lock terminal of the switch is grounded, and when the switch is pushed to the unlock side, Unlock terminal is grounded (See wiring diagram below).

DIAGNOSTIC CHART

1	Check voltage between terminals 2(3), 1(1) of door lock control switch connector and body ground.	OK	Proceed to next circuit inspection shown on matrix chart (See Page BE–365).
	NG		
2	Check door lock control switch.	NG	Replace door lock control switch.
	OK		
3	Check harness and connectors between ECU and door lock control switch, switch and body ground (See Page IN–27).	NG	Repair or replace harness or connector.
	OK		
	Check and replace ECU.		

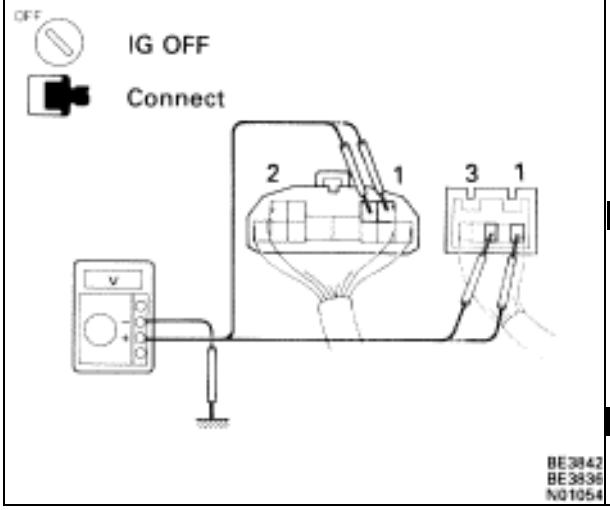
( ): for the RH

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check voltage between terminals 2(3), 1(1) of door lock control switch connector and body ground.



P Remove the door trim and service hole cover.

C Measure voltage between terminals 2(3), 1(1) of door lock control switch connector and body ground, when door lock control switch is pressed to the lock side, unlock side and not pressed.

OK

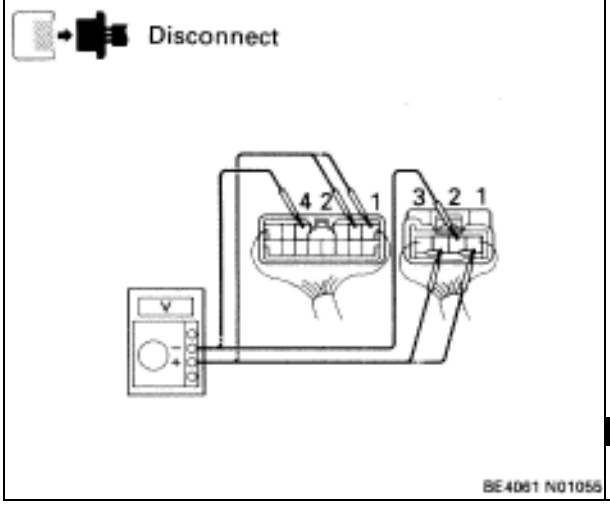
Switch position \ Terminal	2 (3)	1 (1)
Lock side	Below 1 V	10 – 14 V
Unlock side	10 – 14 V	Below 1 V
OFF	10 – 14 V	10 – 14 V

Hint The terminal number without brackets is for the LH, the number with brackets is for the RH.

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–365).**

2 Check door lock control switch.



P Disconnect the door lock control switch connector.

C Check continuity between terminals 2(3), 1(1), and 4(2) of door lock control switch connector, when door lock control switch is pressed to the lock side, and unlock side and not pressed.

OK

Continuity

Switch position \ Terminal	2 (3)	1 (1)	4 (2)
Lock side	○		○
Unlock side		○	○
OFF			

Hint The terminal number without brackets is for the LH, the number with brackets is for the RH.

OK

NG → **Replace door lock control switch.**

3 Check harness and connectors between ECU and door lock control switch, switch and body ground (See page IN–27).

OK

NG → **Repair or replace harness or connector.**

Check and replace ECU. *

*1: Malfunction of the ECU can be considered possible when the problem symptom is the following:

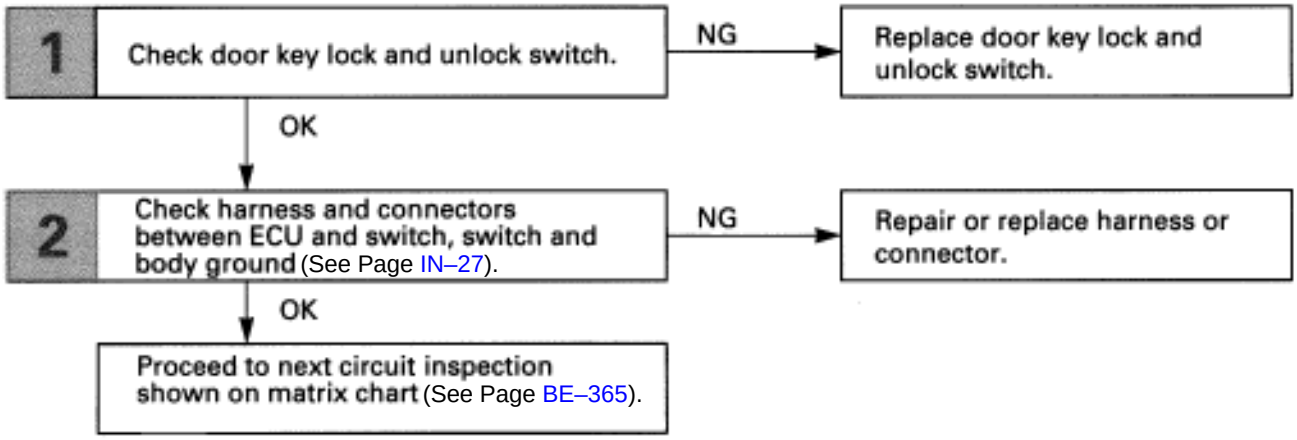
- Lock and/or unlock using the Door Lock Control Switch cannot be done, neither the driver's side nor on the passenger's side.

Door Key Lock and Unlock Switch Circuit

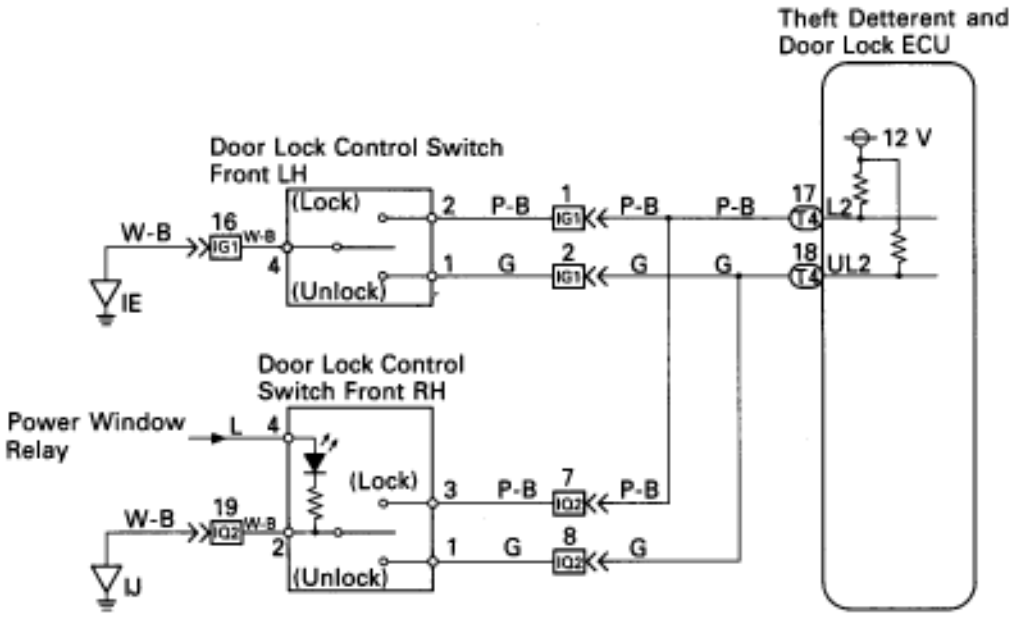
CIRCUIT DESCRIPTION

The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 1 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.

DIAGNOSTIC CHART



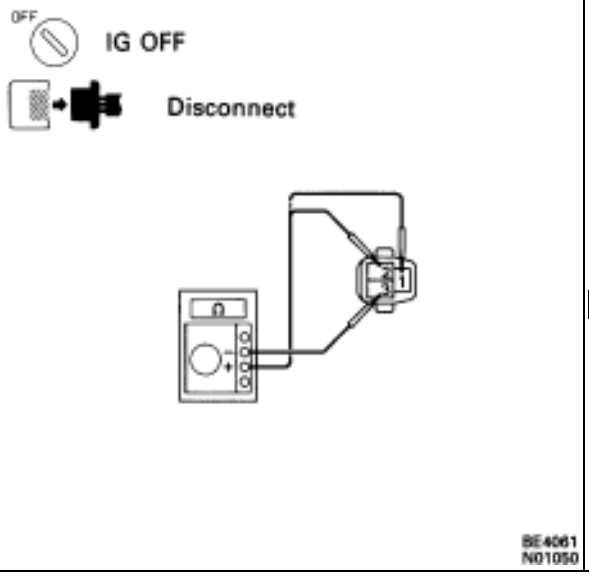
WIRING DIAGRAM



N01255

INSPECTION PROCEDURE

1 **Check door key lock and unlock switch.**



P
1. Remove the door trim and service hole cover.
2. Disconnect the door key lock and unlock switch connector.

C Check continuity between terminals 1, 2 and 3 of door key lock and unlock switch connector, when door key, lock and unlock switch is turned to the lock side, unlock side and not turned.

OK

Continuity

Switch position \ Terminal	1	2	3
Lock side	○		○
Unlock side		○	○
OFF			

OK → **2**

NG → **Replace door key lock and unlock switch.**

2 **Check harness and connectors between ECU and switch, switch and body ground (See page IN–27).**

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–365).**

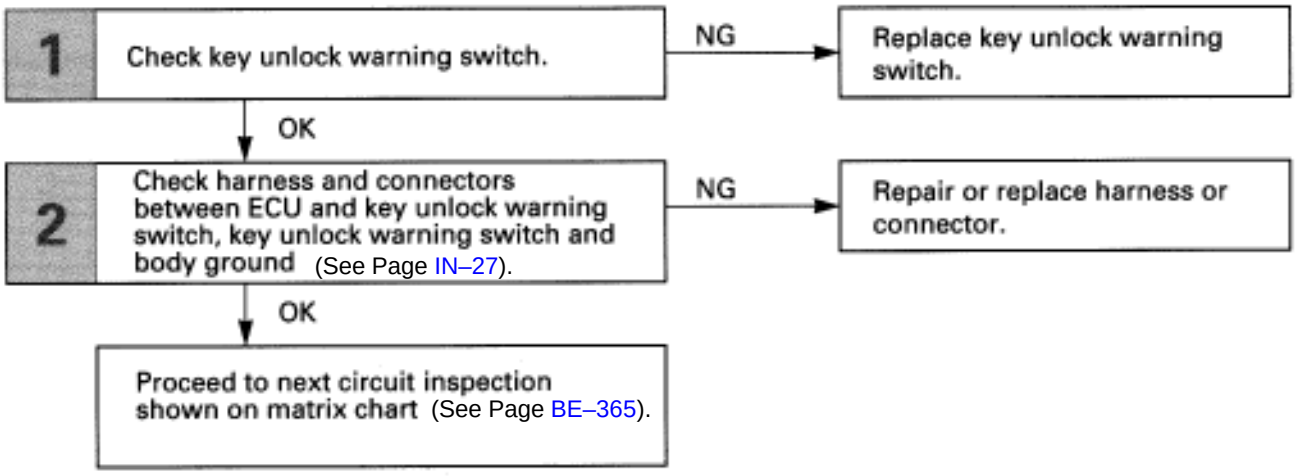
NG → **Repair or replace harness or connector.**

Key Unlock Warning Switch Circuit

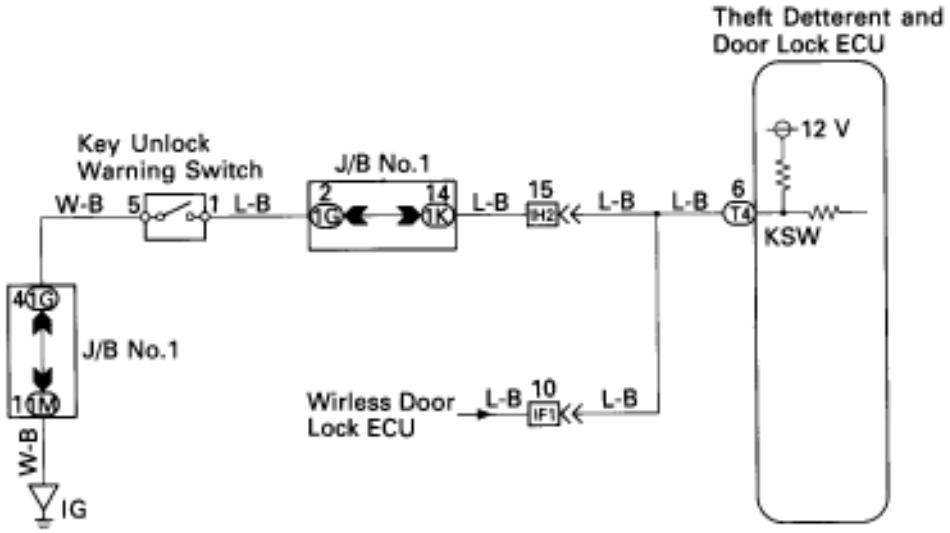
CIRCUIT DESCRIPTION

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.

DIAGNOSTIC CHART



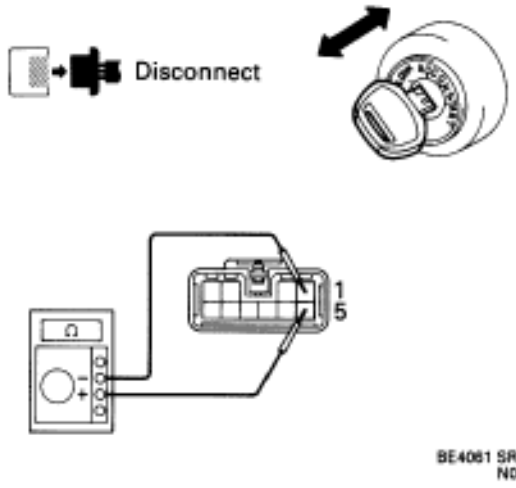
WIRING DIAGRAM



N01259

INSPECTION PROCEDURE

1 **Check key unlock warning switch.**



P Disconnect key unlock warning switch connector.

C Check continuity between terminal 1 and 5 of key unlock warning switch connector, when the key is inserted in the key cylinder or removed.

OK

Continuity

Switch position \ Terminal	1	5
ON (Key inserted)	○——	——○
OFF (Key removed)		

OK → **Replace key unlock warning switch.** (NG)

2 **Check harness and connectors between ECU and key unlock warning switch, key unlock warning switch and body ground (See page IN–27).**

OK → **Repair or replace harness or connector.** (NG)

Proceed to next circuit inspection shown on matrix chart (See page BE–365).

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.

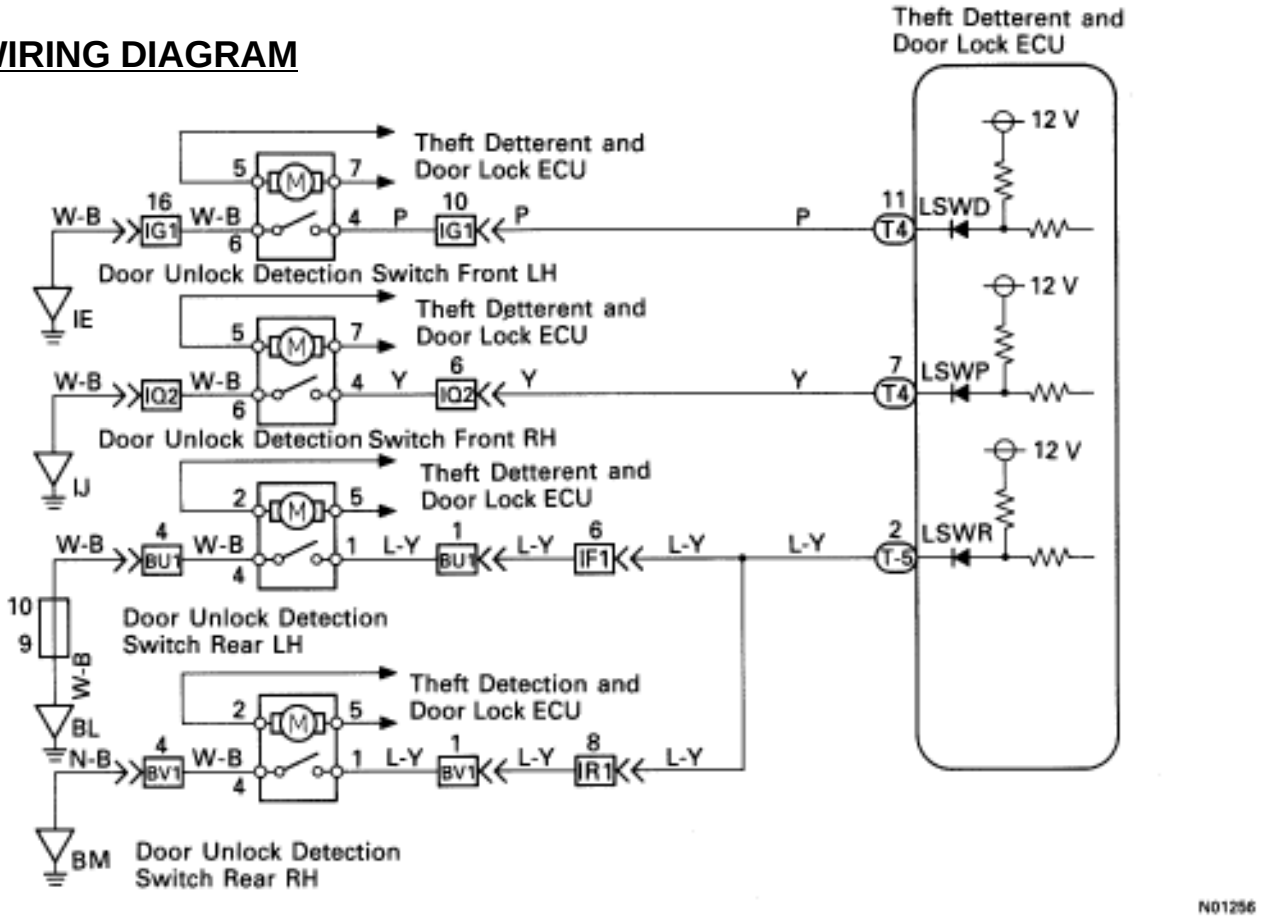
DIAGNOSTIC CHART

1 Check door unlock detection switch.
- NG → Replace door unlock detection switch.
- OK ↓

2 Check harness and connectors between ECU and door unlock detection switch, door unlock detection switch and body ground (See Page IN–27).
- NG → Repair or replace harness or connector.
- OK ↓

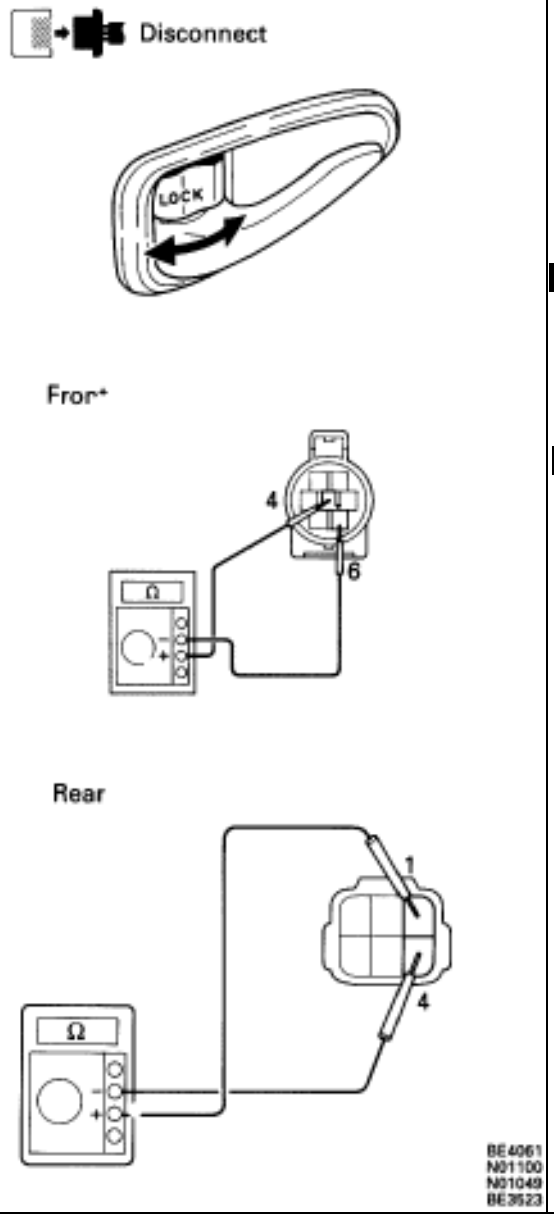
Proceed to next circuit inspection shown on matrix chart (See Page BE–365).

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check Door Unlock Detection Switch.**



P
1. Remove the door trim and service hole cover.
2. Disconnect door unlock detection switch connector.

C Check continuity between terminals 4(1) and 6(4) of door unlock detection switch connector, when the door lock knob is operated to the lock side and unlock side.

OK

Continuity

Switch condition \ Terminal	4 (1)	6 (4)
Door unlock	○——	——○
Door lock		

Hint The terminal number without the bracket is for the Front, the number with the bracket is for the Rear.

OK → **NG** → **Replace door unlock detection switch.**

2 **Check harness and connectors between ECU and door unlock detection switch, door unlock detection switch and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page BE–365).

Luggage Compartment Door Opener Main Switch and Opener Switch Circuit

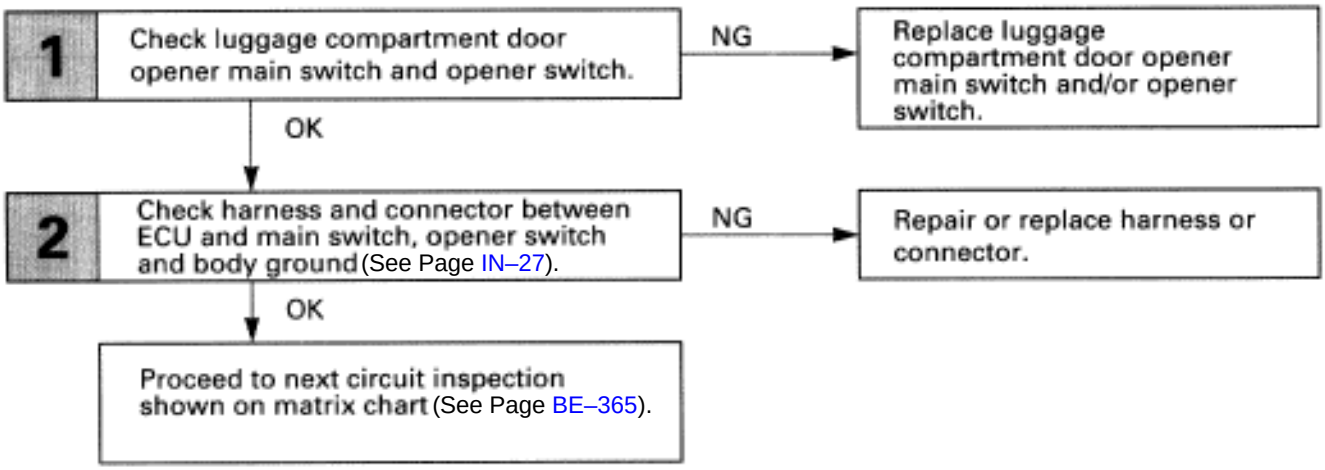
CIRCUIT DESCRIPTION

The luggage compartment door opener main switch is off when it is pushed in, and the luggage compartment door opener switch is on when it is pulled.
The ECU energizes the luggage compartment door opener solenoid only when the main switch and opener switch are together.

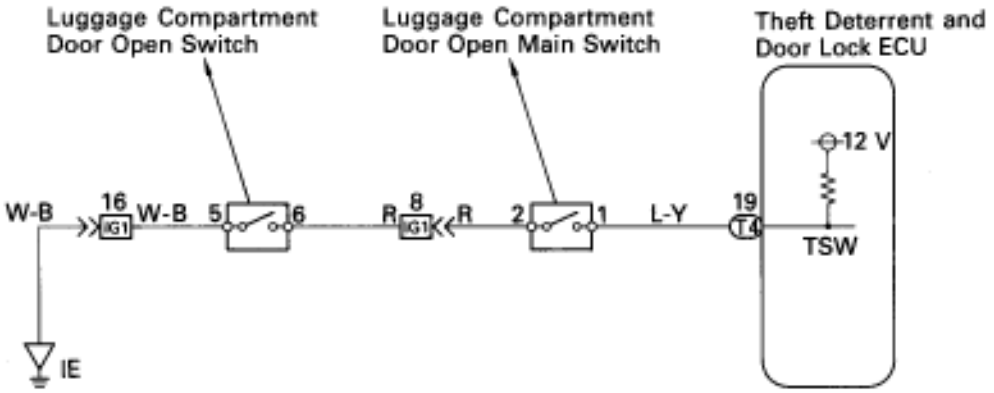
Luggage Compartment. Door Opener Main Switch — N01101

Luggage Compartment. Door Opener Switch — N01102

DIAGNOSTIC CHART



WIRING DIAGRAM

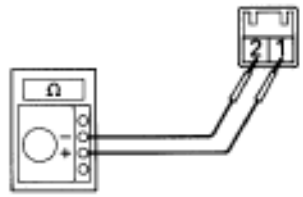


N01257

INSPECTION PROCEDURE

1 **Check luggage compartment door opener main switch and opener switch.**

Luggage Compartment Door Opener Main Switch



N01047

P Disconnect the luggage compartment door opener main switch and opener switch connector.

C Check luggage compartment door opener main switch. Check continuity between terminals of main switch connector.

OK

○—○ Continuity

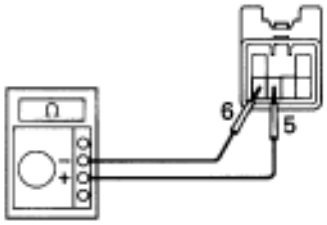
Switch position \ Terminal	1	2
ON	○—○	
OFF		

C Check luggage compartment door opener switch. Check continuity between terminals of main switch and opener switch connector.

OK

Switch position \ Terminal	5	6
ON	○—○	
OFF		

Luggage Compartment Door Opener Switch



N01112

OK → **NG** → **Replace luggage compartment door opener main switch and/or opener switch.**

2 **Check harness and connector between ECU and main switch, opener switch and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

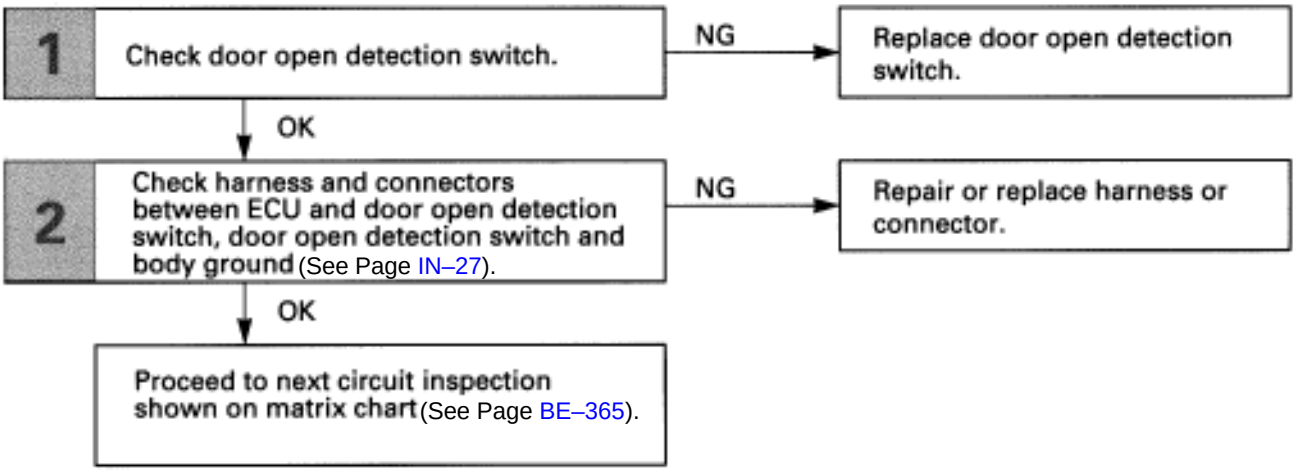
Proceed to next circuit inspection shown on matrix chart (See page BE–365).

Door Lock Control Switch Circuit

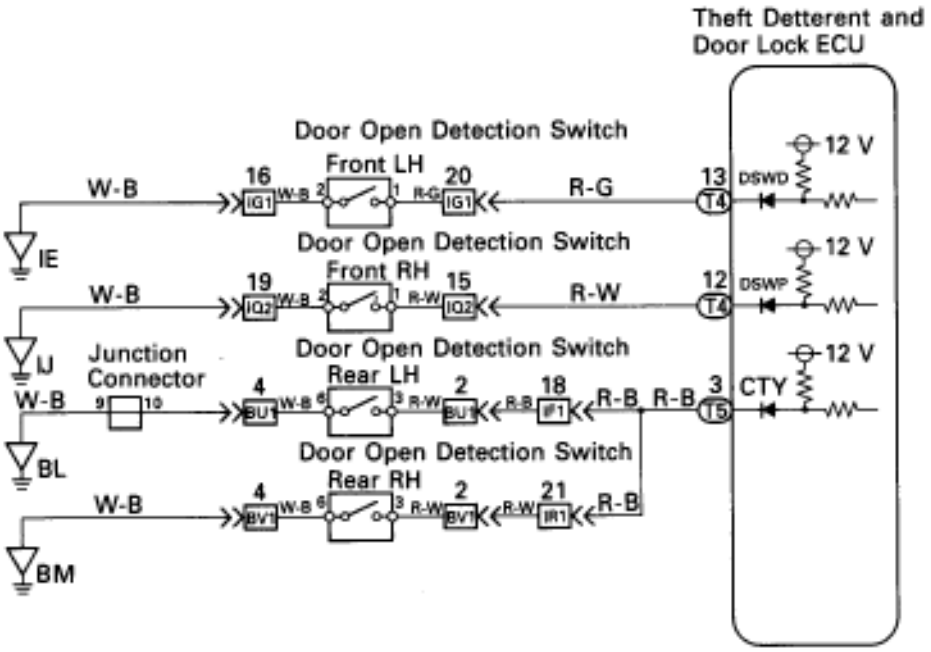
CIRCUIT DESCRIPTION

The door open detection switch is built in the door lock assembly. It is on when the door is open and off when the door is closed.

DIAGNOSTIC CHART



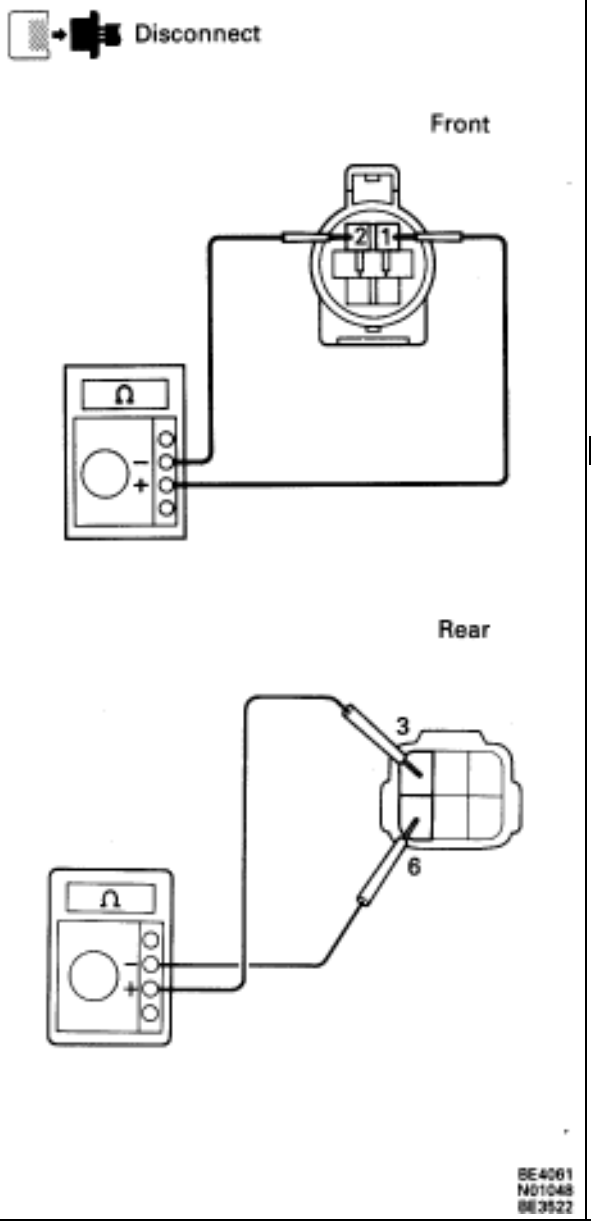
WIRING DIAGRAM



ND1258

INSPECTION PROCEDURE

1 **Check door open detection switch.**



P
1. Remove the door trim and service hole cover.
2. Disconnect door open detection switch connector.

C Check continuity between terminals 1(3) and 2(6) of door open detection switch connector, when the front door is opened and closed.

Continuity

OK

Switch condition \ Terminal	1 (3)	2 (6)
ON (Door opened)	○	○
OFF (Door closed)		

Hint The terminal number without bracket is for the Front, the number with the bracket is for the Rear.

OK → **NG** → **Replace door open detection switch.**

2 **Check harness and connectors between ECU and door open detection switch, door open detection switch and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page BE–365).

CRUISE CONTROL SYSTEM

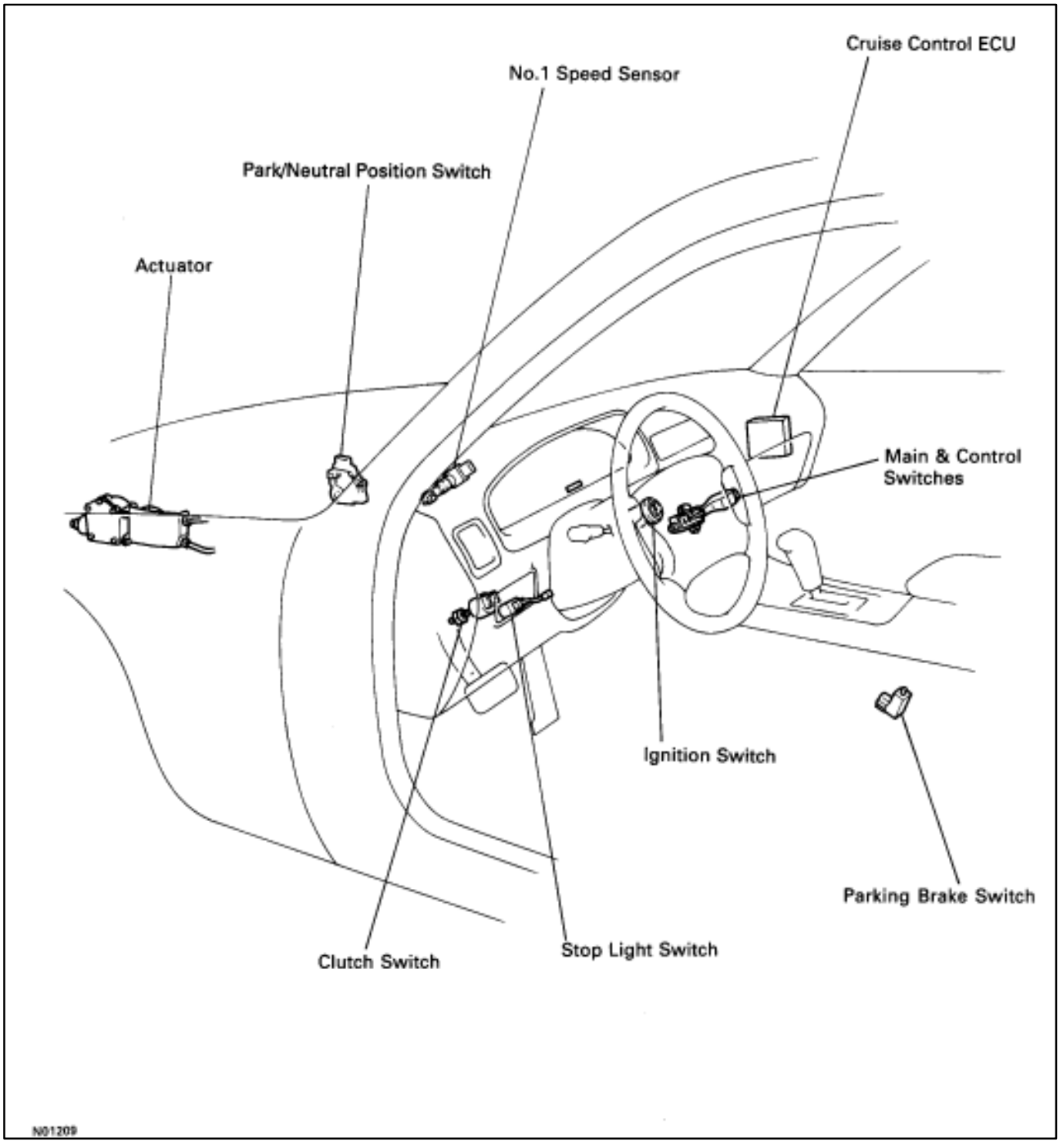
Description

The cruise control system is standard, which is convenient when driving continuously at a constant speed.

The cruise control ECU controls all cruise control functions.

A diagnosis function is built in. In the unlikely event of a malfunction in the system, the problem area is detected by the cruise control ECU and it causes the power indicator light on the combination meter to blink, warning the driver that there is an abnormality as well as storing a malfunction code in the ECU memory for the service technician to retrieve.

Parts Location



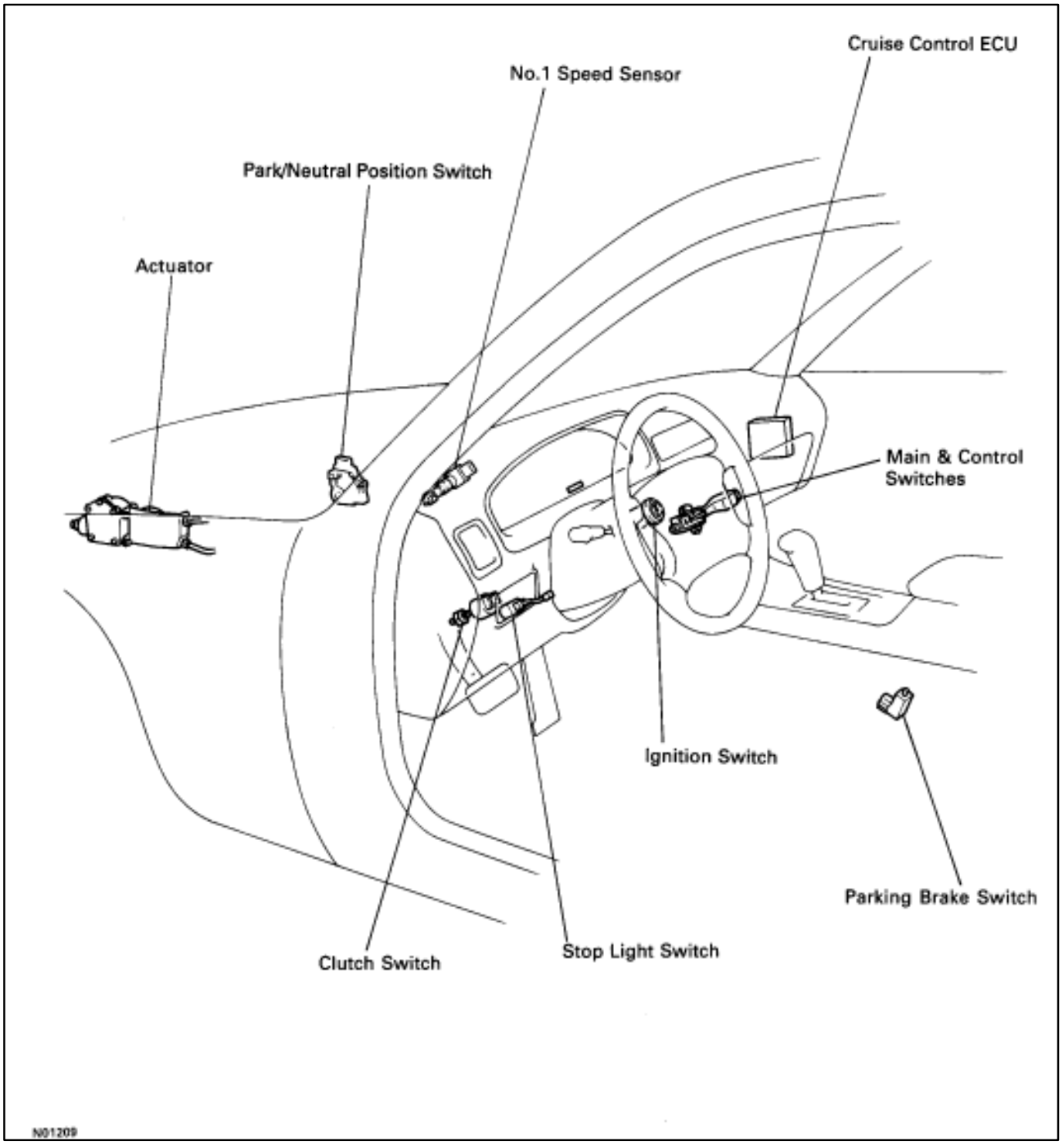
Description

The cruise control system is standard, which is convenient when driving continuously at a constant speed.

The cruise control ECU controls all cruise control functions.

A diagnosis function is built in. In the unlikely event of a malfunction in the system, the problem area is detected by the cruise control ECU and it causes the power indicator light on the combination meter to blink, warning the driver that there is an abnormality as well as storing a malfunction code in the ECU memory for the service technician to retrieve.

Parts Location



HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.

CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem.

2 CHECK AND CLEAR THE DIAGNOSTIC TROUBLE CODES (PRECHECK)

When there is a problem with the cruise control being canceled or failing to set, first check the diagnostic trouble code if there are any trouble codes stored in memory. If there are trouble codes, make a note of them, then clear them and proceed to" ⁎ Problem Symptom Confirmation".

⁎ PROBLEM SYMPTOM CONFIRMATION, 4 SYMPTOM SIMULATION

Comfirm the problem symptoms. If the problem does not reappear, be sure to simulate the problem by mainly checking the circuits indicated by the diagnostic trouble code in step 2, using "Problem Simulation Method".

5 DIAGNOSTIC TROUBLE CODE CHECK

Check the diagnostic trouble codes. Determine if the problem is in the sensors or the wire harness.

If a malfunction code is present, proceed to" 6 Diagnostic Trouble Code Chart". If the normal code is output, proceed to " 7 Matrix Chart of Problem Symptoms".

Be sure to proceed to " 6 Diagnostic Trouble Code Chart" after 2 and ⁎.

If troubleshooting is attempted after only the first malfunction code in the memory is output, errors could be made in the diagnosis.

6 DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is confirmed in the diagnostic trouble code check, proceed to the check procedure indicated by the matrix chart for each diagnostic trouble code.

7 MATRIX CHART OF PROBLEM SYMPTOMS

If the normal code is confirmed in the diagnostic trouble code check, perform inspection in accordance with the inspection order in the matrix chart of problem symptoms.

8 CIRCUIT INSPECTION

Proceed with diagnosis of each circuit in accordance with the inspection order in 6 and 7.

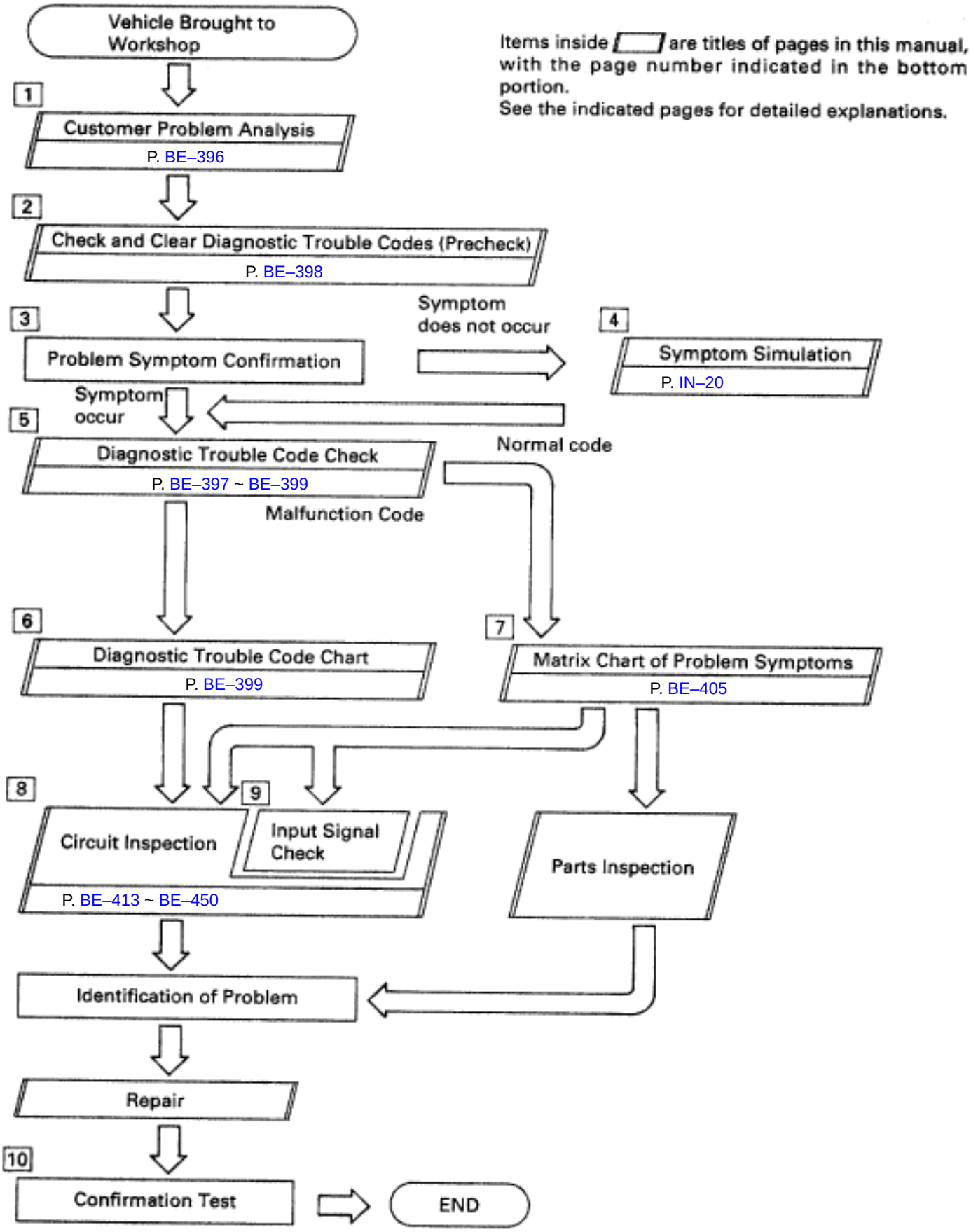
Determine whether the cause of the problem is in the sensor, actuators, wire harness and connectors, or the ECU.

9 INPUT SIGNAL CHECK

Check whether signals from the stop light switch and park/neutral position switch, etc. are input normally to the ECU. This check is indicated in the flow chart for each circuit.

10 CONFIRMATION TEST

After completing repairs, confirm not only that the malfunction is eliminated, but also perform a drive test, etc. to make sure the entire cruise control system is operating correctly.


Vehicle Brought to Workshop
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.
1
Customer Problem Analysis
P. BE–396
2
Check and Clear Diagnostic Trouble Codes (Precheck)
P. BE–398
3
Problem Symptom Confirmation
Symptom does not occur
4
Symptom Simulation
P. IN–20
Symptom occur
5
Diagnostic Trouble Code Check
P. BE–397 ~ BE–399
Normal code
Malfunction Code
6
Diagnostic Trouble Code Chart
P. BE–399
7
Matrix Chart of Problem Symptoms
P. BE–405
8
Circuit Inspection
9
Input Signal Check
P. BE–413 ~ BE–450
Parts Inspection
Identification of Problem
Repair
10
Confirmation Test
END

HOW TO PROCEED WITH TROUBLESHOOTING USING VOLT/OHM METER AND CRUISE CONTROL CHECKER

For the explanation of steps ~ and 9 ~ [12], see the explanation of steps with the same title on page BE–392.

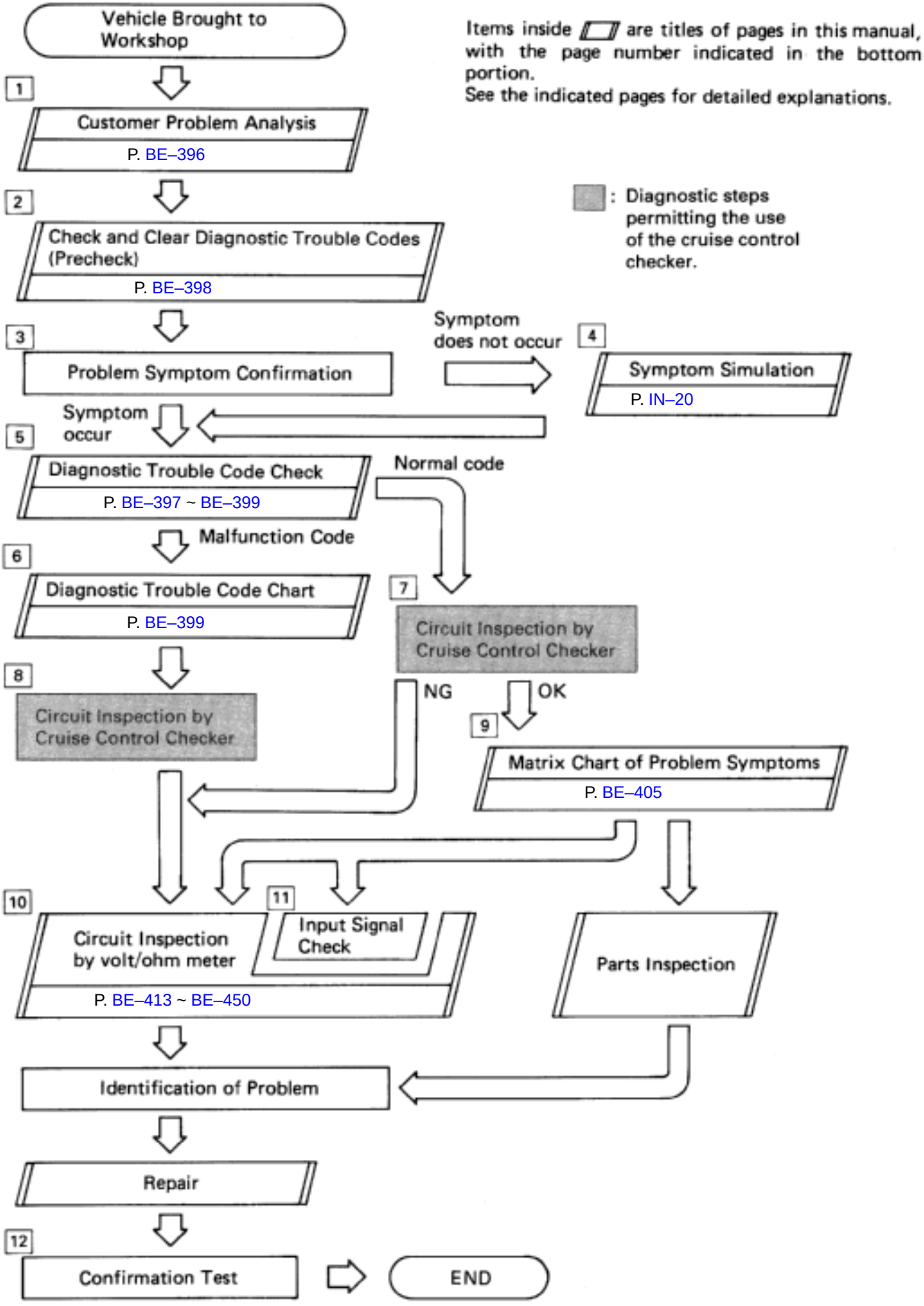
7 8 CIRCUIT INSPECTION BY CRUISE CONTROL CHECKER

If the Normal code is displayed in the diagnostic trouble code check, check all the circuits which can be inspected using the checker.

If a malfunctioning circuit is then detected, proceed to ”Circuit Inspection by Volt/Ohm Meter” and check the applicable circuit using a volt/ohm meter. Determine if the malfunction is in the sensor, actuator, wire harness, connector or the ECM. If the malfunctioning circuit cannot be detected using the checker, proceed to ”Matrix Chart of Problem Symptoms” and perform troubleshooting.

If a malfunction code is displayed in the diagnostic trouble code check, use the checker to inspect the circuit indicated by the diagnostic trouble code chart for the displayed code.

For instructions on how to connect the checker to the vehicle and how to use the checker, please refer to the Instruction Manual for Cruise Control.


Vehicle Brought to Workshop
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.
1
Customer Problem Analysis
P. BE–396
2
Check and Clear Diagnostic Trouble Codes (Precheck)
P. BE–398
: Diagnostic steps permitting the use of the cruise control checker.
3
Problem Symptom Confirmation
Symptom does not occur
4
Symptom Simulation
P. IN–20
Symptom occur
5
Diagnostic Trouble Code Check
P. BE–397 ~ BE–399
Normal code
Malfunction Code
6
Diagnostic Trouble Code Chart
P. BE–399
7
Circuit Inspection by Cruise Control Checker
8
Circuit Inspection by Cruise Control Checker
NG
OK
9
Matrix Chart of Problem Symptoms
P. BE–405
10
Circuit Inspection by volt/ohm meter
11
Input Signal Check
P. BE–413 ~ BE–450
Parts Inspection
Identification of Problem
Repair
12
Confirmation Test
END

CUSTOMER PROBLEM ANALYSIS CHECK SHEET

CRUISE CONTROL Check Sheet

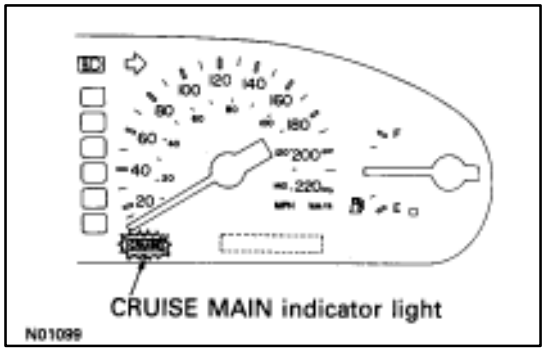
Inspector's Name:

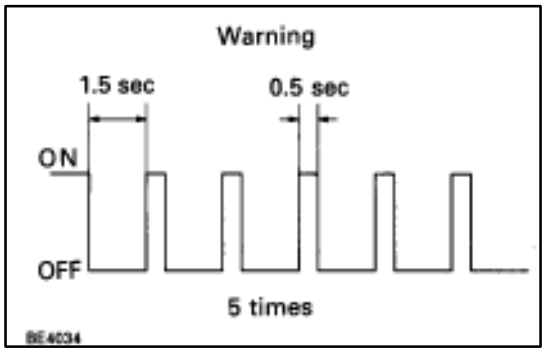
Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km Miles

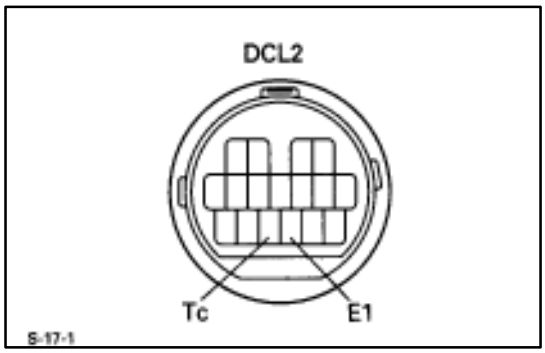
Condition of Problem Occurrence	**Date of Problem Occurence**	/ /
	How Often Does Problem occur?	4 Continuous 4 Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	km/h mile/h

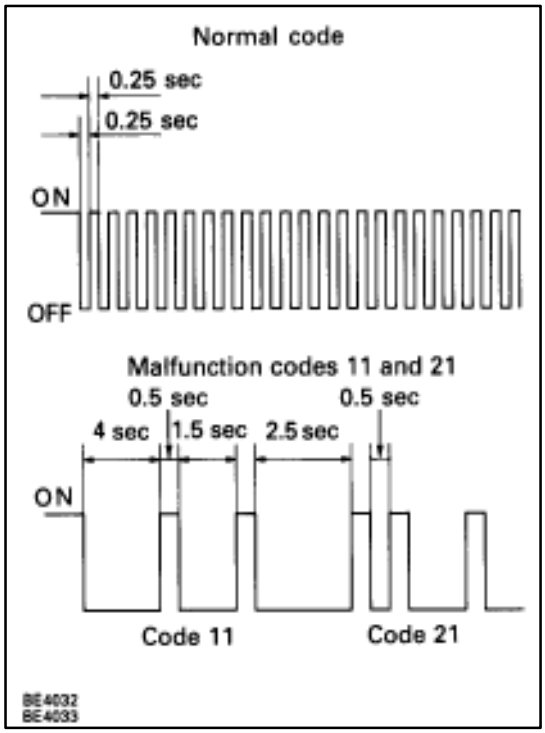
Symptoms	4 Auto cancel occurs	* Driving condition 4 City driving 4 Freeway 4 Up hill 4 Down hill * After cancel occurred, did the driver activate cruise control again? 4 Yes 4 No
	4 Cancel does not occur	4 With brake ON 4 With parking brake ON 4 With clutch ON 4 During N range shift 4 At 40 km/h (25 mph) or less 4 When control SW turns to CANCEL position
	4 Cruise control malfunction	4 Slip to acceleration side 4 Slip to aeceleration side 4 Hunting occurs 4 O/D cut off does not occur 4 O/D does not return
	4 Switch malfunction	4 SET 4 ACCEL. 4 COAST 4 RESUME 4 CANCEL
	4 Faulty CRUISE MAIN indicator light	4 Remains ON 4 Does not light up 4 Blinking

Diagnostic Trouble Code Check	1st Time	4 Normal Code 4 Malfunction Code (Code)
	2nd Time	4 Normal Code 4 Malfunction Code (Code)









DIAGNOSIS SYSTEM

INDICATOR CHECK

1. Turn the ignition switch to ON.
2. Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.
   HINT: If the indicator check result is not normal, proceed to troubleshooting (See page BE–146) for the combination meter section.

DIAGNOSTIC TROUBLE CODE CHECK

HINT: If a malfunction occurs in the speed sensors or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and blinks the CRUISE MAIN indicator light 5 times to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.

Output of Diagnostic Trouble Code

1. Turn the ignition switch ON.
2. Using SST, connect terminals Tc and E, of DCL2.
   SST 09843–18020
3. Read the diagnostic trouble code on the CRUISE MAIN indicator light.
   HINT: If the diagnostic trouble code is not output, inspect the Tc circuit (See page BE–448).

   As an example, the blinking patterns for codes; normal, 11 and 21 are shown in the illustration.
4. Check for the problem using the diagnostic trouble code table on the next page.
5. After completing the check, disconnect terminals Tc and E, and turn off the display.

DIAGNOSTIC TROUBLE CODE

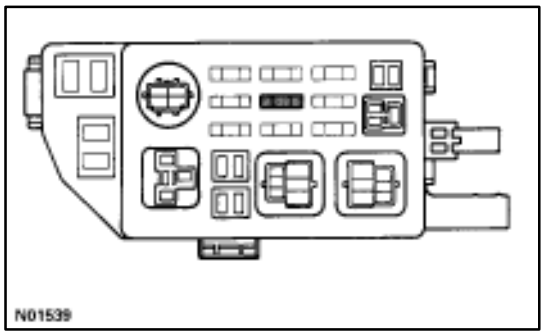
Code No.	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
–	ON OFF BE3931	Normal
11	ON OFF BE3931	• Continuous output to motor acceleration side. • Overcurrent (short) in motor circuit.
12	ON OFF BE3931	• Overcurrent (short) in magnet clutch circuit. • Open in magnet clutch circuit.
13	ON OFF BE3931	• Open in actuator motor circuit. • Position sensor detects abnormal voltage. • Position sensor signal value does not change when the motor operates.
21	ON OFF BE3932	• Speed signal is not input to the ECU.
*23	ON OFF BE3932	• Actual vehicle speed has dropped by 16 km/h (10 mph) or more below the set speed during crusing.
32	ON OFF BE3933	• Short in control switch circuit.
34	ON OFF BE3933	• Voltage abnormality in control switch circuit.

When 41 code is indicated, replace the cruise control ECU.

41	ON OFF BE3934	

HINT: When two or more codes are indicated, the lowest numbered code will be displayed first.

(*) When the vehicle speed is reduced on uphill roads, the speed can be set again and driving continued. (This is not a malfunction.)



Diagnostic Trouble Code Clearance

1. After completing trepairs the diagnostic trouble code retained in memory can be cleared by removing the DOME fuse for 10 seconds or more, with the ignition switch off.
2. Check that the normal code is displayed after connecting the fuse.

DIAGNOSTIC TROUBLE CODE CHART

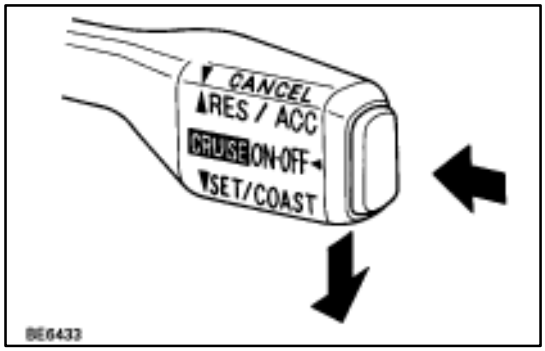
If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code in the table below and proceed to the page given.

The circuits indicated by on the matrix chart can be inspected using the cruise control checker.

Code No.	Circuit Inspection	Page
11	4 ✳ Actuator Motor Circuit	BE–413
12	4 ✳ Actuator Magnet Clutch Circuit	BE–415
13	4 ✳ Actuator Motor Circuit 4 ✳ Actuator Position Sensor Circuit	BE–413 BE–418
21	4 ✳ Speed Sensor Circuit	BE–420
23	4Actuator Control Cable 4 ✳ Speed Sensor Circuit 4 ✳ Actuator Motor Circuit	BE–450 BE–420 BE–413
32, 34	4 ✳ Control switch circuit. (cruise control switch)	BE–423

HINT:

1. 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.
2. If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check or replace the Cruise control ECU as the last step.

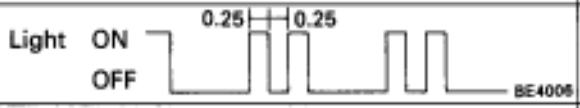
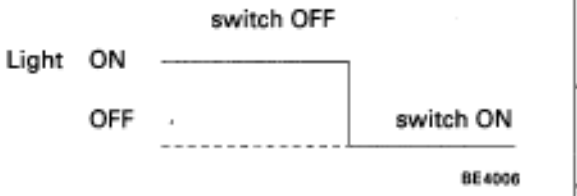


INPUT SIGNAL CHECK

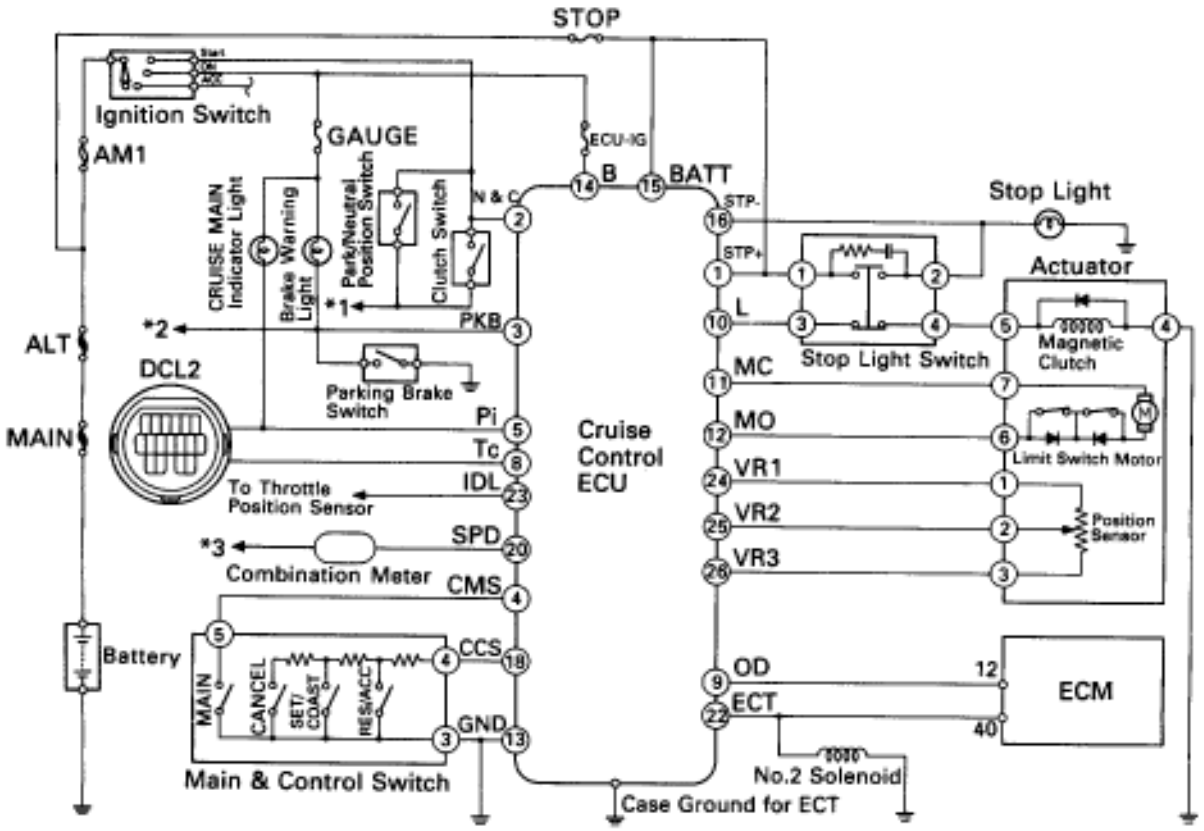
Output of Code

1. (a) For check No.1 ~ No.7
Turn the ignition switch on.
(b) For check No. 8 ~ No. 9
(1) Jack up the vehicle.
(2) Start the engine.

2. Press the control switch to SET/COAST or RES/ACC position and hold it down ①.
3. Push the main switch on ②.
4. Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.
5. Turn the SET/COAST or RES/ACC switch off.
6. Operate each switch as listed in the table below.
7. Read the blinking pattern of the CRUISE MAIN indicator light.
8. After performing the check, turn the main switch off.
HINT: When two or more signals are input to the ECU, only the lowest–numbered code is displayed.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON.		SET/COAST switch circuit is normal.
2	Turn RES/ACC switch ON.		RES/ACC switch circuit is normal.
3	Turn CANCEL switch ON.		CANCEL switch circuit is normal.
4	Turn stop light switch ON. (Depress brake pedal)		Stop light switch circuit is normal.
5	Turn parking brake switch ON.		Parking brake switch circuit is normal.
6	Turn park/neutral position switch ON. (Shift to N or P range).		Park/neutral position switch circuit is normal.
7	Turn clutch start switch ON. (Depress clutch pedal.)		Clutch switch circuit is normal.
8	Drive at 40 km/h (25 mph) or higher.		Speed sensor is normal.
9	Drive at 40 km/h (25 mph) or below.		

Wiring Diagram



*1 : To Stater Relay

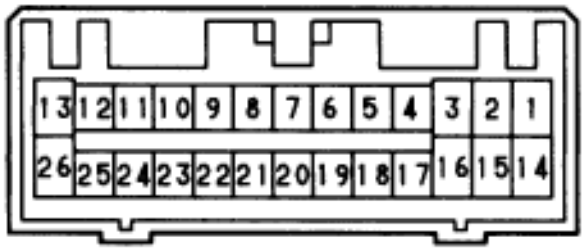
*2 : To Regulator

*3 : To No.1 Speed Sensor

N01272

TERMINALS OF ECU

CRUISE Control ECU



Vd-26-2-B

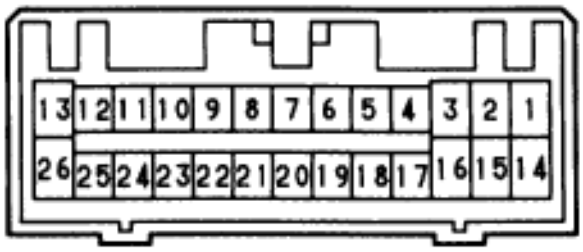
No.	Symbol	Terminal Name	No.	Symbol	Terminal Name
1	STP+	Stop Light Switch	14	B	Power Source
2	N & C	Park/Neutral Position Switch or Clutch Switch	15	BATT	Backup Power Source
3	PKB	Parking Brake Switch	16	STP–	Stop Light Switch
4	CMS	Cruise Main Switch	17		
5	Pi	CRUISE MAIN Indicator Light	18	CCS	CRUISE Control Switch
6			19		
7			20	SPD	Speed Sensor
8	Tc	DCL2	21		
9	OD	ECM	22	ECT	ECT No. 2 Solenoid
10	L	Magnet Clutch (Actuator)	23	IDL	Throttle Position Sensor
11	MC	Motor (Actuator)	24	VR1	Position Sensor (Actuator)
12	MO	Motor (Actuator)	25	VR2	Position Sensor (Actuator)
13	GND	Ground	26	VR3	Position Sensor (Actuator)

STANDARD VALUE OF ECU TERMINAL

Terminals	Symbols	Wiring Color	Condition	Standard Value
C19–1 ← → C19–13	STP+ ← → GND	G–R ← → W–B	Always	10–14 V
C19–2 ← → C19–13	N&C ← → GND	B ← → W–B	IG ON. Depress clutch pedal or P or N ranges	Below 1 V
			IG ON. Release clutch pedal and other ranges.	10–14 V
C19–3 ← → C19–13	PKB ← → GND	R–W ← → W–B	IG ON. Parking brake is operating.	Below 1 V
			IG ON. Parking brake is not operating.	10–14 V
C19–4 ← → C19–13	CMS ← → GND	W–L ← → W–B	IG ON. Main switch hold ON. (Indicator light ON)	Below 1 V
			IG ON. Main switch OFF. (Indicator light OFF.)	10–14 V
C19–5 ← → C19–13	Pi ← → GND	G–L ← → W–B	IG ON. Main switch ON. Main indicator light ON.	Below 1 V
			IG ON. Main switch OFF. Main indicator light OFF.	10–14 V
C19–8 ← → C19–13	TC ← → GND	LG–R ← → W–B	Ignition switch ON.	10–14 V
C19–9 ← → C19–13	OD ← → GND	Y–B ← → W–B	Ex. during cruise control driving.	10–14 V
			During cruise control driving and O/D switch OFF(3rd driving)	Below 1 V
C19–10 ← → C19–13	L ← → GND	G–B ← → W–B	During cruise control driving.	10–14 V
			Ex. during cruise control driving.	Below 1 V
C19–11 ← → C19–13	MC ← → GND	R–B ← → W–B	During cruise control driving and SET/COAST Switch hold ON.	8–14 V
			Ex. during cruise control driving.	Below 1 V
C19–12 ← → C19–13	MD ← → GND	R–G ← → W–B	During cruise control driving.	8–14 V
			Ex. during cruise control driving.	Below 1 V
C19–13 ← → Body Ground	GND ← → Body Ground	W–B ← → Body Ground	Always	Below 1 V
C19–14 ← → C19–13	B ← → GND	B–R ← → W–B	Ignition switch ON.	10–14 V
C19–15 ← → C19–13	BATT ← → GND	G–R ← → W–B	Always	10–14 V

Terminals	Symbols	Wiring color	Condition	Standard Value
C19–16 ← → C19–13	STP–← → GND	G–W ← → W–B	Depress brake pedal.	10–14 V
			Release brake pedal.	Below 1 V
C19–18 ← → C19–13	CCS ← → GND	W ← → W–B	IG ON. Main switch ON. Switch neutral position.	10–14 V
			IG ON. Main switch ON. CANCEL Switch hold ON.	4.2–8.7 V
			IG ON. Main switch ON. SET/COAST Switch hold ON.	2.5–6.2 V
			IG ON. Main switch ON. RESUME/ACCEL Switch hold ON.	0.8–3.6 V
C19–20 ← → C19–13	SPD ← → GND	V–Y ← → W–B	English start. Stop a vehicle.	4.5–5.5 V
			During driving.	Repeatedly changes from Below IV to 4.5–5.5 V
C19–22 ← → C19–13	ECT ← → GND	V–R ← → W–B	During cruise control driving. O/D Switch ON.	Below 1 V
			During cruise control driving. O/D Switch OFF (3rd driving)	10–14 V
C19–23 ← → C19–13	IDL ← → GND	L ← → W–B	IG ON. Throttle valve fully opened.	10–14 V
			IG ON. Throttle valve fully closed.	Below 1 V
C19–24 ← → C19–13	VR1 ← → GND	L ← → W–B	Ignition switch ON.	4.5–5.5 V
C19–25 ← → C19–26	VR2 ← → VR3	L–B ← → P	During cruise control driving.	1.1–4.5 V
			IG ON. Control plate fully opened.	3.8–4.5 V
			IG ON. Control plate fully closed.	1.1–1.4 V
C19–26 ← → C19–13	VR3 ← → GND	L–R ← → W–B	Always	Below 1 V

C19 CRUISE Control ECU



Vd-26-2-B

MATRIX CHART OF PROBLEM SYMPTOMS

If a normal code is displayed during the diagnostic trouble code check but the trouble still occurs (reappears), perform troubleshooting for each problem symptom, checking the circuits for each symptom in the order given in the table below. Proceed to the page located for each circuit.
The circuits indicated by on the matrix chart can be inspected using the cruise control checker.

See Page / Suspect Area / Symptom	BE–413 BE–415 BE–418 ✻ Actuator	BE–420 ✻ Speed Sensor Circuit	BE–423 ✻ Control Switch Circuit (Cruise Control Switch)	BE–426 ✻ Stop Light Switch Circuit	BE–429 ✻ Idle Switch Circuit (main throttle position sensor)	BE–433 ✻ ECT Communication Circuit	BE–435 ✻ Parking Brake Switch Surcuit
SET not occurring or CANCEL occurring. (DTC is Normal)	8	2	3	4			7
SET not occurring or CANCEL occurring. DTC does not output.							
Actual vehicle speed deviates above or below the set speed.	4	2			5	3	
Gear shifting is frequent between 3rd and OD when driving on uphill road. (Hunting)						1	
Cruise control not cancelled, even when parking brake pedal is depressed.	3			1			
Cruise control not cancelled, even when parking brake is operating.	3						1
Cruise control not cancelled, even when clutch pedal is depressed.	3						
Cruise control not cancelled, even when transmission is shifted to "N" range.	3						
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	3		1				
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	3	1					
Poor response in ACCEL and RESUME modes.	3					2	
O/D does not Resume, even though the road is not uphill.						1	
Diagnostic trouble code memory is erased.							
Diagnostic trouble code is not output, or is output when it should not be.							
Cruise MAIN indicator light remains ON or fail to light up.	Combination meter troubleshooting on page BE–118						

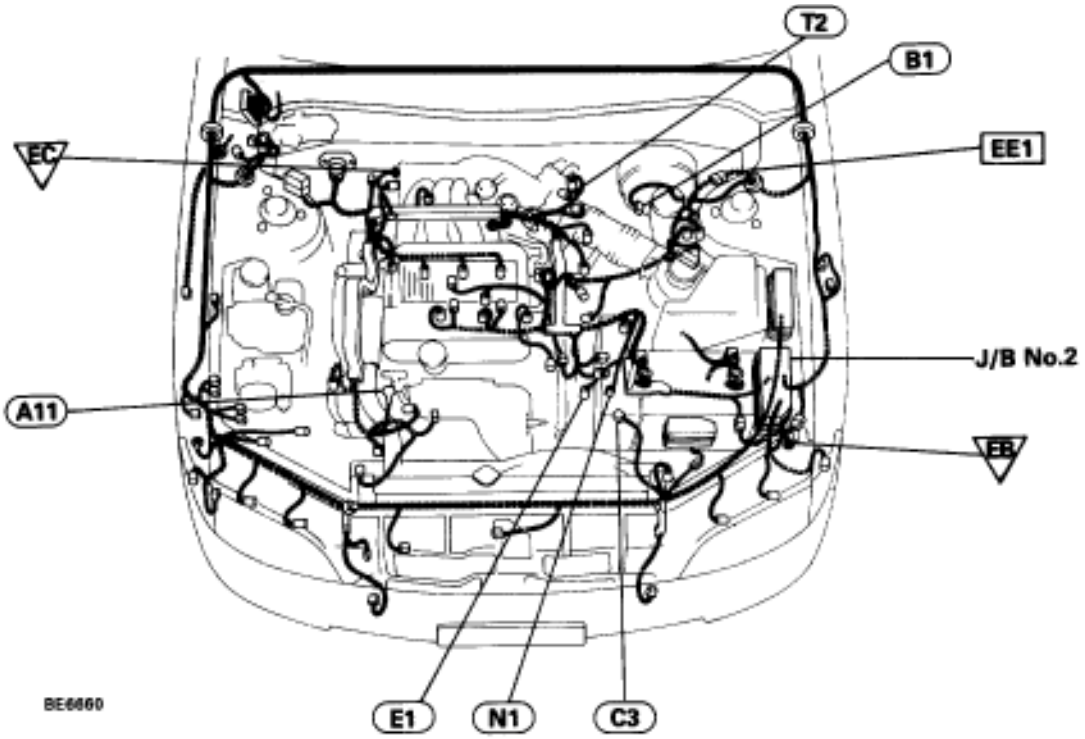
HINT:

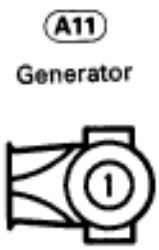
1. If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
2. If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check or replace the cruise control ECU as the last step.

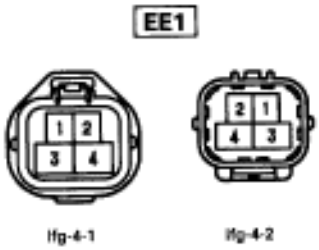
See Page / Suspect Area / Symptom	Park/Neutral Position Switch Circuit ⁜ BE–437	Clutch switch Circuit BE–439	ECU Power Source Circuit ⁜ BE–441	Back-up Power Source Circuit ⁜ BE–444	Main Switch Circuit (Cruise Control Switch) ⁜ BE–446	TC Terminal Circuit BE–448	Actuator Control Cable BE–450	Cruise Control ECU IN–32
SET not occurring or CANCEL occurring. (DTC is Normal)	5	6			1			9
SET not occurring or CANCEL occurring. DTC does not output.			1					2
Actual vehicle speed deviates above or below the set speed.							1	6
Gear shifting is frequent between 3rd and OD when driving on uphill road. (Hunting)								3
Cruise control not cancelled, even when parking brake pedal is depressed.								2
Cruise control not cancelled, even when parking brake is operating.								2
Cruise control not cancelled, even when clutch pedal is depressed.		1						2
Cruise control not cancelled, even when transmission is shifted to “N” range.	1							2
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)								2
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.								2
Poor response in ACCEL and RESUME modes.							1	4
O/D does not Resume, even though the road is not uphill.								2
Diagnostic trouble code memory is erased.				1				2
Diagnostic trouble code is not output, or is output when it should not be.						1		2
Cruise MAIN indicator light remains ON or fail to light up.	Combination meter troubleshooting on page BE–118							

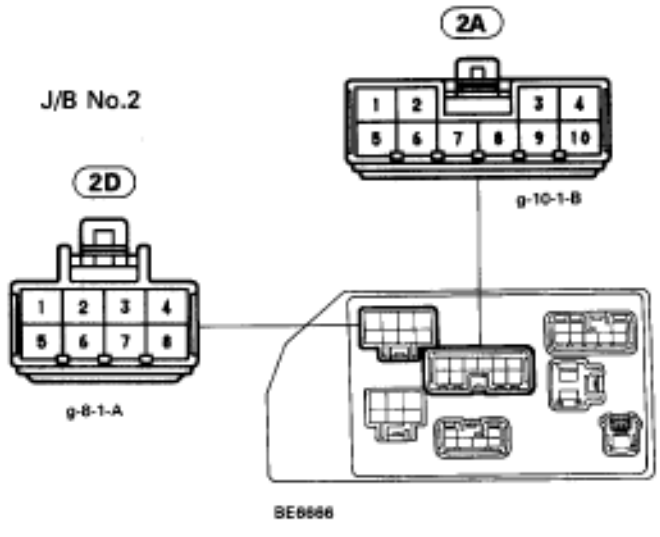
LOCATION OF CONNECTORS

Location of Connectors in Engine Compartment

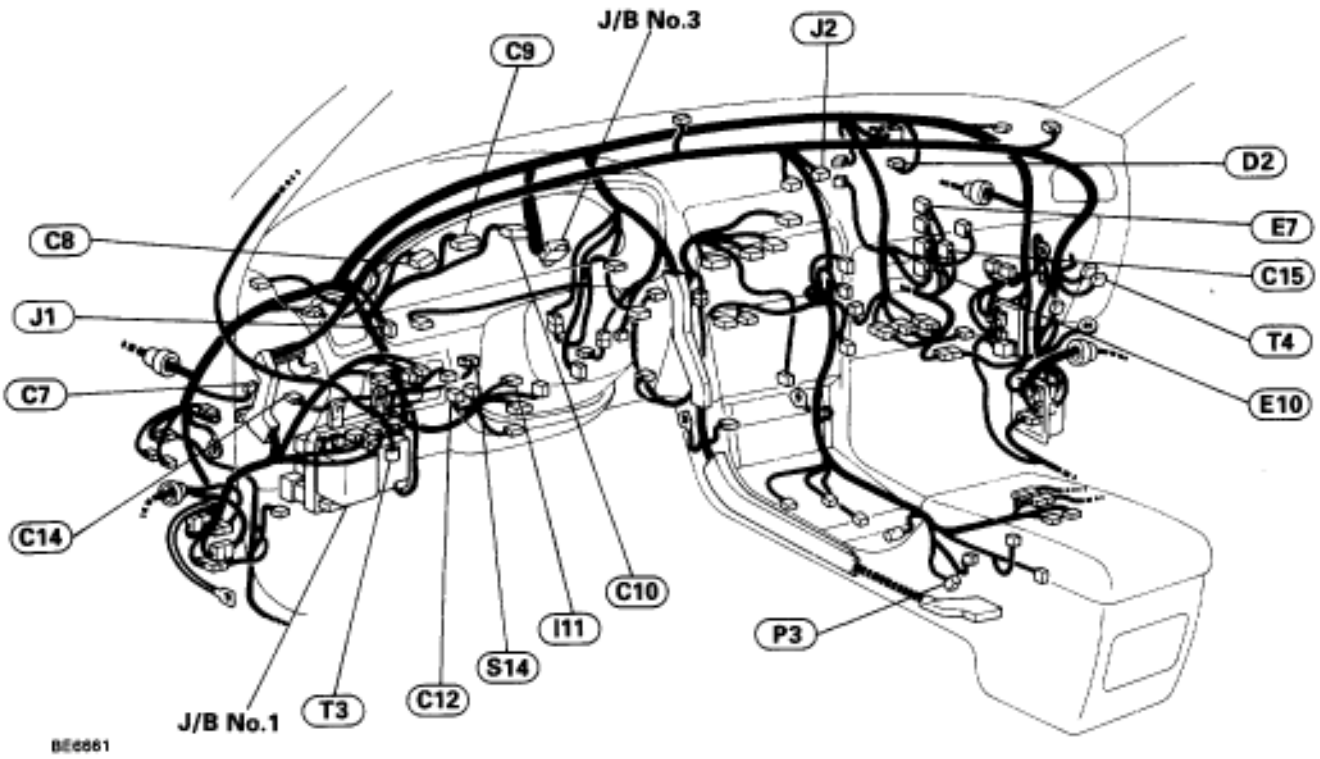


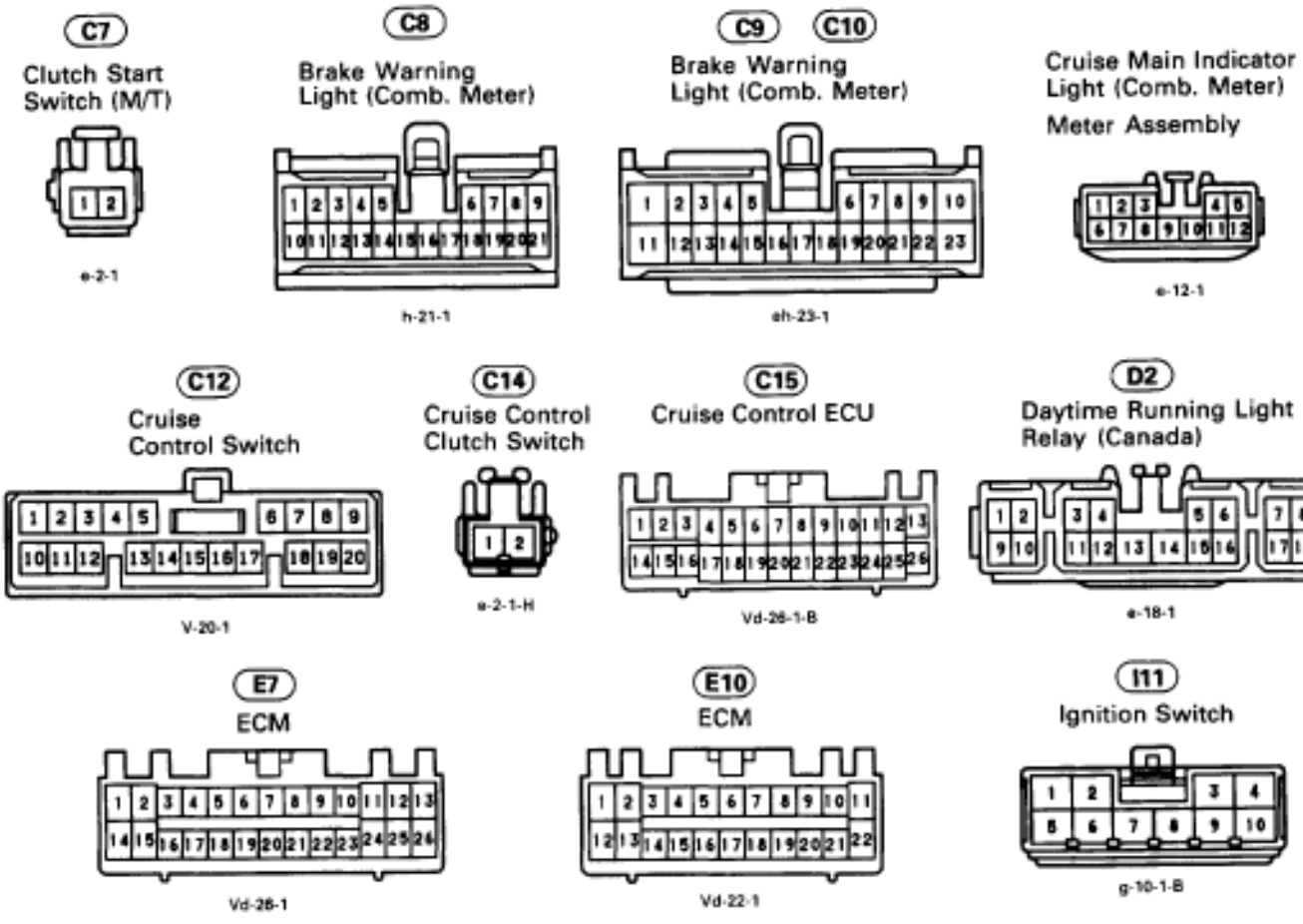




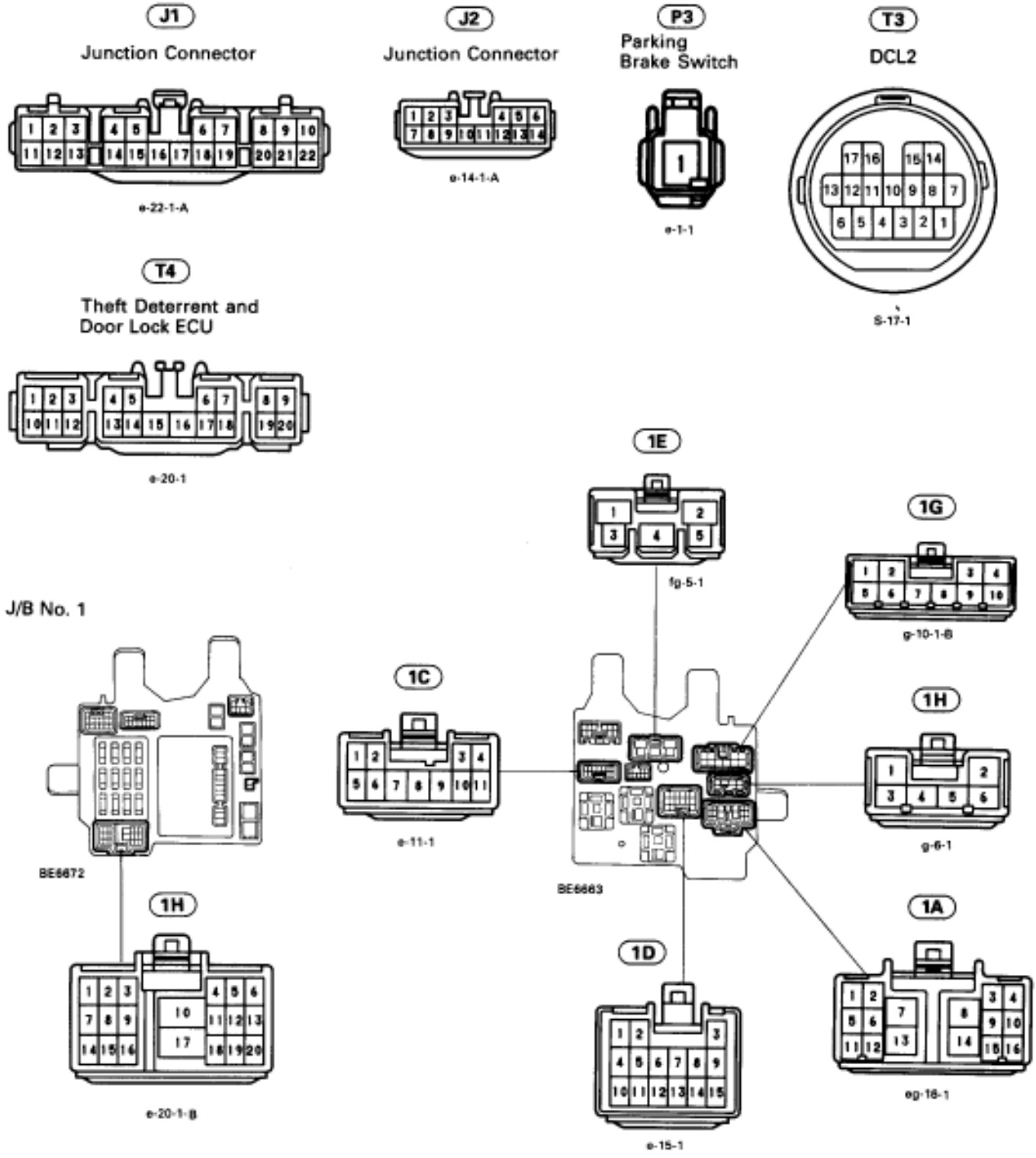


Location of Connectors in Instrument Panel

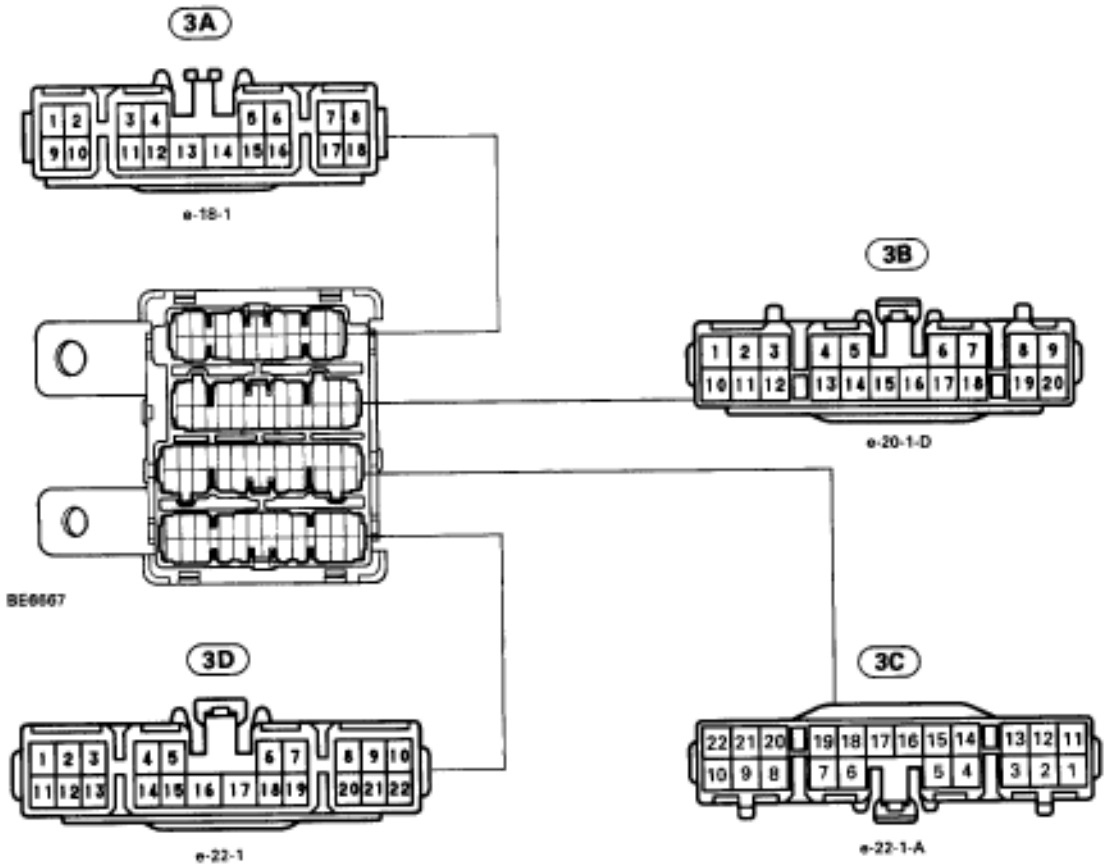




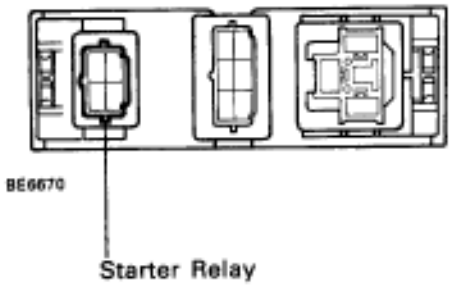
Location of Connectors in Instrument Panel



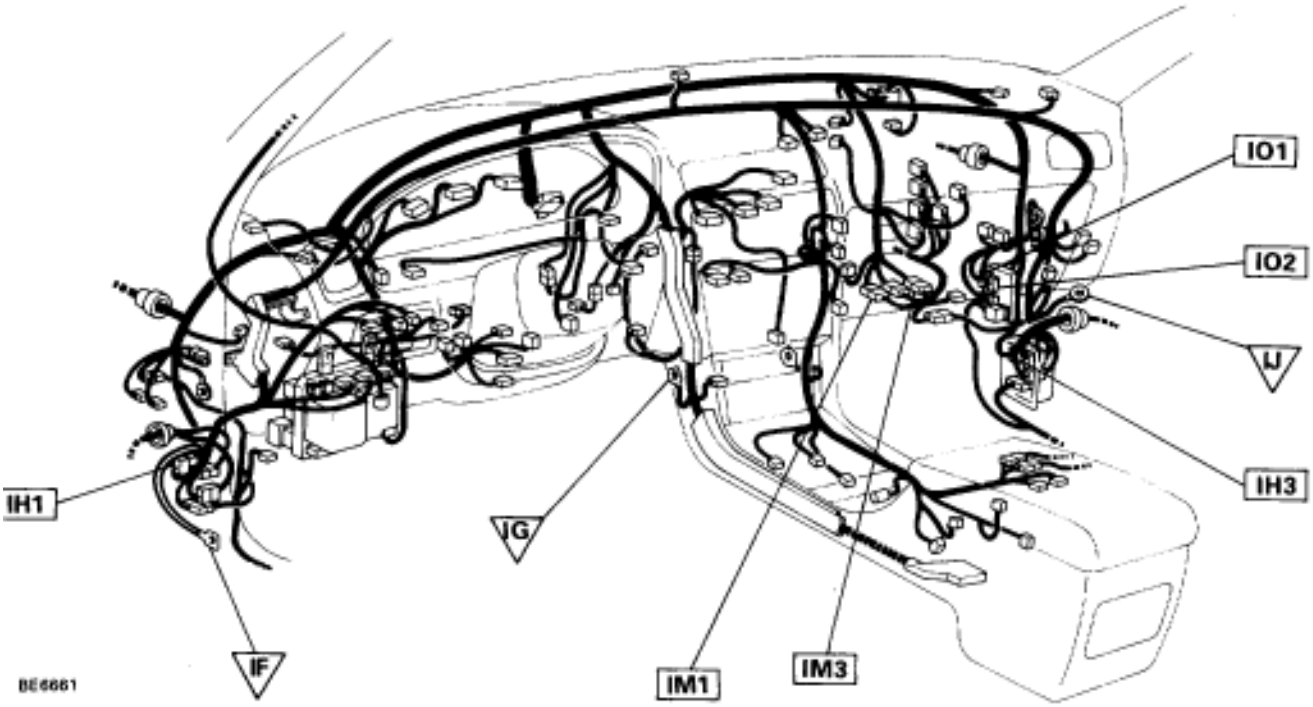
J/B No.3

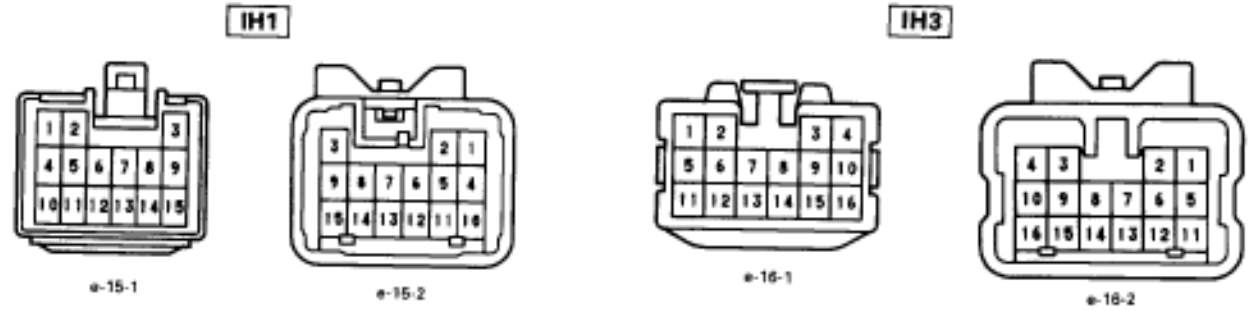

3A
e-18-1
3B
e-20-1-D
BE6667
3D
e-22-1
3C
e-22-1-A

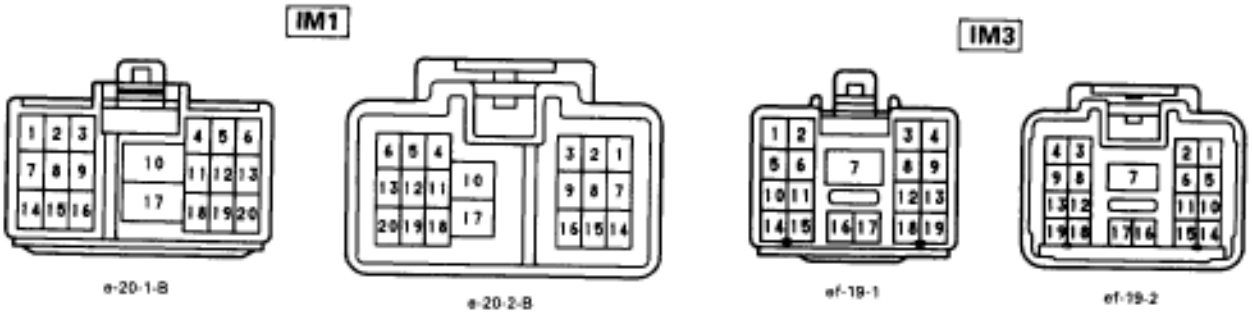
R/B No.6

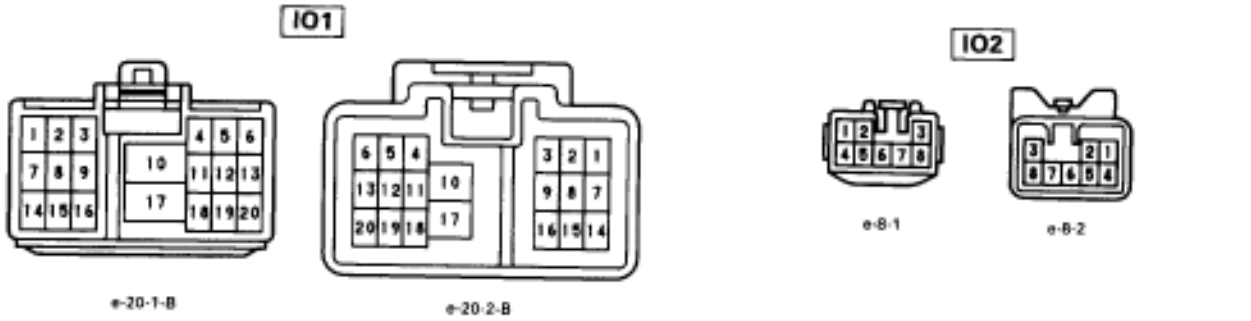

BE6670
Starter Relay

Location of Connectors in Instrument Panel

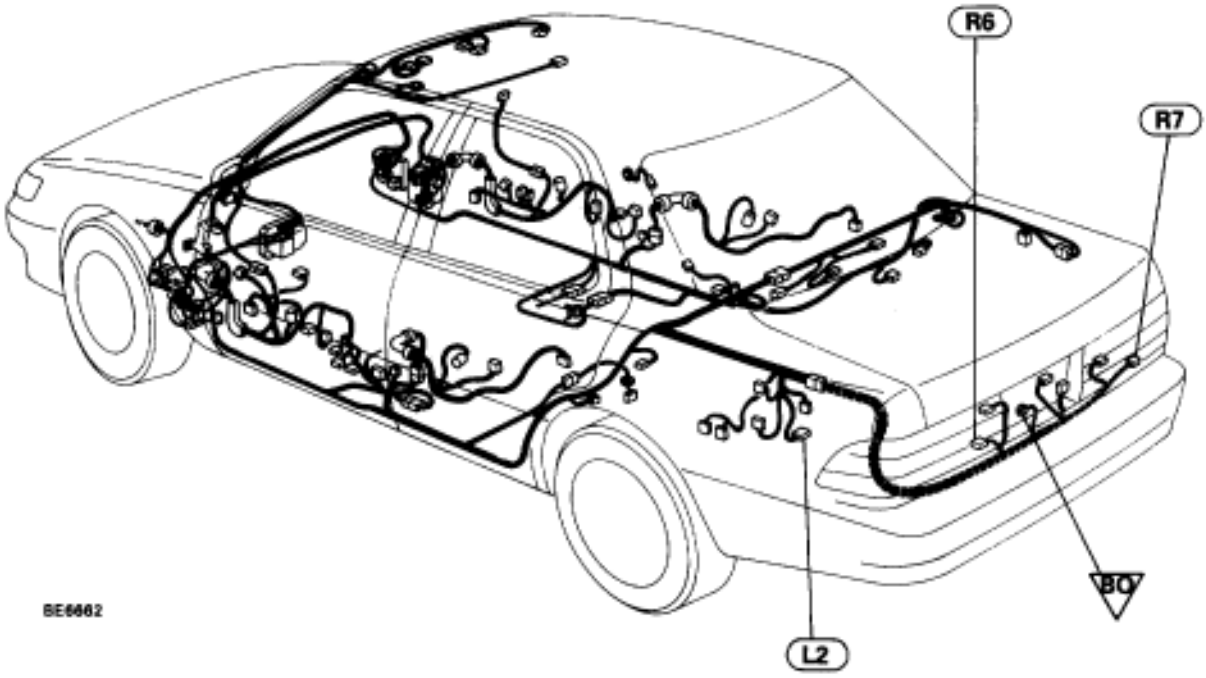








Location of Connectors in Body



L2
Light Failure Sensor

e-12-1

R6
Stop Light LH

e-6-2

R7
Stop Light RH

e-6-2

Circuit Inspection

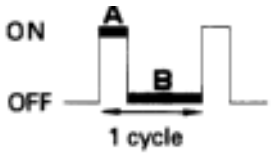
DTC	11, 13	Actuator Motor Circuit

CIRCUIT DESCRIPTION

The actuator motor is operated by signals from the ECU. Acceleration and deceleration signals are transmitted by changes in the Duty Ratio (See note below).

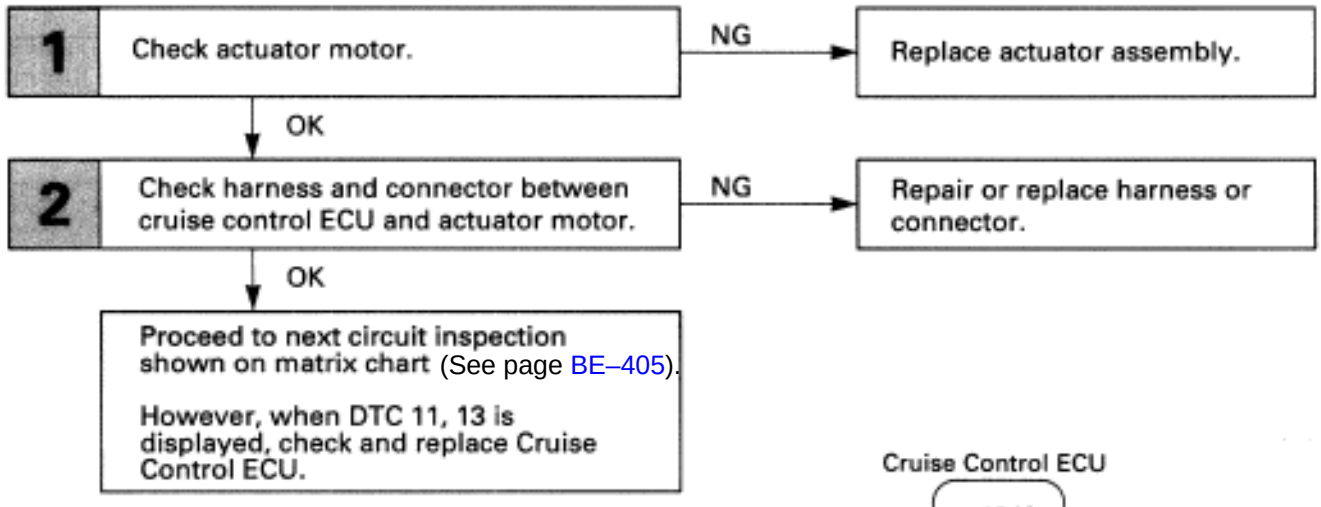
Duty Ratio
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non–continuity, then

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

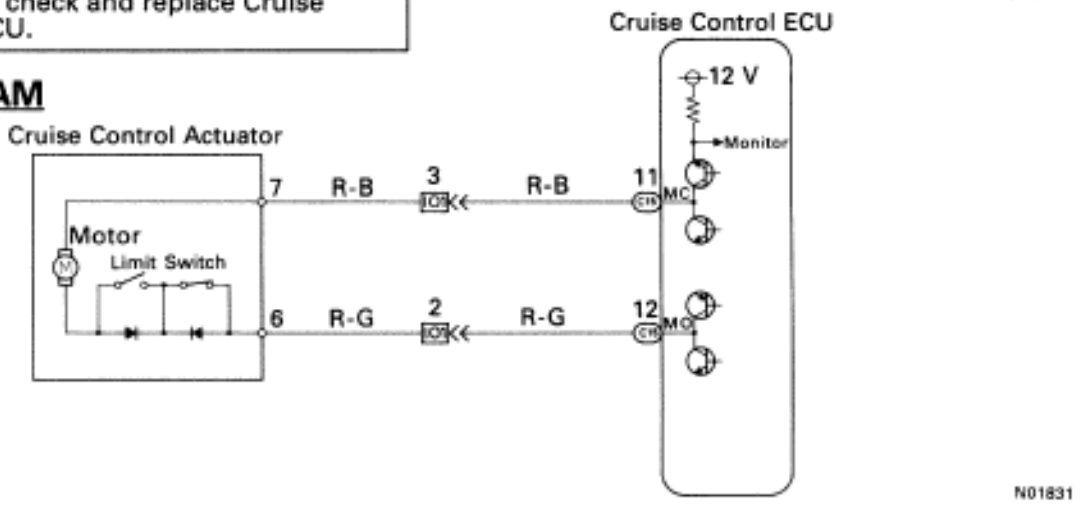


Code No.	Diagnosis	Trouble Area
11	Continuous output to motor acceleration side. Overcurrent (short) in motor circuit.	Cruise control actuator motor. Harness or connector between actuator motor and ECU. ECU
13	Open in actuator motor circuit.	

DIAGNOSTIC CHART

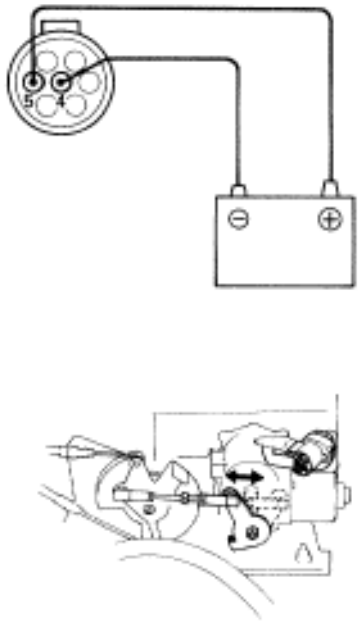


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check actuator motor.**



BE3531
N01263

P
1. Remove cruise control actuator.
2. Disconnect actuator connector.

C
1. Connect positive ⊕ lead to terminal 5 and negative ⊖ lead to terminal 4 of actuator connector. (Magnet clutch ON)
2. When battery positive voltage is applied to each terminal of actuator connector, check that the control plate moves smoothly without hesitating.

○—○ Connect

Moving direction \ Terminal	Positive ⊕	Negative ⊖	6	7
Acceleration side	○	○	○	
		○		○
Deceleration side	○			○
		○	○	

3. With the motor rotating as in 2, check that the motor is stopped by limit switches when the control plate moves to fully opened or fully closed position.

OK → **NG** → **Replace actuator assembly.**

2 **Check harness and connector between cruise control ECU and actuator motor. (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page BE–405).

However, when diag. code 11, 13 is displayed, check and replace Cruise Control ECU.

DTC 12 Actuator Magnet Clutch Circuit

CIRCUIT DESCRIPTION

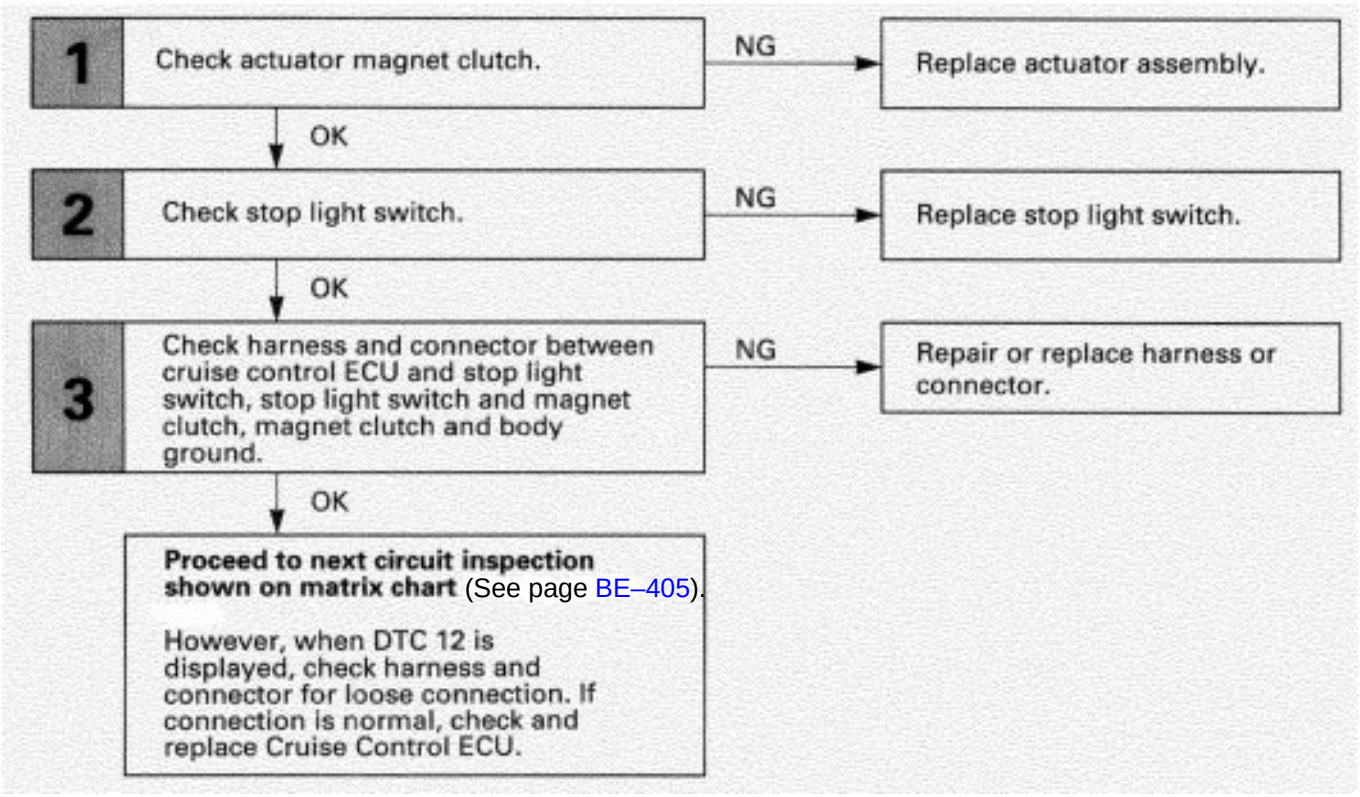
This circuit turns on the magnet clutch inside the actuator during cruise control operation according to the signal from the ECU. If a malfunction occurs in the actuator or speed sensor, etc. during cruise control, the rotor shaft between the motor and control plate is released.

When the brake pedal is depressed, the stoplight switch turns on, supplying electrical power to the stoplight. Power supply to the magnet clutch is mechanically cut and the magnet clutch is turned OFF.

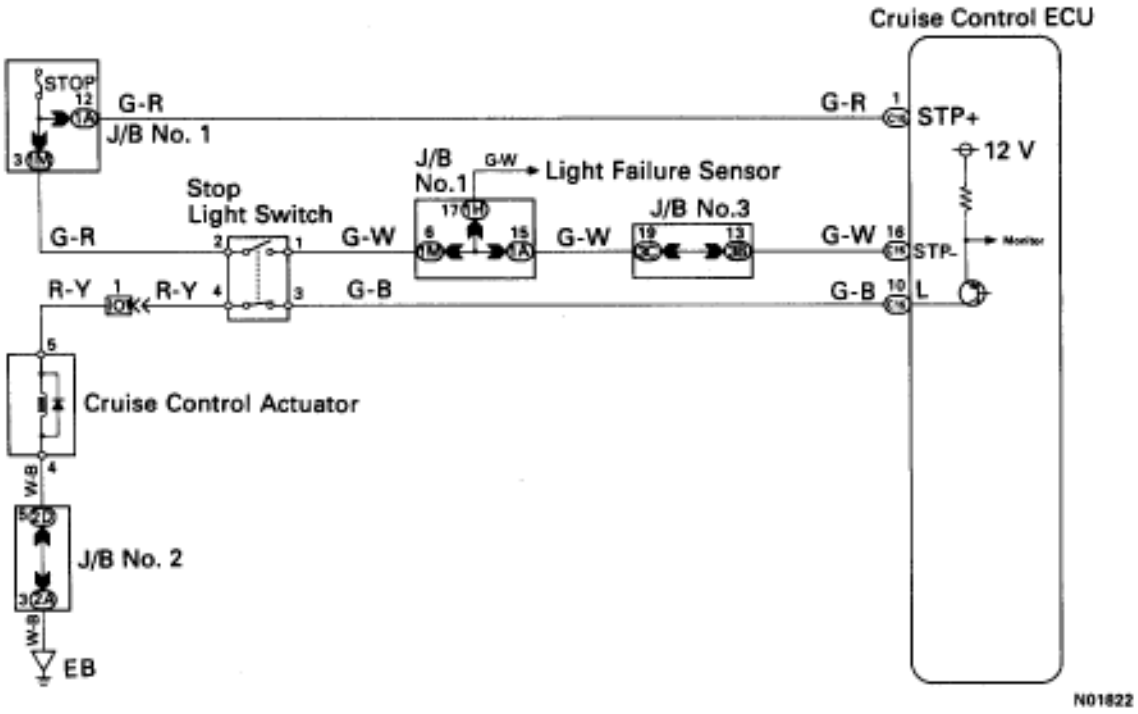
When driving downhill, if the vehicle speed exceeds the set speed by 15 km/h (9 mph), the ECU turns the magnet clutch OFF. If the vehicle speed later drops to within 10 km/h (6 mph) above the set speed, then cruise control at the set speed is resumed.

Code No.	Diagnosis	Trouble Area
12	Overcurrent (short) in magnet clutch circuit. Open in magnet clutch circuit.	Cruise control magnet clutch. Harness or connector between ECU and magnet clutch, magnet clutch and body ground. ECU

DIAGNOSTIC CHART

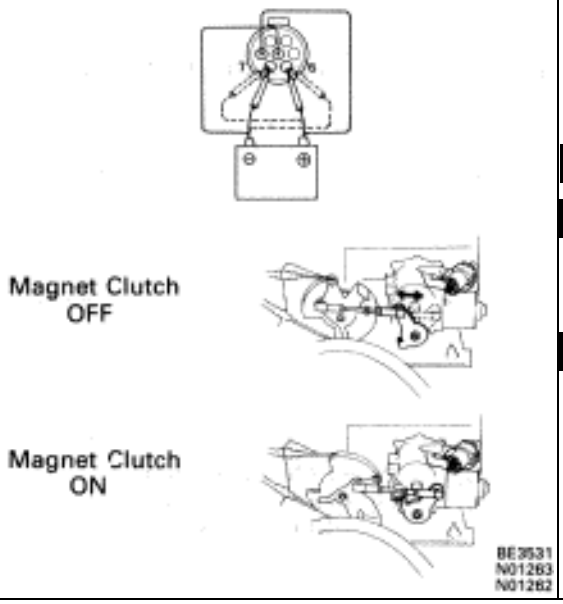


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check actuator magnet clutch.**



P
1. Remove cruise control actuator.
2. Disconnect actuator connector.

C Move the control plate by hand.

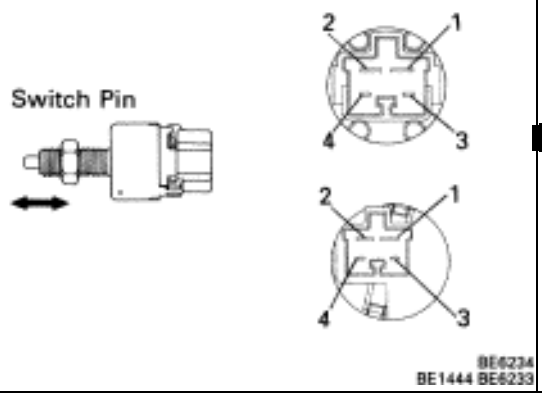
OK **Control plate moves. (Magnet clutch off).**

C
1. Connect positive ⊕ lead to terminal 5 and negative ⊖ lead to terminal 4 of actuator connector.
2. Move the plate by hand.

OK **Control plate doesn't move. (Magnet clutch on)**

OK → **NG** → **Replace actuator assembly.**

2 **Check stop light switch.**



P Disconnect stop light switch connector.

C Check continuity between terminals.

OK

○—○ Continuity

Switch position \ Terminal	1	2	3	4
Switch pin free (Brake pedal depressed)	○	○	○	○
Switch pin pushed in (Brake pedal released)				

OK → **NG** → **Replace stop light switch.**

3 **Check harness and connectors between cruise control ECU and stop light switch, stop light switch and magnet clutch, magnet clutch and body ground. (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page BE–405). However, when diag trouble code 12 is displayed, check harness and connector for loose connection. If connection is normal, check and replace Cruise Control ECU.

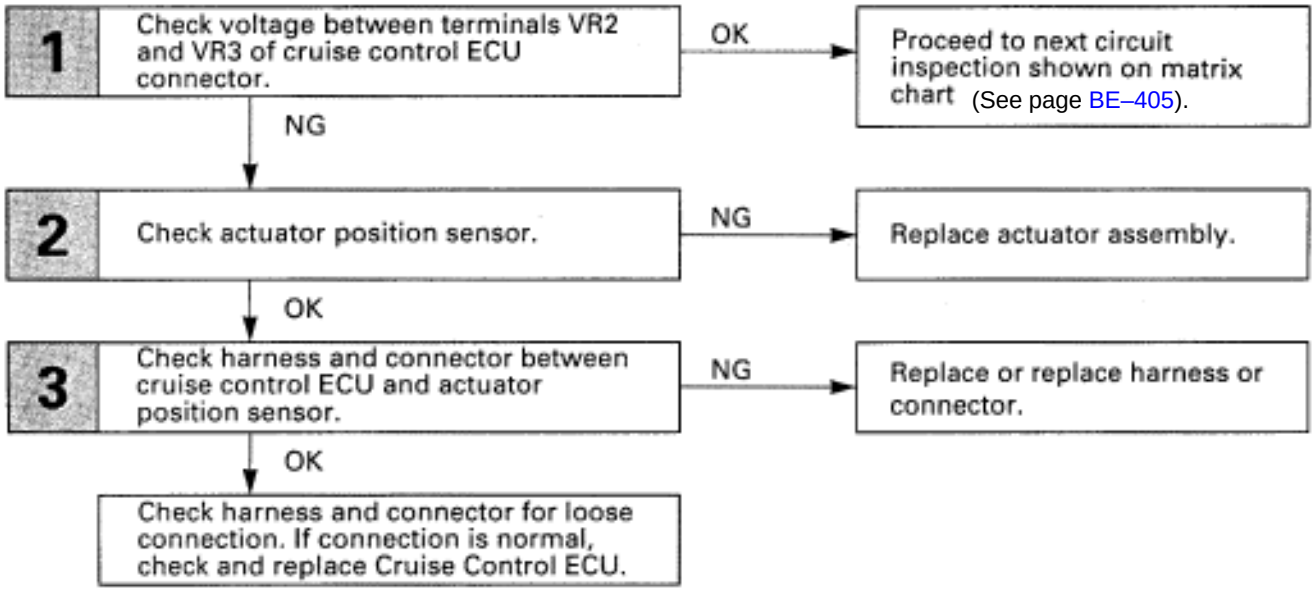
DTC 13 Actuator Position Sensor Circuit

CIRCUIT DESCRIPTION

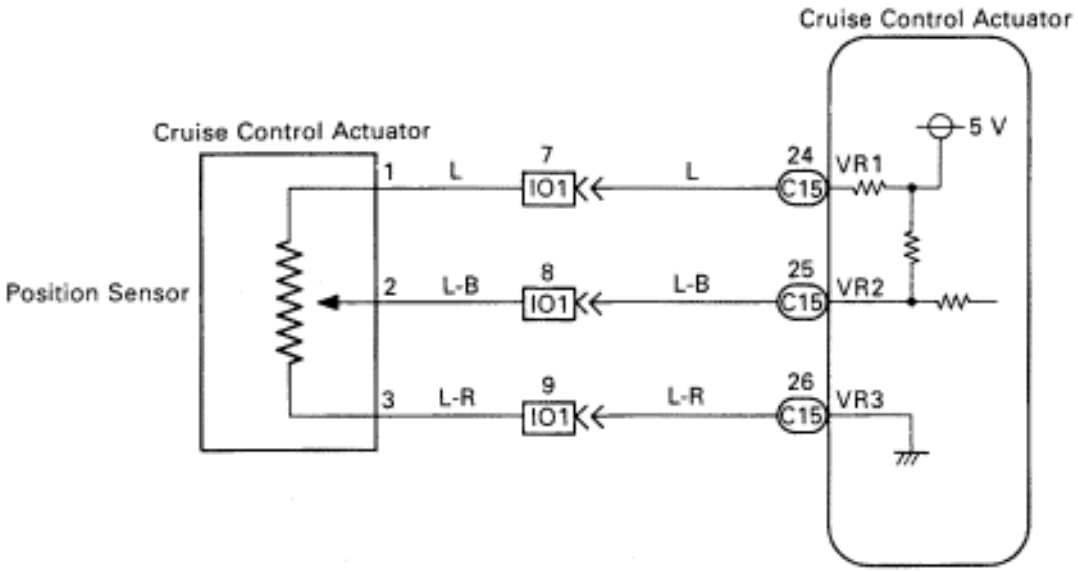
This circuit detects the rotation position of the actuator control plate and sends signal to the ECU.

Code No.	Diagnosis	Trouble Area
13	Position sensor detects abnormal voltage. Position sensor signal value does not change when the motor operates.	Cruise control actuator Position sensor. Harness or connector between actuator position sensor and body ground. ECU

DIAGNOSTIC CHART

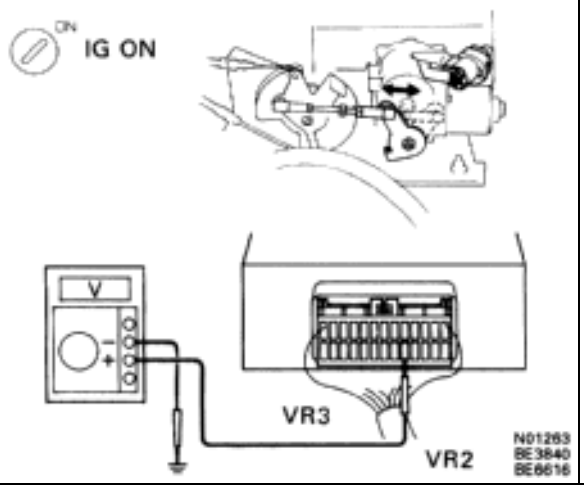


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals VR2 and VR3 of cruise control ECU connector.**



P Remove cruise control ECU with connectors still connected.

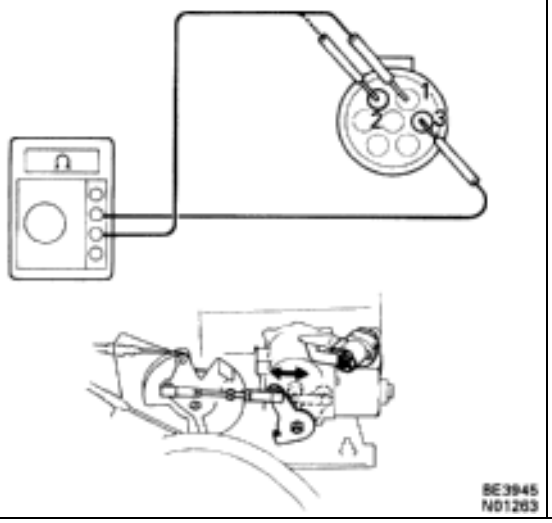
C
1. Turn ignition switch on.
2. Measure voltage between terminals VR2 and VR3 of cruise control ECU connector while turning control plate slowly by hand from the deceleration side to the acceleration side.

OK **Voltage:**
Fully closed: 1.1 – 1.4 V
Fully opened: 3.8 – 4.5 V
In addition, as the control plate is turned, the voltage should increase gradually without interruption.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

2 **Check actuator position sensor.**



P
1. Remove cruise control actuator.
2. Disconnect the actuator connector.

C Measure resistance between actuator terminals 1 and 3 of actuator connector.

OK **Resistance: 1.8 – 2.2 kΩ**

C Measure resistance between terminals 2 and 3 of actuator connector, while turning the control plate slowly by hand from the deceleration side to the acceleration side.

OK **Resistance:**
Fully closed: 500 – 550 Ω
Fully opened: 1.5 – 2.0 kΩ
In addition, as the control plate turns, the resistance should increase gradually without interruption.

OK

NG **Replace actuator assembly.**

3 **Check harness and connector between cruise control ECU and actuator position sensor. (See page IN–27)**

OK

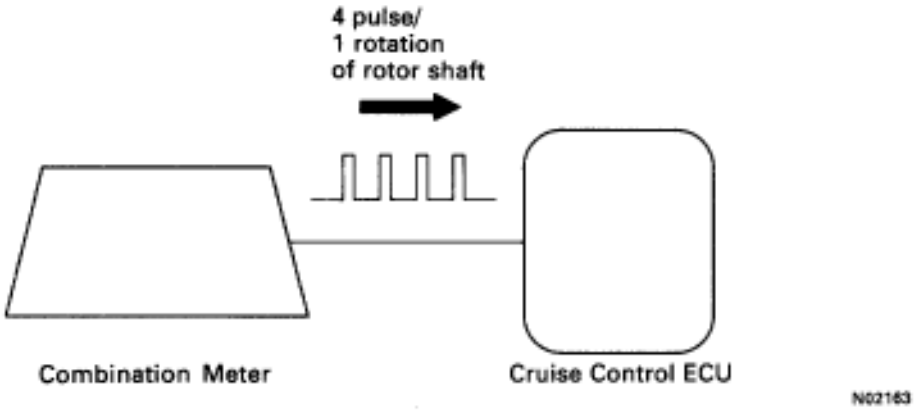
NG **Repair or replace harness or connector.**

Check harness and connector for loose connection. If connection is normal check and replace cruise control ECM.

DTC 21, 23 Actuator Sensor Circuit

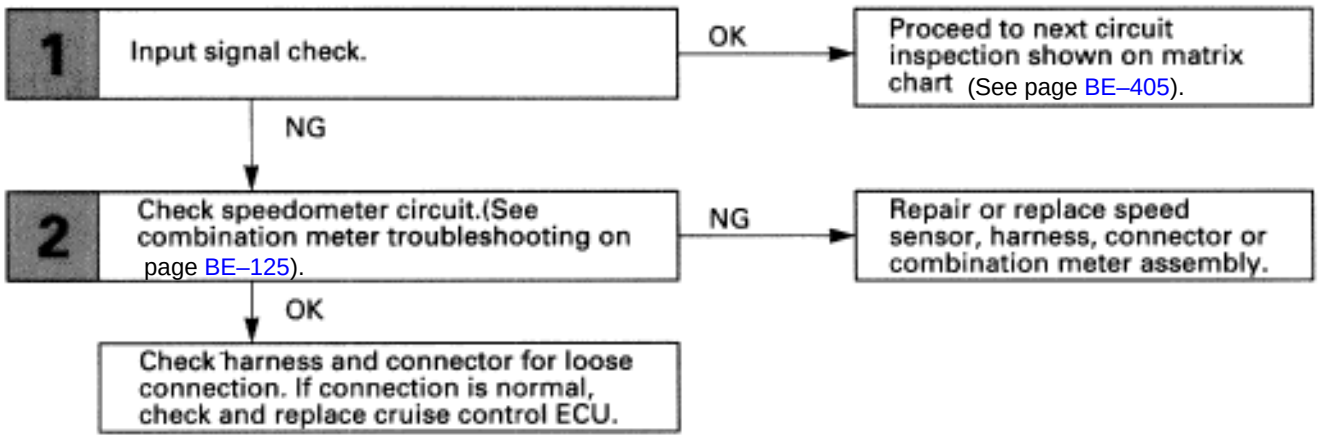
CIRCUIT DESCRIPTION

The speed sensor signal is sent to cruise control ECU as vehicle speed signal.

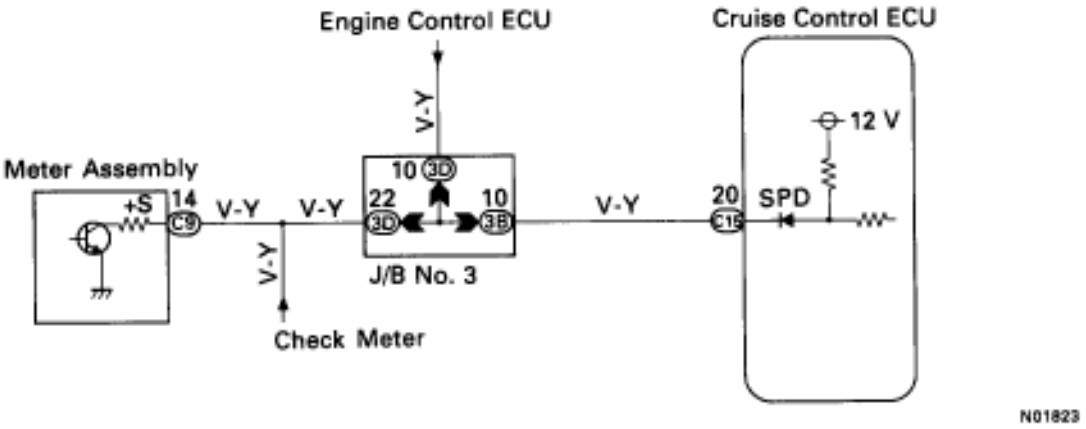


Code No.	Diagnosis	Trouble Area
21	Speed signal is not input to the ECU	Speed sensor Combination meter Harness or connector between speed sensor and combination meter, combination meter and ECU. ECU
23	Actula vehicle speed has dropped by 16 km/h (10 mph) or more below the set speed during cruising. HINT: When speed sensor circuit is opened intermittently (Below 0.2 sec), code 23 is output.	Actuator Actuator control cable Speed sensor Harness or connector in OD and SPD circuit (Open or short intermittently) ECU

DIAGNOSTIC CHART

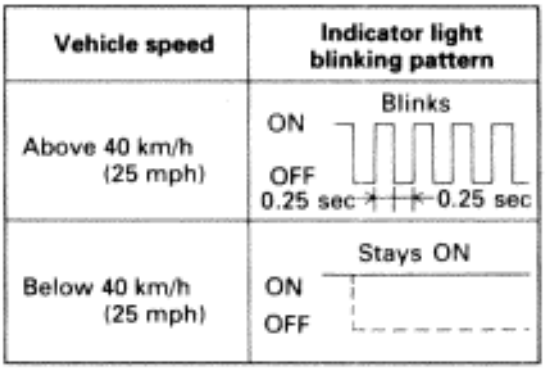


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Input signal check.**



C
1. See input signal check on page BE–400.
2. Check indicator light operation when driving with vehicle speed above 40 km/h (25 mph), and with vehicle speed below 40 km/h (25 mph).

OK
Vehicle speed above 40 km/h (25 mph)
: Indicator light blinks.
Vehicle speed below 40 km/h (25 mph)
: Indicator light stays on

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

2 **Check speedometer circuit. (See combination meter troubleshooting on page BE–125).**

OK

NG **Repair or replace speed sensor, harness, connector or combination meter assembly.**

Check harness and connector for loose connection.

If connection is normal, check and replace cruise control ECU.

DTC	32, 34	Control Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signals (each voltage) to the ECU.

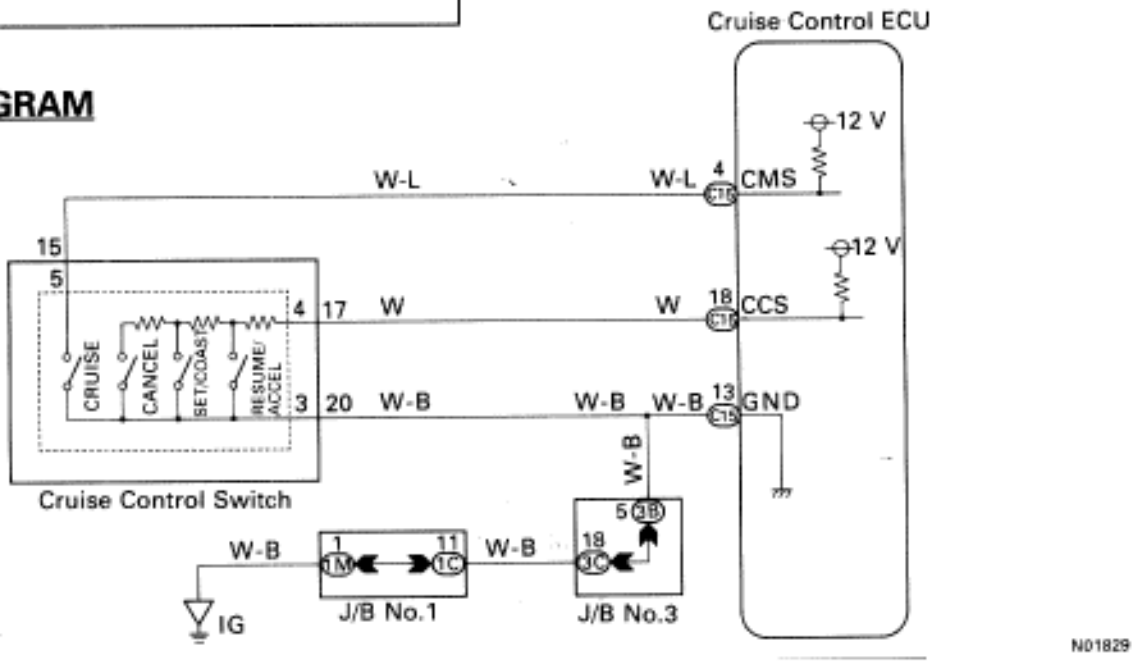
Code No.	Diagnosis	Trouble Area
32	Short in, control switch circuit.	Cruise control switch. Harness or connector between control switch and ECU. ECU
34	Voltage abnormality in control switch circuit	

DIAGNOSTIC CHART

1. Input signal check.
   - OK → Proceed to next circuit inspection shown on matrix chart (See page BE–405).
   - NG ↓
2. Check voltage between terminal CCS of cruise control ECU connector and body ground.
   - OK → Proceed to next circuit inspection shown on matrix chart (See page BE–405).
   - NG ↓
3. Check control switch.
   - NG → Replace cruise control switch.
   - OK ↓
4. Check harness and connector between cruise control ECU and control switch.
   - NG → Repair or replace harness or connector.
   - OK ↓

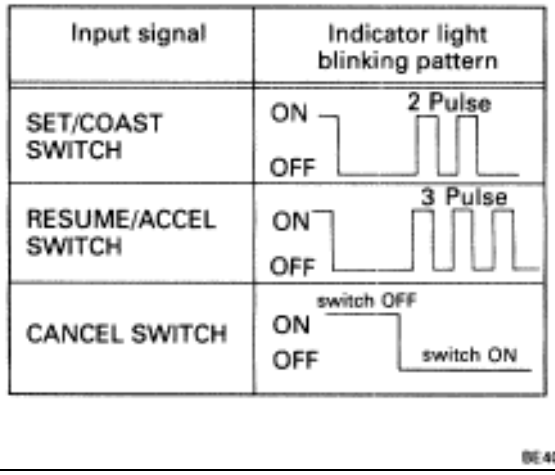
Check and replace cruise control ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Input signal check.



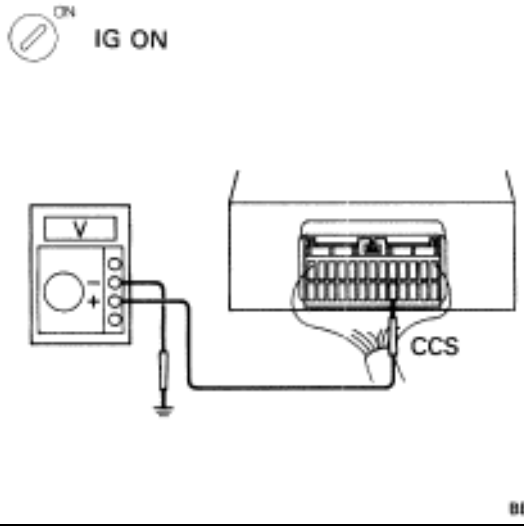
C
1. See input signal check on page BE–400.
2. Check the indicator light operation when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

OK **SET/COAST, RESUME/ACCEL switch**
The signals shown in the table on the left should be output when each switch is ON. The signal should disappear when the switch is turned OFF.
CANCEL switch
The indicator light goes off when the cancel switch is turned ON.

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

2 Check voltage between terminal CCS of cruise control ECU connector and body ground.



P Remove cruise control ECU with connectors still connected.

C
1. Turn ignition switch ON.
2. Measure voltage between terminal CCS of cruise control ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

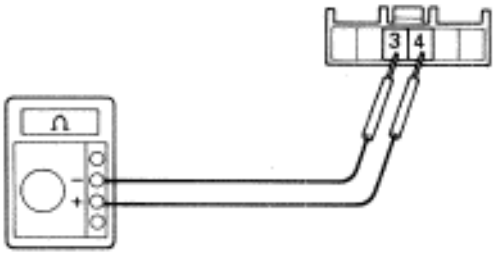
OK

Switc position	Voltage
Neutral	10–14 V
RES/ACC	0.7–2.5 V
SET/COAST	2.4–4.6 V
CANCEL	4.1–7.2 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

3 **Check control switch.**



P
1. Remove steering wheel center pad.
2. Disconnect control switch connector (See page AB–17).

C Measure resistance between terminals 3 and 4 of control switch connector when control switch is operated.

OK

Switch position	Resistance
Neutral	1 MΩ or higher
RES/ACC	60–80 Ω
SET/COAST	190–210 Ω
CANCEL	410–430 Ω

Hint When diagnostic trouble code 34 is displayed, carefully check that resistance is always 1 MΩ or higher in neutral position, particularly when switching between REC/ACC and SET/COAST.

OK → **NG** → **Replace cruise control switch.**

4 **Check harness and connector between cruise control ECU and control switch (See page IN–27)**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace cruise control ECU.

Stop Light Switch Circuit

CIRCUIT DESCRIPTION

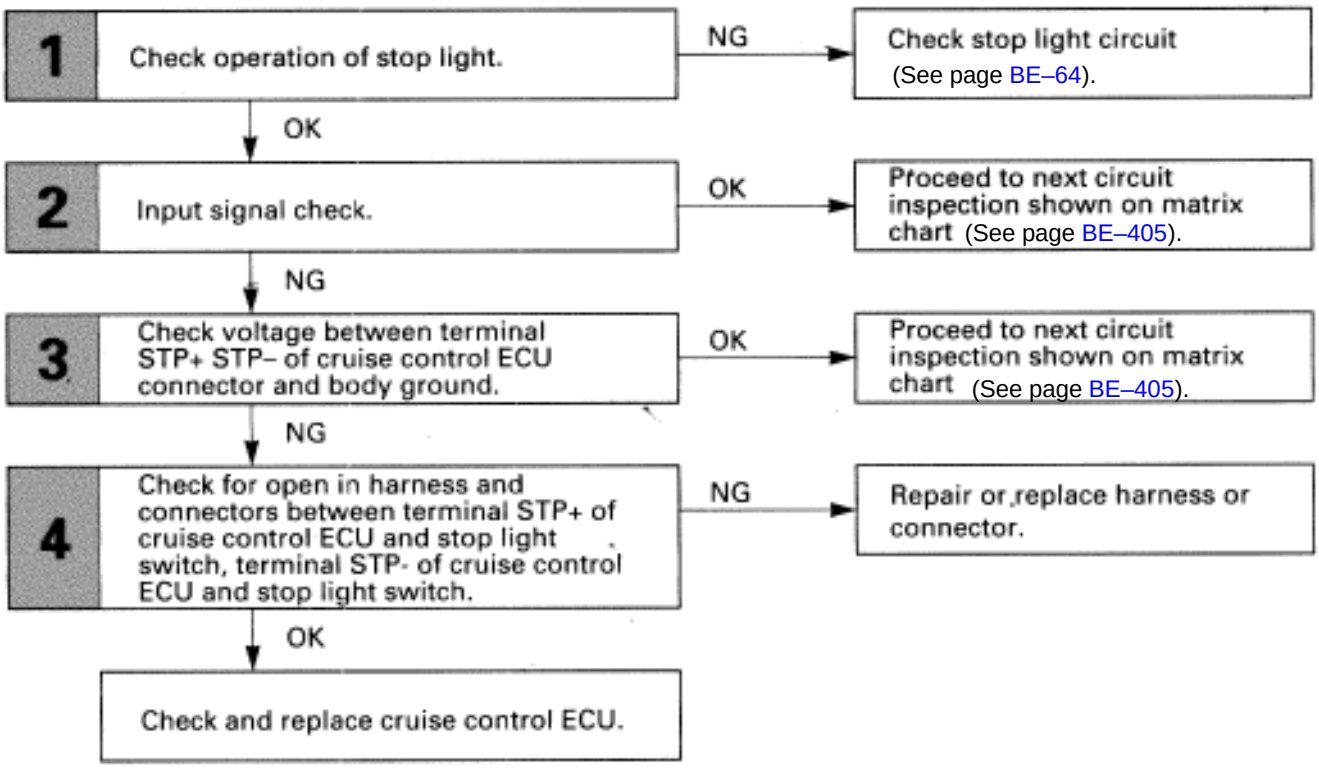
When the brake is on, battery positive voltage normally applies through the stop fuse and stop switch to terminal STP–of the ECU, and the ECU turns the cruise control off.

A fail–safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.

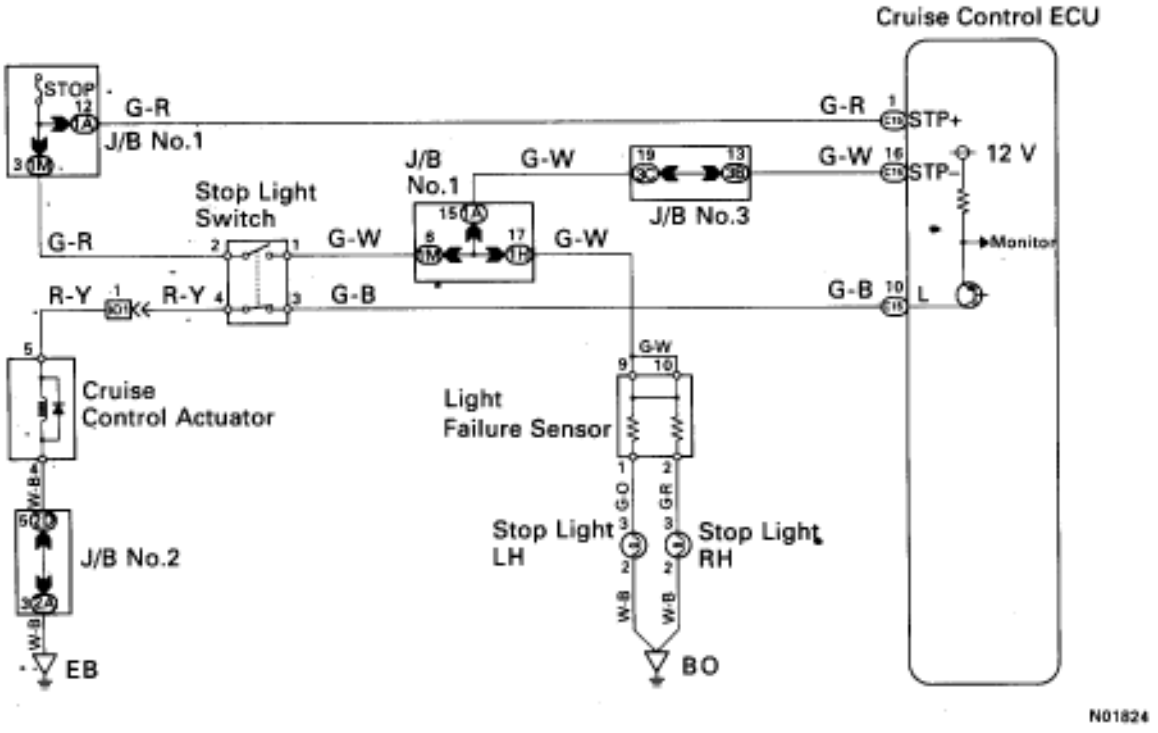
1 If the harness connected to terminal STP–has an open, terminal STP–will have battery positive voltage and the cruise control will be turned off, also SET not occurring.
2 If the stop fuse is open, terminal STP+ becomes approx. 0 V when the brake is turned on, so the ECU performs cancel function normally.

Also, when the brake is on, the magnet clutch circuit is cut mechanically by the stop light switch, turning the cruise control off. (See page BE–415 for operation of the magnet clutch.)

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

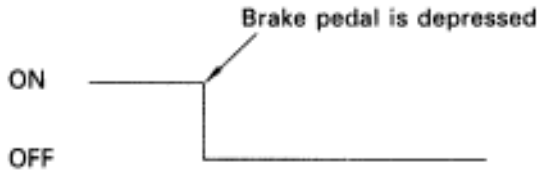
1 **Check operation of stop light.**

C Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

OK

NG **Check stop light circuit (See page BE–64).**

2 **Input signal check.**



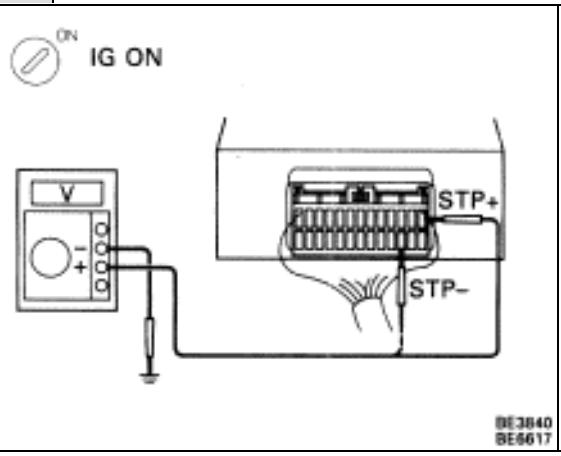
C
1. See input signal check on page BE–400.
2. Check the indicator light when the brake pedal is depressed.

OK **The indicator light goes off when the brake pedal is depressed.**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

3 **Check voltage between terminal STP+, STP– of cruise control ECU connector and body ground.**



P Remove cruise control ECU with connectors still connected.

C
1. Turn ignition switch ON.
2. Measure voltage between terminals STP+, STP– of cruise control ECU connector and body ground, when the brake pedal is depressed and released.

OK

	STP+	STP-
Depressed	10 – 14 V	10 – 14 V
Released	10 – 14 V	Below 1 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

4 **Check for open in harness and connectors between terminals STP+ of cruise control ECU and stop light switch, terminal STP– of cruise control ECU and stop light switch. (See page IN–27)**

OK

NG **Repair or replace harness or connector.**

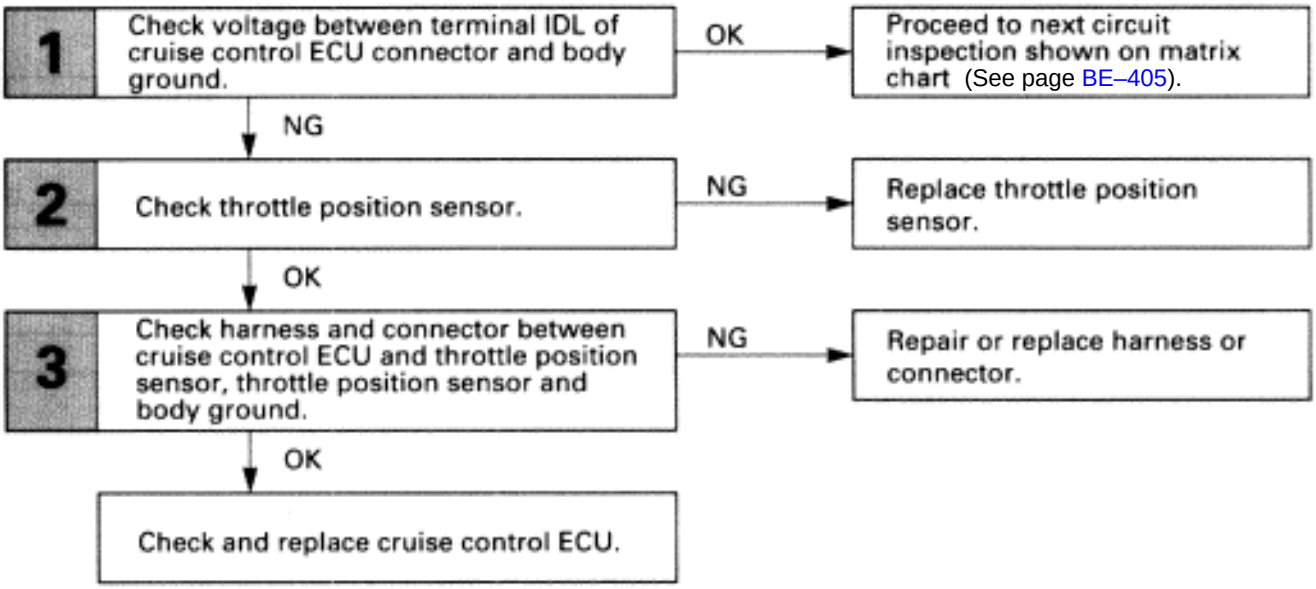
Check and replace cruise control ECU.

Idle Switch Circuit

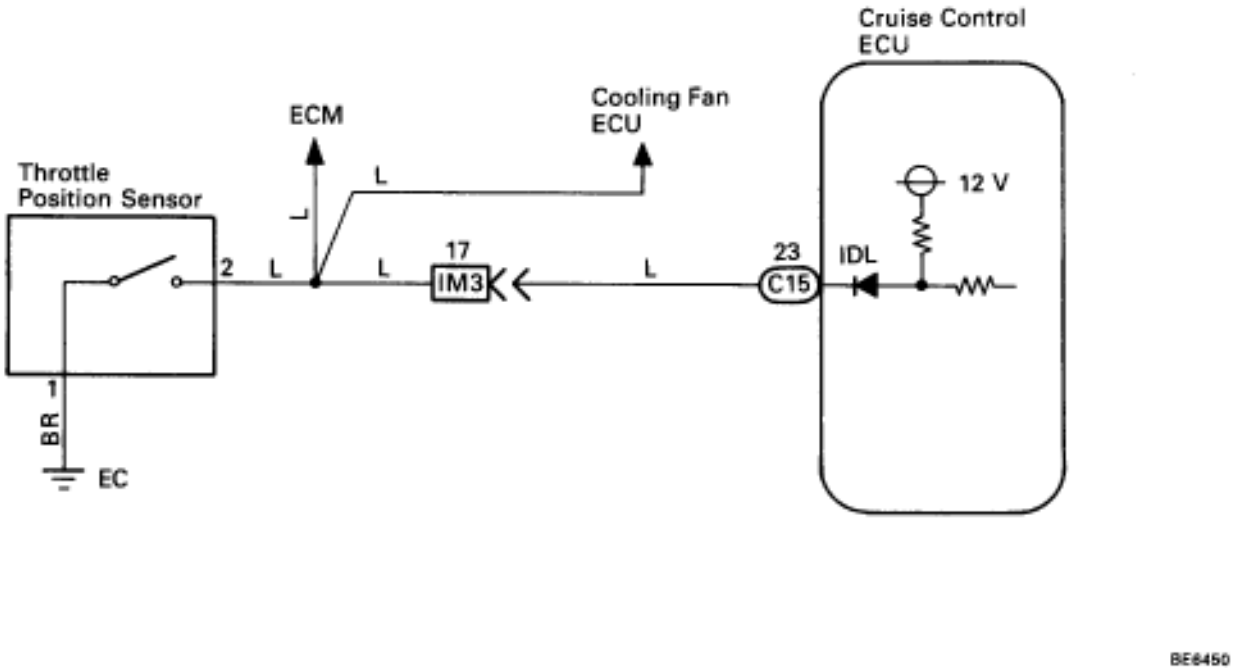
CIRCUIT DESCRIPTION

When the idle switch is turned ON, a signal is sent to the ECU. The ECU uses this signal to enable accurate cruise control at the set speed quickly. If the idle switch is malfunctioning, problem symptoms also occur in the engine, so also inspect the engine.

DIAGNOSTIC CHART

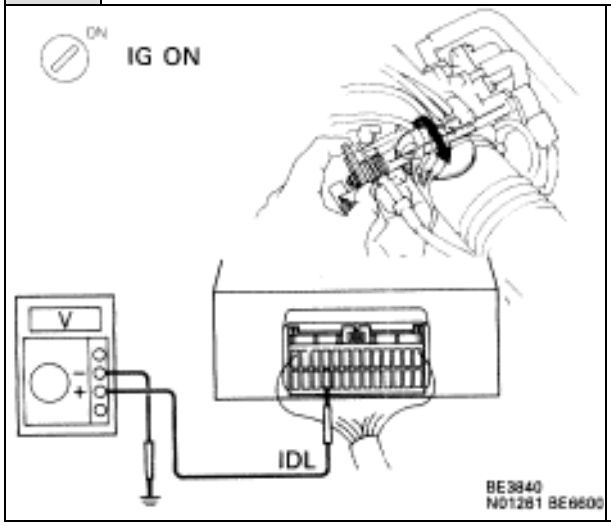


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal IDL of cruise control ECU connector and body ground.**



P
1. Remove cruise control ECU with connectors still connected.
2. Disconnect Engine & ECT and ABS & TRAC ECU connector.

C
1. Turn ignition switch ON.
2. Measure voltage between terminal IDL of cruise control ECU connector and body ground, when the throttle valve is fully closed and fully opened.

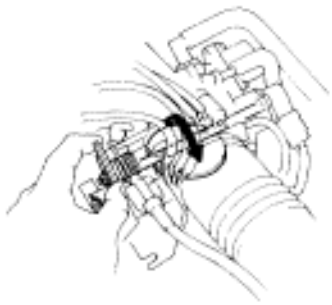
OK

Throttle valve position	Voltage
Fully opened	10 – 14 V
Fully closed	Below 1 V

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

2 **Check throttle position sensor.**



P Disconnect throttle position sensor connector.

C Measure resistance between terminals 1 and 2 of throttle position sensor connector, when the throttle valve is fully closed and fully opened.

OK

Throttle valve position	Resistance
Fully opened	1 MΩ or higher
Fully closed	Below 2 Ω

OK

NG → **Replace throttle position sensor.**

3 **Check harness and connector between cruise control ECU and throttle position sensor, throttle position sensor and body ground. (See page IN–27)**

OK

NG → **Repair or replace harness or connector.**

Check and replace cruise control ECM.

ECT Communication Circuit

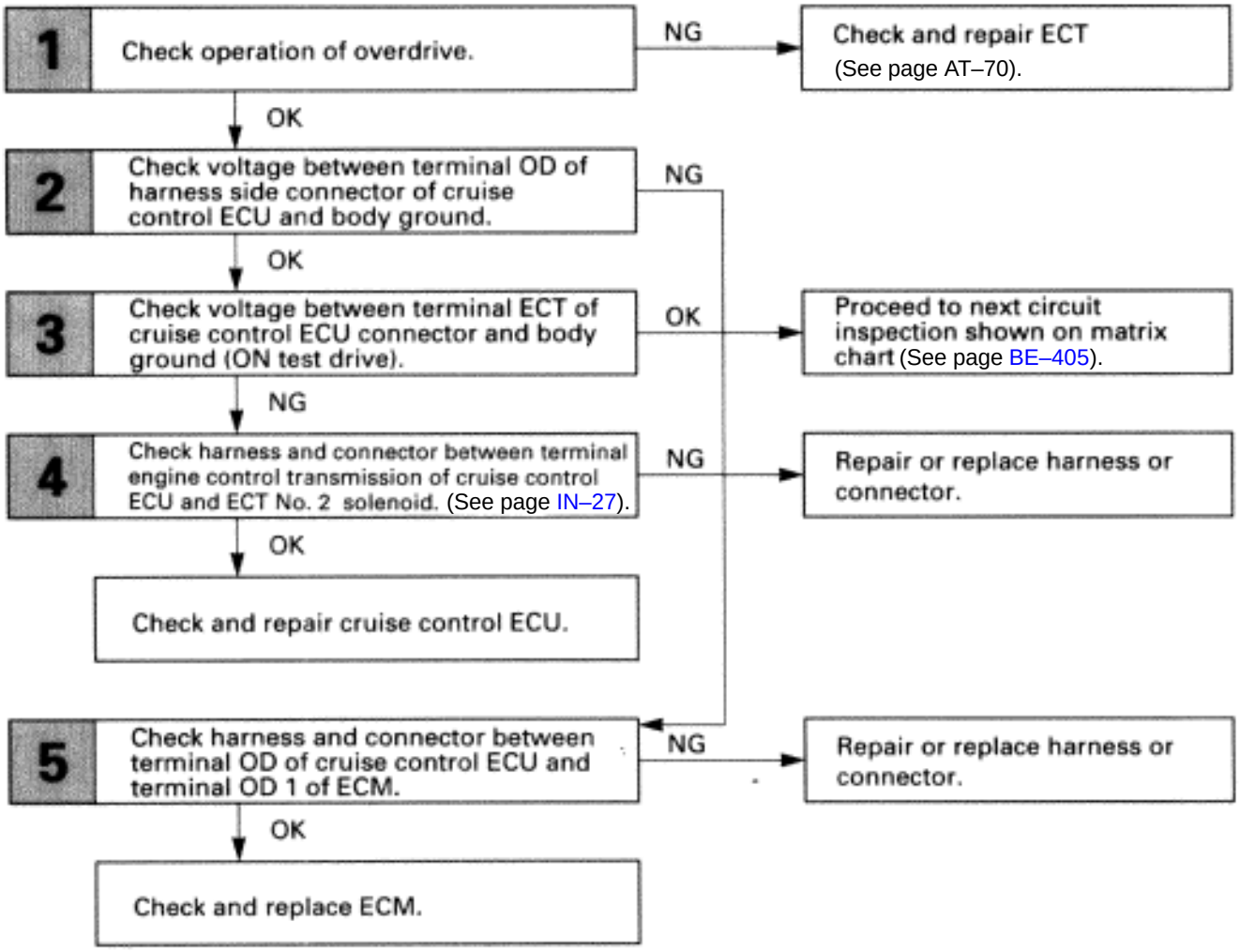
CIRCUIT DESCRIPTION

When driving uphill under cruise control, in order to reduce shifting due to ON–OFF overdrive operation and to provide smooth driving, when down shifting in the ECT occurs, a signal to prevent upshift until the end of the uphill slope is sent from the cruise control ECU to the ECM.

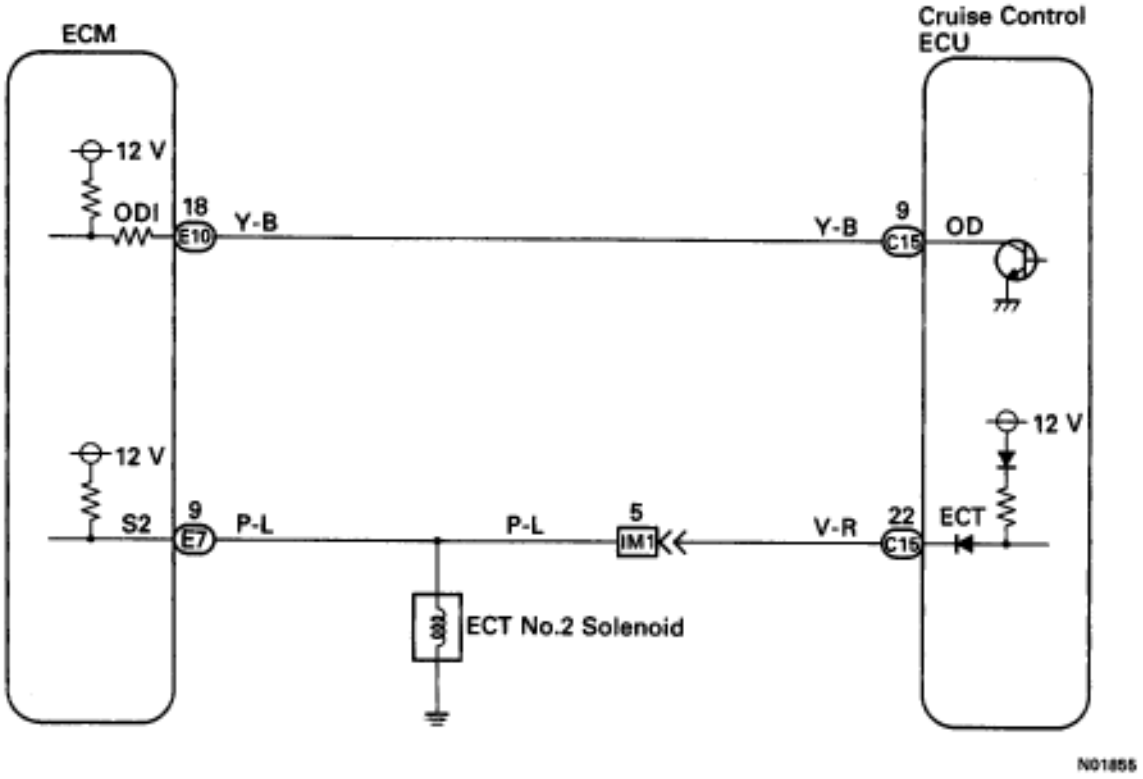
Terminal ECT of the cruise control ECU detects the shift change signal (output to ECT No.2 solenoid) from the ECM.

If vehicle speed down and terminal ECT of the cruise control ECU receives down shifting signal, it sends a signal from terminal OD to ECM to cut overdrive until the end of the uphill slope, and the gear shifts are reduced.

DIAGNOSTIC CHART



WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of overdrive.

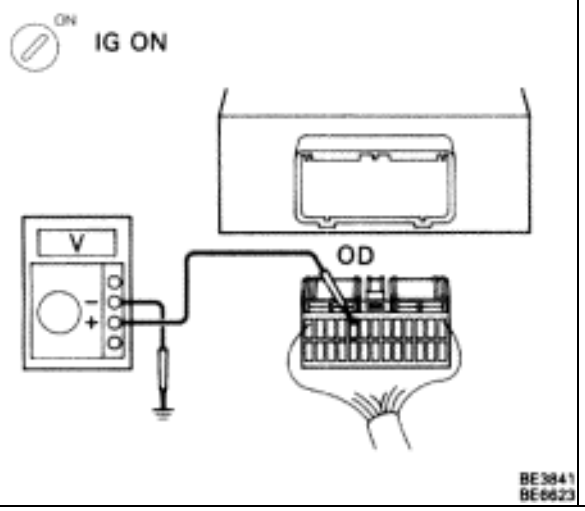
P Test drive after engine warms up.

C Check that overdrive ON ↔ OFF occurs with operation of OD switch ON–OFF.

OK

NG **Check and Repair ECT (See page AX–41).**

2	Check voltage between terminal OD of harness side connector of cruise control ECU and body ground.



P Remove cruise control ECU with connectors still connected.

C
1. Disconnect cruise control ECU connector.
2. Turn ignition switch ON.
3. Measure voltage between terminal OD of harness side connector of cruise control ECU and body ground.

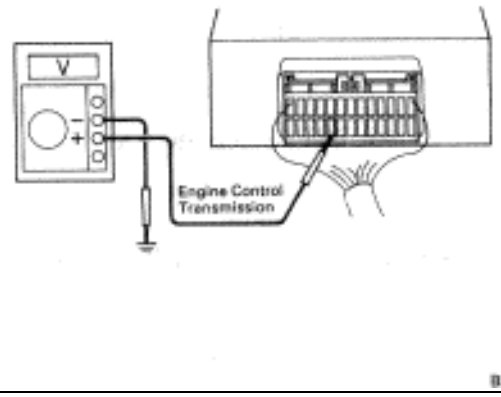
OK **Voltage: 10 – 14 V**

OK

NG **Go to step ✳**

Go to step .

3	Check voltage between terminal engine control transmission of cruise control ECU connector and body ground (On test drive).



P
1. Connect cruise control ECU connector.
2. Test drive after engine warms up.

C Check voltage between terminal TCM of cruise control ECU connector and body ground when OD switch is on and off.

OK

Gear Position	Voltage
O/D	Below 1 V
3rd	10 – 14 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

4	Check harness and connector between terminal engine control transmission of cruise control ECU and engine control transmission solenoid. (See page IN–27).

OK

NG **Repair or replace harness or connector.**

Check and repair cruise control ECU.

5	Check harness and connector between terminal OD of cruise control ECU and terminal OD1 of ECM. (See page IN–29).

OK

NG **Repair or replace harness or connector.**

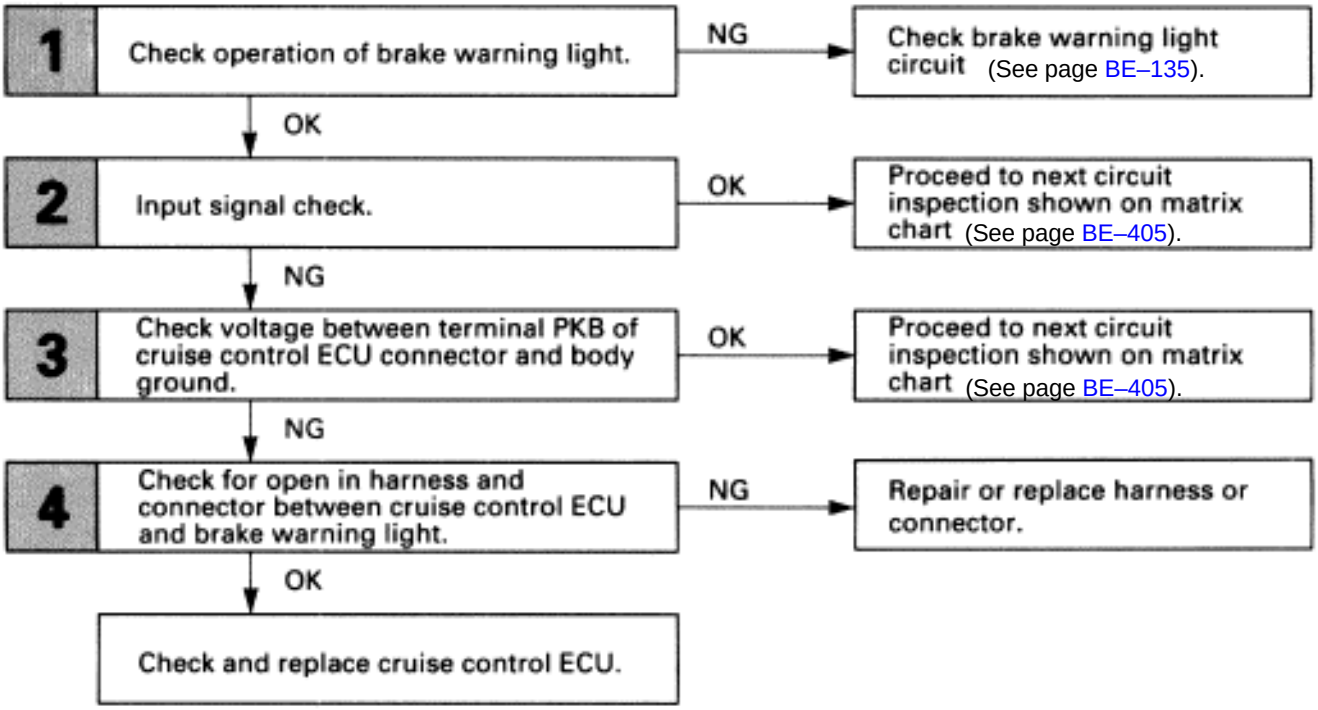
Check and replace ECM.

Parking Brake Switch Circuit

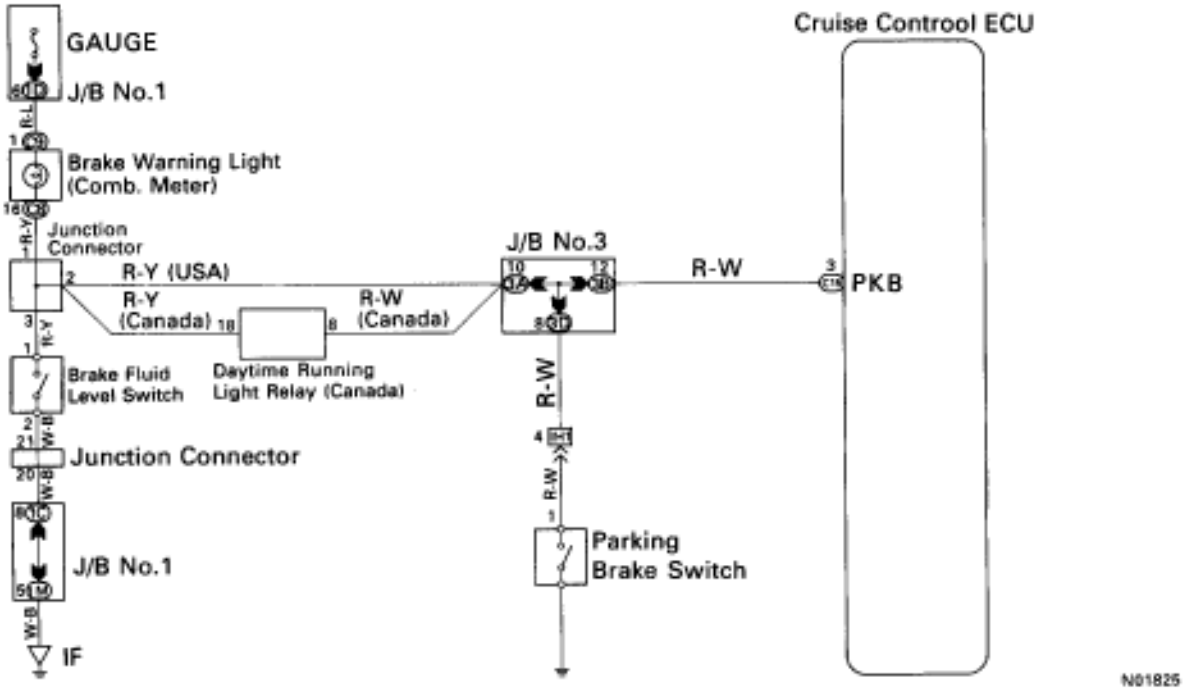
CIRCUIT DESCRIPTION

When the parking brake is operating, the parking brake switch sends a signal to the ECU. When this signal is input to the ECU during cruise control driving, the ECU cancels cruise control.

DIAGNOSTIC CHART



WIRING DIAGRAM



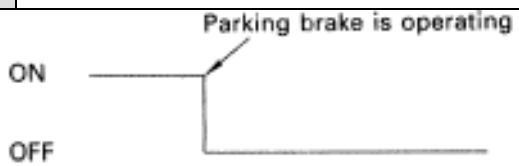
INSPECTION PROCEDURE

1	Check operation of brake warning light.
C	Check that the brake warning light in the instrument panel comes on when the parking brake is operating with the engine running, and the light goes off when the parking brake is not operating.

OK

NG → **Check brake warning light circuit (See page BE–135).**

2	Input signal check.



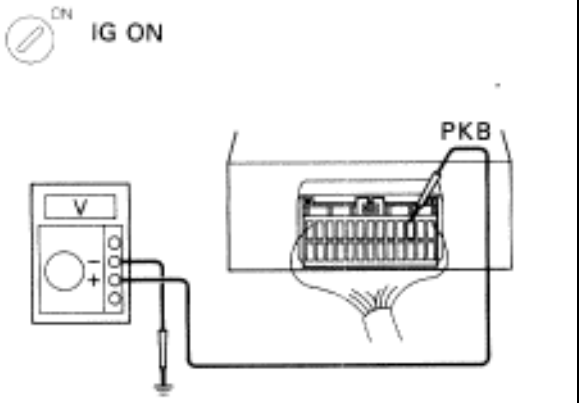
C
1. See input signal check on page BE–400.
2. Check the indicator light when the parking brake is operating.

OK **The indicator light goes off when the parking brake is operating.**

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

3	Check voltage between terminal PKB of cruise control ECU connector and body ground.



P Remove cruise control ECU with connectors still connected.

C
1. Turn ignition switch ON.
2. Measure voltage between terminal PKB of cruise control ECU connector and body ground, when the parking brake lever is operating.

OK

Switch Position	Voltage
ON (lever pulled)	Below 1 V
OFF (lever released)	10 – 14 V

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

4	Check for open in harness and connector between cruise control ECU and brake warning light. (See page IN–27).

OK

NG → **Repair or replace harness or connector.**

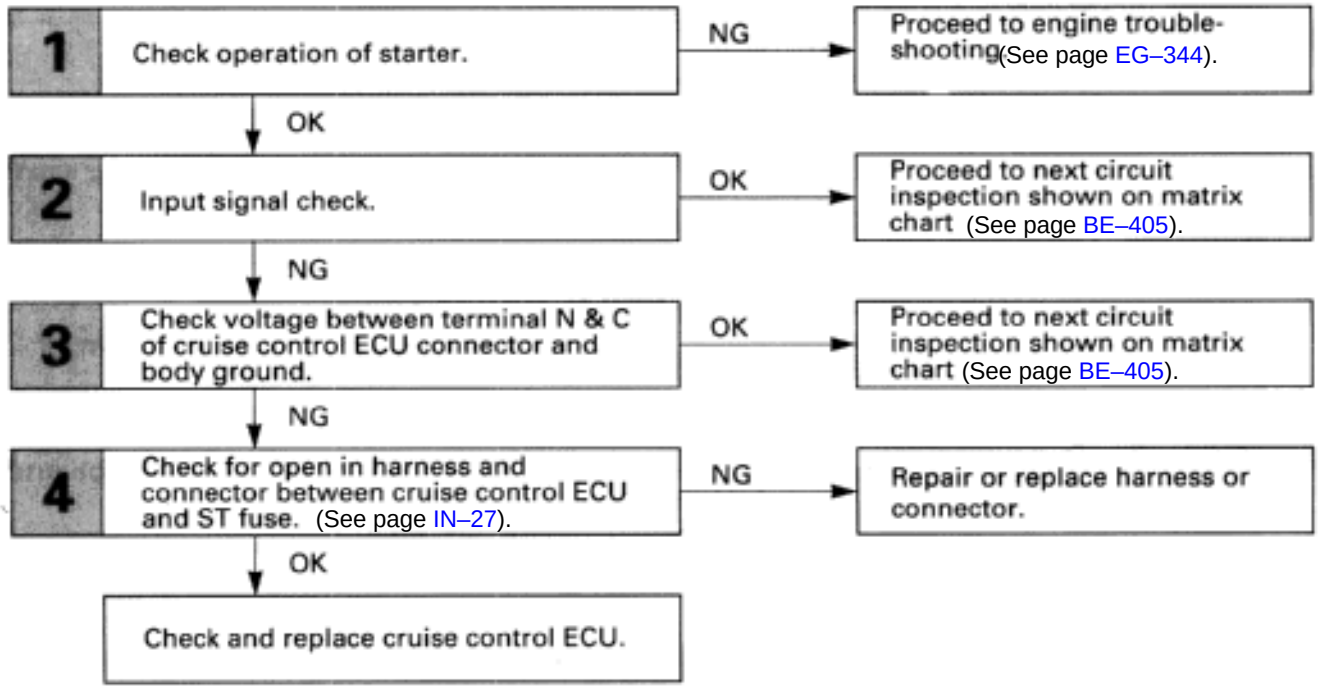
Check and replace cruise control ECM.

Park/Neutral Position Switch

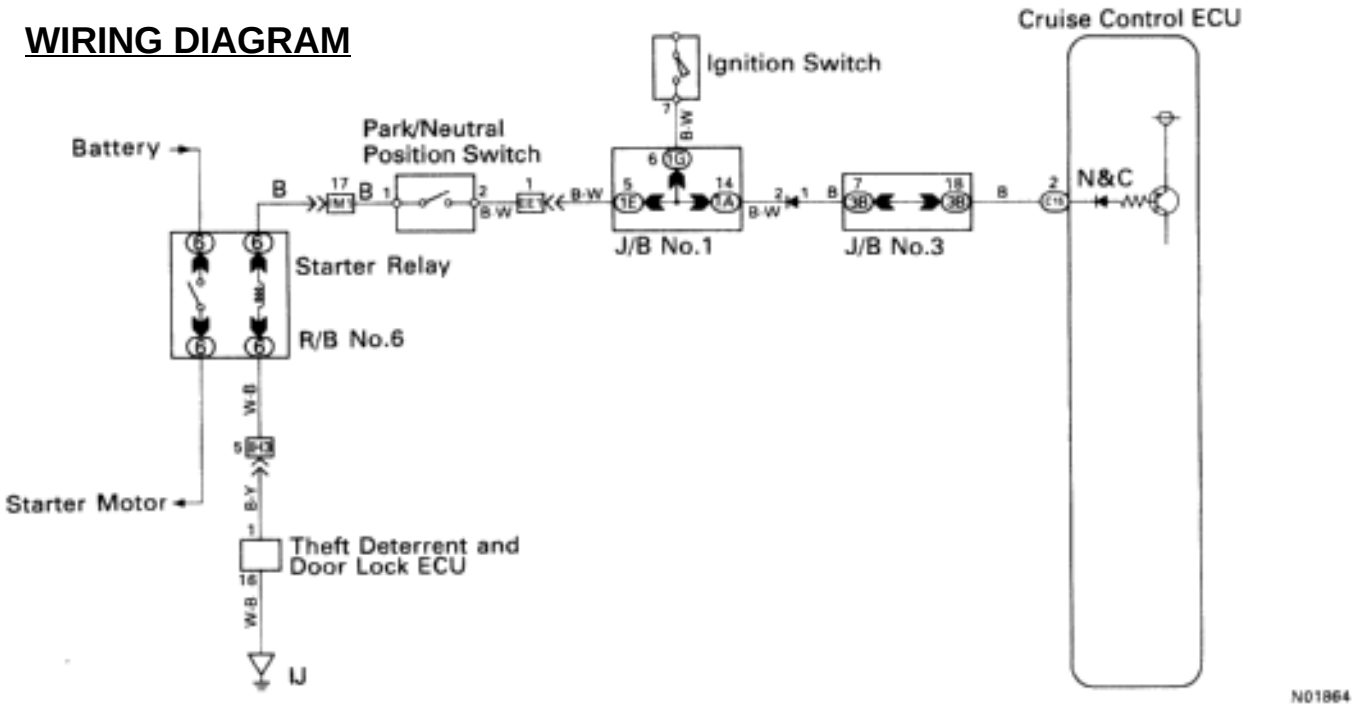
CIRCUIT DESCRIPTION

When the shift position is put in P or N, a signal is sent from the park/neutral position switch to the ECU. When this signal is input during cruise control driving, the ECU cancels the cruise control.

DIAGNOSTIC CHART



WIRING DIAGRAM



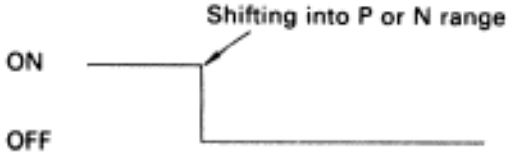
INSPECTION PROCEDURE

1	Check operation of starter.
C	Check that the starter operates normally and that the engine starts.

OK

NG **Proceed to engine troubleshooting (See page EG–344).**

2	Input signal check.



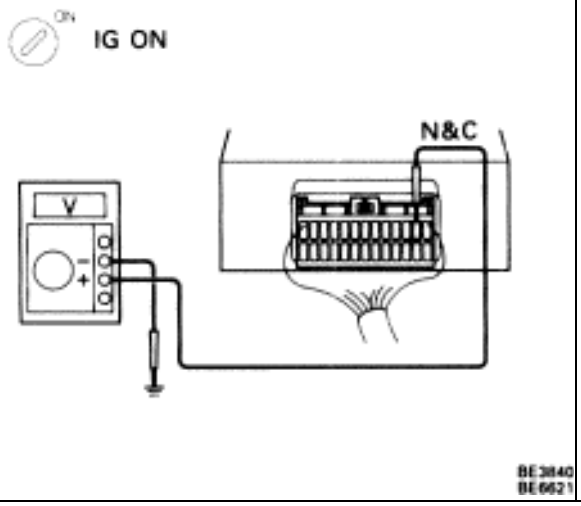
C
1. See input signal check on page BE–400.
2. Check the indicator light when shifting into P range or N range.

OK **The indicator light goes off when shifting into P range or N range.**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

3	Check voltage between terminal N & C of cruise control ECU connector and body ground.



P Remove cruise control ECU with connectors still connected.

C
1. Turn ignition switch ON.
2. Measure voltage between terminal N & C of cruise control ECU connector and body ground, when shifting into P, N, range and other ranges.

OK

Switch Position	Voltage
P or N range	Below 1 V
Other ranges	10 – 14 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

4	Check for open in harness and connector between cruise control ECU and ST fuse. (See page IN–27).

OK

NG **Repair or replace harness or connector.**

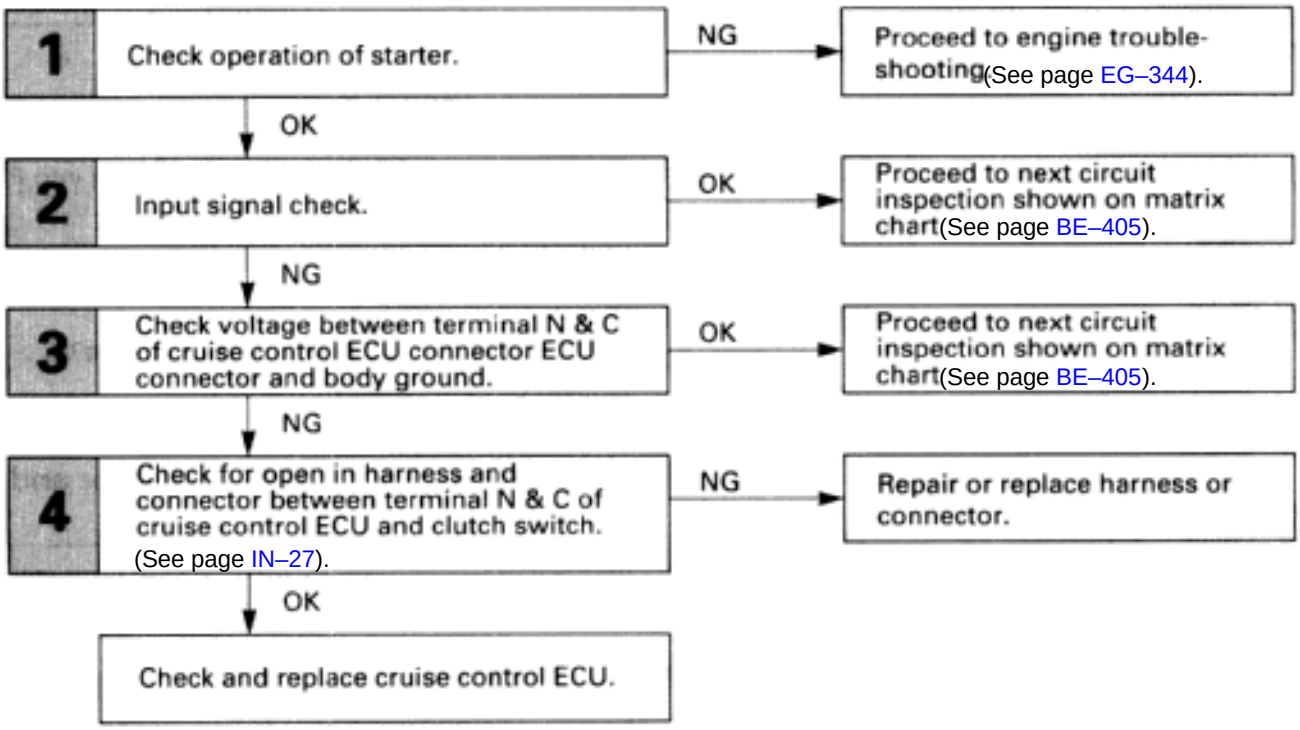
Check and replace cruise control ECU.

Clutch Switch Circuit

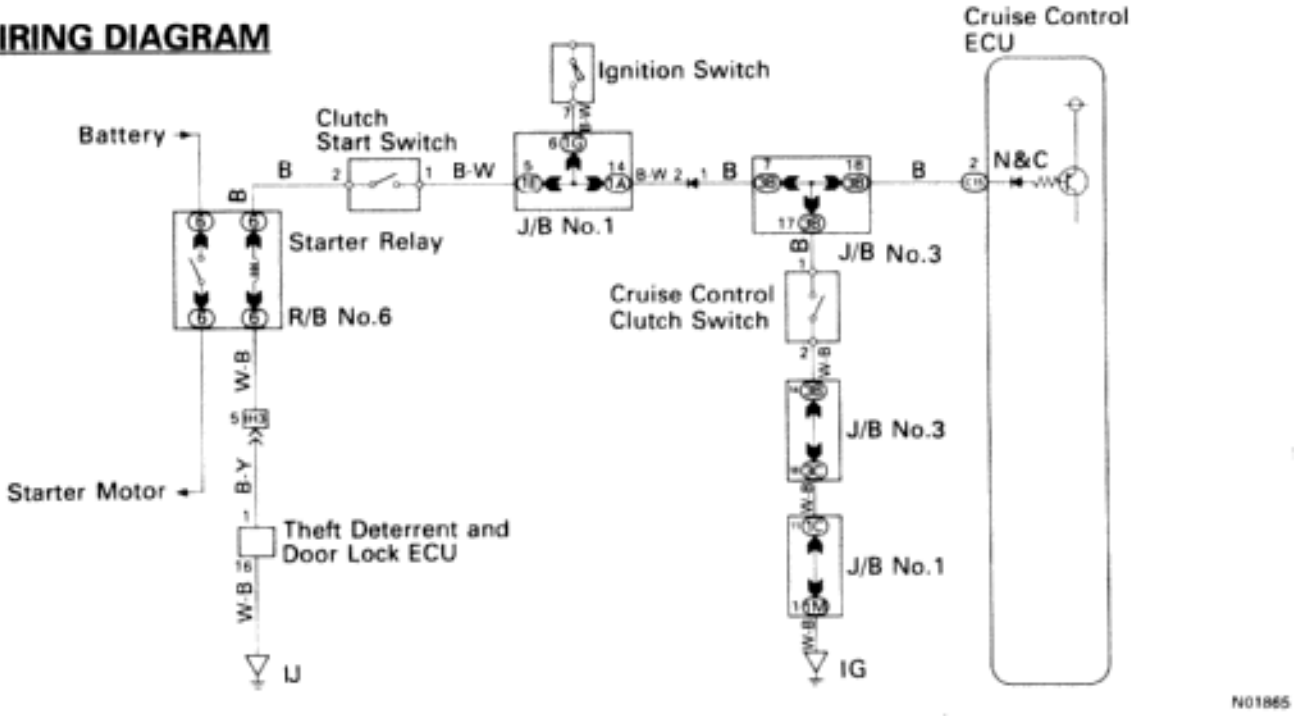
CIRCUIT DESCRIPTION

When the clutch pedal is depressed, the clutch switch sends a signal to the ECU, when this signal is input to the ECU during cruise control driving, the ECU cancels cruise control.

DIAGNOSTIC CHART



WIRING DIAGRAM



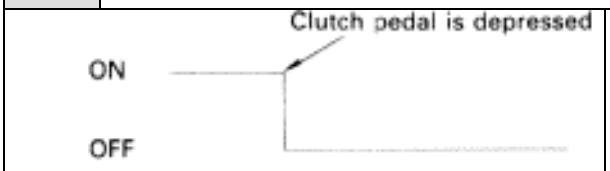
INSPECTION PROCEDURE

1	Check operation of starter.
C	Check that the starter operates normally and that the engine starts.

OK

NG **Proceed to engine troubleshooting (See page EG–344).**

2	Input signal check.



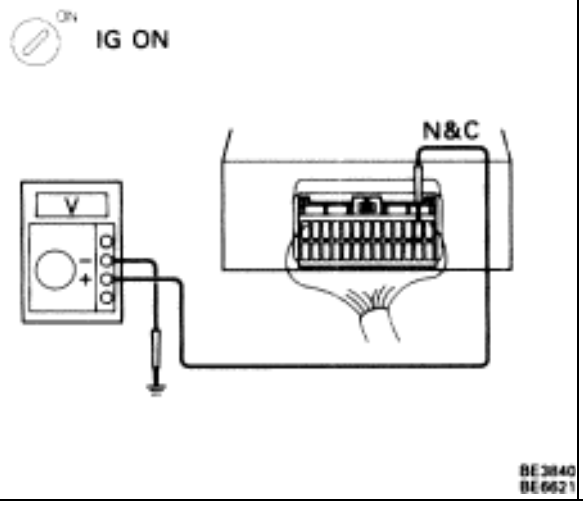
C
1. See input signal check on page BE–400.
2. Check the indicator light when shifting into P range or N range.

OK **The indicator light goes off when the clutch pedal is depressed.**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

3	Check voltage between terminal N & C of cruise control ECU connector and body ground.



P Remove cruise control ECU with connectors still connected.

C
1. Turn ignition switch ON.
2. Measure voltage between terminal N & C of cruise control ECU connector and body ground, when the clutch pedal is depressed.

OK

Switch Position	Voltage
ON (pedal depressed)	Below 1 V
OFF	10 – 14 V

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

4	Check for open in harness and connector between cruise control ECU and ST fuse.

OK

NG **Repair or replace harness or connector.**

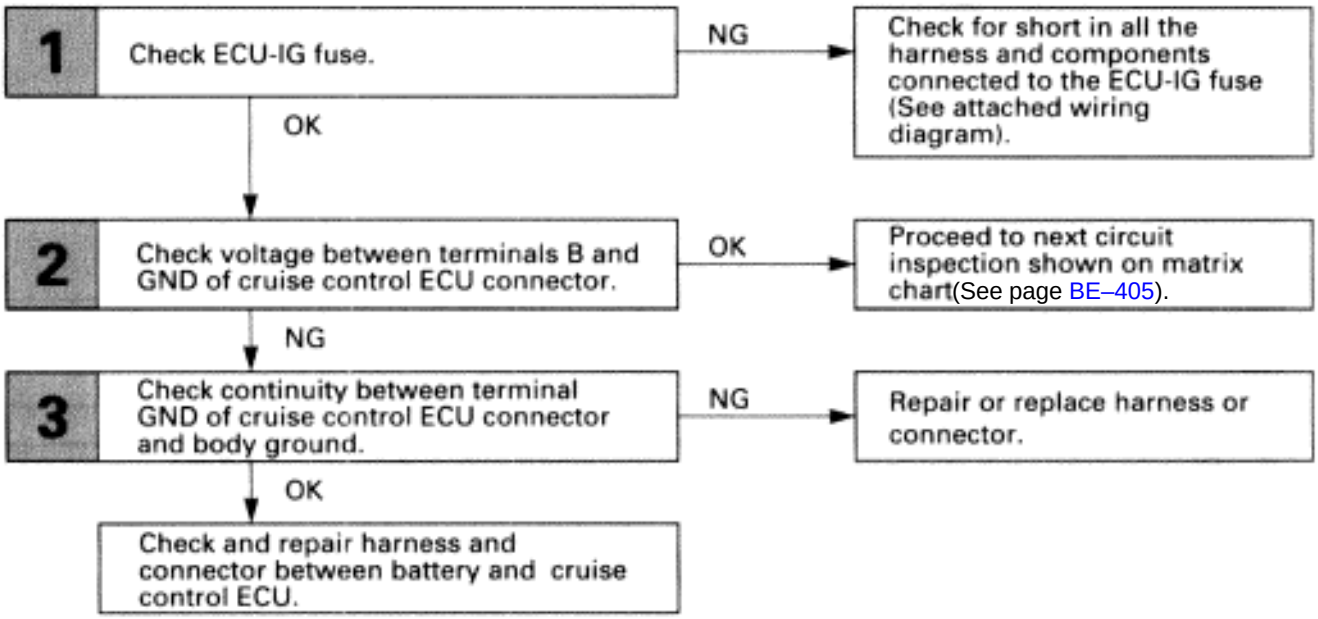
Check and replace cruise control ECU.

ECU Power Source Circuit

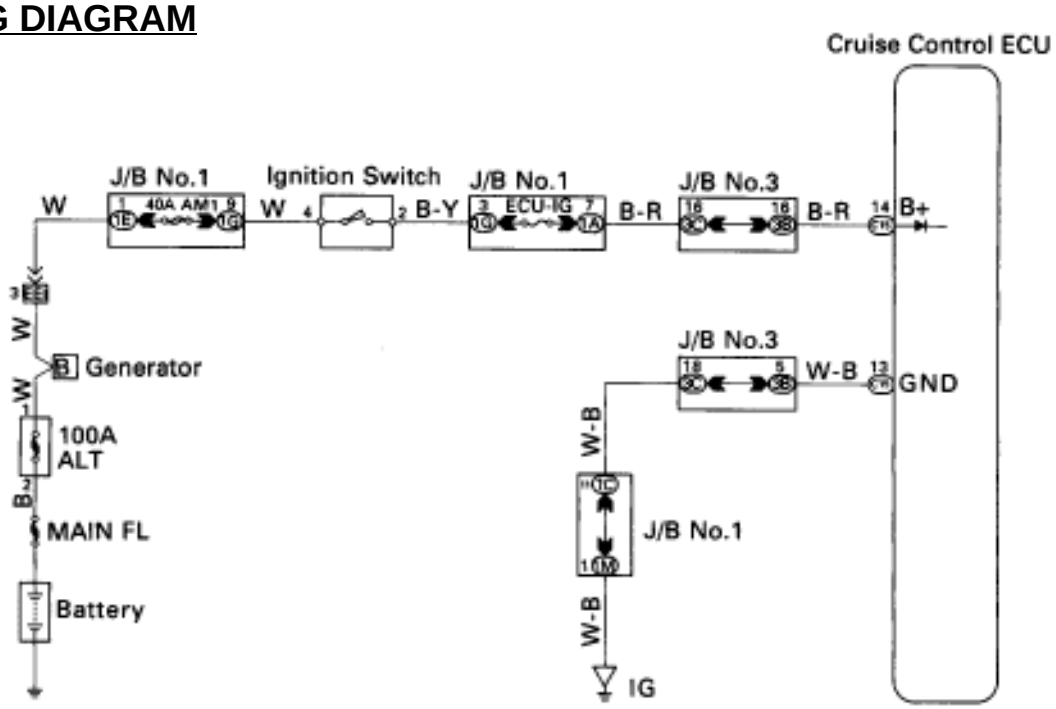
CIRCUIT DESCRIPTION

The ECU power source supplies power to the actuator. Terminal GND and the cruise control ECU case are grounded.

DIAGNOSTIC CHART



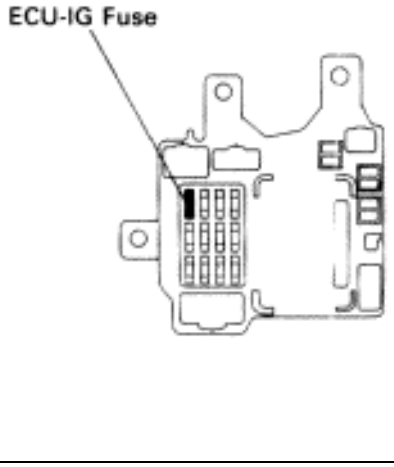
WIRING DIAGRAM



N01826

INSPECTION PROCEDURE

1 **Check ECU–IG fuse.**



P Remove ECU–IG fuse from J/B No. 1.

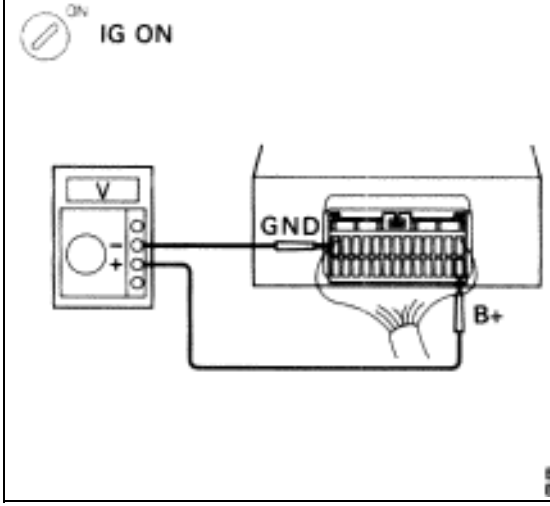
C Check continuity of ECU–IG fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

2 **Check voltage between terminals B+ and GND of cruise control ECU connector.**



P Remove cruise control ECU with connectors still connected.

C
1. Turn ignition switch ON.
2. Measure voltage between terminals B+ and GND of cruise control ECU connector.

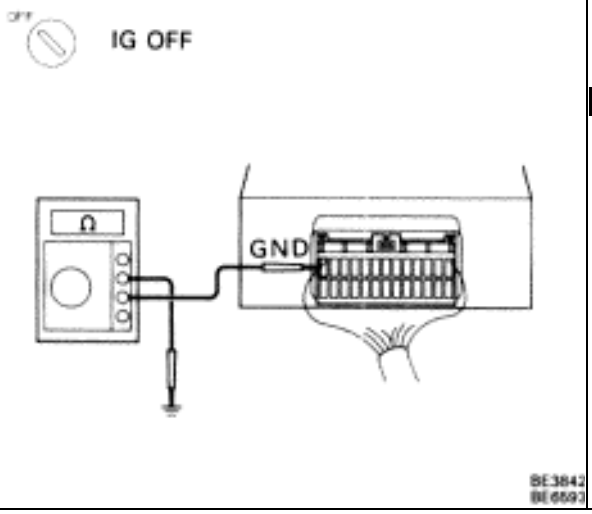
OK **Voltage:** **10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405)**

Go to step .

3	Check continuity between terminal GND of cruise control ECU connector and body ground.



C Measure resistance between terminal GND of cruise control ECU connector and body ground.

OK **Resistance: Below 1 Ω**

OK → **NG** → **Repair or replace harness or connector.**

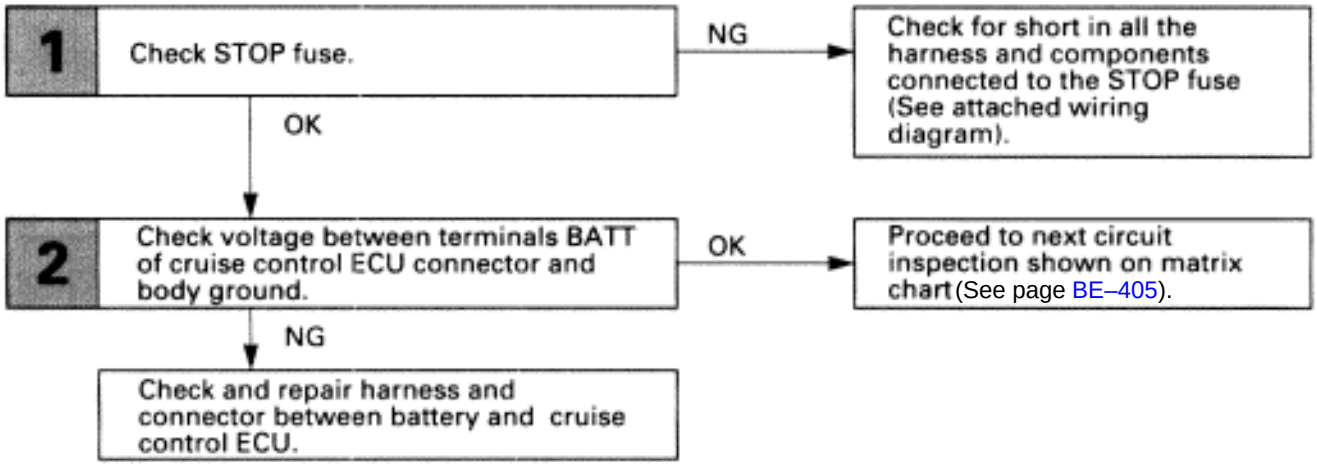
Check and repair harness and connector between battery and cruise control ECU.

Back–up Power Source Circuit

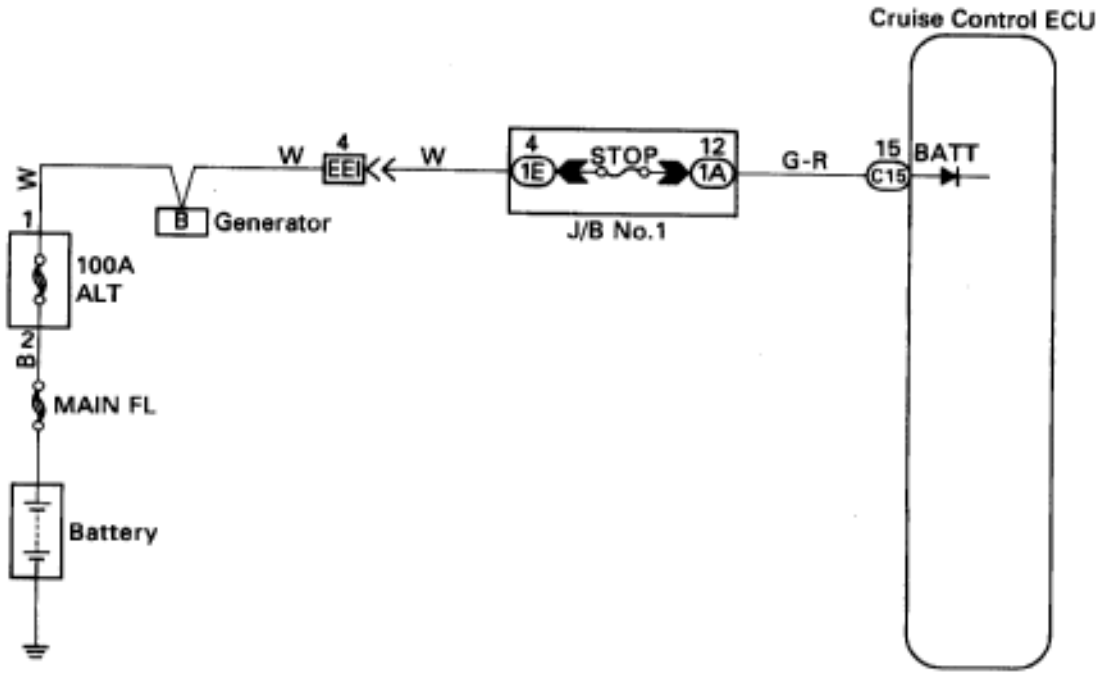
CIRCUIT DESCRIPTION

The ECU back–up power source provides power even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

DIAGNOSTIC CHART



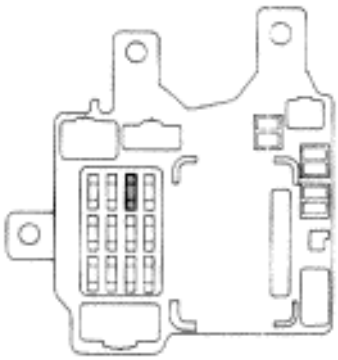
WIRING DIAGRAM



N01827

INSPECTION PROCEDURE

1 **Check STOP fuse.**



P Remove STOP fuse from J/B No. 1.

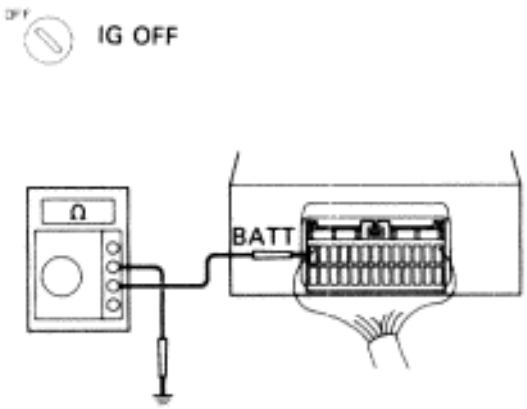
C Check continuity of STOP fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to the STOP fuse (See attached wiring diagram).**

2 **Check voltage between terminals BATT of cruise control ECU connector and body ground.**



P Remove cruise control ECU with connectors still connected.

C Measure voltage between terminal BATT of cruise control ECU connector and body ground.

OK **Voltage:** **10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405)**

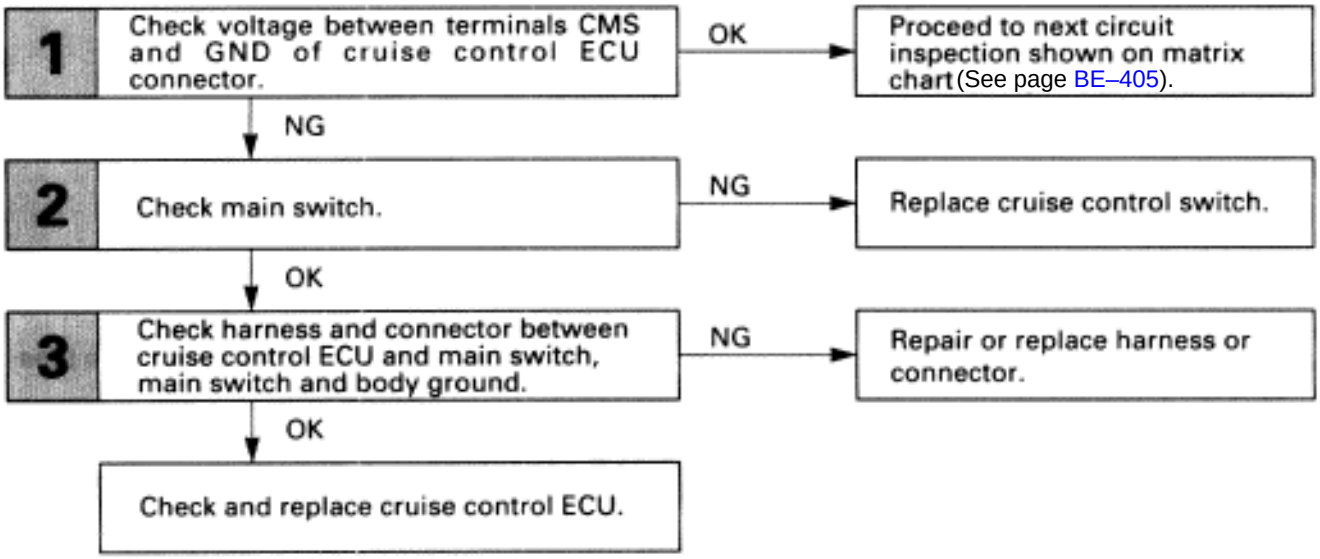
Check and repair harness and connector between battery and cruise control ECU.

Main Switch Circuit (Cruise Control Switch)

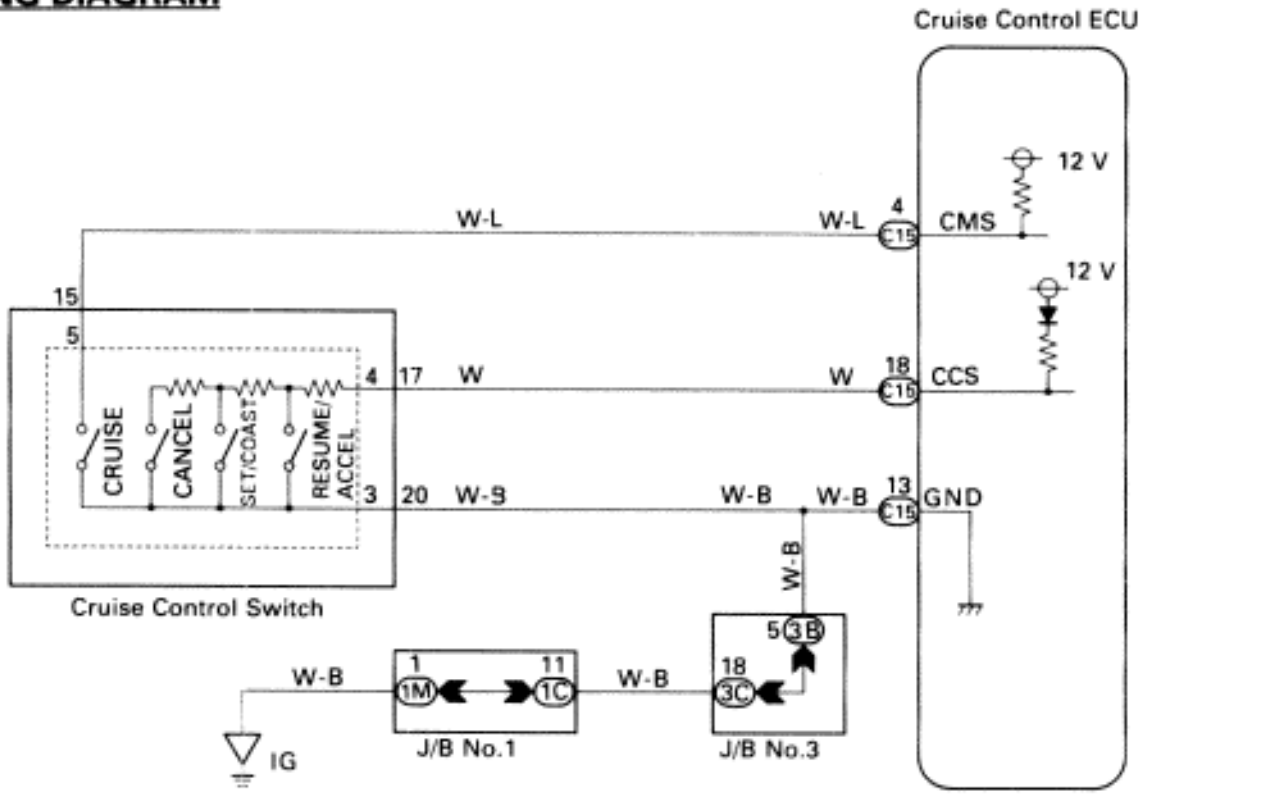
CIRCUIT DESCRIPTION

When the cruise control main switch is turned off, the cruise control does not operate.

DIAGNOSTIC CHART

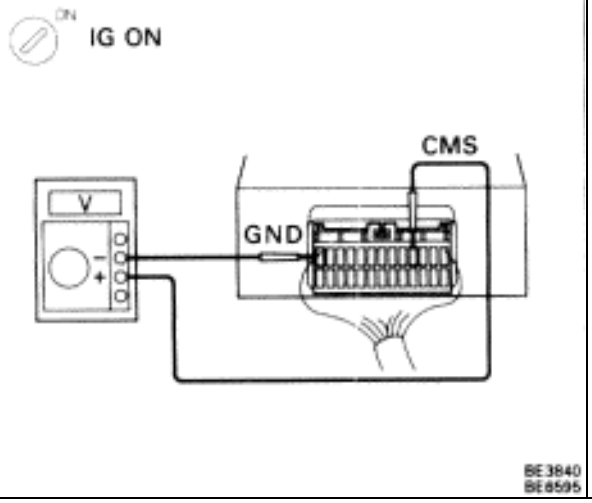


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals CMS and GND of cruise control ECU connector.**



P
1. Remove cruise control ECU with connectors still connected.
2. Turn ignition switch ON.

C Measure voltage between terminals CMS and GND of cruise control ECU connector when main switch is held on and off.

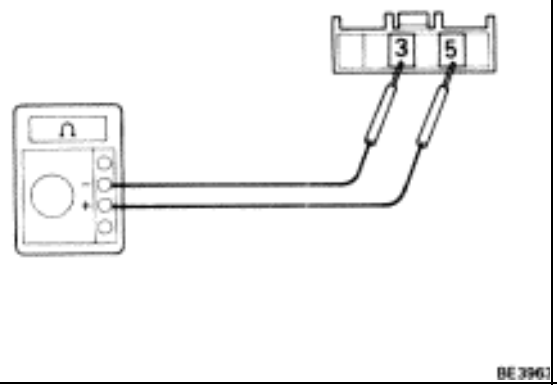
OK

Main switch	Voltage
OFF	10 – 14 V
Hold on	Below 1 V

NG

OK → **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

2 **Check main switch .**



P
1. Remove steering wheel center pad (See page AB–14).
2. Disconnect cruise control switch connector.

C Check continuity between terminals 3 and 5 of cruise control switch connector when main switch is held on and off.

OK

Terminals / Main switch	3	5
OFF		
Hold on	○—○	

○—○ continuity

OK

NG → **Replace control switch.**

3 **Check harness and connector between cruise control ECU and main switch, main switch and body ground.**

OK

NG → **Repair or replace harness or connector.**

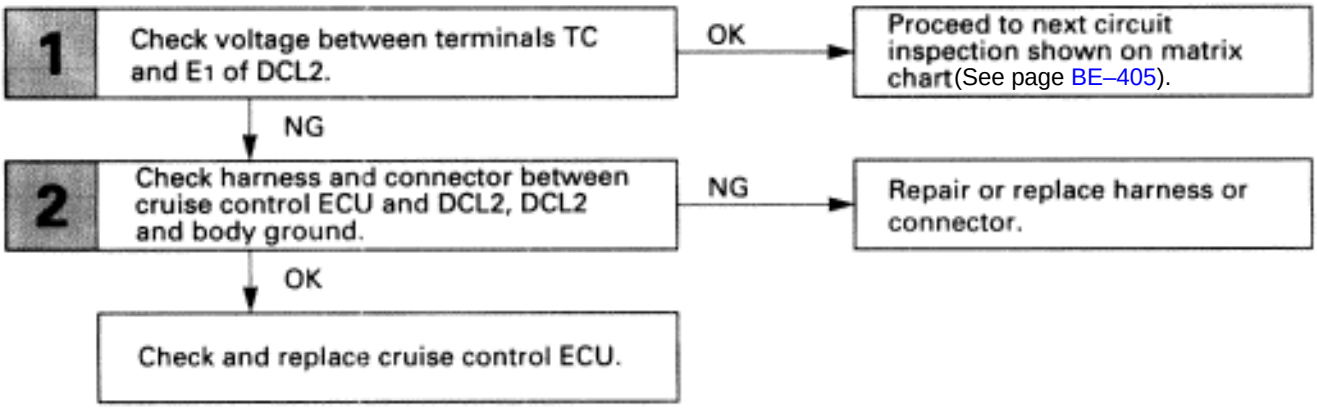
Check and replace cruise control ECM.

TC Circuit

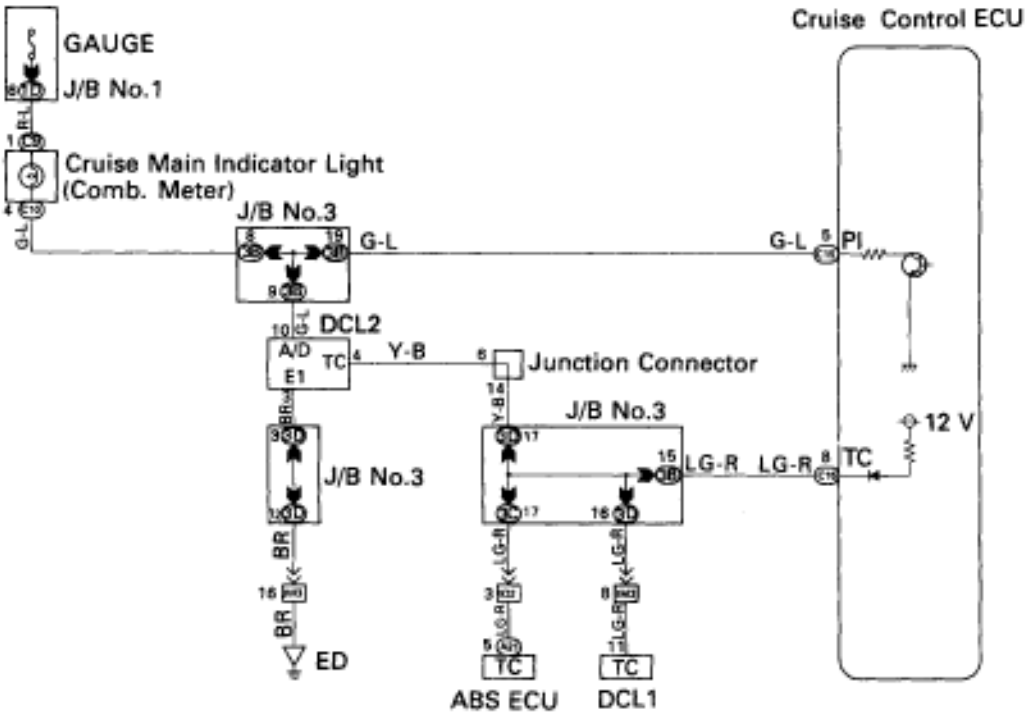
CIRCUIT DESCRIPTION

This circuit sends a signal to the ECU that diagnostic trouble code output is required.

DIAGNOSTIC CHART



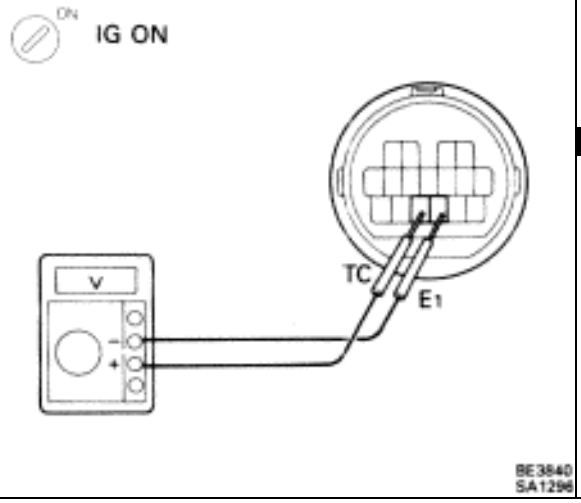
WIRING DIAGRAM



NO1830

INSPECTION PROCEDURE

1 **Check voltage between terminals TC and E1 of DCL2.**



C
1. Turn ignition switch ON.
2. Measure voltage between terminals TC and E1 of DCL2.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page BE–405).**

2 **Check harness and connector between cruise control ECU and DCL2, DCL2 and body ground. (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace cruise control ECU.

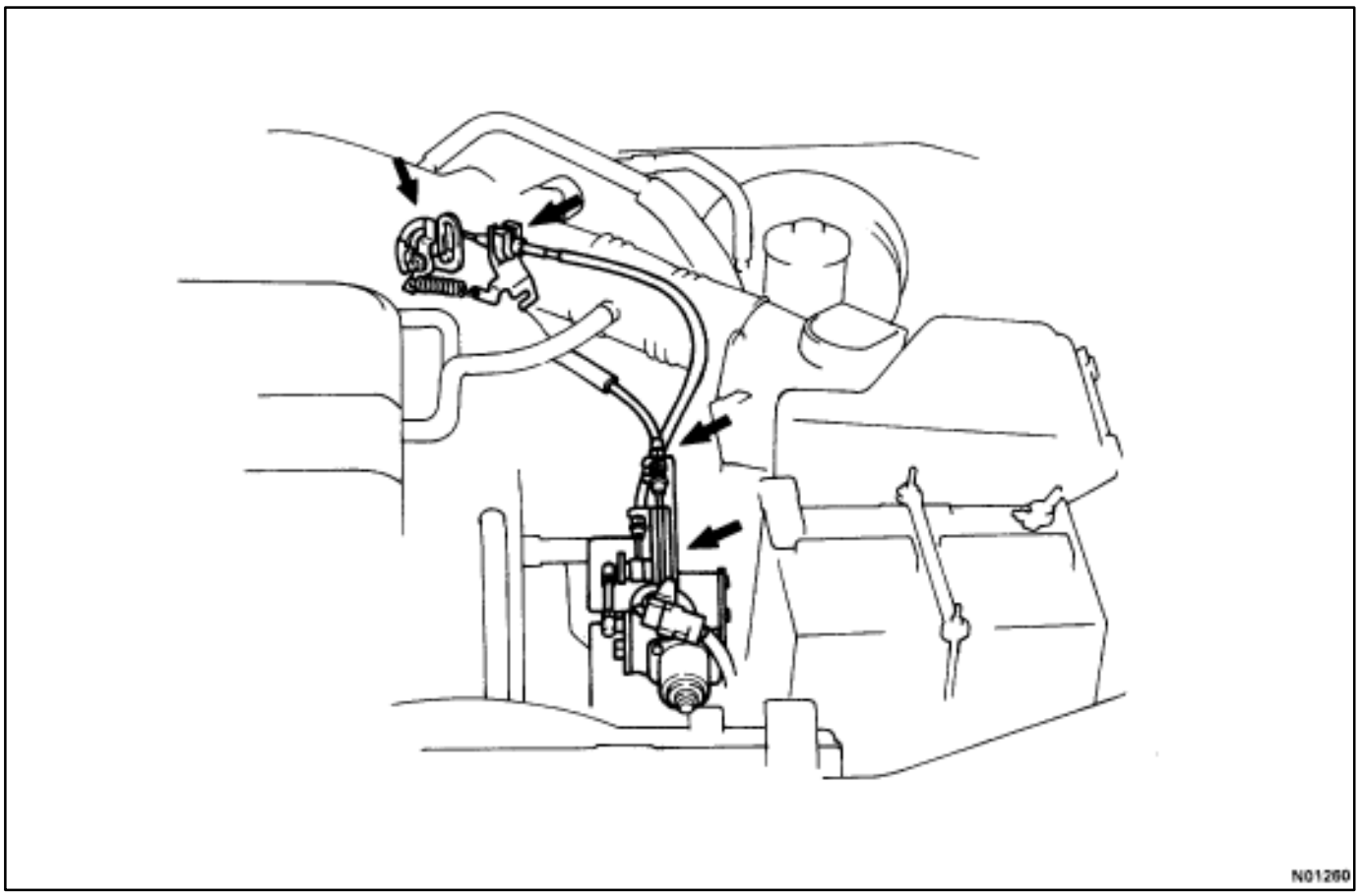
Actuator Control Cable Inspection

C

1. Check that the actuator, control cable and throttle link are properly installed and that the cable and link are connected correctly.
2. Check that the actuator and throttle link are operating smoothly.
3. Check that the cable is not loose or too tight.

Hint

1. If the control cable is very loose, the vehicle's loss of speed going uphill will be large.
2. If the control cable is too tight, the idle rpm will become high.



BRAKE SYSTEM

GENERAL DESCRIPTION

BR03E–01

1. **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.**
2. **It is very important to keep parts and the area clean when repairing the brake system.**

DESCRIPTION

BR03F–01

The service brakes consist of a foot brake which changes rotational energy to thermal energy to stop the vehicle while it is being driven and a parking brake to keep the vehicle from moving while it is parked.

GENERAL DESCRIPTION

BR03E–01

1. **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.**
2. **It is very important to keep parts and the area clean when repairing the brake system.**

DESCRIPTION

BR03F–01

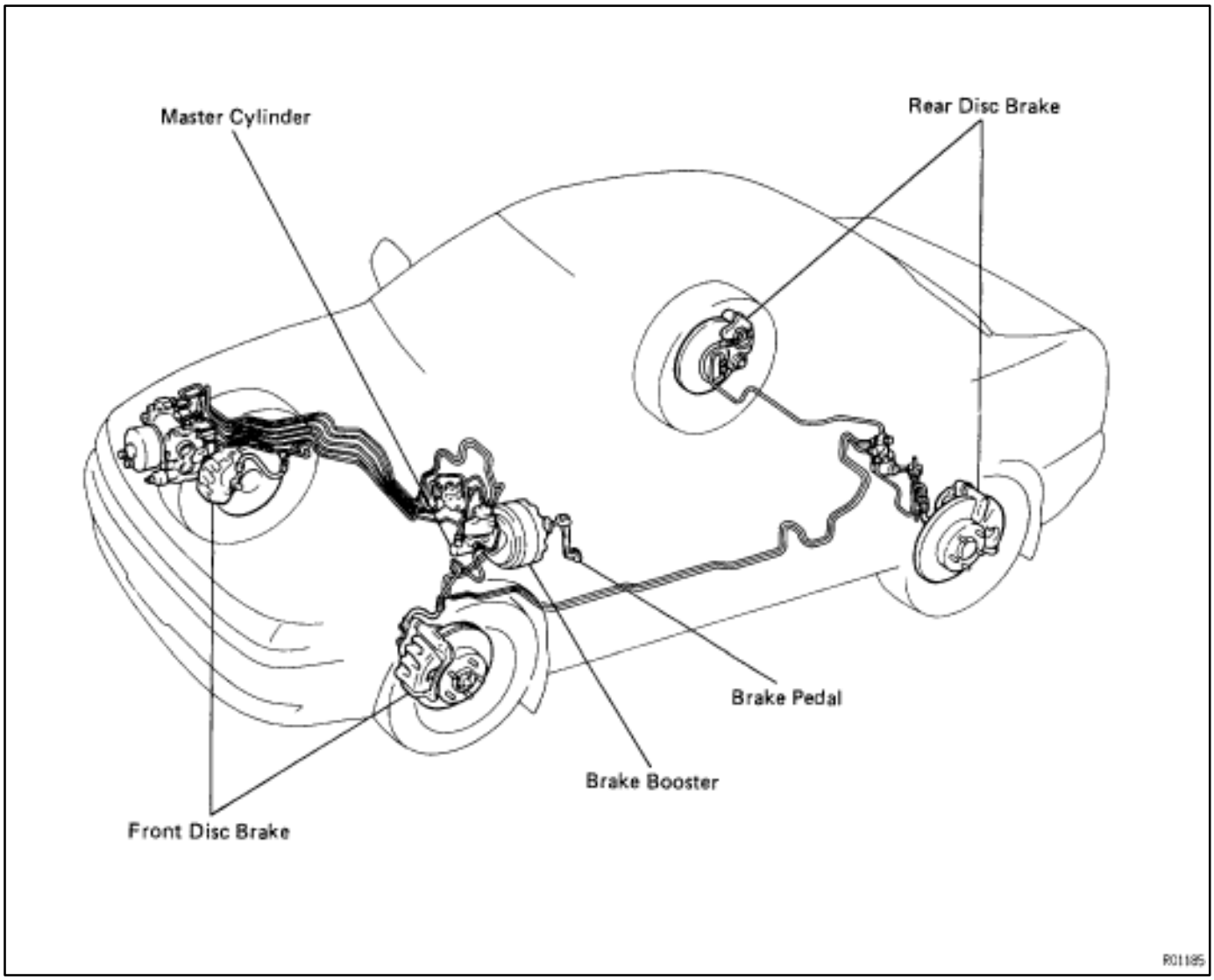
The service brakes consist of a foot brake which changes rotational energy to thermal energy to stop the vehicle while it is being driven and a parking brake to keep the vehicle from moving while it is parked.

OPERATION

BR03G–01

FOOT BRAKE

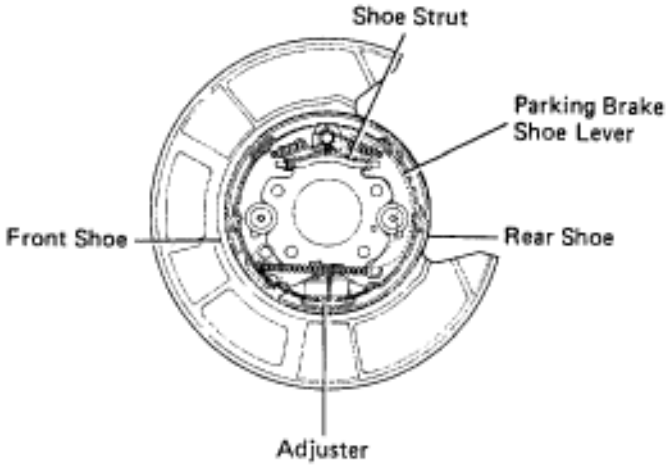
When the brake pedal is depressed, a vacuum builds up in the booster which amplifies the pedal force, pressing on the piston in the master cylinder. The piston raises the hydraulic pressure in the cylinder. This hydraulic pressure is then applied to each respective brake cylinder, and acts to press the brake pads against the rotating rotor discs. The resulting friction converts the rotational energy to thermal energy, stopping the vehicle.



PARKING BRAKE

BR03H–01

When the parking brake lever is pulled up, the parking brake shoe lever is pulled via the parking brake wire. This causes the shoe strut to push the front shoe, which expands and is pressed against the rotor disc. If the parking brake lever continues to be pulled up, the contact point of the parking brake shoe lever and shoe strut then becomes the fulcrum so that the parking brake shoe lever causes the rear shoe to expand. This results in the rotor disc being locked by the front shoe and rear shoe.



V00422

PREPARATION

BR03J–01

SST(SPECIAL SERVICE TOOLS)

	09023–00100	Union Nut Wrench 10 mm	
	09709–29017	LSPV Gauge Set	
	09718–00010	Shoe Hold Down Spring Driver	
	09737–00010	Brake Booster Push Rod Gauge	
	09751–36011	Brake Tube Union Nut 10 x 12 mm Wrench	
	09843–18020	Diagnosis Check Wire	
	09990–00150	ABS (Anti–lock Brake System) Actuator Checker and Sub–harness	
	09990–00163	ABS Actuator Checker Sheet "A"	
	09990–00200	ABS Actuator Checker Sub–harness "C"	
	09990–00210	ABS Actuator Checker Sub–harness "E"	

EQUIPMENT

BR03K–01

Torque wrench	
Micrometer	Brake disc rotor
Dial indicator	Brake disc rotor
Vernier calipers	Brake disc rotor
Voltmeter	
Ohmmeter	

LUBRICANT

BR03L–01

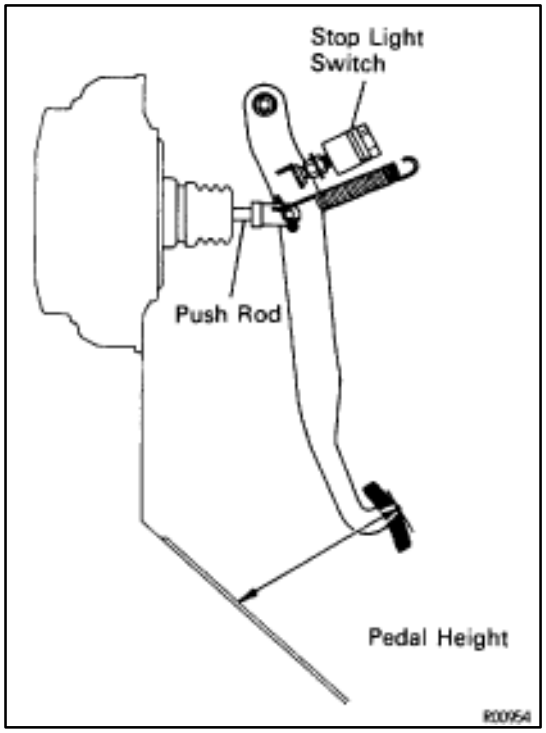
Item	Capacity	Classification
Brake fluid	–	SAEJ1703 or FMVSS No. 116, DOT 3

TROUBLESHOOTING

You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in troubles. Check each part in order. If necessary, replace these parts.

BR03M–01

See page	–	–	BR–19, 27	BR–19, 27	BR–8	BR–12	BR–41	BR–11	–	BR–18	BR–36	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–19, 27	BR–36
Part Name / Trouble	Brake system (Fluid leaks)	Brake system (Air in)	Brake pads (Worn)	Piston seals (Worn or damaged)	Brake pedal (Freeplay minimal)	Master cylinder (Faulty)	Parking brake (Shoe clearance out of adjustment)	Parking brake (Lever travel out of adjustment)	Parking brake wire (Sticking)	Booster push rod (Out of adjustment)	Tension or return spring (Faulty)	Pad (Cracked or distorted)	Piston (Stuck)	Pad (Oily)	Piston (Frozen)	Booster system (Vacuum leaks)	Pad support plate (Loose)	Installation bolt (Loose)	Sliding pin (Worn)	Rotor (Scored)	Pad (Dirty)	Pad (Hardened)	Anti-squeal shim (Damaged)	Hold-down spring (Damaged)
Low pedal or spongy pedal	1	2		3		4				5														
Brake drag					1	11	4	2	3	9	8	5	6		7	10								
Brake pull												5	1	2	3					4				
Hard pedal but brake inefficient	1	2	3							8		4		5		9				7		6		
Noise from brakes											8	1					4	2	5	3	6	7	9	10



CHECK AND ADJUSTMENT

BR03N–02

BRAKE PEDAL CHECK AND ADJUSTMENT

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from asphalt sheet:

147.5–157.5 mm (5.81–6.20 in.)

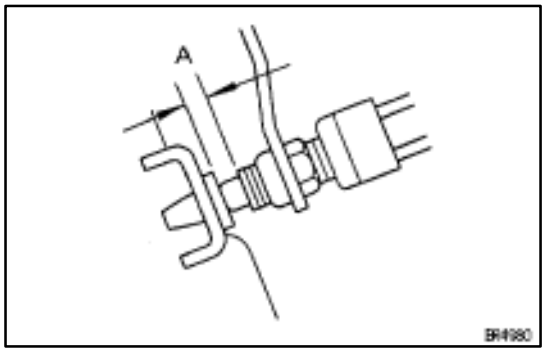
If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Remove the under cover.
(b) Remove the lower pad and air duct.
(c) Disconnect the connector from the stop light switch.
(d) Loosen the stop light switch lock nut and remove the stop light switch.
(e) Loosen the push rod lock nut.
(f) Adjust the pedal height by turning the pedal push rod.
(g) Tighten the push rod lock nut.

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

(h) Install the stop light switch and turn it until it lightly contacts the pedal stopper.
(i) Return the stop light switch one turn.



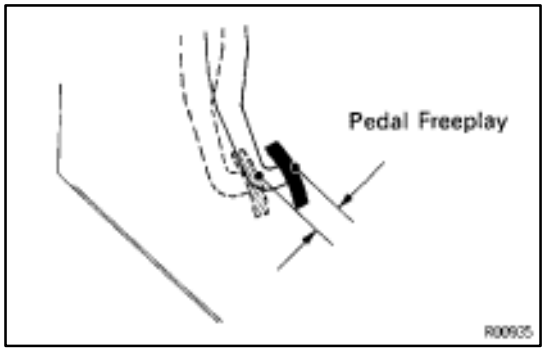
(j) Check that the clearance (A) between stop light switch and pedal.

Clearance:

0.5–2.4 mm (0.02–0.09 in.)

(k) Tighten the stop light switch lock nut.
(l) Connect the connector to the stop light switch.
(m) Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.
(n) After adjusting the pedal height, check the pedal freeplay.

HINT: If clearance (A) between the stop light switch and the brake pedal stopper has been adjusted correctly, the pedal freeplay will meet the specifications.



3. CHECK THAT PEDAL FREEPLAY IS CORRECT, AS SHOWN

(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 beginning of the second point of resistance is felt, then measure the distance as shown.

Pedal freeplay:

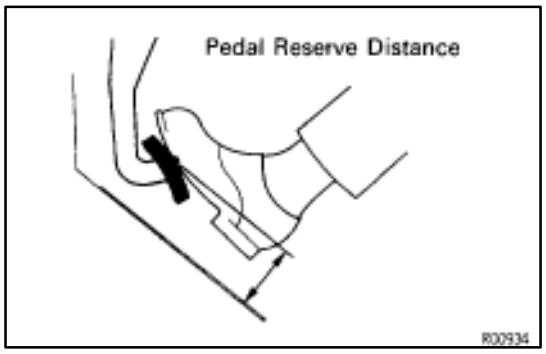
1–6 mm (0.04–0.24 in.)

If incorrect, check the stop light switch clearance. And if the clearance is OK, then troubleshoot the brake system.

HINT: The freeplay to the first point of resistance is due to the play between the clevis and pin. It is 1–3 mm (0.04–0.12 in.) on the pedal.

(c) Install the air duct and lower pad.

(d) Install the under cover.



4. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT, AS SHOWN

Release the parking brake.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

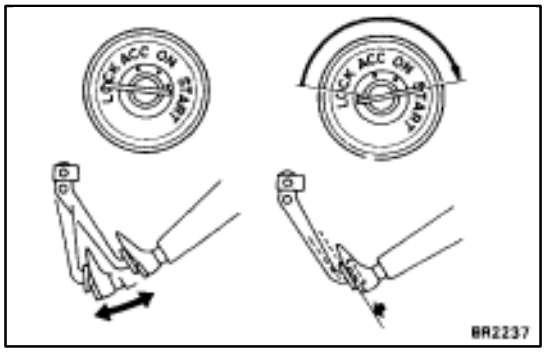
Pedal reserve distance at 490 N (50 kgf, 110.2 lbf):

More than 70 mm (2.76 in.)

If the reserve distance is incorrect, troubleshoot the brake system.

BRAKE BOOSTER OPERATIONAL TEST

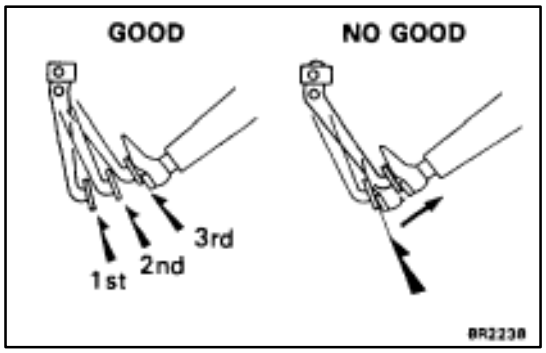
BR03P–01



1. OPERATING CHECK

(a) Depress the brake pedal several times with the engine off and check that there is no change in the pedal reserve distance.

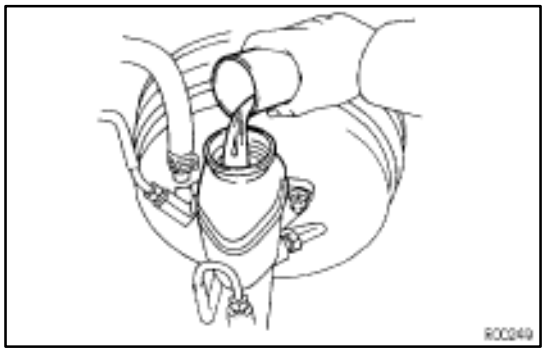
(b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.



2. AIR TIGHTNESS

(a) Start the engine and stop it after one or two minutes. Depress the brake pedal several times slowly. If the pedal goes down the farthest the first time, but gradually rises after the second or third 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 thirty seconds, the booster is air tight.



BRAKE SYSTEM BLEEDING

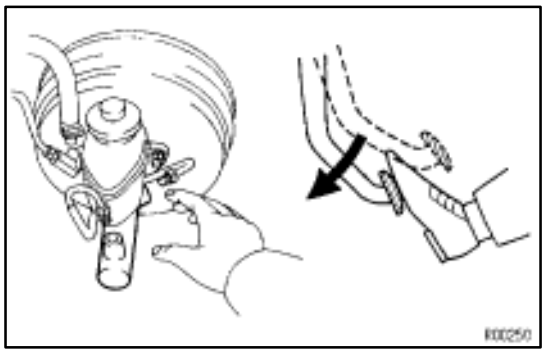
BR03Q–01

HINT: If any work is done on the brake system or if air in the brake lines is suspected, bleed the system of air.

NOTICE: Do not let brake fluid remain on painted surfaces. Wash it off immediately.

1. FILL RESERVOIR TANK WITH BRAKE FLUID

Fluid: SAE J1703 or FMVSS NO. 116DOT3

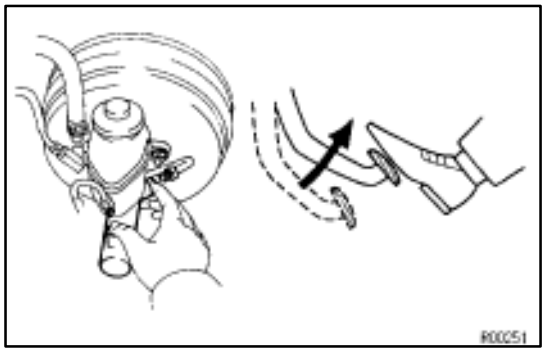


2. BLEED MASTER CYLINDER

HINT: If the master cylinder has been disassembled or if the reservoir tank becomes empty, bleed the air from the master cylinder.

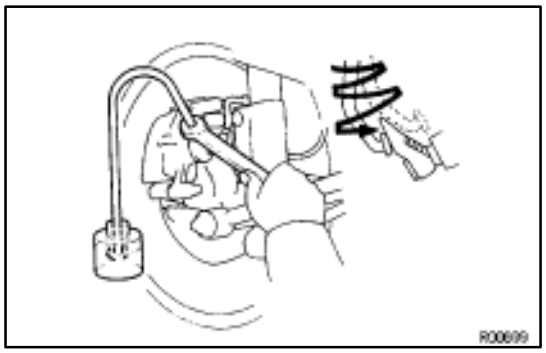
(a) Disconnect the brake tubes from the master cylinder.

(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) three or four times.



3. BLEED BRAKE LINE

(a) Connect the vinyl tube to the brake cylinder.

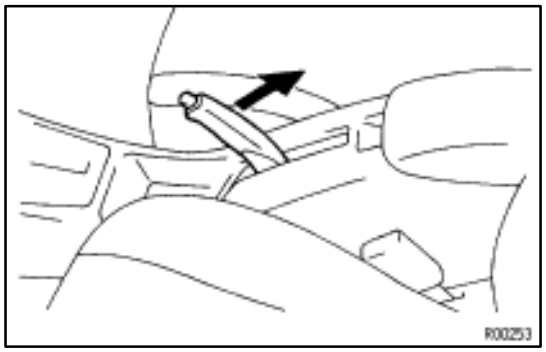
(b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.

(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 above procedure to bleed the air out of the brake line for each wheel.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

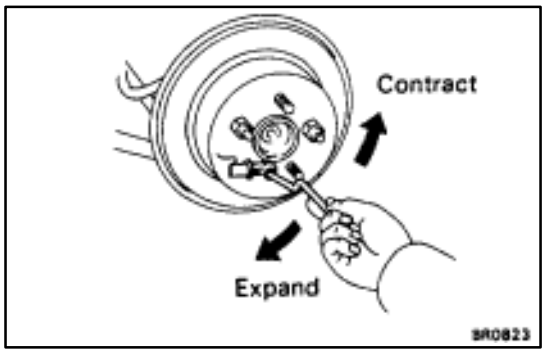
4. CHECK FLUID LEVEL IN RESERVOIR TANK
Check the fluid level and add fluid if necessary.
Fluid: SAE J1703 or FMVSS NO.116DOT3



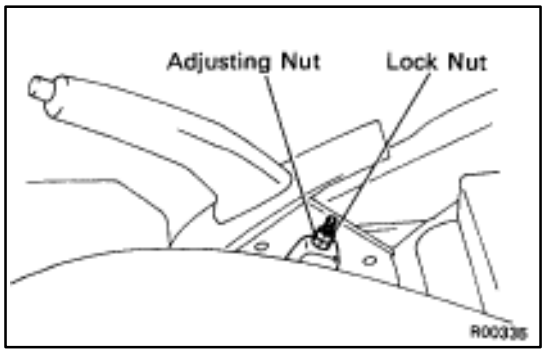
PARKING BRAKE CHECK AND ADJUSTMENT

BR03R–01

1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT
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 LEVER TRAVEL
(a) Remove the rear wheel.
(b) Temporarily install the hub nuts.
(c) Remove the hole plug.
(d) Turn the adjuster and expand the shoes until the rotor disc locks.
(e) Return the adjuster eight notches.
(f) Install the hole plug and hub nuts.
(g) Install the rear wheel.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

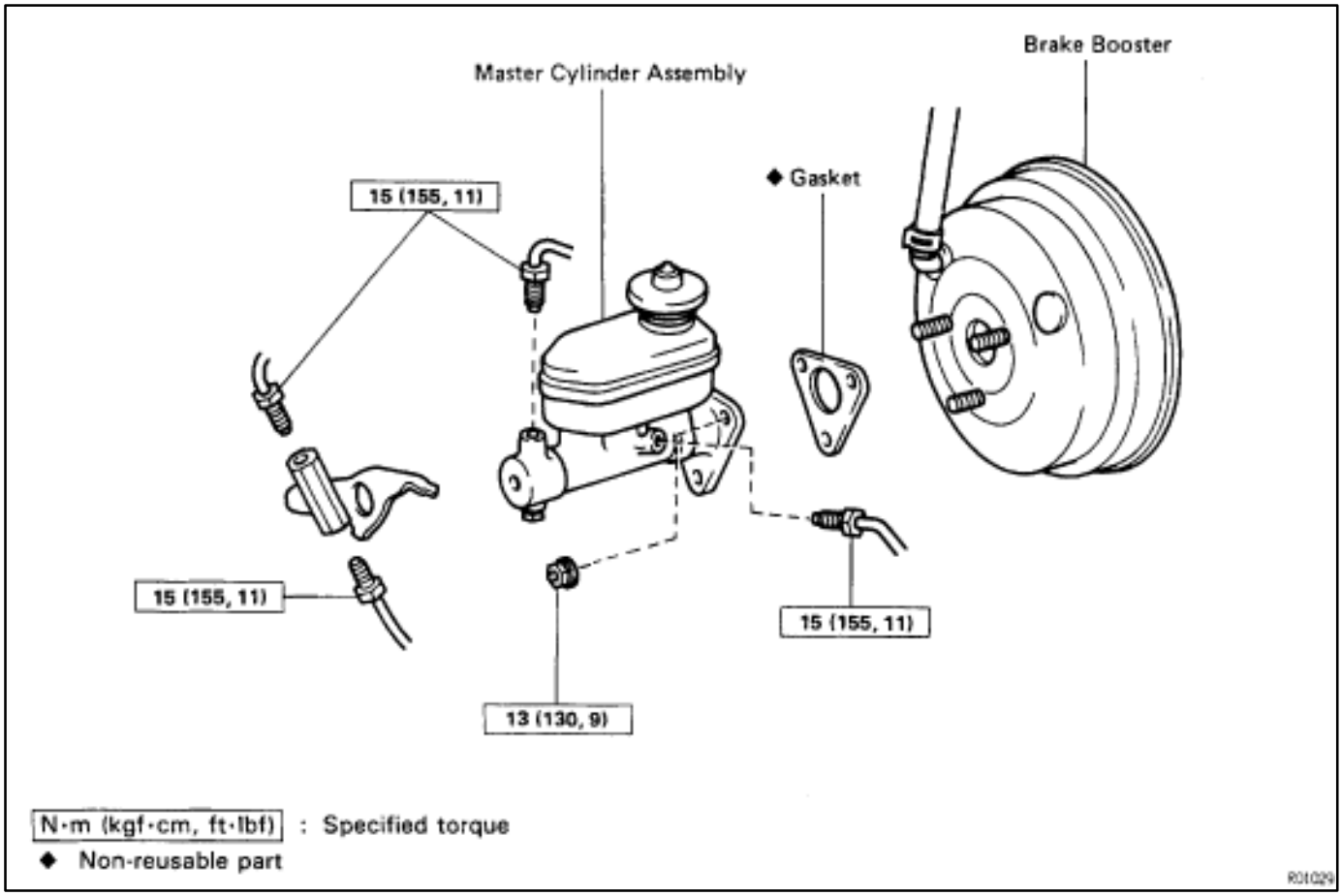


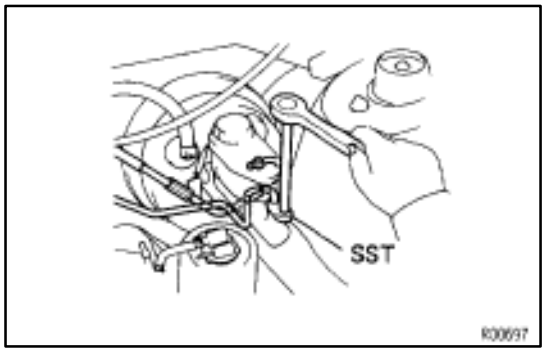
(h) Remove the rear console box.
(i) Loosen the lock nut and turn the adjusting nut until the lever travel is correct.
(j) Tighten the lock nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(k) Install the rear console box.

MASTER CYLINDER

BR03S–01

MASTER CYLINDER REMOVAL





1. DISCONNECT LEVEL WARNING SWITCH CONNECTOR

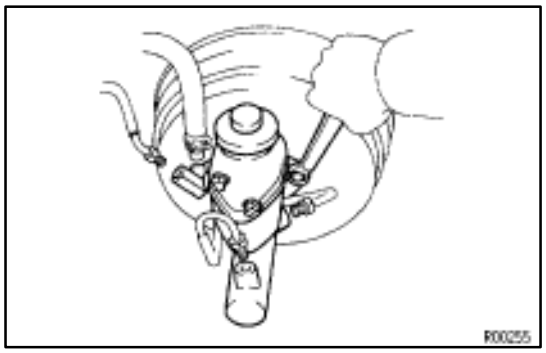
2. TAKE OUT FLUID WITH SYRINGE

NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

3. DISCONNECT BRAKE TUBES

Using SST, disconnect the brake tubes from the master cylinder.

SST 09023–00100

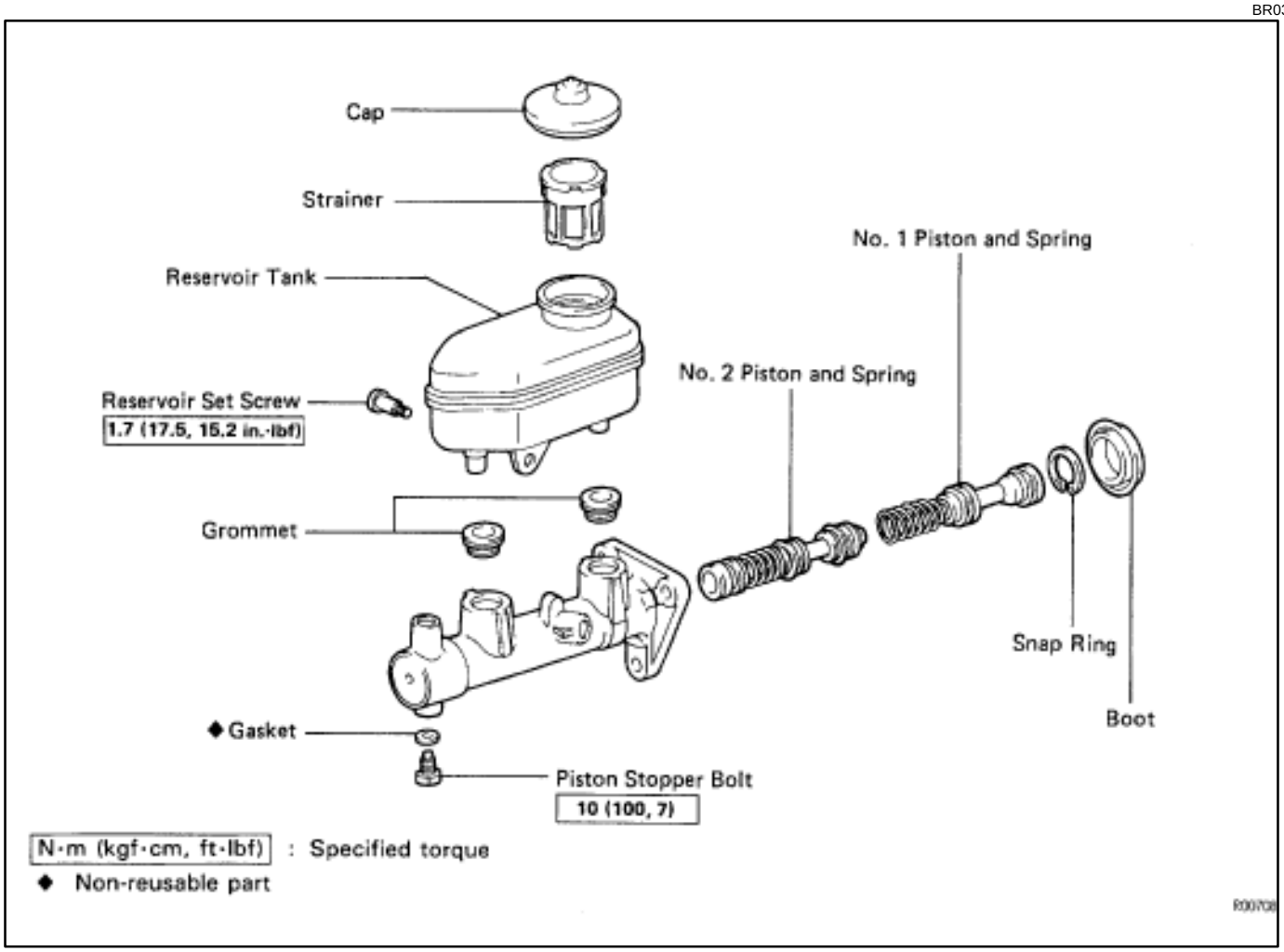


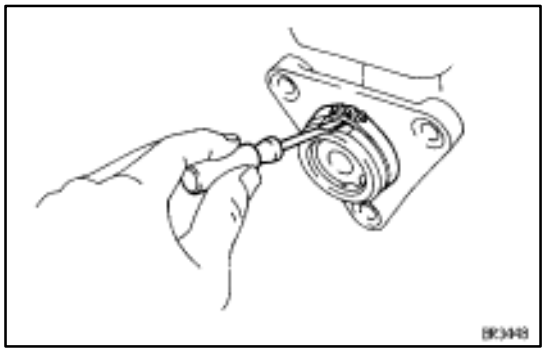
4. REMOVE MASTER CYLINDER

Remove the mounting nuts and pull out the master cylinder and gasket.

COMPONENTS

BR03T–01



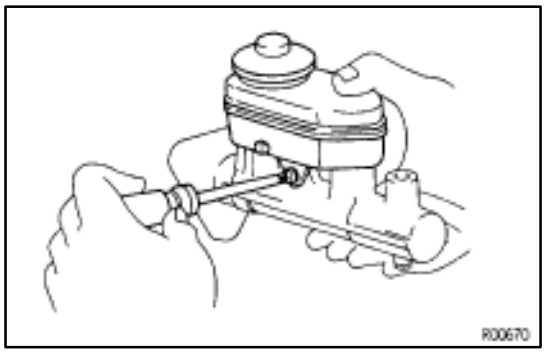


MASTER CYLINDER DISASSEMBLY

BR03U–01

1. REMOVE MASTER CYLINDER BOOT

Using a screwdriver, remove the master cylinder boot.



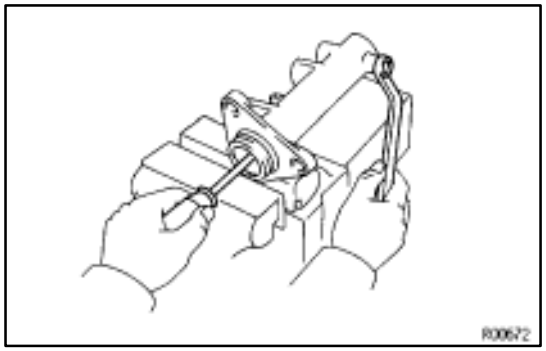
2. REMOVE RESERVOIR TANK

(a) Remove the set screw and pull out the reservoir tank.

(b) Remove the cap and strainer from the reservoir tank.

3. REMOVE TWO GROMMETS

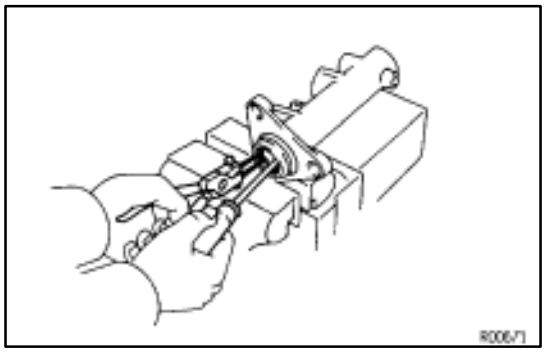
4. PLACE CYLINDER IN VISE



5. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way and remove the piston stopper bolt and gasket.

HINT: Tape the screwdriver tip before use.

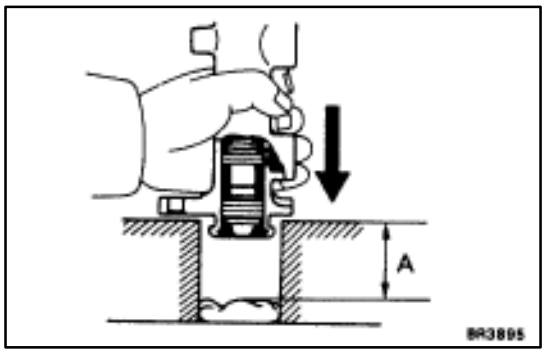


6. REMOVE TWO PISTONS

(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 possibility that the cylinder bore could be damaged.



(c) Place a rag and two 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.).

MASTER CYLINDER COMPONENTS INSPECTION

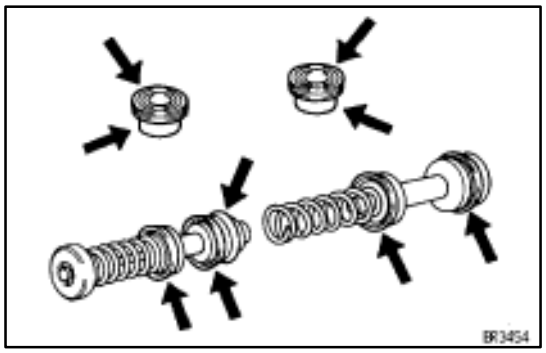
BR03V–01

HINT: Clean the disassembled parts with compressed air.

1. INSPECT CYLINDER BORE FOR RUST OR SCORING

2. INSPECT CYLINDER FOR WEAR OR DAMAGE

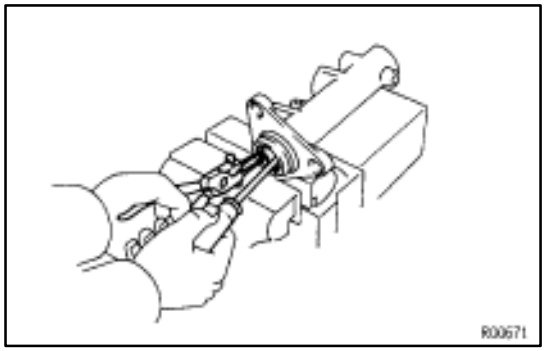
If necessary, clean or replace the cylinder.



MASTER CYLINDER ASSEMBLY

BR03W–01

1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO RUBBER PARTS INDICATED BY ARROWS



2. INSTALL TWO PISTONS

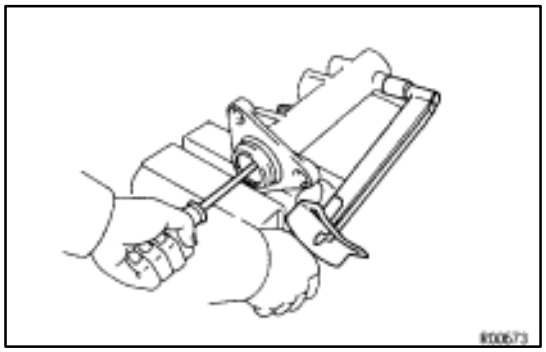
NOTICE: Be careful not to damage the rubber lips on the pistons.

(a) Insert the two pistons straight in, no at an angle.

NOTICE: If inserted at an angle, there is a possibility that the cylinder bore could be damaged.

(b) Push in the piston with a screwdriver and install the snap ring with snap ring pliers.

HINT: Tape the screwdriver tip before use.

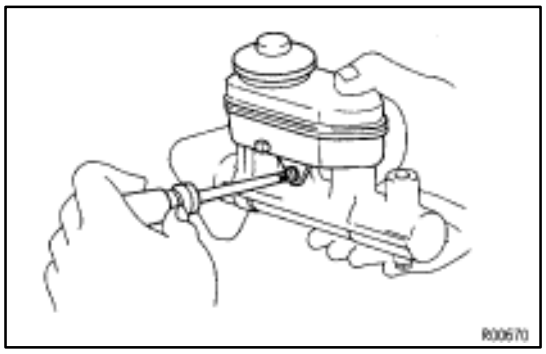


3. INSTALL PISTON STOPPER BOLT

Using a screwdriver, push the piston in all the way and install the piston stopper bolt over the gasket. Torque the bolt.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

4. INSTALL TWO GROMMETS



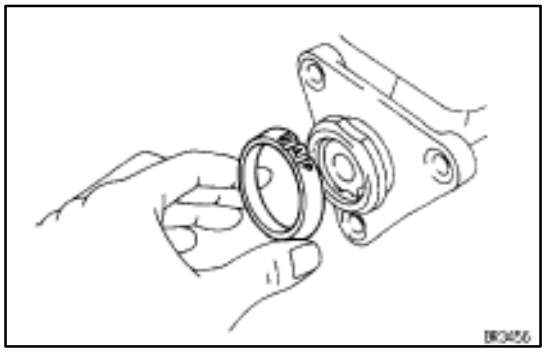
5. INSTALL RESERVOIR TANK

(a) Install the cap and strainer to the reservoir tank.

(b) Push the reservoir tank onto the cylinder.

(c) Install the set screw while pushing on the reservoir tank.

Torque: 1.7 N·m (17.5 kgf·cm, 15.2 in.·lbf)

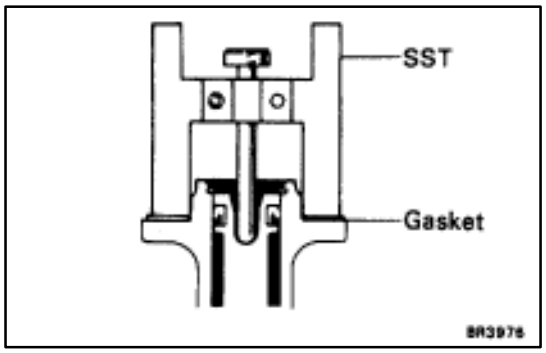


6. INSTALL MASTER CYLINDER BOOT

With the UP mark on the master cylinder boot facing upwards, install the cylinder boot on the master cylinder.

MASTER CYLINDER INSTALLATION

BR03X–01

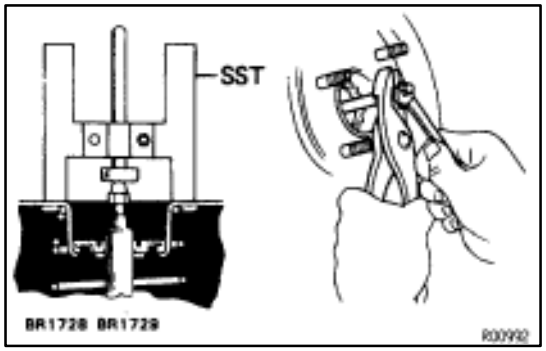


1. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Install the gasket on the master cylinder.

(b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.

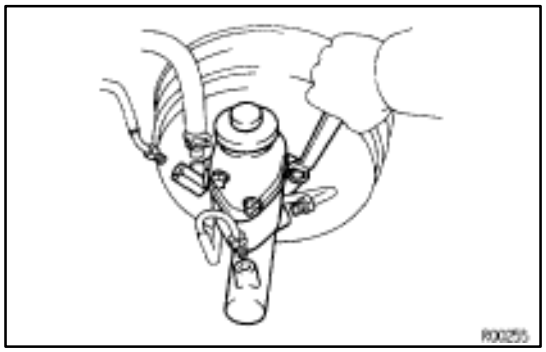
SST 09737–00010



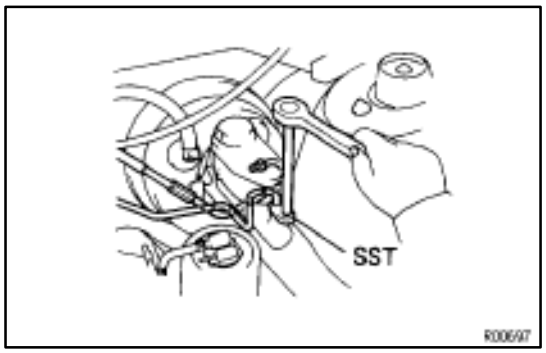
(c) Turn the SST upside down, and set it on the booster.
SST 09737–00010

(d) Measure the clearance between the booster push rod and pin head (SST).
Clearance:
0 mm (0 in.)

(e) Adjust the booster push rod length until the push rod lightly touches the pin head.



2. INSTALL MASTER CYLINDER
Install the master cylinder and gasket on the brake booster with three nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



3. CONNECT TWO BRAKE TUBES
Using SST, connect the brake tubes to the master cylinder. Torque the union nuts.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

4. CONNECT LEVEL WARNING SWITCH CONNECTOR

5. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See brake system bleeding)

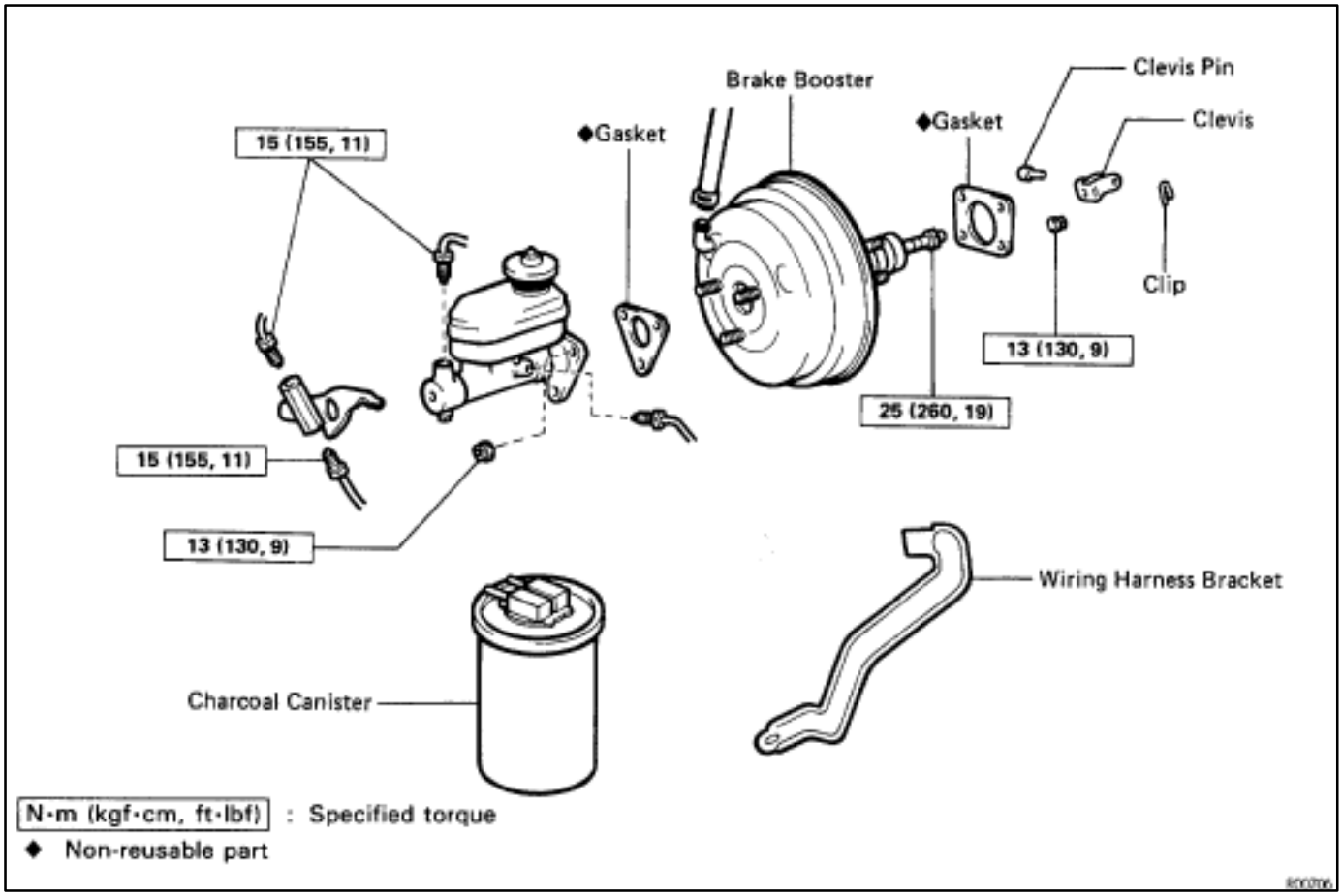
6. CHECK FOR FLUID LEAKAGE

7. CHECK AND ADJUST BRAKE PEDAL
(See brake pedal check and adjustment)

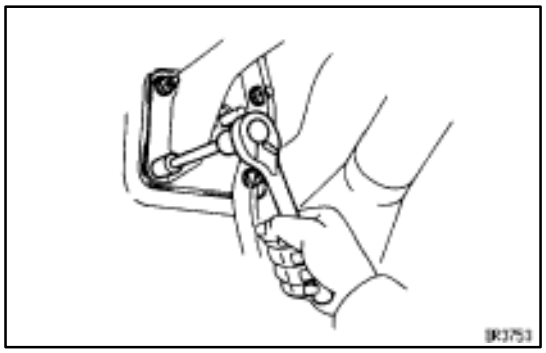
BRAKE BOOSTER

BR03Y–01

BRAKE BOOSTER REMOVAL



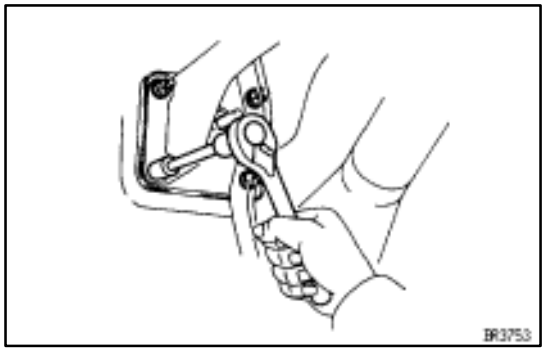
1. **REMOVE MASTER CYLINDER**
2. **REMOVE CHARCOAL CANISTER**
3. **REMOVE WIRING HARNESS BRACKET**
4. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**
5. **REMOVE PEDAL RETURN SPRING**
6. **REMOVE CLIP AND CLEVIS PIN**



7. **REMOVE BRAKE BOOSTER**

(a) Remove the four booster installation nuts.

(b) Pull out the brake booster and gasket.



BRAKE BOOSTER INSTALLATION

BR03Z–01

1. INSTALL BRAKE BOOSTER

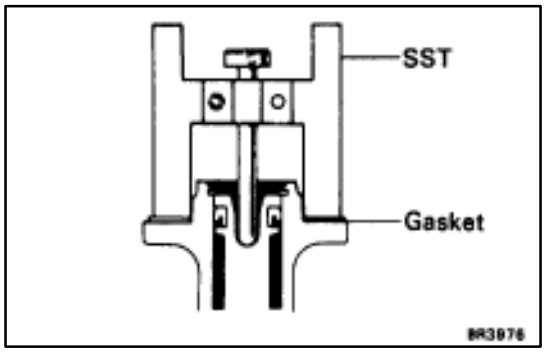
(a) Install the clevis to the operating rod.

(b) Install the booster and gasket.

(c) Install and torque the booster installation nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(d) Insert the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.

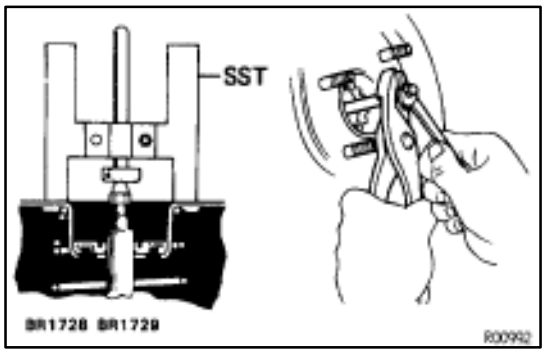
(e) Install the pedal return spring.



2. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Install the gasket on the master cylinder.

(b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.
SST 09737–00010



(c) Turn the SST upside down, and set it on the booster.
SST 09737–00010

(d) Measure the clearance between the booster push rod and pin head (SST).
Clearance:
0 mm (0 in.)

(e) Adjust the booster push rod length until the push rod lightly touches the pin head.

3. INSTALL WIRING HARNESS BRACKET

4. INSTALL CHARCOAL CANISTER

5. INSTALL MASTER CYLINDER

6. CONNECT VACUUM HOSE TO BRAKE BOOSTER

7. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See brake system bleeding)

8. CHECK FOR FLUID LEAKAGE

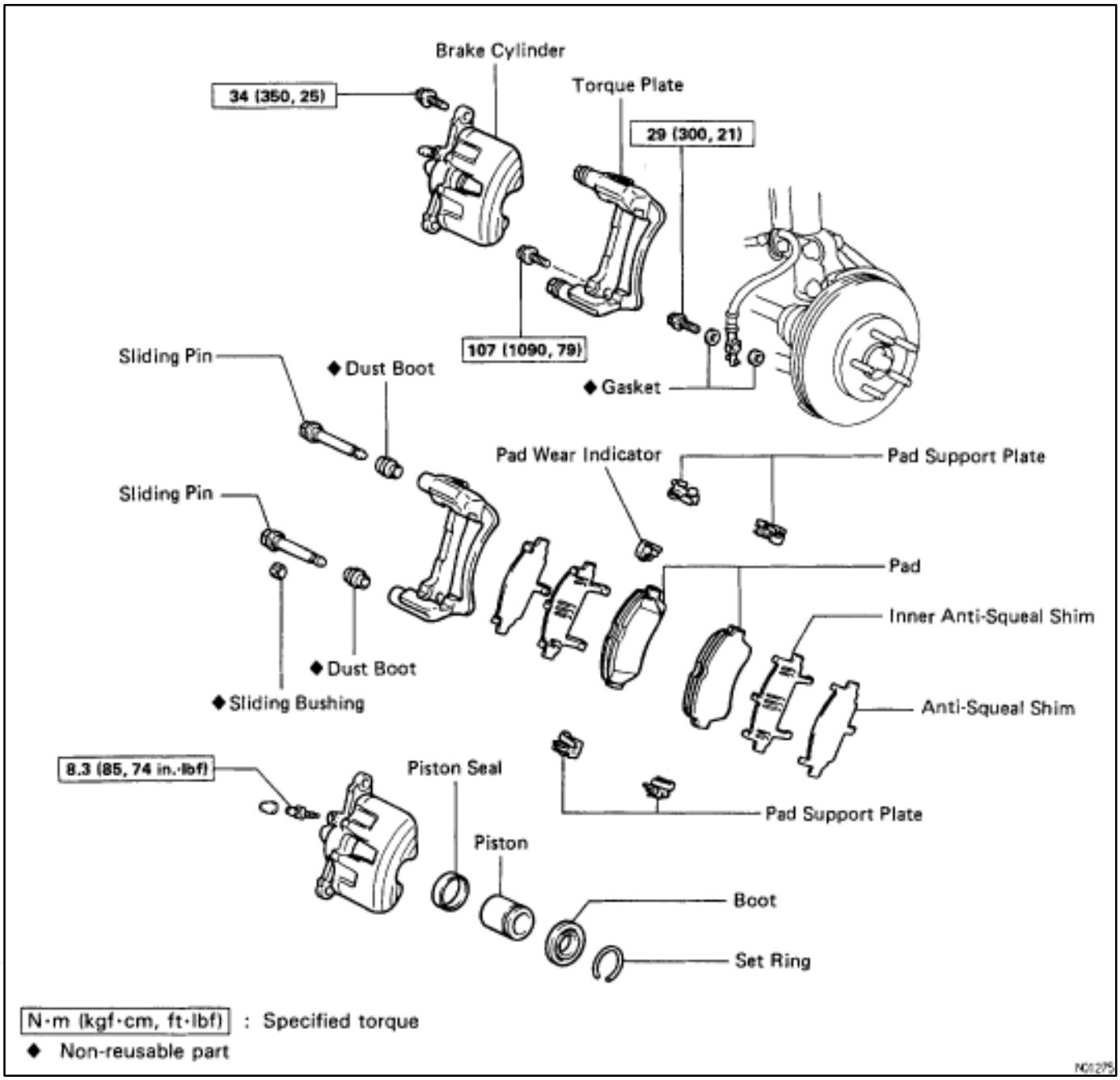
9. CHECK AND ADJUST BRAKE PEDAL
(See brake pedal check and adjustment)

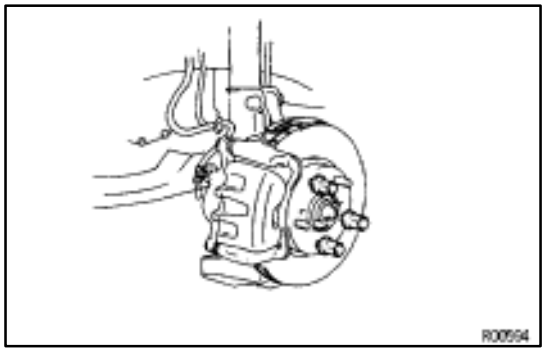
10. PERFORM OPERATIONAL CHECK
(See brake booster operational test)

FRONT BRAKE

BR040–01

COMPONENTS



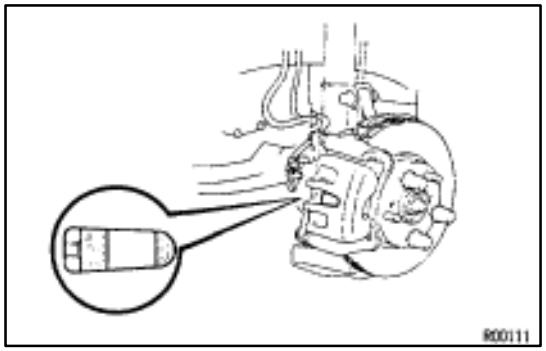


BRAKE PADS REPLACEMENT

BR041–01

1. REMOVE FRONT WHEEL

Remove the wheel and temporarily fasten the rotor disc with the hub nuts.

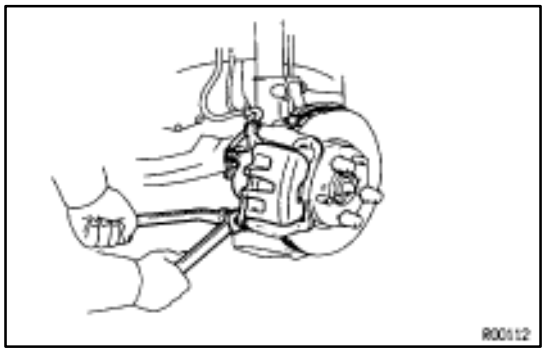


2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the cylinder inspection hole and replace the pads if it is not within the specification.

Minimum thickness:

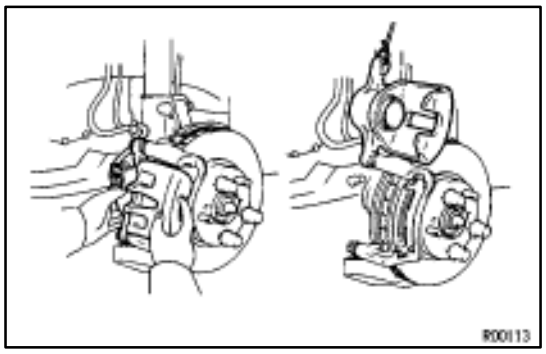
1.0 mm (0.039 in.)



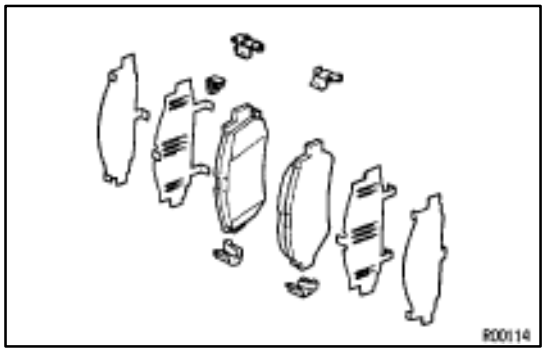
3. LIFT UP CYLINDER

(a) Hold the sliding pin on the bottom and loosen the installation bolt.

(b) Remove the installation bolt.



(c) Lift up the brake cylinder and suspend the cylinder with string.
HINT: Do not disconnect the flexible hose from the brake cylinder.



4. REMOVE FOLLOWING PARTS:

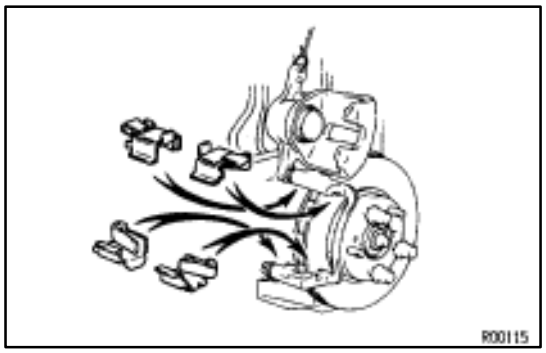
(a) Two brake pads

(b) Four anti–squeal shims

(c) Four pad support plates

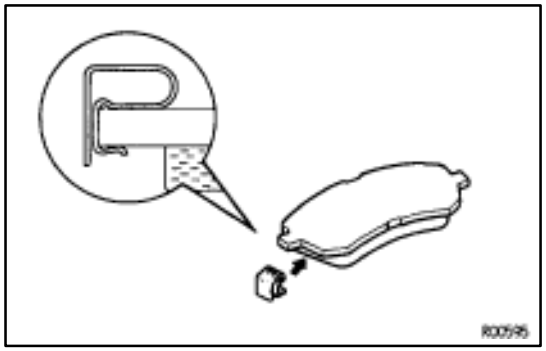
(d) Pad wear indicator

5. CHECK ROTOR DISC THICKNESS AND RUNOUT
(See front brake components inspection and repair)



6. INSTALL PAD SUPPORT PLATES

Install the four pad support plates.

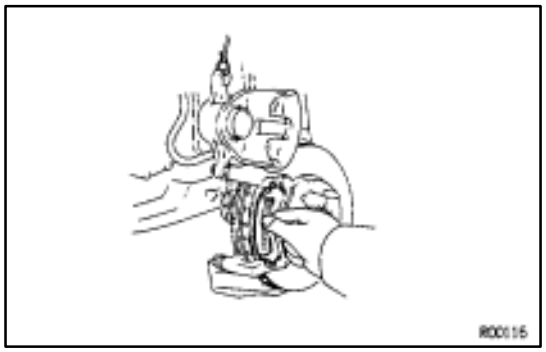


7. INSTALL NEW PADS

(a) Install the pad wear indicator plate on the pad.

(b) Apply disc brake grease to both sides of the inner anti–squeal shim.

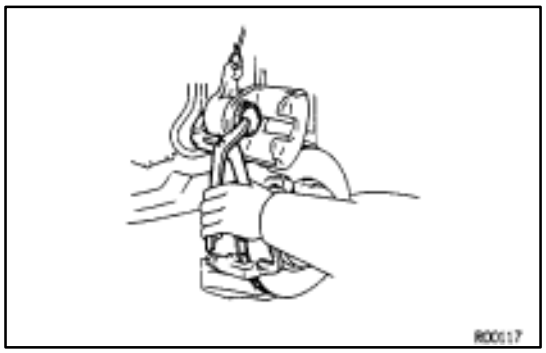
(c) Install the two anti–squeal shims on each pad.



(d) Install two pads with the pad wear indicator plates facing upward.

NOTICE: There should be no oil or grease adhering to the friction surfaces of the pads or the rotor disc.

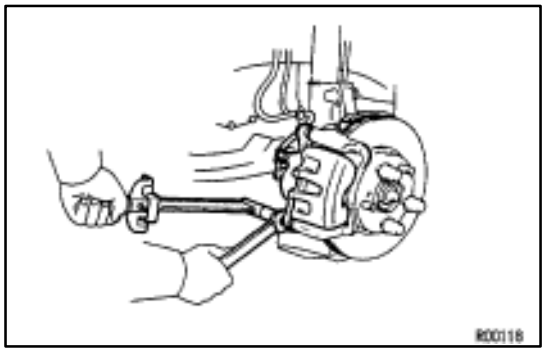
8. INSTALL CYLINDER



(a) Draw out a small amount of brake fluid from the reservoir tank.

(b) Press in the piston with water pump pliers or similar implement.

HINT: If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.



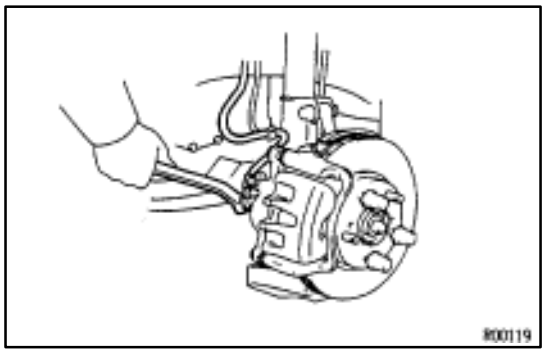
(c) Install the cylinder.

(d) Hold the sliding pin and torque the installation bolt.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

9. INSTALL FRONT WHEEL

10. CHECK THAT FLUID LEVEL IS AT MAX LINE



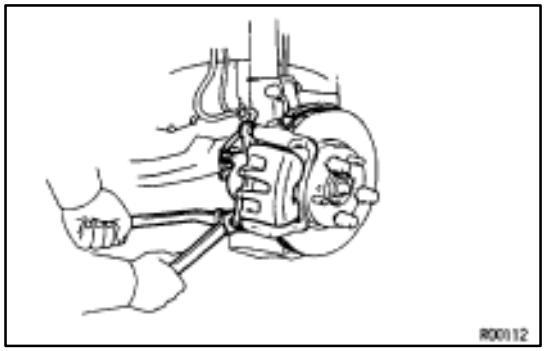
CYLINDER REMOVAL

BR042–01

1. DISCONNECT FLEXIBLE HOSE

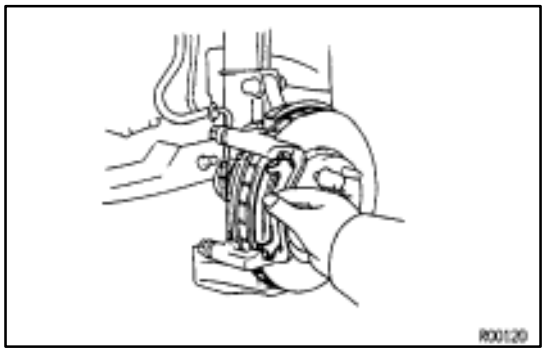
(a) Remove the union bolt and two gaskets from the brake cylinder, then disconnect the flexible hose from the brake cylinder.

(b) Use a container to catch the brake fluid as it drains out.



2. REMOVE CYLINDER

(a) Hold the sliding pin and loosen the two installation bolts.
(b) Remove the two installation bolts.
(c) Remove the cylinder from the torque plate.

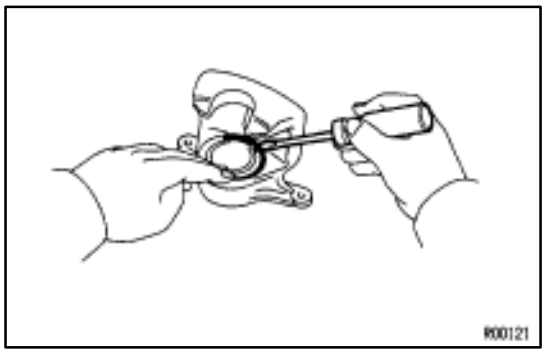


3. REMOVE TWO BRAKE PADS

Remove the inside and outside pads.

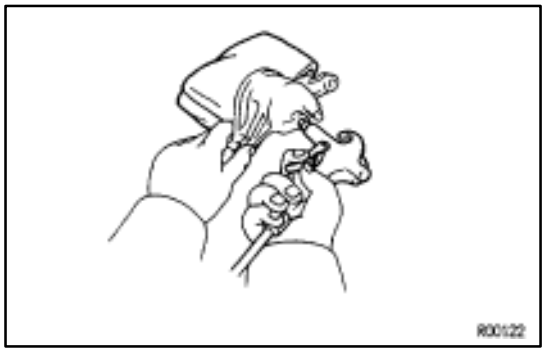
CYLINDER DISASSEMBLY

BR043–01



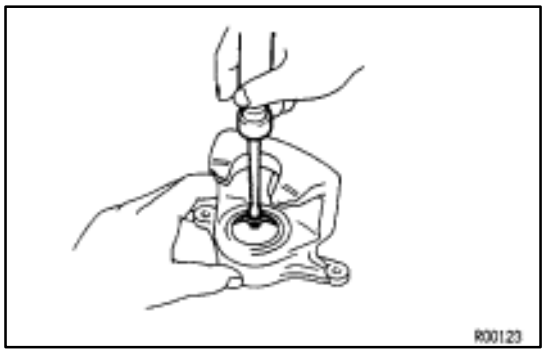
1. REMOVE CYLINDER BOOT SET RINGS AND CYLINDER BOOT

Using a screwdriver, remove the cylinder boot set ring and cylinder boot from the cylinder.



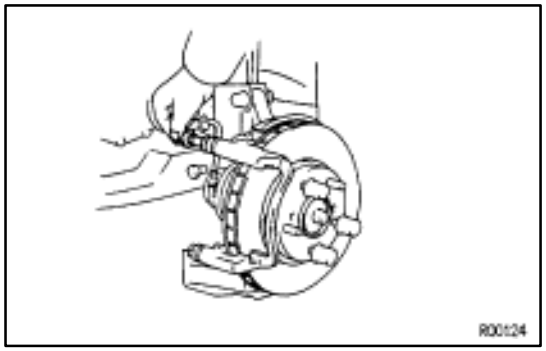
2. REMOVE PISTON

(a) Place a piece of cloth or similar article between the piston and the cylinder.
(b) Use compressed air to remove the piston from the cylinder.
CAUTION: Do not place your fingers in front of the piston when using compressed air.



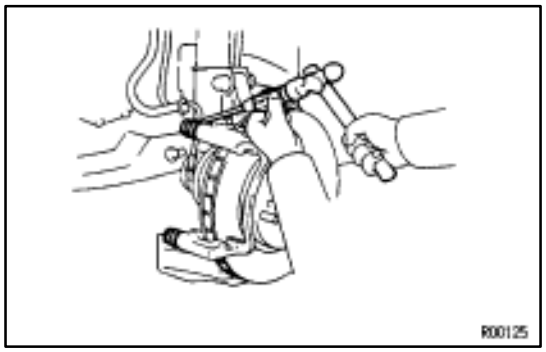
3. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.



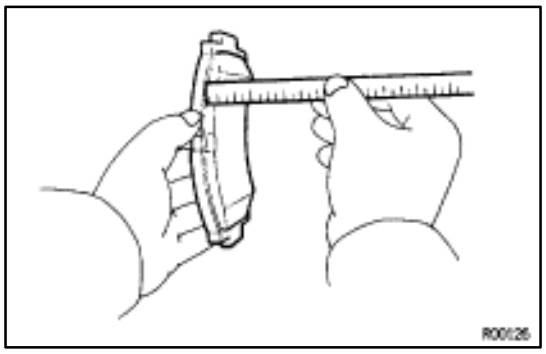
4. REMOVE SLIDING PINS AND DUST BOOTS

(a) Remove the two sliding pins from the torque plate.



(b) Using a chisel and hammer, tap out the two dust boots.

BR044–01



FRONT BRAKE COMPONENTS INSPECTION AND REPAIR

1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

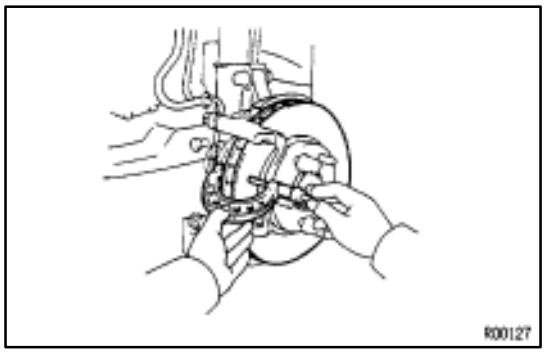
Standard thickness:

11.0 mm (0.433 in.)

Minimum thickness:

1.0 mm (0.039 in.)

Replace the pad if the pad's thickness is at the minimum thickness or less, or if the pad has severely uneven wear.



2. MEASURE ROTOR DISC THICKNESS

Using a micrometer, measure the rotor disc thickness.

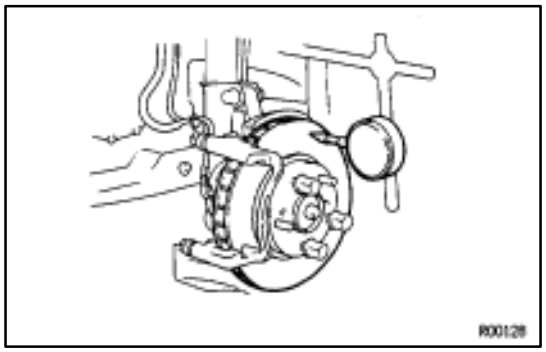
Standard thickness:

28 mm (1.102 in.)

Minimum thickness:

26 mm (1.024 in.)

Replace the rotor disc if the thickness of the rotor disc is at the minimum thickness or less. Replace the rotor disc or grind it on a lathe if it is scored or is worn unevenly.



3. MEASURE ROTOR DISC RUNOUT

Using a dial indicator, measure the rotor disc runout at a position 10 mm (0.39 in.) from the outside edge.

Maximum disc runout:

0.05 mm (0.0020 in.)

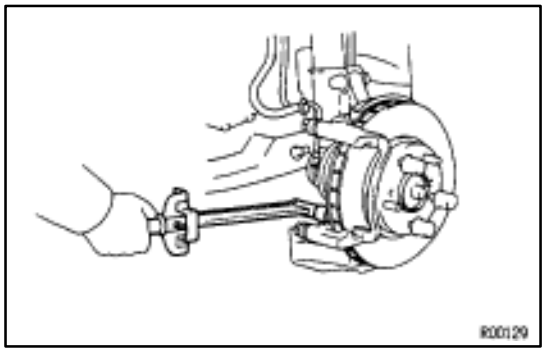
If the rotor disc's runout is at the maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See SA section). If the bearing play and axle hub runout are not abnormal, adjust the rotor disc runout.

4. IF NECESSARY, ADJUST ROTOR DISC RUNOUT

(a) Remove the torque plate from the knuckle.

(b) Remove the hub nuts of the temporarily installed disc and pull off the rotor disc.

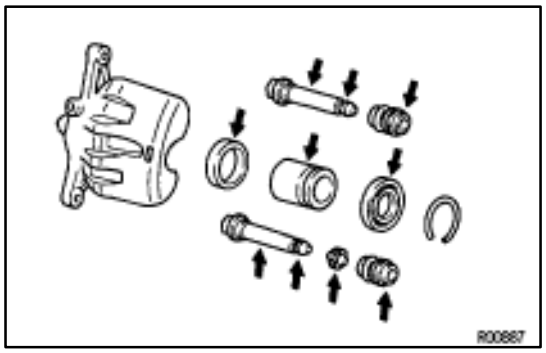
(c) Install the rotor disc and measure the disc runout, then shift the rotor disc one fifth of a turn and measure the disc runout. Similarly measure the runout at each position, and select the position where the runout is minimum.



(d) In this position, if the runout is within specification, install the torque plate and torque the mounting bolts.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

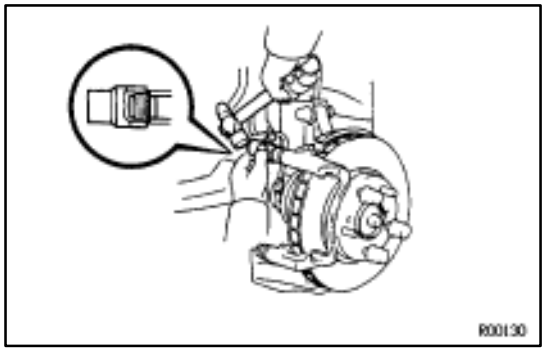
(e) If not within specification, replace the rotor disc, and repeat (c) and (d).



CYLINDER ASSEMBLY

BR045–01

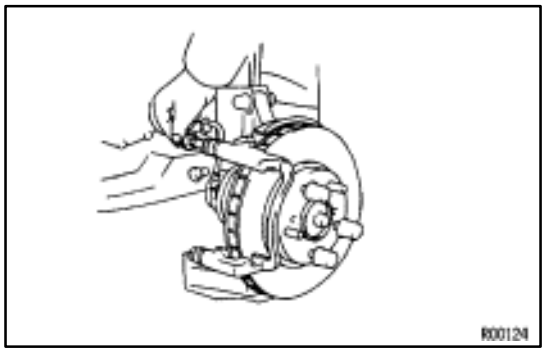
1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED WITH ARROWS



2. INSTALL DUST BOOTS AND SLIDING PINS

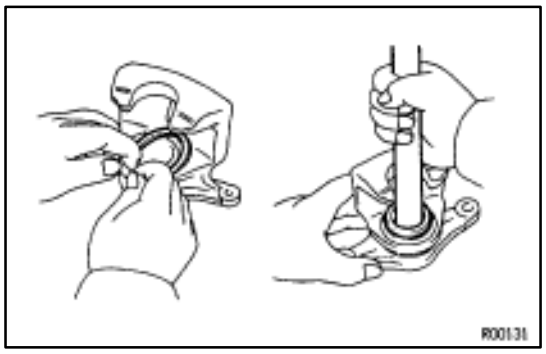
(a) Using a 19 mm socket wrench and hammer, tap in two new dust boots into the torque plate.

(b) Confirm that the metal plate portion of the dust boot fits snugly in the torque plate.

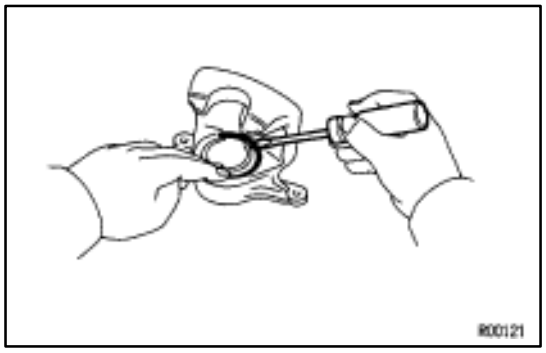


(c) Insert two sliding pins into the torque plate.
NOTICE: Insert the sliding pin with sliding bushing into the bottom side.

3. INSTALL PISTON SEAL AND PISTON IN CYLINDER



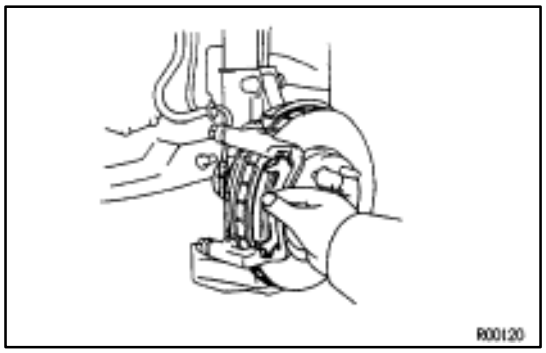
4. INSTALL CYLINDER BOOT AND CYLINDER BOOT SET RING

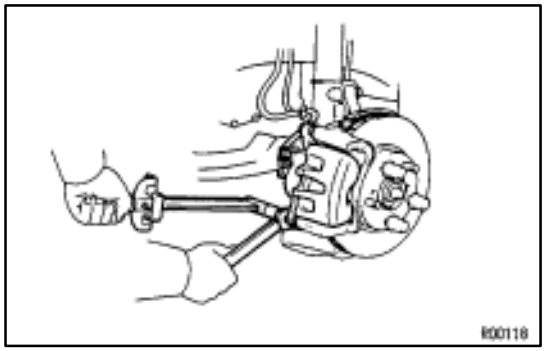


CYLINDER INSTALLATION

BR046–01

1. INSTALL TWO BRAKE PADS
Install the inside and outside pads.

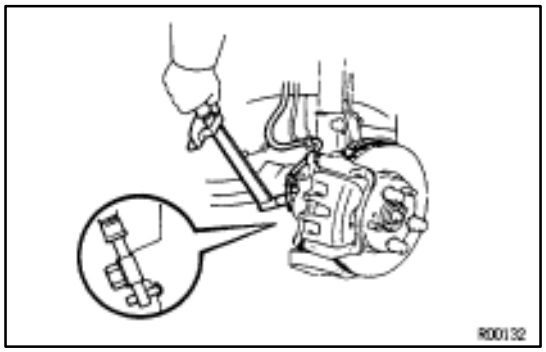




2. INSTALL CYLINDER

(a) Temporarily install the cylinder on the torque plate with two installation bolts.

(b) Hold the sliding pin and torque the installation bolt.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)



3. CONNECT FLEXIBLE HOSE

Install the flexible hose on the brake cylinder with two new gaskets.
Torque: 27 N·m (300 kgf·cm, 21 ft·lbf)

HINT: Insert the flexible hose lock securely in the lock hole in the brake cylinder.

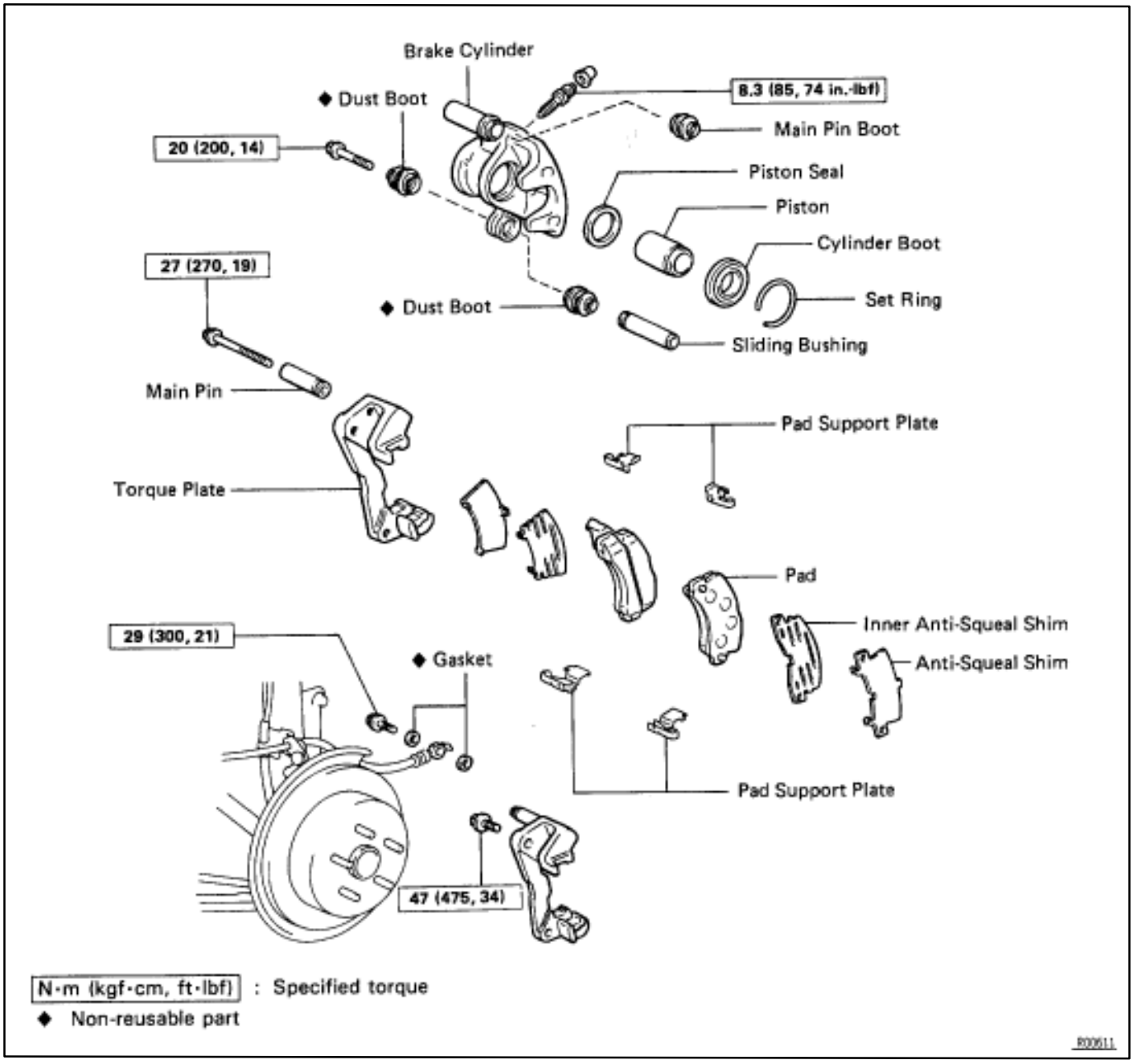
4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See brake system bleeding)

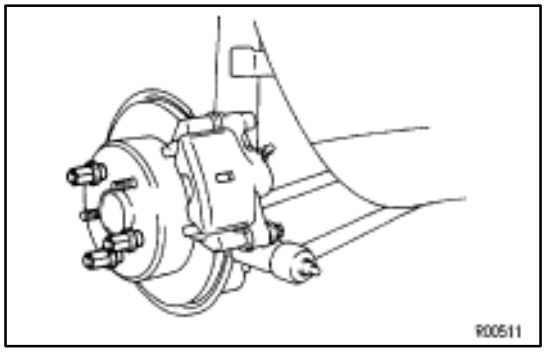
5. CHECK FOR LEAKS

REAR BRAKE (DISC BRAKE)

BR047–01

COMPONENTS



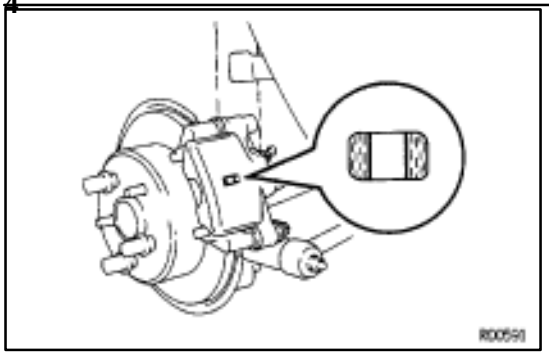


BRAKE PADS REPLACEMENT

BR048–01

1. REMOVE REAR WHEEL

Remove the wheel and temporarily fasten the rotor disc with the hub nuts.

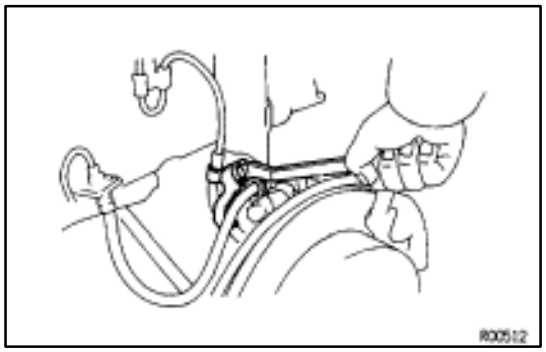


2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the cylinder inspection hole and replace pads if not within specification.

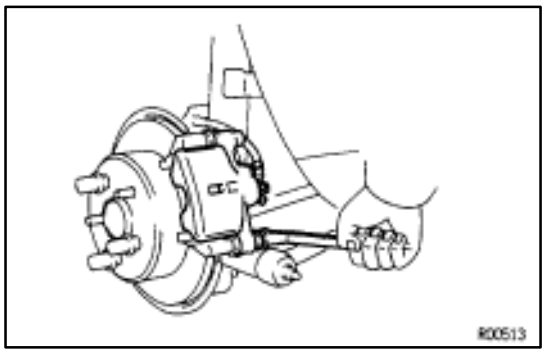
Minimum thickness:

1.0 mm (0.039 in.)

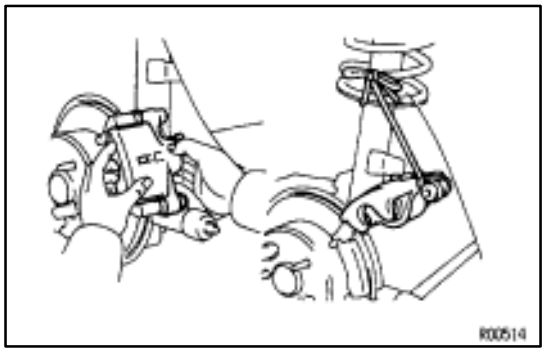


3. LIFT UP CYLINDER

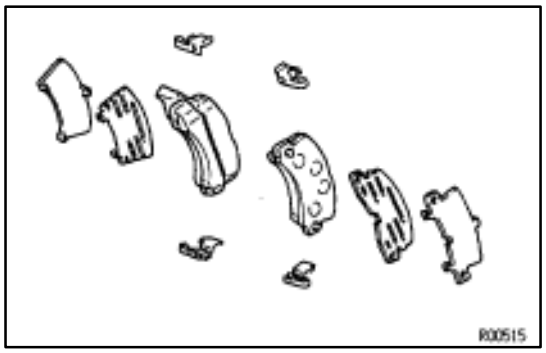
(a) Remove the flexible hose bracket.



(b) Remove the installation bolt.



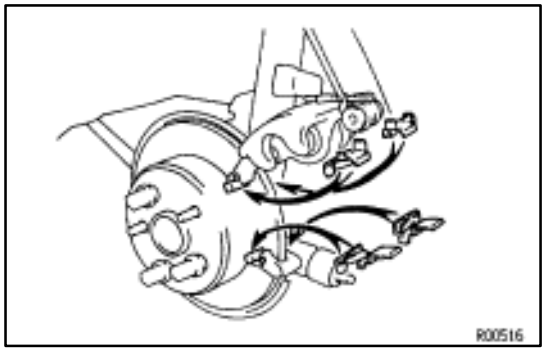
(c) Lift up the brake cylinder and suspend the cylinder with string.
HINT: Do not disconnect the flexible hose from the brake cylinder.



4. REMOVE FOLLOWING PARTS:

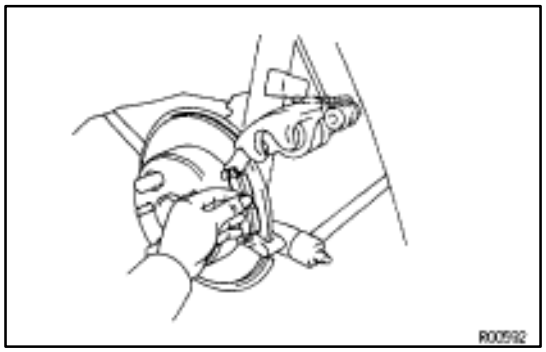
(a) Two brake pads
(b) Four anti–squeal shims
(c) Four pad support plates

5. CHECK ROTOR DISC THICKNESS AND RUNOUT
(See rear brake components inspection and repair)



6. INSTALL PAD SUPPORT PLATES

Install the four pad support plates.



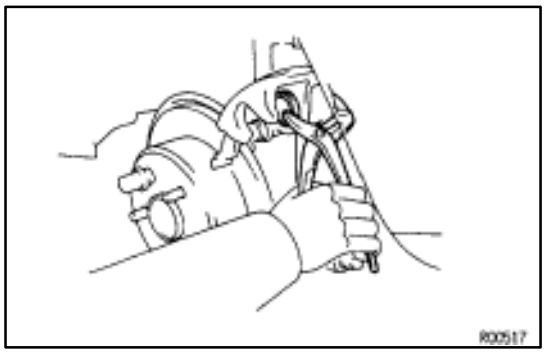
7. INSTALL NEW PADS

(a) Apply disc brake grease to both sides of the inner anti–squeal shims.

(b) Install the two anti–squeal shims on each pad.

(c) Install two pads with the pad wear indicator plates facing upward.

NOTICE: There should be no oil or grease adhering to the friction surfaces of the pads or the rotor disc.

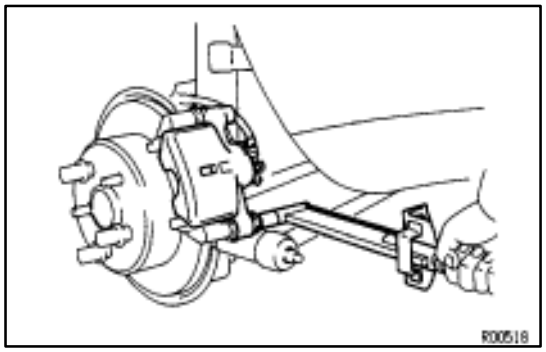


8. INSTALL CYLINDER

(a) Draw out a small amount of brake fluid from the reservoir tank.

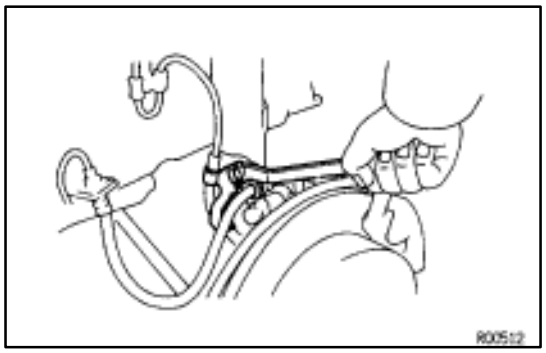
(b) Press in the piston with water pump pliers or similar implement.

HINT: If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.



(c) Install the brake cylinder and torque the installation bolt.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

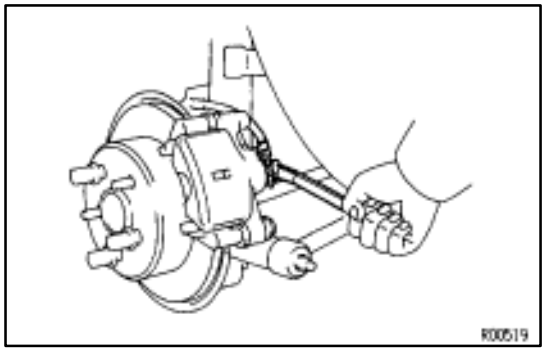


(d) Install the flexible hose bracket.

Torque: 29 N·m (300 kgf·cm, 29 ft·lbf)

9. INSTALL REAR WHEEL

10. CHECK THAT FLUID LEVEL IS AT MAX LINE



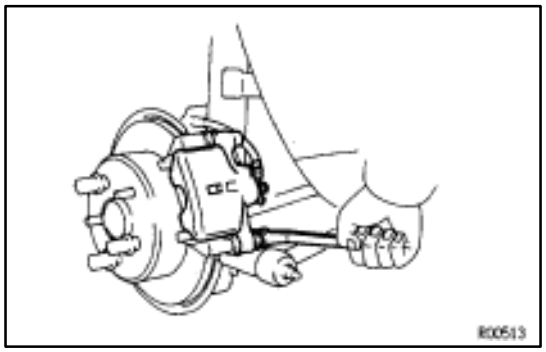
CYLINDER REMOVAL

BR049–01

1. DISCONNECT FLEXIBLE HOSE

(a) Remove the union bolt and two gaskets from the brake cylinder, then disconnect the flexible hose from the brake cylinder.

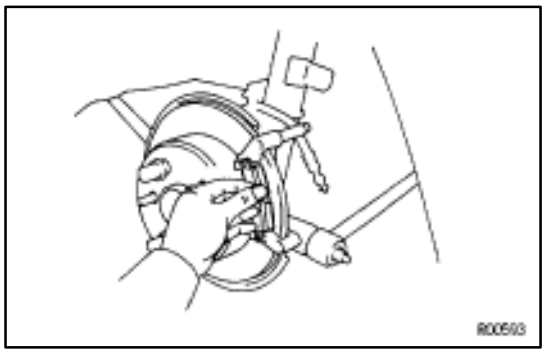
(b) Use a container to catch the brake fluid as it drains out.



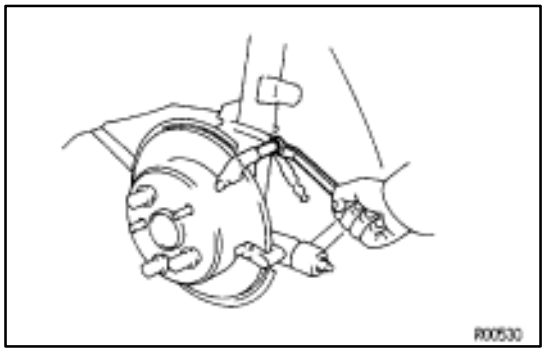
2. REMOVE CYLINDER

(a) Remove the installation bolt.

(b) Remove the cylinder from the torque plate.

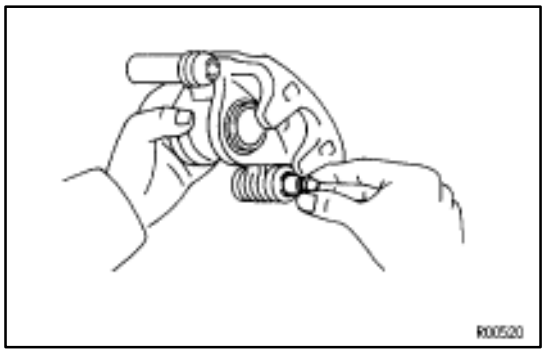


3. REMOVE TWO PADS



4. REMOVE MAIN PIN

Loosen the main pin installation bolt and remove the main pin.

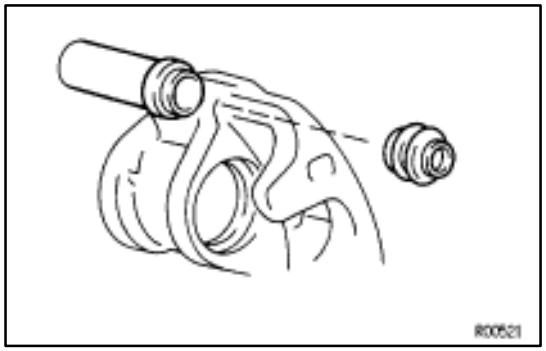


CYLINDER DISASSEMBLY

BR04A–01

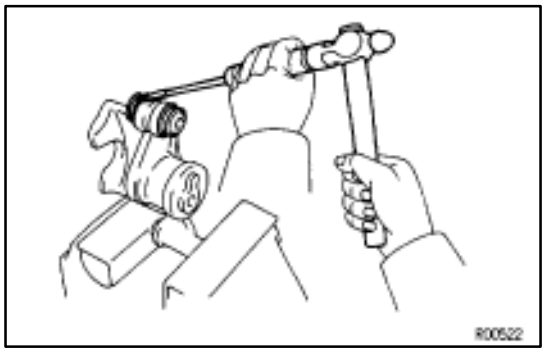
1. REMOVE SLIDING BUSHING

Pull out the sliding bushing.



2. REMOVE MAIN PIN BOOT

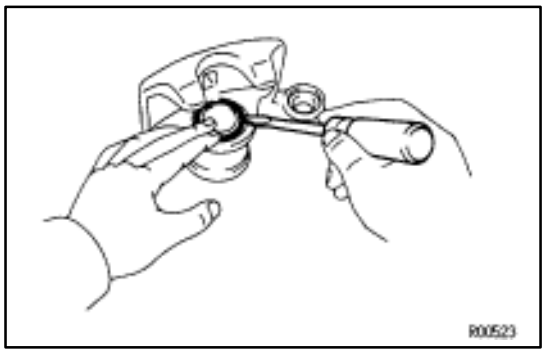
Pull out the main pin boot.



3. REMOVE DUST BOOTS

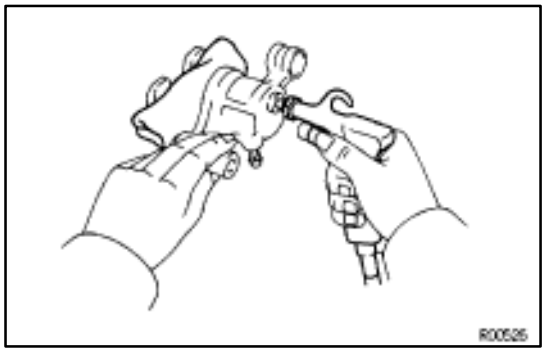
(a) Place the cylinder in vise.

(b) Using a chisel and hammer, tap out the two dust boots.



4. REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT

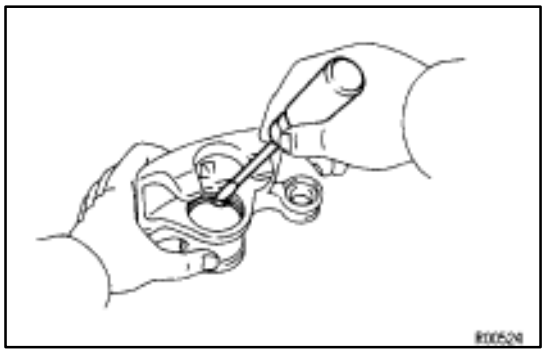
Using a screwdriver, remove the cylinder boot set ring and cylinder boot from the cylinder.



5. REMOVE PISTON

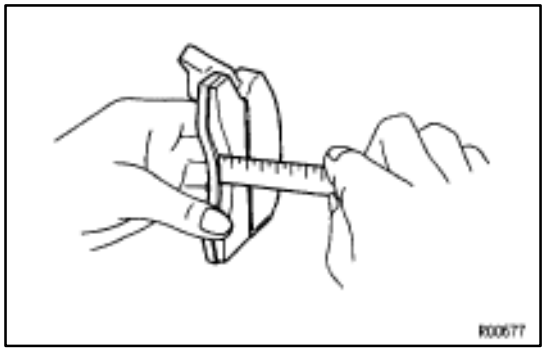
(a) Place a piece of cloth or similar article between the piston and the cylinder.

(b) Use compressed air to remove the piston from the cylinder.
CAUTION: Do not place your fingers in front of the piston when using compressed air.



6. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.



REAR BRAKE COMPONENTS INSPECTION AND REPAIR

BR04B–01

1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

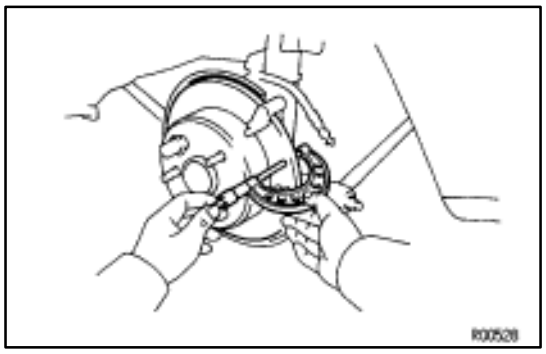
Standard thickness:

10.0 mm (0.394 in.)

Minimum thickness:

1.0 mm (0.039 in.)

Replace the pad if the pad's thickness is at the minimum thickness or less, or if the pad has severely uneven wear.



2. MEASURE ROTOR DISC THICKNESS

Using a micrometer, measure the rotor disc thickness.

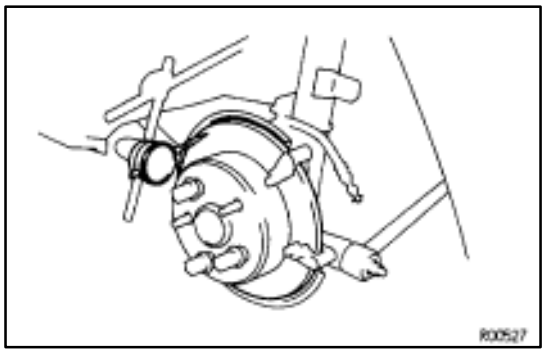
Standard thickness:

10.0 mm (0.394 in.)

Minimum thickness:

9.0 mm (0.354 in.)

Replace the rotor disc if the thickness of the rotor disc is at the minimum thickness or less. Replace the rotor disc or grind it on a lathe if it is scored or is worn unevenly.



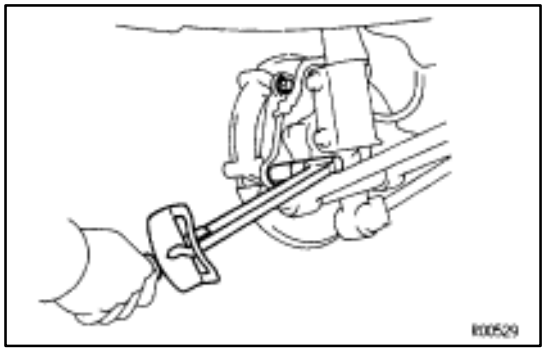
3. MEASURE ROTOR DISC RUNOUT

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

Maximum disc runout:

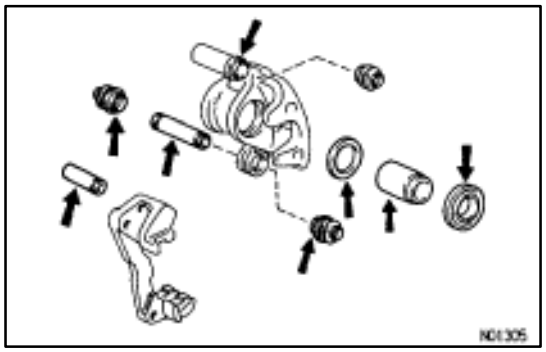
0.15 mm (0.0059 in.)

If the runout is greater than the maximum, replace the disc. HINT: Before measuring the runout, confirm that the hub bearing play is within specification.



4. IF NECESSARY, REPLACE ROTOR DISC

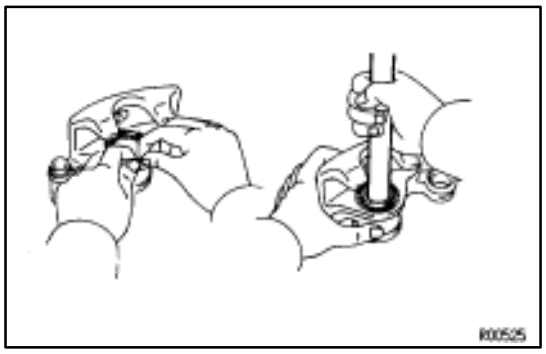
(a) Remove the torque plate.
(b) Remove the hub nuts of the temporarily installed disc and pull off the rotor disc.
(c) Install a new rotor disc and loosely install the hub nuts.
(d) Install the torque plate and tighten the mounting bolt.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)



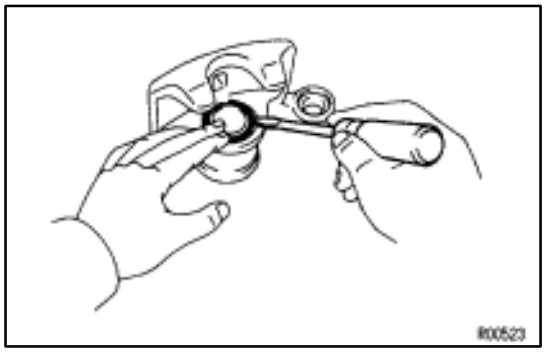
CYLINDER ASSEMBLY

BR04C–01

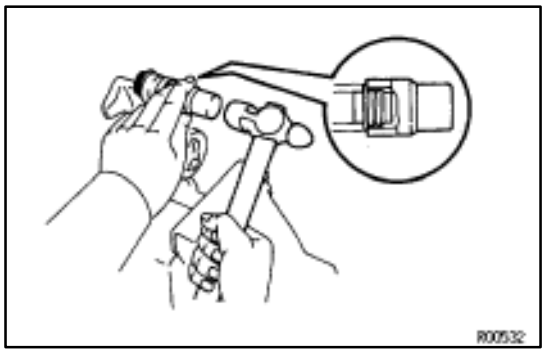
1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED WITH ARROWS



2. INSTALL PISTON SEAL AND PISTON IN CYLINDER

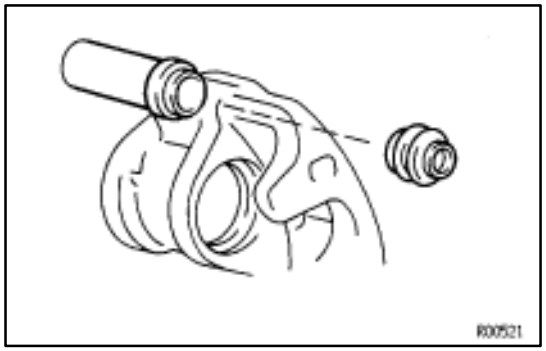


3. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER

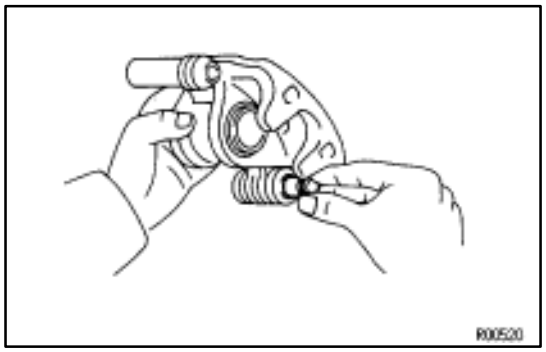


4. INSTALL DUST BOOTS

(a) Place the cylinder in vise.
(b) Using a 19 mm socket wrench and hammer, tap in two new dust boots into the torque plate.
(c) Confirm that the metal plate portion of the dust boot fits snugly in the torque plate.



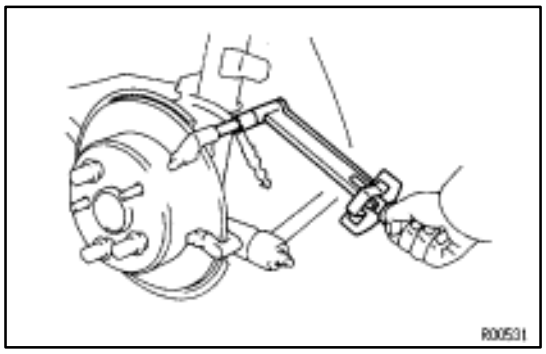
5. INSTALL MAIN PIN BOOT



6. INSTALL SLIDING BUSHING

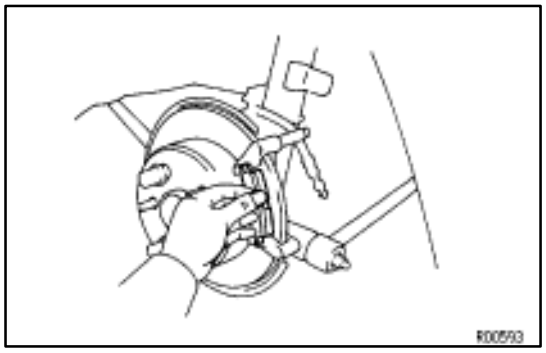
CYLINDER INSTALLATION

BR04D–01



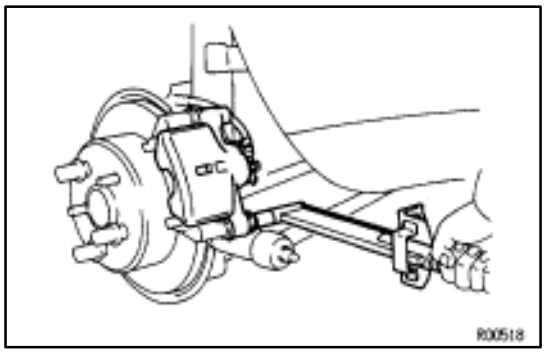
1. INSTALL MAIN PIN

Install the main pin and torque the main pin installation bolt.
Torque: 27 N·m (270 kgf·cm, 19 ft·lbf)



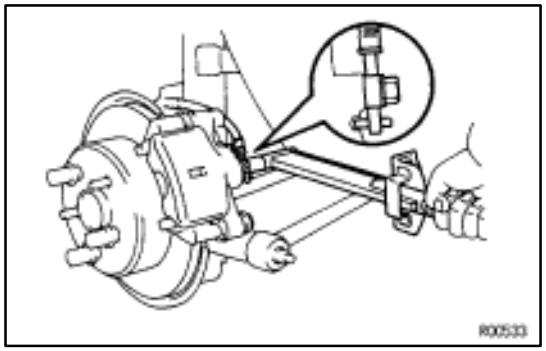
2. INSTALL TWO PADS

Install two pads with the pad wear indicator plate facing upward.
NOTICE: There should be no oil or grease adhering to the friction surfaces of the pads or the rotor disc.



3. INSTALL CYLINDER

Install the brake cylinder and torque the installation bolt.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

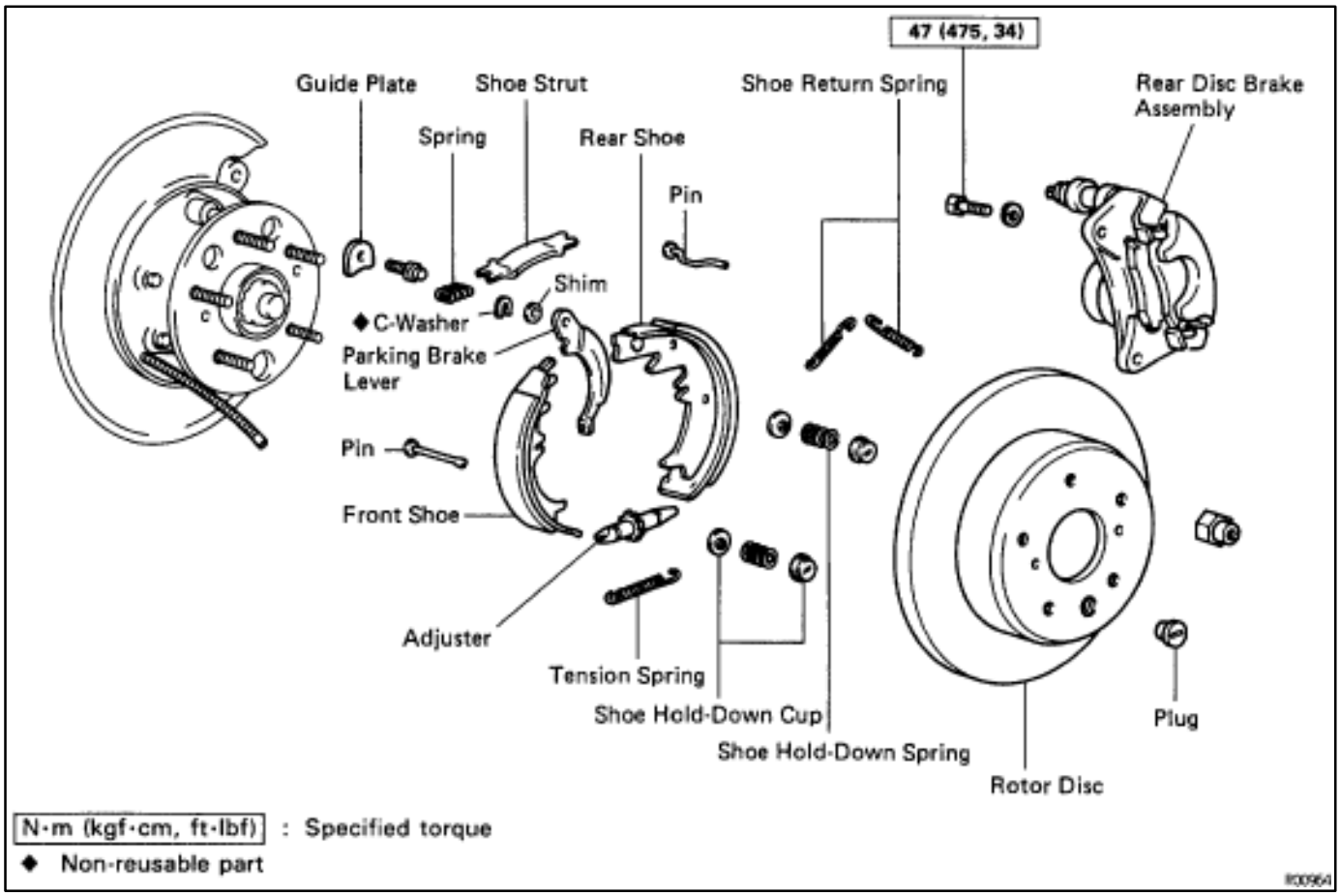


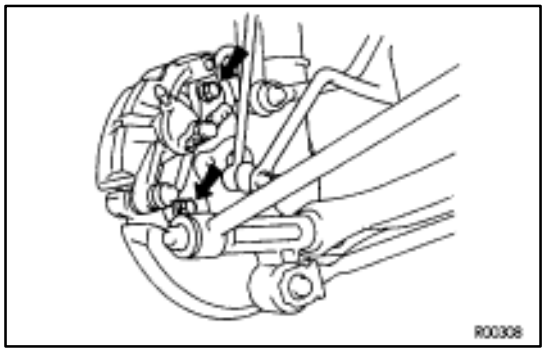
4. **CONNECT FLEXIBLE HOSE**
   Install the flexible hose on the brake cylinder with two new gaskets.
   Torque: 29 N·m (300 kgf·cm, 14 ft·lbf)
   HINT: Insert the flexible hose lock securely in the lock hole in the brake cylinder.
5. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**
   (See brake system bleeding)
6. **CHECK FOR LEAKS**

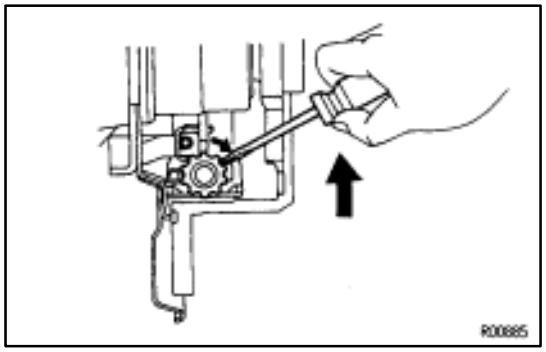
REAR BRAKE (PARKING BRAKE)

BR04E–01

COMPONENTS







PARKING BRAKE DISASSEMBLY

BR04F–01

1. REMOVE REAR WHEEL

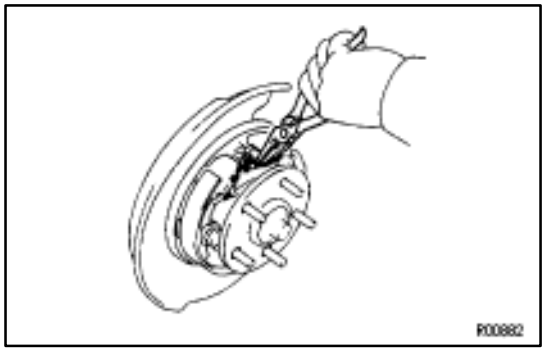
2. REMOVE REAR DISC BRAKE ASSEMBLY

(a) Remove the two mounting bolts and remove the disc brake assembly.

(b) Suspend the disc brake so the hose is not stretched.

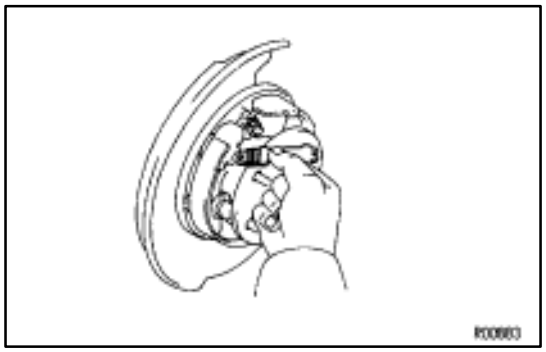
3. REMOVE ROTOR DISC

HINT: If the rotor disc cannot be removed easily, return the shoe adjuster until the wheel turns freely.

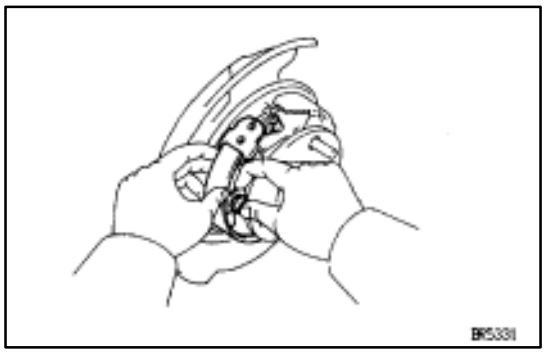


4. REMOVE SHOE RETURN SPRINGS

Using needle–nose pliers, remove the two shoe return springs.

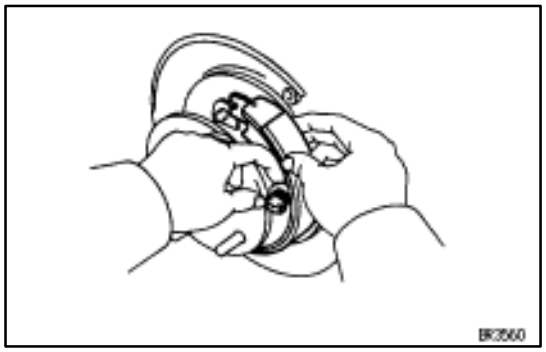


5. REMOVE SHOE STRUT WITH SPRING



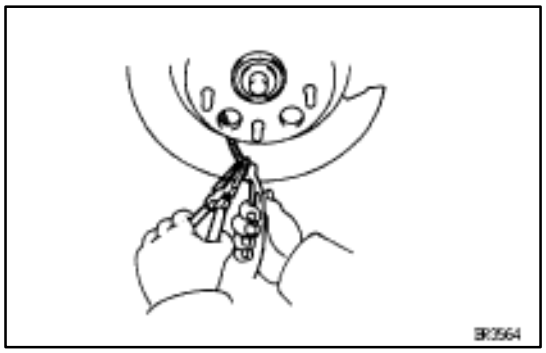
6. REMOVE FRONT SHOE ADJUSTER AND TENSION SPRING

(a) Slide out the front shoe and remove the shoe adjuster.
(b) Disconnect the tension spring and remove the front shoe.



7. REMOVE REAR SHOE

(a) Slide out the rear shoe.
(b) Remove the tension spring from the rear shoe.



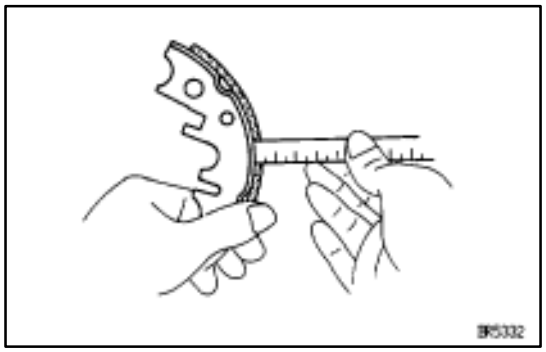
(c) Disconnect the parking brake cable from the parking brake shoe lever.
(d) Remove the shoe hold–down spring cups, springs and pins.

PARKING BRAKE COMPONENTS INSPECTION AND REPAIR

BR04G–01

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



2. MEASURE BRAKE SHOE LINING THICKNESS

Using a scale, measure the thickness of the shoe lining.

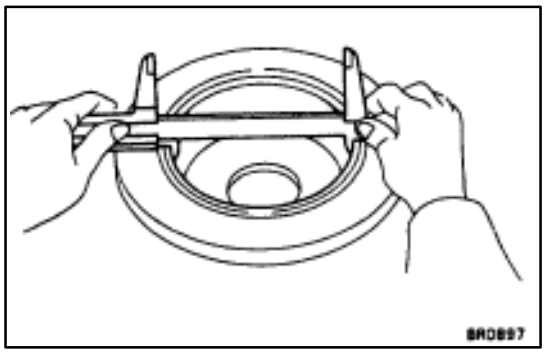
Standard thickness:

2.0 mm (0.079 in.)

Minimum thickness:

1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is extremely uneven wear, replace the brake shoe.



3. MEASURE BRAKE DISC INSIDE DIAMETER

Using a vernier caliper, measure the inside diameter of the rotor disc.

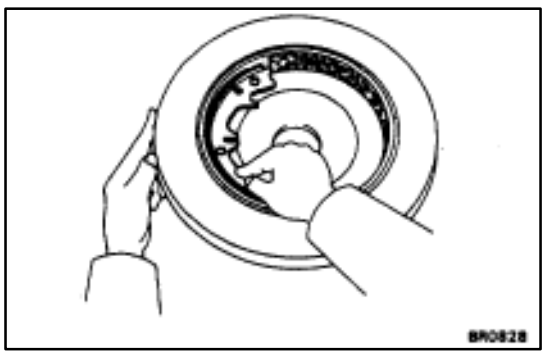
Standard inside diameter:

170 mm (6.69 in.)

Minimum inside diameter:

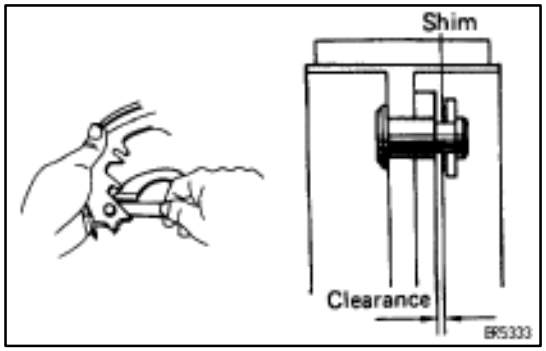
171 mm (6.73 in.)

Replace the rotor disc if the inside diameter is at the maximum value or more. Replace the rotor disc or grind it with a lathe if the rotor disc is scored or is worn unevenly.



4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the rotor, then grind down the brake shoe lining to fit. If the contact between the rotor 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

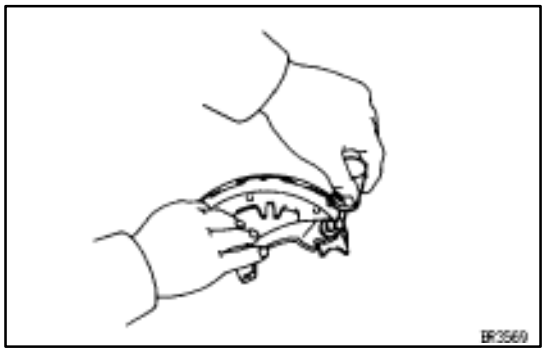
Using a feeler gauge, measure the clearance.

Standard clearance:

Less than 0.35 mm (0.0138 in.)

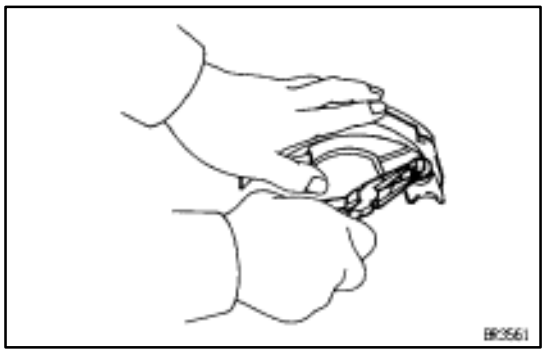
If the clearance is not within the specification, replace the shim with one of the correct size.

Thickness	mm(in.)	Thickness	mm(in.)
0.3	(0.012)	0.9	(0.035)
0.6	(0.024)		



6. IF NECESSARY, REPLACE SHIM

(a) Remove the parking brake shoe lever, and install the correct size shim.



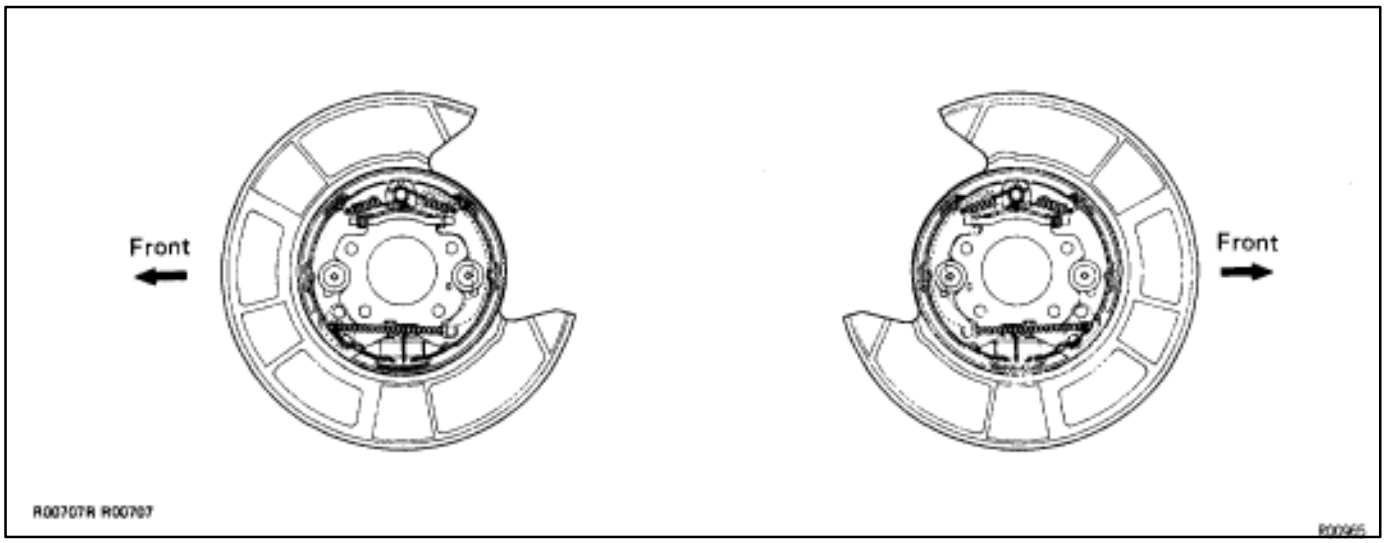
(b) Install the parking brake shoe lever with a new C–washer.

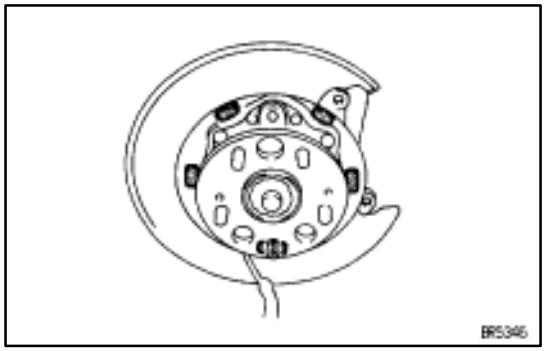
(c) Remeasure the clearance.

PARKING BRAKE ASSEMBLY

BR04H–01

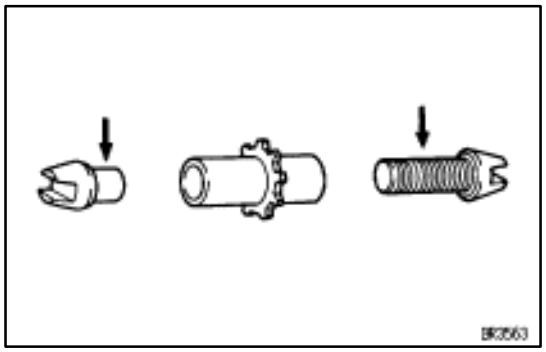
HINT: Assemble the parts in the correct direction as shown.



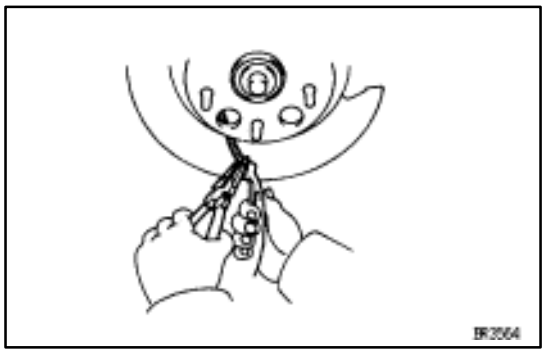


1. APPLY HIGH TEMPERATURE GREASE ON BACKING PLATE AS SHOWN

Apply high temperature grease to the sliding surfaces of the shoe.

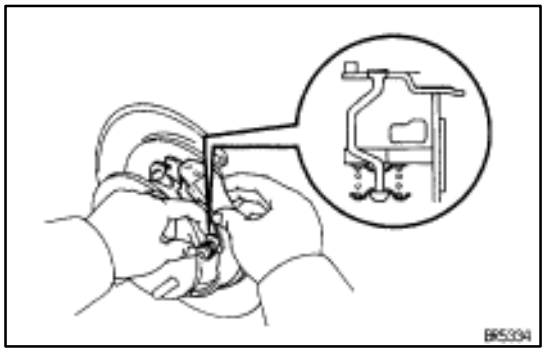


2. APPLY HIGH TEMPERATURE GREASE TO ADJUSTER AS SHOWN



3. CONNECT PARKING BRAKE CABLE TO PARKING BRAKE LEVER

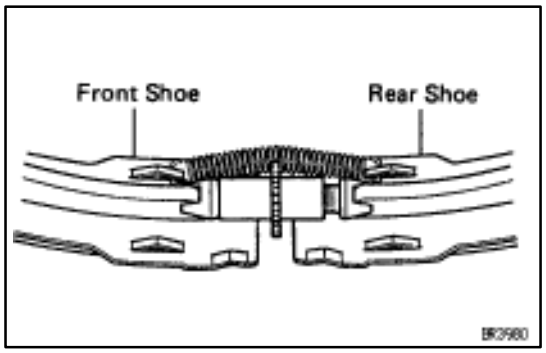
(a) Install the shoe hold–down springs, cups and pins.
(b) Connect the parking brake cable to the parking brake shoe lever of the rear shoe.



4. INSTALL REAR SHOE

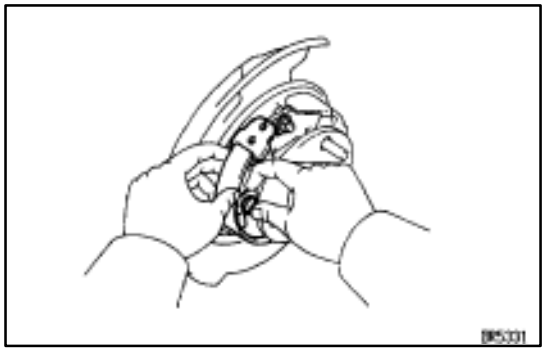
Slide in the rear shoe between the shoe hold–down spring cup and the backing plate.

NOTICE: Do not allow oil or grease to get on the rubbing face.



5. INSTALL TENSION SPRING, FRONT SHOE AND ADJUSTER

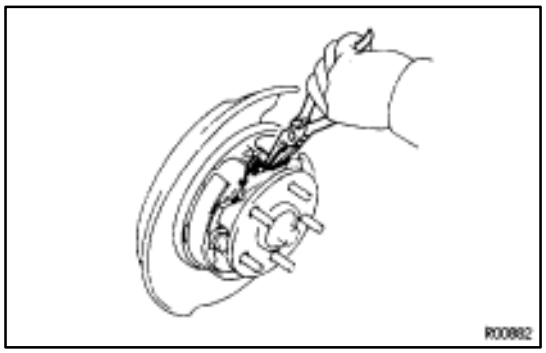
(a) Install the tension spring on the rear shoe.
(b) Install the front shoe on the tension spring.
(c) Install the adjuster between the front and rear shoes.



(d) Slide in the front shoe between the shoe hold–down spring cup and the backing plate.

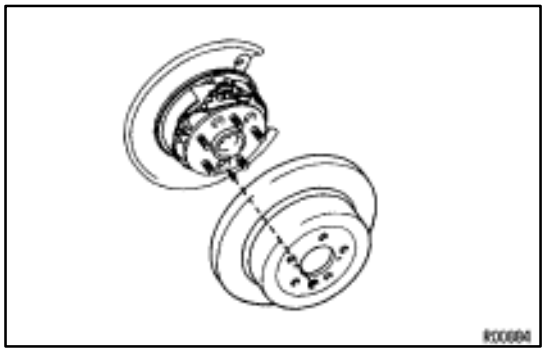
6. INSTALL STRUT WITH SPRING

Install the strut with the spring forward.



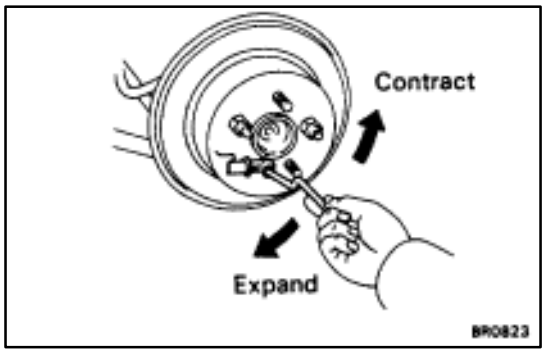
7. INSTALL SHOE RETURN SPRINGS

Using needle–nose pliers, install the shoe return springs.



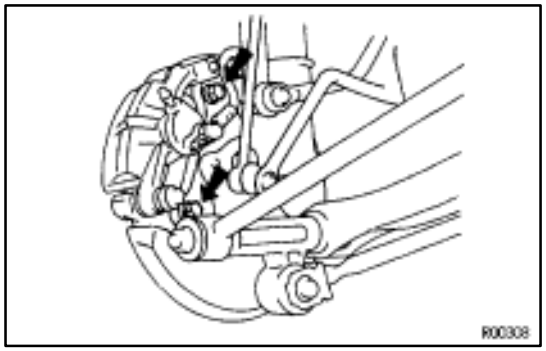
8. INSTALL ROTOR DISC

(a) Before installing, polish the disc and shoe surfaces with sandpaper.
(b) Align the hole on the rear axle shaft flange and service hole on the disc.



9. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the hub nuts.
(b) Remove the hole plug.
(c) Turn the adjuster and expand the shoes until the rotor disc locks.
(d) Return the adjuster eight notches.
(e) Install the hole plug.



10. INSTALL REAR DISC BRAKE ASSEMBLY

Install the disc brake assembly and torque the two mounting bolts.

Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

11. INSTALL REAR WHEEL

12. 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 lever with 98 N (10 kgf, 19.8 lbf) of force.

(c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.

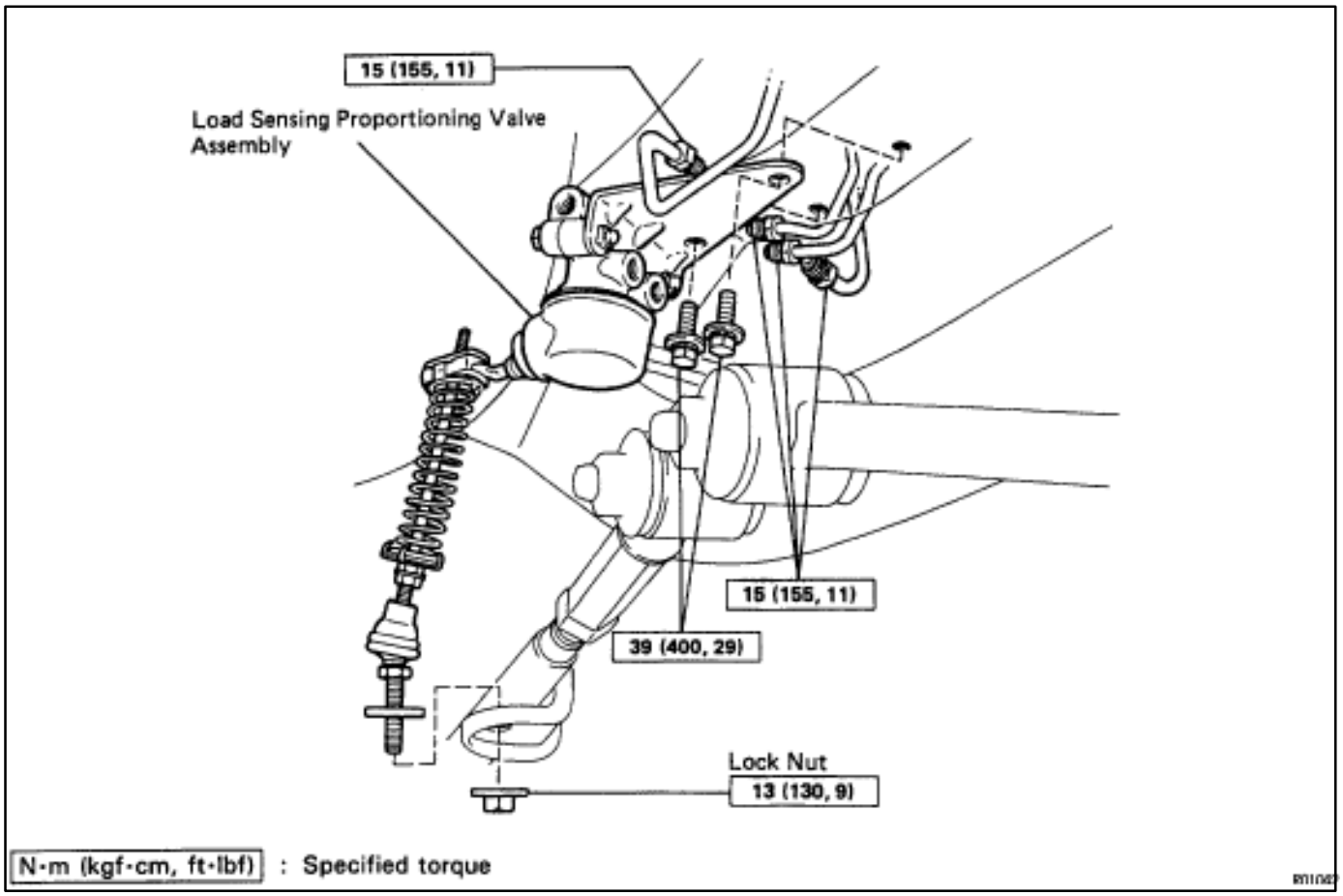
(d) Repeat this procedure two or three times.

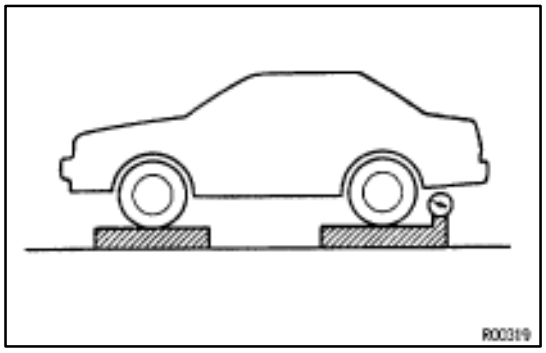
13. CHECK AND ADJUST PARKING BRAKE LEVER TRAVEL (See parking brake check and adjustment)

LOAD SENSING PROPORTIONING VALVE (LSPV)

BR04J–01

COMPONENTS





FLUID PRESSURE CHECK AND ADJUSTMENT

BR04K–01

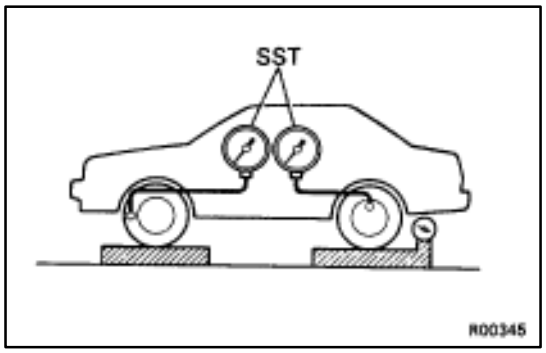
1. SET REAR AXLE LOAD

(a) Set the vehicle to its curb weight.

(b) Measure the rear axle load and note the value.

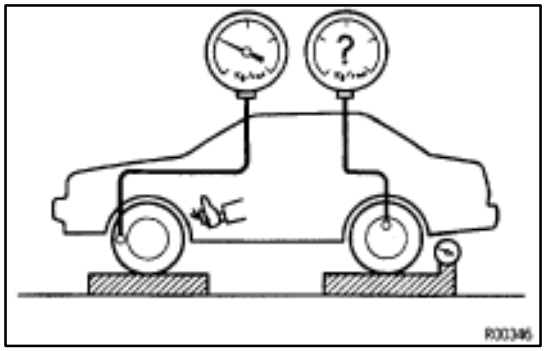
(c) Set the rear axle load.

Rear axle load: Rear axle curb weight + 31 kg (68 lb)



2. INSTALL LSPV GAUGE (SST) AND BLEED BRAKE SYSTEM

SST 09709–29017

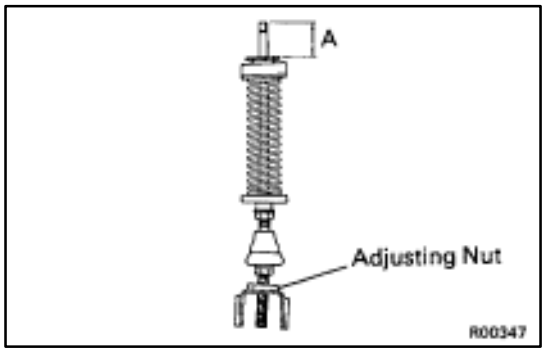


3. RAISE FRONT BRAKE PRESSURE TO 1,787 kpa (110 kgf/cm^2, 1,565 psi) CHECK REAR BRAKE PRESSURE

Brake pressure:

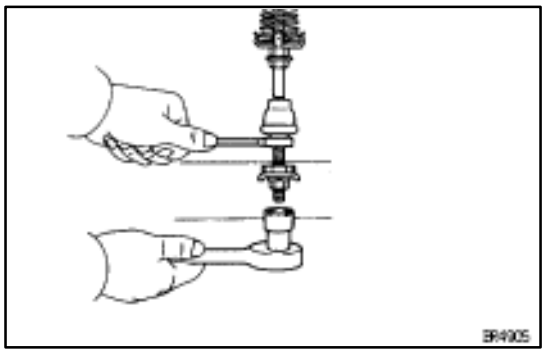
6,227–7,208 kpa (63.5–73.5 kgf/cm^2, 903–1,045 psi)

HINT: The brake pedal should not be depressed twice and/or returned while setting to the specified pressure. Read the value of rear pressure two seconds after adjusting the specified fluid pressure.



4. IF NECESSARY, ADJUST FLUID PRESSURE

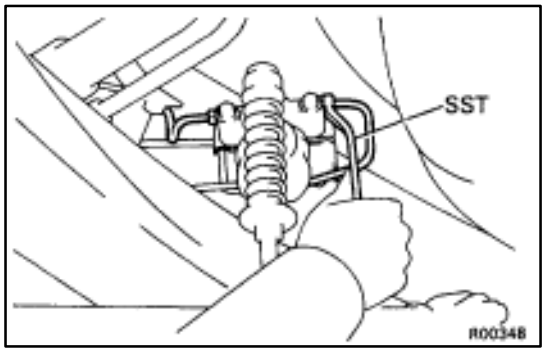
(a) Adjust the fluid pressure by changing the shaft length.
Low pressure–Lengthen A
High pressure–Shorten A
HINT: The fluid pressure is adjusted 245 kpa (2.5 kgf/cm^2, 36 psi) per each turn of the adjusting nut.



(b) Torque the lock nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
If it cannot be adjusted, replace the valve assembly.

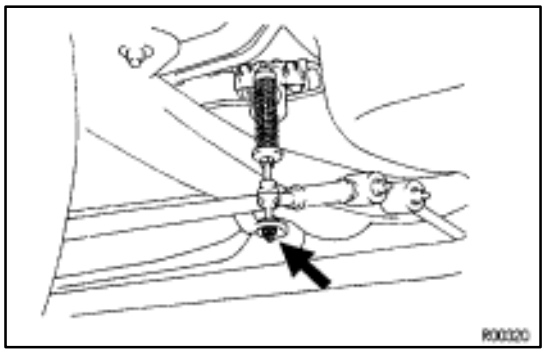
LSPV REMOVAL

BR04L–01



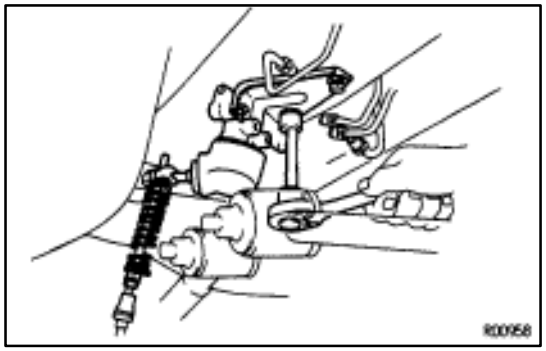
1. DISCONNECT BRAKE TUBES

Using SST, disconnect the brake tubes from the valve body.
SST 09751–36011

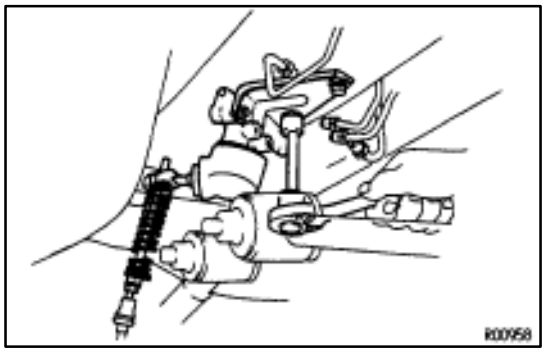


2. REMOVE LSPV ASSEMBLY

(a) Remove the lock nut and disconnect the adjusting bolt from the rear suspension arm.



(b) Remove the two mounting bolts and remove the LSPV assembly.



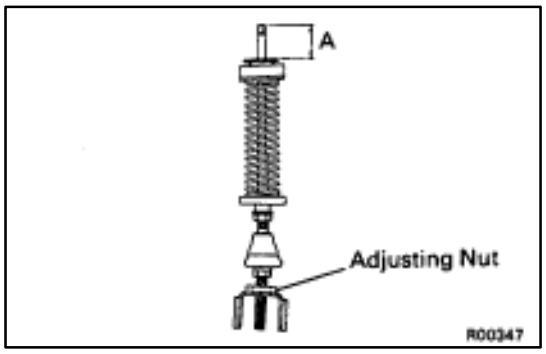
LSPV INSTALLATION

BR04M–01

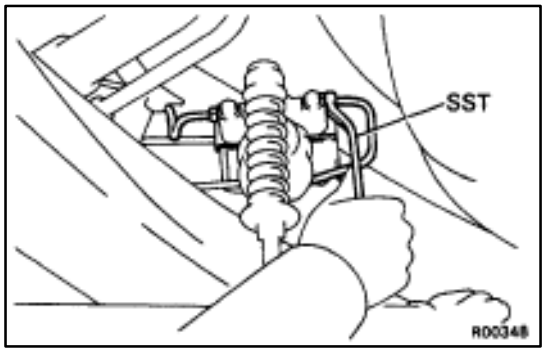
1. INSTALL LSPV ASSEMBLY

(a) Install the valve assembly with the two mounting bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Install the adjusting nut to the adjusting bolt and then install the adjusting bolt lock bolt to the rear suspension arm with the adjusting bolt lock nut.



(c) Set the shaft length A to initial set length and temporarily tighten the adjusting bolt lock nut.
Initial set length:
27.5 mm (1.08 in.)



2. CONNECT BRAKE TUBES
Using SST, connect the brake tubes.
SST 09751–36011
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

3. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See brake system bleeding)

4. CHECK FOR FLUID LEAKAGE

5. CHECK AND ADJUST FLUID PRESSURE

6. REMOVE SST AND BLEED BRAKE SYSTEM
SST 09709–29017

7. CHECK FOR FLUID LEAKAGE

–MEMO–

ANTI–LOCK BRAKE SYSTEM (ABS)

ANTI–LOCK BRAKE SYSTEM (ABS)

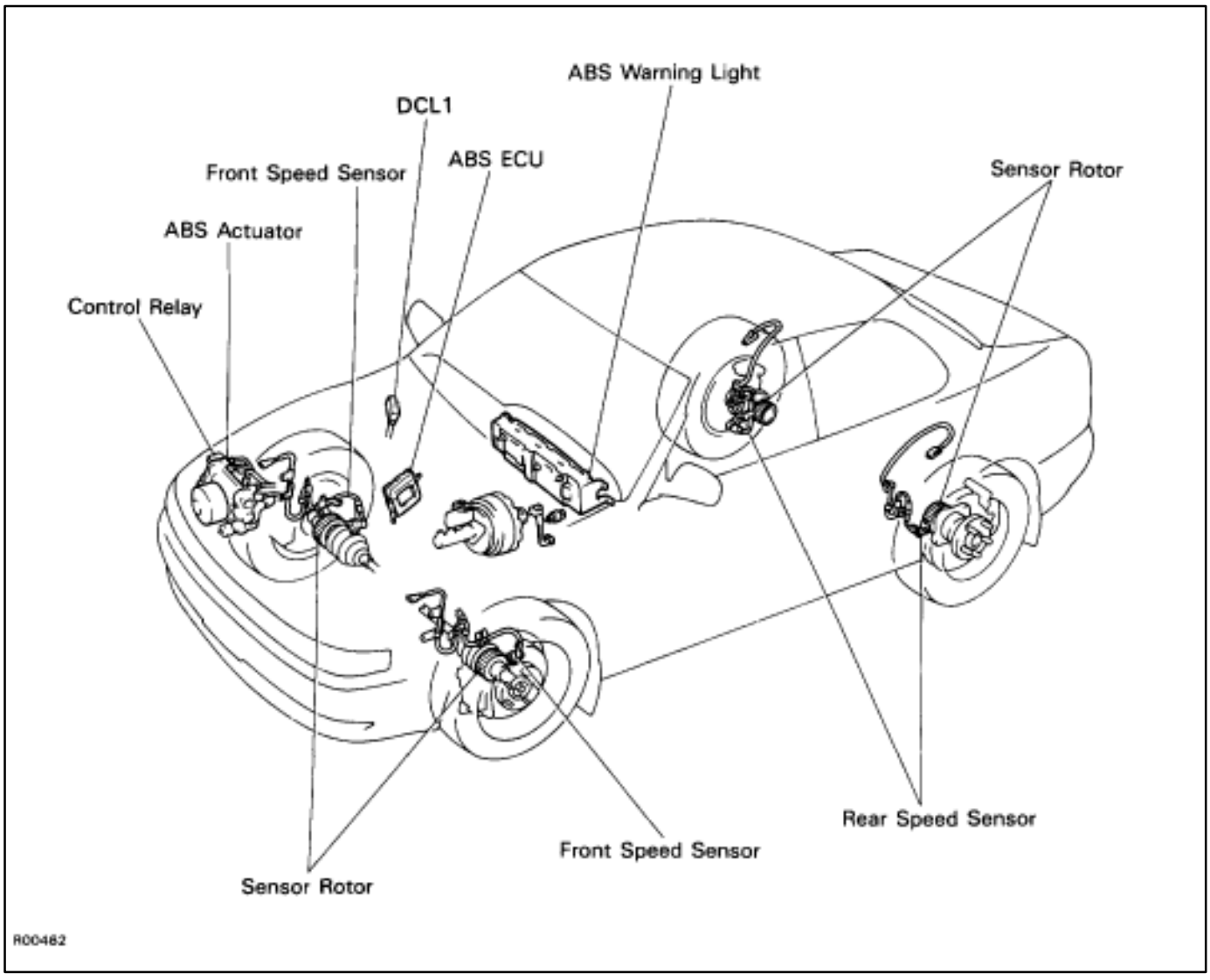
Description

1 The ABS is a brake system which controls the wheel cylinder hydraulic pressure of all four wheels during sudden braking and braking on slippery road surfaces, preventing the wheels from locking. This ABS provides the following benefits:
(1) Enables steering round an obstacle with a greater degree of certainty even when panic braking.
(2) Enables stopping in a panic brake while keeping the effect upon stability and steerability to a minimum, even on curves.

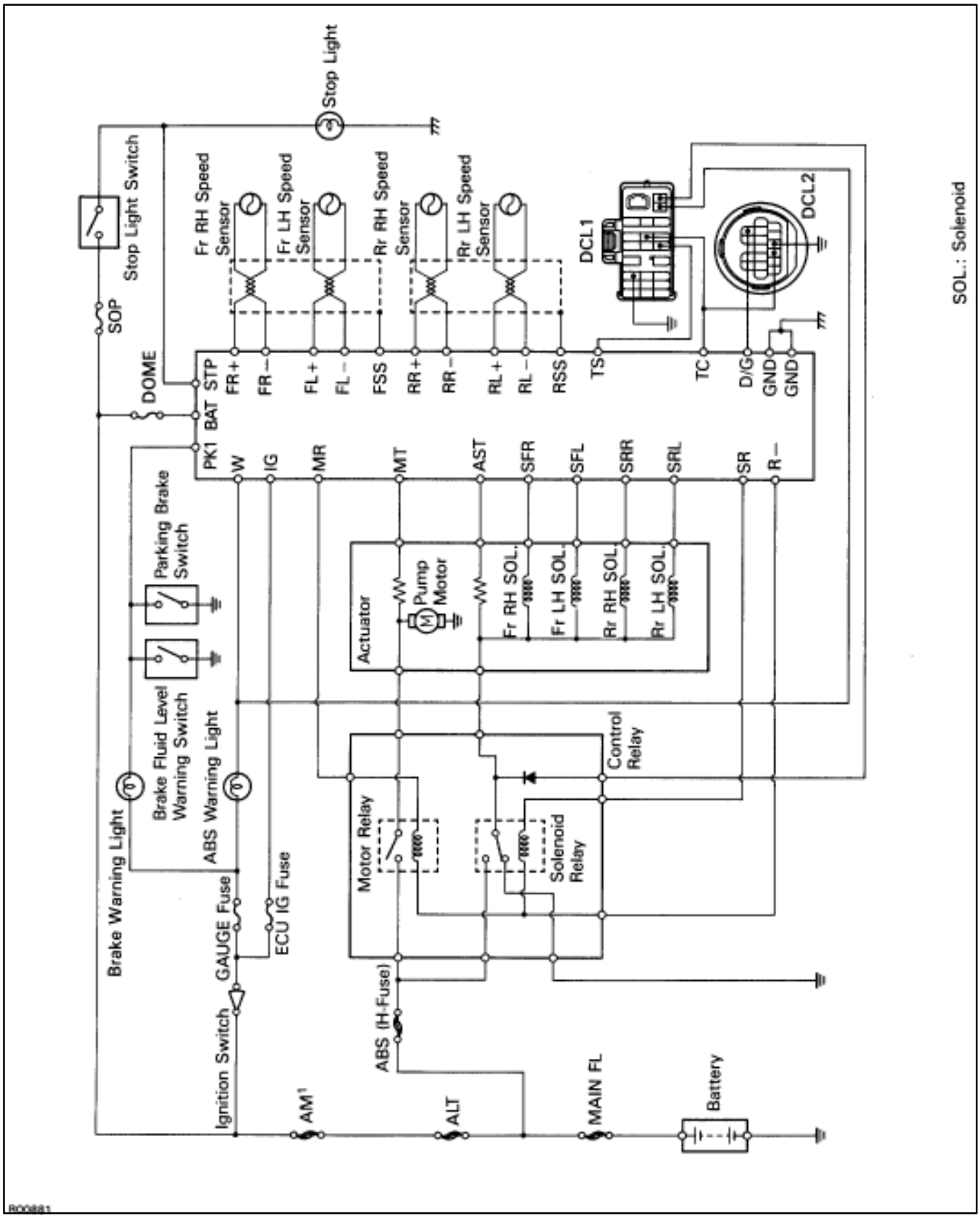
1 The function of the ABS is to help maintain directional stability and vehicle steerability on most road conditions. However, the system cannot prevent the vehicle from skidding if the cornering speed limit is exceeded.

1 In case a malfunction occurs, a diagnosis function and fail–safe system have been adopted for the ABS to increase serviceability.

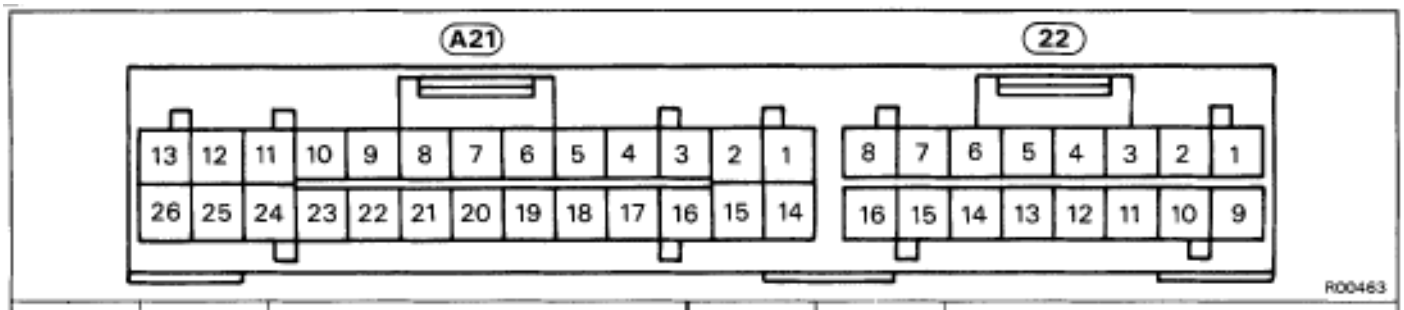
LOCATION OF SYSTEM PARTS



WIRING DIAGRAM



TERMINALS OF ECM (w/o TRAC)



Terminal No.	Symbol	Connection	Terminal No.	Symbol	Connection
A21-1	SFR	Front right solenoid	A22-1	RL–	Rear left sensor
2	GND	Ground	2	–	–
3	FR–	Front right speed sensor	3	–	–
4	–	–	4	DG	DCL2
5	Tc	DCL2	5	–	–
6	MT	ABS motor relay monitor	6	STP	Stop light switch
7	–	–	7	RSS	Sealed wiring harness
8	–	–	8	RR+	Rear right speed sensor
9	FL+	Front left speed sensor	9	RL+	Rear left speed sensor
10	FSS	Sealed wiring harness	10	–	–
11	SR	ABS control (solenoid) relay	11	–	–
12	IG	Ignition switch	12	–	–
13	SFL	Front left solenoid	13	W	ABS warning light
14	SRL	Rear left solenoid	14	PKB	Parking brake switch
15	GND	Ground	15	TS	DCL1
16	FR+	Front speed sensor	16	RR–	Rear right speed sensor
17	–	–			
18	AST	ABS control (solenoid) relay monitor			
19	–	–			
20	–	–			
21	–	–			
22	FL–	Rear left speed sensor			
23	MR	ABS control (motor) relay			
24	R–	Relay			
25	BAT	Battery ground			
26	SRR	Rear solenoid			

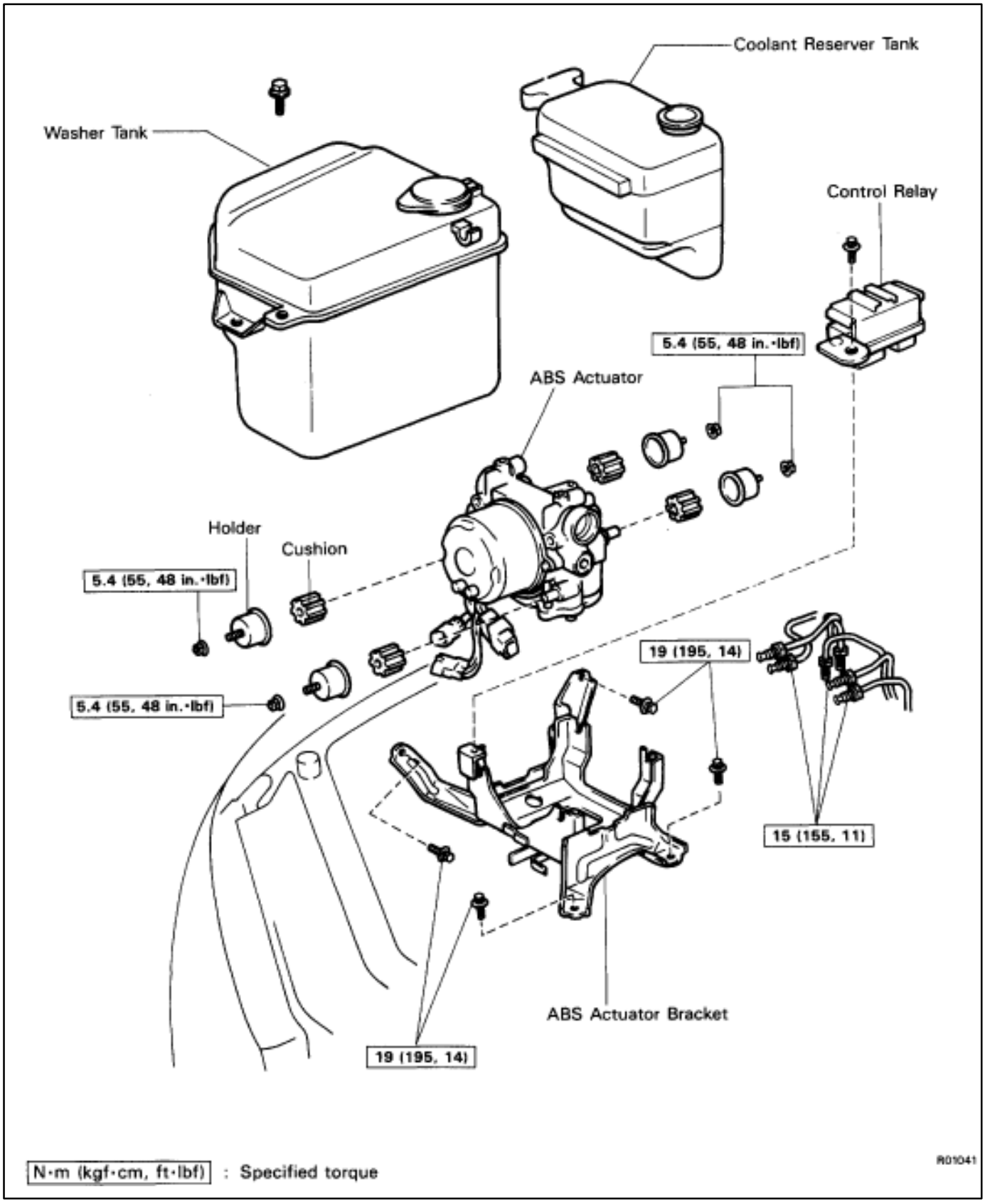
STANDARD VALUE OF ECM TERMINALS

Symbols (Terminals No.)	STD Voltage (V)	Condition
BAT (A21-25) – GND (A21-$\frac{2}{15}$)	10 – 14	Always
IG (A21-12) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON
SR (A21-11) – R– (A21-24)	10 – 14	IG switch ON, ABS warning light OFF
MR (A21-23) – R– (A21-24)	Below 1.0	IG switch ON
SFR (A21-1) – GND (A21-$\frac{5}{15}$)	10 – 14	IG switch ON, ABS warning light OFF
SFL (A21-13) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON, ABS warning light OFF
SRR (A21-26) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON, ABS warning light OFF
AST (A21-18) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON, ABS warning light OFF
W (A22-13) – GND (A21-$\frac{2}{15}$)	Below 1.0	IG switch ON, ABS warning light ON
	10 – 14	IG switch ON, ABS warning light OFF
PKB (A22-14) – GND (A21-$\frac{2}{15}$)	Below 1.0	IG switch ON, PKB switch ON
	10 – 14	IG switch ON, PKB switch OFF
STP (A22-6) – GND (A21-$\frac{2}{15}$)	Below 1.0	Stop light switch OFF
	10 – 14	Stop light switch ON
DG (A22-4) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON, ABS warning light OFF
Tc (A21-5) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON
Ts (A22-15) – GND (A21-$\frac{2}{15}$)	10 – 14	IG switch ON
FR+ (A21-16) – FR– (A21-3)	AC generation	IG switch ON Slowly turn right front wheel
FL+ (A21-9) – FL– (A21-22)	AC generation	IG switch ON Slowly turn left front wheel
RR+ (A22-8) – RR– (A22-16)	AC generation	IG switch ON Slowly turn right rear wheel
RL+ (A22-9) – RL– (A22-1)	AC generation	IG switch ON Slowly turn left rear wheel

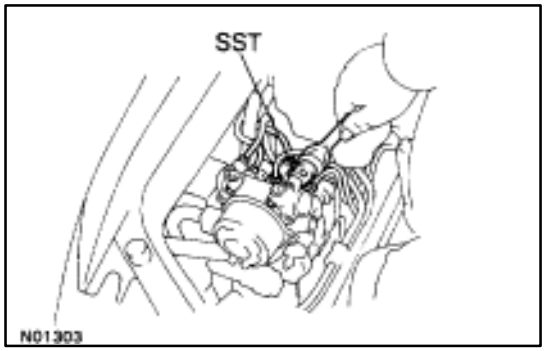
ABS Actuator

ABS ACTUATOR REMOVAL AND INSTALLATION

Remove and install the parts as shown.



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



(MAIN POINT OF REMOVAL AND INSTALLATION)

1. DISCONNECT AND CONNECT BRAKE TUBE

Using SST, disconnect and connect the brake tubes from/to the ABS actuator.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lb)

2. BLEED BRAKE SYSTEM

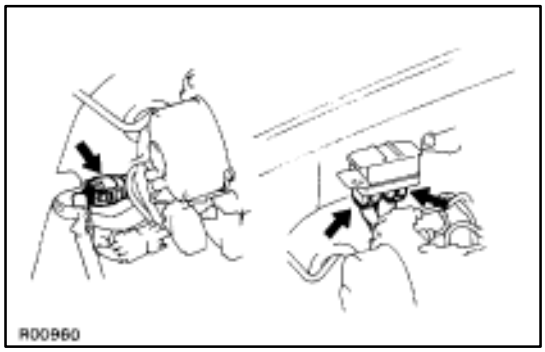
(See brake system bleeding)

ABS ACTUATOR OPERATION INSPECTION

1. INSPECT BATTERY VOLTAGE

Battery positive voltage: 10–14 V

2. REMOVE WASHER TANK



3. DISCONNECT CONNECTORS

(a) Disconnect the connector from the actuator.

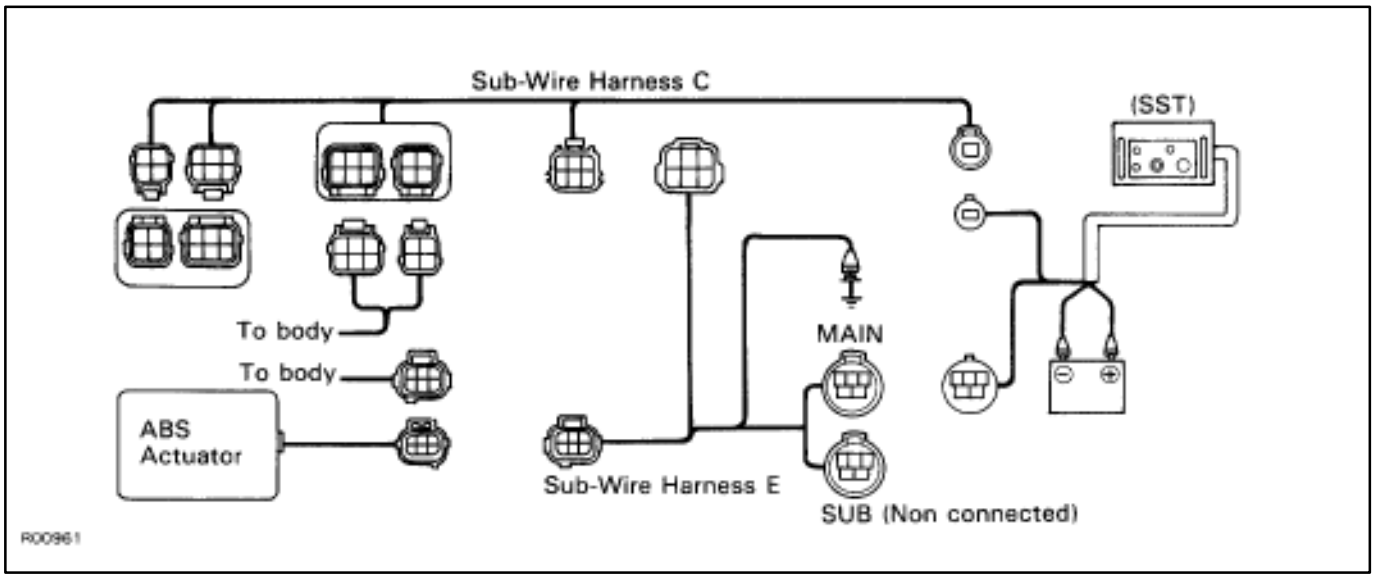
(b) Remove control relay and disconnect the connectors from the control relay.

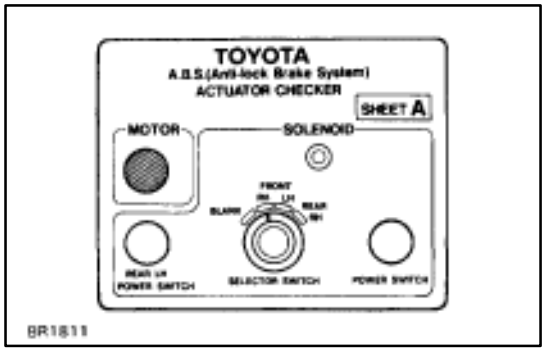
4. CONNECT ACTUATOR CHECKER (SST) TO ACTUATOR

(a) Connect the actuator checker (SST) to the actuator, control relay and body side wire harness through the sub–wire harness (SST) as shown.
SST 09990–00150, 09990–00200 and 09990–00210

(b) Connect the red cable of the checker to the battery positive (+) terminal and black cable to the negative (–) terminal. Connect the black cable of the sub–wire harness to the battery negative (–) terminal or body ground.

(c) Place the “SHEET A” (SST) on the actuator checker.
SST 09990–00163





BR1811

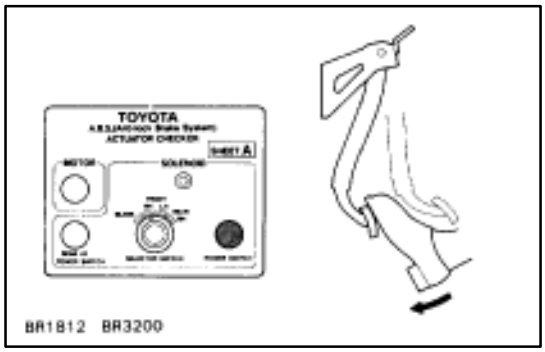
5. INSPECT BRAKE ACTUATOR OPERATION

(a) Start the engine, and run it at idle.

(b) Turn the selector switch of the actuator checker to “FRONT RH” position.

(c) Push and hold in the MOTOR switch for a few seconds.

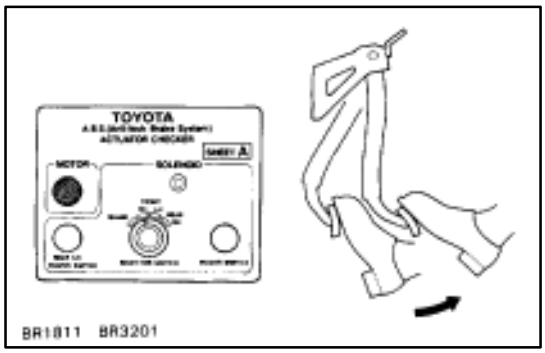
(d) Depress the brake pedal and hold it until the step (g) is completed.



BR1812 BR3200

(e) Push the POWER SWITCH, and check that the brake pedal does not go down.
NOTICE: Do not keep the POWER SWITCH pushing more than 10 seconds.

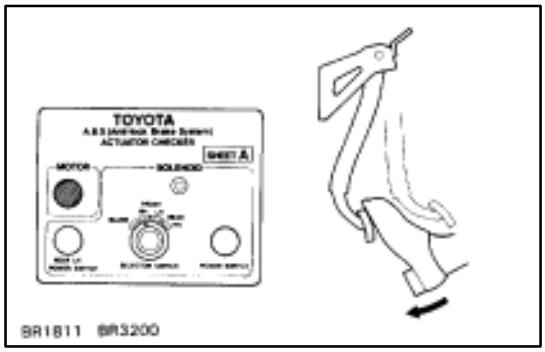
(f) Release the switch, and check that the pedal go down.



BR1811 BR3201

(g) Push and hold in the MOTOR switch for a few seconds, and check that the pedal returns.

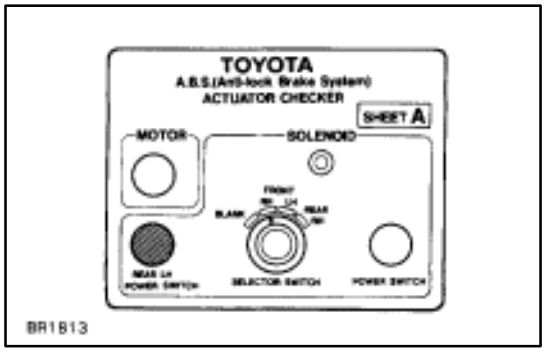
(h) Release the brake pedal.



BR1811 BR3200

(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.



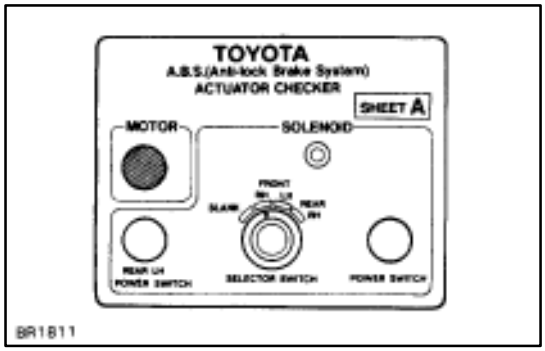
BR1813

6. INSPECT FOR OTHER WHEELS

(a) Turn the selector switch to “FRONT LH” position.

(b) Repeating (c) to (j) of the step 5, check the actuator operation similarly.

(c) Similarly, inspect “REAR RH” and “REAR LH” position.
HINT: When inspecting “REAR LH” position, push the REAR LH switch instead of the POWER SWITCH, and you can inspect in any selector switch position.



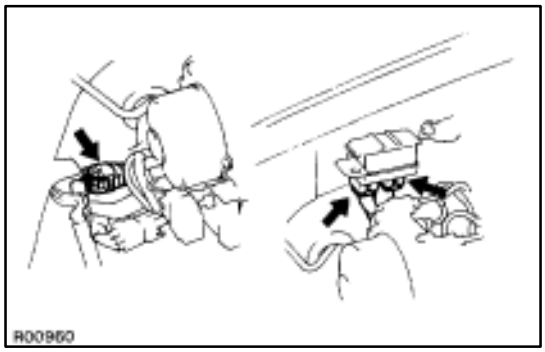
7. PUSH MOTOR SWITCH

Push and hold in the MOTOR switch for a few seconds.

8. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

Remove the “SHEET A” (SST) and disconnect the actuator checker (SST) and sub–wire harness (SST) from the actuator, control relay and body side wire harness.

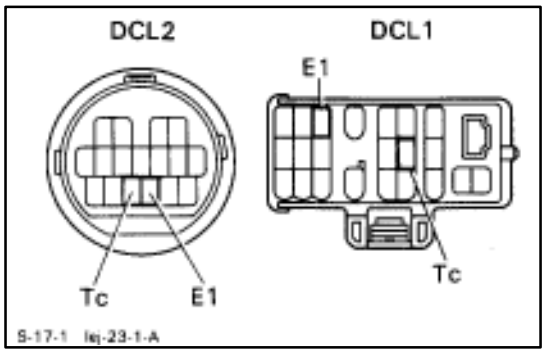
SST 09990–00150, 09990–00200, 09990–00210 and 09990–00163



9. CONNECT ACTUATOR CONNECTORS

Connect the three connectors to actuator and control relay.

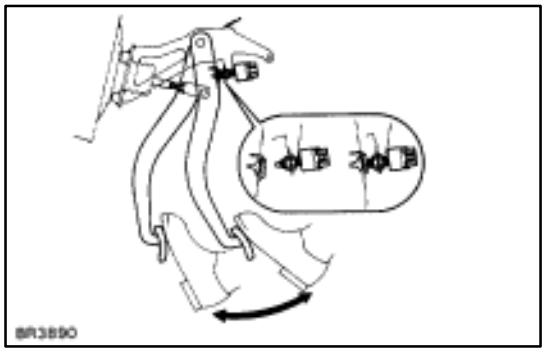
10. INSTALL CONTROL RELAY



11. CLEAR DIAGNOSTIC TROUBLE CODES

(a) Using SST, connect terminals Tc and E1 of DCL2 or DCL1.
SST 09843–18020

(b) IG switch ON.



(c) Clear the diagnostic trouble codes stored in ECU by depressing the brake pedal 8 or more times within 3 seconds.

(d) Check that the warning light shows the normal code.

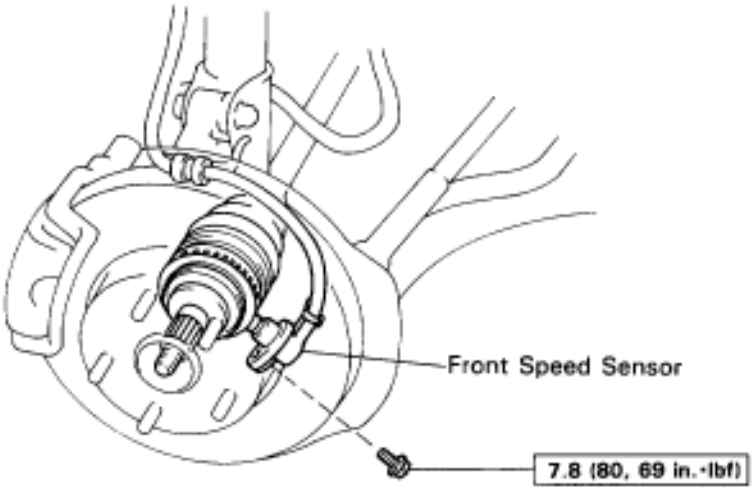
(e) Remove the SST from the terminals of DCL2 or DCL1.

Speed Sensor

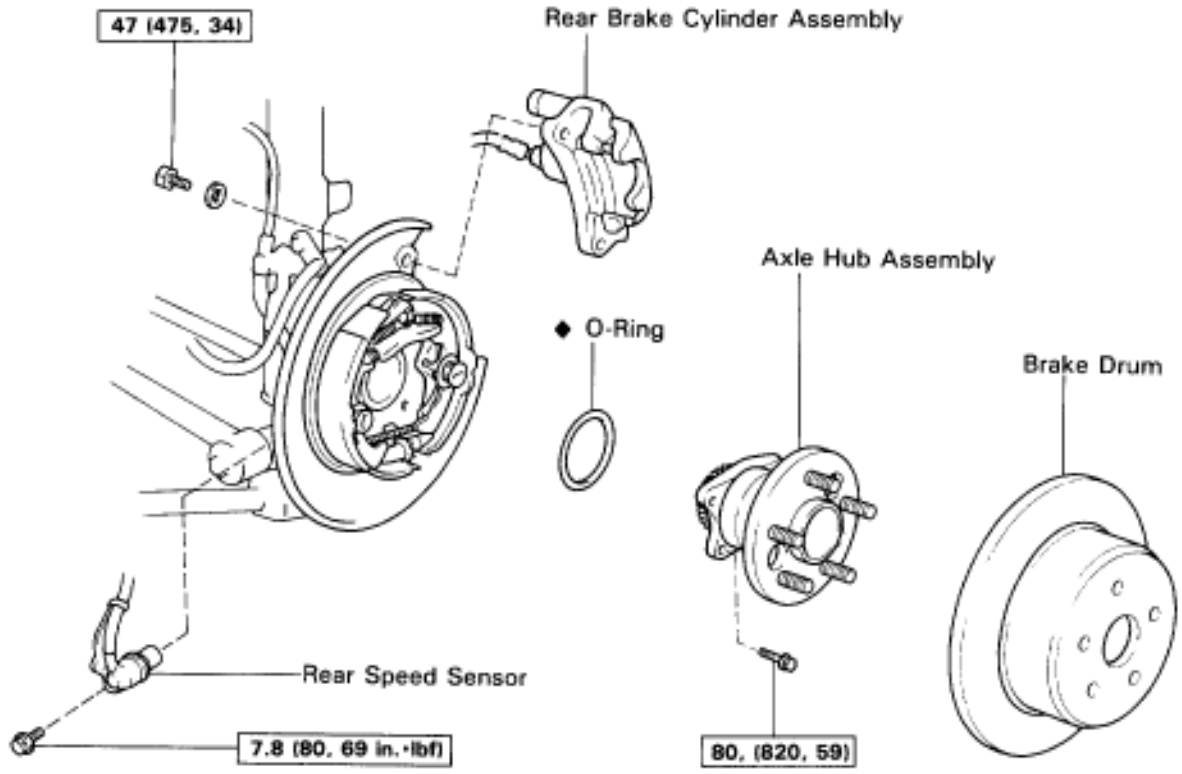
SPEED SENSOR REMOVAL AND INSTALLATION

Remove and install the parts as shown.

Front



Rear



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

◆ Non-reusable part

N01276
N01277

Troubleshooting
HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following pages.

1 CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much detail as possible about the problem.

2 CHECK AND CLEAR THE DIAGNOSTIC TROUBLE CODES (PRECHECK)

If the ABS warning light lights up, and the ABS does not operate, the ECU stores diagnostic trouble codes corresponding to the problem in memory.

Before confirming the trouble, first check the diagnostic trouble codes to see if there are any malfunction codes stored in memory. When there are malfunction codes, make a note of them, then clear them and proceed to "3 Problem Symptom Confirmation".

3 PROBLEM SYMPTOM CONFIRMATION, 4 SYMPTOM SIMULATION

Confirm the problem symptoms. If the problem does not reoccur, be sure to simulate the problem by mainly checking the circuits indicated by the diagnostic trouble code in step 2, using "Problem simulation method".

5 DIAGNOSTIC TROUBLE CODE CHECK

Check the diagnostic trouble codes.

If a malfunction code is output, proceed to "6 Diagnostic Trouble Code Chart". If the normal code is output, proceed to "7 Problem Symptoms Chart".

Be sure to proceed to "6 Diagnostic trouble Code Chart" after the steps 2 and 3 are completed.

If troubleshooting is attempted only by following the malfunction code stored in the memory, errors could be made in the diagnosis.

6 DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is confirmed in the diagnostic trouble code check, proceed to the inspection procedure indicated by the matrix chart for each diagnostic trouble code.

7 PROBLEM SYMPTOMS CHART

If the normal code is confirmed in the diagnostic trouble code check, perform inspection in accordance with the inspection order in the problem symptoms chart.

8 CIRCUIT INSPECTION

Proceed with diagnosis of each circuit in accordance with the inspection order confirmed in 6 and 7. Determine whether the cause of the problem is in the sensor, actuators, wire harness and connectors, or the ECU.

9 SENSOR CHECK

Use the ABS warning light to check if each of the signals from the speed sensors are being input correctly to the ECU. Instructions for this check are given in the circuit inspection.

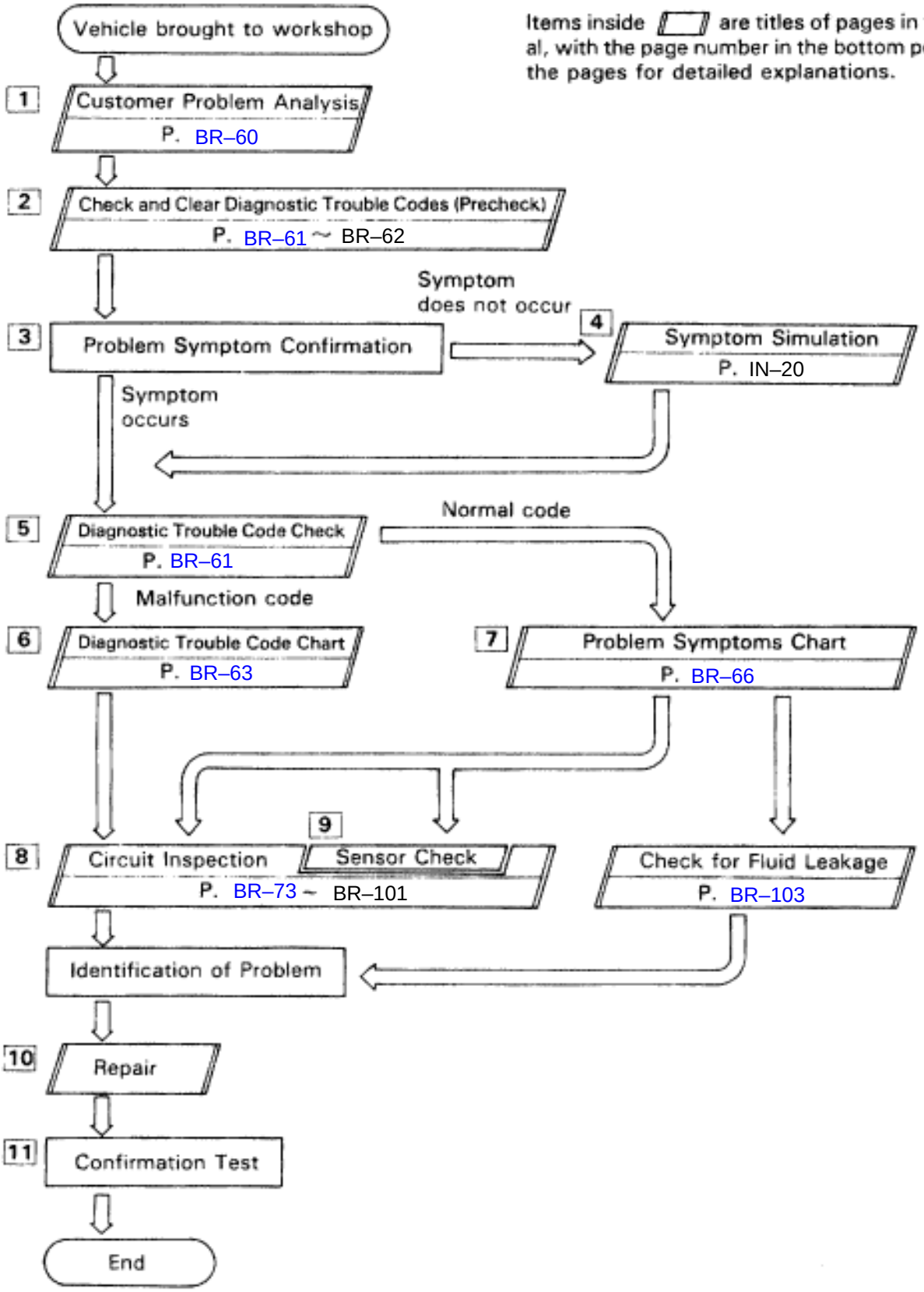
10 REPAIRS

After the cause of the problem is located, perform repairs by following the inspection and replacement procedures in this manual.

[11] CONFIRMATION TEST

After completing repairs, confirm not only that the malfunction is eliminated, but also conduct a test drive, etc., to make sure the entire ABS system is operating correctly. (In vehicles with the TRC system, also check the TRC system.)

Items inside ▭ are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.



CUSTOMER PROBLEM ANALYSIS CHECK SHEET

ABS Check Sheet

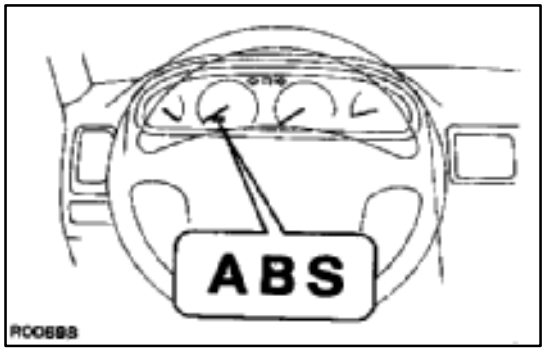
Inspector's Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Mile

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	How Often Does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remain ON ☐ Does not Light UP

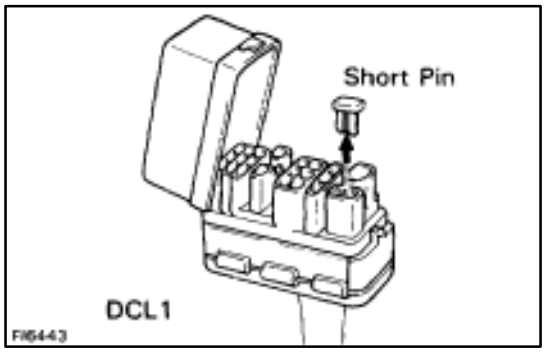
Diagnostic Trouble Code Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)



DIAGNOSIS SYSTEM
INDICATOR CHECK

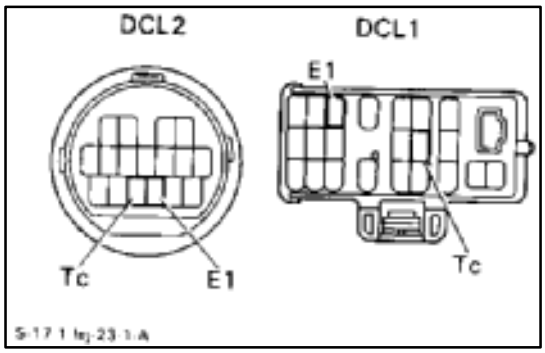
When the ignition switch is turned on, check that the ABS warning light goes on for 3 seconds.

HINT: If the indicator check result is not normal, proceed to troubleshooting (see BE–118) for the combination meter section.

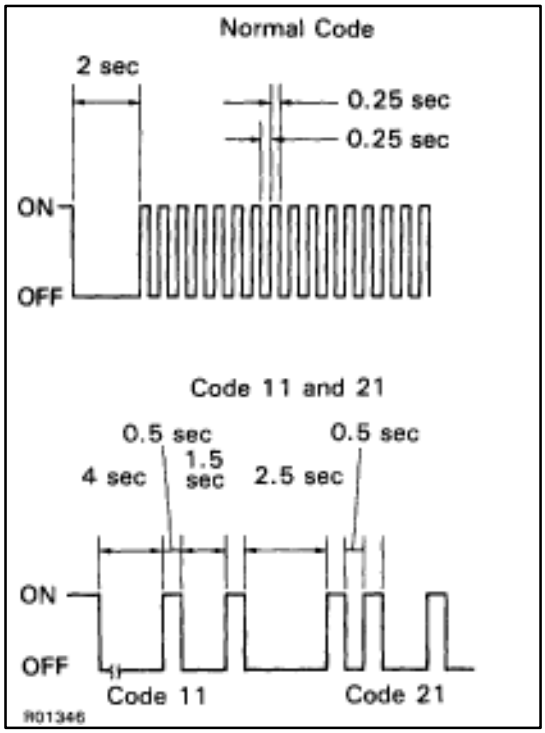


DIAGNOSTIC TROUBLE CODE CHECK

1. Turn the ignition switch to ON.
2. Disconnect the Short Pin from DCL1.

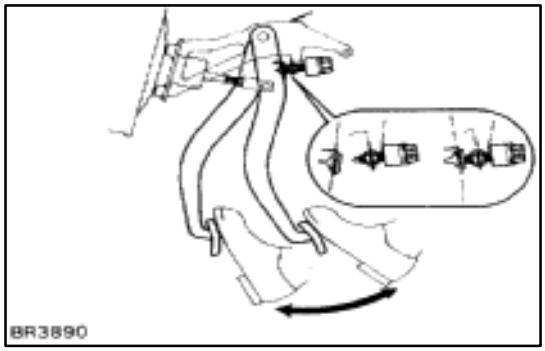


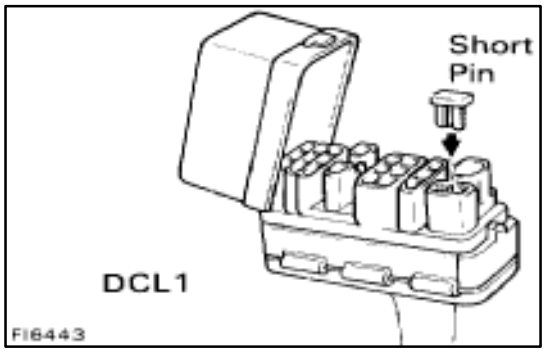
3. Using SST, connect terminals Tc and E1 of DCL2 or DCL1.
   SST 09843–18020
4. Read the diagnostic trouble code from the ABS warning light on the combination meter.
   HINT: If no code appears, inspect the diagnostic circuit (see page BR–98).



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 BR–63.
6. After completing the check, disconnect terminals Tc and E1, and turn off the display.
   If two or more malfunctions are indicated at the same time, the lowest numbered diagnostic trouble code will be displayed first.



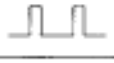
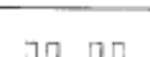
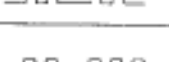
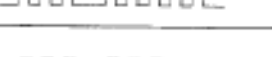
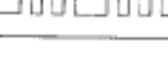


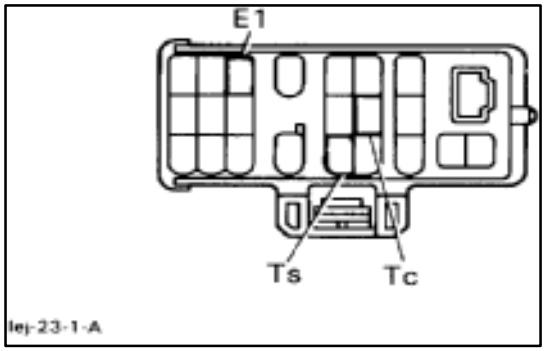
DIAGNOSTIC TROUBLE CODE CLEARANCE

1. Using SST, connect terminals Tc and E1 of DCL2 or DCL1.
   SST 09843–18020
2. IG switch ON.
3. Clear the diagnostic trouble codes stored in ECU by depressing the brake pedal 8 or more times within 3 seconds.
4. Check that the warning light shows the normal code.
5. Remove the SST from the terminals of DCL2 or DCL1.
6. Connect the Short Pin to DCL1.

DIAGNOSTIC TROUBLE CODE CHART

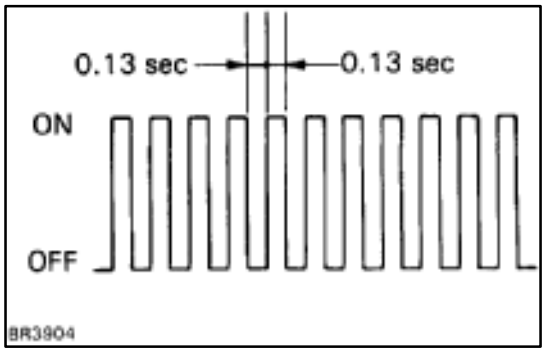
If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code, in the table below and proceed to the page given.

Code	ABS Warning Light Blinking Pattern	Diagnosis
11	ON / OFF  BE3931	Open circuit in ABS control (solenoid) relay circuit
12	ON / OFF BE3931	Short circuit in ABS control (solenoid) relay circuit
13	ON / OFF BE3931	Open circuit in ABS control (pump motor) relay circuit
14	ON / OFF BE3931	Short circuit in ABS control (pump motor) relay circuit
21	ON / OFF BE3932	Open or short circuit in 3-position solenoid circuit for front right wheel
22	ON / OFF  BE3932	Open or short circuit in 3-position solenoid circuit for front left wheel
23	ON / OFF  BE3932	Open or short circuit in 3-position solenoid circuit for rear right wheel
24	ON / OFF BE3932	Open or short circuit in 3-position solenoid circuit for rear t left wheel
31	ON / OFF BE3933	Front right wheel speed sensor signal malfunction
32	ON / OFF BE3933	Front left wheel speed sensor signal malfunction
33	ON / OFF BE3933	Rear right wheel speed sensor signal malfunction
34	ON / OFF BE3933	Rear left wheel speed sensor signal malfunction
35	ON / OFF BE3933	Open circuit in front left or rear right speed sensor circuit
36	ON / OFF BE3933	Open circuit in front right or rear left speed sensor circuit
37	ON / OFF  BE3933	Faulty rear speed sensor rotor
41	ON / OFF  BE3934	Low battery positive voltage or abnormally high battery positive voltage
51	ON / OFF BE3935	Pump motor is locked Open in pump motor ground
Always ON	ON / OFF	Malfunction in ECU

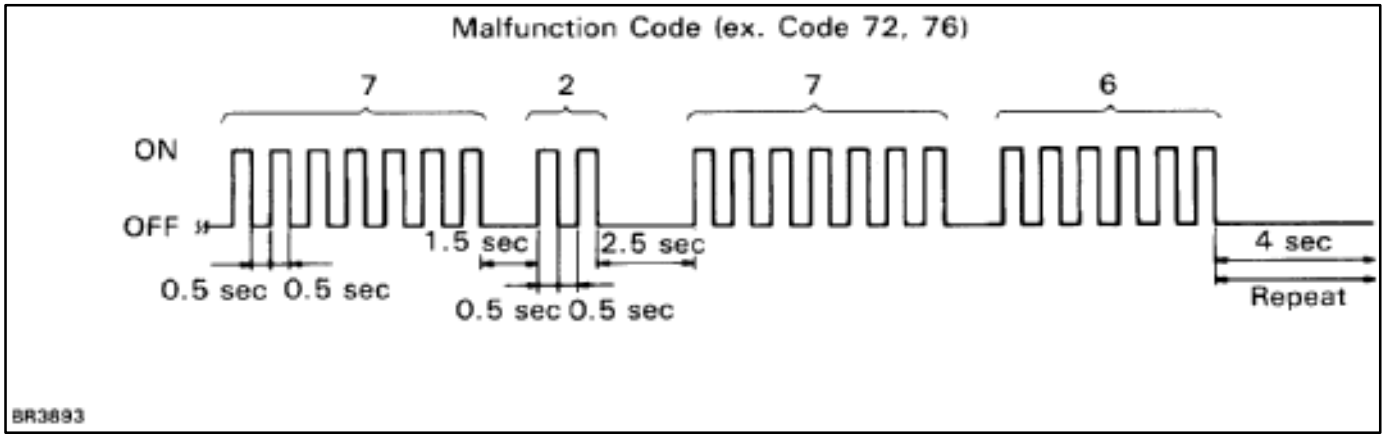


SPEED SENSOR SIGNAL CHECK

1. Turn the ignition switch to OFF.
2. Using SST, connect terminals Ts and E1 of DCL1.
   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 BR–95).
5. Drive vehicle straight forward.
   HINT: Drive vehicle faster than 80 km/h (50 mph) for several seconds.
6. Stop the vehicle.
7. Using SST, connect terminals Tc and E1 of DCL1.
   SST 09843–18020
8. Read the number of blinks of the ABS warning light.
   HINT: See the list of diagnostic trouble codes 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 two or more malfunctions are indicated at the same time, the lowest numbered code will be displayed first.



9. After performing the check, disconnect terminals Ts and E1, Tc and E1 of DCL1, and ignition switch turned off.

Diagnostic Trouble Code of Speed Sensor Check Function

Code No.	Diagnosis	Trouble Area
71	Low output voltage of front right speed sensor	□ Front right speed sensor □ Sensor installation
72	Low output voltage of front left speed sensor	□ Front left speed sensor □ Sensor installation
73	Low output voltage of rear right speed sensor	□ Rear right speed sensor □ Sensor installation
74	Low output voltage of rear left speed sensor	□ Rear left speed sensor □ Sensor installation
75	Abnormal change in output voltage of front right speed sensor.	□ Front right speed sensor rotor
76	Abnormal change in output voltage of front left speed sensor	□ Front left speed sensor rotor
77	Abnormal change in output voltage of rear right speed sensor	□ Rear right speed sensor rotor
78	Abnormal change in output voltage of rear left speed sensor	□ Rear left speed sensor rotor

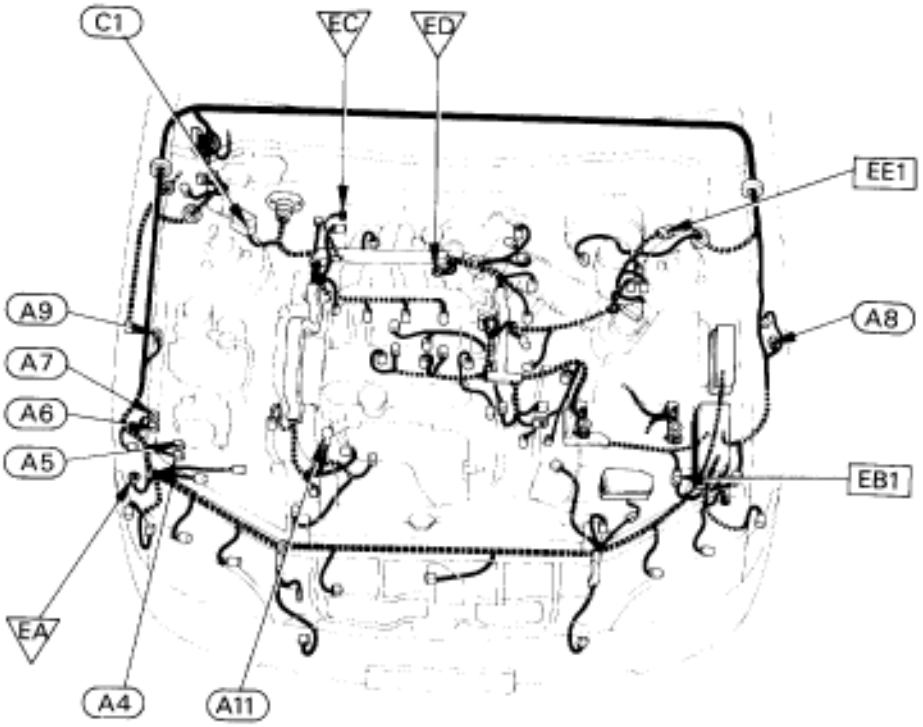
PROBLEM SYMPTOMS CHART

If a normal code is displayed during the diagnostic trouble code 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 page for troubleshooting.

Symptoms	Inspection Circuit	See page
ABS does not operate.	1. Check the diagnostic trouble code, reconfirming that the normal code is output. 2. IG Power Source Circuit 3. Speed sensor circuit. 4. Check the ABS actuator with a checker. If abnormal, check the hydraulic circuit for leakage (see page BR–103). If 1.~4. are all normal and the problem is still occurring, replace the ABS ECU.	BR–61 BR–88 BR–84 BR–54
ABS does not operate efficiently.	1. Check the diagnostic trouble code, reconfirming that the normal code is output. 2. Speed sensor circuit. 3. Stop light switch circuit. 4. Check the ABS actuator with a checker. If abnormal, check the hydraulic circuit for leakage (see page BR–103). If 1.~4. are all normal and the problem is still occurring, replace the ABS ECU.	BR–61 BR–88 BR–93 BR–54
ABS warning light abnormal.	1. ABS warning light circuit. 2. ABS ECU.	BR–95
Diagnostic trouble code check cannot be performed.	1. ABS warning light circuit. 2. Tc terminal circuit. 3. ABS ECU.	BR–95 BR–99
Speed sensor signal check cannot be performed	1. Ts terminal circuit. 2. ABS ECU.	BR–101

LOCATION OF CONNECTORS

Location of Connectors in Engine Compartment



BE6660

A4

ABS Actuator

Ie-6-1-C

A5

ABS Actuator

Ig-4-1-A

A6

ABS Relay
(Motor Relay and
Solenoid Relay)

Ieg-4-1

A7

ABS Relay
(Motor Relay and
Solenoid Relay)

Ieg-6-1

A8

ABS Speed Sensor
Front Left

Ie-2-1-T

A9

ABS Speed Sensor
Front Left

Ie-2-1-T

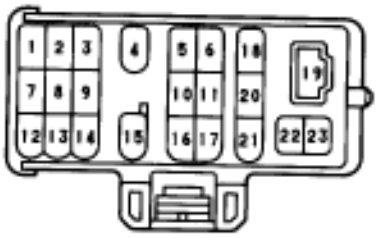
A11

Generator

X-142

C1

DCL1



Ieg-23-1-A

EB1

Ref. B-1

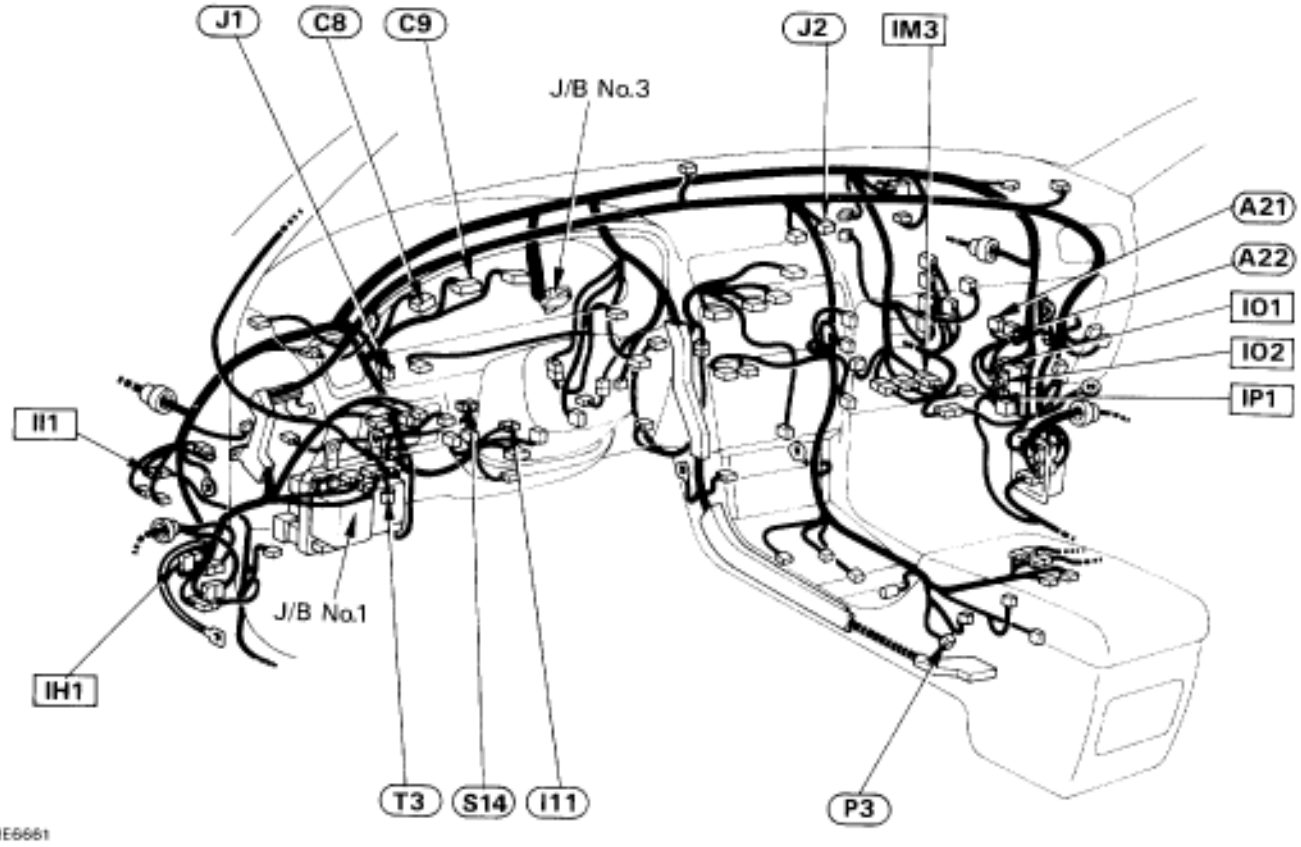
Ref. B-2

EE1

Fig. 4-1

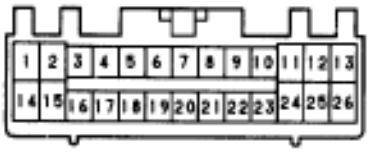
Fig. 4-2

Location of Connectors in Instrument Panel



A21

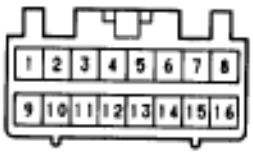
ABS ECU



Vd-26-1

A22

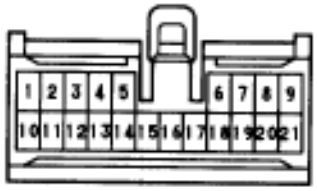
ABS ECU



Vd-16-1

C8

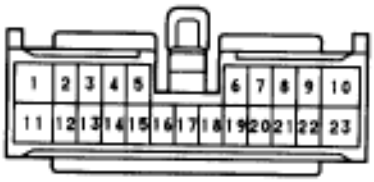
ABS Warning Light



h-21-1

C9

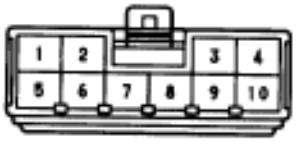
ABS Warning Light



eh-23-1

I11

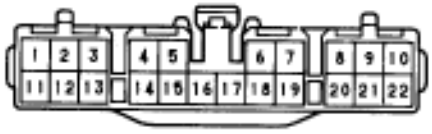
Ignition switch



g-10-1-B

J1

Junction Connector



e-22-1-A

J2

Junction Connector

e-14-1-A

P3

Parking Brake Switch

e-1-1

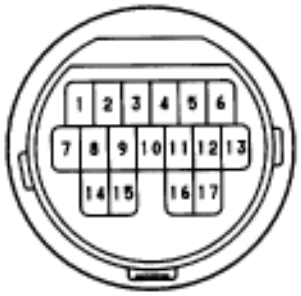
S14

Stop Light Switch

eg-4-1

T3

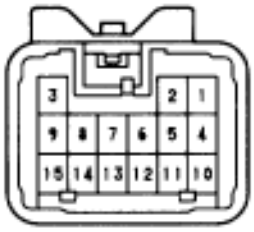
DCL2



5-17-1

IH1

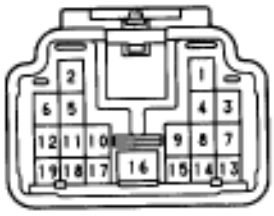
e-15-1



e-15-2

II1

eg-19-1



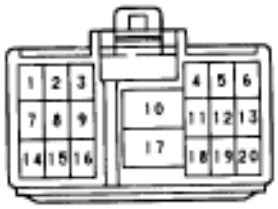
eg-19-2

IM3

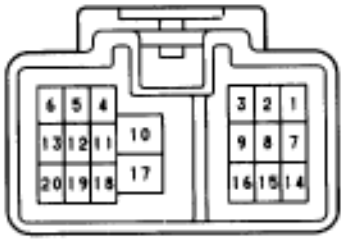
ef-19-1

ef-19-2

IO1



e-20-1-B



e-20-2-B

IO2

e-8-1

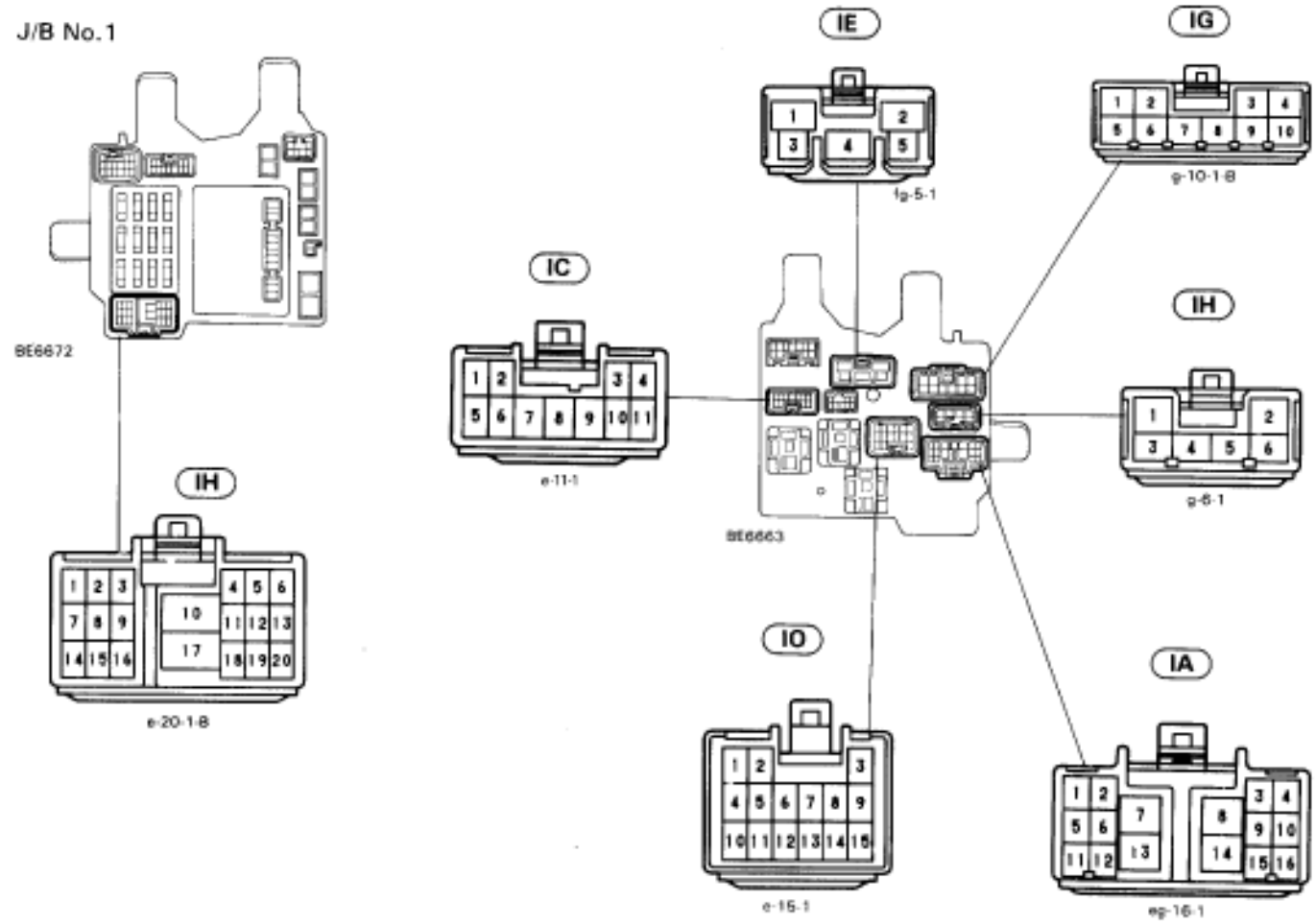
e-8-2

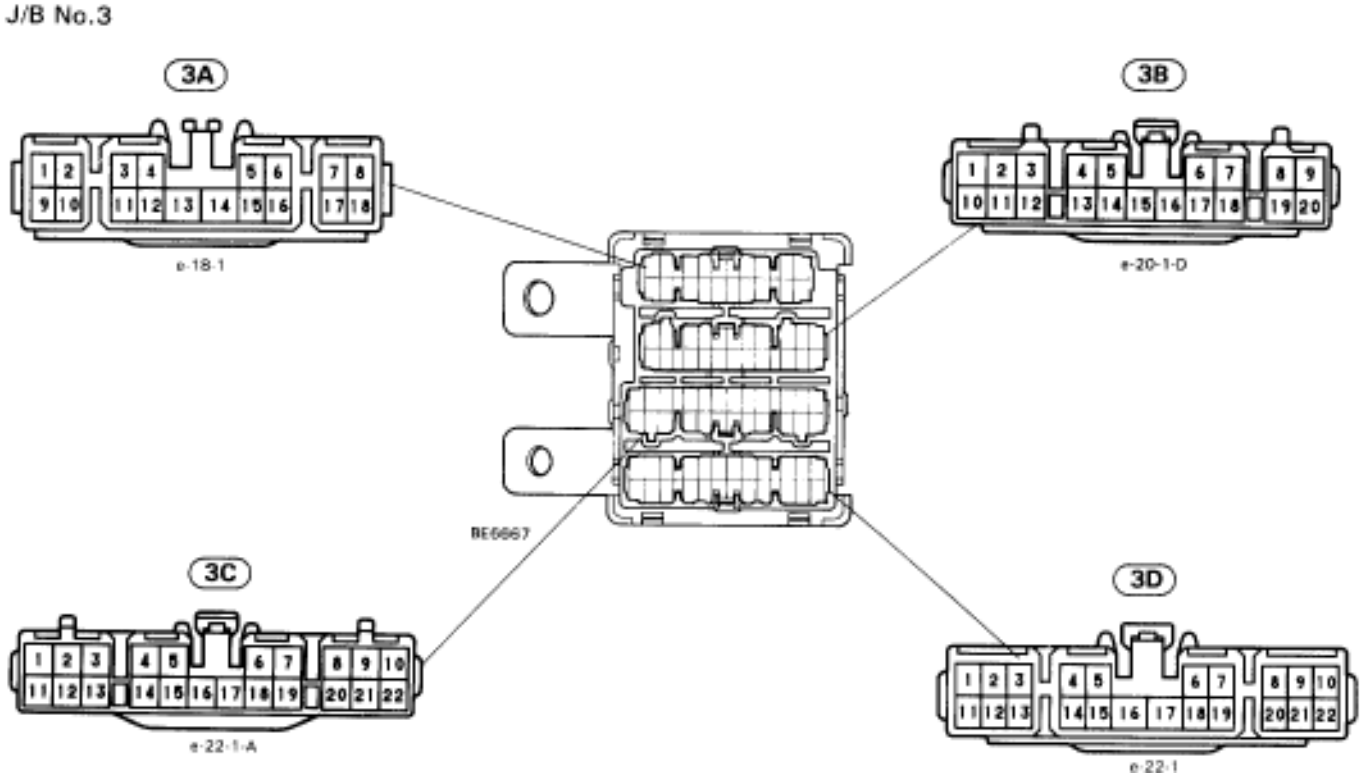
IP1

e-6-1

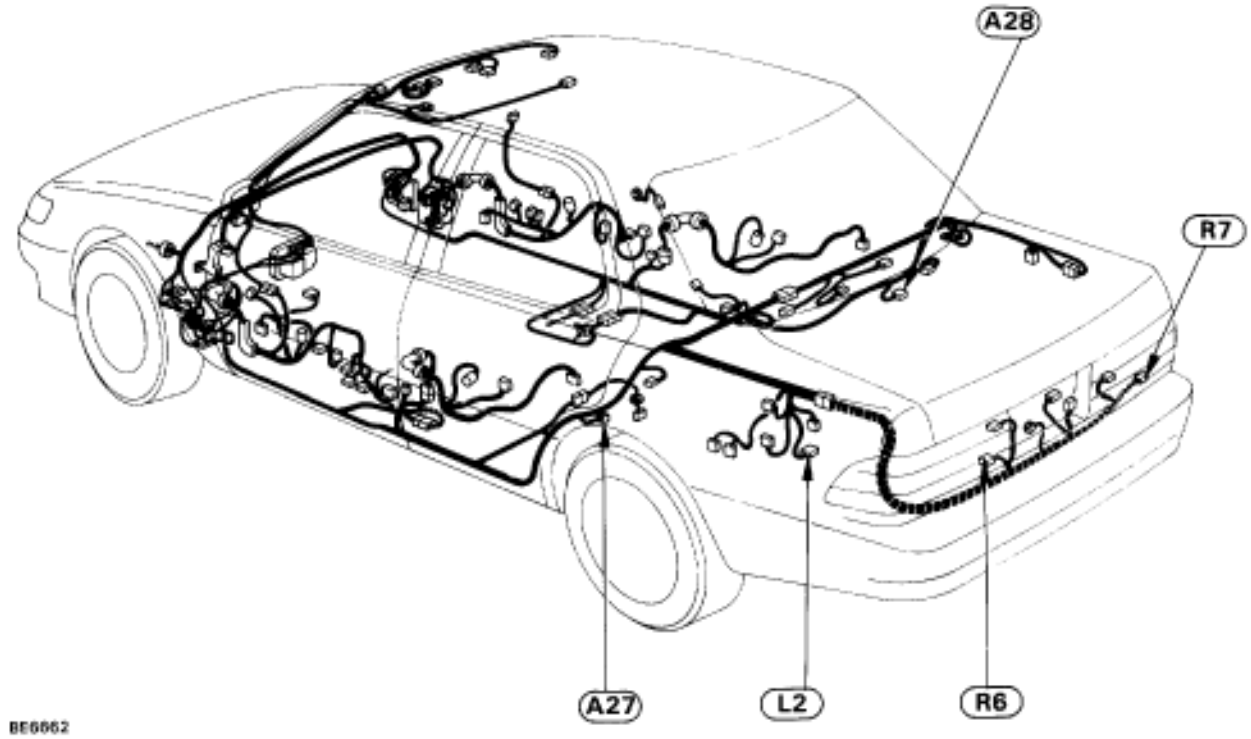
e-6-2

Location of Connectors in Instrument Panel





Location of Connectors in Body



A27
ABS Speed Sensor Rear Left

e-2-2-L

A28
ABS Speed Sensor Rear Right

e-2-2-L

L2
Light Failure Sensor

e-12-1

R6 R7
Stop Light

e-6-2

CIRCUIT INSPECTION

DTC	11, 12	ABS Control (Solenoid) Relay Circuit

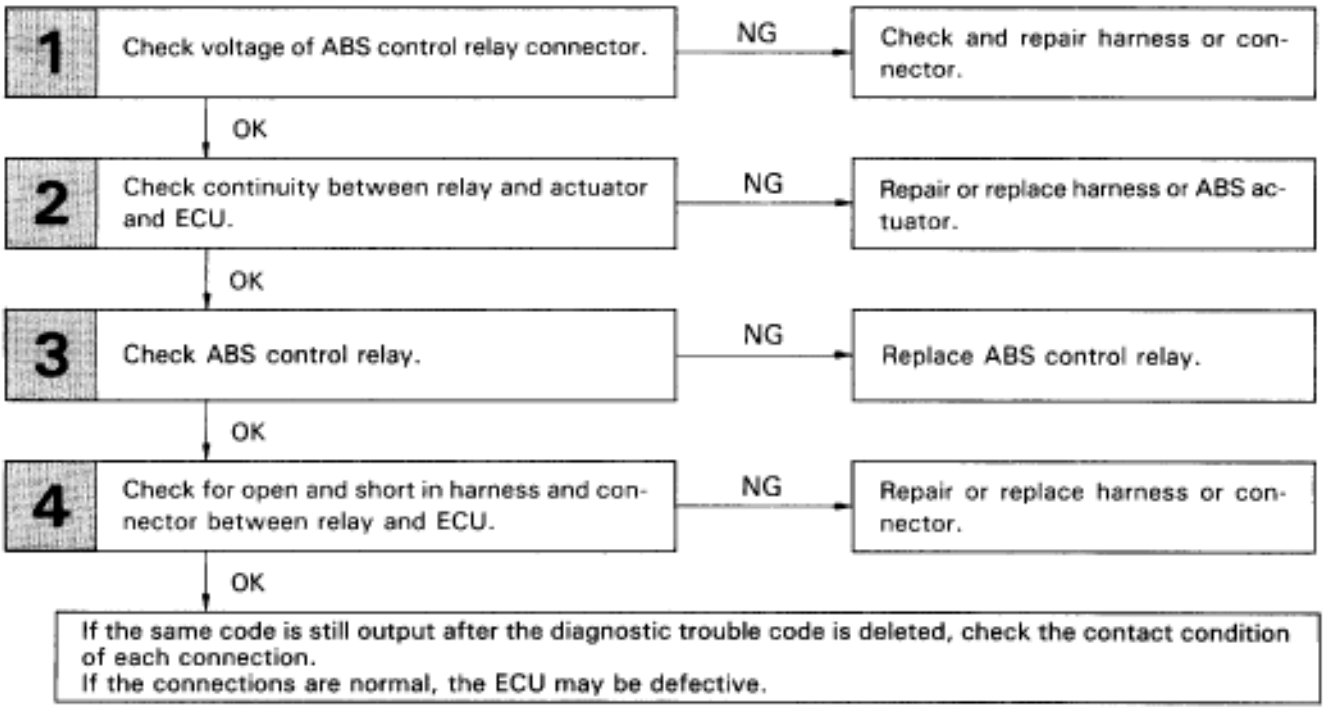
— CIRCUIT DESCRIPTION

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.

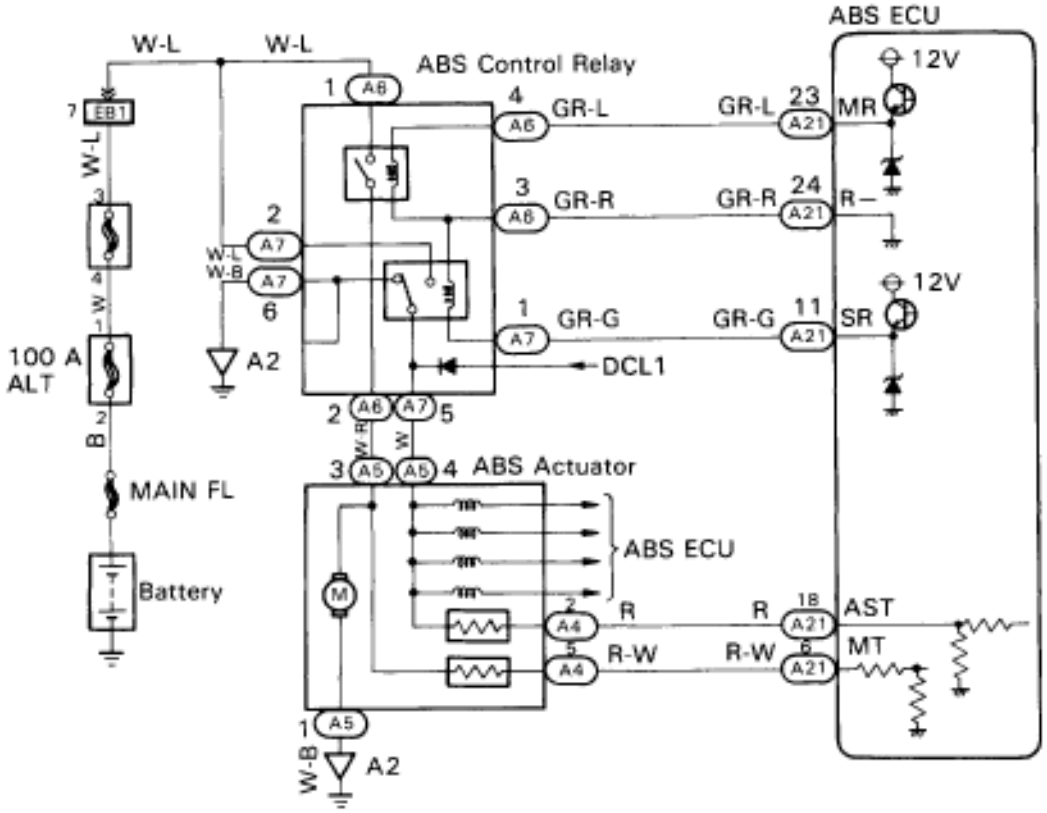
Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
11	Conditions (1) and (2) continue for 0.2 sec. or more: (1) ABS control (solenoid) relay: ON (2) ABS control (solenoid) relay monitor terminal (AST) voltage: 0	ABS control (solenoid) relay. Open or short in ABS control (solenoid) relay circuit. ECU
12	Conditions (1) and (2) continue for 0.2 sec. or more: (1) ABS control (solenoid) relay: OFF (2) ABS control (solenoid) relay monitor terminal (AST) voltage: Battery positive voltage.	ABS control (solenoid) relay. B+ short in ABS control (solenoid) relay circuit ECU

Fail safe function: If trouble occurs in the control (solenoid) relay circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

— DIAGNOSTIC CHART

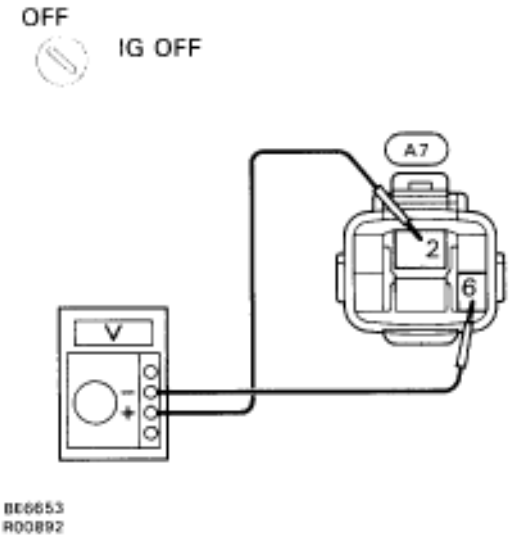


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals 2 and 6 of ABS control relay.**



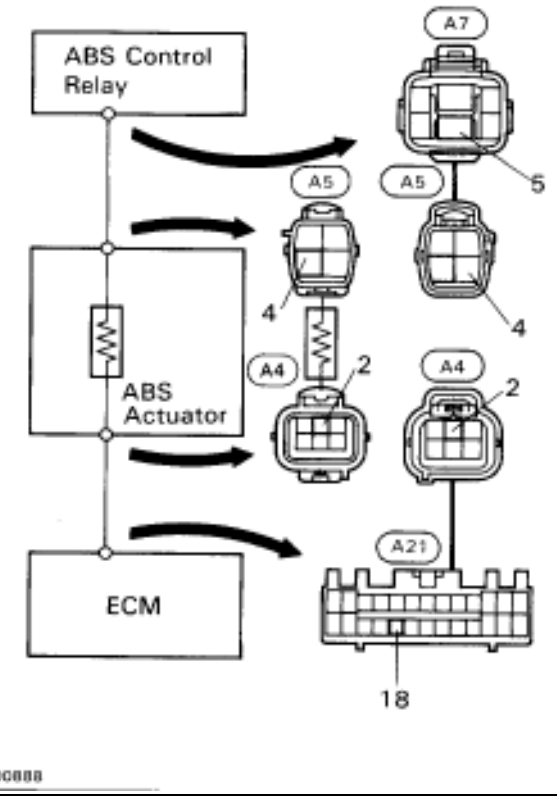
P 1. Remove the washer tank and control relay.
2. Disconnect the ABS control relay connector.

C Measure voltage between terminals 2 and 6 of ABS control relay harness side connector.

OK **Voltage: 10 – 14 V**

OK → **NG** → **Check and repair harness or connector.**

2 **Check continuity between terminal 5 and 4, 4 and 2, 2 and 18**



P Disconnect the two connectors from ABS actuator.

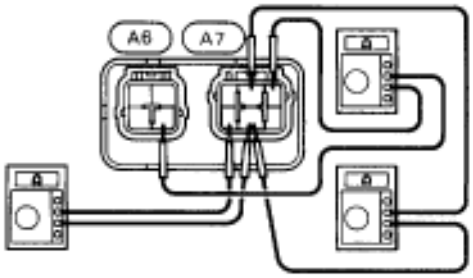
C Check continuity terminal 5 and 4, 4 and 2, 2 and 18.

OK **Continuity**

Hint There is a resistance of 4 ~ 6 Ω between terminals 4 and 2.

OK → **NG** → **Repair or replace harness or ABS actuator**

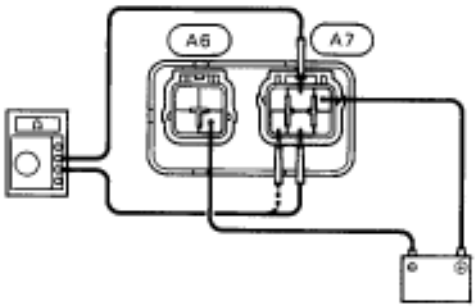
3 **Check ABS control relay.**



C Check continuity between each terminal of ABS control relay shown below.

OK

Terminals (A7) 1 and (A6) 3	Continuity (Reference value 80 Ω)
Terminals (A7) 5 and (A7) 6	Continuity
Terminals (A7) 2 and (A7) 5	Open



C
1. Apply battery positive voltage between terminals ( ) 1 and ( ) 3.
2. Check continuity between each terminal of ABS control relay shown below.

OK

Terminals (A7) 5 and (A7) 6	Open
Terminals (A7) 2 and (A7) 5	Continuity

R00889
R00895

OK → **NG** → **Replace ABS control relay.**

4 **Check for open and short in harness and connector between ABS control relay and ABS ECU (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

If the same code is still output after the diagnostic trouble code is detected, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DTC 13, 14 ABS Control (Motor) Relay Circuit

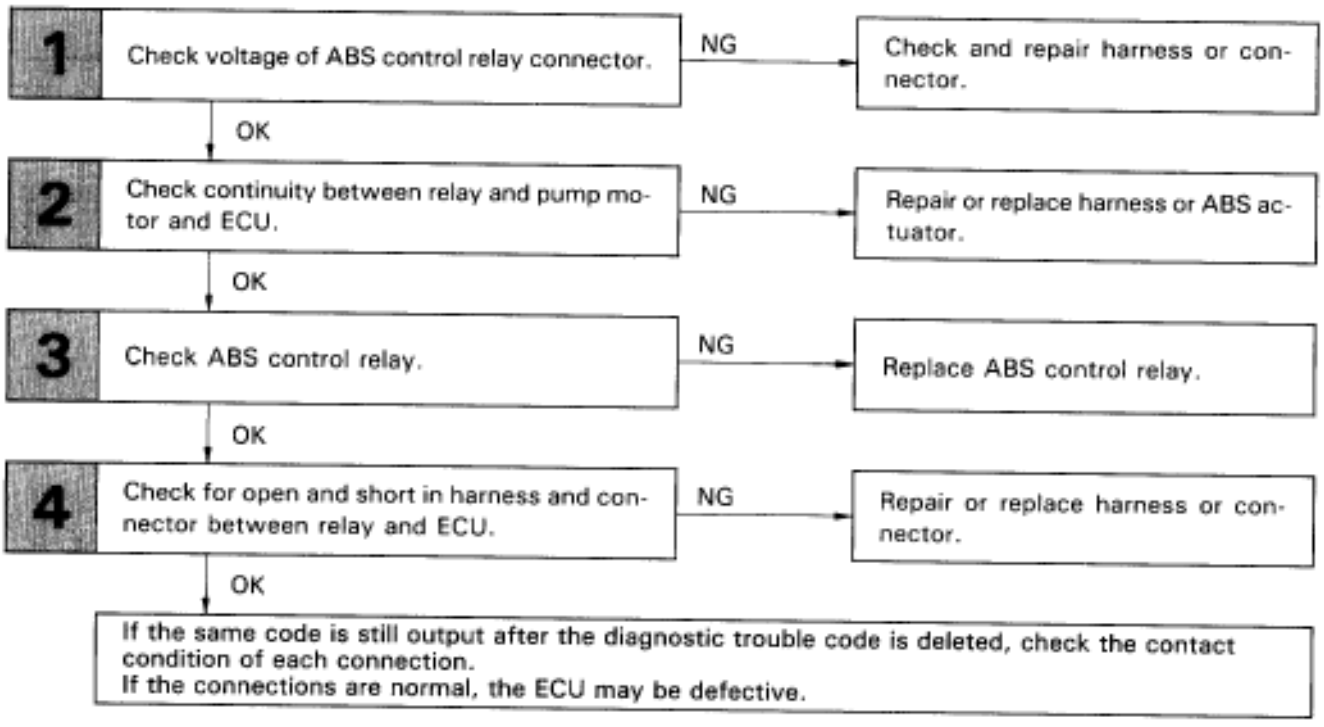
CIRCUIT DESCRIPTION

The ABS control (motor) relay supplies power to the ABS pump motor. If the accumulator pressure drops, the ECU switches the control (motor) relay ON and operates the ABS pump motor.

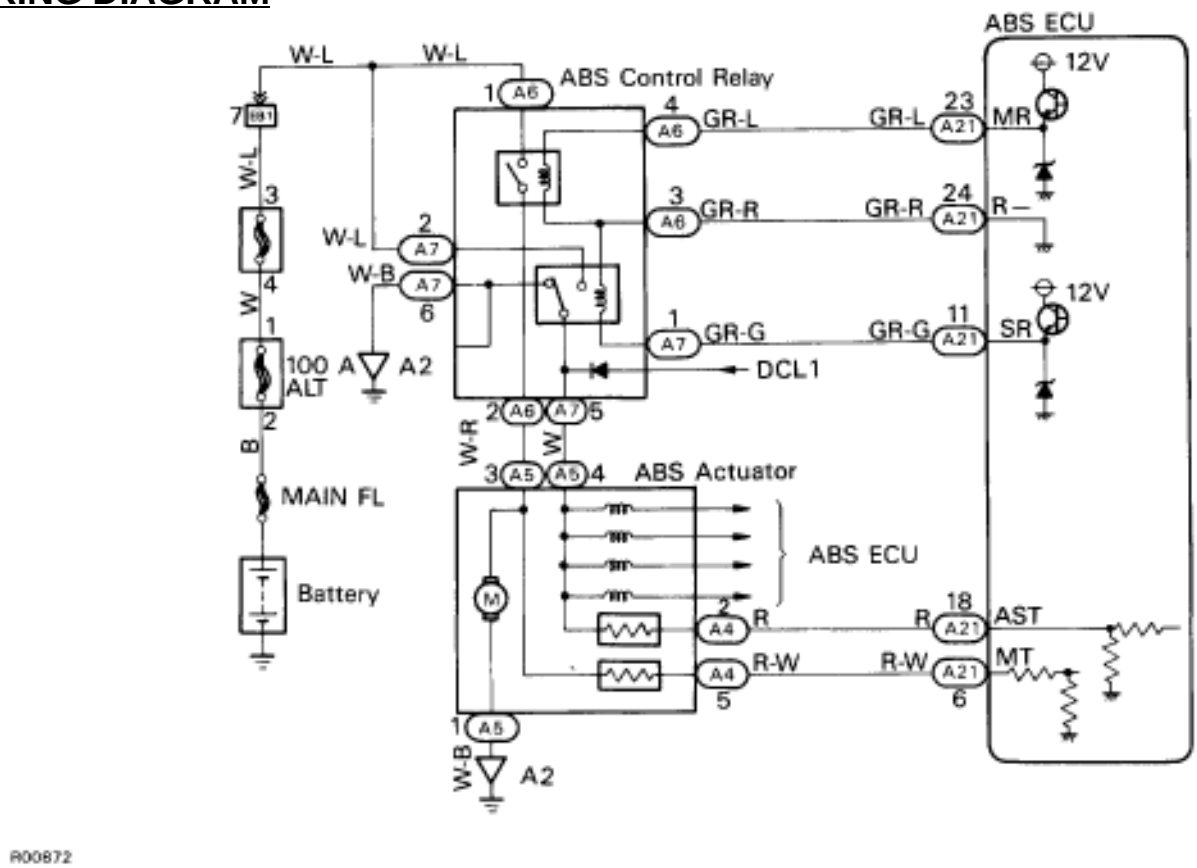
Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
13	Conditions (1) and (2) continued for 0.2 sec. or more: (1) ABS control (motor) relay: ON (2) ABS control (motor) relay monitor terminal (MT) voltage: 0 V	○1 ABS control (motor) relay. ○2 Open or short in ABS control (motor) relay circuit. ○3 ECU.
14	Conditions (1) and (2) continued for 4 sec. or more: (1) ABS control (motor) relay: OFF (2) ABS control (motor) relay monitor terminal (MT) voltage: Battery positive voltage.	○1 ABS monitor relay. ○2 B+ short in ABS control (motor) relay circuit. ○3 ECU.

Fail safe function: If trouble occurs in the control (motor) relay circuit, the ECU cuts off the current to the ABS control (motor) relay and prohibits ABS control.

DIAGNOSTIC CHART

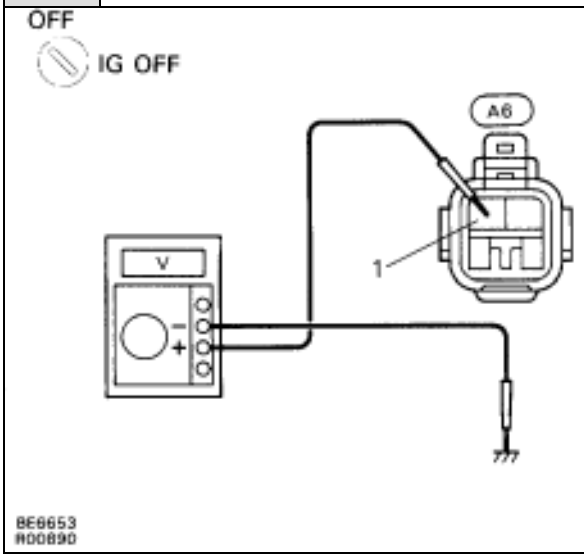


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals 1 of ABS control relay and body ground.**



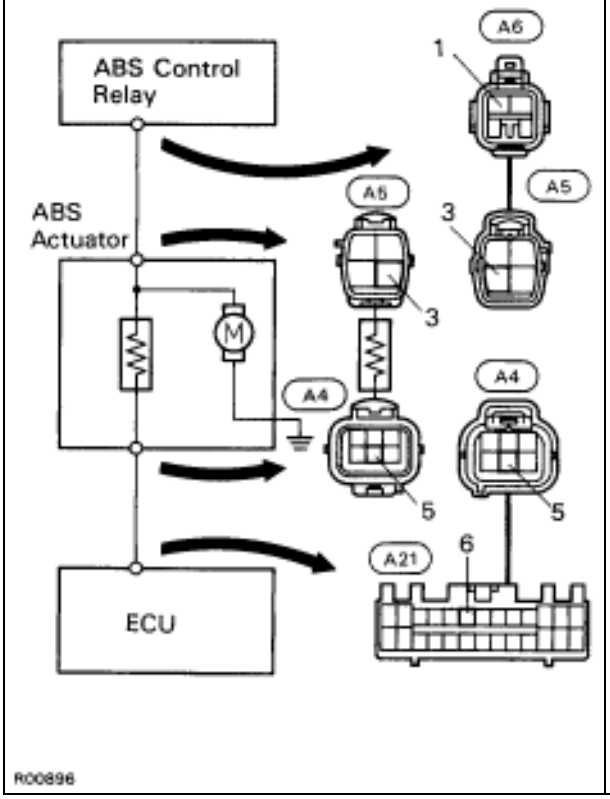
P 1. Remove the washer tank and control relay.
2. Disconnect the ABS control relay connector.

C Measure voltage between terminals 1 of ABS control relay harness side connector and body ground.

OK **Voltage: 10 – 14 V**

OK → **NG** → **Check and repair harness or connector.**

2 **Check continuity between terminal 1 and 3, 3 and 5, 5 and 6.**



P Disconnect the two connectors from ABS actuator.

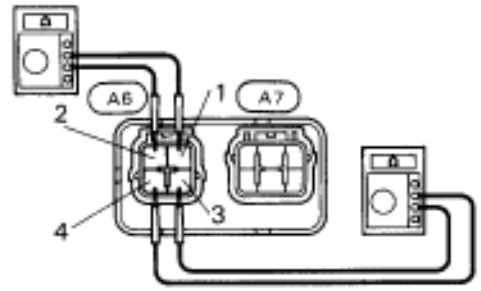
C Check continuity terminal 1 and 3, 3 and 5, 5 and 6.

OK **Continuity**

Hint There is a resistance of 4 ~ 6 Ω between terminals 3 and 5.

OK → **NG** → **Repair or replace harness or ABS actuator.**

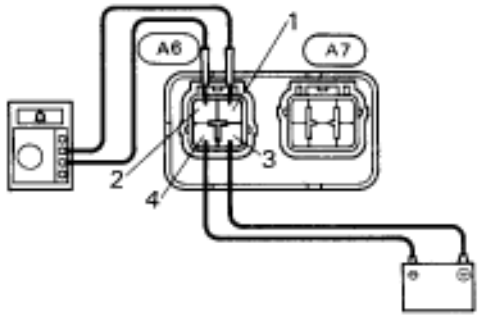
3 **Check ABS control relay**



C Check continuity between each terminal of ABS control relay shown below.

OK

Terminals (A6) 3 and (A6) 4	Continuity (Reference value 62 Ω)
Terminals (A6) 1 and (A6) 2	Open



C
1. Apply battery positive voltage between terminals (A6) 3 and (A6) 4.
2. Check continuity between each terminal of ABS control relay shown below.

OK

Terminals (A6) 1 and (A6) 2	Continuity

R00894
R00893

OK → **NG** → **Replace ABS control relay**

4 **Check for open and short in harness and connector between ABS control relay and ABS ECU (See page IN–27)**

OK → **NG** → **Repair or replace harness or connector.**

If the same code is still output after the diagnostic trouble code is deleted, check the contact condition of each connection.
If the connections are normal, the ECU may be defective.

DTC	21, 22, 23, 24	ABS Actuator Solenoid Circuit

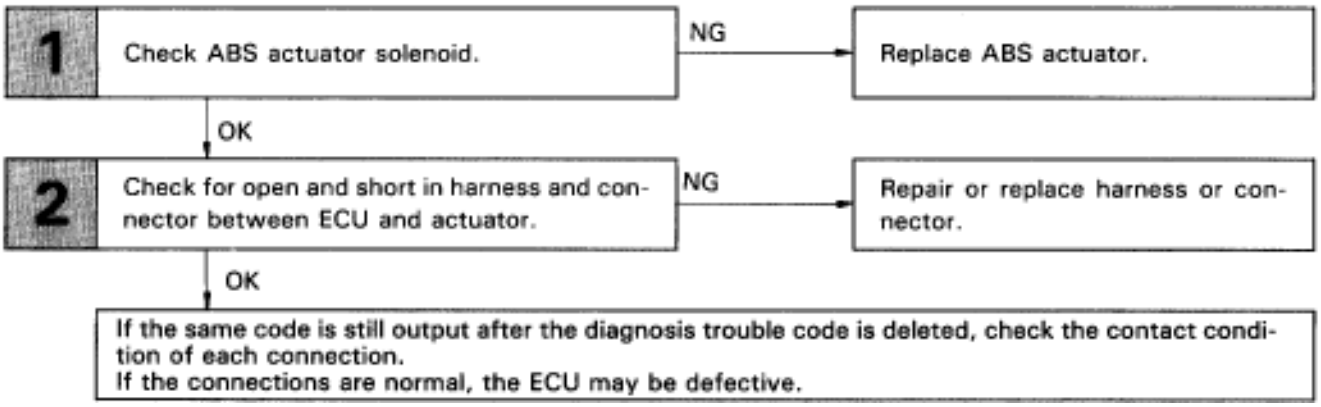
CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling the turning of the wheels.

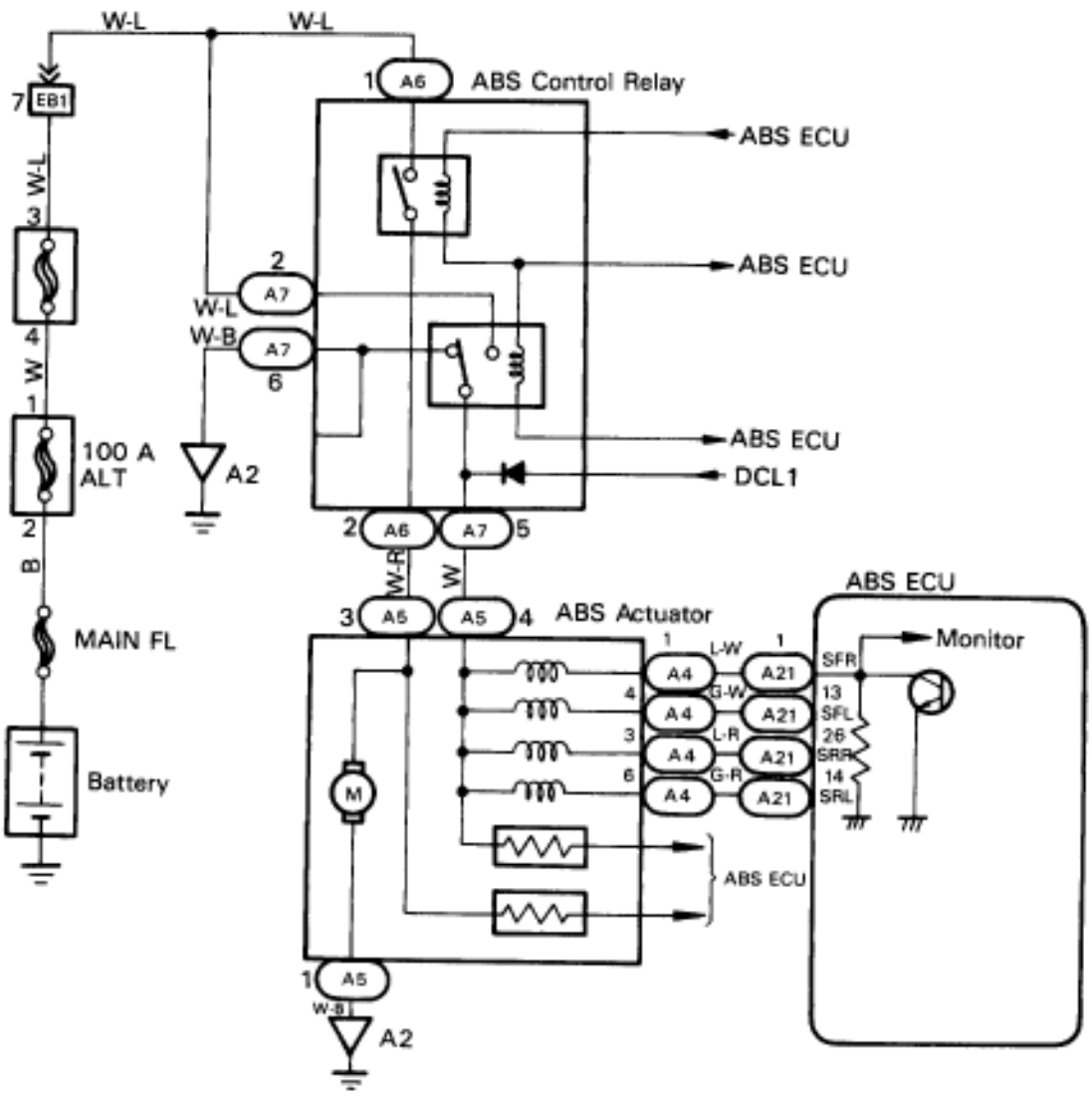
Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
21	Conditions (1) through (3) continue for 0.05 sec. or more: (1) ABS control (solenoid) relay: ON (2) Voltage of ABS ECU terminal AST: Battery positive voltage. (3) When power transistor of ECU is ON, voltage of terminal SFR is 0 V or battery positive voltage.	□A ABS actuator. □B Open or short in SFR circuit. □C ECU.
22	Conditions (1) through (3) continue for 0.05 sec. or more: (1) ABS control (solenoid) relay: ON (2) Voltage of ABS ECU terminal AST: Battery positive voltage. (3) When power transistor of ECU is ON, voltage of terminal SFLR is 0 V or battery positive voltage.	□A ABS actuator. □B Open or short in SFL circuit. □C ECU.
23	Conditions (1) through (3) continue for 0.05 sec. or more: (1) ABS control (solenoid) relay: ON (2) Voltage of ABS ECU terminal AST: Battery positive voltage. (3) When power transistor of ECU is ON, voltage of terminal SRR is 0 V or battery positive voltage.	□A ABS actuator. □B Open or short in SRR circuit. □C ECU.
24	Conditions (1) through (3) continue for 0.05 sec. or more: (1) ABS control (solenoid) relay: ON (2) Voltage of ABS ECU terminal AST: Battery positive voltage. (3) When power transistor of ECU is ON, voltage of terminal SRL is 0 V or battery positive voltage.	□A ABS actuator. □B Open or short in SRL circuit. □C ECU.

Fail safe function: If trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the control (solenoid) relay and prohibits ABS control.

DIAGNOSTIC CHART



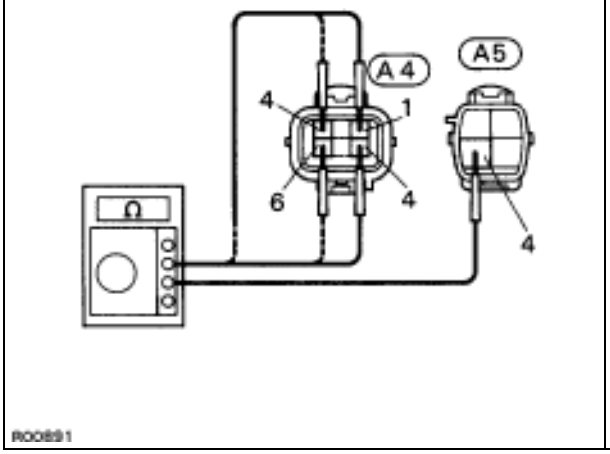
WIRING DIAGRAM



R00874

INSPECTION PROCEDURE

1 **Check ABS actuator solenoid.**



P
1. Remove the washer tank.
2. Disconnect the two connectors from ABS actuator.

C Check continuity between terminal (A4) 4 and (A5) 1, 3, 4, 6 of ABS actuator connector.

OK **Continuity**

Hint Resistance of each solenoid coil is 1.2 Ω.

OK → **NG** → **Replace ABS actuator.**

2 **Check for open and short in harness and connector between ABS ECU and actuator (See page IN–27).**

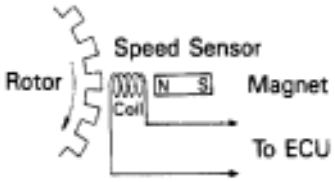
OK → **NG** → **Repair or replace harness or connector.**

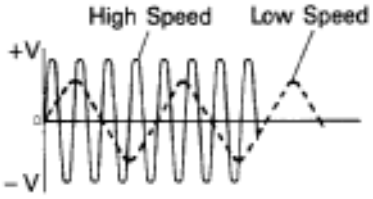
If the same code is still output after the diagnostic trouble code is deleted, check the contact condition of each connection.
If the connections are normal, the ECU may be defective.

DTC	31, 32, 33, 34, 35, 36	Speed Sensor Circuit

— CIRCUIT DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS and system. The front rotor and rear rotor 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 proportion to the speed of the rotors (wheels), the frequency is used by the ECU to detect the speed of each wheel.





8R3583
8R3582

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
31, 32 33, 34	Detection of any of conditions (1) through (3): (1) At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 5 sec. (2) Momentary interruption of the vehicle speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. (3) Abnormal fluctuation of speed sensor signals with the vehicle speed 20 km/h (12 mph) or more.	□ Right front, left front, right rear and left rear speed sensor. □ Open or short in each speed sensor circuit. □ ECU
35	Vehicle speed sensor signal is not input for about 1 sec. while the left front and right rear vehicle speed sensor signals are being checked when the IG switch is turned ON.	□ Open in left front, right rear speed sensor circuit. □ ECU.
36	Vehicle speed sensor signal is not input for about 1 sec. while the right front and left rear vehicle speed sensor signals are being checked with the IG switch ON.	□ Open in right front, left rear speed sensor circuit. □ ECU.

HINT: DTC 31 is for the right front wheel speed sensor.
DTC 32 is for the left front wheel speed sensor.
DTC 33 is for the right rear wheel speed sensor.
DTC 34 is for the left rear wheel speed sensor.

Fail safe function: If trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

DIAGNOSTIC CHART

1 Speed sensor check (See page BR–64).
- OK → When DTC 31 – 36 are displayed, check and replace ABS ECM.
- NG →

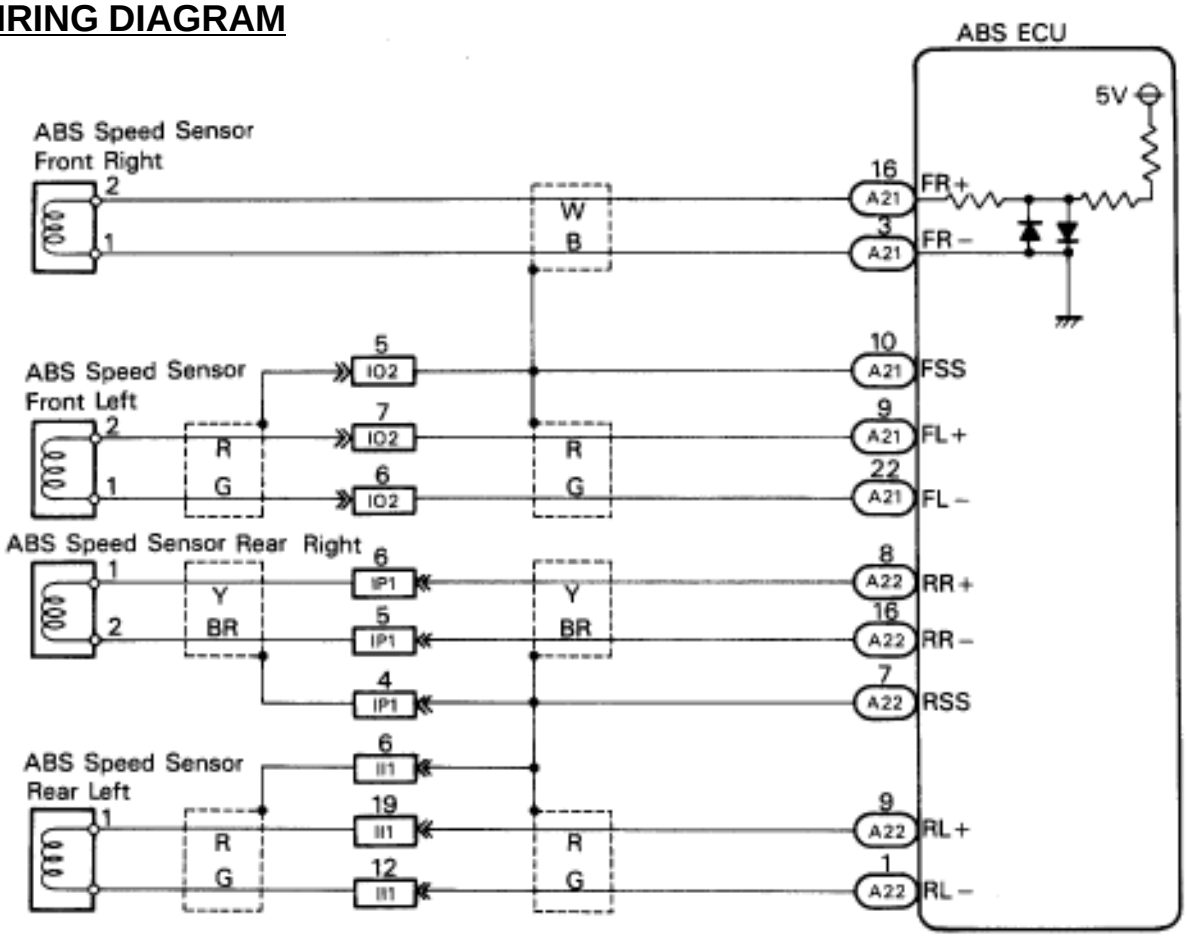
2 Check speed sensor.
- NG → Replace speed sensor.
- OK →

3 Check for open and short in harness and connector between each speed sensor and ECU.
- NG → Repair or replace harness or connector.
- OK →

4 Check sensor rotor and sensor installation.
- NG → Replace speed sensor or rotor.
- OK →

Check and replace ABS ECU.

WIRING DIAGRAM



R00879

INSPECTION PROCEDURE

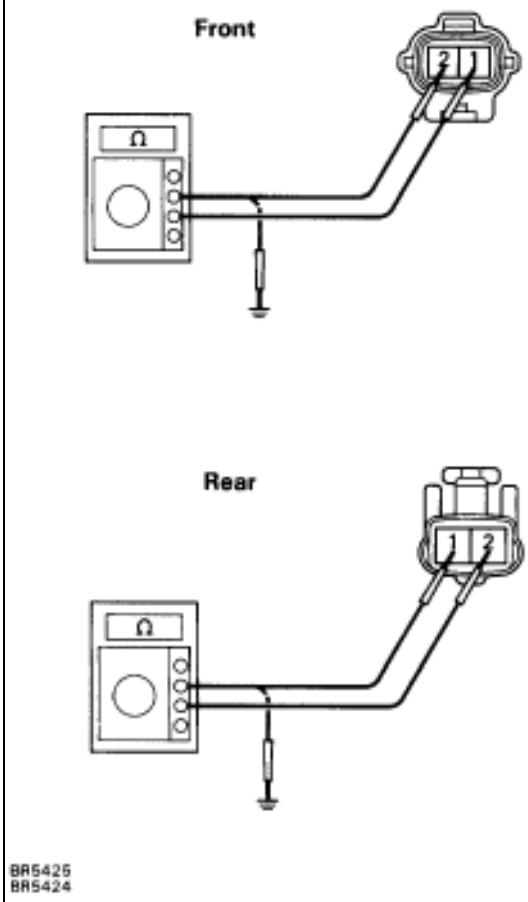
1 **Speed sensor check.**

P See speed sensor check on page BR–64.

NG

OK **When diag. Code 31 – 36 are displayed, check and replace ABS ECU.**

2 **Check speed sensor.**



Front

P
1. Remove front fender liner.
2. Disconnect speed sensor connector.

C Measure resistance between terminals 1 and 2 of speed sensor connector.

OK **Resistance: 0.9 – 1.3 k Ω**

C Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK **Resistance: 1 MΩ or higher**

Rear

P
1. Remove the seat cushion and side seat back.
2. Disconnect speed sensor connector.

C Measure resistance between terminals 1 and 2 of speed sensor connector.

OK **Resistance: 0.9 – 1.3 k Ω**

C Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK **Resistance: 1 MΩ of higher**

OK

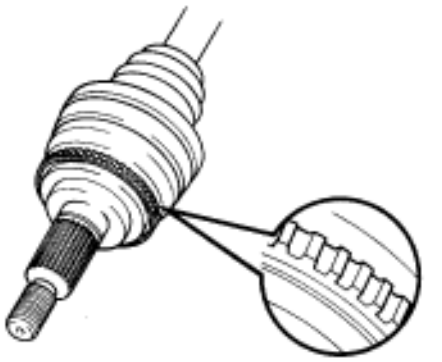
NG **Replace speed sensor**

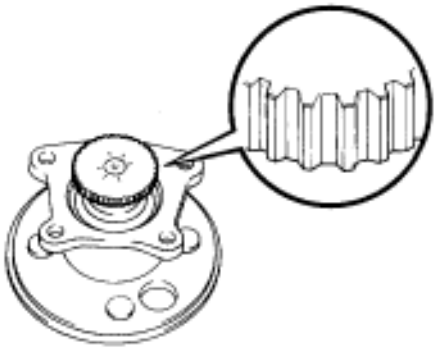
3 **Check for open and short in harness and connector between each speed sensor and ECU (See page IN–27).**

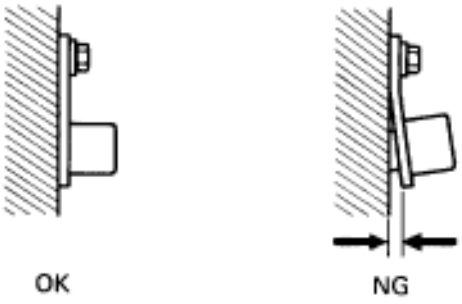
OK

NG **Repair or replace harness or connector.**

4 **Check sensor rotor and sensor installation.**







R00948
R00947
BR3795

Front

P Remove front speed sensor. (See SA section)

C Check sensor rotor serrations.

OK **No scratches or missing teeth.**

C Check the front speed sensor installation.

OK **The installation bolts are tightened properly**

Rear

P Remove the drive shaft. (See the SA section)

C Check the sensor rotor serrations.

OK **No scratches or missing teeth.**

C Check the speed sensor installation.

OK **The installation bolt is tightened properly and there is no clearance between the sensor and rear axle carrier.**

OK

NG **Replace speed sensor or rotor.**

Check and replace ABS ECU.

CIRCUIT INSPECTION

DTC	41	IG Power Source Circuit

CIRCUIT DESCRIPTION

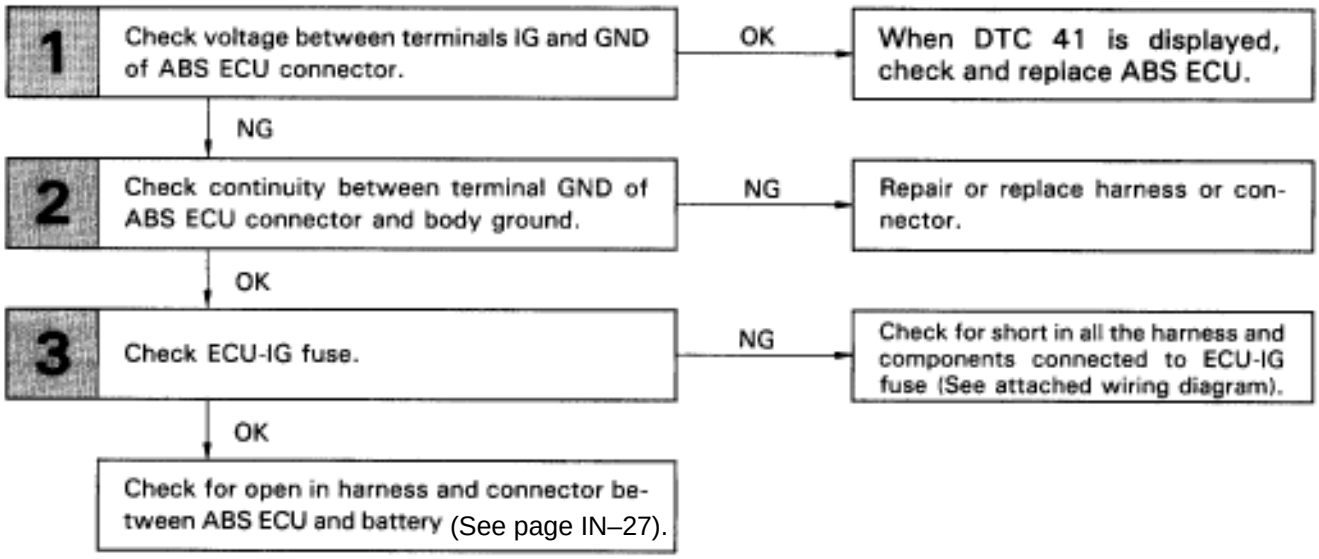
This is the power source for the ECU and becomes power source for the CPU and actuators.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
41	Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains at more than 17 V or below 9.5 V for more than 10 sec.	1. Battery 2. IC regulator 3. Open or short in power source circuit. 4. ECU

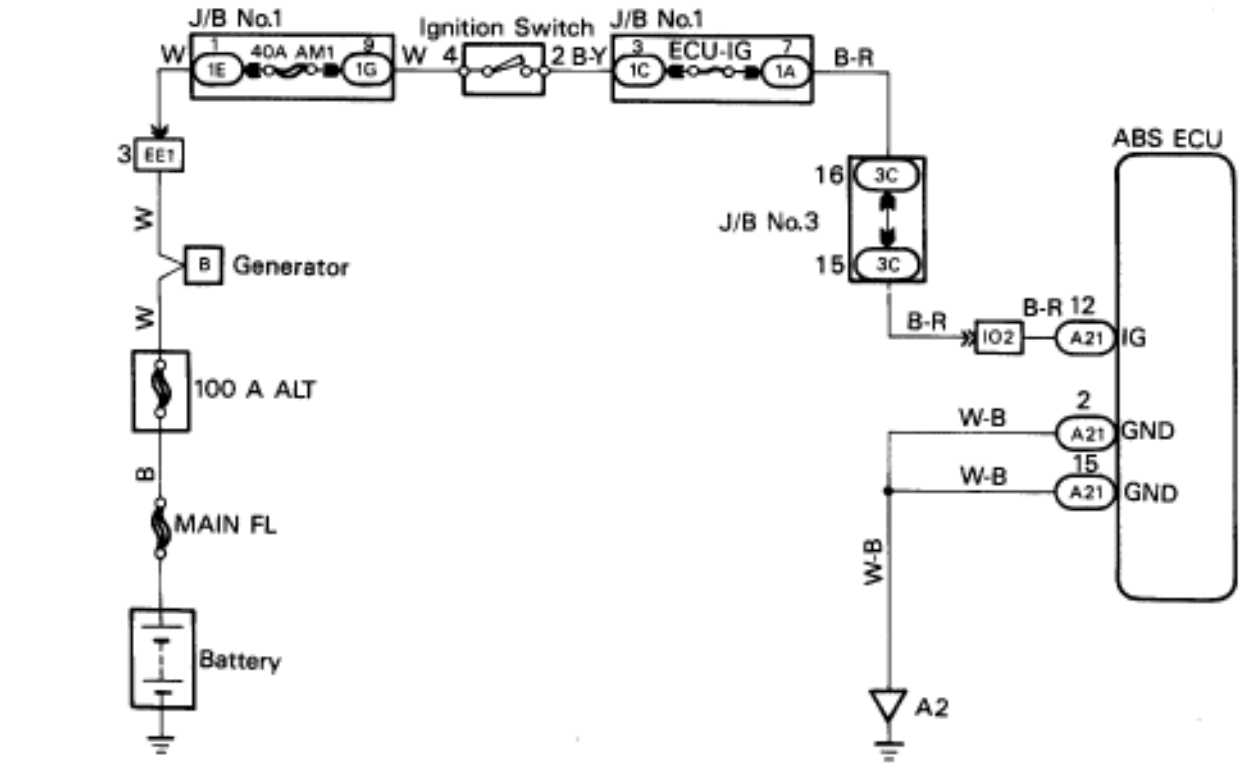
Fail safe function: If trouble occurs in the power source circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

DIAGNOSTIC CHART

First check battery positive voltage. If the voltage is not between 10 V and 14 V, check and repair the charging system.

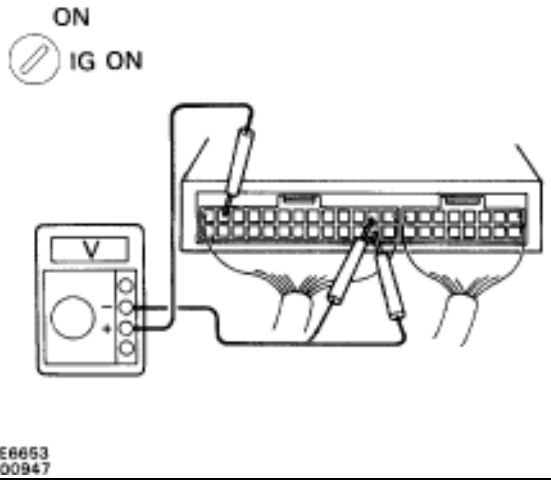


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals IG and GND of ABS ECU connector.**



P Remove ABS ECU with connectors still connected.

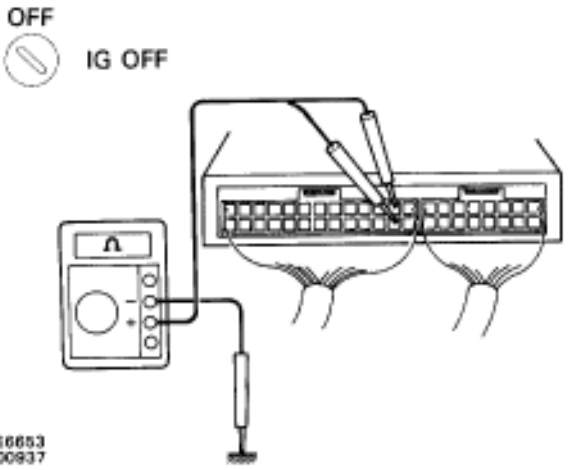
C
1. Turn ignition switch on,
2. Measure voltage between terminals IG and GND of ABS connector.

OK **Voltage: 10 – 14 V**

NG

OK **When diag. code 41 is displayed, check and replace ABS ECU.**

2 **Check continuity between terminal GND of ECU connector and body ground.**



C Measure resistance between terminal GND of ABS connector and body ground.

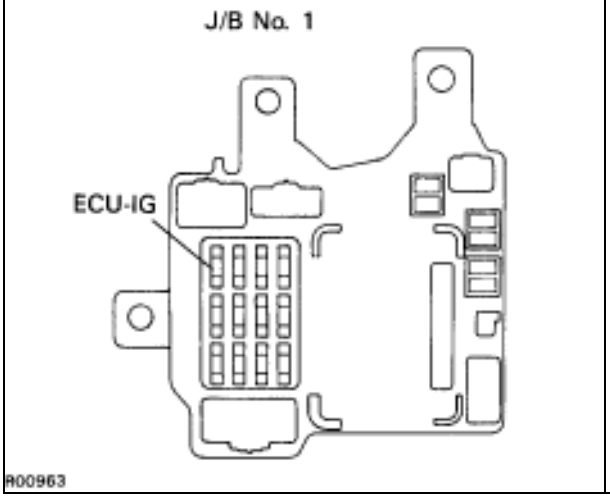
OK **Resistance: 1 Ω or less.**

OK

NG **Repair or replace harness or connector.**

Go to step 1.

3	Check ECU–IG fuse.



P Remove ECU–IG fuse from J/B No. 1.

C Check continuity of ECU–IG fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

Check for open in harness and connector between ABS ECU and battery.

DTC 51 ABS Pump Motor Lock

CIRCUIT DESCRIPTION

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
51	Pump motor is not operating normally during initial check.	ABS pump motor.

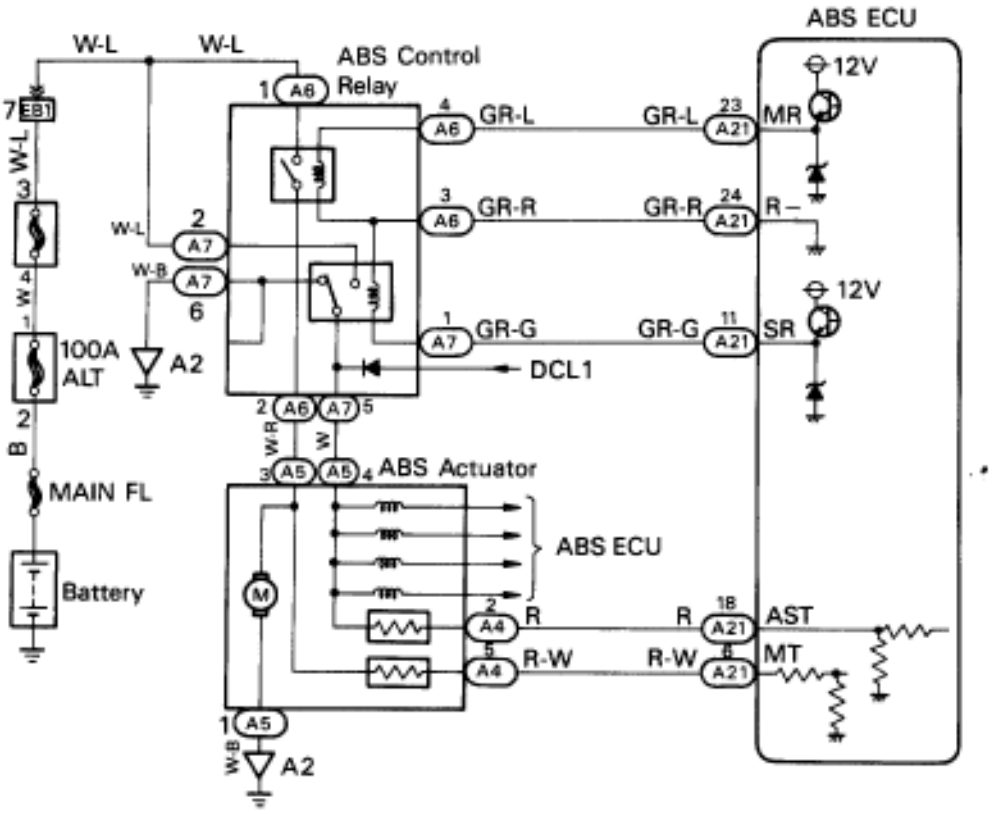
Fail safe function: If trouble occurs in the ABS pump motor, the ECU cuts off the current to the control (motor) relay and prohibits ABS control.

DIAGNOSTIC CHART

See inspection of ABS pump motor (See page BR–54).

WIRING DIAGRAM

(Reference)

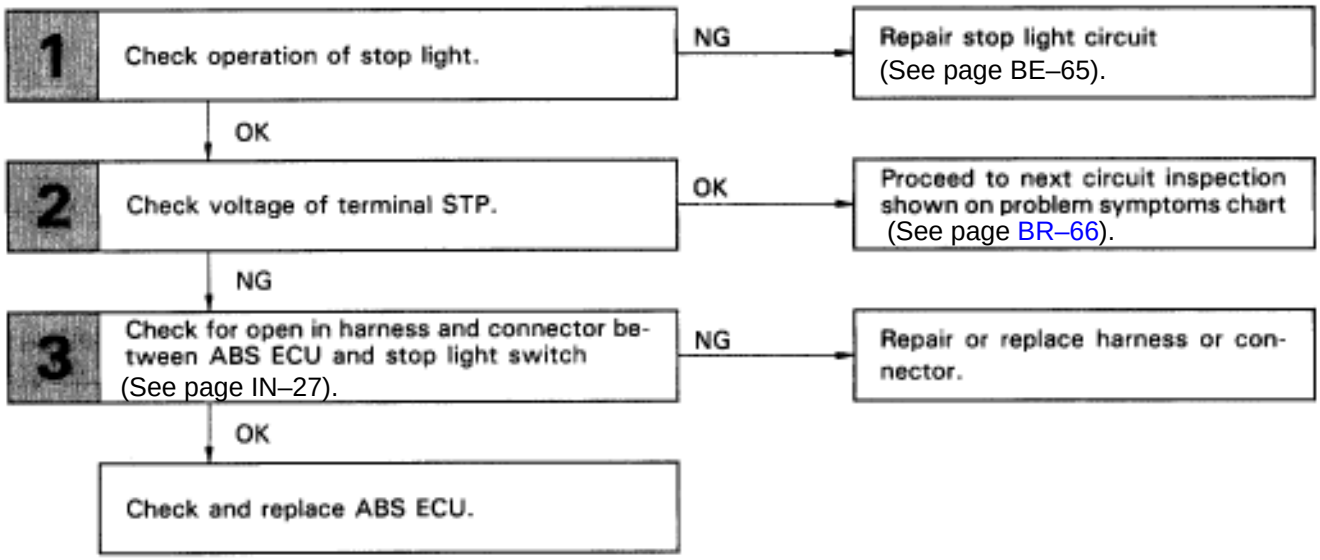


Stop Light Switch Circuit

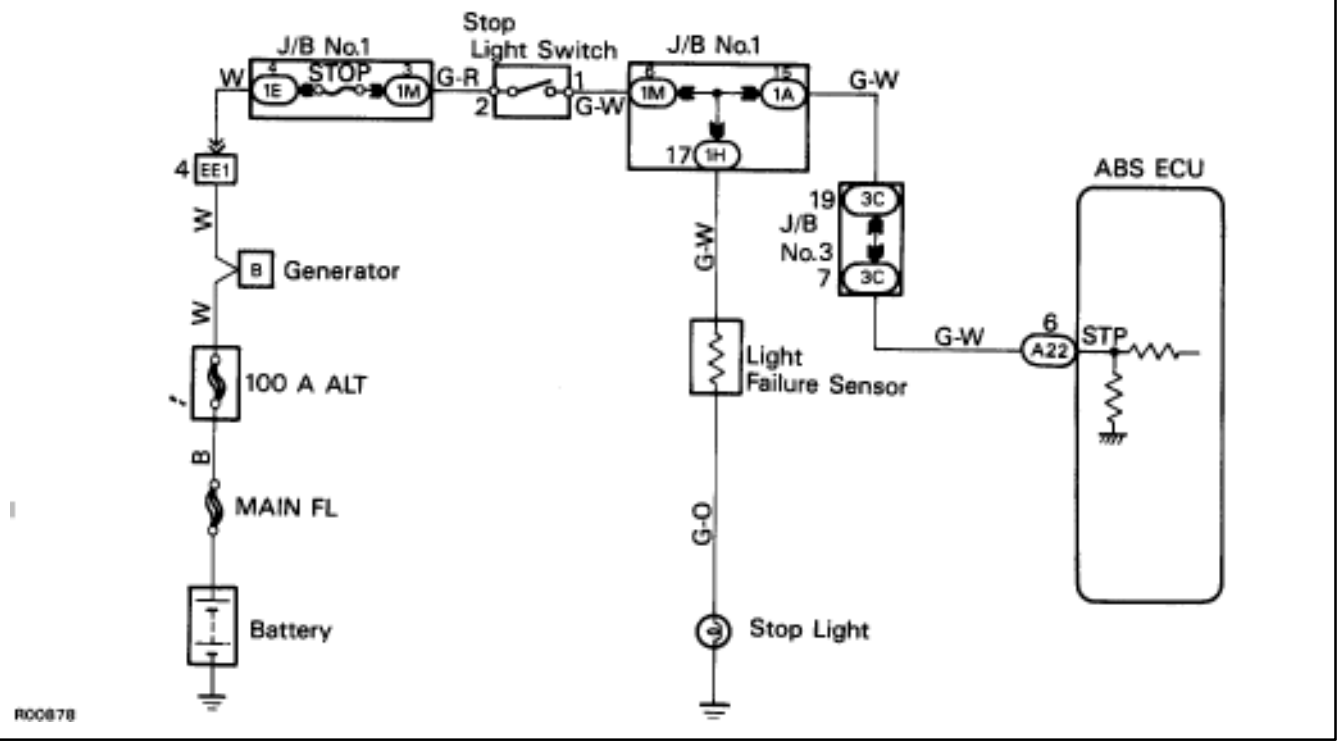
CIRCUIT DESCRIPTION

This stop light switch senses whether the brake pedal is depressed or released, and send the signal to the ECU.

DIAGNOSTIC CHART



WIRING DIAGRAM



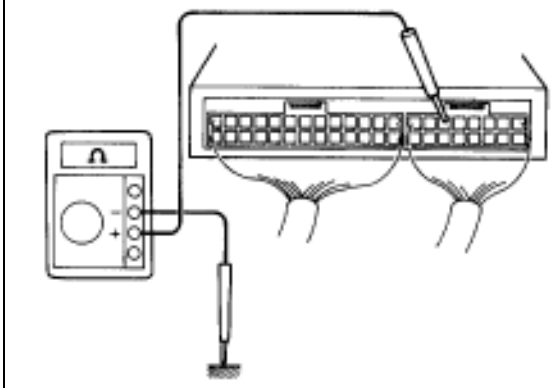
INSPECTION PROCEDURE

1	Check operation of stop light.
C	Check that stop light lights up when brake pedal is depressed and turns off when brake pedal is released.

OK

NG → **Repair stop light circuit (See page BE–65).**

2	Check voltage between terminal STP of ABS ECU and body ground.



P Remove ABS ECU with connectors still connected.

C Measure voltage between terminal.

OK **Voltage: 10 – 14 V**

NG

OK → **Proceed to next circuit inspection shown on problem symptoms chart (See page BR–66).**

3	Check for open in harness and connector between ABS ECU and stop light switch (See page IN–27).

OK

NG → **Repair or replace harness or connector.**

Check and replace ABS ECU.

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

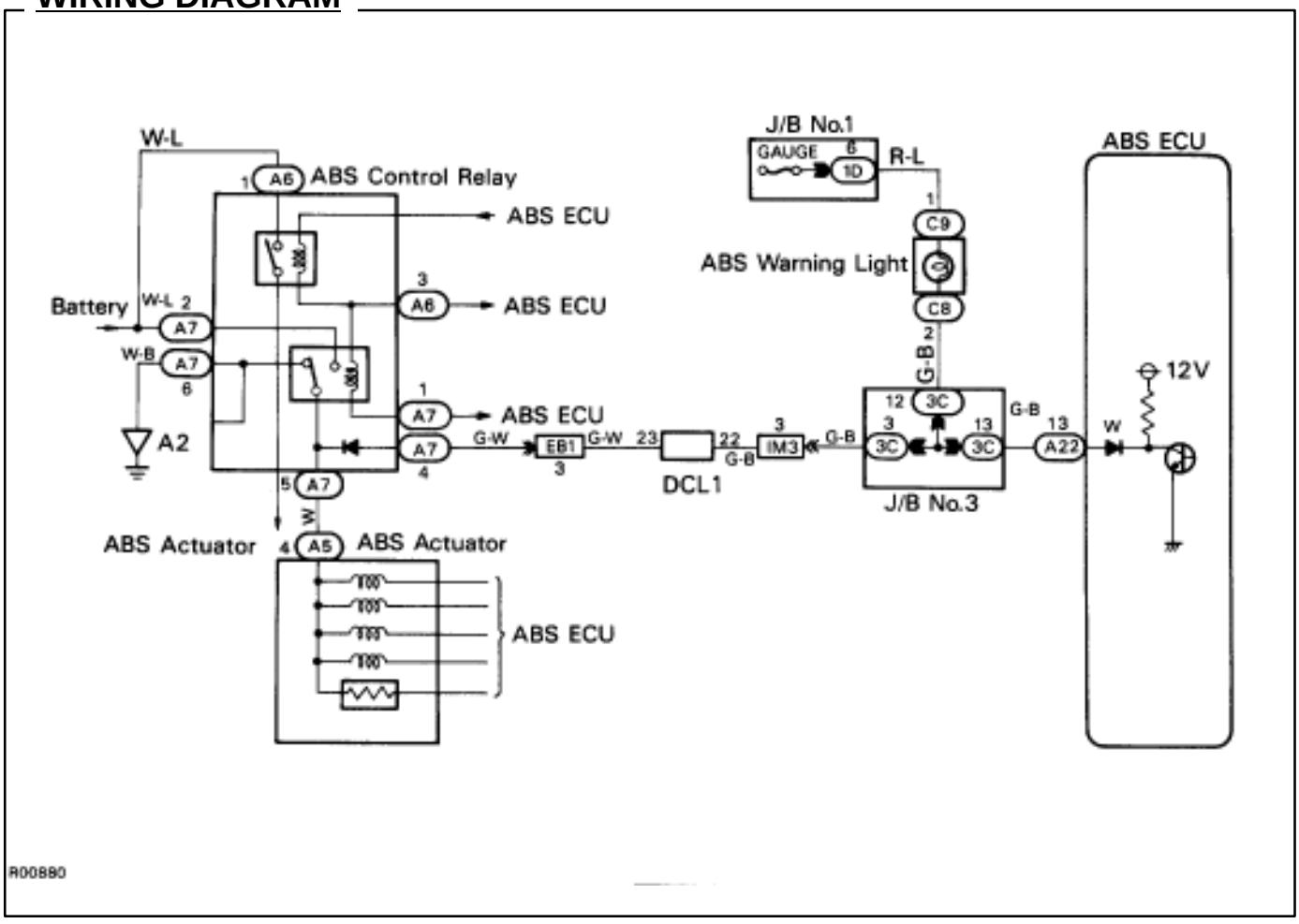
If the ECU detects trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a diagnostic trouble code in memory.
After removing the short pin of the DCL1, connect a DCL1 or connect between Tc and E1 of the DCL2 to cause the ABS warning light to blink and output the diagnostic trouble code is output.

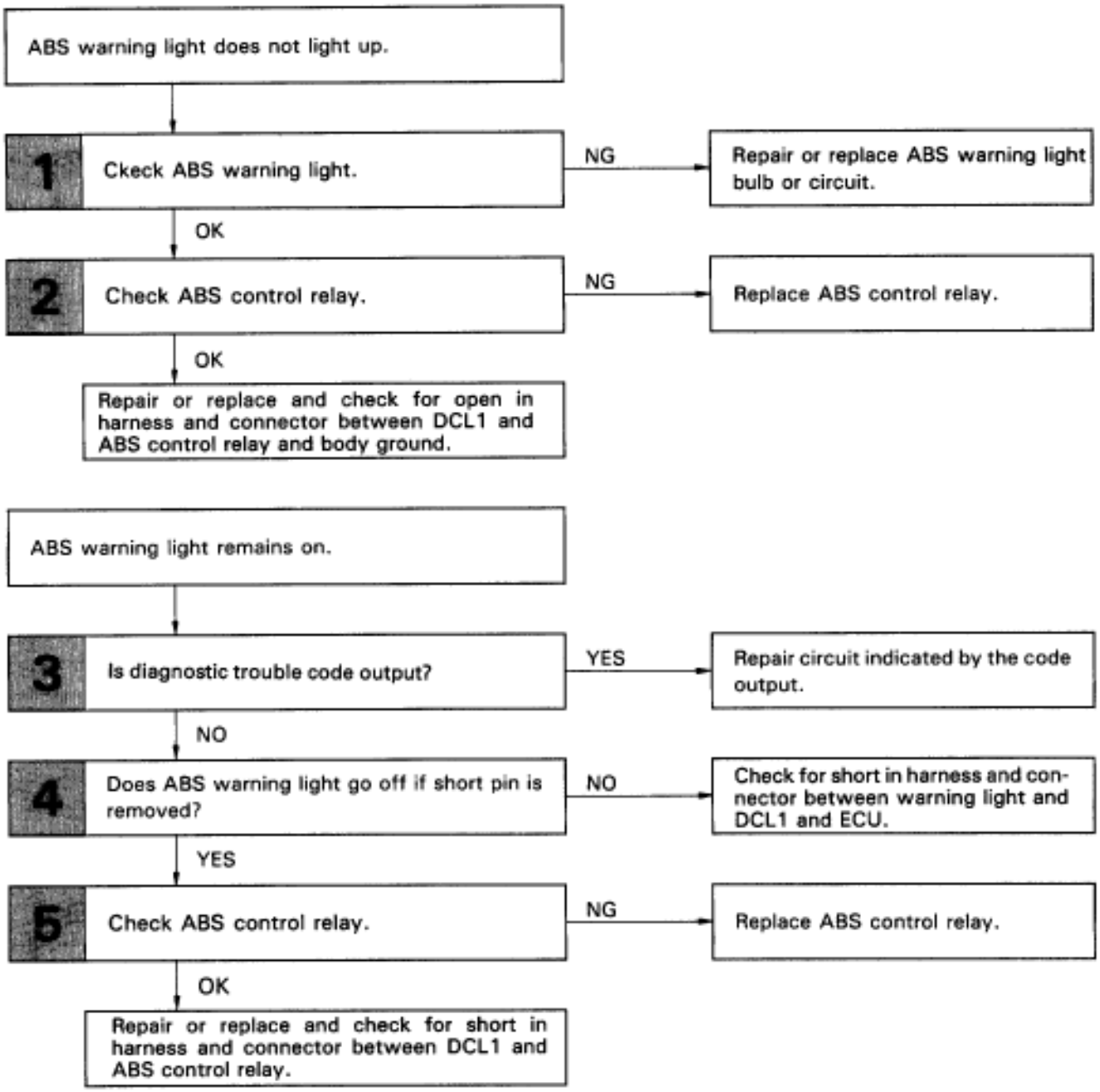
DIAGNOSTIC CHART

Perform troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	Go to step 1
ABS warning light remains on	Go to step 3

WIRING DIAGRAM




ABS warning light does not light up.
1
Ckeck ABS warning light.
NG
Repair or replace ABS warning light bulb or circuit.
OK
2
Check ABS control relay.
NG
Replace ABS control relay.
OK
Repair or replace and check for open in harness and connector between DCL1 and ABS control relay and body ground.
ABS warning light remains on.
3
Is diagnostic trouble code output?
YES
Repair circuit indicated by the code output.
NO
4
Does ABS warning light go off if short pin is removed?
NO
Check for short in harness and connector between warning light and DCL1 and ECU.
YES
5
Check ABS control relay.
NG
Replace ABS control relay.
OK
Repair or replace and check for short in harness and connector between DCL1 and ABS control relay.

INSPECTION PROCEDURE

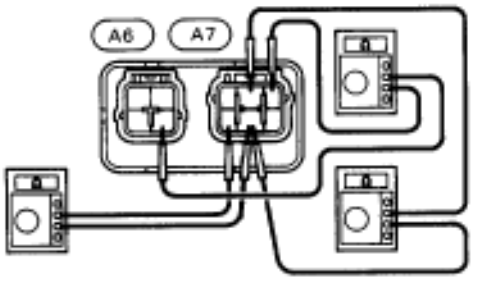
1 **Check ABS warning light.**

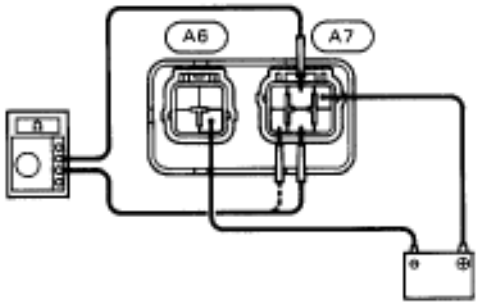
See Combination Meter Troubleshooting on page BE–118.

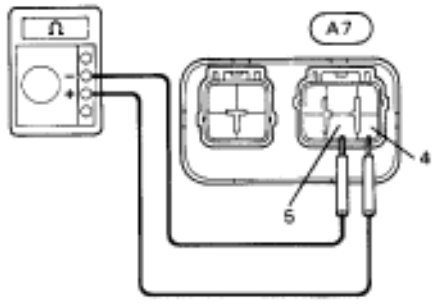
OK

NG **Replace bulb or combination meter assembly.**

2 **Check ABS (control) relay.**







R00889
R00895
R00940

P
1. Remove the washer tank and control relay.
2. Disconnect the connectors from control relay.

C Check continuity between each terminal of ABS control relay shown below.

OK

Terminals (A7) 1 and (A6) 3	Continuity (Reference value 80 Ω)
Terminals (A7) 5 and (A7) 6	Continuity
Terminals (A7) 2 and (A7) 5	Open

C
1. Apply battery positive voltage between terminals ( ) 1 and ( ) 3.
2. Check continuity between each terminal of ABS control relay shown below.

OK

Terminals (A7) 5 and (A7) 6	Open
Terminals (A7) 2 and (A7) 5	Continuity

C Connect the ⊕ test lead to terminal 4 of ( ) and the ⊖ lead to terminal 5 of ( ). Check continuity between the terminals.

OK **Continuity**

If there is no continuity, connect the ⊖ test lead to terminal 4 of ( ) and the ⊕ lead to terminal 5 of ( ). Recheck continuity between terminals.

OK

NG **Replace ABS control relay.**

Repair or replace and check for open in harness and connector between DCL1 and ABS control relay and body ground (See page IN–27).

3	Is diagnostic trouble code output?
Perform diagnostic trouble code check on page BR–61.	

NO

YES → **Repair circuit indicated by the code output.**

4	Does ABS warning light go off if short pin is removed?

YES

NO → **Check for short in harness and connector between warning light and DCL1 and ECU. (see page IN–27).**

5	Check ABS control relay (See step No. 2).

OK

NG → **Replace ABS control relay.**

Repair or replace and check for short in harness and connector between DCL1 and ABS control relay (See page IN–27).

Tc Terminal Circuit

CIRCUIT DESCRIPTION

Connecting between terminals Tc and E1 of the DCL1 or the DCL2 causes the ECU to display the diagnostic trouble code by flashing the ABS warning light.

DIAGNOSTIC CHART

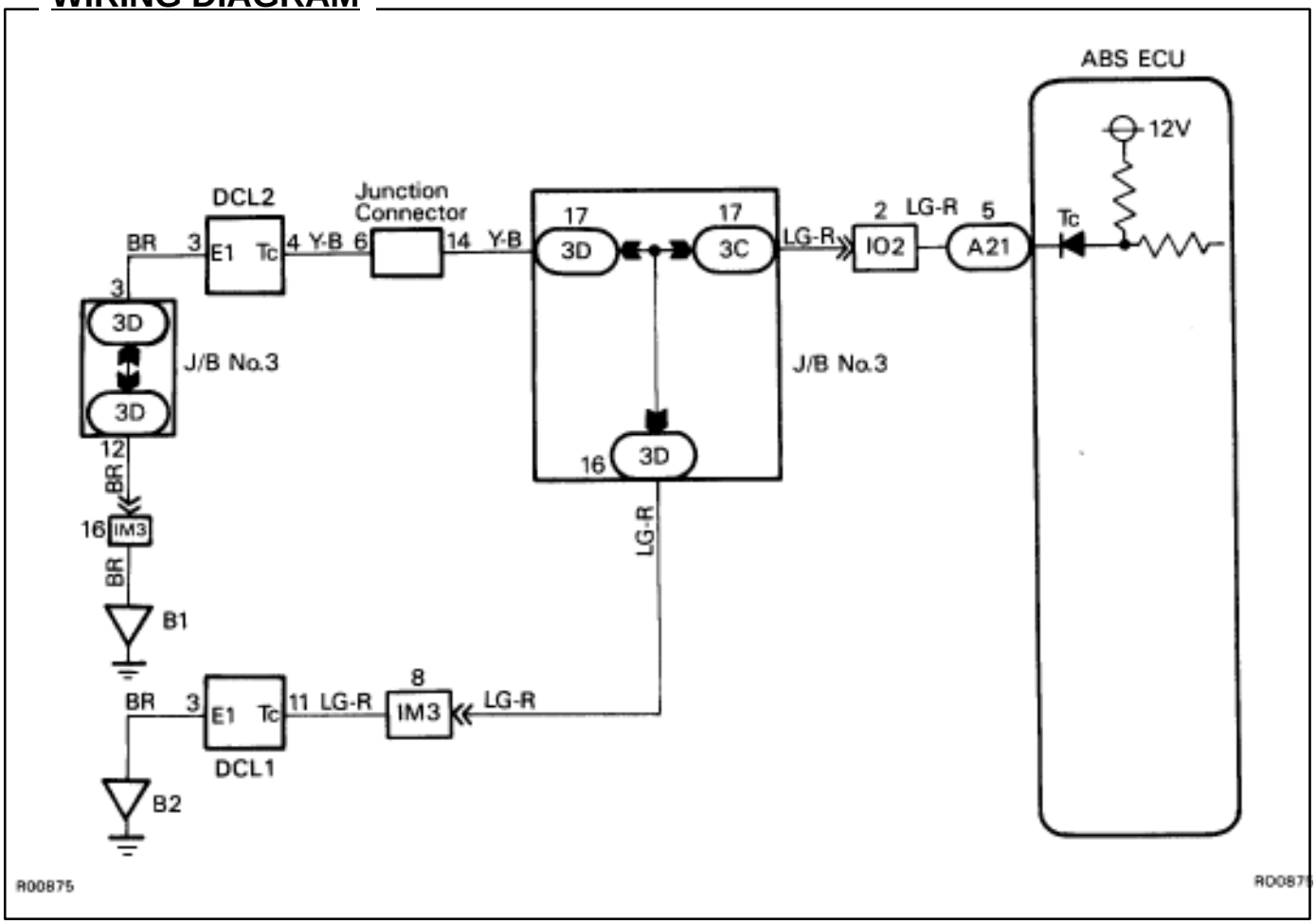
1 Check voltage between terminals Tc and E1 of DCL2 or DCL1.
- OK → If ABS warning light does not blink even after Tc and E1 are connected, the ECU may be defective.*
- NG →

2 Check for open and short in harness and connector between ABS ECM and DCL2 or DCL1, DCL2 or DCL1 and body ground (See page IN–27).
- NG → Repair or replace harness or connector.
- OK →

Check and replace ABS ECU.

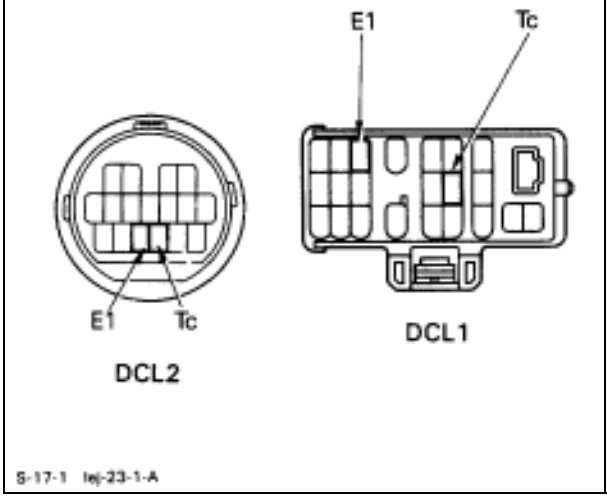
*: Provided that the harness between terminal Tc of DCL2 or DCL1 and terminal Tc of ECU is not open.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals Tc and E1 of DCL2 or DCL1.**



C
1. Turn ignition switch ON.
2. Measure voltage between terminals Tc and E1 of DCL2 or DCL1.

OK **Voltage: 10 – 14 V**

NG

OK **If ABS warning light does not blink even after Tc and E1 are connected, the ECU may be defective.**

2 **Check for open and short in harness and connector between ABS ECU and DCL2 or DCL1, DCL2 or DCL1 and body ground (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

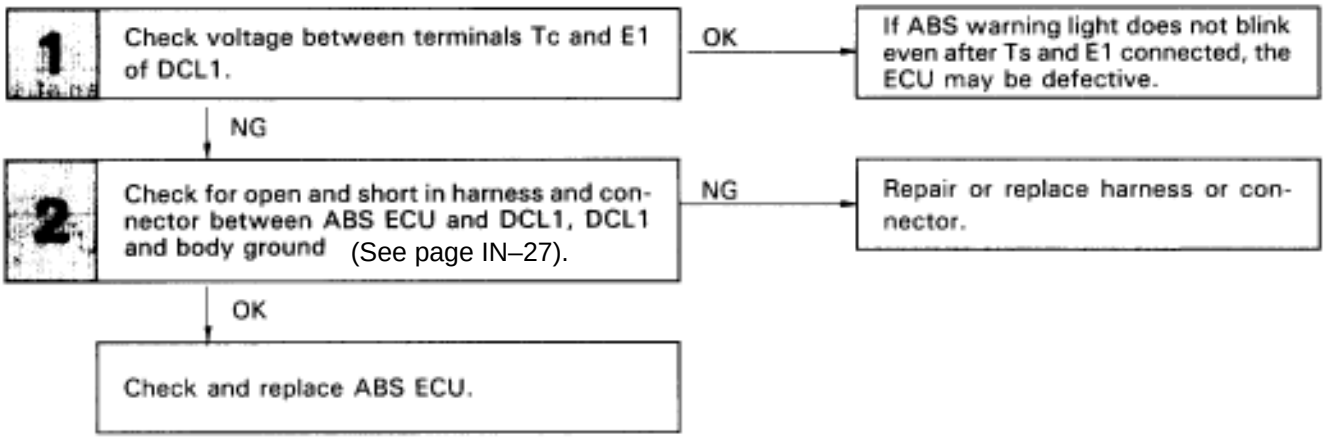
Check and replace ABS ECU.

Ts Terminal Circuit

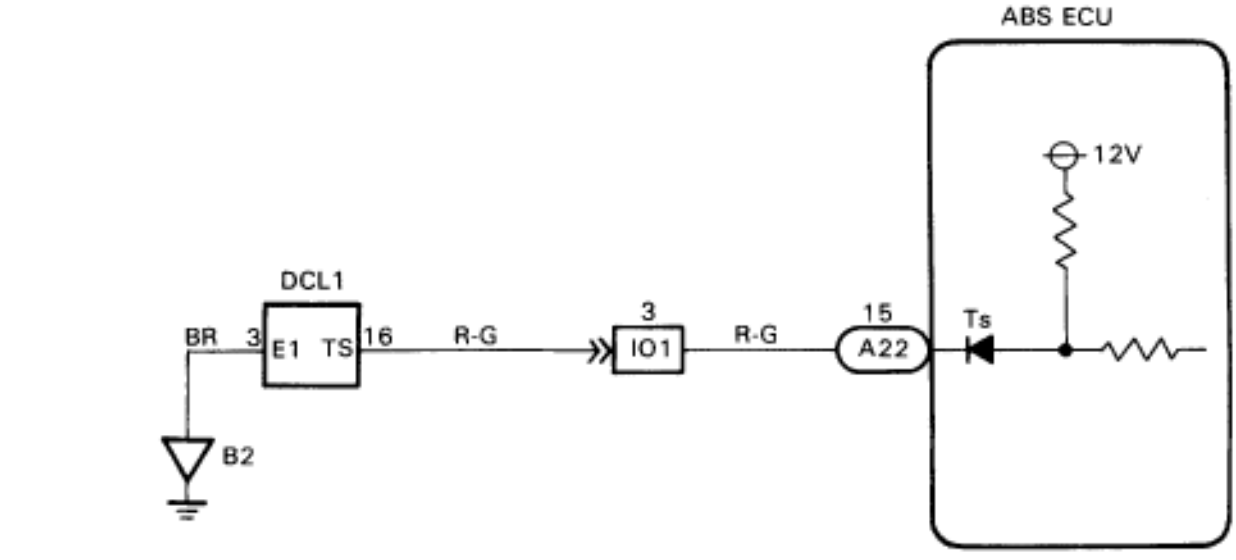
CIRCUIT DESCRIPTION

The sensor check circuit detects abnormalities in the speed sensor signal which can not be detected with the diagnostic trouble code check.
Connecting terminals Tc and E1 of the DCL1 in the engine compartment starts the check.

DIAGNOSTIC CHART

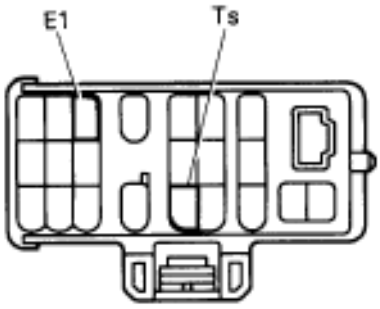


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal Ts and E1 of DCL1.**



DCL1

Inj-23-1-A

C
1. Turn ignition switch ON.
2. Measure voltage between terminal Ts and E1 of DCL1.

OK **Voltage: 10 – 14 V**

NG

OK **If ABS warning light does not blink even after Ts and E1 are connected, the ECU may be defective.**

2 **Check for open and short in harness and connector between ABS ECU and DCL1, DCL1 and body ground (See page IN–27).**

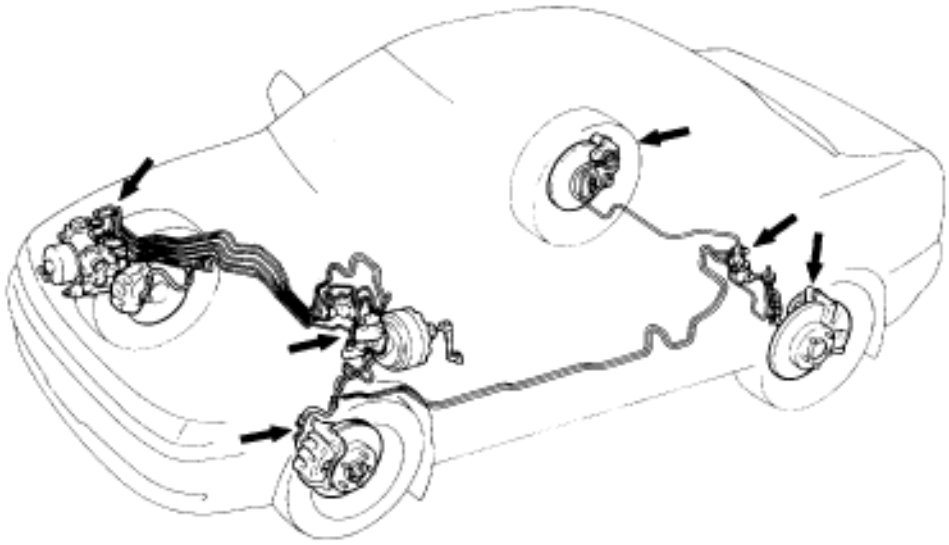
OK

NG **Repair or replace harness or connector.**

Check and replace ABS ECU.

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



R01329

SERVICE SPECIFICATIONS

BR04N–01

SERVICE DATA

Brake pedal height (from asphalt sheet)		147.5–157.5 mm (5.81–6.20 in.)
Brake pedal freeplay		1–6 mm (0.04–0.24 in.)
Brake pedal reserve distance at 490N (50kgf,110.2lbf)		More than 70 mm (2.76 in.)
Brake booster push rod to piston clearance	(w/SST)	0 mm (0 in.)
Front brake pad thickness	STD	11.0 mm (0.433 in.)
Front brake pad thickness	Limit	1.0 mm (0.039 in.)
Front brake disc thickness	STD	28.0 mm (1.102 in.)
Front brake disc thickness	Limit	26.0 mm (1.063 in.)
Front brake disc runout	Limit	0.05 mm (0.0020 in.)
Rear brake pad thickness	STD	10.0 mm (0.394 in.)
Rear brake pad thickness	Limit	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	10.0 mm (0.394 in.)
Rear brake disc thickness	Limit	9.0 mm (0.354 in.)
Rear brake disc runout	Limit	0.15 mm (0.0059 in.)
Rear brake disc inner diameter	STD	170 mm (6.69 in.)
Rear brake disc inner diameter	Limit	171 mm (6.73 in.)
Parking brake lining thickness	STD	2.0 mm (0.079 in.)
Parking brake lining thickness	Limit	1.0 mm (0.039 in.)
Parking brake lever travel 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		0.3mm (0.012 in.) 0.6 mm (0.024 in.) 0.9 mm (0.035 in.)

TORUE SPECIFICATIIONS

BR04P–01

Part tightened	N·m	kgf·cm	ft·lbf
Master cylinder X Reservoir tank	1.7	17.5	15.2 in.·lbf
Piston stopper bolt X Master cylinder	10	100	7
Master cylinder X Brake booster	13	130	9
Brake blister X Clevis lock nut	25	260	19
Brake booster X pedal bracket	13	130	9
Front disc brake torque plate X Steering knuckle	107	1,090	79
Front disc brake cylinder installation bolt	34	350	25
Front disc brake cylinder X Flexible hose union bolt	29	300	21
Brake tube union nut	15	155	11
Bleeder plug	8.3	85	74 in.·lbf
Rear disc brake torque plate X Axle carrier	47	475	34
Rear disc brake cylinder installation bolt	20	200	14
Rear disc brake cylinder main pin installation bolt	27	270	19
Rear disc brake X Flexible hose	29	300	21
LSPV X Body	39	400	29
LSPV adjusting bolt lock nut X Suspension arm	13	130	9
ABS actuator X Actuator bracket	5.4	55	48 in.·lbf
ABS actuator bracket X Body	19	195	14
Front speed sensor installation bolt	7.8	80	69 in.·lbf
Rear speed sensor installation bolt	7.8	80	69 in.·lbf

1993 DEALER MODEL REFERENCE

USA MODEL	V.D.S.	TMC MODEL	SERIAL PREFIX	BODY STYLE	TRANSMISSION
ES 300 SERIES					
9000	VK13T	85921	VCV10L–BTPGKA	4 DOOR SEDAN	4 SPEED AUTOMATIC
9010	VK13T	85921	VCV10L–BTPGKA	4 DOOR SEDAN (CAL)	4 SPEED AUTOMATIC
9001	VK13T	85911	VCV10L–BTMGKA	4 DOOR SEDAN	5 SPEED MANUAL
9011	VK13T	85911	VCV10L–BTMGKA	4 DOOR SEDAN (CAL)	5 SPEED MANUAL
GS 300 SERIES					
9300	JS47E	59921	JZS147L–BEPQFA	4 DOOR SEDAN	4 SPEED AUTOMATIC
9310	JS47E	59921	JZS147L–BEPQFA	4 DOOR SEDAN (CAL)	4 SPEED AUTOMATIC
SC 300 SERIES					
9200	JZ31C	63801	JZZ31L–ACPVFA	2 DOOR COUPE	4 SPEED AUTOMATIC
9210	JZ31C	63801	JZZ31L–ACPVFA	2 DOOR COUPE (CAL)	4 SPEED AUTOMATIC
9201	JZ31C	63781	JZZ31L–ACMVFA	2 DOOR COUPE	5 SPEED MANUAL
9211	JZ31C	63781	JZZ31L–ACMVFA	2 DOOR COUPE (CAL)	5 SPEED MANUAL
SC 400 SERIES					
9220	UZ30C	63721	UZZ30L–ACPZKA	2 DOOR COUPE	4 SPEED AUTOMATIC
9230	UZ30C	63721	UZZ30L–ACPZKA	2 DOOR COUPE (CAL)	4 SPEED AUTOMATIC
LS 400 SERIES					
9100	UF11E	28831	UCF10L–AEPGKA	4 DOOR SEDAN	4 SPEED AUTOMATIC
9110	UF11E	28831	UCF10L–AEPGKA	4 DOOR SEDAN (CAL)	4 SPEED AUTOMATIC

ISSUE DATE: 7/13/92
REVISION DATE: 2/26/93

NOTE:

1) California LS 400 Series model 9110 is ordered by Western Area and Vehicle Services only.
2) California SC 400 Series model 9230 ams SC 300 Series models 9210 and 9211 are ordered by Western Area and Vehicle Services only.
3) California ES 300 Series models 9010 and 9011 are ordered by Western Area and Vehicle Services only.
4) California GS 300 Series model 9310 is ordered by Western Area, Eastern Area (New York State) and Vehicle Services only.

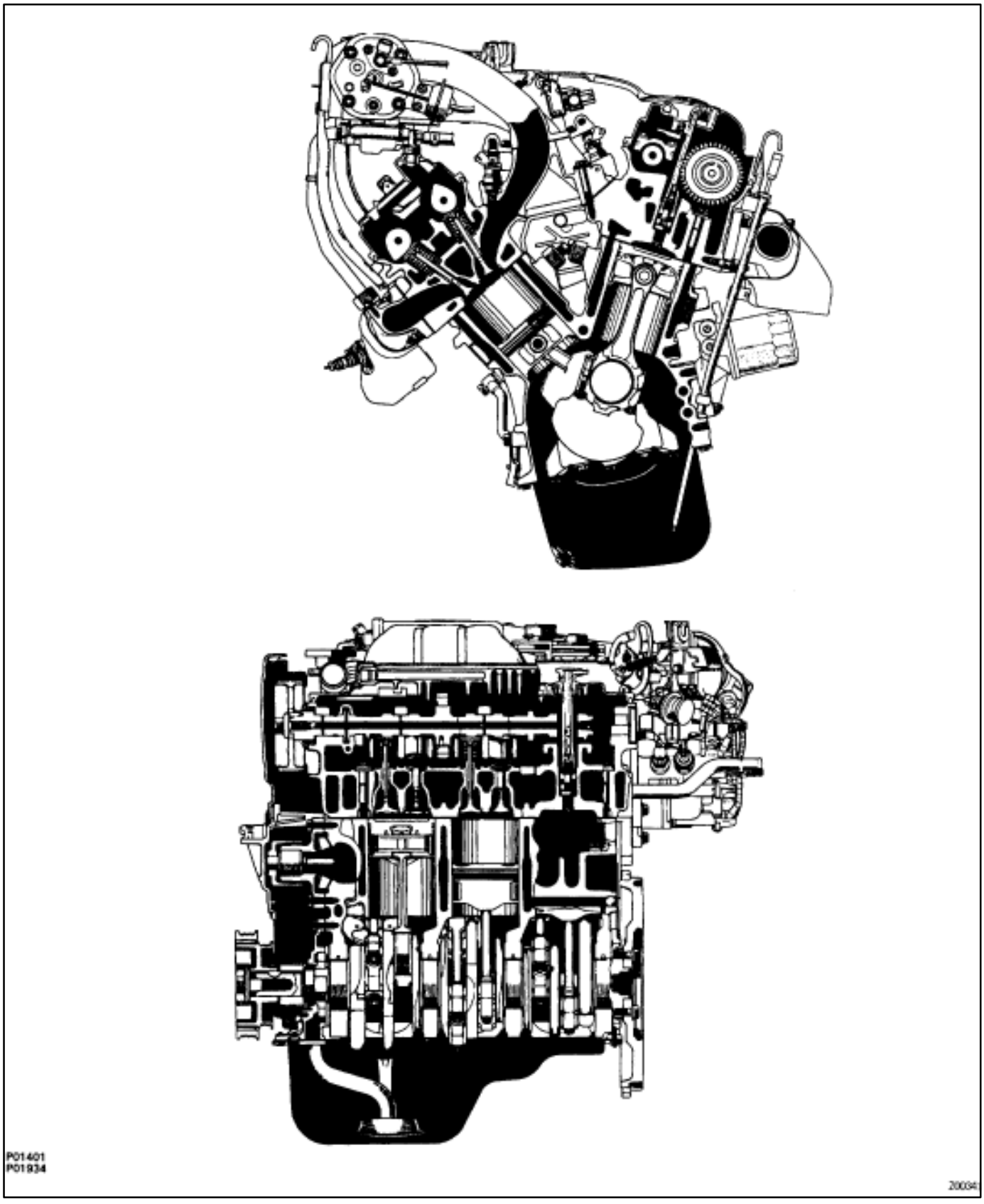
ENGINE

ENGINE MECHANICAL

DESCRIPTION

EG0EF–01

The 3VZ–FE engine is a V–6, 3.0 liter, DOHC 24–valve engine.



P01401
P01934

20034

The 3VZ–FE engine has 6 cylinder in a V arrangement at a bank angle of 60°. From the front of the RH bank cylinders are numbered 1–3–5, and from the front of the LH bank cylinders are numbered 2–4–6. The crankshaft is supported by 4 bearings inside the crankcase. These bearings are made of copper and lead alloy.

The crankshaft is integrated with semi 9 counter weights for balance. Oil holes are placed in the center of the crankshaft for supplying oil to the connecting rods, pistons and other components.

This engine's firing order is 1–2–3–4–5–6. The cylinder head is made of aluminum alloy, with a cross flow type intake and exhaust layout and with pent–roof type combustion chambers. The spark plugs are located in the center of the combustion chambers.

At the front and rear of the intake port of the intake manifold, a water passage has been provided which connects the RH and LH cylinder heads.

Exhaust and intake valves are equipped with irregular pitch springs made of special valve spring carbon steel which are capable of functioning no matter what the engine speed.

The RH and LH intake camshafts are driven by a single timing belt, and a gear on the intake camshaft engages with a gear on the exhaust camshaft to drive it. The camshaft journal is supported at 5 (intake) or 4 (exhaust) places between the valve lifters of each cylinder and on the front end of the cylinder head. Lubrication of the cam journals and gears is accomplished by oil being supplied through the oiler port in the center of the camshaft.

Adjustment of the valve clearance is done by means of an outer shim type system, in which valve adjusting shims are located above the valve lifters. This permits replacement of the shims without removal of the camshafts.

The timing belt cover is composed of the resin type No.2 and No.1 above and below the engine RH mounting bracket.

Pistons are made of high temperature–resistant aluminum alloy, and a depression is built into the piston head to prevent interference with the valves.

Piston pins are the full–floating type, with the pins fastened to neither the piston boss nor the connecting rods. Instead, snap rings are fitted on both ends of the pins, preventing the pins from falling out.

The No.1 compression ring is made of steel and the No.2 compression ring is made of cast iron.

The oil ring is made of a combination of steel and stainless steel. The outer diameter of each piston ring is slightly larger than the diameter of the piston and the flexibility of the rings allows them to hub the cylinder walls when they are mounted on the piston. Compression rings No.1 and No.2 work to prevent gas leakage from the cylinder and the oil ring works to clear oil off the cylinder walls to prevent it from entering the combustion chamber.

The cylinder block is made of cast iron with a bank angle of 60°. It has 6 cylinders which are approximately 1.6 times the length of the piston stroke. The top of the cylinders is closed off by the cylinder heads and the lower end of the cylinders becomes the crankcase, in which the crankshaft is installed. In addition, the cylinder block contains a water jacket, through which engine coolant is pumped to cool the cylinders.

The oil pan is bolted onto the bottom of the cylinder block. The oil pan is an oil reservoir made of pressed steel sheet.

PREPARATION
SST (SPECIAL SERVICE TOOLS)

EG0EG–01

	09011–38121	12 mm Socket Wrench for 12 Pointed Head	Connecting rod bolts
	09201–41020	Valve Stem Oil Seal Replacer	
	09201–70010	Valve Guide Bushing Remover & Replacer	
	09202–70010	Valve Spring Compressor	
	09213–54015	Crankshaft Pulley Holding Tool	
	09213–60017	Crankshaft Pulley & Gear Puller Set	
	(09213–00020)	Body With Bolt	
	(09213–00030)	Handle	
	(09213–00060)	Bolt Set	
	09213–70010	Crancksaft Pulley Holding Tool	
	09223–46011	Crankshaft Front Oil Seal Replacer	
	09223–56010	Crankshaft Rear Oil Seal Replacer	
	09248–55020	Valve Clearance Adjust Tool Set	

	(09248–05011) Valve Lifter Press	
	(09248–05021) Valve Lifter Stopper	
	09249–63010 Torque Wrench Adaptor	
	09278–54012 Drive Shaft Holding Tool	Camshaft timing pulley
	09309–37010 Transmission Bearing Replacer	Crankshaft front oil seal
	09330–00021 Companion Flange Holding Tool	Crankshaft pulley
	09550–10012 Replacer Set "B"	
	(09552–10010) No. 2 Replacer Handle	Spark plug tube gasket
	(09558–10010) Rear Axle Shaft Oil Seal Replacer	Spark plug tube gasket
	09631–22020 Power Steering Hose Nut 14 x 17 mm Wrench Set	
	09816–30010 Oil Pressure Switch Socket	Knock sensor

RECOMMENDED TOOLS

EG0EH–01

	09090–04010	Engine Sling Device	For suspending engine
	09200–00010	Engine Adjust Kit	
	09258–00030	Hose Plug Set	Plug for the vacuum hose, fuel hose etc.
	09904–00010	Expander Set	

EQUIPMENT

EG0EJ–01

Battery specific gravity gauge	
Caliper gauge	
CO/HC meter	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune–up tester	
Heater	
Soft brush	
Micrometer	
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Magnetic finger	
Spring tester	Valve spring

Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
Vernier calipers	

SSM (SERVICE SPECIAL MATERIALS)

EG0EK–01

08826–00080	Seal packing or equivalent	Camshaft bearing cap Cylinder head cover rear oil seat retainer
08826–00100	Seal Packing 1282B, Three Bond 1282B or equivalent	Water by–pass pipe
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Flywheel or drive plate bolt
08833–00080	Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	No.1 idler pulley bolt

TROUBLESHOOTING

EG0EL–01

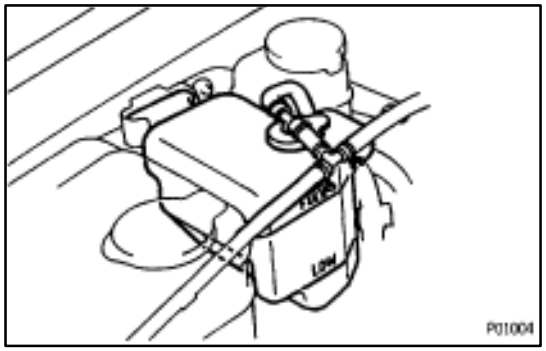
When the malfunction code is not confirmed in the diagnostic trouble code check and the problem still cannot be confirmed in the basic inspection, then proceed to this step and perform troubleshooting according to the numbers in the order given in the table below.

	See page	IG section	IG section	EG–228	EG–224	–	EG–230	EG–200	EG–203	–	–	–	–	EG–170	EG–183	EG–160	EG–186	EG–179 EG–223
	Suspect area / Symptom	RPM Signal Circuit	Ignition Circuit	Main Oxygen Sensor Circuit	Engine Coolant Temp. Sensor Circuit	Intake Air Temp. Sensor Circuit	Sub-Oxygen Sensor Circuit	Volume Air Flow Meter Circuit	Throttle Position Sensor Circuit	STA Signal Circuit	Knock Sensor Circuit	PNP Signal Circuit	A/C Signal Circuit	Fuel Pump	Fuel Pressure Regulator	Fuel Lines	Injectors	Cold Start System
Dose not start	Engine does not crank																	
	Starter runs - engine does not crank																	
	No initial combusion	12	2					5						6				13
	No complete combusion				4			1							3		9	10
Difficult to start	Engine cranks slowly												2					
	Difficult to start ordinaly	12	13		4	14								7	6	8	16	17
	Difficult to start in clod				1	6				2				8	7	9	10	5
	Difficult to start in hot				1	5								8	7	9	10	6
Poor idling	Incorrect first idle				3													
	High engine idle speed				3	5			6			8	7				9	10
	Low engine idle speed				1			4									5	
	Rough idling		18		2			12						7	6	8	16	17
	Misfire		4		6			8									9	10
Poor drivability	Hesitation Poor acceleration			12	10	11		9	8					14	13	15	18	19
	Backfire			6	3	7		5	4					9	8	10	11	
	Muffler explosion (after fire)			8	3	7		5	6						4		9	10
	Serging														1		4	
	Knocking										1							
Engine stall	Engine stall soon after starting				8			7						3	2	4	9	10
	After acceleration pedal depressed							1	3						5	6	7	
	After acceleration pedal released							3										
	During A/C operation												1					
	When N to D shift											1						
Others	Poor fuel economy			21	16	22	23	18	17			19	20				14	15
	Engine overheat										10							
	Engine overcool																	
	Excessive oil consumption																	
	Low oil pressure																	
	High oil pressure																	
	Starter keeps running																	
	Battery often discharge																	

HINT: When inspecting a wire harness or circuit, the electrical wiring diagrams at the end of repair manual should be referred to and the circuits of related systems also should be checked.

–	EG–263	EG–203	–	EG–27	EG–13	EG–24	EG–29	EG–246	EG–62	EG–294	EG–101	EG–101	EG–47	EG–109	–	EG–253	EG–253	EG–250	CH section	–	EG–290	CH section	EG–86
Brakes drag even When released	Cooling Fan System	Dash Pot	Clutch	Compression	Valve Clearance	Valve Timing	Timing Belt	Water Pump	Valve Stem Guide Bushing	Oil Pump	Connecting Rod Bearing	Crankshaft Bearing	Cylinder Head	Piston Ring	Flywheel or Drive Plate	Radiator and Radiator Cap	Water Outlet Cap	Thermostat	Drive Belt	Engine Coolant Temp. Sender Gauge	Oil Pressure Switch	Generator	Cylinder Block
															2								
				9		10	11																
				5		7	8							6									
											3	4											
				9		11								10									
		2																					
		2																					
				10	13	14	15						20	11									
				7																			
2			1	7	16	17																	
						2																	
						2																	
	8					5		10								6	7	9					
6		4	5	11		13								12									
	2					8	6	7		11			12			3	4	5		14			13
	1																	2		3			
				3					2				5	4									6
										2	3	4									5		
										1											2		
																			1			2	

	See page	EG–210	EG–220	EG–221	EG–236	EG–225	EG–231	-	-	-	-	ST section	-	ST section	IG section	IG section	EG–151	-
	Suspect area / Symptom	Idle Air Control Valve	SFI Main Relay	Circuit Opening Relay	Fuel Cut System	Fuel Pressure Control System	Engine control module (ECM)	Fuel Quality	Fuel Leakage	Coolant Leakage	Oil Leakage	Starter Relay	Park/Neutral position SW or Clutch Start SW	Starter	Spark Plug	Distributor	EGR System	Accelerator Pedal Link
Does not start	Engine does not crank											1	3	2				
	Starter runs - engine does not crank													1				
	No initial combusion	8	3	4			14	7								1		
	No complete combusion	2					11											
Difficult to start	Engine cranks slowly													1				
	Difficult to start ordinaly	3					18	1							2	15	5	
	Difficult to start in cold	4					11	3										
	Difficult to start in hot	3				4	11	2										
Poor idling	Incorrect first idle	4					5											1
	High engine idle speed	4					11											1
	Low engine idle speed	2					6										3	
	Rough idling	9					19	1							4	5	3	
	Misfire						11	1							3	5	2	
Poor drivability	Hesitation Poor acceleration						20	3							5	6	4	
	Backfire						12										1	
	Muffler explosion (after fire)				1		11											
	Serging						5								2	3		
	Knocking						11	2							3		4	
Engine stall	Engine stall soon after starting	6					11	1									5	
	After acceleration pedal depressed						8								4		2	
	After acceleration pedal released	1					4										2	
	During A/C operation	2					3											
	When N to D shift	2					3											
Others	Poor fuel economy				8		24	2	1						9	10	7	3
	Engine overheat									1					9			
	Engine overcool																	
	Excessive oil consumption										1							
	Low oil pressure										1							
	High oil pressure																	
	Starter keeps running											1		2				
	Battery often discharge																	



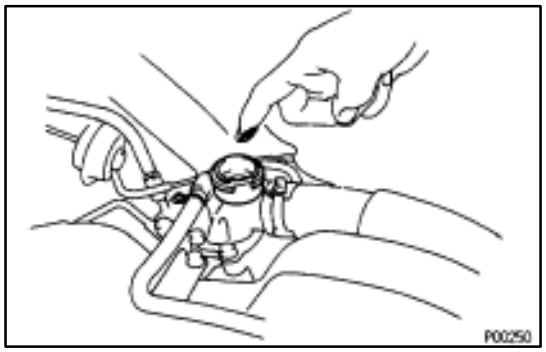
TUNE–UP
ENGINE COOLANT INSPECTION

EG0EM–01

1. CHECK ENGINE COOLANT LEVEL AT RESERVOIR TANK

The engine coolant level should be between the ”LOW” and ”FULL” lines at low temperature.

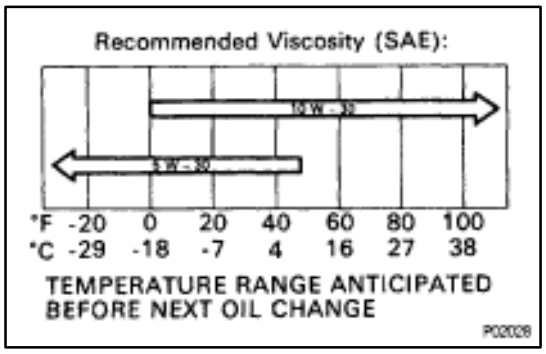
If low, check for leaks and add engine coolant up to the ”FULL” line.



2. CHECK ENGINE COOLANT QUALITY

There should be no excessive deposits of rust or scales around the radiator cap (water outlet side) or water outlet filter hole, and the engine coolant should be free from oil.

If excessively dirty, replace the engine coolant.



ENGINE OIL INSPECTION

EG0EN–02

1. CHECK OIL QUALITY

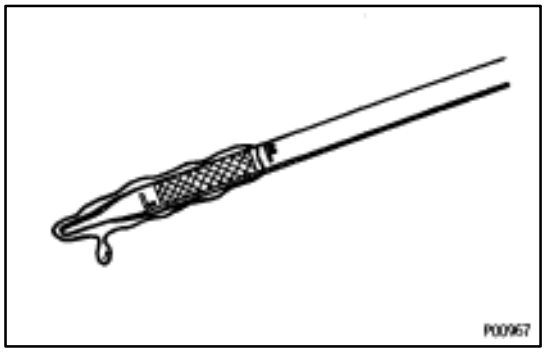
Check the oil for deterioration, entry of water discoloring or thinning.

If oil quality is poor, replace it.

Oil grade:

API grade SG Energy–Conserving II multigrade engine oil.

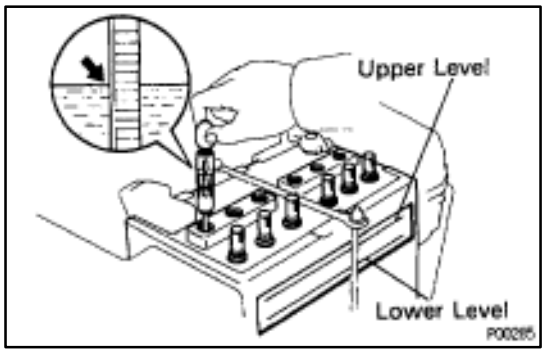
Recommended viscosity is as shown.



2. CHECK ENGINE OIL LEVEL

The oil level should be between the ”L” and ”F” marks on the dipstick.

If low, check for leakage and add oil up to the ”F” mark.



BATTERY INSPECTION

EG0EP–01

1. CHECK BATTERY SPECIFIC GRAVITY AND ELECTROLYTE LEVEL

(a) Check the electrolyte level of each cell.
If insufficient, refill with distilled (or purified) water.

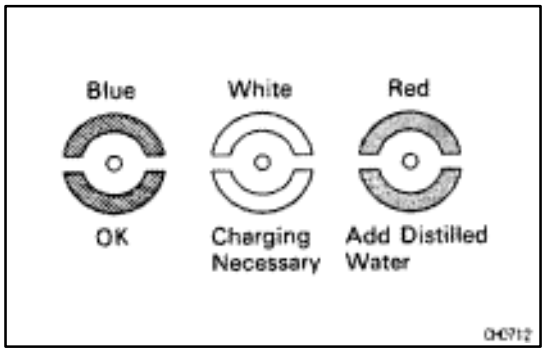
(b) Check the specific gravity of each cell.

Standard specific gravity at 20°C (68°F):

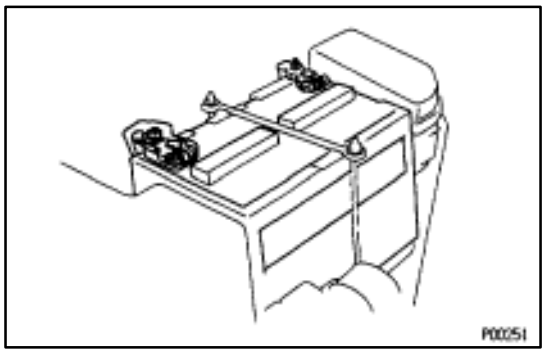
1.25–1.27 (55D23L Battery)

1.27–1.29 (80D26L Battery)

If not within specifications, charge the battery.



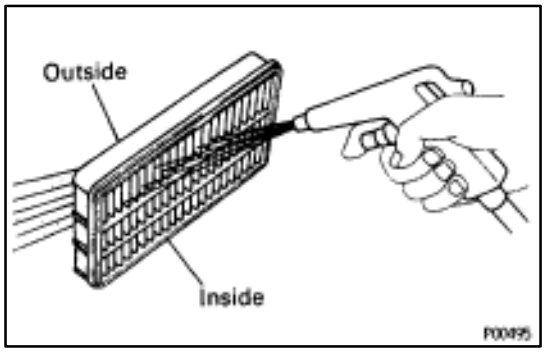
HINT: Check the indicator as shown.



2. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

(a) Check that the battery terminals are not loose or corroded.

(b) Check the fusible link and fuses for continuity.



AIR FILTER INSPECTION

EG0EQ–01

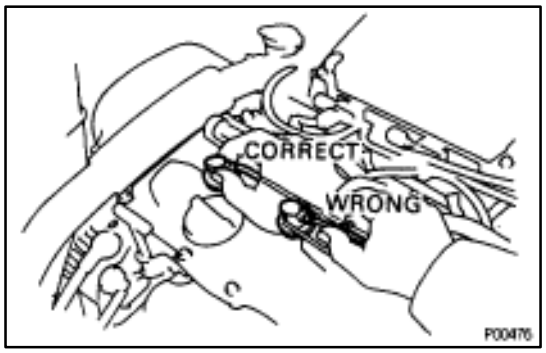
1. INSPECT AIR FILTER

Visually check that the air filter is not excessively dirty, damaged or oily.

2. CLEAN AIR FILTER

Clean the air filter with compressed air.

First blow air from the upper thoroughly. Then blow off the lower of the air filter.



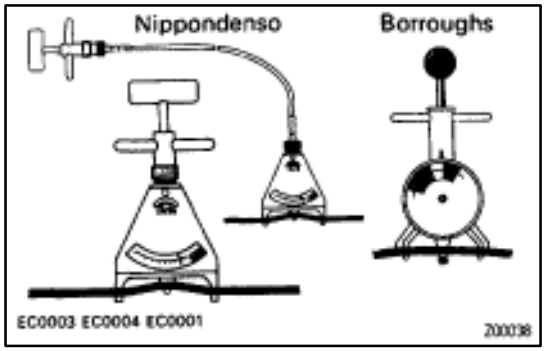
HIGH–TENSION CORDS INSPECTION

EG0ER–01

(See IG section)

Maximum resistance:

25 kΩ per cord



GENERATOR DRIVE BELT INSPECTION

EG0ES–01

(See CH section)

Drive belt tension:

New belt

175 ± 5 lbf

Use belt

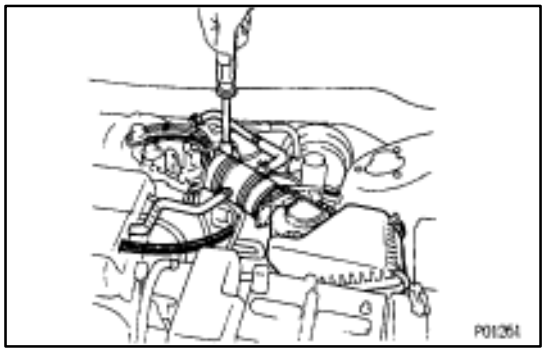
115 ± 20 lbf

VALVE CLEARANCE INSPECTION AND ADJUSTMENT

EG0ET–02

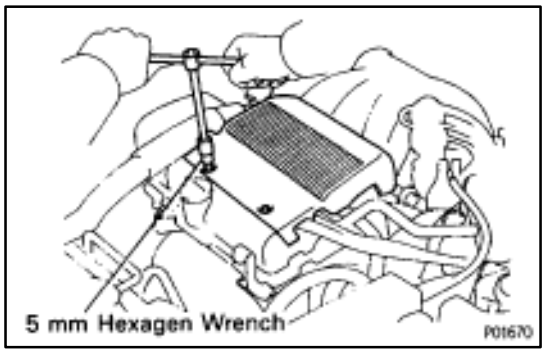
HINT: Inspect and adjust the valve clearance when the engine is cold.

1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT**
3. **DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE**
4. **(A/T)**
   DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

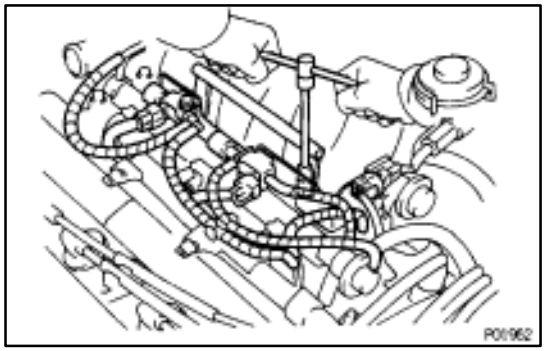


5. **REMOVE AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE**

(a) Disconnect the volume air flow meter
(b) Disconnect the coil cord clamp.
(c) Disconnect the air hoses.
(d) Loosen the air cleaner hose clamp bolt.
(e) Disconnect the air cleaner cap clips.
(f) Remove the air cleaner cap and volume air flow meter together with the air cleaner hose.

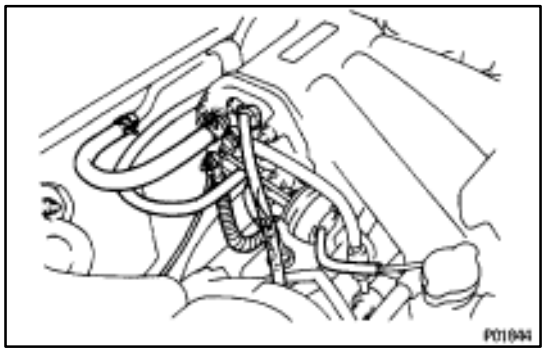


6. **REMOVE V–BANK COVER**
   Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.



7. REMOVE EMISSION CONTROL VALVE SET

(a) (Calif. only)
Disconnect the EGR gas temp. sensor connector clamp from the emission control valve set.
(b) Disconnect the two vacuum hoses of the fuel pressure control VSV.
(c) Disconnect the two vacuum hoses of the IACV VSV.
(d) Disconnect the two VSV connectors.
(e) Remove the two bolts and emission control valve set.



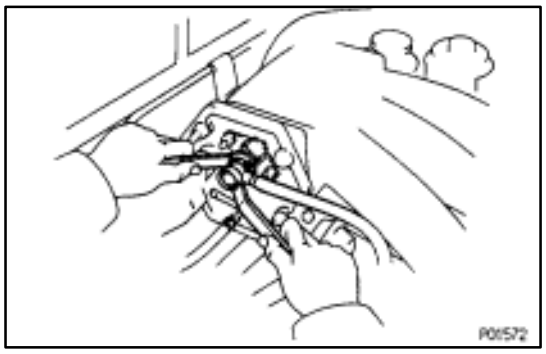
8. DISCONNECT HOSES

(a) Brake booster vacuum hose
(b) PS air hose
(c) PCV hose
(d) IACV vacuum hose

9. DISCONNECT GROUND STRAPS

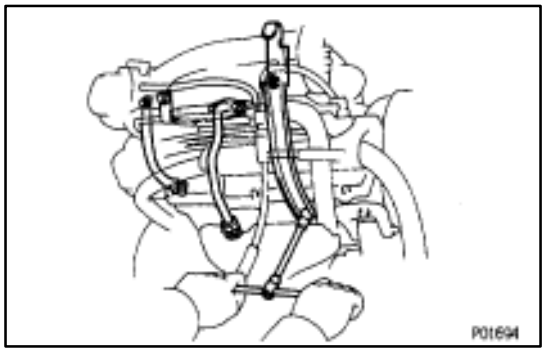
Remove the nut and disconnect the two ground straps.

10. DISCONNECT COLD START INJECTOR CONNECTOR



11. DISCONNECT COLD START INJECTOR PIPE (No.2 FUEL PIPE)

(a) Put a suitable container or shop towel under the injector pipe.
(b) Remove the union bolt and two gaskets, and disconnect the injector pipe.
HINT: Slowly loosen the union bolt.



12. REMOVE NO.1 ENGINE HANGER AND AIR INTAKE CHAMBER STAY

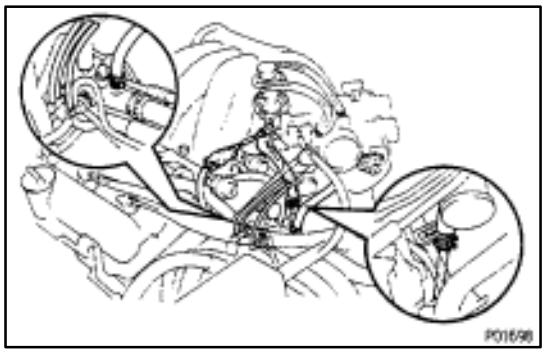
(a) Remove the two bolts and No.1 engine hanger.
(b) Remove the two bolts and air intake chamber stay.

13. REMOVE EGR PIPE

(a) Loosen the union nut.
(b) Remove the two bolts and EGR pipe.

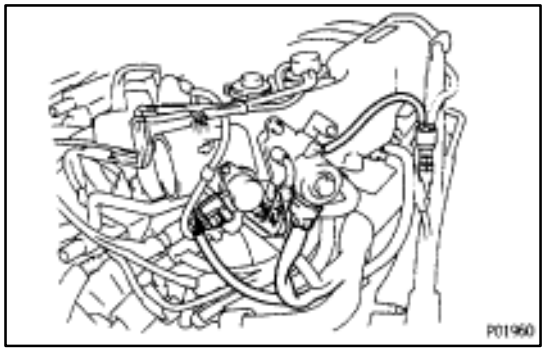
14. DISCONNECT HYDRAULIC MOTOR PRESSURE PIPE

Remove the bolt and disconnect the hydraulic pressure pipe from the air intake chamber.

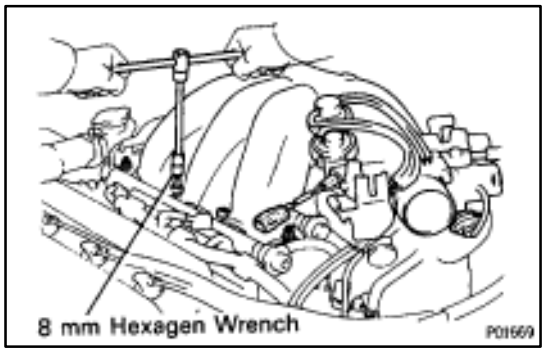


15. REMOVE AIR INTAKE CHAMBER

(a) Disconnect the three emission control vacuum hoses.
(b) Disconnect the two water by–pass hoses.
(c) (Calif. only)
Disconnect the EGR gas temp. sensor connector.

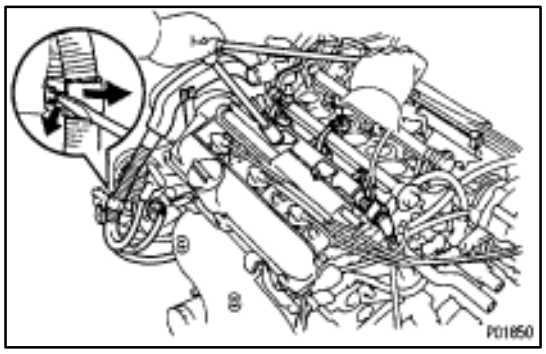


(d) Disconnect the throttle position sensor connector.
(e) Disconnect the IAC valve connector.
(f) Disconnect the IAC valve air hose.
(g) Disconnect the PS air hose.



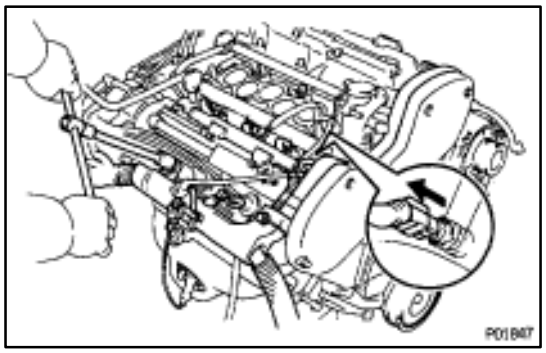
(h) Using 8 mm hexagon wrench, remove the two bolts, nuts air intake chamber and gasket.

16. DISCONNECT LH ENGINE WIRE HARNESS



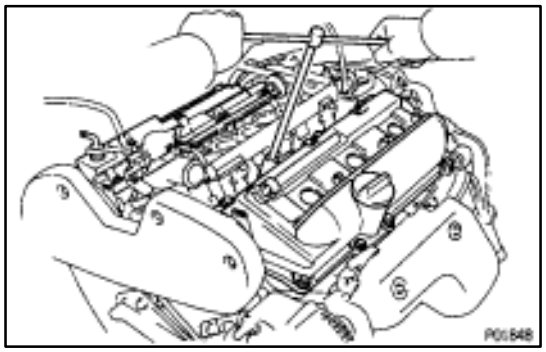
(a) Disconnect the following connectors:
  (1) Three injector connectors
  (2) Engine oil level sensor connector
  (3) Oil pressure switch connector
  (4) A/C compressor connector
  (5) Generator connector and wire
  (6) Engine Coolant temp.sensor connector (for hydraulic cooling fan)
(b) Remove the two bolts, and disconnect the five clamps and LH engine wire harness.

17. DISCONNECT RH ENGINE WIRE HARNESS



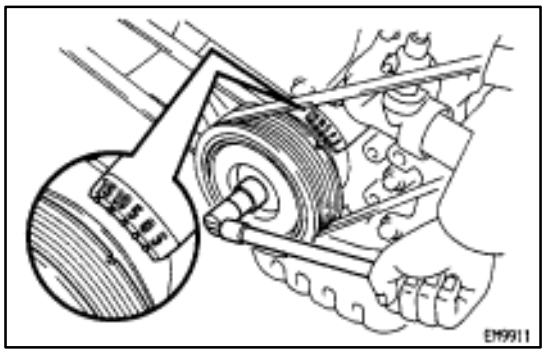
(a) Disconnect the following connectors:
  (1) Three injector connectors
  (2) Engine coolant temperature sender gauge connector
  (3) Oxygen sensor connector
  (4) PS pump connector
(b) Remove the two bolts, and disconnect the two clamps and RH engine wire harness.

18. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS



19. REMOVE CYLINDER HEAD COVERS

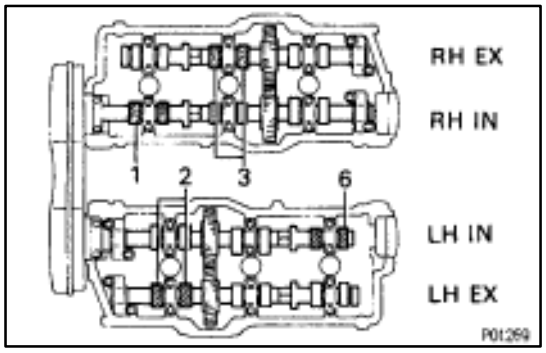
Remove the six nuts, seal washers, cylinder head cover and gasket. Remove the two cylinder head covers.



20. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley, and align its groove with the timing mark ”0” of the No.1 timing belt cover.

(b) Check that the valve lifters on the No.1 (IN) are loose and valve lifters on the on the No.1 (EX) are tight.
If not, turn the crankshaft one revolution (360°) and align the mark as above.



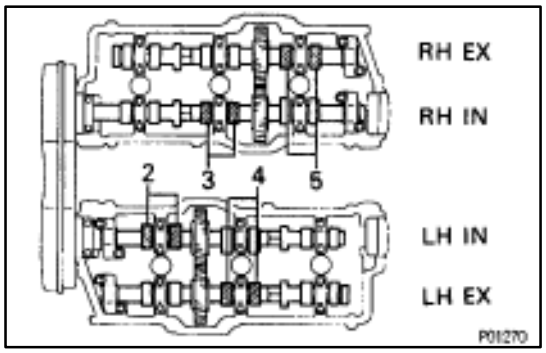
21. ADJUST VALVE CLEARANCE

(a) Check only those valves indicated in the illustration.
- Using a thickness gauge, measure the clearance between the valve lifter and camshaft.
- Record out of specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

Intake

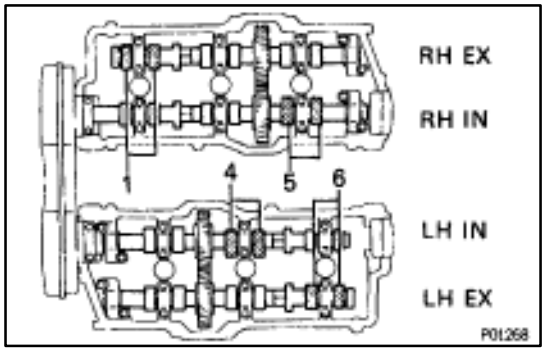
0.13–0.23 mm (0.005–0.009 in.)



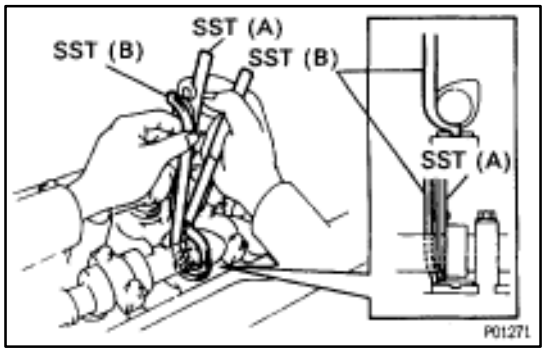
Exhaust

0.27–0.37 mm (0.011–0.015 in.)

(b) Turn the crankshaft 2/3 of a revolution (2405), and check only the valves indicated in the illustration.
Measure the valve clearance.
(See procedure step (a))



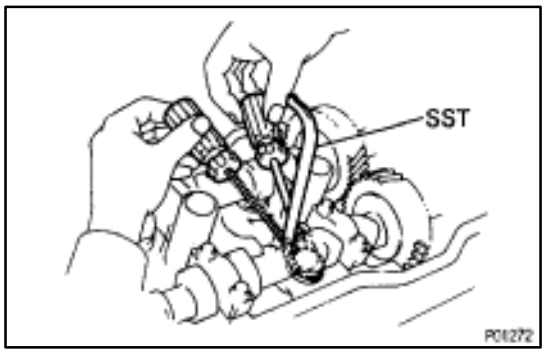
(c) Turn the crankshaft further 2/3 of a revolution (2405), and check only the valves indicated in the illustration.
Measure the valve clearance.
(See procedure step (a))

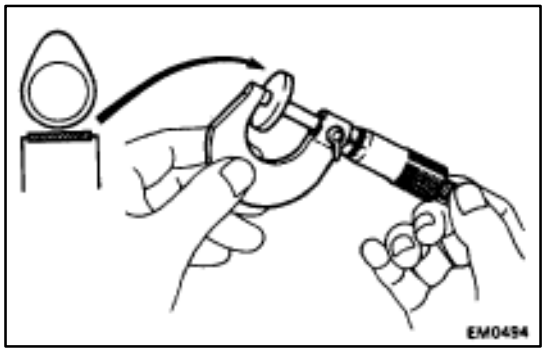


(d) Remove the adjusting shim.
- Turn the crankshaft so that the cam lobe for the valve to be adusted faces up.
- Press down the valve lifter with SST (A), and place SST (B) between the camshaft and valve lifter. Remove SST (A).

SST 09248–55020(09248–05011, 09248–05021)
HINT: Before pressing down the valve lifter, position the notch toward the spark plug.

- Remove the adjusting shim with a small screwdriver and magnetic finger.





(e) Determine the replacement adjusting shim size by following the Formula or Charts:
- Using a micrometer, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so that the valve clearance comes within specified value.

T ___ Thickness of used shim
A ___ Measured valve clearance
N ___ Thickness of new shim

Intake:

N = T + (A–0.18 mm (0.007 in.))

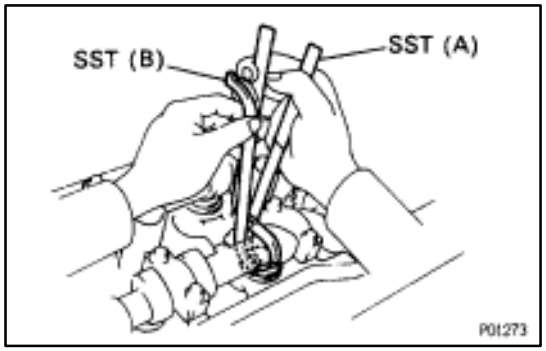
Exhaust:

N = T + (A–0.32 mm (0.013 in.))

- Select a new shim with a thickness as close as possible to the calculated values.

HINT: Shims are available in seventeen sizes in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).

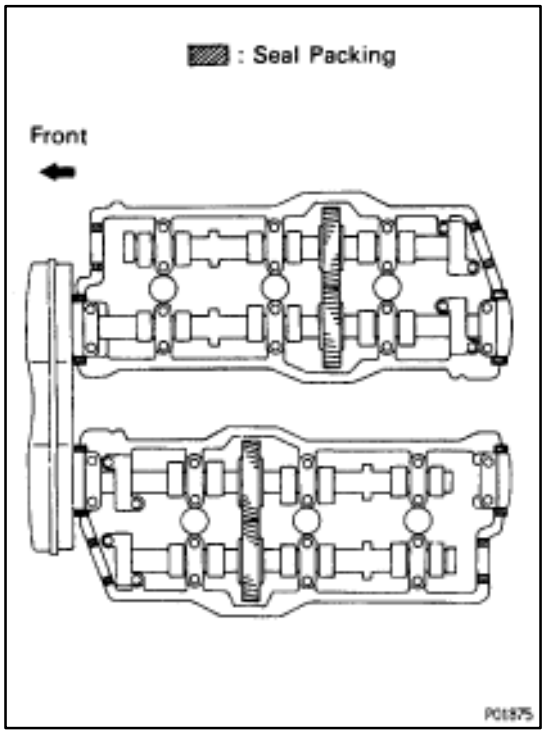
(f) Install a new adjusting shim.



•Place a new adjusting shim on the valve lifter.
•Press down the valve lifter with SST (A), and remove SST (B).

SST 09248–55020(09248–05011, 09248–05021)

(g) Recheck the valve clearance.

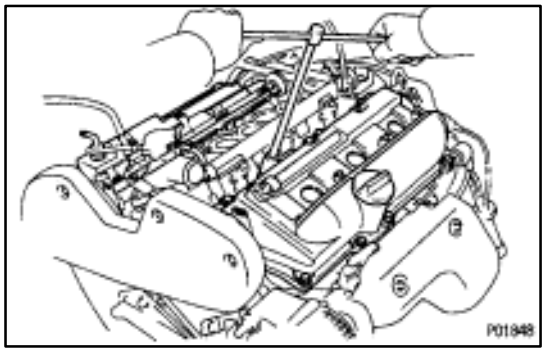


22. REINSTALL CYLINDER HEAD COVERS

(a) Apply seal packing to the cylinder heads as shown in the illustration.

Seal packing:

Part No.08826–00080 or equivalent

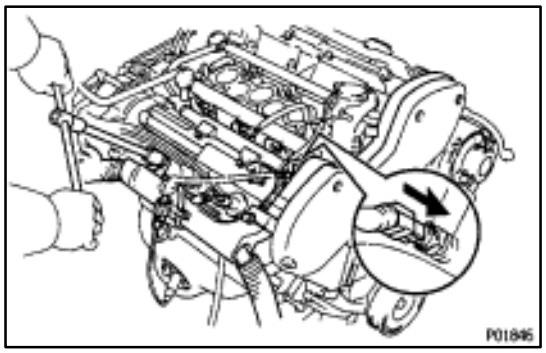


(b) Install the gasket to the cylinder head cover.

(c) Install the cylinder head cover with the six seal washers and nuts. Uniformly tighten the nuts in several passes. Install the two cylinder head covers.

Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

23. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS

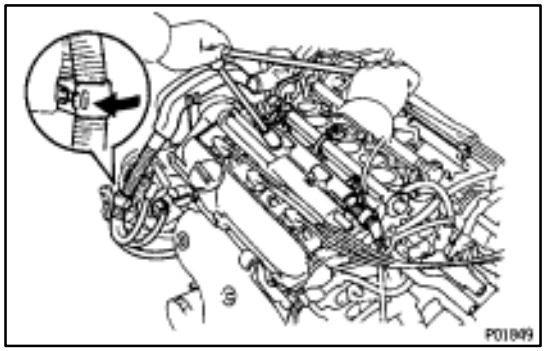


24. RECONNECT RH ENGINE WIRE HARNESS

(a) Connect the two clamps of the RH engine wire harness and install the wire harness with the two bolts.

(b) Connect the following connectors:

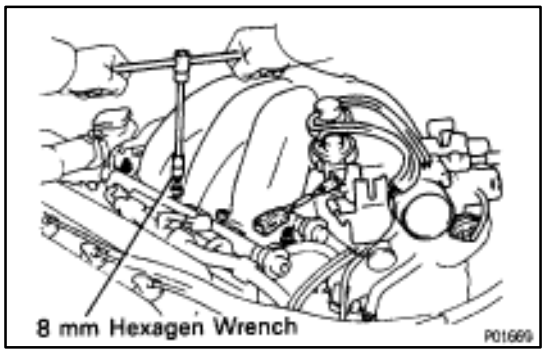
(1) Three injector connectors
(2) Engine coolant temperature sender gauge connector
(3) Oxygen sensor connector
(4) PS pump connector



25. RECONNECT LH ENGINE WIRE HARNESS

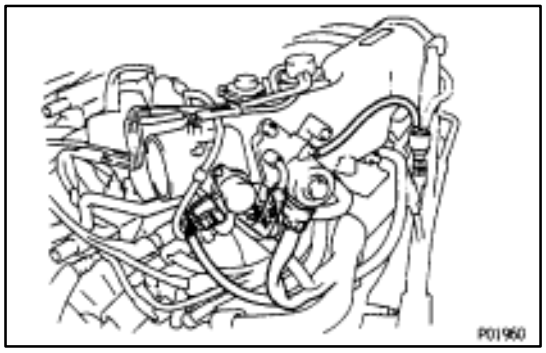
(a) Connect the three clamps of the LH engine wire harness and install the wire harness with the two bolts.

(b) Connect the following connectors:
- (1) Three injector connectors
- (2) Engine oil level sensor connector
- (3) Oil pressure switch connector
- (4) A/C compressor and wire
- (5) Generator connector and wire
- (6) Engine coolant temp. sensor connector (for hydraulic cooling fan)



26. REINSTALL AIR INTAKE CHAMBER

(a) Using 8 mm hexagon wrench, install a new gasket and the air intake chamber with the two bolts and nuts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

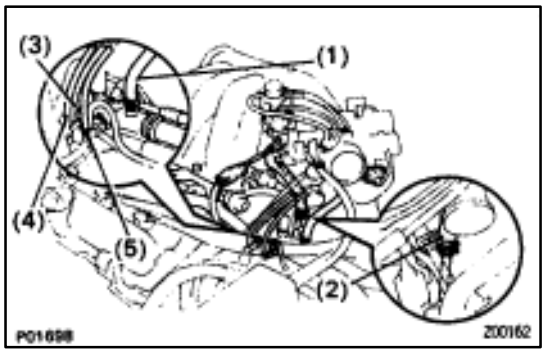


(b) Connect the throttle position sensor connector.

(c) Connect the IAC valve connector.

(d) Connect the IAC valve air hose.

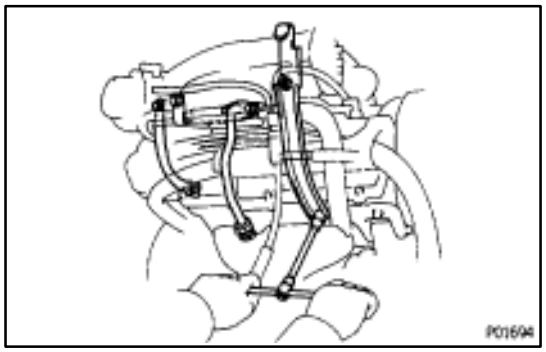
(e) Connect PS air hose.



(f) (Calif. only)
Connect the EGR gas temp. sensor connector.

(g) Connect the following hoses:
- (1) Water by–pass hose to throttle body
- (2) Water by–pass hose to EGR cooler
- (3) Vacuum hose (from EGR valve) to TVV (for EGR)
- (4) Vacuum hose (from EGR vacuum modulator) to TVV (for EGR)

(5) Vacuum hose (from throttle body) to TVV (for EVAP)



27. RECONNECT HYDRAULIC MOTOR PRESSURE PIPE

Connect the hydraulic pressure pipe to the air intake chamber with the bolt.

28. REINSTALL EGR PIPE

Install a new gasket, sleeve ball and the EGR pipe with the two bolts and union nut.

Bolt

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

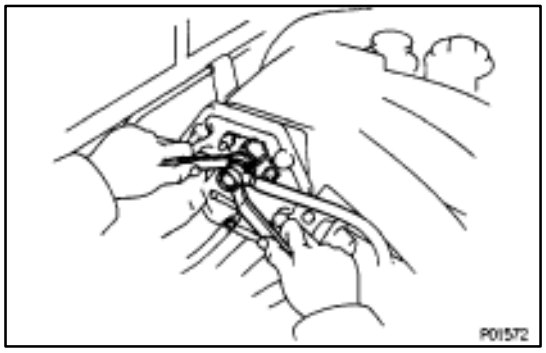
Union nut

Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

29. REINSTALL NO. 1 ENGINE HANGER AND AIR INTAKE CHAMBER STAY

(a) Install the air intake chamber stay with the two bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Install the No.1 engine hanger with the two bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

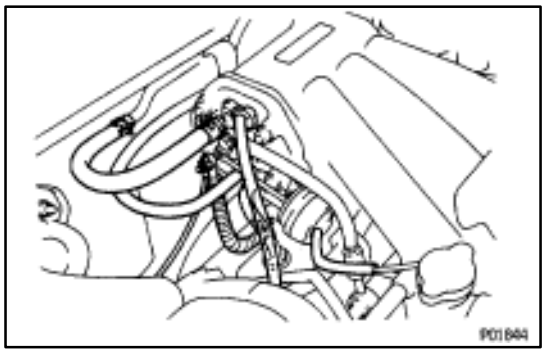


30. RECONNECT COLD START INJECTOR PIPE (NO.2 FUEL PIPE)

Connect the injector pipe with the two new gaskets and union bolt.

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

31. RECONNECT COLD START INJECTOR CONNECTOR



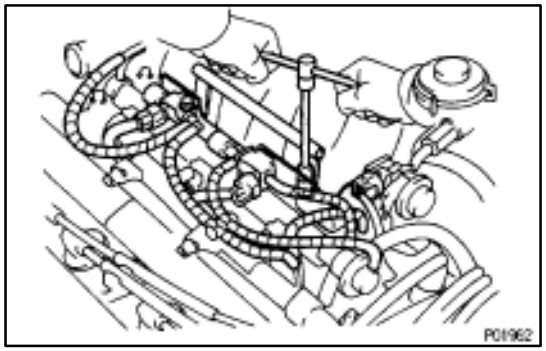
32. RECONNECT GROUND STRAPS

Connect the two ground straps with the nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

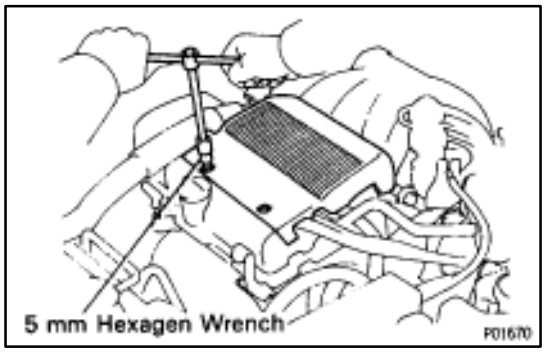
33. RECONNECT HOSES

(a) Brake booster vacuum hose
(b) PS air hose
(c) PCV hose
(d) IACV vacuum hose



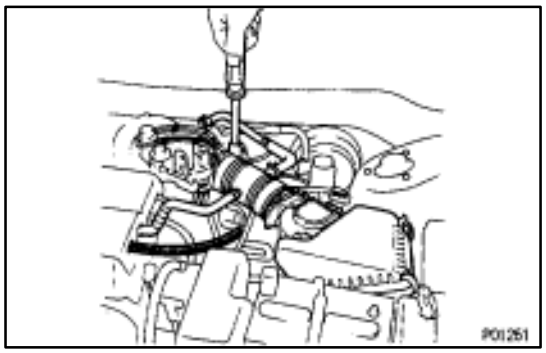
34. REINSTALL EMISSION CONTROL VALVE SET

(a) Install the emission control valve set with the two bolts.
(b) Connect the two VSV connectors.
(c) Connect the two vacuum hoses of the IACV VSV.
(d) Connect the two vacuum hoses of the fuel pressure control VSV.
(e) (Calif. only)
Connect the EGR gas temp. sensor connector clamp to the emission control valve set.



35. REINSTALL V–BANK COVER

Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.



36. INSTALL AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

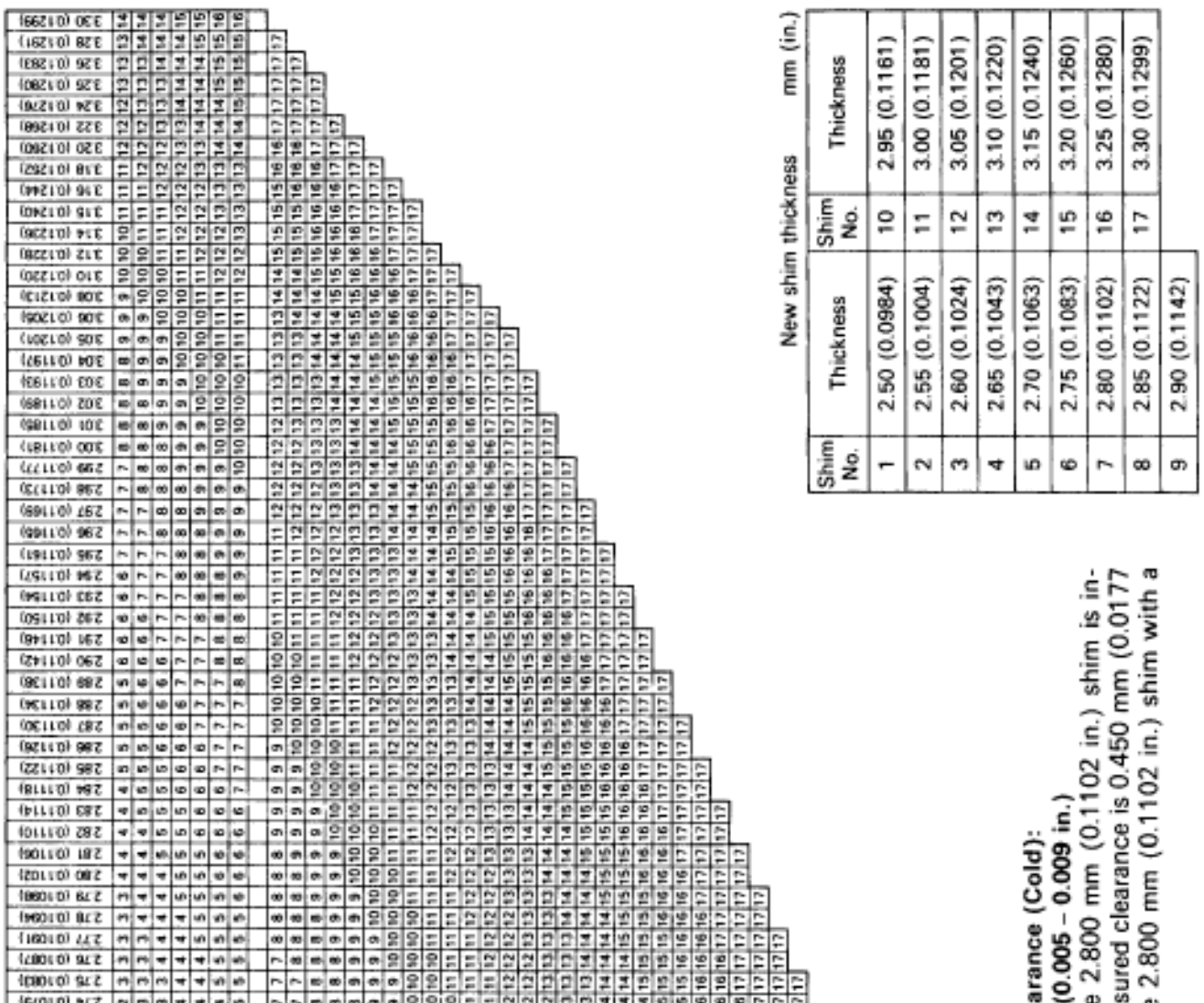
(a) Connect the air cleaner hose, and install the air cleaner cap and volume air flow meter with the four clips.
(b) Tighten the air cleaner hose clamp bolt.
(c) Connect the air hoses.
(d) Connect the coil cord clamp.
(e) Connect the volume air flow meter connector.

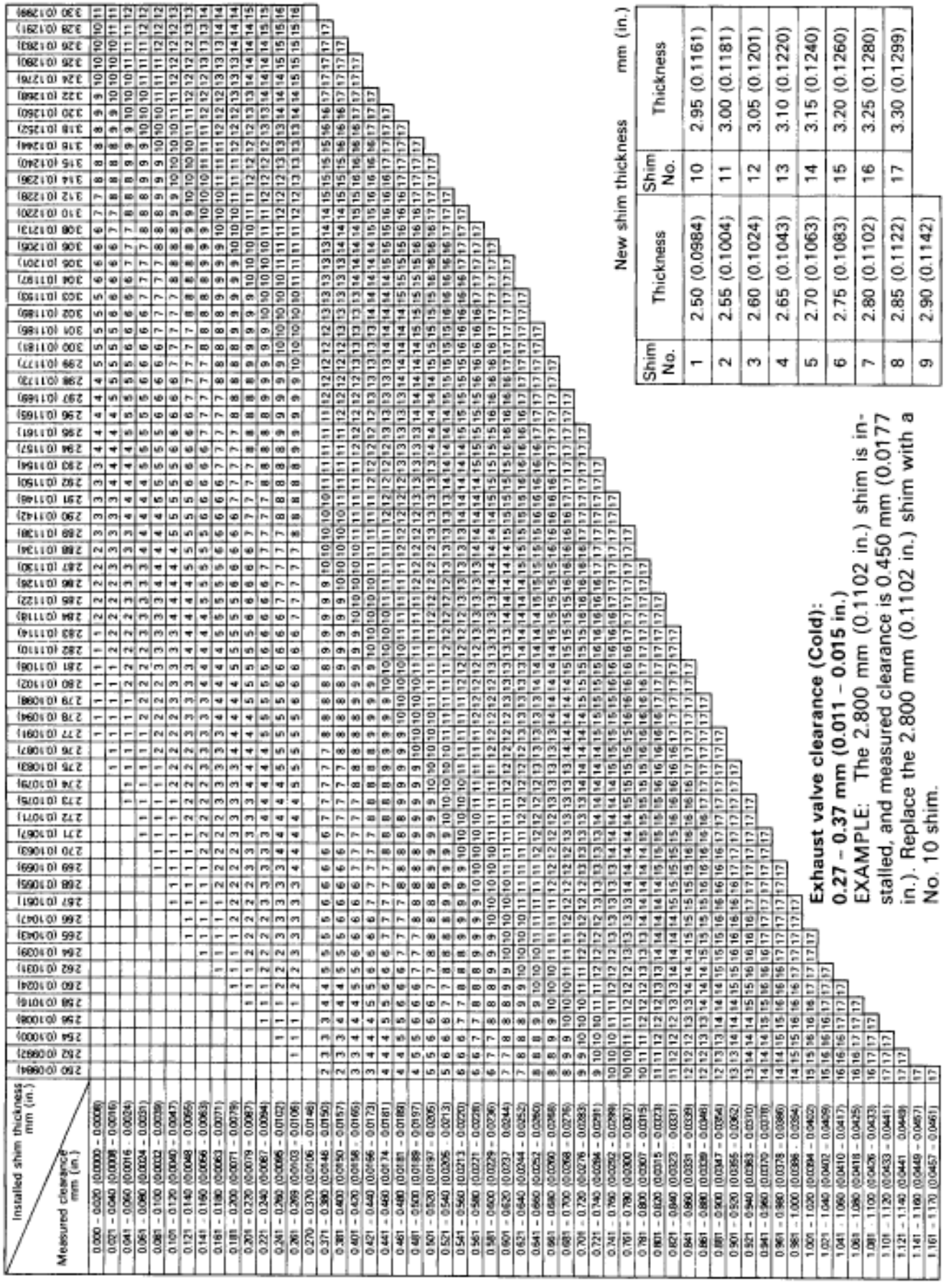
37. (A/T)
CONNECT THROTTLE CABLE, AND ADJUST IT

38. CONNECT ACCELERATOR CABLE, AND ADJUST IT

39. FILL WITH ENGINE COOLANT

40. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY


Adjusting Shim Selection Chart (Intake)
Installed shim thickness mm (in.)
Measured clearance mm (in.)
New shim thickness mm (in.)
Shim No. | Thickness | Shim No. | Thickness
1 | 2.50 (0.0984) | 10 | 2.95 (0.1161)
2 | 2.55 (0.1004) | 11 | 3.00 (0.1181)
3 | 2.60 (0.1024) | 12 | 3.05 (0.1201)
4 | 2.65 (0.1043) | 13 | 3.10 (0.1220)
5 | 2.70 (0.1063) | 14 | 3.15 (0.1240)
6 | 2.75 (0.1083) | 15 | 3.20 (0.1260)
7 | 2.80 (0.1102) | 16 | 3.25 (0.1280)
8 | 2.85 (0.1122) | 17 | 3.30 (0.1299)
9 | 2.90 (0.1142)
Intake valve clearance (Cold):
0.13 – 0.23 mm (0.005 – 0.009 in.)
EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed, and measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a No. 12 shim.
V00503


Adjusting Shim Selection Chart (Exhaust)
Installed shim thickness mm (in.)
Measured clearance mm (in.)
New shim thickness mm (in.)
Shim No. | Thickness | Shim No. | Thickness
1 | 2.50 (0.0984) | 10 | 2.95 (0.1161)
2 | 2.55 (0.1004) | 11 | 3.00 (0.1181)
3 | 2.60 (0.1024) | 12 | 3.05 (0.1201)
4 | 2.65 (0.1043) | 13 | 3.10 (0.1220)
5 | 2.70 (0.1063) | 14 | 3.15 (0.1240)
6 | 2.75 (0.1083) | 15 | 3.20 (0.1260)
7 | 2.80 (0.1102) | 16 | 3.25 (0.1280)
8 | 2.85 (0.1122) | 17 | 3.30 (0.1299)
9 | 2.90 (0.1142)
Exhaust valve clearance (Cold):
0.27 – 0.37 mm (0.011 – 0.015 in.)
EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed, and measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a No. 10 shim.

W00236

IGNITION TIMING INSPECTION AND ADJUSTMENT

EG0EU–01

(See IG section)

Ignition timing:

10° BTDC @ idle

(w/ Terminals TE1 and E1 connected)

IDLE SPEED INSPECTION

EG0EV–01

Idle speed:

700±50 rpm

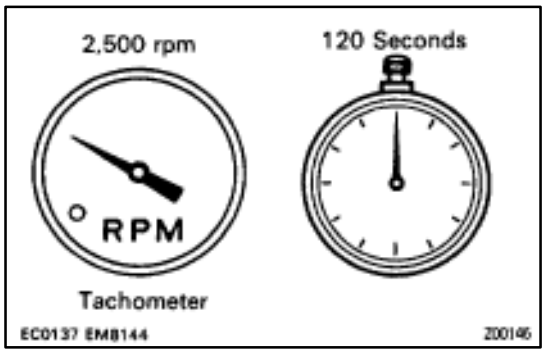
IDLE AND/OR 2,500 RPM CO/HC CHECK

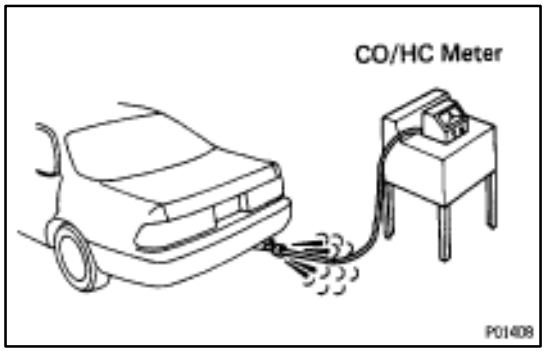
EG0EW–02

HINT: This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All operating accessories switched OFF
(e) All vacuum lines properly connected
HINT: All vacuum hoses for EGR systems, etc. should be properly connected.
(f) SFI system wiring connectors fully plugged in
(g) Transmission in neutral position
(h) Tachometer and CO/HC meter calibrated by hand





2. START ENGINE

3. RACE ENGINE AT 2,500 RPM FOR APPROX. 120 SECONDS

4. INSERT CO/HC METER TESTING PROBE INTO TAILPIPE LEAST 40 cm (1.3 ft)

5. CHECK CO/HC CONCENTRATION AT IDLE

Complete the measuring within three minutes.
HINT: When performing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the regulations.

If the CO/HC concentration at 2.500 rpm does not comply with regulations, try the following procedure.
Race the engine again at 2,500 rpm for approx. 1 minute and quickly repeat steps 4 and 5 above.
This may correct the problem.

Troubleshooting

EG0EX–01

If the CO/HC concentration does not comply with regulations, perform troubleshooting in the order given below.

(a) Check oxygen sensor operation.
(See page EG–228)

(b) See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

HC	CO	Problem	Cause
High	Normal	Rough idle	1. Faulty ignition: • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed high–tension cords • Cracked distributor cap 2. Incorrect valve clearance 3. Leaky EGR valve 4. Leaky intake and exhaust valves 5. Leaky cylinder
High	Low	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hose • EGR valve • Intake manifold • Air intake chamber • Throttle body • IAC valve • Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Clogged air filter 2. Faulty SFI system • Faulty pressure regulator • Clogged fuel return line • Defective engine coolant temp. sensor • Defective air temp. sensor • Faulty ECM • Faulty injector • Faulty cold start injector • Faulty throttle position sensor • Volume air flow meter

COMPRESSION CHECK

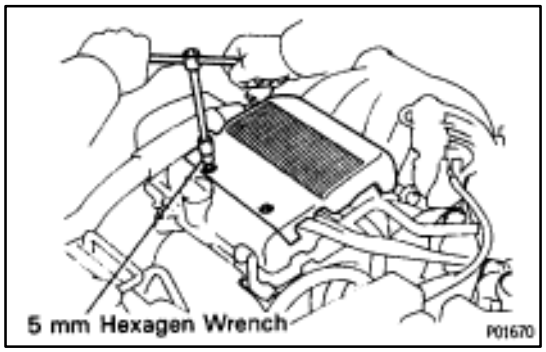
EG0EY–01

HINT: If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

1. WARM UP AND STOP ENGINE

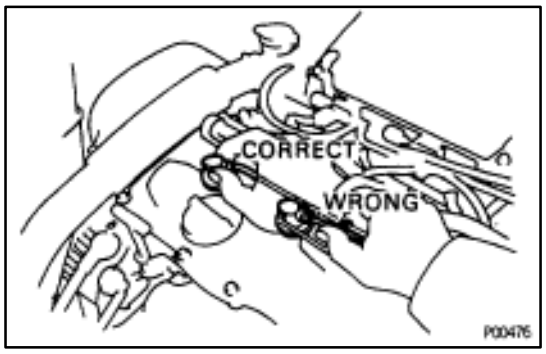
Allow the engine to warm up to normal operating temperature.

2. DISCONNECT DISTRIBUTOR CONNECTOR



3. REMOVE V–BANK COVER

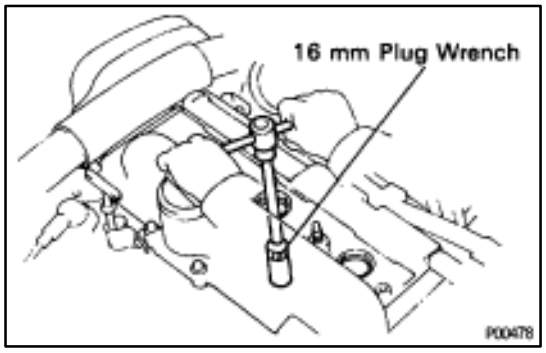
Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.



4. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS

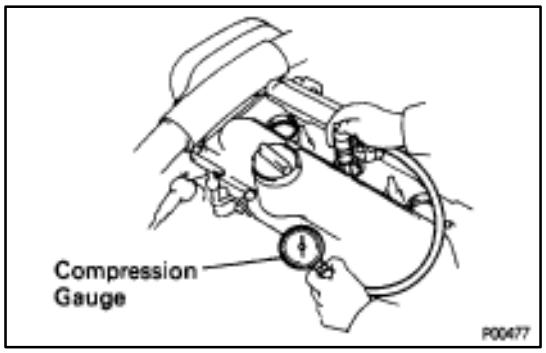
Disconnect the high–tension cords at the rubber boot. DO NOT pull on the cords.

NOTICE: Pulling on or bending the cords may damage the conductor inside.



5. REMOVE SPARK PLUGS

Using a 16 mm plug wrench, remove the spark plug.



6. CHECK CYLINDER COMPRESSION PRESSURE

(a) Insert a compression gauge into the spark plug hole.

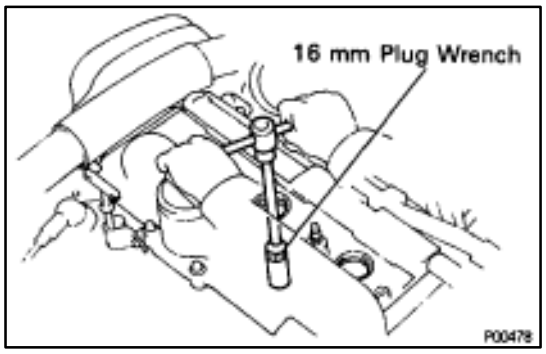
(b) Fully open the throttle.

(c) While cranking the engine, measure the compression pressure.

HINT: Always use a fully charged battery to obtain engine speed of 250 rpm or more.

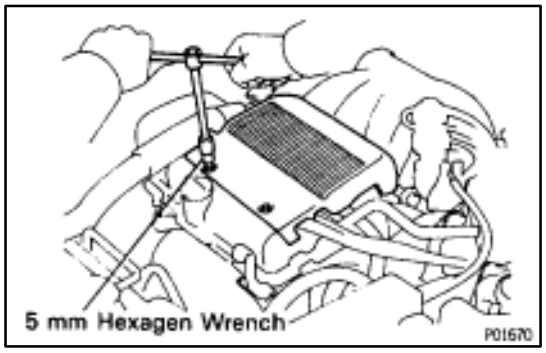
(d) Repeat steps (a) through (c) for each cylinder.
NOTICE: This measurement must be done in as short a time as possible.
Compression pressure:
1,226 kPa (12.5 kgf/cm^2, 178 psi) or more
Minimum pressure:
981 kPa (10.0 kgf/cm^2, 142 psi)
Difference between each cylinder:
98 kPa (1.0 kgf/cm^2, 14 psi) 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 chances are that the piston rings and/or cylinder bore are worn or damaged.
- If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.



7. REINSTALL SPARK PLUGS
Using a 16 mm plug wrench, install the spark plug.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

8. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS

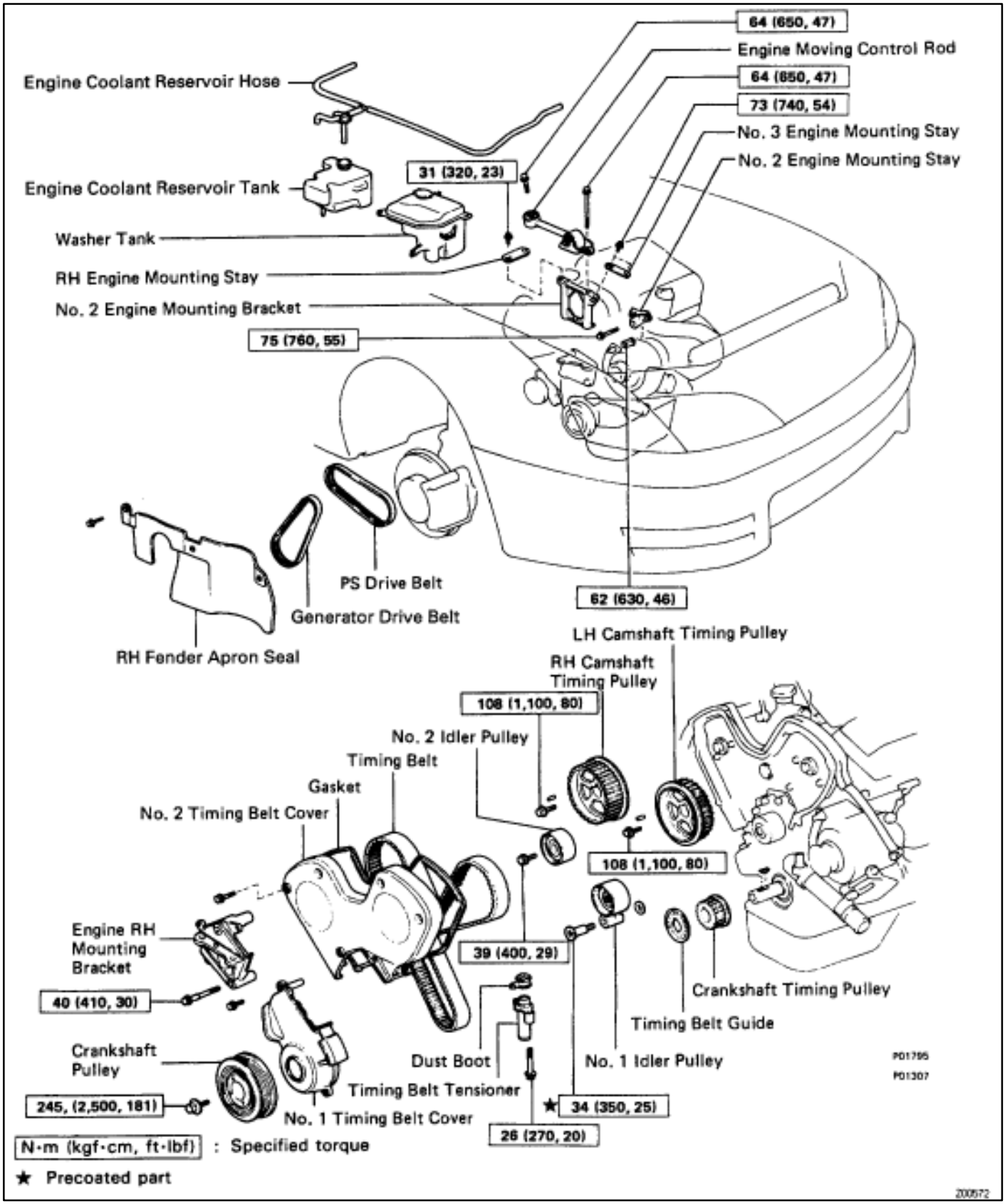


9. REINSTALL V–BANK COVER
Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.

10. RECONNECT DISTRIBUTOR CONNECTOR

TIMING BELT COMPONENTS

EG0EZ–02

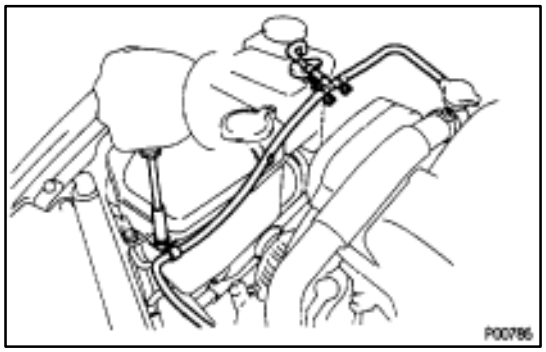


TIMING BELT REMOVAL

EG0F0–02

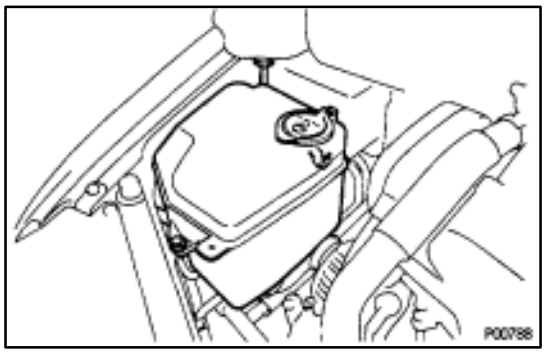
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the ”LOCK” position and the negative (–) terminal cable is disconnected from the battery.



2. DISCONNECT ENGINE COOLANT RESERVOIR HOSE

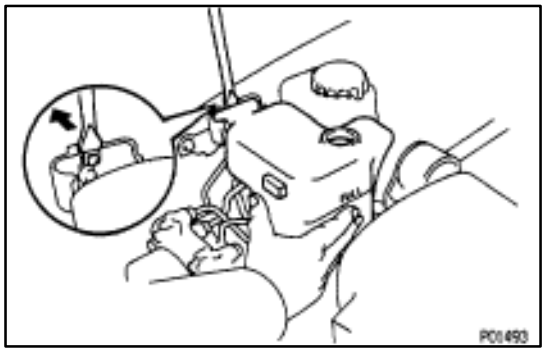
Remove the bolt and disconnect the reservoir hose.



3. REMOVE WASHER TANK

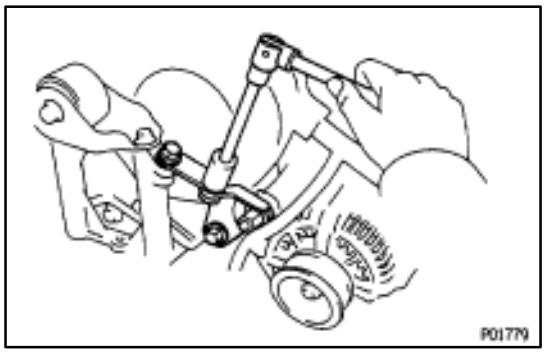
(a) Remove the three washer tank mounting bolts.

(b) Disconnect the connector and hose, and remove the washer tank.



4. REMOVE ENGINE COOLANT RESERVOIR TANK

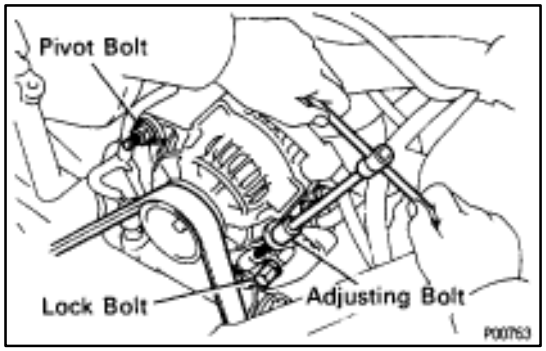
Using a screwdriver, remove the reservoir tank.



5. REMOVE NO.2 AND NO.3 RH MOUNTING STAYS

(a) Remove the two bolts and No.3 RH engine mounting stay.

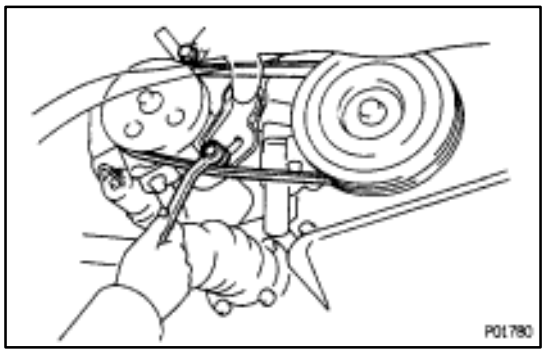
(b) Remove the bolt, nut and No.2 RH engine mounting stay.



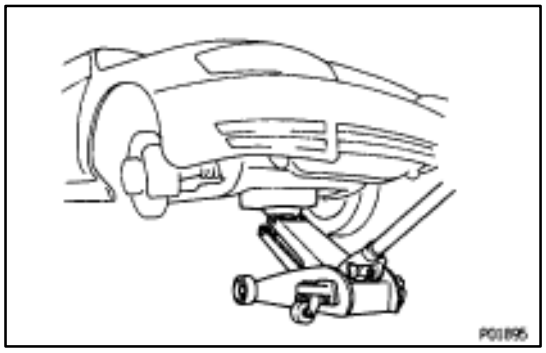
6. REMOVE GENERATOR DRIVE BELT
Loosen the pivot bolt and adjusting lock bolt, and remove the drive belt.

7. REMOVE RH FRONT WHEEL

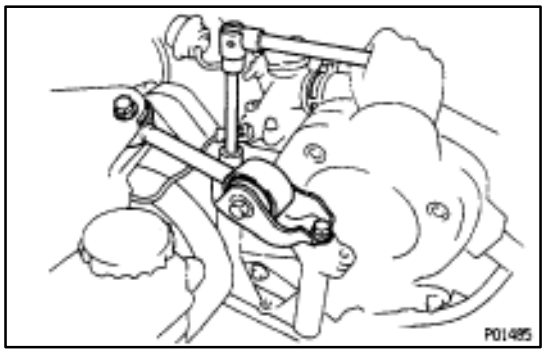
8. REMOVE RH FENDER APRON SEAL



9. REMOVE PS DRIVE BELT
Loosen the bolts, and remove the drive belt.

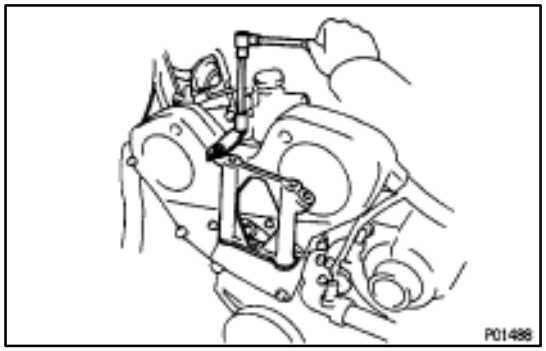


10. SLIGHTLY JACK UP ENGINE
Raise the engine enough to remove the weight from the engine mounting on the right side.



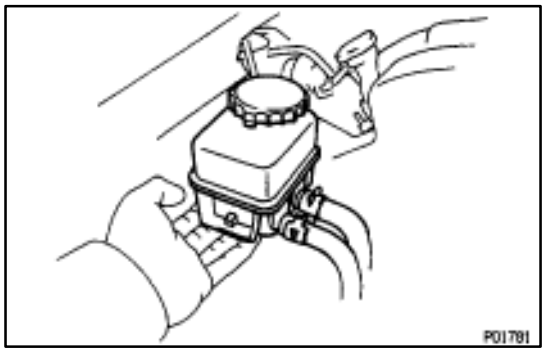
11. REMOVE ENGINE MOVING CONTROL ROD
Remove the three bolts and control rod.

12. DISCONNECT CONNECTOR FROM GROUND WIRE ON RH FENDER APRON



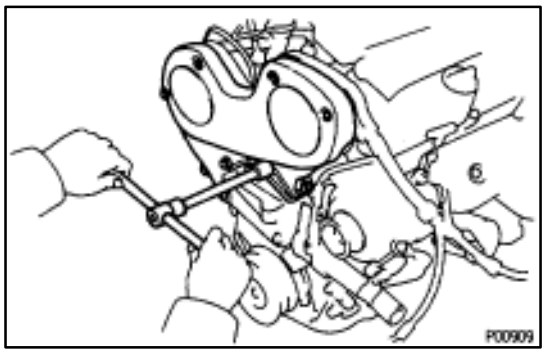
13. REMOVE RH ENGINE MOUNTING STAY AND NO.2 RH ENGINE MOUNTING BRACKET

Remove the bolt, nut, mounting stay and mounting bracket.



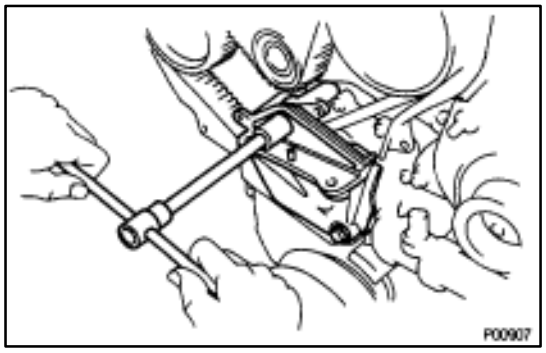
14. REMOVE PS OIL RESERVOIR TANK WITHOUT DISCONNECTING HOSES

15. REMOVE SPARK PLUGS



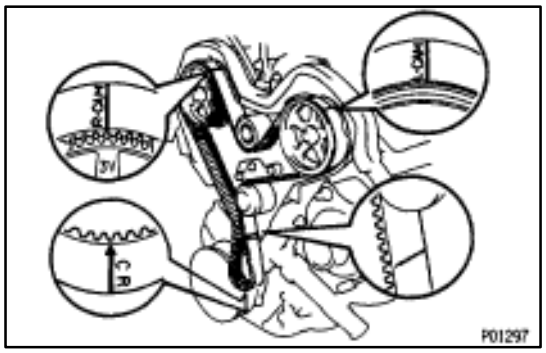
16. REMOVE NO.2 TIMING BELT COVER

Remove the eight bolts, timing belt cover and gasket.



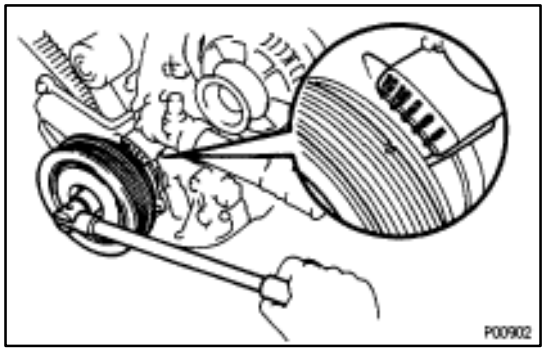
17. REMOVE ENGINE RH MOUNTING BRACKET

Remove the three bolts and mounting bracket.



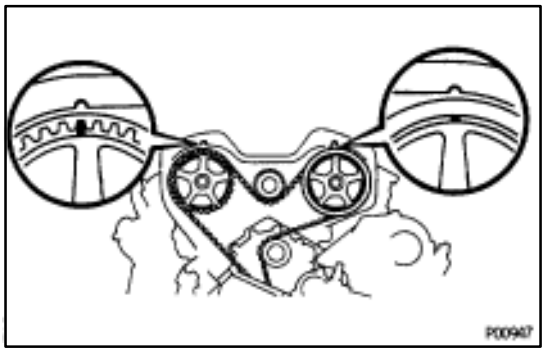
18. IF RE–USING TIMING BELT, CHECK INSTALLATION MARKS ON TIMING BELT

Check that there are four installation marks on the timing belt by turning the crankshaft pulley as shown in the illustration. If the installation marks have disappeared, place a new installation mark on the timing belt before removing each part.

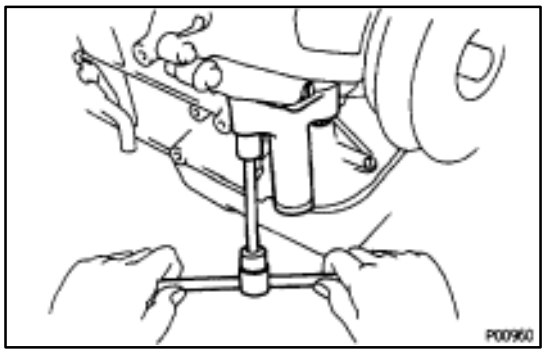


19. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley and align its groove with the timing mark ”O” of the No.1 timing belt cover.

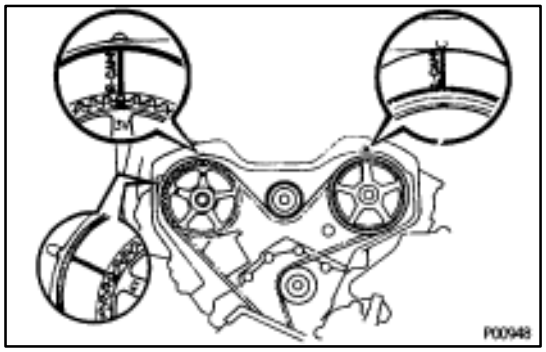


(b) Check that timing marks of the camshaft timing pulleys and No.3 timing belt cover are aligned.
If not, turn the crankshaft one revolution (360°).



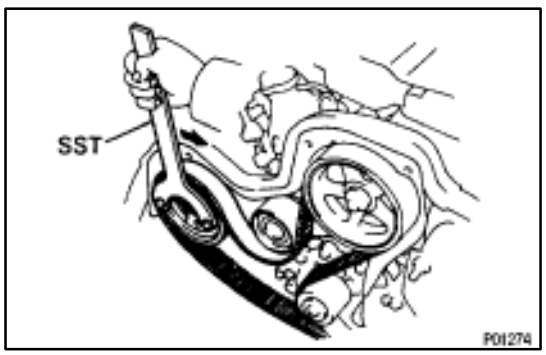
20. REMOVE TIMING BELT TENSIONER

Remove the two bolts, tensioner and dust boot.

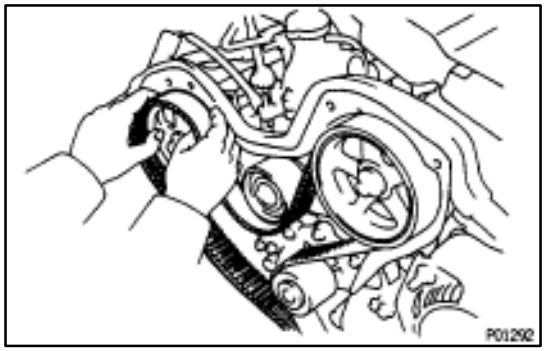


21. REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEY

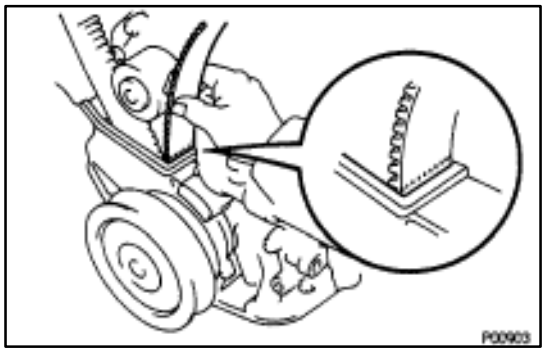
HINT (Re–using timing belt): If the installation marks have disappeared, before removing the timing belt, place new installation marks on the timing belt to match the timing marks of the camshaft timing pulleys.



(a) Using SST, loosen the tension between the LH and RH camshaft timing pulleys by slightly turning the RH camshaft timing pulley clockwise.
SST 09278–54012



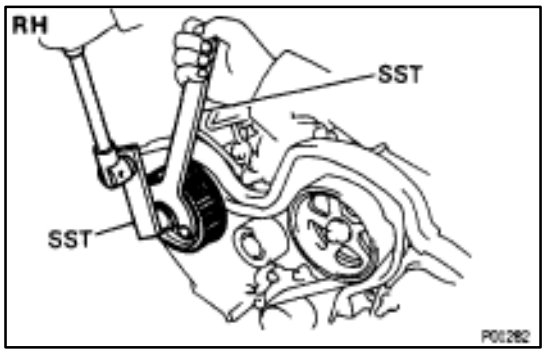
(b) Remove the timing belt from the camshaft timing pulleys.

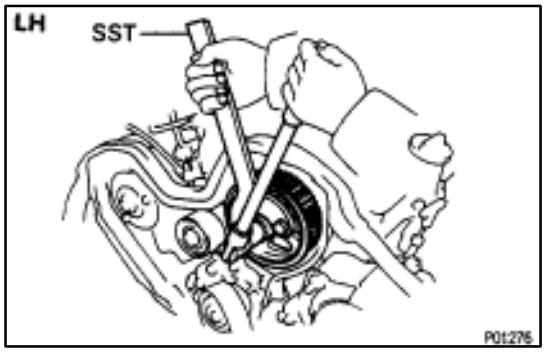


HINT (Re–using timing belt): If the installation marks have disappeared, after removing the timing belt from the camshaft timing pulleys, place new installation mark on the timing belt to match the end of the No.1 timing belt cover.

22. REMOVE CAMSHAFT TIMING PULLEYS

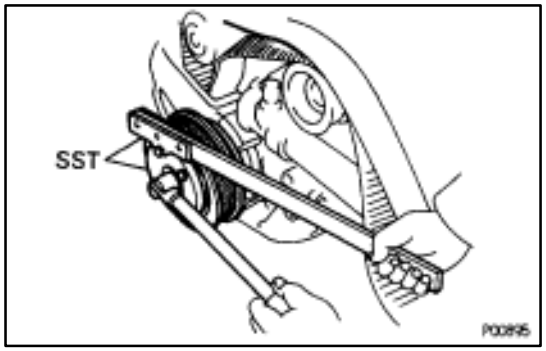
Using SST, remove the bolt, timing pulley and knock pin.
Remove the two timing pulleys.
SST RH 09249–63010 and 09278–54012
LH 09278–54012
HINT: Arrange the RH and LH pulleys.





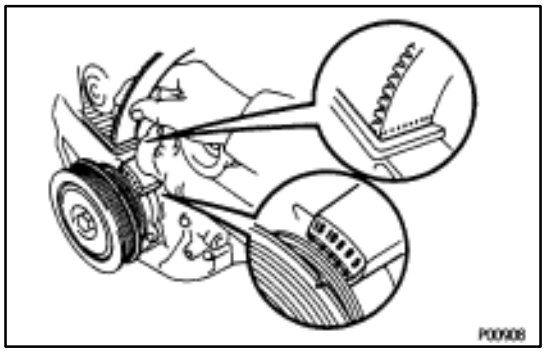
23. REMOVE NO.2 IDLER PULLEY

Remove the bolt and idler pulley.

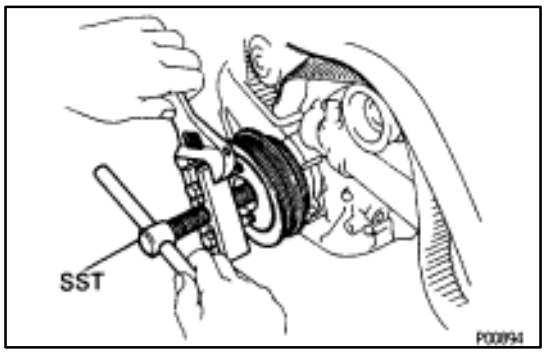


24. REMOVE CRANKSHAFT PULLEY

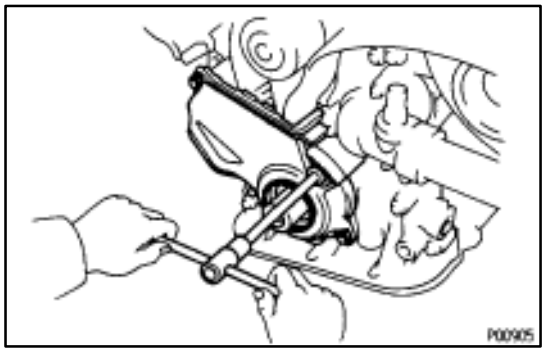
(a) Using SST, remove the pulley bolt.
SST 09213–54015, 09213–70010 (90105–08076)
09330–00021



HINT (Re–using timing belt): When the crankshaft pulley bolt is loosened, the position of the timing mark of the crankshaft pulley and also the installation mark may slip, so check and align them again.

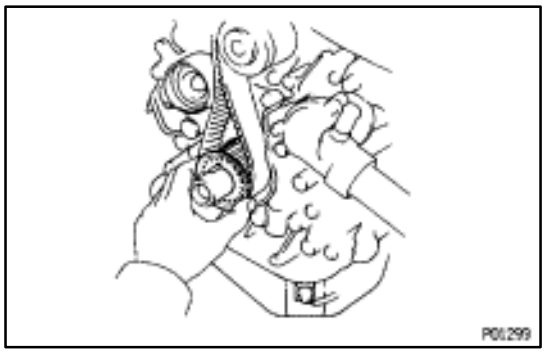


(b) Using SST, remove the pulley.
SST 09213–60017

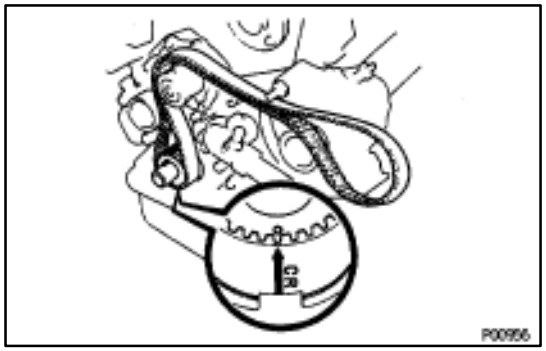


25. REMOVE NO.1 TIMING BELT COVER

Remove the four bolts, timing belt cover and gasket.

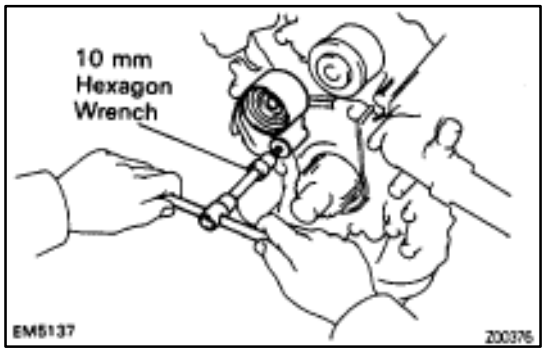


26. REMOVE TIMING BELT GUIDE



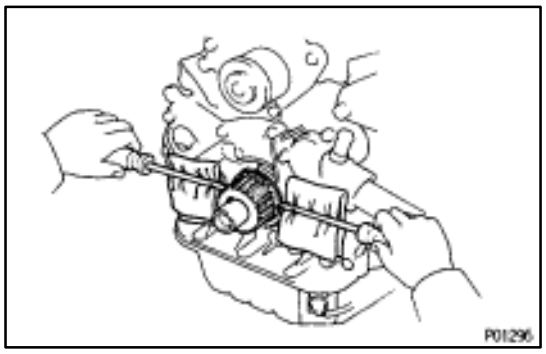
27. REMOVE TIMING BELT

HINT (Re–using timing belt): If the installation marks have disappeared, place a new installation mark on the timing belt to match the drilled mark of the crankshaft timing pulley.



28. REMOVE NO.1 IDLER PULLEY

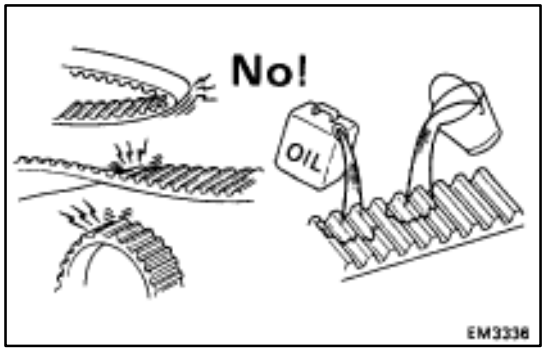
Using a 10 mm hexagon wrench, remove the bolt, idler pulley and plate washer.



29. REMOVE CRANKSHAFT TIMING PULLEY

If the pulley cannot be removed by hand, use two screw–drivers.

HINT: Position shop rags as shown to prevent damage.



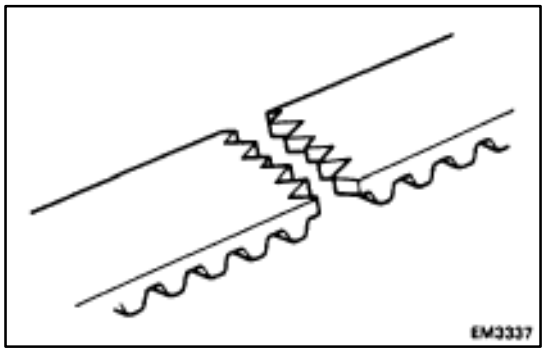
TIMING BELT INSPECTION

EG0F1–01

1. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.**

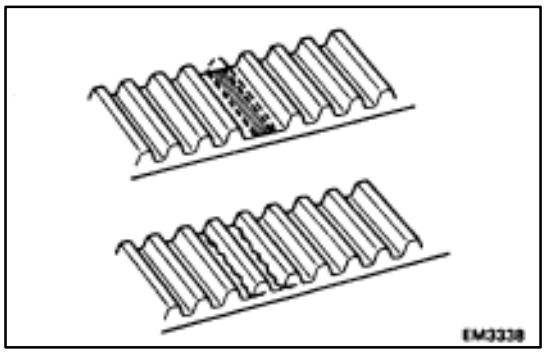


If there are any defects as shown in the figures, check the following points:

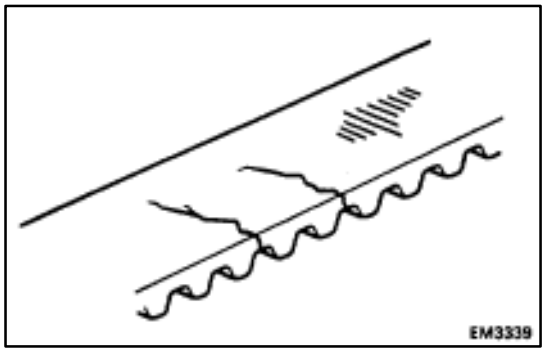
(a) Premature parting

•Check for proper installation.

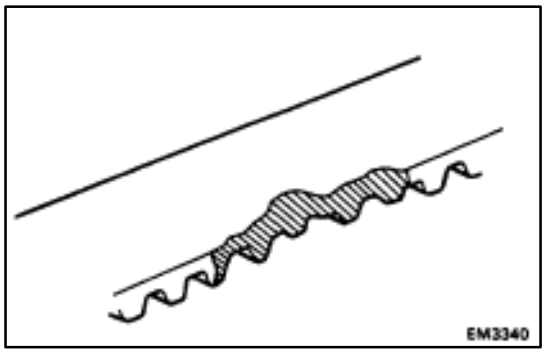
•Check the timing cover gasket for damage and proper installation.



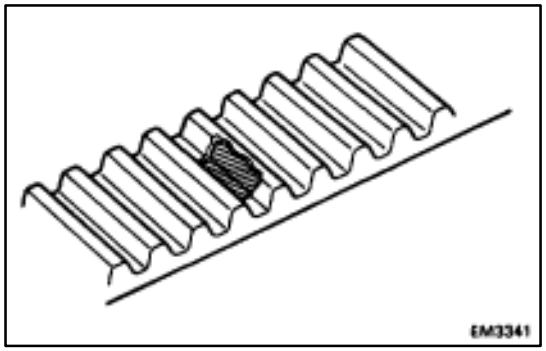
(b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.



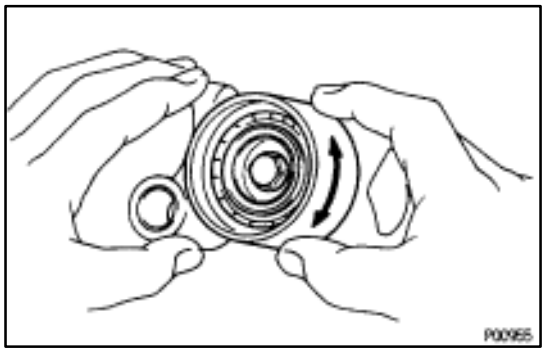
(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock and water pump.



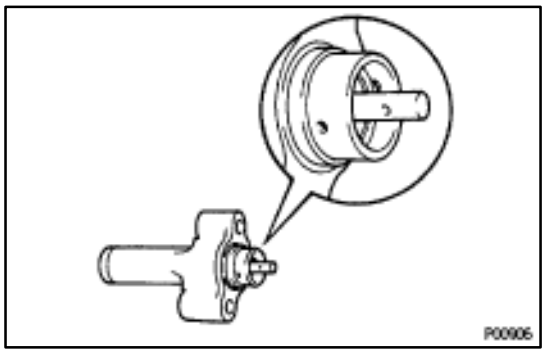
(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.



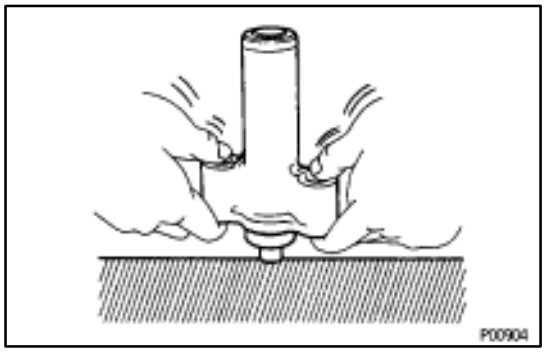
(e) If there is noticeable wear on the belt teeth, check timing cover for damage and check to correct gasket installation and for foreign material on the pulley teeth.
If necessary, replace the timing belt.



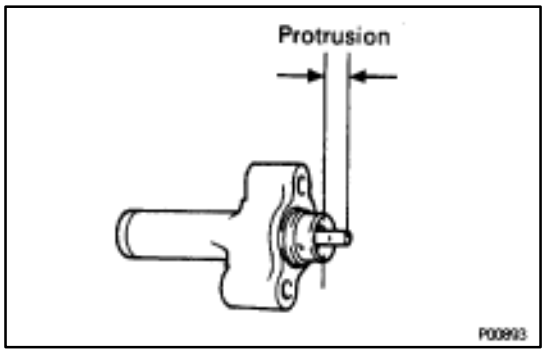
2. INSPECT IDLER PULLEYS
Check that the idler pulley turns smoothly.
If necessary, replace the idler pulley.



3. INSPECT TIMING BELT TENSIONER
(a) Visually check tensioner for oil leakage.
HINT: If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.
If leakage is found, replace the tensioner.



(b) Hold the tensioner with both hands and push the push rod strongly against the floor or wall to check that it doesn't move.
If the push rod moves, replace the tensioner.



(c) Measure the protrusion of the push rod from the housing end.
Protrusion:
10.0–10.5 mm (0.94–0.413 in.)
If the protrusion is not as specified, replace the tensioner.

TIMING BELT INSTALLATION

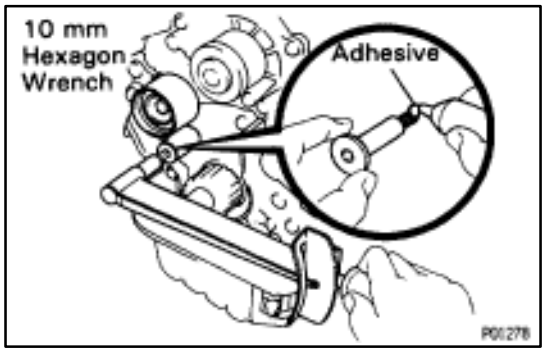
EG0F2–01

(See page EG–29)

1. INSTALL CRANKSHAFT TIMING PULLEY

(a) Align the pulley set key with the key groove of the timing pulley.

(b) Slide on the timing pulley, facing the flange side inward.

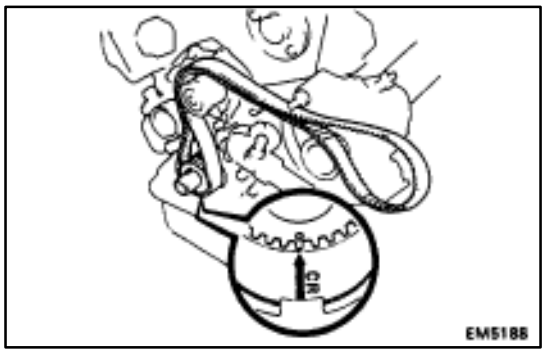


2. INSTALL NO.1 IDLER PULLEY

(a) Apply adhesive to two or three threads of the mount bolt end.
Adhesive:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using a 10 mm hexagon wrench, install the idler pulley with the plate washer and bolt. Torque the bolt.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(c) Check that the pulley bracket moves smoothly.

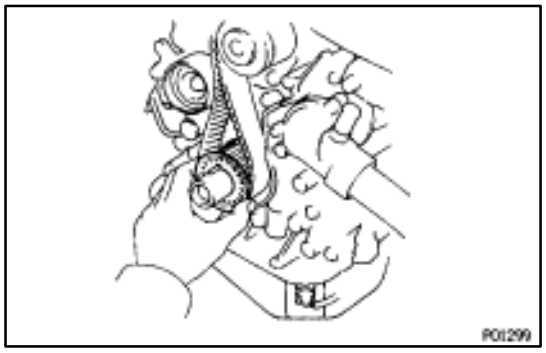


3. TEMPORARILY INSTALL TIMING BELT
NOTICE: The engine should be cold.

(a) Remove any oil or water on the crankshaft timing, No. 1 idler and water pump pulleys, and keep them clean.

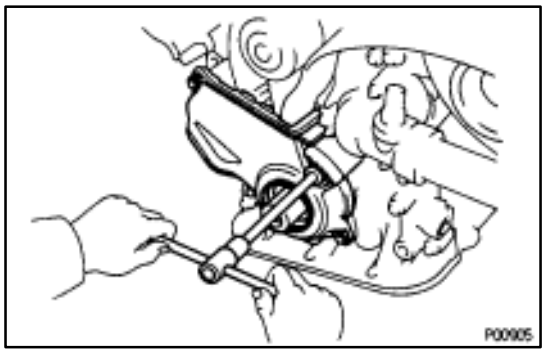
(b) Align the installation mark on the timing belt with the drilled mark of the crankshaft timing pulley.

(c) Install the timing belt on the crankshaft timing, No.1 idler and water pump pulleys.



4. INSTALL TIMING BELT GUIDE

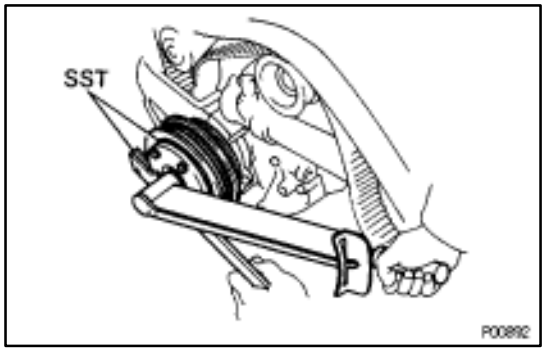
Install the belt guide, facing the cup side outward.



5. INSTALL NO.1 TIMING BELT COVER

(a) Install the gasket to the timing belt cover.

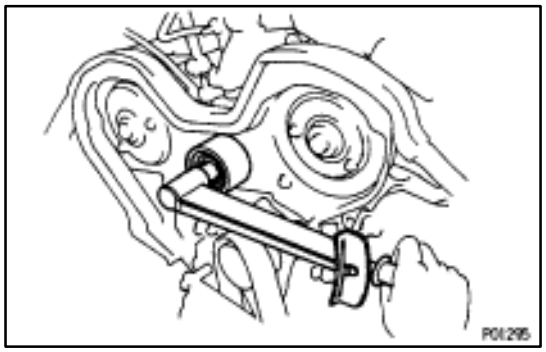
(b) Install the timing belt cover with the four bolts.



6. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley, and slide the pulley.

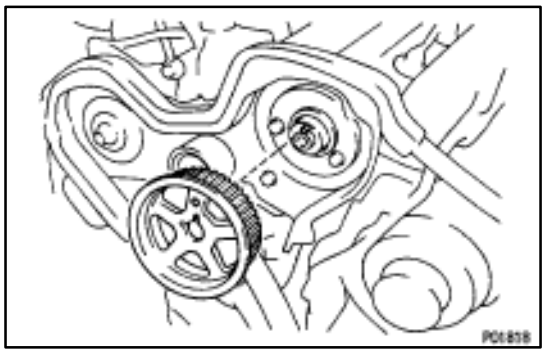
(b) Using SST, install and torque the bolt.
SST 09213–54015, 09213–70010 (90105–08076)
09330–00021
Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)



7. INSTALL NO.2 IDLER PULLEY

(a) Install the idler pulley with the bolt. Torque the bolt.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Check that the idler pulley moves smoothly.

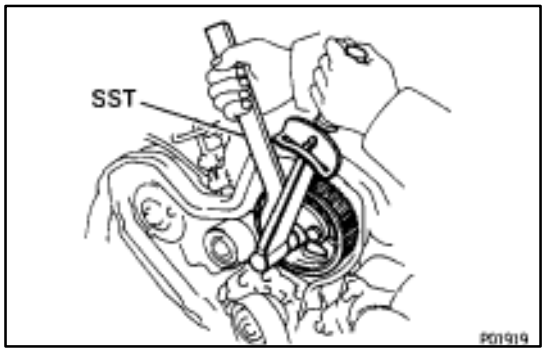


8. INSTALL LH CAMSHAFT TIMING PULLEY

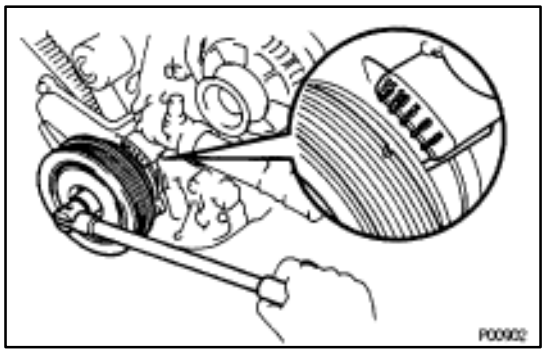
(a) Slide the timing pulley, facing the flange side outward.

(b) Align the knock pin hole of the camshaft with the knock pin groove of the timing pulley as shown.

(c) Install the knock pin.

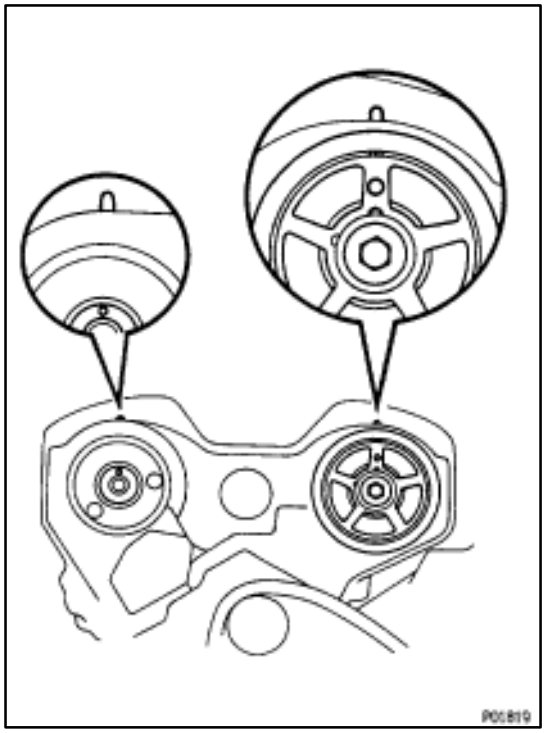


(d) Using SST, install and torque the bolt.
SST 09278–54012
Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)



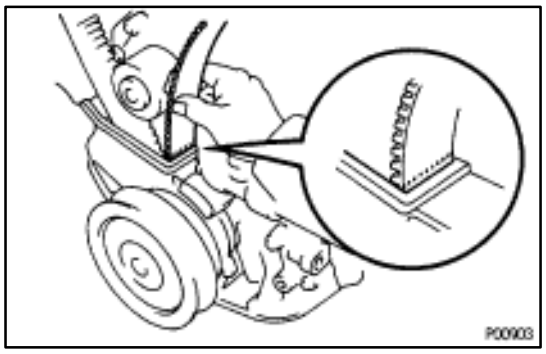
9. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) (Crankshaft Position)
Turn the crankshaft pulley, and align its groove with the ”O” timing mark of the No.1 timing belt cover.



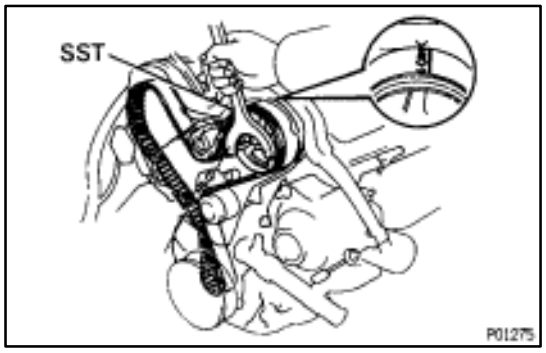
(b) (RH Camshaft Pulley Position)
Turn the camshaft, align the knock pin hole of the camshaft with the timing mark of the No.3 timing belt cover.

(c) (LH Camshaft Pulley Position)
Turn the camshaft timing pulley, align the timing marks of the camshaft timing pulley and No.3 timing belt cover.



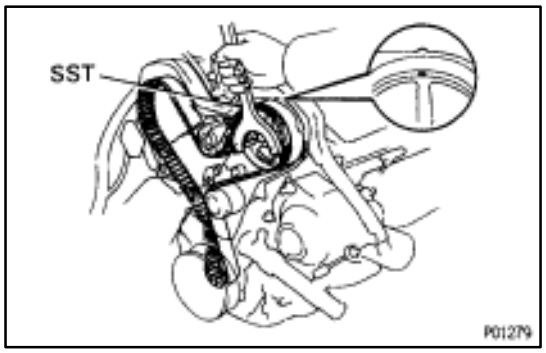
10. INSTALL TIMING BELT TO LH CAMSHAFT TIMING PULLEY

(a) Check that the installation mark on the timing belt matches the end of the No.1 timing belt cover.
If the installation marks do not align, shift the meshing of the timing belt and crankshaft timing pulley until they align.



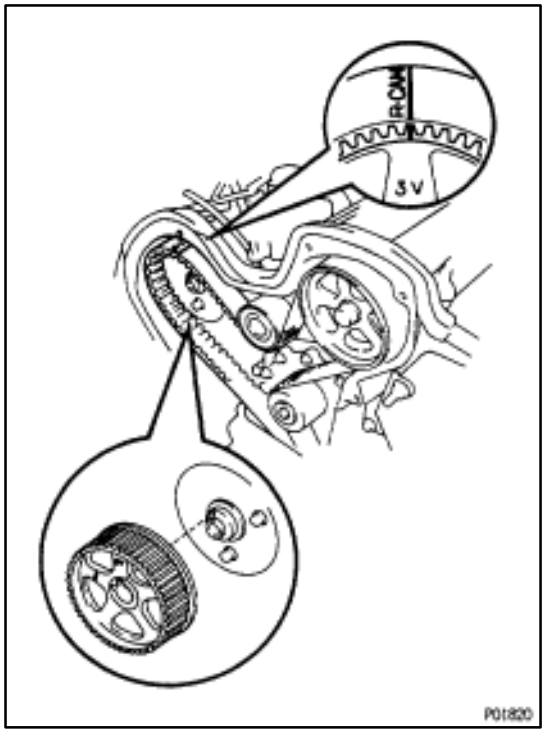
(b) Remove any oil or water on the LH camshaft timing pulley, and keep it clean.

(c) Using SST, slightly turn the LH camshaft timing pulley clockwise. Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley, and hang the timing belt on the LH camshaft timing pulley.
SST 09278–54012



(d) Using SST, align the timing marks of the LH camshaft pulley and No.3 timing belt cover.
SST 09278–54012

(e) Check that the timing belt has tension between the crankshaft timing and LH camshaft timing pulleys.

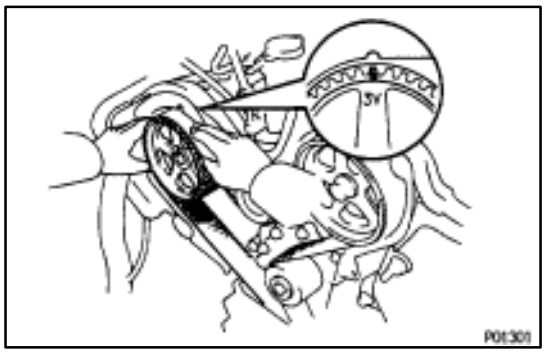


11. INSTALL RH CAMSHAFT TIMING PULLEY AND TIMING BELT

(a) Remove any oil or water on the RH camshaft timing and No.2 idler pulleys, and keep them clean.

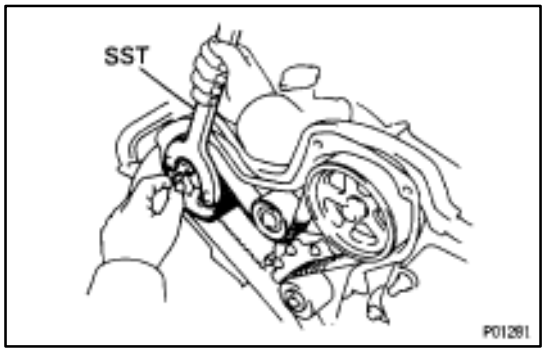
(b) Align the installation mark on the timing belt with the timing mark of the RH camshaft timing pulley as shown.

(c) Hang the timing belt on the RH camshaft timing pulley, facing the flange side inward.

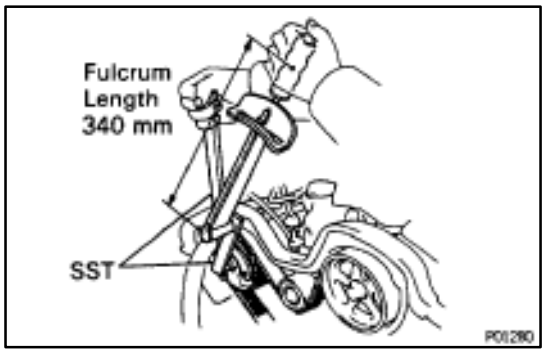


(d) Align the timing marks of the RH camshaft timing pulley and No.3 timing belt cover.

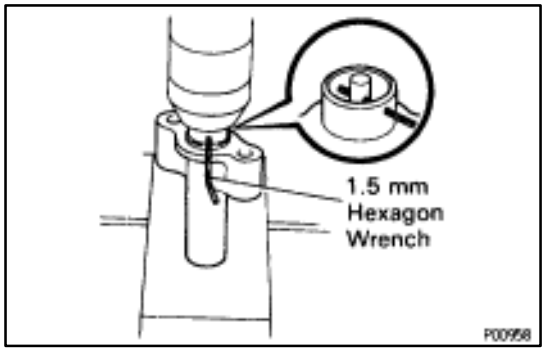
(e) Slide the RH camshaft timing pulley on the camshaft.



(f) Using SST, align the knock pin hole of the camshaft with the knock pin groove (3V mark side) of the pulley and install the knock pin.
SST 09278–54012



(g) Using SST, install and torque the bolt.
SST 09249–63010 and 09278–54012
Torque: 75 N·m (760 kgf·cm, 55 ft·lbf)
HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.)

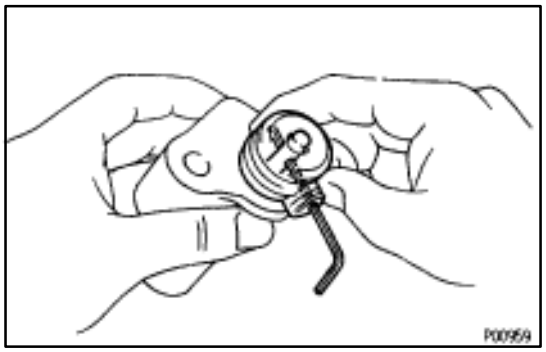


12. SET TIMING BELT TENSIONER

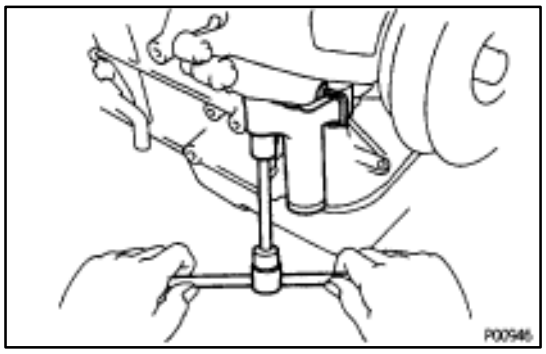
(a) Using a press, slowly press in the push rod using 981–9,807 N (100–1,000 kgf, 200–2,205 lbf) of pressure.

(b) Align the holes of the push rod and housing, pass a 1.5 mm hexagon wrench through the holes to keep the setting position of the push rod.

(c) Release the press.

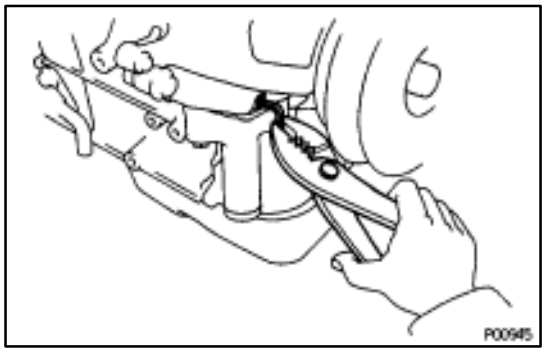


(d) Install the dust boot to the tensioner.

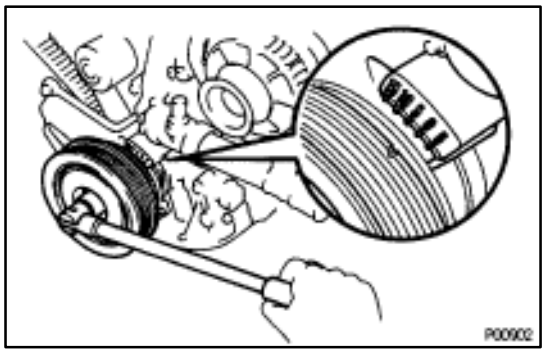


13. INSTALL TIMING BELT TENSIONER

(a) Install the tensioner with the two bolts.
Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)

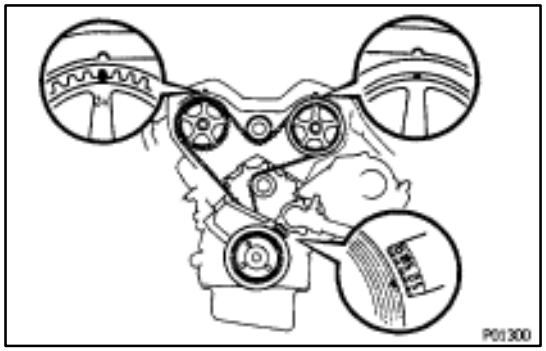


(b) Remove the 1.5 mm hexagon wrench from the tensioner.

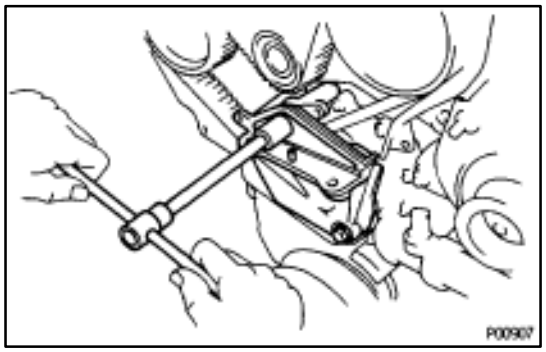


14. CHECK VALVE TIMING

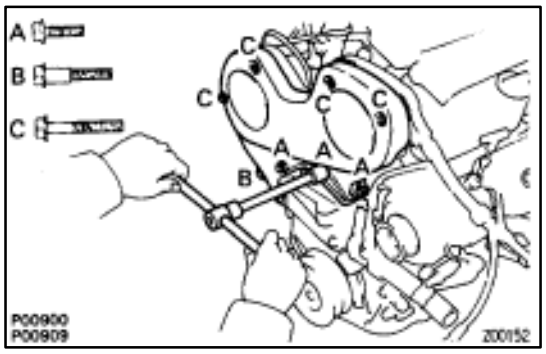
(a) Turn the crankshaft pulley two revolutions from TDC to TDC.
HINT: Always turn the crankshaft clockwise.



(b) CHeck that each pulley aligns with the timing marks as shown in the illustration.
If the marks do not align, remove the timing belt and reinstall it.



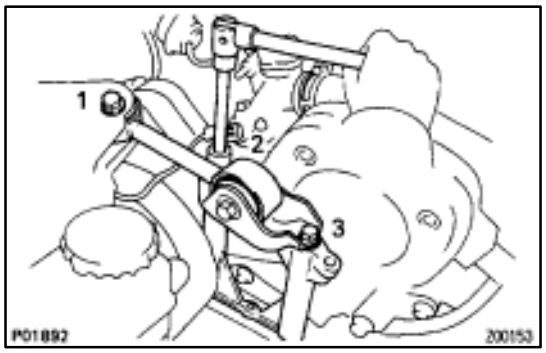
15. INSTALL ENGINE RH MOUNTING BRACKET
Install the mounting bracket with the three bolt.
Torque: 39 N·m (410 kgf·cm, 30 ft·lbf)



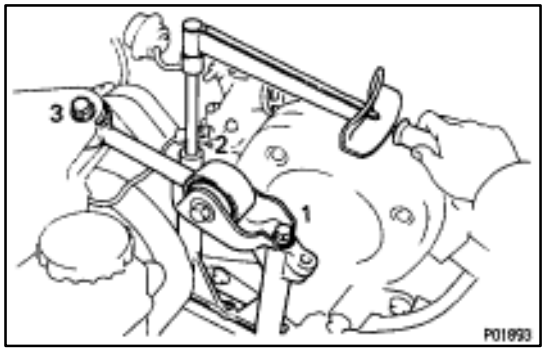
16. INSTALL NO.2 TIMING BELT COVER
(a) Install the gasket to the timing belt cover.
(b) Install the timing belt cover with the eight bolts.
HINT: Use the bolts indicated by A, B and C.

17. INSTALL SPARK PLUGS
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

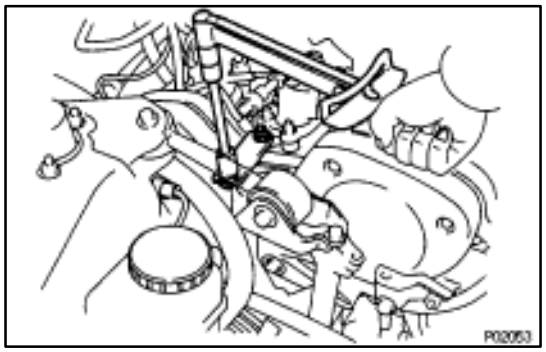
18. INSTALL PS OIL RESERVOIR TANK



19. INSTALL NO.2 RH ENGINE MOUNTING BRACKET AND ENGINE MOVING CONTROL ROD
(a) Temporarily install the No.2 RH engine mounting bracket and engine moving control rod with the three bolts in the sequence shown.

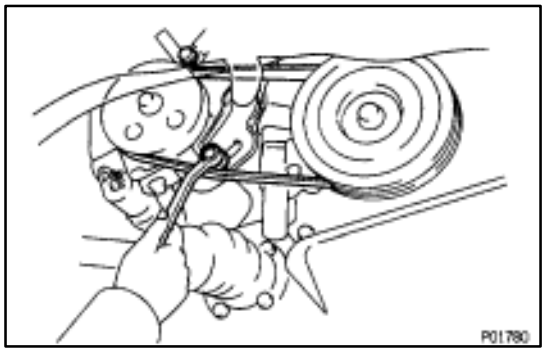


(b) Torque the three bolts in the sequence shown.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

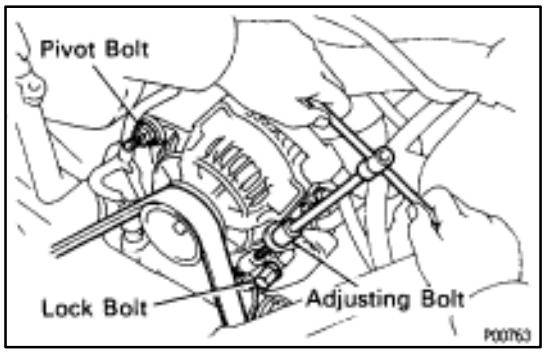


20. INSTALL RH ENGINE MOUNTING STAY
Install the mounting stay with the bolt and nut.
Torque: 31 N·m (320 kgf·cm, 23 ft·lbf)

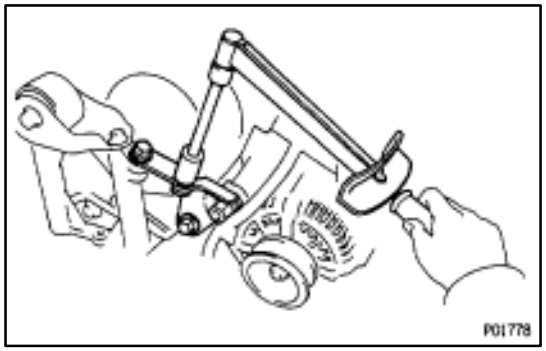
21. CONNECT CONNECTOR TO GROUND WIRE ON RH FENDER APRON
22. INSTALL RH FENDER APRON SEAL
23. INSTALL RH FRONT WHEEL



24. INSTALL AND ADJUST PS DRIVE BELT
Install the drive belt with the pivot and adjusting bolts.
Drive belt tension:
New belt
150–185 lb
Used belt
115±20 lb



25. INSTALL GENERATOR DRIVE BELT
Adjust the drive belt. (See CH section)
Drive belt tension:
New belt
175±5 lb
Used belt
115±20 lb



26. INSTALL NO.2 AND NO.3 RH ENGINE MOUNTING STAYS

(a) Install the No.2 RH engine mounting stay with the bolt and nut.

Bolt

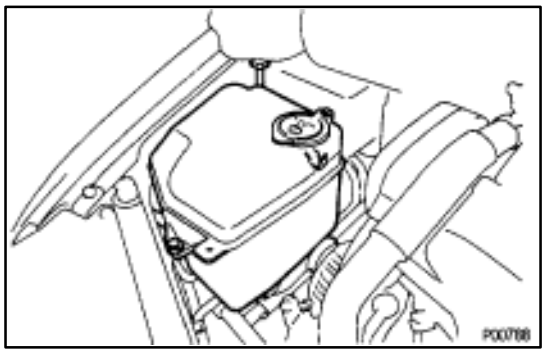
Torque: 75 N·m (760 kgf·cm, 55 ft·lbf)

Nut

Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

(b) Install the No.3 RH engine mounting stay with the two bolts.

Torque: 73 N·m (740 kgf·cm, 54 ft·lbf)

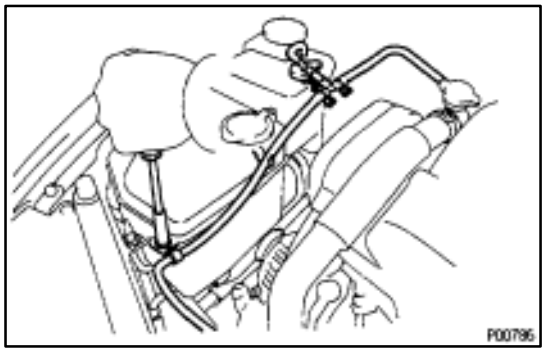


27. INSTALL ENGINE COOLANT RESERVOIR TANK

28. INSTALL WASHER TANK

(a) Connect the connector and vinyl hose to the washer tank.

(b) Install the washer tank with the three bolts.



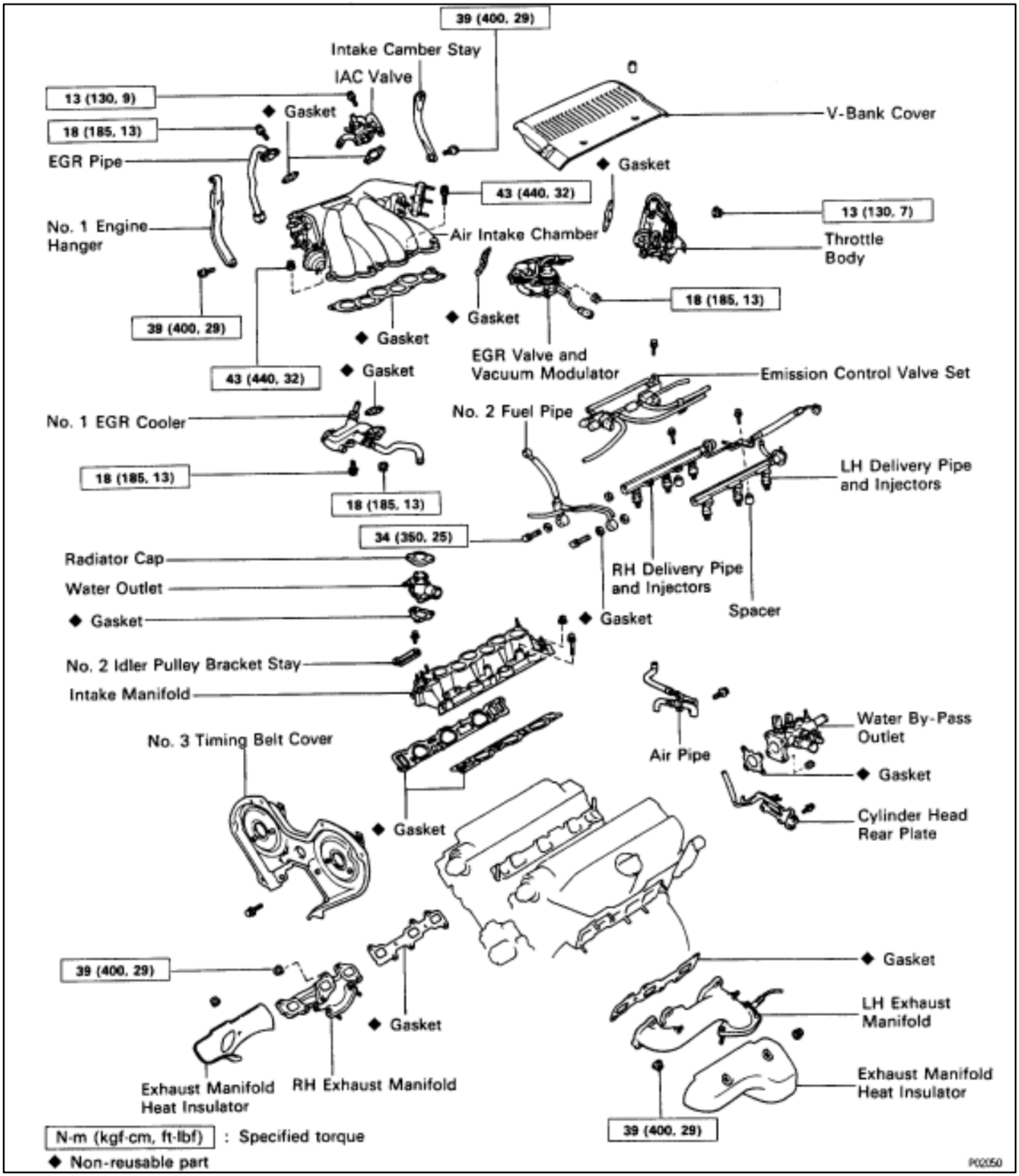
29. INSTALL ENGINE COOLANT RESERVOIR HOSE

Connect the reservoir hose with the bolt.

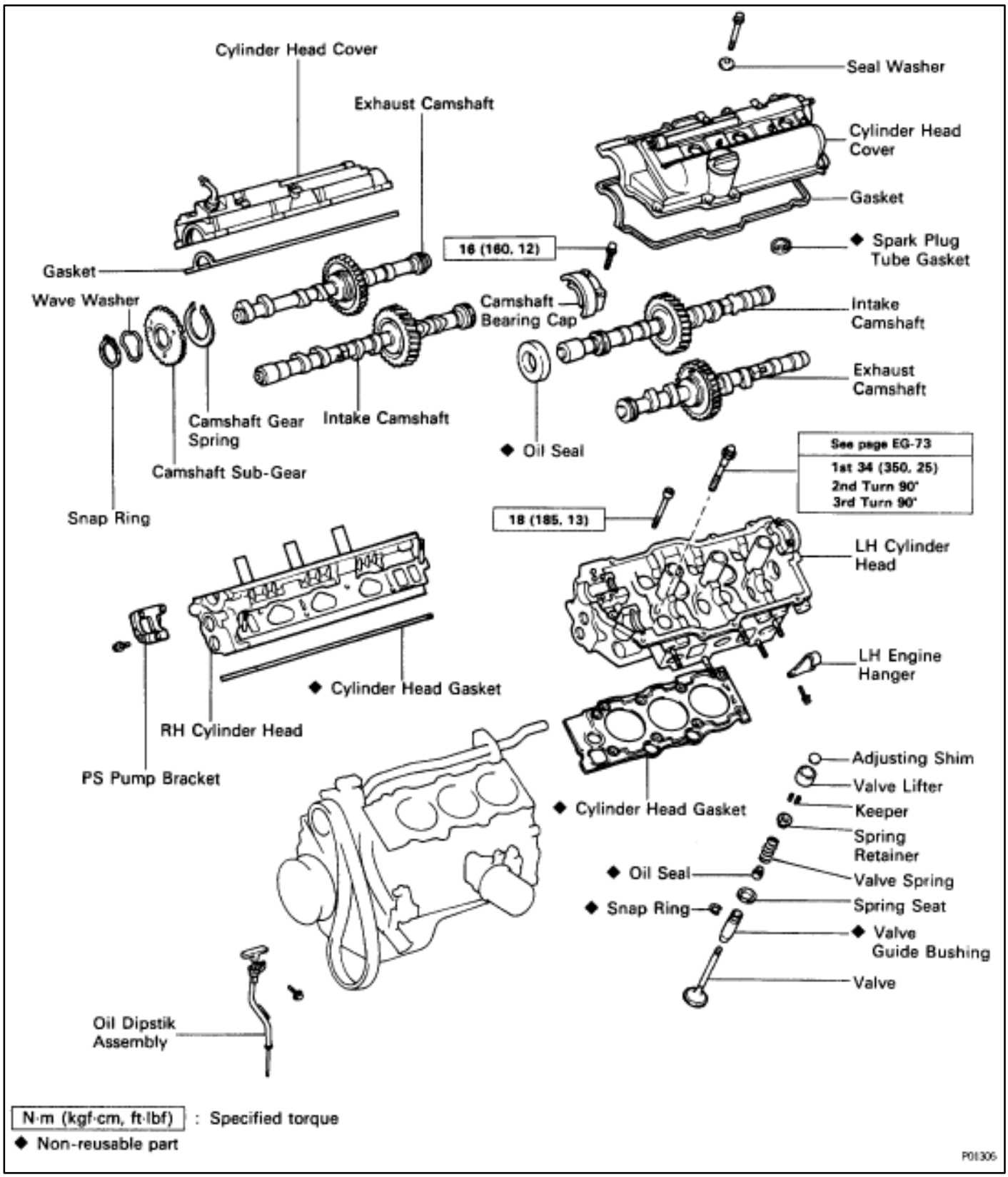
30. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

CYLINDER HEADS COMPONENTS

EG0F3–01



COMPONENTS (Cont'd)



CYLINDER HEADS REMOVAL

EG0F4–02

(See page EG–47)

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

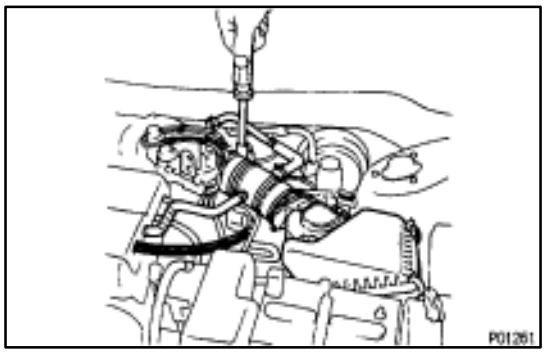
CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. DRAIN ENGINE COOLANT

3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY

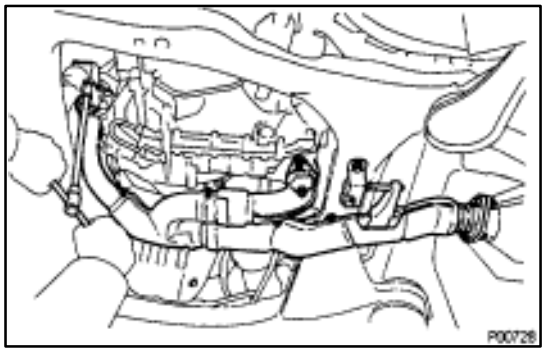
4. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE BODY



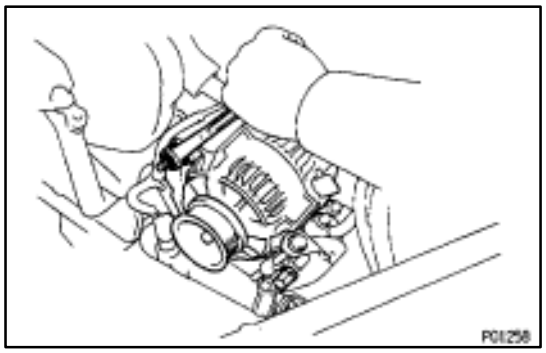
5. REMOVE AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

(a) Disconnect the volume air flow meter connector.
(b) Disconnect the coil cord clamp.
(c) Disconnect the air hoses.
(d) Loosen the air cleaner hose clamp bolt.
(e) Disconnect the air cleaner cap clips.
(f) Remove the air cleaner cap and volume air flow meter together with the air cleaner hose.

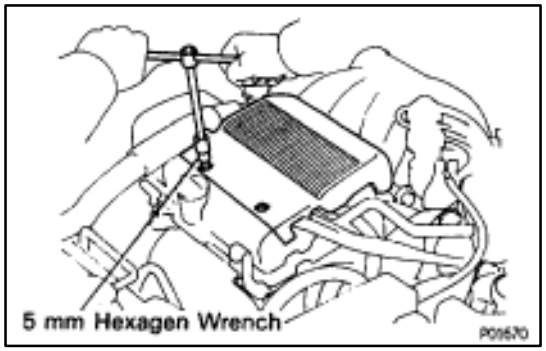


6. REMOVE FRONT EXHAUST PIPE

(a) Loosen the two bolts, and disconnect the bracket.
(b) Remove the two bolts and nuts holding the front exhaust pipe to the three–way catalytic converter.
(c) Remove the four nuts holding the front exhaust pipe to the exhaust manifolds.
(d) Remove the front exhaust pipe and gaskets.

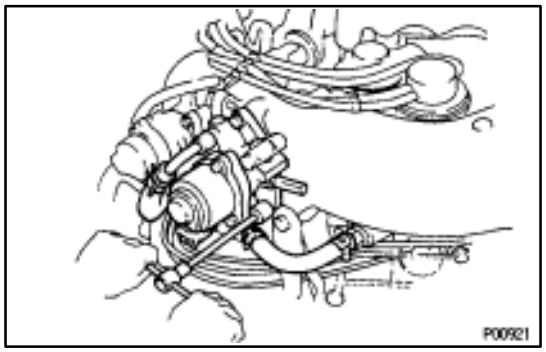


7. REMOVE GENERATOR (See CH section)



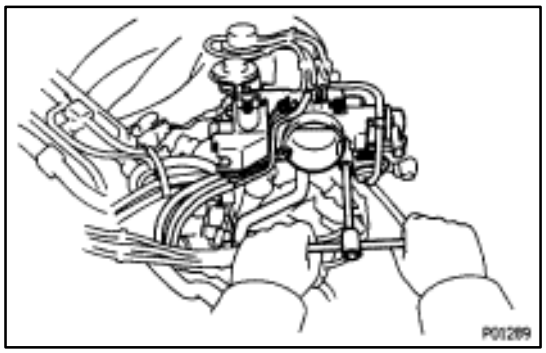
8. REMOVE V–BANK COVER

Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.



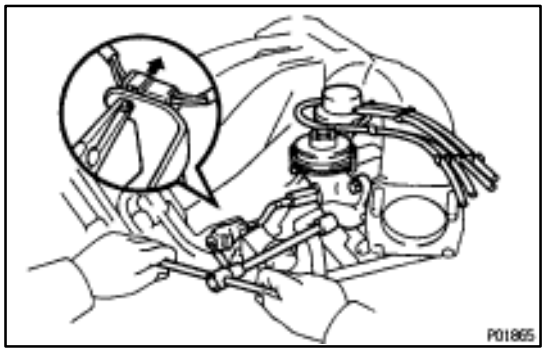
9. REMOVE IAC VALVE

(a) Disconnect the following hoses:
  (1) PS idle–up air hose
  (2) Water by–pass hoses
  (3) No.5 air hose
(b) Disconnect the IAC valve connector.
(c) Remove the two bolts, IAC valve and gasket.



10. REMOVE THROTTLE BODY

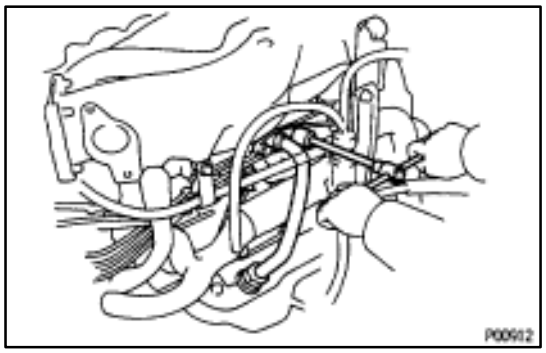
(a) Disconnect the following hoses:
  (1) Three TVV vacuum hoses
  (2) Four EGR vacuum hoses
  (3) Water by–pass hose
(b) Disconnect the throttle position sensor connector.
(c) Remove the two bolts, two nuts, throttle body and gasket.



11. REMOVE EGR VALVE AND VACUUM MODULATOR

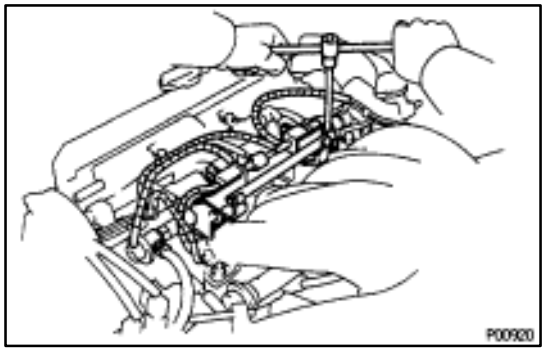
(a) (Calif. only)
Disconnect the EGR gas temp. sensor connector.
(b) Remove the two nuts, EGR valve, vacuum modulator and gasket.

12. REMOVE DISTRIBUTOR (See IG section)



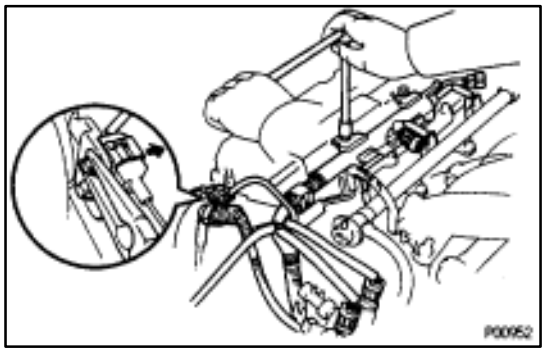
13. REMOVE EGR PIPE

(a) Loosen the union nut.
(b) Remove the two bolts, EGR pipe and gasket.



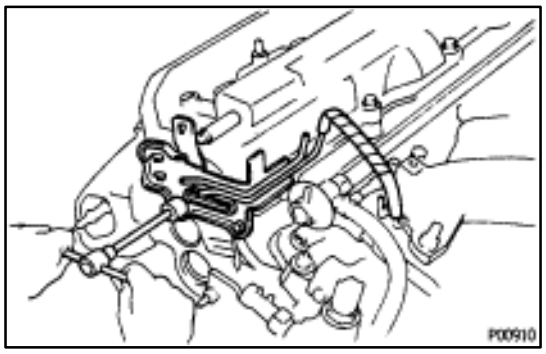
14. REMOVE EMISSION CONTROL VALVE SET

(a) Disconnect the two vacuum hoses of the fuel pressure control VSV.
(b) Disconnect the two vacuum hoses of the IACV VSV.
(c) Disconnect the two VSV connectors.
(d) Remove the two bolts and emission control valve set.



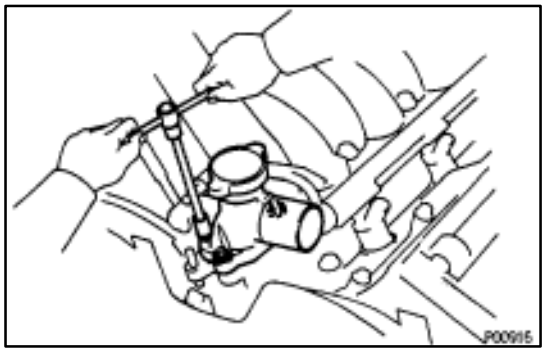
15. DISCONNECT LH ENGINE WIRE HARNESS

(a) Disconnect the following connectors:
  (1) Three injector connectors
  (2) Cold start injector time switch connector
  (3) Engine coolant temperature sensor connector
  (4) Oxygen sensor connector
  (5) Knock sensor connector
(b) Remove the two bolts, and disconnect the three clamps and LH engine wire.



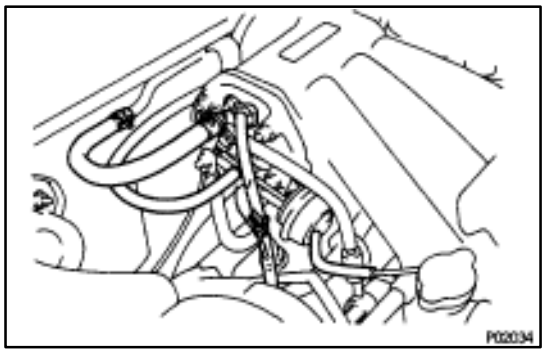
16. REMOVE CYLINDER HEAD REAR PLATE

(a) Disconnect the two vacuum hoses from the vacuum tank.
(b) Disconnect the vacuum hose from the air intake chamber.
(c) Remove the bolt, nut and rear plate.



17. REMOVE WATER OUTLET

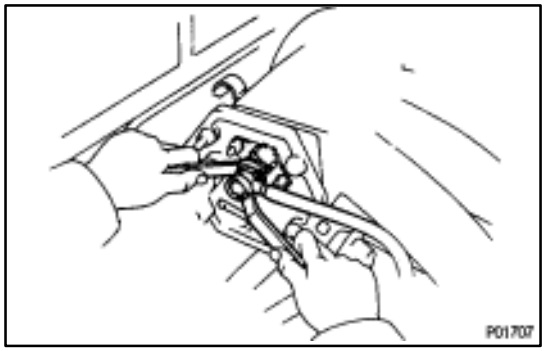
(a) Disconnect the radiator upper hose.
(b) Disconnect the engine coolant reservoir hose.
(c) Remove the three nuts, water outlet and gasket.



18. DISCONNECT HOSES

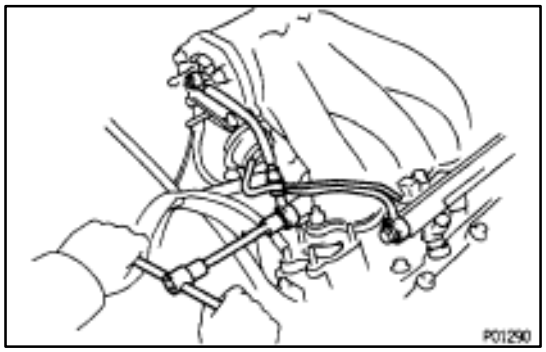
(a) Brake booster vacuum hose
(b) PS air hose
(c) Disconnect the PCV hose
(d) Disconnect EGR water by–pass hose

19. DISCONNECT COLD START INJECTOR CONNECTOR

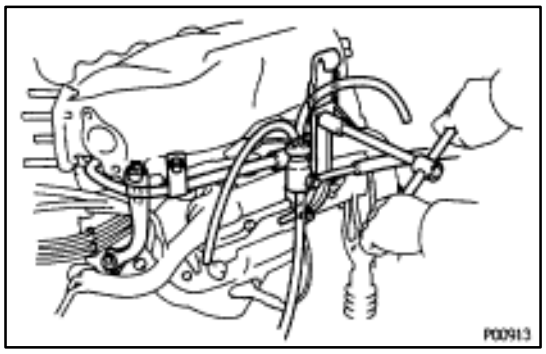


20. REMOVE NO.2 FUEL PIPE

(a) Remove the union bolt and two gaskets, and disconnect the No.2 fuel pipe from the cold start injector.

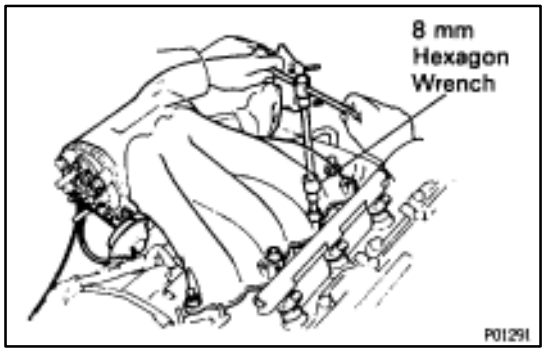


(b) Disconnect the IACV vacuum hose.
(c) Remove the two union bolts, four gaskets and No.2 fuel pipe.

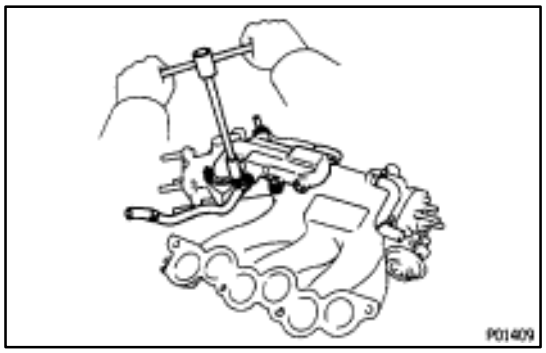


21. REMOVE AIR INTAKE CHAMBER

(a) Remove the nut and disconnect the PS ACV.
(b) Remove the two bolts and No.1 engine hanger.
(c) Remove the two bolts and air intake chamber stay.
(d) Remove the bolt and disconnect the hydraulic pressure pipe.

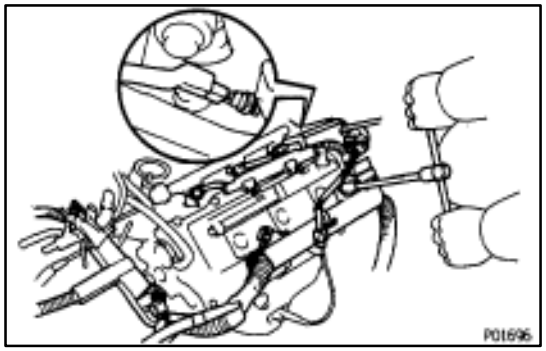


(e) Remove the nut and disconnect the two ground straps.
(f) Using a 8 mm hexagon wrench, remove the two bolts, nuts, air intake chamber and gasket.



22. REMOVE NO.1 COOLER

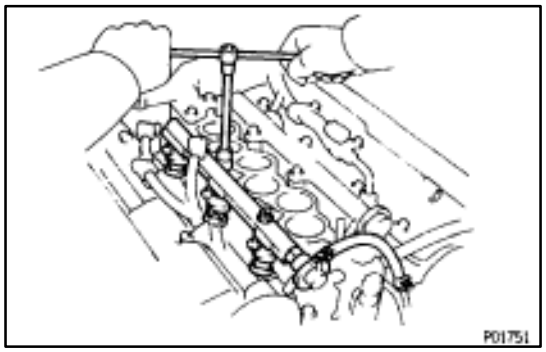
Remove the two nuts, bolt, No.1 EGR cooler and gasket.



23. DISCONNECT RH ENGINE WIRE HARNESS

(a) Disconnect the following connectors:
  (1) Three injector connectors
  (2) Engine coolant temp. sender gauge connector
  (3) Oxygen sensor connector
  (4) PS pump connector
  (5) Oil pressure switch connector
  (6) Engine oil level sensor connector
  (7) A/C compressor connector
  (8) Engine coolant temp. sensor connector (for hydraulic cooling fan)

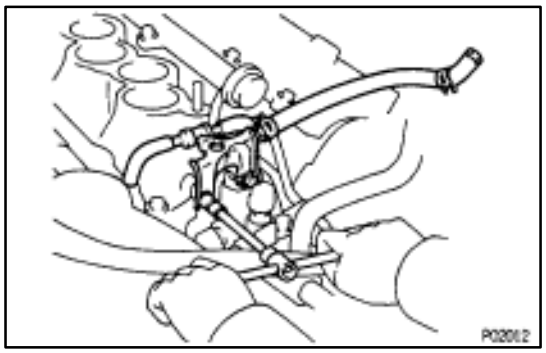
(b) Remove the two clamps, four bolts and engine wire harness.



24. REMOVE LH DELIVERY PIPE AND INJECTORS

(a) Disconnect the fuel return hose from the No.1 fuel pipe (fuel inlet hose).

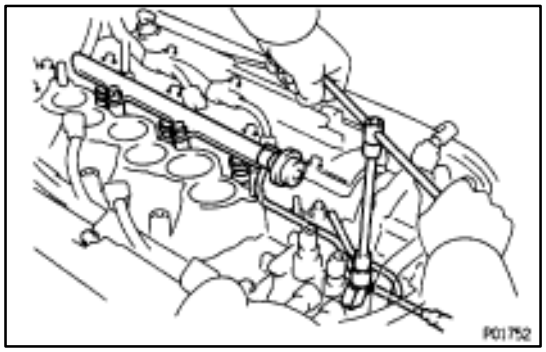
(b) Remove the two bolts and LH delivery pipe together with three injectors.



25. REMOVE AIR PIPE

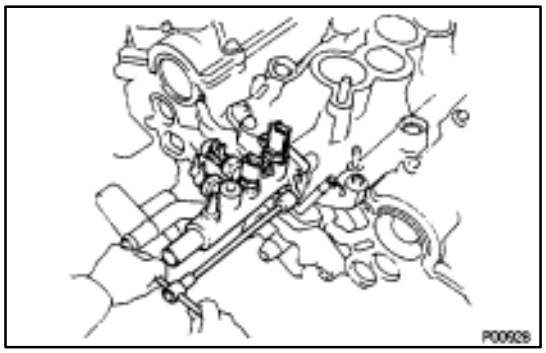
(a) Disconnect the two air hoses from the intake manifold.

(b) Remove the two bolts and air pipe.



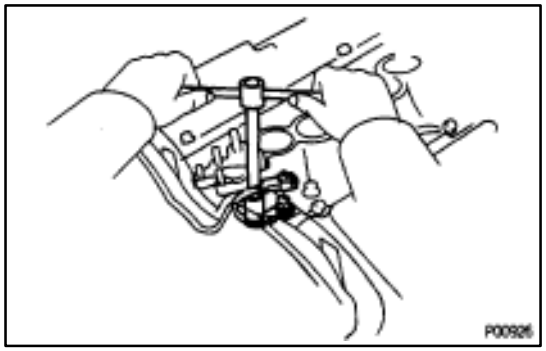
26. REMOVE RH DELIVERY PIPE AND INJECTORS

Remove the three bolts and RH delivery pipe together with the No.1 fuel pipe and three injectors.



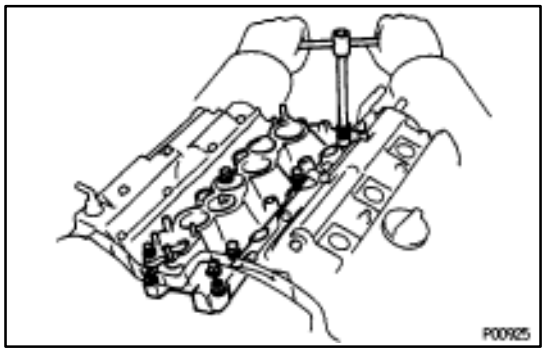
27. REMOVE WATER BY–PASS OUTLET

Remove the two nuts, water by–pass outlet and gasket.

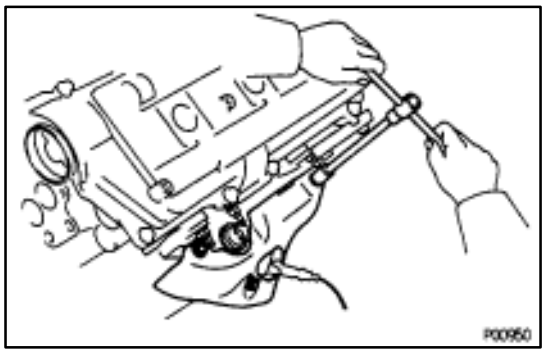


28. REMOVE INTAKE MANIFOLD

(a) Remove the two bolts and No.2 idler pulley bracket stay and disconnect the ground strap.

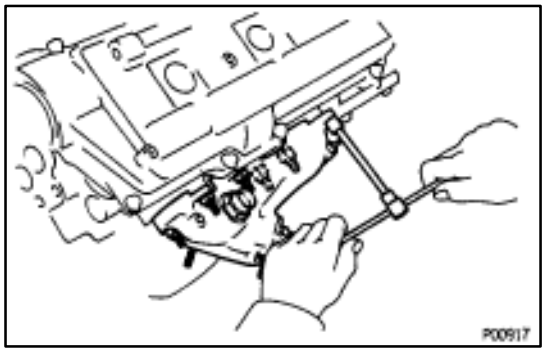


(b) Remove the eight bolts, four nuts, intake manifold and gasket.

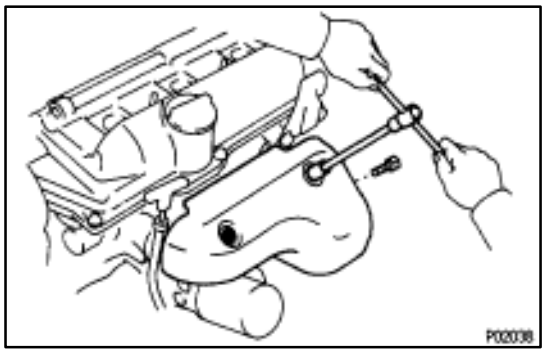


29. REMOVE RH EXHAUST MANIFOLD

(a) Remove the three nuts and heat insulator.

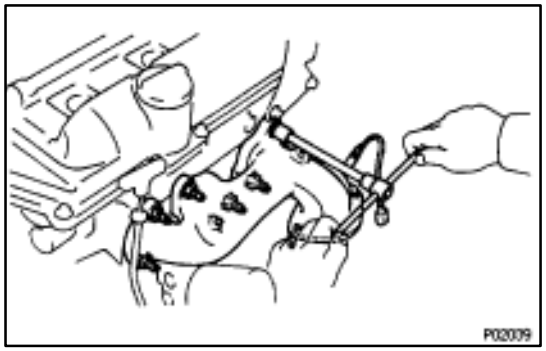


(b) Remove the six nuts, exhaust manifold and gasket.

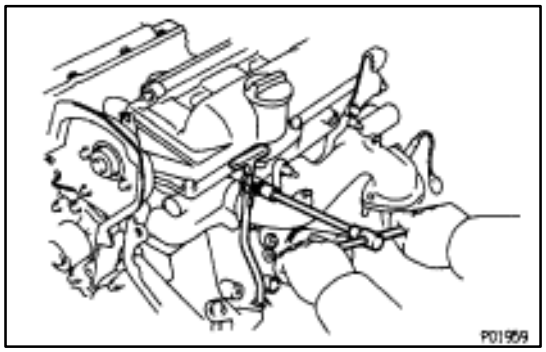


30. REMOVE LH EXHAUST MANIFOLD

(a) Remove the bolt, two nuts, and heat insulator.



(b) Remove the six nuts, exhaust manifold and gasket.



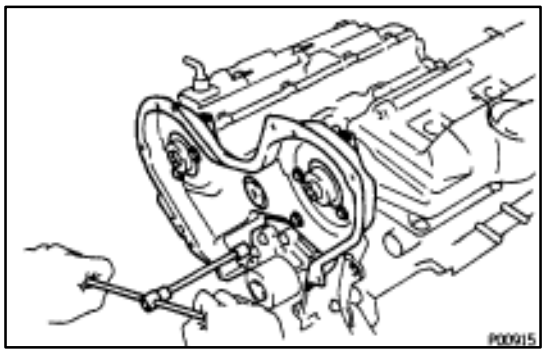
31. REMOVE OIL DIPSTICK ASSEMBLY

Remove the bolt and oil dipstick assembly.

32. REMOVE SPARK PLUGS

33. REMOVE TIMING BELT, CAMSHAFT TIMING PULLEYS AND NO.2 IDLER PULLEY

(See page EG–29)

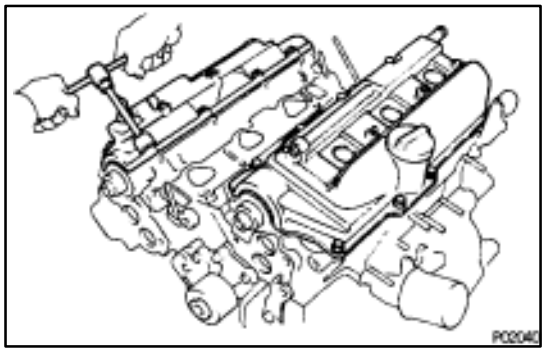


34. REMOVE No.3 TIMING BELT COVER

Remove the six bolts and timing belt cover.

NOTICE:

- **Support the belt, so the meshing of the crankshaft timing pulley and timing belt does not shift.**
- **Be careful not to drop anything inside of the timing belt cover.**
- **Do not allow the belt to come into contact with oil, water or dust.**

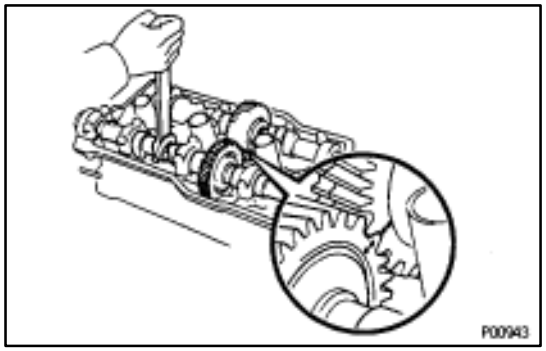


35. REMOVE CYLINDER HEAD COVERS

Remove the eight nuts, seal washers, cylinder head cover and gasket. Remove the two cylinder head covers.

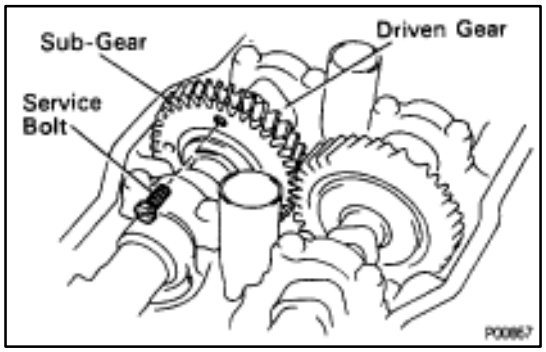
36. REMOVE CAMSHAFTS

NOTICE: Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.

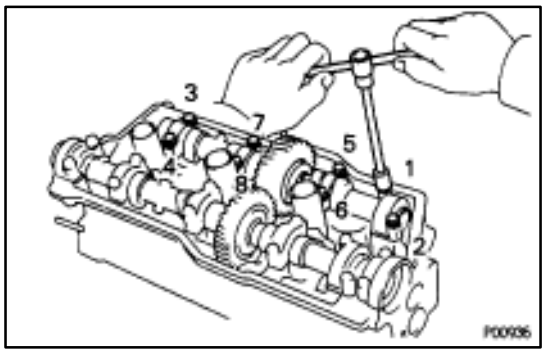


A. Remove exhaust camshaft of RH cylinder head

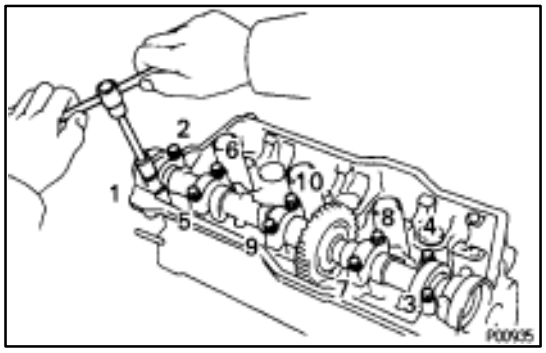
(a) Align the timing marks (two pointed marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(b) Secure the exhaust camshaft sub–gear to the driven gear with a service bolt.
Recommended service bolt:
Thread diameter 6 mm
Thread pitch 1.0 mm
Bolt length 16–20 mm
HINT: When removing the camshaft, mark certain that the torsional spring force of the sub–gear has been eliminated by the above operation.

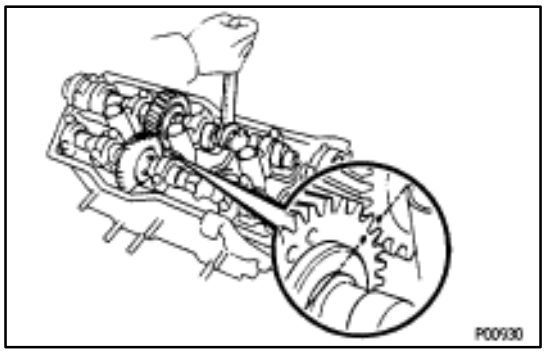


(c) Uniformly loosen and remove the eight bearing cap bolts in several passes, in the sequence shown.
(d) Remove the four bearing caps and exhaust camshaft.



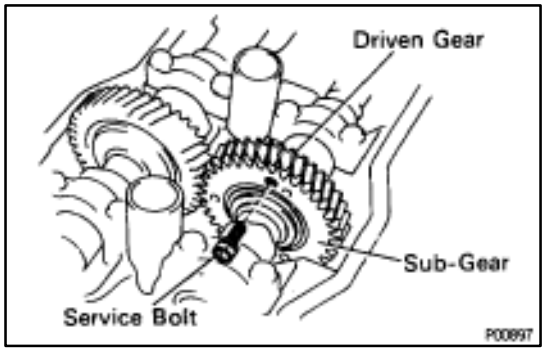
B. Remove intake camshaft of RH cylinder head

(a) Uniformly loosen and remove the ten bearing cap bolts in several passes, in the sequence shown.
(b) Remove the five bearing caps, oil seal and intake camshaft.

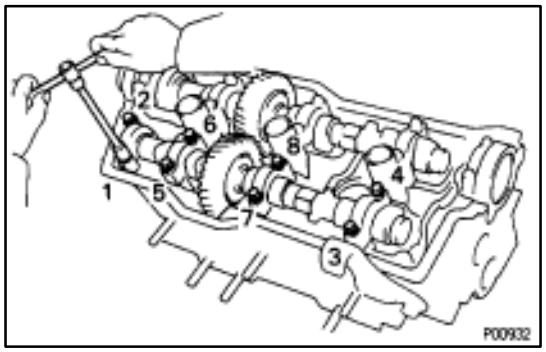


C. Remove exhaust camshaft of LH cylinder head

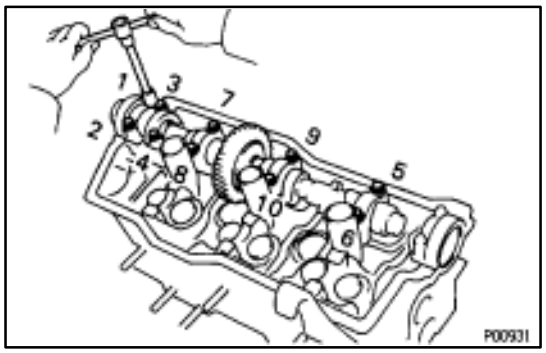
(a) Align the timing marks (one pointed mark) of the camshaft drive and driven gears by turning the camshaft with a wrench.



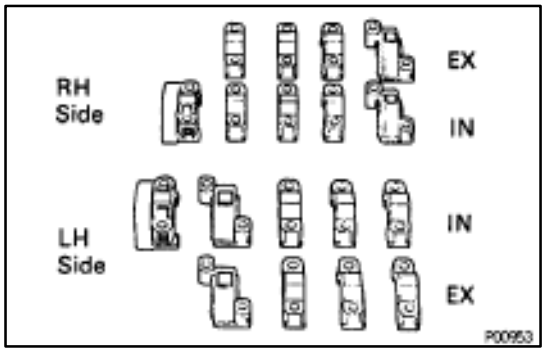
(b) Secure the exhaust camshaft sub–gear to the driven gear with a service bolt.
Recommended service bolt:
Thread diameter 6 mm
Thread pitch 1.0 mm
Bolt length 16–20 mm
HINT: When removing the camshaft, make certain that the torsional spring force of the sub–gear has been eliminated by the above operation.



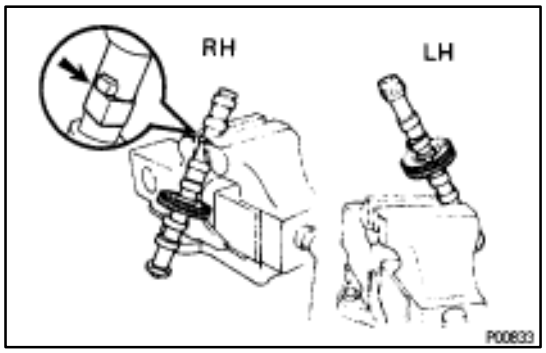
(c) Uniformly loosen and remove the eight bearing cap bolts in several passes, in the sequence shown.
(d) Remove the four bearing caps and exhaust camshaft.



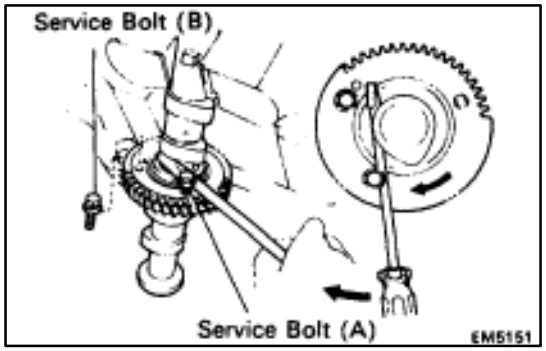
D. Remove intake camshaft of LH cylinder head
(a) Uniformly loosen and remove the ten bearing cap bolts in several passes, in the sequence shown.
(b) Remove the five bearing caps, oil seal and intake camshaft.



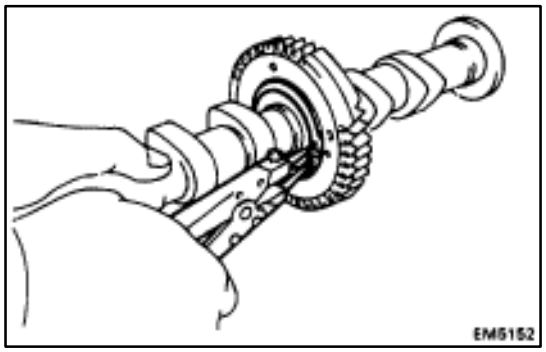
HINT: Arrange the bearing caps in correct order.



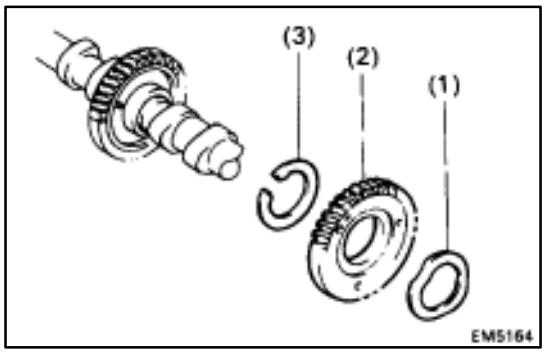
37. DISASSEMBLE EXHAUST CAMSHAFTS
(a) Mount the hexagonal wrench head portion of the camshaft in a vise.
NOTICE: Be careful not to damage the camshaft.



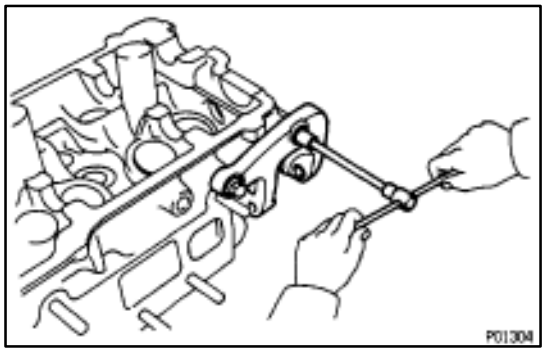
(b) Insert a service bolt (A) into the service hole of the camshaft sub–gear.
(c) Using a screwdriver, turn the sub–gear clockwise, and remove the service bolt (B).
NOTICE: Be careful not to damage the camshaft.



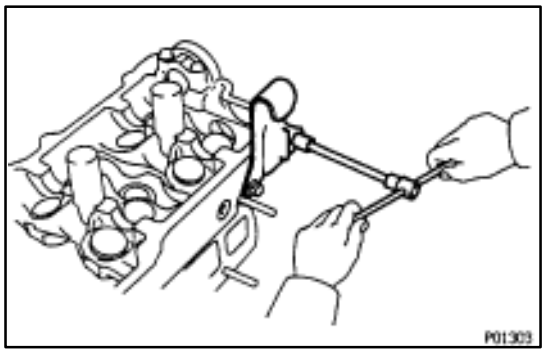
(d) Using snap ring pliers, remove the snap ring.



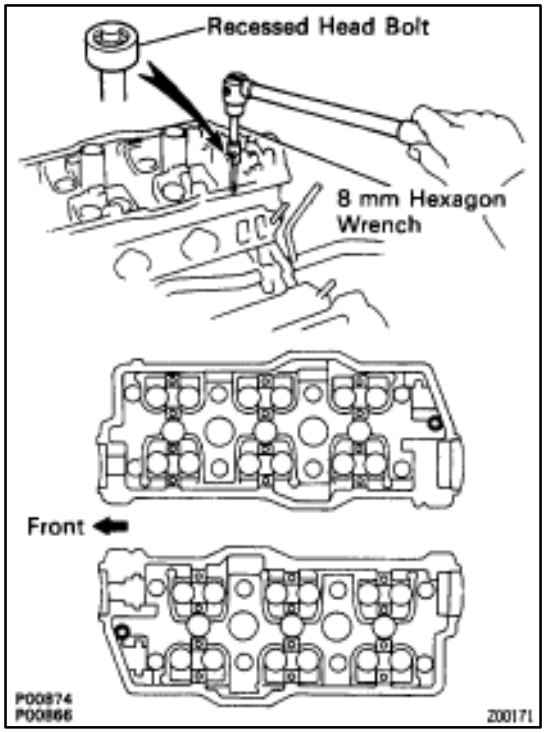
(e) Remove the following parts:
(1) Wave washer
(2) Camshaft sub–gear
(3) Camshaft gear spring.
HINT: Arrange the camshaft sub–gears and gear springs (RH and LH).



38. REMOVE PS PUMP BRACKET
Remove the two bolts and PS pump bracket.

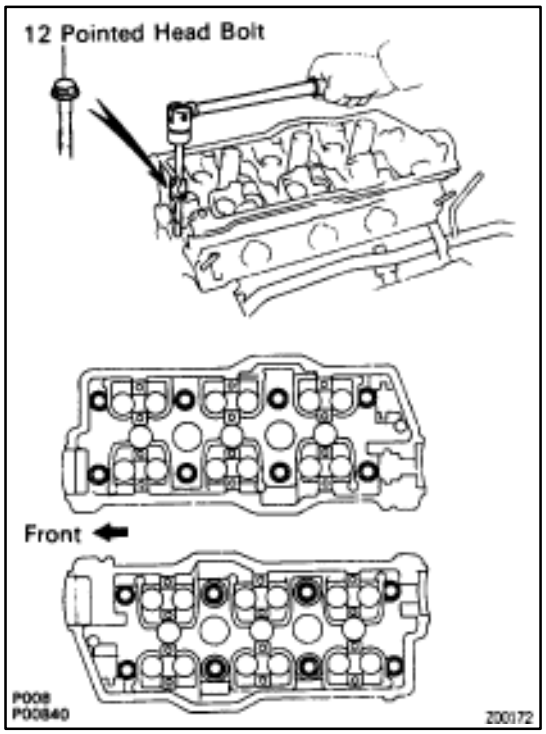


39. REMOVE LH ENGINE HANGER
Remove the two bolts and LH engine hanger.

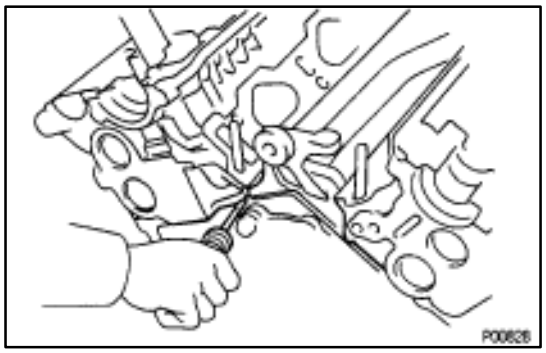


40. REMOVE CYLINDER HEADS

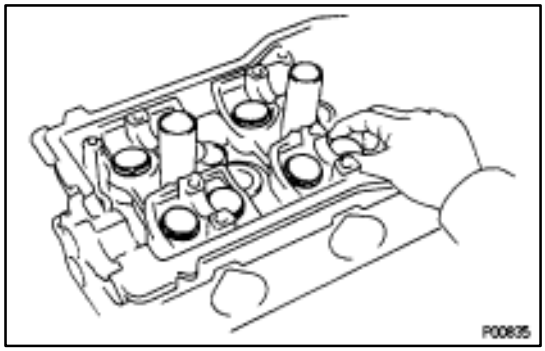
(a) Using a 8 mm hexagon wrench, remove the cylinder head (recessed head) bolts.



(b) Uniformly loosen and remove the cylinder head (12 pointed head) bolts in several passes, in the sequence shown.
NOTICE: Head warpage or cracking could result from removing bolts in an incorrect order.



(c) Lift the cylinder head from the dowels on the cylinder block and place the two cylinder heads on wooden blocks on a bench.
HINT: If the cylinder head is difficult to lift off, pry with a screwdriver between the cylinder head and cylinder block.
NOTICE: Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

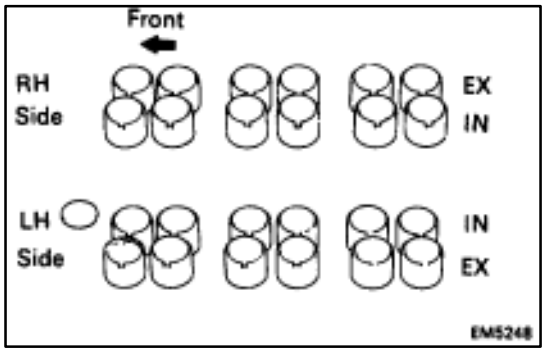


CYLINDER HEADS DISASSEMBLY

EG0F5–01

(See page EG–47)

1. REMOVE VALVE LIFTERS AND SHIMS

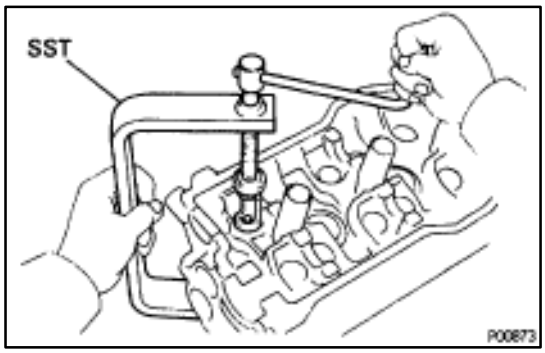


HINT: Arrange the valve lifters and shims in correct order.

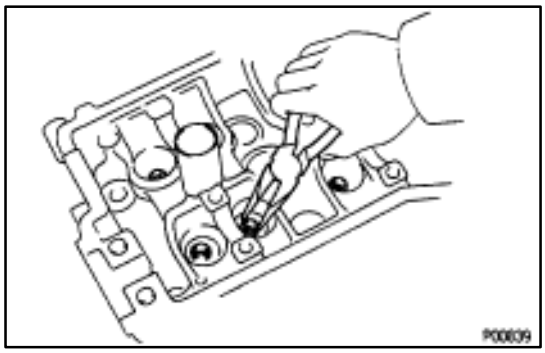
2. REMOVE VALVES

(a) Using SST, compress the valve spring and remove the two keepers.
SST 09202–70010

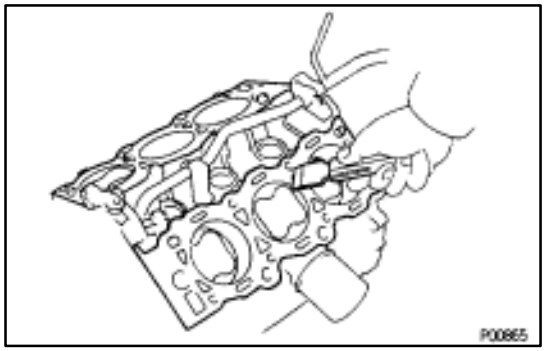
(b) Remove the spring retainer, valve spring, valve and spring seat.



HINT: Arrange the valves, valve springs, spring seats and spring retainers in correct order.



(c) Using needle–nose pliers, remove the oil seal.



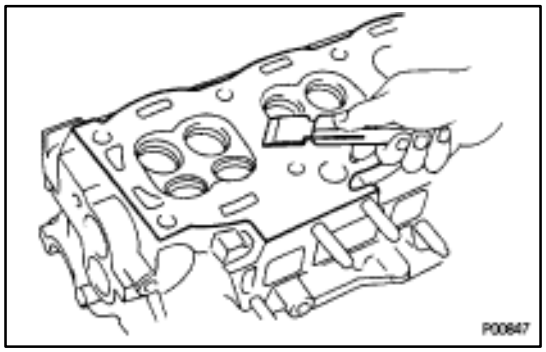
CYLINDER HEAD COMPONENTS INSPECTION, CLEANING AND REPAIR

EG0F6–01

1. CLEAN TOP OF PISTONS AND TOP OF BLOCK

(a) Turn the crankshaft and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surfaces.

(b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.



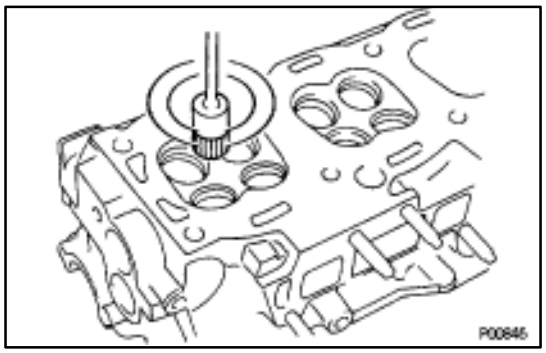
(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION: Protect your eyes when using high–pressure compressed air.

2. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

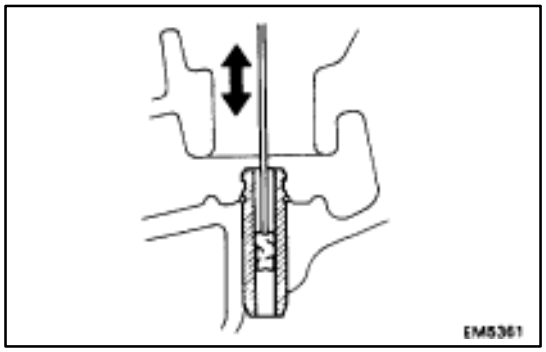
NOTICE: Be careful not to scratch the surfaces.



3. CLEAN COMBUSTION CHAMBERS

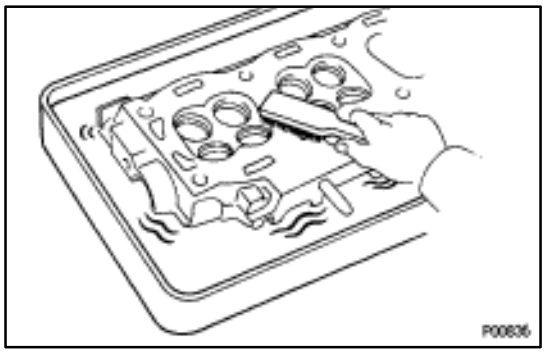
Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE: Be careful not to scratch the cylinder block contact surface.



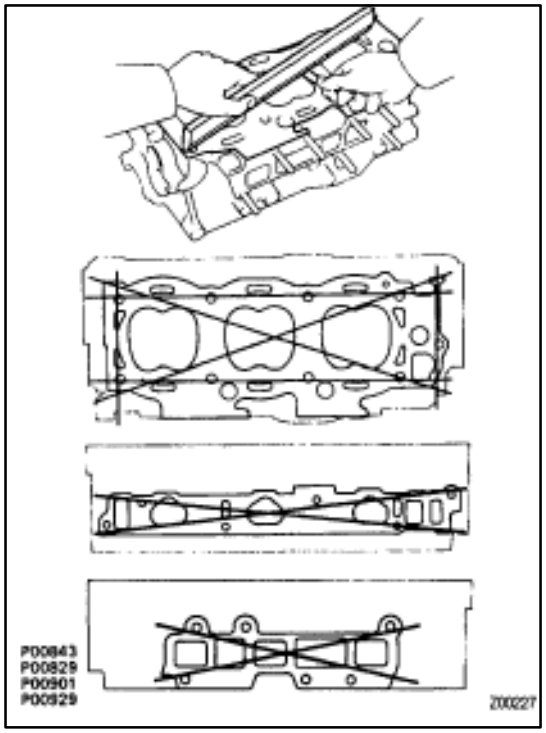
4. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide bushing brush and solvent, clean all the guide bushings.



5. CLEAN CYLINDER HEADS

Using a soft brush and solvent, thoroughly clean the cylinder heads.



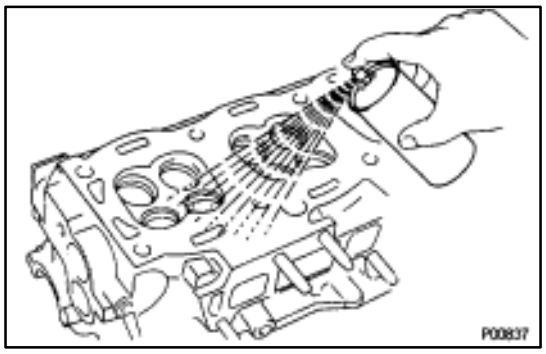
6. INSPECT CYLINDER HEADS FOR FLATNESS

Using precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and manifolds for warpage.

Maximum warpage:

0.10 mm (0.0039 in.)

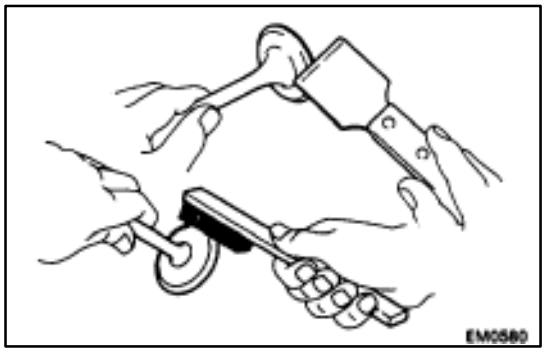
If warpage is greater than maximum, replace the cylinder head.



7. INSPECT CYLINDER HEAD FOR CRACKS

Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

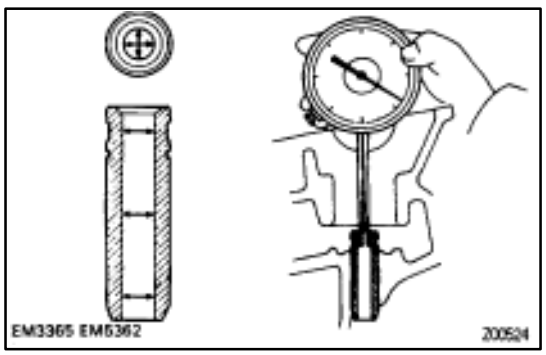
If cracked, replace the cylinder head.



8. CLEAN VALVES

(a) Using a gasket scraper, chip off any carbon from the valve head.

(b) Using a wire brush, thoroughly clean the valve.

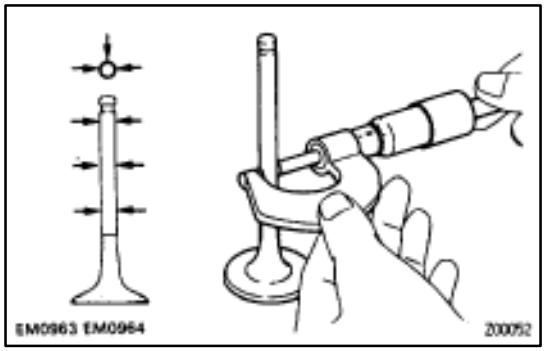


9. INSPECT VALVE STEMS AND GUIDE BUSHINGS

(a) Using a caliper gauge, measure the inside diameter of the guide bushing.

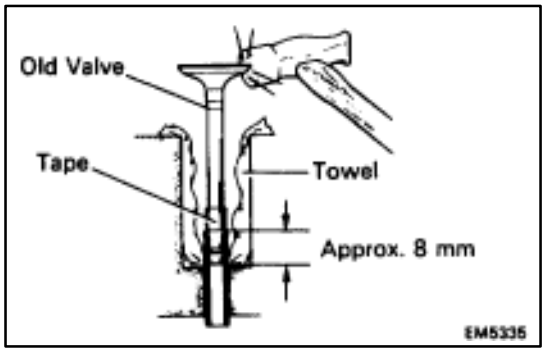
Bushing inside diameter:

6.010–6.030 mm (0.2366–0.2374 in.)



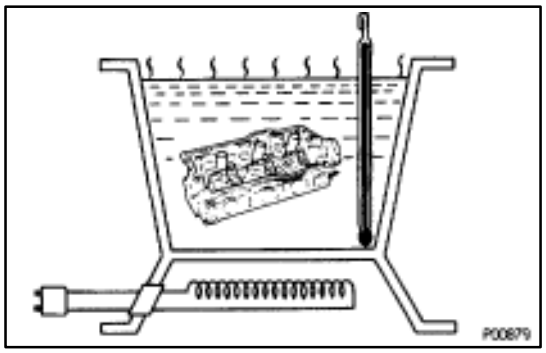
(b) Using a micrometer, measure the diameter of the valve stem.
Valve stem diameter:
Intake
5.970–5.985 mm (0.2350–0.2356 in.)
Exhaust
5.965–5.980 mm (0.2348–0.2354 in.)

(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.

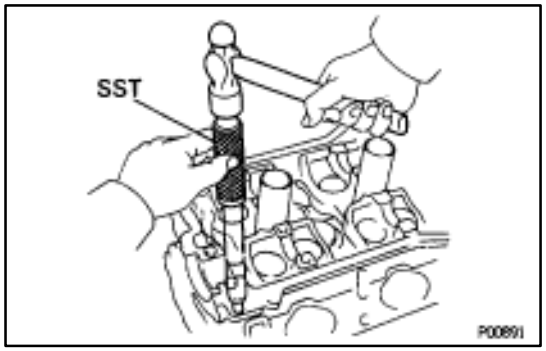


10. IF NECESSARY, REPLACE VALVE GUIDE BUSHINGS

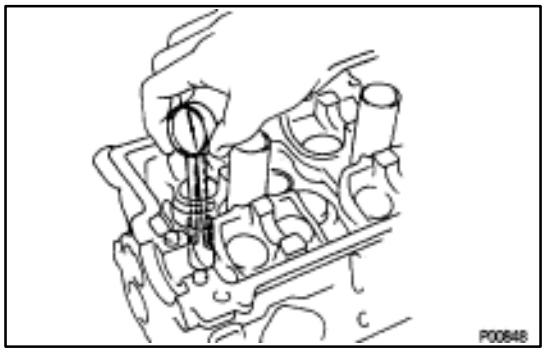
(a) Insert an oil valve wrapped with tape into the valve guide bushing, and break off the valve guide bushing by hitting it with a hammer. Remove the snap ring.
HINT: Wrap the tape approx. 8 mm (0.31 in.) from the valve stem end.
NOTICE: Be careful not to damage the valve lifter hole.



(b) Gradually heat the cylinder head to 80–100°C (176–212°F).



(c) Using SST and a hammer, tap out the guide bushing.
SST 09201–70010

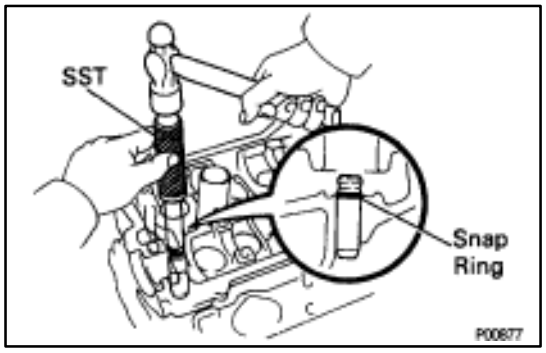


(d) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.
Both intake and exhaust

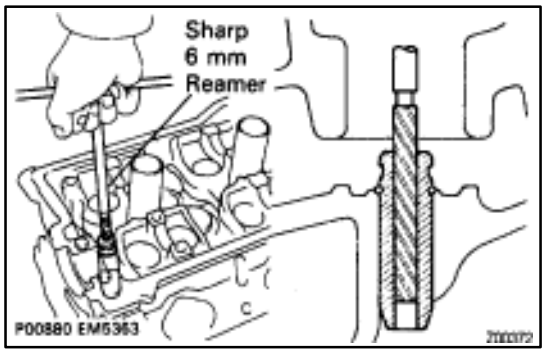
(e) Select a new guide bushing (STD size or O/S 0.05).

Bushing bore diameter mm (in.)	Bushing size
11.000–11.027 (0.4331–0.4342)	Use STD
11.050–11.077 (0.4350–0.4361)	Use O/S 0.05

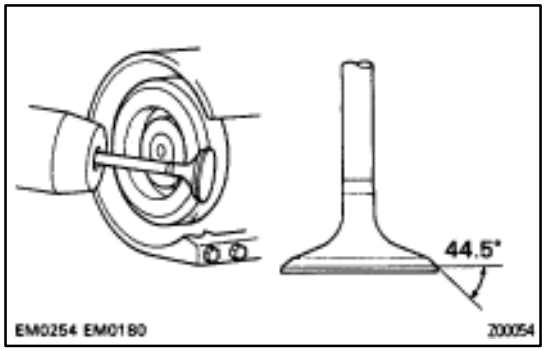
If the bushing bore diameter of the cylinder head is greater than 11.027 mm (0.4341 in.), machine the bushing bore to the following dimension:
11.050–11.077 mm (0.4350–0.4361 in.)
If the bushing bore diameter of the cylinder head is greater than 11.077 mm (0.4361 in.), replace the cylinder head.



(f) Gradually heat the cylinder head to 80–100°C (176–212°F).
(g) Using SST and a hammer, tap in a new guide bushing until the snap ring makes contact with the cylinder head.
SST 09201–70010



(h) Using a sharp 6 mm reamer, ream the guide bushing to obtain the standard specified clearance (See page EG–63) between the guide bushing and valve stem.



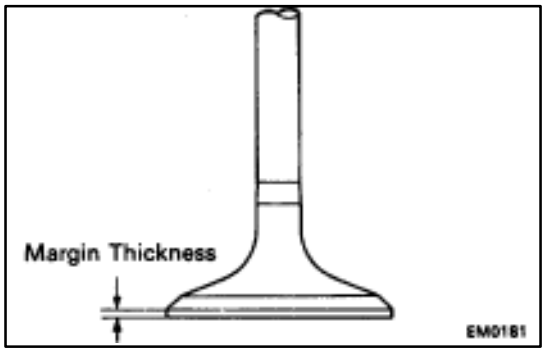
11. INSPECT AND GRIND VALVES

(a) Grind the valve enough to remove pins and carbon.

(b) Check that the valve is ground to the correct valve face angle.

Valve face angle:

44.5°



(c) Check the valve head margin thickness.

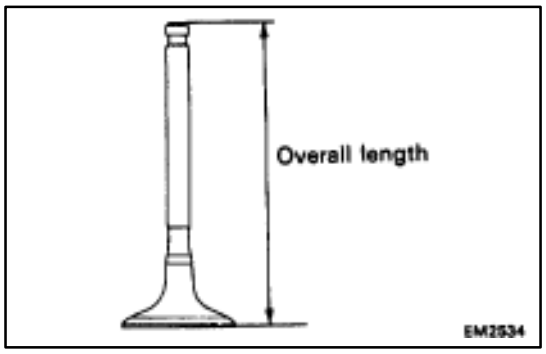
Standard margin thickness:

1.0 mm (0.039 in.)

Minimum margin thickness:

0.5 mm (0.020 in.)

If the margin thickness is less than minimum, replace the valve.



(d) Check the valve overall length.

Standard overall length:

Intake

95.15 mm (3.7461 in.)

Exhaust

94.90 mm (3.7362 in.)

Minimum overall length:

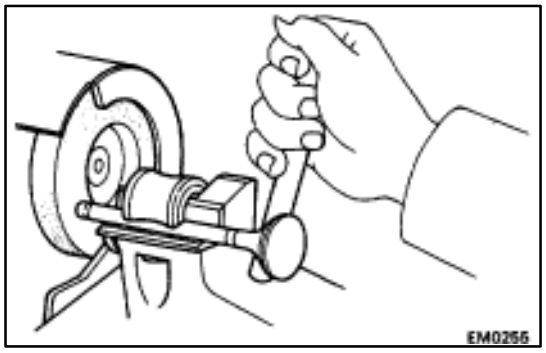
Intake

94.6 mm (3.724 in.)

Exhaust

94.4 mm (3.717 in.)

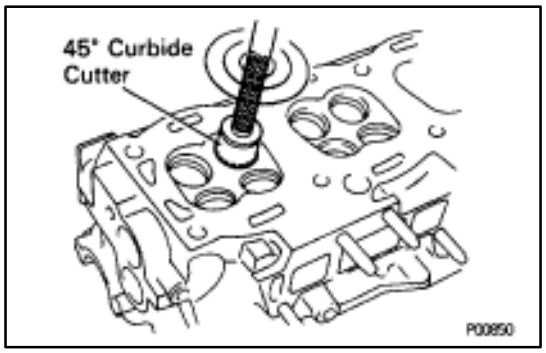
If the overall length is less than minimum, replace the valve.



(e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

NOTICE: Do not grind off more than minimum.



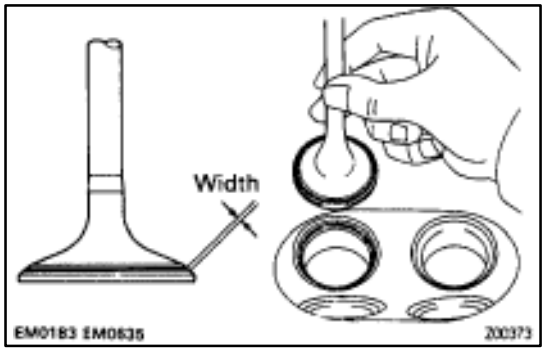
12. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45 1 carbide cutter, resurface the valve seats.

Remove only enough metal to clean the seats.

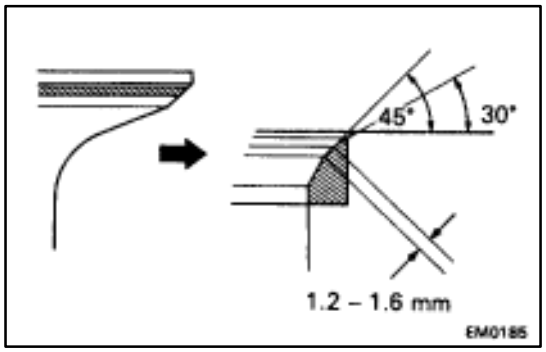
(b) Check the valve seating position.

Apply a thin coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate the valve.



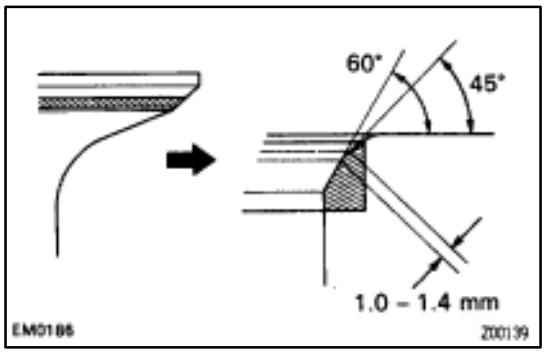
(c) Check the valve face and seat for the following:
- If blue appears 360 [1] around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360 [1] around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:

1.0–1.4 mm (0.039–0.055 in.)

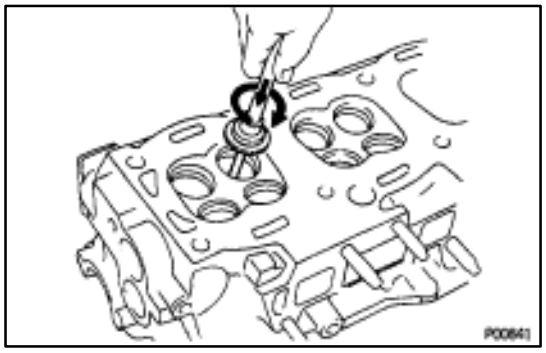


If not, correct the valve seats as follows:

(1) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

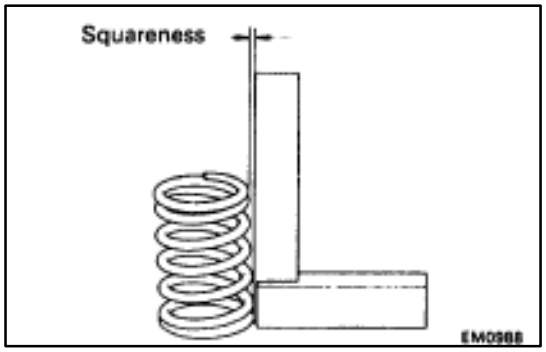


(2) If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.



(d) Hand–lap the valve and valve seat with an abrasive compound.

(e) After hand–lapping, clean the valve and valve seat.



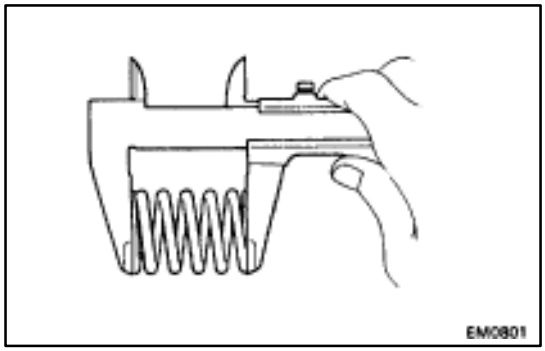
13. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the squareness of the valve spring.

Maximum squareness:

2.0 mm (0.075 in.)

If deviation is greater than maximum, replace the valve spring.

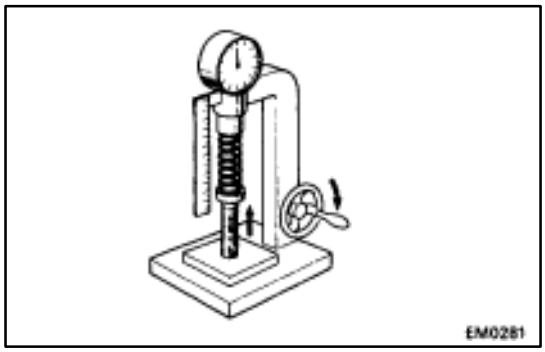


(b) Using a vernier caliper, measure the free length of the valve spring.

Free length:

41.4 mm (1.630 in.)

If the free length is not as specified, replace the valve spring.

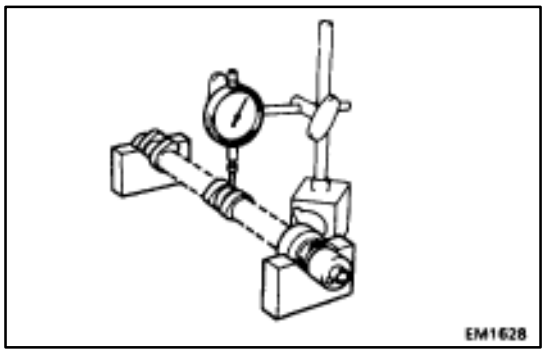


(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

186–206 N (19.0–21.0 kgf, 38.4–42.4 lbf) at 33.3 mm (1.311 in.)

If the installed tension is not as specified, replace the valve spring.



14. INSPECT CAMSHAFTS AND BEARINGS

A. Inspect camshaft for runout

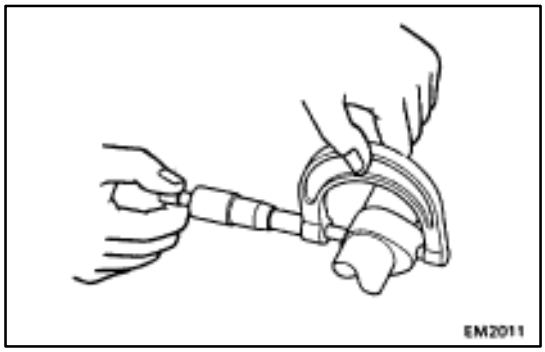
(a) Place the camshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout:

0.06 mm (0.0024 in.)

If the circuit runout is greater than maximum, replace the camshaft.



B. Inspect cam lobes

Using a micrometer, measure the cam lobe height.

Standard cam lobe height:

Intake

42.160–42.260 mm (1.6598–1.6638 in.)

Exhaust

41.960–42.060 mm (1.6520–1.6559 in.)

Minimum cam lobe height:

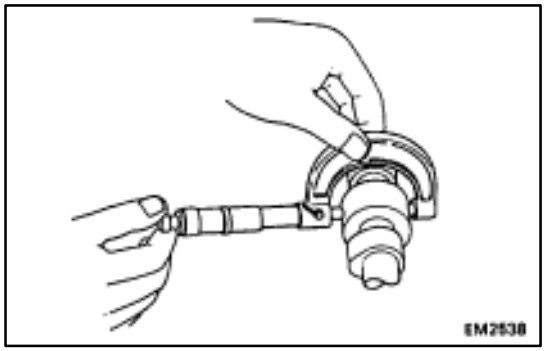
Intake

42.01 mm (1.6539 in.)

Exhaust

41.81 mm (1.6461 in.)

If the cam lobe height is less than minimum, replace the camshaft.



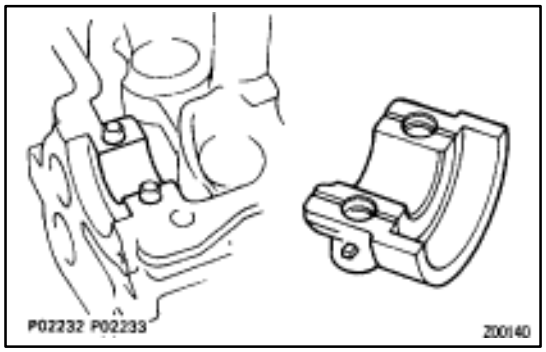
C. Inspect camshaft journals

Using micrometer, measure the journal diameter.

Journal diameter:

26.949–26.965 mm (1.0610–1.0616 in.)

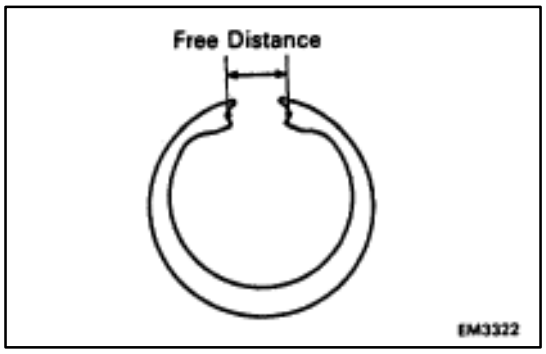
If the journal diameter is not as specified, check the oil clearance.



D. Inspect camshaft bearings

Check the bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.



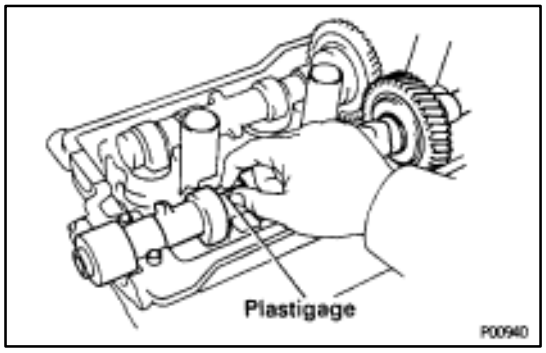
E. Inspect camshaft gear spring

Using a vernier caliper, measure the free distance between the spring end.

Free distance:

18.2–18.8 mm (0.712–0.740 in.)

If the free distance is not as specified, replace the gear spring.

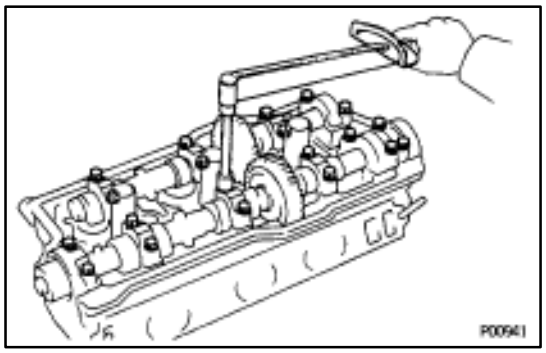


F. Inspect camshaft journal oil clearance

(a) Clean the bearing caps and camshaft journals.

(b) Place the camshafts on the cylinder head.

(c) Lay a strip of Plastigage across each of the camshaft journals.

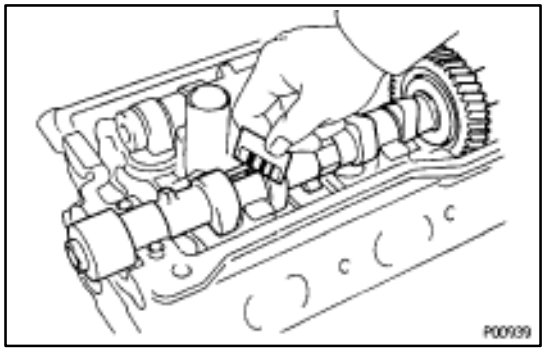


(d) Install the bearing caps.

(See step 5 on page EG–73)

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

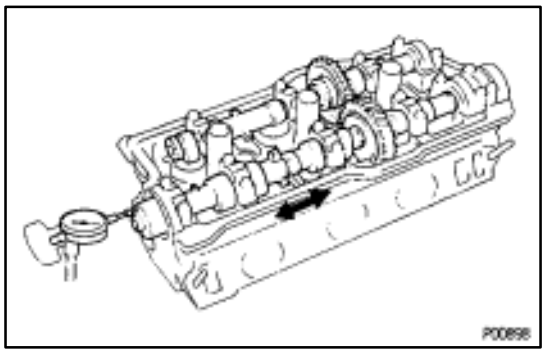
NOTICE: Do not turn the camshaft.



(e) Remove the bearing caps.
(f) Measure the Plastigage at its widest point.
Standard oil clearance:
0.035–0.072 mm (0.0014–0.0028 in.)
Maximum oil clearance:
0.10 mm (0.0039 in.)
If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.
(g) Completely remove the Plastigage.

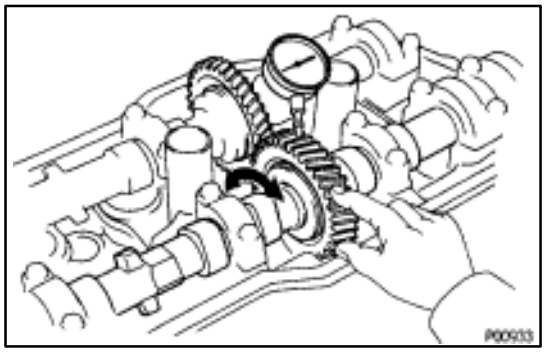
G. Inspect camshaft thrust clearance

(a) Install the camshafts.
(See step 5 on page EG–73)

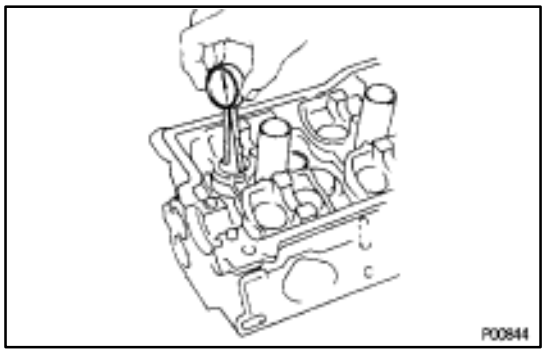


(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.
Standard thrust clearance:
0.033–0.080 mm (0.0013–0.0031 in.)
Maximum thrust clearance:
0.12 mm (0.0047 in.)
If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

H. Inspect camshaft gear backlash

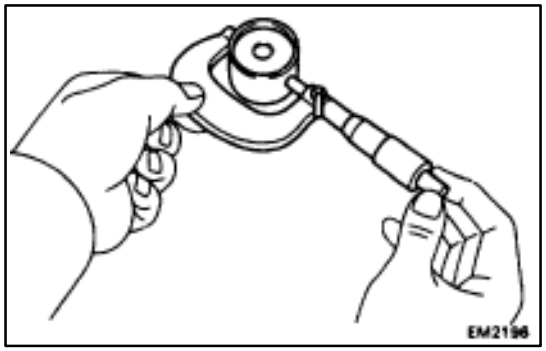


(a) Install the camshafts without installing the exhaust camshaft sub–gear.
(See step 5 on page EG–73)
(b) Using a dial indicator, measure the backlash.
Standard backlash:
0.020–0.200 mm (0.0008–0.0079 in.)
Maximum backlash:
0.30 mm (0.0188 in.)
If the backlash is greater than maximum, replace the camshafts.



15. INSPECT VALVE LIFTERS AND LIFTER BORES

(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.
Lifter bore diameter:
31.000–31.018 mm (1.2204–1.2212 in.)



(b) Using a micrometer, measure the lifter diameter.

Lifter diameter:

30.966 – 30.976 mm (1.2191 – 1.2195 in.)

(c) Subtract the lifter diameter measurement from the lifter bore diameter measurements.

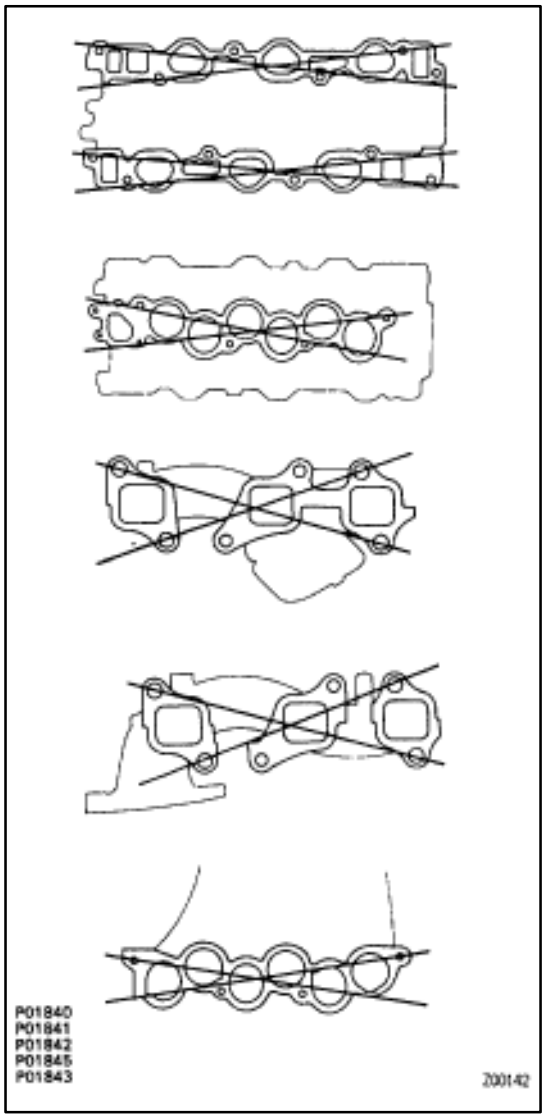
Standard oil clearance:

0.024 – 0.052 mm (0.0009 – 0.0020 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.



16. INSPECT INTAKE MANIFOLD, EXHAUST MANIFOLDS AND AIR INTAKE CHAMBER

(a) (Intake Manifold)

Using precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head and air intake chamber for warpage.

Maximum warpage:

0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the intake manifold.

(b) (Exhaust Manifolds)

Measure the surfaces contacting the cylinder head for warpage.

Maximum warpage:

1.00 mm (0.0394 in.)

If warpage is greater than maximum, replace the exhaust manifold.

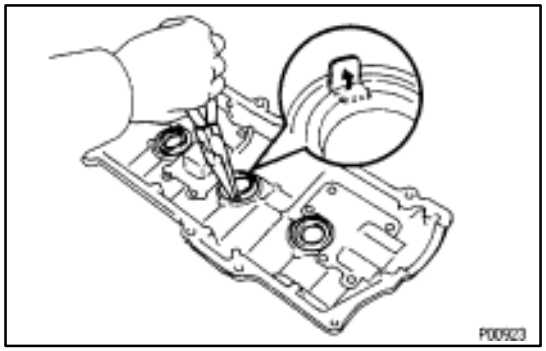
(c) (Air Intake Chamber)

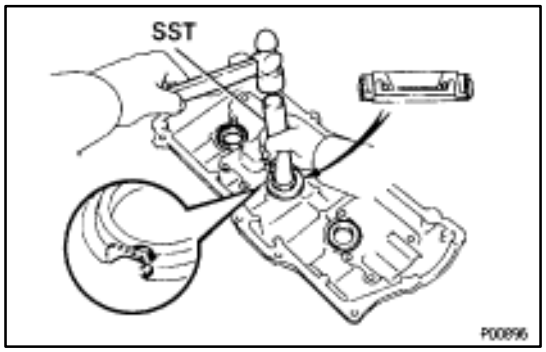
Measure the surfaces contacting the intake manifold for warpage.

Maximum warpage:

0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the air intake chamber.





17. IF NECESSARY, REPLACE SPARK PLUG TUBE GASKETS

(a) Bend up the tab on the ventilation baffle plate which prevents the gasket from slipping out.
NOTICE: Do not deform the baffle plate gasket.

(b) Push in part of the outer circumference of the plug tube gasket and use needle–nose pliers to remove the plug gasket.
NOTICE: Do not scratch or damage the joint of the cylinder head cover.

(c) Using SST, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.
SST 09550–10012 (09552–10010, 09558–10010)

(d) Apply a light coat of MP grease to the gasket lip.

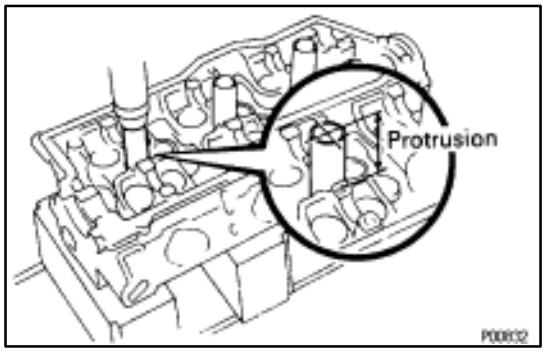
(e) Return the ventilation case claw to its original position.

CYLINDER HEADS ASSEMBLY

EG0F7–02

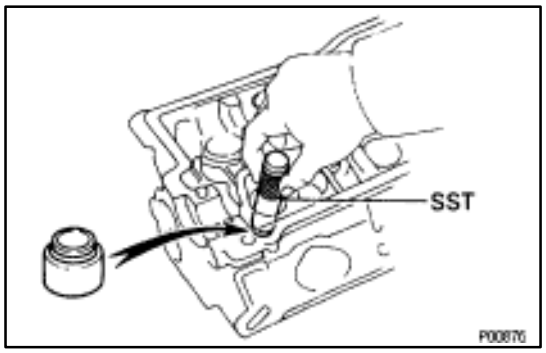
(See page EG–47)

HINT:
- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



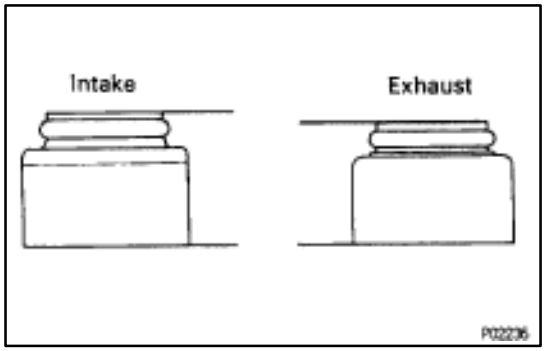
1. INSTALL SPARK PLUG TUBES

HINT: When using a new cylinder head, spark plug tubes must be installed.
Using a press, press in a new spark plug tube until there is 49.0–49.4 mm (1.929–1.945 in.) protruding from the camshaft bearing cap installation surface of the cylinder head.
NOTICE: Avoid pressing a new spark plug tube in too far by measuring the amount of protrusion while pressing.

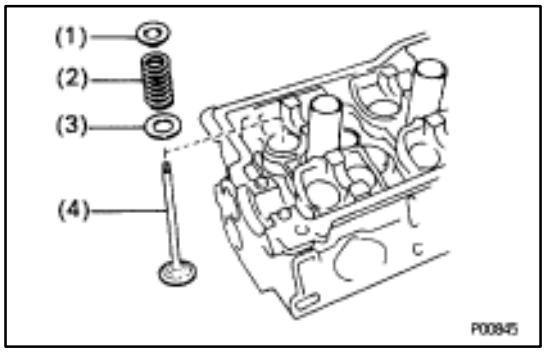


2. INSTALL VALVES

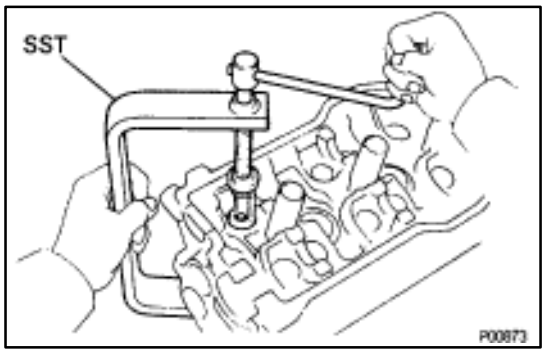
(a) Using SST, push in a new oil seal.
SST 09201–41020



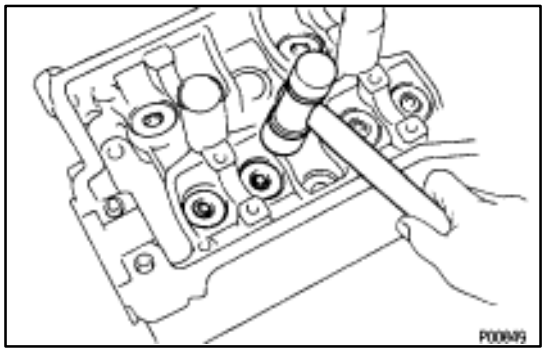
HINT: Different oil seals are used for the intake and exhaust.



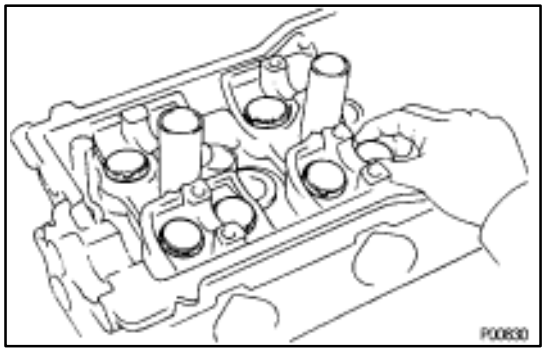
(b) Install the following parts:
(1) Valve
(2) Spring seat
(3) Valve spring
(4) Spring retainer



(c) Using SST, compress the valve spring and place the two keepers around the valve stem.
SST 09202–70010

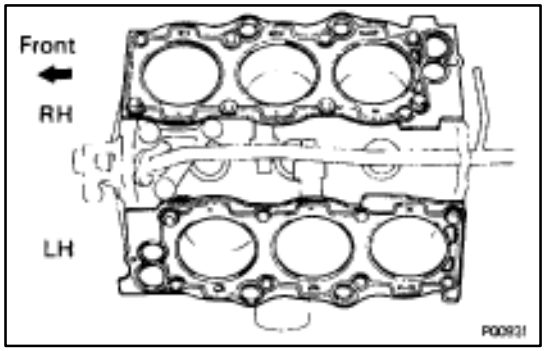


(d) Using a plastic–faced hammer, lightly tap the valve stem tip to assure proper fit.



3. INSTALL VALVE LIFTERS AND SHIMS

Check the valve lifter rotates smoothly by hand.



CYLINDER HEADS INSTALLATION

(See page EG–47)

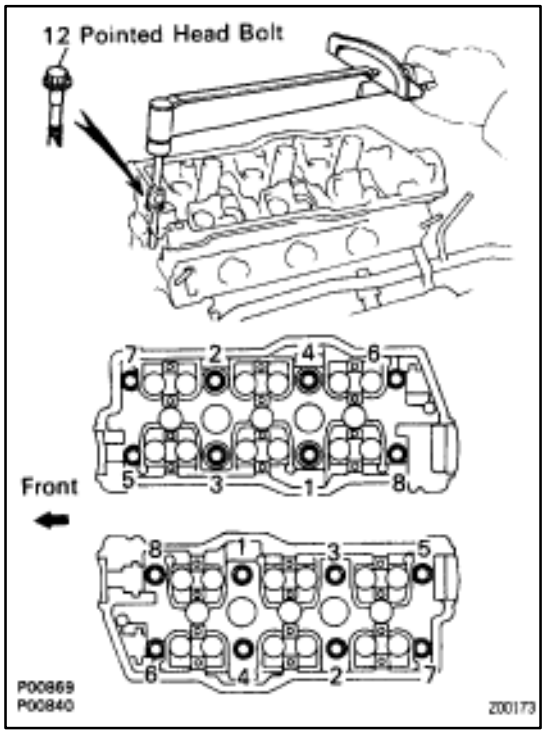
1. INSTALL CYLINDER HEADS

A. Place cylinder head on cylinder block

(a) Place a new cylinder head gasket in position on the cylinder block.

NOTICE: Be sure to install the gasket correctly.

(b) Place the cylinder head in position on the cylinder head gasket.



B. Install cylinder head (12 pointed head) bolts

HINT:

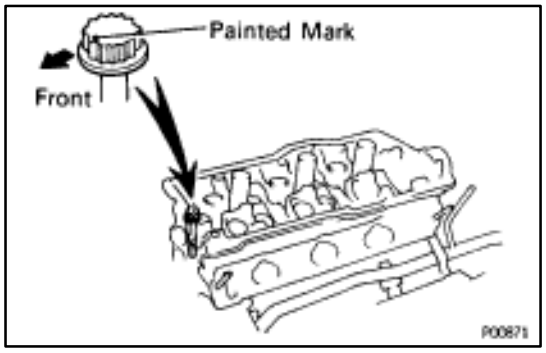
- The cylinder hrad bolts are tightened in three progressive steps (steps (b), (d) and (e)).
- If any bolts is broken or deformed, replace it.

(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

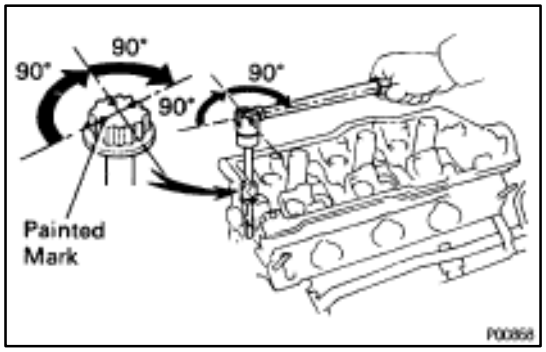
(b) Install and uniformly tighten the cylinder head bolts in several passes, in the sequence shown.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

If any one of the bolts does not meet the torque specification, replace the bolt.



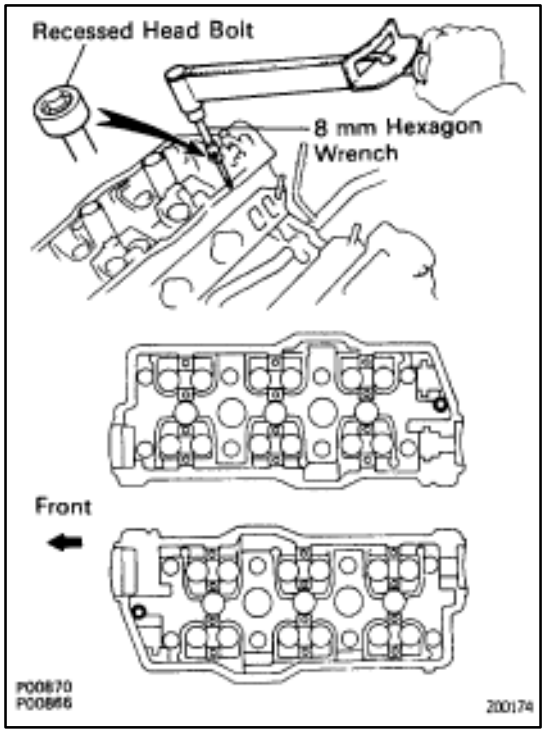
(c) Mark the front of the cylinder head bolt head with paint.



(d) Retighten the cylinder head bolts 90□1 in the numerical order shown.

(e) Retighten cylinder head bolts by an additional 90□1

(f) Check that the painted mark is now facing rearward.

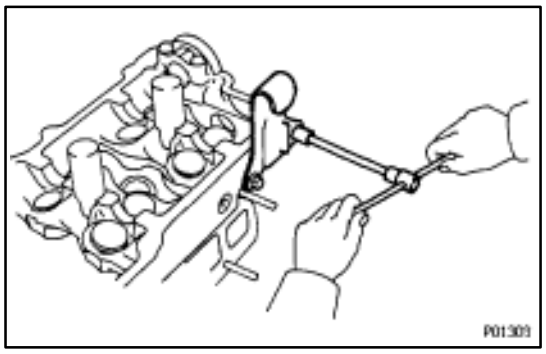


C. Install cylinder head (recessed head) bolts

(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

(b) Using a 8 mm hexagon wrench, install the cylinder head bolts.

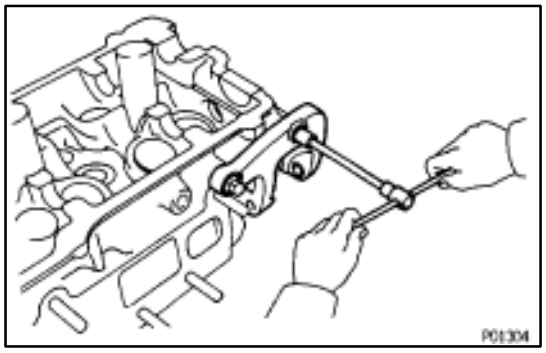
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



2. INSTALL LH ENGINE HANGER

Install the LH engine hanger with the two bolts.

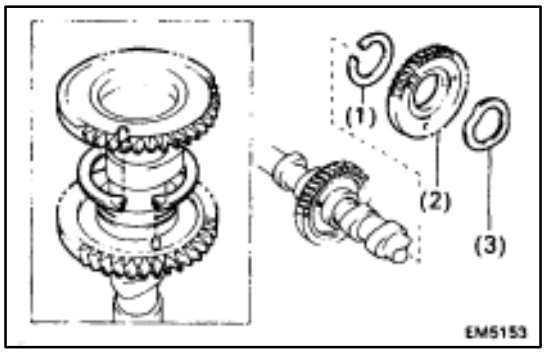
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



3. INSTALL PS PUMP BRACKET

Install the PS pump bracket with the three bolts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



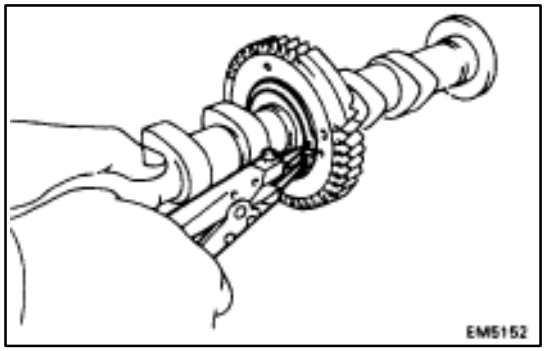
4. ASSEMBLY EXHAUST CAMSHAFTS

(a) Install the following parts:

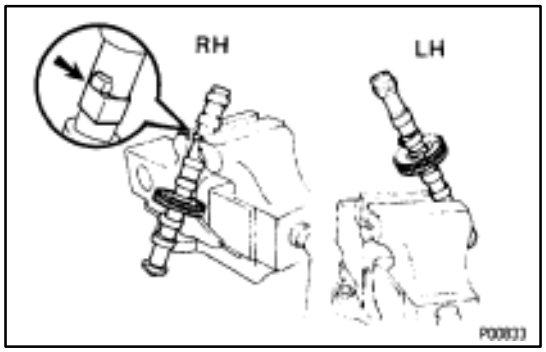
(1) Camshaft gear spring

(2) Camshaft sub–gear

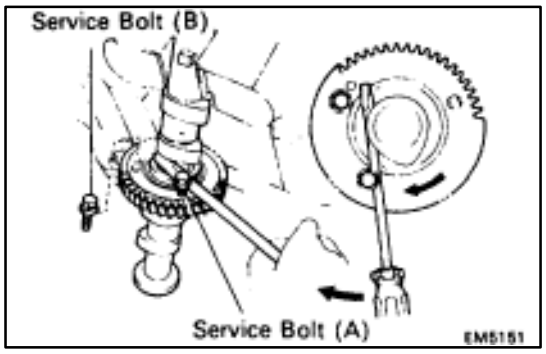
(3) Wave washer



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

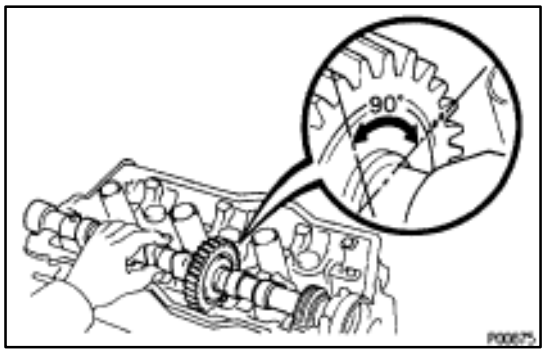


(c) Mount the hexagonal wrench head portion of the camshaft in a vise.
NOTICE: Be careful not to damage the camshaft.

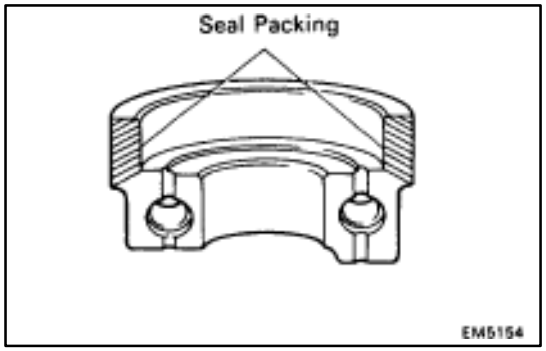


(d) Insert a service bolt (A) into the service hole of the camshaft sub–gear.
(e) Using a screwdriver, align the holes of the camshaft driven gear and sub–gear by turning camshaft subgear clockwise, and install a service bolt (B).
NOTICE: Be careful not to damage the camshaft.

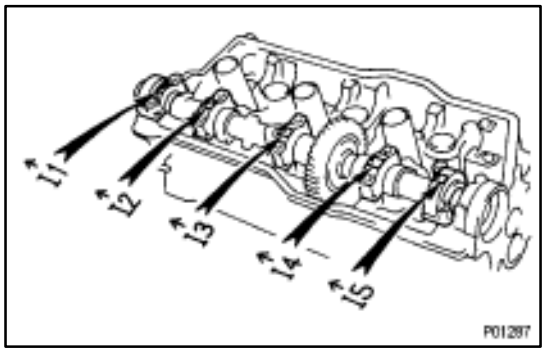
5. INSTALL CAMSHAFTS
NOTICE: Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being installed. If the camshaft is not level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



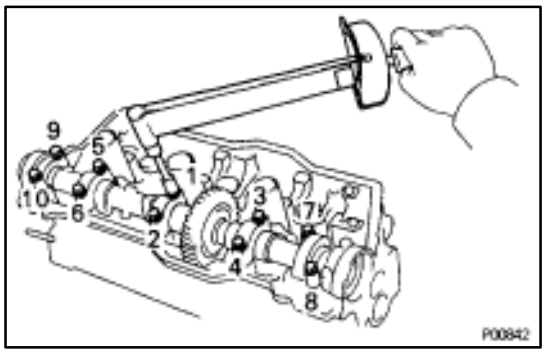
A. Install intake camshaft of RH cylinder head
(a) Apply MP grease to the thrust portion of the camshaft.
(b) Place the intake camshaft at 90□1angle of timing mark (two pointed marks) on the cylinder head.



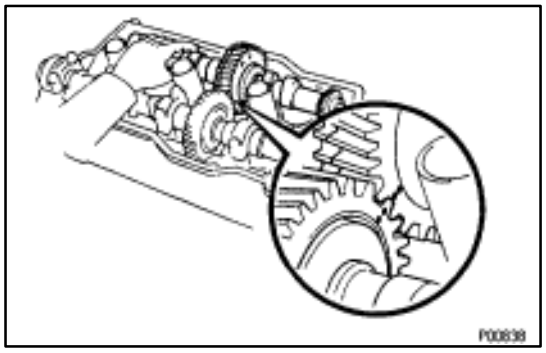
(c) Apply seal packing to the No.1 bearing cap as shown.
Seal packing:
Part No.08826–00080 or equivalent



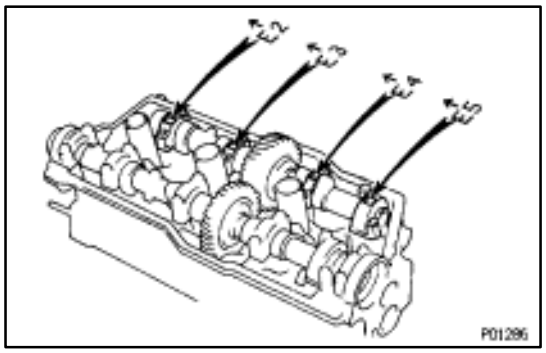
(d) Install the five bearing caps in their proper locations.



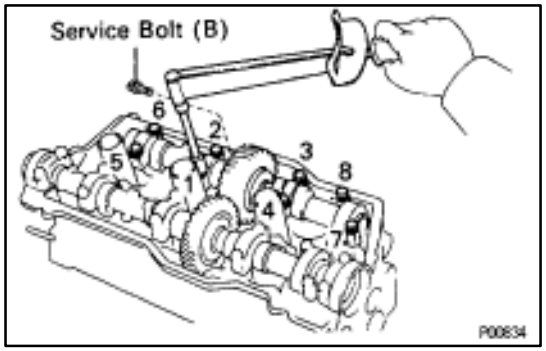
(e) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(f) Install and uniformly tighten the ten bearing cap bolts in several passes, in the sequence shown.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



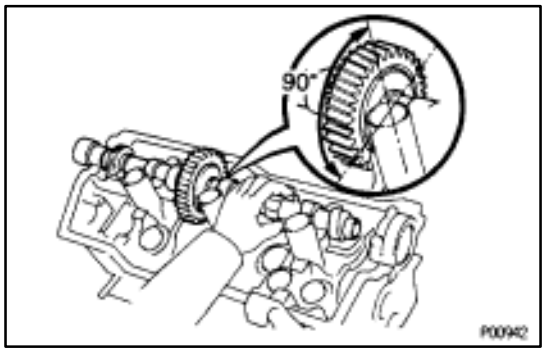
B. Install exhaust camshaft of RH cylinder head
(a) Apply MP grease to the thrust portion of the camshaft.
(b) Align the timing marks (two pointed marks) of the camshaft drive and driven gears.
(c) Place the exhaust camshaft on the cylinder head.



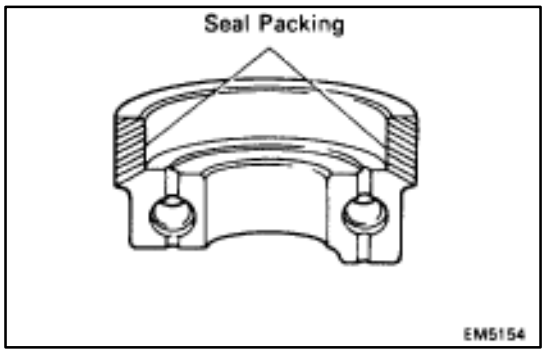
(d) Install the four bearing caps in their proper locations.



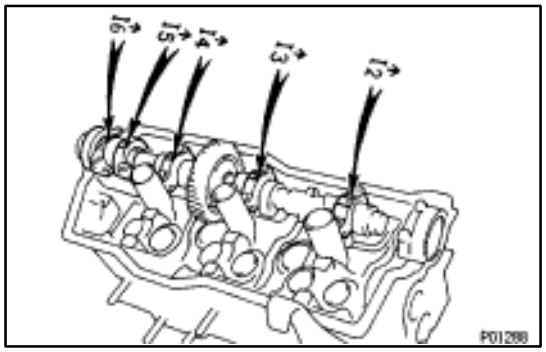
(e) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(f) Install and uniformly tighten the eight bearing cap bolts in several passes, in the sequence shown.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)
(g) Remove the service bolt (B).



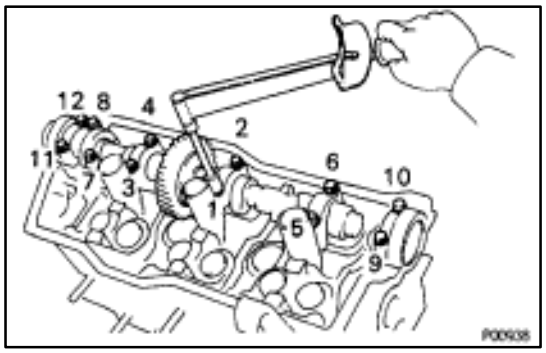
C. Install intake camshaft of LH cylinder head
(a) Apply MP grease to the thrust portion of the camshaft.
(b) Place the intake camshaft at 90□1angle of timing mark (one pointed mark) on the cylinder head.



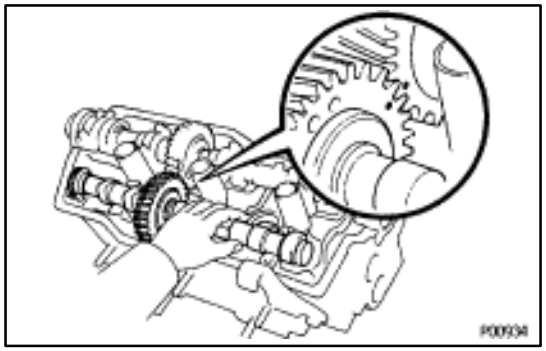
(c) Apply seal packing to the No.1 bearing cap as shown.
Seal packing:
Part No.08826–00080 or equivalent



(d) Install the five bearing caps in their proper locations.



(e) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(f) Install and uniformly tighten the ten bearing cap bolts in several passes, in the sequence shown.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

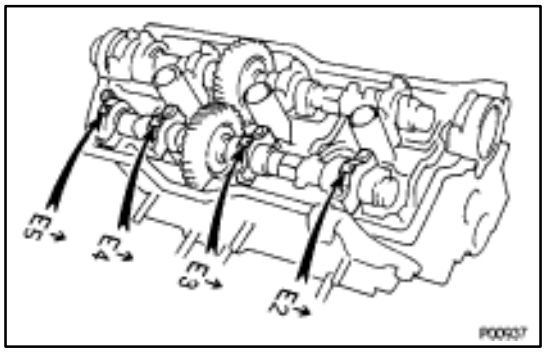


D. Install exhaust camshaft of LH cylinder head

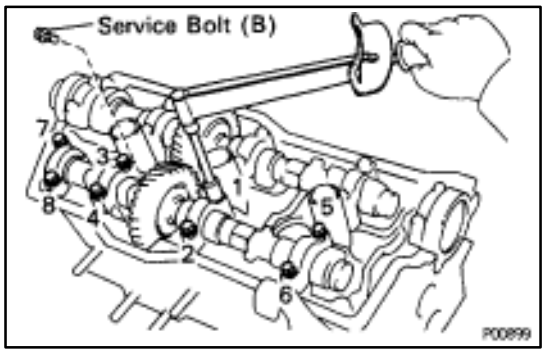
(a) Apply MP grease to the thrust portion of the camshaft.

(b) Align the timing marks (one pointed mark) of the camshaft drive and driven gears.

(c) Place the intake camshaft on the cylinder head.



(d) Install the four bearing caps in their proper locations.



(e) Apply a light coat of engine oil on the threads and under the heads of bearing cap bolts.

(f) Install and uniformly tighten the eight bearing cap bolts in several passes, in the sequence shown.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

(g) Remove the service bolt (B).

6. CHECK AND ADJUST VALVE CLEARANCE
(See page EG–13)

Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

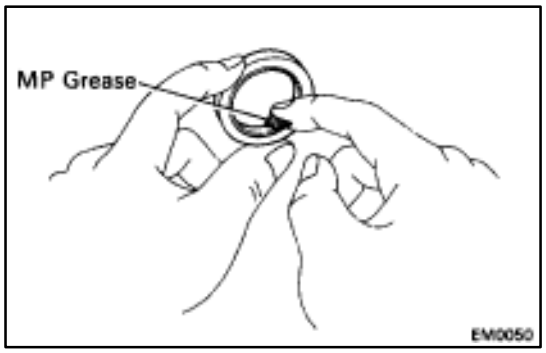
Valve clearance (Cold):

Intake

0.13–0.23 mm (0.005–0.009 in.)

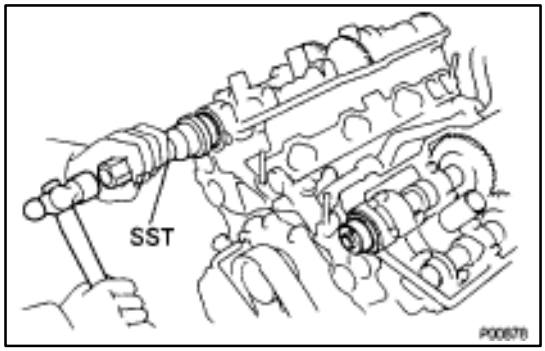
Exhaust

0.27–0.37 mm (0.011–0.015 in.)

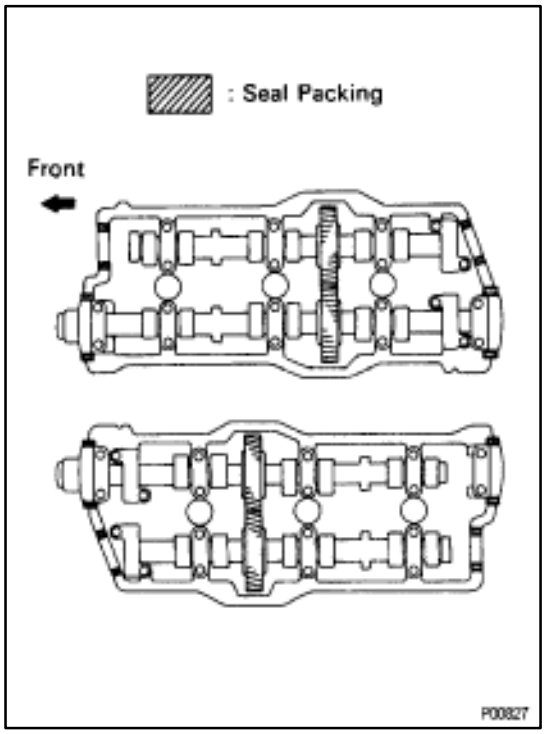


7. INSTALL CAMSHAFT OIL SEALS

(a) Apply MP grease to a new oil seal lip.

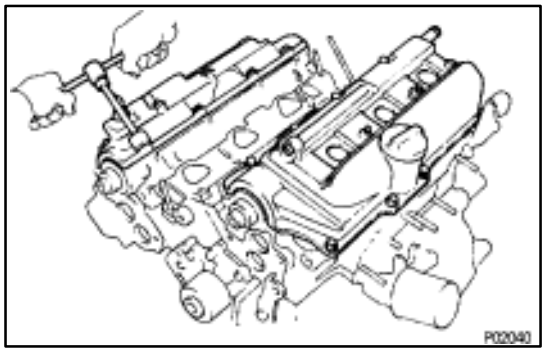


(b) Using SST, tap in the oil seals.
SST 09223–46011

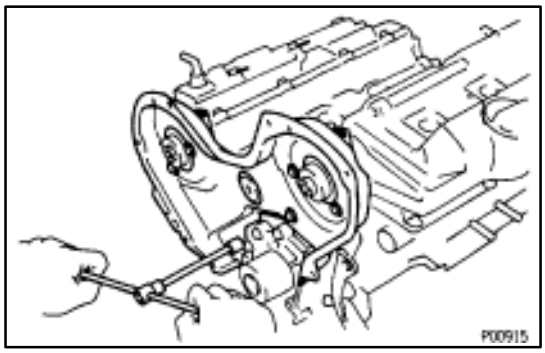


8. INSTALL CYLINDER HEAD COVERS

(a) Apply seal packing to the cylinder heads as shown in the illustration.
Seal packing:
Part No.08826–00080 or equivalent



(b) Install the gasket to the cylinder head cover.
(c) Install the cylinder head cover with the eight seal washers and nuts. Uniformly tighten the nuts in several passes. Install the two cylinder head covers.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)



9. INSTALL NO.3 TIMING BELT COVER

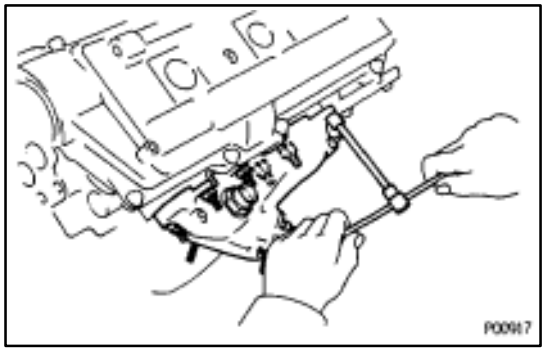
Install the timing belt cover with the six bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

10. INSTALL NO.2 IDLER PULLEY, CAMSHAFT TIMING PULLEYS AND TIMING BELT

(See page EG–29)

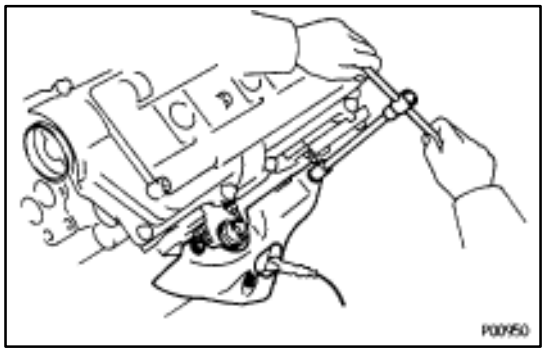
11. INSTALL SPARK PLUGS

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

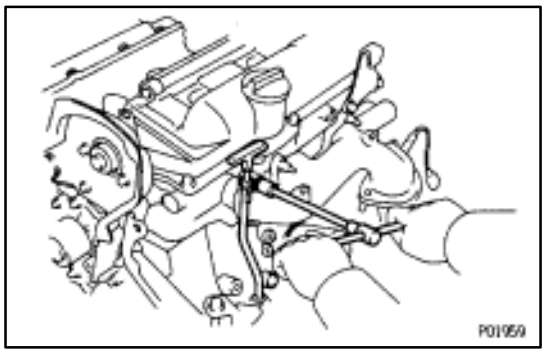


12. INSTALL RH EXHAUST MANIFOLD

(a) Install a new gasket and the exhaust manifold with new six nuts. Uniformly tighten the nuts in several passes.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

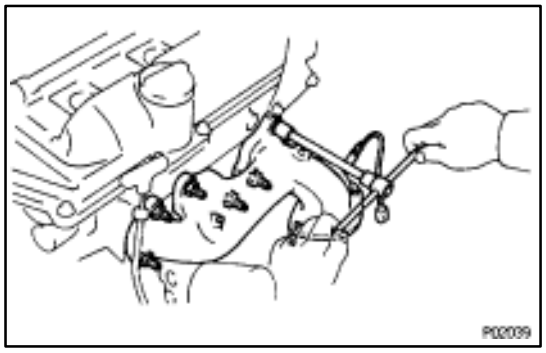


(b) Install the heat insulator with the three nuts.



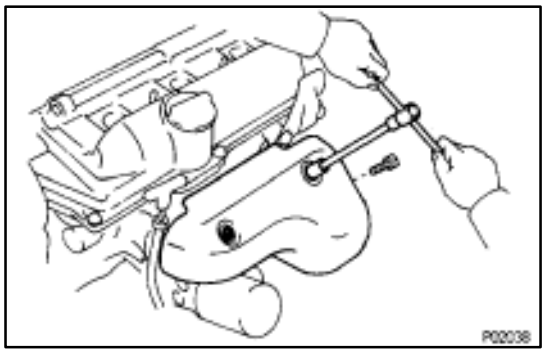
13. INSTALL OIL DIPSTICK

Install the oil dipstick with the bolt.

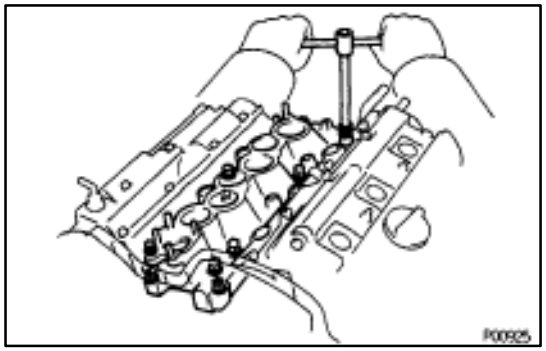


14. INSTALL LH EXHAUST MANIFOLD

(a) Install a new gasket and the exhaust manifold with six new nuts. Uniformly tighten the nuts in several passes.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

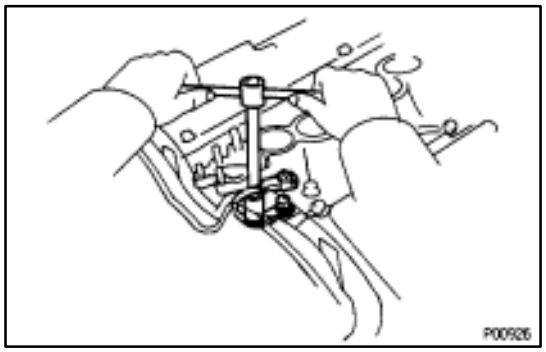


(b) Install the heat insulator with the bolt and two nuts.

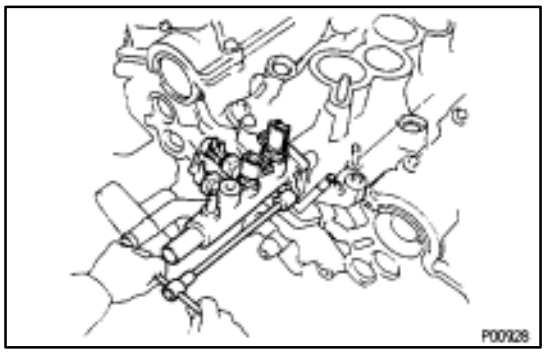


15. INSTALL INTAKE MANIFOLD

(a) Install two new gaskets and the intake manifold with the eight bolts and four nuts. Uniformly tighten the bolts and nuts in several passes.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

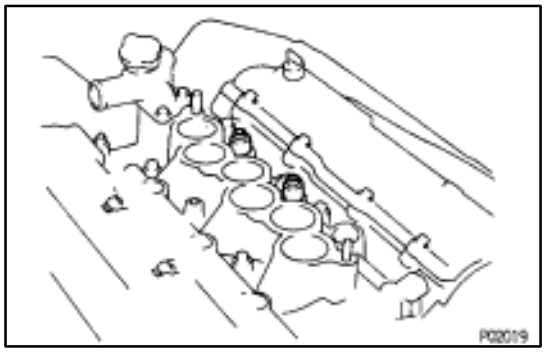


(b) Install the No.2 idler pulley bracket stay and ground strap with the two bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



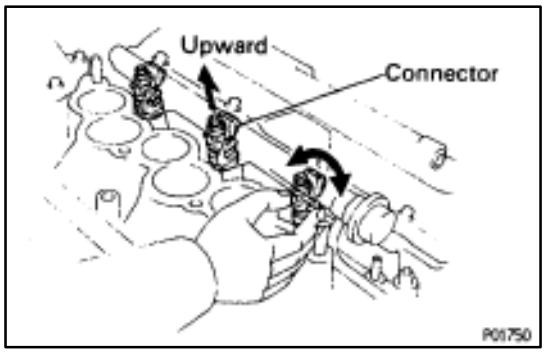
16. INSTALL WATER BY–PASS OUTLET

Install a new gasket and the water by–pass outlet with the two nuts.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

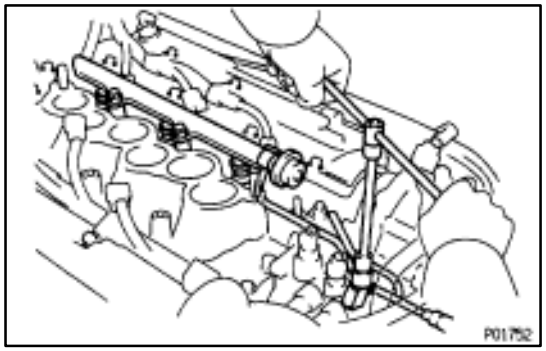


17. INSTALL RH DELIVERY PIPE AND INJECTORS

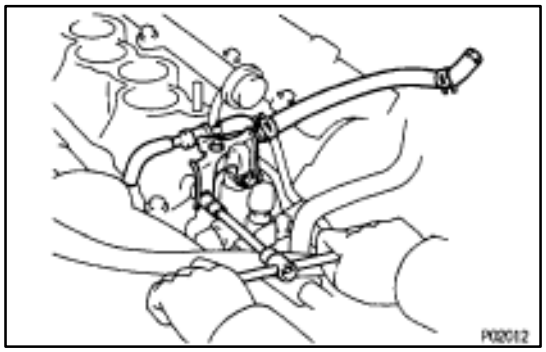
(a) Place the two spacers in position on the intake manifold.
NOTICE: Clean the injector holes before installing the injectors into the intake manifold.



(b) Place the three injectors together with the RH delivery pipe and No.1 fuel pipe in position on the intake manifold.
(c) Check that the injectors rotate smoothly.
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings. Replace the O–rings.
(d) Position the injector connector upward.

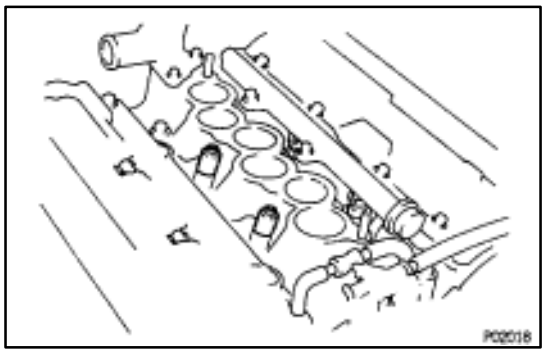


(e) Install the three bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



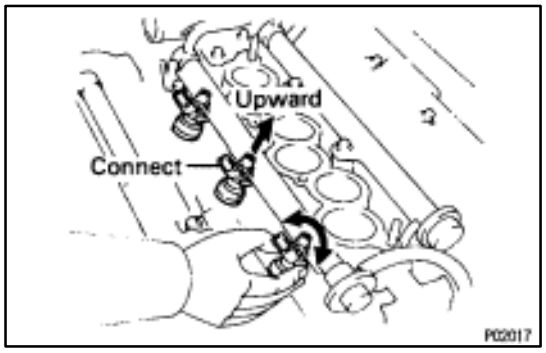
18. INSTALL AIR PIPE

(a) Install the air pipe with the two bolts.
Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

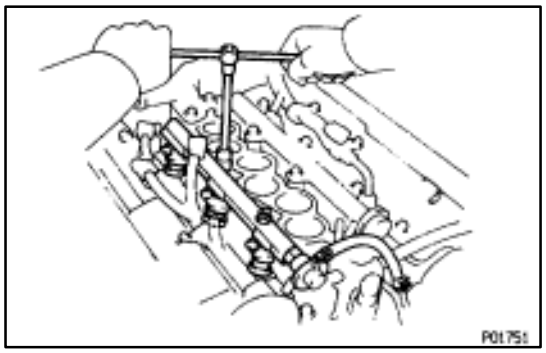


19. INSTALL LH DELIVERY PIPE AND INJECTORS

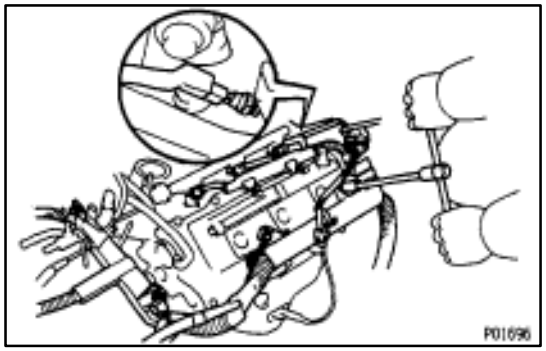
(a) Place the two spacers in position on the intake manifold.
NOTICE: Clean the injector holes before installing the injectors into the intake manifold.



(b) Place the three injectors together with the LH delivery pipe in position on the intake manifold.
(c) Check that the injectors rotate smoothly.
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings. Replace the O–rings.
(d) Position injector connector upward.



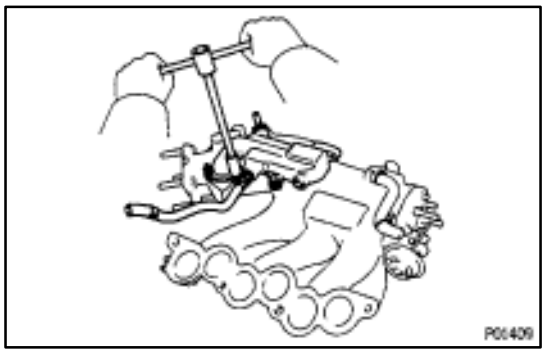
(e) Install the two bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
(f) Connect the fuel return hose to the No.1 fuel pipe (fuel inlet hose).



20. CONNECT RH ENGINE WIRE HARNESS

(a) Connect the two clamps, and install the engine wire harness with the four bolts.

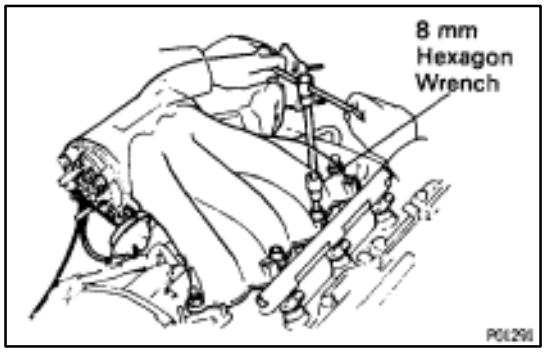
(b) Connect the following connectors:
- (1) Three injector connectors
- (2) Engine coolant temp. sender gauge connector
- (3) Oxygen sensor connector
- (4) PS pump connector
- (5) Oil pressure switch connector
- (6) Engine oil level sensor connector
- (7) A/C compressor connector
- (8) Engine coolant temp. sensor connector (for hydraulic cooling fan)



21. INSTALL NO.1 EGR COOLER

Install a new gasket and the No.1 EGR cooler with the bolt and two nuts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

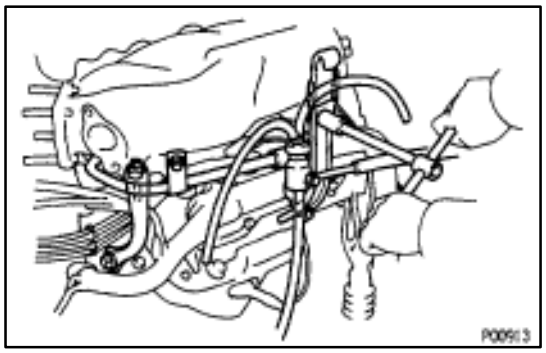


22. INSTALL AIR INTAKE CHAMBER

(a) Using 8 mm hexagon wrench, install a new gasket and the air intake chamber with the two bolts and nuts.
Uniformly tighten the bolts and nuts in several passes.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Connect the two ground straps with the nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

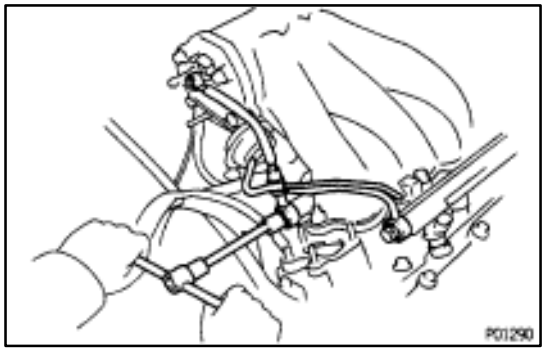
(c) Connect the hydraulic pressure pipe with the bolt.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



(d) Install the air intake chamber stay.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(e) Install the No.1 engine hanger.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

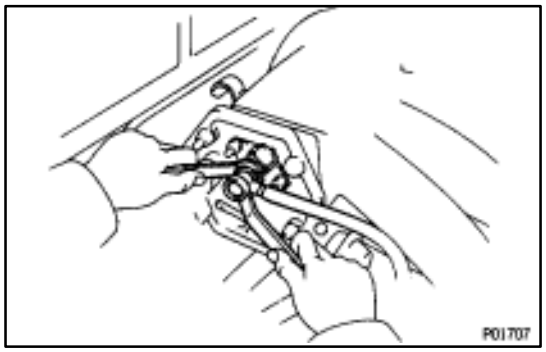
(f) Connect the PS ACV with the nut.



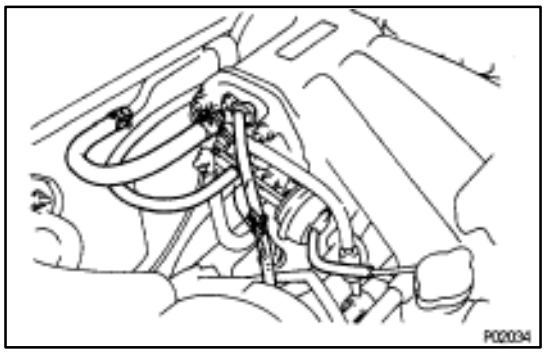
23. INSTALL NO.2 FUEL PIPE

(a) Install the No.2 fuel pipe with four new gaskets and the union boots.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(b) Connect the IACV vacuum hose.



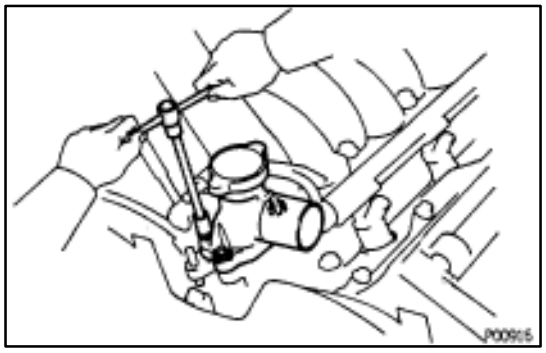
(c) Connect the No.2 fuel pipe with two new gaskets and the union bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



24. CONNECT COLD START INJECTOR CONNECTOR

25. CONNECT HOSES

(a) Brake booster vacuum hose
(b) PS air hose
(c) PCV hose
(d) EGR water by–pass hose

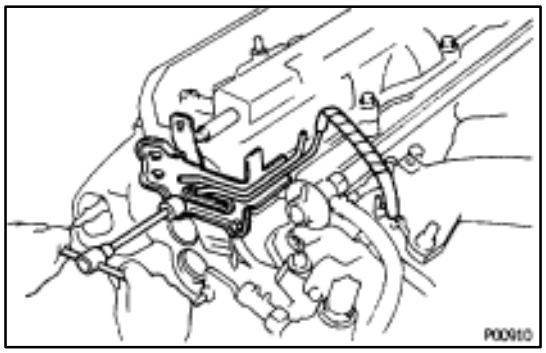


26. INSTALL WATER OUTLET

(a) Install a new gasket and the water outlet with the three bolts.
Torque: 8.3 N·m (85 kgf·cm, 73 ft·lbf)

(b) Connect the engine coolant reservoir hose.

(c) Connect the radiator upper hose.

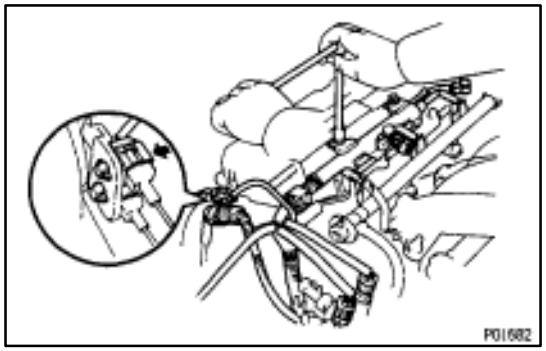


27. INSTALL CYLINDER HEAD REAR PLATE

(a) Install the rear plate with the bolt and nut.

(b) Connect the vacuum hose to the air intake chamber.

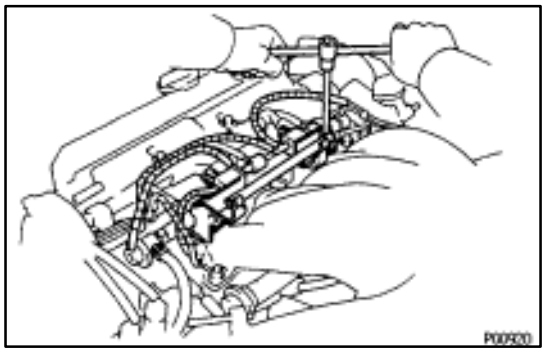
(c) Connect the two vacuum hoses to the vacuum tank.



28. CONNECT LH ENGINE WIRE HARNESS

(a) Connect the three clamps of the LH engine wire harness and install the wire harness with the two bolts.

(b) Connect the following connectors:
- (1) Three injector connectors
- (2) Cold start injector time switch connector
- (3) Engine coolant temperature sensor connector
- (4) Oxygen sensor connector
- (5) Knock sensor connector



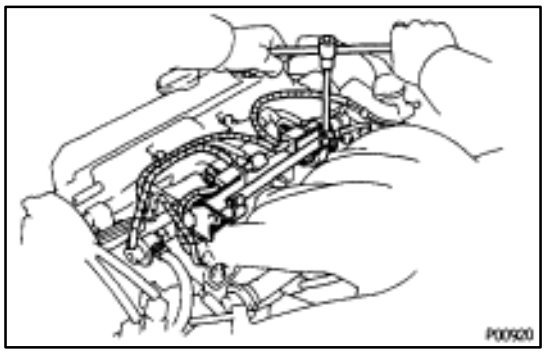
29. INSTALL EMISSION CONTROL VALVE SET

(a) Install the emission control valve set with the two bolts.
Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

(b) Connect the two VSV connectors.

(c) Connect the two vacuum hoses to the IACV VSV.

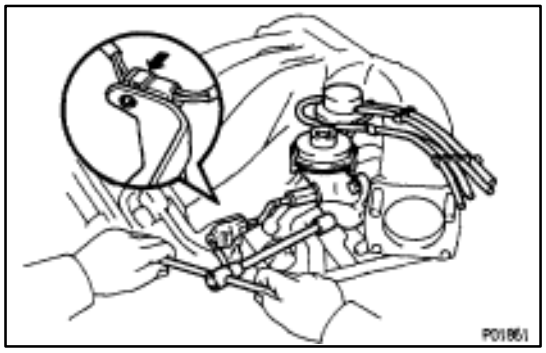
(d) Connect the two vacuum hoses to the fuel pressure control VSV.



30. INSTALL EGR PIPE

Install a new gasket, sleeve ball and the EGR pipe with the two bolts and union nut.
Bolt
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
Union nut
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

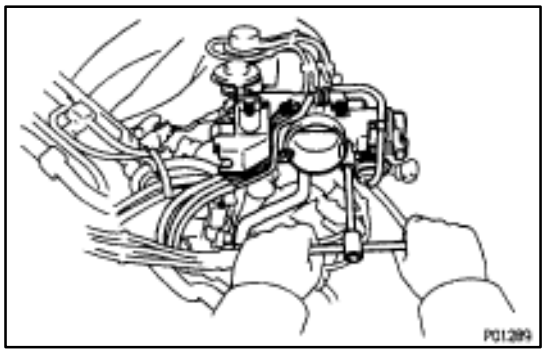
31. INSTALL DISTRIBUTOR (See IG section)



32. INSTALL EGR VALVE AND VACUUM MODULATOR

(a) Install a new gasket and the EGR valve and vacuum modulator with the two nuts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) (Calif. only)
Connect the EGR gas temp. sensor connector.

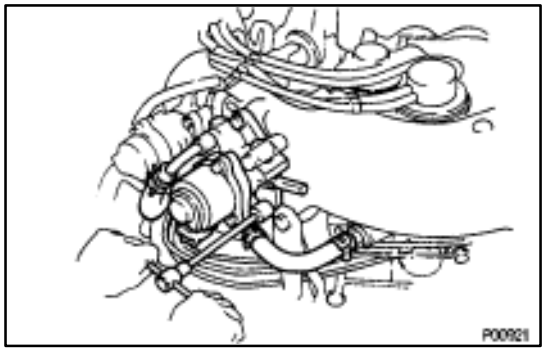


33. INSTALL THROTTLE BODY

(a) Install a new gasket and the throttle body with the two bolts and two nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

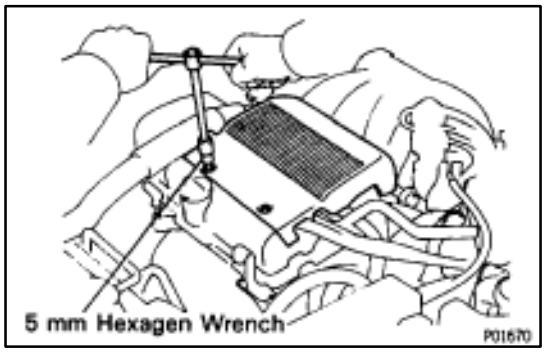
(b) Connect the throttle position sensor connector.

(c) Connect the following hoses:
- (1) Three TVV vacuum hoses
- (2) Four EGR vacuum hoses
- (3) Water by–pass hose



34. INSTALL IAC VALVE

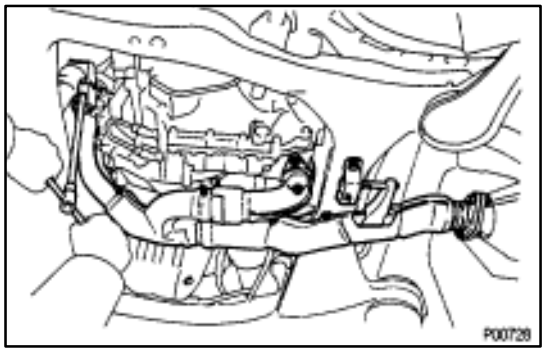
(a) Install a new gasket with the two bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
(b) Connect the IAC valve connector.
(c) Connect the following connectors:
(1) PS idle–up air hose
(2) Water by–pass hoses
(3) No.5 air hose



35. INSTALL V–BANK COVER

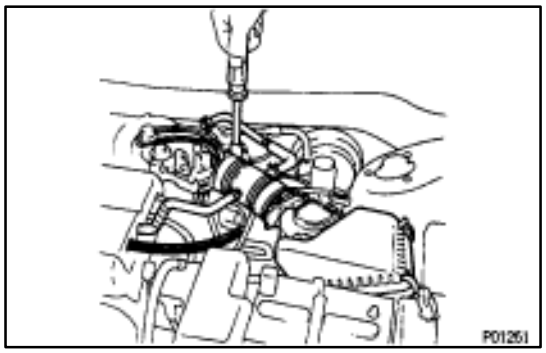
Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.

36. INSTALL GENERATOR
(See CH section)



37. CONNECT FRONT EXHAUST PIPE

(a) Place three new gaskets on the front pipe.
(b) Install the front pipe with the two bolts and six nuts.
Torque the nut.
To manifold
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)
To three–way catalytic converter
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(c) Connect the bracket with the two bolts.



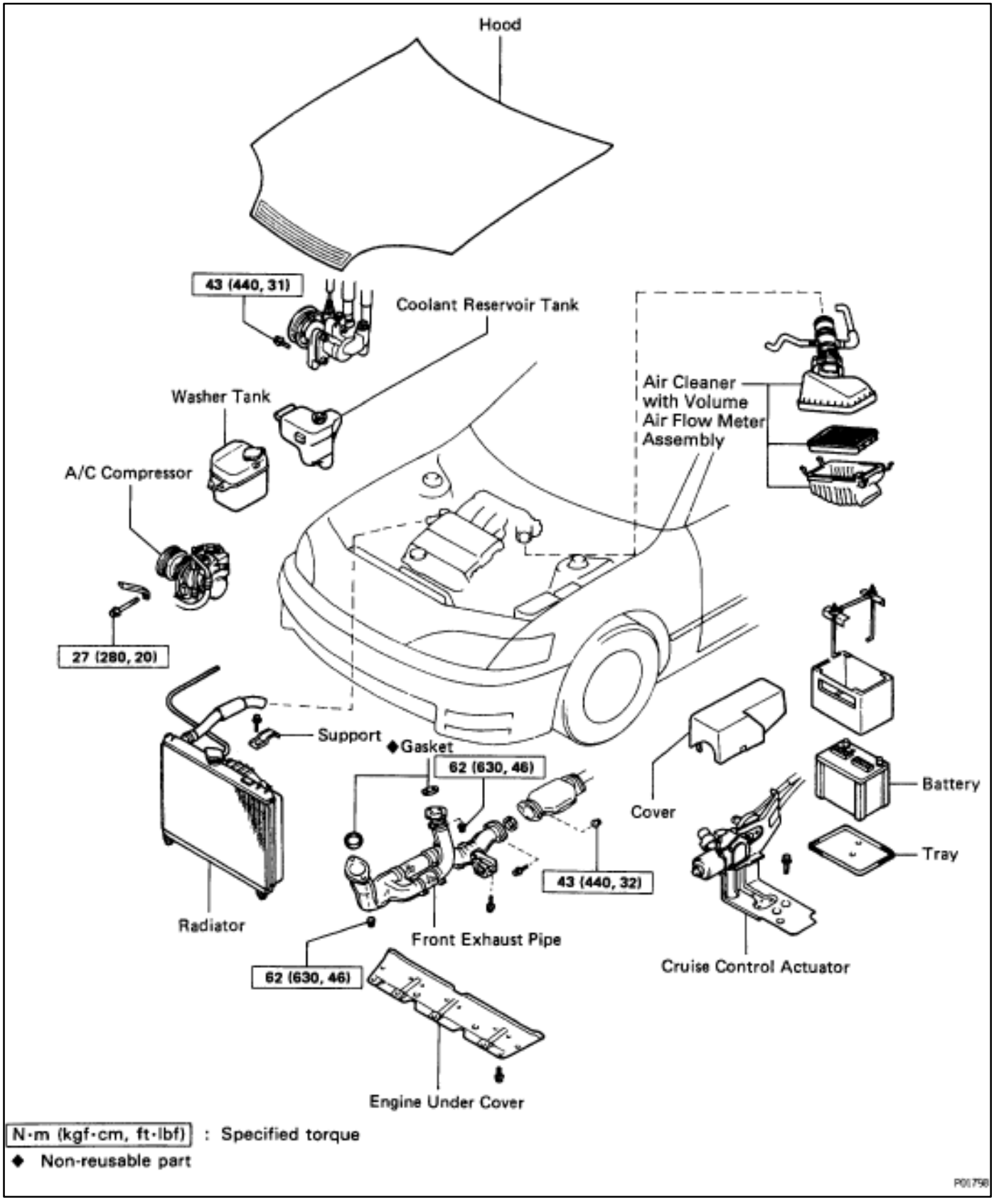
38. INSTALL AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

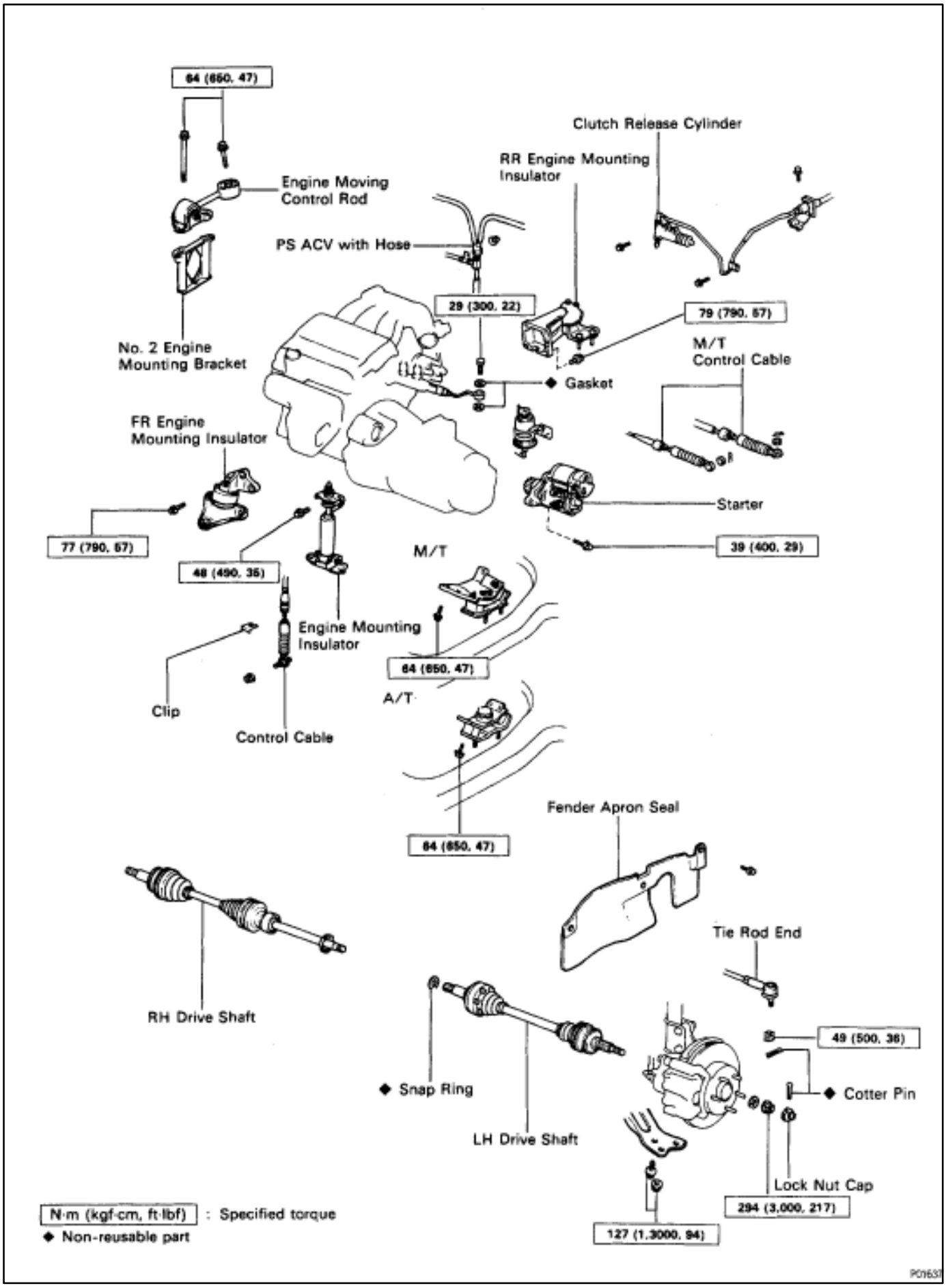
(a) Connect the air cleaner hose, and install the air cleaner cap and volume air flow meter with the four clips.
(b) Tighten the air cleaner hose clamp bolt.
(c) Connect the air hoses.
(d) Connect the coil cord clamp.
(e) Connect the volume air flow meter connector.

39. **(A/T)**
    CONNECT THROTTLE CABLE, AND ADJUST IT
40. **INSTALL ACCELERATOR CABLE, AND ADJUST IT**
41. **FILL WITH ENGINE COOLANT**
42. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**
43. **START ENGINE AND CHECK FOR LEAKS**
44. **ADJUST IGNITION TIMING (See IG section)**
    Ignition timing:
    10° BTDC @ idle
    (w/ Terminals TE1 and E1 connected)
45. **PERFORM ROAD TEST**
    Check for abnormal noise, shock, slippage, correct shift points and smooth operation.
46. **RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL**

CYLINDER BLOCK
ENGINE REMOVAL

EG0F8–02




64 (650, 47)
Clutch Release Cylinder
RR Engine Mounting Insulator
Engine Moving Control Rod
PS ACV with Hose
29 (300, 22)
79 (790, 57)
No. 2 Engine Mounting Bracket
M/T Control Cable
◆ Gasket
FR Engine Mounting Insulator
Starter
77 (790, 57)
48 (490, 35)
39 (400, 29)
M/T
Engine Mounting Insulator
64 (650, 47)
Clip
A/T
Control Cable
64 (650, 47)
Fender Apron Seal
Tie Rod End
RH Drive Shaft
49 (500, 36)
◆ Snap Ring
◆ Cotter Pin
LH Drive Shaft
Lock Nut Cap
294 (3,000, 217)
127 (1,3000, 94)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
P01637

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. REMOVE BATTERY AND TRAY

3. REMOVE HOOD

4. REMOVE ENGINE UNDER COVER

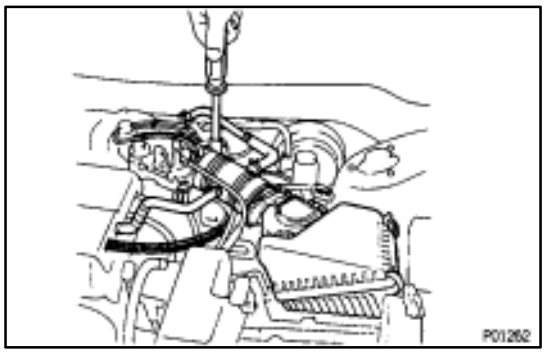
5. DRAIN ENGINE COOLANT

6. DRAIN ENGINE OIL

7. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY

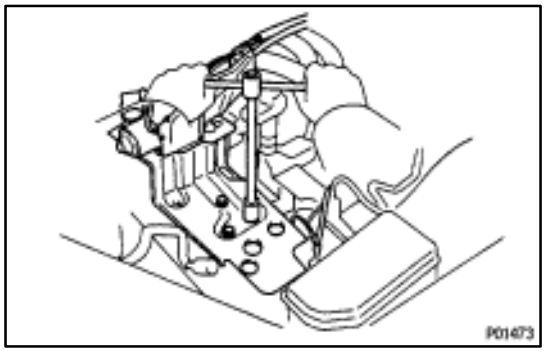
8. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE BODY



9. REMOVE AIR CLEANER ASSEMBLY, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

(a) Disconnect the volume air flow meter connector.
(b) Disconnect the IAC valve and PCV hoses.
(c) Loosen the air cleaner hose clamp bolt.
(d) Disconnect the four air cleaner cap clips.
(e) Disconnect the air cleaner hose from the throttle body, and remove the air cleaner cap together with the volume air flow meter and air cleaner hose.
(f) Remove the air filter.



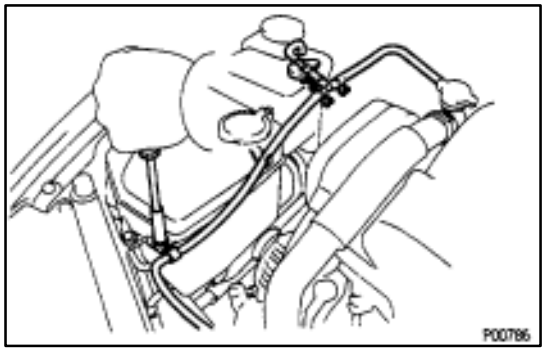
(g) Remove the three bolts and air cleaner case.

10. REMOVE CRUISE CONTROL ACTUATOR

(a) Remove the actuator cover.
(b) Disconnect the actuator connector.
(c) Remove the three bolts, and disconnect the actuator with the bracket.

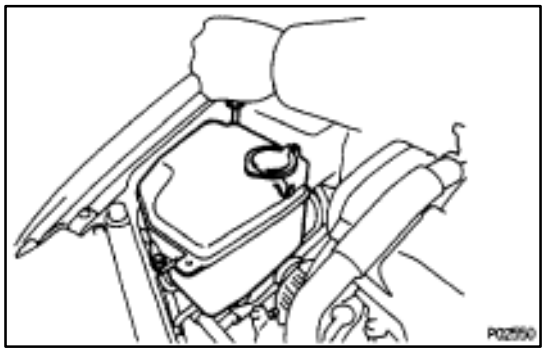
11. DISCONNECT GROUND STRAP FROM BATTERY CARRIER

12. REMOVE RADIATOR



13. DISCONNECT ENGINE COOLANT RESERVOIR HOSE

Remove the bolt and disconnect the reservoir hose.

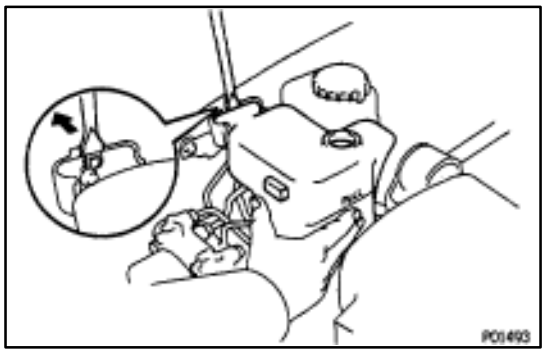


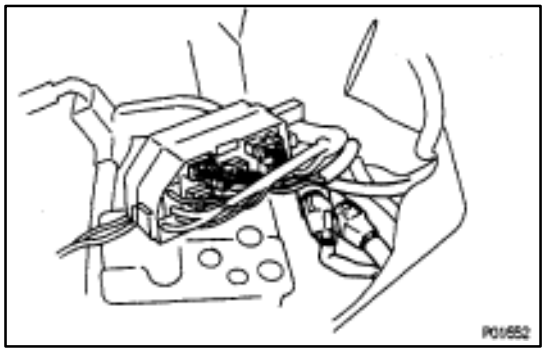
14. REMOVE WASHER TANK

(a) Remove the three washer tank mounting bolts.
(b) Disconnect the connector and hose, and remove the washer tank.

15. REMOVE ENGINE COOLANT RESERVOIR TANK

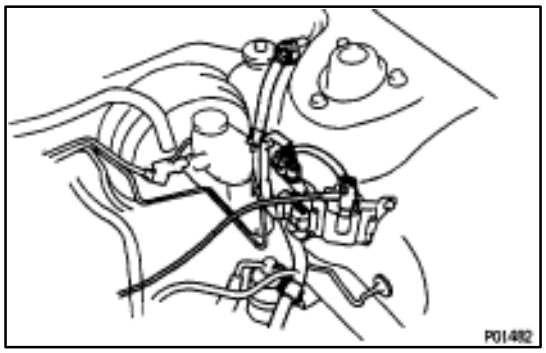
Using a screwdriver, remove the reservoir tank.



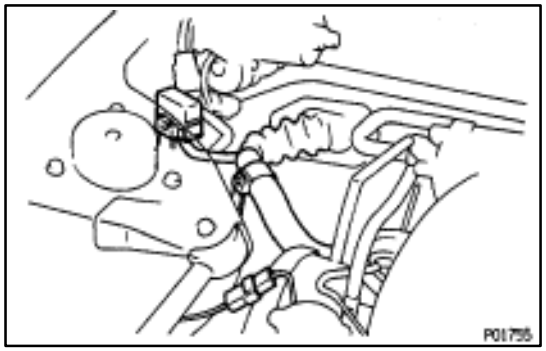


16. DISCONNECT WIRES AND CONNECTORS

(a) Remove the engine relay box, and disconnect the three connectors.
(b) Two connectors from LH fender apron

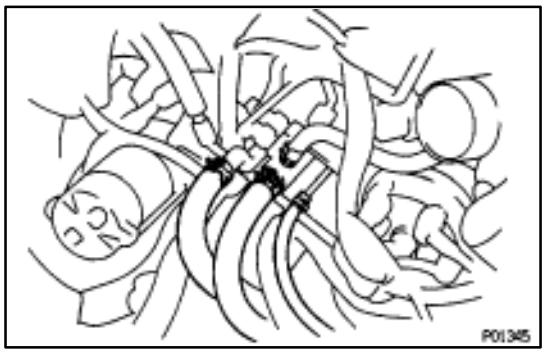


(c) Igniter connector
(d) Ignition coil connector
(e) High–tension cord from ignition coil
(f) Noise filter connector
(g) Connector from fender apron

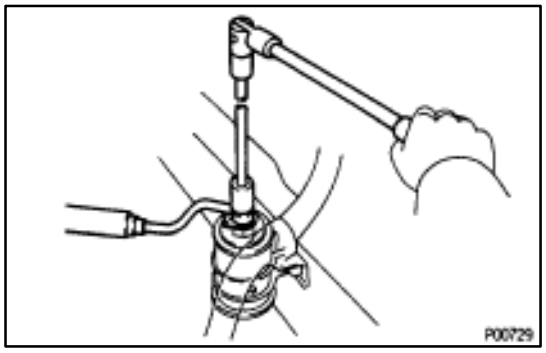


(h) Data link connector 1
(i) Ground strap from RH fender apron

(j) (M/T)
Back–up light switch connector
(k) (M/T)
Speed sensor connector

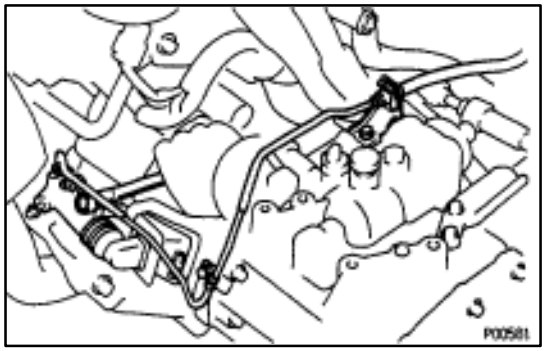


17. DISCONNECT HEATER HOSES
18. DISCONNECT FUEL RETURN HOSE
CAUTION: Catch leaking fuel in a container.

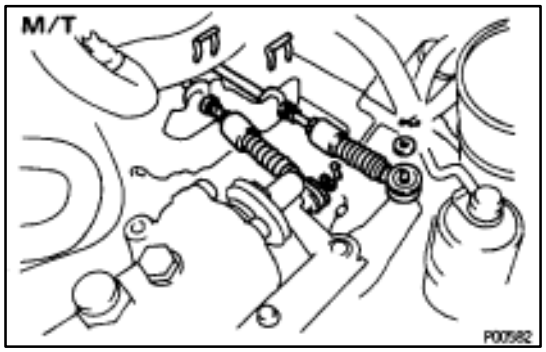


19. DISCONNECT FUEL INLET HOSE
CAUTION: Catch leaking fuel in a container.

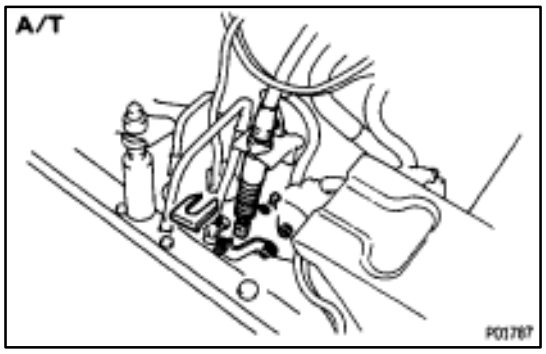
20. (M/T)
REMOVE STARTER



21. (M/T)
REMOVE CLUTCH RELEASE CYLINDER WITHOUT DISCONNECTING TUBE
Remove the four bolts, release cylinder and tube from the transaxle.

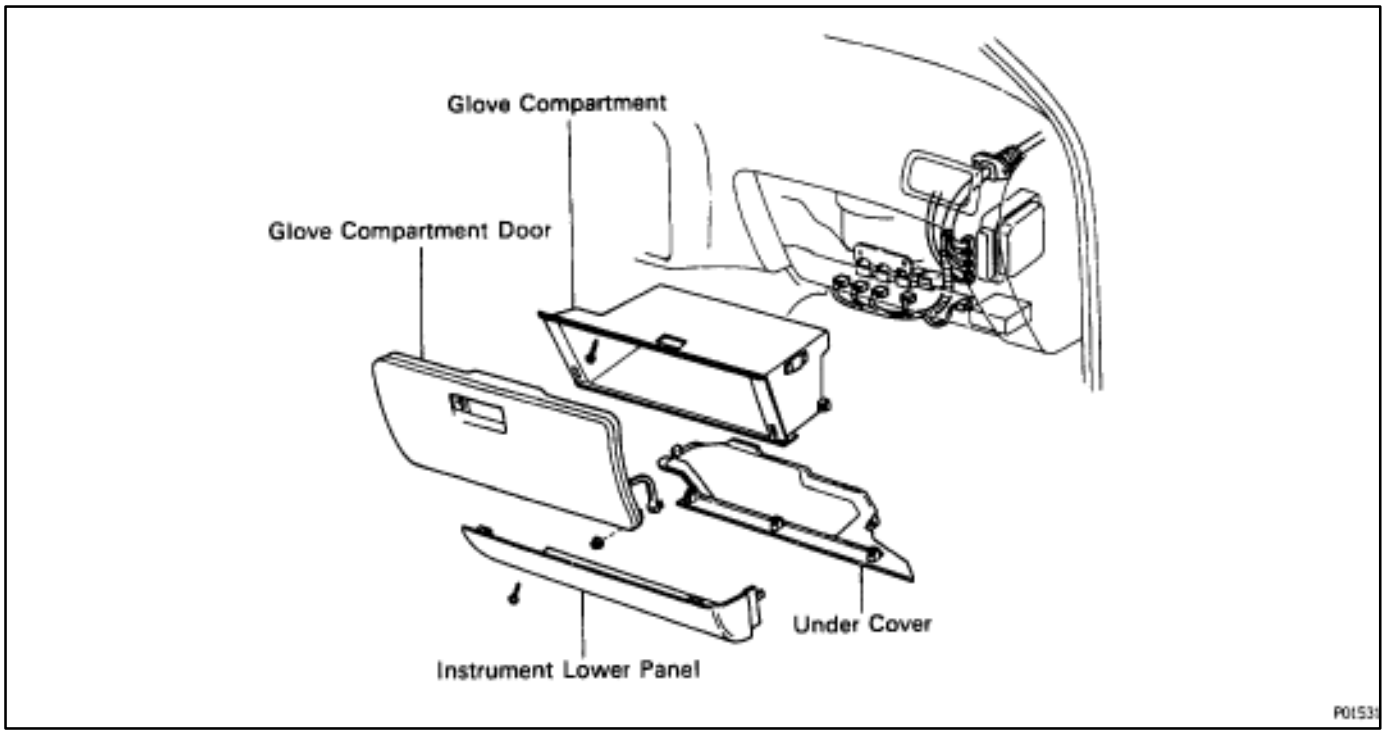


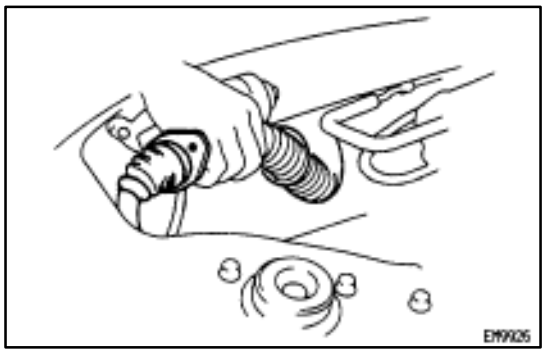
22. DISCONNECT TRANSAXLE CONTROL CABLE (S) FROM TRANSAXLE



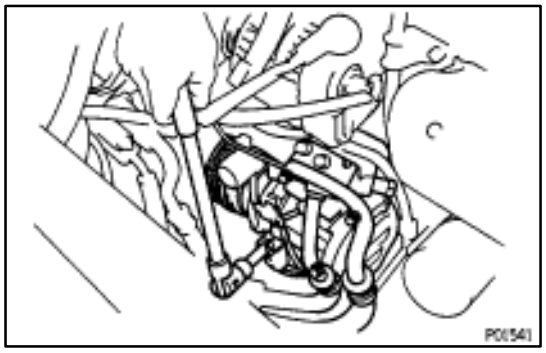
23. DISCONNECT VACUUM HOSES
(a) Brake booster vacuum hose from air intake chamber.
(b) Charcoal canister vacuum hose
(c) IACV vacuum tank vacuum hoses

24. DISCONNECT ENGINE WIRE FROM CABIN
(a) Remove the under cover.
(b) Remove the lower instrument panel.
(c) Remove the glove compartment door.
(d) Remove the glove compartment.
(e) Disconnect the following connectors:
  (1) Three engine control module (ECM) connectors
  (2) Five cowl wire connectors
  (3) Cooling fan ECU connector



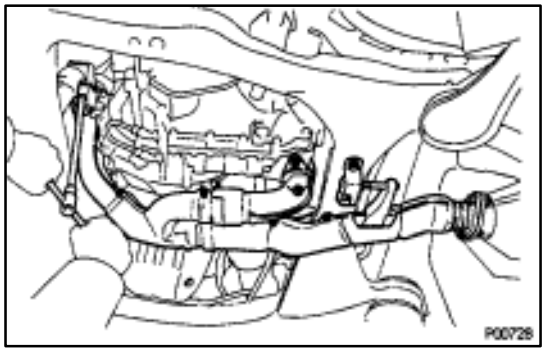


(f) Remove the two nuts, and pull out the engine wire from the cowl panel.



25. REMOVE A/C COMPRESSOR WITHOUT DISCONNECTING HOSES

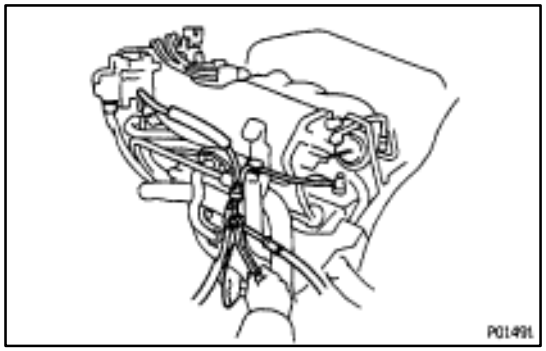
(a) Disconnect the A/C compressor connector.
(b) Remove the drive belt.
(c) Remove the five bolts, compressor stay and disconnect the A/C compressor.
HINT: Put aside the compressor, and suspend it to the radiator support with a string.



26. REMOVE FRONT EXHAUST PIPE

(a) Loosen the two bolts, and disconnect the bracket.
(b) Remove the two bolts and nuts holding the front exhaust pipe to the three–way catalytic converter.
(c) Remove the four nuts holding the exhaust pipe to the exhaust manifolds.
(d) Disconnect the front exhaust pipe and gaskets.

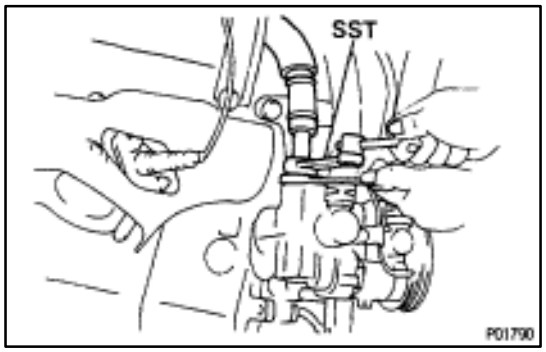
27. REMOVE DRIVE SHAFTS
(See SA section)



28. DISCONNECT PS ACV

(a) Disconnect the two PS air hoses.

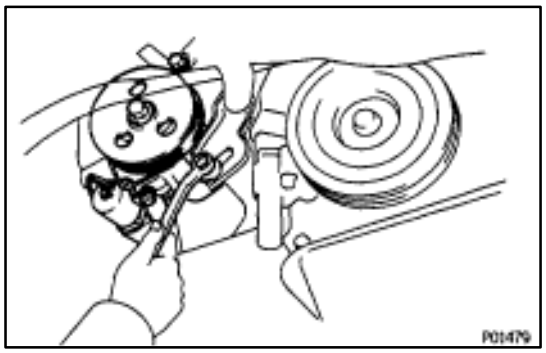
(b) Remove the nut and disconnect the PS ACV



29. DISCONNECT HYDRAULIC COOLING FAN PRESSURE HOSE

Using SST, disconnect the pressure hose.

SST 09631–22020

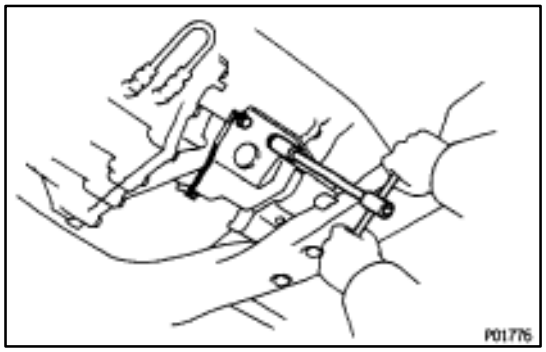


30. REMOVE PS PUMP WITHOUT DISCONNECTING HOSES

(a) Remove the PS drive belt.

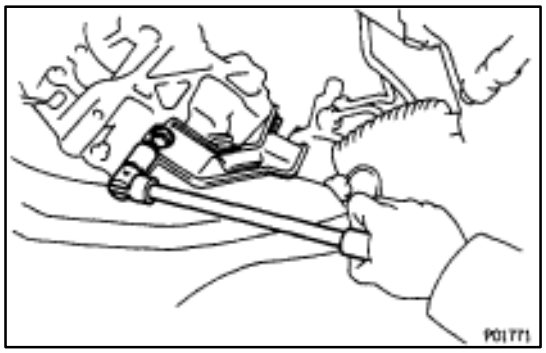
(b) Remove the two bolts, and disconnect the PS pump from the engine.

HINT: Put aside the pump and suspend it to the cowl with a string.



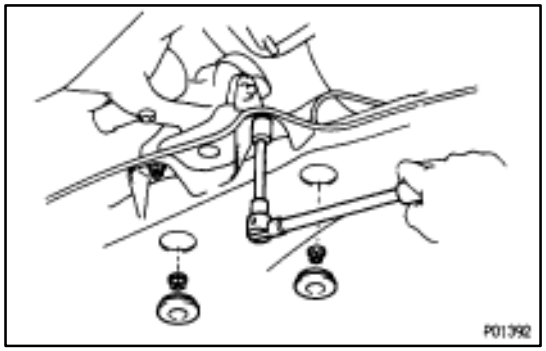
31. DISCONNECT LH ENGINE MOUNTING INSULATOR (M/T)

Remove the three bolts, and disconnect the mounting insulator.



(A/T)

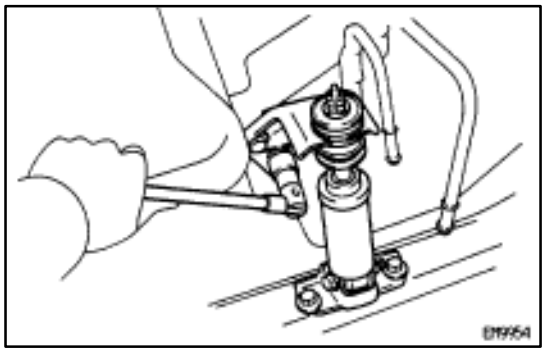
Remove the four bolts, and disconnect the mounting insulator.



32. DISCONNECT RR ENGINE MOUNTING INSULATOR

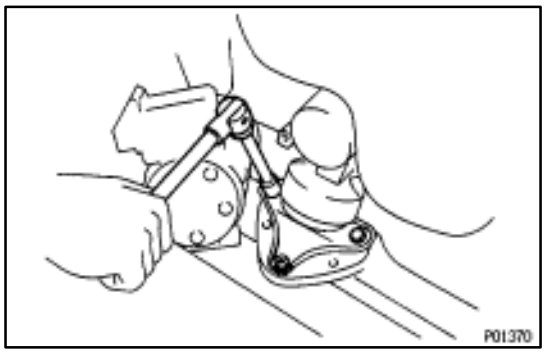
(a) Remove the hole plugs.

(b) Remove the four nuts, and disconnect the mounting insulator.



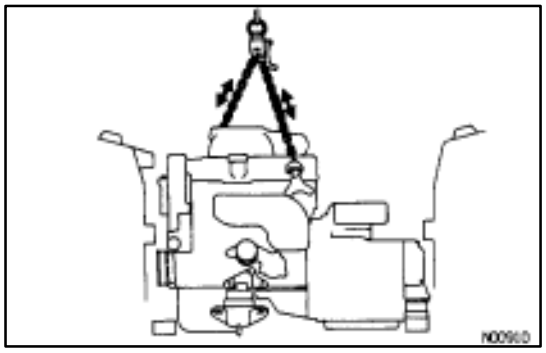
33. REMOVE ENGINE MOUNTING ABSORBER

Remove the four bolts and engine mounting absorber.

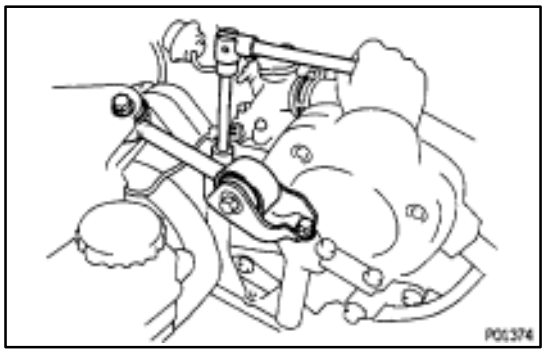


34. DISCONNECT FR ENGINE MOUNTING INSULATOR

Remove the three bolts, and disconnect the mounting insulator.

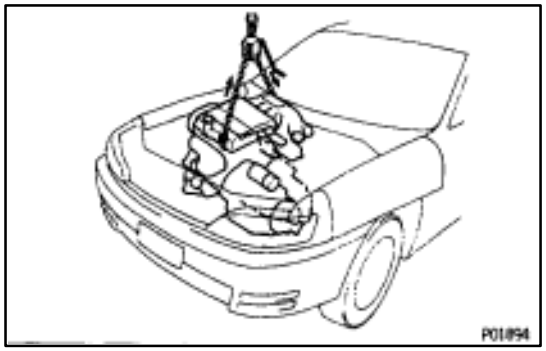


35. ATTACH ENGINE SLING DEVICE TO ENGINE HANGERS



36. REMOVE ENGINE MOVING CONTROL ROD

Remove the three bolts and control rod.



37. REMOVE ENGINE AND TRANSAXLE ASSEMBLY FROM VEHICLE

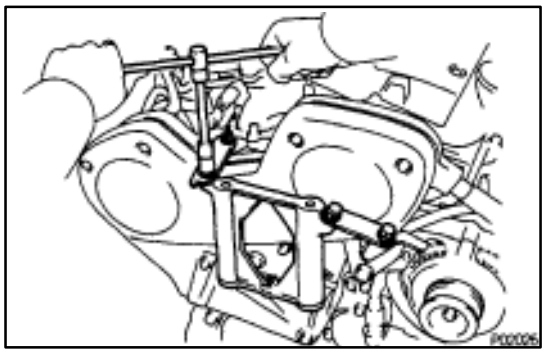
(a) Lift the engine out of the vehicle slowly and carefully.
NOTICE: Be careful not to hit the PS gear housing or park/neutral position switch (A/T).

(b) Make sure the engine is clear of all wiring, hoses and cables.

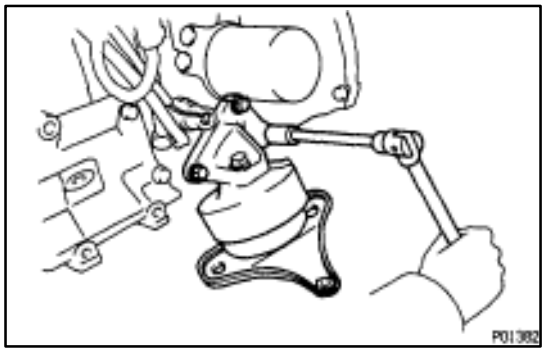
(c) Place the engine and transaxle assembly onto the stand.

38. (A/T)
REMOVE STARTER

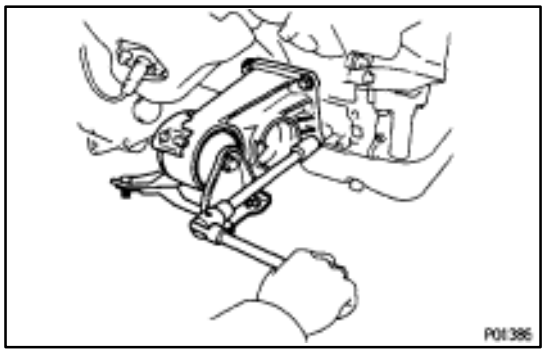
39. SEPARATE ENGINE AND TRANSAXLE
M/T (See MT section)
A/T (See AT section)



40. REMOVE NO.2 RH ENGINE MOUNTING BRACKET
Remove the three bolts and nut, RH engine mounting stays and engine mounting bracket.



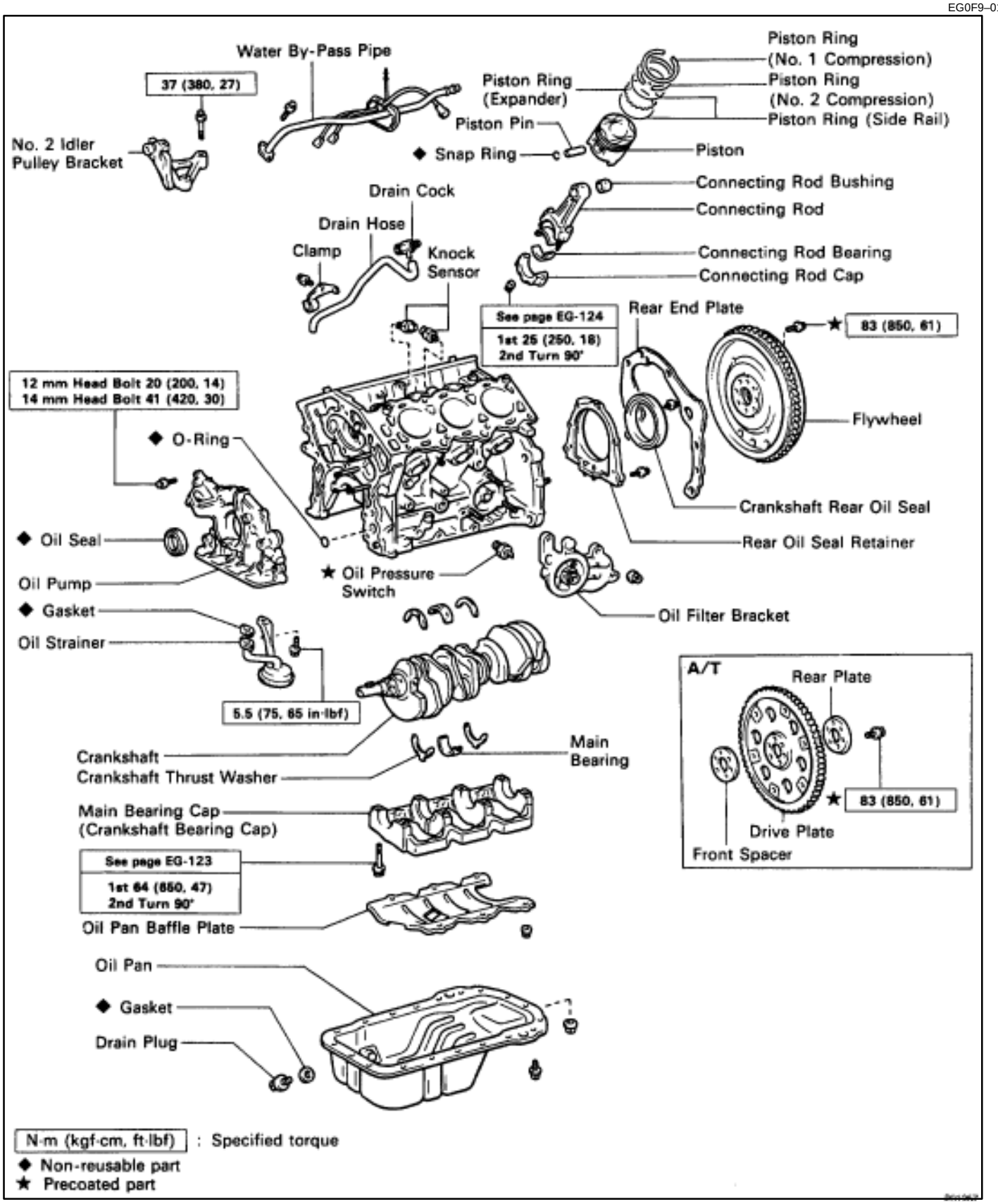
41. REMOVE FR ENGINE MOUNTING INSULATOR
Remove the three bolts and mounting insulator.



42. REMOVE RR ENGINE MOUNTING INSULATOR
Remove the four bolts and mounting insulator.

COMPONENTS

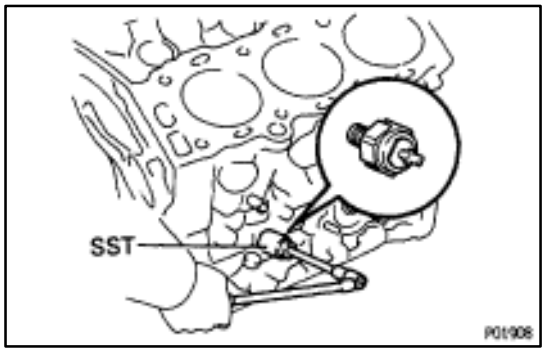
EG0F9–01



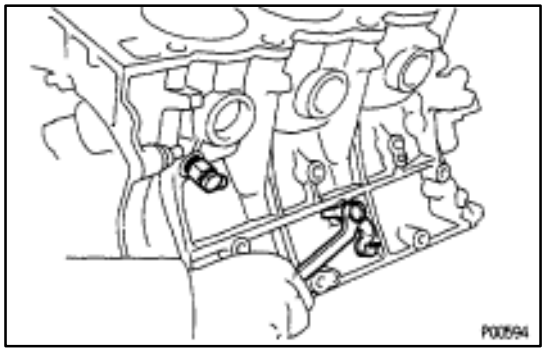
PREPARATION FOR DISASSEMBLY

EG0FA–01

1. **(M/T)**
   REMOVE CLUTCH COVER AND DISC
2. **(M/T)**
   REMOVE FLYWHEEL
3. **(A/T)**
   REMOVE DRIVE PLATE
4. **REMOVE REAR END PLATE**
   Remove the bolt and end plate.
5. **INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY**
6. **REMOVE DISTRIBUTOR (See IG section)**
7. **REMOVE TIMING BELT AND PULLEYS**
   (See page EG–29)
8. **REMOVE CYLINDER HEADS**
   (See page EG–47)
9. **REMOVE WATER PUMP (See page EG–246)**
10. **REMOVE OIL PAN AND OIL PUMP**
    (See page EG–294)
11. **REMOVE OIL FILTER AND FILTER BRACKET**
    (See page EG–307)

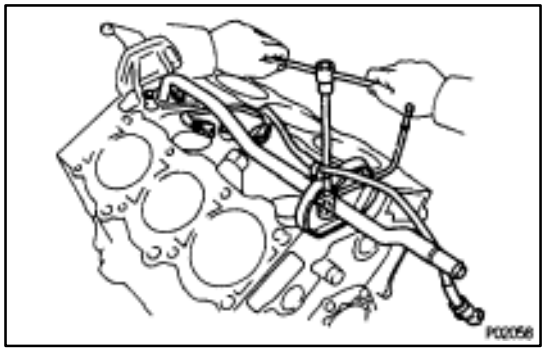


12. **REMOVE OIL PRESSURE SWITCH**
    Using SST, remove the oil pressure switch.
    SST 09816–30010



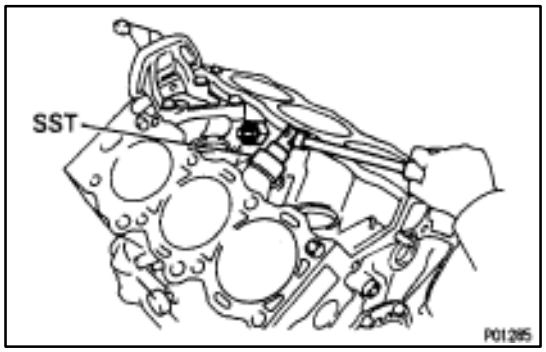
13. **REMOVE ENGINE COOLANT DRAIN COCK**

(a) Remove the water drain hose.
(b) Remove the bolt and hose clamp.
(c) Remove the drain cock.



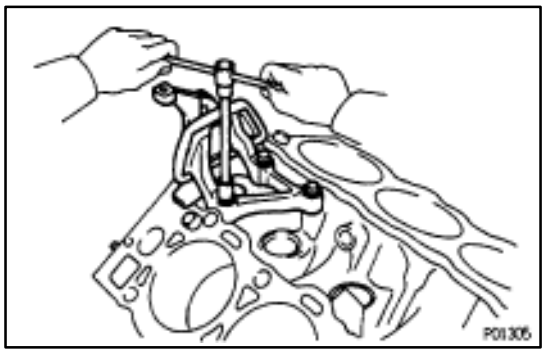
14. REMOVE WATER BY–PASS PIPE

(a) Disconnect the two knock sensor connectors.
(b) Remove the two bolts, nut and water by–pass pipe.



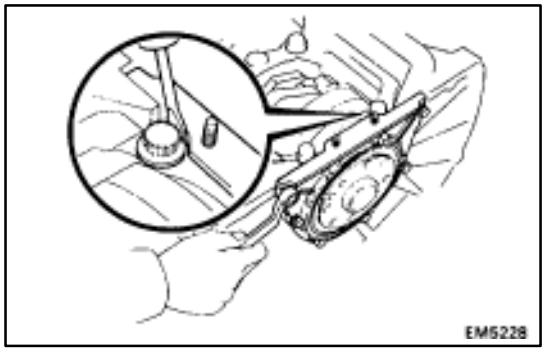
15. REMOVE KNOCK SENSORS

Using SST, remove the two knock sensors.
SST 09816–30010



16. REMOVE NO.2 IDLER PULLEY BRACKET

Remove the three bolts and idler pulley bracket.



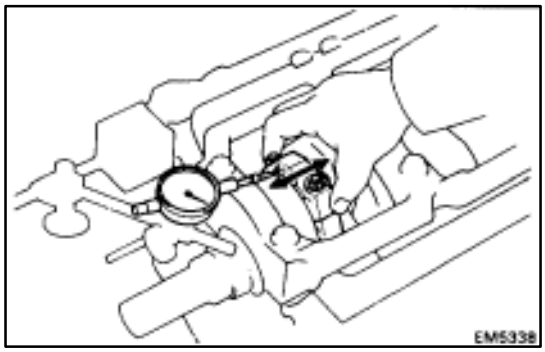
CYLINDER BLOCK DISASSEMBLY

EG0FB–01

(See page EG–98)

1. REMOVE REAR OIL SEAL RETAINER

Remove the six bolts and retainer.



2. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

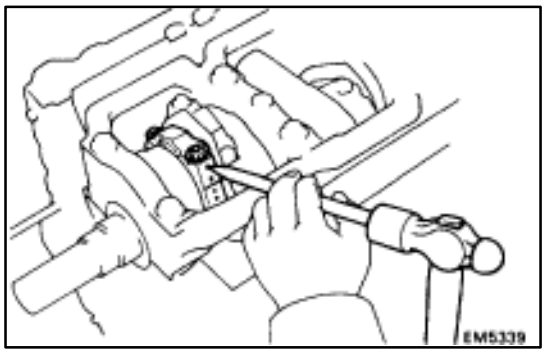
Standard thrust clearance:

0.150–0.330 mm (0.0059–0.0130 in.)

Maximum thrust clearance:

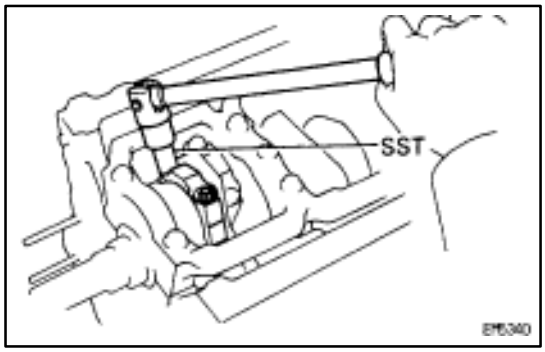
0.38 mm (0.0150 in.)

If the thrust clearance is greater than maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.

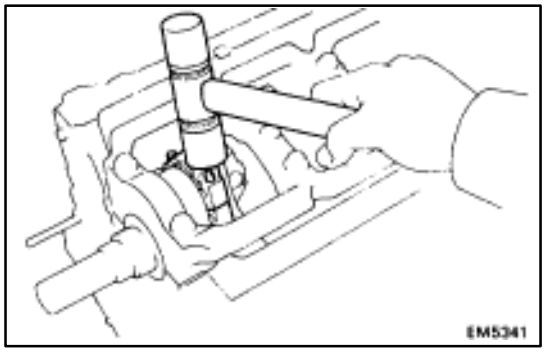


3. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

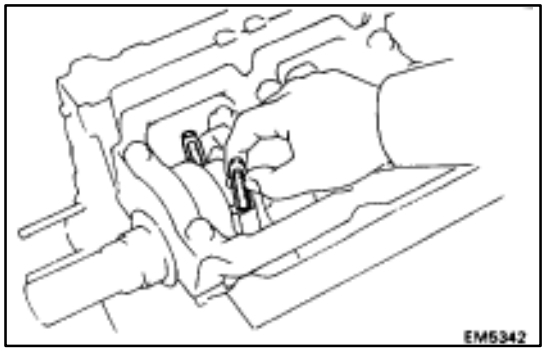
(a) Using a punch or numbering stamp, mark the connecting rod and cap to ensure correct reassembly.



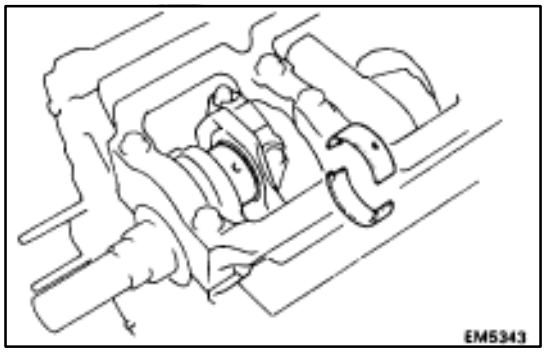
(b) Using SST, remove the connecting rod cap nuts.
SST 09011–38121



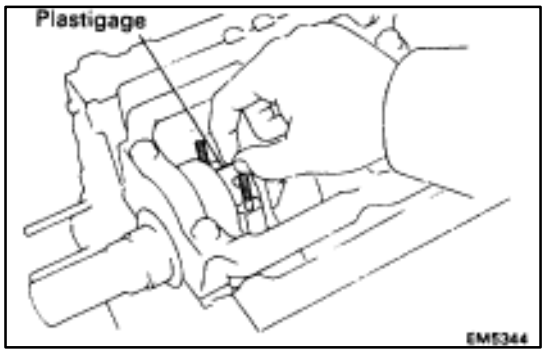
(c) Using a plastic–faced hammer, lightly tap the connecting rod bolts and lift off the connecting rod cap.
HINT: Keep the lower bearing inserted with the connecting cap.



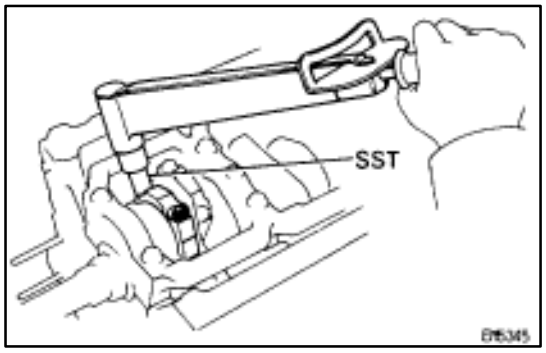
(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



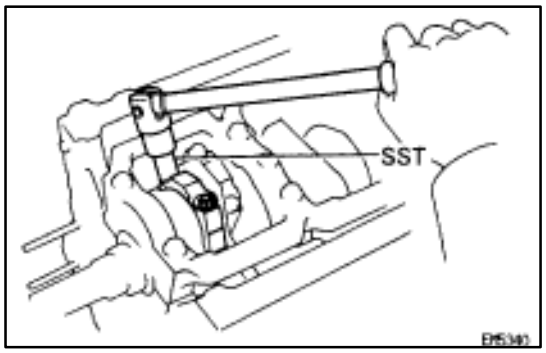
(e) Clean the crank pin and bearing.
(f) Check the crank pin and bearing for pitting and scratches.
If the crank pin or bearing is damaged, replace the bearings.
If necessary, grind or replace the crankshaft.



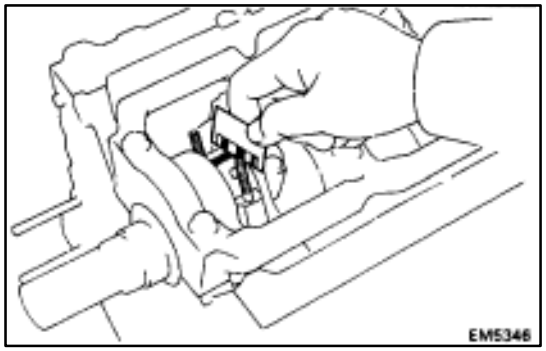
(g) Lay s strip of Plastigage across the crank pin.



(h) Install the connecting rod cap with the two nuts.
(See step 6 on page EG–124)
1st
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)
2nd Turn 90°
NOTICE: Do not turn the crankshaft.



(i) Remove the two nuts and connecting rod cap.
(See procedure (b) and (c) above)



(j) Measure the Plastigage at its widest point.

Standard oil clearance:

STD

0.028–0.065 mm (0.0011–0.0026 in.)

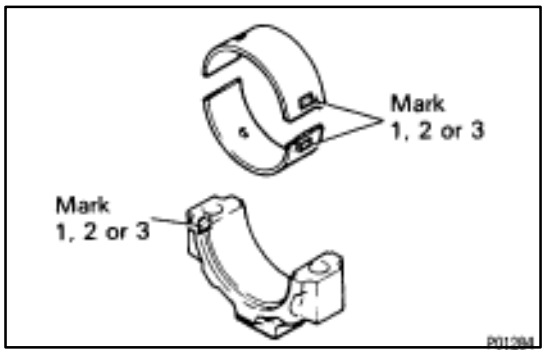
U/S 0.25

0.027–0.080 mm (0.0011–0.0031 in.)

Maximum oil clearance:

0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.



HINT: If using a standard bearing, replace with one having the same number marked on the connecting rod cap. There are three sizes of standard bearings, marked ”1”, ”2” and ”3” accordingly.

(Reference)

Standard sized bearing center wall thickness:

Mark ”1”

1.484–1.488 mm (0.0584–0.0586 in.)

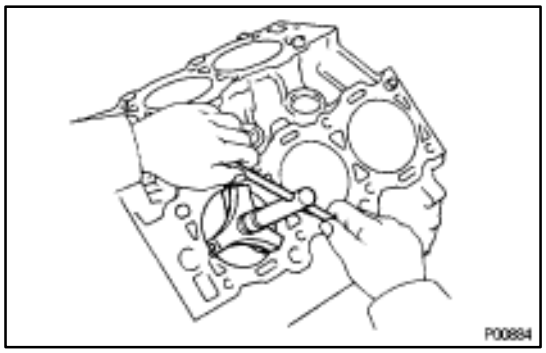
Mark ”2”

1.488–1.492 mm (0.0586–0.0587 in.)

Mark ”3”

1.492–1.496 mm (0.0587–0.0589 in.)

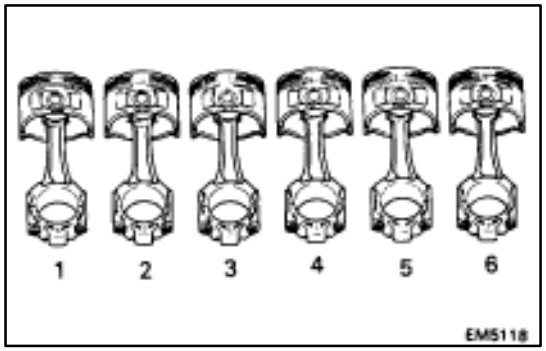
(k) Completely remove the Plastigage.



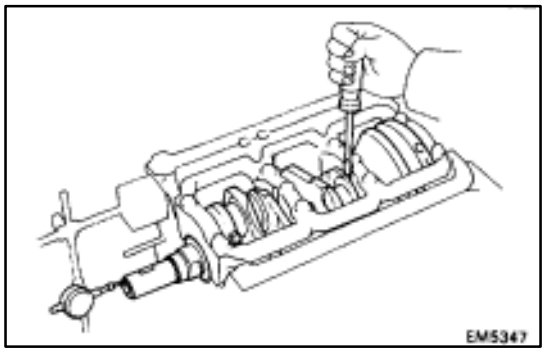
4. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

(a) Using a ridge reamer, remove the all carbon from the top of the cylinder.

(b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.



HINT:
- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in correct order.



5. 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:

0.020–0.220 mm (0.0008–0.0087 in.)

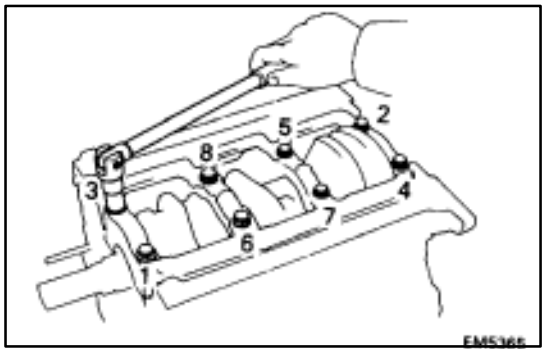
Maximum thrust clearance:

0.30 mm (0.0118 in.)

If the thrust clearance is greater than maximum, replace the thrust washers as a set.

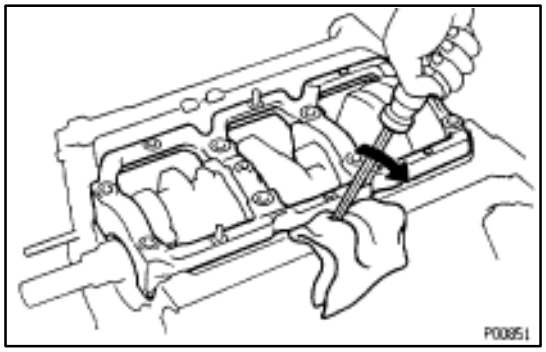
Thrust washer thickness:

2.440–2.490 mm (0.0961–0.0980 in.)



6. REMOVE MAIN BEARING CAP AND CHECK OIL CLEARANCE

(a) Uniformly loosen and remove the main bearing cap bolts in several passes, in the sequence shown.

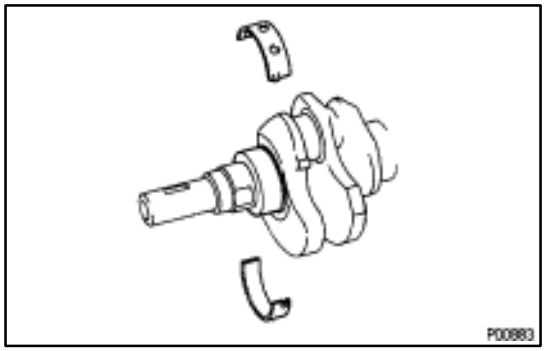


(b) Using a screwdriver, pry up the main bearing cap, and remove the main bearing cap, lower main bearings and lower thrust washers (No.2 journal position of main bearing cap only).

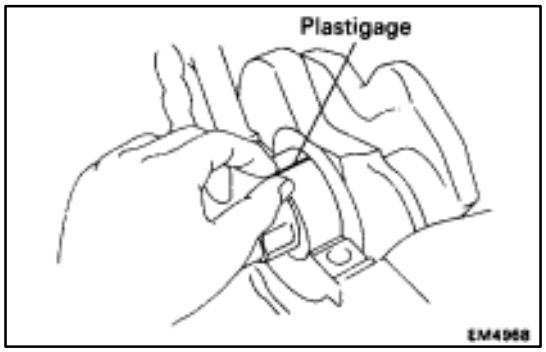
HINT: Keep the lower main bearings and lower thrust washers together with the main bearing cap.

(c) Lift out the crankshaft.

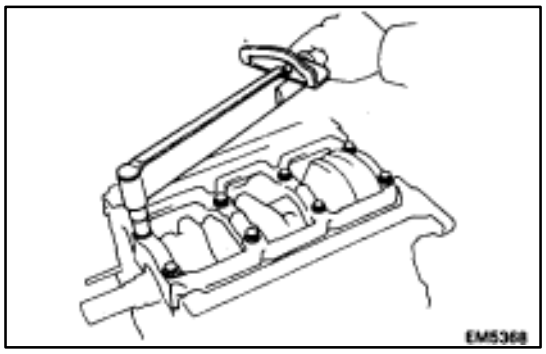
HINT: Keep the upper main bearings and upper thrust washers together with the cylinder block.



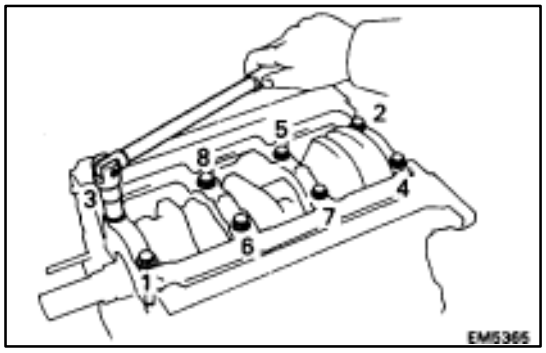
(d) Clean each main journal and bearing.
(e) Check each main journal and bearing for pitting and scratches.
If the journal or bearing is damaged, replace the bearings.
If necessary, grind or replace the crankshaft.



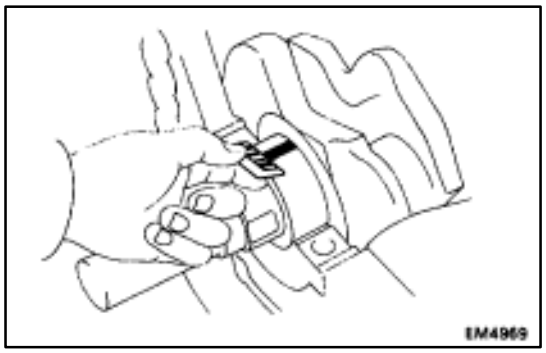
(f) Place the crankshaft on the cylinder block.
(g) Lay a strip of Plastigage across each journal.



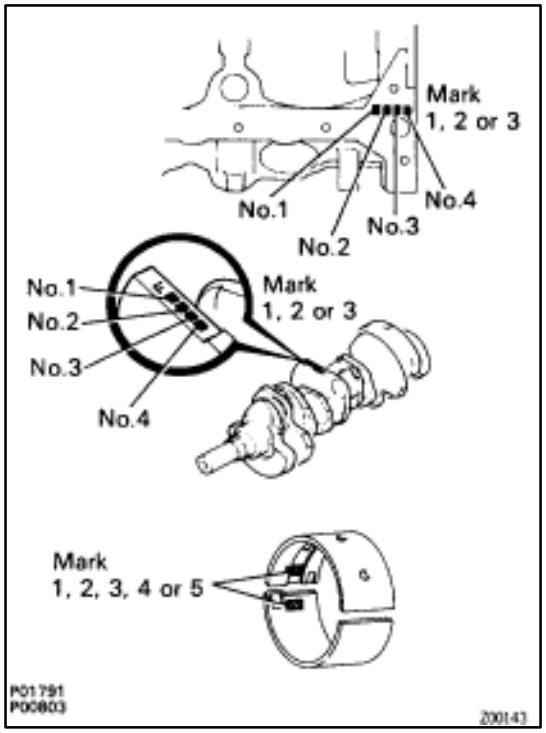
(h) Install the main bearing cap with the eight bolts.
(See step 4 on page EG–122)
1st
Torque: 61 N·m (625 kgf·cm, 45 ft·lbf)
2nd Turn 90°
NOTICE: Do not turn the crankshaft.



(i) Remove the eight bolts and main bearing cap.
(See procedure (a) and (b) above)



(j) Measure the Plastigage at its widest point.
Standard clearance:
STD
0.029–0.056 mm (0.0011–0.0022 in.)
U/S 0.25
0.028–0.080 mm (0.0011–0.0031 in.)
Maximum clearance:
0.08 mm (0.0031 in.)



HINT: If replacing the cylinder block subassembly, the bearing standard clearance will be:
0.031–0.067 mm (0.0012–0.0026 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 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 five 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

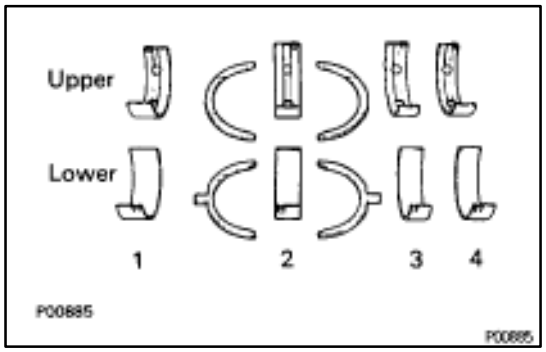
EXAMPLE: Cylinder block ”2” + Crankshaft ”1” = Total number 3 (Use bearing ”3”)

(Reference)
Cylinder block main journal bore diameter:
Mark ”1”
68.010–68.016 mm (2.6776–2.6778 in.)
Mark ”2”
68.016–68.022 mm (2.6778–2.6780 in.)
Mark ”3”
68.022–68.028 mm (2.6780–2.6783 in.)
Crankshaft journal diameter:
Mark ”0”
63.996–64.000 mm (2.5195–2.5197 in.)
Mark ”1”
63.990–63.996 mm (2.5193–2.5195 in.)
Mark ”2”
63.985–63.990 mm (2.5191–2.5193 in.)
Standard sized bearing center wall thickness:
Mark ”1”
1.989–1.992 mm (0.0783–0.0784 in.)
Mark ”2”
1.992–1.995 mm (0.0784–0.0785 in.)
Mark ”3”
1.995–1.998 mm (0.0785–0.0787 in.)
Mark ”4”
1.998–2.001 mm (0.0787–0.0788 in.)

Mark ”5”

2.001–2.004 mm (0.0788–0.0789 in.)

(k) Completely remove the Plastigage.



7. REMOVE CRANKSHAFT

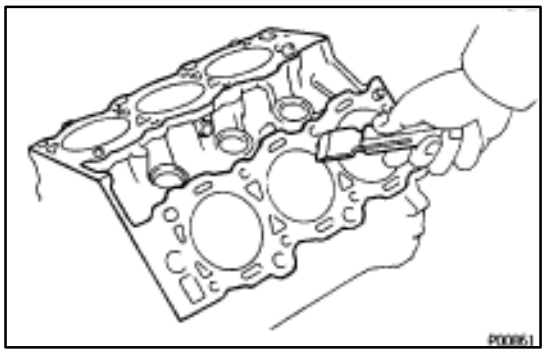
(a) Lift out the crankshaft.

(b) Remove the upper main bearings and upper thrust washers from cylinder block.

HINT: Arrange the main bearings and thrust washers in correct order.

CYLINDER BLOCK INSPECTION

EG0FC–01

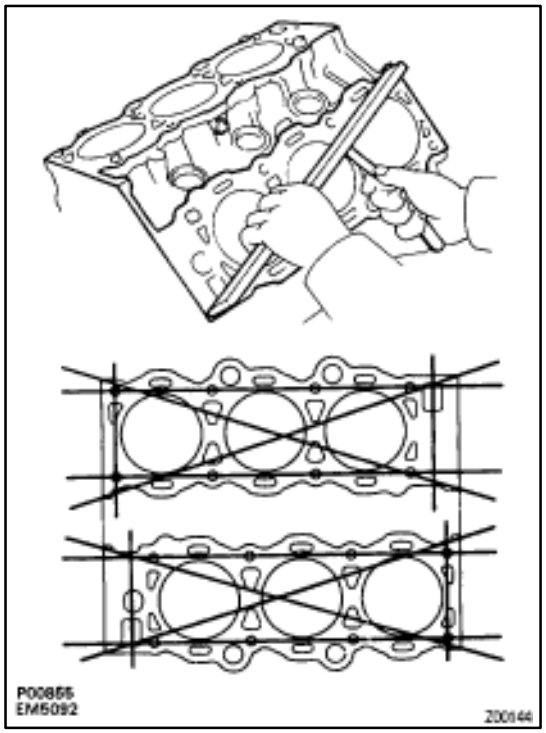


1. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the top surfaces of the cylinder block.

2. CLEAN CYLINDER BLOCK

Using a soft brush and solvent, thoroughly clean the cylinder block.



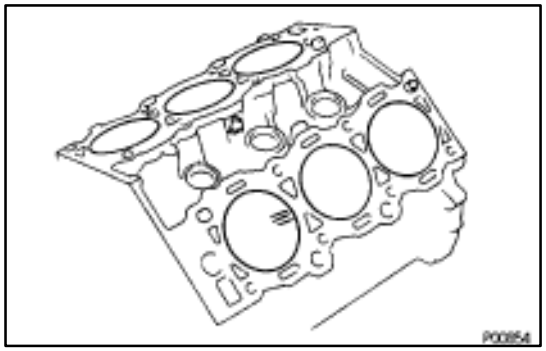
3. INSPECT TOP SURFACES OF CYLINDER BLOCK FOR FLATNESS

Using precision straight edge and feeler gauge, measure the top surfaces of the cylinder block for warpage.

Maximum warpage:

0.05 mm (0.0020 in.)

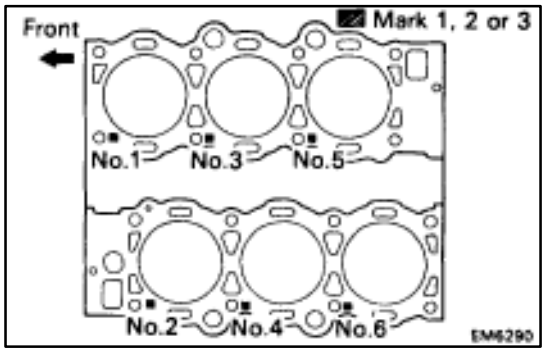
If warpage is greater than maximum, replace the cylinder block.



4. INSPECT CYLINDER FOR VERTICAL SCRATCHES

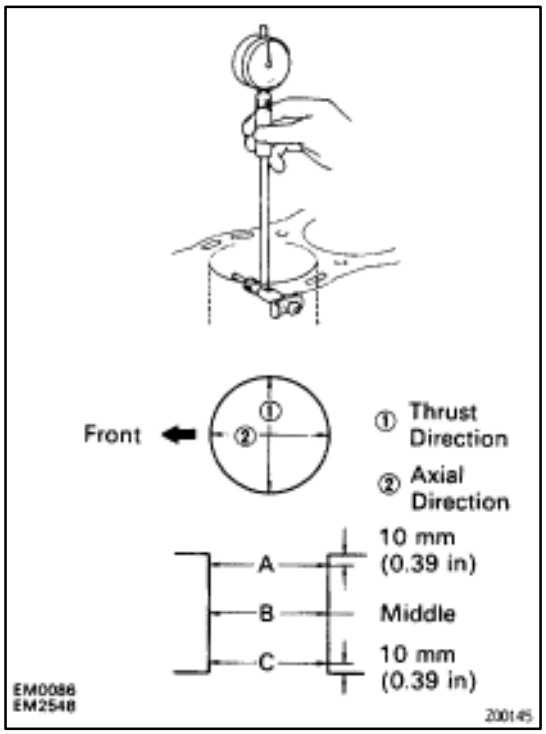
Visually check the cylinder for vertical scratches.

If deep scratches are present, rebore all the six cylinders or replace the cylinder block.



5. INSPECT CYLINDER BORE DIAMETER

HINT: There are three sizes of the standard cylinder bore diameter, marked ”1”, ”2” and ”3” accordingly, The mark is stamped on the top of the cylinder block.



Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

Standard diameter:

STD

Mark ”1”

87.500–87.510 mm (3.4449–3.4453 in.)

Mark ”2”

87.510–87.520 mm (3.4453–3.4457 in.)

Mark ”3”

87.520–87.530 mm (3.4457–3.4461 in.)

Maximum diameter:

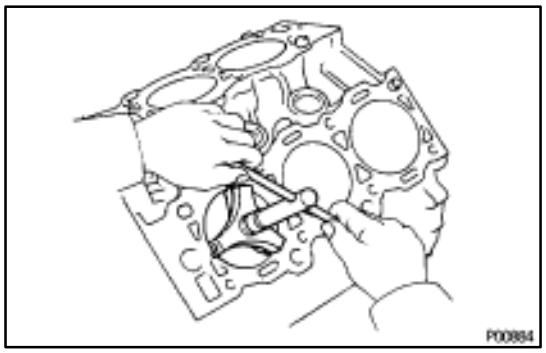
STD

87.73 mm (3.4539 in.)

O/S 0.50

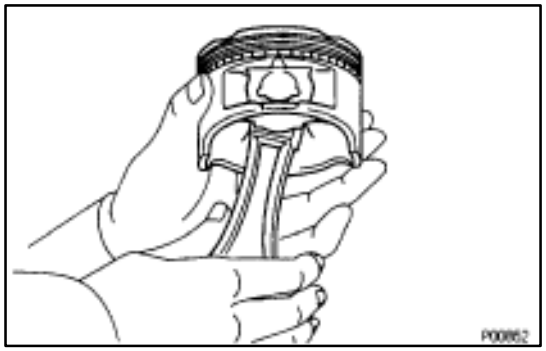
88.23 mm (3.4736 in.)

If the diameter is greater than maximum, rebore all the six cylinders or replace the cylinder block.



6. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

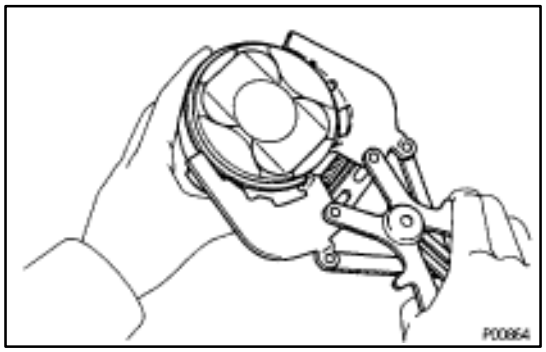


PISTON AND CONNECTING ROD ASSY DISASSEMBLY

EG0FD–01

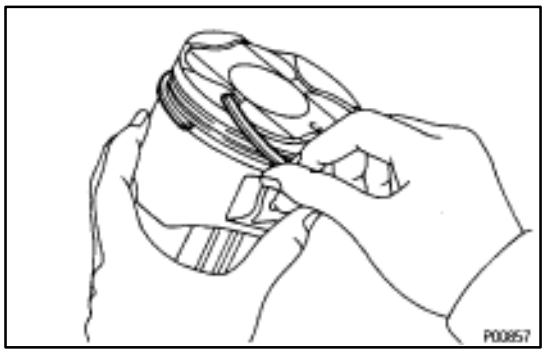
1. CHECK FIT BETWEEN PISTON AND PISTON PIN

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.

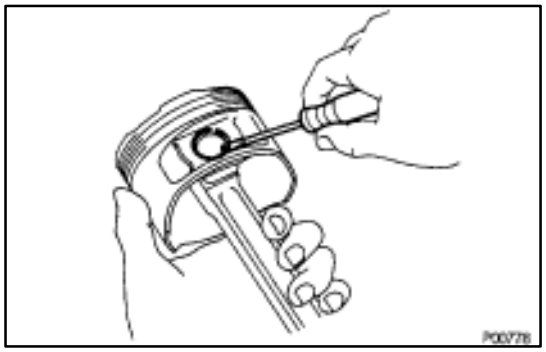


2. REMOVE PISTON RINGS

(a) Using a piston ring expander, remove the two compression rings.

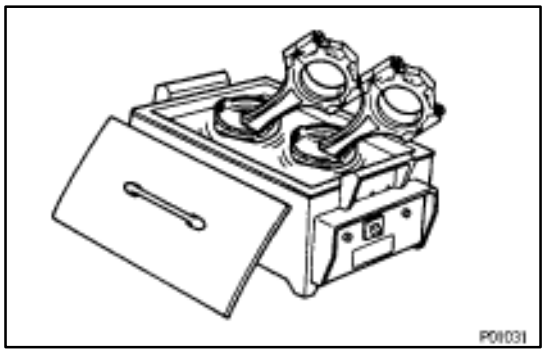


(b) Remove the two side rails and oil ring expander by hand.
HINT: Arrange the rings in correct order only.

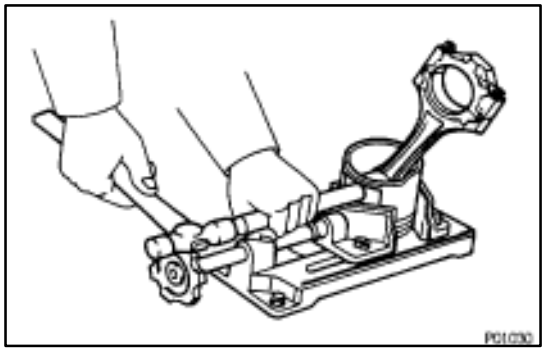


3. DISCONNECT CONNECTING ROD FROM PISTON

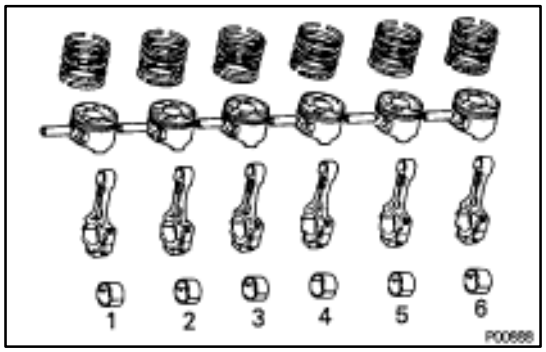
(a) Using a small screwdriver, pry off the snap ring from the piston.



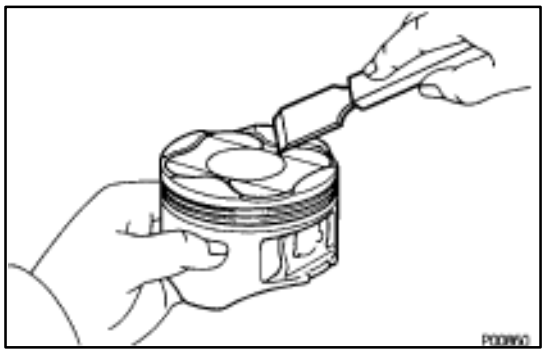
(b) Gradually heat the piston to approx. 605C (1405F).



(c) Using a plastic–faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.



HINT:
- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in correct order.

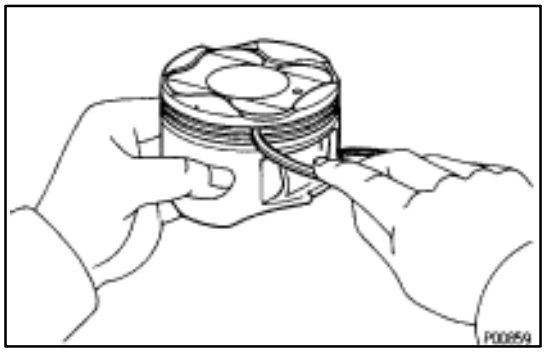


PISTON AND CONNECTING ROD INSPECTION

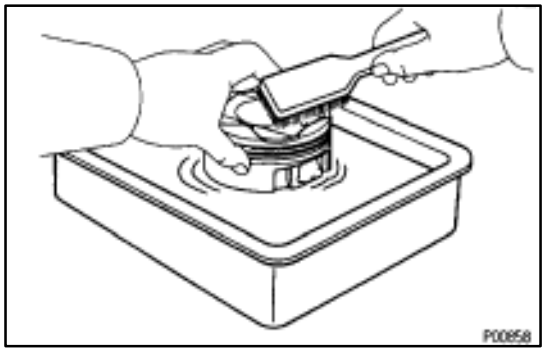
EG0FE–01

1. CLEAN PISTON

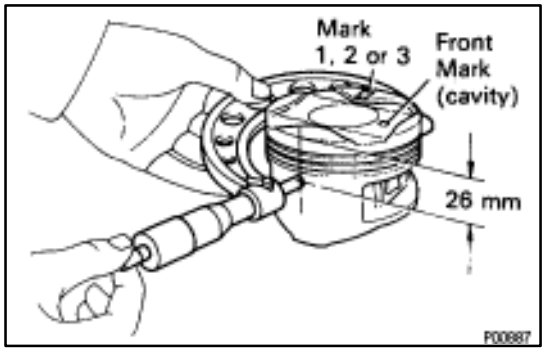
(a) Using a gasket scraper, remove the carbon from the piston top.



(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.



2. INSPECT PISTON

A. Inspect piston oil clearance

HINT: There are three sizes of the standard diameter, marked ”1”, ”2” and ”3” accordingly. The mark is stamped on the top of the piston.

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 26 mm (1.02 in.) from the piston head.

Piston diameter:

STD

Mark ”1”

87.360–87.370 mm (3.4394–3.4398 in.)

Mark ”2”

87.370–87.380 mm (3.4398–3.4402 in.)

Mark ”3”

87.380–87.390 mm (3.4402–3.4405 in.)

O/S 0.50

87.410–87.440 mm (3.4413–3.4425 in.)

(b) Measure the cylinder bore diameter in the thrust directions. (See step 5 on page EG–108)

(c) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

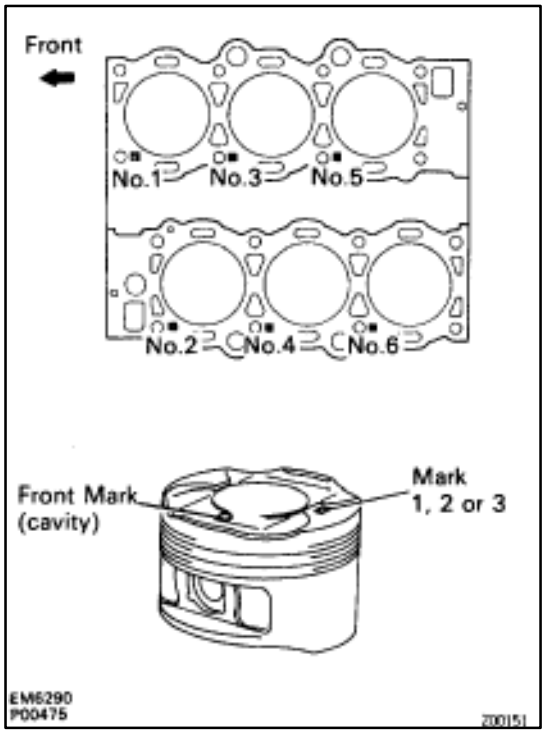
0.13–0.15 mm (0.0051–0.0059 in.)

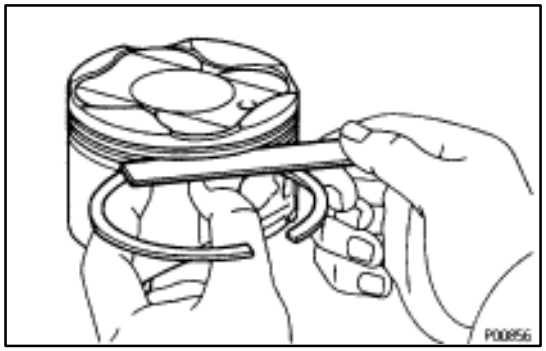
Maximum oil clearance:

0.17 mm (0.0067 in.)

If the oil clearance is greater than maximum, replace all the six pistons. If necessary, rebore all the six cylinders or replace the cylinder block.

HINT (Use new cylinder block): Use a piston with the same number mark as the standard bore diameter marked on the cylinder block.





B. Inspect piston ring groove clearance

Using a thickness gauge, measure the clearance between new piston ring and the wall of the piston ring groove.

Ring groove clearance:

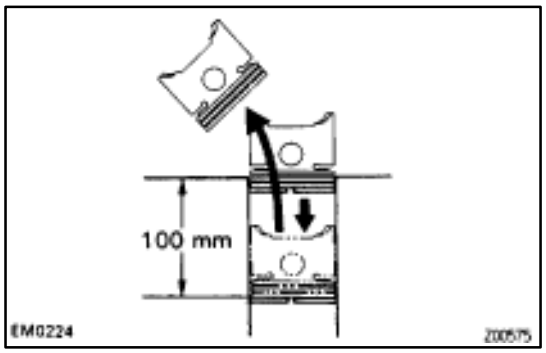
No.1

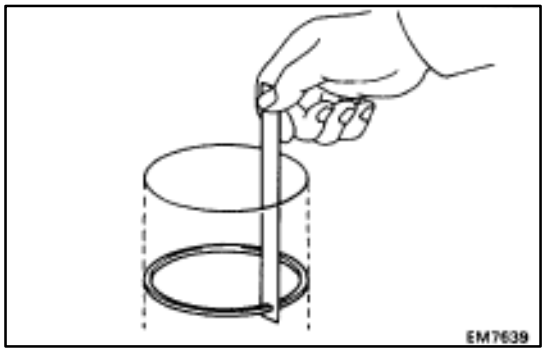
0.010–0.080 mm (0.0004–0.0031 in.)

No.2

0.030–0.070 mm (0.0012–0.0028 in.)

If the clearance is greater than maximum, replace the piston.





C. Inspect piston ring end gap

(a) Insert the piston ring into the cylinder bore.

(b) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 100 mm (3.94 in.) from the top of the cylinder block.

(c) Using a thickness gauge, measure the ring end gap.

Standard ring end gap:

No.1

0.280–0.500 mm (0.0110–0.0197 in.)

No.2

0.380–0.600 mm (0.0150–0.0236 in.)

Oil (Side rail)

0.150–0.570 mm (0.0059–0.0224 in.)

Maximum ring end gap:

No.1

1.10 mm (0.0433 in.)

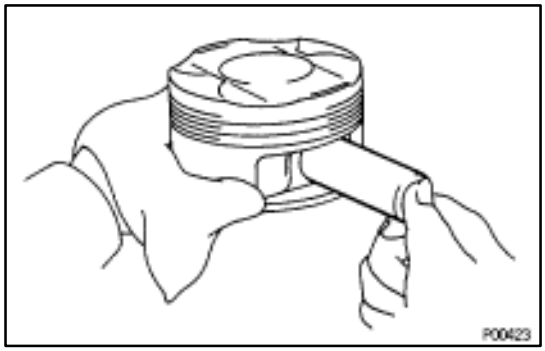
No.2

1.20 mm (0.0472 in.)

Oil (Side rail)

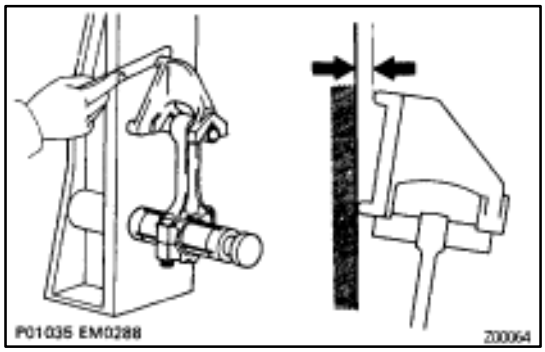
1.17 mm (0.0461 in.)

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 six cylinders or replace the cylinder block.



D. Inspect piston pin fit

At 60°C (140°F), you should be able to push the piston pin into the piston pin hole with your thumb.



3. INSPECT CONNECTING ROD

A. Inspect connecting rod alignment

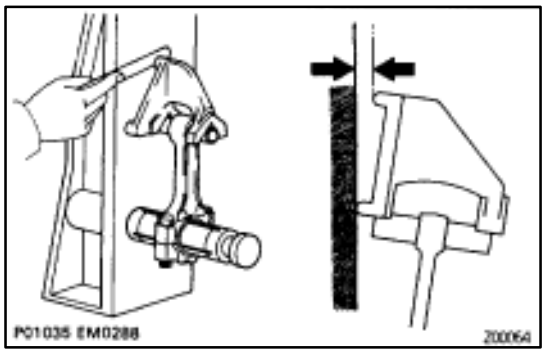
Using a rod aligner and thickness gauge, check the connecting rod alignment.

•Check for bend.

Maximum bend:

0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If bend is greater than maximum, replace the connecting rod assembly.

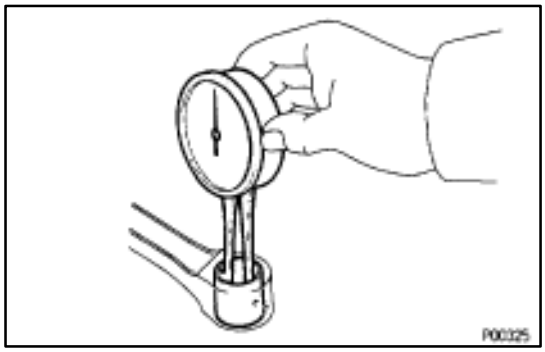


•Check for twist.

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twist is greater than maximum, replace the connecting rod assembly.



B. Inspect piston pin oil clearance

(a) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:

22.005–22.014 mm (0.8663–0.8667 in.)

(b) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

21.997–22.006 mm (0.8660–0.8664 in.)

(c) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

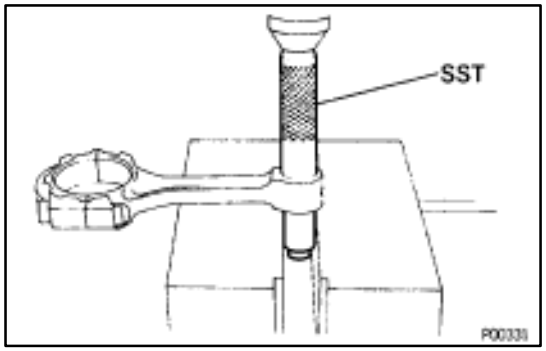
Standard oil clearance:

0.005–0.011 mm (0.0002–0.0004 in.)

Maximum oil clearance:

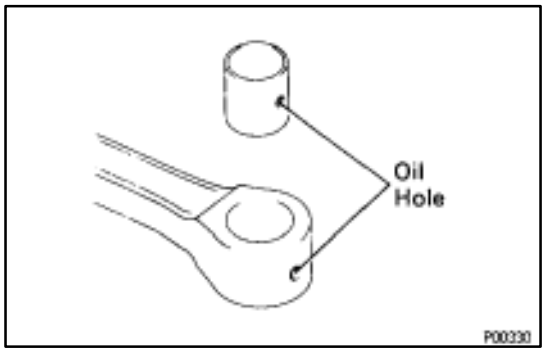
0.05 mm (0.0020 in.)

If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.

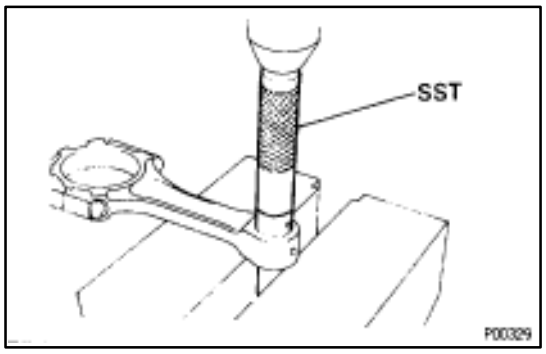


C. If necessary, replace connecting rod bushing

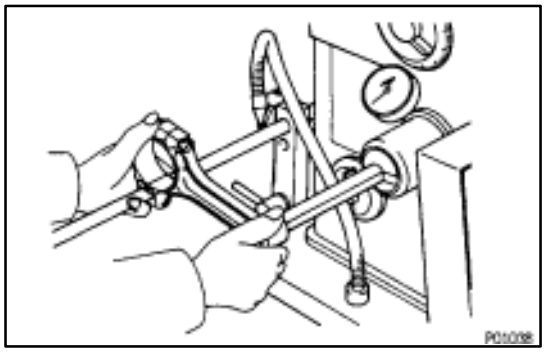
(a) Using SST and a press, press out the bushing.
SST 09222–30010



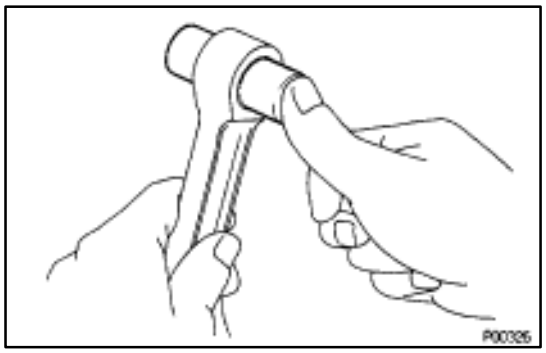
(b) Align the oil holes of a new bushing and the connecting rod.



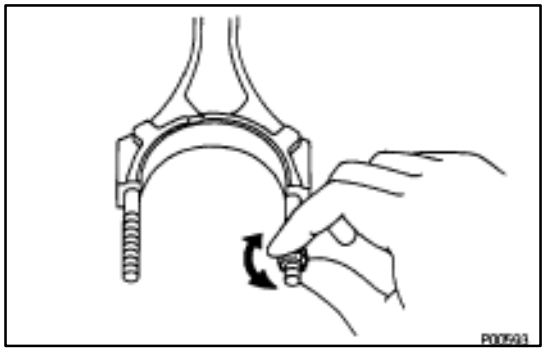
(c) Using SST and a press, press in the bushing.
SST 09222–30010



(d) Using a pin hone grinder, hone the bushing to obtain the standard specified clearance (see step B above) between the bushing and piston pin.

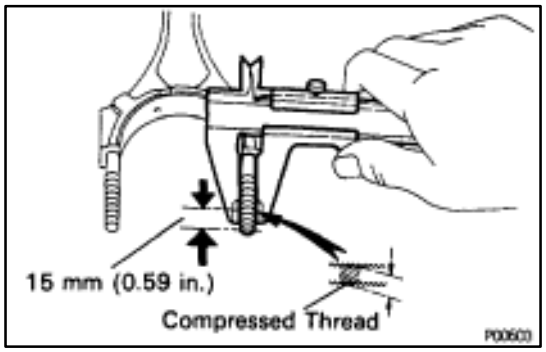


(e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.



D. Inspect connecting rod bolts

(a) Install the cap nut to the connecting rod bolt. Check that the cap nut can be turned easily by hand to the end of the thread.



(b) If the cap nut cannot be turned easily, measure the outer diameter of the compressed thread with a vernier caliper.

Standard outer diameter:

7.860–8.000 mm (0.3094–0.3150 in.)

Minimum outer diameter:

7.60 mm (0.2992 in.)

HINT: If the location of this area cannot be judged by visual inspection, measure the outer diameter at the location shown in the illustration.

If the outer diameter is less than minimum, replace the connecting rod and cap nut as a set.

BORING OF CYLINDER

EG0FF–01

HINT:

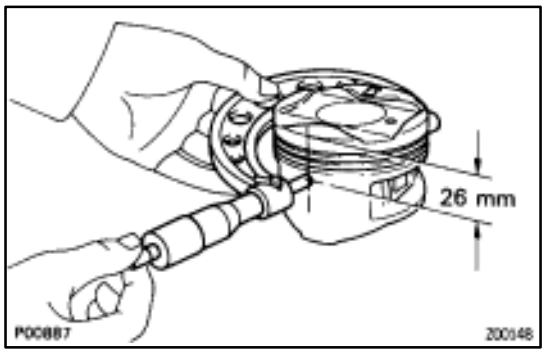
- Bore all the six cylinders for the oversized piston outside diameter.
- Replace the piston rings with ones to match the oversized pistons.

1. KEEP OVERSIZED PISTONS

Oversized piston diameter:

O/S 0.50

87.945–87.975 mm (3.4624–3.4636 in.)



2. CALCULATE AMOUNT TO BORE CYLINDER

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 26 mm (1.02 in.) from the piston head.

(b) Calculate the amount of which each cilinder is to be rebored as follows:

Size to be rebored = P + C – H

P = Piston diameter

C = Piston oil clearance

0.13–0.15 mm (0.0051–0.0059 in.)

H = Allowance for honing

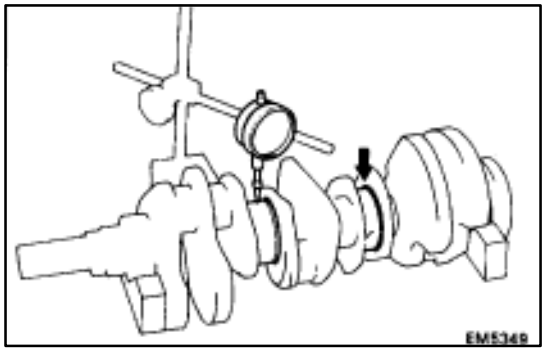
0.02 mm (0.0008 in.) or less

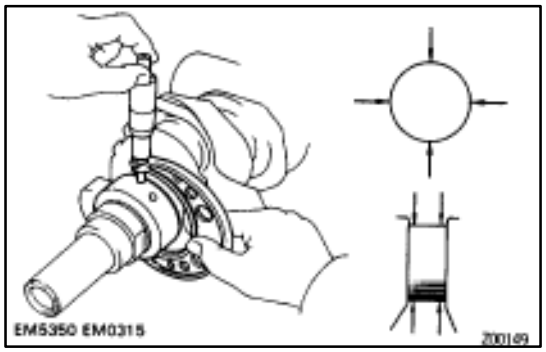
3. BORE AND HONE CYLINDERS TO CALCULATED DIMENSIONS

Maximum honing:

0.02 mm (0.0008 in.)

NOTICE: Excess honing will destroy the finished roundness.





CRANKSHAFT INSPECTION AND REPAIR

EGOFG–01

1. INSPECT CRANKSHAFT FOR RUNOUT

(a) Place the crankshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout:

0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the crankshaft.

2. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

STD

63.985–64.00 mm (2.5191–2.5197 in.)

U/S 0.25

63.745–63.755 mm (2.5096–2.5100 in.)

Crank pin diameter:

STD

54.987–55.000 mm (2.1648–2.1654 in.)

U/S 0.25

54.745–54.755 mm (2.1553–2.1557 in.)

If the diameter is not as specified, check the oil clearance. (See page EG–104)

(b) Check each main journal and crank pin for taper and out–of–round as shown.

Maximum taper and out–of–round:

0.02 mm (0.0008 in.)

If the taper or out–of–round is greater than maximum, grind or replace the crankshaft.

3. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

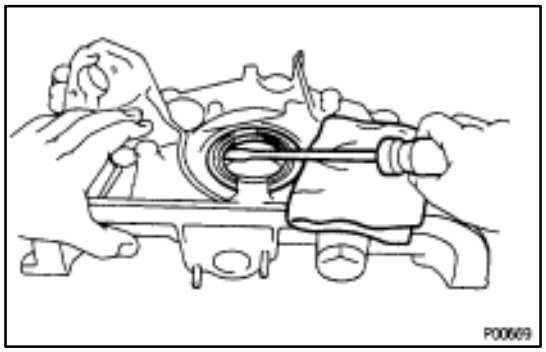
Grind and hone the main journals and/or crank pins to the finished undersized diameter (See procedure step 2).

Install new main journal and/or crank pin undersized bearings.

CRANKSHAFT OIL SEALS REPLACEMENT

EG0FH–01

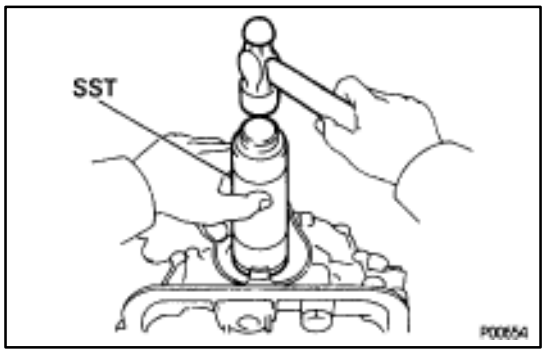
HINT: There are two methods (A and B) to replace the oil seal which are as follows:



1. REPLACE CRANKSHAFT FRONT OIL SEAL

A. If oil pump is removed from cylinder block:

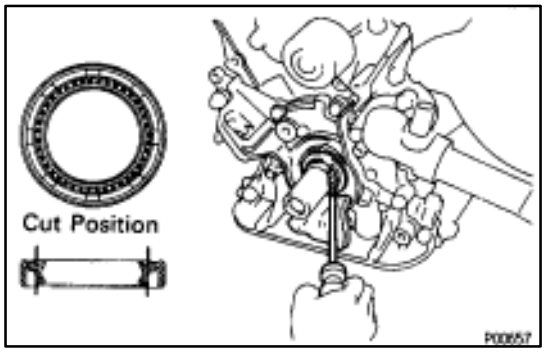
(a) Using a screwdriver, pry out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump case edge.
SST 09309–37010

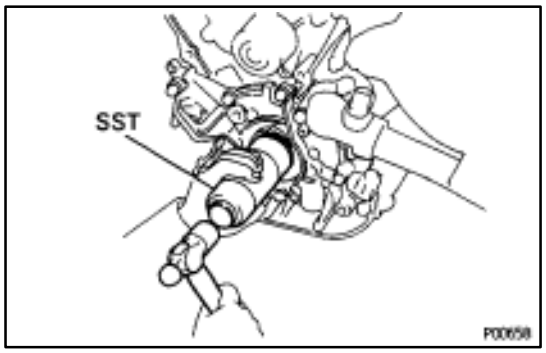
(c) Apply MP grease to the oil seal lip.

B. If oil pump is installed to the cylinder block:



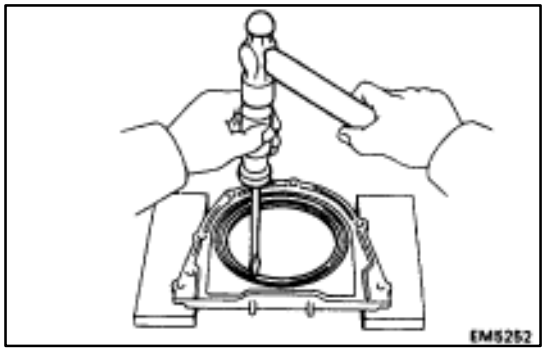
(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.
NOTICE: Be careful not to damage the crankshaft.
Tape the screwdriver tip.



(c) Apply MP grease to a new oil seal lip.

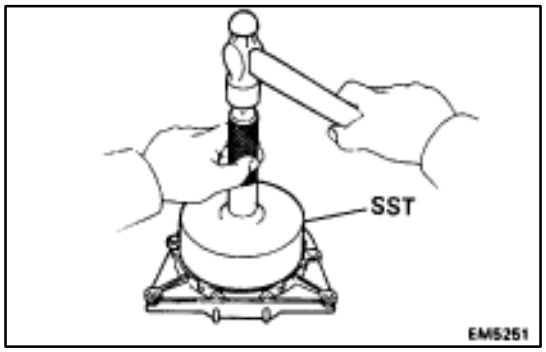
(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump case edge.
SST 09309–37010



2. REPLACE CRANKSHAFT REAR OIL SEAL

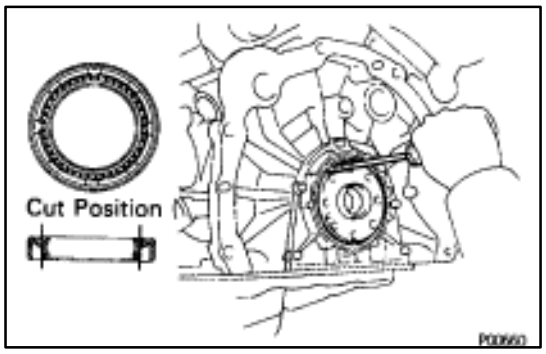
A. If rear oil seal retainer is removed from cylinder block:

(a) Using screwdriver and hammer, tap out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal edge.
SST 09223–56010

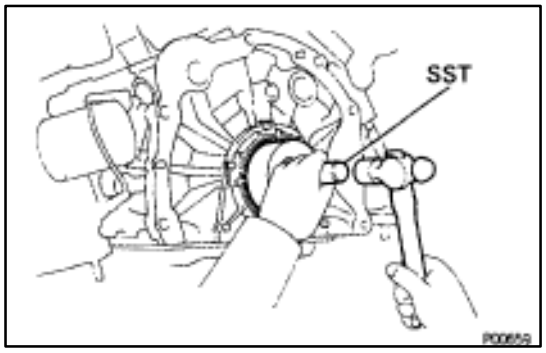
(c) Apply MP grease to the oil seal lip.



B. If rear oil seal retainer is installed to cylinder block:

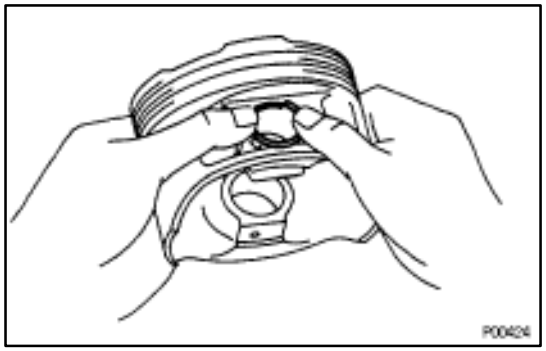
(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.
NOTICE: Be careful not to damage the crankshaft. Tape the screwdriver tip.



(c) Apply MP grease to a new oil seal lip.

(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223–56010

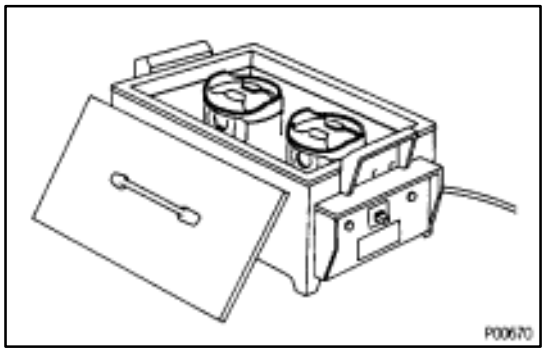


PISTON AND CONNECTING ROD ASSEMBLY

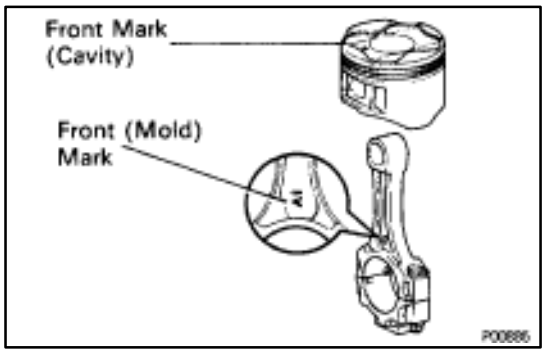
EG0FJ–01

1. ASSEMBLE PISTON AND CONNECTING ROD

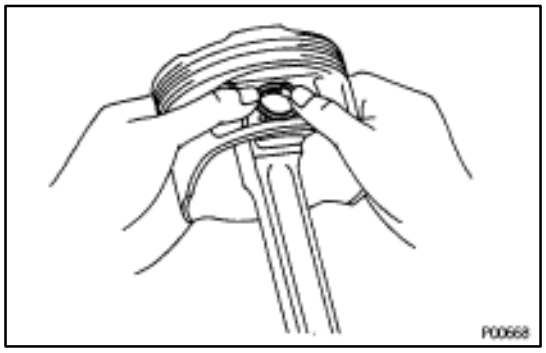
(a) Install a new snap ring on one side of the piston pin hole.
HINT: Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.



(b) Gradually heat the piston to 60°C (140°F).



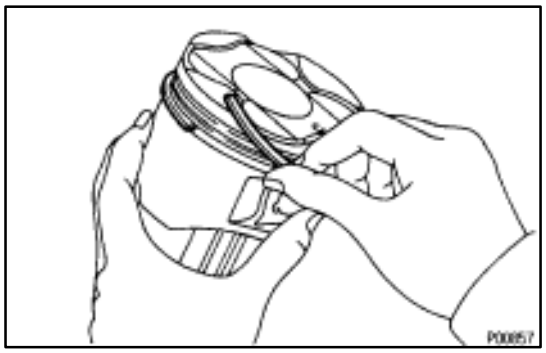
(c) Coat the piston pin with engine oil.
(d) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.
Connecting rod front (mold) mark:
A1, B6, 1B, 8A, C3 or etc.

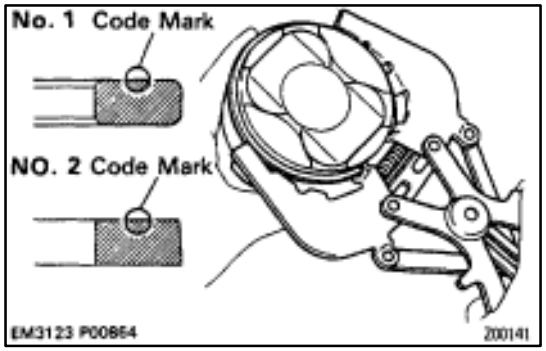


(e) Install a new snap ring on the other side of the piston pin hole.
HINT: Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

2. INSTALL PISTON RINGS

(a) Install the oil ring expander and two side rails by hand.





(b) Using a piston ring expander, install the two compression rings with the code mark facing upward.

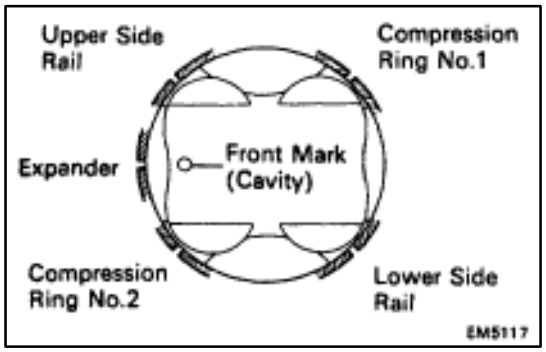
Code mark:

No.1

T or 1R

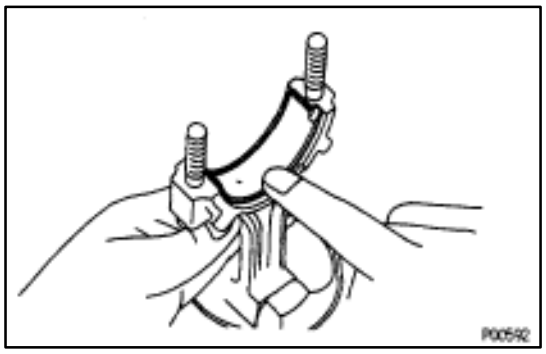
No.2

T2 or 2R



(c) Position the piston rings so that the ring ends are as shown.

NOTICE: Do not align the ring ends.



3. INSTALL 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.

CYLINDER BLOCK ASSEMBLY

EG0FK–01

(See page EG–98)

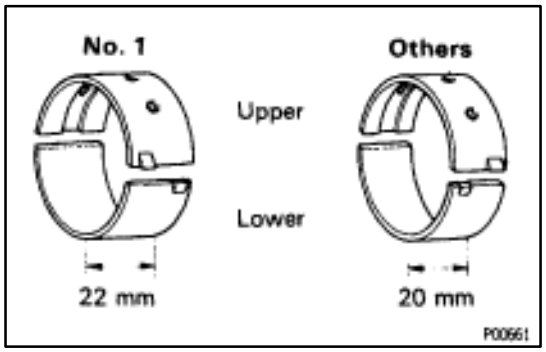
HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O–rings and oil seals with new parts.

1. INSTALL MAIN BEARINGS

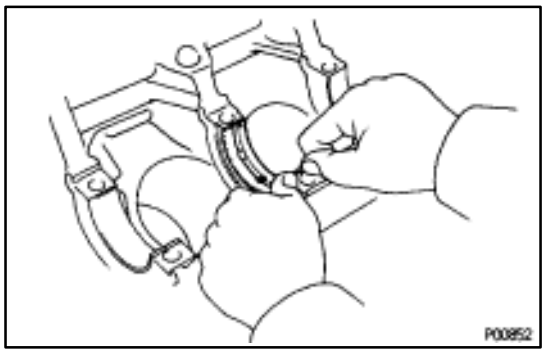
HINT:

- Main bearings come in widths of 20 mm (0.79 in.) and 22 mm (0.87 in.). Install the 22 mm (0.87 in.) bearings in the No.1 cylinder block journal position with the main bearing caps. Install the 20 mm (0.79 in.) bearings in the other positions.
- Upper bearings have oil holes, lower bearings do not.



(a) Align the bearing claw with the claw groove of the main bearing cap or cylinder block.

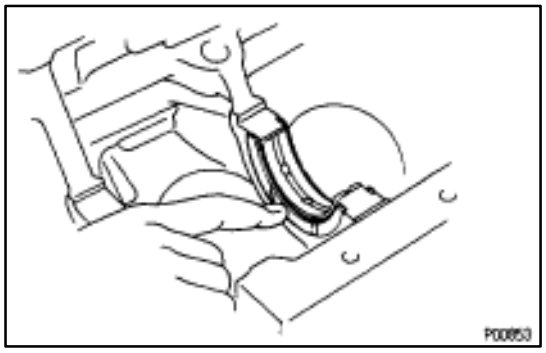
(b) Install the bearings in the cylinder block and main bearing cap.



2. INSTALL UPPER THRUST WASHERS

Install the thrust washers under the No.2 journal position of the block with the oil grooves facing outward.

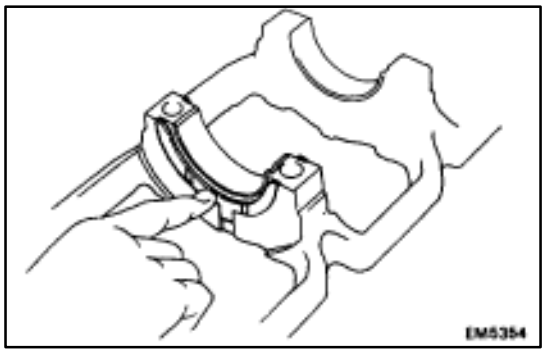
3. PLACE CRANKSHAFT ON CYLINDER BLOCK

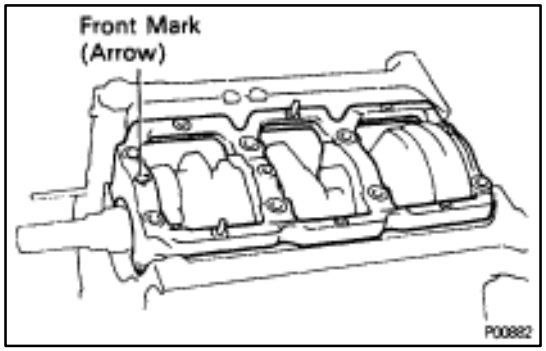


4. INSTALL MAIN BEARING CAP AND LOWER THRUST WASHERS

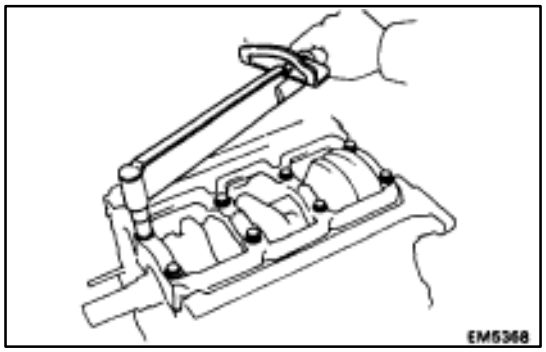
A. Place main bearing cap and lower thrust washers on cylinder block

(a) Install the thrust washers on the No.2 journal position of the bearing cap with the grooves facing outward.





(b) Install the main bearing cap with the front mark facing forward.



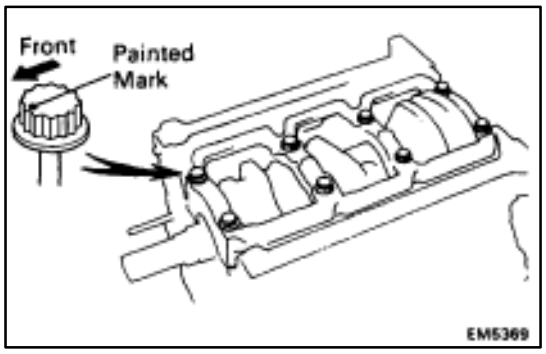
B. Install main bearing cap bolts

HINT:

- The main bearing cap bolts are tightened in two progressive steps (steps (b) and (d)).
- If any main bearing cap bolt is broken or deformed, replace it.

(a) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.

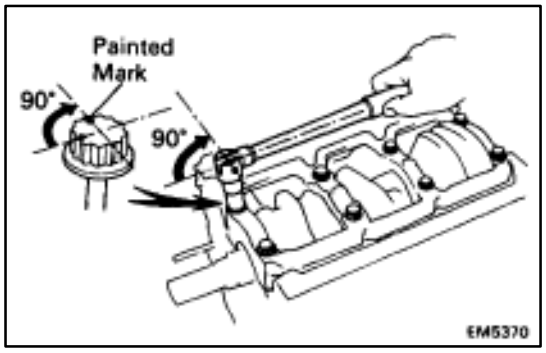
(b) Install and uniformly tighten the eight main bearing cap bolts in several passes, in the sequence shown.



Torque: 61 N·m (625 kgf·cm, 45 ft·lbf)

If any one of the main bearing cap bolts does not meet the torque specification, replace the cap bolt.

(c) Mark the front of the main bearing cap bolt with paint.

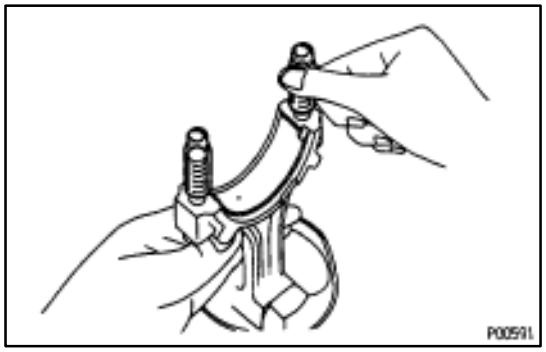


(d) Retighten the main bearing cap bolts 90° in the numerical order shown.

(e) Check that the painted mark is now at a 90° angle to the front.

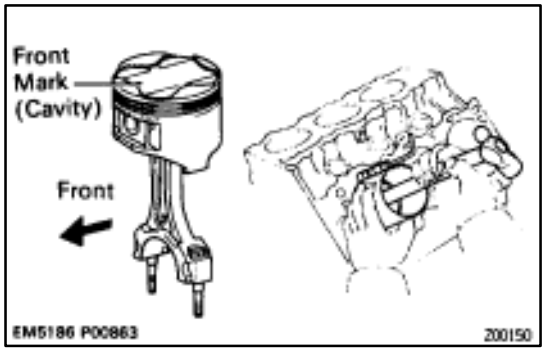
(f) Check that the crankshaft turns smoothly.

(g) Check the crankshaft thrust clearance.
(See step 5 on page EG–104)

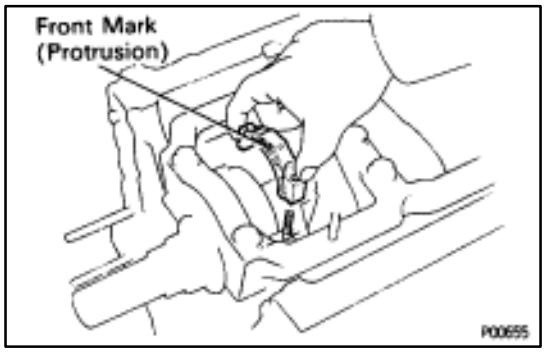


5. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

(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 correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



6. INSTALL CONNECTING ROD CAPS

A. Place connecting rod cap on connecting rod

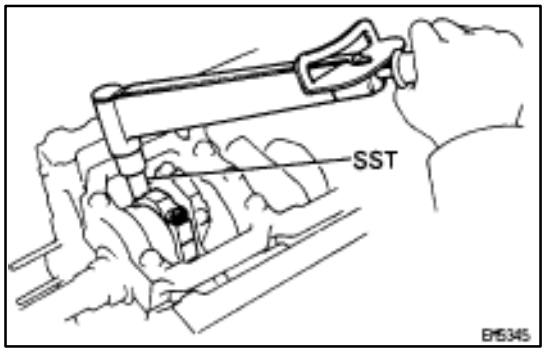
(a) Match the numbered connecting rod cap with the connecting rod.

(b) Install the connecting rod cap with the front mark facing forward.

B. Install connecting rod cap nuts

HINT:

- The connecting rod cap nuts are tightened in two progressive steps (steps (b) and (d)).
- If any connecting rod bolt is broken or deformed, replace them.



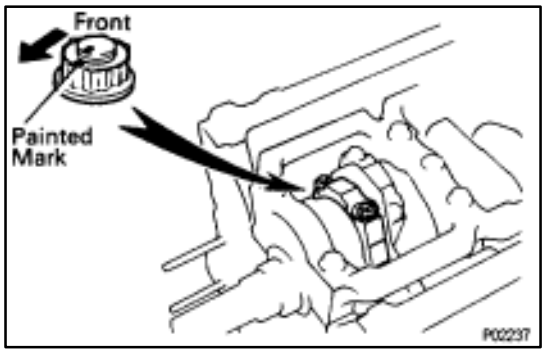
(a) Apply a light of engine oil on the threads and under the nuts of the connecting rod cap.

(b) Using SST, install and alternately tighten the nuts of the connecting rod cap in several passes.

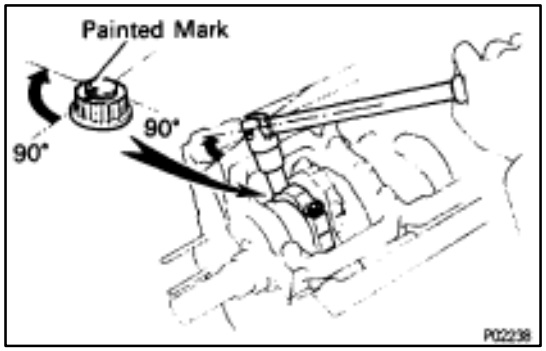
SST 09011–38121

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

If any one of the connecting rod cap nuts does not meet the torque specification, replace the cap nut.



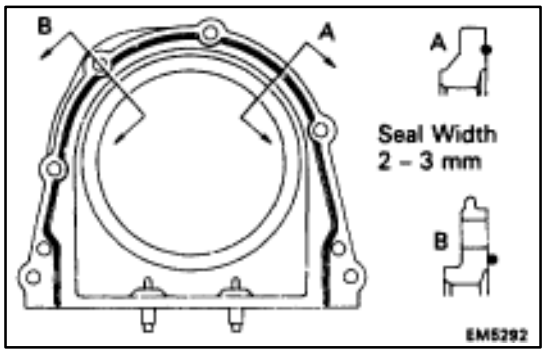
(c) Mark the front of the connecting rod cap nut and bolt with paint.



(d) Retighten the connecting rod cap nuts 905 as shown.
(e) Check that the painted mark is now at a 905 angle to the front.
(f) Check that the crankshaft turns smoothly.
(g) Check the connecting rod thrust clearance.
(See step 2 on page EG–101)

7. INSTALL REAR OIL SEAL RETAINER

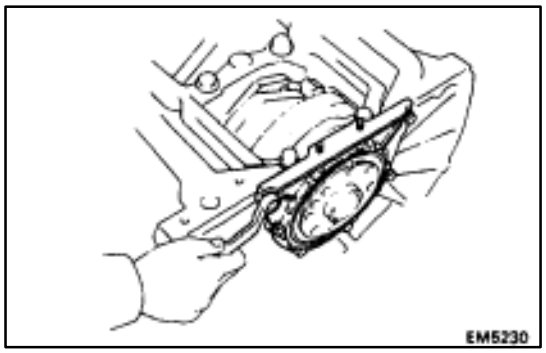
(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the retainer and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

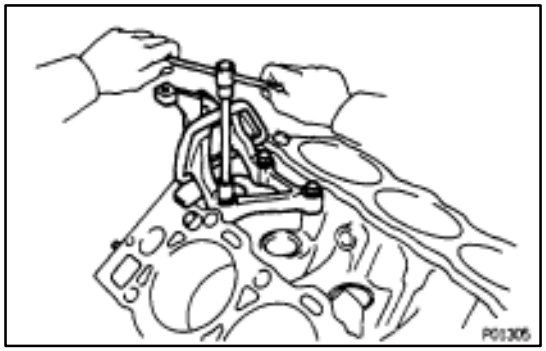


(b) Apply seal packing to the retainer as shown in the illustration.
Seal packing:
Part No.08826–00080 or equivalent
- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the retainer with the six bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)





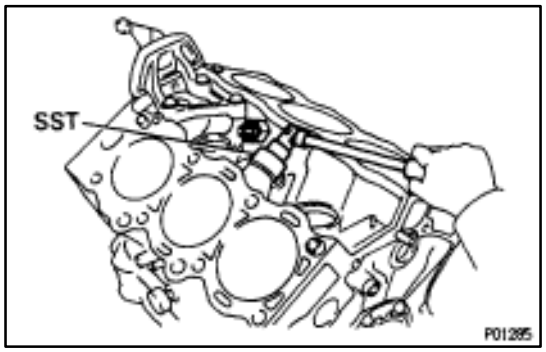
POST ASSEMBLY

EG0FL–01

1. INSTALL NO.2 IDLER PULLEY BRACKET

Install the pulley bracket with the three bolts. Torque the bolts.

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



2. INSTALL KNOCK SENSORS

Using SST, install the two knock sensors.

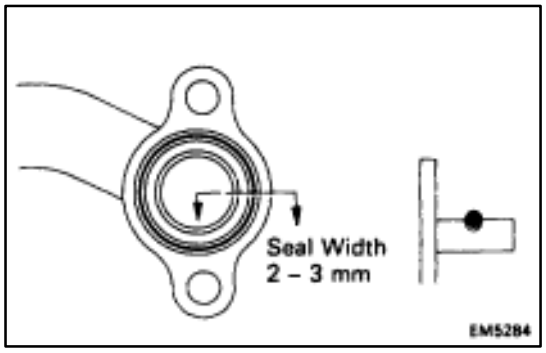
SST 09816–30010

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

3. INSTALL WATER BY–PASS PIPE

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the by–pass pipe and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the groove of the by–pass pipe.

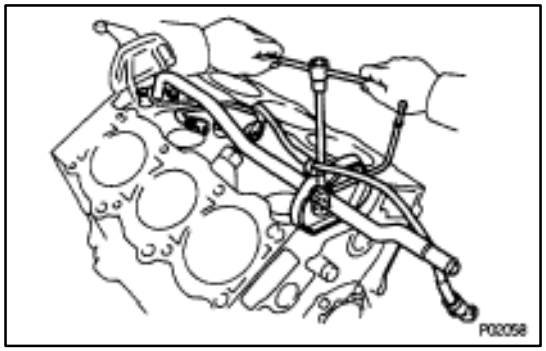
Seal packing:

Part No.08826–00100 or equivalent

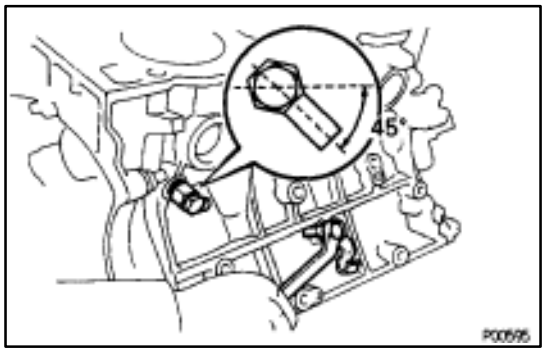
- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

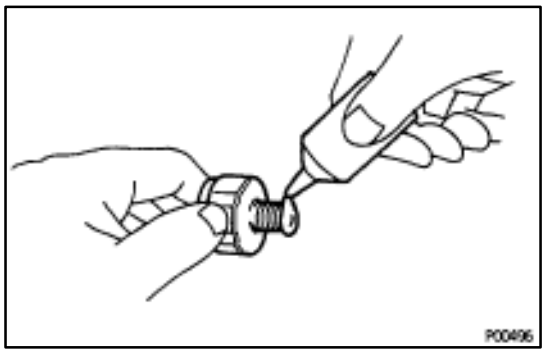
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



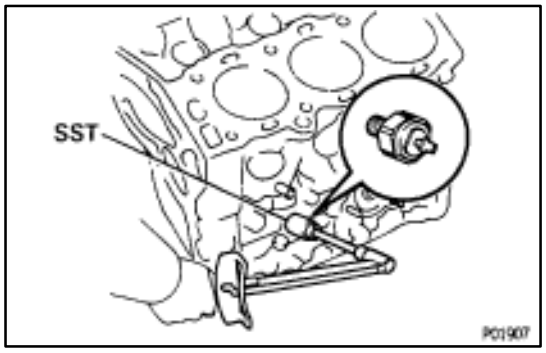
(c) Install the by–pass pipe with the two bolts and nut.
Torque: 8.3 N·m (85 kgf·cm, 74 ft·lbf)
(d) Connect the two knock sensor connectors.



4. INSTALL ENGINE COOLANT DRAIN COCK
(a) Install a new drain cock as shown.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
(b) Install the drain hose clamp with the bolt.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)
(c) Install the drain hose.



5. INSTALL OIL PRESSURE SWITCH
(a) Apply adhesive to two or three threads.
Adhesive:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent



(b) Using SST, install the oil pressure switch.
SST 09816–30010
Torque: 14 N·m (150 kgf·cm, 11 ft·lbf)

6. INSTALL OIL FILTER BRACKET AND FILTER
(See page EG–307)
7. INSTALL OIL PUMP AND OIL PAN
(See page EG–294)
8. INSTALL WATER PUMP (See page EG–246)
9. INSTALL CYLINDER HEADS
(See page EG–47)
10. INSTALL PULLEYS AND TIMING BELT
(See page EG–29)

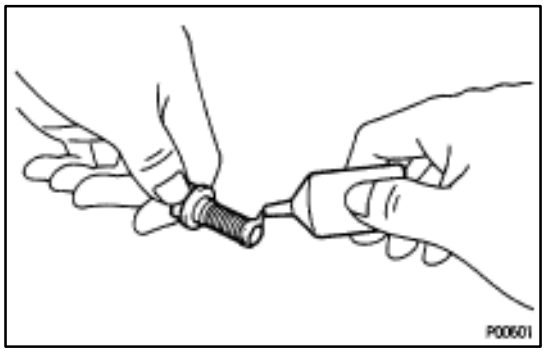
11. INSTALL DISTRIBUTOR (See IG section)

12. REMOVE ENGINE STAND

13. INSTALL REAR END PLATE

Install the end plate with the bolt.

Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



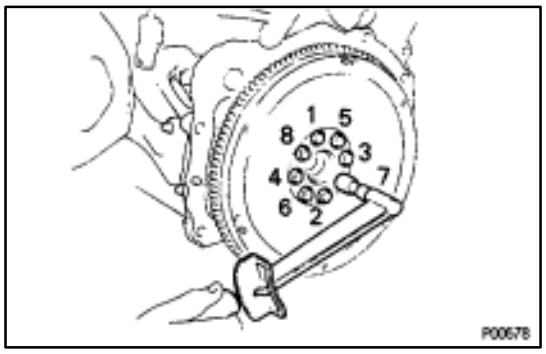
14. (M/T)

INSTALL FLYWHEEL

(a) Apply adhesive to two or three threads of the mount bolt end.

Adhesive:

Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Install the flywheel on the crankshaft.

(c) Install and uniformly tighten the eight mount bolts in several passes, in the sequence shown.

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

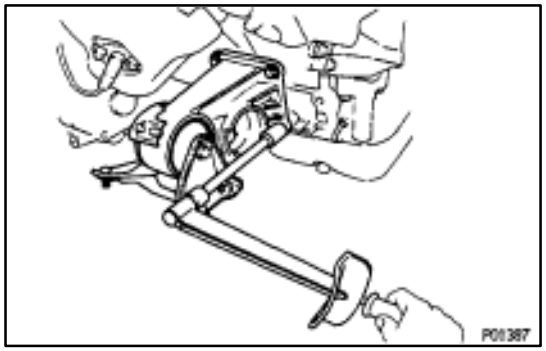
15. (A/T)

INSTALL DRIVE PLATE (See procedure step 14)

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

16. (M/T)

INSTALL CLUTCH DISC AND COVER

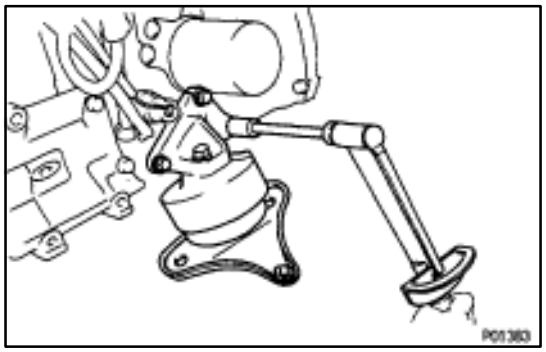


ENGINE INSTALLATION

EG0FM–02

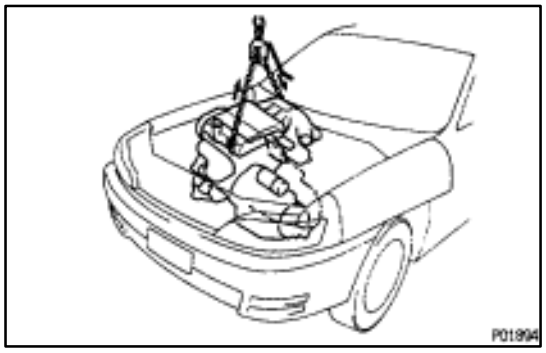
(See page EG–88)

1. **INSTALL RR ENGINE MOUNTING INSULATOR**
   Install the mounting insulator with the four bolts.
   Torque: 77 N·m (790 kgf·cm, 57 ft·lbf)



2. **INSTALL FR ENGINE MOUNTING INSULATOR**
   Install the mounting insulator with the three bolts.
   Torque: 77 N·m (790 kgf·cm, 57 ft·lbf)

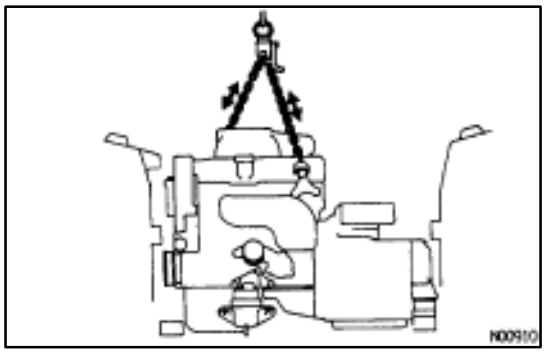
3. **ASSEMBLE ENGINE AND TRANSAXLE**
   M/T (See MT section)
   A/T (See AT section)
4. **(A/T)**
   INSTALL STARTER



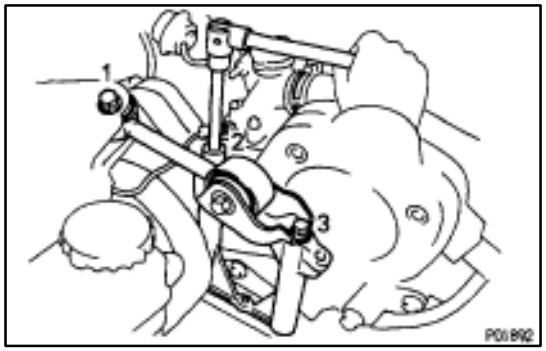
5. **INSTALL ENGINE AND TRANSAXLE ASSEMBLY IN VEHICLE**

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

(b) Lower the engine into the engine compartment.
Tilt the transaxle downward, lower the engine and clear the LH mounting.
NOTICE: Be careful not to hit the PS gear housing or park/neutral position switch (A/T).

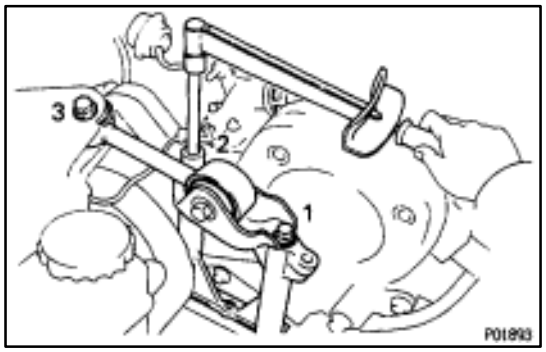


(c) Keep the engine level, and align RH and LH mountings with the body bracket.

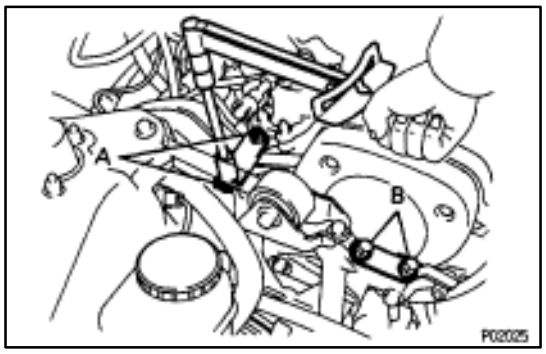


6. INSTALL NO.2 ENGINE MOUNTING BRACKET AND ENGINE MOVING CONTROL ROD

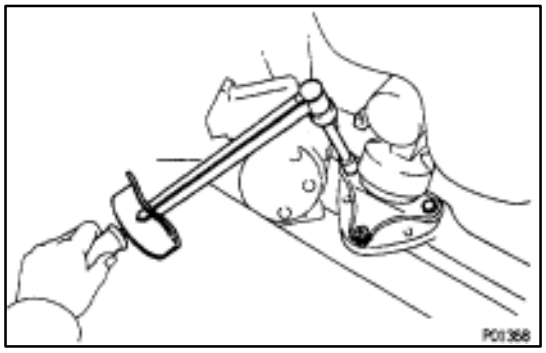
(a) Temporarily install the engine moving control rod and No.2 engine mounting bracket with the three bolts in the sequence shown.



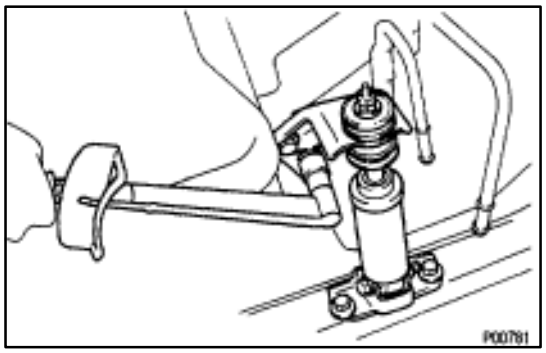
(b) Tighten the three bolts in the sequence shown.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



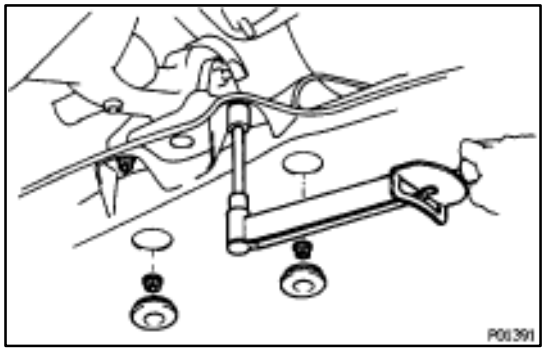
(c) Install the RH mounting stays with the three bolts and nut.
Bolt (A)
Torque: 31 N·m (320 kgf·cm, 23 ft·lbf)
Bolt (B)
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)



7. CONNECT FR ENGINE MOUNTING INSULATOR
Connect the mounting insulator with the three bolts.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



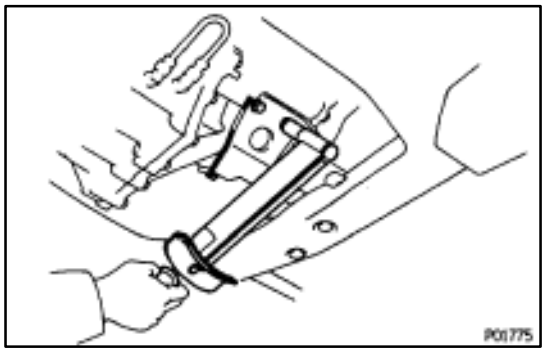
8. INSTALL ENGINE MOUNTING ABSORBER
Install the engine mounting absorber with the four bolts.
Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)



9. CONNECT RR ENGINE MOUNTING INSULATOR

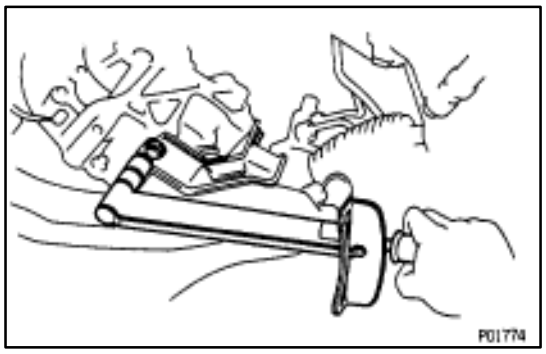
(a) Connect the mounting insulator with the four nuts.
Torque: 66 N·m (670 kgf·cm, 48 ft·lbf)

(b) Install the hole plugs.



10. CONNECT LH ENGINE MOUNTING INSULATOR (M/T)

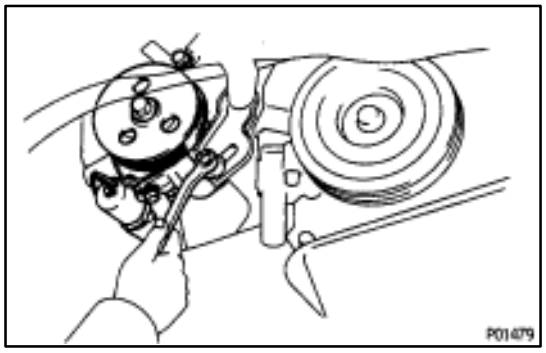
Connect the mounting insulator with the three bolts.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



(A/T)

Connect the mounting insulator with the four bolts.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

11. REMOVE ENGINE SLING DEVICE

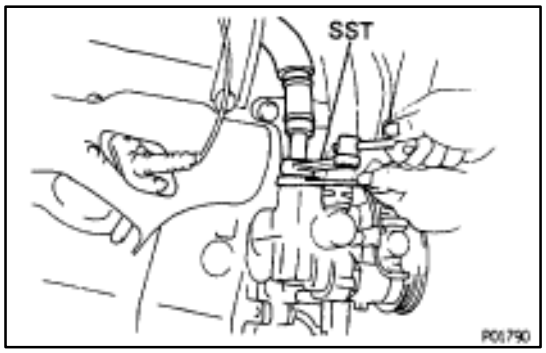


12. INSTALL PS PUMP

(a) Install the PS pump with the two bolts.
Torque: 43 N·m (440 kgf·cm, 31 ft·lbf)

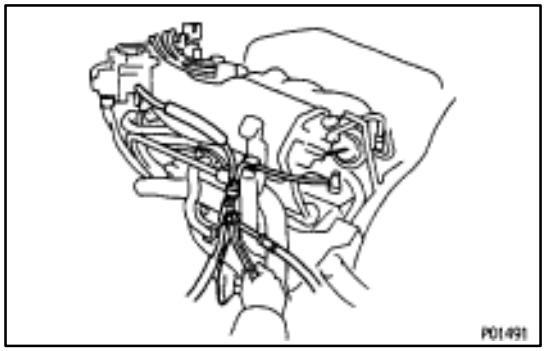
(b) Install the drive belt.

13. INSTALL DRIVE SHAFTS (See SA section)



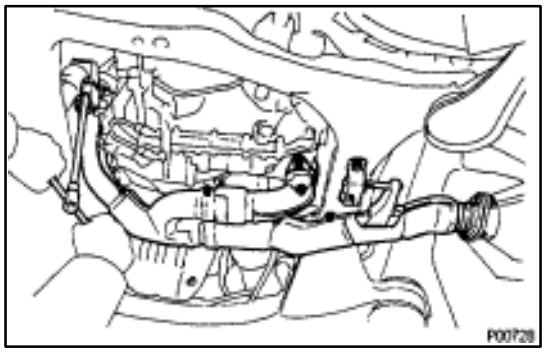
14. CONNECT HYDRAULIC COOLING FAN PRESSURE HOSE

Using SST, connect the pressure hose.
SST 09631–22020



15. CONNECT PS ACV

(a) Connect the PS ACV with the nut.
(b) Connect the two PS air hoses.

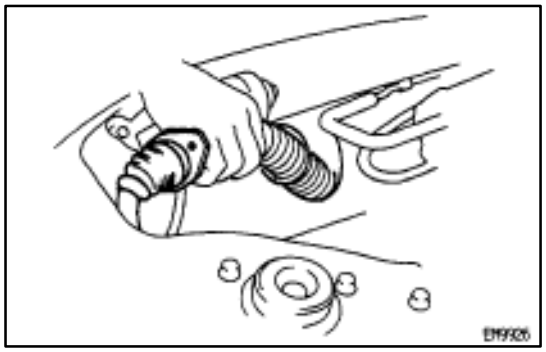


16. INSTALL FRONT EXHAUST PIPE

(a) Place three new gaskets on the front exhaust pipe.
(b) Install the front exhaust pipe with the bolts and six nuts. Torque the nuts.
To manifold
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)
To three–way catalytic converter
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(c) Connect the bracket with the two bolts.

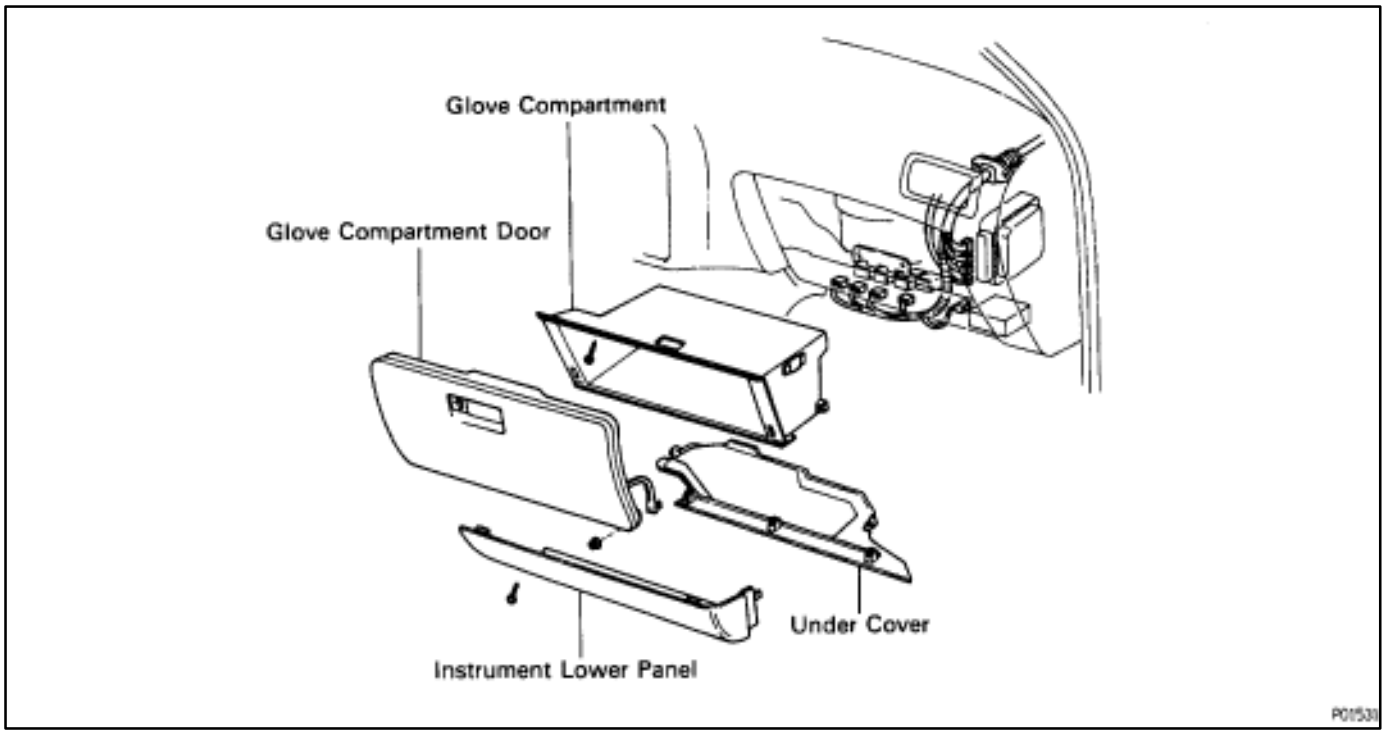
17. INSTALL A/C COMPRESSOR

(a) Install the compressor, compressor stay with the five bolts.
To generator bracket
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)
To cylinder block
Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)
(b) Install the drive belt.
(c) Connect the A/C compressor connector.



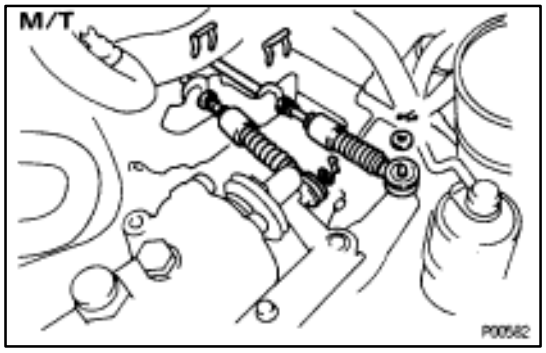
18. CONNECT ENGINE WIRE TO CABIN

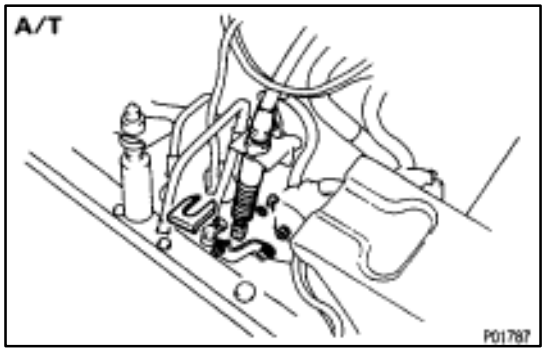
(a) Push in the engine wire through the cowl panel. Install the two nuts.
(b) Connect the following connectors:
(1) Three engine control module (ECM) connectors
(2) Five cowl wire connectors
(3) Cooling fan ECU connector
(c) Install the glove compartment.
(d) Install the glove compartment door.
(e) Install the lower instrument panel.
(f) Install the under cover.



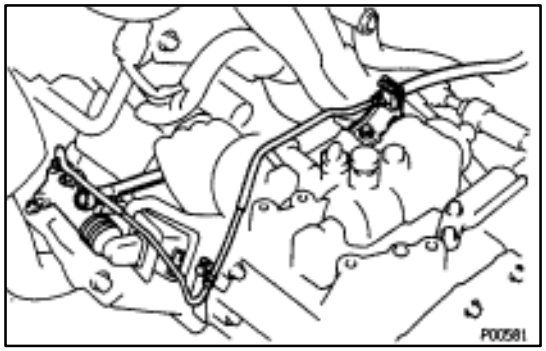
19. CONNECT VACUUM HOSES

(a) Brake booster vacuum hose to air intake chamber
(b) Charcoal canister vacuum hose
(c) IACV vacuum tank vacuum hose



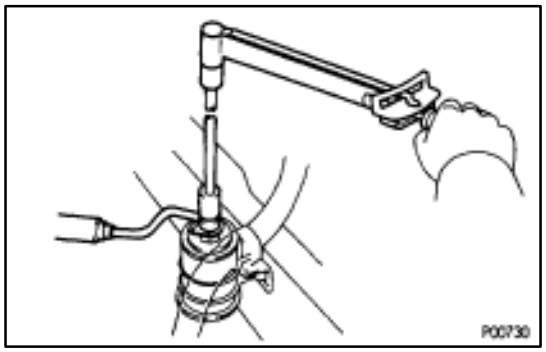


20. CONNECT TRANSAXLE CONTROL CABLE (S) TO TRANSAXLE

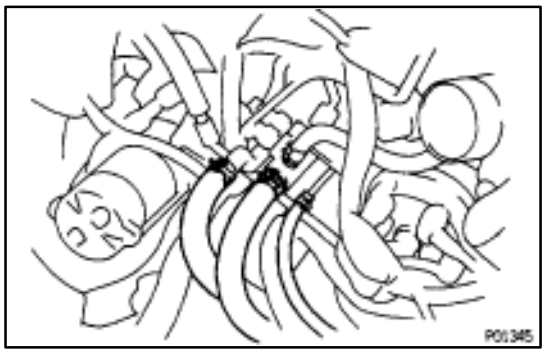


21. (M/T)
INSTALL CLUTCH RELEASE CYLINDER
Install the release cylinder and tube with the four bolts.

22. (M/T)
INSTALL STARTER

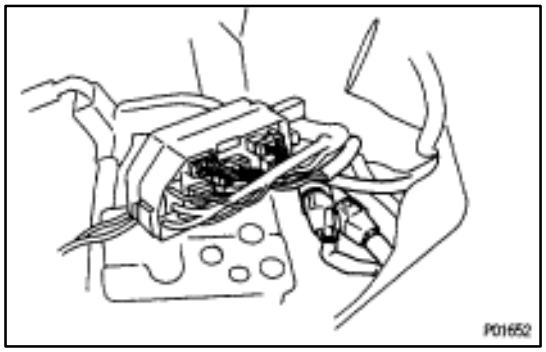


23. CONNECT FUEL INLET HOSE
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



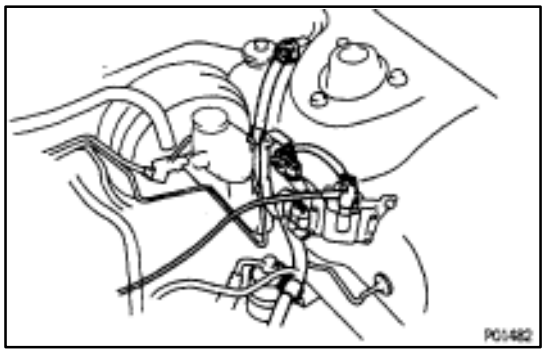
24. CONNECT FUEL RETURN HOSE

25. CONNECT HEATER HOSES

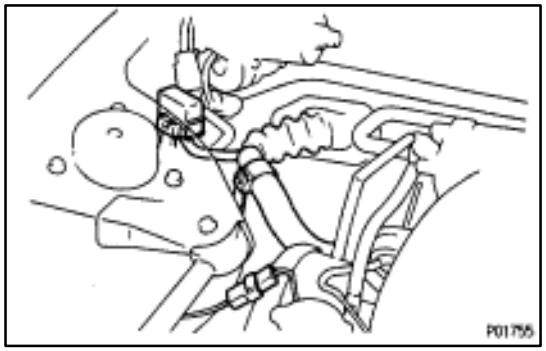


26. CONNECT WIRES AND CONNECTORS

(a) Connect the three connectors to the relay box.
(b) Install the engine relay box.
(c) Two connectors from LH fender apron



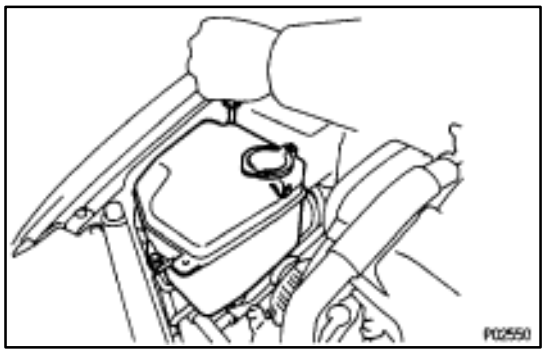
(d) Ignition connector
(e) Ignition coil connector
(f) High–tension cord to ignition coil
(g) Noise filter connector
(h) Connector from fender apron



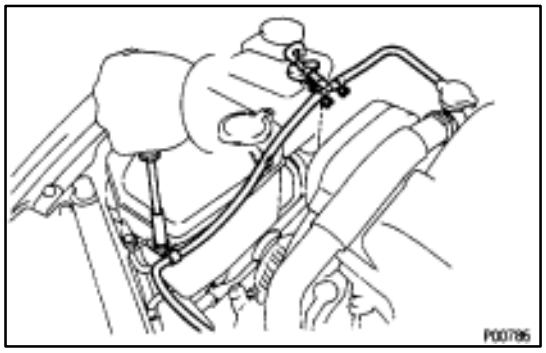
(i) Data link connector 1
(j) Ground strap from RH fender apron

(k) (M/T)
Back–up light switch connector
(l) (M/T)
Speed sensor connector

27. INSTALL ENGINE COOLANT RESERVOIR TANK

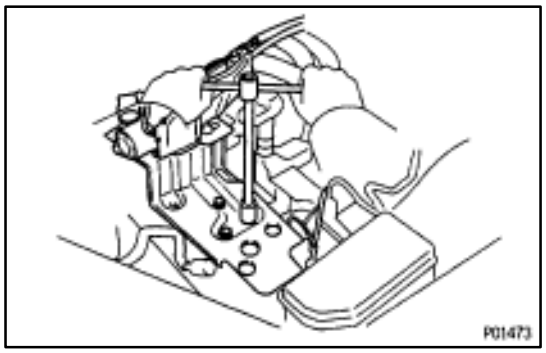


28. INSTALL WASHER TANK
(a) Connect the connector and vinyl hose to the washer tank.
(b) Install the washer tank with the three bolts.



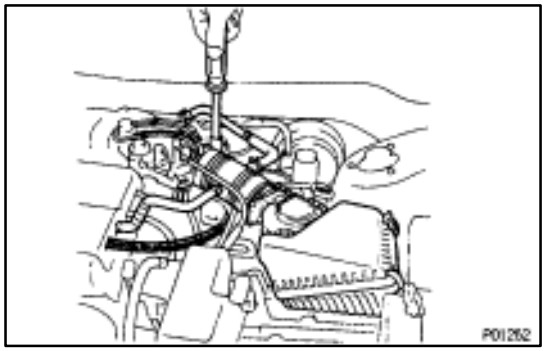
29. INSTALL ENGINE COOLANT RESERVOIR HOSE
Connect the reservoir hose with the bolt.

30. INSTALL RADIATOR



31. CONNECT GROUND STRAP TO BATTERY CARRIER

32. INSTALL CRUISE CONTROL ACTUATOR
(a) Install the actuator and bracket with the three bolts.
(b) Connect the actuator connector.
(c) Install the actuator cover.



33. INSTALL AIR CLEANER ASSEMBLY, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

(a) Install the air cleaner case with three bolts.
(b) Install the air filter.
(c) Connect the air cleaner hose to the throttle body.
(d) Install the air cleaner cap together with the volume air flow meter and air cleaner hose.
(e) Connect the volume air flow meter connector.

34. (A/T)
CONNECT THROTTLE CABLE, AND ADJUST IT

35. INSTALL ACCELERATOR CABLE, AND ADJUST IT

36. FILL WITH ENGINE COOLANT

Capacity (w/ Heater):
NSR
M/T
8.5 liters (9.0 US qts, 7.5 lmp. qts)
A/T
8.4 liters (8.9 US qts, 7.4 lmp. qts)
NWR
9.0 liters (9.5 US qts, 7.9 lmp. qts)

37. FILL WITH ENGINE OIL

Capacity:
Drain and refill
w/ Oil filter change
3.7 liters (3.9 US qts, 3.3 lmp. qts)
w/o Oil filter change
3.9 liters (4.1 US qts, 3.4 lmp. qts)
Dry fill
4.6 liters (4.8 US qts, 4.0 lmp. qts)

38. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

39. START ENGINE AND CHECK FOR LEAKS

40. PERFORM ENGINE ADJUSTMENT

(a) Adjust the generator drive belt.
(See CH section)

Drive belt tension:
New belt
175±5 lb
Used belt
115±20 lb

(b) Adjust the PS drive belt.
(See SR section)
Drive belt tension:
New belt
150–185 lb
Used belt
115±20 lb

(c) Adjust the ignition timing.
(See IG section)
Ignition timing:
10° ± BTDC @ idle
(w/ Terminals TE1 and E1 connected)

41. INSTALL ENGINE UNDER COVERS

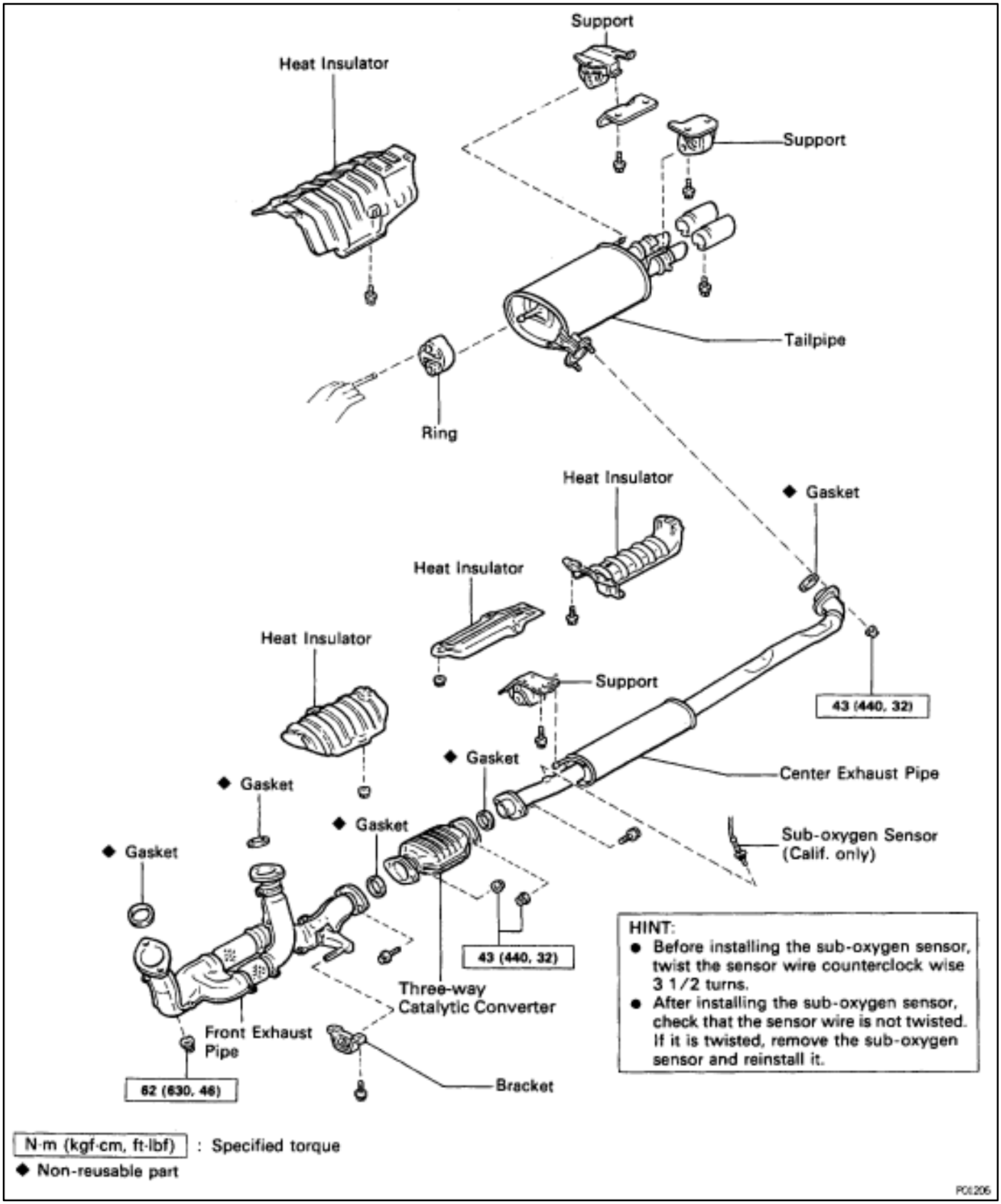
42. INSTALL HOOD

43. PREFORM ROAD TEST
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

44. RECHECK ENGINE COOLANT AND ENGINE OIL LEVELS

EXHAUST SYSTEM COMPONENTS

EG0FN–01



SERVICE SPECIFICATIONS
SERVICE DATA

EG0FP–01

Idle speed	—	700 ± 50 rpm
Intake manifold vacuum	at Idle speed	58.6 kPa (440 mmHg, 17.32 in.hg) or more
Compression pressure	at 250 rpm–STD	1.226 kPa (12.5 kgf/cm^2, 178 psi) or more
	at 250 rpm–Limit	981 kPa (10.0 kgf/cm^2, 142 psi)
	Difference of pressure between each cylinder	98 kPa (1.0kgf/cm^2, 14 psi) or less
Cylinder head	Cylinder block surface warpage–Limit	0.10 mm (0.0039 in.)
	Valve seat–Refacing angle	30°, 45°, 60°
	Valve seat–Contacting angle	45°
	Valve–Contacting width	1.0–1.4 mm (0.039–0.055 in.)
Valve guide bushing	Inside diameter	6.010–6.030 mm (0.2366–0.2374 in.)
	Outside diameter–STD	11.048–11.059 mm (0.4350–0.4354 in.)
	Outside diameter–O/S 0.05	11.098–11.109 mm(0.4369–0.4374 in.)
Valve	Valve overall length–STD (Intake)	95.15 mm (3.7461 in.)
	Valve overall length–STD (Exhaust)	94.90 mm(3.7362 in.)
	Valve overall length–Limit (Intake)	94.6 mm (3.724 in.)
	Valve overall length–Limit (Exhaust)	94.4 mm (3.717 in.)
	Valve face angle	44.5°
	Stem diameter–Intake	5.970–5.985 mm (0.2350–0.2356 in.)
	Stem diameter–Exhaust	5.965–5.980 mm (0.2348–0.2354 in.)
	Stem oil clearance–STD (Intake)	0.025–0.060 mm (0.0010–0.0024 in.)
	Stem oil clearance–STD (Exhaust)	0.030–0.065 mm (0.0012–0.0026 in.)
	Stem oil clearance–Limit (Intake)	0.08 mm (0.0031 in.)
	Stem oil clearance–Limit (Exhaust)	0.10 mm (0.0039 in.)
	Margin thickness–STD	1.0 mm (0.0394 in.)
	Margin thickness–Limit	0.5 mm (0.0197 in.)
Valve spring	Free length	41.4 mm (1.630 in.)
	Installed tension at 33.3 mm (1.311 in.)	186–206 N (19.0–21.0 kgf, 38.4–42.4 lbf)
	Squareness–Limit	2.0 mm (0.075 in.)
Valve lifter	Lifter diameter	30.966–30.976 mm (1.2191–1.2195 in.)
	Cylinder head lifter bore diameter	31.000–31.018 mm (1.2204–1.2212 in.)
	Oil clearance–STD	0.024–0.052 mm (0.0009–0.0020 in.)
	Oil clearance–Limit	0.08 mm (0.0031 in.)
Manifold	Warpage–Limit (Intake)	0.10 mm (0.0039 in.)
	Warpage–Limit (Exhaust)	1.00 mm (0.0394 in.)
Air intake chamber	Warpage–Limit	0.10 mm (0.0039 in.)

Camshaft	Thrust clearance–STD	0.033–0.080 mm (0.0013–0.0031 in.)
	Thrust clearance–Limit	0.12 mm (0.0047 in.)
	Journal oil clearance–STD	0.035–0.072 mm (0.0014–0.0028 in.)
	Journal oil clearance–Limit	0.10 mm (0.0039 in.)
	Journal diameter	26.949–26.965 mm (1.0610–1.0616 in.)
	Circle runout–Limit	0.06 mm (0.0024 in.)
	Cam lobe height–STD (Intake)	42.160–42.260 mm (1.6598–1.6638 in.)
	Cam lobe height–STD (Exhaust)	41.960–42.060 mm (1.6520–1.6559 in.)
	Cam lobe height–Limit (Intake)	42.01 mm (1.6539 in.)
	Cam lobe height–Limit (Exhaust)	41.81 mm (1.6461 in.)
	Camshaft gear backlash–STD	0.020–0.200 mm (0.0008–0.0079 in.)
	Camshaft gear backlash–Limit	0.30 mm (0.0188 in.)
	Camshaft gear spring end free distance	18.2–18.8 mm (0.712–0.740 in.)
Timing belt tensioner	Protrusion (from housing end)	10.0–10.8 mm (0.394–0.425 in.)
Cylinder block	Cylinder head surface warpage–Limit	0.05 mm (1.0020 in.)
	Cylinder bore diameter–STD (Mark 1)	87.500–87.510 mm (3.4449–3.4453 in.)
	Cylinder bore diameter–STD (Mark 2)	87.510–87.520 mm (3.4453–3.4457 in.)
	Cylinder bore diameter–STD (Mark 3)	87.520–87.530 mm (3.4457–3.4461 in.)
	Cylinder bore diameter–Limit (STD)	87.73 mm (2.4539 in.)
	Cylinder bore diameter–Limit (O/S 0.50)	88.23 mm (3.4736 in.)
Piston and piston ring	Piston diameter–STD (Mark 1)	87.360–87.370 mm (3.4394–3.4398 in.)
	Piston diameter–STD (Mark 2)	87.370–87.380 mm (3.4398–3.44020in.)
	Piston diameter–STD (Mark 3)	87.380–87.390 mm (3.4402–3.4405 in.)
	Piston diameter–O/S 0.50	87.410–87.440 mm (3.4413–3.4425 in.)
	Piston oil clearance–STD	0.13–0.15 mm (0.0051–0.0059 in.)
	Piston oil clearance–Limit	0.17 mm (0.0067 in.)
	Piston ring groove clearance–No. 1	0.010–0.080 mm (0.0004–0.0031 in.)
	Piston ring groove clearance–No.2	0.030–0.070 mm (0.0012–0.0028 in.)
	Piston ring end gap–STD (No. 1)	0.280–0.500 mm (0.00110–0.0197 in.)
	Piston ring end gap–STD (No. 2)	0.380–0.600 mm (0.0150–0.0236 in.)
	Piston ring end gap–STD (oil)	0.150–0.570 mm (0.0059–0.0224 in.)
	Piston ring end gap–Limit (No. 1)	1.10 mm (0.0433 in.)
	Piston ring end gap–Limit (No. 2)	1.20 mm (0.0472 in.)
	Piston ring end gap–Limit (Oil)	1.17 mm (0.0461 in.)

Connecting rod	Thrust clearance–STD	0.150–0.330 mm (0.0059–0.0130 in.)
	Thrust clearance–Limit	0.38 mm (0.0150 in.)
	Connecting rod oil clearance–STD (STD)	0.028–0.065 mm (0.0011–0.0026 in.)
	Connecting rod oil clearance–STD (U/S 0.25)	0.027–0.080 mm (0.0011–0.0031 in.)
	Connecting rod oil clearance–Limit	0.08 mm (0.0031 in.)
	Connecting rod bearing center wall thickness	
	–Mark 1	1.484–1.488 mm (0.0584–0.0586 in.)
	–Mark 2	1.488–1.492 mm (0.0586–0.0587 in.)
	–Mark 3	1.492–1.496 mm (0.0587–0.589 in.)
	Rod bending per 100 mm (3.94 in.)–Limit	0.05 mm (0.0020 in.)
	Rod twist per 100 mm (3.94 in.)–Limit	0.15 mm (0.0059 in.)
	Connecting rod bushing inside diameter	22.005–22.014 mm (0.8663–0.8667 in.)
	Piston pin diameter	21.997–22.006 mm (0.8860–0.8664 in.)
	Connecting rod bushing oil clearance–STD	0.005–0.011 mm (0.0002–0.0004 in.)
	Connecting rod bushing oil clearance–Limit	0.05 mm (0.0020 in.)
	Connecting rod bolt outer diameter–STD	7.860–8.000 mm (0.3094–0.3150 in.)
	Connecting rod bolt outer diameter–Limit	7.60 mm (0.2992 in.)
Crankshaft	Thrust clearance–STD	0.020–0.220 mm (0.0008–0.0087 in.)
	Thrust clearance–Limit	0.30 mm (0.0118 in.)
	Thrust washer thickness	2.440–2.490 mm (0.0961–0.0980 in.)
	Main journal oil clearance–STD (STD)	0.029–0.056 mm (0.0011–0.0022 in.)
	Main journal oil clearance–STD (U/S 0.25)	0.028–0.080 mm (0.0011–0.0031 in.)
	Main journal oil clearance–Limit	0.08 mm (0.0031 in.)
	Main journal diameter–STD	63.985–64.000 mm (2.5191–2.5197 in.)
	Main journal diameter–U/S 0.25	63.745–63.755 mm (2.5096–2.5100 in.)
	Main bearing center wall thickness–Mark 1	1.989–1.992 mm (0.0783–0.0784 in.)
	Main bearing center wall thickness–Mark 2	1.992–1.995 mm (0.0784–0.0785 in.)
	Main bearing center wall thickness–Mark 3	1.995–1.998 mm (0.0785–0.0787 in.)
	Main bearing center wall thickness–Mark 4	1.998–2.001 mm (0.0787–0.0788 in.)
	Main bearing center wall thickness–Mark 5	2.001–2.004 mm (0.0788–0.0789 in.)
	Crank pin diameter–STD	54.987–55.000 mm (2.1648–2.1654 in.)
	Crank pin diameter–U/S 0.25	54.745–54.755 mm (2.1553–2.1557 in.)
	Circle runout–Limit	0.06 mm (0.0024 in.)
	Main journal taper and out–of–round–Limit	0.02 mm (0.0008 in.)
	Crank pin taper and out–of–round–Limit	0.02 mm (0.0008 in.)

TORQUE SPECIFICATIONS

EG0FQ–01

Part tightened	N·m	kgf·cm	ft·lbf
Cylinder head cover X Cylinder head	5.9	60	52 in.·lbf
Air intake chamber X Intake manifold	43	440	32
EGR pipe X Exhaust manifold	78	800	58
EGR pipe X Air intake chamber	18	180	13
Hydraulic pressure pipe X Air intake chamber	20	200	14
Air intake chamber stay X Air intake chamber	39	400	29
Air intake chamber stay X Cylinder head	39	400	29
No. 1 engine hanger X Air intake chamber	39	400	29
No. 1 engine hanger X Cylinder head	39	400	29
Cold start injector pipe (No. 2 fuel pipe) X Cold start injector	15	150	11
Spark plug X Cylinder head	18	180	13

No. 1 idler pulley X Oil pump	34	350	25
Crankshaft pulley X crankshaft	245	2,500	181
No. 2 idler pulley X No. 2 idler pulley bracket	39	400	29
Camshaft timing pulley X Camshaft	108	1,100	80
Camshaft timing pulley X Camshaft (For use with SST)	75	760	55
Timing belt tensioner X Oil pump	26	270	20
Engine RH mounting bracket X Cylinder block	39	410	30
Engine moving control rod X No. 2 RH engine mounting bracket	64	650	47
RH engine mounting stay X Intake manifold	31	320	23
RH engine mounting stay X No. 2 RH engine mounting bracket	31	320	23
No. 2 RH engine mounting stay bolt	75	760	55
No. 2 RH engine mounting stay nut	62	630	46
No. 3 RH engine mounting stay bolt	73	740	54
Cylinder head X Cylinder block–12–pointed head bolt (1st)	34	350	25
Cylinder head X Cylinder block–12–pointed head bolt (2nd)	Turn 90°		
Cylinder head X Cylinder block–12–pointed head bolt (3rd)	Turn 90°		
Cylinder head X Cylinder block–Recessed head bolt	18	185	13
LH engine hanger X LH cylinder head	39	400	29
PS pump bracket X RH cylinder head	43	440	32
Camshaft bearing cap X Cylinder head	16	160	12
No. 3 timing belt cover X Cylinder head	7.4	75	65 in.·lbf
No. 3 timing belt cover X Cylinder block	7.4	75	65 in.·lbf
Exhaust manifold X Cylinder head	39	400	29
Intake manifold X Cylinder head	18	185	13
Air pipe X Intake manifold	8.3	85	74 in.·lbf
No. 2 idler pulley bracket stay X Intake manifold	18	185	13
No. 2 idler pulley bracket stay X No. 2 idler pulley bracket	18	185	13
Water by–pass outlet X Intake manifold	8.3	85	74 in.·lbf
Delivery pipe X Intake manifold	13	130	9
No. 1 EGR cooler X Air intake chamber	18	185	13
Water outlet X Intake manifold	8.3	85	74 in.·lbf
Emission control valve set X Air intake chamber	8.3	85	74 in.·lbf
EGR valve X Air intake chamber	18	185	13
Throttle body X Air intake chamber	13	130	9
Front exhaust pipe X Exhaust manifold	62	630	46
Front exhaust manifold X Three–way catalytic converter	43	440	32
Main bearing cap X Cylinder block–1st	61	625	45
Main bearing cap X Cylinder block–2nd	Turn 90°		
Connecting rod cap X Connecting rod–1st	25	250	18
Connecting rod cap X Connecting rod–2nd	Turn 90°		
Rear oil seal retainer X Cylinder block	7.8	80	69 in.·lbf
No. 2 idler pulley bracket X Cylinder block	37	380	27
Knock sensor X Cylinder block	44	450	33
Water by–pass pipe X Cylinder block	8.3	85	74
Coolant drain cock X Cylinder block	39	400	29
Drain hose clamp X Cylinder block	20	200	14
Rear end plate X Cylinder block	8.3	85	74 in.·lbf
Flywheel X Crankshaft (M/T)	83	850	61
Drive plate X Crankshaft (A/T)	83	850	61

RR engine mounting insulator X Cylinder block	77	790	57
FR engine mounting insulator X Cylinder block	77	790	57
FR engine mounting insulator X Front suspension member	80	820	59
Engine mounting absorber X Front suspension member	48	490	35
Engine mounting absorber X Transaxle	48	490	35
RR engine mounting insulator X Front suspension member	80	820	59
LH engine mounting insulator X Transaxle	64	650	47
PS pump X PS pump bracket	43	440	31
A/C compressor X Generator bracket	27	280	20
A/C compressor X Cylinder block	27	280	20
Fuel inlet hose X Fuel filter	29	300	22
Center exhaust pipe X Tail pipe	43	440	32

EMISSION CONTROL SYSTEMS

SYSTEM PURPOSE

EG08A–01

System	Abbreviation	Purpose
Positive crankcase ventilation	PCV	Reduces blow–by gas (HC)
Evaporative emission control	EVAP	Reduces evaporative HC
Exhaust gas recirculation	EGR	Reduces NOx
Three–way catalytic converter	TWC	Reduces HC, CO and NOx
Sequential Multiport Fuel Injection*	SFI	Regulates all engine conditions for reduction of exhaust emissions.

* For inspection and repair of the SFI system, refer to SFI Section.

PREPARATION
RECOMMENDED TOOLS

EG08B–01

	09082–00015 TOYOTA Electrical Tester	

EQUIPMENT

EG08C–01

Heater	TVV
Belt tension gauge	
Tachometer	TVV
Torque wrench	
Vacuum gauge	

SSM (SPECIAL SERVICE MATERIALS)

EG08D–01

08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	TVV

EMISSION CONTROL SYSTEMS

SYSTEM PURPOSE

EG08A–01

System	Abbreviation	Purpose
Positive crankcase ventilation	PCV	Reduces blow–by gas (HC)
Evaporative emission control	EVAP	Reduces evaporative HC
Exhaust gas recirculation	EGR	Reduces NOx
Three–way catalytic converter	TWC	Reduces HC, CO and NOx
Sequential Multiport Fuel Injection*	SFI	Regulates all engine conditions for reduction of exhaust emissions.

* For inspection and repair of the SFI system, refer to SFI Section.

PREPARATION
RECOMMENDED TOOLS

EG08B–01

	09082–00015 TOYOTA Electrical Tester	

EQUIPMENT

EG08C–01

Heater	TVV
Belt tension gauge	
Tachometer	TVV
Torque wrench	
Vacuum gauge	

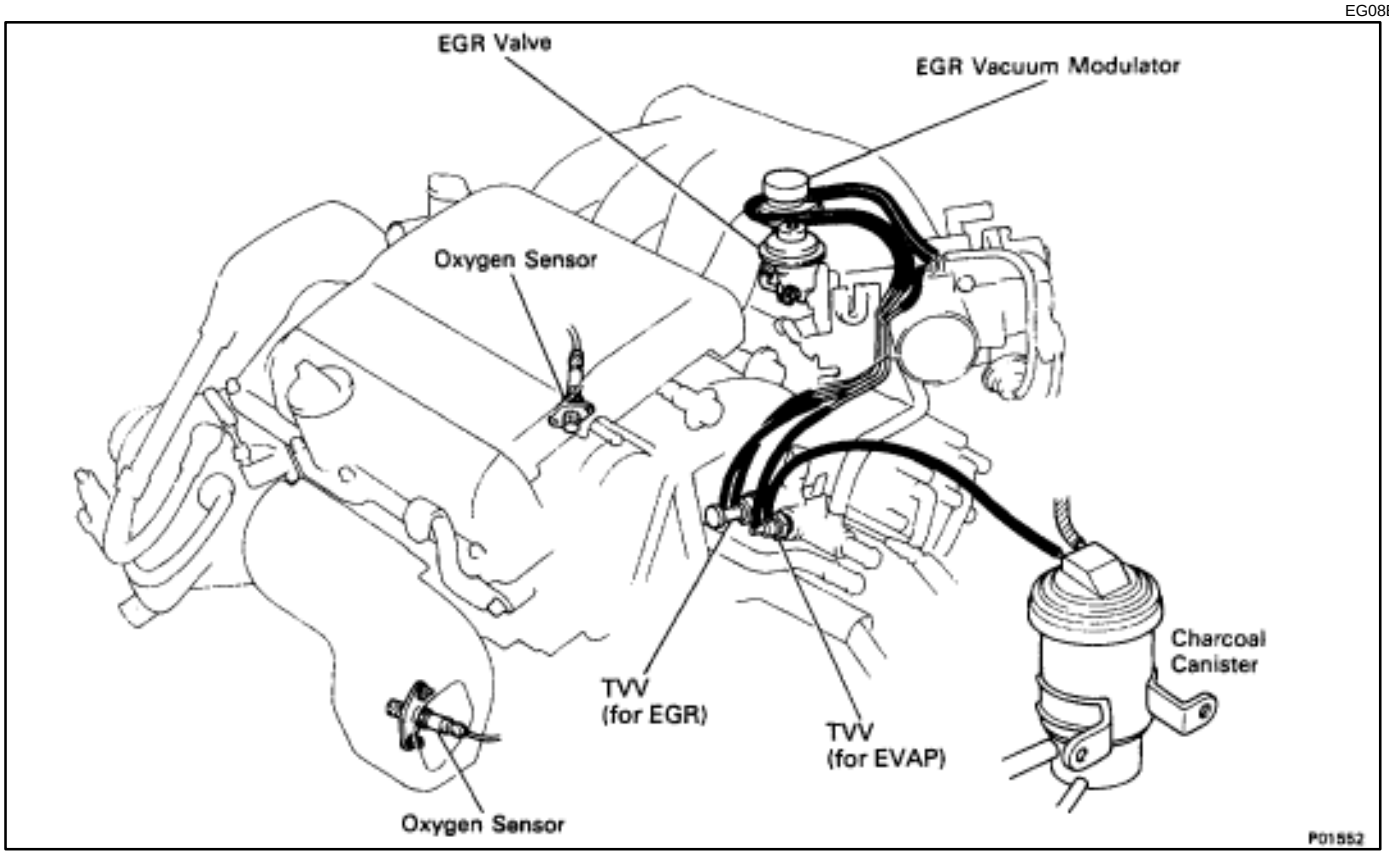
SSM (SPECIAL SERVICE MATERIALS)

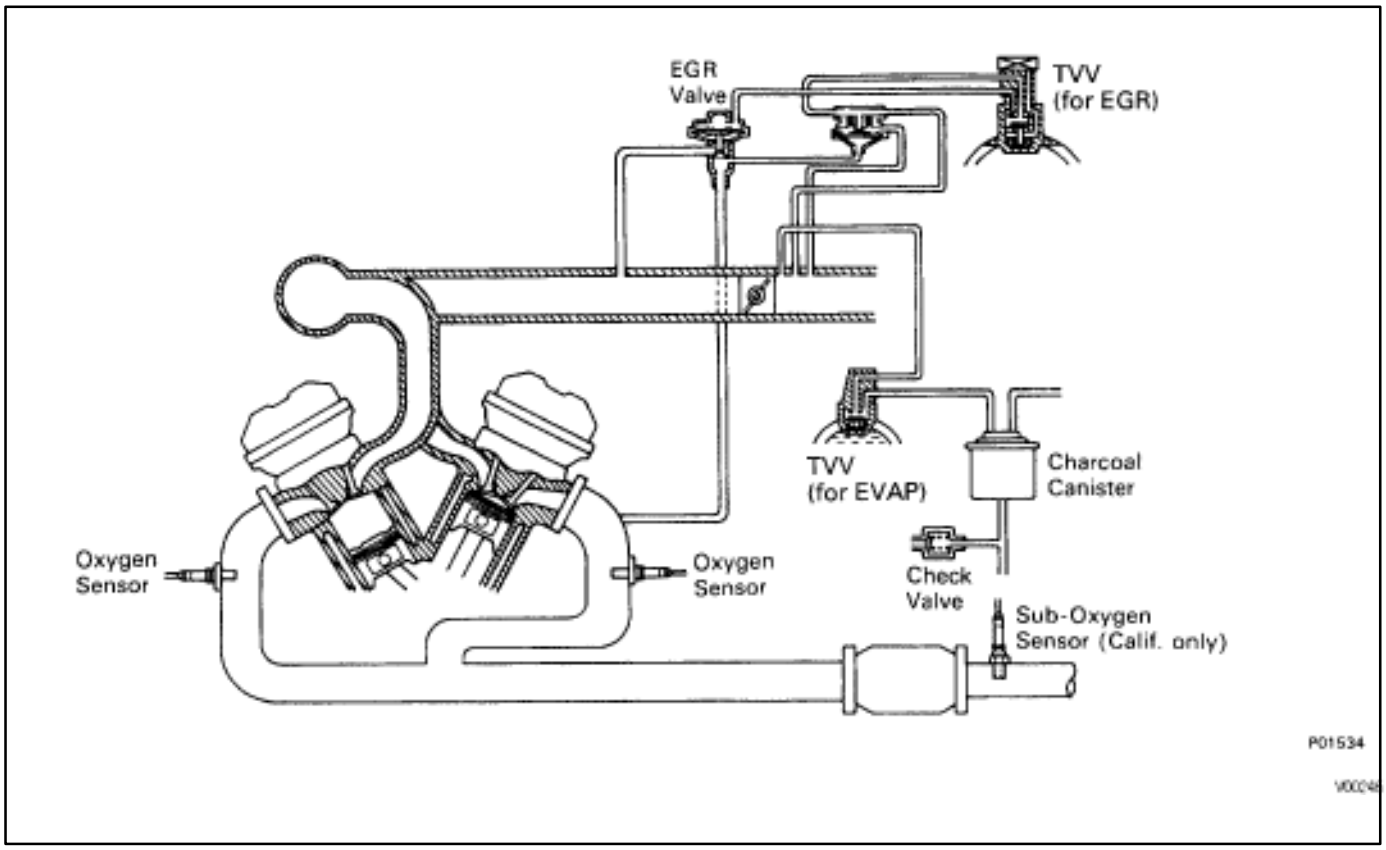
EG08D–01

08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	TVV

LAYOUT AND SCHEMATIC DRAWING

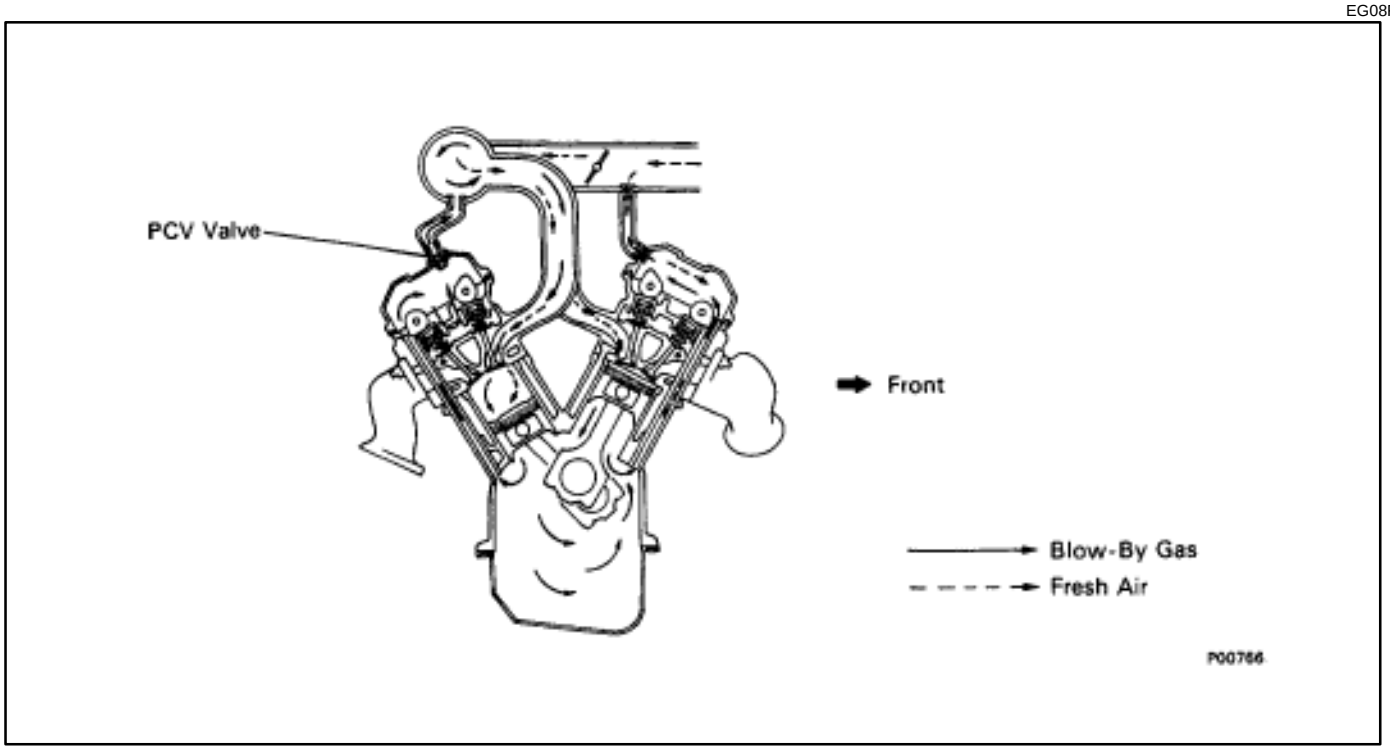
EG08E–01





POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

EG08F–01



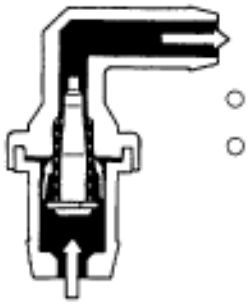
To reduce HC emission, crankcase blow–by gas (HC) is routed through the PCV valve to the air intake chamber for combustion in the cylinders.

Engine not Running

○ PCV VALVE IS CLOSED

EC4388

Normal Operation

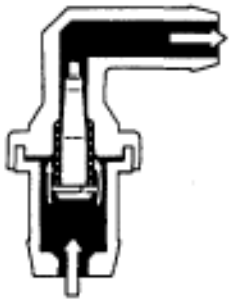


○ PCV VALVE IS OPEN

○ VACUUM PASSAGE IS LARGE.

EC4391

Idling or Deceleration

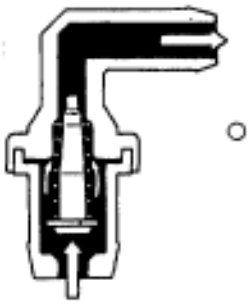


○ PCV VALVE IS OPEN.

○ VACUUM PASSAGE IS SMALL.

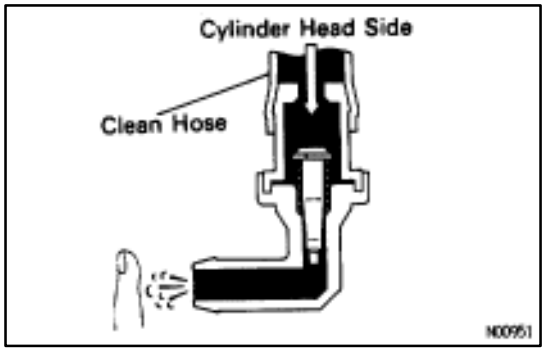
EC4390

Acceleration or High Load



○ PCV VALVE IS FULLY OPEN.

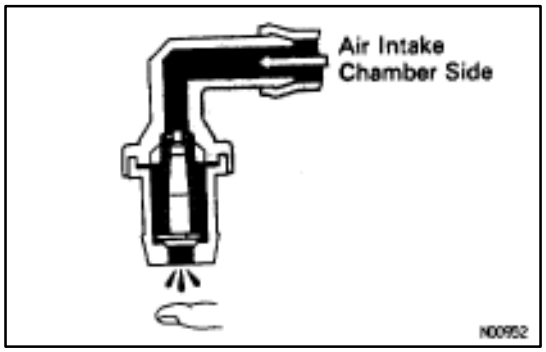
EC4389



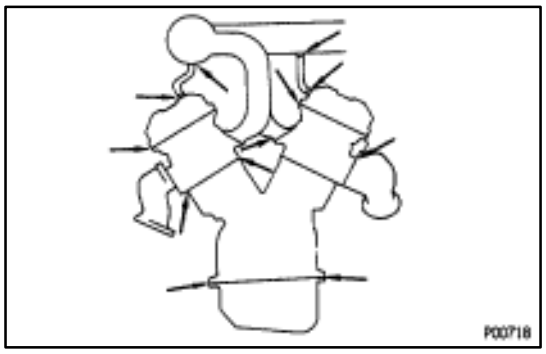
PCV VALVE INSPECTION

EG08G–01

1. **REMOVE PCV VALVE**
2. **INSTALL CLEAN HOSE TO PCV VALVE**
3. **BLOW AIR FROM CYLINDER HEAD SIDE**
   Check that air passes through easily.
   CAUTION: Do not suck air through the valve. Petroleum substances inside the valve are harmful.



4. **BLOW AIR FROM AIR INTAKE MANIFOLD SIDE**
   Check that air passes through with difficulty.
   If the PCV valve fails either of the checks, replace it.
5. **REMOVE CLEAN HOSE FROM PCV VALVE**



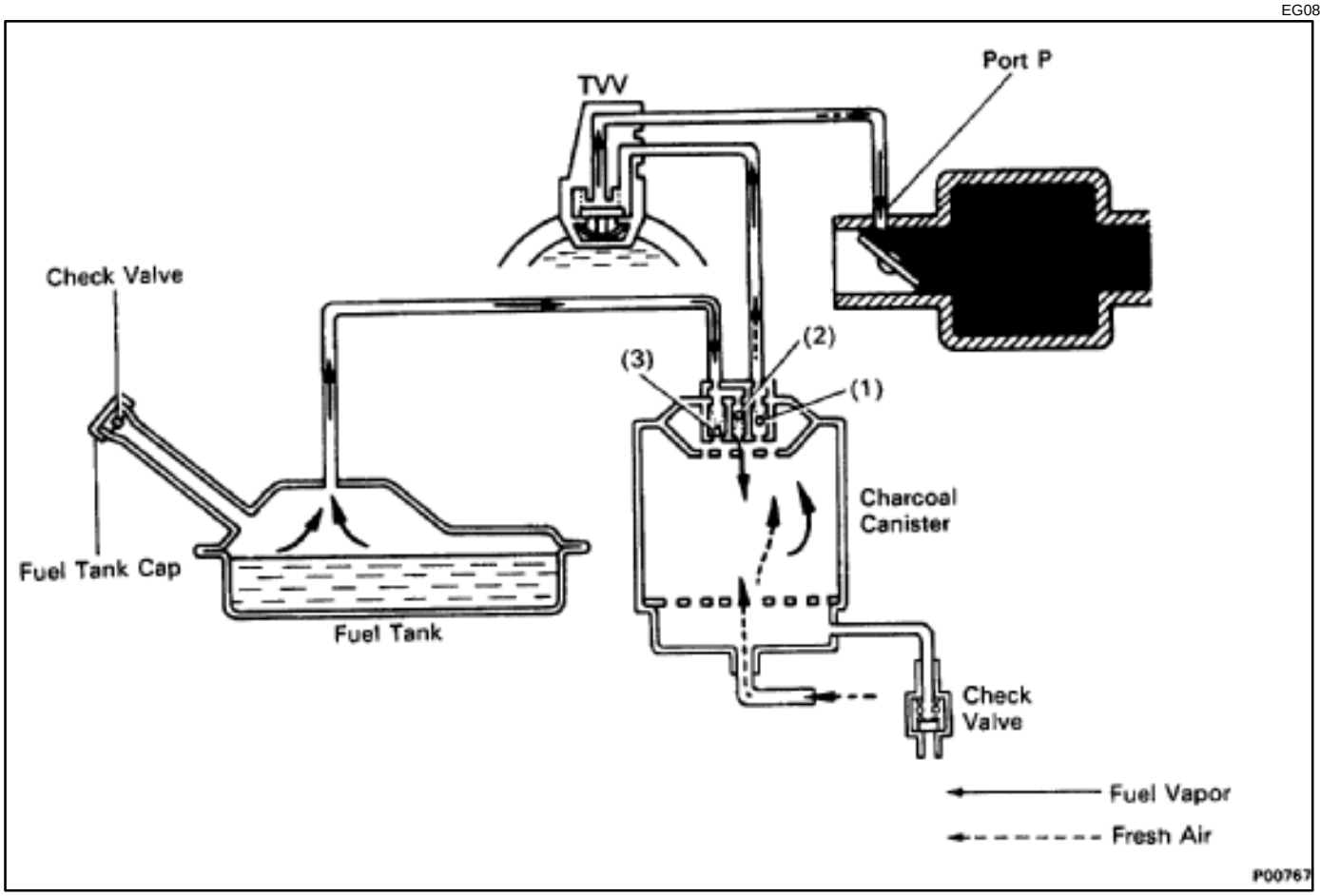
PCV HOSES AND CONNECTIONS INSPECTION

EG08H–01

VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS
Check for cracks, leaks or damage.

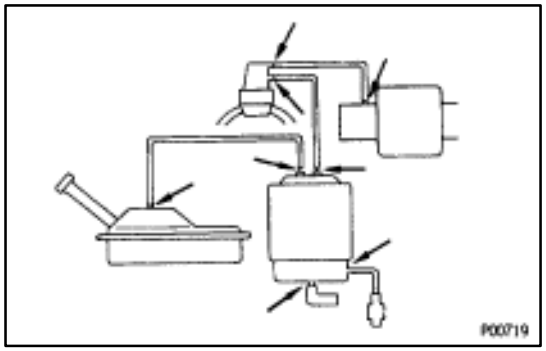
EVAPORATIVE (EVAP) EMISSION CONTROL SYSTEM

EG08J–01



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.

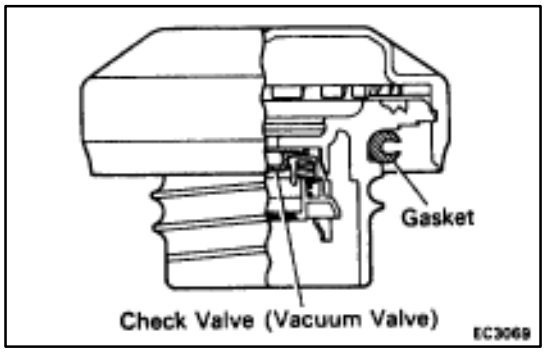
Engine Coolant Temp.	TVV	Throttle Valve Opening	Canister Check Valve			Check Valve in Cap	Evaporated Fuel (HC)
			(1)	(2)	(3)		
Below 35°C (95°F)	CLOSED	–	–	–	–	–	HC from tank is absorbed into the canister
Above 54°C (129°F)	OPEN	Positioned below port P	CLOSED	–	–	–	
		Positioned above port P	OPEN	–	–	–	HC from canister is led into air intake chamber.
High pressure in tank	–	–	–	OPEN	CLOSED	CLOSED	HC from tank is absorbed into the canister.
High vacuum in take	–	–	–	CLOSED	OPEN	OPEN	Air is led into the fuel tank.



FUEL VAPOR LINES, FUEL TANK AND TANK CAP INSPECTION

EG08K–01

1. **VISUALLY INSPECT LINES AND CONNECTIONS**
   Look for loose connections, sharp bends or damage.
2. **VISUALLY INSPECT FUEL TANK**
   Look for deformation, cracks or fuel leakage.

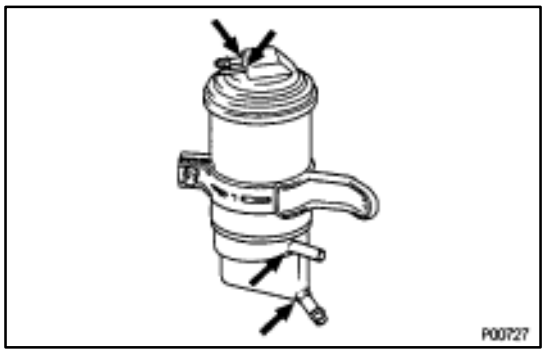


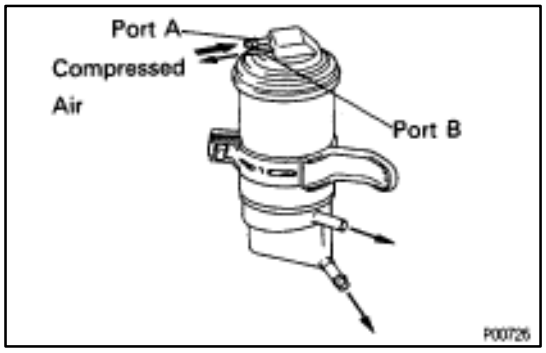
3. **VISUALLY INSPECT FUEL TANK CAP**
   Check if the cap and / or gasket are deformed or damaged.
   If necessary, repair or replace the cap.

CHARCOAL CANISTER INSPECTION

EG08L–01

1. **REMOVE CHARCOAL CANISTER**
2. **VISUALLY INSPECT CHARCOAL CANISTER**
   Look for cracks or damage.



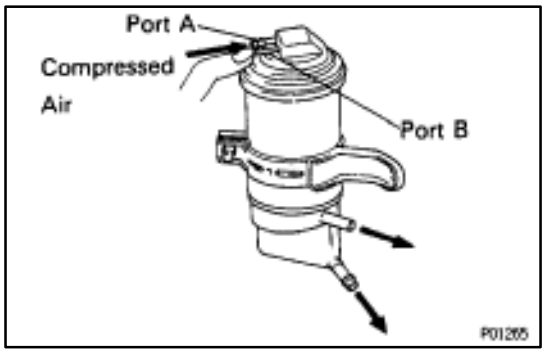


3. **CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE**

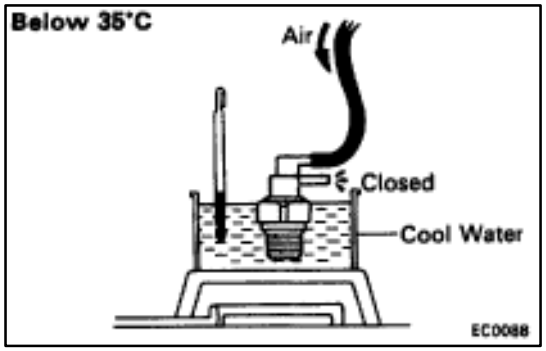
(a) Using low pressure compressed air, blow into port A and check that air flows without resistance from the other ports.

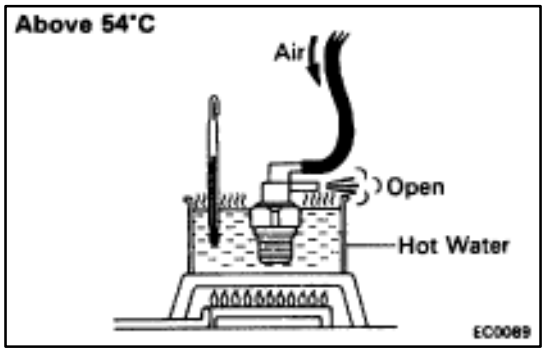
(b) Blow into port B and check that air does not flow from the other ports.

If a problem is found, replace the charcoal canister.



4. **CLEAN FILTER IN CANISTER**
   Clean the filter by blowing 294 kPa (3 kgf/cm^2, 43 psi) of compressed air into port A while holding port B closed.
   NOTICE:
   - **Do not attempt to wash the canister.**
   - **No activated carbon should come out.**
5. **REINSTALL CHARCOAL CANISTER**



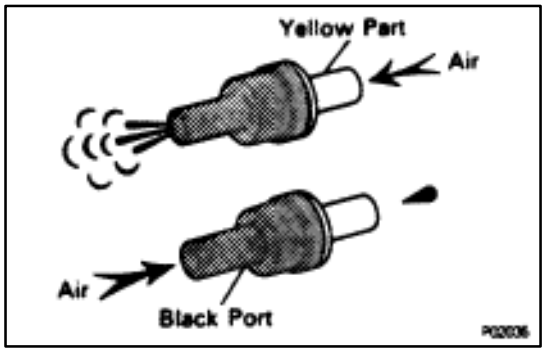


TVV INSPECTION

EG08M–01

CHECK TVV BY BLOWING AIR INTO PIPE

(a) Drain the engine coolant from the radiator into a suitable container.
(b) Remove the TVV from the water by–pass outlet.
(c) Cool the TVV to below 35°C (95°F) with cool water.
(d) Blow air into a port and check that the TVV is closed.
(e) Heat the TVV to above 54°C (129°F) with hot water.
(f) Blow air into a port and check that the TVV is open.
If a problem is found, replace the TVV.
(g) Apply adhesive to two or three threads of the TVV, and reinstall.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
(h) Refill the radiator and engine with engine coolant.



CHECK VALVE INSPECTION

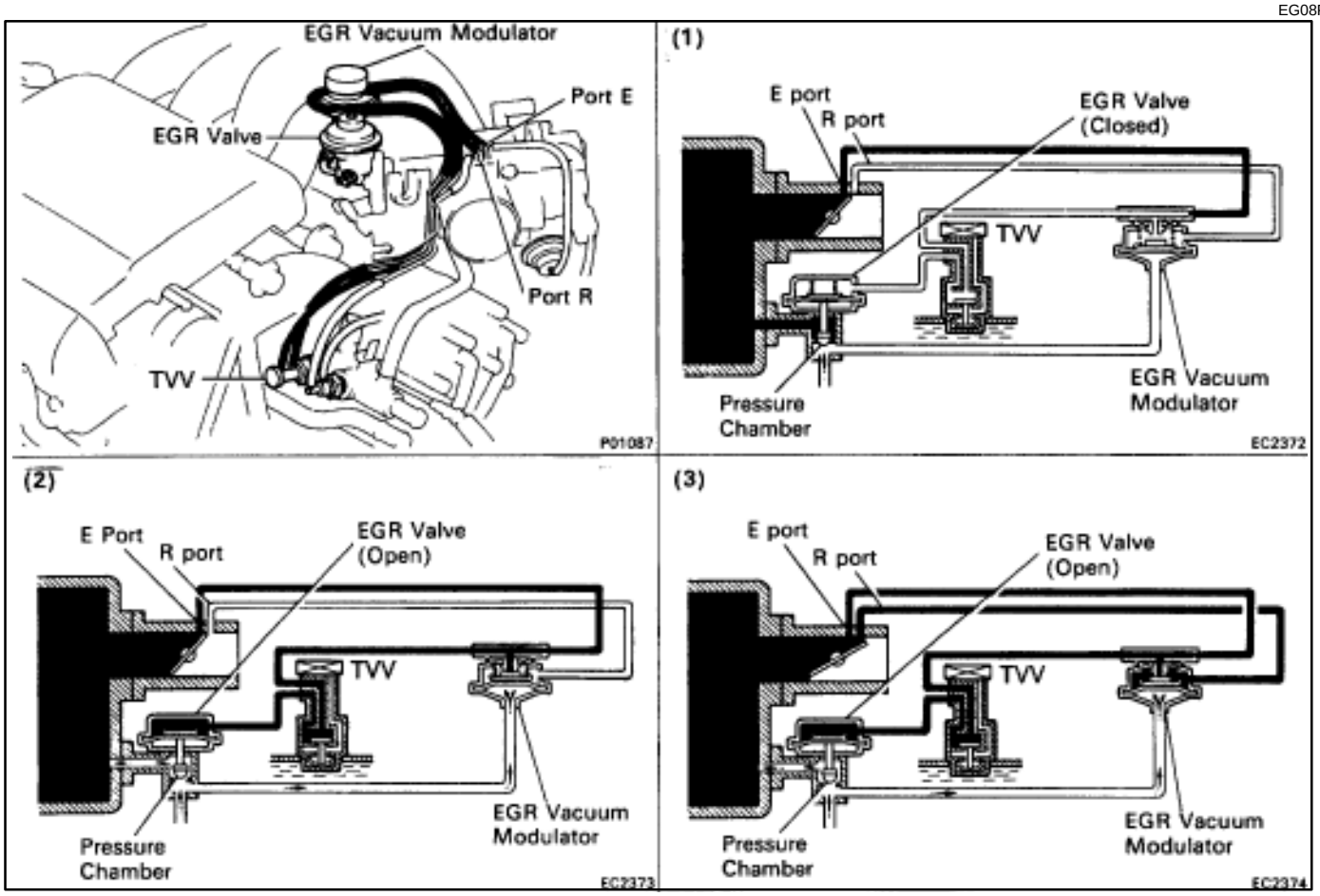
EG08N–01

INSPECT CHECK VALVE

(a) Check that air flows from the yellow port to the black port.
(b) Check that air does not flow from the black port to the yellow port.
If the operation is not as specified, replace the check valve.

EXHAUST GAS RECIRCULATION(EGR) SYSTEM

EG08P–01



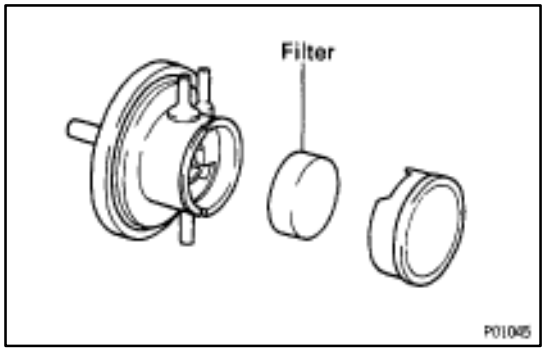
To reduce NOx emissions, part of the exhaust gases are recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Engine coolant Temp.	TVV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 35°C (95°F)	CLOSED	–	–		–	CLOSED	Not recirculated
Above 56°C (133°F)	OPEN	Positioned below port E	–		–	CLOSED	Not recirculated
		Positioned between port E and port R	(1) LOW	*Pressure constantly alternating between low and high	OPENS passage to atmosphere	CLOSED	Not recirculated
			(2) HIGH		CLOSES passage to atmosphere	OPEN	Recirculated
		Positioned above port R	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)

Remarks: * Pressure increase → Modulator closes → EGR valve opens → Pressure drops → EGR valve closes → Modulator opens →

** When the throttle valve is positioned above port R, the EGR vacuum modulator will close the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.

V00248



EGR SYSTEM INSPECTION

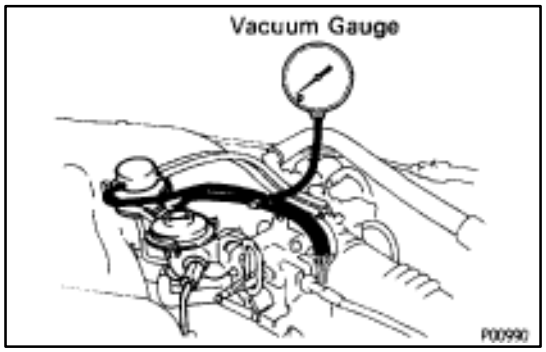
EG08Q–01

1. CHECK AND CLEAN FILTER IN EGR VACUUM MODULATOR

(a) Check the filter for contamination or damage.

(b) Using compressed air, clean the filter.

HINT: Install the filter with the coarser surface facing the atmospheric side (outward).

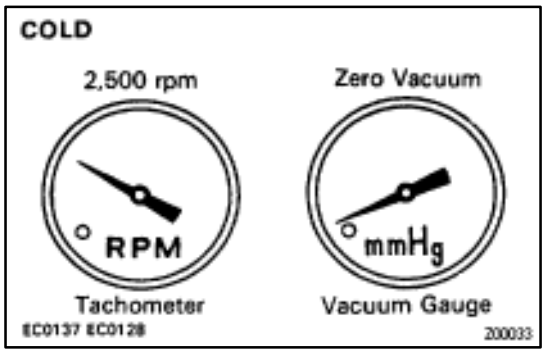


2. PREPARATION

Using a 3–way connector, connect a vacuum gauge to the hose between the EGR valve and vacuum pipe.

3. CHECK SEATING OF EGR VALVE

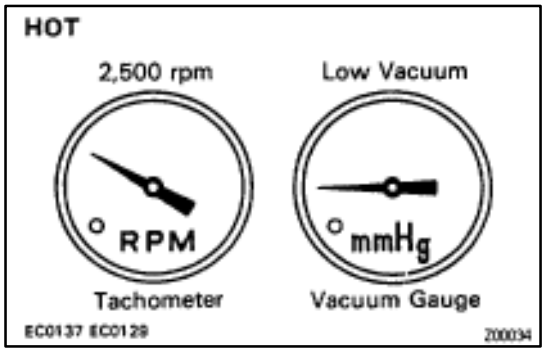
Start the engine and check that the engine starts and runs at idle.



4. CHECK TVV WITH COLD ENGINE

(a) The engine coolant temperature should be below 35°C (95°F).

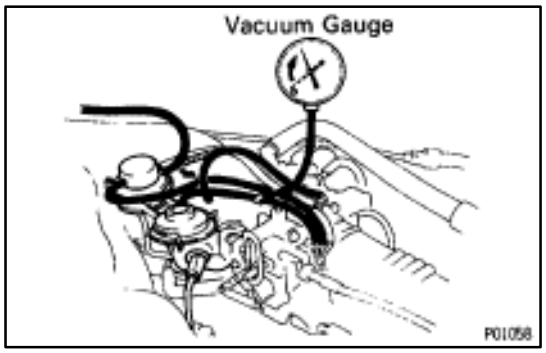
(b) Check that the vacuum gauge indicates zero at 2,500 rpm.



5. CHECK TVV AND EGR VACUUM MODULATOR WITH HOT ENGINE

(a) Warm up the engine.

(b) Check that the vacuum gauge indicates low vacuum at 2,500 rpm.

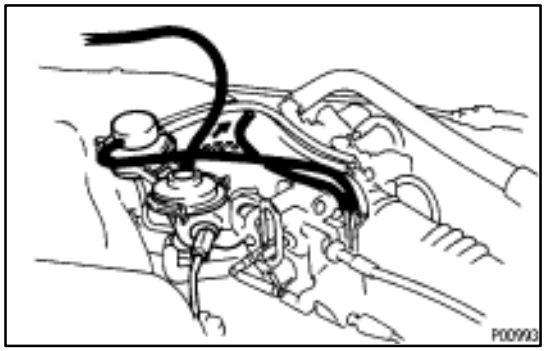


(c) Disconnect the vacuum hose from the R port of the EGR vacuum modulator and connect the R port directly to the intake manifold with another hose.

(d) Check that the vacuum gauge indicates high vacuum at 3,500 rpm.

HINT: As large amount of EGR gas enters, the engine will misfire slightly.

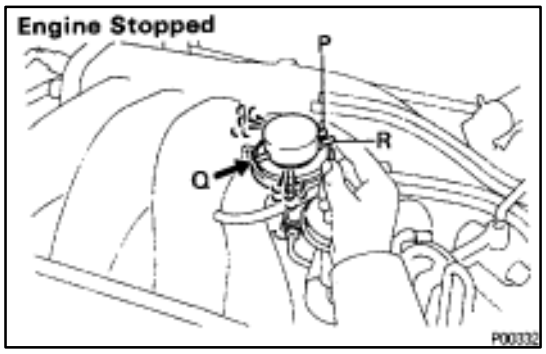
(e) Remove the vacuum gauge and reconnect the vacuum hoses to the proper locations.



6. CHECK EGR VALVE

(a) Apply vacuum directly to the EGr valve with the engine idling.
(b) Check that the engine runs rough or dies.
(c) Reconnect the vacuum hoses to the proper locations.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, SYSTEM IS NORMAL; OTHERWISE INSPECT EACH PART

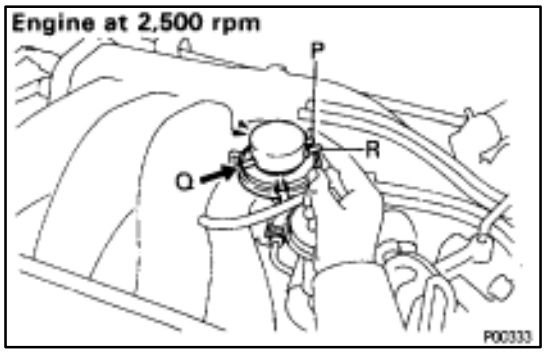


EGR VACUUM MODULATOR INSPECTION

EG08R–01

CHECK EGR VACUUM MODULATOR OPERATION

(a) Disconnect the vacuum hoses from ports P, Q and R of the EGR vacuum modulator.
(b) Block ports P and R with your finger.
(c) Blow air into port Q, and check that the air passes through to the air filter side freely.
(d) Start the engine, and maintain speed at 3,500 rpm.
(e) Repeat the above test. Check that there is a strong resistance to air flow.
(f) Reconnect the vacuum hoses to the proper locations.



EGR VALVE INSPECTION

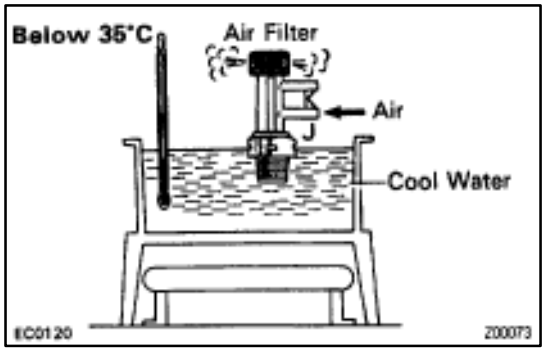
EG08S–01

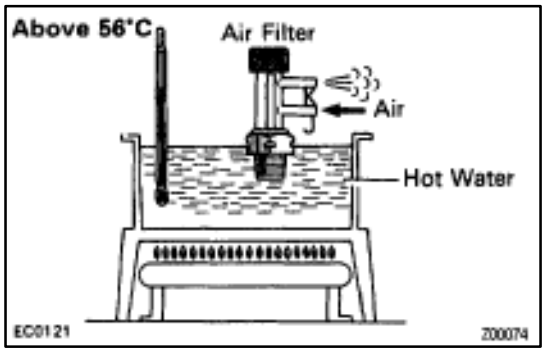
1. REMOVE EGR VALVE

Check for sticking and heavy carbon deposits.
If a problem is found, replace the valve.

2. REINSTALL EGR VALVE WITH NEW GASKET

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)





TVV INSPECTION

EG08T–01

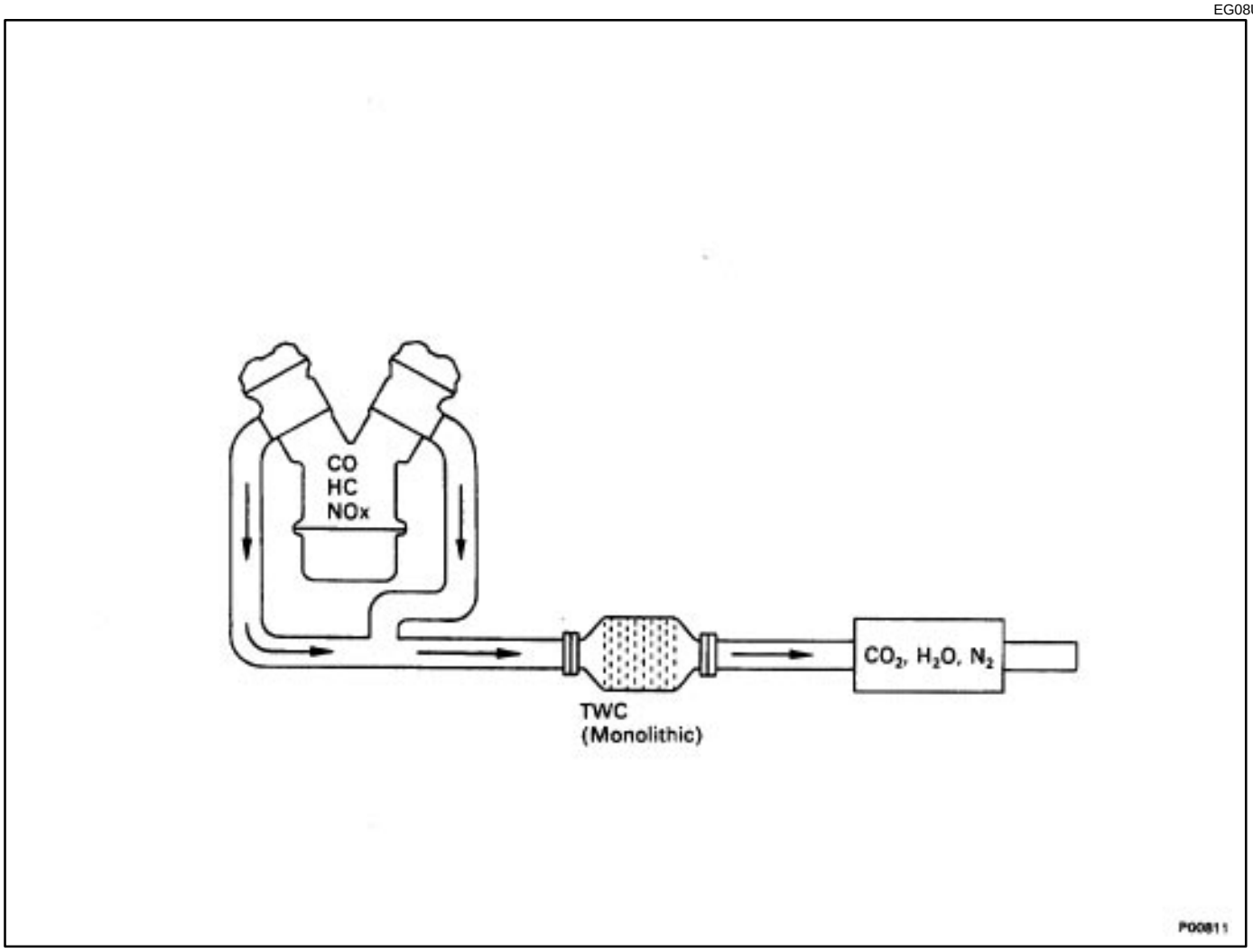
CHECK TVV BY BLOWING AIR INTO PIPE

(a) Drain the engine coolant from the radiator into a suitable container.
(b) Remove the TVV from the water by–pass outlet.
(c) Cool the TVV to below 35°C (95°F) with cool water.
(d) Blow air into the pipe, and check that the TVV is closed.

(e) Heat the TVV to above 56°C (133°F) with hot water.
(f) Blow air into the pipe, and check that the TVV is open.
If a problem is found, replace the TVV.
(g) Apply adhesive to two or three threads of the TVV, and reinstall.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
(h) Refill the radiator with engine coolant.

THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM

EG08U–01



To reduce HC, CO and NOx emissions, they are oxidized, reduced and converted to nitrogen (N_2), carbon dioxide (CO_2) and water (H_2O) by the three-way catalytic converter.

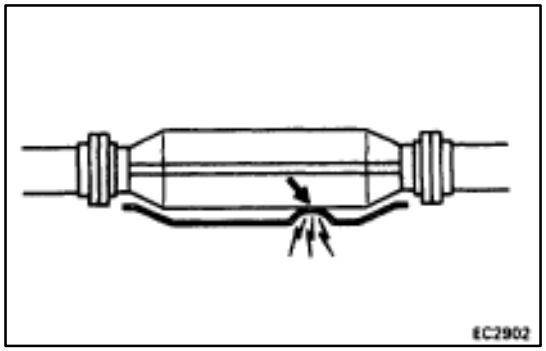
Exhaust port		TWC		Exhaust Gas
HC, CO, AND NOx	→	OXDATION AND REDUCTION	→	CO_2 H_2O H_2

V00215

EXHAUST PIPE ASSEMBLY INSPECTION

EG08V–01

1. CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE
2. CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE

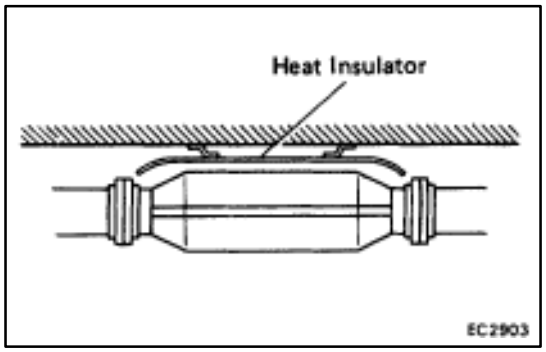


THREE–WAY CATALYTIC CONVERTER INSPECTION

EG08W–01

CHECK FOR DENTS OR DAMAGE

If any part of protector is damaged or dented to the extent that it contacts the three–way catalytic converter, repair or replace it.

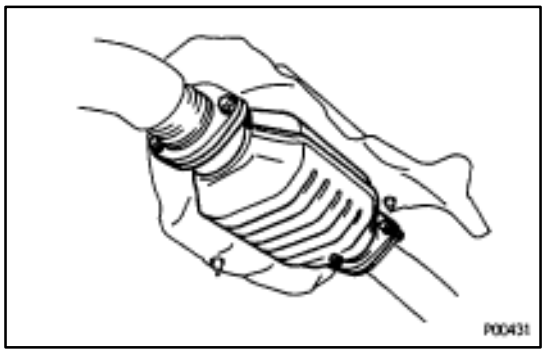


HEAT INSULATOR INSPECTION

EG08X–01

1. CHECK HEAT INSULATOR FOR DAMAGE

2. CHECK FOR ADEQUATE CLEARANCE BETWEEN THREE–WAY CATALYTIC CONVERTER AND HEAT INSULATOR



THREE–WAY CATALYTIC CONVERTER REPLACEMENT

EG08Y–01

1. REMOVE THREE–WAY CATALYTIC CONVERTER

(a) Jack up the vehicle.

(b) Check that the three–way catalytic converter is cool.

(c) Remove the four bolts and nuts holding the pipes to the three–way catalytic converter.

(d) Remove the three–way catalytic converter and two gaskets.

2. REINSTALL THREE–WAY CATALYTIC CONVERTER

(a) Place new two gaskets on the front and rear pipes.

(b) Install the three–way catalytic converter with the bolts and nuts. Torque the bolts and nuts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

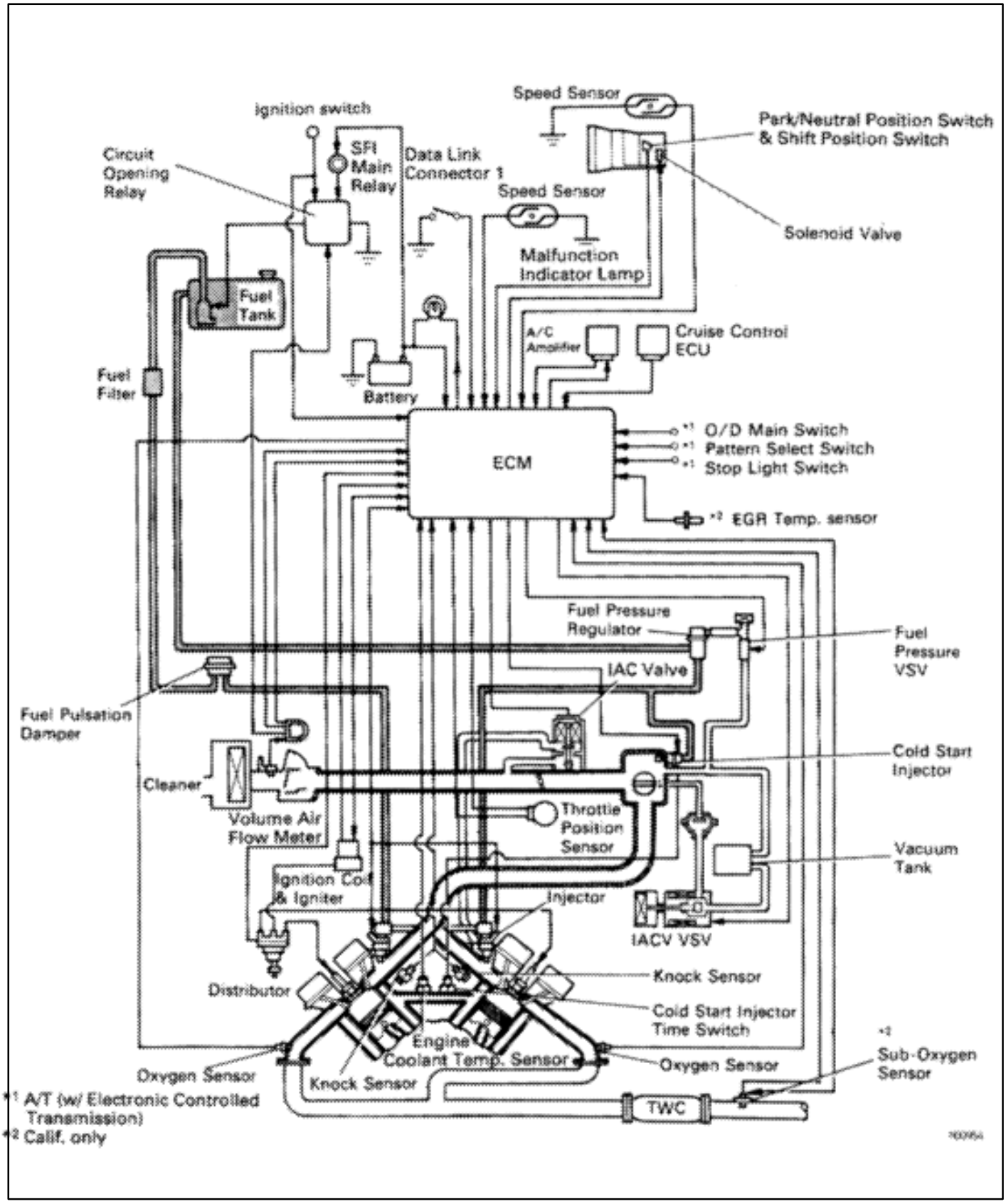
SERVICE SPECIFICATIONS
TORQUE SPECIFICATIONS

EG08Z–01

Part tightened	N·m	kgf·cm	ft·lbf
TVV X Water by–pass outlet	29	300	22
EGR valve X Intake manifold	18	185	13
Three–way catalytic converter X Exhaust pipe	43	440	32

SFI SYSTEM
DESCRIPTION
SYSTEM CIRCUIT

EG0FR–01



EG0FS–01

The SFI system is composed of three basic sub–systems: Fuel, Air Induction and Electronic Control Systems.

FUEL SYSTEM

EG0FT–01

Fuel is supplied under constant pressure to the SFI injectors by an electric fuel pump. The injectors inject a metered quantity of fuel into the intake manifold in accordance with signals from the ECM.

AIR INDUCTION SYSTEM

EG0FU–01

The air induction system provides sufficient air for engine operation.

ELECTRONIC CONTROL SYSTEM

EG0FV–01

The CAMRY 3VZ–FE engine is equipped with a TOYOTA Computer Controlled System (TCCS) which centrally controls the SFI, EI, IAC, Diagnosis systems etc. by means of an ECM (ECM–formerly SFI computer) employing a microcomputer.

By means of the ECM, the controls the following functions:

1. Sequential Multiport Fuel Injection (SFI)

The ECM receives signals from various sensors indicating changing engine operation conditions such as:

Intake air volume
Intake air temperature
Engine coolant temperature
Engine rpm
Acceleration/deceleration
Exhaust oxygen content etc.

The signals are utilized by the ECM to determine the injection duration necessary for an optimum air–fuel ratio.

2. Electronic Ignition (EI)

The ECM is programmed with data for optimum ignition timing under any and all operating conditions. Using data provided by sensors which monitor various engine functions (rpm, engine coolant temperature, etc.), the microcomputer (ECM) triggers the spark at precisely the right instant.
(See IG section)

3. Idle Air Control (IAC)

The ECM is programmed with target idling speed values to respond to different engine conditions (engine coolant temperature, air conditioning ON/OFF, etc.). Sensors transmit signals to the ECM which control the flow of air through the by–pass of the throttle valve and adjust idle speed to the target value.

4. Diagnosis

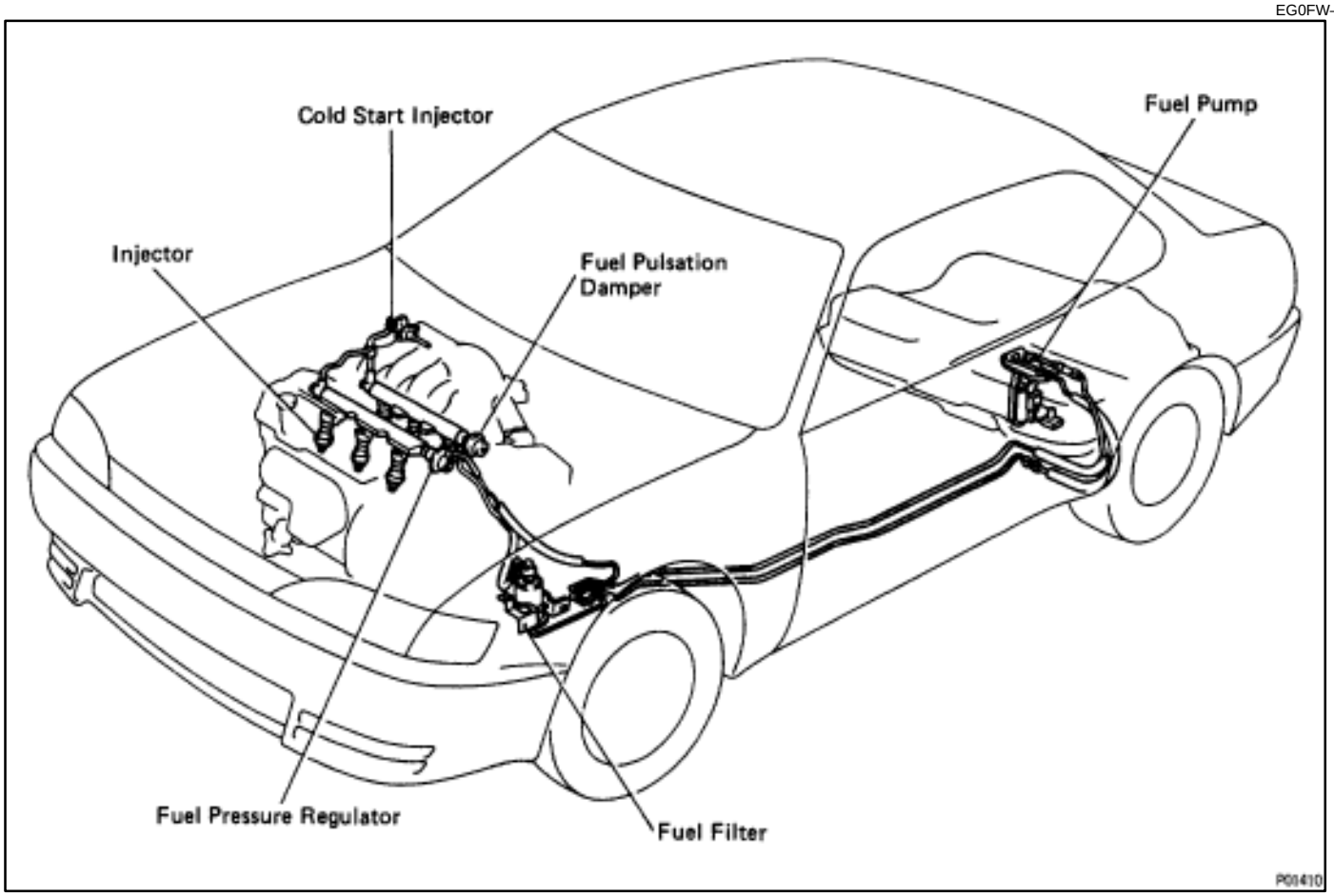
The ECM detects any malfunctions and abnormalities in the sensor network and lights a Malfunction Indicator Lamp on the combination meter. At the same time, the trouble is identified and a diagnostic trouble code is recorded by the ECM. The diagnostic trouble code can be read by the number of blinks of the Malfunction Indicator Lamp when terminals TE1 and E1 are connected. The diagnostic trouble codes are refer red to the later page. (See TR section)

5. Fail–Safe Function

In the event of the sensor malfunctioning, a back–up circuit will take over to provide minimal driveability, and the Malfunction Indicator Lamp will illuminate.

OPERATION
FUEL SYSTEM

EG0FW–02



Fuel is pumped up by the fuel pump, flows through the fuel filter and is distributed to each injector and cold start injector at a set pressure maintained by the pressure regulator.

The fuel pressure regulator adjusts the pressure of the fuel from the fuel line (high pressure side) to a pressure 284 kPa (2.9 kgf/cm^2, 41 psi) higher than the pressure inside the intake manifold, and excess fuel is returned to the fuel tank through the return pipe. When the engine is hot, the fuel pressure is increased to control percolation in the fuel system and improve restartability and idling stability.

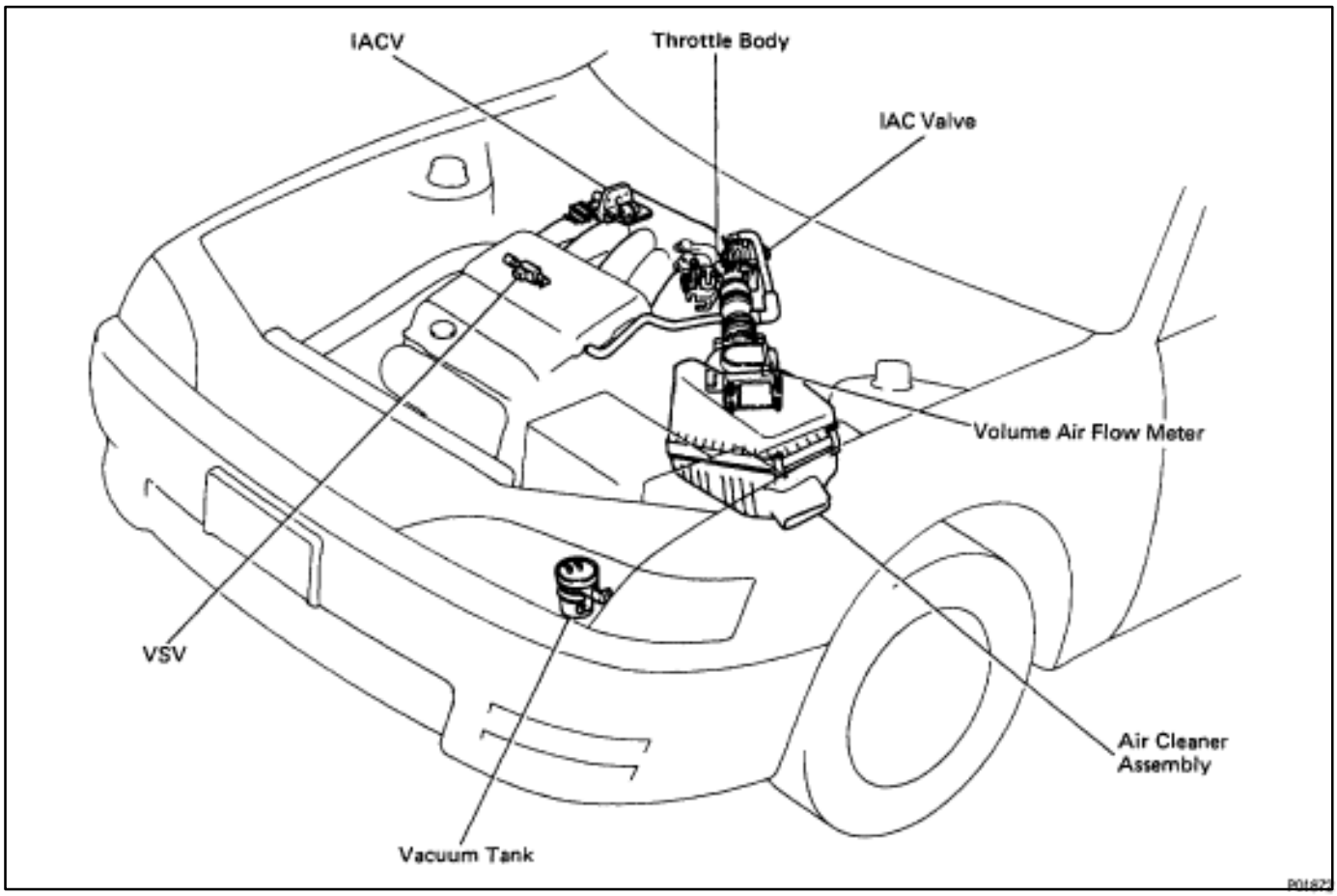
The pulsation damper absorbs the slight fluctuations in fuel pressure caused by fuel injector from the injector.

The injectors operate on input of injection signals from the ECM and inject fuel into the intake manifold.

The cold start injector operates when starting at low engine coolant temperature or at normal temperature ranges, injecting fuel into the air intake chamber to improve startability.

AIR INDUCTION SYSTEM

EG0FX–02



Air filtered through the air cleaner passes through the volume air flow meter and the amount flowing to the air intake chamber is determined according to the throttle valve opening in the throttle body and the engine rpm.

The volume air flow meter measures the intake air flow by the opening of the measuring plate in response to the volume of intake air to the engine.

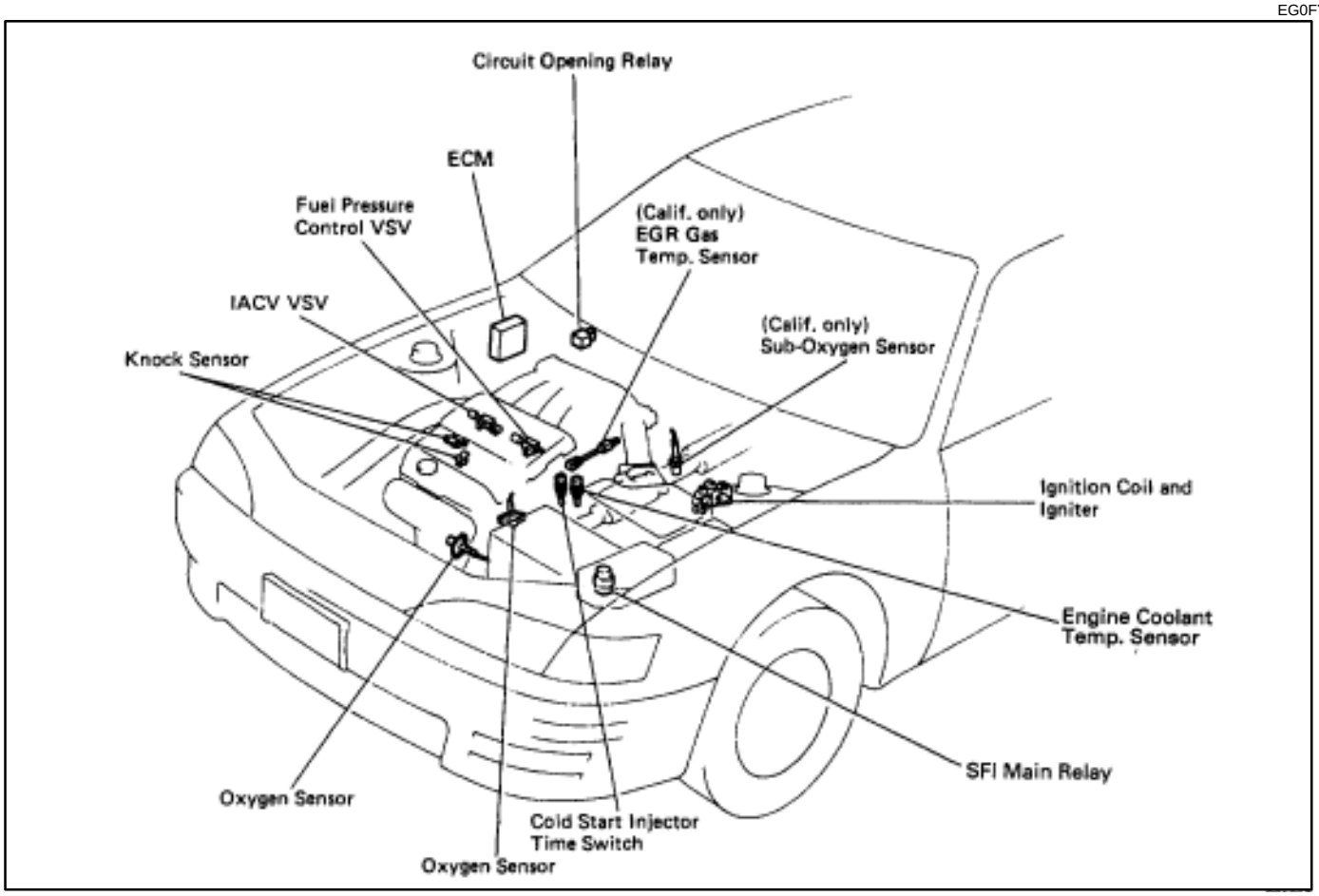
Located in the throttle body is the throttle valve, which regulates the volume of intake air to the engine. Intake air controlled by the throttle valve opening is distributed from the air intake chamber to the manifold of each cylinder and is drawn into the combustion chamber.

At low temperatures the IAC valve opens and the air flows through the IAC valve and the throttle body, into the air intake chamber. During engine warning up, even if the throttle valve is completely closed, air flows to the air intake chamber, thereby increasing the idle speed (first idle operation).

The air intake chamber prevents pulsation of the intake air, reduces the influence on the volume air flow meter and increases the accuracy of the measurement of the intake air volume. It also prevents intake air interference in each cylinder.

ELECTRONIC CONTROL SYSTEM

EG0FY–02



The control system consists of sensors which detect various engine conditions, and a ECM which determines the injection volume (timing) based on the signals from the sensors.

The various sensors detect the intake air volume, engine rpm, oxygen density in the exhaust gas, engine coolant temperature, intake air temperature and atmospheric pressure etc. and convert the information into an electrical signal which is sent to the ECM. Based on these signals, the ECM calculates the optimum ignition timing for the current conditions and operates the injectors.

The ECM not only controls the fuel injection timing, but also the self diagnostic function which records the occurrence of a malfunction, ignition timing control, idle rpm control, fuel pressure control and fuel pump control.

PREPARATION
SST (SPECIAL SERVICE TOOLS)

EG0FZ–01

	09268–41045 Injection Measuring Tool Set	
	(09268–41060) No.3 Union	
	(09268–41080) No.6 Union	
	(90405–09015) No.1 Union	
	09268–45012 EFI Fuel Pressure Gauge	
	09631–22020 Power Steering Hose Nut 14 x 17 mm Wrench Set	Fuel line flare nut
	09842–30055 Wire "G" EFI Inspection	
	09842–30070 Wiring "F" EFI Inspection	
	09843–18020 Diagnosis Check Wire	

RECOMMENDED TOOLS

EG0G0–01

	09082–00015 TOYOTA Electrical Tester	
	09200–00010 Engine Adjust Kit	
	09258–00030 Hose Plug Set	Plug for the vacuum hose, fuel hose etc.

EQUIPMENT

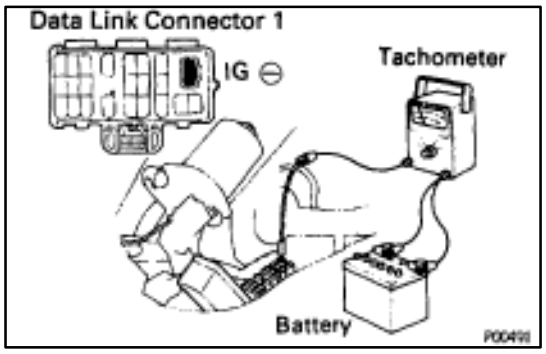
EG0G1–01

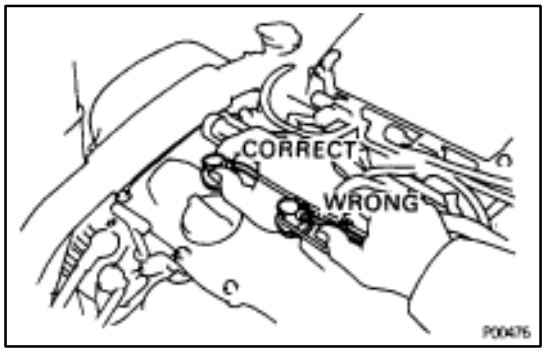
Graduated cylinder	Injector
Carburetor cleaner	Throttle body
Sound scope	Injector
Tachometer	
Torque wrench	
Vacuum gauge	
Soft brush	Throttle body

PRECAUTIONS

EG0G2–01

1. **Before working on the fuel system, disconnect the cable from negative (–) terminal of the battery.**
   HINT: Any diagnostic trouble code retained by the computer will be erased when the battery terminal is removed. Therefore, if necessary, read the diagnosis before removing the battery terminal.
2. **Do not smoke or work near an open flame when working on the fuel system.**
3. **Keep gasoline away from rubber or leather parts.**





MAINTENANCE PRECAUTIONS

EG0G3–01

1. **CHECK CORRECT ENGINE TUNE–UP**
   (See page EG–11)
2. **PRECAUTIONS WHEN CONNECTING GAUGE**

(a) Use the battery as the power source for the timing light, tachometer, etc.
(b) Connect the tester probe of a tachometer to the terminal IG⊕ of the data link connector 1.

3. **IN EVENT OF ENGINE MISFIRE, FOLLOWING PRECAUTIONS SHOULD BE TAKEN**

(a) Check proper connection of battery terminals, etc.
(b) Handle high–tension cords carefully.
(c) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
(d) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

4. **PRECAUTIONS WHEN HANDLING OXYGEN SENSOR**

(a) Do not allow oxygen sensor to drop or hit against an object.
(b) Do not allow the sensor to come into contact with water.

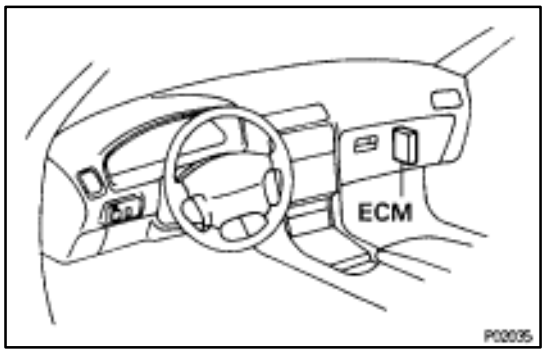
IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

EG0G4–02

The ECM has been designed so that it will not be affected by outside interference.

However, if your vehicle is equipped with a CB radio transceiver, etc. (even one with about 10 W output), it may, at times, have an affect upon ECM operation, especially if the antenna and feeder are installed nearby.

Therefore, observe the following precautions:

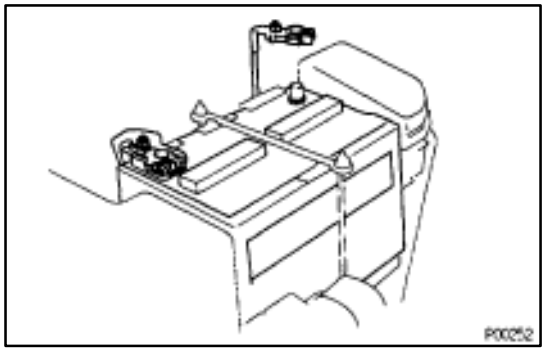


1. Install the antenna as far away as possible from the ECM. The ECM is located under the dash board on the passenger's side so the antenna should be installed at the rear side of the vehicle.
2. Keep the antenna feeder as far away as possible from the ECM wires–at least 20 cm (7.87 in.)–and, especially, do not wind them together.
3. Check that the feeder and antenna are properly adjusted.
4. Do not equip your vehicle with a powerful mobile radio system.
5. Do not open the cover or the case of the ECM unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

AIR INDUCTION SYSTEM

EG0G5–01

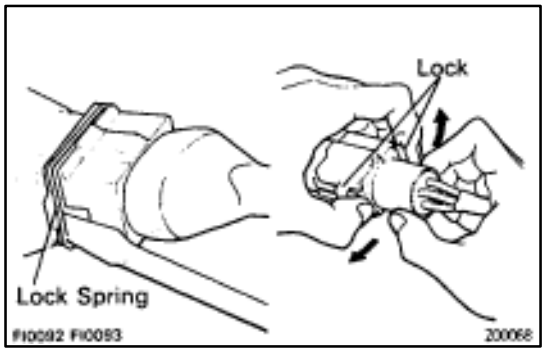
1. Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.
2. Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run out of tune.



ELECTRONIC CONTROL SYSTEM

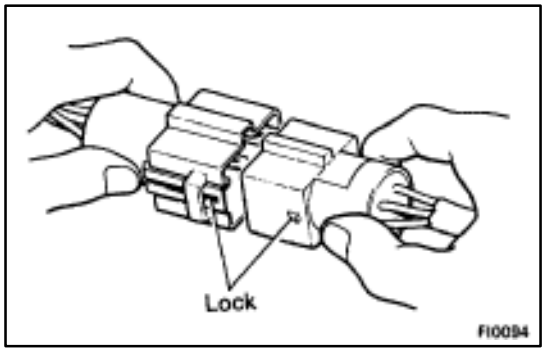
EG0G6–01

1. Before removing SFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF or disconnecting the battery terminals.
   HINT: Always check the diagnostic trouble code before disconnecting the battery terminal.
2. When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.
3. Do not permit parts to receive a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.
4. Do not be careless during troubleshooting as there are numerous transistor circuits and even slight terminal contact can cause further troubles.
5. Do not open the ECM cover.
6. When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the SFI parts and wiring connectors.
7. Parts should be replaced as an assembly.

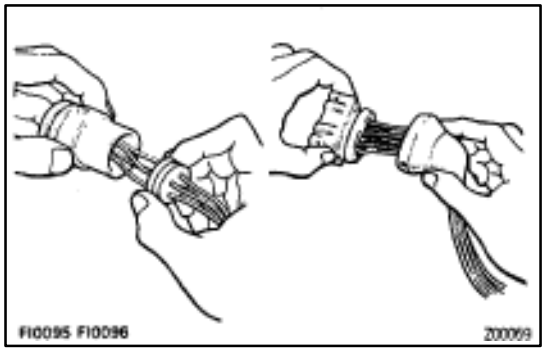


8. Care is required when pulling out and inserting wiring connectors.

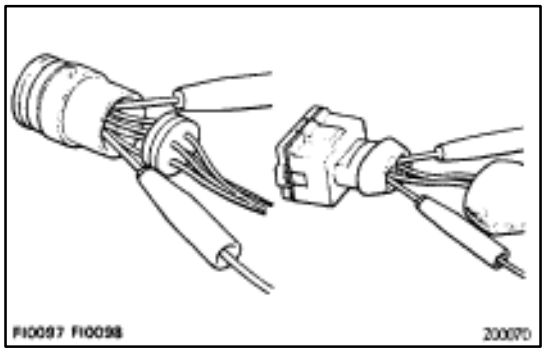
(a) Release the lock and pull out the connector, pulling on the connectors.



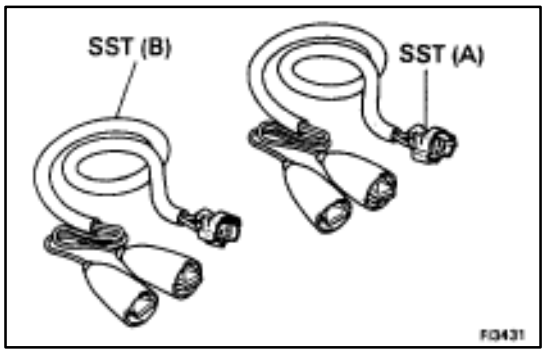
(b) Fully insert the connector and check that it is locked.



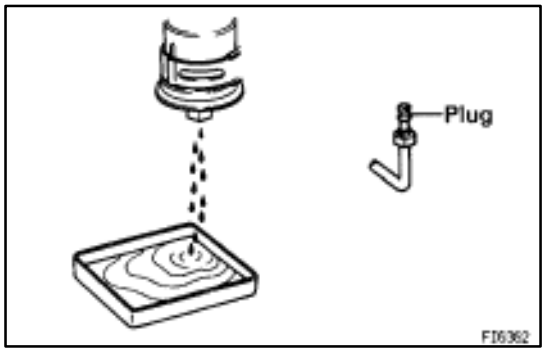
9. When inspecting a connector with a volt/ohmmeter.
(a) Carefully take out the water–proofing rubber if it is a water–proof type connector.



(b) Insert the test probe into the connector from wiring side when checking the continuity, amperage or voltage.
(c) Do not apply unnecessary force to the terminal.
(d) After checking, install the water–proofing rubber on the connector securely.



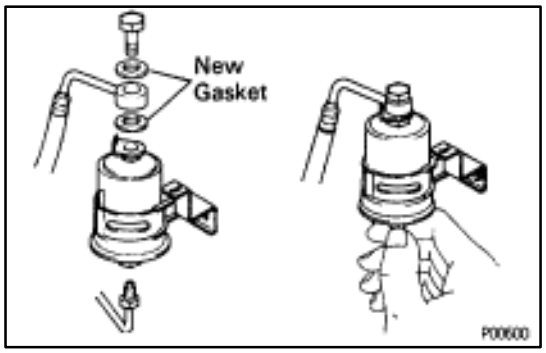
10. Use SST for inspection or test of the injector, cold start injector or its wiring connector.
SST 09842–30055 (A)
SST 09842–30070 (B)



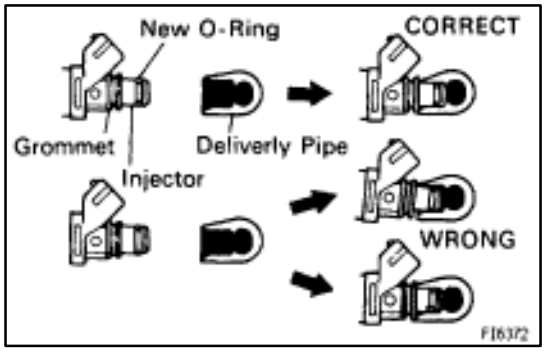
FUEL SYSTEM

EG0G7–01

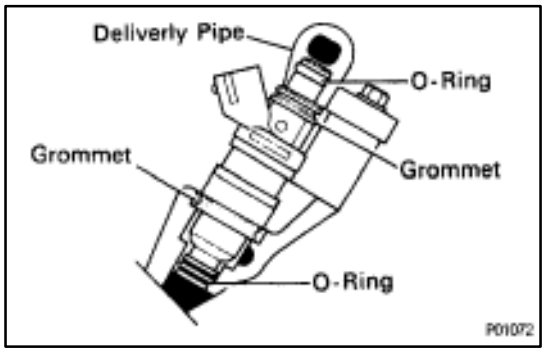
1. When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe the following procedures:
(a) Put a container under the connection.
(b) Slowly loosen the connection.
(c) Disconnect the connection.
(d) Plug the connection with a rubber plug.



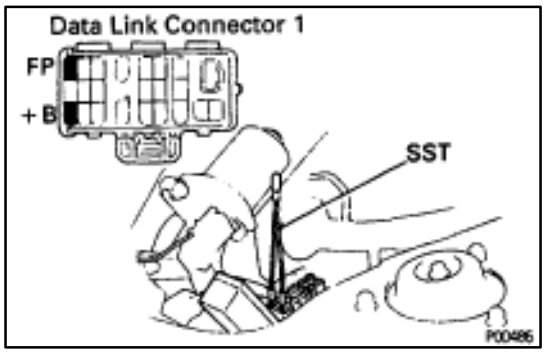
2. When connecting the flare nut or union bolt on the high pressure pipe union, observe the following procedures:
(Union Bolt Type)
(a) Always use a new gasket.
(b) Tighten the union bolt by hand.
(c) Tighten the union bolt to the specified torque.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



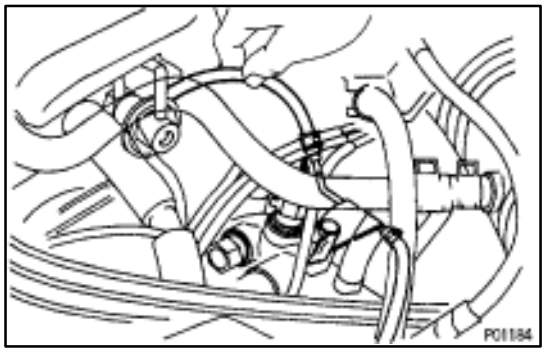
3. Observe the following precautions when removing and installing the injectors.
(a) Never reuse the O–ring.
(b) When placing a new O–ring on the injector, take care not to damage it in any way.
(c) Coat a new O–ring with spindle oil or gasoline before installing–never use engine, gear or brake oil.



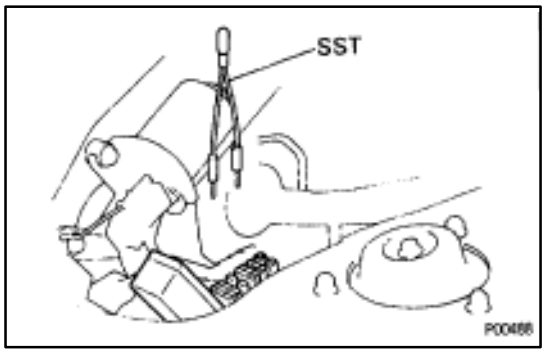
4. Install the injector to delivery pipe and intake manifold as shown in the illustration.



5. Check that there are no fuel leaks after performing any maintenance on the fuel system.
(a) Using SST, connect terminals +B and FP of the data link connector 1.
SST 09843–18020
(b) With engine stopped, turn the ignition switch ON.



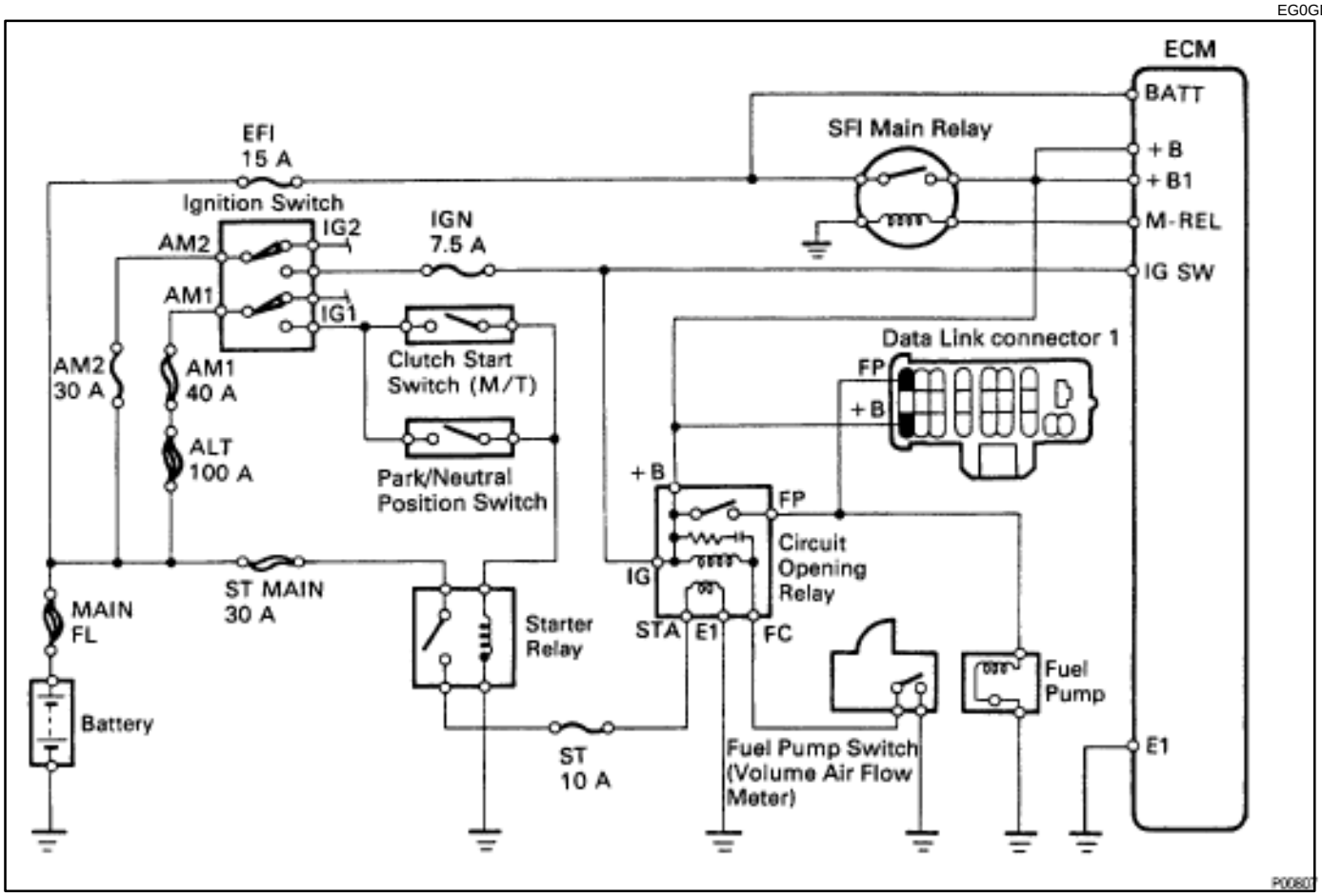
(c) When the fuel return hose is pinched, the pressure within high pressure line will rise to approx. 392 kPa (4 kgf/cm^2, 57 psi). In this state, check to see that there are no leaks from any part of the fuel system.
NOTICE: Always pinch the hose. Avoid bearing as it may cause the hose to crack.

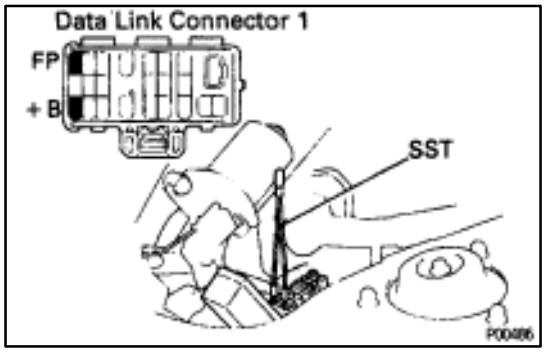


(d) Turn the ignition switch OFF.
(e) Remove the SST.
SST 09843–18020

FUEL PUMP SYSTEM CIRCUIT

EG0GD–01





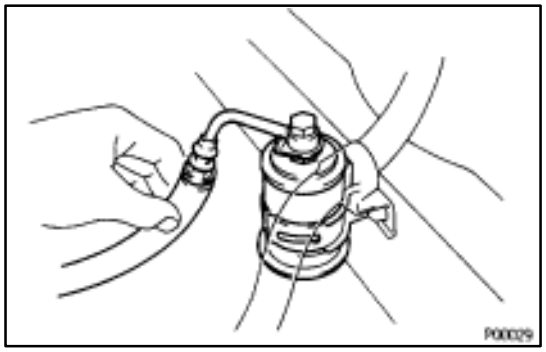
ON–VEHICLE INSPECTION

EG0GE–01

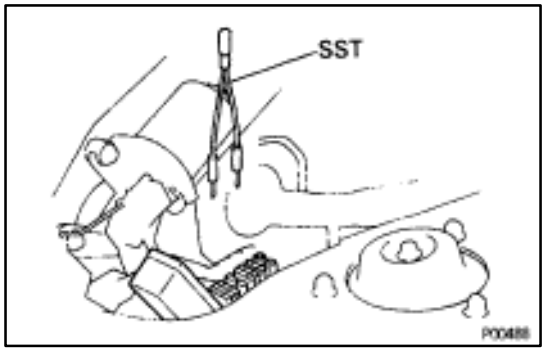
1. CHECK FUEL PUMP OPERATION

(a) Using SST, connect terminals +B and FP of the data link connector 1.
SST 09843–18020

(b) Turn the ignition switch ON.
NOTICE: Do not start the engine.



(c) Check that there is pressure in the hose from the fuel filter.
HINT: At this time, you will hear fuel return noise.



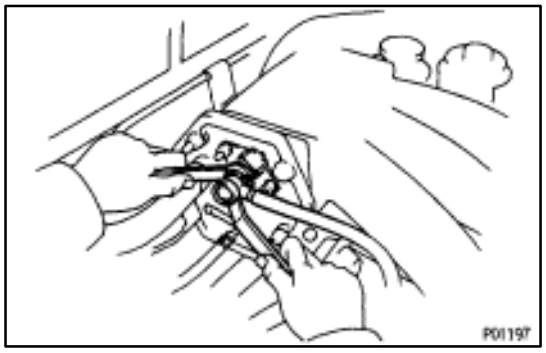
(d) Remove SST.
SST 09843–18020

(e) Turn the ignition switch OFF.
If there is no pressure, check the following parts:
- Fusible link
- Fuses (AM2 30A, EFI 15A, IGN 7.5A)
- SFI main relay
- Fuel pump
- ECM
- Wiring connections

2. CHECK FUEL PRESSURE

(a) Check that the battery voltage is above 12 volts.

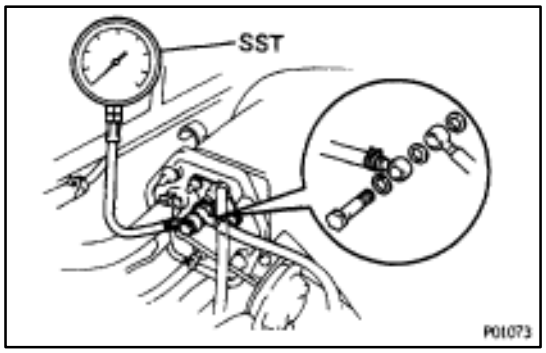
(b) Disconnect the cable from the negative (–) terminal of the battery.
CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.



(c) Disconnect the cold start injector connector.

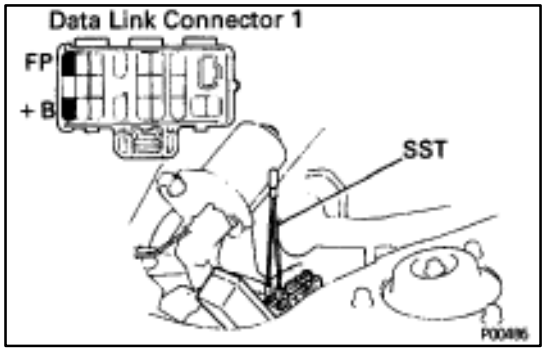
(d) Put a suitable container or shop towel under the cold start injector pipe (No.2 fuel pipe).

(e) Remove the union bolt and two gaskets, and disconnect the cold start injector pipe from the cold start injector.
HINT: Slowly loosen the union bolt.



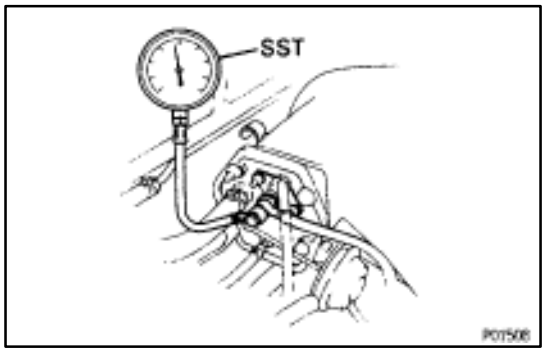
(f) Install SST (pressure gauge) to the cold start injector with three new gaskets and the union bolt.
SST 09268–45012
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(g) Wipe off any splattered gasoline.



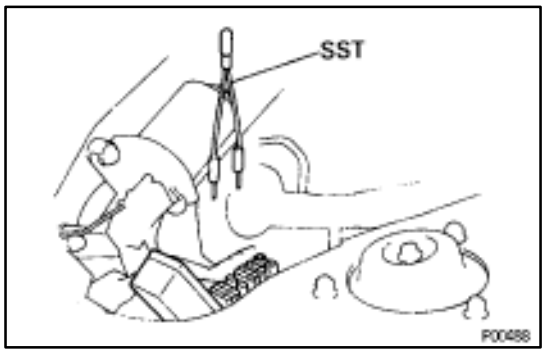
(h) Using SST, connect terminals +B and FP of the data link connector 1.
SST 09843–18020

(i) Reconnect the battery negative (–) cable.



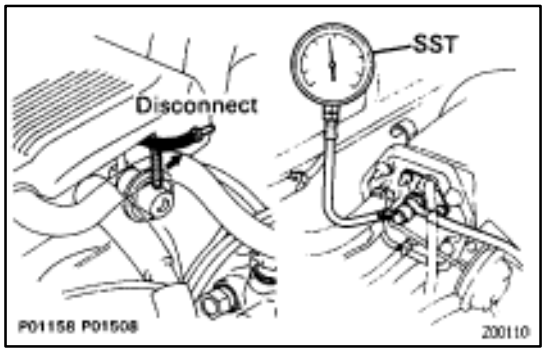
(j) Turn the ignition switch ON.

(k) Measure the fuel pressure.
Fuel pressure:
265–304 kPa (2.7–3.1 kgf/cm^2, 38–44 psi)
If pressure is high, replace the fuel pressure regulator.
If pressure is low, check the following parts:
•Fuel hoses and connection
•Fuel pump
•Fuel filter
•Fuel pressure regulator



•Injector

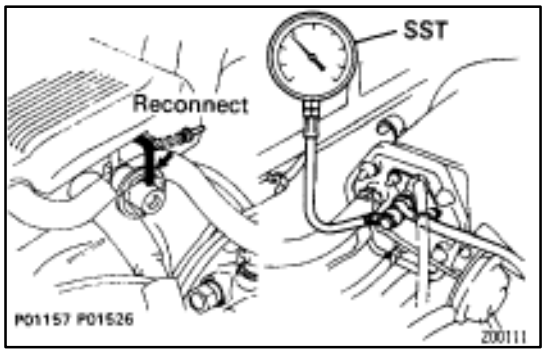
(l) Remove SST.
SST 09843–18020



(m) Start the engine.

(n) Disconnect the vacuum sensing hose from the fuel pressure regulator, and plug the hose end.

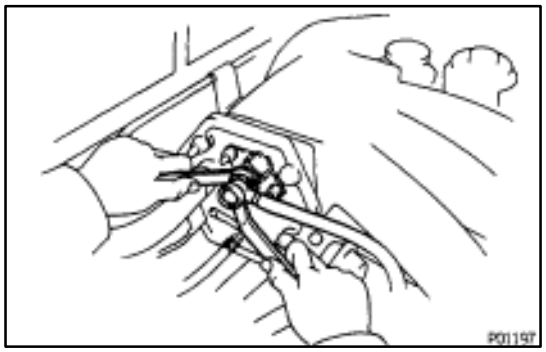
(o) Measure the fuel pressure at idle.
Fuel pressure:
265–304 kPa (2.7–3.1 kgf/cm^2, 38–44 psi)



(p) Reconnect the vacuum sensing hose to the fuel pressure regulator.

(q) Measure the fuel pressure at idle.
Fuel pressure:
226–265 kPa (2.3–2.6 kgf/cm^2, 33–37 psi)
If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

(r) Stop the engine. Check that the fuel pressure remains 147 kPa (1.5 kgf/cm^2, 21 psi) or more for 5 minutes after the engine is turned off.
If pressure is not as specified, check the fuel pump, pressure regulator and/or injector.



(s) After checking fuel pressure, disconnect the battery negative (–) cable and carefully remove the SST to prevent gasoline from splashing.
SST 09268–45012

(t) Connect the cold start injector pipe (No.2 fuel pipe) with two new gaskets and the union bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(u) Reconnect the cold start injector connector.

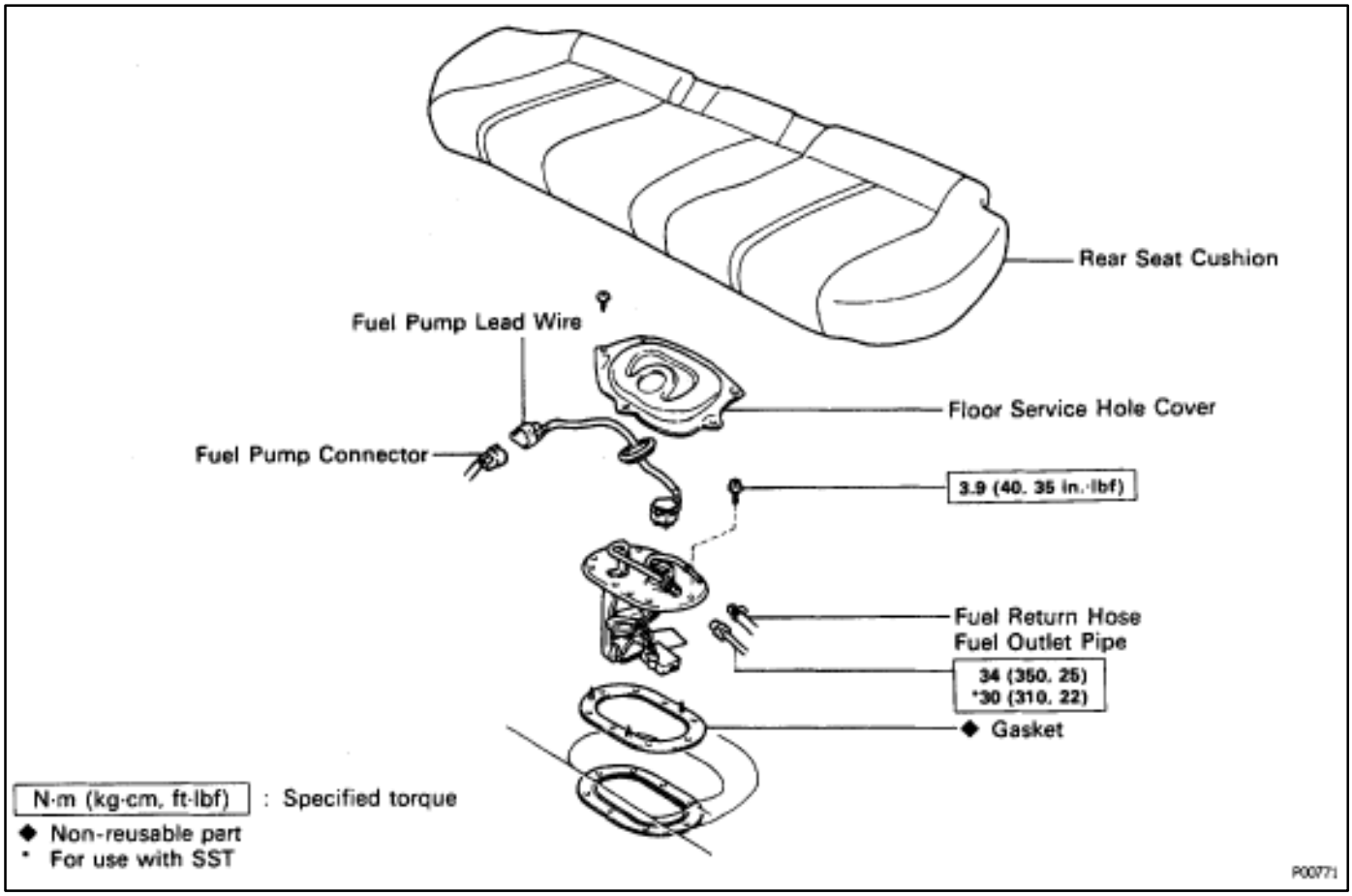
(v) Reconnect the cable to the negative (–) terminal of the battery.

(w) Check for fuel leakage.

FUEL PUMP REMOVAL AND INSPECTION

EG0GF–01

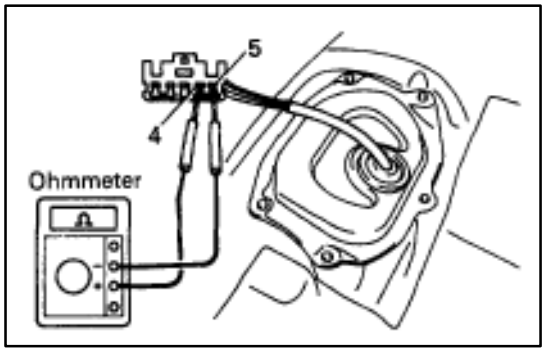
CAUTION: Do not smoke or work near an open flame when working on the fuel pump.



1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**

   CAUTION (w/ Air bag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. **REMOVE REAR SEAT CUSHION**



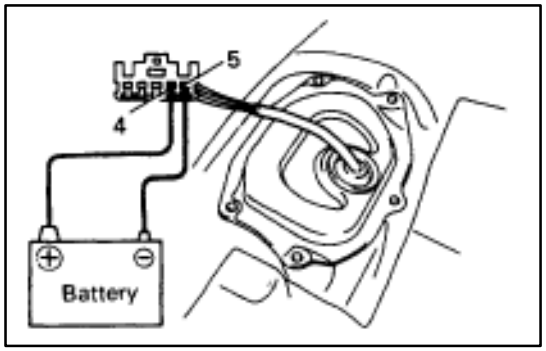
3. **INSPECT FUEL PUMP RESISTANCE**

   Using an ohmmeter, measure the resistance between terminals 4 and 5.

   Resistance (Cold):

   0.2–3.0 Ω

   If the resistance is not as specified, replace the fuel pump.



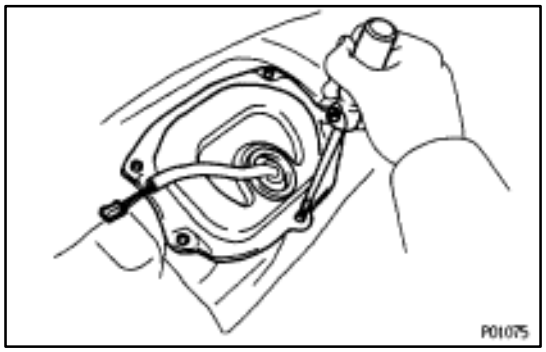
4. INSPECT FUEL PUMP OPERATION

Connect the positive (+) lead from the battery to terminal 4 of the connector, and the negative (–) lead to terminal 5. Check that the fuel pump operates.

NOTICE:

- **These tests must be performed quickly (within 10 seconds) to prevent the coil burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always perform switching at the battery side.**

If operation is not as specified, replace the fuel pump.

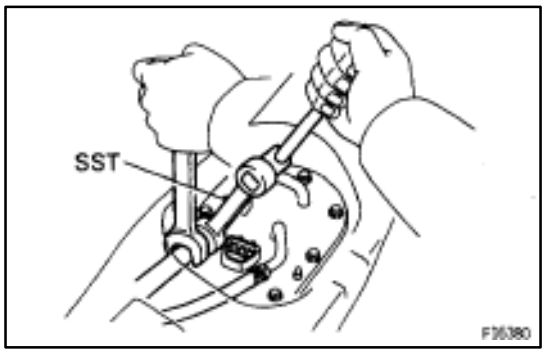


5. REMOVE FLOOR SERVICE HOLE COVER

(a) Disconnect the fuel pump connector.

(b) Remove the five screws and service hole cover.

6. REMOVE FUEL PUMP LEAD WIRE

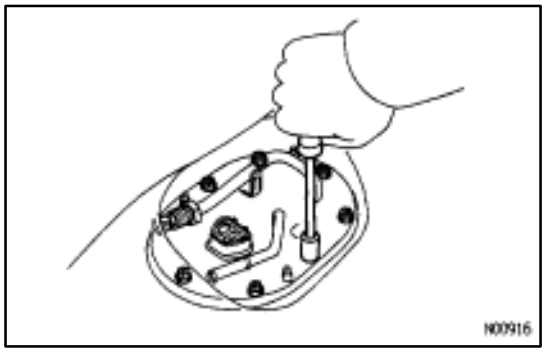


7. DISCONNECT FUEL PIPE AND HOSE FROM FUEL PUMP BRACKET

CAUTION: Remove the fuel filter cap to prevent the fuel from flowing out.

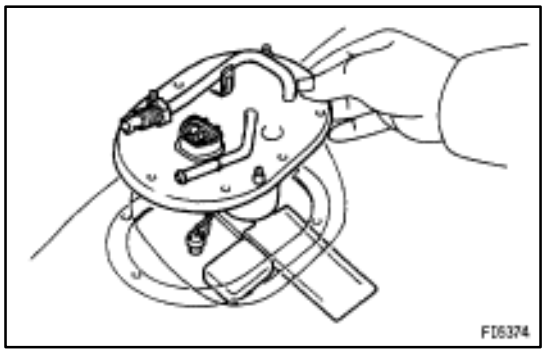
(a) Using SST, disconnect the outlet pipe from the pump bracket.
SST 09631–22020

(b) Disconnect the return hose from the pump bracket.



8. REMOVE FUEL PUMP BRACKET ASSEMBLY FROM FUEL TANK

(a) Remove the eight bolts.

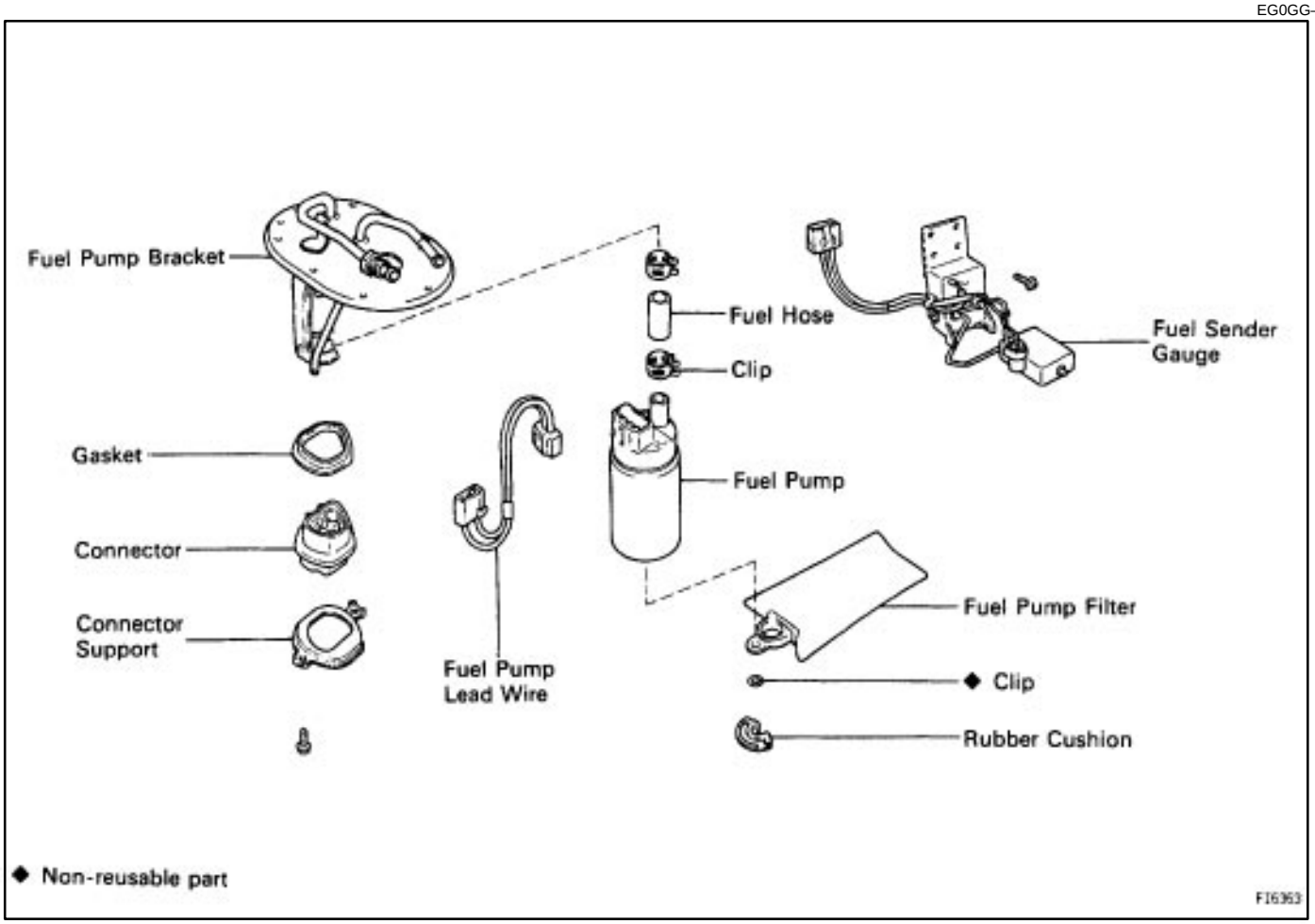


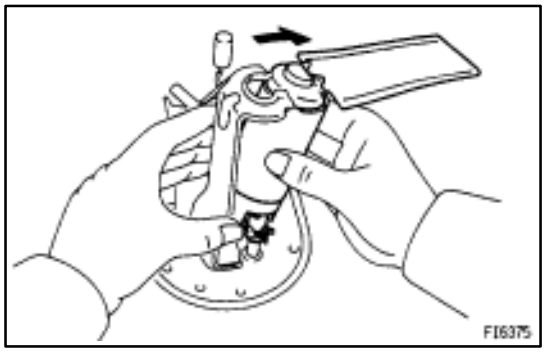
(b) Pull out the pump bracket assembly.

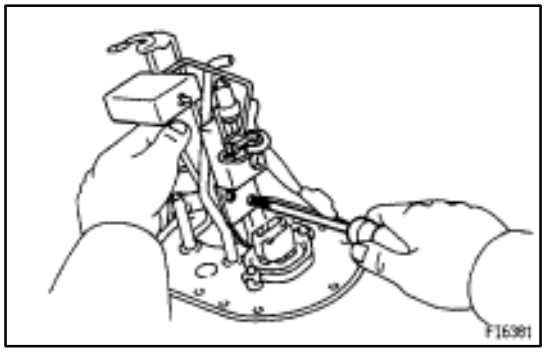
(c) Remove the gasket from the pump bracket.

COMPONENTS

EG0GG–01







FUEL PUMP DISASSEMBLY

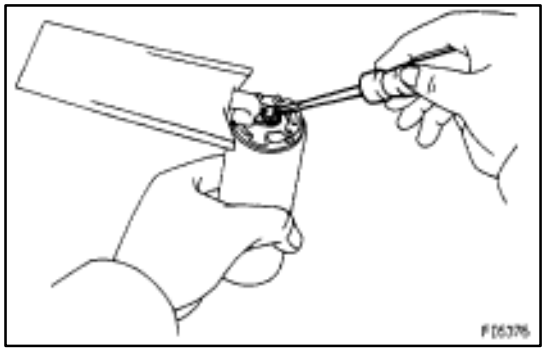
EG0GH–01

1. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

(a) Remove the fuel pump lead wire.
(b) Pull off the lower side of the fuel pump from the pump bracket.
(c) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.
(d) Remove the rubber cushion from the fuel pump.

2. REMOVE FUEL SENDER GAUGE FROM FUEL PUMP BRACKET

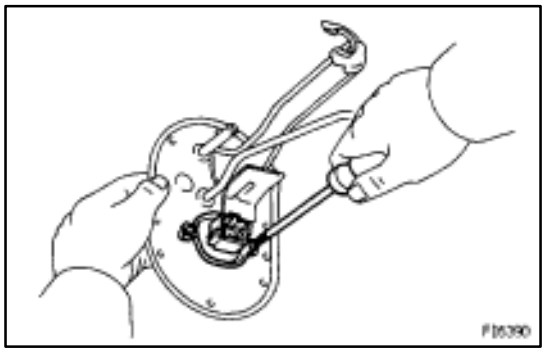
(a) Disconnect the fuel sender gauge connector.
(b) Remove the two screws and sender gauge.



3. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

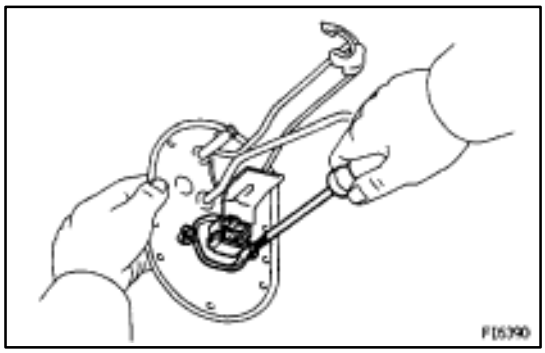
(a) Using a small screwdriver, remove the clip.

(b) Pull out the pump filter.



4. REMOVE CONNECTOR

Remove the two screws, connector support, connector and gasket.



FUEL PUMP ASSEMBLY

EG0GJ–01

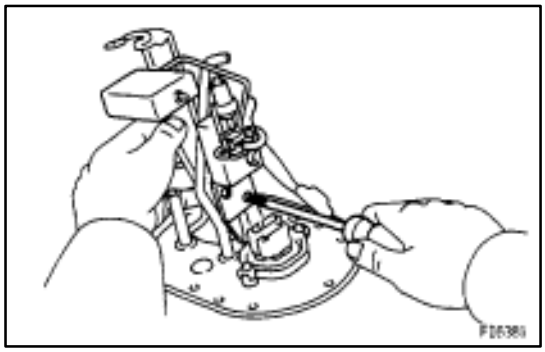
(See page EG–176)

1. INSTALL CONNECTOR

Install the gasket, connector and connector support with the two screws.

2. INSTALL FUEL PUMP FILTER TO FUEL PUMP

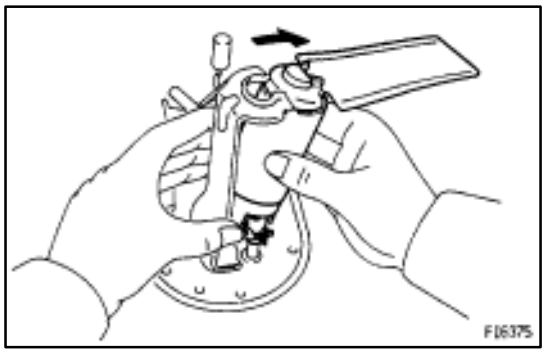
Install the pump filter with a new clip.



3. INSTALL FUEL SENDER GAUGE TO FUEL PUMP BRACKET

(a) Install the sender gauge with the two screws.

(b) Connect the fuel sender gauge connector.



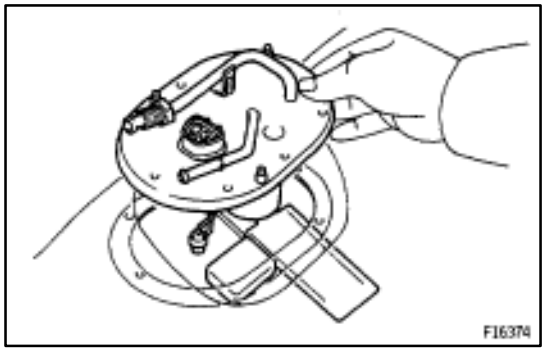
4. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

(a) Install the rubber cushion to the fuel pump.

(b) Connect the fuel hose to the outlet port of the fuel pump.

(c) Install the fuel pump by pushing the lower side of the fuel pump.

(d) Install the fuel pump connector.



FUEL PUMP INSTALLATION

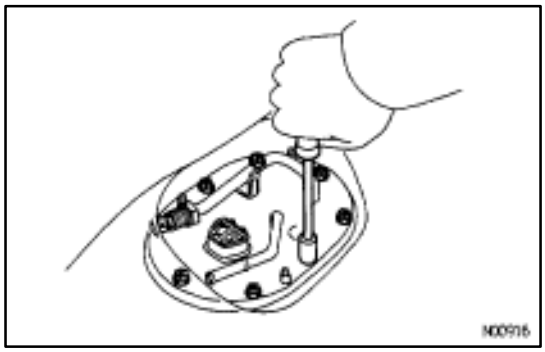
EG0GK–01

(See page EG–174)

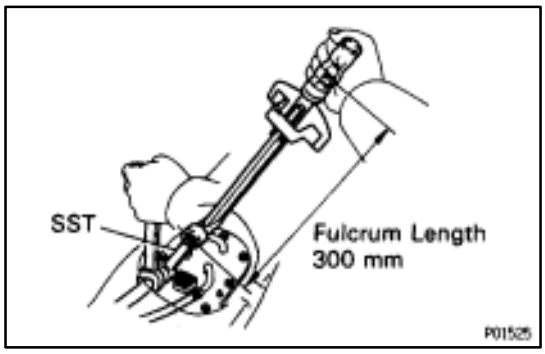
1. INSTALL FUEL PUMP BRACKET ASSEMBLY TO FUEL TANK

(a) Install a new gasket to the pump bracket.

(b) Insert the pump bracket assembly into the fuel tank.



(c) Install the pump bracket with the eight screws.
Torque: 3.9 N·m (40 kgf·cm, 35 in.·lbf)



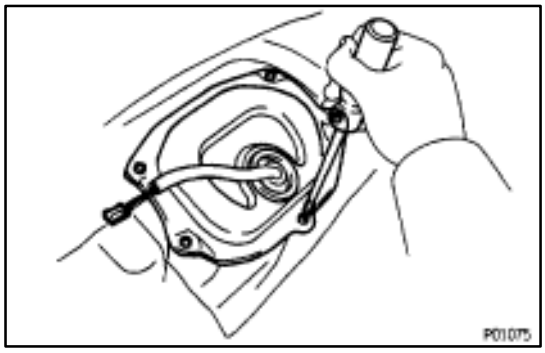
2. CONNECT FUEL PIPE AND HOSE TO FUEL PUMP BRACKET

(a) Using SST, connect the outlet pipe to the pump bracket.
SST 09631–22020
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

(b) Connect the return hoses to the pump bracket.

3. CHECK FOR FUEL LEAKAGE (See page EG–160)

4. CONNECT FUEL PUMP LEAD WIRE



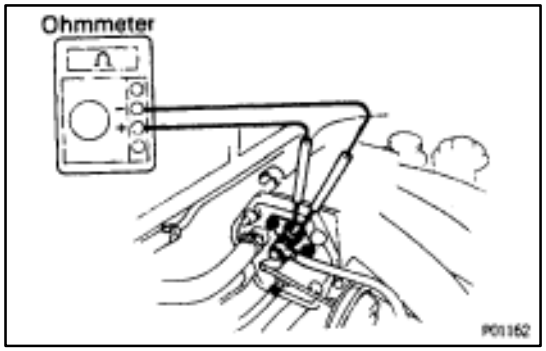
5. INSTALL FLOOR SERVICE HOLE COVER

(a) Install the service hole cover with the three screws.

(b) Connect the fuel pump (with fuel sender gauge) connector.

6. INSTALL REAR SEAT CUSHION

7. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY



COLD START INJECTOR ON–VEHICLE INSPECTION

EG0GL–01

INSPECT RESISTANCE OF COLD START INJECTOR

(a) Disconnect the cold start injector connector.

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

Resistance:

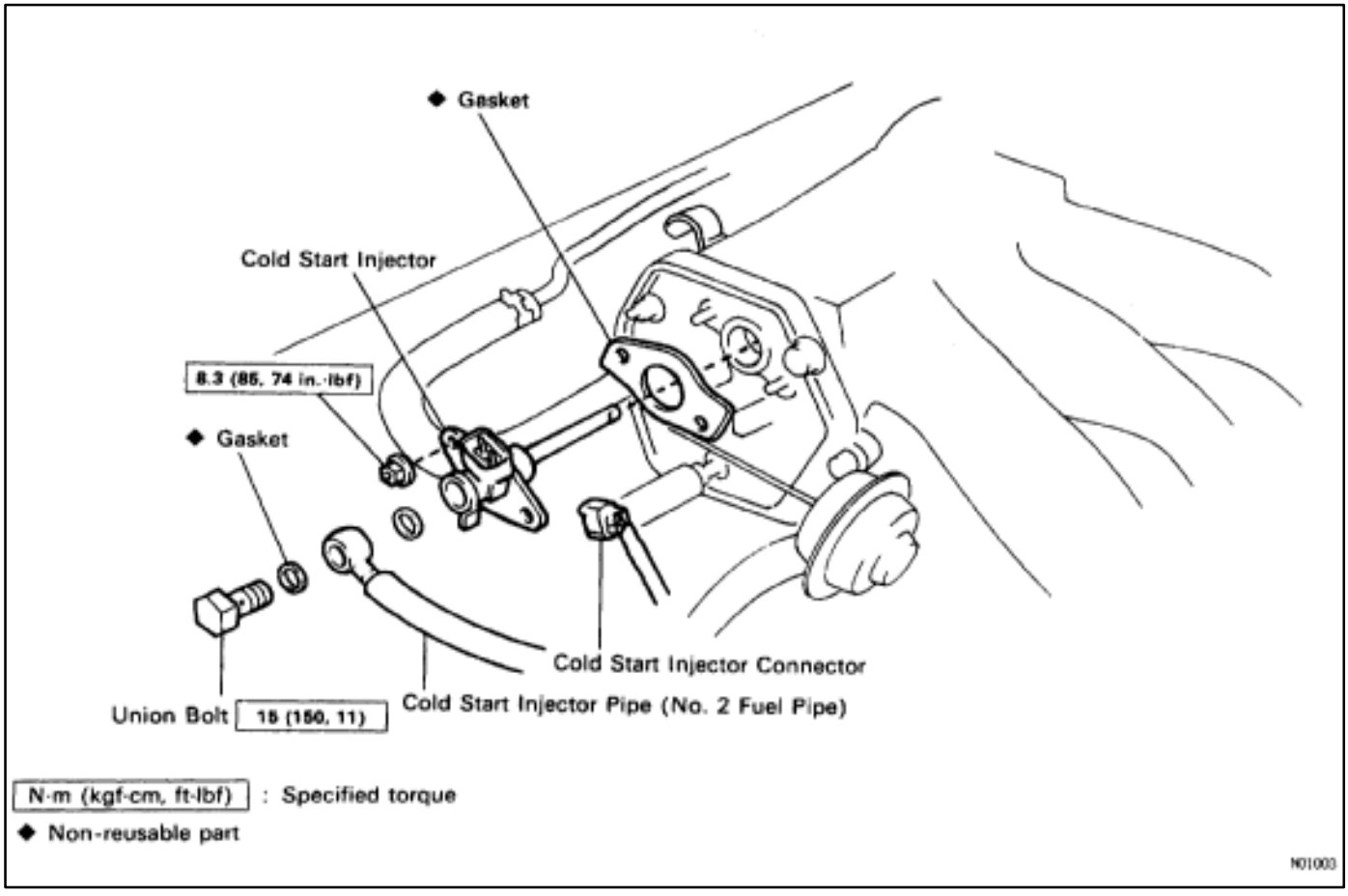
2–4 Ω

If the resistance is not as specified, replace the cold start injector.

(c) Reconnect the cold start injector connector.

COLD START INJECTOR REMOVAL

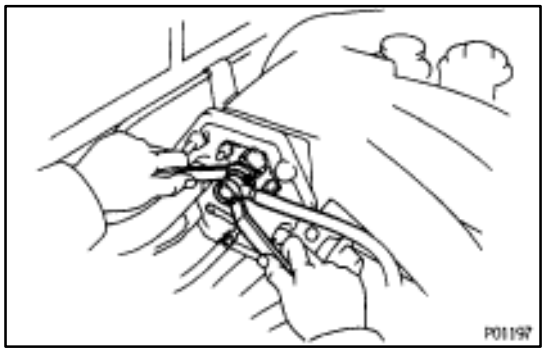
EG0GM–01



1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. DISCONNECT COLD START INJECTOR CONNECTOR

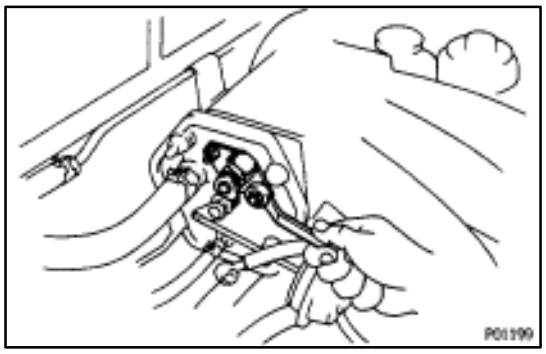


3. DISCONNECT COLD START INJECTOR PIPE (No.2 FUEL PIPE)

(a) Put a suitable container or shop towel under the injector pipe.

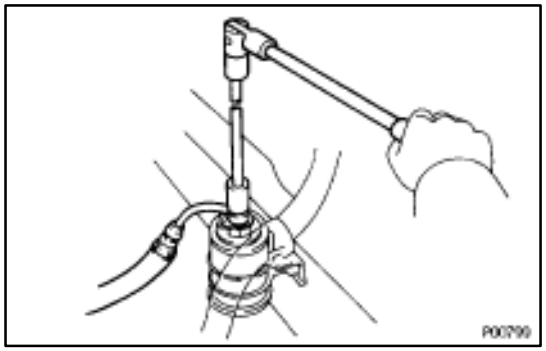
(b) Remove the union bolt and two gaskets, and disconnect the injector pipe.

HINT: Slowly loosen the union bolt.



4. REMOVE COLD START INJECTOR

Remove the two nuts, cold start injector and gasket.



COLD START INJECTOR INSPECTION

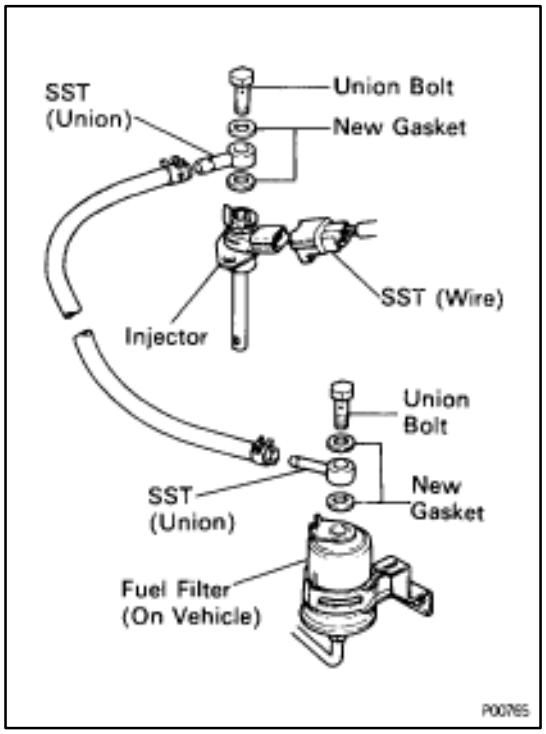
EG0GN–01

1. INSPECT INJECTION OF COLD START INJECTOR

CAUTION: Keep injector clear of sparks during the test.

(a) Put a suitable container or shop towel under the fuel filter.

(b) Remove the union bolt and two gaskets, and disconnect the fuel inlet hose from the fuel filter outlet.
HINT: Slowly loosen the union bolt.



(c) Install SST (two unions) to the injector and fuel filter outlet with new gaskets and the union bolts.
SST 09268–41045(09268–41080,09405–09015)

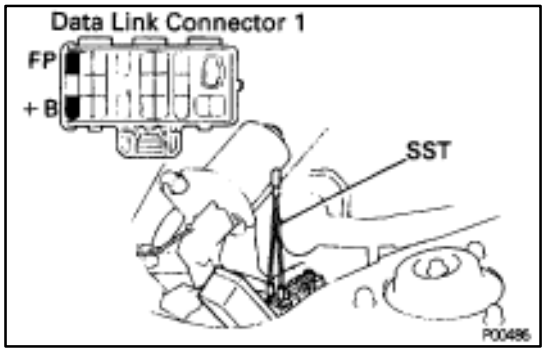
(d) Connect SST (hose) to the unions.
SST 09268–41045

(e) Connect SST (wire) to the injector.
SST 09842–30055

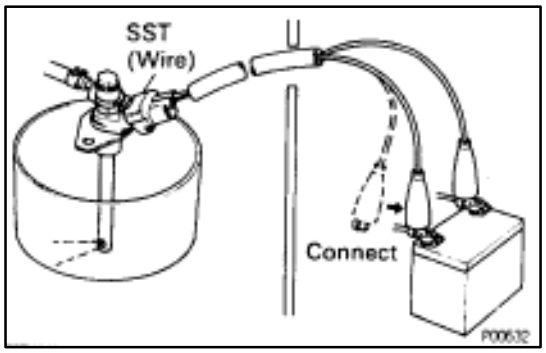
(f) Put a container under the injector.

(g) Reconnect the battery negative (–) cable.

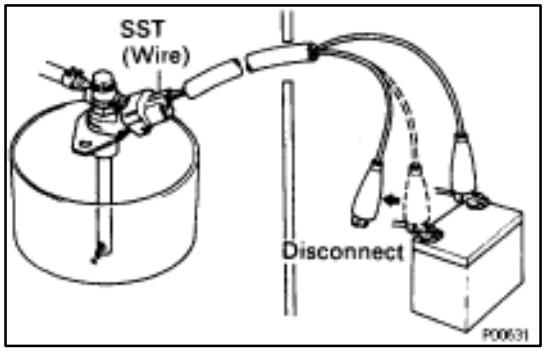
(h) Turn the ignition switch ON.
NOTICE: Do not start the engine.



(i) Using SST, connect terminals +B and FP of the data link connector 1.
SST 09843–18020



(j) Connect the test probes of the SST (wire) to the battery, and check that the fuel spray is as shown.
SST 09842–30055
NOTICE: Perform this check within the shortest possible time.

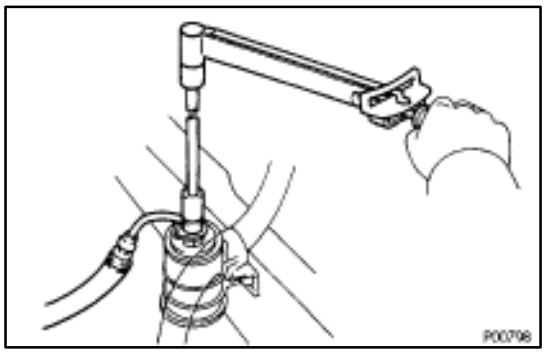


2. INSPECT LEAKAGE

(a) In the condition above, disconnect the test probes of SST (wire) from the battery and check fuel leakage from the injector.
SST 09842–30050
Fuel drop:
One drop or less per minute

(b) Disconnect the battery negative (–) cable.

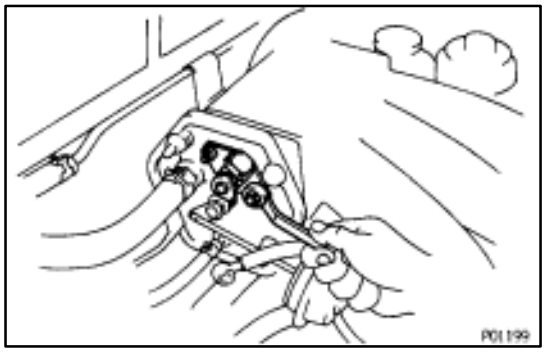
(c) Remove SST.
SST 09268–41045, 09842–30050 and 09843–18020



(d) Connect the fuel inlet hose with two new gaskets and the union bolt.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

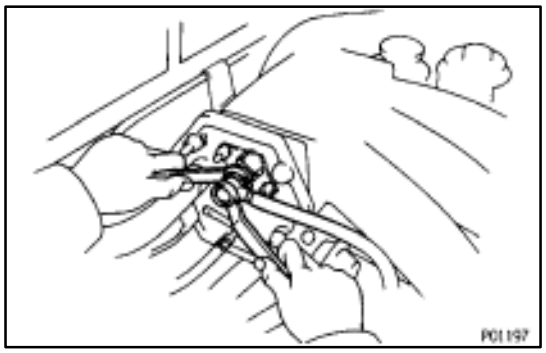
COLD START INJECTOR INSTALLATION

EG0GP–01



(See page EG–179)

1. INSTALL COLD START INJECTOR
Install a new gasket and the injector with the two nuts.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



2. CONNECT COLD START INJECTOR PIPE (NO. 2 FUEL PIPE)
Connect the injector pipe with two new gaskets and the union bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

3. CONNECT COLD START INJECTOR CONNECTOR

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

5. CHECK FOR FUEL LEAKAGE (See page EG–160)

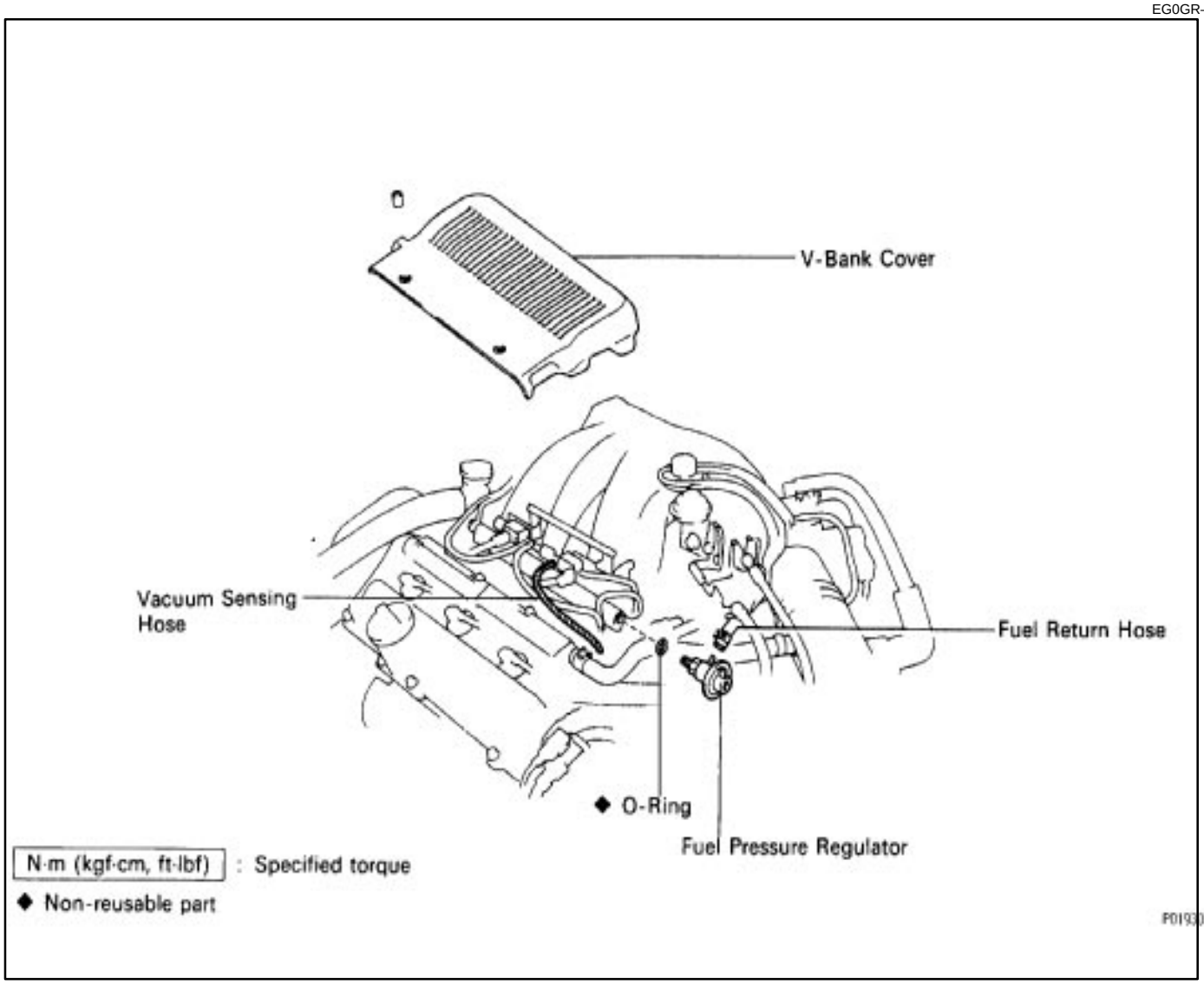
FUEL PRESSURE REGULATOR ON–VEHICLE INSPECTION

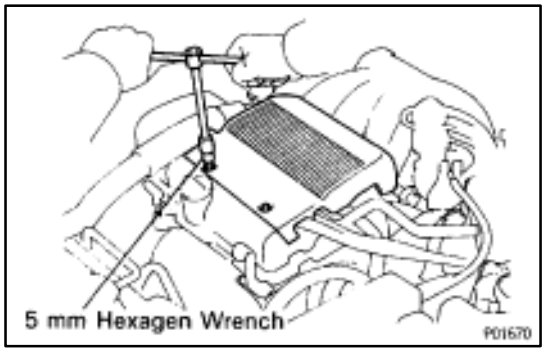
EG0GQ–01

INSPECT FUEL PRESSURE (See page EG–171)

FUEL PRESSURE REGULATOR REMOVAL

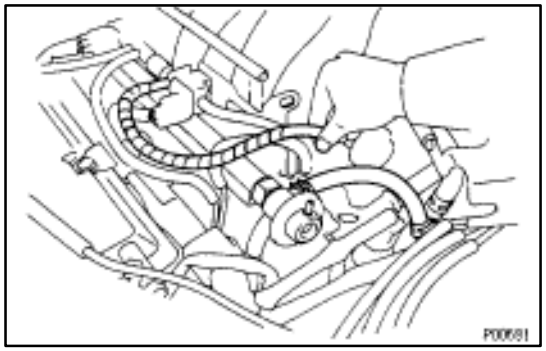
EG0GR–01





1. REMOVE V–BANK COVER

Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.

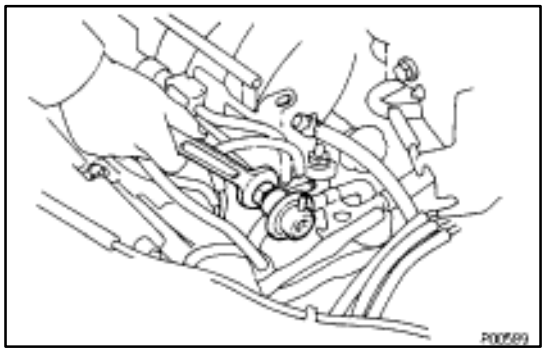


2. DISCONNECT VACUUM SENSING HOSE

3. DISCONNECT FUEL RETURN HOSE

(a) Put a suitable container or shop towel under the pressure regulator.

(b) Disconnect the return hose from the pressure regulator.



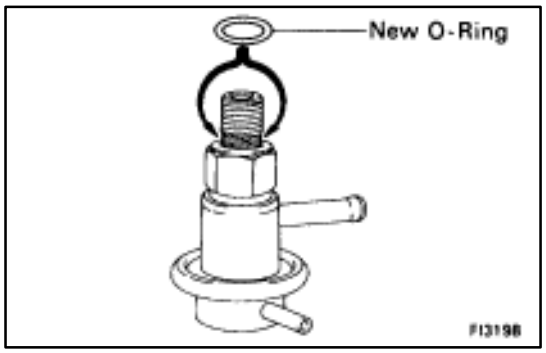
4. REMOVE FUEL PRESSURE REGULATOR

Loosen the lock nut, and remove the pressure regulator.

FUEL PRESSURE REGULATOR INSTALLATION

EG0GS–01

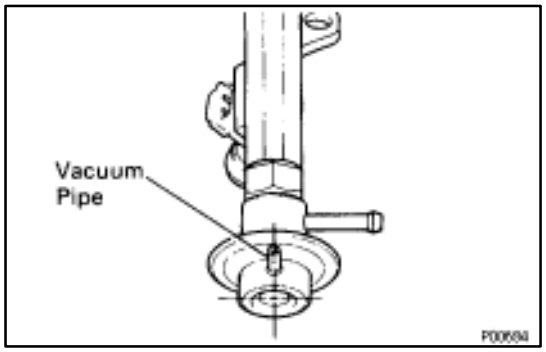
(See page EG–183)



1. INSTALL FUEL PRESSURE REGULATOR

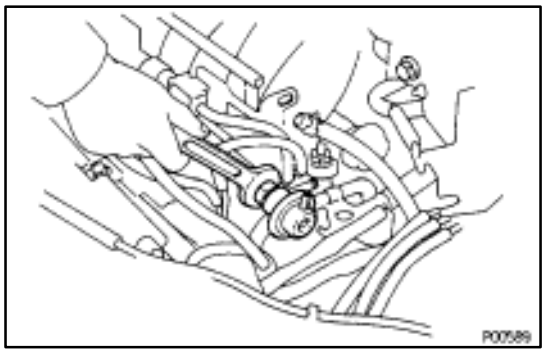
(a) Fully loosen the lock nut of the pressure regulator.

(b) Apply a light coat of gasoline to a new O–ring, and install it to the pressure regulator.



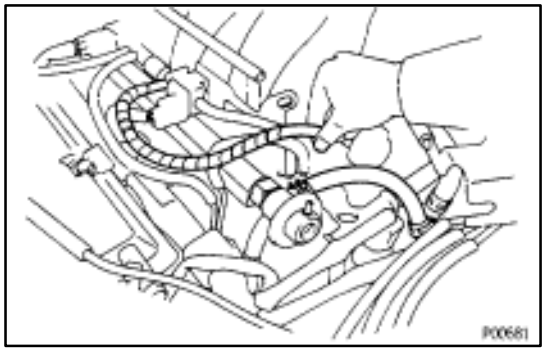
(c) Thrust the pressure regulator completely into the delivery pipe by hand.

(d) Turn the pressure regulator counterclockwise until the vacuum pipe faces in the direction indicated in the illustration.



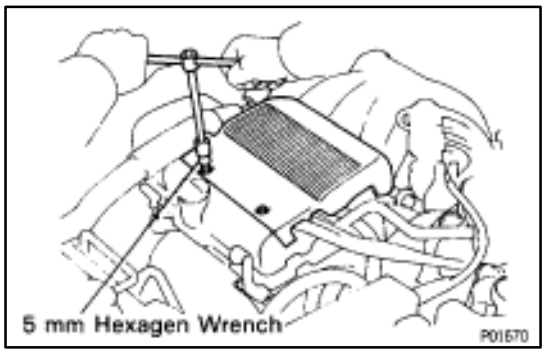
(e) Tighten the lock nut.

Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)

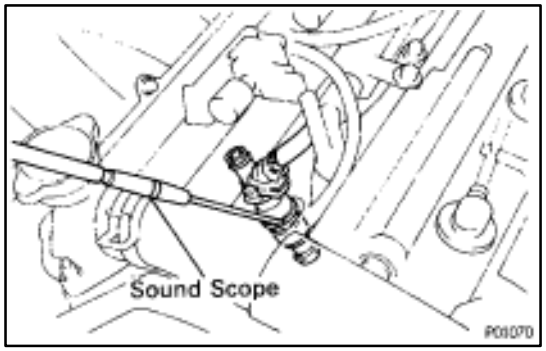


2. **CONNECT FUEL RETURN HOSE**
3. **CONNECT VACUUM SENSING HOSE**

4. **CHECK FOR FUEL LEAKAGE (See page EG–160)**



5. **INSTALL V–BANK COVER**
   Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.



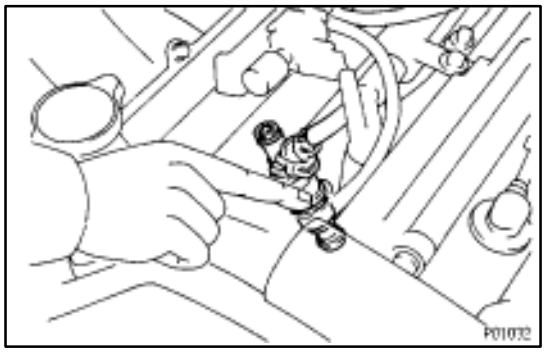
INJECTORS
ON–VEHICLE INSPECTION

EG0GT–01

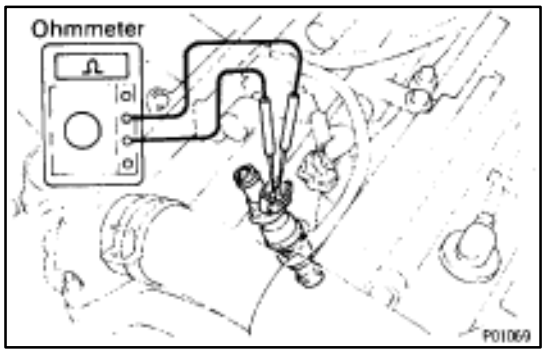
1. INSPECT INJECTOR OPERATION

Check operation sound from each injector.

(a) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine rpm.



(b) If you have no sound scope, you can check the injector transmission operation with your finger.
If no sound or unusual sound is heard, check the wiring connector, injector or injection signal from the ECM.



2. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connector.

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

Resistance:

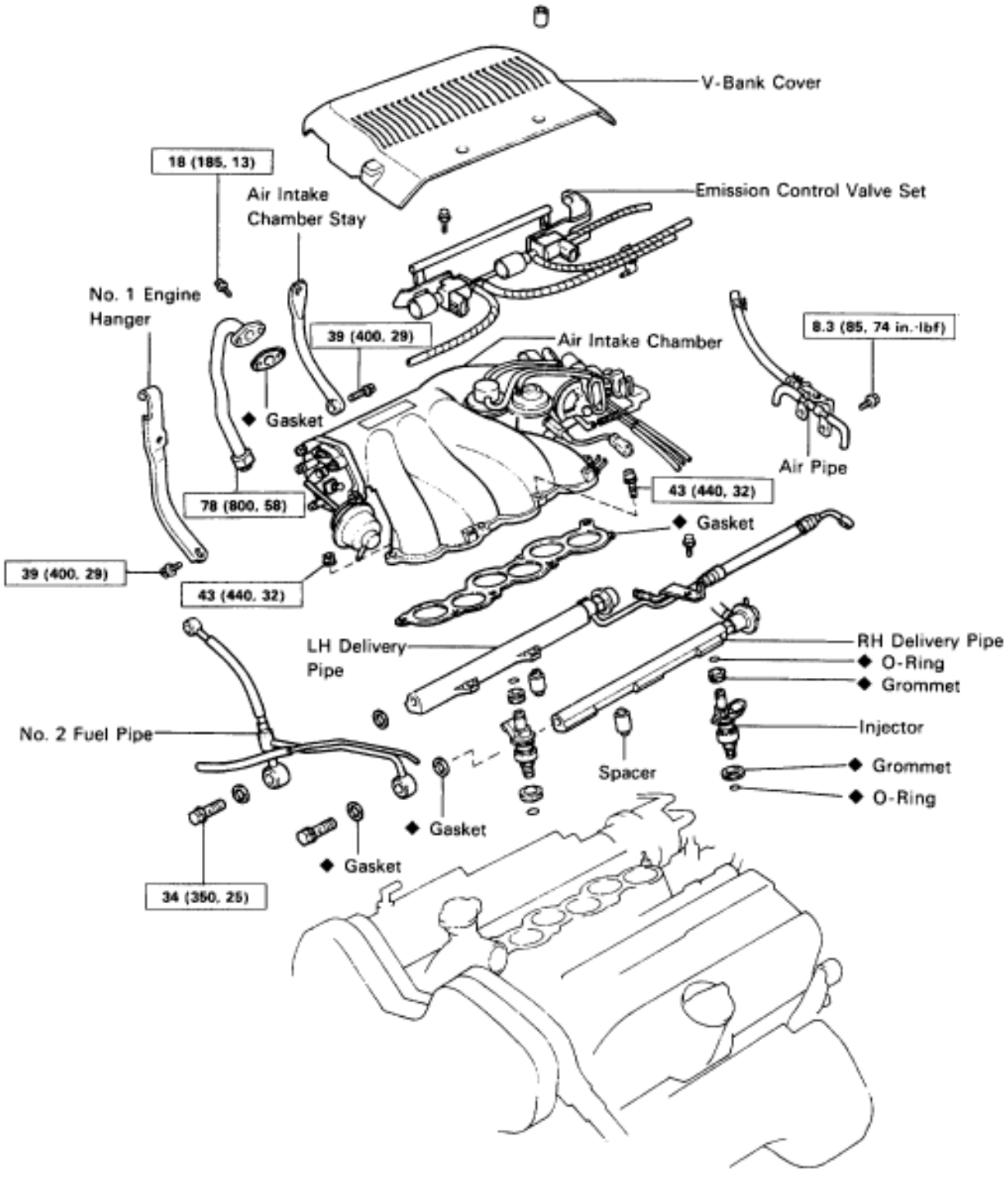
Approx. 13.8 Ω

If the resistance is not as specified, replace the injector.

(c) Reconnect the injector connector.

INJECTORS REMOVAL

EG0GU–01



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

◆ Non-reusable part

P01969

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. DRAIN ENGINE COOLANT

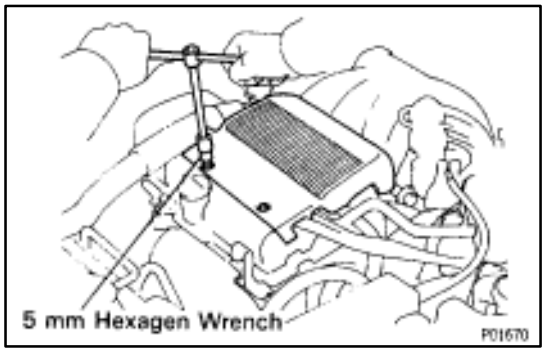
3. DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE

4. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE

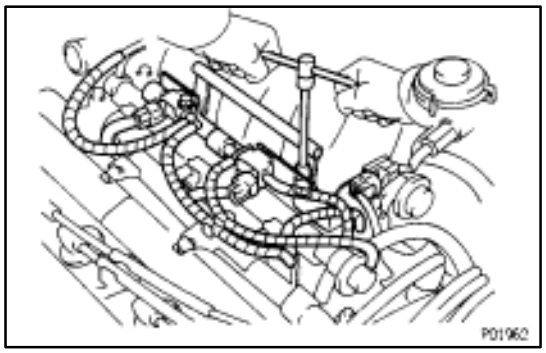
5. REMOVE AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

(a) Disconnect the volume air flow meter connector.
(b) Disconnect the coil cord clamp.
(c) Disconnect the air hoses.
(d) Loosen the air cleaner hose clamp bolt.
(e) Disconnect the air cleaner cap clips.
(f) Remove the air cleaner cap and volume air flow meter together with the air cleaner hose.



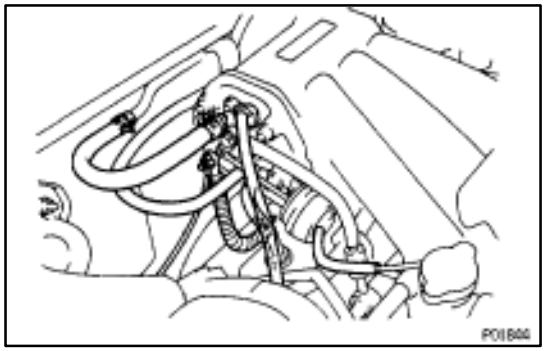
6. REMOVE V–BANK COVER

Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.



7. REMOVE EMISSION CONTROL VALVE SET

(a) Disconnect the EGR gas temp. sensor connector clamp from the emission control valve set.
(b) Disconnect the two vacuum hoses of the fuel pressure control VSV.
(c) Disconnect the two vacuum hoses of the IACV VSV.
(d) Disconnect the two VSV connectors.
(e) Remove the two bolts and emission control valve set.



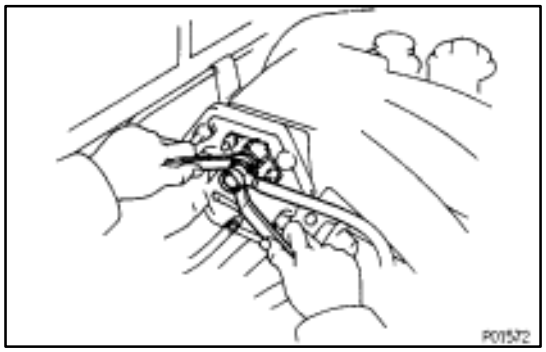
8. DISCONNECT HOSES

(a) Brake booster vacuum hose
(b) PS air hose
(c) PCV hose
(d) IACV vacuum hose

9. DISCONNECT GROUND STRAPS

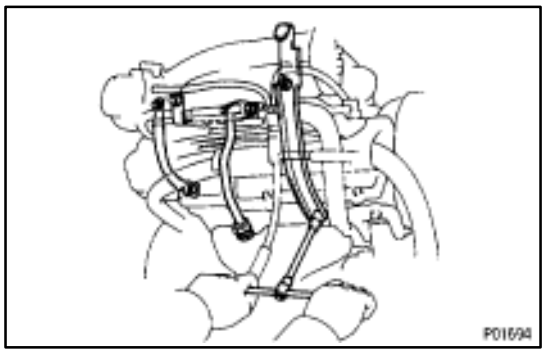
Remove the nut and disconnect the two ground straps.

10. DISCONNECT COLD START INJECTOR CONNECTOR



11. DISCONNECT COLD START INJECTOR PIPE (NO.2 FUEL PIPE)

(a) Put a suitable container or shop towel under the injector pipe.
(b) Remove the union bolt and two gaskets, and disconnect the injector pipe.
HINT: Slowly loosen the union bolt.



12. REMOVE NO.1 ENGINE HANGER AND AIR INTAKE CHAMBER STAY

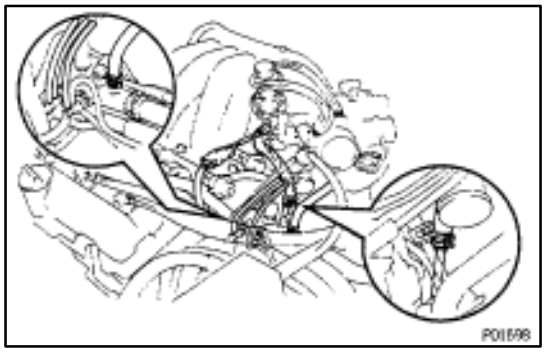
(a) Remove the two bolts and No.1 engine hanger.
(b) Remove the two bolts and air intake chamber stay.

13. REMOVE EGR PIPE

(a) Loosen the union nut.
(b) Remove the two bolts and EGR pipe.

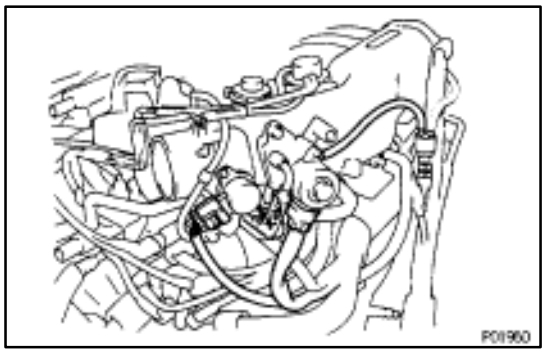
14. DISCONNECT HYDRAULIC MOTOR PRESSURE PIPE

Remove the bolt and disconnect the hydraulic pressure pipe from the air intake chamber.

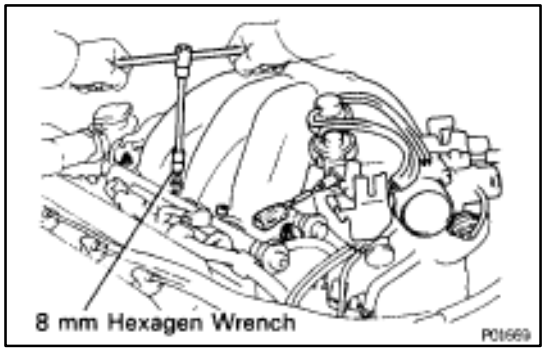


15. REMOVE AIR INTAKE CHAMBER

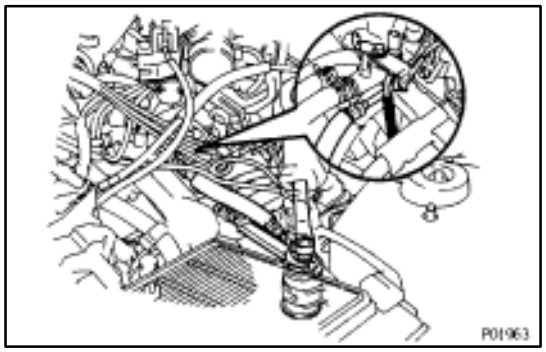
(a) Disconnect the three emission control vacuum hoses.
(b) Disconnect the two water by–pass hoses.
(c) (Calif. only)
Disconnect the EGR gas temp. sensor connector.



(d) Disconnect the throttle position sensor connector.
(e) Disconnect the IAC valve connector.
(f) Disconnect the IAC valve air hose.
(g) Disconnect the PS air hose.



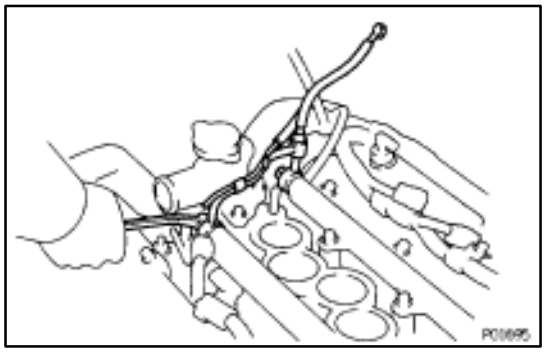
(h) Using 8 mm hexagon wrench, remove the two bolts, nuts, air intake chamber and gasket.



16. DISCONNECT FUEL INLET AND RETURN HOSES

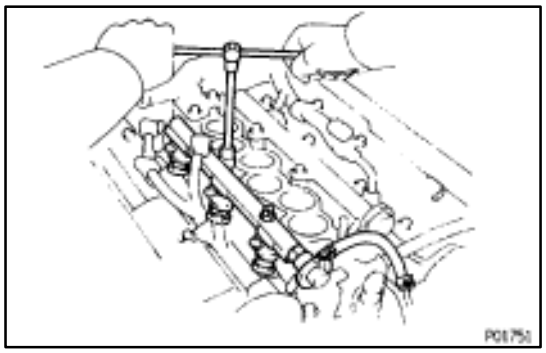
(a) Disconnect the fuel return hoses from the No.1 fuel pipe.
(b) Disconnect the fuel inlet hose from the fuel filter.

17. DISCONNECT INJECTOR CONNECTORS



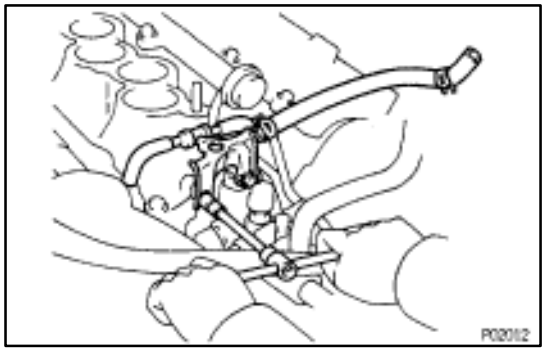
18. REMOVE NO.2 FUEL PIPE

(a) Disconnect the vacuum hose.
(b) Remove the two union bolts, four gaskets and No.2 fuel pipe.



19. REMOVE LH DELIVERY PIPES AND INJECTORS

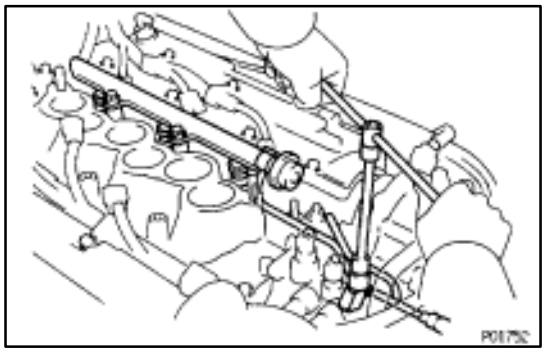
(a) Disconnect the fuel hose from the No.1 fuel pipe.
(b) Remove two bolts and LH delivery pipe together with the three injectors.
NOTICE: Be careful not to drop the injectors, when removing the LH delivery pipe.
(c) Pull out the three injectors from the LH delivery pipe.
(d) Remove the two spacers from the intake manifold.



20. REMOVE AIR PIPE WITH HOSES

(a) Disconnect the two air hoses.

(b) Remove the bolts and air pipe with hoses.



21. REMOVE RH DELIVERY PIPE AND INJECTORS

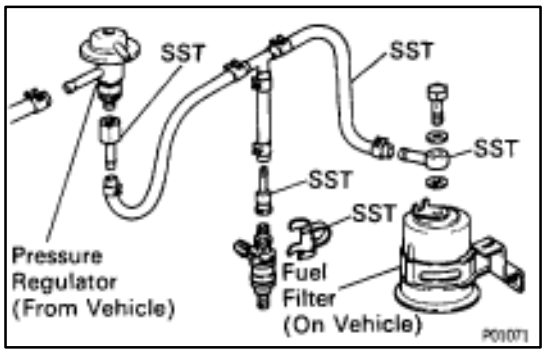
(a) Remove three bolts and RH delivery pipe together with the three injectors.
NOTICE: Be careful not to drop the injectors, when removing the LH delivery pipe.

(b) Pull out the three injectors from the RH delivery pipe.

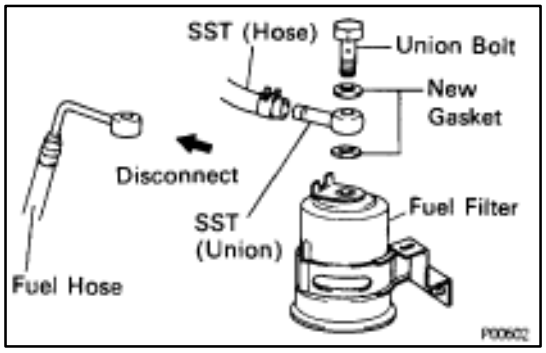
(c) Remove the two spacers from the intake manifold.

INJECTORS INSPECTION

EG0GV–01

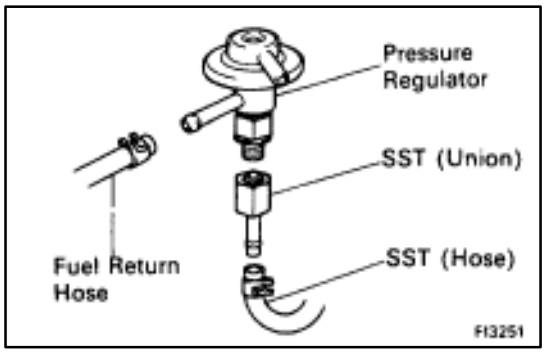


1. INSPECT INJECTOR INJECTION
CAUTION: Keep clear of sparks during the test.



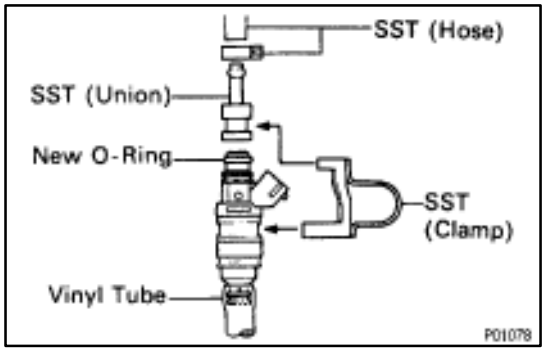
(a) Disconnect the fuel hose from the fuel filter outlet.

(b) Connect SST (union an hose) to the fuel filter outlet with two new gaskets and the union bolt.
SST 09268–41045(90405–09015)
HINT: Use the vehicle's fuel filter.

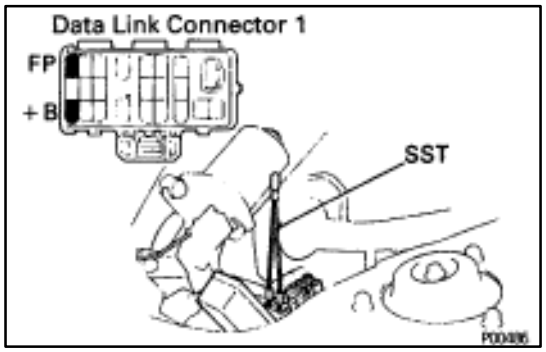


(c) Remove the pressure regulator. (See page EG–183)

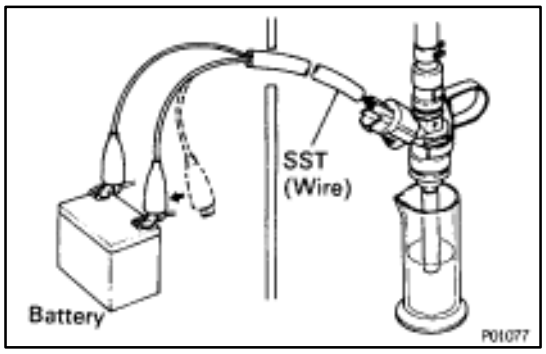
(d) Connect the fuel return hose and SST (hose) to the pressure regulator with SST (union).
SST 09268–41045(09268–41060)



(e) Install a new O–ring to the injector.
(f) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268–41045
(g) Put the injector into the graduated cylinder.
HINT: Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.

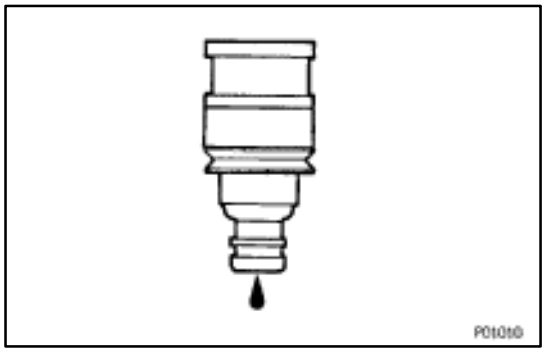


(h) Using SST, connect terminals +B and FP of the data link connector 1.
SST 00843–18020
(i) Reconnect the battery negative (–) cable.
(j) Turn the ignition switch ON.
NOTICE: Do not start the engine.

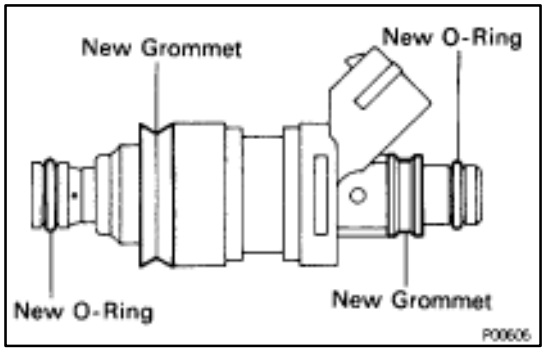


(k) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector two or three times.
SST 09842–30070
Volume:
54–64 cc (3.3–3.9 cu in.) per 15 sec.
Difference between each injector:
5 cc (0.3 cu in.) or less

If the ignition 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:
One drop or less per minute
(b) Disconnect the battery negative (–) cable.
(c) Remove SST.
SST 09268–41045 and 09843–18020



INJECTORS INSTALLATION

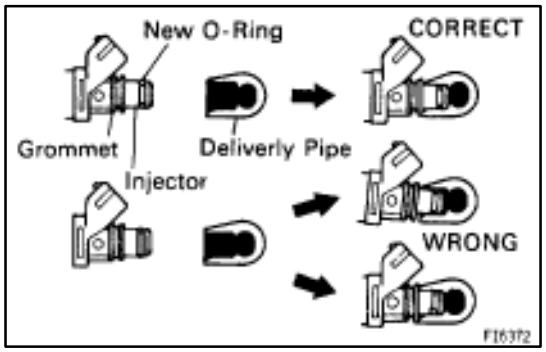
EG0GW–02

(See page EG–187)

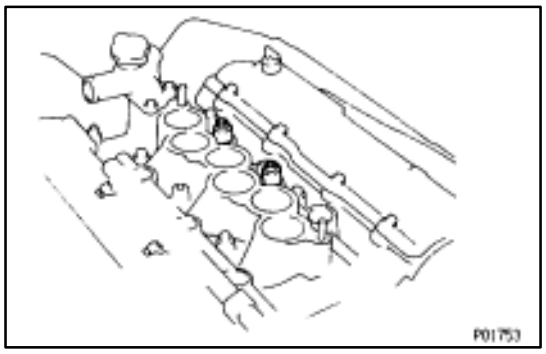
1. INSTALL INJECTORS TO DELIVERY PIPES

(a) Install two new grommets to the injector.

(b) Apply a light coat of gasoline to two new O–rings and install them to the injector.

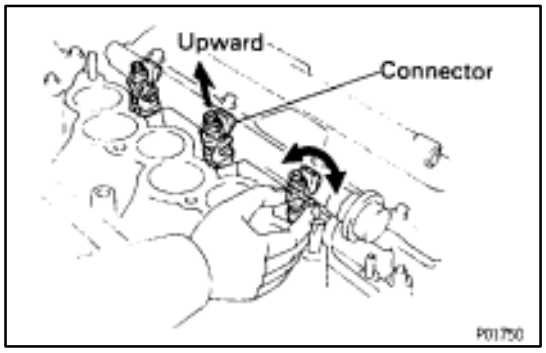


(c) When turning the injector left and right, install it to the delivery pipes. Install the six injectors.



2. INSTALL RH DELIVERY PIPE AND INJECTORS

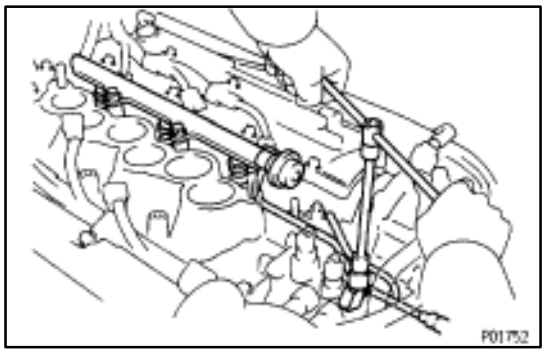
(a) Place the two spacers in position on the intake manifold.
Clean the injector holes before installing the injectors into the intake manifold.



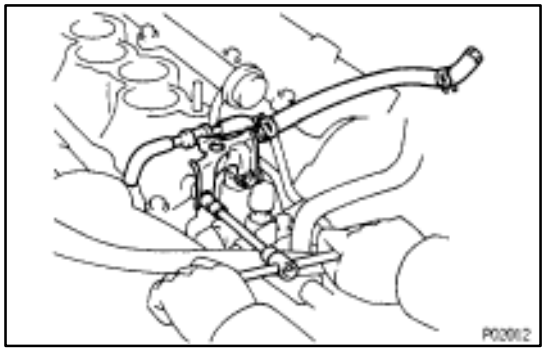
(b) Place the three injectors together with the RH delivery pipe and No.1 fuel pipe in position on the intake manifold.

(c) Check that the injectors rotate smoothly.
HINT: If the injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings.
Replace the O–rings.

(d) Position the injector connector upward.



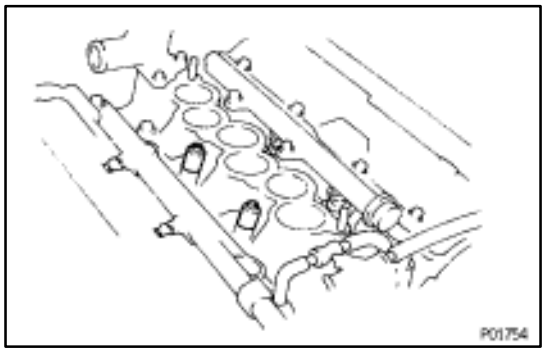
(e) Install and tighten the three bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



3. INSTALL AIR PIPE WITH HOSES

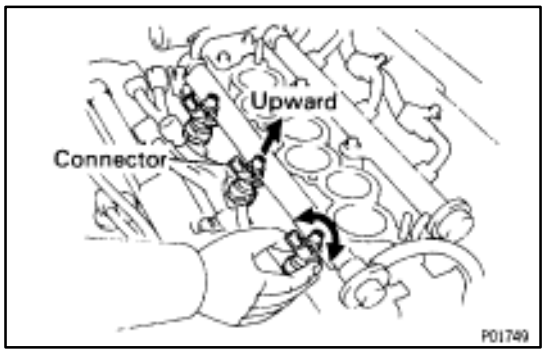
(a) Install the air pipe with the two bolts.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

(b) Connect the two air hoses.



4. INSTALL LH DELIVERY PIPE AND INJECTORS

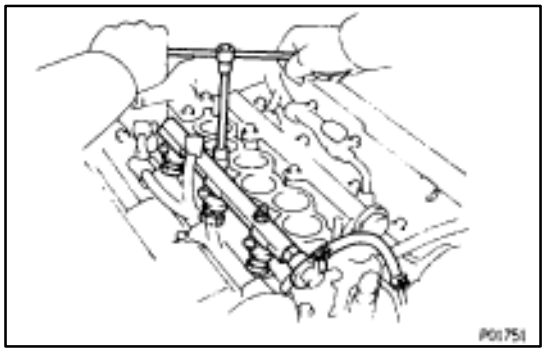
(a) Place the two spacers in position on the intake manifold.
Clean the injector holes before installing the injectors into the intake manifold.



(b) Place the three injectors together with the LH delivery pipe in position on the intake manifold.

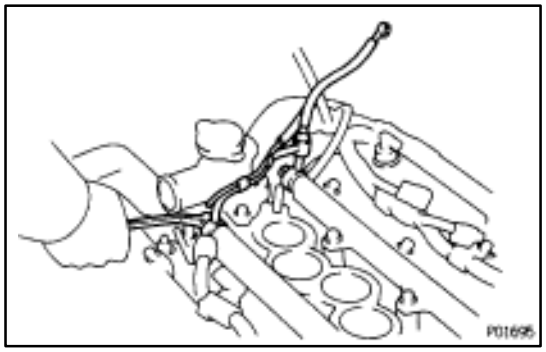
(c) Check that the injectors rotate smoothly.
HINT: If the injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings.
Replace the O–rings.

(d) Position the injector connector upward.



(e) Install and tighten the two bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(f) Connect the fuel hose to the No.1 fuel pipe.

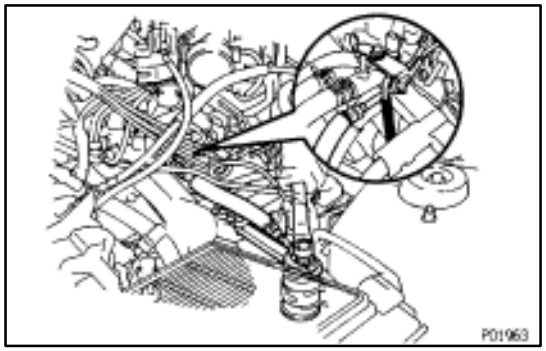


5. INSTALL NO.2 FUEL PIPE

(a) Install the No.2 fuel pipe with four new gaskets and the two union bolts.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(b) Connect the IACV vacuum hose.

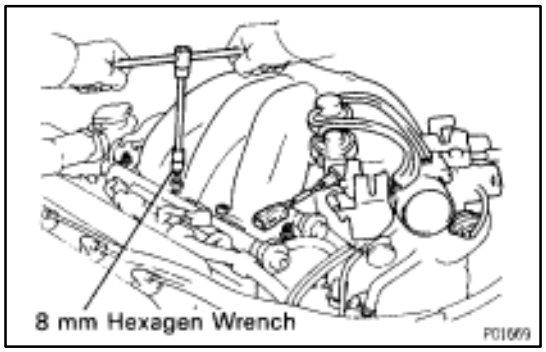
6. CONNECT INJECTOR CONNECTORS



7. CONNECT FUEL INLET AND RETURN HOSES

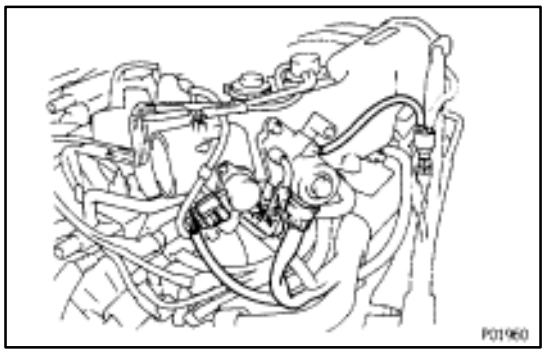
(a) Connect the inlet hose to the fuel filter with two new gaskets and union bolt.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Connect the return hose to the No.1 fuel pipe.

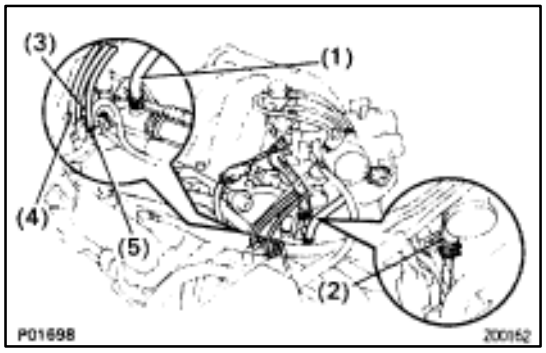


8. INSTALL AIR INTAKE CHAMBER

(a) Using 8 mm hexagon wrench, install a new gasket and the air intake number with the two bolts and nuts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

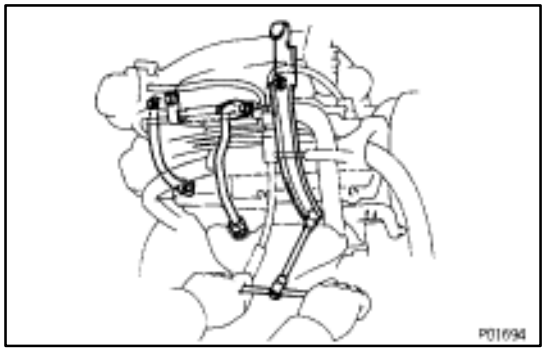


(b) Connect the throttle position sensor connector.
(c) Connect the IAC valve connector.
(d) Connect the IAC valve air hose.
(e) Connect PS air hose.



(f) (Calif. only)
Connect the EGR gas temp. sensor connector.

(g) Connect the following hoses:
(1) Water by–pass hose to throttle body
(2) Water by–pass hose to EGR cooler
(3) Vacuum hose (from EGR valve) to TVV (for EGR)
(4) Vacuum hose (from EGR vacuum modulator) to TVV (for EGR)
(5) Vacuum hose (from throttle body) to TVV (for EVAP)



9. CONNECT HYDRAULIC MOTOR PRESSURE PIPE

Connect the hydraulic pressure pipe to the air intake chamber with the bolt.

10. INSTALL EGR PIPE

Install a new gasket, sleeve ball and the EGR pipe with the two bolts and union nut.

Bolt

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

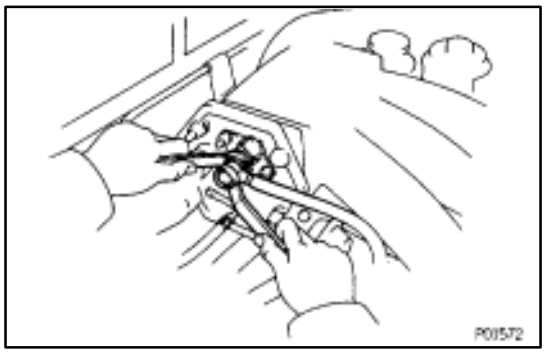
Union nut

Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

11. INSTALL NO.1 ENGINE HANGER AND AIR INTAKE CHAMBER STAY

(a) Install the air intake chamber stay with the two bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Install the No.1 engine hanger with the two bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

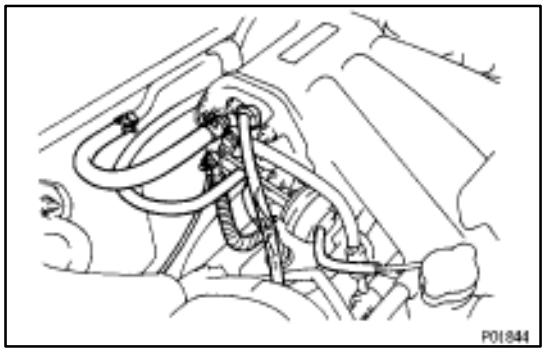


12. CONNECT COLD START INJECTOR PIPE (NO. 2 FUEL PIPE)

Connect the injector pipe with two new gaskets and union bolt.

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

13. CONNECT COLD START INJECTOR CONNECTOR



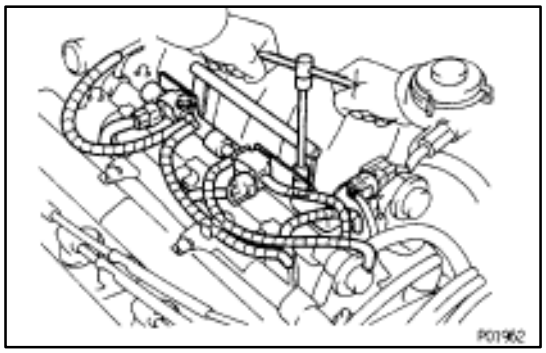
14. CONNECT GROUND STRAPS

Connect the two ground straps with the nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

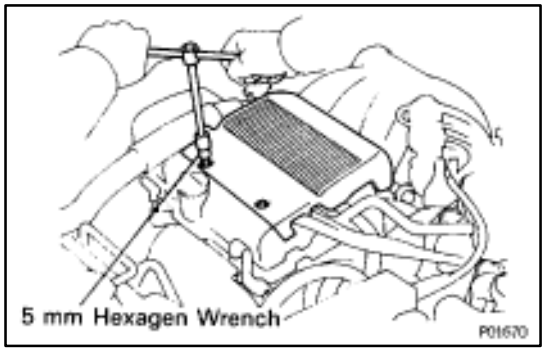
15. CONNECT HOSES

(a) Brake booster vacuum hose
(b) PS air hose
(c) PCV hose
(d) IACV vacuum hose



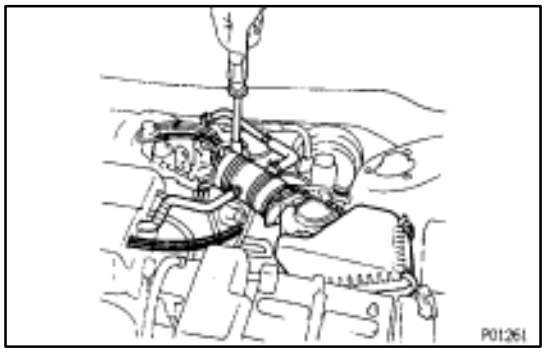
16. INSTALL EMISSION CONTROL VALVE SET

(a) Install the emission control valve set with the two bolts.
(b) Connect the two VSV connectors.
(c) Connect the two vacuum hoses of the IACV VSV.
(d) Connect the two vacuum hoses of the fuel pressure control VSV.
(e) Connect the EGR gas temp. sensor connector clamp to the emission control valve set.



17. INSTALL V–BANK COVER

Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.



18. INSTALL AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

(a) Connect the air cleaner hose, and install the air cleaner cap and volume air flow meter with the four clips.
(b) Tighten the air cleaner hose clamp bolt.
(c) Connect the air hoses.
(d) Connect the coil cord clamp.
(e) Connect the volume air flow meter connector.

19. (A/T)
CONNECT THROTTLE CABLE, AND ADJUST IT

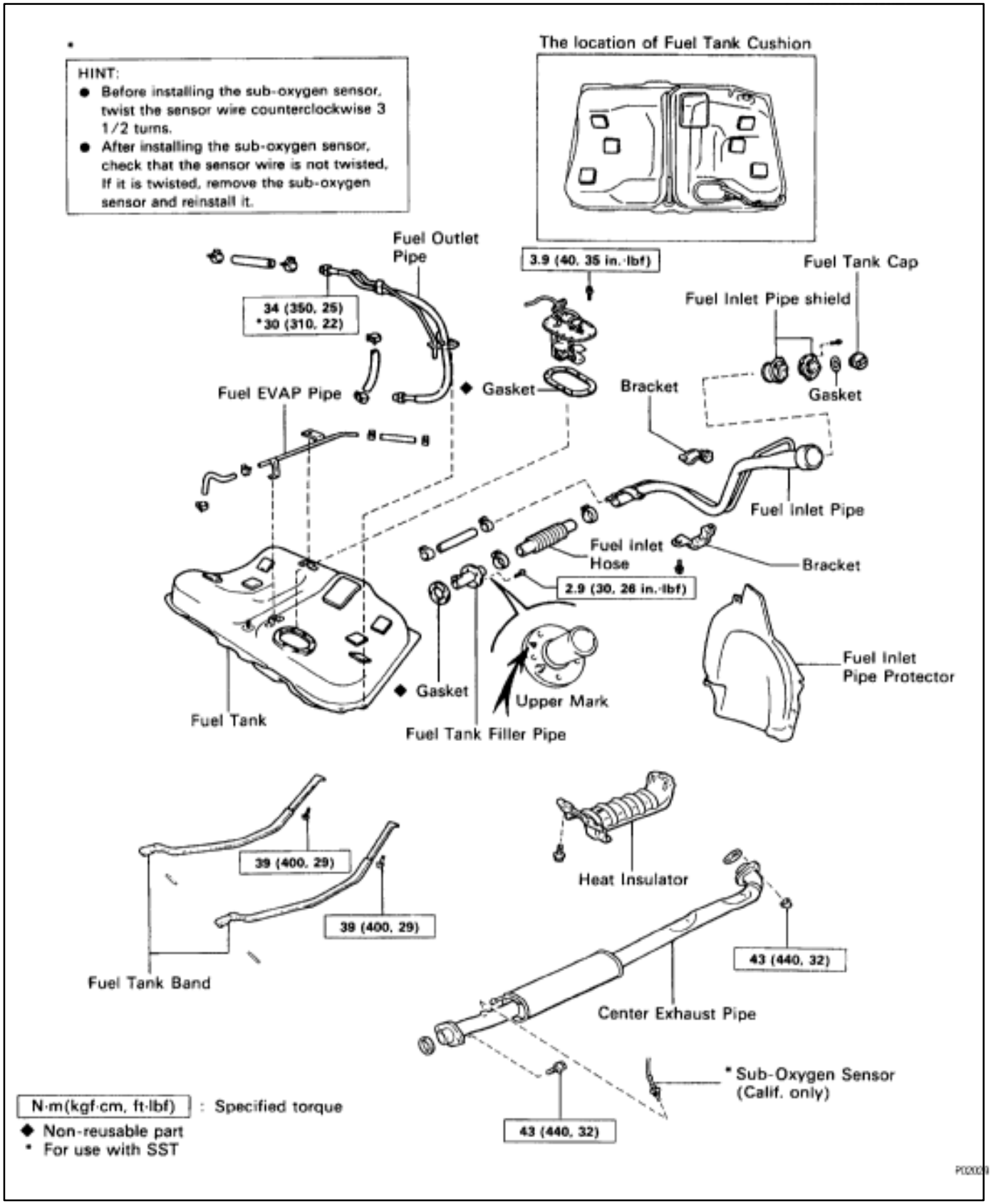
20. CONNECT ACCELERATOR CABLE, AND ADJUST IT

21. FILL WITH ENGINE COOLANT

22. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

FUEL TANK AND LINES COMPONENTS

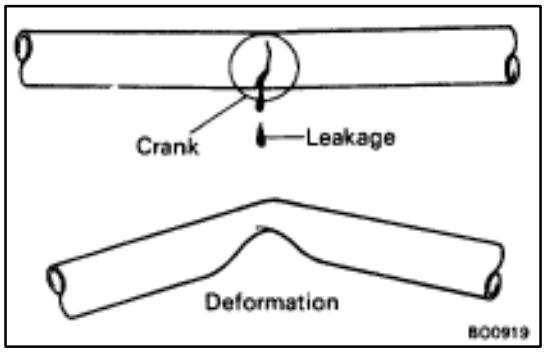
EG0GX–01

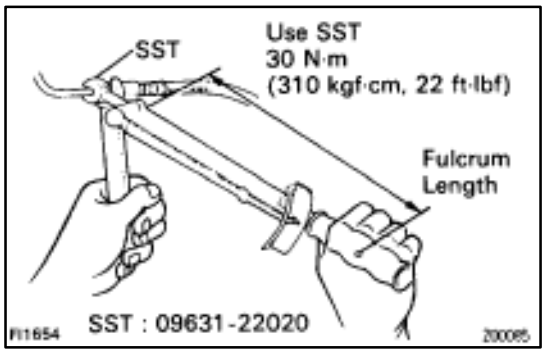


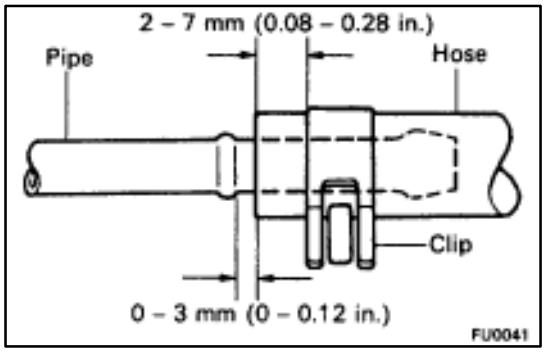
PRECAUTIONS

EG0GY–01

1. **Always use new gaskets when replacing the fuel tank or component parts.**
2. **Apply the proper torque to all parts tightened.**







FUEL LINES AND CONNECTIONS INSPECTION

EG0GZ–01

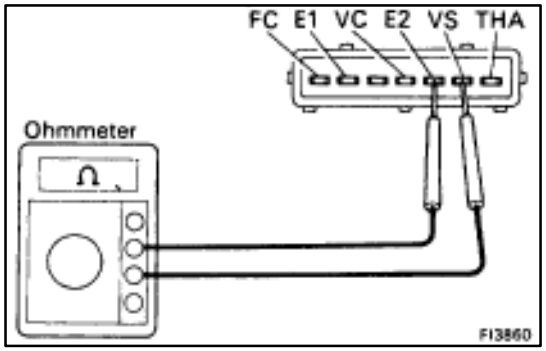
(a) Check the fuel lines for cracks or leakage, and all connections for deformation.

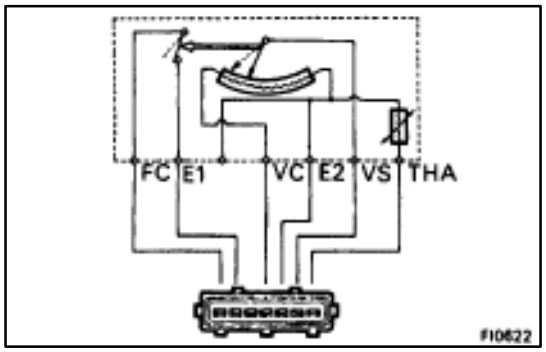
(b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.

(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 tube connections are as shown in the illustration. If a problem is found, repair or replace the parts as necessary.





VOLUME AIR FLOW METER ON–VEHICLE INSPECTION

EG0H0–01

INSPECT RESISTANCE OF VOLUME AIR FLOW METER

(a) Disconnect the volume air flow meter connector.

(b) Using an ohmmeter, measure the resistance between each terminal.

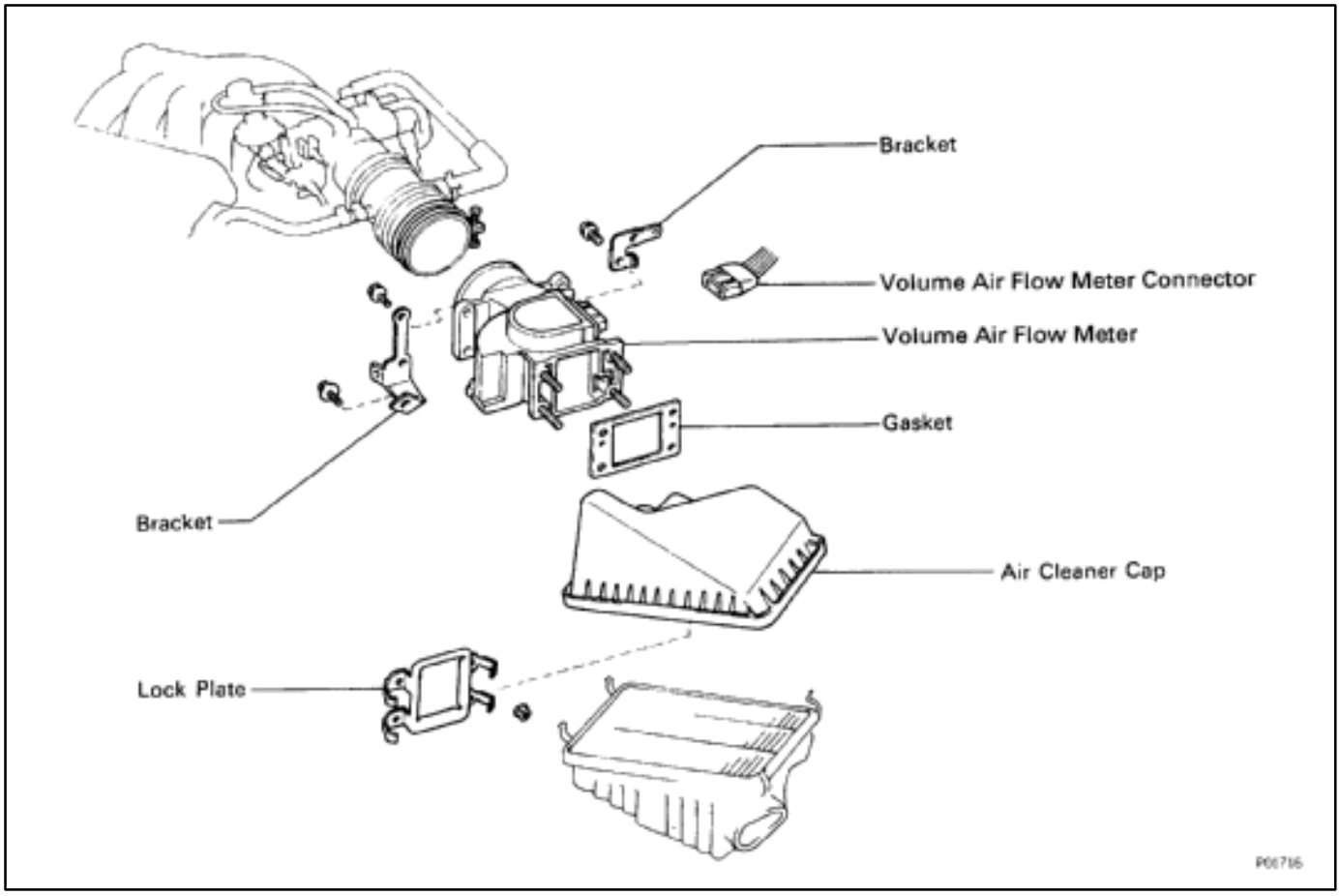
Between terminals	Resistance (Ω)	Temp. °C (°F)
VS–E2	200–600	–
VC–E2	200–400	–
THA–E2	10,000–20,000 4,000–7,000	–20 (–4) 0 (32)
FC–E1	Infinity	–

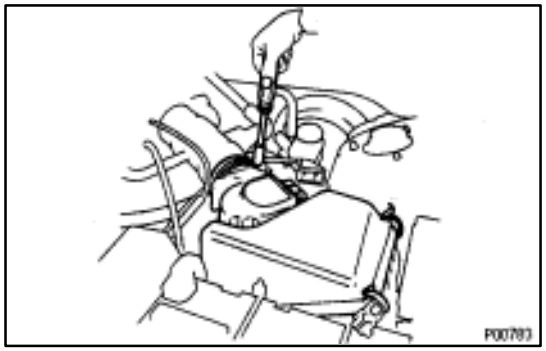
If the resistance is not as specified, replace the volume air flow meter.

(c) Reconnect the volume air flow meter connector.

VOLUME AIR FLOW METER REMOVAL

EG0H1–01





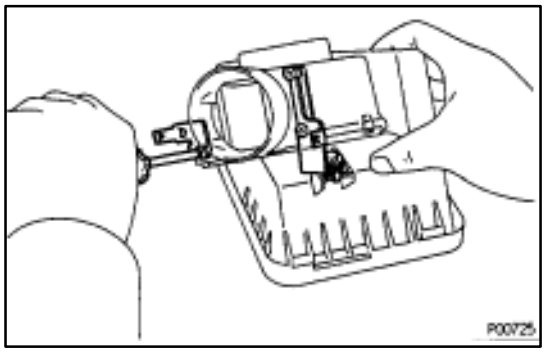
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION (w/Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable disconnected from the battery.

2. DISCONNECT COIL CORD CLAMP

3. DISCONNECT VOLUME AIR FLOW METER CONNECTOR

4. DISCONNECT AIR CLEANER HOSE

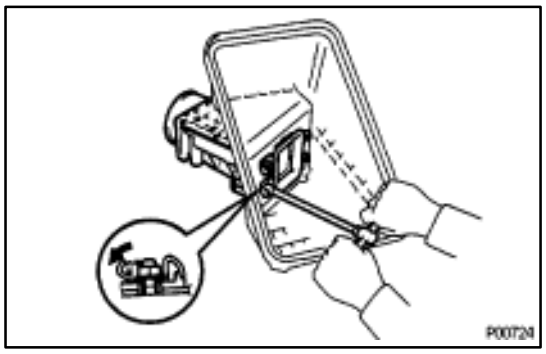


5. REMOVE AIR CLEANER CAP AND VOLUME AIR FLOW METER ASSEMBLY

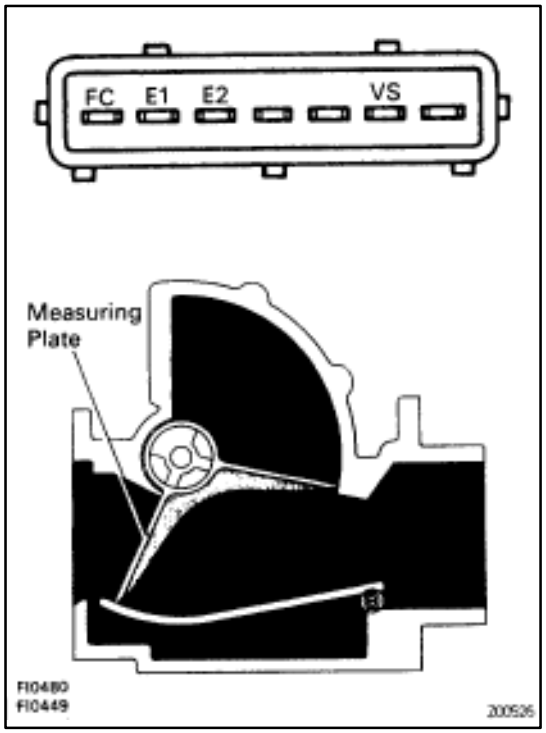
6. REMOVE VOLUME AIR FLOW METER FROM AIR CLEANER CAP

(a) Remove the screw and wire bracket.

(b) Remove the bolt, two screws and bracket.



(c) Pry off the lock plate, and remove the four nuts, lock plate, volume air flow meter and gasket.



VOLUME AIR FLOW METER INSPECTION

EG0H2–01

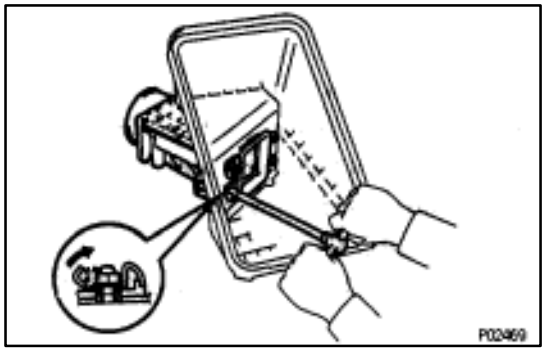
INSPECT RESISTANCE OF VOLUME AIR FLOW METER

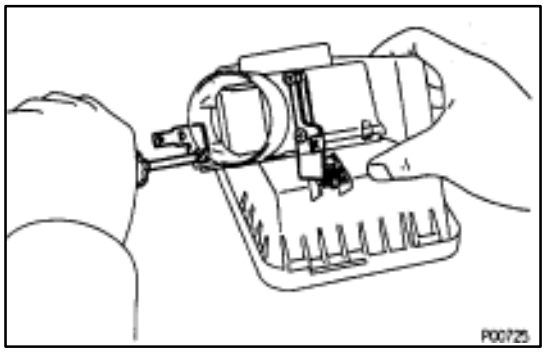
Using an ohmmeter, measure the resistance between each terminal by moving the measuring plate.

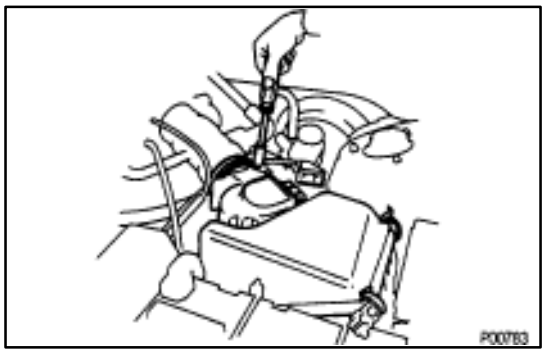
Between terminals	Resistance (Ω)	Measuring plate opening
FC–E1	Infinity	Fully closed
FC–E1	Zero	Other than closed
VS–E2	200–600	Fully closed
VS–E2	20–1,200	Fully open

HINT: Resistance between terminals E2 and VS will change in a wave pattern as the measuring plate slowly opens.

If the resistance is not as specified, replace the volume air flow meter.







VOLUME AIR FLOW METER INSTALLATION

EG0H3–01

(See page EG–200)

1. INSTALL VOLUME AIR FLOW METER TO AIR CLEANER CAP

(a) Install the volume air flow meter with the gasket, lock plate, four plate washers, four nuts and bolt. Pry the lock plate on the nut.

(b) Install the bracket with the bolt and two screws.

(c) Install the wire bracket with the screw.

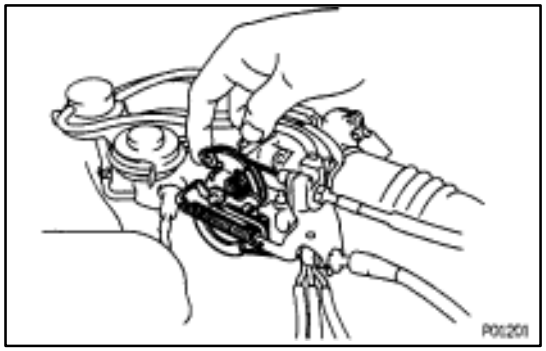
2. INSTALL AIR CLEANER CAP AND VOLUME AIR FLOW METER ASSEMBLY

3. CONNECT AIR CLEANER HOSE

4. CONNECT VOLUME AIR FLOW METER CONNECTOR

5. CONNECT COIL CORD CLAMP

6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

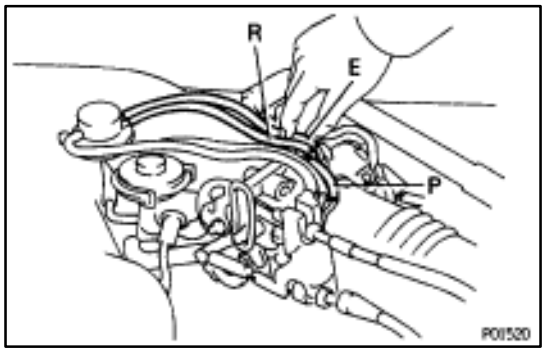


THROTTLE BODY
ON–VEHICLE INSPECTION

EG0H4–01

1. INSPECT THROTTLE BODY

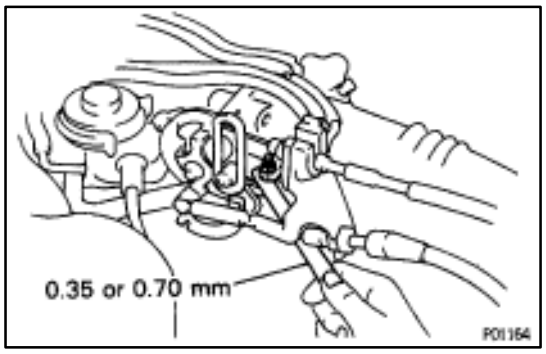
(a) Check that the throttle linkage moves smoothly.



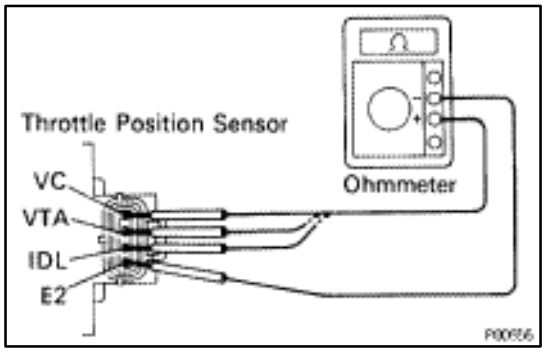
(b) Check the vacuum at each port.
- Start the engine.
- Check the vacuum with your finger.

Port name	At idle	Other than idle
P	No vacuum	Vacuum
E	No vacuum	Vacuum
R	No vacuum	Vacuum

2. INSPECT THROTTLE POSITION SENSOR

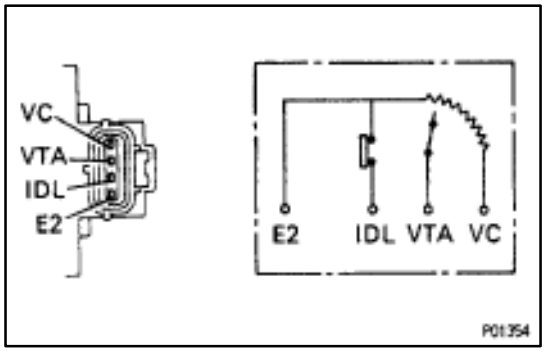


(a) Apply vacuum to the throttle opener.
(b) Disconnect the sensor connector.
(c) Insert a thickness gauge between the throttle stop screw and stop lever.



(d) Using an ohmmeter, measure the resistance between each terminal.

Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA–E2	0.28–6.4 kΩ
0.35 mm (0.014 in.)	IDL–E2	0.5 kΩ or less
0.70 mm (0.028 in.)	IDL–E2	Infinity
Throttle valve fully open	VTA–E2	2.0–11.6 kΩ
–	VC–E2	2.7–7.7 kΩ



(e) Reconnect the sensor connector.

3. INSPECT AND ADJUST DASH POT (DP)

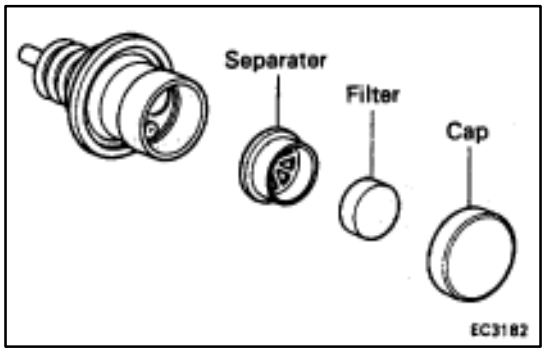
A. Warm up engine

Allow the engine to warm up to normal operating temperature.

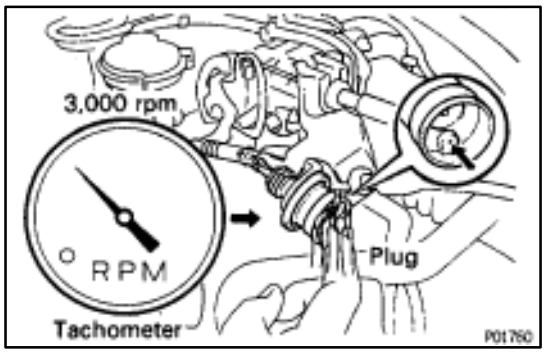
B. Check idle speed

Idle speed:

700 ± 50 rpm



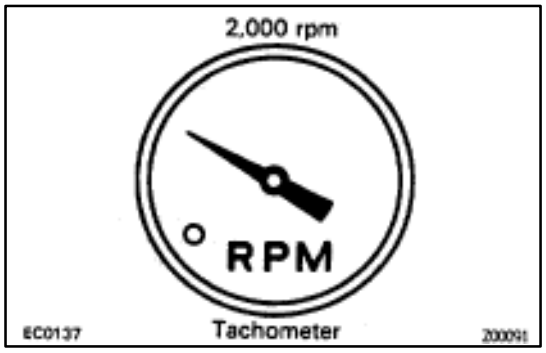
C. Remove cap, filter and separator from DP



D. Check and adjust DP setting speed

(a) Maintain the engine at 3,000 rpm.

(b) Plug the VTV hole with your finger.

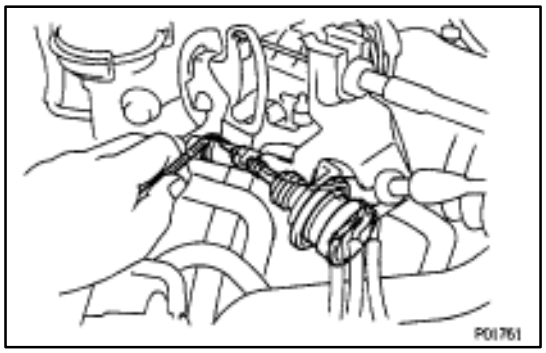


(c) Release the throttle valve.

(d) Check that the DP is set.

DP setting speed:

2,000 rpm



If not as specified, adjust with the DP adjusting screw.

E. Reinstall DP separator, filter and cap

HINT: Install the filter with the coarser surface facing the atmospheric side (outward).

4. INSPECT THROTTLE OPENER

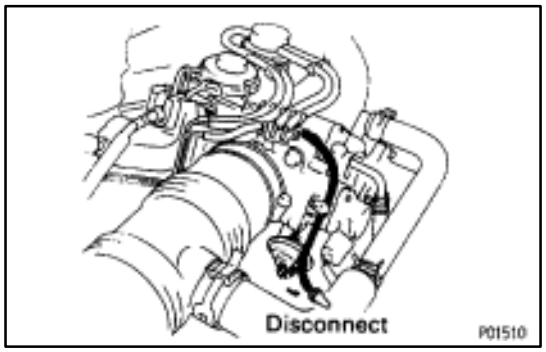
A. Warm up engine

Allow the engine to warm up to normal operating temperature.

B. Check idle speed

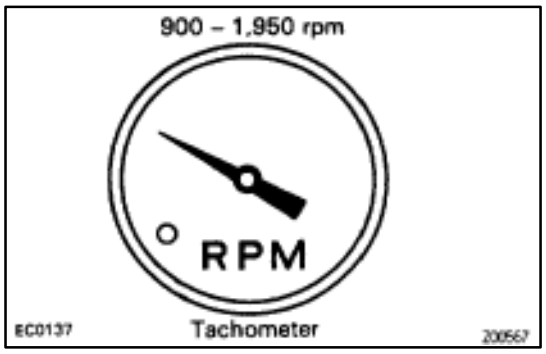
Idle speed:

700 ± 50 rpm



C. Check throttle opener setting speed

(a) Disconnect the vacuum hose from the throttle opener, and plug the hose end.



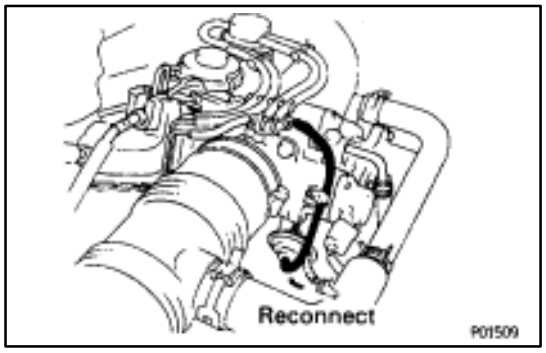
(b) Check the throttle opener setting speed.

Throttle opener setting speed:

900–1,950 rpm

If the throttle opener setting is not as specified, replace the throttle body.

(c) Stop the engine.

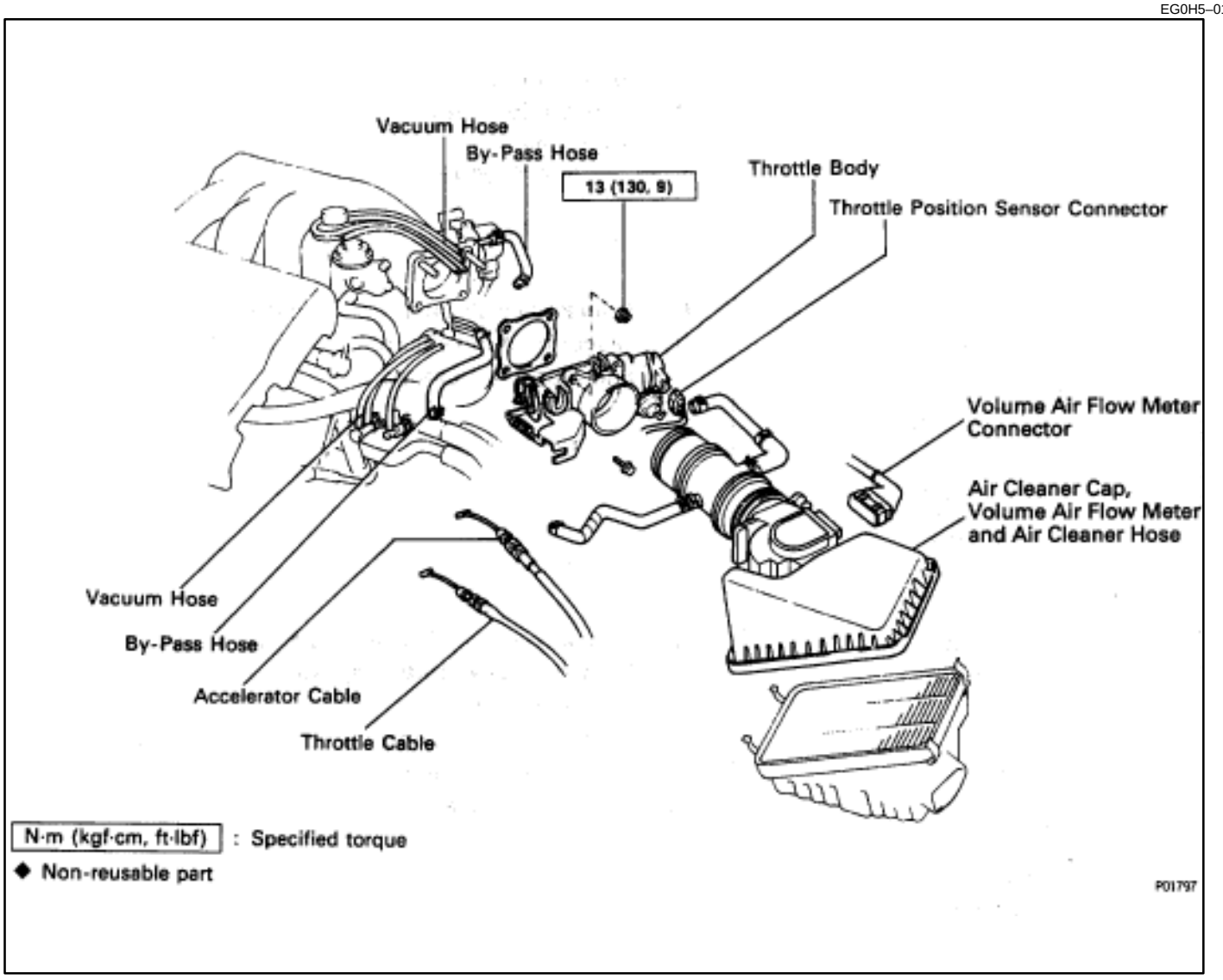


(d) Reconnect the vacuum hose to the throttle opener.

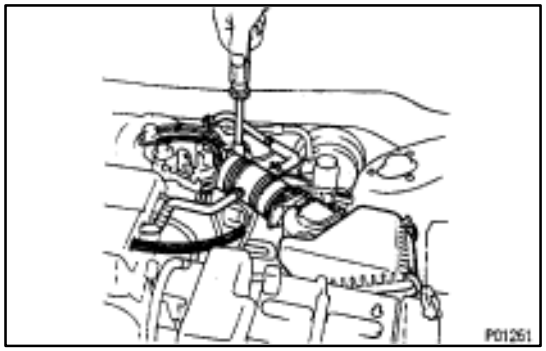
(e) Start the engine and check that the idle rpm returns to the correct speed.

THROTTLE BODY REMOVAL

EG0H5–01

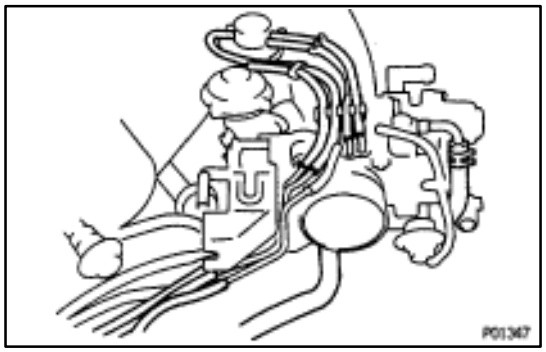


1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT**
3. **DISCONNECT ACCELERATOR CABLE FROM THROTTLE LINKAGE**
4. **(A/T)**
   DISCONNECT THROTTLE CABLE FROM THROTTLE LINKAGE



5. REMOVE AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

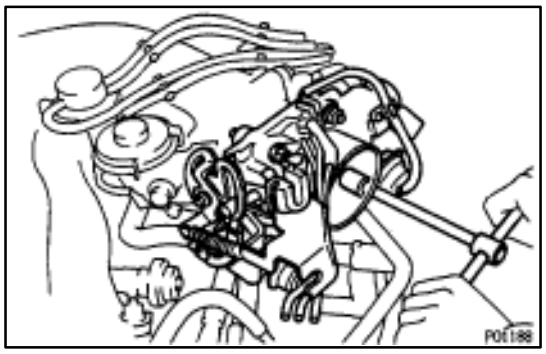
(a) Disconnect the volume air flow meter connector.
(b) Disconnect the coil cord clamp.
(c) Disconnect the air hoses.
(d) Loosen the air cleaner hose clamp bolt.
(e) Disconnect the air cleaner cap clips.
(f) Remove the air cleaner cap and volume air flow meter together with the air cleaner hose.



6. DISCONNECT THROTTLE POSITION SENSOR CONNECTOR

7. DISCONNECT HOSES FROM THROTTLE BODY

(a) Water by–pass hoses
(b) Emission control vacuum hoses

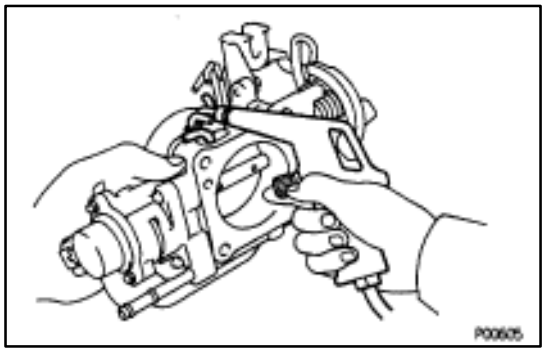


8. REMOVE THROTTLE BODY

Remove the two bolts and two nuts, throttle body and gasket.

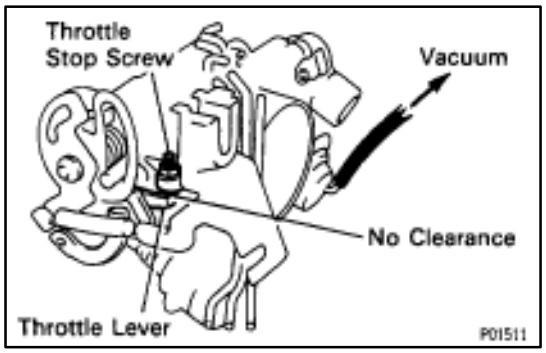
THROTTLE BODY INSPECTION

EG0H6–01



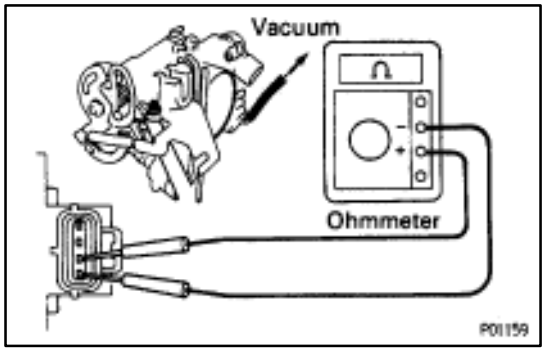
1. CLEAN THROTTLE BODY

(a) Using a soft brush and carburetor cleaner, clean the cast parts.
(b) Using compressed air, clean all the passages and apertures.
NOTICE: To prevent deterioration, do not clean the throttle position sensor.



2. INSPECT THROTTLE VALVE

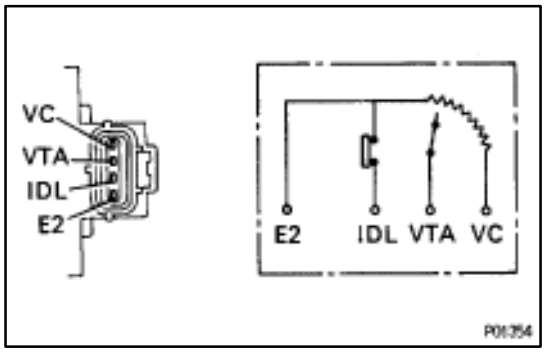
(a) Apply vacuum to the throttle opener.
(b) Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.



3. INSPECT THROTTLE POSITION SENSOR

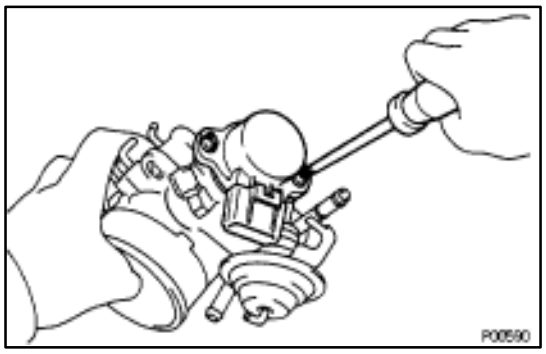
(a) Apply vacuum to the throttle opener.
(b) Insert a thickness gauge between the throttle stop screw and stop lever.
(c) Using an ohmmeter, measure the resistance between each terminal.

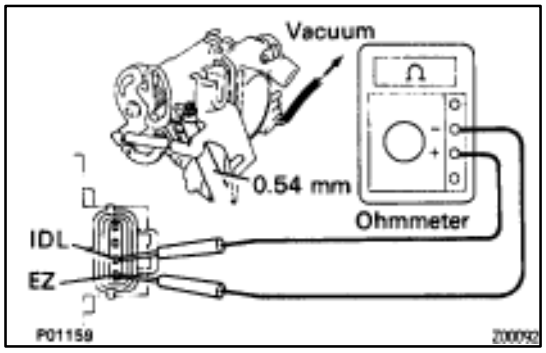
Clearance between lever and stop screw	Between terminals	Resistance
0 mm (0 in.)	VTA–E2	0.28–6.4 kΩ
0.35 mm (0.014 in.)	IDL–E2	0.5 kΩ or less
0.70 mm (0.028 in.)	IDL–E2	Infinity
Throttle valve fully open	VTA–E2	2.0–11.6 kΩ
–	VC–E2	2.7–7.7 kΩ



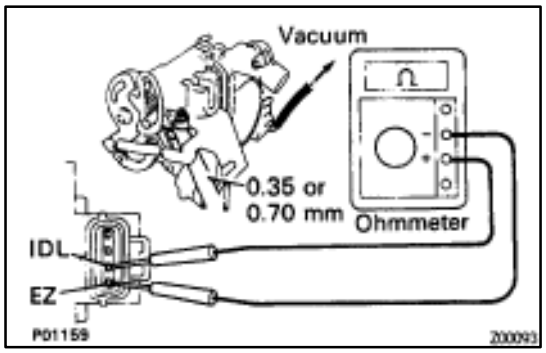
4. IF NECESSARY, ADJUST THROTTLE POSITION SENSOR

(a) Loosen the two set screws of the sensor.



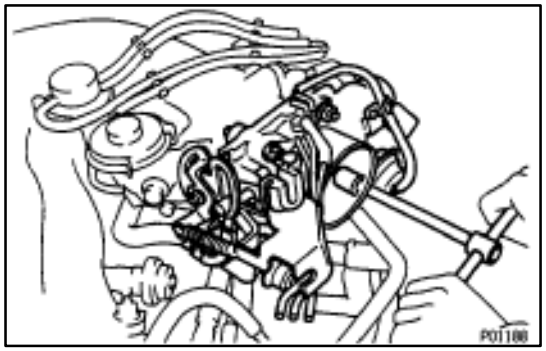


(b) Apply vacuum to the throttle opener.
(c) Insert a 0.54 mm (0.021 in.) thickness gauge, between the throttle stop screw and stop lever.
(d) Connect the test probe of an ohmmeter to the terminals IDL and E2 of the sensor.
(e) Gradually turn the sensor clockwise until the ohmmeter deflects, and secure it with the two set screws.



(f) Recheck the continuity between terminals IDL and E2.

Clearance between lever and stop screw	Continuity (IDL–E2)
0.35 mm (0.014 in.)	Continuity
0.70 mm (0.028 in.)	No continuity



THROTTLE BODY INSTALLATION

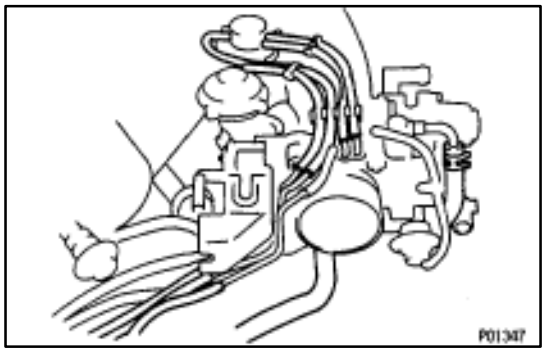
EG0H7–01

(See page EG–206)

1. INSTALL THROTTLE BODY

Install a new gasket and the throttle body with the two bolts and two nuts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

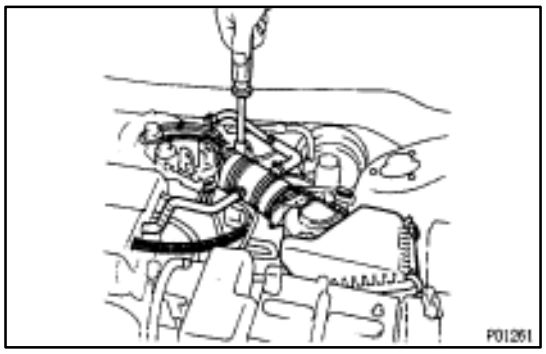


2. CONNECT HOSES TO THROTTLE BODY

(a) Water by–pass hose

(b) Emission control vacuum hoses

3. CONNECT THROTTLE POSITION SENSOR CONNECTOR



4. INSTALL AIR CLEANER CAP, VOLUME AIR FLOW METER AND AIR CLEANER HOSE

(a) Connect the air cleaner hose, and install the air cleaner cap and volume air flow meter with the four clips.

(b) Tighten the air cleaner hose clamp bolt.

(c) Connect the air hoses.

(d) Connect the coil cord clamp.

(e) Connect the volume air flow meter connector.

5. (A/T)
CONNECT THROTTLE CABLE, AND ADJUST IT

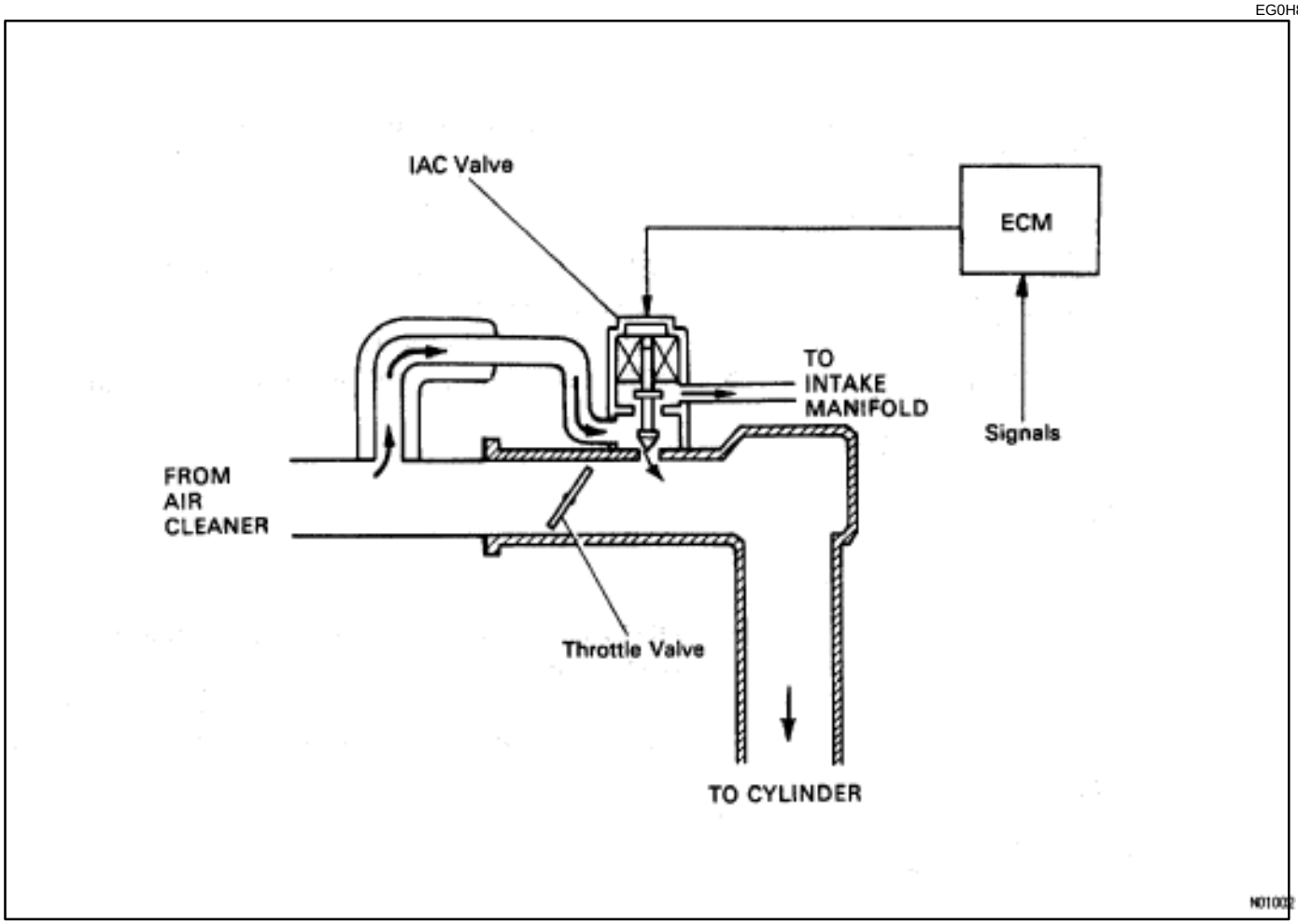
6. CONNECT ACCELERATOR CABLE, AND ADJUST IT

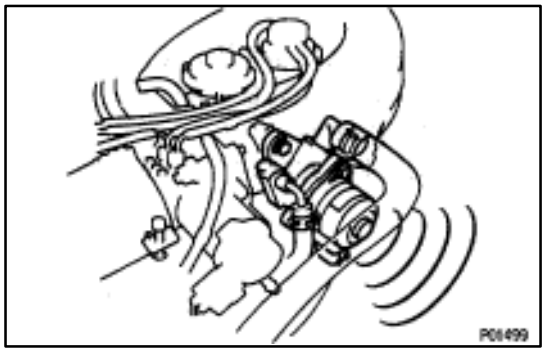
7. FILL WITH ENGINE COOLANT

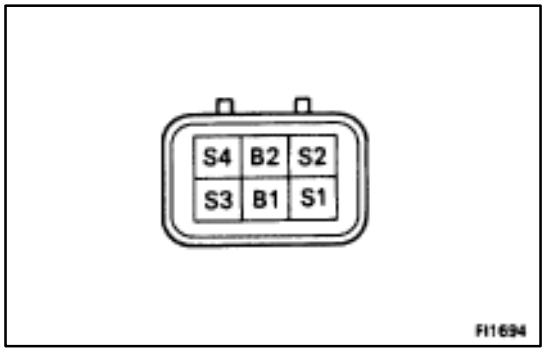
8. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

IAC VALVE

EG0H8–01







ON–VEHICLE INSPECTION

EG0H9–01

1. CHECK FOR OPERATING SOUND FROM IAC VALVE

Check that there is a clicking sound immediately stopping the engine.

2. INSPECT IAC VALVE RESISTANCE

(a) Disconnect the IAC valve connector.

(b) Using an ohmmeter, measure the resistance between terminals B1–S1 or S3, and B2–S2 or S4.

Resistance:

B1–S1 or S3

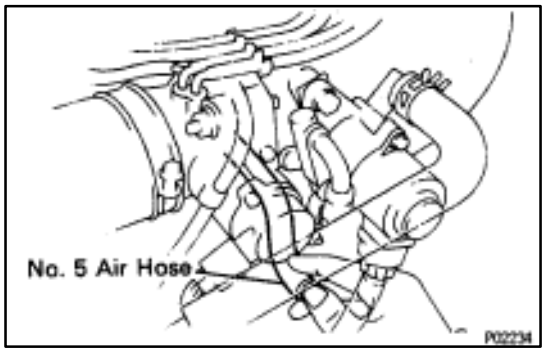
10–30 Ω

B2–S2 or S4

10–30 Ω

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

(c) Reconnect the IAC valve connector.



3. INSPECT AIR ASSIST SYSTEM

(a) Start and wame up the engine.

(b) Disconnect the No.5 air hose from the IAC valve and plug the hose end with your finger.

(c) Check that vacuum pressure acts against your finger.

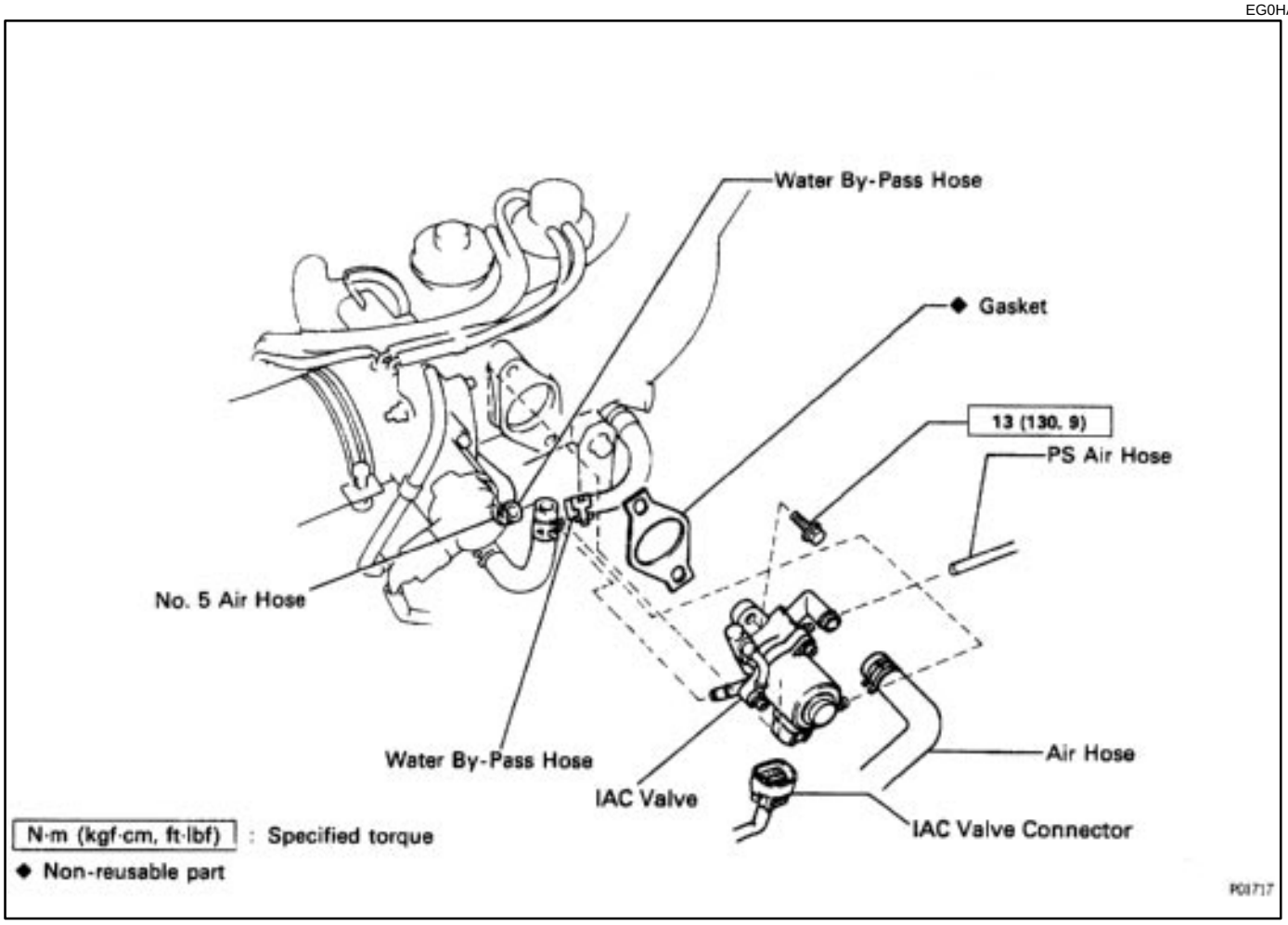
Reference vacuum:

27 kPa (200 mmHg, 7.9 in.Hg) or more

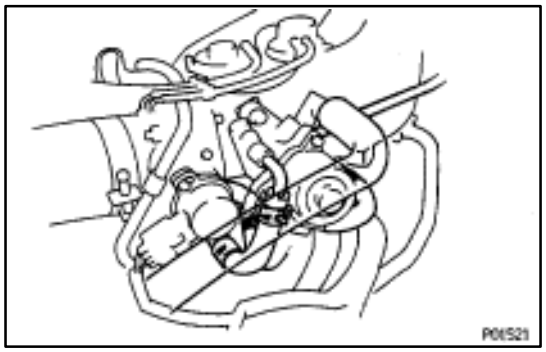
If no vacuum exists, check whether the air hose, pipe is clogged.

IAC VALVE REMOVAL

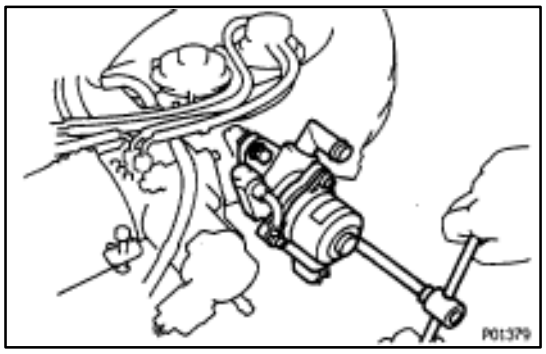
EG0HA–01



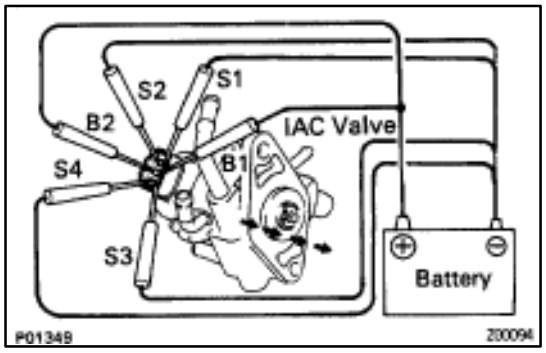
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w/Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT**
3. **DISCONNECT IAC VALVE CONNECTOR**



4. **DISCONNECT TWO AIR HOSES**
5. **DISCONNECT TWO WATER BY–PASS HOSES**
6. **DISCONNECT PS IDLE UP VACUUM HOSE**



7. **REMOVE IAC VALVE**
   Remove the two bolts, IAC valve and gasket.

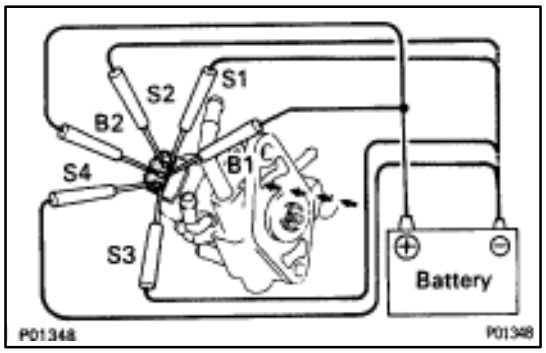


IAC VALVE INSPECTION

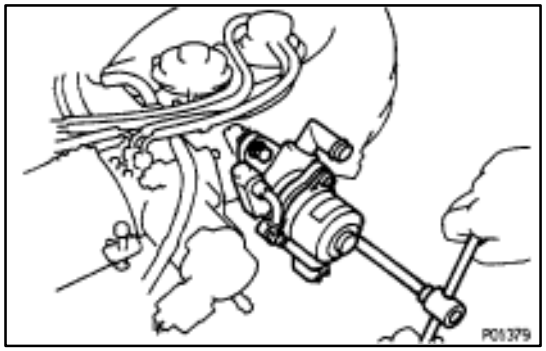
EG0HB–01

INSPECT IAC VALVE OPERATION

(a) Apply battery voltage to terminals B1 and B2, and while repeatedly grounding S1–S2–S3–S4–S1 in sequence, check that the valve moves toward the closed position.



(b) Apply battery voltage to terminals B1 and B2, and while repeatedly grounding S4–S3–S3–S1–S4 in sequence, check that the valve moves toward the open position.
If operation is not as specified, replace the IAC valve.



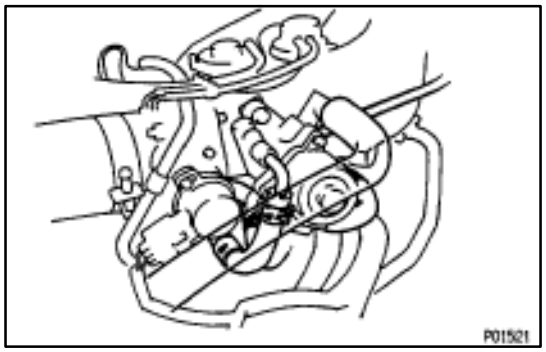
IAC VALVE INSTALLATION

EG0HC–01

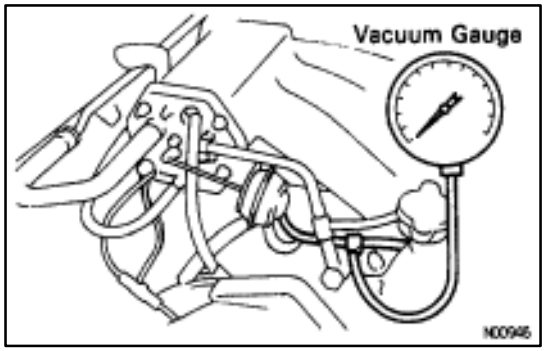
(See page EG–210)

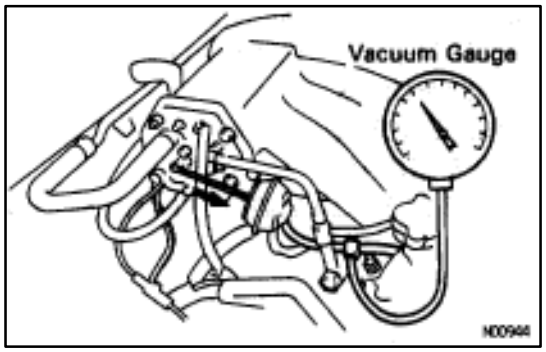
1. INSTALL IAC VALVE

(a) Install a new gasket and the IAC valve with the two bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



2. CONNECT PS IDLE UP VACUUM HOSE
3. CONNECT TWO WATER BY–PASS HOSES
4. CONNECT TWO AIR HOSES
5. CONNECT IAC VALVE CONNECTOR
6. FILL WITH ENGINE COOLANT
7. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY





INTAKE AIR CONTROL VALVE (IACV) ON–VEHICLE INSPECTION

EG0HD–01

1. INSPECT IACV

(a) Using a 3–way connector, connect vacuum gauge to the actuator hose.

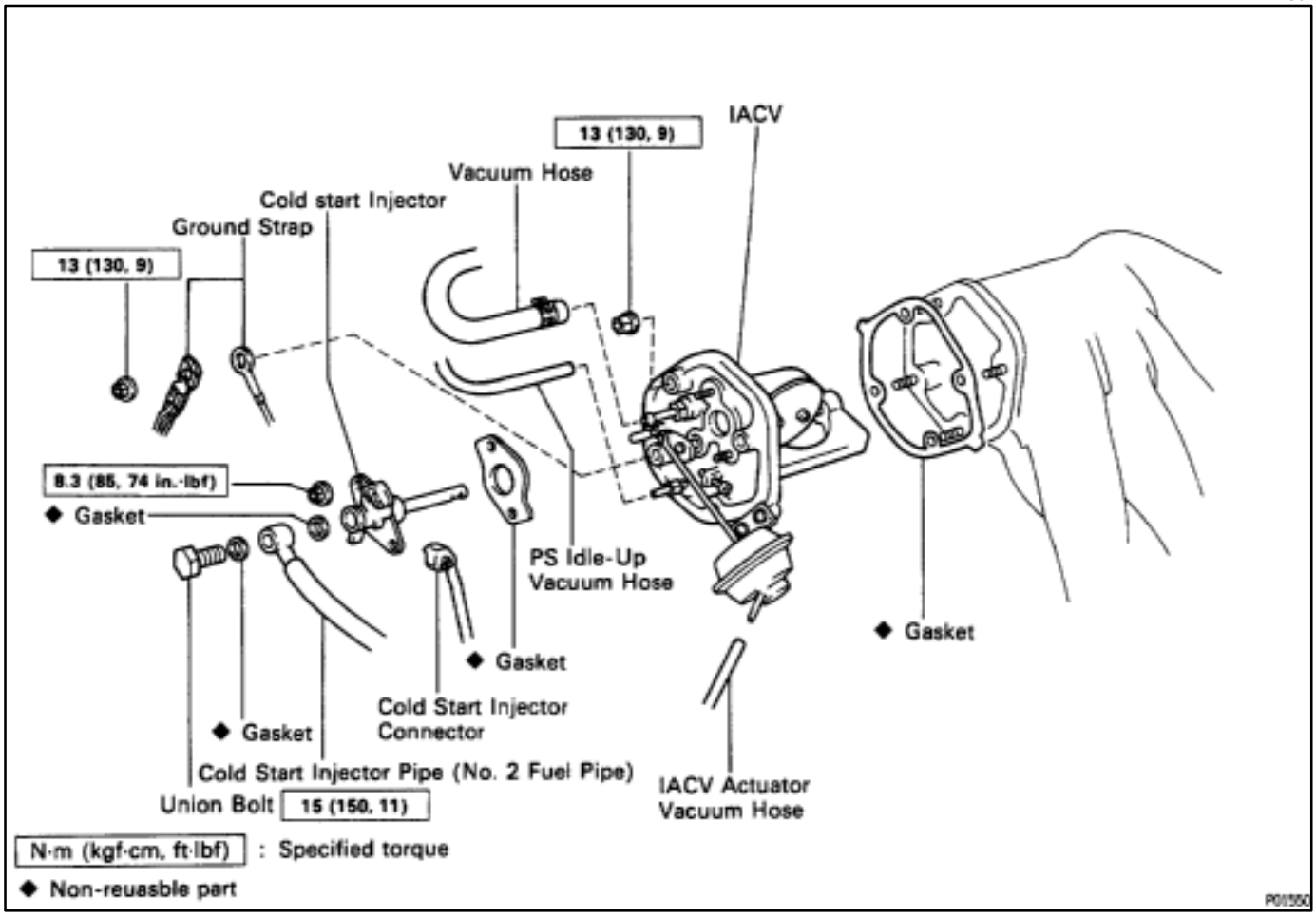
(b) Start the engine.

(c) While the engine is idling, check that the vacuum gauge needle does not move.

(d) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle momentarily fluctuates approx. 26.7 kPa (200 mmHg, 7.9 in.Hg). (The actuator rod is pulled out.)

IACV REMOVAL

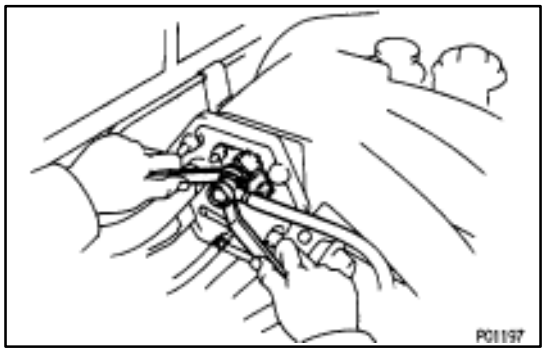
EG0HE–01



1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

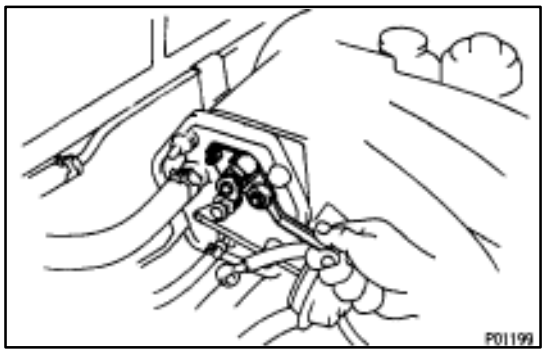
CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

2. DISCONNECT COLD START INJECTOR CONNECTOR



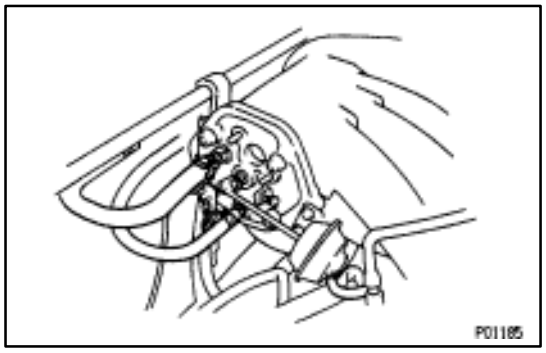
3. DISCONNECT COLD START INJECTOR PIPE (NO.2 FUEL PIPE)

(a) Put a suitable container or shop towel under the injector pipe.
(b) Remove the union bolt and two gaskets, and disconnect the injector pipe.
HINT: Slowly loosen the union bolt.



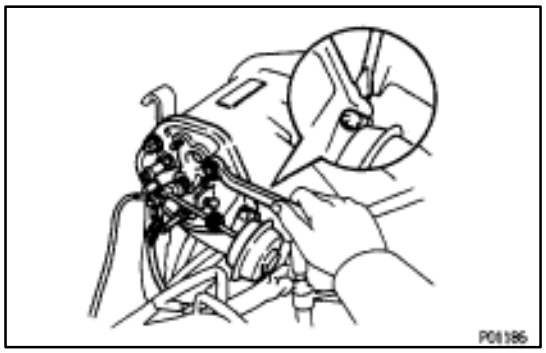
4. REMOVE COLD START INJECTOR

Remove the two nuts, cold start injector and gasket.



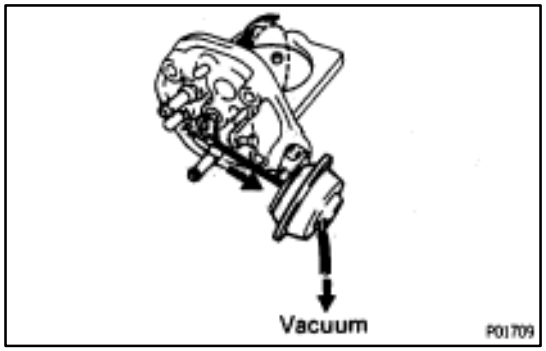
5. DISCONNECT HOSES FROM IACV

(a) Brake booster vacuum hose
(b) PS idle–up vacuum hose
(c) IACV actuator vacuum hose



6. REMOVE IACV

(a) Remove the four nuts and disconnect the two ground straps.
(b) Remove the IACV by prying a screwdriver between the IACV and intake manifold.
(c) Remove the gasket.



IACV AND COMPONENTS INSPECTION

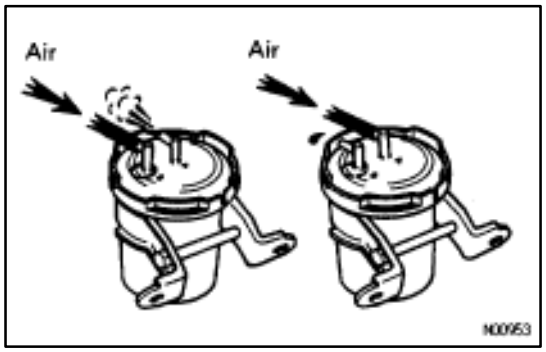
EG0HF–01

1. INSPECT IACV

(a) With 26.7 kPa (200 mmHg, 7.9 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.

(b) One minute after applying the vacuum in (a), check that the actuator rod does not return.

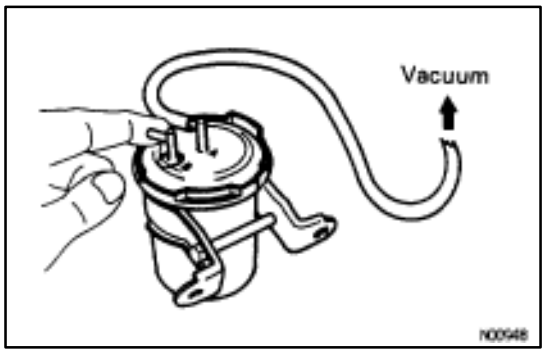
If the operation is not as specified, replace the IACV.



2. INSPECT VACUUM TANK

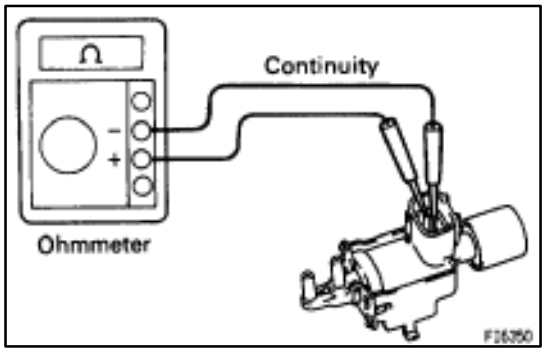
(a) Check that air flows from port B to port A.

(b) Check that air does not flow from port A to port B.



(c) Plug port B with your finger, and apply 26.7 kPa (200 mmHg, 7.9 in.Hg) of vacuum to port A, and check that there is no change in vacuum after one minute.

If the operation is not as specified, replace the vacuum tank.



3. INSPECT IACV VSV

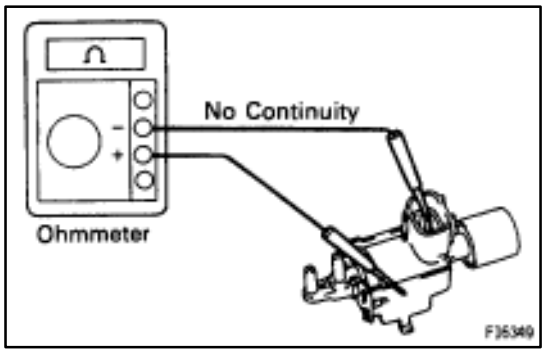
A. Inspect VSV for open circuit

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold):

33–39 Ω

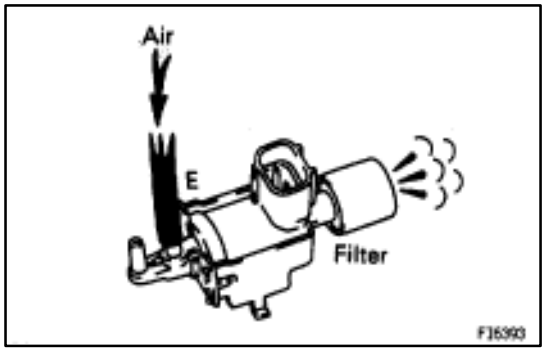
If there is not continuity, replace the VSV.



B. Inspect VSV for ground

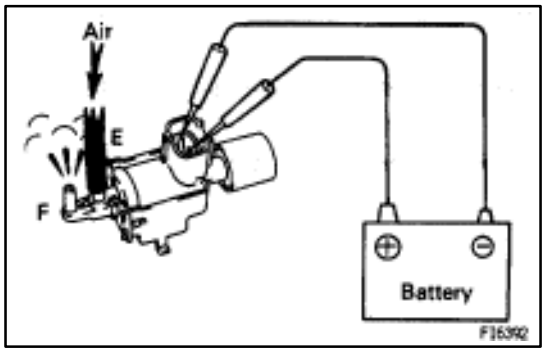
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



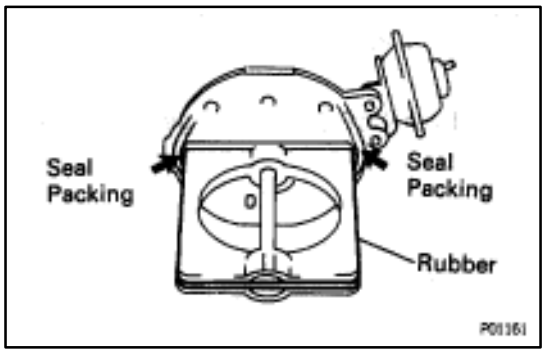
C. Inspect VSV operation

(a) Check that air flows from pipe E to the filter.



(b) Apply battery voltage across the terminals.

(c) Check that air flows from pipe E to pipe F.
If operation is not as specified, replace the VSV.



IACV INSTALLATION

EG0HG–01

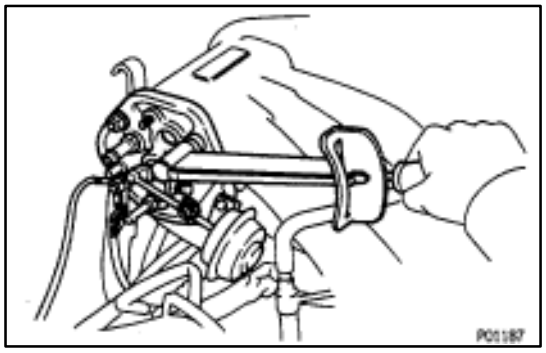
(See page EG–214)

1. INSTALL IACV

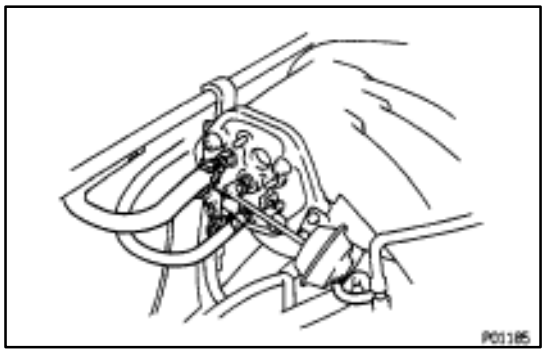
(a) Install a new gasket to the intake manifold.

(b) Apply a light coat of engine oil to the rubber portions.

(c) Apply seal packing to the positions of the IACV shown in the illustration.



(e) Install the IACV and two ground straps with the four nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

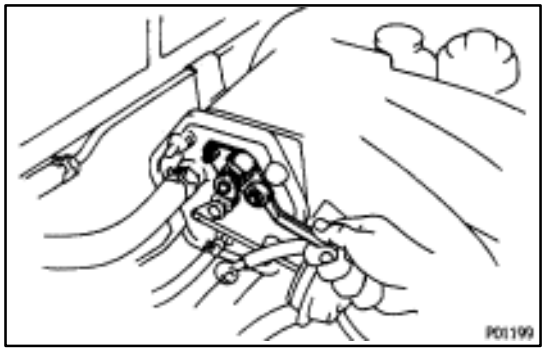


2. CONNECT HOSES TO IACV

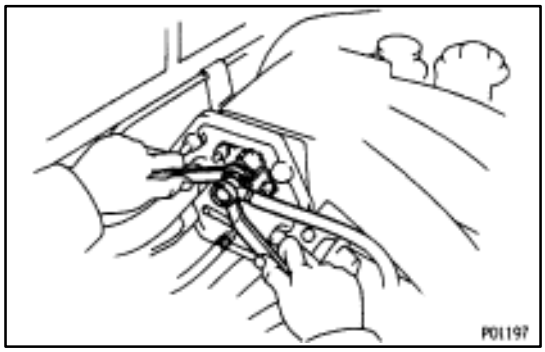
(a) Brake booster vacuum hose

(b) PS idle–up vacuum hose

(c) IACV actuator vacuum hose



3. **INSTALL COLD START INJECTOR**
Install a new gasket and the injector with the two nuts.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

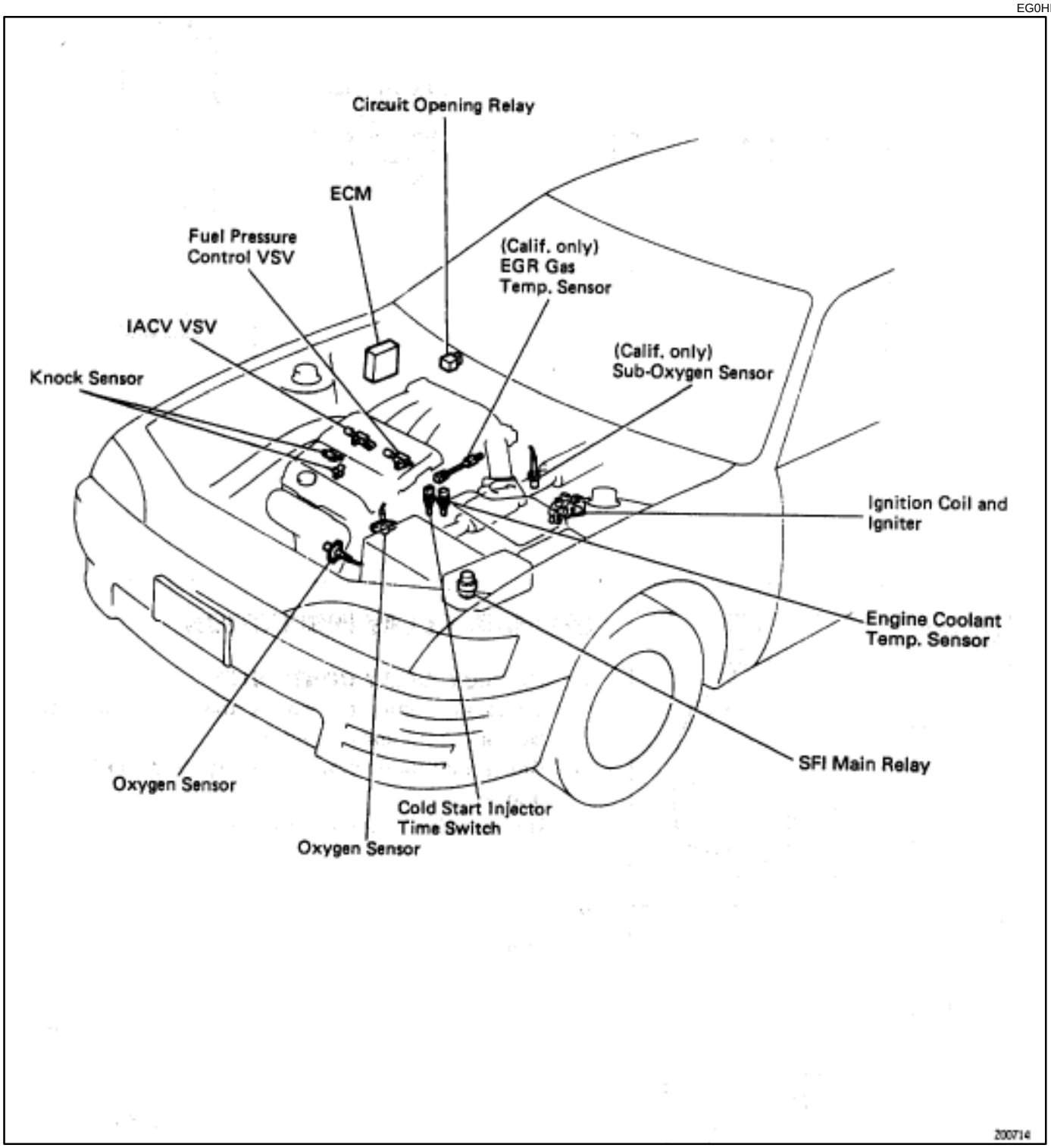


4. **CONNECT COLD START INJECTOR (NO.2 FUEL PIPE)**
Connect the injector pipe with two new gaskets and the union bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

5. **CONNECT COLD START INJECTOR CONNECTOR**
6. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**
7. **CHECK FOR FUEL LEAKAGE (See page EG–160)**

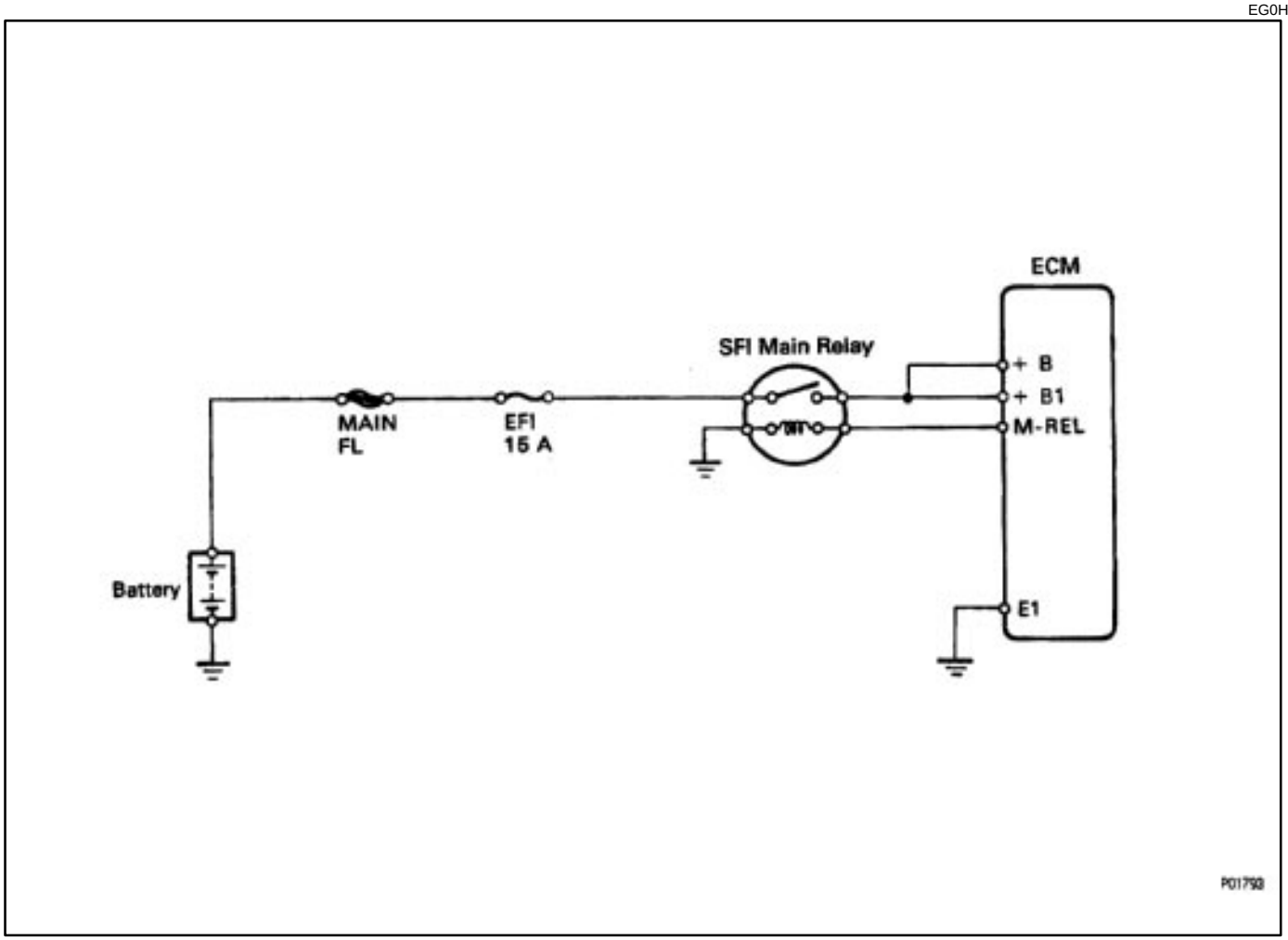
ELECTRONIC PARTS LOCATION

EG0HH–04



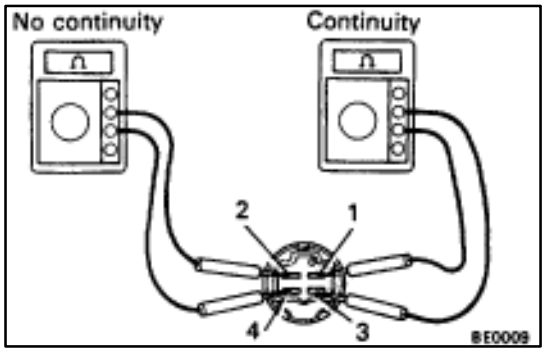
SFI MAIN RELAY

EG0HJ–01



SFI MAIN RELAY INSPECTION

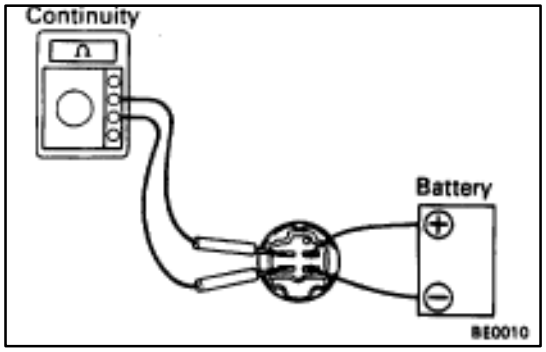
EG0HK–01



1. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.
If continuity is not as specified, replace the relay.



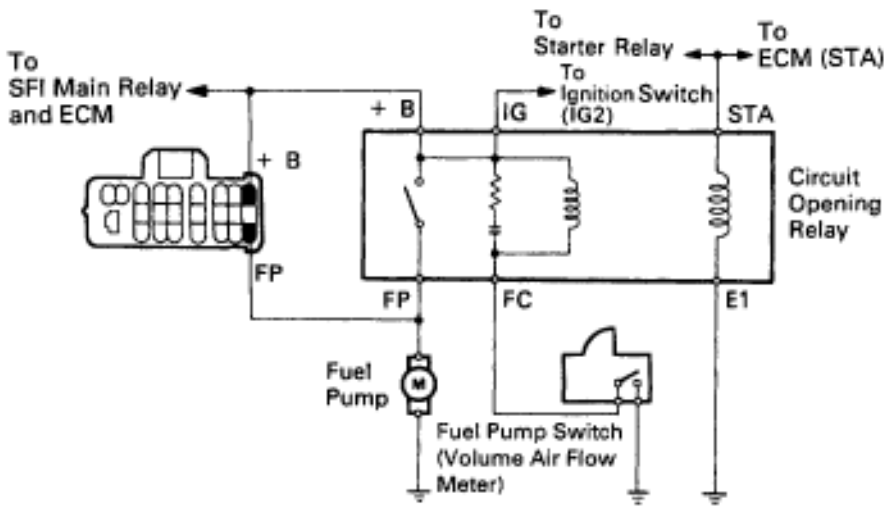
2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Using an ohmmeter, check that there is continuity between terminals 2 and 4.
If operation is not as specified, replace the relay.

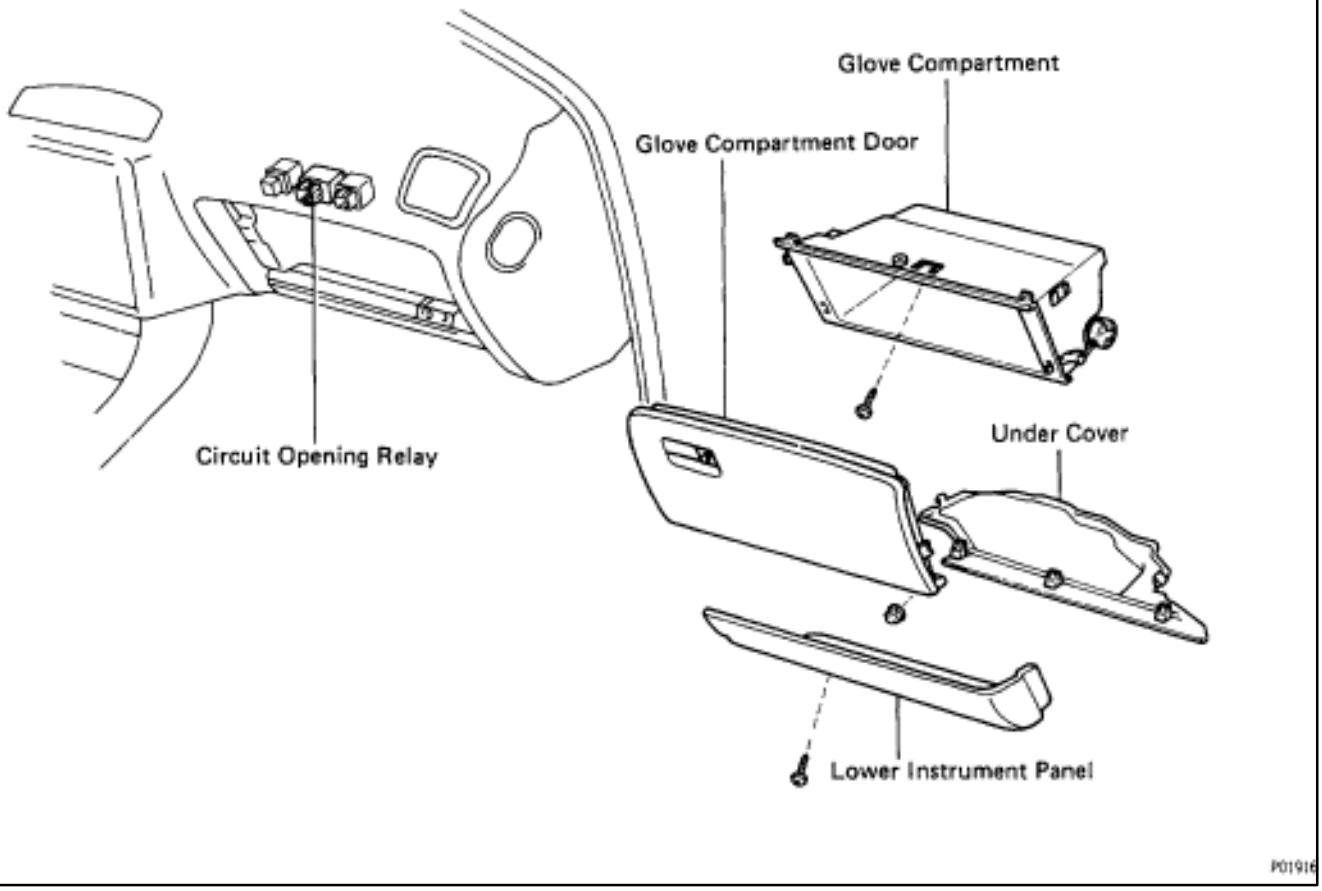
CIRCUIT OPENING RELAY

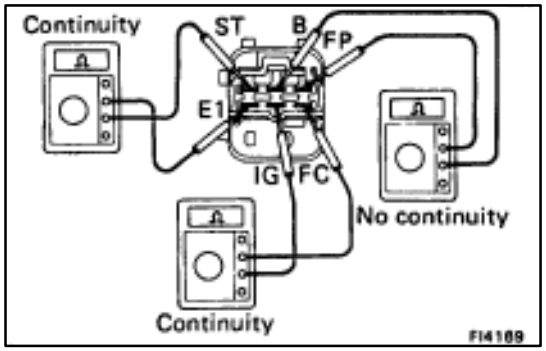
EGOHL–01

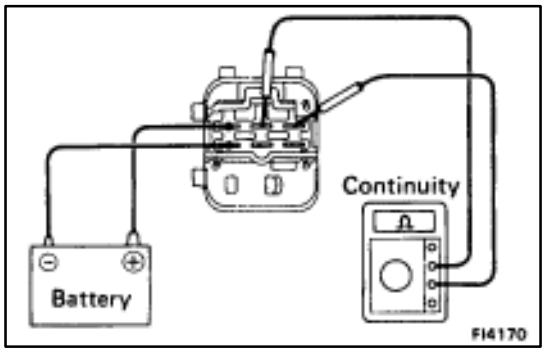


CIRCUIT OPENING RELAY REMOVAL AND INSTALLATION

EG0HM–02







CIRCUIT OPENING RELAY INSPECTION

EG0HN–01

1. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals ST and E1.

(b) Check that there is continuity between terminals IG and FC.

(c) Check that there is no continuity between terminals B and FP.

If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

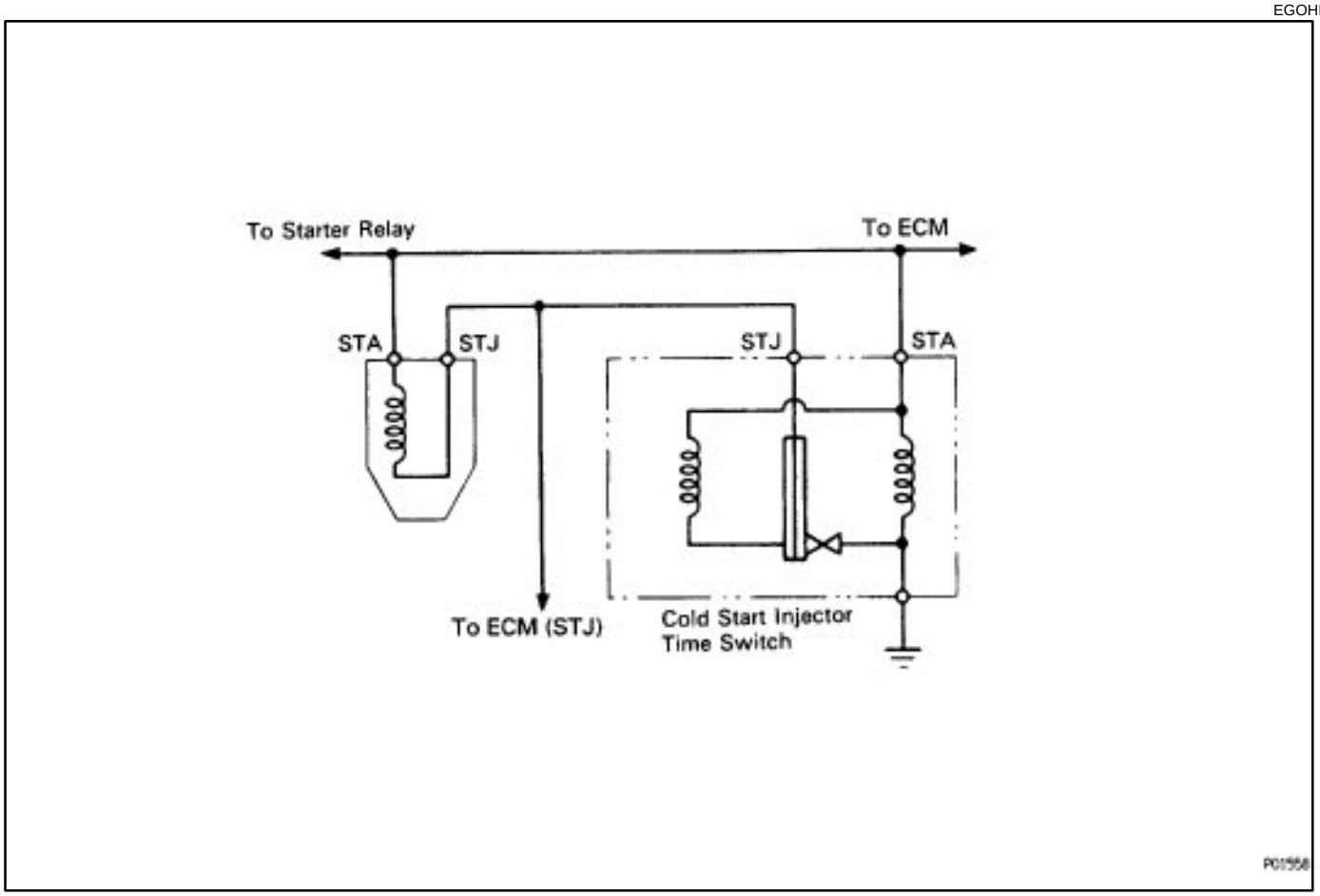
(a) Apply battery voltage across terminals ST and E1.

(b) Using an ohmmeter, check that there is continuity between terminals B and FP.

If operation is not as specified, replace the relay.

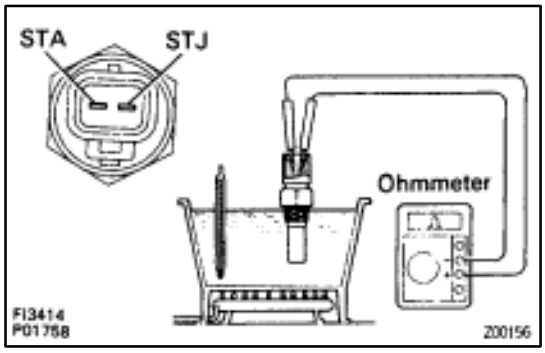
COLD START INJECTOR TIME SWITCH

EGOHP–01



COLD START INJECTOR TIME SWITCH INSPECTION

EGOHQ–01



INSPECT RESISTANCE OF COLD START INJECTOR TIME SWITCH

Using an ohmmeter, measure the resistance between each terminal.

Resistance:

STA–STJ

25–45 Ω below 15°C (59°F)

65–85 Ω above 30°C (86°F)

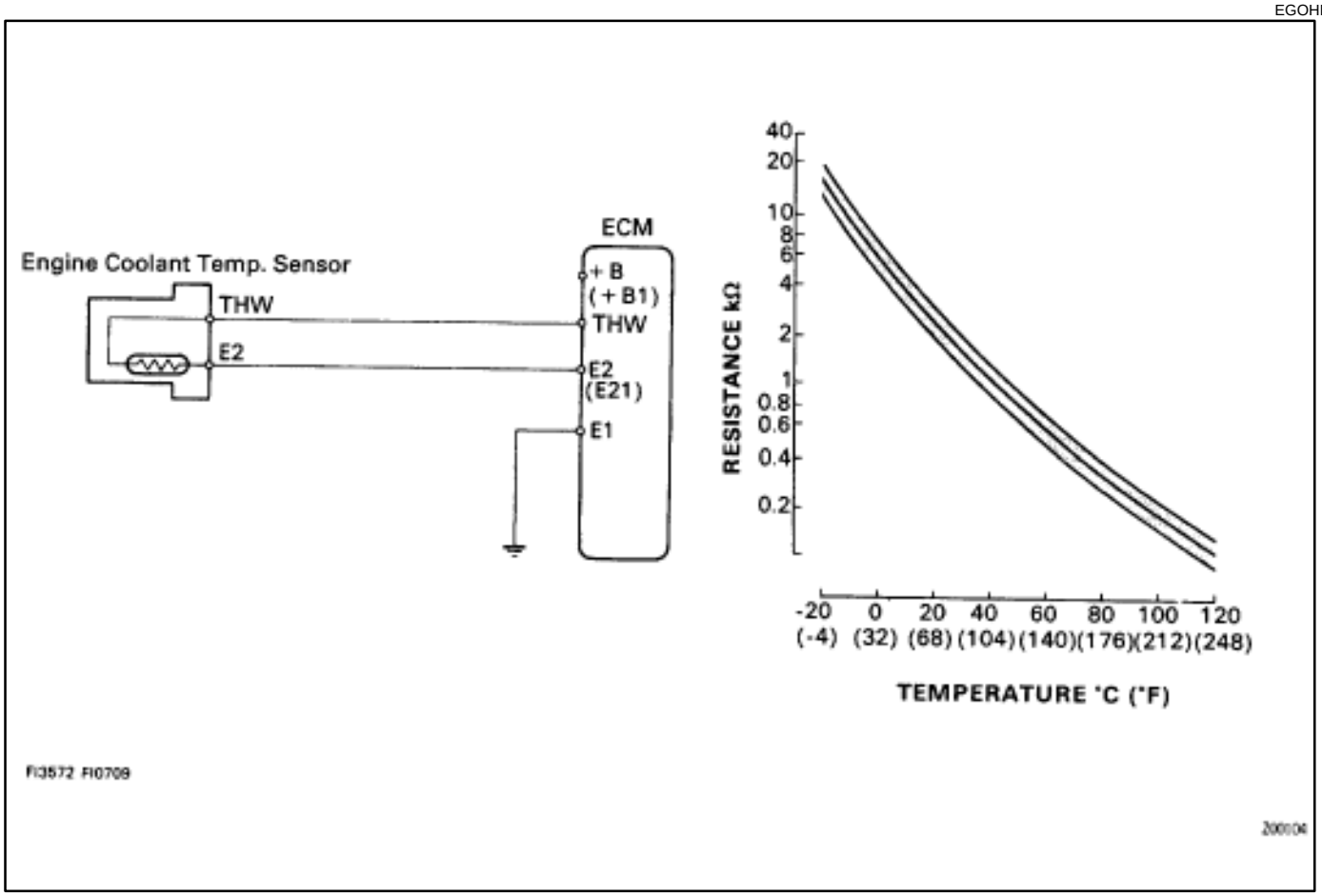
STA–Ground

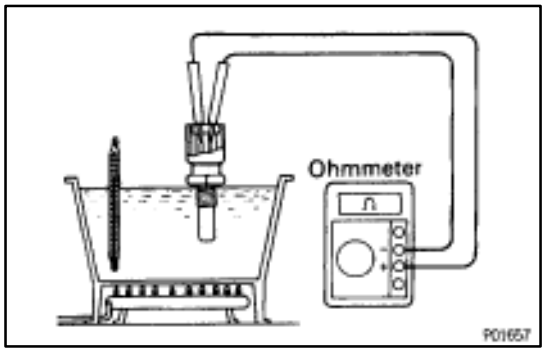
25–85 Ω

If the resistance is not as specified, replace the switch.

ENGINE COOLANT TEMPERATURE SENSOR

EGOHR–01





ENGINE COOLANT TEMPERATURE SENSOR INSPECTION

EGOHS–01

INSPECT RESISTANCE OF ENGINE COOLANT TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

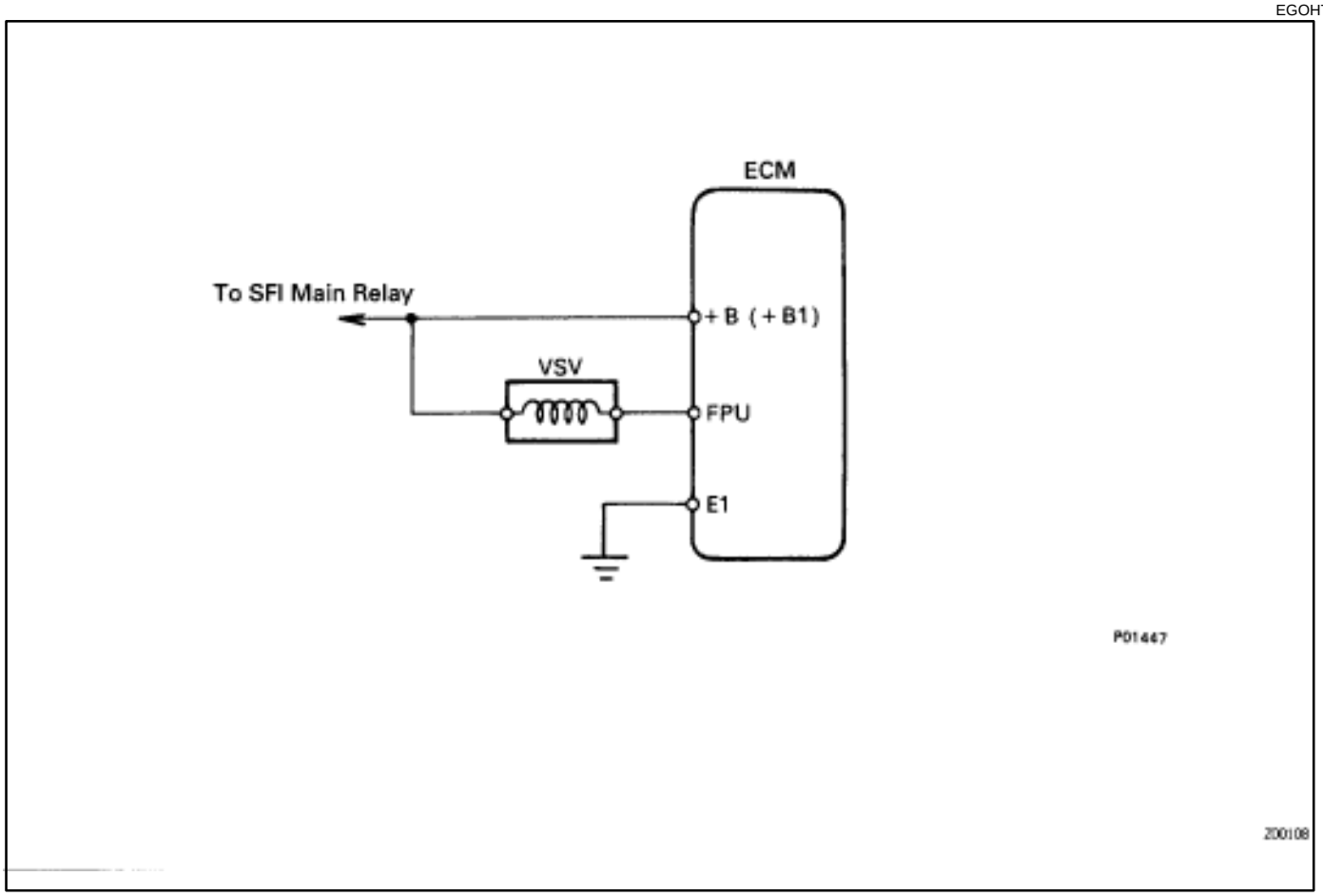
Resistance:

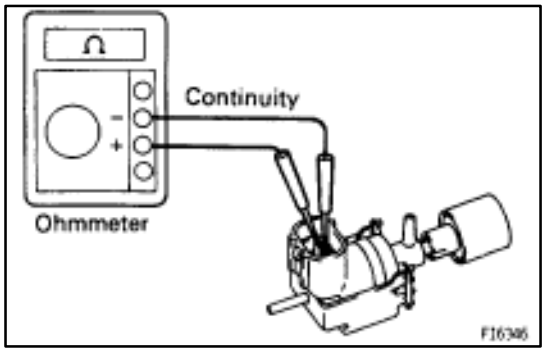
Refer to the chart above

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

FUEL PRESSURE VSV

EGOHT–01





FUEL PRESSURE VSV INSPECTION

EGOHU–01

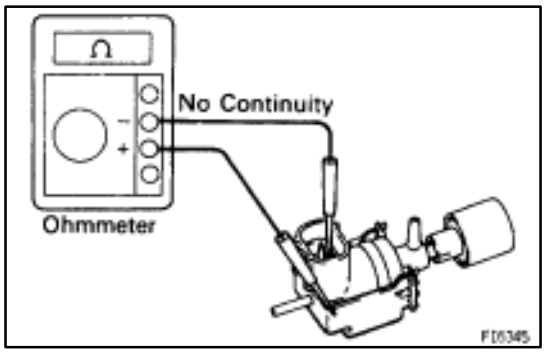
1. CHECK VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold):

33–39 Ω

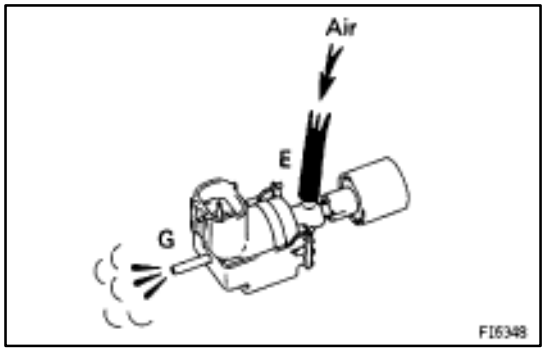
If there is no continuity, replace the VSV.



2. CHECK VSV FOR GROUND

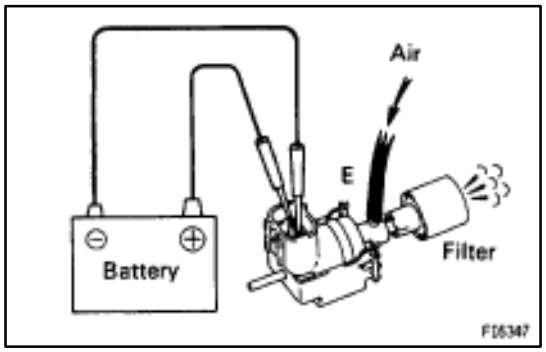
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



3. CHECK VSV OPERATION

(a) Check that the air flows from port E to port G.



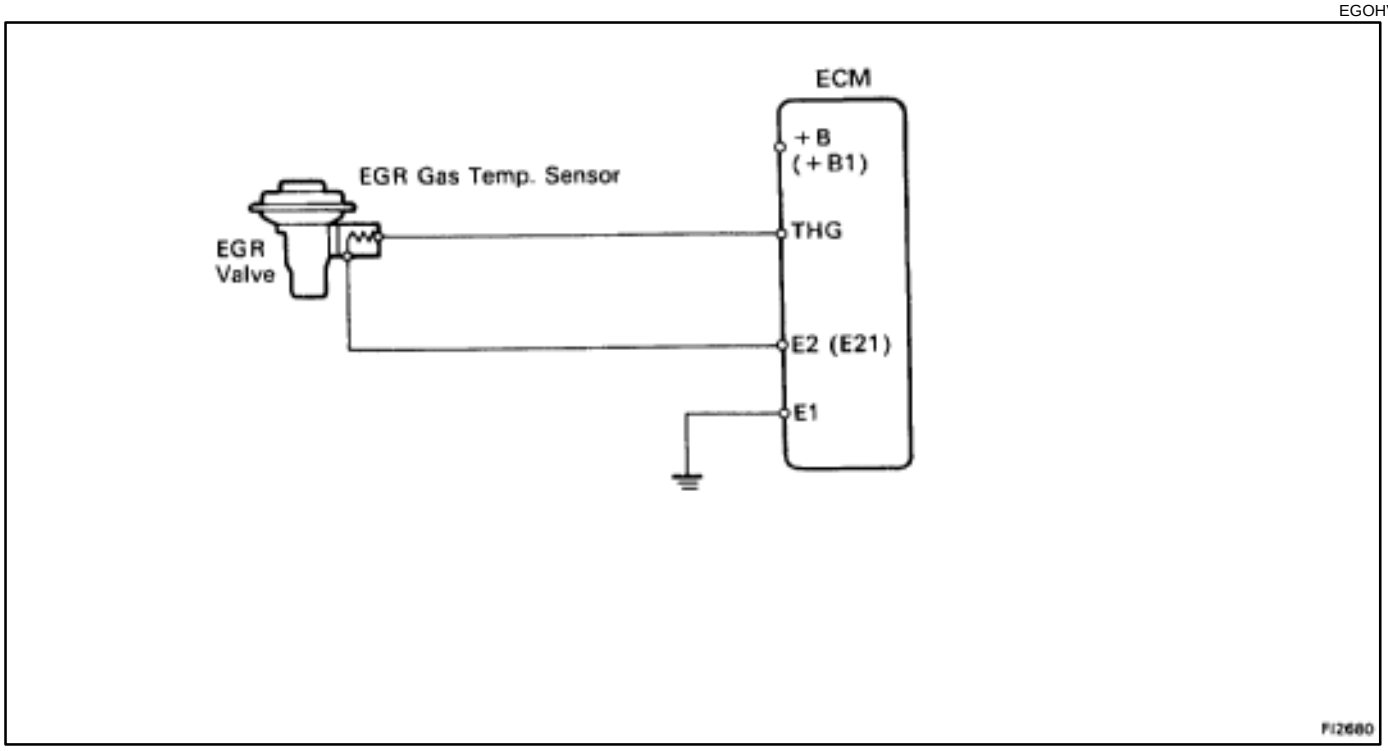
(b) Apply battery voltage across the terminals.

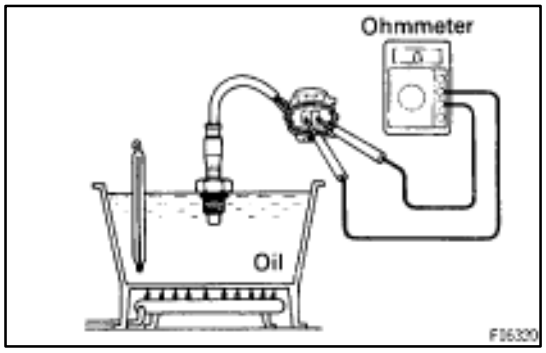
(c) Check that the air flows from port E to the filter.

If operation is not as specified, replace the VSV.

EGR GAS TEMPERATURE SENSOR (CALIFORNIA ONLY)

EGOHV–01





EGR GAS TEMPERATURE SENSOR INSPECTION

EG0HW–01

INSPECT EGR GAS TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance:

69–89 kΩ at 50°C (112°F)

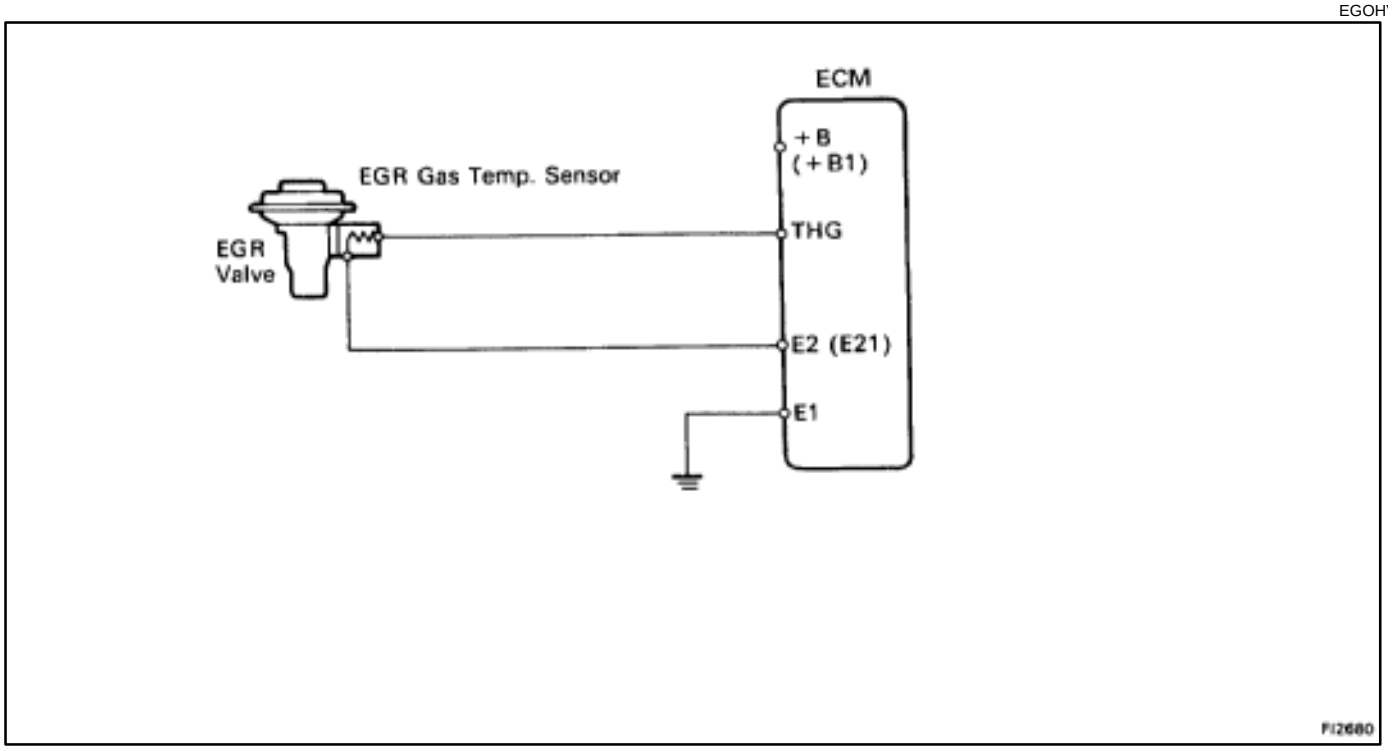
11 –15 kΩ at 100°C (212°F)

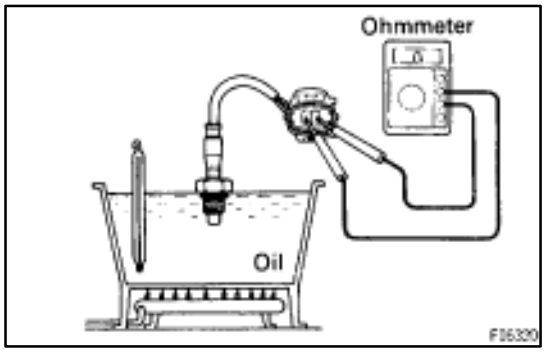
2 – 4 K kΩ at 150°C (302°F)

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

EGR GAS TEMPERATURE SENSOR (CALIFORNIA ONLY)

EGOHV–01





EGR GAS TEMPERATURE SENSOR INSPECTION

EG0HW–01

INSPECT EGR GAS TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

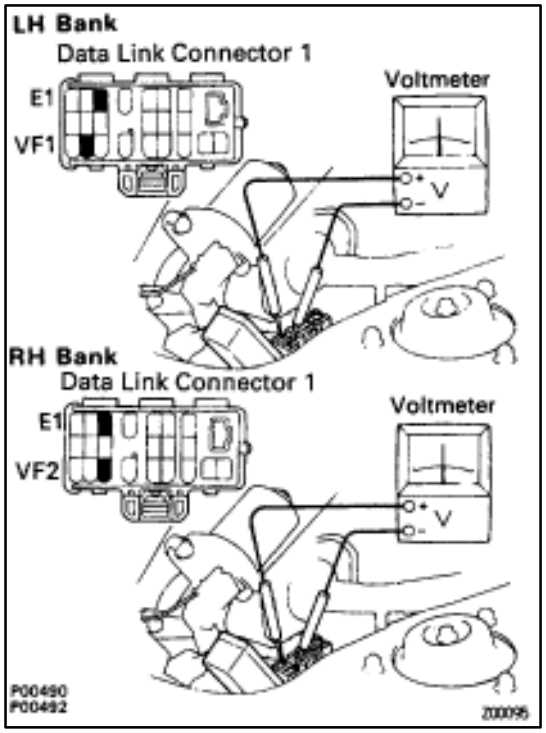
Resistance:

69–89 kΩ at 50°C (112°F)

11 –15 kΩ at 100°C (212°F)

2 – 4 K kΩ at 150°C (302°F)

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



OXYGEN SENSOR
OXYGEN SENSOR INSPECTION

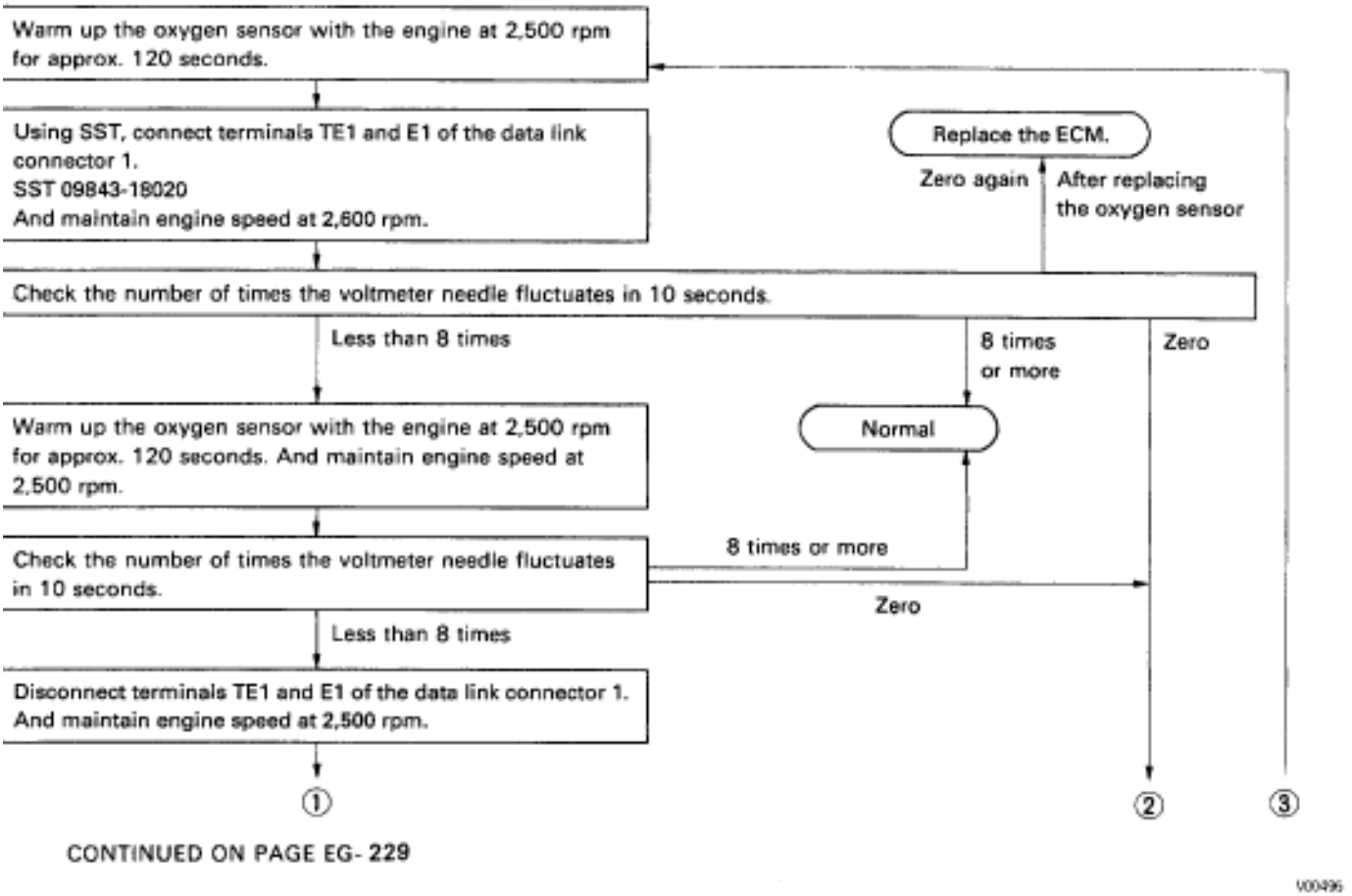
EG0HX–01

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

2. INSPECT FEEDBACK VOLTAGE

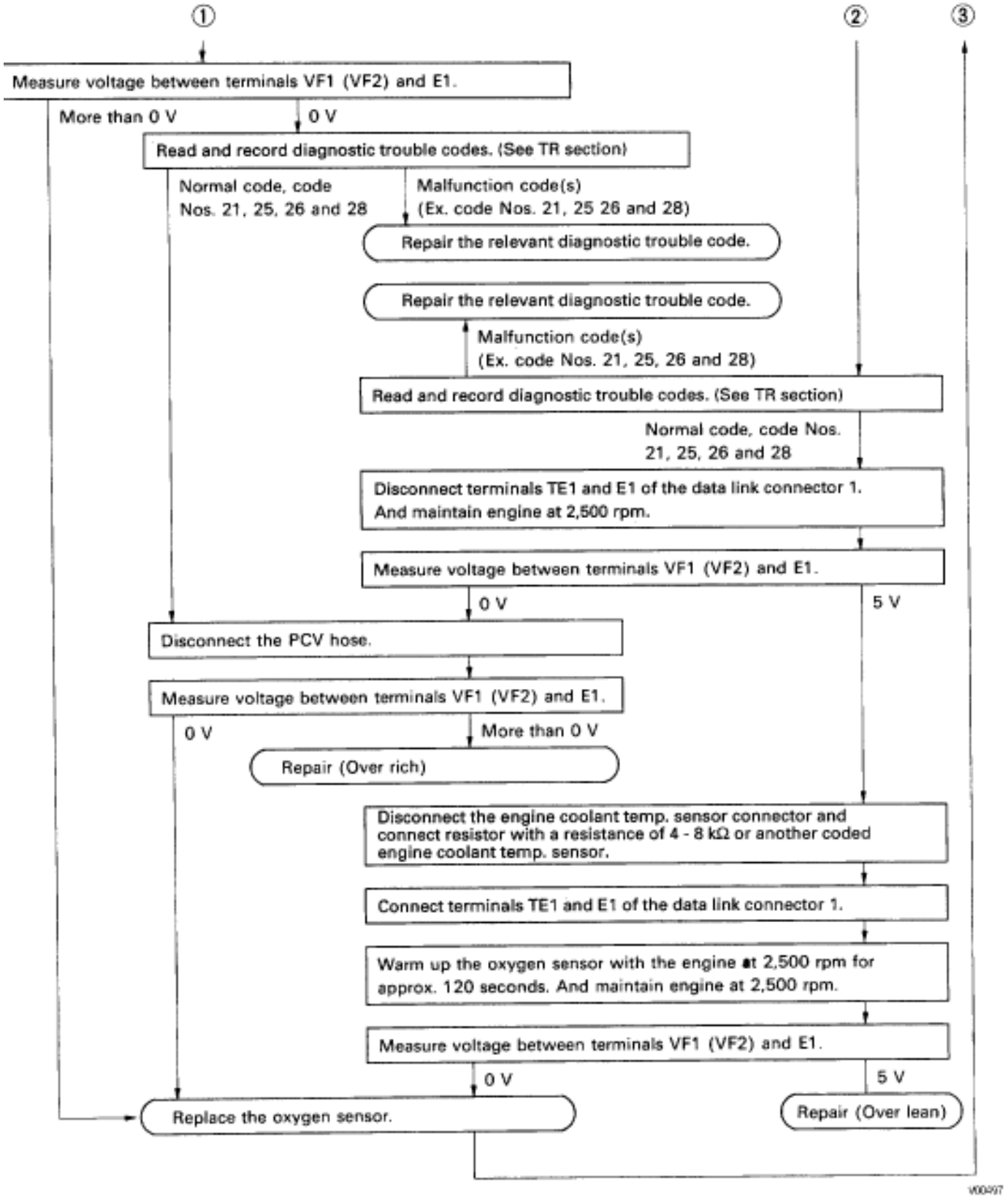
Connect the position (+) probe of a voltmeter to terminal VF1 (for LH bank) or VF2 (for RH bank) of the data link connector 1, and negative (–) probe to terminal E1. Perform the test as follows:



CONTINUED ON PAGE EG- 229

V00496

CONTINUED FROM PAGE EG- 228



SUB–OXYGEN SENSOR (CALIFORNIA ONLY)
SUB–OXYGEN SENSOR INSPECTION

EG0HY–01

1. INSPECT SUB–OXYGEN SENSOR

HINT: Inspect only when code No.27 is displayed.

(a) Cancel the diagnostic trouble code. (See TR section)

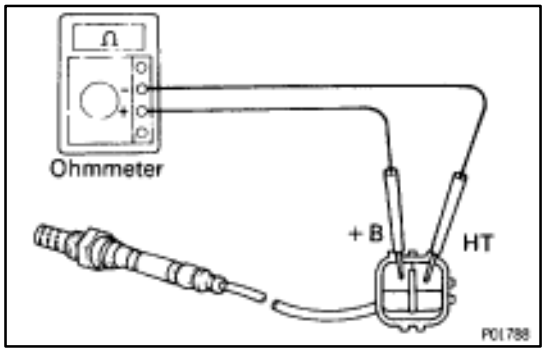
(b) Warm up the engine until it reaches normal operating temperature.

(c) (M/T)
Drive for 5 minutes or more at a speed less than 80 km/h (50 mph) in 4th or 5th gear.
(A/T)
Drive for 5 minutes or more at a speed less than 80 km/h (50 mph) in ”D” position.

(d) Following the conditions in step (c), fully depress on the accelerator pedal for 2 seconds or more.

(e) Stop the vehicle and turn the ignition switch OFF.

(f) Carry out steps (b), (c) and (d) again to test acceleration.
If code No.27 appears again, check the sub–oxygen sensor circuit. If the circuit is normal, replace the sub –oxygen sensor.



2. INSPECT HEATER RESISTANCE OF SUB–OXYGEN SENSOR

Using an ohmmeter, measure the resistance between terminals +B and HT.

Resistance:

11.7–14.3 Ω at 20°C (68°F)

If resistance is not as specified, replace the sub–oxygen sensor.

SUB–OXYGEN SENSOR (CALIFORNIA ONLY)
SUB–OXYGEN SENSOR INSPECTION

EG0HY–01

1. INSPECT SUB–OXYGEN SENSOR

HINT: Inspect only when code No.27 is displayed.

(a) Cancel the diagnostic trouble code. (See TR section)

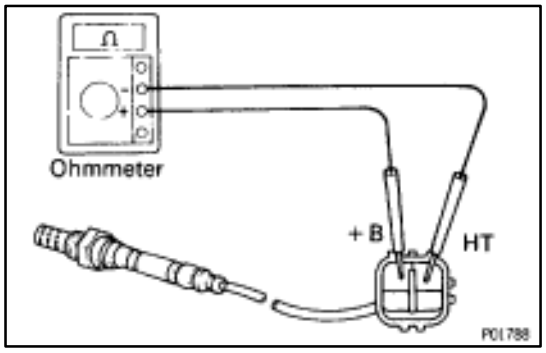
(b) Warm up the engine until it reaches normal operating temperature.

(c) (M/T)
Drive for 5 minutes or more at a speed less than 80 km/h (50 mph) in 4th or 5th gear.
(A/T)
Drive for 5 minutes or more at a speed less than 80 km/h (50 mph) in ”D” position.

(d) Following the conditions in step (c), fully depress on the accelerator pedal for 2 seconds or more.

(e) Stop the vehicle and turn the ignition switch OFF.

(f) Carry out steps (b), (c) and (d) again to test acceleration.
If code No.27 appears again, check the sub–oxygen sensor circuit. If the circuit is normal, replace the sub –oxygen sensor.



2. INSPECT HEATER RESISTANCE OF SUB–OXYGEN SENSOR

Using an ohmmeter, measure the resistance between terminals +B and HT.

Resistance:

11.7–14.3 Ω at 20°C (68°F)

If resistance is not as specified, replace the sub–oxygen sensor.

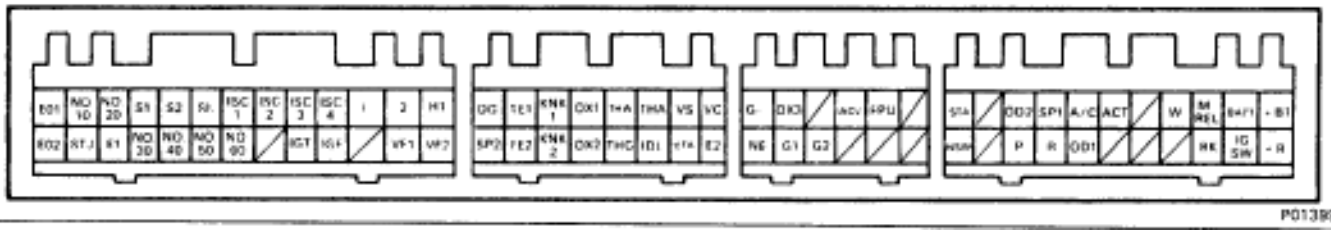
ENGINE CONTROL MODULE (ECM)
Engine Control Module (ECM) Terminals

EG0GB–01

Symbol	Terminal Name	Symbol	Terminal Name	Symbol	Terminal Name
E01	POWER GROUND	DG	DATA LINK CONNECTOR 1		–
E02	POWER GROUND	SP2	No.2 SPEED SENSOR		–
No.10	INJECTOR	TE1	DATA LINK CONNECTOR 1	STA	STARTER SWITCH
STJ	COLD START INJECTOR	TE2	DATA LINK CONNECTOR 1	*1 NSW	PARK/NEUTRAL POSITION SWITCH
No.20	INJECTOR	KNK1	KNOCK CONTROL SENSOR 1		–
E1	COMPUTER GROUND	KNK2	KNOCK CONTROL SENSOR 2		–
*1 S1	SOLENOID	OX1	OXYGEN SENSOR	OD2	OD MAIN SWITCH
No.30	INJECTOR	OX2	OXYGEN SENSOR	*1 P	PATTERN SELECT SWITCH
*1 S2	SOLENOID	THW	ENGINE COOLANT TEMP. SENSOR	SP1	No.1 SPEED SENSOR
No.40	INJECTOR	*2 THG	EGR GAS TEMP. SENSOR	*1 R	SHIFT POSITION SWITCH
*1 SL	SOLENOID	THA	AIR TEMP. SENSOR	A/C	A/C AMPLIFIE
No.50	INJECTOR	IDL	THROTTLE POSITION SENSOR	OD1	CRUISE CONTROL COMPUTER
ISC 1	IAC MOTOR NO.1 COIL	VS	VOLUME AIR FLOW METER	ACT	A/C AMPLIFIE
No.60	INJECTOR	VTA	THROTTLE POSITION SENSOR		–
ISC2	IAC MOTOR NO.2 COIL	VC	VOLUME AIR FLOW METER THROTTLE POSITION SENSOR		–
	–	E2	SENSOR GROUND		–
ISC3	IAC MOTOR NO.3 COIL	G–	DISTRIBUTOR	W	SERVICE REMINDER INDICATOR
IGT	IGNITER	NE	DISTRIBUTOR		–
ISC4	IAC MOTOR NO.4 COIL	*2 OX3	SUB-OXYGEN SENSOR	M-REL	SFI MAIN RELAY (COIL)
IGF	IGNITER	G1	DISTRIBUTOR	*1 BK	BRAKE SWITCH
*1 L	SHIFT POSITION SWITCH		–	BATT	BATTERY
	–	G2	DISTRIBUTOR	IGSW	IGNITION SWITCH
*1 2	SHIFT POSITION SWITCH	IACV	IACV VSV	+B1	SFI MAIN RELAY
VF1	CHECK CONNECTOR		–	+B	SFI MAIN RELAY
*2 HT	OXYGEN SENSOR HEATER	FPU	FUEL PRESSURE CONTROL VSV		
VF2	CHECK CONNECTOR		–		

*1 A/T (w/ Electronic Controlled Transmission)
*2 Calif.only

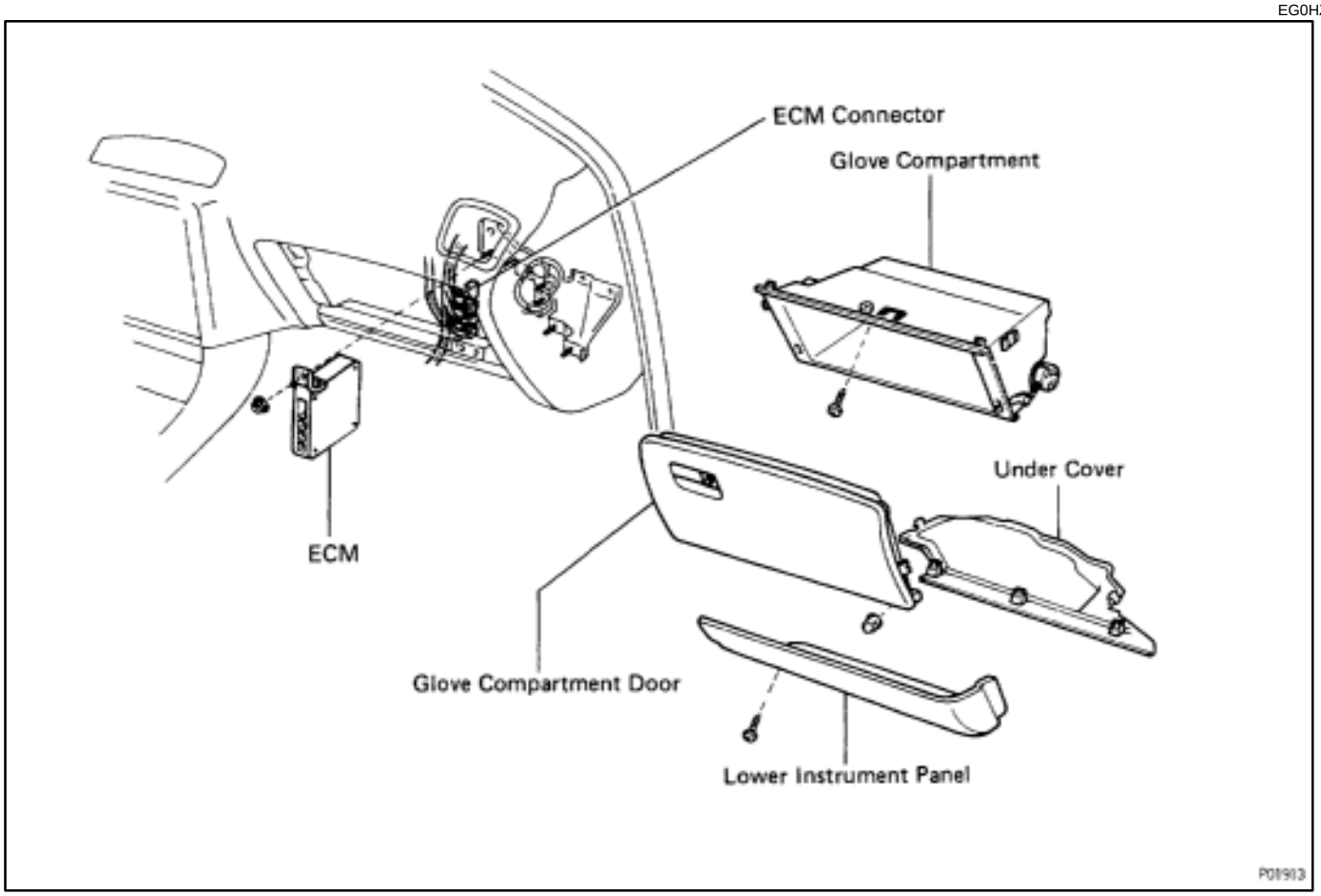
ECM Terminals



P01389

ECM REMOVAL AND INSTALLATION

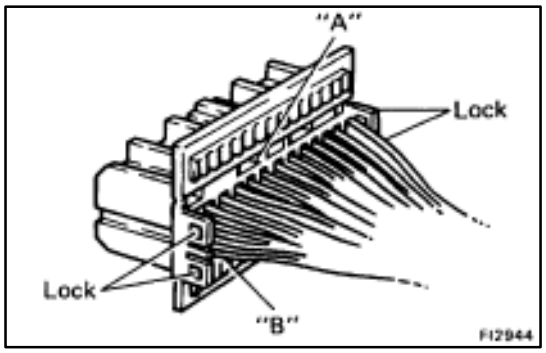
EG0HZ–01



ECM INSPECTION

EG0J0–01

HINT: The SFI circuit can be checked by measuring the resistance and voltage at the wiring connectors of the ECM.

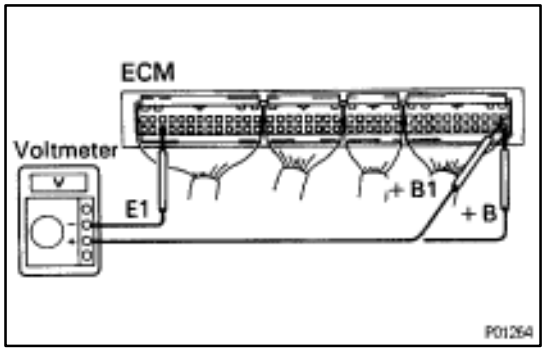


1. PREPARATION

(a) Disconnect the connectors from the ECM.

(b) Remove the locks as shown in the illustration so that the tester probe(s) can easily come in.

NOTICE: Pay attention to sections "A" and "B" in the illustration which can be easily broken.



2. INSPECT VOLTAGE OF ECM

Check the voltage between each terminal of the wiring connectors.

- Turn the ignition switch ON.
- Measure the voltage at each terminal.

HINT:

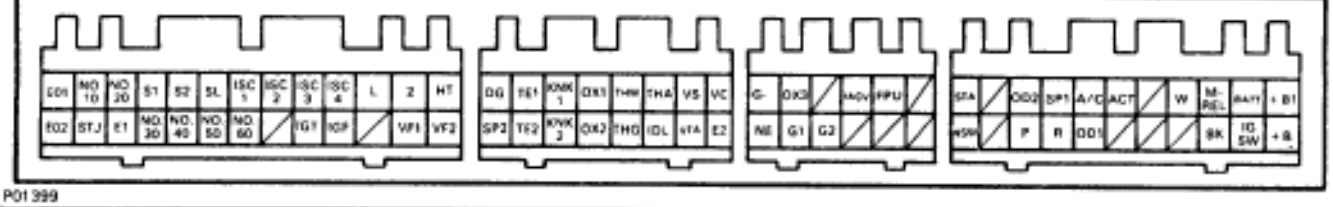
- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is ON.

ECM Wiring Connectors Voltage

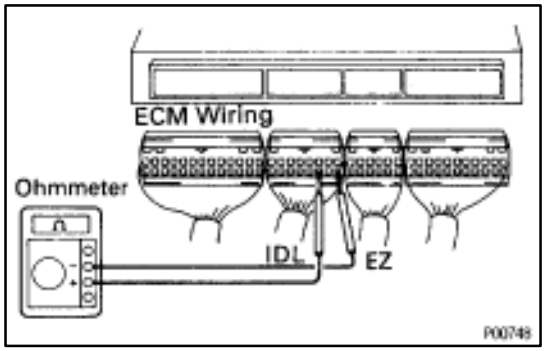
Terminals	Condition		STD voltage (V)
BATT – E1	–		10 – 14
IG SW – E1	IG SW ON		
M-REL – E1			
+B, +B1 – E1			
IDL – E2	IG SW ON	Throttle valve open	10 – 14
VTA – E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.3 – 0.8
		Throttle valve open	2.7 – 5.2
VC – E2		–	4 – 6
VS – E2		Measuring plate fully closed	3.7 – 4.3
		Measuring plate fully open	0.2 – 0.5
	Idling		1.6 – 4.1
	3,000 rpm		1.0 – 2.0
No.10, No.20, No.30, No.40, No.50, No.60 – E01, E02	IG SW ON		10 – 14
THA – E2	IG SW ON	Intake air temp. 20°C (68°F)	1 – 3
THW – E2		Engine coolant temp. 80°C (176°F)	0.1 – 1.0
STA – E1	Cranking		6 – 14
IGT – E1	Cranking or idling		1.0 – 3.0 (Fluctuate)
ISC1, ISC2, ISC3, ISC4 – E1	IG SW ON		9 – 14
W – E1	No trouble (Malfunction Indicator Lamp off) and engine running		10 – 14
*1 A/C – E1	IG SW ON	Air conditioning ON	8 – 14
*1 ACT – E1		Heater blower SW ON	4 – 6
TE1 – E1		Data Link Connector 1 TE1 - E1 not connected	4 – 6
TE2		Data Link Connector 1 TE1 - E1 connected	0.5 or less
*2 NSW – E1		Shift position P or N position	0 – 2
		Ex. shift position P or N position	10 – 14
*2 BK – E1	Stop light SW ON (Brake pedal depressed)		10 – 14

ECM Terminals

*1 w/ A/C
*2 w/ ECM



P01399



3. INSPECT RESISTANCE OF ECM

NOTICE:

- Do not touch the ECM terminals.
- **The tester probe should be inserted in the wiring connector from the wiring side.**

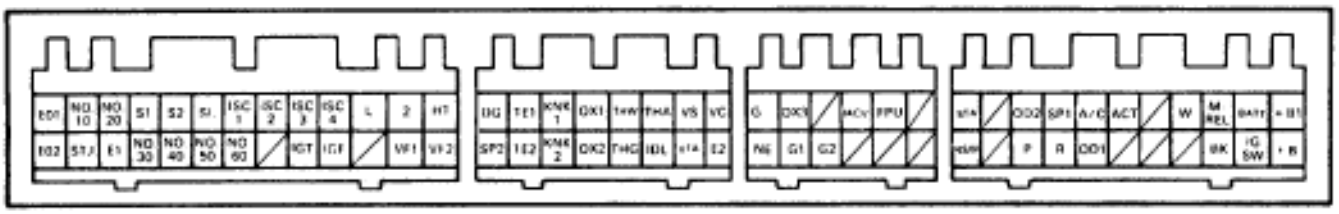
Check the resistance between each of the terminals of the wiring connector.

- Disconnect the connectors from the ECM.
- Measure the resistance at each terminal.

ECM Wiring Connectors Resistance

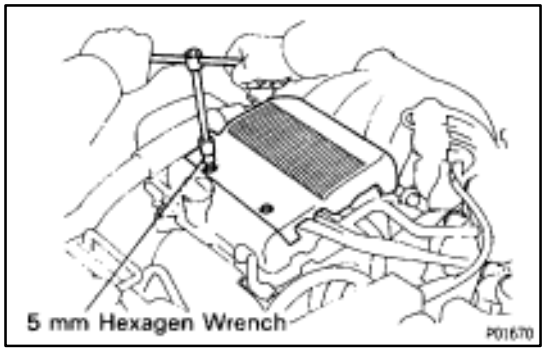
Terminals	Condition	STD resistance (Ω)
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed	500 or less
VTA – E2	Throttle valve fully open	2,000 – 11,600
	Throttle valve fully closed	280 – 6,400
VC – E2	–	200 – 400
VS – E2	Measuring plate fully closed	200 – 600
	Measuring plate fully open	20 – 1,200
THA – E2	Intake air temp. 20°C (68°F)	2,000 – 3,000
THW – E2	Engine coolant temp. 80°C (176°F)	200 – 400
G1, G2 – G⊖	Cold	125 – 190
NE – G⊖	Cold	155 – 240
ISC1, ISC2, ISC3, ISC4 – +B, +B1	–	10 – 30

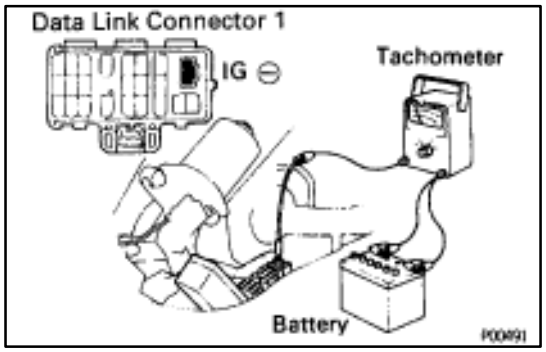
ECM Terminals

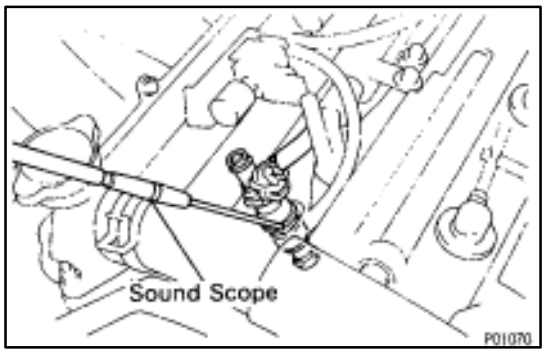


P01399

V00278







FUEL CUT RPM
FUEL CUT RPM INSPECTION

EG0J1–01

1. REMOVE V–BANK COVER

Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.

2. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

3. CONNECT TACHOMETER TO ENGINE

Connect the test probe of a tachometer to terminal IG ⊕ of the data link connector 1.

NOTICE:

- **NEVER allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.**
- **As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your until before use.**

4. INSPECT FUEL CUT PRM

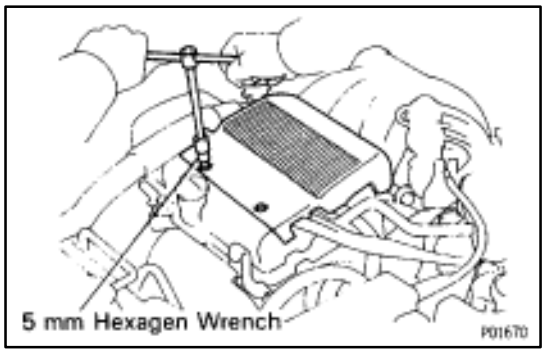
(a) Increase the engine speed to at least 2,500 rpm.
(b) Use a sound scope to check for injector operating noise.
(c) Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

HINT: Measure with the A/C OFF.

Fuel return rpm:

1,200 rpm

5. DISCONNECT TACHOMETER



6. REINSTALL V–BANK COVER

Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.

SERVICE SPECIFICATIONS
SERVICE DATA

EG0J2–01

Fuel pressure regulator	Fuel pressure	at no vacuum	26–304 kPa (2.7–3.1 kgf/cm2, 38–44 psi)
Fuel pump	Resistance		0.2–3.0 Ω
Cold start injector	Resistance		2–4 Ω
	Fuel leakage		One drop or less per minute
Injector	Resistance		Approx. 13.8 Ω
	Injection volume		54–64 cc (3.3–3.9 cu in.)/15 sec
	Difference volume between each injector		5 cc (0.31 cu in.) or less
	Fuel leakage		One drop or less per minute
Volume air flow meter	Resistance VS–E2		200–600 Ω (Measuring plate fully closed)
			20–1,200 Ω (Measuring plate fully open)
	VC–E2		200–400 Ω
	FC–E1		Infinity (Measuring plate fully closed)
			Zero (Others)
	THA–E2	at –20°C (–4°F)	10–20 kΩ
		at 0°C (32°F)	4–7 kΩ
		at 20°C (68°F)	2–3 kΩ
		at 40°C (104°F)	0.9–1.5 kΩ
		at 60°C (140°F)	0.4–0.7 kΩ

Throttle position sensor	Clearance between stop screw and lever	Between terminals	Resistance
	0 mm 0 in.	VTA–E2	0.28–6.4 kΩ
	0.35 mm 0.014 in.	IDL–E2	0.5 kΩ or less
	0.70 mm 0.028 in.	IDL–E2	Infinity
	Throttle valve fully open	VTA–E2	2.0–11.6 kΩ
	–	VC–E2	2.7–7.7 kΩ

Dash pot (DP)	Setting speed		2,000 rpm
Throttle opener	Setting speed		1,500 ± 300 rpm
IAC valve	Resistance	B1–S1 or S3	10–30 Ω
		B2–S2 or S4	10–30 Ω
Cold start injector time switch	Resistance STA–STJ	below 15°C (59°F)	25–45 Ω
		above 30°C (86°F)	65–85 Ω
	STA–Ground		25–85 Ω
Engine coolant temp. sensor	Resistance	at –20°C (–4°F)	10–20 kΩ
		at 0°C (32°F)	4–7 kΩ
		at 20°C (68°F)	2–3 kΩ
		at 40°C (104°F)	0.9–1.3 kΩ
		at 60°C (140°F)	0.4–0.7 kΩ
		at 80°C (176°F)	0.2–0.4 kΩ
Fuel pressure VSV	Resistance		33–39 Ω
EGR gas temp. sensor (Calif. only)	Resistance	at 50°C (122°F)	69–89 kΩ
		at 100°C (212°F)	11–15 kΩ
		at 150°C (302°F)	2–4 kΩ
Sub–oxygen sensor	Heater resistance		11.7–14.3 Ω

SERVICE DATA (Cont'd)

ECM	HINT: Perform all voltage and resistance measurements with the ECM connected. Verify that the battery voltage is 11 V or above with the ignition switch is ON.			
	Voltage			
	Terminals	Condition		STD voltage (V)
	BATT–E1	–		10–14
	IG SW–E1	IG SW ON		
	M–REL–E1			
	+B, +B1 –E1			
	IDL–E2	IG SW ON	Throttle valve open	10–14
	VATA–E2		Throttle valve fully closed (Throttle opener must be cancelled first)	0.3–0.8
			Throttle valve open	2.7–5.2
	VC–E2		–	4–6
	VS–E2		Measuring plate fully closed	3.7–4.3
			Measuring plate fully open	0.2–0.5
		Idling		1.6–4.1
		3,000 rpm		1.0–2.0
	No.10, No.60 –E01, –E02	IG SW ON		10–14
	THA–E2	IG SW ON	Intake air temp. 20°C (68°F)	1–3
	THW–E2		Engine coolant temp. 80°C (176°F)	0.1–1.0
	STA–E1	Cranking		6–14
	IGT–E1	Cranking or idling		1.0–3.0 (Fluctuate)
	ISC1, ISC4 –E1	IG SW ON		9–14
	W–E1	No trouble (Malfunction Indicator Lamp off) and engine running		10–14
	*1A/C–E1	IG SW ON	Air conditioning ON	10–14
	*1ACT–E1		Heater blower SW ON	4–6
	TE1, TE2 –E1		Data Link Connector 1 TE1–E1 not connected	4–6
			Data Link Connector 1 TE1–E1 connected	0.5 or less
	*2NSW–E1		Shift position P or N position	0–2
			Ex. shift position P or N position	10–14
	*2BK–E1	Stop light SW ON (Brake pedal depressed)		10–14

*1 w/ A/C *2 w/ECM

SERVICE DATA (Cont'd)

ECM (cont'd)			
	Terminals	Condition	STD resistance (Ω)
	IDL–E2	Throttle valve open	Infinity
		Throttle valve fully closed (Throttle opener must be cancelled first)	500 or less
	VTA–E2	Throttle valve fully open	2,000–11,600
		Throttle valve fully closed (Throttle opener must be cancelled first)	280–6,400
	VC–E2	–	200–400
	VS–E2	Measuring plate fully closed	200–600
		Measuring plate fully open	20–1,200
	THA–E2	Intake air temp. 20°C (68°F)	2,000–3,000
	THW–E2	Engine coolant temp. 80°C (176°F)	200–400
	G1 –G ⊕ G2	Cold	125–190
	NE–G ⊕	Cold	155–240
	ISC1 ISC2 +B – ISC3 +B1 ISC4	–	10–30
Fuel cut rpm	Fuel return rpm		1,200 rpm

TORQUE SPECIFICATIONS

EG0J3–01

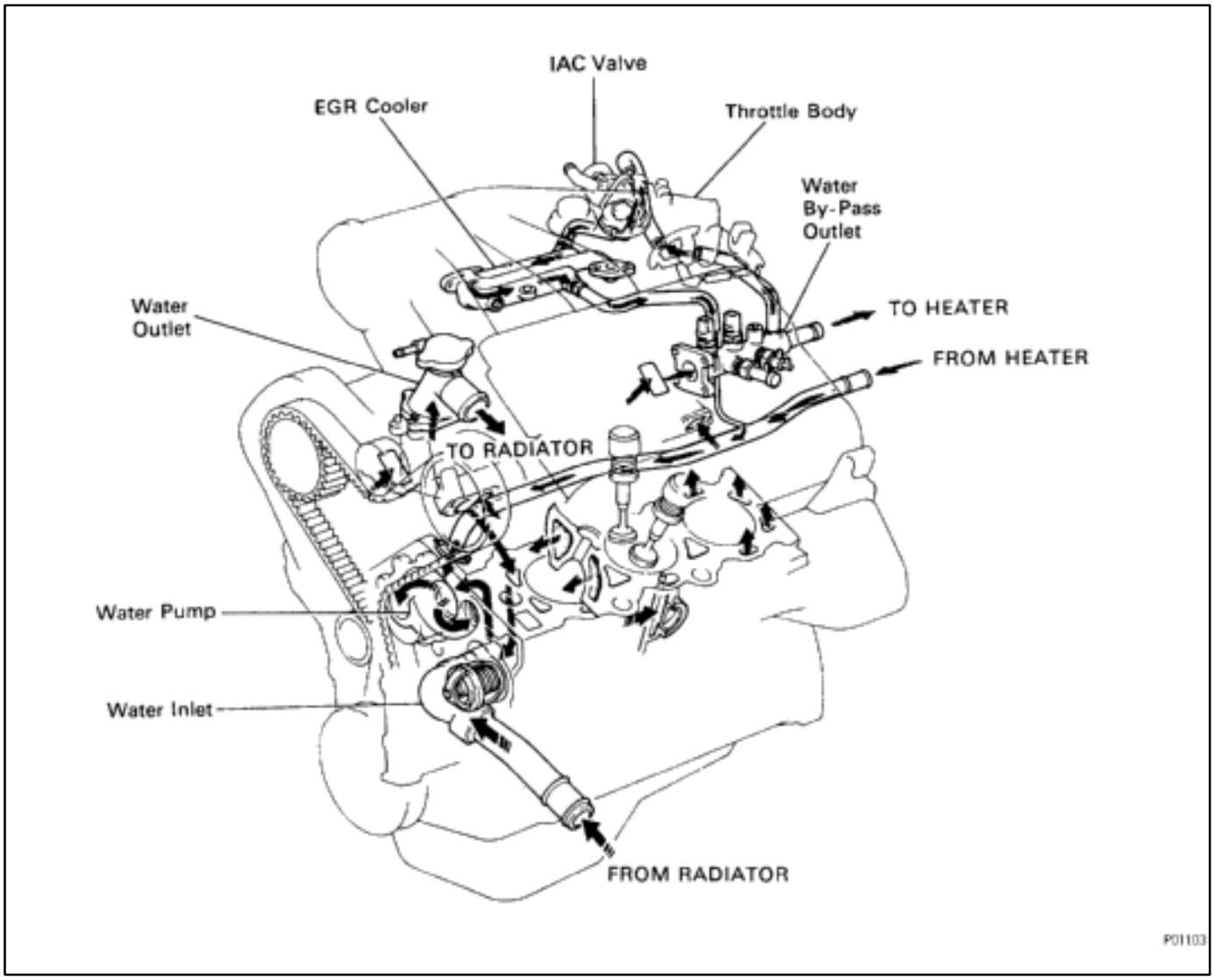
Part tightened	N·m	kgf·cm	ft·lbf
Fuel line (Union bolt type)	29	300	22
Fuel line (Flare nut type)	30	310	22
Fuel tank band X Body	39	400	29
Fuel pump X Fuel tank	3.9	40	35 in.·lbf
Fuel pressure regulator X Delivery pipe	5.4	55	48 in.·lbf
Fuel return pipe X Fuel pressure regulator	19	195	14
Delivery pipe X Cylinder head	13	130	9
Fuel pulsation damper X Delivery pipe	34	350	25
Intake manifold X Cylinder head	19	195	14
Intake manifold stay X Intake manifold	22	220	16
Intake manifold stay X Cylinder block	42	425	31
No.1 air intake chamber stay X Intake manifold	42	425	31
No.1 air intake chamber stay X Cylinder head	42	425	31
EGR pipe union nut	59	600	43
EGR pipe X Intake manifold	13	130	9
Throttle body X Intake manifold	42	425	31

COOLING SYSTEM

DESCRIPTION

EG09K–01

This engine utilizes a pressurized forced circulation cooling system which includes a thermostat equipped with a by–pass valve mounted on the inlet side.



The cooling system is composed of the water jacket (inside the cylinder block and cylinder head), radiator, water pump, thermostat, electronically controlled hydraulic cooling fan, hoses and other components.

Engine coolant which is heated in the water jacket is pumped to the radiator, through which a cooling fan blows air to cool the engine coolant as it passes through. Engine coolant which has been cooled is then sent back to the engine by the water pump, where it cools the engine.

The water jacket is a network of channels in the shell of the cylinder block and cylinder head through which engine coolant passes. It is designed to provide adequate cooling of the cylinders and combustion chambers which become heated during engine operation.

RADIATOR

The radiator performs function of cooling the engine coolant which has passed through the water jacket and become hot, and it is, mounted in the front of the vehicle. The radiator consists of an upper tank and lower tank, and a core which connects the two tanks. The upper tank contains the inlet for engine coolant from the water jacket and the filler inlet. It also has a hose attached through which excess engine coolant or steam can flow. The lower tank has an outlet and drain cock for the engine coolant. The core contains many tubes through which engine coolant flows from the upper tank to the lower tank as well as to cooling fins which radiate heat away from the engine coolant in the tubes. The air sucked through the radiator by the cooling fan, as well as the wind generated by the vehicle's travel, passes through the radiator, cooling the engine coolant. Models with automatic transmission include an automatic transmission fluid cooler built into the lower tank of the radiator. A cooling fan is mounted behind radiator to assist the flow of air through the radiator. When the engine coolant temperature is low, the fan operates slowly to help the warm up, and when the engine coolant temperature becomes high, the fan speed is increased to provide the air flow required for cooling.

RADIATOR CAP

The radiator caps are pressure type caps which seal the radiator and, resulting in pressurization of the radiator as the engine coolant expands. The pressurization prevents the engine coolant from boiling even when the engine coolant temperature exceeds 100°C (212°F). A relief valve (pressurization valve) and a vacuum valve (negative pressure valve) are built into the radiator cap. The relief valve opens and lets steam escape through the overflow pipe when the pressure generated inside the cooling system exceeds the limit (engine coolant temperature: 110–120°C (230–248°F), pressure; 69–113 kPa (0.7–1.15 kgf/cm^2, 10.0–16.4 psi). The vacuum valve opens to alleviate the vacuum which develops in the engine coolant system after the engine is stopped and the engine coolant temperature drops. The valve's opening, allows the engine coolant in the reservoir tank to return to the cooling system.

RESERVOIR TANK

The reservoir tank is used to catch engine coolant which overflows from the cooling system as a result of volumetric expansion when the engine coolant is heated. The engine coolant in the reservoir tank returns to the radiator when the engine coolant temperature drops, thus keeping the radiator full at all times and avoiding needless engine coolant loss.

Check the reservoir tank level to learn if the engine coolant needs to be replenished.

WATER PUMP

The water pump is used for forced circulation of engine coolant through the cooling system. It is mounted on the front of the cylinder block and driven by a timing belt.

THERMOSTAT

The thermostat has a wax type bypass valve and is mounted in the water inlet housing. The thermostat includes a type of automatic valve operated by fluctuations in the engine coolant temperature. This valve closes when the engine coolant temperature drops, preventing the circulation of engine coolant through the engine and thus permitting the engine to warm up rapidly. The valve opens when the engine coolant temperature has risen, allowing the circulation of engine coolant. Wax inside the thermostat expands when heated and contracts when cooled. Heating the wax thus generates pressure which overpowers the force of the spring which keeps the valve closed, thus opening the valve. When the wax cools, its contraction causes the force of the spring to take effect once more, closing the valve. The thermostat in this engine operates at a temperature of 82°C (180°F).

ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN (See page EG–263)

PREPARATION
SST (SPECIAL SERVICE TOOLS)

EG09L–01

	09230–01010	Radiator Service Tool Set	
	09620–30010	Steering Gear Box Replacer Set	
	(09627–30010)	Steering Sector Shaft Bushing Replacer	Hydraulic motor oil seal
	(09631–00020)	Handle	Hydraulic motor oil seal
	09843–18020	Diagnosis Check Wire	

RECOMMENDED TOOLS

EG09M–01

	09025–00010	Small Torque Wrench	For measuring preload
	09082–00015	TOYOTA Electrical Tester	
	09905–00013	Snap Ring Pliers	

EQUIPMENT

EG09N–01

Heater	Water temperature switch
Radiator cap tester	
Thermometer	Water temperature switch
Torque wrench	
Vernier calipers	

LUBRICANT

EG09P–01

Item	Capacity	Classification
Power steering fluid (Total) (Hydraulic cooling fan fluid)	2.2 liters (2.3 US qts, 1.9 lmp.qts)	ATF DEXRON®II

COOLANT

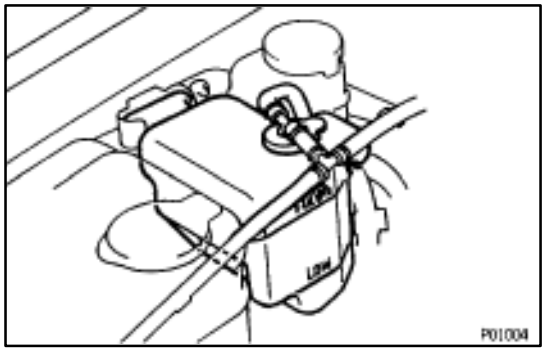
EG09Q–01

Item	Capacity	Classification
Engine coolant (w/Heater)		Ethylene–glycol base
NSR M/T	8.5 liters (9.0 US qts, 7.5 lmp.qts)	
NSR A/T	8.4 liters (8.9 US qts, 7.4 lmp.qts)	
NWR	9.0 liters (9.5 US qts, 7.9 lmp.qts)	

SSM (SPECIAL SERVICE MATERIALS)

EG09R–01

08826–00100	Seal Packing 1282B, Three Bond 1282B or equivalent	Water pump



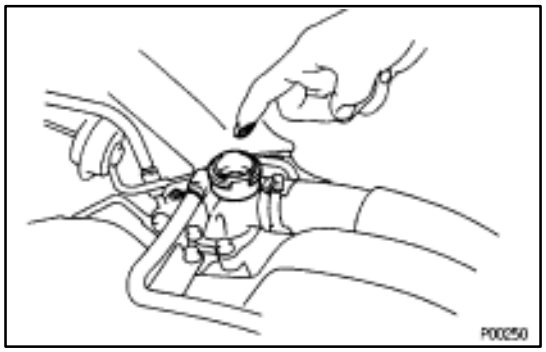
COOLANT CHECK AND REPLACEMENT

EG09S–01

1. CHECK ENGINE COOLANT LEVEL AT RESERVE TANK

The engine coolant level should be between the ”LOW” and ”FULL” lines.

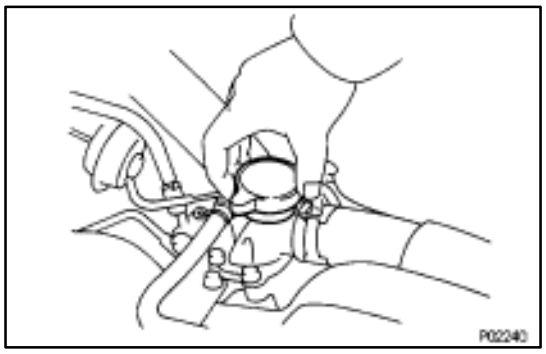
If low, check for leaks and add engine coolant up to the ”FULL” line.



2. CHECK ENGINE COOLANT QUALITY

There should not be any excessive deposits of rust or scales around the radiator cap (water outlet side) or water outlet filler hole, and the engine coolant should be free from oil.

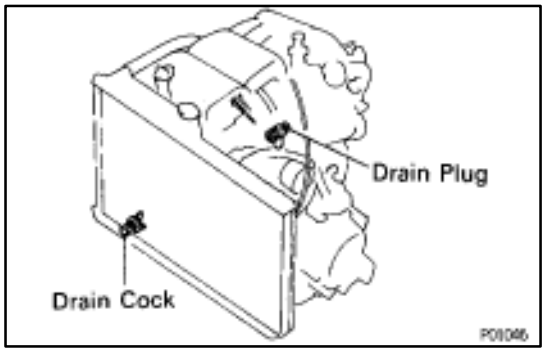
If excessively dirty, replace the engine coolant.



3. REPLACE ENGINE COOLANT

(a) Remove the radiator cap from the water outlet.

CAUTION: To avoid the danger of being burned, do not remove it while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



(b) Drain the engine coolant from the radiator drain cock and engine drain plug (Engine drain plug at the right of engine block.)

(c) Close the drain cock.

Torque (Engine drain plug):

29 N·m (300 kgf·cm, 22 ft·lbf)

(d) Slowly fill the system with engine coolant from the water outlet.

- Use a good brand of ethylene–glycol base engine coolant and mix it according to the manufacturer’s directions.
- Using engine coolant which includes more than 50% ethylene–glycol (but not more than 70%) is recommended.

NOTICE:

- **Do not use alcohol type coolant.**
- **The engine coolant should be mixed with demineralized water or distilled water.**

Capacity (w / Heater):

NSR

M/T

8.5 liters (9.0 US qts, 7.5 lmp. qts)

A/T

8.4 liters (8.9 US qts, 7.4 lmp. qts)

NWR

9.0 liters (9.5 US qts, 7.9 lmp. qts)

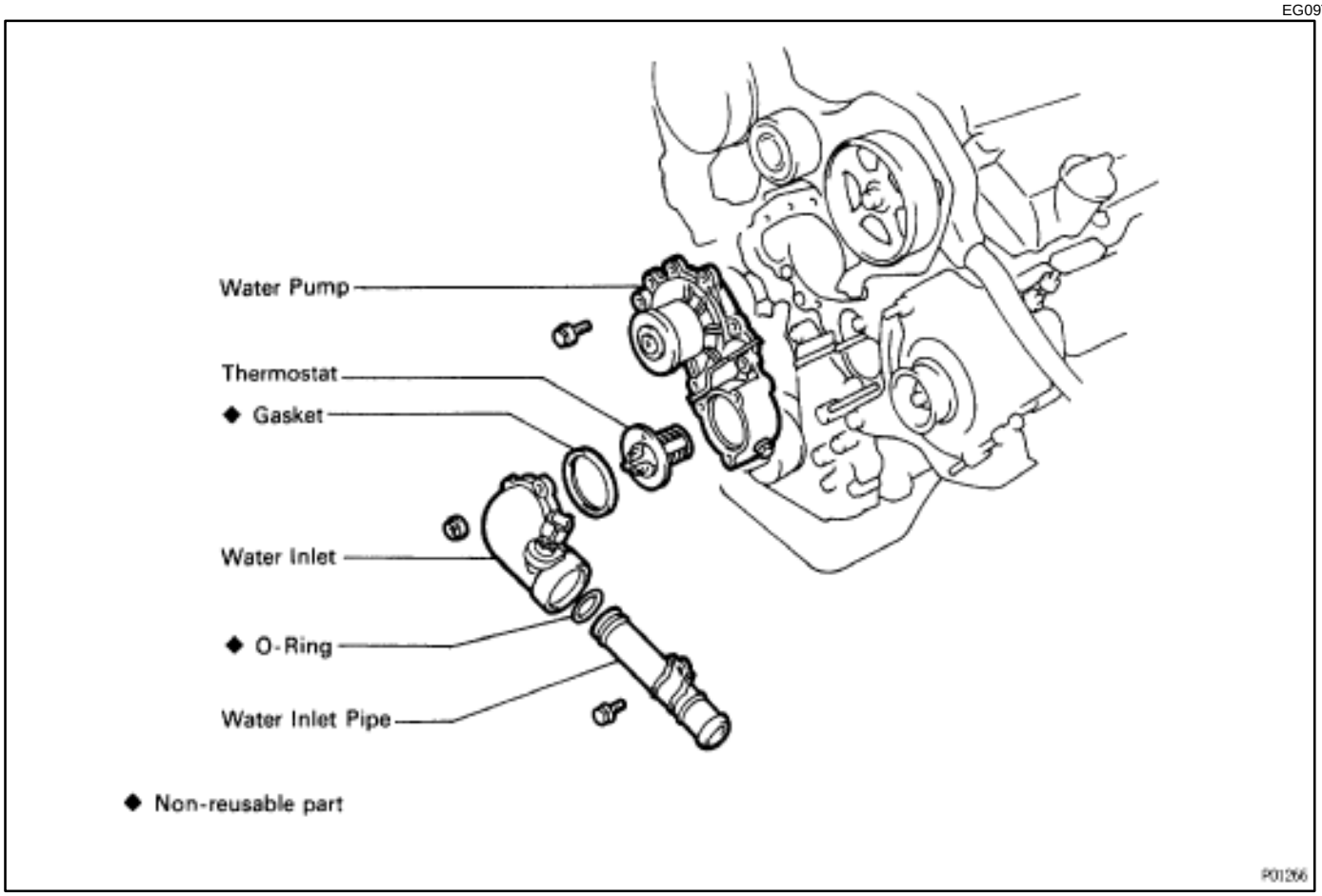
(e) Reinstall the radiator cap to the water outlet.

(f) Warm up the engine and check for leaks.

(g) Recheck the engine coolant level and refill as necessary.

WATER PUMP COMPONENTS

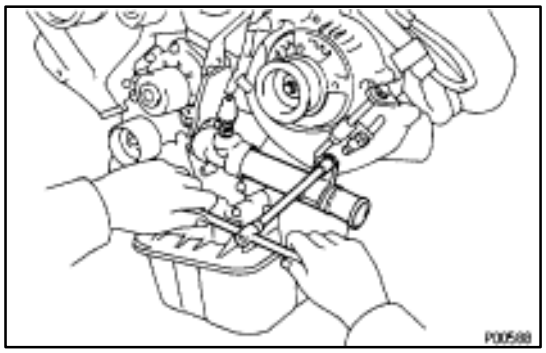
EG09T–01



WATER PUMP REMOVAL

EG09U–01

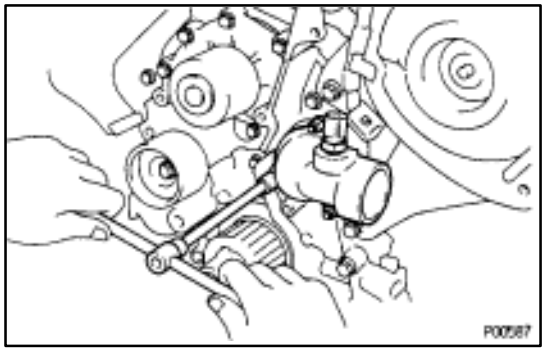
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT (See page EG–244)**



3. **DISCONNECT RADIATOR LOWER HOSE FROM WATER INLET PIPE**
4. **REMOVE TIMING BELT (See page EG–29)**
5. **REMOVE WATER INLET PIPE**

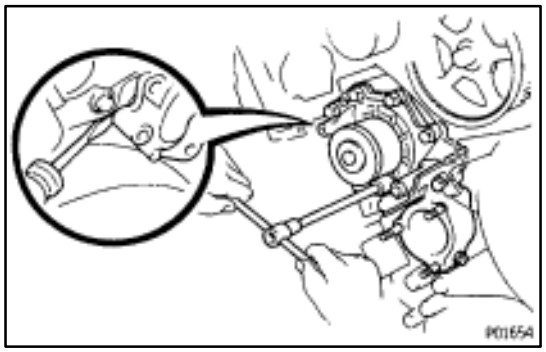
(a) Remove the bolt holding the water inlet pipe to the generator belt adjusting bar.

(b) Remove the water inlet pipe and O–ring.



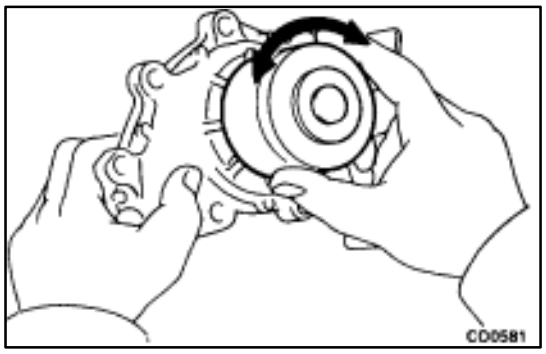
6. REMOVE WATER INLET AND THERMOSTAT

(a) Disconnect the engine coolant temperature sensor connector.
(b) Remove the three nuts and water inlet from the water pump.
(c) Remove the thermostat and gasket.



7. REMOVE WATER PUMP

(a) Remove the seven bolts.
(b) Remove the water pump by prying a screwdriver between the water pump and cylinder block.



WATER PUMP INSPECTION

EG09V–01

INSPECT WATER PUMP

Turn the pulley and check that the water pump bearing moves smoothly and quietly.

WATER PUMP INSTALLATION

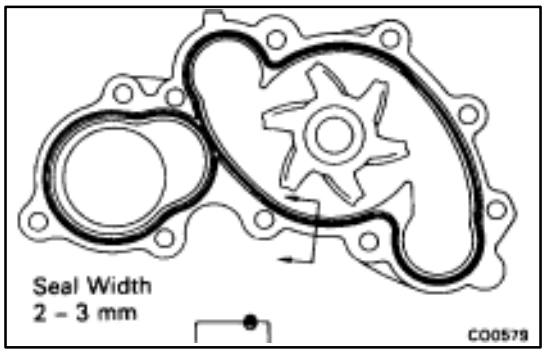
EG09W–01

(See page EG–246)

1. INSTALL WATER PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water pump and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the water pump groove.

Seal packing:

Part No.08826–00100 or equivalent

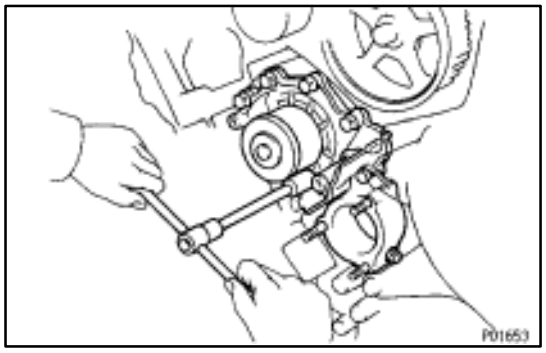
- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the water pump with the seven bolts.

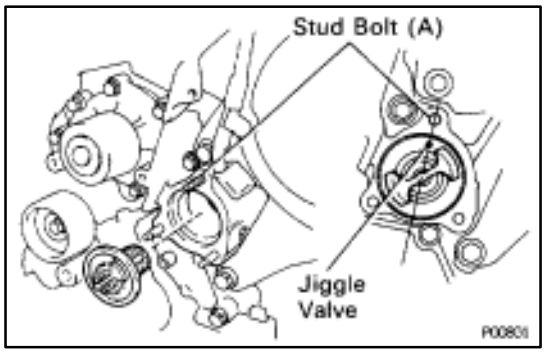
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

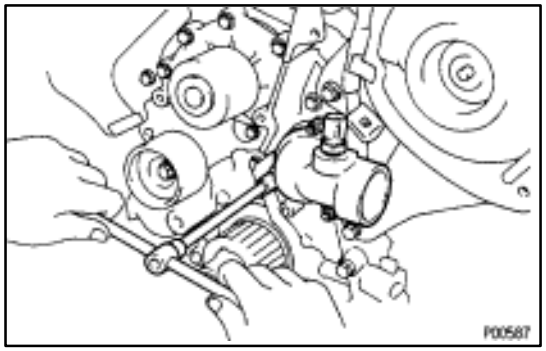


2. INSTALL WATER INLET AND THERMOSTAT

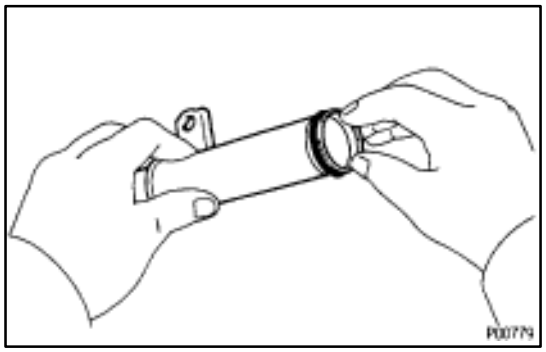
(a) Install a new gasket to the thermostat.

(b) Align the jiggle valve of the thermostat with stud bolt (A), and inset the thermostat in the water pump.

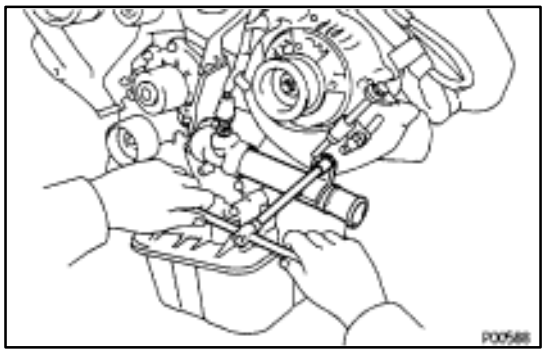




(c) Install the water inlet with the three nuts.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



3. INSTALL WATER INLET PIPE
(a) Install a new O–ring to the water inlet pipe.



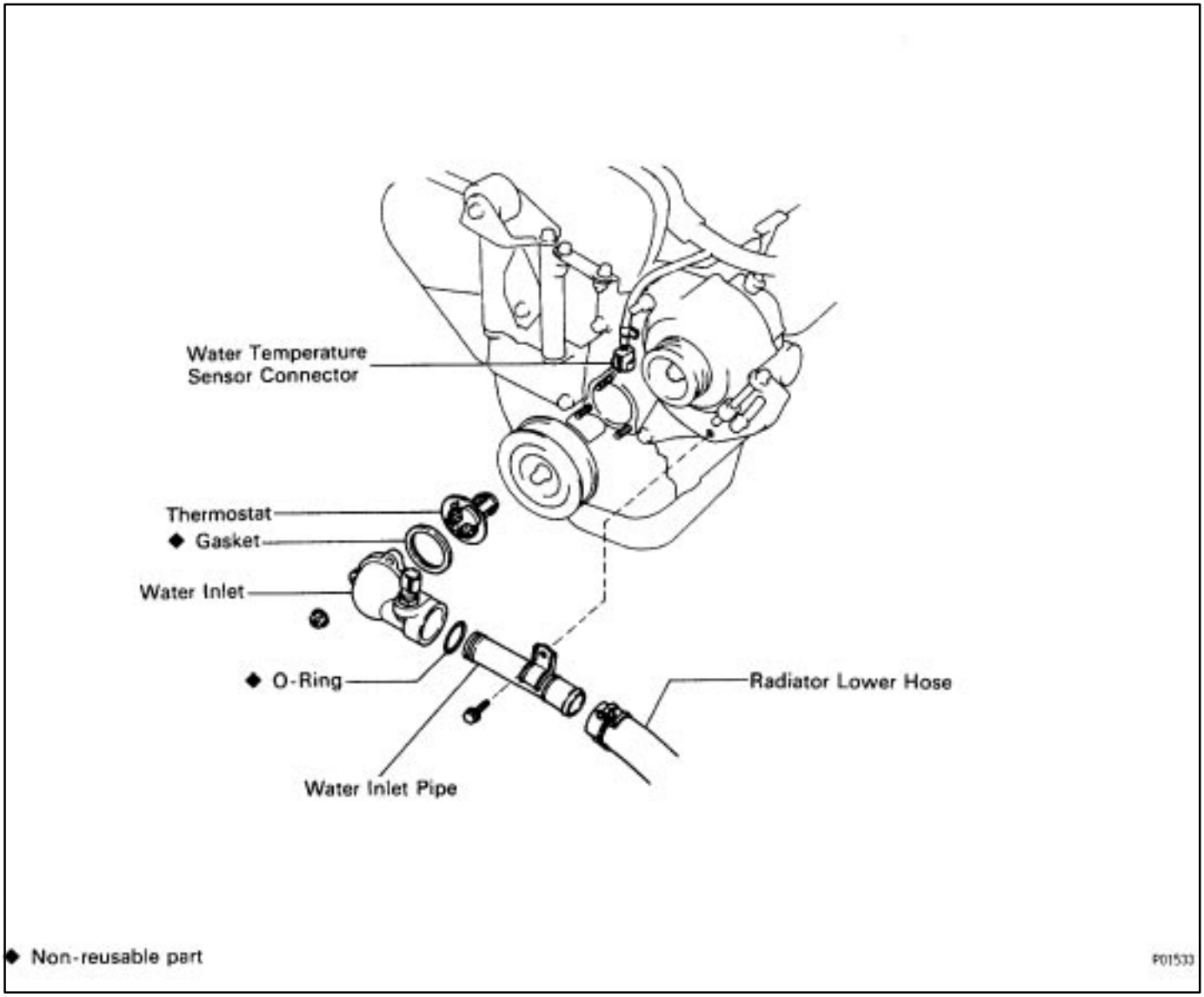
(b) Apply soapy water to the O–ring.
(c) Connect the water inlet pipe to the water inlet.
(d) Install the bolt holding the water inlet pipe to the generator belt adjusting bar.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

4. INSTALL TIMING BELT (See page EG–29)
5. CONNECT RADIATOR LOWER HOSE
6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY
7. FILL WITH ENGINE COOLANT (See page EG–244)

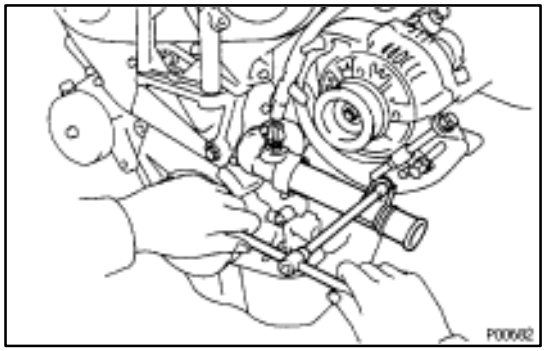
THERMOSTAT
THERMOSTAT REMOVAL

EG09X–01

HINT: Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.



1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT (See page EG–244)**

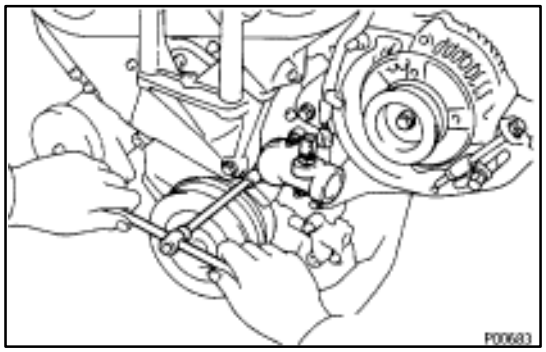


3. REMOVE WATER INLET PIPE

(a) Remove the bolt holding the water inlet pipe to the generator belt adjusting bar.

(b) Remove the water inlet pipe and O–ring.

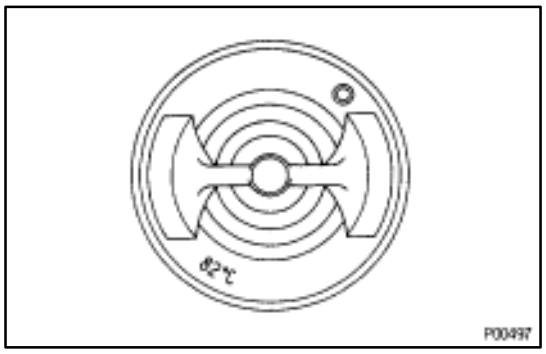
4. DISCONNECT ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR



5. REMOVE WATER INLET

Remove the three nuts and water inlet from water pump.

6. REMOVE THERMOSTAT AND GASKET

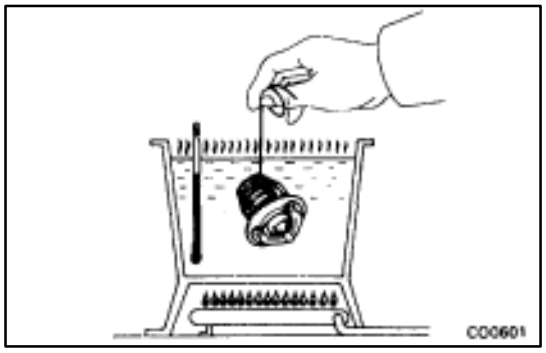


THERMOSTAT INSPECTION

EG09Y–01

INSPECT THERMOSTAT

HINT: The thermostat is numbered with the valve opening temperature.



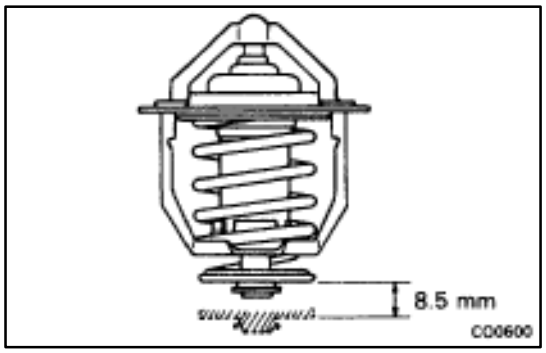
(a) Immerse the thermostat in water and gradually heat the water.

(b) Check the valve opening temperature.

Valve opening temperature:

80–84°C (176–183°F)

If the valve opening temperature is not as specified, replace the thermostat.



(c) Check the valve lift.

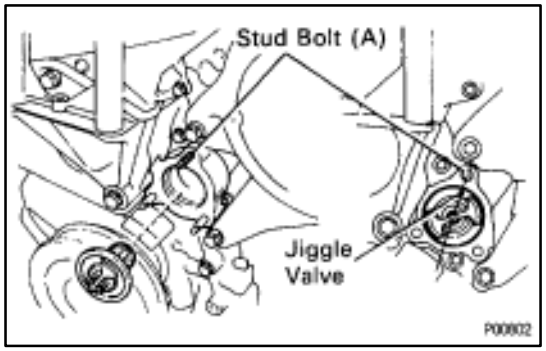
Valve lift:

8.5 mm (0.335 in.) or more at 95°C (203°F)

If the valve lift is not as specified, replace the thermostat.

(d) Check that the valve spring is tight when the thermostat is fully closed.

If not closed, replace the thermostat.



THERMOSTAT INSTALLATION

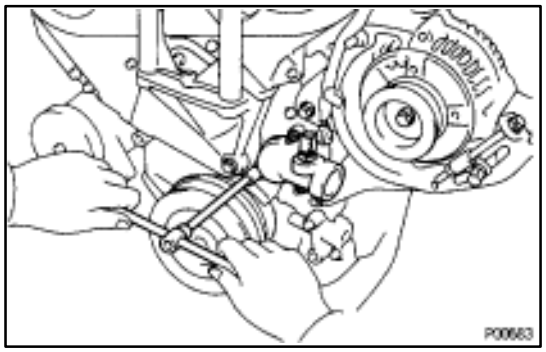
EG09Z–01

(See page EG–250)

1. PLACE THERMOSTAT IN WATER PUMP

(a) Install a new gasket to the thermostat.

(b) Align the jiggle valve of the thermostat with stud bolt (A), and insert the thermostat in the water pump.

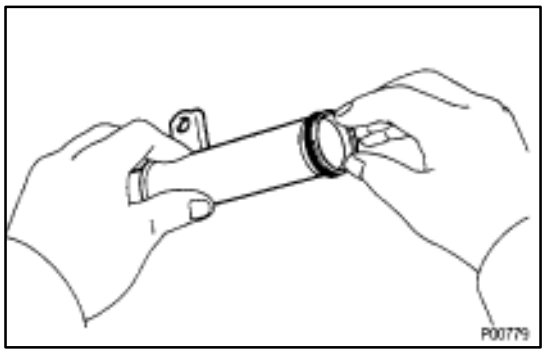


2. INSTALL WATER INLET

Install the water inlet with the three nuts.

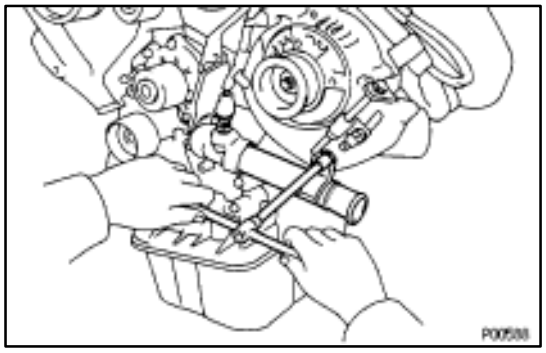
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

3. CONNECT ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR



4. INSTALL WATER INLET PIPE

(a) Install a new O–ring to the water inlet pipe.



(b) Apply soapy water to the O–ring.

(c) Connect the water inlet pipe to the water inlet.

(d) Install the bolt holding the water inlet pipe to the generator belt adjusting bar.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

5. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

6. FILL WITH ENGINE COOLANT (See page EG–244)

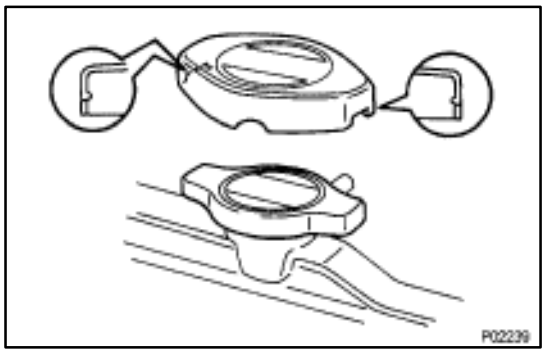
7. START ENGINE AND CHECK FOR LEAKS

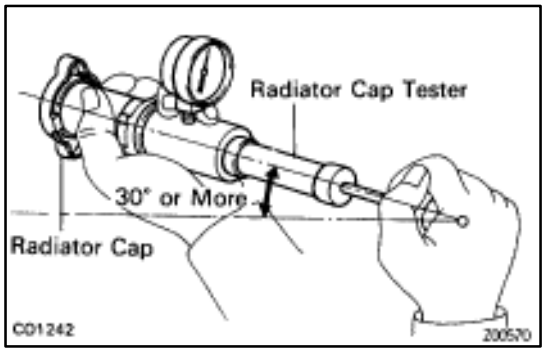
RADIATOR
RADIATOR CLEANING

EG0A0–01

Using water or a steam cleaner, remove any mud and dirt from the radiator core.

NOTICE: If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. If the cleaner nozzle pressure is 2,942–3,432 kPa (30–35 kgf/cm^2, 427–498 psi), keep a distance at least 40–50 cm (15.75 –19.69 in.) between the radiator core and cleaner nozzle.





RADIATOR INSPECTION

EG0A1–01

1. INSPECT RADIATOR CAP

NOTICE:

- **The radiator cap cover is kept in place by the projections shown in the illustration, so do not try to remove the cap cover forcibly.**
- **When performing steps (a) and (b) below, keep the radiator pump tester at an angle of over 30 1 above the horizontal.**

(a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the relief valve.

Pump speed:

1 push/3 seconds or more

NOTICE: Push the pump at a constant speed.

If air is not coming from the relief valve, replace the radiator cap.

(b) Pump the tester several times and measure the relief valve opening pressure.

Pump speed:

1st time

1 push/1 second or less

2nd time or more

Any speed

Standard opening pressure:

Radiator side

93–123 kPa(0.95–1.25 kgf/cm^2, 13.5–17.8 psi)

Water outlet side

83–113 kPa

(0.85–1.15 kgf/cm^2, 12.1–16.4 psi)

Minimum opening pressure:

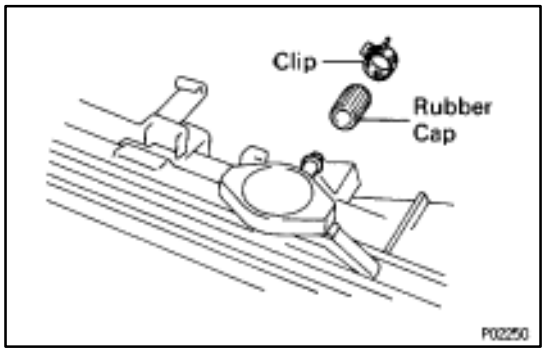
Radiator side

78 kPa (0.8 kgf/cm^2, 11.4 psi)

Water outlet side

69 kPa (0.7 kgf/cm^2, 10.0 psi)

If the opening pressure is less than minimum, replace the radiator cap.



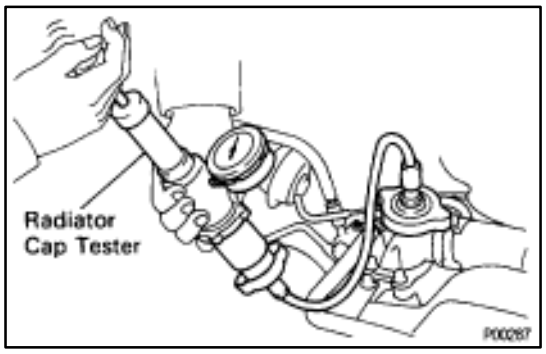
2. INSPECT COOLING SYSTEM FOR LEAKS

(a) Fill the radiator and engine with engine coolant and attach a radiator cap tester to the water outlet.

(b) Warm up the engine.

(c) Disconnect the reservoir hose from the radiator overflow pipe.

(d) Install a rubber cap onto the radiator overflow pipe, then fix the rubber cap in place with a clip.



(e) Pump it to 127 kPa (1.3 kgf/cm^2, 18.5 psi) and check that the pressure does not drop.
If the pressure drops, check for leaks from the hoses, radiator or water pump. If no external leaks are found, check the heater core, cylinder block and head.

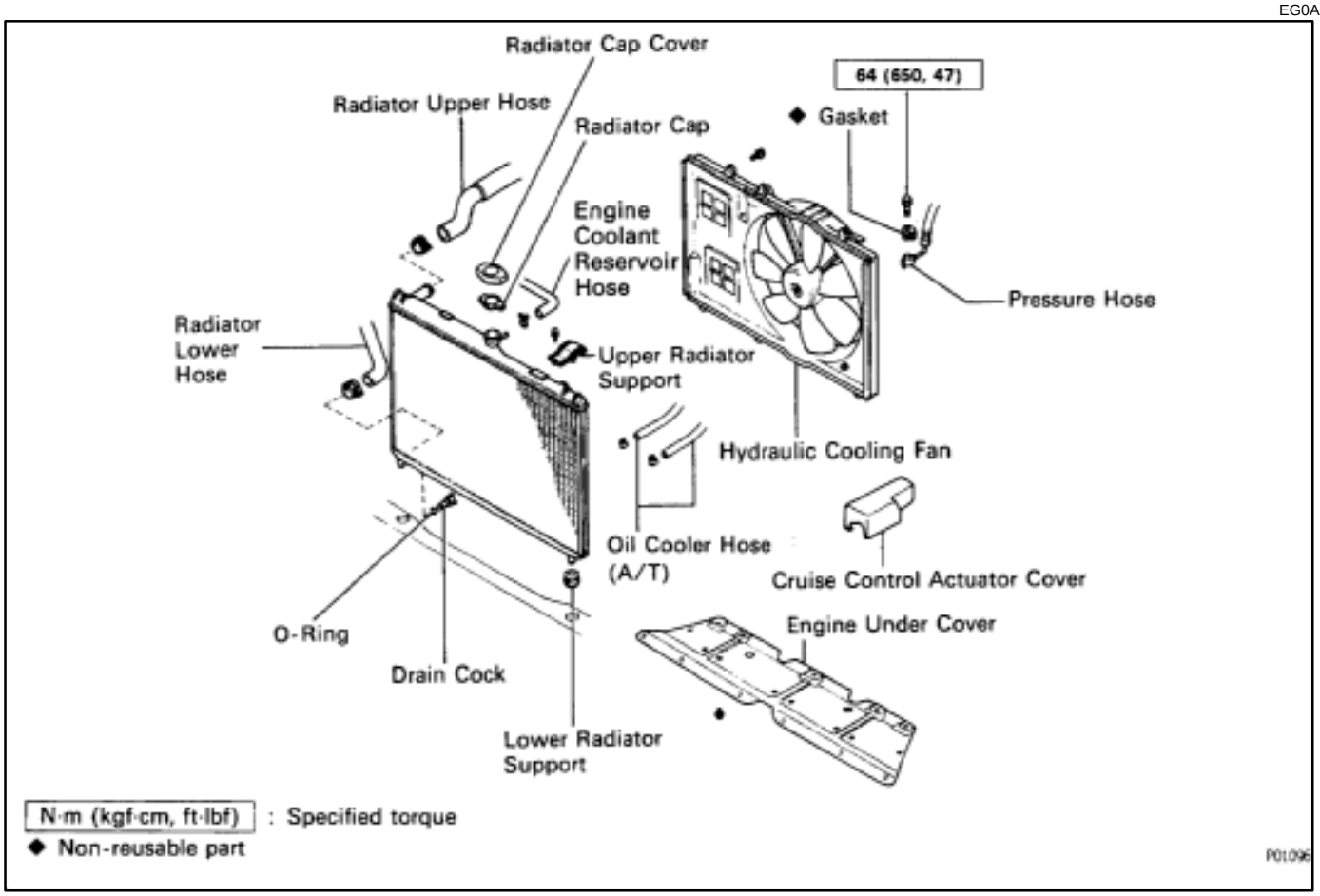
(f) Remove the radiator cap tester and install the radiator cap to the water outlet.

(g) Remove the clip and rubber cap from the radiator overflow pipe.

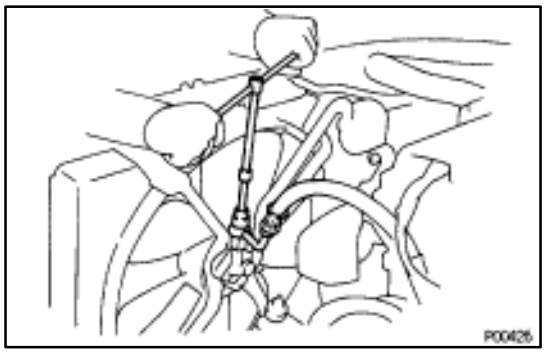
(h) Connect the reservoir hose to the radiator overflow pipe.

RADIATOR REMOVAL

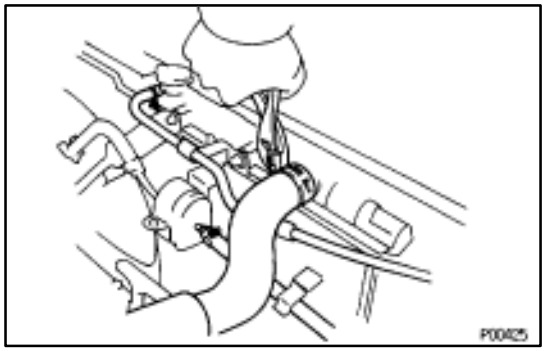
EG0A2–01



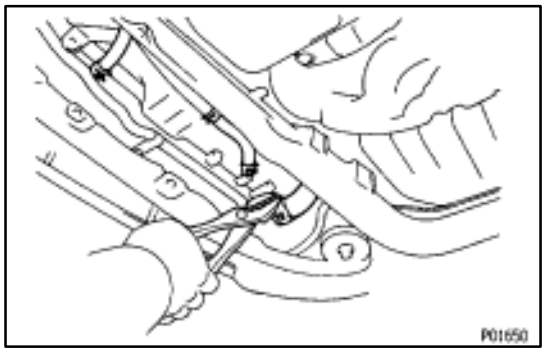
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT (See page EG–244)**
3. **REMOVE CRUISE CONTROL ACTUATOR COVER**



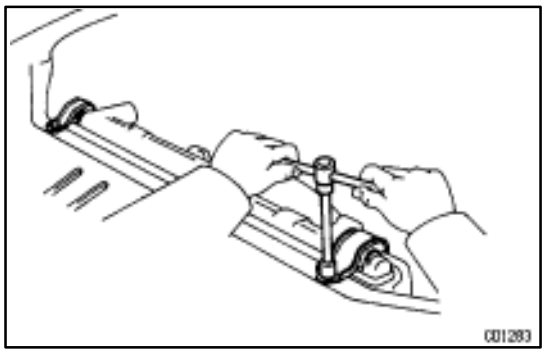
4. **DISCONNECT PRESSURE HOSE**
   Remove the union bolt and gasket, and disconnect the pressure hose from the hydraulic motor.
   NOTICE: Catch leaking oil in a container.



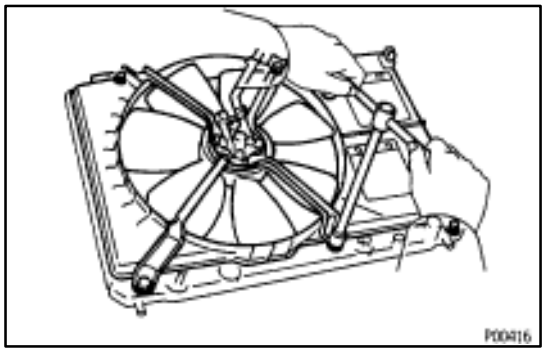
5. DISCONNECT RADIATOR UPPER HOSE
6. DISCONNECT ENGINE COOLANT RESERVOIR HOSE
7. DISCONNECT HYDRAULIC MOTOR RETURN HOSE
8. REMOVE ENGINE UNDER COVER



9. DISCONNECT RADIATOR LOWER HOSE
10. (A/T)
DISCONNECT OIL COOLER HOSE



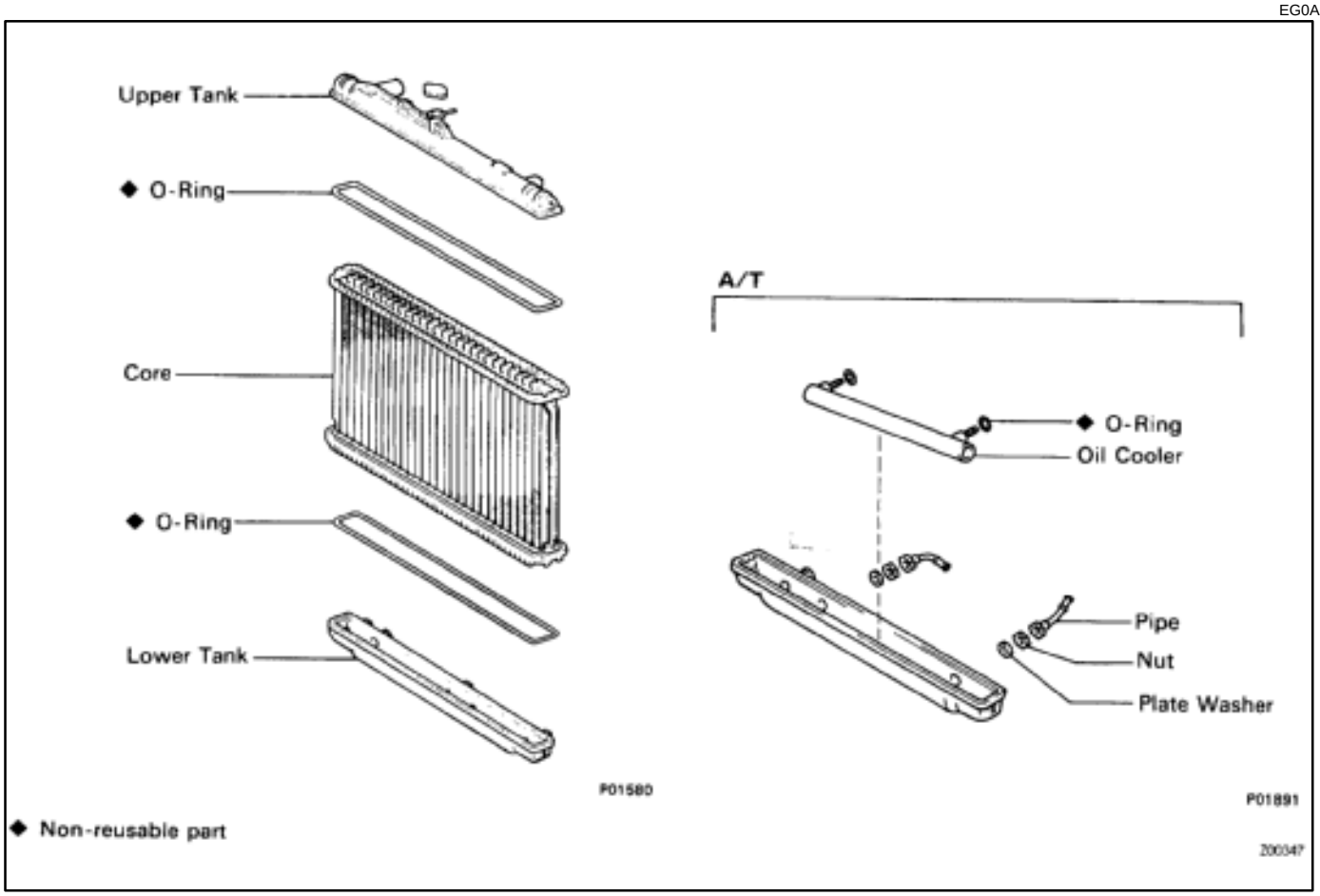
11. REMOVE RADIATOR AND HYDRAULIC COOLING FAN
(a) Remove the two bolts and two upper supports.
(b) Lift out the radiator.
(c) Remove the two lower radiator supports.



12. REMOVE HYDRAULIC COOLING FAN FROM RADIATOR
Remove the six bolts and cooling fan.

COMPONENTS

EG0A3–01



RADIATOR DISASSEMBLY

EG0A4–01

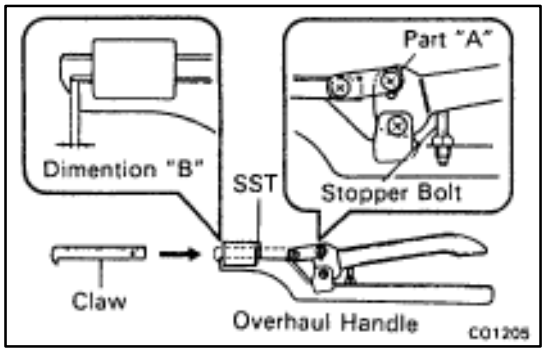
1. ASSEMBLY OF SST

SST 09230–01010

(a) Install the claw to the overhaul handle, inserting it in the hole in part ”A” as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” shown in the diagram is 0.2–0.5 mm (0.008–0.020 in.).

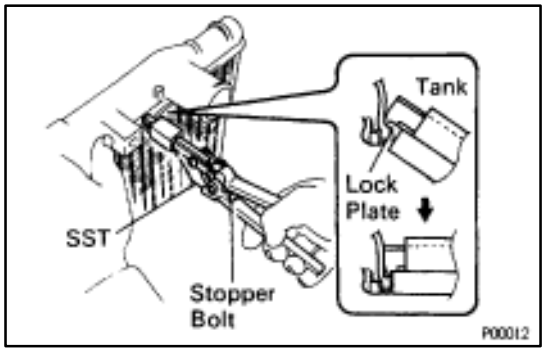
NOTICE: If this adjustment is not performed, the claw may be damaged.

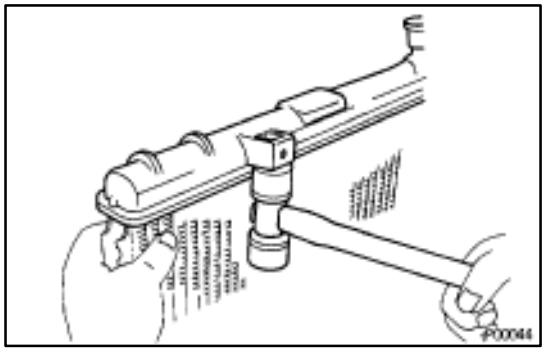


2. UNCAULK LOCK PLATES

Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230–01010

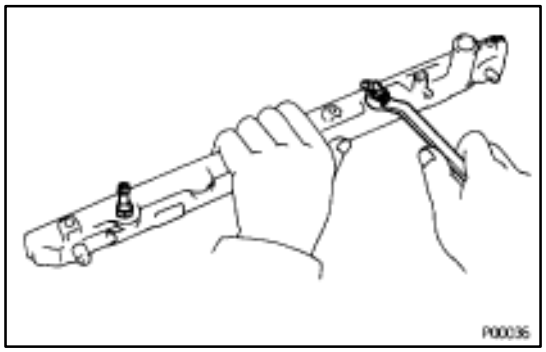




3. REMOVE TANKS AND O–RINGS

(a) Lightly tap the radiator hose inlet (or outlet) with a soft–faced hammer and remove the tank.

(b) Remove the O–ring.



4. (A/T)

REMOVE OIL COOLER FROM LOWER TANK

(a) Remove the pipes.

HINT: Make a note of the direction to face the pipes.

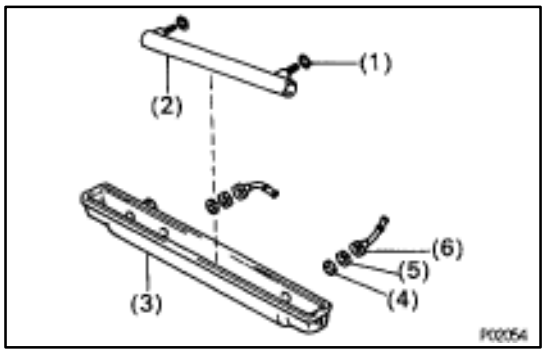
(b) Remove the nuts, and plate washers.

(c) Remove the oil cooler and O–rings.

RADIATOR ASSEMBLY

EG0A5–01

(See page EG–257)



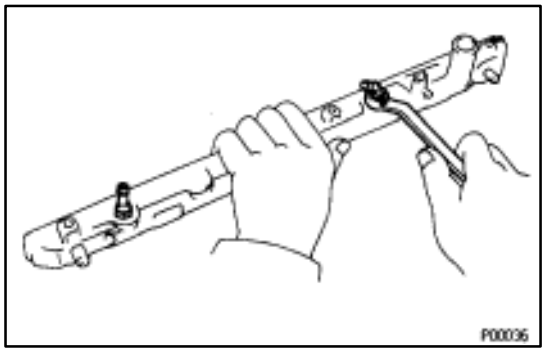
1. (A/T)

INSTALL OIL COOLANT TO LOWER TANK

(a) Clean the O–ring contact surface of the lower tank and oil cooler.

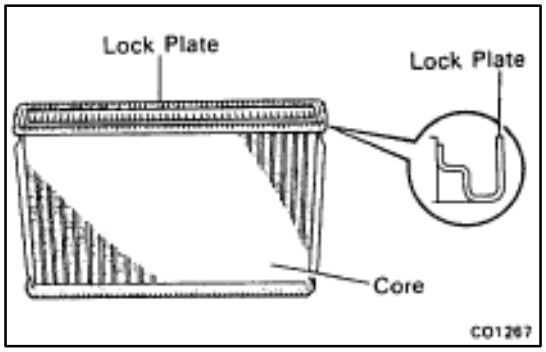
(b) Install new O–rings (1) to the oil cooler (2).

(c) Install the oil cooler (2) with the O–rings (1) to the lower tank (3).



(d) Install the plate washers (4), and nuts (5). Torque the nuts (5).
Torque: 8.3 N·m (85 kgf·cm, 74 ft·lbf)

(e) Install the pipes (6).
Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)
HINT: Face the pipes in the same direction as before disassembly.



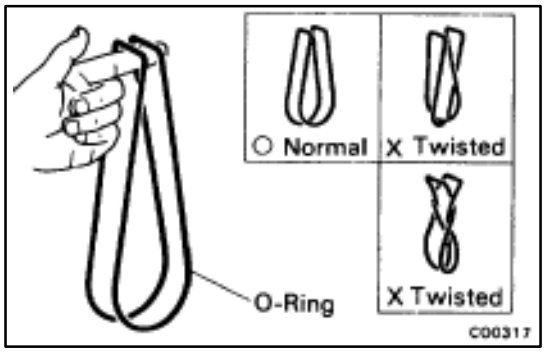
2. INSPECT LOCK PLATE

Inspect the lock plate for damage.

HINT:

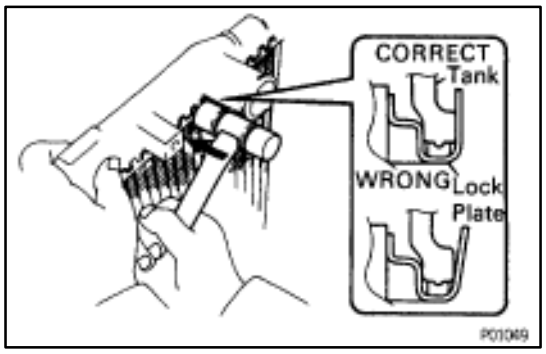
- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.

•Therefore, first correct any deformation with pliers or like object. Water leakage will result if the bottom of the lock plate groove is damaged or dented, Therefore, repair or replace if necessary.

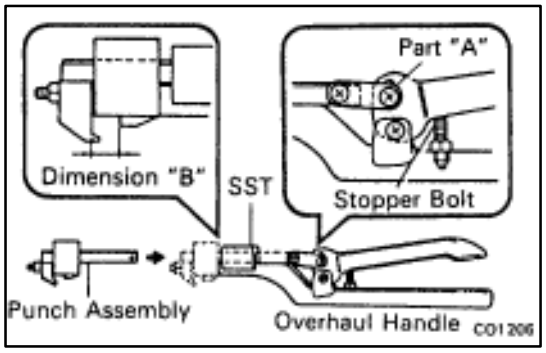


3. INSTALL NEW O–RINGS AND TANKS

(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.



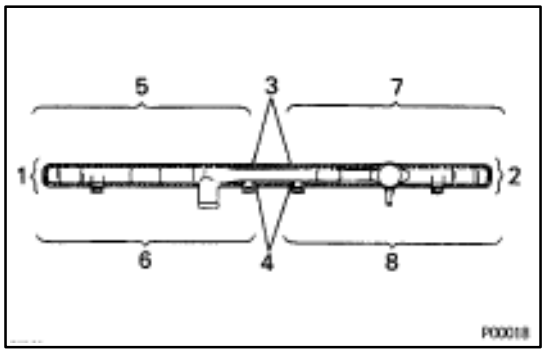
(b) Install the tank without damaging the O–ring.
(c) Tap the lock plate with a soft–faced hammer so that there is no gap between it and the tank.



4. ASSEMBLY OF SST

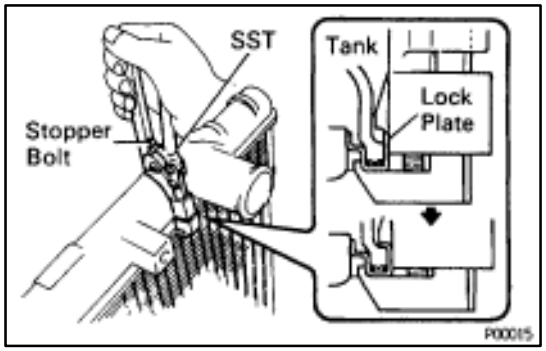
SST 09230–01010

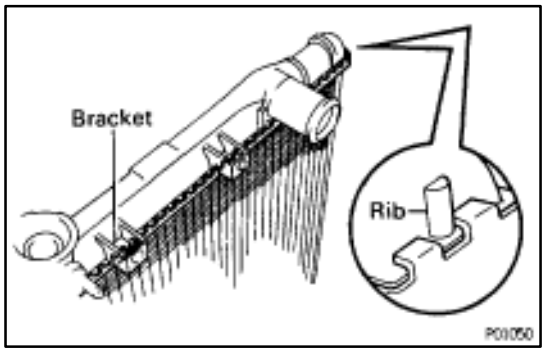
(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part ”A” as shown in the illustration.
(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” shown in the diagram is 7.7 mm (0.30 in.).



5. CAULK LOCK PLATE

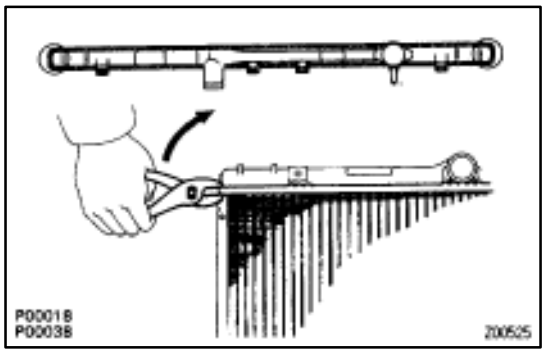
(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.
SST 09230–01010



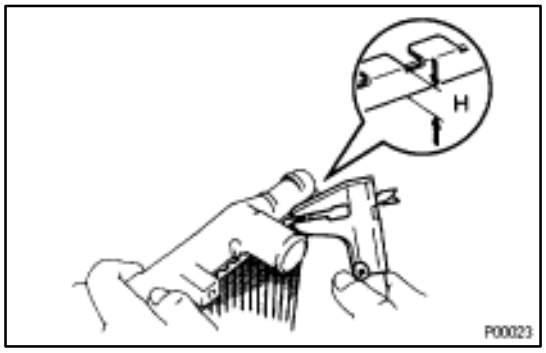


HINT:

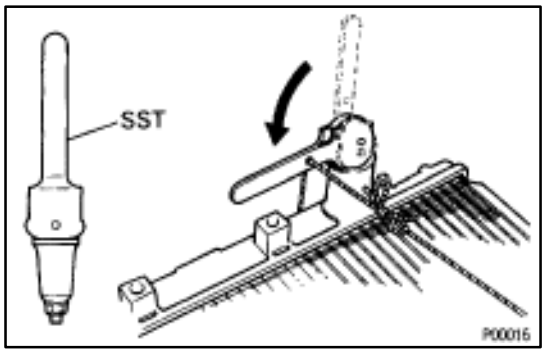
- Do not stake the areas protruding around the pipes, brackets or tank ribs.



- The points shown in the illustration and oil cooler near here (A/T) cannot be staked with the SST. Use a plier or like object and be careful not to damage the core plates.

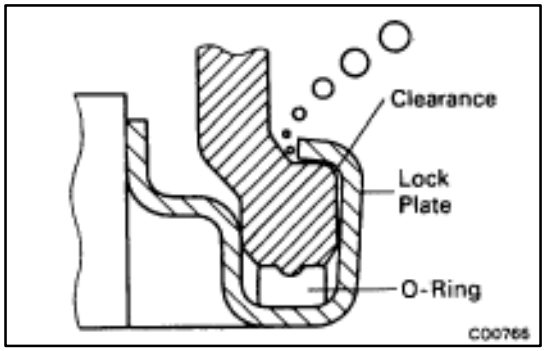


(b) Check the lock plate height (H) after completing the caulking.
Plate height:
7.75–8.25 mm (0.305–0.325 in.)
If not within the specified height, adjust the stopper bolt of the handle again and perform the caulking again.



6. INSPECT FOR WATER LEAKS

(a) Tighten the drain plug.
(b) Plug the inlet and outlet pipes of the radiator with SST.
SST 09230–01010
(c) Using a radiator cap tester, apply pressure to the radiator.
Torque: 177 kPa (1.8 kgf/cm^2, 26 psi)
(d) Inspect for water leaks.



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 oil leak when the radiator is submerged in water. Therefore, before performing the water leak test, first switch the radiator around in the water until all air bubbles disappear.

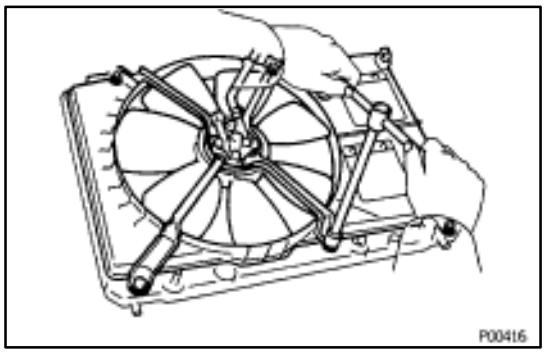
7. PAINT LOCK PLATES

HINT: If the water leak test checks out okay, allow the radiator to completely dry and then paint the lock plates.

RADIATOR INSTALLATION

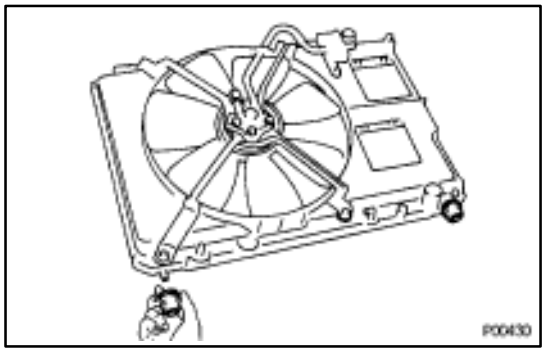
EG0A6–01

(See page EG–255)



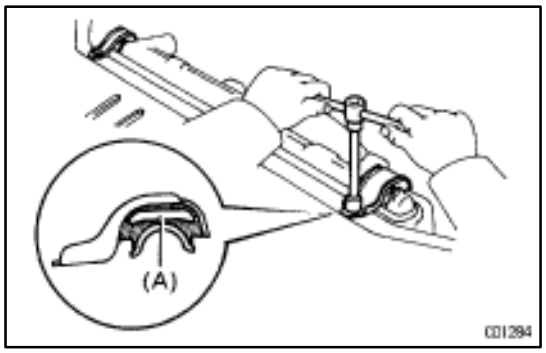
1. INSTALL HYDRAULIC COOLING FAN TO RADIATOR

Install the cooling fan with the six bolts.



2. INSTALL RADIATOR AND HYDRAULIC COOLING FAN

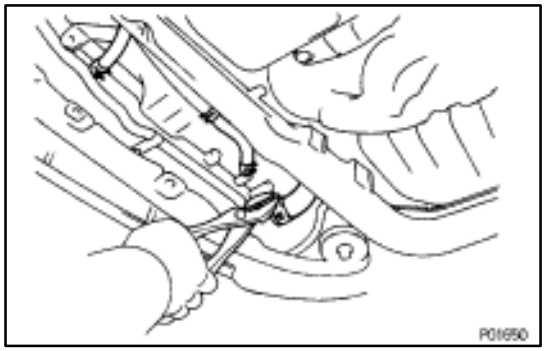
(a) Place the two lower radiator supports in position on the body.



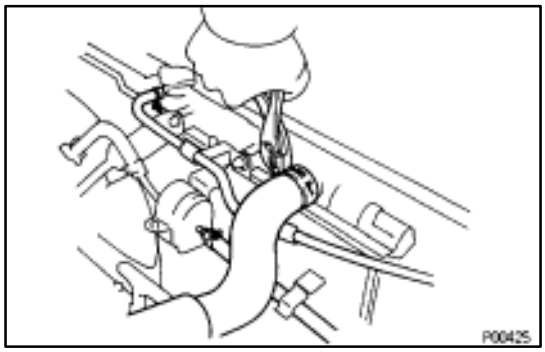
(b) Place the radiator in position, and install the two upper supports with the two bolts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

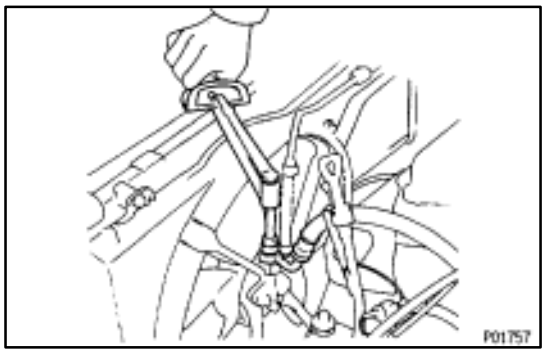
HINT: After installation, check that the rubber cushion (A) of the support is not depressed.



3. (A/T)
   CONNECT OIL COOLER HOSES
4. CONNECT RADIATOR LOWER HOSE
5. INSTALL ENGINE UNDER COVER



6. CONNECT HYDRAULIC MOTOR RETURN HOSE
7. CONNECT ENGINE COOLANT RESERVOIR HOSE
8. CONNECT RADIATOR UPPER HOSE



9. CONNECT PRESSURE HOSE TO HYDRAULIC MOTOR
   Connect the pressure hose with a new gasket and the union bolt.
   Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

10. INSTALL CRUISE CONTROL ACTUATOR COVER
11. FILL WITH ENGINE COOLANT (See page EG–244)
12. FILL COOLING FAN (PS) RESERVOIR TANK WITH FLUID
13. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY
14. START ENGINE AND CHECK FOR LEAKS
15. BLEED ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN SYSTEM
    (See page EG–265)
16. (A/T)
    CHECK AUTOMATIC TRANSMISSION (A/T) FLUID LEVEL
    NOTICE: Do not overfill.

ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN SYSTEM

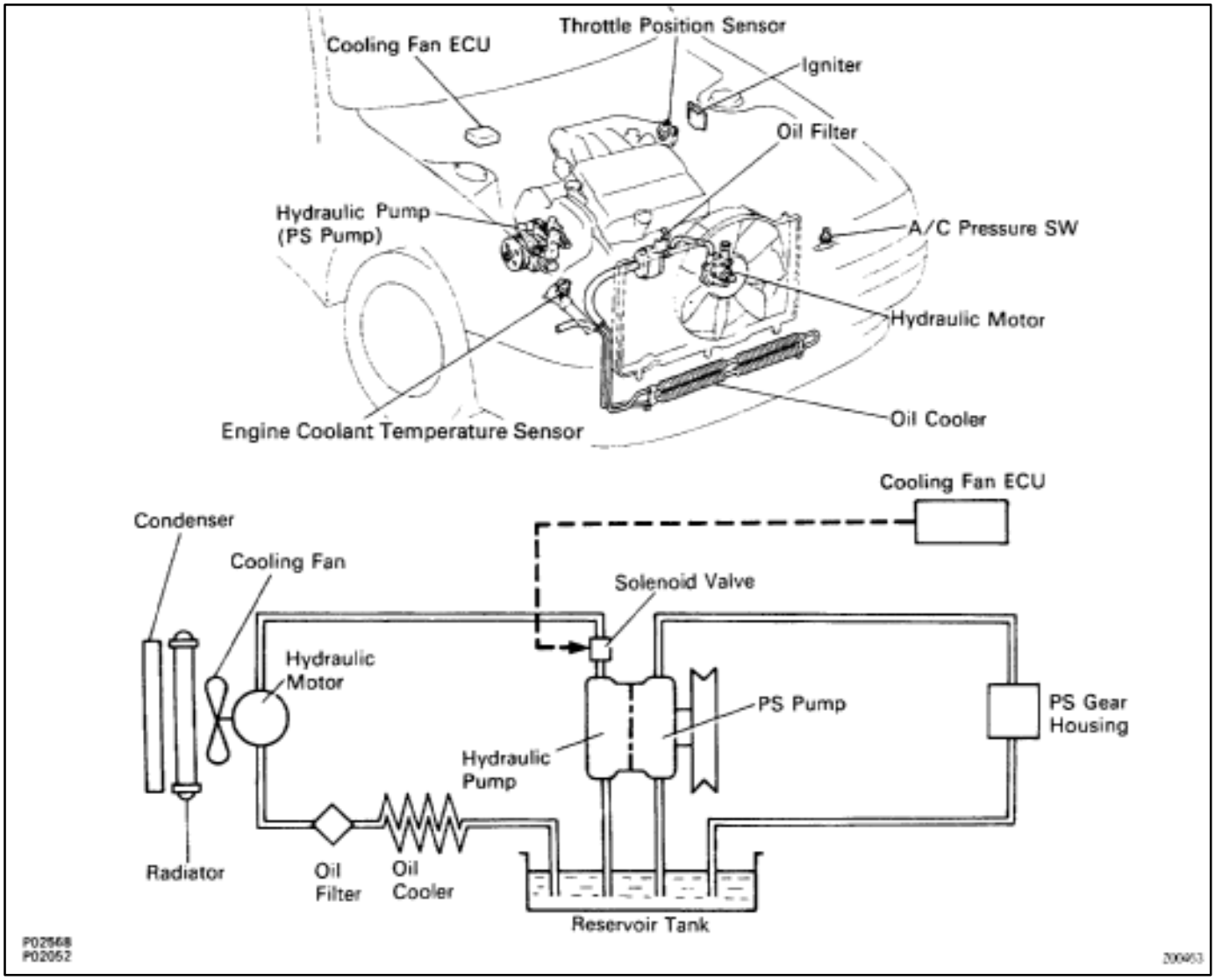
DESCRIPTION

EG0A7–01

In this system, the cooling fan ECU controls the hydraulic pressure acting on the hydraulic motor, thus controlling the speed of the cooling fan steplessly in response to the condition of the engine and air conditioning.

OPERATION

EG0A8–01



The hydraulic pump integrated with PS pump is driven by the PS pump drive belt. The solenoid valve adjusts the volume of oil sent from the hydraulic pump to the hydraulic motor which drives the fan directly, thereby controlling the fan speed.

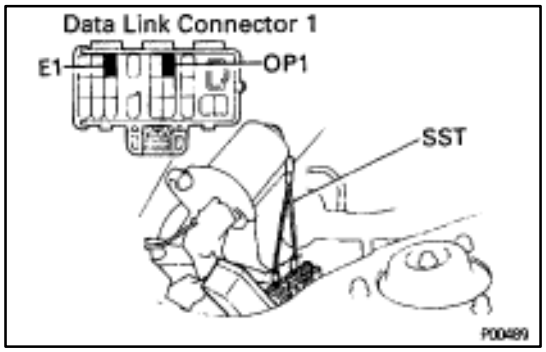
Oil which has passed through the hydraulic motor is cooled by the oil cooler before returning to the PS pump reservoir tank.

The solenoid valve is controlled by the computer in accordance with the engine rpm, engine coolant temp. and A/C signals.

ON–VEHICLE INSPECTION
FLUID LEVEL INSPECTION

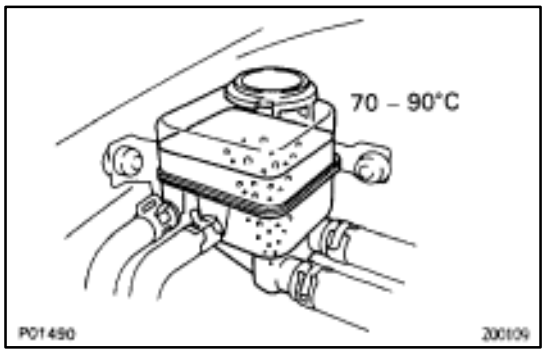
EG0A9–01

1. KEEP VEHICLE LEVEL



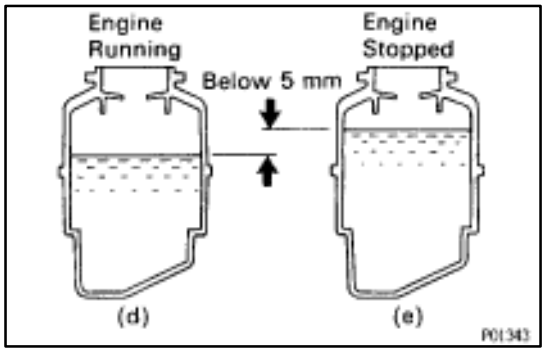
2. INSPECT FLUID LEVEL

(a) Using SST, connect terminals OP1 and E1 of the data link connector 1.
SST 09843–18020

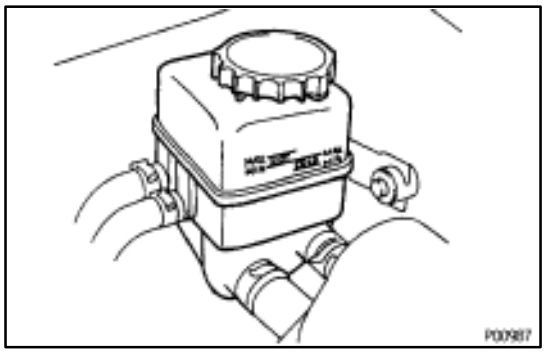


(b) Keep the engine speed at 2,000 rpm until the fluid temperature reaches the specified temperature.
Fluid temperature:
70–90°C (158–195°F)

(c) Check that that there is no foaming and emulsification of the fluid in the reservoir tank.

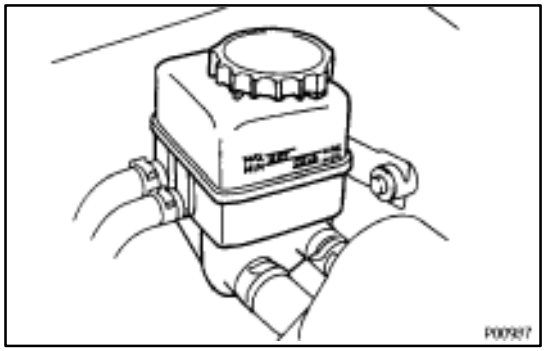


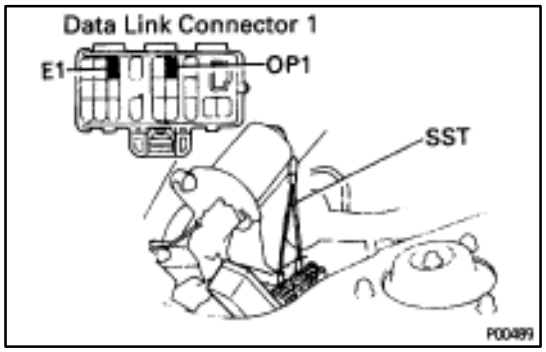
(d) Measure the fluid level with the engine running.
(e) Stop the engine, and measure the fluid level.
(f) Subtract (d) from (e).
Maximum stroke:
5 mm (0.20 in.)

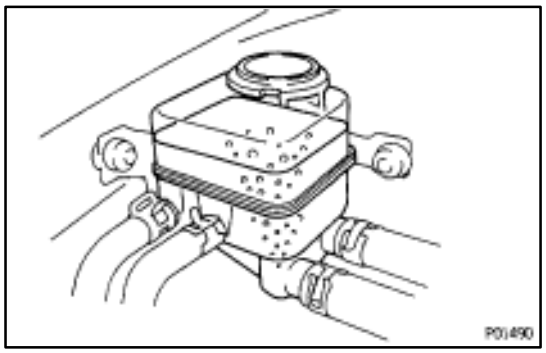


(g) Check the fluid level.
If low, add fluid.
Fluid:
ATF DEXRON® II
HINT: Check that fluid level is within the ”HOT” level on reservoir tank. If the fluid is cold, check that it is within the ”COLD” level on the tank.

(h) Remove the SST from the data link connector 1.
SST 09843–19020







HYDRAULIC COOLING FAN SYSTEM BLEEDING

EG0AA–01

1. CHECK FLUID LEVEL IN RESERVOIR TANK

If low, add fluid.

Fluid:

ATF DEXRON® II

HINT: Check that fluid level is within the ”HOT” level on reservoir tank. If the fluid is cold, check that it is within the ”COLD” level on the tank.

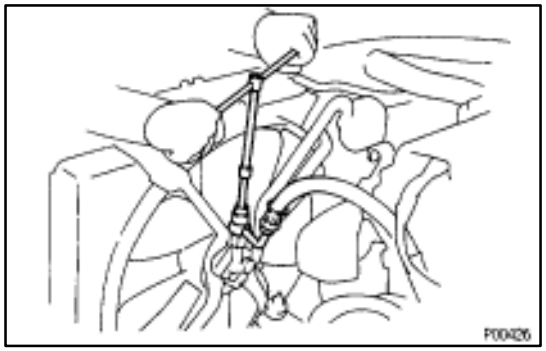
2. BLEED COOLING SYSTEM

(a) Using SST, connect terminals OP1 and E1 of the data link connector 1.
SST 09843–18020

(b) Start the engine without depressing the accelerator pedal.

(c) Leave the engine running for several seconds.

(d) Check that there is no foaming and emulsification of the fluid in the reservoir tank.

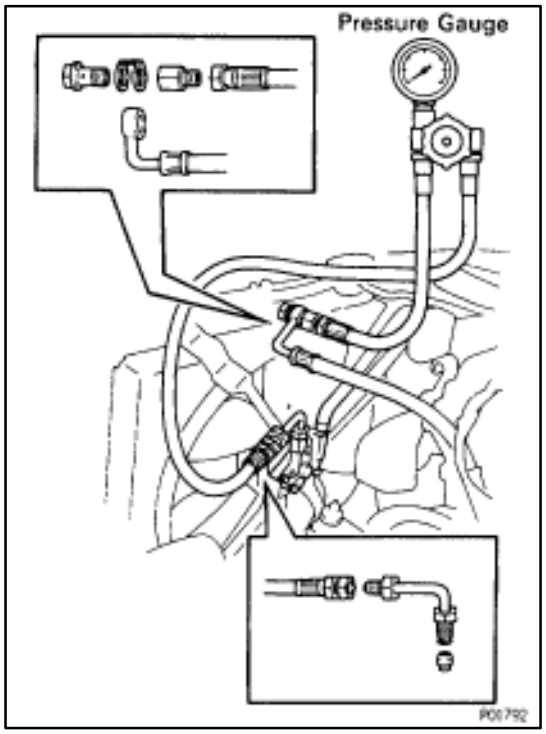


OIL PRESSURE INSPECTION

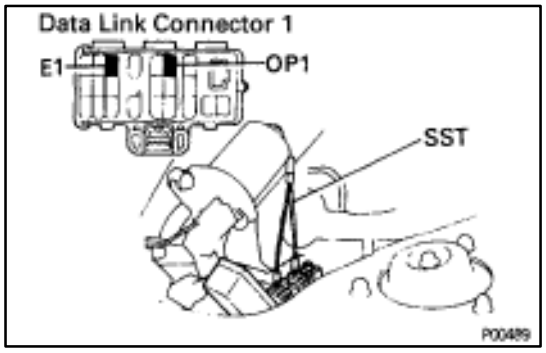
EG0AB–01

1. CONNECT PRESSURE GAUGE

(a) Remove the union bolt and gasket, and disconnect the pressure hose from the hydraulic motor.



(b) Connect the gauge side of a pressure gauge to pressure hose, and the valve side to the hydraulic motor.

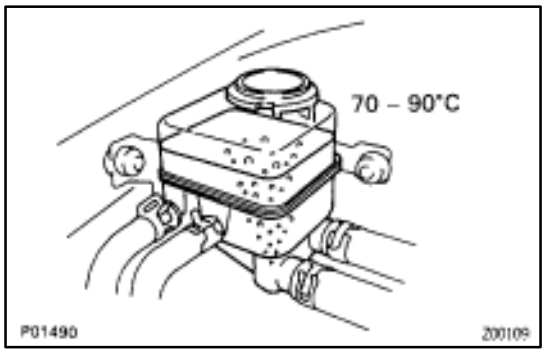


2. INSPECT OIL PRESSURE

HINT: Before inspecting the oil pressure, first check that the A/C is off.

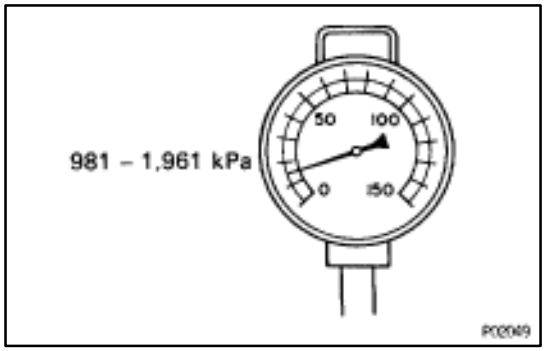
(a) Using SST, connect terminals OP1 and E1 of the data link connector 1.
SST 09843–18020

(b) Bleed the hydraulic cooling system.
(See page EG–265)

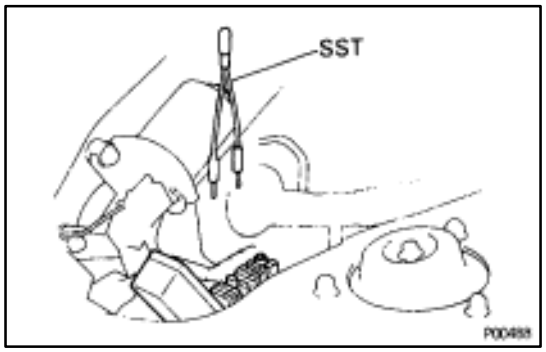


(c) Keep the engine speed at 2,000 rpm until the fluid temperature reaches the specified temperature.
Fluid temp.:
70–90°C (158–195°F)

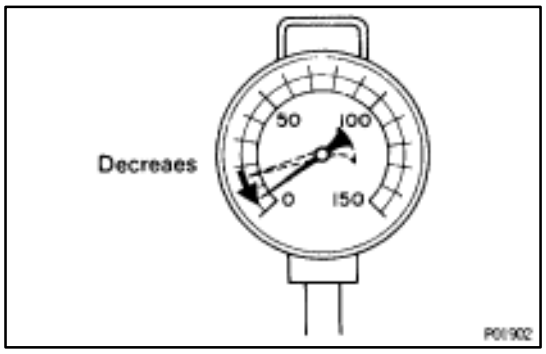
(d) Check the fluid level is correct.



(e) Measure the oil pressure at idling.
Oil pressure:
981–1,961 kPa (10–20 kgf/cm^2, 142–284 psi)



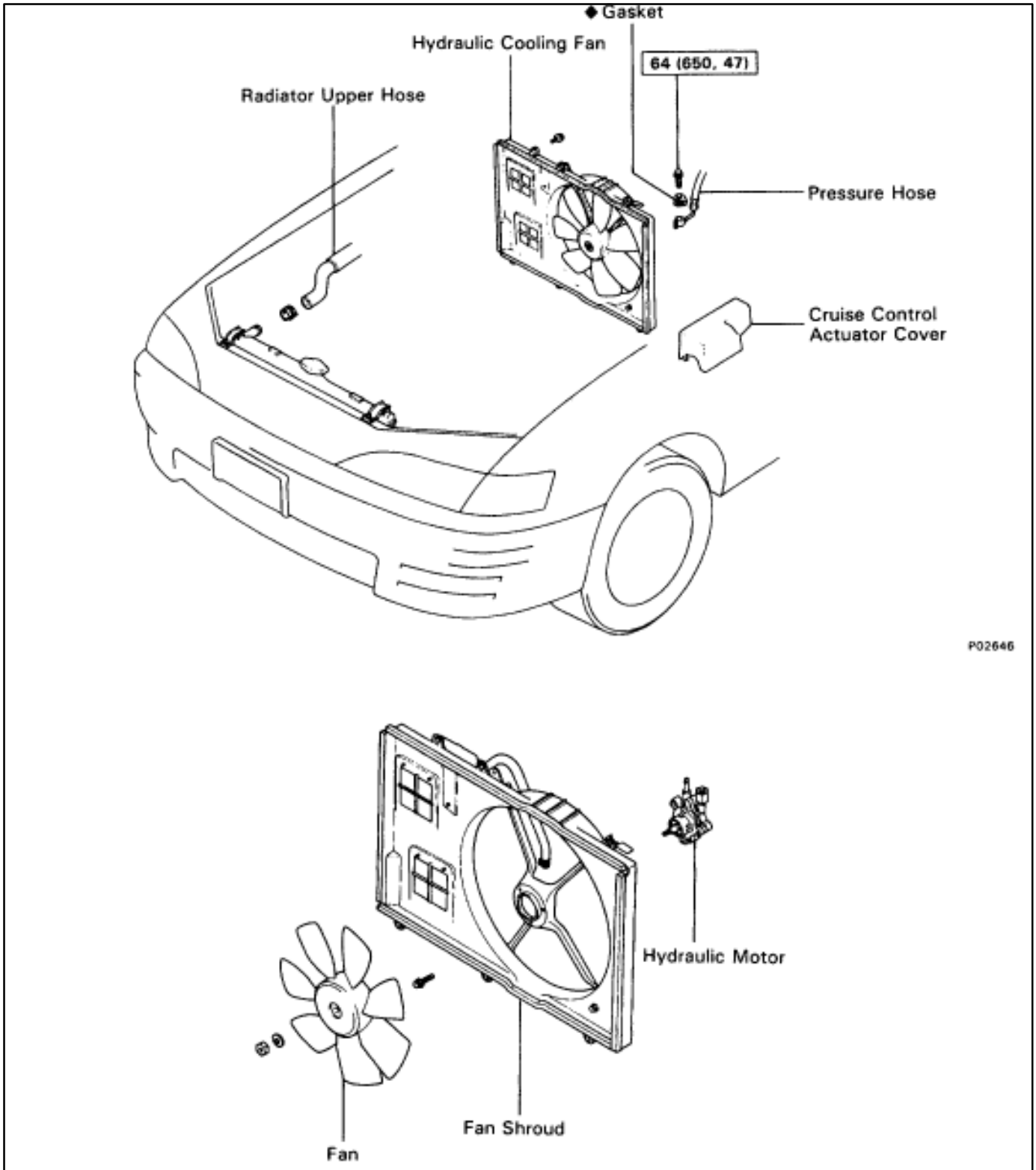
(f) Remove the SST from the data link connector 1.
SST 09843–18020



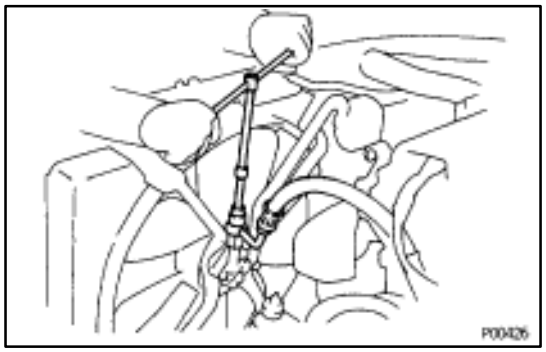
(g) Check that the oil pressure decreases.

HYDRAULIC MOTOR
HYDRAULIC MOTOR REMOVAL

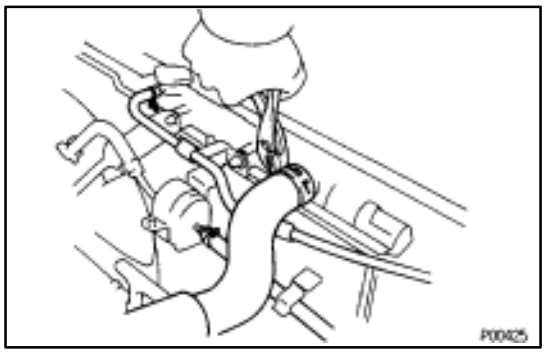
EG0AD–03



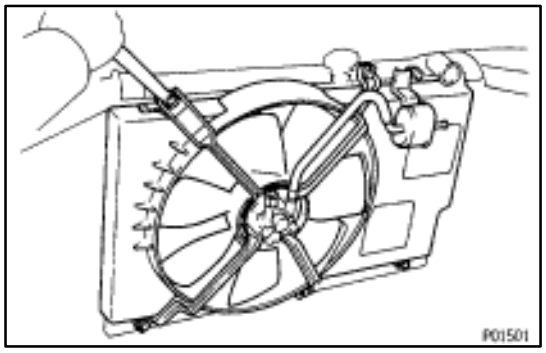
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **DRAIN ENGINE COOLANT (See page EG–244)**
3. **REMOVE CRUISE CONTROL ACTUATOR COVER**



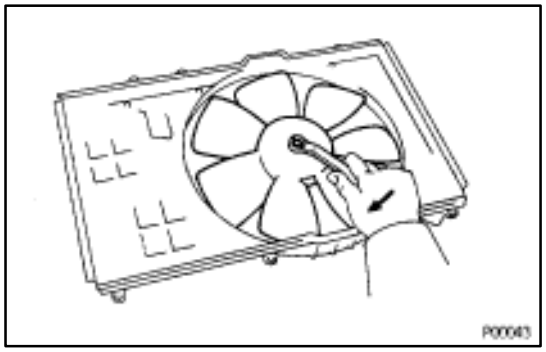
4. **DISCONNECT PRESSURE HOSE**
   Remove the union bolt and gasket, and disconnect the pressure hose from the hydraulic motor.
   NOTICE: Catch leaking oil in a container



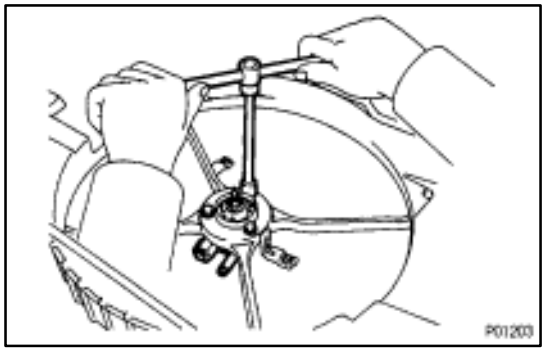
5. **DISCONNECT RADIATOR UPPER HOSE**
6. **DISCONNECT ENGINE COOLANT RESERVOIR HOSE**
7. **DISCONNECT HYDRAULIC MOTOR RETURN HOSE**



8. **REMOVE HYDRAULIC COOLING FAN**
   Remove the six bolts and hydraulic cooling fan.



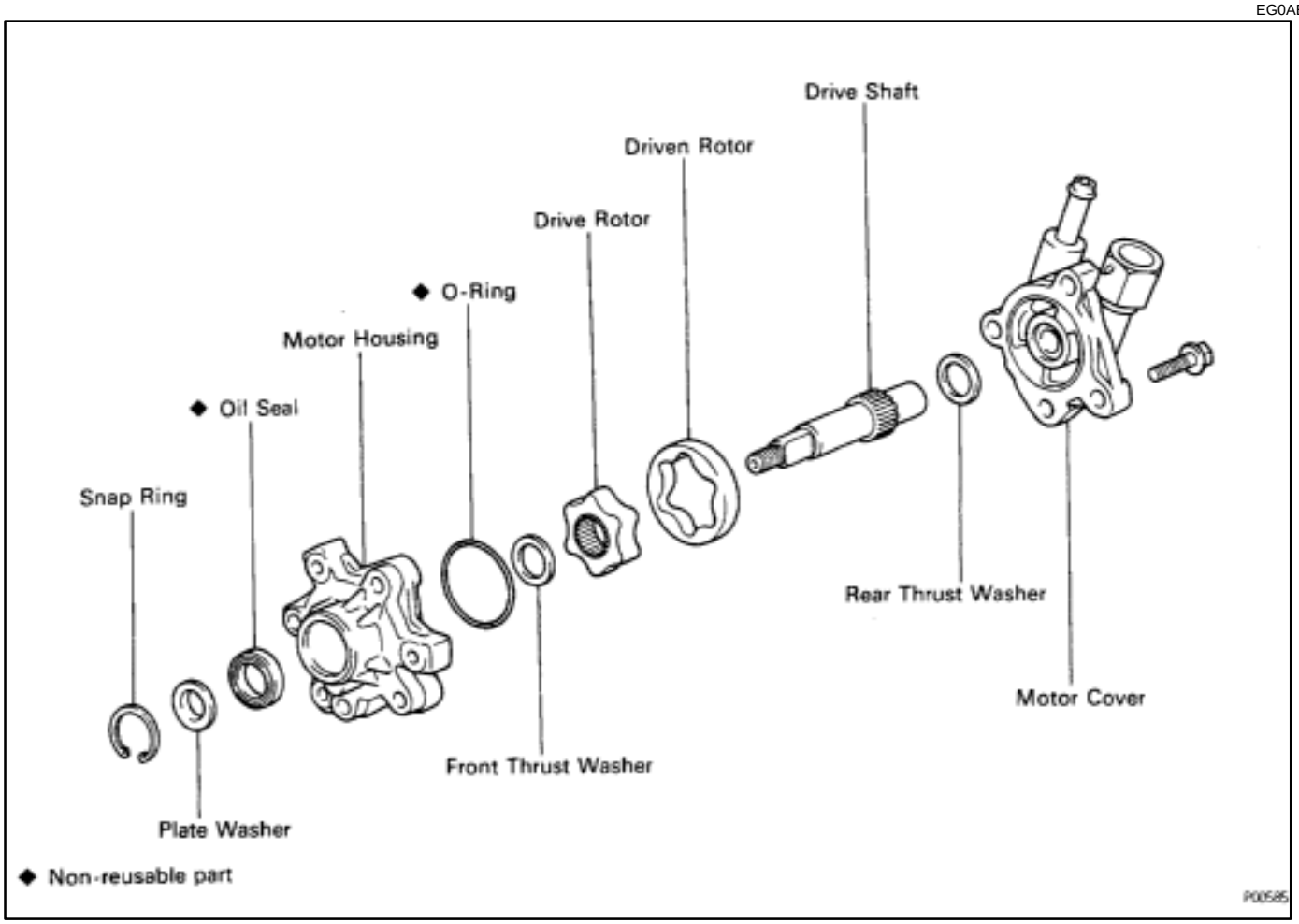
9. **REMOVE COOLING FAN FROM HYDRAULIC MOTOR**
   Loosen the fan mounting nut clockwise, and remove the nut, plate washer and fan.



10. REMOVE HYDRAULIC MOTOR FROM FAN SHROUD
Remove the three bolts and hydraulic motor.

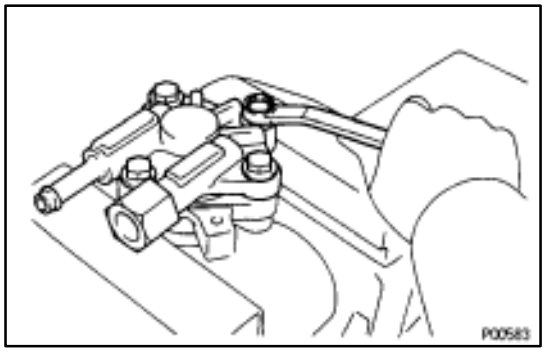
COMPONENTS

EG0AE–01



HYDRAULIC MOTOR DISASSEMBLY

EG0AF–01

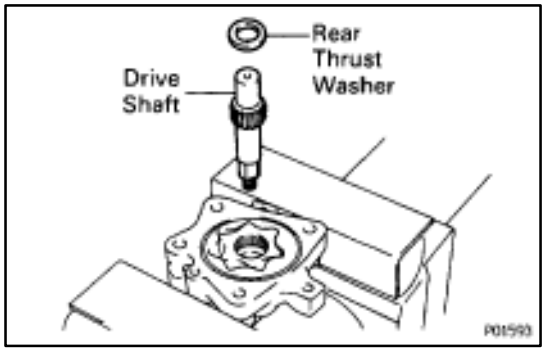


1. MOUNT MOTOR HOUSING
Slightly mount the motor housing in a vise.
NOTICE: Be careful not to damage the motor housing.

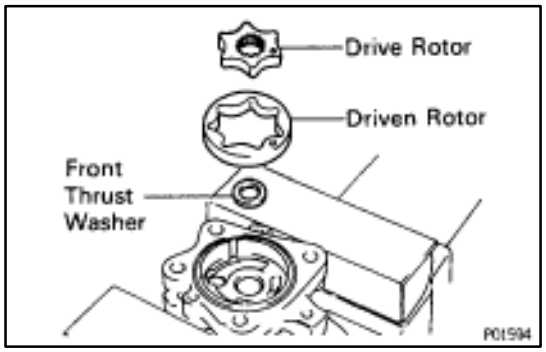
2. REMOVE MOTOR COVER

(a) Remove the four bolts and motor cover.

(b) Remove the O–ring from the motor cover.



3. REMOVE REAR THRUST WASHER AND DRIVE SHAFT

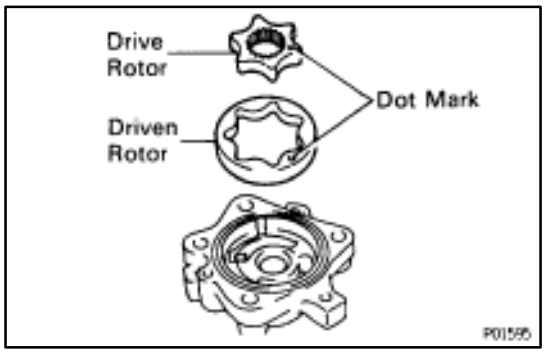


4. REMOVE DRIVE AND DRIVEN ROTORS

5. REMOVE FRONT THRUST WASHER

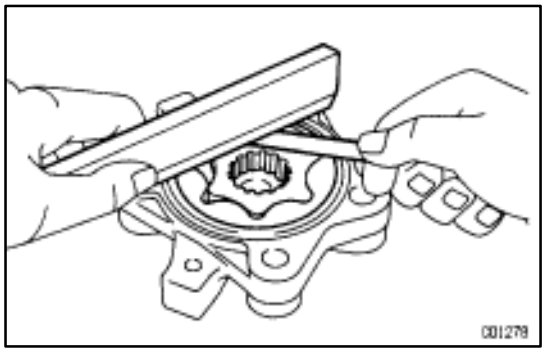
HYDRAULIC MOTOR INSPECTION

EG0AG–01



1. INSPECT DRIVE AND DRIVEN ROTORS

(a) Install the drive and driven rotor to the motor housing with the dot mark facing upward.



(b) Using a thickness gauge and precision straight edge, measure the side clearance between the rotor and precision straight edge.

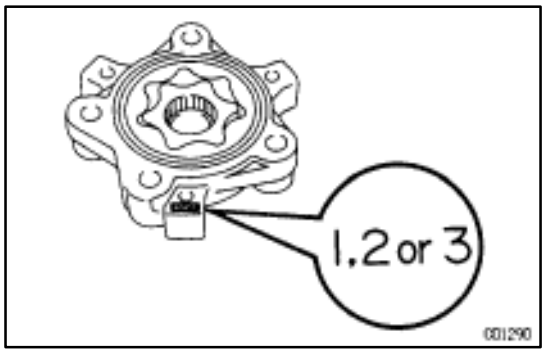
Standard side clearance:

0.01–0.04 mm (0.0004–0.0016 in.)

Maximum side clearance:

0.05 mm (0.0020 in.)

If the clearance is greater than maximum, replace the rotors as a set. If necessary, replace the motor assembly.



HINT: When replacing the rotors, select the new rotor set according to the imprinted mark on the motor housing.

Imprinted mark on housing	Rotor set
1	16906–50010
2	16906–50020
3	16906–50030

2. INSPECT OIL CLEARANCE OF DRIVE SHAFT

(a) Using a caliper gauge, measure the shaft hole inside diameter of the housing and cover.

Shaft hole inside diameter:

14.000–14.011 mm (0.5512–0.5516 in.)

(b) Using a micrometer, measure the drive shaft diameter.

Shaft diameter:

13.973–13.984 mm (0.5501–0.5506 in.)

(c) Subtract the drive shaft diameter measurement from the shaft hole diameter measurement.

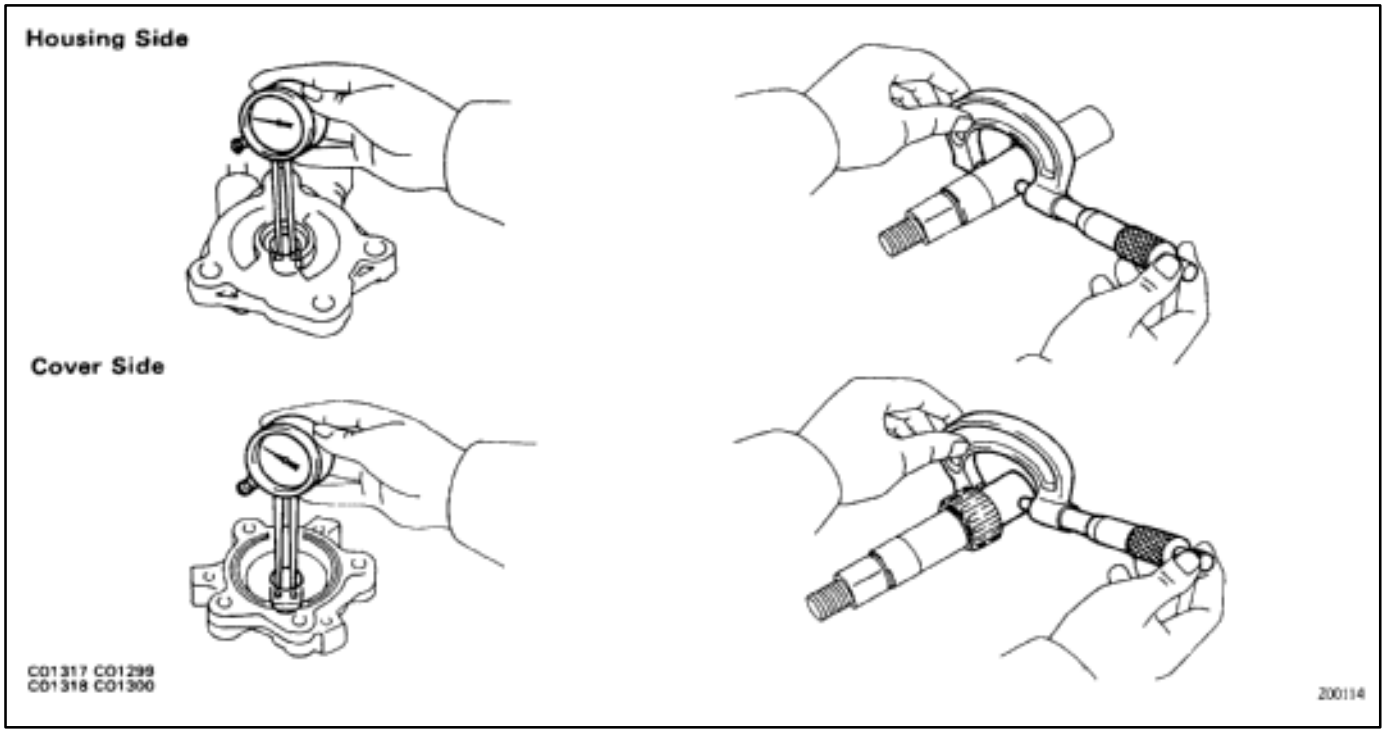
Standard clearance:

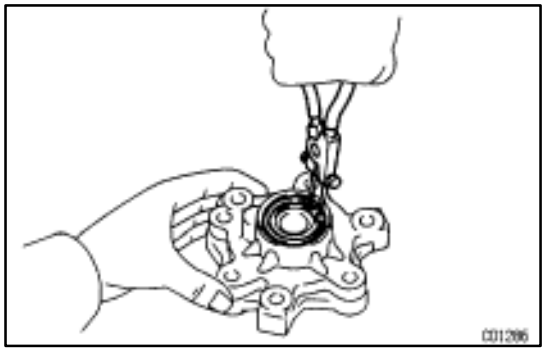
0.16–0.038 mm (0.0006–0.0015 in.)

Maximum clearance:

0.04 mm (0.0016 in.)

If the clearance is greater than maximum. replace the shaft. If necessary, replace the motor assembly.



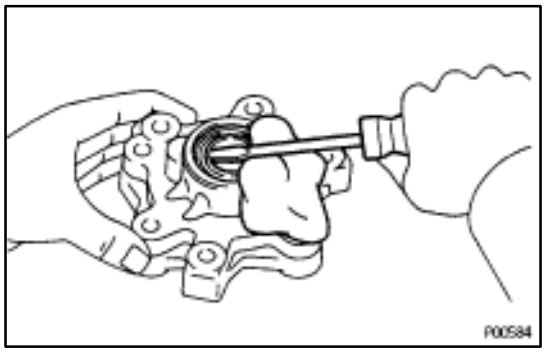


OIL SEAL REPLACEMENT

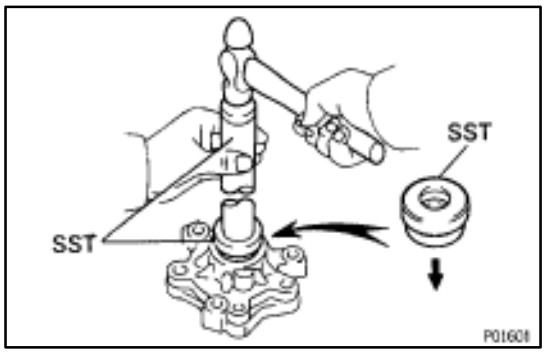
EG0AH–01

1. REMOVE OIL SEAL

(a) Using snap ring pliers, remove the snap ring and plate washer.

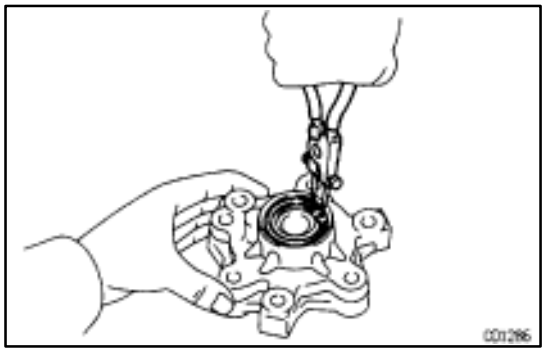


(b) Using a screwdriver, pry out the oil seal.
NOTICE: Be careful not to damage the housing.



2. INSTALL OIL SEAL

(a) Using SST, and a hammer, tap in a new oil seal to a depth of 4.5–5.5 mm (0.177–0.217 in.) from the housing edge.
SST 09620–30010(09627–30010,09631–00020)



(b) Using snap ring pliers, install the plate washer and snap ring.
(c) Apply fluid to the oil seal lip.

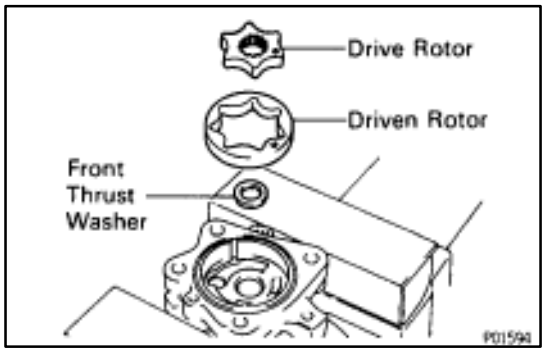
HYDRAULIC MOTOR ASSEMBLY

EG0AJ–01

(See page EG–270)

HINT:

- Throughly clean all parts to be assembled.
- Before installing the parts, apply new fluid to all sliding and rotating surfaces.



1. MOUNT MOTOR HOUSING

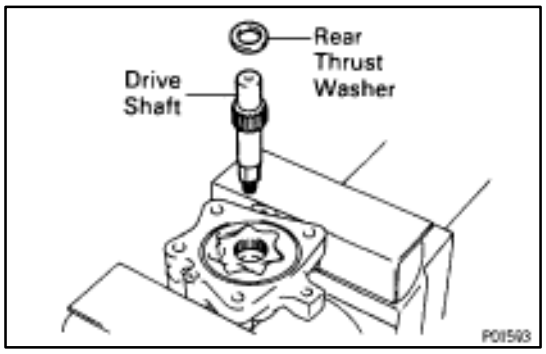
Slightly mount the motor housing in a vise.

NOTICE: Be careful not to damage the motor housing.

2. INSTALL FRONT THRUST WASHER

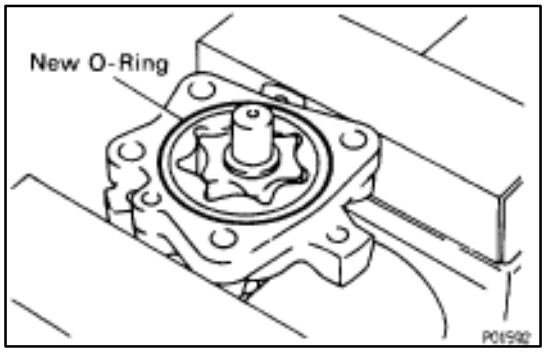
3. INSTALL DRIVEN AND DRIVE ROTORS

Install the drive and driven rotors with the dot mark facing upward.



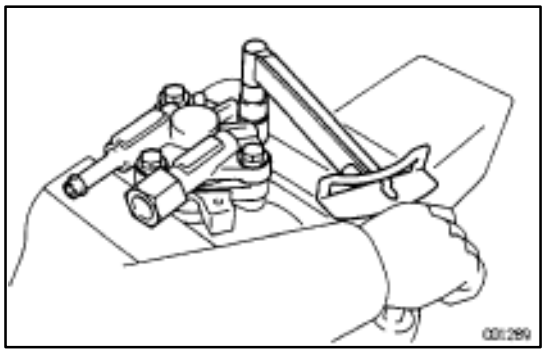
4. INSTALL DRIVE SHAFT

5. INSTALL REAR THRUST WASHER



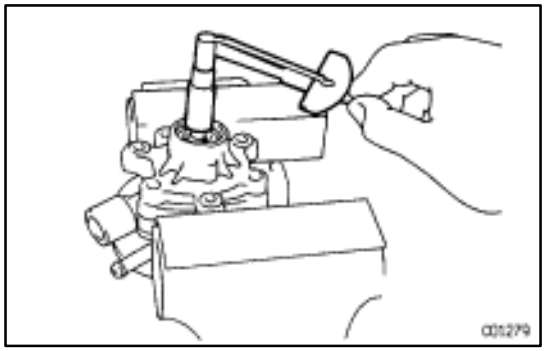
6. INSTALL MOTOR COVER

(a) Install a new O–ring to the motor housing groove.



(b) Install the motor cover with the four bolts.

Torque: 28 N·m (200 kgf·cm, 21 ft·lbf)



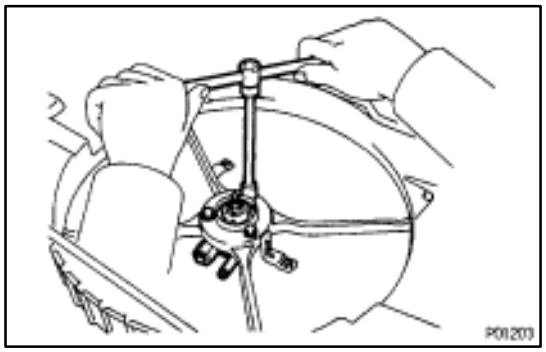
7. INSPECT DRIVE SHAFT PRELOAD

(a) Check that the drive shaft rotates smoothly without abnormal noise.

(b) Temporarily install the pulley nut, and check the rotating torque.

Rotating torque:

0.3 N·m (3.0 kgf·cm, 2.6 in.·lbf)



HYDRAULIC MOTOR INSTALLATION

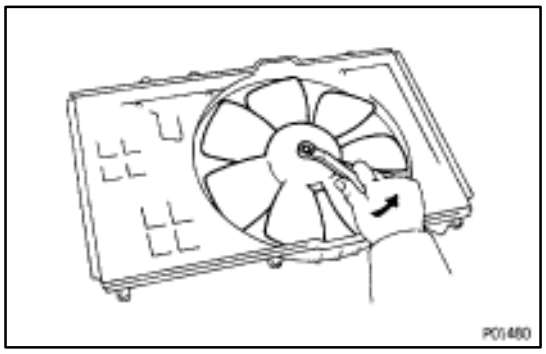
EG0AK–01

(See page EG–268)

1. INSTALL HYDRAULIC MOTOR TO FAN SHROUD

Install the hydraulic motor with the three bolts.

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

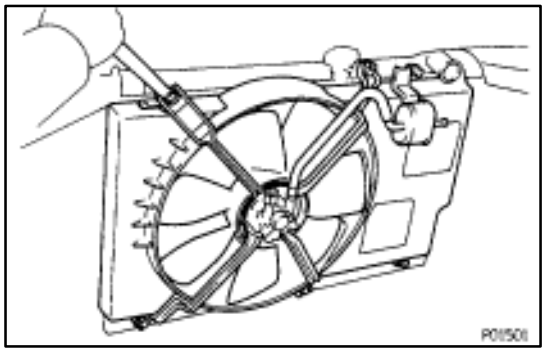


2. INSTALL COOLING FAN TO HYDRAULIC MOTOR

Install the fan with the plate washer and nut.

Tighten the nut by turning it counterclockwise.

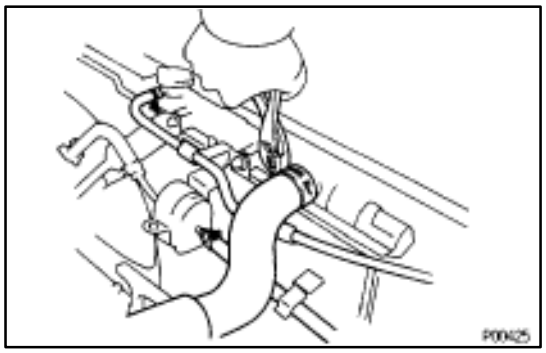
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



3. INSTALL HYDRAULIC COOLING FAN

Install the hydraulic cooling fan with the six bolts.

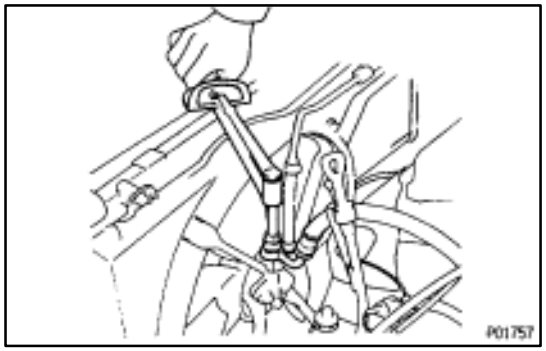
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



4. CONNECT HYDRAULIC MOTOR RETURN HOSE

5. CONNECT ENGINE COOLANT RESERVOIR HOSE

6. CONNECT RADIATOR UPPER HOSE

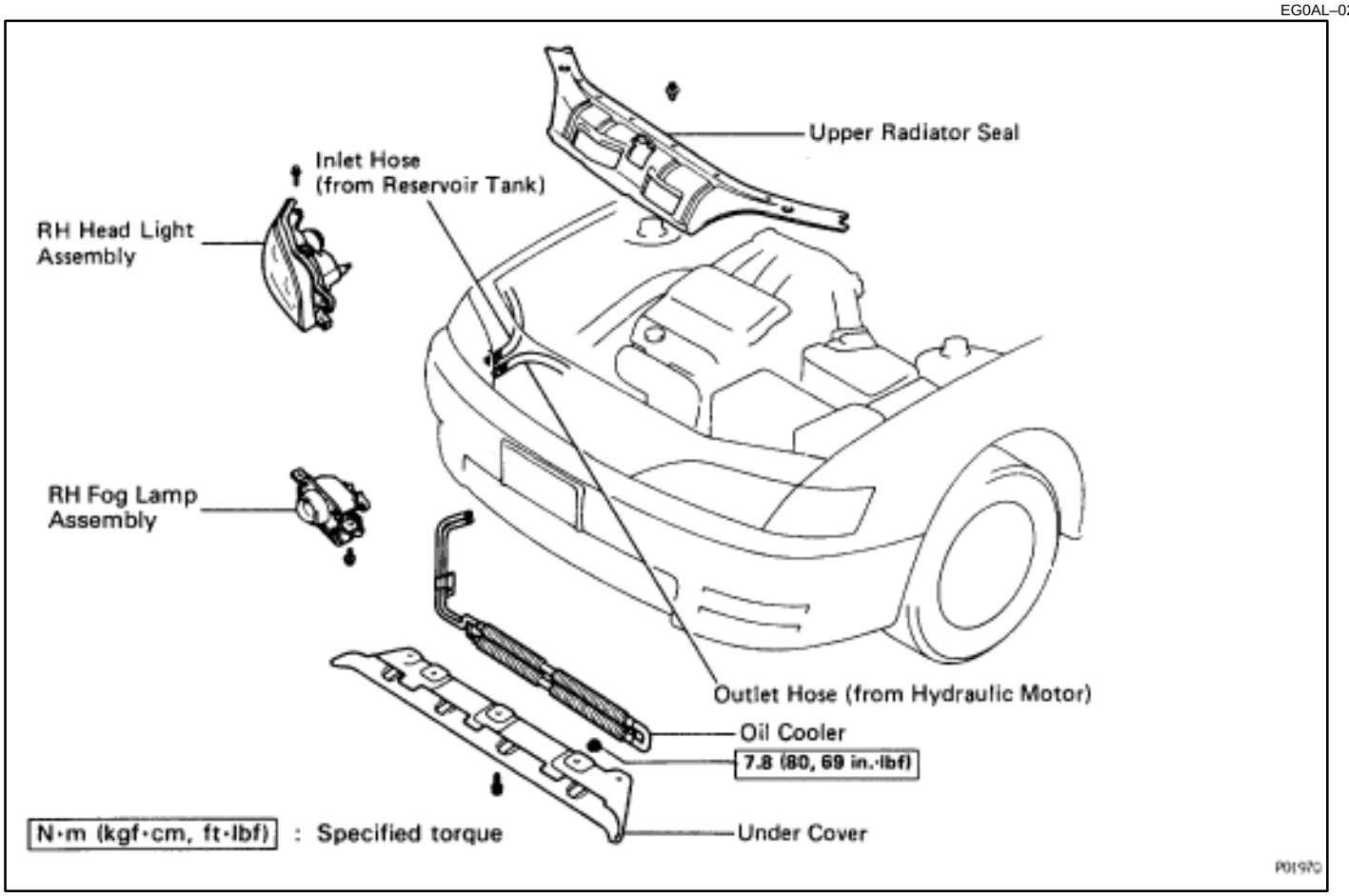


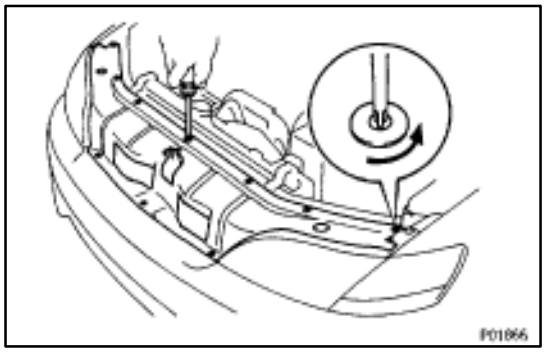
7. **CONNECT PRESSURE HOSE TO HYDRAULIC MOTOR**
   Connect the pressure hose with a new gasket and union bolt.
   Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

8. **INSTALL CRUISE CONTROL ACTUATOR COVER**
9. **FILL WITH ENGINE COOLANT**
   (See page EG–244)
10. **FILL PS RESERVOIR TANK WITH FLUID**
    (See page EG–264)
11. **BLEED ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN SYSTEM**
    (See page EG–265)
12. **INSPECT OIL PRESSURE OF ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN SYSTEM**
    (See page EG–266)

OIL COOLER
OIL COOLER REMOVAL

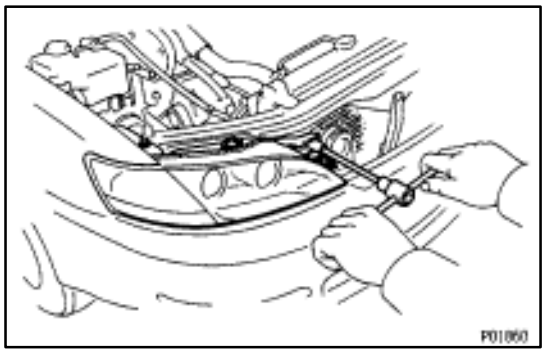
EG0AL–02





1. REMOVE UPPER RADIATOR SEAL

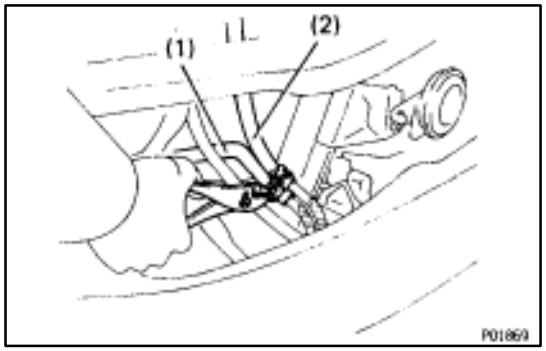
Remove the ten clips and radiator seal.



2. REMOVE RH HEADLIGHT ASSEMBLY

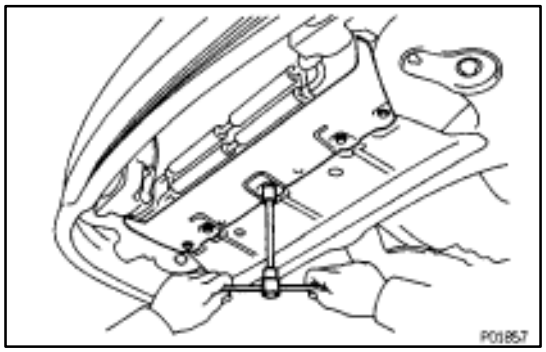
(a) Remove the three bolts.

(b) Disconnect the three connectors and remove the headlight assembly.



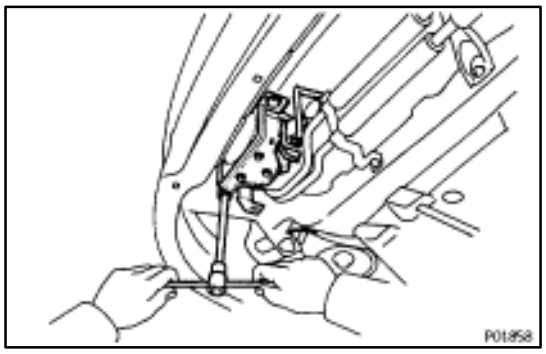
3. DISCONNECT HOSES FROM OIL COOLER

Disconnect the following hoses:
(1) Outlet hose (to reservoir tank)
(2) Inlet hose (from hydraulic motor)



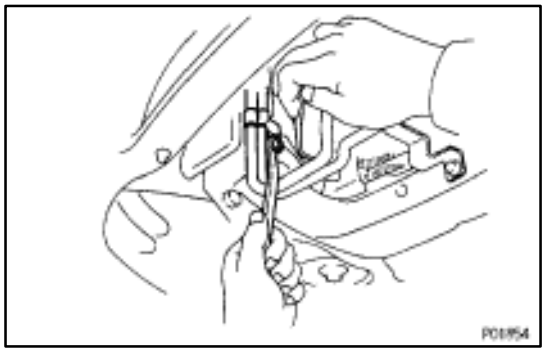
4. REMOVE UNDER COVER

Remove the five bolts and under cover.



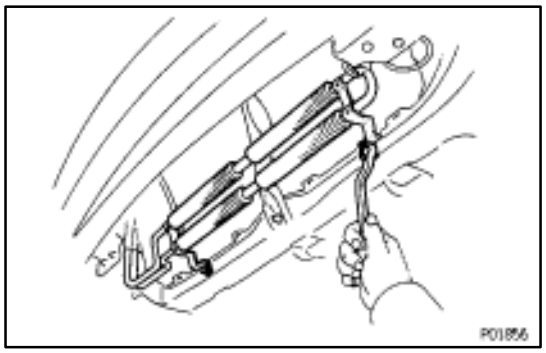
5. REMOVE RH FOG LAMP ASSEMBLY

(a) Remove the two bolts.
(b) Disconnect the connector and remove the fog lamp assembly.

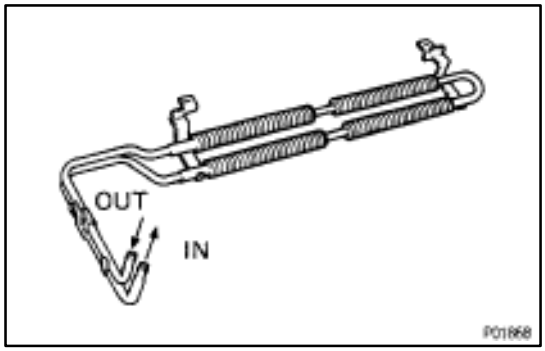


6. REMOVE OIL COOLER

(a) Pull aside the shroud to expose the bolt in the stay. Remove the bolt.



(b) Remove the two nuts and remove the oil cooler.

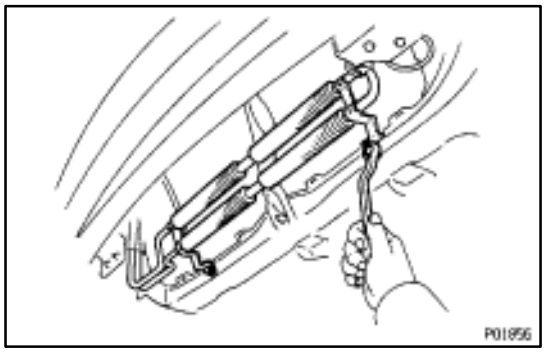


OIL COOLER INSPECTION

EG0AM–02

INSPECT OIL COOLER

Check the oil cooler for damage or clogging.
If necessary, replace the oil cooler.



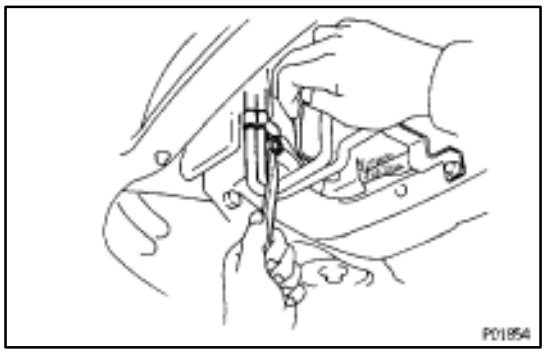
OIL COOLER INSTALLATION

EG0AN–02

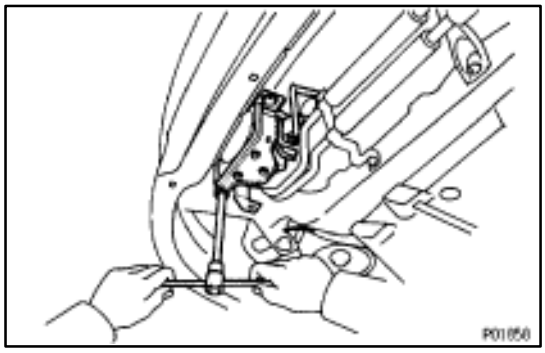
(See page EG–277)

1. INSTALL OIL COOLER

(a) Install the oil cooler with the two nuts.
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

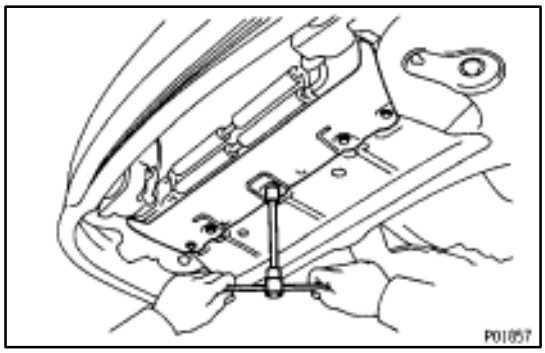


(b) Install the bolt while pulling aside the shroud.



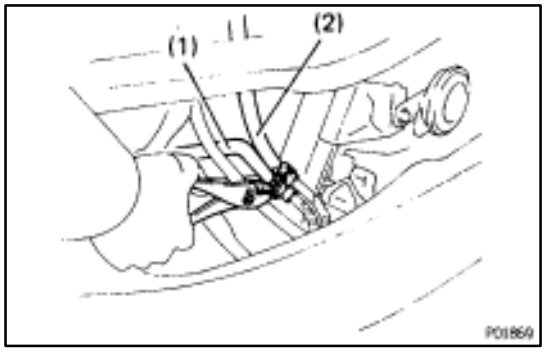
2. INSTALL RH FOG LAMP ASSEMBLY

(a) Connect the connector.
(b) Install the fog lamp assembly with the two bolts.



3. INSTALL UNDER COVER

Install the under cover with the five bolts

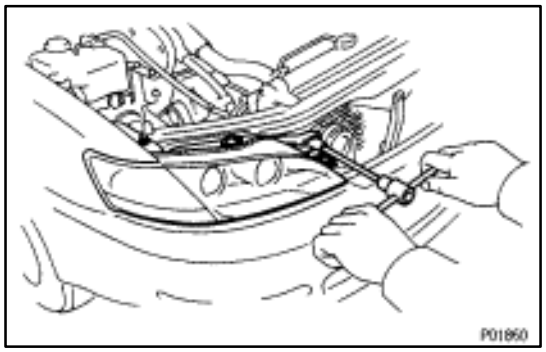


4. CONNECT HOSES TO OIL COOLER

Connect the following hoses:

(1) Outlet hose (to reservoir)

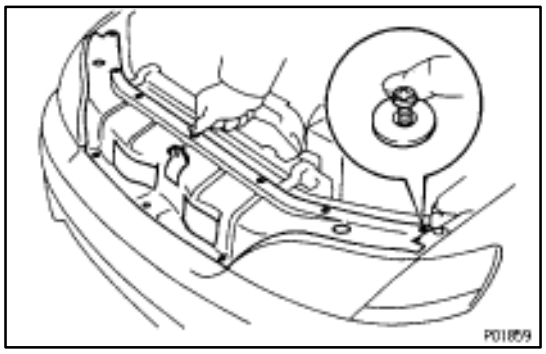
(2) Inlet hose (from hydraulic motor)



5. INSTALL RH HEADLIGHT ASSEMBLY

(a) Connect the three connectors.

(b) Install the headlight assembly with the three bolts.



6. INSTALL UPPER RADIATOR SUPPORT SEAL

Install the support seal with the ten clips.

7. FILL PS RESERVOIR TANK WITH FLUID

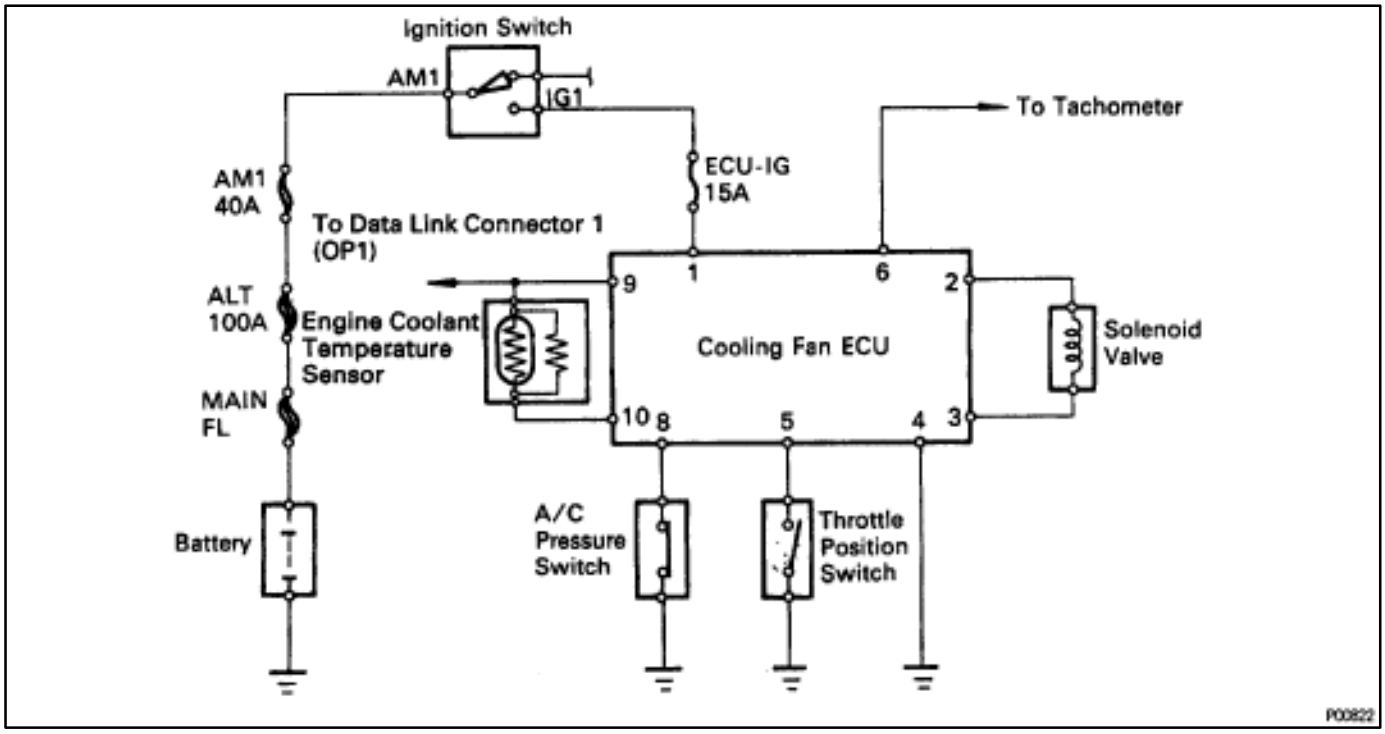
(See page EG–264)

8. BLEED ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN SYSTEM

(See page EG–265)

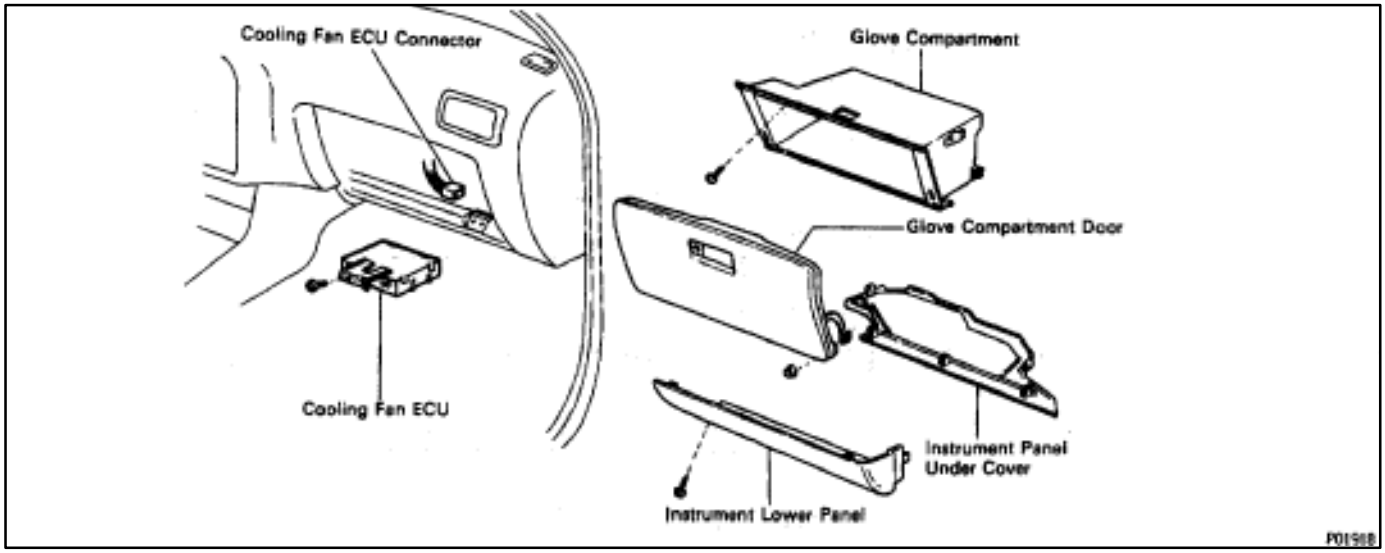
ELECTRONIC CONTROL PARTS SYSTEM CIRCUIT

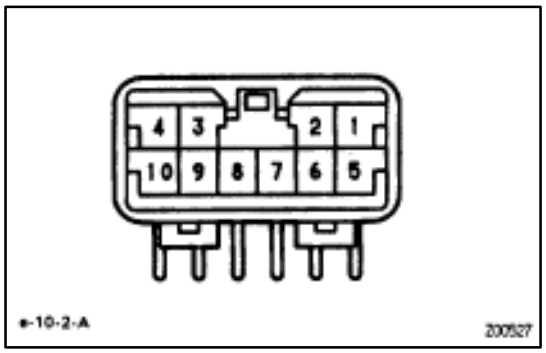
EG0AP–01



COOLING FAN ECU
COOLING FAN ECU REMOVAL AND INSTALLATION

EG0AQ–01





COOLING FAN ECU INSPECTION

EG0AR–01

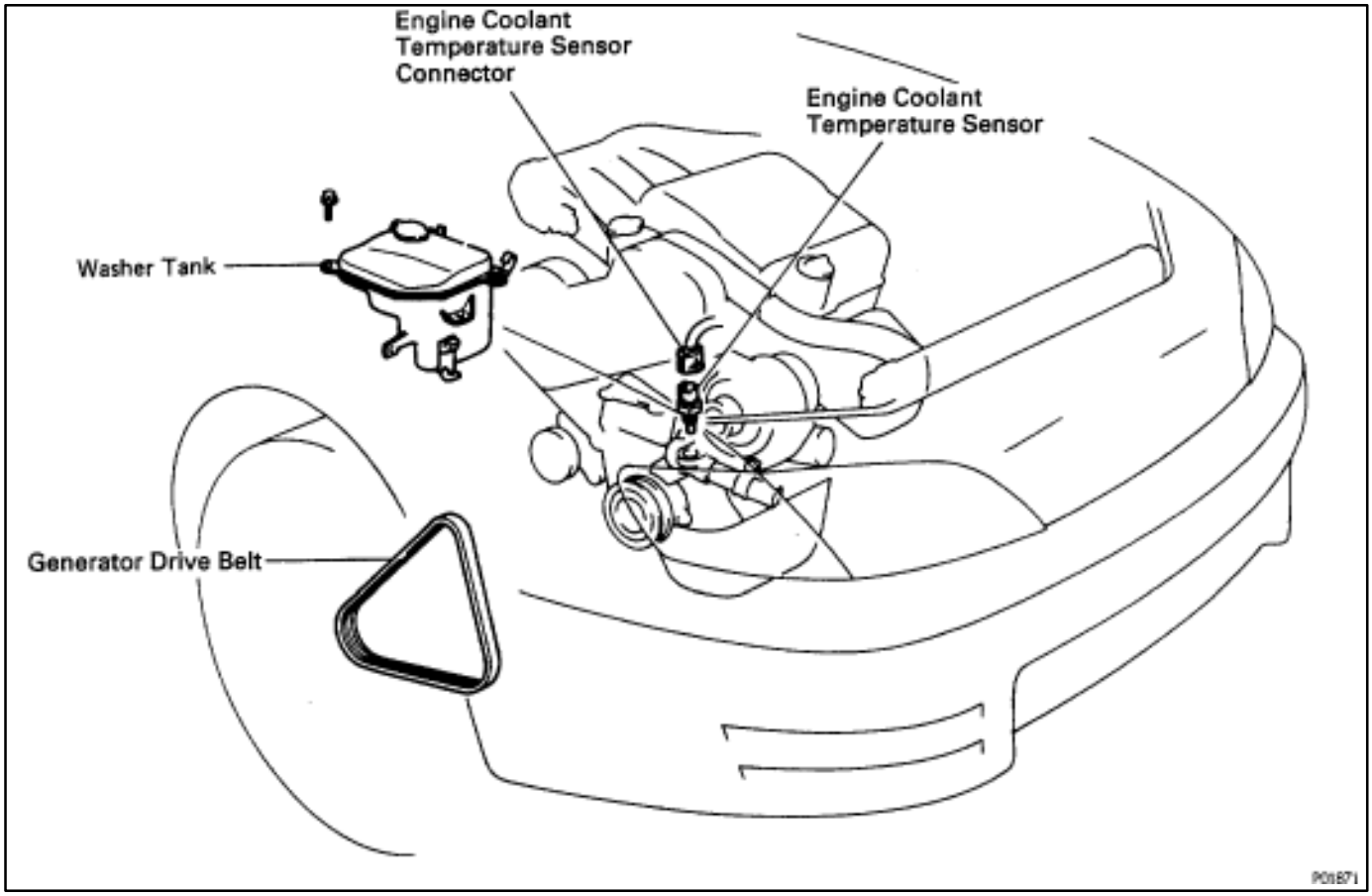
INSPECT COOLING FAN ECU

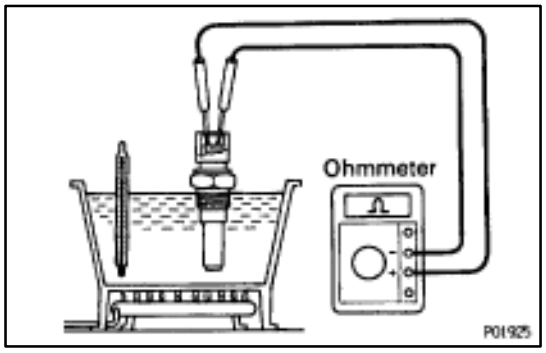
Check the connector on the wiring harness side as shown in the chart.

Check for	Tester connection	Condition	Specified value
Voltage	1–Ground	Ignition switch ON	Battery voltage
Resistance	2–3	Solenoid valve at cold (25°C (77°F))	7.6⊕8.0 Ω
Continuity	4–Ground	–	Continuity
Continuity	5–Ground	Throttle valve open	No continuity
		Throttle valve closed	Continuity
Continuity	8–Ground	A/C pressure SW connector disconnected	No continuity
		A/C pressure SW connector connected	Continuity
Resistance	9–10	Engine coolant temperature at 80°C (176°F)	1.48–1.58 kΩ

ENGINE COOLANT WATER TEMPERATURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR REMOVAL AND INSTALLATION

EG0AS–02





INSPECT ENGINE COOLANT TEMPERATURE SENSOR

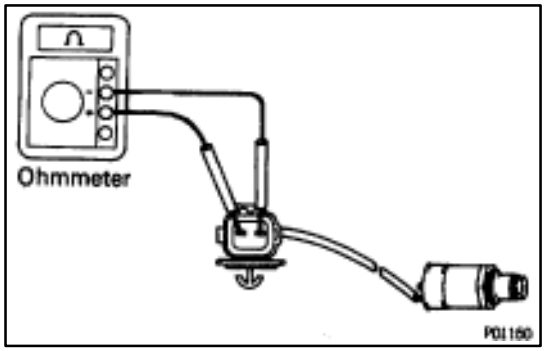
EG0AT–01

Using an ohmmeter, measure the resistance between the terminals.

Resistance:

1.48–1.58 kΩ at 80°C (176°F)

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



SOLENOID VALVE
SOLENOID VALVE INSPECTION

EG0AU–01

INSPECT SOLENOID VALVE

Using an ohmmeter, measure the resistance between the terminals

Resistance:

7.6–8.0 Ω at 25°C (77°F)

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

SERVICE SPECIFICATIONS
SERVICE DATA

EG0AV–01

Thermostat	Valve opening pressure	80–84°C (176–183°F)
	Valve lift at 95°C (203°F)	8.5 mm (0.35 in.) or more
Radiator cap	Relief valve opening pressure	
	Radiator side (STD)	93–123 kPa (0.95–1.25 kgfcm2, 13.5–17.8 psi)
	Radiator side (Limit)	78 kPa (0.8 kgfcm2, 11.4 psi)
	Water outlet side (STD)	83–113 kPa (0.85–1.15 kgfcm2, 12.1–16.4 psi)
	Water outlet side (Limit)	69 kPa (0.7 kgfcm2, 10.0 psi)
Radiator	Plate height	7.75–8.25 mm (0.3051–0.3248 in.)
On–vehicle inspection for hydraulic–driven cooling motor	Oil pressure	981–1,961 kPa (10–20 kgfcm2, 142–284 psi)
Hydraulic motor	Rotor side clearance (STD)	0.01–0.04 mm (0.0004–0.0016 in.)
	Rotor side clearance (Limit)	0.05 mm (0.0020 in.)
	Drive shaft hole inside diameter	14.000–14.011 mm (0.5512–0.5516 in.)
	Drive shaft diameter	13.973–13.984 mm (0.5501–0.5506 in.)
	Drive shaft oil clearance (STD)	0.016–0.038 mm (0.0006–0.0015 in.)
	Drive shaft oil clearance (Limit)	0.04 mm (0.0031 in.)
	Drive shaft preload (rotating torque)	0.03 N·m (3.0 kgf·cm, 2.6 in.·lbf)
Engine coolant temp. sensor	Resistance at 80°C (176°F)	1.48–1.58 kΩ

TORQUE SPECIFICATIONS

EG0AW–01

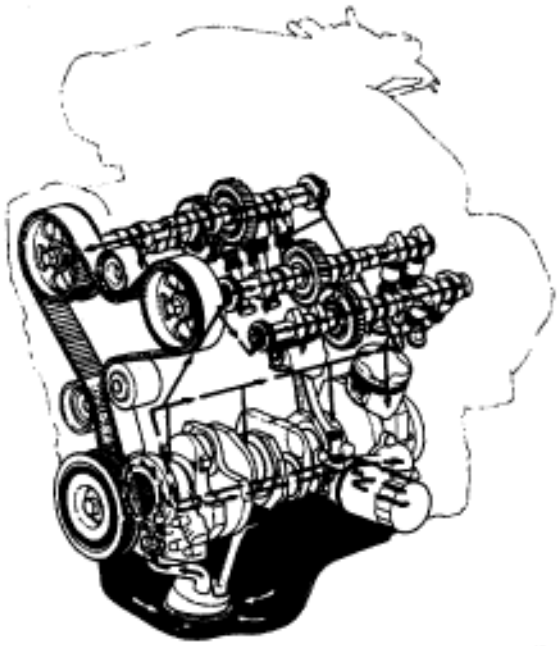
Part tightened	N·m	kgf·cm	ft·lbf
Cylinder block X Drain plug	29	300	22
Water pump X Cylinder block	20	200	14
Water inlet X Water pump	20	200	14
Water inlet pipe X Generator belt adjusting bar	20	200	14
Radiator oil cooler X Radiator lower tank	22	220	16
Pressure hose X Hydraulic motor	64	650	47
Radiator support bolt	13	130	9
Hydraulic motor housing X Motor cover	28	290	21
Hydraulic motor X Fan shroud	4.9	50	43 in.·lbf
Cooling fan X Hydraulic motor	15	150	11
Hydraulic cooling fan X Radiator	4.9	50	43 in.·lbf
Oil cooler (for hydraulic cooling fan) X Radiator lower support	7.8	80	69 in.·lbf

LUBRICATION SYSTEM

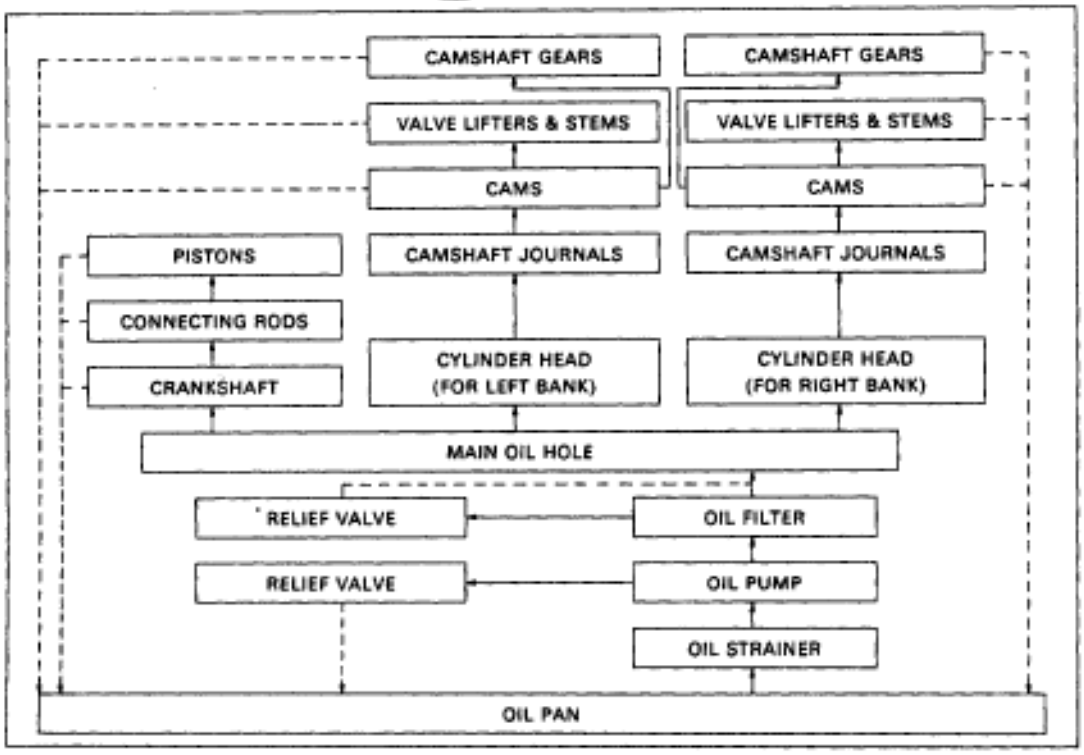
DESCRIPTION

EG090–01

A fully pressurized, fully filtered lubrication system has been adopted for this engine.



P01102



2005/1

A pressure feeding lubrication system has been adopted to supply oil to the moving parts of this engine. The lubrication system consists of an oil pan, oil pump, oil filter and other external parts which supply oil to the moving parts in the engine block. The oil circuit is shown in the illustration at the top of the previous page. Oil from the oil pan is pumped up by the oil pump. After it passes through the oil filter, it is fed through the various oil holes in the crankshaft and cylinder block. After passing through the cylinder block and performing its lubricating function, the oil is returned by gravity to the oil pan. A dipstick on the center left side of the cylinder block is provided to check the oil level.

OIL PUMP

The oil pump pumps up oil from the oil pan and feeds it under pressure to the various parts of the engine. An oil strainer is mounted in front of the inlet to the oil pump. The oil pump itself is a trochoid type pump, inside of which there is a drive rotor and a driven rotor. When the drive rotor rotates, the driven rotor rotates in the same direction, and since the axis of the drive rotor shaft is different from the center of the driven rotor, the space between the two rotors is changes as they rotate. Oil is drawn in when the space is wide and is discharged when the space in narrow.

OIL PRESSURE REGULATOR

At high engine speeds, the engine oil supplied by the oil pump exceeds the capacity of the engine to utilize it. For that reason, the oil pressure regulator works to prevent an oversupply of oil. During normal oil supply, a coil spring and valve keep the bypass closed, but when too much oil is being fed, the pressure become extremely high, overpowering the force of the spring and opening the valves. This allows the excess oil to flow through the relief valve and return to the oil pan.

OIL FILTER

The oil filter is a full flow type filter with a built–in paper filter element. Particles of metal from wear, air borne dirt, carbon and other impurities can get into the oil during use a could cause accelerated wear or sizing if allowed to circulate through the engine. The oil filter, integrated into the oil line, removes these impurities as the oil passes through it. The filter is mounted outside the engine to simplify replacement of the filter element. A relief valve is also included ahead of the filter element to relieve the high oil pressure in case that the filter element becomes clogged with impurities. The relief valve opens when the oil pressure overpowers the force of the spring. Oil passing through the relief valve by–passes the oil filter and flows directly into the main oil hole in the engine.

PREPARATION
SST (SPECIAL SERVICE TOOLS)

EG091–01

	09032–00100 Oil Pan Seal Cutter	
	09228–07500 Oil Filter Wrench	
	09309–37010 Transmission Bearing Replacer	Camshaft front oil seal
	09816–30010 Oil Pressure Switch Socket	

RECOMMENDED TOOLS

EG092–01

	09090–04000 Engine Sling Device	For suspension engine
	09200–00010 Engine Adjust Kit	

EQUIPMENT

EG093–01

Oil pressure gauge	
Precision straight edge	Oil pump
Torque wrench	

LUBRICANT

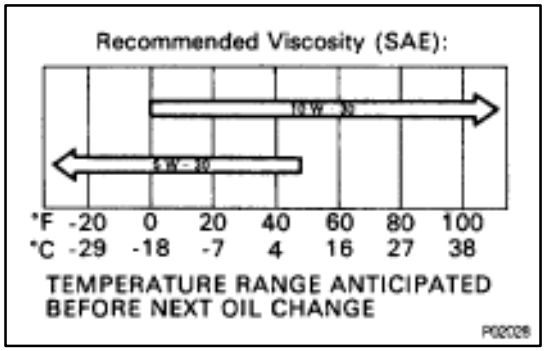
EG094–01

Item	Capacity	Classification
Engine oil		API grade SG, Energy–Conserving II, multigrade and recommended viscosity oil
Dry fill	5.0 liters (5.3 US qts, 4.4 lmp. qts)	
Drain and refill		
w/ Oil filter change	4.3 liters (4.5 US qts, 3.8 lmp. qts)	
w/o Oil filter change	4.1 liters (4.3 US qts, 3.6 lmp. qts)	

SSM (SPECIAL SERVICE MATERIALS)

EG095–01

08826–00080	Seal packing or equivalent	Oil pump, Oil pan baffle plate, Oil pan
08833–00080	Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	Oil pressure switch



OIL PRESSURE CHECK

EG096–01

1. CHECK ENGINE OIL QUALITY

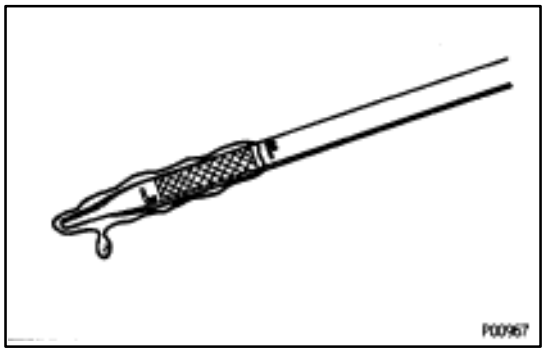
Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is poor, replace the oil.

Oil grade:

API grade SG Energy–Conserving II multigrade engine oil.

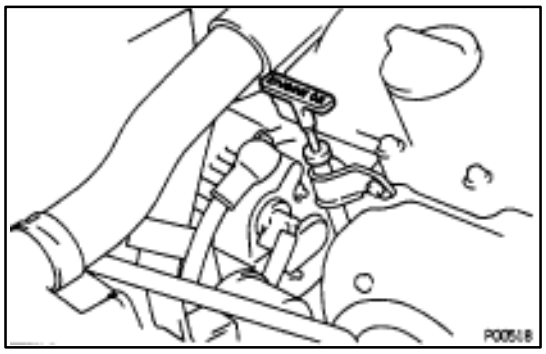
Recommended viscosity is as shown.



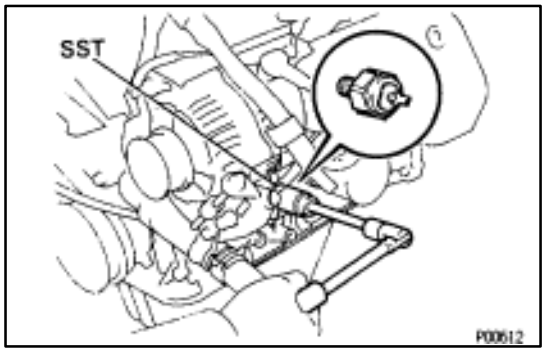
2. CHECK ENGINE OIL LEVEL

The oil level should be between the ”L” and ”F” marks on the dipstick.

If low, check for leakage and add oil up to ”F” mark.

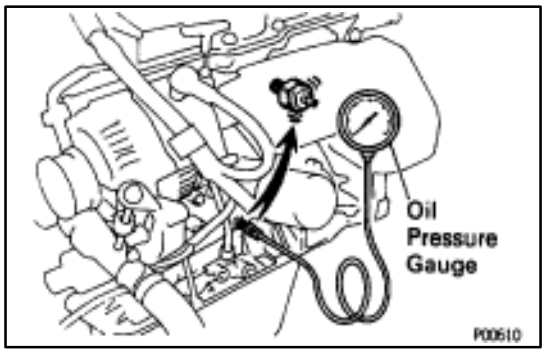


NOTICE: Install the oil dipstick facing the direction shown in the illustration.



3. REMOVE OIL PRESSURE SWITCH, AND INSTALL OIL PRESSURE GAUGE

(a) Using SST, remove the oil pressure switch.
SST 09816–30010



(b) Install the oil pressure gauge.

4. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

5. CHECK OIL PRESSURE

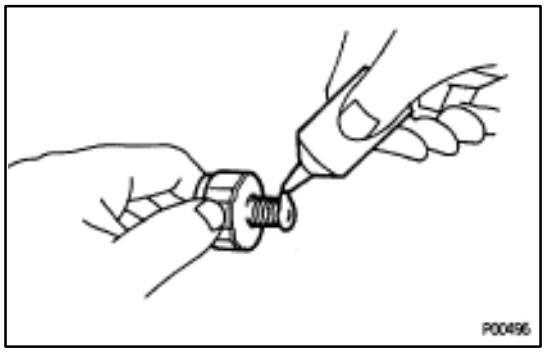
Oil pressure:

At idle

29 kPa (0.3 kgf/cm^2, 4.3 psi) or more

At 3,000 rpm

294–539 kPa (3.0–5.5 kgf/cm^2, 43–78 psi)



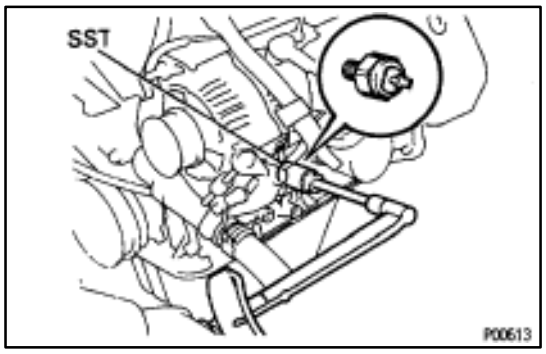
6. REMOVE OIL PRESSURE GAUGE AND REINSTALL OIL PRESSURE SWITCH

(a) Remove the oil pressure gauge.

(b) Apply adhesive to two or three threads of the oil pressure switch.

Adhesive:

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



(c) Using SST, reinstall the oil pressure switch.

SST 09816–30010

Torque: 14 N·m (150 kgf·cm, 11 ft·lbf)

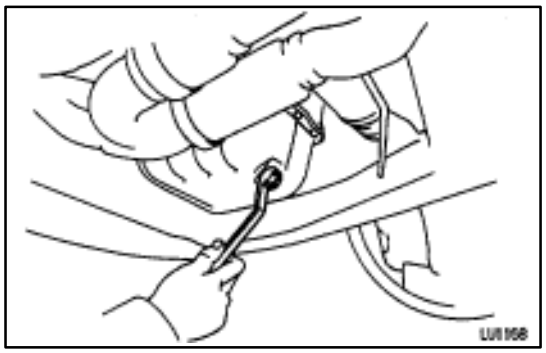
7. START ENGINE AND CHECK FOR LEAKS

OIL AND FILTER REPLACEMENT

EG097–01

CAUTION:

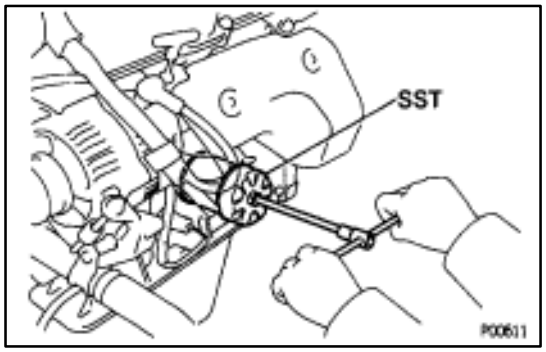
- **Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- **Care should be taken, therefore, when 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 waterless hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.**
- **In order to preserve the environment, used oil and used oil filter must be disposed of only at designated disposal sites.**



1. DRAIN ENGINE OIL

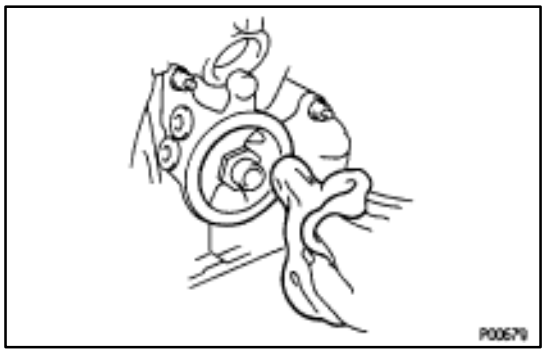
(a) Remove the oil filler cap.

(b) Remove the oil drain plug, and drain the oil into a container.

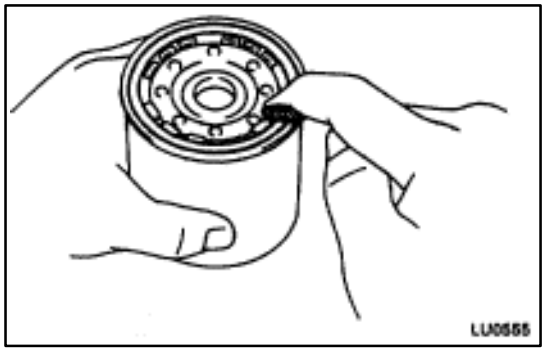


2. REPLACE OIL FILTER

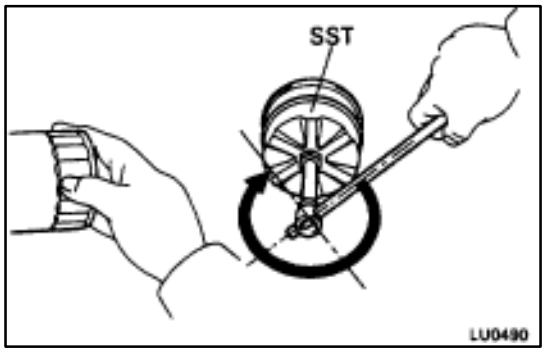
(a) Using SST, remove the oil filter.
SST 09228–07500



(b) Check and clean the oil filter installation surface.



(c) Apply clean engine oil to the gasket of a new oil filter.



(d) Lightly screw the oil filter into place, and tighten it until the gasket contacts the seat.
(e) Using SST, tighten it an additional 3/4 turn.
SST 09228–07500

3. FILL WITH ENGINE OIL

(a) Clean the install the oil drain plug with a new gasket.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

(b) Fill with new engine oil (API grade SG Energy–conserving II multigrade and recommended viscosity oil).
Capacity:
Drain and refill
w/ Oil filter change
4.3 liters (4.5 US qts, 3.8 lmp.qts)
w/o Oil filter change
4.1 liters (4.3 US qts, 3.6 lmp. qts)
Dry fill
5.0 liters (5.3 US qts, 4.4 lmp. qts)

(c) Reinstall the oil filler cap.

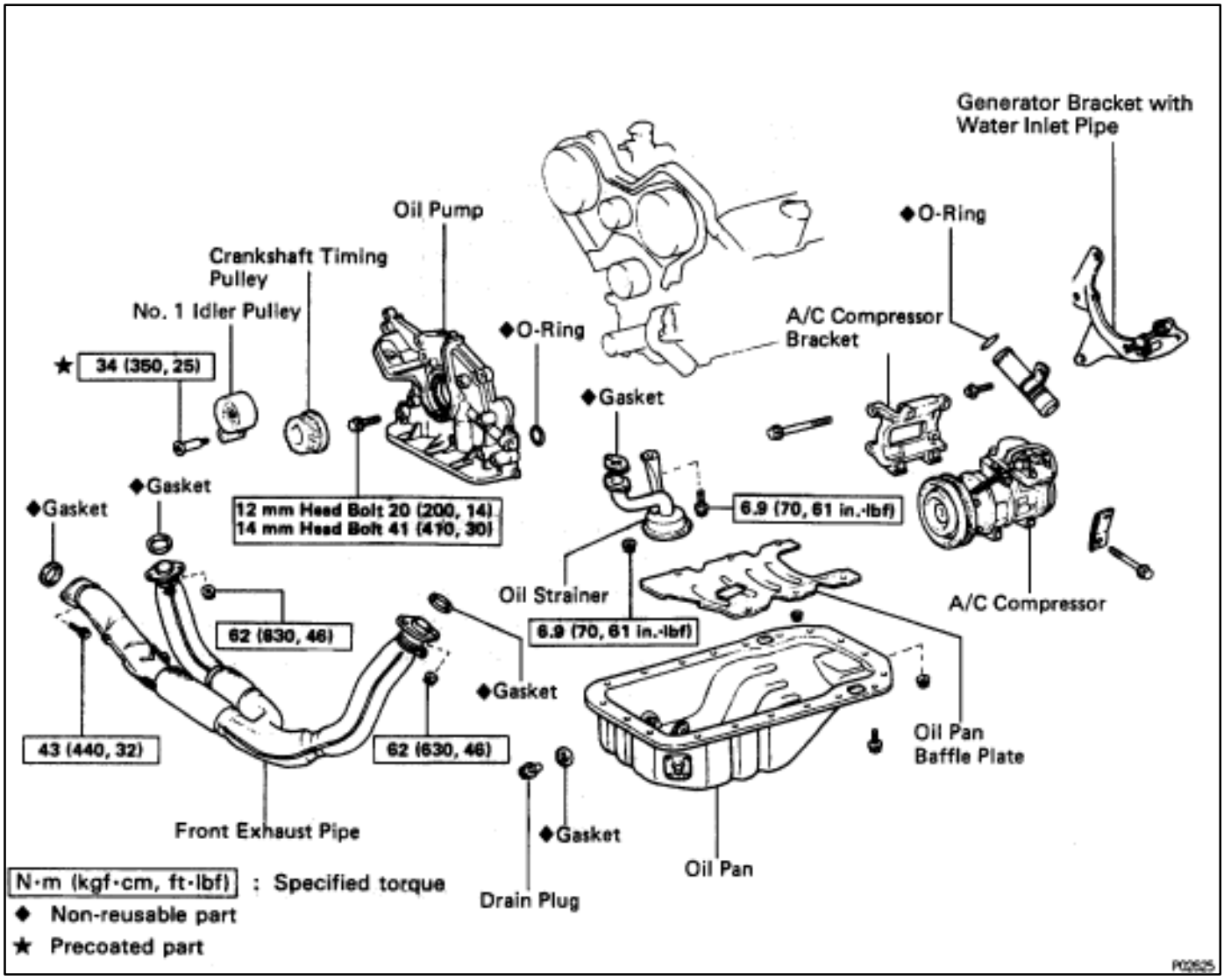
4. START ENGINE AND CHECK FOR LEAKS

5. RECHECK ENGINE OIL LEVEL (See page EG–290)

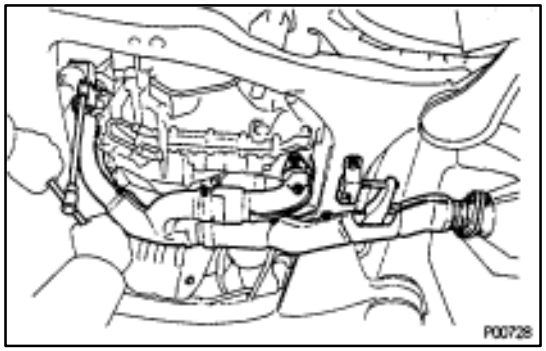
OIL PUMP
OIL PUMP REMOVAL

EG098–02

HINT: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

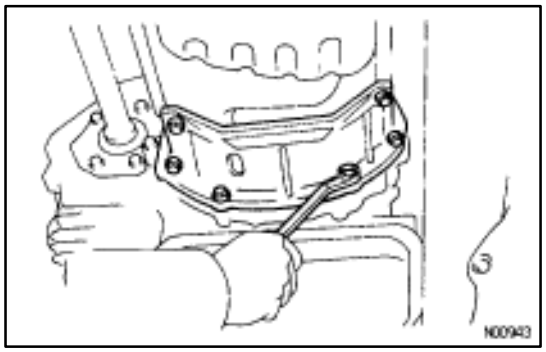


1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **REMOVE HOOD**
3. **DRAIN ENGINE COOLANT**
4. **DRAIN ENGINE OIL**



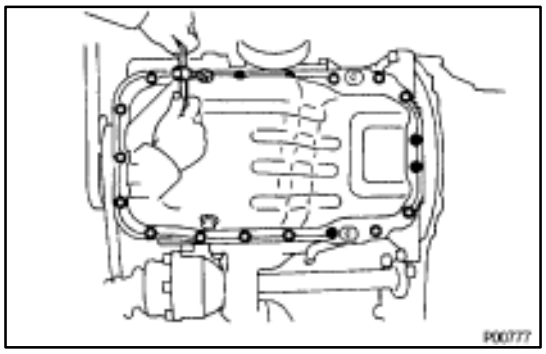
5. REMOVE FRONT EXHAUST PIPE

(a) Loosen the two bolts, and disconnect the bracket.
(b) Remove the two bolts and nuts holding the front exhaust pipe to the three–way catalyst converter.
(c) Remove the four nuts holding the front exhaust pipe to the exhaust manifolds.
(d) Remove the front exhaust pipe and gaskets.



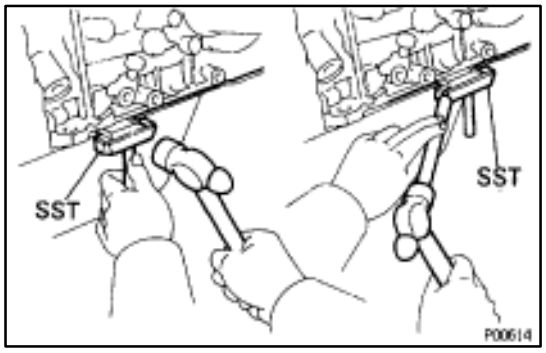
6. REMOVE STIFFENER PLATE

Remove the six bolts, stiffener plate and dust seal.

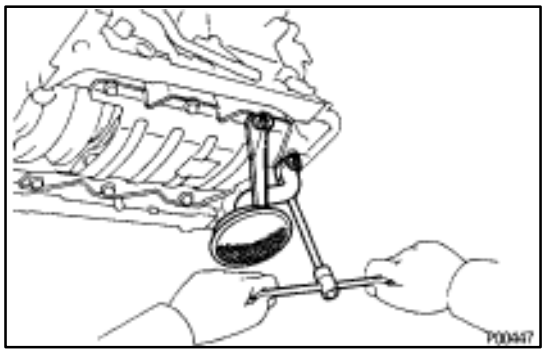


7. REMOVE OIL PAN

(a) Remove the dipstick.
(b) Remove the fifteen bolts and four nuts.

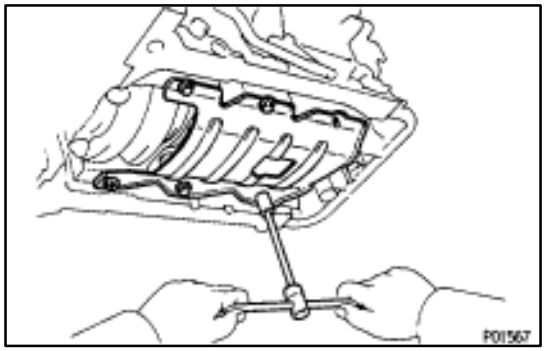


(c) Insert the blade of SST between the cylinder block and oil pan, and cut off applied sealer and remove the oil pan.
SST 09032–00100
NOTICE: Be careful not to damage the flanges of the oil pan and baffle plate.

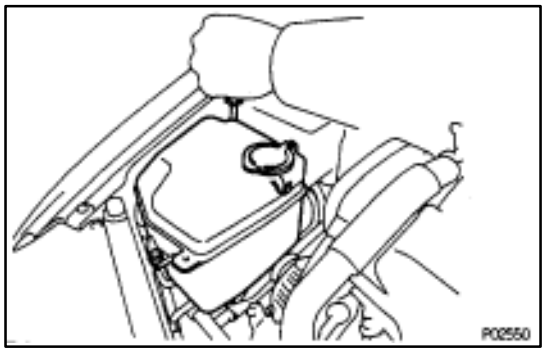


8. REMOVE OIL STRAINER

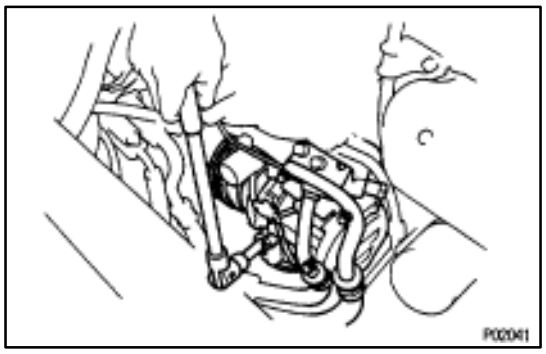
Remove the three nuts, oil strainer and gasket.



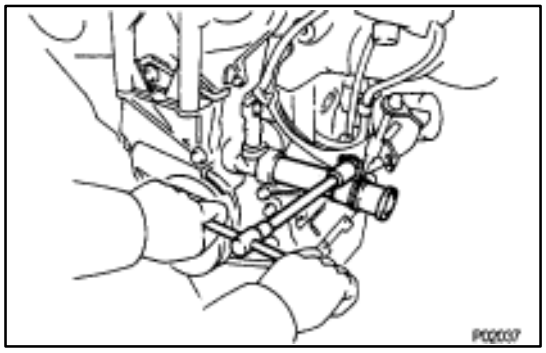
9. REMOVE OIL PAN BAFFLE PLATE
Remove the four bolts, nut and baffle plate.



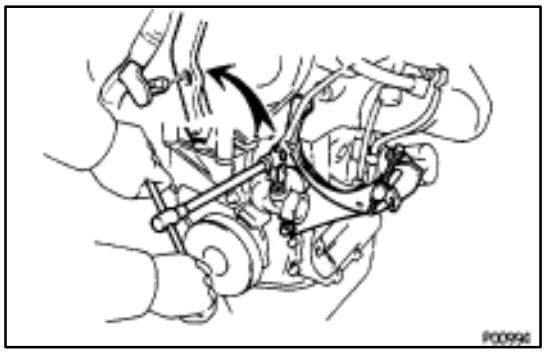
10. REMOVE WASHER TANK
(a) Remove the three washer tank mounting bolts.
(b) Disconnect the connector and hose, and remove the washer tank.
11. REMOVE GENERATOR (See CH section)
12. DISCONNECT RADIATOR LOWER HOSE



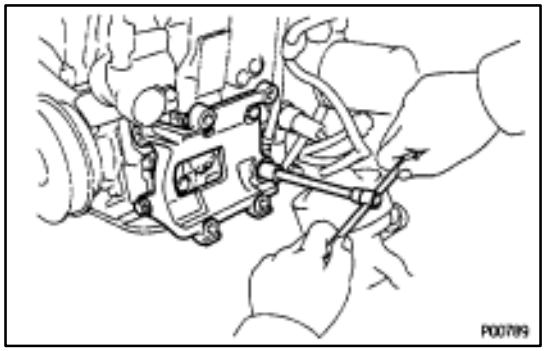
13. REMOVE A / C COMPRESSOR WITHOUT DISCONNECTING HOSES
(a) Disconnect the connector.
(b) Remove the five bolts, drive belt adjusting bar bracket and compressor.
HINT: Put aside the compressor, and suspend it to the radiator support with a string.



14. REMOVE WATER INLET PIPE
Remove the bolt and water inlet pipe.

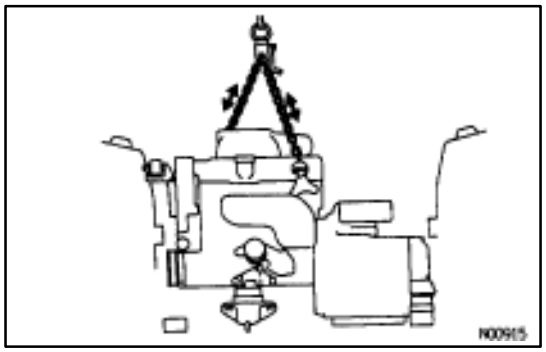


15. REMOVE GENERATOR BRACKET
Remove the two bolts and generator bracket.



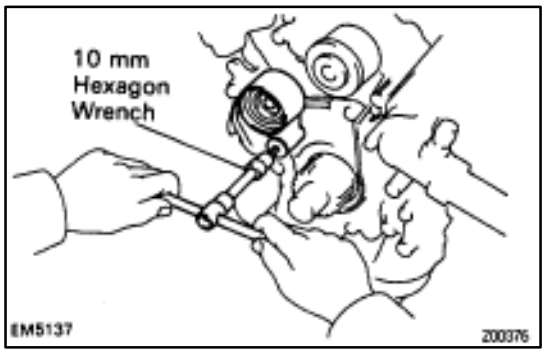
16. REMOVE A/C COMPRESSOR BRACKET

Remove the three bolts and A/C compressor bracket.



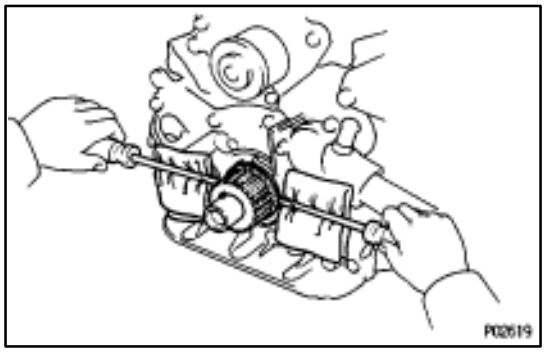
17. SUSPEND ENGINE WITH ENGINE SLING DEVICE

18. REMOVE TIMING BELT (See page EG–29)



19. REMOVE NO.1 IDLER PULLEY

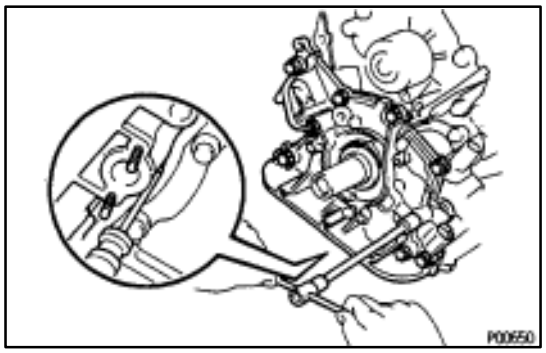
Using a 10 mm hexagon wrench, remove the bolt, idler pulley and plate washer.



20. REMOVE CRANKSHAFT TIMING PULLEY

If the pulley cannot be removed by hand, use two screwdrivers.

HINT: Position shop rags as shown to prevent damage.



21. REMOVE OIL PUMP

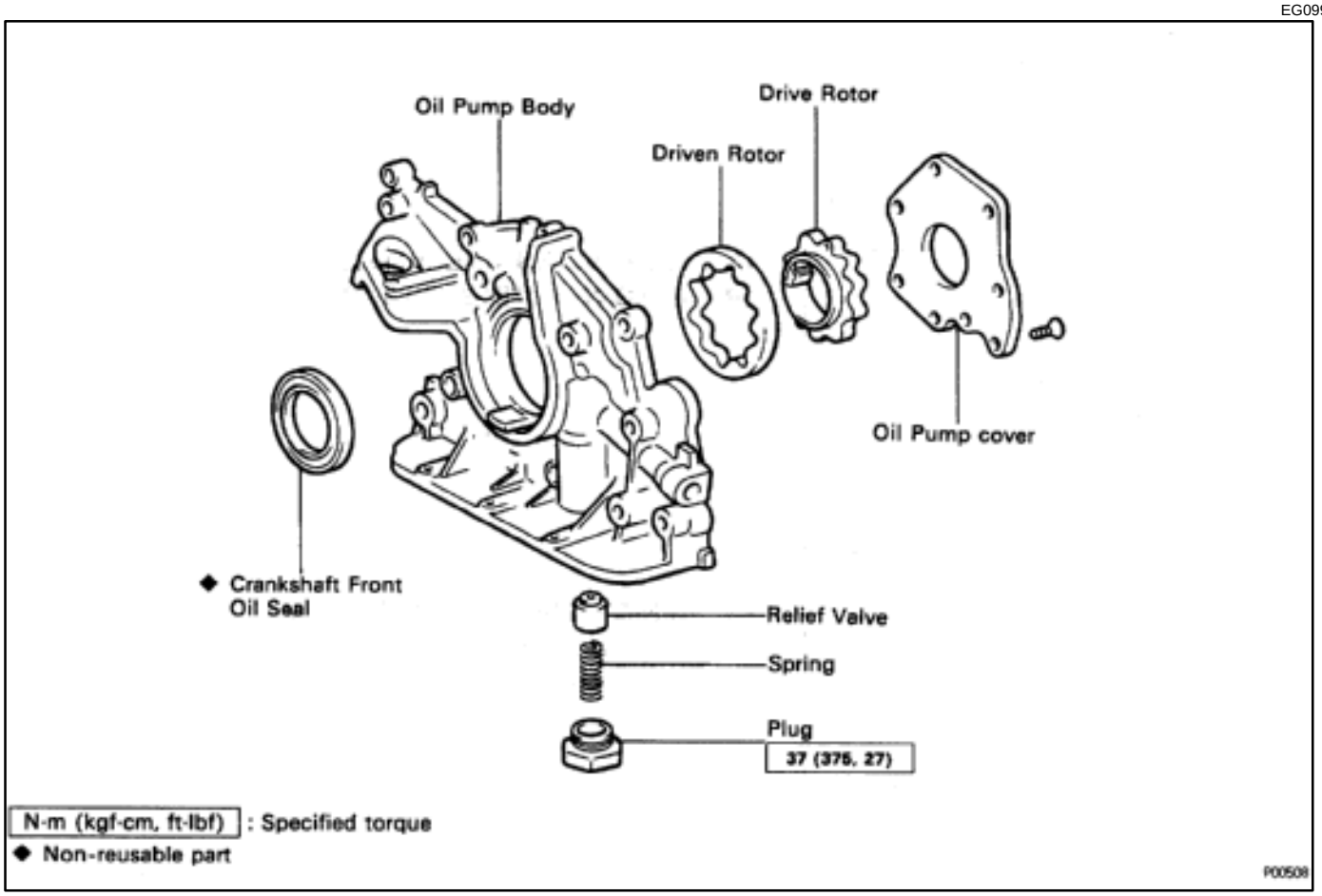
(a) Remove the nine bolts.

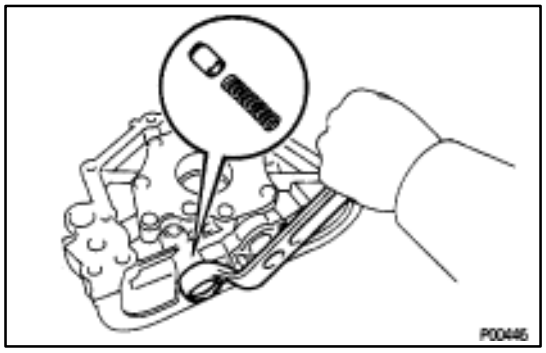
(b) Remove the oil pump by prying a screwdriver between the oil pump and main bearing cap.

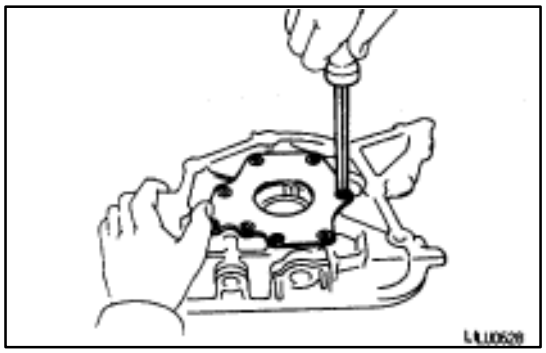
(c) Remove the O–ring.

COMPONENTS

EG099–01







OIL PUMP DISASSEMBLY

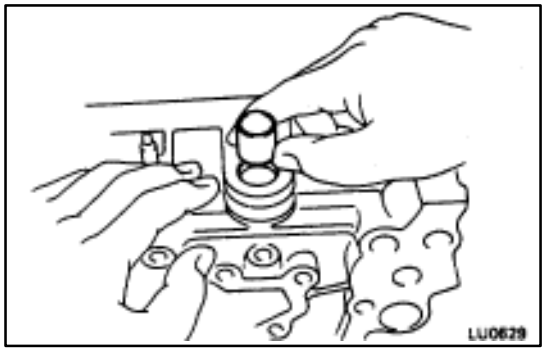
EG09A–01

1. REMOVE RELIEF VALVE

Remove the plug, spring and relief valve.

2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the eight screws, pump body cover, the drive and driven rotors.



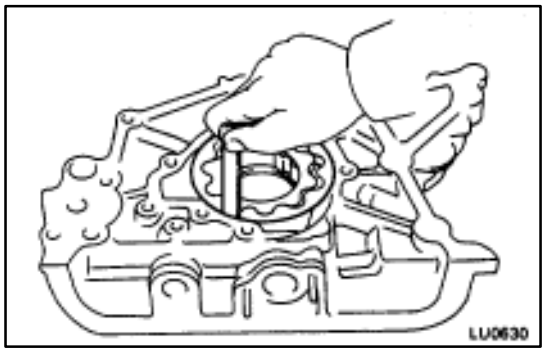
OIL PUMP INSPECTION

EG09B–01

1. INSPECT RELIEF VALVE

Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.

If it does not, replace the relief valve. If necessary, replace the oil pump assembly.



2. INSPECT DRIVE AND DRIVEN ROTORS

A. Inspect rotor body clearance

Using a thickness gauge, measure the clearance between the driven rotor and body.

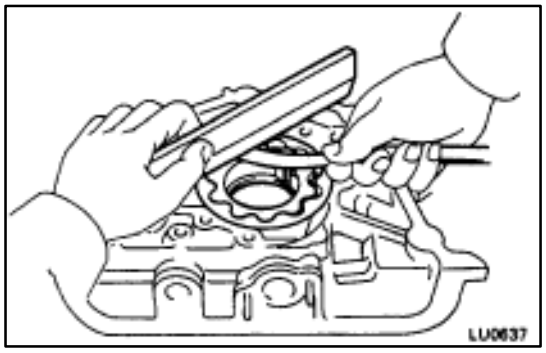
Standard body clearance:

0.100–0.175 mm (0.0039–0.0069 in.)

Maximum body clearance:

0.30 mm (0.0118 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



B. Inspect rotor side clearance

Using a thickness gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

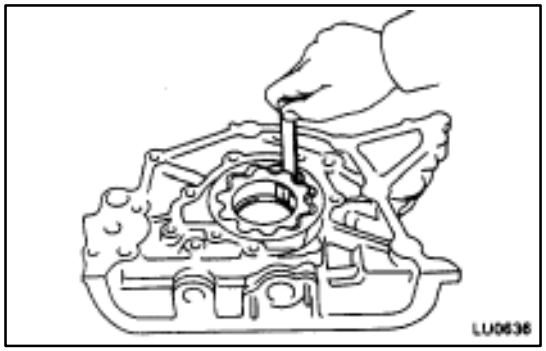
Standard side clearance:

0.030–0.090 mm (0.0012–0.0035 in.)

Maximum side clearance:

0.15 mm (0.0059 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



C. Inspect rotor tip clearance

Using thickness gauge, measure the clearance between the drive and driven rotors.

Standard tip clearance:

0.110–0.240 mm (0.0043–0.0094 in.)

Maximum tip clearance:

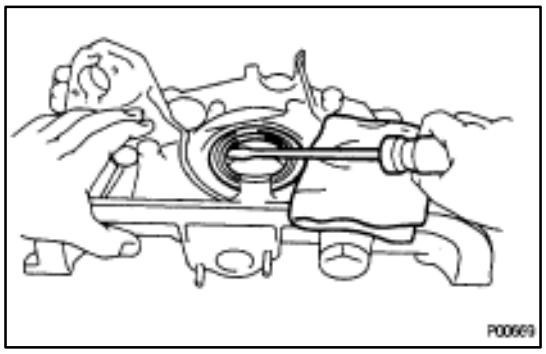
0.35 mm (0.0138 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.

CRANKSHAFT FRONT OIL SEAL REPLACEMENT

EG09C–01

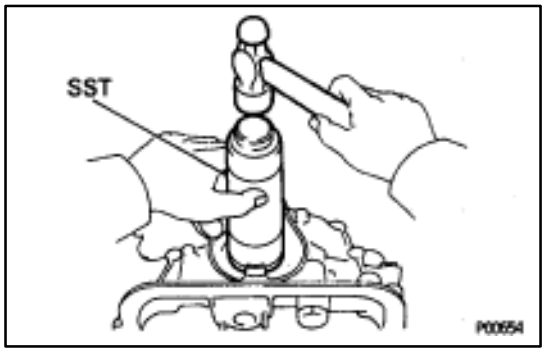
HINT: There are two methods (A and B) to replace the oil seal which are as follows:



REPLACE CRANKSHAFT FRONT OIL SEAL

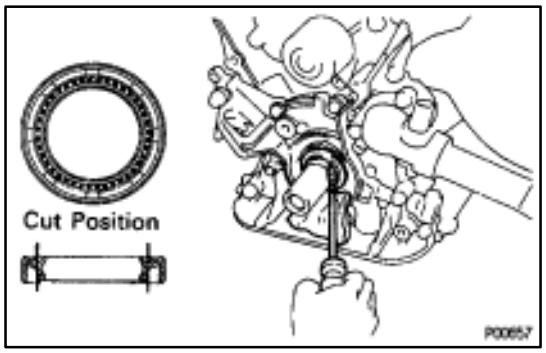
A. If oil pump is removed from cylinder block:

(a) Using a screwdriver, pry out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump case edge.
SST 09309–37010

(c) Apply MP grease to the oil seal lip.

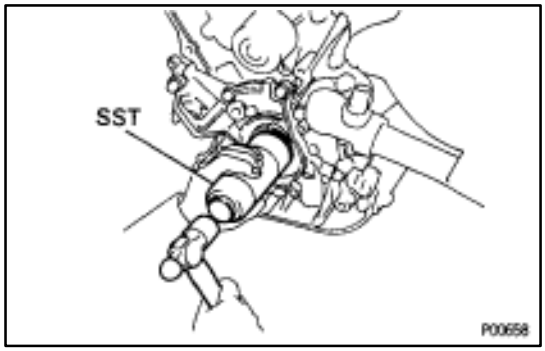


B. If oil pump is installed to the cylinder block:

(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.

NOTICE: Be careful not to damage the crankshaft. Tape the screwdriver tip.



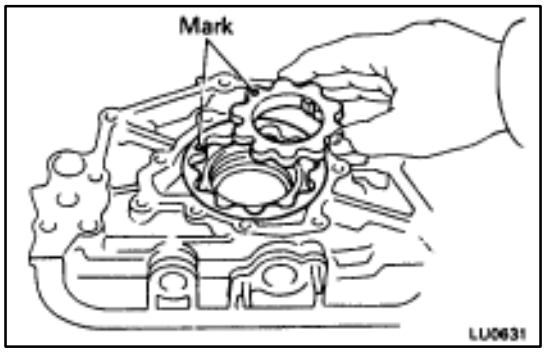
(c) Apply MP grease to a new oil seal lip.
(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump case edge.
SST 09309–37010

OIL PUMP ASSEMBLY

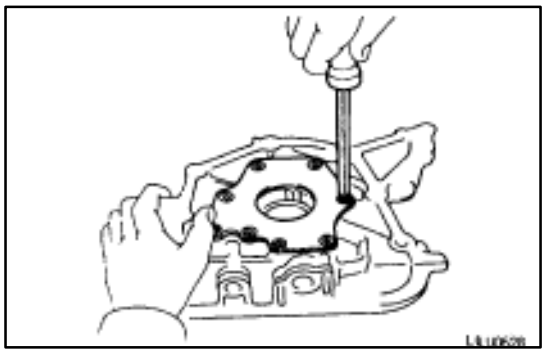
EG09D–01

(See page EG–298)

1. INSTALL DRIVE AND DRIVEN ROTORS

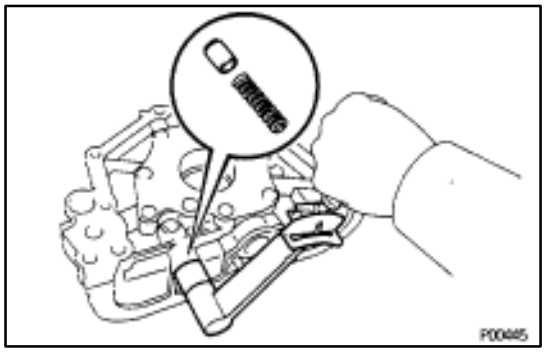


(a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.

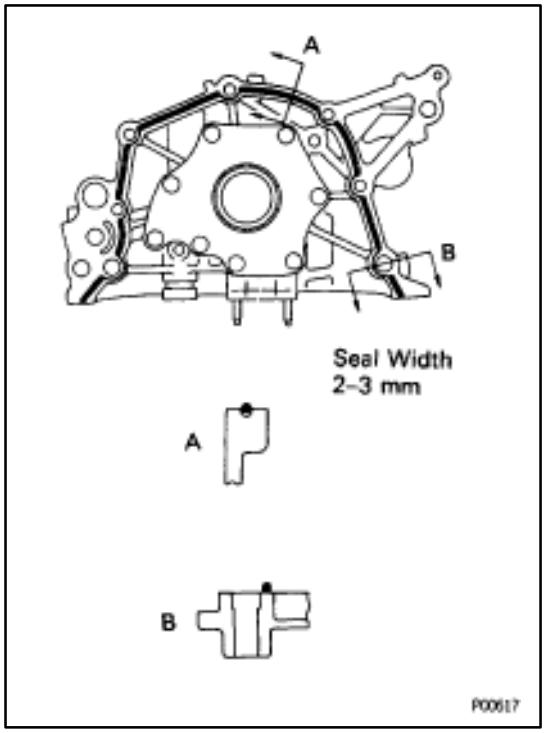


(b) Install the pump body cover with the eight screws.

2. INSTALL RELIEF VALVE



(a) Insert the relief valve and spring into the pump body hole.
(b) Install and torque the plug.
Torque: 37 N·m (375 kgf·cm, 37 ft·lbf)



OIL PUMP INSTALLATION

EG09E–02

(See page EG–294)

1. INSTALL OIL PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop and oil on the contact surfaces of the oil pump and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

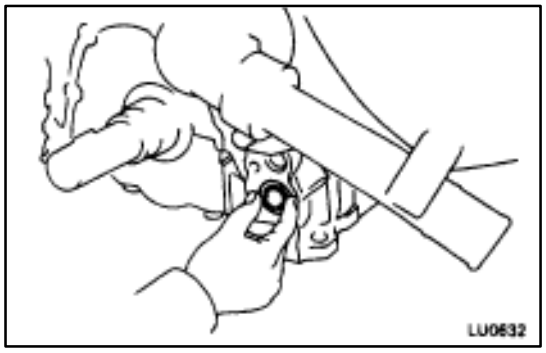
(b) Apply seal packing to the oil pump as shown in the illustration.

Seal packing:

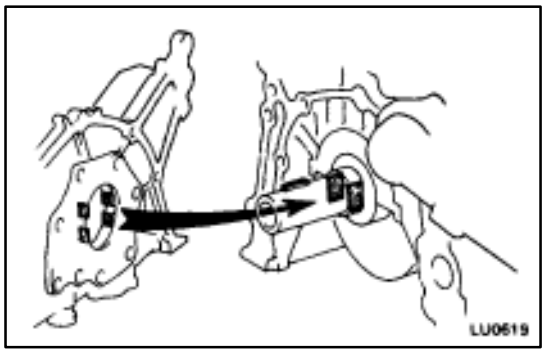
Part No. 08826–00080 or equivalent
- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 in.) opening.

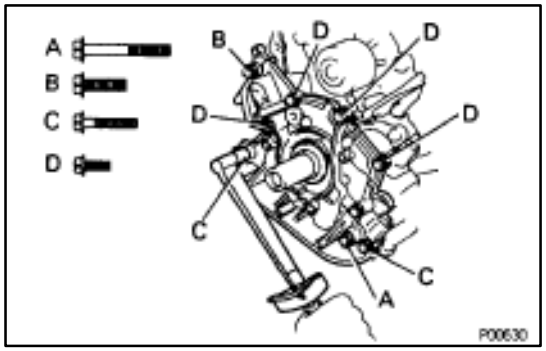
HINT: Avoid applying an excessive amount to the surface.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Place a new O–ring in position on the cylinder block.

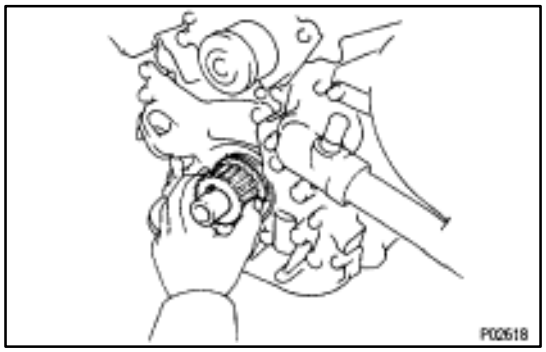


(d) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide.

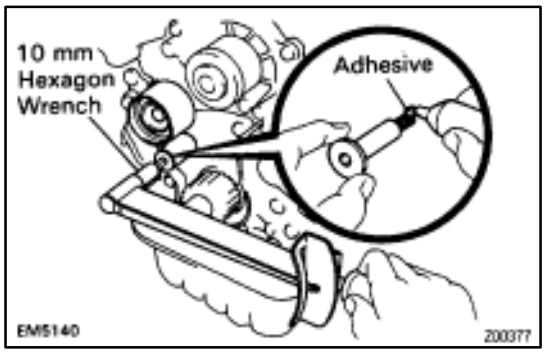




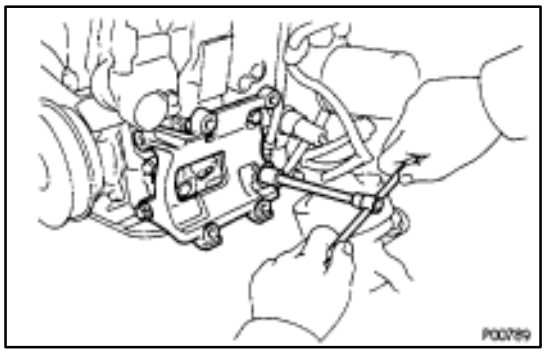
(e) Install the oil pump with the nine bolts.
12 mm head bolt (C and D)
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)
14 mm head bolt (A and B)
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)
HINT: On vehicles with A/C, tighten bolt A together with the A/C bracket.



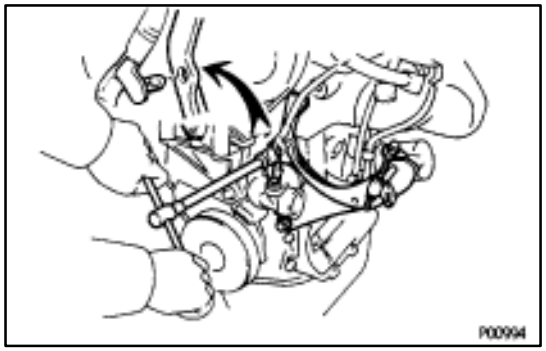
2. INSTALL CRANKSHAFT TIMING PULLEY
(a) Align the pulley set key with the key groove of the timing pulley.
(b) Slide on the timing pulley, facing the flange side inward.



3. INSTALL NO.1 IDLER PULLEY
(a) Apply adhesive to two or three threads of the mount bolt end.
Adhesive: Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(b) Using a 10 mm hexagon wrench, install the idler pulley with the plate washer and bolt. Torque the bolt.
Torque: 350 N·m (25 kgf·cm, 34 ft·lbf)
(c) Check that the pulley bracket moves smoothly.
4. INSTALL TIMING BELT (See page EG–29)
5. REMOVE ENGINE SLING DEVICE FROM ENGINE

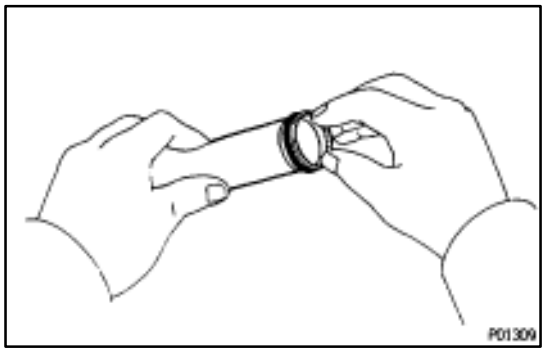


6. INSTALL A/C COMPRESSOR BRACKET
Install the A/C compressor bracket with the three bolts.



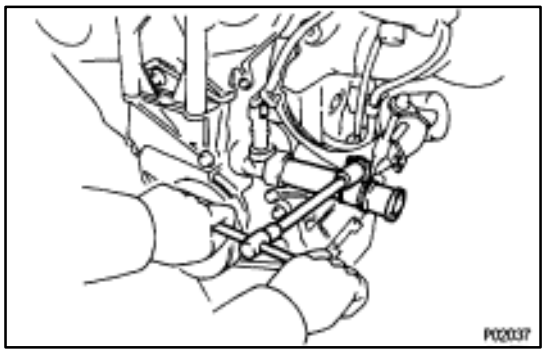
7. INSTALL GENERATOR BRACKET

Install the generator bracket with the two bolts.

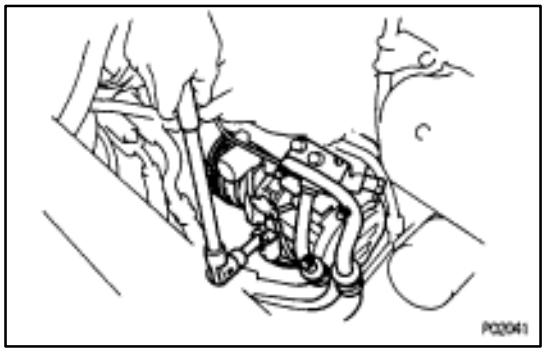


8. INSTALL WATER INLET PIPE

(a) Install a new O–ring to the water inlet pipe.



(b) Install the water inlet with the the bolt.



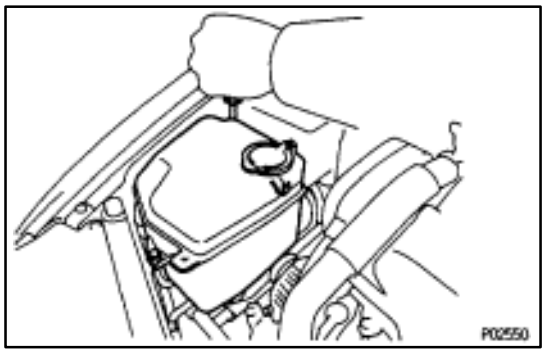
9. INSTALL A/C COMPRESSOR

(a) Install the A/C compressor and drive belt adjusting bar bracket with the five bolts.

(b) Connect the connector.

10. CONNECT RADIATOR LOWER HOSE

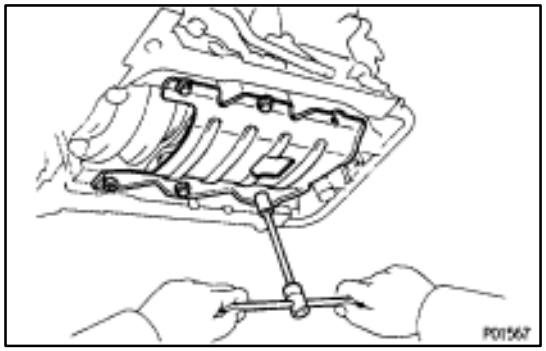
11. INSTALL GENERATOR (See CH section)



12. INSTALL WASHER TANK

(a) Connect the connector and vinyl hose to the washer tank.

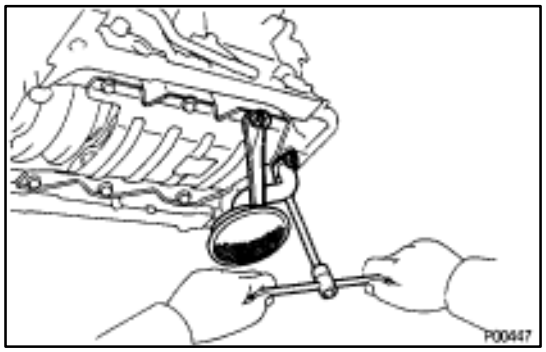
(b) Install the washer tank with the three bolts.



13. INSTALL OIL PAN BAFFLE PLATE

Install the baffle plate with the four bolts and nut.

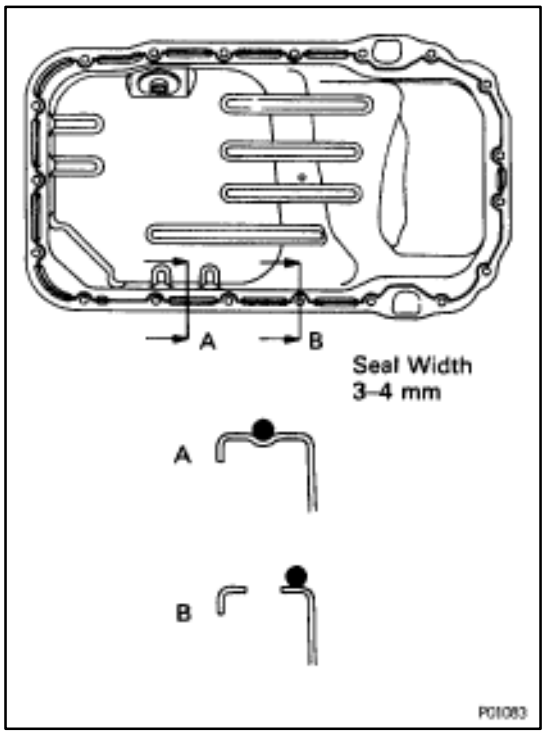
Torque: 5.5 N·m (75 kgf·cm, 65 in.·lbf)



14. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the three nuts.

Torque: 5.5 N·m (75 kgf·cm, 65 in.·lbf)



15. INSTALL OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pan and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

NOTICE: Do not use a solvent which will affect the painted surfaces.

(b) Apply seal packing to the oil pan as shown in the illustration.

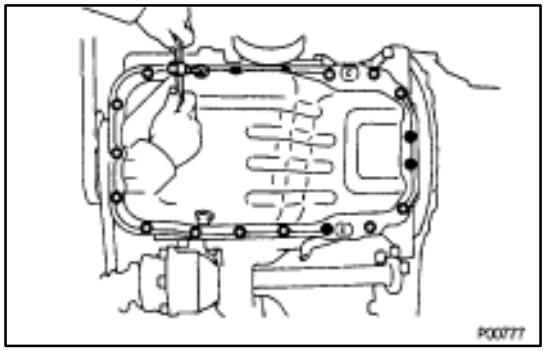
Seal packing:

Part No. 08826–00080 or equivalent

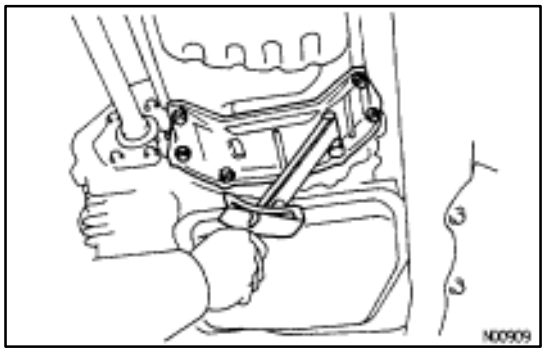
- Install a nozzle that has been cut to a 3–4 mm (0.12–0.16 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

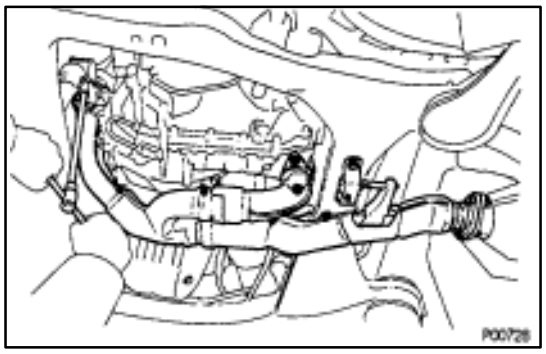
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Install the oil pan with the fifteen bolts and four nuts.
Torque: 5.5 N·m (75 kgf·cm, 65 in.·lbf)
(d) Install the dipstick.



16. INSTALL STIFFENER PLATE
(a) Install the dust seal to the stiffener plate.
(b) Install the stiffener plate with the six bolts.
12 mm head bolt
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
14 mm head bolt
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

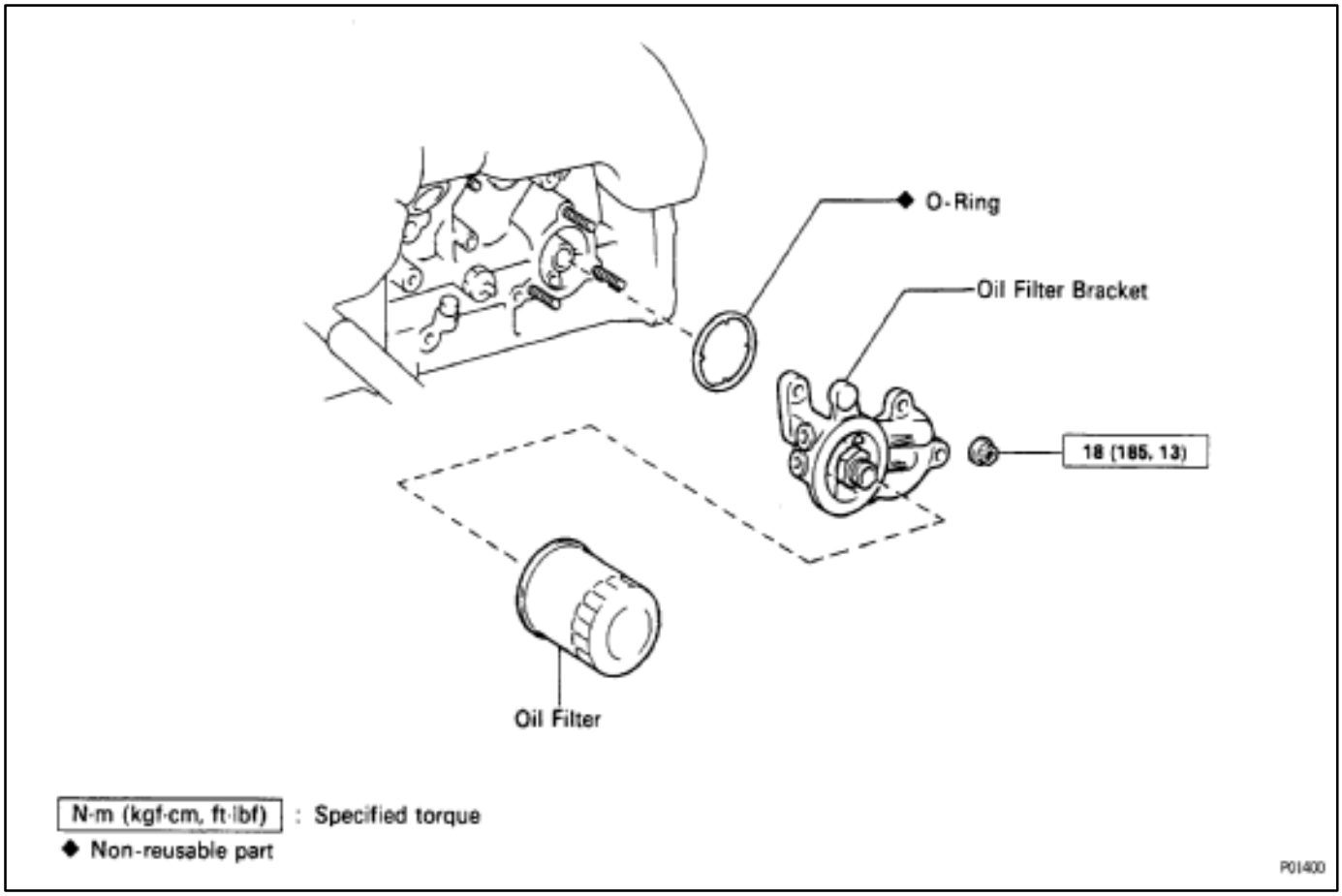


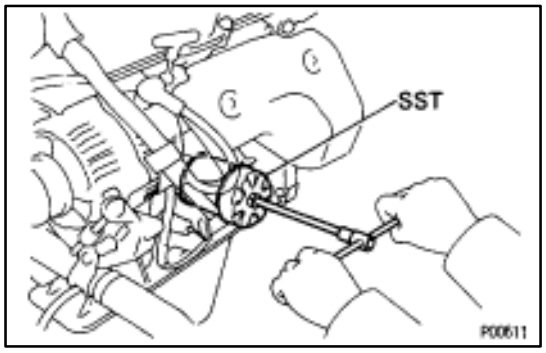
17. CONNECT FRONT EXHAUST PIPE
(a) Place three new gaskets on the front pipe.
(b) Install the front pipe with the two bolts and six nuts.
Torque the nut.
To manifold
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)
To three–way catalytic converter
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(c) Connect the bracket with the two bolts.
18. FILL WITH ENGINE OIL
19. FILL WITH ENGINE OIL
20. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY
21. START ENGINE AND CHECK FOR LEAKS
22. RECHECK ENGINE COOLANT AND ENGINE OIL LEVELS
23. INSTALL HOOD

OIL FILTER BRACKET

OIL FILTER BRACKET REMOVAL

EG09F–01

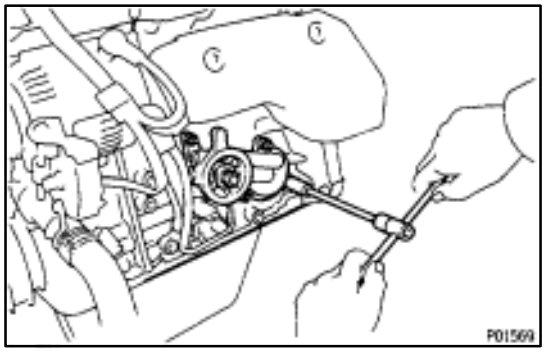




1. REMOVE OIL FILTER

Using SST, remove the oil filter.

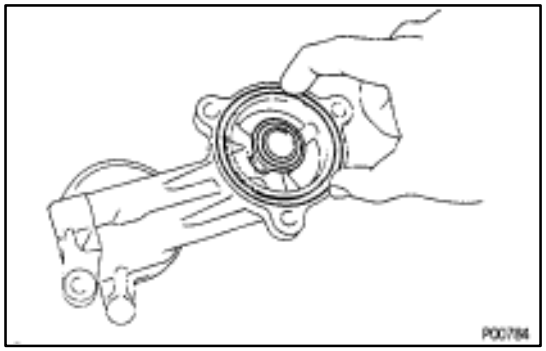
SST 09228–07500



2. REMOVE OIL FILTER BRACKET

(a) Remove the four nuts and oil filter bracket.

(b) Remove the O–ring from the oil filter bracket.



OIL FILTER BRACKET INSTALLATION

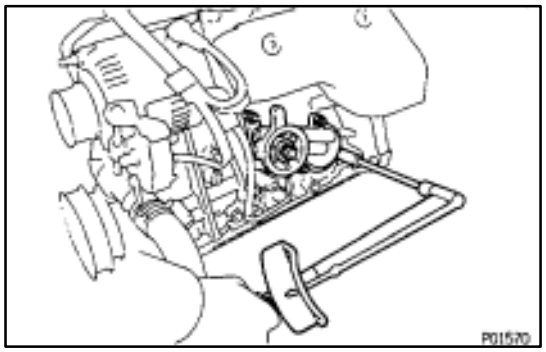
EG09G–01

(See page EG–307)

1. INSTALL OIL FILTER BRACKET

(a) Install a new O–ring to the oil filter bracket.

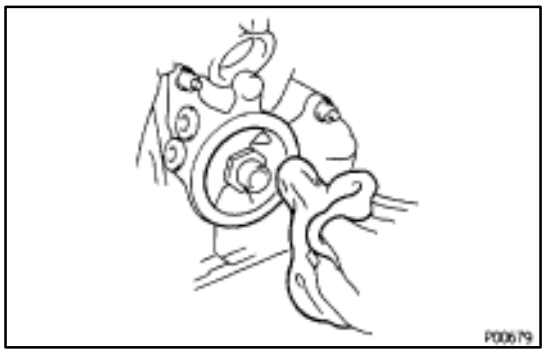
(b) Apply a light coat of engine oil on the O–ring.



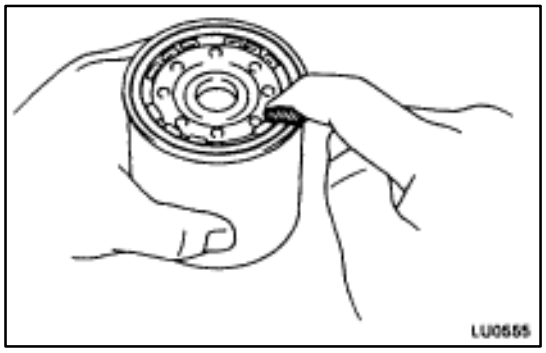
(c) Install the oil filter bracket with the four nuts.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

2. INSTALL OIL FILTER

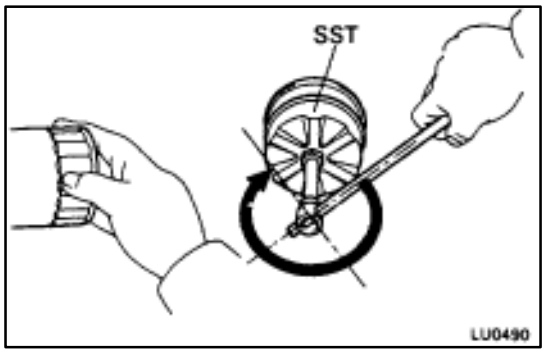
(a) Clean the filter contact surface on the filter mounting.



(b) Lubricate the filter rubber gasket with engine oil.



(c) Tighten filter until the gasket contacts seat of the filter mounting. Then using SST, give it an additional 3/4 turn to seat the filter.
SST 09228–07500



3. START ENGINE AND CHECK FOR LEAKS

4. CHECK ENGINE OIL LEVEL

SERVICE SPECIFICATIONS
SERVICE DATA

EG09H–01

Oil pressure	At idle speed (normal operating temperature)	29 kPa (0.3 kgfcm^2, 4.3 psi) or more
	At 3,000 rpm (normal operating temperature)	294–539 kPa (3.0–5.5 kgfcm^2, 43–78 psi)
Oil pump	Body clearance (STD)	0.100–0.175 mm (0.0039–0.0069 in.)
	Body clearance (Maximum)	0.30 mm (0.0118 in.)
	Tip clearance (STD)	0.110–0.240mm (0.0043–0.0094 in.)
	Tip clearance (Maximum)	0.35 mm (0.0138 in.)
	Side clearance (STD)	0.30–0.090 mm (0.0012–0.0035 in.)
	Side clearance (Maximum)	0.15 mm (0.0059 in.)

TORQUE SPECIFICATIONS

EG09J–01

Part tightened	N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder block	14	150	11
Oil pan x drain plug	37	375	27
Oil pump x Cylinder block (12 mm head bolt)	20	200	14
Oil pump x Cylinder block (14 mm head bolt)	41	420	30
Oil strainer x Main bearing cap	5.5	75	65 in.·lbf
Oil strainer x Oil pump	5.5	75	65 in.·lbf
Oil pan x Cylinder block	5.5	75	65 in.·lbf
Oil pan x Oil pump	5.5	75	65 in.·lbf
Oil pan x Rear oil seal retainer	5.5	75	65 in.·lbf
Stiffener plate x Cylinder block	18	185	13
Stiffener plate x Transaxle case	37	380	27
Front exhaust pipe x Exhaust manifold	62	630	46
Front exhaust pipe x Three–way catalytic converter	43	440	32
Oil filter bracket x Cylinder block	19	195	14

–MEMO–

ENGINE TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

The Engine Control System broadly consists of the sensors, ECM and actuators. The ECM receives signals from various sensors, judges the operating conditions and determines the optimum injection duration, timing, ignition timing and idle speed.

In general, the Engine Control System is considered to be a very intricate system to troubleshoot. But, the fact is that if you proceed to inspect the circuit one by one following the procedures directed in this manual, troubleshooting of this system is not complex.

This section explains the most ideal method of troubleshooting and tells how to carry out the necessary repairs.

1 CUSTOMER PROBLEM ANALYSIS

Using the customer problem analysis check sheet for reference, ask the customer in as much details as possible about the problem.

2 CHECK AND CLEAR DIAGNOSTIC TROUBLE CODE (PRECHECK)

Before confirming the problem symptom, first check the diagnostic trouble code and make a note of any malfunction code which is output, then clear the code.

HINT: Output of the malfunction code indicates that there is a malfunction in the circuit indicated. However, it does not indicate whether the malfunction is still occurring or occurred in the past and returned to normal. In order to determine this, the problem symptoms should be confirmed in 44 first and the diagnostic trouble code be rechecked in 6.

Accordingly, if troubleshooting is begun based on the malfunction code only in diagnostic trouble code check in 2, it could result in a misdiagnosis, leading to troubleshooting of circuits which are normal and making it more difficult to locate the cause of the problem.

3 SETTING THE TEST MODE DIAGNOSIS, 4 PROBLEM SYMPTOM CONFIRMATION, 5 SYMPTOM SIMULATION

In order to find out the trouble more quickly, set the diagnosis check in test mode and with higher sensing ability of the ECM, confirm the problem symptoms. If the trouble does not reappear, use the symptom simulation method to make sure the trouble is reproduced.

6 DIAGNOSTIC TROUBLE CODE CHECK IN TEST MODE

Check the diagnostic trouble code in test mode. If the malfunction code is output, proceed to ”step 8 Diagnostic Trouble Code Chart”. If the normal code is output, proceed to ”step 7 Basic Inspection”.

7 BASIC INSPECTION

Carry out basic inspection such as the spark check and fuel pressure check, etc.

8 DIAGNOSTIC TROUBLE CODE CHART

If the malfunction code is displayed, proceed to inspect the circuit indicated by the chart for each code.

9 MATRIX CHART OF PROBLEM SYMPTOMS

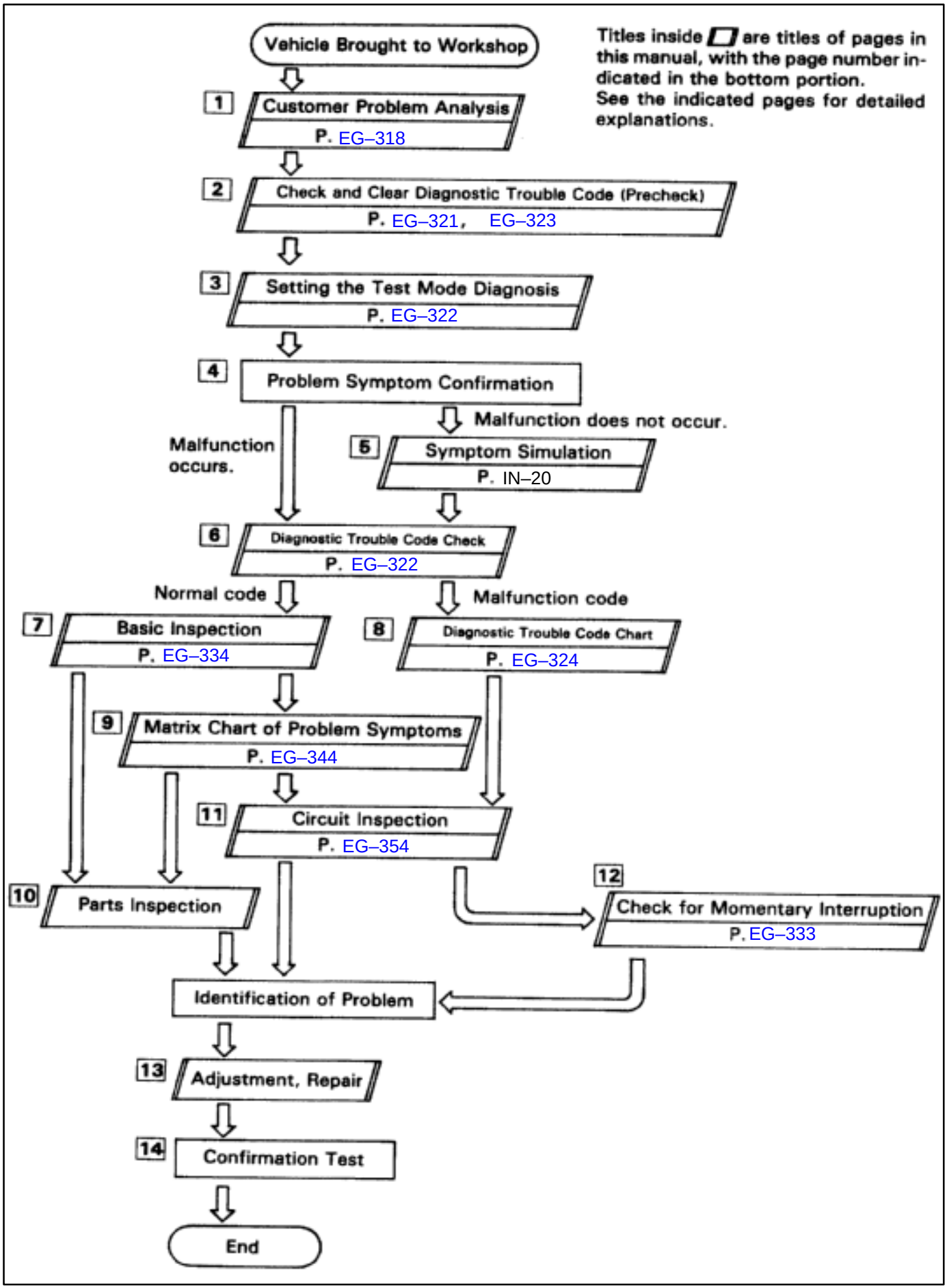
If the normal code is displayed in the diagnosis in test mode, perform troubleshooting according to the inspection order in the Matrix Chart of Problem Symptoms.

10 PARTS INSPECTION

When the Matrix Chart of Problem Symptoms instructs to check the parts, proceed to parts inspection section included in this manual.

[11] CIRCUIT INSPECTION

Determine if the malfunction is the sensor, actuator, wire harness, connector or the ECM.


Vehicle Brought to Workshop
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.
1 Customer Problem Analysis
P. EG–318
2 Check and Clear Diagnostic Trouble Code (Precheck)
P. EG–321, EG–323
3 Setting the Test Mode Diagnosis
P. EG–322
4 Problem Symptom Confirmation
Malfunction does not occur.
Malfunction occurs.
5 Symptom Simulation
P. IN–20
6 Diagnostic Trouble Code Check
P. EG–322
Normal code
Malfunction code
7 Basic Inspection
P. EG–334
8 Diagnostic Trouble Code Chart
P. EG–324
9 Matrix Chart of Problem Symptoms
P. EG–344
11 Circuit Inspection
P. EG–354
10 Parts Inspection
12 Check for Momentary Interruption
P. EG–333
Identification of Problem
13 Adjustment, Repair
14 Confirmation Test
End

[12]. CHECK FOR MOMENTARY INTERRUPTION

By performing the check for momentary interruption, the place where momentary interruptions or momentary shorts are occurring due to poor contacts can be isolated.

[13] ADJUSTMENT, REPAIR

After the cause of the problem is located, perform adjustment or repairs by following the inspection and replacement procedures in this manual.

[14] CONFIRMATION TEST

After completing adjustment or repairs, confirm not only that the malfunction is eliminated, but also conduct a test drive, etc., to make sure the entire Engine Control System is operating normally.

–MEMO–

How to Proceed with Troubleshooting Using Volt/Ohm Meter and TCCS Checker

For the explanation of steps 1 ~ 6, 8 and 10 ~ [16], see the explanation of steps with the same title on page EG–312.

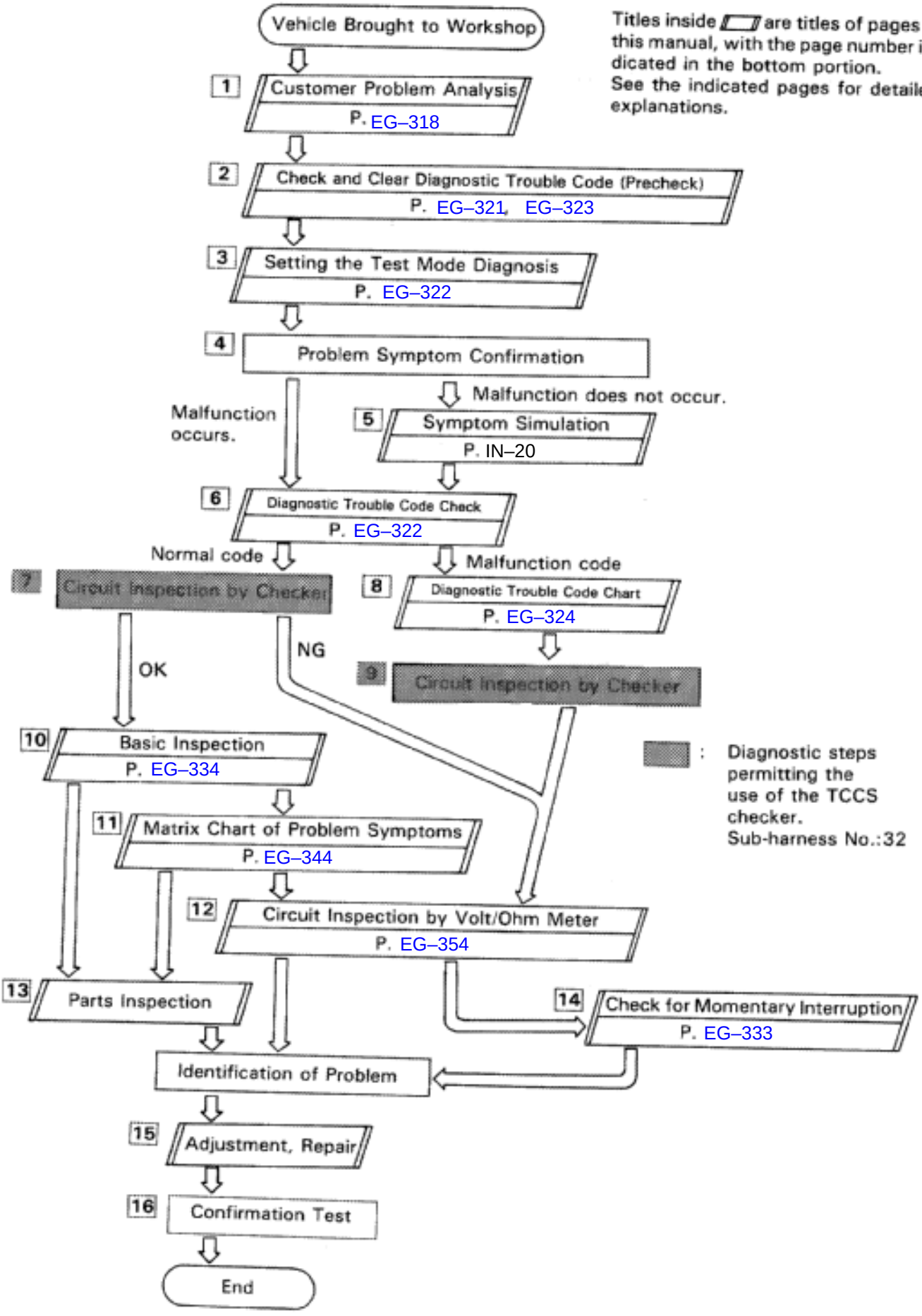
7 9 CIRCUIT INSPECTION BY CHECKER

If the Normal code is displayed in the diagnostic trouble code check, connect the checker to the vehicle and check all the circuits which can be inspected using the checker.

If a malfunctioning circuit is then detected, proceed to ”Circuit Inspection by Volt/Ohm Meter” and check the applicable circuit using a volt/ohm meter. Determine if the malfunction is in the sensor, actuator, wire harness, connector or the ECM. If the malfunctioning circuit cannot be detected using the checker, proceed to ”Basic Inspection” and perform troubleshooting.

If a malfunction code is displayed in the diagnostic trouble code check, use the checker to inspect the circuit indicated by the diagnostic trouble code chart for the displayed code.

For instructions on how to connect the checker to the vehicle and how to use the checker, please refer to the Instruction Manual for TCCS checker.


Vehicle Brought to Workshop
1 Customer Problem Analysis
P. EG–318
2 Check and Clear Diagnostic Trouble Code (Precheck)
P. EG–321, EG–323
3 Setting the Test Mode Diagnosis
P. EG–322
4 Problem Symptom Confirmation
Malfunction does not occur.
Malfunction occurs.
5 Symptom Simulation
P. IN–20
6 Diagnostic Trouble Code Check
P. EG–322
Normal code
Malfunction code
7 Circuit Inspection by Checker
8 Diagnostic Trouble Code Chart
P. EG–324
OK
NG
9 Circuit Inspection by Checker
10 Basic Inspection
P. EG–334
11 Matrix Chart of Problem Symptoms
P. EG–344
12 Circuit Inspection by Volt/Ohm Meter
P. EG–354
13 Parts Inspection
14 Check for Momentary Interruption
P. EG–333
Identification of Problem
15 Adjustment, Repair
16 Confirmation Test
End
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.
: Diagnostic steps permitting the use of the TCCS checker. Sub-harness No.:32

CUSTOMER PROBLEM ANALYSIS CHECK SHEET

ENGINE CONTROL System Check Sheet

Inspector's Name :

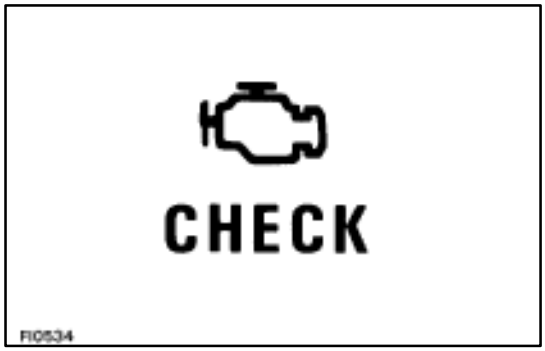
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In		Odometer Reading	km Miles

Date of Problem Occurrence		
Frequency of Problem Occurrence		☐ Constant ☐ Sometime (times per day/month) ☐ Once only ☐ Other ( )
Conditions at Time of Problem Occurrence	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))
	Place	☐ Highway ☐ Suburbs ☐ Inner City ☐ Hill (☐ Up, ☐ Down) ☐ Rough road ☐ Other ( )
	Engine Coolant Temp.	☐ Cold ☐ Warming up ☐ After warming up ☐ Any temp. ☐ Other
	Engine Operation	☐ Starting ☐ Just after starting ☐ Idling ☐ Racing without load ☐ Driving (☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other ( ))

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 ☐ Low (rpm)] ☐ Rough idling ☐ Other ( )
	☐ Poor Driveability	☐ Hesitation ☐ Back fire ☐ Muffler explosion (after fire) ☐ Surging ☐ Knocking ☐ Other ( )
	☐ Engine Stall	☐ Engine stall soon after starting ☐ After acceleration pedal depressed ☐ After acceleration pedal released ☐ During A/C operation ☐ When N to D shift ☐ Other ( )
	☐ Others	

Condition of Malfunction Indicator Lamp		☐ Remains on ☐ Sometimes lights up ☐ Does not light up
Diagnostic Trouble Code Inspection	Normal Mode (Precheck)	☐ Normal code ☐ Malfunction code [code]
	Test Mode	☐ Normal code ☐ Malfunction code [code]

–MEMO–



DIAGNOSIS SYSTEM

DESCRIPTION

The ECM contains a built–in self–diagnosis system by which troubles with the engine signal network are detected and a Malfunction Indicator Lamp on the instrument panel lights up.

By analyzing various signals as shown in the later table (See page EG–324) the ECM detects system malfunctions relating to the sensors or actuators.

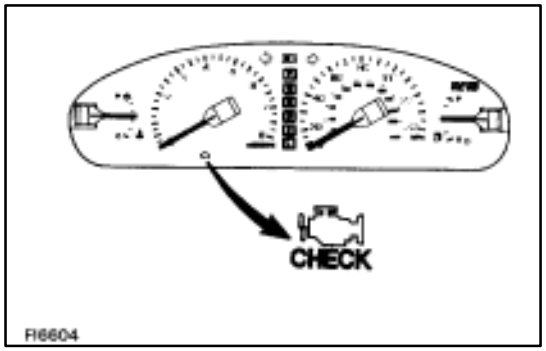
In the normal mode, the self–diagnosis system monitors 21 (California specification vehicles) or 18 (Other than California specification vehicles) items, indicated by code No. as shown in EG–324. A Malfunction Indicator Lamp informs the driver that a malfunction has been detected. The light goes off automatically when the malfunction has been repaired. But the diagnostic trouble code(s) remains stored in the ECM memory (except for code Nos. 16 and 53). The ECM stores the code(s) until it is cleared by removing the EFI fuse with the ignition switch off.

The diagnostic trouble code can be read by the number of blinks of the Malfunction Indicator Lamp when TE1 and E1 terminals on the data link connector 2 or data link connector 1 are connected. When 2 or more codes are indicated, the lowest number (code) will appear first.

In the test mode, 13 (California specification vehicles) or 10 (Other than California specification vehicles) items, indicated by code No. as shown in EG–324 are monitored. If a malfunction is detected in any one of the systems indicated by code Nos. 13, 21, 22, 24, 25, 26, 27, 28, 31, 32, 41, 42, and 71 (California specification vehicles) or 13, 21, 22, 24, 25, 28, 31, 32, 41 and 42 (Other than California specification vehicles) the ECM lights the Malfunction Indicator Lamp to warn the technician that malfunction has been detected. In this case, TE2 and E1 terminals on the data link connector 2 or data link connector 1 should be connected as shown later. (See page EG–322)

In the test mode, even if the malfunction is corrected, the malfunction code is stored in the ECM memory even when the ignition switch is off (except code Nos. 43 and 51). This also applies in the normal mode. The diagnostic mode (normal or test) and the output of the Malfunction Indicator Lamp can be selected by connecting the TE1, TE2 and E1 terminals on the data link connector 1 or data link connector 2, as shown later.

A test mode function has been added to the functions of the self–diagnosis system of the normal mode for the purpose of detecting malfunctions such as poor contact, which are difficult to detect in the normal mode. This function fills up the self–diagnosis system. The test mode can be implemented by the technician following the appropriate procedures of check terminal connection and operation described later. (See page EG–322)



Diagnosis Inspection (Normal Mode)

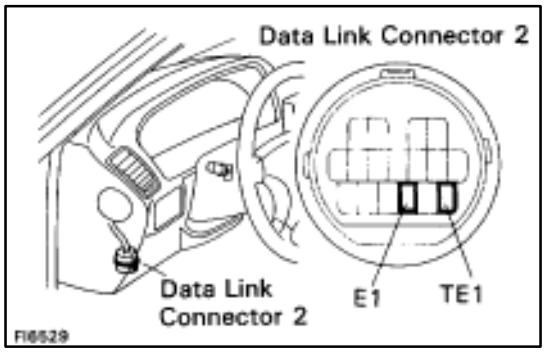
MALFUNCTION INDICATOR LAMP CHECK

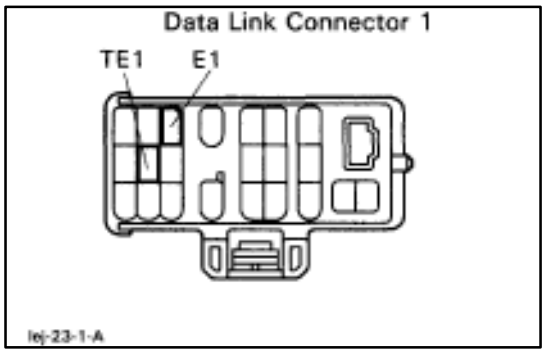
1. The Malfunction Indicator Lamp will come on when the ignition switch is turned ON and the engine is not running.
   HINT: If the Malfunction Indicator Lamp does not light up, proceed to troubleshooting of the combination meter (See page BE–144).
2. When the engine is started, the Malfunction Indicator Lamp should go off.

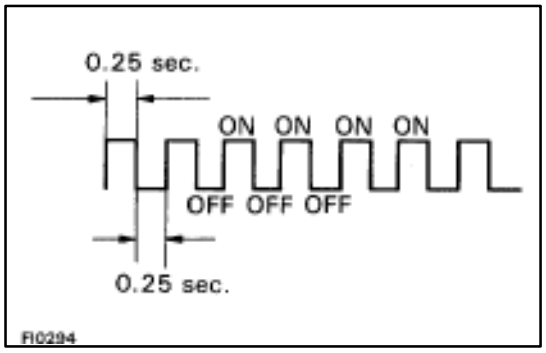
   If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

DIAGNOSTIC TROUBLE CODE CHECK

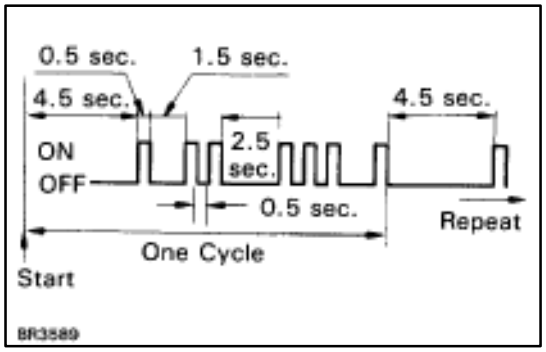
1. Turn ignition switch on.
2. Using SST, connect terminals between TE1 and E1 of Data link connector 2 or 1.
   SST 09843–18020



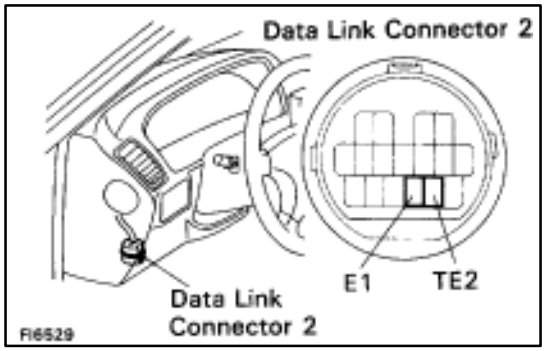


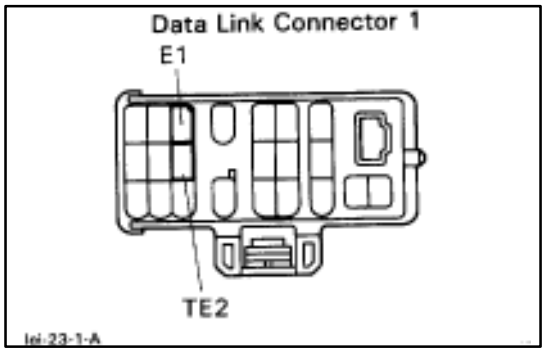


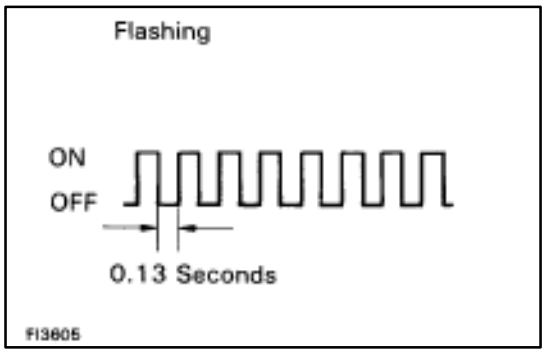
3. Read the diagnostic trouble code from Malfunction Indicator Lamp.
   HINT: If a diagnostic trouble code is not output, check the TE1 terminal circuit (See page EG–456).

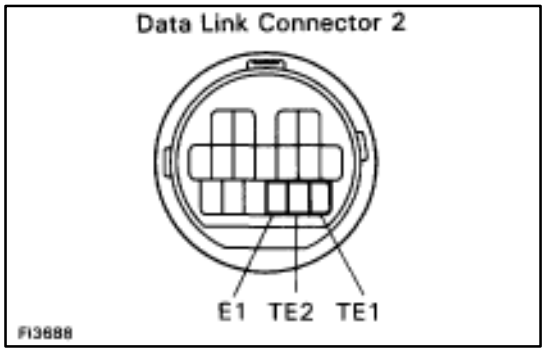


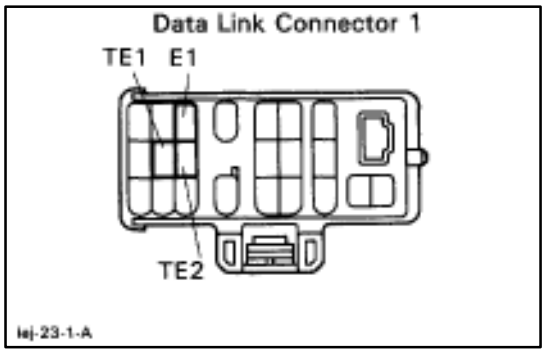
   As an example, the blinking patterns for codes; normal, 12 and 31 are as shown on the illustration.
4. Check the details of the malfunction using the diagnostic trouble code table on page EG–324.
5. After completing the check, disconnect terminals TE1 and E1, and turn off the display.
   HINT: In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the larger.











Diagnosis Inspection (Test Mode)

Compared to the normal mode, the test mode has high sensing ability to detect malfunctions.

It can also detect malfunctions in the starter signal circuit, the IDL contact signal of the throttle position sensor, air conditioning signal and park/neutral position switch signal.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the test mode.

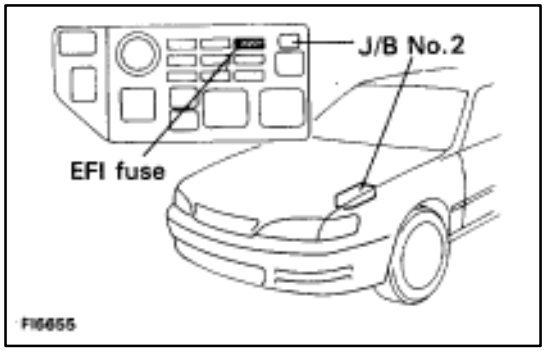
DIAGNOSTIC TROUBLE CODE CHECK

1. Initial conditions.
(a) Battery voltage 11 V or more.
(b) Throttle valve fully closed (throttle position sensor IDL points closed).
(c) Transmission in neutral position.
(d) Air conditioning switched off.
2. Turn ignition switch off.
3. Using SST, connect terminals TE2 and E1 of data link connector 2 or 1. SST 09843–18020

4. Turn ignition switch on.
HINT:
- To confirm that the test mode is operating, check that the Malfunction Indicator Lamp flashes when the ignition switch is turned to ON.
- If the Malfunction Indicator Lamp does not flash, proceed to troubleshooting of the TE2 terminal circuit on page EG–456.

5. Start the engine.

6. Simulate the conditions of the malfunction described by the customer.
7. After the road test, using SST, connect terminals TE1 and E1 of data link connector 2 or 1.
SST 09843–18020
8. Read the diagnostic trouble code on Malfunction Indicator Lamp on the combination meter (See page EG–321).
9. After completing the check, disconnect terminals TE1, TE2 and E1, and turn off the display.
HINT:
- The test mode will not start if terminals TE2 and E1 are connected after the ignition switch is turned on.
- When vehicle speed is 5 km/h (3mph) or below, diag. trouble code ”42” (Vehicle speed signal) is output, but this is not abnormal.
- When the engine is not cranked, diag. trouble code ”43” (Starter signal) output, but this is not abnormal.
- When the automatic transmission shift lever is in the ”D”, ”2”, ”L” or ”R” shift position, or when the air conditioning is on or when the accelerator pedal is depressed, code ”51” (Switch condition signal) is output, but this is not abnormal.



DIAGNOSTIC TROUBLE CODE CLEARANCE

1. After repair of the trouble areas, the diagnostic trouble code retained in the ECM memory must be cleared out by removing the EFI fuse (15A) from J/B No.2 for 10 seconds or more, with the ignition switch OFF.
   HINT:
   - Cancellation can also be done by removing the battery negative (–) terminal, but in this case, other memory systems (clock, etc.) will also be cancelled out.
   - If it is necessary to work on engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic trouble code has been recorded.
2. After cancellation, road test the vehicle to check that a normal code is now read on the Malfunction Indicator Lamp. If the same diagnostic trouble code appears, it indicates that the trouble area has not been repaired thoroughly.

DIAGNOSTIC TROUBLE CODE CHART

HINT: Parameters listed in the chart may not be exactly same as your reading due to type of the instruments or other factors.

Code No.	Number of Check Engine Blinks	Circuit	Diagnostic Trouble Code Detecting Condition
–	BE3931	Normal	No code is recorded.
12	BE3931	RPM Signal	No "NE" or "G1" and "G2" signal to ECM within 2 sec. after cranking. Open in "G⊖" circuit.
13	BE3931	RPM Signal	No NE signal to ECM for 0.1 sec. or more at 1,000 rpm or more. No 12 pulses of NE to ECM during the interval between G1 and G2 pulses.
14	BE3931	Ignition Signal	No IGF signal to ECM for 6 consecutive IGT signal.
16	BE3931	Electronic Controlled Transmission Control Signal	Fault in communications between the engine CPU and Electronic Controlled Transmission CPU in the ECM.
21	BE3932	Main Oxygen Sensor Signal (on left bank)	Main oxygen sensor signal voltage is reduced to between 0.35 V and 0.70 V for 60 sec. under conditions (a) – (d). (2 trip detection logic)*4 (a) Engine coolant temp.: Between 70°C (158°F) and 90°C (194°F). (b) Engine speed: 1,500 rpm or more. (c) Load driving (EX. Electronic Controlled Transmission in 4th speed, A/C ON, Flat road, 50 mph (80 km/h)) (d) Main oxygen sensor signal voltage: Alternating above and below 0.45 V.

*4: See page EG–331.

If a malfunction code is displayed during the diagnostic trouble code check in test mode, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

Trouble Area	Malfunction Indicator Lamp*1		Memory*2	See Page
	Normal Mode	Test Mode		
–	–	–	–	–
□1 Open or short in NE, G circuit. □1 Distributor □1 Open or short in STA circuit. □1 ECM	ON	N.A.	O	EG–354
□1 Open or short in NE circuit. □1 Distributor □1 ECM	ON	N.A.	O	EG–357
□1 Open or short in NE circuit. □1 Distributor □1 ECM	N.A.	ON		
□1 Open or short in IGF or IGT circuit from igniter to ECM. □1 Igniter □1 ECM	ON	N.A.	O	EG–358
□1 ECM	ON	N.A.	X	EG–364
□1 Main oxygen sensor circuit □1 Main oxygen sensor	ON	ON	O	EG–366

*1, 2: See page EG–330.

DIAGNOSTIC TROUBLE CODE CHART (Cont'd)

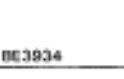
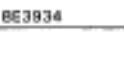
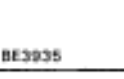
Code No.	Number of Check Engine Blinks	Circuit	Diagnostic Trouble Code Detecting condition
22	BE3932	Engine Coolant Temp. Sensor Signal	Open or short in engine coolant temp. sensor circuit for 0.5 sec. or more.
24	BE3932	Intake Air Temp. Sensor Signal	Open or short in intake air temp. sensor circuit for 0.5 sec. or more.
25	BE3932	Air-Fuel Ratio Lean Malfunction	(1) Main oxygen sensor voltage is 0.45 V or less (lean) for 90 sec. under conditions (a) and (b). (2 trip detection logic)*4 (a) Engine coolant temp.: 50°C (122°F) or more. (b) Engine speed: 1,500 rpm or more.
			(2)*3 Difference of air-fuel ratio feedback compensation value between right and left banks is more than 15 percentage for 20 sec. or more under conditions (a) and (b). (2 trip detection logic)*4 (a) Engine speed: Idling (b) Engine coolant temp.: Between 70°C (158°F) and 95°C (203°F).
26*3	BE3932	Air-Fuel Ratio Rich Malfunction	Difference of air-fuel ratio feedback compensation value between right and left banks is more than 15 percentage for 20 sec. or more under conditions (a) and (b). (2 trip detection logic)*4 (a) Engine speed: Idling (b) Engine coolant temp.: Between 70°C (158°F) and 95°C (203°F).
27*3	BE3932	Sub-Oxygen Sensor Signal	(1) Open or short in heater circuit of sub-oxygen sensor for 0.5 sec. or more.
			(2) Main oxygen sensor signal is 0.45 V or more and sub-oxygen sensor signal is 0.45 V or less under conditions (a) – (c). (2 trip detection logic)*4 (a) Engine coolant temp.: 80°C (176°F) or more. (b) Engine speed: 1,500 rpm or more. (c) Accel-pedal: Full depressed for 2 sec. or more.
28	BE3932	Main Oxygen Sensor Signal (on right bank)	Same as Code No. 21

*3, 4: See page EG–330, 331.

Trouble Area	Malfunction Indicator Lamp*1		Memory*2	See Page
	Normal Mode	Test Mode		
□Open or short in engine coolant temp. sensor circuit. □Water temp. sensor □ECM	ON	ON	O	EG–370
□Open or short in intake air temp. sensor circuit □Intake air temp. sensor □ECM	OFF	ON	O	EG–374
	ON*3			
□Open or short in main oxygen sensor circuit. □Main oxygen sensor □Ignition system □ECM	ON	ON	O	EG–376
□Fuel line pressure (injector leak, blockage) □Mechanical system malfunction (skipping teeth of timing belt) □Ignition system □Compression pressure □Volume air flow meter □ECM				
□Fuel line pressure (injector leak, blockage) □Mechanical system malfunction (skipping teeth of timing belt) □Ignition system □Compression pressure □Volume air flow meter □ECM	ON	ON	O	EG–376
□Open or short in heater circuit of sub–oxygen sensor. □Sub–oxygen sensor heater. □ECM	ON	N.A.	O	EG–382
□Open or short in sub–oxygen sensor circuit. □Sub–oxygen sensor □ECM	ON	ON		
□Same as Code No. 21	ON	ON	O	EG–366

*1, 2, 3: See page EG–330.

DIAGNOSTIC TROUBLE CODE CHART (Cont'd)

Code No.	Number of Check Engine Blinks	Circuit	Diagnostic Trouble Code Detecting Condition
31	BE3933	Volume Air Flow Meter Signal	All conditions below are detected continuously for 0.5 sec. or more. (a) Closed throttle position (b) Voltage of terminal VS: 0.1 V or less (c) Engine speed: 1,500 rpm or less
32	BE3933	Volume Air Flow Meter Signal	VS exceeds 4.9 V for 0.5 sec. or more.
41	BE3934	Throttle Position Sensor Signal	Open or short in throttle position sensor circuit (VTA) for 0.5 sec. or more.
42	BE3934	Vehicle Speed Sensor Signal (for Electronic Controlled Transmission)	All conditions below are detected continuously for 8 sec. or more. (a) Vehicle speed signal: 0 km/h (mph) (b) Engine speed: 3,000 rpm or more (c) Park/Neutral position switch (PNP)
		Vehicle Speed Sensor Signal (for M/T)	All conditions below are detected continuously for 8 sec. or more. (a) Vehicle speed signal: 0 km/h (mph) (b) Engine speed: Between 3,000 rpm and 4,500 rpm (c) Engine coolant temp.: 80°C (176°F) or more (d) Load driving
43	 BE3934	Starter Signal	No starter signal to ECM.
52	 BE3935	Knock Sensor Signal (on left bank)	No No.2 knock sensor signal to ECM for 2 crank revolutions with engine speed between 1,600 rpm and 5,200 rpm.
53	BE3935	Knock Control Signal	Engine control computer (for knock control) malfunction at engine speed between 650 rpm and 5,200 rpm.
55	 BE3935	Knock Sensor Signal (on right bank)	No No.1 knock sensor signal to ECM for 2 crank revolutions with engine speed between 1,600 rpm and 5,200 rpm.

Trouble Area	Malfunction Indicator Lamp*1		Memory*2	See Page
	Normal Mode	Test Mode		
□ Open (VC) or short (VC–E2) in volume air flow meter circuit. □ Volume air flow meter □ ECM	ON	ON	O	EG–388
□ Open (E2) or short (VC–VS) in volume air flow meter circuit. □ Volume air flow meter □ ECM	ON	ON	O	EG–390
□ Open or short in throttle position sensor circuit. □ Throttle position sensor □ ECM	OFF ON*3	ON	O	EG–392
□ No. 1 speed sensor □ Combination meter □ Open or short in No. 1 speed sensor circuit. □ ECM	OFF	OFF	O	EG–396
□ Open or short in starter signal circuit. □ Open or short in ignition switch or starter relay circuit. □ ECM	N.A.	OFF	X	EG–400
□ Open or short in knock sensor (on left bank) circuit. □ Knock sensor of left bank (looseness) □ ECM	ON	N.A.	O	EG–402
□ ECM	ON	N.A.	X	EG–402
□ Open or short in knock sensor (on right bank) circuit. □ Knock sensor of right bank (looseness) □ ECM	ON	N.A.	O	EG–402

*1, 2, 3: See page EG–330.

DIAGNOSTIC TROUBLE CODE CHART (Cont'd)

Code No.	Number of Check Engine Blinks	Circuit	Diagnostic Trouble Code Detecting condition
70*3	BE3937	EGR System Malfunction	EGR gas temp. is 70°C (158°F) or below for 1 ~ 4 min. under conditions (a) and (b). (2 trip detection logic)*4 (a) Engine coolant temp.: 60°C (140°F) or more. (b) EGR operation possible (EX. ECM in D position, A/C ON, 60 mph (96 km/h), Flat road.).
51	BE3935	Switch Condition Signal	(1) 3 sec. or more after engine starts, idle switch OFF (IDL). (2) Park/Neutral position switch OFF (PNP). (Shift position in "R", "D", "2" or "1" positions). (3) A/C switch ON.

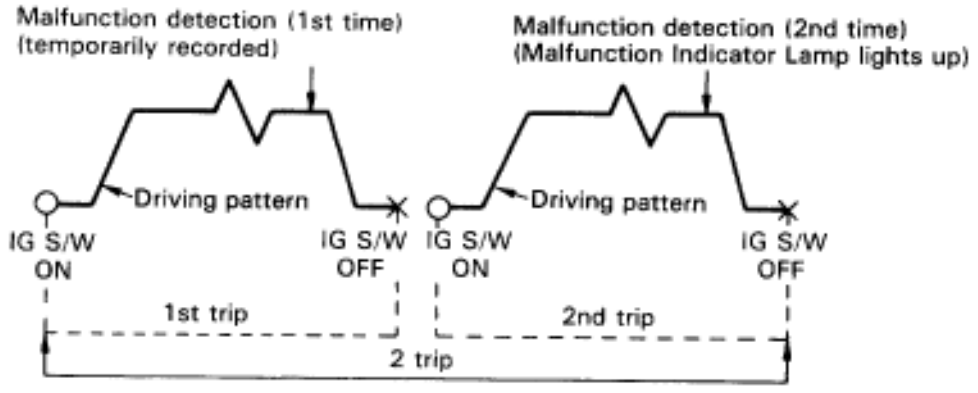
*1: "ON" displayed in the diagnosis mode column indicates that the Malfunction Indicator Lamp is lighted up when a malfunction is detected. "OFF" indicates that the "CHECK" does not light up during malfunction diagnosis, even if a malfunction is detected. "N.A." indicates that the item is not included in malfunction diagnosis.

*2: "O" in the memory column indicates that a diagnostic trouble code is recorded in the ECM memory when a malfunction occurs. "X" indicates that a diagnostic trouble code is not recorded in the ECM memory even if a malfunction occurs. Accordingly, output of diagnostic results in normal or test mode is performed with the IG switch ON.

*3: Only for California specification vehicles.

Trouble Area	Malfunction Indicator Lamp*1		Memory*2	See Page
	Normal Mode	Test Mode		
□Open in EGR gas temp. sensor circuit. □EGR or TVV vacuum hose disconnected, valve stuck. □Clogged EGR gas passage. □ECM	ON	ON	O	EG–408
□A/C switch circuit □Throttle position sensor IDL circuit □Park/Neutral position switch circuit □Accelerator pedal and cable □ECM	N.A.	OFF	X	EG–412

*4: This indicates items for which ”2 trip detection logic” is used. With this logic, when a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same case is detected again during the second drive test, this second detection causes the Malfunction Indicator Lamp to light up. The 2 trip repeats the same mode a 2nd time. (However, the IG switch must be turned OFF between the 1st trip and 2nd trip).
In the Test Mode, the Malfunction Indicator Lamp lights up the 1st trip a malfunction is detected.



EM9413

FAIL–SAFE CHART

If any of the following codes is recorded, the ECM enters fail–safe mode.

Code No.	Fail–Safe Operation	Fail–Safe Deactivation Conditions
14	Fuel cut	1 IGF1 detected in consecutive 3 ignitions.
16	Torque control prohibited	Returned to normal condition.
22	THW is fixed at 80°C (176°F)	Returned to normal condition.
24	THA is fixed at 20°C (68°F)	Returned to normal condition.
31 • **32**	Ignition timing fixed at 10° BTDC. Injection time fixed IDL ON__3.0 m sec. IDL OFF__5.6 m sec.	Returned to normal condition
41	VTA is fixed at 0°	The following 1 or 2 must be repeated at least 2 times consecutively. 1 0.1 V ⊕ VTA ⊕ 0.95 V 2 IDL ON
52	Max. timing retardation.	IG switch OFF.
53	Max. timing retardation.	Returned to normal condition.
55	Max. timing retardation.	IG switch OFF.

Back–Up Function

If there is trouble with the program in the ECM and the ignition signals (IGT) are not output, the ECM controls fuel injection and ignition timing at predetermined levels as a back–up function to make it possible to continue to operate the vehicle.

Furthermore, the injection duration is calculated from the starting signal (STA) and the throttle position signal (IDL). Also, the ignition timing is fixed at the initial ignition timing, 5° BTDC, without relation to the engine speed.

HINT: If the engine is controlled by the back–up function, the Malfunction Indicator Lamp lights up to warn the driver of the malfunction but the diagnostic trouble code is not output.

CHECK FOR MOMENTARY INTERRUPTION

As described in the preceding paragraph, abnormality detection ability in the test mode is increased compared to that in the normal mode, so that when momentary interruptions or momentary shorts occur in the ECM signal circuits (G1, G2, NE, THW, THA, VS, VTA) shown in the table below, the appropriate diagnostic trouble code is output.

Accordingly, when the diagnostic trouble codes shown in the table below (13, 22, 24, 31, 32, 41) are output during the diagnostic trouble code check, and inspection of the appropriate circuits reveals no abnormality, perform the check for momentary interruption as described below.

By performing the check for momentary interruption, the place where momentary interruptions or momentary shorts are occurring due to poor contacts can be isolated.

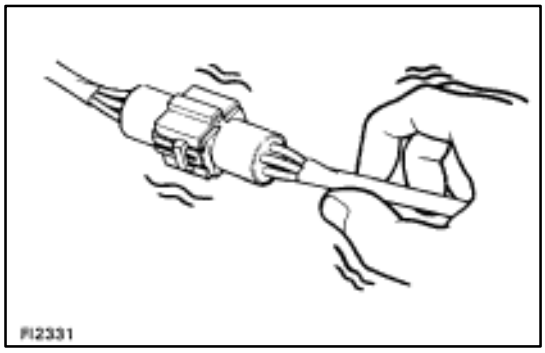
Diag. Code	Circuit
13	RPM signal circuit (No.2)
22	Engine coolant temp. sensor circuit
24	Intake air temp. sensor circuit
31·32	Volume air flow meter circuit
41	Throttle position sensor circuit

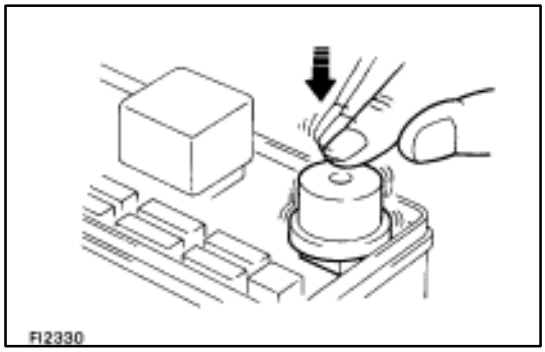
CLEAR DIAGNOSTIC TROUBLE CODES

See page EG–323.

SET TEST MODE

1. **With the ignition switch off, using SST, connect the terminals TE2 and E1 of the Data link connector 2 or 1.**
   SST 09843–18020
2. **Start the engine and check to see the Malfunction Indicator Lamp to go off.**





PERFORM A SIMULATION TEST

Using the symptom simulation (See page IN–20), apply vibration to and pull lightly on the wire harness, connector or terminals in the circuit indicated by the malfunction code. In this test, if the Malfunction Indicator Lamp lights up, it indicates that the place where the wire harness, connector or terminals being pulled or vibrated has faulty contact. Check that point for loose connections, dirt on the terminals, poor fit or other problems and repair as necessary.

HINT: After cancelling out the diagnostic trouble code in memory and set the test mode, if the Malfunction Indicator Lamp does not go off after the engine is started, check thoroughly for faulty contact, etc., then try the check again. If the Malfunction Indicator Lamp still does not go off, check and replace ECM.

BASIC INSPECTION

When the normal code is displayed in the diagnostic trouble code 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?**

YES

NO → **Charge or replace battery.**

2 **Is engine cranked?**

YES

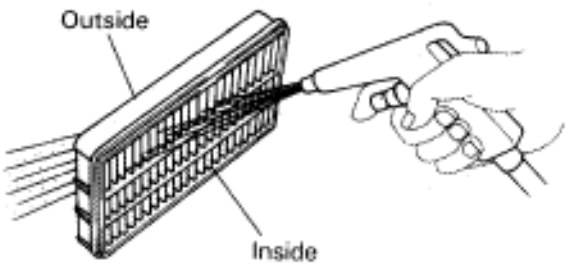
NO → **Proceed to matrix chart of problem symptoms on page EG–344.**

3 **Does engine start?**

YES

NO → **Go to step 3.**

4 **Check air filter.**



P Remove air filter.

C Visually check that the air filter is not excessively damaged or oily.

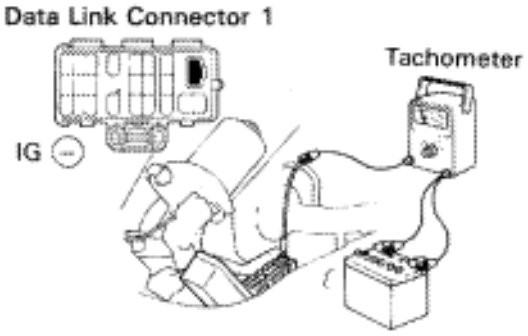
Hint If necessary, clean the air filter with compressed air. First blow from inside thoroughly, then blow off outside of the air filter.

OK

NG → **Repair or replace.**

Go to step 1.

5 **Check idle speed.**



P
1. Shift transmission into “N” position or neutral.
2. Warm up engine at normal operating temperature.
3. Switched off all accessories.
4. Switched off air conditioning.
5. Connect tachometer test probe to terminal IG ⊕ of data link connector 1.

C Check idle speed.

OK **Idle speed: 650 ∼ 750 rpm**

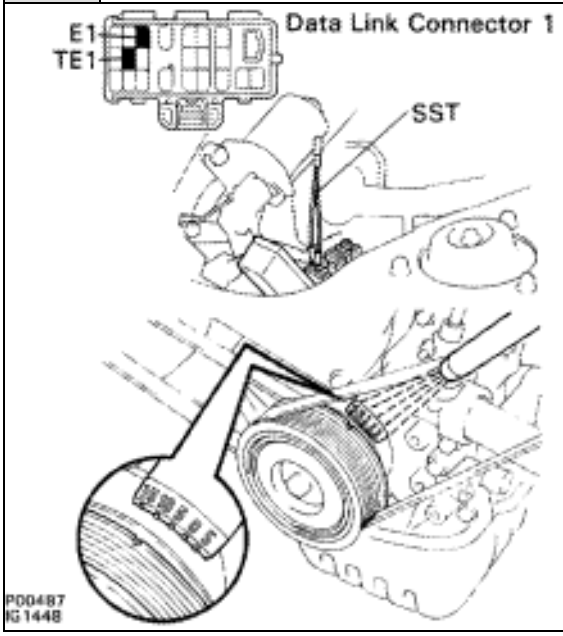
Caution:

□4 NEVER allow tachometer test probe to touch ground as it could result in damage to igniter and/or ignition coil.

□4 As some tachometers are not compatible with this ignition system, we recommend that you confirm compatibility of your unit before use.

OK → **NG** → **Proceed to matrix chart of problem symptoms on page EG–344.**

6 **Check ignition timing.**



P
1. Shift transmission into “N” position or neutral.
2. Warm up engine at normal operating temperature.
3. Keep the engine speed at idle.
4. Using SST, connect terminals TE1 and E 1 of data link connector 1.

SST 09843–18020

5. Using a timing light, connect the tester to No. 4 high–tension cord.

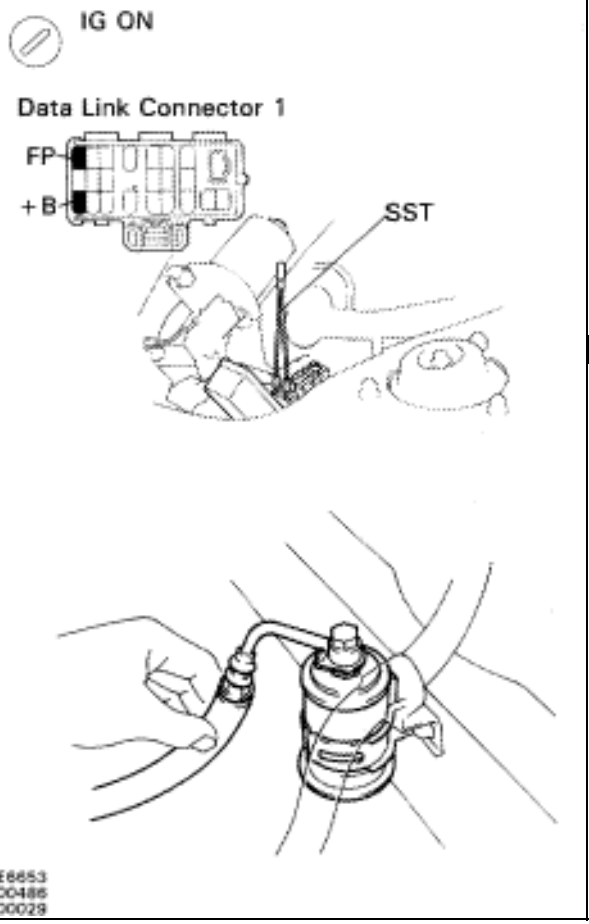
C Check ignition timing.

OK **Ignition timing: 10□5 BTDC at idle.**

OK → **NG** → **Proceed to page IG–19 and continue to troubleshoot.**

Proceed to matrix chart of problem symptoms on page EG–344.

7 **Check fuel pressure.**



P
1. Be sure that fuel is enough in tank.
2. Turn ignition switch on.
3. Using SST, connect terminals FP and +B of data link connector 1.

SST 09843–18020

C Check that there is pressure in the hose from the fuel filter.

Hint At this time, you will hear fuel return noise.

Caution: NEVER make a mistake with the terminal connection position as this will cause a malfunction.

OK

NG **Proceed to page EG–171 and continue to troubleshoot.**

8 **Check for spark.**

C Disconnect the high–tension cord from the distributor and, hold the end about 12.5 mm (1/2”) from the ground, see if spark occurs while the engine is being cranked.

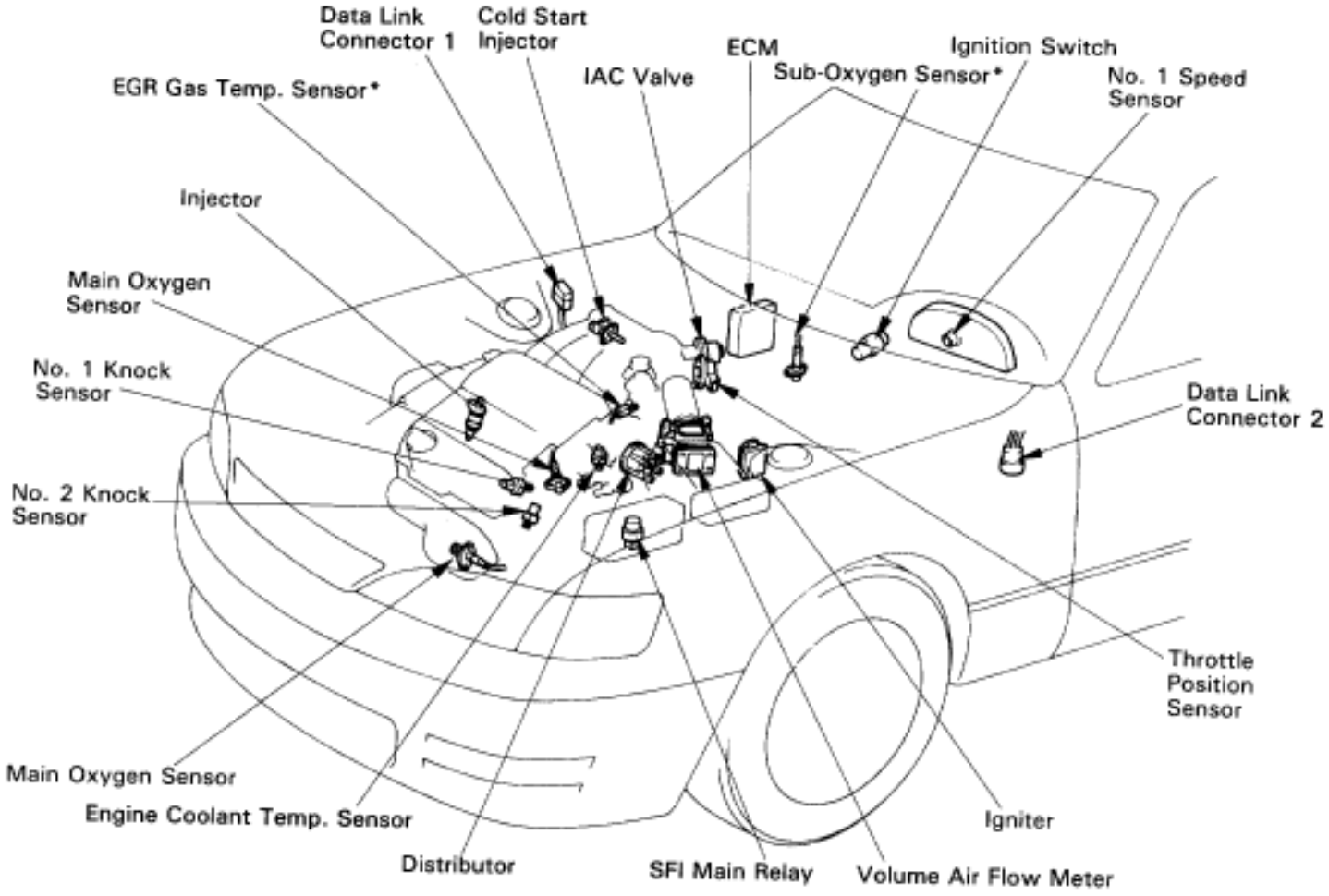
Hint To prevent excessive fuel injected from the injectors during this test. don’t crank the engine for more than 1 – 2 seconds at a time.

OK

NG **Proceed to page IG–6 and continue to troubleshoot.**

Proceed to matrix chart of problem symptoms on page EG–344.

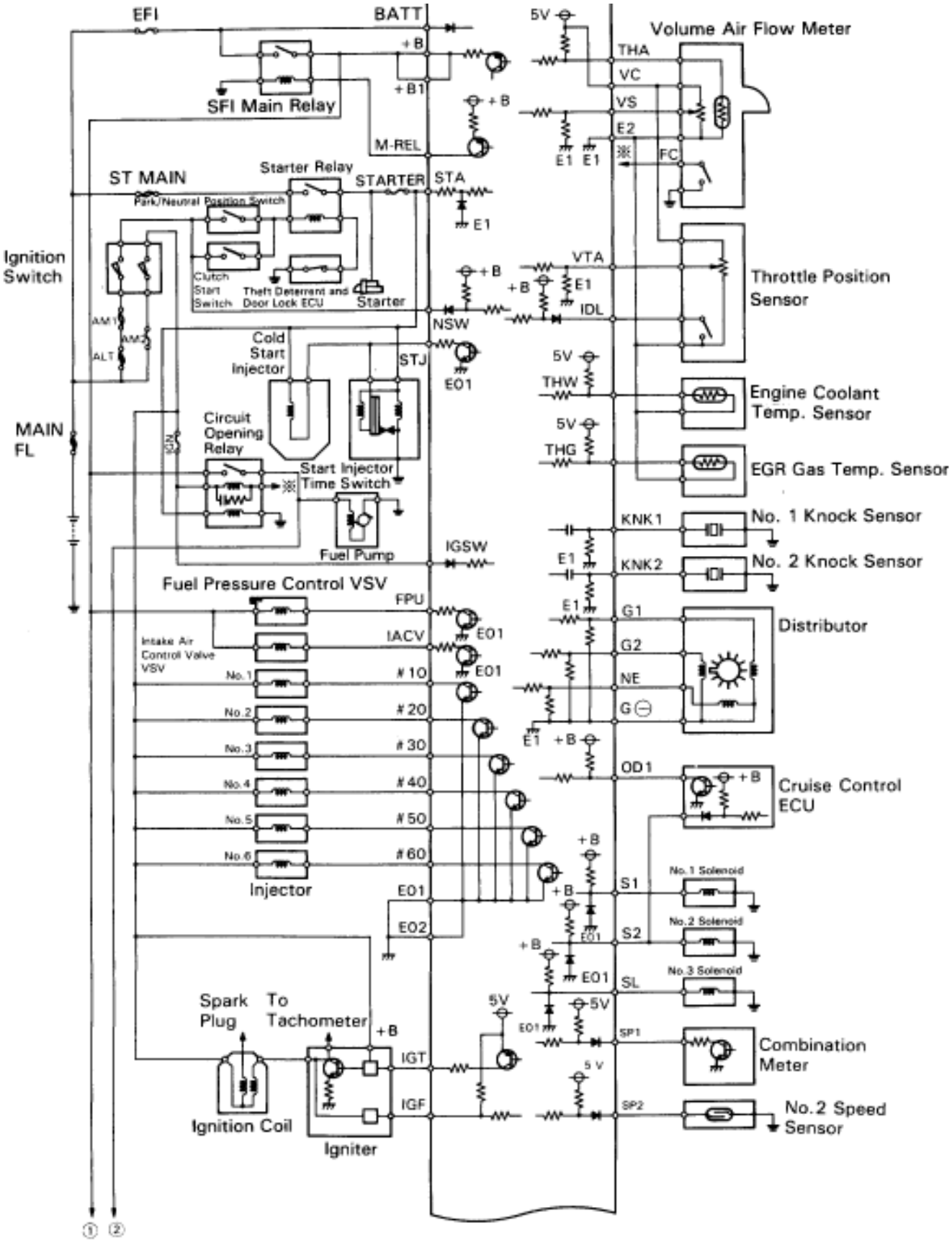
PARTS LOCATION

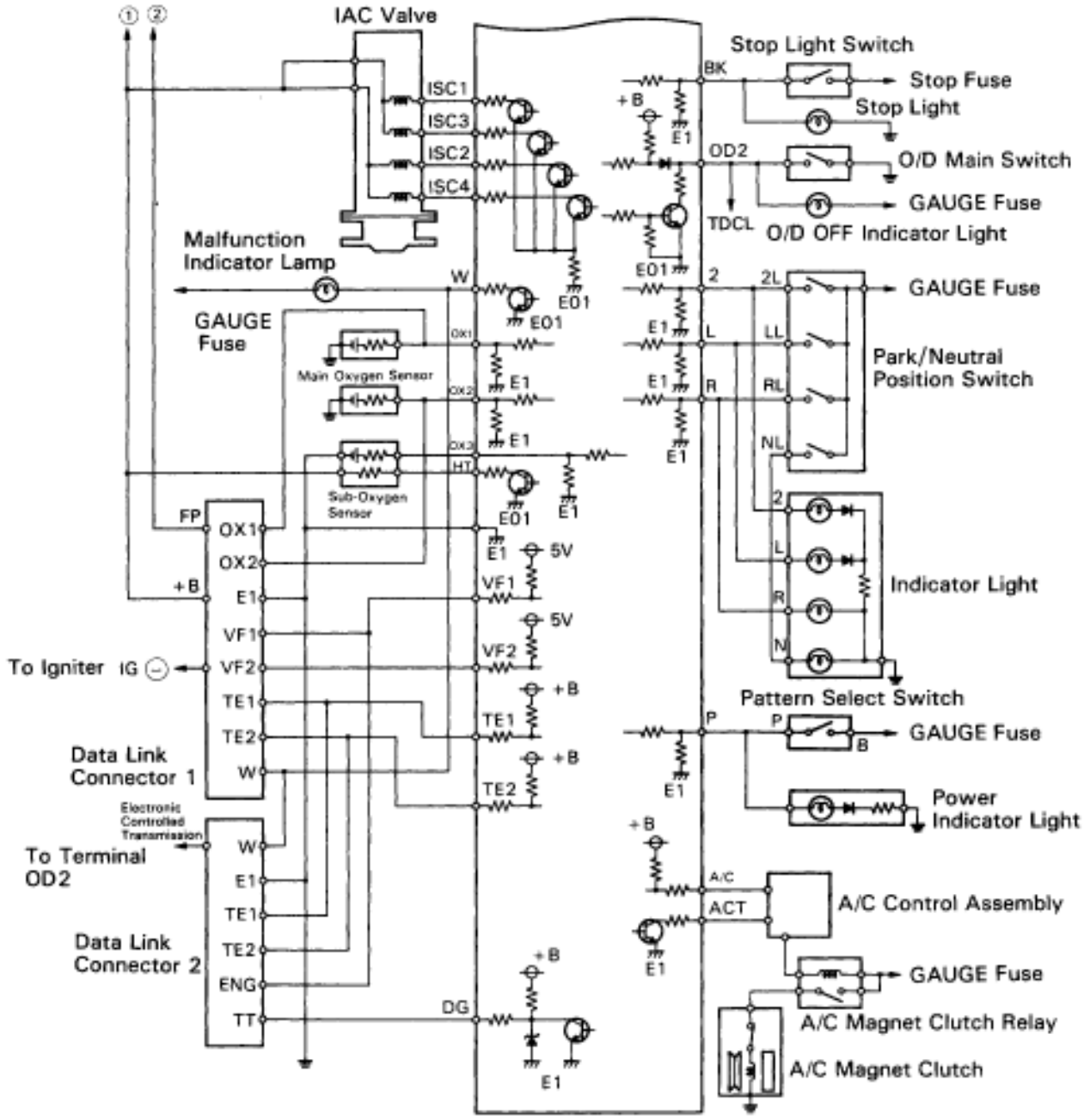


*: Only for Calif. spec.

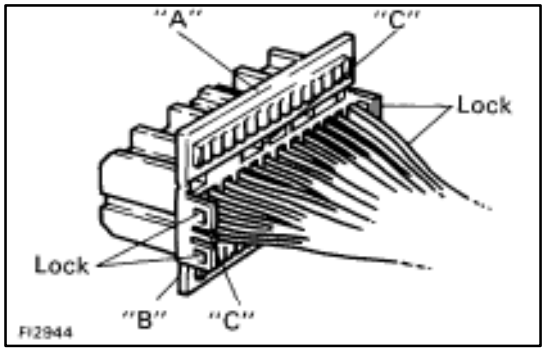
FI6803

WIRING DIAGRAM




IAC Valve
ISC1
ISC3
ISC2
ISC4
Malfunction Indicator Lamp
GAUGE Fuse
Main Oxygen Sensor
Sub-Oxygen Sensor
FP
OX1
OX2
+B
E1
VF1
VF2
TE1
TE2
W
To Igniter
IG
Data Link Connector 1
Electronic Controlled Transmission
To Terminal OD2
Data Link Connector 2
ENG
TT
DG
HT
E01
5V
Stop Light Switch
BK
Stop Fuse
Stop Light
OD2
O/D Main Switch
TDCL
O/D OFF Indicator Light
GAUGE Fuse
2
2L
L
LL
R
RL
NL
Park/Neutral Position Switch
Indicator Light
Pattern Select Switch
P
B
Power Indicator Light
A/C
ACT
A/C Control Assembly
A/C Magnet Clutch Relay
A/C Magnet Clutch

FI6575



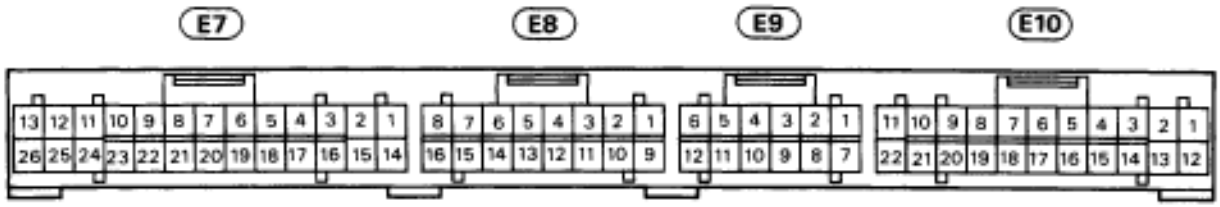
TERMINALS OF ECM

When measuring the voltage or resistance of the connector part of the ECM, remove the locks as required in the following procedure and always insert the test probe into the connector from the wire harness side.

PREPARATION

(a) Turn the ignition switch to LOCK position.
(b) Disconnect the connectors from the ECM.
(c) To remove section "A" and "B", carefully pull outward the lock on both sides as shown in the illustration.
NOTICE: Pay attention to section "C" in the illustration which can be easily broken.
(d) Reconnect the connectors to the ECM.

ECU Terminals



Terminal No.	Symbol	Connection	Terminal No.	Symbol	Connection
E7-1	HT*2	Sub-oxygen sensor heater	E7-14	VF2	Data link connector 1
-2	2*1	Park/Neutral position switch	-15	VF1	Data link connector 1
-3	L*1	Park/Neutral position switch	-16	–	———
-4	ISC4	IAC valve	-17	IGF	Igniter
-5	ISC3	IAC valve	-18	IGT	Igniter
-6	ISC2	IAC valve	-19	–	———
-7	ISC1	IAC valve	-20	#60	No. 6 injector
-8	SL*1	Solenoid	-21	#50	No. 5 injector
-9	S2*1	Solenoid	-22	#40	No. 4 injector
-10	S1*1	Solenoid	-23	#30	No. 3 injector
-11	#20	No.2 injector	-24	E1	ECM ground
-12	#10	No.1 injector	-25	STJ	Cold start injector
-13	E01	Power ground	-26	E02	Power ground

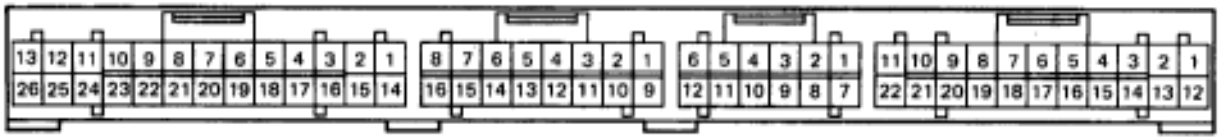
Terminal No.	Symbol	Connection	Termi-nal No.	Symbol	Connection
E8–1	VC	Throttle position sensor Volume air flow meter	**E9–10**	G2	Distributor
–2	VS	Volume air flow meter	**–11**	G1	Distributor
–3	THA	Intake air temp. sensor	**–12**	NE	Distributor
–4	THW	Engine coolant temp. sensor	**E10–1**	+B1	SFI main relay
–5	OX1	Main oxygen sensor (on right bank)	**–2**	BATT	Battery
–6	KNK1	No. 1 knock sensor	**–3**	M–REL	SFI main relay
–7	TE1	Data link connector 1	**–4**	W	Malfunction Indicator Lamp
–8	DG	Data link connector 1	**–5**	–	–
–9	E2	Sensor ground	**–6**	ACT	A/C control assembly
–10	VTA	Throttle position sensor	**–7**	A/C	A/C control assembly
–11	IDL	Throttle position sensor	**–8**	SP1	Speed sensor No.1
–12	THG*2	EGR gas temp. sensor	**–9**	OD2*1	O/D main switch
–13	OX2	Main oxygen sensor (on left bank)	**–10**	–	–
–14	KNK2	No. 2 knock sensor	**–11**	STA	Starter relay
–15	TE2	Data link connector 1	**–12**	+B	SFI main relay
–16	SP2*1	Speed sensor No. 2 (for ECT)	**–13**	IGSW	Ignition switch
E9–1	–	–	**–14**	BK*1	Stop light switch Stop light
–2	FPU	Fuel pressure up VSV	**–15**	–	–
–3	IACV	VSV (intake air control valve)	**–16**	–	–
–4	–	–	**–17**	–	–
–5	OX3*2	Sub–oxygen sensor	**–18**	OD1*1	Cruise control ECU
–6	G ⊕	Distributor	**–19**	R*1	Neutral start switch
–7	–	–	**–20**	P*1	Electronic Controlled Transmission pattern select switch
–8	–	–	**–21**	–	–
–9	–	–	**–22**	NSW*1	Park/Neutral position switch

*1: Only vehicles with Electronic Controlled Transmission.

*2: Only for California specification vehicles.

STANDARD VALUE OF ECM TERMINALS

ECM Terminals



Symbols (Terminals No.)	Wiring Color	STD Voltage (V)	Condition
BATT (E10-2)–E1 (E7-24)	W-L ↔ BR	10 ~ 14	Always
IGSW (E10-13) +B (E10-12)–E1 (E7-24) +B1 (E10-1)	BO (IGSW) B-O (+B) ↔ BR B-O (+B1)	10 ~ 14	IG switch ON.
VC (E8-1)–E2 (E8-9)	L-R ↔ BR	4.0 ~ 6.0	IG switch ON.
IDL (E8-11)–E2 (E8-9)	L ↔ BR	Below 1.0	IG switch ON. Closed throttle position
		10 ~ 14	IG switch ON. Throttle valve fully open
VTA (E8-10)–E2 (E8-9)	B ↔ BR	0.3 ~ 0.8	IG switch ON. Closed throttle position
		2.7 ~ 5.2	IG switch ON. Throttle valve fully open
VS (E8-2)–E2 (E8-9)	Y-L ↔ BR	3.7 ~ 4.3	IG switch ON.
		2.0 ~ 4.0	Idling
THA (E8-3)–E2 (E8-9)	L-B ↔ BR	1.0 ~ 3.0	Idling, Intake air temp. 20°C (68°F)
THW (E8-4)–E2 (E8-9)	G ↔ BR	0.1 ~ 1.0	Idling, Engine coolant temp. 80°C (176°F)
#10 (E7-12) #20 (E7-11) #30 (E7-23) – E01 (E7-13) #40 (E7-22) #50 (E7-21) #60 (E7-20)	W (#10) Y (#20) GR (#30) L (#40) R (#50) G (#60) ↔ W-B	10 ~ 14	IG switch ON.
		Pulse generation	Idling
IGT (E7-18)–E1 (E7-24)	W ↔ BR	Pulse generation (0 and 4 ~ 6)	Idling
IGF (E7-17)–E1 (E7-24)	W-R ↔ BR	Below 1.0	IG switch ON.
		Pulse generation (1.0 and 4 ~ 6)	Idling
G1 (E9-11) G2 (E9-10) – G⊖ (E9-6)	R (G1), L(G2) ↔ Y	Pulse generation (−1.3 ~ +1.3 or higher)	Idling
NE (E9-12)–G⊖ (E9-6)	B ↔ Y	Pulse generation (−0.6 ~ +0.6 or higher)	Idling
M-REL (E10-3)–E1 (E7-24)	RL ↔ BR	10 ~ 14	IG switch ON.

Symbols (Terminals No.)	Wiring Color	STD Voltage (V)	Condition
FPU (E9-2)–E1 (E7-24)	B-R ↔ BR	10 – 14	IG switch ON.
		Below 2.0	Restarting high temp. (Engine coolant temp.: 100°C (212°F) or more, Intake air temp.: 65°C (149°F) or more)
ISC1 (E7-7) ISC2 (E7-6) ISC3 (E7-5) ISC4 (E7-4) – E1 (E7-24)	W-L (ISC1) G-W (ISC2) L-R (ISC3) R-B (ISC4) ↔ BR	10 – 14	IG switch ON.
VF1 (E7-15) VF2 (E7-14) –E1 (E7-24)	R-W (VF1) B (VF2) ↔ BR	1.0 – 4.0	Maintain engine speed at 2,500 rpm for two minutes after warming up then return to idling.
OX1 (E8-5) OX2 (E8-13) –E1 (E7-24)	W (OX1) R-L (OX2) ↔ BR	Pulse generation (0 – 1.0)	Maintain engine speed at 2,500 rpm for two minutes after warming up.
HT (E7-1)–E01 (E7-13)	P-B ↔ W-B	10 – 14	IG switch ON.
		Below 2.0	Idling
KNK1 (E8-6) KNK2 (E8-14) –E1 (E7-24)	W (KNK1) R-L (KNK2) ↔ BR	Pluse generation (Frequency: 7.6 kHz)	Idling
NSW (E10-22)–E1 (E7-24)	B-W ↔ BR	10 – 14	IG switch ON. Shift position not in "P", "N" positions.
		Below 2.0	IG switch ON. Shift position in "P", "N" positions.
SP1 (E10-8)–E1 (E7-24)	V-Y ↔ BR	Pulse generation (0 and 4 – 6)	IG switch ON. Rotate driving wheel slowly.
TE1 (E8-7)–E1 (E7-24)	GR ↔ BR	10 – 14	IG switch ON.
TE2 (E8-15)–E1 (E7–24)	G-W ↔ BR	10 – 14	IG switch ON.
W (E10-4)–E1 (E7-24)	G-R ↔ BR	Below 2.0	IG switch ON.
		10 – 14	Idling
OD1 (E10-18)–E1 (E7-24)	Y-B ↔ BR	10 – 14	IG switch ON.
A/C (E10-7)–E1 (E7-24)	B-Y ↔ BR	Below 2.0	A/C switch ON. (At idling)
		10 – 14	A/C switch OFF.
ACT (E10-6)–E1 (E7-24)	LG-R ↔ BR	10 – 14	A/C switch ON. (At idling)
		Below 2.0	A/C switch OFF.
IACV (E9-3)–E01 (E7-13)	LG ↔ W-B	10 – 14	IG switch ON.
STA (E10-11)–E1 (E7-24)	B-W ↔ BR	6.0 or more	Cranking
STJ (E7-25)–E01 (E7-13)	G ↔ W-B	10 – 14	Starting

MATRIX CHART OF PROBLEM SYMPTOMS

When the malfunction code is not confirmed in the diagnostic trouble code check and the problem still can not be confirmed in the basic inspection, then proceed to this step and perform troubleshooting according to the numbered order given in the table below.

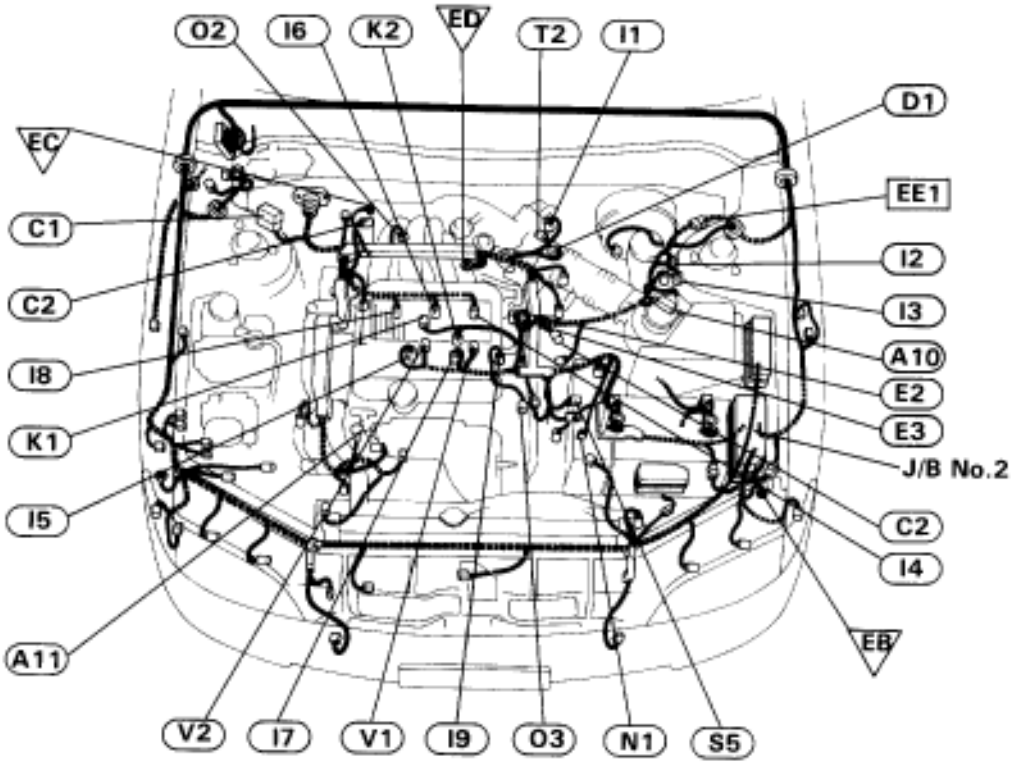
The circuits indicated by ※ on the matrix chart can be inspected using the TCCS checker.

Symptom	Suspect area	See page	Volume air flow meter circuit ※	Starter signal circuit ※	EGR System	Switch condition signal circuit	Park/Neutral position switch circuit ※	ECM power source circuit	Back up power source circuit	Injector circuit ※	Cold start injector circuit	IAC valve circuit	Fuel system circuit	Fuel pressure control VSV circuit	A/C cut control circuit	A/C signal circuit (Compressor circuit) ※	Starter and starter relay	Ignition signal circuit (Spark test)	Spark plug	Ignition coil	Distributor	Compression	Electronic Controlled Transmission faulty	Theft deterrent ECU	ECM
		EG–388, 390	EG–400,	EG–408,	EG–412,	EG–416,	EG–420,	EG–426	EG–428	EG–432	EG–436	EG–440	EG–446	EG–450	AC–84,	ST–17–19	IG–6	IG–9	IG–11	IG–11	EG–27	AX–66	BE–278	IN–32
Does not start	Engine does not crank						2										1							3	
	No initial combustion							1		5	6		3					2	4						
	No complete combustion									6	7		1					5	4	2	3				
Difficult to start	Difficult to start normally		1							8	9	2	3						6	4	5	7			
	Difficult to start in cold		1							5	3	2	4						8	6	7				
	Difficult to start in hot		1							5	6	2	4	3					9	7	8				
Poor Idling	Incorrect first idle				1							2													
	High engine idle speed				1	5	4	6				2				3									
	Low engine idle speed	7			3	4		8	6			1	5			2									
	Rough idling	3		5	1			12	4	13	2	8						6	11	9	10	7			
	Hunting	3			1		4				2	5													
Poor Driveability	Hesitation/Poor acceleration	2			1				3			4		9				5	8	6	7		10		
	Muffler explosion (after fire)				1				5										4	2	3				
	Surging				1				5			2							4		3				
Engine Stall	Engine stalls soon after starting	2								4	3	1													
	After acceleration pedal depressed	2			1					3															
	After acceleration pedal released								1	3	2														4
	During A/C operation										1				2										3
	When N to D shift					1				3	2														

–MEMO–

LOCATION OF CONNECTORS

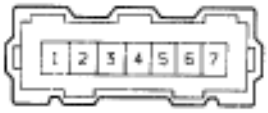
Location of Connectors in Engine Compartment



BE6660

A10

Intake Air Temp. Sensor (Inside the volume air flow meter)



J-7-1

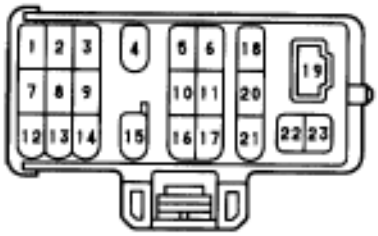
A11

Generator

X-142

C1

Data Link Connector 1



Ie-23-1-A

C2

Cold Start Injector

IS-2-1-I

D1

Distributor

Ie-4-1-E

E2

Engine Coolant Temp. Sensor

V-2-1-C

E3

EGR Gas Temp. Sensor

Ie-2-1-C

I1

IAC Valve

Ie-6-1-D

I2

Igniter

Ie-5-1

I3

Ignition Coil

Ie-2-1-n

I4

Injector No.1

IS-2-1-T

I5

Injector No. 2

IS-2-1-T

I6

Injector No.3

IS-2-1-T

I7

Injector No. 4

IS-2-1-T

I8

Injector No. 5

IS-2-1-T

I9

Injector No. 6

IS-2-1-T

K1

No. 1 Knock Sensor

Ie-1-1-B

K2

No. 2 Knock Sensor

Ie-1-1-B

N1

Park/Neutral Position Switch (Electronic Controlled Transmission)

SH-9-1-A

O2

Main Oxygen Sensor (On Right Bank)

Ie-1-1

O3

Main Oxygen Sensor (On Left Bank)

Ie-1-1

S4

Start Injector Time Switch

V-2-1-A

S5

Starter

H-1-1

T2

Throttle Position Sensor

IS-4-1-C

V1

VSV (For Fuel Pressure Control)

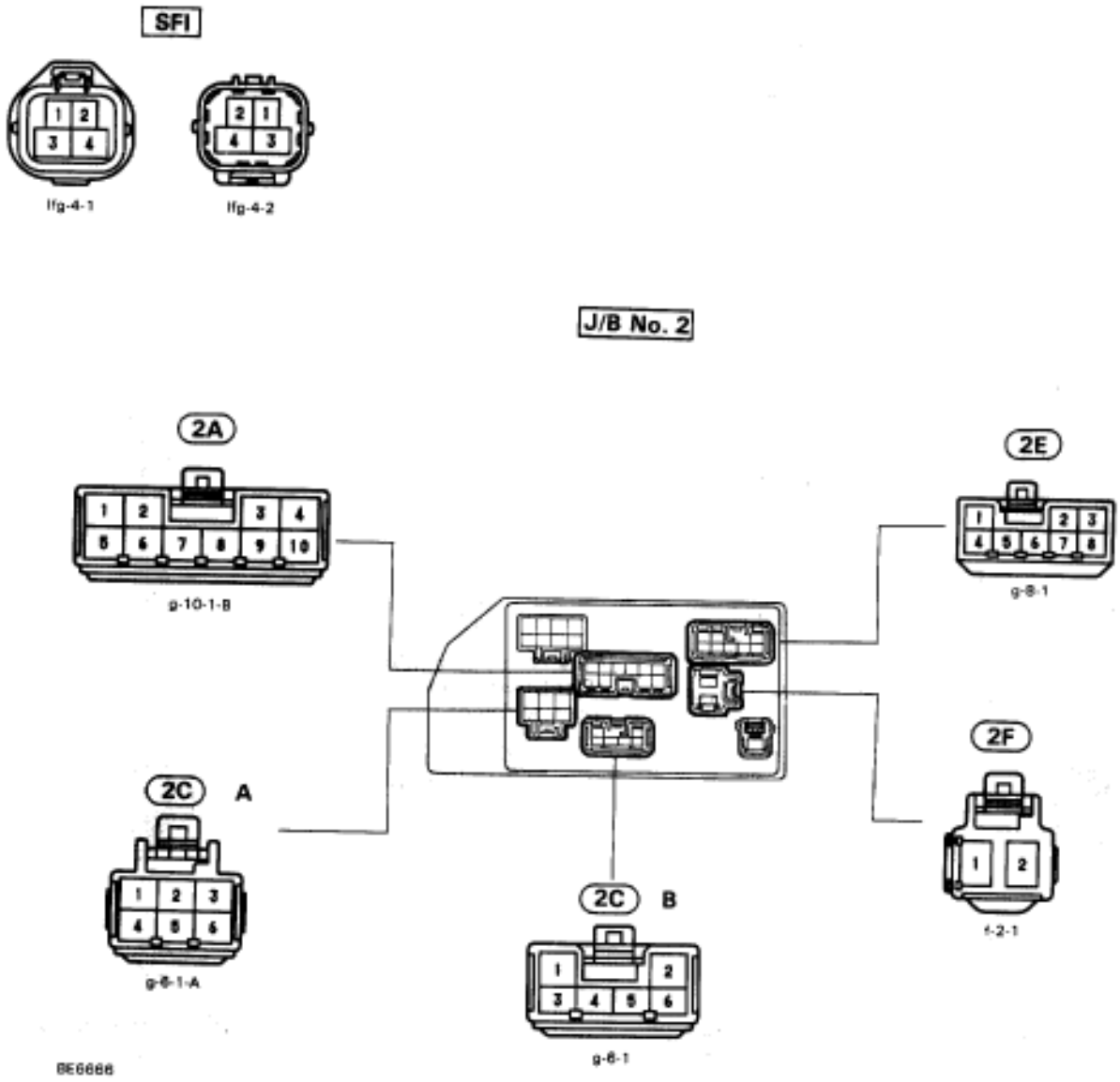
Ie-2-1-X

V2

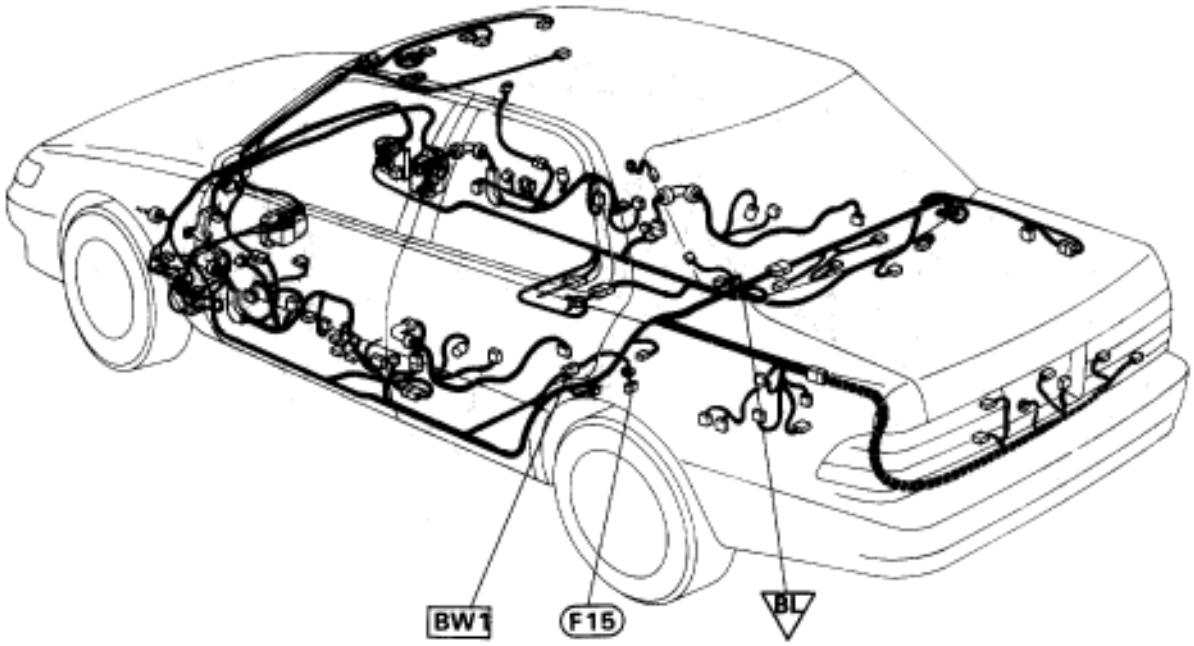
VSV (For Intake Air Control Valve)

Ie-2-1-W

Location of Connectors in Engine Compartment (Cont'd)



Location of Connectors in Body



BE6662

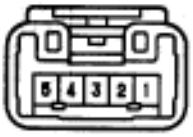
F15

Fuel Pump

Ia-5-1-A

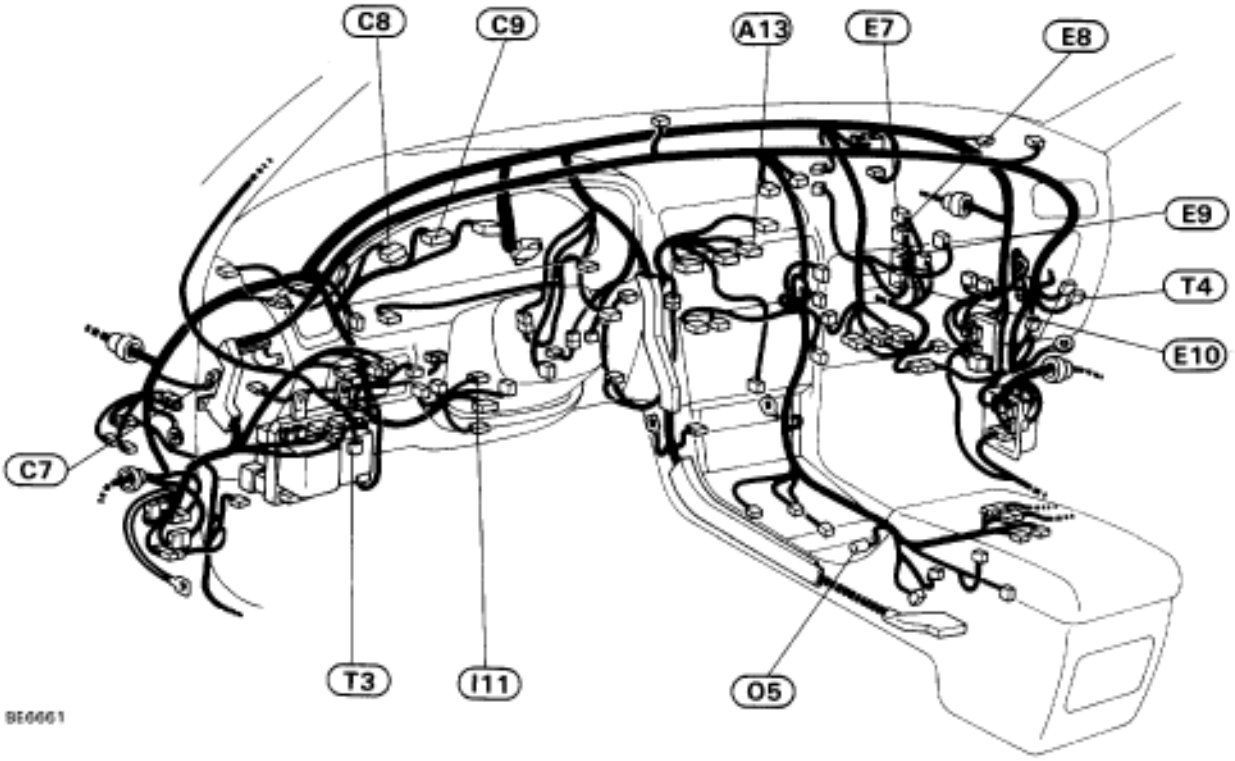
BW1

e-5-1



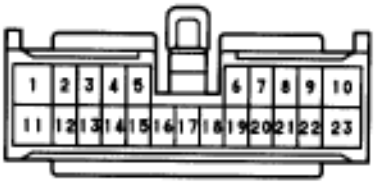
e-5-2

Location of Connectors in Instrument Panel



A13

A/C Control Assembly



eh-23-1

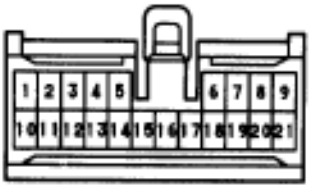
C7

Clutch Start Switch (M/T)

e-2-1

C8

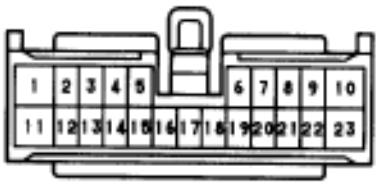
Charge Warning Light



h-21-1

C9

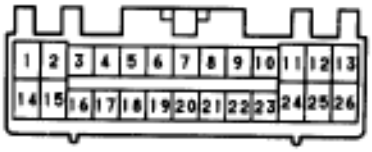
Meter Assembly



eh-23-1

E7

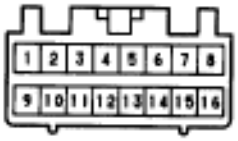
ECM



Vd-26-1

E8

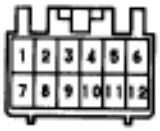
ECM



Vd-16-1

E9

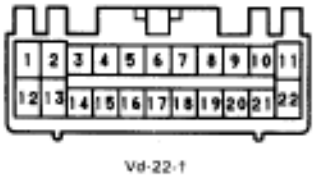
ECM



d-12-1

E10

ECM



Vd-22-1

(O5)

Sub-Oxygen Sensor

la-4-1-D

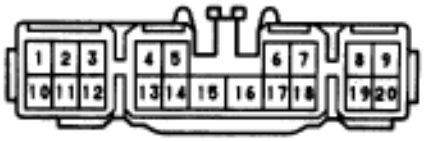
(T3)

Data Link Connector 1

S-17-1

(T4)

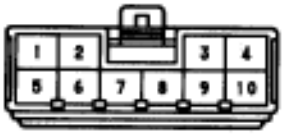
Theft Deterrent and Door Lock ECU



e-20-1

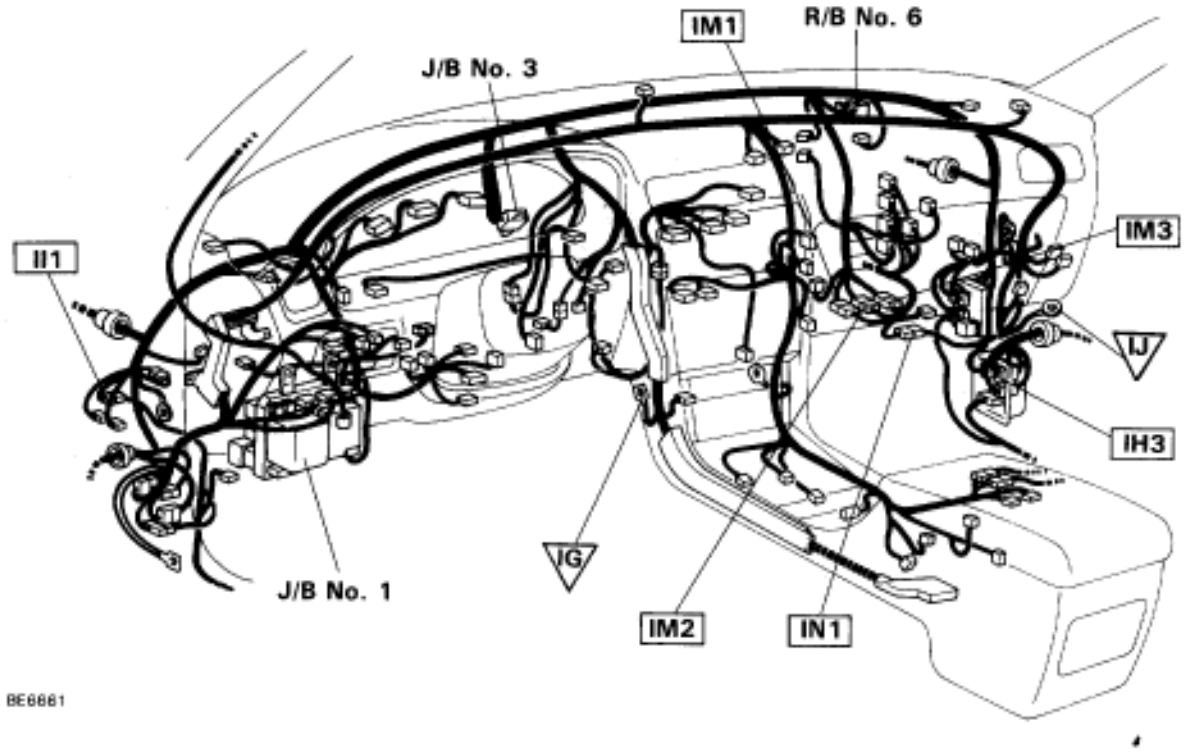
(I11)

Ignition Switch

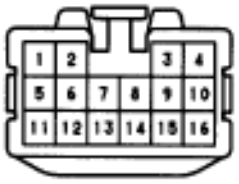


g-10-1-B

Location of Connectors in Instrument Panel (Cont'd)



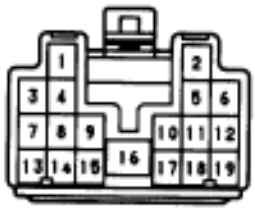
IH3



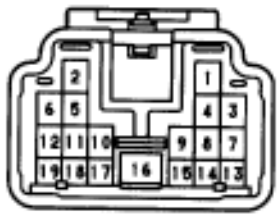
e-16-1

e-16-2

II1

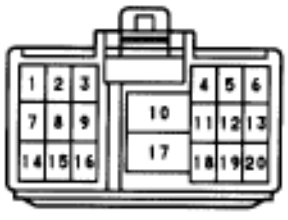


eg-19-1

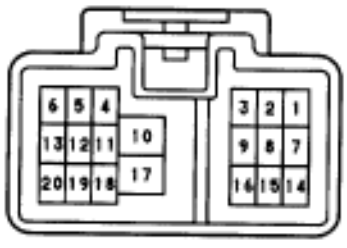


eg-19-2

IM1



e-20-1-B



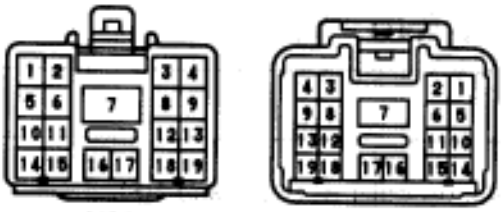
e-20-2-B

IM2

e-13-1

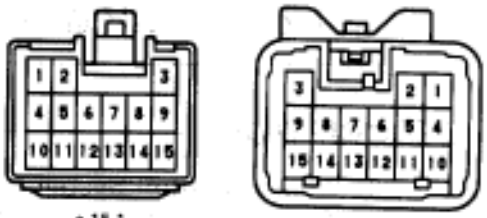
e-13-2

IM3



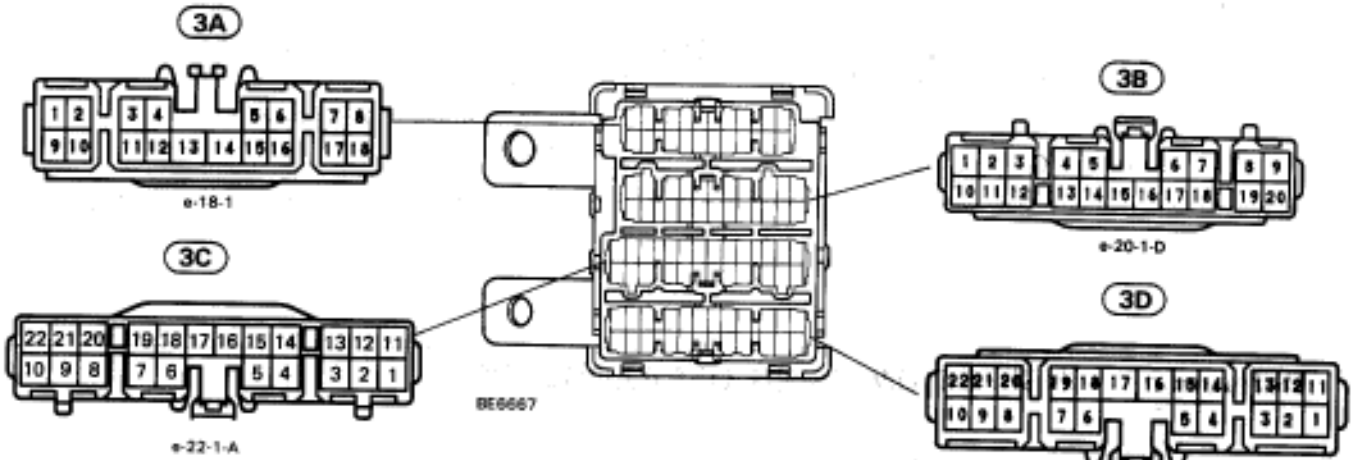
ef-19-1 ef-19-2

IN1

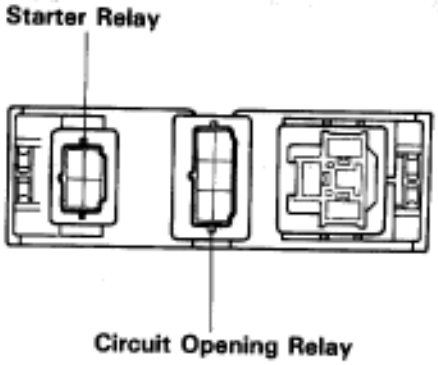


e-15-1 e-15-2

J/B No. 3



R/B No. 6



BE6670

CIRCUIT INSPECTION

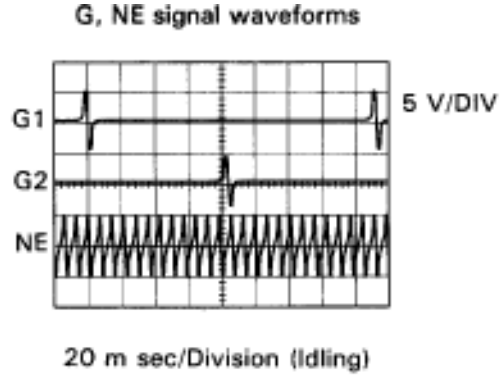
DTC	12	RPM Signal Circuit (No. 1)

— CIRCUIT DESCRIPTION —

The distributor in the Engine Control System contains three pick–up coils (G1, G2 and NE).
The G1, G2 signals inform the ECM of the standard crankshaft angle.
The NE signals inform the ECM of the crankshaft angle and the engine speed.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
12	No “NE” or “G1” and “G2” signal to ECM within 2 sec. after cranking.	□ Open or short in NE, G circuit. □ Distributor □ Open or short in STA circuit. □ ECM
	Open in “G ⊕” circuit.	

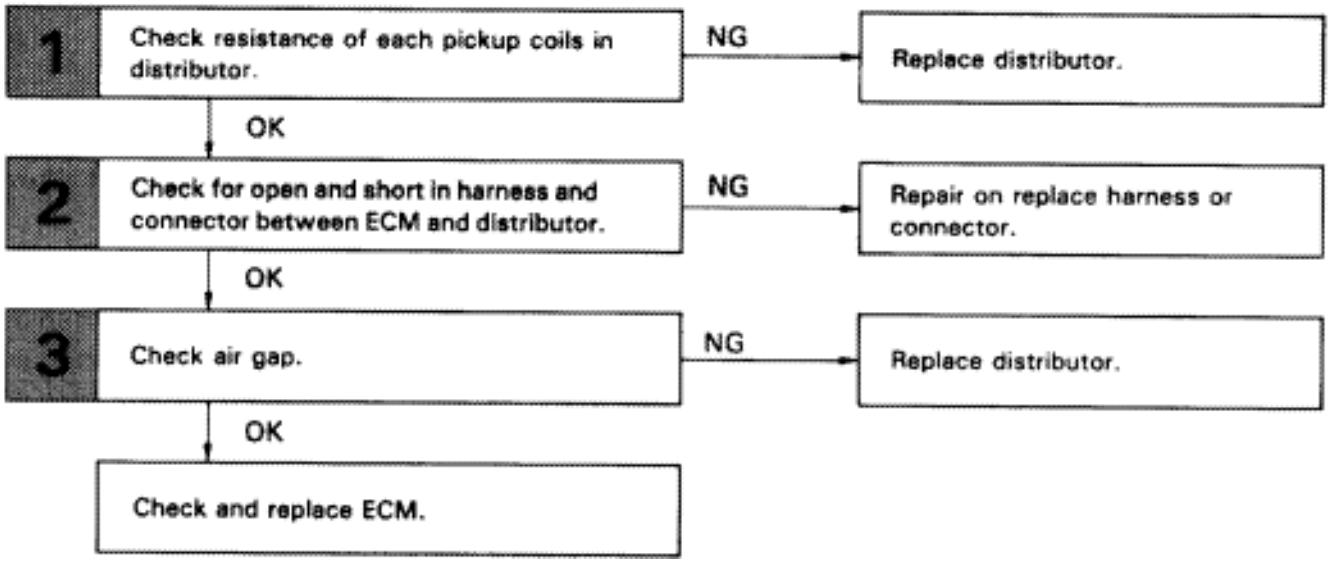
Reference INSPECTION USING OSCILLOSCOPE



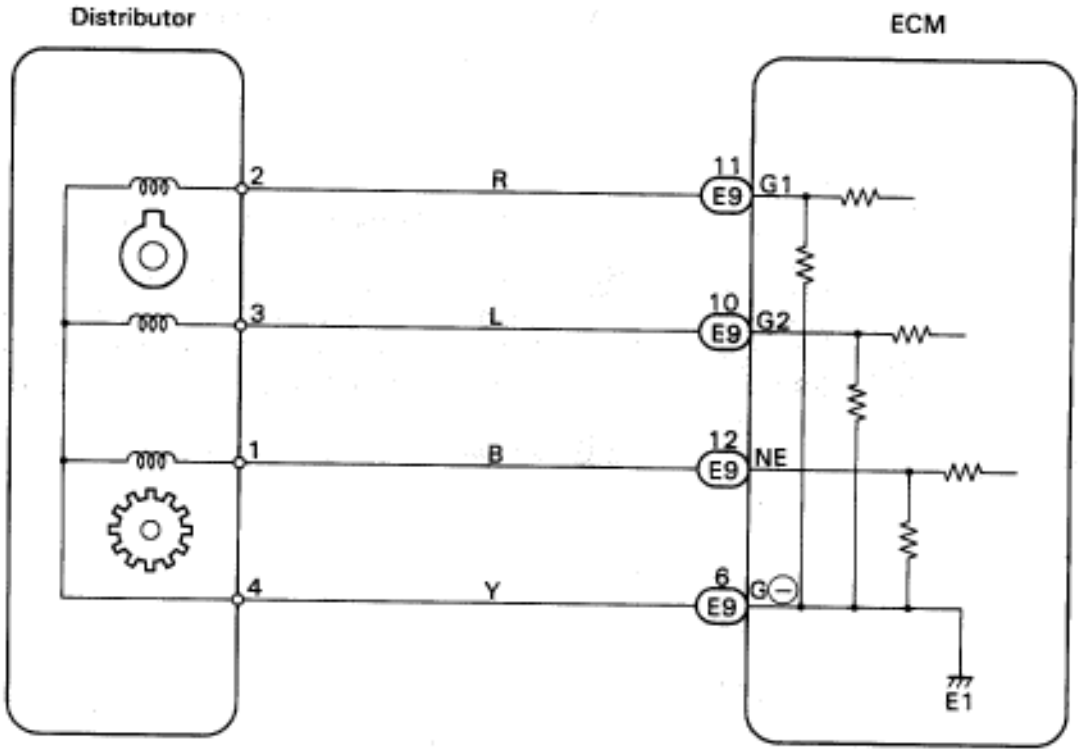
□ During cranking or idling, check between terminals G1, G2, NE and G ⊕ of ECM.

HINT: The correct waveforms appear as shown in the illustration on the left.

DIAGNOSTIC CHART



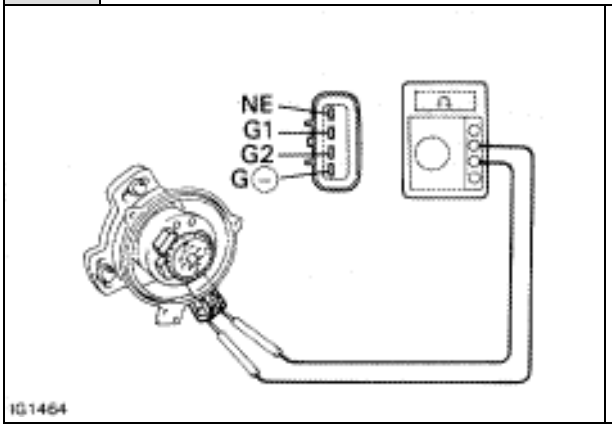
WIRING DIAGRAM



FI6543

INSPECTION PROCEDURE

1 **Check resistance of each pickup coils in distributor.**



P Disconnect distributor connector.

C Measure resistance between each terminal shown.

OK

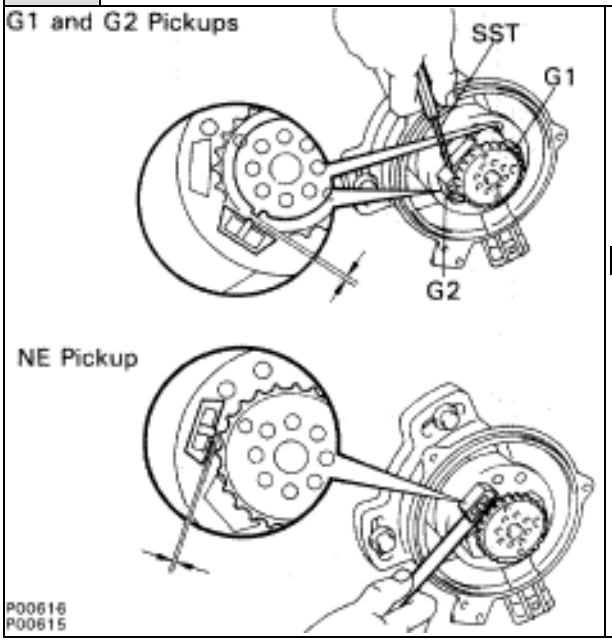
	Terminals	Resistance
G1 pickup coil (Cold)	G1–G⊖	125–190 Ω
G2 pickup coil (Cold)	G2–G⊖	125–190 Ω
NE pickup coil (Cold)	NE–G⊖	155–240 Ω

OK → **NG** → **Replace distributor.**

2 **Check for open and short in harness and connector between ECM and distributor (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

3 **Check air gap.**



P Remove distributor cap and rotor.

C Using SST (G1 and G2 pickups) and a thickness gauge (NE pickup), measure the air gap between the signal rotor projection and pickup coil.

SST 09240–00020 for G1 and G2 pickups.

OK **Air gap: 0.2 – 0.4 mm (0.008 – 0.016 in.)**

OK → **NG** → **Replace distributor.**

Check and replace ECM.

DTC 13 RPM Signal Circuit (No. 2)

CIRCUIT DESCRIPTION

Refer to RPM signal circuit (No. 1) on page EG–354.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
13	No NE signal to ECM for 0.1 sec. or more at 1,000 rpm or more. No 12 pulses of NE to ECM during the interval between G1 and G2 pulses.	□ Open or short in NE circuit. □ Distributor □ ECM

DIAGNOSTIC CHART

This code indicates that a momentary interruption of the RPM signal from the distributor to the ECM has occurred, but that it is returned to normal. Note that although this problem may not necessarily appear at the time of inspection, it cannot be ignored because this diagnostic trouble code is output, indicating that there is or was a malfunction in the RPM signal circuit; this “malfunction” is usually a loose connector.
The distributor connector and the NE terminal of the ECM connector must therefore be checked for the following:

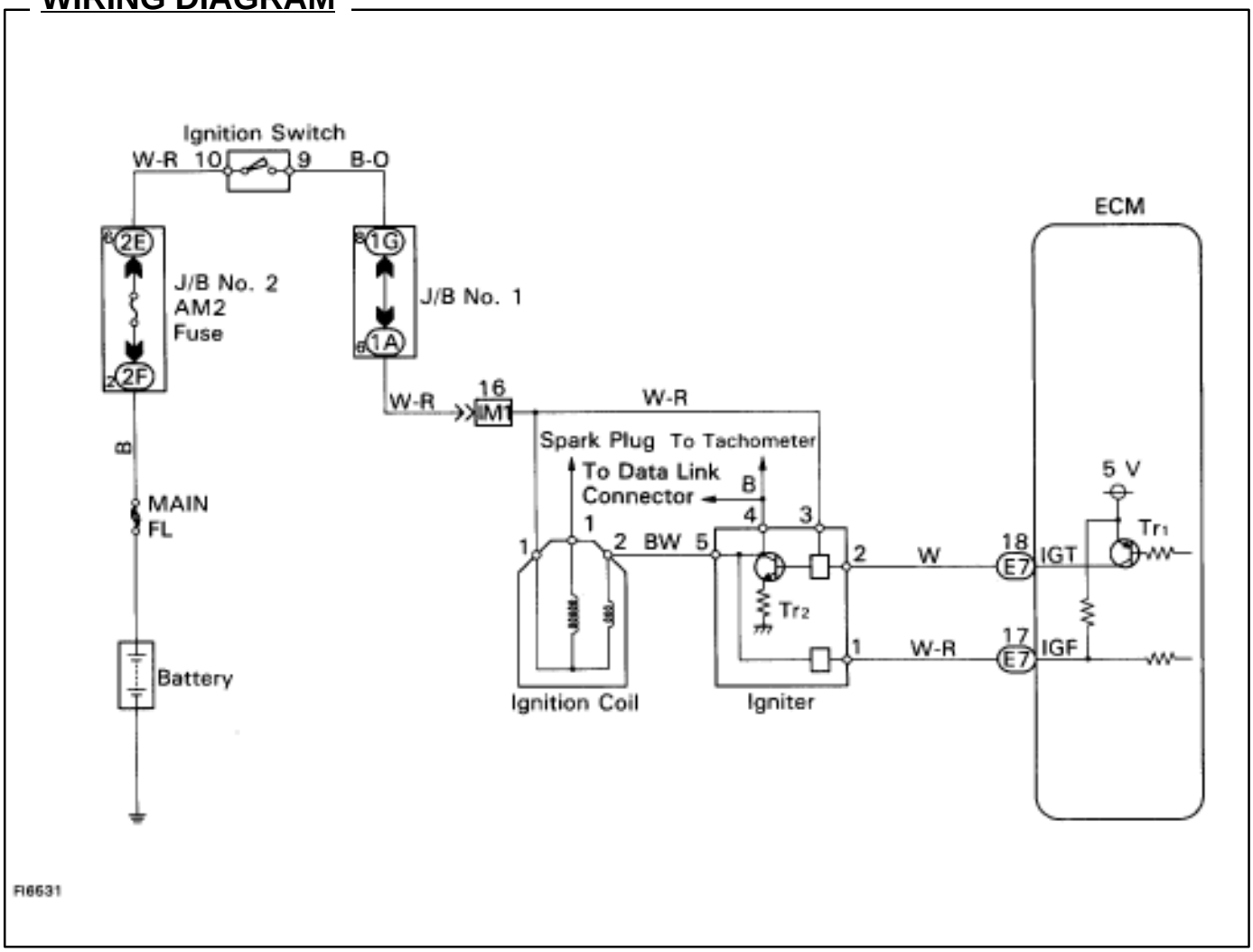
1. Loose connectors
2. Dirty connector terminals
3. Loose connector terminals

DTC 14 Ignition Signal Circuit

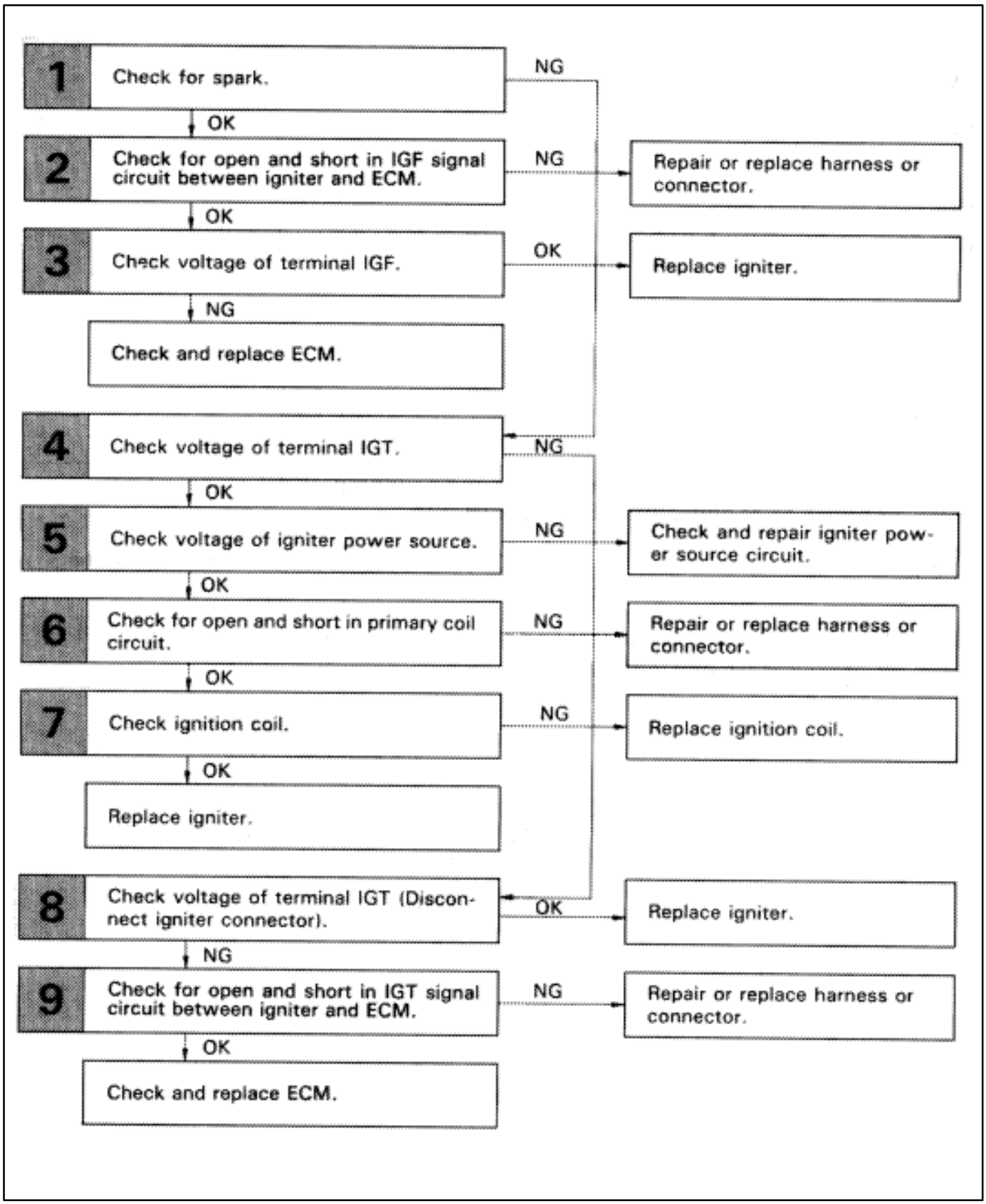
The ECM determines the ignition timing, turns on Tr_1 at a predetermined angle (□CA) before the desired ignition timing and outputs an ignition signal (IGT) “1” to the igniter.
Since the width of the IGT signal is constant, the dwell angle control circuit in the igniter determines the time the control circuit starts primary current flow to the ignition coil based on the engine rpm and ignition timing one revolution ago, that is, the time the Tr_2 turns on.
When it reaches the ignition timing, the ECM turns Tr_1 off and outputs the IGT signal “0”.
This turns Tr_2 off, interrupting the primary current flow and generating a high voltage in the secondary coil which causes the spark plug to spark. Also, by the counter electromotive force generated when the primary current is interrupted, the igniter sends an ignition confirmation signal (IGF) to the ECM. The ECM stops fuel injection as a fail safe function when the IGF signal is not input to the ECM.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
14	No IGF signal to ECM for 6 consecutive IGT signal.	□Open or short in IGF or IGT circuit from igniter to ECM. □Igniter □ECM

WIRING DIAGRAM



DIAGNOSTIC CHART



INSPECTION PROCEDURE

1	Check for spark.
C	Disconnect the high–tension cord from the distributor, hold its end about 12.5 mm (1/2”) from the ground, see if spark occurs while the engine is being cranked.
OK	Spark should be generated.
Hint	To prevent excessive fuel injected from the injectors during this check, don’t crank the engine for more the 1 – 2 seconds at a time.

OK

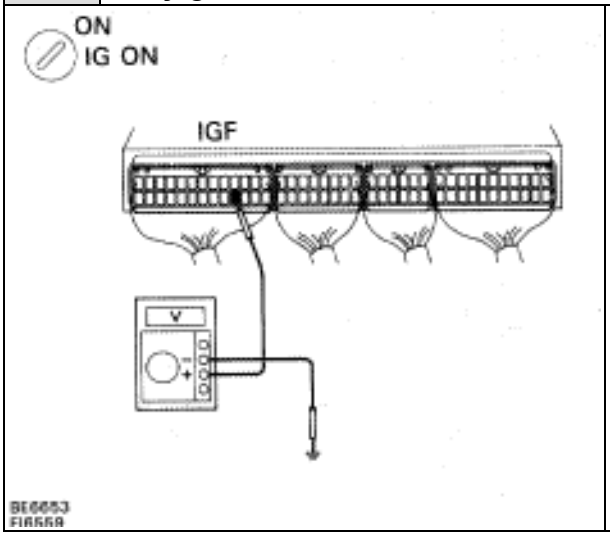
NG → Go to step 1.

2	Check for open and short in harness and connector in IGF signal circuit between ECM and igniter (See page IN–27).

OK

NG → Repair or replace harness or connector.

3	Disconnect igniter connector and check voltage between terminal IGF of ECM connector and body ground.



P
1. Disconnect igniter connector.
2. Remove glove compartment (See page BO–111).
3. Turn ignition switch on.

C Measure voltage between terminal IGF of ECM connector and body ground.

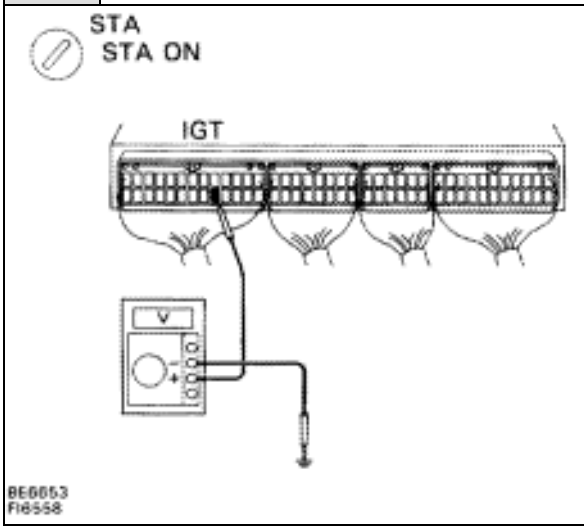
OK **Voltage: 4 – 6 V**

NG

OK → Replace igniter.

Check and replace ECM.

4 **Check voltage between terminal IGT of ECM connector and body ground.**

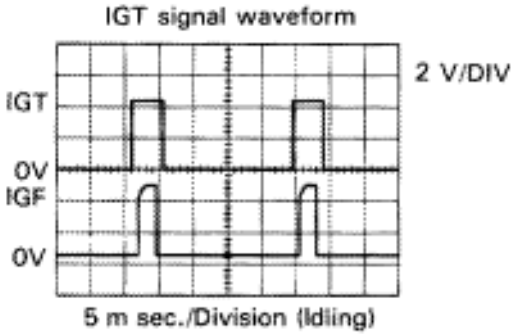


P Remove glove compartment (See page BO–111).

C Measure voltage between terminal IGT of ECM connector and body ground when engine is cranked.

OK **Voltage:** **0.5 – 1.0 V**
(Neither 0 V nor 5 V)

Reference **INSPECTION USING OSCILLOSCOPE**

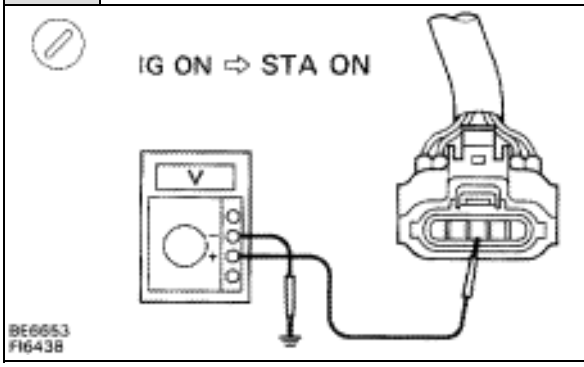


During cranking or idling, check waveform between terminal IGT and E1 of ECM.

HINT: The correct waveform appears as shown in the illustration on the left, with rectangle waves.

OK → **NG** → **Go to step** 3

5 **Check voltage between terminal 3 of igniter connector and body ground.**



P Disconnect igniter connector.

C Measure voltage between terminal 3 of igniter connector and body ground, when ignition switch is turned to "ON" and "STA" position.

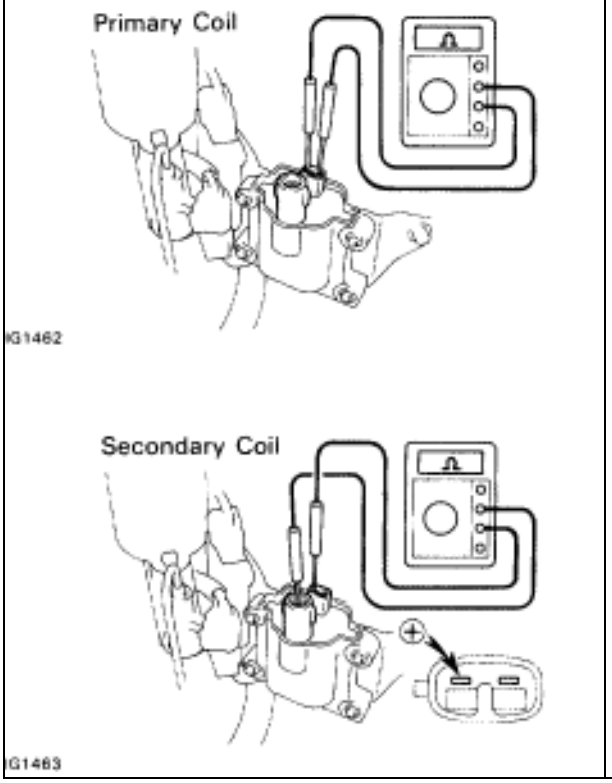
OK **Voltage:** **10 – 14 V**

OK → **NG** → **Check and repair igniter power source circuit.**

6	Check for open and short in harness and connector between ignition switch and ignition coil, ignition coil and igniter (See page IN–27).

OK → NG → **Repair or replace harness or connector.**

7	Check ignition coil.



P Disconnect ignition coil connector.

C
1. Check primary coil.
   Measure resistance between terminals of ignition coil connector.
2. Check secondary coil.
   Measure resistance between terminal ⊕ of ignition coil connector and high–tension terminal.

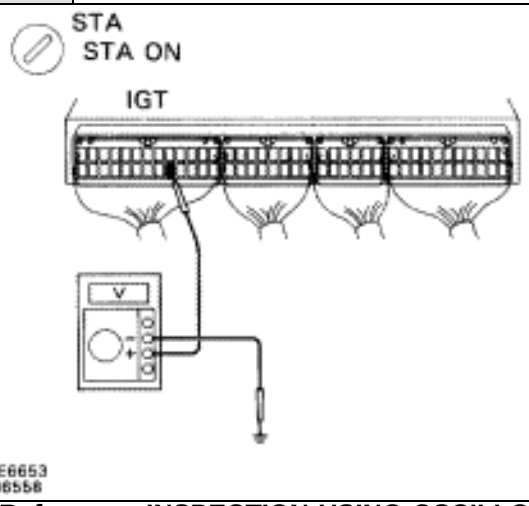
OK

	Resistance
Primary Coil (Cold)	0.2 – 0.3 Ω
Secondary Coil (Cold)	6 – 11 kΩ

OK → NG → **Replace ignition coil.**

Replace igniter.

8 **Disconnect igniter connector and check voltage between terminal IGT of ECM connector and body ground.**

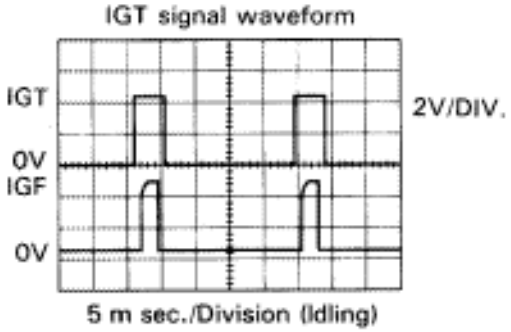


P Disconnect igniter connector.

C Measure voltage between terminal IGT of ECM connector and body ground when engine is cranked.

OK **Voltage:** **0.5 – 1.0 V**
(Neither 0 V nor 5 V)

Reference: INSPECTION USING OSCILLOSCOPE



During cranking or idling, measure between terminal IGT and E1 of ECM.

HINT: The correct waveform appears as shown in the illustration on the left, with rectangle waves.

NG

OK **Replace igniter.**

9 **Check for open and short in harness and connector in IGT signal circuit between ECM and igniter (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

DTC	16	ELECTRONIC CONTROLLED TRANSMISSION Control Signal Malfunction

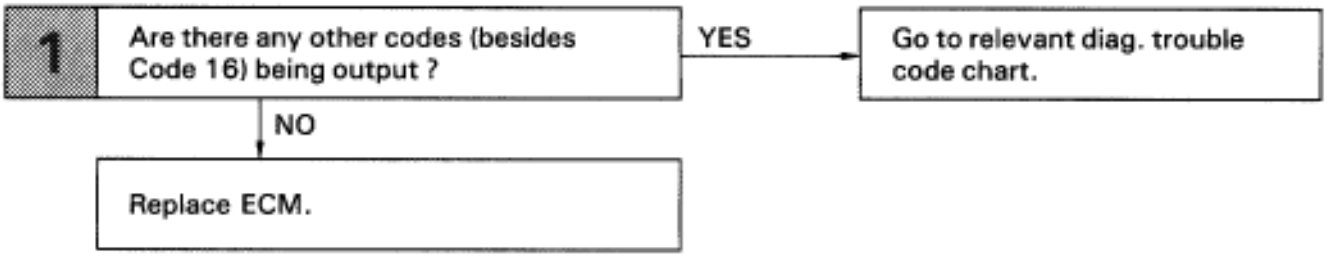
CIRCUIT DESCRIPTION

The signal from the Electronic Controlled Transmission CPU retards the ignition timing of the engine during Electronic Controlled Transmission gear shifting, thus momentarily reducing torque output of the engine for smooth clutch operation inside the transmission and reduced shift shock.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
16	Fault in communications between the engine CPU and Electronic Controlled Transmission CPU in the ECM.	ECM

If the ECM records the diagnostic code “16” in memory, it prohibits the torque control of the Electronic Controlled Transmission which performs smooth gear shifting.

DIAGNOSTIC CHART

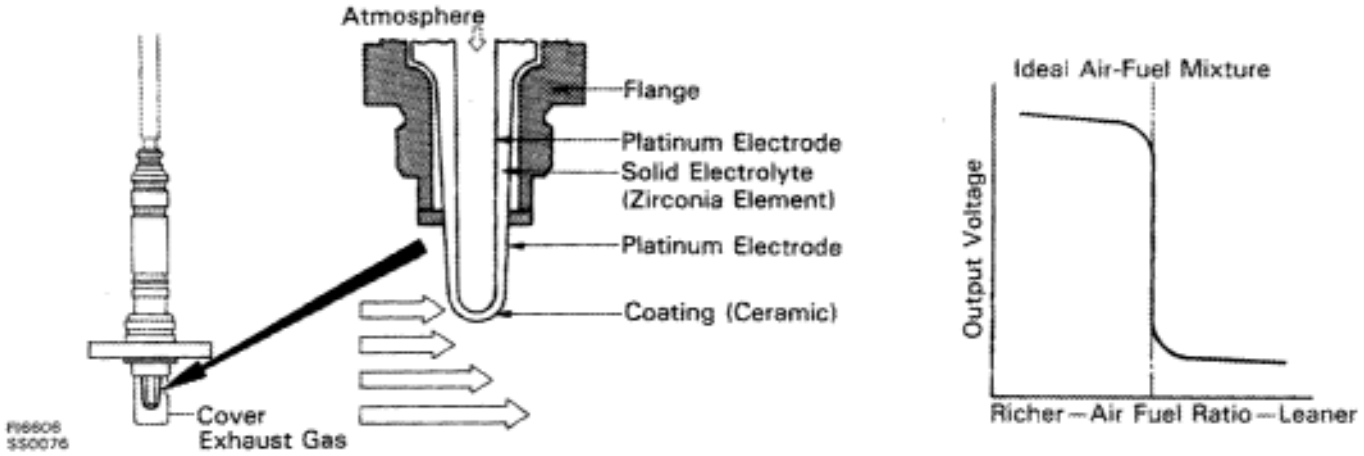


–MEMO–

DTC 21, 28 Main Oxygen Sensor Circuit

CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NO_x components of the exhaust gas, a Three–Way Catalyst Converter is used, but for the most efficient use of the Three–Way Catalyst Converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.
The oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide feedback to the computer for control of the air–fuel ratio.
When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the ECM of the LEAN condition (small electromotive force: 0 V).
When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio, the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the ECM of the RICH condition (large electromotive force: 1 V).
The ECM judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the ECM is unable to perform accurate air–fuel ratio control.



Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
21 1 28	Main oxygen sensor signal voltage is reduced to between 0.35 V and 0.70 V for 60 sec. under conditions (a) ∼ (d). (2 trip detection logic)* (a) Engine coolant temp.: Between 70°C (158°F) and 90°C (194°F) (b) Engine speed: 1,500 rpm or more (c) Load driving (Ex. Electronic Controlled Transmission in 4th speed, A/C ON , flat road, 50 mph (80 km/h)) (d) Main oxygen sensor signal voltage: Alternating above and below 0.45 V.	1 Main oxygen sensor circuit 1 Main oxygen sensor

*: See page EG–331.
HINT: Diag. trouble code 21 is for the left bank main oxygen sensor circuit. Diag. Trouble code 28 is for the right bank main oxygen sensor circuit.

— CIRCUIT DESCRIPTION (Cont'd)

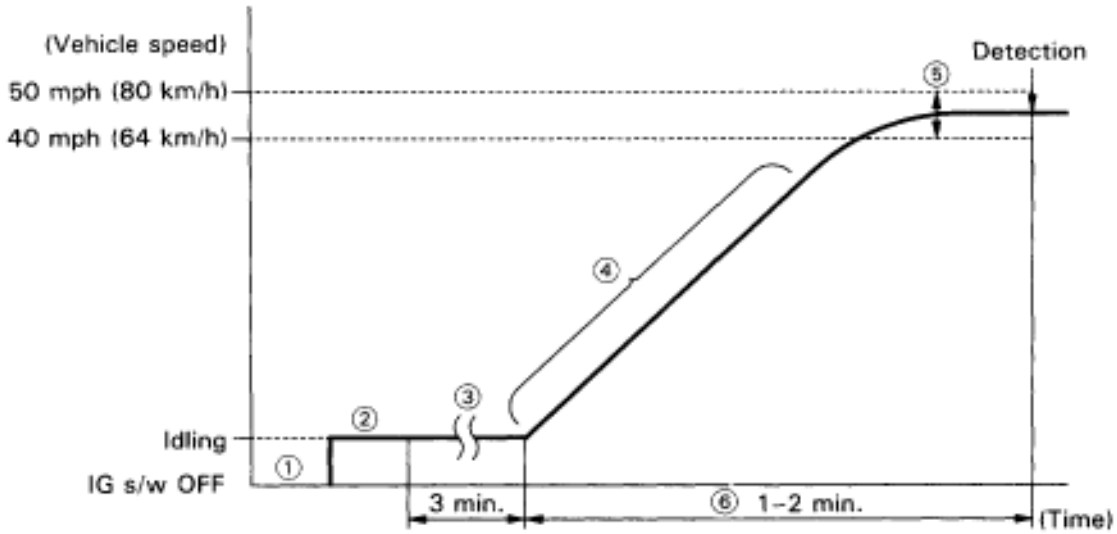
DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern

(a) To simulate diag. trouble code detecting condition after diag. trouble code is recorded.

(b) To check that the malfunction is corrected when the repair is completed confirming that diag. trouble code is no longer detected.

Malfunction: Main Oxygen Sensor Deterioration



FI6464

1 Disconnect the EFI fuse (15 A) for 10 sec. or more, with IG switch OFF.
Initiate test mode (Connect terminal TE2 and E1 of data link connector 1 or 2 with IG switch OFF).

2 Start the engine and warm up with all ACC switch OFF.

3 After the engine is warmed up, let it idle for 3 min.

4 After performing the idling in 3, perform gradual acceleration with in the range 1,300 1,700 rpm (centered around 1,500 rpm) with the A/C switch ON and D position for A/T (5th for M/T). (Take care that the engine speed does not fall below 1,200 rpm when shifting. Gradually depress the accelerator pedal and keep it steady to that engine braking does not occur).

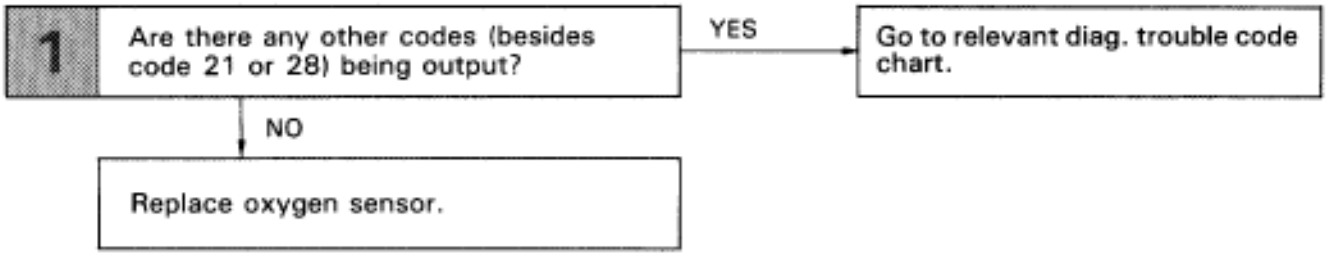
5 Maintain the vehicle speed at 40 – 50 mph (64 – 80 km/h).

6 Keep the vehicle running for 1 – 2 min. after starting acceleration.

HINT: If a malfunction exists, the Malfunction Indicator Lamp will light up after approx. 60 sec. from the start of acceleration.

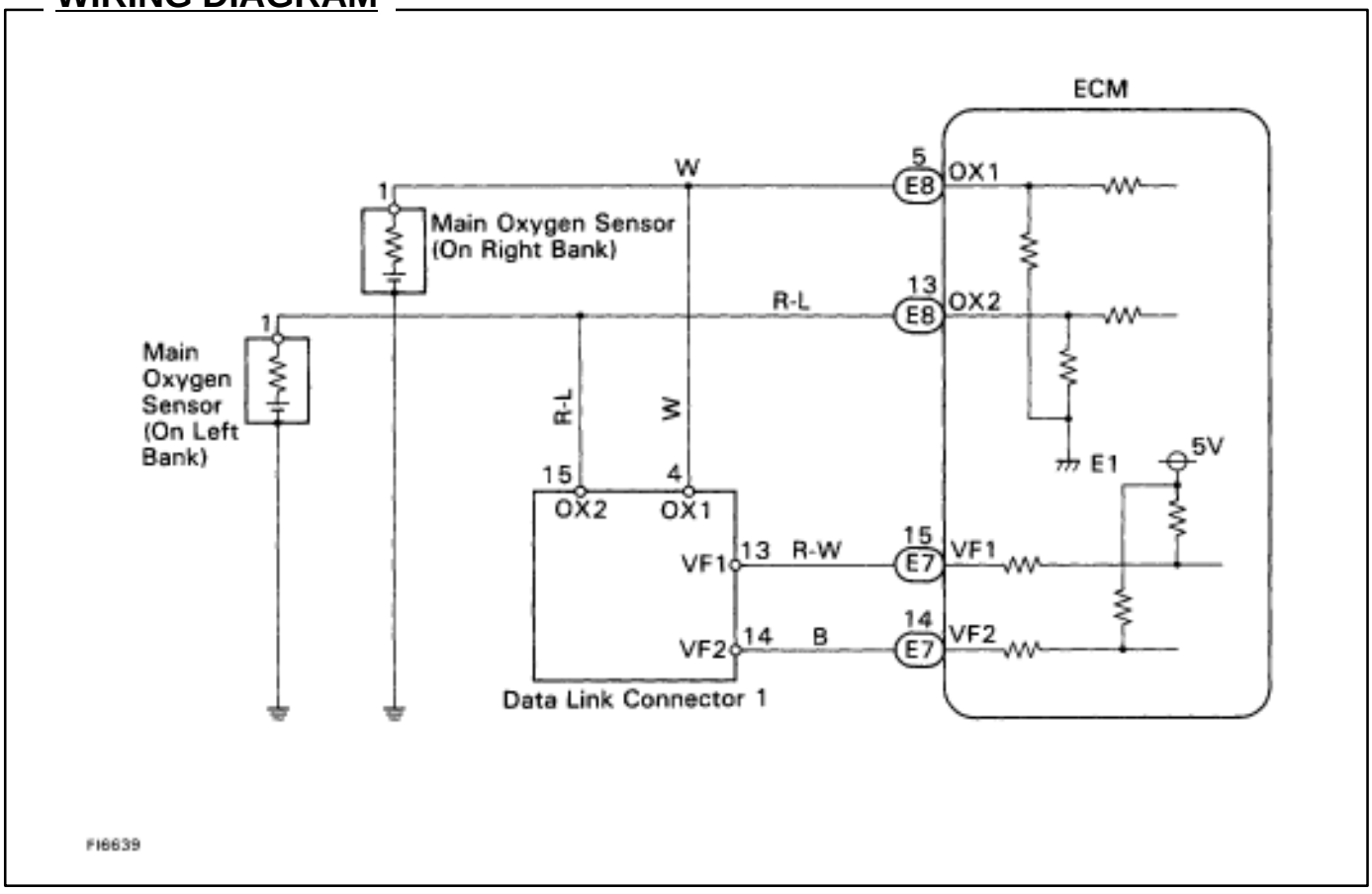
NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART



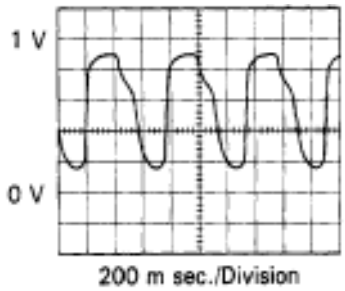
HINT: If diag. trouble code 21 is output, replace the left bank main oxygen sensor.
If diag. trouble code 28 is output, replace the right bank main oxygen sensor.

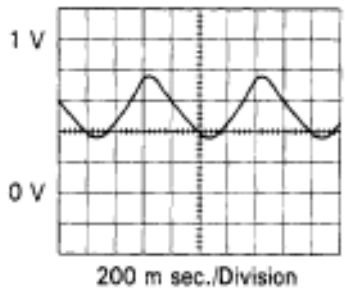
WIRING DIAGRAM



Reference: INSPECTION USING OSCILLOSCOPE

Ox signal waveform





F05514
F05515

With the engine racing (4,000 rpm) measure between terminals OX1, OX2 and E1 of ECM.

HINT: The correct waveform appears as shown in the illustration on the left, oscillating between approx. 0.1 V and 0.9 V.

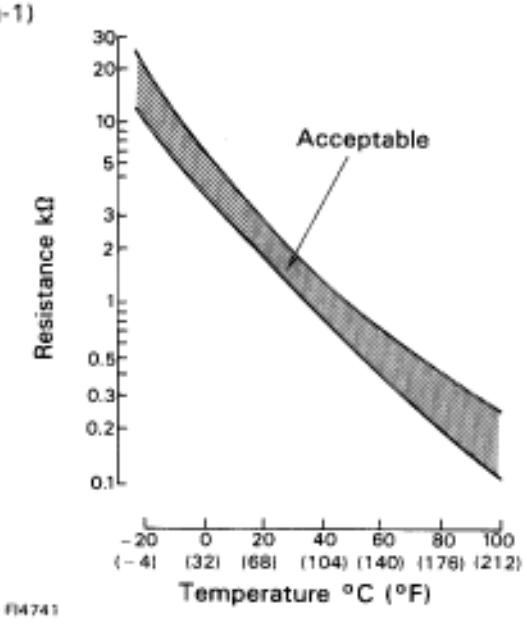
If the oxygen sensor is deteriorated, the amplitude of the voltage is reduced as shown on the left.

DTC 22 Engine Coolant Temp. Sensor Circuit

— CIRCUIT DESCRIPTION

The water temperature sensor senses the engine coolant temperature. A thermistor built in the sensor changes the resistance value according to the engine coolant temperature. The lower the engine coolant temperature, the greater the thermistor resistance value, and the higher the engine coolant temperature, the lower the resistance value (See Fig. 1). The engine coolant temperature sensor is connected to the ECM (See next page). The 5V power source voltage in the ECM is applied to the engine coolant temperature sensor form the terminal THW via a resistor R. That is, the resistor R and the engine coolant temperature sensor are connected in series. When the resistance value of the engine coolant temperature sensor changes in accordance with changes in the engine coolant temperature, the potential at the terminal THW also changes. Based on this signal, the ECM increases the fuel injection volume to improve drivability during cold engine operation. If the ECM records the diagnostic trouble code 22, it operates the fail safe function, keeping the engine coolant temperature at a constant 80□C (176□F).

(fig-1)



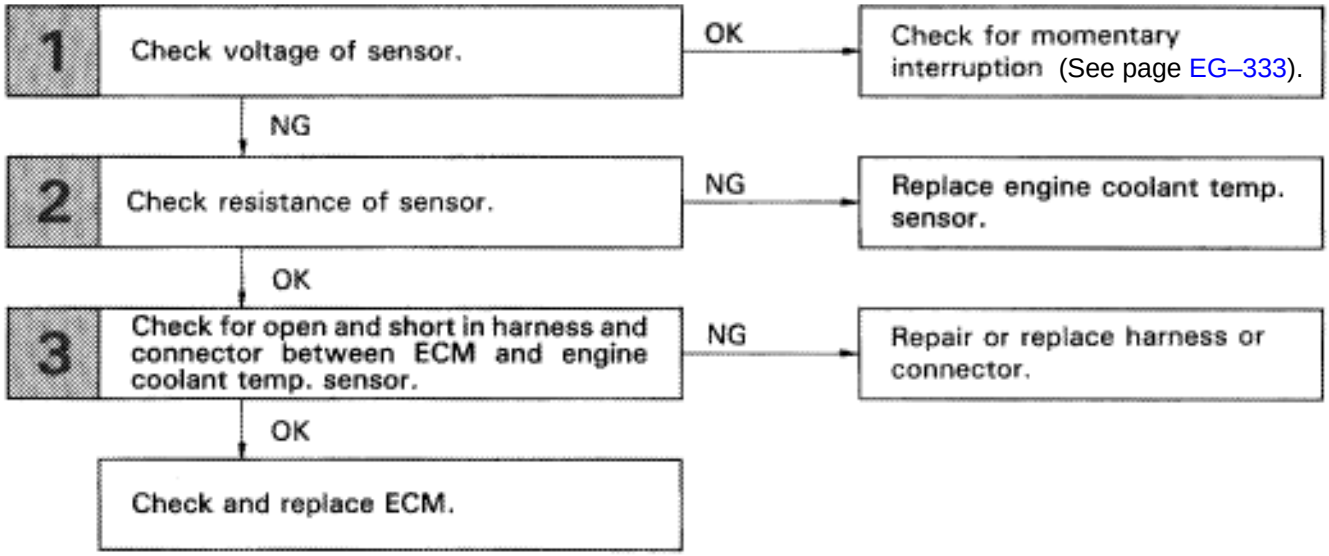
<Reference>

Engine Coolant Temp. □C (F□)	Resistance (kΩ)	Voltage (V)
–20 (–4)	16.0	4.3
0 (32)	5.9	3.4
20 (68)	2.5	2.4
40 (104)	1.2	1.5
60 (140)	0.6	0.9
80 (176)	0.3	0.5
100 (212)	0.2	.03

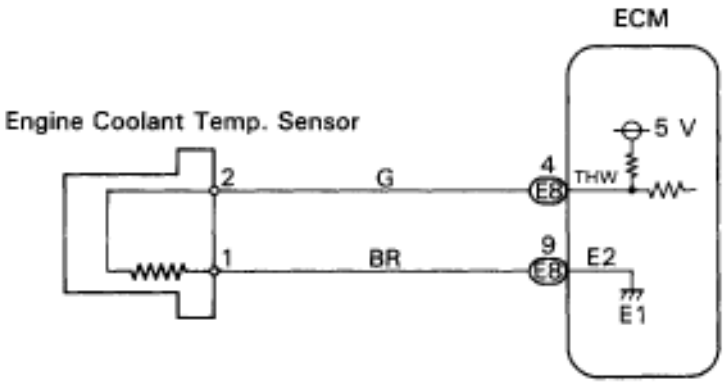
Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
22	Open or short in engine coolant temp. sensor circuit for 0.5 sec. or more.	□1 Open or short in engine coolant temp. sensor circuit □2 Engine coolant temp. sensor □3 ECM

DIAGNOSTIC CHART

HINT: If diagnostic trouble codes 22, 24, 32 and 41 are output simultaneously, E2 (Sensor ground) may be open.



WIRING DIAGRAM

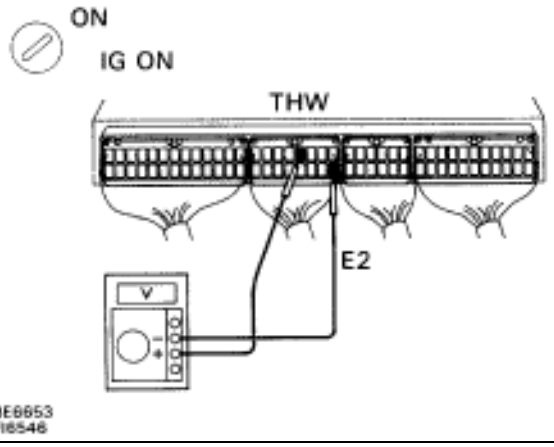


FI6448

INSPECTION PROCEDURE

HINT: If diagnostic trouble codes 22, 24, 32 and 41 are output simultaneously, E2 (sensor ground) may be open.

1 **Check voltage between terminals THW and E2 of ECM connector.**



P 1. Remove glove compartment (See page BO–111).
2. Turn ignition switch on.

C Measure voltage between terminals THW and E2 of ECM connector.

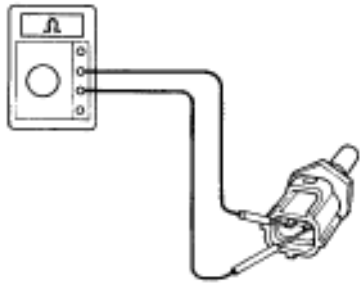
OK

Water Temp. °C (°F)	Voltage
20 (68) (Engine is cool)	1 – 3 V
80 (176) (Engine is hot)	0.1 – 1.0 V

NG

OK **Check for momentary interruption (See page EG–333).**

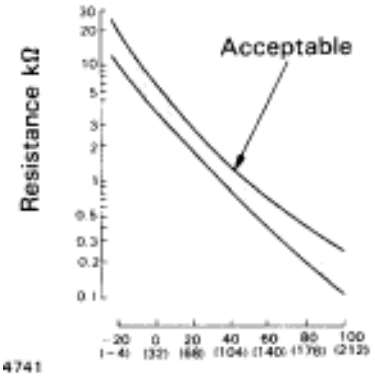
2 **Check engine coolant temp. sensor.**



P Disconnect the engine coolant temp. sensor connector, (See page EG–224).

C Measure resistance between terminals.

OK **Resistance is within Acceptable Zone on chart.**



Water temp. °C (°F)	Resistance
20 (68)	2 – 3 kΩ
80 (176)	0.2 – 0.4 kΩ

OK

NG **Replace engine coolant temp. sensor.**

3 **Check for open and short in harness and connector between ECM and water temp. sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

–MEMO–

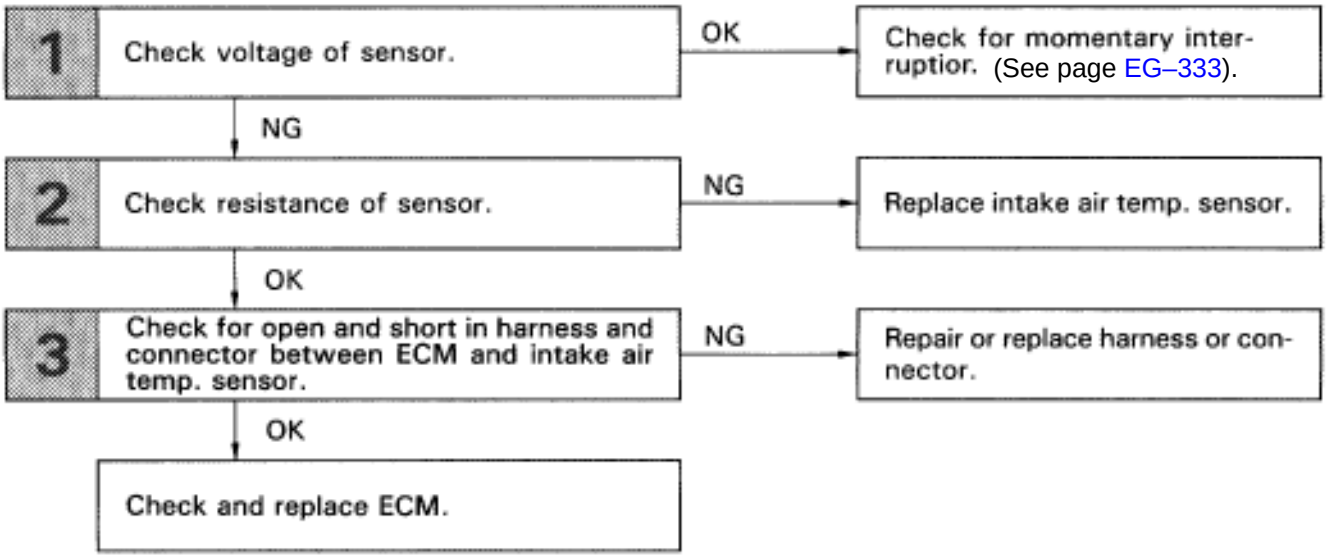
DTC 24 Intake Air Temp. Sensor Circuit

CIRCUIT DESCRIPTION

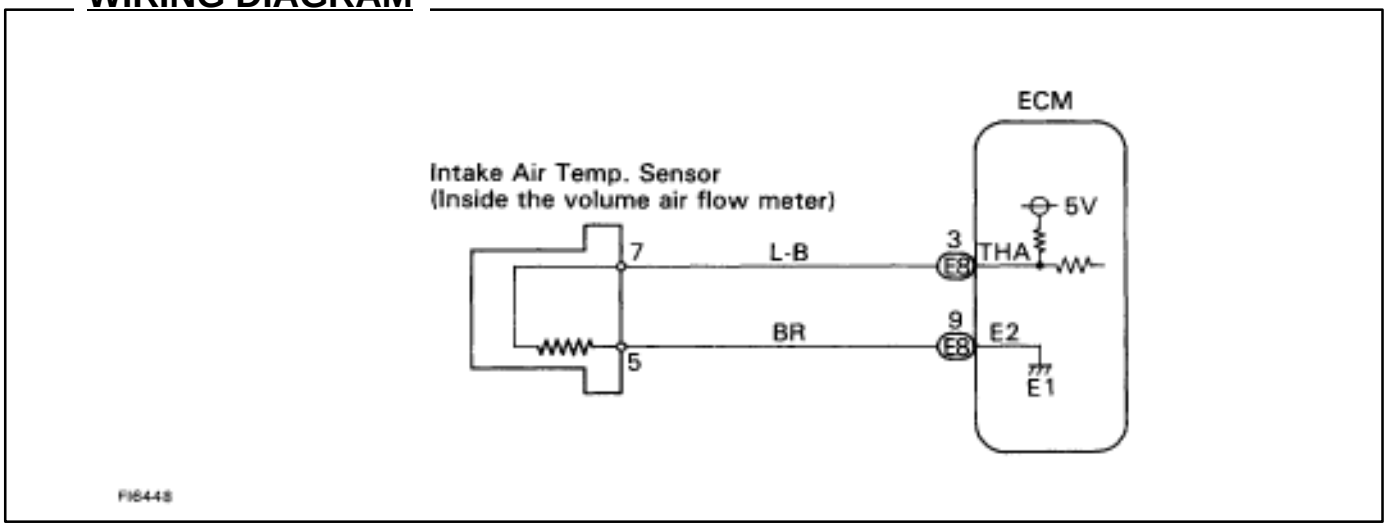
The intake air temp. sensor is built into the volume air flow meter and senses the intake air temperature.
The structure of the sensor and connection to the ECM is the same as the water temp. sensor shown on page EG–370.
If the ECM records the diagnostic trouble code “24”, it operates the fail safe function, keeping the intake air temperature at a constant 20□C (68□F).

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
24	Open or short in intake air temp. sensor circuit for 0.5 sec. or more.	□Open or short in intake air temp. sensor circuit. □Intake air temp. sensor □ECM

DIAGNOSTIC CHART

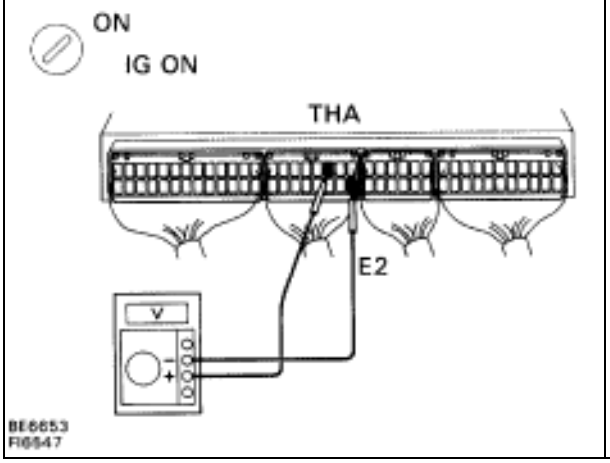


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals THA and E2 of ECM connector.**



P 1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch on.

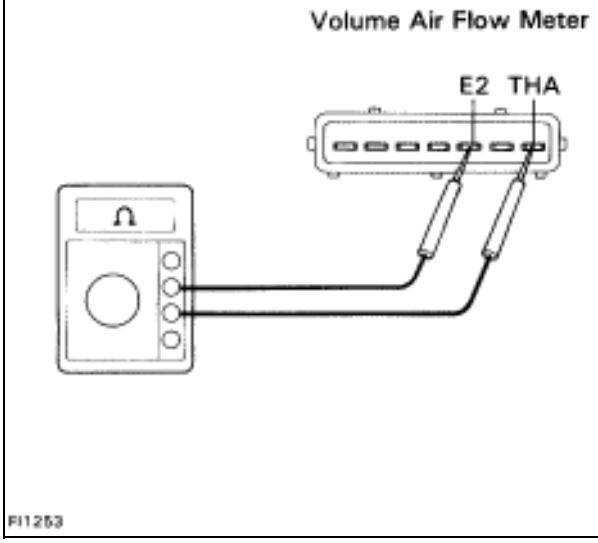
C Measure voltage between terminals THA and E2 of ECM connector.

OK

Intake air temp. °C (°F)	Voltage
20 (68)	1 – 3 V
60 (140)	0.5 – 1.0 V

NG → **OK** → **Check for momentary interruption (See page EG–333).**

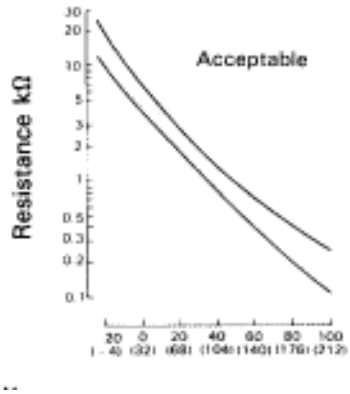
2 **Check intake air temp. sensor.**



P Disconnect he volume air flow meter connector.

C Measure resistance between terminals THA and E2 of volume air flow meter connector.

OK **Resistance is within Acceptable Zone on chart.**



Intake air temp. °C (°F)	Resistance
20 (68)	2 – 3 kΩ
60 (140)	0.4 – 0.7 kΩ

OK → **NG** → **Replace intake air temp. sensor (Replace volume air flow meter).**

3 **Check for open and short in harness and connector between ECM and intake air temp. sensor (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace ECM.

DTC	25	Air–Fuel Ratio Lean Malfunction
	26	Air–Fuel Ratio Rich Malfunction

— CIRCUIT DESCRIPTION

The main oxygen sensor is located in the exhaust manifold.
It indirectly determines whether the fuel mixture is rich or lean by detecting the concentrate of oxygen present in the exhaust gas.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
25	Main oxygen sensor voltage is 0.45 V or less (lean) for 90 sec. under conditions (a) and (b). (2 trip detection logic)*2 (a) Engine coolant temp.: 50°C (122°F) or more. (b) Engine speed: 1,500 rpm or more	● Open or short in main oxygen sensor circuit ● Main oxygen sensor ● Ignition system ● ECM
	*1 Difference of air–fuel ratio feedback compensation value between right and left banks is more than 15 percent for 20 sec. or more under conditions (a) and (b). (2 trip detection logic)*2 (a) Engine coolant temp.: Between 70°C (158°F) and 95°C (203°F) (b) Engine speed: Idling	● Fuel line pressure (injector leak, blockage) ● Mechanical system malfunction (skipping teeth of timing belt) ● Ignition system ● Compression pressure ● Volume air flow meter ● ECM
26	Difference of air–fuel ratio feedback compensation value between right and left banks is more than 15 percent for 20 sec. or more under conditions (a) and (b). (2 trip detection logic)*2 (a) Engine coolant temp.: Between 70°C (158°F) and 95°C (203°F) (b) Engine speed: Idling	● Fuel line pressure (injector leak, blockage) ● Mechanical system malfunction (skipping teeth of timing belt) ● Ignition system ● Compression pressure ● Volume air flow meter ● ECM

*1: Only for California specification vehicles
*2: See page EG–331.

— CIRCUIT DESCRIPTION (Cont'd)

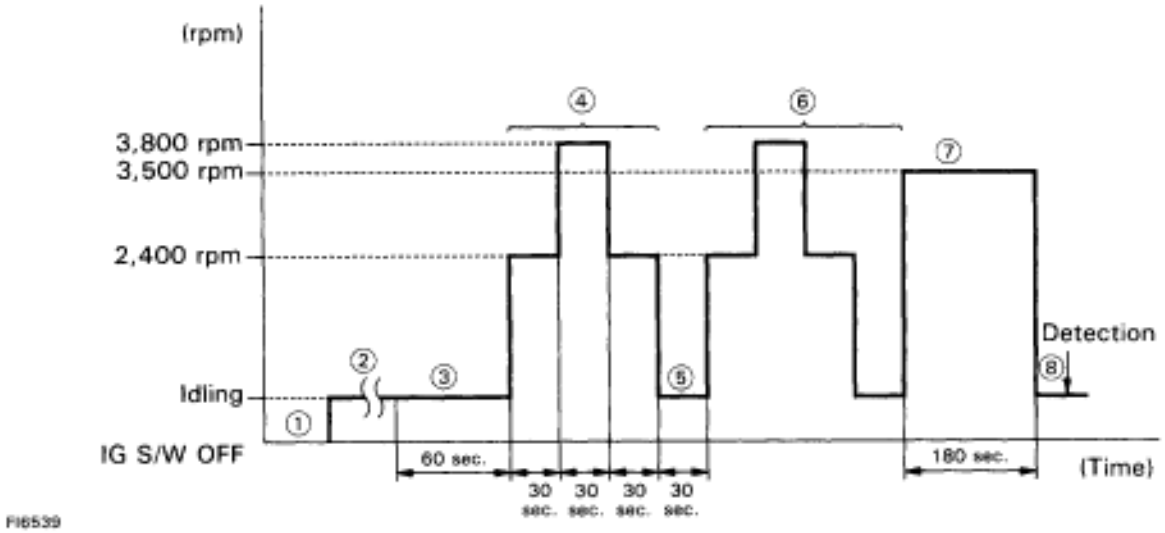
DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern

(a) To simulate diag. trouble code detecting condition after diag. trouble code is recorded.

(b) To check that the malfunction is corrected when the repair is completed confirming that diag. trouble code is no longer detected.

Malfunction: Open or Short in Main Oxygen Sensor
Open or Short in Injector circuit, Injector Leak or Blockage



1 Disconnect the EFI fuse (15 A) for 10 sec. or more, with IG switch OFF.
Initiate test mode (Connect terminal TE2 and E1 of data link connector 1 or 2 with IG S/W OFF).

2 Start the engine and warm up with all ACC switch OFF.

3 After the engine is warmed up, let it idle for 60 sec.

4 After performing the idling in 3, perform racing at 2,400 rpm, 3,800 rpm then 2,400 rpm again for 30 sec. each.

5 After performing the racing in 4, perform idling for 30 sec.

6 After performing the idling in 5, perform steps 4 and 5 again.

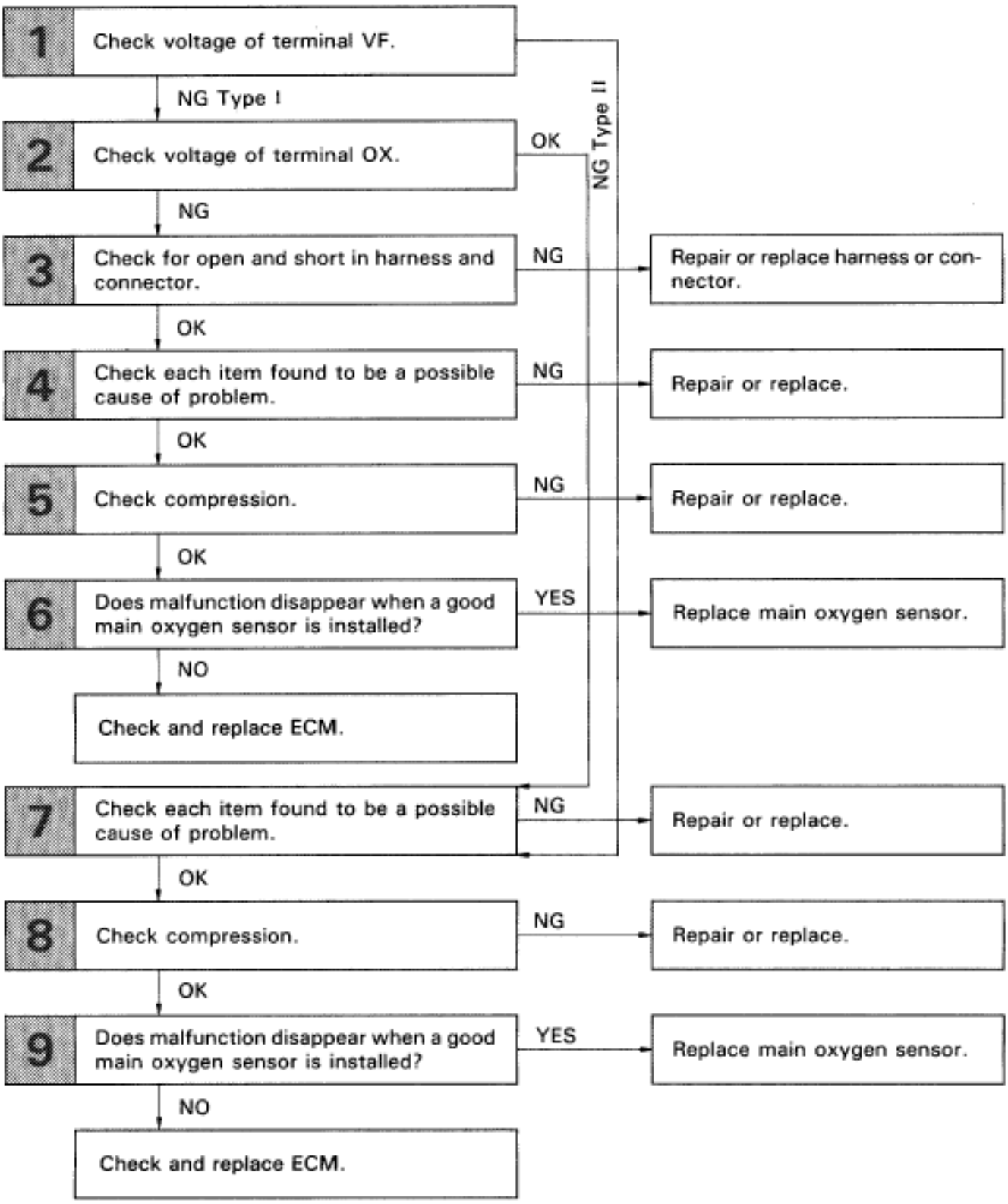
7 After performing the idling in 6, perform idling at 3,500 rpm for 180 sec.

8 After performing the racing in 7, perform idling 30 sec.

HINT: If a malfunction exists, the Malfunction Indicator Lamp will light up during step 8

NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART

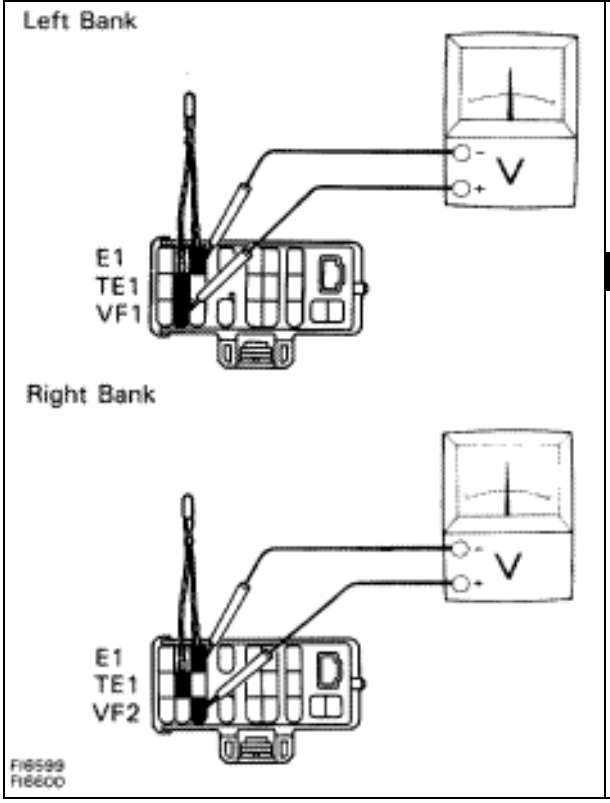


WIRING DIAGRAM

Refer to page EG–368 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

1 Check voltage between terminals VF1, VF2 and E1 of data link connector 1.



P
1. Warm up engine at normal operating temperature.
2. Connect terminals TE1 and E1 of data link connector 1.
3. Connect positive probe to terminal VF1, VF2 and negative probe to terminal E1 of data link connector.

C
1. Warm up the oxygen sensor by running engine at 2,500 rpm for about 2 minutes.
2. Then, maintaining engine at 2,500 rpm, count how may times needle of voltmeter fluctuates between 0 and 5 V.

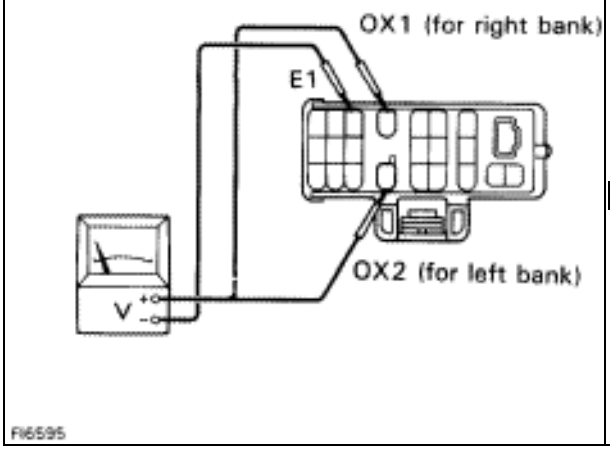
Result:

Result	
Needle fluctuates of 8 times for every ten seconds	OK
Continue at 0 V	NG Type I
Continue at 5 V	NG Type II

NG Type I

NG Type II → **Go to step 3.**

2 Check voltage between terminals OX1, OX2 and E1 of data link connector 1.



P Warm up engine at normal operating temperature.

C Measure voltage between terminals OX1, OX2 and E1 of data link connector 1 when engine is suddenly raced to full throttle.

OK **The voltage should be 0.5 V or higher at least once.**

Hint Perform inspection within 1 second.

NG

OK → **Go to step 3.**

3	Check for open and short in harness and connector between ECM and main oxygen sensor, ECM and data link connector 1 (See page IN–27).

OK → NG: Repair or replace harness or connector.

4	Check each item found to be a possible cause of problem.

Check each circuit found to be a possible cause of trouble according to the results of the check in 1 or 4. The numbers in the table below show the order in which the checks should be performed.

Main oxygen sensor signal from either side continues at 0 V.	Main oxygen sensor signals from both sides continue at 0 V.	Possible Cause	See page
1		Faulty sensor installation.	–
3		Injector circuit	EG–428
2	3	Misfire	IG–6
4		Valve timing	EG–43
	1	Air leakage	EG–166
	2	Fuel system	EG–440
	6	Characteristic deviation in volume air flow meter	EG–388 390
	4	Characteristic deviation in engine coolant temp.. sensor	EG–370
	5	Characteristic deviation in intake air temp. sensor	EG–374

OK → NG: Repair or replace.

5	Check compression (See page EG–27).

OK → NG: Repair or replace.

6	Does malfunction disappear when a good main oxygen sensor is installed?

NO → YES: Replace main oxygen sensor.

Check and replace ECM.

7 **Check each item found to be a possible cause of problem.**

Check each circuit found to be a possible cause of trouble according to the results of the check in 1. The numbers in the table below show the order in which the checks should be performed.

Main oxygen sensor signal from either side continues at 5.0 V.	Main oxygen sensor signals from both sides continue at 5.0 V.	Main oxygen sensor signals from both sides are normal.	Possible Cause	See page
1		7	Injector circuit	EG–428
		3	Misfire	IG–6
2		4	Valve timing	EG–43
		1	Air leakage	EG–166
	1	2	Fuel system	EG–440
3	4		Cold start injector circuit	EG–432
	5	8	Characteristic deviation in volume air flow meter	EG–388 390
	2	5	Characteristic deviation in engine coolant temp.. sensor	EG–370
	3	6	Characteristic deviation in intake air temp. sensor	EG–374

OK → **NG** → **Repair or replace.**

8 **Check compression (See page EG–27).**

OK → **NG** → **Repair or replace.**

9 **Does malfunction disappear when a good main oxygen sensor is installed?**

NO → **YES** → **Replace main oxygen sensor.**

Check and replace ECM.

DTC	27	Sub–Oxygen Sensor Circuit (only for California spec.)

— CIRCUIT DESCRIPTION

The sub–oxygen sensor is installed on the exhaust pipe. Its construction and operation is the same as the man oxygen sensor on page EG–366.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
27	(a) Open or short in heater circuit of sub–oxygen sensor for 0.5 sec. or more.	○1 Open or short in heater circuit of sub–oxygen sensor. ○2 Sub–oxygen sensor heater. ○3 ECM
	(b) Main oxygen sensor signal is 0.45 V or more and sub–oxygen sensor signal is 0.45 V or less under conditions (a) ∼ (c). (2 trip detection logic)* (a) Engine coolant temp.: 80°C (176°F) or more (b) Engine speed: 1,500 rpm or more. (c) Accel. pedal: Fully depressed for 2 sec or more	○1 Open or short in sub–oxygen sensor circuit. ○2 Sub–oxygen sensor ○3 ECM

*: See page EG–331

— CIRCUIT DESCRIPTION (Cont'd)

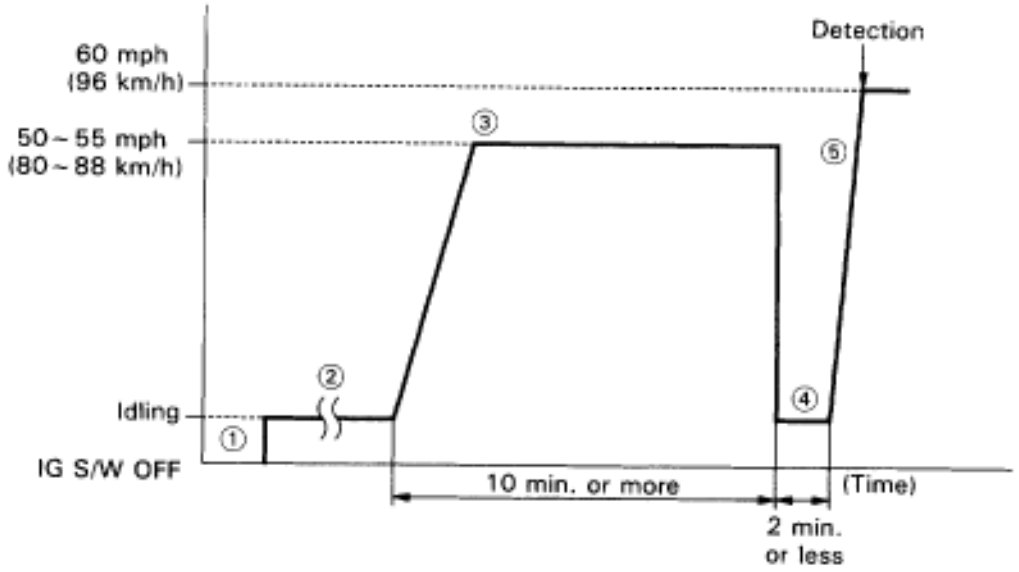
DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern

(a) To simulate diag. trouble code detecting condition after diag. trouble code is recorded.

(b) To check that the malfunction is corrected when the repair is completed confirming that diag. trouble code is no longer detected.

Malfunction: Open or Short in Sub–Oxygen Sensor



FI6527

1 Disconnect the EFI fuse (15 A) for 10 sec. or more, with IG switch OFF.
Initiate test mode (Connect terminal TE2 and E1 of data link connector 1 with IG switch OFF).

2 Start the engine and warm up with all ACC switch OFF.

3 After the engine is warmed up, let it drive at 50 ∼ 55 mph (80 ∼ 88 km/h) for 10 min. or more.

4 After driving, stop at a safe place and perform idling for 2 min. or less.

5 After performing the racing in 4, perform acceleration to 60 mph (96 km/h) with the throttle valve fully open.

HINT: If a malfunction exists, the Malfunction Indicator Lamp will light up during step 5

NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART

HINT:

3 When other codes are output in addition to 27 at the same time, check the circuits for other codes first.

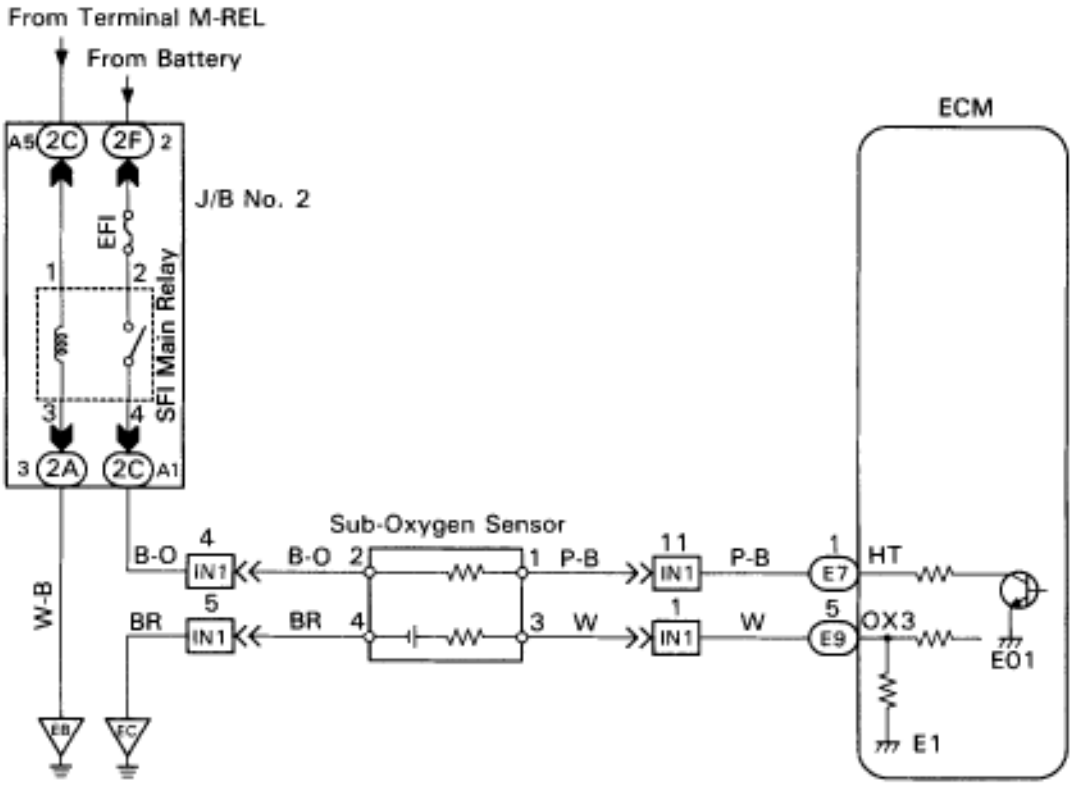
1 Check voltage of terminal HT.
- OK → 4
- NG → 2

2 Check resistance of sub-oxygen sensor heater.
- NG → Replace sub-oxygen sensor.
- OK → 3

3 Check for open and short in harness and connector between SFI main relay and ECM.
- NG → Repair or replace harness or connector.
- OK → Check and replace ECM.

4 Check operation of sub-oxygen sensor heater.
- OK → Replace sub-oxygen sensor.*
- NG → Check and replace ECM.

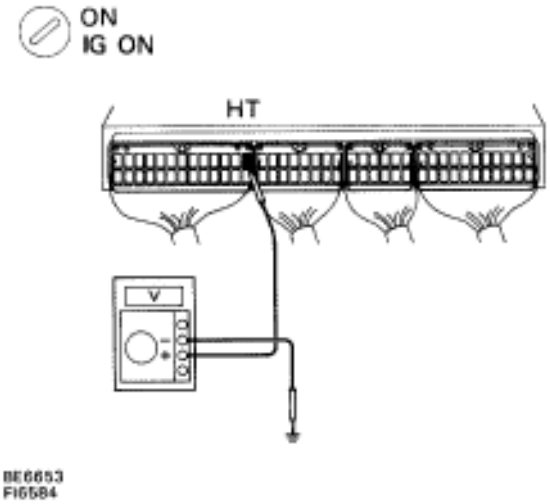
*: In this case, oxygen sensor can be deteriorated.



FI6544

INSPECTION PROCEDURE

1 **Check voltage between terminal HT of ECM connector and body ground.**



P 1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch on.

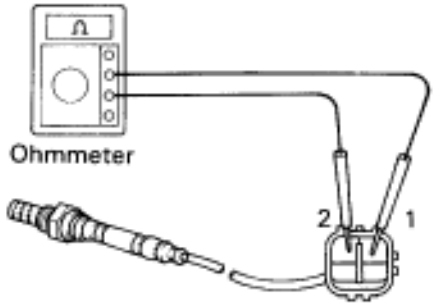
C Measure voltage between terminal HT of ECM connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Go to step 1.**

2 **Check sub–oxygen sensor heater.**



P Disconnect sub–oxygen sensor connector.

C Measure resistance between terminals 1 and 2 of sub–oxygen sensor connector.

OK **Resistance: 11.7 – 14.3 Ω 20°C (68°F)**

OK

NG **Replace sub–oxygen sensor.**

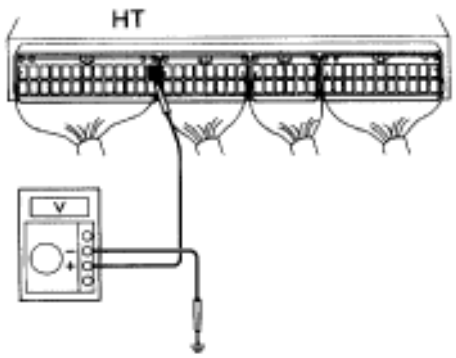
3 **Check for open and short in harness and connector between SFI main relay and ECM (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

4 **Check voltage between terminal HT of ECM connector and body ground**



P
1. Connect ECM connector.
2. Warm up engine to normal operating temperature.

C Measure voltage between terminal HT of ECM connector and body ground, when engine is idling and racing at 2,500 rpm.

OK

	Voltage
Idling	0 V
Racing at 2,500 rpm	10 – 14 V

Hint In the 2,500 rpm racing check, continue engine racing at 2,500 rpm for approx. 20 seconds or more.

NG

OK **Replace sub–oxygen sensor.***
*: In this case, oxygen sensor can be deteriorated.

Check and replace ECM.

–MEMO–

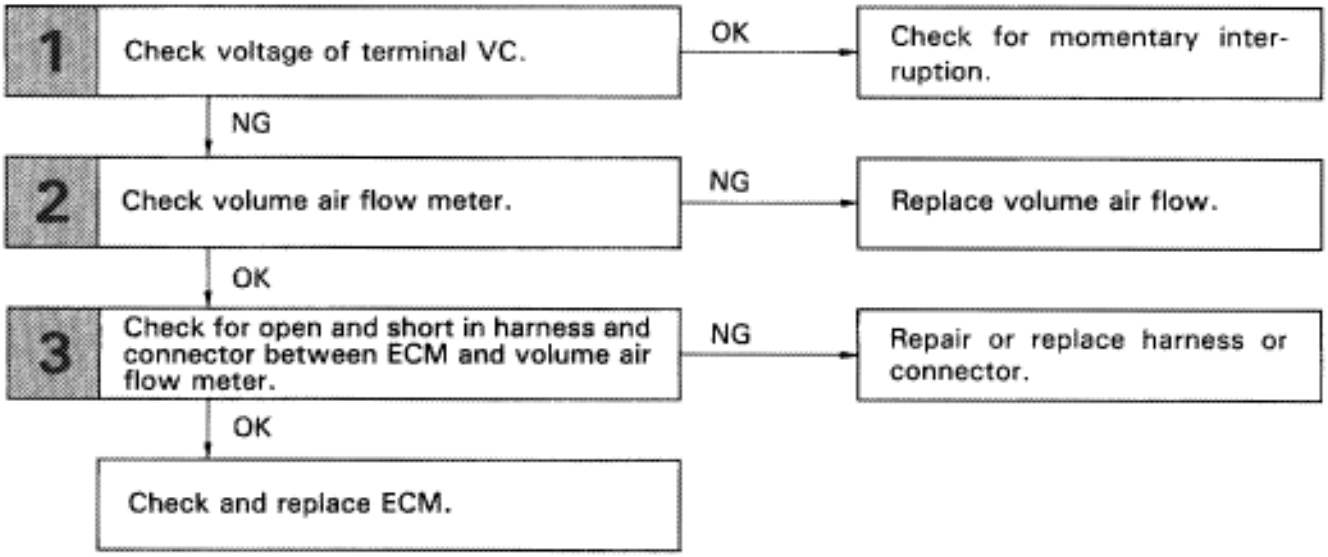
DTC 31 Volume Air Flow Meter Circuit (No. 1)

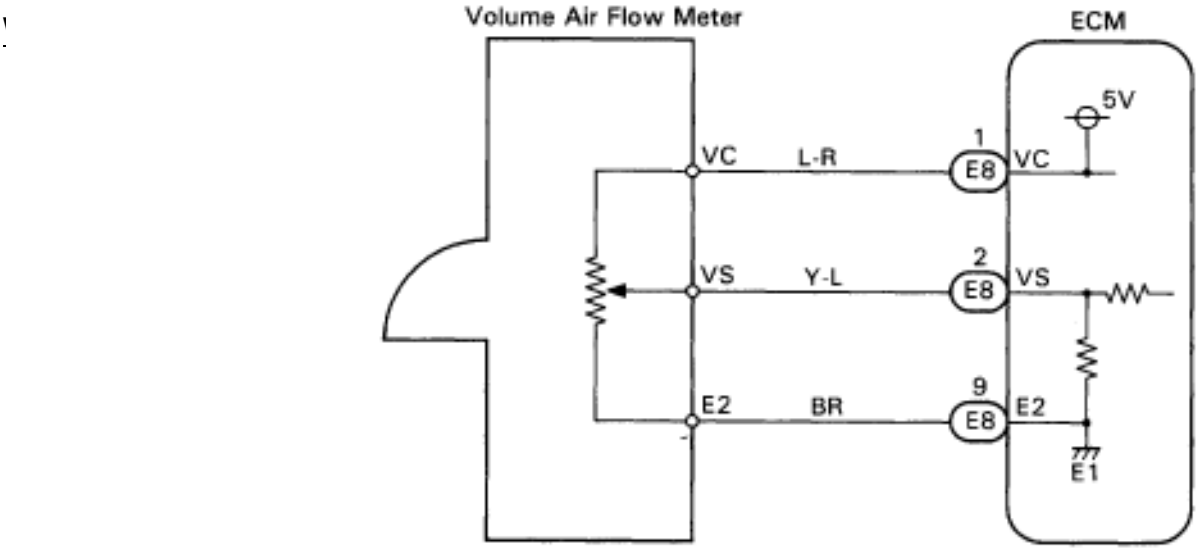
CIRCUIT DESCRIPTION

The volume ar flow meter is located directly behind the air cleaner, and detects the intake air volume. It converts the intake air readings into a voltage signal by means of a potentiometer. Intake air volume signal is used to calculate the basic injection duration and basic ignition advance angle.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
31	All conditions below are detected continuously for 0.5 sec. or more. (a) Idle switch: ON (IDL) (b) Voltage of terminal VS: 0.1 V or less (c) Engine speed: 1,500 rpm or less	□ Open (VC) or short (VC–32) in volume air flow meter circuit. □ Volume air flow meter □ ECM

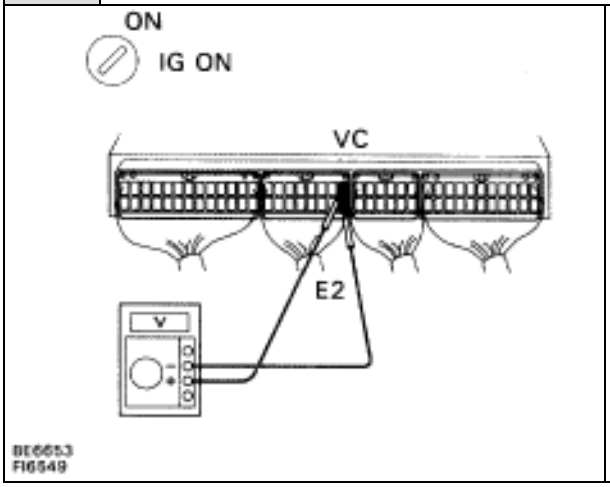
DIAGNOSTIC CHART





INSPECTION PROCEDURE

1 **Check voltage between terminals VC and E2 of ECM**



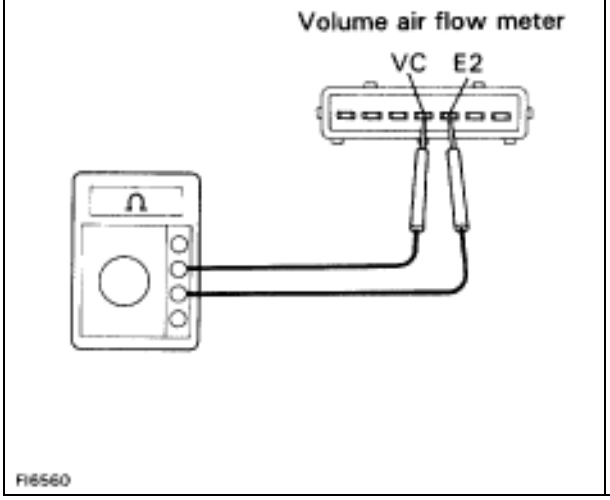
P 1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch ON.

C Measure voltage between terminals VC and E2 of ECM.

OK **Voltage: 4 – 6 V**

NG → **OK** → **Check for momentary interruption (See page EG–333)**

2 **Check resistance between terminals VC and E2 of volume air flow meter.**



P Disconnect the volume air flow meter connector.

C Measure resistance between terminals VC and E2 of volume air flow meter.

OK **Resistance: 200 – 400 Ω**

OK → **NG** → **Replace volume air flow meter.**

3 **Check for open and short in harness and connector between ECM and volume air flow meter (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace ECM.

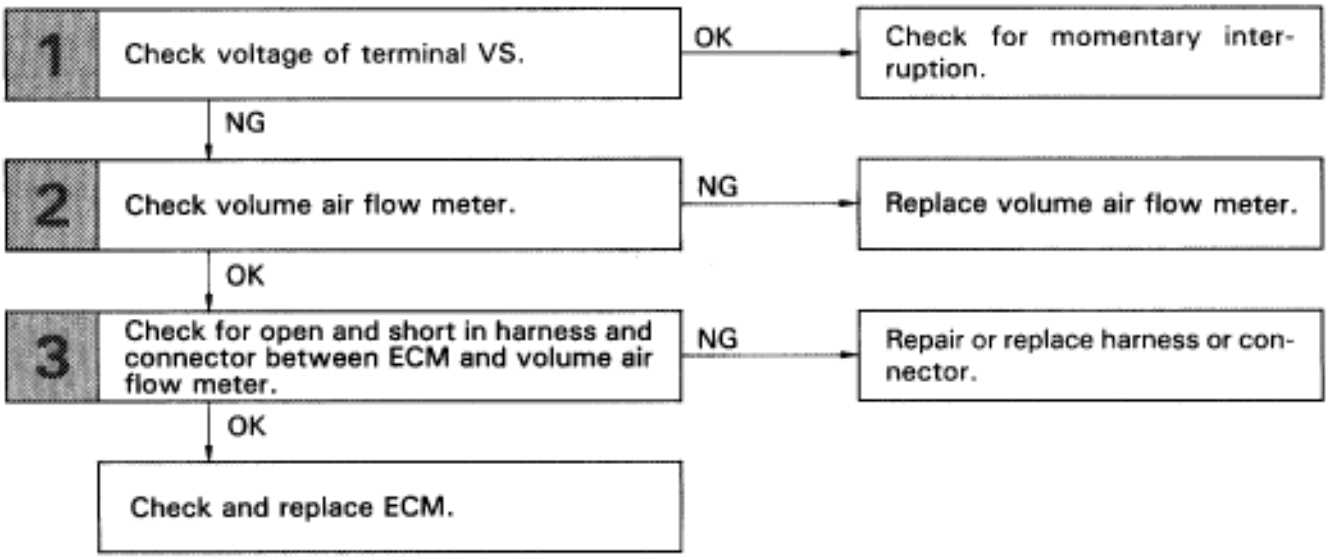
DTC 32 Volume Air Flow Meter Circuit (No. 2)

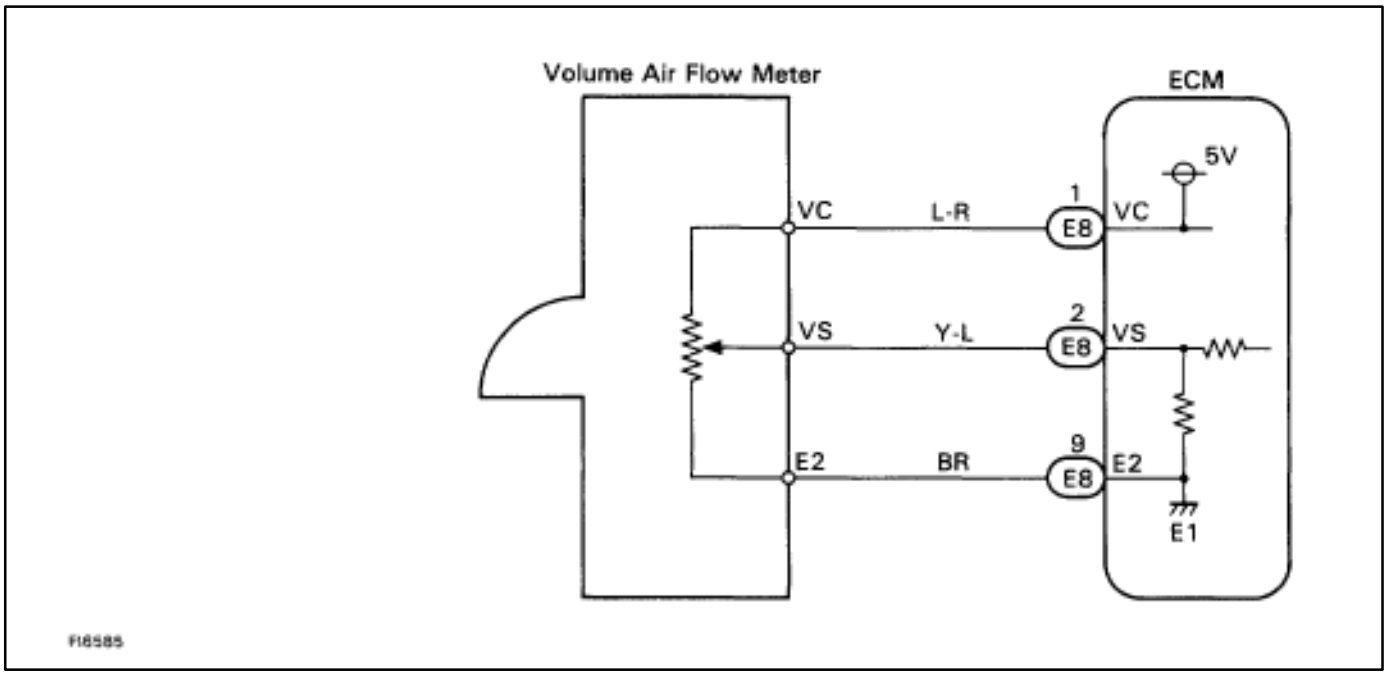
CIRCUIT DESCRIPTION

The volume ar flow meter is located directly behind the air cleaner, and detects the intake air volume. It converts the intake air readings into a voltage signal by means of a potentiometer. Intake air volume signal is used to calculate the basic injection duration and basic ignition advance angle.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
32	VS exceeds 4.9 V for 0.5 sec. or more.	□Open (E2) or short (VS–VS) in volume air flow meter circuit. □Volume air flow meter □ECM

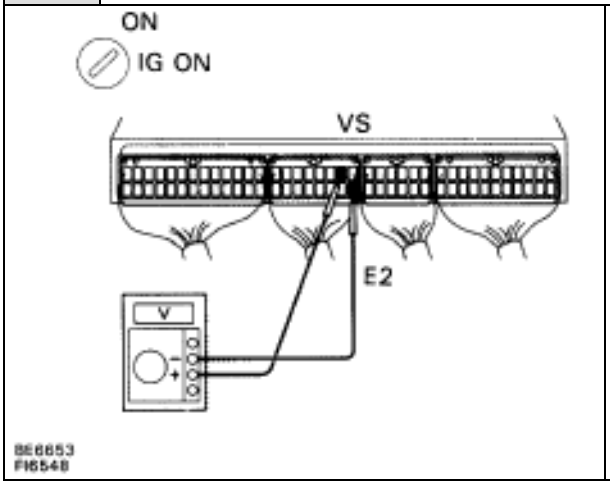
DIAGNOSTIC CHART





INSPECTION PROCEDURE

1 **Check voltage between terminals VS and E2 of ECM**



P
1. Remove air cleaner cap.

C
2. Remove glove compartment. (See page BO–111).
3. Turn ignition switch ON.

Measure voltage between terminals VS and E2 of ECM.

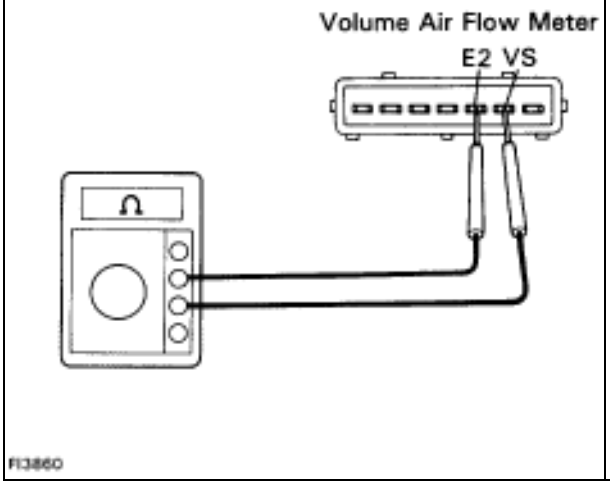
OK

Measuring Plate	Voltage
Fully closed	3.7 – 4.3 V
Fully open	0.2 – 0.5 V

NG

OK → **Check for momentary interruption (See page EG–333)**

2 **Check resistance between terminals VS and E2 of volume air flow meter.**



P
Disconnect the volume air flow meter connector.

C
Measure resistance between terminals VS and E2 of volume air flow meter.

OK

Measuring Plate	Resistance
Fully closed	200 – 600 Ω
Fully open	20 – 1,200 Ω

OK

NG → **Replace volume air flow meter.**

3 **Check for open and short in harness and connector between ECM and volume air flow meter (See page IN–27).**

OK

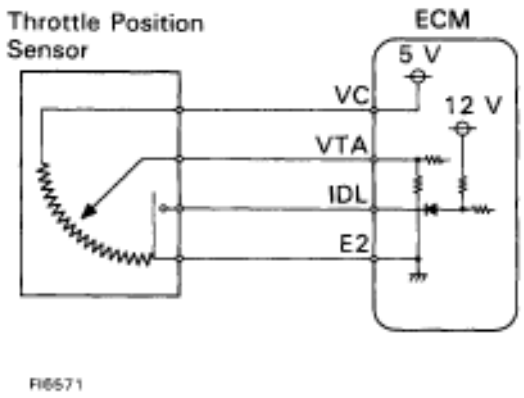
NG → **Repair or replace harness or connector.**

Check and replace ECM.

DTC 41 Throttle Position Sensor Circuit

— CIRCUIT DESCRIPTION

The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle. When the throttle valve is fully closed, the IDL contacts in the throttle position sensor are on, so the voltage at the terminal IDL of the ECM become 0 V. At this time, a voltage of approximately 0.7 is applied to the terminal VTA of the ECM. When the throttle valve is opened, the IDL contacts go off and thus the power source voltage of approximately 12 V in the ECM is applied to the terminal VTA of the ECM increases in proportion to the opening angle of the throttle valve and becomes approximately 3.5 0 5.0 V when the throttle valve is fully opened. The ECM judges the vehicle driving conditions from these signals input from the terminals VTA and IDL, and uses them as one of the conditions for deciding the air–fuel ratio correction, power increase correction and fuel–cut control etc.



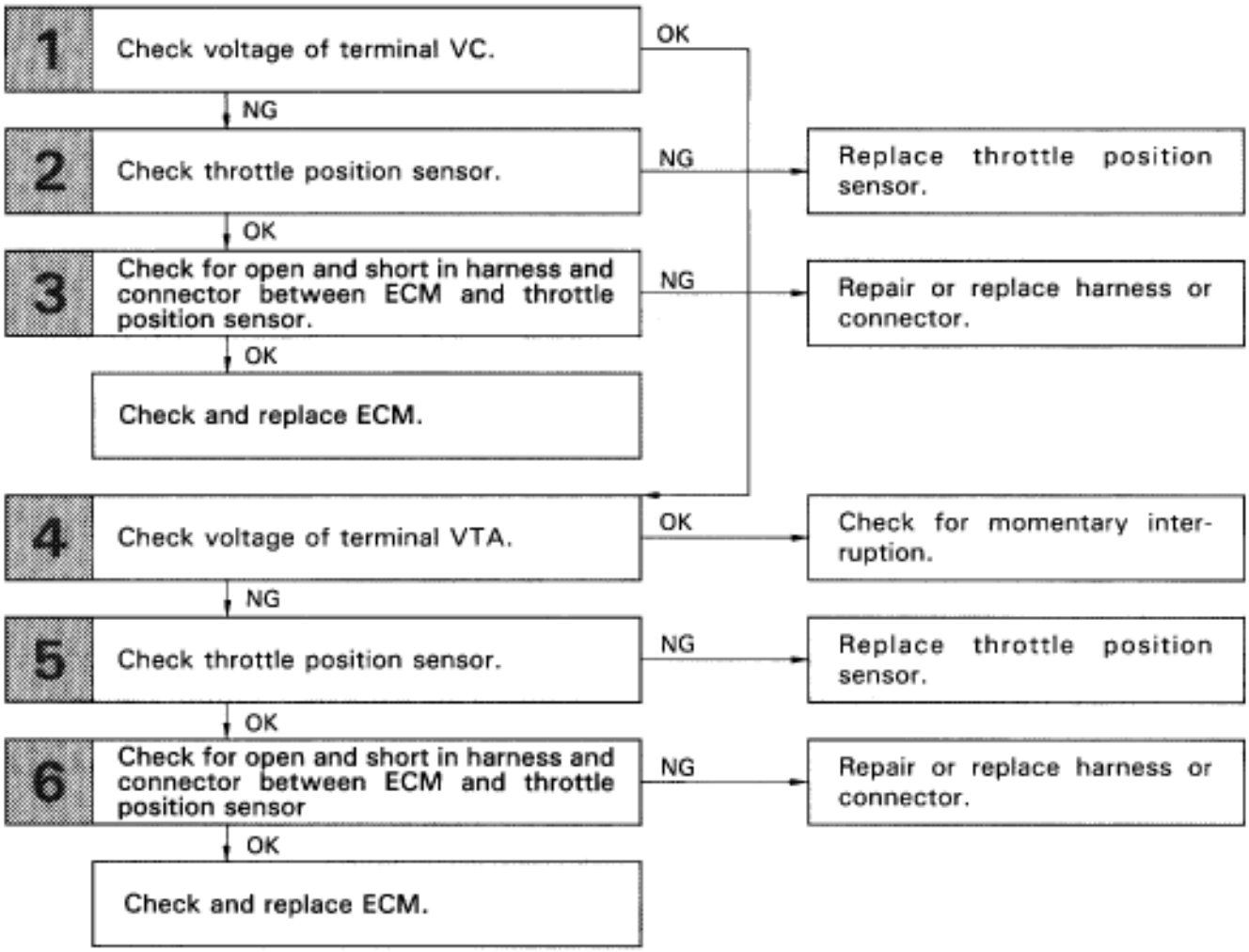
Text

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
41	Open or short in throttle position sensor circuit (VTA) for 0.5 sec. or more.	1. Open or short in throttle position sensor circuit 2. Throttle position sensor 3. ECM

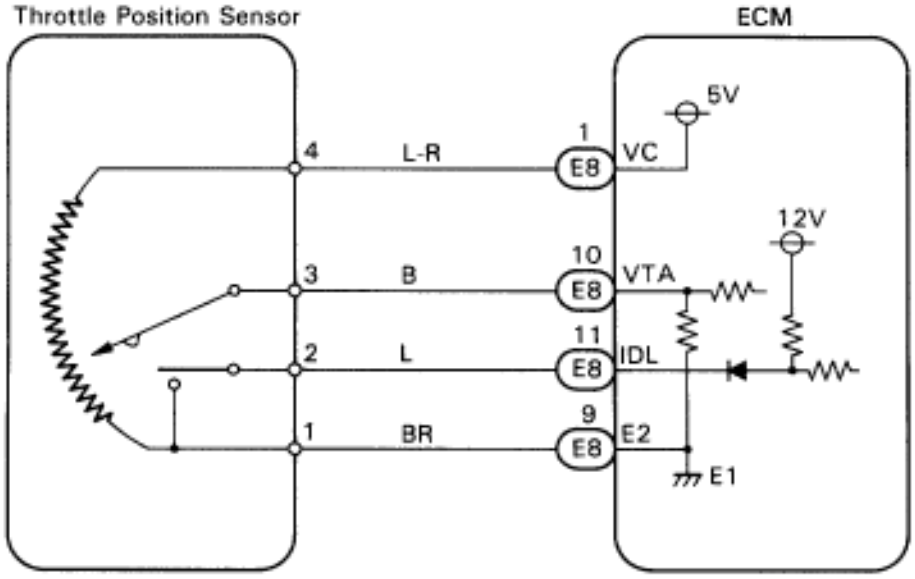
HINT: When the connector for the throttle position sensor is disconnected, diagnostic trouble code 41 is not displayed, Diagnostic trouble code 41 is displayed only when there is an open or short in the VTA signal circuit of the throttle position sensor.

DIAGNOSTIC CHART

HINT: If diagnostic trouble codes 22, 24, 32 and 41 are output simultaneously, E2 (sensor ground) may be open.



WI

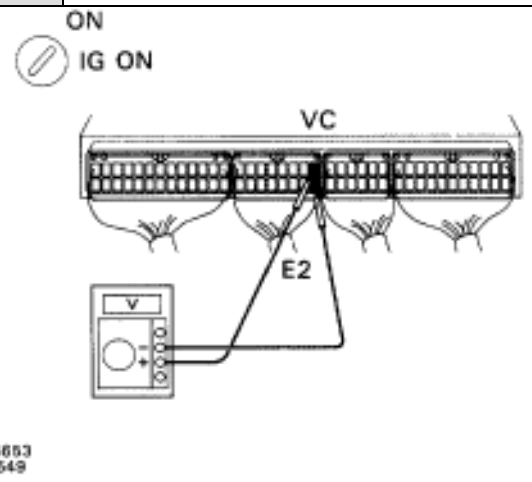


FI6573

INSPECTION PROCEDURE

HINT: If diagnostic trouble codes 22, 24, 32 an d41 are output simultaneously, E2 (sensor ground) may be open.

1 **Check voltage between terminals VC and E2 of ECM.**



P 1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch ON.

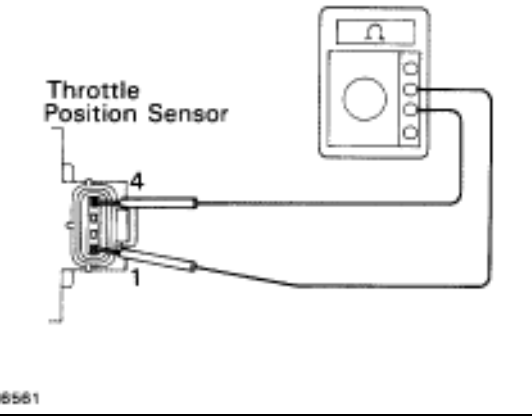
C Measure voltage between terminals VC and E2 of ECM.

OK **Voltage: 4 – 6 V**

NG

OK **Go to step 1.**

2 **Check resistance between terminals 4 and 1 of throttle position sensor.**



P Disconnect the throttle position sensor connector.

C Measure resistance between terminals 4 and 1 of throttle position sensor.

OK **Resistance: 4.25 – 8.25 kΩ**

OK

NG **Replace throttle position sensor.**

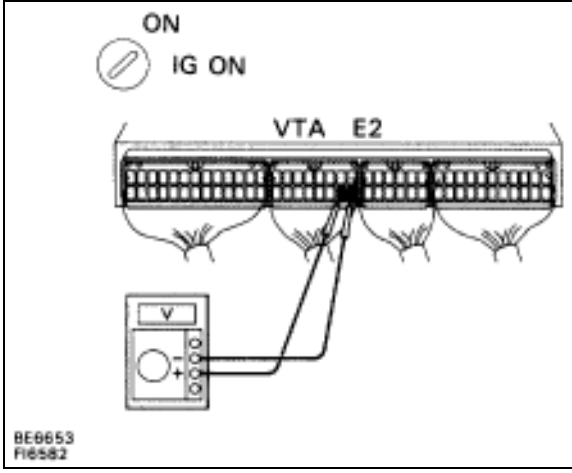
3 **Check for open and short in harness and connector between ECM and throttle position sensor (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

4 **Check voltage between terminals VTA and E2 of ECM.**



P Turn ignition switch ON.

C Measure voltage between terminals VTA and E2 of ECM.

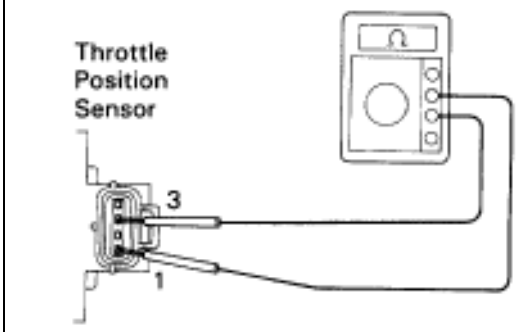
OK

Throttle Valve	Voltage
Fully closed	0.3 – 0.8 V
Fully open	2.7 – 5.2 V

NG

OK **Check for momentary interruption (See page EG–333).**

5 **Check resistance between terminals 3 and 1 of throttle position sensor.**



P Disconnect the throttle position sensor connector.

C Measure the resistance between terminals 3 and 1 of throttle position sensor.

OK

Throttle Valve	Resistance
Fully closed	0.3 – 6.3 kΩ
Fully open	3.5 – 10.3 kΩ

OK

NG **Replace throttle position sensor.**

6 **Check for open and short in harness and connector between ECM and throttle position sensor (See page IN–27).**

OK

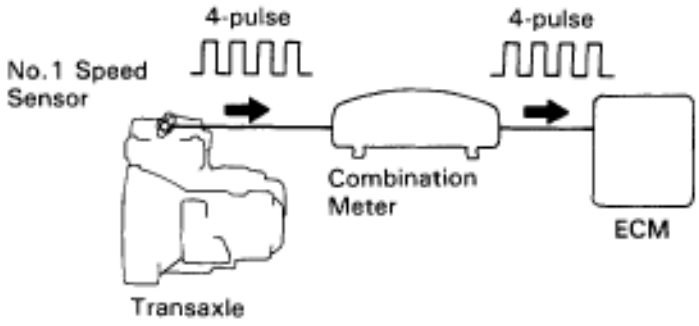
NG **Repair or replace harness or connector.**

Check and replace ECM.

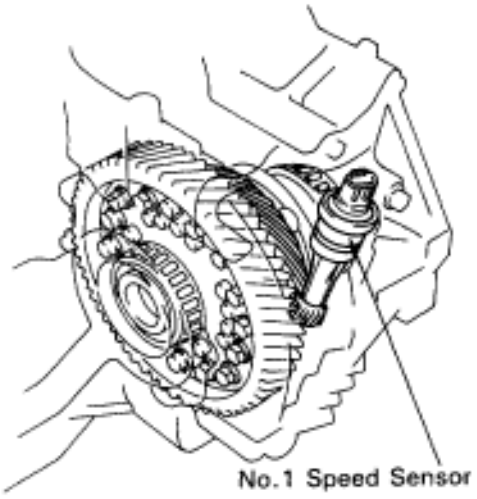
DTC 42 Vehicle Speed Sensor Signal Circuit

— CIRCUIT DESCRIPTION

The No.1 speed sensor outputs a 4–pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.

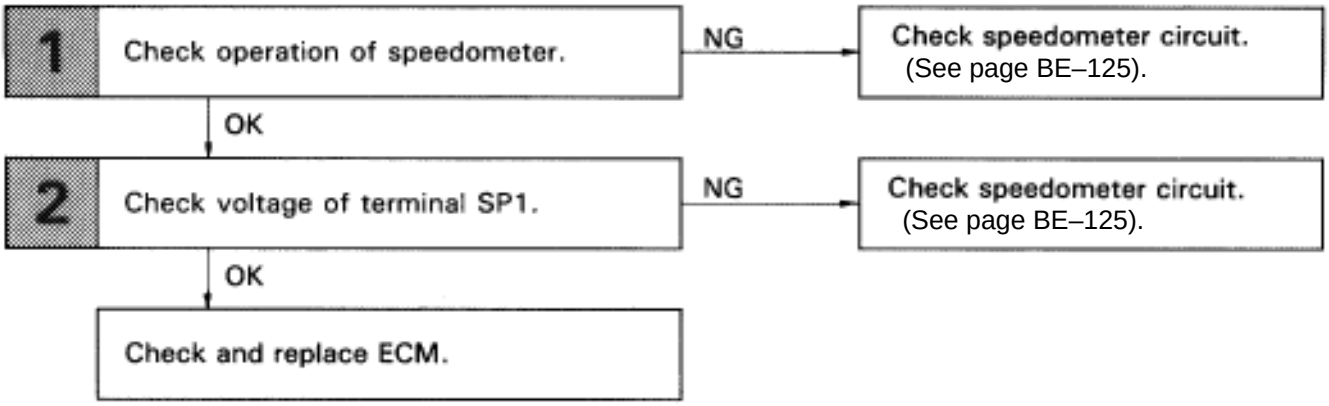


Q00515 Q00514

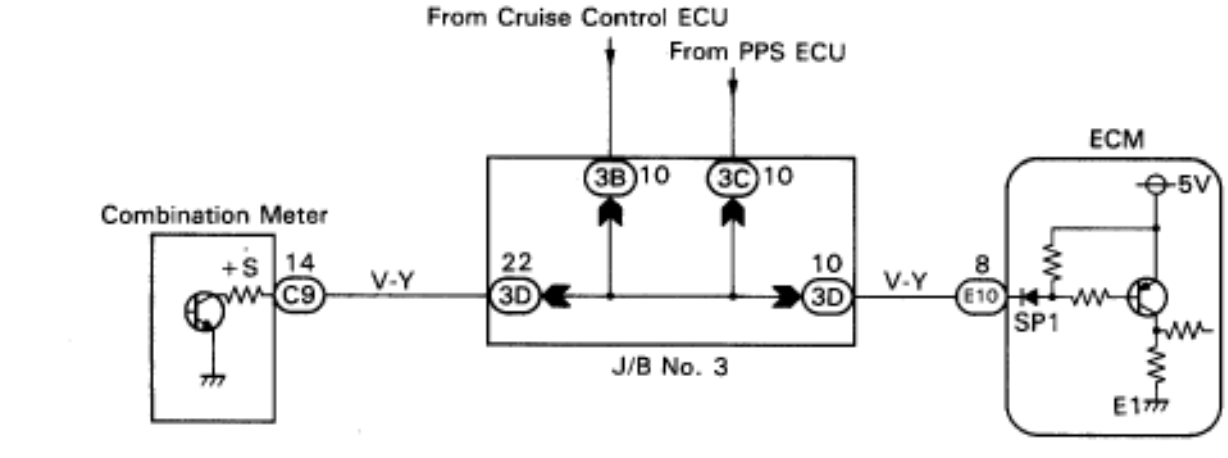


Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
45	For Electronic Controlled Transmission All conditions below are detected continuously for 8 sec. or more. (a) Vehicle speed signal: 0 km/h (mph) (b) Engine speed: 3,000 rpm or more (c) Park/Neutral position switch (PNP) OFF	□1 No. 1 speed sensor □2 Combination meter □3 Open or short in No. 1 speed sensor circuit □4 ECM
	For M/T All conditions below are detected continuously for 8 sec. or more. (a) Vehicle speed signal: 0 km/h (mph) (b) Engine speed: Between 3,000 ∼ 4,500 rpm (c) Engine coolant temp.: 80□C (176□F) or more (d) Load driving	

DIAGNOSTIC CHART



WIRING DIAGRAM



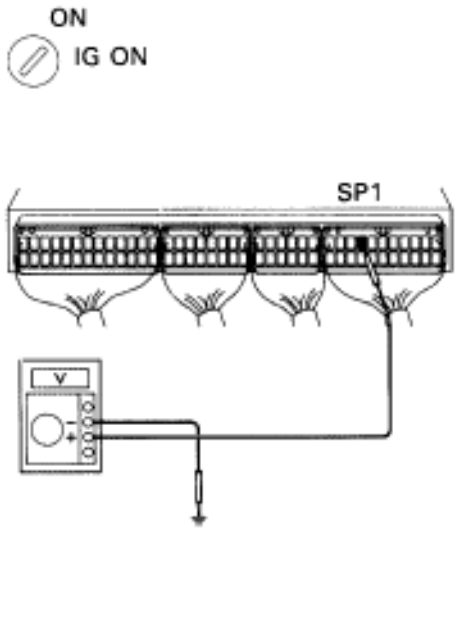
INSPECTION PROCEDURE

1	Check operation of speedometer.
C	Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
Hint	The No. 1 speed sensor is operating normally if the speedometer display is normal.

OK

NG **Check speedometer circuit. See combination meter troubleshooting on page BE–125.**

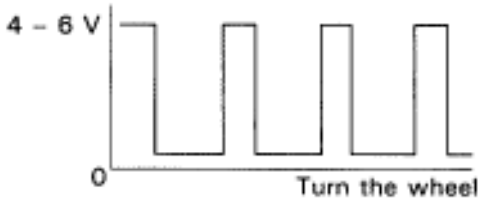
2	Check voltage between terminal SP1 of ECM connector and body ground.



P
1. Remove glove compartment. (See page BO–111).
2. Disconnect power steering ECU connector and cruise control ECU connector.
3. Shift the shift lever to N position or neutral.
4. Jack up a front wheel o one side.
5. Turn ignition switch on.

C Measure voltage between terminal SP1 of ECM connector and body ground when the wheel is turned slowly.

OK **Voltage is generated intermittently.**



OK

NG **Check speedometer circuit. See combination meter troubleshooting on page BE–125.**

Check and replace ECM.

–MEMO–

DTC 43 Starter Signal Circuit

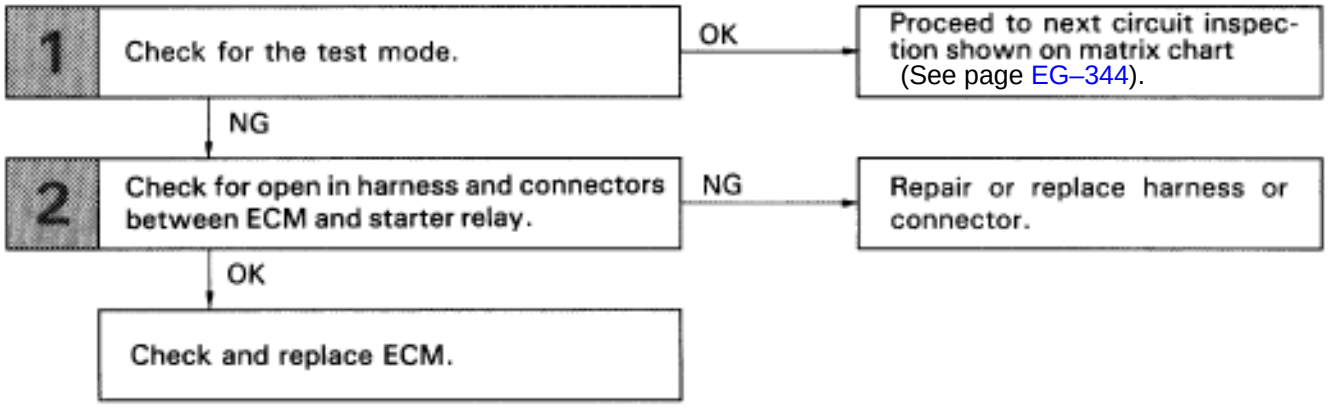
CIRCUIT DESCRIPTION

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 voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after–start injection control.

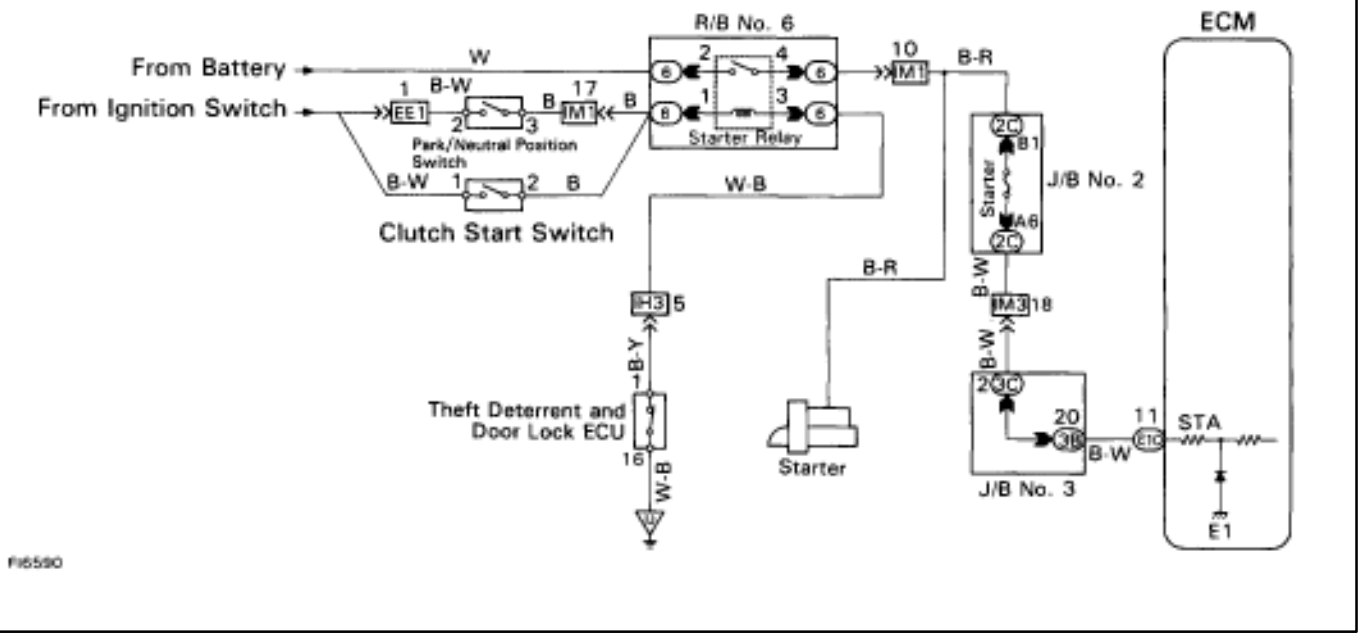
Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
43	No starter signal to ECM	□ Open or short in starter signal circuit. □ Open or short in ignition switch or starter relay circuit □ ECM

DIAGNOSTIC CHART

HINT: This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the matrix chart of problem symptoms on page EG–344.

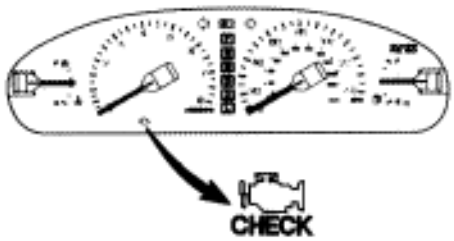


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check output condition of diag. trouble code 43.**



FI6604

P Setting the test mode.

1. Turn ignition switch OFF.
2. Connect terminals TE2 and E1 of data link connector 2.
3. Turn ignition switch ON. (Don't start the engine.)
4. Connect terminals TE1 and E1 of data link connector 2.

C Check if code "43" is output by the Malfunction Indicator Lamp.

OK **Code "43" is output.**

C Start the engine. Check if the code "43" disappears.

OK **Code "43" is not output.**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page EG–344).**

2 **Check for open in harness and connectors between ECM and starter relay (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

DTC 52, 53, 55 Knock Sensor Circuit

— CIRCUIT DESCRIPTION

Knock sensors are fitted one each to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
52	No No. 2 knock sensor signal to ECM for 4 crank revolutions with engine speed between 1,600 rpm ∼ 5,200 rpm.	○1 Open or short in No. 2 knock sensor circuit. ○2 No. 2 Knock sensor (looseness) ○3 ECM
53	Engine control computer (for knock circuit) malfunction at engine speed between 650 rpm and 5,2.00 rpm.	○1 ECM
55	No No. 1 knock sensor signal to ECM for 4 crank revolutions with engine speed between 1,600 rpm ∼ 5,200 rpm.	○1 Open or short in No. 1 knock sensor circuit. ○2 No. 1 knock sensor (looseness) ○3 ECM

If the ECM detects the above diagnosis conditions, it operates the fail safe function in which the corrective retard angle value is set to the maximum value.

— CIRCUIT DESCRIPTION (Cont'd)

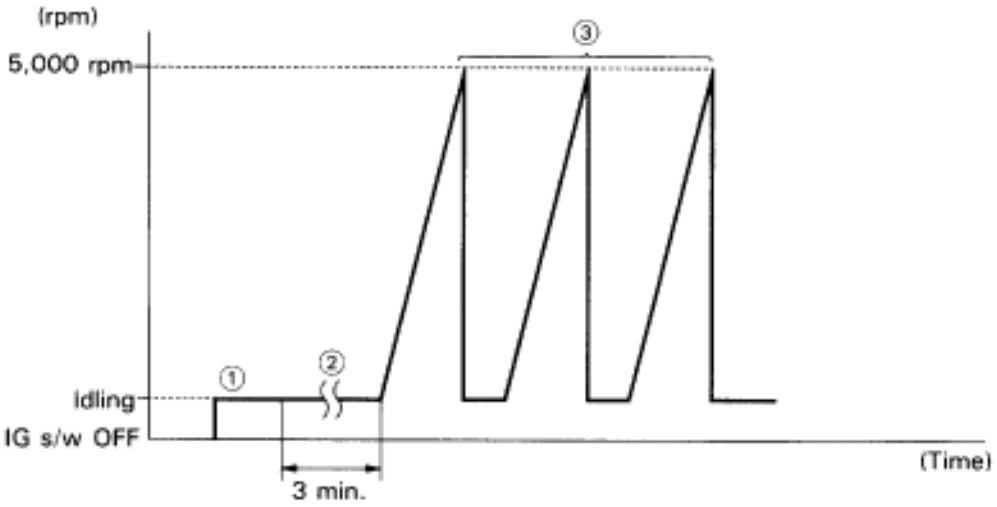
DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern.

(a) To simulate diag. trouble code detecting condition after diag. trouble code is recorded.

(b) To check that the malfunction is corrected when the repair is completed confirming that diag. trouble code is no longer detected.

Malfunction: Open or Short in Knock Sensor



FI6461

1 Start the engine and warm up.

2 After the engine is warmed up, let it idle for 3 min.

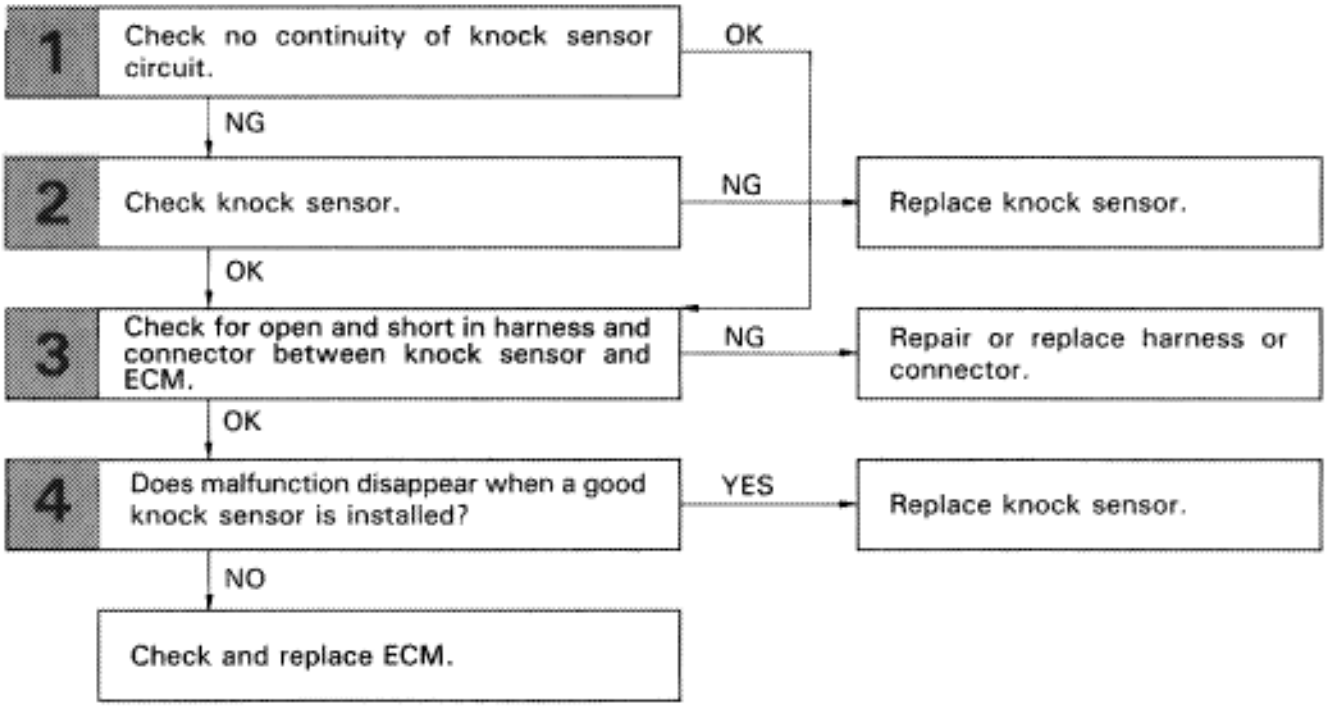
3 With the A/C ON, perform quick racing (5,000 rpm) three times.
(Rapidly depress the accelerator pedal and suddenly release it.)

HINT: If a malfunction exists, the Malfunction Indicator Lamp will light up when sudden racing is performed.

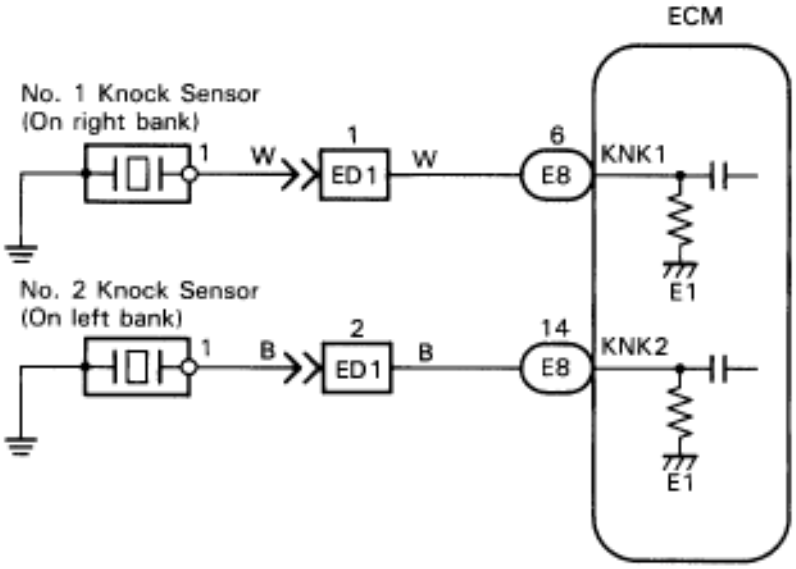
NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART

HINT: If diag. trouble code 52 is displayed, check No.2 knock sensor (for left bank) circuit.
If diag. trouble code 55 is displayed, check No. 1 knock sensor (for right bank) circuit.
If diag. trouble code 53 is displayed, replace ECM.



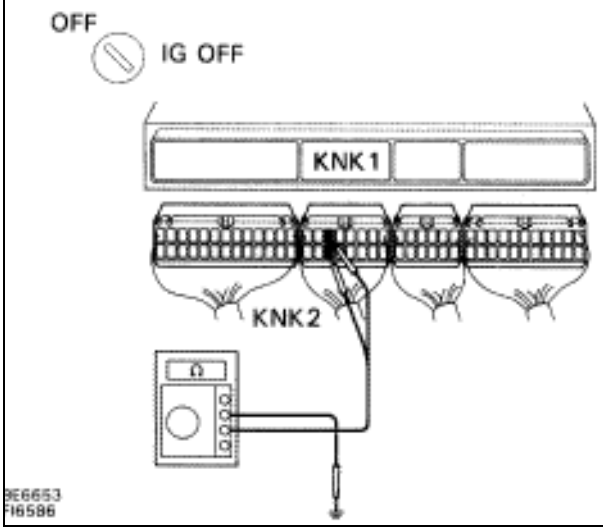
W



FI6610

INSPECTION PROCEDURE

1 **Check continuity between terminals KNK1, KNK2 of ECM connector and body ground.**



P 1. Remove glove compartment. (See page BO–111).
2. Disconnect the ECM connector.

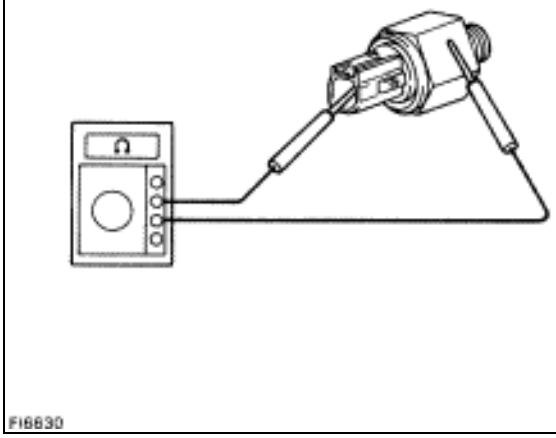
C Measure resistance between terminals KNK1, KNK2 of ECM connector and body ground.

OK **Resistance: 1 MΩ or higher**

NG

OK **Go to step** 1

2 **Check knock sensor.**



P Disconnect knock sensor connector.

C Measure resistance between the knock sensor terminal and body.

OK **Resistance: 1 MΩ or higher**

OK

NG **Replace knock sensor (See page EG–100).**

3	Check for open and short in harness and connectors between ECM and knock sensor (See page IN–27).

OK

NG → Repair or replace harness or connector.

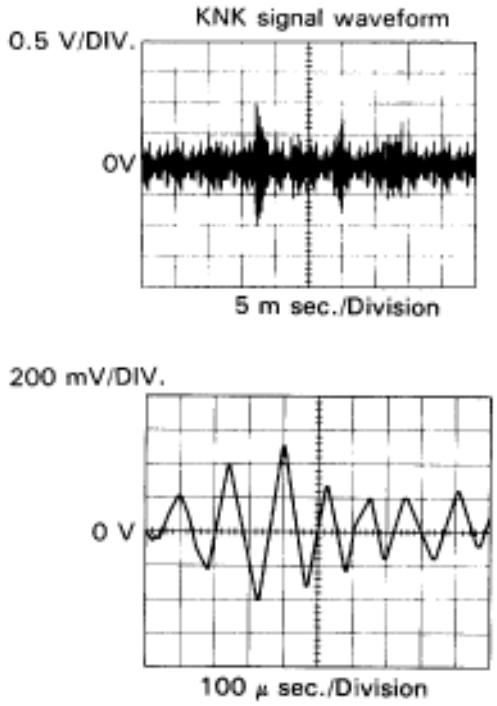
4	Does malfunction disappear when a good knock sensor is intalled?

NO

YES → Replace knock sensor (See page EG–100).

Check and replace ECM

Reference INSPECTION USING OSCILLOSCOPE



3. With the engine racing (4,000 rpm) measure between terminals KNK1, KNK2 of ECM and body ground.

HINT: The correct waveform appears as shown in the illustration on the left.

4. Spread the time on the horizontal axis, and confirm that period of the wave is 132 sec. (Normal mode vibration frequency of knock sensor: 7.6 KHz)

HINT: If normal mode vibration frequency is not 7.6 KHz, the sensor is malfunctioning.

–MEMO–

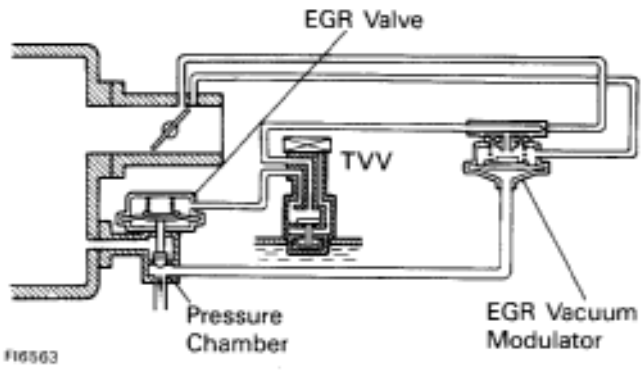
DTC	71	EGR System Malfunction (Only for California spec.)

— CIRCUIT DESCRIPTION

The EGR system, recirculates exhaust gas, which is controlled to the proper quantity to suit the driving conditions, into the intake air mixture to slow down combustion, reduce the combustion temperature and reduce NOx emissions. The amount of EGR is regulated by the EGR vacuum modulator according to the engine load.

Under the following conditions, EGR is cut to maintain driveability.

- Engine coolant temp. below 35°C (95°F)
- During deceleration (throttle valve closed)
- Light engine load (amount of intake air very small)
- Engine idling



Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
71	EGR gas temp. is 70°C (158°F) or below for 1 ~ 4 min. under conditions (a) and (b). (2 trip detection logic)* (a) Engine coolant temp: 60°C (140°F) or more (b) EGR operation possible. (EX. Electronic Controlled Transmission in D position, A/C ON, 60 mph (96 kn/h), Flat road).	Open in EGR gas temp. sensor circuit EGR or TVV vacuum hose disconnected valve stuck Clogged EGR gas passage ECM

*: See page EG–331.

— CIRCUIT DESCRIPTION (Cont'd)

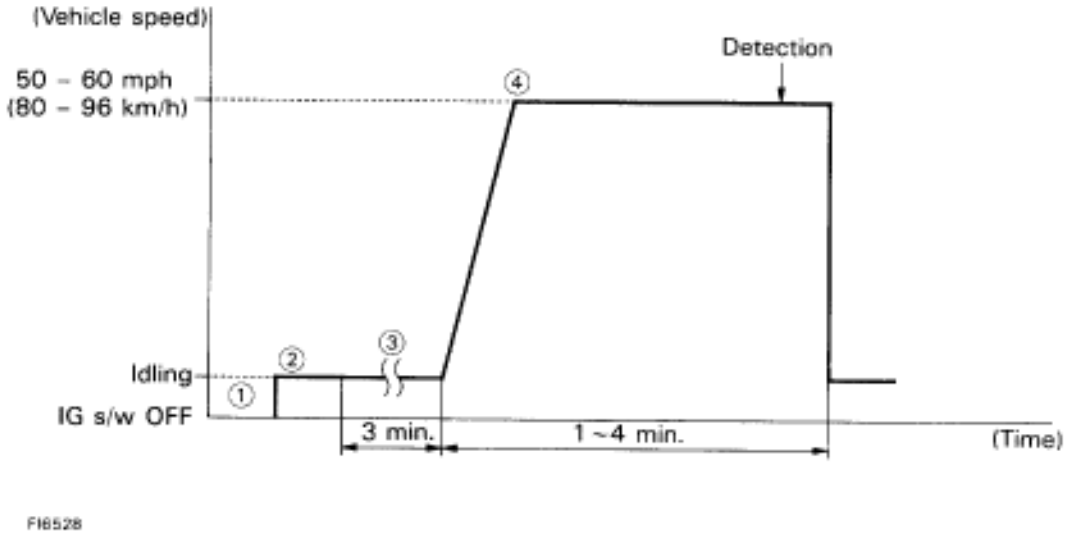
DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern.

(a) To simulate diag. trouble code detecting condition after diag. trouble code is recorded.

(b) To check that the malfunction is corrected when the repair is completed confirming that diag. trouble code is no longer detected.

Malfunction: Open in EGR gas temp. sensor circuit



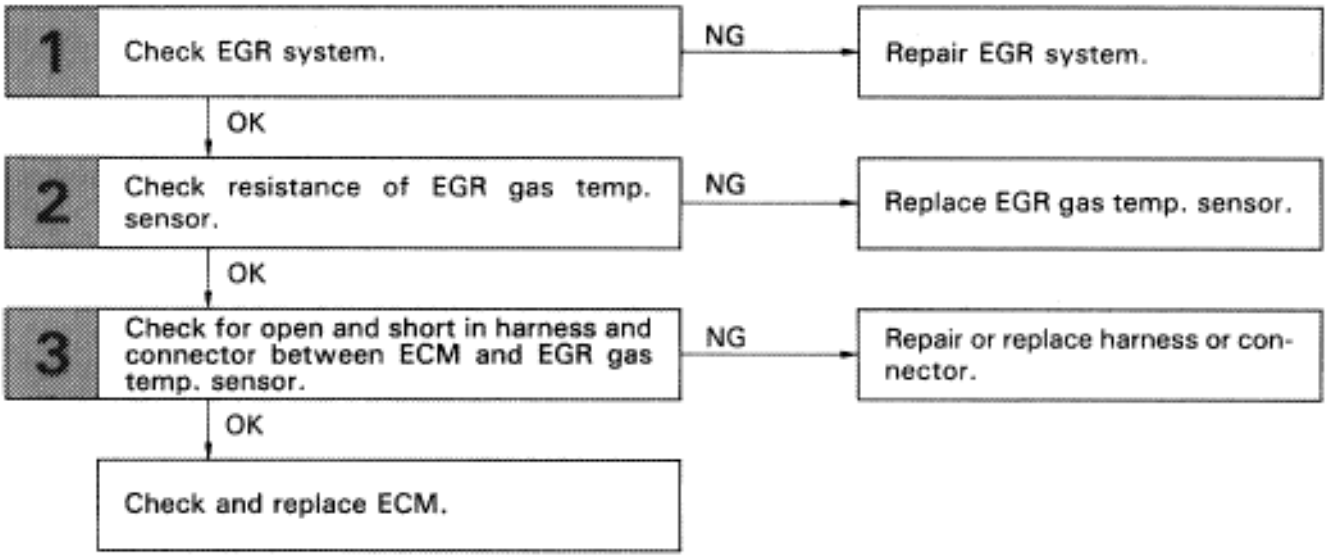
FI6528

1. Disconnect the EFI fuse (15 A) for 10 sec. or more, with IG switch OFF.
   Initiate test mode (Connect terminal TE2 and E1 of data link connector 1 or 2 with IG switch OFF).
2. Start the engine and warm up.
3. After the engine is warmed up, let it idle for 3 min.
4 With the A/C ON and transmission in 5th gear (D position for A/T), drive at 50 ~ 60 mph (80 ~ 96 km/h) for 4 min, or less.

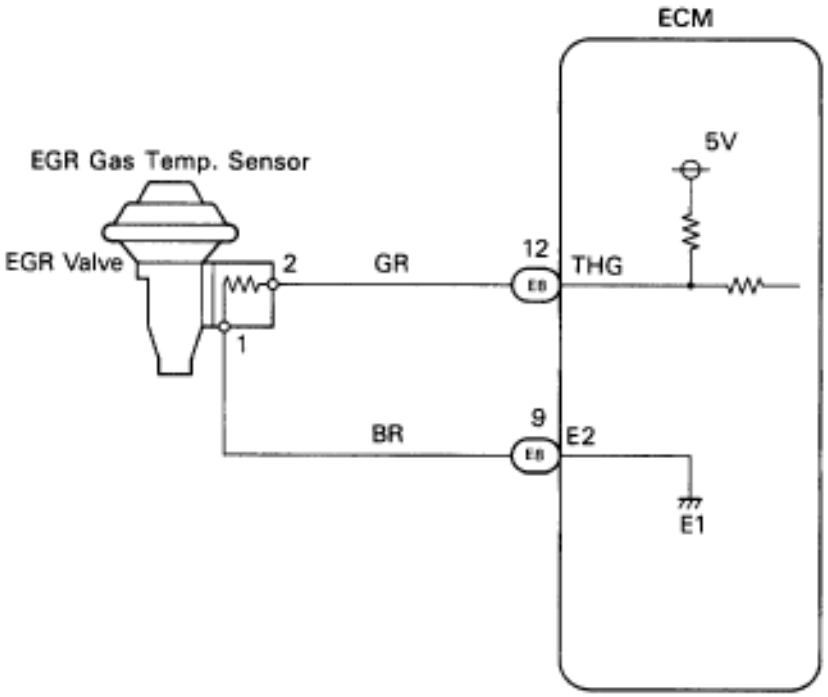
HINT: If a malfunction exists, the Malfunction Indicator Lamp will light up during step .

NOTICE: If the conditions in this test are not strictly observed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART



WIRING DIAGRAM



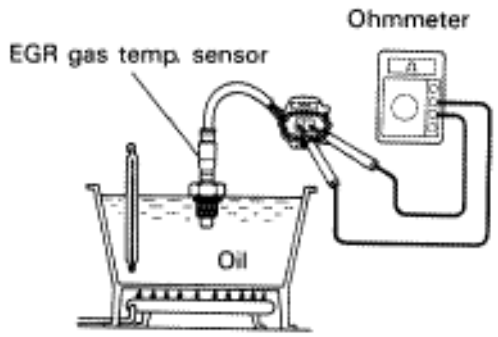
FI6579

INSPECTION PROCEDURE

1 **Check EGR system (See page EG–152).**

OK → **NG** → **Repair EGR system.**

2 **Check resistance of EGR gas temp. sensor.**



P Remove EGR gas temp. sensor.

C **OK** Measure resistance between terminals of EGR gas temp. sensor connector.

Resistance: **69 – 89 kΩ at 50°C (122°F)**
12 – 15 kΩ at 100°C (212°F)
2 – 4 kΩ at 150°C (302°F)

Hint

OK → **NG** → **Replace EGR gas temp. sensor**

3 **Check for open in harness and connector between EGR gas temp. sensor and ECM (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Check and replace ECM.

DTC 51 Switch Condition Signal Circuit

CIRCUIT DESCRIPTION

Park/Neutral Position Switch Signal*

The ECM uses the signals from the park/neutral position switch to determine whether the transmission is in park or neutral, or in some other position.

Air Conditioning Switch Signal

The ECM uses the output from the air conditioning switch to determine whether or not the air conditioning is operating so that it can increase the idling speed of the engine if necessary.

Throttle Position Sensor IDL Signal

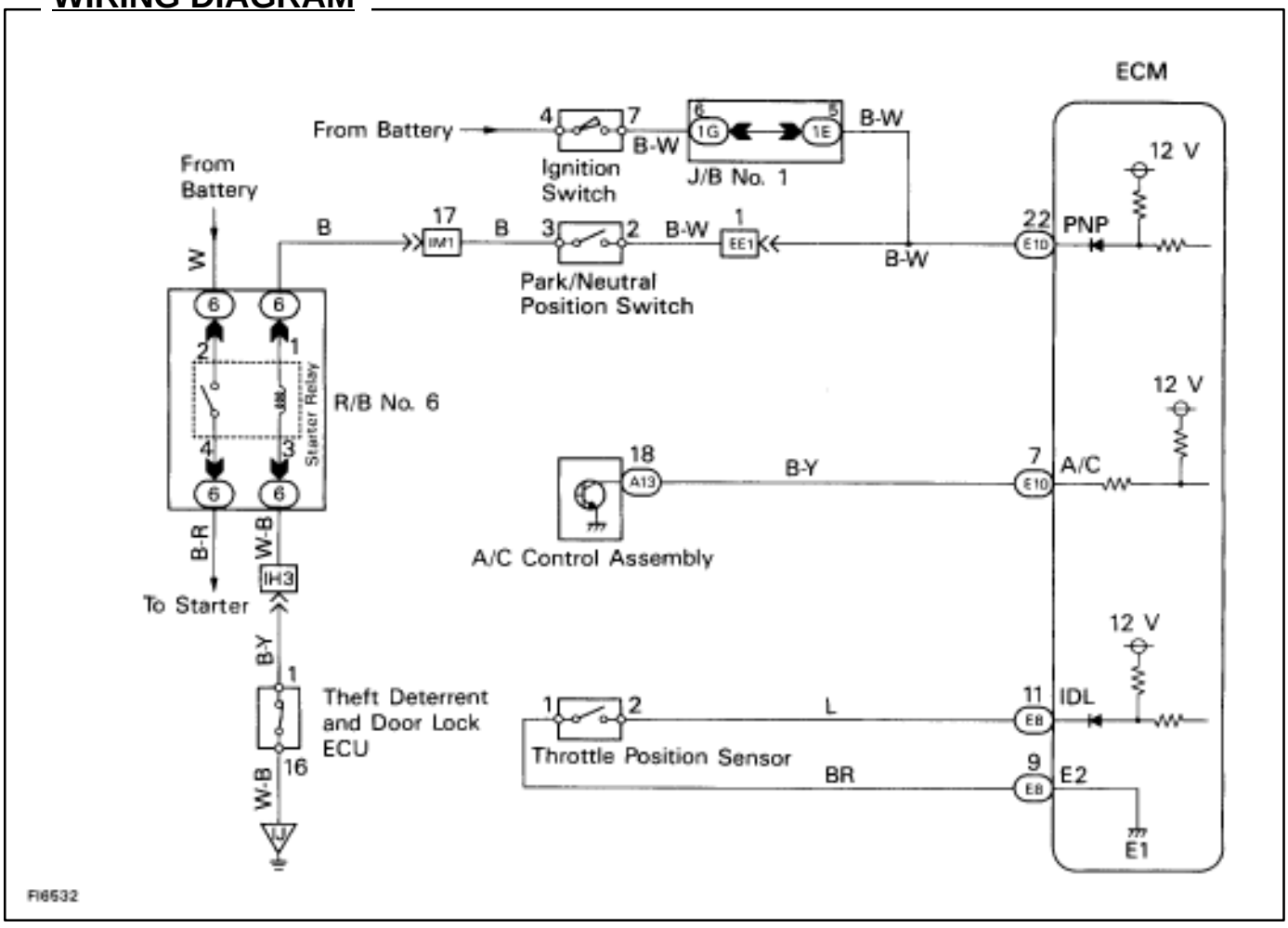
The IDL contacts are mounted in the throttle position sensor, and detects the idle condition.

Code No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
51	1. 3 sec. or more after engine starts idle switch OFF (IDL 1) 2. *Park/Neutral position switch OFF (PNP). (Shift position in “R”, “D”, “2” or “1” position). 3. A/C switch ON.	○1 Throttle position sensor IDL circuit. ○2 Accelerator pedal and cable ○3 A/C switch circuit ○4 ECM

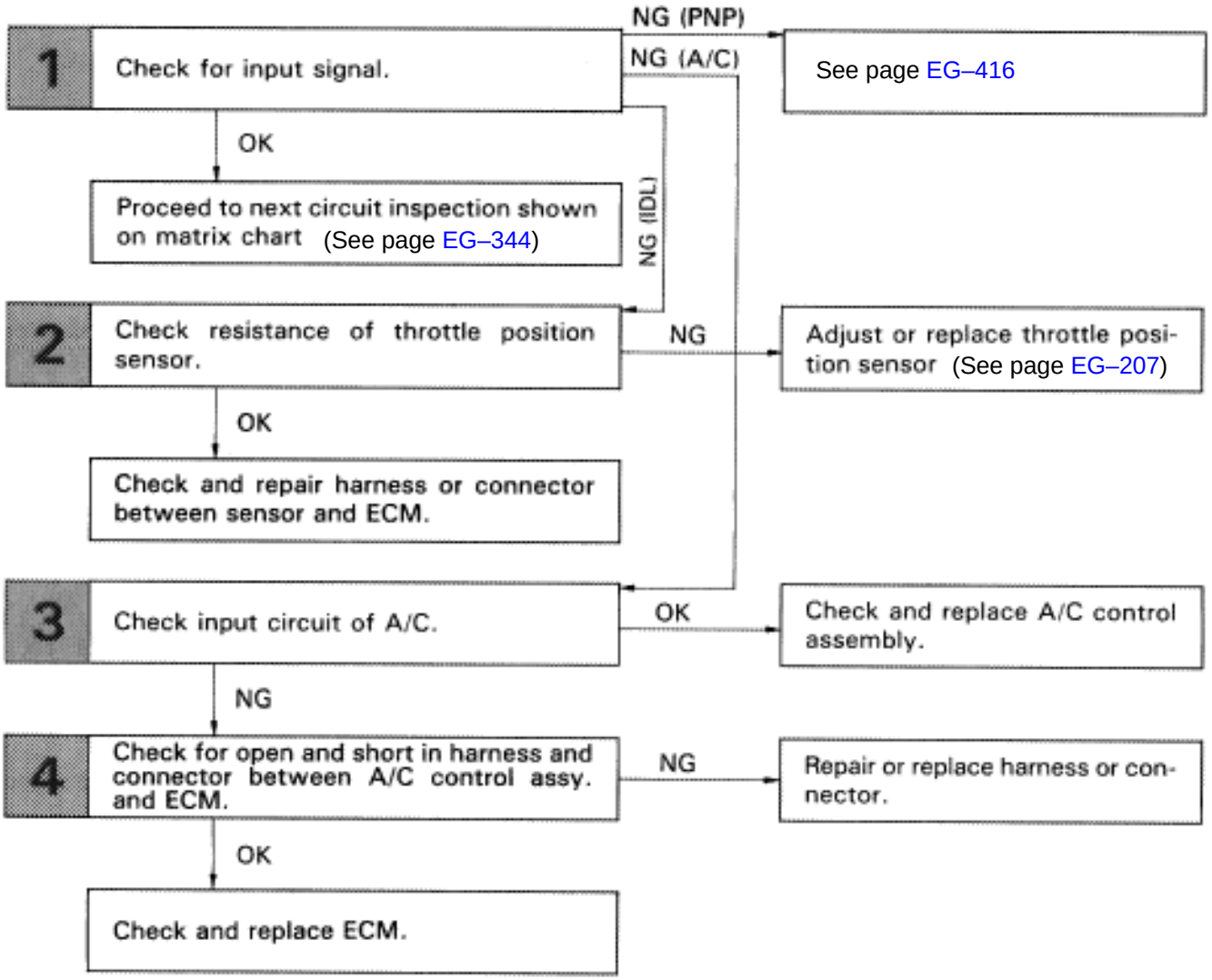
*: Only vehicles with Electronic Controlled Transmission.

HINT: In this circuit, diagnosis can only be made in the test mode.

WIRING DIAGRAM

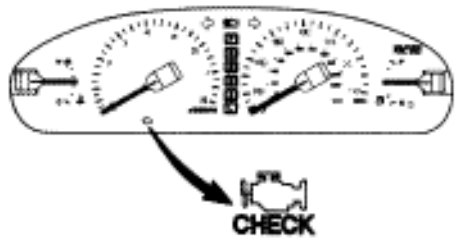


DIAGNOSTIC CHART



INSPECTION PROCEDURE

1 Check output condition of diag. trouble code 51.



FI6604

P Setting the test mode.

1. Turn ignition switch OFF.
2. Connect terminals TE2 and E1 of data link connector.
3. Turn ignition switch ON. (For checking terminal A/C, start the engine.)
4. Connect terminals TE1 and E1 of data link connector 2.

C Check if code “51” is output by the Malfunction Indicator Lam.

OK

	Condition	Code
Park/Neutral Position Switch (PNP)	P or N position	Normal*
	R, D, 2 or L position	51*
Throttle Position Sensor (IDL)	Accelerator pedal released	Normal*
	Accelerator pedal depressed	51*
A/C Switch (A/C)	A/C SW ON	51
	A/C SW OFF	Normal

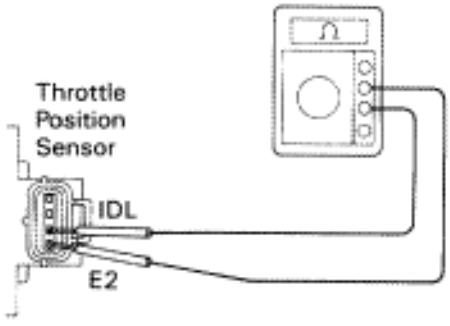
*: Before the STA signal is input (ST is not ON), diagnostic trouble code 43 is also output.

Hint Diag. trouble code 42 is output with vehicle speed 5 km/h (3 mph) or below.

OK → **Proceed to next circuit inspection shown on matrix chart (See page EG–344).**

NG → **IDL...Go to step 3** **PNP....Go to page EG–416**
A/C....Go to step 1

2 Check throttle position sensor.



FI6564

P Disconnect throttle position sensor connector.

C Measure resistance between terminals IDL and E2 of throttle position sensor connector.

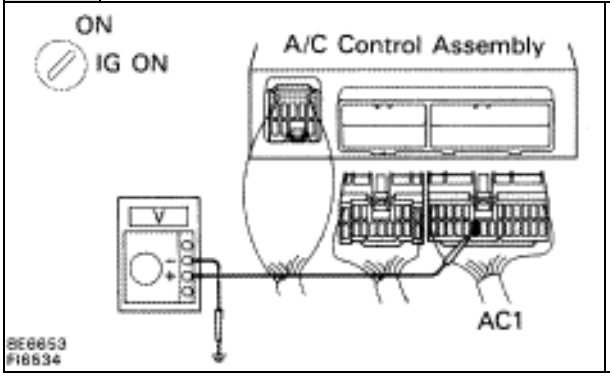
OK

Throttle Valve	Resistance
Fully closed	Less than 0.5 kΩ
Opened	1 MΩ or higher

OK → **Check and repair harness or connector between ECM and throttle position sensor.**

NG → **Adjust or replace throttle position sensor (See page EG–207).**

3	Disconnect A/C control assembly connector, check voltage between terminal AC1 of A/C control assembly connector and body ground.



P
1. Remove air conditioning control assembly.
2. Disconnect air conditioning control assembly connector.
3. Turn ignition switch on.

C Measure voltage between terminal AC1 of air conditioning control assembly connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Check and replace A/C control assembly.**

4	Check for open and short in harness and connector between ECM and A/C control assembly (See page IN–27).

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

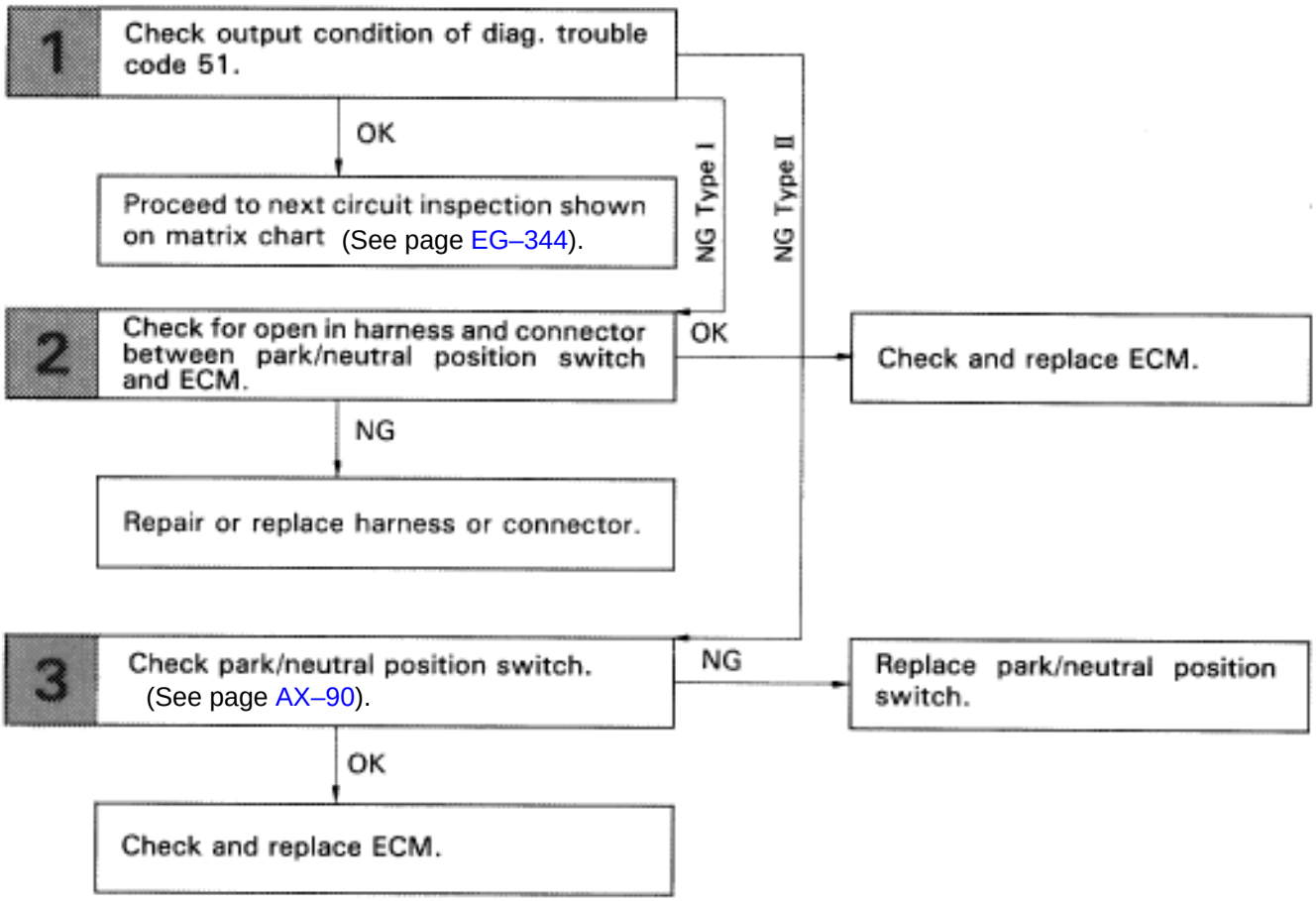
Park/Neutral Position Switch Circuit (Only vehicles with ELECTRONIC CONTROLLED TRANSMISSION)

CIRCUIT DESCRIPTION

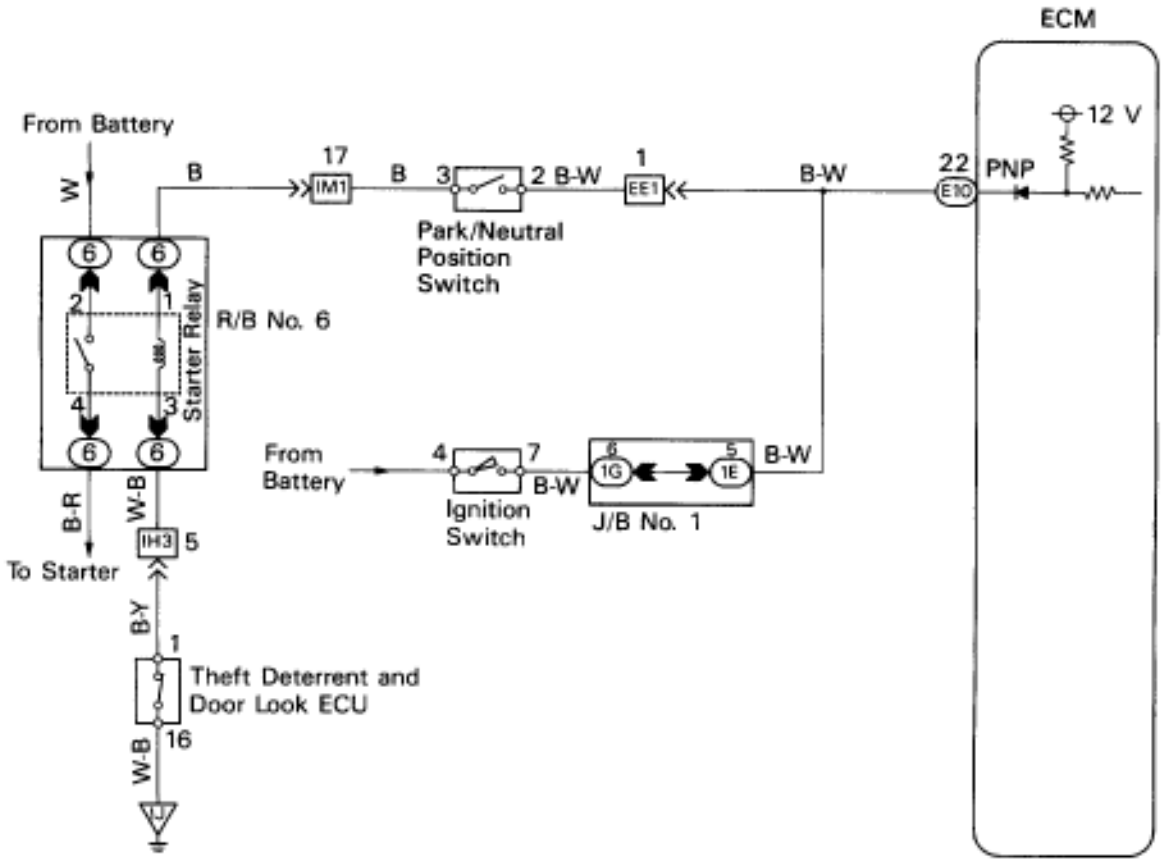
The park/neutral position switch goes on when the shift lever is in the N or P shift position. When it goes on the terminal PNP of the ECM is grounded to body ground via the starter relay and theft deterrent ECU, thus the terminal PNP voltage becomes O V. When the shift lever is in the D, 2, L or R position, the park/neutral position switch goes off, so the voltage of ECM terminal PNP becomes battery voltage, the voltage of the ECM internal power source.
If the shift lever is moved from the N position to the D position, this signal is used for air–fuel ratio correction and for idle speed control (estimated control), etc.
When the park/neutral position switch is off, code ”51” is output in the test mode diagnosis. (This is not abnormal.)

DIAGNOSTIC CHART

HINT: This diagnosis chart is based on premise that the engine is cranked normally. If the engine is not cranked, proceed to the matrix chart of problem symptoms on page EG–344.

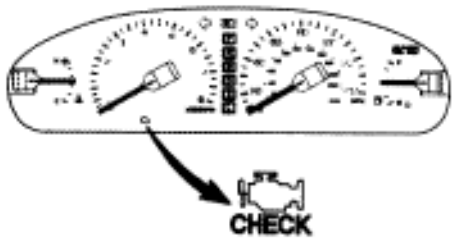


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check output condition of diag. trouble code 51.**



FI6604

P
C
OK

1. Connect terminals TE2 and E1 of data link connector 2.
2. Turn ignition switch on.
3. Crank the engine.
4. Connect terminals TE1 and E1 of data link connector 2.

Result

Hint

Check if diagnostic trouble code “51” is output when the shift lever is in the P and D shift positions.

Shift Position	Result		
	OK	NG Type I	NG Type II
“P”	Normal Code	Code 51	Normal Code
“D”	Code 51	Code 51	Normal Code

OK → **Proceed to next circuit inspection shown on matrix chart (See page EG–344).**

NG TYPE I → **Go to step 3**

NG TYPE II → **Go to step 1**

2 **Check for open harness and connector between ECM and park/neutral position switch (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK → **Check and replace ECM.**

3 **Check park/neutral position switch (See page AX–90).**

OK → **Check and replace ECM.**

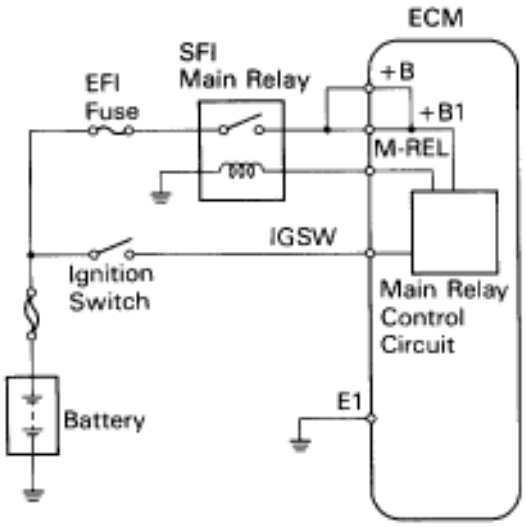
NG → **Replace park/neutral position switch.**

–MEMO–

ECM Power Source Circuit

CIRCUIT DESCRIPTION

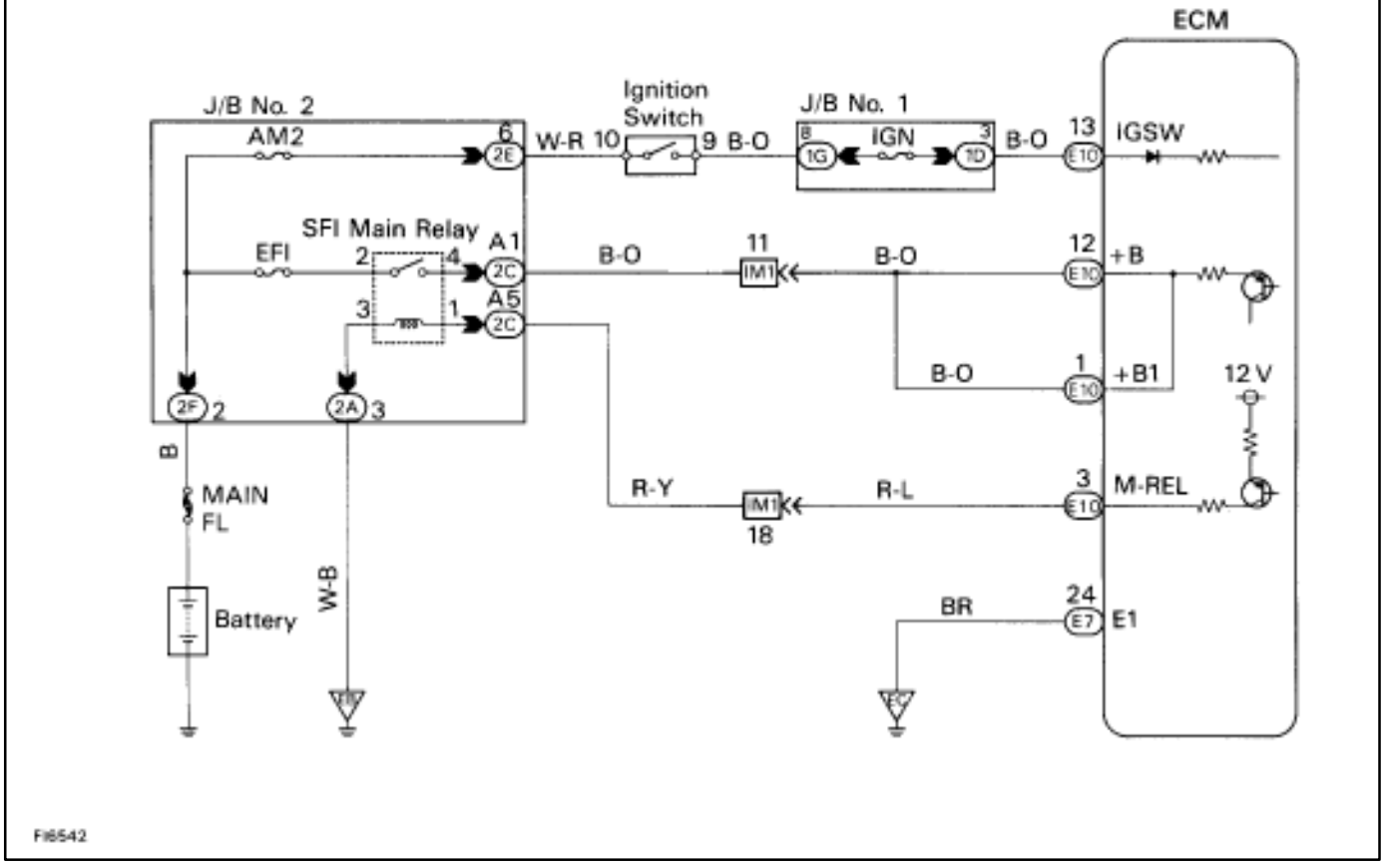
When the ignition switch is turned on, battery voltage is applied to the terminal IGSW of the ECM, and the main relay control circuit in the ECM sends a signal to the terminal M–REL of the ECM, switching on the main relay. This signal causes current to flow to the coil, closing the contacts of the main relay and supplying power to the terminals +B and +B1 of the ECM.
If the ignition switch is turned off, the ECM continues to switch on the main relay for a maximum of 2 seconds for the initial setting of the IAC valve.



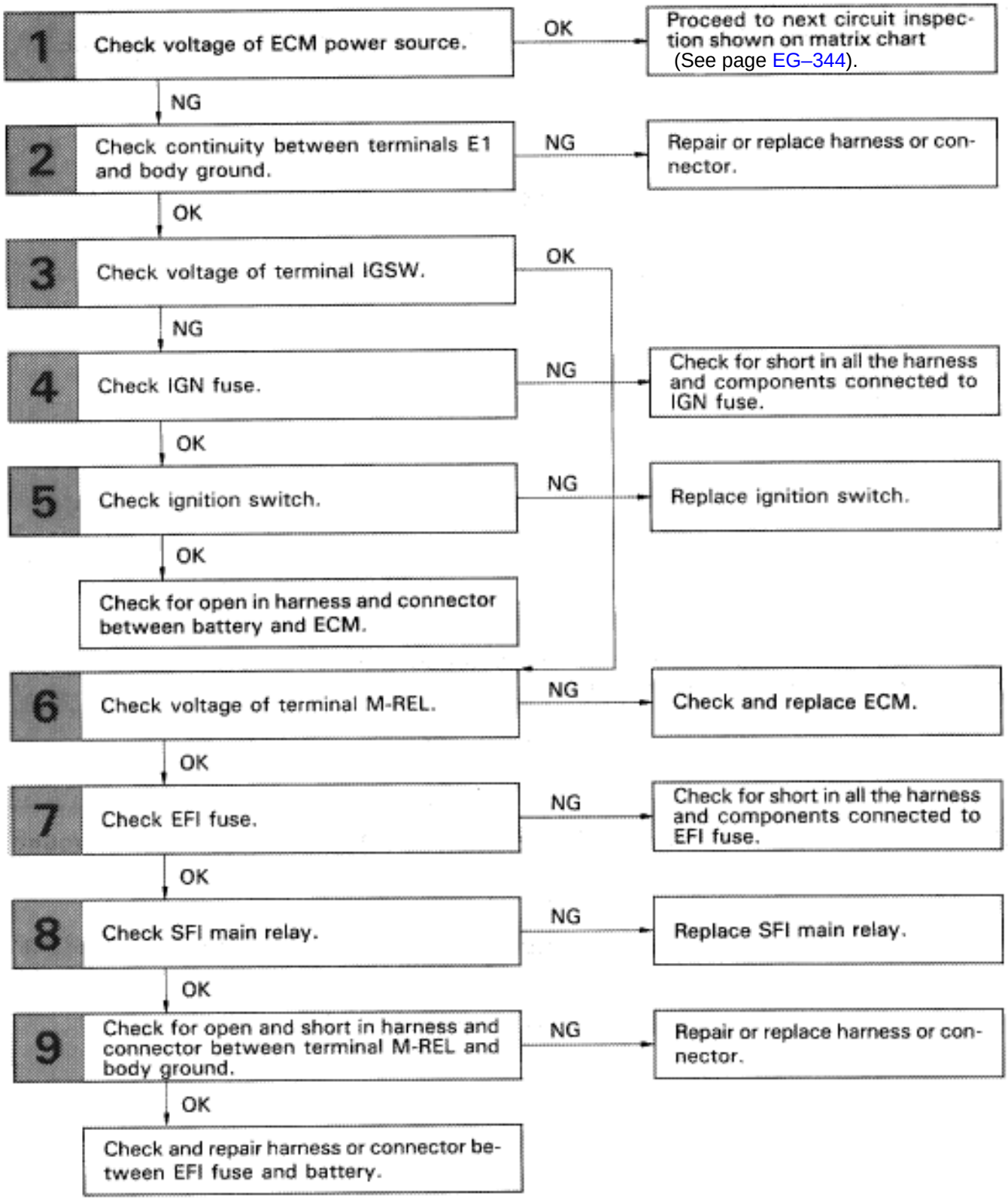
DIAGNOSTIC CHART

See next page for the DIAGNOSTIC CHART.

WIRING DIAGRAM

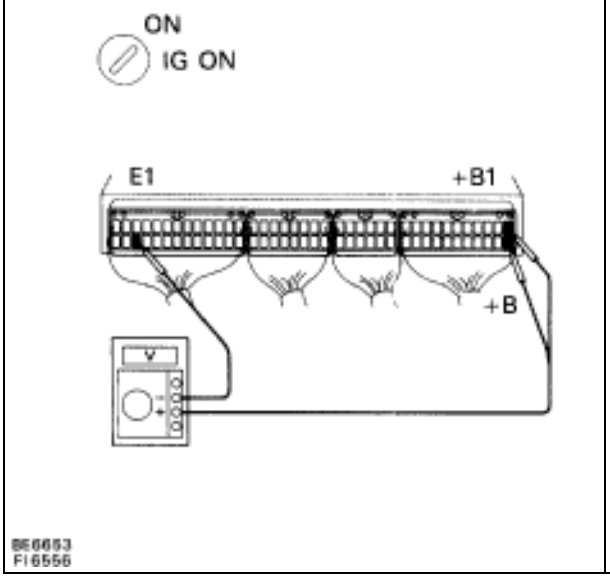


DIAGNOSTIC CHART



INSPECTION PROCEDURE

1 **Check voltage between terminals +B, +B1 and E1 of ECM connector.**



P 1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch on

C Measure voltage between terminals +B, +B1 and E1 of ECM connector.

OK **Voltage: 10 – 14 V**

NG

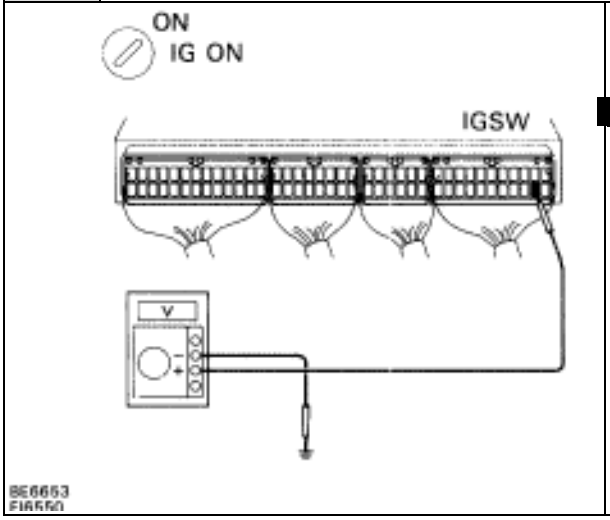
OK **Proceed to next circuit inspection shown on matrix chart (See page EG–344).**

2 **Check for open in harness and connector between terminal E1 of ECM and body ground (See page IN–27).**

OK

NG **Repair or replace harness or connector.**

3 **Check voltage between terminal IGSW of ECM connector and body ground.**



P Turn ignition switch on.

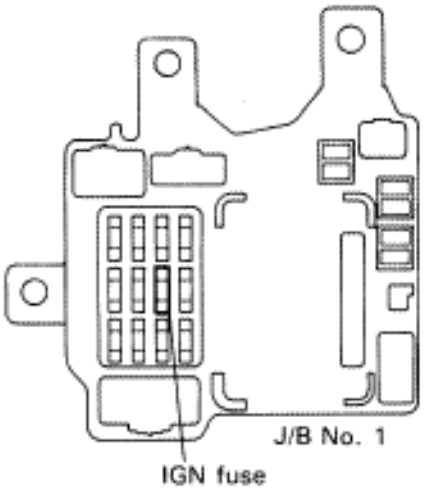
C Measure voltage between terminal IGSW of ECM connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Go to step** 1

4 **Check IGN fuse.**



P Remove IGN fuse form J/B No. 1

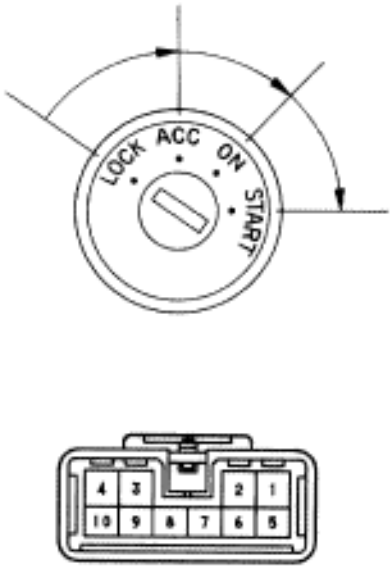
C Check continuity of IGN fuse.

OK **Continuity**

OK

NG **Check for short in all the harness and components connected to IGN fuse (See attached wiring diagram).**

5 **Check ignition switch.**



P Remove under cover and finish panel.

C Check continuity between terminals.

OK

○—○ continuity

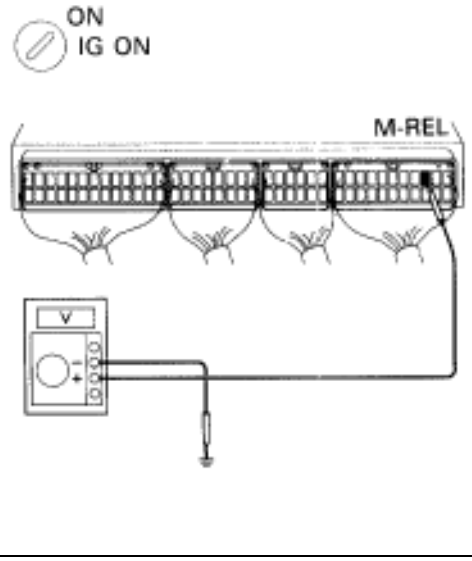
Terminal / Switch position	2 IG1	3 ACC	4 AM1	6 ST2	7 ST1	9 IG2	10 AM2
LOCK							
ACC		○	○				
ON	○	○	○			○	○
START	○		○	○	○	○	○

OK

NG **Replace ignition switch.**

Check and repair harness and connector between battery and ignition switch, ignition switch and ECM.

6 **Check voltage between terminal M–REL of ECM connector and body ground.**



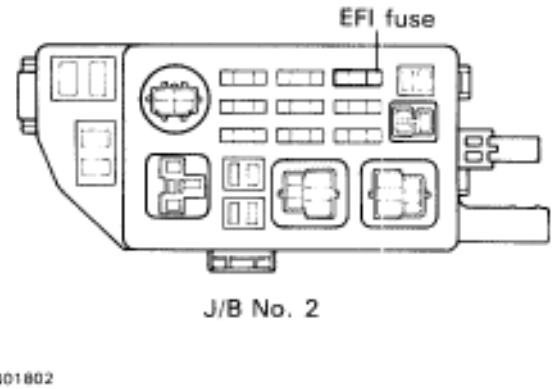
P Turn ignition switch on.

C Measure voltage between terminal M–REL of ECM connector and body ground.

OK **Voltage:** **10 – 14 V**

OK → **NG** → **Check and replace ECM.**

7 **Check EFI fuse.**



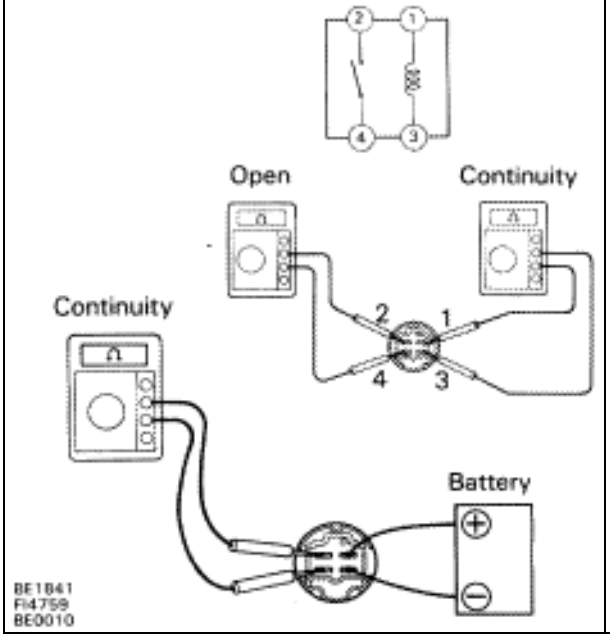
P Remove EFI fuse from J/B No. 2.

C Check continuity of EFI fuse.

OK **Continuity**

OK → **NG** → **Check for short in all the harness and components connected to EFI fuse (See attached wiring diagram).**

8 **Check SFI main relay.**



P Remove SFI main relay from J/B No. 2.

C Check continuity between terminals of SFI main relay shown below.

OK

Terminals 2 and 4	Open
Terminals 1 and 3	Continuity (Reference value 72 Ω)

C
1. Apply battery voltage between terminals 1 and 3.
2. Check continuity between terminals 2 and 4.

OK

Terminals 2 and 4	Continuity

OK → **NG** → **Replace SFI main relay.**

9 **Check for open and short in harness and connector between terminal M–REL of ECM and body ground (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector,**

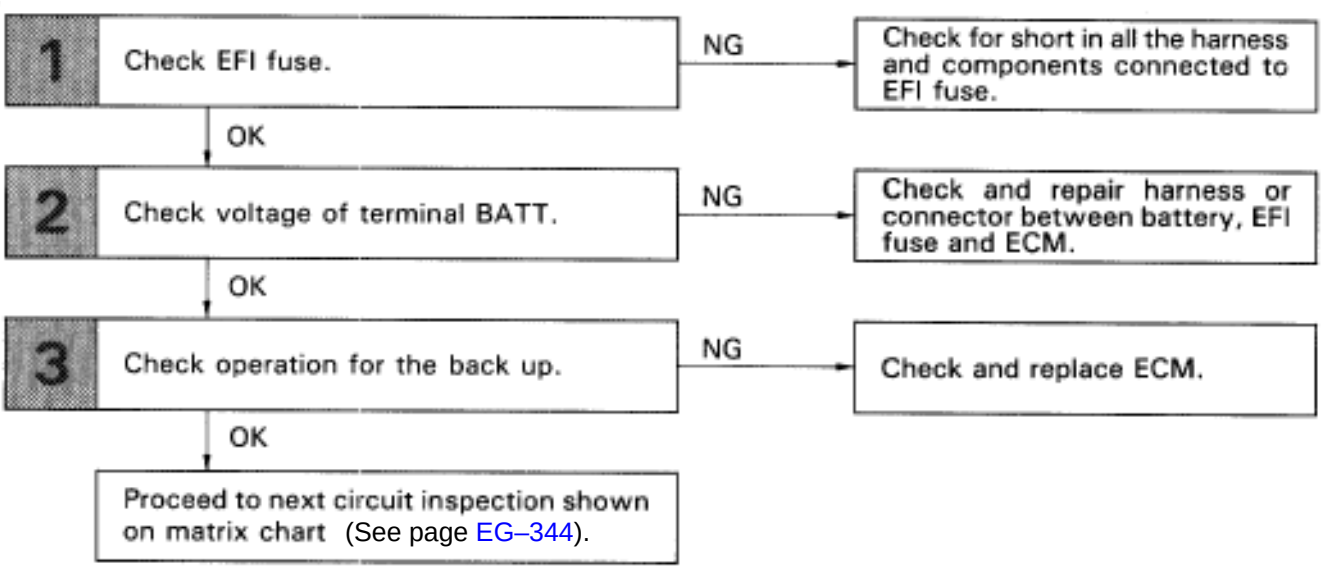
Check and repair harness or connector between EFI fuse and battery.

Back Up Power Source Circuit

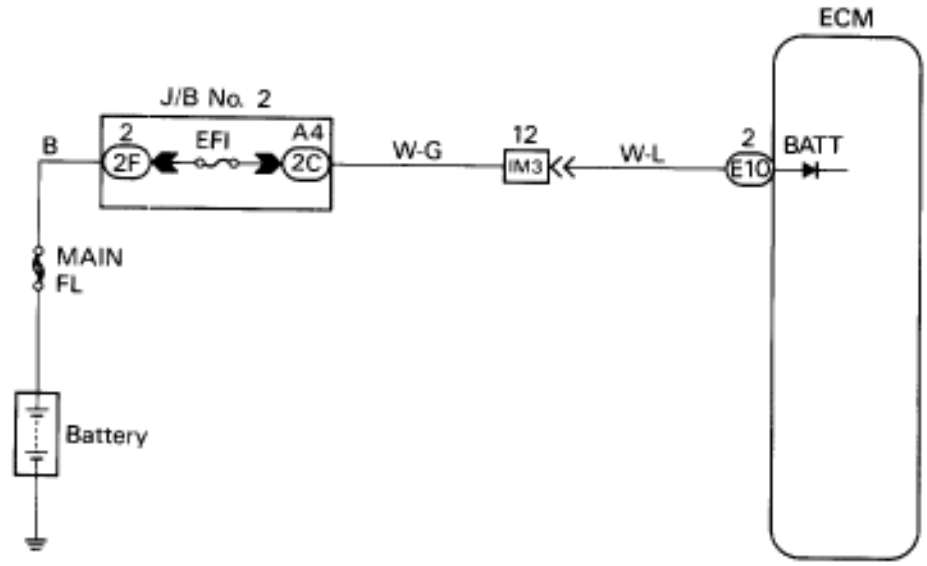
CIRCUIT DESCRIPTION

Battery voltage is supplied to terminal BATT of the ECM even when the ignition switch is off for use by the diagnostic trouble code memory and air–fuel ratio adaptive control value memory, etc.

DIAGNOSTIC CHART



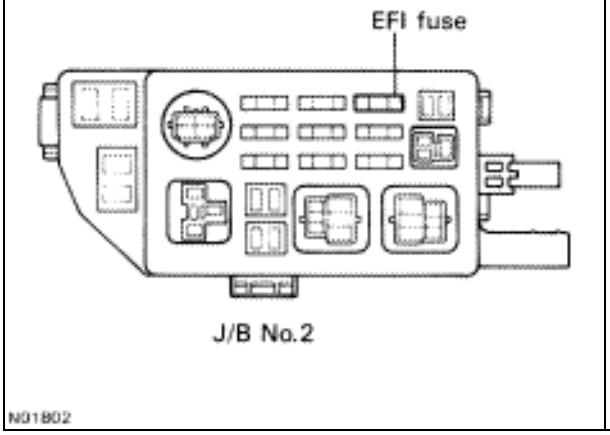
WIRING DIAGRAM



FI6581

INSPECTION PROCEDURE

1 **Check EFI fuse.**



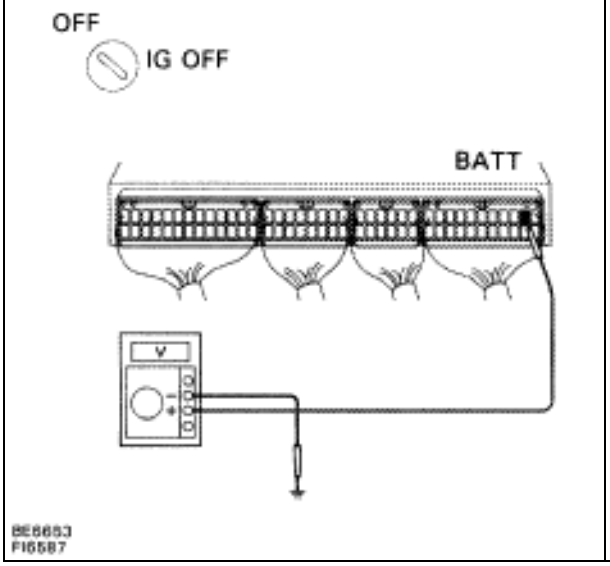
P Remove EFI fuse from J/B No. 2.

C Check continuity of EFI fuse.

OK **Continuity**

OK → **NG** → **Check for short in all the harness and components connected to EFI fuse (See attached wiring diagram).**

2 **Check voltage between terminal BATT of ECM connector and body ground.**



P Remove glove compartment. (See page BO–111).

C Measure voltage between terminal BATT of ECM connector and body ground.

OK **Voltage:** **10 – 14 V**

OK → **NG** → **Check and repair harness or connector between ECM and EFI fuse, EFI fuse and battery.**

3 **Are the diagnostic trouble codes still in the memory when the ignition switch is turned OFF?**

YES → **NO** → **Check and replace ECM.**

Proceed to next circuit inspection shown on matrix chart (See page EG–344).

Injector Circuit

— CIRCUIT DESCRIPTION

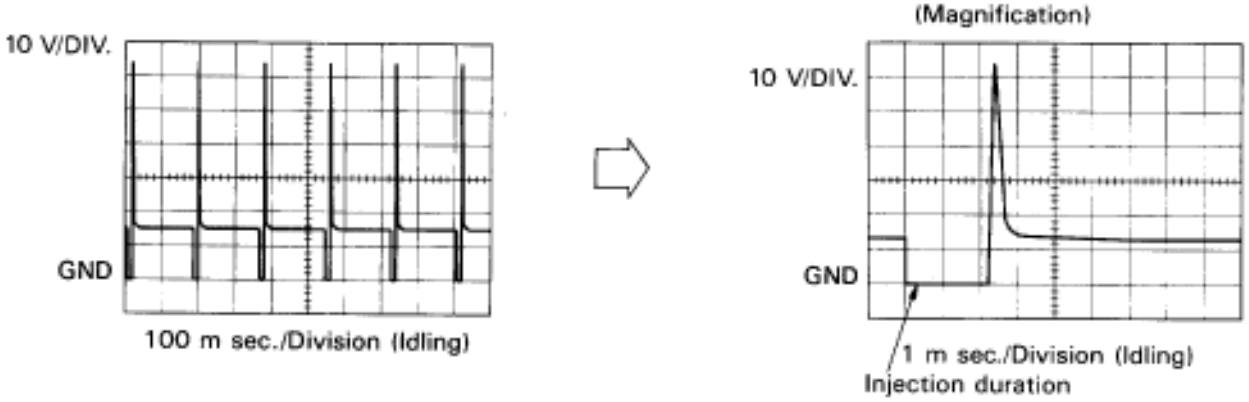
The injectors are provided to the intake manifold. They inject fuel into the cylinders based on the signals from the ECM.

Reference INSPECTION USING OSCILLOSCOPE

INJECTOR SIGNAL WAVEFORM

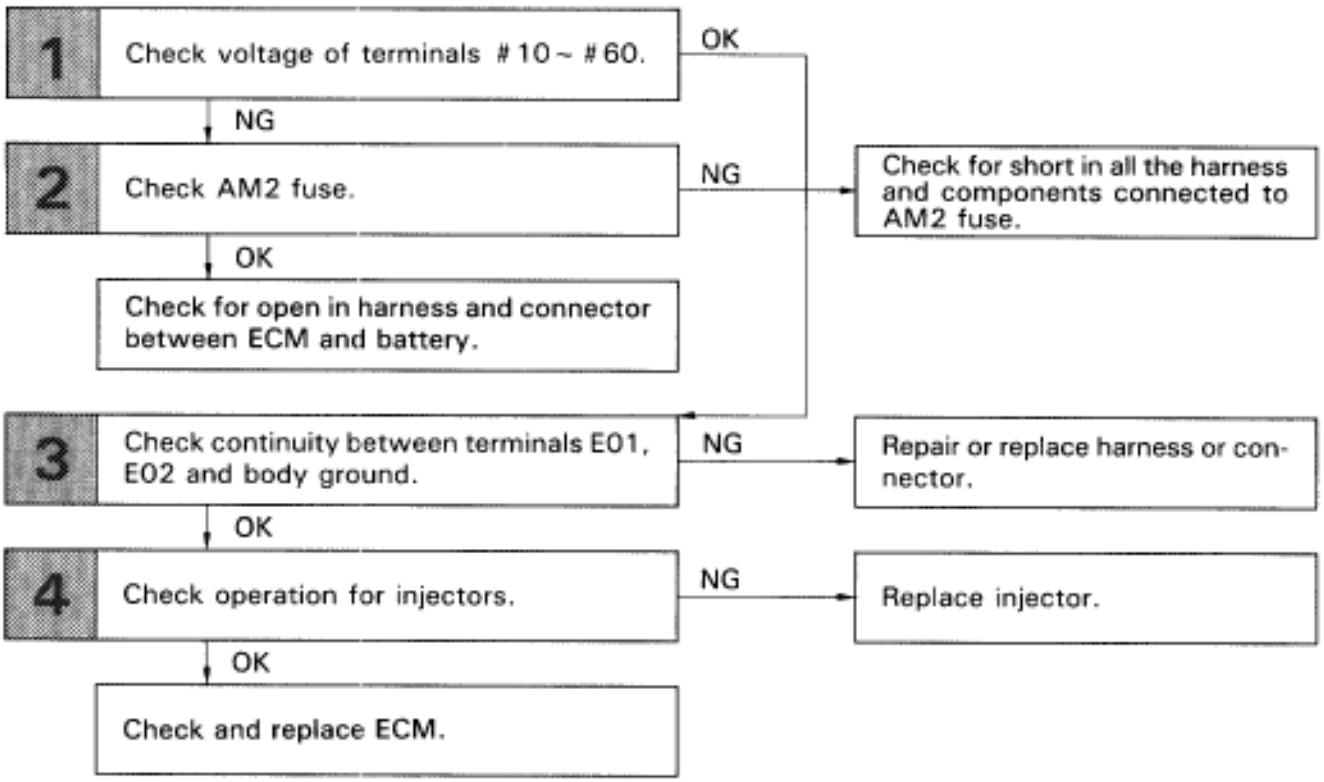
3 With the engine idling measure between terminals # 10 ~ # 60 and E01 of ECM.

HINT: The correct waveform appears as shown in the illustration on the below.

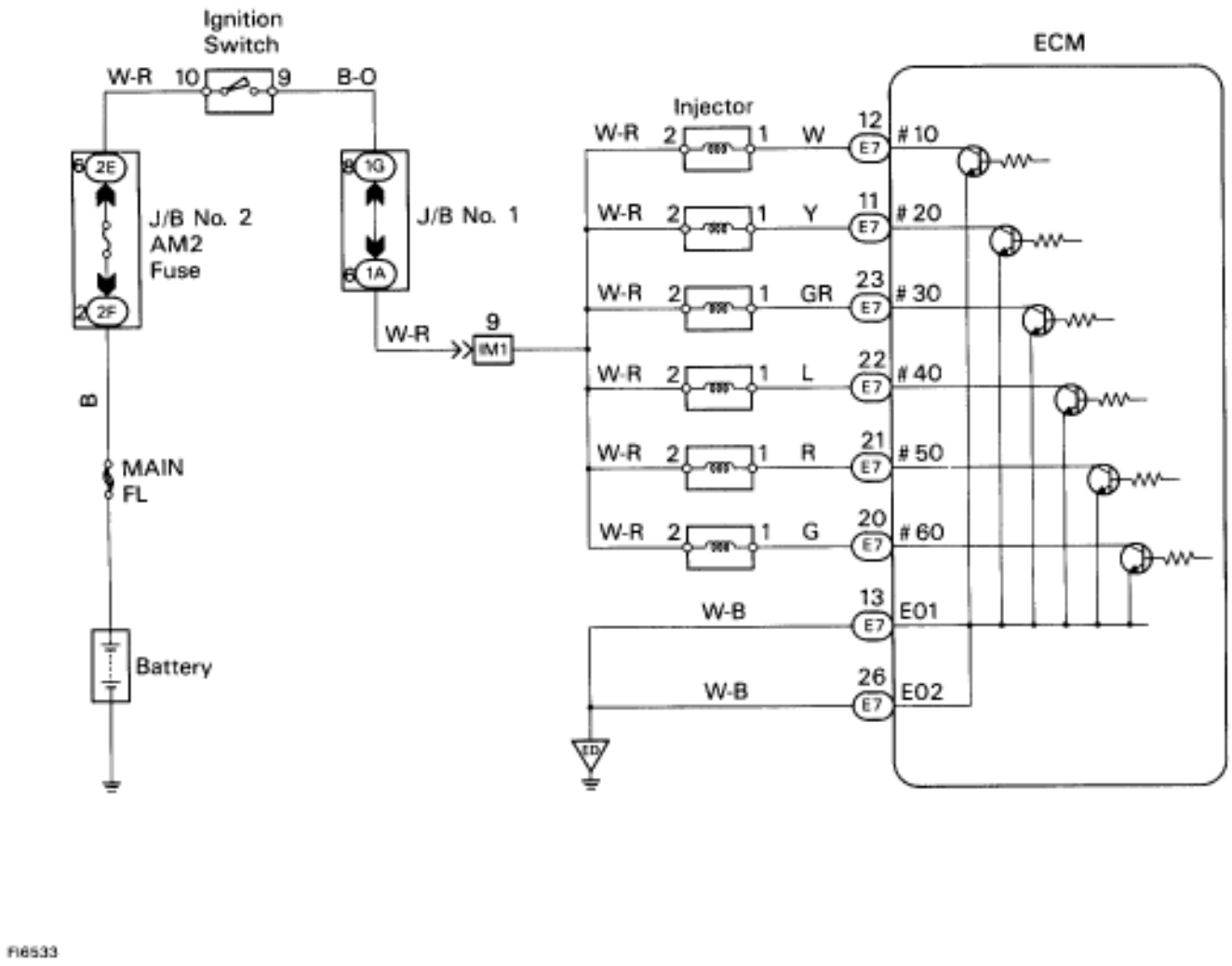


FI6588 FI6538

— DIAGNOSTIC CHART

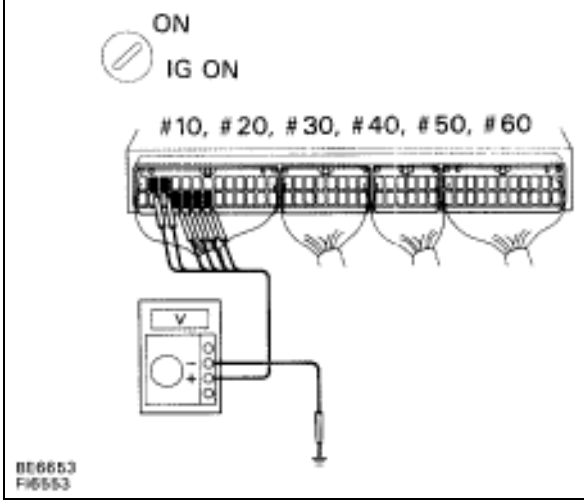


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminals #10 ∼ 60 of ECM and body ground.**



P 1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch on.

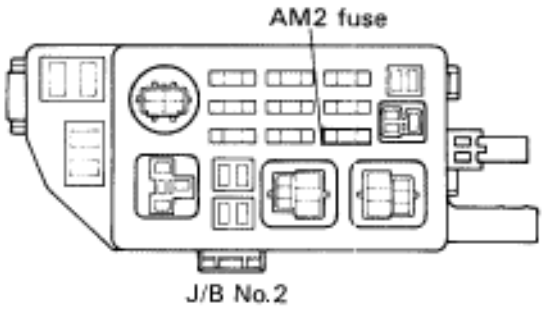
C Measure voltage between terminals #10 ∼ 60 of ECM and body ground.

OK **Voltage: 10 – 14 V**

NG

OK → **Go to step** 1

2 **Check AM2 fuse.**



P Remove AM2 fuse from J/B No. 2.

C Check continuity of AM2 fuse.

OK **Continuity**

OK

NG → **Check for short in all the harness and components connected to AM2 fuse.**

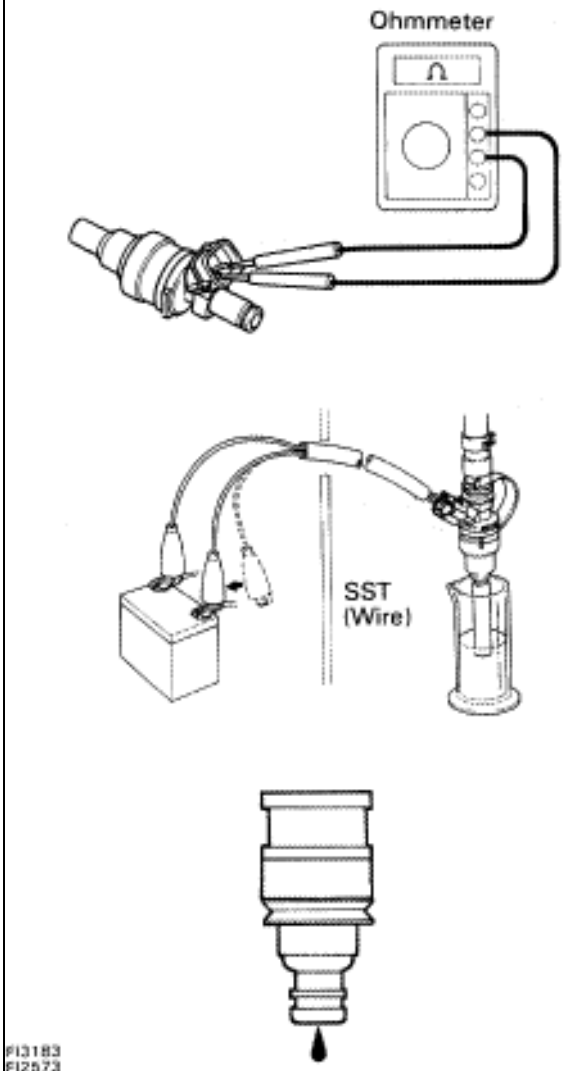
Check for open in harness and connector between ECM and battery.

3	Check for open in harness and connector between terminal E01, E02 of ECM connector and body ground (See page IN–27).

OK

NG **Repair or replace harness or connector.**

4	Check injectors.



P Disconnect injector connector (See page EG–187).

C Measure resistance of injector.

OK **Resistance: 13.4 – 14.2 Ω at 20°C (68°F)**

C Check injection volume of injector (See page EG–191).

OK ③ **Injection volume**
58 – 68 cc/15 sec. (3.5 – 4.1 cu in.)
Difference between each injector:
Less than 5 cc (0.3 cu in.)

③ **Leakage**
Fuel drop: One drop or less per minute

OK

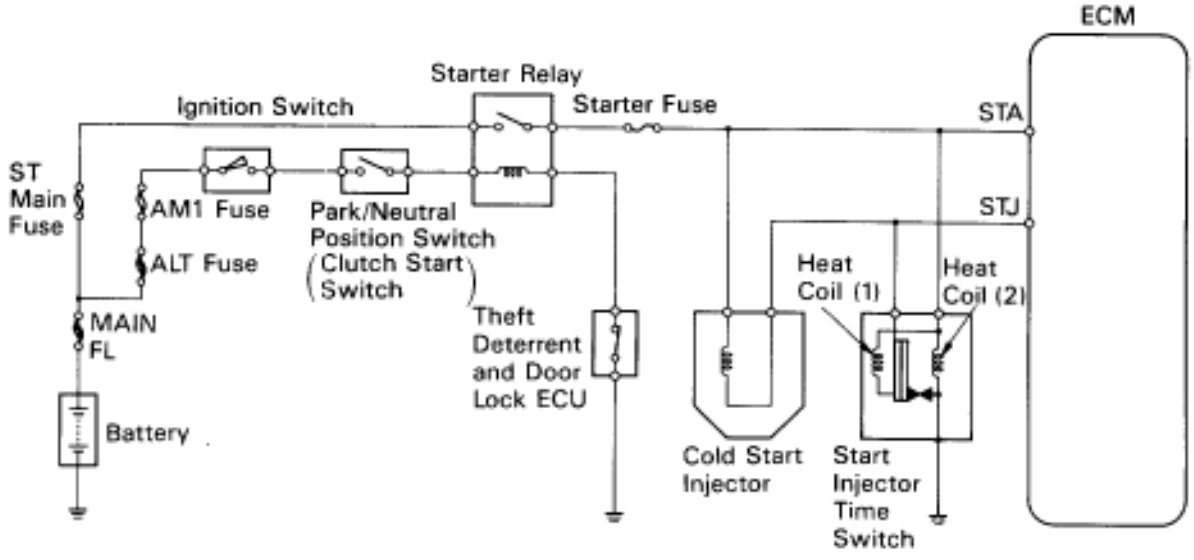
NG **Replace injector.**

Check and replace ECM.

Cold Start Injector Circuit

— CIRCUIT DESCRIPTION

The cold start injector is used to maintain the engine startability when it is cold. The injection volume, i,e, the length of time the injector is energized, is controlled by the ECM and the cold start injector time switch.
During a cold start, when the starter turns the contacts in the cold start injector time switch close. Thus current flows to the cold start injector coil, injecting fuel. At the same time, a bimetal in the heat coil is energized and heats up. This soon causes the contacts to open, cutting off the current flow to the injector coil and stopping fuel injection.
The injection duration of the cold start injector is determined by the engine coolant temperature and the length of time current flows to the heat coil. When the engine is warm, the contacts are opened by the bimetal and the cold start injector does not operate.
When the engine is hard to start and the starter is operated continuously, heat coil (2) heats up the bimetal keeping the contacts open to prevent spark plugs from becoming fouled, which is caused by the cold start injector operation when the open contacts close again.
When the engine is started at engine coolant temperature of 22°C (72°F) or lower, the cold start injector operation time is controlled by the cold start injector time switch.
When the engine coolant temperature is in the normal temperature range 22°C (72°F) or higher, the contacts of the cold start injector time switch are open and the time switch is off, instead, the ECM controls the operating time of the cold start injector.
In this way, the CO and HC levels can be reduced while the engine is being started and the engine startability is maintained. Control by the ECM ends when the engine coolant temperature reaches 60°C (140°F).



FI6576

DIAGNOSTIC CHART

1 Check voltage of cold start injector power source.
- OK → 3
- NG → 2

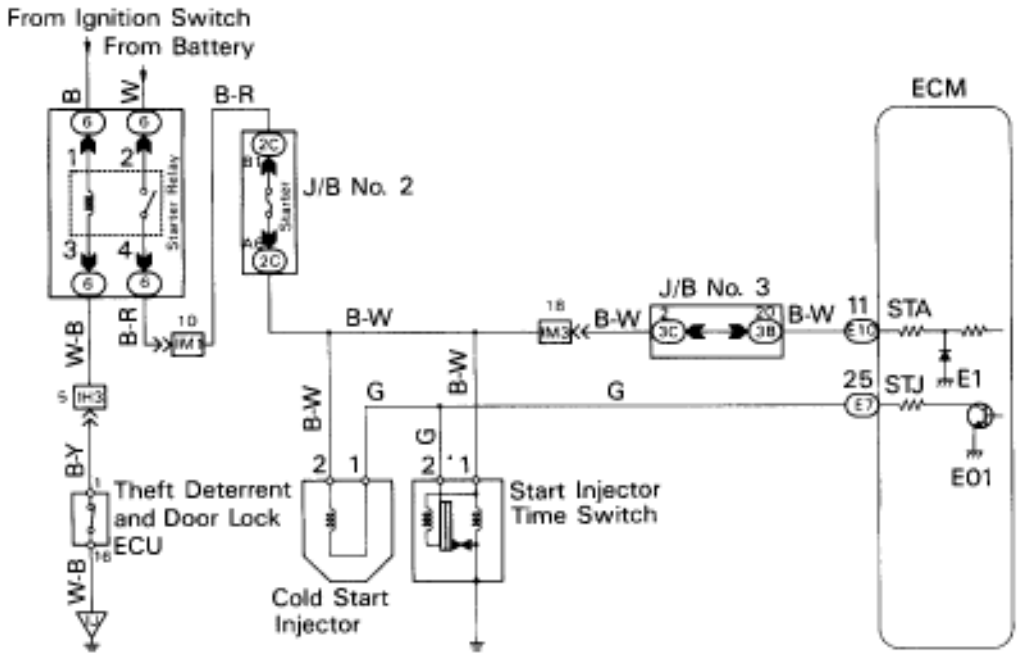
2 Check cold start injector.
- NG → Replace cold start injector.
- OK → Check for open in harness and connector between battery and ECM.

3 Check start injector time switch.
- NG → Replace start injector time switch.
- OK → 4

4 Check for open and short in harness and connector between cold start injector and start injector time switch.
- NG → Repair or replace harness or connector.
- OK → 5

5 Check fuel injection of cold start injector.
- NG → Replace cold start injector.
- OK → Proceed to next circuit inspection shown on matrix chart (See page EG–344).

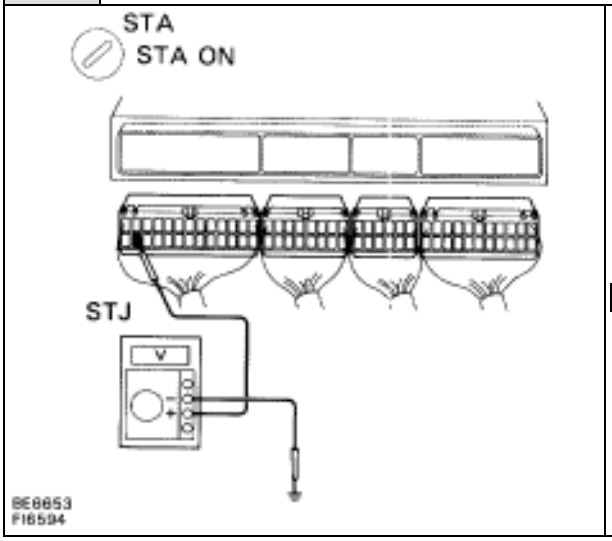
WIRING



FI6577

INSPECTION PROCEDURE

1 **Check voltage between terminal STJ of ECM connector and body ground.**



P
1. Remove glove compartment. (See page BO–111).
2. Disconnect start injector time switch connector.
3. Disconnect ECM connector.

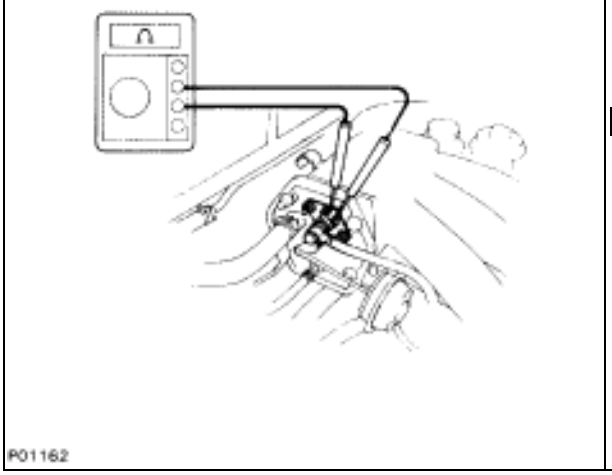
C Measure voltage between terminal STJ of ECM connector and body ground when ignition switch is turned to STA.

OK **Voltage: 10 – 14 V**

NG

OK → **Go to step 1**

2 **Check resistance of cold start injector.**



P Disconnect cold start injector connector.

C Measure resistance between terminals of cold start injector.

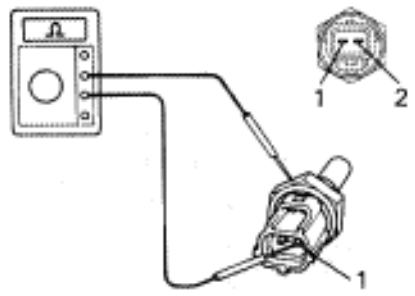
OK **Resistance: 2 – 4 Ω at 20°C (68°F)**

OK

NG → **Replace cold start injector.**

Check and repair harness and connector between ECM and cold start injector, cold start injector and battery.

3 **Check start injector time switch.**



R04175

P Remove start injector time switch (See page EG–219).

C Measure resistance between terminals shown below.

OK

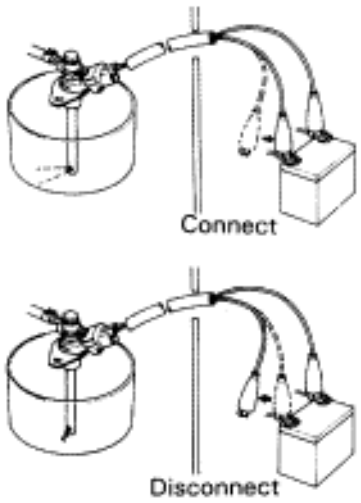
Terminals	Resistance	Engine coolant temperature
1 – 2	25 – 45 Ω	below 15°C (59°F)
	65 – 85 Ω	above 30°C (86°F)
1-Ground	25 – 85 Ω	–

OK → **NG** → **Replace start injector time switch.**

4 **Check for open and short in harness and connector between cold start injector and start injector time switch (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

5 **Check fuel injection of cold start injector.**



P00632
P00631

P Remove cold start injector (See page EG–179),

C
1. Check fuel injection of cold start injector (See page EG–181).
2. Check fuel leakage of cold start injector (See page EG–182).

OK
1. **Fuel is injected normally.**
2. **Fuel leakage is less than one drop per minute.**

Notice: Perform this check within the shortest possible time.

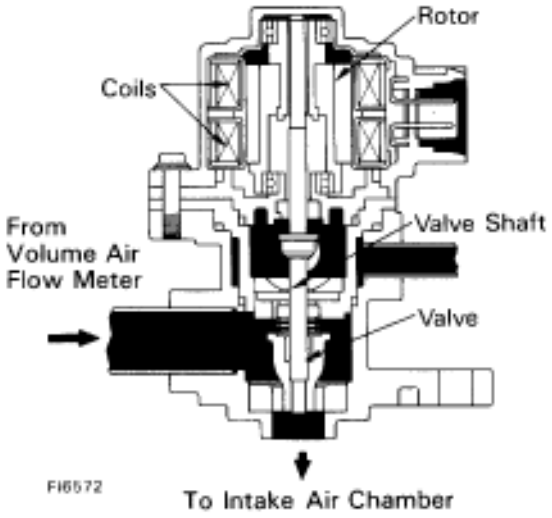
OK → **NG** → **Repair or replace cold start injector,**

Proceed to next circuit inspection shown on matrix chart (See page EG–344).

IAC Valve Circuit

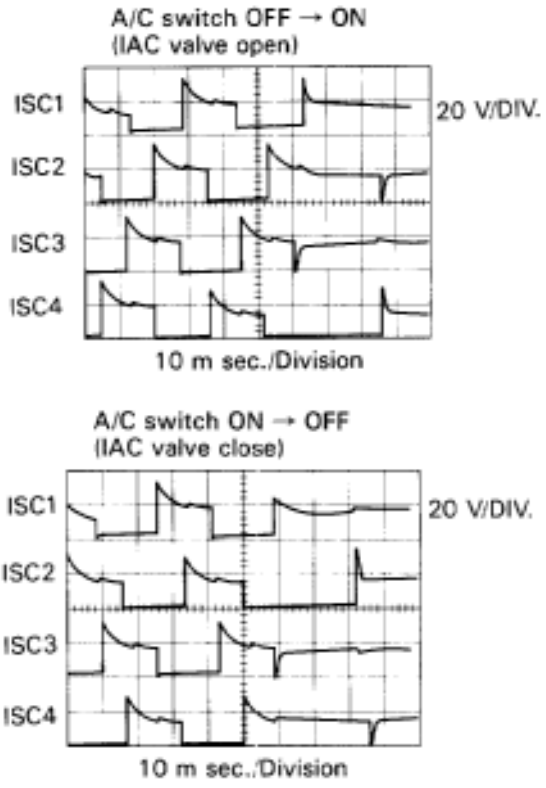
— CIRCUIT DESCRIPTION

The IAC valve is provided on the intake air chamber and intake air bypassing the throttle valve is directed to the IAC valve through a hose.
A step motor is built into the IAC valve. It consists of four coils, the magnetic rotor, valve shaft and valve.When current flows to the coils due to signals from the ECM, the rotor turns and moves the valve shaft forward or backward, changing the clearance between the valve and the valve seat.
In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed.There are 125 possible positions to which the valve can be opened.



Reference: INSPECTION USING OSCILLOSCOPE

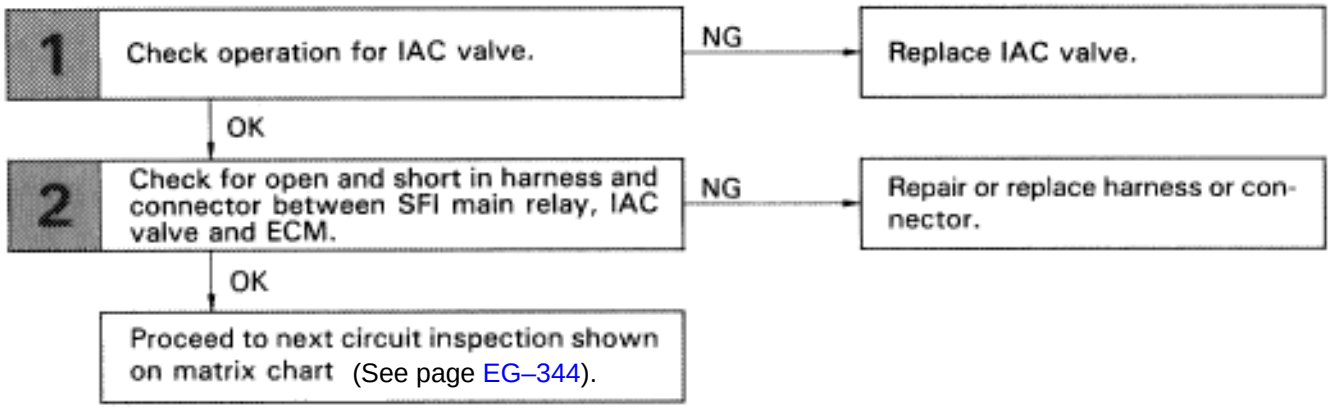
IAC SIGNAL WAVEFORM



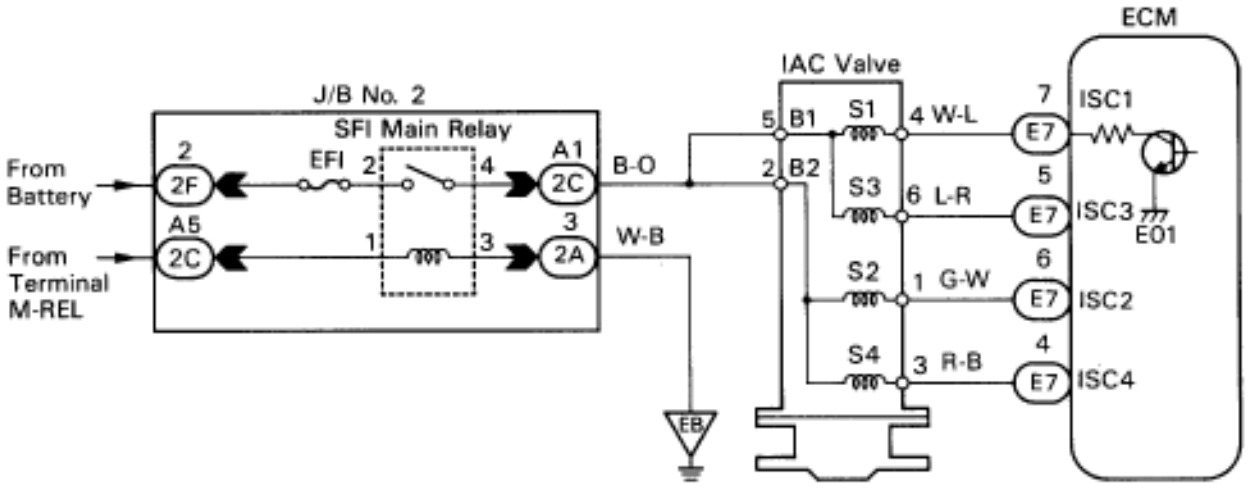
1 With the engine idling measure between terminals ISC1, ISC2, ISC3, ISC4 abd E01 of ECM when A/C switch ON or OFF.

HINT:
The correct waveform appears as shown in the illustration on the left.

DIAGNOSTIC CHART

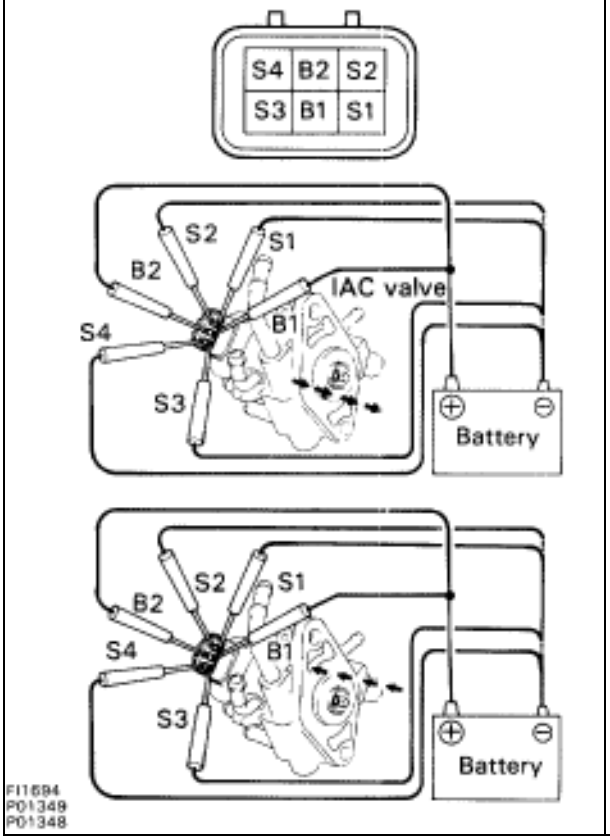


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check IAC valve.**



P Disconnect IAC valve connector.

C Measure resistance between terminals shown below.

OK

Terminal	Resistance
B1 – S1	10 Ω – 30 Ω
B1 – S3	10 Ω – 30 Ω
B2 – S2	10 Ω – 30 Ω
B2 – S4	10 Ω – 30 Ω

P Remove IAC valve.

C
1. Connect the battery positive lead to terminals B1 and B2, and the negative lead to terminals S1–S2–S3–S4 in that order.
2. Connect the battery positive lead to terminals B1 and B2, and the negative lead to terminals S4–S3–S2–S1 in that order.

OK
1. **The valve moves in the closing direction.**
2. **The valve moves in the opening direction.**

OK → **NG** → **Replace IAC valve.**

2 **Check for open and short in harness and connector between SFI main relay and IAC valve, IAC valve and ECM (See page IN–27).**

OK → **NG** → **Repair or replace harness or connector.**

Proceed to next circuit inspection shown on matrix chart (See page EG–344).

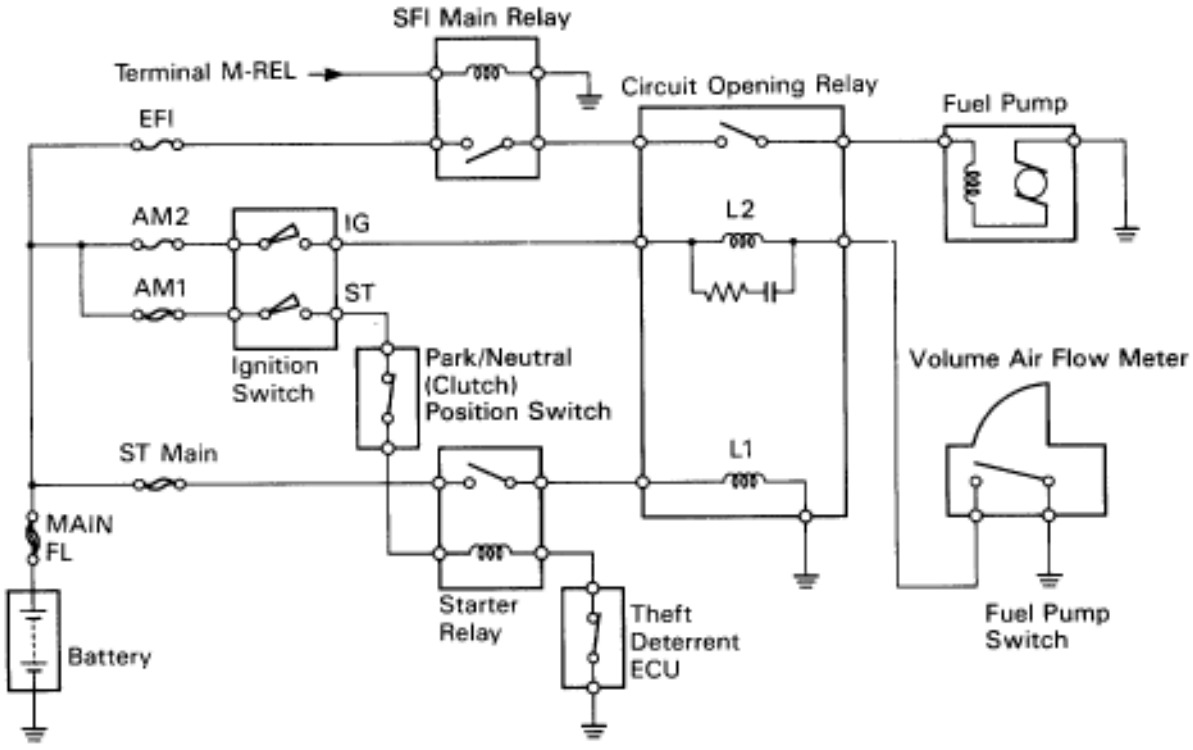
–MEMO–

Fuel System Circuit

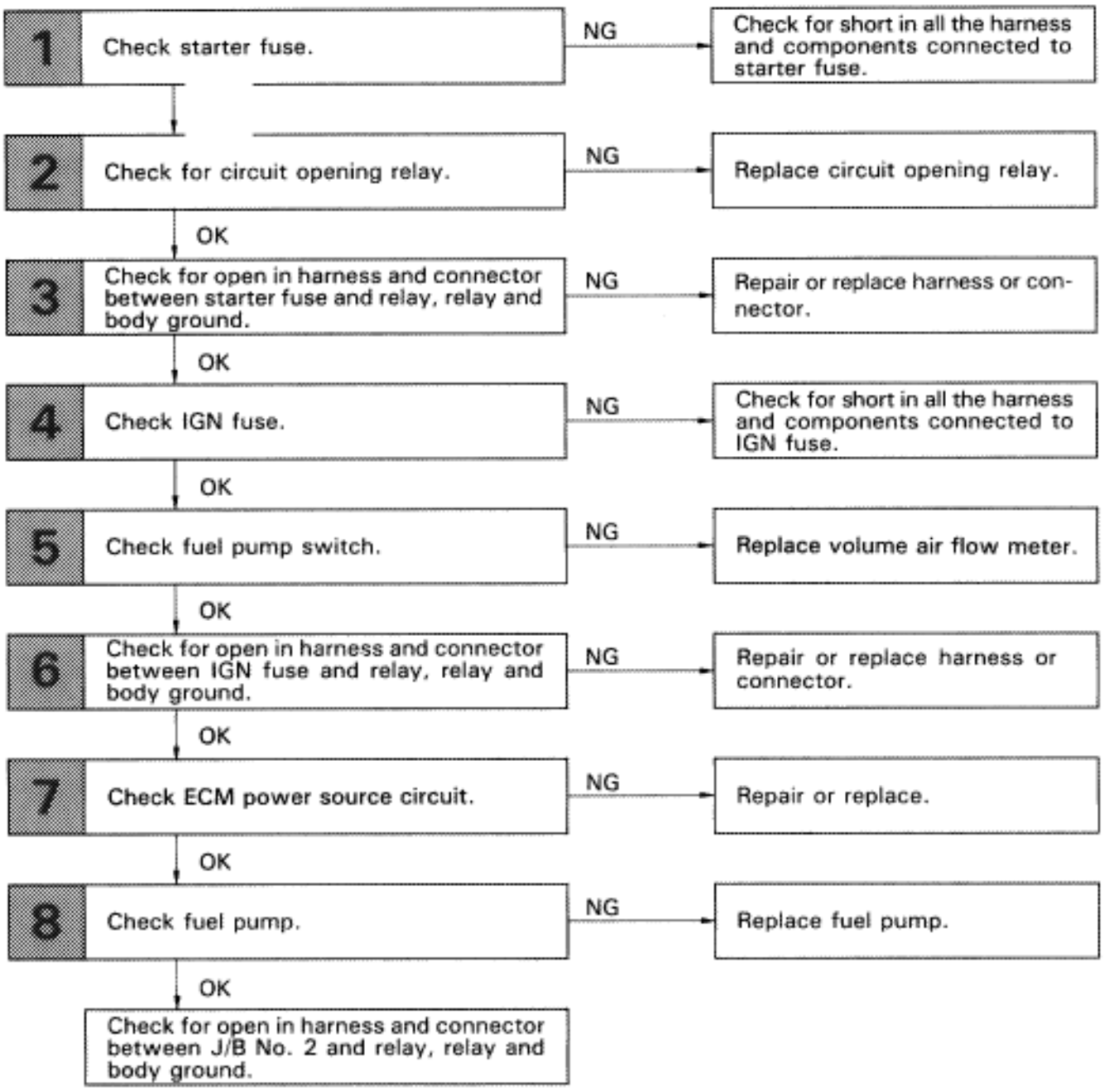
— CIRCUIT DESCRIPTION

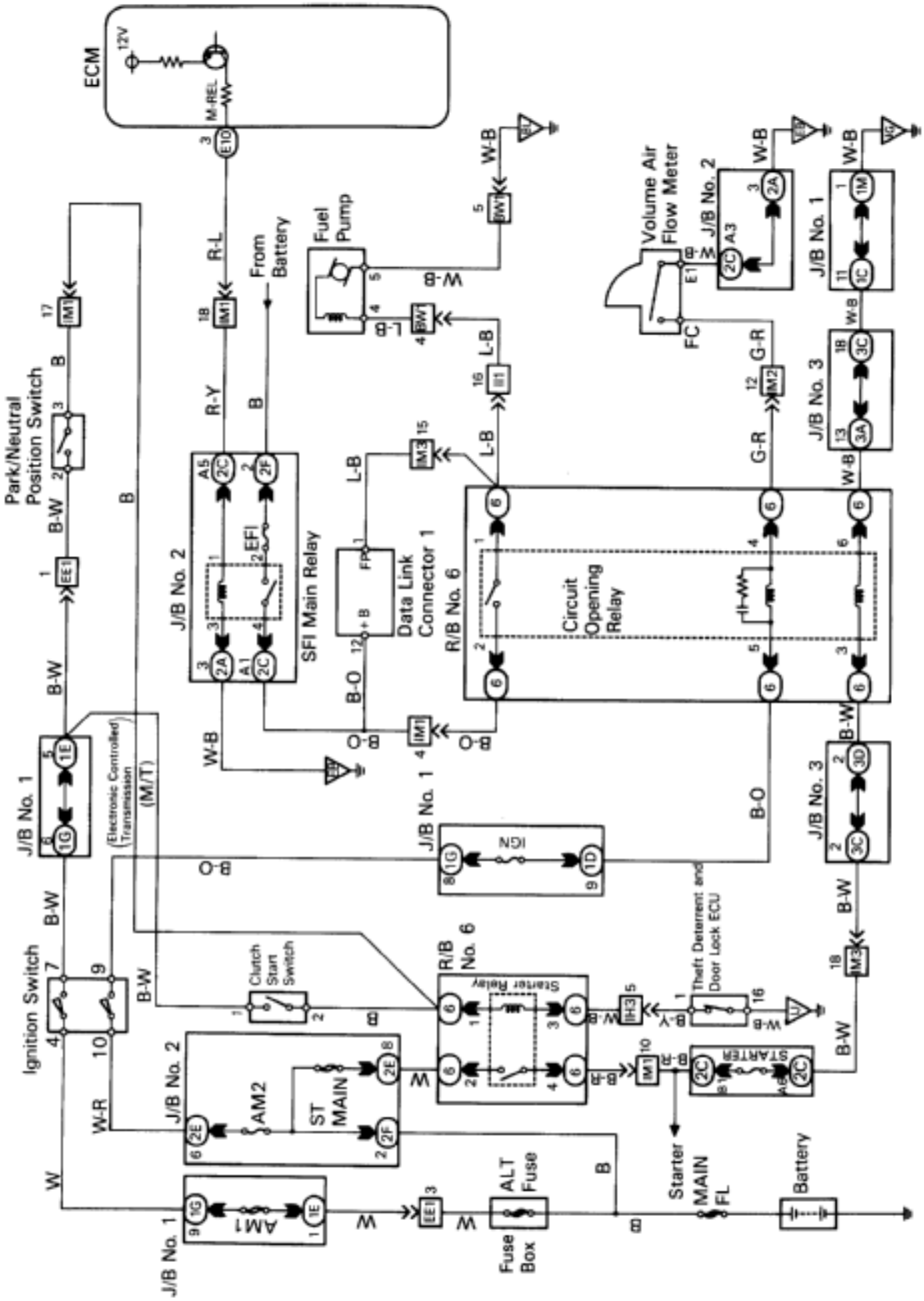
In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay coil, the starter relay switches on and current flows to coil L1 of the circuit opening relay. Thus the circuit opening relay switches on, power is supplied to the fuel pump and the fuel pump operates. After the engine cranks, the cylinders beginning in air, causing the measuring plate inside the volume air flow meter to open. This turns on the fuel pump switch, which is connected to the measuring plate, and current flows to the L2 coil of the circuit opening relay.

After the engine starts and the ignition switch is turned from START back to ON, current flowing to the L1 coil of the circuit opening relay is cut off. However current continues to flow to the L2 coil even after the engine starts due to the fuel pump switch inside the volume air flow meter. As a result, the circuit opening relay stays on, allowing the fuel pump to continue operating.



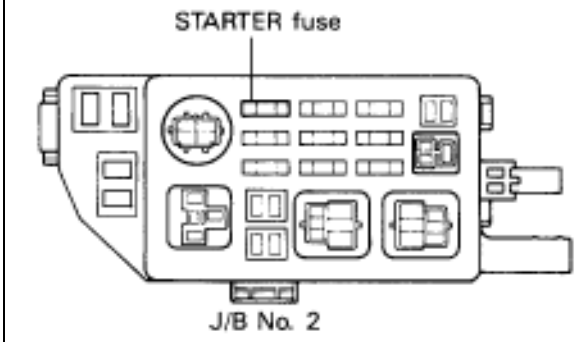
DIAGNOSTIC CHART




ECM
12V
M-REL
E10
R-L
From Battery
Fuel Pump
W-B
Volume Air Flow Meter
J/B No. 2
J/B No. 1
J/B No. 3
Park/Neutral Position Switch
R-Y
B
B-W
L-B
G-R
W-B
B-O
J/B No. 2
EFI
SFI Main Relay
Data Link Connector 1
R/B No. 6
Circuit Opening Relay
J/B No. 1
(Electronic Controlled Transmission (M/T))
IGN
Ignition Switch
Clutch Start Switch
R/B No. 6
Starter Relay
Theft Deterrent and Door Lock ECU
J/B No. 2
AM2
ST
MAIN
STARTER
Starter MAIN FL
Battery
J/B No. 1
AM1
ALT Fuse
Fuse Box

INSPECTION PROCEDURE

1 Check STARTER fuse.



P Remove STARTER fuse from J/B No. 2.

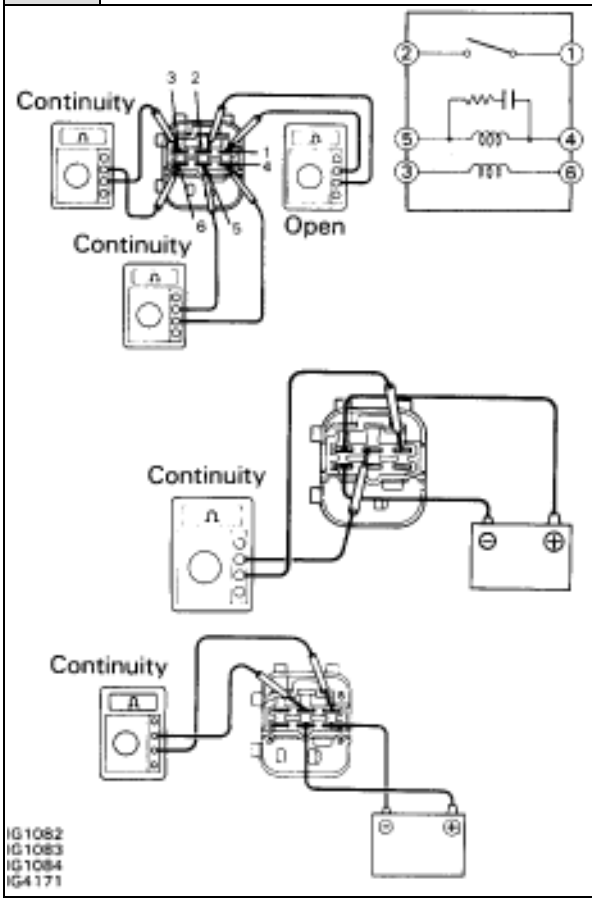
C Check continuity of STARTER fuse.

OK **Continuity.**

OK → Go to Step 2

NG → **Check for short in all the harness and components connected to STARTER fuse.**

2 Check circuit opening relay.



P
1. Remove glove compartment (See page BO–111).
2. Remove circuit opening relay from R/B No. 6.

C Check continuity between terminals of circuit opening relay shown below.

OK

Terminals 1 and 2	Open
Terminals 3 and 6	Continuity (Reference value 30 Ω)
Terminals 4 and 5	Continuity (Reference value 150 Ω)

C
1. Apply battery voltage between terminals 3 and 6, 4 and 5.
2. Check continuity between terminals 1 and 2.

OK

Terminals 1 and 2	Continuity

OK → Go to Step 3

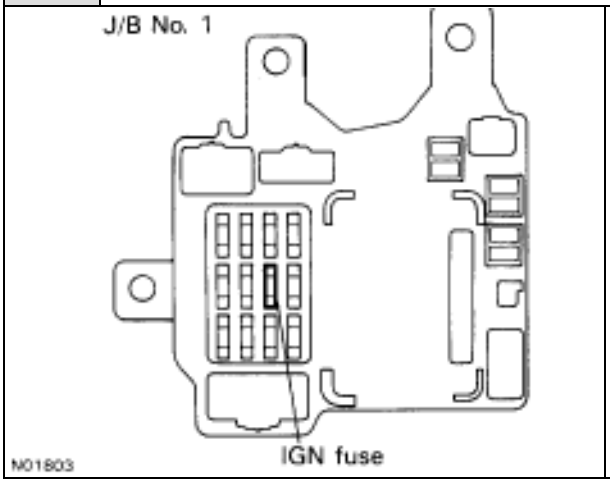
NG → **Replace circuit opening relay.**

3	Check for open in harness and connector between STARTER fuse and circuit opening relay, relay and body ground (See page IN–27).

OK

NG **Repair or replace harness or connector.**

4	Check IGN fuse.



P Remove IGN fuse from J/B No. 1.

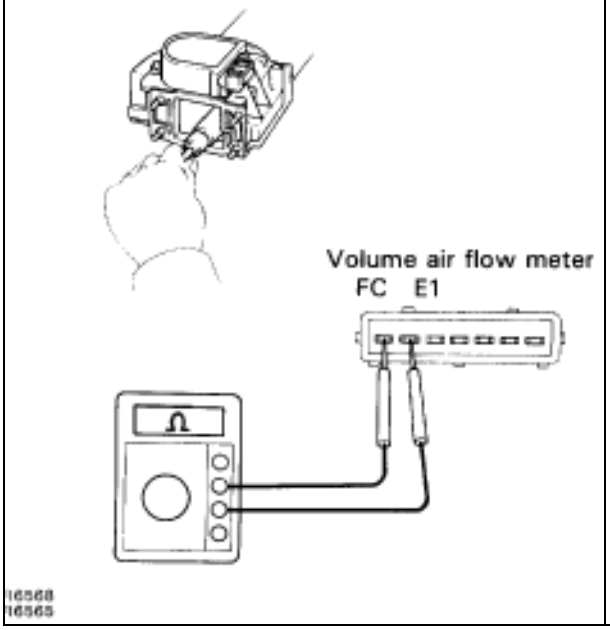
C Check continuity of IGN fuse.

OK **Continuity.**

OK

NG **Check for short in all the harness and components connected to IGN fuse.**

5	Check fuel pump switch (inside the volume air flow meter).



P
1. Remove air cleaner cap.
2. Disconnect volume air flow meter connector.

C Measure resistance between terminals FC and E1 of volume air flow meter connector when measuring plate is open and close with a screwdriver.

OK

Measuring plate	Resistance
Open	Continuity
Closed	1 MΩ or higher

OK

NG **Replace volume air flow meter.**

6	Check for open in harness and connector between IGN fuse and circuit opening relay, relay and body ground (See page IN–27).

OK

NG → Repair or replace harness or connector.

7	Check ECM power source circuit (See page EG–420).

OK

NG → Repair or replace.

8	Check fuel pump (See page EG–170).

OK

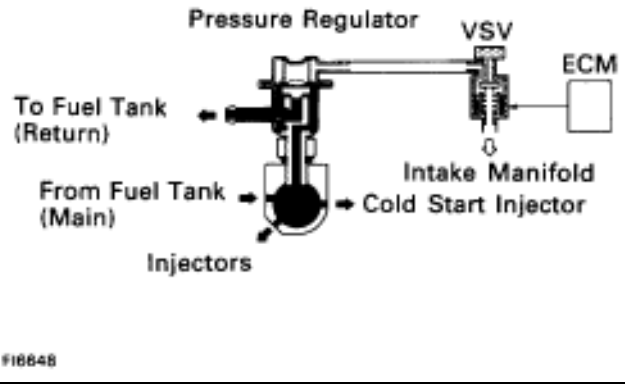
NG → Replace fuel pump.

Check for open in harness and connector between J/B No. 2 and circuit opening relay, relay and body ground (See page IN–27).

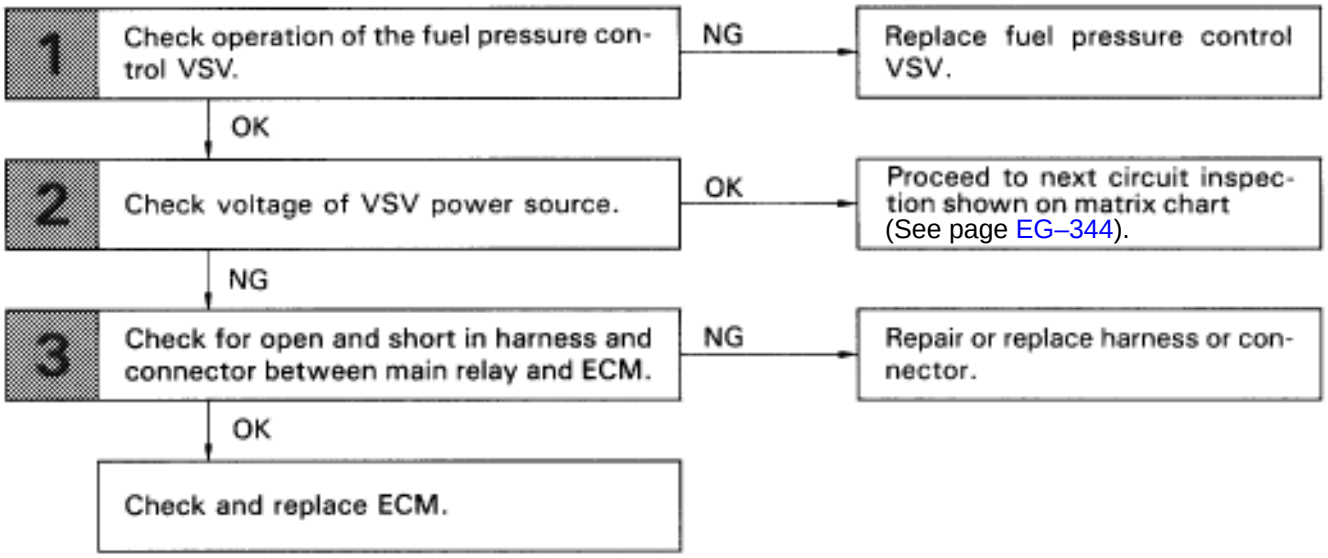
Fuel Pressure Control VSV Circuit

CIRCUIT DESCRIPTION

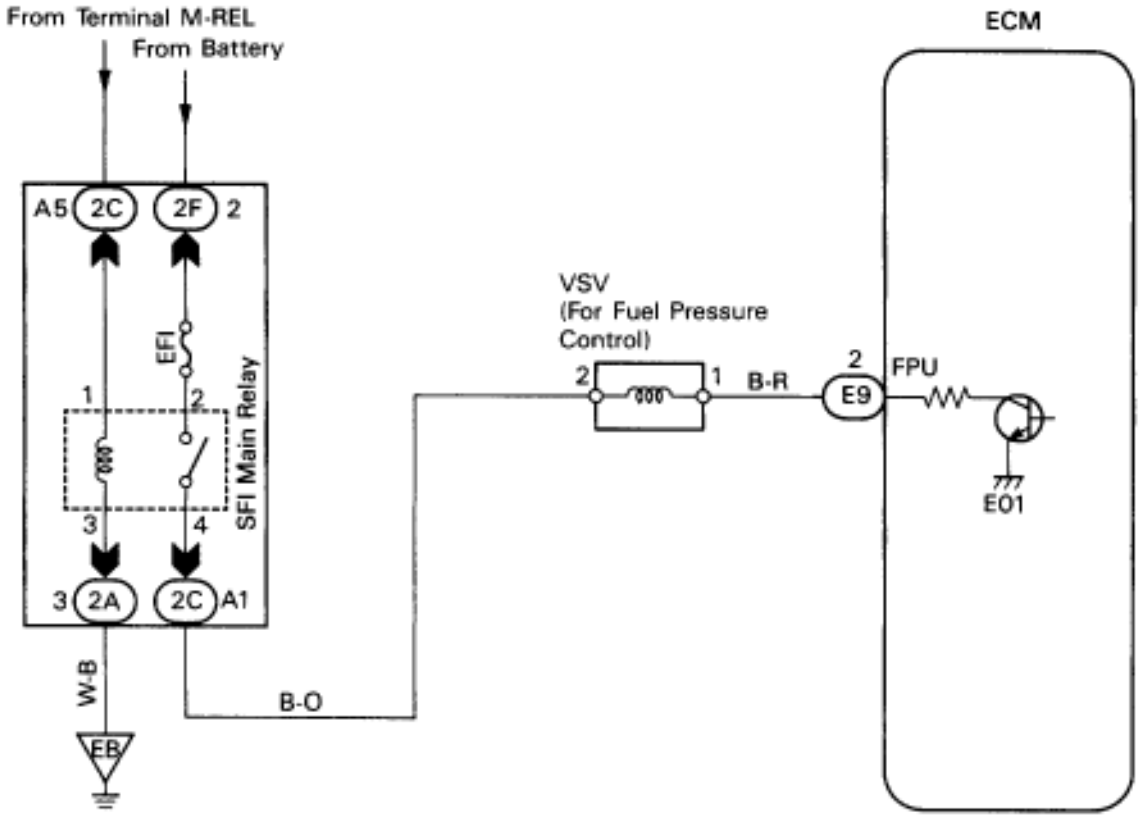
The ECM turns on a VSV (Vacuum Switching valve) to draw the air into the diaphragm chamber of the pressure regulator if it detects that the temperature of the engine coolant is too high during engine starting.
The air drawn into the chamber increases the fuel pressure to prevent fuel vapor lock at high engine temperature in order to help the engine start when it is warm.
Fuel pressure control ends approx. 120 sec. after the engine is started.



DIAGNOSTIC CHART



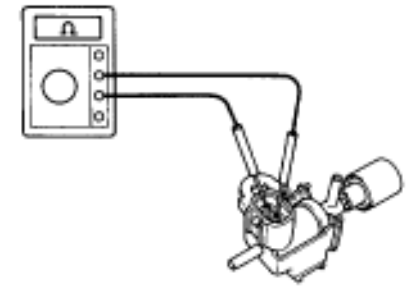
WIRING DIAGRAM

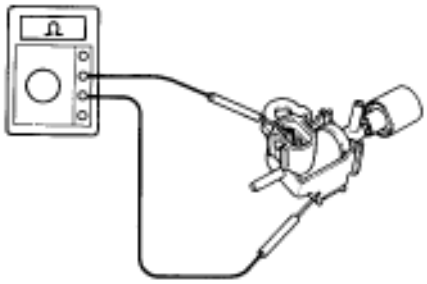


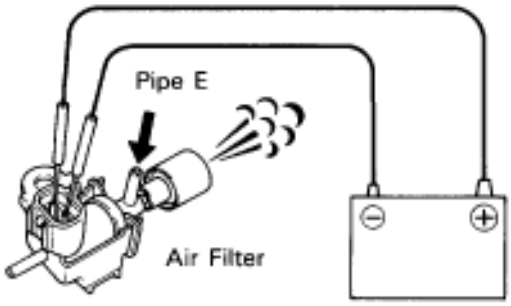
FI6535

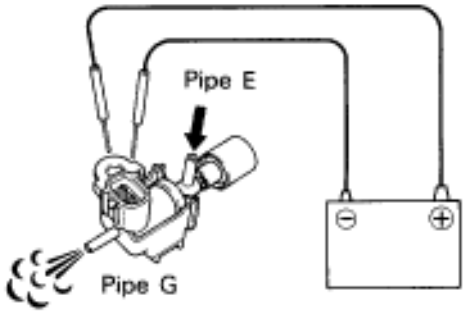
INSPECTION PROCEDURE

1 **Check fuel pressure control VSV.**









FI4181
FI4182
FI4183
FI4184

P
1. Remove fuel pressure control VSV.
2. Disconnect fuel pressure control VSV connector.

C
1. Measure resistance between terminals.
2. Measure resistance between each terminal and the body.

OK
1. **Resistance: 30 – 50 Ω at 20°C (68°F)**
2. **Resistance: 1 MΩ or higher**

C Check operation of fuel pressure control VSV when battery voltage is applied to the terminals of fuel pressure control VSV connector or not.

OK **Battery voltage is applied:**
The air from pipe E is flowing out through the air filter.

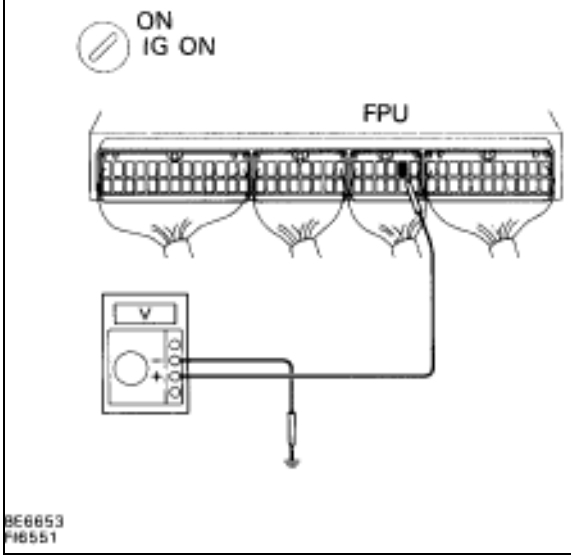
Battery voltage is not applied:
The air from pipe E is flowing out through pipe C.

OK

NG **Replace fuel pressure control VSV.**

Go to step 1

2	Check voltage between terminal FPU of ECM connector and body ground.



P
1. Remove glove compartment. (See page BO–111).
2. Turn ignition switch on.

C Measure voltage between terminal FPU of ECM connector and body ground.

OK **Voltage: 10 – 14 V**

NG

OK **Proceed to next circuit inspection shown on matrix chart (See page EG–344).**

3	Check for open and short in harness and connector between ECM and VSV, VSV and SFI main relay (See page IN–27).

OK

NG **Repair or replace harness or connector.**

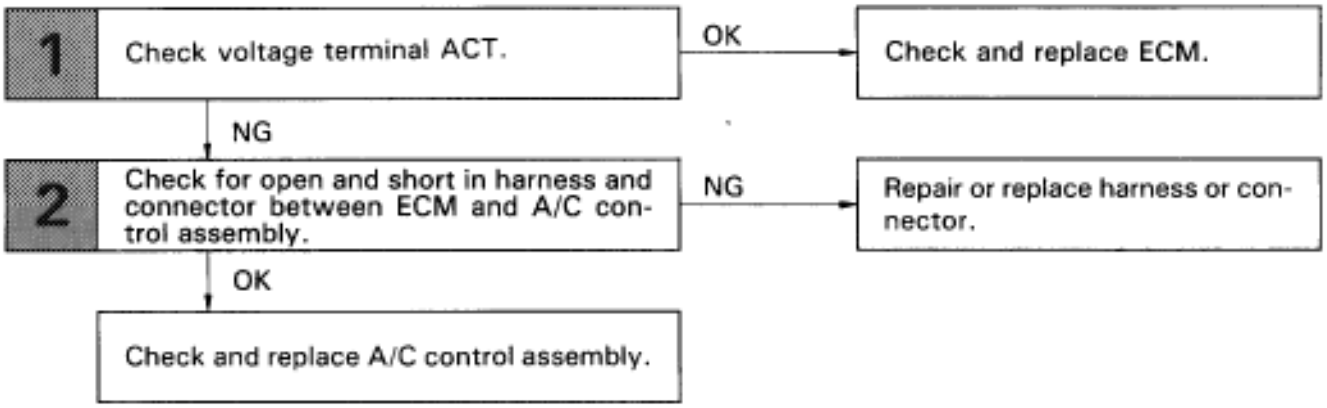
Check and replace ECM.

Air Conditioning Cut Control Circuit

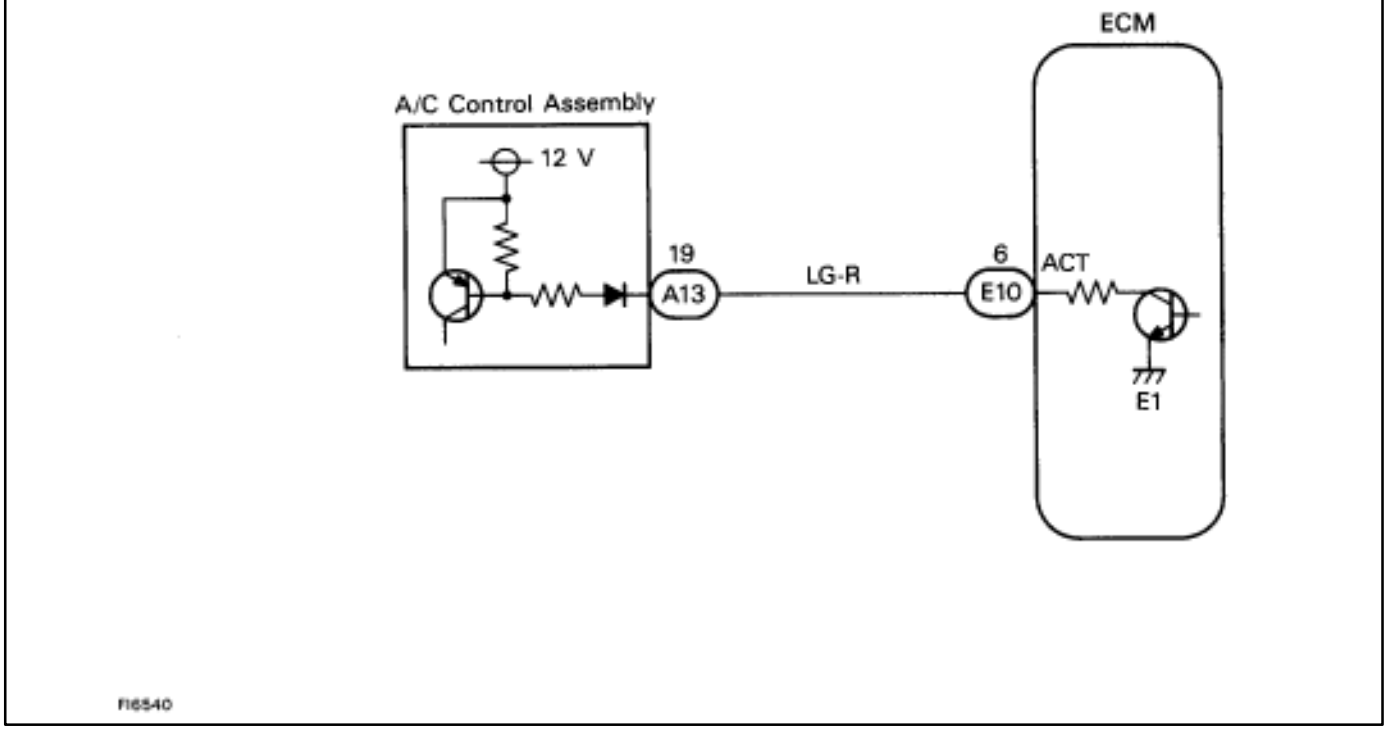
CIRCUIT DESCRIPTION

This circuit cuts air conditioning operation during vehicle acceleration in order to increase acceleration performance. During acceleration with the vehicle speed at 25 km/h (16 mph) or less, engine speed at 1,600 rpm or less and throttle valve opening angle at 60° or more, the A/C magnet switch is turned OFF for several seconds.

DIAGNOSTIC CHART

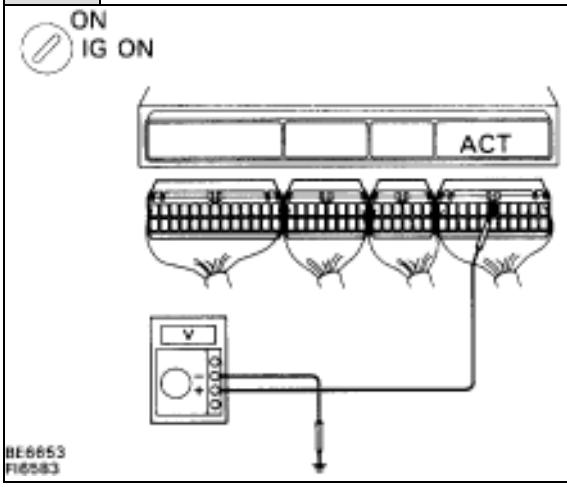


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check voltage between terminal ACT of ECM and body ground.**



P
1. Remove glove compartment. (See page BO–111).
2. Disconnect ECM connector.
3. Turn ignition switch ON.

C Measure voltage between terminal ACT of ECM and body ground when A/C switch is turned to ON.

OK **Voltage: 10 – 14 V**

NG

OK **Check and replace ECM.**

2 **Check for open and short in harness and connector between ECM and A/C control assembly.**

OK

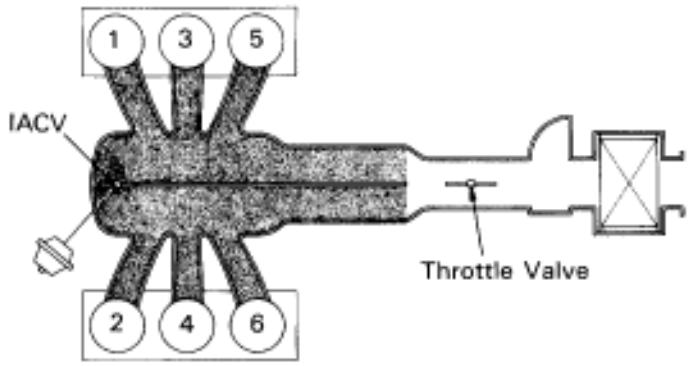
NG **Repair or replace harness or connector.**

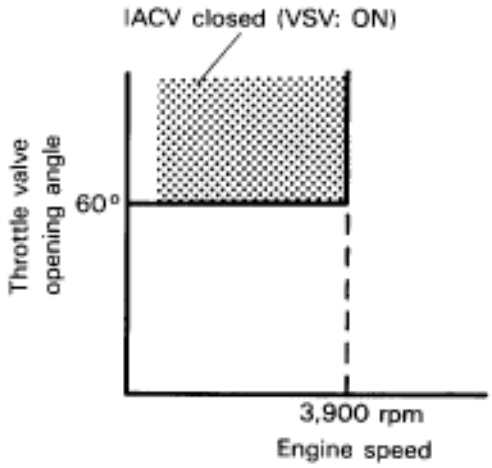
Check and replace A/C control assembly.

IACV Control VSV Circuit

CIRCUIT DESCRIPTION

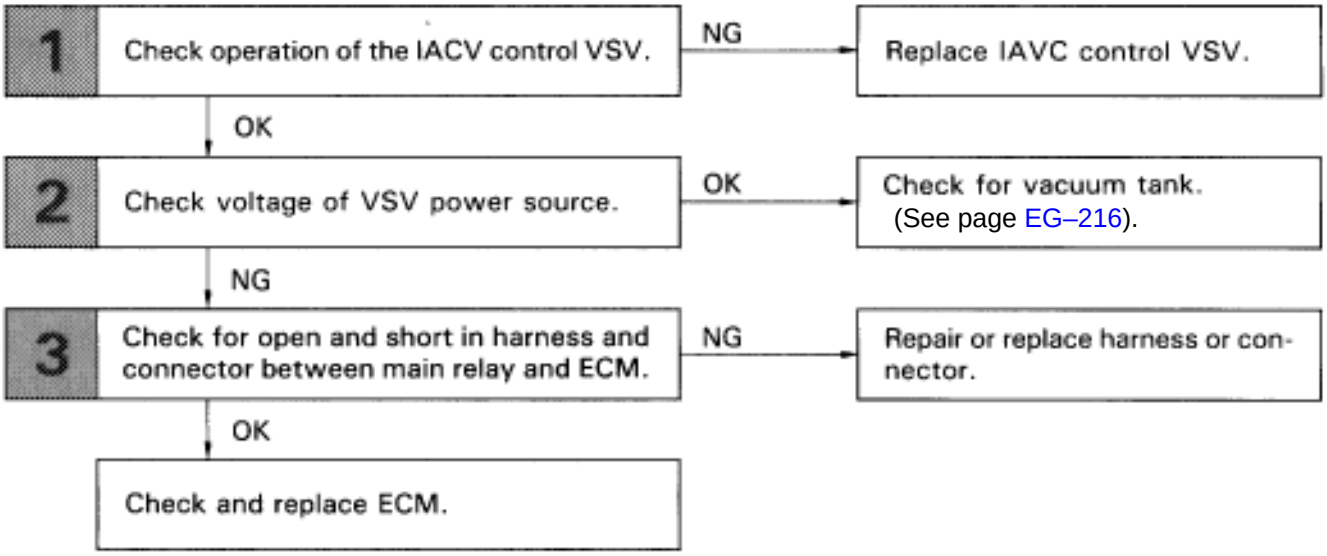
This circuit opens and closes the IACV (Intake Air Control Valve) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).
When the engine speed is 3,900 rpm or less and the throttle valve opening angle is 60° or more, the ECM turns the VSV ON and closes the IACV. At all other times, the VSV is OFF, so the IACV is open.



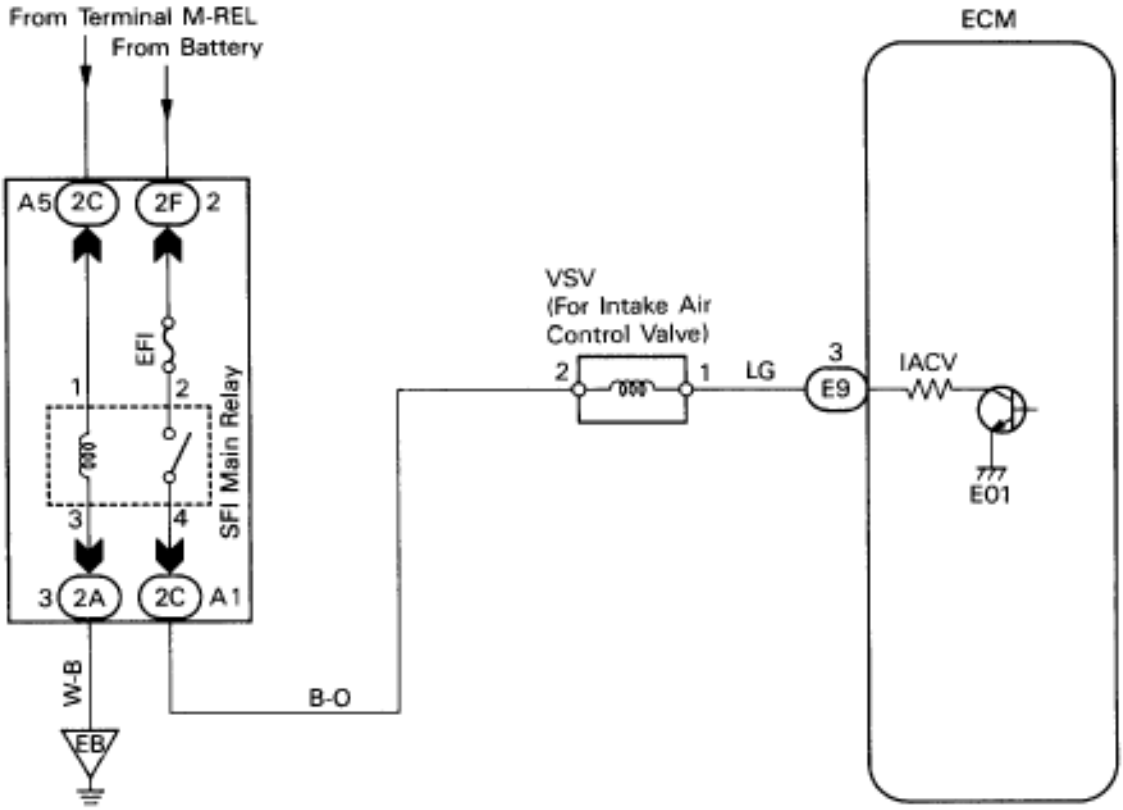


FI6569 FI6570

DIAGNOSTIC CHART

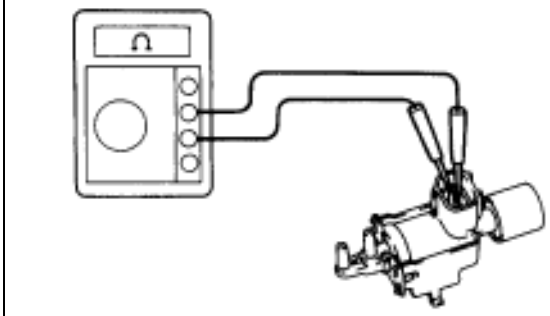


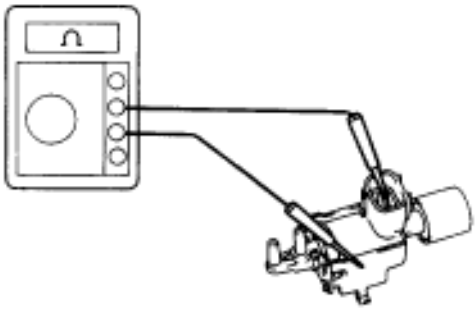
WIRING DIAGRAM

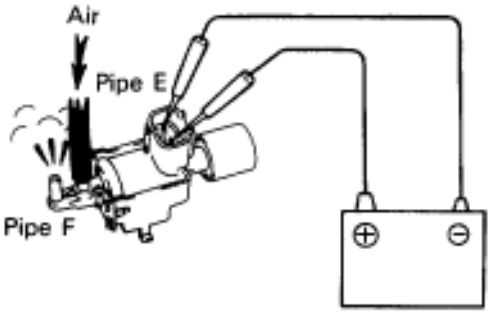


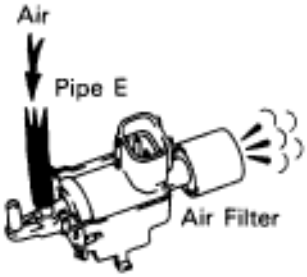
INSPECTION PROCEDURE

1 **Check IACV control VSV.**









FI6350
FI6349
FI6392
FI6393

P
1. Remove IACV control VSV.
2. Disconnect IACV control VSV connector.

C
1. Measure resistance between terminals.
2. Measure resistance between each terminal and the body.

OK
1. **Resistance: 33 – 39 Ω at 20°C (68°F)**
2. **Resistance: 1 MΩ or higher**

C Check operation of IACV control VSV when battery voltage is applied to the terminals of IACV control VSV connector or not.

OK **Battery voltage is applied:**
The air from pipe E is flowing out through pipe F.

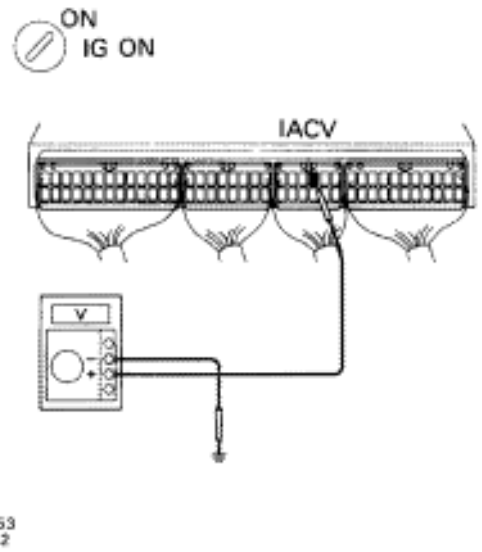
Battery voltage is not applied:
The air form pipe E is flowing out through the air filter.

OK

NG **Replace IACV control VSV.**

Go to step 1

2	Check voltage between terminal ISAAC of ECM connector and body ground.



P 1. Remove glove compartment. (See page BO–111).

C 2. Turn ignition switch on.

OK Measure voltage between terminals ISAAC of ECM connector and body ground.

Voltage: 10 – 14 V

Hint

NG

OK **Check for vacuum tank. (See page EG–216).**

3	Check for open and short in harness and connector between SFI main relay and ECM (See page IN–27).

OK

NG **Repair or replace harness or connector.**

Check and replace ECM.

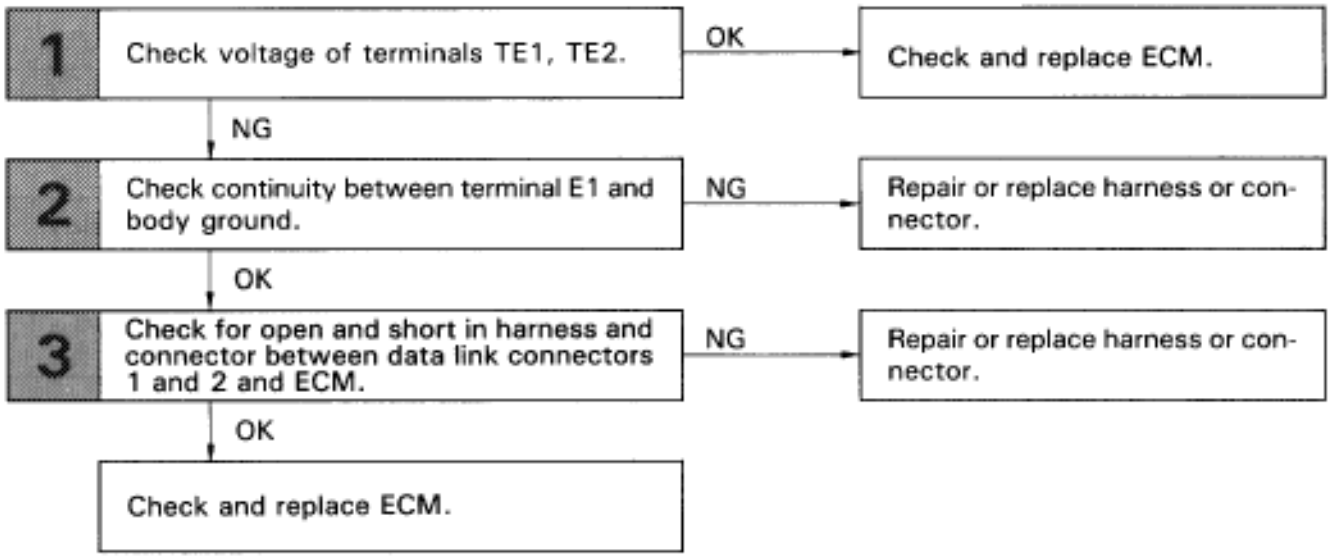
TE1, TE2 Terminal Circuit

CIRCUIT DESCRIPTION

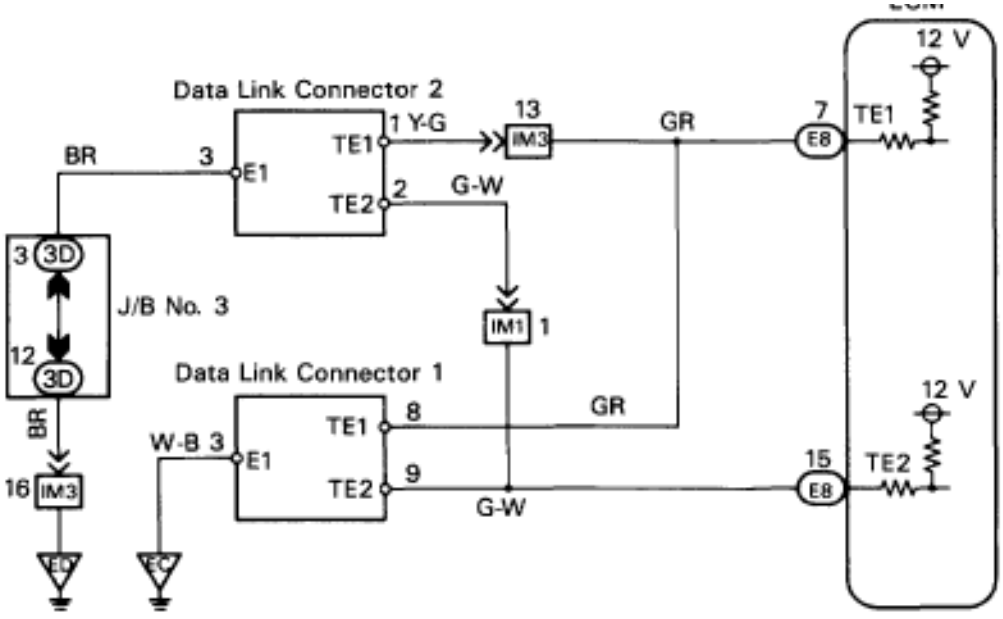
Terminals TE1 and TE2 are located in the data link connectors 1 and 2. The data link connector 1 located in the engine compartment and the data link connector 2 located in the cabin. When these terminals are connected with the E1 terminal, diagnostic trouble codes in normal mode or test mode can be read from the Malfunction Indicator Lamp on the combination meter.

DIAGNOSTIC CHART

HINT: If terminals TE1 and TE2 are connected with terminal E1, diagnostic trouble code is not output or test mode is not activated.
Even though terminal TE1 is not connected with terminal E1, the Malfunction Indicator Lamp blinks.
For the above phenomenon, the likely cause is an open or short in the wire harness, or malfunction inside the ECM.



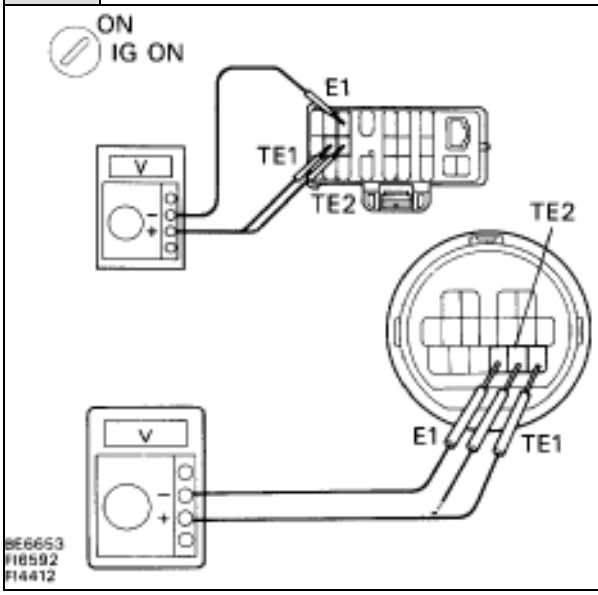
V



FI6609

INSPECTION PROCEDURE

1 **Check voltage between terminals TE1, TE2 and E1 of data link connectors 1 and 2.**



P Turn ignition switch on.

C Measure voltage between terminals TE1, TE2 and E1 of data link connectors 1 and 2.

OK **Voltage: 10 – 14 V**

NG

OK → **Check and replace ECM.**

2 **Check continuity between terminal E1 of data link connectors 1 and 2 and body ground.**

OK

NG → **Repair or replace harness or connector.**

3 **Check for open and short in harness and connector between ECM and data link connectors 1 and 2 (See page IN–27).**

OK

NG → **Repair or replace harness or connector.**

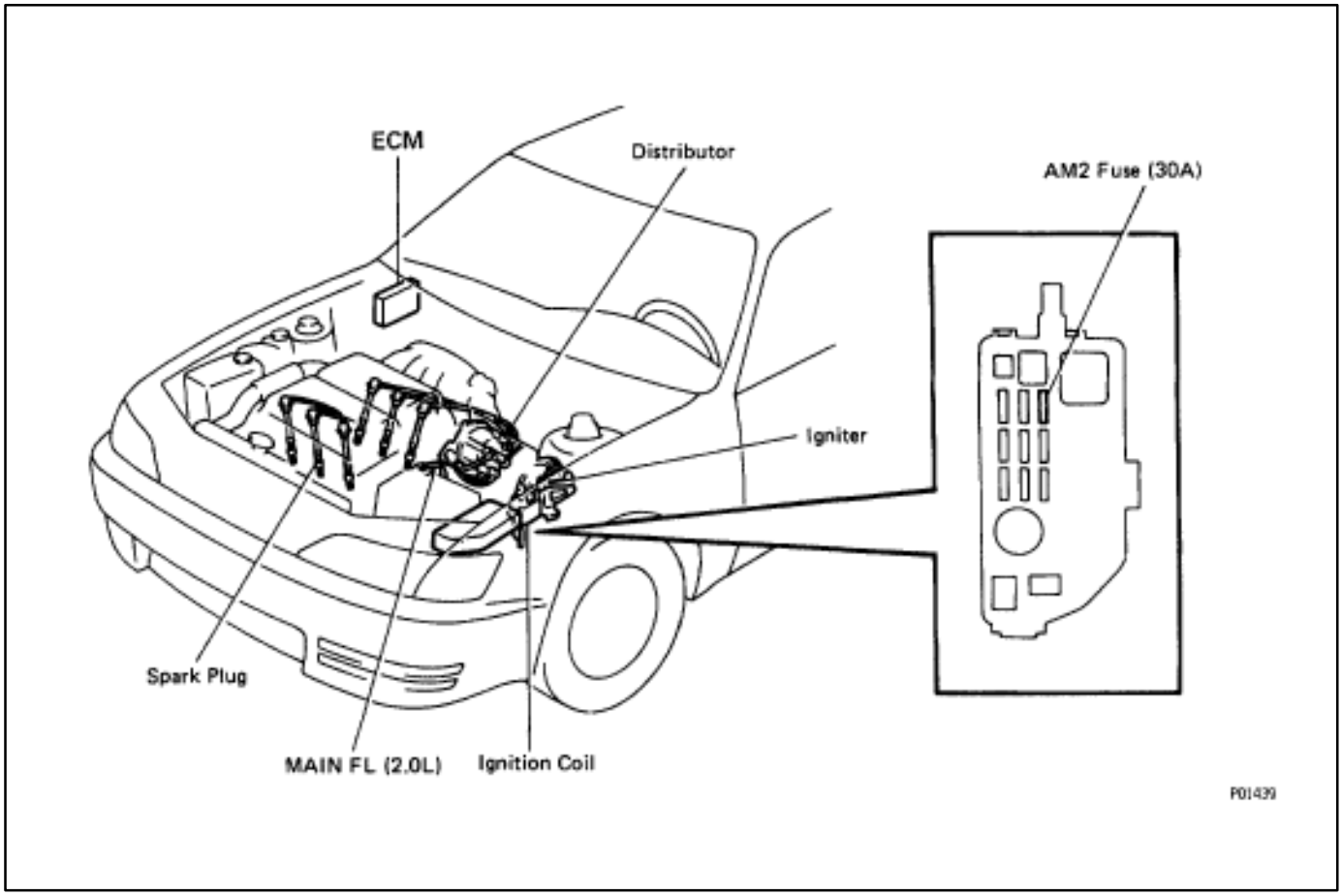
Check and replace ECM.

IGNITION SYSTEM

DESCRIPTION

IG018–02

The ECM is programmed with data for optimum ignition timing under any and all operating conditions. Using data provided by sensors which monitor various engine functions (rpm, intake air volume, eng, temperature, etc.), the microcomputer (ECM) triggers the spark at precisely the right instant.



The ECM monitors the engine condition by signals from each sensor, calculates the ignition timing and sends an ignition signal to the igniter. High voltage from the ignition is distributed to each spark plug in the appropriate order to generate a spark between the electrodes, which ignites the air–fuel mixture.

IGNITER

The igniter temporarily interrupts the primary current with the ignition signal (IGT signal) from the ECM and generates sparks at the spark plug. Also, as a fail–safe measure, when ignition occurs an ignition confirmation signal (IGF signal) is sent to the ECM.

IGNITION COIL

The ignition coil uses a closed core coil with the primary coil wrapped around the core and the secondary coil wrapped around the primary coil. This allows the generation of a high voltage sufficient to cause a spark to jump across the spark plug gap.

DISTRIBUTOR

This correctly distributes high voltage to the spark plug of each cylinder in the specified ignition order.

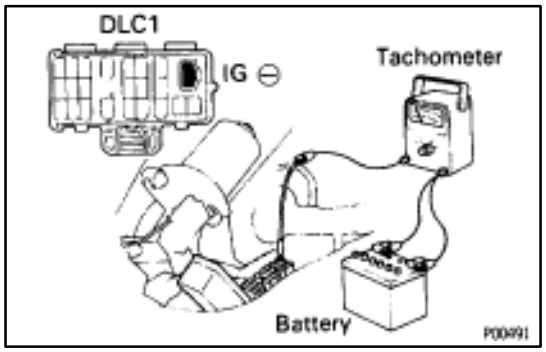
PICKUP COILS

The NE coil detects the crankshaft position, and the G1 and G2 coils detect the camshaft position.

PRECAUTIONS

IG019–01

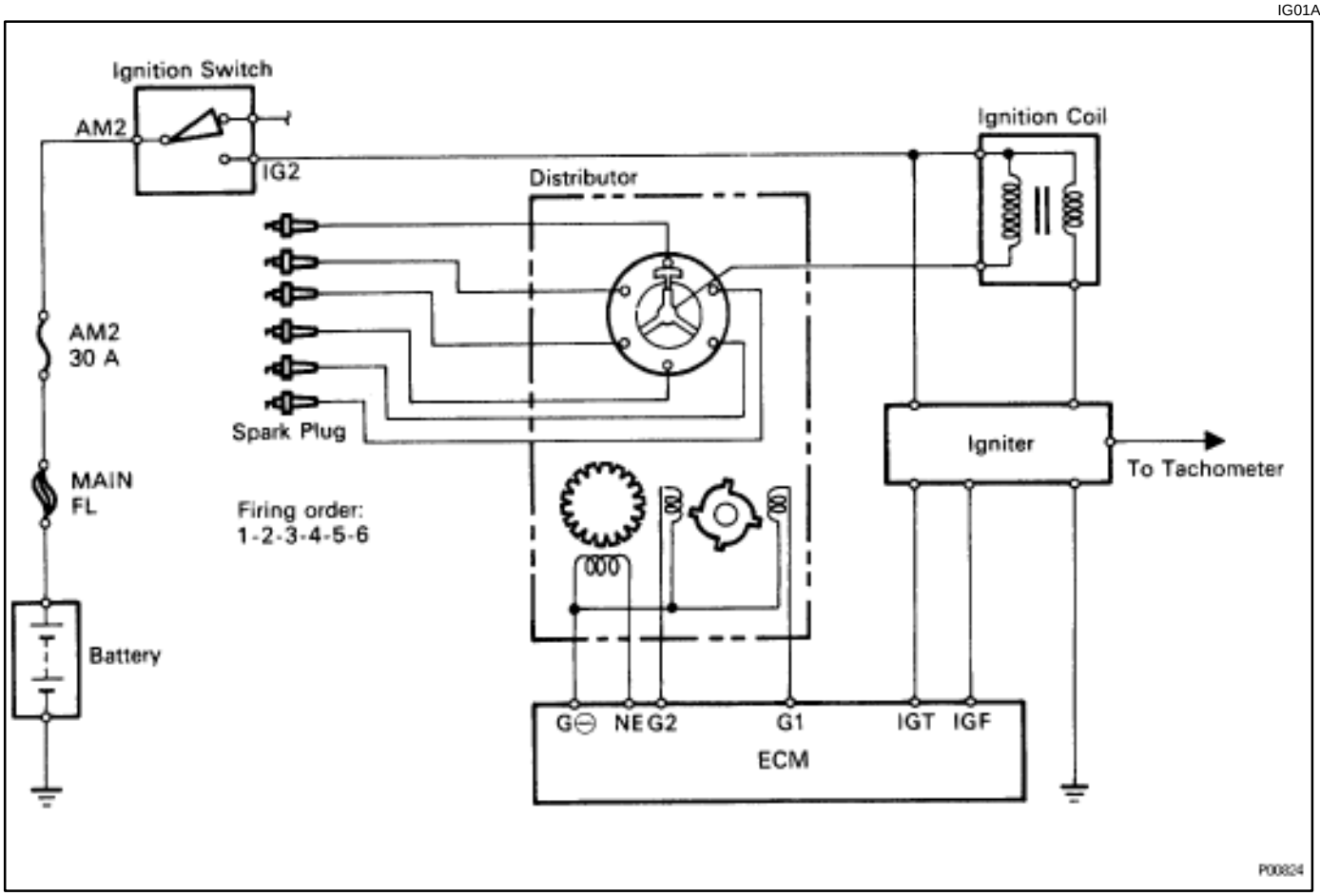
1. **Do not leave the ignition switch on for more than 10 minutes if the engine does not start.**



2. **With a tachometer connected to the system. Connect the test probe of the tachometer to terminal IG ⊕ of the DLC1.**
3. **As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your before use.**
4. **NEVER allow the tachometer terminals to touch ground as it could result in damage to the igniter and/or ignition coil.**
5. **Do not disconnect the battery while the engine is running.**
6. **Check that the igniter is properly grounded to the body.**

SYSTEM CIRCUIT

IG01A–01



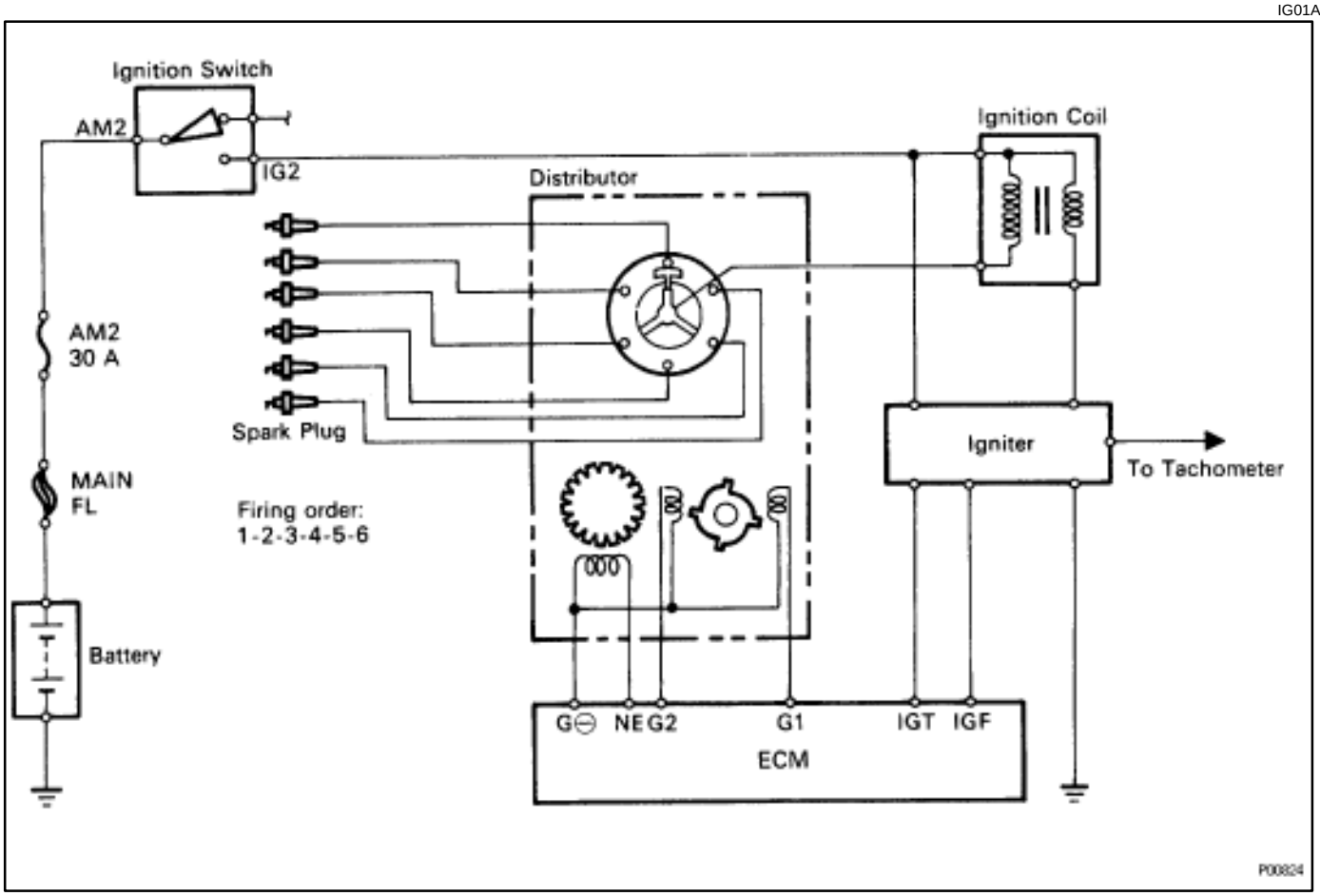
OPERATION

IG01B–01

To maintain the most appropriate ignition timing, the ECM sends a control signal so that the igniter sends current to the ignition coil and the spark plugs produce a spark.

SYSTEM CIRCUIT

IG01A–01



OPERATION

IG01B–01

To maintain the most appropriate ignition timing, the ECM sends a control signal so that the igniter sends current to the ignition coil and the spark plugs produce a spark.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

IG01C–01

	09240–00020 Wire Gauge Set	Air gap
	09843–18020 Diagnosis Check Wire	

RECOMMENDED TOOLS

IG01D–01

	09082–00015 TOYOTA Electrical Tester	
	09200–00010 Engine Adjust Kit	

EQUIPMENT

IG01E–01

Spark plug cleaner	
Tachometer	
Timing light	Ignition timing

ON–VEHICLE INSPECTION

SPARK TEST

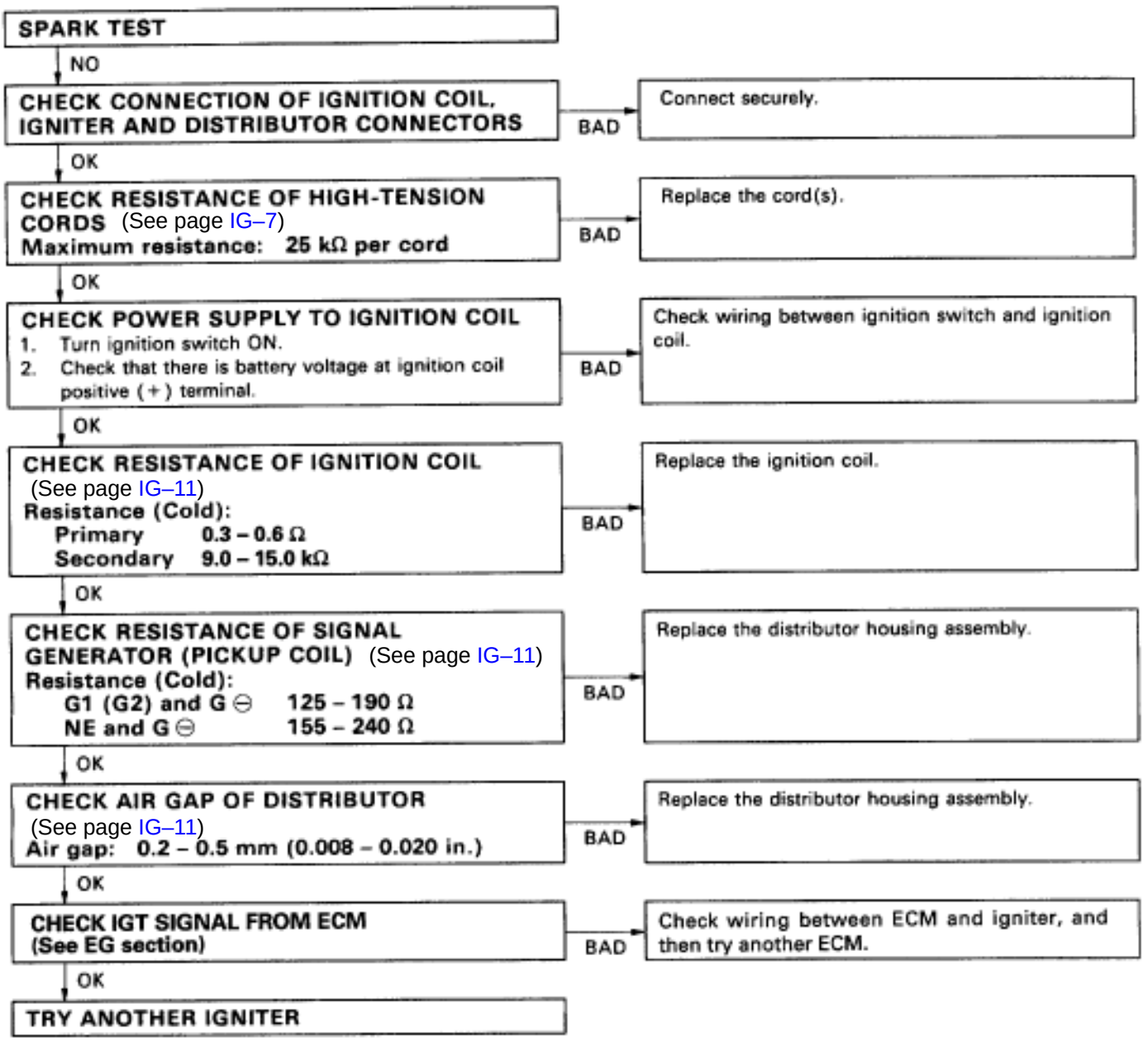
IG01R–02

CHECK THAT SPARK OCCURS

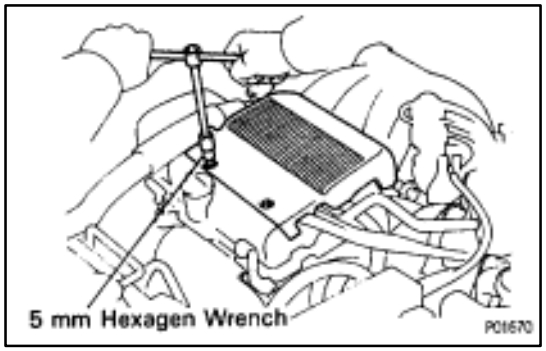
(a) Disconnect the high–tension cord from the distributor. (See page IG–7)

(b) Hold the end approx. 12.5 mm (0.50 in.) from the body of vehicle.

(c) See if spark occurs while engine is being cranked.
HINT: To prevent gasoline from being injected from injectors during this test, crank the engine for no more than 1–2 seconds at time.
If the spark does not occur, perform the test as follows:



V00216

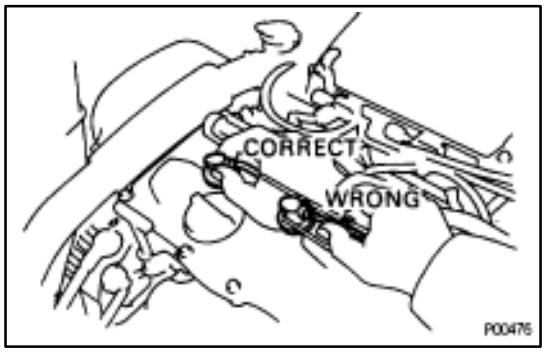


HIGH–TENSION CORDS INSPECTION

IG01F–01

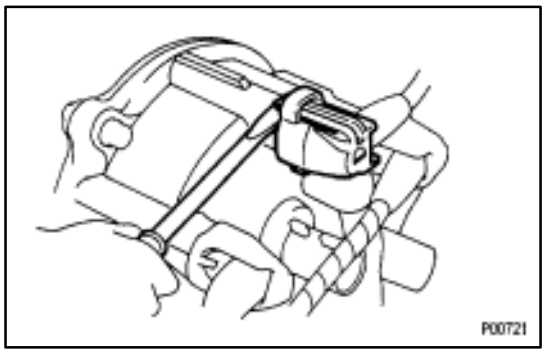
1. REMOVE V–BANK COVER

Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.



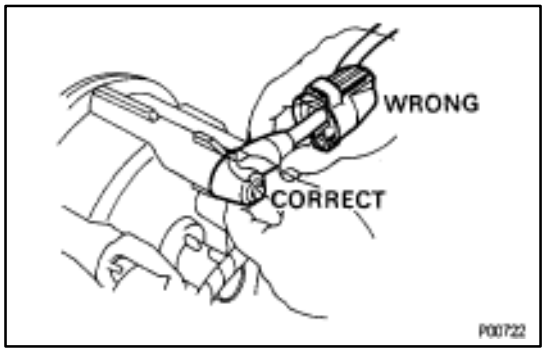
2. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS

Disconnect the high–tension cords at the rubber boot.
DO NOT pull on the cords.
NOTICE: Pulling on or bending the cords may damage the conductor inside.

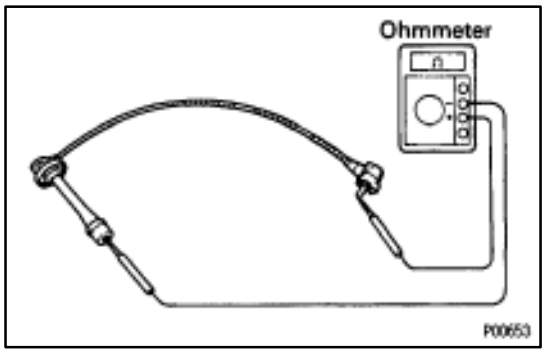


3. DISCONNECT HIGH–TENSION CORDS FROM DISTRIBUTOR CAP AND IGNITION COIL

(a) Using a screwdriver, lift up the lock claw and disconnect the holder from the distributor cap (ignition coil).



(b) Disconnect the high–tension cord at the grommet.
DO NOT pull on the cord.
NOTICE:
- **Pulling on or bending the cords may damage the conductor inside.**
- **Do not wipe any of the oil from the grommet after the high–tension cord is disconnected.**

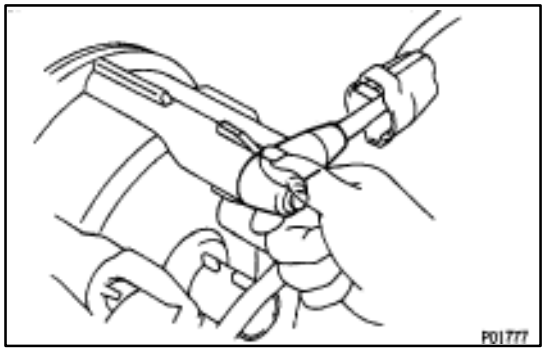


4. INSPECT HIGH–TENSION CORD RESISTANCE

Using an ohmmeter, measure the resistance.
Maximum resistance:

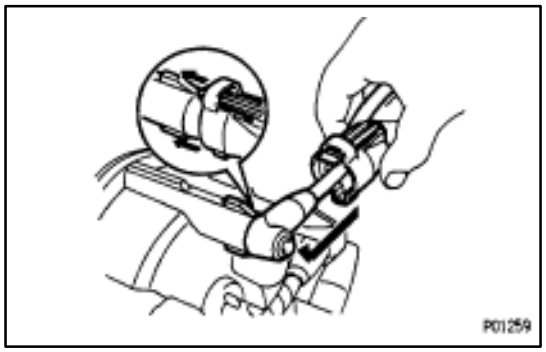
25 kΩ per cord

If the resistance is greater than maximum, check the terminals. If necessary, replace the high–tension cord.

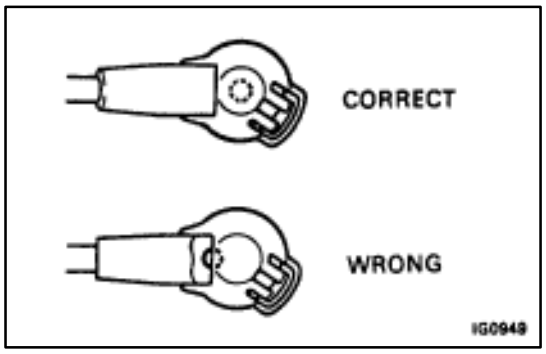


5. RECONNECT HIGH–TENSION CORDS TO DISTRIBUTOR CAP AND IGNITION COIL

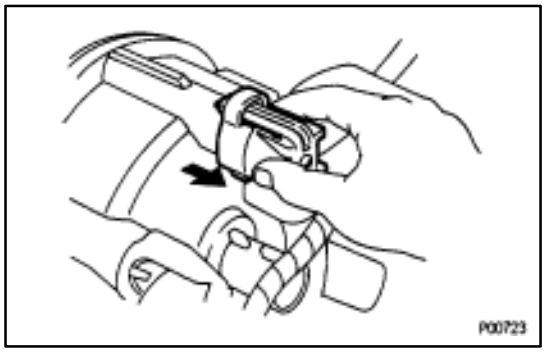
(a) (Ex. Center Cord on the Distributor Side)
Insert the grommet portion into the terminal hole of the distributor cap (ignition coil).



(b) (Ex. Center Cord on the Distributor Side)
Align the spline of the distributor (ignition coil) with the spline of the holder, and slide on the holder.



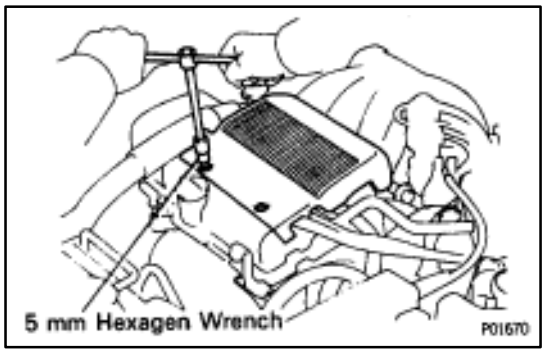
NOTICE: Check that the holder is correctly installed to the grommet and distributor cap as shown in the illustration.



(c) Check that the lock claw of the holder is engaged by lightly pulling the holder.

(d) (Center Cord on the Distributor Side)
Insert the grommet and holder together.

6. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS



7. REINSTALL V–BANK COVER

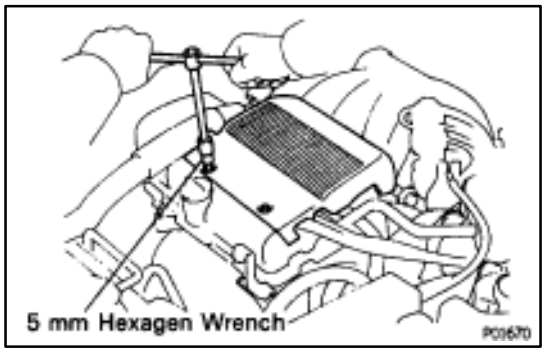
Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.

SPARK PLUGS INSPECTION

IG01G–02

NOTICE:

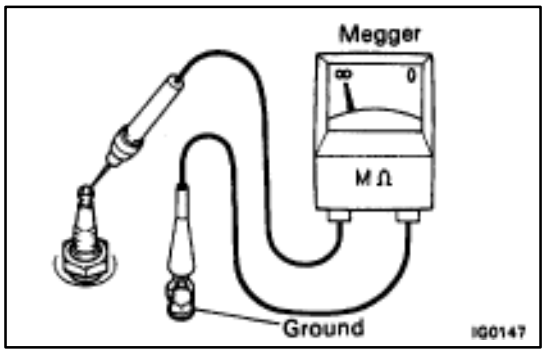
- **Never use a wire brush for cleaning.**
- **Never attempt to adjust the electrode gap on used spark plug.**
- **Spark plug should be replaced every 100,000 km (60,000 miles).**



1. REMOVE V–BANK COVER

Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.

2. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS



3. INSPECT ELECTRODE

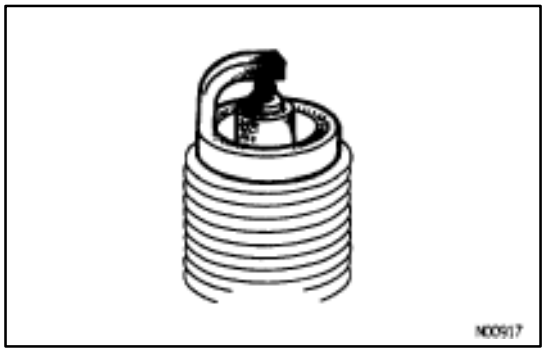
Using a megger (insulation resistance meter), measure the insulation resistance.

Standard correct insulation resistance:

10 M Ω or more

If the resistance is less than specified, proceed to step 4.

HINT: If a megger is not available, the following simple method of inspection provides fairly accurate results.



(Simple Method)

(a) Quickly race the engine to 4,000 rpm five times.

(b) Remove the spark plug. (See step 4)

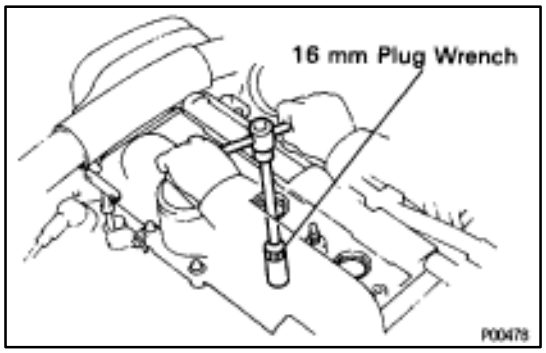
(c) Visually check the spark plug.

If the electrode is dry ... Okay

If the electrode is wet ... Proceed to step 5

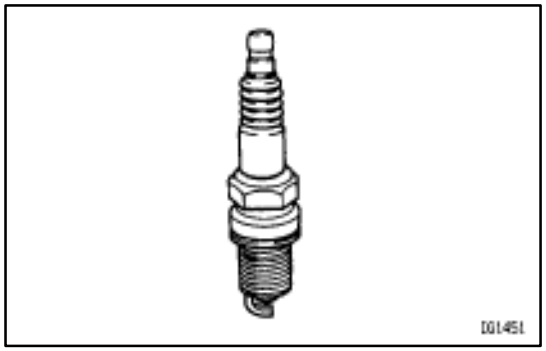
(d) Reinstall the spark plug.

(See step 8 on page IG–10)



4. REMOVE SPARK PLUGS

Using a 16 mm plug wrench, remove the spark plug.



5. VISUALLY INSPECT SPARK PLUGS

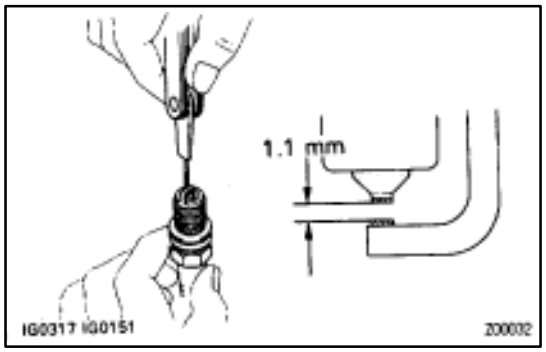
Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

ND PQ20R

NGK BCPR6EP–11



6. INSPECT ELECTRODE GAP

Maximum electrode gap:

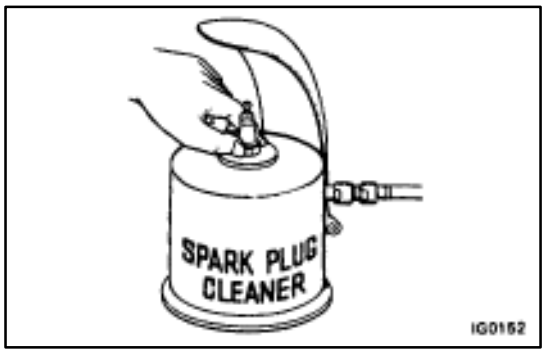
1.3 mm (0.051 in.)

If the gap is greater than maximum, replace the spark plug.

Correct electrode gap of new spark plug:

1.1 mm (0.043 in.)

NOTICE: If adjusting the gap of a new spark plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on the used plug.



7. CLEAN SPARK PLUGS

If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

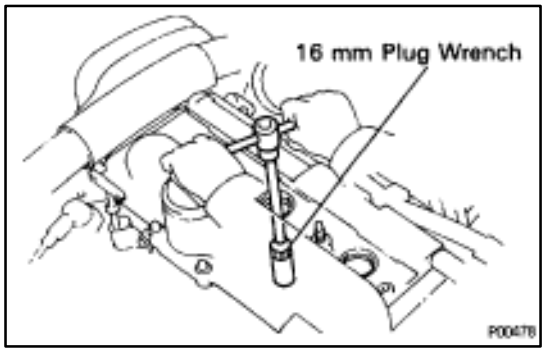
Air pressure:

Below 588 kPa (6 kgf/cm^2, 85 psi)

Duration:

20 seconds or less

HINT: If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

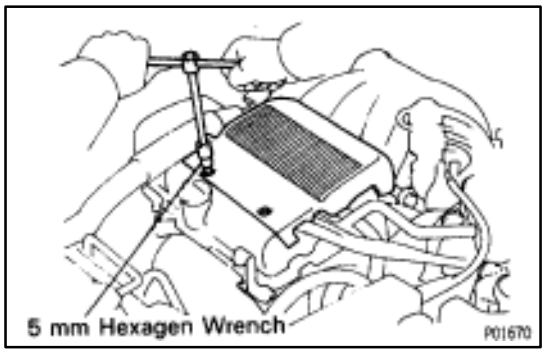


8. INSTALL SPARK PLUGS

Using a 16 mm plug wrench, install the spark plug.

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

9. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS



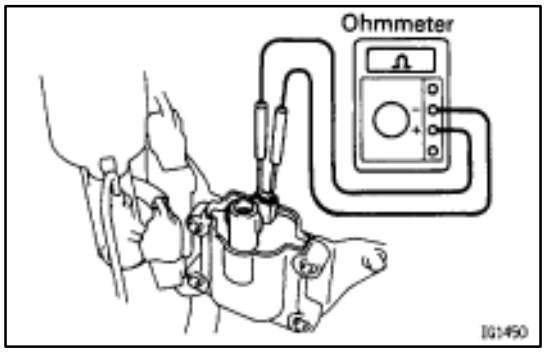
10. REINSTALL V–BANK COVER

Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.

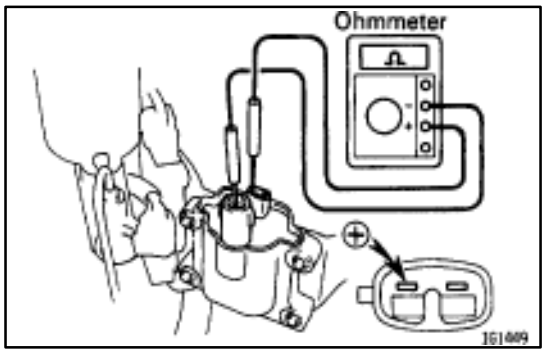
IGNITION COIL INSPECTION

IG02G–01

1. **DISCONNECT IGNITION COIL CONNECTOR**
2. **DISCONNECT HIGH–TENSION CORD**



3. **INSPECT PRIMARY COIL RESISTANCE**
   Using an ohmmeter, measure the resistance between the positive (+) and negative (–) terminals.
   Primary coil resistance (Cold):
   0.3–0.6 Ω
   If the resistance is not as specified, replace the ignition coil.

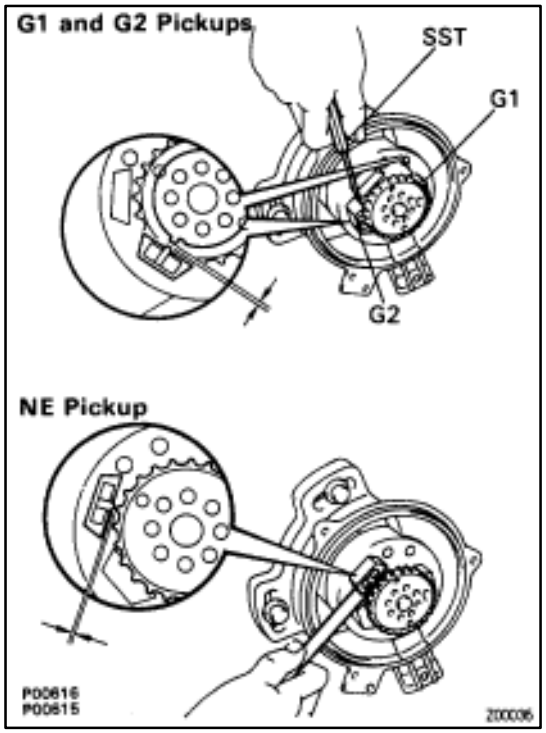


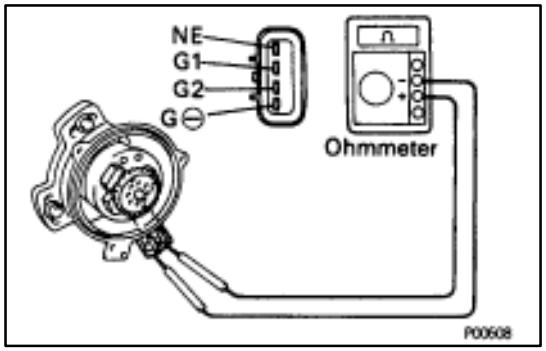
4. **INSPECT SECONDARY COIL RESISTANCE**
   Using an ohmmeter, measure the resistance between the positive (+) and high–tension terminals
   Secondary coil resistance (Cold):
   9.0–15.0 k Ω
5. **RECONNECT HIGH–TENSION CORD**
6. **RECONNECT IGNITION COIL CONNECTOR**

DISTRIBUTOR INSPECTION

IG01J–02

1. **DISCONNECT DISTRIBUTOR CONNECTOR**
2. **REMOVE DISTRIBUTOR CAP**
3. **REMOVE ROTOR**
4. **INSPECT AIR GAP**
   Using SST (G1 and G2 pickups) and a thickness gauge (NE pickup), measure the air gap between the signal rotor and pickup coil projection.
   SST 09240–00020 for G1 and G2 pickups
   Air gap:
   0.2–0.5 mm (0.008–0.020 in.)
   If the air gap is not as specified, replace the distributor housing assembly.





5. INSPECT SIGNAL GENERATOR (PICKUP COIL) RESISTANCE

Using an ohmmeter, measure the resistance between terminals.

Pickup coil resistance (Cold):

G1 and G ⊕

125–190 Ω at–10~40°C (14~104°F)

G2 and G ⊕

125–190 Ω at–10~40°C (14~104°F)

NE and G ⊕

155–240 Ω at–10~40°C (14~104°F)

If the resistance is not as specified, replace the distributor housing assembly.

6. REINSTALL ROTOR

7. REINSTALL DISTRIBUTOR CAP

8. RECONNECT DISTRIBUTOR CONNECTOR

IGNITER INSPECTION

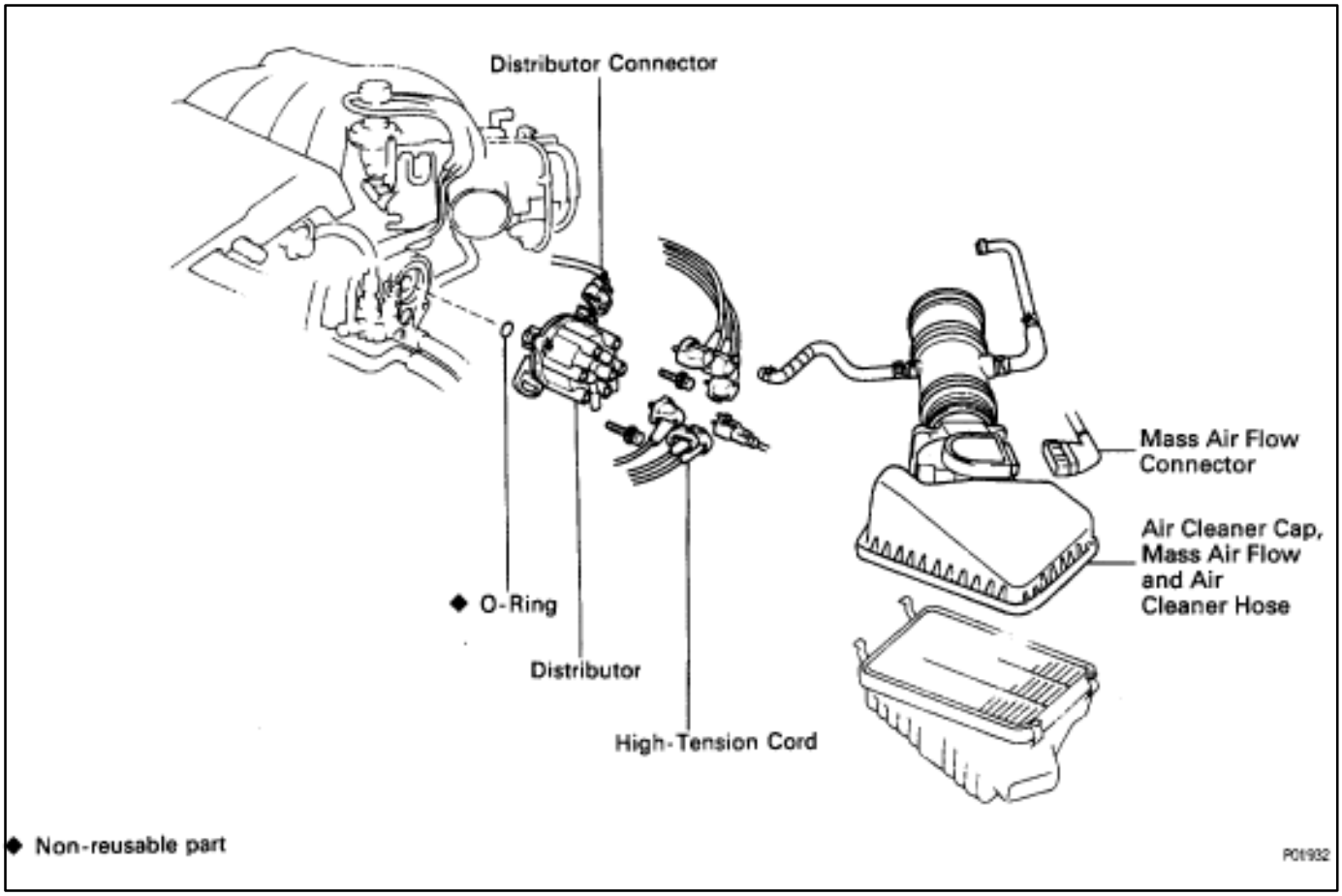
IG01S–02

(See procedure Spark Test on page IG–6)

DISTRIBUTOR

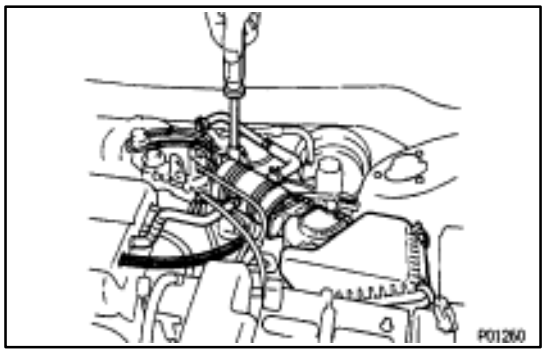
DISTRIBUTOR REMOVAL

IG01T–01

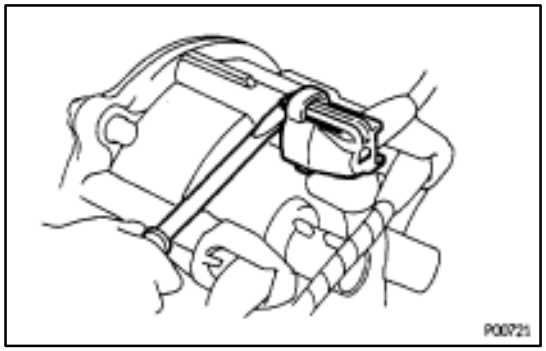


1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **REMOVE AIR CLEANER CAP, MASS AIR FLOW AND AIR CLEANER HOSE**

(a) Disconnect the mass air flow connector.

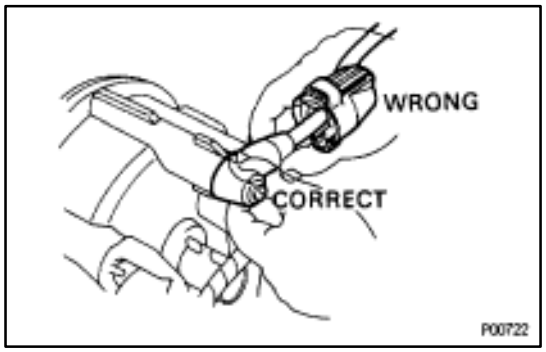


(b) Disconnect the mass air flow wire from the clamp on the mass air flow.
(c) Disconnect the air hoses.
(d) Loosen the air cleaner hose clamp bolt.
(e) Disconnect the four air cleaner cap clips.
(f) Disconnect the air cleaner hose from the throttle body, and remove the air cleaner cap together with the mass air flow and air cleaner hose.



3. DISCONNECT HIGH–TENSION CORDS FROM DISTRIBUTOR CAP AND IGNITION COIL

(a) Using a screwdriver, lift up the lock claw and disconnect the holder from the distributor cap (ignition coil).

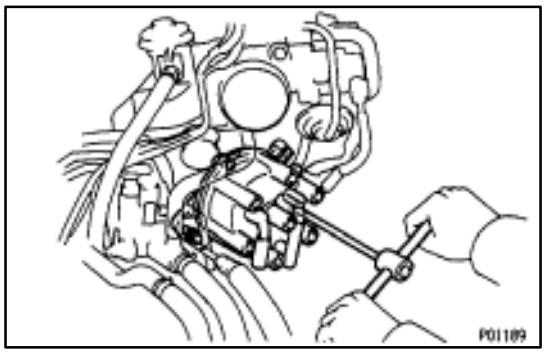


(b) Disconnect the high–tension cord at the grommet.
DO NOT pull on the cord.

NOTICE:

- **Pulling on or bending the cords may damage the conductor inside.**
- **Do not wipe any of the oil from the grommet after the high–tension cord is disconnected.**

4. DISCONNECT DISTRIBUTOR CONNECTOR

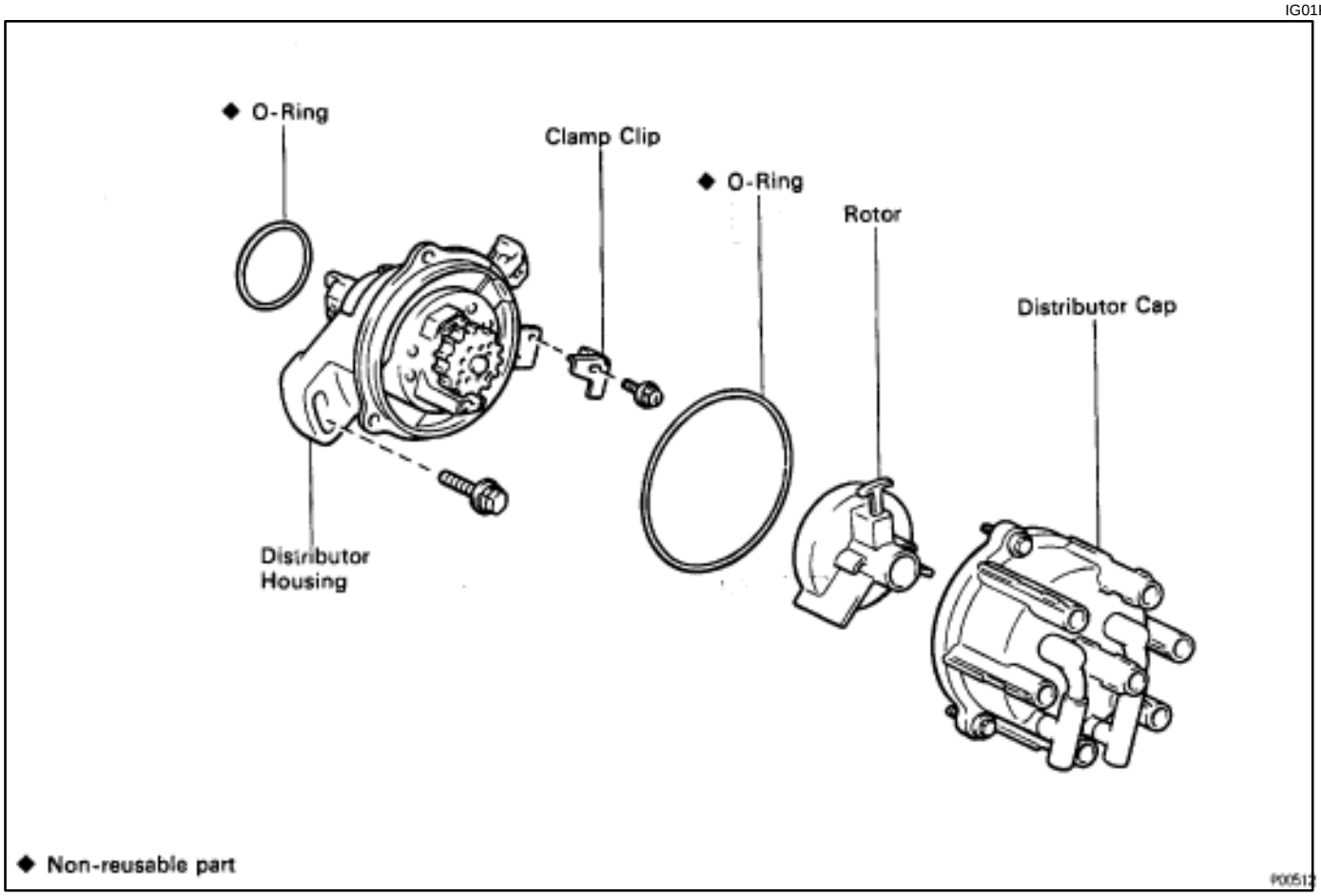


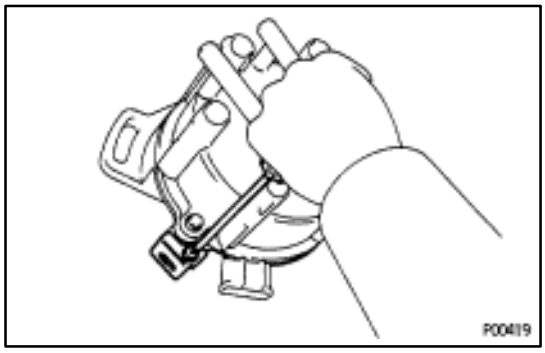
5. REMOVE DISTRIBUTOR

(a) Remove the hold–down bolts and pull out the distributor.
(b) Remove the O–ring from the distributor housing.

COMPONENTS

IG01K–01



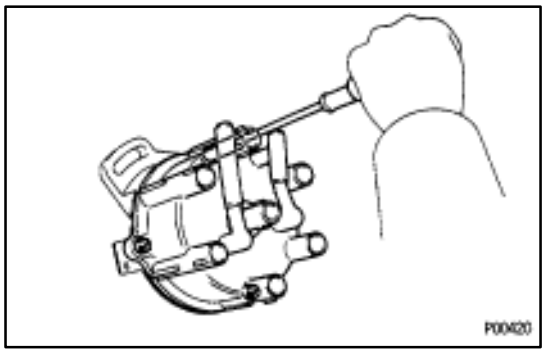


DISTRIBUTOR DISASSEMBLY

IG01L–01

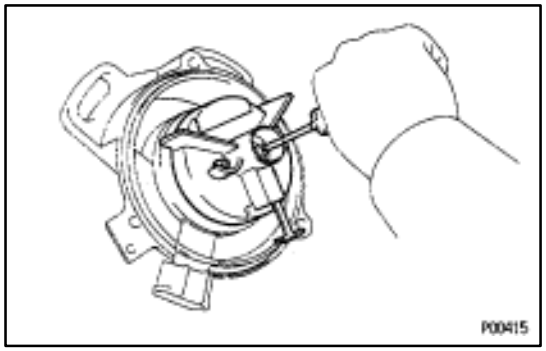
1. REMOVE WIRE HARNESS CLAMP CLIP

Remove the screw and clip.



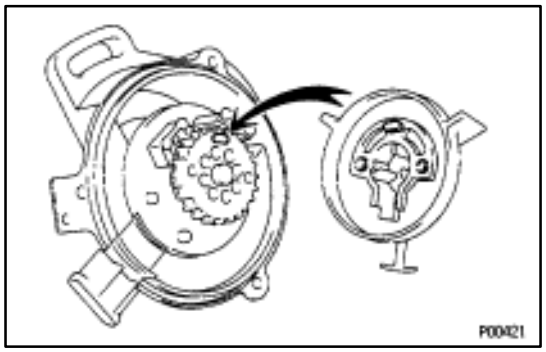
2. REMOVE DISTRIBUTOR CAP

Remove the three bolts and distributor cap.



3. REMOVE ROTOR

Remove the two screws and rotor.



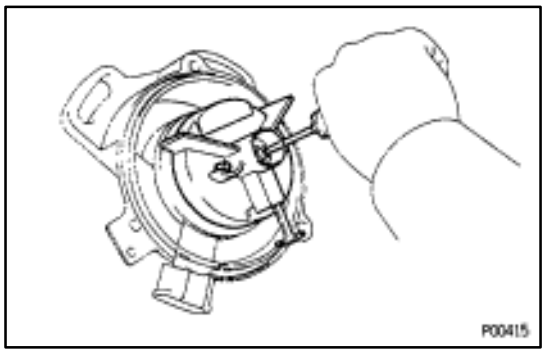
DISTRIBUTOR ASSEMBLY

IG01M–02

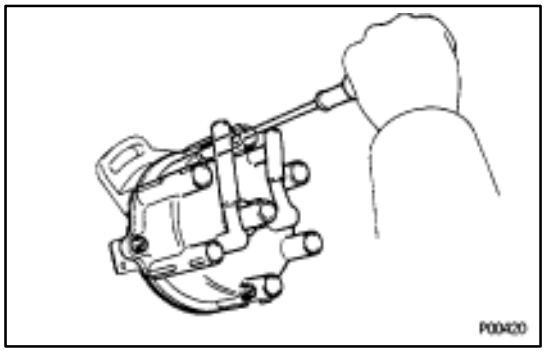
(See page IG–15)

1. INSTALL ROTOR

(a) Align the hollow of the signal rotor with the protrusion of the rotor.

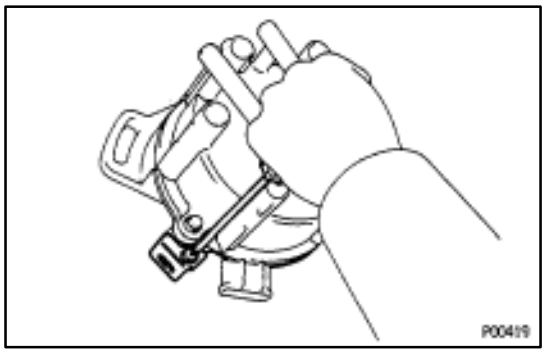


(b) Install the rotor with the two screws.



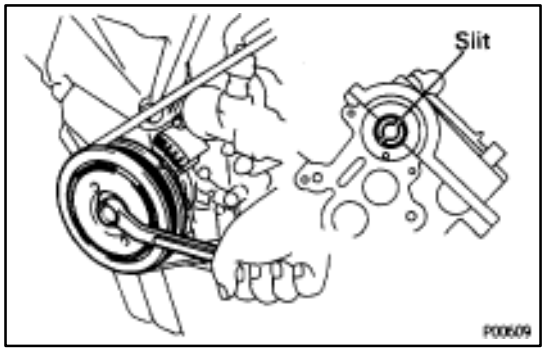
2. INSTALL DISTRIBUTOR CAP

Install the distributor cap with the three screws.



3. INSTALL WIRE HARNESS CLAMP CLIP

Install the clip with the screw.



DISTRIBUTOR INSTALLATION

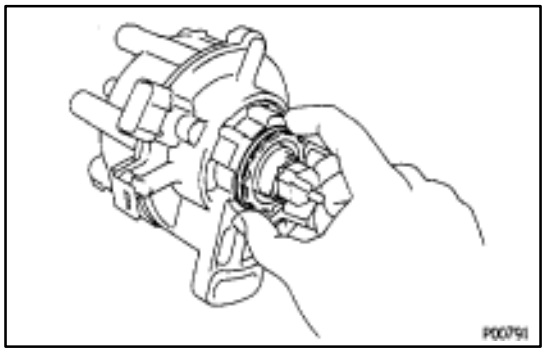
IG01N–02

(See page IG–13)

1. SET NO. 1 CYLINDER TO TDC/COMPRESSION

Turn the crankshaft clockwise, and position the slit of the intake camshaft (RH cylinder head) as shown.

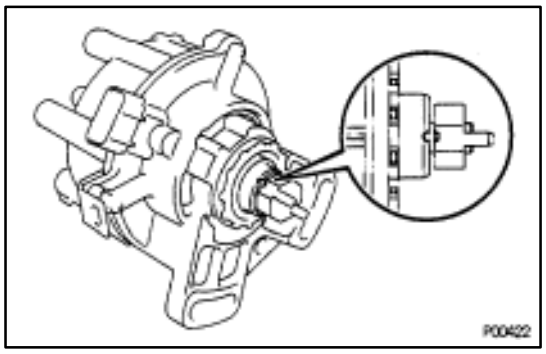
Look at the distributor attachment hole to set.



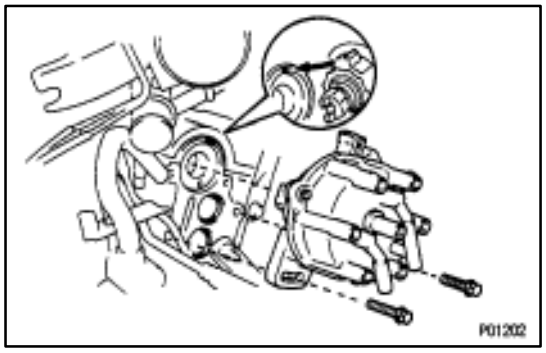
2. INSTALL DISTRIBUTOR

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

(b) Apply a light coat of engine oil on the O–ring.

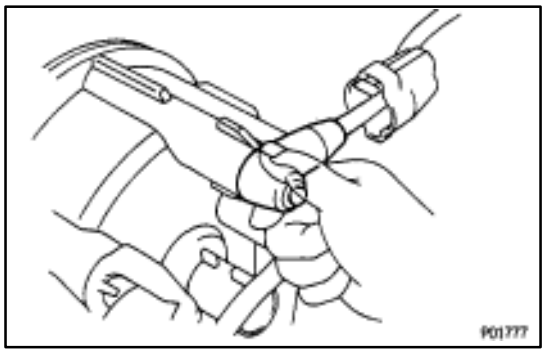


(c) Align the cutout marks of the coupling and housing.



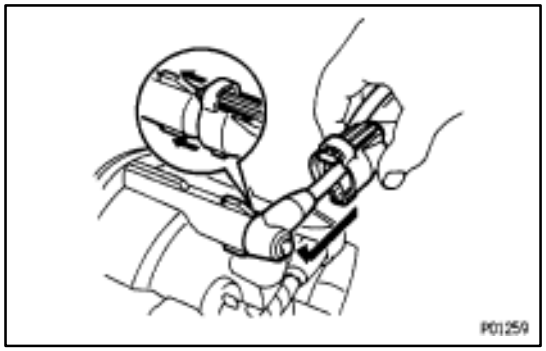
(d) Insert the distributor, aligning the line of the housing with the cutout of the distributor attachment bearing cap.

(e) Lightly tighten the two hold–down bolts.

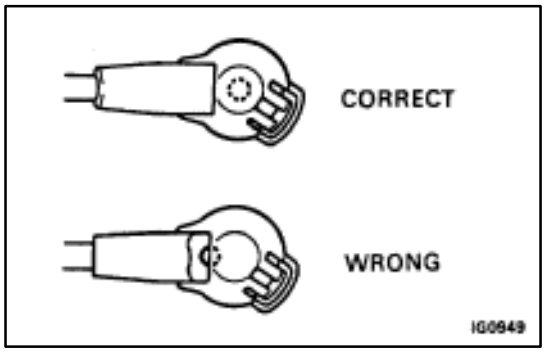


3. CONNECT HIGH–TENSION CORDS TO DISTRIBUTOR CAP

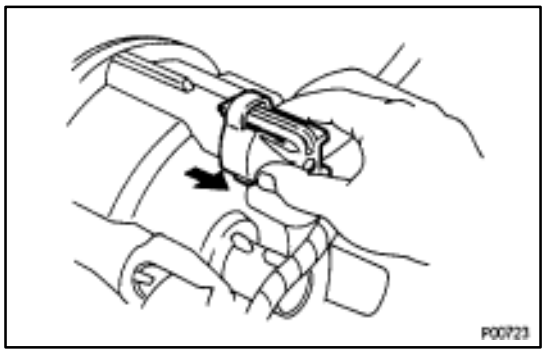
(a) (Ex. Center Cord)
First, insert the grommet part only.



(b) (Ex. Center Cord)
Align the spline of the distributor cap with the spline groove of the holder, and slide the holder.

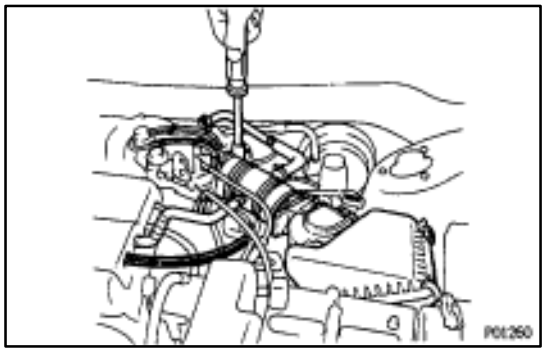


NOTICE: Check that the holder is correctly installed to the grommet and distributor cap as shown in the illustration.



(c) Check that the lock claw of the holder is engaged by lightly pulling the holder.
(d) (Center Cord)
Insert the grommet and holder together.

4. CONNECT DISTRIBUTOR CONNECTOR

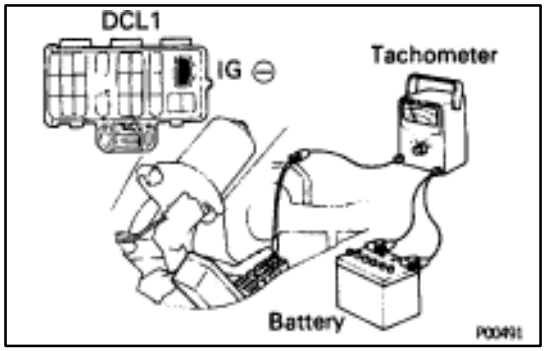


5. INSTALL AIR CLEANER CAP, MASS AIR FLOW AND AIR CLEANER HOSE

(a) Connect the air cleaner hose to the throttle body, and install the air cleaner cap together with the mass air flow with the four clips.
(b) Tighten the air cleaner hose clamp bolt.
(c) Connect the air hoses.
(d) Connect the mass air flow connector.
(e) Connect the mass air flow wire to the clamp on the mass air flow.

6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

7. WARM UP ENGINE
Allow the engine to reach normal operating temperature.

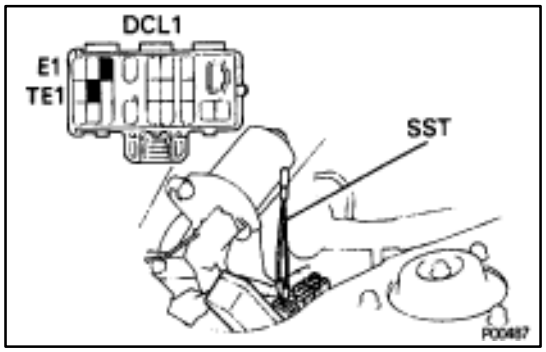


8. CONNECT TACHOMETER AND TIMING LIGHT TO ENGINE

Connect the tachometer test probe to terminal IG ⊕ of the DCL1.

NOTICE:

- **NEVER allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.**
- **As some tachometers are not compatible with this ignition system, we recommended that you confirm the compatibility of your unit before use.**



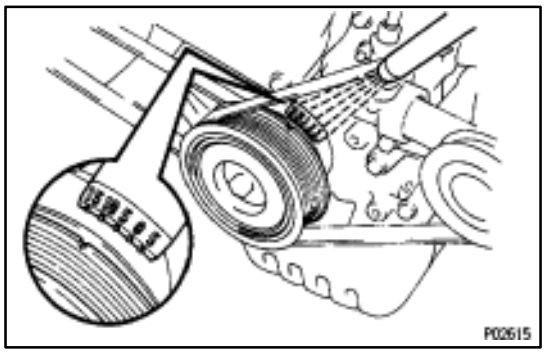
9. ADJUST IGNITION TIMING

(a) Check the idle speed.

Idle speed:

700 ± 50 rpm

(b) Using SST, connect terminals TE1 and E1 of the DCL1.
SST 09843–18020



(c) Using a timing light, check the ignition timing.

Ignition timing:

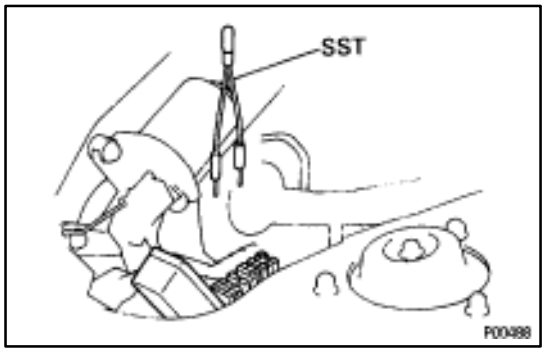
10° BTDC @ idle

(Transmission in neutral range)

(d) Loosen the two hold–down bolts, and adjust by turning the distributor.

(e) Tighten the hold–down bolts, and recheck the ignition timing.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



(f) Remove SST.
SST 09843–18020

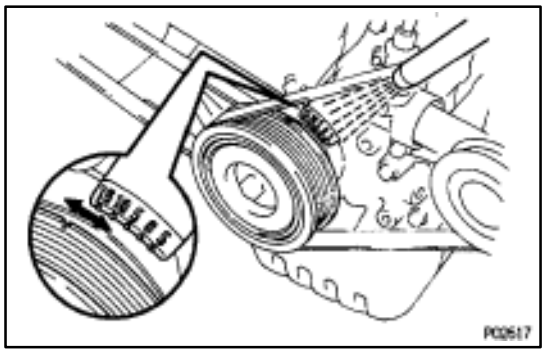
10. FURTHER CHECK IGNITION TIMING

Ignition timing:

10–20° BTDC @ idle

(Transmission in neutral range)

HINT: The timing mark moves in a range between 10° and 20°.



11. DISCONNECT TACHOMETER AND TIMING LIGHT FROM ENGINE

SERVICE SPECIFICATIONS

SERVICE DATA

IG01P–01

Ignition timing	w/ Terminals TE1 and E1 connected		10° BTDC @ idle
Firing order	–		1–2–3–4–5–6
High–tension cord	Resistance (Maximum)		25 kΩ per cord
Spark plug	Recommended spark plug	ND	PQ20R
	Recommended spark plug	NGK	BCPR6EP–11
	Correct electrode gap		1.1 mm (0.043 in.)
Ignition coil	Primary coil resistance (Cold)		0.3–0.6 Ω
	Secondary coil resistance (Cold)		9.0–15.0 kΩ
Distributor	Air gap		0.2–0.5 mm (0.08–0.020 in.)
	Signal generator (pickup coil) resistance (Cold)		
	G1–G⊕		125–190 Ω
	G2–G⊕		125–190 Ω
	NE–G⊕		155–240 Ω

TORQUE SPECIFICATIONS

IG01Q–01

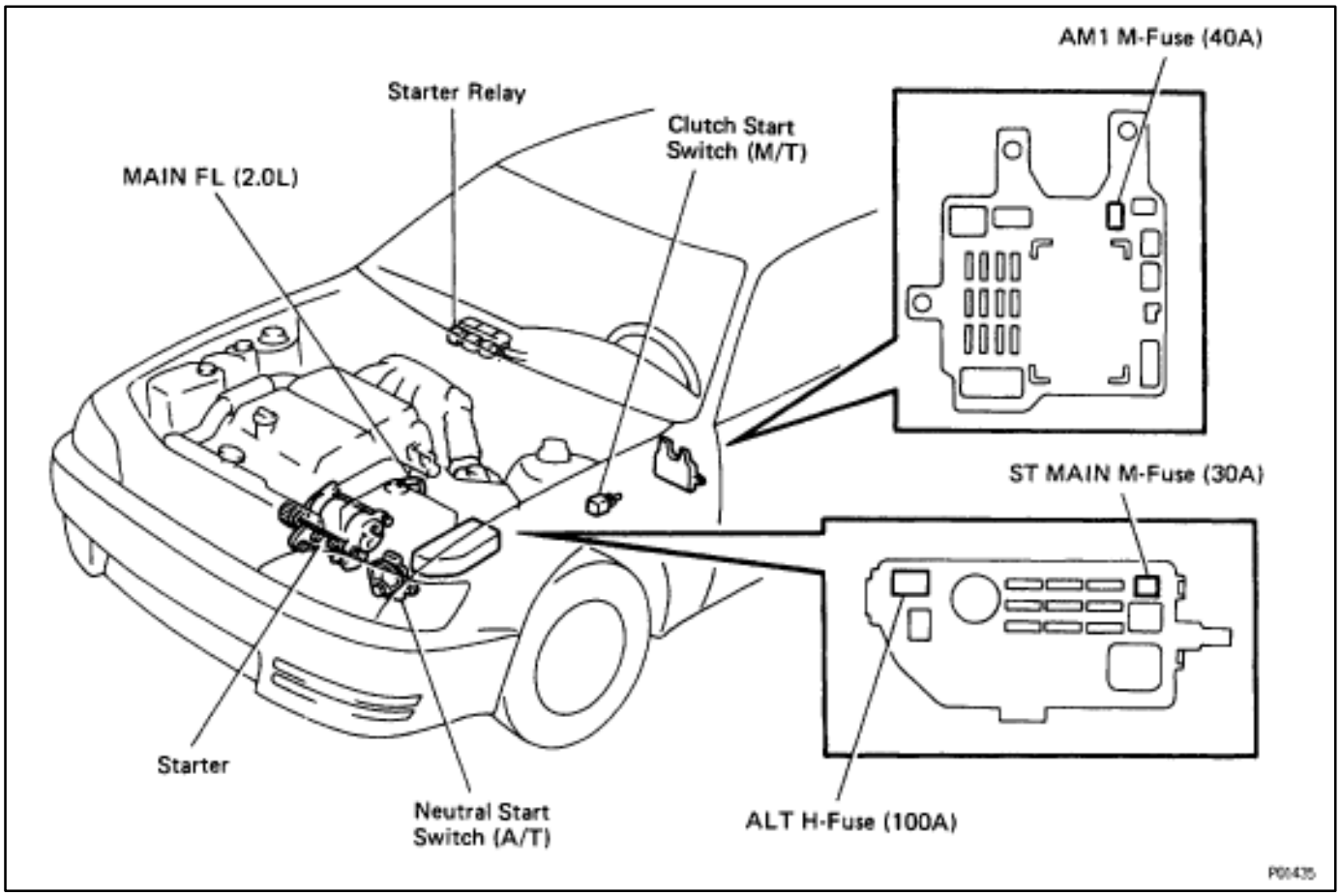
Part tightened	N·m	kgf·cm	ft·lbf
Spark plug X Cylinder head	18	180	13
Distributor X Cylinder head	18	185	13

STARTING SYSTEM

DESCRIPTION

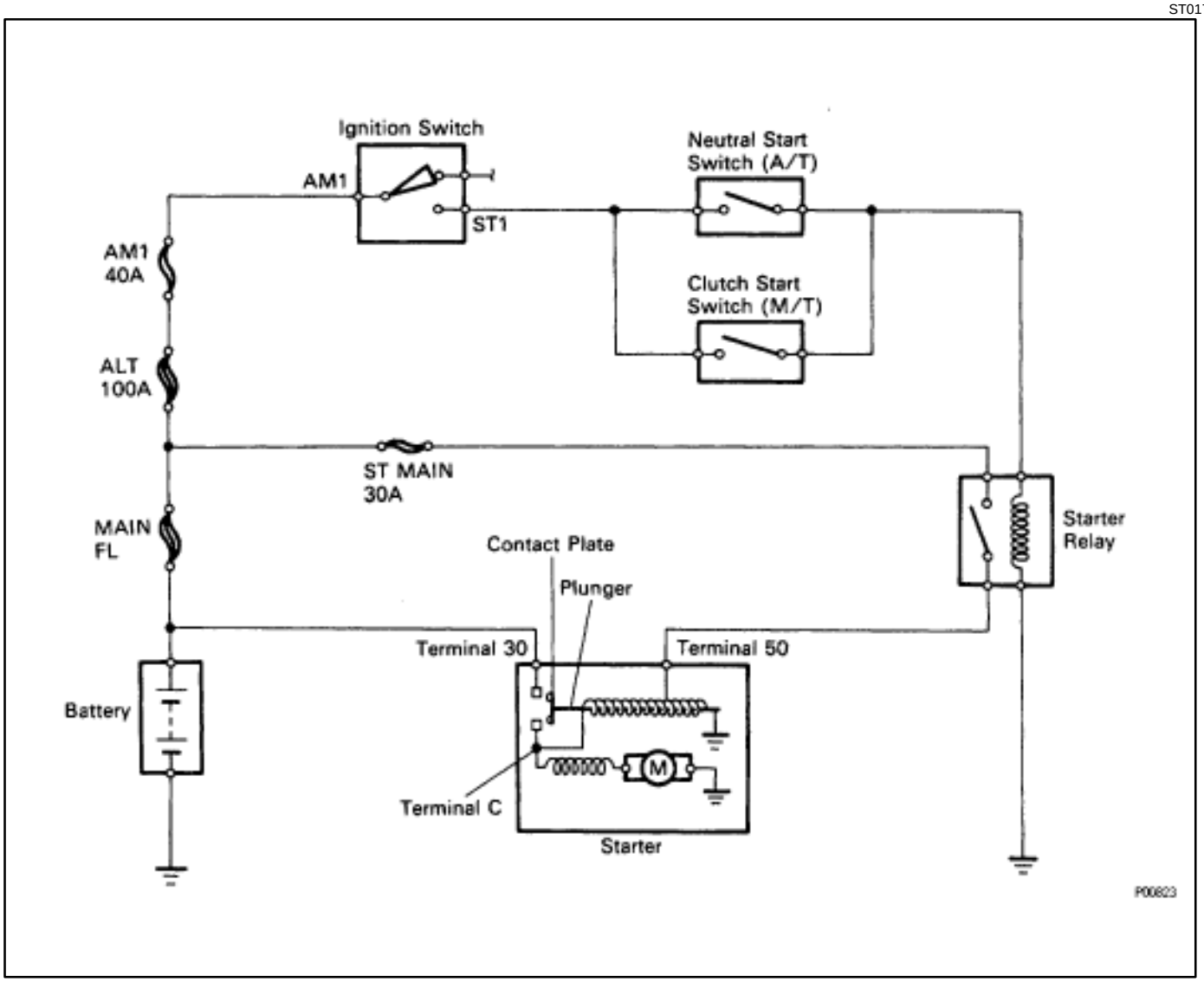
ST018–02

The starter is a reduction type with a small, high–speed motor used to drive the pinion gear.



SYSTEM CIRCUIT

ST017–01



OPERATION

ST019–01

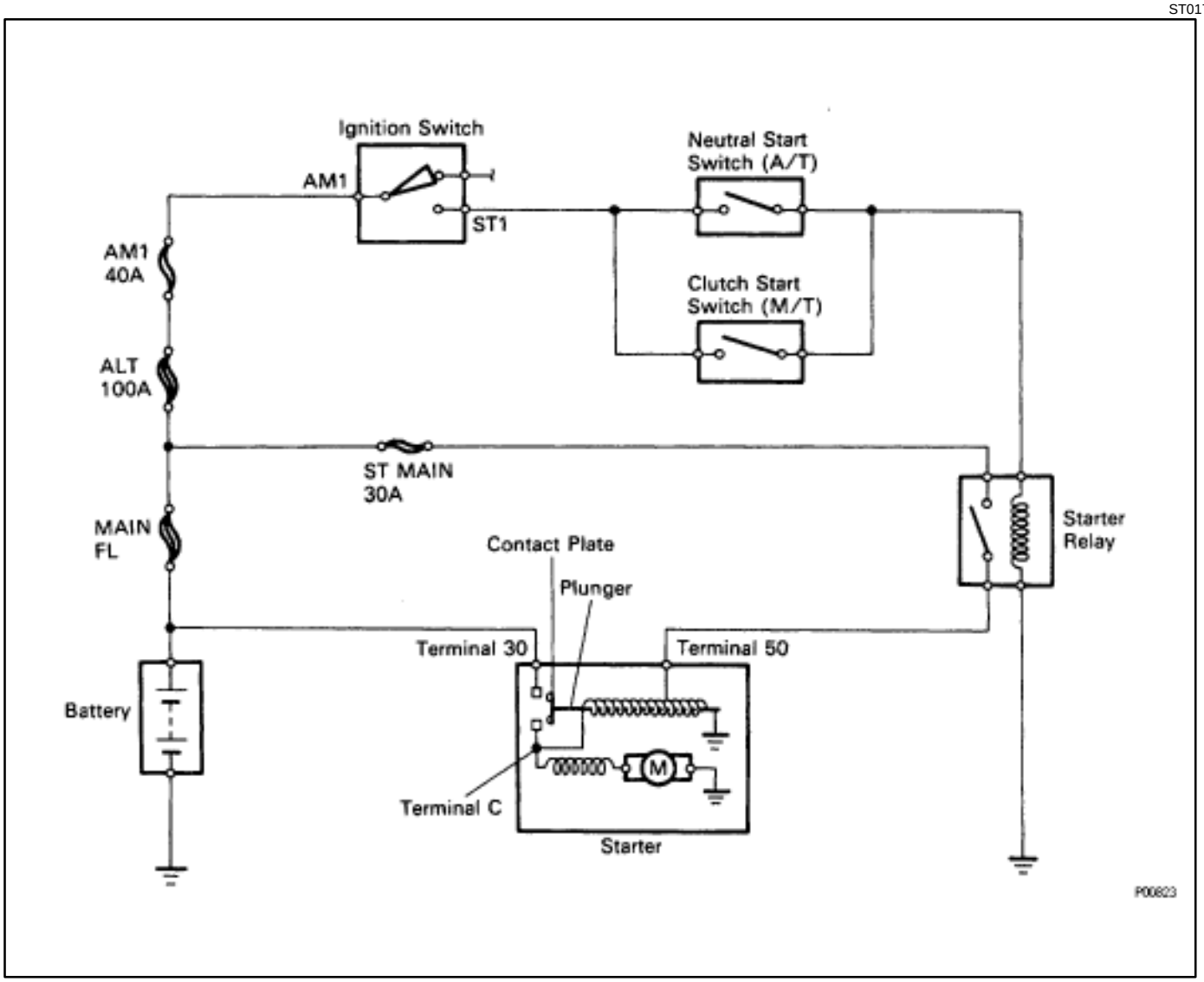
When the ignition switch is turned to START position, current flows from terminal 50 to the coil of the solenoid and the plunger is pulled by the magnetic force of the coil. When the plunger is pulled to the left as shown above, the contact plate of the plunger allows current from the battery to flow directly from terminal 30 to the motor, and the starter rotates.

When the engine is running and the ignition switch is returned to ON, the magnetic force of the coil disappears and the contact plate of the plunger is returned to its original position by the return spring.

Battery voltage no longer flows from terminal 30, so the motor stops.

SYSTEM CIRCUIT

ST017–01



OPERATION

ST019–01

When the ignition switch is turned to START position, current flows from terminal 50 to the coil of the solenoid and the plunger is pulled by the magnetic force of the coil. When the plunger is pulled to the left as shown above, the contact plate of the plunger allows current from the battery to flow directly from terminal 30 to the motor, and the starter rotates.

When the engine is running and the ignition switch is returned to ON, the magnetic force of the coil disappears and the contact plate of the plunger is returned to its original position by the return spring.

Battery voltage no longer flows from terminal 30, so the motor stops.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

ST01A–01

	09286–46011	Injection Pump Spline Shaft Puller	Armature bearing
	09820–00030	Alternator Rear Bearing Replacer	Armature front bearing

RECOMMENDED TOOLS

ST01C–01

	09082–00015	TOYOTA Electrical Tester	

EQUIPMENT

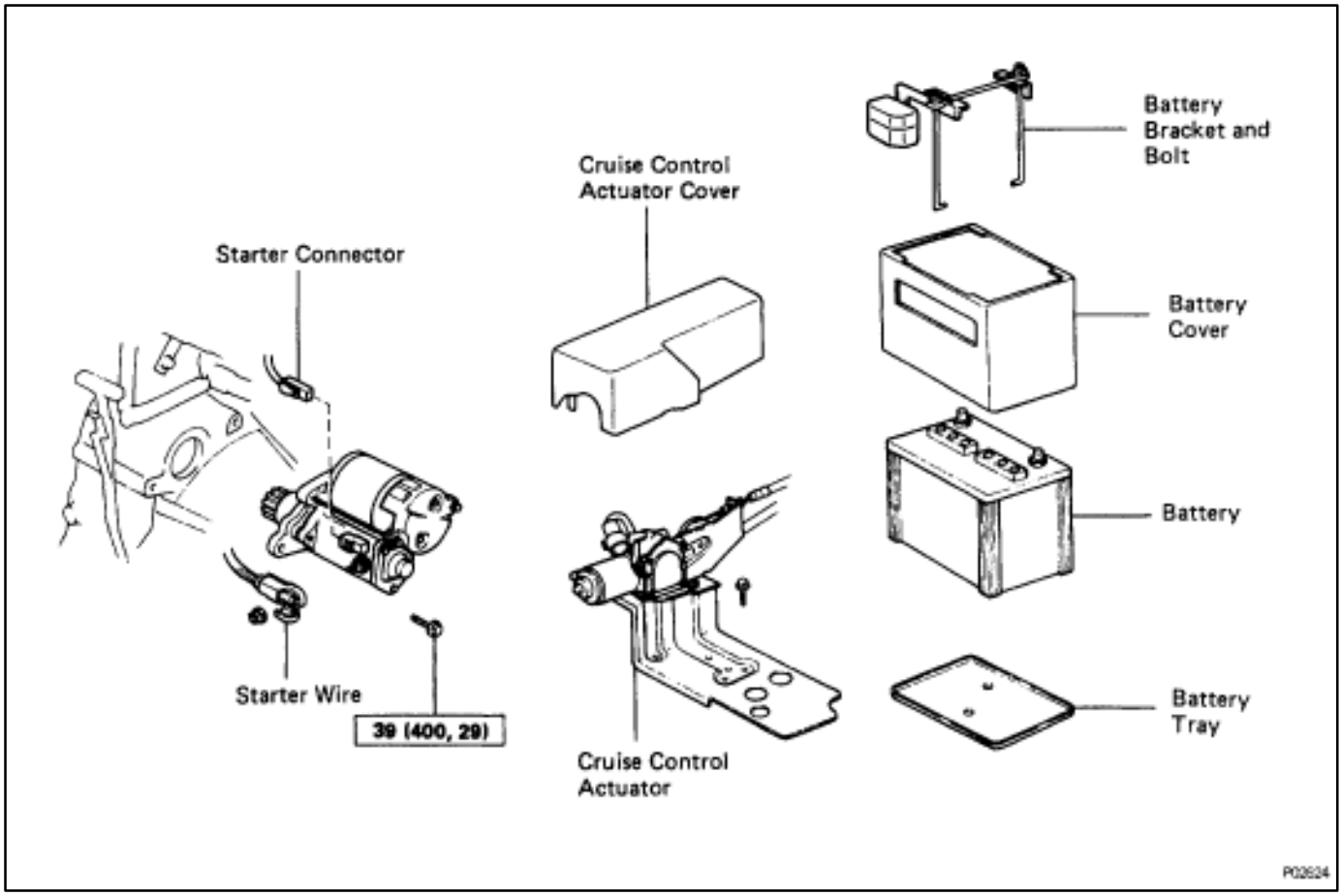
ST01E–01

Dial indicator	Commutator
Magnetic finger	Steel ball
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V–block	Commutator
Vernier calipers	Commutator, Brush

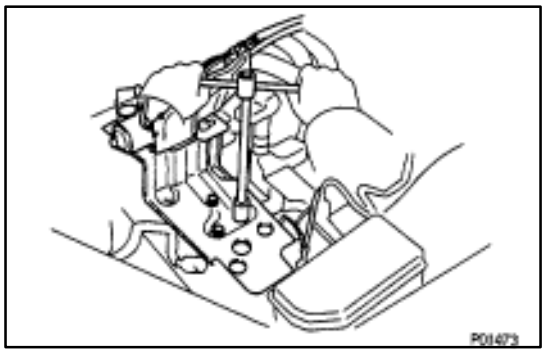
STARTER

STARTER REMOVAL

ST01B–02

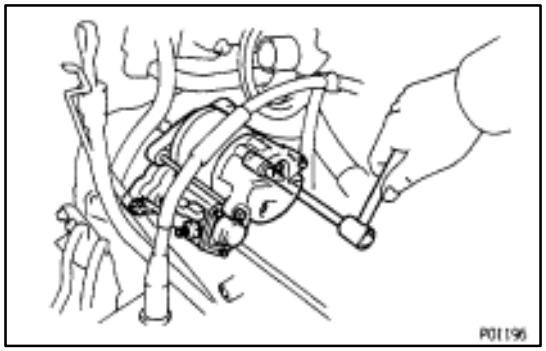


1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
   CAUTION (w/ Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
2. **REMOVE BATTERY**



3. **REMOVE CRUISE CONTROL ACTUATOR**

(a) Remove the actuator cover.
(b) Disconnect the actuator connector.
(c) Remove the three bolts and cruise control actuator.

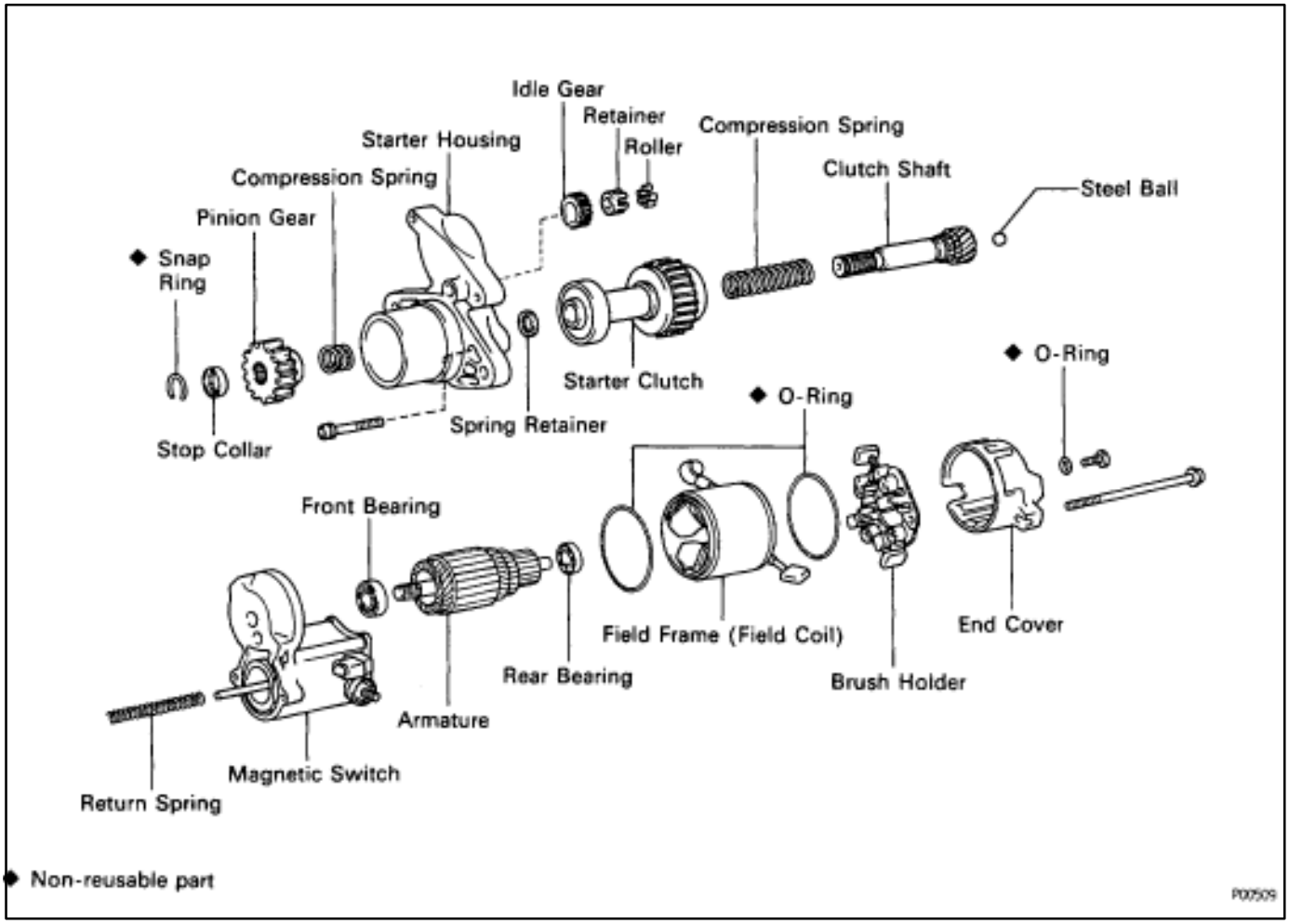


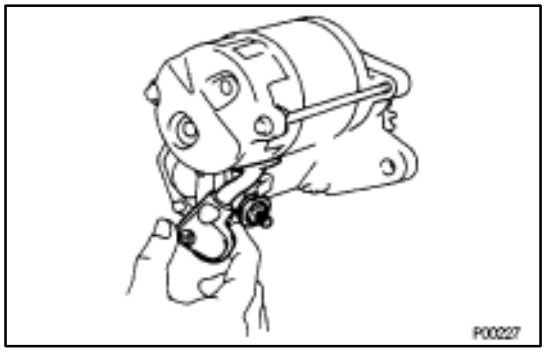
4. REMOVE STARTER

(a) Disconnect the starter connector.
(b) Remove the nut, and disconnect the starter wire.
(c) Remove the two bolts and starter.

COMPONENTS

ST01D–01



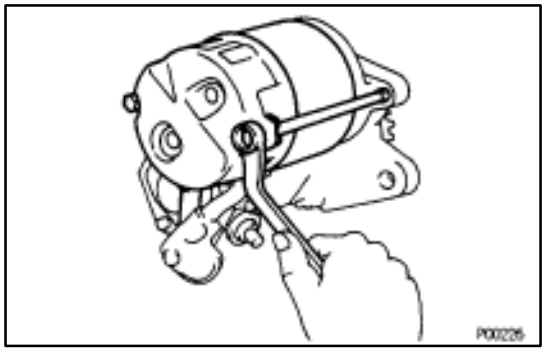


STARTER DISASSEMBLY

ST01F–01

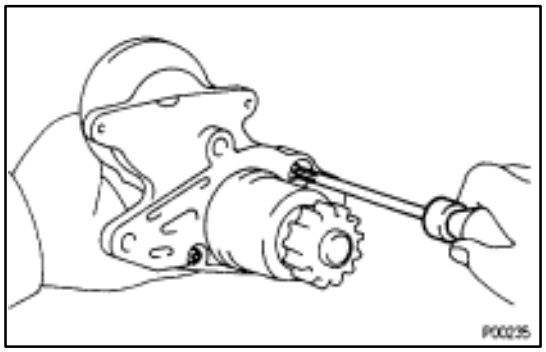
1. REMOVE FIELD FRAME AND ARMATURE

(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.

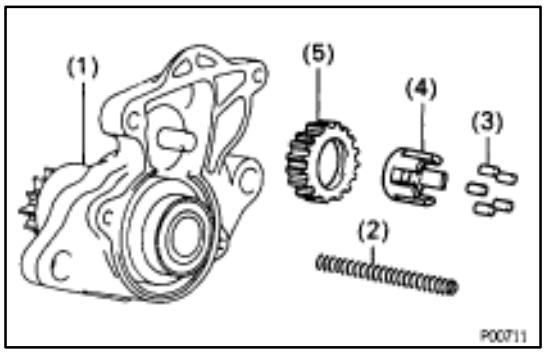


(b) Remove the two through bolts.
(c) Pull out the field frame with the armature from the magnetic switch assembly.
(d) Remove the O–ring.

2. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

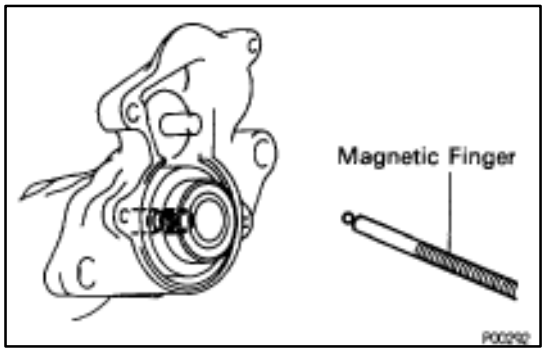


(a) Remove the two screws.



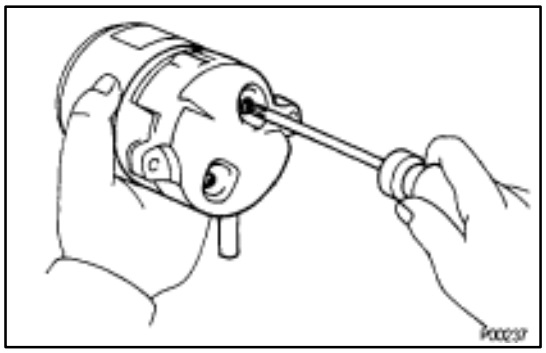
(b) Remove the following parts from the magnetic switch assembly:
(1) Starter housing and clutch assembly
(2) Return spring
(3) Roller
(4) Retainer
(5) Idler gear

3. REMOVE STEEL BALL

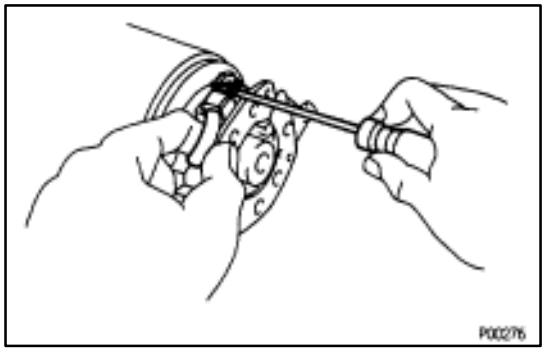


Using a magnetic finger, remove the steel ball from the clutch shaft hole.

4. REMOVE BRUSH HOLDER

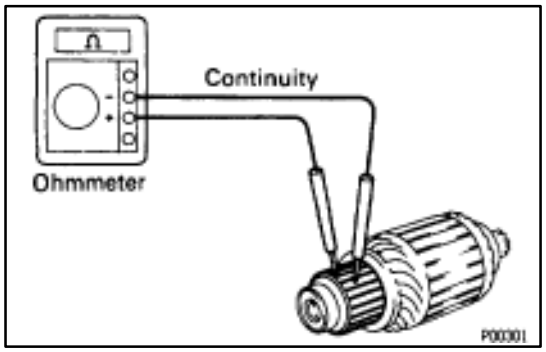


(a) Remove the two screws and end cover from the field frame.
(b) Remove the O–ring from the field frame.



(c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder. Disconnect the four brushes and remove the brush holder.

5. REMOVE ARMATURE FROM FIELD FRAME



STARTER INSPECTION AND REPAIR

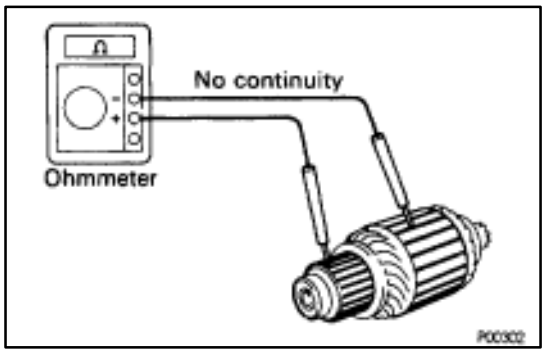
ST01G–01

Armature Coil

1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segment, replace the armature.



2. INSPECT COMMUTATOR FOR GROUND

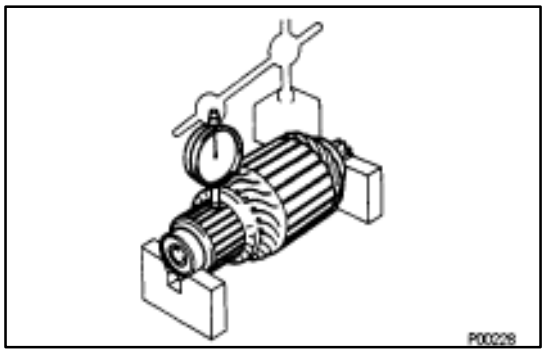
Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.

Commutator

1. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If the surface is dirty or burnt, correct it with sandpaper (No.400) or on a lathe.



2. INSPECT COMMUTATOR CIRCLE RUNOUT

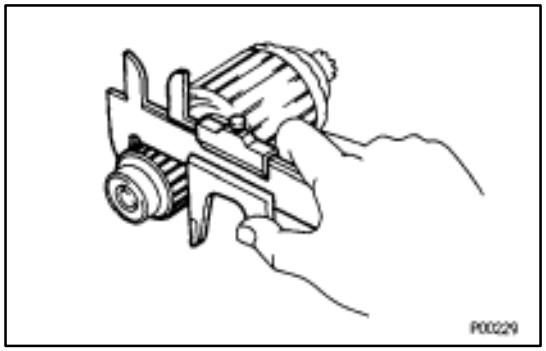
(a) Place the commutator on V–blocks.

(b) Using a dial gauge, measure the circle runout.

Maximum circle runout:

0.05 mm (0.0020 in.)

If the circle runout is greater than maximum, correct it on a lathe.



3. INSPECT COMMUTATOR DIAMETER

Using a vernier caliper, measure the commutator diameter.

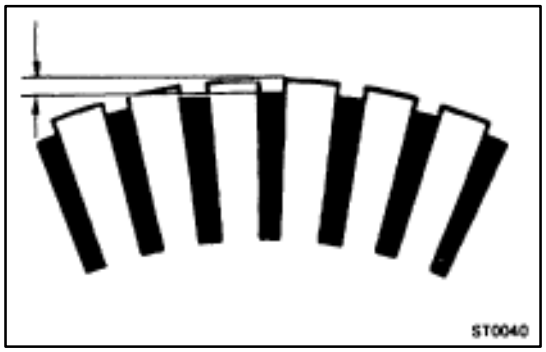
Standard diameter:

30 mm (1.18 in.)

Minimum diameter:

29 mm (1.14 in.)

If the diameter is less than minimum, replace the armature.



4. INSPECT UNDERCUT DEPTH

Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

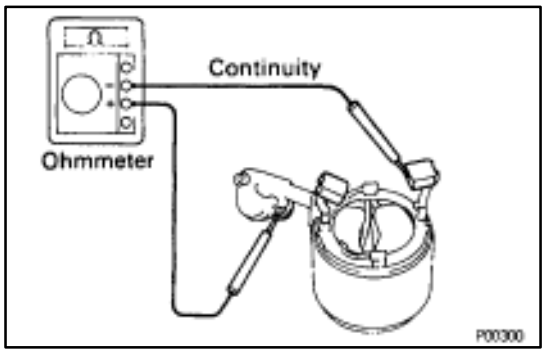
Standard undercut depth:

0.6 mm (0.024 in.)

Minimum undercut depth:

0.2 mm (0.008 in.)

If the undercut depth is less than minimum, correct it with a hacksaw blade.

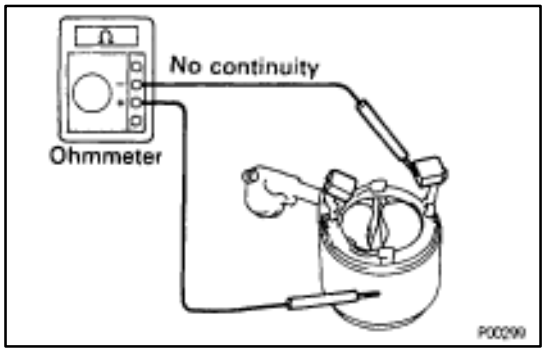


Field Frame (Field Coil)

1. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

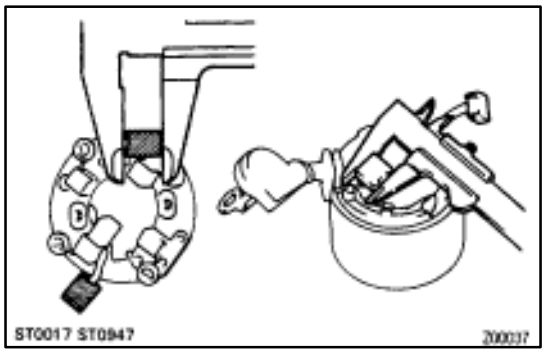
If there is no continuity, replace the field frame.



2. INSPECT FIELD COIL FOR GROUND

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, repair or replace the field frame.



Brushes

INSPECT BRUSH LENGTH

Using a vernier caliper, measure the brush length.

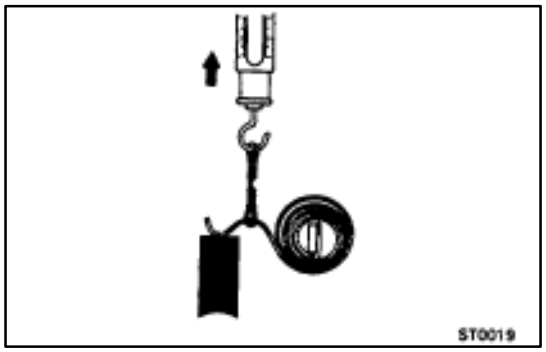
Standard length:

15.0 mm (0.591 in.)

Minimum length:

10.0 mm (0.394 in.)

If the length is less than minimum, replace the brush holder and field frame.



Brush Springs

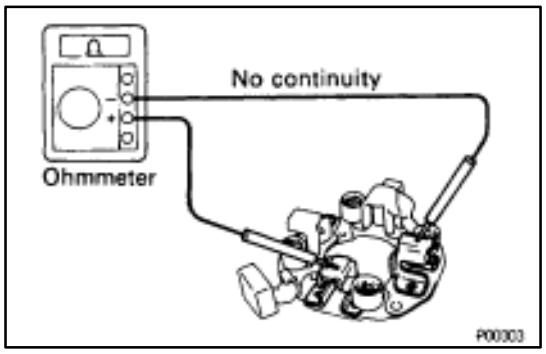
INSPECT BRUSH SPRING LOAD

Take the pull scale reading the instant the brush spring separates from the brush.

Spring installed load:

18–24 N (1.79–2.41 kgf, 3.9–5.3 lbf)

If the installed load is not within specification, replace the brush springs.



Brush Holder

INSPECT BRUSH HOLDER INSULATION

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

If there is continuity, repair or replace the brush holder.

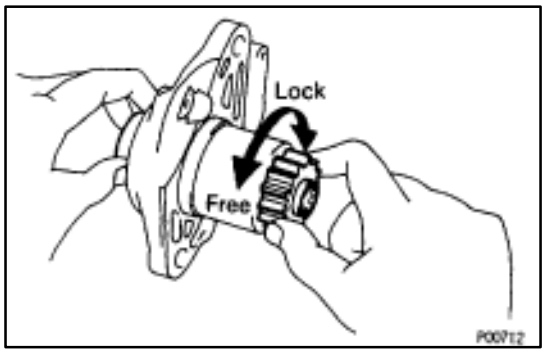
Clutch and Gears

1. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idle gear and clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

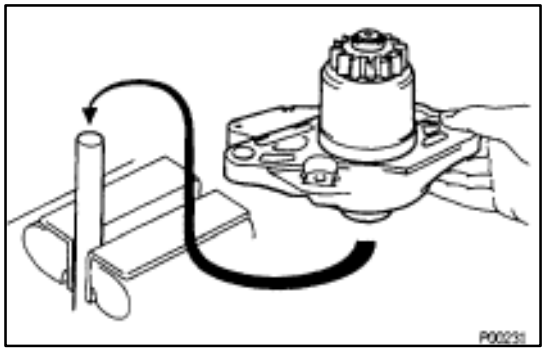
If damaged, also check the drive plate ring gear for wear or damage.



2. INSPECT CLUTCH PINION GEAR

Hold the starter clutch and rotate the pinion gear counterclockwise, and check that it turns freely. Try to rotate the pinion gear clockwise and check that it locks.

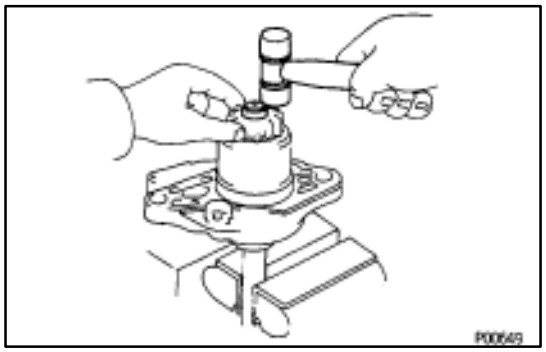
If necessary, replace the clutch assembly.



3. IF NECESSARY, REPLACE CLUTCH ASSEMBLY

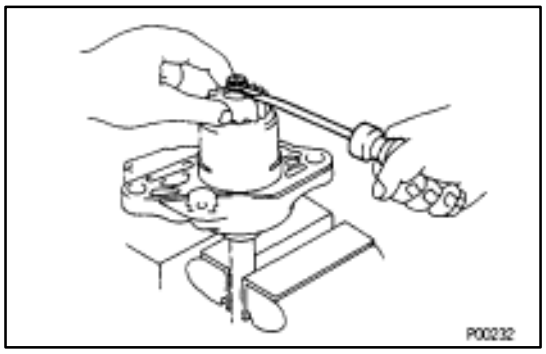
A. Disassembly of starter housing and clutch assembly

(a) Mount a brass bar in a vise, and install the starter housing and clutch assembly to the brass bar.

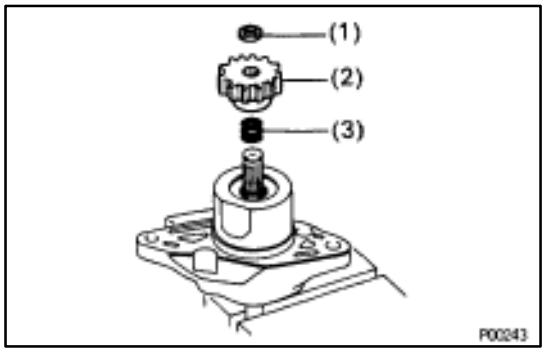


(b) Push down the pinion gear

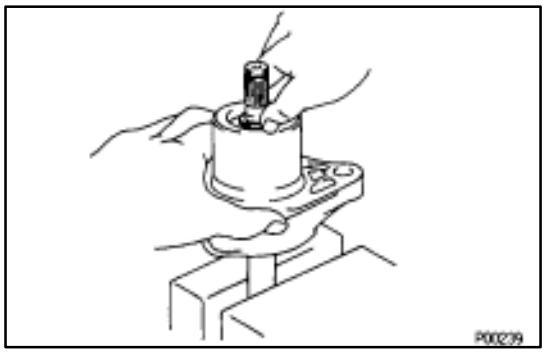
(c) Using a plastic–faced hammer, tap down the stop collar.



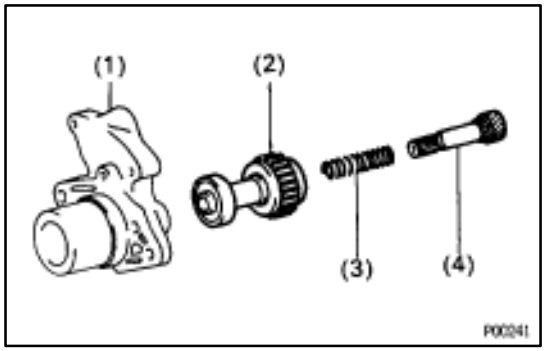
(d) Using a screwdriver, pry out the snap ring.



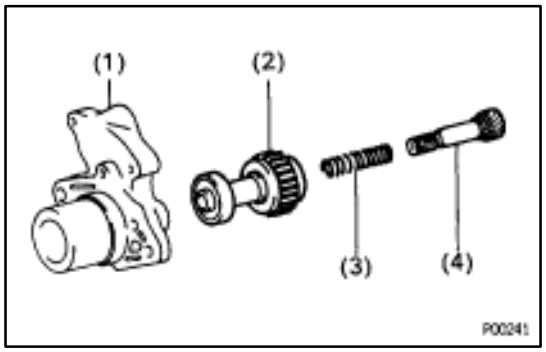
(e) Remove the following parts:
   (1) Stop collar
   (2) Pinion gear
   (3) Compression spring



(f) Push down the starter housing, and remove the spring retainer.

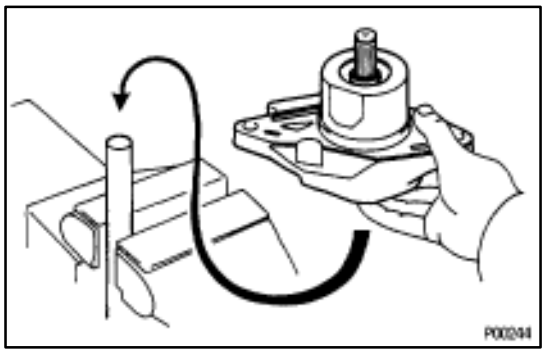


(g) Disassemble the following parts:
(1) Starter housing
(2) Starter clutch
(3) Compression spring
(4) Clutch shaft

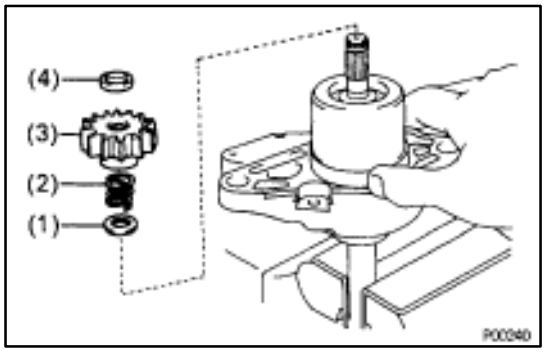


B. Assemble starter housing and clutch assembly

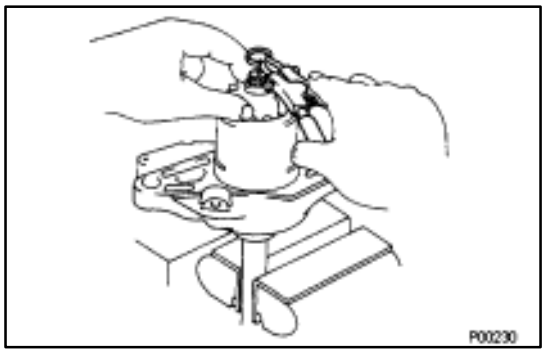
(a) Assemble the following parts:
(1) Starter housing
(2) Starter clutch
(3) Compression spring
(4) Clutch shaft



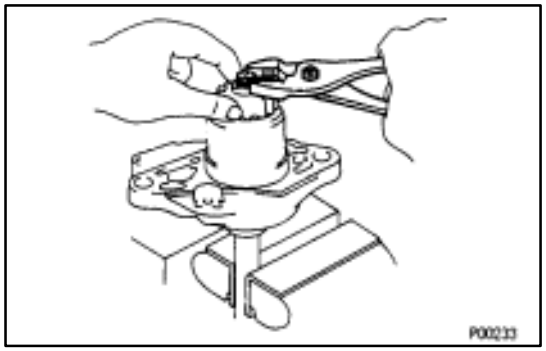
(b) Mount a brass bar in a vise, install the starter housing and clutch assembly to the brass bar.



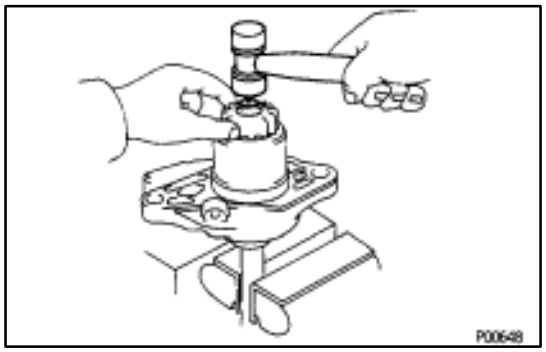
(c) Push down the starter housing, and install the following parts:
(1) Spring retainer
(2) Compression spring
(3) Pinion gear
(4) Stop collar



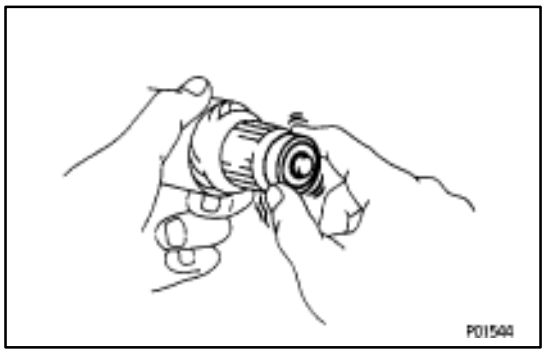
(d) Push down the pinion gear.
(e) Using snap ring pliers, install a new snap ring.



(f) Using pliers, compress the snap ring.
(g) Check that the snap ring fits correctly.



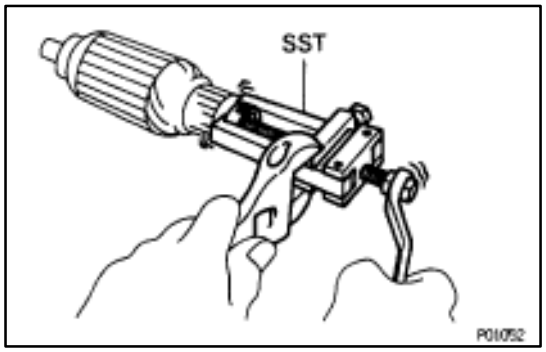
(h) Remove the starter housing and clutch assembly from the brass bar.
(i) Using a plastic–faced hammer, tap the clutch shaft and install the stop collar onto the snap ring.



Bearings

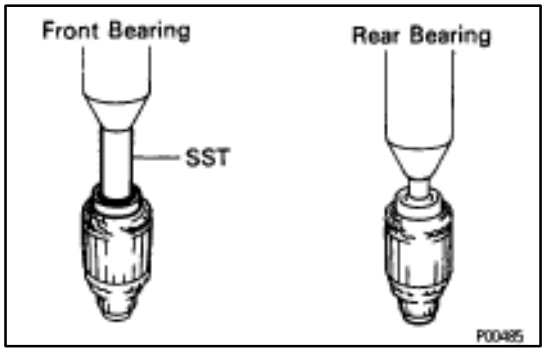
1. INSPECT BEARINGS

Turn each bearing by hand while applying inward force.
If resistance is felt or the bearing sticks, replace the bearing.

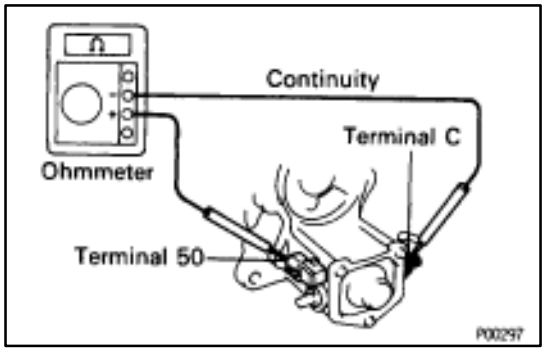


2. IF NECESSARY, REPLACE BEARING

(a) Using SST, remove the bearing.
SST 09286–46011



(b) Using SST and a press, press in a new front bearing.
SST 09820–00030
(c) Using a press, press in a new rear bearing.

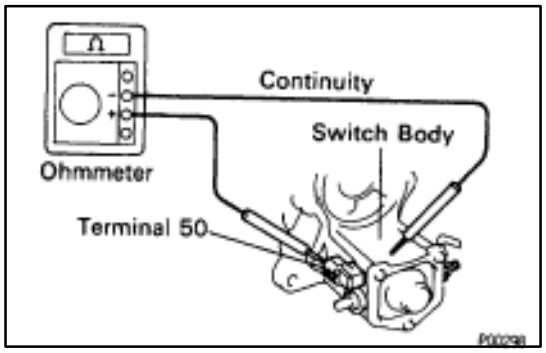


Magnetic Switch

1. PERFORM PULL–IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, replace the magnetic switch.



2. PERFORM HOLD–IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

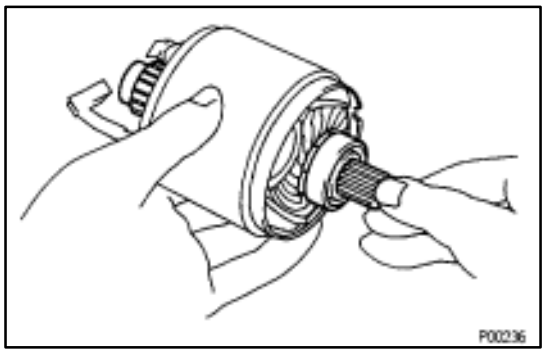
If there is no continuity, replace the magnetic switch.

STARTER ASSEMBLY

ST01J–02

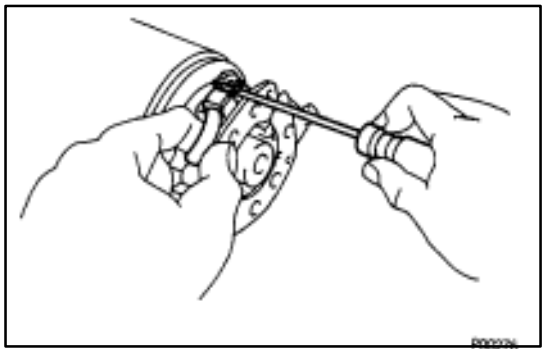
(See page ST–6)

HINT: Use high–temperature grease to lubricate the bearings and gears when assembling the starter.



1. PLACE ARMATURE INTO FIELD FRAME

Apply grease to the armature bearings, and insert the armature into the field frame.

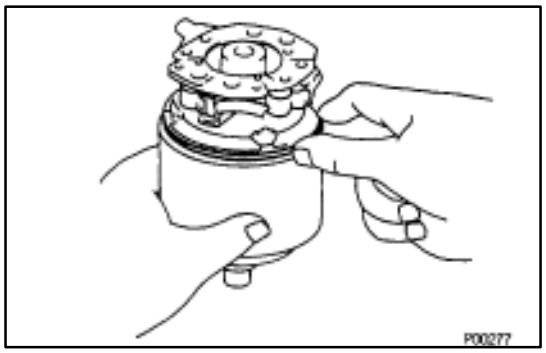


2. INSTALL BRUSH HOLDER

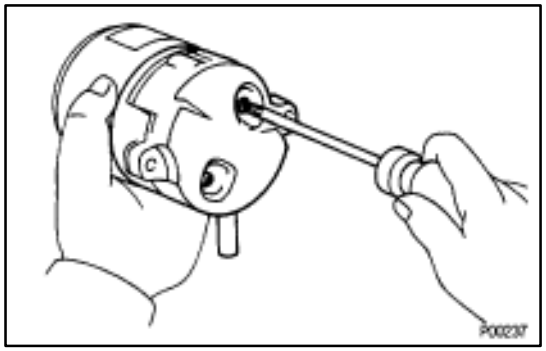
(a) Place the brush holder on the armature.

(b) Using a screwdriver, hold the brush spring back, and connect the brush into the brush holder. Connect the four brushes.

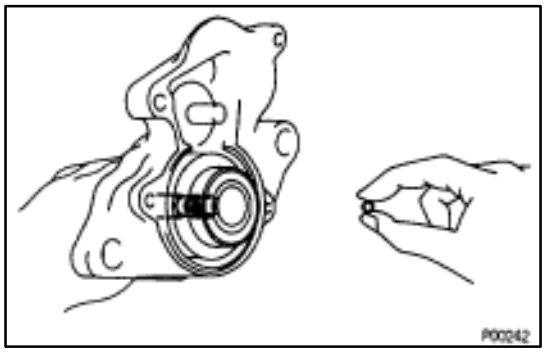
NOTICE: Check that the positive (+) lead wires are not grounded.



(c) Place a new O–ring in position on the field frame.

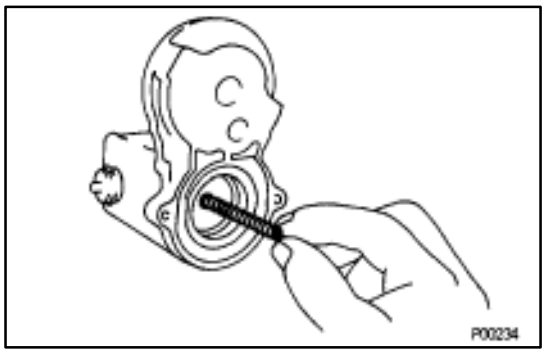


(d) Install a new O–ring to the end cover screw.
(e) Install the end cover to the field frame with the two screws.



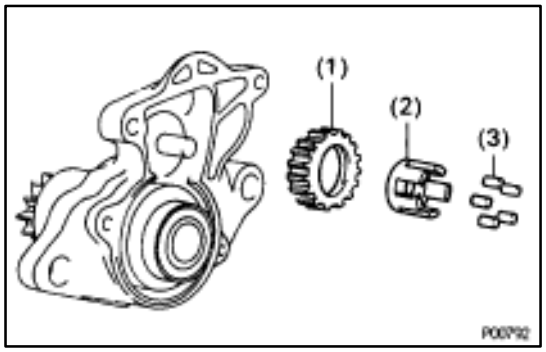
3. INSERT STEEL BALL INTO CLUTCH SHAFT HOLE

(a) Apply grease to the steel ball.
(b) Insert the steel ball into the clutch shaft hole.

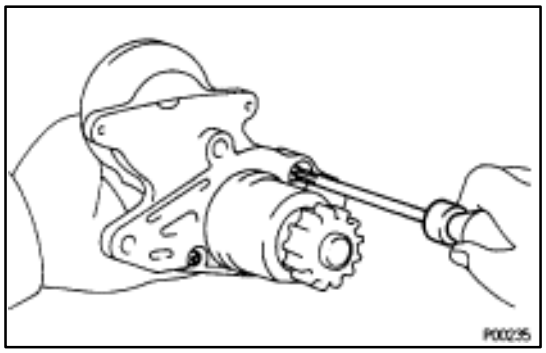


4. INSTALL STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

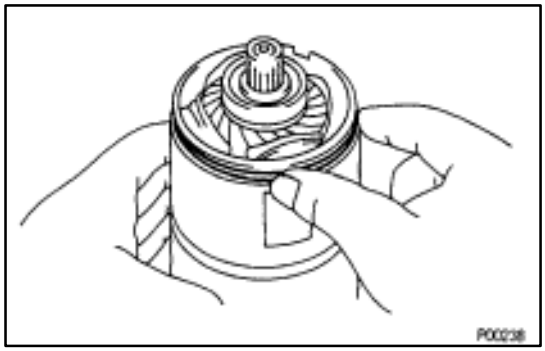
(a) Apply grease to the return spring.
(b) Insert the return spring into the magnetic switch hole.



(c) Place the following parts in position on the starter housing:
    (1) Idler gear
    (2) Retainer
    (3) Roller

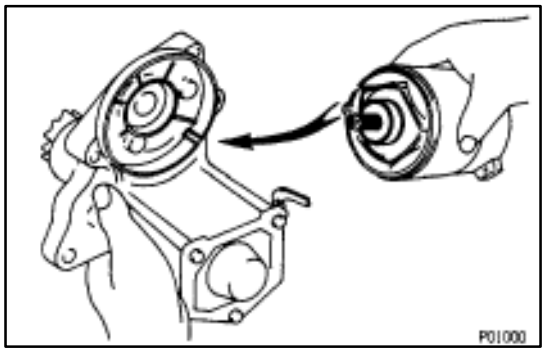


(d) Assemble the starter housing and magnetic switch assembly and install the two screws.

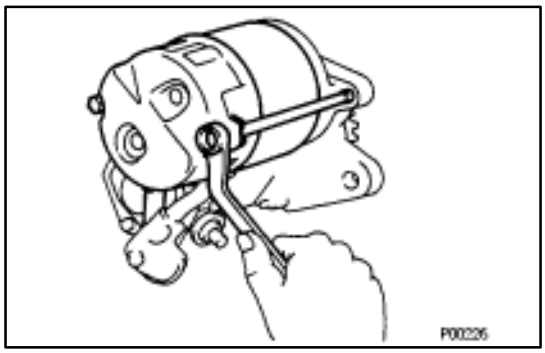


5. INSTALL FIELD FRAME AND ARMATURE ASSEMBLY

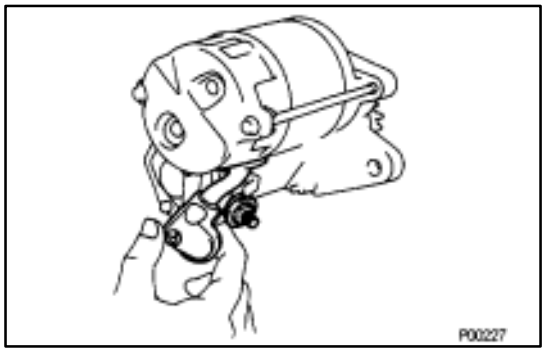
(a) Place a new O–ring in position on the field frame.



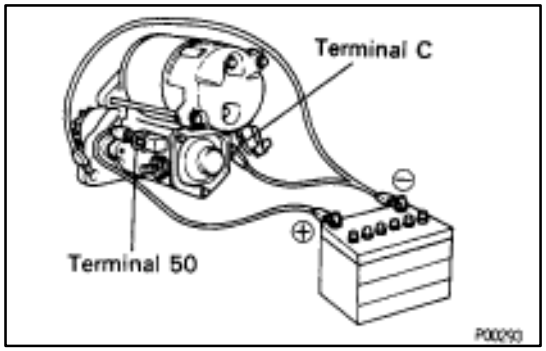
(b) Align the protrusion of the field frame with the cutout of the magnetic switch.



(c) Install the field frame and armature assembly with the two through bolts.



(d) Connect the lead wire to terminal C, and install the nut.



STARTER PERFORMANCE TEST

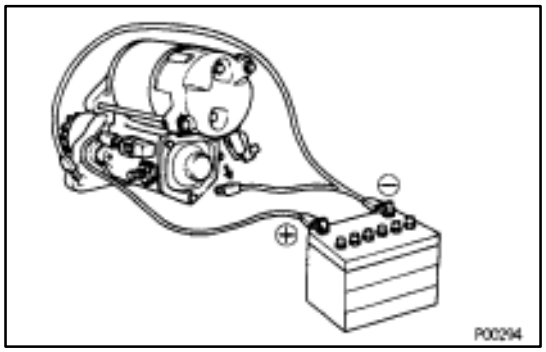
ST01L–01

NOTICE: These tests must be performed within 3 to 5 seconds to avoid burning out the coil.

1. PERFORM PULL–IN TEST

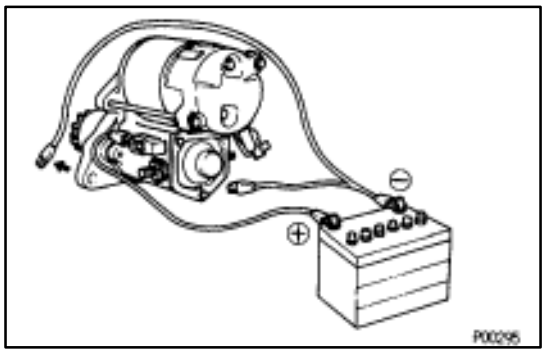
(a) Disconnect the field coil lead wire from terminal C.

(b) Connect the battery to the magnetic switch as shown.
Check that the clutch pinion gear moves outward.
If the clutch pinion gear does not move, replace the magnetic switch assembly.



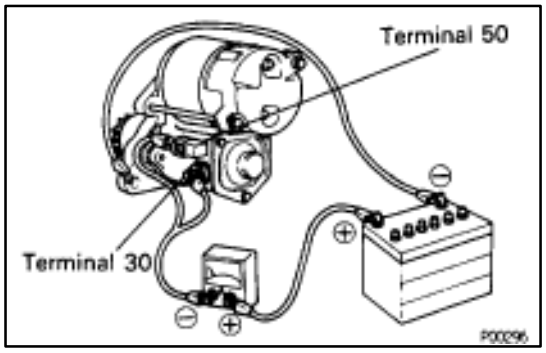
2. PERFORM HOLD–IN TEST

With battery connected as above with the clutch pinion gear out, disconnect the negative (–) lead from terminal C. Check that the pinion gear terminals out.
If the clutch pinion gear returns inward, replace the magnetic switch assembly.



3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (–) lead from the switch body.
Check that the clutch pinion gear returns inward.
If the clutch pinion gear does not return, replace the magnetic switch assembly.



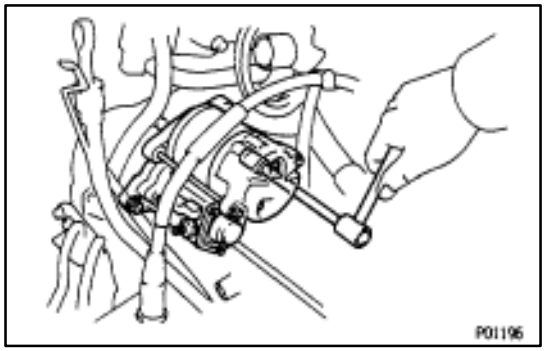
4. PERFORM NO–LOAD PERFORMANCE TEST

(a) Connect the battery and ammeter to the starter as shown.

(b) Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter shows the specified current.

Specified current:

90 A or less at 11.5 V



STARTER INSTALLATION

ST01M–02

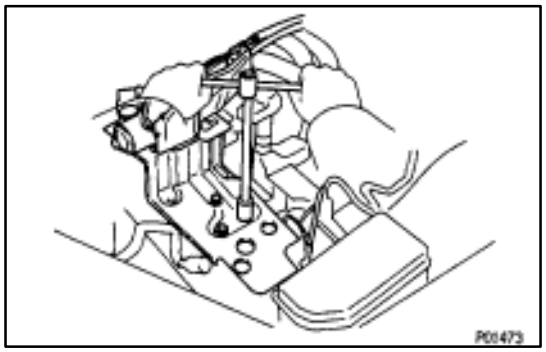
(See page ST–5)

1. INSTALL STARTER

(a) Install the starter with the two bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Connect the starter wire with the nut.

(c) Connect the starter connector.



2. INSTALL CRUISE CONTROL ACTUATOR

(a) Install the cruise control actuator with the three bolts.

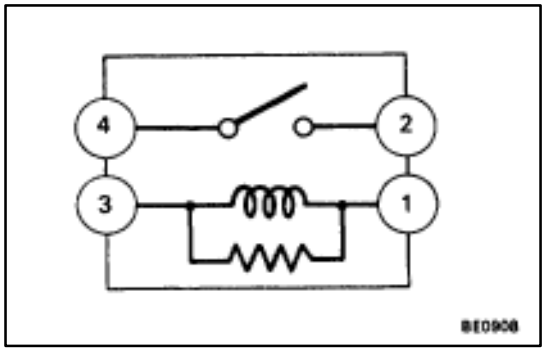
(b) Connect the actuator connector.

(c) Install the actuator cover.

3. INSTALL BATTERY

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

5. CHECK THAT ENGINE STARTS

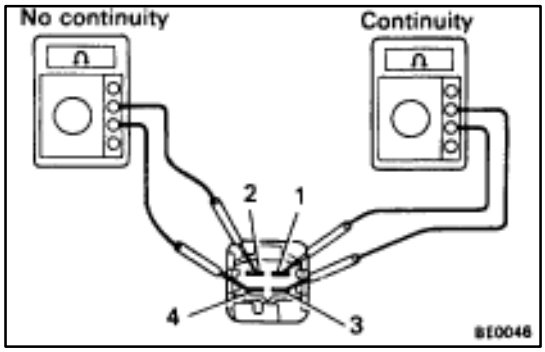


STARTER RELAY

STARTER RELAY INSPECTION

ST01H–02

LOCATION: (See page ST–2)

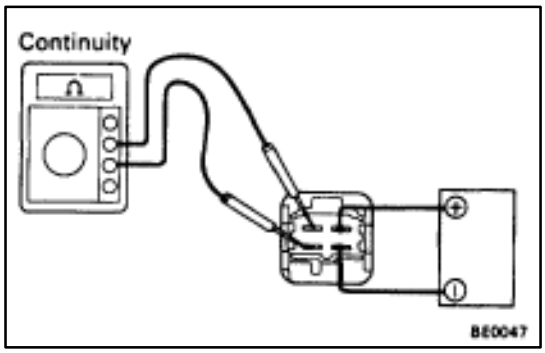


1. INSPECTION RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Using an ohmmeter, check that there is continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

CLUTCH START SWITCH

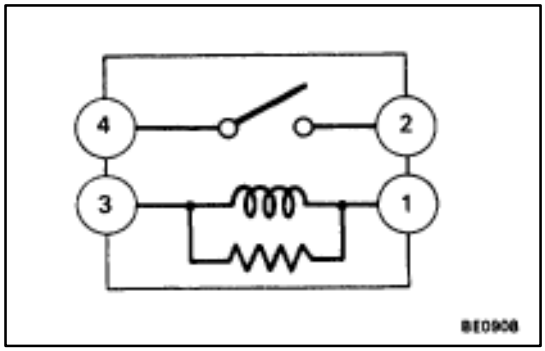
ST01K–01

(See MX section)

NEUTRAL START SWITCH

ST01N–01

(See AX section)

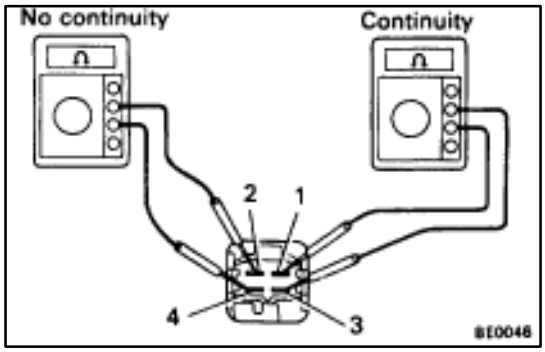


STARTER RELAY

STARTER RELAY INSPECTION

ST01H–02

LOCATION: (See page ST–2)

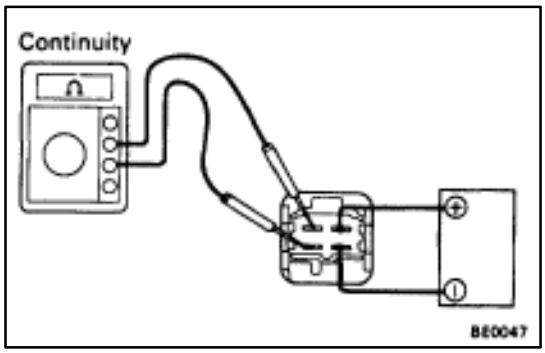


1. INSPECTION RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Using an ohmmeter, check that there is continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

CLUTCH START SWITCH

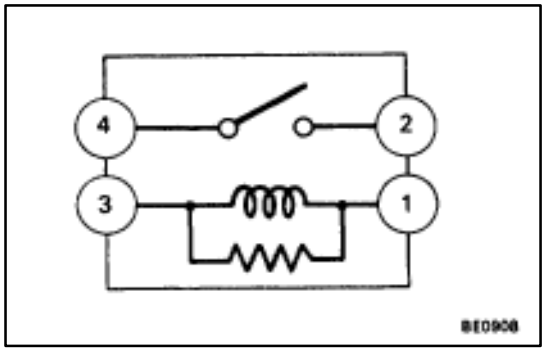
ST01K–01

(See MX section)

NEUTRAL START SWITCH

ST01N–01

(See AX section)

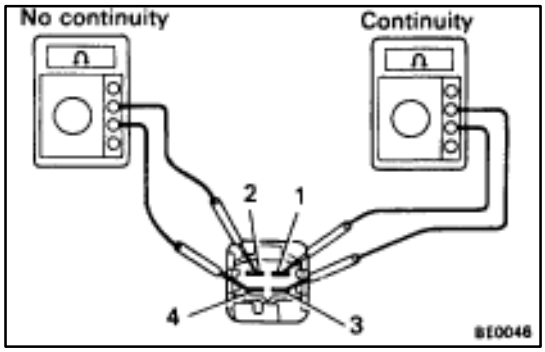


STARTER RELAY

STARTER RELAY INSPECTION

ST01H–02

LOCATION: (See page ST–2)

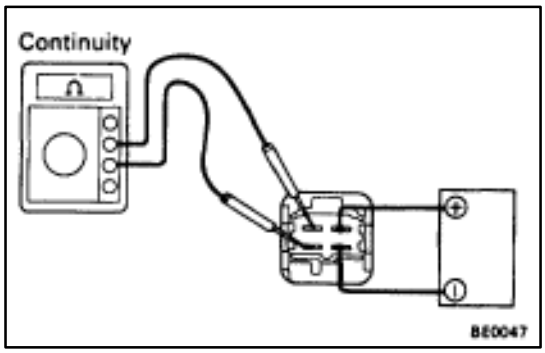


1. INSPECTION RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Using an ohmmeter, check that there is continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

CLUTCH START SWITCH

ST01K–01

(See MX section)

NEUTRAL START SWITCH

ST01N–01

(See AX section)

SERVICE SPECIFICATIONS

SERVICE DATA

ST01P–01

Starter	Rated voltage and output power	12 V 1.4 kW
	No–load characteristics (Current)	90 A or less at 11.5 V
	No–load characteristics (rpm)	3,000 rpm or more
	Brush length (STD)	15.0 mm (0.591 in.)
	Brush length (Minimum)	10.0 mm (0.394 in.)
	Spring installed load	18–24 N (1.79–2.41 kgf, 3.9–5.3 lbf)
	Commutator	
	Diameter (STD)	30 mm (1.18 in.)
	Diameter (Minimum)	29 mm (1.14 in.)
	Undercut depth (STD)	0.6 mm (0.024 in.)
	Undercut depth (Minimum)	0.2 mm (0.008 in.)
	Circle runout (Maximum)	0.05 mm (0.0020 in.)

TORQUE SPECIFICATIONS

ST01Q–01

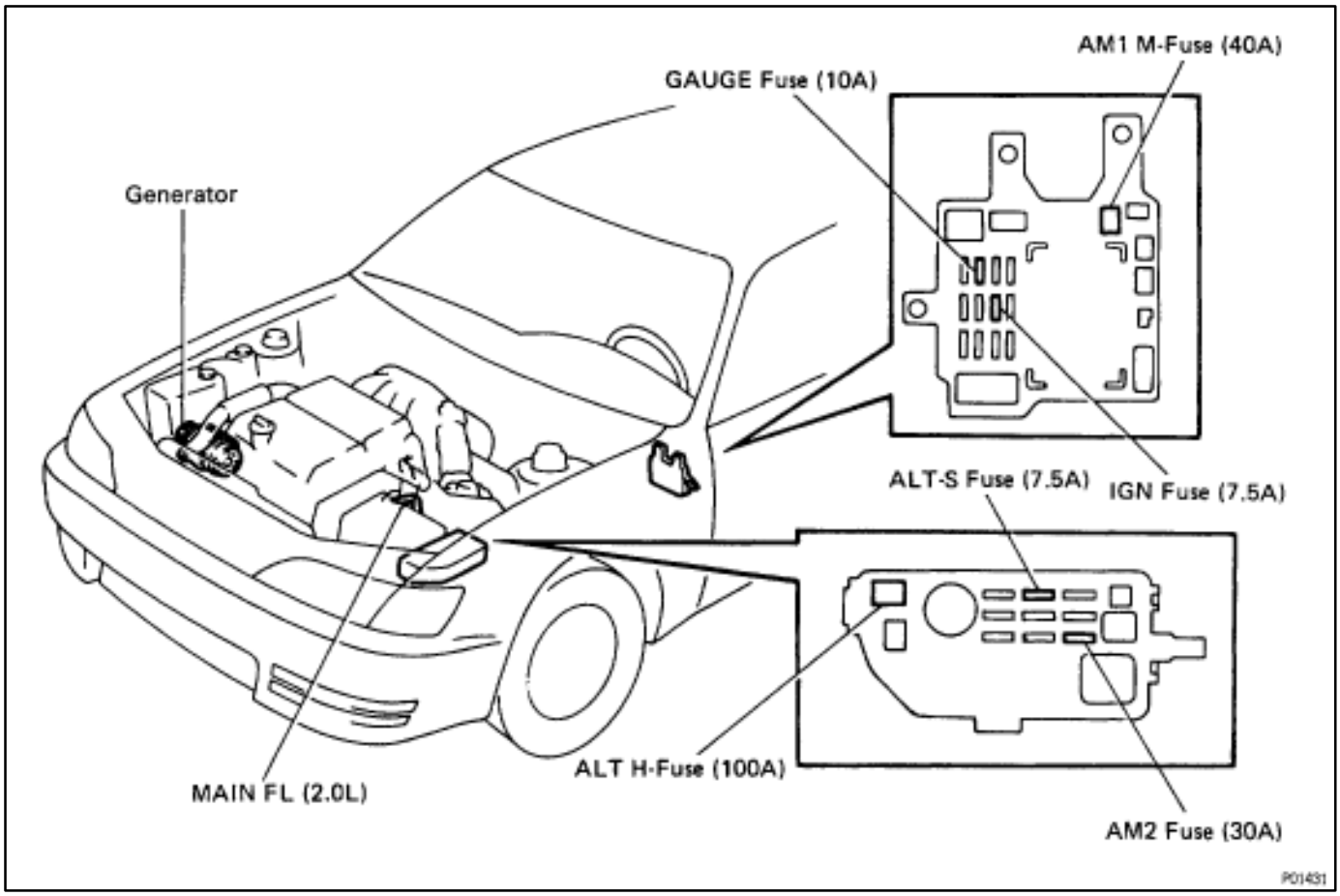
Part tightened	N·m	kgf·cm	ft·lbf
Starter mounting bolt	39	400	29

CHARGING SYSTEM

DESCRIPTION

CH00H–02

The generator is a small, high rpm, high performance type with an IC regulator incorporated. The IC regulator uses integrated circuits and controls the voltage produced by the generator.



PRECAUTIONS

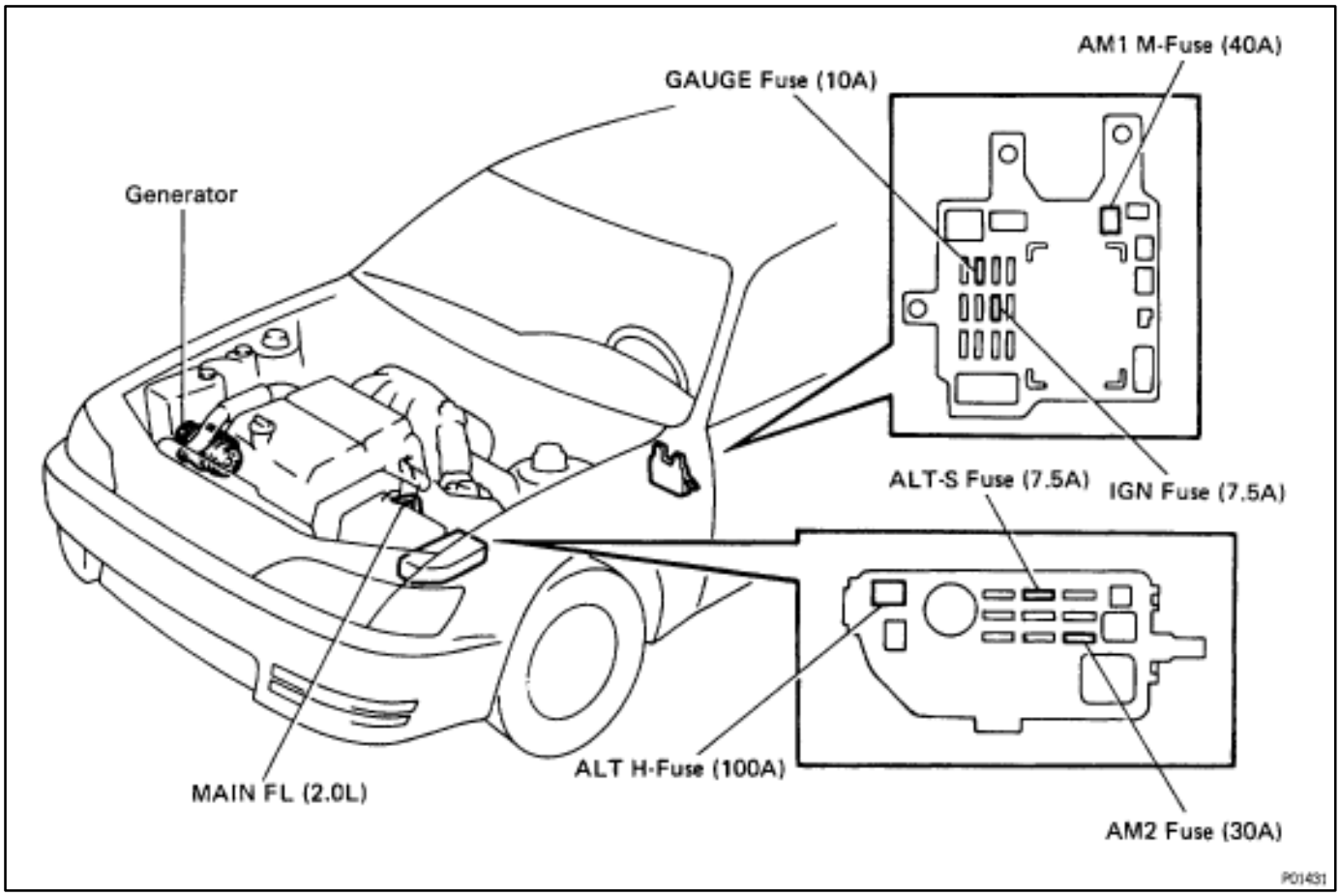
CH00K–01

1. **Check that the battery cables are connected to the correct terminals.**
2. **Disconnect the battery cables when the battery is given a quick charge.**
3. **Do not perform tests with a high voltage insulation resistance tester.**
4. **Never disconnect the battery while the engine is running.**

DESCRIPTION

CH00H–02

The generator is a small, high rpm, high performance type with an IC regulator incorporated. The IC regulator uses integrated circuits and controls the voltage produced by the generator.



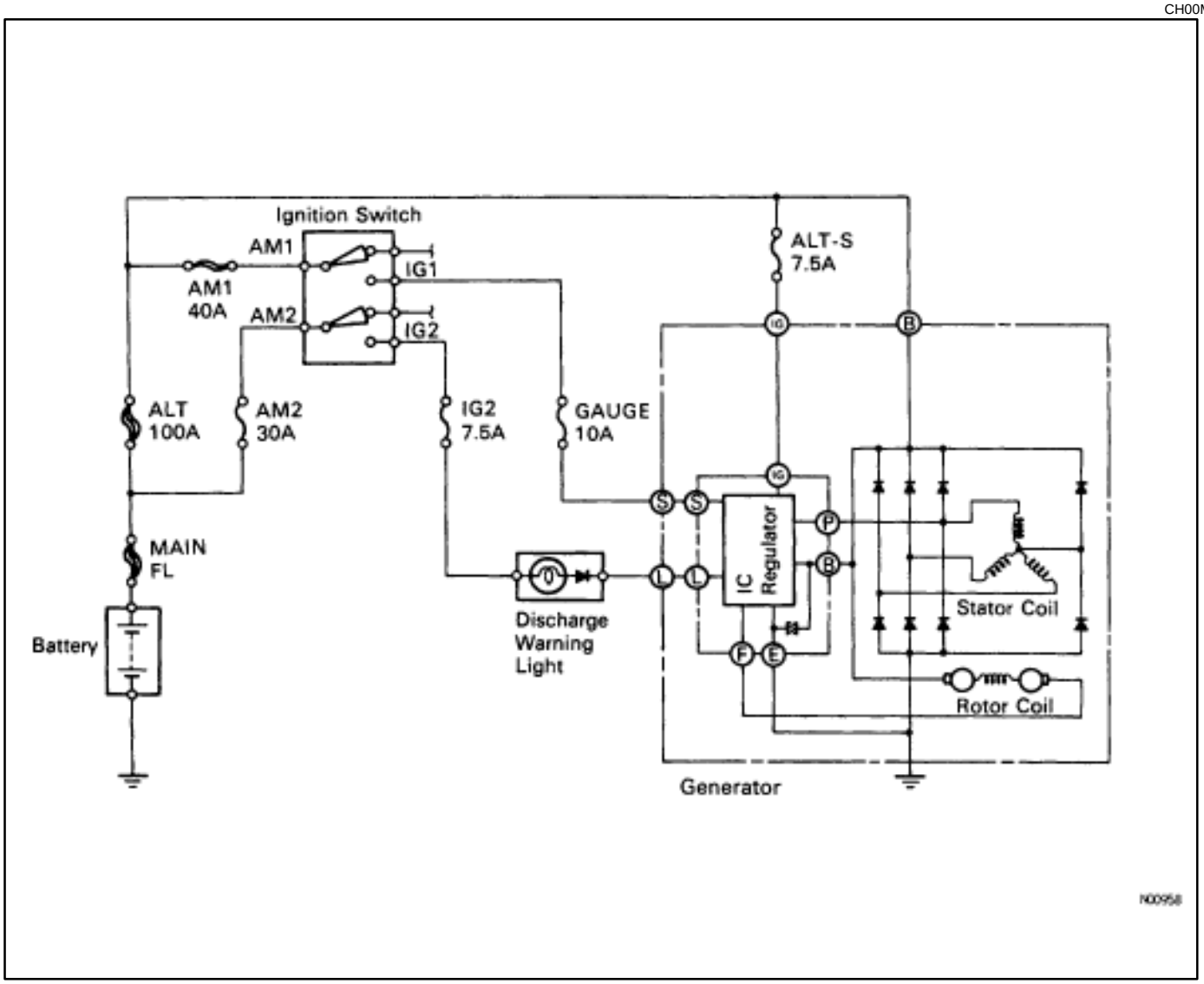
PRECAUTIONS

CH00K–01

1. **Check that the battery cables are connected to the correct terminals.**
2. **Disconnect the battery cables when the battery is given a quick charge.**
3. **Do not perform tests with a high voltage insulation resistance tester.**
4. **Never disconnect the battery while the engine is running.**

SYSTEM CIRCUIT

CH00M–01



OPERATION

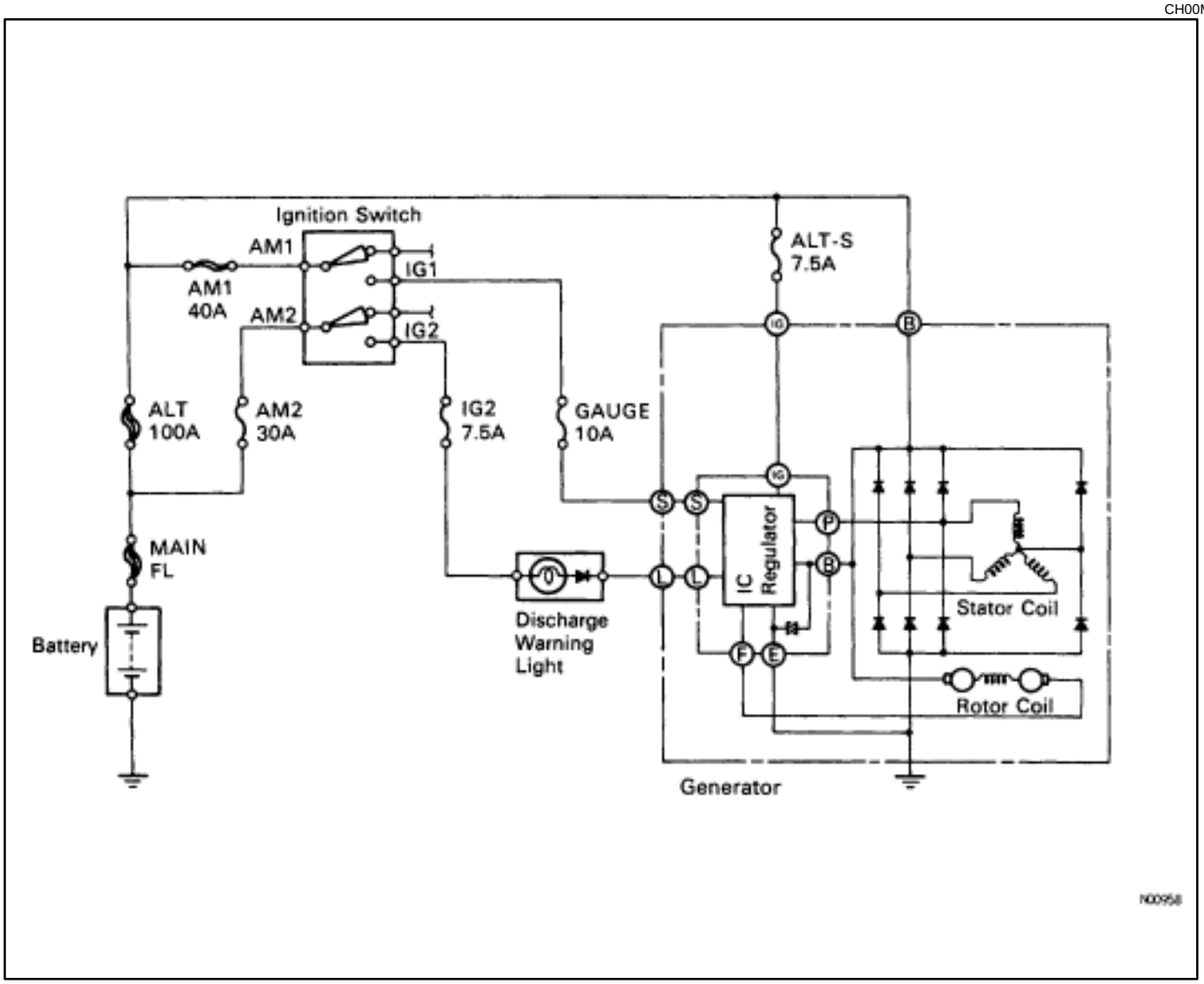
CH00P–01

When the ignition switch is turned ON, current from the battery flows from terminal L of the generator through the IC regulator to terminal E, causing the discharge warning light to light up. Then when the engine is started, the voltage output increases as the generator rpm increases. When the voltage output becomes greater than the battery positive voltage, current for recharging flows from terminal B.

Simultaneously, voltage at terminal L increases and the potential difference between battery and terminal L disappears, causing the discharge warning light to go off. When the voltage output exceeds the regulator adjustment voltage, the transistor inside the IC regulator regulates the voltage so that the voltage from the generator remains constant.

SYSTEM CIRCUIT

CH00M–01



OPERATION

CH00P–01

When the ignition switch is turned ON, current from the battery flows from terminal L of the generator through the IC regulator to terminal E, causing the discharge warning light to light up. Then when the engine is started, the voltage output increases as the generator rpm increases. When the voltage output becomes greater than the battery positive voltage, current for recharging flows from terminal B.

Simultaneously, voltage at terminal L increases and the potential difference between battery and terminal L disappears, causing the discharge warning light to go off. When the voltage output exceeds the regulator adjustment voltage, the transistor inside the IC regulator regulates the voltage so that the voltage from the generator remains constant.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

CH00R–01

	09285–76010	Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09286–46011	Injection Pump Spline Shaft Puller	Rectifier end frame
	09608–20012	Front Hub & Drive Pinion Bearing Tool Set	
	(09608–00030)	Replacer	Rotor front bearing
	09820–00021	Alternator Rear Bearing Puller	
	09820–00030	Alternator Rear Bearing Replacer	Rotor rear bearing
	09820–63010	Alternator Pulley Set Nut Wrench Set	

RECOMMENDED TOOLS

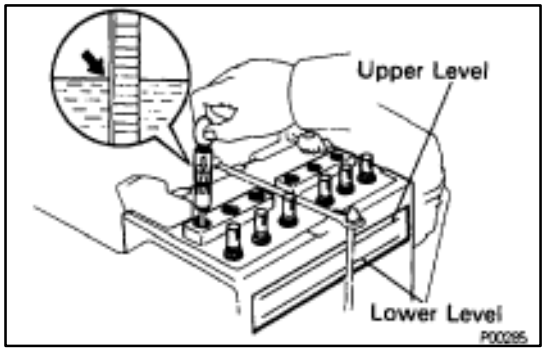
CH00T–01

	09082–00015	TOYOTA Electrical Tester

EQUIPMENT

CH00V–01

Ammeter(A)	
Battery specific gravity gauge	Battery
Belt tension gauge	
Torque wrench	
Vernier calipers	Rotor (Slip ring)



ON–VEHICLE INSPECTION

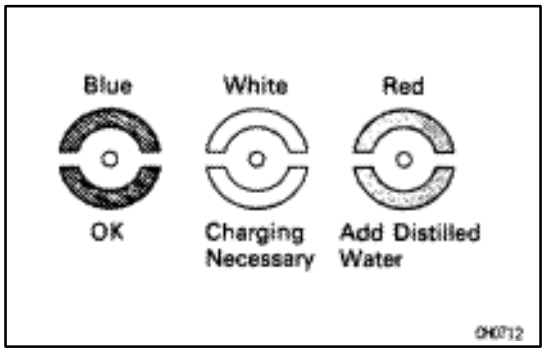
CH00X–01

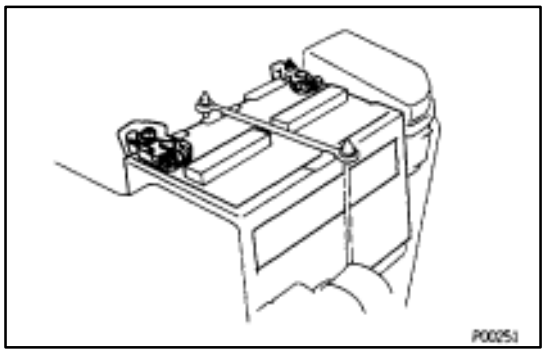
1. CHECK BATTERY SPECIFIC GRAVITY AND ELECTROLYTE LEVEL

(a) Check the electrolyte level of each cell.
If insufficient, refill with distilled (or purified) water.

(b) Check the specific gravity of each cell.
Standard specific gravity at 20°C (68°F):
1.25–1.27 (55D23L Battery)
1.27–1.29 (80D26L Battery)

If not within specifications, charge the battery.
HINT: Check the indicator as shown.

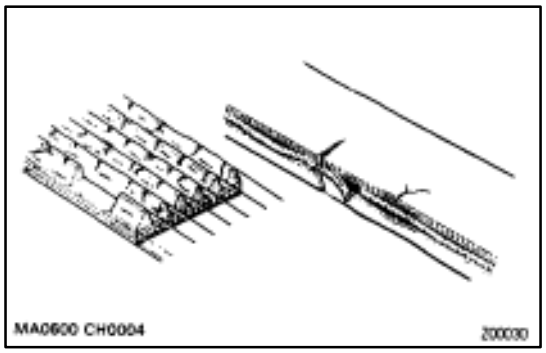




2. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

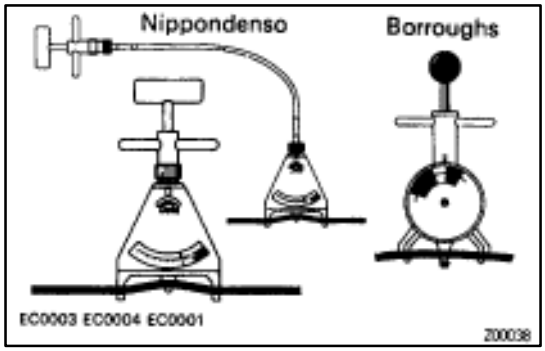
(a) Check that the battery terminals are not loose or corroded.

(b) Check the fusible link and fuses for continuity.
Fusible link:
MAIN 2.0 L
H–Fuse:
ALT 100 A
M–Fuse:
AM1 40 A
Fuse:
AM2 30 A
IG2 7.5 A
GAUGE 10 A
ALI–S 7.5 A



3. 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: Cranks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



(b) Using a belt tension gauge, measure the drive belt tension.

Belt tension gauge:

Nippondenso BTG–20 (95506–00020)

Borroughs No. BT–33–73F

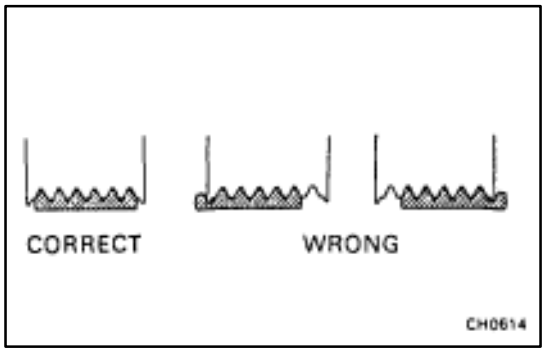
Drive belt tension:

New belt

175±5 lb

Used belt

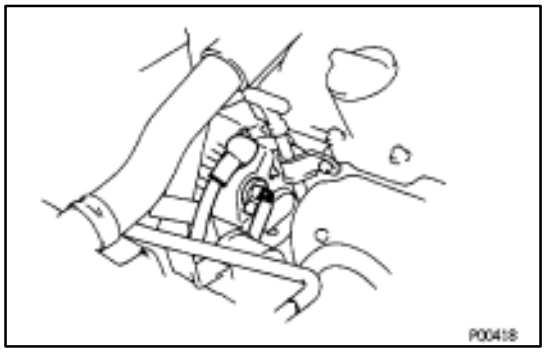
115±20 lb



If the belt tension is not as specified, adjust it.

HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.



4. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

(a) Check that the wiring is in good condition.

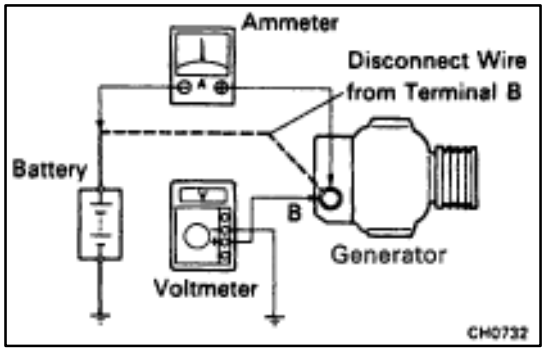
(b) Check that there is no abnormal noise from the generator while the engine is running.

5. INSPECT DISCHARGE WARNING LIGHT CIRCUIT

(a) Turn the ignition switch "ON". Check that the discharge warning light comes on.

(b) Start the engine. Check that the light goes off.

If the light does not operate as specified, troubleshoot the discharge warning light circuit.

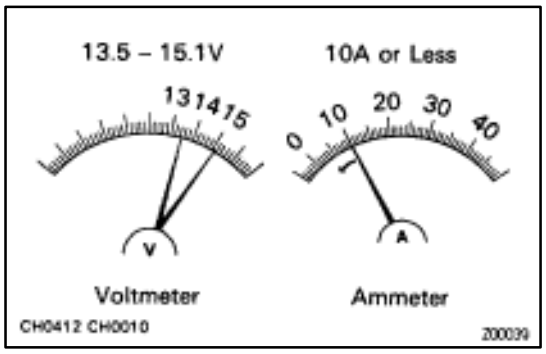


6. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT: If a battery/generator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

(a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:

- Disconnect the wire from terminal B of the generator and connect it to the negative (–) lead of the ammeter.
- Connect the positive (+) lead of the ammeter to terminal B of the generator.
- Connect the positive (+) lead of the voltmeter to terminal B of the generator.
- Ground the negative (–) lead of the voltmeter.



(b) Check the charging circuit as follows:

With the engine running from idle to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage:

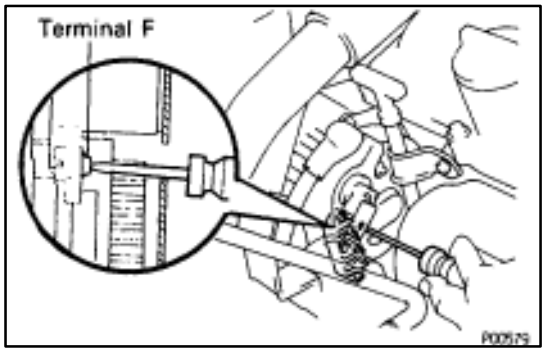
10 A or less

Standard voltage:

14.0–15.0 V at 25°C (77°F)

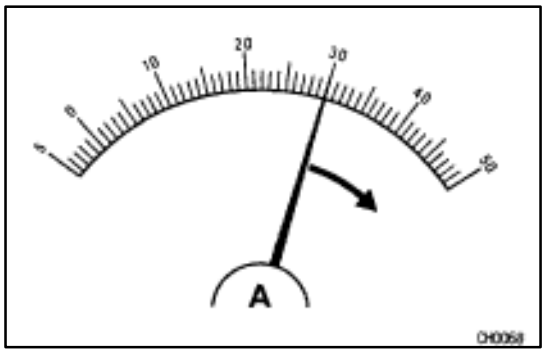
13.5–14.3 V at 115°C (239°F)

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 generator as follows:

- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than standard voltage, replace the IC regulator.
- If the voltmeter reading is less than standard voltage, check the generator.



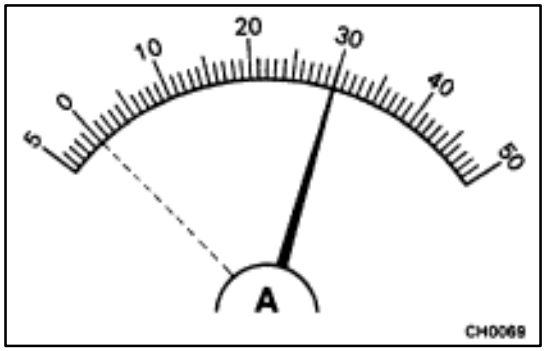
7. INSPECT CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "HI".

(b) Check the reading on the ammeter.

Standard amperage:

30 A or more

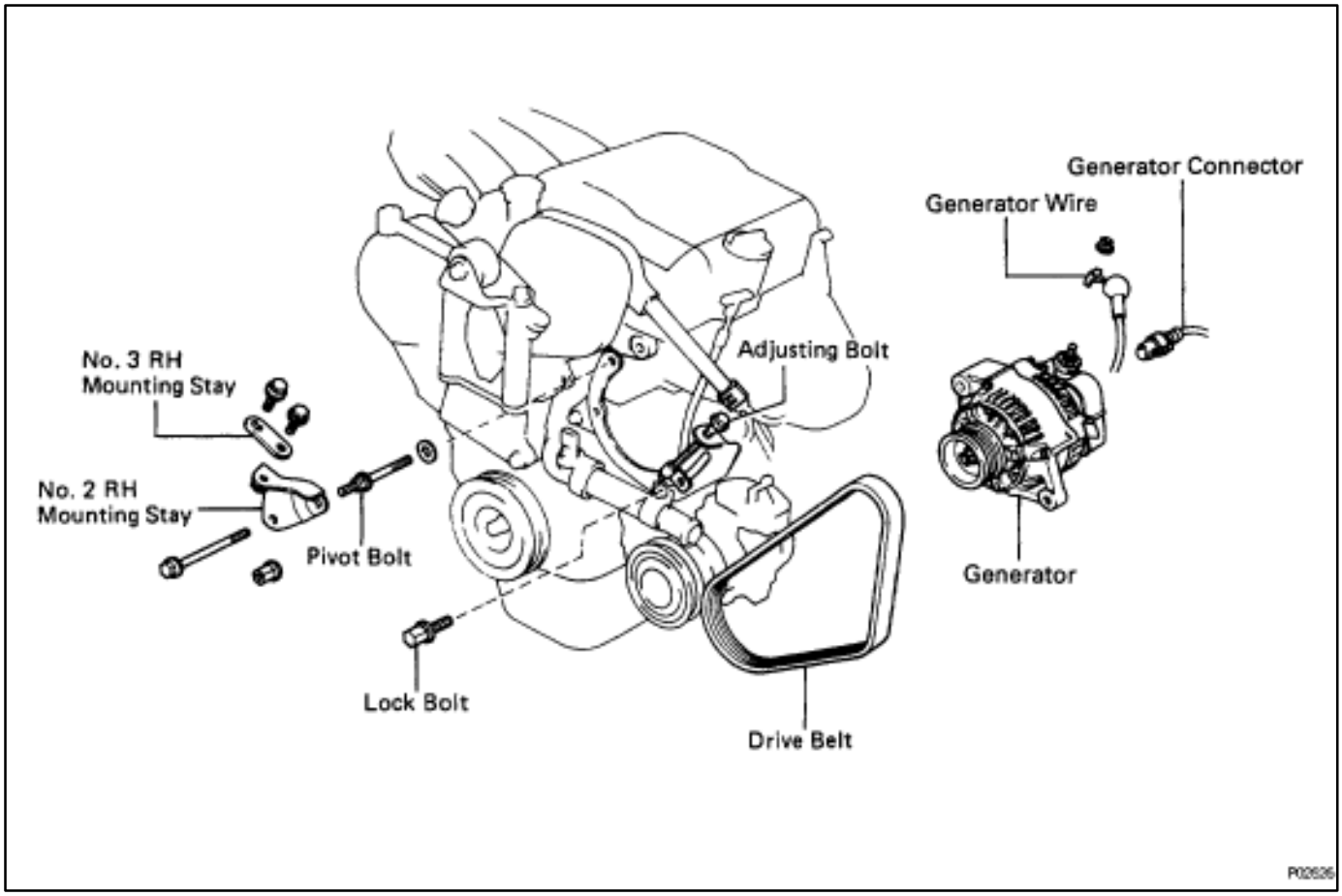


If the ammeter reading is less than the standard amperage, repair the generator. (See page CH–9)
HINT: If the battery is fully charged, the indication will sometimes be less than standard amperage.

GENERATOR

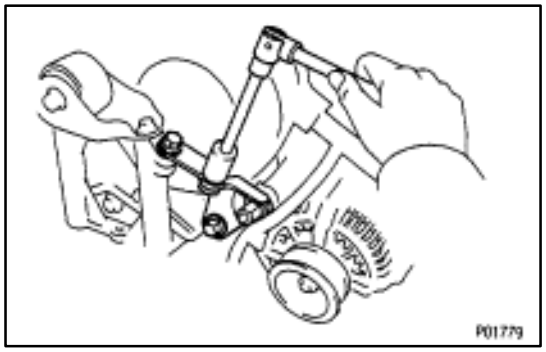
GENERATOR REMOVAL

CH00Z–02



1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

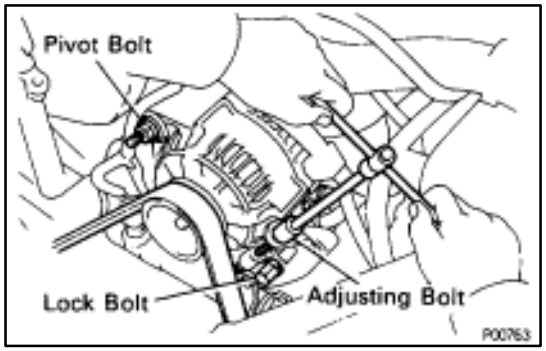
CAUTION (w / Airbag): Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.



2. REMOVE NO.2 AND NO.3 RH ENGINE MOUNTING STAYS

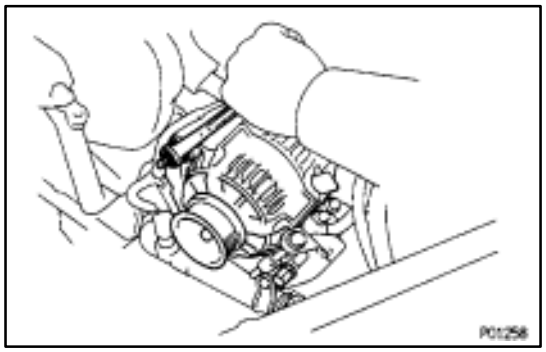
(a) Remove the two bolts and No.3 RH engine mounting stay.

(b) Remove the bolt, nut and No.2 RH engine mounting stay.



3. REMOVE DRIVE BELT

Loosen the pivot bolt and adjusting lock bolt, and remove the drive belt.

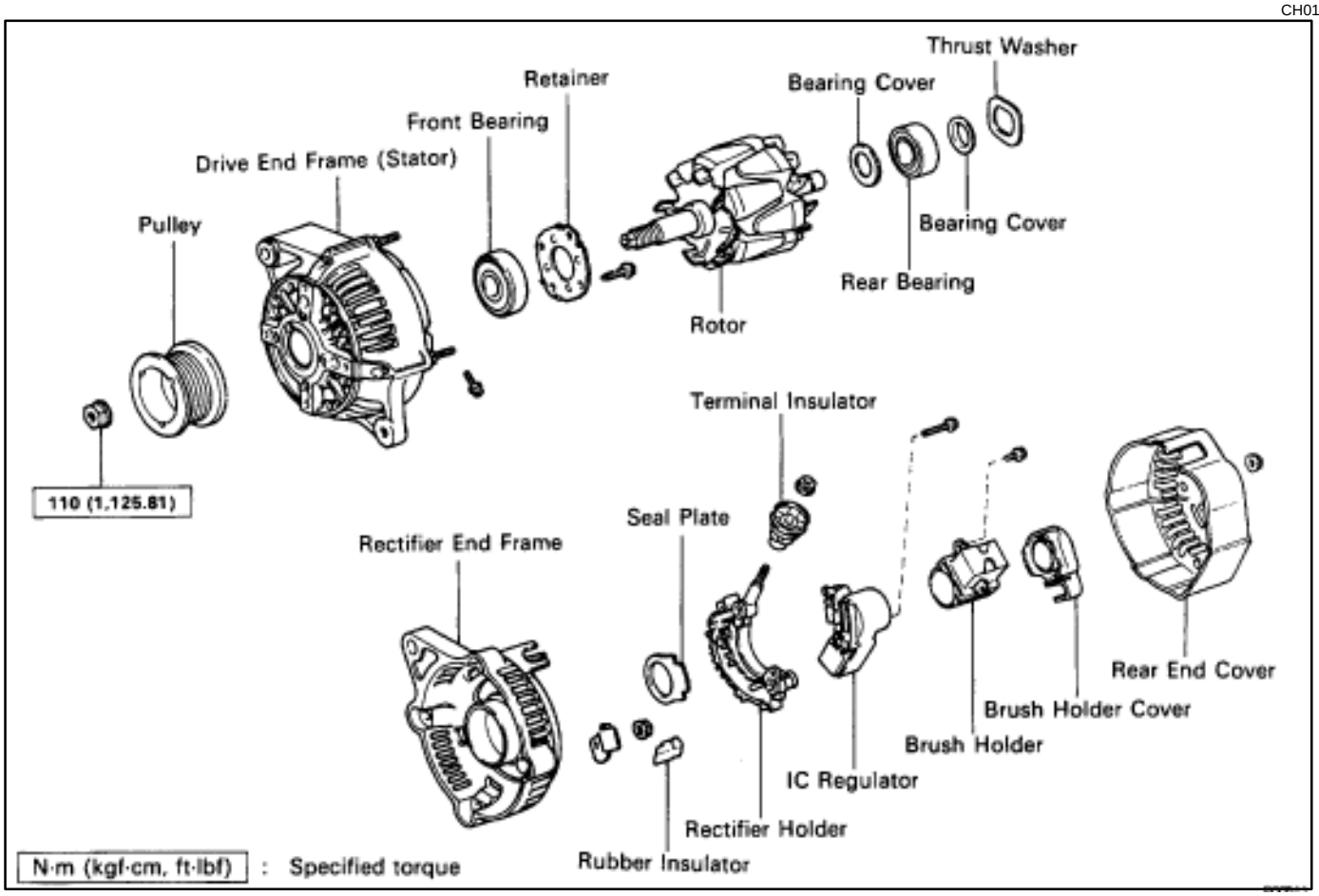


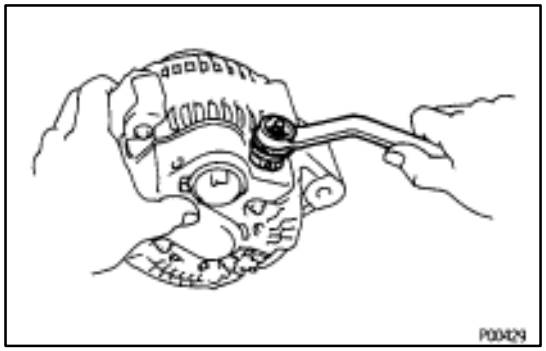
4. REMOVE GENERATOR

(a) Disconnect the generator connector.
(b) Remove the nut, and disconnect the generator wire.
(c) Disconnect the wire harness from the clip.
(d) Remove the pivot bolt, adjusting lock bolt and generator.

COMPONENTS

CH011–01



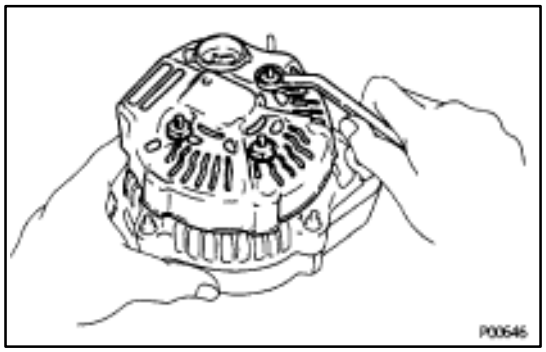


GENERATOR DISASSEMBLY

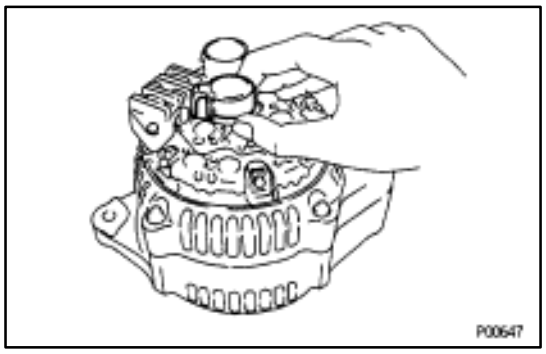
CH013–01

1. REMOVE REAR END COVER

(a) Remove the nut and terminal insulator.

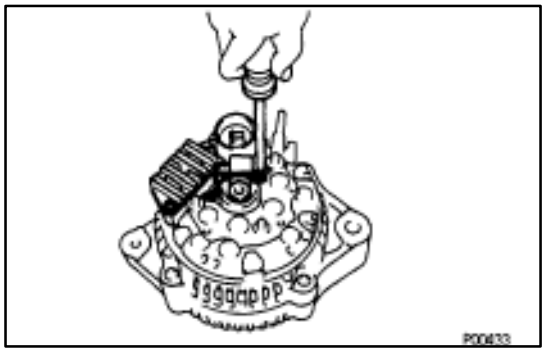


(b) Remove the three nuts and end cover.

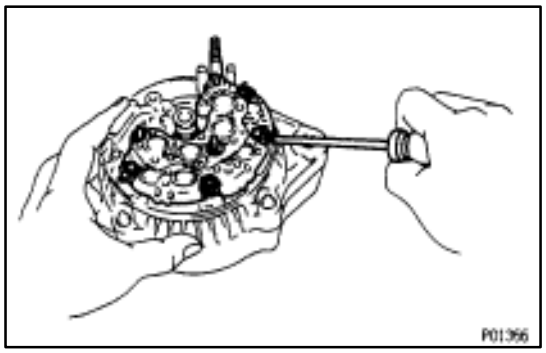


2. REMOVE BRUSH HOLDER AND IC REGULATOR

(a) Remove the brush holder cover from the brush holder.

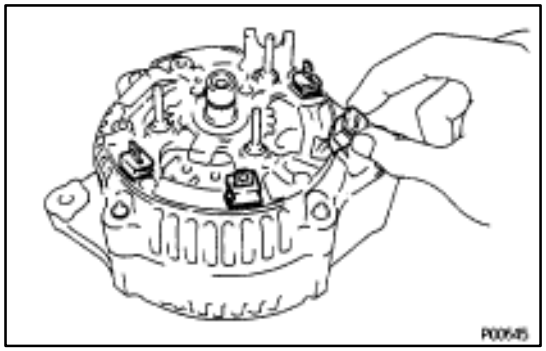


(b) Remove the five screws, brush holder and IC regulator.

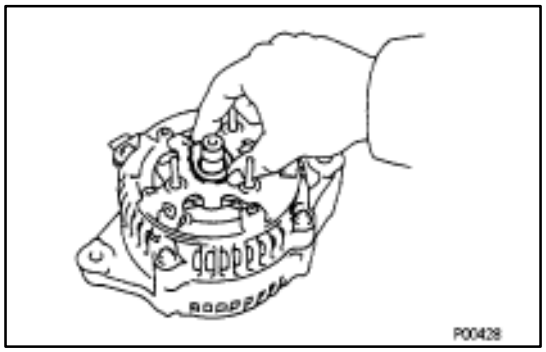


3. REMOVE RECTIFIER HOLDER

(a) Remove the four screws and rectifier holder.



(b) Remove the four rubber insulators.

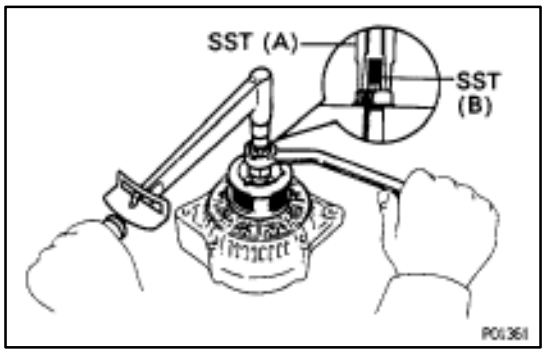


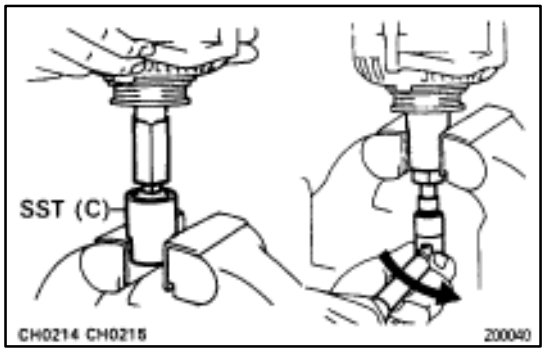
(c) Remove the seal plate.

4. REMOVE PULLEY

(a) Hold SST (a) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820–63010
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Check that SST (A) is secured to the rotor shaft.





(c) As shown in the illustration, mount SST (c) in a vise, and install the generator to SST (C).

(d) 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.

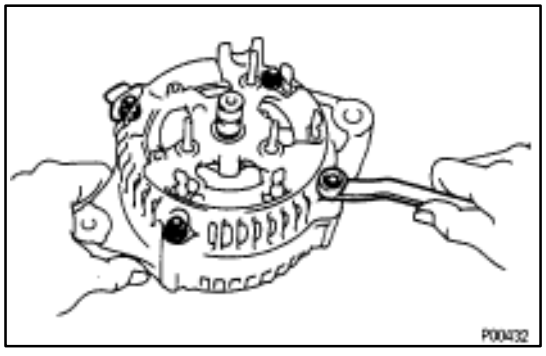
(e) Remove the generator from SST (C).

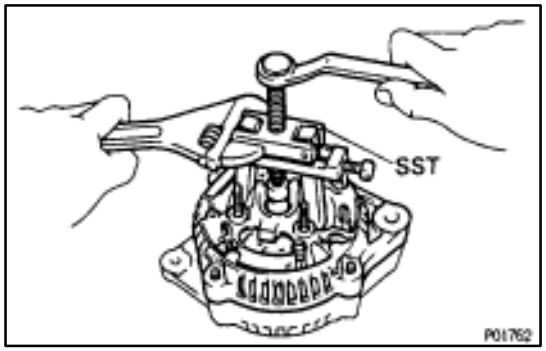
(f) Turn SST (B) and remove SST (A and B).

(g) Remove the pulley nut and pulley.

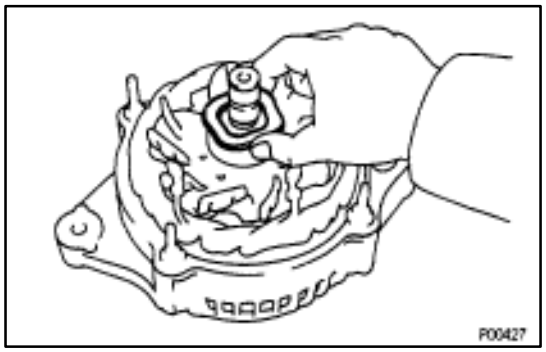
5. REMOVE RECTIFIER END FRAME

(a) Remove the four nuts and cord clip.

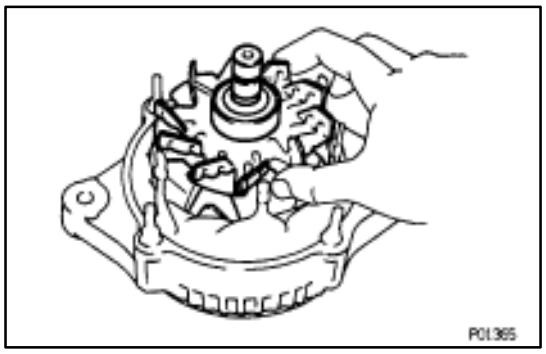




(b) Using SST, remove the rectifier end frame.
SST 09286–46011



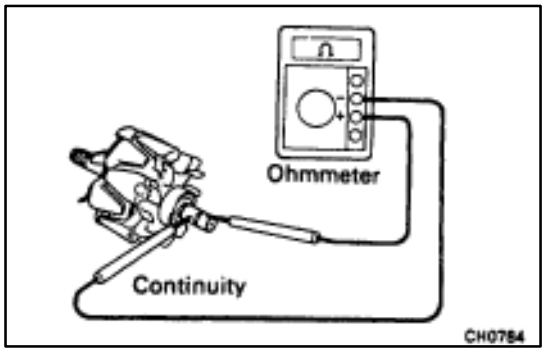
(c) Remove the thrust washer.

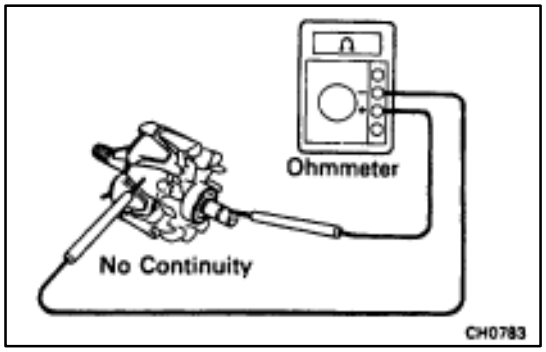


6. REMOVE ROTOR FROM DRIVE END FRAME

GENERATOR INSPECTION AND REPAIR

CH015–01





Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance (Cold):

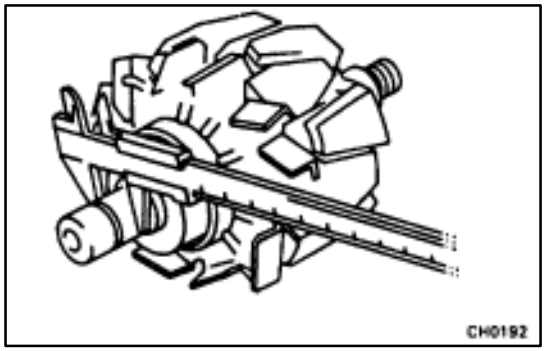
2.8–3.0 Ω

If there is no continuity, replace the rotor.

2. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

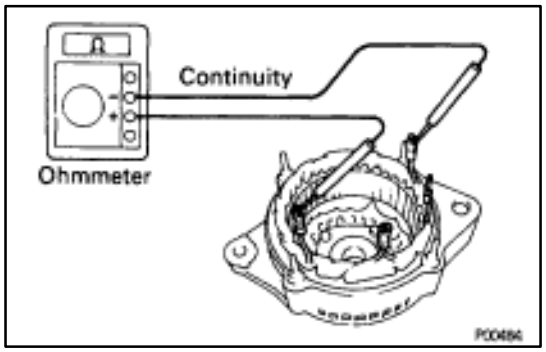
If there is continuity, replace the rotor.



3. INSPECT SLIP RINGS

(a) Check that the slip rings are not rough or scored.
If rough or scored, replace the rotor.

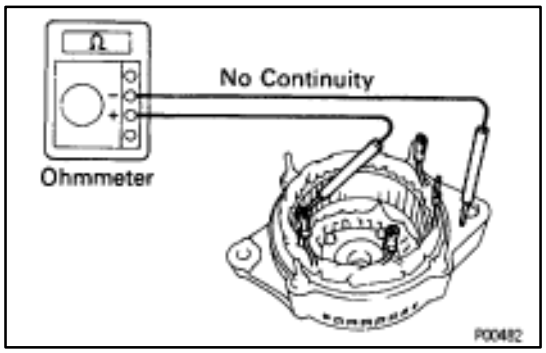
(b) Using a vernier caliper, measure the slip ring diameter.
Standard diameter:
4.2–14.4 mm (0.559–0.567 in.)
Minimum diameter:
12.8 mm (0.504 in.)
If the diameter is less than minimum, replace the rotor.



Stator (Drive End Frame)

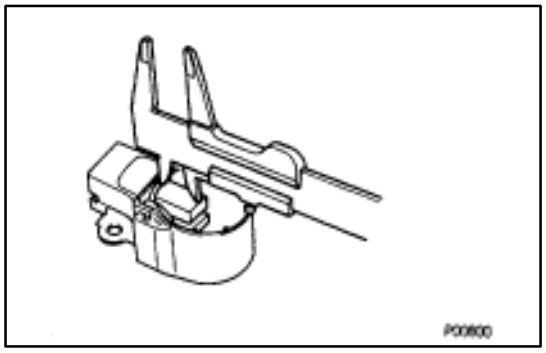
1. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.
If there is no continuity, replace the drive end frame assembly.



2. INSPECT STATOR FOR GROUND

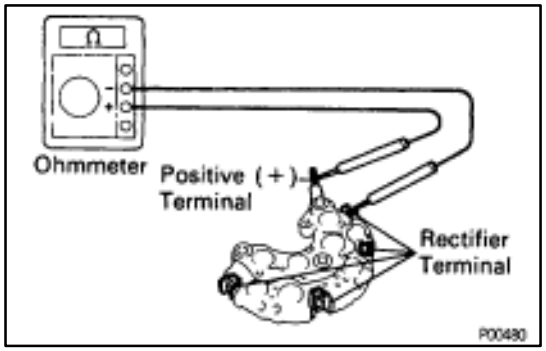
Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.
If there is continuity, replace the drive end frame assembly.

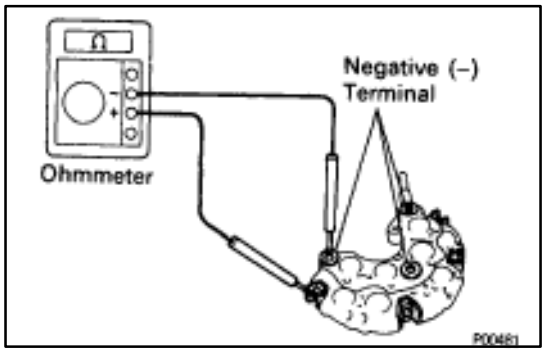


Brushes

1. INSPECT EXPOSED BRUSH LENGTH

Using a vernier caliper, measure the exposed brush length.
Standard exposed length:
10.5 mm (0.413 in.)
Minimum exposed length:
1.5 mm (0.059 in.)
If the exposed length is less than minimum, replace the brushes and brush holder assembly.





Rectifiers (Rectifier Holder)

1. INSPECT POSITIVE RECTIFIER

(a) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.

(b) Reverse the polarity of the tester probes and repeat step (a).

(c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

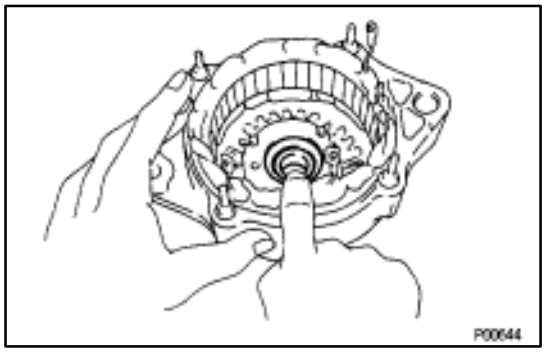
2. INSPECT NEGATIVE RECTIFIER

(a) Using an ohmmeter, connect one tester probe to each negative (–) terminal and the other to each rectifier terminal.

(b) Reverse the polarity of the tester probes and repeat step (a).

(c) Check that one shows continuity and the other shows no continuity.

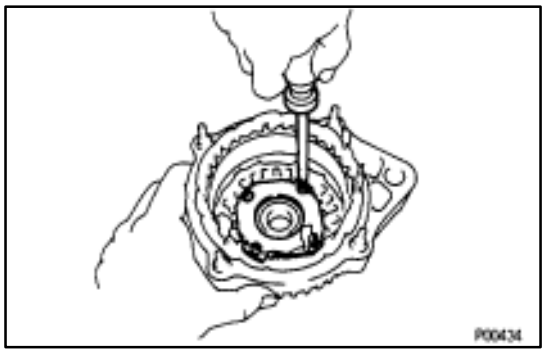
If continuity is not as specified, replace the rectifier holder.



Bearings

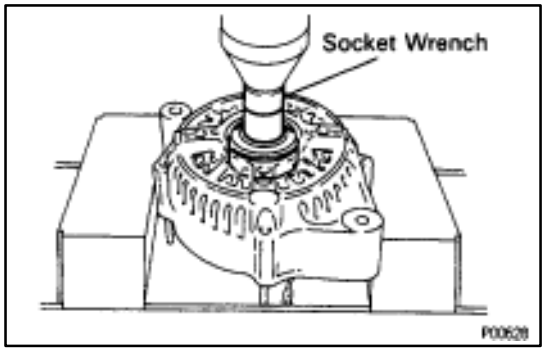
1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

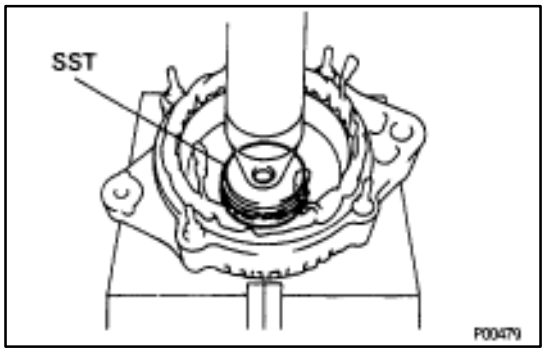


2. IF NECESSARY, REPLACE FRONT BEARING

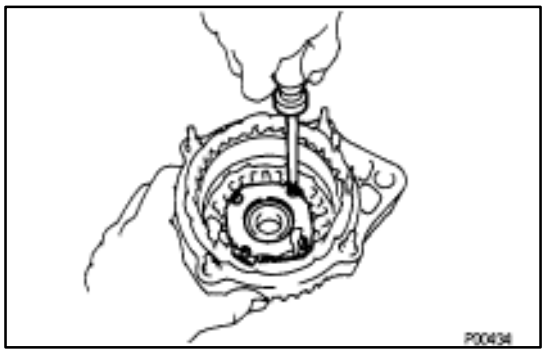
(a) Remove the four screws, bearing retainer and bearing



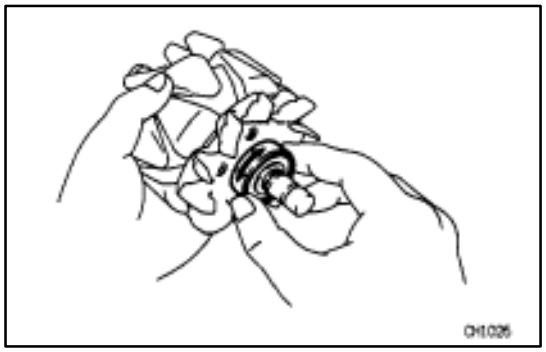
(b) Using a socket wrench and press, press out the bearing.



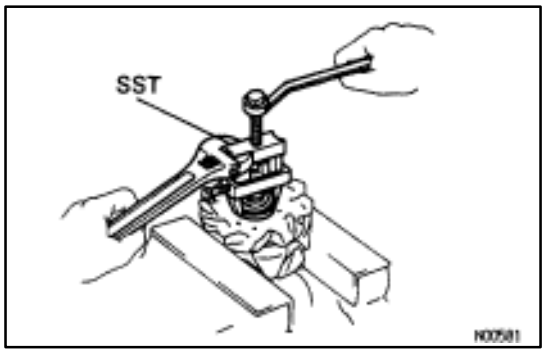
(c) Using SST and a press, press in a new bearing.
SST 09608–20012(09608–00030)



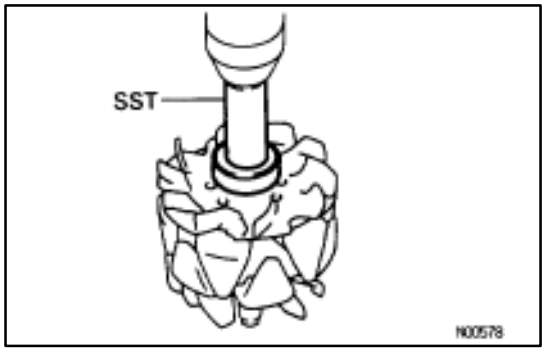
(d) Install the bearing retainer with the four screws.



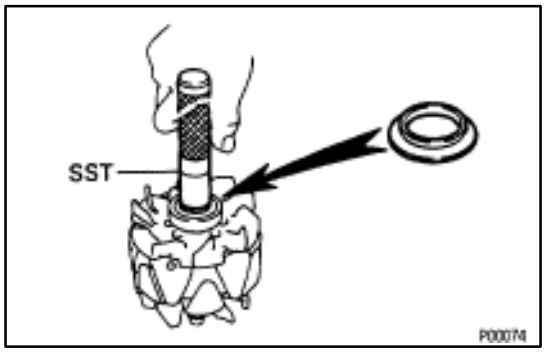
3. INSPECT REAR BEARING
Check that the bearing is not rough or worn.



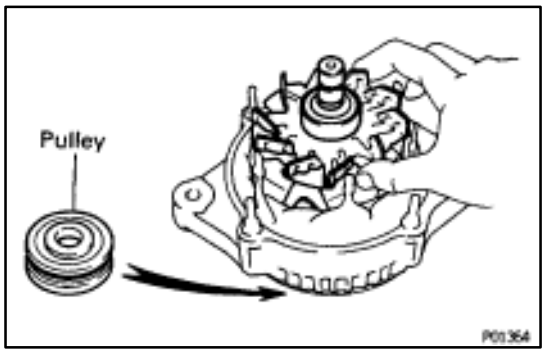
4. IF NECESSARY, REPLACE REAR BEARING
(a) Using SST, remove the bearing covers and bearing.
SST 09820–00021
NOTICE: Be careful not to damage the fan.
(b) Place the bearing cover on the rotor.



(c) Using SST and a press, press in a new bearing.
SST 09820–00030



(d) Using SST, push in the bearing cover.
SST 09285–76010



GENERATOR ASSEMBLY

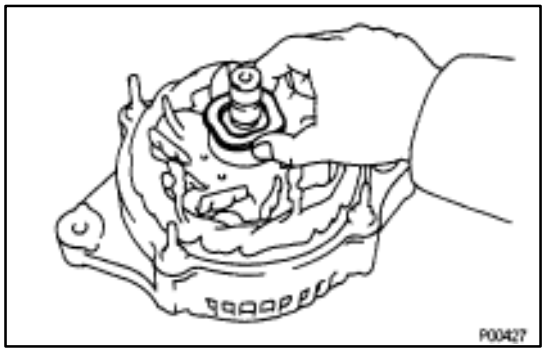
CH017–02

(See page CH–10)

1. INSTALL ROTOR TO DRIVE END FRAME

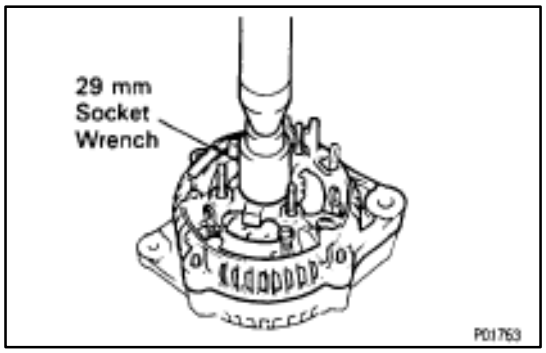
(a) Place the rectifier end frame on the pulley.

(b) Install the rotor to the rectifier end frame.

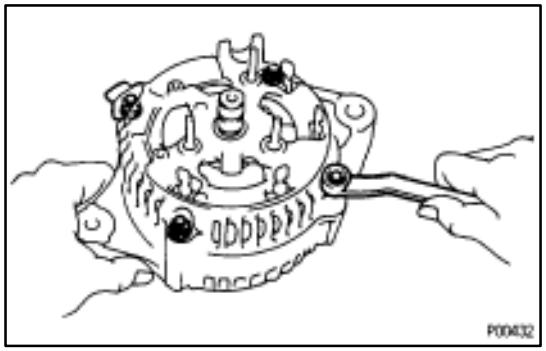


2. INSTALL RECTIFIER END FRAME

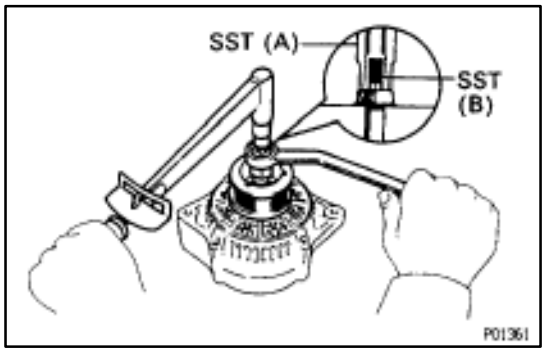
(a) Place the thrust washer on the rotor.



(b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.



(c) Install the cord clip and four nuts.

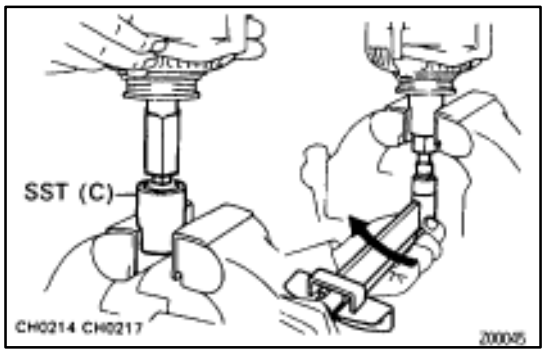


3. INSTALL PULLEY

(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(b) Hold SST (A) with a torque wrench, and tighten SST (b) clockwise to the specified torque.
SST 09820–63010
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(c) Check that SST (A) is secured to the pulley shaft.

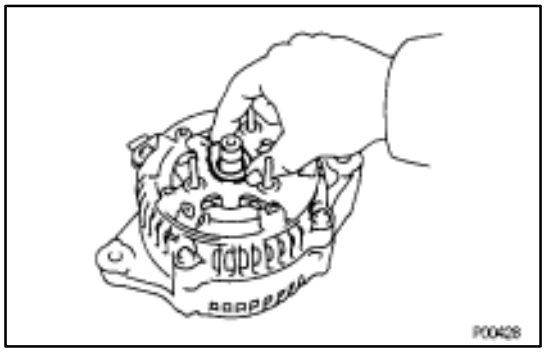


(d) As shown in the illustration, mount SST (C) in a vise, and install the generator to SST (C).

(e) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)

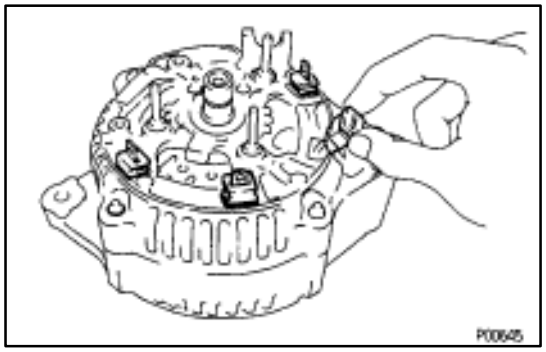
(f) Remove the generator from SST (C).

(g) Turn SST (B) and remove SST (A and B).

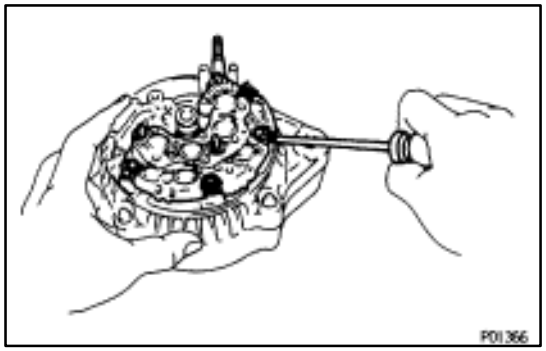


4. INSTALL RECTIFIER HOLDER

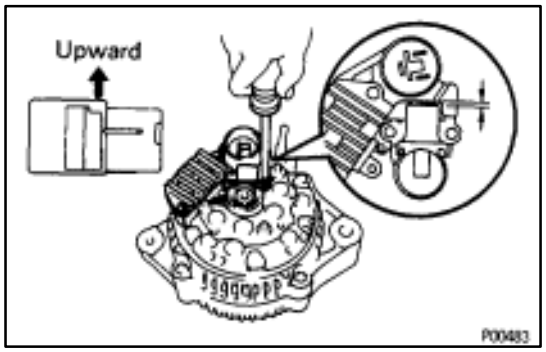
(a) Place the seal plate on the rectifier end frame.



(b) Install the four rubber insulators on the lead wires.



(c) Install the rectifier holder with the four screws.

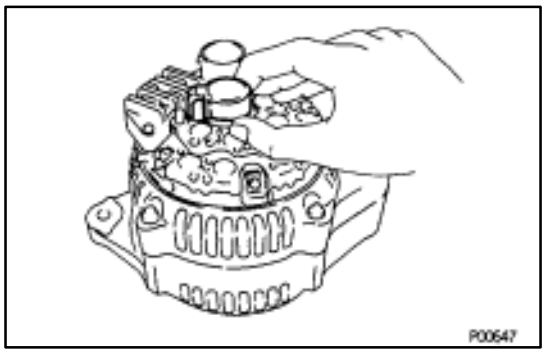


5. INSTALL IC REGULATOR AND BRUSH HOLDER

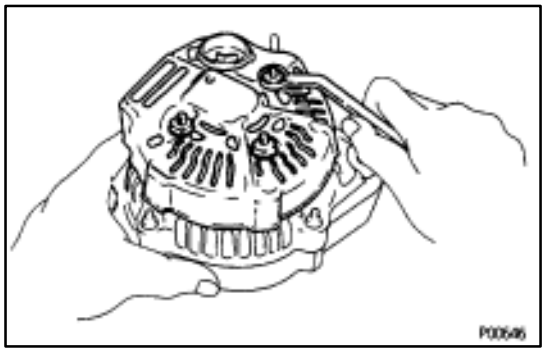
(a) Place the IC regulator and brush holder on the rectifier end frame.

NOTICE: Be careful of the holder installation direction.

(b) Install the five screws until there is a clearance of approx. 1 mm (0.04 in.) between the brush holder and connector.

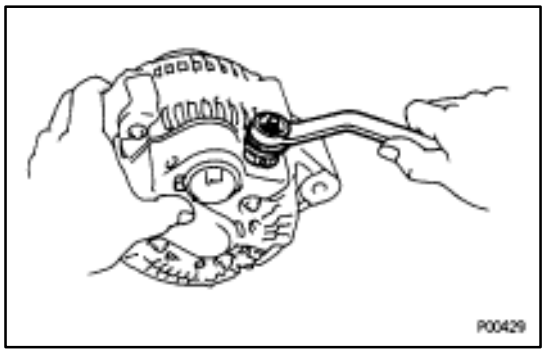


(c) Place the brush holder cover on the brush holder.

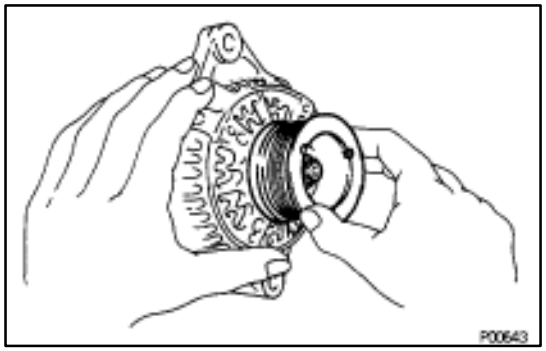


6. INSTALL REAR END COVER

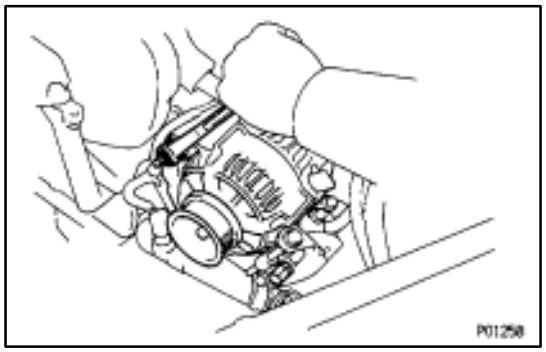
(a) Install the end cover with the three nuts.



(b) Install the terminal insulator with the nut.



7. CHECK THAT ROTOR ROTATES SMOOTHLY



GENERATOR INSTALLATION

CH019–02

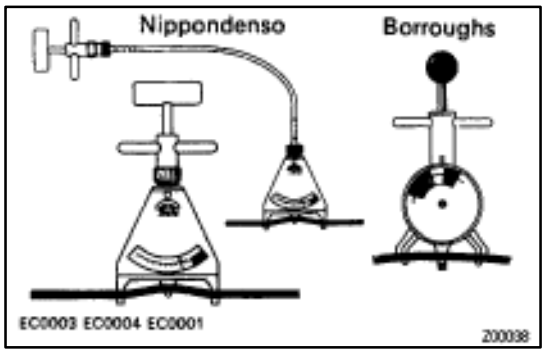
(See page CH–9)

1. INSTALL GENERATOR

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

(b) Connect the generator connector.

(c) Connect the generator wire with the nut.



2. INSTALL DRIVE BELT

(a) Install the drive belt.

(b) Using a belt tension gauge, measure the drive belt tension.

Belt tension gauge:

Nippondenso BTG–20 (95506–00020)

Borroughs No. BT–33–73F

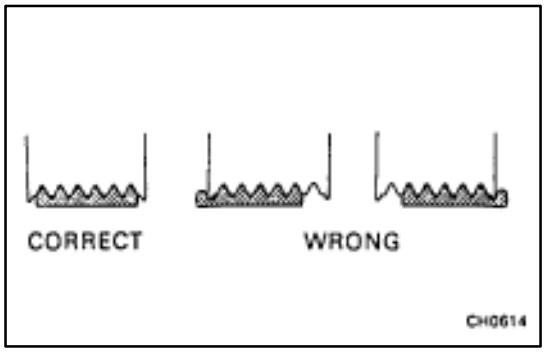
Drive belt tension:

New belt

175±5 lb

Used belt

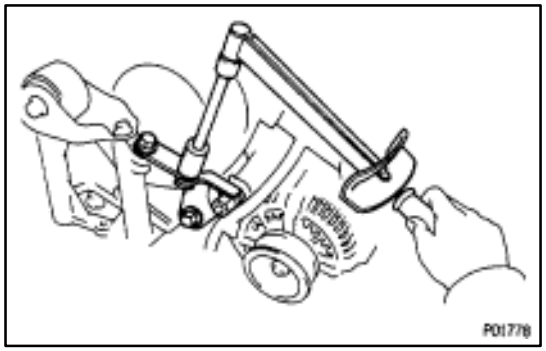
115±20 lb



(c) Tighten the pivot and adjusting lock bolt.

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 by 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.



3. INSTALL NO.2 AND NO.3 RH ENGINE MOUNTING STAYS

(a) Install the No.2 RH engine mounting stay with the bolt and nut.

Bolt

Torque: 75 N·m (760 kgf·cm, 55 ft·lbf)

Nut

Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

(b) Install the No.3 RH engine mounting stay with the two bolts.

Torque: 73 N·m (740 kgf·cm, 54 ft·lbf)

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

5. PERFORM ON–VEHICLE INSPECTION

(See page CH–5)

SERVICE SPECIFICATIONS

SERVICE DATA

CH01B–02

Battery	Specific gravity (When full charged at 20°C (68°F))	
	55D23L battery	1.25–1.27
	80D26L battery	1.27–1.29
Drive belt	Tension	
	New belt	175 ± 5 lb
	Used belt	115 ± 10 lb
Generator	Rated output	12 V–80 A
	Rotor coil resistance	2.8–3.0 Ω
	Slip ring diameter (STD)	14.2–14.4 mm (0.559–0.5679 in.)
	Slip ring diameter (Minimum)	12.8 mm (0.504 in.)
	Brush exposed length (STD)	10.5 mm (0.413 in.)
	Brush exposed length (Minimum)	1.5 mm (0.059 in.)
Generator regulator (IC)	Regulating voltage at 25°C (77°F)	14.0–14.3 V
	Regulating voltage at 115°C (239°F)	13.5–14.3 V

TORQUE SPECIFICATIONS

CH01D–01

Part tightened	N·m	kgf·cm	ft·lbf
Pulley nut	110	1,125	81
No.2 RH engine mounting stay	75	760	55
No.2 RH engine mounting stay nut	62	630	46
No.3 RH engine mounting stay bolt	73	740	54

INTRODUCTION

HOW TO USE THIS MANUAL

IN002–01

INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired.
To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

GENERAL DESCRIPTION

At the beginning of each section, a General Description (Precautions) is given that pertains to all repair operations contained in that section.
Read these precautions before starting any repair task.

TROUBLESHOOTING

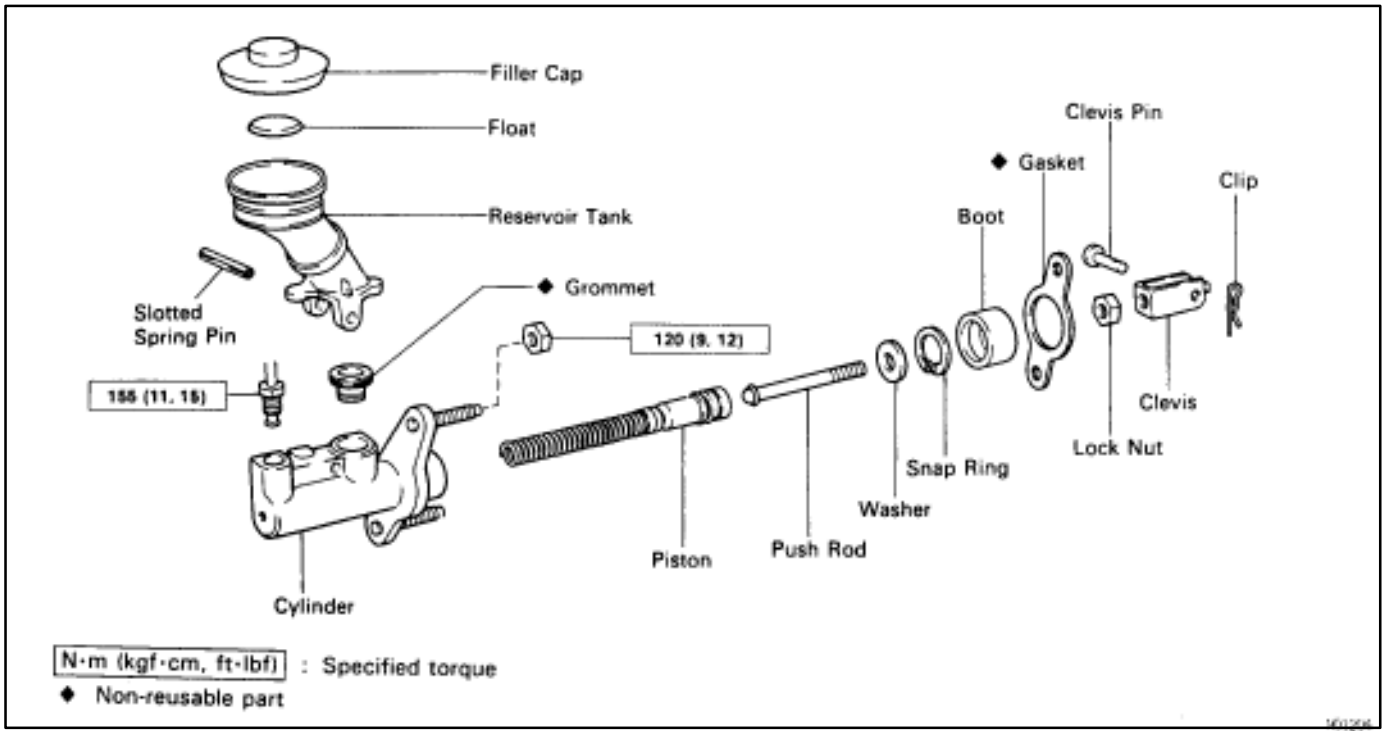
TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause.

PREPARATION

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

REPAIR PROCEDURES

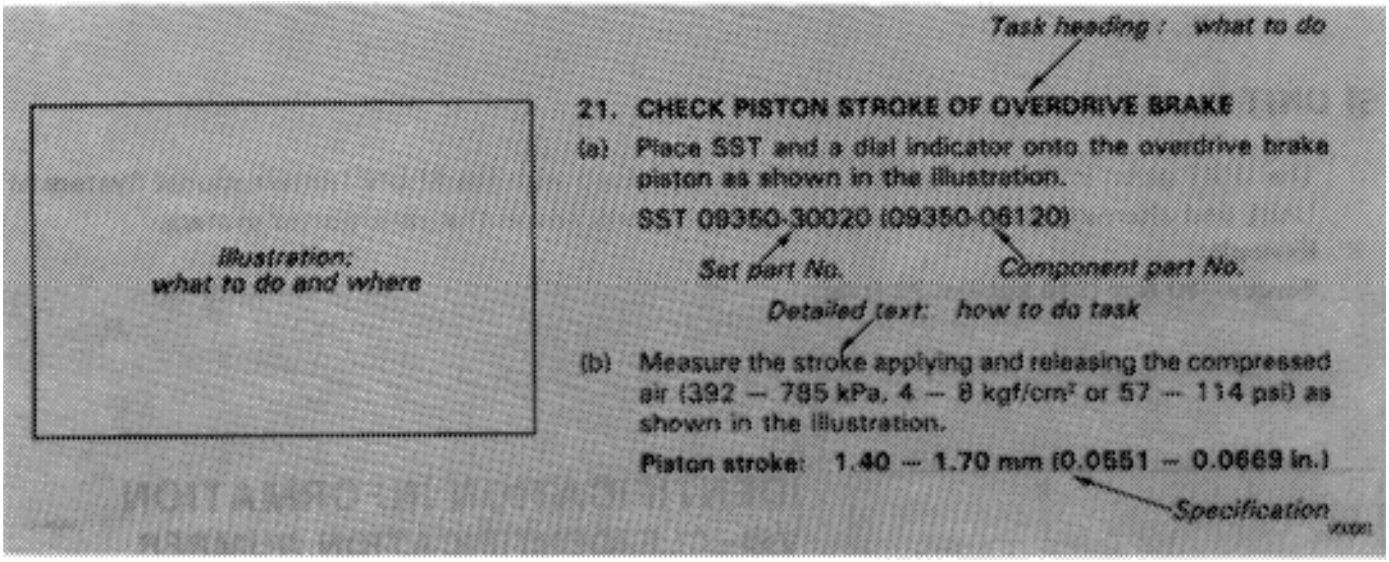
Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.
Example:



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

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

Example:



This format provides the experienced technician with a FAST TRACK to the information needed.

The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

REFERENCES

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

SPECIFICATIONS

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

CAUTIONS, NOTICES, HINTS:

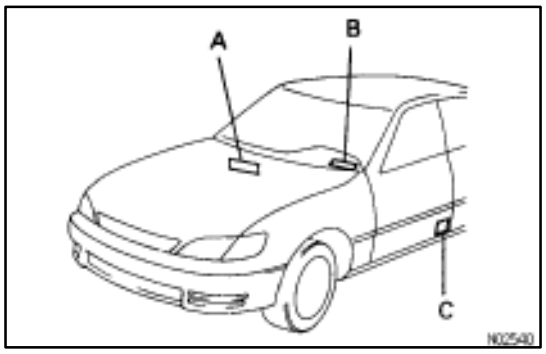
- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide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

SI UNIT

The UNIT given in this manual are primarily expressed with the SI UNIT(International System of Unit), and alternately expressed in the metric system and in the yard/pound system.

Example:

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



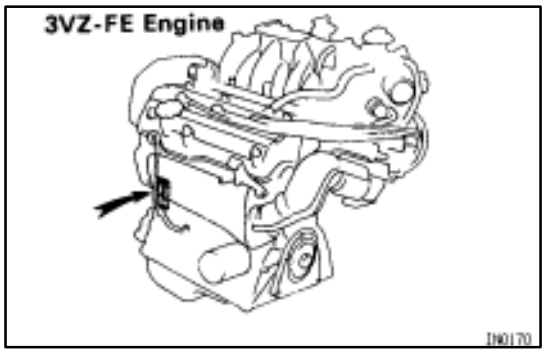
IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION NUMBER

IN003–01

The vehicle identification number is stamped on the cowl panel. This number has also been stamped on the vehicle identification number plate and certification regulation label.

A. Vehicle Identification Number
B. Vehicle Identification Number Plate
C. Certification Regulation Label



ENGINE SERIAL NUMBER

IN004–01

The engine serial number is stamped on the engine block as shown.

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

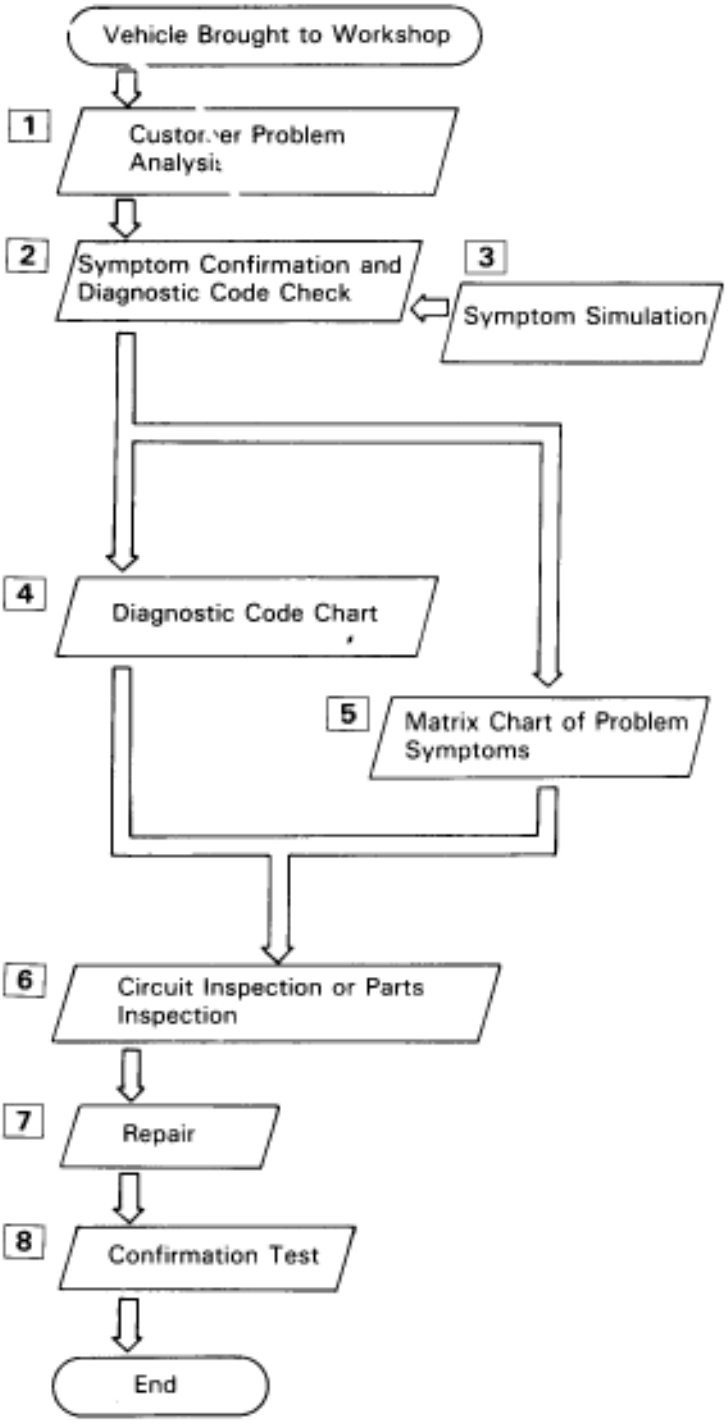
A large number of ECU controlled systems are used in the LEXUS ES300. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. However, the fact is that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems:

Repair Manual	System	Page
Vol. 1	1. Engine	EG–311
	2. Automatic Transaxle	AX–41
	3. Anti–Lock Brake	BR–58
Vol. 2	4. SRS Airbag	AB–25
	5. Door Lock Control	BE–356
	6. Theft Deterrent	BE–278
	7. Wireless Door Lock Control	BE–323
	8. Cruise Control	BE–392
	9. Air Conditioner	AC–21

The troubleshooting procedure and how to make use of it are described on the following pages.

HOW TO PROCEED WITH TROUBLESHOOTING

Carry out troubleshooting in accordance with the procedure on the following page. Here, only the basic procedure is shown. Details are provided in each section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



★
Ask the customer about the conditions and the environment when the problem occurred.

2 ◆
Confirm the symptoms and the problem conditions, and check the diagnostic 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 code chart or the matrix chart of problem symptoms.

7
Check and repair the affected system or part in accordance with the instructions in Step 6.

8
After completing repairs, confirm that the problem has been eliminated.
(If the problem is not reproduced, perform the confirmation test under the same conditions and in the same environment as when it occurred for the first time.)

★ CUSTOMER PROBLEM ANALYSIS

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgement. To ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.

Important Points in the Problem Analysis

The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases, so as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in the troubleshooting section for each system for your use.

Important Points in the Customer Problem Analysis

- What ——————— Vehicle model, system name
- When ——————— Date, time, occurrence frequency
- Where ——————— Road conditions
- Under what conditions? ——————— Running conditions, driving conditions, weather conditions
- How did it happen? ——————— Problem symptoms

(Sample) Engine control system check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK SHEET

ENGINE CONTROL System Check Sheet

Inspector's Name

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In		Odometer Reading	km Miles

Date of Problem Occurrence		
Frequency of Problem Occurrence		☐ Constant ☐ Sometime (times per day/month) ☐ Once only ☐ Other ( )
Conditions at Time of Problem Occurrence	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))
	Place	☐ Highway ☐ Suburbs ☐ Inner City ☐ Hill (☐ Up, ☐ Down) ☐ Rough road ☐ Other ( )
	Engine Temp.	☐ Cold ☐ Warming up ☐ After warming up ☐ Any temp. ☐ Other
	Engine Operation	☐ Starting ☐ Just after starting ☐ Idling ☐ Racing without load ☐ Driving (☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other ( ))

Symptoms	☐ Engine does not Start	☐ Engine does not crank ☐ No initial combustion ☐ No complete combustion
	☐ Difficult to Start	☐ Engine cranks slowly ☐ Other ( )
	☐ Poor Idling	☐ [illegible] (☐ High ☐ Low (rpm))

2 SYMPTOM CONFIRMATION AND DIAGNOSTIC CODE CHECK

The diagnostic system in the LEXUS ES300 fulfills various functions. The first function is the Diagnostic 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.
The air conditioner system has an Actuator Check function whereby the ECU automatically operates the actuators of the damper and blowermotor, etc. to check the operation. The cruise control system has a Cancel Signal Check function which memorizes and displays what sort of signal it was that last cancelled the cruise control. By using these check functions, the problem areas can be narrowed down quickly and troubleshooting can be performed effectively. Diagnostic functions are incorporated in the following systems in the LEXUS ES300.

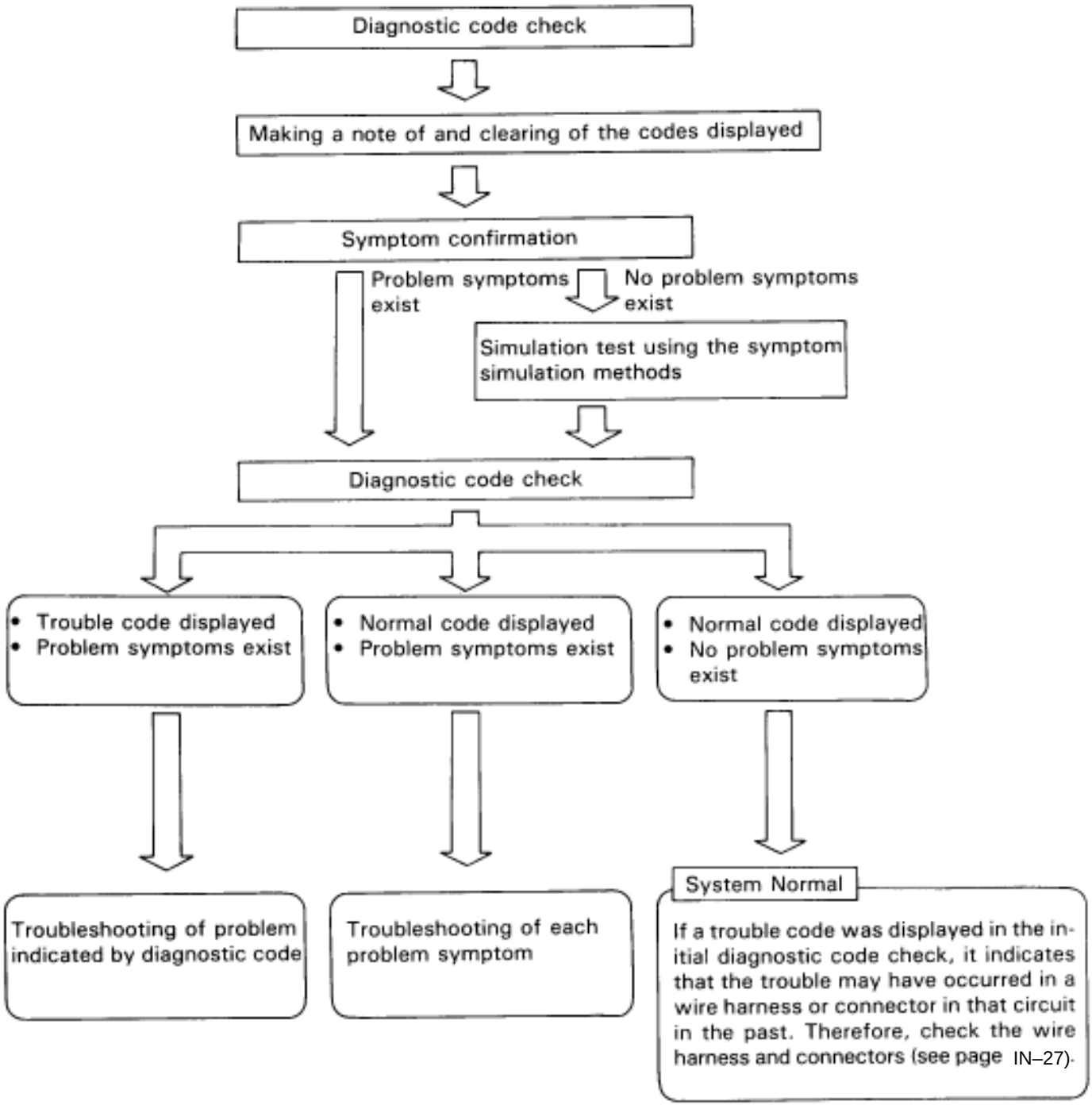
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Other Diagnosis Function
Engine	O (with Test Mode)	O	
Automatic Transaxle	O (with Test Mode)	O	
Anti–Lock Brake	O	O	
SRS Airbag	O		
Wireless Door Lock Control		O	
Cruise Control	O	O	Cancel Signal Check
Air Conditioner	O	O	Actuator Check

In diagnostic code check, it is very important to determine whether the problem indicated by the diagnostic 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 code is directly related to the problem symptom or not. For this reason, the diagnostic 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 code check.

DIAGNOSTIC CODE CHECK PROCEDURE

Diagnostic Code Check (Make a note of and then clear)	Confirmation of Symptoms	Diagnostic Code Check	Problem Condition
Trouble Code Display	Problem symptoms exist	Same 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 trouble code displayed first is either for a past problem or it is a secondary problem.)
	No problem symptoms exist		The problem occurred in the diagnostic circuit in the past.
Normal Code Display	Problem symptoms exist	Normal code is Displayed	The problem is still occurring in a place other than in the diagnostic circuit.
	No problem symptoms exist	Normal code is Displayed	The problem occurred in a place other than in the diagnostic circuit in the past.

Taking into account the above points, a flow chart showing how to proceed with troubleshooting using the diagnostic code check is shown below. This flow chart shows how to utilize the diagnostic code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic code troubleshooting or to troubleshooting of problem symptoms.



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 now 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) are likely causes for problems which are 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.

◆ SYMPTOM SIMULATION

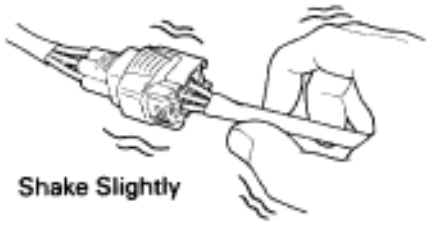
Important Points in the Symptom Simulation Test

In the symptom simulation test, the problem symptoms should of course be confirmed, but the problem area or parts must also be found out. To do this, narrow down the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the matrix chart of problem symptoms for each system to narrow down the possible causes of the symptom.

1	VIBRATION METHOD: When vibration seems to be the major cause.

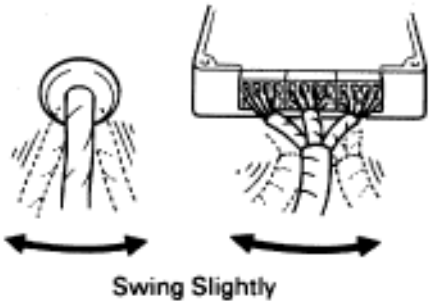
CONNECTORS

Slightly shake the connector vertically and horizontally.



WIRE HARNESS

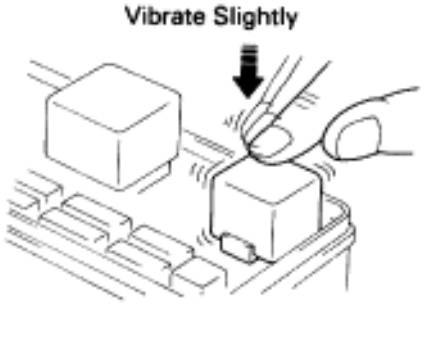
Slightly shake the wire harness vertically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.



PARTS AND SENSORS

Apply slight vibration with a finger to the part of the sensor considered to be the problem cause and check if the malfunction occurs.

HINT: Applying strong vibration to relays may result in open relays.



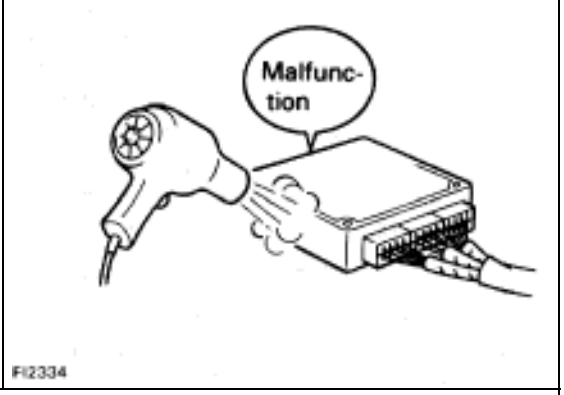
2 **HEAT METHOD: When the problem seems to occur when the suspect area is heated.**

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 limit that no damage is done to the component).

(2) Do not apply heat directly to parts in the ECU.



FI2334

3 **WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.**

Sprinkle water onto the vehicle and check to see if the malfunction occurs.

NOTICE:

(1) Never sprinkle water directly into the engine compartment, but indirectly change the temperature and humidity by applying water spray onto the radiator front surface.

(2) Never apply water directly onto the electronic components.

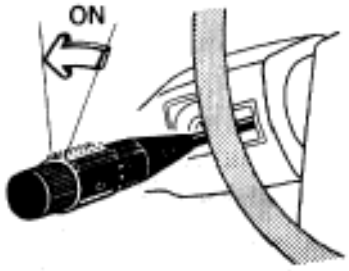
(Service hint)

If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be used.

BE4069

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.



FI2336

4 DIAGNOSTIC CODE CHART

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the trouble codes displayed in the diagnostic code check. Proceed with troubleshooting in accordance with the inspection procedure given in the diagnostic chart corresponding to the trouble codes displayed. The engine diagnostic code chart is shown below as an example.

- Code No.
  Indicates the diagnostic code.
- Circuit to be Checked
  Indicates the circuit or part which needs to be checked.
- Diagnostic Code Detecting Condition
  Indicates the diagnostic code set parameter.

DIAGNOSTIC CODE CHART

HINT: Parameters listed in the chart may not be exactly same as your reading due to type of the instruments or other factors.

Code No.	Number of Check Engine Blinks	Circuit	Diagnostic Code Detecting Condition
–		Normal	No code is recorded.
12		RPM Signal	No "NE" or "G1" and "G2" signal to ECU within 2 sec. after cranking.
			Open in "G⊖" circuit.
13		RPM S	No NE signal to ECU for 0.1 sec. or more at 1,000 rpm or more.
			the interval between G1 and

- Trouble Area
  Indicates the suspect area of the problem.
- Page or Instructions
  Indicates the page where the inspection procedure for each circuit is to be found, or gives instructions for checking and repairs.

If a malfunction code is displayed during the diagnostic code check in test mode, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

Trouble Area	"CHECK" Engine Warning Light*1		Memory*2	See Page
	Normal Mode	Test Mode		
———	–	–	———	———
• Open or short in NE, G circuit. • Distributor • Open or short in STA circuit. • ECU	ON	N.A.	○	EG-354
• Open or short in NE circuit. • Distributor • ECU		N.A.	○	EG-357
Open or short in NE				

5 MATRIX CHART OF PROBLEM SYMPTOMS

The suspect circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a "Normal" code is displayed in the diagnostic 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 Symptom
- Page
  Indicates the page where the flow chart for each circuit is located.
- Circuit or Part Name
  Indicates the circuit or part which needs to be checked.

MATRIX CHART OF PROBLEM SYMPTOMS

When the malfunction code is not confirmed in the diagnostic code check and the problem still can not be confirmed in the basic inspection, then proceed to this step and perform troubleshooting according to the numbered order given in the table below.

The circuits indicated by ※ on the matrix chart can be inspected using the TCCS checker.

Symptom	Suspect area	See page
	Air flow meter circuit ※	EG-388 390
	Starter signal circuit ※	EG-400
	EGR System	EG-408
	Switch condition signal circuit	EG-412
	Neutral start switch circuit ※	EG-416
	ECU power source circuit	EG-420
	Back up power source circuit	EG-426
	Injector circuit ※	EG-428
	Cold start injector circuit	EG-432
	ISC valve circuit	EG-436
	Fuel system circuit	EG-440
	Fuel pressure control VSV circuit	EG-446
	A/C cut control circuit	EG-450
	A/C signal circuit (Compressor circuit) ※	AC-84
	Starter and starter relay	ST-17-19
	Ignition signal circuit (Spark test)	IG-6
	Spark plug	IG-9
	Ignition coil	IG-11
	Distributor	IG-11
	Compression	EG-27
	ECT faulty	AX-66
	Theft deterrent ECU	BE-278
	Engine (& ECT) ECU	IN-32
Does not start: Engine does not crank		2 1 3
Does not start: No initial combustion	1 5 6 3 2 4	
Does not start: No complete combustion	6 7 1 5 4 2 3	
Difficult to start: Difficult to start normally	1 8 9 2 3 6 4 5 7	
Difficult to start: Difficult to start cold	1 5 3 2 4 8 6 7	
Difficult to start: Difficult to start hot	1 5 6 2 4 3 9 7 8	
Idling: Incorrect first idle	1 2	
Idling: High engine idle speed	2 3	
Idling: Low engine idle speed	2 6 11 9 10 7	

- Circuit Inspection, Inspection Order
  Indicates the circuit which needs to be checked for each problem symptom. Check in the order indicated by the numbers.

6 CIRCUIT INSPECTION

How to read and use each page is shown below.

- Diagnostic Code No. and Circuit Name

- Circuit Description
  The major role and operation, etc. of the circuit and its component parts are explained.

Diag. Code 24 | Intake Air Temp. Sensor Circuit

- Indicates the diagnostic code, diagnostic code set parameter and suspect area of the problem.

CIRCUIT DESCRIPTION

The intake air temp. sensor is built into the air flow meter and senses the intake air temperature.
The structure of the sensor and connection to the ECU is the same as in the water temp. sensor shown on page EG-370.
If the ECU records the diagnostic code "24", it operates the fail safe function, keeping the intake air temperature at a constant 20°C (68°F).

Code No.	Diagnostic Code Detecting Condition	Trouble Area
24	Open or short in intake air temp. sensor circuit for 0.5 sec. or more.	• Open or short in intake air temp. sensor circuit. • Intake air temp. sensor • ECU

- Diagnostic Chart
  The troubleshooting procedure for the circuit is shown in a flow chart.
  Use it 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. For details of each inspection, the page number of the related "Inspection Procedure" is included.

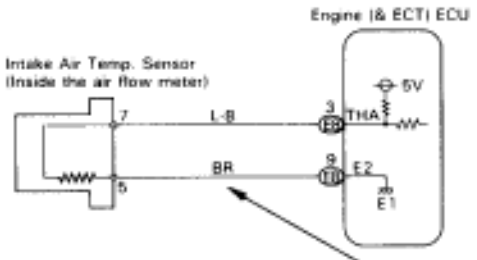
DIAGNOSTIC CHART

HINT: If diagnostic codes 22, 24, 32 and 41 are output simultaneously, E2 (sensor ground) may be open.

1. Check voltage of sensor.
   - OK → Check for momentary interruption (See page EG-333).
   - NG
2. Check resistance of sensor.
   - NG → Replace intake air temp. sensor.
   - OK
3. Check for open and short in harness and connector between ECU and intake air temp. sensor.
   - NG → Repair or replace harness or connector.
   - OK

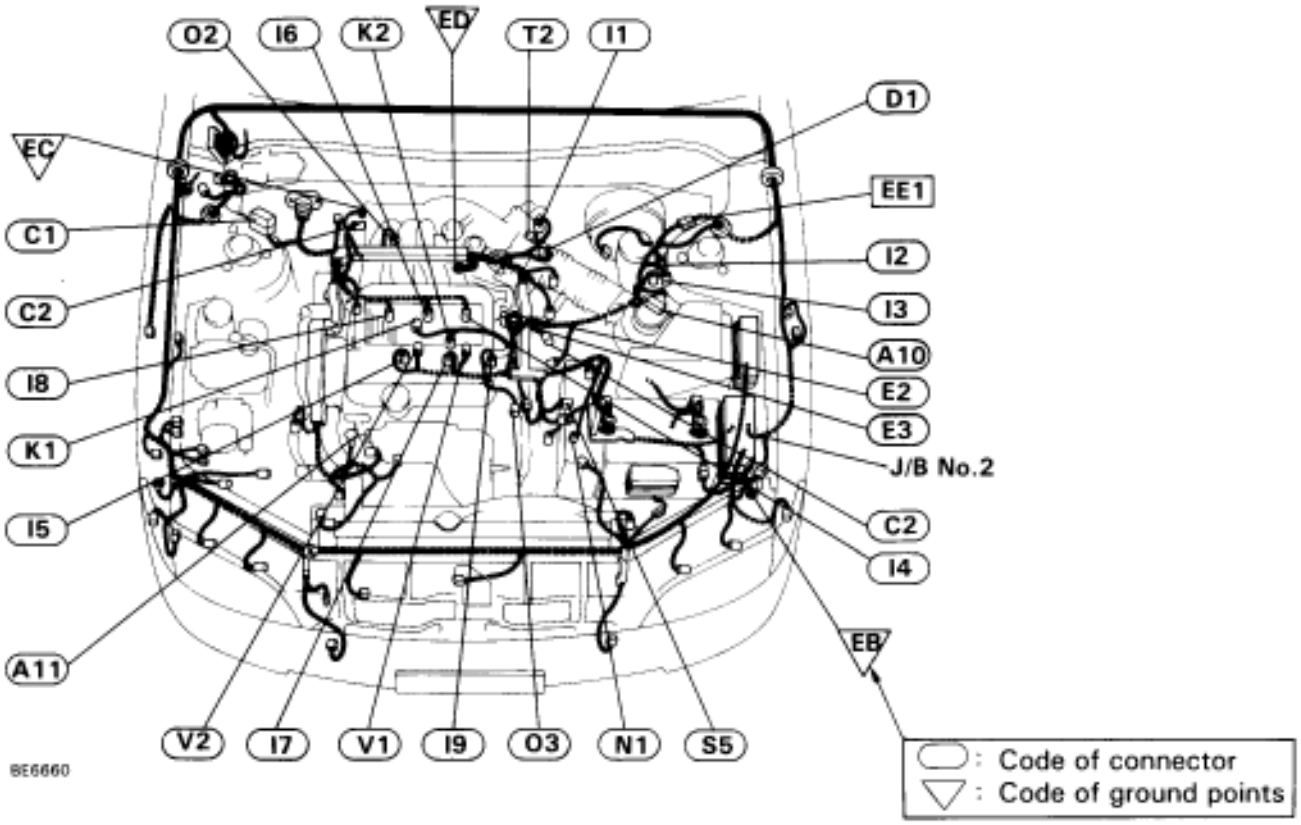
Check and replace ECU.

WIRING DIAGRAM



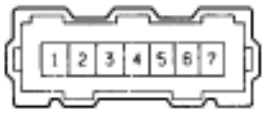
- Wiring Diagram
  This shows a wiring diagram of the circuit. Use this diagram together with the location of connectors to thoroughly understand the circuit.

Location of Connectors in Engine Compartment



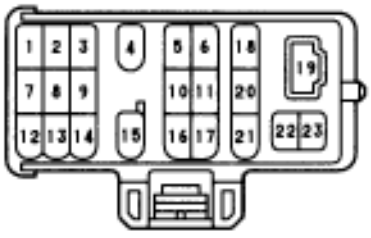
- Location of connectors
  This diagram shows the wire harnesses and connectors used in one system.
  The connector shows the harness side connector, so when checking the part side connector (sensor, actuator, etc.), be careful not to mistake the terminal positions.

A10
Intake Air Temp. Sensor (Inside the air flow meter)



A11
Alternator

C1
Check Connector



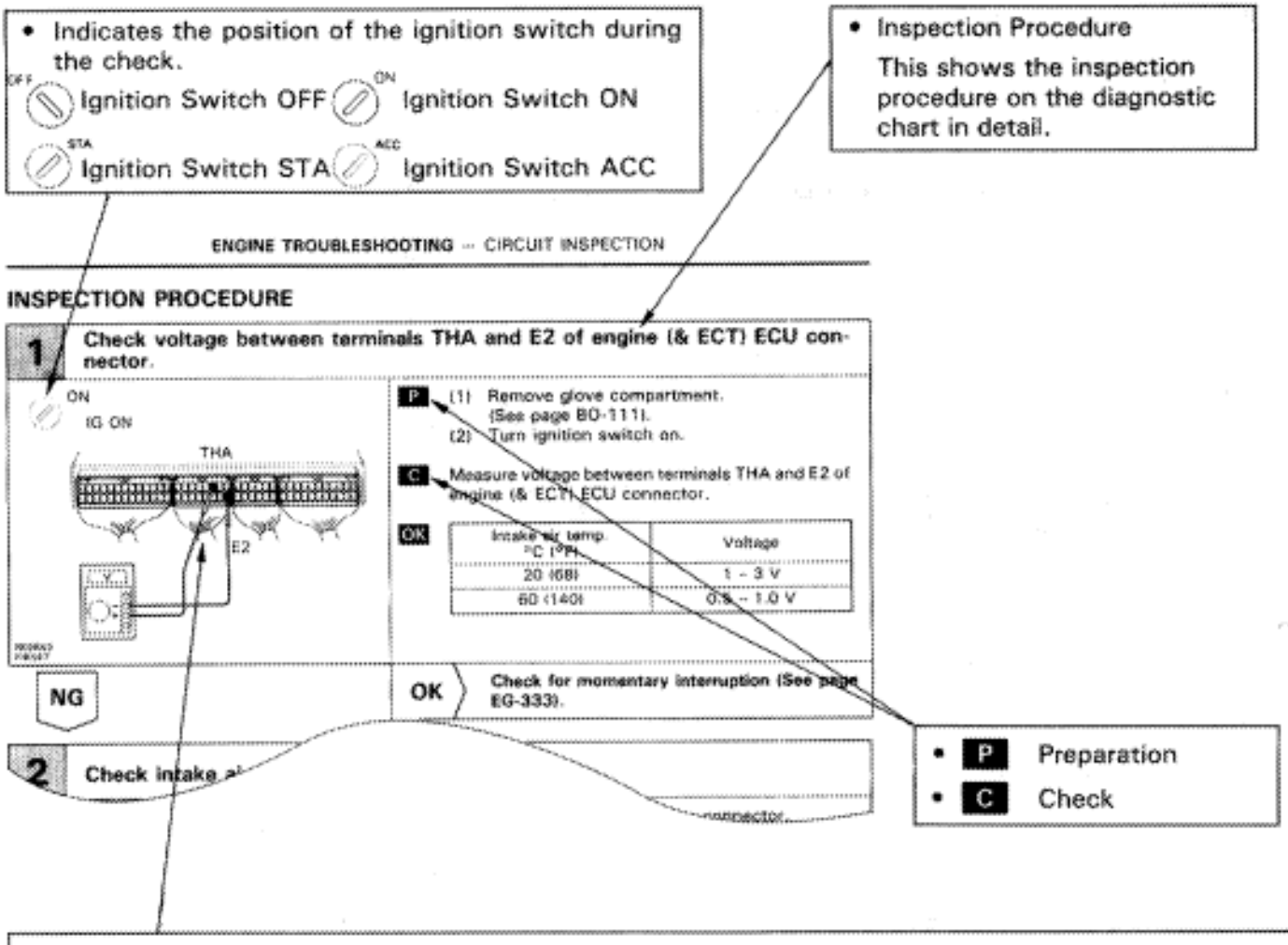
C2
Cold Start Injector

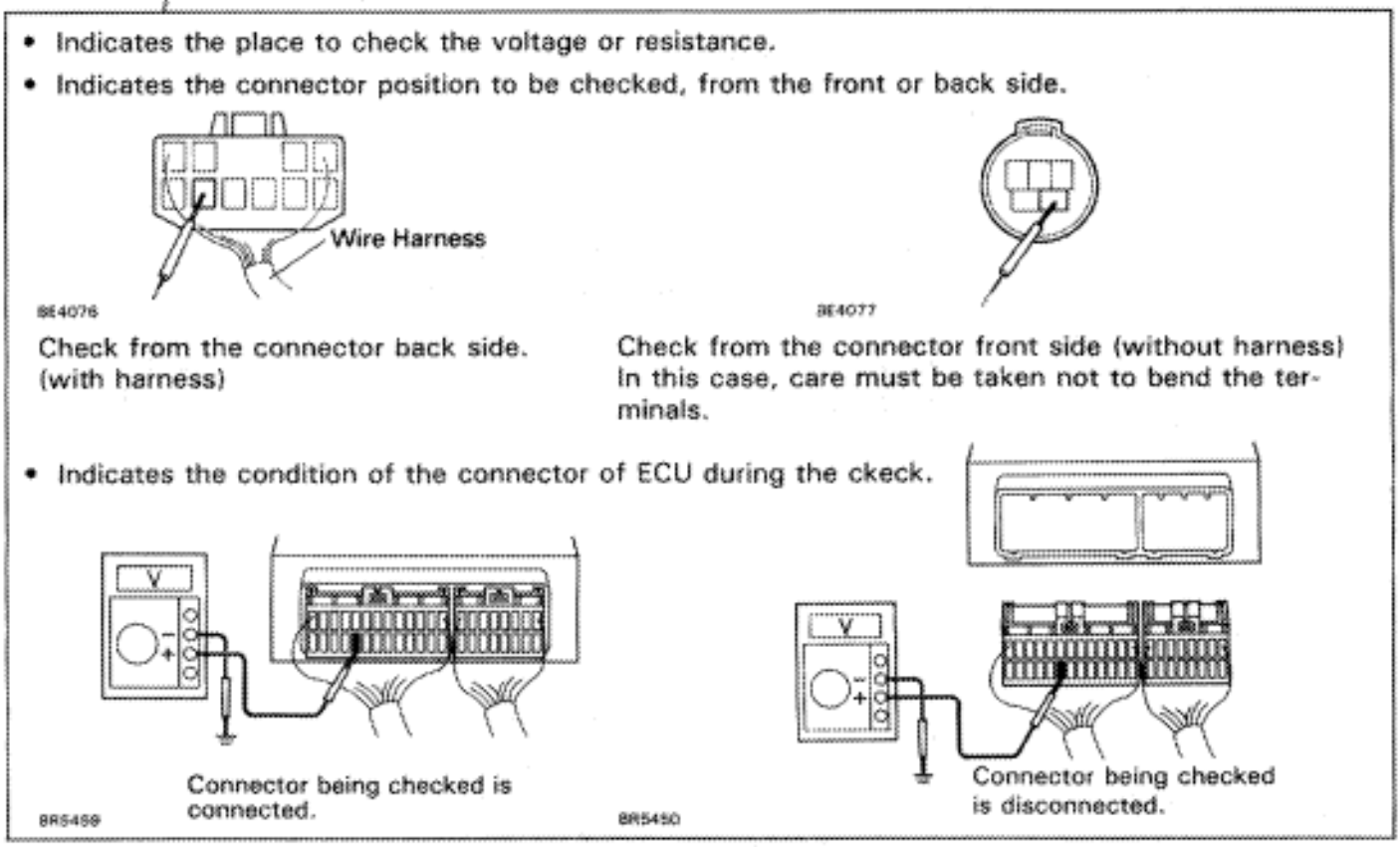
D1
Distributor

E2
Water Temp. Sensor

E3
EGR Gas Temp. Sensor

I1
ISC Valve


• Indicates the position of the ignition switch during the check.
OFF
Ignition Switch OFF
ON
Ignition Switch ON
STA
Ignition Switch STA
ACC
Ignition Switch ACC
• Inspection Procedure
This shows the inspection procedure on the diagnostic chart in detail.
ENGINE TROUBLESHOOTING – CIRCUIT INSPECTION
INSPECTION PROCEDURE
1
Check voltage between terminals THA and E2 of engine (& ECT) ECU connector.
ON
IG ON
THA
E2
P
(1) Remove glove compartment. (See page BO-111).
(2) Turn ignition switch on.
C
Measure voltage between terminals THA and E2 of engine (& ECT) ECU connector.
OK
Intake air temp. °C (°F)
Voltage
20 (68)
1 – 3 V
60 (140)
0.2 – 1.0 V
NG
OK
Check for momentary interruption (See page EG-333).
2
Check intake a
connector.
• P Preparation
• C Check


• Indicates the place to check the voltage or resistance.
• Indicates the connector position to be checked, from the front or back side.
Wire Harness
8E4076
Check from the connector back side. (with harness)
8E4077
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 ckeck.
V
Connector being checked is connected.
8R5459
8R5450
Connector being checked is disconnected.

HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

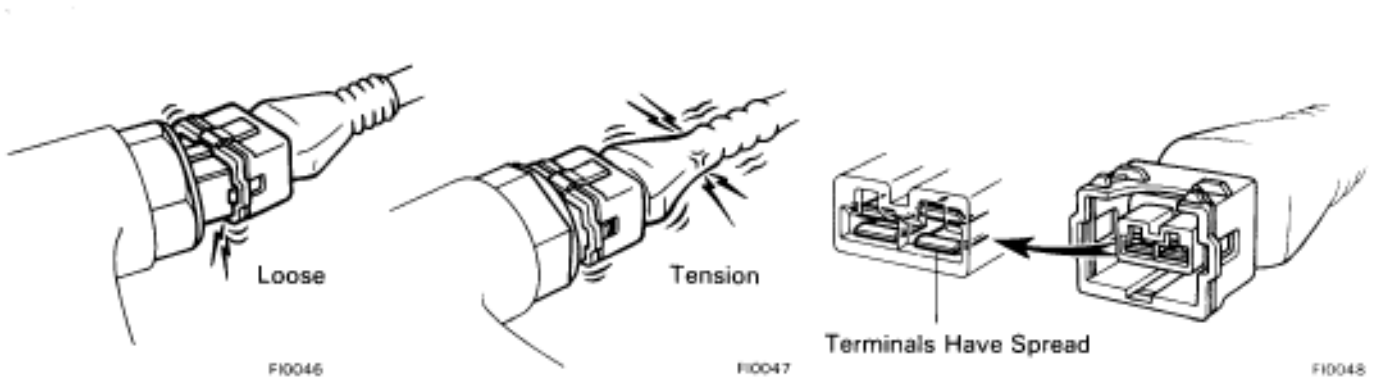
1. For troubleshooting, diagnostic code charts or problem symptom charts are provided for each circuit with detailed inspection procedures on the following pages.
2. When all the component parts, wire harnesses and connectors of each circuit except the ECU are found to be normal in troubleshooting, then it is determined that the problem is in the ECU.
   Accordingly, if diagnosis is performed without the problem symptoms occurring, the instruction will be to check and replace the ECU, even if the problem is not in the ECU. So, always confirm that the problem symptoms are occurring, or proceed with inspection while using the symptom simulation method.
3. 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 codes. Follow the procedure outlined below whenever these instructions appear.

Check Wire Harness and Connector

The problem in the wire harness or connector is an open circuit or a short circuit.

OPEN CIRCUIT:

This could be due to a disconnected wire harness, faulty contact in the connector, a connector terminal pulled out, etc.



HINT:

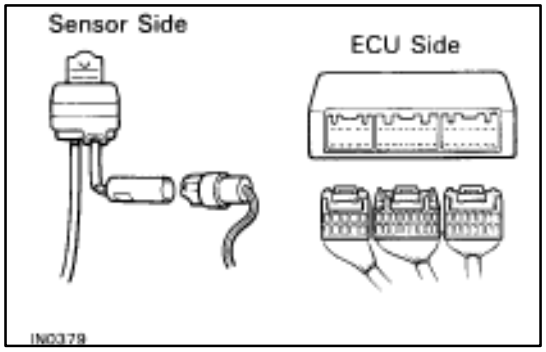
1. It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators.
2. Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a drop in the contact pressure between the male and female terminals of the connector. 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 short circuit between the wire harness and the body ground or to a short inside the switch, etc.

HINT:

- When there is a short between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.



1. CONTINUITY CHECK (OPEN CIRCUIT CHECK)

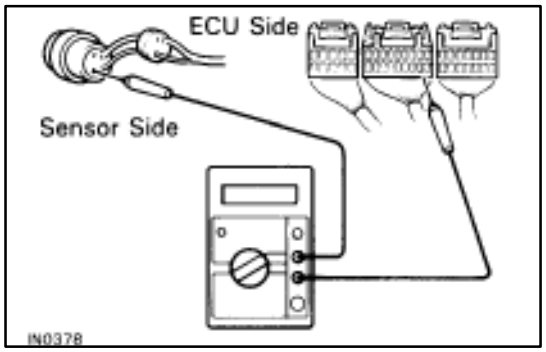
(1) Disconnect the connectors at both ECU and sensor sides.

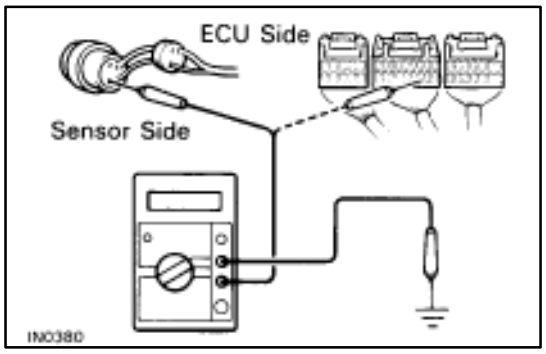
(2) Measure the resistance between the applicable terminals of the connectors.

Resistance: 1 Ω or less

HINT:

- Measure the resistance while lightly shaking the wire harness vertically and horizontally.
- When tester probes are inserted into a connector, insert the probes from the back. For waterproof connectors in which the probes cannot be inserted from the back, be careful not to bend the terminals when inserting the tester probes.





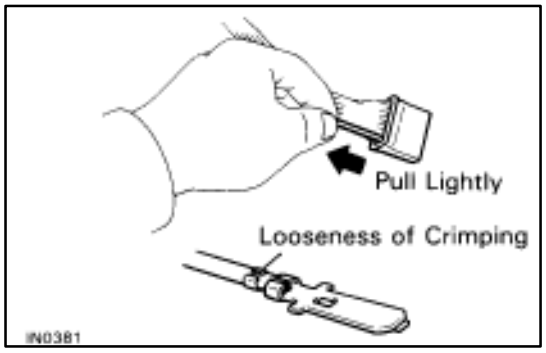
2. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

(1) Disconnect the connectors at both ends.

(2) 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.



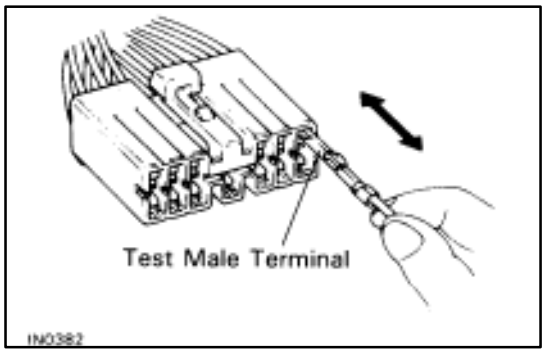
3. VISUAL CHECK AND CONTACT PRESSURE CHECK

(1) Disconnect the connectors at both ends.

(2) Check for rust or foreign material, etc. on the terminals of the connectors.

(3) Check crimped portions for looseness or damage and check if the terminals are secured in the lock position.

HINT: The terminals should not come out when pulled lightly.



(4) Prepare a test male terminal and insert it in the female terminal, then pull it out.

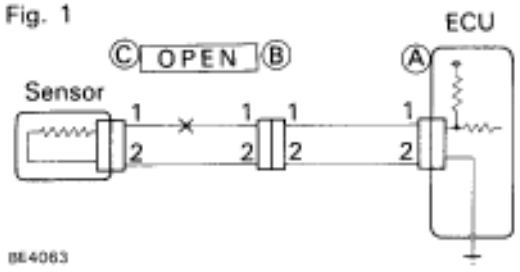
HINT: When the test terminal is pulled out more easily than others, there may be poor contact in that section.

Actual examples of the inspection method for open circuit and short circuit are explained below.

1. OPEN CIRCUIT CHECK

For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.

Fig. 1



(a) Continuity Check

(1) Disconnect connectors A and C and measure the resistance between them.

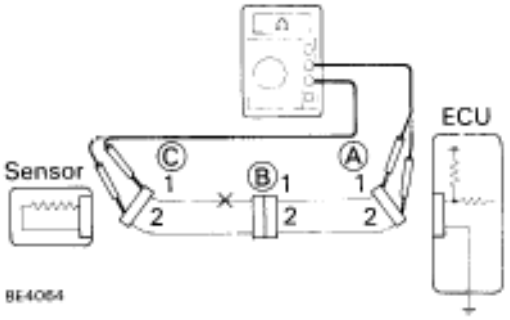
In the case of Fig. 2,

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. 2



(2) Disconnect connector B and measure the resistance between connectors A and B, B and C.

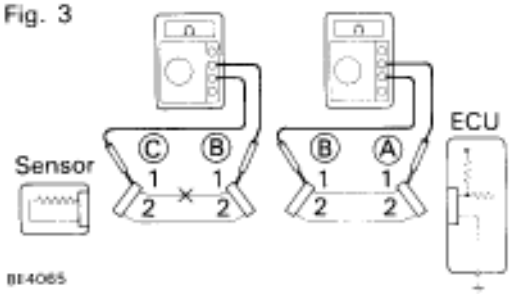
In the case of Fig. 3,

Between terminal 1 of connector A and terminal 1 of connector B → Continuity

Between terminal 1 of connector B 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 B and terminal 1 of connector C.

Fig. 3



(b) Voltage Check

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.

(1) 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 5 V output terminal, terminal 1 of connector B, and terminal 1 of connector C, in that order.

If the results are:

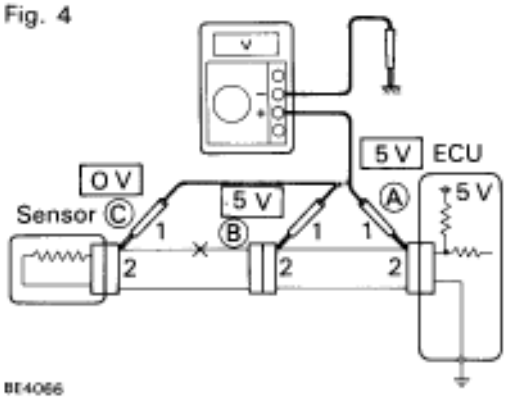
5 V: Between Terminal 1 of connector A and Body Ground

5 V: Between Terminal 1 of connector B and Body Ground

0 V: 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.

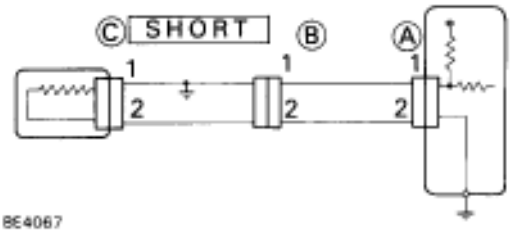
Fig. 4



2. SHORT CIRCUIT CHECK

If the wire harness is ground shorted as in Fig. 5, locate the section by conducting a ”continuity check with ground”.

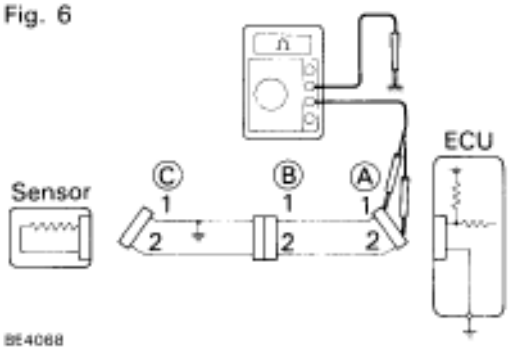
Fig. 5



(a) Continuity Check with Ground

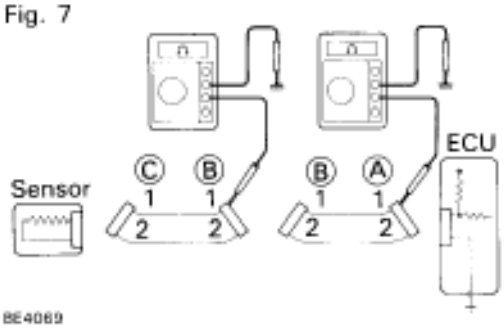
(1) Disconnect connectors A and C and measure the resistance between terminals 1 and 2 of connector A and body ground.
In the case of Fig. 6,
Between terminal 1 of connector A and body ground → Continuity
Between terminal 2 of connector A and body ground → No continuity (open)
Therefore, it is found out that there is a short circuit between terminal 1 of connector A and terminal 1 of connector C.

Fig. 6



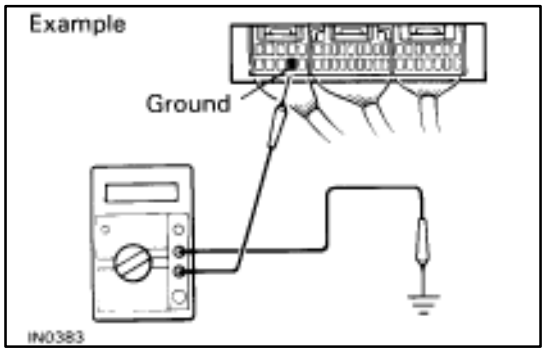
(2) Disconnect connector B and measure the resistance between terminal 1 of connector A and body ground, and terminal 1 of connector B and body ground.
Between terminal 1 of connector A and body ground → No continuity (open)
Between terminal 1 of connector A and body ground → Continuity
Therefore, it is found out that there is a short circuit between terminal 1 of connector A and terminal 1 of connector C.

Fig. 7



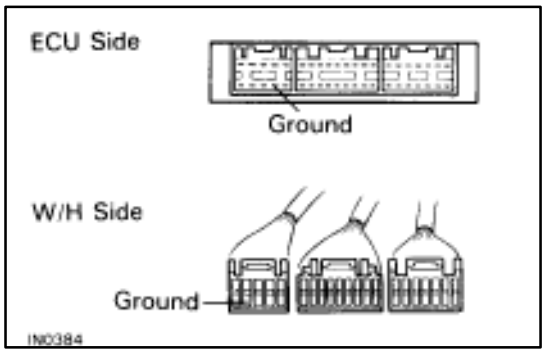
Check and Replace ECU

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 known good one and check if 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.

CAUTIONS, NOTICES, HINTS:

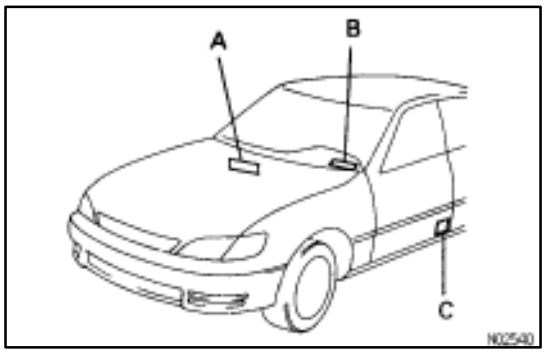
- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide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

SI UNIT

The UNIT given in this manual are primarily expressed with the SI UNIT(International System of Unit), and alternately expressed in the metric system and in the yard/pound system.

Example:

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



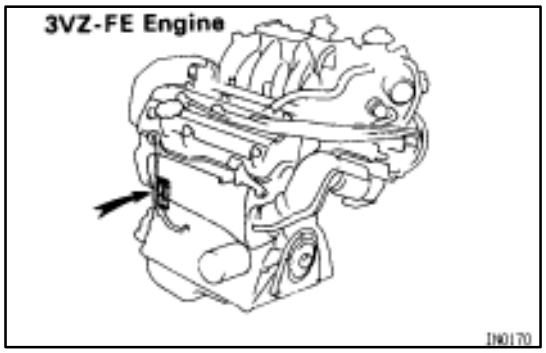
IDENTIFICATION INFORMATION

IN003–01

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped on the cowl panel. This number has also been stamped on the vehicle identification number plate and certification regulation label.

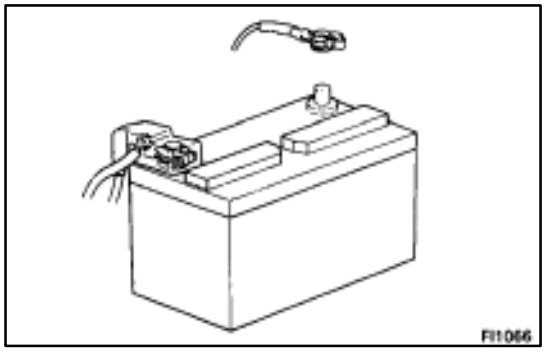
A. Vehicle Identification Number
B. Vehicle Identification Number Plate
C. Certification Regulation Label



ENGINE SERIAL NUMBER

IN004–01

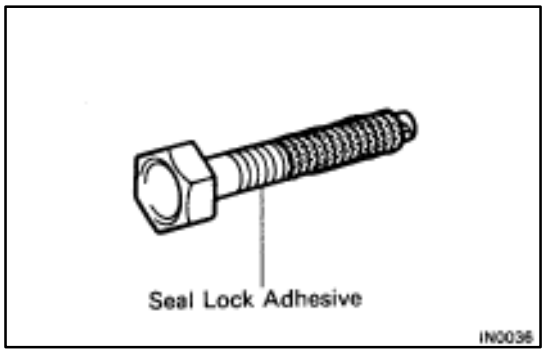
The engine serial number is stamped on the engine block as shown.



GENERAL REPAIR INSTRUCTIONS

IN005–02

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

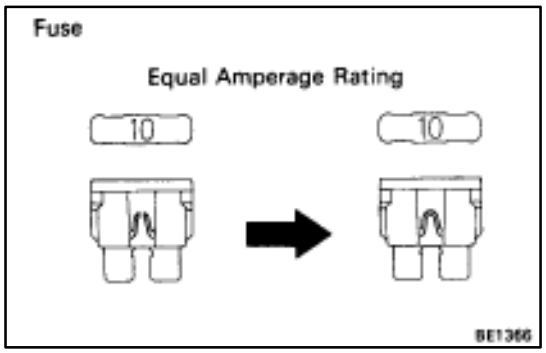


6. Precoated parts
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.

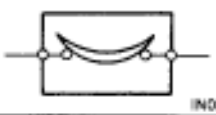
(a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

(b) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.
(c) Precoated parts are indicated in the component illustrations by the "★" symbol.

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

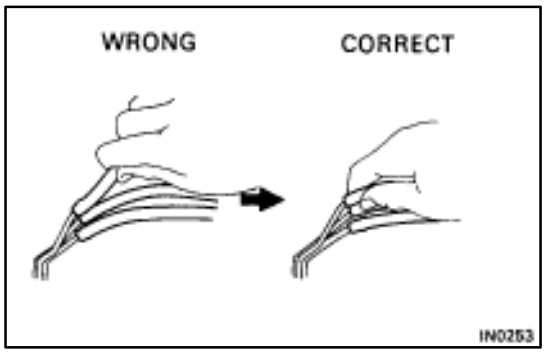


10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

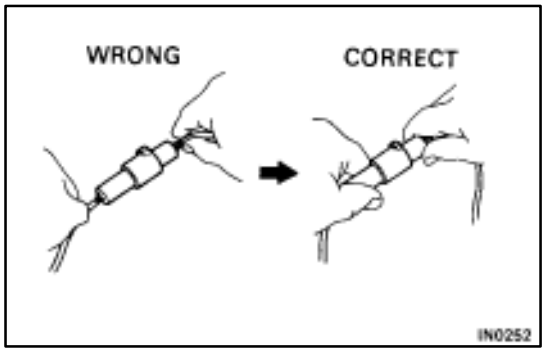
Illustration	Symbol	Part Name	Abbraviation
BE5594	IN0365	FUSE	FUSE
BE5595	IN0366	MEDIUM CURRENT FUSE	M-FUSE
BE5596	IN0367	HIGH CURRENT FUSE	H-FUSE
BE5597	IN0367	FUSIBLE LINK	FL
BE5598	 IN0368	CIRCUIT BREAKER	CB

V00076

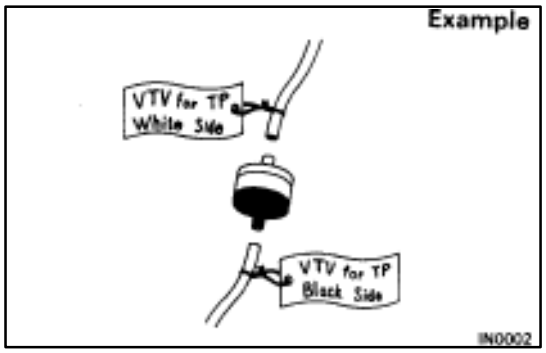
11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN–33)
    (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
    (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.
12. Observe the following precautions to avoid damage to the parts:
    (a) 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.)



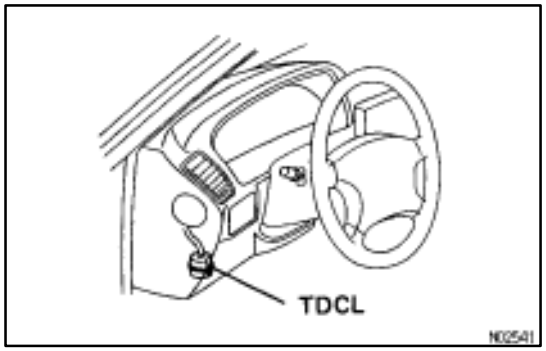
    (b) To disconnect vacuum hoses, pull on the end, not the middle of the hose.
    (c) To pull apart electrical connectors, pull on the connector itself, not the wires.
    (d) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
    (e) When steam cleaning an engine, protect the distributor, air filter, and VCV from water.



    (f) Never use an impact wrench to remove or install temperature switches or temperature sensors.
    (g) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
    (h) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step–down adapter instead. Once the hose has been stretched, it may leak.



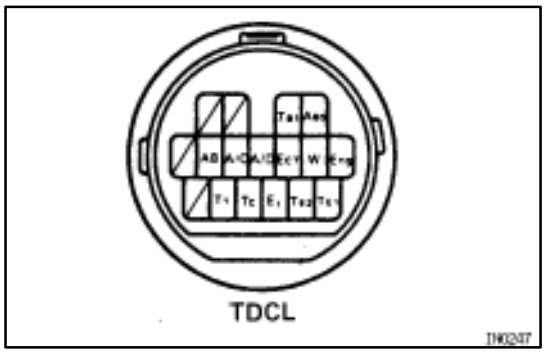
13. Tag hoses before disconnecting them:
    (a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
    (b) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.



FOR VEHICLES WITH TOTAL DIAGNOSTIC COMMUNICATION LINK (TDCL)

IN008–01

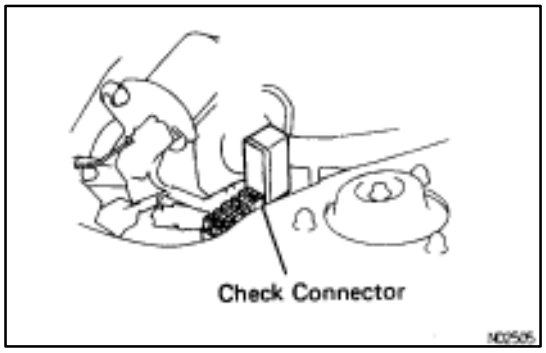
The TDCL is provided inside the cabin (located under the left side instrument panel) as a connector exclusively for diagnosis of data from the engine, ECT, ABS, A/C, Airbag and Cruise Control System to improve serviceability. The check connector inside the engine compartment is used for engine adjustment.



Connecting the following terminals of the TDCL to terminal E1 selects the diagnosis mode shown.

NOTICE: Never make a mistake with the terminal connection position as this will cause a malfunction.

Terminal	System
TE1	Engine and ECT (Normal mode)
TE2 and TE1	Engine and ECT (Test mode)
TC	ABS, A/C, Airbag and Cruise Control System
TT	ECT



Refer to the respective system for the inspection method.

HINT: By connecting the TDCL up to a monitor specifically designed for use with the TDCL, the diagnosis result for each system can be read easily.

PRECAUTION

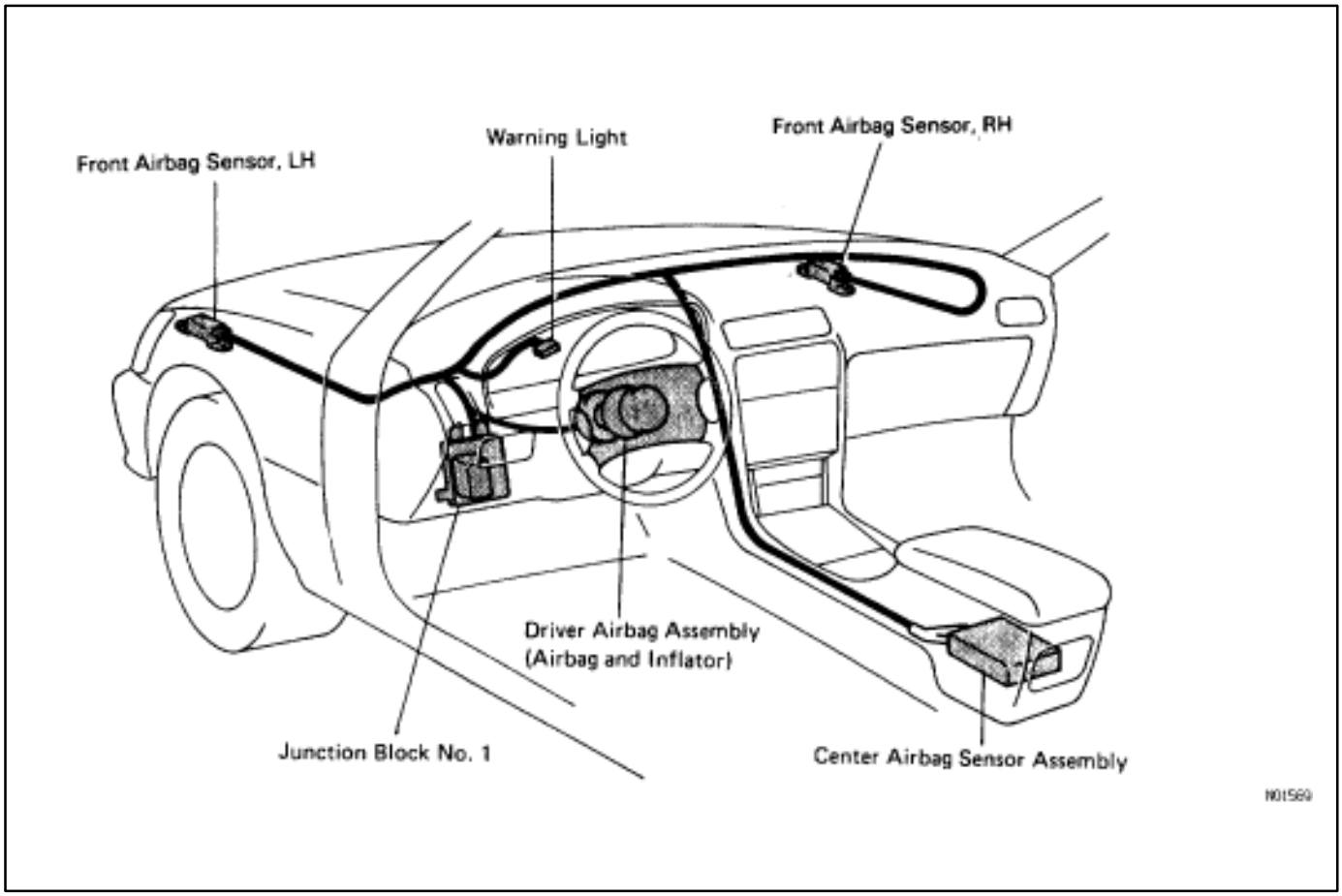
FOR VEHICLES EQUIPPED WITH SRS AIRBAG

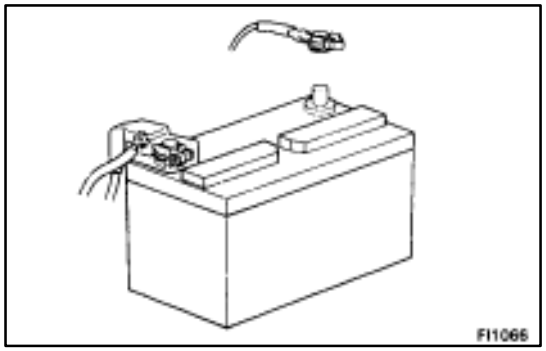
IN00E–02

The 1993 LEXUS ES300 specifications is equipped with an SRS (Supplemental Restraint System) airbag. Failure to carry out service operations in the correct sequence could cause the airbag system to unexpectedly deploy during servicing, possibly leading to a serious accident.

Further, if a mistake is made in servicing the airbag system, it is possible the airbag 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 procedure described in this manual.

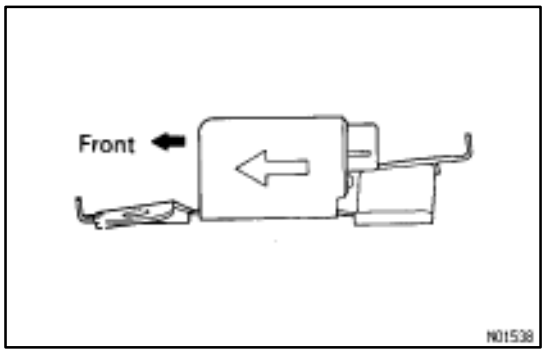
Locations of Airbag Components





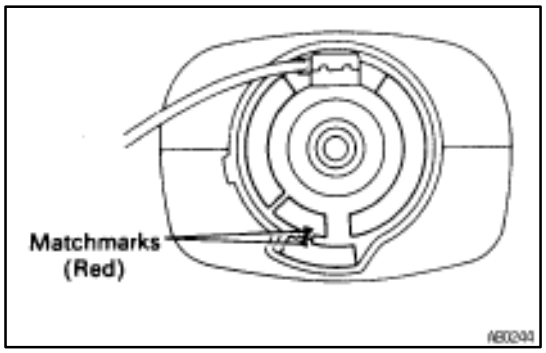
1. Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic codes become the most important source of information when troubleshooting. When troubleshooting the airbag system, always inspect the diagnostic codes before disconnecting the battery (See page AB–24).
2. **Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery.**
   (The airbag system is equipped with a back–up power source so that if work is started within 30 seconds of disconnecting the negative (–) terminal cable of the battery, the airbag may be deployed.)
   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 each memory system. Then when work is finished, reset the clock and audio systems as before.
   To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.
3. Even in cases of a minor collision where the airbag does not deploy, the front airbag sensors and the steering wheel pad should be inspected (See page AB –9).
4. Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.
5. Before repairs, remove the airbag sensors if shocks are likely to be applied to the sensors during repairs.
6. The center airbag sensor assembly contains mercury. After performing replacement, do not destroy the old part. When scrapping the vehicle or replacing the center airbag sensor assembly itself, remove the center airbag sensor assembly and dispose of it as toxic waste.
7. Never disassemble and repair the front airbag sensors, center airbag sensor assembly or steering wheel pad in order to reuse it.
8. If the front airbag sensors, center airbag sensor assembly o r steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.

9. Do not expose the front airbag sensors, center airbag sensor assembly or steering wheel pad directly to hot air or flames.
10. Use a volt/ohmmeter with high impedance (10 k Ω/V minimum) for troubleshooting of the electrical circuit.
11. Information labels are attached to the periphery of the airbag components. Follow the notices.
12. After work on the airbag system is completed, perform the airbag warning light check (See page AB–31).



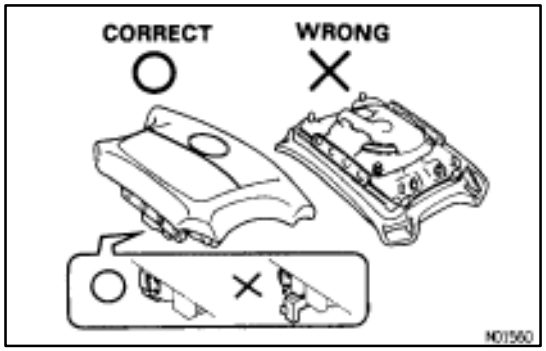
Front Airbag Sensor

1. Never reuse the front airbag sensors involved in a collision when the airbag has deployed. (Replace both left and right airbag sensors.)
2. Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.
3. The front airbag sensor set bolts have been anti–rust treated. When the sensor is removed, always replace the set bolts with new ones.
4. The front airbag 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 diagnosis system (See page AB–7).



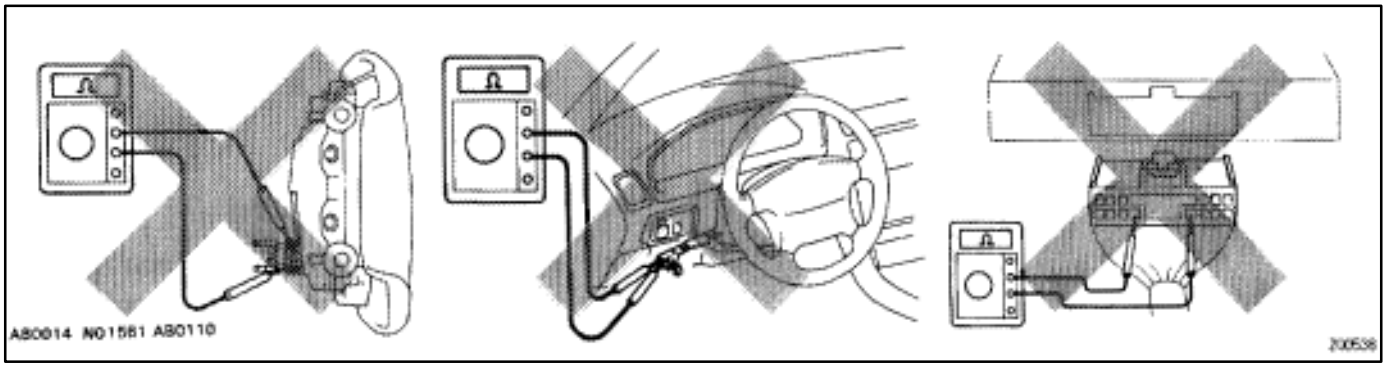
Spiral Cable (in Combination Switch)

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 page AB–15 of this manual concerning correct steering wheel installation.



Steering Wheel Pad (with Airbag)

1. **When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.**
   In this case, the twin–lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. And do not store a steering wheel pad on top of another one. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)
2. **Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)**



3. Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
4. Store the steering wheel pad where the ambient temperature remains below 90°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 AB–84). Perform the operation in a place away from electrical noise.**

Center Airbag Sensor Assembly

The connector to the center airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connector is connected or disconnected while the center airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the airbag system.

Wire Harness and Connector

The airbag system's wire harness is integrated with the cowl wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the airbag system wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page AB–21.

FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

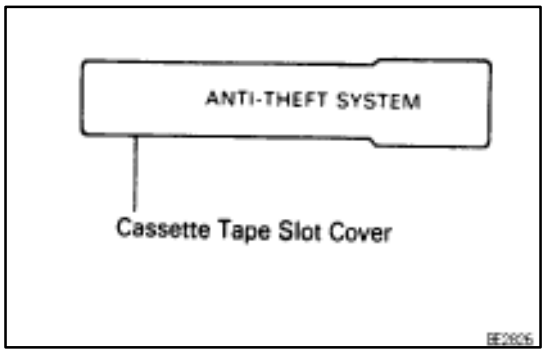
IN006–03

CAUTION: If large amounts of unburned gasoline flow into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

1. **Use only unleaded gasoline.**
2. **Avoid prolonged idling.**
   Avoid running the engine at idle speed for more than 20 minutes.
3. **Avoid spark jump test.**

(a) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
(b) While testing, never race the engine.

4. **Avoid prolonged engine compression measurement.**
   Engine compression tests must be done as rapidly as possible.
5. **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.
6. **Avoid coasting with ignition turned off and prolonged braking.**
7. **Do not dispose of used catalyst along with parts contaminated with gasoline or oil.**



FOR VEHICLES WITH AN AUDIO SYSTEM WITH BUILT–IN ANTI–THEFT SYSTEM

IN00C–01

Audio System displaying the sign ”ANTI–THEFT SYSTEM” shown on the left has a built–in anti–theft system which makes the audio system soundless if stolen.

If the power source for the audio system is cut even once, the anti–theft system operates so that even if the power source is reconnected, the audio system will not produce any sound unless the ID number selected by the customer is input again. Accordingly, when performing repairs on vehicles equipped with this system, before disconnecting the battery terminals or removing the audio system the customer should be asked for the ID number so that the technician can input the ID number afterwards, or else a request made to the customer to input the ID number. For the method to input the ID number or cancel the anti–theft system, refer to the Owner’s Manual.

ABBREVIATIONS USED IN THIS MANUAL

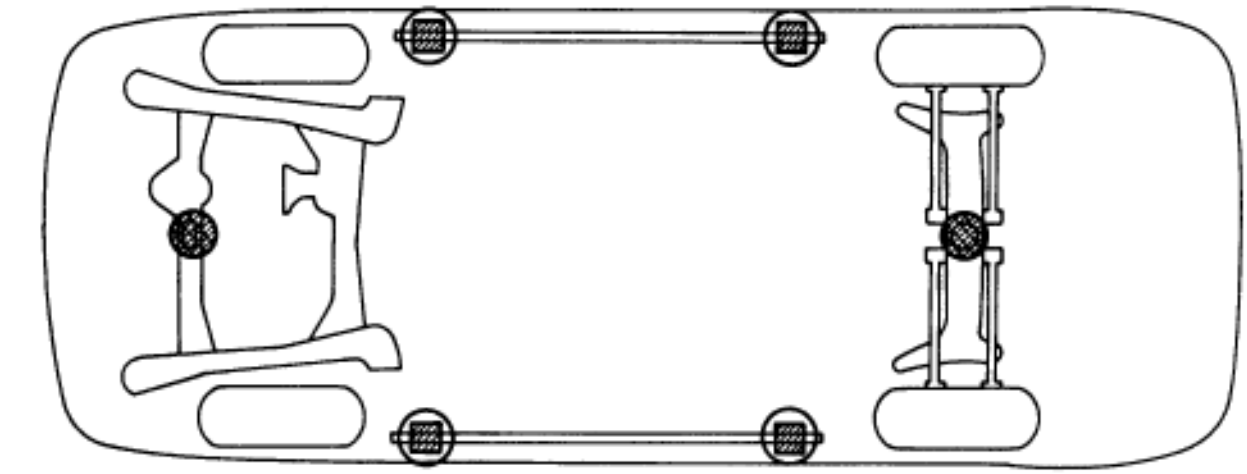
IN009–01

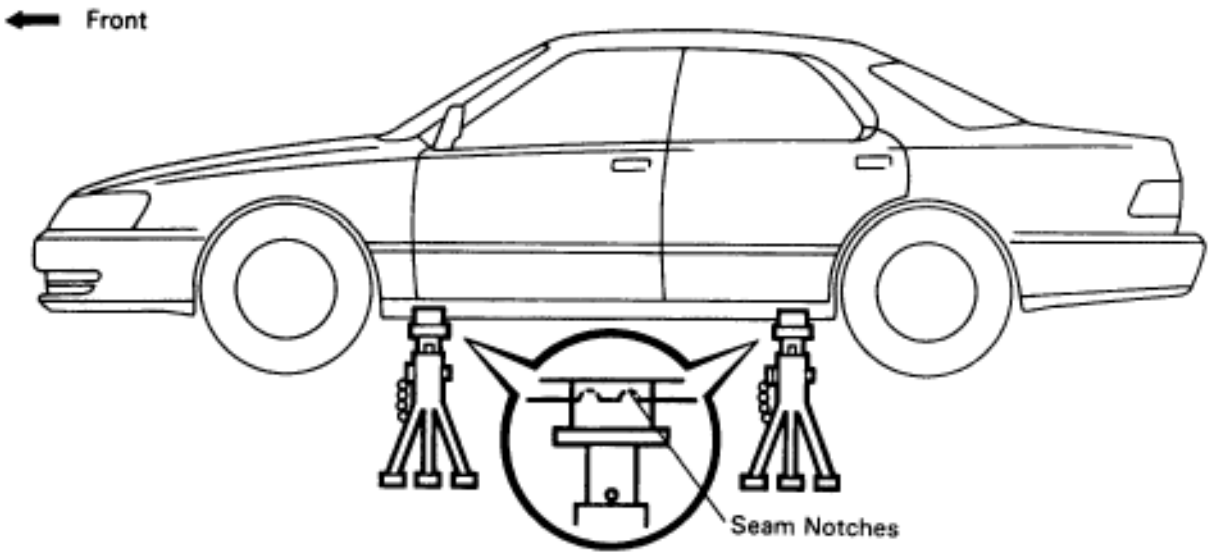
ABS	Anti–Lock Brake System
A/C	Air Conditioner
ALR	Automatic Locking Retractor
A/T	Automatic Transaxle
ATF	Automatic Transmission Fluid
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BVSV	Bimetal Vacuum Switching Valve
CALIF	Vehicles Sold in California
CB	Circuit Breaker
CRS	Child Restraint System
DOHC	Double Over Head Cam
DP	Dash Pot
ECT	Electronic Controlled Transmission
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
EGR	Exhaust Gas Recirculation
ELR	Emergency Locking Retractor
EPR	Evaporator Pressure Regulator
ESA	Electronic Spark Advance
EVAP	Evaporative (Emission Control)
EX	Exhaust (manifold, valve)
Ex.	Except
FIPG	Formed in Place Gasket
FL	Fusible Link
FPU	Fuel Pressure Up
FR, Fr	Front
HAC	High Altitude Compensation
IG	Ignition
IN	Intake (manifold, valve)
INT	Intermittent
ISC	Idle Speed Control
J/B	Junction Block
LED	Light Emitting Diode
LH	Left–Hand
LHD	Left–Hand Drive
LLC	Long Life Coolant (Year Around Coolant)
LSPV	Load Sensing Proportioning Valve
Max.	Maximum
Min.	Minimum
MP	Multipurpose
M/T	Manual Transaxle
OD, O/D	Overdrive
O/S	Oversize
P & BV	Proportioning and Bypass Valve
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PS	Power Steering
RH	Right–Hand
RR, Rr	Rear
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
SW	Switch
TDC	Top Dead Center
TDCL	Total Diagnostic Communication Link
TWC	Three–Way Catalyst
U/S	Undersize
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
w/	With
w/o	Without

V00515

VEHICLE LIFT AND SUPPORT LOCATIONS

IN007–01





JACK POSITION ——————————

Front ..... Front crossmember
Rear ..... Rear axle beam

CAUTION: When jack-up the rear and front, make sure the car is not carrying any extra weight.

PANTOGRAPH JACK POSITION ——————————

SUPPORT POSITION

Safety stand and swing arm type lift .....

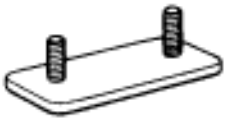
NO2506
NO2542

20K539

STANDARD BOLT TORQUE SPECIFICATIONS

IN008–01

HOW TO DETERMINE BOLT STRENGTH

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

V00078

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	–	–	–
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65in.·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		61	620	45	68	690	50
	12		110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10		70	710	51	78	790	57
	12		125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10		78	800	58	88	890	64
	12		140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10		87	890	64	97	990	72
	12		155	1,600	116	175	1,800	130

GLOSSARY OF SAE AND LEXUS TERMS

IN016–03

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

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

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

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

The Importance of Scheduled Maintenance

Regular maintenance is essential to obtaining the highest level of performance, safety and reliability from your Lexus. It can also enhance your vehicle's resale value. This section of the *Owner's Manual Supplement* is designed to help you make sure your vehicle receives proper and timely maintenance. It includes factory-recommended maintenance guidelines as well as logs in which to document your vehicle's maintenance history.

In addition to scheduled maintenance, your Lexus requires ongoing general maintenance such as fluid checks and visual inspections. These procedures are described in the "Maintenance" section of the *Owner's Manual*.

With proper maintenance and care, your vehicle will last longer and deliver more dependable, economical performance. Follow this booklet's recommendations and you'll enjoy maximum reliability and peace of mind from your Lexus for many years to come.

Maintaining your vehicle according to the recommendations in this booklet is required to ensure that your warranty coverage remains intact. You should keep detailed records of vehicle maintenance, including date of service, mileage at time of service and a description of service and/or parts installation performed. The maintenance logs in this booklet are a good place to record this information. If you sell your vehicle, be sure to give your maintenance records to the new owner.

Lexus will not deny a warranty claim solely because you do not have records to show that you maintained your vehicle. However, damage or failures caused by lack of proper maintenance are not covered under warranty.

Maintenance and repair services may be performed by you or by any automotive service provider you choose. Lexus will not deny a warranty claim solely because you used a service provider other than a Lexus dealership for maintenance and repairs. However, damage or failures caused by improper maintenance or repairs are not covered under warranty.

Your dealer may recommend more frequent maintenance intervals or more maintenance services than those listed in the scheduled maintenance log. These additional services are not required to maintain your warranty coverage. Ask your dealer for an explanation of any recommended maintenance not included in the scheduled maintenance log.

For a complete description of Lexus warranty coverages, see pages 16–33 of this booklet.

LEXUS DEALERSHIP SERVICE

To ensure that your vehicle receives first-quality service and factory-authorized parts, Lexus recommends having maintenance performed by an authorized Lexus dealership.

Lexus dealership technicians are experts in the maintenance and repair of Lexus vehicles. They stay current on the latest service information through Lexus technical bulletins, service publications and training courses. Many are also certified through the Lexus Commitment to Perfection Certification Program, which requires specialized, state-of-the-art training as well as rigorous exams through both Lexus and the National Institute for Automotive Service Excellence.

Additionally, when you have your vehicle serviced at a Lexus dealership, your service information is recorded in the Lexus National Service History database. This is the first database of its kind in the automotive industry. It can be accessed by any Lexus dealership in the U.S. — a great convenience if you relocate or need to have your vehicle serviced while traveling.

You can be confident you're getting the best possible service for your vehicle when you take it to a Lexus dealership. Don't trust your investment to anything less than a team of Lexus specialists.

Determining the Proper Maintenance Interval

Depending on your circumstances, you should obtain maintenance for your Lexus every 5,000 miles or every 7,500 miles. Follow these guidelines to determine which interval to use.

5,000-Mile Intervals

Use 5,000-mile intervals if you *primarily* operate your vehicle under any of the following conditions:

- Driving on unpaved or dusty roads.
- Towing a trailer or using a camper or car-top carrier.
- Repeated trips of less than five miles in temperatures below freezing.

7,500-Mile Intervals

Use 7,500-mile intervals if you *primarily* operate your vehicle under conditions other than those listed above.

Following the Maintenance Log Charts

The scheduled maintenance log identifies the maintenance required at each mileage interval and corresponding time interval based on mileage of 1,250 miles per month. If you drive more than 1,250 miles per month, you should obtain maintenance at the indicated mileage interval rather than the indicated time interval.

If you choose 5,000-mile intervals, follow the maintenance instructions shown below non-shaded headings such as this one:

5,000 Miles or 4 Months

If you choose 7,500-mile intervals, follow the maintenance instructions shown below shaded headings such as this one:

7,500 Miles or 6 Months

At 15,000-mile increments, the 5,000-mile and 7,500-mile intervals coincide. Therefore, shaded and non-shaded headings appear together, as in this example:

15,000 Miles or 12 Months
15,000 Miles or 12 Months

Special Operating Conditions

In addition to standard maintenance items, the scheduled maintenance log indicates services that should be performed on vehicles that are driven under special operating conditions. These conditions are listed in the next column.

You should perform the additional maintenance services if you drive *primarily* under any of these conditions during the maintenance interval period. If you drive only occasionally under these conditions during the maintenance interval period, it is not necessary to perform the additional services.

- Driving on rough, muddy or snow-melted roads
- Driving on salt-covered roads
- Driving on unpaved or dusty roads
- Extensive idling or low-speed driving for long distances
- Towing a trailer or using a camper or car-top carrier

The following descriptions are provided to give you a better understanding of the maintenance services that should be performed on your vehicle. The scheduled maintenance log indicates at which mileage/time intervals each service should be performed. Please note that many maintenance services should be performed only by a qualified technician.

For further information on maintenance services that you can perform yourself, see the "Service Procedures and Specifications" section of your *Owner's Manual*.

WARNING: Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**

Air Conditioner Filter

Replace as directed at the maintenance interval you choose. Refer to your *Owner's Manual* for service details.

Ball Joints and Dust Covers

Check the suspension and steering linkage ball joints for looseness and damage. Check all dust covers for deterioration and damage. A qualified technician should perform these inspections.

Body Inspection

Visually check for corrosion, scratches and other damage. Check outer body panels, inner panels of the hood and doors, and underneath the vehicle. Apply touch-up paint to any chips and scratches or have them repaired by a qualified technician.

Brake Fluid

Replace using fluid type specified in your *Owner's Manual*. A qualified technician should perform this operation.

Explanation of Maintenance Items

Brake Lines and Hoses
Visually inspect for proper installation. Check for chafing, cracks, deterioration and signs of leakage. Replace any deteriorated or damaged parts. A qualified technician should perform these operations.

Brake Linings/Drums and Brake Pads/Discs
Check the parking brake linings (shoes) and drums for scoring, burning, fluid leakage, broken parts and excessive wear. Check brake pads for excessive wear and brake discs for runout, excessive wear and fluid leakage. A qualified technician should perform these inspections.

Charcoal Canister
Check for internal damage and clogging. If necessary, clean with compressed air or replace. A qualified technician should perform these operations.

Differential Oil
Check for correct oil level and inspect each differential component for signs of leakage. If you discover any leakage, have it repaired by a qualified technician immediately.

Drive Belts
Inspect for cracks, excessive wear and oiliness. Check the belt tension and adjust if necessary. Replace the belts if they are damaged.

Drive Shaft Boots
Check the drive shaft boots and clamps for cracks, deterioration and damage. Replace any damaged parts and, if necessary, repack the grease. Re-torque the drive shaft flange bolts at the indicated intervals. A qualified technician should perform these operations.

Engine Air Filter
Check for damage, excessive wear and oiliness. Replace if necessary.

Engine Coolant
Drain and flush the cooling system and refill with an ethylene-glycol type coolant. A qualified technician should perform this operation.

Engine Oil and Oil Filter
Replace the oil filter and drain and refill the engine oil at specified intervals. For recommended oil grade and viscosity, refer to your *Owner's Manual*.

Engine Valve Clearance
Inspect for excessive lifter noise and engine vibration and adjust if necessary. A qualified technician should perform this operation.

Exhaust Pipes and Mountings
Visually inspect the exhaust pipes, muffler and hangers for cracks, deterioration and damage. Start the engine and listen carefully for any exhaust gas leakage. Tighten connections or replace parts as necessary.

Fuel Lines and Connections, Fuel Tank Band and Fuel Tank Vapor Vent System Hoses
Visually inspect for corrosion, damage, cracks and loose or leaking connections. Tighten connections or replace parts as necessary.

Fuel Tank Cap Gasket
Visually inspect for cracks, deterioration and damage and replace if necessary.

Nuts and Bolts on Chassis and Body
Re-tighten the seat mounting bolts and front/rear suspension member retaining bolts to specified torque.

Rack and Pinion Assembly
Inspect the rack and pinion assembly or steering gear box for signs of leakage. If you discover any leakage, have it repaired immediately by a qualified technician.

Explanation of Maintenance Items

Road Test
While driving the vehicle, check for proper operation of engine, transmission, brakes and steering. Also check for abnormal noise or vibration from any part of the vehicle.

Spark Plugs
Install new plugs of the same type as originally equipped. A qualified technician should perform this operation.

Steering Linkage and Boots
With the vehicle stopped, check for excessive freeplay in the steering wheel. Inspect the linkage for bending and damage and the dust boots for deterioration, cracks and damage. Replace any damaged parts. A qualified technician should perform these operations.

Timing Belt
Replace every 90,000 miles or 72 months. A qualified technician should perform this operation.

Tire Rotation
Tires should be rotated according to the instructions in your *Owner's Manual*. When rotating tires, check for damage and uneven wear.

Transmission Fluid
Check for correct fluid level and inspect each transmission component for signs of leakage. If you discover any leakage, have it repaired by a qualified technician immediately.

Free Scheduled Maintenance Services

The first two scheduled maintenance services for your Lexus are provided at no charge. The first service is at 30 days and includes a body/chassis inspection, a check for fluid leaks and a vehicle road test. The second service is at 5,000 miles/4 months or 7,500 miles/6 months, depending on which maintenance interval you use. This service includes a change of the engine oil and oil filter, rotation of the tires and a vehicle road-test. See page 85 to determine the proper maintenance interval for your vehicle.

To obtain your complimentary scheduled maintenance services, call an authorized Lexus dealership to make an appointment, or take your vehicle to the dealership. The dealership will verify performance of the services in the boxes at the right.

30-Day Check

Dealer Service Verification

Date: _____

Mileage: _____

5,000-Mile/4-Month Service or 7,500-Mile/6-Month Service

Dealer Service Verification

Date: _____

Mileage: _____

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

5,000 Miles or 4 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

10,000 Miles or 8 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

7,500 Miles or 6 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

15,000 Miles or 12 Months

15,000 Miles or 12 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)[4]
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Body (see page 126)
  - ____Brake lines and hoses
  - ____Brake linings/drums and brake pads/discs
  - ____Differential oil
  - ___Drive shaft boots
  - ___Exhaust pipes and mountings
  - ___Rack and pinion assembly
  - ___Steering linkage and boots

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect engine air filter
- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 10,000 miles/8 months.

5 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

20,000 Miles or 16 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

25,000 Miles or 20 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

22,500 Miles or 18 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[4]
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

30,000 Miles or 24 Months

30,000 Miles or 24 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, LS 430)
- ❑ Replace brake fluid
- ❑ Replace engine air filter
- ❑ Replace engine coolant
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Body (see page 127)
  - ____Brake lines and hoses
  - ____Brake linings/drums and brake pads/discs
  - ____Differential oil
  - ____Drive shaft boots
  - ____Exhaust pipes and mountings
  - ____Fuel lines and connections, fuel tank band and fuel tank vapor vent system hoses
  - ____Fuel tank cap gasket
  - ____Rack and pinion assembly
  - ____Steering linkage and boots
  - ____Transmission fluid
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace air conditioner filter (IS 300)[3]
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

[1] See page 100 to determine if your vehicle requires these maintenance items.

[2] If equipped.

[3] Only if vehicle is operated primarily on unpaved or dusty roads.

[4] Do not replace if replaced at 20,000 miles/16 months.

[5] Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

35,000 Miles or 28 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

40,000 Miles or 32 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

37,500 Miles or 30 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

45,000 Miles or 36 Months

45,000 Miles or 36 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[4]
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Body (see page 128)
  - ___Brake lines and hoses
  - ___Brake linings/drums and brake pads/discs
  - ___Differential oil
  - ___Drive shaft boots
  - ___Exhaust pipes and mountings
  - ___Rack and pinion assembly
  - ___Steering linkage and boots

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect engine air filter
- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 40,000 miles/32 months.

5 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

50,000 Miles or 40 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Brake linings/drums and brake pads/discs
  - ___Drive shaft boots
  - ___Engine air filter
  - ___Nuts and bolts on chassis and body
  - ___Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

55,000 Miles or 44 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Brake linings/drums and brake pads/discs
  - ___Drive shaft boots
  - ___Engine air filter
  - ___Nuts and bolts on chassis and body
  - ___Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

52,500 Miles or 42 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)[4]
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

60,000 Miles or 48 Months

60,000 Miles or 48 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, LS 430)
- ❑ Replace brake fluid
- ❑ Replace differential oil (IS 300[5])
- ❑ Replace engine air filter
- ❑ Replace engine coolant
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Body (see page 129)
  - ____Brake lines and hoses
  - ____Brake linings/drums and brake pads/discs
  - ____Differential oil
  - ____Drive belts
  - ____Drive shaft boots
  - ____Engine valves
  - ____Exhaust pipes and mountings
  - ____Fuel lines and connections, fuel tank band and fuel tank vapor vent system hoses
  - ____Fuel tank cap gasket
  - ____Rack and pinion assembly
  - ____Steering linkage and boots
  - ____Transmission fluid
- ❑ Replace engine oil and oil filter
- ❑ Replace spark plugs (GS 300, IS 300)[6]
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace air conditioner filter (IS 300)[3]
- ❑ Replace differential oil[7]
- ❑ Replace transmission fluid[7]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 50,000 miles/40 months.

5 If equipped with limited-slip differential.

6 Required under the terms of the Emission Control Warranty.

7 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

65,000 Miles or 52 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Brake linings/drums and brake pads/discs
  - ___Engine air filter
  - ___Nuts and bolts on chassis and body

Dealer Service Verification

Date: _____

Mileage: _____

70,000 Miles or 56 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Brake linings/drums and brake pads/discs
  - ___Drive shaft boots
  - ___Engine air filter
  - ___Nuts and bolts on chassis and body
  - ___Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

67,500 Miles or 54 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300[4])
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

75,000 Miles or 60 Months

75,000 Miles or 60 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)[5]
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Body (see page 130)
  - ___Brake lines and hoses
  - ___Brake linings/drums and brake pads/discs
  - ___Differential oil
  - ___Drive belts
  - ___Drive shaft boots
  - ___Exhaust pipes and mountings
  - ___Rack and pinion assembly
  - ___Steering linkage and boots

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect engine air filter
- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace differential oil[6]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 60,000 miles/48 months.

5 Do not replace if replaced at 70,000 miles/56 months.

6 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

80,000 Miles or 64 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

85,000 Miles or 68 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

82,500 Miles or 66 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)[4]
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

90,000 Miles or 72 Months

90,000 Miles or 72 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300, LS 430)
- ❑ Replace brake fluid
- ❑ Replace engine air filter
- ❑ Replace engine coolant
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Body (see page 131)
  - ____Brake lines and hoses
  - ____Brake linings/drums and brake pads/discs
  - ____Differential oil
  - ____Drive belts
  - ____Drive shaft boots
  - ____Exhaust pipes and mountings
- ❑ Replace engine oil and oil filter
- ❑ Replace timing belt
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle
  - ____Fuel lines and connections, fuel tank band and fuel tank vapor vent system hoses
  - ____Fuel tank cap gasket
  - ____Rack and pinion assembly
  - ____Steering linkage and boots
  - ____Transmission fluid

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 80,000 miles/64 months.

5 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

95,000 Miles or 76 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

100,000 Miles or 80 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

97,500 Miles or 78 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

105,000 Miles or 84 Months

105,000 Miles or 84 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)[4]
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle
- ❑ Inspect the following:

____Ball joints and dust covers	___Drive belts
____Body	___Drive shaft boots
____Brake lines and hoses	___Exhaust pipes and mountings
____Brake linings/drums and brake pads/discs	___Rack and pinion assembly
____Differential oil	___Steering linkage and boots

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect engine air filter
- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 100,00 miles/80 months.

5 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

110,000 Miles or 88 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

115,000 Miles or 92 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

112,500 Miles or 90 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[4]
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

120,000 Miles or 96 Months

120,000 Miles or 96 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, LS 430)
- ❑ Replace brake fluid
- ❑ Replace differential oil (IS 300[5])
- ❑ Replace engine air filter
- ❑ Replace engine coolant
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Body
  - ____Brake lines and hoses
  - ____Brake linings/drums and brake pads/discs
  - ____Differential oil
  - ____Drive belts
  - ____Drive shaft boots
  - ____Engine valves
  - ____Exhaust pipes and mountings
  - ____Fuel lines and connections, fuel tank band and fuel tank vapor vent system hoses
  - ____Fuel tank cap gasket
  - ____Rack and pinion assembly
  - ____Steering linkage and boots
  - ____Transmission fluid
- ❑ Replace engine oil and oil filter
- ❑ Replace spark plugs[6]
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace air conditioner filter (IS 300)[3]
- ❑ Replace differential oil[7]
- ❑ Replace transmission fluid[7]

Dealer Service Verification

Date: _____

Mileage: _____

[1] See page 100 to determine if your vehicle requires these maintenance items.

[2] If equipped.

[3] Only if vehicle is operated primarily on unpaved or dusty roads.

[4] Do not replace if replaced at 110,000 miles/88 months.

[5] If equipped with limited-slip differential.

[6] Required under the terms of the Emission Control Warranty.

[7] Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

125,000 Miles or 100 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Brake linings/drums and brake pads/discs
  - ___Drive shaft boots
  - ___Engine air filter
  - ___Nuts and bolts on chassis and body
  - ___Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

130,000 Miles or 104 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ___Ball joints and dust covers
  - ___Brake linings/drums and brake pads/discs
  - ___Drive shaft boots
  - ___Engine air filter
  - ___Nuts and bolts on chassis and body
  - ___Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

127,500 Miles or 102 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300[4])
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

135,000 Miles or 108 Months

135,000 Miles or 108 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[4]
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle
- ❑ Inspect the following:

____Ball joints and dust covers	___Drive belts
____Body	___Drive shaft boots
____Brake lines and hoses	___Exhaust pipes and mountings
____Brake linings/drums and brake pads/discs	___Rack and pinion assembly
____Differential oil	___Steering linkage and boots

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect engine air filter
- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

[1] See page 100 to determine if your vehicle requires these maintenance items.

[2] If equipped.

[3] Only if vehicle is operated primarily on unpaved or dusty roads.

[4] Do not replace if replaced at 130,000 miles/104 months.

[5] Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

SCHEDULED MAINTENANCE LOG

5,000-Mile Maintenance Intervals
7,500-Mile Maintenance Intervals

To determine the appropriate maintenance interval for your vehicle, see page 99.

140,000 Miles or 112 Months

- ❑ Replace air conditioner filter (LS 430)
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Replace air conditioner filter (ES 300[2], GS models, IS 300)[3]
- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive belts
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

145,000 Miles or 116 Months

- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Re-torque drive shaft flange bolts
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Brake linings/drums and brake pads/discs
  - ____Drive shaft boots
  - ____Engine air filter
  - ____Nuts and bolts on chassis and body
  - ____Steering linkage and boots

Dealer Service Verification

Date: _____

Mileage: _____

142,500 Miles or 114 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models)[4]
- ❑ Replace engine oil and oil filter
- ❑ Rotate tires
- ❑ Road-test vehicle

Dealer Service Verification

Date: _____

Mileage: _____

150,000 Miles or 120 Months

150,000 Miles or 120 Months

- ❑ Replace air conditioner filter (ES 300[2], GS models, LS 430)
- ❑ Replace brake fluid
- ❑ Replace engine air filter
- ❑ Replace engine coolant
- ❑ Inspect the following:
  - ____Ball joints and dust covers
  - ____Body
  - ____Brake lines and hoses
  - ____Brake linings/drums and brake pads/discs
  - ____Differential oil
  - ____Drive belts
  - ____Drive shaft boots
  - ____Exhaust pipes and mountings
  - ____Fuel lines and connections, fuel tank band and fuel tank vapor vent system hoses
  - ____Fuel tank cap gasket
  - ____Rack and pinion assembly
  - ____Steering linkage and boots
  - ____Transmission fluid
- ❑ Replace engine oil and oil filter
- ❑ Re-torque drive shaft flange bolts
- ❑ Rotate tires
- ❑ Road-test vehicle

Additional Maintenance Items for Special Operating Conditions:[1]

- ❑ Inspect nuts and bolts on chassis and body
- ❑ Replace air conditioner filter (IS 300)[3]
- ❑ Replace differential oil[5]

Dealer Service Verification

Date: _____

Mileage: _____

1 See page 100 to determine if your vehicle requires these maintenance items.

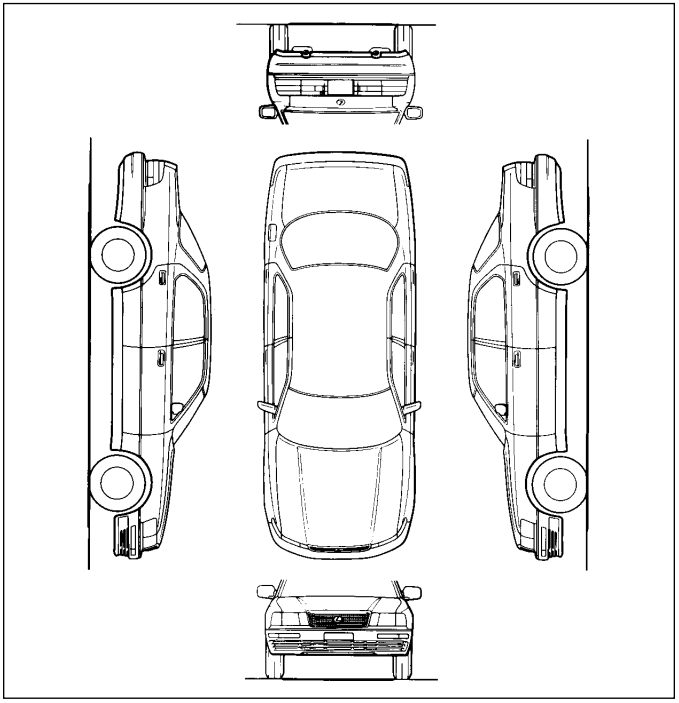
2 If equipped.

3 Only if vehicle is operated primarily on unpaved or dusty roads.

4 Do not replace if replaced at 140,000 miles/112 months.

5 Only if vehicle is operated primarily while towing a trailer or using a camper or car-top carrier.

Body Inspection Log



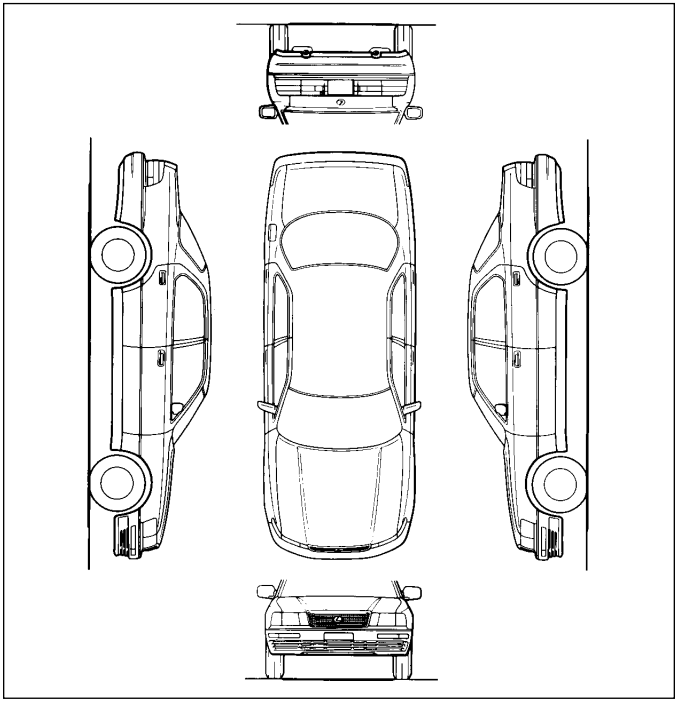
Technician: Indicate where attention is needed by marking "x" in appropriate spots on diagram.

15,000 Miles or 12 Months

Dealer Service Verification

Date: _____

Mileage: _____



Technician: Indicate where attention is needed by marking "x" in appropriate spots on diagram.

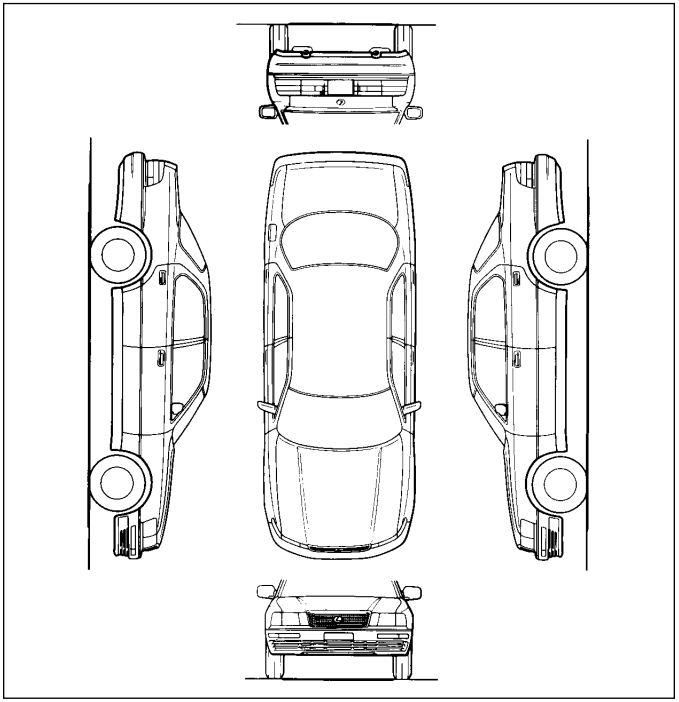
30,000 Miles or 24 Months

Dealer Service Verification

Date: _____

Mileage: _____

Body Inspection Log



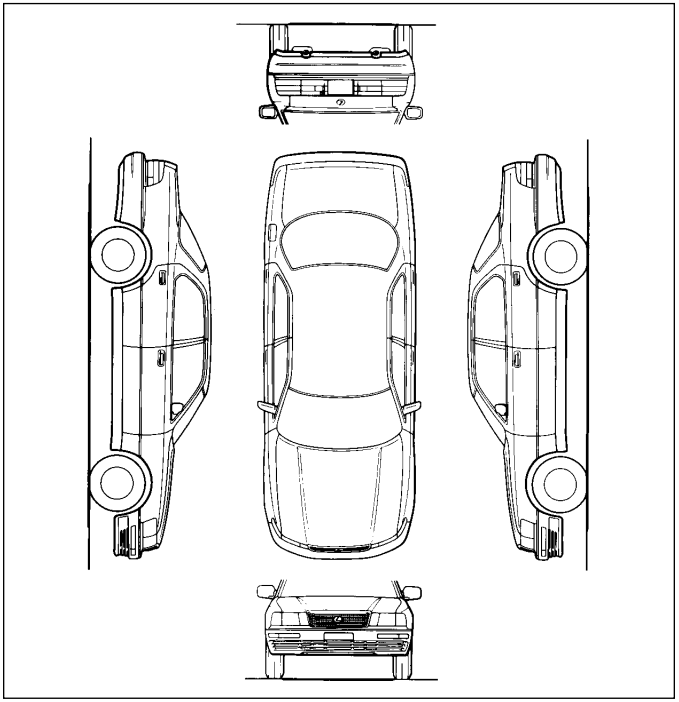
Technician: Indicate where attention is needed by marking "x" in appropriate spots on diagram.

45,000 Miles or 36 Months

Dealer Service Verification

Date: _____

Mileage: _____



Technician: Indicate where attention is needed by marking "x" in appropriate spots on diagram.

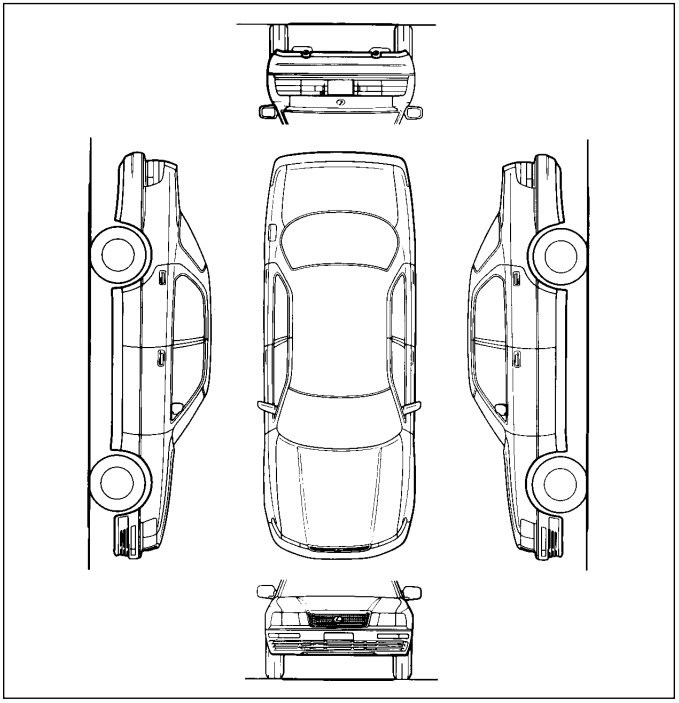
60,000 Miles or 48 Months

Dealer Service Verification

Date: _____

Mileage: _____

Body Inspection Log



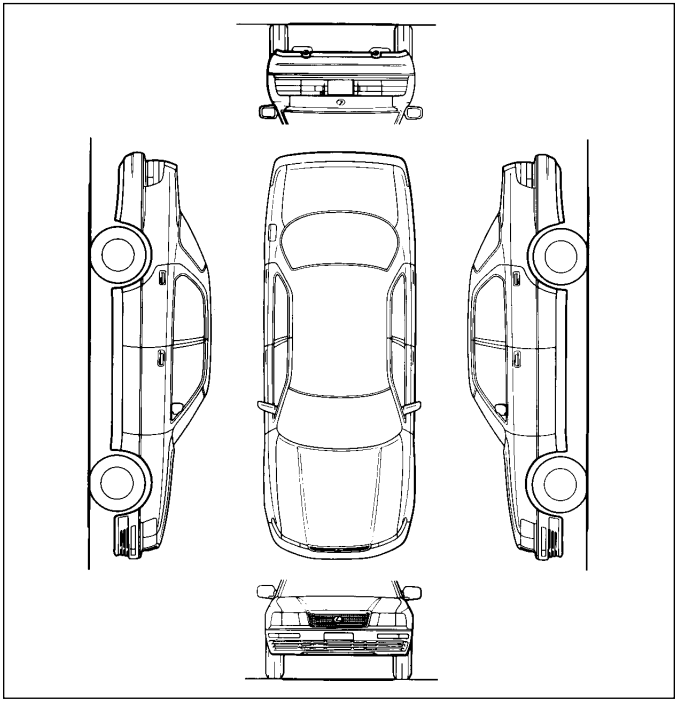
Technician: Indicate where attention is needed by marking "x" in appropriate spots on diagram.

75,000 Miles or 60 Months

Dealer Service Verification

Date: _____

Mileage: _____



Technician: Indicate where attention is needed by marking "x" in appropriate spots on diagram.

90,000 Miles or 72 Months

Dealer Service Verification

Date: _____

Mileage: _____

VEHICLE IDENTIFICATION

Model _____ Body style _____

In-service date _____ Mileage at delivery _____

Selling dealership _____ Selling dealership phone number _____

Key number _____

Vehicle identification number _____

Owner Information Change Form

If your name or address has changed or if you purchased your Lexus as a used vehicle, please complete and mail one of the attached cards, even if your warranty coverage has expired. This will enable Lexus to contact you with important product or safety updates concerning your vehicle. If there is no longer a card attached, please call the Lexus Customer Satisfaction Department at **(800) 255-3987**.

Check one:

FBC

- ❑ Same owner, name and/or address changed
- ❑ Same owner, additional driver who should receive product/safety updates
- ❑ New owner, purchased vehicle used from a Lexus dealership on this date: _____
- ❑ New owner, purchased vehicle used from other than a Lexus dealership on this date: _____

Vehicle identification number (required to process change)

Today's date: Mo. Day Year

❑ Mr. ❑ Mrs. ❑ Ms. ❑ Miss ❑ Dr.

First name | M.I. | Last name

Company name

Check here if address below is for company: ❑

Street address or P.O. Box | Apt. or suite number

City | State | Zip code

Home phone number | Work phone number | Extension

Social Security Number
(optional; for Lexus customer reference only)

E-mail address: _____

This information is obtained solely for the use of Lexus Division, Toyota Motor Sales, U.S.A., Inc. Lexus occasionally sends special promotional offers to registered owners. Check here if you prefer not to receive these offers. ❑

LEXUS

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 449 TORRANCE, CA

POSTAGE WILL BE PAID BY THE ADDRESSEE

LEXUS DIVISION
L202
ATTN: CUSTOMER SATISFACTION
PO BOX 2991
TORRANCE CA 90509-9975

Owner Information Change Form

If your name or address has changed or if you purchased your Lexus as a used vehicle, please complete and mail one of the attached cards, even if your warranty coverage has expired. This will enable Lexus to contact you with important product or safety updates concerning your vehicle. If there is no longer a card attached, please call the Lexus Customer Satisfaction Department at **(800) 255-3987**.

Check one:

FBC

- ❑ Same owner, name and/or address changed
- ❑ Same owner, additional driver who should receive product/safety updates
- ❑ New owner, purchased vehicle used from a Lexus dealership on this date: _____
- ❑ New owner, purchased vehicle used from other than a Lexus dealership on this date: _____

Vehicle identification number (required to process change)

Today's date: Mo. Day Year

❑ Mr. ❑ Mrs. ❑ Ms. ❑ Miss ❑ Dr.

First name | M.I. | Last name

Company name

Check here if address below is for company: ❑

Street address or P.O. Box | Apt. or suite number

City | State | Zip code

Home phone number | Work phone number | Extension

Social Security Number
(optional; for Lexus customer reference only)

E-mail address: _____

This information is obtained solely for the use of Lexus Division, Toyota Motor Sales, U.S.A., Inc. Lexus occasionally sends special promotional offers to registered owners. Check here if you prefer not to receive these offers. ❑

LEXUS

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 449 TORRANCE, CA

POSTAGE WILL BE PAID BY THE ADDRESSEE

LEXUS DIVISION
L202
ATTN: CUSTOMER SATISFACTION
PO BOX 2991
TORRANCE CA 90509-9975

MAINTENANCE

GENERAL NOTES:

- **The maintenance schedule for the vehicle consists of separate A and B schedule which are applicable depending on the conditions the vehicle is used in.**
  Confirm the vehicle's usage conditions, select the appropriate schedule and service the vehicle accordingly.
- **Every service item in the periodic maintenance list must be performed.**
- **Next to the columns of periods in the schedule, reference pages have been added for easy access to service data and procedures necessary for each position.**
- **Periodic maintenance service must be performed according to whichever interval in the periodic maintenance list occurs first, the odometer reading (miles or km) or the time interval (months).**
- **Maintenance services after the last period should be performed at the same interval as before unless otherwise noted.**
- **Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.**

MAINTENANCE SCHEDULE

SCHEDULE A

MA0368-01

Maintenance operation: A = Check and adjust if necessary;
R = Replace, change or lubricate;
I = Inspect and correct or replace if necessary

CONDITIONS:

- Towing a trailer, using a camper or car top carrier.
- Operating on dusty, rough, muddy or salt spread roads.
- Repeat short trips of less than 5 miles (8 km) with outside temperatures remain below freezing.
- Extensive idling and/or low speed driving for long distance, such as police, taxi or door-to-door delivery use.

System	Service interval (Use odometer reading or months, whichever comes first) / Maintenance items	Maintenance services beyond 60,000 miles (96,000 km) should continue to be performed at the same intervals shown for each maintenance schedule.																	See Page (Item No.)
	Miles × 1,000	1	3.75	7.5	11.25	15	18.75	22.5	26.25	30	33.75	37.5	41.25	45	48.75	52.5	56.25	60	Months
	km × 1,000	1.6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	
ENGINE	Timing belt (1)																	R	–	MA-5 (Item 1)
	Valve clearance																	A	A: Every 72 months	MA-8 (Item 12)
	Drive belts	I: First period 60,000 miles or 72 months. I: After that every 7,500 miles or 12 months																		MA-5 (Item 2)
	Engine oil and oil filter *		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		R: Every 6 months	MA-7 (Item 6)
	Engine coolant	R: First period 45,000 miles or 36 months. R: After that every 30,000 miles or 24 months																		MA-7 (Item 7)
	Exhaust pipes and mountings					I				I				I				I	I: Every 24 months	MA-8 (Item 11)
FUEL	Air filter (2) *		I	I	I	I	I	I	I	R	I	I	I	I	I	I	I	R	I: Every 6 months R: Every 36 months	MA-6 (Item 3)
	Fuel line and connections (3)									I								I	I: Every 36 months	MA-8 (Item 10)
	Fuel tank cap gasket																	R	R: Every 72 months	MA-8 (Item 9)
IGNITION	Spark plugs (Platinum tipped type)																	R	R: Every 72 months	MA-6 (Item 5)
EVAP	Charcoal canister																	I	I: Every 72 months	MA-8 (Item 8)
BRAKES	Brake linings and drums (4)			I		I		I		I		I		I		I		I	I: Every 12 months	MA-10 (Item 14)
	Brake pads and discs (Front and rear)			I		I		I		I		I		I		I		I	I: Every 12 months	MA-9 (Item 14)
	Brake fluid (5)	I				I				R				I				R	R: Every 36 months	MA-10 (Item 16)
	Brake line pipes and hoses					I				I				I				I	I: Every 24 months	MA-9 (Item 13)
CHASSIS	Steering linkage			I		I		I		I		I		I		I		I	I: Every 12 months	MA-10 (Item 17)
	SRS airbag	I: First period 10 years. I: After that every 2 years.																		MA-11 (Item 18)
	Ball joints and dust covers			I		I		I		I		I		I		I		I	I: Every 12 months	MA-11 (Item 21)
	Manual transaxle, automatic transaxle and differential	I				R				R				R				R	R: Every 24 months	MA-12 (Item 22)
	Steering gear housing oil (6)	I				I				I				I				I	I: Every 24 months	MA-11 (Item 19)
	Bolts and nuts on chassis and body (7)	I		I		I		I		I		I		I		I		I	I: Every 12 months	MA-13 (Item 24)
	Body inspection	I		I		I		I		I		I		I		I		I	I: Every 12 months	MA-13 (Item 25)
	Road test	I		I		I		I		I		I		I		I		I	I: Every 12 months	MA-13 (Item 26)

* mark indicate maintenance which is part of the warranty conditions for the emission control system. The warranty period is in accordance with the owner's guide or the warranty booklet. (* : California specification vehicles.)

(1) Applicable to vehicles operated under conditions of extensive idling and / or low speed driving for long distances such as police, taxi or door-to-door delivery use.
(2) Applicable when operating mainly on dusty roads.
(3) Includes inspection of fuel tank band and vapor vent system.
(4) Also applicable to drum lining for parking brake. For other usage conditions, refer to SCHEDULE B.
(5) Check for leakage.
(6) Check for oil leaks from steering gear box.
(7) Applicable only when operating mainly on rough, muddy roads. The applicable parts are listed below. For other usage conditions, refer to SCHEDULE B.
- Front and rear suspension member to cross body.
- Strut bar bracket to body bolts.
- Bolts for sheet installation.

V00504

SCHEDULE B

CONDITION

Conditions other than those listed for SCHEDULE A.

System	Service interval (Use odometer reading or months, whichever comes first) / Maintenance items	Maintenance services beyond 60,000 miles (96,000 km) should continue to be performed at the same intervals shown for each maintenance schedule.										See Page (Item No.)
		Miles × 1,000	1	7.5	15	22.5	30	37.5	45	52.5	60	Months
		km × 1,000	1.6	12	24	36	48	60	72	84	96	
ENGINE	Valve clearance										A	A: Every 72 months	MA-8 (item 12)
	Drive belt	I: First period 60,000 miles or 72 months. I: After that every 7,500 miles or 12 months											MA-5 (item 2)
	Engine oil and oil filter★			R	R	R	R	R	R	R	R	R: Every 12 months	MA-7 (item 6)
	Engine coolant	R: First period 45,000 miles or 36 months. R: After that every 30,000 miles or 24 months											MA-7 (item 7)
	Exhaust pipes and mountings						I				I	I: Every 36 months	MA-8 (item 11)
FUEL	Air filter★						R				R	R: Every 36 months	MA-6 (item 3)
	Fuel lines and connections (1)						I				I	I: Every 36 months	MA-8 (item 10)
	Fuel tank cap gasket										R	R: Every 72 months	MA-8 (item 9)
IGNITION	Spark plugs (Platinum tipped type)										R	R: Every 72 months	MA-6 (item 5)
EVAP	Charcoal canister										I	I: Every 72 months	MA-8 (item 8)
BRAKES	Brake linings and drums (2)				I		I		I		I	I: Every 24 months	MA-10 (item 14)
	Brake pads and discs (Front and rear)				I		I		I		I	I: Every 24 months	MA-9 (item 14)
	Brake fluid (3)	I			I		R		I		R	R: Every 36 months	MA-10 (item 16)
	Brake line pipes and hoses				I		I		I		I	I: Every 24 months	MA-9 (item 13)
CHASSIS	Steering linkage				I		I		I		I	I: Every 24 months	MA-10 (item 17)
	SRS airbag	I: First Period 10 years. I: After that ever 2 years											MA-11 (item 18)
	Ball joints and dust covers				I		I		I		I	I: Every 24 months	MA-11 (item 21)
	Manual transaxle, automatic transaxle and differential	I			I		I		I		I	I: Every 24 months	MA-12 (item 22)
	Steering gear housing oil (4)	I			I		I		I		I	I: Every 24 months	MA-11 (item 19)
	Bolts and nuts on chassis and body (5)	I			I		I		I		I	I: Every 24 months	MA-13 (item 24)
	Body inspection	I	I	I	I	I	I	I	I	I	I	I: Every 12 months	MA-13 (item 25)
	Road test	I	I	I	I	I	I	I	I	I	I	I: Every 12 months	MA-13 (item 26)

★ mark indicates maintenance which is part of the warranty conditions for the emission control system. The warranty period is in accordance with the owner's guide or the warranty booklet. (★ : California specification vehicles)

(1) Includes inspection of fuel tank band and vapor vent system.
(2) Also applicabel to lining drum for parking brake.
(3) Check for leakage.
(4) Check for oil leaks from steering gear box.
(5) The applicable parts are listed below.
- Front and rear suspension member to cross body.
- Strut bar bracket to body bolts.
- Bolts for sheet installation.

V00505

PREPARATION

EQUIPMENT

MA009–01

Belt tension gauge	
Dial indicator with magnetic base	
Micrometer	
Mirror	Brake hose
Steel square	
Thermometer	
Torque wrench	
Vernier calipers	

COOLANT

MA00B–010

Item	Capacity	Classification
Engine coolant (w/ Heater)		Ethylene–glycol base
NSR M/T	8.5 liters (9.0 US qts, 7.5 lmp. qts)	
NSR A/T	8.4 liters (8.9 US qts, 7.4 lmp. qts)	
NWR	9.0 liters (9.5 US qts, 7.9 lmp.qts)	

LUBRICANT

MA00D–02

Item	Capacity	Classification
Engine oil		API grade SG, Energy–Conserving II
Dry fill	5.0 liters (5.3 US qts, 4.4 lmp. qts)	multigrade, and recommended
Drain and refill		viscosity oil
w/Oil filter change	4.3 liters (4.5 US qts, 3.8 lmp. qts)	
w/o Oil filter change	4.1 liters (4.3 US qts, 3.6 lmp. qts)	
Manual transaxle oil		API GL–4 or GL–5
(w/Differential oil)	4.2 liters (4.4 US qts, 3.7 lmp. qts)	SAE 75 W–90 or 80 W–90
Automatic transaxle fluid		ATF DEXRON® II
(w/Differential oil)		
Dry fill	7.3 liters (7.7 US qts, 6.4 lmp. qts)	
Drain and refill	3.1 liters (3.3 US qts, 2.7 lmp. qts)	

MAINTENANCE OPERATIONS
Cold Engine Operations

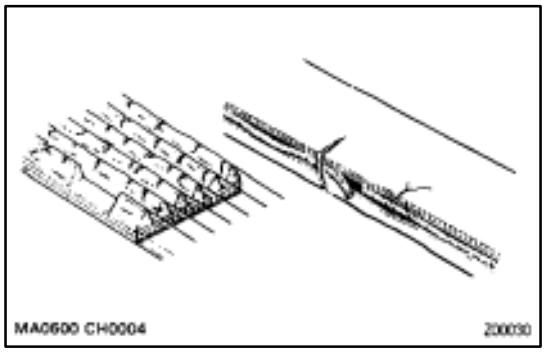
MA00F–01

1. REPLACE TIMING BELT

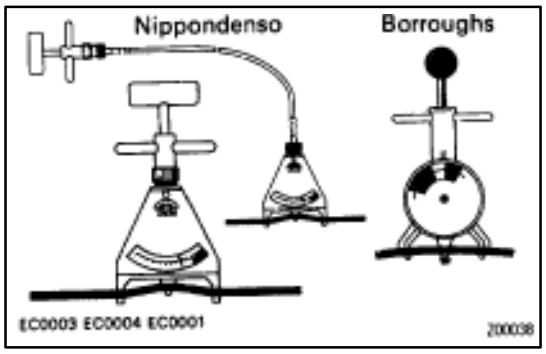
(a) Remove the timing belt.
(See EG section)

(b) Install the timing belt.
(See EG section)

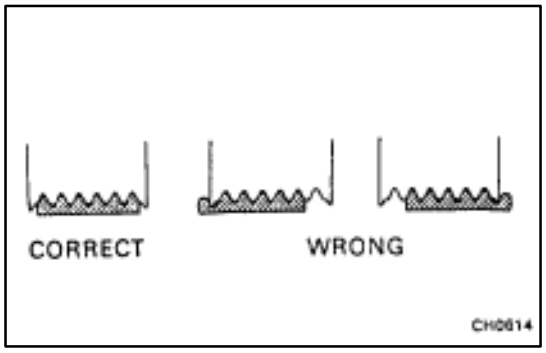
2. INSPECT DRIVE BELT



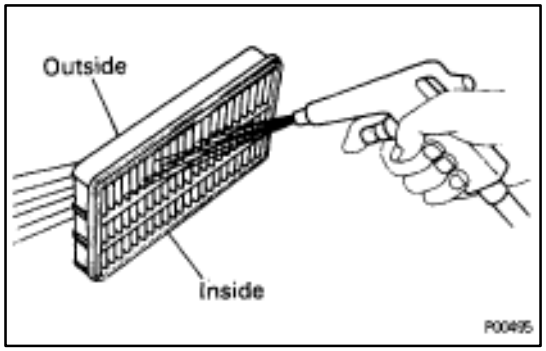
(a) Visually check the belt for excessive wear, frayed cords etc. If necessary, replace the drive belt.
HINT: Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



(b) Using a belt tension gauge, measure the drive belt tension.
Belt tension gauge:
Nippondenso BTG–20 (95506–00020)
Borroughs NO.BT–33–73F
Drive belt tension:
Alternator
New belt
170–180 lbf
Used belt
95–135 lbf
PS pump
New belt
150–185 lbf
Used belt
95–135 lbf
If necessary, adjust the drive belt tension.
HINT:



- "New belt" refers to a belt which has been used 5 miniutes or less on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the 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.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.



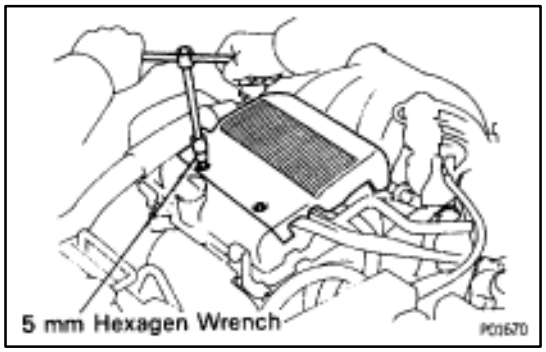
3. INSPECT AIR FILTER

(a) Visually check that the air cleaner element is not excessively damaged or only.

(b) Clean the element with compressed air.
First blow from the inside thoroughly, then blow off the outside of the element.

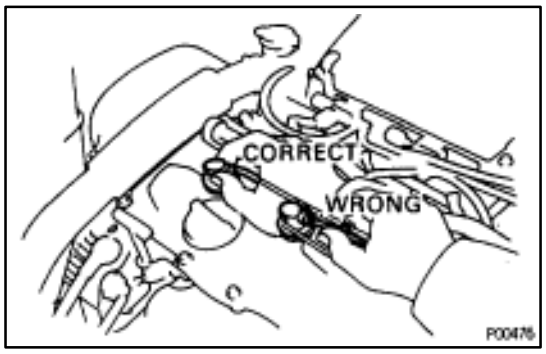
4. REPLACE AIR FILTER

Replace the air cleaner element with a new one.

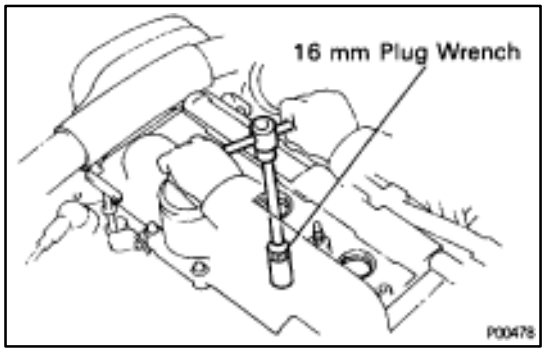


5. REPLACE SPARK PLUGS

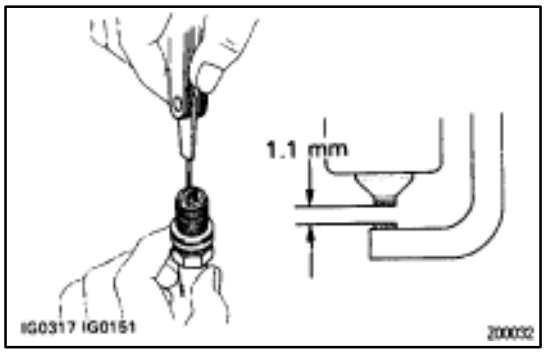
(a) Using a 5 mm hexagon wrench, remove the two nuts and V–bank cover.



(b) Disconnect the spark plug cords at the rubber boot.
DO NOT pull on the cords.



(c) Using a 16 mm plug wrench, remove the spark plugs.



(d) Check the electrode gap of new spark plugs.

Correct electrode gap:

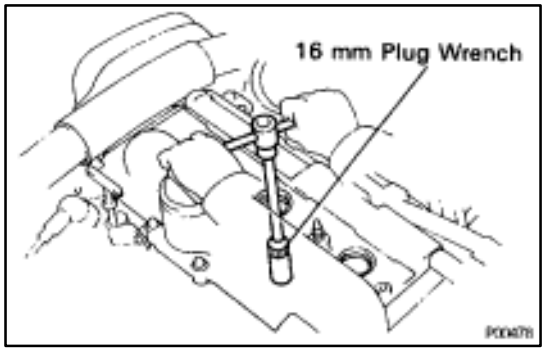
1.1 mm (0.043 in.)

Recommended spark plugs:

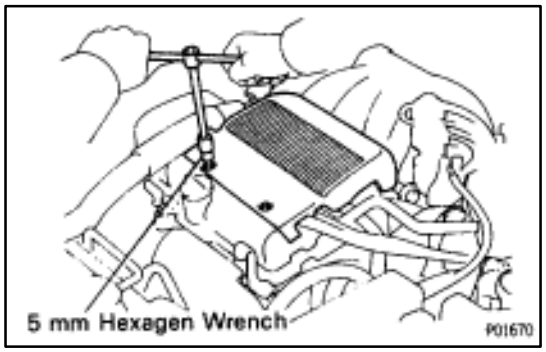
ND PQ20R

NGK BCPR6EP–11

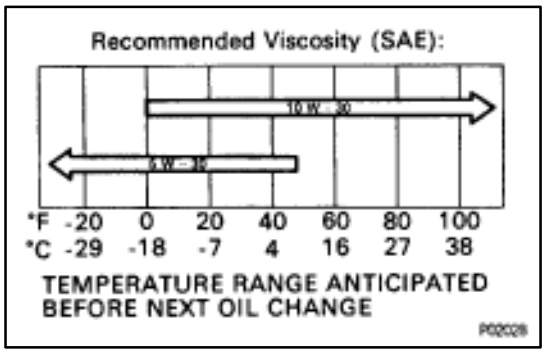
NOTICE: If adjusting the gap of a new plug, bend only the base of the ground electrode. DO NOT touch the tip. Never attempt to adjust the gap on a used plug.



(e) Using a 16 mm plug wrench, reinstall the spark plugs.



(f) Using a 5 mm hexagon wrench, install the V–bank cover with the two nuts.



6. REPLACE ENGINE OIL AND OIL FILTER
(See EG section)

Oil grade:

API grade SG Energy–Conserving II multigrade engine oil. Recommended viscosity is as shown.

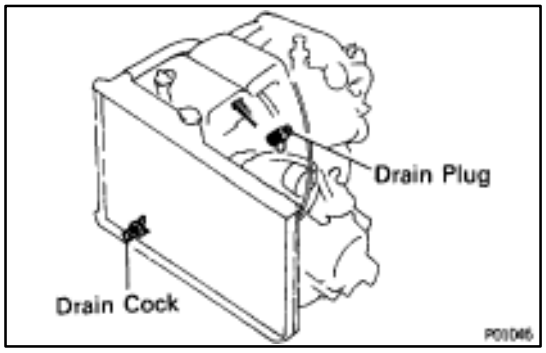
Drain and refill capacity:

w/ Oil filter change

4.3 liters (4.5 US qts, 3.8 lmp. qts)

w/o Oil filter change

4.1 liters (4.3 US qts, 3.6 lmp. qts)



7. REPLACE ENGINE COOLANT
(See EG section)

HINT:

- Use a good brand of ethylene–glycol base coolant and mix it according to the manufacturer's instructions.
- Using coolant which includes more than 50% ethylene–glycol (but not more than 70%) is recommended.

NOTICE:

- **Do not use alcohol type coolant.**
- **The coolant should be mixed with demineralized water or distilled water.**

Coolant capacity (w/ Heater):

NSR

M/T

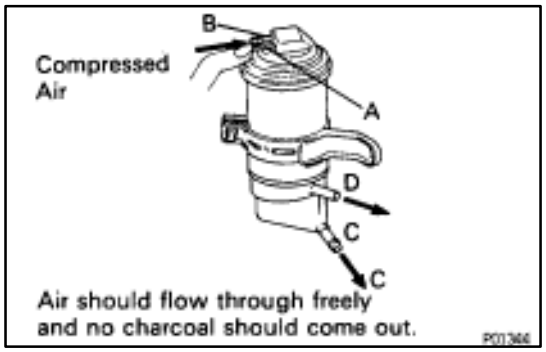
8.5 liters (9.0 US qts, 7.5 lmp. qts)

A/T

8.4 liters (8.9 US qts, 7.4 lmp. qts)

NWR

9.0 liters (9.5 US qts, 7.9 lmp. qts)



8. INSPECT CHARCOAL CANISTER

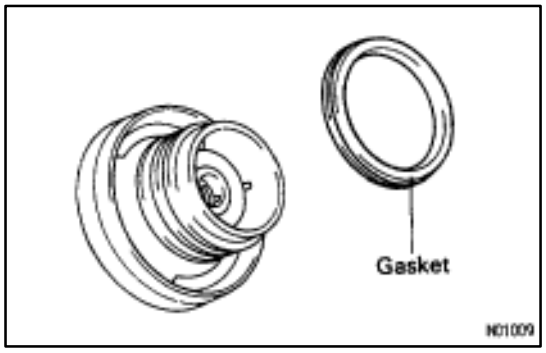
(a) Disconnect the hoses from the charcoal canister.
Label hoses for correct installation.

(b) Plug port A with your finger, and blow compressed air (294 kPa, 3kgf/cm^2 or 43 psi) through port B (fuel tank side).
- Check that air comes out of the bottom ports C and D without resistance.
- Check that no activated charcoal comes out.

If necessary, replace the charcoal canister.

NOTICE: Do not attempt to wash the charcoal.

(c) Reconnect the hoses to the charcoal canister.



9. REPLACE GASKET IN FUEL TANK CAP

(a) Remove the old gasket from the tank cap. Do not damage the cap.

(b) Install a new gasket by hand.

(c) Check the cap for damage or cracks.

(d) Install the cap and check the torque limiter.

10. INSPECT FUEL LINES AND CONNECTIONS

Visually check the fuel lines for cracks, leakage, loose connections, deformation or tank band looseness.

11. INSPECT EXHAUST PIPES AND MOUNTINGS

Visually check the pipes, hangers and connections for severe corrosion, leaks or damage.

12. ADJUST VALVE CLEARANCE (See EG section)

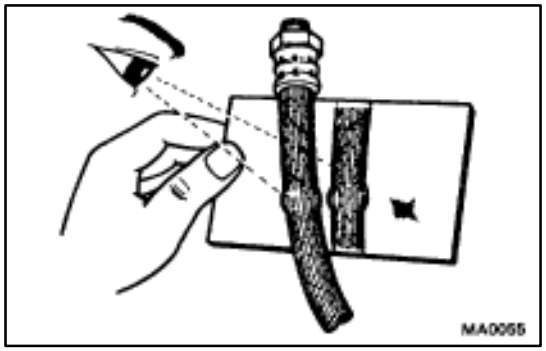
Valve clearance (Cold):

Intake

0.13–0.23 mm (0.005–0.009 in.)

Exhaust

0.27–0.37 mm (0.011–0.015 in.)



BRAKES

MA00H–02

13. INSPECT BRAKE LINE PIPES AND HOSES

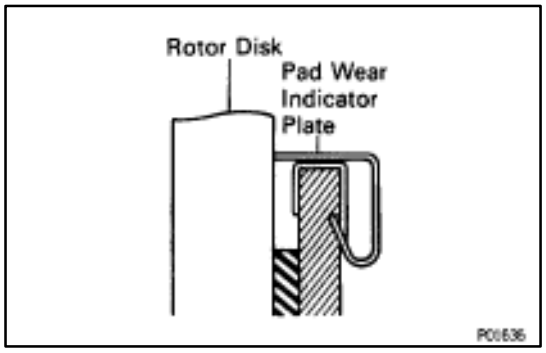
HINT: Check in a well lighted area. Check the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before checking the front brake.

(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 installed in grommets pass through the center of the grommets.



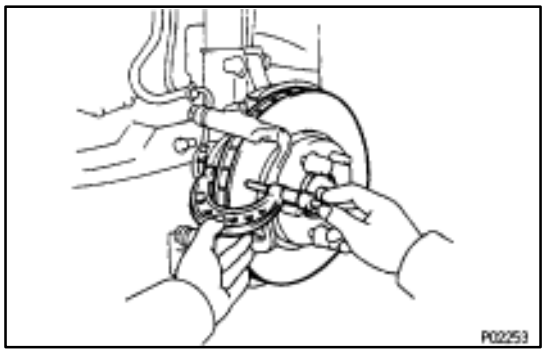
14. INSPECT FRONT AND REAR BRAKE PADS AND DISCS (See BR section)

(a) Check the thickness of the disc brake pads and check for irregular wear.

Minimum pad thickness:

1.0 mm (0.039 in.)

HINT: If a squealing or scraping noise comes from the brake during driving, check the pad wear indicator to see if it is contacting the disc rotor. If so, the disc pad should be replaced.



(b) Check the disc for wear or runout.

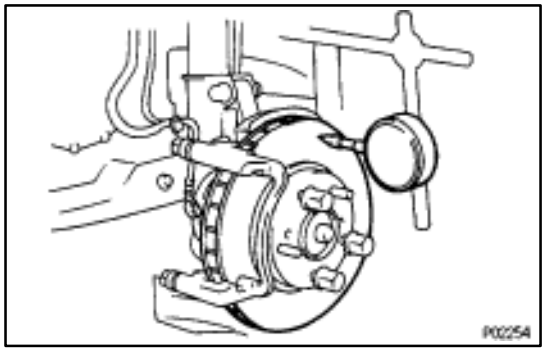
Minimum disc thickness:

Front

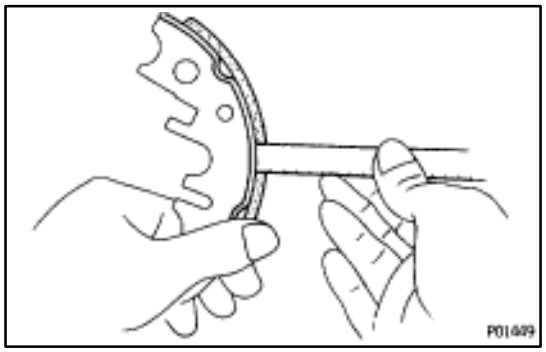
26.0 mm (1.024 in.)

Rear

9.0 mm (0.354 in.)



Maximum disc runout:
Front
0.05 mm (0.0020 in.)
Rear
0.15 mm (0.0059 in.)

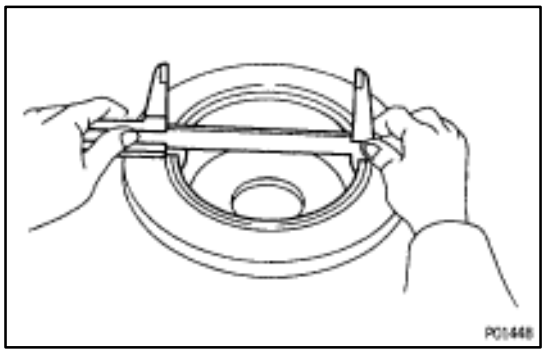


15. INSPECT PARKING BRAKE LININGS AND DRUMS (See BR section)

(a) Check the lining–to–drum contact condition and lining wear.
Minimum lining thickness:
1.0 mm (0.0039 in.)

(b) Check the brake drums for scoring or wear.
Maximum drum inside diameter:
171.0 mm (6.732 in.)

(c) Clean the brake parts with a damp cloth.



NOTICE: Do not use compressed air to clean the brake parts.

(d) Settle the parking brake shoes and drum. When performing the road test in item 24, do the following:
- Drive the vehicle at approx. 50 km/h (30 mph) on a safe, level and dry road.
- (Center lever type parking brake)

With the parking brake release lever pushed in, pull on the lever with 88 N (9 kgf, 20 lbf) of force.
- (Pedal type parking brake)

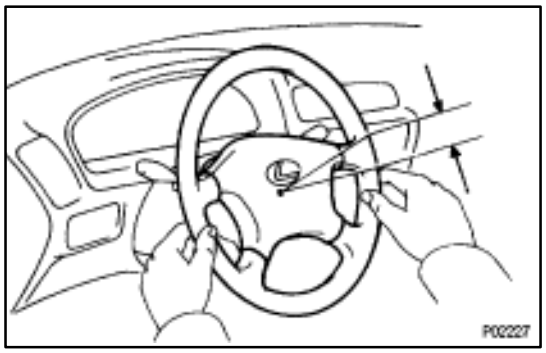
Depress the pedal with 147 N (15 kgf, 33 lbf) of force.
- Drive the vehicle for approx. 400 m (1/4 miles) in this condition.
- Repeat this procedure 2 or 3 times.
- Check parking lever travel.

16. INSPECT OR CHANGE BRAKE FLUID

(a) Visually inspect the master cylinder for leaks.
(b) Change brake fluid (See BR section)

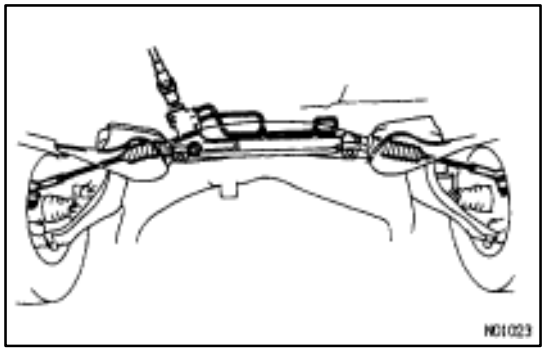
CHASSIS

MA00K–02

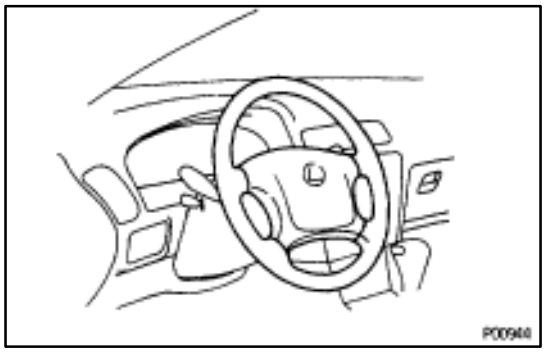


17. INSPECT STEERING LINKAGE

(a) Check the steering wheel freeplay.
Maximum steering wheel freeplay:
30 mm (1.18 in.)
With the vehicle stopped and pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure.



(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.



18. INSPECT SRS AIRBAG

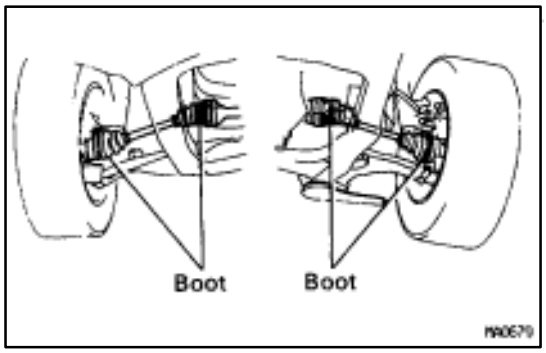
Visually inspect the steering wheel pad (airbag and inflater).
- Use the diagnosis check to check if there are abnormalities.
- Check that there are no cuts, cracks or noticeable color changes on the surface of the steering wheel pad or in the center groove of the pad.
- Remove the steering wheel pad from the vehicle and check the wiring and steering wheel for damage and corrosion due to rusting etc.

If necessary, replace the steering wheel pad.

CAUTION:
- **For removal and replacement of the steering wheel pad, see SR section and be sure to perform the operation in the correct order.**
- **Before disposing of the steering wheel pad, the airbag must first be deployed by using an SST (See AB section).**

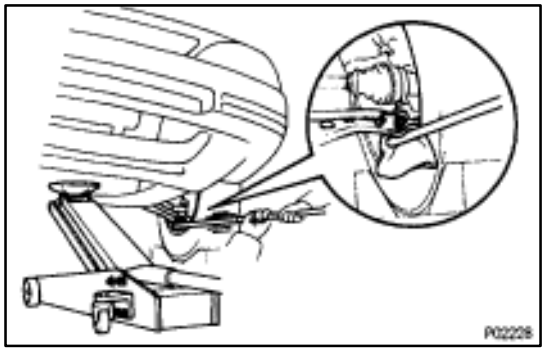
19. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.



20. INSPECT DRIVE SHAFT BOOTS

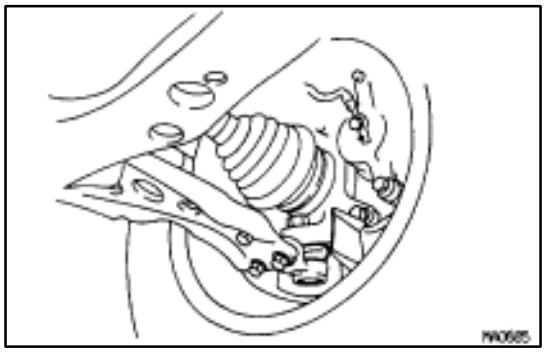
Check the drive shaft boots for clamp looseness, leakage or damage.



21. INSPECT BALL JOINTS AND DUST COVERS

(a) Inspect the ball joints for excessive looseness.

- Jack up the front of the vehicle and place wooden blocks with a height of 180–200 mm (7.09–7.87 in.) under the front tires.
- Lower the jack until there is about half a load on the front coil springs. Place stands under the vehicle for safety.
- Check that the front wheels are in a straight forward position, and block them with chocks.



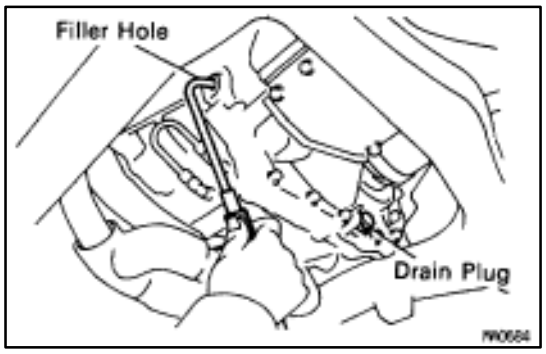
- Using a lever, pry up the end of the lower arm, and check the amount of play.

Maximum ball joint vertical play:

0 mm (0 in.)

If there is play, replace the ball joint.

(b) Check the dust cover for damage.



22. CHECK TRANSAXLE OIL (FLUID)

Visually check the transaxle for fluid leakage.
If leakage is found, check for cause and repair.

23. REPLACE TRANSAXLE OIL (FLUID)

A. (M/T)

Replace transaxle oil

(a) Remove the filler and drain plugs, and drain the oil.
(b) Reinstall the darin plug securely.
(c) Add new oil until it begins to run out of the filler hole.

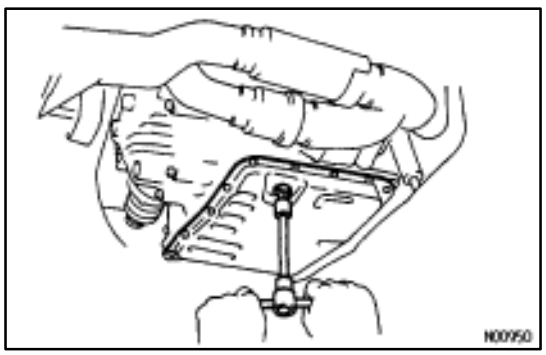
Transaxle oil:

Oil grade API GL–4 or GL–5
Viscosity SA 75W–90 or 80W–90

Capacity:

4.2 liters (4.4 US qts, 3.7 lmp.qts)

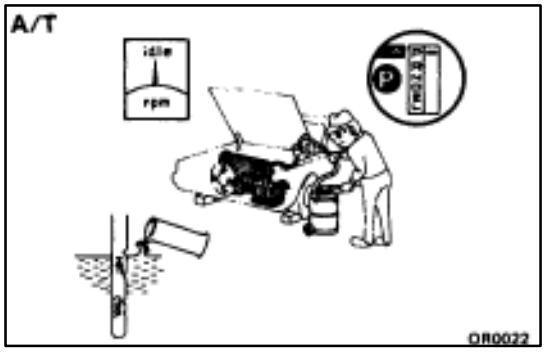
(d) Reinstall filler plug securely.



B. (A/T)

Replace transaxle fluid

(a) Using a 10 mm hexagon wrench, remove the drain plug and drain the fluid.
(b) Reinstall the drain plug securely.



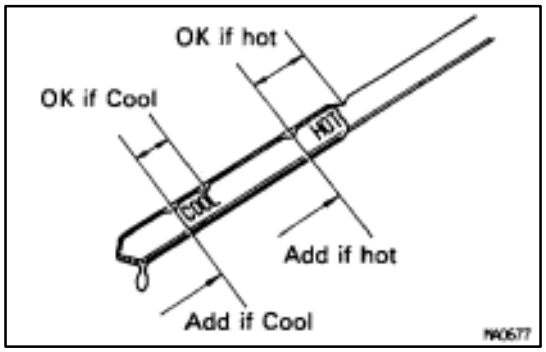
(c) With the engine OFF, and new fluid through the dipstick tube.
Transaxle fluid:
ATF DEXRON® II
Drain and refill capacity:
3.1 liters (3.3 US qts, 2.7 Imp. qts)

(d) Start the engine and shift the selector into all positions from "P" through "L", and then shift into "P".

(e) With the engine idling, check the fluid level. Add fluid up to the "COOL" level on the dipstick.

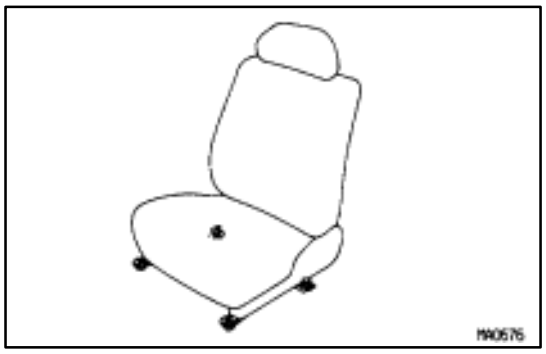
NOTICE: Do not overfill. The transmission and differential are separate units.

(f) Recheck the fluid level with the normal temperature (70–80°C (158–176°F)) and add as necessary.



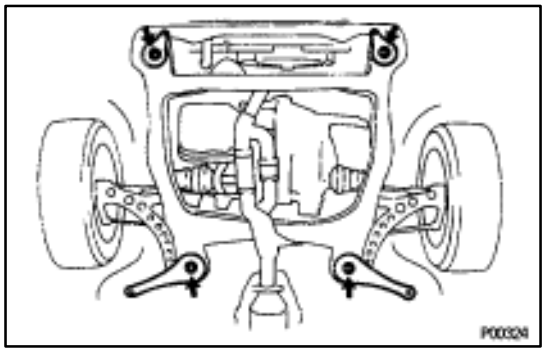
24. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

Tighten the following parts:



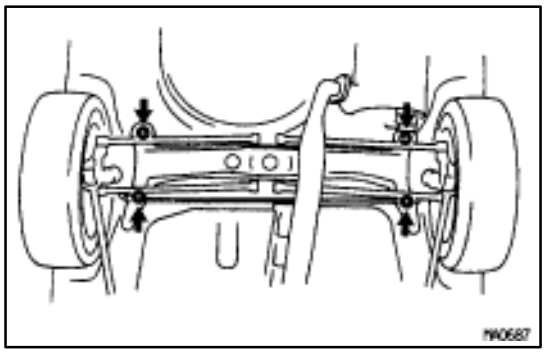
- Front seat mount bolts

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)



- Front suspension member–to–body mounting bolts

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



- Rear suspension member–to–body mounting nuts

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

25 BODY INSPECTION

(a) Check the body exterior for dents, scratches and rust.

(b) Check the underbody for rust and damage.
If necessary, replace or repair.

26 ROAD TEST

(a) Check the engine ahd 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) Perform setting or the parking brake shoes and drum.

27. FINAL INSPECTION

(a) Check the operation of the body parts:

- Hood

Auxiliary catch operates properly
Hood locks securely when closed

- Front and rear doors

Door lock operates properly
Doors close properly

- Luggage compartment door and back door

Door lock operates properly

- Seats

Seat adjusts easily and locks securely in any position
Front seat back locks securely in any position
Folding–down rear seat backs lock securely

(b) Road test

- Check the engine and chassis for abnormal noises.
- Check that the vehicle does not wander or pull to one side.
- Check that the brakes work properly and do not drag.
- Perform bedding down of the parking brake shoes and drum. (See page MA–10)

(b) Be sure to deliver a clean car and especially chack:

- Steering wheel
- Shift lever knob
- All switch knobs
- Door handles
- Seats

GENERAL MAINTENANCE

MA00M–01

There are the maintenance and inspection items which are considered to be the owner's responsibility. They can be performed by the owner or be can have them done at a service shop. These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner perform. Items and procedures for general maintenance are as follows:

OUTSIDE VEHICLE

1. TIRES

(a) Check the pressure with a gauge. Adjust if necessary.

(b) Check for cuts, damage or excessive wear.

2. WHEEL NUTS

Wheel checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

3. TIRE ROTATION

It is recommended that tires be rotated every 7,500 miles (12,000 km).

4. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do no wipe clean. Replace if necessary.

5. FLUID LEAKS

(a) Check underneath for leaking fuel, oil, water or other fluid.

(b) If you smell gasoline fumes or notice any leak, have the cause found and corrected.

6. DOORS AND ENGINE HOOD

(a) Check that all doors including the trunk lid and back door operate smoothly, and that all latches lock securely.

(b) Check that the engine hood secondary latch secures the hood from opening when the primary latch is released.

INSIDE VEHICLE

7. LIGHTS

(a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights are all working.

(b) Check the headlight aim.

8. WARMING LIGHT AND BUZZERS

Check that all warning lights and buzzers function properly.

9. HORN

Check that it is working.

10. WINDSHIELD GLASS

Glass for scratches, pits or abrasions.

11. WINDSHIELD WIPER AND WASHER

(a) Check operation of the wipers and washer.

(b) Check that the wipers do not streak.

12. WINDSHIELD DEFROSTER

Check that the air comes out from the defroster outlet when operating the heater air conditioner at defroster mode.

13. REAR VIEW MIRROR

Check that it is mounted securely.

14. SUN VISORS

Check that they move freely and mounted securely.

15. STEERING WHEEL

Check that it has the specified freeplay. Be alert for changes in steering condition, such as hard steering, excessive freeplay or strange noise.

16. SEATS

(a) Check that all front seat controls such as seat adjusters, seatback recliner, etc. operate smoothly.

(b) Check that all latches lock securely in any position.

(c) Check that the locks hold securely in any latched position.

(d) Check that the head restraints move up and down smoothly and that the locks hold securely in ay latches position.

(e) For folding–down rear seat backs, check that the latches lock securely.

17. SEAT BELTS

(a) Check that the seat belt system such as buckles, retractors and anchors operate properly and smoothly.

(b) Check that the belt webbing is not cut, frayed, worn or damaged.

18. ACCELERATOR PEDAL

Check the pedal for smooth operation and uneven pedal effort or catching.

19. CLUTCH PEDAL (See CL section)

Check the pedal for smooth operation.
Check that the pedal has the proper freeplay.

20. BRAKE PEDAL (See BR section)

(a) Check that pedal for smooth operation.

(b) Check that the pedal has the proper reserve distance and freeplay.

(c) Check the brake booster function.

21. BRAKES

At a safe place, check that the brakes do not pull to one side when applied.

22. PARKING BRAKE (See BR section)

(a) Check that the lever has the proper travel.

(b) On a safe incline, check that the vehicle is help securely with only the parking brake applied.

23. AUTOMATIC TRANSMISSION PARK MECHANISM

(a) Check the lock release button of the selector lever for proper and smooth operation.

(b) On a safe incline, check that the vehicle is help securely with the selector lever in the “P” position and all brakes released.

UNDER HOOD

24. WINDSHIELD WASHER FLUID

Check that there is sufficient fluid in the tank.

25. ENGINE COOLANT LEVEL

Check that the coolant level is between the “FULL” and “LOW” lines on the see–through reservoir.

26. RADIATOR AND HOSES

(a) Check that the front of the radiator is clean and not blocked with leaves, dirt or bugs.

(b) Check the hoses for cracks, kinks, rot or loose connections.

27. BATTERY ELECTROLYTE LEVEL

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case. If level is low, add distilled water only.

28. BRAKE AND CLUTCH FLUID LEVELS

(a) Check that the brake fluid level is near the upper level line on the see–through reservoir.

(b) Check that the clutch fluid level is within ± 5 mm (0.20 in.) of the reservoir hem.

29. ENGINE DRIVE BELTS

Check all drive belts for fraying, cracks, wear or oiliness.

30. ENGINE OIL LEVEL

Check that level on the dipstick with the engine turned off.

31. POWER STEERING FLUID LEVEL

Check the level.

The level should be in the “HOT” or “COLD” range depending on the fluid temperature.

32. AUTOMATIC TRANSMISSION FLUID LEVEL

(a) Park the vehicle on a level surface.

(b) With the engine idling and the parking brake applied, shift the selector into all positions from “P” to “L” and then shift into “P”.

(c) Pull out the dipstick and wipe off the fluid with a clean rag.

Re–insert the dipstick and check that the fluid level is in the HOT range.

(d) Perform this check with the fluid at normal driving temperature (70–80°C or 158–176°F).

NOTE: Wait about 30 minutes before checking the fluid level after extended driving at high speeds in hot weather, driving in heavy traffic or with a trailer.

33. EXHAUST SYSTEM

Visually inspect for cracks, holes or loose supports.

If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, have the cause located and corrected.

SERVICE SPECIFICATIONS

SERVICE DATA

MA002–01

Drive belt tension			
Alternator		New belt	170–180 lbf
Alternator		Used belt	95–135 lbf
PS pump		New belt	150–185 lbf
PS pump		Used belt	95–135 lbf
Spark plug	Recommended spark plug	ND	PQ20R
Spark plug	Recommended spark plug	NGK	BCPR6EP–11
Spark plug	Correct electrode gap		1.1 mm (0.043 in.)
Firing order			1–2–3–4–5–6
Valve clearance		Intake	0.13–0.23 mm (0.005–0.009 in.)
Valve clearance		Exhaust	0.27–0.37 mm (0.011–0.015 in.)
Front and rear brake			
Pad thickness		Minimum	1.0 mm (0.039 in.)
Disc thickness	Front	Minimum	26.0 mm (1.024 in.)
Disc thickness	Rear	Minimum	9.0 mm (0.354 in.)
Disc runout	Front	Maximum	0.05 mm (0.020 in.)
Disc runout	Rear	Maximum	0.15 mm (0.0059 in.)
Parking brake			
Lining thickness		Minimum	1.0 mm (0.039 in.)
Drum inside diameter		Maximum	171.0 mm (6.732 in.)
Front axle and suspension			
Ball joint vertical play		Maximum	0 mm (0 in.)
Steering wheel freeplay		Maximum	30 mm (1.18 in.) or less

TORQUE SPECIFICATIONS

MA003–01

Part tightened	N·m	kgf·cm	ft·lbf
Front seat mount bolts	37	375	27
Front suspension member X Body	181	1,850	134
Rear suspension member X Body	113	1,150	83

1993 MY U.S.A. Maintenance Schedule

Chassis & Body

No.	Items \ Service Intervals x 1000 miles	1	7.5	15	22.5	30	37.5	45	52.5	60	Months	ES300	LS400	SC300/400	GS300
1	Brake Linings and drums			I		I		I		I	I: Every 24 Months	X	X	X	X
2	Brake pads and discs			I		I		I		I	I: Every 24 Months	X	X	X	X
3	Brake Fluid	I		I		R		I		R	R: Every 36 Months	X	X	X	X
4	Brake line pipes and hoses			I		I		I		I	I: Every 24 Months	X	X	X	X
5	Steering linkage			I		I		I		I	I: Every 24 Months	X	X	X	X
6	SRS airbag	After inspection at 10 years, inspect every 2 years										X	X	X	X
7	Steering gear box See note (1)	I		I		I		I		I	I: Every 24 Months	X	X	X	X
8	Ball joints and dust covers			I		I		I		I	I: Every 24 Months	X	X	X	X
9	Drive shaft boots			I		I		I		I	I: Every 24 Months	X			
10	Automatic transmission and differential	I		I		I		I		I	I: Every 24 Months	X	X	X	X
11	Manual Transaxle/Transmission	I		I		I		I		I	I: Every 24 Months	X		X	
12	Bolts and nuts on chassis and body	I		I		I		I		I	I: Every 24 Months	X	X	X	X
13	Body Inspection	I	I	I	I	I	I	I	I	I	I: Every 12 Months	X	X	X	X
14	Air conditioning filter		R	R	R	R	R	R	R	R	R: Every 12 Months		X		
15	Road Test	I	I	I	I	I	I	I	I	I	I: Every 12 Months	X	X	X	X

I: Inspect and correct or replace as necessary **R**: Replace, change, or lubricate

Note:

(1) Inspect the steering gear housing for oil leakage only

1993 MY U.S.A. Maintenance Schedule

Chassis & Body

No.	Items \ Service Intervals x 1000 miles	1	7.5	15	22.5	30	37.5	45	52.5	60	Months	ES300	LS400	SC300/400	GS300
1	Brake Linings and drums			I		I		I		I	I: Every 24 Months	X	X	X	X
2	Brake pads and discs			I		I		I		I	I: Every 24 Months	X	X	X	X
3	Brake Fluid	I		I		R		I		R	R: Every 36 Months	X	X	X	X
4	Brake line pipes and hoses			I		I		I		I	I: Every 24 Months	X	X	X	X
5	Steering linkage			I		I		I		I	I: Every 24 Months	X	X	X	X
6	SRS airbag	After inspection at 10 years, inspect every 2 years										X	X	X	X
7	Steering gear box See note (1)	I		I		I		I		I	I: Every 24 Months	X	X	X	X
8	Ball joints and dust covers			I		I		I		I	I: Every 24 Months	X	X	X	X
9	Drive shaft boots			I		I		I		I	I: Every 24 Months	X			
10	Automatic transmission and differential	I		I		I		I		I	I: Every 24 Months	X	X	X	X
11	Manual Transaxle/Transmission	I		I		I		I		I	I: Every 24 Months	X		X	
12	Bolts and nuts on chassis and body	I		I		I		I		I	I: Every 24 Months	X	X	X	X
13	Body Inspection	I	I	I	I	I	I	I	I	I	I: Every 12 Months	X	X	X	X
14	Air conditioning filter		R	R	R	R	R	R	R	R	R: Every 12 Months		X		
15	Road Test	I	I	I	I	I	I	I	I	I	I: Every 12 Months	X	X	X	X

I: Inspect and correct or replace as necessary **R**: Replace, change, or lubricate

Note:

(1) Inspect the steering gear housing for oil leakage only

1993 MY U.S.A. Maintenance Schedule

Engine

No.	Service Intervals / Items	x 1000 miles	1	7.5	15	22.5	30	37.5	45	52.5	60	Months	ES300	LS400	SC300/400	GS300
1	Valve Clearance										**A**	A: Every 72 months	X	X	X	X
2	Drive Belt										**I**	I: See note (1)	X	X	X	X
3	Engine oil and Filter			**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	R: Every 12 Months	X	X	X	X
4	Engine Coolant								**R**			R: See note (2)	X	X	X	X
5	Exhaust Pipes & Mountings						**I**				**I**	I: Every 36 Months	X	X	X	X
6	Air Cleaner Filter						**R**				**R**	R: Every 36 Months	X	X	X	X
7	Fuel lines and connections						**I**				**I**	I: Every 36 Months	X	X	X	X
8	Fuel tank cap gasket										**R**	R: Every 72 Months	X	X	X	X
9	Spark Plugs										**R**	R: Every 72 Months	X	X	X	X
10	Charcoal cannister										**I**	I: Every 72 Months	X	X	X	X

A: Check and adjust as necessary **I**: Inspect and correct or replace as necessary **R**: Replace, change, or lubricate

Note:
(1) After 60,000 miles (96,000 km) or 72 months, inspect every 7,500 miles (12,000 km) or 12 months
(1) After 45,000 miles (72,000 km) or 36 months, replace every 30,000 miles (48,000 km) or 24 months

FOREWORD

To assist you in your service activities, this manual explains the main characteristics of the 1993 model year vehicles, in particular providing a technical explanation of the construction and operation of new mechanisms and new technology used.

This manual consists of the following sections.

1. **General 1993 Features** — Changed features common to all models are explained.

2. ~ **4. Each Model** — Changed features for each model are explained.

5. **Appendix** — Major technical specifications of the vehicle.

CAUTION, NOTICE, ***REFERENCE*** and **NOTE** are used in the following ways:

CAUTION	A potentially hazardous situation which could result in injury to people may occur if instructions on what to do or not do are ignored.
NOTICE	Damage to the vehicle or components may occur if instructions on what to do or not do are ignored.
REFERENCE	Explains the theory behind mechanisms and techniques.
NOTE	Notes or comments not included under the above 3 titles.

For detailed service specifications and repair procedures, refer to the following Repair Manuals:

Manual Name		Pub. No.
° 1993 LEXUS SC 300 Repair Manual	Vol. 1	RM320U1
	Vol. 2	RM320U2
° 1993 LEXUS SC 400 Repair Manual	Vol. 1	RM302U1
	Vol. 2	RM302U2
° 1993 LEXUS LS 400 Repair Manual	Vol. 1	RM300U1
	Vol. 2	RM300U2
° 1993 LEXUS ES 300 Electrical Wiring Diagram		EWD159U
° 1993 LEXUS SC 300/400 Electrical Wiring Diagram		EWD165U
° 1993 LEXUS LS 400 Electrical Wiring Diagram		EWD164U

All information contained herein is the most up–to–date at the time of publication. We reserve the right to make changes without prior notice.

TOYOTA MOTOR CORPORATION

▶ 1992 TOYOTA MOTOR CORPORATION
All rights reserved. This book may not be reproduced or copied, in whole or in part, without the written permission of Toyota Motor Corporation.

ES 300

ES 300

OUTLINE OF NEW FEATURES

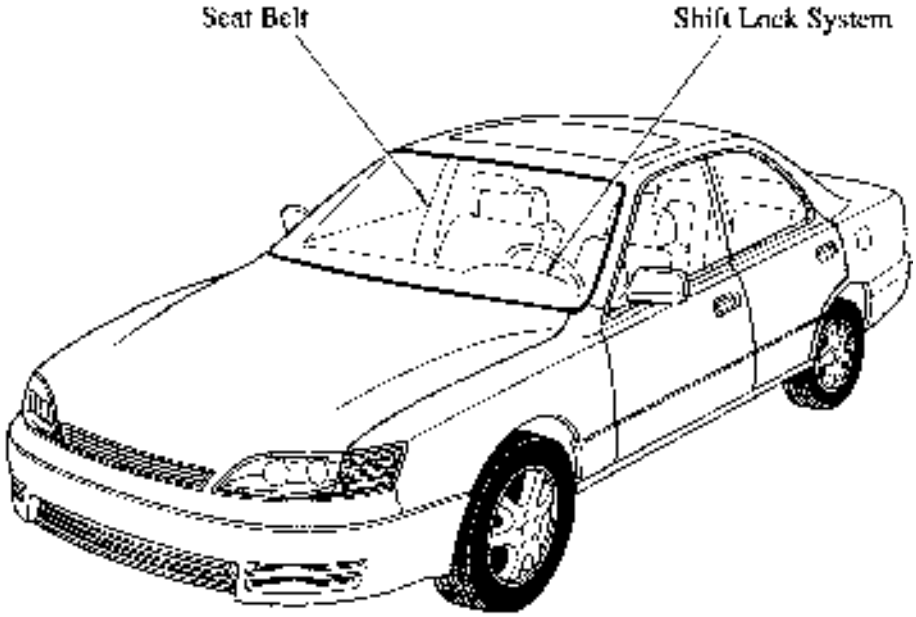
The ES300, which is favorably received as a distinctive sporty personal sedan, offers the following changes in the ’93 model:

1. Shift Lock System (See General 1993 Features for details)

The shift lever of automatic transmission vehicles has a cap over the shift lock override button.

2. SEAT BELT (See General 1993 Features for details)

The front passenger and rear seats (except center) have an ALR (Automatic Locking Retractor) function in their 3–point ELR (Emergency Locking Retractor).



MODEL CODE

V C V 1 0 L – B T P G K A

② ③ ④ ⑤ ⑥ ⑦ ⑧

	BASIC MODEL CODE
	VCV10: With 3VZ–FE Engine

②	STEERING WHEEL POSITION
	L: Left–Hand Drive

③	MODEL NAME
	B: ES 300

④	BODY TYPE
	T: 4–Door Sedan

⑤	GEARSHIFT TYPE
	M: 5–Speed Manual P: 4–Speed Automatic

⑥	GRADE
	G: —

⑦	ENGINE SPECIFICATION
	K: DOHC and MFI* [EFI]

⑧	DESTINATION
	A: U.S.A. K: Canada

*MFI (Multiport Fuel Injection)

MODEL LINE–UP

TRANSAXLE				5–Speed Manual	4–Speed Automatic
DESTINATION	ENGINE	BODY TYPE	GRADE	E53	A540E
U.S.A.	3VZ–FE	4–Door Sedan	—	VCV10L–BTMGKA	VCV10L–BTPGKA
Canada				VCV10L–BTMGKK	VCV10L–BTPGKK

– **MEMO** –

General 1993 Features

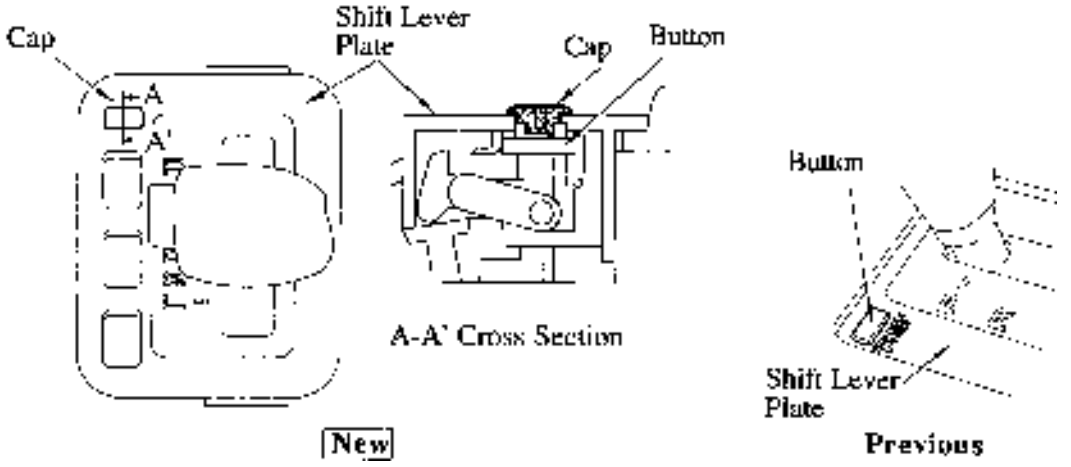
GENERAL 1993 FEATURES

SHIFT LOCK SYSTEM

■ SHIFT LOCK OVERRIDE BUTTON

The shift lock system of automatic transmission vehicles, beginning with the ’93 models is provided with a cap on the shift lock override button. The shift lock override button previously protruded from the shift lever plate, but now, the button is below the plate and covered by a cap.

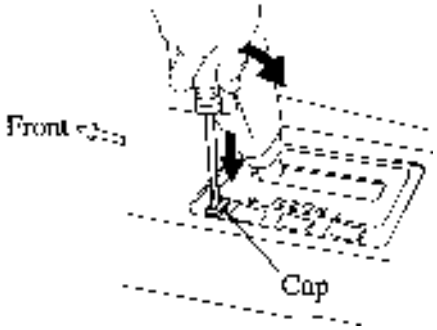
▶For LS400°



NOTE: To operate the shift lock override button:

② Remove the cap with a flat–blade screwdriver or equivalent.

③ Insert the screwdriver or equivalent into the hole to push the button.



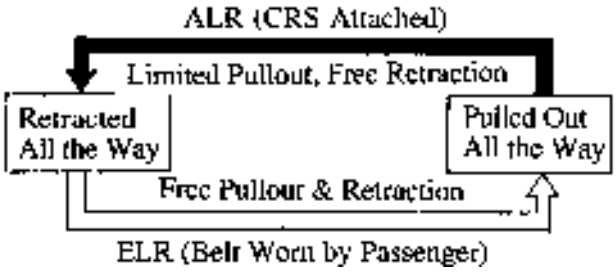
SEAT BELT

■ ELR WITH AIR FUNCTION

All ’93 models now offer an ALR (Automatic Locking Retractor) function in their 3–point ELR (Emergency Locking Retractor) of the front passenger and rear seats. This function is the same as the 3–point ELR rear seat belts previously used in the LS400.

This means that when the seat belt is fully extended it operates as an ALR for easy use when securing the CRS (Child Restraint System), making use of a locking clip unnecessary.

▶Retractor Activating Modes°



APPENDIX

MAJOR TECHNICAL SPECIFICATIONS

▶ ES300

Item		Area	U.S.A.		Canada	
Body Type			4–Door Sedan		4–Door Sedan	
Vehicle Grade			—	—	—	—
Model Code			VCV10L–BTMGKA	VCV10L–BTPGKA	VCV10L–BTMGKK	VCV10L–BTPGKK
Major Dimensions & Vehicle Weights	Overall	Length mm (in.)	4770 (187.8)	←	←	←
		Width mm (in.)	1780 (70.1)	←	←	←
		Height mm (in.)	1370 (53.9)	←	←	←
	Wheel Base	mm (in.)	2620 (103.1)	←	←	←
	Tread	Front mm (in.)	1550 (61.0)	←	←	←
		Rear mm (in.)	1500 (59.1)	←	←	←
	Effective Head Room	Front mm (in.)	960 (37.8), 926 (36.5)*	←	←	←
		Rear mm (in.)	930 (36.6), 909 (35.8)*	←	←	←
	Effective Leg Room	Front mm (in.)	1105 (43.5)	←	←	←
		Rear mm (in.)	588 (23.1)	←	←	←
	Shoulder Room	Front mm (in.)	1389 (54.7)	←	←	←
		Rear mm (in.)	1398 (55.0)	←	←	←
	Overhang	Front mm (in.)	1005 (39.6)	←	←	←
		Rear mm (in.)	1145 (45.1)	←	←	←
	Min. Running Ground Clearance	mm (in.)	130 (5.1)	←	←	←
	Angle of Approach	degrees	16°	←	←	←
	Angle of Departure	degrees	15°	←	←	←
	Curb Weight	Front kg (lb)	955 (2105)	975 (2149)	955 (2105)	975 (2149)
		Rear kg (lb)	570 (1257)	←	←	←
		Total kg (lb)	1525 (3362)	1545 (3406)	1525 (3362)	1545 (3406)
	Gross Vehicle Weight	Front kg (lb)	1095 (2415)	←	←	←
		Rear kg (lb)	910 (2005)	←	←	←
		Total kg (lb)	2005 (4420)	←	←	←
	Fuel Tank Capacity	L (U.S. gal., Imp. gal.)	70 (18.49, 15.40)	←	←	←
	Luggage Compartment Capacity	m^3 (cu.ft)	0.395 (13.9)	←	←	←
Performance	Max. Speed	km/h (mph)	—	—	—	—
	Max. Cruising Speed	km/h (mph)	175 (109)	170 (106)	175 (109)	170 (106)
	Acceleration	0 to 100 km/h sec.	8.0	8.7	8.0	8.7
		0 to 400 m sec.	—	—	—	—
	Max. Permissible Speed	1st Gear km/h (mph)	58 (36)	66 (41)	58 (36)	66 (41)
		2nd Gear km/h (mph)	102 (63)	121 (75)	102 (63)	121 (75)
		3rd Gear km/h (mph)	157 (98)	—	157 (98)	—
		4th Gear km/h (mph)	—	—	—	—
	Turning Diameter (Outside Front)	Wall to Wall m (ft.)	11.8 (38.7)	←	←	←
		Curb to Curb m (ft.)	11.2 (36.7)	←	←	←
Engine	Engine Type		3VZ–FE	←	←	←
	Valve Mechanism		4–Valves, DOHC	←	←	←
	Bore x Stroke	mm (in.)	87.5 x 83.0 (3.44 x 3.23)	←	←	←
	Displacement	cm^3 (cu.in.)	2959 (180.6)	←	←	←
	Compression Ratio		9.6 : 1	←	←	←
	Carburetor Type		MFI	←	←	←
	Research Octane No.	RON	96	←	←	←
	Max. Output (SAE–NET)	kW/rpm (HP @ rpm)	138/5200 (185 @ 5200)	←	←	←
	Max. Torque (SAE–NET)	N·m/rpm (lb–ft @ rpm)	264/4400 (195 @ 4400)	←	←	←
Engine Electrical	Battery Capacity (5HR)	Voltage & Amp. hr.	12–52	←	←	←
	Alternator Output	Watts	960	←	←	←
	Starter Output	kW	1.4	←	←	←
Chassis	Clutch Type		DST	—	DST	—
	Transaxle Type		E53	A540E	E53	A540E
	Transmission Gear Ratio	In First	3.583	2.810	3.583	2.810
		In Second	2.045	1.549	2.045	1.549
		In Third	1.333	1.000	1.333	1.000
		In Fourth	1.028	0.734	1.028	0.734
		In Fifth	0.820	—	0.820	—
		In Reverse	3.583	2.296	3.583	2.296
	Counter Gear Ratio		—	1.027	—	1.027
	Differential Gear Ratio (Final)		3.625	3.933	3.625	3.933
	Brake Type	Front	Ventilated Disc	←	←	←
		Rear	Solid Disc	←	←	←
	Parking Brake Type		Drum	←	←	←
	Brake Booster Type and Size	in.	Tandem 8" + 9"	←	←	←
	Proportioning Valve Type		Dual–LSPV	←	←	←
	Suspension Type	Front	MacPherson Strut	←	←	←
		Rear	MacPherson Strut	←	←	←
	Stabilizer Bar	Front	STD	←	←	←
		Rear	STD	←	←	←
	Steering Gear Type		Rack & Pinion	←	←	←
	Steering Gear Ratio (Overall)		15.9	←	←	←
	Power Steering Type		Integral Type	←	←	←

* : With Moon Roof

Special Service Campaign (SSC) and Limited Service Campaign (LSC) General Procedures

April 2005

PREPARING FOR AN SSC/LSC

Overview 3
Customer Notification 3
SSC/LSC and Customer Satisfaction 3
Identifying Affected Vehicles 3
Manpower and Facility Requirements 4
Tools and Equipment 4
Technical Training 4
Parts 5
DMS Systems 5
Planning Your Communication Strategy 5
Calls to Your Customers 5
Calls from Your Customers 5
Calls from the Media 6

IMPLEMENTING AN SSC/LSC

Car Rental and Service Loaners 6
Remote Area Service Plan 6
The Service Write-Up 7
Preparing for Delivery after SSC/LSC Completion 8
Delivery of the Vehicle after SSC/LSC Completion 8
Follow-Up 8
Work Order Closing/Claim Submission 8
Recap of Claim Submission and General Provisions of an SSC/LSC 9
Claiming Reimbursement for Special Services 9
Claim Preparation Instructions 10

PREPARING FOR AN SSC/LSC

Overview

This handbook contains the general procedures dealers should follow for each and every Special Service Campaign (SSC) or Limited Service Campaign (LSC) Lexus initiates. Campaign-specific details will be included in the dealer notification package sent to each dealer at the launch of a campaign.

Customer Notification

The customer notification schedule and sample letter will be included in the dealer notification package sent to each dealer at the launch of a campaign.

SSC/LSC and Customer Satisfaction

Each Special Service Campaign or Limited Service Campaign provides us with an opportunity to demonstrate the Lexus commitment to total customer satisfaction. Lexus requests that dealers use the fundamental principals embodied in the Lexus Covenant when servicing these owners and their vehicles. By implementing new campaigns in an organized and efficient manner, we can nurture our on-going relationships with these customers and strengthen these associations. Throughout each campaign, we need to let our customers know that we are genuinely interested in resolving the matter in a timely fashion with as little inconvenience to them as possible.

Identifying Affected Vehicles

Specific vehicle model, model year and VIN range applications will be included with the campaign-specific dealer notification package sent to all dealers at the launch of a campaign.

Always consult Dealer Daily or TIS to confirm eligibility and to assure the SSC/LSC is applicable. This will verify the vehicle is involved and has not already been completed by another dealer. TMS warranty will not reimburse dealers for repairs conducted on vehicles that are not affected.

Manpower and Facility Requirements

Your dealership must plan carefully to accommodate the additional service volume generated as a result of an SSC/LSC. In reviewing your dealership's manpower and facility requirements for a campaign, there are several items you need to consider.

- Do you need to develop ways to increase your service capacity?
- Do you need to hire additional support staff for pick-up/delivery, car washes and fuel tank fill-ups?

You will need to hold a meeting with all dealership associates to discuss:

- Importance of Lexus customer care for each SSC/LSC customer.
- Various procedures such as phone inquiries, pick up and delivery, loaners, etc.
- Campaign specifics including your dealership's assigned quantity, completion objectives, and technical details.

We recommend that one person at your dealership be designated as the campaign coordinator.

Your District Service and Parts Manager will meet with you to answer your questions and monitor the progress of each SSC/LSC.

Tools and Equipment

Each dealer notification package will include information on the tools and equipment required to perform the campaign repairs.

Technical Training

Lexus suggests that all service department staff who will be directly involved in completing a repair or supporting an SSC/LSC should review the repair procedures in the dealer notification package to prepare for a campaign.

Parts

Each dealer notification package will contain specific part number information and order procedures. Your

dealership is requested to **order only those parts needed to repair vehicles with service appointments**. Individual dealer tracking will be done and irregularities in quantity ordering will be passed on to Lexus Area Offices for follow-up and correction. Lexus will ensure there will be sufficient inventory to accommodate an SSC/LSC but there will be only enough supply to cover the affected vehicle population. Please only order based upon **true demand**.

DMS Systems

Labor operation codes will be transmitted to your dealership. (See dealer notification package for specific campaign opcode and labor hour information). DMS dealer files are automatically updated and no further action should be required.

Planning Your Communication Strategy

It is important that you develop a strategy to communicate effectively. Each dealer notification package will contain a series of Questions and Answers (Q&A) that can be used when explaining an SSC/LSC.

Calls to Your Customers

- Customers **involved** in the SSC/LSC

  ⇒ Each affected vehicle owner will receive a notification letter. Please let them that the campaign is being undertaken by Lexus to keep their confidence in the Lexus brand.

- Customers **not involved** in the SSC/LSC

  ⇒ Assure any customers with vehicles outside of the involved VIN ranges that this repair is not needed.

Calls from Your Customers

It is important to institute a system to respond to customers calling for more information regarding an SSC/LSC. We recommend designating an individual to answer these inquiries to ensure that callers get accurate, consistent information.

Calls from the Media

We ask that you refer any calls from the media or government agencies directly to Lexus headquarters in Torrance, California. The contact at Lexus is:

Bill Ussery, Lexus Public Relations Manager

IMPLEMENTING AN SSC/LSC

Car Rental and Service Loaners

One of the ways we can demonstrate that Lexus cares is by honoring loaner car requests with the best loaner available for those customers unable or unwilling to wait for this repair.

Lexus Customer Convenience System (LCCS)
Officially enrolled LCCS vehicles may be claimed at a rate of $44.00 per day. (Lexus vehicles only)

Lexus Dealer Fleet (Lexus vehicles only)
A rate of $44.00 per day may be claimed if using this option. Be sure to follow customer supplied insurance guidelines.

The motivating factor for any of these options is the customer's convenience and consideration. Again please provide the best available vehicle. If extraordinary customer requests are made, please contact your DSPM. In addition, **loaner car requests that exceed one day must carry proper DSPM authorization.**

Remote Area Service Plan

"Remote" is defined as those distances where a customer is 100 or more miles from the nearest Lexus dealership. Your DSPM will work with you to develop and authorize an action plan.

Guidelines to be used in performing remote repairs are:

- If the customer is within 100 miles of the nearest Lexus dealership, the closest Lexus dealership will perform the repair provided that prior authorization for related expenses has been approved by the DSPM.
- If the customer is more than 100 miles from the nearest Lexus dealership, Lexus area associates or, Lexus national associates may perform the repair. Dealerships may also make these repairs but only with the authorization of the Area Coordinator (most likely the F.T.S.).
- Each situation will be handled on a case-by-case basis.
- Lexus will only pay for authorized costs that have been approved by DSPM or area offices.
- Alternatives include pick-up and redelivery of remotely located vehicles.

The Service Write-Up

Listed below are some general guidelines to use when the customer arrives at your dealership for an SSC/LSC:

- Explain how long the repair will take. Inform the customer that the special services (refueling, car wash) will require additional time at your dealership.
- Explain the type of repair involved.
- If the customer does not have an SSC/LSC notice:
  - Check the VIN against the national Service History File or TIS to see if the vehicle has been previously repaired under the Campaign.
  - Check the left front door hinge post for an SSC/LSC completion label.
  - If the vehicle falls outside of the above guidelines, explain that the vehicle does not require the Campaign repairs.
  - If the vehicle is eligible, explain the SSC/LSC repair procedure to the customer.
- If the customer has an appointment, pull the work order; otherwise, create a work order reflecting the need to complete the campaign.
- Issue the work order to the technician and include job instructions for the SSC/LSC.

Preparing for the Delivery after SSC/LSC Completion

- Wash/clean the vehicle inside and out.
- Fill the gas tank with the specified unleaded fuel
- Notify customer of completion and arrange for re-delivery or return of rental vehicle.

Delivery of the Vehicle After SSC/LSC Completion

The delivery of the vehicle is a very important part of ensuring a high level of customer satisfaction. Explain all SSC/LSC repairs to the customer and apologize for any inconveniences. Thank the customer for his or her time and their continuing patronage.

Follow-Up

Complete 100% after-service follow-up is critical to ensure complete customer satisfaction with the repairs performed and the service provided.

Work Order Closing/ Claim Submission

Each SSC/LSC dealer notification package will include information that explains the policies and procedures for preparation and submission of a warranty claim for reimbursement of a repair performed under the SSC/LSC.

NOTE: Lexus warranty will only accept one claim per vehicle under the terms of an SSC/LSC. Please ensure that your dealership checks the National History File to see if the vehicle has been repaired under an SSC/LSC prior to servicing the vehicle.

Recap of Claim Submission and General Provisions of an SSC/LSC

- Lexus will pay for gas tank fill-up (actual cost)
- Lexus will pay for washing the vehicle (not to exceed $20 per vehicle)

- Lexus will provide a loaner vehicle if required (DSPM authorization required for more than one day)
- Lexus will pay for costs associated with remote repairs if required
- Lexus will pay for remote pick-up and delivery if required (DSPM authorization only)

Claiming Reimbursement for Special Services

You must use sublet to claim any special services required in conjunction with an SSC/LSC repair.

- Issue **"TW"** (Tow Vehicle)
  - Applicable if the nature of the SSC/LSC requires the vehicle to be towed to the dealership
  - Claim actual receipt amount as a sublet
- Issue **"RT"** (Rental)
  - Applicable to every vehicle if required
  - The loaner vehicle reimbursement rate cap is **one day** per repair unless otherwise authorized by DSPM
- Issue **"GA"** (Gas Tank Fill-Up)
  - Applicable to every vehicle
  - Claim actual fill-up amount
- Issue **"CW"** (Car Wash/Administrative Time)
  - Applicable to every vehicle
  - Amount not to exceed $20.00 per vehicle
- Issue **"DE"** (Pick-Up and Delivery/**Remote Repairs**)
  - Applicable only under special circumstances (e.g. more than 100 miles from the nearest Lexus dealership)
  - Claim actual dealer cost
  - **F.T.S/C.S.O.M.** authorization is required for this expense
- Issue **"DE"** (**Pick-Up and Delivery**/Remote Repairs)
  - Applicable at dealer discretion

- Claim actual dealer cost

Claim Preparation Instructions

NOTE: Each sublet must be a separate entry with:

- Unique invoice number
- Description
- Sublet Type
- Dollar Amount

ES 300

Air Conditioning Expansion Valve Replacement

Special Service Campaign PL1

Table of Contents

OVERVIEW 1

PREPARING FOR THE SSC
- Determining Demand 2
- Manpower & Facility Requirements 2
- Tools & Equipment 3
- Technical Training 4
- Parts Availability 5
- Creating Menu Codes 6
- Planning Your Communication Strategy 9
- Calls from the Media 11

IMPLEMENTING THE SSC
- Service Loaners 12
- Contacting Customers 12
- Remote Area Service Plan 13
- Write–Up 15
- Work Order Entry 15
- Preparing for Delivery After the SSC Completion 16
- Delivery After the SSC Completion 16
- Follow–Up 16
- Work Order Closing/Claim Submission 17
- Claiming Reimbursement for Special Services 18
- TDN Claim Preparation Instructions 18
- Invoicing 19
- Paper Claim Submission 26
- Sample Customer Letter 34

TECHNICAL INSTRUCTIONS 35

Overview

Lexus will be initiating a Special Service Campaign (“SSC” PL–1) for certain 1992 and 1993 ES 300 vehicles. This booklet provides all the details necessary to plan and implement the SSC at your dealership. The key points of this Special Service Campaign are summarized below.

Condition

Under certain conditions, particularly in high temperature and high humidity areas, the air conditioning expansion valve in certain ES 300 vehicles may malfunction. As a result, there will be a gradual reduction of air conditioning efficiency and eventual loss of cabin cooling capability. The vehicle should operate normally in all other respects.

Repair

This campaign involves the inspection of the air conditioning system and injection of an anti–corrosion lubricant (Toyota ND6–AC Refrigerant Oil) OR, if necessary, replacement of the air conditioning expansion valve.

Customer Notification

Notification letters will be sent to vehicle owners beginning June 1, 1993. A copy of the letter can be found on page 34 of this booklet. You will be provided with a list of owners/vehicles so that you may begin contacting your customers as soon as you are prepared.

Vehicles Involved

Approximately 41,480 1992 and 1993 ES 300 vehicles are involved. Toyota will be conducting a concurrent campaign involving the same parts and repair procedures. Lexus dealers cannot submit claims directly for repairing Toyota vehicles.

The SSC and Customer Satisfaction

Throughout this Special Service Campaign, please make every effort to ensure a positive experience for each and every Lexus owner. This situation affords us all an opportunity to further demonstrate Lexus’ commitment to customer satisfaction in the “Lexus Cares” tradition.

Determine Your Demand

Qualified vehicles are limited to the VIN range shown below. No other vehicles before or after this range are to be repaired under the provisions of this SSC.

Model	Model Year	VDS	Involved VIN Range
ES 300	92-93	VK13T	0001001–0129016

NOTE: Canadian vehicles falling within this VIN range qualify under the same guidelines.

- The enclosed SSC Summary Report lists vehicles sold by your dealership.

- From the list, determine the actual number of customers who should come back into your dealership for the Special Service Campaign.

Manpower and Facility Requirements

It is estimated that approximately 60% of the vehicles involved will need only to have the special anti–corrosion lubricant injected. This will take about 1/2 hour. The remaining 40% of the vehicles will need to have the expansion valve and possibly the liquid tube replaced, which takes approximately two hours. This works out to an average repair time of one hour per affected vehicle.

It is critical that every effort be made to minimize the impact this activity will have on your other service customers. Based upon your projections of the number of customers who may have the SSC performed in your service department, you need to take the following actions to ensure adequate capacity:

- Determine if you have sufficient manpower and facility space to process the number of vehicles in your area.

- Determine if you need to provide extended service hours, a second shift and/or Saturday appointments to accommodate the number of vehicles to be serviced.

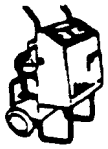
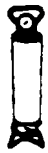
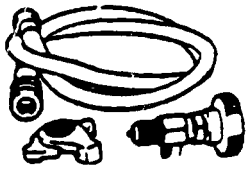
- Determine if you need to hire additional technicians either full or part time.

NOTE: Technicians must be "MACS" or "ASE" certified to perform the A/C type repairs in this campaign.

- Determine if you require additional equipment to service your customers' needs by repairing vehicles simultaneously.

Tools and Equipment

Refer to the following list to determine if you have the proper tools and equipment necessary to perform all aspects of the service. Ensure all coolant recovery and recharge equipment has been tested recently and is in excellent working order. The demand on this equipment will be substantial.

Air Conditioning Service Tool Set		Refrigerant Recovery Machine	
Vacuum Pump Assembly		Charging Cylinder	
Gas Leak Detector Assembly		AC Oil Injector Kit (TOY219721)	
Socket Hexagon Wrench 5 mm		Torque Wrench	
		Standard Tools	———

Stop valves must be used to meet your local state regulations.

NOTE: Special Service Tool Part No. TOY219721 (AC Oil Injection Kit) has recently been shipped to your dealership, free of charge. Additional tool kits can be ordered through Owatonna Tool Co. (OTC) for $28.91 each.

Technical Training

- Your dealership was sent a video tape copy of repair procedures and instructions for training and future reference along with this booklet.
- We also recommend that key customer contact personnel such as the Sales Manager and General Manager view this tape to better understand the nature of this Special Service Campaign.
- We recommend that one person be designated as the campaign coordinator. All inquiries about this campaign should be directed to this person to avoid dissemination of incorrect or inappropriate information.

Required Parts

(a) Anti–Corrosion Lubricant **(Supplied only in packages of 12 cans/package).**

Part Number	Part Name	Qty Per Vehicle
00263–09106	Toyota ND6 AC Refrigerant Oil Charge	One Can

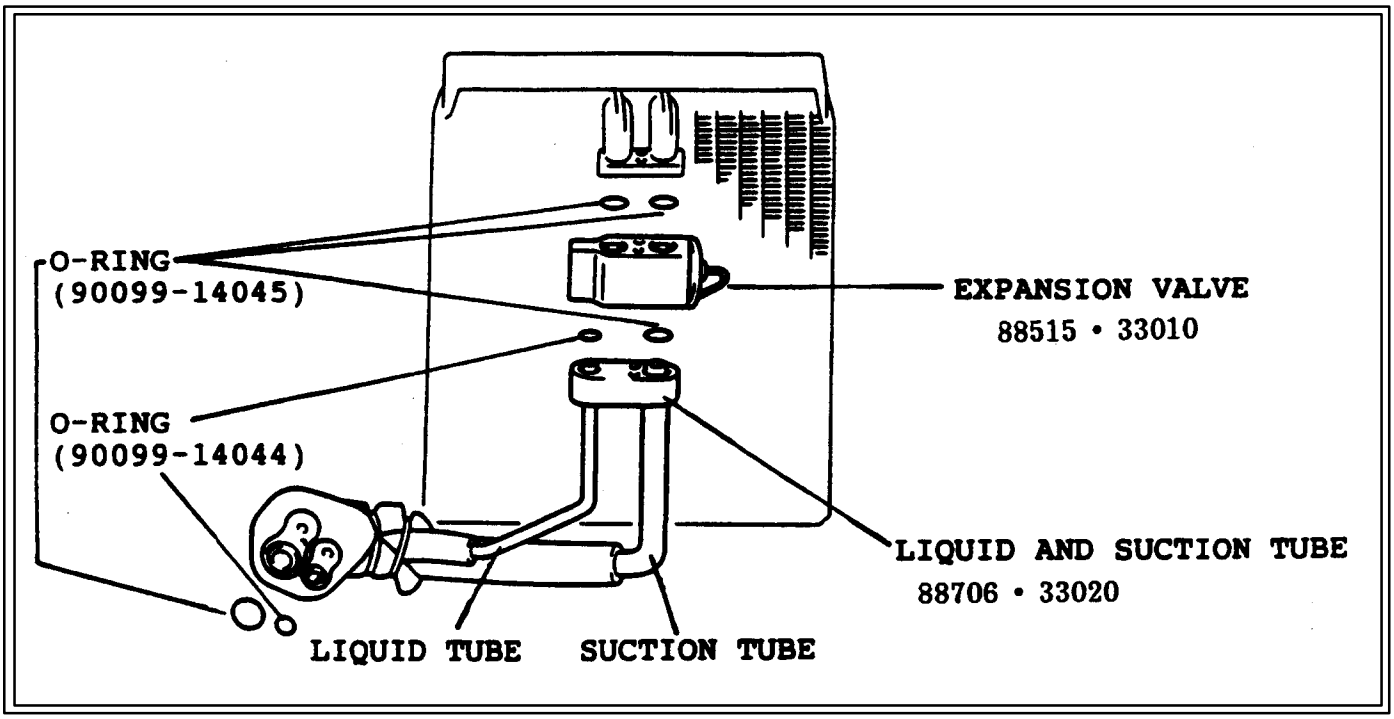
(b) Expansion Valve, Liquid and Suction Tube, and O–rings

Model	Part Name	Part No.	Qty./Vehicle	
			With Tube Replacement	Without Tube Replacement
ES 300 VK13T	Cooler Expansion Valve	88515–33010	1	1
	Liquid Pipe Sub–Assy.	88706–33020	1	0
	O–Ring–Large	90099–14045	2*	4
	O–Ring–Small	90099–14044	0*	2

* Two each of large and small O–rings are provided with liquid tube.

Parts Availability/Ordering

- Sufficient supplies of all SSC parts will initially be sent to you by including those part numbers on your Dealer Stocking Guide at the appropriate time.
- As used or obligated from your D.S.G., the automatic replenishment system will generate timely reorder quantities to your facing Parts Distribution Center (P.D.C.). This should ensure continuous supply of parts inventory into your dealership.
- You are encouraged to order only those quantities of parts that you have service appointments for. Individual dealer tracking will be made and irregularities in quantity ordering will be passed on to the Lexus Area Offices for their follow–up.
- An electronic mail message will be sent to all Lexus dealers indicating quantities and D.S.G. installation dates as roll out commences.



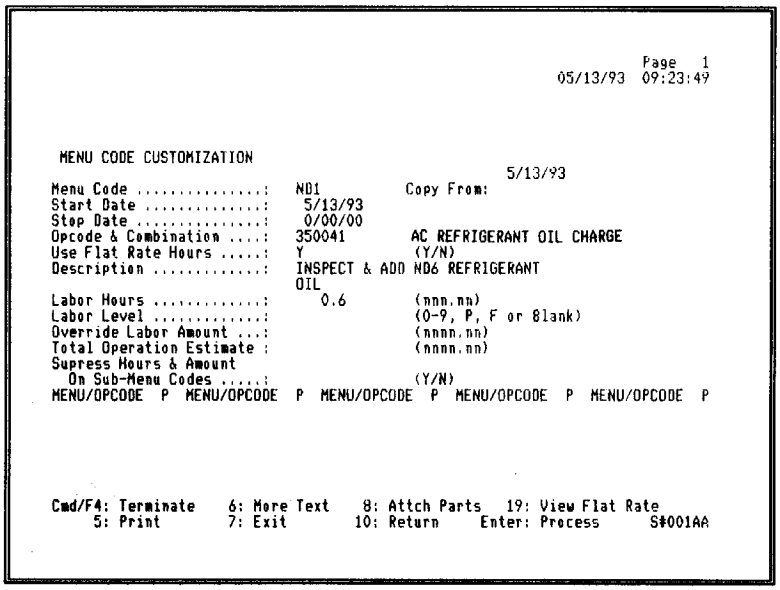
TDN System

The following steps must be taken to prepare your TDN system for processing the SSC claims.

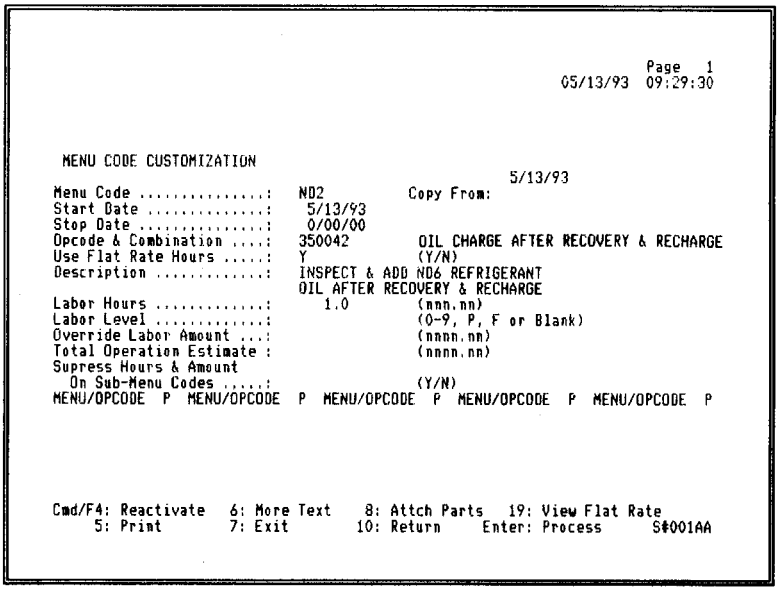
- Labor Operation codes were transmitted to your dealership. If you have not received these call the TDN hotline.
- Create menu codes using the new labor operation codes established for this SSC.

Menu Option SC–2

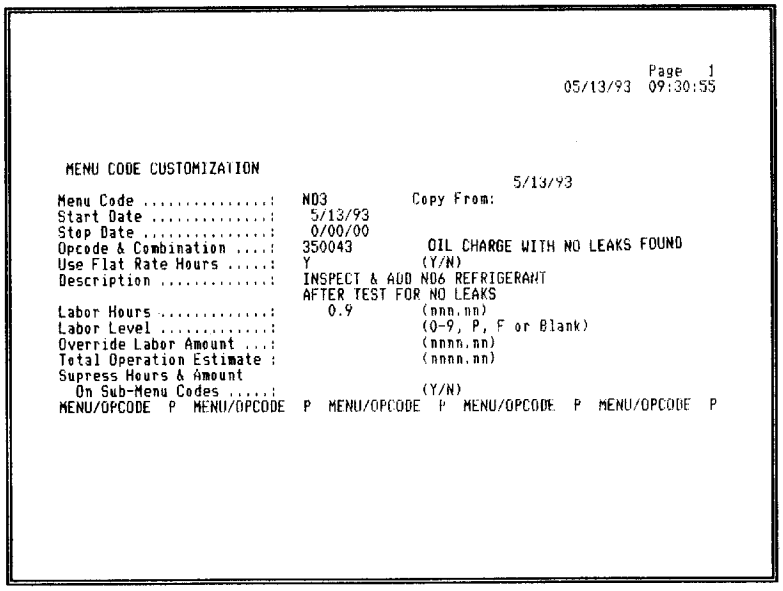
Menu Code ND1
Labor Op. Code: 350041



Menu Code ND2
Labor Op. Code: 350042

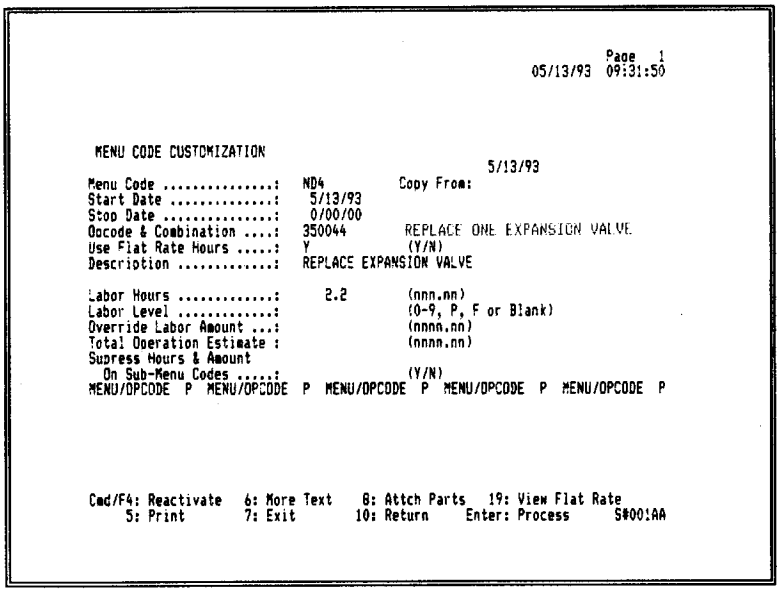


Menu Code ND3
Labor Op. Code: 350043



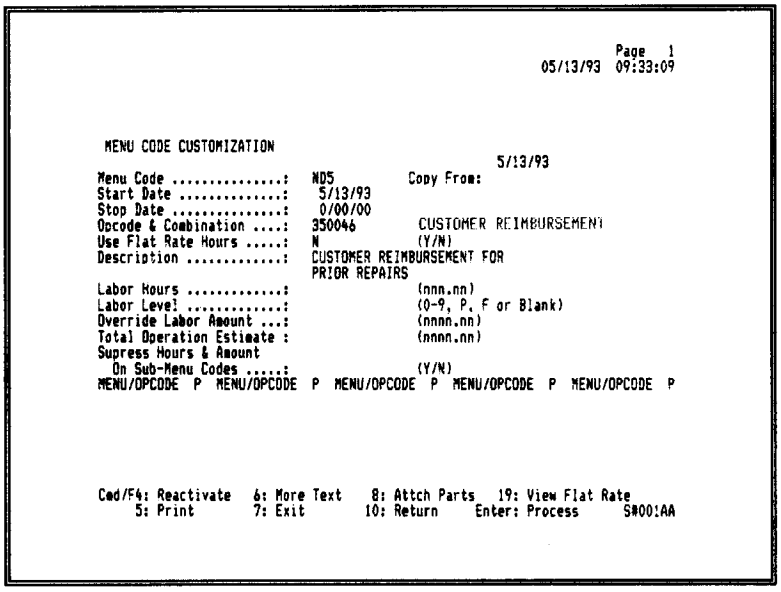
```
                                                          Page   1
                                                05/13/93  09:30:55


 MENU CODE CUSTOMIZATION
                                                  5/13/93
Menu Code ..............:   ND3          Copy From:
Start Date .............:    5/13/93
Stop Date ..............:    0/00/00
Opcode & Combination ....:   350043        OIL CHARGE WITH NO LEAKS FOUND
Use Flat Rate Hours .....:   Y             (Y/N)
Description ............:   INSPECT & ADD ND6 REFRIGERANT
                             AFTER TEST FOR NO LEAKS
Labor Hours ............:      0.9         (nnn.nn)
Labor Level ............:                  (0-9, P, F or Blank)
Override Labor Amount ...:                  (nnnn.nn)
Total Operation Estimate :                  (nnnn.nn)
Supress Hours & Amount
  On Sub-Menu Codes .....:                  (Y/N)
MENU/OPCODE  P  MENU/OPCODE  P  MENU/OPCODE  P  MENU/OPCODE  P  MENU/OPCODE  P
```

Menu Code ND4
Labor Op. Code: 350044



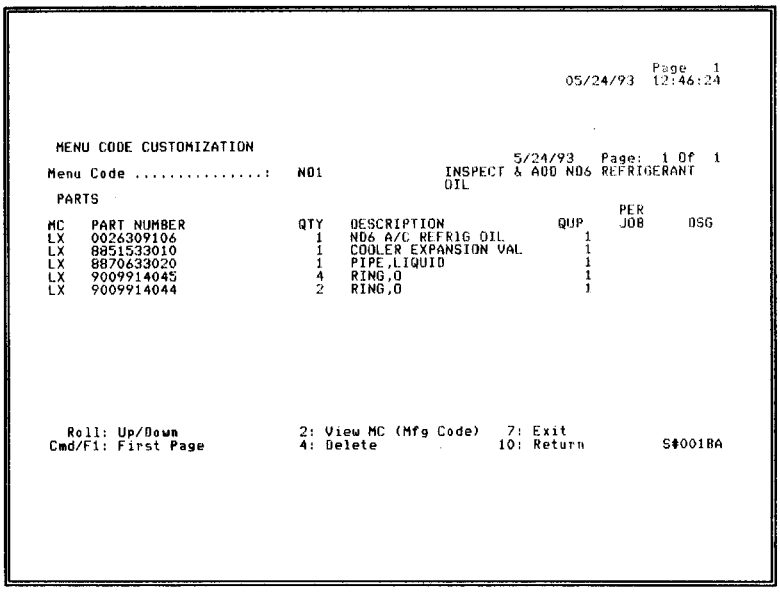
```
                                                          Page   1
                                                05/13/93  09:31:50


 MENU CODE CUSTOMIZATION
                                                  5/13/93
Menu Code ..............:   ND4          Copy From:
Start Date .............:    5/13/93
Stop Date ..............:    0/00/00
Opcode & Combination ....:   350044        REPLACE ONE EXPANSION VALVE
Use Flat Rate Hours .....:   Y             (Y/N)
Description ............:   REPLACE EXPANSION VALVE

Labor Hours ............:      2.2         (nnn.nn)
Labor Level ............:                  (0-9, P, F or Blank)
Override Labor Amount ...:                  (nnnn.nn)
Total Operation Estimate :                  (nnnn.nn)
Supress Hours & Amount
  On Sub-Menu Codes .....:                  (Y/N)
MENU/OPCODE  P  MENU/OPCODE  P  MENU/OPCODE  P  MENU/OPCODE  P  MENU/OPCODE  P



Cmd/F4: Reactivate   6: More Text    8: Attch Parts   19: View Flat Rate
     5: Print        7: Exit        10: Return      Enter: Process      S#001AA
```

Menu Code ND5
Labor Op. Code: 350046



- **Attach part numbers to Menu Code ND1**

Menu Option SC–8



Planning Your Communication Strategy

It is important that you develop a communication strategy to communicate effectively. The following are some general statements that can be used when explaining the Special Service Campaign to customers.

1. Affected Vehicles

Q1. Which models are affected?
A1. The affected model is the 1992 & 1993 Lexus ES 300.
Q2. How many vehicles are involved?
A2. Approximately 41,480 vehicles in the U.S.
Q3. Is this a world–wide campaign?
A3. No. The expansion valve malfunction occurs only under certain conditions, particularly high temperatures and humidity. The areas with the right combination of these conditions is limited to the U.S., mainly the Southern areas.

2. Condition

Q1. What is the function of the expansion valve?
A1. The expansion valve controls the volume of liquid refrigerant which flows into the evaporator and is converted into a gaseous state.
Q2. What is the condition?
A2. Under conditions of high temperature and high humidity, a chemical reaction of the refrigerant may cause gradual corrosion within the expansion valve causing it to malfunction.
Q3. How will this malfunction affect the air conditioning system?
A3. The malfunction will be evidenced by a gradual reduction in the efficiency of the air conditioning system and eventual loss of cabin cooling capability.
Q4. How was this condition discovered?
A4. Last summer Toyota Motor Corporation received a report from the U.S. and immediately began an investigation.

Q5. Does this condition affect the safety of the vehicle?
A5. No. This condition does not affect safety.
Q6. What effect does this condition have on the environment?
A6. The amount and possibility of refrigerant being released into the environment are negligible, but due to Lexus' concern for the environment, we have taken steps to eliminate even the slightest possibility.

3. Remedy

Q1. How has the condition been remedied?
A1. The expansion valve has been modified to include a special surface treatment.
Q2. What will Lexus do in the marketplace?
A2. To prevent the chemical reaction from occurring, a protectant will be injected with lubricant and refrigerant into the A/C system. If the chemical reaction has already occurred, the expansion valve will be replaced with a new one.
Q3. Why aren't expansion valves replaced on all affected vehicles?
A3. The protectant will stop the chemical reaction from occurring and therefore, it is unnecessary to replace the existing expansion valve.
Q4. How long will this procedure take?
A4. Approximately 1/2 hour for injection of the protectant OR approximately 2 hours for replacement of the expansion valve.
Q5. What should owners do?
A5. When Lexus has completed the necessary preparations, owners will be notified by first class mail and requested to bring their vehicle into the local Lexus dealer to conduct this campaign.

You will have two general types of communications with customers concerning this Special Service Campaign:

- **Outbound Calls**
  These are customers that your dealership will be calling. These will include:

  - ES 300 owners involved in the SSC.
    You may want to use the list provided in this package to begin calling your customers as soon as your preparations are completed.

  - ES 300 owners not involved.
    You may want to call these customers as well to address any concerns that they might have. You can use your TDN system to run a report of all ES 300's sold at your dealership that are outside the campaign parameters.

- **Inbound Calls**
  It is important to institute a system to respond to customers calling your dealership for more information regarding the SSC. We recommend designating an individual or certain individuals to answer these inquiries to assure that callers get accurate and consistent information.

Calls from the Media

We ask that you refer <u>any</u> calls from the media or government agencies directly to Lexus headquarters in Torrance. The contact person is:

- Art Garner, Lexus Public Relations Manager
  (310) 781–3282

Service Loaners

Ease of servicing is a critical aspect of the customer's perception as to how well the SSC is handled. It is extremely important that every effort be made to conduct the SSC with minimal inconvenience to the customer.

- ♦ After determining the number of vehicles per day you will be scheduling, verify that you have an adequate supply of service loaners available for customers.

- ♦ Because of the relatively short amount of time it takes to complete the service you may want to develop a while–you–wait program. Items needed would include:

  - Sufficient supply of parts
  - A dedicated work area, properly equipped
  - Dedicated technicians who are properly trained and certified

It is important to recognize that customers must know how long they will be required to wait. Every effort must be made to have the vehicle finished when promised.

- ♦ Consider a pick–up and delivery service at customer's home or place of business.

Contacting Customers

- ♦ Check the service history of each customer before you contact them to see if any other routine maintenance or services need to be performed at the same time. This will help minimize a customer's perception of being inconvenienced.

- ♦ Begin contacting the customers on your SSC lists to schedule appointments and reserve parts using the TDN system.

- ♦ Make sure you schedule appointments to coincide with the receipt of all necessary parts.

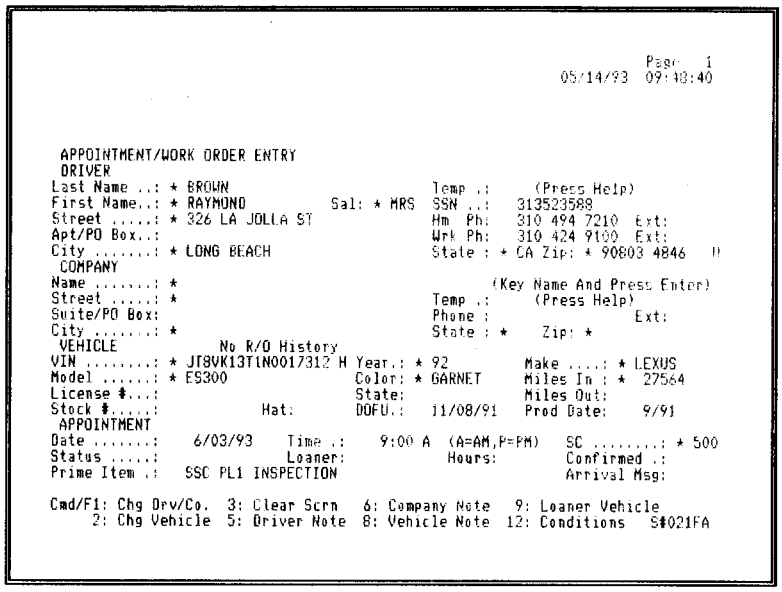
- ♦ Be sure to have the information provided on page 9 so that you are able to respond to any questions the owner might have.

Remote Area Service Plan

- **Your DSPM will work with you to develop an action plan.** Alternatives include:
  - Pick–up and re–delivery of remotely located vehicles
  - Performing repairs in a location other than a Lexus dealership
- Each situation will be handled on a case–by–case basis.
- **Lexus will pay for certain related costs. DSPM or area office authorization is required.**

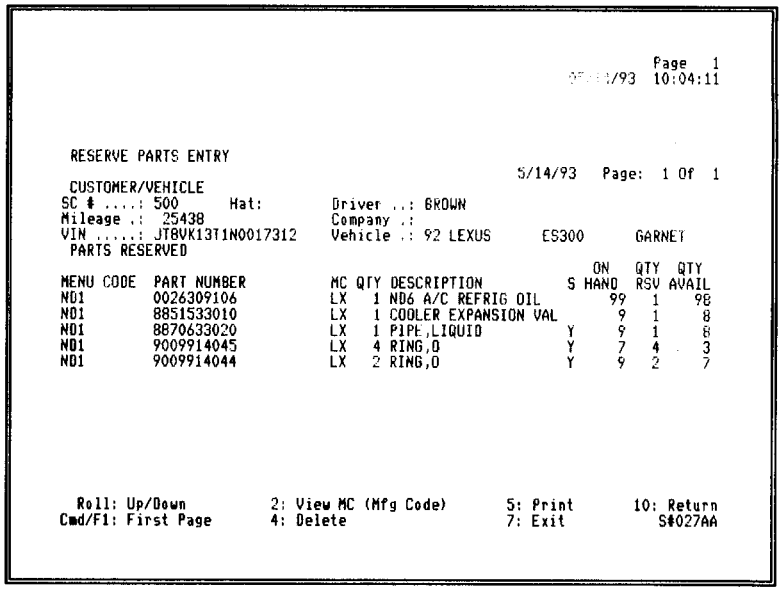
CREATE APPOINTMENT

SI–1



RESERVE PARTS

SI–1
CMD 23



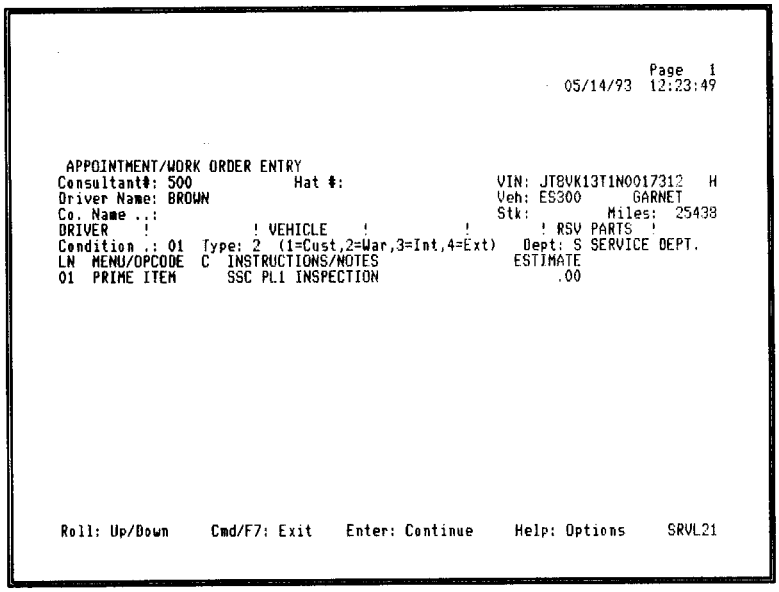
The Write–Up

Listed below are some general guidelines to use when the customer arrives at your dealership for the Special Service Campaign:

- Explain that in about half the cases the repairs will only take about 1/2 hour. And in the other half of the cases, when the expansion valve must be replaced, the repairs will take about 2 hours.
- Explain the types of repairs involved.
- If the customer does not have an SSC notice:
  - Check the left front door hinge post near the door check for an SSC completion label or the National History File to see if the vehicle has been previously repaired or inspected under this campaign.
  - If there is no label, check the VIN against the SSC list.
  - If the vehicle is eligible, explain the campaign, the procedure and the amount of time needed for the inspection/repair to the customer.
- Input the usual necessary information into the TDN system to create a work order (VIN, mileage, etc.).
- Issue the work order to the technician, and include job instructions for the SSC.

WORK ORDER ENTRY

SI–2



Preparing for the Delivery After SSC Completion

- Wash/clean each vehicle inside and out.
- Fill the gas tank with premium unleaded fuel. **This cost will be charged as an SSC expense.**
- Notify customer of completion.

Delivery of the Vehicle After SSC Completion

The methods used to re–deliver the vehicle after performing the SSC are an important factor in achieving high levels of customer satisfaction in this activity.

- Thoroughly explain to the customer all SSC and any other work performed.
- Explain any additional work and/or charges if other services were performed.
- Thank each customer.

NOTE: The costs of car washes and loaners/pick–up and delivery in your normal servicing area (100 miles) are not reimbursable under this campaign.

Follow–Up

100% after–service follow–up is critical to the overall success of the program.

Work Order Closing/Claim Submission

The following information explains the policies and procedures for preparation and submission of a warranty claim for reimbursement of an inspection or repair performed under SSC PL–1.

Operation Code	Description	Labor Hours
350041	Add “Toyota ND6 AC refrigerant oil charge” with protector only.	0.6 hr./vehicle
350042	Add “Toyota ND6 AC refrigerant oil charge” after recovery and recharge of refrigerant	1.0 hr./vehicle
350043	Add “Toyota ND6 AC refrigerant oil charge” after confirming no leaks of gas at the drain hose.	0.9 hr./vehicle
350044	Replacement of expansion valve including liquid tube (if required).	2.2 hr./vehicle
350046	Customer reimbursement for previous repairs.	

NOTE: Lexus Warranty will only accept <u>one</u> claim per vehicle under the terms of this Special Service Campaign. Please ensure that the claim for your dealer is submitted under the correct operation code at the time of submission. Also, please ensure that your dealership checks the National History File to see if the vehicle has been repaired or inspected under this campaign prior to servicing the vehicle.

Recap of Claims Submission & General Provisions of the SSC

- Only one of the five labor operation codes can be used per vehicle claim.
- Lexus will pay for gas tank fill–up.
- Lexus will pay for costs associated with remote repairs, remote pick–up and delivery and loaner cars, **with DSPM authorization only**.

Claiming Reimbursement for Special Services

You must use a sublet to claim any special services required in conjunction with the special service campaign repair.

- ‘GA’ (Gas Tank Fill–up)
  - Applicable to every vehicle.

- ‘RT’ (Rental Car)
  - Applicable only under extenuating circumstances.
  - Must be authorized by a DSPM.

- ‘DE’ (Pick–up and Delivery)
  - Applicable only under special circumstances (e.g., more than 100 miles from nearest Lexus dealer).
  - Claimed at actual dealer cost.
  - DSPM authorization is always required for this expense.

- ‘ZZ’ (Remote Repair)
  - Applicable only under special circumstances (e.g., 200+ miles from nearest Lexus dealer which requires using an alternate repair facility).
  - Claimed at actual dealer cost.
  - DSPM authorization is always required for this expense.

NOTE: Each sublet must be a separate entry with:
- **Unique Invoice Number**
- **Description**
- **Sublet Type**
- **$ Amount**

TDN Claim Preparation Instructions

- In Repair Order Management select claim type ‘SC’ (Special Service Campaign) unless the dealer is requesting reimbursement for a remote repair or pick–up and delivery of the customer’s vehicle. If you are claiming for remote repair or pick–up and delivery of a customer’s vehicle you must use ‘RG’ (Regular) claim type. Refer to the TDN section of this manual (page 19) for examples of claim preparation via TDN.

INVOICING – Inspection Only Example

Create Invoice
SI–3

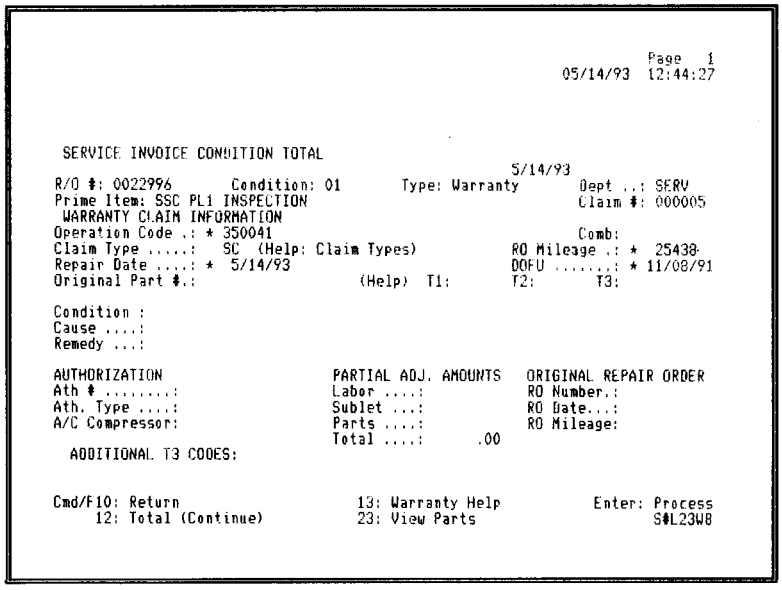
```
                                                                Page  1
                                                      05/14/93  12:38:30


 INVOICING ENTRY
R/O .......: 0022996      S/C: 500     Hat#:        VIN: JT8VK13J1N0017312
Driver Name: BROWN                                  Veh: ES300      GARNET
Co. Name ..:                                        Stk:         Miles:  25438
DRIVER    !           ! VEHICLE    !           !          !          !
Condition .: 01  Type: 2  (1=Cust,2=War,3=Int,4=Ext)   Dept: S SERVICE DEPT.
LN MENU/OPCOD C L TEC ACT TM FLG TM INSTRUCTIONS/NOTES                  LABOR
01 PRIME ITEM                      SSC PL1 INSPECTION                    .00
02 ND1           314          .60 INSPECT & ADD ND6 REFRIGERANT        36.00
03                                 OIL                                   .00









Roll: Up/Down    Cmd/F12: Total    Enter: Process     Help: Options    SRVL23C
```

Condition Total
SI–3
CMD–12

```
                                                                Page  1
                                                      05/14/93  12:41:46


 SERVICE INVOICE CONDITION TOTAL
                                                          5/14/93
R/O #: 0022996       Condition: 01       Type: Warranty       Department: SERV
Prime Item: SSC PL1 INSPECTION
 TOTAL AMOUNTS                          ! WARRANTY INFORMATION
COST     SALE      ACCT    DESCRIPTION      CLAIM#   DESCRIPTION
   14.00    36.00  4420    WARR MECH L&R             WARRANTY CLAIMS-LEX
     .00      .00          PARTS
     .00      .00  4460    SUBLET RPR MECH
     .00      .00  7193    SUPPLY&SM TOOLS
     .00      .00  7185    FREIGHT-P&A
     .00      .00  4770    TIRES,GAS,OIL &
              .00  3143    TIRE TAX
     .00      .00          MISCELLANEOUS
     .00      .00          MISCELLANEOUS

          36.00            Condition Total
        =========


Cmd/F10: Return                          23: View Parts
     12: Total (Continue)              Enter: Process                S$L23WA
```

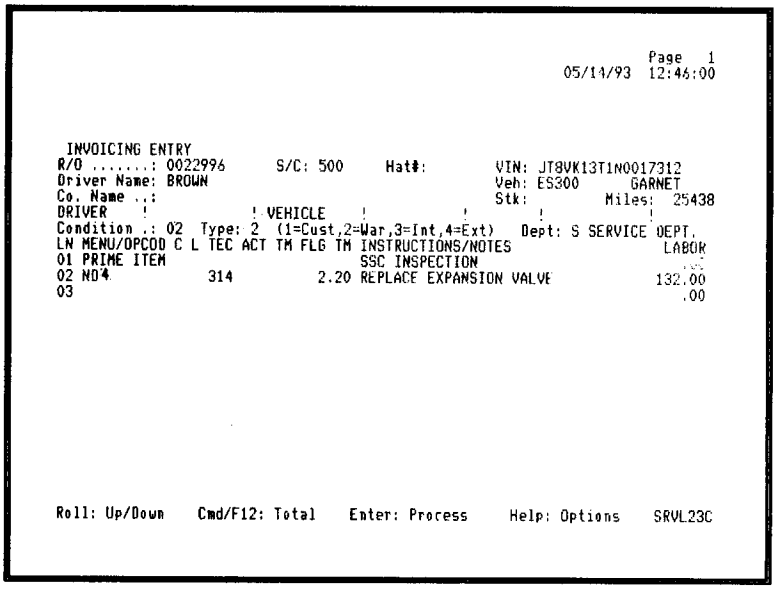
INVOICING – Inspection Only Example

Claim Information
SI–3
CMD–12



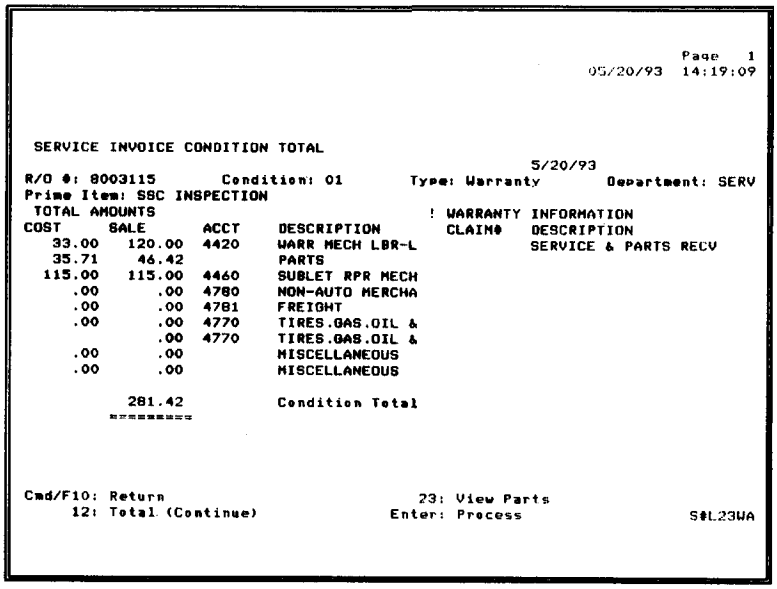
INVOICING–Expansion Valve Replacement

Create Invoice
SI-3



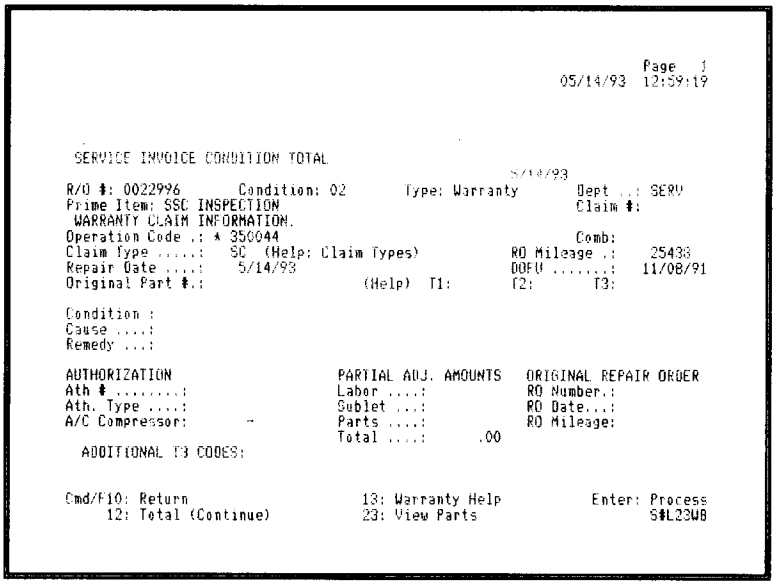
- **Attach reserved parts**

Condition Total
SI-3
CMD-12



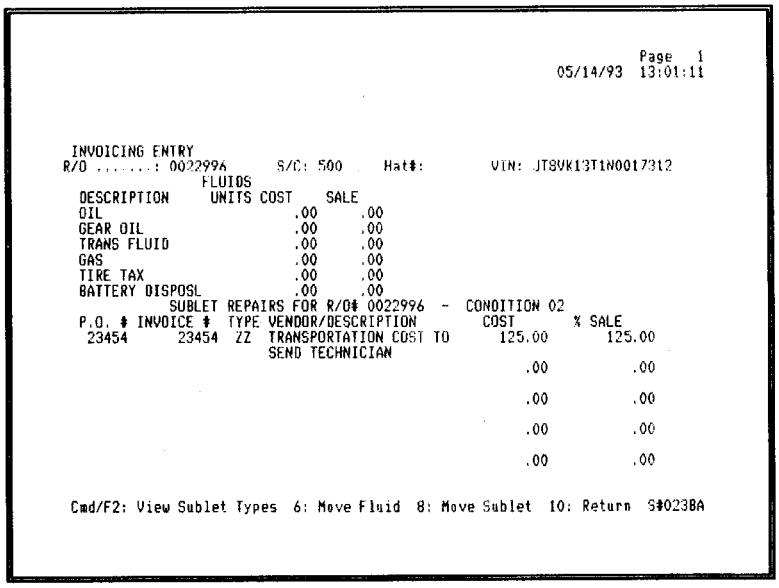
Claim Information
SI-3
CMD-12

INVOICING–Expansion Valve Replacement Example



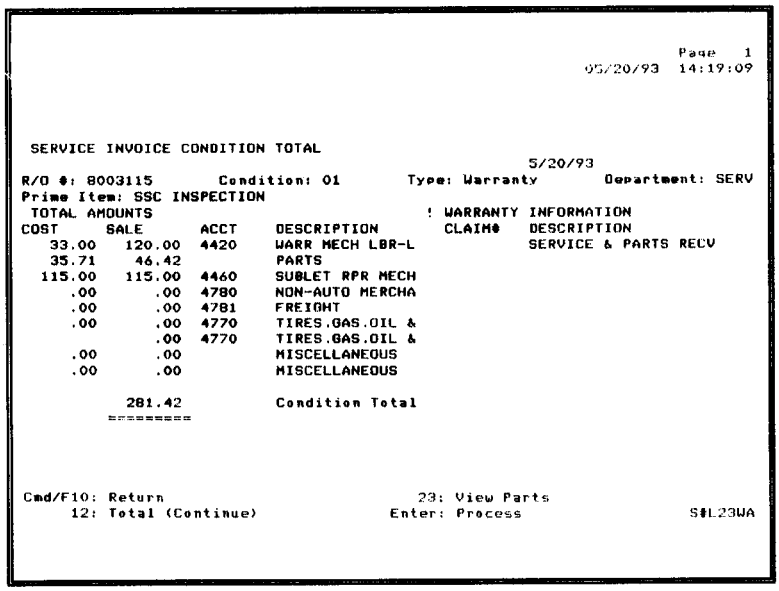
SI-3
CMD-22

SUBLET INFORMATION–Example of Transportation Costs to Make Remote Repairs



```
                                                              Page  1
                                                    05/14/93  13:01:11


 INVOICING ENTRY
 R/O .....: 0022996      S/C: 500     Hat#:        VIN: JT8VK13T1N0017312
              FLUIDS
  DESCRIPTION     UNITS COST    SALE
  OIL                    .00     .00
  GEAR OIL               .00     .00
  TRANS FLUID            .00     .00
  GAS                    .00     .00
  TIRE TAX               .00     .00
  BATTERY DISPOSL        .00     .00
          SUBLET REPAIRS FOR R/O# 0022996  -  CONDITION 02
  P.O. # INVOICE #  TYPE VENDOR/DESCRIPTION      COST      % SALE
   23454      23454  ZZ  TRANSPORTATION COST TO     125.00       125.00
                         SEND TECHNICIAN
                                                     .00          .00

                                                     .00          .00

                                                     .00          .00

                                                     .00          .00

 Cmd/F2: View Sublet Types  6: Move Fluid  8: Move Sublet  10: Return  S#0238A
```

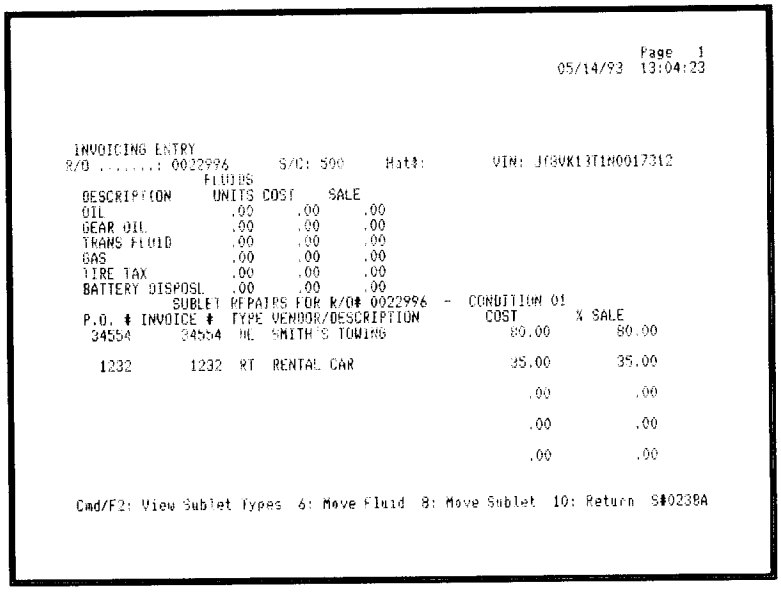
Condition Total
SI-3
CMD-12



```
                                                              Page  1
                                                    05/20/93  14:19:09


 SERVICE INVOICE CONDITION TOTAL
                                                        5/20/93
R/O #: 8003115       Condition: 01       Type: Warranty       Department: SERV
Prime Item: SSC INSPECTION
 TOTAL AMOUNTS                              ! WARRANTY INFORMATION
COST     SALE      ACCT    DESCRIPTION       CLAIM#   DESCRIPTION
   33.00   120.00  4420    WARR MECH LBR-L             SERVICE & PARTS RECV
   35.71    46.42          PARTS
  115.00   115.00  4460    SUBLET RPR MECH
     .00      .00  4780    NON-AUTO MERCHA
     .00      .00  4781    FREIGHT
     .00      .00  4770    TIRES,GAS,OIL &
              .00  4770    TIRES,GAS,OIL &
     .00      .00          MISCELLANEOUS
     .00      .00          MISCELLANEOUS

         281.42           Condition Total
        =========


Cmd/F10: Return                        23: View Parts
     12: Total (Continue)           Enter: Process                S#L23WA
```

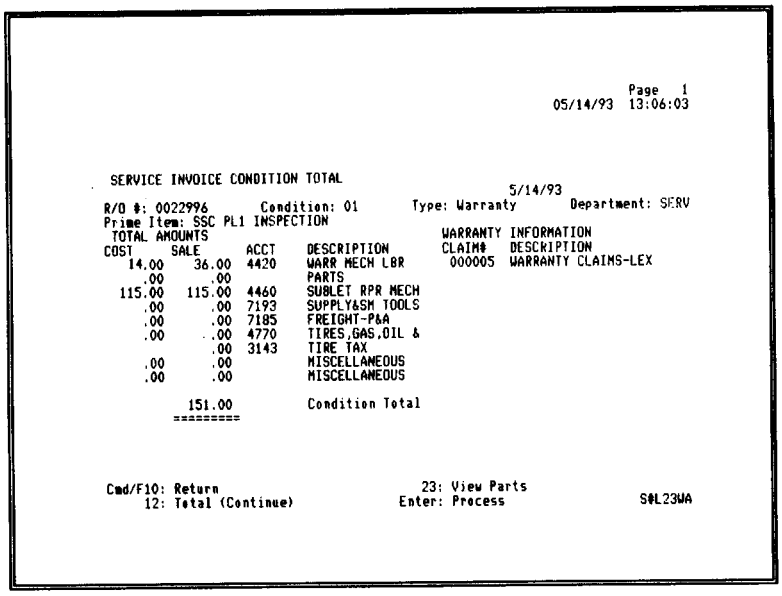
SUBLET INFORMATION–Example of Costs to Transport Vehicle to Dealership

SI-3
CMD-22



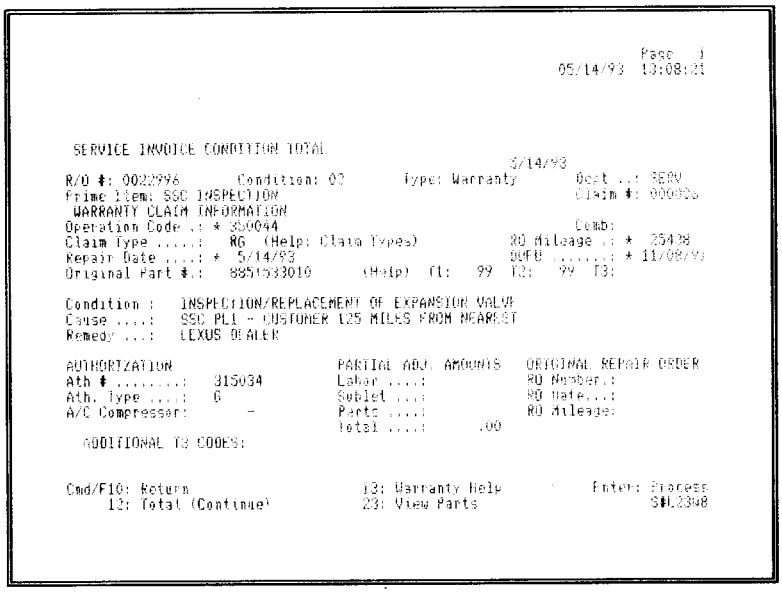
```
                                                                  Page  1
                                                        05/14/93  13:04:23


 INVOICING ENTRY
R/O .....: 0022996      S/C: 500     Hat#:        VIN: JT8VK13T1M0017312
                 FLUIDS
  DESCRIPTION     UNITS COST    SALE
  OIL               .00     .00     .00
  GEAR OIL          .00     .00     .00
  TRANS FLUID       .00     .00     .00
  GAS               .00     .00     .00
  TIRE TAX          .00     .00     .00
  BATTERY DISPOSL   .00     .00     .00
         SUBLET REPAIRS FOR R/O# 0022996  -  CONDITION 01
 P.O. # INVOICE #  TYPE VENDOR/DESCRIPTION       COST       % SALE
  34554      34554  HL  SMITH'S TOWING             80.00        80.00

   1232       1232  RT  RENTAL CAR                 35.00        35.00

                                                    .00          .00

                                                    .00          .00

                                                    .00          .00


Cmd/F2: View Sublet Types  6: Move Fluid  8: Move Sublet  10: Return  S#0238A
```

Condition Total
SI-3
CMD-12



```
                                                                  Page  1
                                                        05/14/93  13:06:03


  SERVICE INVOICE CONDITION TOTAL
                                                          5/14/93
 R/O #: 0022996      Condition: 01      Type: Warranty      Department: SERV
 Prime Item: SSC PL1 INSPECTION
  TOTAL AMOUNTS                          WARRANTY INFORMATION
 COST     SALE     ACCT   DESCRIPTION    CLAIM#  DESCRIPTION
    14.00    36.00 4420   WARR MECH LBR   000005  WARRANTY CLAIMS-LEX
     .00      .00        PARTS
   115.00   115.00 4460   SUBLET RPR MECH
     .00      .00 7193   SUPPLY&SM TOOLS
     .00      .00 7185   FREIGHT-P&A
     .00      .00 4770   TIRES,GAS,OIL &
              .00 3143   TIRE TAX
     .00      .00        MISCELLANEOUS
     .00      .00        MISCELLANEOUS

          151.00         Condition Total
         =========


 Cmd/F10: Return                    23: View Parts
     12: Total (Continue)           Enter: Process              S#L23WA
```

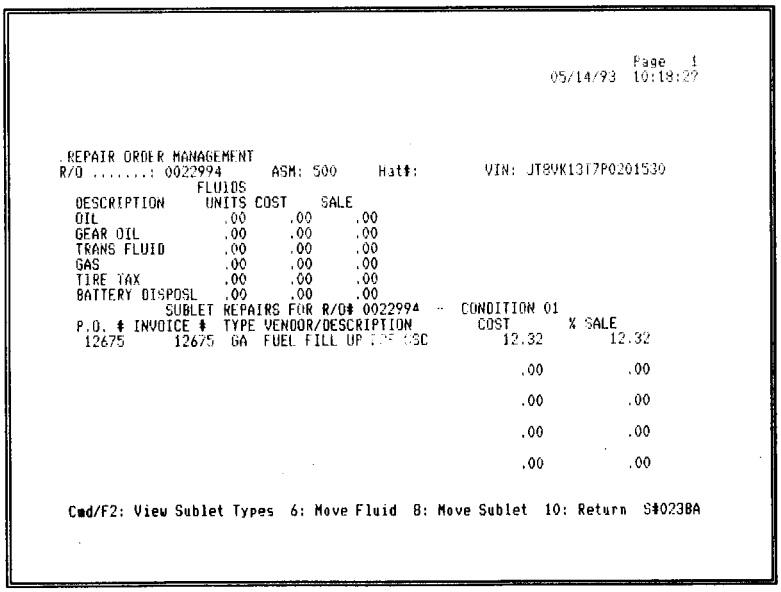
WARRANTY INFORMATION SCREEN



NOTE: Authorization required for expenses incurred for remote service or pickup and delivery in remote locations.

REPAIR ORDER MANAGEMENT–Adding Fuel Costs

CW1
CMD-22



Paper Claim Submission

Please use the following instructions in the event that a paper claim must be submitted. The following claim instructions list required information field by field corresponding to the format of the Lexus Warranty Paper Claim Form. If information is not required for SSC claim submission it will be noted.

Dealer Number: Enter the 5–digit number assigned to your dealership by Lexus.

Claim Number: Enter the 6–digit claim number that your dealership has assigned to the claim. The claim number must be unique and must begin with the letter “A” and be followed by numeric characters.

Repair Order Number: Enter the repair order number from the invoice created at the time of the repair.

In–Service Date: Enter the date the vehicle was first put into service (enter in MM–DD–YY format).

Vehicle Identification Number: Enter the complete 17–digit VIN number from the vehicle that was repaired.

Repair Date: Enter the date the vehicle was repaired (MM–DD–YY format).

Repair Miles: Enter the vehicle mileage at the time of repair (do not enter tenths of miles).

Original Part Number: Not required on an SSC claim.

Operation Code: Enter the 6–digit operation code that indicates which SSC inspection or inspection/replacement was performed.

Combination Code: Not allowed with the SSC repairs.

Total Hours: Enter the total labor hours allowed for the SSC inspection or inspection/replacement that was performed.

Sublet Invoice Number: Enter only if a special service was provided to the customer as per the guidelines on the previous pages of this manual.

Sublet Type: Enter the 2–digit sublet type–code only if a special service was provided to the customer as per the guidelines on the previous pages of this manual.

Sublet Description: Enter a brief description of the sublet only if a special service was provided to the customer as per the guidelines on the previous pages of this manual.

T–1 Code: Not required for an SSC claim.
T–2 Code: Not required for an SSC claim.
T–3 Codes: Not used for an SSC claim.

Replacement Part Number: Enter any parts replaced as per the SSC repair guidelines. Refer to the previous warranty instructions for a list of appropriate replacement parts by operation code.

Replacement Parts Quantity: Enter the number of each part replaced.

Original R.O./Installed Date/Installed Miles: Not required for an SSC claim.

Authorization Number: Enter an authorization number if authorization is required as per the guidelines on the previous pages of this manual.

Authorization Type: Enter authorization type “G” only if an authorization number has also been entered and is required as per the guidelines on the previous pages of this manual.

Labor Amount: Enter the total dollar amount to be claimed for the labor portion of the repair. This figure is calculated as the dealers authorized warranty labor rate multiplied by the allowable labor hours for the repair performed.

Sublet Amount: Enter the total dollar amount to be claimed for sublet.

Parts Amount: Enter the total dollar amount to be claimed for any replacement part. This figure is calculated as the total dealer cost of all parts replaced.

Parts Mark–up: Enter the total dollar amount to be claimed for parts mark–up. This figure is calculated as the total parts amount claimed multiplied by 30% if 1992 vehicle and 45% if 1993 vehicle.

Claim Total: Enter the total amount to be claimed for the repair. This figure is calculated as the total of labor, sublet, parts and parts mark–up.

Battery Ship Code/Cell Readings: Not used at this time.
Partial Adj. Labor/Sublet/Parts: Not used for SSC claims.

Condition/Cause/Remedy: Enter a description of the repair and the conditions requiring use of the “Pick–up and Delivery” or “Remote Repair” special services. If a C/C/R is entered, something must be written in all three lines of the field.

Add "Toyota ND6 AC refrigerant oil charge" with protector only.

LEXUS

WARRANTY CLAIM

DEALER NO	CLAIM NO
61234	A12345

R.O. NUMBER	IN-SERVICE DATE	VEHICLE IDENTIFICATION NUMBER	REPAIR DATE	REPAIR MILEAGE	ORIGINAL PART NUMBER
093725	11-06-91	JT8VK13T0N0018046	05-27-93	24,537	

OPERATION NO.	COMBINATION CODES	TOTAL HOURS	INVOICE NUMBER	TYPE	DESCRIPTION	T1	T2	T3
350041		0.6	093725	GA	Fuel Fill-Up			

REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.
00263091106	1				

FOR SERVICE PARTS ONLY			AUTHORIZATION		CLAIM SUMMARY	
ORIG. R.O. NO.	INST. DATE	INST. MILES	AUTHORIZATION NO.	AUTH. TYPE		DEALER AMOUNTS
					LABOR	31 20
					SUBLET	14 31
					PARTS	2 27
					PARTS MARK-UP	68
					CLAIM TOTAL	48 46

FOR BATTERIES ONLY	PARTIAL ADJUSTMENT AMOUNT	
BATTERY SHIP CODE ____ ____	LABOR	
CELL READINGS	SUBLETS	
— — — — — —	PARTS	

CONDITION:

CAUSE:

REMEDY:

DEALER SIGNATURE K. E. Trawy DATE 5-29-93

89-LEX-250

5M 00240-30007 9/89

Add "Toyota ND6 AC refrigerant oil charge" after recovery and recharge or refrigerant.

LEXUS

WARRANTY CLAIM

DEALER NO.	CLAIM NO.
61234	A12346

R.O. NUMBER	IN-SERVICE DATE	VEHICLE IDENTIFICATION NUMBER	REPAIR DATE	REPAIR MILEAGE	ORIGINAL PART NUMBER
094012	11-06-91	JT8VK13TON0018046	05-28-93	24,537	

LABOR			SUBLET			TROUBLE CODES		
OPERATION NO.	COMBINATION CODES	TOTAL HOURS	INVOICE NUMBER	TYPE	DESCRIPTION	T1	T2	T3
350042		1.0	094012	GA	Fuel Fill-Up			

PARTS

REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.
00263091106	1				

FOR SERVICE PARTS ONLY			AUTHORIZATION		CLAIM SUMMARY	
ORIG. R.O. NO.	INST. DATE	INST. MILES	AUTHORIZATION NO.	AUTH. TYPE		DEALER AMOUNTS
					LABOR	52 00
					SUBLET	13 23
					PARTS	2 27
					PARTS MARK-UP	68
					CLAIM TOTAL ➡	68 18

FOR BATTERIES ONLY	PARTIAL ADJUSTMENT AMOUNT	
BATTERY SHIP CODE ____ ____	LABOR	
CELL READINGS	SUBLETS	
____ ____ ____ ____ ____ ____	PARTS	

CONDITION:

CAUSE:

REMEDY:

DEALER SIGNATURE K.E. Trawty DATE 05-28-93

89-LEX-250

5M 00240-30007 9/89

Add "Toyota ND6 AC refrigerant oil charge" after confirming no leaks of gas at the drain hose.

LEXUS

WARRANTY CLAIM

DEALER NO	CLAIM NO
61234	A12347

R.O. NUMBER	IN-SERVICE DATE	VEHICLE IDENTIFICATION NUMBER	REPAIR DATE	REPAIR MILEAGE	ORIGINAL PART NUMBER
094001	11-06-91	JT8VK13TON0018046	05-23-93	24,537	

LABOR			SUBLET			TRUCK		
OPERATION NO.	COMBINATION CODES	TOTAL HOURS	INVOICE NUMBER	TYPE	DESCRIPTION	T1	T2	T3
350043		0.9	094001	GA	Fuel Fill-Up			

PARTS

REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.
00263091O6	1				

FOR SERVICE PARTS ONLY			AUTHORIZATION		CLAIM SUMMARY	
ORIG. R.O. NO.	INST. DATE	INST. MILES	AUTHORIZATION NO.	AUTH. TYPE		DEALER AMOUNTS
					LABOR	46 80
					SUBLET	10 00
					PARTS	2 27
					PARTS MARK-UP	68
					CLAIM TOTAL	59 75

FOR BATTERIES ONLY	PARTIAL ADJUSTMENT AMOUNT	
BATTERY SHIP CODE ____ ____	LABOR	
CELL READINGS	SUBLETS	
— — — — — —	PARTS	

CONDITION:

CAUSE:

REMEDY:

DEALER SIGNATURE K. E. Trawy DATE 05-26-93

89-LEX-250

5M 00240-30007 9/89

Replacement of expansion valve including liquid tube (if required).

LEXUS

WARRANTY CLAIM

DEALER NO	CLAIM NO
61234	A12348

R.O. NUMBER	IN-SERVICE DATE	VEHICLE IDENTIFICATION NUMBER	REPAIR DATE	REPAIR MILEAGE	ORIGINAL PART NUMBER
095321	11-06-91	JT8VK13TON0018046	06-03-93	24,537	

LABOR			SUBLET			TROUBLE CODE		
OPERATION NO.	COMBINATION CODES	TOTAL HOURS	INVOICE NUMBER	TYPE	DESCRIPTION	T1	T2	T3
350044		2.2	095321	GA	Fuel Fill-Up			

PARTS

REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.
00263091060	1				
8851533010	1				
8870633020	1				
9009914045	2				

FOR SERVICE PARTS ONLY			AUTHORIZATION	
ORIG. R.O. NO.	INST. DATE	INST. MILES	AUTHORIZATION NO.	AUTH. TYPE

FOR BATTERIES ONLY	PARTIAL ADJUSTMENT AMOUNT	
BATTERY SHIP CODE ____ ____	LABOR	
CELL READINGS	SUBLETS	
— — — — — —	PARTS	

CLAIM SUMMARY	DEALER AMOUNTS
LABOR	114 40
SUBLET	12 34
PARTS	73 49
PARTS MARK-UP	22 05
CLAIM TOTAL	222 28

CONDITION:

CAUSE:

REMEDY:

DEALER SIGNATURE K.E. Gravely DATE 06-04-93

89-LEX-250

5M 00240-30007 9/89

Customer reimbursement for previous repairs.

LEXUS

WARRANTY CLAIM

DEALER NO.	CLAIM NO.
61234	A12349

R.O. NUMBER	IN-SERVICE DATE	VEHICLE IDENTIFICATION NUMBER	REPAIR DATE	REPAIR MILEAGE	ORIGINAL PART NUMBER
073452	11-06-91	JT8VK13TON0018046	06-04-93	25,321	

LABOR			SUBLET			TROUBLE CODES		
OPERATION NO.	COMBINATION CODES	TOTAL HOURS	INVOICE NUMBER	TYPE	DESCRIPTION	T1	T2	T3
350046		0.0	A35432	CR	Customer Reimburse			

PARTS

REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.

FOR SERVICE PARTS ONLY			AUTHORIZATION	
ORIG. R.O. NO.	INST. DATE	INST. MILES	AUTHORIZATION NO.	AUTH. TYPE

FOR BATTERIES ONLY

BATTERY SHIP CODE ____ ____

CELL READINGS

— — — — — —

PARTIAL ADJUSTMENT AMOUNT	
LABOR	
SUBLETS	
PARTS	

CLAIM SUMMARY	DEALER AMOUNTS
LABOR	0.00
SUBLET	212.37
PARTS	0.00
PARTS MARK-UP	0.00
CLAIM TOTAL	212.37

CONDITION:

CAUSE:

REMEDY:

DEALER SIGNATURE K.E. Trawy DATE 06-04-93

89-LEX-250

5M 00240-30007 9/89

SPECIAL SERVICE CAMPAIGN – SSC PL1

Dear Lexus Owner:

Lexus would like to announce a special service program for the air conditioning system of certain ES300 model Lexus vehicles.

What is the condition?

- Under certain high temperature and high humidity conditions, the air conditioning expansion valve may malfunction. This malfunction will be evidenced by a gradual reduction of air conditioning efficiency and eventually a loss of cooling capability.

What will Lexus do?

- Lexus will inspect and, if necessary, repair your vehicle's air conditioning system as follows:
  - If the system is functioning correctly, a special anti-corrosion lubricant will be injected into the system to protect the components at **NO COST** to you.
  - If the expansion valve is not performing correctly, it will be replaced and the system recharged at **NO COST** to you.
  - If your basic new vehicle warranty is still in effect, **any** necessary recharging or other A/C system repairs will be performed at **NO COST** to you within the guidelines of Lexus' new vehicle warranty policy.
  - If recharging or other repairs are necessary, and your new vehicle warranty has expired, there may be some items for which you will be charged. Your Lexus dealer will provide you with an estimate before repairs are performed.

What should you do?

- Make an appointment with your Lexus dealer at your earliest convenience to have this inspection performed. Please do not delay as this inspection should be performed as soon as possible. Present this notice to your Lexus dealer when you bring your vehicle in for the inspection.
- The work will take approximately 60 minutes. However, it may be necessary to make your vehicle available for a longer period of time, depending upon the dealer's work schedule or if your vehicle required repairs beyond the injection of the anti-corrosive lubricant.
- If you have previously paid for the replacement of your expansion valve, please present the invoice to your dealer for reimbursement.

What if you have other questions?

- Please contact your local Lexus dealer or:

Lexus Customer Assistance Center
1-800-255-3987
Monday-Friday, 6 AM to 6 PM PDT

We would like to thank you for your cooperation and wish to apologize for any inconvenience this may cause you.

Thank you for driving a Lexus.

Sincerely,

LEXUS, A DIVISION OF TOYOTA MOTOR SALES U.S.A., INC.

Technical Instructions
Table of Contents

VIN LOCATION 37

SIGHT GLASS INSPECTION OF REFRIGERANT VOLUME 39

PROCEDURE FOR CASE A 41

Performance Testing the A/C System 47

SSC Completion Label Installation 48

DRAIN HOSE LEAK INSPECTION 49

PROCEDURE FOR CASE B 50

Performance Testing the A/C System 52

SSC Completion Label Installation 53

PROCEDURE FOR CASE C 54

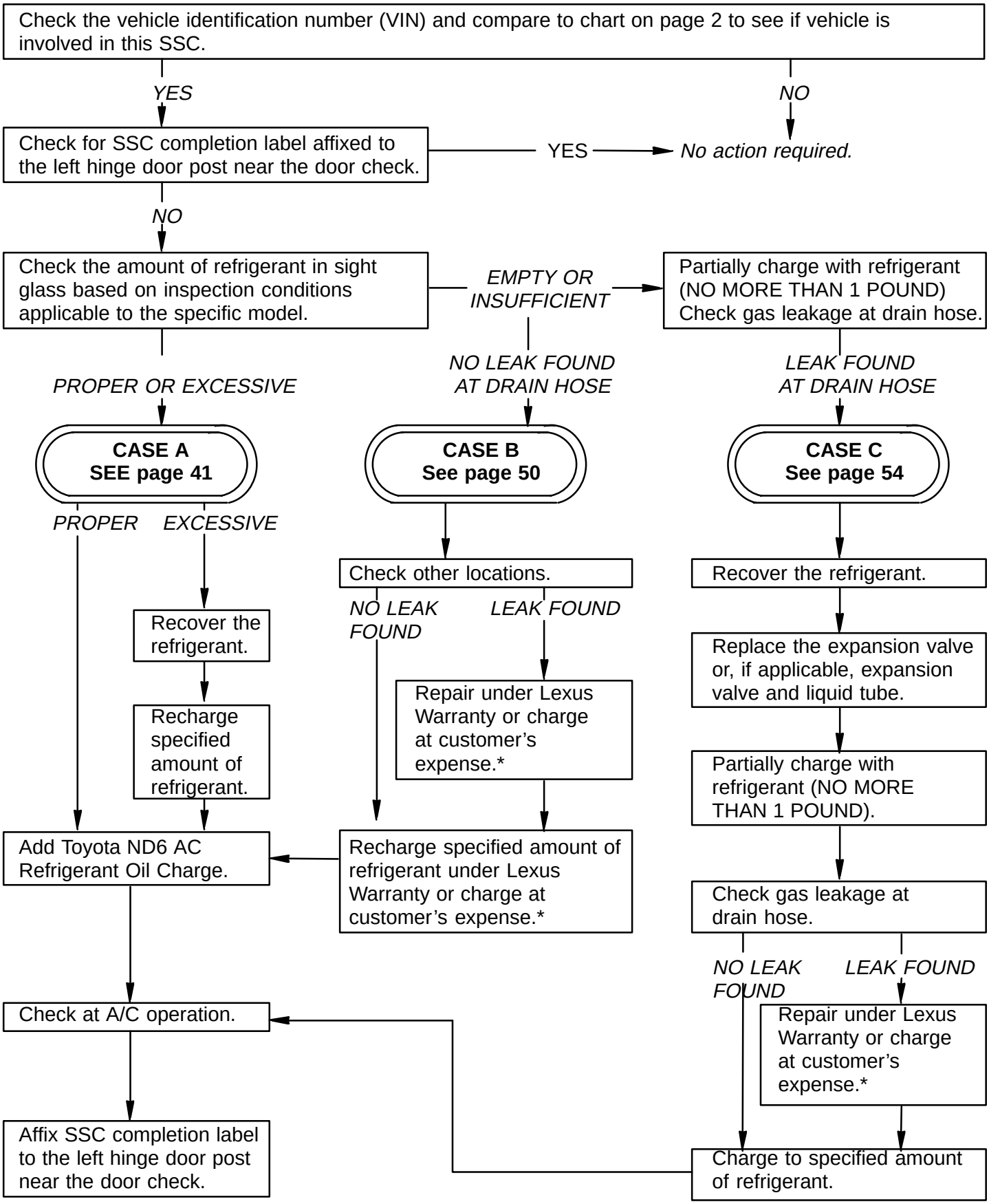
Evacuation, Recharge, and Re–inspection 60

Performance Testing the A/C System 61

SSC Completion Label Installation 62

ES 300 A/C SYSTEM SPECIFICATIONS 63

Inspection and Repair Procedures Flow Chart

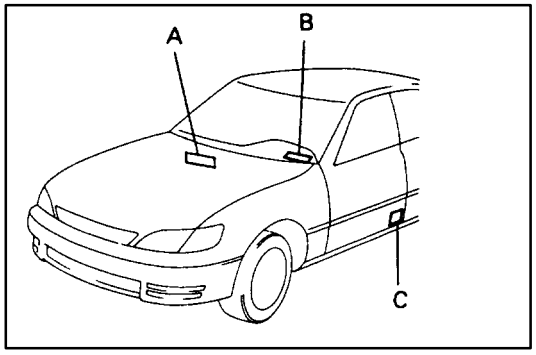


* See original for footnote text.

VIN Location

NOTE: The technician must be MACS or ASE refrigerant recovery certified to perform the procedures in this booklet.

Determine if special service applies to vehicle as follows:



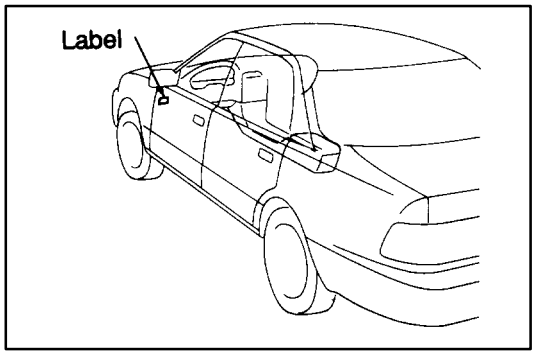
1. Check the Vehicle Identification Number (VIN).

(a) Locate one of the Vehicle Identification Number (VIN) plates.

(b) Are the last seven digits within the following range: 0001001 – 0129016?

NO: Assure customer that the A/C on their ES 300 is okay. No further action is necessary.

YES: Check for a SSC–PL1 Completion Label affixed to the left door hinge post near the door check.



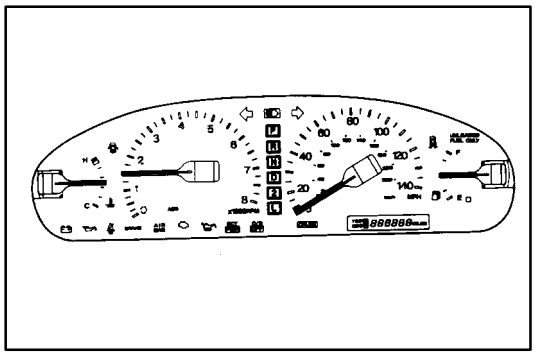
2. Is an SSC PL1 Completion Label present?

YES: Special Service has already been performed. No further action is necessary.

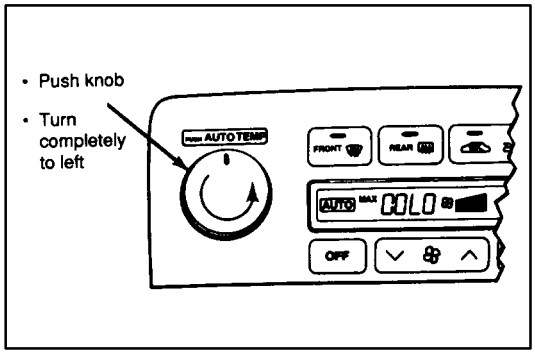
NO: Continue with the special service procedure by inspecting the A/C Sight Glass (below).

Sight Glass Inspection of Refrigerant Volume

Inspect A/C Sight Glass as follows:

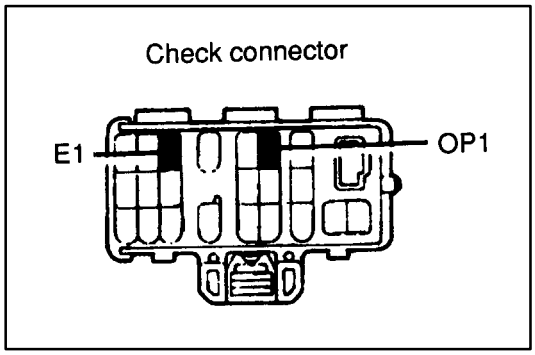


1. Start the engine and maintain 1500 RPM.

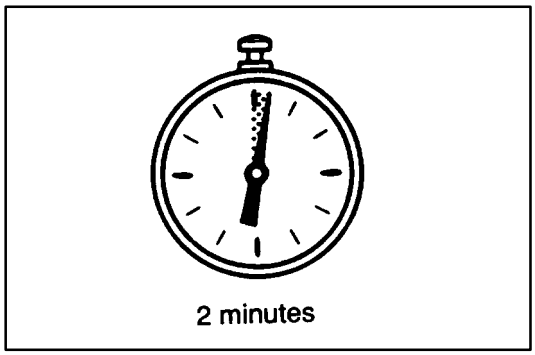


2. Set the A/C controls to AUTO – MAX COOL.

3. Open all vehicle doors.



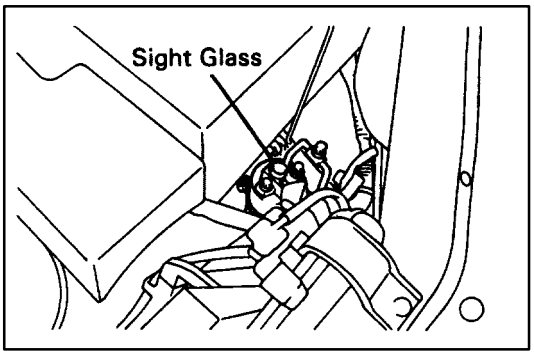
4. At the Under Hood Diagnostic Connector jump OP1 to E1 to maintain a stable fan speed.



5. Run the engine at 1500 RPM with the doors open for at least 2 minutes to stabilize the A/C system.

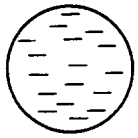
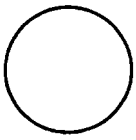
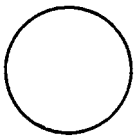
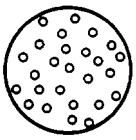
NOTE: Every A/C sight glass shows air bubbles both immediately after starting and after switching from one condition to another. So, it is necessary to wait 2 minutes after any A/C operating condition has changed.

Sight Glass Inspection of Refrigerant Volume



6. While continuing to run the engine at 1500 RPM, check the sight glass. Compare the sight glass on the vehicle to the ones shown in the Refrigerant Volume Inspection Table (below).

REFRIGERANT VOLUME INSPECTION TABLE

Conditions in sight glass	Refrigerant Volume	Symptom	Service Procedure
	Correct	With the compressor operating, the refri–gerant flow in the sight glass will be trans–parent with no air bubbles and a clear indication of fluid moving through the system.	Proceed to Case A (See Page 41)
 Clear	Too High	With the compressor operating, the sight glass will be clear with no indication of refrigerant flow because it is so full that fluid flow cannot be detected.	
 Clear	Empty	With the compressor **not** operating, the sight glass is again clear with no fluid flow.	Proceed with A/C Drain Hose Leak Check (See Page 49)
	Too Low	With the compressor operating, bubbles will be seen continuously in the sight glass.	

Drain Hose Leak Inspection

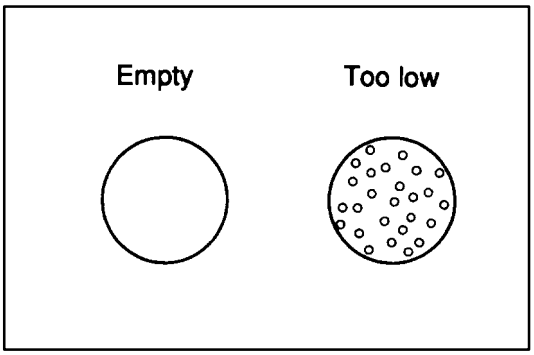
Proceed with the drain hose leak inspection if the sight glass inspection (see page 39) indicated that the refrigerant volume is low or empty.

Equipment needed for this procedure:

(a) A/C gas leak detector

(b) Refrigerant

(c) Charging tools and equipment

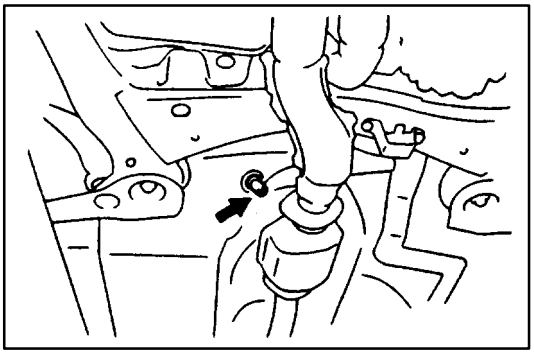


1. Ensure the A/C system is at least partially charged:

(a) Is the A/C system partially charged or empty?

Yes: Partially charged–Perform the Drain Hose Leak Inspection Procedure (below).

No: Empty–Add no more than 450 g (1 lb.) refrigerant and perform the Drain Hose Leak Inspection Procedure (below).



2. Perform Drain Hose Leak Inspection:

(a) Use an A/C gas leak detector to determine if refrigerant gas is leaking from the A/C drain hose.

Gas NOT present at the drain hose: Follow Procedure for Case B, page 50.

Gas IS present at the drain hose: Follow Procedure for Case C, page 54.

SPECIAL SERVICE IF REFRIGERANT VOLUME IS PROPER OR EXCESSIVE

Depending on the refrigerant volume indicated by inspecting the sight glass, proceed as follows:

Refrigerant Volume Correct: Proceed to “Addition of Toyota ND6AC Refrigerant Oil Charge” (below).

Refrigerant Volume Too High: Take the following actions:

1. Recover refrigerant (following procedures in the equipment and service manuals).

2. Recharge with correct amount of refrigerant: 950 g + 50 g (33.51 oz + 1.8 oz, 2.1 lb + 0.1 lb)

3. Proceed to “Addition of Toyota ND6AC Refrigerant Oil Charge” (below).

ADDITION OF TOYOTA ND6AC REFRIGERANT OIL CHARGE

NOTE: Before starting this operation, please read and observe all cautions and warnings on the refrigerant oil charge can.

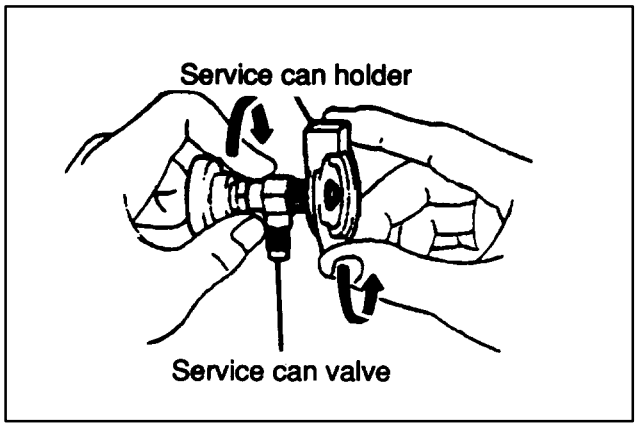
Equipment needed for this operation:

(a) One can of Toyota ND6AC Refrigerant Oil Charge (Part No. 00263–09106)

(b) AC R–12 vacuum pump

(c) AC Oil Injection Kit (Supplied to dealer). Special Service Tool Part No. TOY219721.

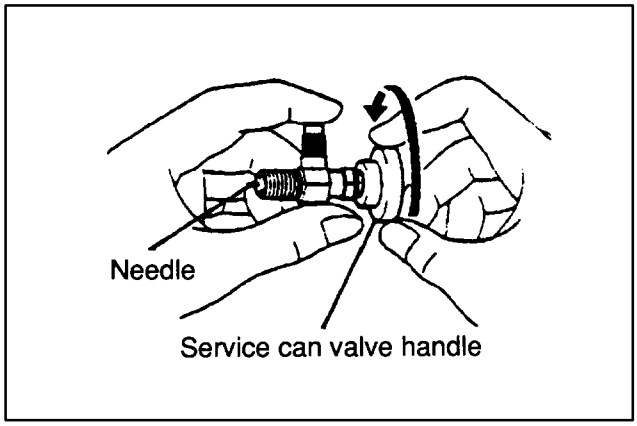
(d) Shop towel



SERVICE TOOL CHECK

Perform the service tool check as follows:

1. **Verify the operation of the Special Service Tool.**
   (a) Turn the service can valve counterclockwise.
   (b) Remove the service can valve from the service can holder.



2. **Turn the service can valve handle clockwise until it is fully seated. Make sure that the valve puncture needle protrudes fully.**

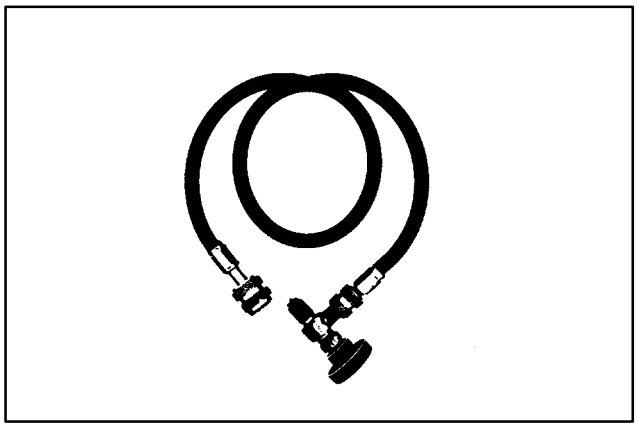
   NOTE: When you perform the AC refrigerant oil injection for the first time, or if the oil injection service can valve and holder assembly from the Special Service Tool has been accidentally opened to the atmosphere, it must be evacuated first.

SERVICE TOOL EVACUATION PROCEDURE

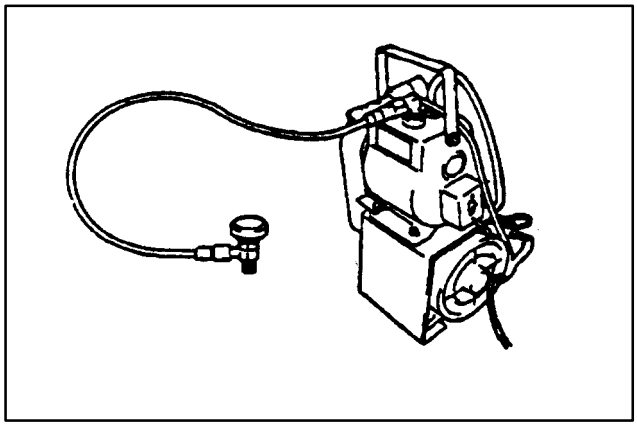
Evacuate the service tool as follows:

1. **Check that the vacuum pump fitting has a Shrader valve. If the vacuum pump does not have a Shrader valve, use an adapter hose that does.**

   NOTE: In this procedure, you are to install the hose with the small end attached to the valve (this is opposite of the normal setup).



2. **To evacuate the service can valve and hose assembly, first attach smaller end of hose (without check valve) onto the service can valve.**



3. **Next, attach the larger hose end with check valve to the Shrader valve on the vacuum pump.**

   NOTE: Make sure all hose connections are tight.

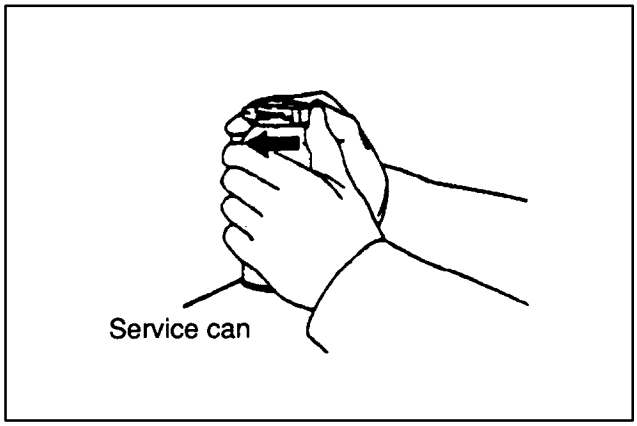
4. **Start the vacuum pump and allow it to run for approximately 2 minutes or until the vacuum gauge on the vacuum pump shows no more movement.**

5. **Quickly remove the hose connection from the vacuum pump BEFORE switching off the pump to keep air from entering the hose.**

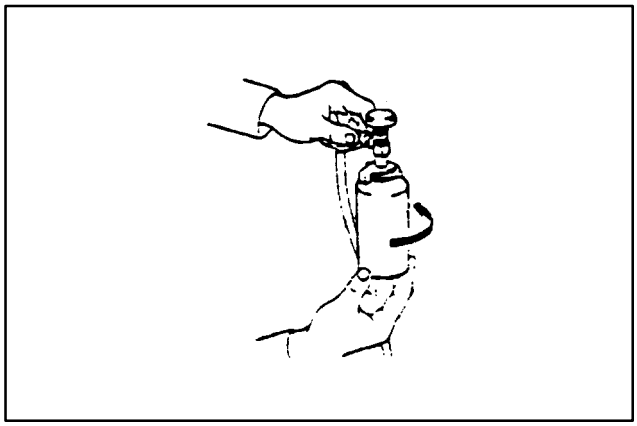
   NOTE: If you turn off the vacuum pump before disconnecting the hose, the hose will be contaminated with air and you will have to repeat the evacuation procedure.

SPECIAL OIL INJECTION SERVICE:

Proceed with the following Special Oil Injector Service only after you have checked the operation of the Special Service Tool and evacuated the service valve and hose assembly (if required).

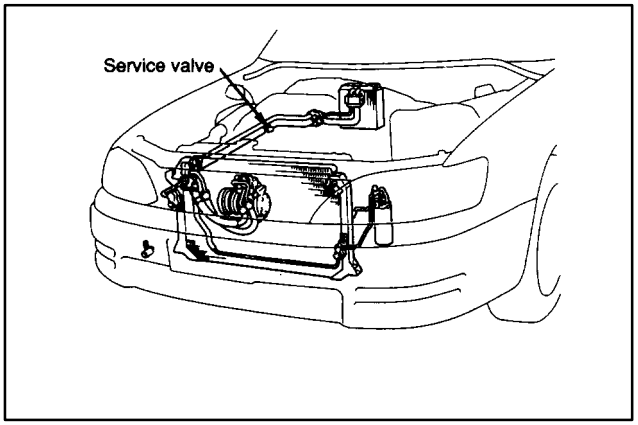


1. **Install the service can holder on the ND6AC refrigerant oil charge can.**



2. **With the service can valve still closed, quickly spin the oil charge can (and holder) clockwise to the service can valve as far as it will go.**

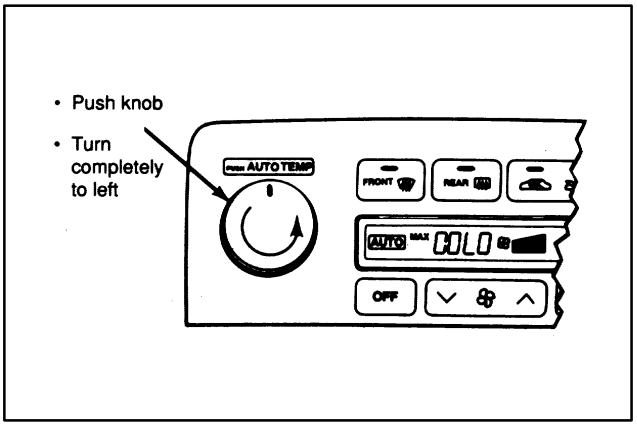
   NOTE: Be sure to turn the service can valve quickly onto the service can holder until it seats snugly against the refrigerant oil can. This will prevent refrigerant from escaping to the atmosphere when the valve needle punctures the top of the can.



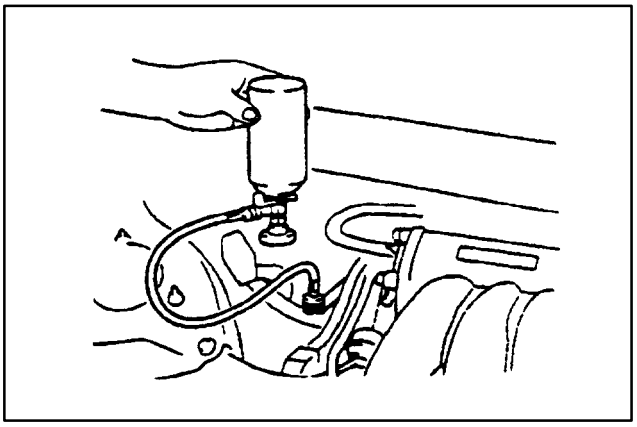
3. **Remove the cap from the low pressure charge valve on the vehicle. Attach the larger end of the hose to the low pressure charging valve (service valve).**

   NOTE: Use a shop towel when doing this to shield your hands from any refrigerant that may escape from the A/C system.

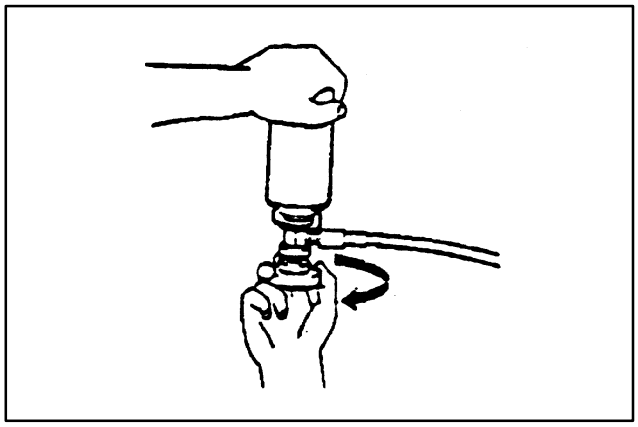
Procedure for Case A



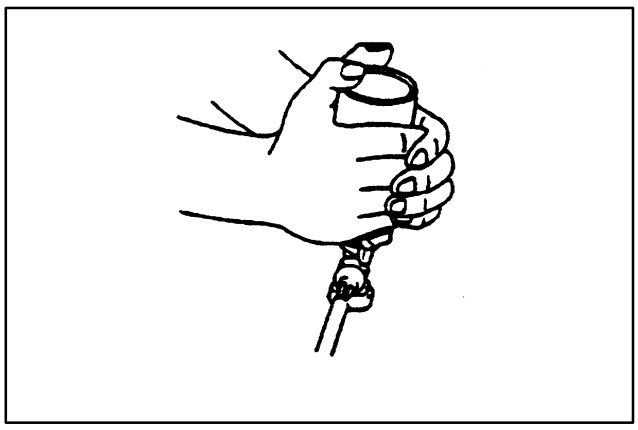
4. **Run the engine at approximately 1,500 RPM and set the A/C control to AUTO––MAX COOL.**



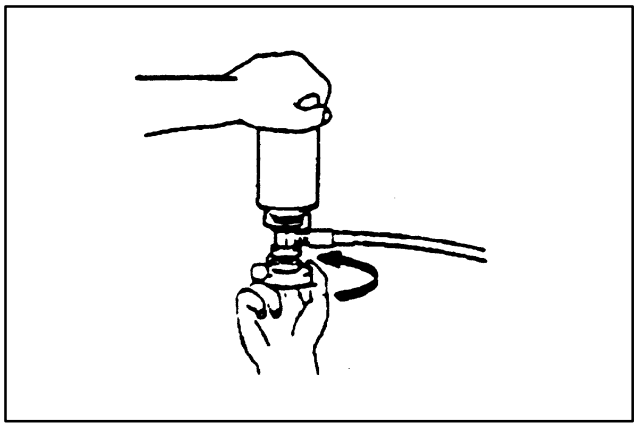
5. **Turn the refrigerant oil charge can upside down to make sure all of the oil is forced into the system by gas pressure.**



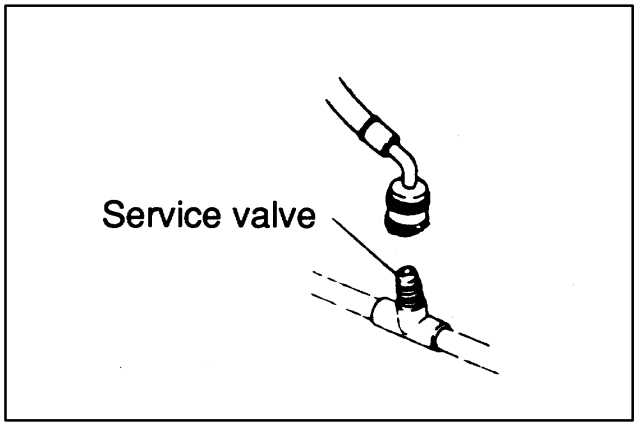
6. **Open the service can valve.**



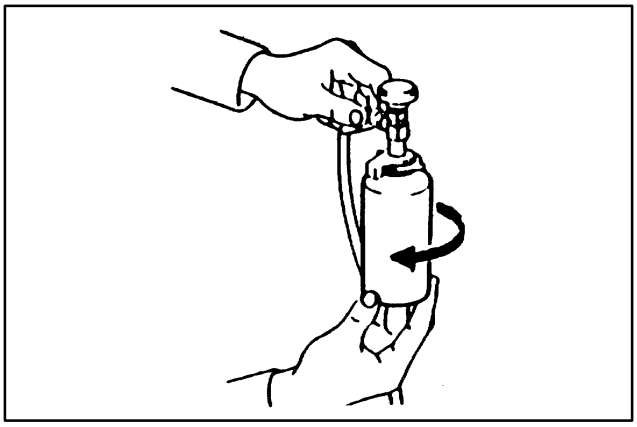
7. **Warm the refrigerant oil charge can with your hands or a warm towel. (This will allow the refrigerant oil charge to empty more easily.)**



8. **When charging is complete, close the service can valve fully.**



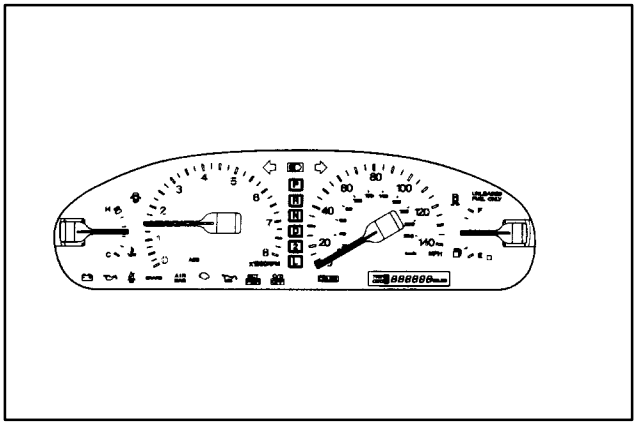
9. **Stop the engine and disconnect the charging hose from the vehicle's low pressure charging valve (service valve).**



10. **Remove the service can valve from the service can holder and the refrigerant oil charge can.**
11. **Remove the service can holder from the refrigerant oil charge can by moving the lever counterclockwise.**

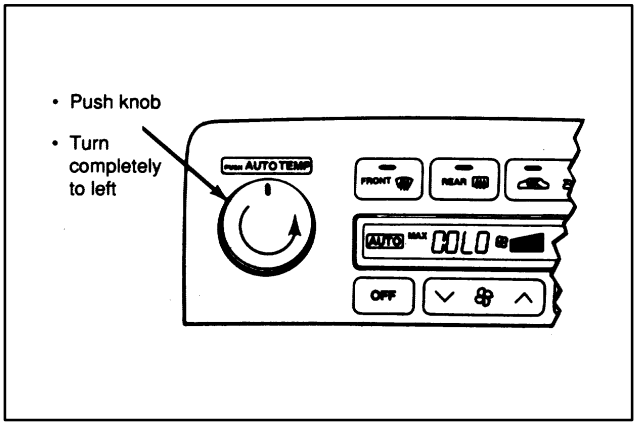
    CAUTION: Do not open the service can valve between services. If the valve is opened, you will have to evacuate the service can valve and hose again.

Performance Testing the A/C System

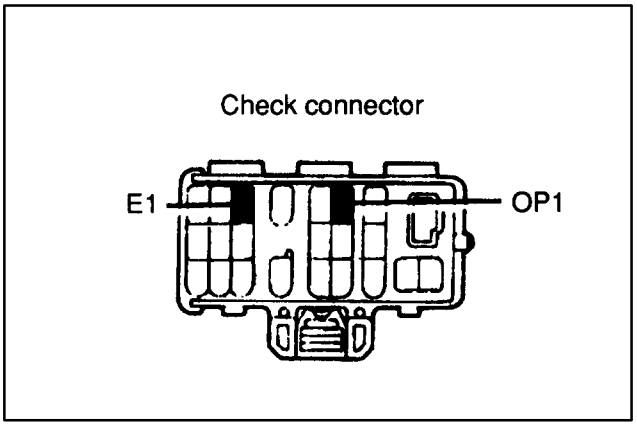


Proceed with Performance Testing the A/C System after completing the Special Oil Injection Service.

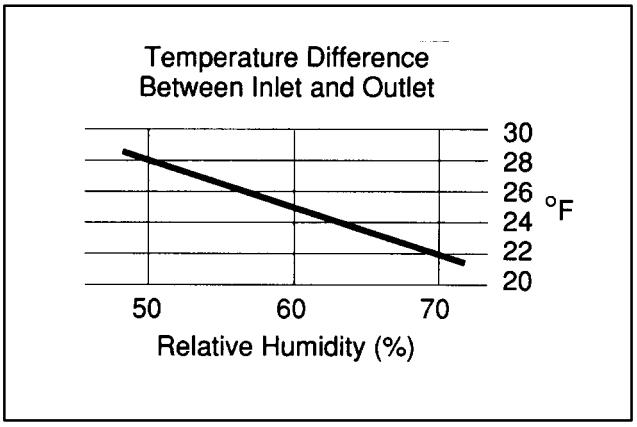
1. **Start the engine and maintain 1,500 RPM.**



2. **Set the A/C to AUTO –– MAX COOL.**
3. **Fully open all doors.**

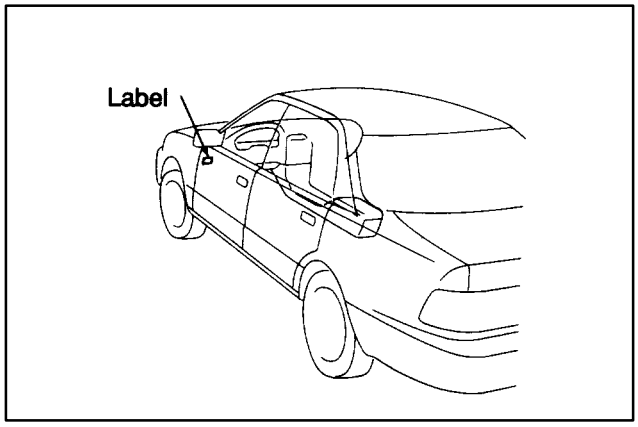


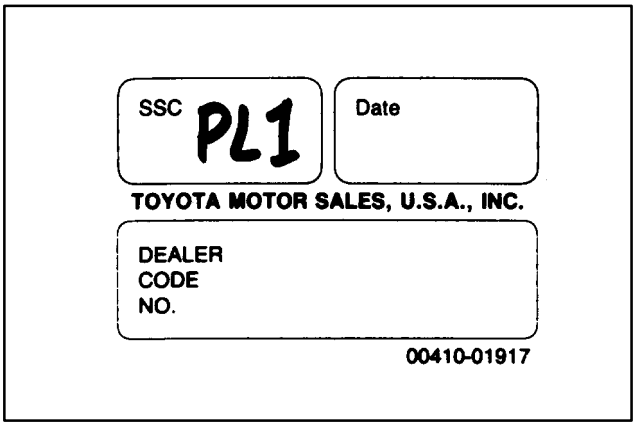
4. **At the Under Hood Diagnostic Connector jump OP1 to E1 to maintain a stable fan speed.**
5. **Position one thermometer in the center duct and one thermometer near the A/C inlet. (NOT laying on the carpet.)**



6. **After 5 minutes of operation compare the difference between the inlet temperature and the center duct temperature to the Performance Test Chart. System performance is acceptable if temperature difference is greater than the specified minimum (as shown).**

SSC Completion Label Installation



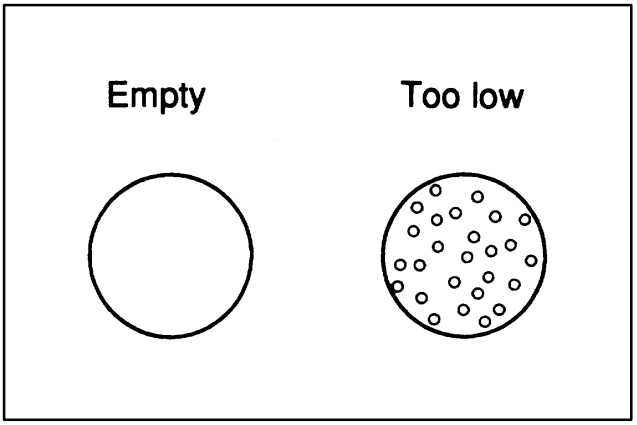


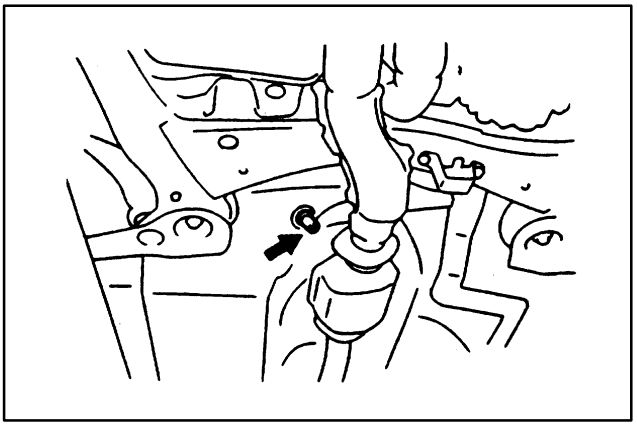
1. **After completing the special service and successfully performance testing the A/C system, affix an SSC completion label to the left front door hinge post near the door check.**

   NOTE: An SSC completion label is enclosed in the owner's letter. Additional labels, in sheets of 50 (P/N 00410–01917) can be ordered through the non–parts system on a 1459 order form or through the TDN system.

2. **Fill out the label.**

Drain Hose Leak Inspection





Proceed with the drain hose leak inspection if the sight glass inspection (see page 39) indicated that the refrigerant volume is low or empty.

Equipment needed for this procedure:

(a) A/C gas leak detector

(b) Refrigerant

(c) Charging tools and equipment

1. Ensure the A/C system is at least partially charged:

(a) Is the A/C system partially charged or empty?

YES: Partially charged – Perform the Drain Hose Leak Inspection Procedure (below).

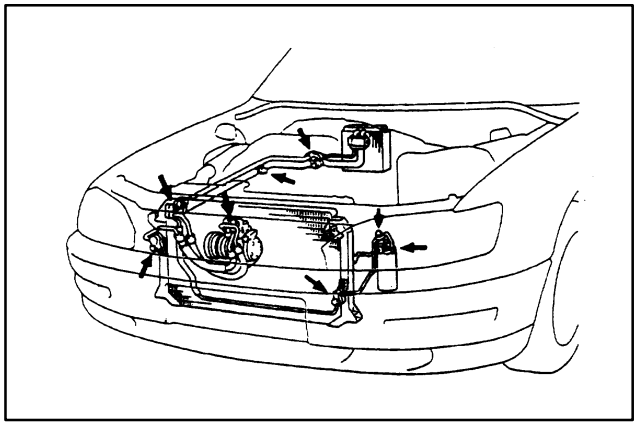
NO: Empty – Add no more than 450 g (1 lb) of refrigerant and perform the Drain Hose Leak Inspection Procedure (below).

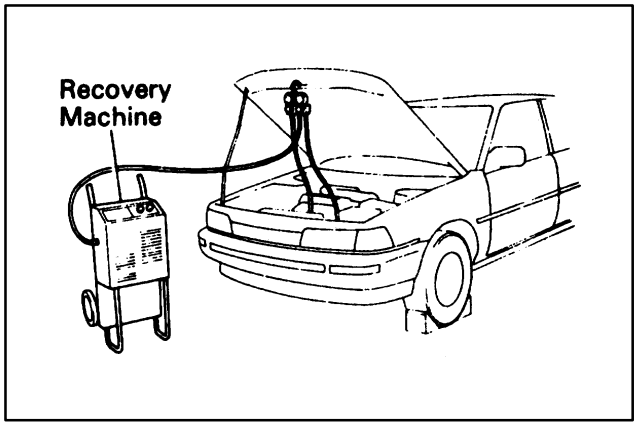
2. Perform Drain Hose Leak Inspection:

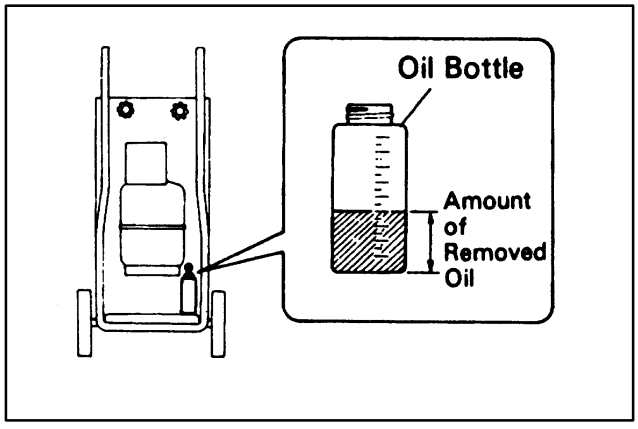
(a) Use an A/C gas leak detector to determine if refrigerant gas is leaking from the A/C drain hose.

Gas NOT present at the drain hose – Follow Procedure for Case B, page 50.

Gas IS present at the drain hose – Follow Procedure for Case C, page 54.







GAS LEAK INSPECTION FOR LOCATIONS OTHER THAN DRAIN HOSE

Equipment needed for this procedure:

(a) A/C gas leak detector

NOTE: Before proceeding verify that the customer has given prior consent and understands that the A/C fault is not part of the special service. Repairs are either:

(a) Covered by Lexus Basic Warranty Policy

(b) Charged to customer

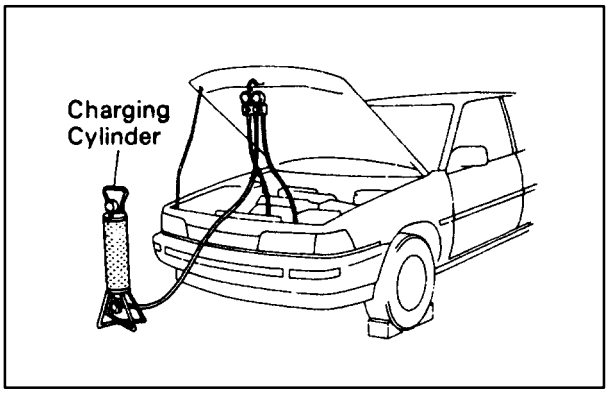
1. Use a leak detector to determine whether the gas is leaking from the locations shown by the arrows.

Leak Found:

(a) Recover the refrigerant following cautions and procedures in the appropriate service equipment and manuals.

NOTE: When refrigerant is recovered, compressor oil is recovered with the refrigerant. When recharging a system that has been evacuated, DO NOT reuse the old compressor oil. Measure the amount of compressor oil removed and add the same amount of NEW Toyota ND Oil 6 Compressor Oil (Part No. 88899–28040) into the system.

Procedure for Case B



(b) Complete the repair following procedures in the appropriate service manual.

(c) Evacuate for 10 minutes.

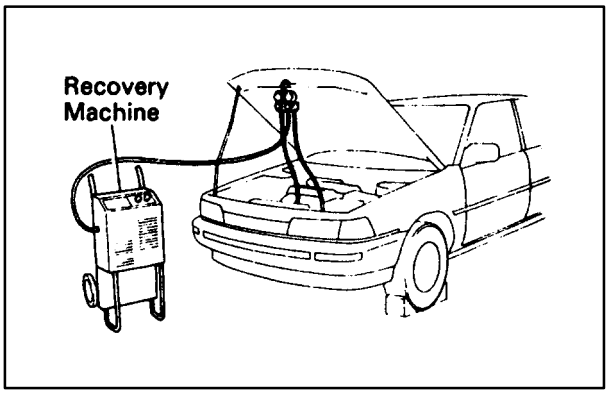
(d) Check for air tightness for 5 minutes.

(e) Partially recharge system.

(f) Re–check for leaks using a gas leak detector.

(g) Fully re–charge system.

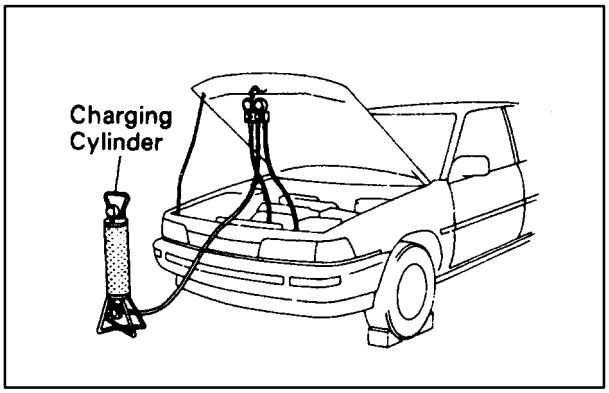
(h) Follow “Addition of Toyota ND6AC Refrigerant Oil Charge Procedure” as shown on page 41 of this booklet.



No Leak Found:

(a) Recover the refrigerant following cautions and procedures in the appropriate service equipment and manuals.

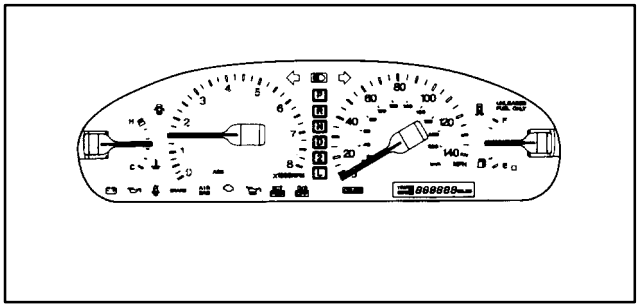
NOTE: When refrigerant is recovered, compressor oil is recovered with the refrigerant. When recharging a system that has been evacuated, DO NOT reuse the old compressor oil. Measure the amount of compressor oil removed and add the same amount of NEW Toyota ND Oil 6 Compressor Oil (Part No. 88899–28040) into the system.



(b) Fully recharge the system.

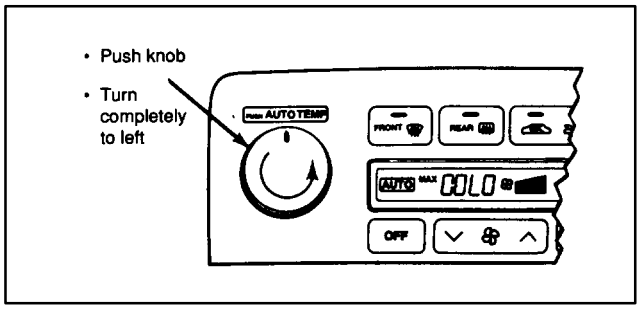
(c) Follow “Addition of Toyota ND6AC Refrigerant Oil Charge Procedure” as shown on page 41 of this booklet.

After the system has been fully recharged and no leaks are detected, conduct a Performance Test of the A/C System (page 52).

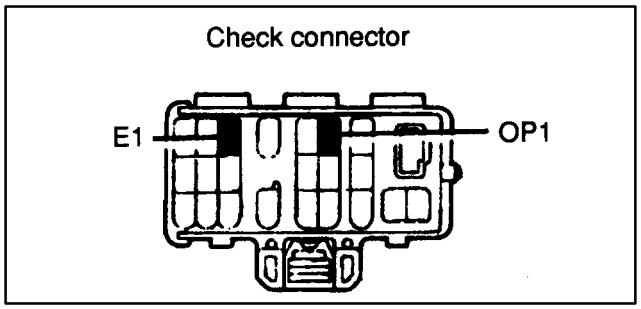


Proceed with Performance Testing the A/C System after completing the Special Oil Injection Service.

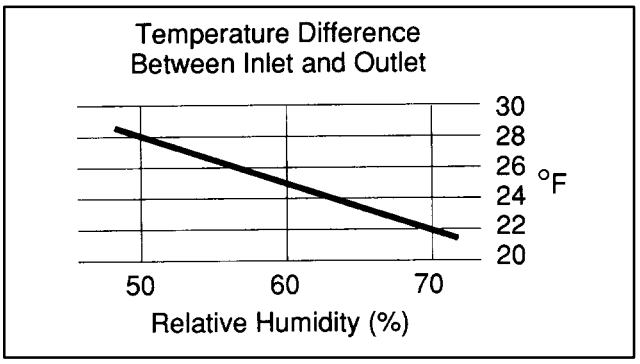
1. **Start the engine and maintain 1,500 RPM.**



2. **Set the A/C to AUTO –– MAX COOL.**
3. **Fully open all doors.**

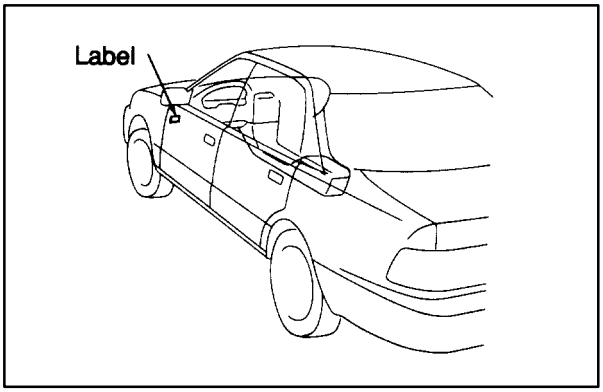


4. **At the Under Hood Diagnostic Connector jump OP1 to E1 to maintain a stable fan speed.**
5. **Position one thermometer in the center duct and one thermometer near the A/C inlet. (NOT laying on the carpet.)**



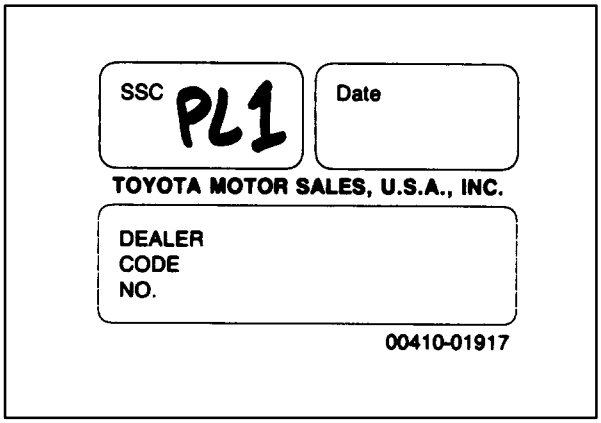
6. **After 5 minutes of operation compare the difference between the inlet temperature and the center duct temperature to the Performance Test Chart. System performance is acceptable if temperature difference is greater than the specified minimum (as shown).**

SSC Completion Label Installation

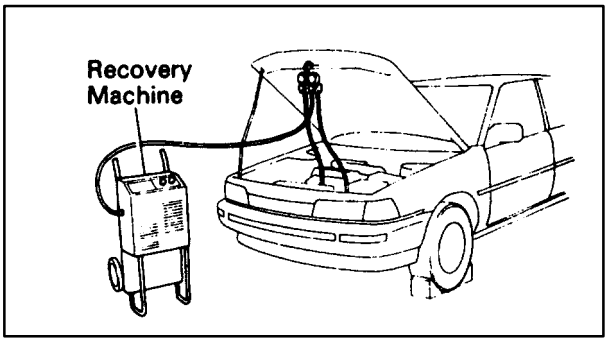


1. After completing the special service and successfully performance testing the A/C system, affix an SSC completion label to the left front door hinge post near the door check.

NOTE: An SSC completion label is enclosed in the owner's letter. Additional labels, in sheets of 50 (P/N 00410–01917) can be ordered through the non–parts system on a 1459 order form or through the TDN system.

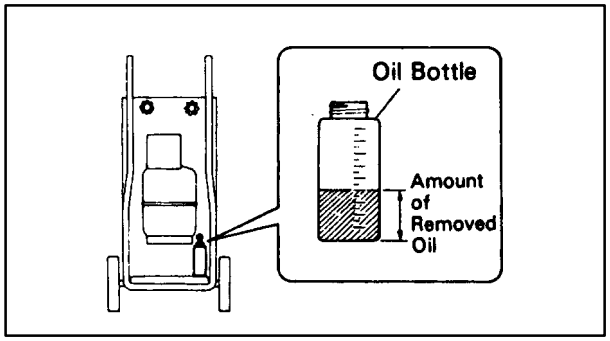


2. Fill out the label.



SPECIAL SERVICE IF REFRIGERANT VOLUME IS LOW OR EMPTY

NOTE: Before replacing parts recover the refrigerant. Always use a recovery machine when recovering the refrigerant. (Follow equipment instructions and precautions.)



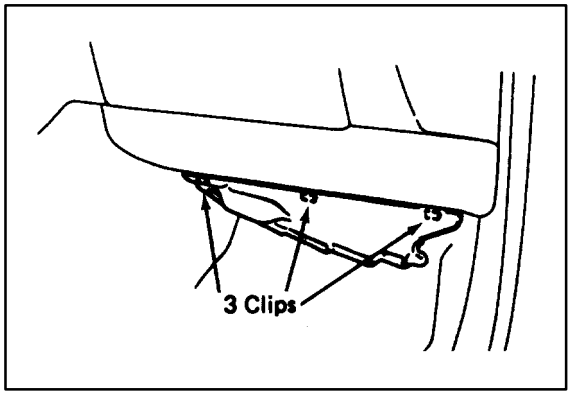
NOTE: When refrigerant is recovered, compressor oil is recovered with the refrigerant. When recharging a system that has been evacuated, DO NOT reuse the old compressor oil. Measure the amount of compressor oil removed and add the same amount of NEW Toyota ND Oil 6 Compressor Oil (Part No. 88899–28040) into the system.

EXPANSION VALVE AND LIQUID AND SUCTION TUBES INSPECTION

1. **Obtain the audio system security code (if the customer has one).**

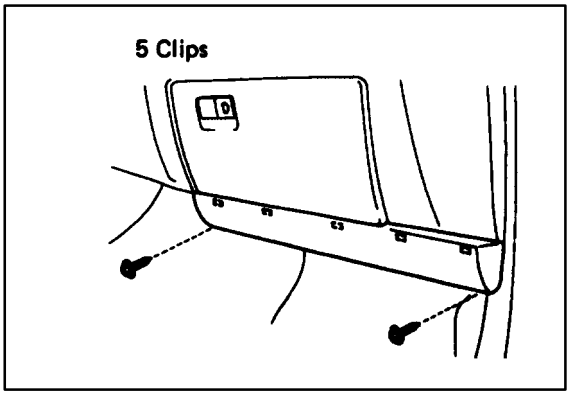
NOTE: With the ignition off, the red LED on the radio will flash if the audio system has a code.

2. **Clear audio system security code.**
3. **Record on the back of the RO the 6 AM and 12 FM preset radio stations.**
4. **Disconnect the negative terminal of the battery.**



5. Pull off the Under Cover No. 2.

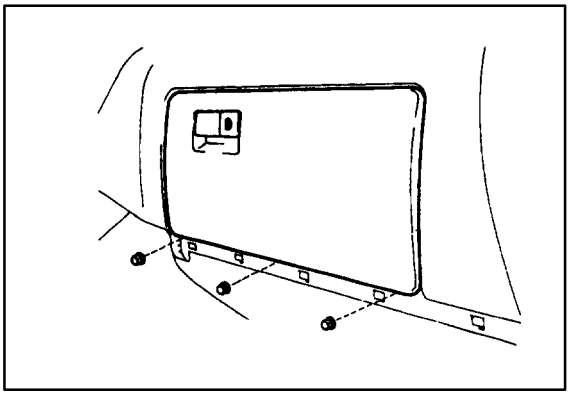
NOTE: The cover is held in place by three clips.



6. Remove the instrument lower panel No. 2:

(a) Remove two screws.

(b) Pull off the lower panel. (Held in place with five clips.)

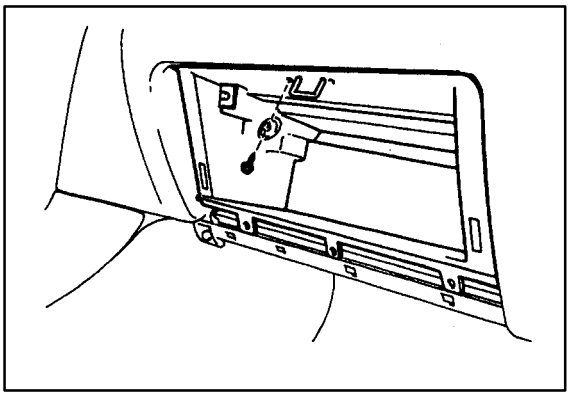


7. Remove the glove compartment door:

(a) Disconnect the damper ring from the door check arm.

(b) Remove three nuts.

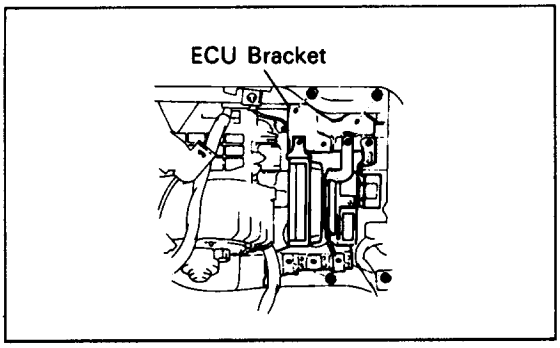
(c) Remove the door.



8. Remove the glove compartment:

(a) Remove the screw.

(b) Pull out the glove compartment.

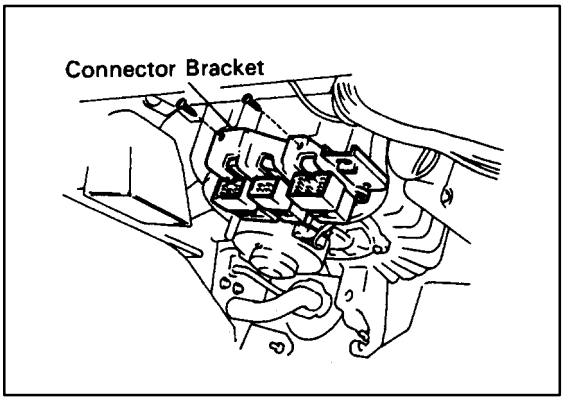


9. Remove the engine ECU and ECU bracket:

(a) Disconnect the connectors from the engine ECU.

(b) Remove the nut on top of the ECU bracket and the bolt in the far back.

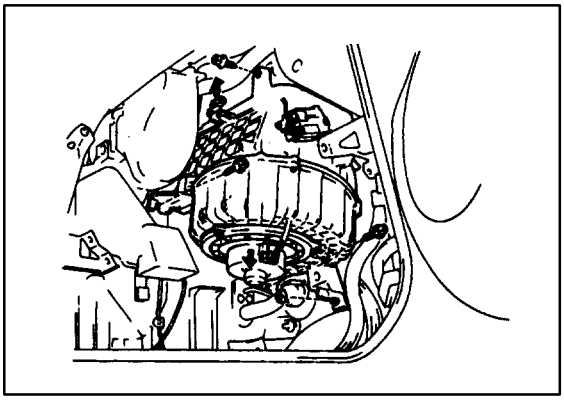
(c) Remove the ECU and ECU bracket as one assembly.



10. Remove the connector bracket:

(a) Disconnect the connector from the connector bracket.

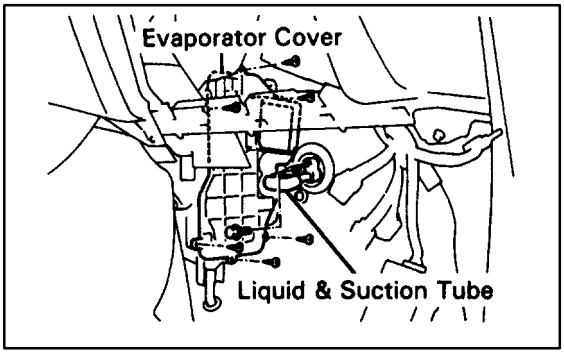
(b) Remove the two screws and the bracket.



11. Remove the blower unit:

(a) Disconnect the connectors from the blower unit.

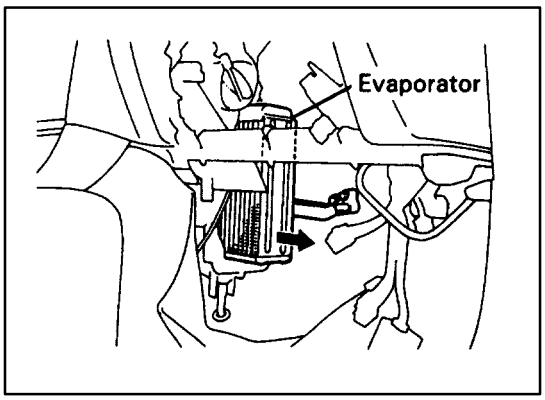
(b) Remove the three screws and one nut, and blower unit.



12. Remove the evaporator cover:

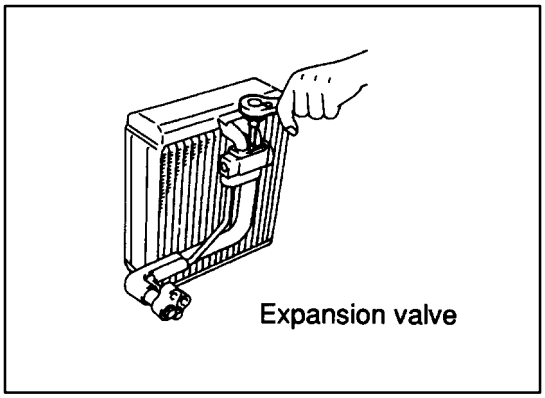
(a) Remove two bolts for the liquid and suction tubes.

(b) Remove eight screws and evaporator cover.



13. Remove the evaporator:

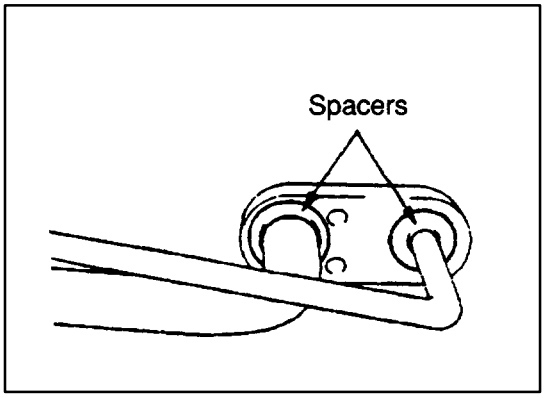
(a) Pull out the evaporator.



14. Remove the expansion valve and the liquid and suction tubes:

(a) Remove the 2 bolts using a hexagon wrench.

(b) Remove the expansion valve from the evaporator.



15. Inspect the liquid and suction tubes to determine if the spacers are gold colored (made of zinc–plated steel).

IF the spacers are gold colored, replace the tubes.

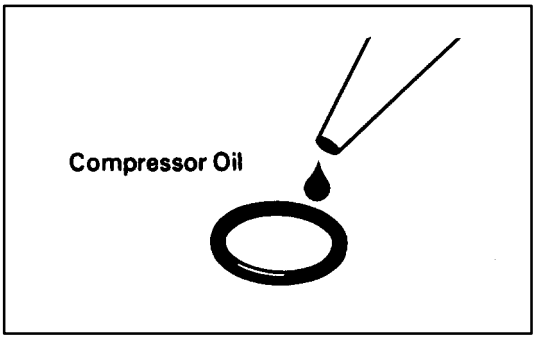
IF the spacers are NOT gold covered, DO NOT replace the tubes.

NOTE: Replace all o–rings with new ones. Large o–ring Part # 90099–14045 Small o–ring Part # 90099–14044

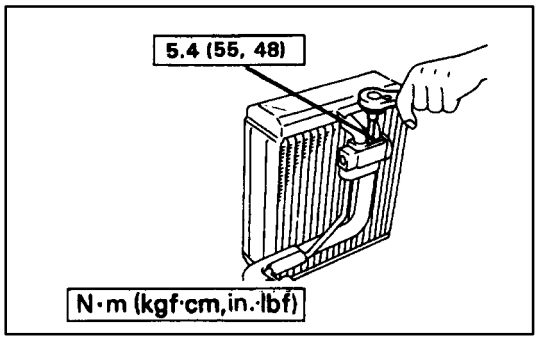
(a) 2 o–rings (1 large and 1 small) between the expansion valve and the evaporator.

(b) 2 o–rings (1 large and 1 small) between the expansion valve and the liquid and suction tubes.

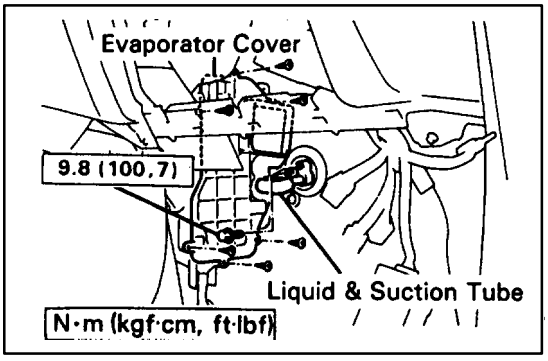
(c) 2 o–rings (1 large and 1 small) where the liquid and suction tubes join the vehicle tubes at the engine wall.
NOTE: 2 large and 2 small o–rings come with Part # 88706–33020 tube.



16. Apply a few drops of compressor oil to o–ring fittings for easy tightening and to prevent leaking of refrigerant gas.



17. Install a new expansion valve with tubes that do not have gold–colored spacers. Tighten to specified torque.
Torque: 5.4 N–m (55 kg–cm, 48 in–lb)



18. Reinstall the evaporator and cover. Tighten liquid and suction tubes to specified torque.
Torque: 8.8 N–m (100 kg–cm, 7 ft–lb)

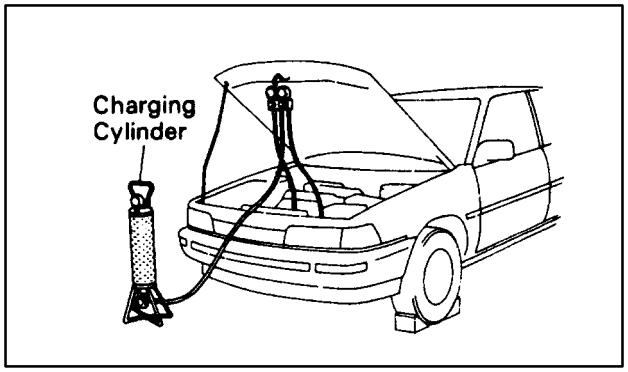
19. Reinstall the blower unit.
20. Reinstall the connector bracket.
21. Reinstall ECU and ECU bracket.
22. Reinstall glove compartment and glove compartment door.
23. Reinstall instrument lower panel.
24. Reinstall under cover No. 2.

25. **Reconnect negative battery terminal.**

26. **Reset customer preset radio stations.**

27. **Reset the clock to the correct time.**

28. **Reset audio system security code to same code that you entered in step 1. DO NOT ENTER A CODE IF CUSTOMER HAD NO CODE.**



After completing the repair, perform the following procedures:

1. **Evacuate A/C system for 10 minutes.**
2. **Check for air tightness for 5 minutes.**
3. **Partially recharge system.**
4. **Re–check for leaks using a gas leak detector.**

RE–INSPECTION RESULT AND ACTION

Leak Found:

(a) Recover refrigerant.

(b) Repair leaks, evacuate, and recharge.
(c) Re–inspect for leaks.

NOTE: Leaks are either:

(a) Covered by Lexus Basic Warranty Policy.

(b) Charged at customer's expense (ensure customer gives approval before repair).

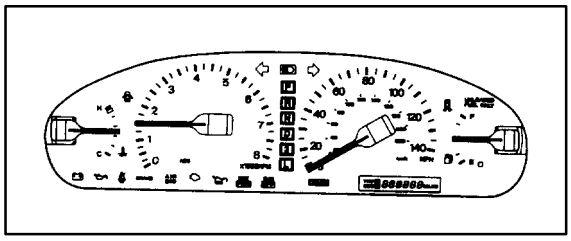
No Leak Found:

(a) Continue to charge the A/C system until full.

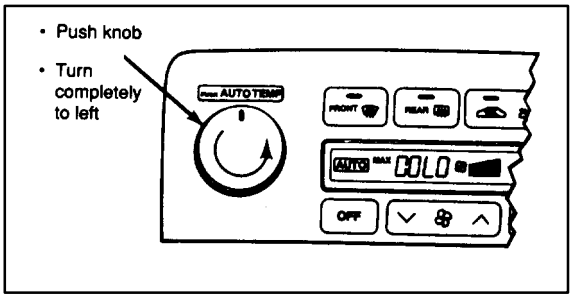
(b) Re–check for leaks using a gas leak detector. (If leaks are found repeat the Evacuation, Recharge, and Re–inspection procedure.)

(c) Repeat A/C System Performance Test (below).

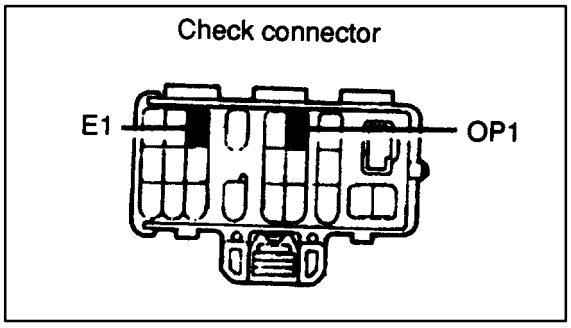
Proceed with Performance Testing the A/C System after completing the repair and recharging the system.



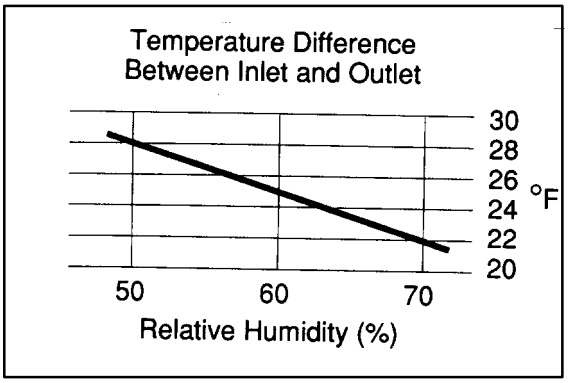
1. **Start the engine and maintain 1,500 RPM.**



2. **Set the A/C to AUTO –– MAX COOL.**
3. **Fully open all doors.**

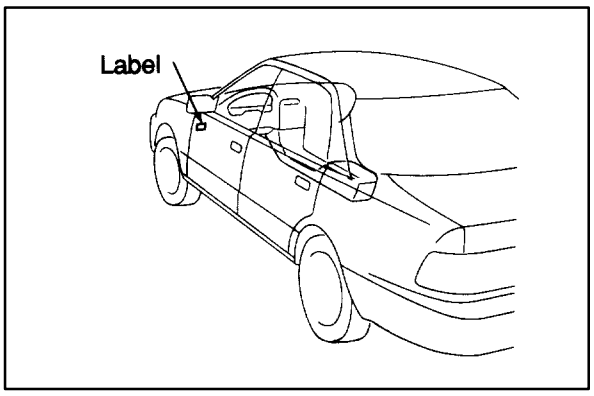


4. **At the Under Hood Diagnostic Connector jump OP1 to E1 to maintain a stable fan speed.**
5. **Position one thermometer in the center duct and one thermometer near the A/C inlet. (NOT laying on the carpet.)**



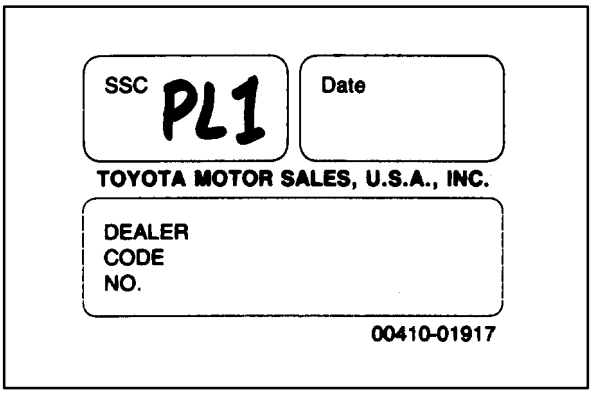
6. **After 5 minutes of operation compare the difference between the inlet temperature and the center duct temperature to the Performance Test Chart. System performance is acceptable if temperature difference is greater than the specified minimum (as shown).**

SSC Completion Label Installation



1. After completing the special service and successfully performance testing the A/C system, affix an SSC completion label to the left front door hinge post near the door check.

NOTE: An SSC completion label is enclosed in the owner's letter. Additional labels, in sheets of 50 (P/N 00410–01917) can be ordered through the non–parts system on a 1459 order form or through the TDN system.



2. Fill out the label.

Torque:

Expansion valve x evaporator: 5.4 N–m (55 Kg–cm, 48 in–lb)

Liquid and Suction Tube x A/C unit: 9.8 N–m (100 Kg–cm, 7 ft–lb)

Refrigerant Charging Volume:

Specified amount: 950 g + 50 g (33.51 oz + 1.76 oz, 2.1 lb + 0.1 lb)

STEERING

GENERAL DESCRIPTION

SR01E–01

- **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 steering wheel pad has an airbag built in, so take all due precautions when handling it. For more details, see the SRS AIRBAG section.**

TROUBLESHOOTING

SR003–02

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the priority of the probable cause of trouble. Check each part in the order shown. If necessary, repair or replace the part.

See page / Parts Name / Trouble	Tires (Improperly inflated)	Front wheel alignment (Incorrect)	Fluid level (Low)	Drive belt (Loose)	Steering system joints (Worn)	Suspension arm ball joints (Worn)	Steering column (Binding)	Sliding yoke (Worn)	Steering gear housing	Solenoid valve	Electronic control	Front wheel bearing (Worn)
See page	SA–3	SA–3	SR–28	SR–28	–	SA–46	–	–	SA–48	SR–70	SR–66	SA–10
Hard steering	1	4	2	3	5	6	7		10	8	9	
Poor return	1	2					3		4			
Excessive play					1	2		3	5			4
Abnormal noise			1		2				3			

V00492

GENERAL DESCRIPTION

SR01E–01

- **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 steering wheel pad has an airbag built in, so take all due precautions when handling it. For more details, see the SRS AIRBAG section.**

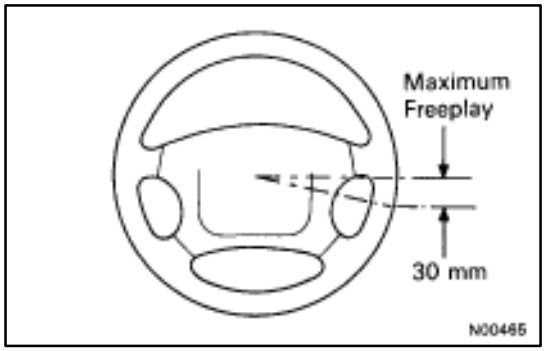
TROUBLESHOOTING

SR003–02

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the priority of the probable cause of trouble. Check each part in the order shown. If necessary, repair or replace the part.

See page / Parts Name / Trouble	Tires (Improperly inflated)	Front wheel alignment (Incorrect)	Fluid level (Low)	Drive belt (Loose)	Steering system joints (Worn)	Suspension arm ball joints (Worn)	Steering column (Binding)	Sliding yoke (Worn)	Steering gear housing	Solenoid valve	Electronic control	Front wheel bearing (Worn)
See page	SA–3	SA–3	SR–28	SR–28	–	SA–46	–	–	SA–48	SR–70	SR–66	SA–10
Hard steering	1	4	2	3	5	6	7		10	8	9	
Poor return	1	2					3		4			
Excessive play					1	2		3	5			4
Abnormal noise			1		2				3			

V00492



ON–VEHICLE INSPECTION

SR004–02

CHECK THAT STEERING WHEEL FREEPLAY IS CORRECT

With the vehicle stopped and tires pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure.

Freeplay should not exceed the maximum.

Maximum freeplay:

30mm (1.18in.)

If incorrect, repair.

SERVICE SPECIFICATIONS

SR02B–03

SERVICE DATA

Steering wheel freeplay (Maximum)		30mm (1.18in.) or less
STEERING COLUMN		
Pawl stopper	Mark	
	1 or A	12.68–12.74mm (0.4992–0.5016in.)
	2 or B	12.61–12.67mm (0.4965–0.4988in.)
	3 or C	12.54–12.60mm (0.4937–0.4961in.)
	4 or D	12.47–12.53mm (0.4909–0.4933in.)
	5 or E	12.40–12.46mm (0.4882–0.4906in.)
	6 or F	12.33–12.39mm (0.4854–0.4878in.)
	7 or G	12.26–12.32mm (0.4827–0.4850in.)
PS ON–VEHICLE INSPECTION		
Drive belt tension (New belt)		667–824N (68–84kgf, 150–185lbf)
Drive belt tension (Used belt)		422–598N (43–61kgf, 95–135lbf)
Maximum rise of oil level		5mm (0.20in.)
Oil pressure at idle speed with valve closed (Minimum)		9,316kpa (95kgf/cm•, 1,351psi)
Steering effort at idle speed (Maximum)		34N (3.5kgf, 7.7lbf)
PS PUMP		
Rotor shaft bushing oil clearance (STD)		0.03–0.05mm (0.0012–0.0020in.)
Rotor shaft bushing oil clearance (Maximum)		0.07mm (0.0028in.)
Vane plate to rotor groove clearance (Maximum)		0.035mm (0.0014in.)
Vane plate length (Minimum) for PS		14.99mm (0.5902in.)
Vane plate height (Minimum) for PS		8.6mm (0.339in.)
Vane plate thickness (Minimum) for PS		1.4mm (0.055in.)
Vane plate length (Minimum) for Hydraulic cooling fan		14.98mm (0.5898in.)
Vane plate height (Minimum) for Hydraulic cooling fan		8.1mm (0.319in.)
Vane plate thickness (Minimum) for Hydraulic cooling fan		1.8mm (0.071in.)
Vane plate length for PS		
(Cam ring mark)	(Rotor mark)	
2	None	15.003–15.005mm (0.59067–0.59075in.)
3	1	15.001–15.003mm (0.59059–0.59067in.)
4	2	14.999–15.001mm (0.59051–0.59059in.)
5	3	14.997–14.999mm (0.59043–0.59051in.)
6	4	14.995–14.997mm (0.59035–0.59043in.)
Vane plate length for Hydraulic cooling fan		
(Cam ring mark)	(Rotor mark)	
1	None	14.996–14.998mm (0.59039–0.59047in.)
2	1	14.994–14.996mm (0.59031–0.59039in.)
3	2	14.992–14.994mm (0.59024–0.59031in.)
4	3	14.990–14.992mm (0.59016–0.59024in.)
5	4	14.988–14.990mm (0.59008–0.59016in.)
Flow control valve spring length (Minimum)		37mm (1.46in.)
Pump rotating torque (Maximum)		0.3N·m (2.8kgf·cm, 2.4in.·lbf)
PS GEAR HOUSING		
Steering rack runout (Maximum)		0.3mm (0.012in.)
Total preload (Turning)		0.8–1.4N·m (8–14kgf·cm, 6.9–12.2in.·lbf)
Solenoid valve resistance		4–9 Ω

TORQUE SPECIFICATIONS

SR026–03

Part tightened	N·m	kgf·cm	ft·lbf
STEERING COLUMN			
Steering main shaft X Universal joint	35	360	26
Column bracket X Body	25	260	19
Steering wheel	35	360	26
Wheel pad	8.8	90	78in.·lbf
Tilt lever assembly installation bolt	2.9	30	26in.·lbf
Tilt pawl set nut	5.9	60	52in.·lbf
Tilt lever retainer set nut	15	150	11
Compression spring bushing bolt	7.8	80	69in.·lbf
POWER STEERING PUMP			
Pressure port union X Pump housing	83	850	62
Suction port union X Pump housing	13	130	9
Front housing X Rear housing	46	470	34
Control valve assembly	59	600	43
Pump pully X Pump shaft	43	440	32
Pressure tube X Pressure port union	44	450	33
PS pump installation bolt	43	440	32
POWER STEERING GEAR HOUSING			
Control valve housing X Rack housing	18	185	13
Control valve self–locking nut	25	250	18
Rack housing cap	59	600	43
Lock nut	55	560	41
Rack X Rack end	72	730	53
Tie rod end lock nut	74	750	54
Turn pressure tube union nut	11	110	8
Gear housing X Sub frame	181	1,850	134
Control valve shaft X Universal joint	35	360	26
Pressure and return tube X Gear housing	25	250	18
Tie rod end X Steering knuckle	49	500	36

STEERING COLUMN

PREPARATION

SST(SPECIAL SERVICE TOOLS)

SR02F–01

	09213–31021 Crankshaft Pulley Puller	Steering wheel
	09910–00015 Puller Set	
	(09911–00011) Puller Clamp	
	(09912–00010) Puller Slide Hammer	
	09950–20017 Universal Puller	

RECOMMENDED TOOLS

SR01G–01

	09042–00010 Torx Socket T30	Steering wheel pad
	09905–00012 Snap Ring No. 1 Expander	

EQUIPMENT

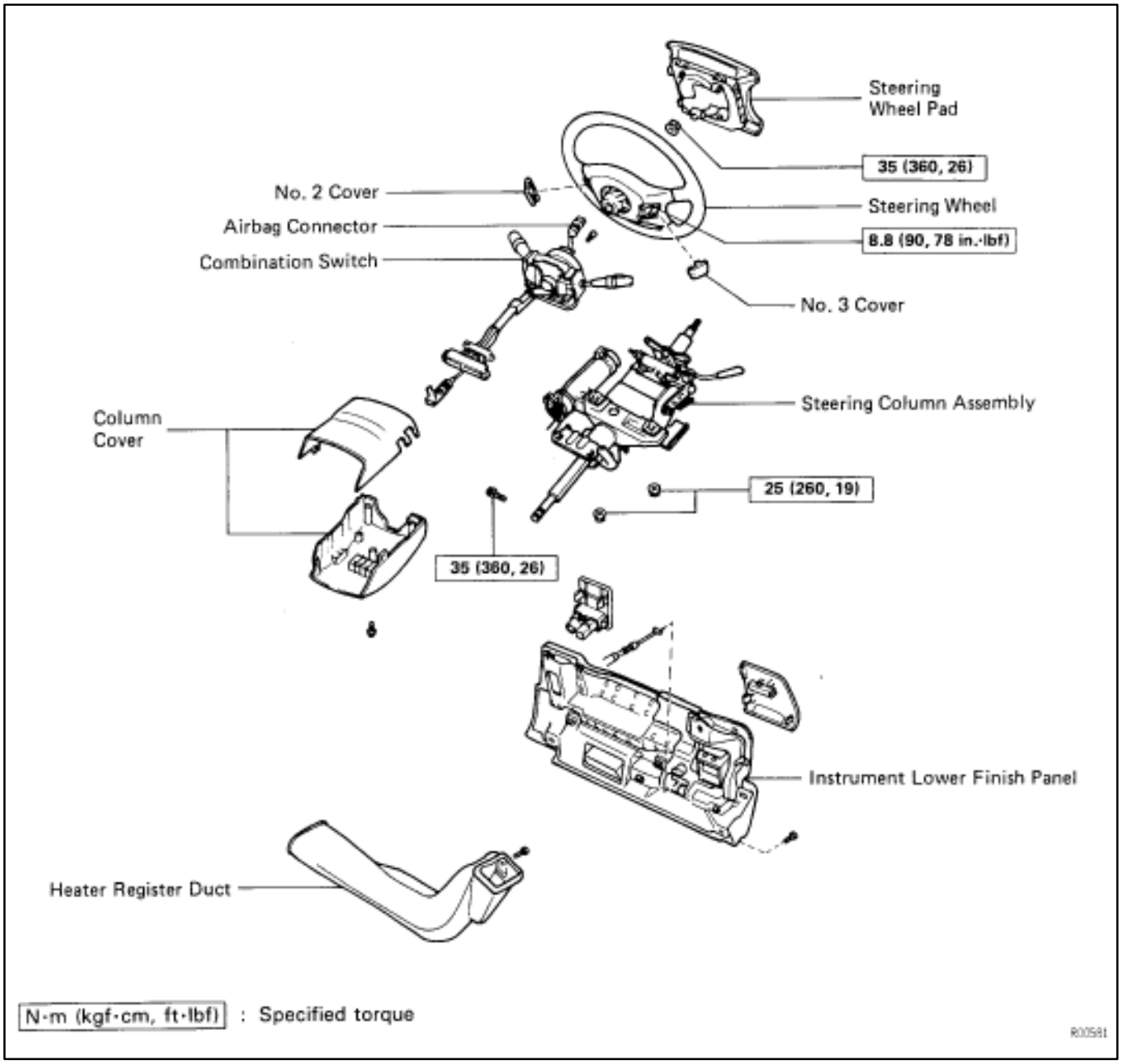
SR007–01

Torque wrench	

ASSEMBLY REMOVAL AND INSTALLATION

SR02G–01

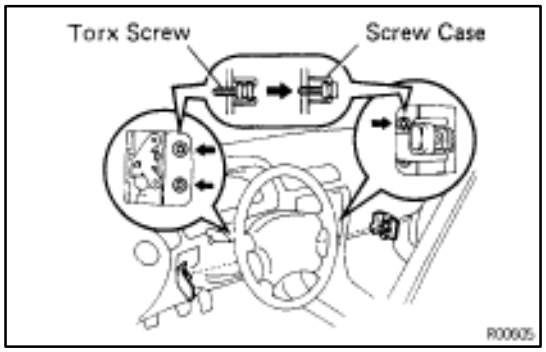
Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery.

NOTICE: If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.



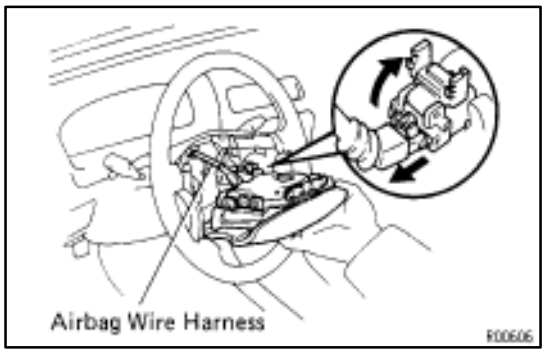
1. REMOVE STEERING WHEEL PAD

(a) Disconnect the battery negative (–) terminal.

(b) Place the front wheels facing straight ahead.

(c) Using a torx wrench, loosen the three screws.
Torx wrench: T30 (Part No. 09042–00010 or locally manufactured tool)

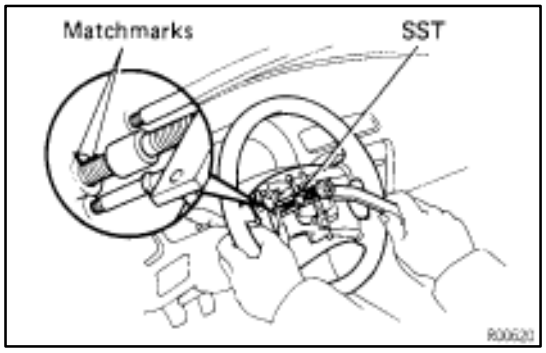
(d) Loosen the torx screws until the groove along the screw circumference catches on the screw case.



(e) Pull the wheel pad out from the steering wheel and disconnect the airbag connector.

NOTICE: When removing the wheel pad, take care not to pull the airbag wire harness.

CAUTION: When storing the wheel pad, keep the upper surface of the pad facing upward.

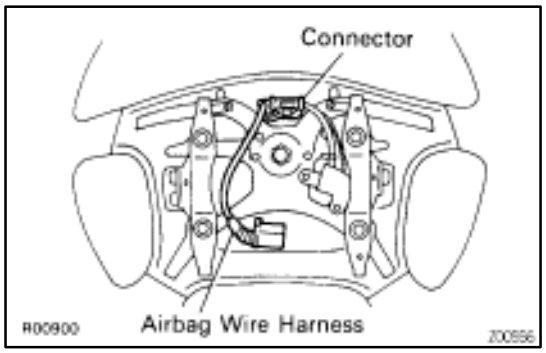


2. REMOVE STEERING WHEEL

(a) Disconnect the connector.

(b) Remove the set nut.

(c) Using SST, remove the steering wheel.
SST 09213–31021



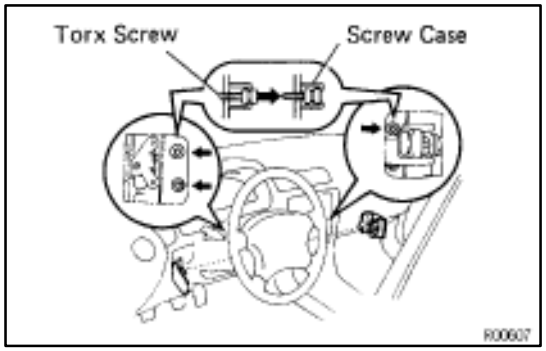
3. INSTALL STEERING WHEEL AND WHEEL PAD

(a) Check that the front wheels are facing straight ahead.

(b) Center the spiral cable.
(See page AB–15)

(c) Install the steering wheel and torque the set nut.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(d) Connect the connector.



(e) Install the wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

(f) Using a torx wrench, tighten the three screws.

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

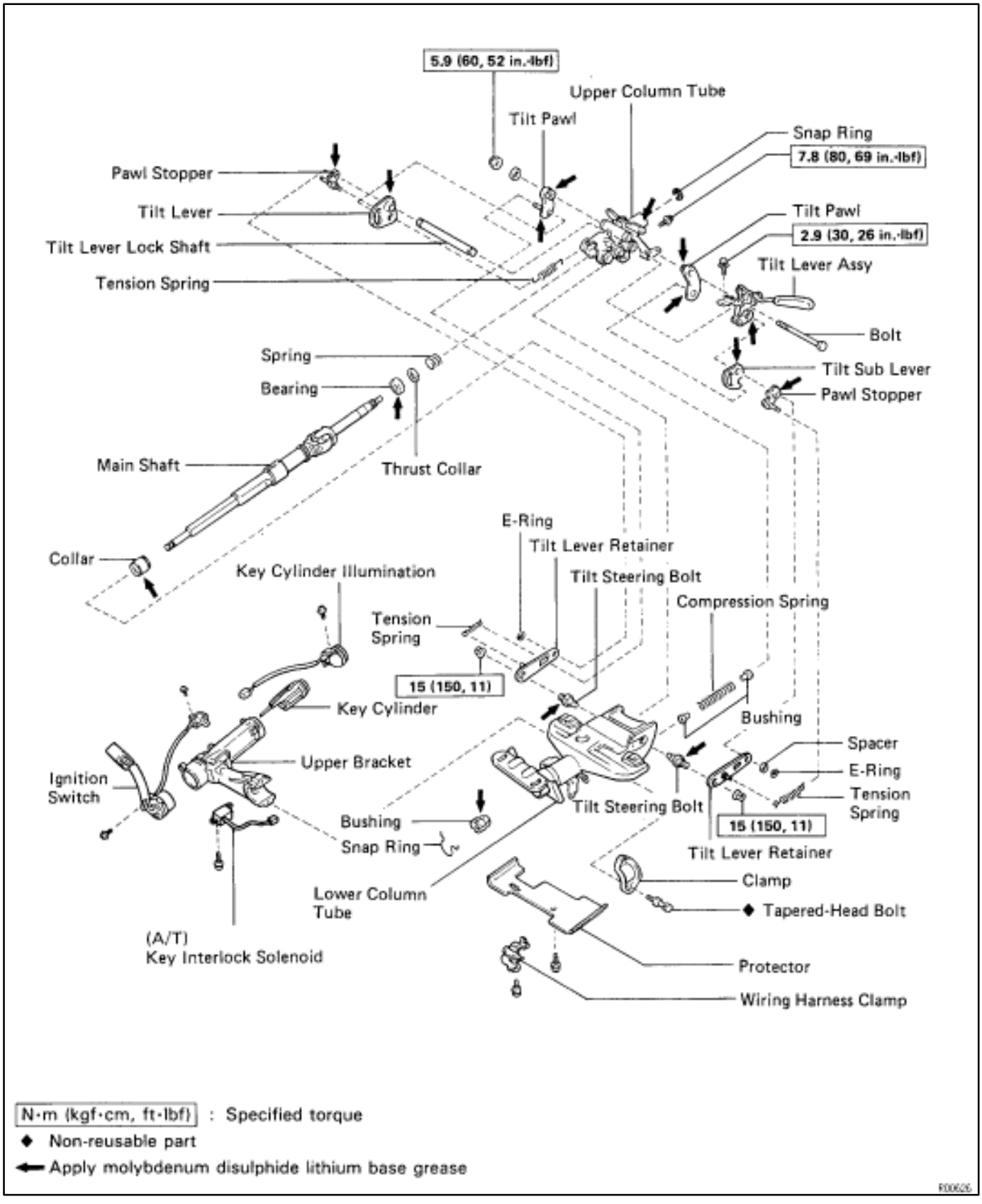
NOTICE:

- **Make sure the wheel pad is installed to the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**

4. CHECK STEERING WHEEL CENTER POINT AFTER INSTALLING STEERING COLUMN

STEERING COLUMN
COMPONENTS

SR006–02

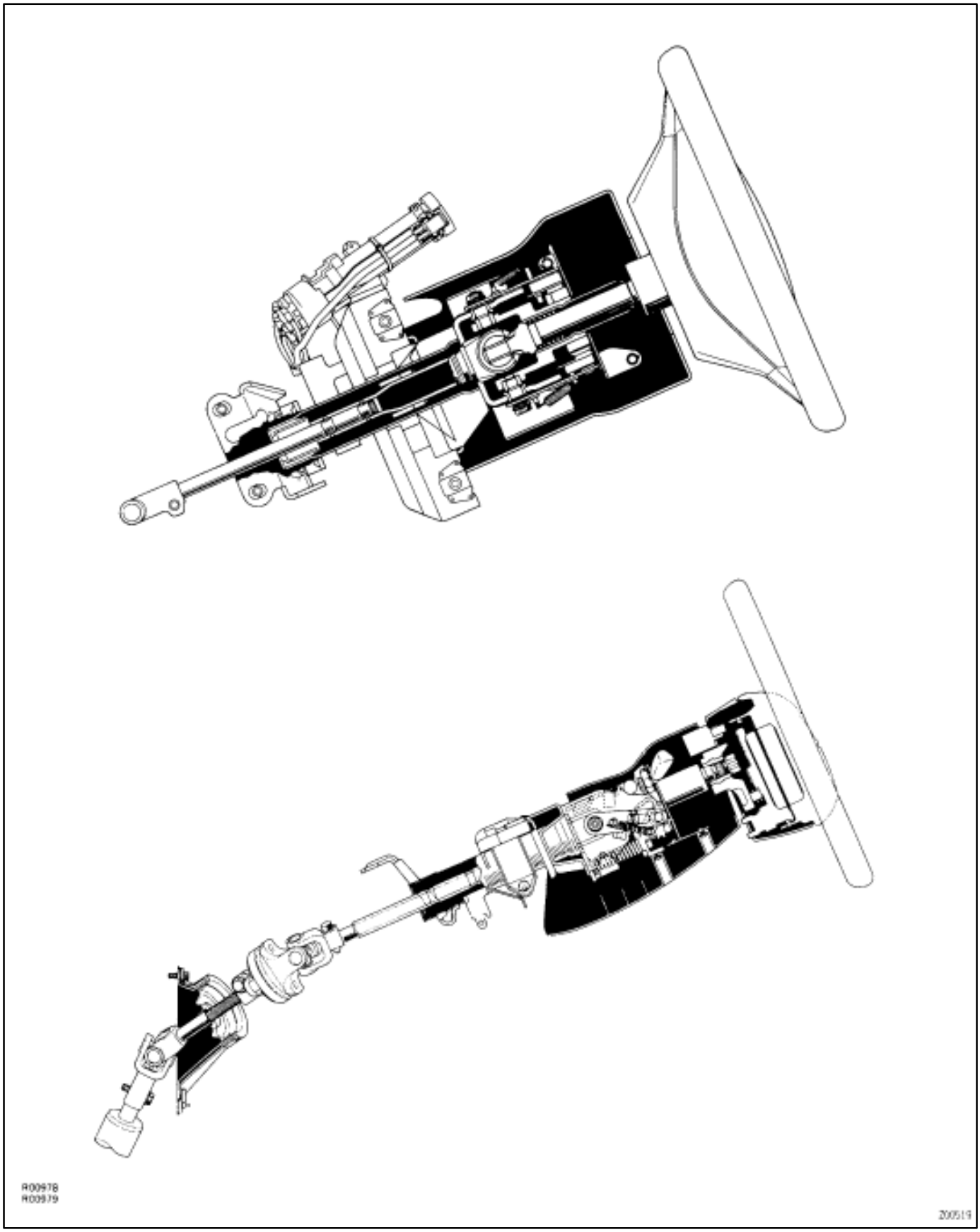


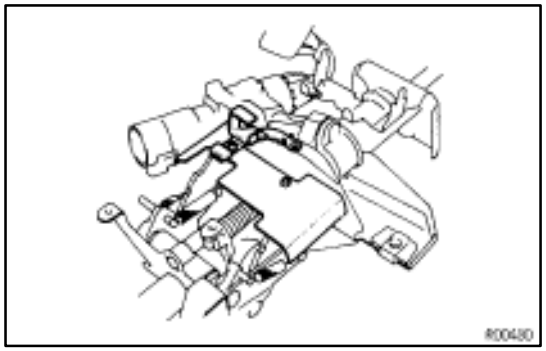
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
⬅ Apply molybdenum disulphide lithium base grease

R00620

SECTIONAL VIEW

SR02H–01





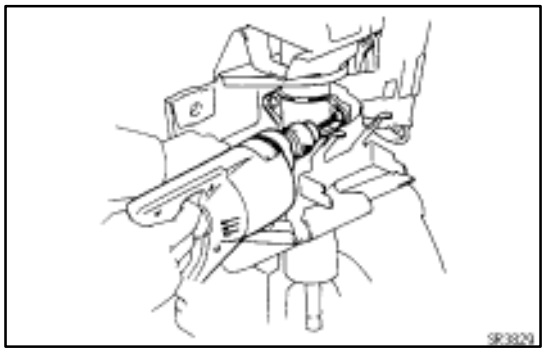
STEERING COLUMN DISASSEMBLY

SR02J–01

1. REMOVE IGNITION KEY CYLINDER ILLUMINATION

2. REMOVE WIRING HARNESS CLAMP

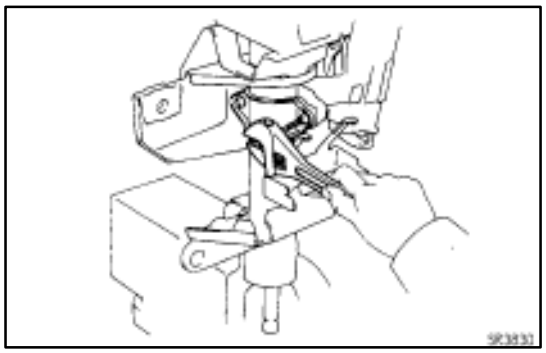
3. REMOVE PROTECTOR



4. REMOVE UPPER BRACKET

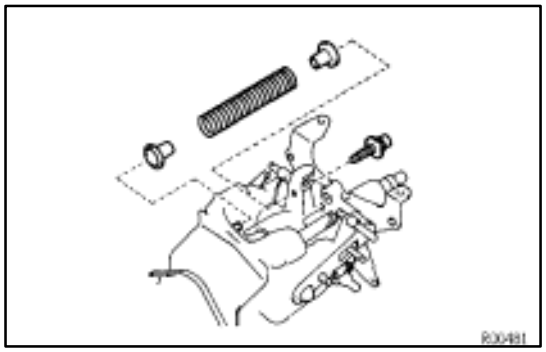
(a) Using a centering punch, mark the center of the tapered–head bolts.

(b) Using a 3–4 mm (0.12–0.16 in.) drill, drill into the tapered–head bolts.



(c) Using a screw extractor, remove the tapered–head bolts.

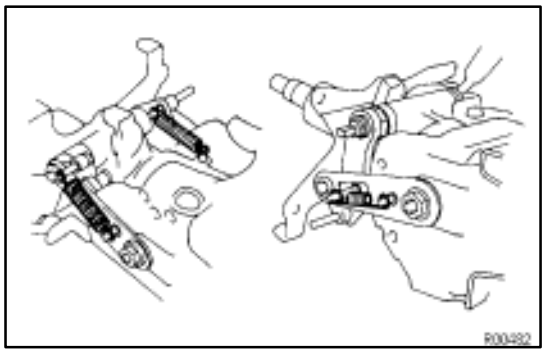
(d) Remove the two bolts, and separate the upper bracket and column tube.



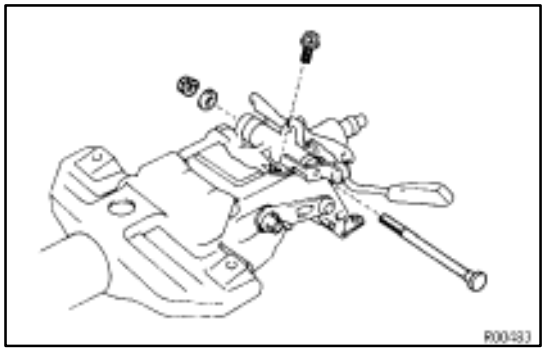
5. REMOVE COMPRESSION SPRING

(a) Using a torx wrench, remove the bolt and spring.
Torx wrench: T30 (Part No. 09042–00010 or locally manufactured tool)

(b) Remove the two bushings from the spring.

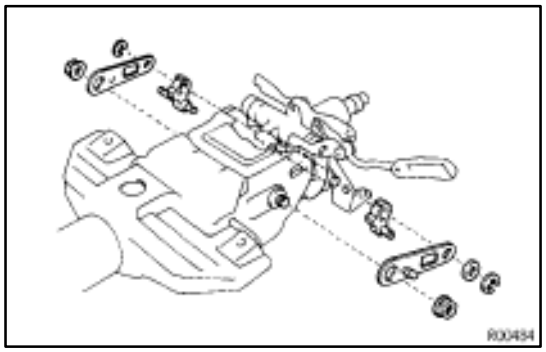


6. REMOVE THREE TENSION SPRINGS

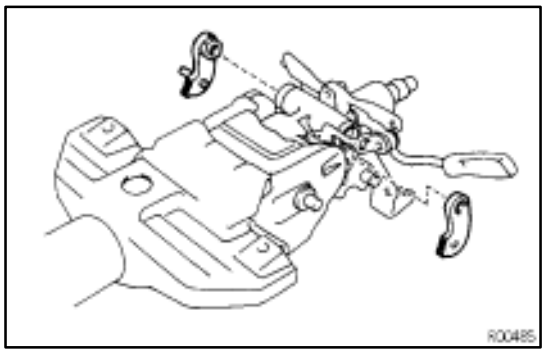


7. REMOVE TILT LEVER RETAINERS AND PAWL STOPPERS

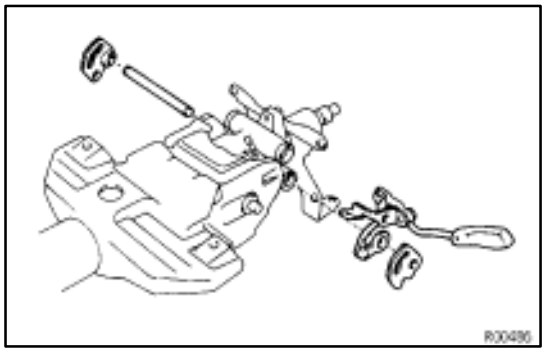
(a) Remove the nut and washer.
(b) Pull out the bolt.
(c) Remove the tilt lever assembly installation bolt.



(d) Remove the two E–rings from the tilt lever lock shaft.
(e) Remove the spacer.
(f) Remove the two nuts from the tilt steering bolts.
(g) Remove the two tilt lever retainers and two pawl stoppers.

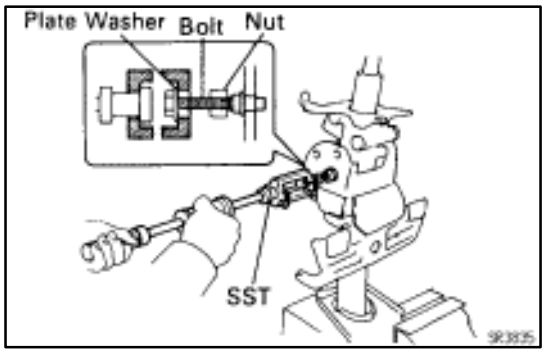


8. REMOVE TILT PAWLS



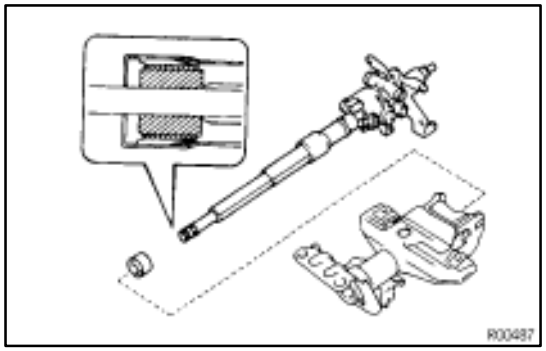
9. REMOVE TILT LEVER, TILT SUB LEVER, TILT LEVER ASSEMBLY AND TILT LEVER LOCK SHAFT

(a) Remove the tilt lever, tilt sub lever and tilt lever assembly from the tilt lever lock shaft.
(b) Pull out the tilt lever lock shaft.

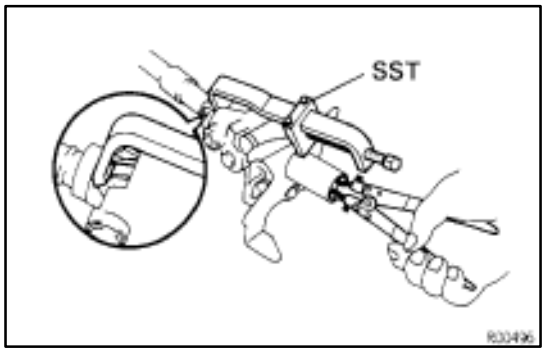


10. REMOVE UPPER COLUMN TUBE

(a) Set SST, the nut (10 mm diameter, 1.25 mm pitch), plate washer (36 mm outer diameter) and bolt (10 mm diameter, 1.25 mm pitch, 50 mm length) as shown.
And then remove the two tilt steering bolts.
SST 09910–00015 (09911–00011, 09912–00010)
(Reference)
Nut: 90170–10004
Plate washer: 90201–10201
Bolt: 91111–51050

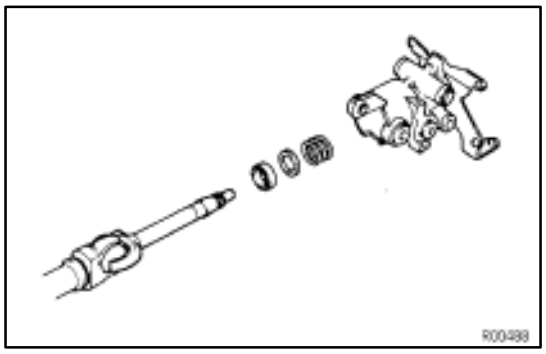


(b) Remove the upper column tube from the lower column tube.
(c) Remove the collar from the main shaft.

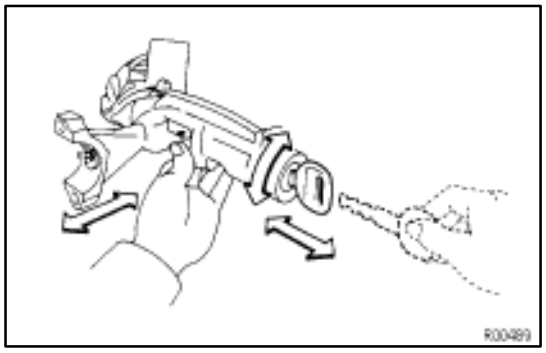


11. REMOVE MAIN SHAFT

(a) Using SST to compress the main shaft spring, remove the snap ring with snap ring pliers.
SST 09950–20017



(b) Remove the main shaft from the column tube.
(c) Remove the spring, thrust collar and bearing.

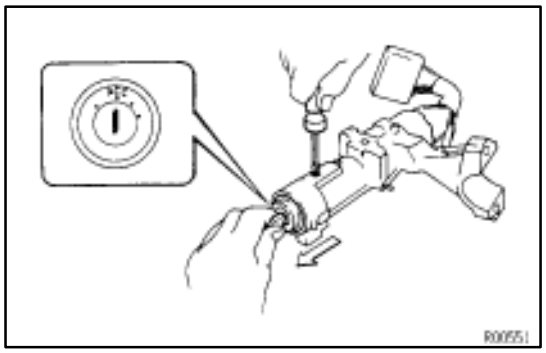


STEERING COLUMN INSPECTION AND REPLACEMENT

SR02K–01

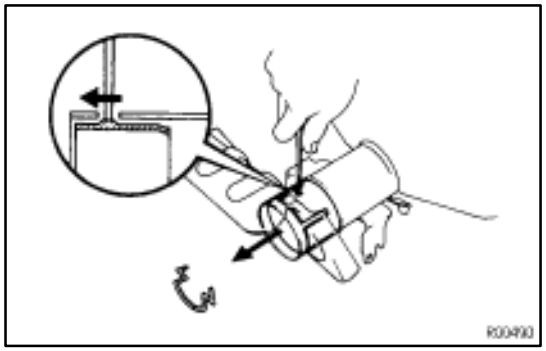
1. INSPECT KEY CYLINDER

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

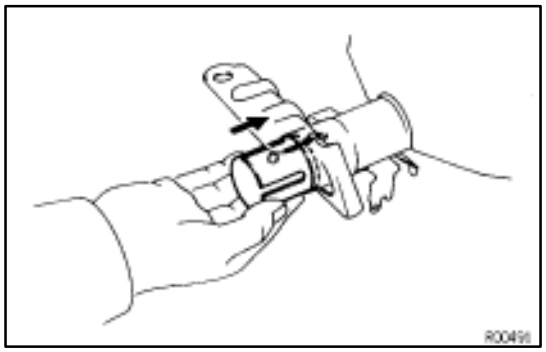
(a) Place the ignition key at the ACC position.
(b) Push down the stop pin with a thin rod, and pull out the key cylinder.
(c) Make sure the ignition key is at the ACC position.
(d) Install a new key cylinder.



3. IF NECESSARY, REPLACE MAIN SHAFT BUSHING

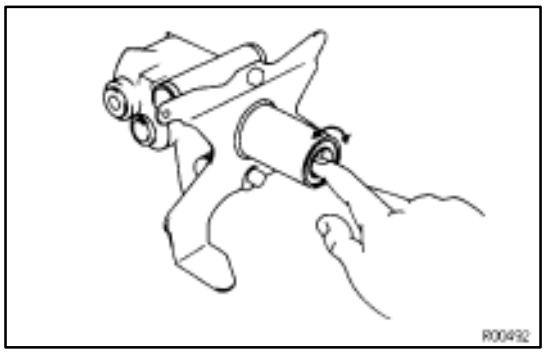
(a) Remove the snap ring.

(b) Using a screwdriver, remove the bushing.



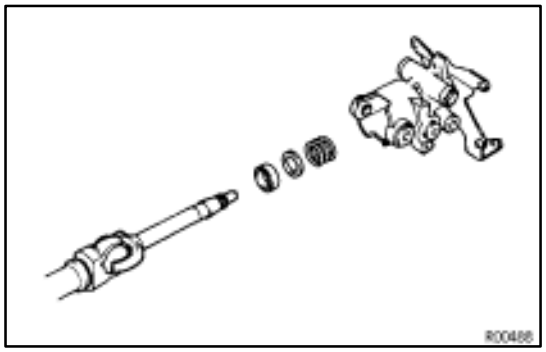
(c) Align the holes of the tube and projections of a new bushing, and insert the bushing in the column tube.

(d) Install the snap ring.



4. INSPECT UPPER BEARING

Check the upper bearing rotation condition and check for abnormal noise.



STEERING COLUMN ASSEMBLY

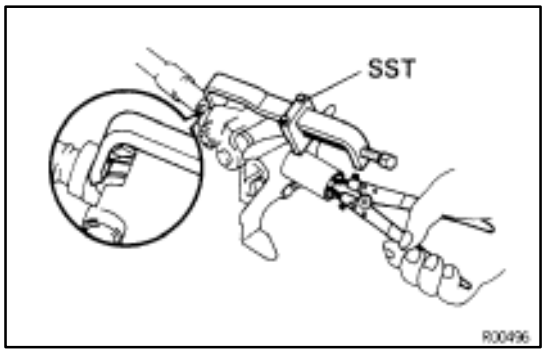
SR02L–01

1. APPLY MOLYBDENUM DISULPHID LITHIUM BASE GREASE (See page SR–8)

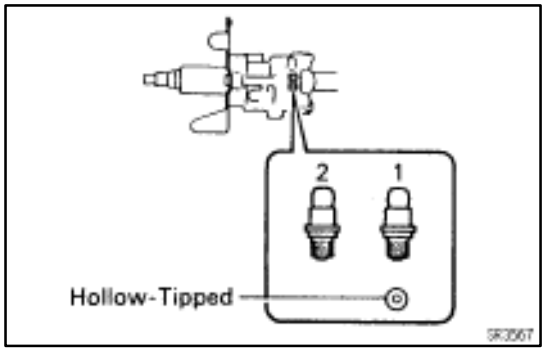
2. INSTALL MAIN SHAFT

(a) Install the bearing, thrust collar and spring to the main shaft.

(b) Insert the main shaft into the upper column tube.

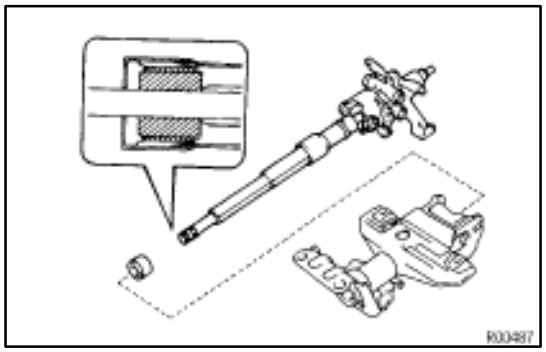


(c) Using SST to compress the main shaft spring, install the snap ring with snap ring pliers.
SST 09950–20017



3. SELECT TILT STEERING BOLTS

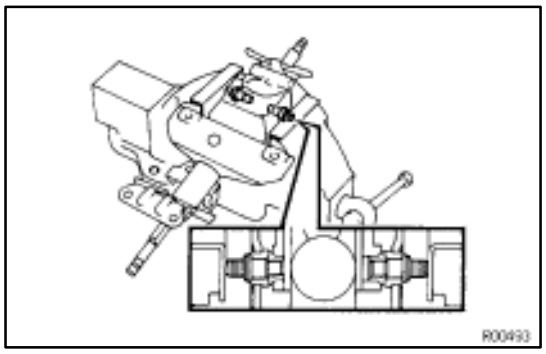
Select the bolt with the plain thread end when the upper column tube mark is 2, and the bolt with the hollow–tipped thread end when the mark is 1.



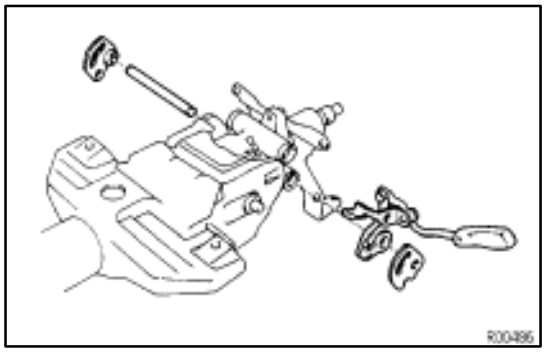
4. INSTALL MAIN SHAFT WITH UPPER COLUMN TUBE

(a) Install the collar to the main shaft.

(b) Insert the main shaft with the upper column tube into the lower column tube.



(c) Using a vise, press in the two tilt steering bolts.
HINT: Make sure the upper tube turns smoothly.

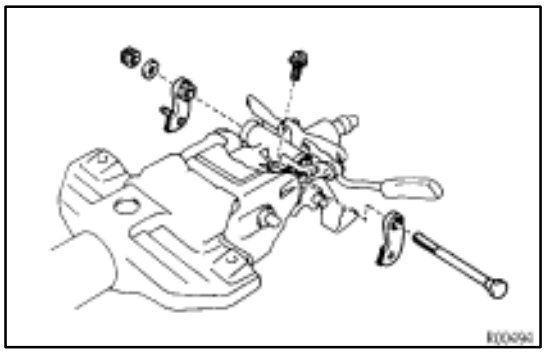


5. INSTALL TILT LEVER LOCK SHAFT, TILT LEVER ASSEMBLY, TILT SUB LEVER AND TILT LEVER

(a) Insert the tilt lever lock shaft into the upper column tube.

(b) Install the tilt lever assembly.

(c) Install the tilt lever and tilt sub lever.



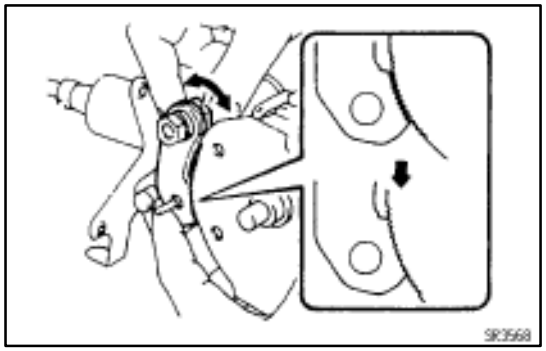
6. INSTALL TILT PAWLS

(a) Install the two tilt pawls to the upper column tube.
HINT: Insert the pawl pin into the long hole of the tilt lever and tilt sub lever.

(b) Install the bolt through the tilt pawls and tilt lever assembly.

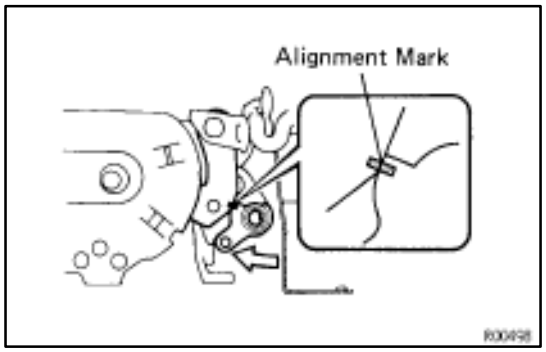
(c) Temporarily install the washer and nut.

(d) Install and torque the tilt lever assembly installation bolt.
Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)



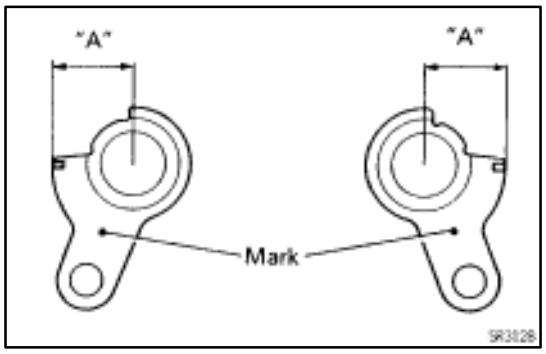
7. ENGAGE AND ADJUST TILT PAWL

(a) Engage the tilt sub lever side pawl to the center of the ratchet.
(b) While turning the tilt lever side collar, completely engage the tilt lever side pawl to the ratchet.
(c) Tighten the nut.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)
(d) Check that the pawls rotate smoothly.



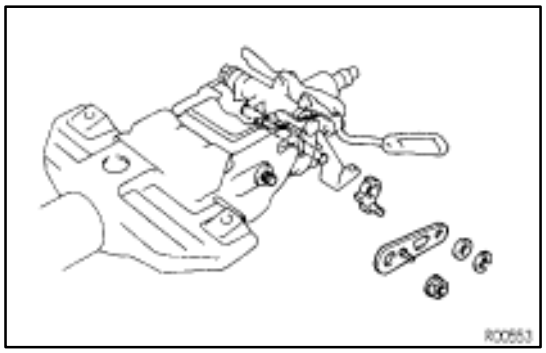
8. SELECT PAWL STOPPERS

(a) With the tilt pawl and ratchet engaged, install two pawl stoppers.
(b) Check that the alignment marks on the stopper and pawl align when the stopper is lightly rotated to the pawl side.
(c) If the alignment marks do not align, select pawl stoppers according to the following table.



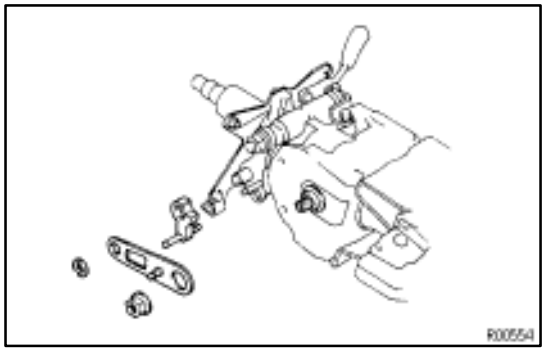
Tilt lever side	Tilt sub lever side	Dimension"A"mm (in.)
1	A	12.68–12.74 (0.4992–0.5016)
2	B	12.61–12.67 (0.4965–0.4988)
3	C	12.54–12.60 (0.4937–0.4961)
4	D	12.47–12.53 (0.4909–0.4933)
5	E	12.40–12.46 (0.4882–0.4906)
6	F	12.33–12.39 (0.4854–0.4878)
7	G	12.26–12.32 (0.4827–0.4850)

(d) After selecting the stoppers, check that on both sides the pawl and ratchet are fully engaged.

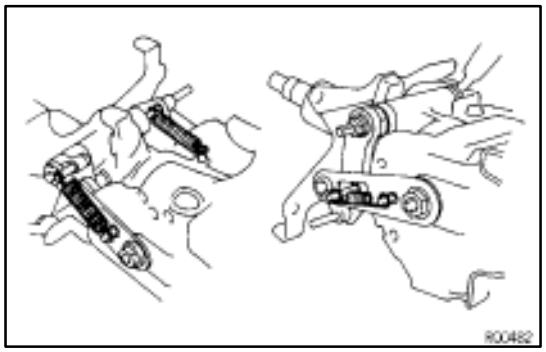


9. INSTALL PAWL STOPPERS AND TILT LEVER RETAINERS

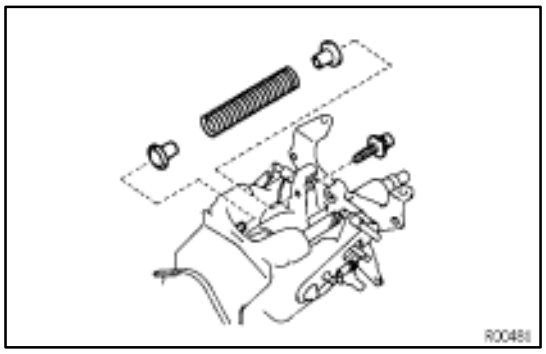
(a) Install the tilt sub lever side pawl stopper and tilt lever retainer.
(b) Install the spacer.
(c) Install the E–ring.
(d) Install and torque the nut.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



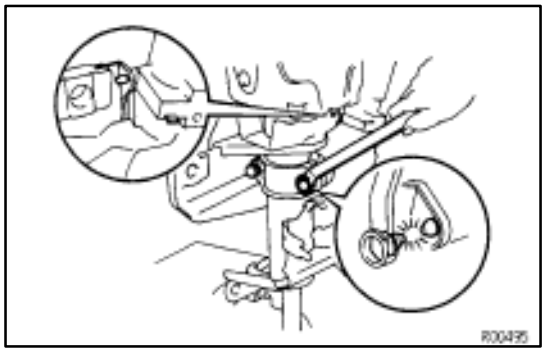
(e) Install the tilt lever side pawl stopper and tilt lever retainer.
(f) Install the E–ring.
(g) Install and torque the nut.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



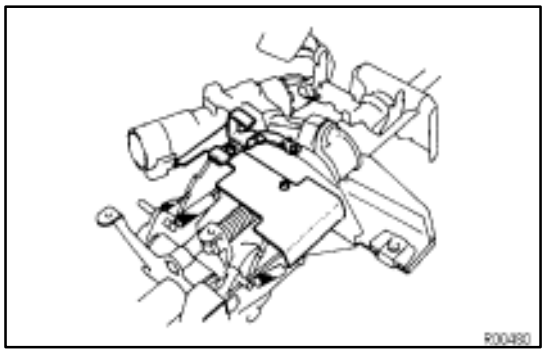
10. INSTALL THREE TENSION SPRINGS



11. INSTALL COMPRESSION SPRING
(a) Install the two bushings to the spring.
(b) Install the spring and bolt.
(c) Using a torx wrench, tighten the bolt.
Torx wrench: T30 (part No. 09042–00010 or locally manufactured tool)
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)



12. INSTALL UPPER BRACKET
(a) Install the upper bracket with two new tapered–head bolts.
HINT: Insert the upper bracket pin into the column tube hole.
(b) Tighten the tapered–head bolts until the bolt heads break off.



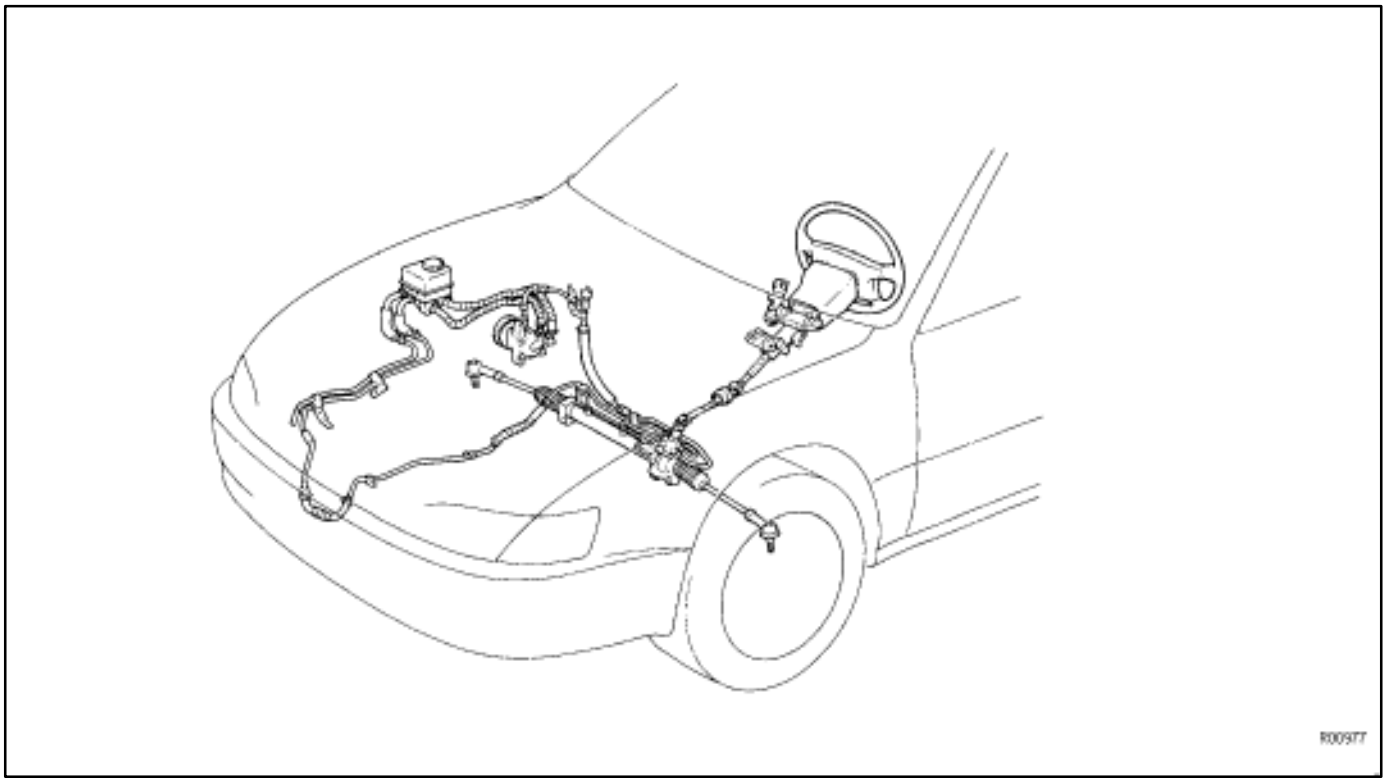
13. INSTALL PROTECTOR
14. INSTALL WIRING HARNESS CLAMP
15. INSTALL IGNITION KEY CYLINDER ILLUMINATION
16. CHECK OPERATION OF TILT STEERING
(a) With the main shaft in the neutral position, push the tilt lever and check that the main shaft rises to the uppermost position.
(b) Lower the main shaft, and check that it locks in the uppermost position.

POWER STEERING

DESCRIPTION

SR02M–01

The Progressive Power Steering (PPS) is basically a power rack and pinion gear with a rotary control valve. In addition the unit incorporates an electronically controlled hydraulic reaction chamber. The PPS varies the amount of hydraulic assist with respect to vehicle road speed.



OPERATION

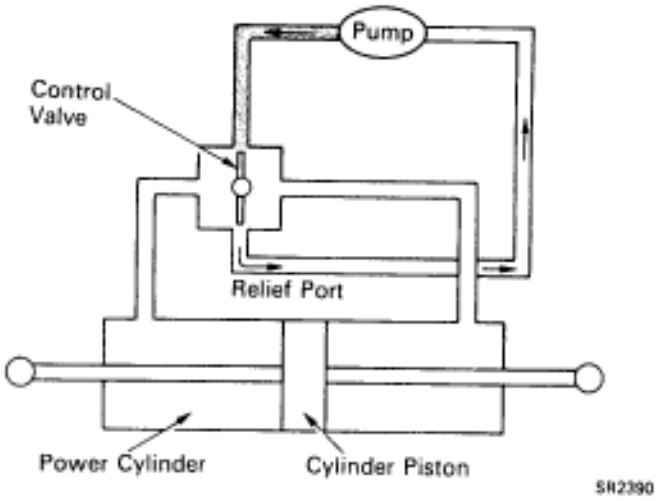
POWER STEERING PRINCIPLES

SR00Z–02

Power steering is one type of hydraulic device for utilizing engine power to reduce steering effort. Consequently, the engine is used to drive a pump to develop fluid pressure, and this pressure acts on a piston within the power cylinder so that the piston assists the rack effort. The amount of this assistance depends on the extent of pressure acting on the piston. Therefore, if more steering force is required, the pressure must be raised. The variation in the fluid pressure is accomplished by a control valve which is linked to the steering main shaft.

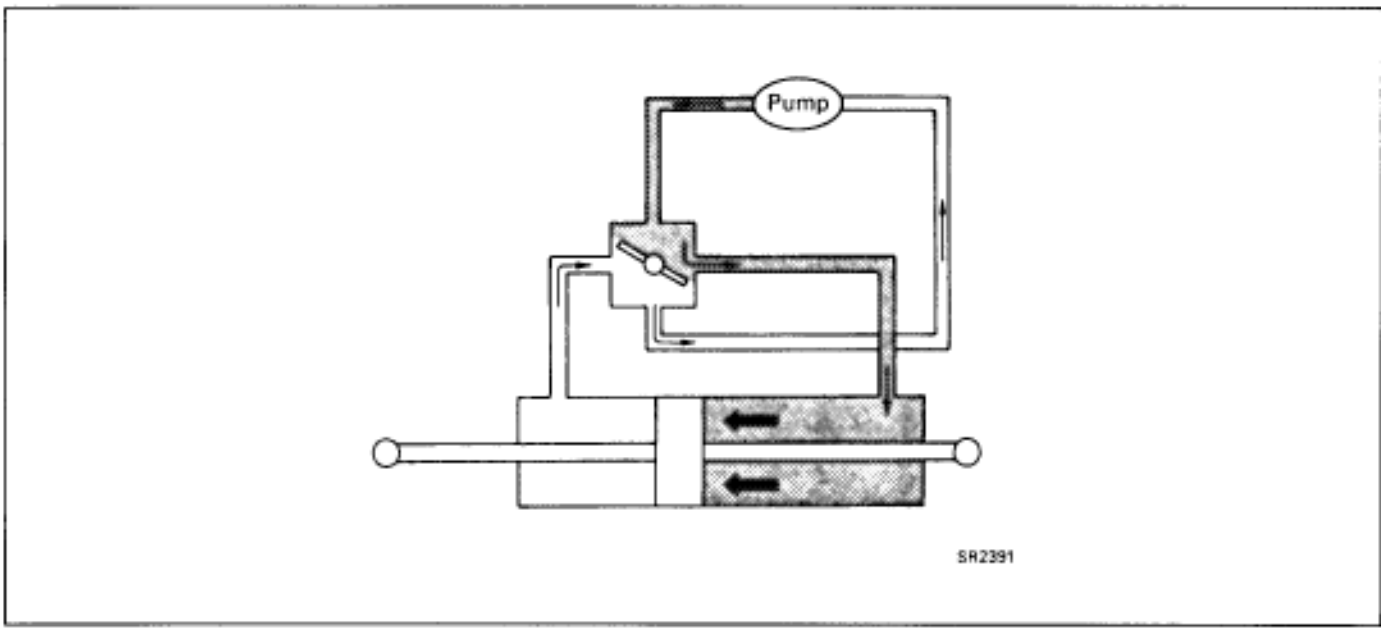
NEUTRAL (STRAIGHT–AHEAD) POSITION

Fluid from the pump is sent to the control valve. If the control valve is in the neutral position, all the fluid will flow through the control valve into the relief port and back to the pump. At this time, hardly any pressure is created and because the pressure on the cylinder piston equal on both sides, the piston will not move in either direction.



WHEN TURNING

When the steering main shaft is turned in either direction, the control valve also moves, closing one of the fluid passages. The other passage then opens wider, causing a change in fluid flow volume and, at the same time, pressure is created. Consequently, a pressure difference occurs between both sides of the piston and the piston moves in the direction of the lower pressure so that the fluid in the cylinder is forced back to the pump through the control valve.



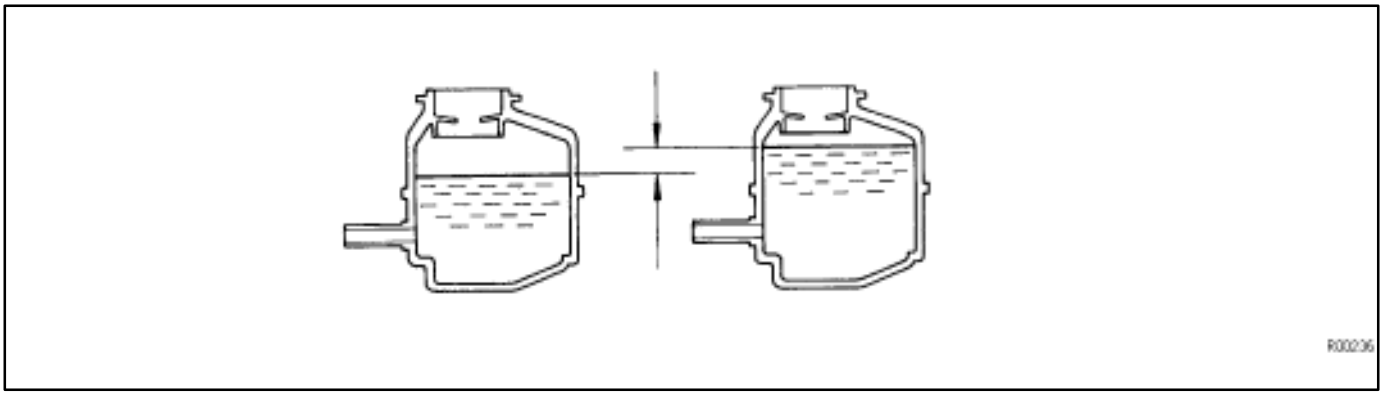
SERVICE HINT

Trouble with the power steering system usually involves hard steering resulting from lack of assist. In such cases, before attempting to make repairs, you should determine whether the trouble lies with the pump or with the gear housing. To do this, use a pressure gauge to perform an on–vehicle inspection.
This model is fitted with a hydraulic cooling fan system which is driven by the power steering fluid. Accordingly, when inspecting the power steering system, you should also inspect the fluid passages of the hydraulic cooling fan system.

ON–VEHICLE INSPECTION

Power steering is a hydraulic device and problems are normally due to insufficient fluid pressure acting on the piston. This could be caused by either the pump not producing the specified fluid pressure or the control valve in the gear housing not functioning properly so that the proper fluid pressure can not be obtained. If the fault lies with the pump, the same symptoms will generally occur whether the steering wheel is turned fully to the right or left. On the other hand, if the fault lies with the control valve, there will generally be a difference between the amount of assist when the steering wheel is turned to the left and right, causing harder steering. However, if the piston seal of the power cylinder is worn, there will be a loss of fluid pressure whether the steering wheel is turned to the right or left and the symptoms will be the same for both.
Before performing an on–vehicle inspection, a check must first be made to confirm that the power steering system is completely free of any air. If there is any air in the system, the volume

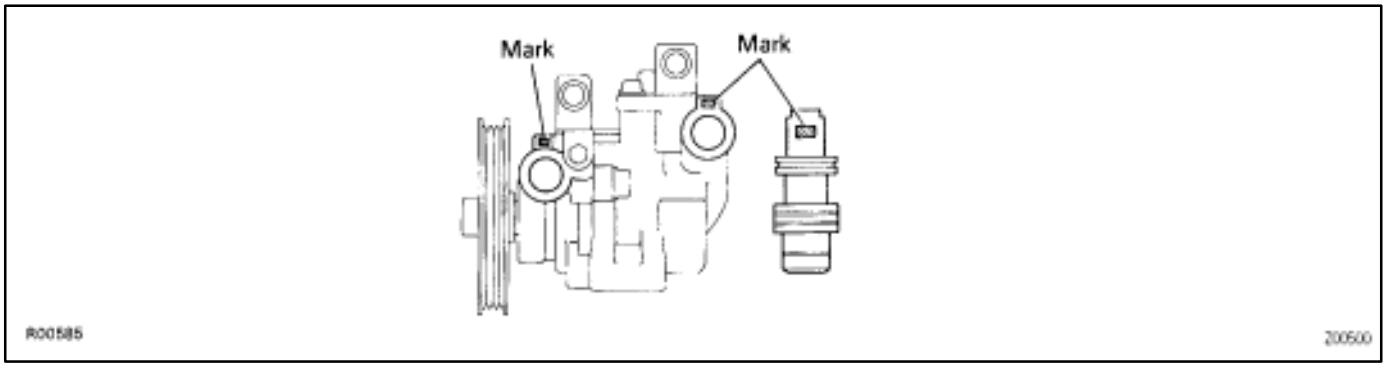
of this air will change when the fluid pressure is raised, causing a fluctuation in the fluid pressure so that the power steering will not function properly. To determine if there is any air in the system, check if there is a change of fluid level in the reservoir tank when the steering wheel is turned fully to the right or left.
If there is air in the system, it will be compressed to a smaller volume when the steering wheel is turned, causing a considerable drop in the fluid level. If the system is free of air, there will be very little change in the level even when the fluid pressure is raised. This is because the fluid, being a liquid, does not change volume when compressed. The small change in the fluid level is due to expansion of the hoses between the pump and gear housing when pressure rises.
Also, air in the system sometimes causes abnormal noise in the pump or gear housing when the steering wheel is fully turned in either direction.
This on–vehicle inspection must be performed every time after overhauling or repairing the pump or gear housing to ensure that the power steering system is working properly.



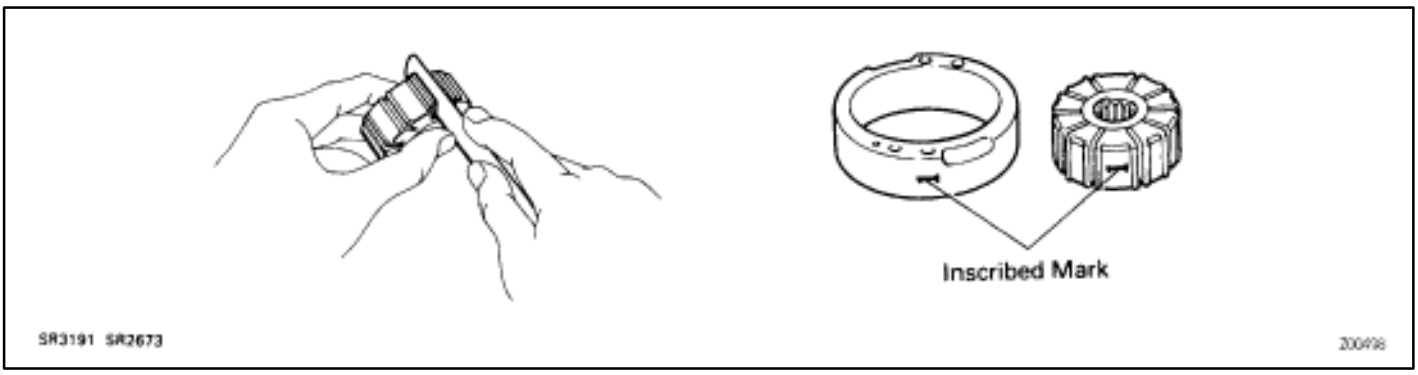
VANE PUMP

The main component parts of the vane pump, such as the cam ring, rotor, vanes and flow control valve are high precision parts and must be handled carefully. Also, because this pump produces a very high fluid pressure, O–rings are used for sealing each part. When reassembling the pump, always use new O–rings.
In the flow control valve, there is a relief valve which controls the maximum pressure of the pump. The amount of this maximum pressure is very important; if it is too low, there will be insufficient power steering assist and if too high, it will have an adverse effect on the pressure hoses, oil seals, etc. If the maximum pressure is either too high or too low due to a faulty relief valve, do not disassemble or adjust the relief valve, but replace the flow control valve as an assembly.

The clearance between the flow control valve and pump body installation hole is very important. After manufacture, the factory measures the size of the installation hole and outer circumference of the flow control valve, and punches a mark accordingly. Therefore, when replacing the flow control valve, be sure to do so with one having the same mark in order to insure the proper clearance.

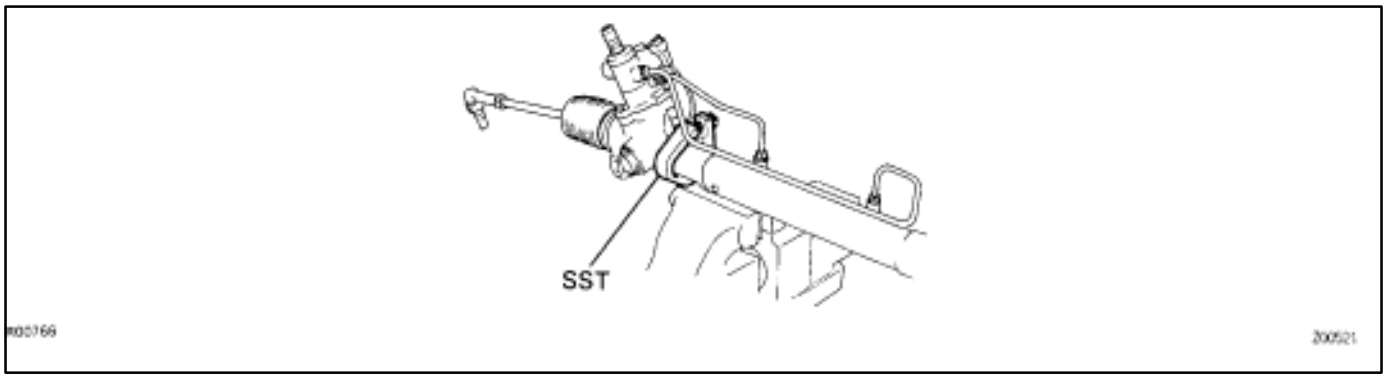


The functional parts of the pump which produce fluid pressure are the cam ring, rotor and vanes, and these should be checked for wear. If the clearance between each is not within standard when reassembling, any worn parts should be replaced.
In this case, the replaced cam ring and rotor should be of the same length (have the same mark), and the vanes should be replaced with those having a length corresponding to that mark, otherwise the proper thrust clearance cannot be obtained. If there is too much thrust clearance, there will be insufficient fluid pressure at low speeds. If there is too little thrust clearance, it may result in seizure of the vanes.



GEAR HOUSING

If the gear housing is secured directly in a vise during overhaul, there is danger of deforming it, so always first secure it in the SST provided (rack and pinion steering rack housing stand) before placing it in the vise.

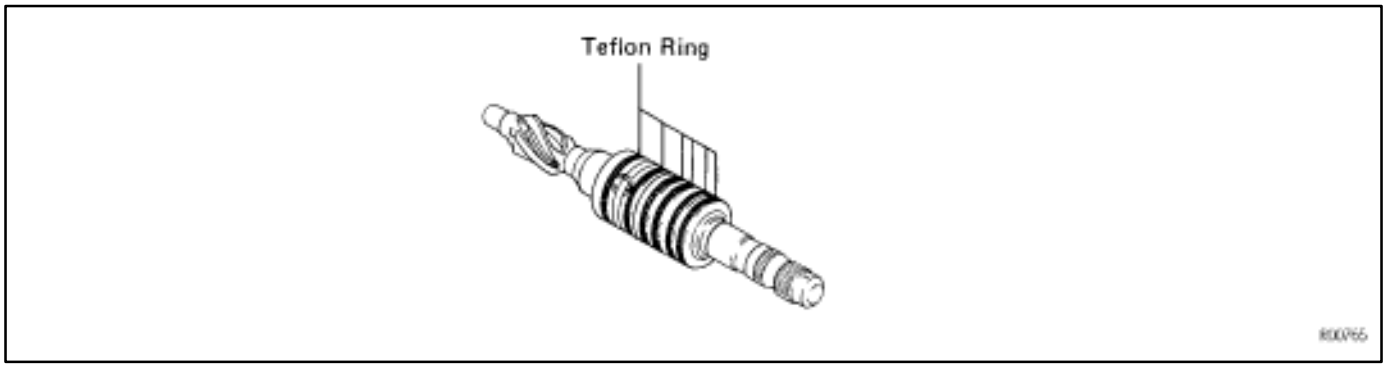


The oil seals on both sides of the power cylinder are for the prevention of leakage of the high pressure fluid which acts on the piston. Always use new oil seals when reassembling and be very careful not to scratch or damage them.

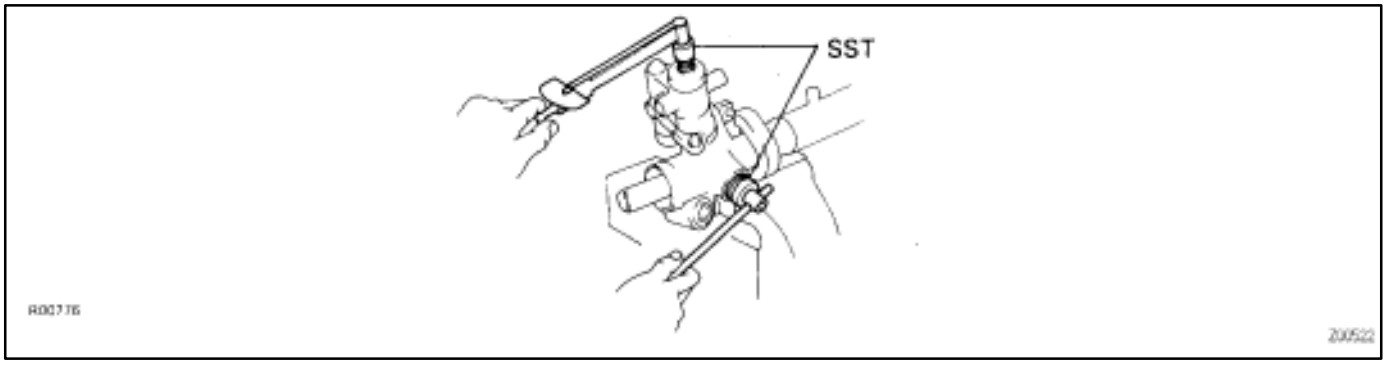
Because of the high pressure, even the slightest scratch will cause fluid leakage, resulting in an inoperative power steering system.

Also, be very careful not to scratch the sliding portion of the rack which makes contact with the oil seals. When removing the rack ends from the rack, it is very easy to cause a burr when holding the tip of the rack with a wrench. Therefore, before assembling the rack, first check the tip for burrs and remove any with an oil stone.

Teflon rings are used for the piston and control valve. These teflon rings are highly durable against wear, but if it is necessary to replace them, be careful not so stretch the new ones. After installing a teflon ring into its groove, snug it down into the groove before assembly of the cylinder or housing to prevent possible damage.



As with the rack and pinion type steering, preload is very important. If the preload is not correct, it could result in such trouble as steering wheel play or shimmy or lack of durability, so always make sure that it is correct.

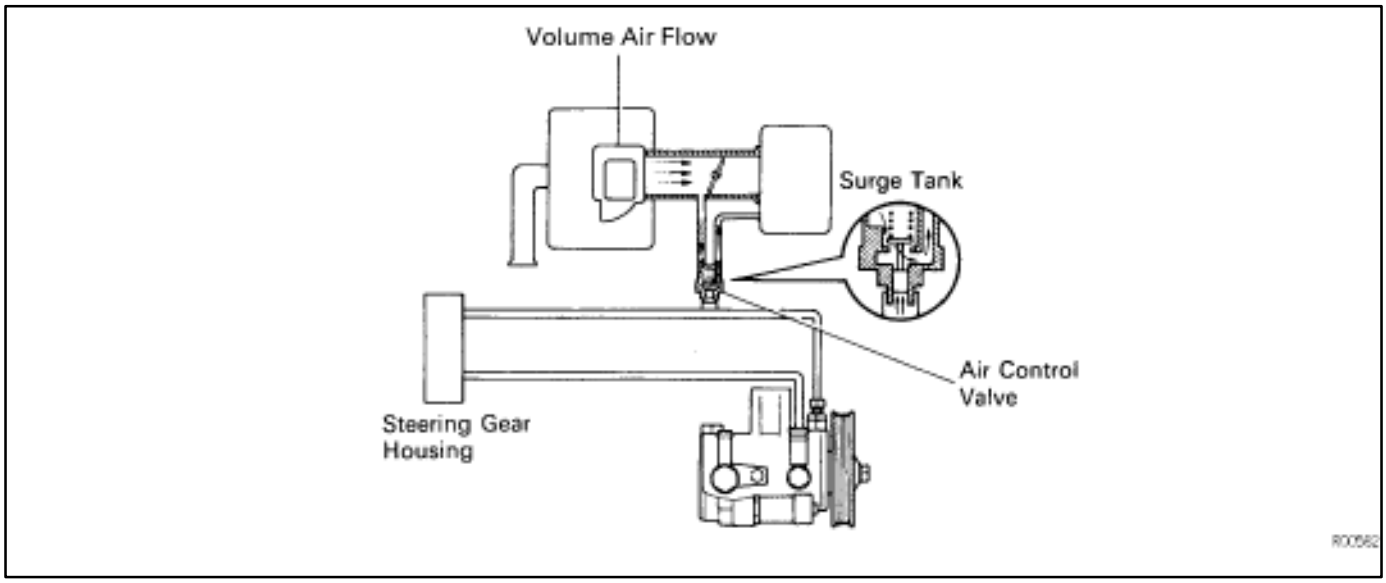


IDLE–UP DEVICE

SR01N–02

The pump produces the maximum fluid pressure when the steering wheel is turned fully to the right or left and, at this time, there is a maximum load on the pump which causes a decrease in engine idle rpm. To solve this problem, vehicles are equipped with an idle–up device which acts to raise the engine idle rpm whenever there is a heavy load on the pump.

On SFI engines, when the piston of the air control valve is pushed by fluid pressure, the air valve opens and the volume of air by–passing the throttle valve is increased to regulate engine rpm.

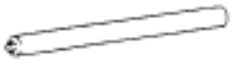


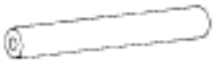
PREPARATION

SR029–02

SST (SPECIAL SERVICE TOOLS)

	09238–47012	Water Pump Bearing Remover & Replacer	PS pump bearing
	09608–12010	Front Hub & Drive Pinion Bearing Replacer Set	Gear housing oil seal
	(09608–00080)	Replacer	
	09612–00012	Rack & Pinion Steering Rack Housing Stand	
	09612–22011	Tilt Handle Bearing Replacer	Control valve oil seal
	09612–24014	Steering Gear Housing Overhaul Tool Set	
	(09613–22011)	Steering Rack Shaft Bushing Puller	
	(09617–24020)	Steering Pinion Bearing Adjusting Screw Lock Nut Wrnech	
	(09617–24030)	Steering Rack End Wrench	PS pump control valve
	09616–00010	Steering Worm Bearing Adjusting Socket	
	09616–30020	Steering Worm Bearing Adjusting Screw Wrench	PS pump pulley
	09617–14010	Steering Rack End Wrench	
	09620–30010	Steering Gear Box Replacer Set	

	(09623–30010)	Steering Worm Bearing & Oil Seal Replacer	
	(09631–00020)	Handle	
	09628–62011	Ball Joint Puller	Tie rod end
	09630–24013	Steering Rack Oil Seal Tool Set	
	(09620–24010)	Valve Cup Oil Seal Remover	
	(09620–24020)	Valve Cup Oil Seal Replacer	
	(09620–24040)	Seal Ring Guide	
	09631–10021	Rack Stopper Wrench	
	09631–10030	Oil Seal Remover	
	09631–12020	Handle	
	09631–12071	Steering Rack Oil Seal Test Tool	
	09631–16010	Cylinder End Stopper Nut Wrench	
	09631–20070	Seal Ring Guide	
	09631–20081	Seal Ring Tool	

	09631–22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	
	09631–32010	Oil Seal Replacer	
	09631–33010	Steering Rack Cover "I"	
	09633–00020	Power Steering Hose Nut Wrench	
	09910–00015	Puller Set	
	(09911–00011)	Puller Clamp	
	(09912–00010)	Puller Slide Hammer	

RECOMMENDED TOOLS

SR01P–02

	09025–00010	Small Torque Wrench	For measuring preload
	09082–00015	TOYOTA Electrical Tester	
	09905–00012	Snap Ring No. 1 Expander	
	09905–00013	Snap Ring Pliers	

EQUIPMENT

SR027–02

Belt tension gauge	
Calipers	
Dial indicator	

Micrometer	
Oil pressure gauge	
Torque wrench	
Vacuum gauge	

LUBRICANT

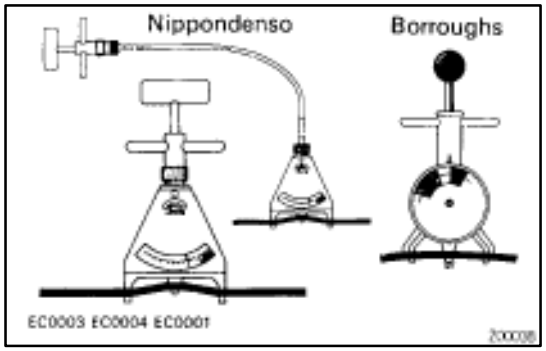
SR015–02

Item	Capacity	Classification
Power steering fluid Total	2.2 liters (2.3 US qts, 1.9 lmp.qts)	ATF DEXRON® II

SSM (SPECIAL SERVICE MATERIALS)

SR016–03

08833–0008	Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	Rack housing cap Rack guide spring cap Rack guide spring cap lock nut



ON–VEHICLE INSPECTION

DRIVE BELT TENSION CHECK

SR01Q–02

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

Belt tension gauge:

Nippondenso BTG–20 (95506–00020) or
Borroughs No.BT–33–73F

Drive belt tension:

New belt

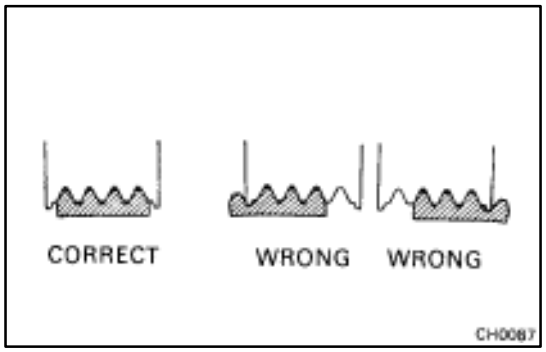
667–824 N (68–84 kgf, 150–185 lbf)

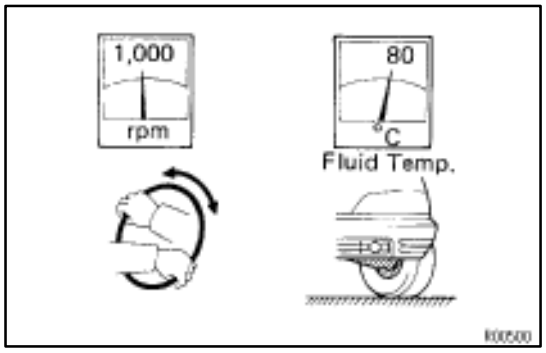
Used belt

422–598 N (43–61 kgf, 95–135 lbf)

HINT:

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





FLUID LEVEL CHECK

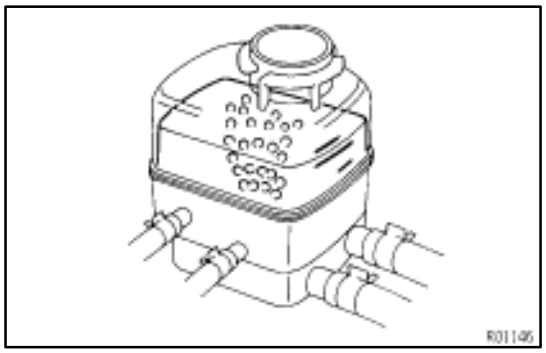
SR00F–03

1. **KEEP VEHICLE LEVEL**
2. **BOOST FLUID TEMPERATURE**

With the engine idling at 1,000 rpm or less, turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature:

80° C (176° F)



3. **CHECK FOR FORMING OR EMULSIFICATION**

HINT: Forming and emulsification indicate either the existence of air in the system or that the fluid level is too low.

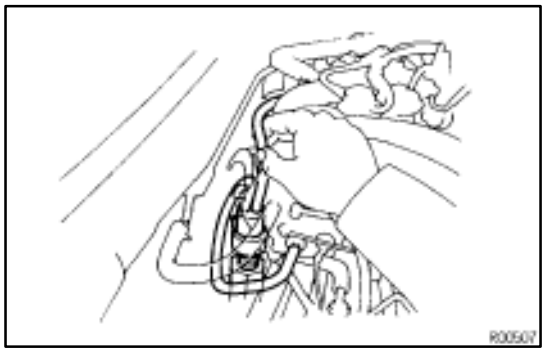
4. **CHECK FLUID LEVEL IN RESERVOIR**

Check the fluid level and add fluid if necessary.

Fluid:

ATF DEXRON® II

HINT: Check that the fluid level is within the HOT LEVEL of the tank. If the fluid is cold, check that it is within the COLD LEVEL of the tank.



IDLE–UP CHECK

SR01R–01

1. WARM UP ENGINE

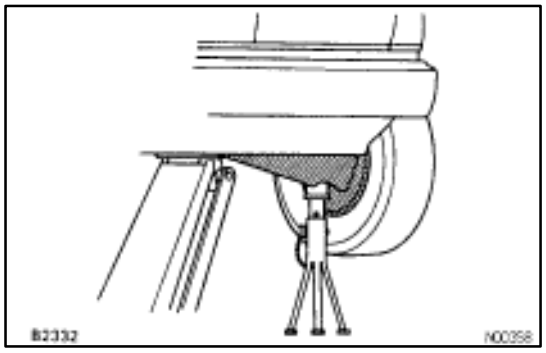
2. TURN AIR CONDITIONING SWITCH OFF

3. CHECK IDLE–UP

(a) Fully turn the steering wheel.

(b) Check that the engine rpm decreases when the air control valve hose is pinched.

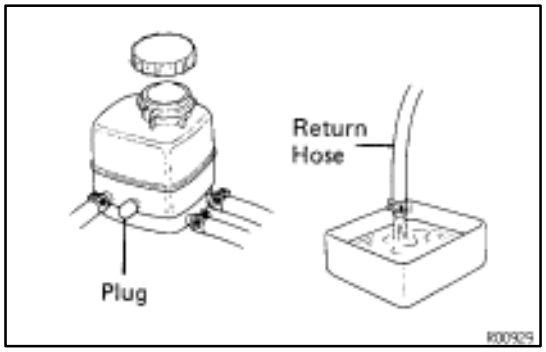
(c) Check that the engine rpm increases when the air control valve hose is released.



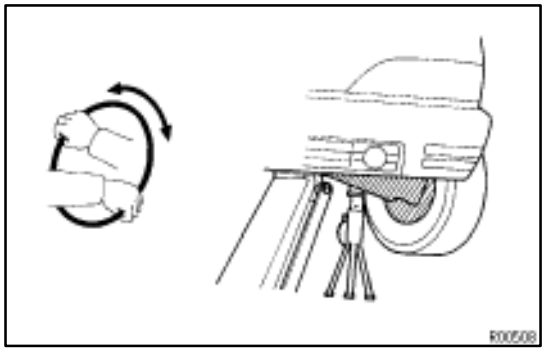
POWER STEERING FLUID REPLACEMENT

SR018–01

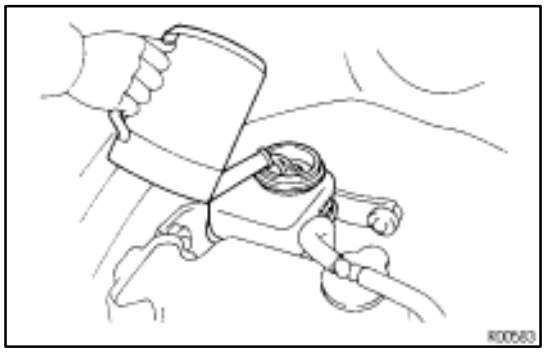
1. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS



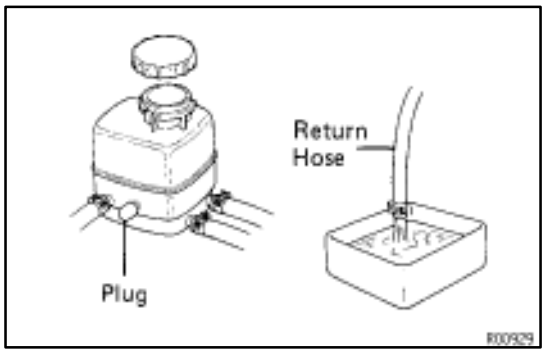
2. REMOVE FLUID RETURN HOSE FROM RESERVOIR TANK AND DRAIN FLUID INTO CONTAINER



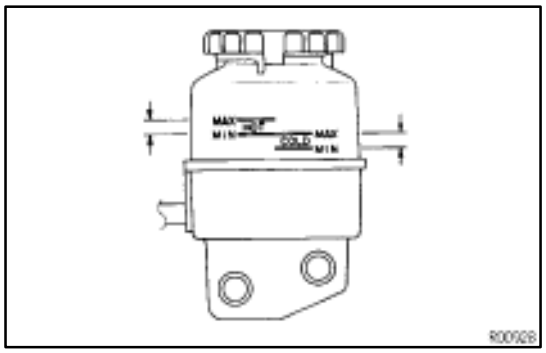
3. **WITH ENGINE IDLING, TURN STEERING WHEEL FROM LOCK TO LOCK WHILE DRAINING FLUID**
4. **STOP ENGINE**



5. **FILL RESERVOIR TANK WITH FRESH FLUID**
   Fluid:
   ATF DEXRON® II



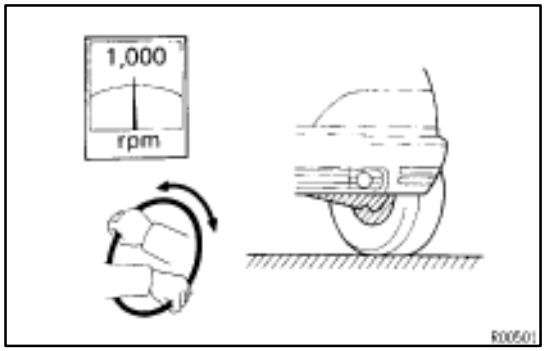
6. **START ENGINE AND RUN IT AT 1,000 RPM**
   After 1 or 2 seconds, fluid will begin to discharge from the return hose. Stop the engine immediately at this time.
   NOTICE: Take care that some fluid remains left in the reservoir tank.
7. **REPEAT STEPS 5 AND 6 FOUR OR FIVE TIMES UNTIL THERE IS NO MORE AIR IN FLUID**
8. **CONNECT RETURN HOSE TO RESERVOIR TANK**
9. **BLEED POWER STEERING SYSTEM**



POWER STEERING SYSTEM BLEEDING

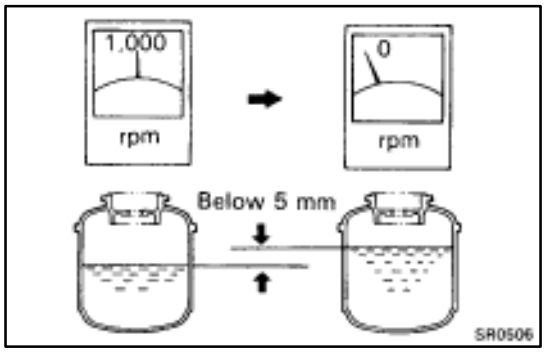
SR00G–02

1. **CHECK FLUID LEVEL IN RESERVOIR TANK**
   Check the fluid level and add fluid if necessary.
   Fluid:
   ATF DEXRON® II
   HINT: Check that the fluid level is within the HOT LEVEL of the tank. If the fluid is cold, check that it is within the COLD LEVEL of the tank.



2. START ENGINE AND TURN STEERING WHEEL FROM LOCK TO LOCK THREE OR FOUR TIMES

With the engine speed below 1,000 rpm, turn the steering wheel to left or right full lock and keep it there for 2–3 seconds, then turn the wheel to the reverse full lock and keep it there for 2–3 seconds.



3. CHECK THAT FLUID IN RESERVOIR IS NOT FOAMY OR CLOUDY AND DOES NOT RISE OVER MAXIMUM WHEN ENGINE IS STOPPED

Measure the fluid level with the engine running. Stop the engine and measure the fluid level.

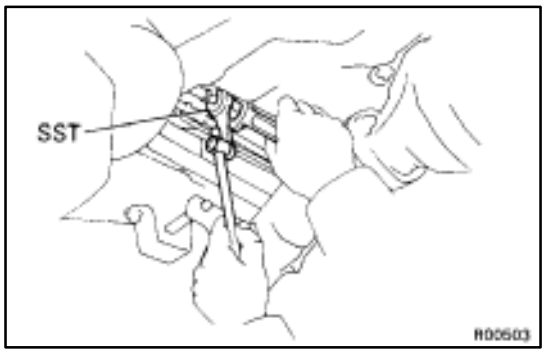
Maximum rise:

5mm (0.20in.)

If a problem is found, repeat steps 5 to 8 on page SR –30. Repair the PS if the problem persists.

OIL PRESSURE CHECK

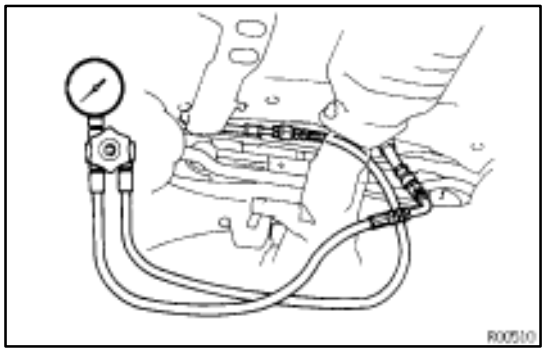
SR02P–01



1. CONNECT PRESSURE GAUGE

(a) Remove the tube clamp.

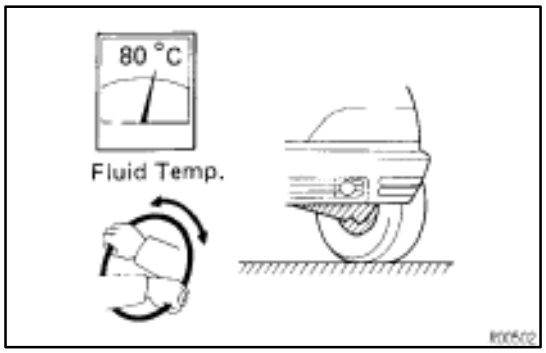
(b) Using SST, disconnect the pressure line joint.
SST 09631–22020



(c) Connect the gauge side of the pressure gauge to the PS pump side, and the valve side to the gear housing side.

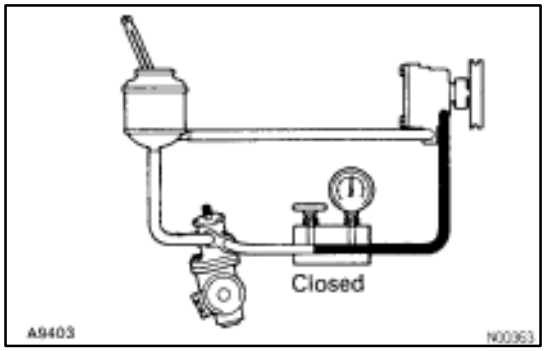
(d) Bleed the system. Start the engine and turn the steering wheel from lock to lock two or three times.

(e) Check that the fluid level is correct.



2. CHECK THAT FLUID TEMPERATURE IS AT LEAST 80°C (176° F)

3. START ENGINE AND RUN IT AT IDLE



4. CHECK FLUID PRESSURE READING WITH VALVE CLOSED

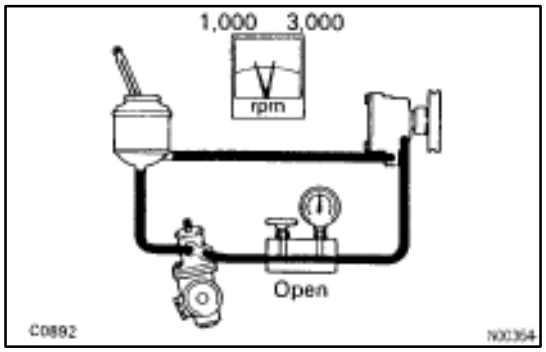
Close the pressure gauge valve and observe the reading on the gauge.

Minimum pressure:

9,316 kPa (95 kgf/cm•, 1,351 psi)

NOTICE:

- **Do not keep the valve closed for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**



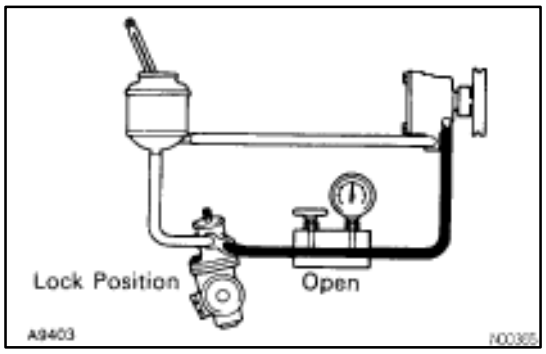
If pressure is low, repair or replace the PS pump.

5. OPEN VALVE FULLY

6. CHECK AND RECORD PRESSURE READING AT 1,000 RPM

7. CHECK AND RECORD PRESSURE READING AT 3,000 RPM

Check that there is 490 kPa (5 kgf/cm•, 71 psi) or less difference in pressure between the 1,000 rpm and 3,000 rpm checks.



If the difference is excessive, repair or replace the flow control valve of the PS pump.

8. CHECK PRESSURE READING WITH STEERING WHEEL TURNED TO FULL LOCK

Be sure the pressure gauge valve is fully opened and the engine idling.

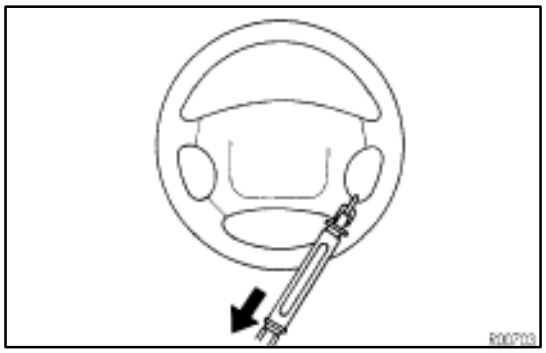
Minimum pressure:

9,316 kPa (95 kgf/cm•, 1,351 psi)

NOTICE:

- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

If pressure is low, the gear housing has an internal leak and must be repaired or replaced.



9. MEASURE STEERING EFFORT

(a) Center the steering wheel and run the engine at idle.

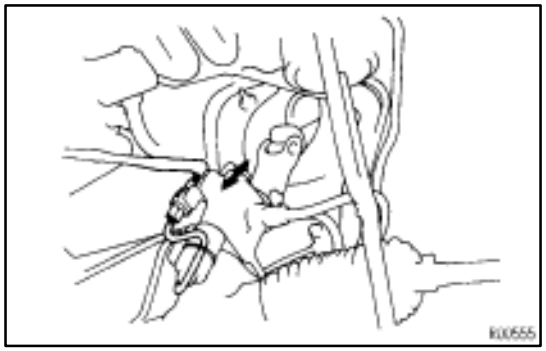
(b) Using a spring scale, measure the steering effort in both directions.

Maximum steering effort:

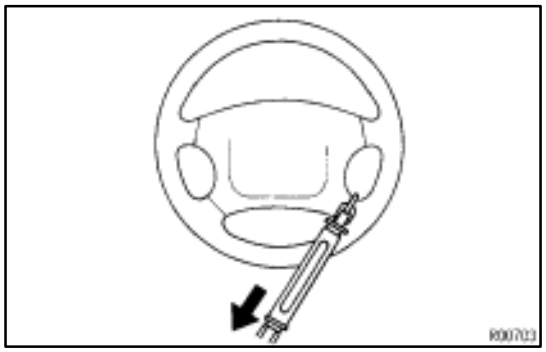
34 N (3.5 kgf, 7.7 lbf)

If steering effort is excessive, repair the PS unit.

HINT: Be sure to consider the tire type, pressure and contact surface before making your diagnosis.



(c) Disconnect the solenoid connector.



(d) Using a spring scale, measure the steering effort in both directions.

(Reference)

Maximum steering effort:

78 N (8 kgf, 17.6 lbf)

If steering effort is not heavier than (b), check the solenoid.

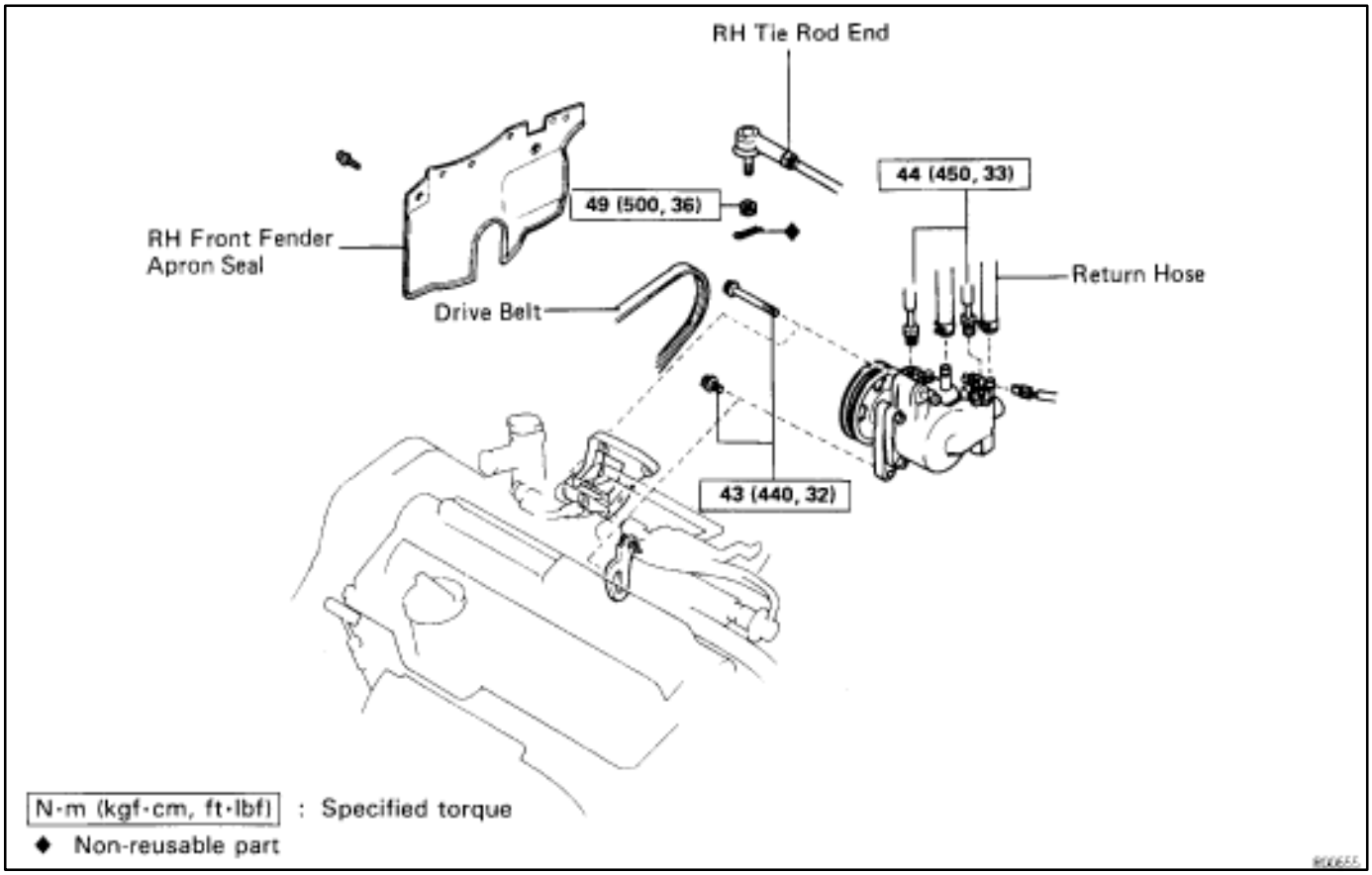
HINT: Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

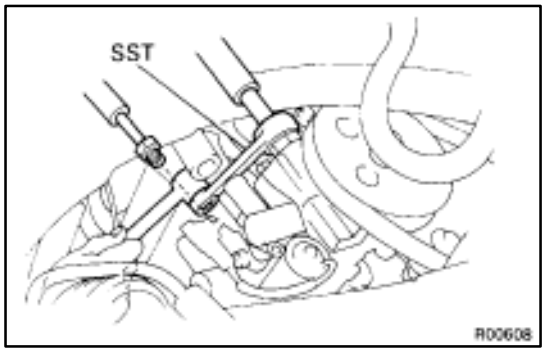
POWER STEERING PUMP

SR01X–01

POWER STEERING PUMP REMOVAL AND INSTALLATION

Remove and install the parts as shown.



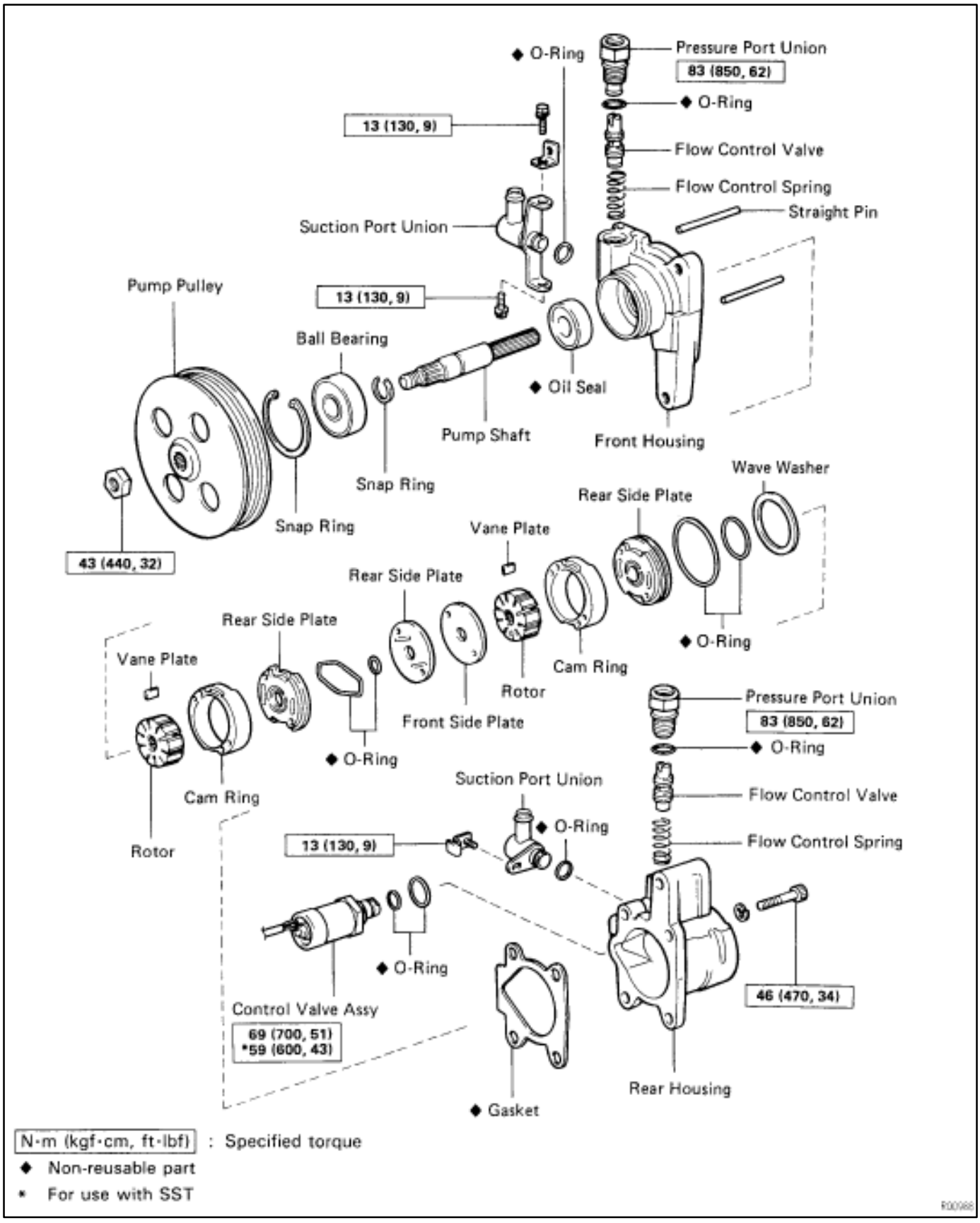


(MAIN POINTS OF REMOVAL AND INSTALLATION)

1. **REMOVE PRESSURE TUBES**
   Using SST, remove the pressure tubes.
   SST 09631–22020
2. **ADJUST DRIVE BELT TENSION AFTER INSTALLING PS PUMP**
3. **BLEED POWER STEERING SYSTEM**

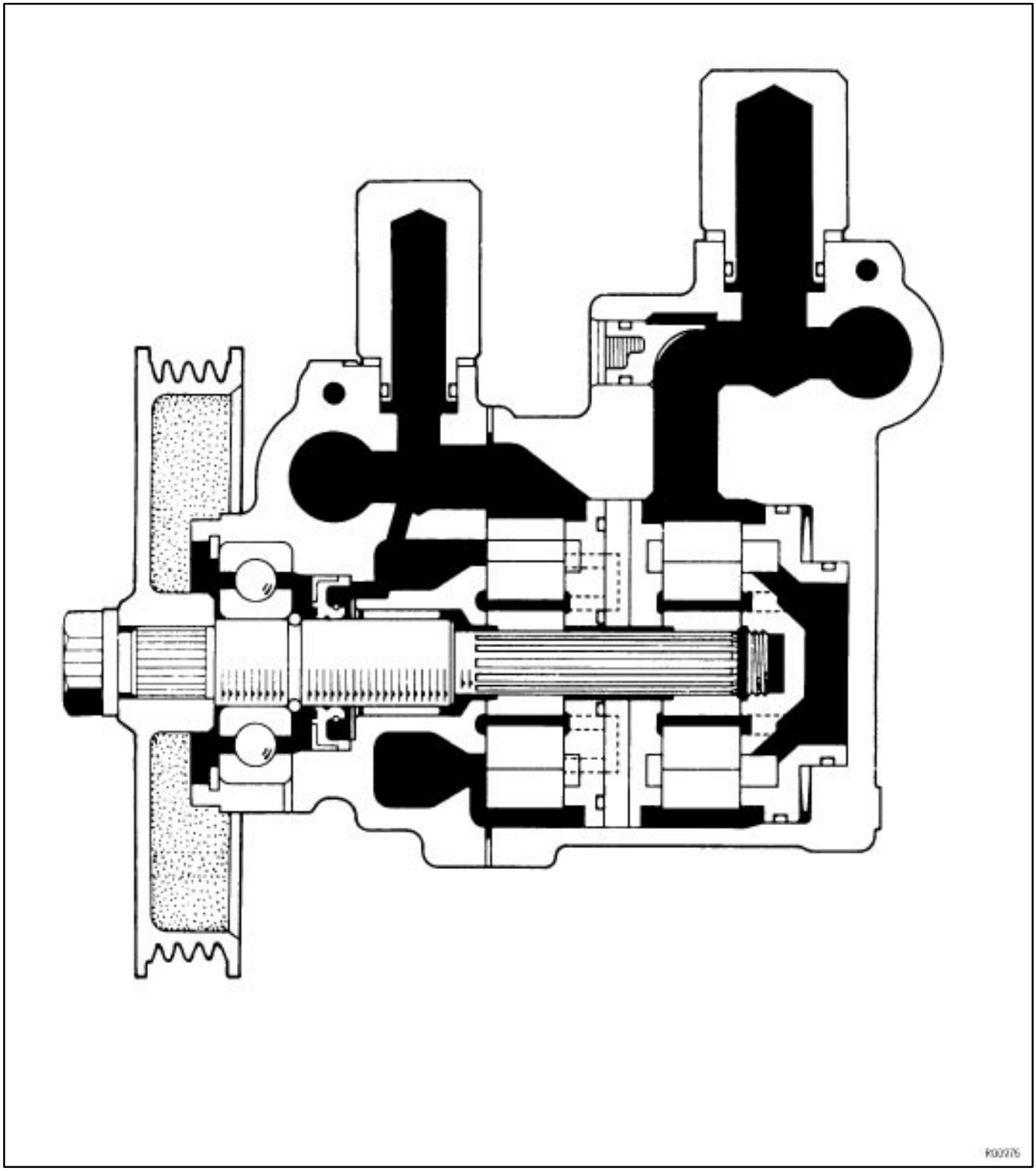
COMPONENTS

SR00K–03



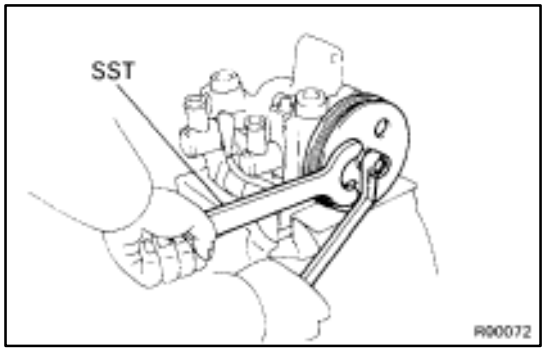
SECTIONAL VIEW

SR02Q–01



POWER STEERING PUMP DISASSEMBLY

SR01Y–01

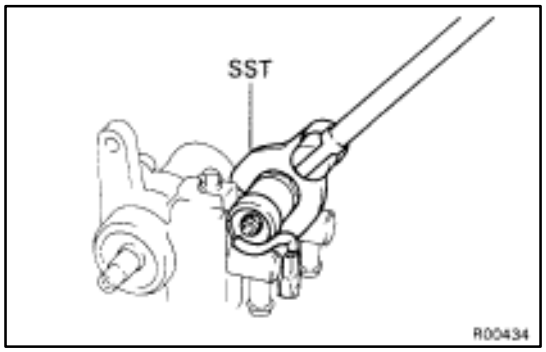


1. MOUNT POWER STEERING PUMP IN VISE
NOTICE: Do not tighten the vise to tight.

2. REMOVE PS PUMP PULLEY

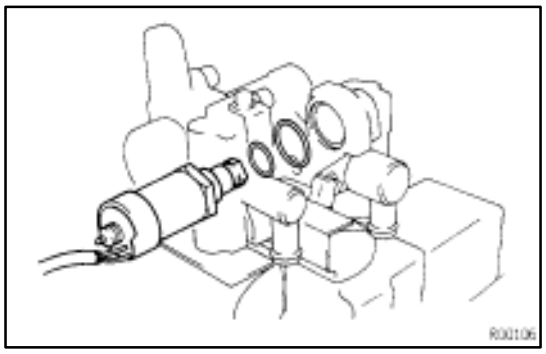
(a) Using SST, remove the pulley set nut.
SST 09616–30020

(b) Remove the pump pulley from the shaft.



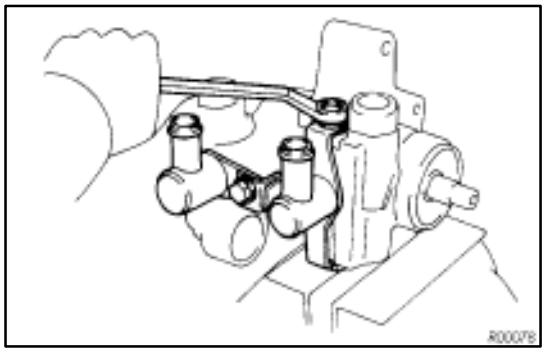
3. REMOVE CONTROL VALVE

(a) Using SST, remove the control valve.
SST 09612–24014 (09617–24030)



(b) Remove the O–ring from the control valve.

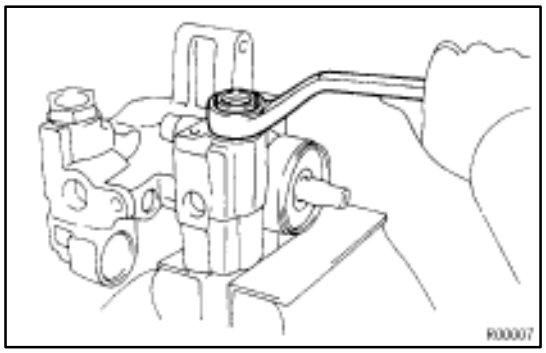
(c) Remove the O–ring from the rear housing.



4. REMOVE SUCTION PORT UNIONS

(a) Remove the three bolts and two suction port unions.

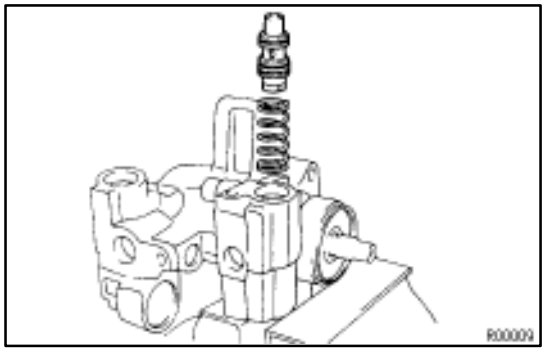
(b) Remove the O–ring from each suction port union.



5. REMOVE FLOW CONTROL VALVE (For PS)

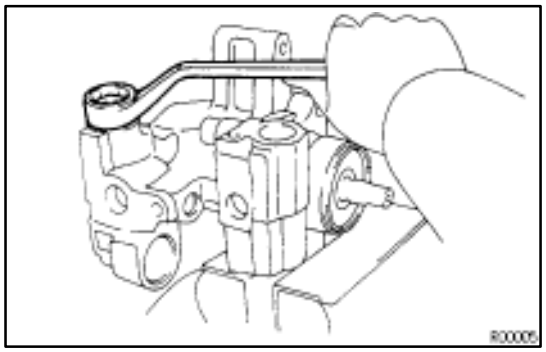
(a) Remove the pressure port union.

(b) Remove the O–ring from the pressure port union.



(c) Using a magnetic finger, remove the flow control valve and spring.

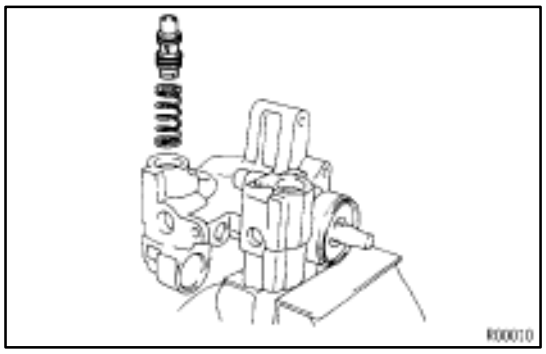
NOTICE: Be careful not to confuse the flow control valve of the PS with that of the hydraulic cooling fan system.



6. REMOVE FLOW CONTROL VALVE (For Hydraulic Cooling Fan System)

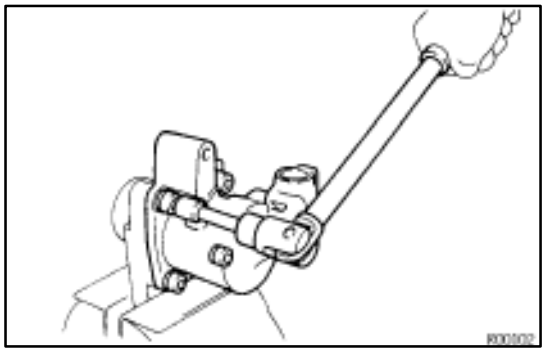
(a) Remove the pressure port union.

(b) Remove the O–ring from the pressure port union.



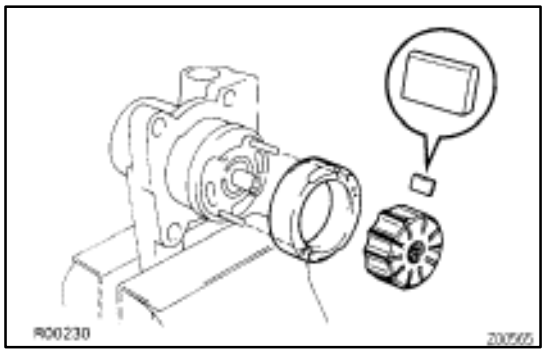
(c) Using a magnetic finger, remove the flow control valve and spring.

NOTICE: Be careful not to confuse the flow control valve of the hydraulic cooling fan system with that of the PS.



7. REMOVE REAR HOUSING

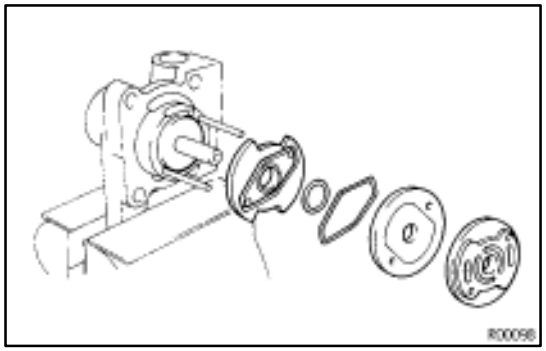
Using a hexagon wrench (8 mm), remove the four bolts, rear housing and gasket.



8. REMOVE CAM RING, ROTOR AND VANE PLATE (For Hydraulic Cooling Fan System)

Remove the cam ring, rotor and ten vane plates.

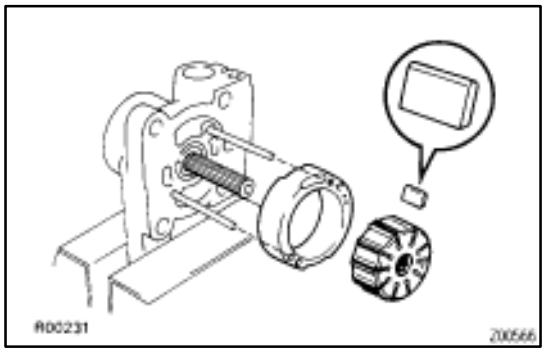
NOTICE: Be careful not to confuse the cam ring, rotor and vane plates of the hydraulic cooling fan system with those of the PS.



9. REMOVE FRONT SIDE PLATE AND TWO REAR SIDE PLATES

(a) Remove the front side plate and two rear side plates.

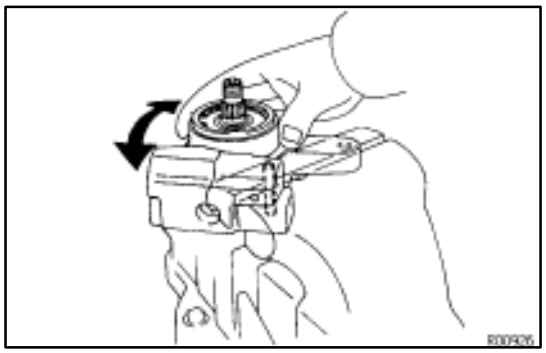
(b) Remove the two O–rings from the rear side plate.



10. REMOVE CAM RING, ROTOR AND VANE PLATES (For PS)

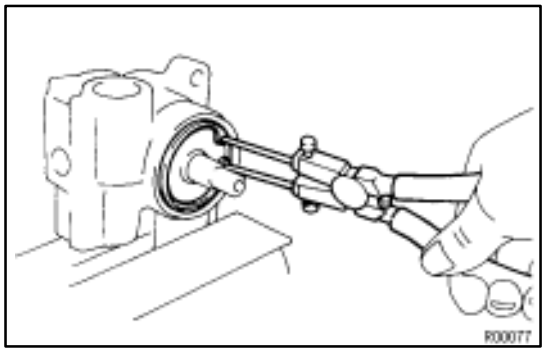
Remove the cam ring, rotor and ten vane plates.

NOTICE: Be careful not to confuse the cam ring, rotor and vane plates of the PS with those of the hydraulic cooling fan system.



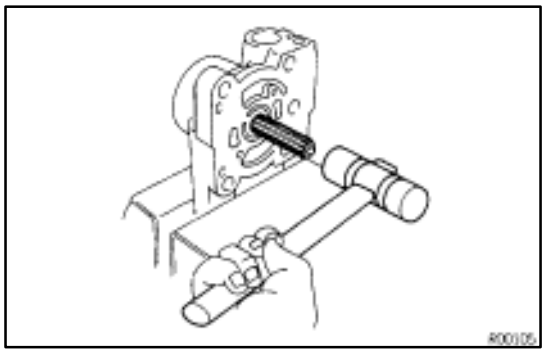
11. REMOVE STRAIGHT PINS

Put each straight pin in the vise and rotate the housing to pull the straight pin out from the housing.

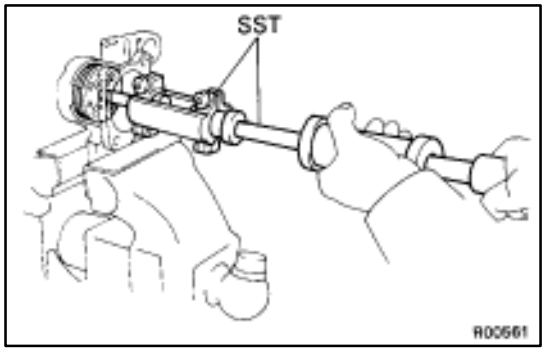


12. REMOVE PUMP SHAFT

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



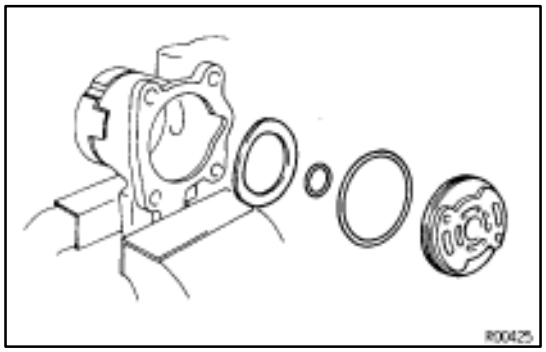
(b) Using a plastic hammer, tap out the pump shaft.



13. REMOVE REAR SIDE PLATE AND WAVE WASHER FROM REAR HOUSING

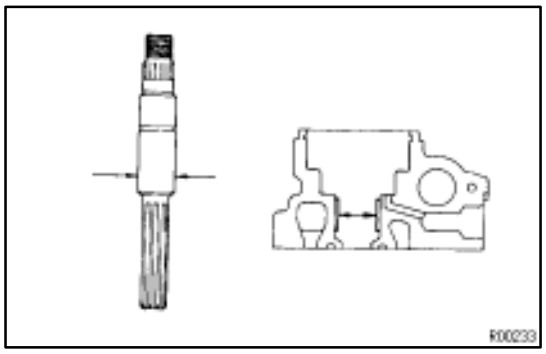
(a) Install a suitable bolt and plate washer to the rear plate.

(b) Using SST, remove the rear plate.
SST 09910–00015 (09911–00011, 09912–00010)



(c) Remove the two O–rings from the rear side plate.

(d) Remove the wave washer.



POWER STEERING PUMP INSPECTION AND REPLACEMENT

SR01Z–02

NOTICE: Be careful not to confuse the parts of the PS with those of the hydraulic cooling fan system.

1. MEASURE OIL CLEARANCE OF SHAFT AND BUSHING

Using a micrometer and calipers, measure the oil clearance.

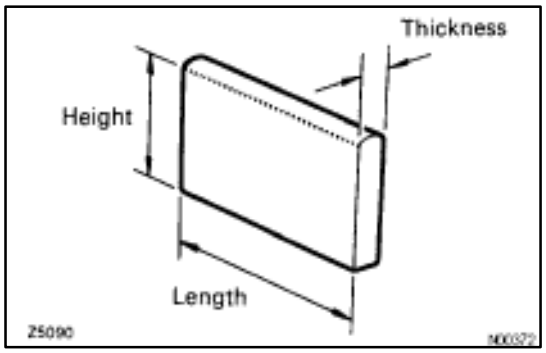
Standard clearance:

0.03–0.05 mm (0.0012–0.0020 in.)

Maximum clearance:

0.07 mm (0.0028 in.)

If more than maximum, replace the entire power steering pump.



2. INSPECT ROTOR AND VANE PLATES

(a) Using a micrometer, measure the height, thickness and length of the vane plates.

(For PS)

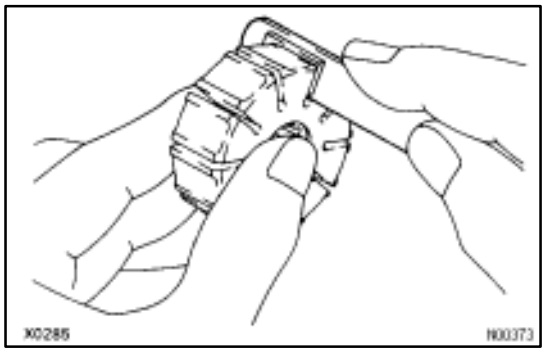
Minimum height:

8.6 mm (0.339 in.)

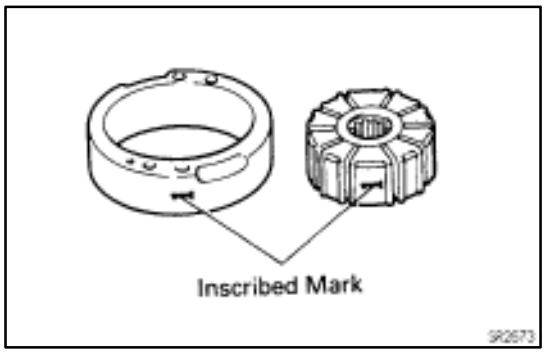
Minimum thickness:

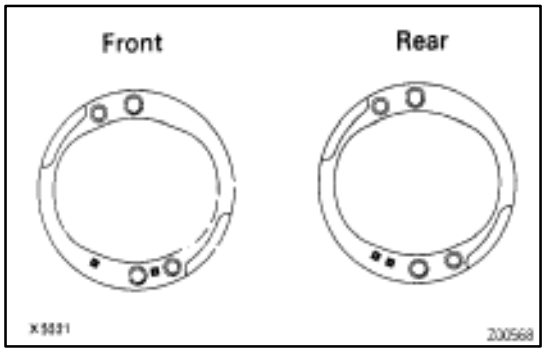
1.4 mm (0.055 in.)

Minimum length:
14.99 mm (0.5902 in.)
(For Hydraulic Cooling Fan System)
Minimum height:
8.1 mm (0.319 in.)
Minimum thickness:
1.8 mm (0.071 in.)
Minimum length:
14.98 mm (0.5898 in.)



(b) Using a feeler gauge, measure the clearance between the rotor groove and vane plate.
Maximum clearance:
0.035 mm (0.0014 in.)
If more than maximum, replace the vane plate and/or rotor.
HINT: There are five lengths with the following rotor and cam ring marks.



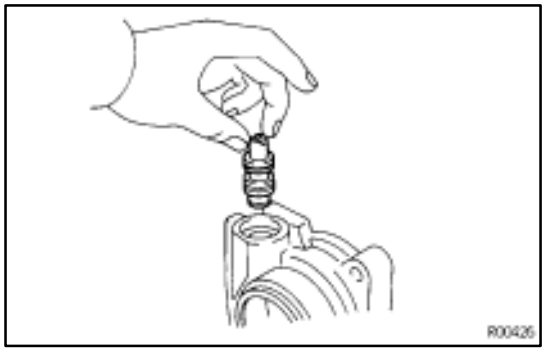


(For PS)

Cam ring mark	Rotor mark	Vane length mm (in.)
2	None	15.003–15.005 (0.59067–0.59075)
3	1	15.001–15.003 (0.59059–0.59067)
4	2	14.999–15.001 (0.59051–0.59059)
5	3	14.997–14.999 (0.59043–0.59051)
6	4	14.995–14.997 (0.59035–0.59043)

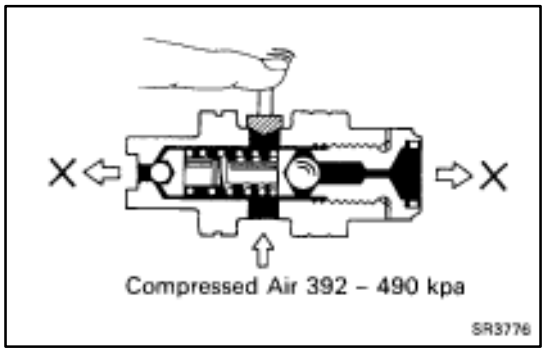
(For Hydraulic Cooling Fan System)

Cam ring mark	Rotor mark	Vane length mm (in.)
1	None	14.996–14.998 (0.59039–0.59047)
2	1	14.994–14.996 (0.59031–0.59039)
3	2	14.992–14.994 (0.59024–0.59031)
4	3	14.990–14.992 (0.59016–0.59024)
5	4	14.988–14.990 (0.59008–0.59016)

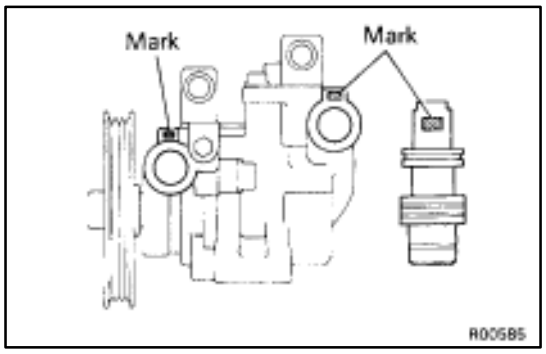


3. INSPECT FLOW CONTROL VALVE

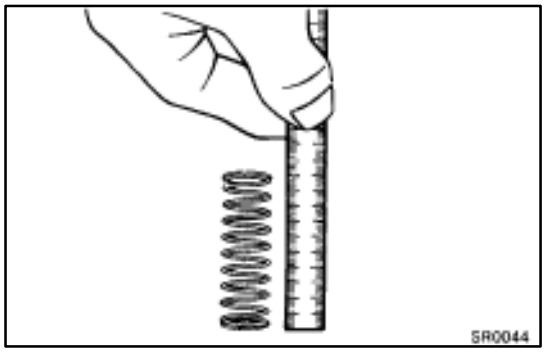
(a) Coat the valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.



(b) Check the flow control valve for leakage.
Close one of the holes and apply compressed air [392 –490 kPa (4–5 kgf/cm•, 57–71 psi)] into the opposite side, and confirm that air does not come out from the end holes.

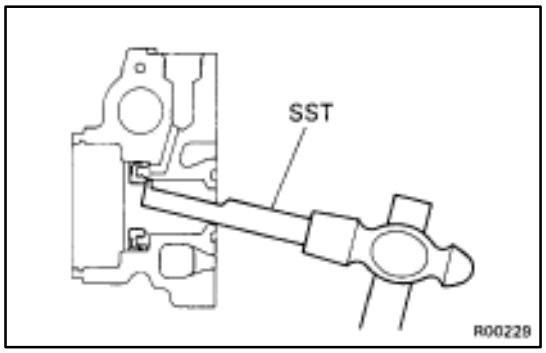


If necessary, replace the valve with one having the same letter as inscribed on the front housing.
Inscribed mark:
A,B,C,D,E or F



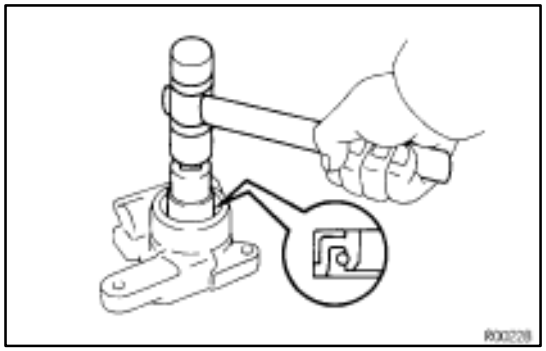
4. INSPECT FLOW CONTROL SPRING

Using a scale, measure the free length of the spring.
Spring length:
37–39 mm (1.46–1.54 in.)

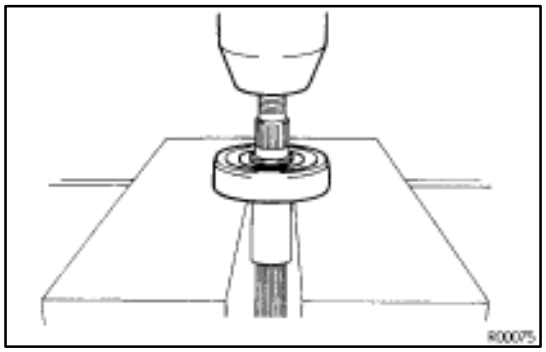


5. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST and a hammer, drive out the oil seal.
SST 09631–10030

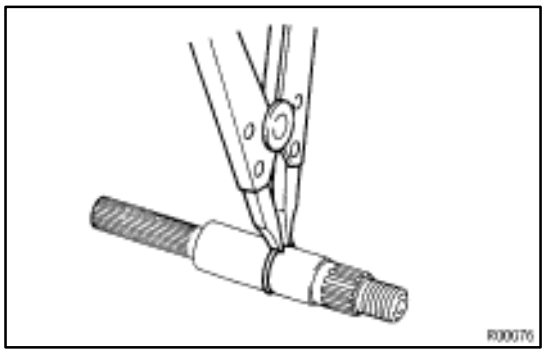


(b) Using a socket wrench (24 mm) and hammer, drive in a new oil seal.

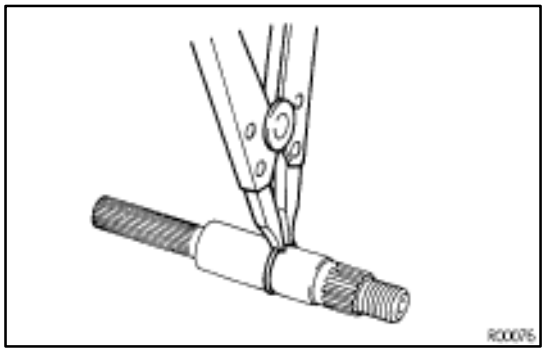


6. IF NECESSARY, REPLACE BALL BEARING

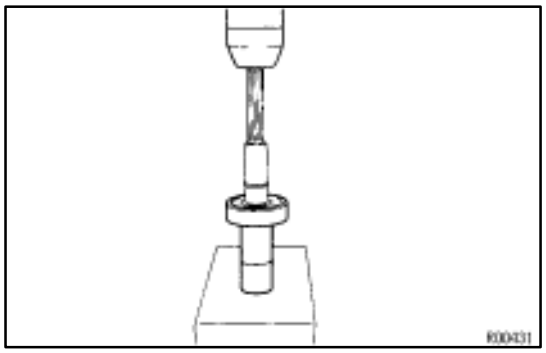
(a) Using a press, remove the ball bearing from the pump shaft.



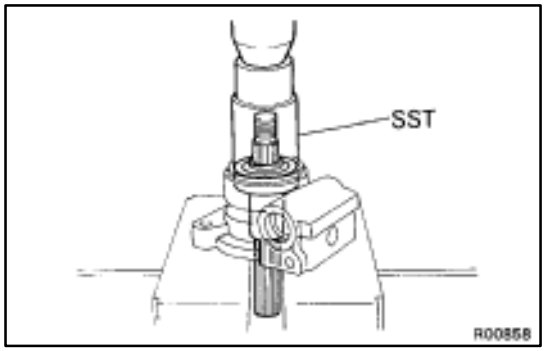
(b) Using snap ring pliers, remove the snap ring from the pump shaft.



(c) Using snap ring pliers, install the snap ring to the pump shaft.



(d) Using a press and deep socket wrench (17 mm), install a new ball bearing to the pump shaft.



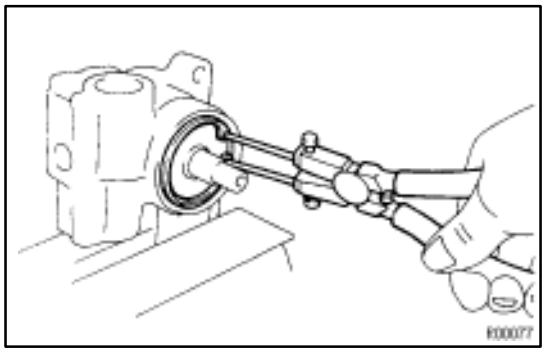
POWER STEERING PUMP ASSEMBLY

SR020–01

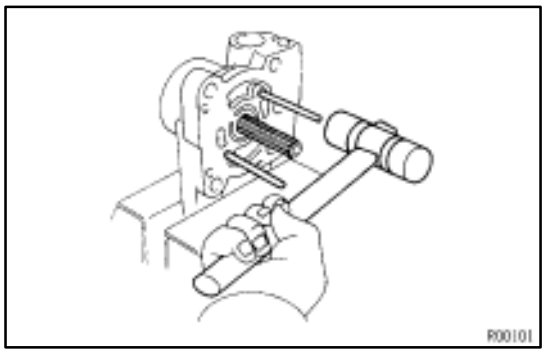
1. COAT ALL SLIDING SURFACES WITH POWER STEERING FLUID BEFORE ASSEMBLY

2. INSTALL PUMP SHAFT

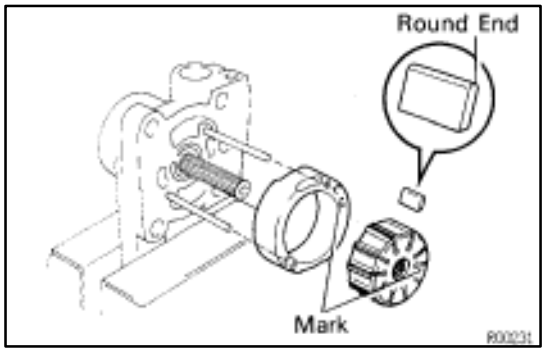
(a) Using SST and a press, install the pump shaft with the ball bearing.
SST 09238–47012



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

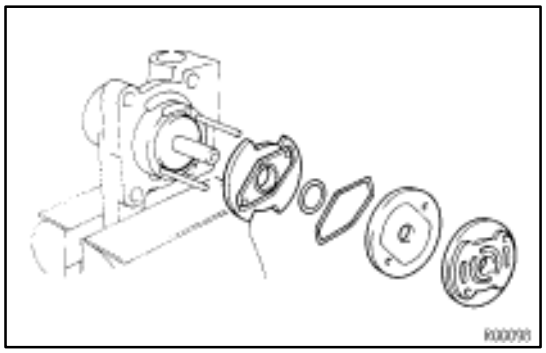


3. INSTALL STRAIGHT PINS
Using a plastic hammer, tap in the two straight pins.



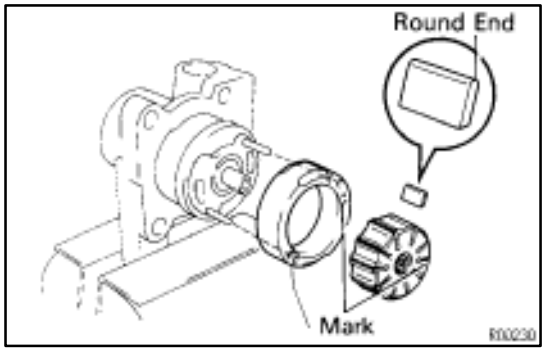
4. INSTALL CAM RING, ROTOR AND VANE PLATES (For PS)

(a) Align the holes of the cam ring and straight pins, and install the cam ring with the inscribed mark facing outward.
(b) Install the rotor to the shaft with the inscribed mark facing outward.
(c) Coat the vane plates with power steering fluid.
(d) Install the ten vane plates with the round end facing outward.



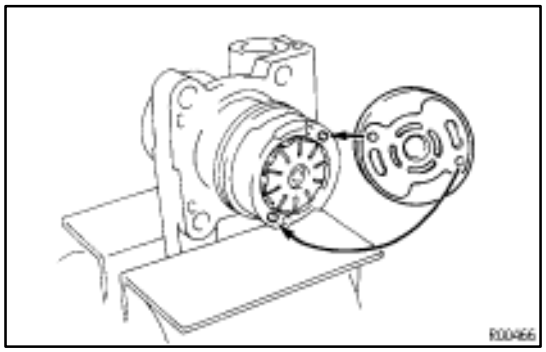
5. INSTALL FRONT SIDE PLATE AND TWO REAR SIDE PLATES

(a) Install two new O–rings to the rear side plate.
(b) Align the holes of the plates and straight pins, and install the plates.



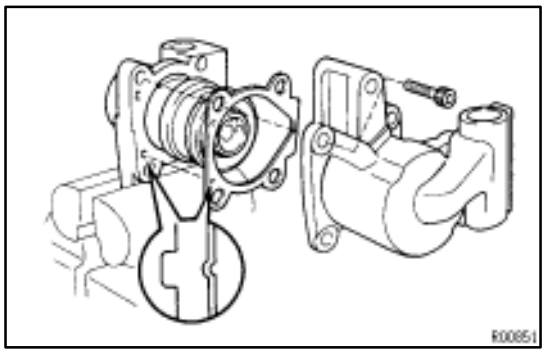
6. INSTALL CAM RING, ROTOR AND VANE PLATES (For Hydraulic Cooling Fan System)

(a) Align the holes of the cam ring and straight pins, and install the cam ring with the inscribed mark facing outward.
(b) Install the rotor to the shaft with the inscribed mark facing outward.
(c) Coat the vane plates with power steering fluid.
(d) Install the ten vane plates with the round end facing outward.



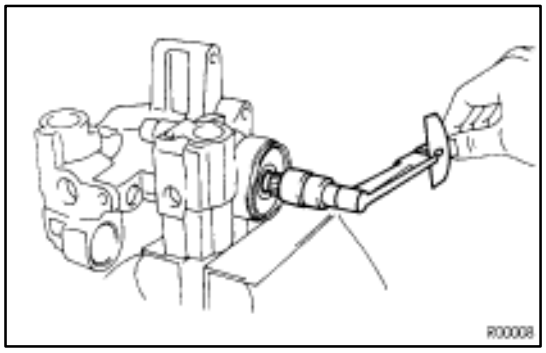
7. INSTALL REAR SIDE PLATE AND WAVE WASHER

(a) Install two new O–rings to the rear side plate.
(b) Align the holes of the side plate with the pins, and install the plate.
(c) Install the wave washer.



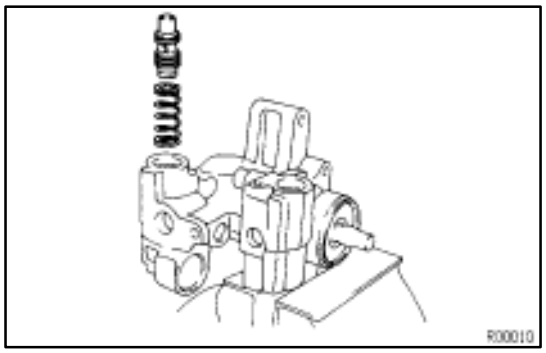
8. INSTALL REAR HOUSING

(a) Install a new gasket and the rear housing.
HINT: Be careful in the direction of the gasket.
(b) Using a hexagon wrench (8 mm), install and torque the four bolts
Torque: 46 N·m (470 kgf·cm, 34 ft·lbf)



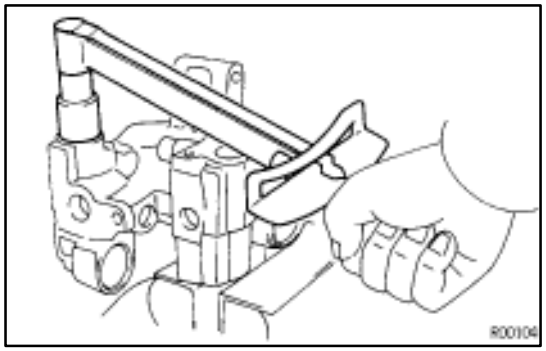
9. MEASURE PUMP SHAFT PRELOAD

(a) Check that the shaft rotates smoothly with out abnormal noise.
(b) Temporarily install the pulley nut and check the rotating torque.
Rotating torque:
0.3 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less

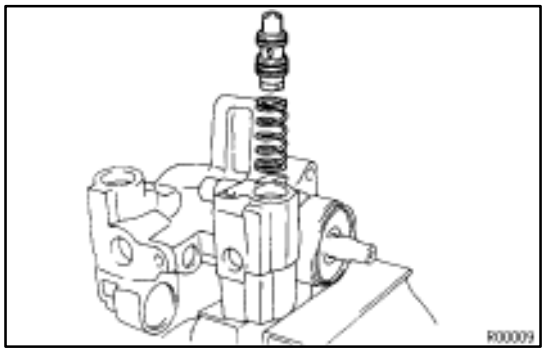


10. INSTALL FLOW CONTROL VALVE (For Hydraulic Cooling Fan System)

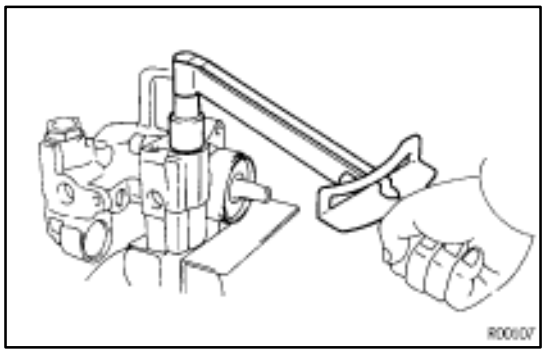
(a) Install the spring and flow control valve into the housing.



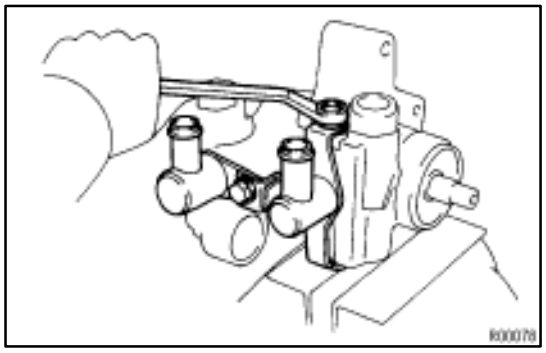
(b) Install a new O–ring to the pressure port union.
(c) Install and torque the pressure port union.
Torque: 83 N·m (850 kgf·cm, 62 ft·lbf)



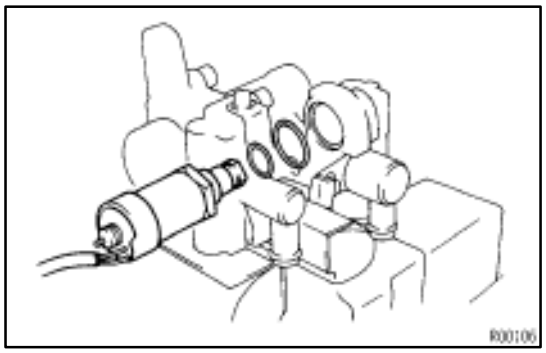
11. INSTALL FLOW CONTROL VALVE (For PS)
(a) Install the spring and flow control valve into the housing.



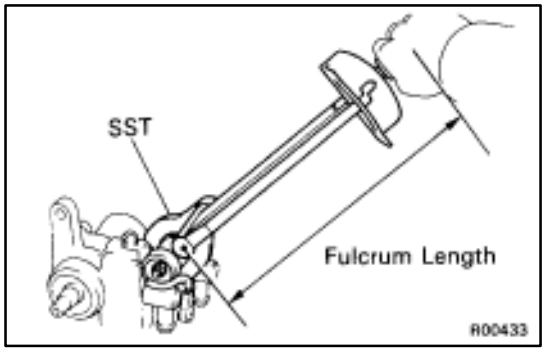
(b) Install a new O–ring to the pressure port union.
(c) Install and torque the pressure port union.
Torque: 83 N·m (850 kgf·cm, 62 ft·lbf)



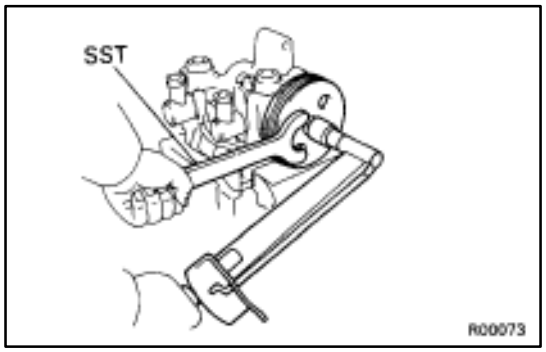
12. INSTALL SUCTION PORT UNIONS
(a) Install a new O–ring to each suction port union.
(b) Install the suction port union with the three bolts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



13. INSTALL CONTROL VALVE
(a) Install a new O–ring to the rear housing.
(b) Install a new O–ring to the control valve.



(c) Using SST, install and torque the control valve.
SST 09612–24014 (09617–24030)
Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)
HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).



14. INSTALL PS PUMP PULLEY

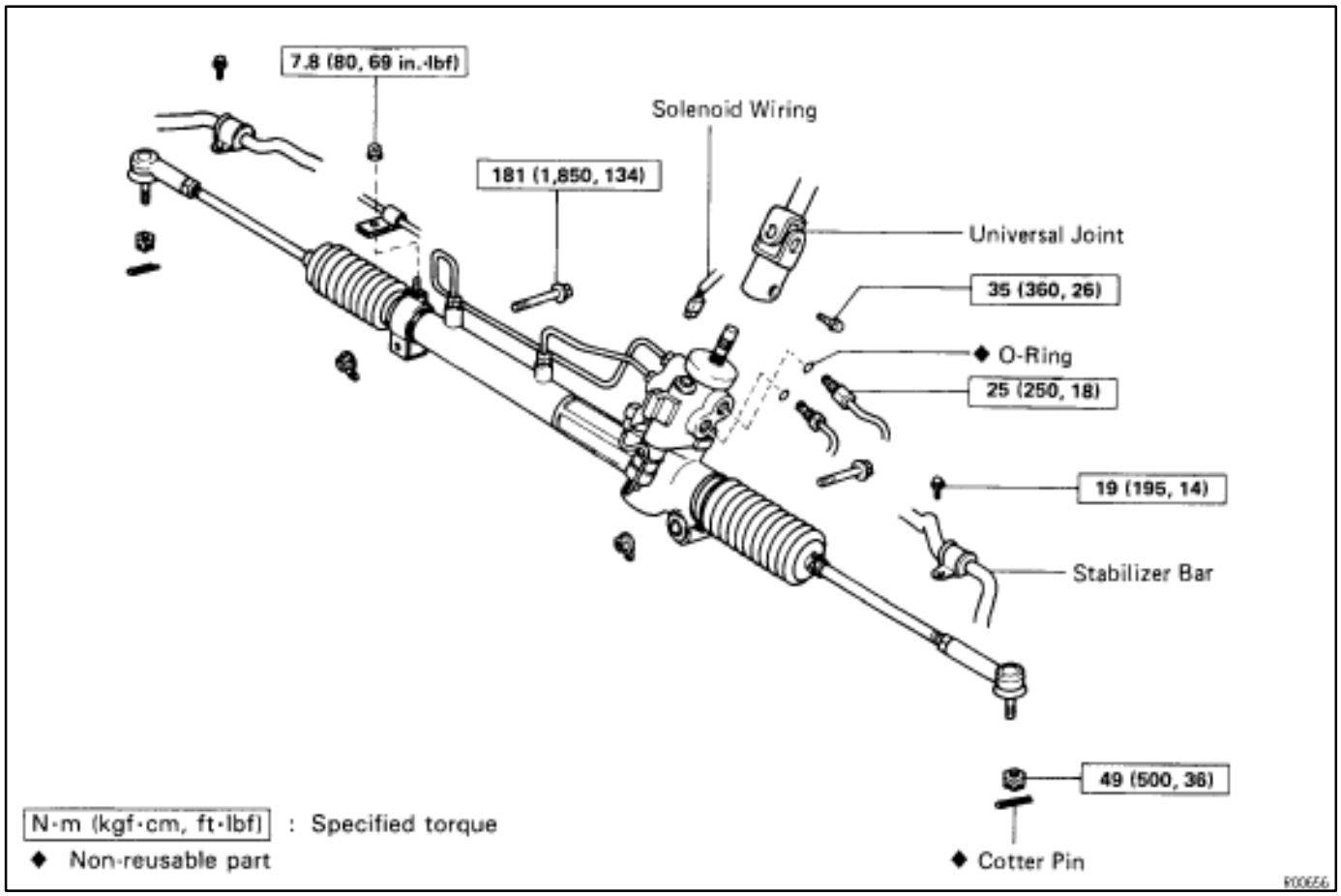
(a) Install the pump pulley to the shaft.
(b) Using SST, install and torque the pulley set nut.
SST 09616–30020
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

GEAR HOUSING

SR02R–01

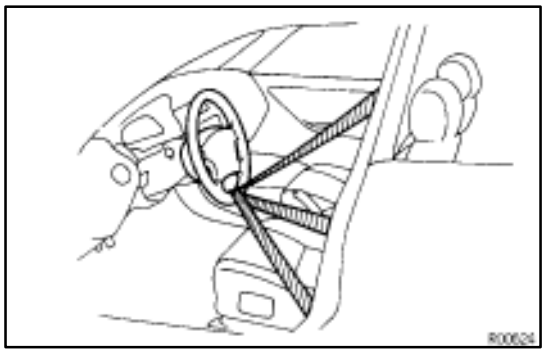
STEERING GEAR HOUSING REMOVAL AND INSTALLATION

Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

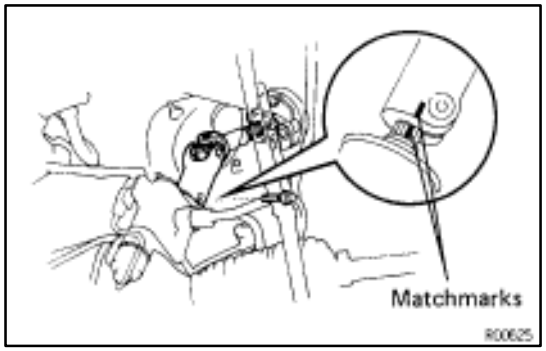
NOTICE: When disconnecting the universal joint during removal of the gear housing, remove the steering wheel and perform centering of the spiral cable.
(See page AB–14)
If the operation is performed without removing the steering wheel, use the procedure below to make sure the steering wheel is firmly fixed in position and cannot turn.



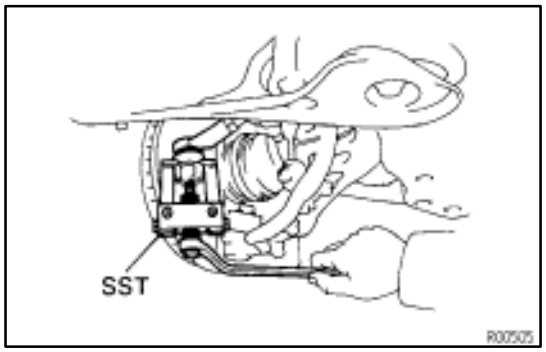
1. DISCONNECT UNIVERSAL JOINT

(a) Position the front wheels facing straight ahead.

(b) Using the seat belt of the driver's seat, fix the steering wheel so that it does not turn.

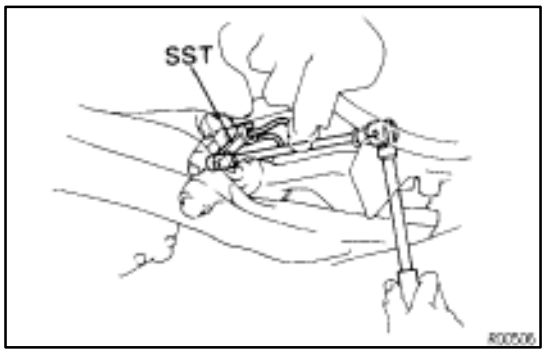


(c) Place matchmarks on the universal joint and control valve shaft.
(d) Loosen the bolt on the upper side of the universal joint, remove the bolt on the lower side and disconnect the universal joint.



2. DISCONNECT TIE ROD ENDS

(a) Remove the cotter pins and nuts.
(b) Using SST, disconnect the tie rod end from the knuckle arm.
SST 09628–62011

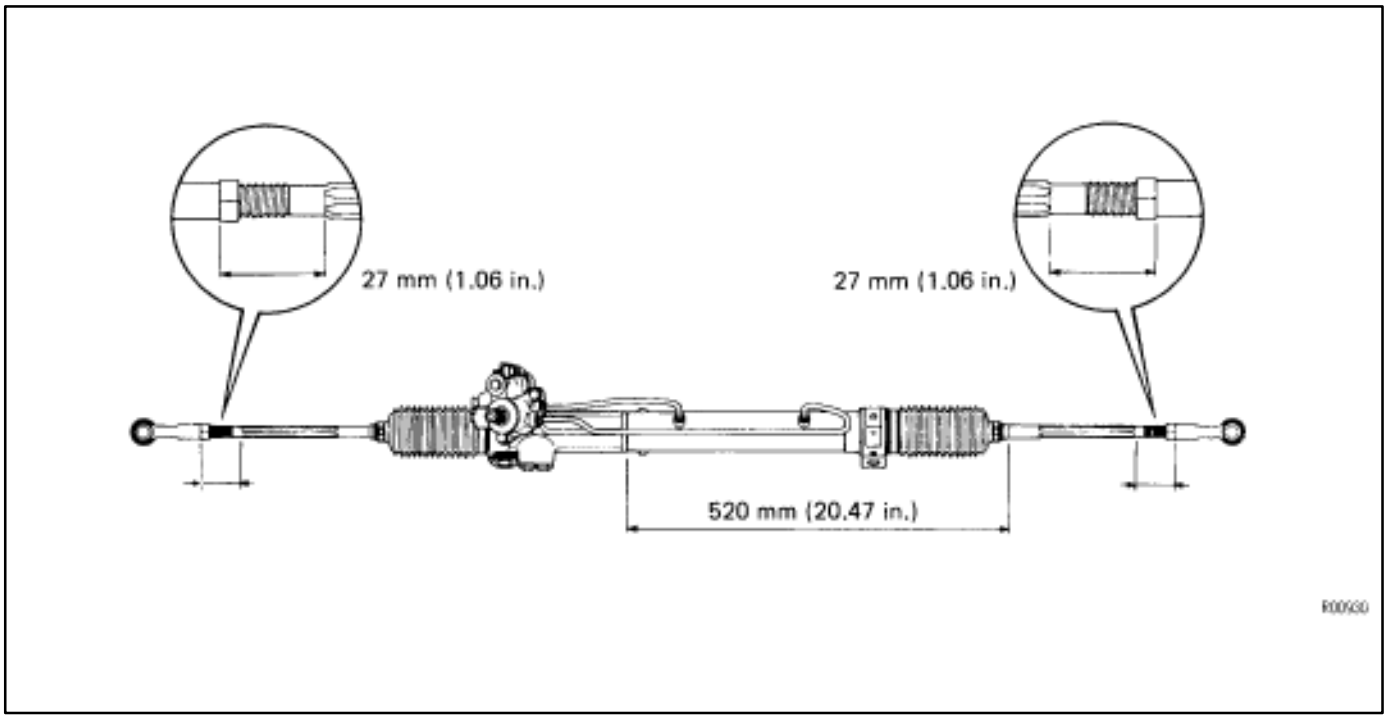


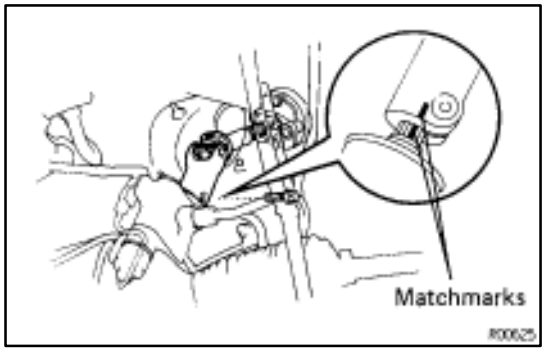
3. DISCONNECT PRESSURE AND RETURN TUBES

Using SST, disconnect and connect the pressure and return tubes.
SST 09631–22020
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

4. CONNECT UNIVERSAL JOINT

(a) Set the gear housing so that it matches the dimensions shown below, with the gear housing at the center point.





(b) Align matchmarks on the universal joint and control valve shaft and connect them.

5. CENTER SPIRAL CABLE

If the steering wheel has been removed, or the steering wheel may have moved during the operation, always perform centering of the spiral cable.

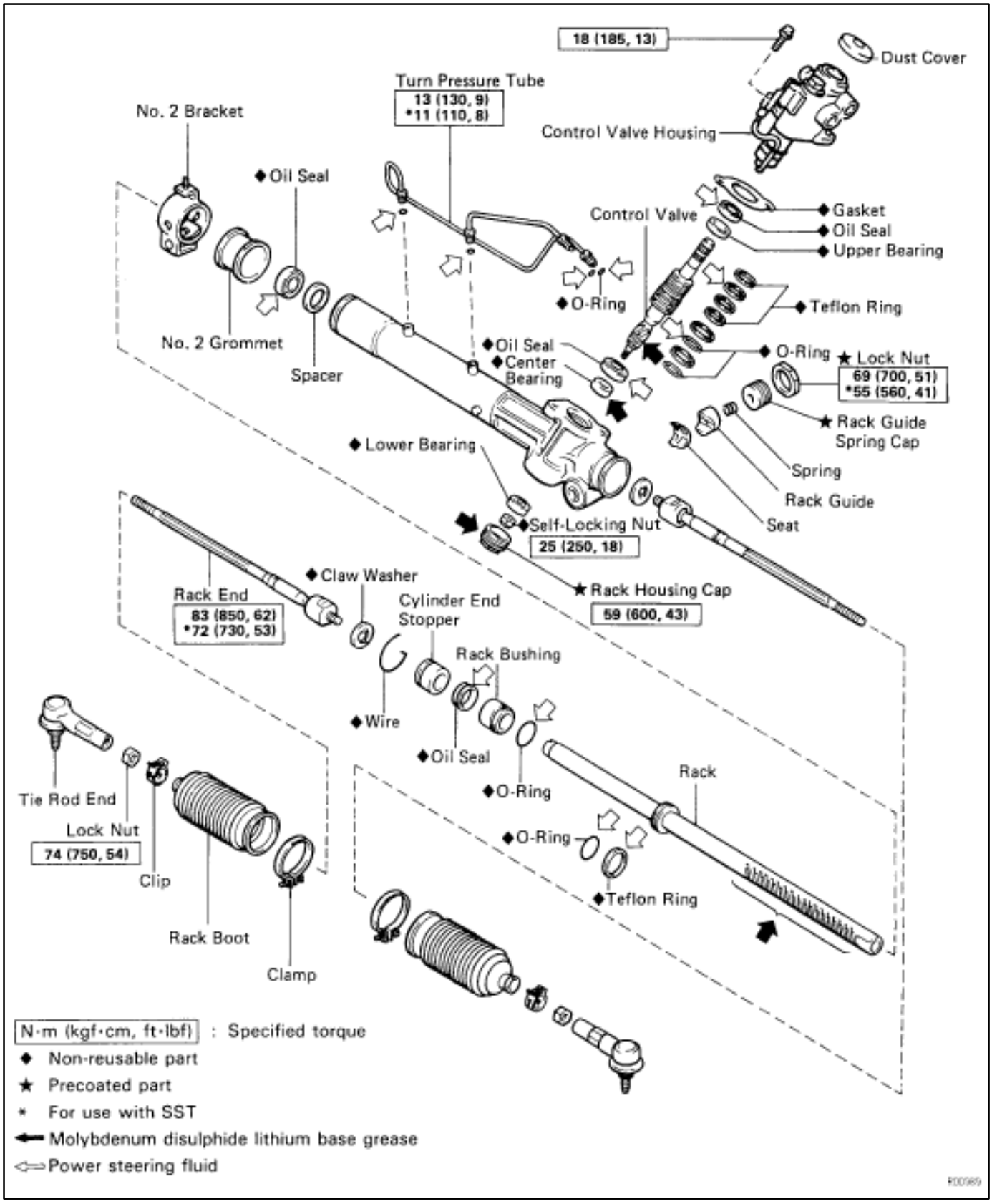
(See page AB–15)

6. CHECK STEERING WHEEL CENTER POINT

7. CHECK TOE–IN

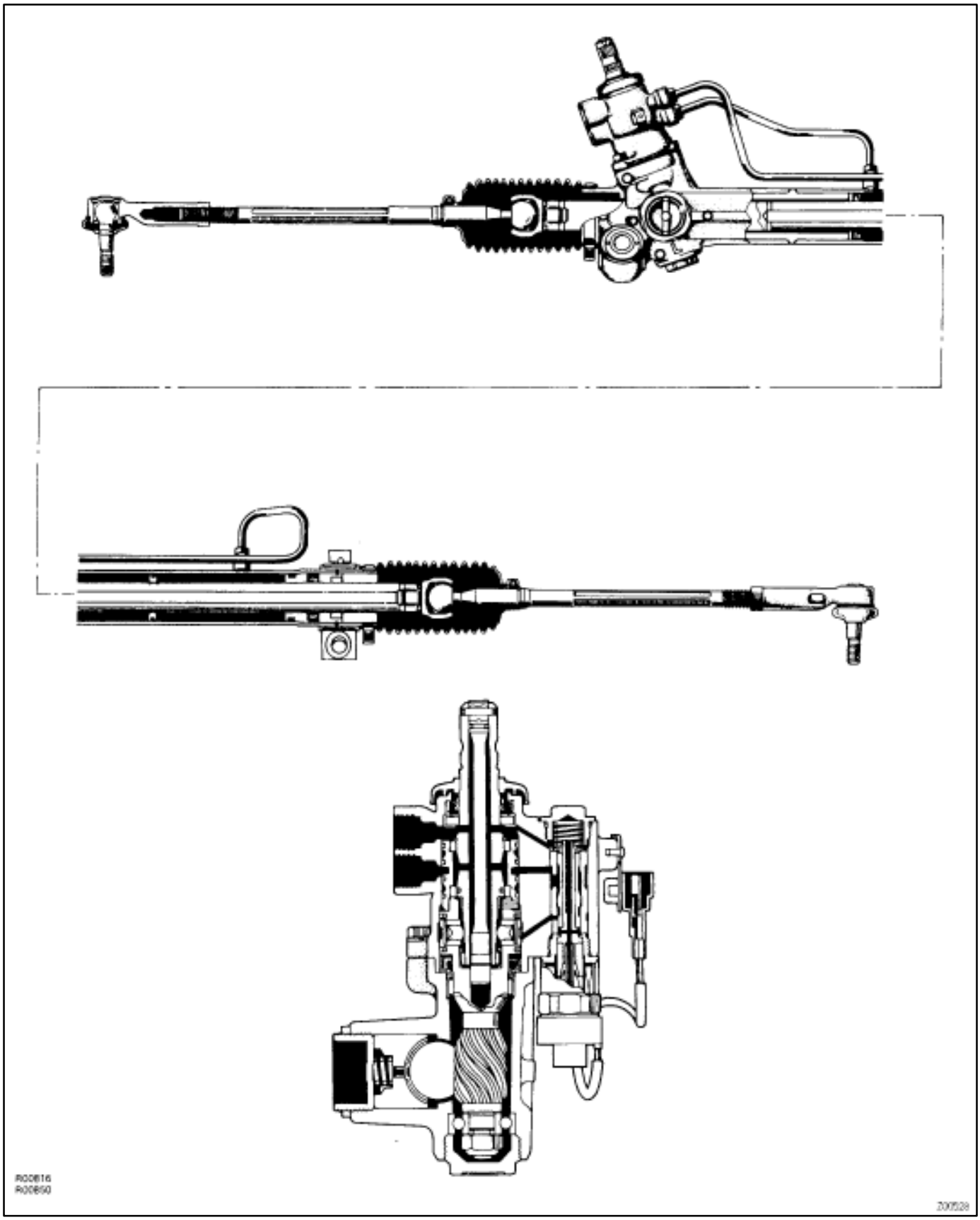
COMPONENTS

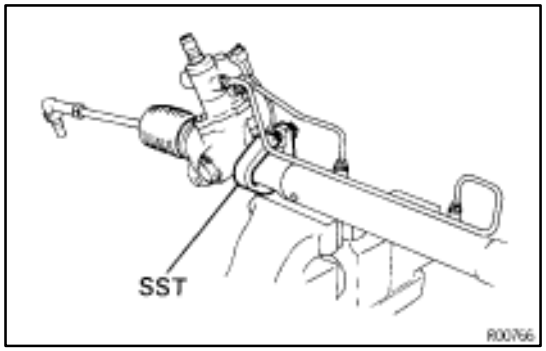
SR00N–02



SECTIONAL VIEW

SR02S–01



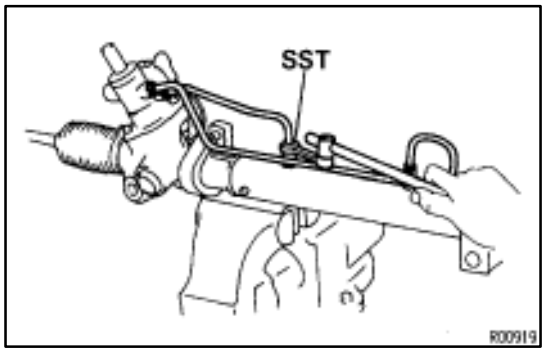


STEERING GEAR HOUSING DISASSEMBLY

SR022–02

1. CLAMP GEAR HOUSING IN VISE

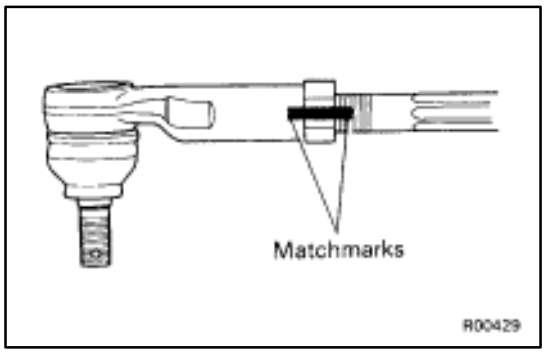
Using SST, secure the steering gear in a vise.
SST 09612–00012



2. REMOVE LEFT AND RIGHT TURN PRESSURE TUBES

(a) Using SST, remove the turn pressure tubes.
SST 09630–00020

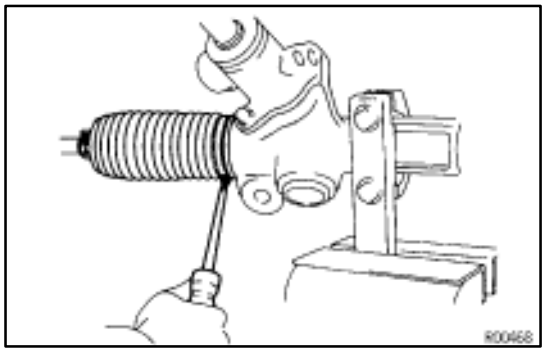
(b) Remove the O–rings from the turn pressure tubes.



3. REMOVE TIE ROD ENDS

(a) Loosen the lock nut and place matchmarks on the tie rod end and rack end.

(b) Remove the tie rod ends and lock nuts.

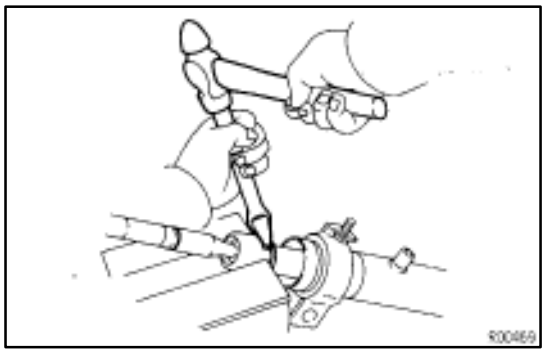


4. REMOVE RACK BOOTS

(a) Remove the clips and clamps.

(b) Remove the rack boots.

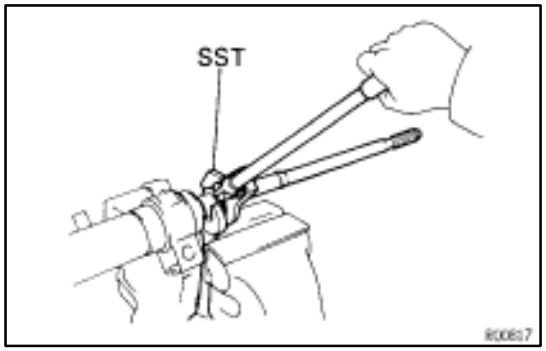
NOTICE: Be careful not to damage the rack boots and rack housing.



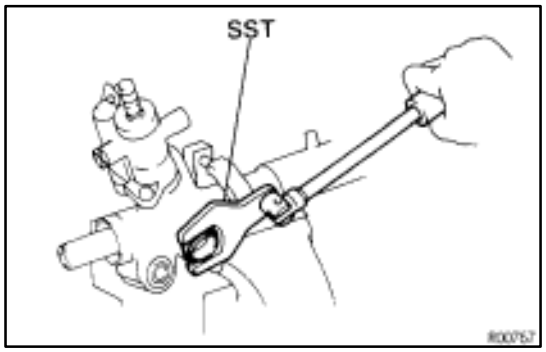
5. REMOVE RACK ENDS AND CLAW WASHERS

(a) Unstake the claw washers.

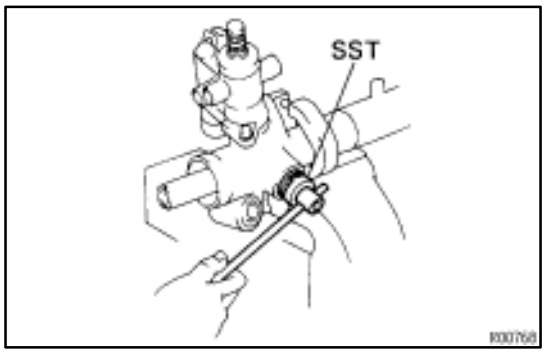
NOTICE: Avoid any impact to the rack.



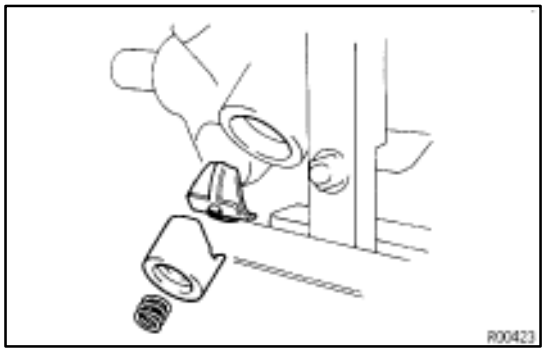
(b) Using SST, remove the rack ends.
SST 09617–14010
(c) Mark the left and right rack ends accordingly.
(d) Remove the claw washers.



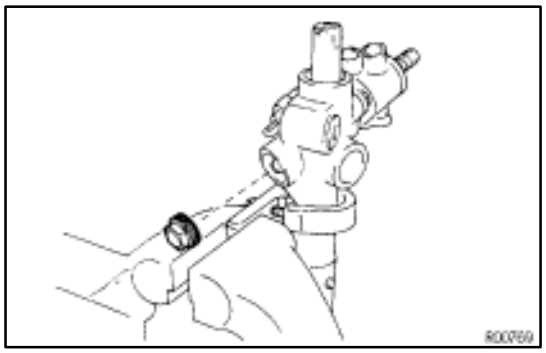
6. REMOVE RACK GUIDE SPRING CAP LOCK NUT
Using SST, remove the rack guide spring cap lock nut.
SST 09612–24014 (09617–24020)



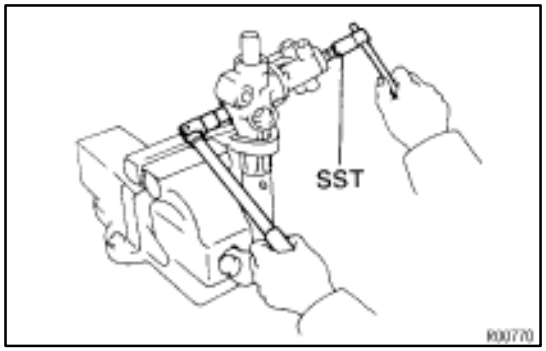
7. REMOVE RACK GUIDE SPRING CAP
Using SST, remove the rack guide spring cap.
SST 09631–10021



8. REMOVE RACK GUIDE SPRING, RACK GUIDE AND SEAT



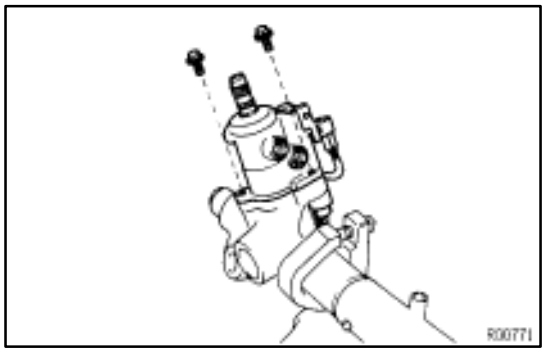
9. REMOVE RACK HOUSING GAP



10. REMOVE SELF–LOCKING NUT

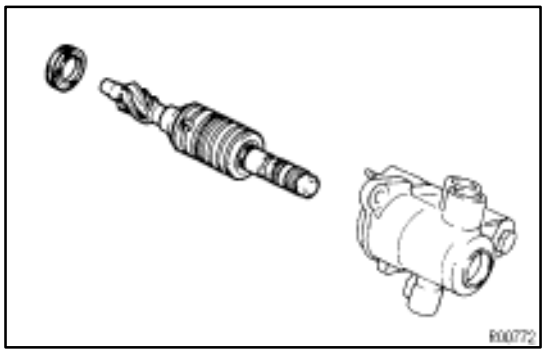
Using SST to hold the control valve, remove the self–locking nut.

SST 09616–00010



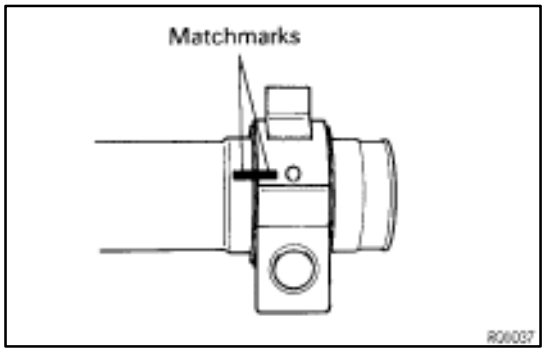
11. REMOVE CONTROL VALVE HOUSING

(a) Remove the dust cover.
(b) Remove the two bolts.
(c) Pull out the valve with the valve housing.
(d) Remove the gasket from the rack housing.



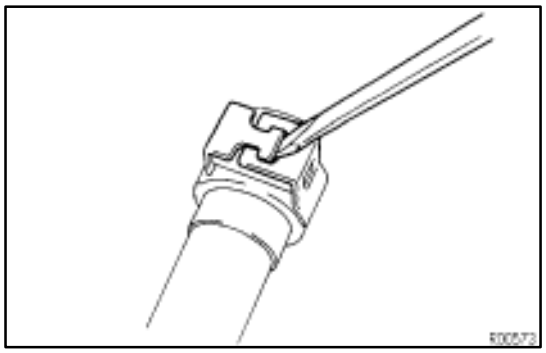
12. REMOVE CONTROL VALVE FROM HOUSING

Tap out the control valve and oil seal.

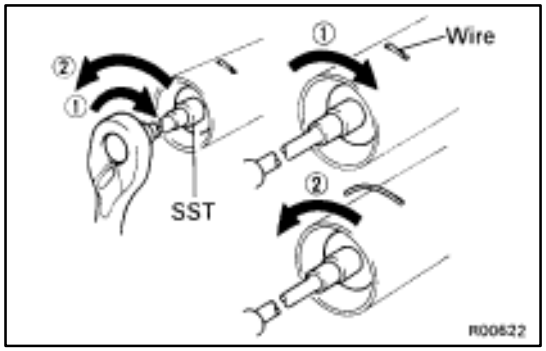


13. REMOVE NO.2 BRACKET

(a) Place matchmarks on the bracket and rack housing.



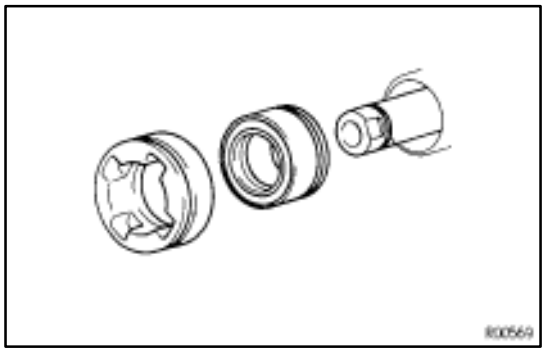
(b) Using a screwdriver, pry a part the clasp of the No.2 bracket.
(c) Remove the bushing and bracket from the rack housing.
(d) Remove the bushing from the bracket.



14. REMOVE CYLINDER END STOPPER

(a) Using SST, turn the cylinder end stopper clockwise until the wire end comes out.
SST 09631–16010

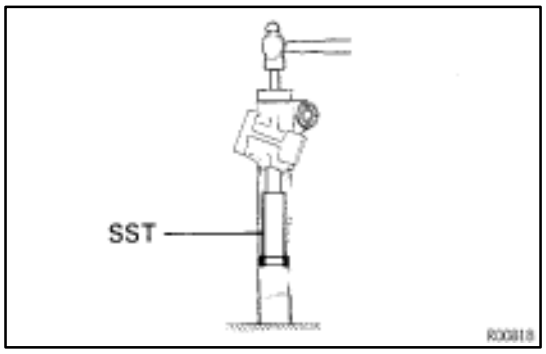
(b) Using SST, turn the cylinder end stopper counterclockwise, and remove the wire.
SST 09631–16010



15. REMOVE RACK BUSHING AND RACK

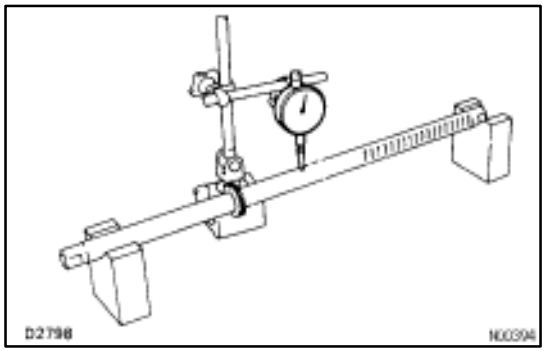
(a) Using a brass bar, tap out the rack with the rack busing.

(b) Remove the O–ring from the bushing.



16. REMOVE CYLINDER HOUSING OIL SEAL AND SPACER

Using SST and a brass bar, drive out the oil seal and spacer.
SST 09620–30010 (09623–30010)



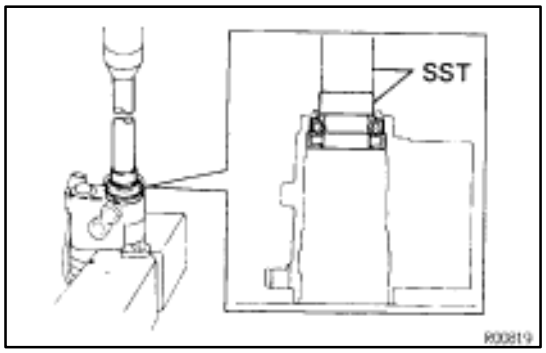
STEERING GEAR HOUSING INSPECTION AND REPLACEMENT

SR02T–01

1. INSPECT RACK

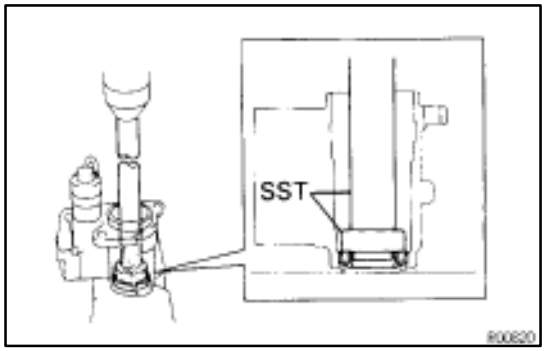
(a) Check the rack for runout and for tooth wear or damage.
Maximum runout:
0.3 mm (0.012 in.)

(b) Check the back surface for wear or damage.
If faulty, replace it.

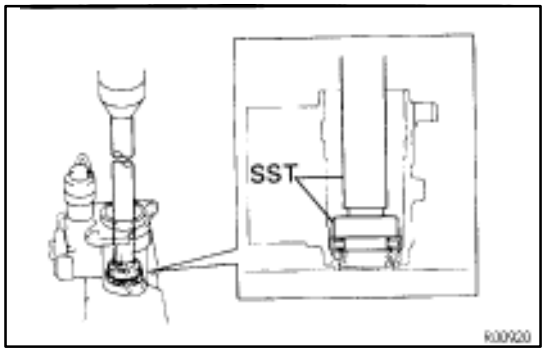


2. IF NECESSARY, REPLACE CONTROL VALVE HOUSING OIL SEAL AND UPPER BEARING

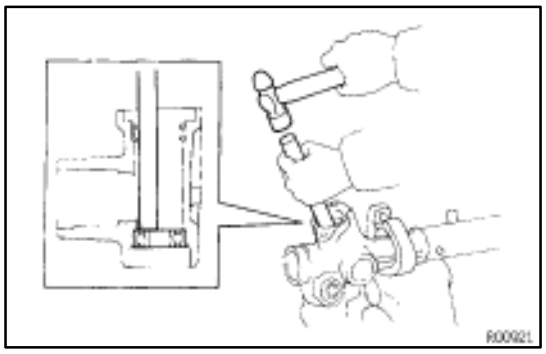
(a) Using SST, press out the oil seal and upper bearing.
SST 09620–30010 (09631–00020)
09630–24013 (09620–24010)



(b) Using SST, press in a new oil seal as shown.
SST 09620–30010 (09631–00020)
09630–24013 (09620–24020)

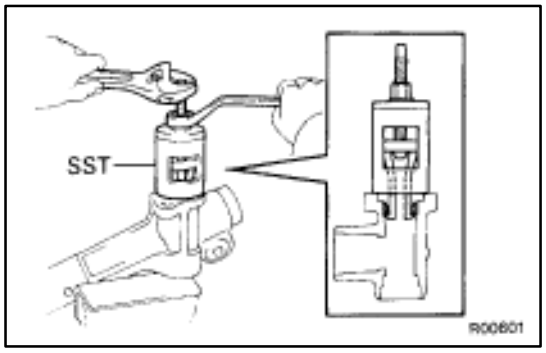


(c) Using SST, press in a new upper bearing as shown.
SST 09620–30010 (09631–00020)
09630–24013 (09620–24020)

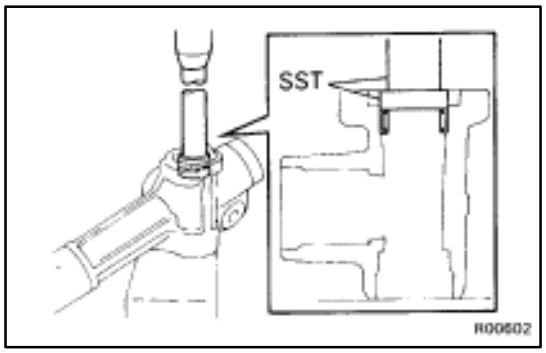


3. IF NECESSARY, REPLACE CONTROL VALVE LOWER BEARING AND CENTER BEARING

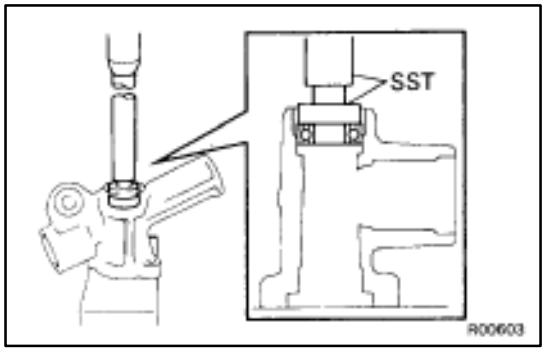
(a) Using a brass bar, drive out the lower bearing.



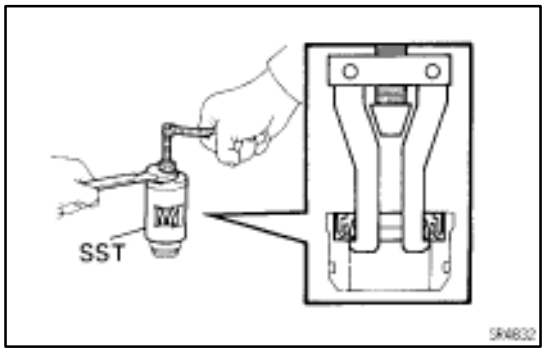
(b) Using SST, remove the center bearing.
SST 09612–24014 (09613–22011)



(c) Using SST, press in a new center bearing as shown.
SST 09630–24013 (09620–24020) 09631–12020

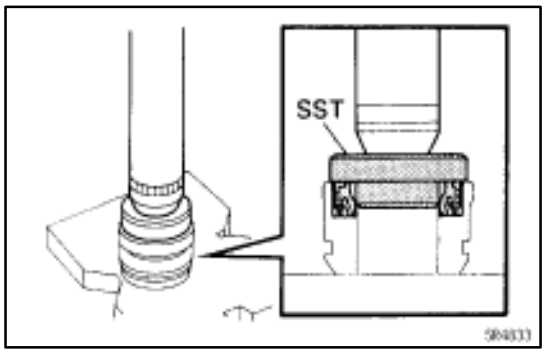


(d) Using SST, press in a new lower bearing.
SST 09630–24013 (09620–24020) 09631–12020

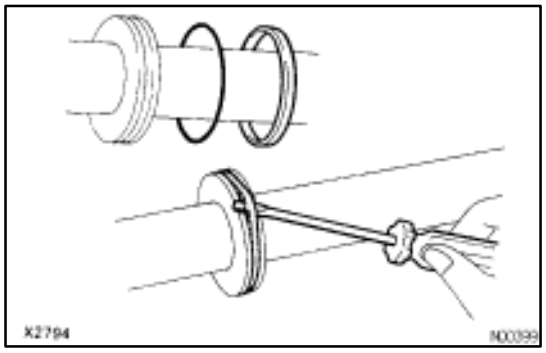


4. IF NECESSARY, REPLACE RACK BUSHING OIL SEAL

(a) Using SST, remove the oil seal.
SST 09612–24014 (09613–22011)

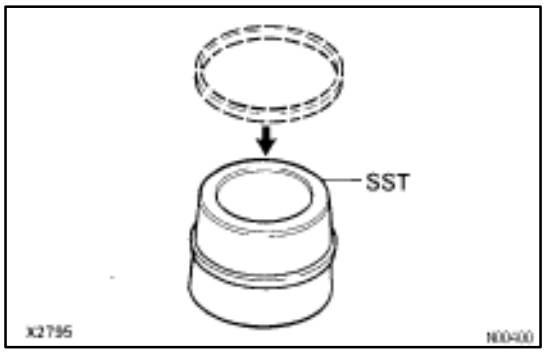


(b) Coat a new oil seal with power steering fluid.
(c) Using SST, press in the oil seal.
SST 09631–32010

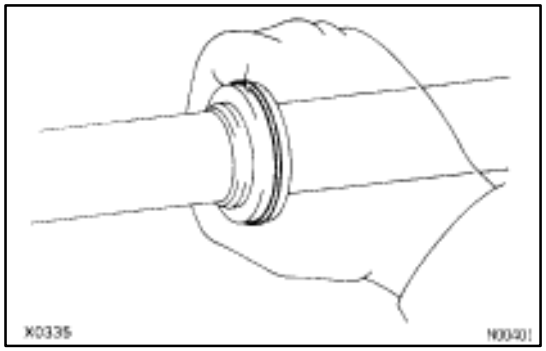


5. IF NECESSARY, REPLACE TEFLON RING AND ORING

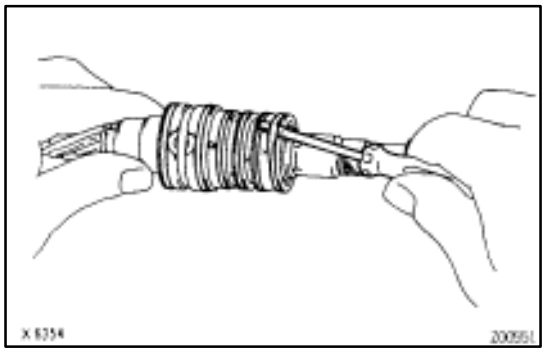
(a) Remove the teflon ring and O–ring.
NOTICE: Be careful not to damage the steering rack.
(b) Coat a new O–ring with power steering fluid and install it.



(c) Coat a new teflon ring with power steering fluid.
(d) Install the teflon ring to SST and expand it.
SST 09630–24013 (09620–24040)

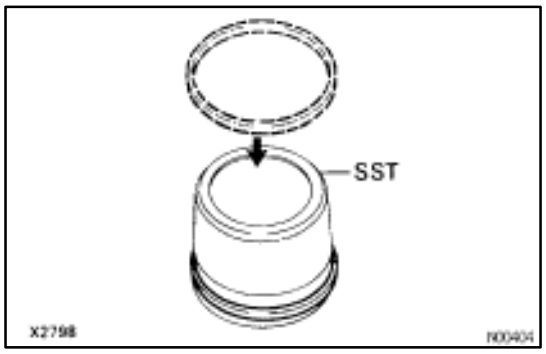


(e) Install the expanded teflon ring to the steering rack and sung it down with your fingers so that it fits tightly in the groove.

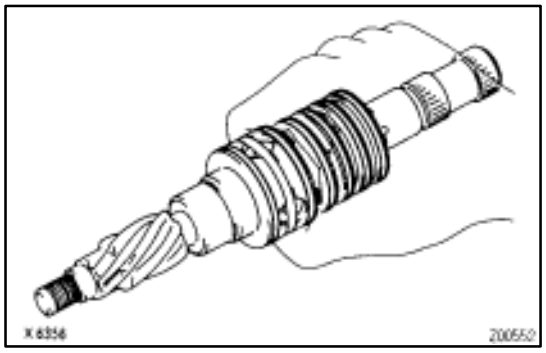


6. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RING

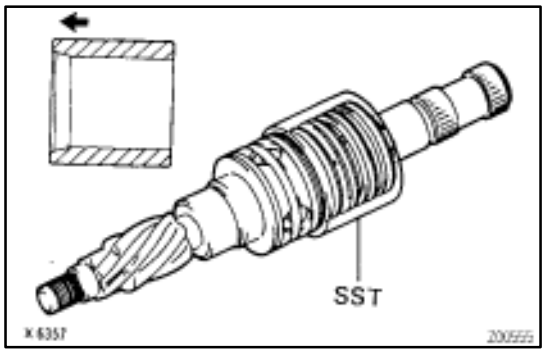
(a) Using a screwdriver, remove the teflon rings.
NOTICE: Be careful not to damage the control valve.



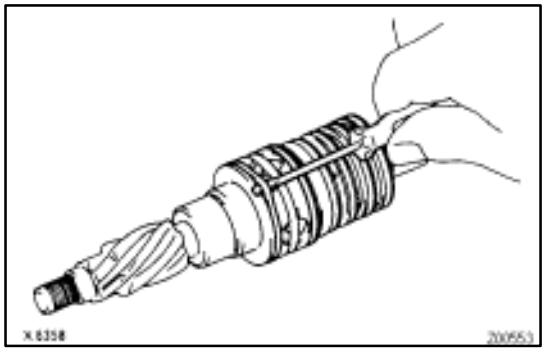
(b) Install new teflon rings to SST and expand them.
SST 09631–20070



(c) Install the expanded teflon rings to the control valve and snug them down with your fingers.



(d) Coat the teflon rings with power steering fluid, and carefully slide the tapered end of SST over the teflon rings to seat the ring.
SST 09631–20081

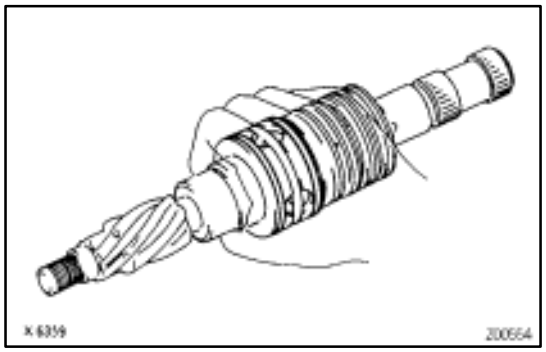


7. IF NECESSARY, REPLACE HYDRAULIC REACTION CHAMBER TEFLON RINGS AND O–RINGS

(a) Remove the teflon rings and O–rings.
NOTICE: Be careful not to damage the control valve.

(b) Coat two new O–rings with power steering fluid, and install them.

(c) Expand new teflon rings with your fingers.
NOTICE: Be careful not to over–expand the teflon rings.

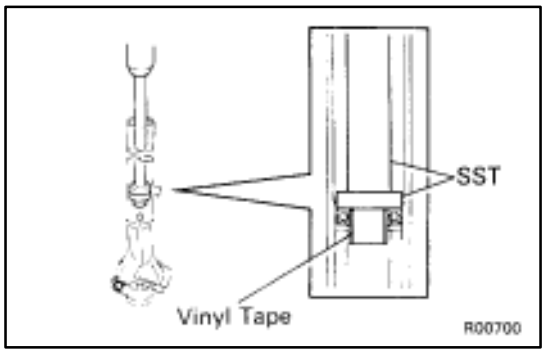


(d) Install the expanded teflon rings to the control valve.

(e) Coat the teflon rings with power steering fluid, and snug them down with your fingers.
NOTICE: Be careful not to damage the teflon rings.

STEERING GEAR HOUSING ASSEMBLY

SR024–03

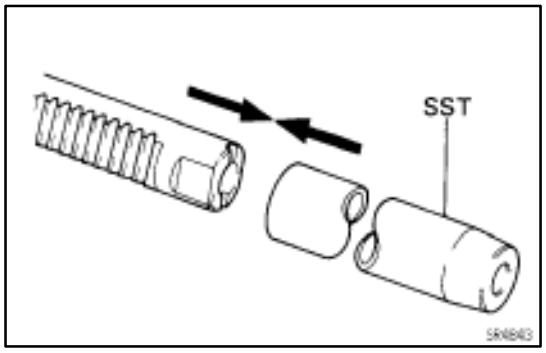


1. INSTALL CYLINDER HOUSING OIL SEAL AND SPACER

(a) Coat a new oil seal lip with power steering fluid.

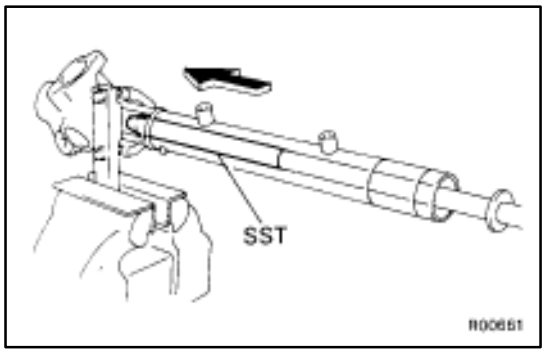
(b) Tape the showing part of SST before use.

(c) Install the oil seal and spacer to SST, and press in them.
SST 09608–12010 (09608–00080) 09631–12020



2. INSTALL RACK

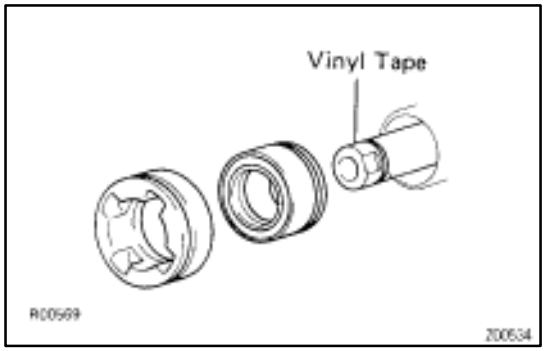
(a) Install SST to the rack.
HINT: If necessary, scrape the burrs off the rack teeth end and burnish.
SST 09631–33010



(b) Coat SST with power steering fluid.

(c) Insert the rack into the cylinder.

(d) Remove SST.
SST 09631–33010

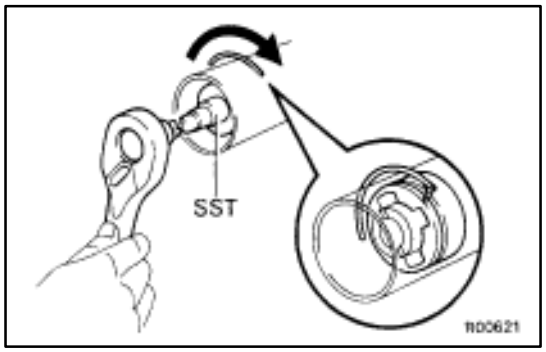


3. INSTALL RACK BUSHING AND CYLINDER END STOPPER

(a) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.

(b) Coat a new O–ring with power steering fluid and install it to the bushing.

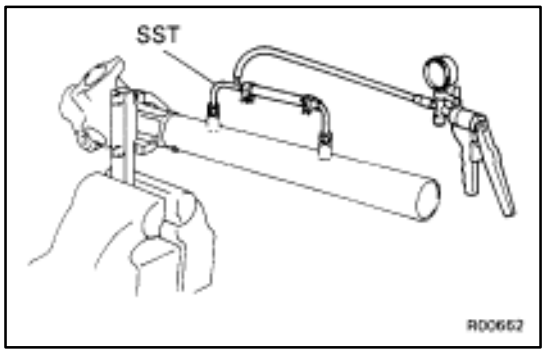
(c) Push in the rack bushing and cylinder end stopper until the wire installation hole appears.



4. INSTALL WIRE

(a) Insert a new wire end into the hole.

(b) Using SST, turn the cylinder end stopper clockwise until the wire end disappears.
SST 09631–16010

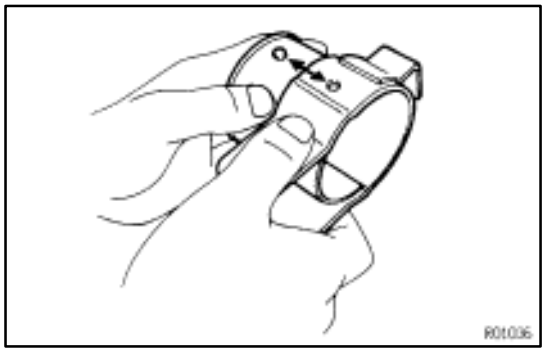


5. AIR TIGHTNESS TEST

(a) Install SST to the unions of the cylinder housing.
SST 09631–12071

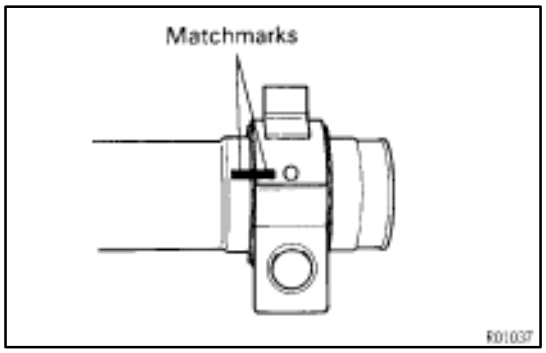
(b) Apply 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.

(c) Check that there is no change in the vacuum.
If there is change in the vacuum, check the installation of the rack housing oil seal.

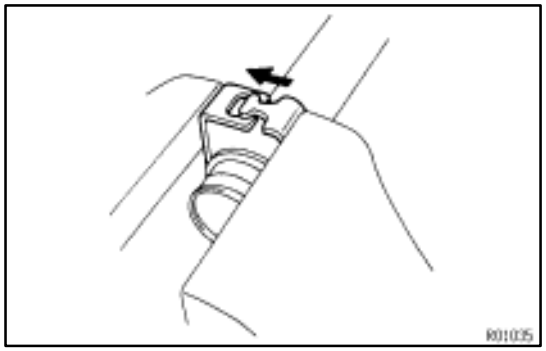


6. INSTALL NO.2 BRACKET

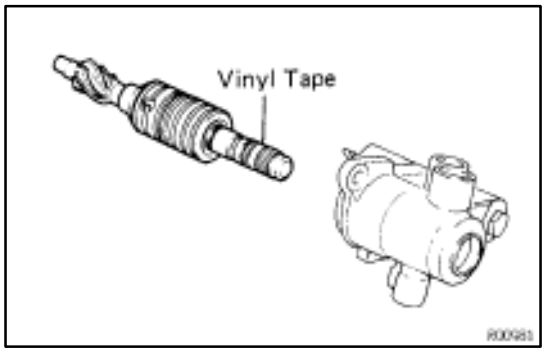
(a) Install the bushing to the bracket.



(b) Install the bushing and bracket to the rack housing.
HINT: Align the matchmarks on the bracket and rack housing.



(c) Place the No.2 bracket in a vise and tighten the vise to fasten the clasp.



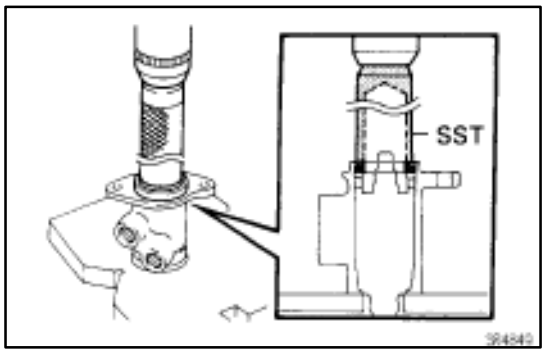
7. INSTALL CONTROL VALVE

(a) Wind vinyl tape on the control valve.

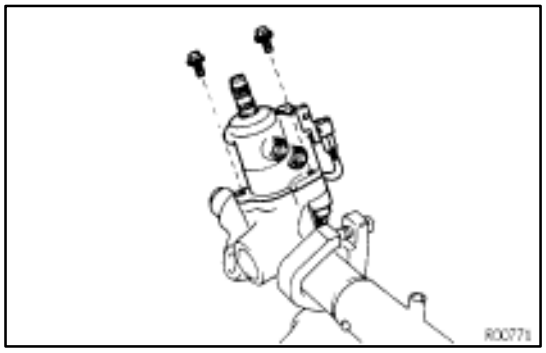
(b) Coat the teflon rings with power steering fluid.

(c) Push the control valve into the housing.

NOTICE: Be careful not to damage the teflon rings and oil seal.



(d) Using SST, press in a new oil seal.
SST 09612–22011

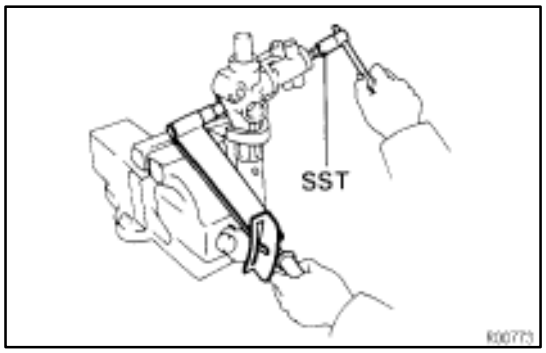


8. INSTALL CONTROL VALVE HOUSING

(a) Place a new gasket on the rack housing.

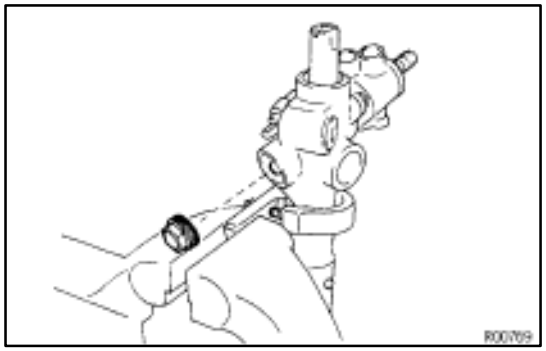
(b) Torque the two bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Install the dust cover.



9. INSTALL SELF–LOCKING NUT

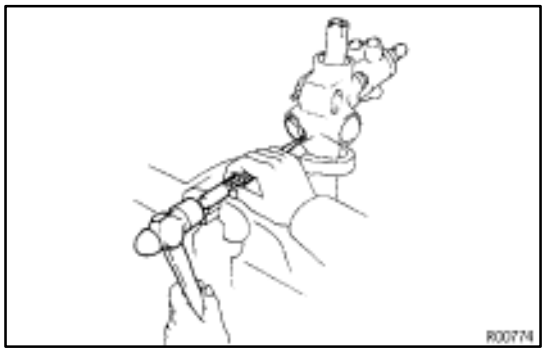
Using SST to hold the control valve, install a new self –locking nut.
SST 09616–00010
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



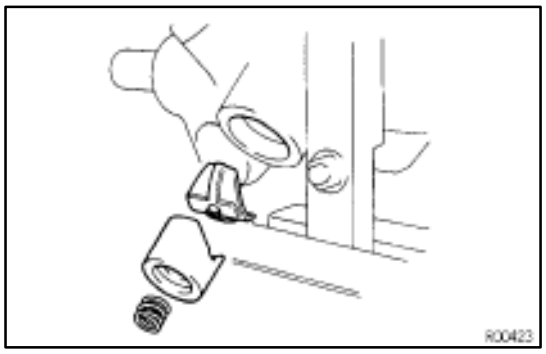
10. INSTALL RACK HOUSING CAP

(a) Apply sealant to 2 or 3 threads of the housing cap.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOC–TIT 242 or equivalent

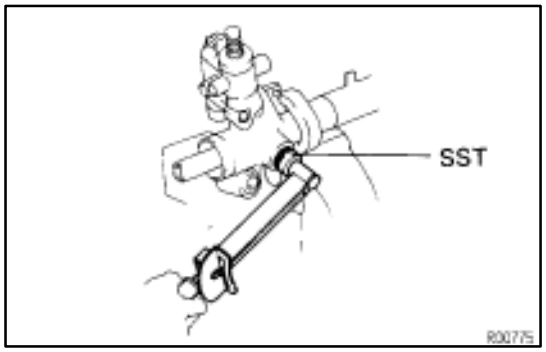
(b) Install the rack housing cap.
Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



(c) Using a center punch, stake the housing at two places.



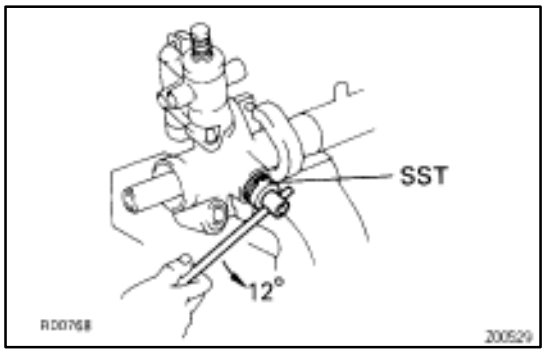
11. INSTALL RACK GUIDE SEAT, RACK GUIDE AND SPRING



12. ADJUST TOTAL PRELOAD

(a) Apply sealant to 2 or 3 threads of the spring cap.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOC–TITE 242 or equivalent

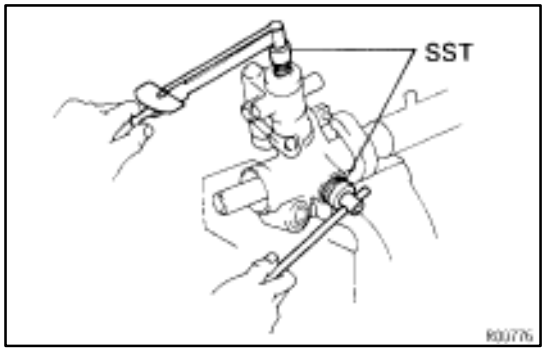
(b) Using SST, install and torque the spring cap.
SST 09631–10021
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



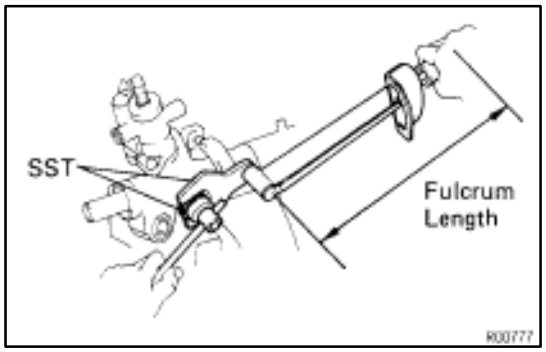
(c) Using SST, return the rack guide spring cap 12•.
SST 09631–10021

(d) Turn the control valve shaft right and left one or two times.

(e) Loosen the spring cap until the rack guide compression spring is not functioning.



(f) Using SST and a torque meter, tighten the rack guide spring cap until the preload is within specification.
SST 09616–00010, 09631–10021
Preload (turning):
0.8–1.4 N·m (8–14 kgf·cm, 6.9–12.2 in.·lbf)

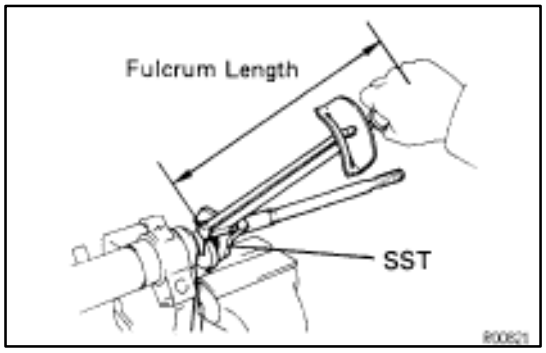


13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the lock nut.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOC–TITE 242 or equivalent

(b) Using SST, install and torque the lock nut.
SST 09612–24014 (09617–24020) 09631–10021
Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)
HINT: Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

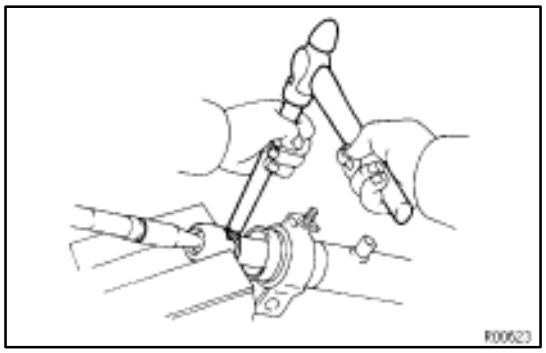
(c) Recheck the total preload.



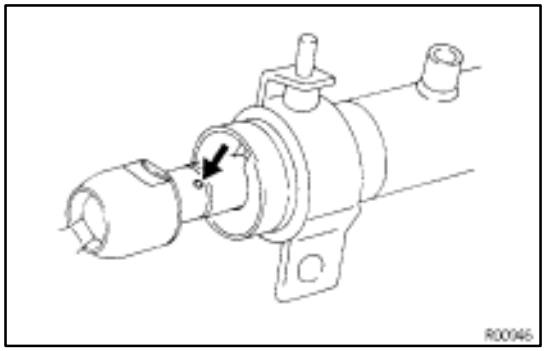
14. INSTALL RACK ENDS

(a) Install a new claw washer.

(b) Using SST, install the rack ends.
SST 09617–14010
Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)
HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).



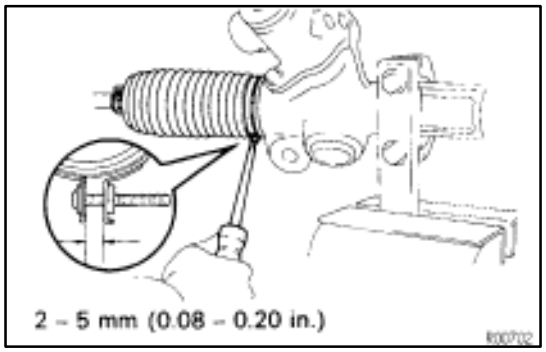
(c) Using a brass bar and hammer, stake the claw washers.



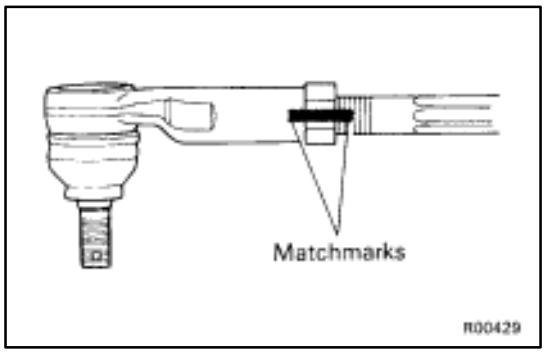
15. INSTALL RACK BOOTS

(a) Insure that the tube hole is not clogged with grease.
HINT: If the tube hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel turned.

(b) Install the boots.
HINT: Be careful not to damage or twist the boot.



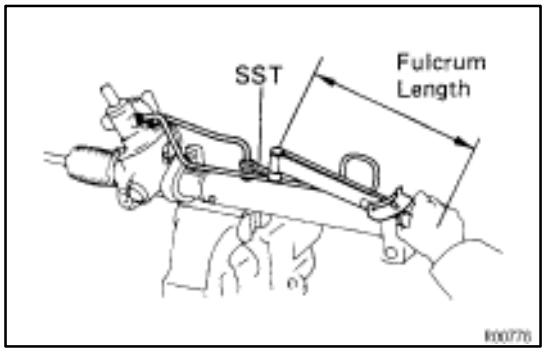
(c) Install the clamps and clips.



16. INSTALL TIE ROD ENDS

(a) Screw the lock nuts and tie rod ends onto the rack ends until the matchmarks are aligned.

(b) After adjusting toe–in, torque the lock nut.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



17. INSTALL RIGHT AND LEFT TURN PRESSURE TUBES

(a) Install new O–rings to the tube.

(b) Using SST, install and torque the tubes.
SST 09633–00020
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
HINT: Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

ELECTRONIC CONTROL SYSTEM

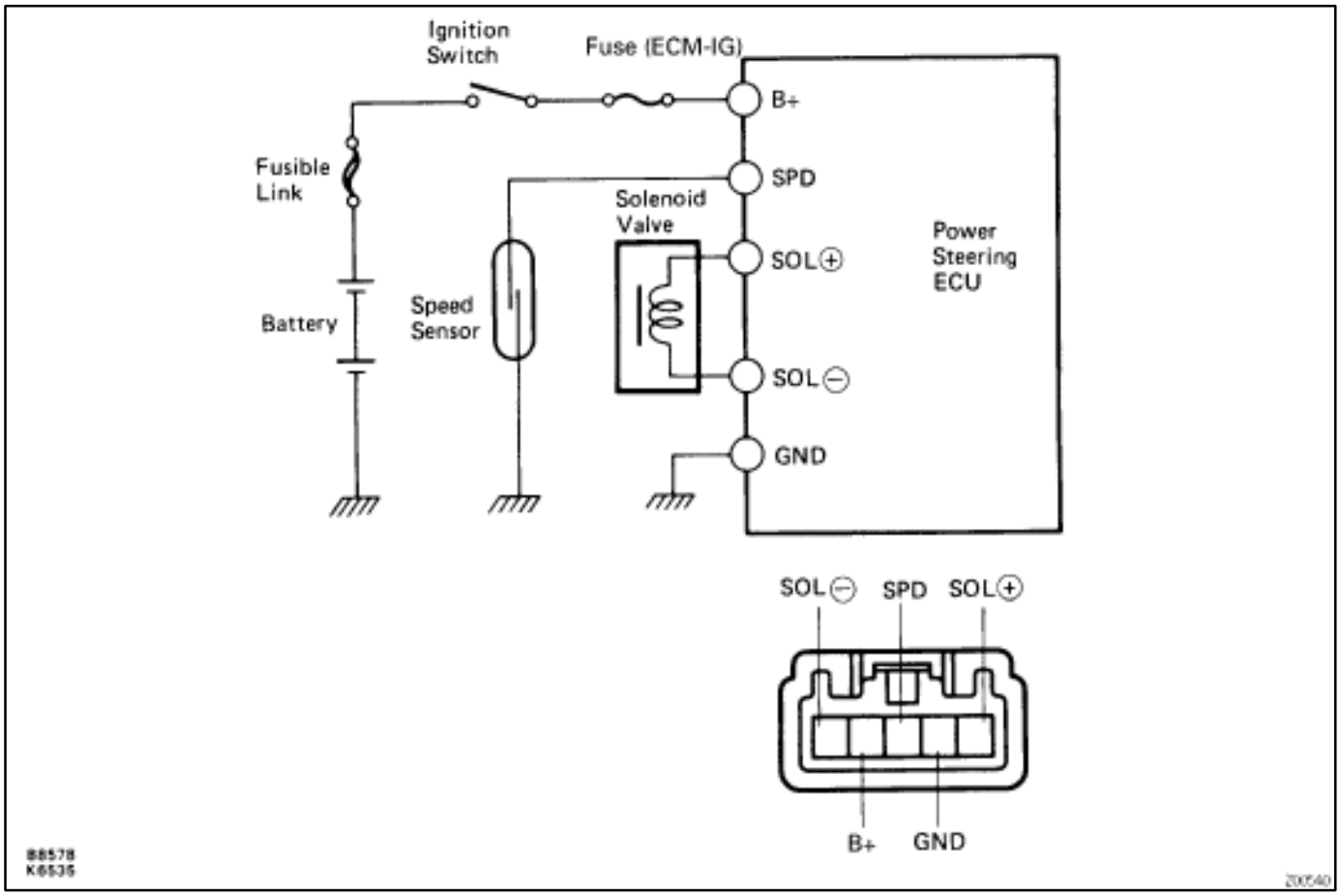
PRECAUTION

SR02U–01

Do not open the cover or the case of the ECU and various computers unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

ELECTRONIC CIRCUIT

SR02V–01



TROUBLESHOOTING FLOW–CHART

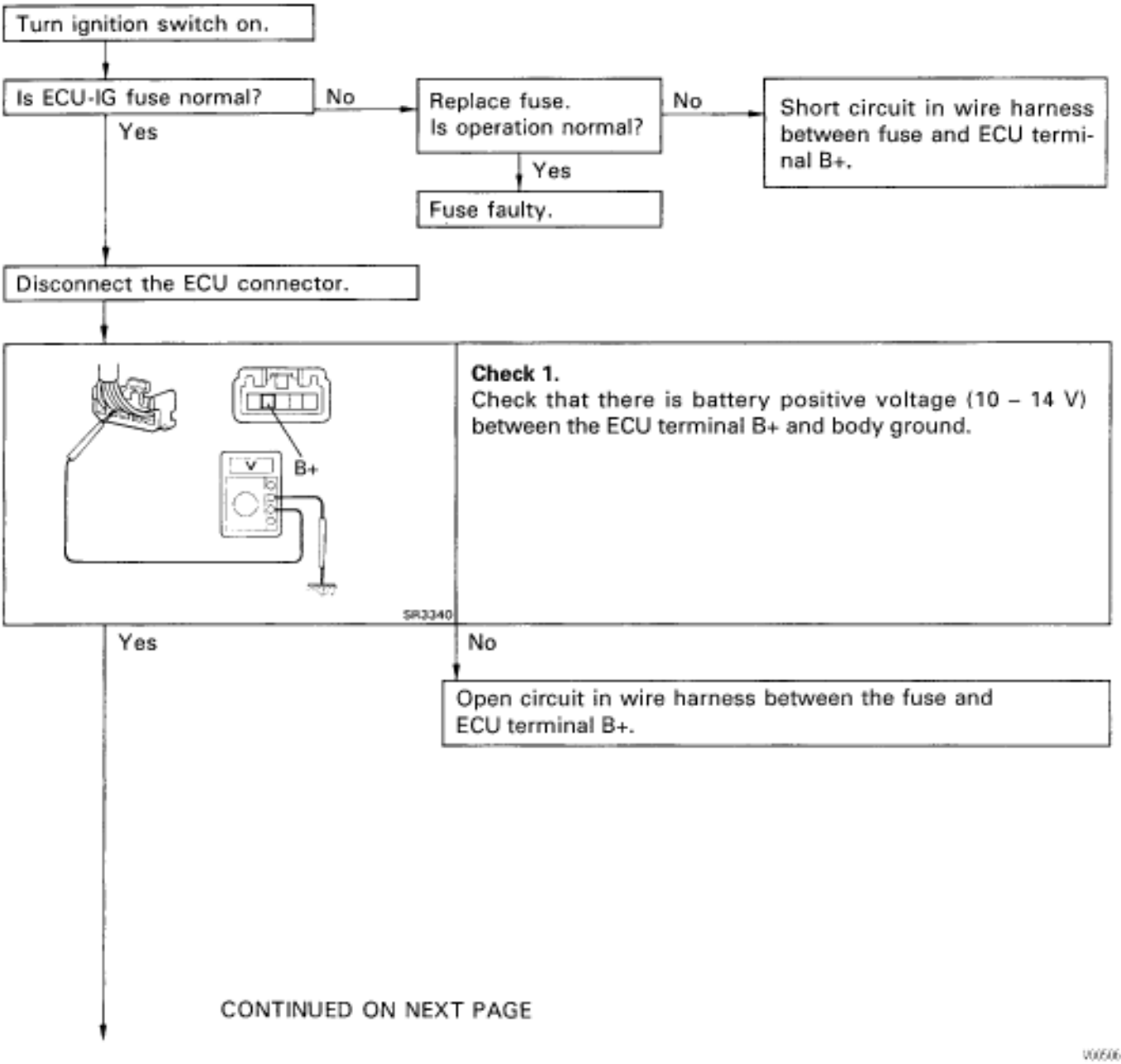
SR02W–01

Trouble

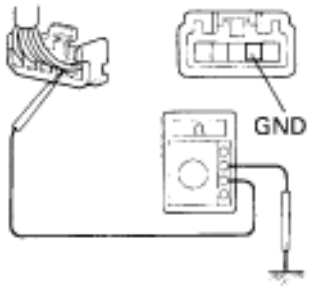
- Hard steering at idle or low–speed driving.
- Steering too sensitive during high–speed driving.

Preliminary Check

- Check tire pressure.
- Check lubrication of suspension and steering linkage.
- Check front wheel alignment.
- Check steering system joint and suspension arm ball joint.
- Check for bent steering column.
- Check that all connectors are secure.
- Check PS pump fluid pressure.



Yes CONTINUED FROM PREVIOUS PAGE

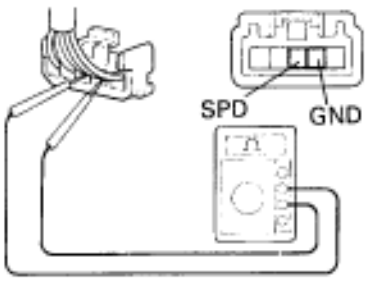


Check 2.
Check that there is continuity between the ECM terminal GND and body ground.

Yes

No

- Open circuit in wire harness between the ECU terminal GND and body ground.
- Body ground faulty.

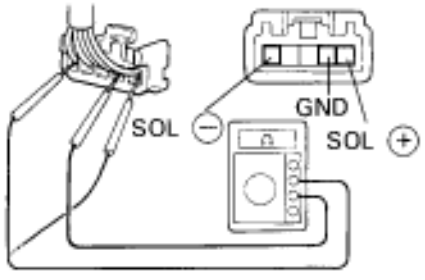


Check 3.
(a) Jack up a front wheel on one side.
(b) Connect an ohmmeter between the ECU connector terminals SPD and GND.
(c) Spin the wheel and check the resistance .
Resistance (Ω) 0 Ω → ∞ → 0 Ω

Yes

No

- Open or short circuit in wire harness between the ECU terminal SPD and speed sensor.
- Speed sensor faulty (See BE section).



Check 4.
Check that there is no continuity between terminals SOL ⊕ or SOL ⊖ and GND.

Yes

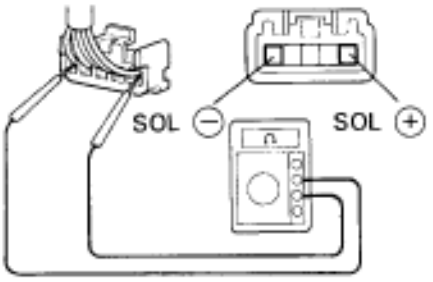
No

- Short circuit in wire harness between the terminals SOL ⊕ and SOL ⊖.
- Solenoid valve faulty.

CONTINUED ON NEXT PAGE

V00507

Yes CONTINUED FROM PREVIOUS PAGE



Check 5.
Measure the resistance between terminals SOL ⊕ and SOL ⊖.
Standard resistance: 4.0 – 9.0 Ω

Yes

No

- Open circuit in wire harness between the terminals SOL ⊕ and SOL ⊖.
- Solenoid valve faulty.

Check 6.
Inspect ECU.

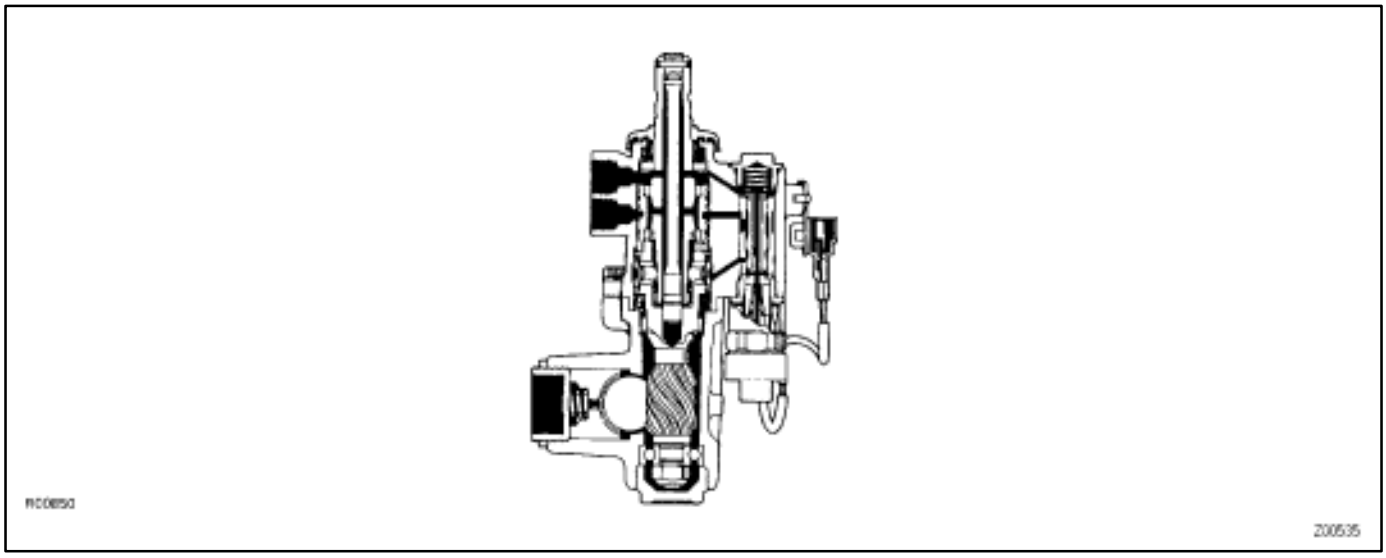
Bad → Replace ECU.

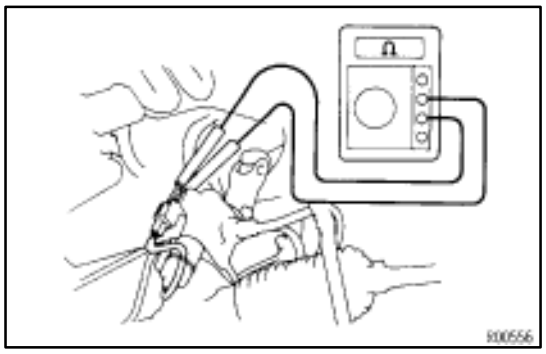
V00508

ELECTRONIC CONTROL COMPONENTS INSPECTION

SR02X–01

Solenoid Valve





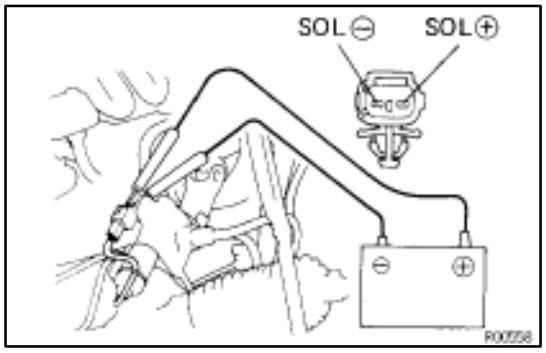
1. DISCONNECT WIRING CONNECTOR

2. MEASURE RESISTANCE

Measure the resistance between SOL and SOL.

Resistance:

4.0–9.0 Ω



3. CHECK SOLENOID OPERATION

(a) Connect the battery positive terminal to the solenoid terminal SOL⊕.

(b) Connect the battery negative terminal to the solenoid terminal SOL⊖.

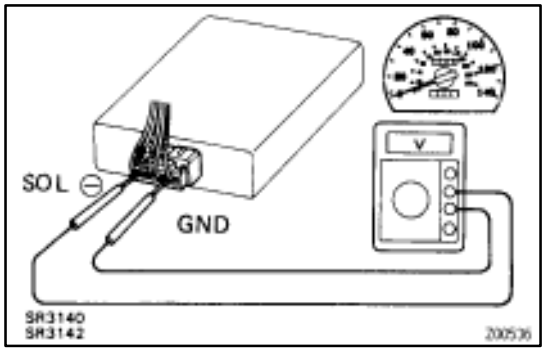
(c) Check that the solenoid is clicked.

If faulty, replace the control valve housing with the solenoid valve.

NOTICE:

- **Do not apply voltage for more than 30 seconds to avoid burning out the solenoid.**
- **If repeating this step, wait until the solenoid cools down enough that it can be touched by hand.**

4. CONNECT WIRING CONNECTOR



Power Steering ECU

1. JACK UP VEHICLE AND SUPPORT IT ON STANDS

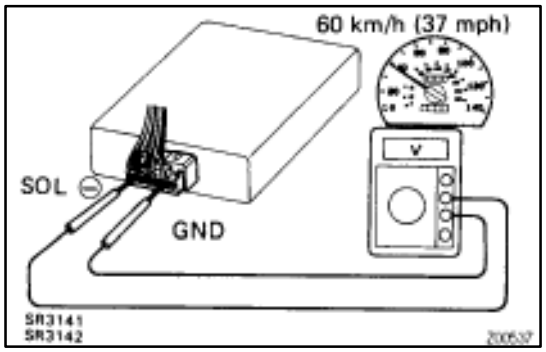
2. START ENGINE

3. MEASURE VOLTAGE OF ECU

(a) Using a voltmeter, measure the voltage between ECU terminals SOL⊖ and GND while the engine is idling.

Standard voltage:

0.43–0.56 V



(b) Place the transmission in gear and while running at about 60 km/h (37 mph), measure the voltage between ECU terminals SOL⊖ and GND.

Standard voltage:

Voltage measured in (a) above, minus 0.08–0.22 V

If no voltage, try another ECU.

4. LOWER VEHICLE

SRS AIRBAG

GENERAL DESCRIPTION

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) airbag.
Failure to carry out service operations in the correct sequence could cause the airbag system to unexpectedly deploy during servicing, possibly leading to a serious accident.
Further, if a mistake is made in servicing the airbag system, it is possible the airbag 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 procedure described in the repair manual.

1. Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting.
   When troubleshooting the airbag system, always inspect the diagnostic trouble codes before disconnecting the battery (See page AB–25).
2. **Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery. (The airbag system is equipped with a back–up power source so that if work is started within 30 seconds of disconnecting the negative (–) terminal cable of the battery, the airbag may be deployed.)**
   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 audio memory system. Then when work is finished, reset the audio systems as before and adjust the clock. When the vehicle has power tilt and power telescopic steering, power seat, power outside rear view mirror and power shoulder belt anchorage, which are all equipped with memory function, it is not possible to make a record of the memory contents. So when the work is finished, it will be necessary to explain this fact to the customer, and ask the customer to adjust the features and reset the memory.
   To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.
3. Even in cases of a minor collision where the airbag does not deploy, the front airbag sensors and the steering wheel pad should be inspected (See page AB–9).
4. Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.
5. Before repairs, remove the airbag sensors if shocks are likely to be applied to the sensors during repairs.
6. Never disassemble and repair the front airbag sensors, center airbag sensor assembly or steering wheel pad in order to reuse it.
7. If the front airbag sensors, center airbag sensor assembly or steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
8. Do not expose the front airbag sensors, center airbag sensor assembly or steering wheel pad directly to hot air or flames.
9. Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.
10. Information labels are attached to the periphery of the airbag components. Follow the instructions on the notices.
11. After work on the airbag system is completed, perform the airbag warning light check (See page AB–31).

FRONT AIRBAG SENSOR

1. Never reuse the front airbag sensors involved in a collision when the airbag has deployed. (Replace both the left and right airbag sensors.)
2. Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.
3. The front airbag sensor set bolts have been anti–rust treated. When the sensor is removed, always replace the set bolts with new ones.

N01538

4. The front airbag 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 diagnosis system (See page AB–7).

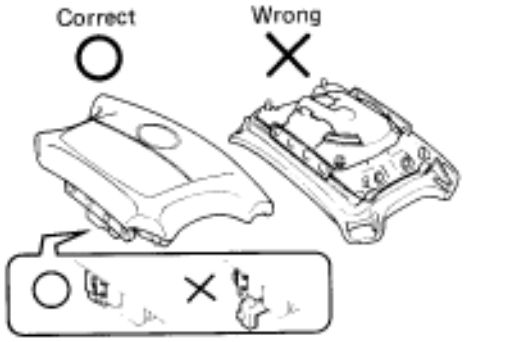
SPIRAL CABLE (in COMBINATION SWITCH)

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 page AB–17 of this manual concerning correct steering wheel installation.

STEERING WHEEL PAD (with AIRBAG)

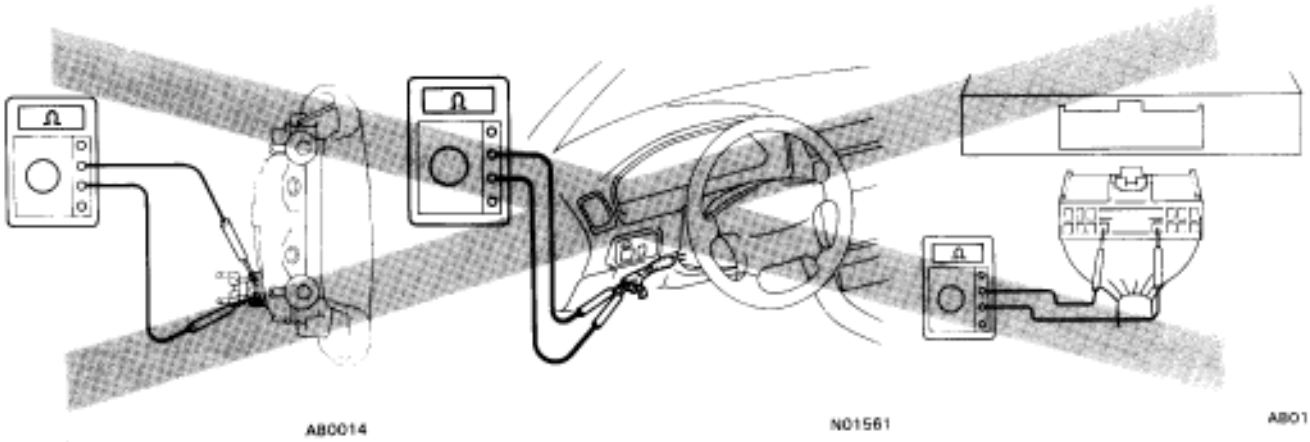
1. **When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.**

   In this case, the twin–lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. And do not store a steering wheel pad on top of another one. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)



N01560

2. **Never measure the resistance of the airbag squib.**
   (This may cause the airbag to deploy, which is very dangerous.)


AB0014 N01561 AB0110

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$_1$C (200$_1$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 AB–88). Perform the operation in a place away from electrical noise.

CENTER AIRBAG SENSOR ASSEMBLY

The connector of the center airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connector is connected or disconnected while the center airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the airbag system.

WIRE HARNESS AND CONNECTOR

The airbag system wire harness is integrated with the cowl wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the airbag system wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page AB–21.

OPERATION

FUNCTION OF COMPONENTS

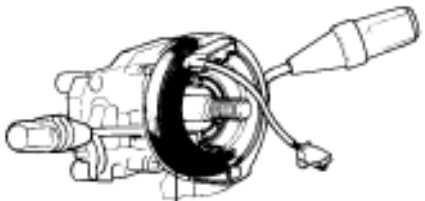
1. FRONT AIRBAG SENSOR

A front airbag sensor is mounted inside each of the front fenders. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit in a collision, the contacts in the sensor make contact, sending a signal to the center airbag sensor assembly. The sensor cannot be disassembled.

N01538

2. SPIRAL CABLE (in COMBINATION SWITCH)

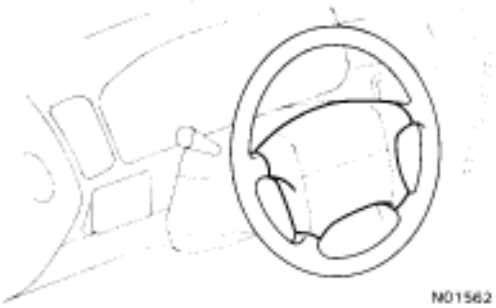
A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



AB0250

3. STEERING WHEEL PAD (with AIRBAG)

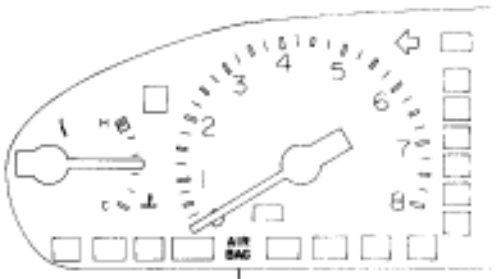
The inflater and bag of the airbag system are stored in the steering wheel pad and cannot be disassembled.
The inflater contains a squib, igniter charge, gas generant, etc., and inflates the bag in case of a frontal collision.



N01562

4. AIRBAG WARNING LIGHT

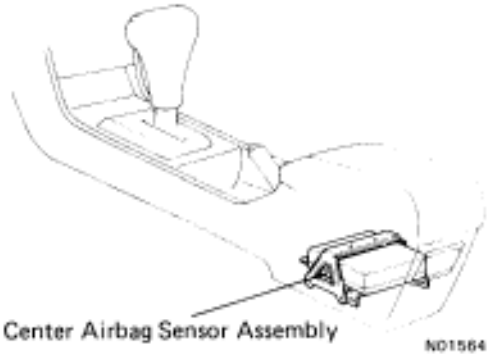
The airbag warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the center airbag sensor assembly self–diagnosis. In normal operating condition when the ignition switch is turned to the ACC or ON position, the light goes on for about 6 seconds and then goes off.



N01563

5. CENTER AIRBAG SENSOR ASSEMBLY

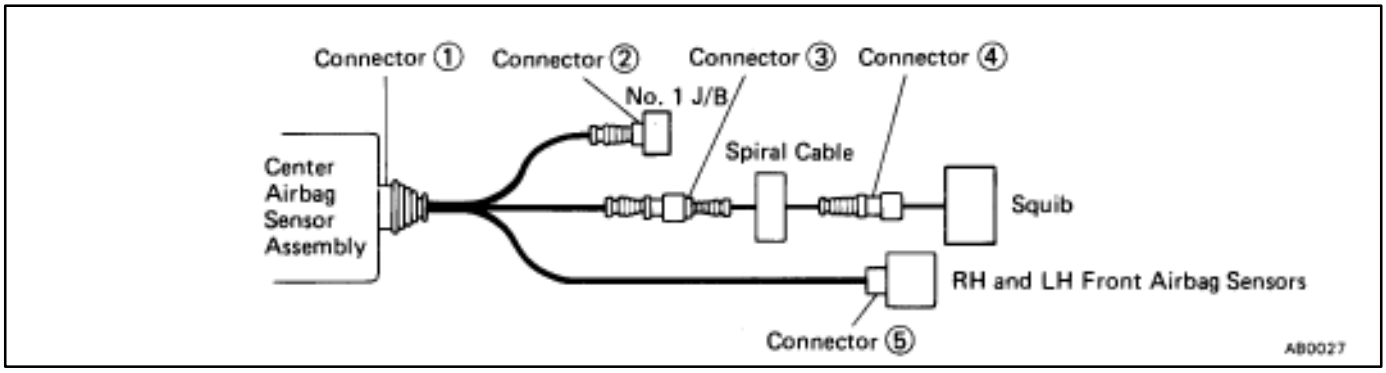
The center airbag sensor assembly is mounted on the floor inside the center cluster. The center airbag sensor assembly consists of a center airbag sensor, safing sensors, ignition control and drive circuit, diagnosis circuit, etc. It receives signals from the airbag sensors, judges whether the airbag must be activated or not and diagnoses system malfunctions.



N01564

6. AIRBAG CONNECTORS

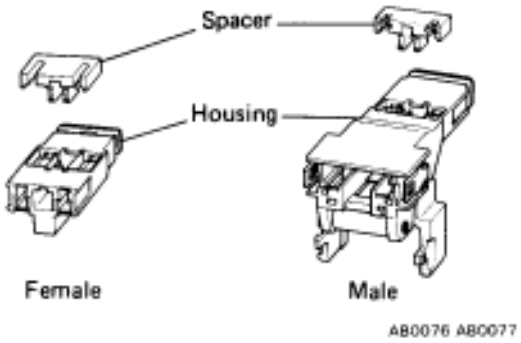
All connectors in the airbag system are colored yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for airbags are used in the locations shown below to ensure high reliability. These connectors use durable gold–plated terminals.



No.	Item	Application
(1)	Terminal Twin–Lock Mechanism	Connectors ①,②,③,④,⑤
(2)	Airbag Activation Prevention Mechanism	Connectors ①,③,④
(3)	Electrical Connection Check Mechanism	Connectors ①,⑤
(4)	Connector Twin–Lock Mechanism	Connectors ②,③,④

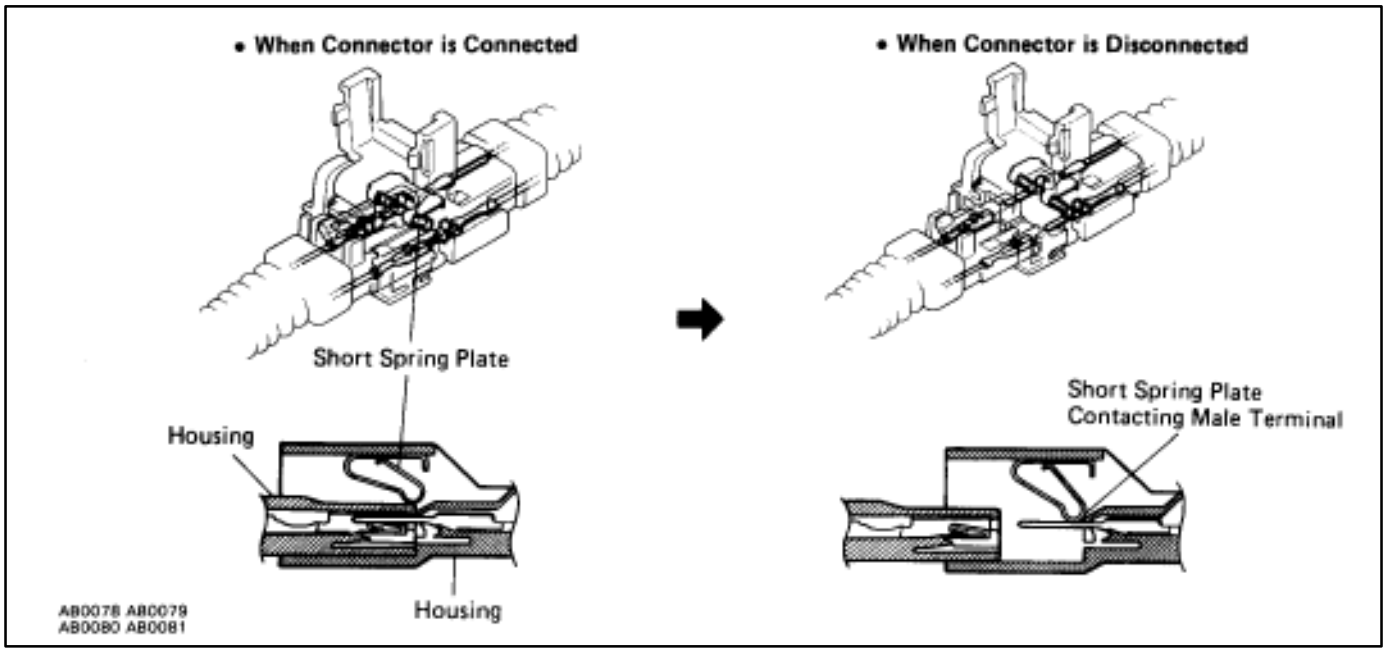
(1) Terminal Twin–Lock Mechanism

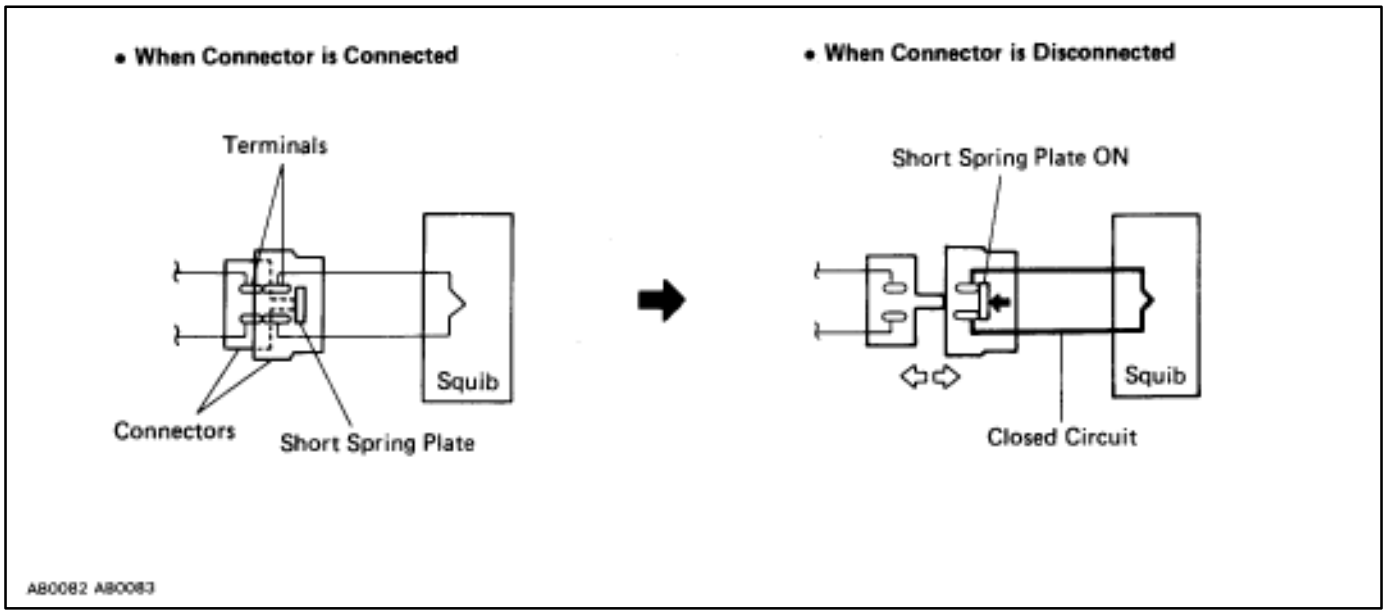
Each connector has a two–piece construction consisting of a housing and a spacer. This design secures the locking of the terminal by two locking devices (the spacer and the lance) to prevent terminals from coming out.



(2) Airbag Activation Prevention Mechanism

Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the power source and grounding terminals of the squib.



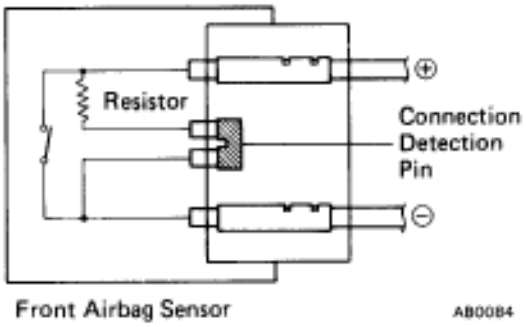


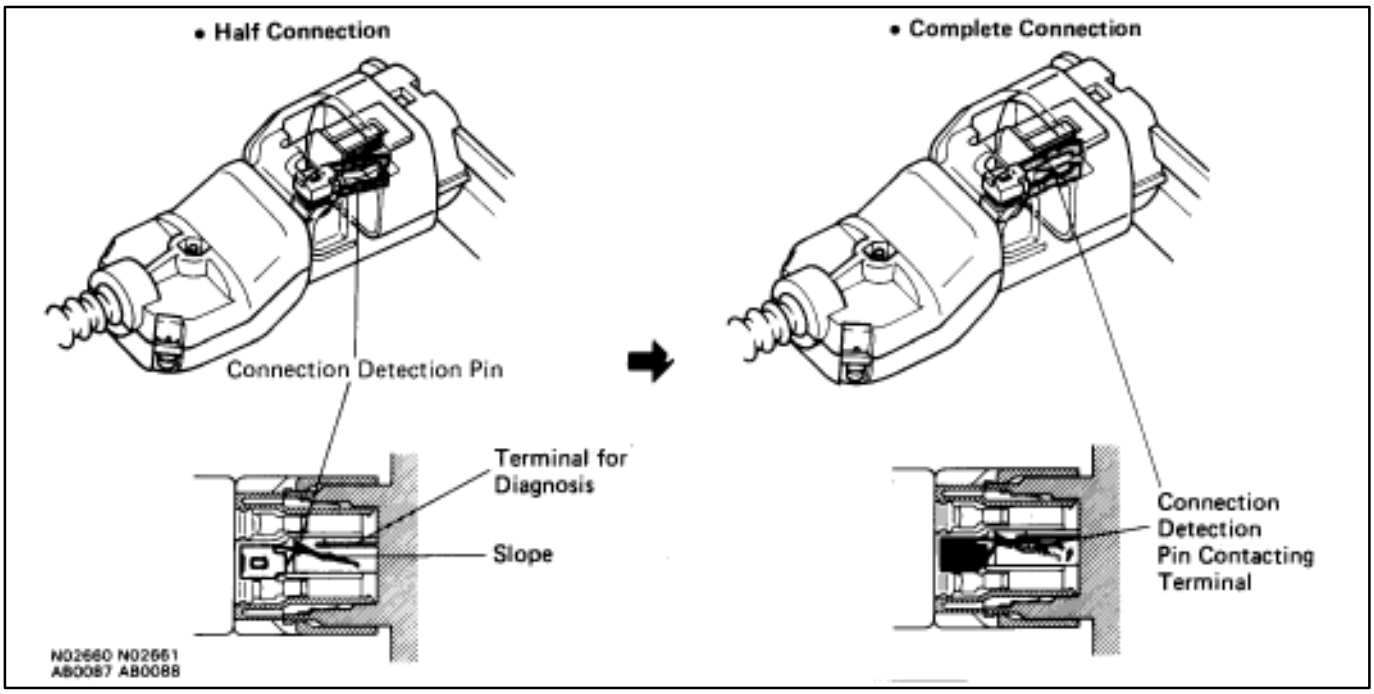
HINT: The illustration shows connectors ③ and ④. Connector ① has a short spring plate on the female terminal side, but the operating principle is the same.

(3) Electrical Connection Check Mechanism

This mechanism is designed to electrically check if connectors are connected correctly and completely.

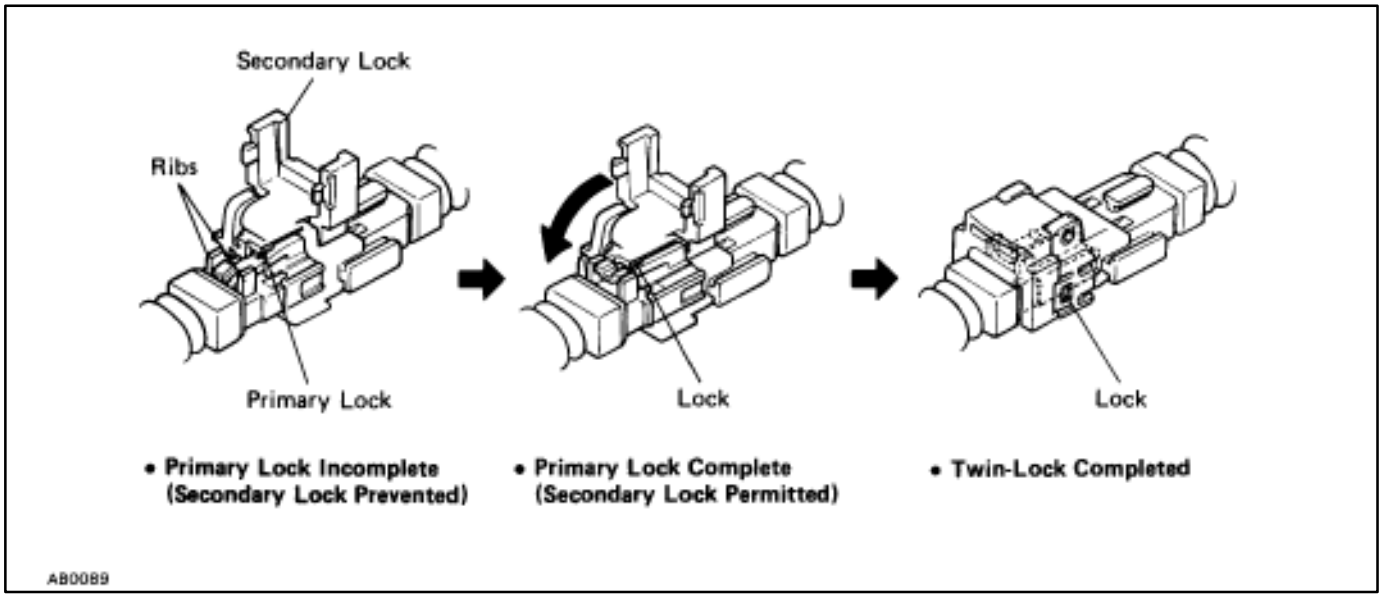
The electrical connection check mechanism is designed so that the connection detection pin connects with the diagnosis terminals when the connector housing lock is in the locked condition.





HINT: The illustration shows connector ⑤. Connector ① also has the same operating principle.

(4) Connector Twin–Lock Mechanism
With this mechanism connectors (male and female connectors) are locked by two locking devices to increase connection reliability. If the primary lock is incomplete, ribs interfere and prevent the secondary lock.



When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than a predetermined level, the airbag is activated automatically. Safing sensors are designed to go on at a smaller deceleration rate than the front and center airbag sensors. As illustrated in Fig. 2 below, ignition is caused when current flows to the squib, which happens when a safing sensor and a front airbag sensor and/or the center airbag sensor go on simultaneously.
When a deceleration force acts on the sensors, it causes the squib to ignite. Gas is then generated, increasing the pressure inside the bag rapidly. The inflated bag breaks open the steering wheel pad. Bag inflation then ends, and the gas is discharged through discharge holes provided behind the bag. The bag becomes deflated as a result.

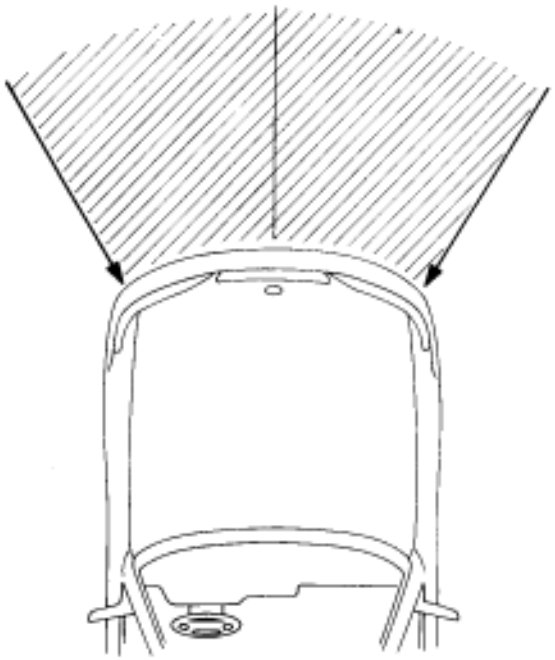


Fig. 1
N01585

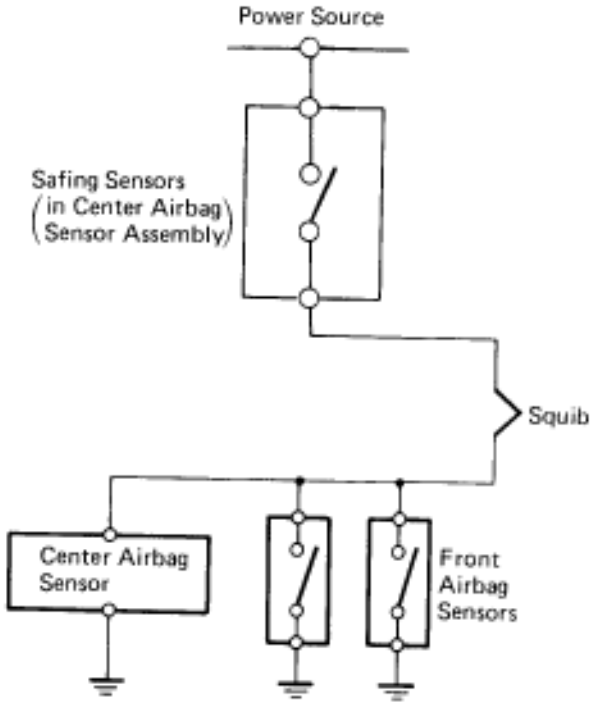


Fig. 2
N02896

INSPECTION ITEMS AND REPLACEMENT REQUIREMENTS

If a vehicle is brought in for an airbag system inspection, or if a vehicle which has been involved in a collision is inspected, perform the inspection in accordance with the following procedure. If any problems are discovered, replace the affected part with a new one.

Steering Wheel Pad (with Airbag), Steering Wheel and Spiral Cable

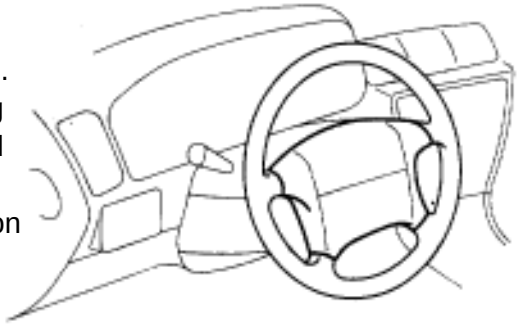
INSPECTION ITEMS

1. VEHICLES NOT INVOLVED IN A COLLISION

(a) Perform a diagnostic system check (See page AB–31).

(b) Perform a visual check which includes the following items with the steering wheel pad (with airbag) installed in the vehicle.

- Check for cuts, minute cracks or marked discoloration of the steering wheel pad top surface and grooved portion.


N01562

2. VEHICLES INVOLVED IN A COLLISION

IF THE AIRBAG IS NOT DEPLOYED

(a) Perform a diagnostic system check (See page AB–31).

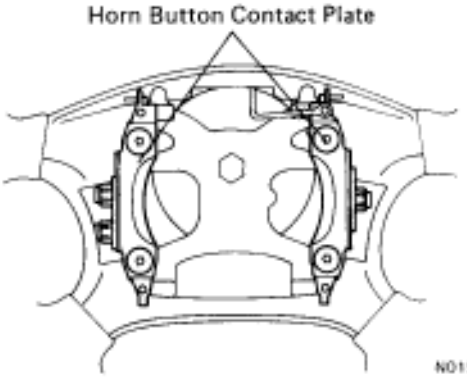
(b) Perform a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check for cuts or cracks in, or marked discoloration of the steering wheel pad top surface and grooved portion.
- Check for cuts and cracks in, or chipping of connectors and wire harnesses.
- Check for deformation of the horn button contact plate of the steering wheel.

N01566

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 the steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.



N01995

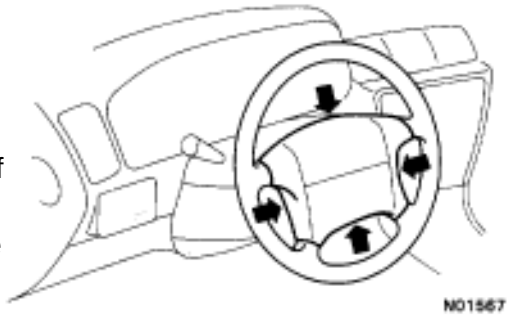
CAUTION: For removal and installation of the steering wheel pad, see page AB–16, ”REMOVAL AND INSTALLATION” and be sure to follow the correct procedure.

IF THE AIRBAG IS DEPLOYED

(a) Perform a diagnostic system check (See page AB–31).

(b) Perform a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check for deformation of the horn button contact plate of the steering wheel.
- Check for damage to the spiral cable connector and wire harness.


N01567

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 the steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

CAUTION: For replacement of the steering wheel pad, see page AB–16, "REMOVAL AND INSTALLATION" and be sure to follow the correct procedure.

- If the airbag has been deployed.
- If the steering wheel pad or spiral cable has been found to be faulty in troubleshooting.
- If the steering wheel pad, steering wheel or spiral cable has been found to be faulty during the check in item 1–(b) or 2–(b).
- If the steering wheel pad has been dropped.

Front Airbag Sensor

INSPECTION ITEMS

1. VEHICLES NOT INVOLVED IN A COLLISION

- Perform a diagnostic system check (See page AB–31).

2. VEHICLES INVOLVED IN A COLLISION

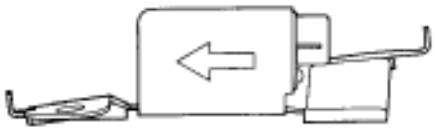
(a) Perform a diagnostic system check (See page AB–31).

(b) If the front fender of the car or its periphery is damaged, perform visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:

- Bracket deformation.
- Peeling of paint from the bracket.
- Cracks, dents or chips in the case.

N01588

- Cracks and dents in, or chipping and scratches of the connector.
- Peeling off of the label or damage to the series number.



N01538

Also refer to the body dimension drawings on page BO–174 and check the dimensions and mounting surface angle of the body area where the front airbag sensors are mounted. (The airbag may malfunction, or may not work, if the mounting angle or dimensions of the sensor mount are not correct.)

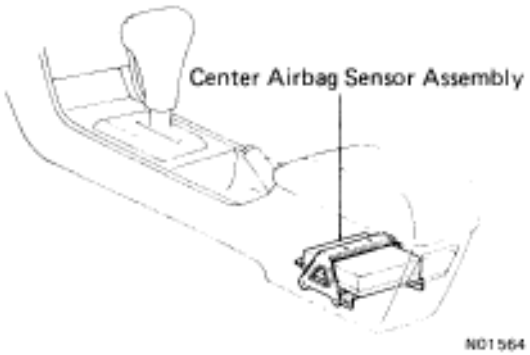
REPLACEMENT REQUIREMENTS

In the following cases, replace the front airbag sensor.

NOTICE: For replacement of the front airbag sensor, see page AB–18, "REMOVAL AND INSTALLATION."

- If the airbag 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 the check in item 2–(b).
- If the front airbag sensor has been dropped.

Center Airbag Sensor Assembly



INSPECTION ITEMS

1. VEHICLES NOT INVOLVED IN A COLLISION

- Perform a diagnostic system check (See page AB–3

2. VEHICLES INVOLVED IN A COLLISION

IF THE AIRBAG IS NOT DEPLOYED

- Perform a diagnostic system check (See page AB–3

IF THE AIRBAG IS DEPLOYED

- Replace the airbag sensor assembly certainly.

REPLACEMENT REQUIREMENTS

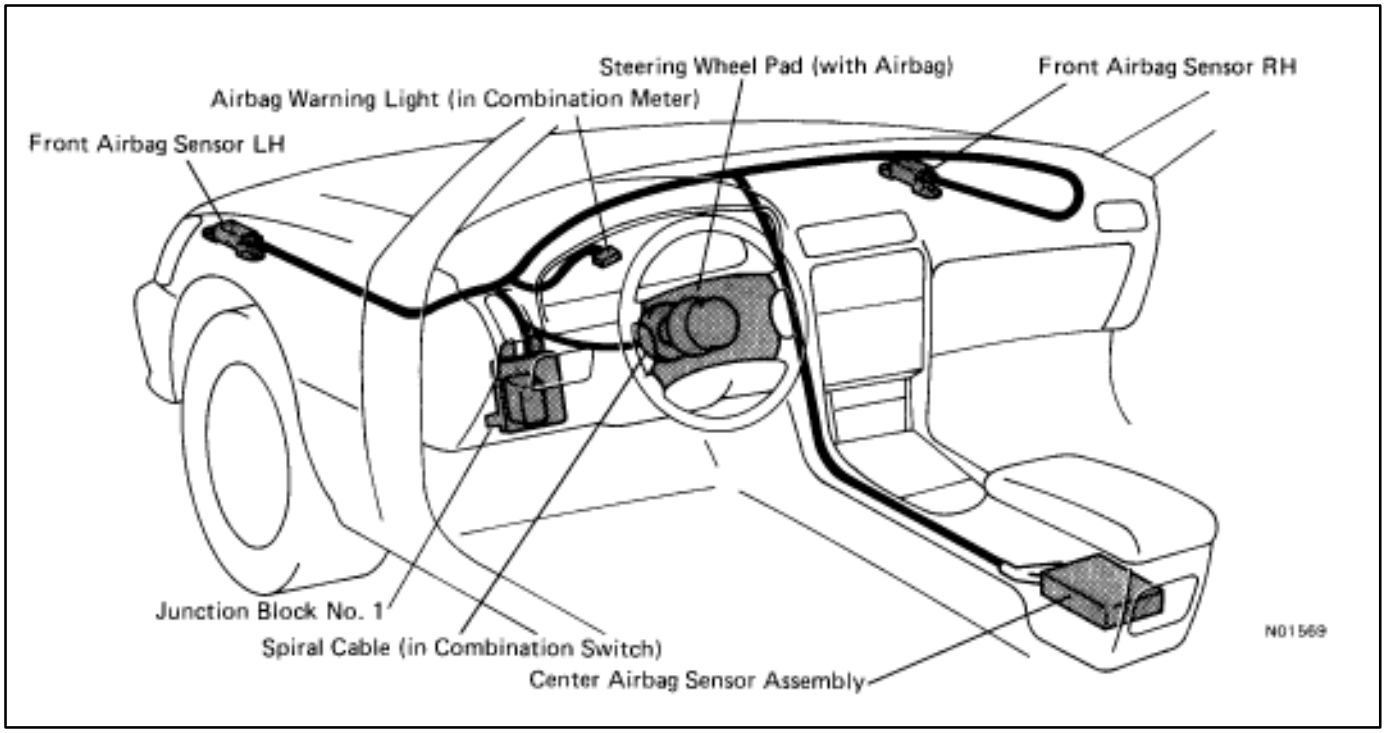
In the following cases, replace the center airbag sensor assembly.

NOTICE: For replacement of the center airbag sensor assembly, see page AB–18, "REMOVAL AND INSTALLATION"

- If the airbag is DEPLOYED.
- If the center airbag sensor assembly has been found to be faulty in troubleshooting.
- If the center airbag sensor assembly has been found to be faulty as followings.
  (1) Deformation of the bracket or case
  (2) Vinyl seal broken
  (3) Damage to the connector
- If the center airbag sensor assembly has been dropped.

Wire Harness and Connector

HINT: The airbag system wire harness is integrated with the cowl wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube and all the connectors in the system are a standard yellow color.



INSPECTION ITEMS

1. VEHICLES NOT INVOLVED IN A COLLISION

2 Perform a diagnostic system check (See page AB–31).

2. VEHICLES INVOLVED IN A COLLISION

(a) Perform a diagnostic system check (See page AB–31).
(b) If there is a break in any of the wires in the airbag system wire harness, or if conductors are exposed.
(c) If the airbag system wire harness connectors are cracked or chipped.

REPLACEMENT REQUIREMENTS

In the following cases, replace the wire harness or connector.

2 If any part of the airbag system wire harness or any connector has been found to be faulty in troubleshooting.

2 If any part of the airbag system wire harness or any connector has been found to be faulty during the check in item 2–(b) or (c).

NOTICE: If the wire harness used in the airbag system is damaged, replace the whole wire harness assembly.

When the connector to the airbag front sensors can be repaired alone (when there is no damage to the wire harness), use the repair wire specially designed for the purpose (See page AB–21).

PREPARATION

SST (SPECIAL SERVICE TOOLS)

AB00F–01

	09082–00700	SRS Airbag Deployment Tool	
	09213–31021	Crankshaft Pulley Puller	Steering wheel
	09843–18020	Diagnosis Check Wire	

AB00G–01

RECOMMENDED TOOLS

	09042–00010	Torx Socket T30	Steering wheel pad
	09042–00020	Torx Socket T40	Center airbag sensor assembly
	09082–00015	TOYOTA Electrical Tester	

AB00H–01

EQUIPMENT

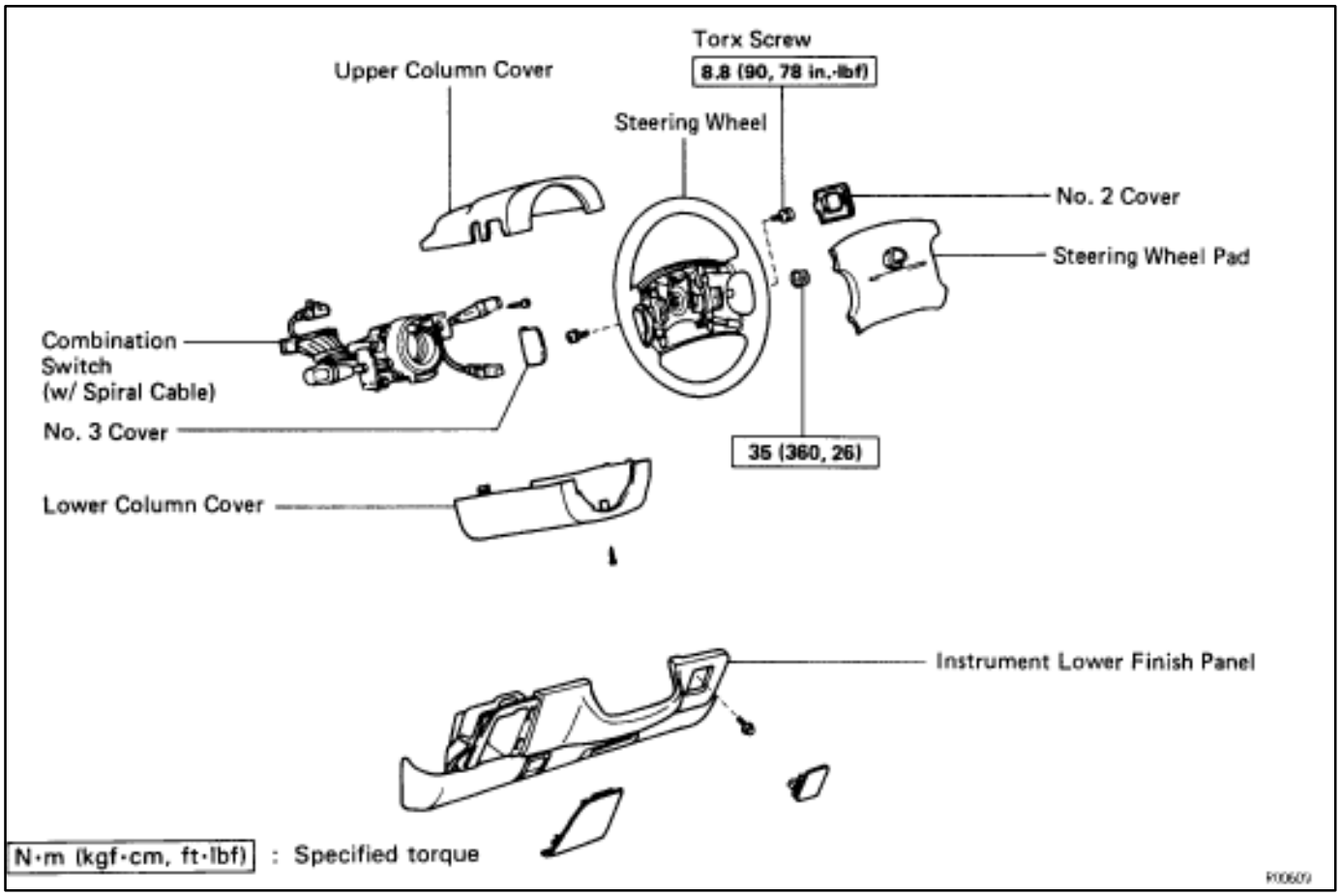
Torque wrench	

COMPONENT PARTS REMOVAL AND INSTALLATION

STEERING WHEEL PAD AND SPIRAL CABLE

AB00J–01

Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected form the battery.

NOTICE:

- **If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.**
- **Never use airbag parts from another vehicle. When replacing parts, replace with new parts.**

PREPARATION

SST (SPECIAL SERVICE TOOLS)

AB00F–01

	09082–00700	SRS Airbag Deployment Tool	
	09213–31021	Crankshaft Pulley Puller	Steering wheel
	09843–18020	Diagnosis Check Wire	

AB00G–01

RECOMMENDED TOOLS

	09042–00010	Torx Socket T30	Steering wheel pad
	09042–00020	Torx Socket T40	Center airbag sensor assembly
	09082–00015	TOYOTA Electrical Tester	

AB00H–01

EQUIPMENT

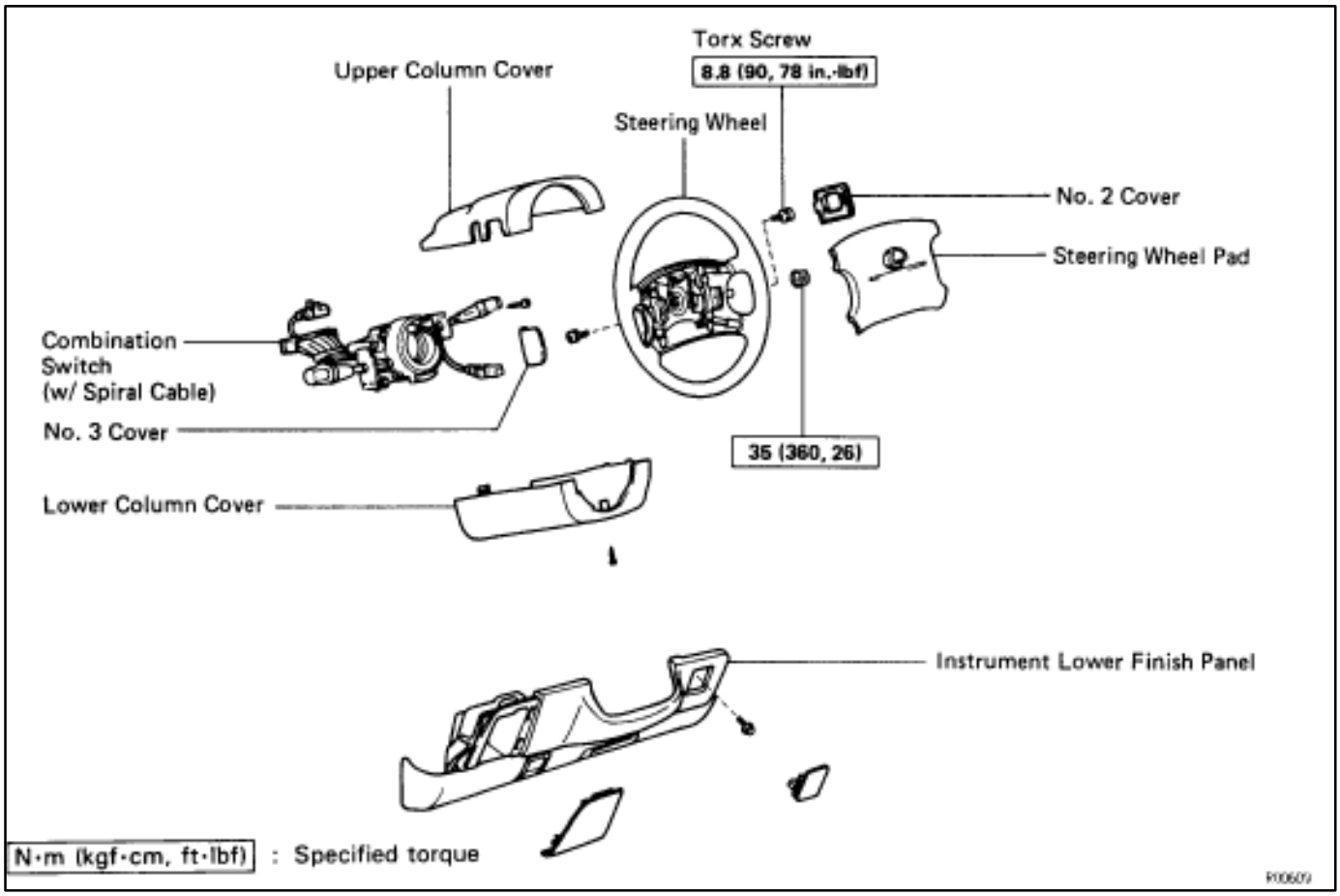
Torque wrench	

COMPONENT PARTS REMOVAL AND INSTALLATION

STEERING WHEEL PAD AND SPIRAL CABLE

AB00J–01

Remove and install the parts as shown.

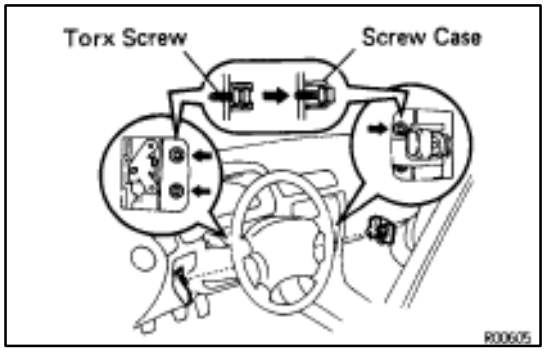


(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected form the battery.

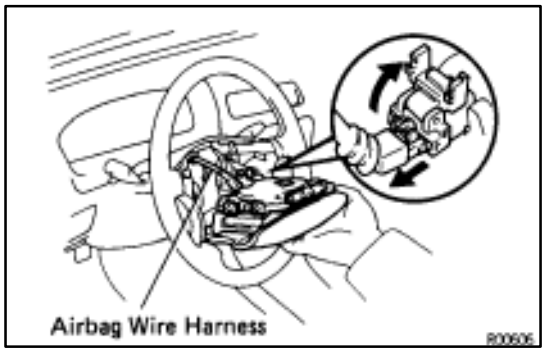
NOTICE:

- **If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.**
- **Never use airbag parts from another vehicle. When replacing parts, replace with new parts.**

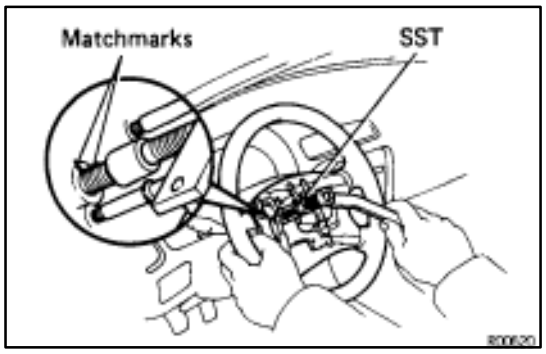


1. REMOVE STEERING WHEEL PAD

(a) Remove negative terminal (–) from the battery.
(b) Place the front wheels facing straight ahead.
(c) Using a torx wrench, loosen the three screws.
Torx wrench: T30 (Part No. 09042–00010 or locally manufactured tool)
(d) Loosen the torx screws until the groove along the screw circumference catches on the screw case.



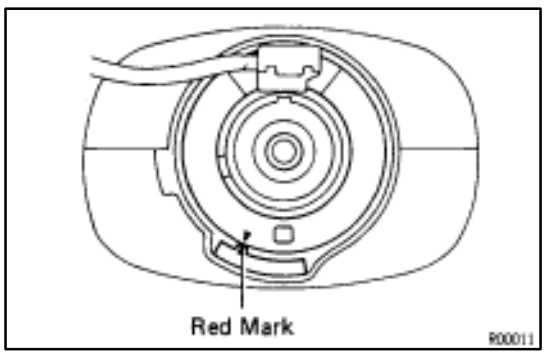
(e) Pull the wheel pad out from the steering wheel and disconnect the airbag connector.
NOTICE: When removing the wheel pad, take care not to pull the airbag wire harness.
CAUTION:
- **When storing the wheel pad, keep the upper surface of the pad facing upward.**
- **Never disassemble the wheel pad.**



2. REMOVE STEERING WHEEL

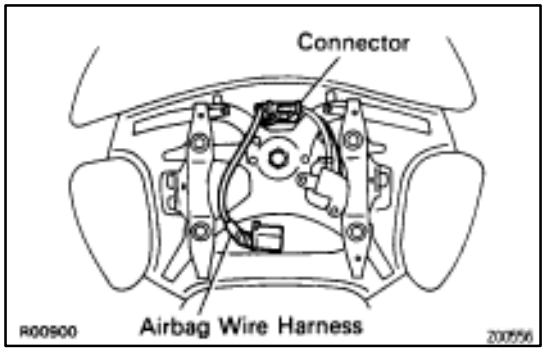
(a) Disconnect the connector.
(b) Remove the set nut.
(c) Place matchmarks on the steering wheel and main shaft.
(d) Using SST, remove the steering wheel.
SST 09213–31021

3. REMOVE AND INSTALL SPIRAL CABLE FROM/TO COMBINATION SWITCH
(See BE Section)
NOTICE: Do not disassemble the spiral cable or apply oil to it.



4. CENTER SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.
(b) Turn the spiral cable counterclockwise by hand until it becomes harder to turn the cable.
(c) Then rotate the spiral cable clockwise about 3 turns to align the red mark.
HINT: The spiral cable will rotate about 3 turns to either left or right of the center.

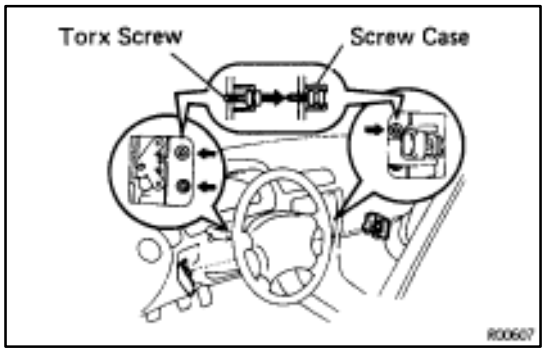


5. INSTALL STEERING WHEEL

(a) Align matchmarks on the steering wheel and main shaft, and install the steering wheel to the main shaft.

(b) Install and torque the set nut.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Connect the connector.



6. INSTALL STEERING WHEEL PAD

(a) Connect the airbag connector.

(b) Install the wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

(c) Using a torx wrench, tighten the three screws.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

NOTICE:

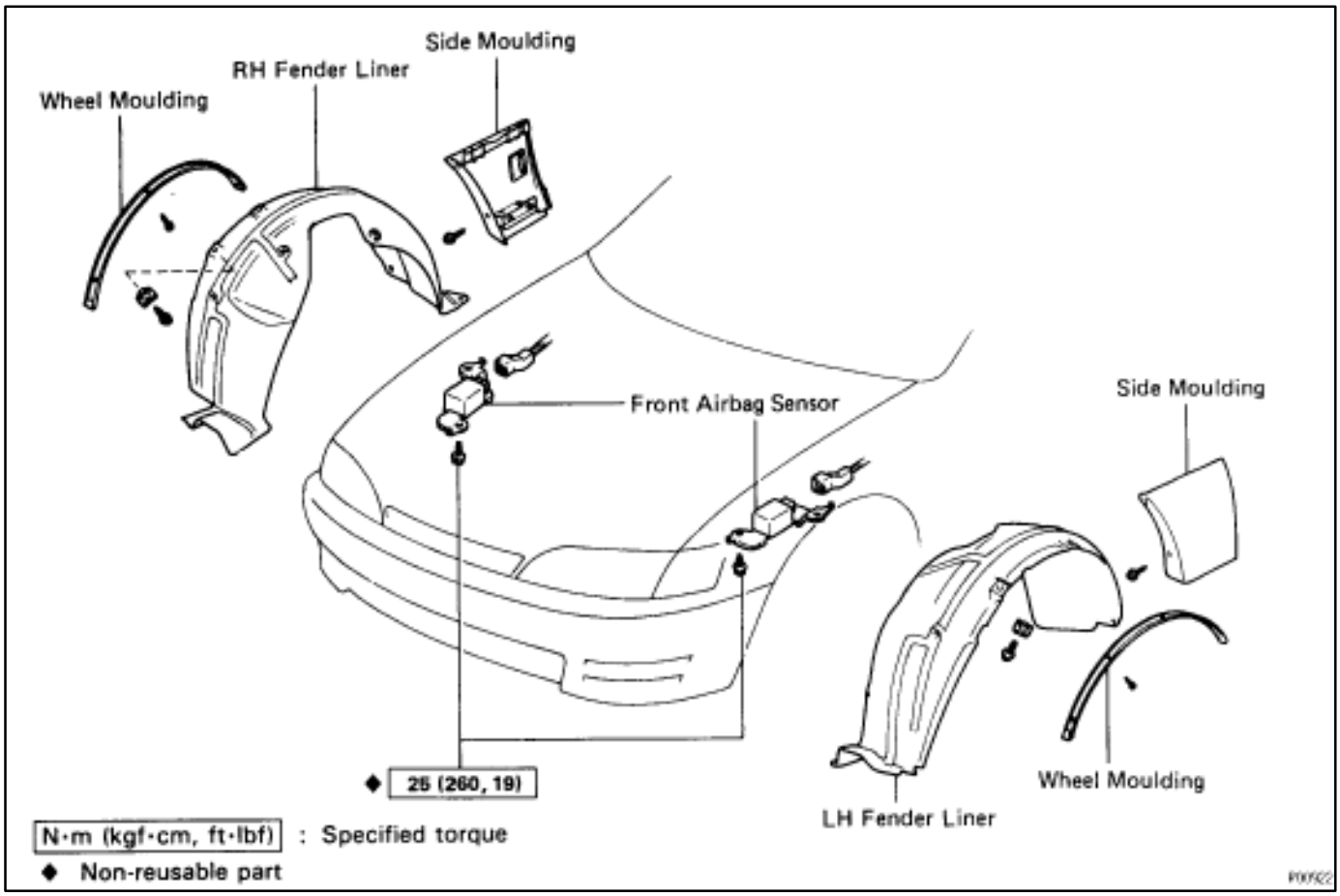
- **Make sure the wheel pad is installed to the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**

7. CHECK STEERING WHEEL CENTER POINT

FRONT AIRBAG SENSOR

AB00K–01

Remove and install the parts as shown.

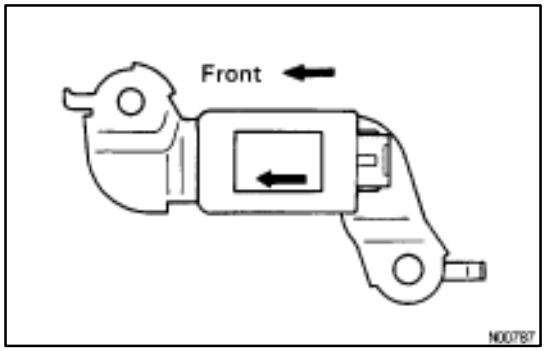


(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery.

NOTICE:

- **If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.**
- **Never use airbag parts from another vehicle. When replacing parts, replace with new parts.**
- **Never reuse the sensor involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



INSTALL FRONT AIRBAG SENSOR

Install the sensor with the arrow on the sensor facing toward the front of the vehicle.

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

NOTICE:

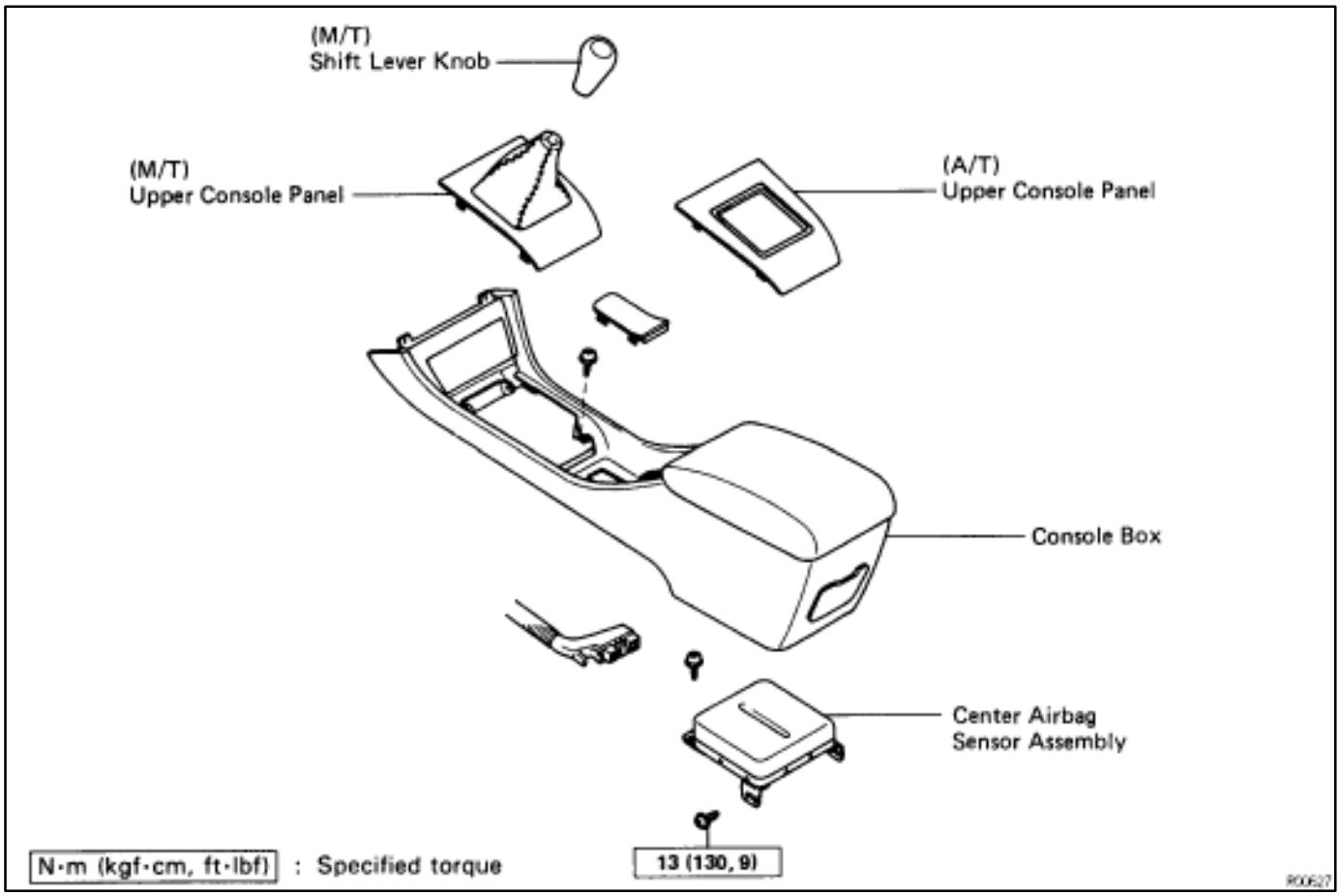
- **Make sure the sensor is installed to the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor with a new one.**
- **The sensor set bolts have been anti–rust treated. When the sensor is removed, always replace the set bolts with new ones.**
- **After installation, shake the sensor to check that there is no looseness.**
- **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 diagnosis system.**
- **Check that the dimensions of the body where the front airbag sensor is installed match those in the body dimension drawings of BO section.**

  (The airbag may malfunction, or may not work, if the mounting angle or dimensions of the sensor mount are not correct.)

CENTER AIRBAG SENSOR ASSEMBLY

AB00L–01

Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

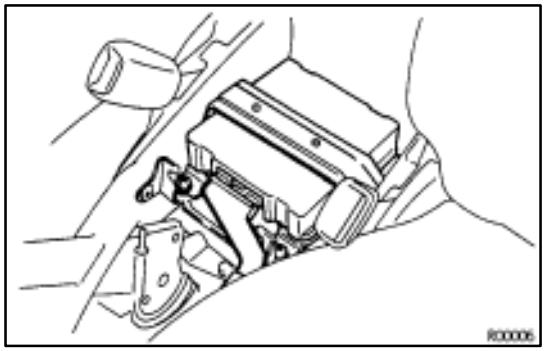
CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to LOCK position and the negative (–) terminal cable is disconnected from the battery.

NOTICE:

- **Do not open the cover or the case of the ECU and various computers unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)**
- **Never use airbag parts from another vehicle.**

When replacing parts, replace with new parts.

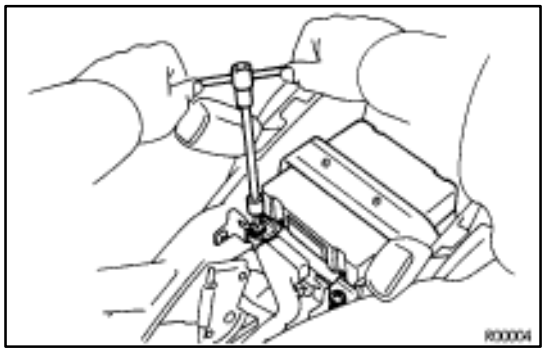
- **Never reuse the center airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



REMOVE AND INSTALL CENTER AIRBAG SENSOR ASSEMBLY

(a) Disconnect and connect the connector.

NOTICE: Removal and installation of the connector is done with the sensor assembly installed.



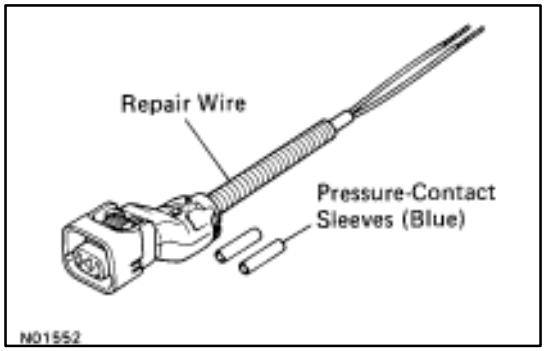
(b) Using a torx wrench, loosen and tighten the four screws.

Torx wrench: T40 (Part No. 09042–00020 or locally manufactured tool)

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

NOTICE:

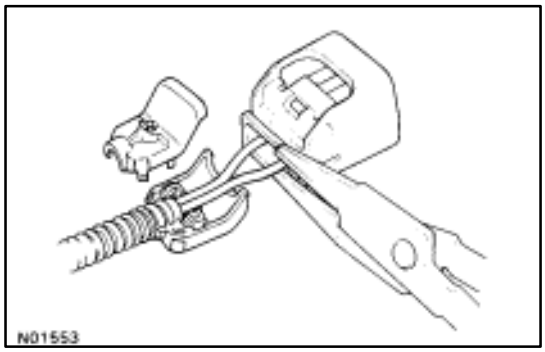
- **Make sure the sensor assembly is installed to the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the sensor assembly, take care that the airbag wirings do not interfere with other parts and are not pinched between other parts.**
- **After installation, shake the sensor assembly to check that there is no looseness.**



REPLACEMENT OF REPAIR WIRE FOR FRONT AIRBAG SENSOR

Repair wire with two pressure–contact sleeves (Part No. 82988–50010) has been prepared for exclusive use in repairing connector damage etc. caused by frontal collision of the vehicle. When repairing the front airbag sensor connector on the wire harness side, always use the special repair wire.

NOTICE: Do not replace the connector housing or terminal only.



REPLACEMENT OF AIRBAG REPAIR WIRE

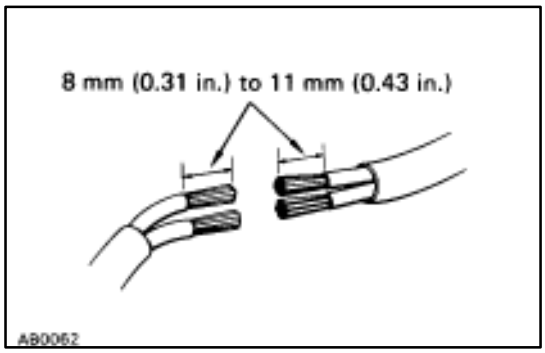
CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

1. DISCONNECT WIRE HARNESS AT VEHICLE SIDE

(a) Remove the cover at the rear of the connector housing and expose the wire harness.

(b) Cut the wire harness behind the connector housing.

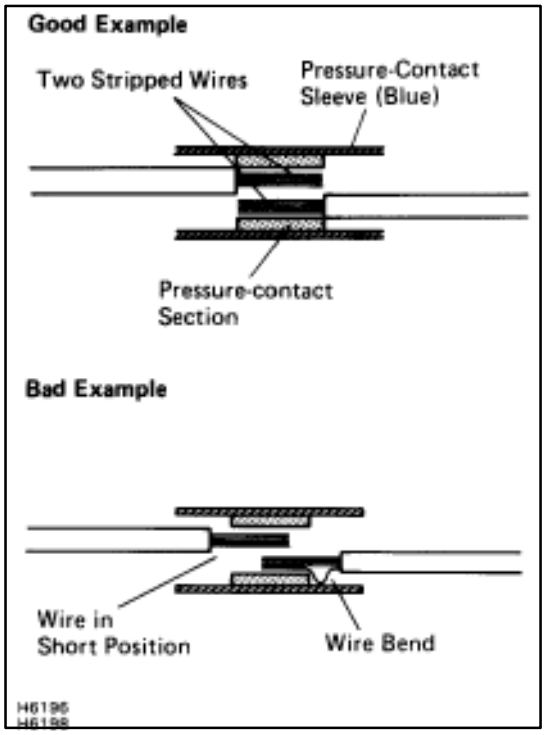
HINT: The operation is performed more easily if the wire harness is left as long as possible.



2. CONNECT FRONT AIRBAG SENSOR WIRE HARNESS AT VEHICLE SIDE AND REPAIR WIRE

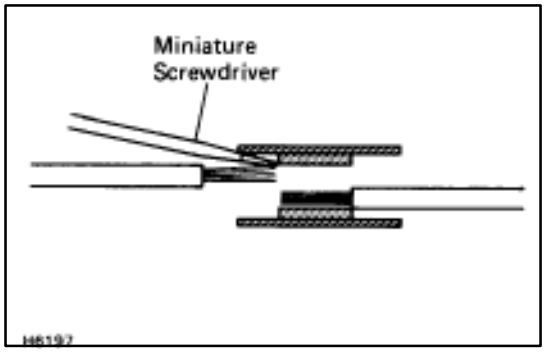
(a) Start stripping at least 8 mm (0.31 in.) to 11 mm (0.43 in.) away from the end of the existing harness at vehicle side and also from the end of the repair wire.

NOTICE: Take care not to damage the wire when stripping the wire harness lead. After finishing the operation, visually inspect the wire. If there is any damage, perform the operation again.

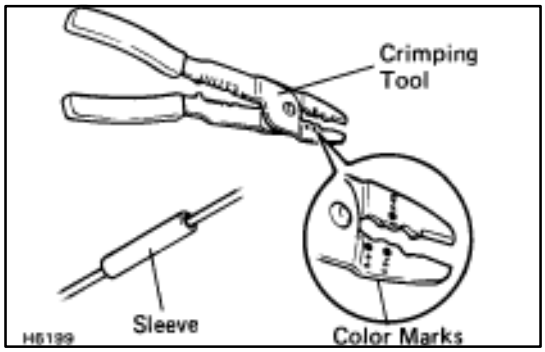


(b) Overlap the two stripped wire ends inside of the pressure–contact sleeve as illustrated in the left.

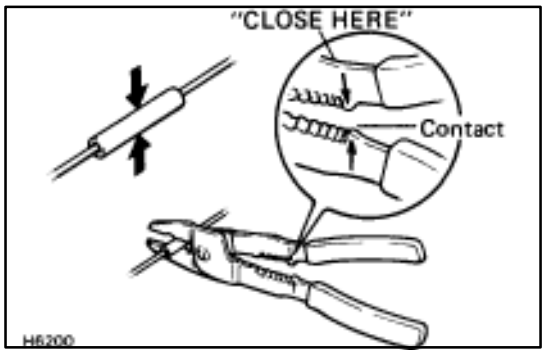
HINT: The blue pressure–contact sleeve (Part No. 82999–12020) is available as a solitary spare part.



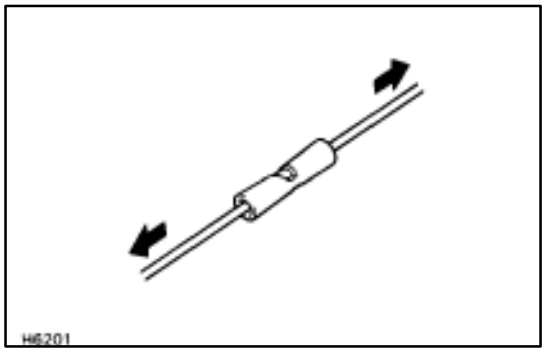
HINT: You might find it easier if you use a miniature screwdriver as a guide as you insert wires into the sleeve.



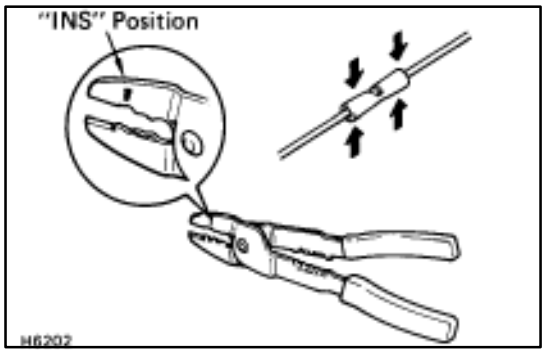
(c) The crimping tool (AMP Part No. 169060) has color marks on it. Place the sleeve in the correct section of the tool according to the color of the sleeve itself.
HINT: As the crimping tool, AMP ”Part No. 169060” is convenient to use.



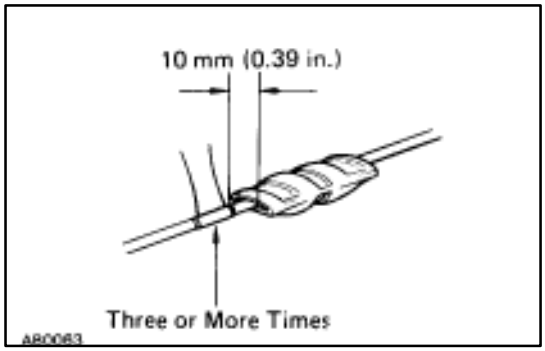
(d) With the center of the sleeve correctly placed between the crimping jaws, squeeze the crimping tool until either end comes into contact at the section marked by ”CLOSE HERE”.
HINT: Check to see that the sleeve and wires are still in the correct position before closing the crimping tool ends with steady pressure.



(e) Pull the joined wires to either end. Make sure that they are joined firmly by the sleeve.
NOTICE: If the joined wires come loose the splice is defective, so replace the sleeve and repeat the procedure.



(f) Crimp both ends of the sleeve with the crimping tool at the ”INS” position.



3. PROTECT JOINED SECTION

Wrap silicon tape around the joins to protect them from water.

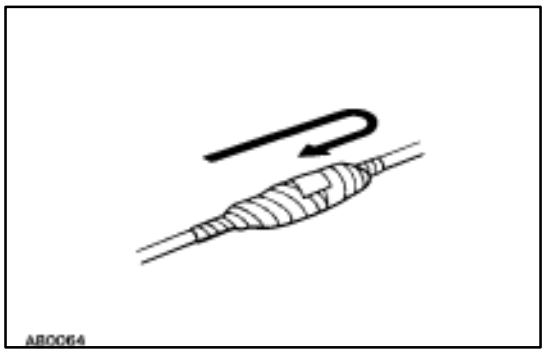
HINT:

- Before starting the operation, thoroughly wipe dirt and grease off the sections to be joined.
- If the adhesive surfaces of two tapes come in contact they will stick together and will not come apart, so do not remove the backing film except when using the tape.
- Do not let oil and dust, etc. get on the tape surface.

(a) Ready about 100 mm (3.94 in.) of silicon tape (Part No. 08231–00045) and peel off the film.

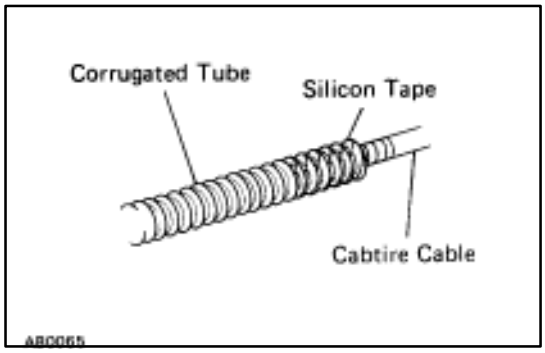
(b) Stretch the silicon tape until its width is reduced by half.

(c) About 10 mm (0.39 in.) from the end of the pressure–contact sleeve, wrap the silicon tape around the sleeve three or more times while stretching the tape.

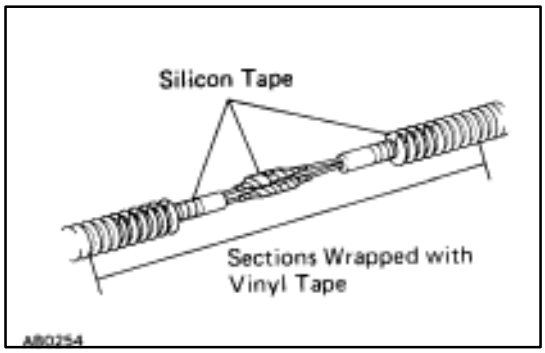


(d) Wrap the remaining part of sleeve with half of the tape overlapping at each turn.

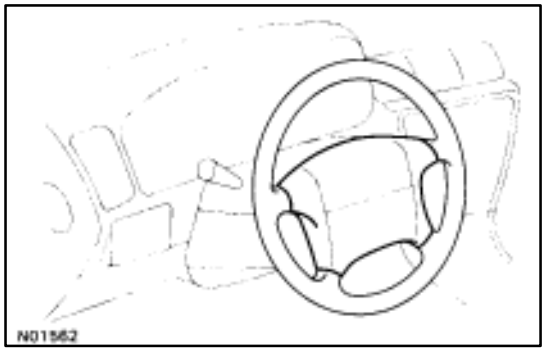
(e) Firmly wrap the tape two times or more about 10 mm (0.39 in.) from the other end of the pressure–contact sleeve, then wrap the tape back towards the start again and firmly finish winding the tape around the center of the sleeve.



(f) Fix the corrugated tube to the cabtire cable using silicon tape.



(g) After applying the silicon tape, apply vinyl tape on the corrugated tube of repair wire side over to the corrugated tube of vehicle wire harness side.



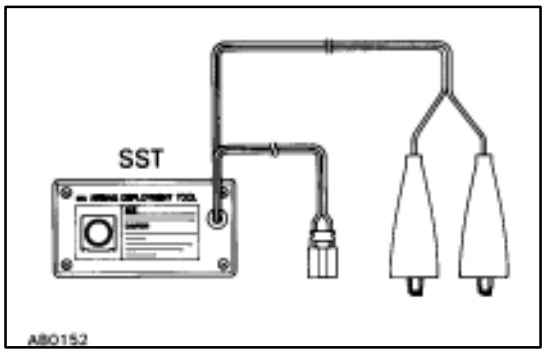
DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)

When scrapping vehicles equipped with an airbag system or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below.

If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC..

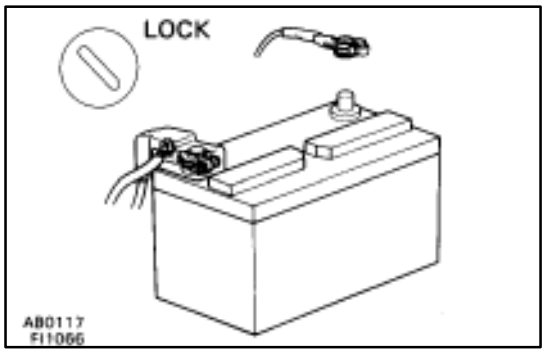
Never dispose of a steering wheel pad which has an undeployed airbag.

When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given under ”AIRBAG DEPLOYMENT PROCEDURE (WHEN SCRAPPING THE VEHICLE), part 5, DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)” (See page AB–89).



PRECAUTIONS FOR AIRBAG DEPLOYMENT

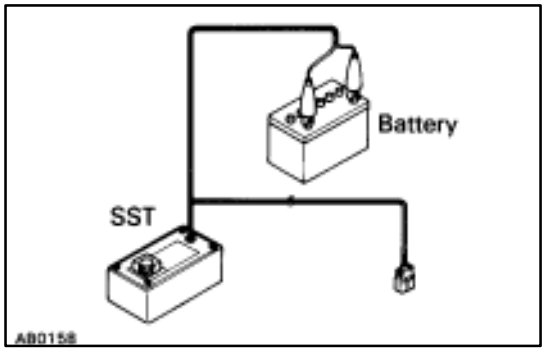
1. **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors and where it will not create a nuisance to nearby residents.**
2. **When deploying the airbag, always use the specified SST; SRS AIRBAG DEPLOYMENT TOOL (SST 09082–00700). Perform the operation in a place away from electrical noise.**
3. **When deploying an airbag, perform the operation from at least 10 m (33 ft) away from the steering wheel pad.**
4. **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
5. **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
6. **Always wash your hands with water after completing the operation.**
7. **Do not apply water, etc. to a steering wheel pad with deployed airbag.**



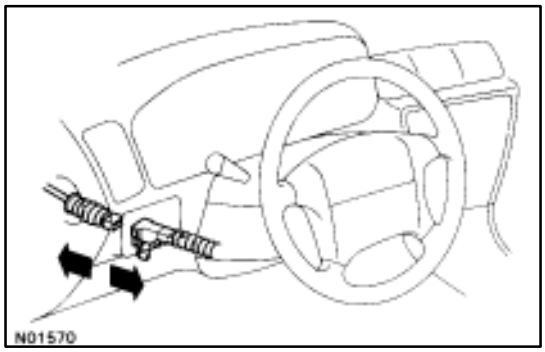
AIRBAG DEPLOYMENT PROCEDURE (WHEN SCRAPPING VEHICLE)

HINT: Have a battery ready as the power source to deploy the airbag.

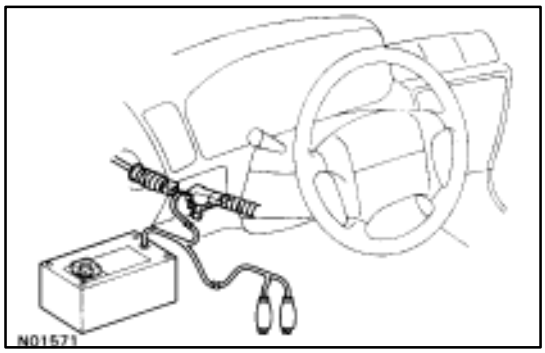
1. **DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY**
   CAUTION: Work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB–2).



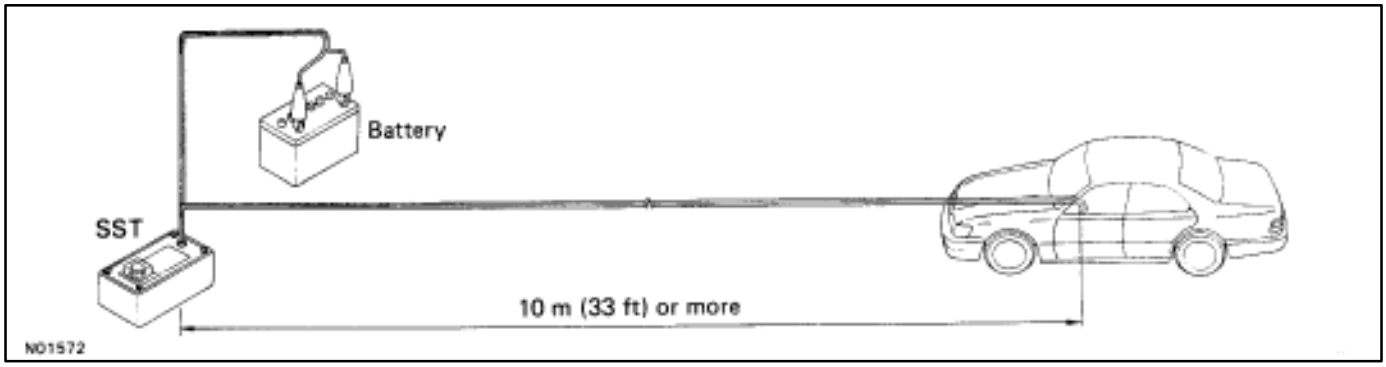
2. CONFIRM FUNCTIONING OF SST (See page AB–94)
SST 09082–00700

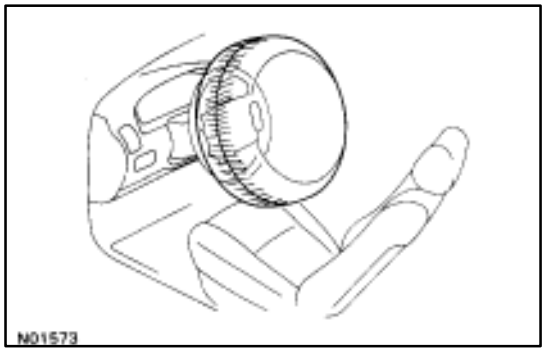


3. INSTALL SST
CAUTION: Check that there is no looseness in the steering wheel and steering wheel pad.
(a) Remove the No. 1 under cover.
(b) Disconnect the airbag connector of the spiral cable.



(c) Connect the SST connector to the airbag connector of the spiral cable.
SST 09082–00700
(d) Move the SST to at least 10 m (33 ft) from the front of the vehicle.
(e) Close all the doors and windows of the vehicle.
NOTICE: Take care not to damage the SST wire harness.
(f) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.





4. DEPLOY AIRBAG
(a) Confirm that no–one is inside the vehicle or within 10 m (33 ft) of the vehicle.
(b) Press the SST activation switch and deploy the airbag.
HINT: The airbag deploys simultaneously as the LED of the SST activation switch lights up.

5. DISPOSAL 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 deployed airbag.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(a) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the steering wheel pad still installed.

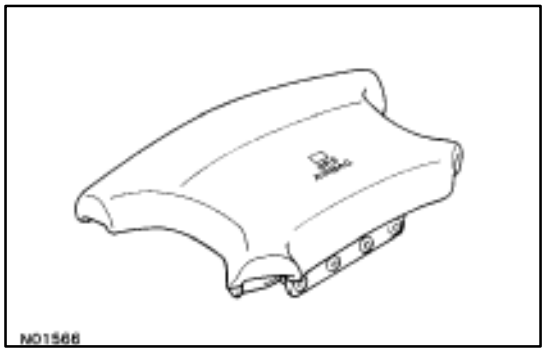
(b) When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.

AIRBAG DEPLOYMENT PROCEDURE (PROCEDURE FOR DISPOSAL OF STEERING WHEEL PAD ONLY)

When disposing of the steering wheel pad (with airbag) only, never use the customer's vehicle to deploy the airbag.

Remove the steering wheel pad from the vehicle and be sure to follow the procedure given below when deploying the airbag.

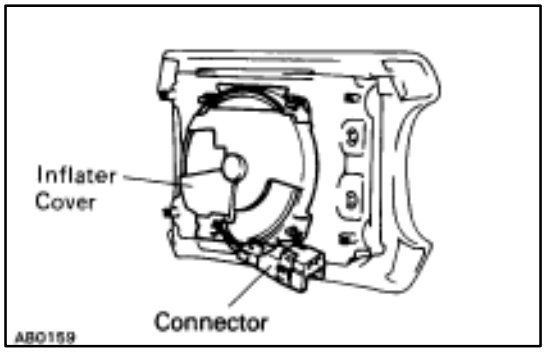
HINT: Have a battery ready as the power source to deploy the airbag.



1. REMOVE STEERING WHEEL PAD (SEE PAGE AB–16)

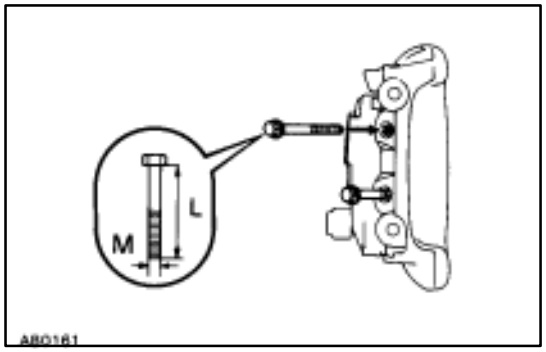
CAUTION:

- **When removing the steering wheel pad (with airbag), work must be started after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery.**
- **When storing the steering wheel pad, keep the upper surface of the pad facing upward.**



2. REMOVE STEERING WHEEL PAD CONNECTOR

Remove the connector on the steering wheel pad rear surface from the inflater cover.

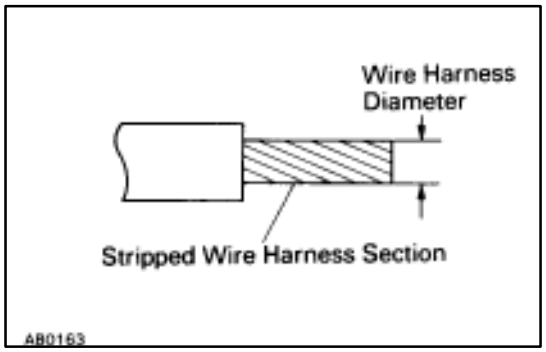


3. FIX STEERING WHEEL PAD TO DISC WHEEL WITH TIRE

(a) Install bolts with washers in the four bolt holes in the steering wheel pad.

Bolt: L 35.0 mm (1.4 in.)
M 6.0 mm
Pitch 1.0 mm

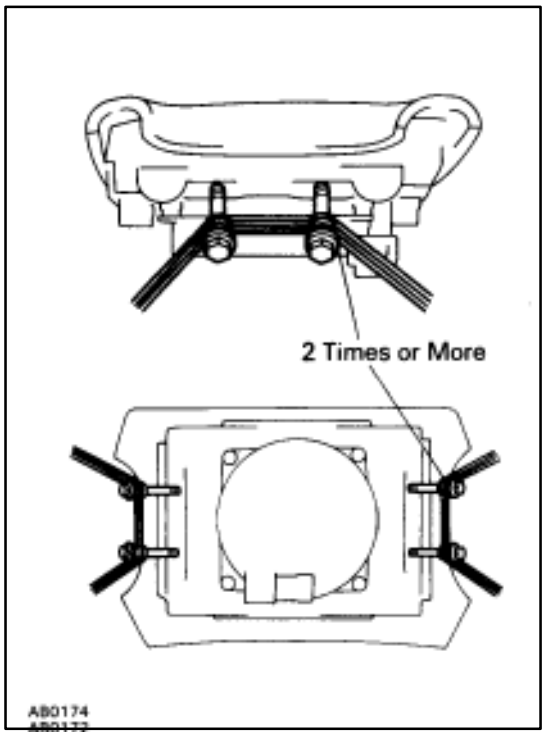
NOTICE: Tighten the bolts by hand until the bolts become difficult to turn.
Do not tighten the bolts too much.



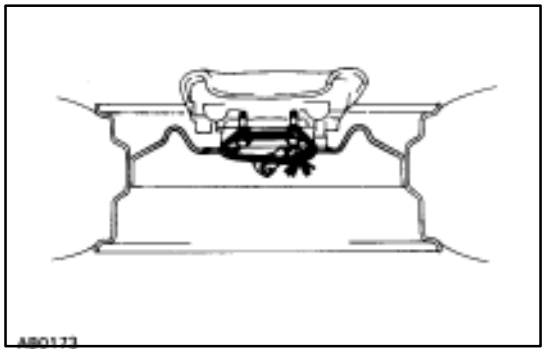
(b) Using a service–purpose wire harness for vehicle, tie down the steering wheel pad to the disc wheel.
Wire harness: Stripped wire harness section 1.25 mm_1 or more (0.002 $in._1$ or more)
HINT: To calculate the square of the stripped wire harness section–

$$\text{Square} = \frac{3.14 \times (\text{Diameter})_1}{4}$$

CAUTION: If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed, this is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm_1 (0.002 $in._1$).



(1) Using 3 wire harnesses, wrap the wire harnesses at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.
CAUTION: Tightly wind the wire harness around the bolts so that there is no slack.
If there is slackness in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed, this is highly dangerous.



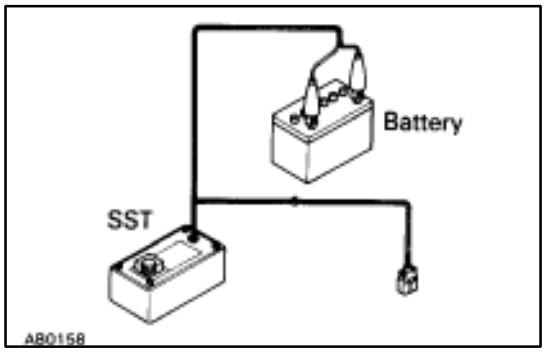
(2) Face the upper surface of the steering wheel pad upward.
Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes.
Position the steering wheel pad connector so that it hangs downward through a hub hole in the disc wheel.
CAUTION:

- **Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the steering wheel pad coming free through the shock of the airbag deploying.**

- **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock of the airbag deploying and the steering wheel pad will be thrown into the air.**

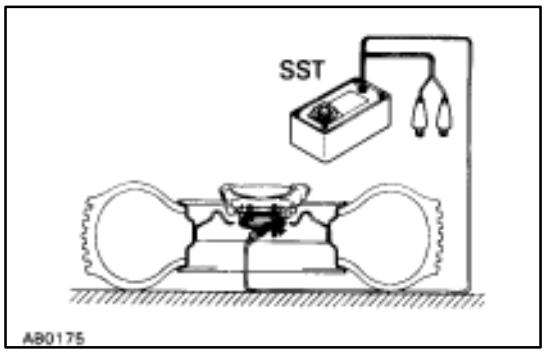
HINT:

- The disc wheel will be marked by airbag deployment, so use a redundant disc wheel.



4. CONFIRM FUNCTIONING OF SST (SEE PAGE AB–94)

SST 09082–0700



5. INSTALL SST

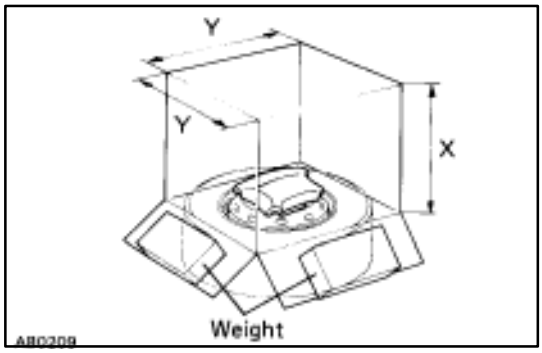
CAUTION: Place the disc wheel on level ground.

(a) Connect the SST connector to the steering wheel pad connector.

SST 09082–00700

NOTICE: To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, provide some slack for the SST wire harness inside the disc wheel.

(b) Move the SST to at least 10 m (33 ft) away from the steering wheel pad tied down on the disc wheel.



6. COVER STEERING WHEEL PAD WITH CARDBOARD BOX OR TIRES

(Covering Method Using Cardboard Box)

Cover the steering wheel pad with the cardboard box and weigh the cardboard box down in four places with a at least 20 kg (44 lb, 196 N).

Size of cardboard box: Must exceed the following dimensions–

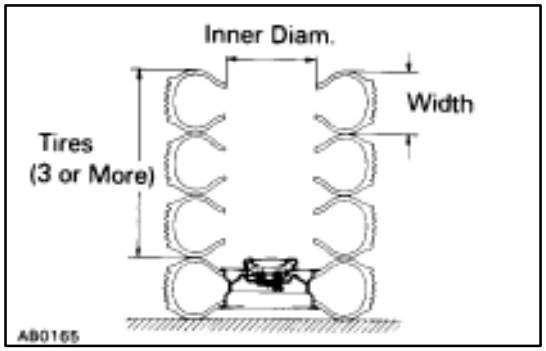
x = 460 mm (18.11 in.)

When dimension y of the cardboard box exceeds the diameter of the disc wheel with tire the steering wheel pad is tied to–

x = 460 mm (18.11 in.) + width of tire

y = 650 mm (25.59 in.)

NOTICE: If a cardboard box smaller than the size specified is used, the cardboard box will be broken by the shock of the airbag deployment.



(Covering Method Using Tires)

Place at least three 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 (7.28 in.)
Inner diam	360 mm (14.17 in.)

CAUTION: Do not use tires with disc wheels.

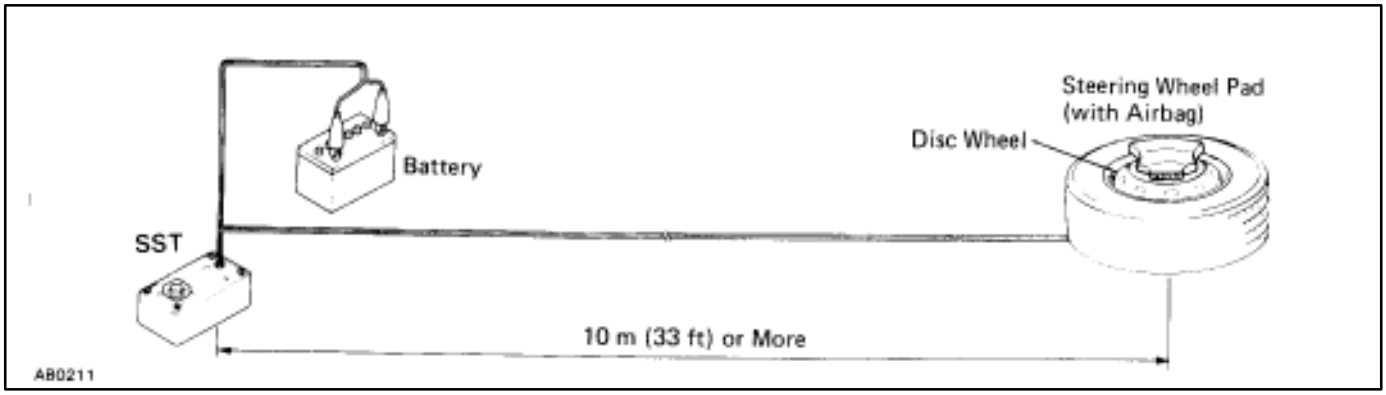
NOTICE: The tires may be marked by the airbag deployment, so use redundent tires.

7. AIRBAG DEPLOYMENT

(a) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

(b) Confirm that no–one is within 10 m (33 ft) of the disc wheel the steering wheel pad is tied to.

(c) Press the SST activation switch and deploy the airbag.
HINT: The airbag deploys simultaneously as the LED of the SST activation switch lights up.



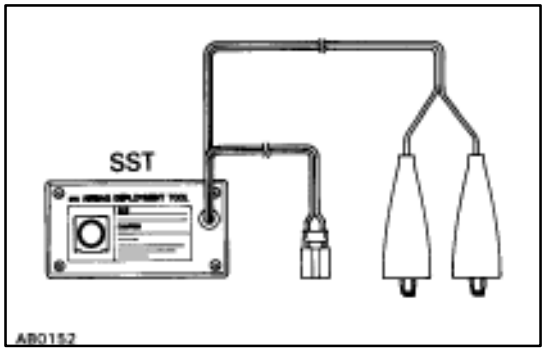
8. DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)

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 deployed airbag.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**

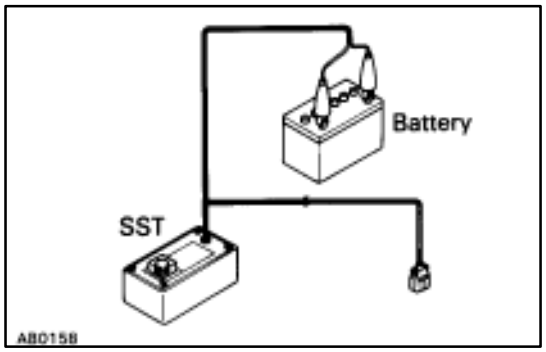
(a) Remove the steering wheel pad from the disc wheel.

(b) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it the same way as other general parts.



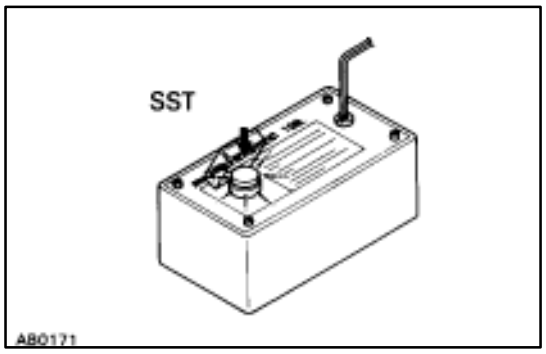
CONFIRM FUNCTIONING OF SST

When, deploying the airbag, always use the specified SST:
SRS AIRBAG DEPLOYMENT TOOL.
SST 09082–00700



1. CONNECT SST TO BATTERY

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
HINT: Do not connect the yellow connector which connects with the airbag system.



2. CONFIRM FUNCTIONING OF SST

Press the SST activation switch, and confirm the LED of the SST activation switch lights up.
CAUTION: If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

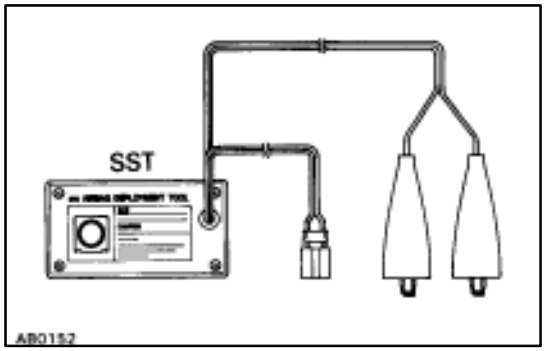
SERVICE SPECIFICATIONS

SPECIFICATIONS

Terminal	Front airbag sensor resistance
⊕S – ⊕A	755 – 885 Ω
⊕S – ⊖S	±
⊖S – ⊖A	Less than 1 Ω

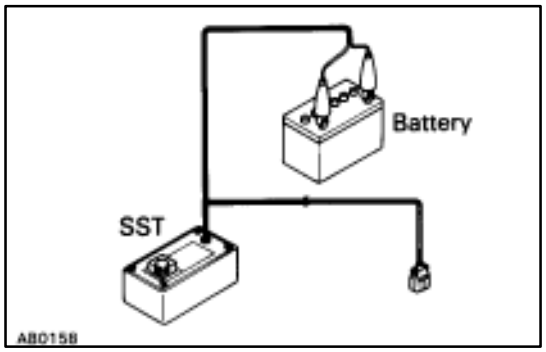
TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	35	360	26
Steering wheel pad	9	90	78 in.·lbf
Front airbag sensor	25	260	19
Center airbag sensor assembly	13	130	9



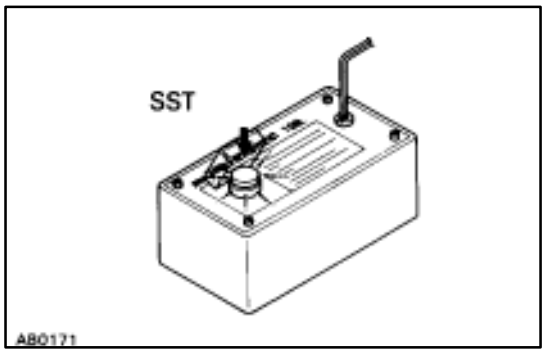
CONFIRM FUNCTIONING OF SST

When, deploying the airbag, always use the specified SST:
SRS AIRBAG DEPLOYMENT TOOL.
SST 09082–00700



1. CONNECT SST TO BATTERY

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
HINT: Do not connect the yellow connector which connects with the airbag system.



2. CONFIRM FUNCTIONING OF SST

Press the SST activation switch, and confirm the LED of the SST activation switch lights up.
CAUTION: If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

SERVICE SPECIFICATIONS

SPECIFICATIONS

Terminal	Front airbag sensor resistance
⊕S – ⊕A	755 – 885 Ω
⊕S – ⊖S	±
⊖S – ⊖A	Less than 1 Ω

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	35	360	26
Steering wheel pad	9	90	78 in.·lbf
Front airbag sensor	25	260	19
Center airbag sensor assembly	13	130	9

TROUBLESHOOTING

How To Proceed With Troubleshooting

Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. Perform troubleshooting of the airbag system in accordance with the following procedure:

HINT: Do not disconnect the battery negative (–) terminal cable until step 2 , Diagnostic Trouble Code Check and Recording, has been completed.

1 **CUSTOMER PROBLEM ANALYSIS**

Using the CUSTOMER PROBLEM ANALYSIS CHECK SHEET (See page AB–29) for reference, ask the customer in as much detail as possible about the problem.

2 **WARNING LIGHT CHECK**

Check the airbag warning light. If the light remains on, a malfunction is stored in the center airbag sensor assembly, so proceed to step 2 . If the airbag warning light is not on, a malfunction has occurred in the airbag warning light circuit, so perform troubleshooting for code 22.

HINT: Code 22 is recorded when a malfunction occurs in the airbag warning light system.

If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic trouble codes (including code 22) cannot be confirmed.

2 **DIAGNOSTIC TROUBLE CODE CHECK AND RECORDING**

Check the diagnostic trouble codes and make a note of any malfunction codes which are output. If a normal code is output, an abnormality in the power source circuit may have occurred, so perform troubleshooting for source voltage in step 8.

If code 22 is output, skip steps 4 and 5 and proceed to step 7.

4 **CLEARING OF MALFUNCTION CODE (EXCEPT CODE 41)**

Clear the malfunction code.

HINT: The malfunction code output in step 2 indicates that a malfunction has occurred in the circuit designated by the malfunction code, but does not indicate whether the malfunction is still occurring or whether it was in the past.

Accordingly, it is necessary to find out the present condition of the malfunction occurrence by clearing the malfunction code and performing the diagnostic trouble code check again. If this operation is neglected and troubleshooting is performed using only the malfunction code confirmed in step 2 , isolating the problem component becomes difficult and invites mistaken diagnosis.

5 **DIAGNOSTIC TROUBLE CODE CHECK AND RECORDING** 6 **SYSMPTOM SIMULATION**

After repeating ignition switch ON–OFF operation (ON: wait 20 secs., OFF: wait 20 secs.) 5 times, check the diagnostic trouble codes. If any code output, the malfunction is still occurring so proceed to step 7.

If code 41 only is output, the following three cases are possible:

Intermittent trouble occurred previously, but it is now normal.

Focusing on the circuit of the malfunction code stored in step 2 , use the simulation method in step 6 in order to simulate the malfunction. If the malfunction occurs, proceed to step 7; if not, proceed to step [12].

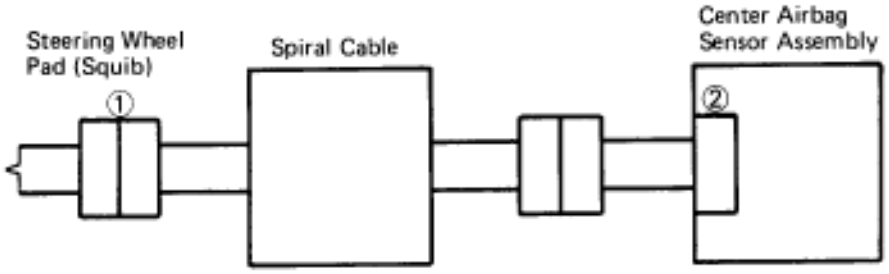
NOTICE: When connecting the battery after clearing the malfunction code, always do it with the ignition switch in LOCK position. When the battery has been reconnected, turn the ignition switch to ACC or ON position after at least 2 seconds have elapsed.
If the battery is reconnected with the ignition switch in ACC or ON position, or the ignition switch is turned to ACC or ON within 2 seconds of connecting the battery, it is possible that the diagnosis system will not operate normally.

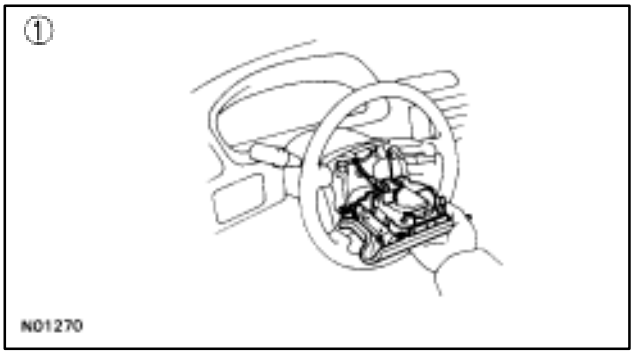
HINT: Determine the malfunction in the airbag system in step 6 by whether or not a malfunction code is output.

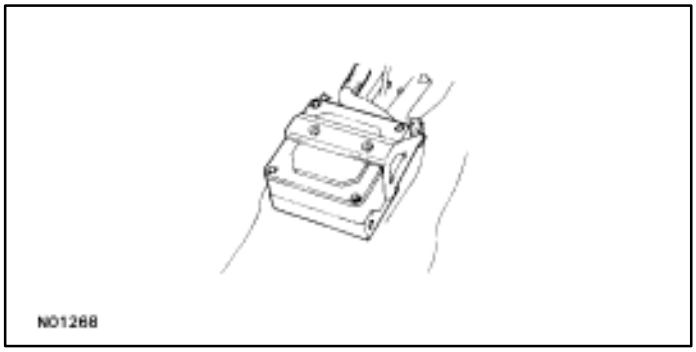
7 **DIAGNOSTIC TROUBLE CODE CHART**
Proceed to the appropriate flow chart in step 8 in accordance with the malfunction code found in step 5 or 6.

8 **CIRCUIT INSPECTION** 9 **REPAIR**
Find out if the problem lies in a sensor, actuator or wire harness and connector, and repair the problem. After the problem part is repaired, reinstall the disassembled parts. Do not start work until at least 20 seconds after the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected.

CAUTION: If incorrect procedure is used, a malfunction may occur in the system or there is the danger that the airbag may be accidentally activated during the repair operation. Carefully read the GENERAL DESCRIPTION (See page AB–2) and the cautions for each operation, and perform repairs in the correct order using the correct methods.
HINT: The following illustration for the CIRCUIT INSPECTION shows each connector for the circuit from the center airbag sensor assembly to the steering wheel pad (squib).







[10] CLEARING OF MALFUNCTION CODE
When all the malfunction codes found in steps 5 and 6 have been repaired, clear the malfunction codes.

[11] DIAGNOSTIC TROUBLE CODE CHECK

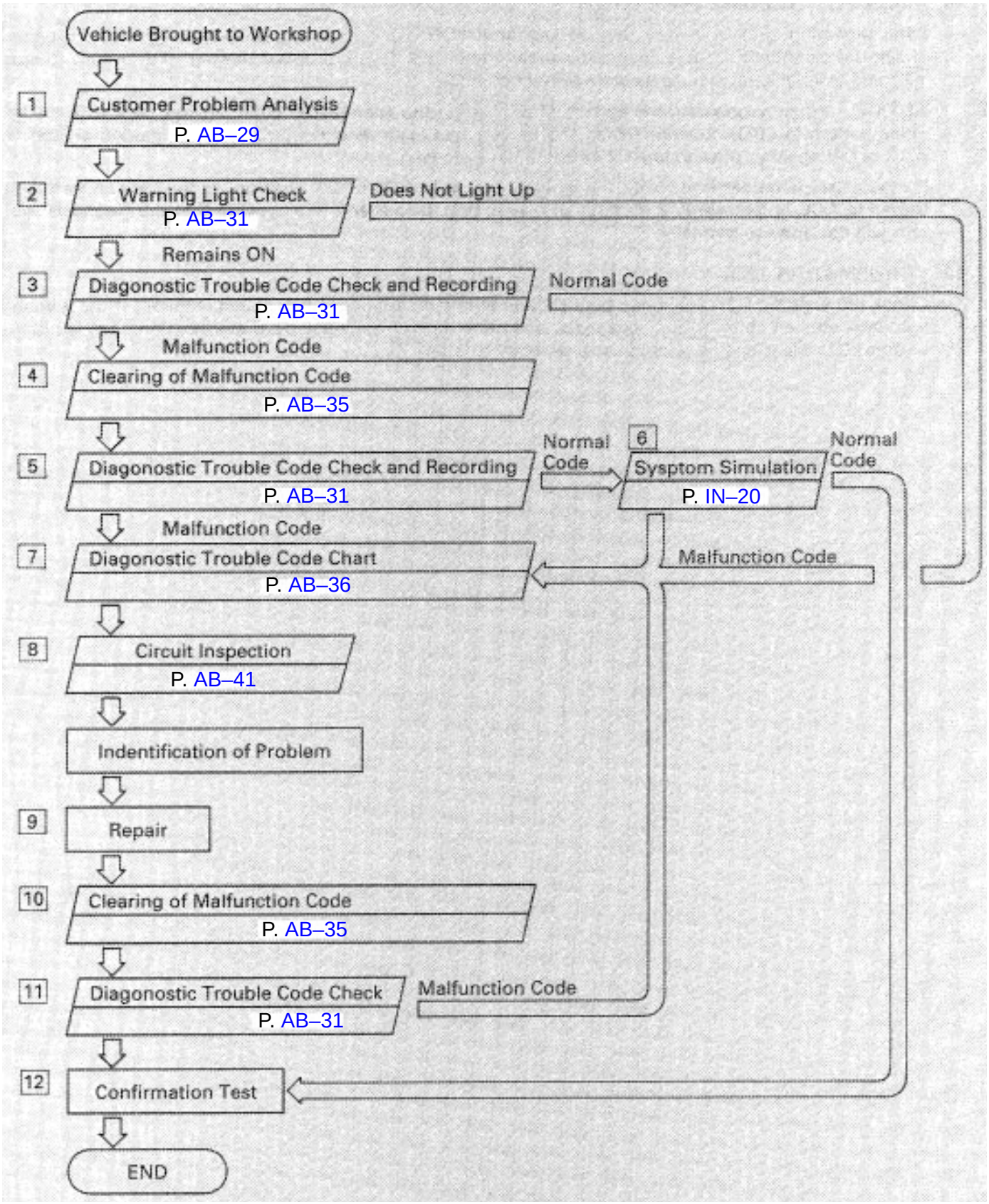
After repeating ignition switch ON–OFF operation (ON: wait 20 secs., OFF; wait 20 secs.) 5 times, check the diagnostic trouble codes. If normal code is displayed, proceed to step 12 return to step 7 and troubleshoot the displayed malfunction code.

NOTICE: When connecting the battery after clearing the malfunction code, always do it with the ignition switch in LOCK position. When the battery has been reconnected, turn the ignition switch to ACC or ON position after at least 2 seconds have elapsed.

If the battery is reconnected with the ignition switch in ACC or ON position, or the ignition switch is turned to ACC or ON within 2 seconds of connecting the battery, it is possible that the diagnosis system will not operate normally.

[12] CONFIRMATION TEST

Check the warning light again and confirm that all the malfunctions have been repaired. If the warning light indicates an abnormality, repeat the operation again from step 2. If malfunction code is output at step $_2$, skip steps 4 and 5 and proceed to step 7.


Vehicle Brought to Workshop
1
Customer Problem Analysis
P. AB–29
2
Warning Light Check
P. AB–31
Does Not Light Up
Remains ON
3
Diagonostic Trouble Code Check and Recording
P. AB–31
Normal Code
Malfunction Code
4
Clearing of Malfunction Code
P. AB–35
5
Diagonostic Trouble Code Check and Recording
P. AB–31
Normal Code
6
Sysptom Simulation
P. IN–20
Normal Code
Malfunction Code
7
Diagonostic Trouble Code Chart
P. AB–36
Malfunction Code
8
Circuit Inspection
P. AB–41
Indentification of Problem
9
Repair
10
Clearing of Malfunction Code
P. AB–35
11
Diagonostic Trouble Code Check
P. AB–31
Malfunction Code
12
Confirmation Test
END

Customer Problem Analysis Check Sheet

SRS AIRBAG 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		/ /
Conditions at Time of Problem Occurrence	Weather	☐Fine ☐Cloudy ☐Rainy ☐Snowy ☐Various/Other
	Outdoor Temperature	☐Hot ☐Warm ☐Cool ☐Cold (Approx. °C (°F))
	Vehicle Operation	☐Starting ☐Idling ☐Driving [☐Constant Speed ☐Acceleration ☐Deceleration ☐Other]
	Condition of road	

Details of Problem	
Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Airbag System)	

(Diagnosis System Inspection)

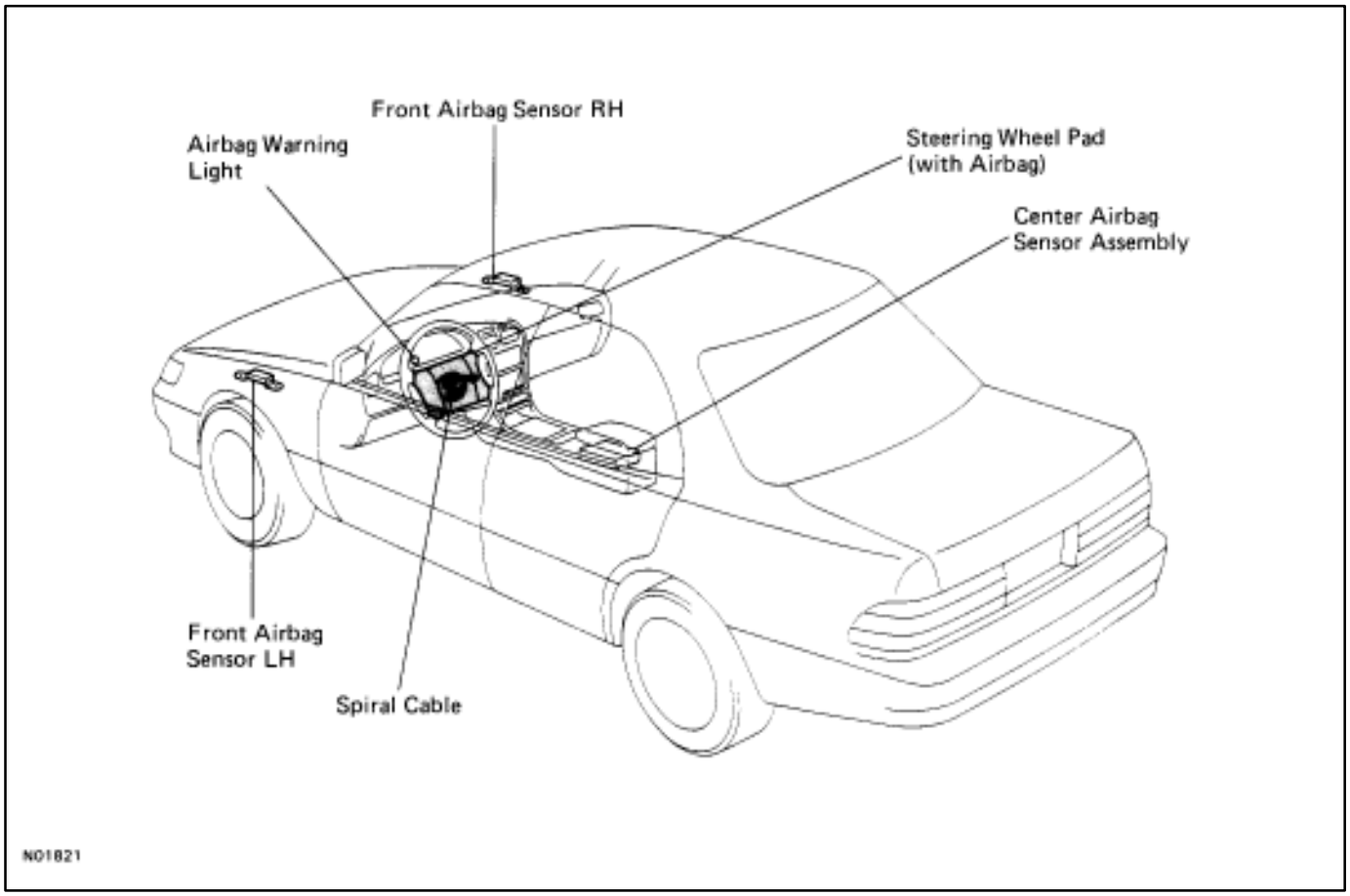
Airbag Warning Light Inspection	1st Time	☐ Remains On ☐ Sometimes Lights Up ☐ Does Not Light Up
	2nd Time	☐ Remains On ☐ Sometimes Lights Up ☐ Does Not Light Up
Diagnostic Trouble Code Inspection	1st Time	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

DESCRIPTION

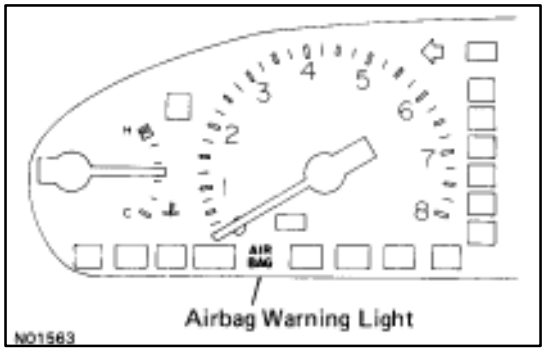
The SRS (Supplemental Restraint System) airbag, together with the seat belt, is designed to help protect the driver. Frontal inpact, the airbag sensors detect the shock, and if the front–to–rear shock is greater than a specified value, an airbag stored in the steering wheel pad is inflated instantaneously to help reduce the shock to the driver.

NO1267

LOCATION OF COMPONENTS



NO1821



Diagnosis Inspection

AIRBAG WARNING LIGHT CHECK

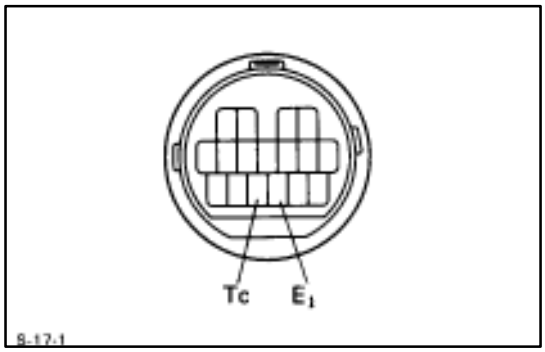
(a) Turn the ignition switch to ACC or ON and check that the airbag warning light lights up.

(b) Check that the airbag warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the airbag warning light remains on, the center airbag sensor assembly has detected a malfunction code.

- If, after approx. 6 seconds have elapsed, the airbag warning light sometimes lights up or the airbag warning light lights up even when the ignition switch is OFF, a short in the airbag warning light circuit can be considered likely. Proceed to Airbag warning light system (always lit up) on page AB–81.



DIAGNOSTIC TROUBLE CODE CHECK

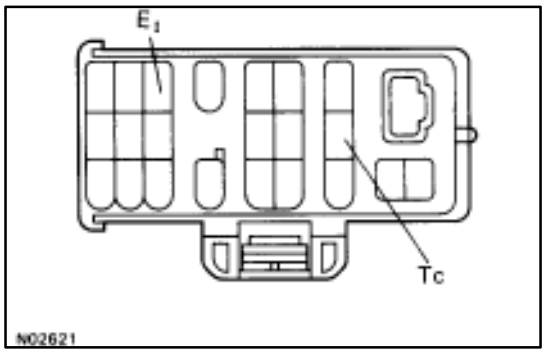
1. OUTPUT DIAGNOSTIC TROUBLE CODE

(a) Turn the ignition switch to ACC or ON position and wait approx. 30 seconds.

(b) Using SST, connect terminals T_C and E_1 of the DCL2.

SST 09843–18020

NOTICE: Never make a mistake with the terminal connection position as this will cause a malfunction.



2. READ DIAGNOSTIC TROUBLE CODE

Read the diagnostic trouble code as indicated by the number of times the airbag warning light blinks.

- Normal code indication

The light will blink 2 times per second.

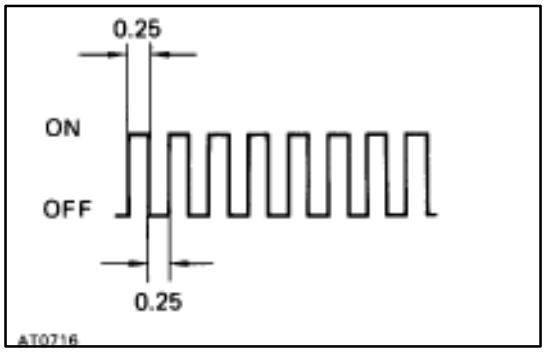
- Malfunction code indication

In the event of a malfunction, the light will blink. The first number of the code No. will equal the first digit of a 2–digit diagnostic trouble code, and after a 1.5 second pause, the 2nd number of the code No. will equal the 2nd digit. If there are two or more codes, there will be a 2.5 second pause between each.

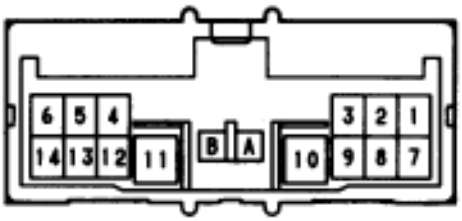
After all the codes have been output, there will be a 4.0 second pause and they will all be repeated.

HINT:

- In the event of a number of trouble codes, indication will begin from the smaller numbered code to the larger.
- If a diagnostic trouble code is not output or is continuously output, proceed to the TC terminal circuit inspection on page AB–83.



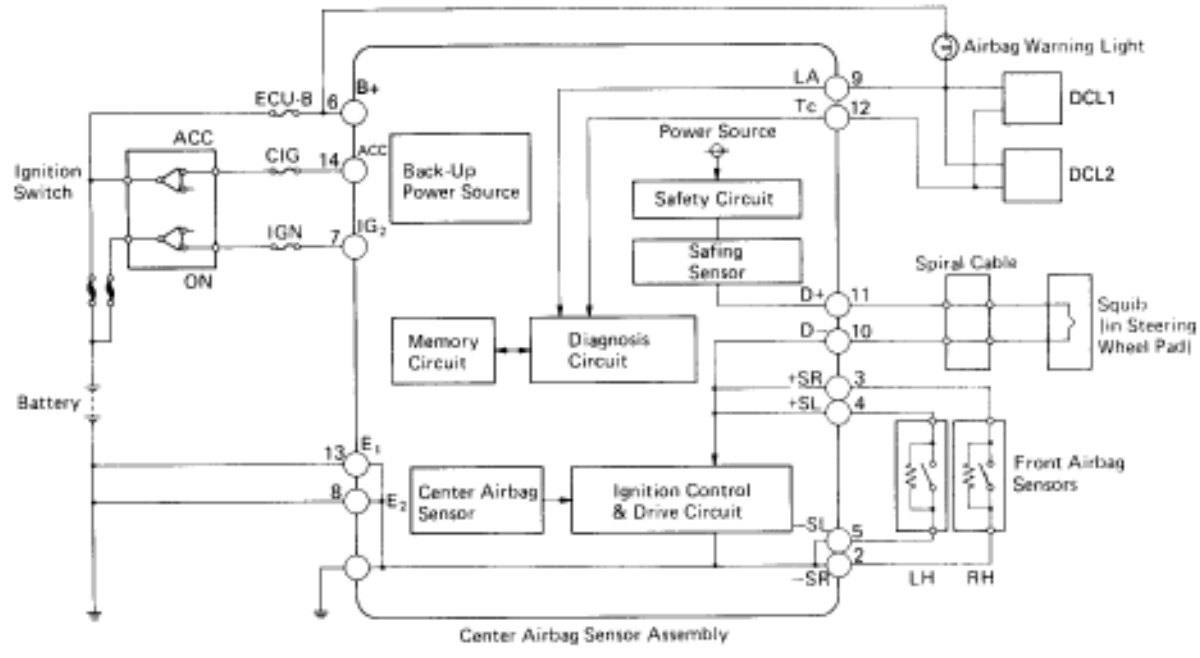
Terminals of ECM



No.	Symbol	Terminal Name	No.	Symbol	Terminal Name
1			8	E_2	Ground
2	–SR	RH Front Airbag Sensor ⊖	9	LA	Airbag Warning Light
3	+SR	RH Front Airbag Sensor ⊕	10	D–	Squib ⊖
4	+SL	LH Front Airbag Sensor ⊕	11	D+	Squib ⊕
5	–SL	LH Front Airbag Sensor ⊖	12	Tc	Diagnosis
6	B+	Battery (ECU–B Fuse)	13	E_1	Ground
7	IG_2	Power Source (IGN Fuse)	14	Acc	Power Source (CIG Fuse)
A	–	Electrical Connection Check Mechanism	B	–	Electrical Connection Check Mechanism

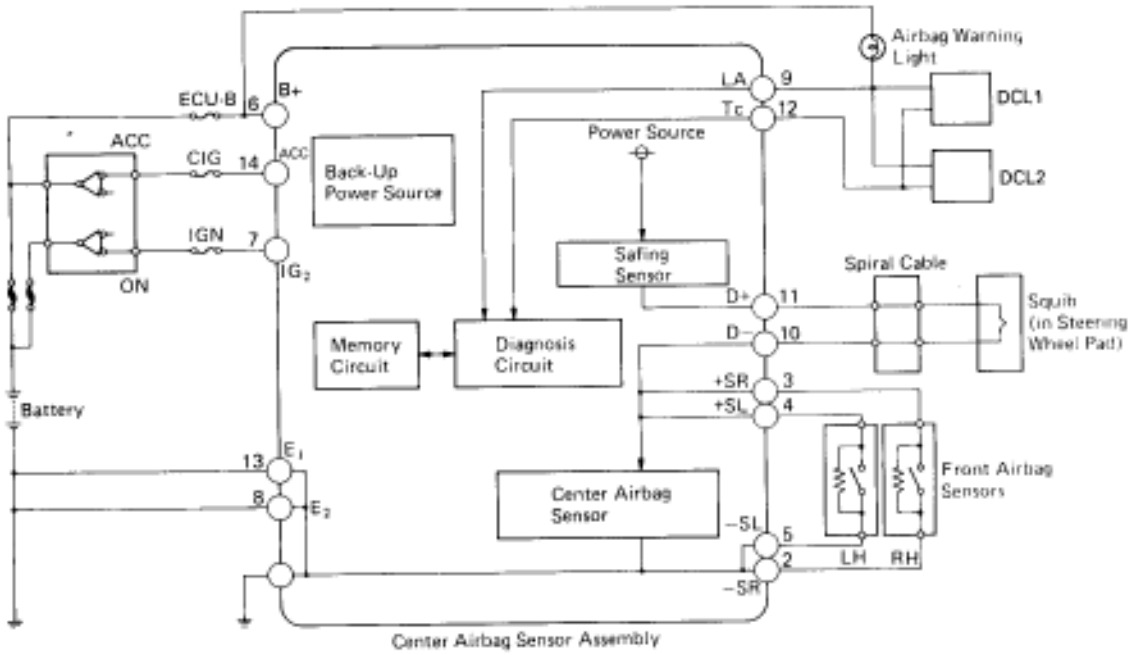
WIRING DIAGRAM

For NIPPONDENSO



AB0330

For TRW TECHNAR



NO1188

DIAGNOSTIC TROUBLE CODES

Code No.	Blink Pattern	Diagnosis	Trouble Area	AIRBAG Warning Light
(Normal)		• System normal	–	OFF
		• Source voltage drop	• Battery • Center airbag sensor assembly	ON
11	AB0057	• Short in squib circuit (to ground) • Front airbag sensor malfunction • Center airbag sensor malfunction	• Steering wheel pad (squib) • Front airbag sensor • Spiral cable • Center airbag sensor assembly • Wire harness	ON
12	FI1389	• Short in squib circuit (to B+) • Open in both front airbag sensor circuit	• Steering wheel pad (squib) • Front airbag sensor • Spiral cable • Center airbag sensor assembly • Wire harness	ON
13	FI1390	• Short in squib circuit (between D^+ wire harness and D^- wire harness)	• Steering wheel pad (squib) • Spiral cable • Center airbag sensor assembly • Wire harness	ON
14	FI1391	• Open in squib circuit	• Steering wheel pad (squib) • Spiral cable • Center airbag sensor assembly • Wire harness	ON
15	AB0058	• Open in front airbag sensor circuit	• Front airbag sensor • Center airbag sensor assembly • Wire harness	ON
22	FI1392	• Airbag warning light system malfunction	• Airbag warning light • Center airbag sensor assembly • Wire harness	ON
31	FI1394	• Center airbag sensor assembly malfunction	• Center airbag sensor assembly	ON
41	FI1396	• Malfunction stored in memory	• (Center airbag sensor assembly)	ON

HINT:

- When the airbag warning light remains lit up and the diagnostic trouble code is the normal code, this means a source voltage drop.
  This malfunction is not stored in memory by the center airbag sensor assembly and if the power source voltage returns to normal, after approx. 10 seconds the airbag warning light will automatically go out.
- Code 22 is recorded when a malfunction occurs in the airbag warning light system. If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic trouble codes (including code 22) cannot be confirmed.
- When a malfunction occurs in the airbag system, malfunction codes 11 to 31 are output. After repairing the malfunction indicated by malfunction codes 11 to 31, codes 11 to 31 are cleared from the memory, but there is a case that code 41 is output instead. Once the malfunction has been detected, the airbag warning light will remain lit up until code 41 is cleared, even though the malfunction has been repaired.
- When 2 or more codes are indicated, the lowest numbered code will appear first.
- If a code not listed on the chart is displayed, then the center airbag sensor assembly is faulty.

CLEARING OF DIAGNOSTIC TROUBLE CODE

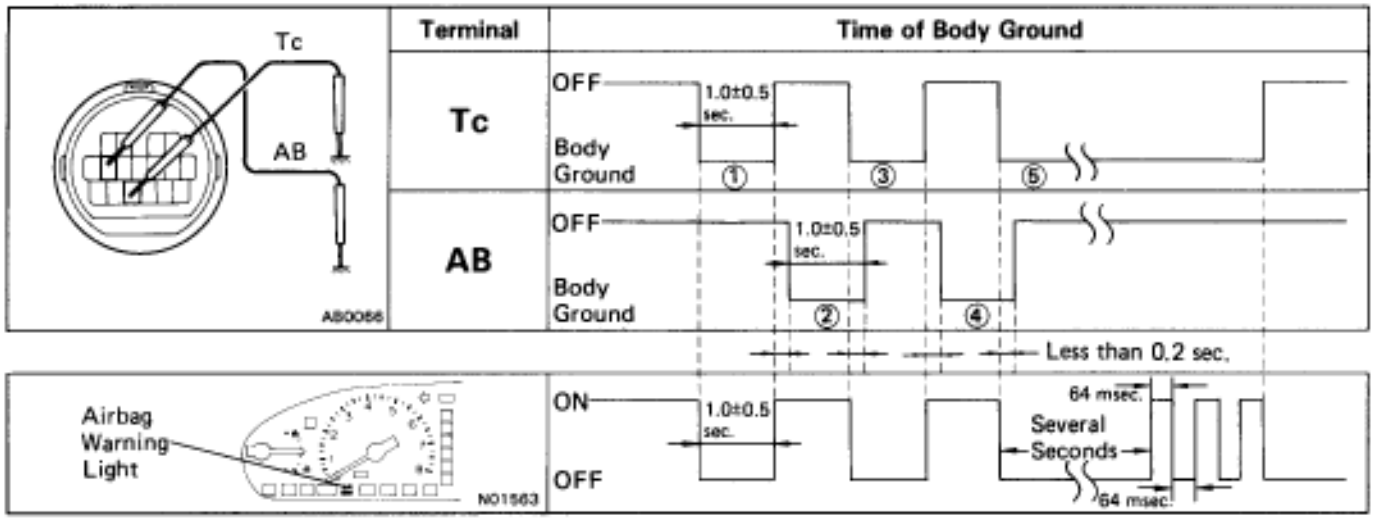
CLEARING OF MALFUNCTION CODE STORED IN MEMORY

(a) Connect service wires to terminals Tc and AB of the DCL2.

(b) Turn the ignition switch ACC or ON and wait approx. 6 seconds.

(c) Starting with the Tc terminal, apply body ground alternately to terminal Tc and terminal AB twice each in cycles of 1.0 ± 0.5 seconds. Finally, keep applying body ground to terminal Tc.

HINT: When alternating between body ground of terminals Tc and AB release one from body ground while applying it to the other terminal. The time interval in between must be within the following conditions. If it is out of the malfunction conditions, code will not be cleared.



(d) After several seconds, when the airbag warning light starts to blink in a 64 msec. cycle, cancellation is completed.

HINT: This method clears malfunction codes all at once.

Diagnostic Trouble Code Matrix Chart

If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

Code No.	Diagnosis	Page
(Normal) *1	2 Source voltage drop	AB–41
11	2 Short in squib circuit (to ground) 2 Front airbag sensor malfunction 2 Center airbag sensor malfunction	AB–43
12	2 Short in squib circuit (to B+) 2 Open in front sensor circuit	AB–49
13	2 Short in squib circuit (between D+ wire harness and D wire harness)	AB–54
14	2 Open in squib circuit	AB–61
15	2 Open in front airbag sensor circuit	AB–66
22*1	2 Airbag warning light system malfunction	AB–71
31	2 Center airbag sensor assembly malfunction	AB–77
41	2 Malfunction stored in memory	AB–79

HINT:

*1 When the airbag warning light remains lit up and the diagnostic trouble code is the normal code, this means a source voltage drop.

*2 Code 22 is recorded when a malfunction occurs in the airbag warning light system. If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic trouble codes (including code 22) cannot be confirmed.

Problem Symptom Chart

Proceed with troubleshooting of each circuit in the table below.

Problem Symptom	Inspection Item	Page
2 With the ignition switch at ACC or ON, the airbag warning light sometimes lights up after approx. 6 seconds have elapsed. 2 Airbag warning light lights up even when ignition switch is in the LOCK position.	2 Airbag warning light system (Always lit up)	AB–81
2 Diagnostic trouble code not displayed. 2 Diagnostic trouble code continuously displayed.	2 Tc terminal circuit	AB–83

Diagnostic Trouble Code Matrix Chart

If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

Code No.	Diagnosis	Page
(Normal) *1	2 Source voltage drop	AB–41
11	2 Short in squib circuit (to ground) 2 Front airbag sensor malfunction 2 Center airbag sensor malfunction	AB–43
12	2 Short in squib circuit (to B+) 2 Open in front sensor circuit	AB–49
13	2 Short in squib circuit (between D+ wire harness and D wire harness)	AB–54
14	2 Open in squib circuit	AB–61
15	2 Open in front airbag sensor circuit	AB–66
22*1	2 Airbag warning light system malfunction	AB–71
31	2 Center airbag sensor assembly malfunction	AB–77
41	2 Malfunction stored in memory	AB–79

HINT:

*1 When the airbag warning light remains lit up and the diagnostic trouble code is the normal code, this means a source voltage drop.

*2 Code 22 is recorded when a malfunction occurs in the airbag warning light system. If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic trouble codes (including code 22) cannot be confirmed.

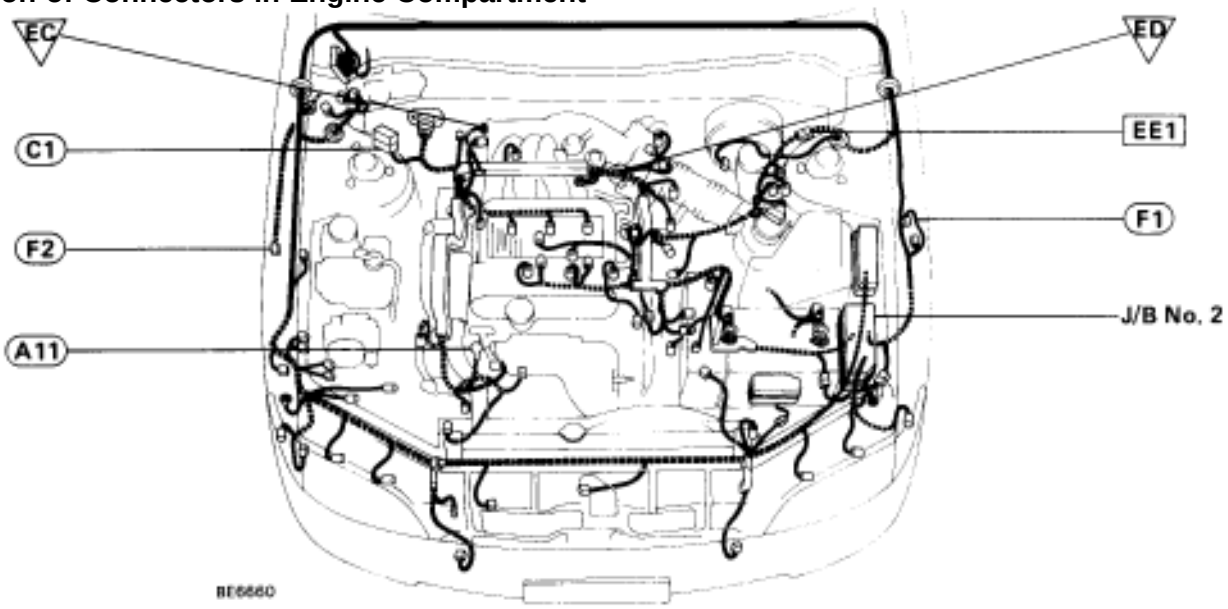
Problem Symptom Chart

Proceed with troubleshooting of each circuit in the table below.

Problem Symptom	Inspection Item	Page
2 With the ignition switch at ACC or ON, the airbag warning light sometimes lights up after approx. 6 seconds have elapsed. 2 Airbag warning light lights up even when ignition switch is in the LOCK position.	2 Airbag warning light system (Always lit up)	AB–81
2 Diagnostic trouble code not displayed. 2 Diagnostic trouble code continuously displayed.	2 Tc terminal circuit	AB–83

LOCATION OF CONNECTORS

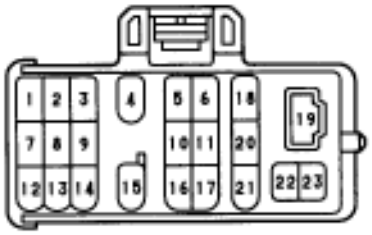
Location of Connectors in Engine Compartment



A11
Generator

X-142

C1
DCL1



lej-23-1

F1
Front Airbag Sensor LH

le-2-1-8

F2
Front Airbag Sensor RH

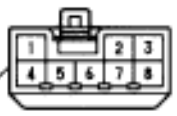
le-2-1-8

EE1

lfg-4-1

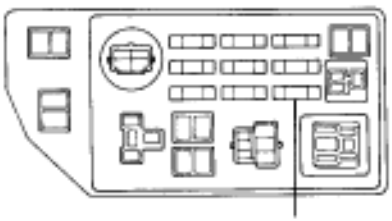
lfg-4-2

2E



g-3-1

J/B No. 2



BE6665

AM2 Fuse

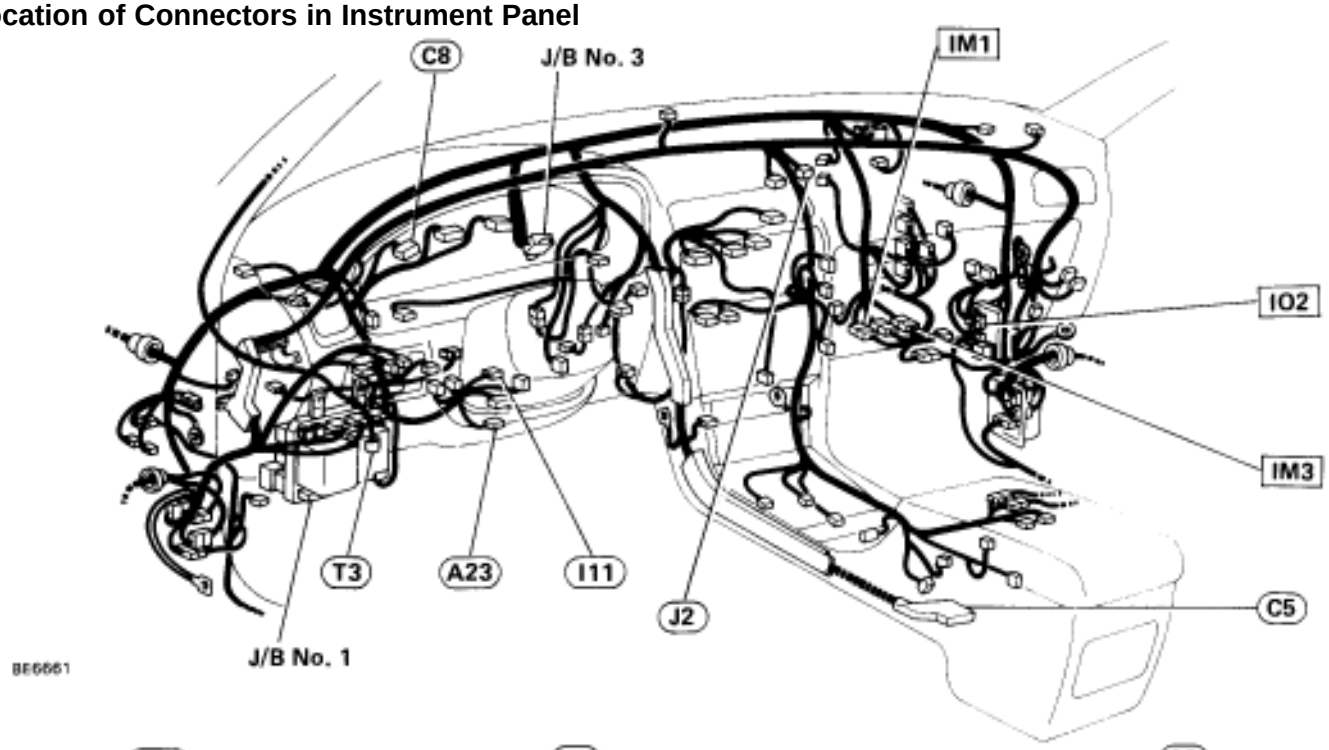
BE6666

2F

f-2-1

LOCATION OF CONNECTORS

Location of Connectors in Instrument Panel



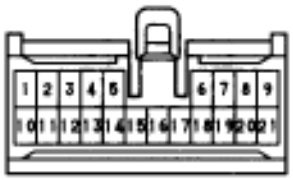
A23
Airbag Squib

e-2-1-C

C5
Center Airbag Sensor Assembly

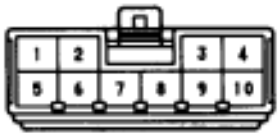
e-14-1-D

C8
Airbag Warning Light (Comb. Meter)



h-21-1

I11
Ignition Switch



g-10-1-B

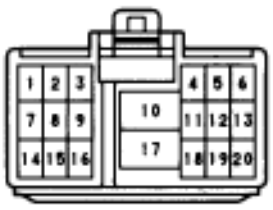
J2
Junction Connector

e-14-1-A

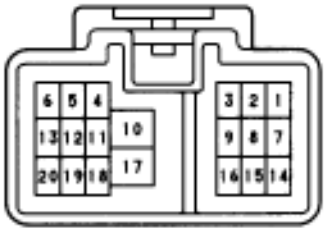
T3
DCL2

S-17-1

IM1



e-20-1-B



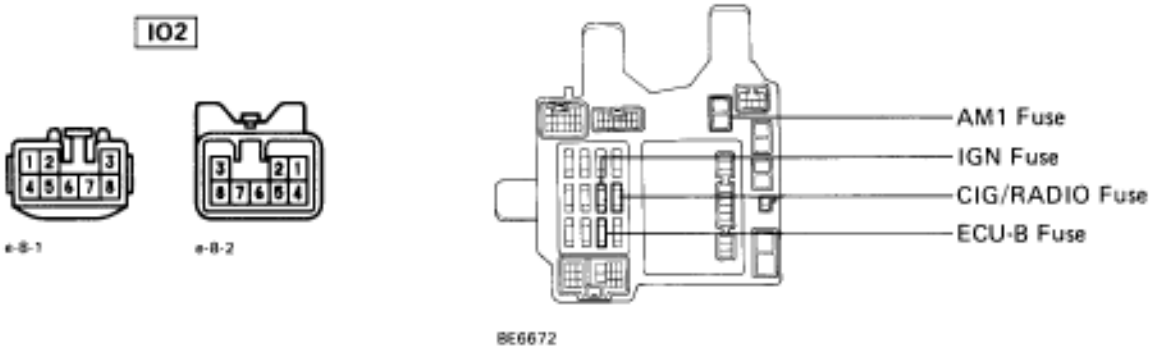
e-20-2-B

IM3

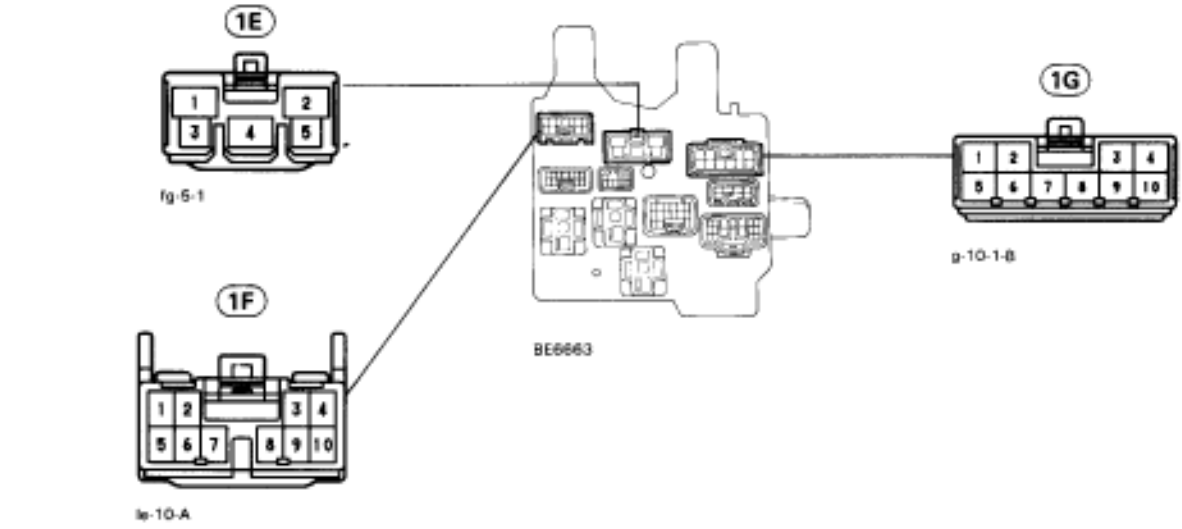
ef-19-1

ef-19-2

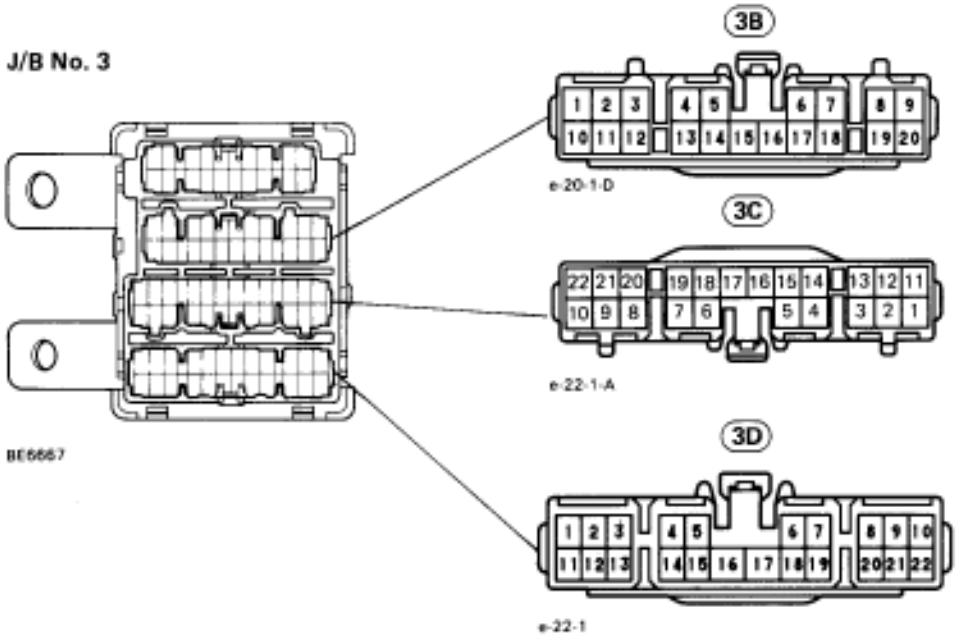
J/B No. 1



J/B No. 1



J/B No. 3



–MEMO–

Circuit Inspection

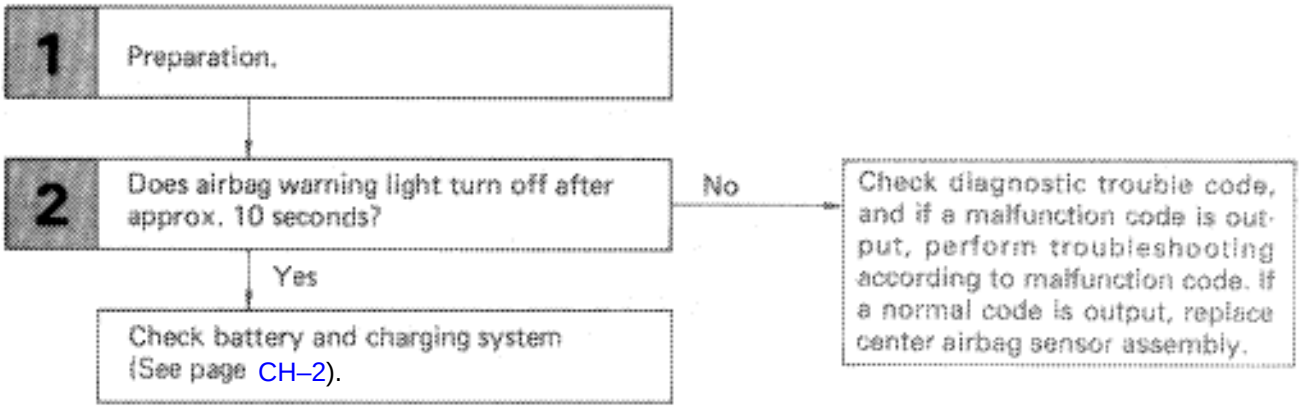
DTC (Normal) Source Voltage Drop

CIRCUIT DESCRIPTION

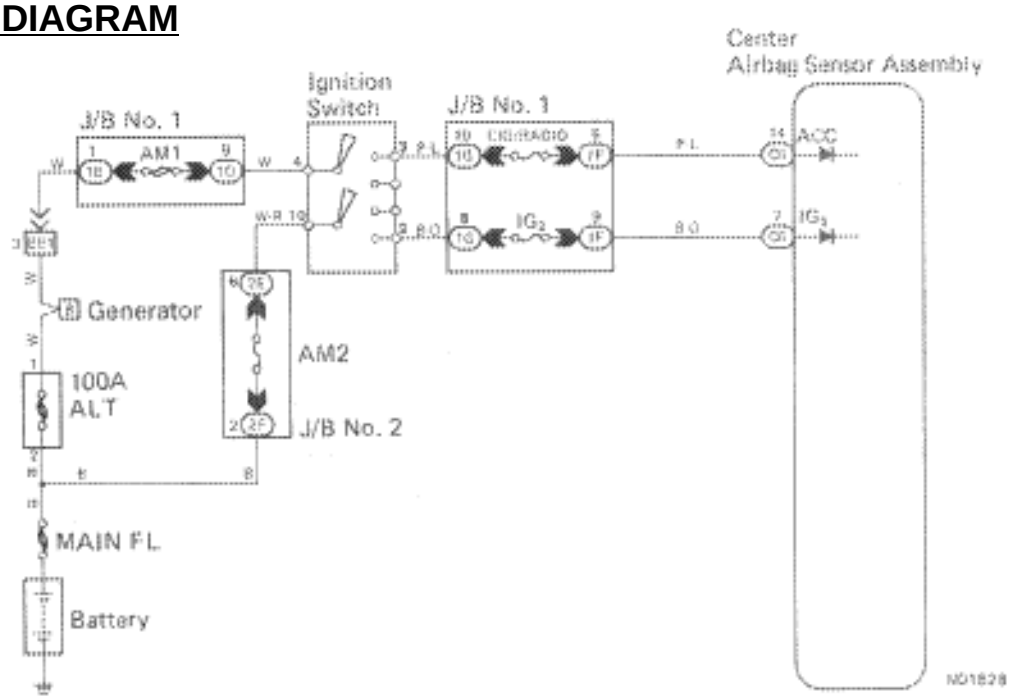
The airbag system is equipped with a voltage–increase circuit (DC–DC converter) in the center airbag sensor assembly in case the source voltage drops.
When the battery positive voltage drops, the voltage–increase circuit (DC–DC converter) functions to increase the voltage of the airbag system to normal voltage.
The diagnosis system malfunction display for this circuit is different to other circuits–when the airbag warning light remains lit up and the diagnostic trouble code is a normal code, source voltage drop is indicated. Malfunction in this circuit is not recorded in the center airbag sensor assembly, and approx. 10 seconds after the source voltage returns to normal, the airbag warning light automatically goes off.

Code No.	Diagnosis
(Normal)	Source voltage drop.

DIAGNOSTIC CHART



WIRING DIAGRAM



Circuit Inspection

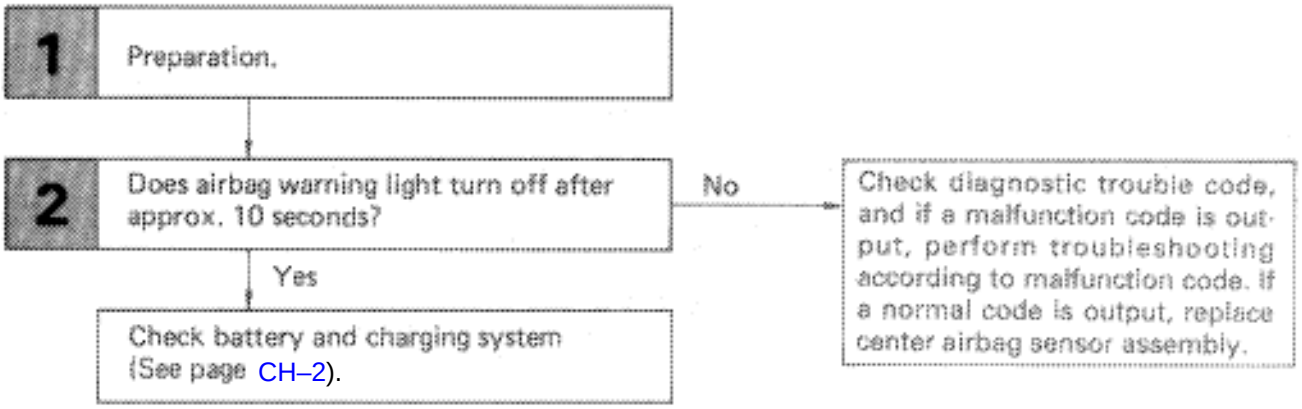
DTC (Normal) Source Voltage Drop

CIRCUIT DESCRIPTION

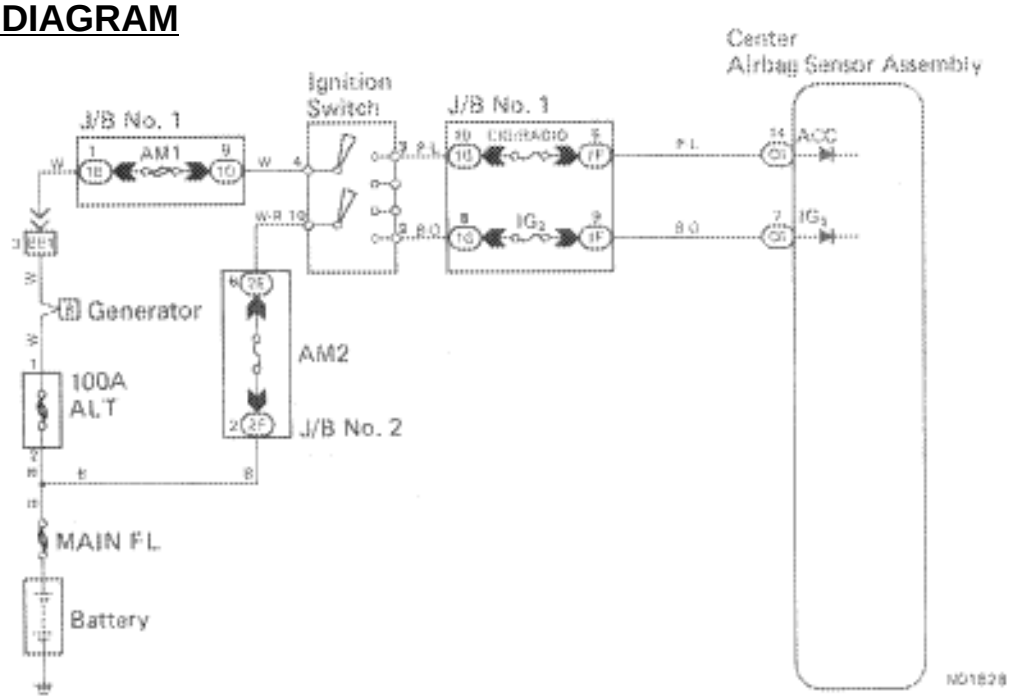
The airbag system is equipped with a voltage–increase circuit (DC–DC converter) in the center airbag sensor assembly in case the source voltage drops.
When the battery positive voltage drops, the voltage–increase circuit (DC–DC converter) functions to increase the voltage of the airbag system to normal voltage.
The diagnosis system malfunction display for this circuit is different to other circuits–when the airbag warning light remains lit up and the diagnostic trouble code is a normal code, source voltage drop is indicated. Malfunction in this circuit is not recorded in the center airbag sensor assembly, and approx. 10 seconds after the source voltage returns to normal, the airbag warning light automatically goes off.

Code No.	Diagnosis
(Normal)	Source voltage drop.

DIAGNOSTIC CHART

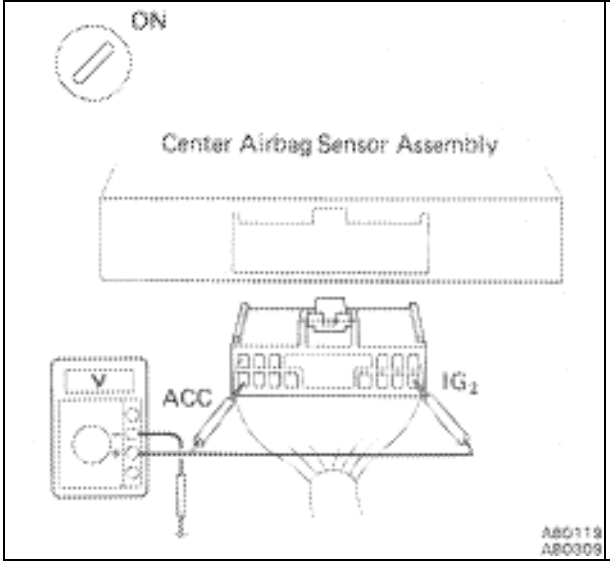


WIRING DIAGRAM



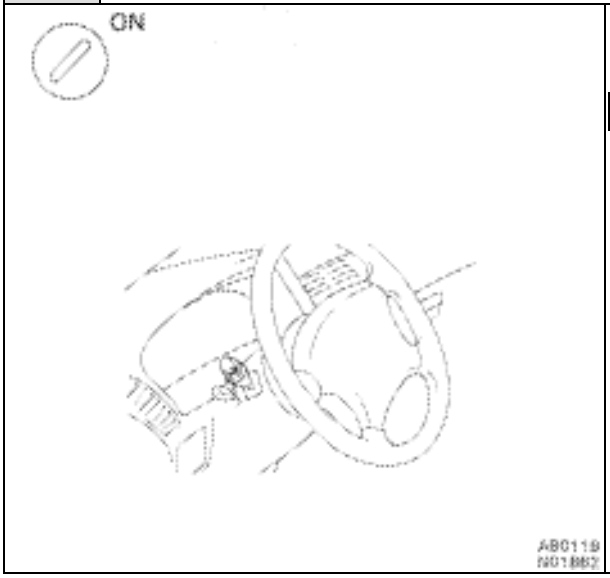
INSPECTION PROCEDURE

1 **Preparation.**



P
1. Turn ignition switch LOCK.
2. Disconnect center airbag sensor assembly connector.
3. Turn ignition switch ON. But do not start engine.
4. Measure voltage at IG_1, IG_2 or ACC on connector wire harness side of center airbag sensor assembly and operate electric system (defogger, wiper, headlight, heater blower, etc.).
   Voltage: 6V – 11.5 V at IG_1, IG_2 and ACC.
5. Turn electric system switch OFF.
6. Turn ignition switch LOCK.
7. Remove voltmeter and connect center airgag sensor assembly connector.

2 **Does airbag warning light turn off after approx. 10 seconds?**



P Turn ignition switch ON.

C Operate electric system checked in ┐ (4) and check that airbag warning light goes off after approx. 10 seconds.

YES

NO **Check diagnostic trouble code, and if a malfunction code is output, perform troubleshooting according to malfunction code. If normal code is output, replace center airbag sensor assembly.**

CHeck battery and charging system (See page CH–1)

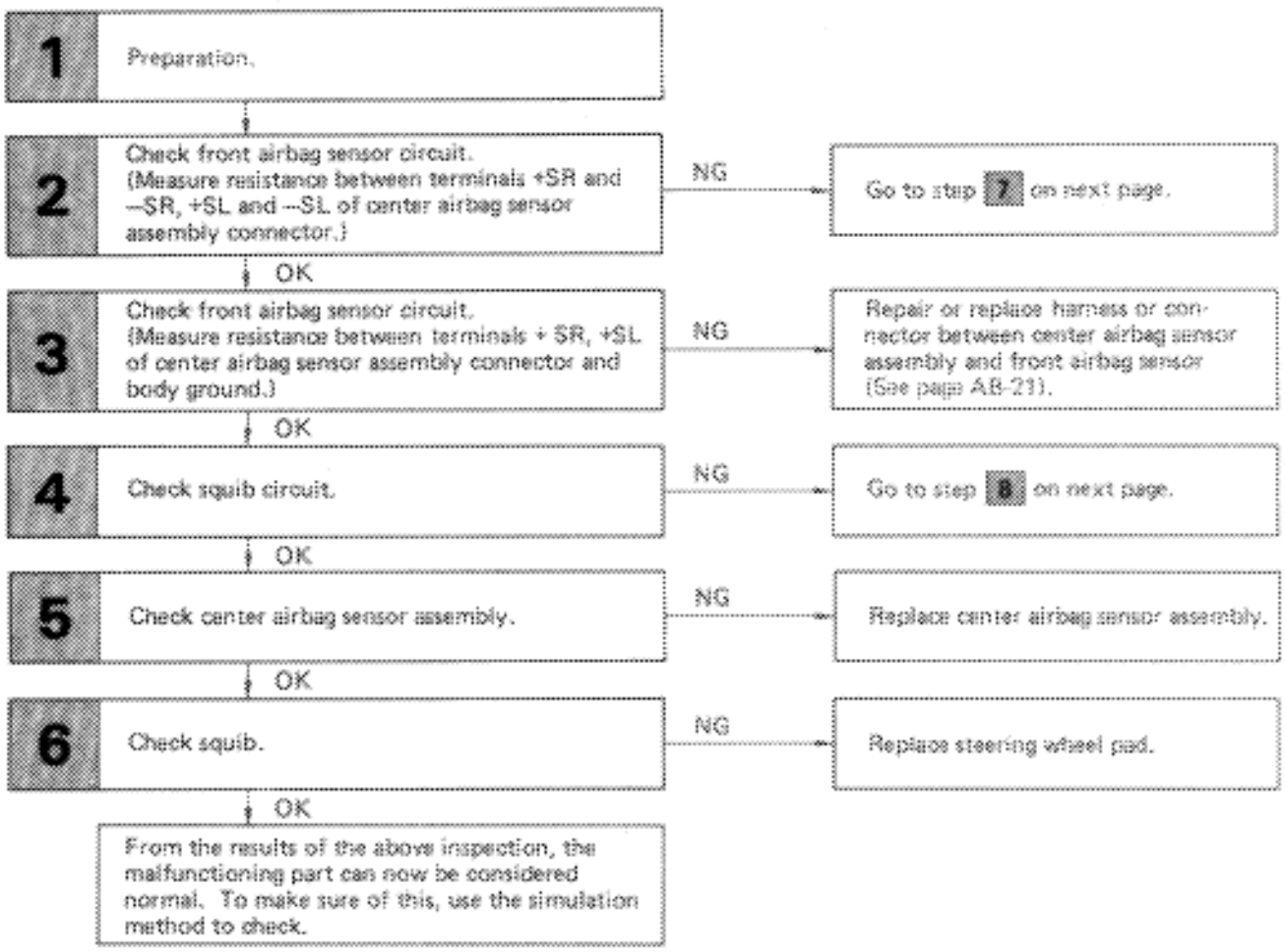
DTC	11	2 Short in Squib Circuit (to Ground) 2 Front Airbag Sensor Malfunction 2 Center Airbag Sensor Malfunction

CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions and satisfied.
The front airbag sensor detects the deceleration force in a frontal collision and is located in the front fender on the left and right sides.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB–5.
Diagnostic trouble code 11 is recorded when occurrence of ground short is detected in the squib circuit.

DTC No.	Diagnosis
11	2Short circuit in squib wire harness (to ground). 2Squib malfunction. 2Short circuit in front airbag sensor +S wire harness (to ground). 2Front airbag sensor malfunction. 2Short circuit between +S wire harness and –S wire harness of front airbag sensor. 2Spiral cable malfunction. 2Center airbag sensor assembly malfunction.

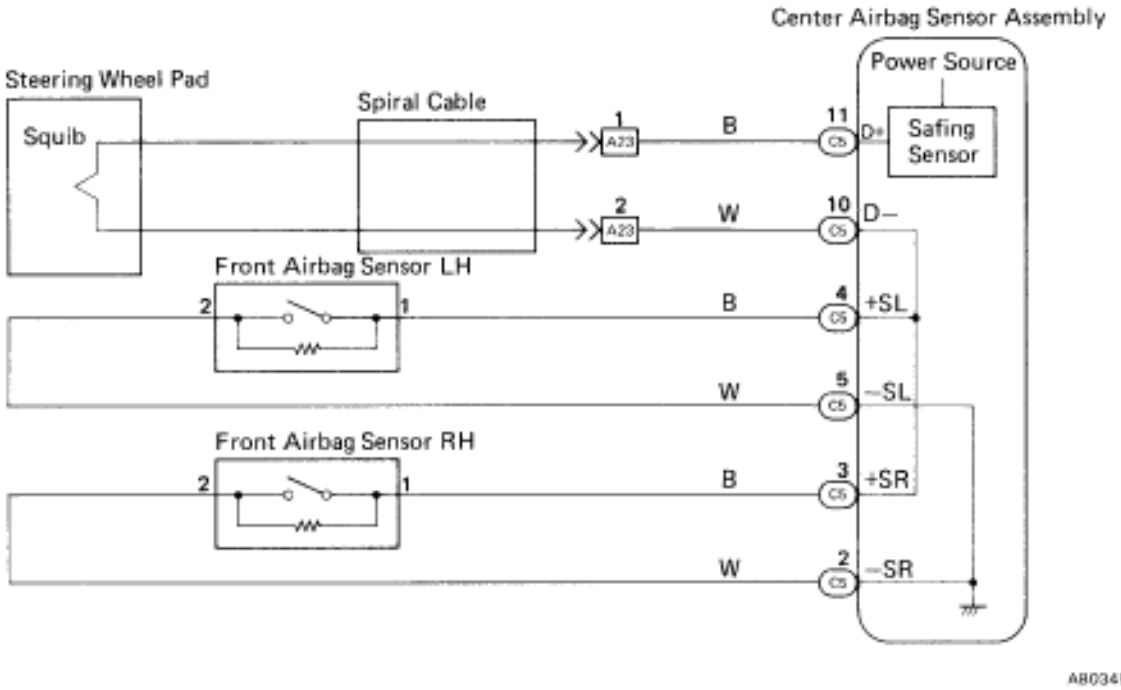
DIAGNOSTIC CHART



DIAGNOSTIC CHART (Cont'd)

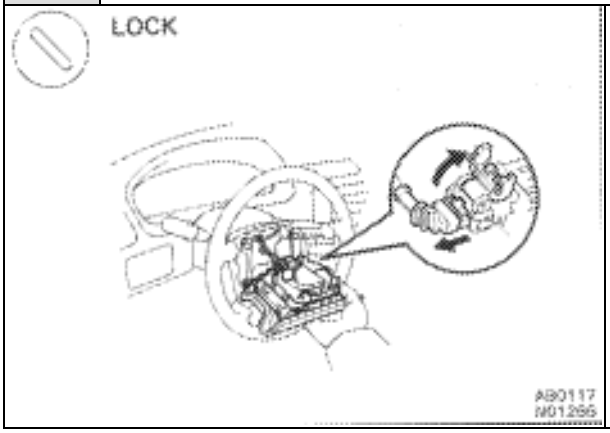
7	Check front airbag sensor.	NG	Replace front airbag sensor.
	OK		
	Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–21).		
8	Check spiral cable.	NG	Repair or replace spiral cable.
	OK		
	Repair or replace harness or connector between center airbag sensor assembly and spiral cable.		

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Preparation.**

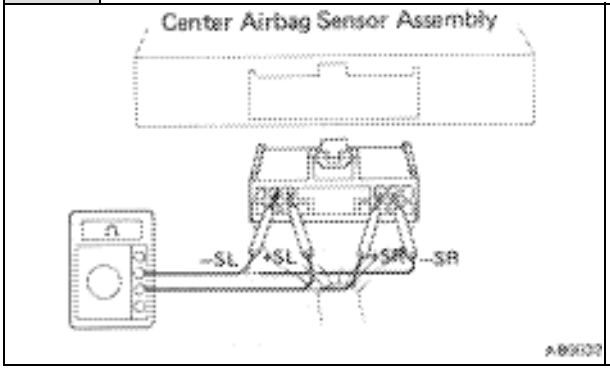


P
1. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
2. Remove steering wheel pad (See page AB–16)

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 **Check front airbag sensor circuit. (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector.)**



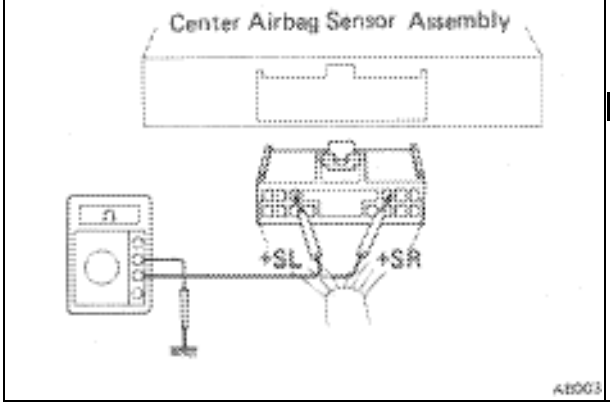
P Disconnect center airbag sensor assembly connector.

C Measure resistance between terminals +SR and –SR, +SL and –SL of harness side connector of center airbag sensor assembly.

OK **Resistance: 755 Ω – 885 Ω**

OK → **NG** → **Go to step 7.**

3 **Check front airbag sensor circuit. (Measure resistance between terminals +SR, +SL of center airbag sensor assembly connector and body ground.)**



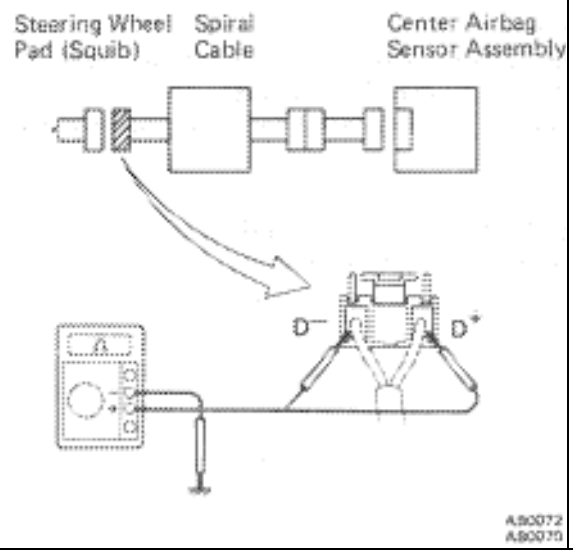
C Measure resistance between terminals +SR, +SL of harness side connector of center airbag sensor assembly and body ground.

OK

Resistance: 1 MΩ or higher

OK → **NG** → **Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–22).**

4 **Check squib circuit.**

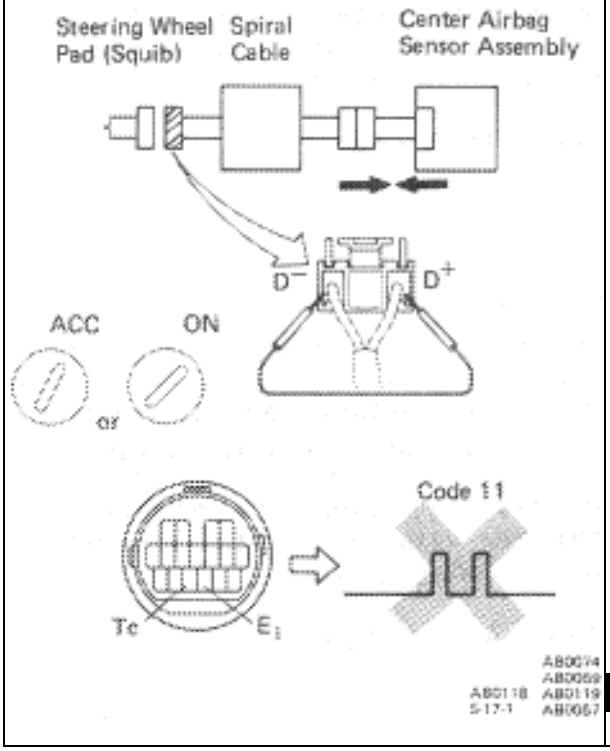


C Measure resistance between D^+, D^- on spiral cable side of connector between spiral cable and steering wheel pad and body ground.

OK **Resistance: 1 M Ω or higher**

OK → **NG** → **Go to step 1 .**

5 **Check center airbag sensor assembly.**



P
1. Connect connector to center airbag sensor assembly.
2. Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
3. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
4. Clear malfunction code stored in memory (See page AB–35).

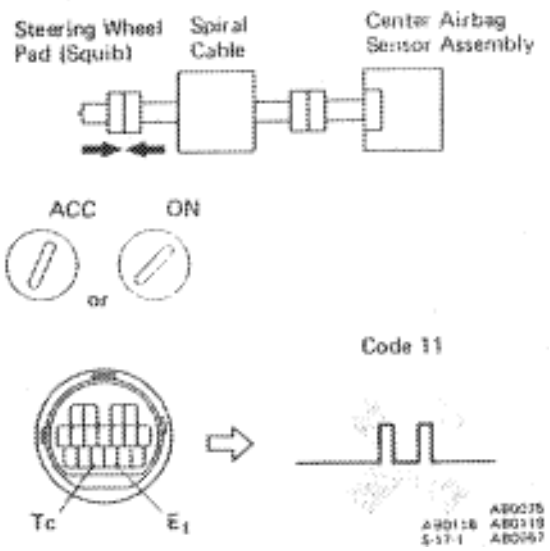
C
1. Turn ignition switch ACC or ON and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

OK **Diagnostic trouble code 11 is not output.**

Hint Codes other than code 11 may be output at this time, but this is not relevant to this check.

OK → **NG** → **Replace center airbag sensor assembly.**

6 Check squib.



P
1. Turn ignition switch LOCK.
2. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
3. Connect steering wheel pad (squib) connector.
4. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
5. Clear malfunction code stored in memory (See page AB–35).

C
1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

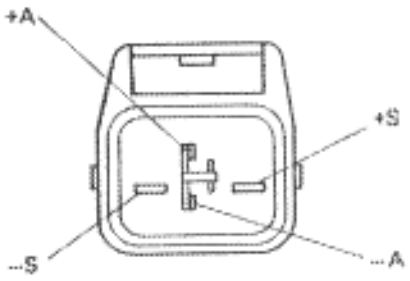
OK **Diagnostic trouble code 11 is not output.**

Hint Codes other than code 11 may be output at this time, but it is not relevent to this check.

OK → **NG** **Replace steering wheel pad.**

Fromt the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

7 Check front airbag sensor.



P Disconnect front airbag sensor connector.

C Measure resistance between each terminal of front airbag sensor.

OK

Terminal	Resistance
+S – +A	Below 1 Ω
+S – –S	1 MΩ or higher
–S – –A	755 Ω – 885 Ω

Notice:

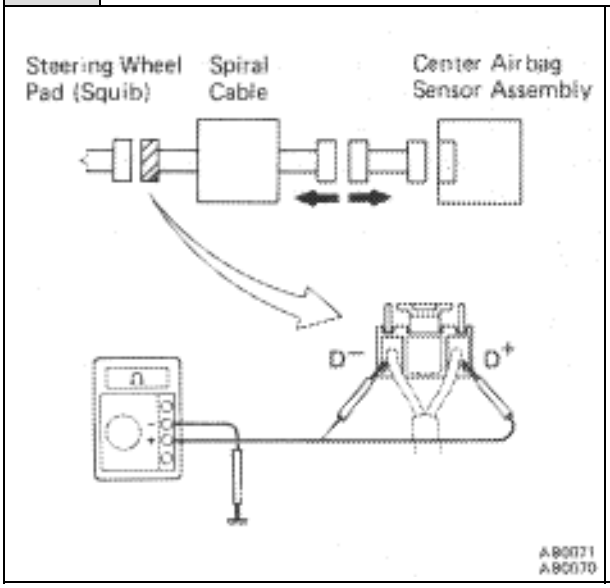
2 **Do not touch ohmmeter probes strongly against terminals of front airbag sensor.**

2 **Make sure the front airbag sensor connector is properly connected.**

OK → **NG** **Replace front airbag sensor.**

Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–21).

8 **Check spiral cable.**



P Disconnect connector between center airbag sensor assembly and spiral cable.

C Measure resistance between D^+, D^- on spiral cable side of connector between spiral cable and steering wheel pad and body ground.

OK **Resistance: 1 M Ω or higher**

OK

NG **Repair or replace spiral cable.**

Repair or replace harness or connector between center airbag sensor assembly and spiral cable.

DTC	12	┐ Short in squib Circuit (to B+) ┐ Open in Front Sensor Circuit

— CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
The front airbag sensor detects the deceleration force in a frontal collision and is located in the front fender on the left and right sides.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB–5.
Diagnostic trouble code 12 is recorded when a B+ short is detected in the squib circuit.

DTC No.	DTC Detecting Condition
12	┐ Short circuit in squib wire harness (to B+). ┐ Squib malfunction. ┐ Short circuit in front airbag sensor +S wire harness (to B+). ┐ Open circuit in RH and LH front airbag sensor harness. ┐ Spiral cable malfunction. ┐ Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

↓

2 Check front airbag sensor circuit. (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector.)

NG → Go to Code 15 (See page AB–66).

↓ OK

3 Check front airbag sensor circuit. (Measure voltage between terminal +SR or +SL of center airbag sensor assembly connector and body ground.)

NG → Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–21).

↓ OK

4 Check squib circuit.

NG → Go to step **7**.

↓ OK

5 Check center airbag sensor assembly.

NG → Replace center airbag sensor assembly.

↓ OK

6 Check squib.

NG → Replace steering wheel pad.

↓ OK

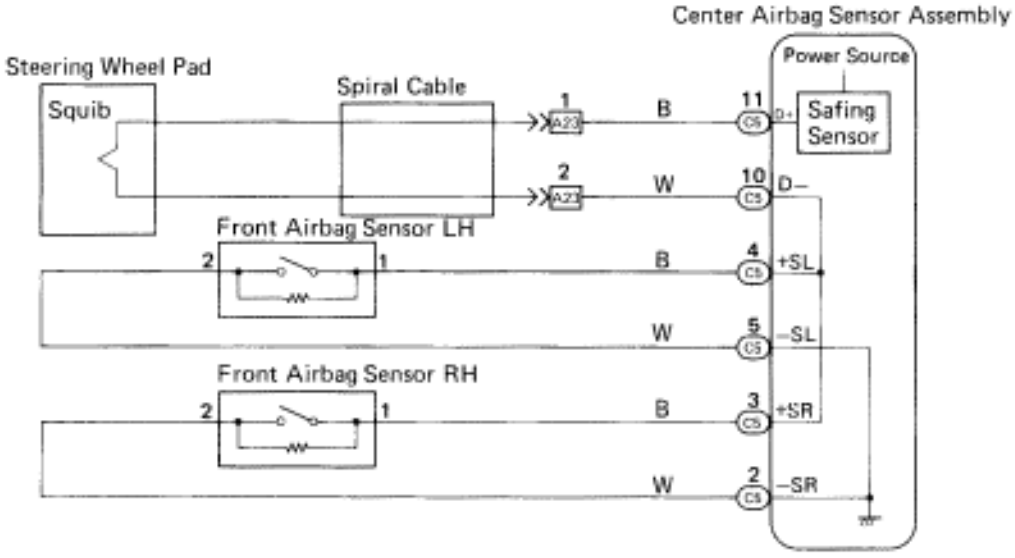
From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

7 Check spiral cable.

NG → Repair or replace spiral cable.

↓ OK

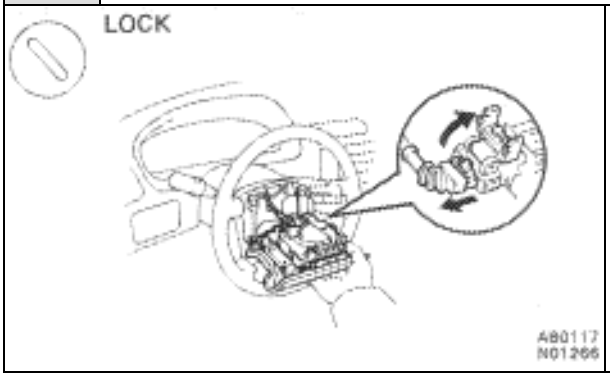
Repair or replace harness or connector between center airbag sensor assembly and spiral cable.



AB0345

INSPECTION PROCEDURE

1 **Preparation.**

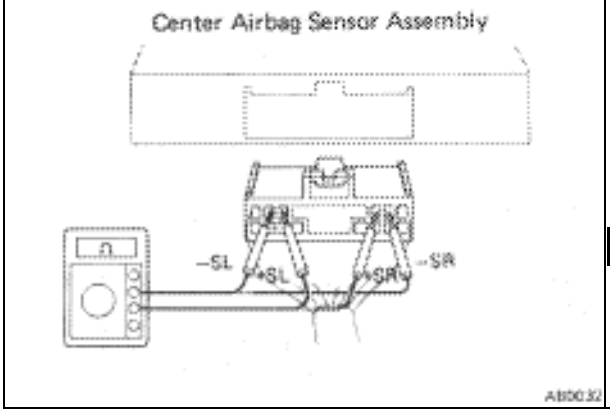


P
1. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
2. Remove steering wheel pad (See page AB–16)

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 **Check front airbag sensor circuit. (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector.)**



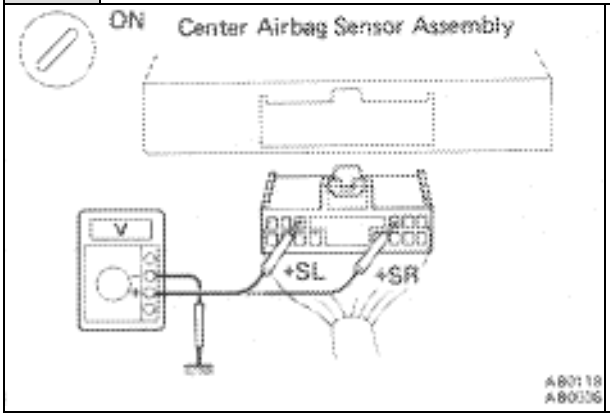
P Disconnect center airbag sensor assembly connector.

C Measure resistance between terminals +SR and –SR, +SL and –SL of harness side connector of center airbag sensor assembly.

OK **Resistance: 755 Ω – 885 Ω**

OK → **NG** → **Go to Code 15 (See page AB–66).**

3 **Check front airbag sensor circuit. (Measure resistance between terminals +SR or +SL of center airbag sensor assembly connector and body ground.)**



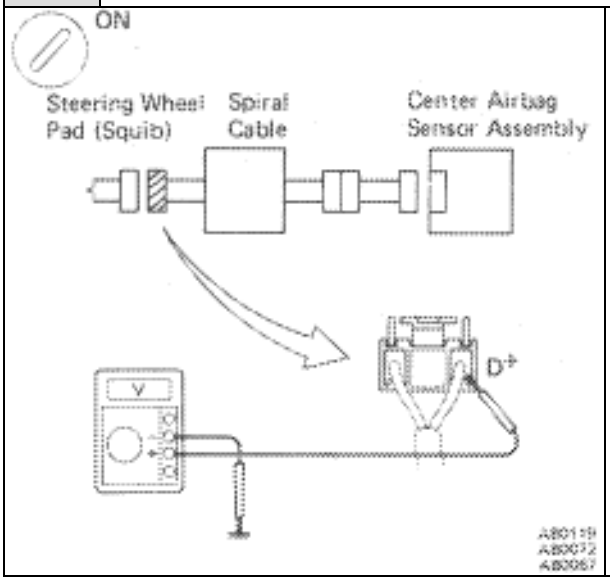
P
1. Connect negative (–) terminal cable to battery.
2. Turn ignition switch ON.

C Measure voltage between terminals +SR or +SL of harness side connector of center airbag sensor assembly and body ground.

OK **Voltage: Below 1 V**

OK → **NG** → **Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–21).**

4 **Check squib circuit.**

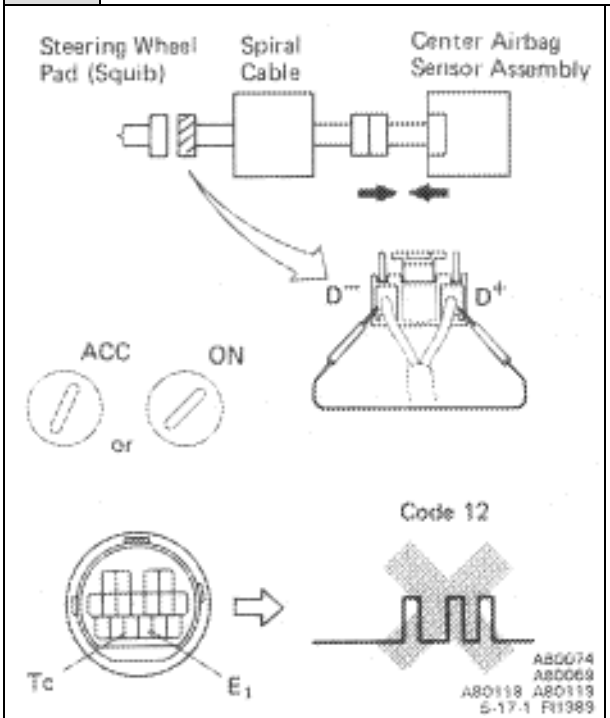


C Measure voltage between D^+, D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Voltage:** **Below 1 V**

OK → **NG** → **Go to step 7.**

5 **Check center airbag sensor assembly.**



P
1. Turn ignition switch LOCK.
2. Disconnect negative (–) terminal cable from battery.
3. Connect connector to center airbag sensor assembly.
4. Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
5. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
6. Clear malfunction code stored in memory (See page AB–35).

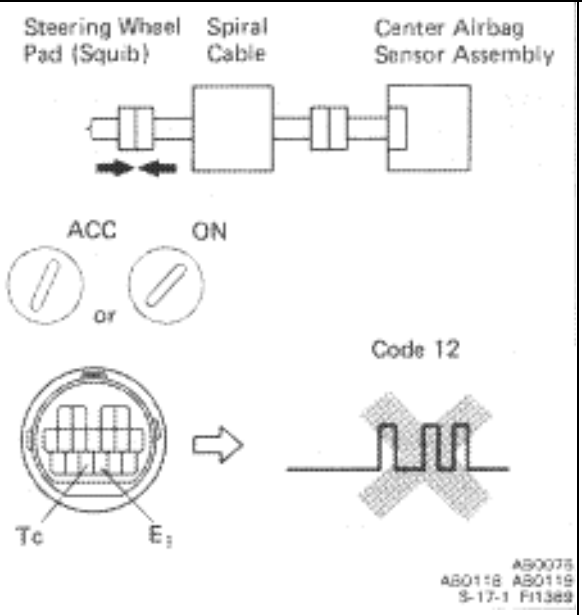
C
1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

OK **Diagnostic trouble code 12 is not output.**

Hint Codes other than code 12 may be output at this time, but this is not relevant to this check.

OK → **NG** → **Replace center airbag sensor assembly.**

6 Check squib.



P
1. Turn ignition switch LOCK.
2. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
3. Connect steering wheel pad (squib) connector.
4. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
5. Clear malfunction code stored in memory (See page AB–35).

C
1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

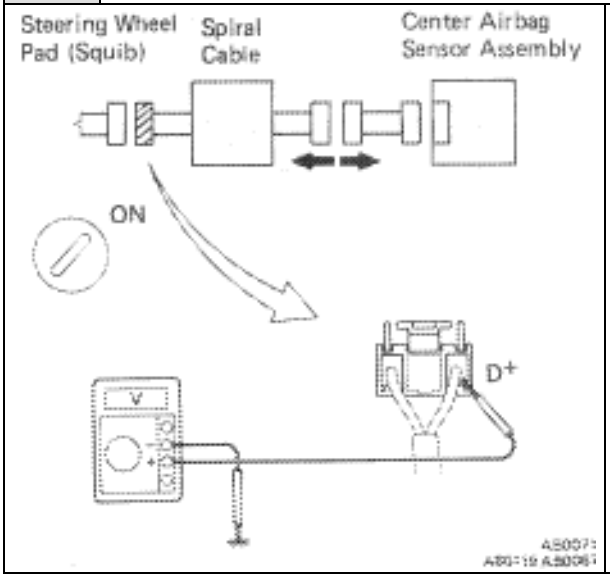
OK **Diagnostic trouble code 12 is not output.**

Hint Codes other than code 12 may be output at this time, but it is not relevent to this check.

OK → **NG** → **Replace steering wheel pad.**

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.

7 Check spiral cable.



P
1. Turn ignition switch LOCK.
2. Disconnect connector between center airbag sensor assembly and spiral cable.
3. Turn ignition switch ON.

C Measure voltage at D^+, on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Voltage:** **Below 1 V**

OK → **NG** → **Repair or replace spiral cable.**

Repair or replace harness or connector between center airbag sensor assembly and spiral cable.

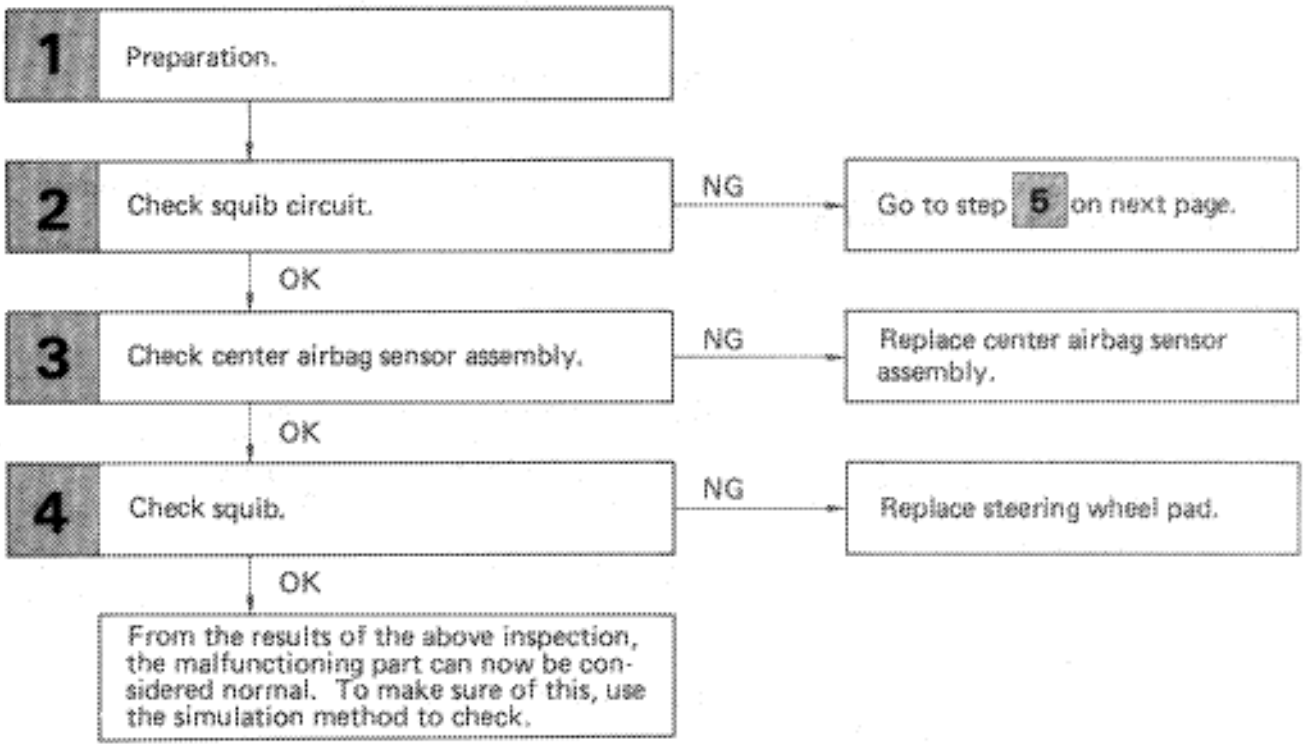
DTC	13	Short in Squib Circuit (Between D^+ Wire Harness and D^- WIre Harness)

CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB–5.
Diagnostic trouble code 13 is recorded when a short is detected in the D+ wire harness and D– wire harness of the squib circuit.

DTC No.	Diagnosis
13	1 Short circuit between D+ wire harness and D– wire harness of squib. 1 Squib malfunction. 1 Spiral cable malfunction. 1 Center airbag sensor assembly malfunction.

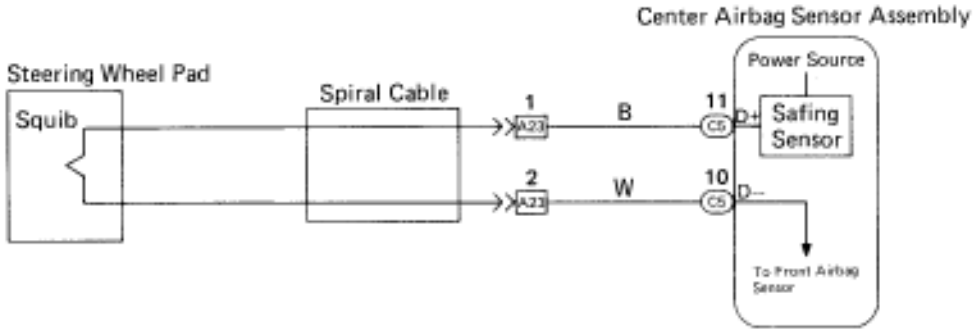
DIAGNOSTIC CHART



DIAGNOSTIC CHART

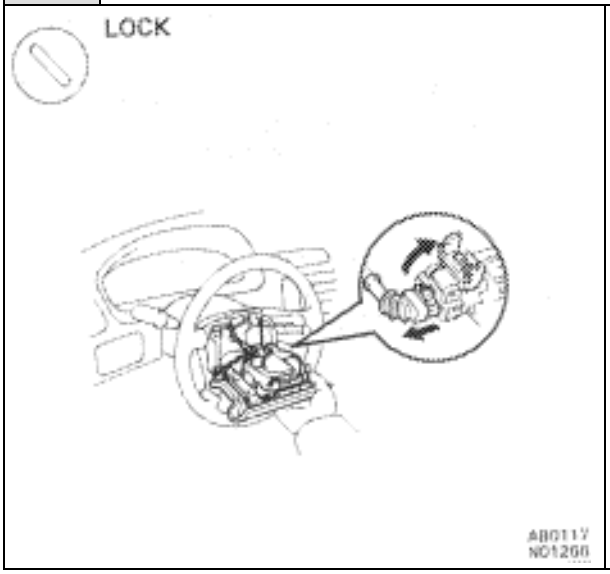
5	Check spiral cable.	NG	Repair or replace spiral cable.
	OK		
6	Check harness between center airbag sensor assembly and spiral cable.	NG	Repair or replace harness or connector between center airbag sensor assembly and spiral cable.
	OK		
7	Check center airbag sensor assembly.	NG	Replace center airbag 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.		

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Preparation.**

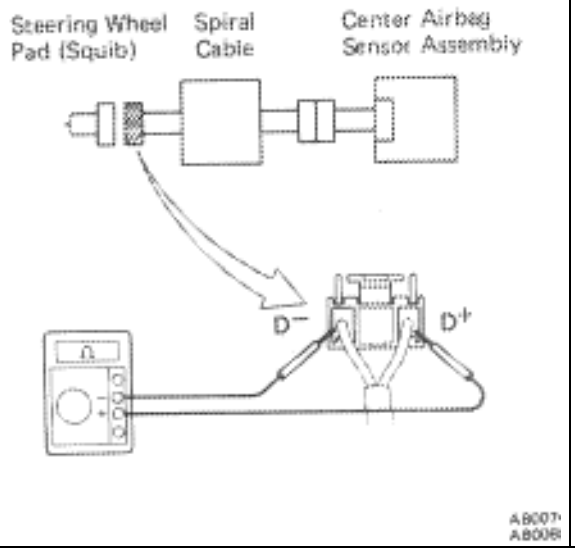


P
1. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
2. Remove steering wheel pad (See page AB–16)

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 **Check squib circuit.**



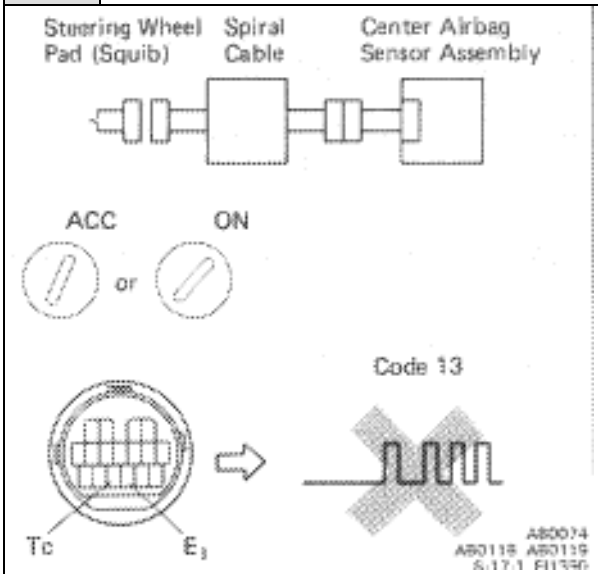
P Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: 1kΩ or higher**

OK

NG **Go to step 5.**

3 **Check center airbag sensor assembly.**



P
1. Connect negative (–) terminal cable to battery.
2. Clear malfunction code stored in memory (See page AB–35).

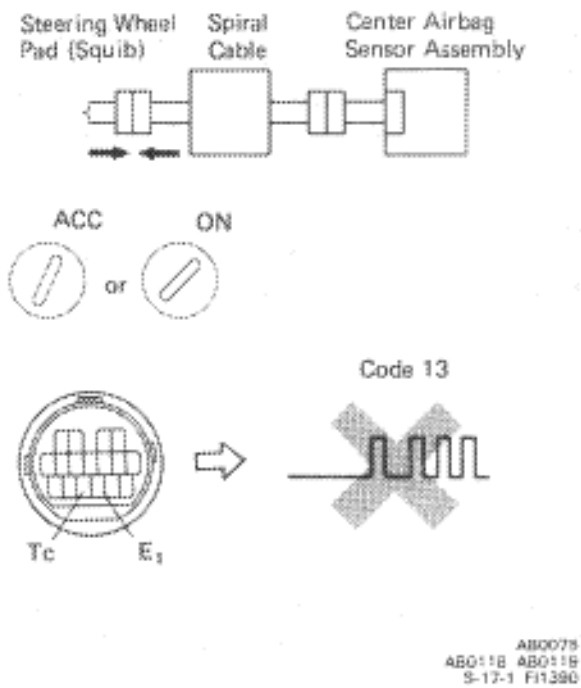
C
1. Turn ignition switch to LOCK, and wait at least 2 seconds.
2. Turn ignition switch ACC or ON, and wait at least 20 seconds.
3. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
4. Check diagnostic trouble code.

OK **Diagnostic trouble code 13 is not output.**

Hint Codes other than code 13 may be output at this time, but this is not relevant to this check.

OK → **NG** → **Replace center airbag sensor assembly.**

4 **Check squib.**



P
1. Turn ignition switch LOCK.
2. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
3. Connect steering wheel pad (squib) connector.
4. Connect negative (–) terminal cable to battery.
5. Clear malfunction code stored in memory (See page AB–35).

C
1. Turn ignition switch LOCK, and wait at least 2 seconds.
2. Turn ignition switch ACC or ON, and wait at least 20 seconds.
3. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
4. Check diagnostic trouble code.

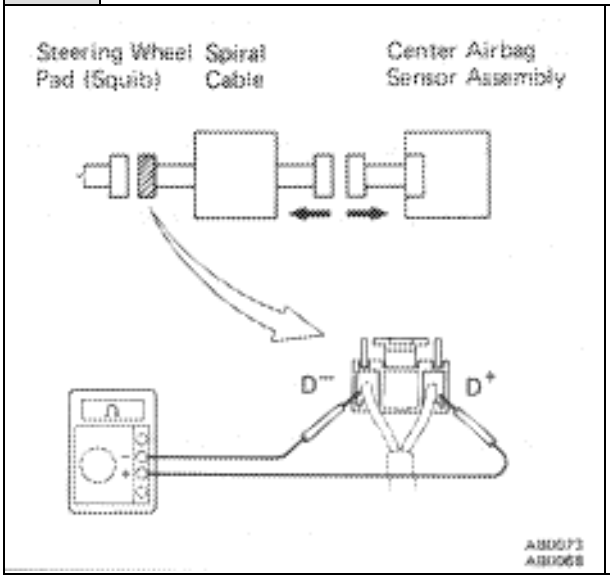
OK **Diagnostic trouble code 13 is not output.**

Hint Codes other than code 13 may be output at this time, but it is not relevant to this check.

OK → **NG** → **Replace steering wheel pad.**

From the results of the above inspection, the malfuncctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5 **Check spiral cable.**



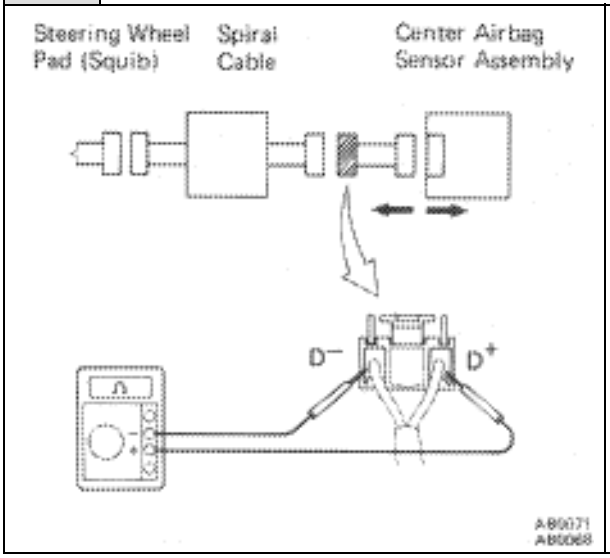
P
1. Disconnect connector between center airbag sensor assembly and spiral cable.
2. Release airbag activation prevention mechanism on center airbag sensor assembly side of spiral cable connector (See page (AB–60).

C Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: 1 MΩ or higher**

OK → **NG** → **Repair or replace spiral cable.**

6 **Check harness between center airbag sensor assembly and spiral cable.**



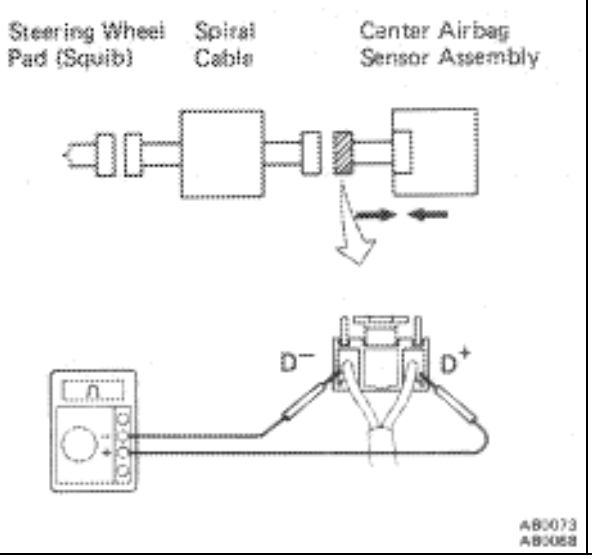
P
1. Disconnect center airbag sensor assembly connector.
2. Release airbag activation prevention mechanism on center airbag sensor assembly connector (See page AB–60).

C Measure resistance between D^+ and D^- on center airbag sensor assembly side of connector between center airbag sensor assembly and spiral cable.

OK **Resistance: 1MΩ or higher**

OK → **NG** → **Repair or replace harness or connector between center airbag sensor assembly and spiral cable.**

7	Check center airbag sensor assembly.



P Connect center airbag sensor assembly connector.

C Measure resistance between D^+ and D^- on center airbag sensor assembly side of connector between center airbag sensor assembly and spiral cable.

OK **Resistance: 1kΩ or higher**

OK

NG **Replace center airbag sensor assembly.**

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.

RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

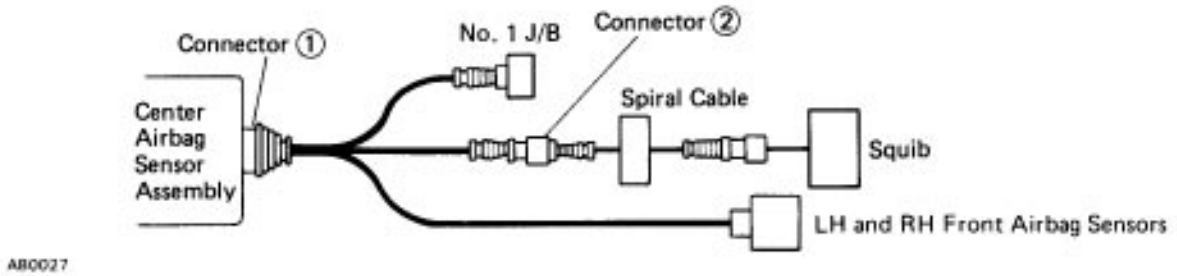
An airbag activation prevention mechanism is built into the connector for the squib circuit of the airbag system. When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors ① and ② below, insert paper which is the same thickness as the male terminal, between the terminal and the short spring.

CAUTION:

- **NEVER RELEASE the airbag activation prevention mechanism on the steering wheel pad connector.**

NOTICE:

- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the paper inserted is too thick the terminal and short spring may be damaged, so always use paper the same thickness as the male terminal.**

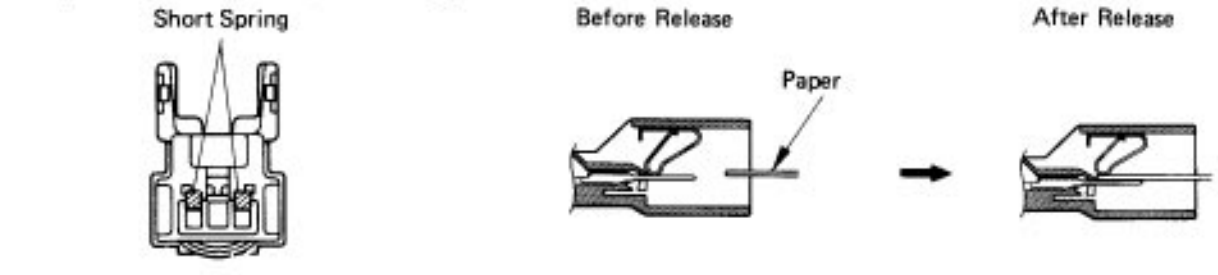


AB0027

Center Airbag Sensor Assembly Connector (Connector ①)

AB0131 AB0042 AB0043

Spiral Cable Connector (Connector ②)



AB0130 AB0045 AB0046

DTC 14 Open in Squib Circuit

— CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB–5.
Diagnostic trouble code 14 is recorded when an open is detected in the squib circuit.

DTC No.	Diagnosis
14	┐Open circuit in D+ wire harness or D– wire harness of squib. ┐Squib malfunction. ┐Spiral cable malfunction. ┐Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

2 Check squib circuit.
- OK → Go to step 5.
- NG

3 Check spiral cable.
- NG → Repair or replace spiral cable.
- OK

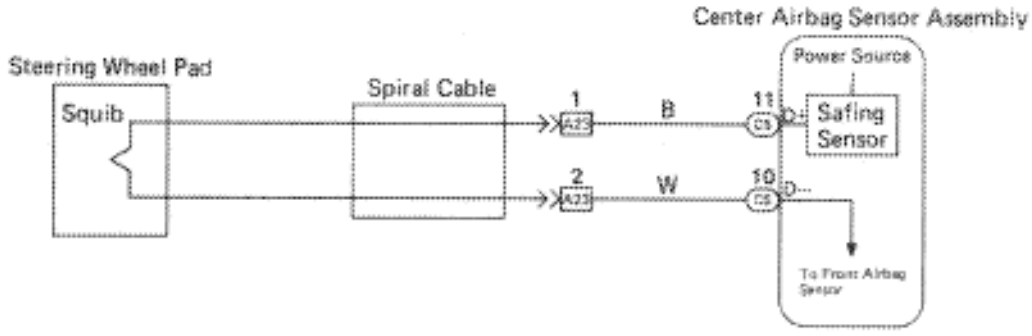
4 Check harness between center airbag sensor assembly and spiral cable.
- NG → Repair or replace harness or connector between center airbag sensor assembly and spiral cable.
- OK

5 Check center airbag sensor assembly.
- NG → Replace center airbag sensor assembly.
- OK

6 Check squib.
- 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.

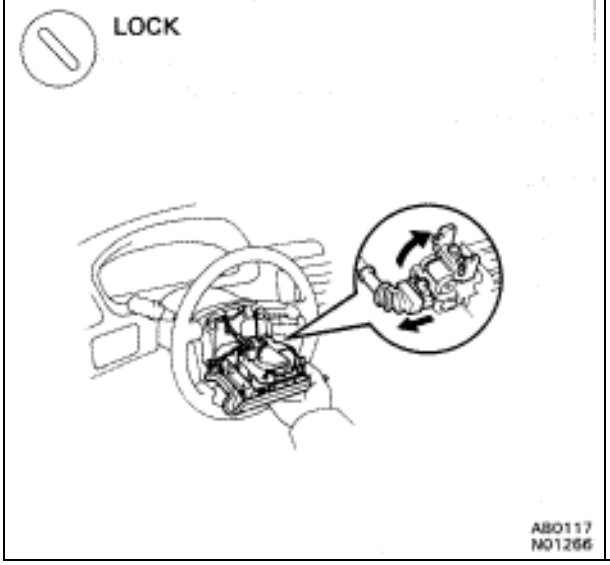
WIRING DIAGRAM



AB0346

INSPECTION PROCEDURE

1 **Preparation.**

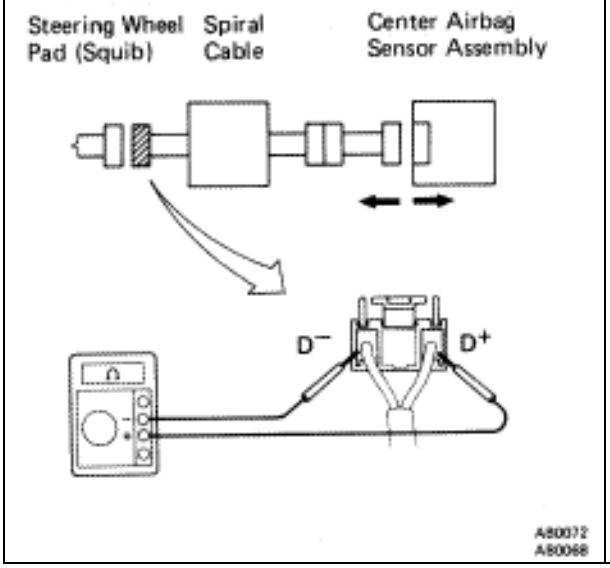


P
1. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
2. Remove steering wheel pad (See page AB–16)

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 **Check squib circuit.**



P Disconnect center airbag sensor assembly connector.

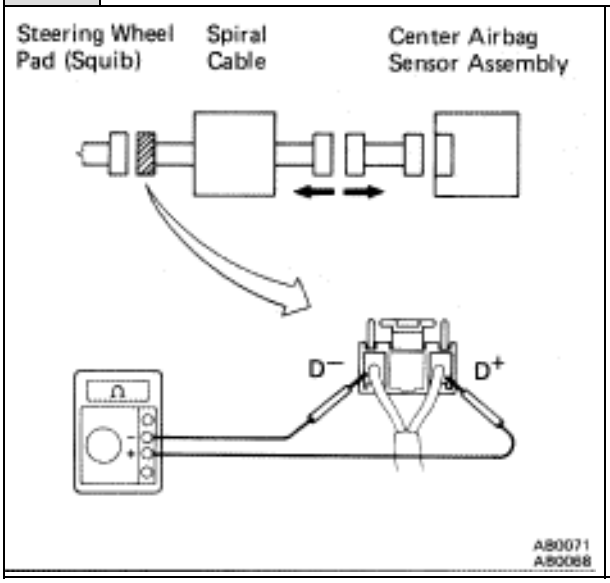
C Measure resistance between D^+, D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: Below 1Ω**

NG

OK **Go to step 5.**

3 **Check spiral cable.**



P Disconnect connector between center airbag sensor assembly and spiral cable.

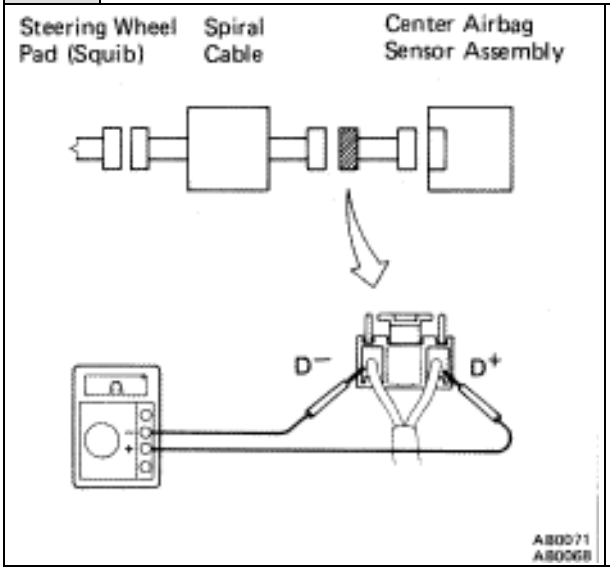
C Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: Below 1 Ω**

OK

NG **Repair or replace spiral cable.**

4 **Check harness between center airbag sensor assembly and spiral cable.**



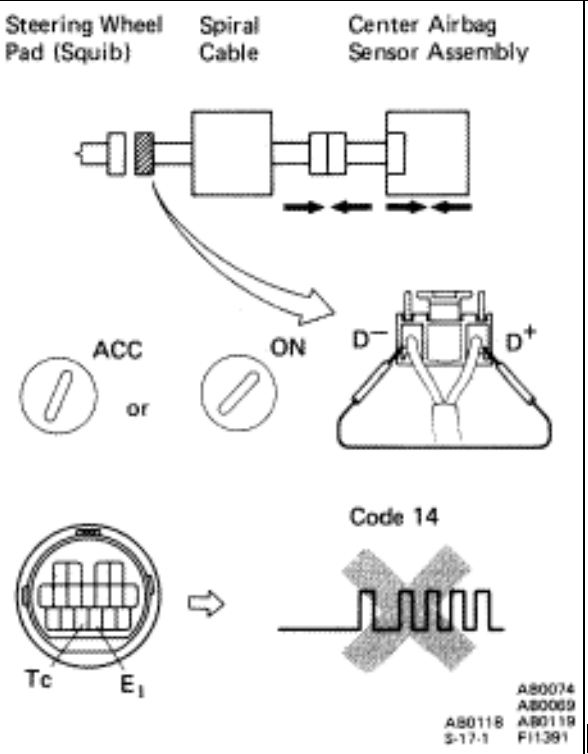
C Measure resistance between D^+ and D^- on center airbag sensor assembly side of connector between center airbag sensor assembly and spiral cable.

OK **Resistance: Below 1 Ω**

OK

NG **Repair or replace harness or connector between center airbag sensor assembly and spiral cable.**

5 Check center airbag sensor assembly.



P

1. Connect connector to center airbag sensor connector.
2. Connect connector between center airbag sensor assembly and spiral cable.
3. Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
4. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
5. Clear malfunction code stored in memory (See page AB–35).

C

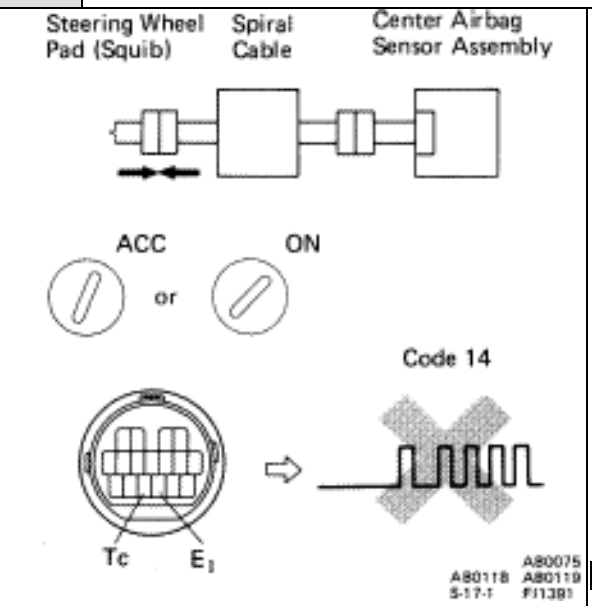
1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

OK **Diagnostic trouble code 14 is not output.**

Hint Codes other than code 14 may be output at this time, but this is not relevant to this check.

OK → **NG** → **Replace center airbag sensor assembly.**

6 Check squib.



P

1. Turn ignition switch LOCK.
2. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
3. Connect steering wheel pad (squib) connector.
4. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

C

1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

OK **Diagnostic trouble code 14 is not output.**

Hint Codes other than code 14 may be output at this time, but it is not relevent to this check.

OK → **NG** → **Replace steering wheel pad.**

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.

DTC 15 Open in Front Airbag Sensor Circuit

— CIRCUIT DESCRIPTION

The front airbag sensor detects the deceleration force in a frontal collision and is located in the front fender on the left and right sides.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB–5.
Diagnostic trouble code 15 is recorded when an open is detected in the front airbag sensor circuit.

NOTICE: The front airbag sensor connector is equipped with an electrical connection check mechanism for the purpose of detecting an open in the front airbag sensor (See page AB–7). This mechanism is constructed so that when the terminals of the front airbag sensor have been connected (when the connector housing lock is in the locked condition), the connection detection pin on the wire harness side connects with the terminals for diagnosis use on the sensor side. If the connector is not properly connected, the diagnosis system may detect only a malfunction code, even though the airbag system is functioning normally.
When connecting the front airbag sensor connector, make sure it is connected properly. If diagnostic trouble code 15 is displayed after the front airbag sensor connector has been connected, check again that it is properly connected.

Code No.	Diagnosis
15	2 Open circuit in +S wire harness or –S wire harness of front airbag sensor. 2 Front airbag sensor malfunction. 2 Malfunction of electrical connection check mechanism of front airbag sensor. 2 Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

2 Check front airbag sensor circuit (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector).
- NG → Go to step 4.
- OK ↓

3 Check center airbag sensor assembly.
- NG → Replace center airbag sensor assembly.
- OK ↓

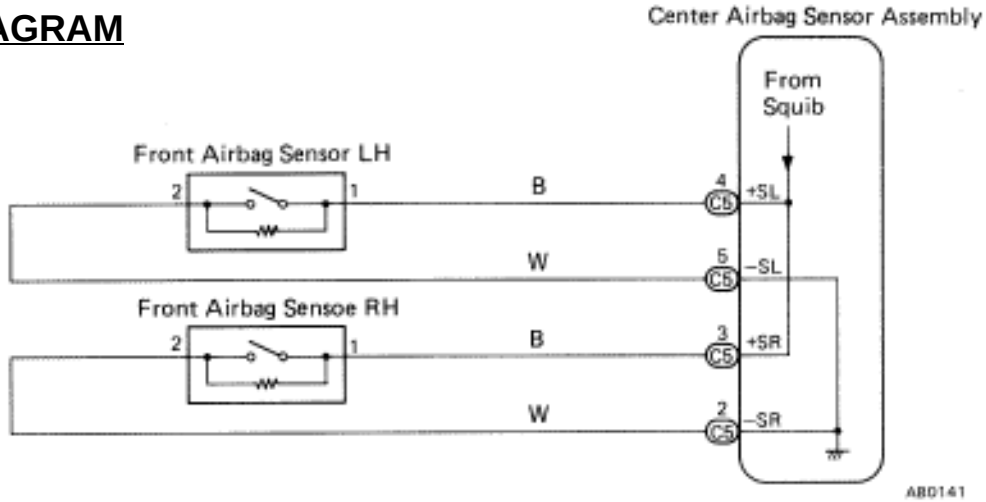
From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

4 Check front airbag sensor.
- NG → Replace front airbag sensor.
- OK ↓

5 Check harness between center airbag sensor assembly and front airbag sensor.
- NG → Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–21).
- OK ↓

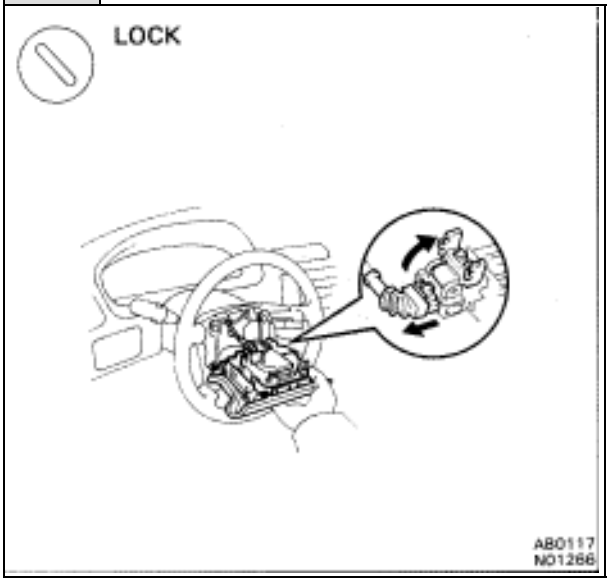
Replace front airbag sensor connector (See page AB–21).

WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Preparation.**

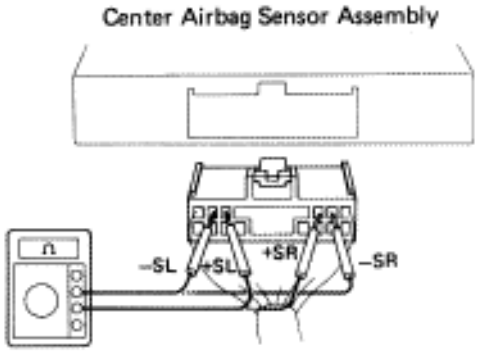


P
1. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
2. Remove steering wheel pad
(See page AB–16)

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 **Check front airbag sensor circuit. (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector.).**



P Disconnect center airbag sensor assembly connector.

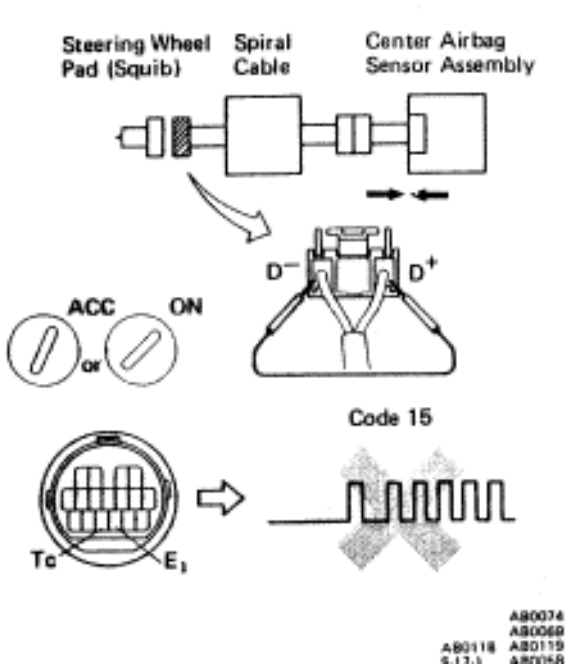
C Measure resistance between terminals +SR and –SR, +SL and –SL of harness side connector of center airbag sensor assembly.

OK **Resistance: 755 Ω – 885 Ω**

OK

NG **Go to step 1 .**

3 **Check center airbag sensor assembly.**



P
1. Connect connector to center airbag sensor assembly.
2. Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
3. Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
4. Clear malfunction code stored in memory (See page AB–35).

C
1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

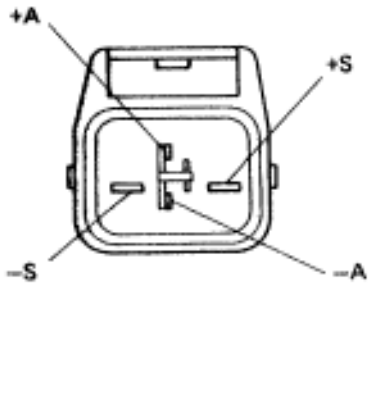
OK **Diagnostic trouble code 15 is not output.**

Hint Codes other than code 15 may be output at this time, but this is not relevant to this check.

OK → **NG** **Replace center airbag sensor assembly.**

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.

4 **Check front airbag sensor.**



P Disconnect front airbag sensor connector.

C Measure resistance between each terminal of front airbag sensor.

OK

Terminal	Resistance
+S – +A	Below 1 Ω
+S – –S	1 MΩ or higher
–S – –A	755 Ω – 885 Ω

Notice:

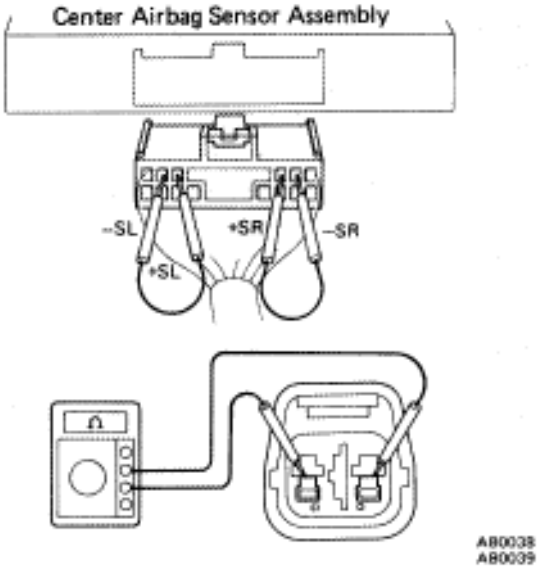
2 **Do not touch ohmmeter probes strongly against terminals of front airbag sensor.**

2 **Make sure the front airbag sensor connector is properly connected.**

OK → **NG** **Replace front airbag sensor.**

CORRECTION FOR PUB. NO. RM319U2, April 1993

5	Check harness between center airbag sensor assembly and front airbag sensor.



P

1. Disconnect center airbag sensor assembly connector.
2. Using service wires, connect +SR and –SR, +SL and –SL on the wire harness side of the center airbag sensor assembly connector.

C Measure resistance between terminals +SR and –SR, +SL and –SL of harness side connector of front airbag sensor.

Notice

2 Lightly tough ohmmeter probes at position shown in illustration.

2 Make sure the front airbag sensor connector is properly connected.

OK **Resistance: Below 1Ω**

OK

NG **Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB–21).**

Replace front airbag sensor connector (See page AB–21).

DTC 22 Airbag Warning Light System Malfunction

— CIRCUIT DESCRIPTION

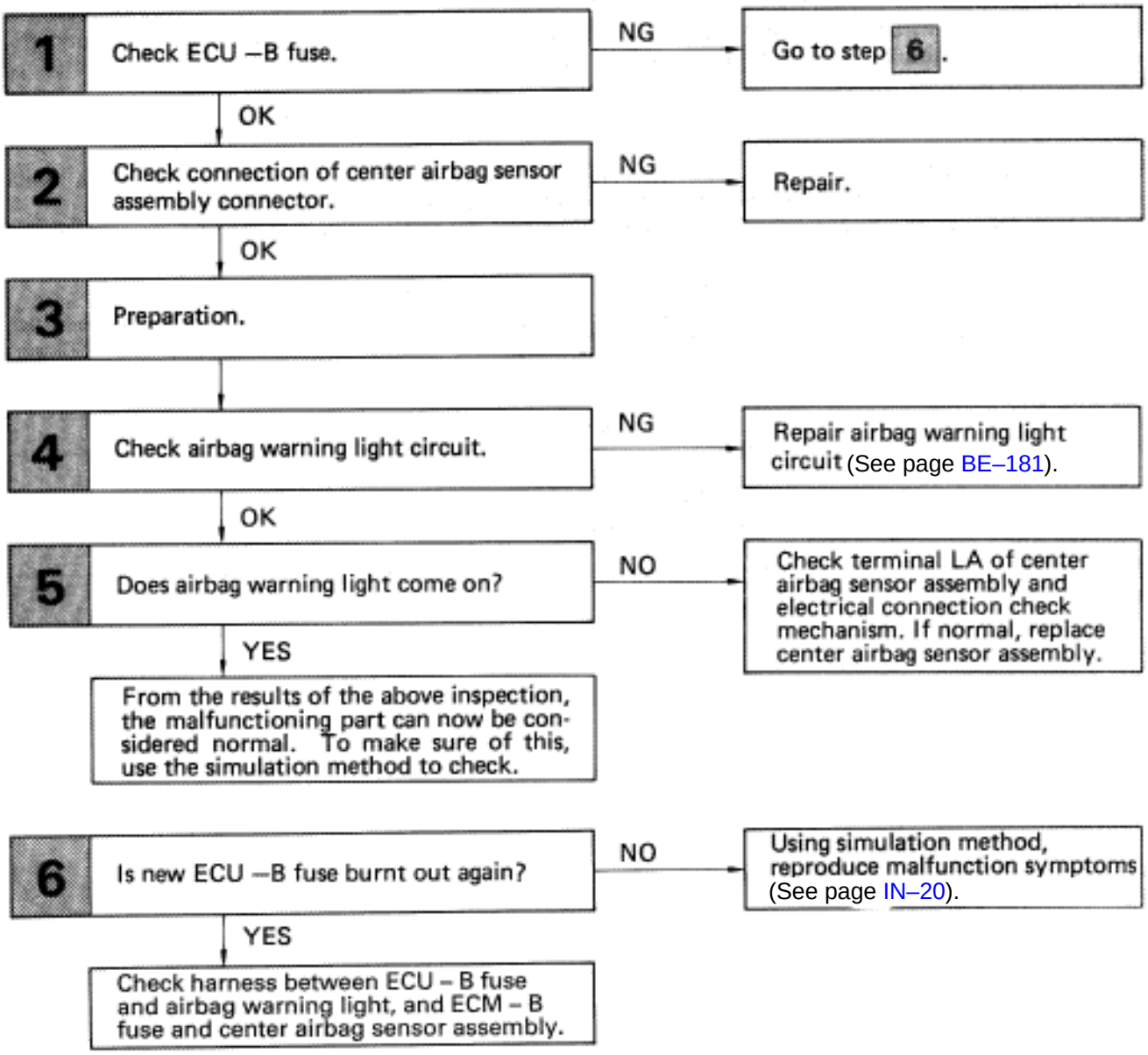
The airbag warning light is located on the combination meter
When the airbag system is normal, the airbag warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.
If there is a malfunction in the airbag system, the airbag warning light lights up to inform the driver of the abnormality.
When terminals Tc and T_2 of the DCL2 are connected, the diagnostic trouble code is displayed by the blinking of the airbag warning light.
The airbag warning light circuit is equipped with an electrical connection check mechanism which detects when the connector to the center airbag sensor assembly is not properly connected.
If the connector to the center airbag sensor assembly is not properly connected, the airbag warning light will not light up.
Diagnostic trouble code 22 is recorded when a malfunction occurs in the airbag warning light system.
If an OPEN malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired the diagnostic trouble codes (including code 22) cannot be confirmed.

DTC No.	Diagnosis
22	⊡4Open circuit in airbag warning light system. ⊡4Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

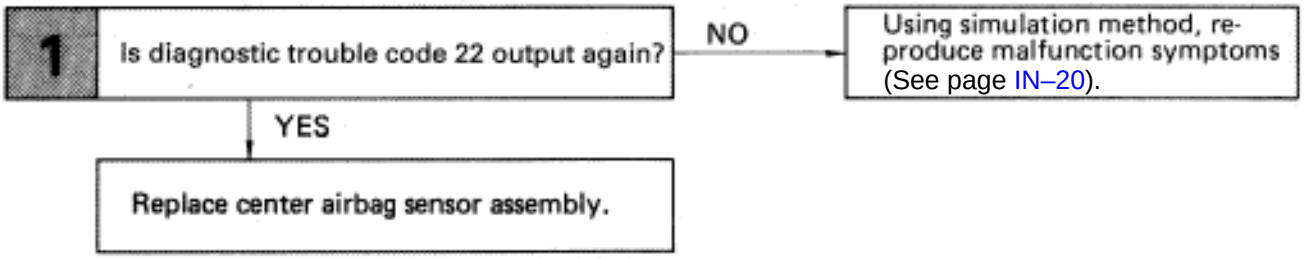
Troubleshooting for this system is different for when the airbag warning light does not light up and for when diagnostic trouble code 22 is output. Confirm the problem symptoms first before selecting the appropriate troubleshooting procedure.

HINT: If airbag warning light does not light up, perform the following troubleshooting:

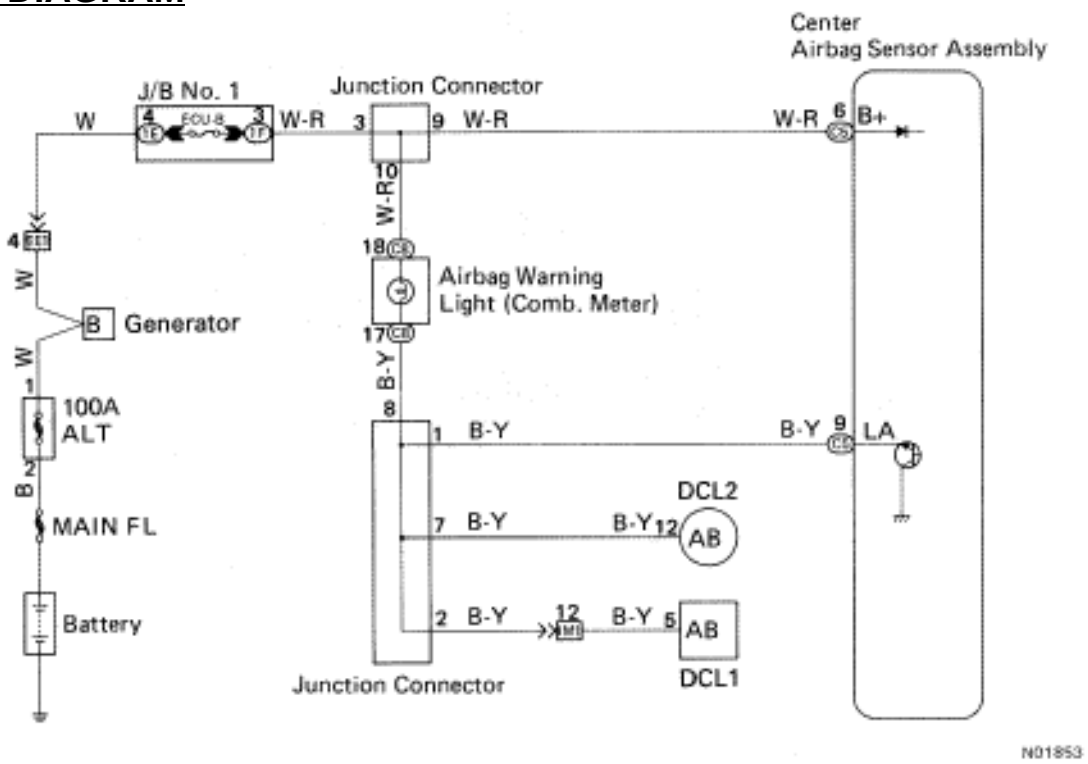


DIAGNOSTIC CHART

HINT: If diagnostic trouble code 22 is output, perform the following troubleshooting:



WIRING DIAGRAM



INSPECTION PROCEDURE

HINT: If airbag warning light does not light up, perform the following troubleshooting:

1 **Check ECU–B fuse.**

OK

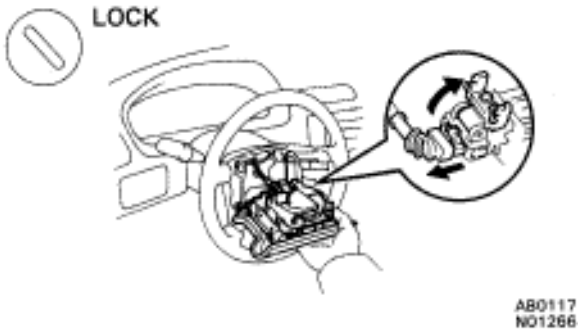
NG → **Go to step 1 .**

2 **Check connection of center airbag sensor assembly connector.**

OK

NG → **Repair.**

3 **Preparation.**



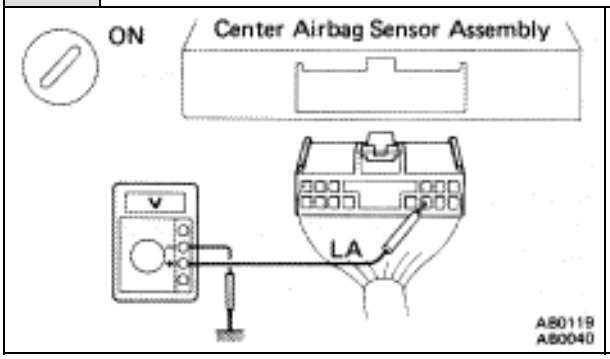
P

1. Disconnect battery negative (–) terminal cable, and wait at least 30 seconds.
2. Remove steering wheel pad (See page AB–16)

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

4 **Check airbag warning light circuit.**



P
1. Disconnect center airbag sensor assembly.
2. Connect negative (–) terminal cable to battery.
3. Turn ignition switch ACC or ON.

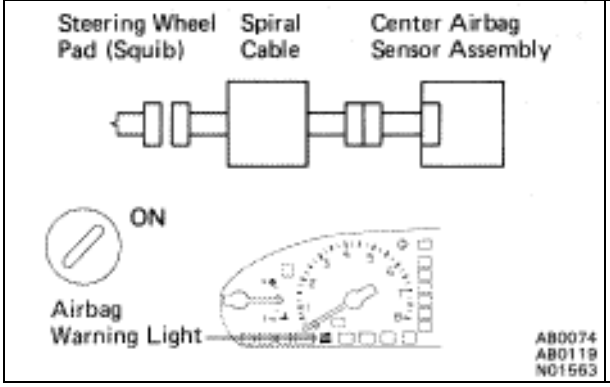
C Measure voltage LA terminal of harness side connector of center airbag sensor assembly.

OK **Voltage: 10 – 14 V**

OK

NG **Repair airbag warning light circuit (See page BE–181).**

5 **Does airbag warning light come on?**



P
1. Disconnect negative (–) terminal cable from battery.
2. Connect center airbag sensor assembly.
3. Connect negative (–) terminal cable to battery.
4. Turn ignition switch ACC or ON.

C Check operation of airbag warning light.

YES

NO **Check terminal LA of center airbag sensor assembly and electrical connection check mechanism. If normal, replace center airbag sensor assembly.**

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.

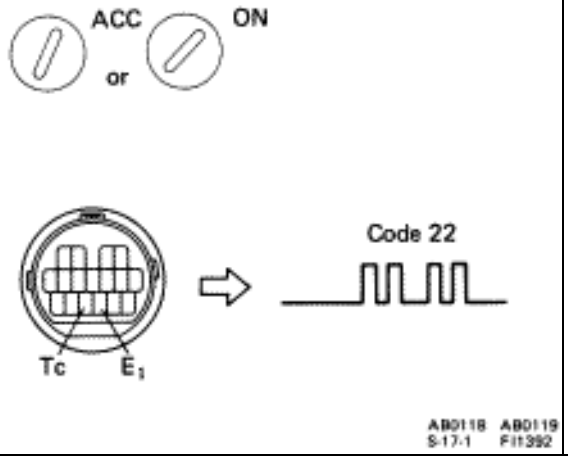
6 **Is new ECU–B fuse burnt out again?**

YES

NO **Using simulation method, reproduce malfunction symptoms (See page IN–20).**

Check harness between ECU–B fuse and airbag warning light, and ECU–B fuse and center airbag sensor assembly.

HINT: If diagnostic trouble code 22 is output, perform the following troubleshooting:

1	Is diagnostic trouble code 22 output again?
	**P** Clear malfunction code stored in memory (See page AB–35). **C** 1. Turn ignition switch LOCK, and wait at least 2 seconds. 2. Turn ignition switch ACC or ON, and wait at least 20 seconds. 3. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020 4. Check diagnostic trouble code.

YES

NO **Using simulation method, reproduce malfunction symptoms (See page IN–20).**

Replace center airbag sensor assembly.

DTC 31 Center Airbag Sensor Assembly Malfunction

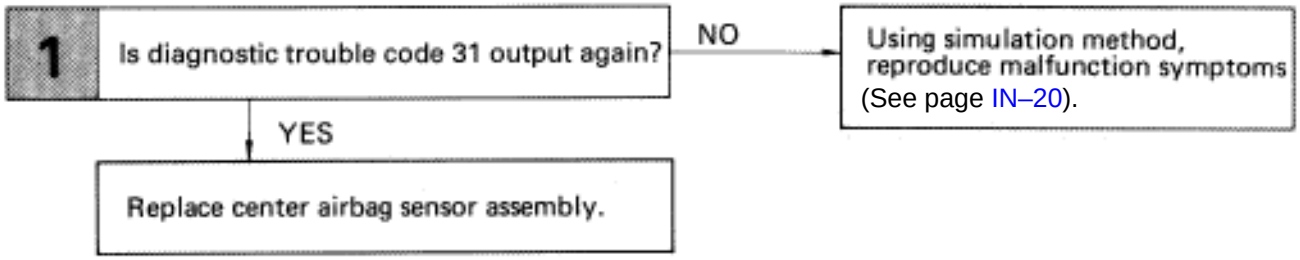
CIRCUIT DESCRIPTION

The center airbag sensor assembly consists of a center airbag sensor, safing sensors, ignition control and drive circuit, diagnosis circuit, etc.
It receives signals from the airbag sensors, judges whether or not the airbag must be activated, and diagnoses system malfunction.
Diagnostic trouble code 31 is recorded when occurrence of a malfunction in the center airbag sensor assembly is detected.

DTC No.	Diagnosis
31	1 Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

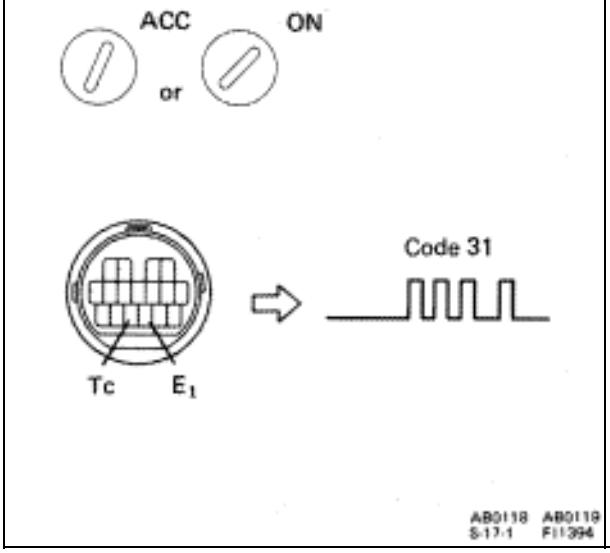
HINT: When a malfunction code other than code 31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code 31.



INSPECTION PROCEDURE

HINT: When a malfunction code other than code 31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code 31.

1 **Is diagnostic trouble code 31 output again?**



P Clear malfunction code stored in memory (See page AB–35).

C
1. Turn ignition switch LOCK, and wait at least 20 seconds.
2. Turn ignition switch ACC or ON, and wait at least 20 seconds.
3. Repeat operation in step (1) and (2) at least 5 times.
4. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
5. Check diagnostic trouble code.

YES → **Replace center airbag sensor assembly.**

NO → **Using simulation method, reproduce malfunction symptoms (See page IN–20).**

DTC 41 Malfunction Stored in Memory

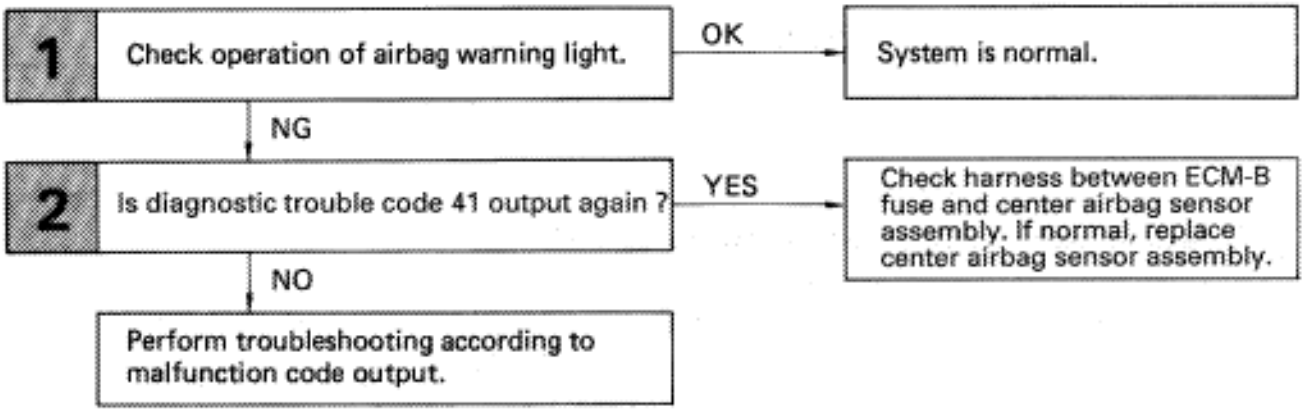
CIRCUIT DESCRIPTION

If a malfunction occurs in the airbag system, malfunction codes 11 to 31 may be output, and when the battery is disconnected after the malfunction is repaired, malfunction codes 11 to 31 will be cleared, but code 41 will be output instead.

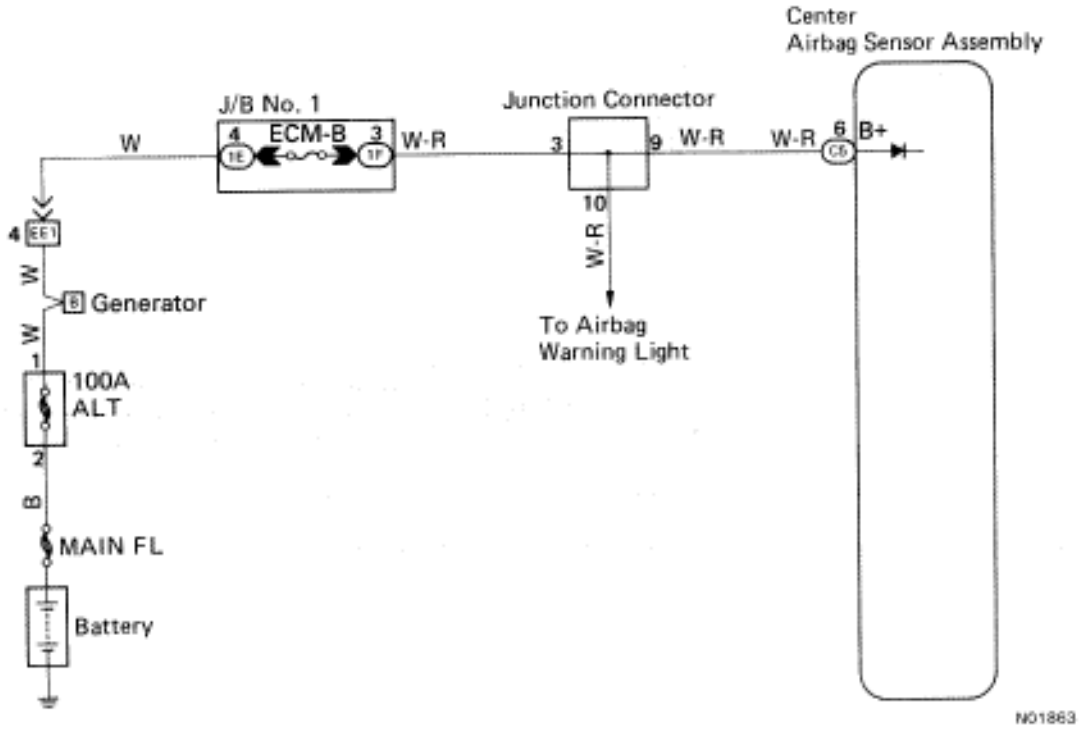
So long as the cancellation operation for a malfunction stored in memory (See page AB–35) is not performed, code 41 is stored in the center airbag sensor assembly and the airbag warning light remains lit up.

DTC No.	DTC Detecting Condition	Trouble Area
41	1 Malfunction recorded in memory. 1 Center airbag sensor assembly malfunction.	

DIAGNOSTIC CHART

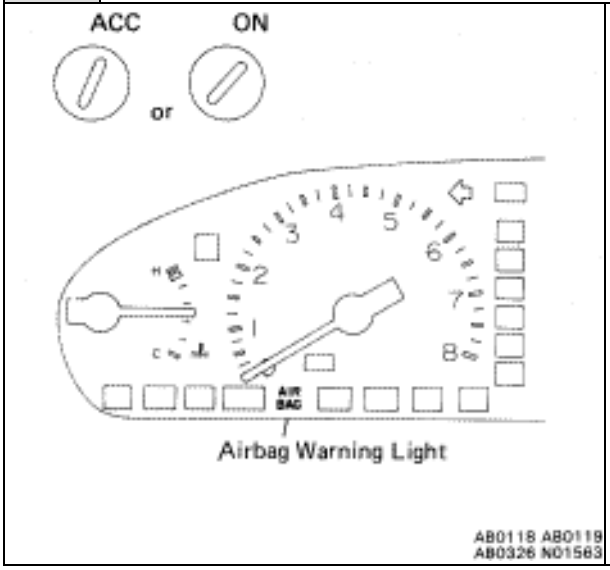


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Check operation of airbag warning light.**



P Clear malfunction code stored in memory (See page AB–35)

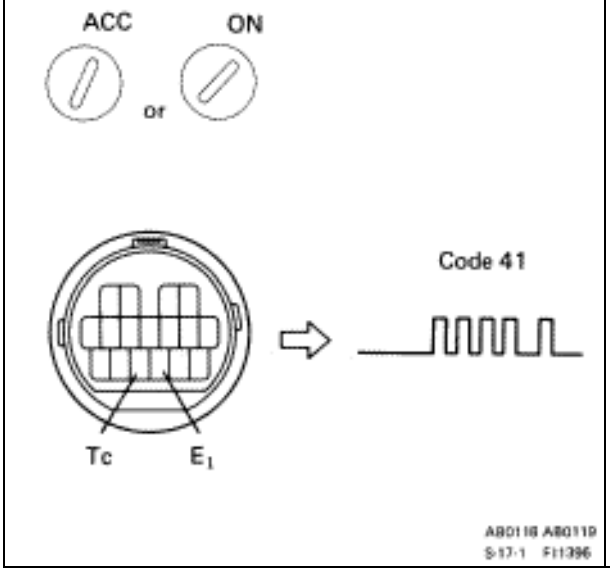
C
1. Turn ignition switch LOCK, and wait at least 2 seconds.
2. Turn ignition switch ACC or ON, and wait at least 20 seconds.
3. Check operation of airbag warning light.

OK **Airbag warning light turns off.**

NG

OK **System is normal.**

2 **Is diagnostic trouble code 41 output again?**



C
1. Turn ignition switch ACC or ON, and wait at least 20 seconds.
2. Using SST, connect terminals Tc and E_1 of DLC2. SST 09843–18020
3. Check diagnostic trouble code.

NO

YES **Check harness between ECM–B fuse and center airbag sensor assembly. If normal, replace center airbag sensor assembly.**

Perform troubleshooting according to malfunction code output.

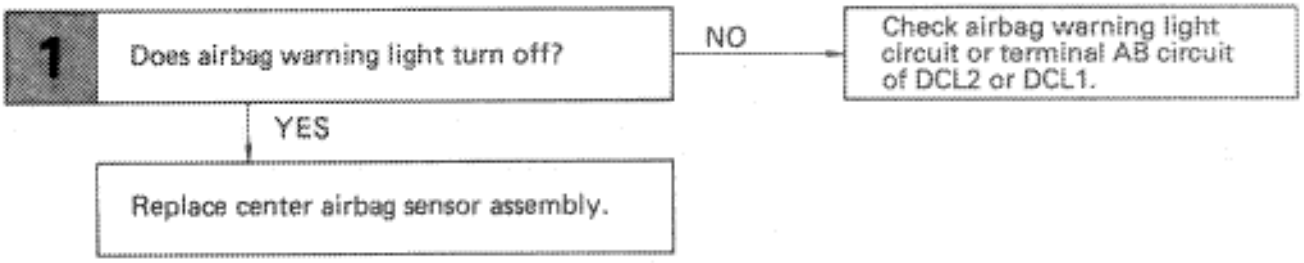
Airbag Warning Light System (Always Lit Up)

CIRCUIT DESCRIPTION

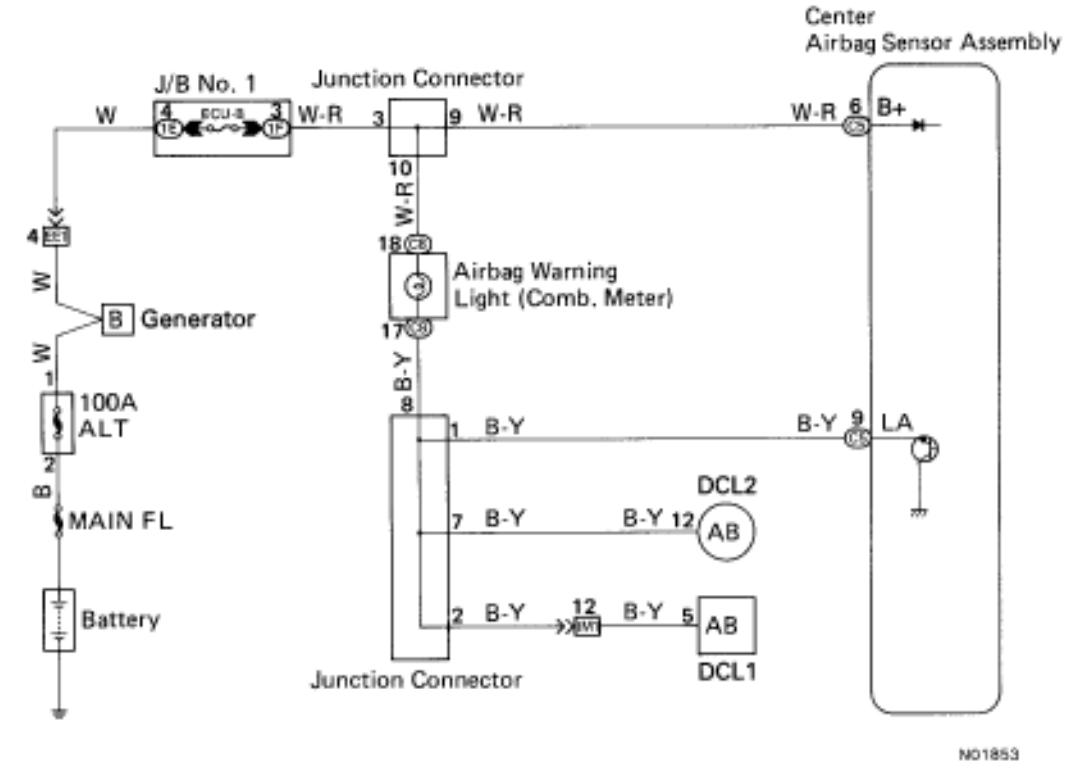
The airbag warning light is located on the combination meter.When the airbag system is normal, the airbag warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.If there is a malfunction in the airbag system, the airbag warning light lights up to inform the driver of the abnormality.

When terminals Tc and E_1 of the DCL2 are connected, the diagnostic trouble code is displayed by the blinking of the airbag warning light.

DIAGNOSTIC CHART

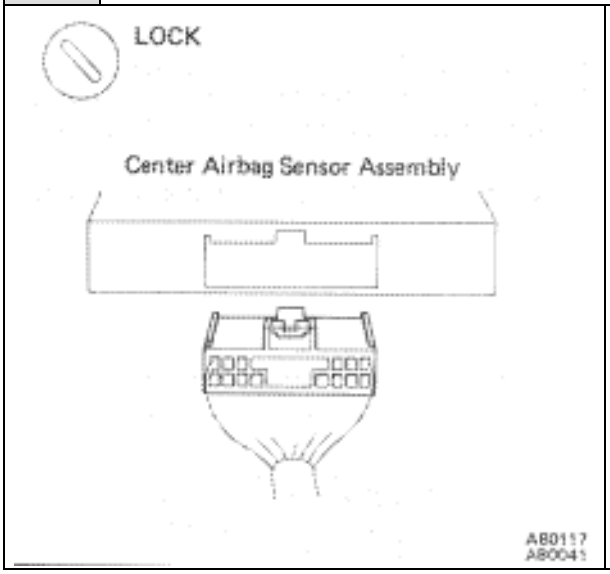


WIRING DIAGRAM



INSPECTION PROCEDURE

1 **Does airbag warning light turn off ?**



P
1. Turn ignition switch LOCK.
2. Disconnect negative (–) terminal cable from battery.
3. Disconnect center airbag sensor assembly connector.
4. Connect negative (–) terminal cable to battery.

C Check operation of airbag warning light.

YES

NO **Check airbag warninglight circuit or terminal AB circuit of DCL2 or DCL1.**

Replace center airbag sensor assembly.

Tc Terminal Circuit

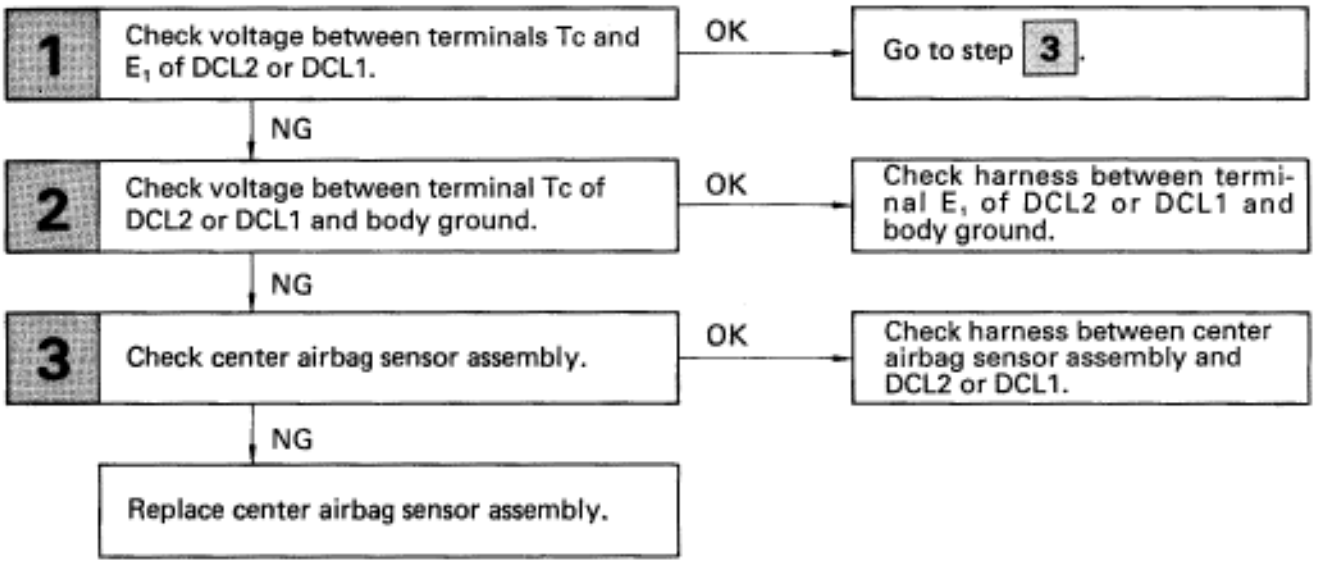
CIRCUIT DESCRIPTION

By connecting terminals Tc and E_1 of the DCL2 or DCL1, the center airbag sensor assembly is set in the diagnostic trouble code output mode. The diagnostic trouble code are displayed by the blinking of the airbag warning light.

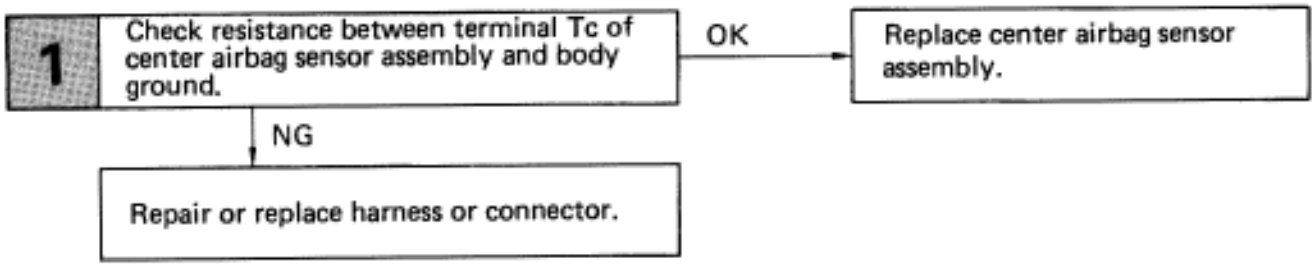
DIAGNOSTIC CHART

Troubleshooting for this system is different depending on whether the diagnostic trouble code is not displayed or is continuously displayed. Confirm the problem symptoms first before selecting the appropriate troubleshooting procedure.

HINT: If the diagnostic trouble code is note displayed, perform the following troubleshooting:

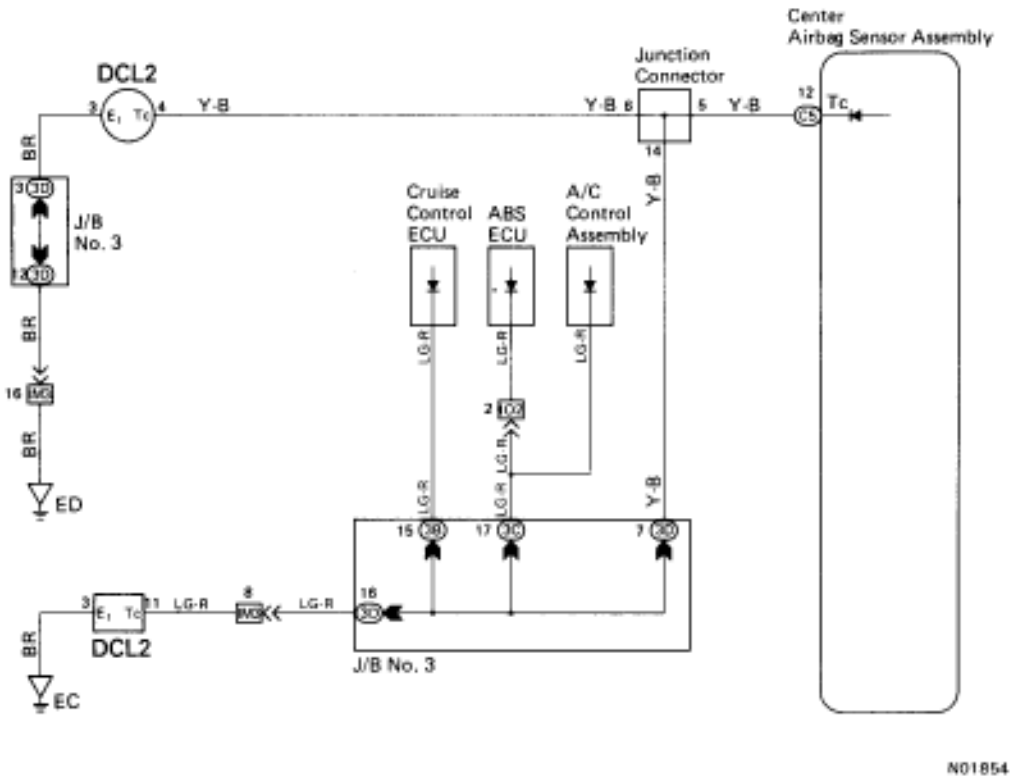


HINT: If the diagnostic trouble code is continuously displayed, perform the following troubleshooting:



DIAGNOSTIC CHART

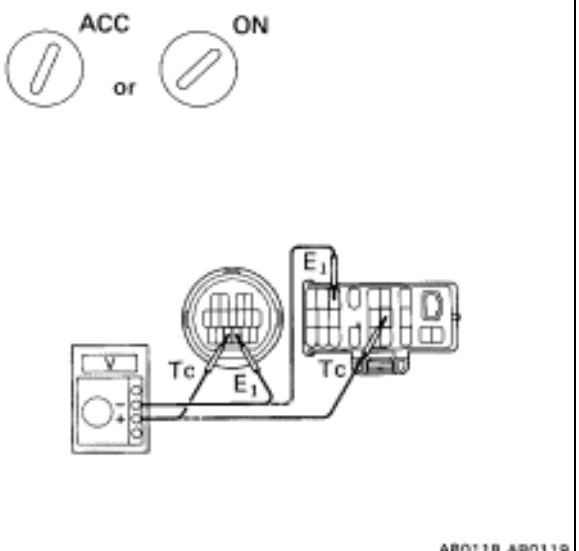
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT: If the diagnostic trouble code is not displayed, perform the following troubleshooting:

1 **Check voltage between terminals Tc and E_1 of DCL2 or DCL1.**



P Turn ignition sitch ACC on ON.

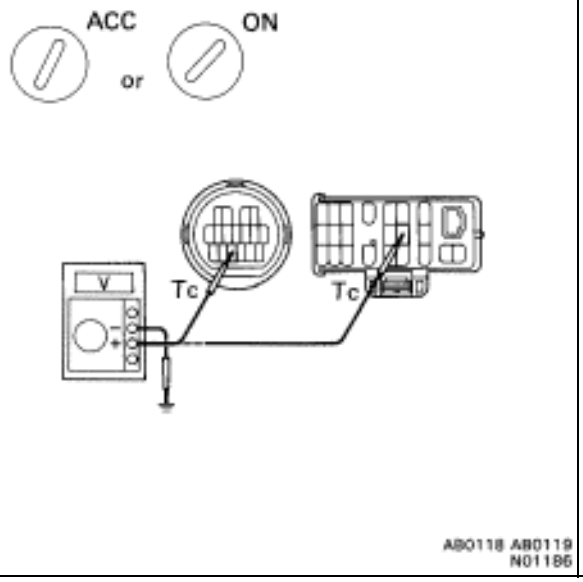
C Measure voltage between terminals Tc and E_1 of DCL2 or DCL1.

OK **Voltage 10 – 14 V**

NG

OK → **Go to step 3 .**

2 **Check voltage between terminal Tc of DCL2 or DCL1 and body ground.**



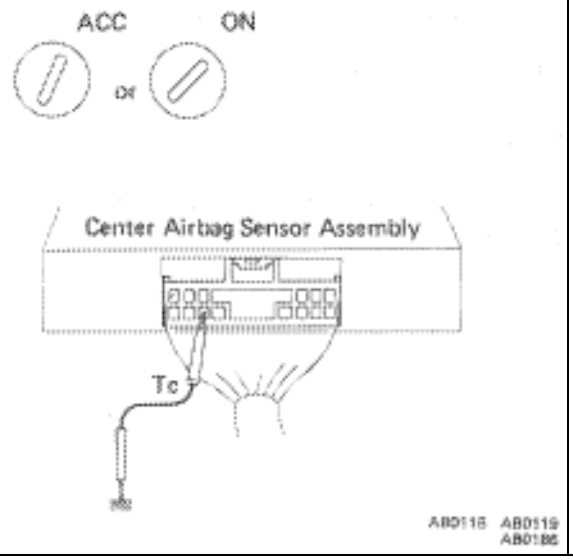
C Measure voltage between terminals Tc of DCL2 or DCL1 and body ground.

OK **Voltage: 10 – 14 V**

NG

OK → **Check harness between terminal E_1 of DCL2 or DCL1 and body ground.**

3	Check center airbag sensor assembly.



P Using a service wire, connect terminal Tc of center airbag sensor assembly connector to body ground.

C Check operation of airbag warning light.

OK **Airbag warning light comes on.**

NG

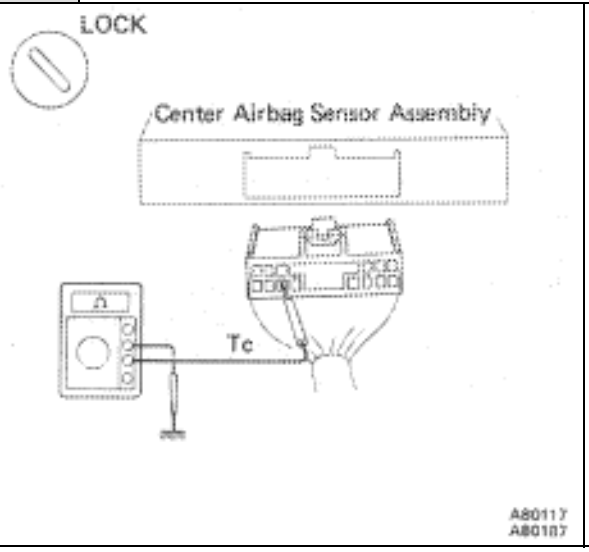
Replace center airbag sensor assembly.

OK

Check harness between center airbag sensor assembly and DCL2 or DCL1.

HINT: If the diagnostic trouble code is continuously displayed, perform the following troubleshooting.

1 **Check resistance between terminal Tc of center airbag sensor assembly and body ground.**



P
1. Turn ignition switch LOCK.
2. Disconnect center airbag sensor assembly connector.

C Check resistance between terminal Tc of center airbag sensor assembly and body ground.

OK **Resistance: 1 MΩ or higher**

OK → **Repair or replace harness or connector.**

NG → **Replace center airbag sensor assembly.**

SUSPENSION AND AXLE

TROUBLESHOOTING

SA00J–01

You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in troubles. Check each part in order. If necessary, replace these parts.

See Page / Parts Name / Trouble	Tires	Cold tire inflation pressure	Wheel alignment	Springs	Stabilizer bar	Shock absorber	Ball joint	Hub bearings	Steering linkage	Steering gear	Suspension parts	Overloaded	Wheel balance
	–	SA–3	SA–3	SA–34, 63	SA–48, 76	SA–34, 63	SA–45	SA–9, 54	–	–	–	–	–
Wander/pulls	1		2					4	3	5	6		
Bottoming				2		3						1	
Sways/pitches	1				2	3							
Front wheel shimmy	1		4			3	5	6	7	8			2
Abnormal tire wear		1	2			4					3		

V00313

WHEEL ALIGNMENT

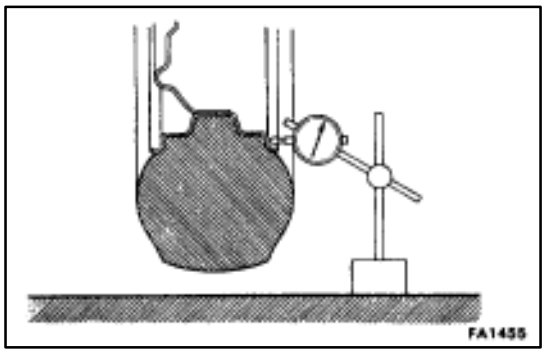
SA01Q–02

PRIMARY INSPECTION

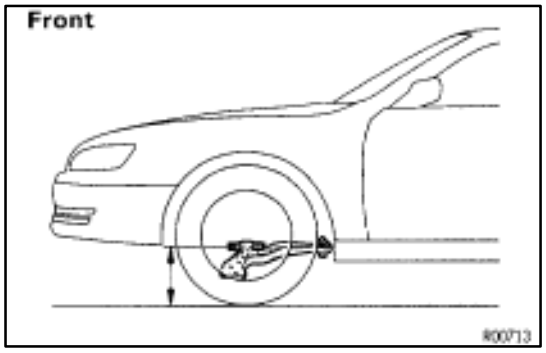
1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

(a) Check the tires for wear and for the proper inflation pressure.
Cold inflation pressure:

Tire size	Front	Rear
P205/65R15	180 kPa (1.8 kgf/cm^2, 26 psi)	180 kPa (1.8 kgf/cm^2, 26 psi)



(b) Check the wheel bearings for looseness.
(c) Check the wheel runout.
Lateral runout:
1.0 mm (0.039 in.) or less
(d) Check the suspension for looseness.
(e) Check the steering linkage for looseness.
(f) Check that the shock absorbers work properly by using the standard bounce test.



2. MEASURE VEHICLE HEIGHT

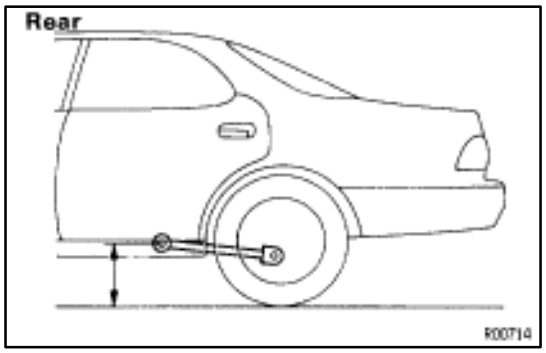
Vehicle height:

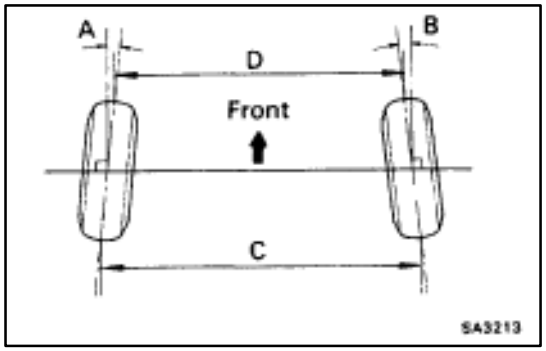
Tire size	Front	Rear
P205/65R15	211 mm (8.31 in.)	259 mm (10.20 in.)

HINT:

- Measuring point
  Front: Measure from the ground to the center of the front side lower arm mounting bolt.
  Rear: Measure from the ground to the center of the strut rod mounting bolt.
- Before inspecting the wheel alignment, adjust the vehicle height to specification.

If the vehicle height is not standard, try to adjust it by pushing down on or lifting the body.





FRONT WHEEL ALIGNMENT

SA01R–02

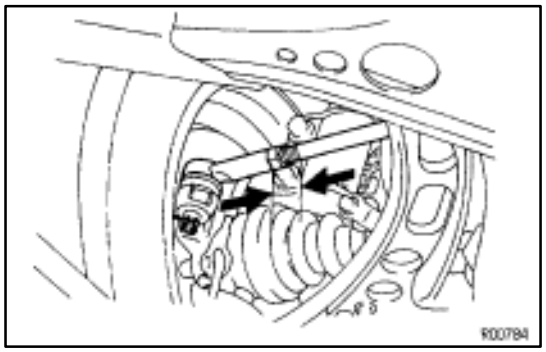
1. INSPECT TOE–IN

Toe–in (total):

A+B 0°±0.2°

(C–D 0±2 mm, 0±0.08 in.)

If the toe–in is not within the specification, adjust it at the tie rod end.



2. ADJUST TOE–IN

(a) Remove the boot clamps.

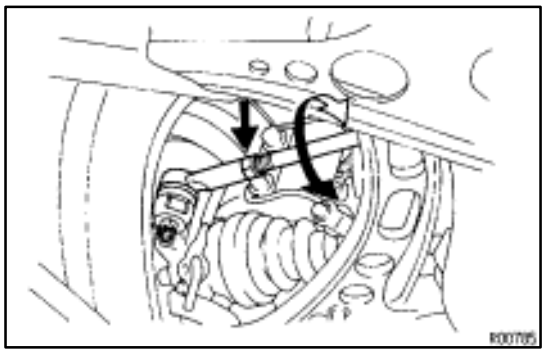
(b) Loosen the tie rod end lock nuts.

(c) Turn the left and right tie rod ends an equal amount to adjust the toe–in.

HINT: Measure that the lengths of the left and right tie rod end length are the same.

Tie rod end length difference:

1.5 mm (0.059 in.) or less

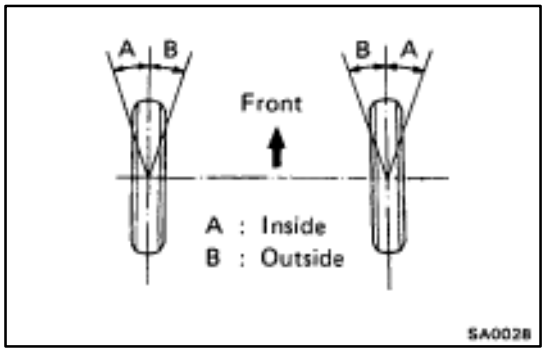


(c) Torque the tie rod end lock nuts.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

(e) Place the boot on the seat and install the clamp.

HINT: Make sure that the boots are not twisted.



3. INSPECT WHEEL ANGLE

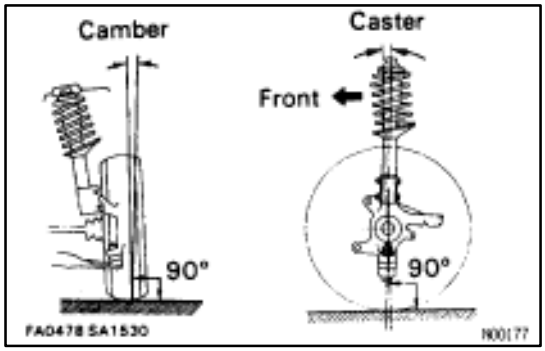
Wheel angle:

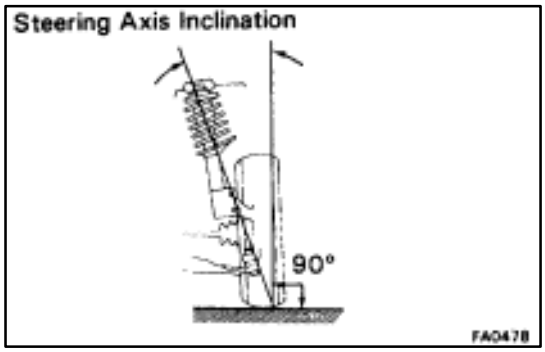
Tire size	Inside wheel	Outside wheel (reference)
P205/65R15	35°55'±2°	31°15'

If the wheel angles differ from the specification, check the difference of the left and right tie rod end length.

Tie rod end length difference:

1.5 mm (0.059 in.) or less





4. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber:

–0°40'±45'

Cross camber:

45' or less

Caster:

1°15'±45'

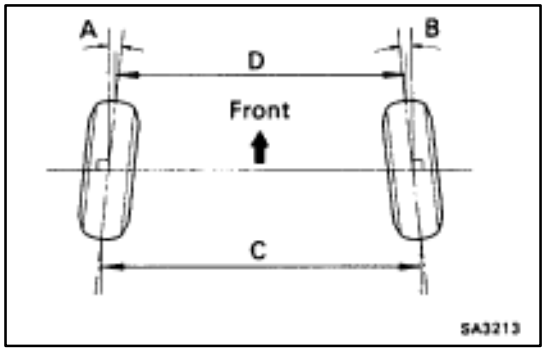
Cross caster:

45' or less

Steering axis inclination:

13° 05'±45'

HINT: Camber, caster and steering axis inclination are not adjustable. If measurements are not within specification, inspect the suspension parts for damaged and/or worn out parts and replace them as necessary.



REAR WHEEL ALIGNMENT

SA01S–01

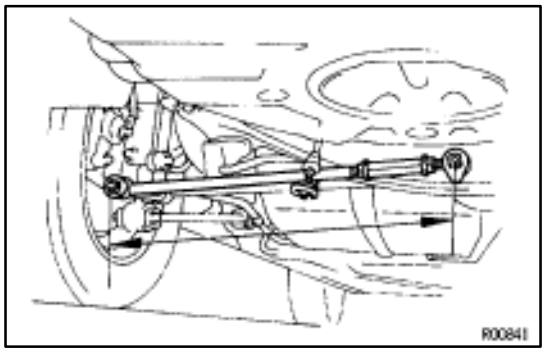
1. INSPECT TOE–IN

toe–in (total):

A+B 0.4°±0.2°

(C–D 4±2 mm, 0.16±0.08 in.)

If the toe–in is not within the specification, adjust it at the No.2 lower suspension arm.



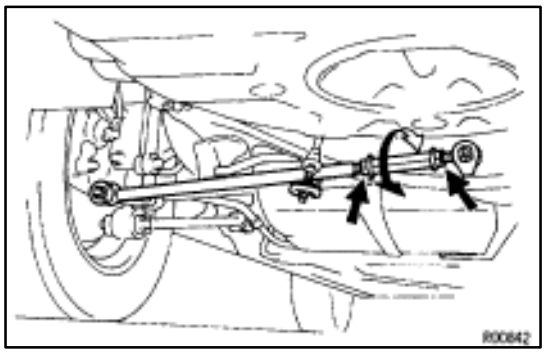
2. ADJUST TOE–IN

(a) Measure the length of the left and right No.2 lower suspension arm.

Left–right difference:

1 mm (0.04 in.) or less

If the left–right difference is greater than the specification, adjust the length.



(b) Loosen the lock nuts.

(c) Turn the left and right adjusting tube an equal amount to adjust toe–in.

HINT: One turn of the one side adjusting tube will adjust the toe–in about 0.6° (6.7 mm, 0.264 in.).

(d) Torque the lock nuts.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

3. INSPECT CAMBER

Camber:

–0°30'±45'

Cross camber:

45' or less

HINT: Camber is not adjustable, if measurement is not within specification, inspect and replace the suspension parts as necessary.

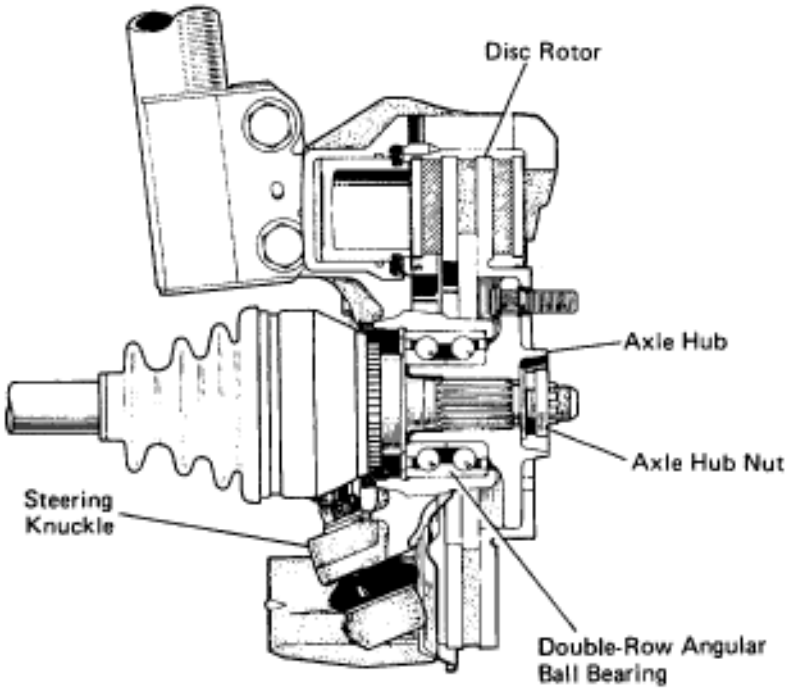
FRONT AXLE

SA01T–01

DESCRIPTION

The wheel bearings are double–row angular ball bearings combined with the oil seals having small rolling resistance and are free from maintenance.

The preload of the bearings cam be determined only tightening the axle hub nut at a specified torque, improving serviceability.



PREPARATION

SST (SPECIAL SERVICE TOOLS)

SA01U–01

SA01V–01

	09310–35010	Countershaft Bearing Replacer	Bearing removal Axle shaft installation
	09316–60010	Transmission & Transfer Bearing Replacer	Dust deflector Installation
	(09316–00010)	Replacer Pipe	
	(09316–00040)	Replacer "C"	
	09520–00031	Rear Axle Shaft Puller	
	09608–32010	Steering Knuckle Oil Seal Replacer	Bearing installation Axle hub installation Dust deflector installation
	09628–10011	Ball Joint Puller	Hub bolt removal
	09628–62011	Ball Joint Puller	
	09950–00020	Bearing Remover	

RECOMMENDED TOOLS

SA01W–01

	09905–00013	Snap Ring Pliers	

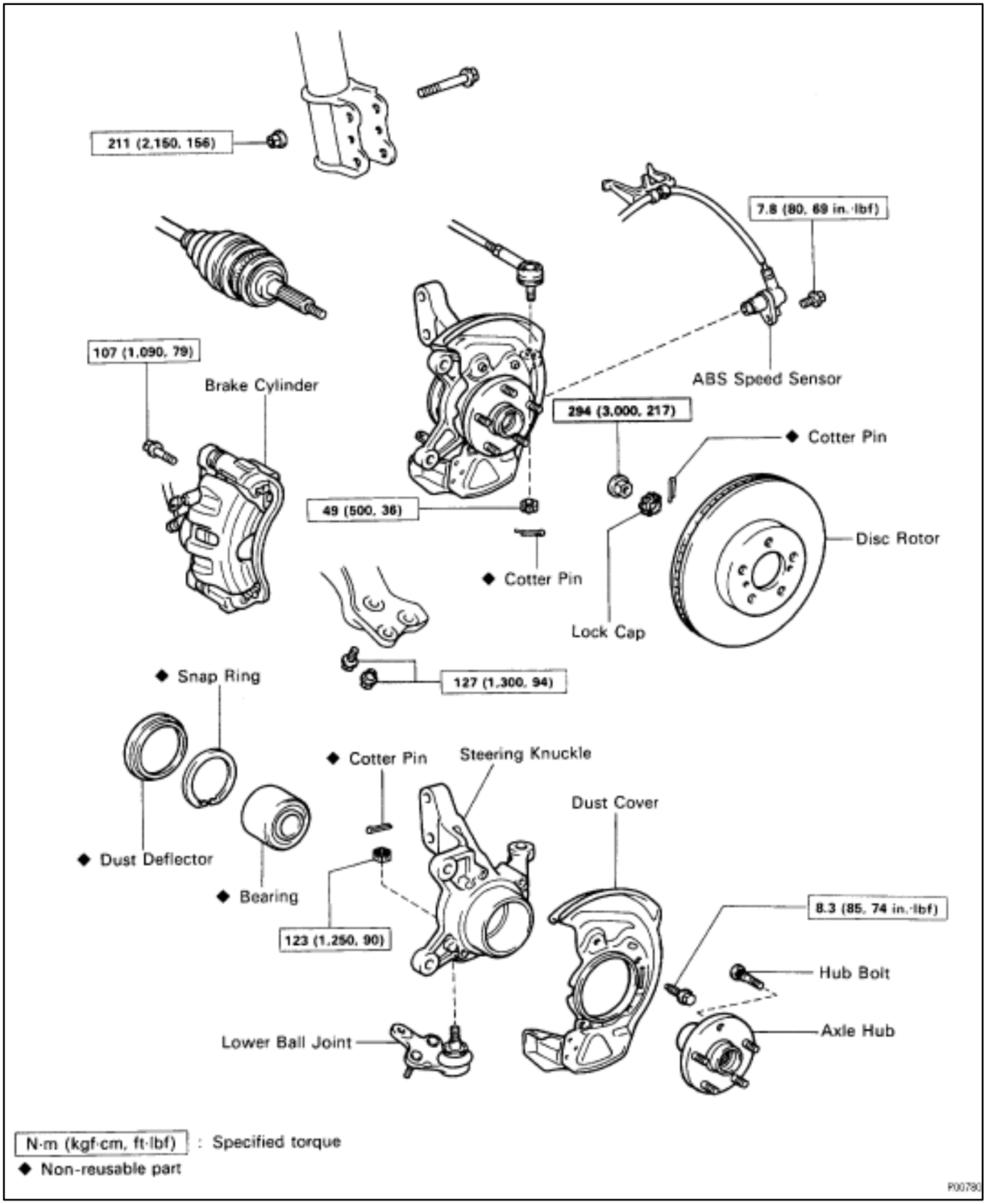
EQUIPMENT

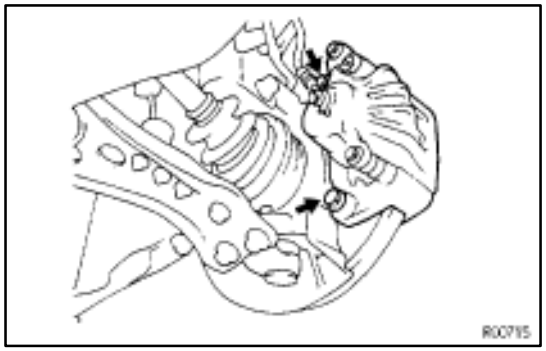
Dial indicator	
Torque wrench	

FRONT AXLE HUB

SA01X–01

COMPONENTS





STEERING KNUCKLE WITH AXLE HUB REMOVAL

SA01Y–02

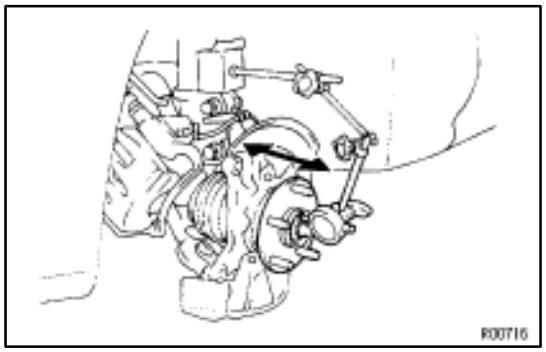
1. JACK UP VEHICLE, REMOVE FRONT WHEEL

2. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

(a) Remove the two brake cylinder set bolts.

(b) Hang up the brake cylinder using wire, etc.

(c) Remove the disc rotor.

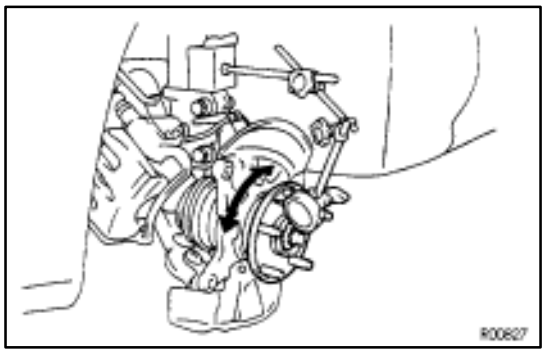


(d) Place the dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum:

0.05 mm (0.0020 in.)

If greater than the specified maximum, replace the bearing.

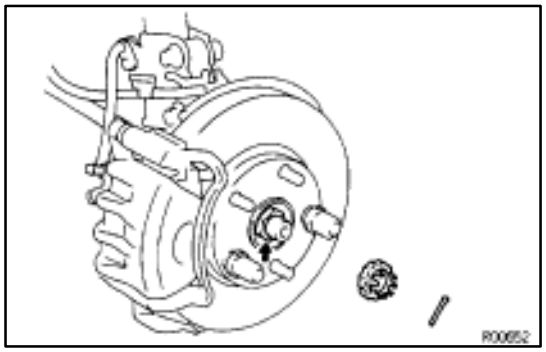


(e) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum:

0.05 mm (0.0020 in.)

If greater than the specified maximum, replace the axle hub.



3. REMOVE DRIVE SHAFT LOCK NUT

(a) Install the disc rotor and brake cylinder.

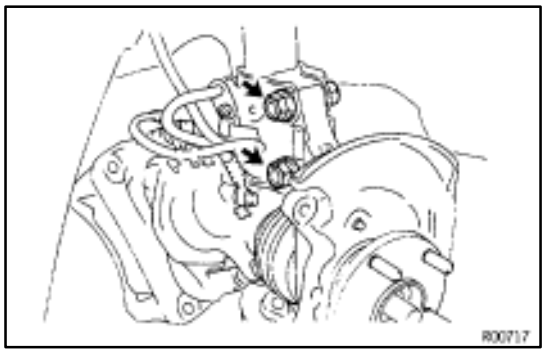
(b) Remove the cotter pin and lock cap.

(c) While applying the brakes, remove the nut.

(d) Remove the brake cylinder and disc rotor.

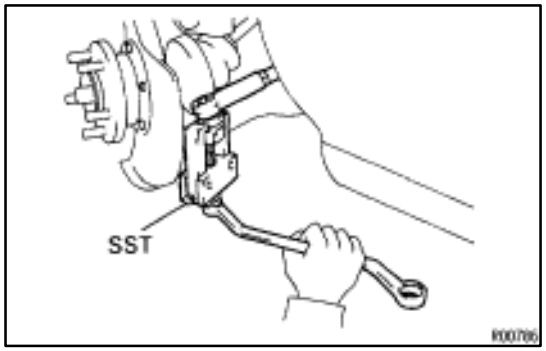
4. REMOVE ABS SPEED SENSOR

Remove the ABS speed sensor from the steering knuckle.



5. LOOSEN NUTS ON LOWER SIDE OF SHOCK ABSORBER

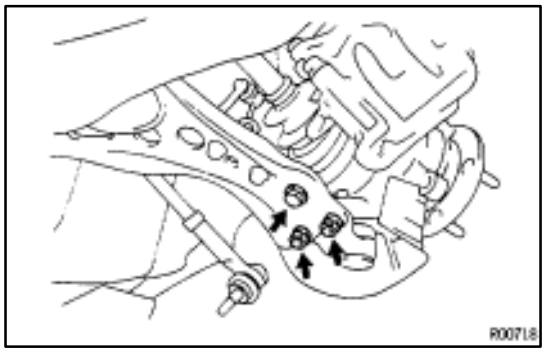
HINT: Do not remove the bolts.



6. DISCONNECT THE ROD END FROM STEERING KNUCKLE

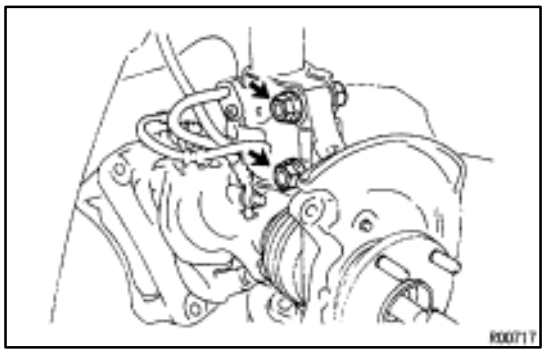
(a) Remove the cotter pin and remove the nut.

(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09628–62011



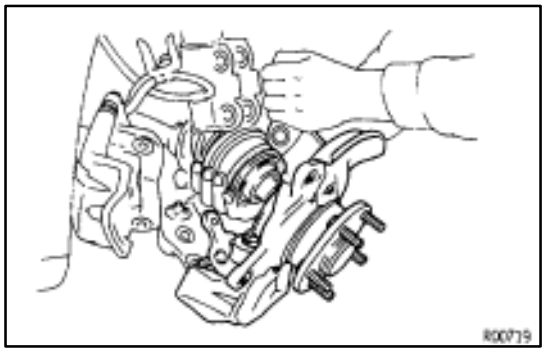
7. DISCONNECT LOWER BALL JOINT FROM LOWER ARM

Remove the bolt and the two nuts.

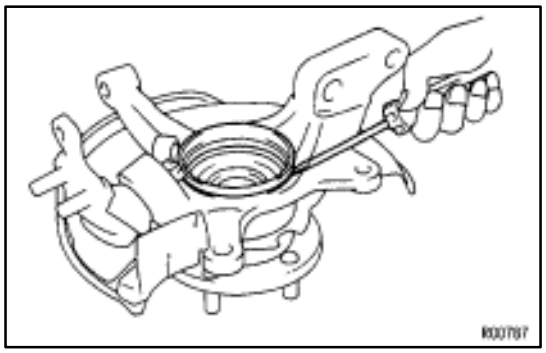


8. REMOVE STEERING KNUCKLE WITH AXLE HUB

(a) Remove the two nuts and bolts on lower side of the shock absorber.



(b) Remove the steering knuckle with axle hub.

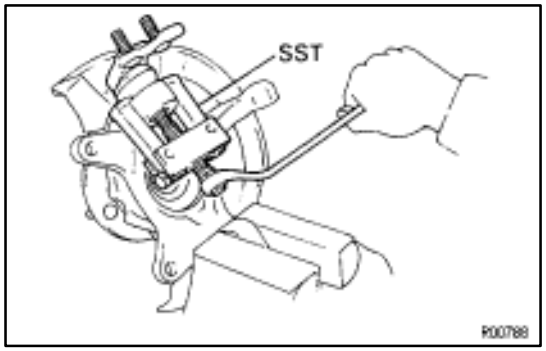


FRONT AXLE HUB DISASSEMBLY

SA01Z–01

1. REMOVE DUST DEFLECTOR

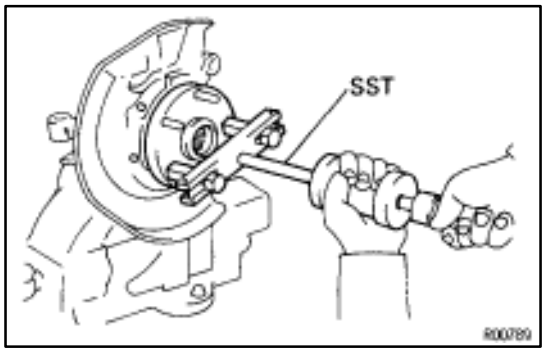
Using a screwdriver, remove the dust deflector.



2. REMOVE LOWER BALL JOINT

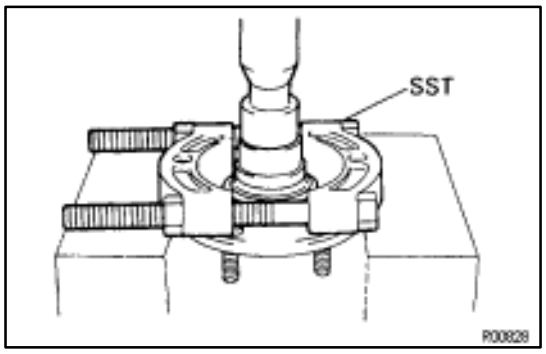
(a) Remove the cotter pin and nut.

(b) Using SST, remove the lower ball joint.
SST 09628–62011

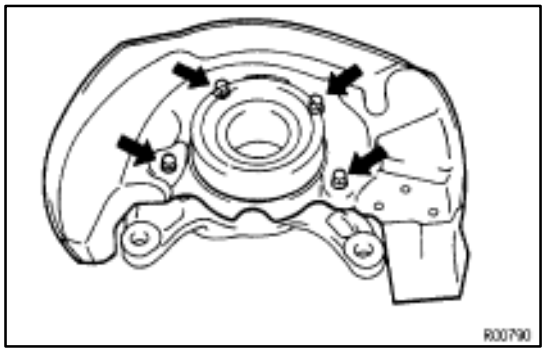


3. REMOVE AXLE HUB

(a) Using SST, remove the axle hub.
SST 09520–00031

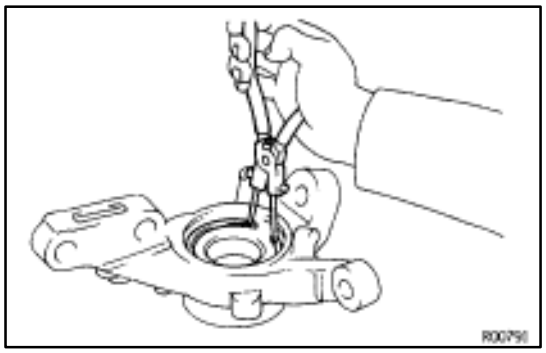


(b) Using SST and a press, remove the inner race (outside) from the axle hub.
SST 09950–00020



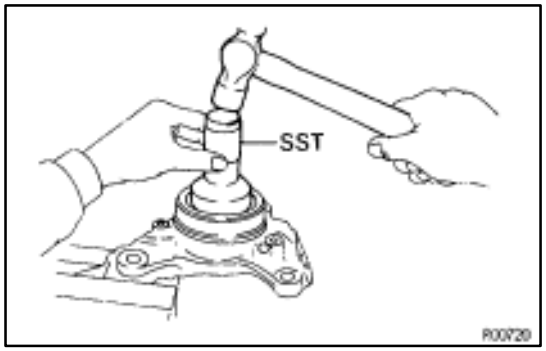
4. REMOVE DUST COVER

Remove the four bolts and dust cover.

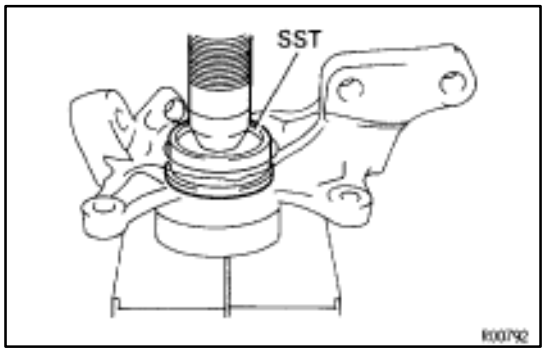


5. REMOVE BEARING FROM STEERING KNUCKLE

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



(b) Place the inner race on the outside of the bearing.
(c) Using SST and a hammer, remove the bearing.
SST 09310–35010

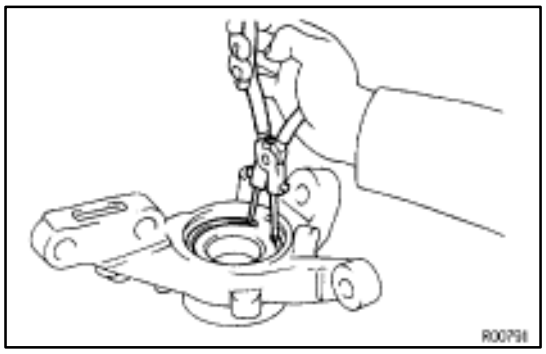


FRONT AXLE HUB ASSEMBLY

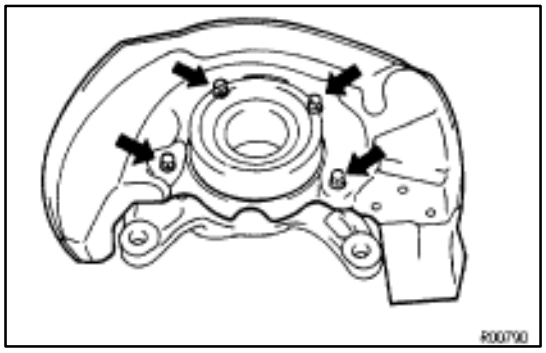
SA020–01

1. INSTALL BEARING

(a) Using SST and a press, install a new bearing to the steering knuckle.
SST 09608–32010

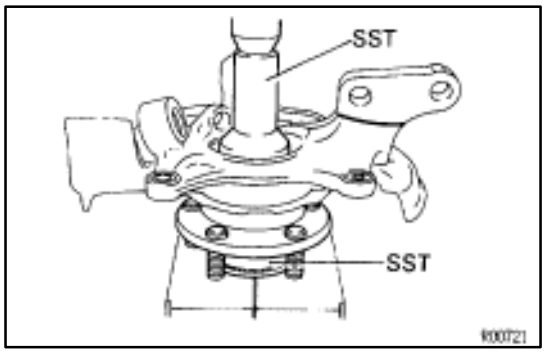


(b) Using snap ring pliers, install a new snap ring.



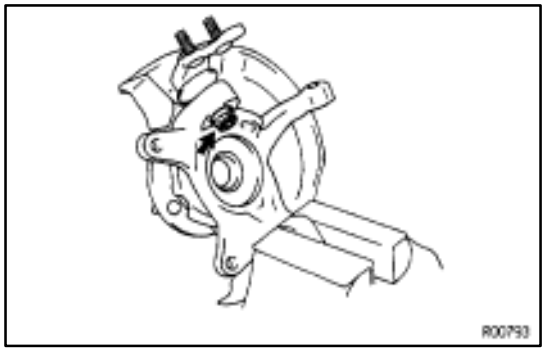
2. INSTALL DUST COVER

Place the dust cover and torque the four bolts.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



3. INSTALL FRONT AXLE HUB

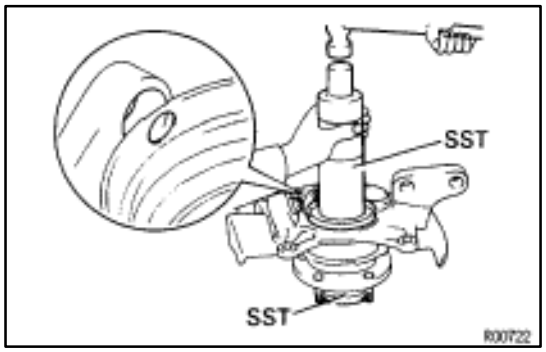
Using SST and a press, install the axle hub.
SST 09310–35010,09608–32010



4. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint and torque the nut.
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

(b) Install a new cotter pin.

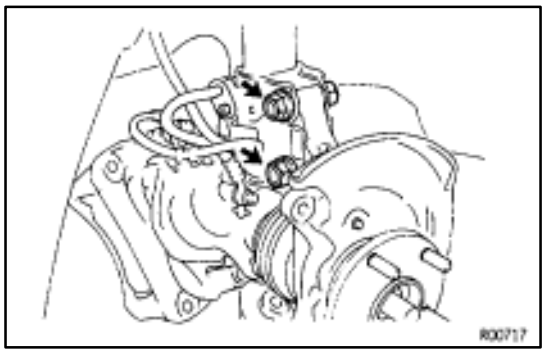


5. INSTALL DUST DEFLECTOR

Using SST and a hammer, install a new dust deflector.
SST 09316–60010(09316–00010,09316–00040)
09608–32010
HINT: Align the holes for the ABS speed sensor in the dust deflector and steering knuckle.

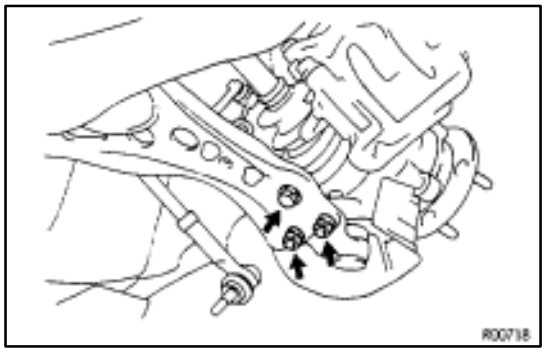
STEERING KNUCKLE WITH AXLE HUB INSTALLATION

SA040–02

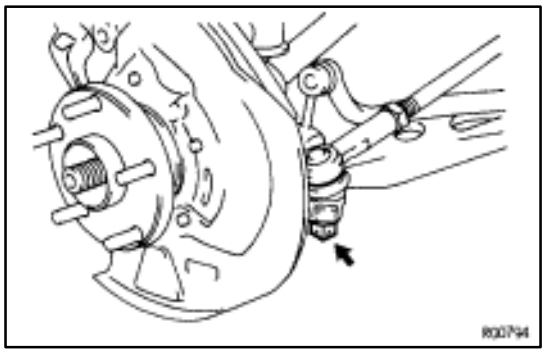


1. INSTALL STEERING KNUCKLE

(a) Place the steering knuckle and temporarily install the two bolts and nut on lower side of shock absorber.
HINT: Coat the threads of nuts with engine oil.



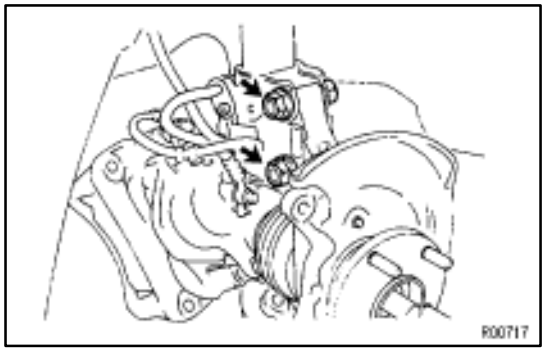
(b) Connect the lower ball joint to the lower arm and tighten the bolt and nuts.
Torque: 127 N·m (1,300 kgf·cm, 94 ft·lbf)



2. CONNECT TIE ROD END TO STEERING KNUCKLE

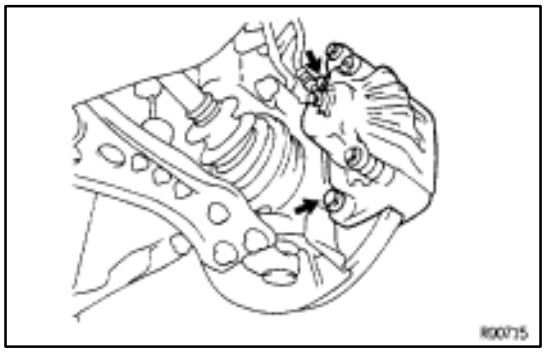
(a) Connect the tie rod end to the steering knuckle and tighten the nut.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

(b) Install a new cotter pin.

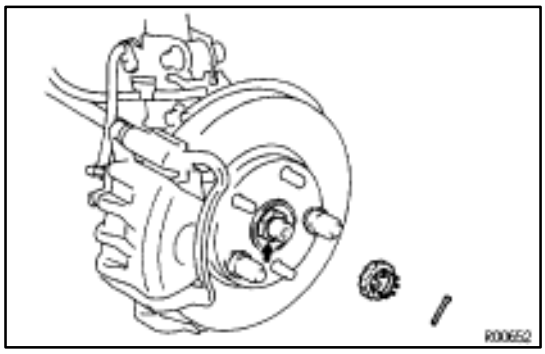


3. TORQUE BOLTS ON LOWER SIDE OF SHOCK ABSORBER
Torque: 211 N·m (2,150 kgf·cm, 156 ft·lbf)

4. INSTALL ABS SPEED SENSOR
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)



5. INSTALL FRONT BRAKE CYLINDER
(a) Install the disc rotor.
(b) Install the brake cylinder.
Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)



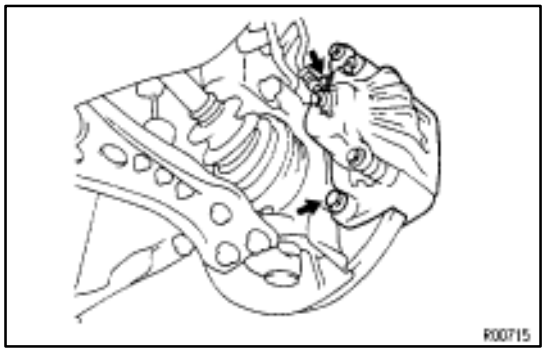
6. INSTALL DRIVE SHAFT LOCK NUT
(a) While applying the brakes, install the nut.
Torque: 294 N·m (3,000 kgf·cm, 217 ft·lbf)
(b) Install the lock cap and a new cotter pin.

7. INSTALL FRONT WHEEL AND LOWER VEHICLE
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

8. INSPECT FRONT WHEEL ALIGNMENT
(See page SA–3)

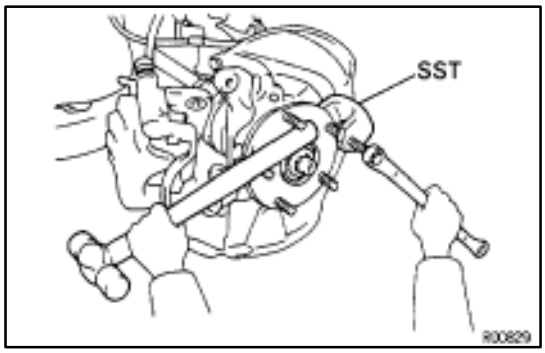
HUB BOLT REPLACEMENT

SA021–01

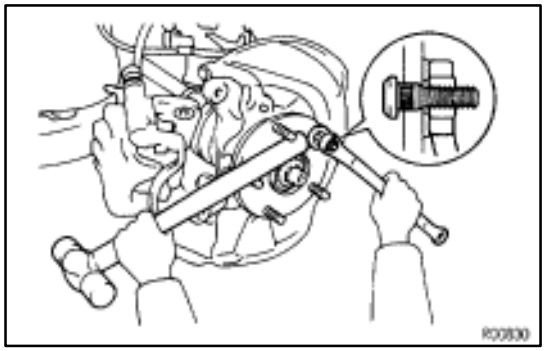


1. JACK UP VEHICLE AND REMOVE FRONT WHEEL

2. REMOVE FRONT BRAKE CYLINDER AND DISC ROTOR

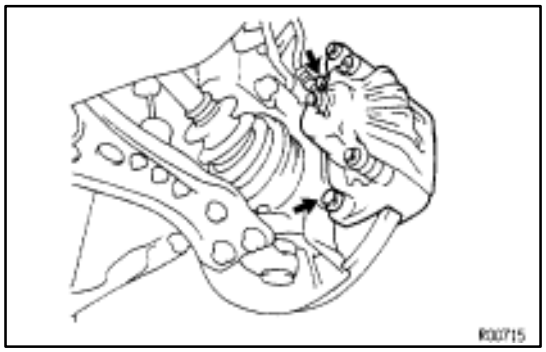


3. REMOVE HUB BOLT
Using SST, remove the hub bolt.
SST 09628–10011



4. INSTALL HUB BOLT

Install washer and nut to the hub bolt as shown in the illustration, and install the hub bolt with torquing the nut.



5. INSTALL FRONT BRAKE DISC ROTOR AND BRAKE CYLINDER

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

6. INSTALL FRONT WHEEL AND LOWER VEHICLE

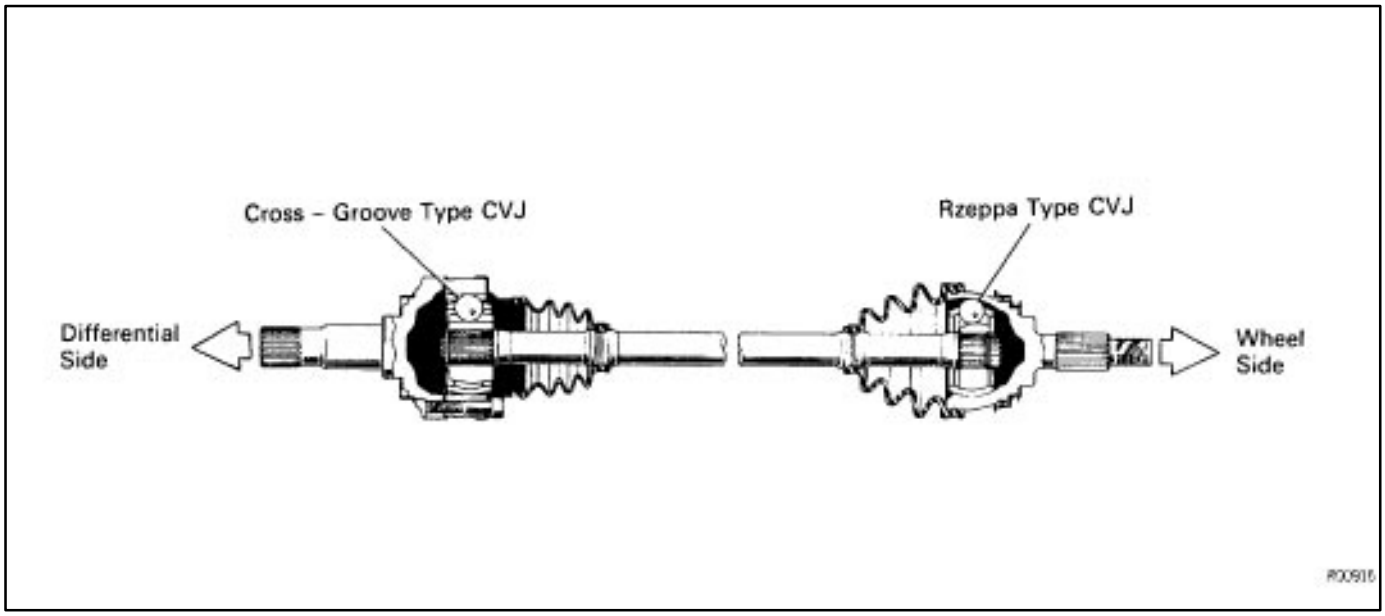
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

FRONT DRIVE SHAFT

SA022–01

DESCRIPTION

The drive shaft has a cross–groove type CVJ (Constant Velocity Joint) on the differential side and Rzeppa type CVJ on the wheel side.



PREPARATION

SA023–01

SST (SPECIAL SERVICE TOOLS)

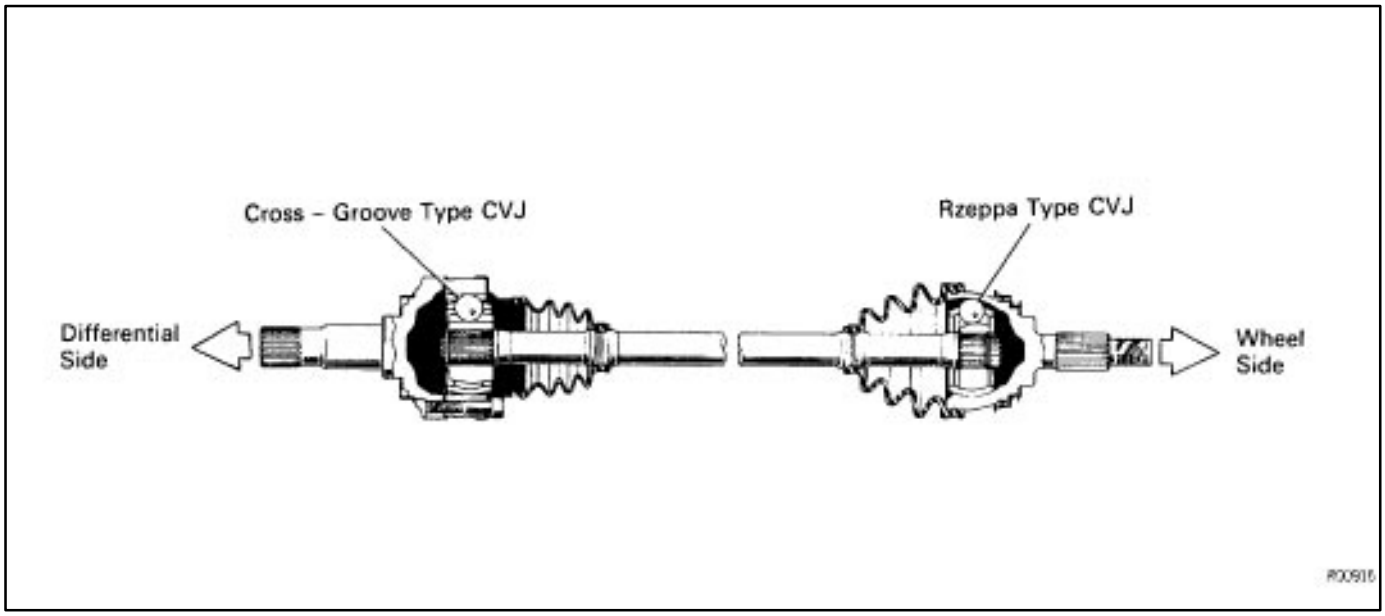
	09608–16041 Front Hub Bearing Adjusting Tool	
	(09608–02020) Bolt & Nut	
	(09608–02040) Retainer	
	09628–62011 Ball Joint Puller	Tie rod end
	09726–10010 Lower Suspension Arm Bushing Remover & Replacer	
	(09726–00030) Spacer	Drive shaft inboard joint

FRONT DRIVE SHAFT

SA022–01

DESCRIPTION

The drive shaft has a cross–groove type CVJ (Constant Velocity Joint) on the differential side and Rzeppa type CVJ on the wheel side.



PREPARATION

SA023–01

SST (SPECIAL SERVICE TOOLS)

	09608–16041 Front Hub Bearing Adjusting Tool	
	(09608–02020) Bolt & Nut	
	(09608–02040) Retainer	
	09628–62011 Ball Joint Puller	Tie rod end
	09726–10010 Lower Suspension Arm Bushing Remover & Replacer	
	(09726–00030) Spacer	Drive shaft inboard joint

	09923–00020 Hexagon 8 mm Wrench	
	09950–00020 Bearing Remover	Center drive shaft dust cover

RECOMMENDED TOOLS

SA024–01

	09905–00012 Snap Ring No. 1 Expander	For removing and installing snap ring

EQUIPMENT

SA025–01

Torque wrench	

LUBRICANT

SA027–02

Item	Capacity	Classification
Outboard joint grease	120–130 g (4.2–4.6 oz.)	
Inboard joint grease	133–153 g (4.7–5.4 oz.)	

SSM (SPECIAL SERVICE MATERIALS)

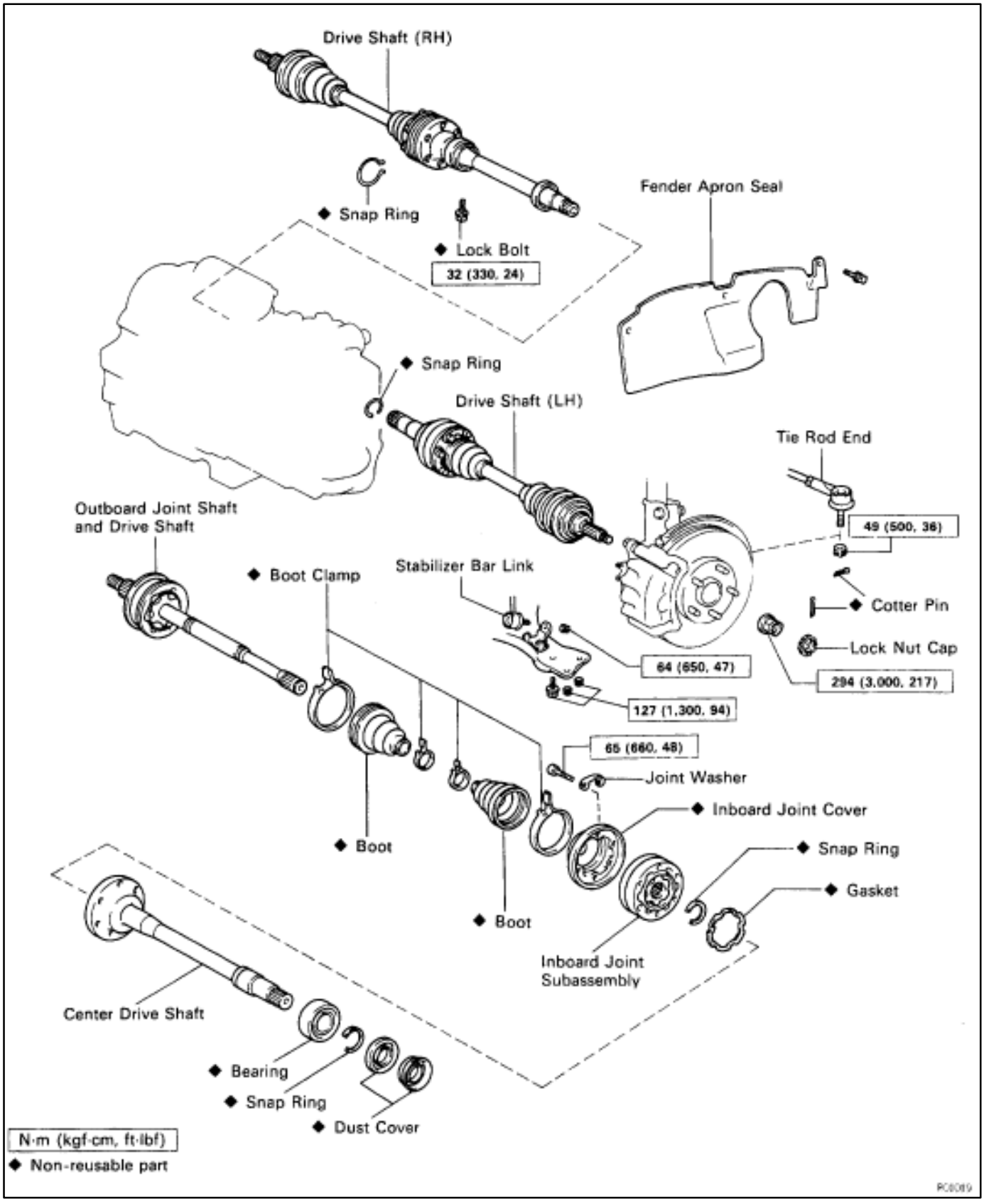
SA026–02

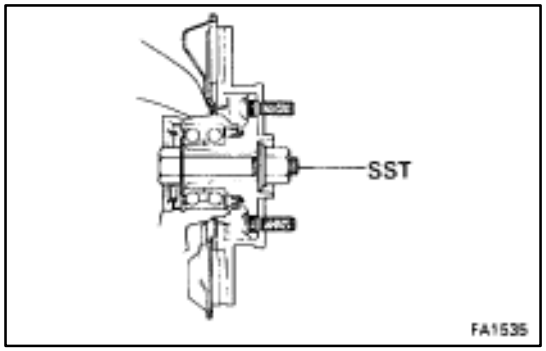
08826–00801	Seal Packing 1121, Three bond 1121, or equivalent	Drive shaft inboard joint cover

FRONT DRIVE SHAFT

SA028–01

COMPONENTS

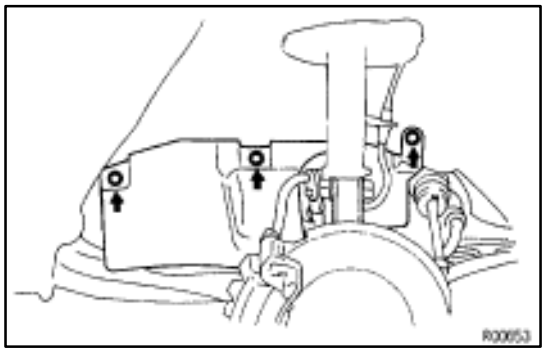




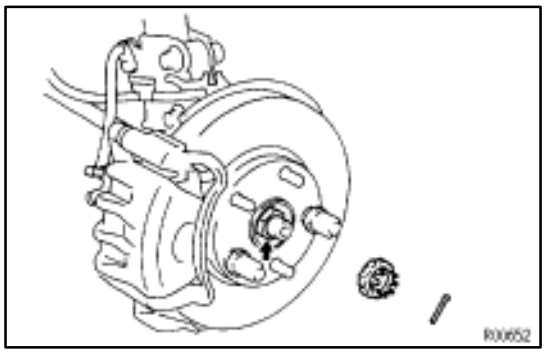
FRONT DRIVE SHAFT REMOVAL

SA029–01

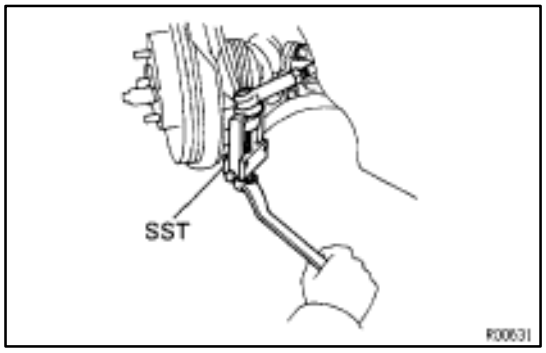
NOTICE: The hub bearing could be damaged if it is subjected to the vehicle weight, such as when moving the vehicle with the drive shaft removed.
Therefore, if it is absolutely necessary to place the vehicle weight on the hub bearing, first support it with SST.
SST 09608–16041(09608–02020,09608–02040)



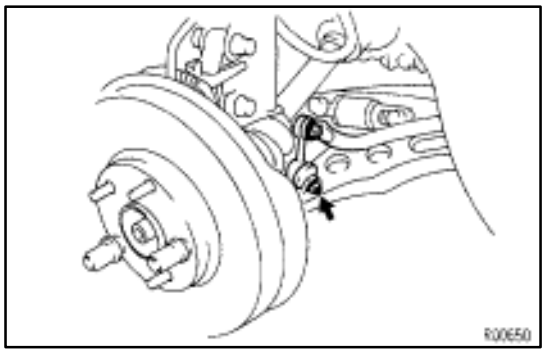
1. REMOVE FRONT FENDER APRON SEAL



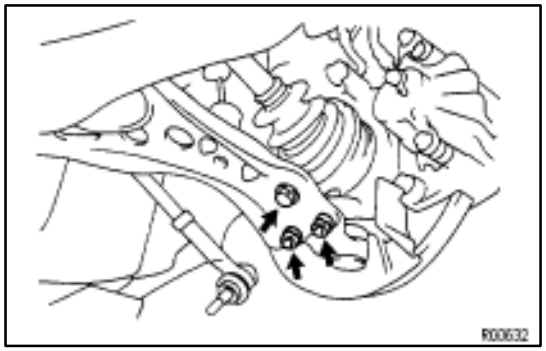
2. REMOVE COTTER PIN, LOCK NUT CAP AND LOCK NUT
(a) Remove the cotter pin and lock nut cap.
(b) Loosen the bearing lock nut while depressing the brake pedal.



3. DRAIN OUT GEAR OIL FLUID
4. DISCONNECT TIE ROD END FROM STEERING KNUCKLE
(a) Remove the cotter pin and nut from the tie rod end.
(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09628–62011



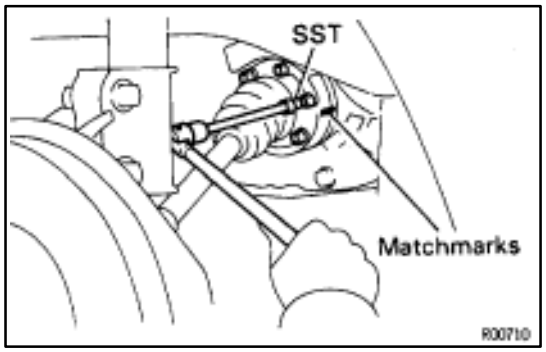
5. DISCONNECT STABILIZER BAR LINK FROM LOWER ARM
Remove the nut and disconnect the stabilizer bar link from lower arm.



6. DISCONNECT STEERING KNUCKLE FROM LOWER BALL JOINT

(a) Remove the bolt and two nuts.

(b) Disconnect the steering knuckle from lower ball joint.



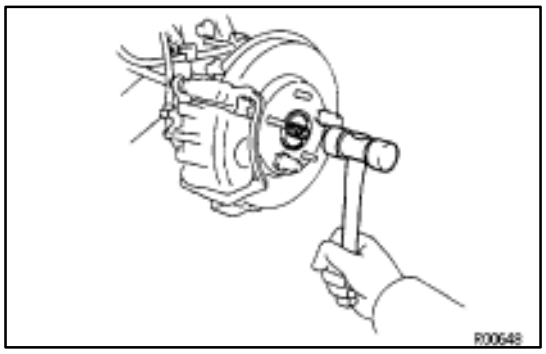
7. LOOSEN SIX BOLTS HOLDING DRIVE SHAFT TO DIFFERENTIAL SIDE GEAR SHAFT OR CENTER DRIVE SHAFT

(a) Place matchmarks on the drive shaft and side gear shaft or center drive shaft.

NOTICE: Do not use a punch to mark the matchmarks. Use paint, etc.

(b) Using SST, loosen the six hexagon bolts while depressing the brake pedal.

SST 09923–00020

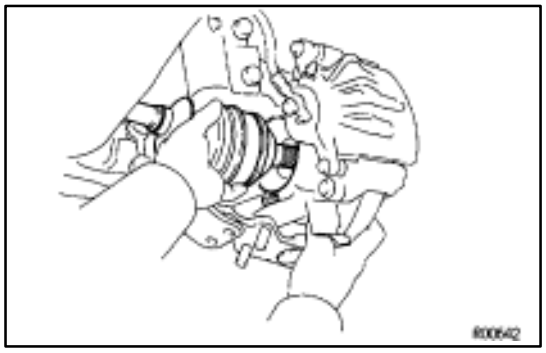


HINT: Do not remove the bolts, finger tighten them not to drop down the drive shaft.

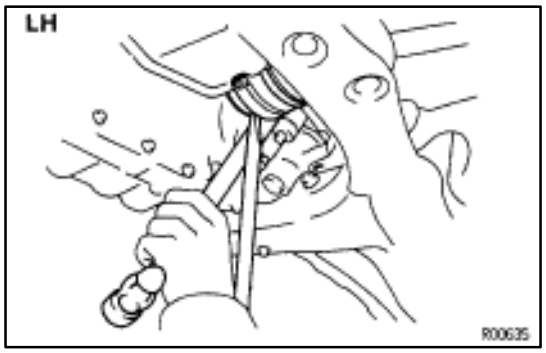
8. DISCONNECT DRIVE SHAFT FROM AXLE HUB

(a) Using a plastic hammer, disconnect the drive shaft from the axle hub.

NOTICE: Cover the drive shaft boot with cloth to protect it from damage.

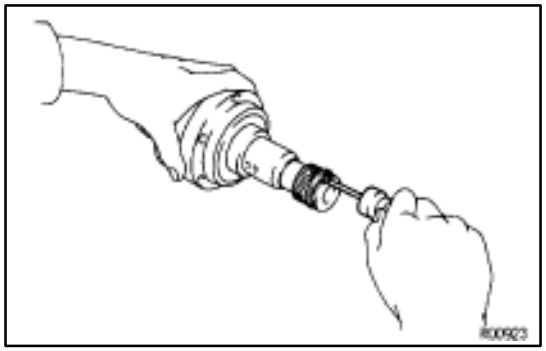


(b) Push the front axle hub toward the outside of the vehicle, and separate the drive shaft from the axle hub.



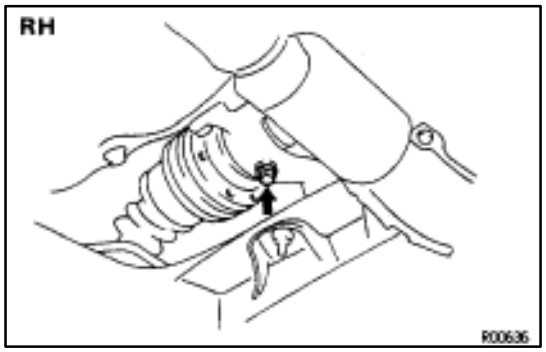
9. REMOVE LH DRIVE SHAFT

(a) Using hub nut wrench and hammer handle or an equivalent, pull out the drive shaft as shown.

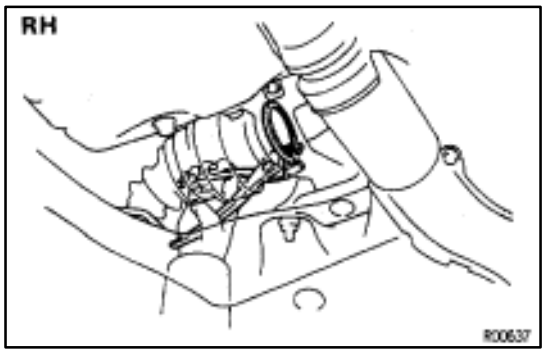


(b) Using a screwdriver, remove the snap ring.

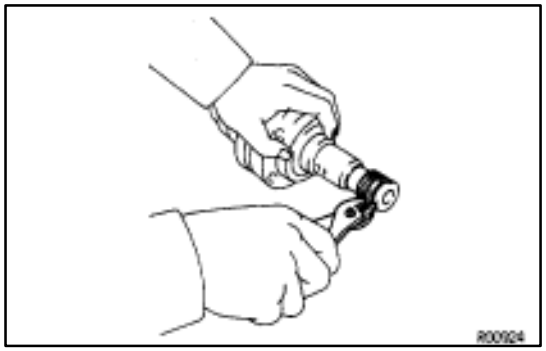
10. REMOVE RH DRIVE SHAFT



(a) Remove the bearing lock bolt.



(b) Using pliers, remove the snap ring, and pull out the drive shaft.

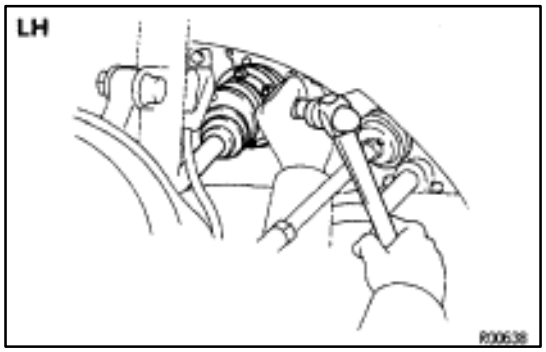


FRONT DRIVE SHAFT INSTALLATION

SA02A–01

1. INSTALL LH DRIVE SHAFT

(a) Using pliers, install a new snap ring.



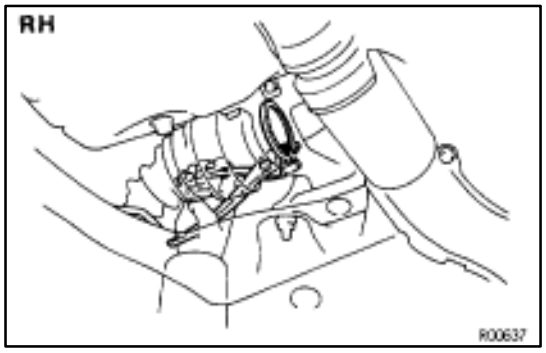
(b) Coat gear oil to the side gear shaft and differential case sliding surface.

(c) Using a brass bar and hammer, tap in the drive shaft until it makes contact with the pinion shaft.
HINT:
- Before installing the drive shaft, set the snap ring opening side facing downward.
- Whether or not the side gear shaft is making contact with the pinion shaft can be known by the sound or feeling when driving it in.

2. CHECK INSTALLATION OF LH DRIVE SHAFT

(a) Check that there is 2–3 mm (0.08–0.12 in.) of play in axial direction.

(b) Check that the drive shaft will not come out by trying to pull it completely out by hand.

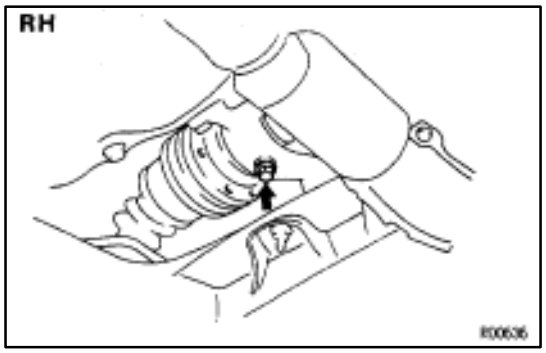


3. INSTALL RH DRIVE SHAFT

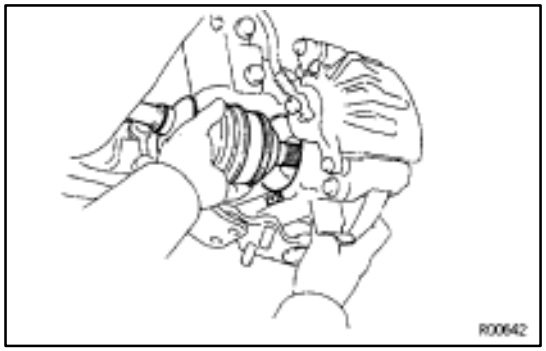
(a) Coat gear oil to the inboard joint and differential sliding surface.

(b) Install the drive shaft to the transaxle through the bearing bracket.
NOTICE: Do not damage the oil seal lip.

(c) Using pliers, install a new snap ring.



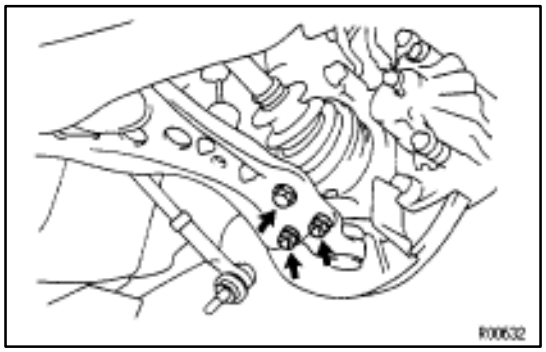
(d) Install a new bearing lock bolt and tighten it.
Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)



4. CONNECT DRIVE SHAFT TO AXLE HUB

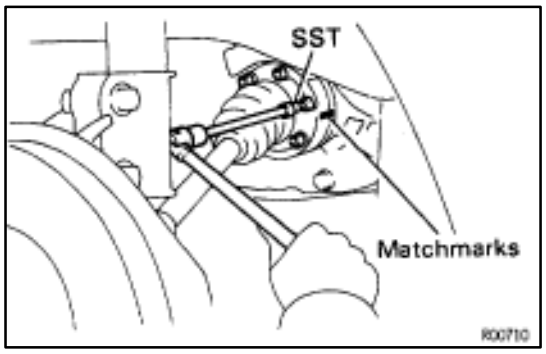
Install the outboard joint side of the drive shaft to the axle hub.

NOTICE: Do not damage the boot.



5. CONNECT STEERING KNUCKLE TO LOWER ARM

Torque: 127 N·m (1,300 kgf·cm, 94 ft·lbf)

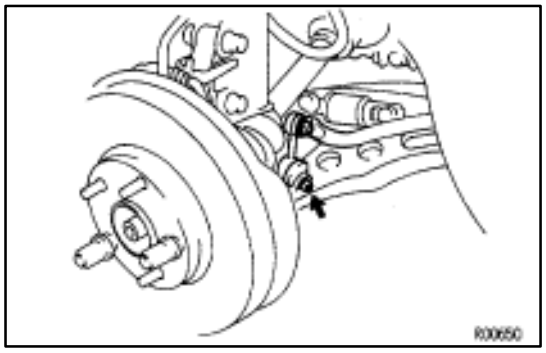


6. TIGHTEN SIX HEXAGON BOLTS

Using SST, tighten the six hexagon bolts while depressing the brake pedal.

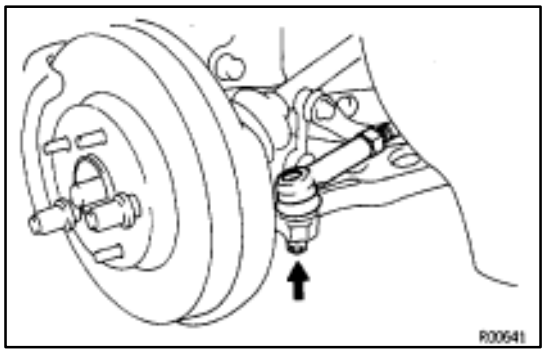
SST 09043–88010

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



7. CONNECT STABILIZER BAR LINK TO LOWER ARM

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



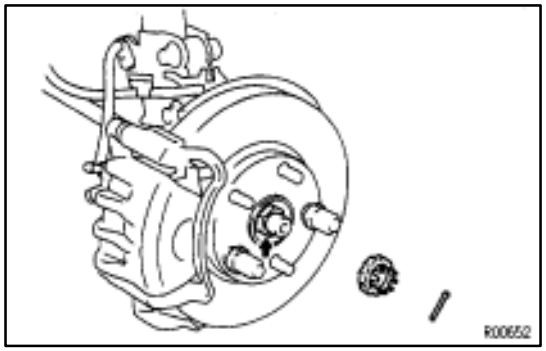
8. CONNECT TIE ROD END TO STEERING KNUCKLE

(a) Connect the tie rod end to the steering knuckle and torque the nut.

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

(b) Install a new cotter pin.

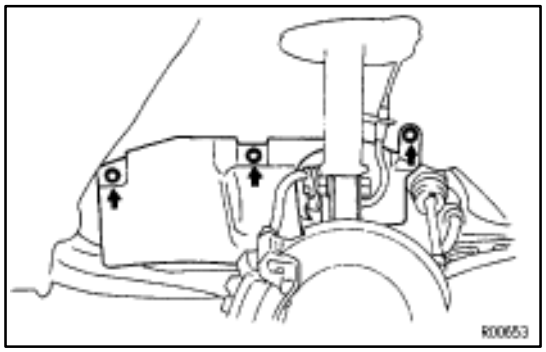
HINT: If the cotter pin hole does not line up, correct by tightening the nut by the smallest amount possible.



9. INSTALL BEARING LOCK NUT, LOCK NUT CAP AND NEW COTTER PIN

(a) Install and torque the bearing lock nut.
Torque: 294 N·m (3,000 kgf·cm, 217 ft·lbf)

(b) Install the lock nut cap and secure it with a new cotter pin.



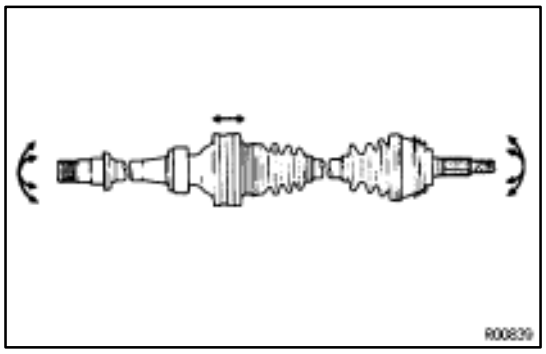
10. FILL TRANSAXLE WITH GEAR OIL

11. INSTALL FRONT FENDER APRON SEAL

12. CHECK FRONT WHEEL ALIGNMENT

FRONT DRIVE SHAFT DISASSEMBLY

SA044–01



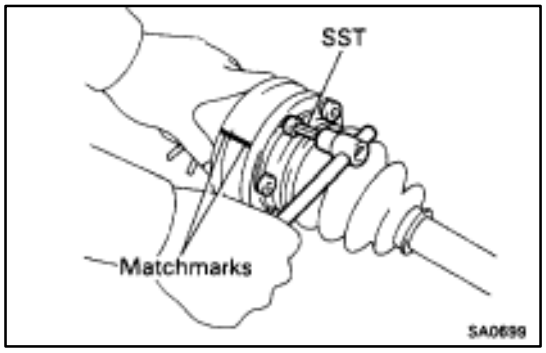
1. CHECK DRIVE SHAFT

(a) Check to see that there is no play in the inboard and outboard joints.

(b) Check to see that the inboard joint slides smoothly in the thrust direction.

(c) Check to see that there is no remarkable play in the radial direction of the in board joint.

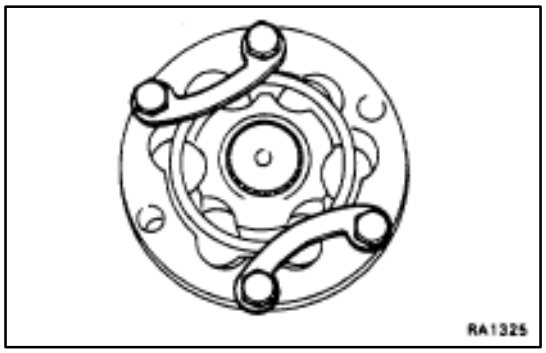
(d) Check the boot for damage.



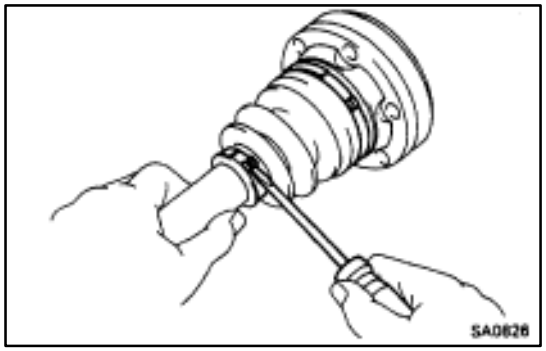
2. DISCONNECT CENTER DRIVE SHAFT OR SIDE GEAR SHAFT

(a) Using SST, remove the six bolts and three washers, and disconnect the center drive shaft or side gear shaft from the drive shaft.
SST 09923–00020
NOTICE: Do not compress the inboard boot.

(b) Remove the joint end cover gasket from the drive shaft.



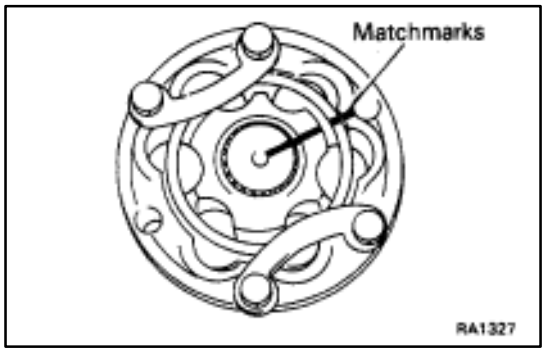
(c) Use bolts, nuts and washers to keep the inboard joint together.
NOTICE: Tighten the bolts by hand to avoid scratching the flange surface.



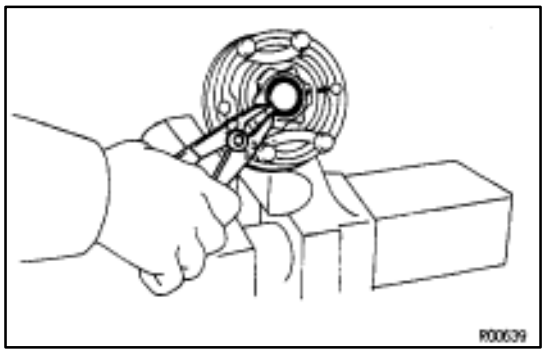
3. REMOVE INBOARD AND OUTBOARD JOINT BOOT CLAMPS

Using a screwdriver, remove the inboard and outboard joint clamps.

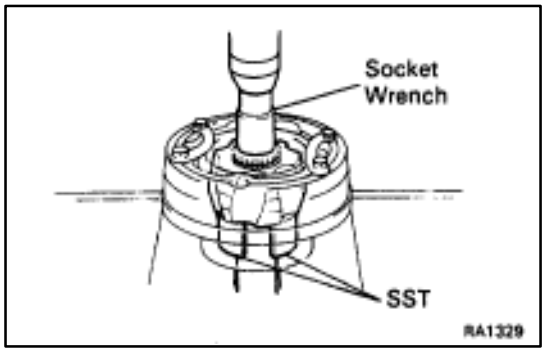
4. DISASSEMBLY INBOARD JOINT



(a) Place matchmarks on the inboard joint and drive shaft.

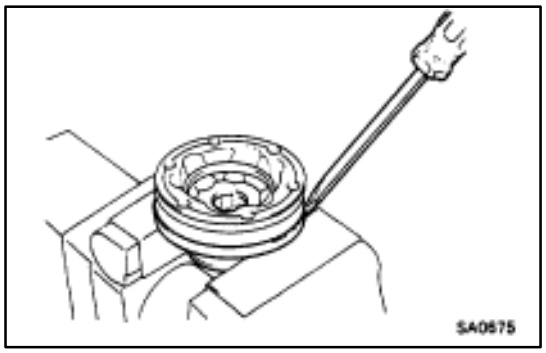


(b) Using a snap ring expander remove the snap ring.



(c) Using SST, a socket wrench and a press, remove the inboard joint from the drive shaft.
SST 09726–10010(09726–00030)

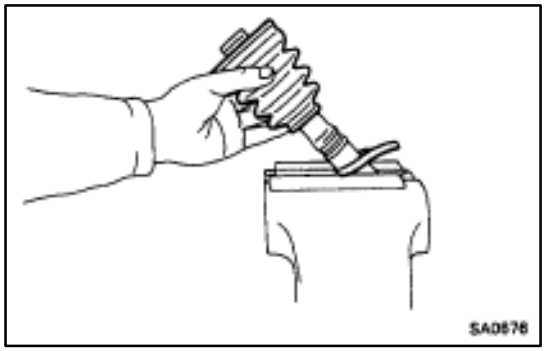
(d) Remove the bolts, nuts and washers.



(e) Using a screw driver and a hammer, pry around the whole perimeter of the inboard joint cover.

(f) Using a screw driver, remove the inboard joint from inboard joint cover.

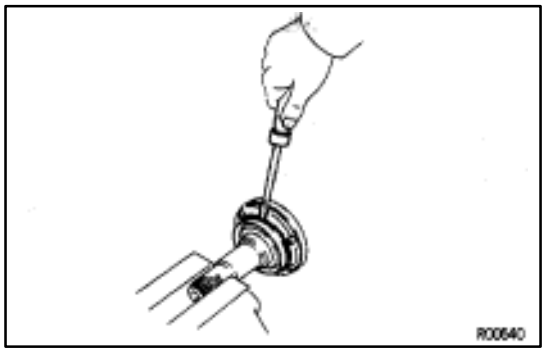
NOTICE: When lifting the inboard joint, hold onto the inner race and outer race.



5. REMOVE BOOTS

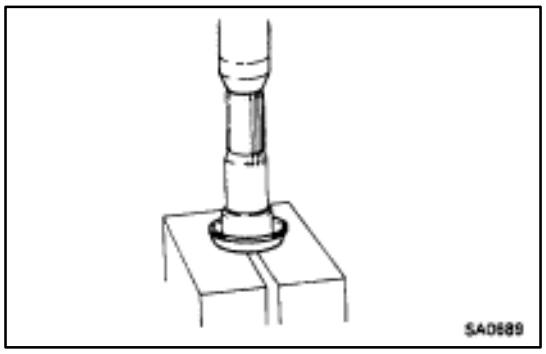
(a) Remove the inboard joint boot and outboard joint boot.

(b) Check the inside and outside of the boots for damage.



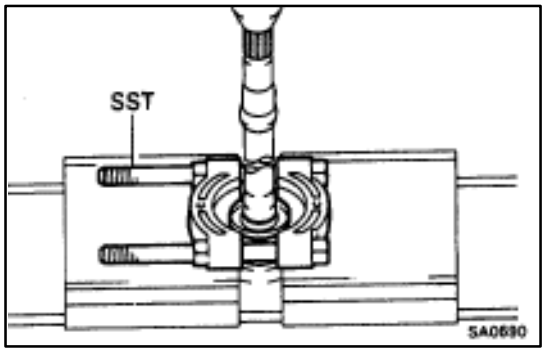
6. (LH DRIVE SHAFT)
DISASSEMBLE SIDE GEAR SHAFT

Using a screwdriver, remove the dust cover.

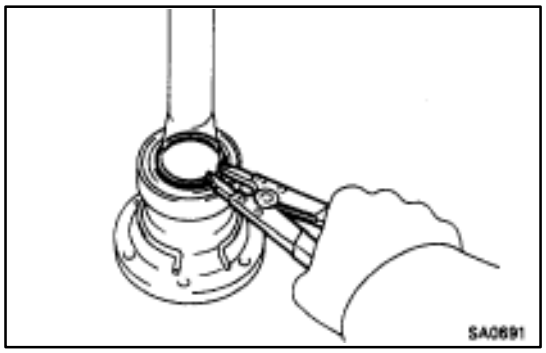


7. (RH DRIVE SHAFT)
DISASSEMBLE CENTER DRIVE SHAFT

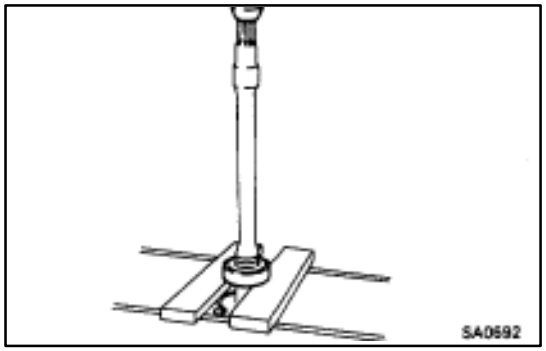
(a) Using a press, press out the transaxle side dust cover.



(b) Using SST and a press, press out the drive shaft side dust cover.
SST 09950–00020



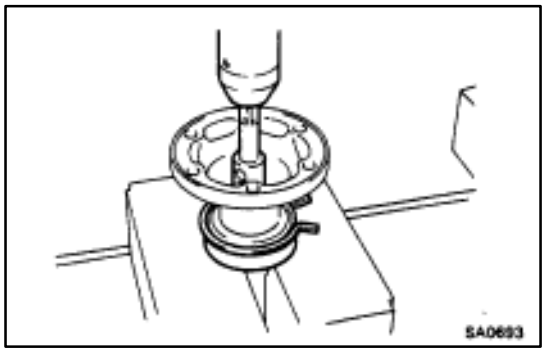
(c) Using snap ring pliers, remove the snap ring.



(d) Using a press, press out the bearing.
(e) Remove the snap ring.

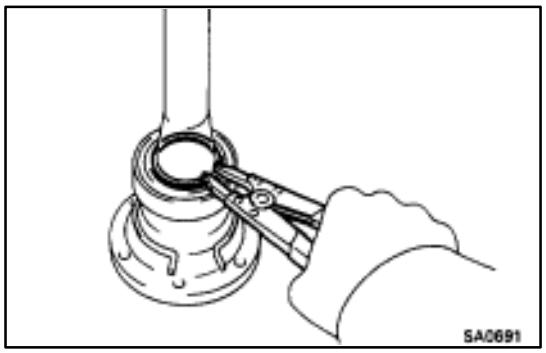
FRONT DRIVE SHAFT ASSEMBLY

SA045–01

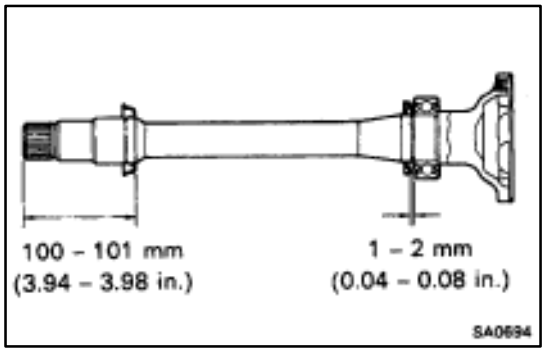


1. (RH DRIVE SHAFT)
ASSEMBLE CENTER DRIVE SHAFT

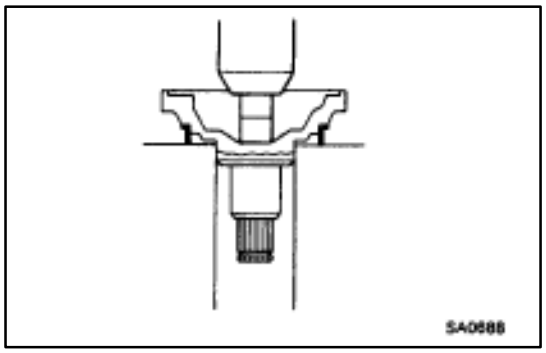
(a) Install a new snap ring to the center drive shaft.
(b) Using a press and extension bar, press in a new bearing.



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

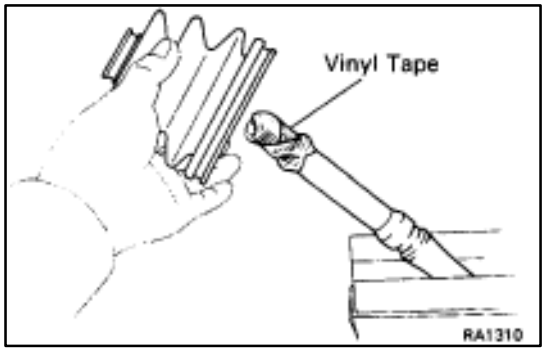


(d) Using a press, press in a new drive shaft side dust cover.
HINT: The clearance between the dust cover and the bearing should be kept in the range shown in the illustration.
(e) Using a press, press in a new transaxle side dust cover.



2. (LH DRIVE SHAFT)
ASSEMBLE SIDE GEAR SHAFT

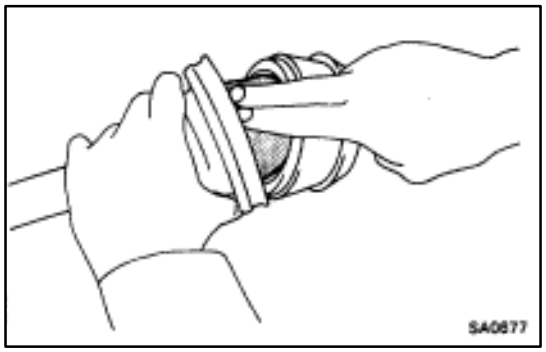
Using a press, press in a new dust cover.



3. INSTALL OUTBOARD JOINT BOOT AND NEW BOOT CLAMP

HINT:

- Before installing the boot, wrap vinyl tape around the spline of the shaft to prevent damaging the boot.
- Temporarily install the boot and new clamps to the outboard joint.



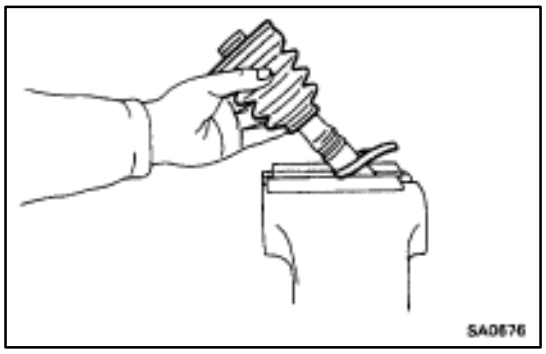
4. ASSEMBLE BOOT TO OUTBOARD JOINT

Before assembling the boot, pack in grease.

HINT: Use the grease supplied in the boot kit.

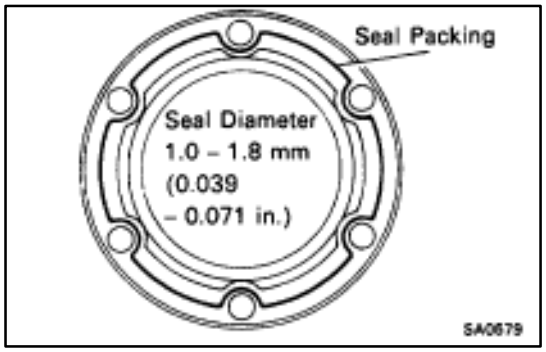
Grease capacity:

120–130 g (4.2–4.6 oz.)



5. INSTALL NEW BOOT CLAMPS AND INBOARD JOINT BOOT

Temporarily install the two new boot clamps and inboard joint boot.



6. ASSEMBLE NEW INBOARD JOINT COVER

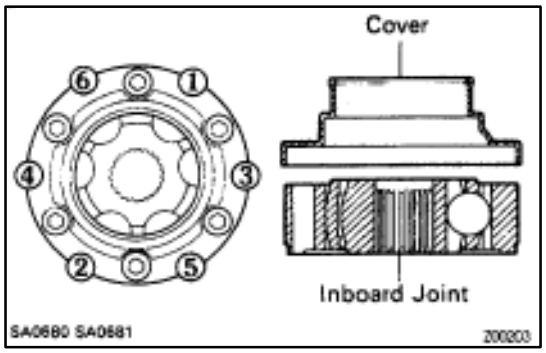
(a) Clean contacting surfaces of any residual packing material using cleaner.

(b) Apply seal packing to the inboard joint cover as shown in the illustration.

Seal packing:

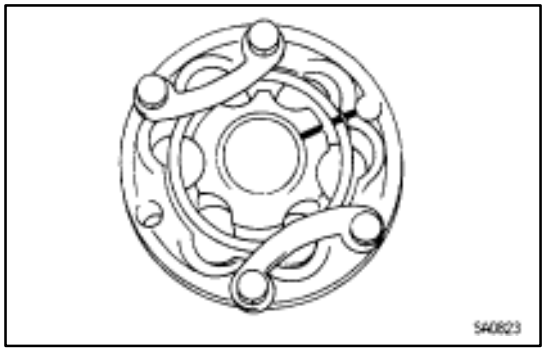
Part No. 08826–00801, THREE BOND 1122 or equivalent

HINT: Avoid applying an excess amount to the surface.

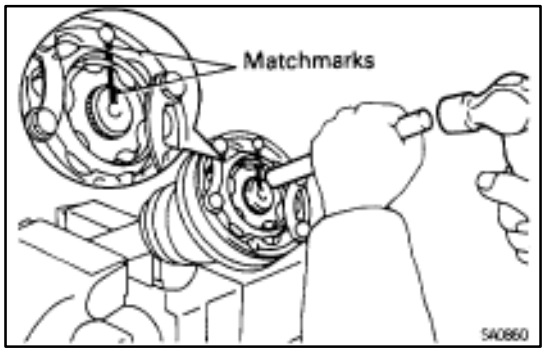


(c) Align the bolt holes of the cover with those of the inboard joint, then insert the hexagon bolts.

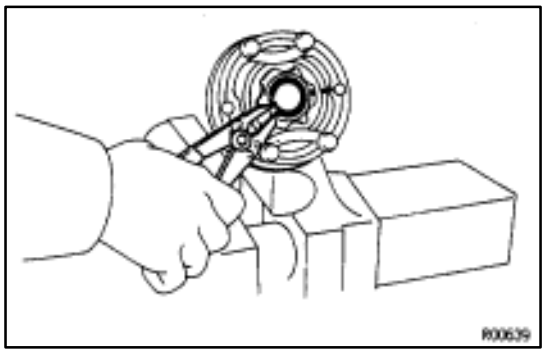
(d) Use a plastic hammer to tap the rim of the inboard joint cover into place. Do this in the order shown, and repeat several times.



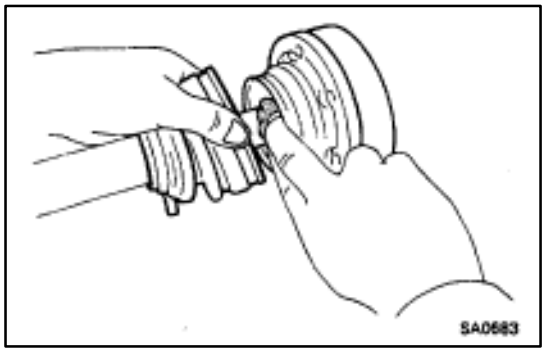
(e) Use bolts, nuts and washers to keep the inboard joint together.
NOTICE: Tighten the bolts by hand to avoid scratching the flange surface.



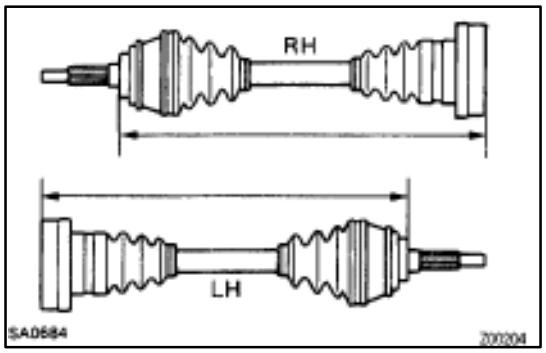
7. ASSEMBLE INBOARD JOINT
(a) Align the matchmarks placed before disassembly.
(b) Using a brass bar and hammer, tap the inboard joint onto the drive shaft.
NOTICE: Check that the brass bar is touching the inner race, and not the cage.



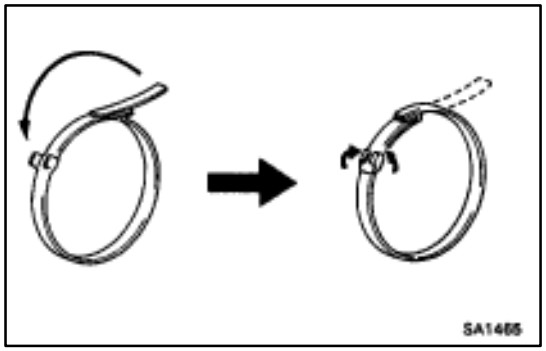
(c) Using a snap ring expander, install a new snap ring.
NOTICE: Work carefully so that the outer race does not come off.



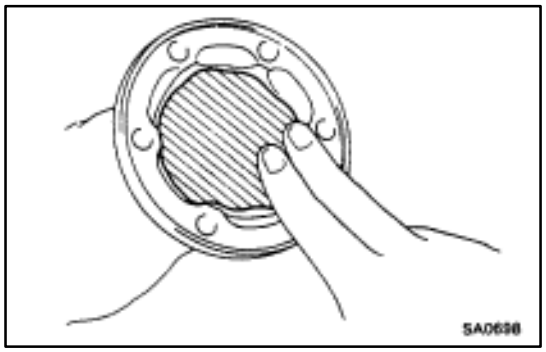
8. ASSEMBLE INBOARD JOINT BOOT TO INBOARD JOINT
Pack in grease to the inboard tulip and boot.
HINT: Use the grease supplied in the boot kit.
Grease capacity:
90–100 g (3.2–3.5 oz.)



9. ASSEMBLE BOOT CLAMPS TO BOTH BOOTS
(a) Be sure the boots are on the shaft groove.
(b) Insure that the boots are not stretched or contracted when the drive shaft is at standard length.
Drive shaft standard length:
LH 456.0 mm (17.953 in.)
RH 455.9 mm (17.949 in.)



(c) Bend the band and lock it as shown.



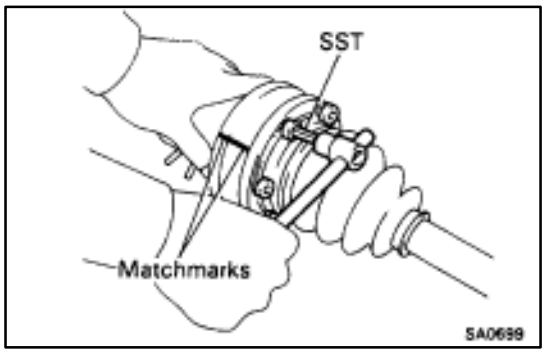
10. PACK IN GREASE TO CENTER DRIVE SHAFT OR SIDE GEAR SHAFT

Pack grease into the center drive shaft or side gear shaft.

Grease capacity:

43–53 g (1.5–1.9 oz.)

HINT: Use the grease supplied in the boot kit.



11. CONNECT DRIVE SHAFT AND CENTER DRIVE SHAFT OR SIDE GEAR SHAFT

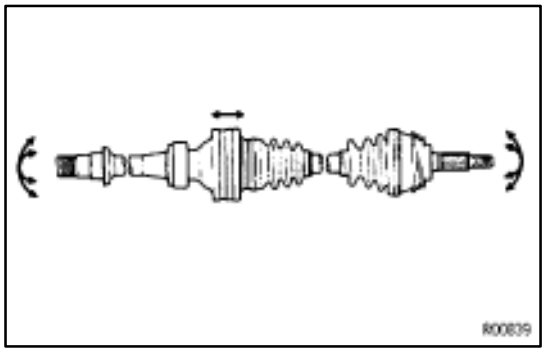
(a) Remove the bolts, nuts and washers.

(b) Align the matchmarks on the drive shaft and center drive shaft or side gear shaft.

(c) Place a new gasket on the inboard joint.

(d) Install the center drive shaft or side gear shaft to the drive shaft.

NOTICE: When moving the drive shaft, do not compress the inboard boot.



(e) Install the three washers and six hexagon bolts, and using SST, temporarily tighten them.

SST 09923–00020

12. CHECK DRIVE SHAFT

(a) Check to see that there is no play in the inboard joint and outboard joint.

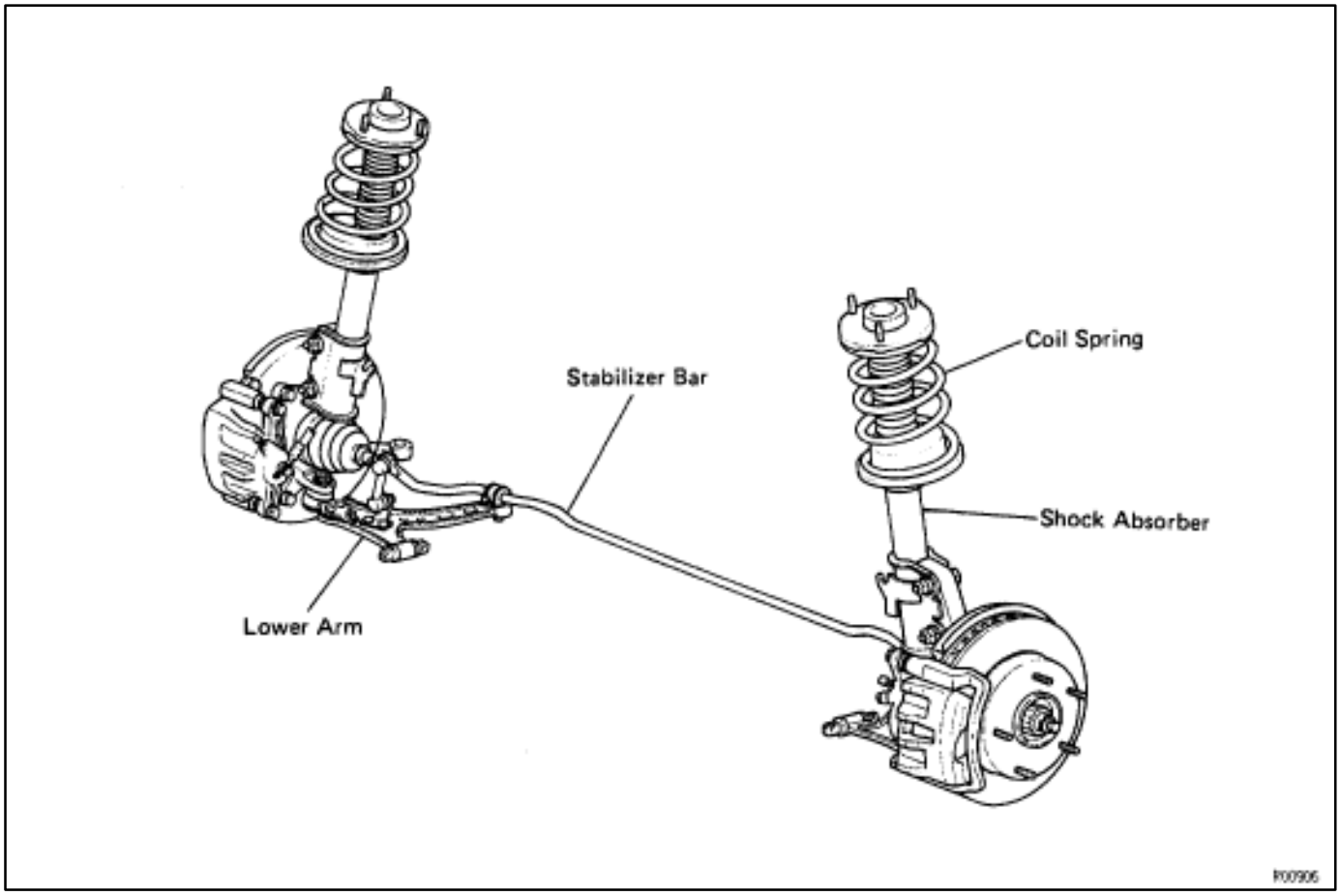
(b) Check to see that inboard joint slides smoothly in the thrust direction.

FRONT SUSPENSION

SA02P–01

DESCRIPTION

The front suspension is MacPherson strut type suspension with L–shape lower arm.



PREPARATION

SA02Q–01

SST (SPECIAL SERVICE TOOLS)

	09316–60010	Transmission & Transfer Bearing Replacer	Dust deflector installation
	(09316–00010)	Replacer Pipe	
	(09316–00040)	Replacer "C"	
	09608–32010	Steering Knuckle Oil Seal Replacer	Dust deflector installation
	09628–62011	Ball Joint Puller	
	09727–00045	Arm Set "B"	
	09727–30020	Coil Spring Compressor	
	09729–22031	Front Spring Upper Seat Holder	

RECOMMENDED TOOLS

SA02R–01

	09025–00010	Small Torque Wrench	

EQUIPMENT

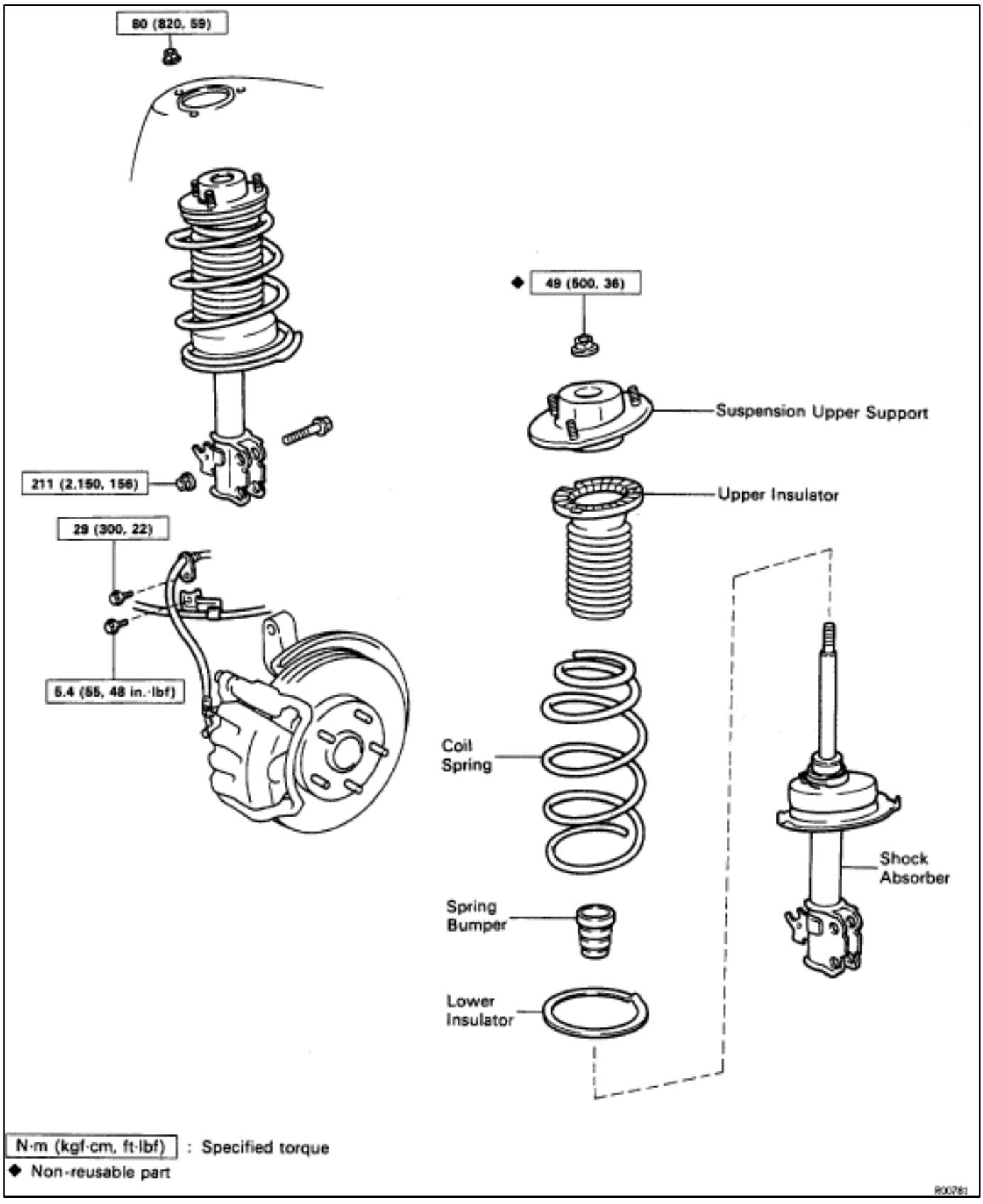
SA02S–01

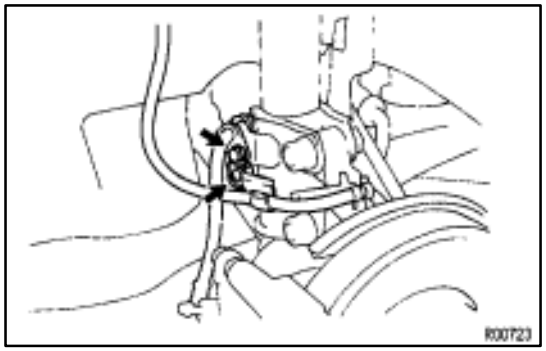
Torque wrench	

FRONT SHOCK ABSORBER

SA02T–01

COMPONENTS



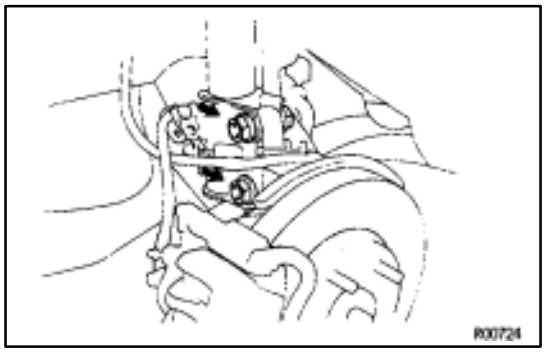


FRONT SHOCK ABSORBER REMOVAL

SA02U–02

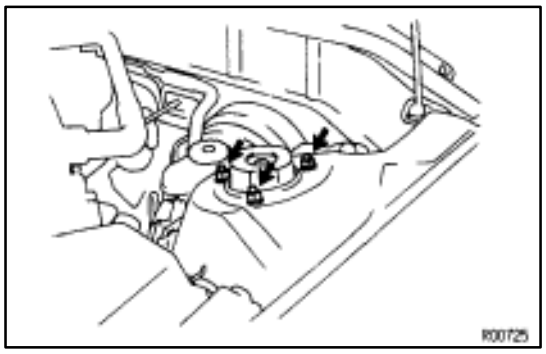
1. JACK UP VEHICLE AND REMOVE FRONT WHEEL

2. REMOVE BRAKE HOSE AND ABS SPEED SENSOR WIRE FROM SHOCK ABSORBER



3. DISCONNECT SHOCK ABSORBER FROM STEERING KNUCKLE

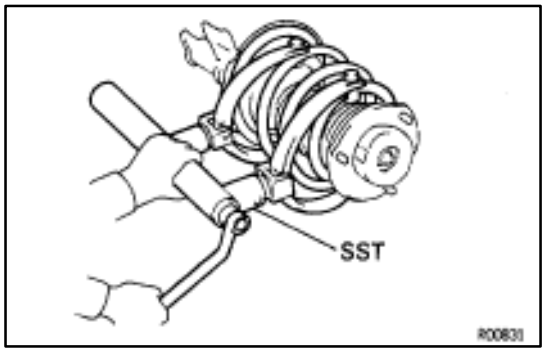
Remove the two nuts and bolts and disconnect the shock absorber from the steering knuckle.



4. REMOVE SHOCK ABSORBER WITH COIL SPRING

(a) Remove the three nuts on upper side of the shock absorber.

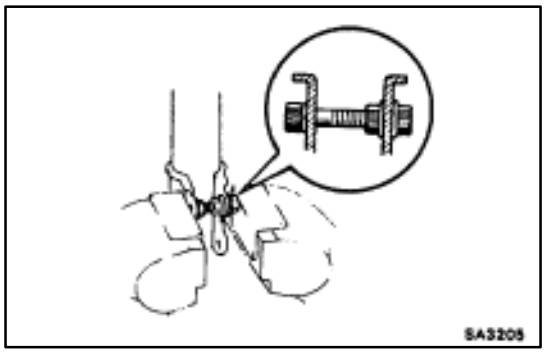
(b) Remove the shock absorber with coil spring.



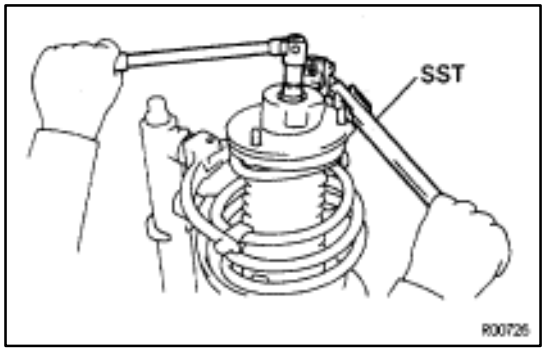
5. REMOVE COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–00045,09727–30020

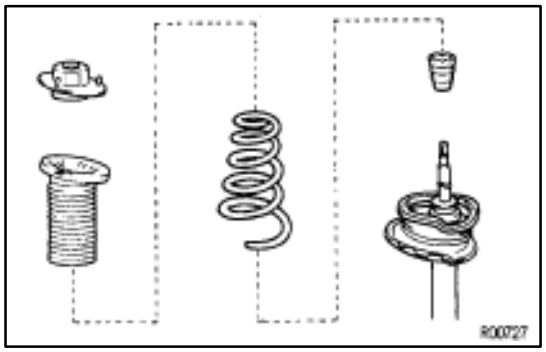
NOTICE: When holding the shock absorber with the coil spring removed, do not hold it by the spring lower seat. Also, do not knock the spring lower seat.



(b) Install a bolt and two nuts to the bracket at the lower portion of the shock absorber and secure it in a vise.

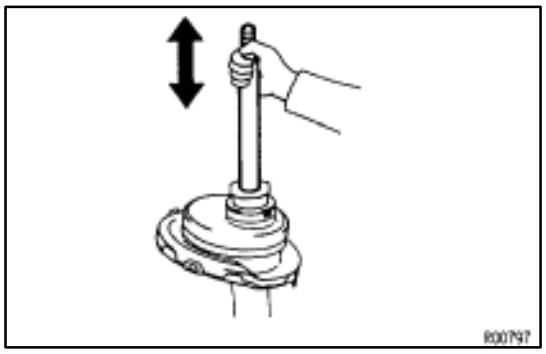


(c) Using SST to hold the upper support remove the nut.
SST 09729–22031



(d) Remove the following parts.
- Suspension upper support
- Upper insulator
- Coil spring
- Spring bumper
- Lower insulator

NOTICE: Do not disassemble the spring lower seat.



FRONT SHOCK ABSORBER INSPECTION

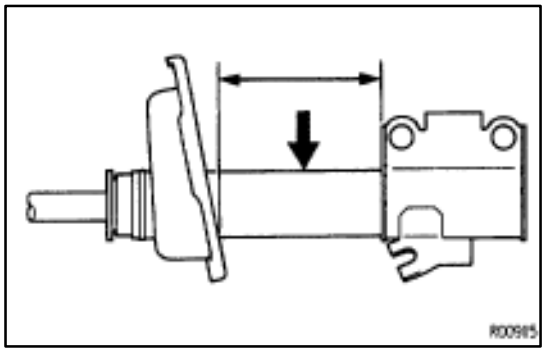
SA02V–01

1. 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, use the following procedure.



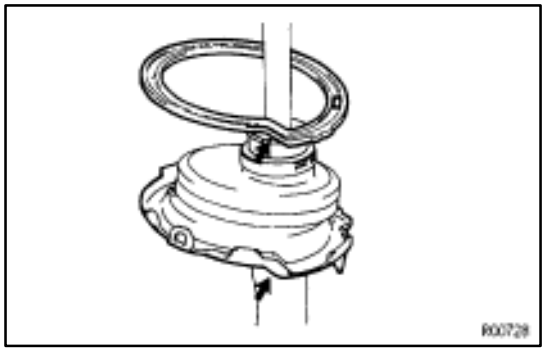
FRONT SHOCK ABSORBER DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD

2. DRILL HOLE TO REMOVE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown to remove the gas inside.

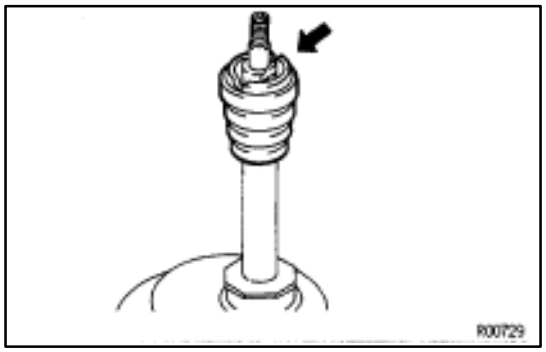
CAUTION: The gas coming out is harmless, but be careful of chips which mayfly up when drilling.



FRONT SHOCK ABSORBER INSTALLATION

SA041–02

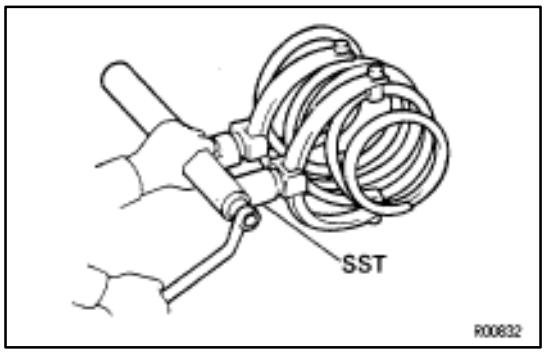
1. INSTALL LOWER INSULATOR ONTO SHOCK ABSORBER



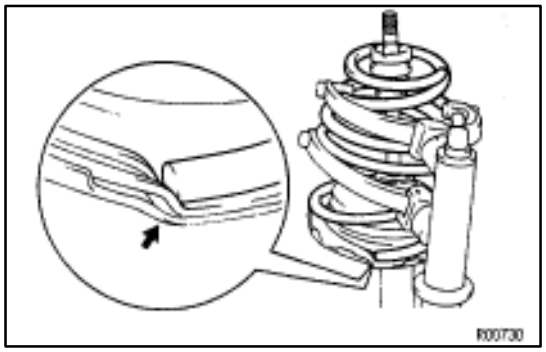
2. INSTALL SPRING BUMPER TO PISTON ROD

3. INSTALL COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–00045,09727–30020

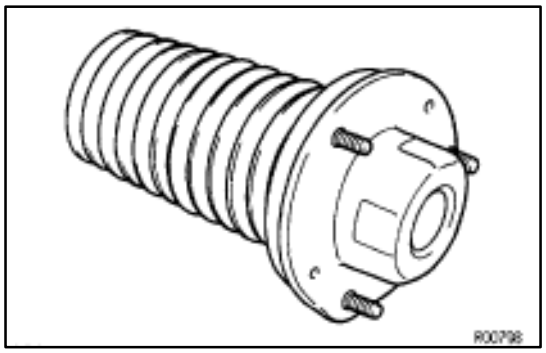


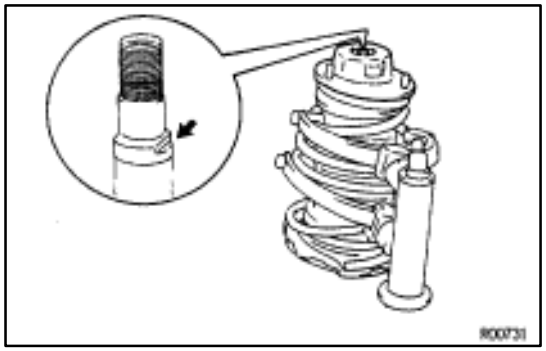
(b) Install the coil spring to the shock absorber.
HINT: Fit the lower end of the coil spring into the gap of the lower seat.



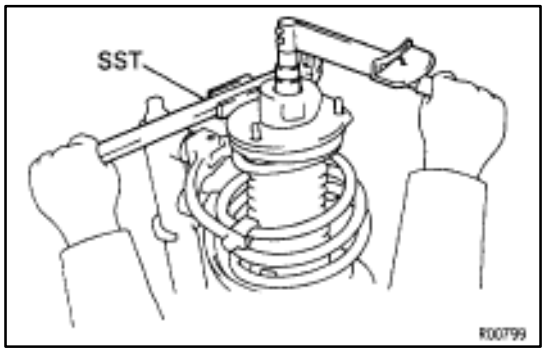
4. INSTALL UPPER INSULATOR AND UPPER SUPPORT

(a) Install the upper insulator to the upper support.

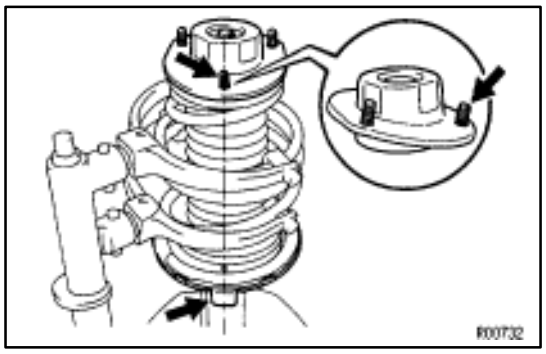




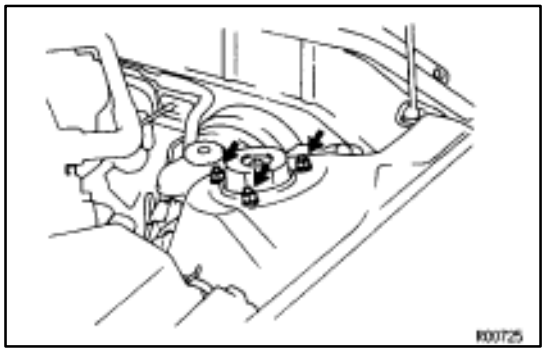
(b) Install the upper support to the piston rod.



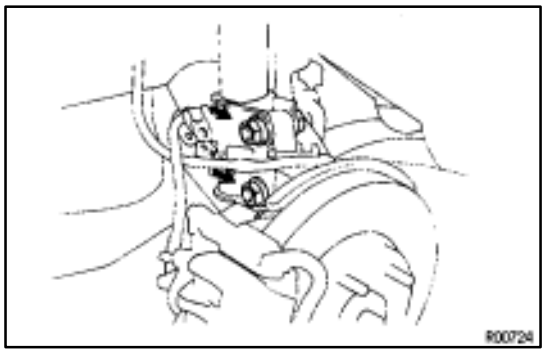
(c) Using SST to hold the upper support, install a new nut.
SST 09729–20031
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



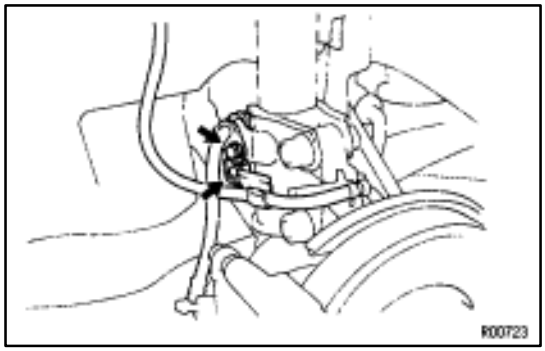
(d) Rotate the upper support so that the lowest bolt on the upper supportis aligned with the projection part of the spring lower seat shown in the illustration.
(e) Remove the SST.
HINT: After removing SST, again check the direction of the upper support.



5. INSTALL SHOCK ABSORBER WITH COIL SPRING
Place the shock absorber and install the three nuts.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



6. CONNECT SHOCK ABSORBER TO STEERING KNUCKLE
(a) Coat the threads of the nuts with engine oil.
(b) Install the two bolts and nuts.
Torque: 211 N·m (2,150 kgf·cm, 156 ft·lbf)



7. INSTALL BRAKE HOSE AND ABS SPEED SENSOR WIRE TO SHOCK ABSORBER

Brake hose

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

ABS wire

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

8. INSTALL FRONT WHEEL AND LOWER VEHICLE

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

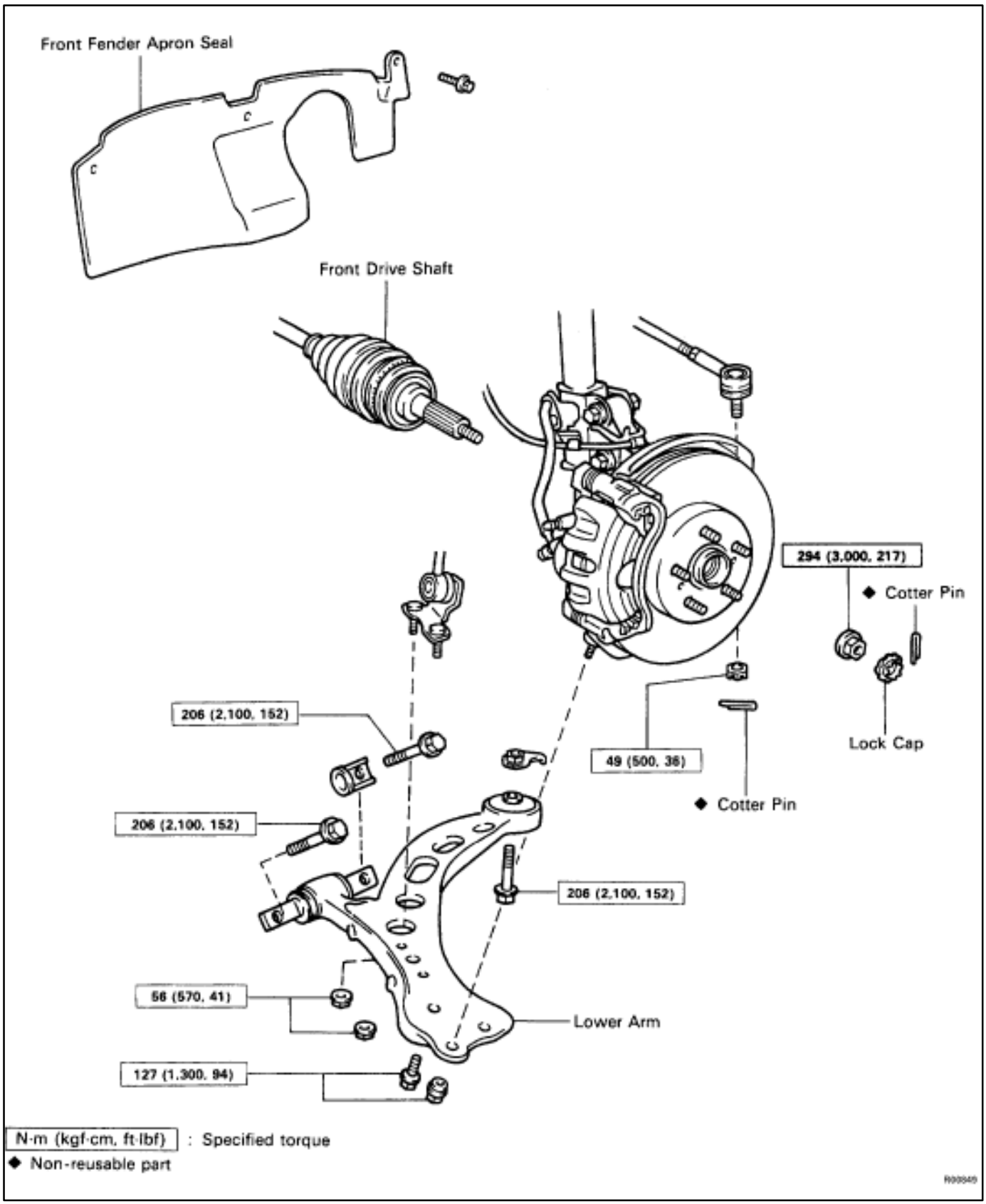
9. INSPECT FRONT WHEEL ALIGNMENT

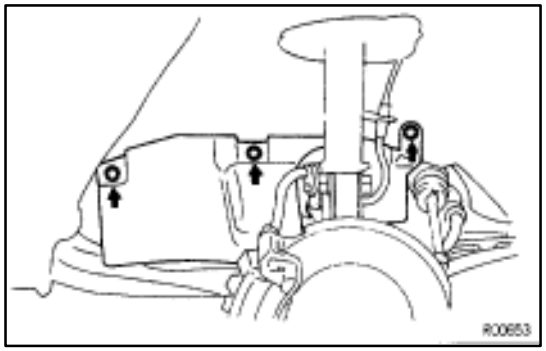
(See page SA–3)

LOWER SUSPENSION ARM

SA02W–01

COMPONENTS



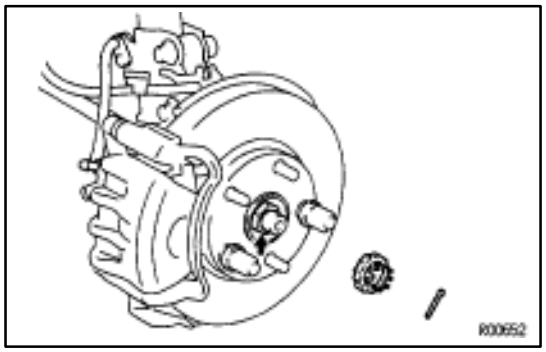


LOWER ARM REMOVAL

SA02X–01

1. JACK UP VEHICLE AND REMOVE FRONT WHEEL

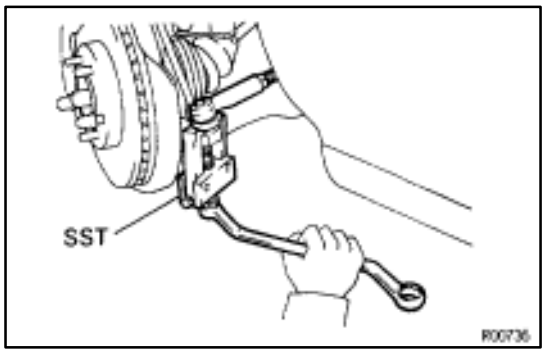
2. REMOVE FRONT FENDER APRON SEAL



3. REMOVE DRIVE SHAFT LOCK NUT

(a) Remove the cotter pin and lock cap.

(b) While applying the brakes, remove the nut.

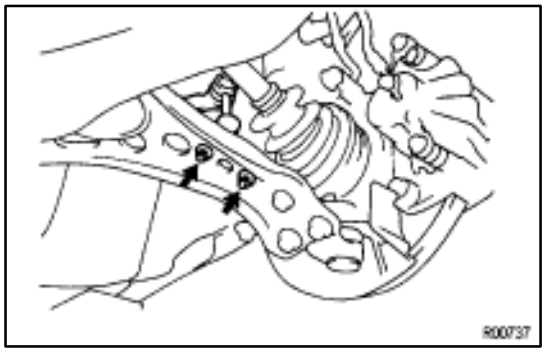


4. DISCONNECT TIE ROD END FROM STEERING KNUCKLE

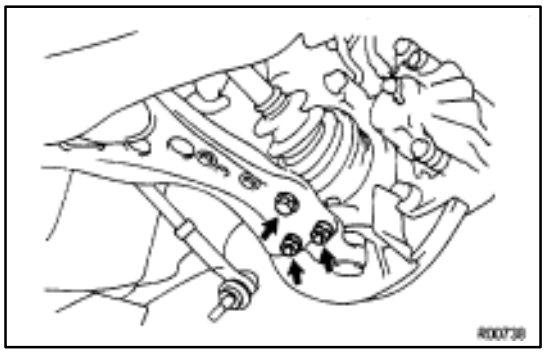
(a) Remove the cotter pin and remove the nut.

(b) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09628–62011

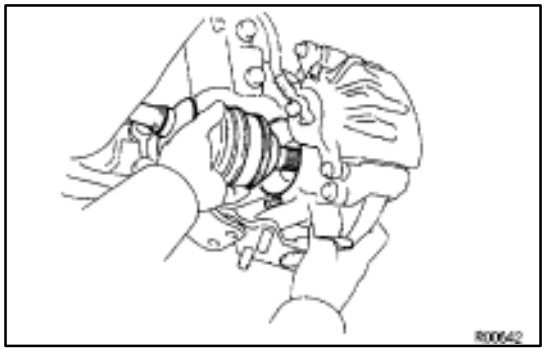


5. REMOVE LEFT AND RIGHT STABILIZER END BRACKETS FROM LOWER ARMS



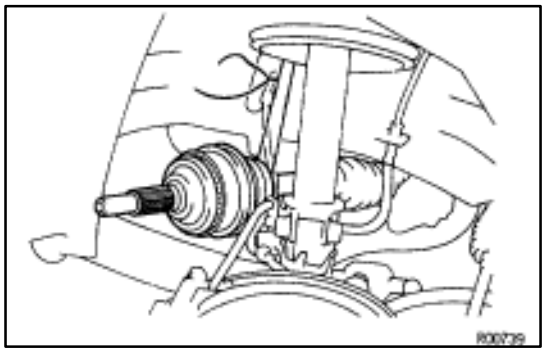
6. DISCONNECT LOWER ARM FROM LOWER BALL JOINT

Remove the bolt and two nuts.

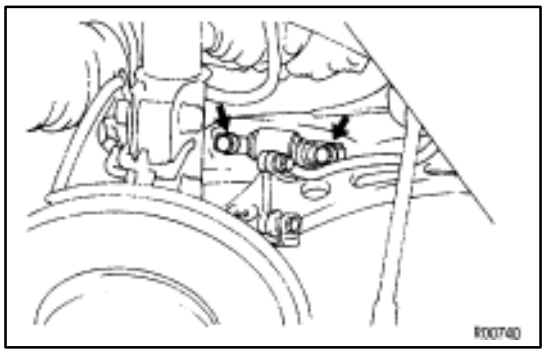


7. REMOVE DRIVE SHAFT FROM AXLE HUB

(a) Remove the drive shaft from the axle hub.

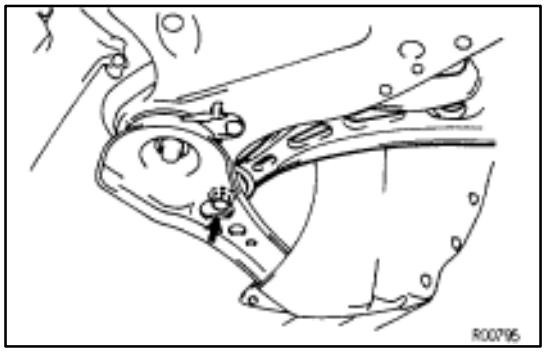


(b) Hang up the drive shaft using wire, etc.
NOTICE: Be careful not to damage the drive shaft boot and ABS sensor rotor.

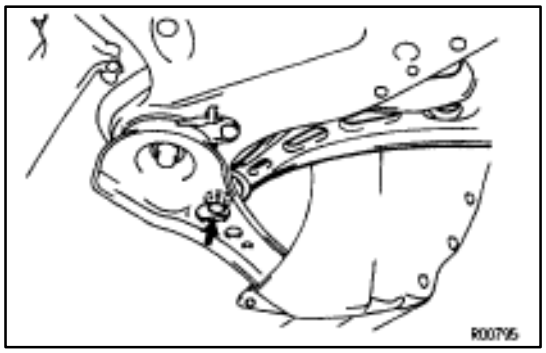


8. REMOVE LOWER ARM

(a) Remove the two bolts on front side of the lower arm.



(b) Remove the bolt and nut on rear side of the lower arm.
(c) Remove the lower arm.
(d) Remove the lower arm bushing stopper from the lower arm shaft.

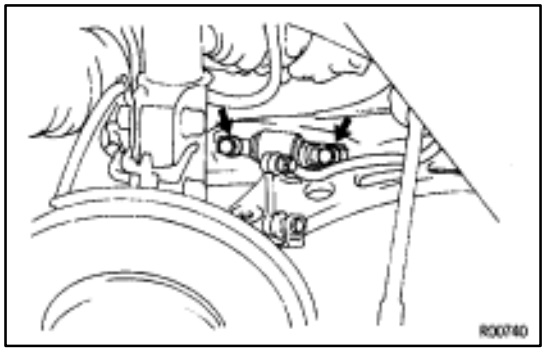


LOWER ARM INSTALLATION

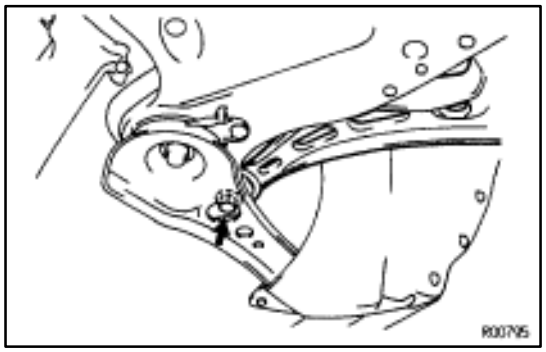
SA02Y–01

1. INSTALL LOWER ARM

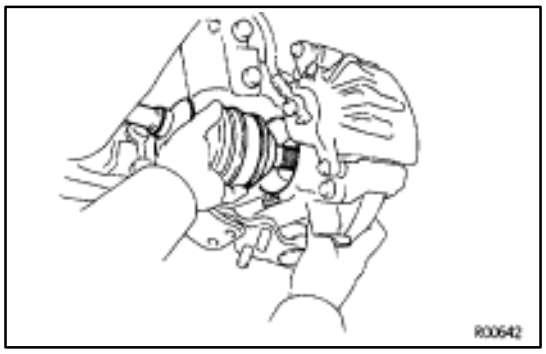
(a) Place the lower arm and temporarily install the rear side bolt and nut



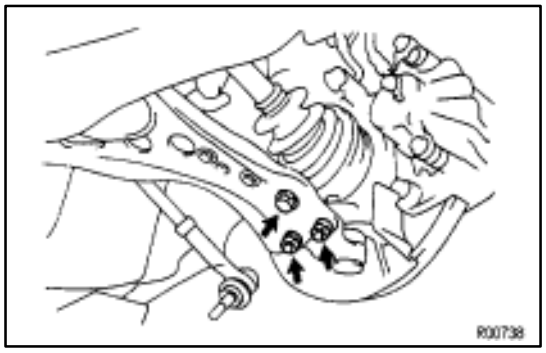
(b) Install the lower arm bushing stopper to the lower arm shaft.
(c) Install the two bolts on the front side of the lower arm.
Torque: 206 N·m (2,100 kgf·cm, 152 ft·lbf)



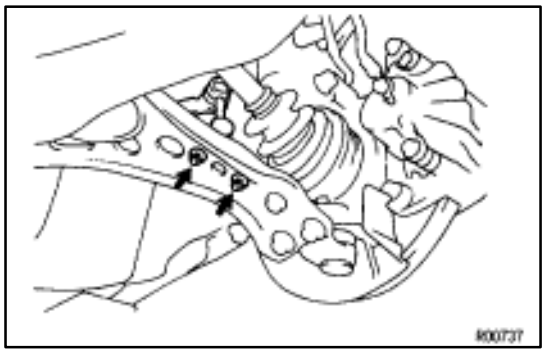
(d) Tighten the bolt on rear side of the lower arm.
Torque: 206 N·m (2,100 kgf·cm, 152 ft·lbf)



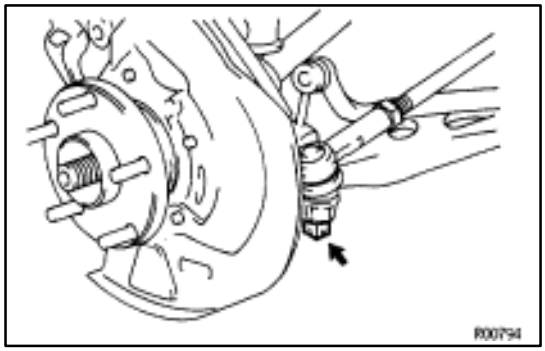
2. INSTALL DRIVE SHAFT TO AXLE HUB



3. CONNECT LOWER ARM TO LOWER BALL JOINT
Install the bolt and two nuts.
Torque: 127 N·m (1,300 kgf·cm, 94 ft·lbf)



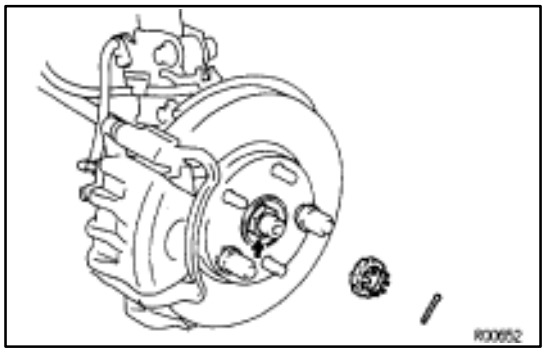
4. INSTALL LEFT AND RIGHT STABILIZER END BRACKETS TO LOWER ARMS
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)



5. CONNECT TIE ROD END TO STEERING KNUCKLE

(a) Connect the tie rod end to the steering knuckle and tighten the nut.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

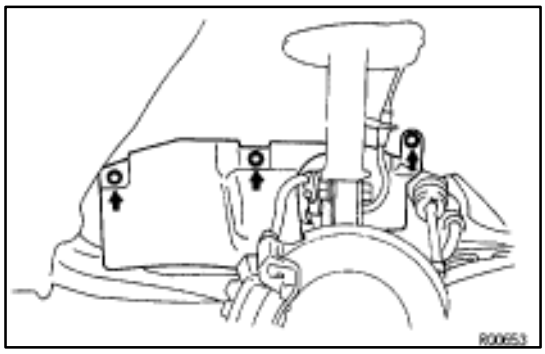
(b) Install a new cotter pin.



6. INSTALL DRIVE SHAFT LOCK NUT

(a) While applying the brakes, install the nut.
Torque: 294 N·m (3,000 kgf·cm, 217 ft·lbf)

(b) Install the lock cap and a new cotter pin.



7. INSTALL FRONT FENDER APRON SEAL

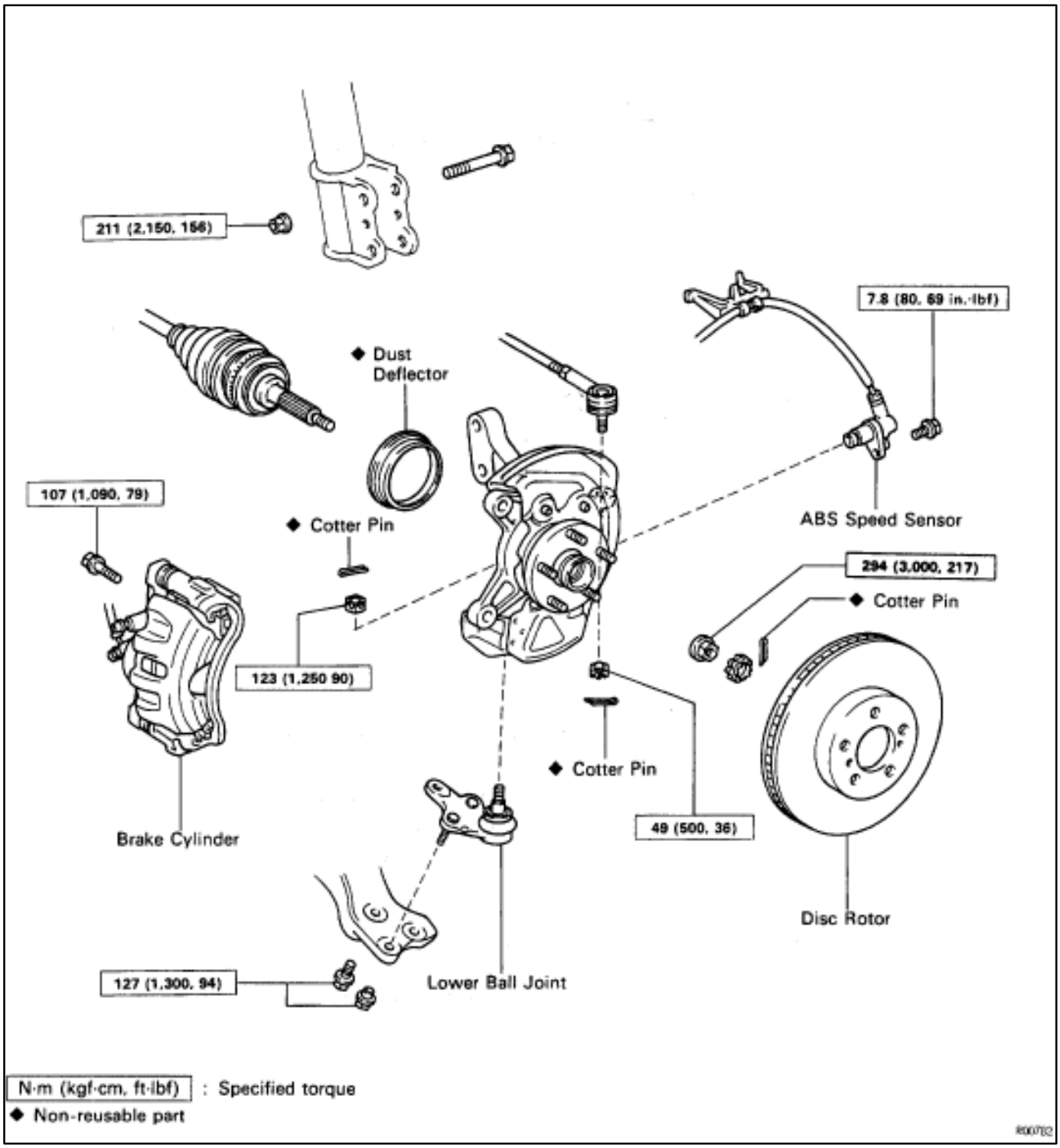
8. INSTALL FRONT WHEEL AND LOWER VEHICLE
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

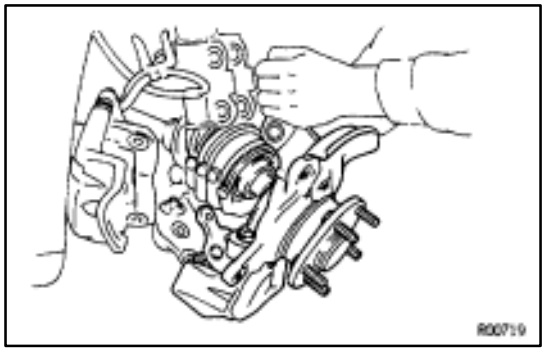
9. INSPECT FRONT WHEEL ALIGNMENT
(See page SA–3)

LOWER BALL JOINT

SA02Z–01

COMPONENTS

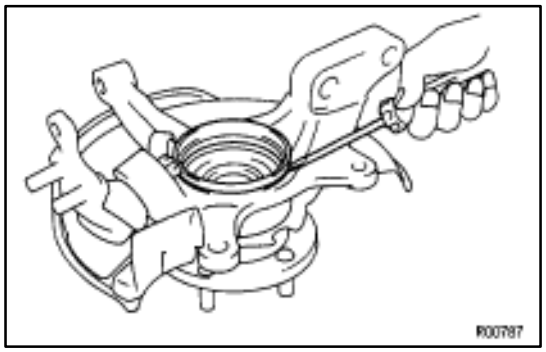




LOWER BALL JOINT REMOVAL

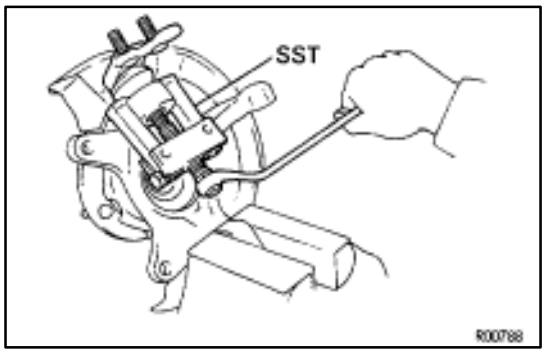
SA030–01

1. REMOVE STEERING KNUCKLE WITH AXLE HUB
(See page SA–10)

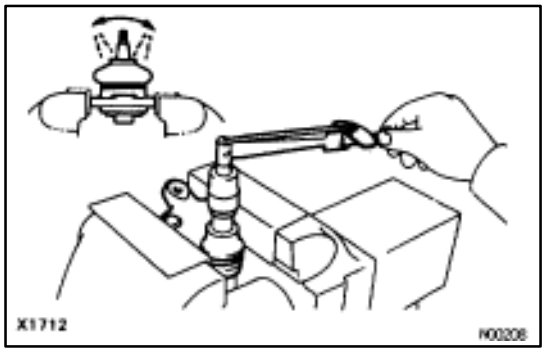


2. REMOVE LOWER BALL JOINT

(a) Using a screwdriver, remove the dust deflector.



(b) Remove the cotter pin and nut.
(c) Using SST, remove the lower ball joint.
SST 09628–62011

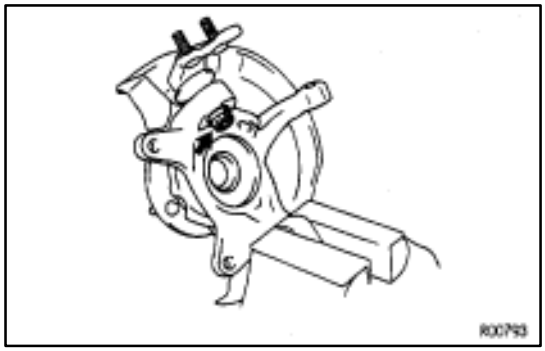


LOWER BALL JOINT INSPECTION

SA031–01

INSPECT BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times before installing the nut.
(b) Using a torque gauge, turn the nut continuously one 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, 8.7–26 in.·lbf)



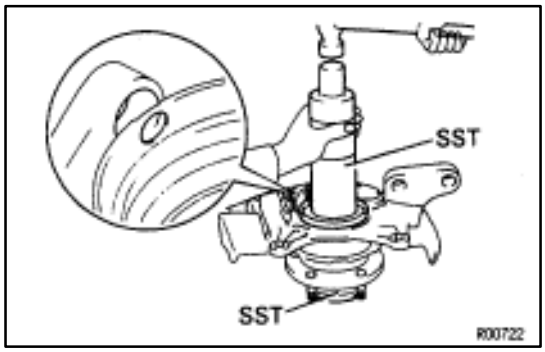
LOWER BALL JOINT INSTALLATION

SA032–01

1. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint and tighten the nut.
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

(b) Install a new cotter pin.



2. INSTALL DUST DEFLECTOR

Using SST and a hammer, install a new dust deflector.
SST 09316–60010 (09316–00010, 09316–00040) 09608–32010

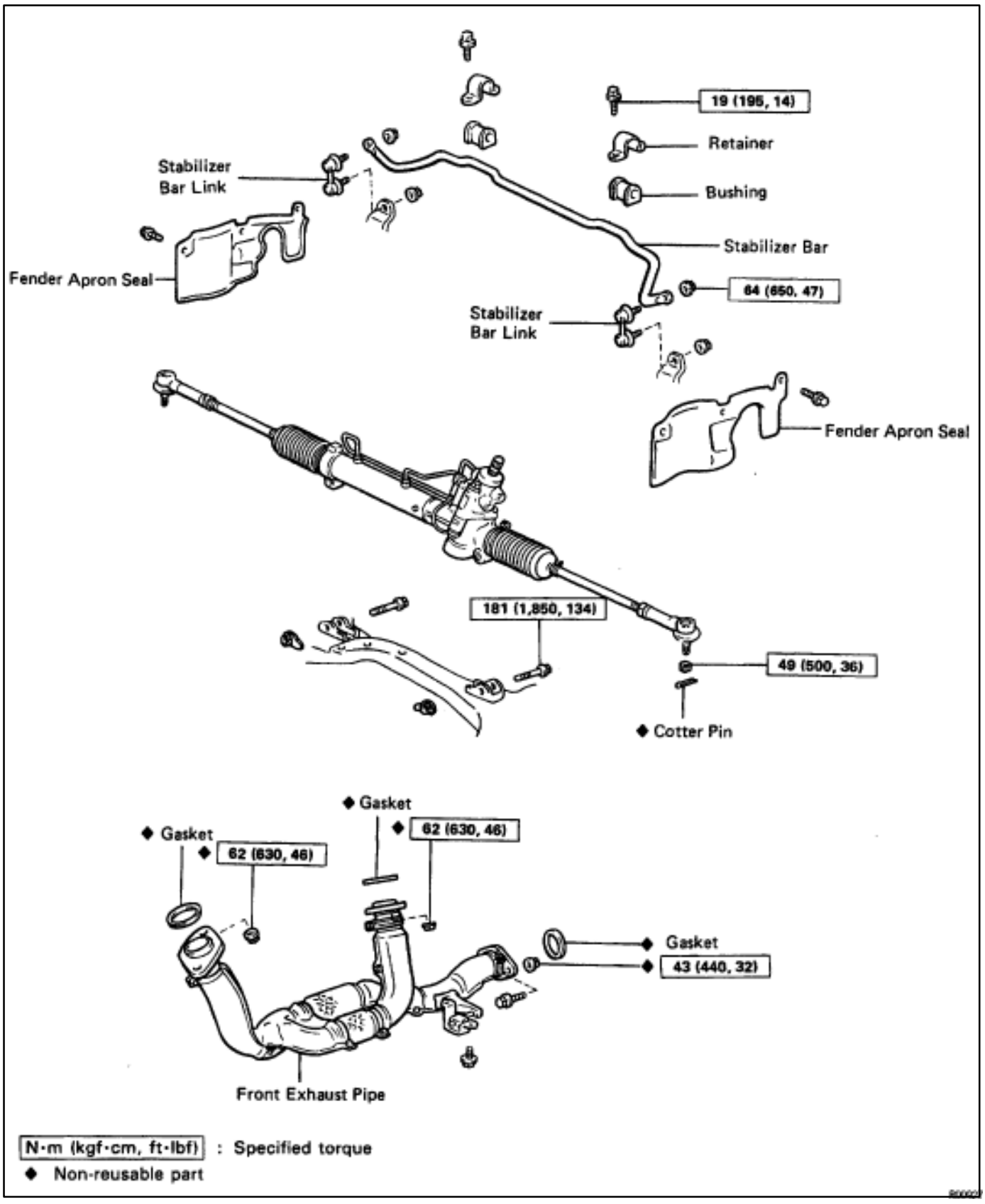
HINT: Align the hoses for the ABS speed sensor in the dust deflector and steering knuckle.

3. INSTALL STEERING KNUCKLE WITH AXLE HUB
(See page SA–14)

STABILIZER BAR

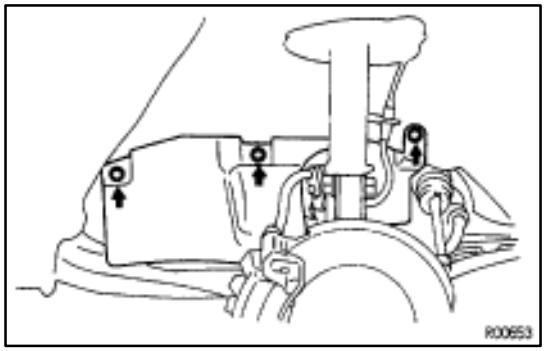
SA033–01

COMPONENTS



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

◆ Non-reusable part

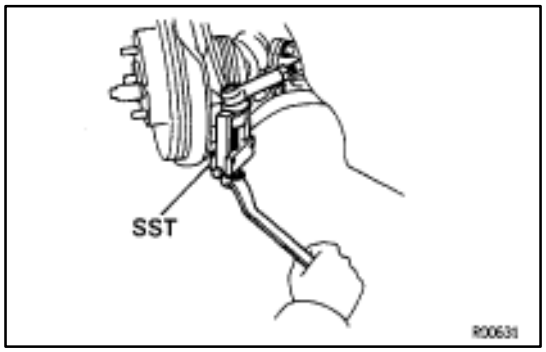


STABILIZER BAR REMOVAL

SA034–01

1. JACK UP VEHICLE AND REMOVE LEFT AND RIGHT FRONT WHEELS

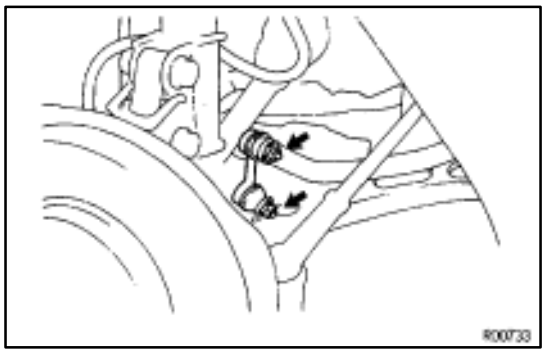
2. REMOVE LEFT AND RIGHT FENDER APRON SEALS



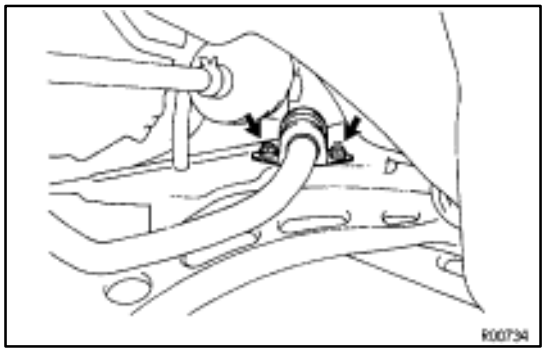
3. DISCONNECT LEFT AND RIGHT TIE ROD ENDS FROM STEERING KNUCKLES

(a) Remove the cotter pin and nut.

(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09628–62011



4. REMOVE LEFT AND RIGHT STABILIZER BAR LINKS

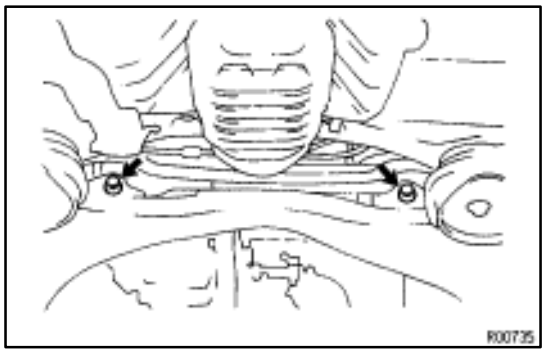


5. REMOVE LEFT AND RIGHT STABILIZER BAR BUSHINGS

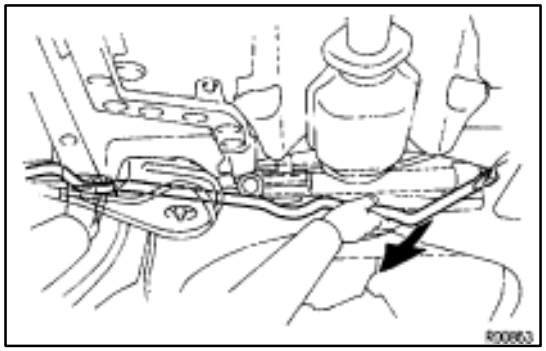
(a) Remove the left and right bushing retainers.

(b) Remove the stabilizer bar bushings.

6. REMOVE EXHAUST FRONT PIPE
(See EG section)

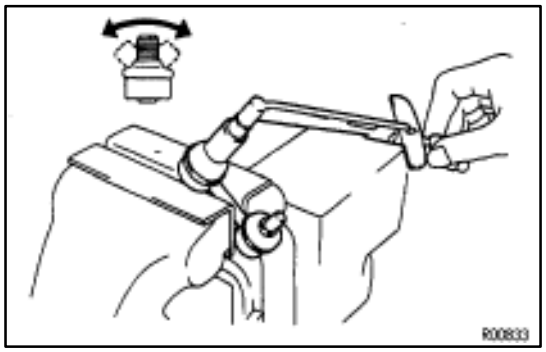


7. REMOVE STEERING GEAR BOX MOUNTING BOLTS AND NUTS



8. REMOVE STABILIZER BAR

HINT: Lift the steering gear box and remove the stabilizer bar.



STABILIZER BAR LINK INSPECTION

SA035–01

1. INSPECT BALL JOINT FOR ROTATION CONDITION

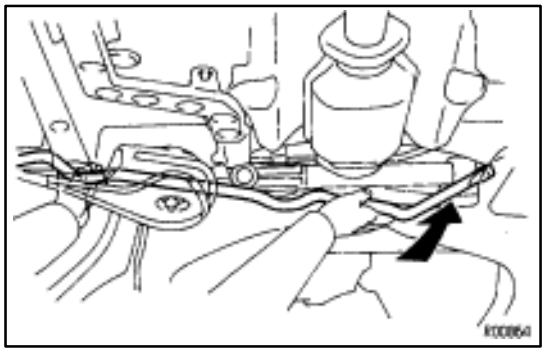
(a) Flip the ball joint stud back and forth 5 times as shown in the figure, before installing the nut.

(b) Using a torque gauge, turn the nut continuously one turn each 2–4 seconds and take the torque reading on the fifth turn.

Turning torque:

0.05–1.0 N·m (0.5–10 kgf·cm, 0.4–8.7 in.·lbf)

If not within specification, replace the stabilizer bar link.

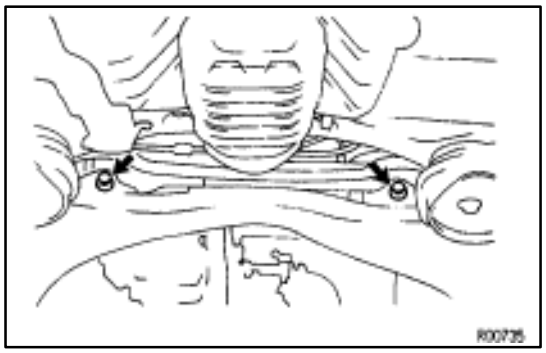


STABILIZER BAR INSTALLATION

SA036–01

1. PLACE STABILIZER BAR

HINT: Lift the steering gear box and place the stabilizer bar.

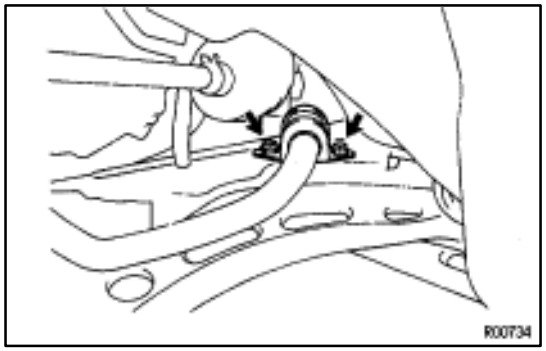


2. INSTALL STEERING GEAR BOX MOUNTING BOLTS AND NUTS

Torque: 181 N·m (1.850 kgf·cm, 134 ft·lbf)

3. INSTALL EXHAUST FRONT PIPE

(See EG section)

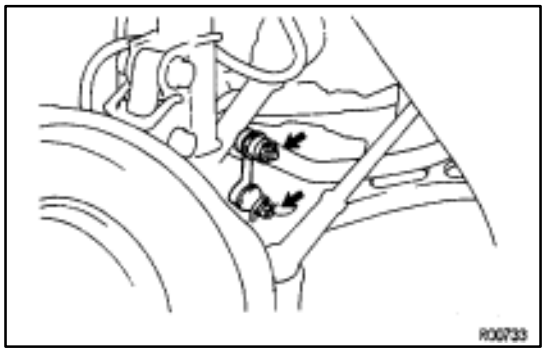


4. INSTALL LEFT AND RIGHT STABILIZER BAR BUSHINGS

(a) Install the stabilizer bar bushings.

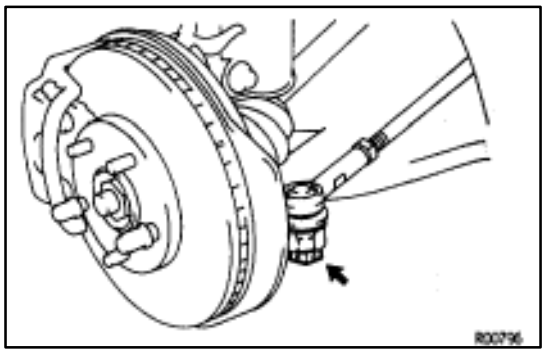
(b) Install the bushing retainers and bolts.

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



5. INSTALL LEFT AND RIGHT STABILIZER BAR LINKS

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

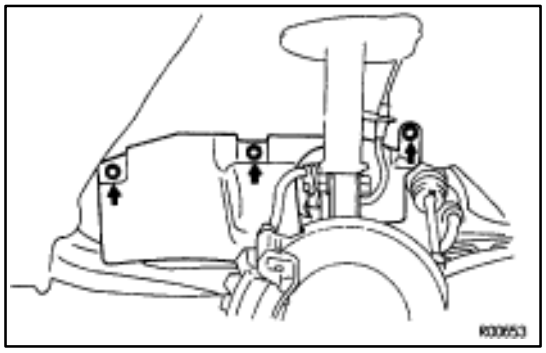


6. CONNECT LEFT AND RIGHT TIE ROD ENDS TO STEERING KNUCKLES

(a) Connect the tie rod end to the steering knuckle and tighten the nut.

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

(b) Install a new cotter pin.



7. INSTALL LEFT AND RIGHT FENDER APRON SEALS

8. INSTALL FRONT WHEELS AND LOWER VEHICLE

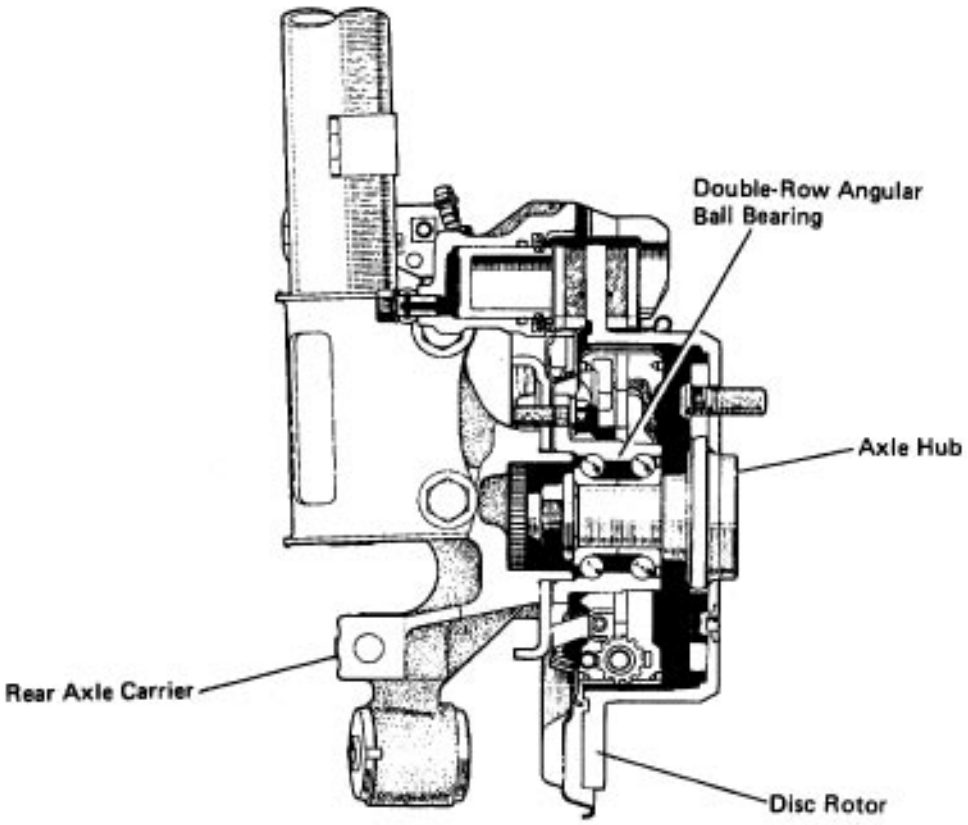
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR AXLE

SA037–01

DESCRIPTION

The rear axle also uses oil–sealed double–row angular ball bearings for wheel bearings as the front axle. There is no need for bearing grease maintenance or preload adjustment.



PREPARATION

SST (SPECIAL SERVICE TOOLS)

SA038–02

	09628–10011 Ball Joint Puller	Hub bolt removal

EQUIPMENT

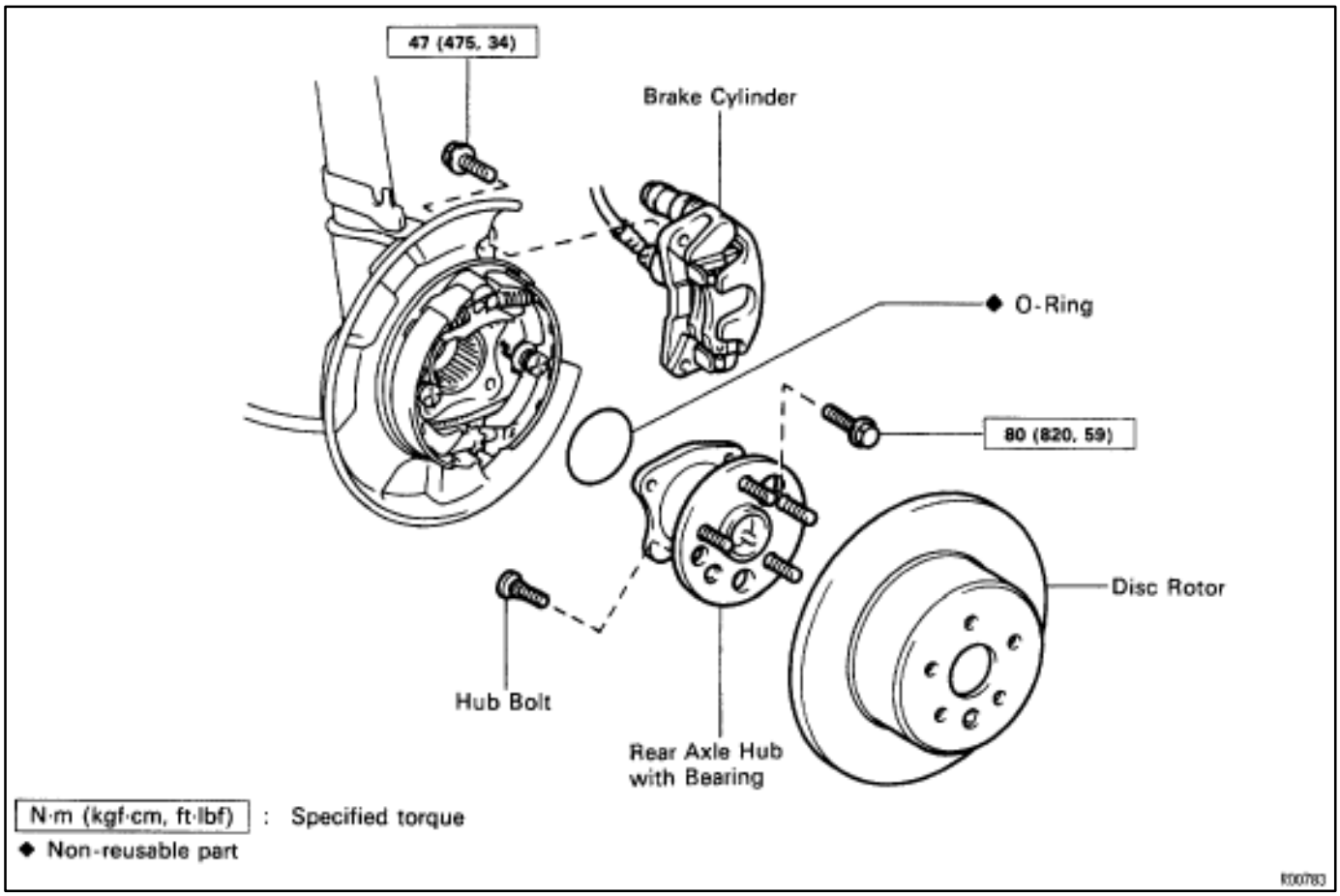
SA039–01

Dial indicator	
Torque wrench	

REAR AXLE HUB

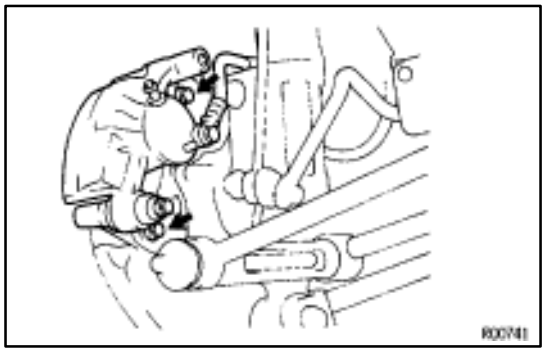
SA03A–01

COMPONENTS



SA03B–0

REAR AXLE HUB REMOVAL



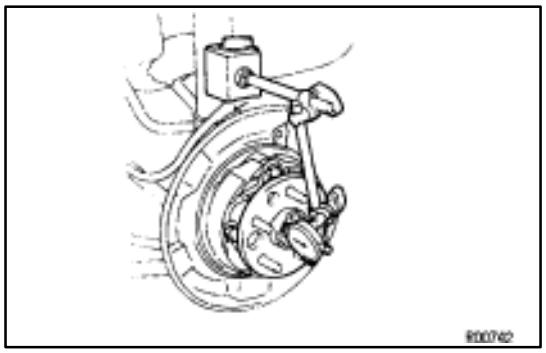
1. JACK UP VEHICLE AND REMOVE REAR WHEEL

2. REMOVE BRAKE CYLINDER AND DISC ROTOR

(a) Remove the two brake cylinder set bolts.

(b) Hang up the brake cylinder using wire, etc.

(c) Remove the disc rotor.



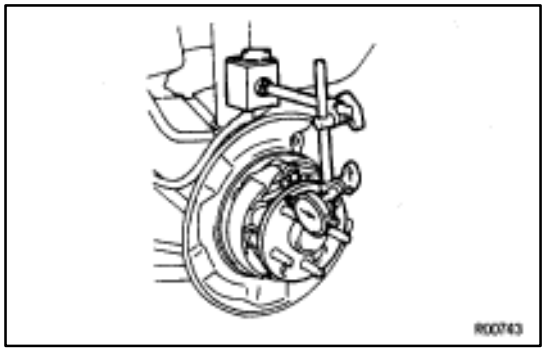
3. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

(a) Place the dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

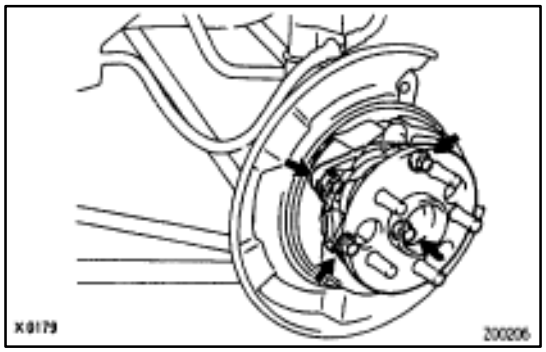
Maximum:

0.05 mm (0.0020 in.)

If greater than the specified maximum, replace the bearing.



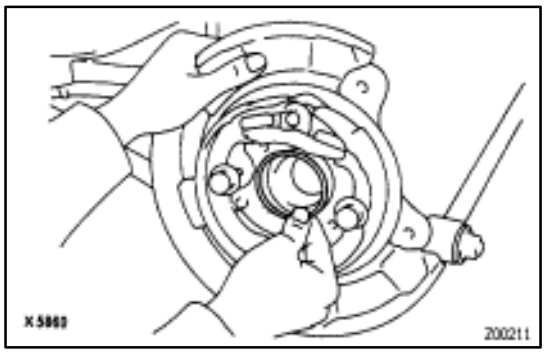
(b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.
Maximum:
0.07 mm (0.0028 in.)
If greater then the specified maximum, replace the axle shaft and bearing.



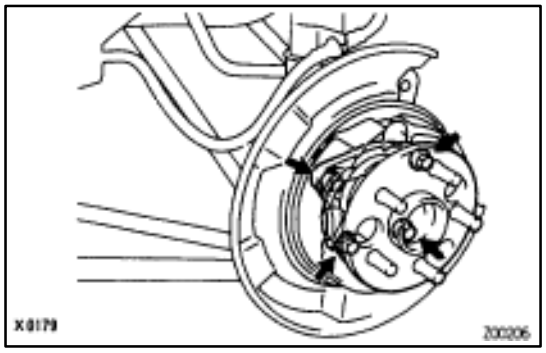
4. REMOVE REAR AXLE HUB
(a) Remove the four bolts and rear axle hub.
(b) Remove the O–ring.

REAR AXLE HUB INSTALLATION

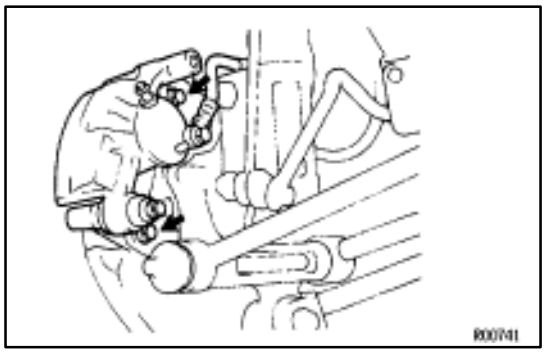
SA03Z–02



1. INSTALL REAR AXLE HUB
(a) Install a new O–ring.
HINT: Coat the O–ring with MP grease.

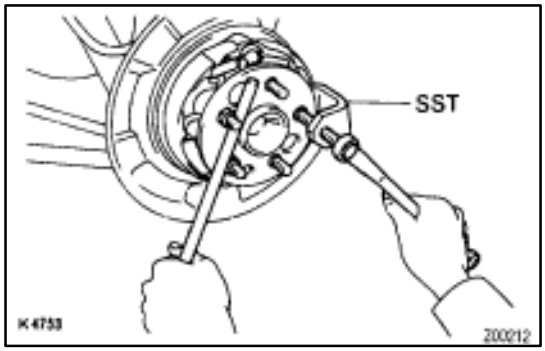


(b) Install the rear axle hub with the four bolts.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



2. INSTALL DISC ROTOR AND BRAKE CYLINDER
(a) Install the disc rotor.
(b) Install the brake cylinder.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

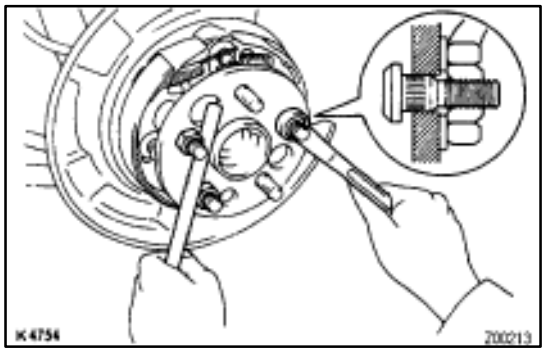
3. INSTALL REAR WHEEL AND LOWER VEHICLE
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



HUB BOLT REPLACEMENT

SA03E–02

1. **JACK UP VEHICLE AND REMOVE REAR WHEEL**
2. **REMOVE REAR BRAKE DISC ROTOR**
3. **REMOVE HUB BOLT**
   Using SST, remove the hub bolt.
   SST 09628–10011

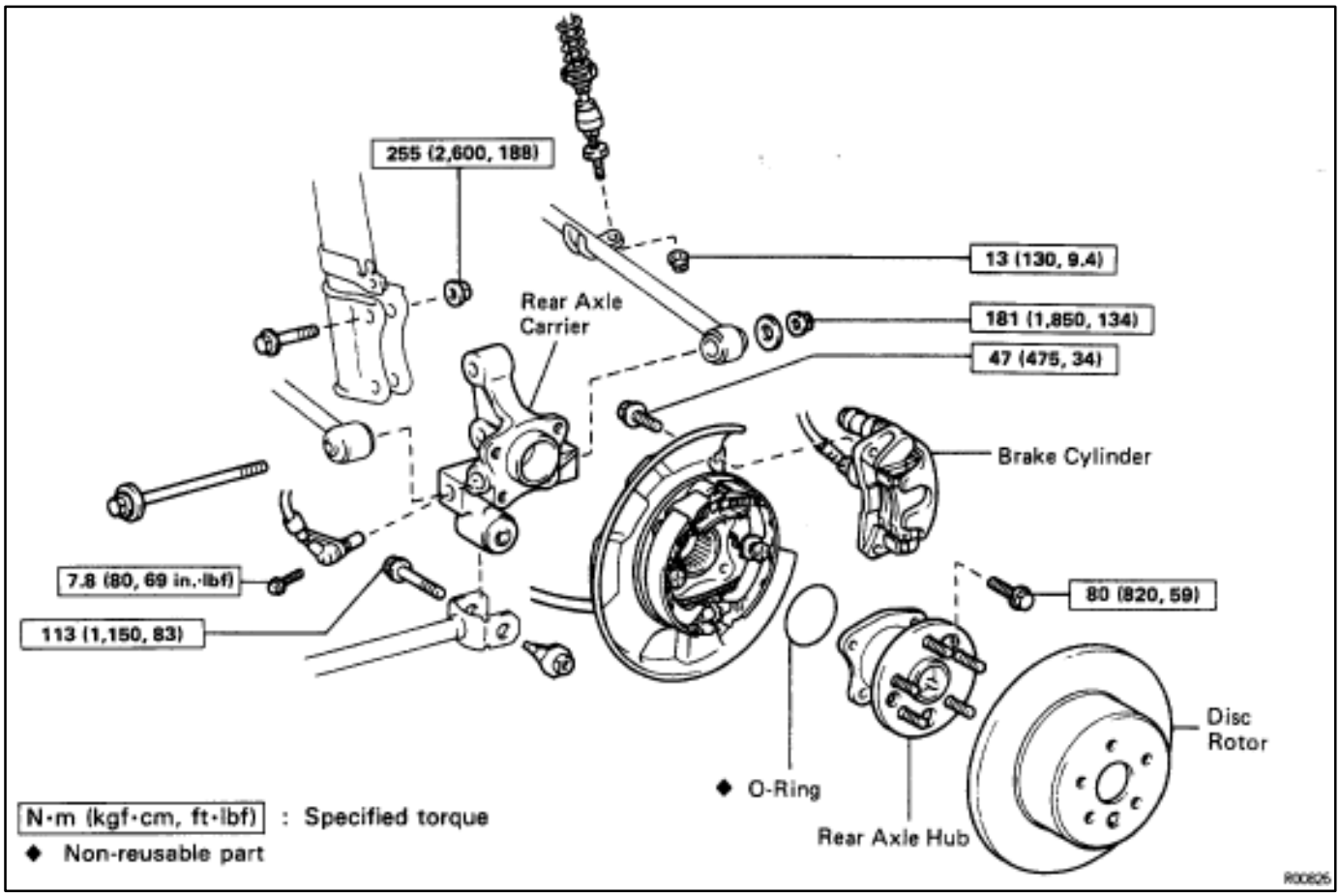


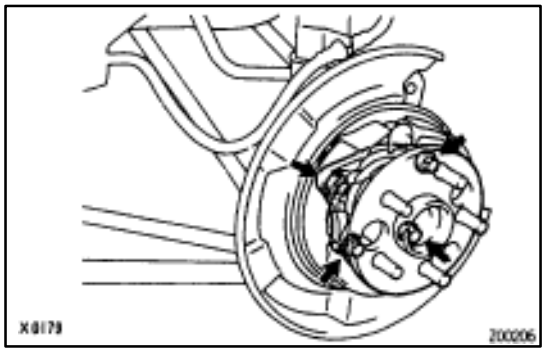
4. **INSTALL HUB BOLT**
   Install washer and nut to the hub bolt as shown in the illustration, and install the hub bolt with tightening the nut.
5. **INSTALL REAR BRAKE DISC ROTOR**
6. **INSTALL REAR WHEEL AND LOWER VEHICLE**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

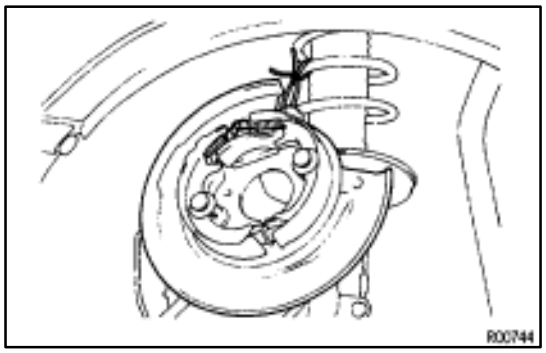
REAR AXLE CARRIER

SA03F–01

COMPONENTS







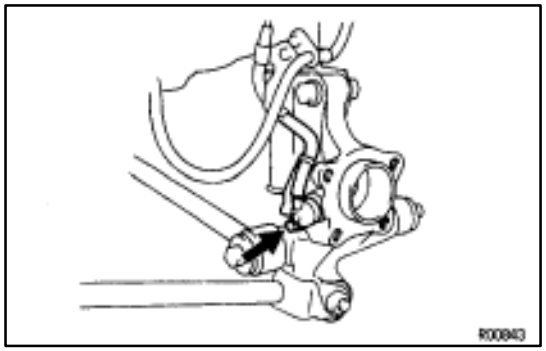
REAR AXLE CARRIER REMOVAL

SA03G–02

1. REMOVE REAR AXLE HUB

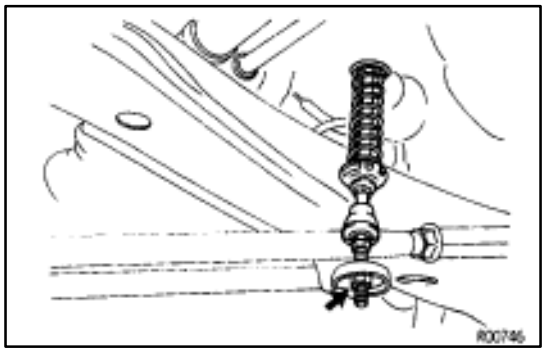
2. REMOVE BACKING PLATE FROM REAR AXLE CARRIER

Hang up the backing plate using wire, etc.

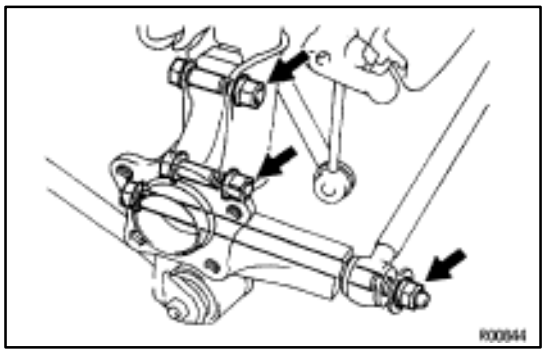


3. REMOVE ABS SPEED SENSOR AND LSPV SPRING

(a) Remove the ABS speed sensor from rear axle carrier.

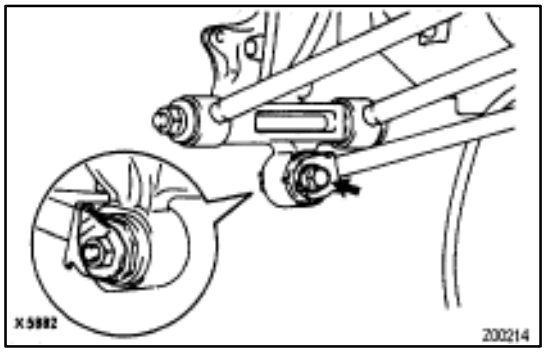


(b) Disconnect the LSPV spring from the lower arm.

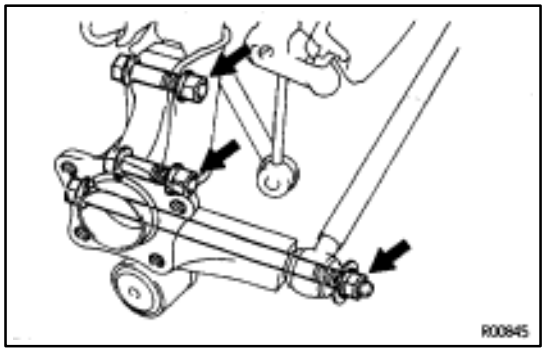


4. REMOVE REAR AXLE CARRIER

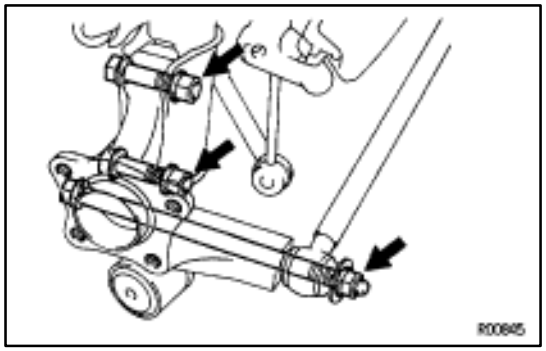
(a) Loosen the three nuts.
HINT: Do not remove the bolts.



(b) Remove the bolt and nut and disconnect the strut rod from the rear axle carrier.



(c) Remove the three nuts and bolts.
(d) Remove the rear axle carrier.

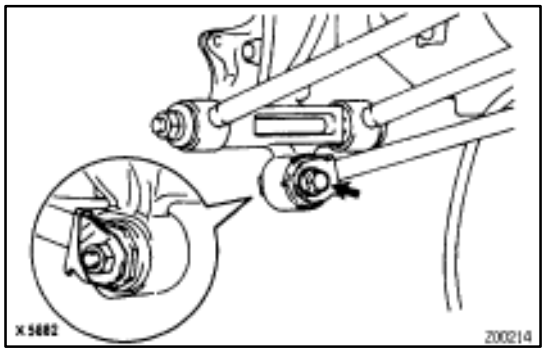


REAR AXLE CARRIER INSTALLATION

SA046–01

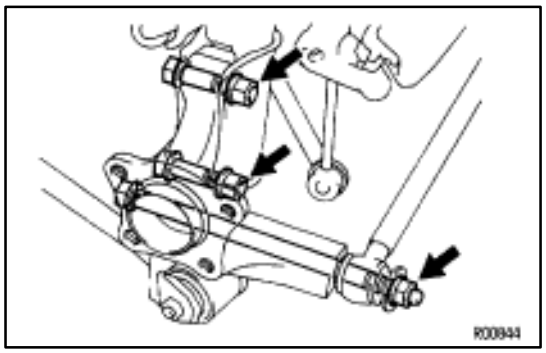
1. INSTALL REAR AXLE CARRIER

(a) Place the rear axle carrier and temporarily install the three bolts and nuts.



(b) Connect the strut rod to the rear axle carrier.

(c) Temporarily install the bolt and nut.



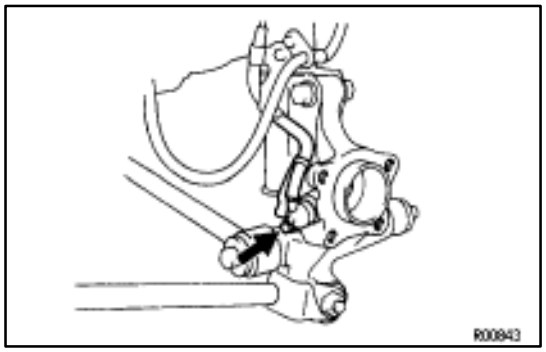
(d) Torque the three nuts.

Lower side of shock absorber:

Torque: 255 N·m (2,600 kgf·cm, 188 ft·lbf)

Lower arm:

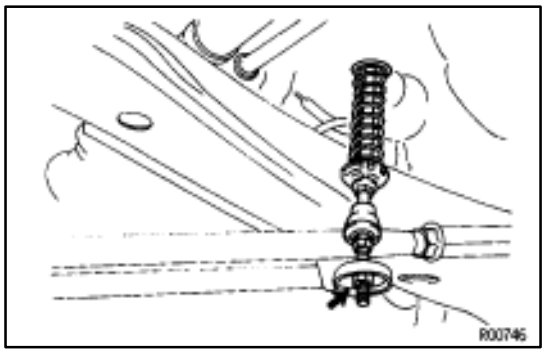
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)



2. INSTALL ABS SPEED SENSOR AND LSPV SPRING

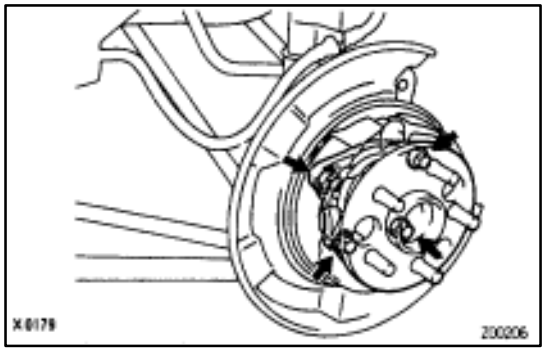
(a) Install the ABS speed sensor to the rear axle carrier.

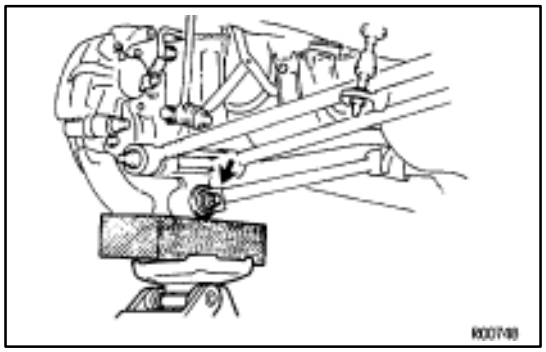
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)



(b) Connect the LSPV spring to the lower arm.

Torque: 13 N·m (130 kgf·cm, 9.4 ft·lbf)





3. INSTALL BACKING PLATE AND REAR AXLE HUB

(a) Place the backing plate.
(b) Install a new O–ring.
(c) Install the rear axle hub.
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

4. STABILIZE SUSPENSION

(a) Install the rear wheel and lower the vehicle.
(b) Bounce the vehicle up and down several times to stabilize the suspension.

5. TORQUE STRUT ROD BOLT

(a) Jack up the vehicle and support the body.
(b) Remove the rear wheel.
(c) Support the rear axle carrier with a jack.
(d) Torque the bolt.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

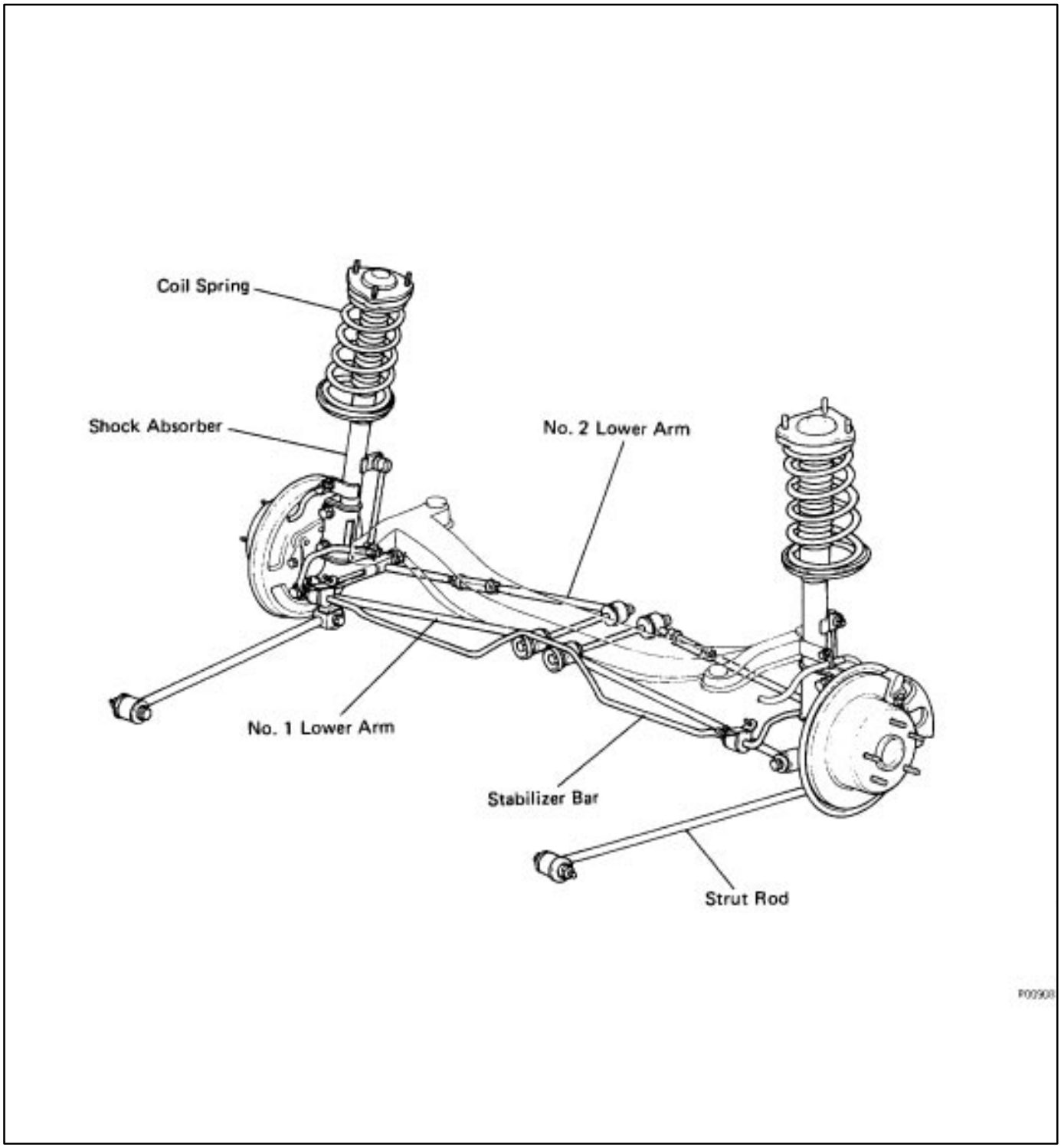
6. INSTALL REAR WHEEL AND LOWER VEHICLE
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR SUSPENSION

SA03J–01

DESCRIPTION

The rear suspension is dual–link strut independent suspension composed of two lower arms in parallel at the side, and strut rods which extend forward.



PREPARATION

SST (SPECIAL SERVICE TOOLS)

SA03K–01

	09727–30020 Coil Spring Compressor	
	09729–22031 Front Spring Upper Seat Holder	

RECOMMENDED TOOLS

SA03L–01

	09025–00010 Small Torque Wrench	

EQUIPMENT

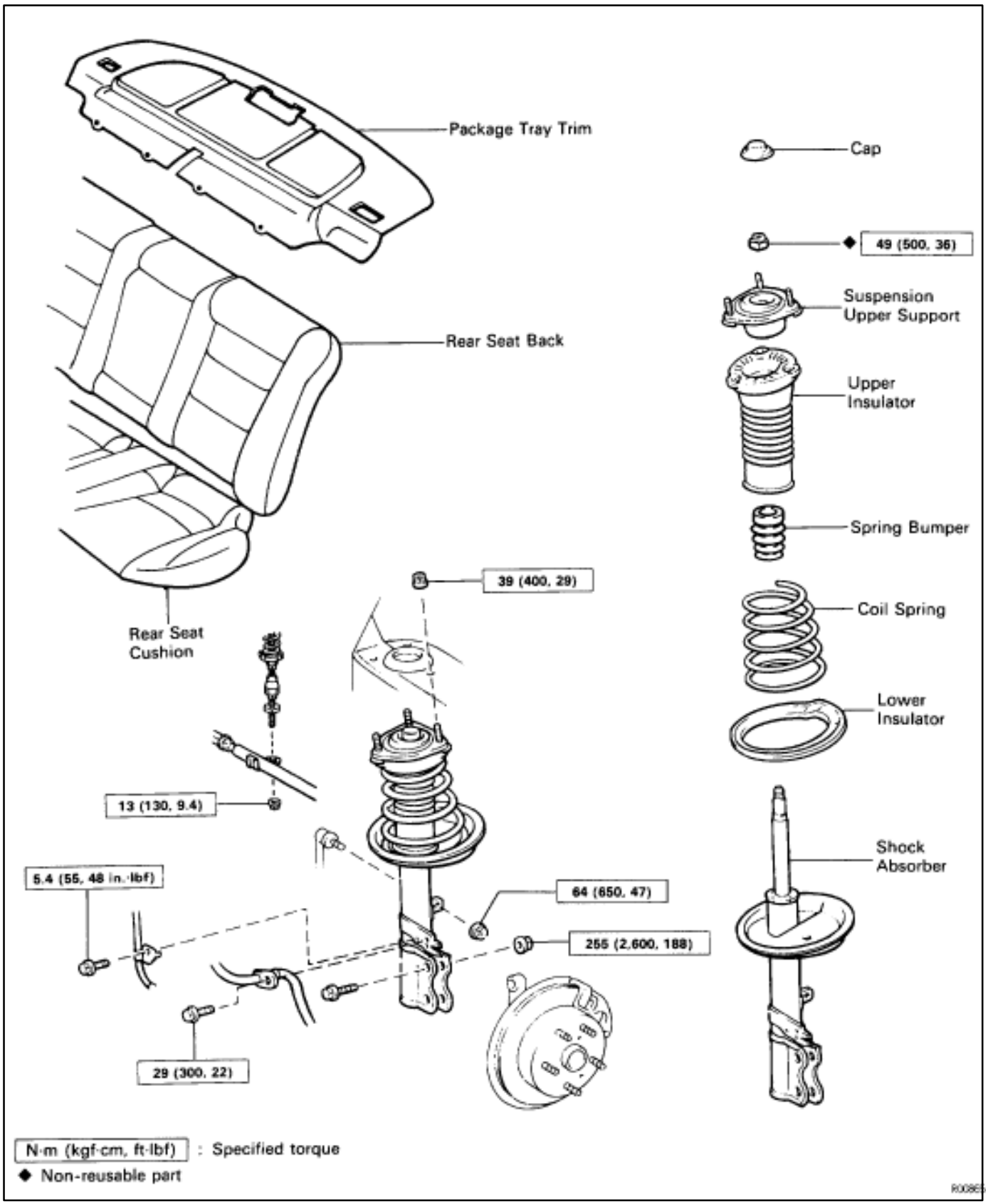
SA03M–01

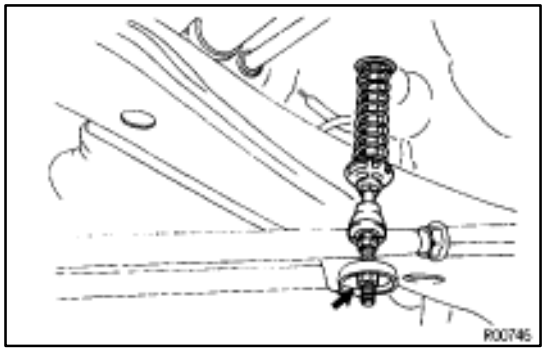
Torque wrench	

REAR SHOCK ABSORBER

SA03N–01

COMPONENTS

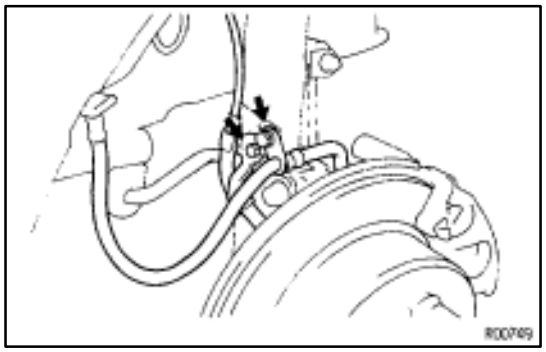




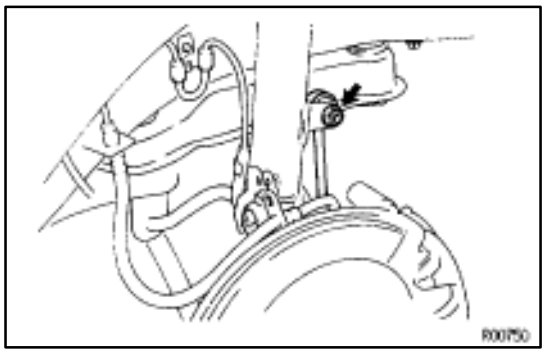
REAR SHOCK ABSORBER REMOVAL

SA03P–02

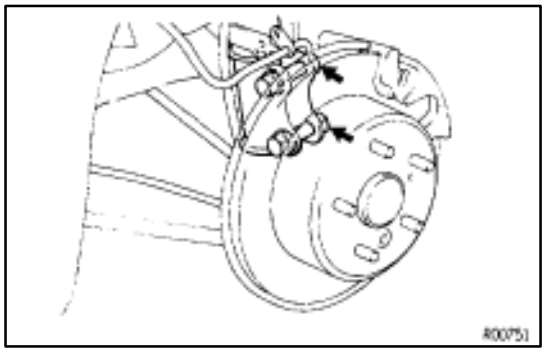
1. **REMOVAL REAR SEAT AND PACKAGE TRAY TRIM (See BO section)**
2. **JACK UP VEHICLE AND REMOVE REAR WHEEL**
3. **DISCONNECT LSPV SPRING FROM LOWER ARM**



4. **REMOVE ABS SPEED SENSOR WIRE AND BRAKE HOSE FROM SHOCK ABSORBER**

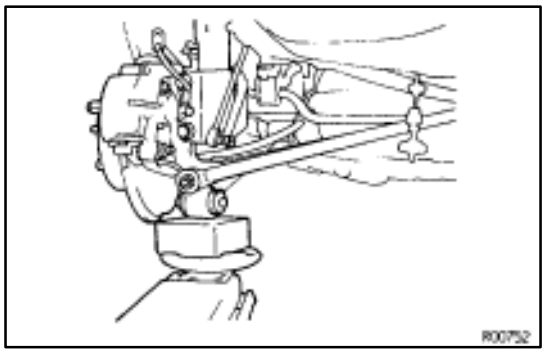


5. **DISCONNECT STABILIZER BAR LINK FROM SHOCK ABSORBER**

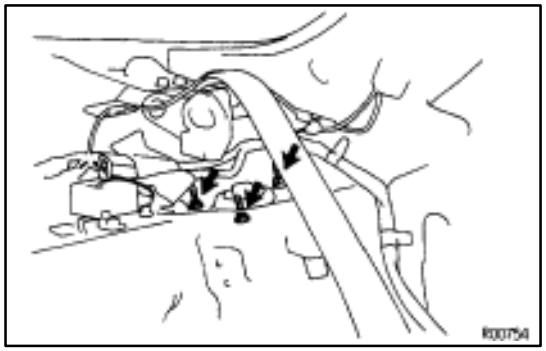


6. **REMOVE SHOCK ABSORBER WITH COIL SPRING**

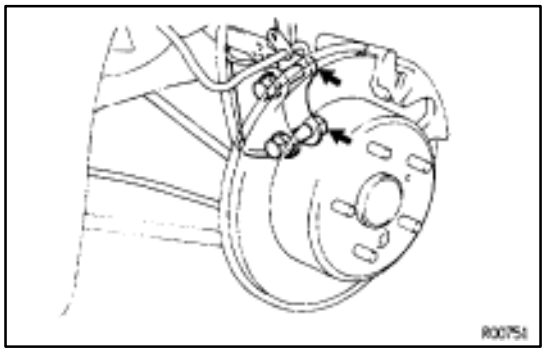
(a) Loosen the two nuts on lower side of shock absorber.



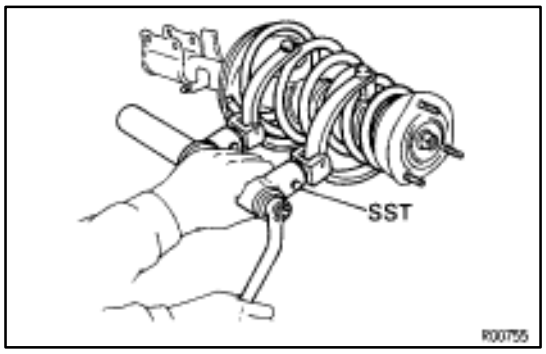
(b) Support the rear axle carrier with a jack.



(c) Remove the three nuts of upper support.

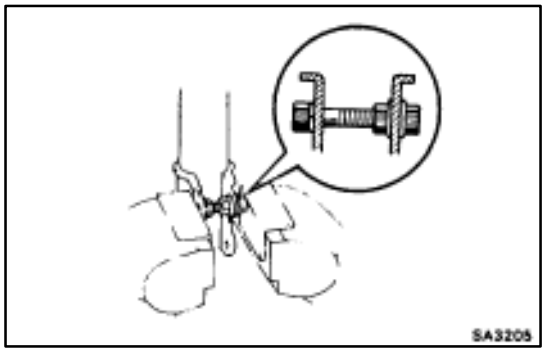


(d) Lower the rear axle carrier and remove the two bolts.
(e) Remove the shock absorber with coil spring.

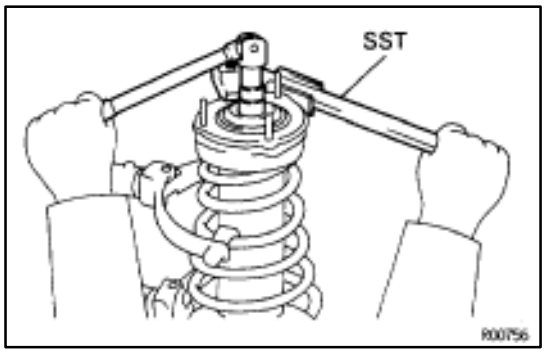


7. REMOVE COIL SPRING

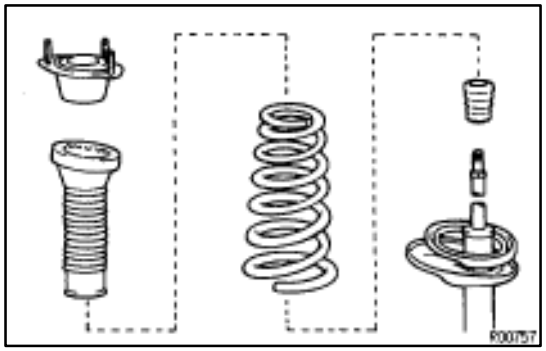
(a) Remove the cap.
(b) Using SST, compress the coil spring.
SST 09727–30020



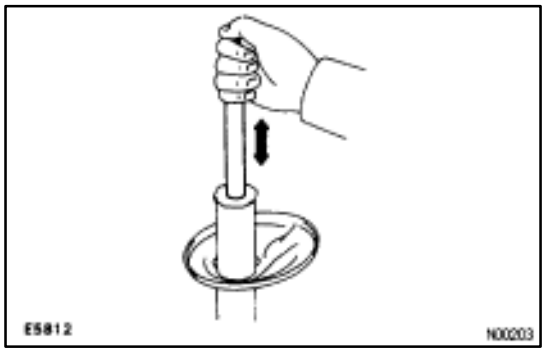
(c) Install a bolt and two nuts to the bracket at the lower portion of the shock absorber and secure it in a vice.



(d) Using SST to hold the upper support, remove the nut.
SST 09729–22031



(e) Remove the following parts.
- Suspension upper support
- Upper insulator
- Coil spring
- Spring bumper
- Lower insulator



REAR SHOCK ABSORBER INSPECTION

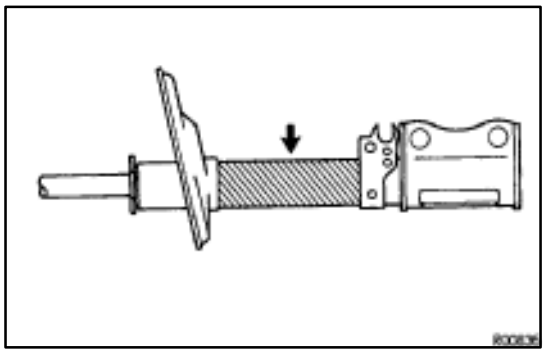
SA03Q–01

1. 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, use the following procedure.



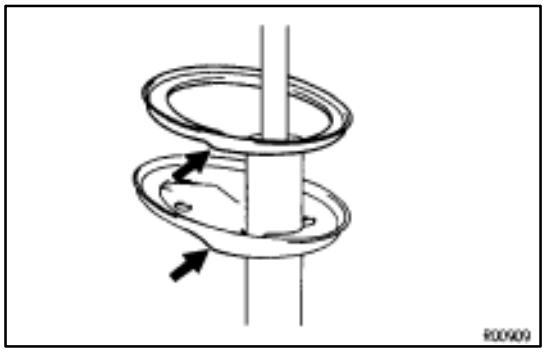
REAR SHOCK ABSORBER DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD

2. DRILL HOLE TO REMOVE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown to remove the gas inside.

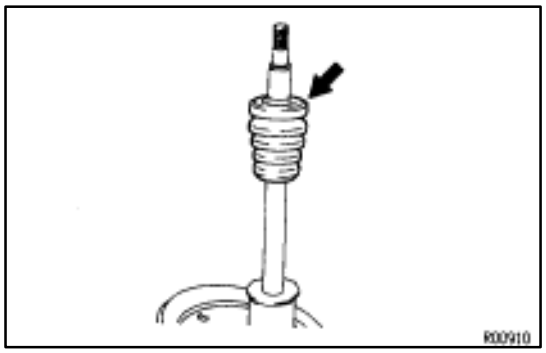
CAUTION: The gas coming out is harmless, but be careful of ships which may fly up when drilling.



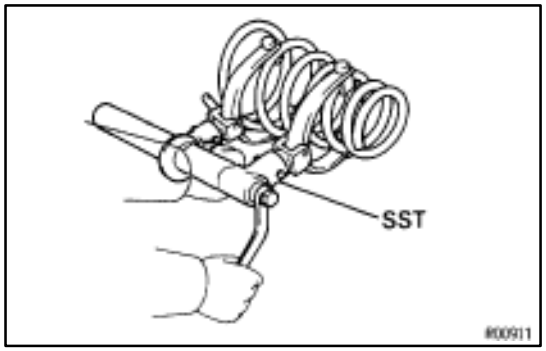
REAR SHOCK ABSORBER INSTALLATION

SA03R–02

1. INSTALL LOWER INSULATOR ONTO SHOCK ABSORBER

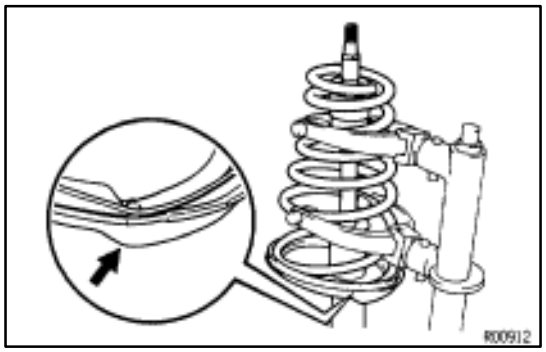


2. INSTALL SPRING BUMPER TO PISTON ROD

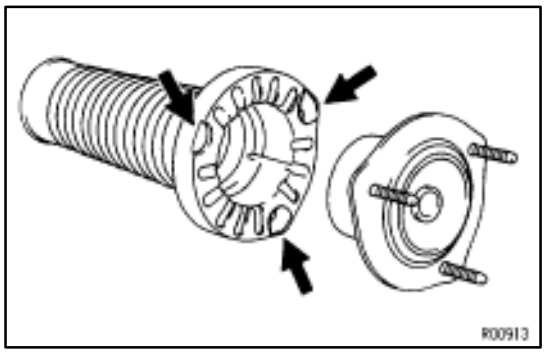


3. INSTALL COIL SPRING

(a) Using SST, compress the coil spring
SST 09727–30020

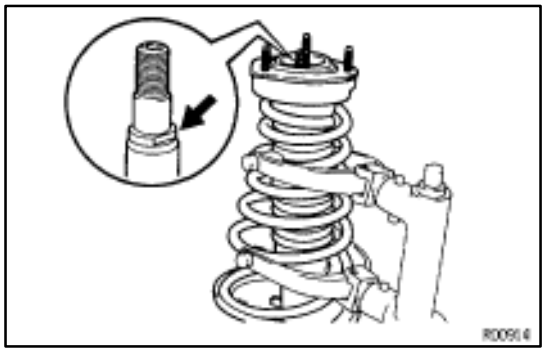


(b) Install the coil spring to the shock absorber.
HINT: Fit the lower end of the coil spring into the gap of the lower seat.

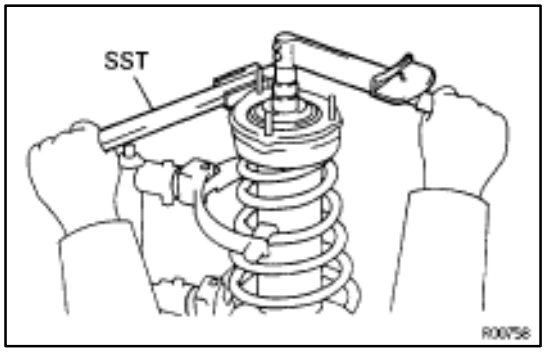


4. INSTALL UPPER INSULATOR AND UPPER SUPPORT

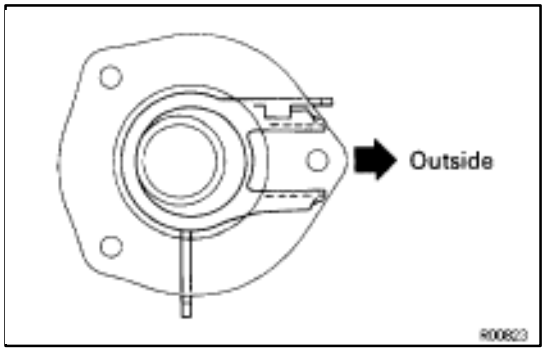
(a) Install the upper insulator to the upper support.
HINT: Match the bolt of the upper support with the cut–off part of the insulator.



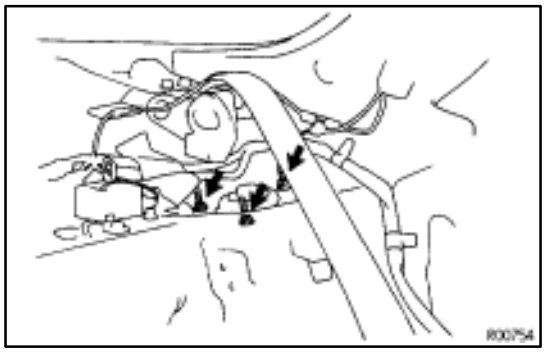
(b) Install the upper support to the piston rod.



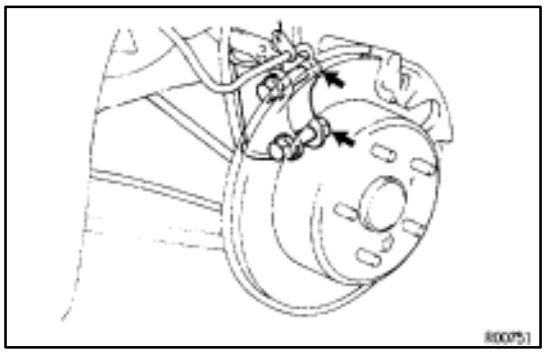
(c) Using SST to hold the upper support, install a new nut.
SST 09729–22031
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



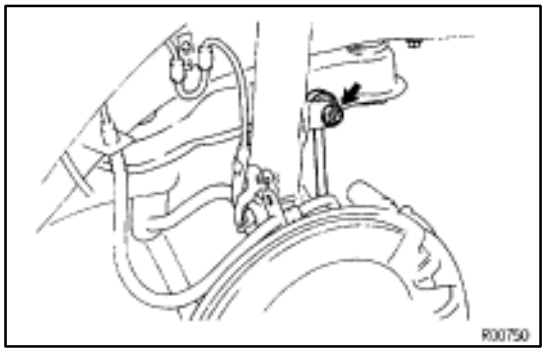
(d) Rotate the upper support and set it in the direction shown in the illustration.
(e) Remove the SST.
HINT: After removing SST, again check the direction of the upper support.
(f) Install the cap.



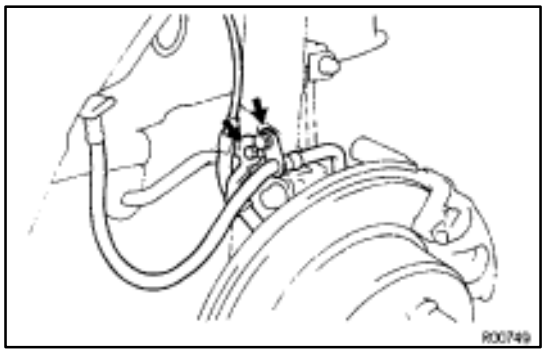
5. INSTALL SHOCK ABSORBER WITH COIL SPRING
Place the shock absorber and install the three nuts of upper support.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



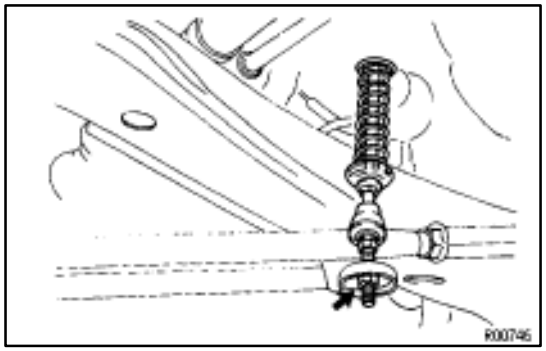
6. CONNECT SHOCK ABSORBER TO REAR AXLE CARRIER
(a) Coat the threads of the nuts with engine oil.
(b) Install the two bolts and nuts.
Torque: 255 N·m (2,600 kgf·cm, 188 ft·lbf)



7. CONNECT STABILIZER BAR LINK TO SHOCK ABSORBER
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



8. INSTALL ABS SPEED SENSOR WIRE AND BRAKE HOSE TO SHOCK ABSORBER
Brake hose
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
ABS wire
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



9. CONNECT LSPV SPRING FROM LOWER ARM
Torque: 13 N·m (130 kgf·cm, 94 ft·lbf)

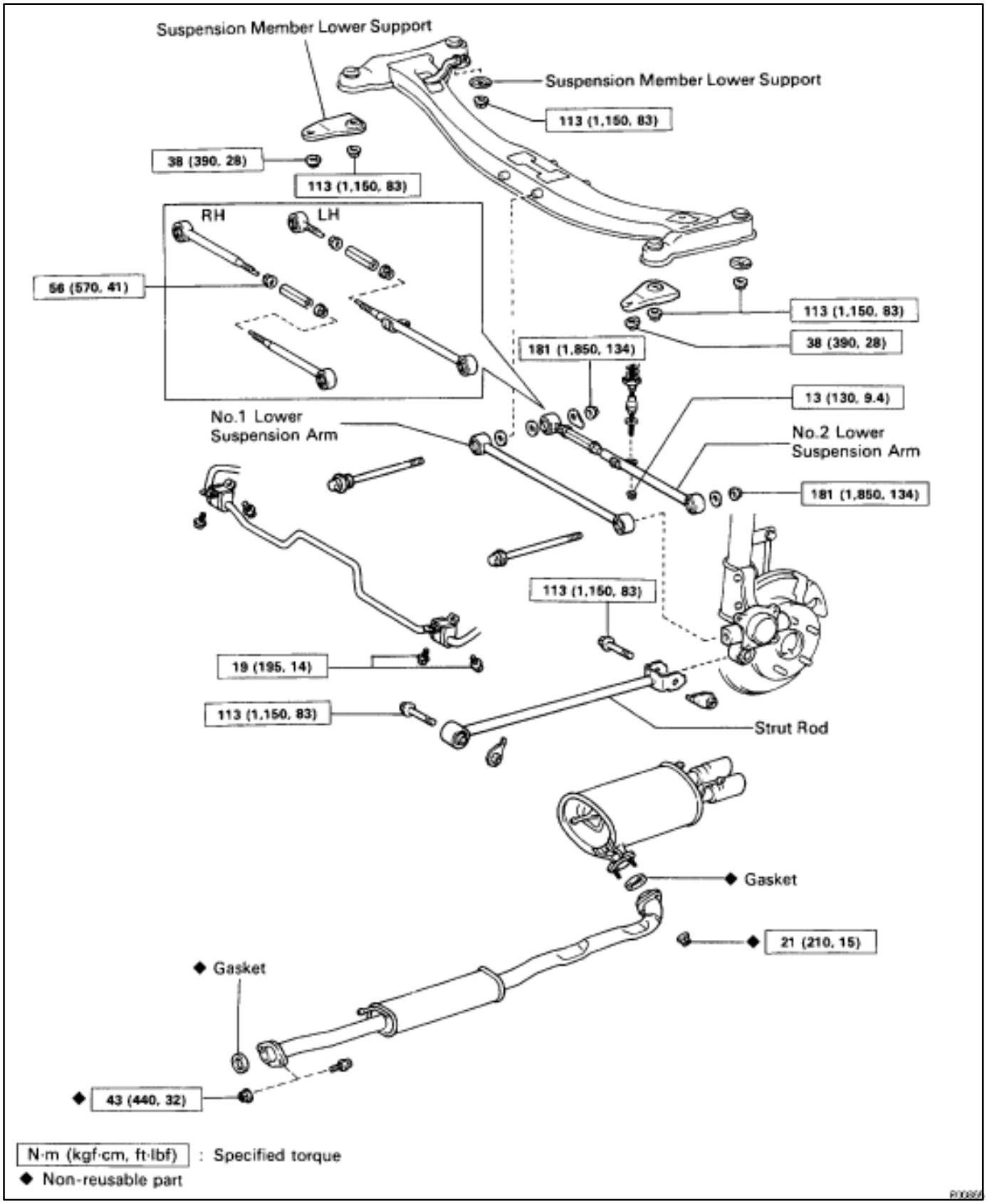
10. INSTALL REAR WHEEL AND LOWER VEHICLE
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

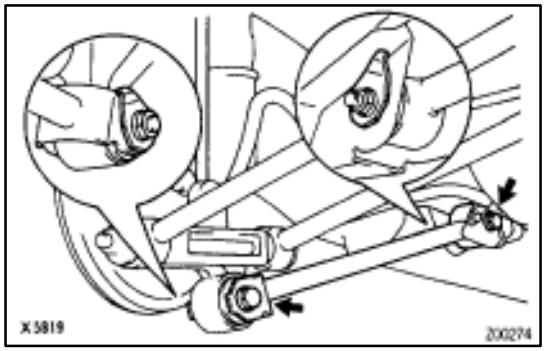
11. INSTALL PACKAGE TRY TRIM AND REAR SEAT (See BO section)

LOWER SUSPENSION ARM AND STRUT ROD

SA03S–01

COMPONENTS





LOWER SUSPENSION ARM AND STRUT ROD REMOVAL

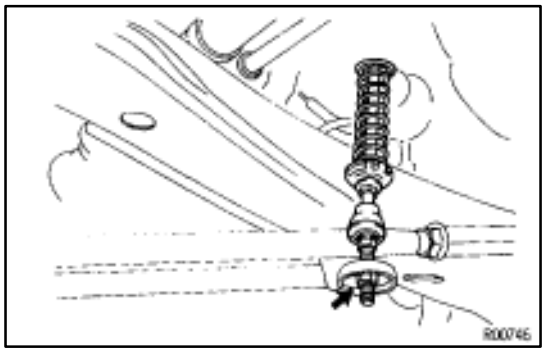
SA03T–02

1. JACK UP VEHICLE AND REMOVE REAR WHEEL

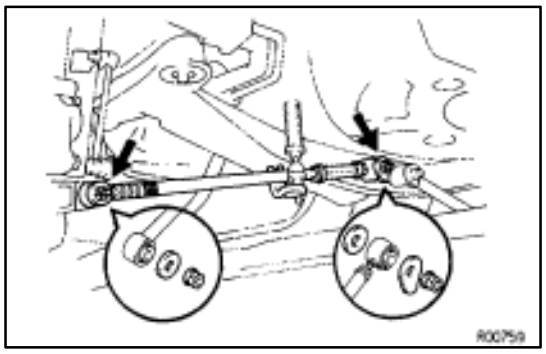
2. REMOVE STRUT ROD

(a) Remove the two bolts and nuts.

(b) Remove the strut rod.



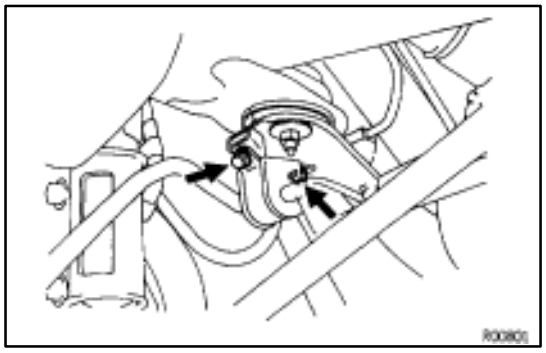
3. DISCONNECT LSPV SPRING FROM LOWER ARM



4. REMOVE NO.2 LOWER SUSPENSION ARM

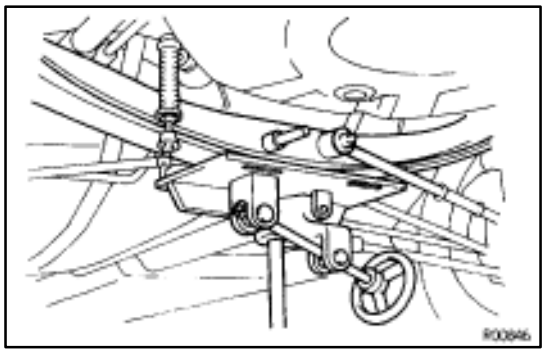
(a) Remove the two nuts and washers.

(b) Remove the No.2 lower suspension arm.



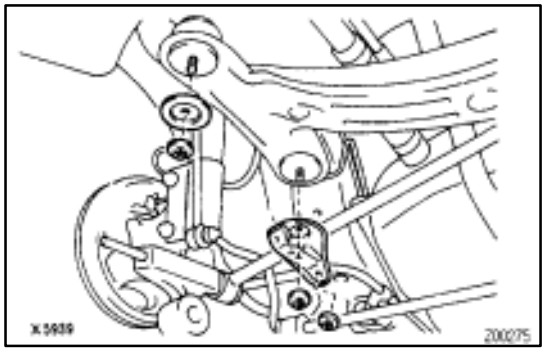
5. REMOVE LEFT AND RIGHT STABILIZER BUSHING RETAINER

6. REMOVE EXHAUST CENTER PIPE AND TALE PIPE (See EG section)

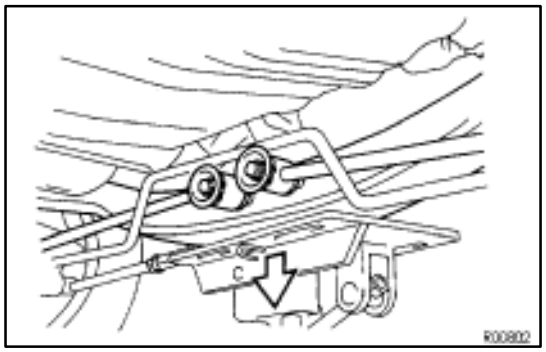


7. REMOVE NO.1 LOWER SUSPENSION ARM

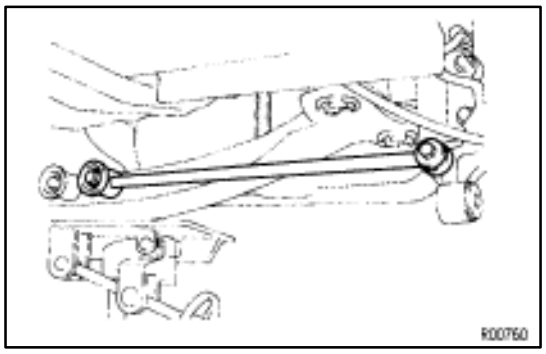
(a) Support the suspension member with a jack.



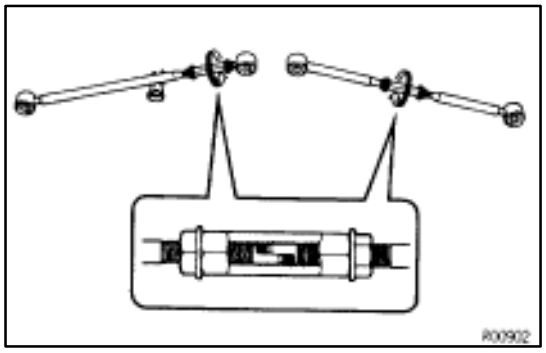
(b) Remove the six nuts and the left and right suspension member lower stopper.



(c) Lower the suspension member.



(d) Remove the No.1 lower suspension arm with the two bolts and the washer.

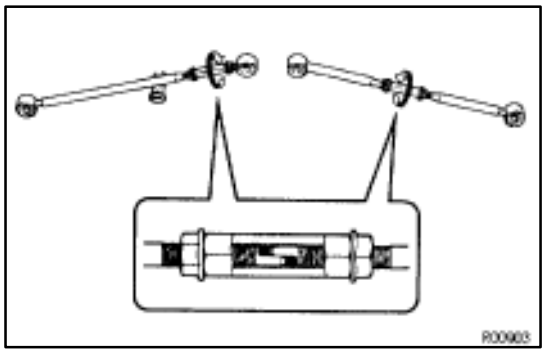


NO.2 LOWER SUSPENSION ARM DISASSEMBLY

SA03U–01

1. DISASSEMBLE NO.2 LOWER SUSPENSION ARM

(a) Loosen the two lock nuts.
(b) Turn the adjusting tube and disassemble the No.2 lower suspension arm.
(c) Remove the lock nuts from the arms.

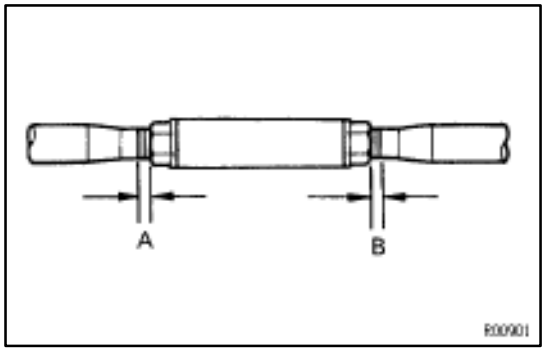


NO.2 LOWER SUSPENSION ARM ASSEMBLY

SA03V–01

1. ASSEMBLE NO.2 LOWER SUSPENSION ARM

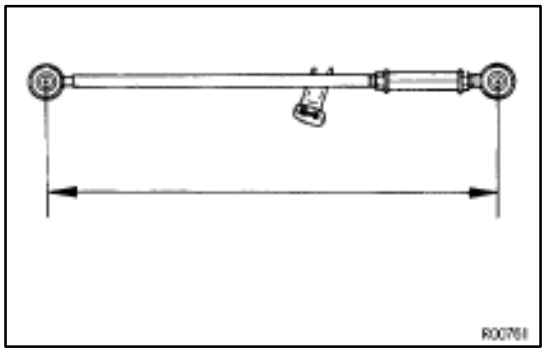
(a) Install the lock nuts to the arms.
(b) Turn the adjusting tube and assemble the No.2 lower suspension arm.



HINT: When assembling the No.2 lower suspension arm, try to make dimensions A and B shown in the illustration as close as possible.

Maximum difference:

3 mm (0.12 in.)



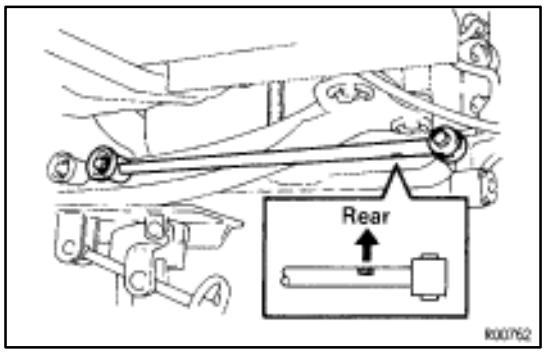
(c) Adjust the No.2 lower suspension arm length by turning the adjusting tube.

Arm length:

584.2 mm (23.000 in.)

(d) Temporarily tighten the two lock nuts.

HINT: After adjusting the rear wheel alignment, torque the lock nuts.



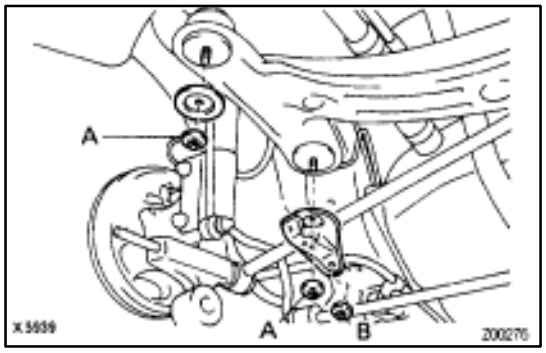
LOWER SUSPENSION ARM AND STRUT ROD INSTALLATION

SA03W–02

1. INSTALL NO.1 LOWER SUSPENSION ARM

Install the No.1 lower suspension arm with the washer and the two bolts.

HINT: Face the paint mark to the rearward.



2. INSTALL SUSPENSION MEMBER TO BODY

(a) Jack up the suspension member.

(b) Install the suspension member lower supports and the six nuts.

Nut A:

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

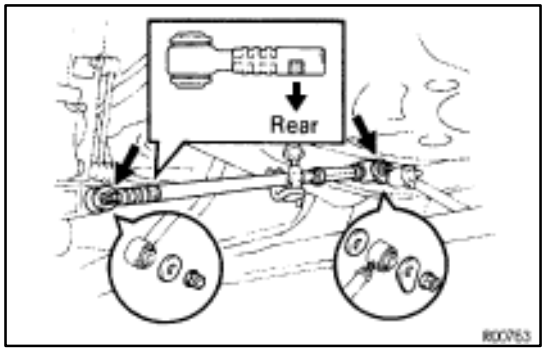
Nut B:

Torque: 38 N·m (390 kgf·cm, 28 ft·lbf)

3. INSTALL LEFT AND RIGHT STABILIZER BUSHING RETAINERS

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

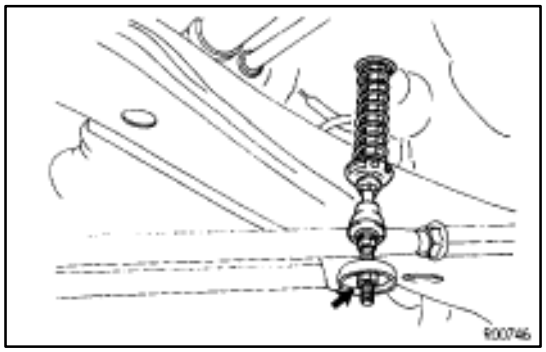
4. INSTALL EXHAUST CENTER PIPE AND TALE PIPE (See EG section)



5. INSTALL NO.2 LOWER SUSPENSION ARM

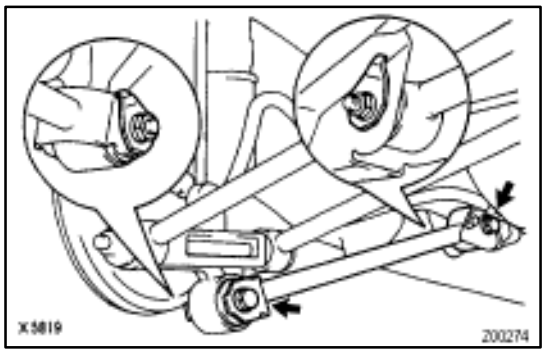
(a) Install the No.2 lower suspension arm with the three washers.
HINT: Face the paint mark to the rearward.

(b) Temporarily install the two lock nut.



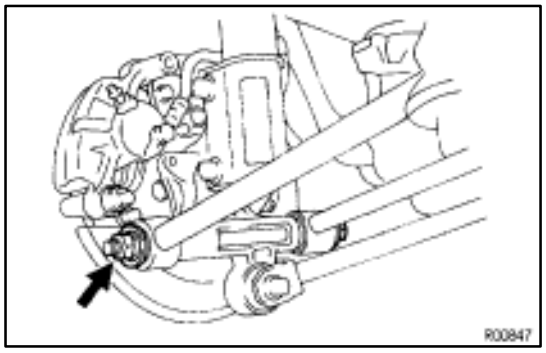
6. CONNECT LSPV SPRING TO LOWER ARM

Torque: 13 N·m (130 kgf·cm, 9.4 ft·lbf)



7. INSTALL STRUT ROD

Place the strut rod and temporarily install the two bolts and nuts.

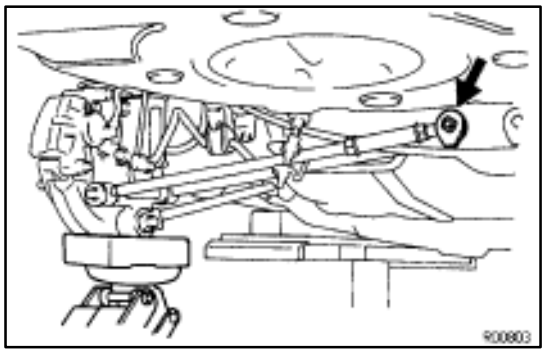


8. TORQUE BOLTS AND NUTS

(a) Torque the nut on outside of the lower arm.
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

(b) Install the rear wheel and lower the vehicle.

(c) Bounce the vehicle up and down several times to stabilized suspension.

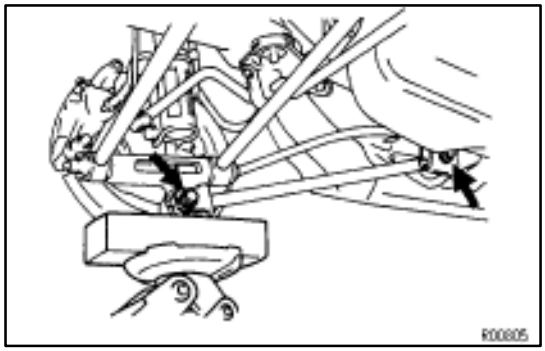


(d) Jack up the vehicle and support the body with stands.

(e) Remove the rear wheel.

(f) Support the rear axle carrier with a jack.

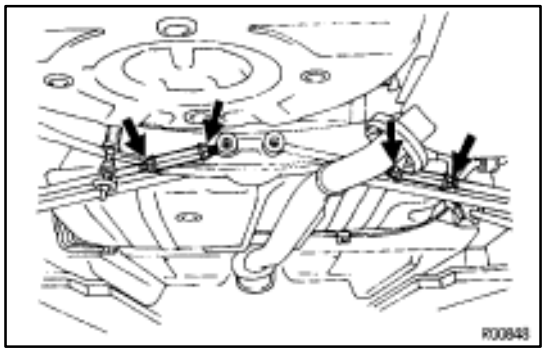
(g) Torque the nut on inside of lower arm.
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)



(h) Torque the strut rod set bolts.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

9. INSTALL REAR WHEEL AND LOWER VEHICLE

10. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

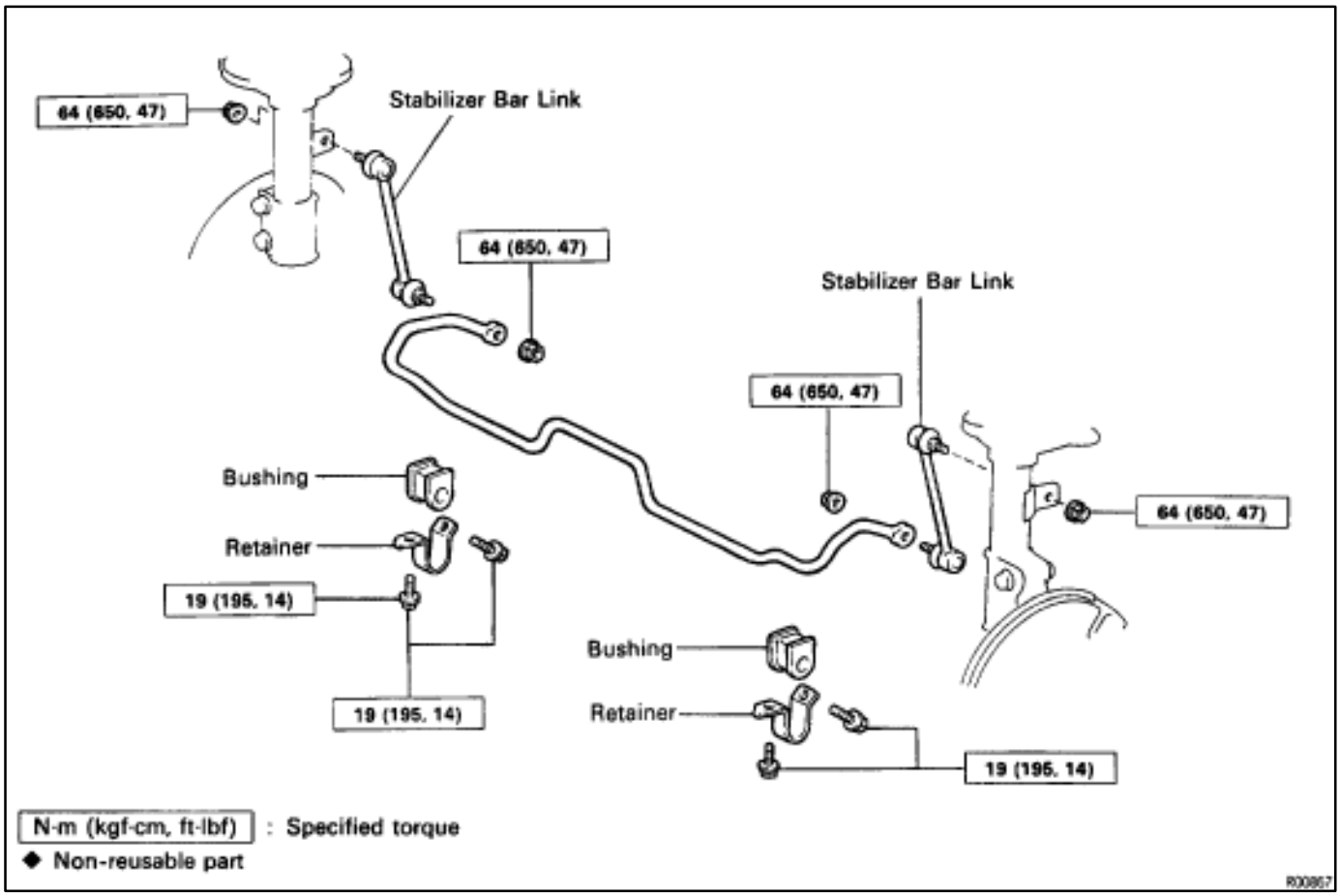


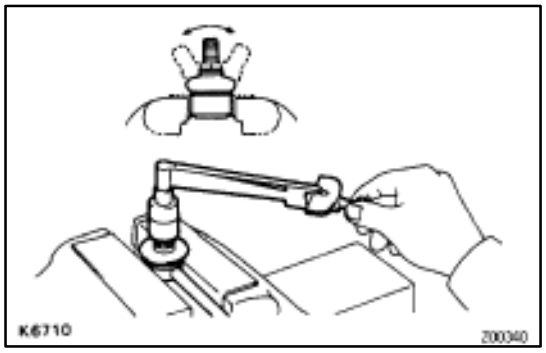
11. TORQUE NO.2 LOWER SUSPENSION ARM LOCK NUTS
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

STABILIZER BAR

SA03X–01

COMPONENTS





STABILIZER BAR LINK INSPECTION

SA03Y–01

INSPECT BALL JOINT FOR ROTATION CONDITION

(a) Flip the ball joint stud back and forth 5 times as shown in the figure, before installing the nut.

(b) Using a torque gauge, turn the nut continuously one turn each 2 , 4 seconds and take the torque reading on the fifth turn.

Turning torque:

0.05–1.0 N·m (0.5–10 kgf·cm, 0.4–8.7 in.·lbf)

If not within specification, replace the stabilizer bar link.

SERVICE SPECIFICATIONS

SA043–01

SERVICE DATA

V00511

Cold tire inflation pressure	Tire size		Pressure	
			Front	Rear
	205/65R15		180 kPa (1.8 kgf/cm^2, 26 psi)	180 kPa (1.8 kgf/cm^2, 26 psi)
Vehicle height	Front		211 mm (8.31 in.)	
	Rear		259 mm (10.20 in.)	
Front wheel alignment	Toe–in (total)		0° ± 0.2° (0 ± 2 mm, 0 ± 0.08 in.)	
	Wheel angle	Inside wheel	35°55’ ± 2°	
		Outside wheel	31°15’ (reference)	
	Camber		–0°40’ ± 45’	
	Cross camber		45’ or less	
	Caster		1°15’ ± 45’	
	Cross caster		45’ or less	
	Steering axis inclination		13°05’ ± 45’	
Rear wheel alignment	Toe–in (total)		0.4° ± 0.2° (4 ± 2 mm, 0.16 ± 0.08 in.)	
	Camber		–0°30’ ± 45’	
	Cross Camber		45’ or less	
Front axle	Axle bearing backlash		0.05 mm (0.0020 in.) or less	
	Axle hub deviation		0.05 mm (0.0020 in.) or less	
Front suspension	Lower ball joint turning torque		1.0–2.9 N·m (10–30 kgf·cm, 8.7–26 in.·lbf)	
	Stabilizer bar link turning torque		0.05–1.0 N·m (0.5–10 kgf·cm, 0.4–8.7 in.·lbf)	
Rear axle	Axle bearing backlash		0.05 mm (0.0020 in.) or less	
	Axle hub deviation		0.07 mm (0.0028 in.) or less	
Rear suspension	Stabilizer bar link turning torque		0.05–1.0 N·m (0.5–10 kgf·cm, 0.4–8.7 in.·lbf)	

TORQUE SPECIFICATIONS

SA047–01

(FRONT)

Part tightened	N·m	kgf·cm	ft·lbf
Tie rod end lock nut	74	750	54
Steering knuckle X Shock absorber	211	2,150	156
Steering knuckle X Brake cylinder	107	1,090	79
Steering knuckle X Tie rod end	49	500	36
Axle hub nut	294	3,000	217
Ball joint X Lower arm	127	1,300	94
Ball joint X Steering knuckle	123	1,250	90
Steering knuckle X Disc brake dust cover	8.3	85	74in.·lbf
Drive shaft X Side gear shaft	65	660	48
Drive shaft center bearing lock bolt	32	330	24
Suspension upper support X Body	80	820	59
Suspension upper support X Piston rod	49	500	36
Brake hose X Shock absorber	29	300	22
ABS speed sensor wire X Shock absorber	5.4	55	48in.·lbf
Lower arm set bolt	206	2,100	152
Lower arm X Stabilizer bar link bracket	56	570	41
Stabilizer bar bushing retainer	19	195	14
Stabilizer bar link set nut	64	650	47
Steering gear box set bolt	181	1,850	134

(REAR)

Part tightened	N·m	kgf·cm	ft·lbf
Brake cylinder X Rear axle carrier	47	475	34
Axle bearing set bolt	80	820	59
Shock absorber X Rear axle carrier	255	2,600	188
Brake hose X Shock absorber	29	300	22
ABS speed sensor set bolt	7.8	80	69in.·lbf
ABS speed sensor wire X Shock absorber	5.4	55	48in.·lbf
Suspension upper support X Body	39	400	29
Suspension upper support X Piston rod	49	500	36
Lower suspension arm X Suspension member	181	1,850	134
Lower suspension arm X Rear axle carrier	181	1,850	134
Strut rod X Body	113	1,150	83
Strut rod X Rear axle carrier	113	1,150	83
Suspension member X Body (17mm)	113	1,150	83
Suspension member X Body (14mm)	38	390	28
LSPV spring X Lower suspension arm	13	130	9.4
8Stabilizer bar bushing retainer	19	195	14
Stabilizer bar link set nut	64	650	47

LEXUS

Technical Service Information Bulletin

April 3, 1998

Title:

R-12 AIR CONDITIONER SYSTEM RETROFIT

Models:

'90–'93 ES 250/300, SC 400/300, LS 400

TSIB

Introduction

The following information should be used for guidance when retrofitting vehicle air conditioning systems from R–12 to R134a refrigerant.

Affected Vehicles

- **1990–1992** model year **LS 400, 1990–1991** model year **ES 250, 1992–1993** model year **ES 300, 1992–1993** model year **SC 300, 1992–1993** model year **SC 400**

Parts Information

All parts required for retrofit are available through the normal parts system:

IDENTIFICATION		REQUIRED PARTS & MATERIALS			
MODEL	COMPRESSOR	RETROFIT SET	RECEIVER	ND OIL 8	CHARGE
LS 400	10PA20	88840–33020 (1) plus 90099–14044 (2) 90099–14045 (1)	88471–16050	170 cc	1000 g
ES 250	10PA17V		88471–12040	100 cc	650 g
ES 300	10PA17		88471–16050	150 cc	900 g
SC 300					
SC400					

NOTE:

Retrofit Set 88840–33020 includes:

88374–33010	**Low pressure side service fitting adaptor (7/16–20 UNF)**
88374–33020	**High pressure side service fitting adaptor (3/8–20 UNF)**
88723–20040	**R134a "USE ONLY" label (ND Oil 8 for 10P, 10PA compressor)**
88723–33050	**Retrofit Caution Label**
90099–14046	**Piping O–rings for discharge hose (quantity 2)**

Required for all models (not included in set):

90099–14044	**Receiver O–rings (quantity 2)**
08885–09107	**ND–Oil 8**

Also available as needed:

88374–33040	**L–shaped low pressure side service fitting adaptor**
88374–33050	**L–shaped high pressure side service fitting adaptor**

Warranty Information

OP CODE	NWC	DESCRIPTION	TIME	OPN	T1	T2
Not Applicable to Warranty						

Table of Contents

Affected Vehicles ..... page 1
Service Precautions ..... page 3
Retrofit Kit Parts ..... page 1
Required Parts ..... page 2
Required Tools & Materials ... page 2
Retrofitting Overview ..... page 2
Repair Procedures ..... page 3
Warranty Information ..... page 1

Required Tools & Materials

A. Required Equipment:

1. R–12 recovery/recycling/recharging equipment
2. R134a recovery/recycling/recharging equipment
3. Measuring cylinder (for compressor oil)
4. Valve core remover for service valves
5. Air conditioner service tool set
6. Torque Wrench Set, P/N 00002–50284–01, includes the following*:
   - 14 mm 00002–51410–01
   - 17 mm 00002–51710–01
   - 22 mm 00002–52216–01
   - 27 mm 00002–52724–01

B. Required Parts & Materials: **

1. R134a Refrigerant
2. Service Fitting Adaptors
3. Caution Labels
4. ND–OIL 8 compressor oil (PAG type oil)
5. Receiver
6. O–Rings for compressor, line & hose connections ***
7. Loctite 262 or equivalent

* required size dependent upon model.
** see parts information section of this bulletin on page 1.
*** it is **not** necessary to replace any O–rings on ES 300, SC 300 and SC 400 models.

Retrofitting Overview

A. Refrigerant and Oil Charges

- Oil and refrigerant charge amounts are different after the R–12 system has been retrofitted to R134a. Refrigerant charge amounts are less, while oil charge amounts are greater, compared to R–12 system requirements. Refer to the **ND OIL 8** and **CHARGE** columns in “Parts Information” table on page 1 for proper amounts.

B. System Performance

- A slight decrease in system performance may be noticed on some vehicles under certain operating conditions.

C. Refrigerant Pressures

- R134a high side pressures are greater than that of R–12 above ambient temperatures of 68˚F.

D. Flushing Requirements

- There is no need to remove or flush R–12 mineral oil from the system. Simply charge the system with the specified amount of ND–Oil 8 to provide proper lubrication.

E. Use of Sight Glass

- Mineral based R–12 oil remains and circulates in the A/C system and does not dissolve in R134a refrigerant. This results in a cloudy appearance at the sight glass making it impossible to judge the refrigerant charge amount by using the sight glass method. To prevent misdiagnosis on retrofit vehicles, apply black paint to the sight glass on block–joint (FF) type Receivers. Union–nut joint (BAG) type retrofit Receivers are manufactured without a sight glass.

Service Precautions

A. Refrigerant handling
1. Do not handle refrigerant in an enclosed area or near an open flame.
2. Always wear eye protection.
3. Avoid getting liquid refrigerant in your eyes or on your skin.
4. Never heat a container with an open flame.
5. Keep containers below 104˚F.
6. When heating a refrigerant can with water, keep the valve above water.
7. Never reuse empty service cans.

B. Replacing parts
1. Plug off any open connections to prevent the entry of moisture and dust.
2. Do not remove plugs from Receiver ports until it is ready for installation.

C. Tightening connecting parts
1. Apply a few drops of ND–Oil 8 compressor oil to O–ring fittings before tightening.
2. Avoid twisting refrigerant piping when installing R134a service fitting adapters.
3. Tighten all fittings to specified torque.

D. Recharging with A/C “on”
1. Never open the high side valve with the engine running.
2. Never run the A/C system when low on refrigerant as compressor damage may occur.
3. Never charge the system with liquid refrigerant with the engine running.
4. Be careful not to overcharge the system.

NOTE:
Oil removed during R–12 evacuation should not be used with an R134a System.

Repair Procedure

A. Vehicle Inspection:
- Ensure the integrity of the A/C system before proceeding with retrofit.

B. Recover R–12 using R–12 recovery/recycling/recharging equipment:
- Follow Lexus recommended procedure.

C. Install R134a service fitting adapters:
1. Remove valve cores from R–12 service fittings and discard.
2. Clean external threads of the R–12 service fittings.
3. Apply adhesive to threads (Loctite 262 or equivalent), screw on R134a adapter fittings, and tighten to **13** ft–lb.

NOTE:
Vehicles with more than 2 service fittings will require the installation of additional adaptors. All service fittings must have R134a adaptors installed.

D. Replace piping and hose O–rings:
1. Disconnect discharge hose from compressor.
2. Remove and discard old O–rings.
3. Lubricate with ND–Oil 8 and install **new** O–rings.
4. Disconnect discharge hose from condenser.
5. Lubricate and install retrofit O–rings with ND–Oil 8.
6. Reconnect hoses and torque to specification. (Specifications can be found in applicable manuals/guides.)

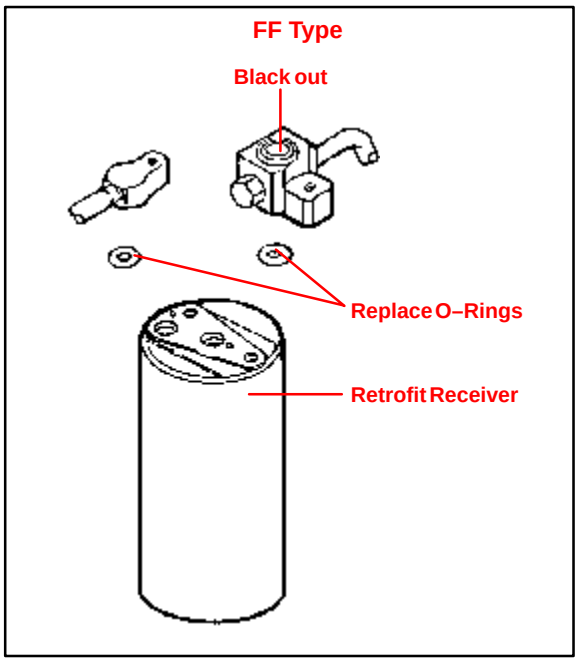
Repair Procedure (continued)

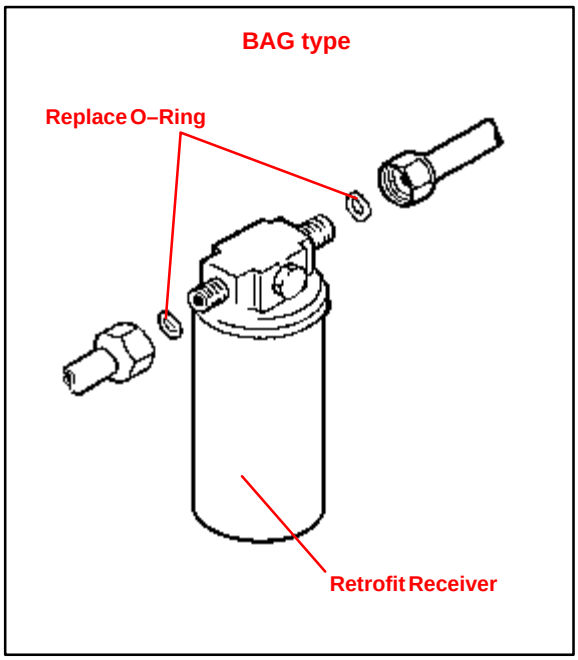
E. Replace Receiver
   1. Remove original R–12 Receiver and discard.
   2. Measure oil and pour 1/2 of specified amount of oil into the **"OUT"** side of new Receiver (see table on page 1 for amount).
   3. Black out the sight glass on block – joint – type Receiver with black paint.
   4. Lubricate and install the O–rings on the Receiver connections.
   5. Install Receiver.

F. Using **R134a** Recovery equipment, evacuate, charge, and leak test the system (Use equipment manufacturer's recommended procedure).
   1. Evacuate for 45 minutes.
   2. Vacuum check.
   3. If vacuum check is OK, add remaining 1/2 compressor oil using the recovery equipment.
      - Using recovery / recycling / recharging equipment charge the system with the remaining ½ of the specified amount of oil from step **E2**.
   4. Charge system with specified amount of **R134a**. (reference table on page 1).
   5. Perform a gas leak check.

G. Confirm cooling performance of Air Conditioning system.

H. Install retrofit labels:
   1. Choose **R134a "USE ONLY"** label for proper oil type (**ND–OIL 8**).
   2. Using a ball point pen, enter the proper retrofit refrigerant and oil charges on the caution label.
   3. Cross out unused type of compressor oil on caution label.
   4. Affix labels in a prominent location such as radiator support, underside of hood, or suspension tower area.
   5. Remove any R–12 labels.





Technical Service Information Bulletin
December 16, 2004

Title:

SENSOR INSPECTION FOR AIR CONDITIONING SYSTEM

Models:

'90 – Current All Models

TSIB

Introduction

This service bulletin contains inspection procedures to more precisely confirm proper operation of the following temperature sensors of the air conditioning system. Follow the procedures in this service bulletin when inspecting these sensors. These contents will be reflected in future repair manuals.

- Room Temperature Sensor
- Ambient Temperature Sensor
- Air Duct Sensor
- Evaporator Temperature Sensor
- Solar Sensor
- Room Humidity Sensor

Applicable Vehicles

- **All 1990 – Current** model year **Lexus** vehicles.

Warranty Information

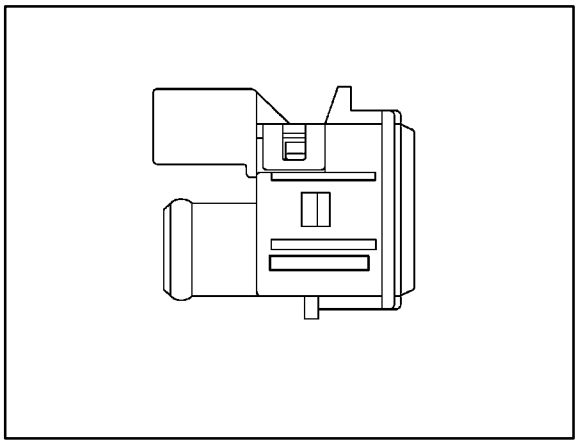
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Inspection Procedure

1. Inspect Room Temperature Sensor.

A. Measure the sensor resistance.

Resistance Value at 77°F (25°C)	1700 +/– 85Ω



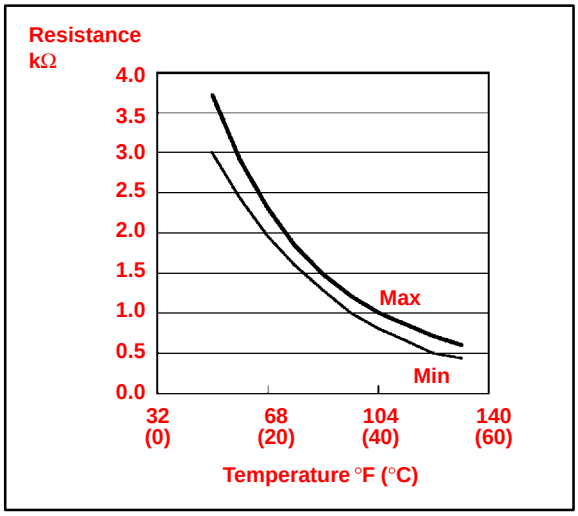
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	3.00 to 3.73
59 (15)	2.45 to 2.88
68 (20)	1.95 to 2.30
77 (25)	1.60 to 1.80
86 (30)	1.28 to 1.47
95 (35)	1.00 to 1.22
104 (40)	0.80 to 1.00
113 (45)	0.65 to 0.85
122 (50)	0.50 to 0.70
131 (55)	0.44 to 0.60
140 (60)	0.36 to 0.50

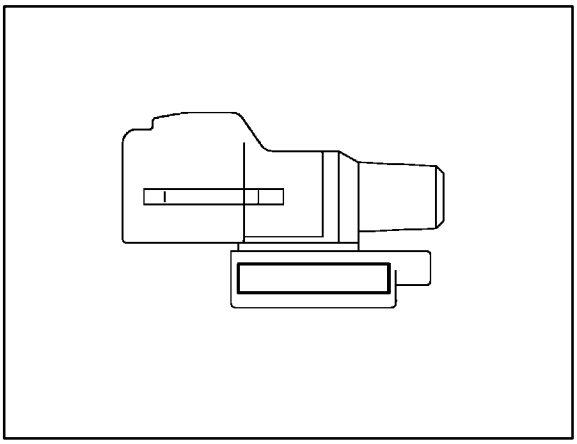


Inspection Procedure (Continued)

2. Inspect Ambient Temperature Sensor.

A. Measure the sensor resistance according to the selected graph (specification).

Resistance Value at 77°F (25°C)	1700 +/– 85Ω



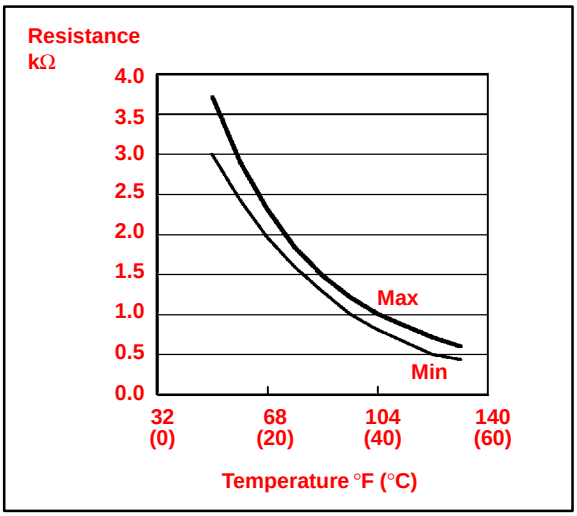
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	3.00 to 3.73
59 (15)	2.45 to 2.88
68 (20)	1.95 to 2.30
77 (25)	1.60 to 1.80
86 (30)	1.28 to 1.47
95 (35)	1.00 to 1.22
104 (40)	0.80 to 1.00
113 (45)	0.65 to 0.85
122 (50)	0.50 to 0.70
131 (55)	0.44 to 0.60
140 (60)	0.36 to 0.50



Inspection Procedure (Continued)

3. Inspect Air Duct Sensor.

A. Measure the sensor resistance according to the table and graph (specification).

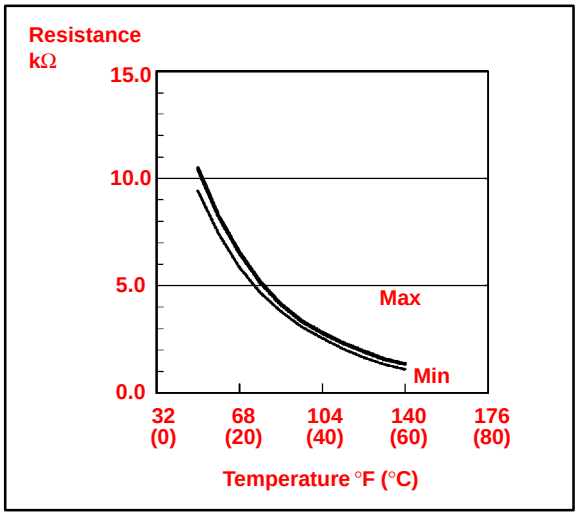
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

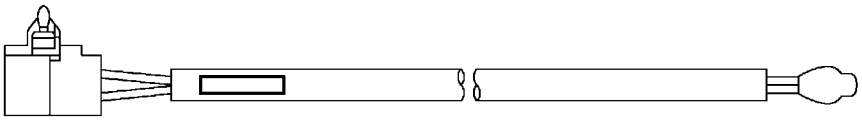
As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	9.48 to 10.49
59 (15)	7.50 to 8.28
68 (20)	5.95 to 6.57
77 (25)	4.77 to 5.25
86 (30)	3.85 to 4.21
95 (35)	3.12 to 3.40
104 (40)	2.53 to 2.79
113 (45)	2.06 to 2.30
122 (50)	1.69 to 1.91
131 (55)	1.39 to 1.59
140 (60)	1.15 to 1.33



Inspection Procedure (Continued)

4. Inspect Evaporator Temperature Sensor.



Select the appropriate graph (specification) using the following table.

NOTE:

Please inspect the sensors for model years not indicated by this bulletin, according to the instructions in the applicable repair manual.

MODEL	MODEL YEAR	COMMENTS	PART NUMBER	GRAPH
ES 300	1992 – 2001		88625–33070	2
ES 300/330	2002 – 2003		88625–17130	2
	2003		88625–33170	3
GS 300	1993 – 1997		88625–3A020	2
GS 300/400/430	1998 – 2002		88625–3A120	2
GX 470	2003 – 2005	Thermistor No. 1	88625–35050	3
		Thermistor No. 2	88625–16210	2
IS 300	2000 – 2001		88625–48010	2
LS 400	1990 – 1992		88625–32040	2
	1993 – 1994		88625–50100	2
	1995 – 2000		88625–50140	2
LS 430	2001 – 2005		88625–50160	2
LX 450	1996 – 1997		88625–60060	2
LX 470	1998 – 2000	Thermistor No. 2	88625–60140	2
	1998 – 2002	Thermistor No. 1	88625–60130	2
	2003 – 2005		88625–47011	2
RX 300	1998 – 2003		88625–48010	2
RX 330	2004	CBU	88625–48050	1
	2004 – 2005	CBU	88625–48060	3
		NAP		
SC 300/400	1991 – 2000		88625–32040	2

Inspection Procedure (Continued)

A. Measure the sensor resistance according to the selected graph (specification).

NOTE:

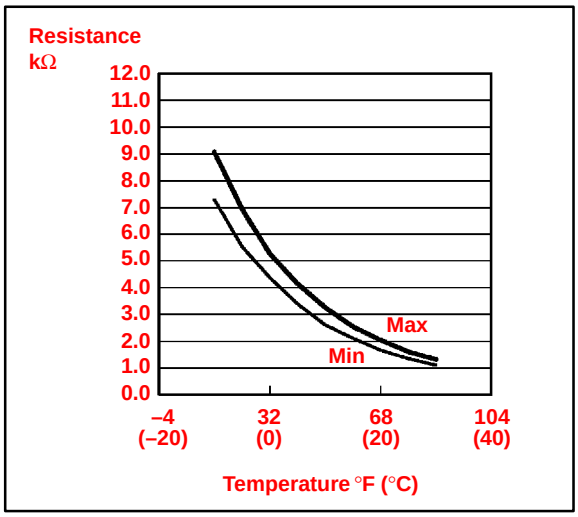
- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

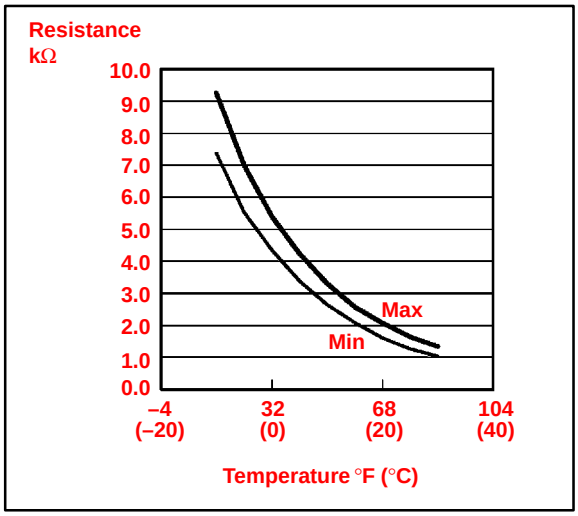
Graph 1:

TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	7.30 to 9.10
23 (–5)	5.65 to 6.95
32 (0)	4.40 to 5.35
41 (5)	3.40 to 4.15
50 (10)	2.70 to 3.25
59 (15)	2.14 to 2.58
68 (20)	1.71 to 2.05
77 (25)	1.38 to 1.64
86 (30)	1.11 to 1.32



Graph 2:

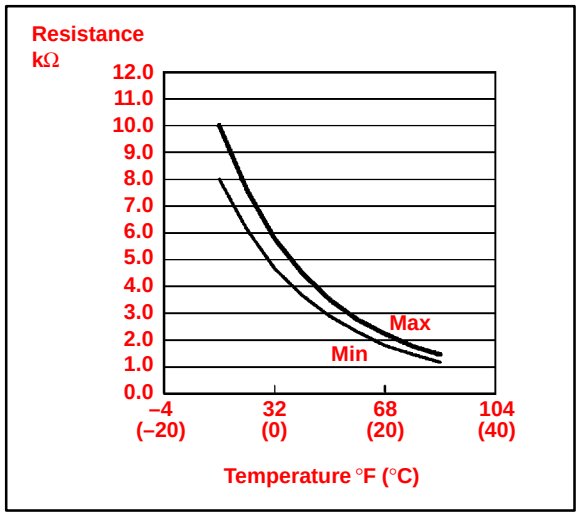
TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	7.40 to 9.20
23 (–5)	5.65 to 7.00
32 (0)	4.35 to 5.40
41 (5)	3.40 to 4.20
50 (10)	2.68 to 3.30
59 (15)	2.10 to 2.60
68 (20)	1.66 to 2.10
77 (25)	1.32 to 1.66
86 (30)	1.05 to 1.35



Inspection Procedure (Continued)

Graph 3:

TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	8.00 to 10.00
23 (–5)	6.15 to 7.65
32 (0)	4.75 to 5.85
41 (5)	3.70 to 4.55
50 (10)	2.91 to 3.55
59 (15)	2.32 to 2.80
68 (20)	1.85 to 2.22
77 (25)	1.48 to 1.77
86 (30)	1.20 to 1.43



Inspection Procedure (Continued)

5. Inspect Solar Sensor.

Four types of solar sensors are used on Lexus vehicles depending on the vehicle specifications. The inspection procedure for each type of sensor differs from the others. Select the appropriate inspection procedure from the table below according to vehicle specifications and perform the inspection.

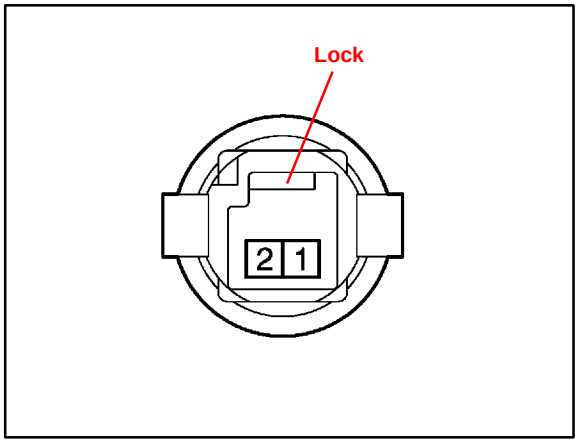
EQUIPPED WITH AUTOMATIC LIGHT CONTROL SYSTEM	A/C SYSTEM WITH RIGHT/LEFT INDEPENDENT TEMPERATURE CONTROL	INSPECTION PROCEDURE
No	No	A
No	Yes	B
Yes	Yes	C
Yes	No	D

Procedure A:

a. Disconnect the solar sensor connector.

b. Measure the resistance between terminals 1 and 2 of the solar sensor under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



NOTE:

- **Terminal 1 of the sensor is always on the right, when the lock is facing up.**
- **When using an analog tester, connect the positive (+) lead to terminal 2 and negative (–) lead to terminal 1 of the solar sensor.**

HINT:

If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Infinite ohms
When the sensor is exposed to light	Less than infinite resistance

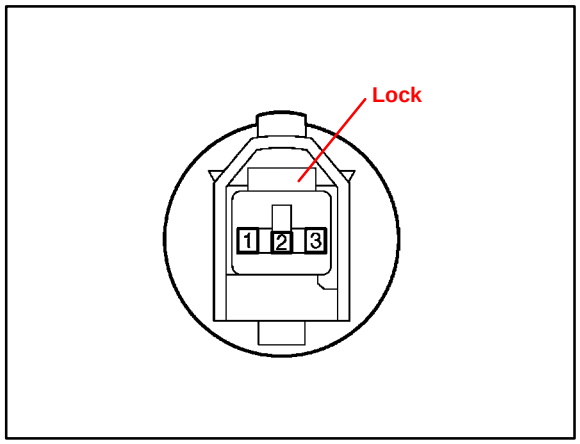
Inspection Procedure (Continued)

Procedure B:

a. Disconnect the solar sensor connector.

b. Measure the resistance between terminals 2 and 3 of the solar sensor under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



NOTE:

When using an analog tester, connect the positive (+) lead to terminal 3 and negative (–) lead to terminal 2 of the solar sensor.

HINT:

If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Infinite ohms
When the sensor is exposed to light	Less than infinite resistance

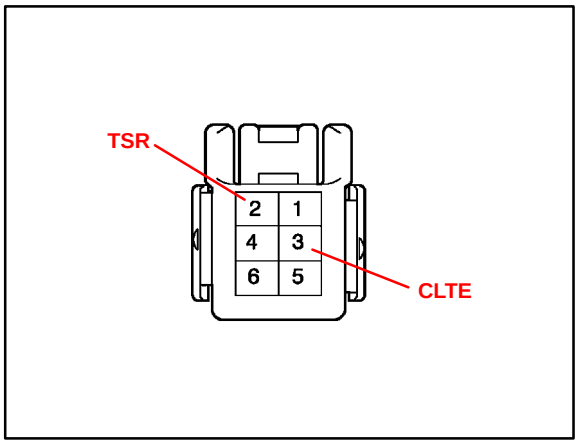
Inspection Procedure (Continued)

Procedure C:

a. Turn the ignition switch ON.

b. Measure the voltage between terminals TSR (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



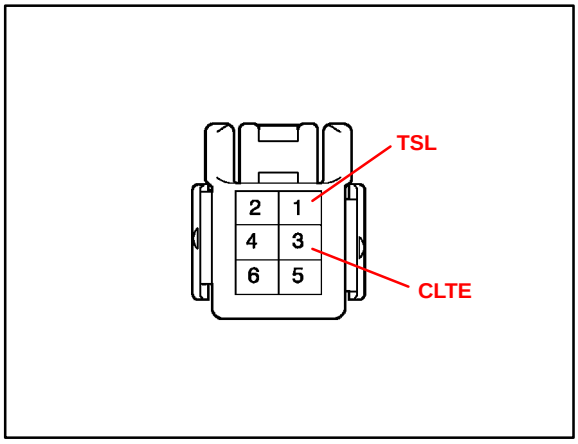
HINT:
- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

c. Measure the voltage between terminals TSL (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



HINT:
- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

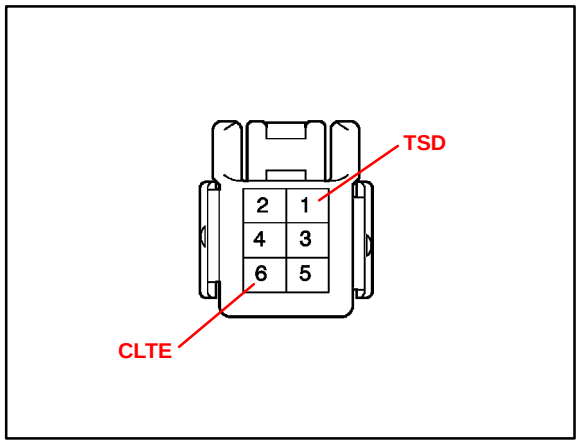
Inspection Procedure (Continued)

Procedure D:

a. Turn the ignition switch ON.

b. Using the tester, measure the voltage between terminals TSD (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



HINT:

- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

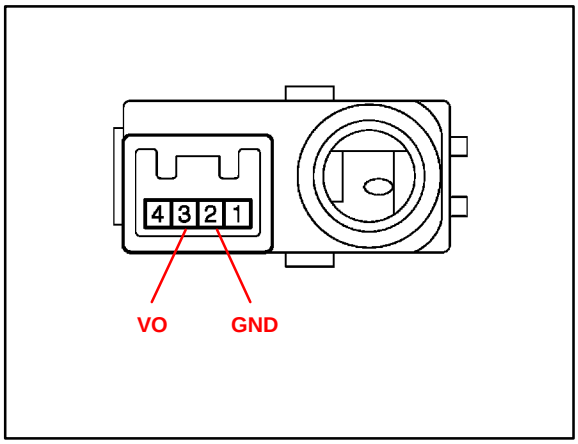
Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

Inspection Procedure (Continued)

6. Inspect Room Humidity Sensor.

Measure the humidity and output voltage of the humidity sensor when the sensor is installed on the vehicle and the temperature at the humidity sensor position (room temperature sensor position) is 77°F (25°C).
If the output voltage is within the specifications according to the graph and table below, the sensor is normal.



HINT:

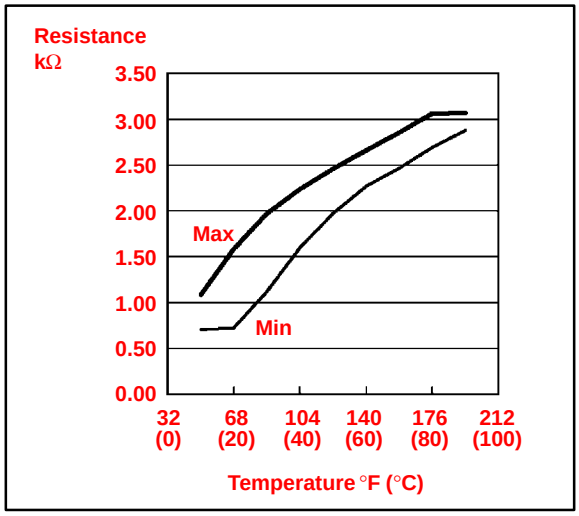
For the inspection procedure of the room temperature sensor, refer to "Room Temperature Sensor Inspection Procedure" in this bulletin.

A. Turn the ignition switch to the ON position.

B. Measure the voltage between terminal VO (3) and GND (2) of the room humidity sensor.

C. Measure the humidity and voltage when the room temperature (humidity sensor position) is 77°F (25°C). According to the result, determine whether the sensor is normal or not.

HUMIDITY (% RH)	OUTPUT VOLTAGE AT 77°F (25°C)
10	0.70 to 1.08 V
20	0.72 to 1.57 V
30	1.13 to 1.95 V
40	1.61 to 2.24 V
50	1.99 to 2.46 V
60	2.26 to 2.66 V
70	2.48 to 2.85 V
80	2.68 to 3.04 V
90	2.87 to 3.05 V



LEXUS

Technical Service Information Bulletin

March 17, 2000

Title:

LEXUS "DINGHY" TOWING GUIDE

Models:

All Models

TSIB

ACCESSORIES

AX001–00

Introduction

The following chart indicates which Lexus vehicles can be Dinghy towed (towed with four wheels on the ground) behind a Motorhome.

CAUTION:

Dinghy towing a vehicle behind a Motorhome requires special towing equipment and accessories. Please see your Motorhome Manufacturer / Service Outlet for recommended towing equipment.

Applicable Vehicles

- **All Models**

YEAR	MODEL	DINGHY TOWABLE		SPEED/DISTANCE LIMITS
		M/T	A/T	
1990–2000	LS 400	Not Towable		–
1992–2000	SC 400/300	Not Towable	Not Towable	–
1993–2000	GS 400/300	Not Towable		–
1992–1998	ES 300	Not Towable		–
1999–2000	ES 300	Yes		55 mph / 200 miles
1999–2000	RX 300 2WD	Yes		55 mph / 200 miles
1999–2000	RX 300 4WD	Yes		55 mph / 200 miles
1996–1997	LX 450	Not Towable		–
1998–2000	LX 470	Not Towable		–

NOTE:

After "Dinghy" Towing, or at the recommended distance limits, let the Engine idle for more than 3 minutes before operating the vehicle or resuming towing.

NOTE:

Vehicles that are Dinghy towable will not sustain internal damage to the transmission or transfer components, as long as speed/distance limits are observed. The transmission must be placed in the "neutral" position when Dinghy towing. Dinghy towing these vehicles does not eliminate the possibility of damage to other vehicle systems (Body, Chassis, Electrical Systems, etc.).

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

May 25, 2001

Title:

RETRO-FIT INTERNAL TRUNK RELEASE KITS

Models:

ES 300, GS 400/300, LS 400 & SC 400/300

TSIB

TSIB REVISION NOTICE:

The parts information updated in this TSIB is red and underlined.

Introduction

In order to respond to requests of our valued customers, we are offering Retro–Fit Internal Trunk Release Kits. These kits allow the trunk to be opened from the inside in case of entrapment.

Applicable Vehicles

MODEL	MODEL CODE	MODEL YEAR	# CLAMPS
ES 300	VCV10, MCV10	1992 – 1996	4
	MCV20	1997 – 2000	4
GS 300	JZS147	1994 – 1997	4
GS 400/300	UZS160, JZS160	1998 – 2000	4
LS 400	UCF10	1993 – 1994	4
	UCF20	1995 – 2000	4
SC 400/300	UZZ30, JZZ31	1992 – 2000	4

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
–	64640–33030	Trunk Release
–	90464–00551	Clamp
–	MDC 00237–LUTRI–01	Installation Instructions

Installation Procedure

Order the appropriate trunk release, at least as many clamps as listed above, and a set of installation instructions. Follow the installation procedure detailed in the installation instructions. Installation time is 0.7 hours.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Technical Service Information Bulletin
March 19, 1999

Title:
LEXUS "DINGHY" TOWING GUIDE

Models:
All Models

TSIB

Introduction

The following chart indicates which Lexus vehicles can be Dinghy towed (towed with four wheels on the ground) behind a Motorhome.

CAUTION:
Dinghy towing a vehicle behind a Motorhome requires special towing equipment and accessories. Please see your Motorhome Manufacturer / Service Outlet for recommended towing equipment.

Affected Vehicles

- **All Models**

YEAR	MODEL	DINGHY TOWABLE		SPEED/DISTANCE LIMITS
		M/T	A/T	
1990 – 1999	LS 400	Not Towable		–
1992 – 1999	SC 300	Not Towable		–
1992 – 1999	SC 400	Not Towable		–
1993 – 1999	GS 300	Not Towable		–
1992 – 1998	ES 300	Not Towable		–
1999	ES 300	N/A	Yes	55 mph / 200 miles
1996 – 1997	LX 450	Not Towable		–
1998 – 1999	LX 470	Not Towable		–
1999	RX 300 2WD	N/A	Yes	55 mph / 200 miles
1999	RX 300 4WD	N/A	Yes	55 mph / 200 miles

NOTE:
After "Dinghy" Towing, let the Engine idle for more than 3 minutes.

NOTE:
Vehicles that are Dinghy towable will not sustain internal damage to the transmission or transfer components. The transmission must be placed in the "neutral" position when Dinghy towing. Dinghy towing these vehicles does not eliminate the possibility of damage to other vehicle systems (Body, Chassis, Electrical Systems, etc.).

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

July 29, 2002

Title:

CHILD RESTRAINT SEAT TOP STRAP BRACKET INSTALLATION

Models:

'90 – '00 All Models

TSIB

BODY

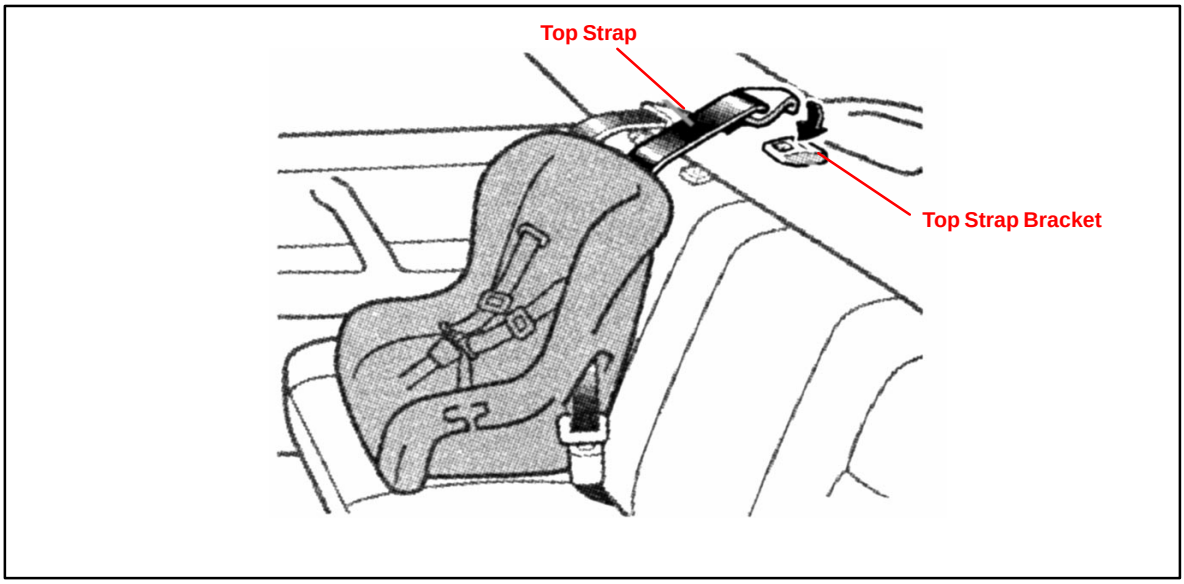
BO004-02

Introduction

Child restraint seat top strap bracket installation procedures are provided to supplement the Owner's Manual. Beginning with 2001 models, the top strap brackets are factory installed.

NOTE:

- **The child restraint seat top strap assembly is not available as a service part. Contact the child restraint seat manufacturer for recommended top strap information, top strap to child restraint seat installation instructions, and top strap retailers.**
- **The top strap brackets can only be installed on vehicles that have nuts welded in place by the factory. The locations of these nuts can be found in the Owner's Manual (for most 1990 and newer models). Lexus does not recommend modifying vehicles that do not have nuts welded in place by the factory. All LX 450 and LX 470 vehicles, prior to 2001 model year, may not have these nuts welded in by the factory.**



Applicable Vehicles

- **1990 – 2000** model year vehicles, **all models.**

Parts Information

PART NUMBER	PART NAME
73709–12010	Bracket Sub–Assembly (Bracket, Bolt, 10 mm Spacer, and Washers)
04731–22012	CRS Kit (two Bolts [15 mm, 30 mm], three Spacers [5 mm, 10 mm, 15 mm], and Locking Clip)

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Installation Procedure

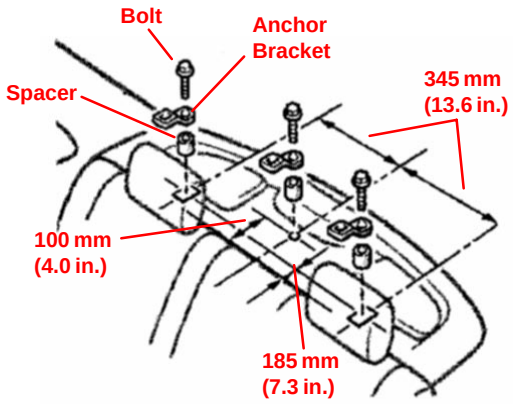
Child Restraint Seat Top Strap Bracket Installation

Obtain the exact year and vehicle model Lexus Owner's Manual before beginning installation.

1. Confirm with the customer which seat location(s) they will be installing the child restraint seat. The Owner's Manual seat section provides an illustration showing available top strap bracket location(s). The illustration page in the Owner's Manual is provided on page 4 of this bulletin.

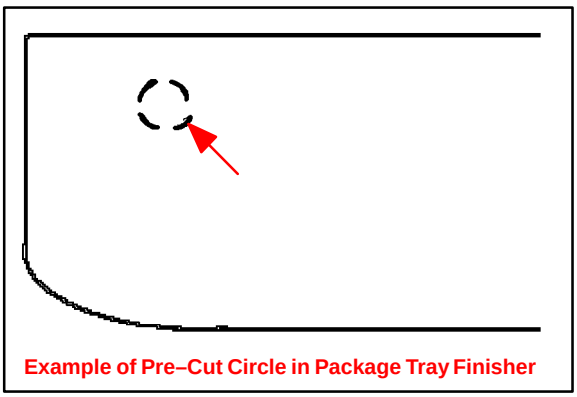
NOTE:

Determine which kit parts are needed for each specific child seat location, by referring to page 4 of this bulletin.



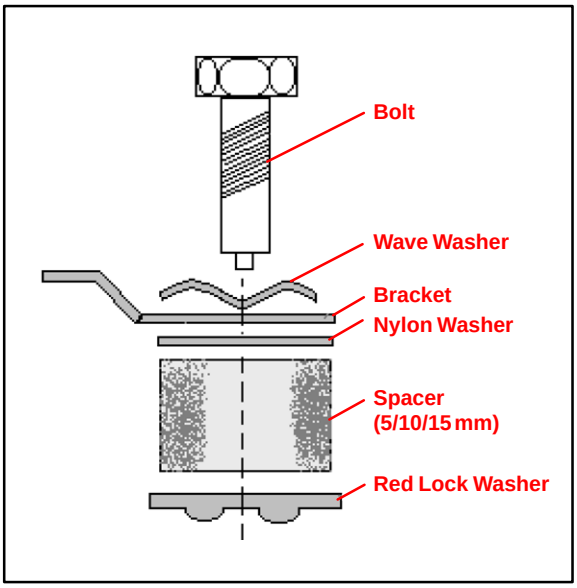
Example of 1999 ES 300 Showing Three (3) Available Bracket Locations

2. Remove a 20 mm diameter area of the carpet or trim material above the bracket mounting location. In some vehicles, a 20 mm circle is already pre–cut into the interior trim material. Once the interior trim material is removed, the nuts welded in by the factory should be visible.



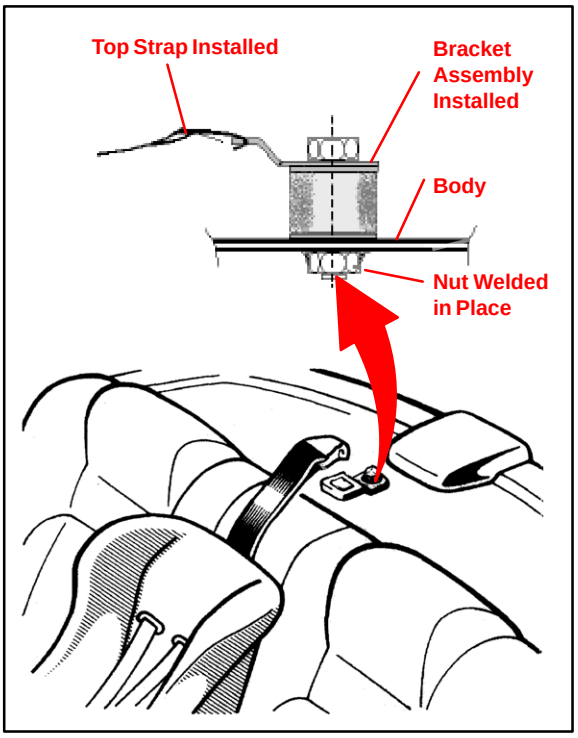
Example of Pre–Cut Circle in Package Tray Finisher

3. If a 5 mm or 15 mm spacer is specified, remove the red lock washer from the Bracket Sub–Assembly (P/N 73709–12010) and remove the 10 mm spacer. Assure the red lock washer is re–installed onto the bolt. If a 5 mm spacer is needed, use the 15 mm bolt from the CRS Kit (P/N 04731–22012).



Installation Procedure (Continued)

4. Install the bracket assembly, according to the directions in the Owner's Manual. Tighten the bolt to 16.5 – 24.7 N–m, (1.68 – 2.52 kgf–m, 12.2 – 18.2 ft–lbf).
   - Assure the top strap is attached to the child seat, according to the child seat manufacturer's instructions.
   - Assure the child seat is installed in the vehicle according to the Lexus Owner's Manual (seat section).



Installation Reference Information

Owner's Manual Installation Reference Information

Page 4 of this bulletin is a reference chart containing:

- Owner's Manual page(s) that provide the illustration showing available top strap bracket location(s). The information goes back to 1990 model year. 2001 models and newer already had the bracket installed by the factory.
- Installation notes, such as bracket spacer sizes for each specific child seat location.

EXAMPLE:

OWNER'S MANUAL	ES 300
1997	pg 89–90 a

This cell contains information on the 1997 ES300

Refer to this page in the Owner's Manual to find the illustration showing available top strap bracket locations.

Installation Note. In this case, all bracket positions on the 1997 ES 300 will require a 15 mm spacer.

INSTALLATION NOTE	COMMENT
a	Spacer – 15 mm for all anchors
b	Spacer – 10 mm for outer, 15 mm for center
c	Spacer – 15 mm for outer, 10 mm for center
d	Spacer – 5 mm for all anchors
N/A	Top strap anchor bracket mounting not available
Standard	No installation necessary, anchor already installed by factory

Installation Reference Information (Continued)

OWNER'S MANUAL	LS 400	ES 300	ES 250	SC 400	SC 300
2000	pg 117–118 Standard	pg 114–115 Standard		N/A	N/A
1999	pg 112–114 a	pg 105–106 a		N/A	N/A
1998	pg 111–113 a	pg 99–100 a		N/A	N/A
1997	pg 98–100 a	pg 89–90 a		pg 91–92 a	pg 91–92 a
1996	pg 79–82 a	pg 67–68 c		pg 72–73 a	pg 72–73 a
1995	pg 77–80 a	pg 67–68 c		pg 70–71 a	pg 70–71 a
1994	pg 74–75 b	pg 68–69 c		pg 67–68 a	pg 67–68 a
1993	pg 74–75 b	pg 60–61 c		pg 67–68 a	pg 67–68 a
1992	pg 62 b	pg 61–62 c		pg 61–62 a	pg 61–62 a
1991	pg 61–62 b		pg 59–60 a		
1990	pg 61 b		pg 55–56 a		

OWNER'S MANUAL	GS 400	GS 300	LX 470	LX 450	RX 300
2000	pg 112–113 Standard	pg 112–113 Standard	N/A		pg 126–127 d
1999	pg 108–109 a	pg 108–109 a	N/A		pg 123–124 d*
1998	pg 107–108 a	pg 107–108 a	N/A		
1997		pg 97–98 a		N/A	
1996		pg 70–72 a		N/A	
1995		pg 69–70 a			
1994		pg 69–70 a			
1993		pg 69–70 a			
1992					
1991					
1990					

* 1999 RX 300 Owner's Manual OM48403U refer to pages 126–127.

LEXUS

Technical Service Information Bulletin

March 23, 2001

Title:

NEW SEAT BELT TONGUE PLATE STOPPER SERVICE PARTS

Models:

All Applicable Models

TSIB

Introduction

A new service part for seat belt tongue plate stoppers has been introduced. Installation procedures are provided to supplement the Repair Manual.

Applicable Vehicles

MODEL	YEAR
LS 400	1990 – 2001
ES 250	1990 – 1991
ES 300	1992 – 2001
SC 400	1992 – 2001
SC 300	1992 – 2001
GS 400	1993 – 2001
GS 300	1993 – 2001
LX 450	1996 – 1998
LX 470	1998 – 2001
RX 300	2000 – 2001

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	73219–02010	Stopper, Tongue Plate (Black)*
N/A	73219–02020	Stopper, Tongue Plate (Gray)*
N/A	73219–02030	Stopper, Tongue Plate (Beige)*

* Use a stopper color that is closest to the seat belt webbing color.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
BD0046	Install Seat Belt Tongue Plate Stopper	0.1	73219–020#0	62	12

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

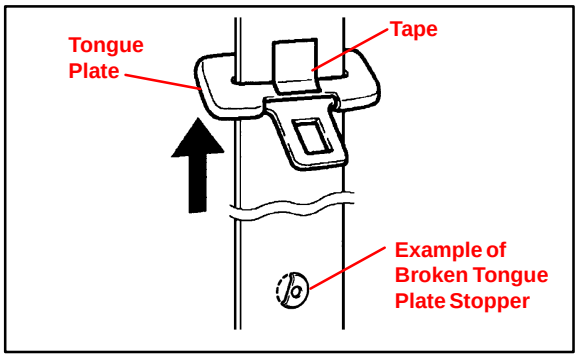
* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Installation Procedure

1. Preparation

A. Shift the Tongue Plate to the upper portion of the Tongue Plate Stopper, and temporarily hold it with a clip or tape.

B. Remove any pieces of the original Tongue Plate Stopper in the webbing with a pair of pliers.



CAUTION:

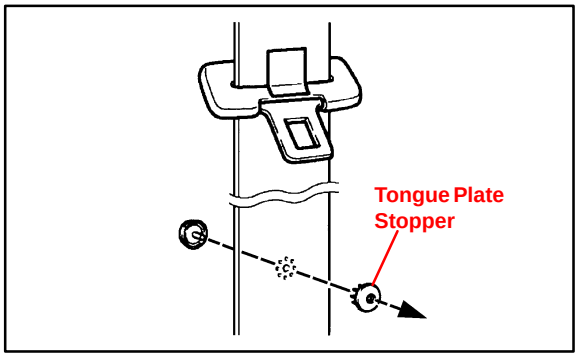
Damaged or weakened seat belts may break in an accident and injure the occupant. The seat belt assembly must be replaced if:

- **The webbing is cut, frayed, worn, or damaged.**
- **It has been used in a severe impact.**

Inspect the entire length of webbing for damage and replace the assembly if needed. Be careful not to damage the webbing during repair.

2. Install the Tongue Plate Stopper

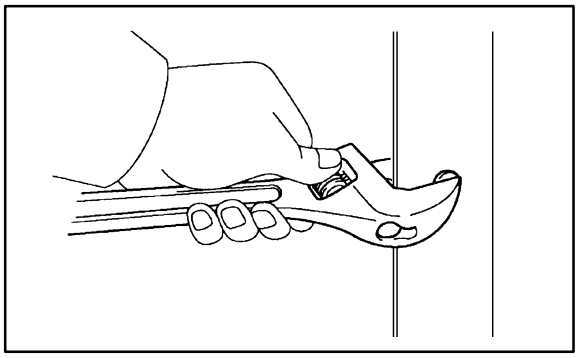
A. Install a new Tongue Plate Stopper in the hole of the webbing.



NOTE:

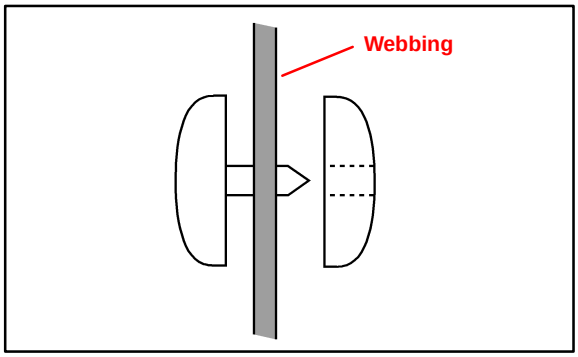
Be aware of the installation direction of the Tongue Plate Stopper as shown in the illustration.

B. Pinch the Tongue Plate Stopper into the webbing using an adjustable wrench, and turn and push the adjustment screw by hand.



HINT:

Press the adjustment screw in order to position the male and female parts of the Tongue Plate Stopper parallel to each other, as shown in illustration.

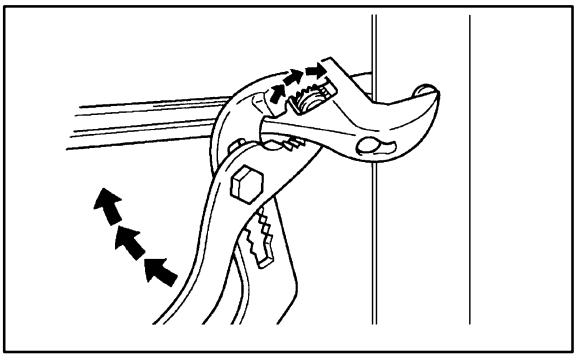


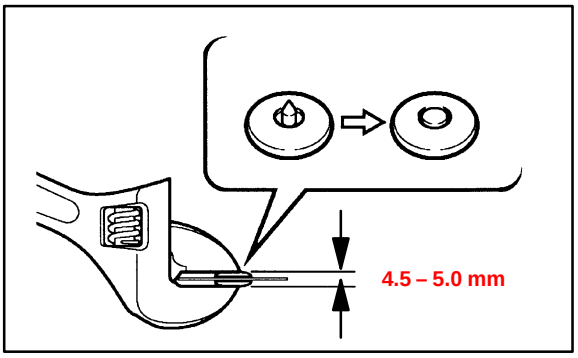
CAUTION:

DO NOT use pliers. They may damage the webbing.

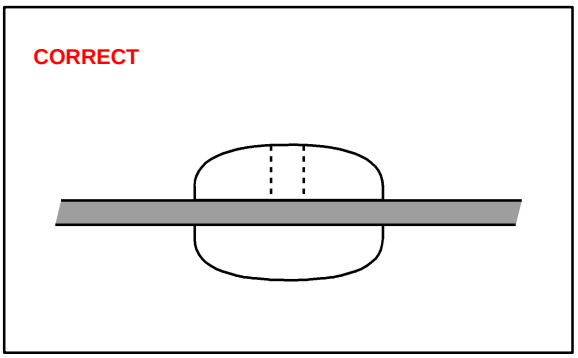
Installation Procedure (Continued)

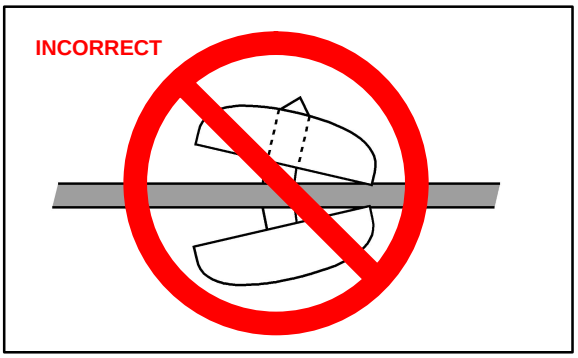
C. When the adjustment screw for the adjustable wrench can't be turned by hand, tighten the adjustment screw using a pair of adjustable joint pliers until the space between jaws of the adjustable wrench is 4.5 – 5.0 mm. (See illustrations.)





D. Check to be sure that the male pin of the Tongue Plate Stopper has become deformed evenly in the hole of the female part and is firmly held to the belt webbing. (See illustrations.)





Technical Service Information Bulletin
October 20, 2000

Title:

BRAKE PAD CLICKING NOISE

Models:

'90 – '00 All Models

TSIB

Introduction

A clicking type noise may be noticed when first applying the brakes after changing vehicle travel direction (*Drive/Forward* to *Reverse, Reverse* to *Drive/Forward*). This is a normal noise caused by the required brake pad–to–caliper clearances. When the direction of travel is changed, the brake pads may "shift" towards the new direction of travel. When the brake pad contacts the caliper, a clicking noise may be heard.

To minimize this clicking noise, a disc brake caliper grease has been made available for use during brake service/maintenance operations. Under normal usage conditions this grease should be effective for a period of 6 months to 1 year.

Applicable Vehicles

- **1990 – 2000** model year **Lexus vehicles, all models.**

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	08887–80609	Disc Brake Caliper Grease (50 g tube)

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Application Procedure

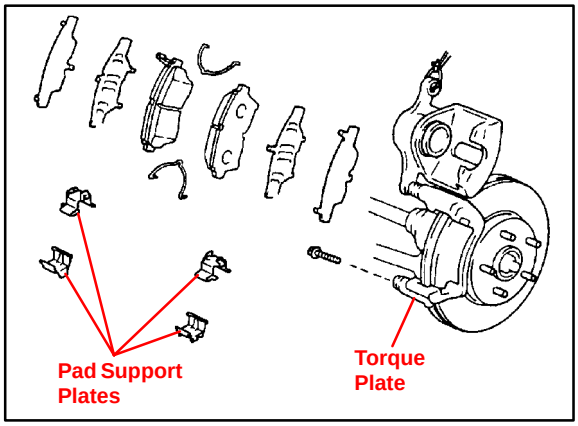
There are two types of brake calipers: floating and fixed. Check the type of brake caliper installed on the vehicle by removing the wheel assembly.

1. Floating Type Brake Caliper

A. Lift up or remove the brake caliper and suspend it securely.

HINT:

Do not disconnect the flexible hose from the brake caliper.



B. If equipped with anti–squeal spring: Remove the anti–squeal springs.

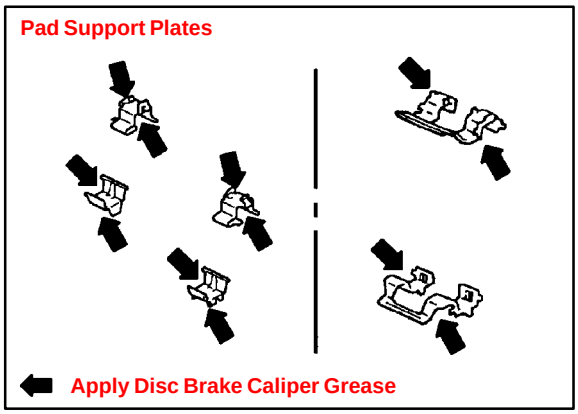
C. Remove the brake pads with anti–squeal shims.

D. Remove the pad support plates from the torque plate. Clean any dust from the pad support plates, torque plates and brake pads.

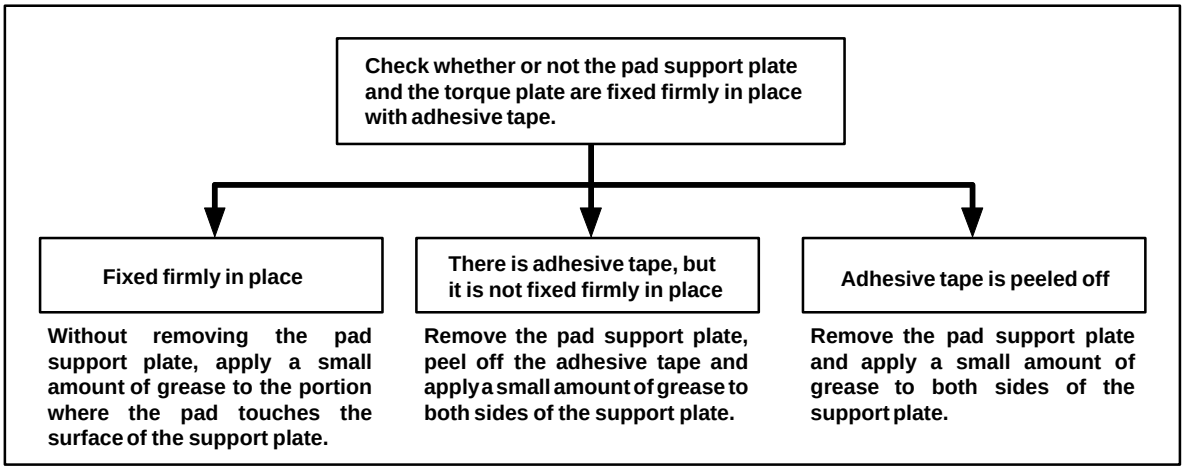
E. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to both sides of the pad support plates.

NOTE:

Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.



F. If the pad support plate is fixed to the torque plate with adhesive tape, perform the operation according to the following flow chart.



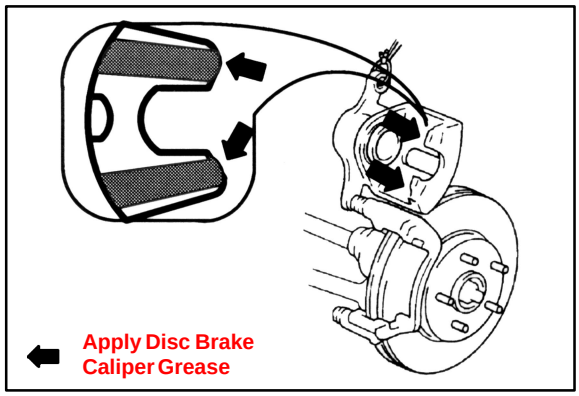
Application Procedure (Continued)

G. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to the caliper as indicated in the illustration.

H. Install the brake pads with the anti–squeal shims.

I. If equipped with anti–squeal spring: Install the anti–squeal springs.

J. Press the piston in firmly and install the brake caliper.



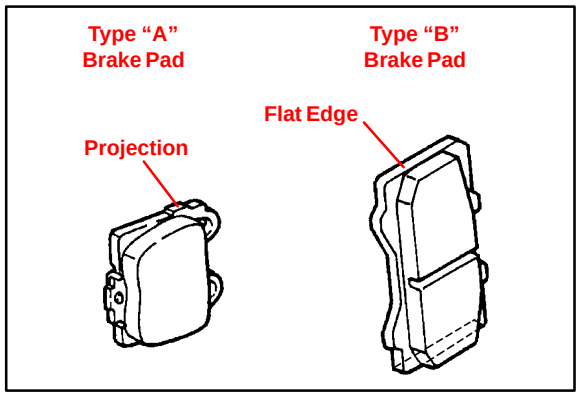
NOTE:
- **Clean excess grease from brake pad and caliper.**
- **Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.**

K. Install the wheel assembly.

2. Fixed Type Brake Caliper

There are two types of brake pads:

- Type “**A**”: Has a projection on the upper and lower side of the brake pad. (See illustration.)
- Type “**B**”: Has a flat upper and lower edge on the brake pad backing plate.

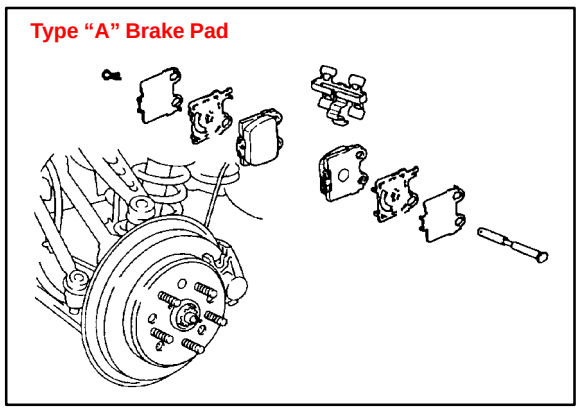


Type “A” Brake Pad

A. Remove the anti–squeal spring, clip and pad guide pin.

B. Remove the brake pads with the anti–squeal shims.

C. Clean any dust from the brake pads.



Application Procedure (Continued)

D. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to the areas indicated in the illustration.

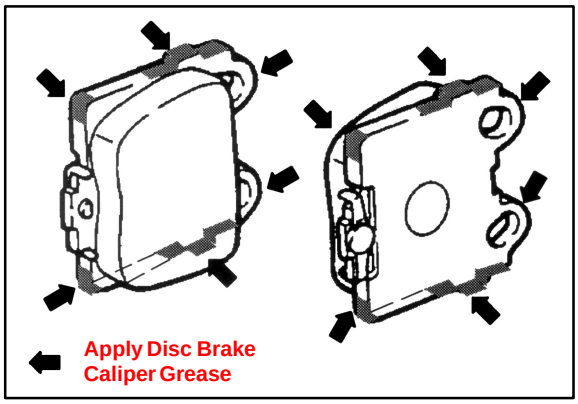
NOTE:
Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.

E. Install the brake pads with the anti–squeal shims.

NOTE:
Clean excess grease from the brake pads and caliper.

F. Install the pad guide pin, clip and anti–squeal spring.

G. Install the wheel assembly.

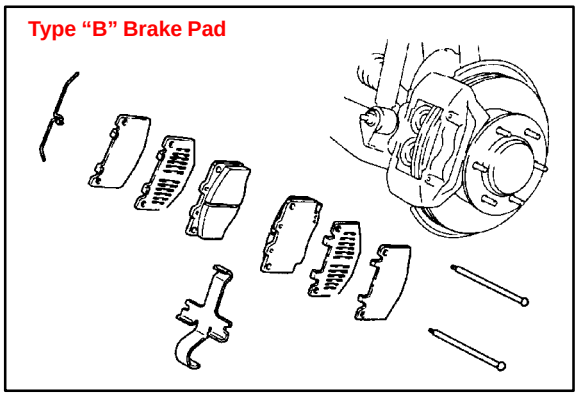


Type “B” Brake Pad

A. Remove the clip, pins and anti–rattle spring/pad retainer clip.

B. Remove the brake pads with the anti–squeal shims.

C. Clean any dust from the brake pads.



D. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to the areas indicated in the illustration.

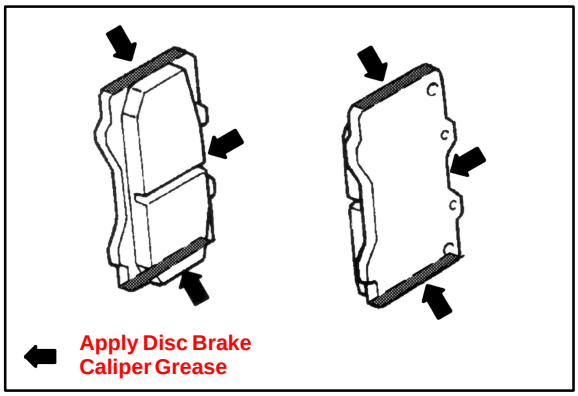
NOTE:
Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.

E. Install the brake pads with the anti–squeal shims.

NOTE:
Clean excess grease from the brake pads and caliper.

F. Install the pad guide pin, clip and anti–squeal spring.

G. Install the wheel assembly.



LEXUS

Technical Service Information Bulletin

August 7, 1998

Title:

FRONT BRAKE NOISE

Models:

'92 – '96 ES 300

TSIB

Introduction

New Front Brake Pads are available to reduce front brake groan noise, grinding noise, squeak or vibration on 1992 to 1996 ES 300s.

Affected Vehicles

- **All 1992 to 1996 ES 300s.**

Parts Information

PART NUMBER	PART NAME
04465–33100	Front Brake Pads
04945–33010	Shim Kit (If Needed*)

* Visually inspect Shims for heat discoloration. If discolored, then replace.

Repair Procedure

1. Surface the disc rotors with the "On–Car Brake Lathe" to within serviceable limits.
2. If the rotors are unserviceable or below minimum thickness, replace the rotors.
3. Check any new disc rotors for runout.
4. If the disc rotor runout is over 0.03 mm (0.0012 in), perform phase matching procedure.
5. Replace the front brake pads.
6. Road test.

Warranty Information

OP CODE	COMBO	DESCRIPTION	TIME	OPN	T1	T2
473025	A	Grind Front Discs and Replace Pads, Shims (if needed) for Squeak (both sides)	2.1	43512–33040	36	99
		Grind Front Discs and Replace Pads, Shims (if needed) for Vibration (both sides)			21	99
		Grind Front Discs and Replace Pads, Shims (if needed) for Groan/Grinding (both sides)			91	99

Applicable Warranty:**

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

** Warranty application is limited to correction of a problem based upon a customer's complaint.

NOTE:

Replacement of front brake pad kit and/or shims is limited to correction of a problem based upon customer complaint and subject to all of the provisions of Lexus Warranty Policy Bulletin POL94–17, dated November 4, 1994.

LEXUS

Technical Service Information Bulletin

February 24, 2003

Title:

SULFUR ODOR FROM EXHAUST

Models:

All Models

TSIB

ENGINE

EG001-03

Introduction

Some owners of Lexus vehicles may experience a sulfur–like or “rotten egg” odor from the exhaust system. Sulfur is a natural component of crude oil from which gasoline is refined and the amount of sulfur can be decreased through the refining process. The amount of sulfur in fuel sold in California is regulated, however gasoline sold in other states can have substantially higher sulfur content. Sulfur content also varies considerably between gasoline brands and locations.

Applicable Vehicles

- **All Models.**

Repair Procedure

A sulfur odor emitted from the vehicle’s tailpipe does not necessarily indicate that there is an issue with the engine’s running condition, but is most likely directly related to the fuel. If the vehicle is exhibiting an excessive sulfur odor, the following checks should be performed:

- If the MIL light is ON, check for DTCs and repair as necessary.

If no trouble is found after performing the above check, recommend the customer try a different source of fuel.

Replacement of oxygen sensors, air/fuel ratio sensors or catalytic converters will not reduce the odor and will therefore **not** be considered warrantable.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

March 28, 2005

Title:

RADIATOR CAP INSPECTION

Models:

All Models

TSIB

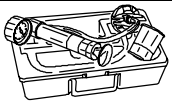
Introduction

The procedure for inspecting the radiator cap has been revised. Please refer to the following procedures when inspecting the radiator cap on all Lexus models.

Applicable Vehicles

- **All Lexus models.**

Required Equipment

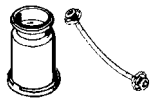
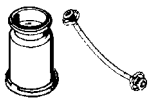
MANUFACTURER	EQUIPMENT	QTY
Snap–On/Sun SVTS262A (or equivalent)	Cooling System Tester (Radiator Cap Tester) 	1

NOTE:
Additional Lexus Approved Dealer Equipment may be ordered by calling Lexus Approved Dealer Equipment at 1–800–368–6787.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Radiator Cap Test Set*** 	09230–00030–02	1	7
2	**Radiator Cap Test Set (Small)*** 	09230–00020–02	1	7

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

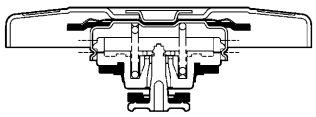
Radiator Cap Identification Procedure

1. Use the illustration below to identify the vehicle's radiator cap type and kPa rating.
2. Proceed to the required inspection procedure for the radiator cap and kPa rating.

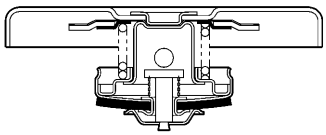
Radiator Cap Identification

kPa Rating

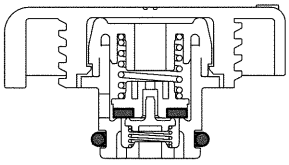
N–Cap



Compact Cap

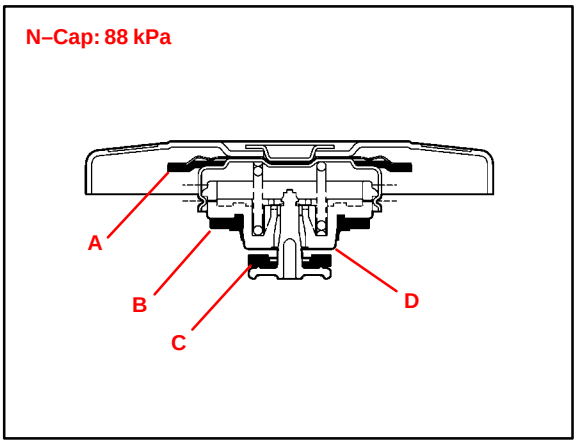


Plastic Cap



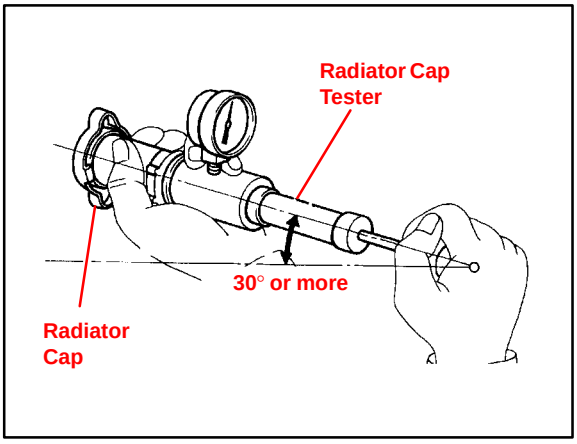
Radiator Cap Inspection Procedure

Type: N–cap, 88 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A," "B," and "C" are not deformed, cracked, or swollen.
3. Check that points "C" and "D" are not stuck together.
4. Apply engine coolant to points "B" and "C" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

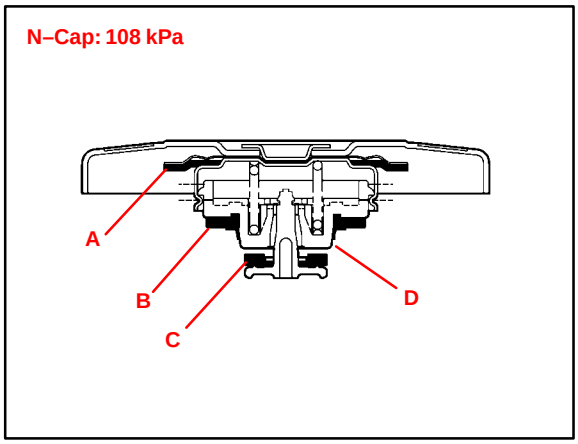
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	74.0 to 103.0 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)
Minimum standard value (for in–service cap)	59 kPa (0.60 kgf/cm^2, 8.53 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

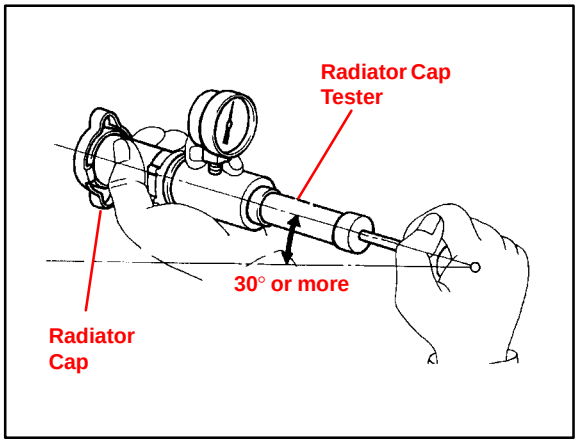
Radiator Cap Inspection Procedure (Continued)

Type: N–cap, 108 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A," "B," and "C" are not deformed, cracked, or swollen.
3. Check that points "C" and "D" are not stuck together.
4. Apply engine coolant to points "B" and "C" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

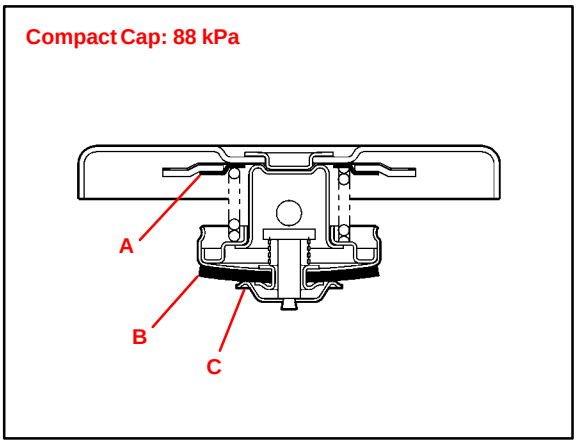
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

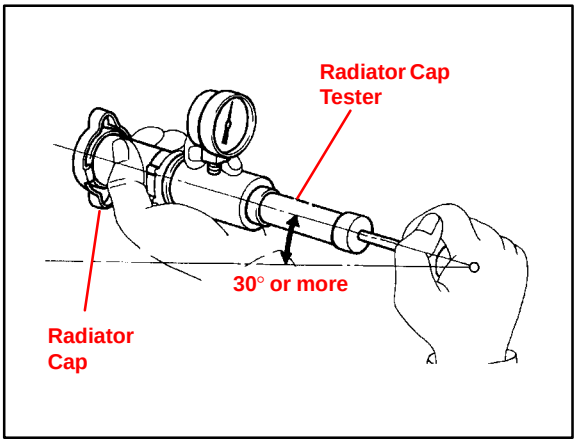
Radiator Cap Inspection Procedure (Continued)

Type: Compact Cap, 88 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A" and "B" are not deformed, cracked, or swollen.
3. Check that points "B" and "C" are not stuck together.
4. Apply engine coolant to point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

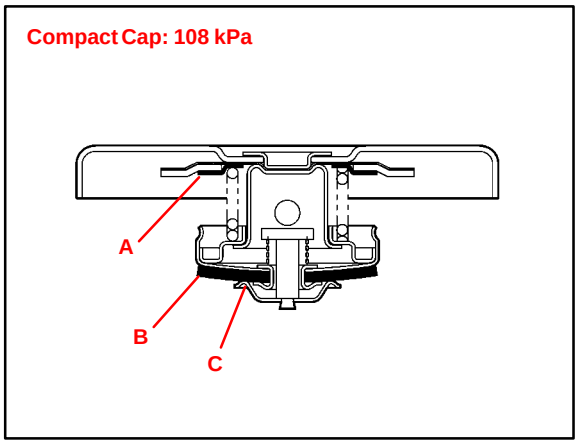
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	74.0 to 103.0 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)
Minimum standard value (for in–service cap)	59 kPa (0.60 kgf/cm^2, 8.53 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

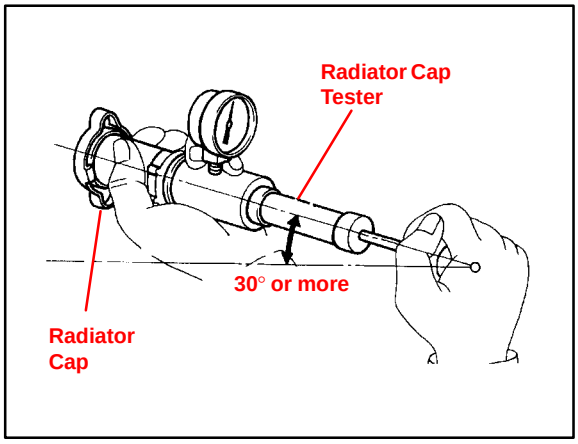
Radiator Cap Inspection Procedure (Continued)

Type: Compact Cap, 108 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A" and "B" are not deformed, cracked, or swollen.
3. Check that points "B" and "C" are not stuck together.
4. Apply engine coolant to point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

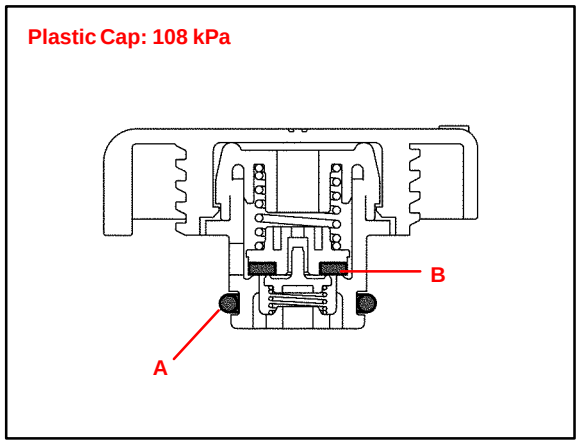
If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

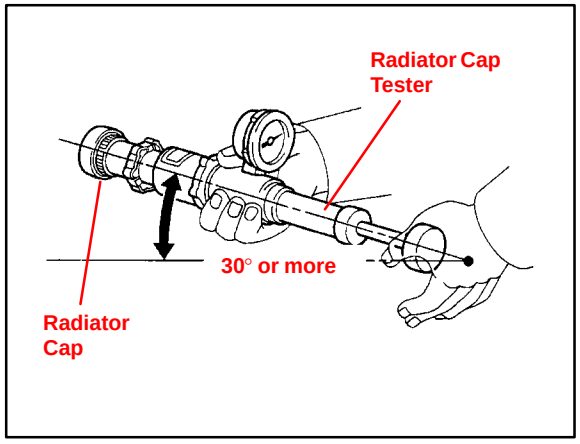
Radiator Cap Inspection Procedure (Continued)

Type: Plastic Cap, 108 kPa

1. Remove coolant and any foreign material on O–ring "A."
2. Check that O–ring "A" is not deformed, cracked, or swollen.
3. Apply engine coolant to O–ring "A" and rubber point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
4. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
5. When using the radiator cap tester, tilt it more than 30 degrees.
6. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second





HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

Technical Service Information Bulletin
September 3, 2004

Title:

ENGINE BANK 1 AND BANK 2 A/F AND O2 IDENTIFICATION

Models:

Applicable Models

TSIB

Introduction

This service bulletin provides information on the proper identification of engine bank 1 and engine bank 2 for correct A/F sensor and oxygen sensor replacement.

This bulletin contains information that identifies engine bank 1 and engine bank 2 on the following engines: 1MZ–FE, 3MZ–FE, 1UZ–FE, 2UZ–FE and 3UZ–FE.

- Bank 1 (B1) refers to the bank that includes cylinder No. 1.
- Bank 2 (B2) refers to the bank opposite bank 1.
- Sensor 1 (S1) refers to the sensor that is located before the catalytic converters.
- Sensor 2 (S2) refers to the sensor that is located after the catalytic converters.

Applicable Vehicles

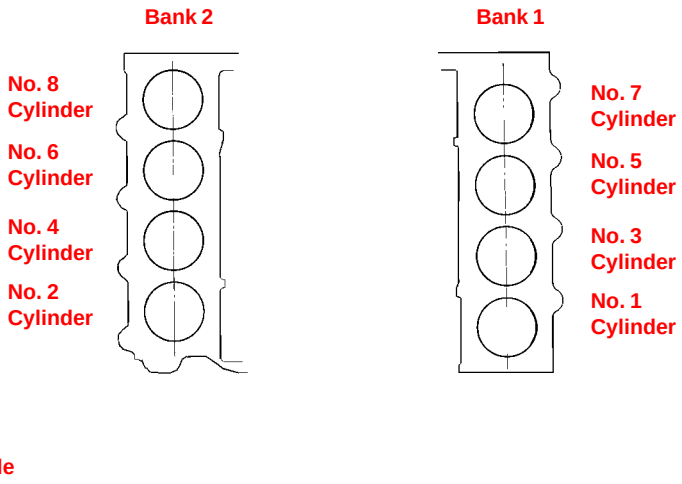
- **1994 – 2003** model year **ES 300** vehicles equipped with **1MZ–FE engine**.
- **2004** model year **ES 330** and **RX 330** vehicles equipped with **3MZ–FE engine**.
- **1998 – 2000** model year **GS 400** vehicles equipped with **1UZ–FE engine**.
- **2003 – 2004** model year **GX 470** vehicles equipped with **2UZ–FE engine**.
- **1990 – 2000** model year **LS 400** vehicles equipped with **1UZ–FE engine**.
- **2001 – 2004** model year **LS 430** and **GS 430** vehicles equipped with **3UZ–FE engine**.
- **1998 – 2004** model year **LX 470** vehicles equipped with **2UZ–FE engine**.
- **1999 – 2003** model year **RX 300** vehicles equipped with **1MZ–FE engine**.
- **1992 – 2000** model year **SC 400** vehicles equipped with **1UZ–FE engine**.
- **2002 – 2004** model year **SC 430** vehicles equipped with **3UZ–FE engine**.

Warranty Information

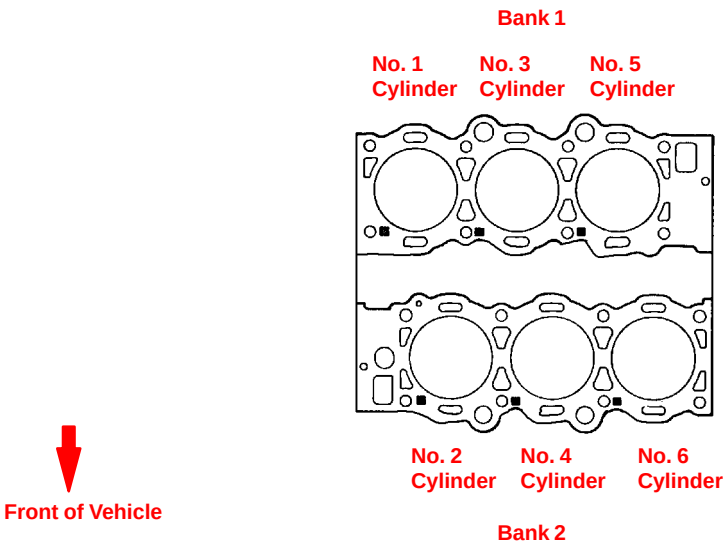
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Engine Bank Identification

1UZ–FE, 2UZ–FE and 3UZ–FE Engine Bank Identification

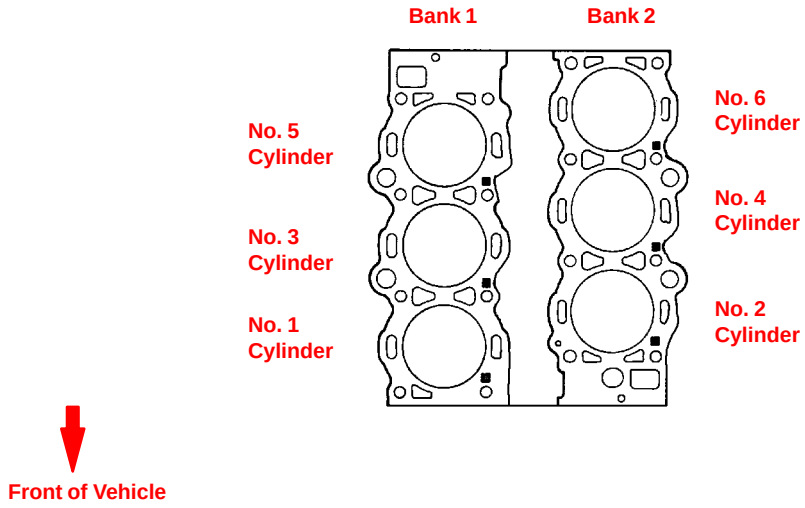


1MZ–FE and 3MZ–FE Engine Bank Identification



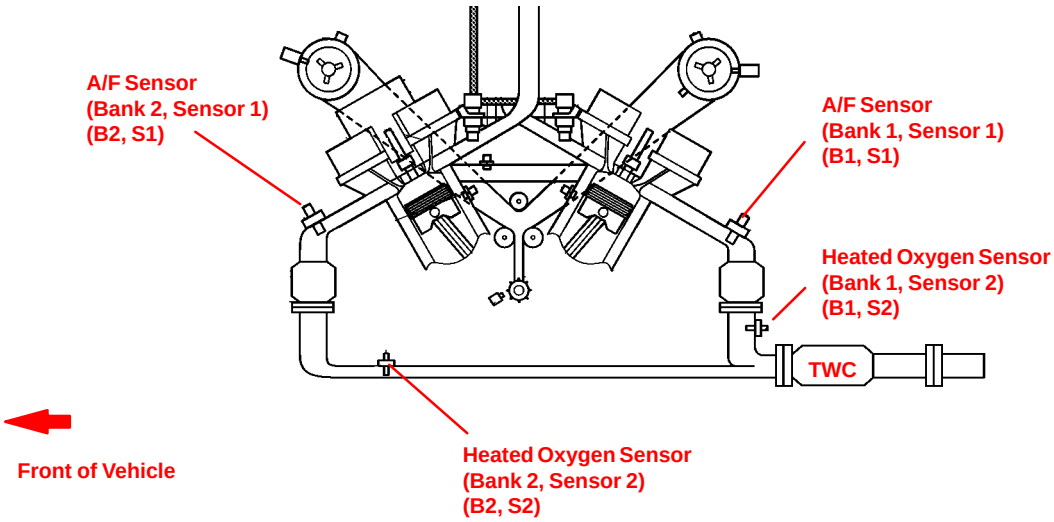
Engine Bank Identification (Continued)

5VZ–FE and 1GR–FE Engine Bank Identification



A/F and O2 Sensor Identification

Sensor Identification (Example of FWD V6)



LEXUS

Technical Service Information Bulletin

April 10, 1998

Title:

CIGARETTE LIGHTER SERVICE

Models:

All Model

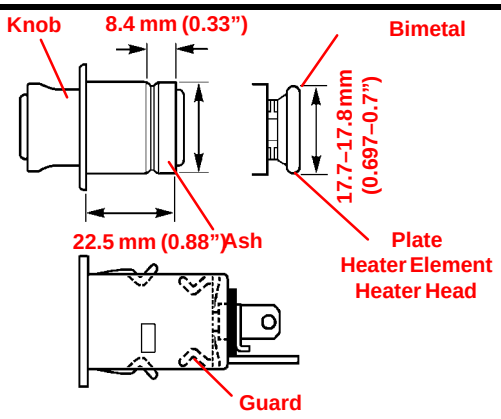
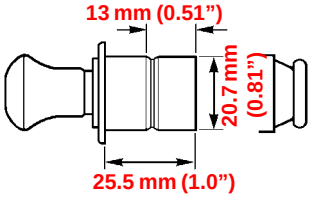
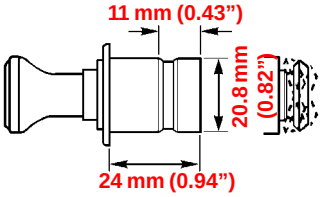
TSIB

Introduction

When receiving customer complaints to repair the lighter or lighter socket, please carefully investigate the cause of the failure to prevent further occurrences. If the customer uses the wrong size lighter element or power accessory plug, damage may occur to the lighter socket. When applicable, instruct the customer to replace the lighter element with original equipment components or to use an appropriate sized accessory plug. Dimensional information included within this document will instruct you on component specifications.

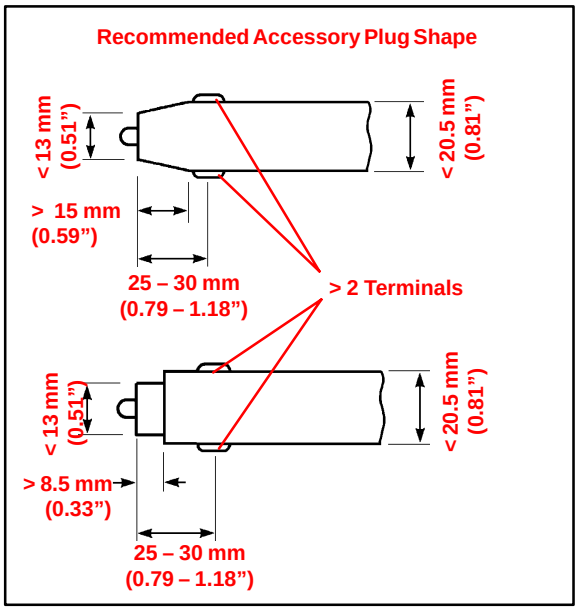
Service Procedure

1. Determine if the lighter is original equipment by using the specifications shown.
   a. If the vehicle has a non–genuine lighter element, it has the possibility to cause a short circuit between the lighter element and the lighter socket, which can result in an open fuse.
   b. A non–genuine lighter element may cause a rattle or bend the socket bimetal contacts.
   c. If a non–genuine lighter element is being used, advise the customer to use an original equipment element.

TYPE	DRAWING WITH DIMESIONS	FEATURES
Genuine		No Problem to use.
Non–Genuine		Too long an ash guard will contact bimetal (positive circuit) plate and cause fuse to melt.
		Excessive free play on the heater head which allows contact between heater element, socket body and bimetal plate, will cause fuse to melt.

Service Procedure (Continued)

2. If the lighter element is original equipment and the lighter socket is bent or pulled out of the dash, please ask the customer about the accessory plug being used in the lighter socket.
    a. The attached specifications in the drawing provide the maximum recommended size of accessory plug. If the customer is using an accessory plug larger than recommended, please advise the customer to use a plug of appropriate size.
    b. Using a power plug larger than the given dimensions may damage the lighter socket.
    c. If the vehicle has a power point socket, advise the customer to use this socket instead of the lighter socket.



Affected Vehicles

- **All** models, **all** model years

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Beginning with the Montreal Protocol signed in April 1988, auto manufacturers world–wide committed to phase–out the use of ozone damaging Refrigerant R–12, also known as Freon. All automobile manufacturers are re–designing new production vehicles to use non-ozone depleting R–134a which is the only universally approved replacement refrigerant for R–12. All 1994 and newer Lexus use R–134a.

Several independent companies have begun marketing alternative refrigerants which they claim can replace R–12 when servicing vehicles in the dealership. These R–12 replacements commonly referred to as blends or hydrocarbon based refrigerants, have the potential to cause damage to Lexus AC systems and in some cases can cause personal injury to the service technician or the end–user. **Lexus strongly discourages the use of these refrigerants in Lexus vehicles.**

Furthermore, dealer technicians should be cautious of vehicles that may be labeled or otherwise identified to contain such refrigerants. Servicing these vehicles **can contaminate your AC refrigerant recovery equipment** causing refrigerant stored in the recovery machine to be rendered unusable. Also, if the contaminated refrigerant equipment is then used on subsequent repairs, the dealer may unknowingly contaminate other owner's vehicles.

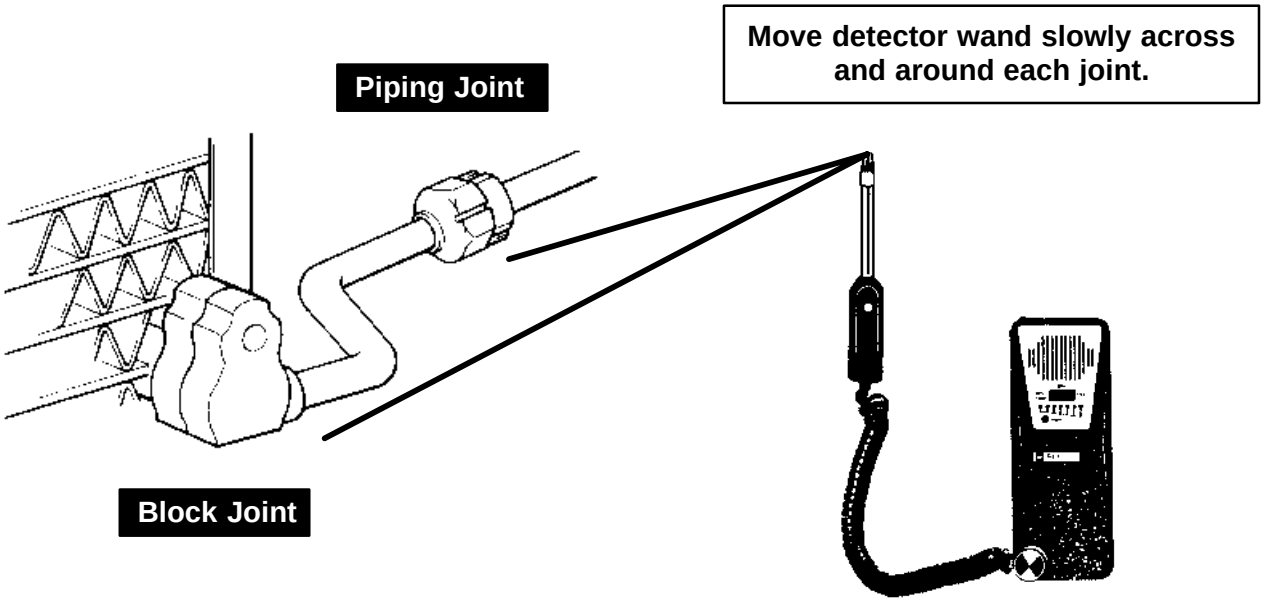
For all Lexus models and years that are designed to operate on R–12, **continue to service with R–12 as long as it is available which is expected to be two or more years.** When research is complete and R–12 becomes difficult to acquire, Lexus will provide parts and procedures to properly retrofit an R–12 vehicle to non–ozone depleting R–134a.

Use of electronic leak detectors for checking A/C systems refrigerant leakage is the only method approved by TMS. This type of leak detector is sensitive not only to refrigerant, but also sensitive to numerous petrochemical substances (motor oil, gasoline, solvents, etc.) commonly found in a repair shop environment. Because this sensitivity could diminish the leak detector's capacity for accurate leak detection, some service hints have been provided to help increase the accuracy of your diagnosis.

SERVICE HINTS:

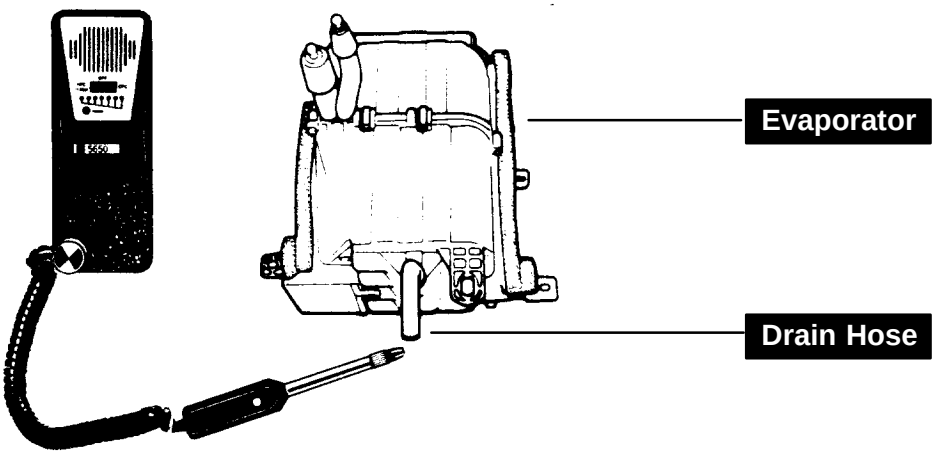
1. **Visual Inspection:** Do a quick visual inspection under the hood for signs of refrigerant leakage. Check for areas of heavy oil leakage at block and piping joints. Many times these areas have accumulated road dust and dirt.
2. **Inspection with leak detector:** **NOTE:** Make sure the system is fully charged. Operate the system to increase refrigerant pressure. Shut the system off before inspecting with leak detector.

   A. Checking for leakage at a joint: Wipe the oil/dirt accumulation off the joint with a clean rag. Do not use solvents to clean the joint. Refrigerant is heavier than air so start checking for leaks with the detector wand about 1/4 in. below the joint. Move the wand slowly across and around each joint (see illustration below).



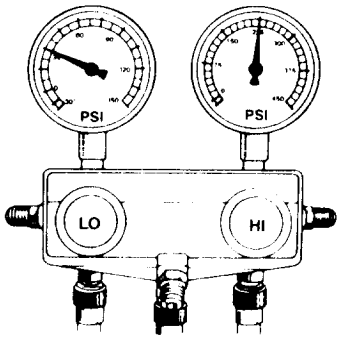
B. Checking for leakage at the evaporator: The evaporator drain hose provides an excellent access point to check for refrigerant leakage from the evaporator. Be sure to raise the vehicle on a lift so that the evaporator is as far as possible from any petrochemical source that may be on the shop floor. When leak checking in this area, turn the system off, pinch off the evaporator drain hose, and wait 10 to 15 minutes to allow the refrigerant to accumulate in the evaporator case. When the system is ready to check, release the drain hose and hold the leak detector wand about 1/4 inch below the drain opening (see diagram).

NOTE: Do not allow the leak detector tip to come in contact with water from the evaporator.

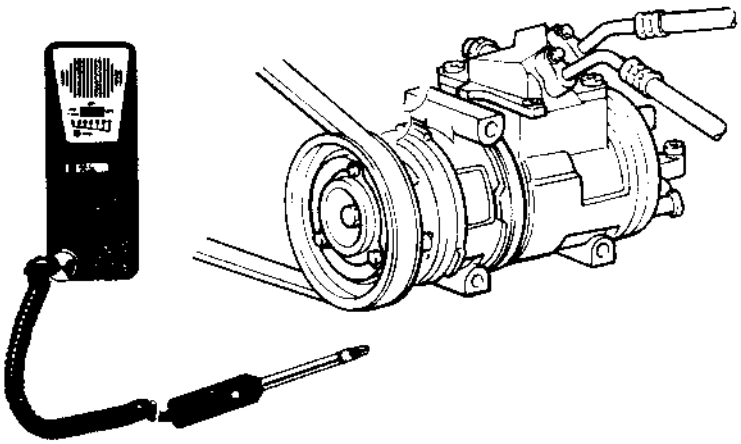


C. Checking for leakage at front compressor seal: Front compressor seal leaks are probably the most difficult leaks to detect accurately. Special diagnostic procedures must be followed for the best success. Make sure the system is fully charged. Operate the system with a pressure gauge installed and assure that the system has correct system pressures. **Shut off the engine.** Begin the leak check by placing the detector probe along the bottom half of the compressor clutch. Move the wand slowly across the bottom of the compressor clutch. Be careful not to expose the detector wand tip to any oil residue as this may cause a false leakage reading.

Verify correct system pressure.



Move dectector wand slowly across the bottom half of the compressor clutch.



D. Checking for leakage at service valves or pressure switches:
Small accumulations of refrigerant gas under the service valve caps or pressure switch connectors is normal. When checking for leaks at these points, use the following procedures to assure the highest accuracy:

1. Remove the service valve cap or pressure switch connector.

2. Allow the service valve or pressure switch to remain uncapped for approximately 20 minutes. This will allow the air to circulate and carry away the accumulated refrigerant. (This is a good time to leak check other areas of the system).

3. Do not use compressed air to flush out the service valve or pressure switch cavity. Petroleum residue from inline oilers or compressor lubrication may cause false readings.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: HEATING & AIR CONDITIONING

NO: AC001-96

DATE: MAY 3, 1996

MODEL: LS 400, GS 300, SC 400, SC 300, ES 300

Title **AMBIENT TEMPERATURE DISPLAYS -22˚F**

On Lexus models equipped with an ambient temperature display, –22°F may appear in the ambient temperature display if continuity through the ambient temperature sensor circuit is interrupted. Since the –22˚ F is retained in memory, the condition will persist even after continuity through the ambient temperature sensor circuit has been re–established. Climate control system operation may also be adversely affected.

This condition can be corrected by briefly removing the fuse supplying the B+ power source to the air conditioning control unit.

Do not attempt repairs before performing the following reset procedure:

RESET PROCEDURE:

Refer to the table below and remove the appropriate fuse for 30 seconds and reinstall.

MODEL	YEARS	VIN	FUSE	BLOCK	LOCATION
ES 300	'94-'96	All	ECU-B	JB #2	Left Engine Compartment
GS 300	'93-'96	All	ECU-B	JB #2	Left Engine Compartment
LS 400	'93-'96	All	Dome	JB #2	Left Engine Compartment
LS 400	'95	Before JT8UF22E*S0018654	ECU-B	JB #2	Left Engine Compartment
LS 400	'95-'96	After JT8UF22E*S0018654	Fuel Open	JB #1	Left Instrument Panel
SC 300	'95-'96	All	Dome	RB #2	Left Engine Compartment
SC 400	'95-'96	All	Dome	RB #2	Left Engine Compartment

IMPORTANT: Some of these fuses provide power to other systems for memory retention. Check and reset clock, radio presets, and memory as necessary.

If ambient temperature display is not corrected, refer to repair manual for diagnosis.

LEXUS

Technical Service Information Bulletin

September 12, 1997

Title:

AIR CONDITIONING EVAPORATOR ODOR

Models:

’92–96 ES 300, ’93–’94 LS 400, All GS 300, SC 300/400, LX 450.

Introduction

A musty odor may be emitted from the air conditioning system of some vehicles which are usually operated in areas with high temperature and humidity. It is most noticeable when the air conditioner is first turned “ON” after the vehicle has been parked for several hours. The odor could result from one or more of the following conditions:

1. Blockage of the evaporator housing drain pipe, resulting in the build up of condensation.

2. Microbial growth in the evaporator, arising from dampness in the evaporator housing where the cooling air flow is dehumidified.

To address excessive air conditioning evaporator odor, check the evaporator housing drain pipe for blockage. If no problems are found, the evaporator and housing should be cleaned and disinfected using the general procedure given on page 2, and the model specific procedure on the pages indicated in the Table of Contents at the bottom of this page.

Affected Vehicles

- While this procedure may be used on any Lexus vehicle, this bulletin gives details specifically for the **’92–’96 ES 300, all GS 300, ’93–’94 LS 400, all SC 300/400 and the LX 450.**

Tools & Materials

PART NUMBER	DESCRIPTION OF TOOLS & MATERIALS	QUANTITY	SOURCE
08821–00810–01	Spray Gun Kit	1	OTC
08821–00811–01	Spray Gun (replacement)	(1)	OTC
08821–00812–01	Spray Gun Nozzle (replacement)	(1)	OTC
08821–00813–01	Freshener Mixing Container (replacement)	(1)	OTC
08821–00801–DS	Air Conditioning Freshener	1 per vehicle	TMS

CAUTION:
Wear safety glasses, protective mask, and gloves while working with the freshener.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	No applicable warranty information	–	–	–	–

Table of Contents

MODEL	PAGE	MODEL	PAGE	MODEL	PAGE	MODEL	PAGE
GENERAL	2	ES 300	3	GS 300	5	LS 400	7
		SC 300	9	SC 400	9	LX 450	11
General Procedure applies to all models and model years. The Specific Model Sections cover only the listed “affected models.”							

General Procedure

1. Preparation of freshener solution:

   (a) Invert freshener container and shake vigorously for 30 seconds.
   (b) Mix 3.4 fl. oz. of freshener (1 container) with 30 fl. oz. to make 1 qt. of solution.

2. Drying the evaporator:
   - Dry the evaporator for 10 minutes with the following settings:
     A/C: . . . . . Off
     Air Outlet: . . . . . Foot
     Mode: . . . . . Recirc.
     Blower: . . . . . High
     Temp: . . . . . Max Warm

3. Evaporator Treatment Preparation:

   (a) Ensure availability of 30–45 psi compressed air to be used with spray gun for application of freshener.
   (b) Place a tray under the evaporator housing drain hose to collect used cleaning solution.
   (c) Place shop cloth under the evaporator housing in the vehicle to prevent cleaning solution from dripping onto the floor mat.

4. Vehicle Preparation: **See specific model section.**

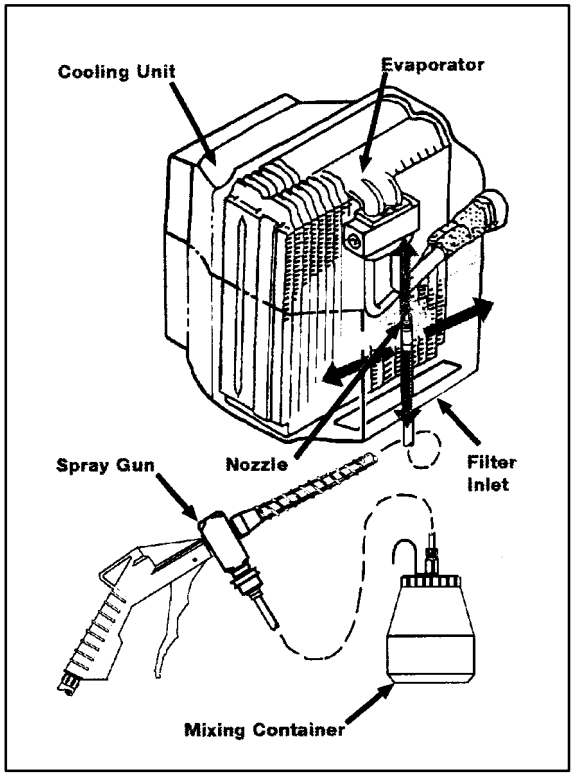
5. Evaporator treatment:

   (a) Set HVAC mode as follows:
   A/C: . . . . . Off
   Air Outlet: . . . . . Face
   Mode: . . . . . Fresh
   Blower: . . . . . High
   Temp: . . . . . Max Warm
   Windows: . . . . . Open
   (b) Insert spray nozzle into the filter inlet and spray the entire quantity (1 qt.) of freshener solution into the evaporator while moving the nozzle around to cover the complete evaporator surface.
   (c) Turn the blower OFF.

6. Reinstallation of Parts.

7. Completion of Treatment.

   (a) Dry the evaporator for 30 minutes with the following settings:
   A/C: . . . . . Off
   Air Outlet: . . . . . Foot
   Mode: . . . . . Recirc.
   Blower: . . . . . High
   Temp: . . . . . Max Warm
   Windows: . . . . . Closed
   (b) If the vehicle still has alcohol smell, open windows for ventilation. Do not turn on the AC switch until the evaporator is completely dry as this can reduce the effectiveness of the solution.

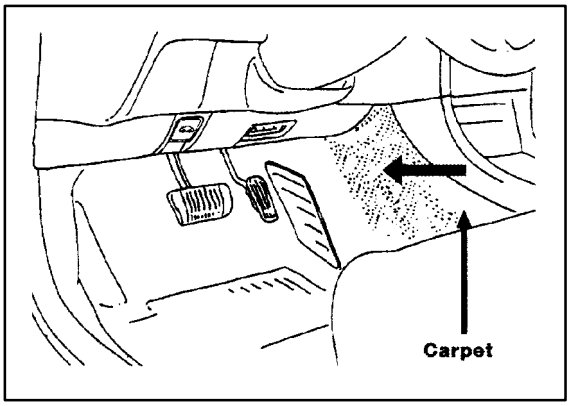


CAUTION
Do not get into the vehicle during this drying operation.

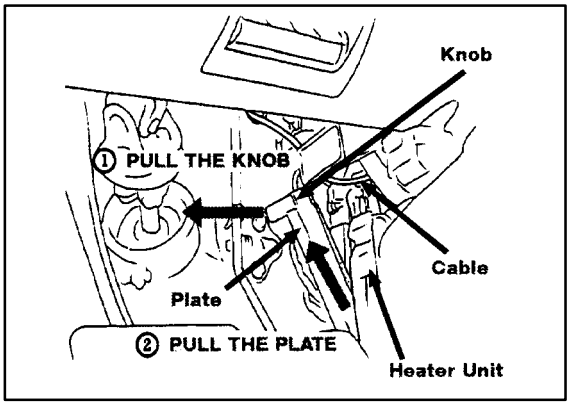
ES 300 ('92–'96)

1. Removal of parts.

(a) Pull down the carpet from the center console as indicated by red arrow in the illustration.



(b) Remove the plate on the side of the heater unit using steps ① and ❷, indicated with red arrows to show direction, in the illustration.

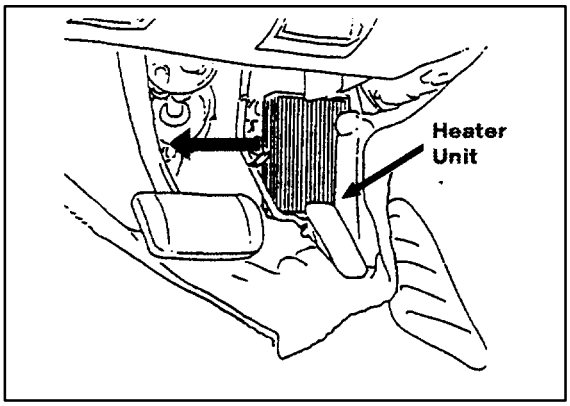


CAUTION:
Do not bend the cable.

NOTE:
The Plate will be reused.

(c) Remove the filter.

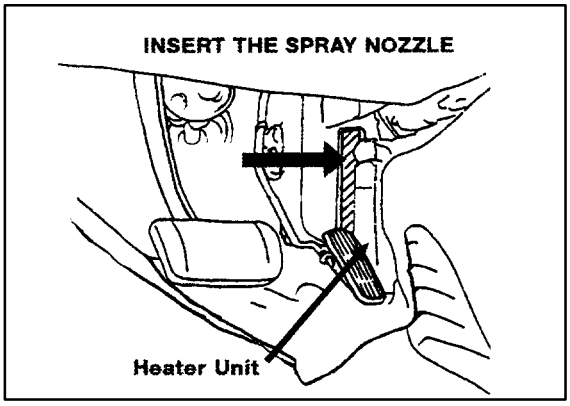
(d) Remove the blower controller.



2. Clean the Evaporator.

- Follow the general procedures given on page 2.

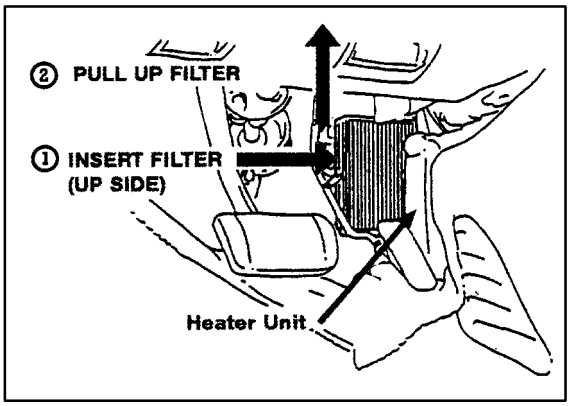
NOTE:
Location for insertion of spray nozzle is indicated by the red arrow in the illustration.



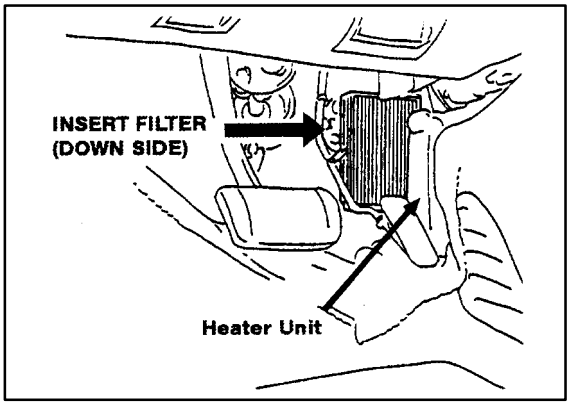
ES 300 ('92–'96) (Continued)

3. Reinstallation of parts.

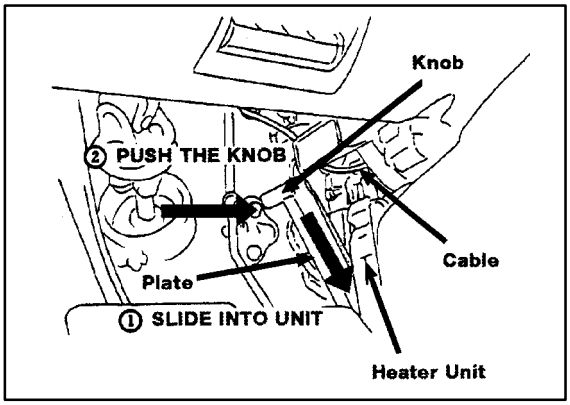
(a) Insert the filter (up side) into the heater unit following the numbered steps shown in the illustration.



(b) Insert the filter (down side) into the heater unit.



(c) Reinstall the plate on the side of the heater unit using steps ① and ❷, indicated with **red** arrows to show direction, in the illustration.



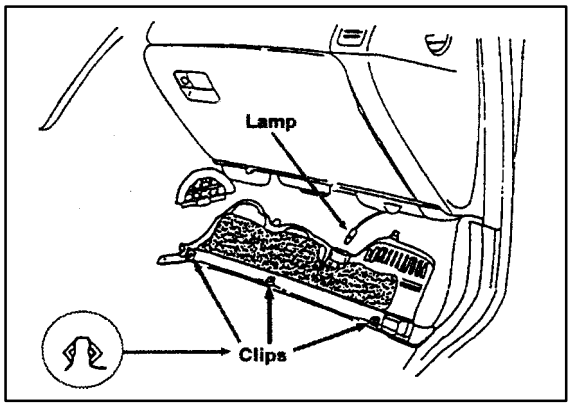
CAUTION:
Confirm that the plate is secure.

(d) Restore the carpet to its original position taking care not to bend the cable.

GS 300 1. Removal of parts.

(a) Remove the undercover.

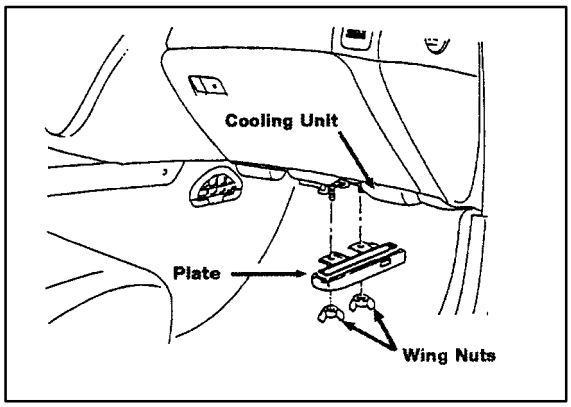
NOTE:
Pull down the clip areas (3 places) of the Undercover to remove.



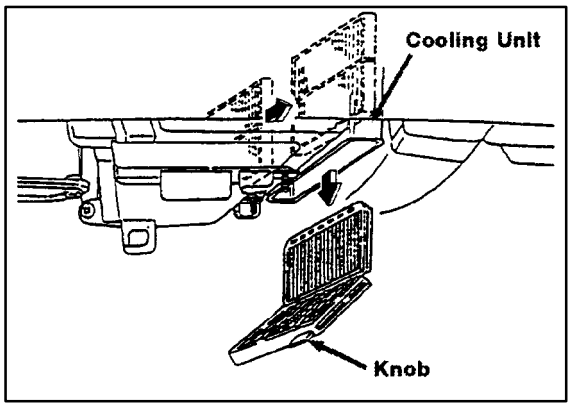
(b) Remove the lamp.

(c) Remove the (2) wing nuts and the plate on the bottom of the cooling unit.

CAUTION:
The plate and wing nuts will be reused.



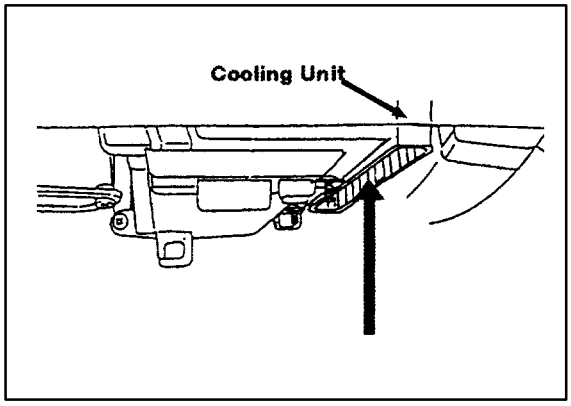
(d) Remove the (2) filters from the cooling unit.



2. Clean the Evaporator.

- Follow the general procedures given on page 2.

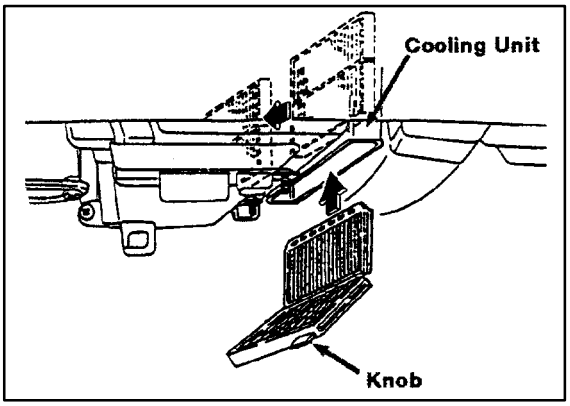
NOTE:
Location for insertion of spray nozzle is indicated by the red arrow in the illustration.



GS 300 (Continued)

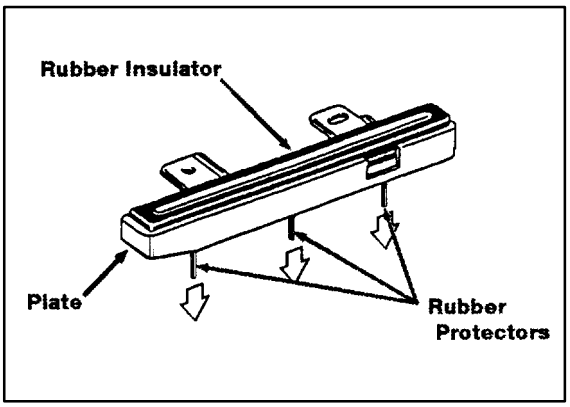
3. Reinstallation of parts.

(a) Insert the (2) filters into the cooling unit as shown in the illustration.



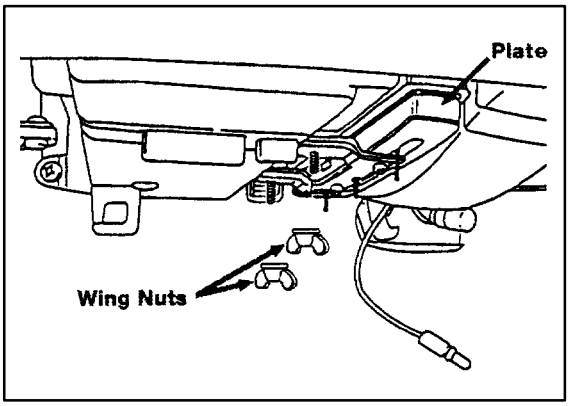
NOTE:
Insert a clean air filter with it's knob facing downwards, then slide it forward and install the second filter in the same manner.

(b) Assemble the rubber insulator on the plate.



CAUTION:
To prevent the cooling unit from leaking water, pull the three rubber projections from the other side of the plate to make sure that the rubber insulator seals properly against the plate.

(c) Install the plate on the cooling unit and secure with the (2) wing nuts.



CAUTION:
To prevent water leaks, verify that the cooling unit and plate are fully secure before tightening the wing nuts.

NOTE:
Before installing the plate on the cooling unit, coat the rubber insulator with water for easier assembly.

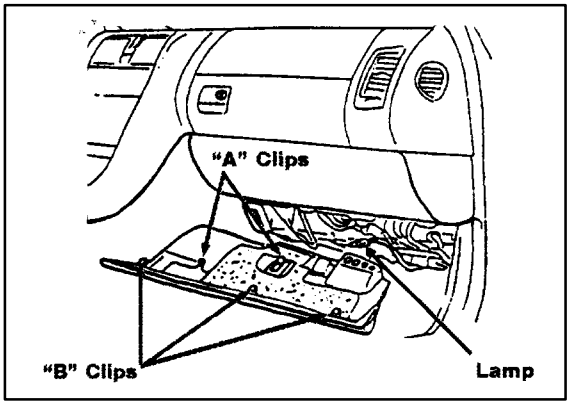
(d) Reinstall the lamp.

(e) Reassemble the Undercover.

LS 400 ('93–'94)

1. Removal of parts.

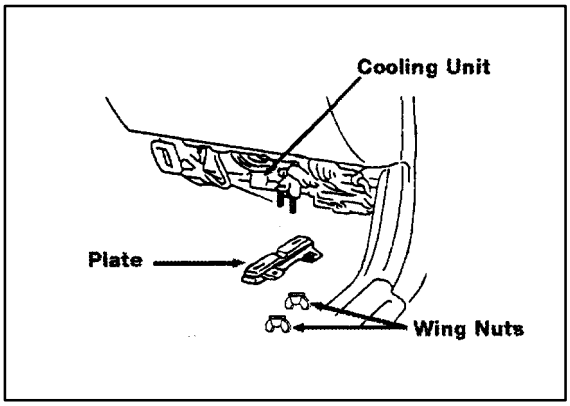
   (a) Remove the undercover.



NOTE:
- **Remove the front of "A" clips.**
- **Pull down the three "B" clip areas of the Undercover to remove.**

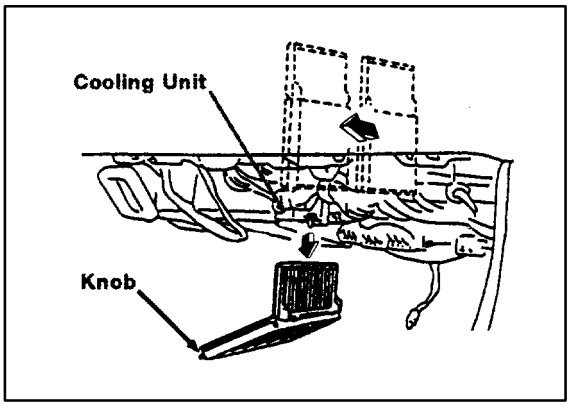
   (b) Remove the lamp.

   (c) Remove the (2) wing nuts and the plate on the bottom of the cooling unit.



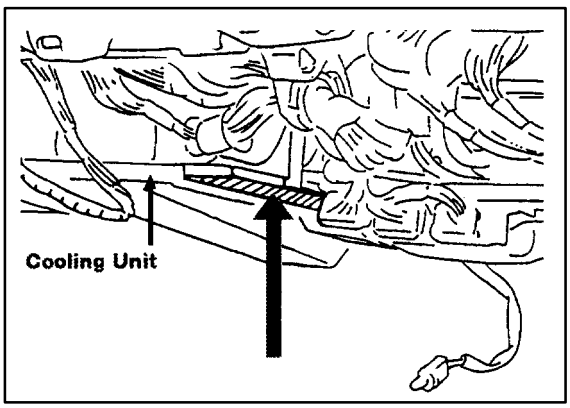
CAUTION:
The plate and wing nuts will be reused.

   (d) Remove the (2) filters from the cooling unit.



2. Clean the Evaporator

   - Follow the general procedures given on page 2.

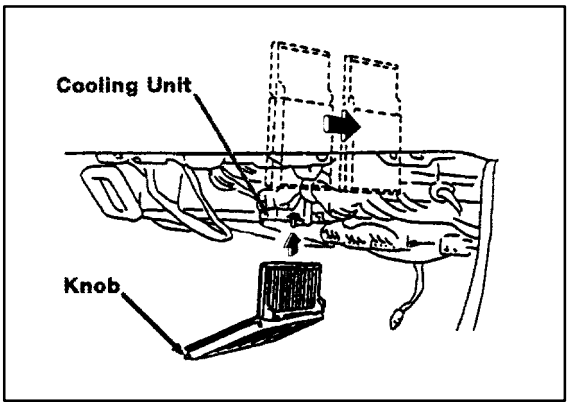


NOTE:
Location for the insertion of spray nozzle is indicated by the red arrow in the illustration.

LS 400 ('93–'94) (Continued)

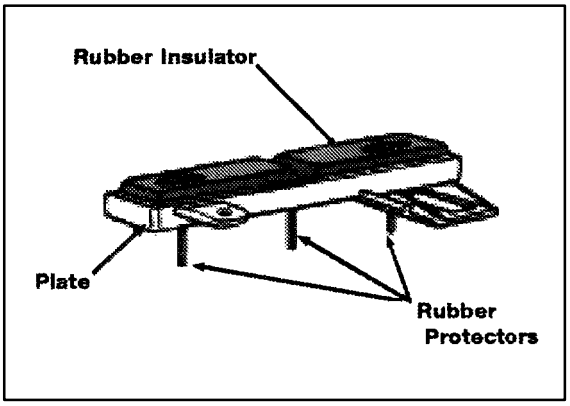
3. Reinstallation of parts.

(a) Insert the (2) filters into the cooling unit as shown in the illustration.



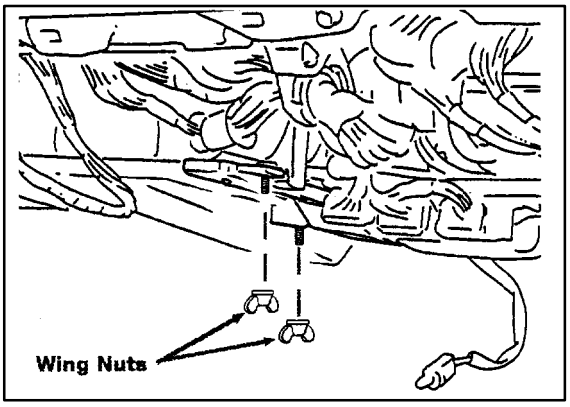
NOTE:
Insert a clean air filter with it's knob facing downwards, then slide it forward and install the second filter in the same manner.

(b) Assemble the rubber insulator on the plate.



CAUTION:
To prevent the cooling unit from leaking water, pull the three rubber projections from the other side of the plate to make sure that the rubber insulator seals properly against the plate.

(c) Install the plate on the cooling unit and secure with the (2) wing nuts.

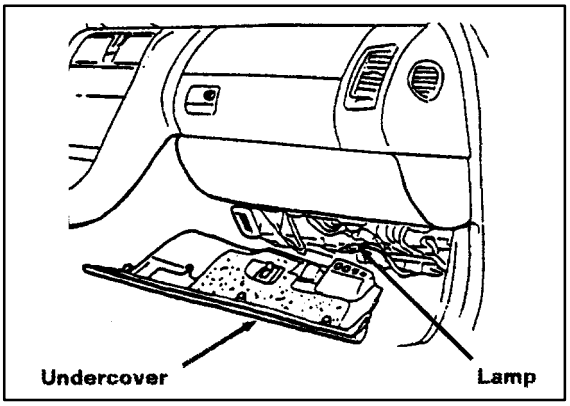


CAUTION:
To prevent water leaks, verify that the cooling unit and plate are fully secure before tightening the wing nuts.

NOTE:
Before installing the plate on the cooling unit, coat the rubber insulator with water for easier assembly.

(d) Reinstall the lamp.

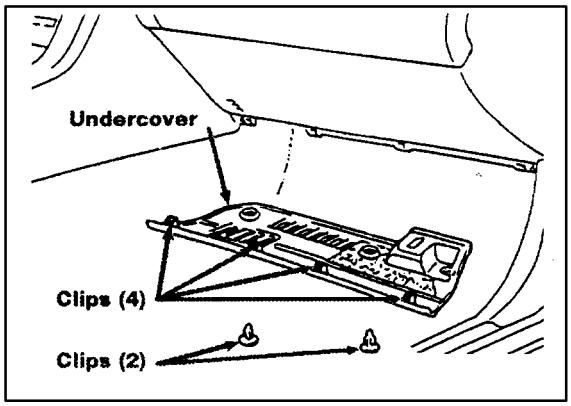
(e) Reassemble the Undercover.



SC 300
SC 400

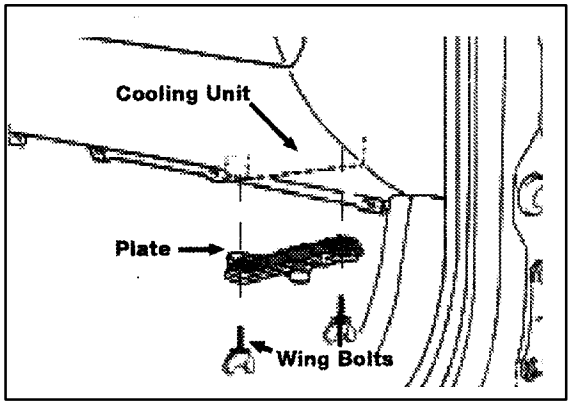
1. Removal of parts.

   (a) Remove two clips using the clip remover then remove the undercover.



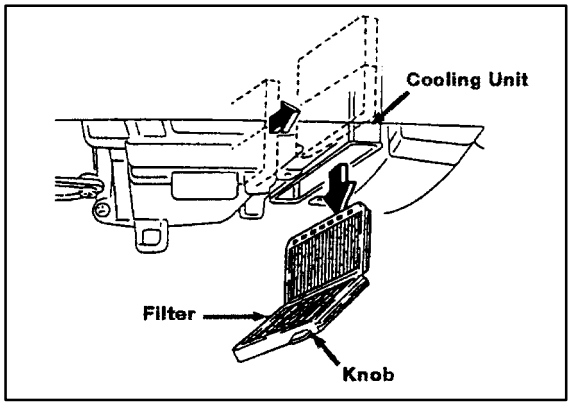
> **NOTE:**
> **Pull down the clip areas (4 places) of the Undercover to remove.**

   (b) Remove the (2) wing nuts and the plate on the bottom of the cooling unit.



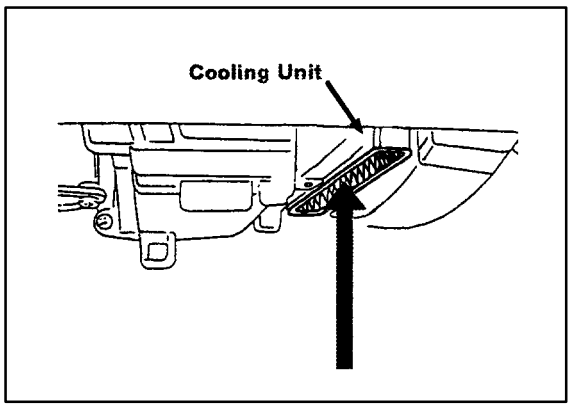
> **CAUTION:**
> **The plate and wing nuts will be reused.**

   (c) Remove the (2) filters from the cooling unit.



2. Clean the Evaporator

   - Follow the general procedures given on page 2.

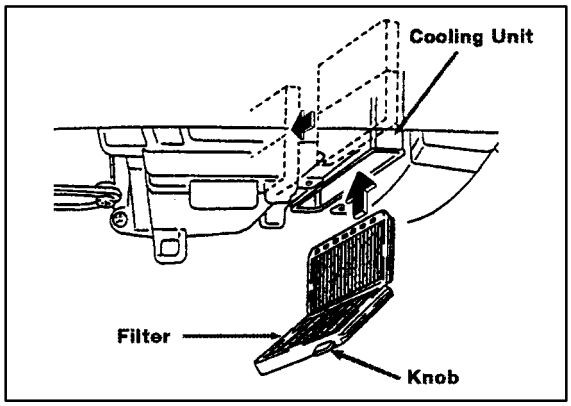


> **NOTE:**
> **Location for the insertion of spray nozzle is indicated by the red arrow in the illustration.**

SC 300
SC 400
(Continued)

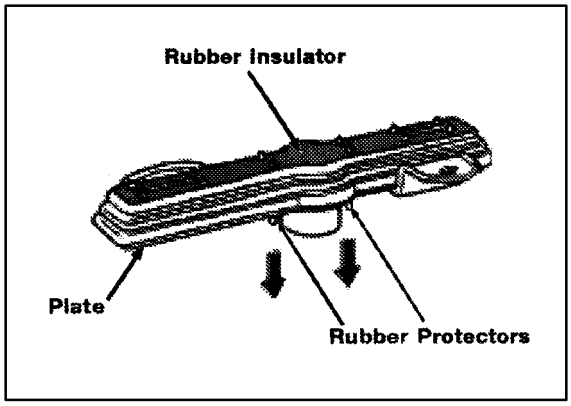
3. Reinstallation of parts.

(a) Insert the (2) filters into the cooling unit as shown in the illustration.



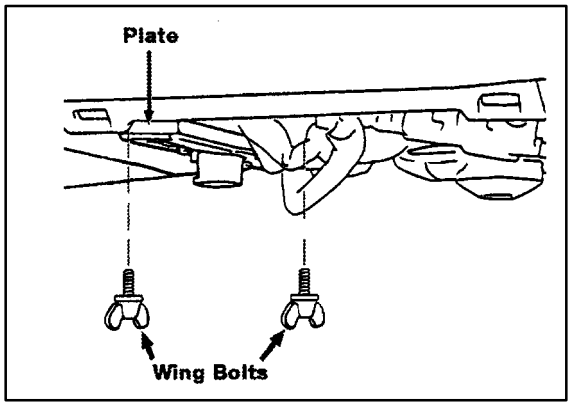
NOTE:
Insert a clean air filter with it's knob facing downwards, then slide it forward and install the second filter in the same manner.

(b) Assemble the rubber insulator on the plate.



CAUTION:
To prevent the cooling unit from leaking water, pull the three rubber projections from the other side of the plate to make sure that the rubber insulator seals properly against the plate.

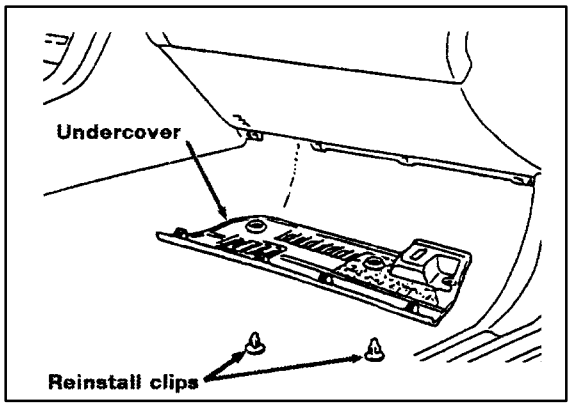
(c) Install the plate on the cooling unit and secure with the (2) wing nuts.



CAUTION:
To prevent water leaks, verify that the cooling unit and plate are fully secure before tightening the wing nuts.

NOTE:
Before installing the plate on the cooling unit, coat the rubber insulator with water for easier assembly.

(d) Reassemble the Undercover.



LX 450 1. Removal of parts.

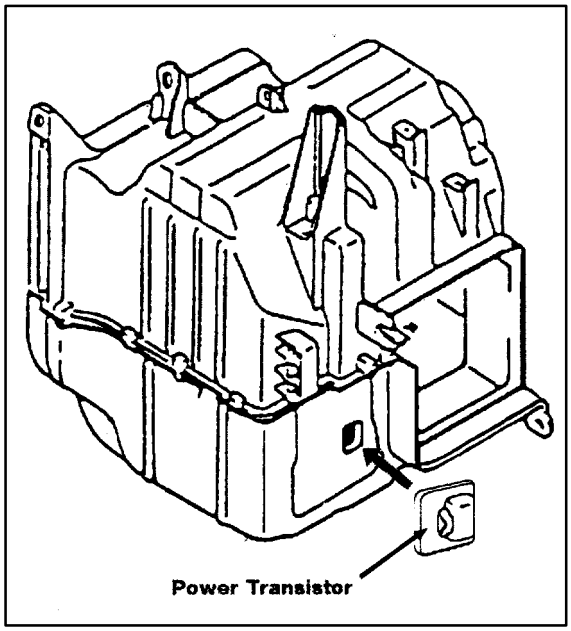
(a) Remove the glove compartment door.
(b) Remove the A/C Amplifier.
(c) Remove power transistor.

2. Clean the Evaporator

- Follow the general procedures given on page 2.

3. Reinstallation of parts.

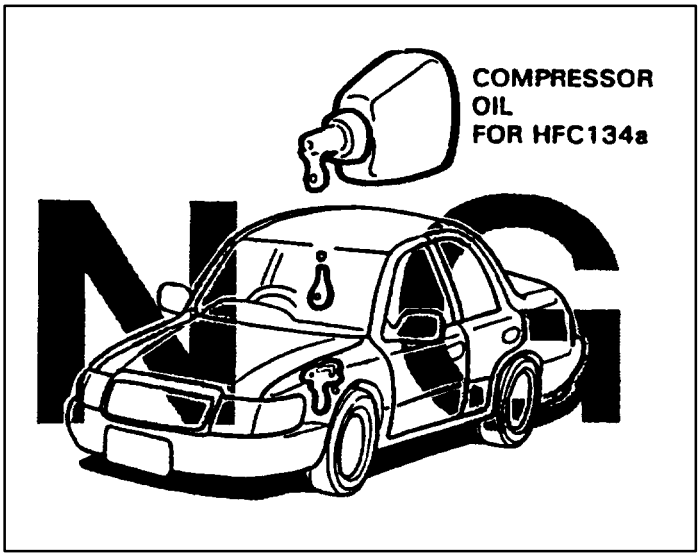
- Reinstall the parts in reverse order of removal described in step 1.



Title **HFC–134A REFRIGERANT OIL HANDLING PRECAUTIONS**

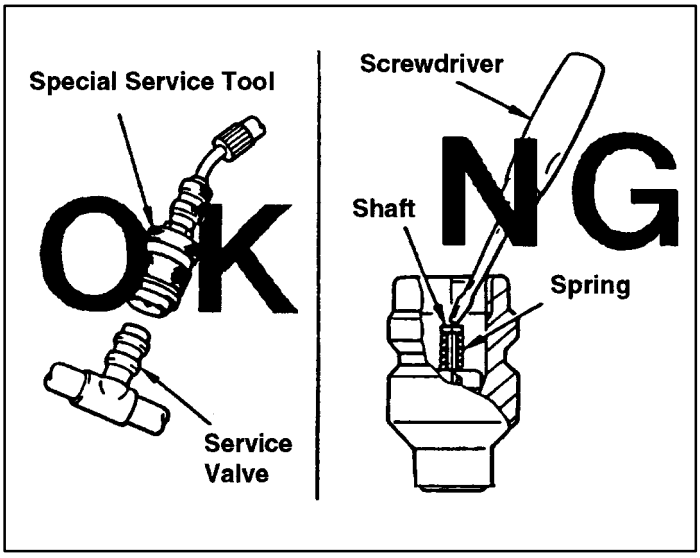
Special precautions need to be exercised when handling the new refrigerant oil for HFC–134a systems.

ND–OIL8 is used in systems utilizing swash plate type compressors (10P/10PA). Do not allow refrigerant oil (ND–OIL8) to come into contact with any of the vehicle's surfaces. It will cause discoloration of painted surfaces and will deteriorate components made from acrylic or ABS (Acrylonitrile Butadiene Styrene).



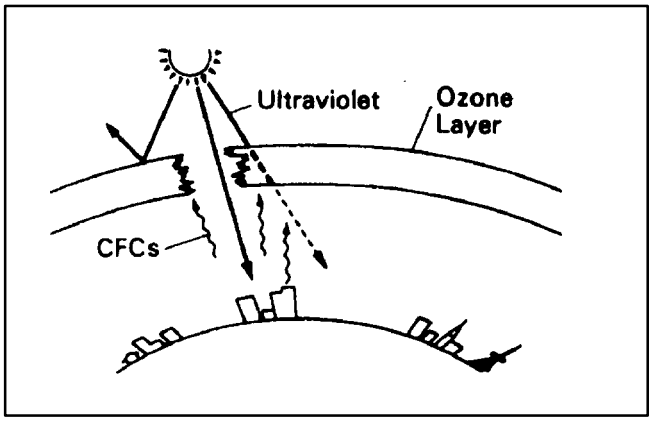
PRECAUTION:

When servicing a HFC–134a system, use only approved Lexus Special Service Tools (SSTs) to perform refrigerant recovery. Use of unapproved tools may cause unnecessary release of refrigerant into the atmosphere, oil contamination of vehicle surfaces or damage system components.

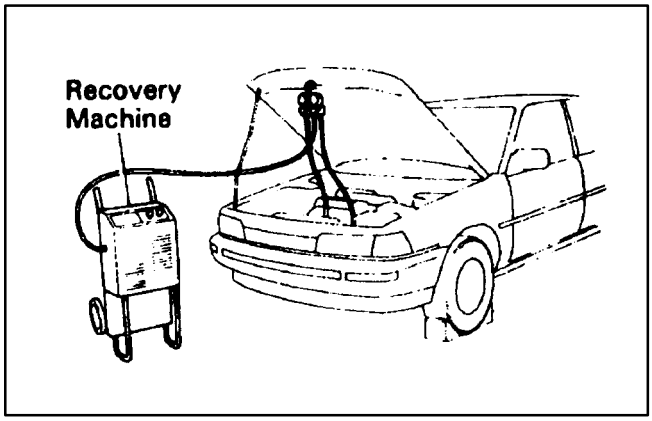


SPECIAL CARE SHOULD ALSO BE TAKEN TO ENSURE THAT THE HIGH SIDE AND LOW SIDE SERVICE VALVE CAPS ARE INSTALLED AFTER ANY WORK IS COMPLETED ON A SYSTEM.

In recent years, there has been a growing concern for the effects of chemical substances on the environment throughout the world. One of the substances that has attracted attention is the R–12 refrigerant used in automotive air conditioning (A/C) systems.



The chemical name for R–12 is Chlorofluorocarbon (CFC) and it has been identified along with CFCs from other sources as being a contributing factor in the depletion of the ozone layer in the earth's atmosphere. The ozone layer provides protection from the harmful effects of the sun's ultraviolet rays. Consequently it is very important to minimize the amount of refrigerant released into the atmosphere.

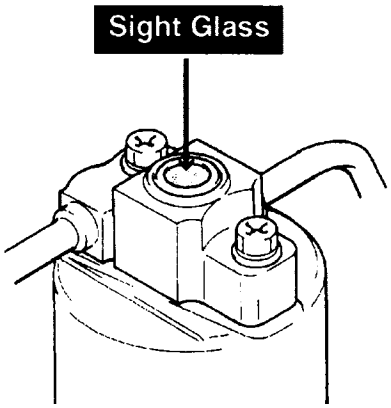


When servicing the A/C system it is mandatory to use a **Lexus Approved** refrigerant recovery machine **(Lexus P/N 00002–01396–02)** or its equivalent, and to use only the minimum amount of refrigerant necessary to test or charge the system.

The actual repair of each model's A/C system is detailed in the appropriate Lexus repair manual. However, to aid you in making quick, accurate diagnosis and repair of low refrigerant level conditions, the following inspection procedures have been developed.

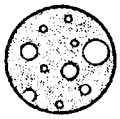
QUICK CHECKS OF REFRIGERANT VOLUME:

Inspect the condition of the refrigerant flowing through the sight glass, according to the following indicators:



Properly charged system

Almost no air bubbles are seen in the flow of refrigerant. When raising the engine speed gradually from idle to 1500 rpm, the bubbles disappear, making the refrigerant transparent.



Insufficiently charged system

Air bubbles seen continuously in the refrigerant.

Excessively charged system

No air bubbles seen in the refrigerant flow.

Item	Symptom	Amount of Refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present in sight glass	None, sufficient or too much	Refer to items 3 and 4
3.	No difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
4	Temperature of 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) Recover refrigerant (2) Evacuate air and charge proper amount of purified refrigerant
6	When air conditioner is turned off, refrigerant foams briefly and then stays clear	Correct	

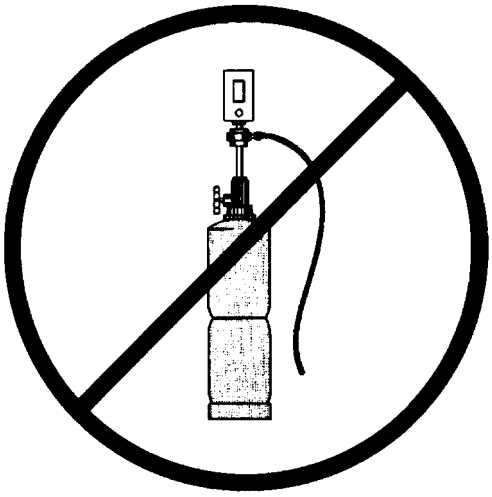
☞ **With higher ambient temperatures (above about 85 F), bubbles in the sight glass can be considered normal if cooling is sufficient.**

LEAK DETECTION:

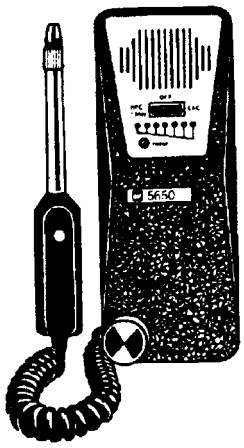
Identifying the exact location of A/C refrigerant leaks must be done with great care and can sometimes be difficult.

1) Ensure that at least 1 lb (450 g) of A/C refrigerant is in the system.
2) Install a gauge set and operate the A/C system to obtain normal system pressures. (Low: 21~28 psi, Hi: 206~213 psi)
3) Stop engine and allow low side pressure to peak.
4) Always use a proper gas leak detector for the refrigerant you are working with.
   A) **Do not** use propane type testers
   B) Always allow full warm–up of electronic type testers
   C) Calibrate instrument according to manufacturer's instructions
   D) **Do not** get probe wet or oily, etc.
5) Inspect the A/C system according to the following A/C system inspection procedures.

NOTE: **BEFORE PERFORMING ANY REPAIRS, CONNECT AND USE THE REFRIGERANT RECOVERY MACHINE.**

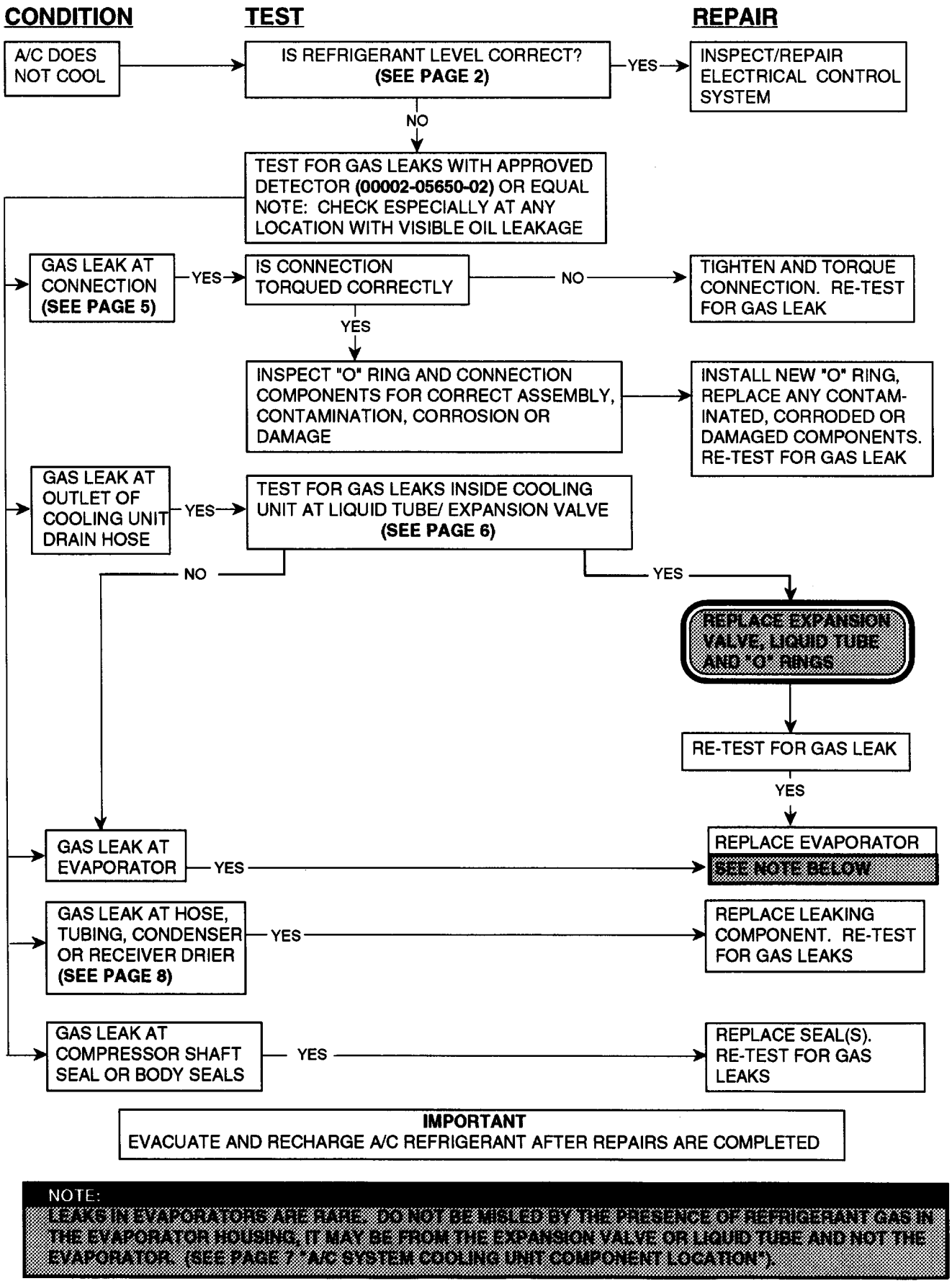


Halide Leak Detector



HFC 134a & R-12 Electronic Leak Detector

A/C SYSTEM INSPECTION PROCEDURE:

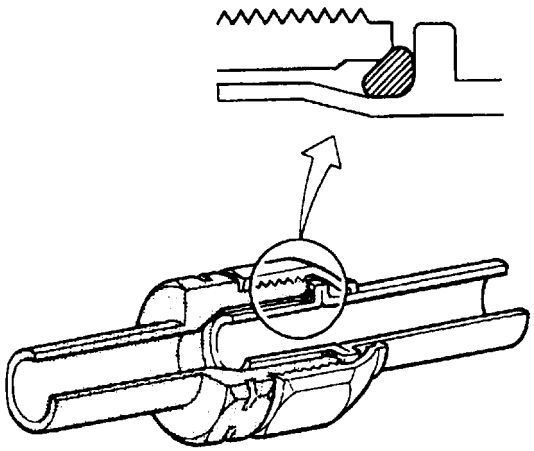


IMPORTANT
EVACUATE AND RECHARGE A/C REFRIGERANT AFTER REPAIRS ARE COMPLETED

NOTE:
LEAKS IN EVAPORATORS ARE RARE. DO NOT BE MISLED BY THE PRESENCE OF REFRIGERANT GAS IN THE EVAPORATOR HOUSING, IT MAY BE FROM THE EXPANSION VALVE OR LIQUID TUBE AND NOT THE EVAPORATOR. (SEE PAGE 7 "A/C SYSTEM COOLING UNIT COMPONENT LOCATION").

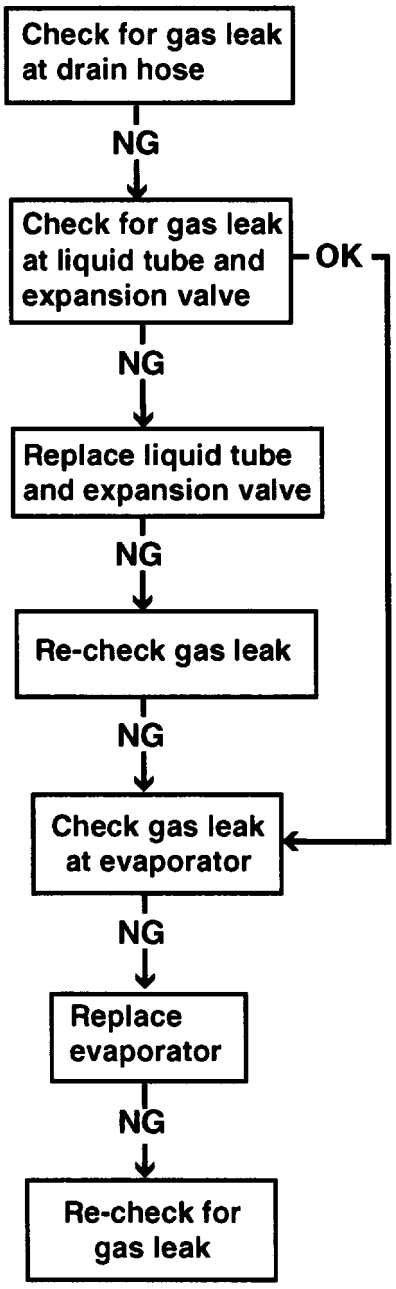
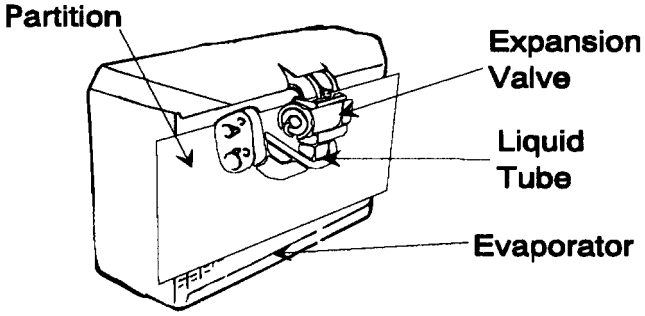
GAS LEAK INSPECTION:

1. Connection

INSPECTION AND REPAIR PROCEDURE	REMARKS
Check For Gas Leak NG Check Connection Torque — OK NG Tighten and Torque Connector Re-Check For Gas Leak NG Inspect "O" Ring And Connection Install New "O" Ring And Replace Any Damaged Components Re-Check For Gas Leak	Carefully check each connection in the refrigerant system: Pipe to pipe Pipe to each functional A/C component  Refer to the applicable repair manual to obtain correct torque value and determine O–Ring lubrication requirements.

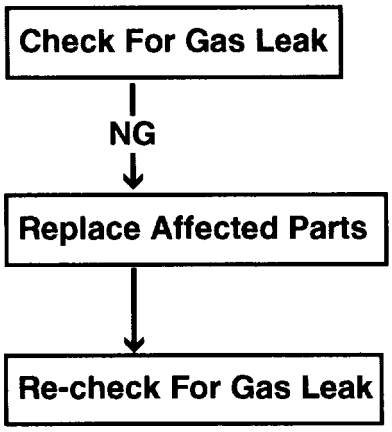
NG = No Good

2. Outlet of Cooling Unit Drain Hose

INSPECTION & REPAIR PROCEDURES	REMARKS
	CHECK WITH GAS LEAK DETECTION AT OUTLET OF COOLING UNIT DRAIN HOSE. CHECK INSIDE COOLING UNIT (a) Disconnect negative battery terminal. (b) Remove parts surrounding cooling unit. (c) Remove evaporator cover or appropriate component to allow access to the expansion valve and liquid tube. (d) Clear any residual gas in the cooling housing by blowing with low pressure compressed air. (e) If possible, insert a partition of plastic or card board between expansion valve/liquid tube and evaporator to more easily pinpoint gas leak location.  (f) Check for gas leak at the following locations: Mating surfaces of expansion valve and evaporator or expansion valve and liquid tube Expansion valve adjustment screw Evaporator tubes

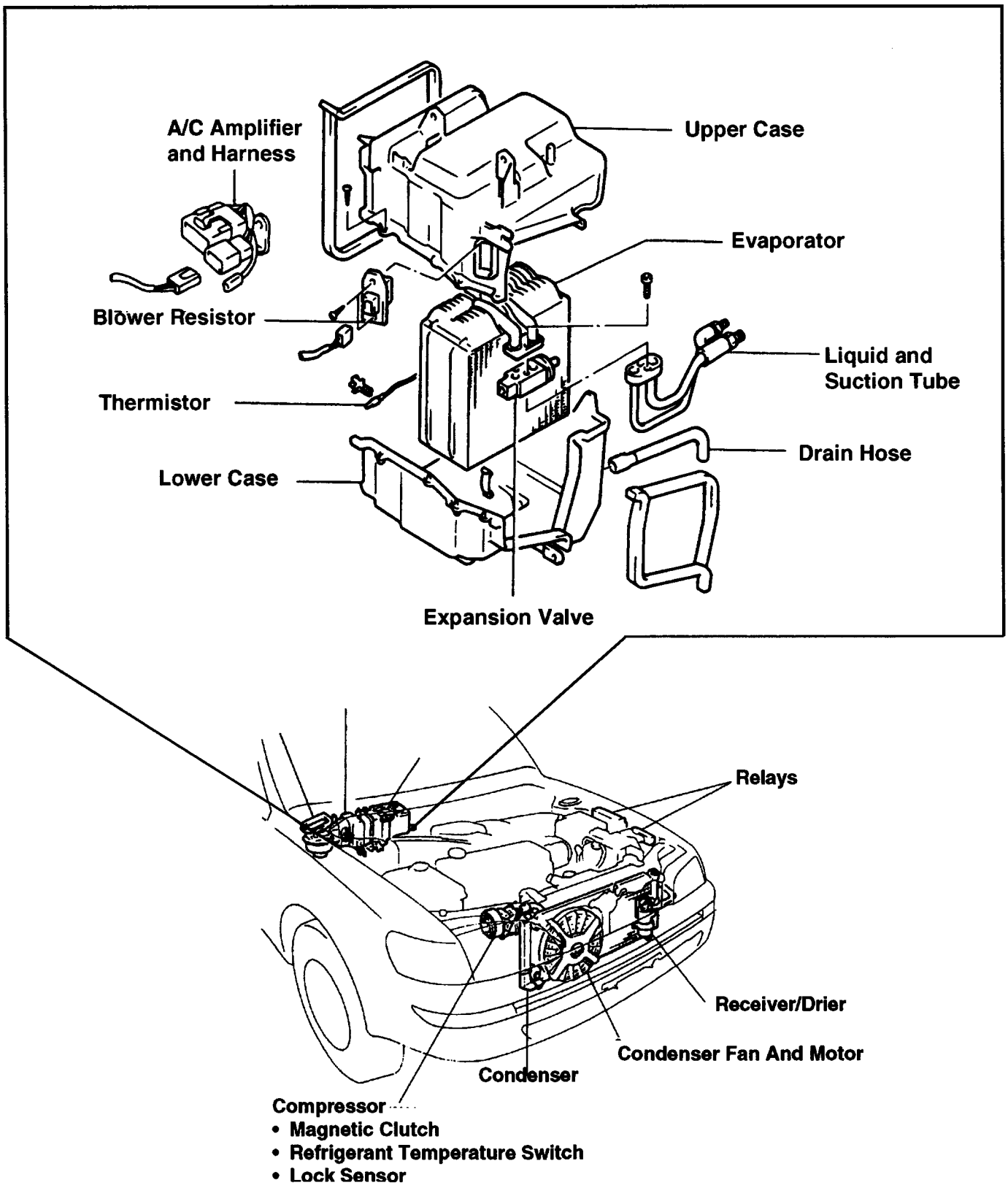
NG = No Good

3. Condenser / Receiver Drier / Compressor

INSPECTION & REPAIR PROCEDURES	REMARKS
	Check affected components by using the gas leak detector: All portions of condenser Compressor shaft seal and body seals Compressor lock sensor

AIR CONDITIONING SYSTEM COOLING UNIT COMPONENT LOCATION

(1) A/C system for single evaporator (all Passenger Cars)



LEXUS

TECHNICAL SERVICE INFORMATION

REF: HEATING & AIR CONDITIONING
NO: AC003-96
DATE: JUNE 7, 1996
MODEL: ALL MODELS

Title **A/C COMPRESSOR MAINTENANCE FOR STORED VEHICLES**

When a vehicle is stored for a long period, the volume of oil in the A/C compressor may decrease due to oil flow into the condenser, pipes, etc.

If the A/C system is turned on at high engine RPM after a long storage period, A/C compressor damage may result.

To minimize the possibility of damage to the A/C compressor while storing a vehicle, perform the following recommended procedure at least once a month to lubricate the compressor.

RECOMMENDED PROCEDURE FOR A/C COMPRESSOR LUBRICATION:

1. Turn off A/C And blower switches prior to starting engine.
2. Start and warm–up engine until engine speed drops below 1,000 RPM.
3. Turn on the A/C system using the following settings:
   - A/C switch: On
   - Blower Speed: High
   - Engine speed: Below 1,000 RPM
4. Keep A/C on with engine idling for 30 seconds.
5. Turn off A/C system and stop engine.

Lexus Supports ASE Certification

Care must be taken to use **only** refrigerant oil which is compatible to the vehicle's system. Following are A/C oil application charts for both R–12 and HFC–134a systems:

R–12 SYSTEMS

MODEL	OIL TYPE	PART NUMBER	QUANTITY
All Models	ND–Oil 6	P/N (88899–28040)	60 cc
	(or Equivalent)	P/N (07117–68040)	500 cc

HFC–134A SYSTEMS

MODEL	OIL TYPE	PART NUMBER	QUANTITY
All Models	ND–Oil 8	P/N (08885–09109)	40 cc
		P/N (08885–09107)	250 cc

LEXUS

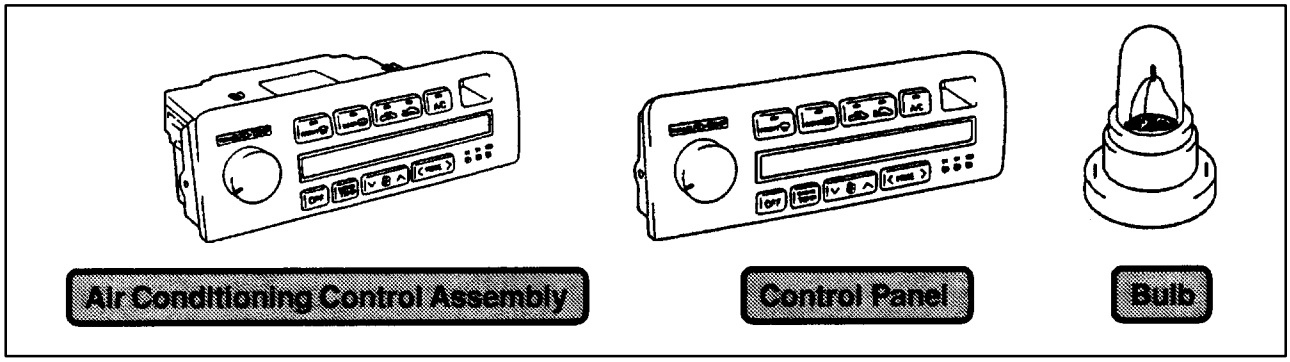
TECHNICAL SERVICE INFORMATION

REF: HEATING & AIR CONDITIONING
NO: AC006–96
DATE: AUGUST 9, 1996
MODEL: ES 300

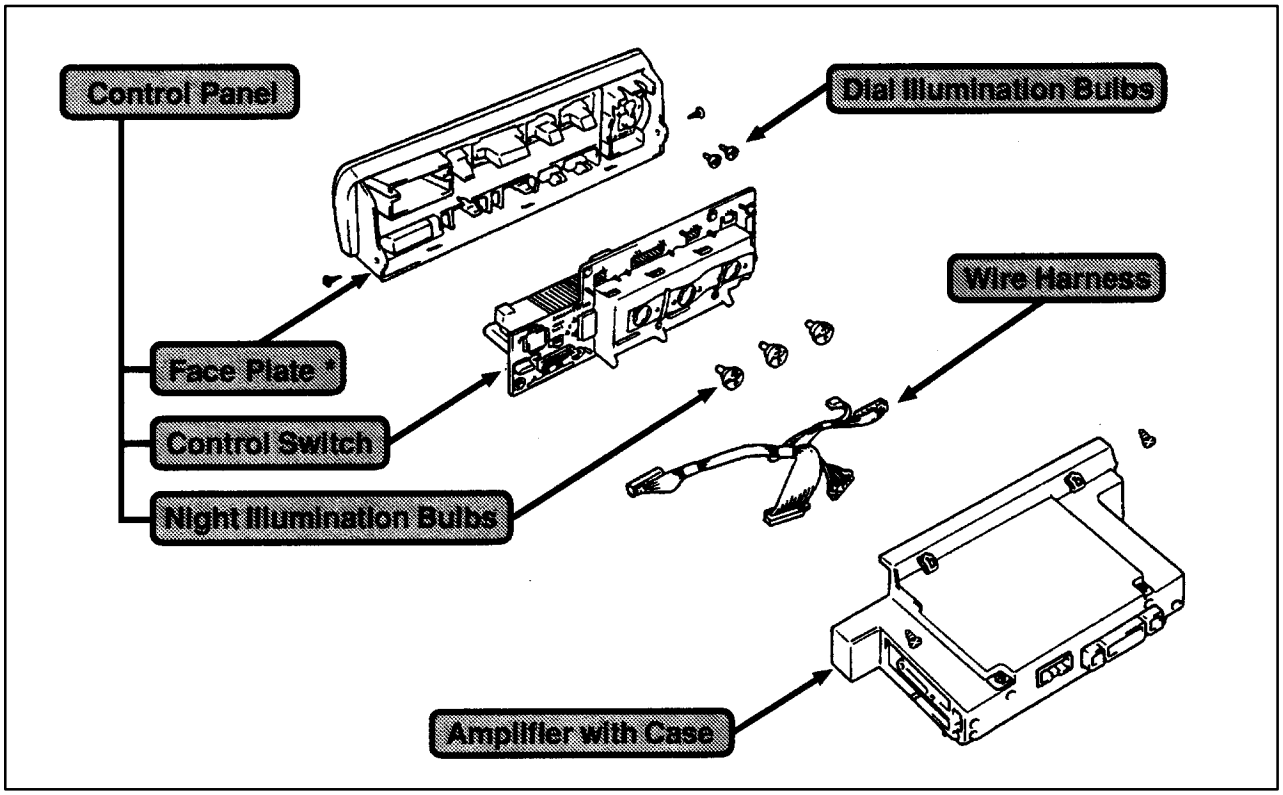
Title **1992 – 1995 ES 300 A/C CONTROL ASSEMBLY SERVICE PARTS**

To allow repairs to the A/C Control Assembly, service parts are now available. The following information on parts and troubleshooting will aid you in addressing complaints with the LCD display, night illumination or switch indicators.

PREVIOUSLY AVAILABLE PARTS:



CURRENTLY AVAILABLE PARTS:



* Face Plate is not available as a separate part.

TROUBLESHOOTING:

Use the matrix chart below as a guide to repairs. Verify necessary inputs to the A/C Control Assembly from the vehicle prior to disassembly. Use the repair manual, A/C System section, to validate inputs such as B+, ILL+, ground, etc..

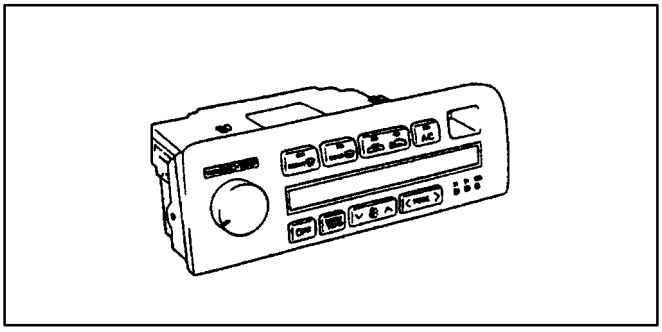
SUSPECT AREA / SYMPTOM	Control Switch	Bulb Switch	Switch Control	Indicator Lamp Circuit
Night Illumination does not come on		●		
LCD back lighting does not come on	●*1			
Indicator lamps of all switches are off			●	●
Indicator lamps of all switches are on			●	
LCD is faulty	●			

***1** LCD Illumination bulbs are not serviceable, Control Switch must be replaced if illumination does not occur.

NOTE: If symptoms still exist after the suspect areas have been tested and found not to be faulty, replace the amplifier.

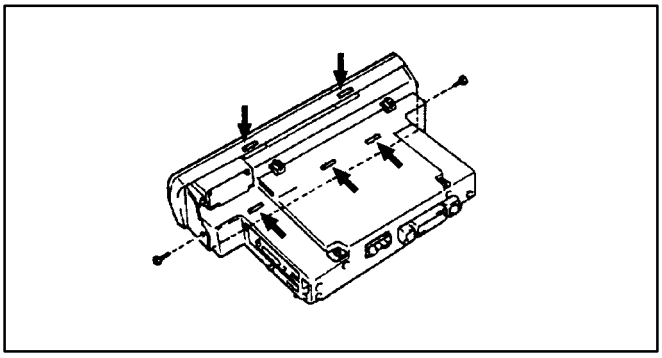
AIR CONDITIONING DISASSEMBLY:

1. Remove the Air Conditioning Control Assembly.



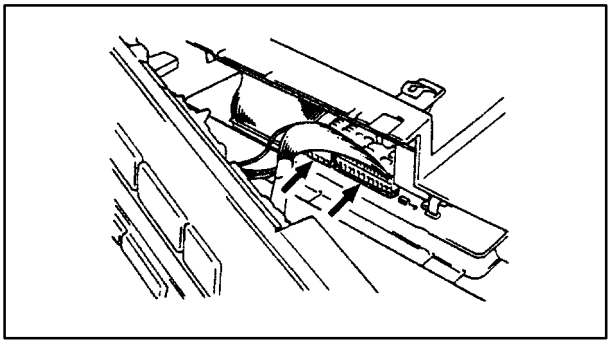
2. Separate Control Panel from case.

   a. Remove the 2 screws and release the 5 clips to separate the Control Panel from the case.

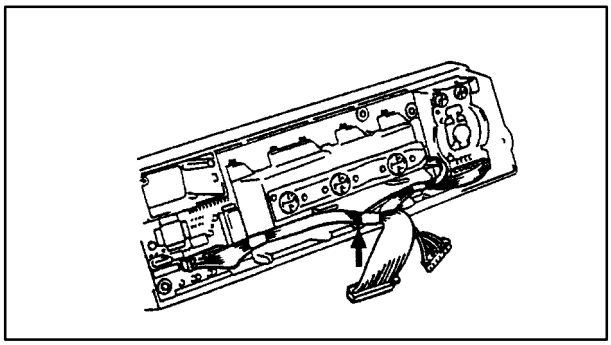


AIR CONDITIONING CONTROL DISASSEMBLY (Cont'd):

b. Disconnect the 2 connectors and separate the Control Panel from the case.

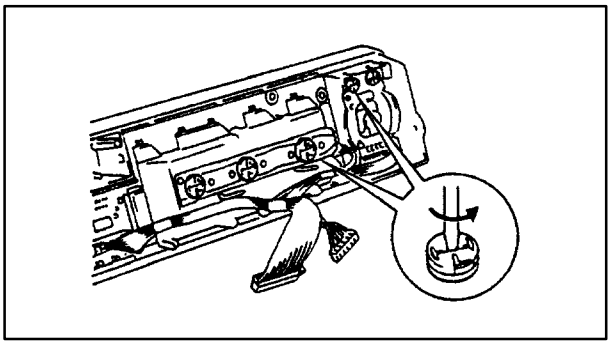


c. Remove the Wire Harness as shown in the illustration.



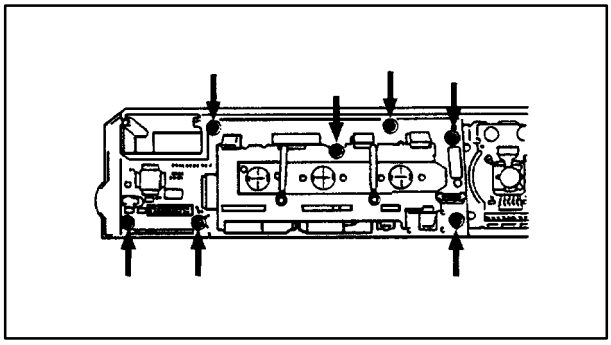
3. Replace the Night Illumination Bulb.

   Use a flat–bladed screwdriver to remove and replace the Night Illumination Bulb.

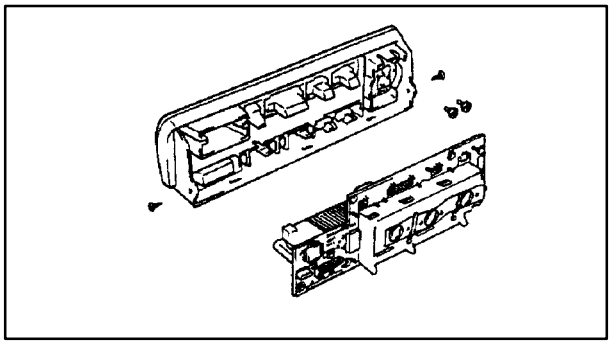


4. Remove the Control Switch.

   a. Release the 7 screws to remove the Control Switch.

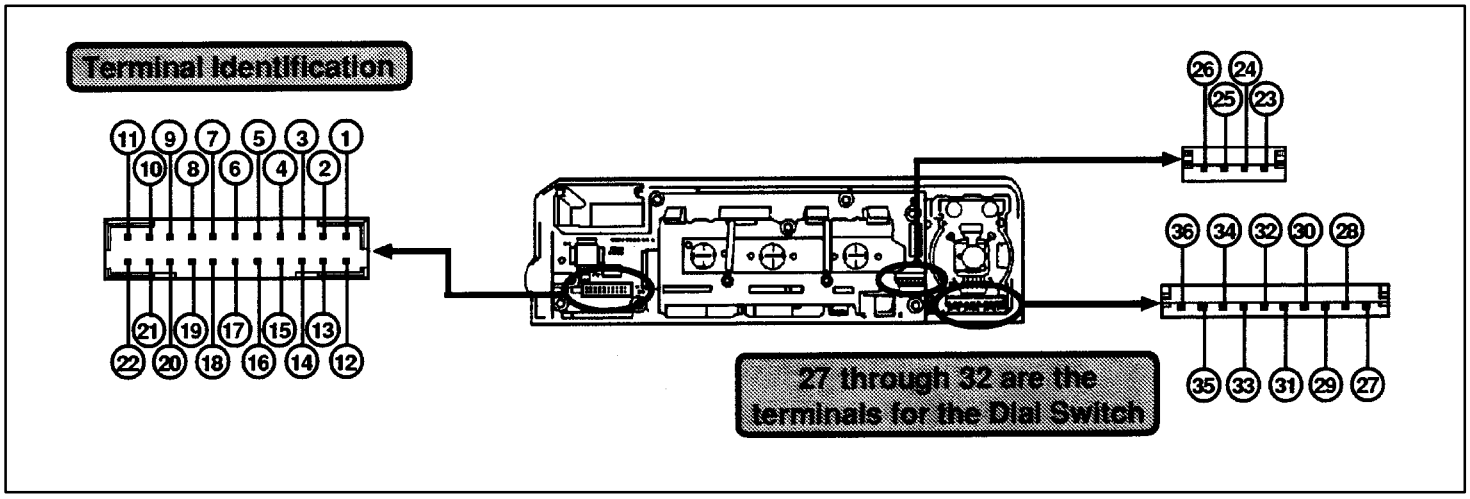


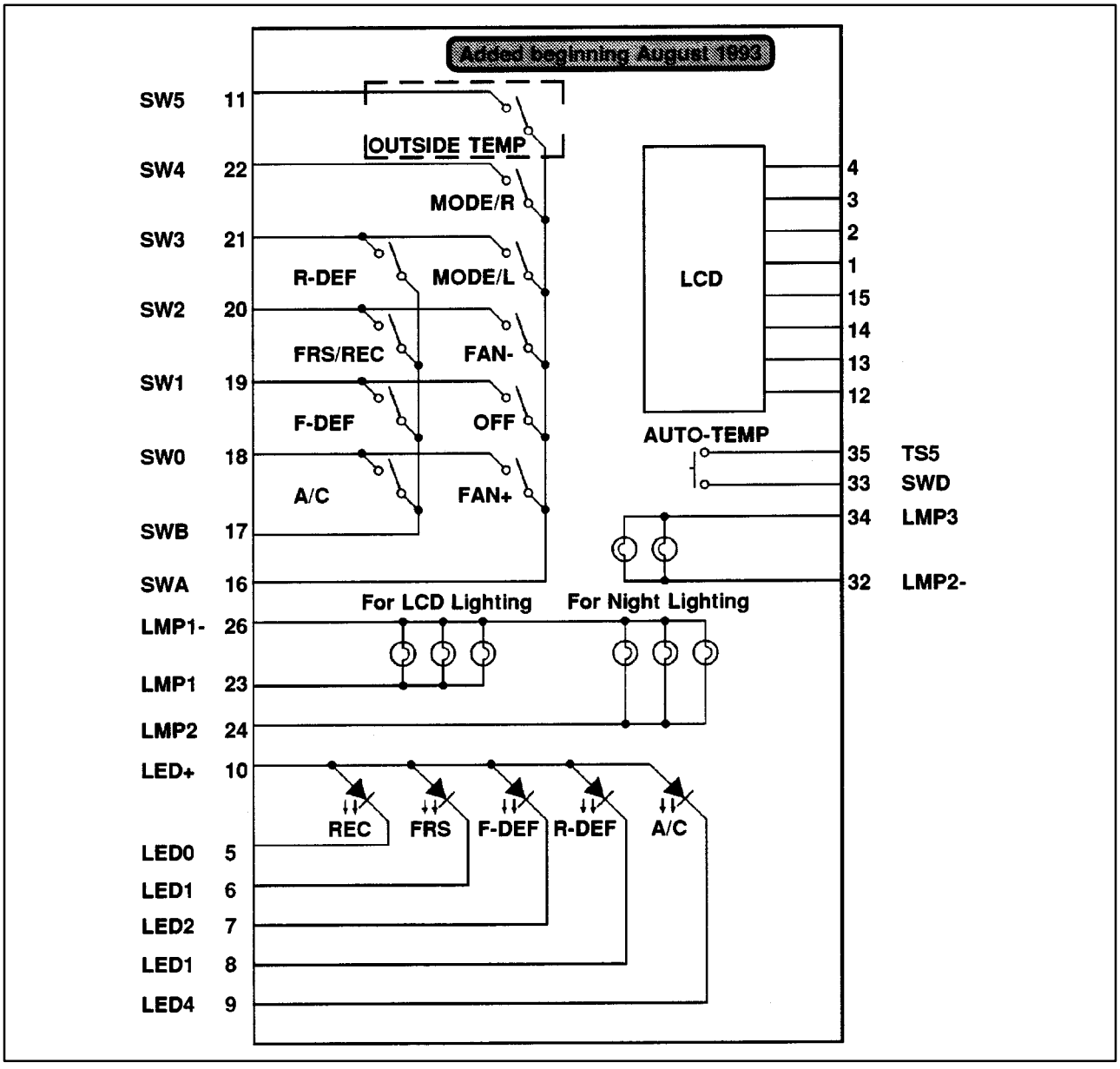
   b. Separate the Control Switch from the Face Plate.



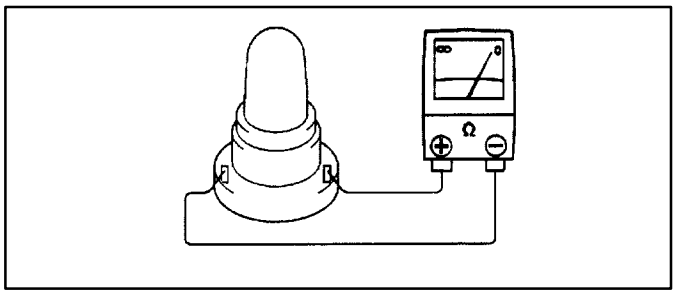
CONTROL PANEL INSPECTION PROCEDURE:

Interior Circuits –





INSPECTION PROCEDURE:

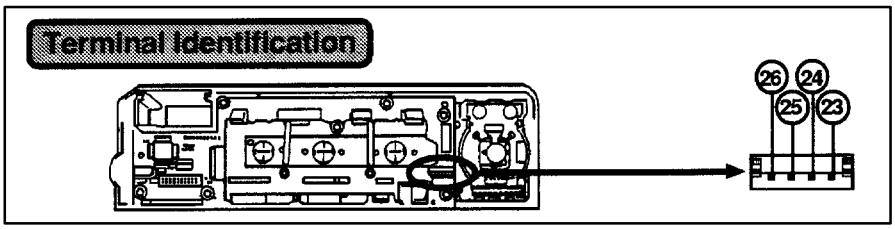


1. Bulb Circuit –

   Perform the following tests on suspect Night Illumination Bulbs. Check for continuity as shown. Replace the bulb if there is no continuity.

2. Bulb Circuit Inspection –

   Verify continuity between terminals 24 – 26, if no continuity replace the Control Switch.



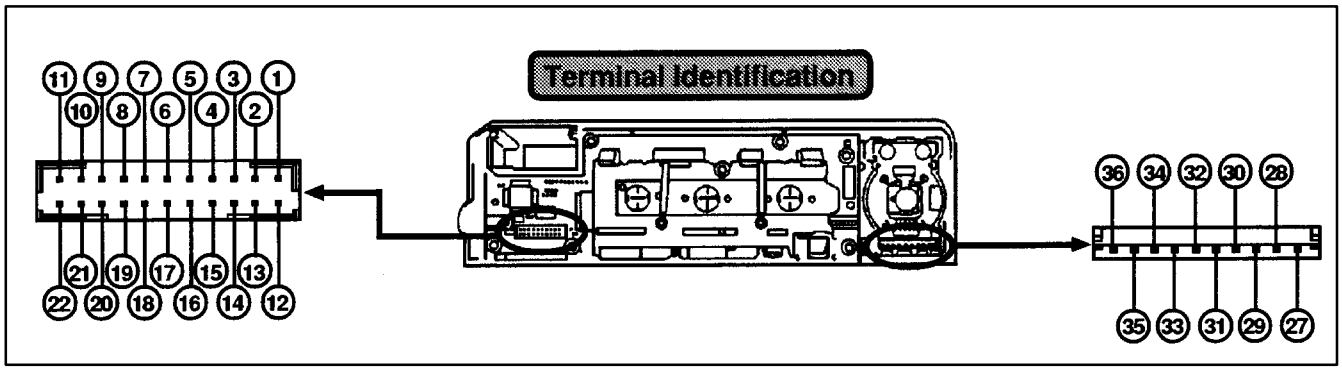
3. Switch Circuit –

   a. Switch Continuity Inspection:

   - Check that there is continuity between the terminals while the switch is pressed.
   - If there is no continuity between even one pair of terminals, replace the Control Switch.

* Added beginning August 1993.

SWITCH	INSPECTION TERMINALS
Outside Temp*	11 – 16
Mode/Right	22 – 16
Mode/Left	21 –16
Rear Def	21 – 17
Fan Down	20 –16
Fresh/Recirc	20 –17
Off	19 –16
Front Def	19 – 17
Fan Up	18 – 16
A/C	18 – 17
Auto–Temp	35 – 33

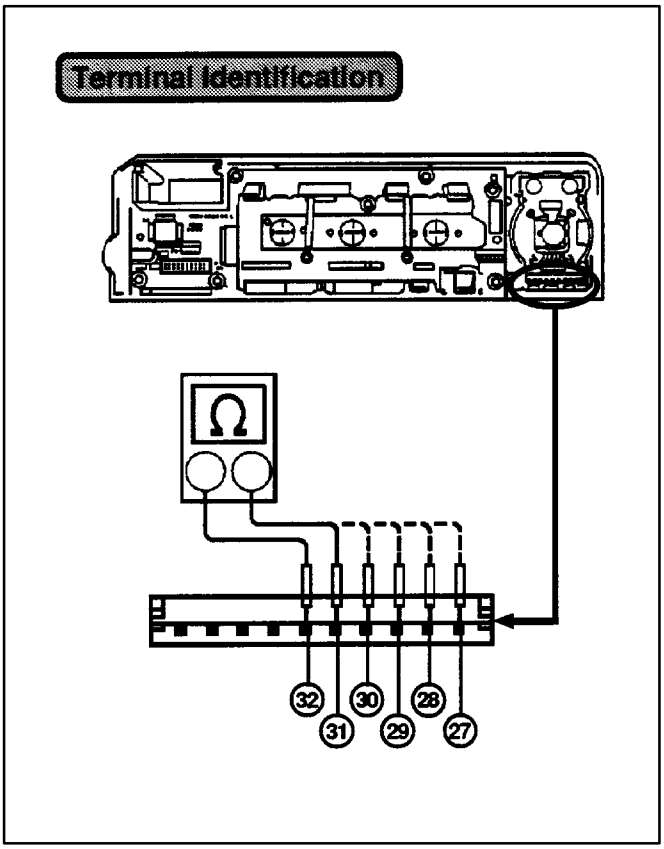


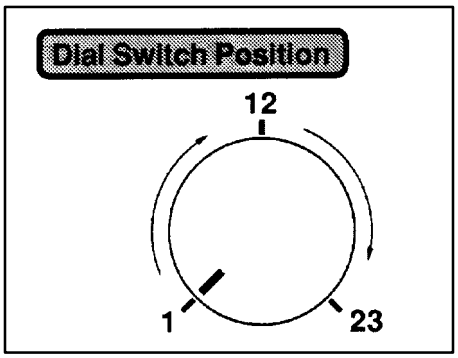
INSPECTION PROCEDURE (CONT'D):

b. Dial Switch Continuity Inspection –

- Check terminal continuity between 32 and 27 – 31.
- Rotate the Dial Switch to positions 1 through 23 and check for continuity/no continuity.
- If continuity is not as identified on the chart, Control Panel replacement is required.
- Chart Legend –

CONTINUITY: **1** – Yes
0 – No





POSITION	TERMINAL NUMBER				
	(31)	(30)	(29)	(28)	(27)
1	0	0	1	1	1
2	0	0	1	0	1
3	0	0	1	0	0
4	0	1	1	0	0
5	0	1	1	0	1
6	0	1	1	1	1
7	0	1	1	1	0
8	0	1	0	1	0
9	0	1	0	1	1
10	0	1	0	0	1
11	0	1	0	0	0
12	1	1	0	0	0
13	1	1	0	0	1
14	1	1	0	1	1
15	1	1	0	1	0
16	1	1	1	1	0
17	1	1	1	1	1
18	1	1	1	0	1
19	1	1	1	0	0
20	1	0	1	0	0
21	1	0	1	0	1
22	1	0	1	1	1
23	1	0	1	1	0

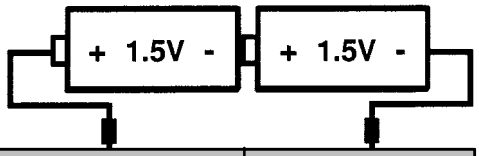
INSPECTION PROCEDURE (Cont'd):

4. Indicator Lamp Circuit –

   Connect two 1.5v dry cell batteries in series. Using the table, check that each suspect Indicator Lamp illuminates.

NOTE: Since the Indicator Lamps are LEDs, do not mix the "+" and "–" terminals of the test batteries or apply power to them for more than 3 seconds at a time.

If a suspect LED does not illuminate when tested, replace the Control Switch.



INDICATOR	TERMINAL TO CONNECT "+"	TERMINAL TO CONNECT "–"
A/C	10	9
REAR–DEF	10	8
FRONT–DEF	10	7
FRESH	10	6
RECIRC	10	5

PART NUMBER INFORMATION:

PART NAME	PART NUMBER	MODEL YEAR	MODEL APPLICATION	QTY
Control Panel	55902–33100	'92–'93	VK13T	1
	55902–33050	'94–'95	GK13T	1
Control Switch	88601–33040	'92–'93	VK13T	1
	88601–33020	'94–'95	GK13T	1
Bulb	84999–60420	'92–'93	VK13T	2
	84999–60440	'94–'95	GK13T	3
Dial Switch Bulb	84999–60430	'92–'95	VK13T, GK13T	2
Amplifier with Case	88650–33110	'92–'93	VK13T	1
	88650–33070	'94	GK13T	1
	88650–33140	'95	GK13T	1
Wire Harness	88484–33020	'92–'95	VK13T, GK13T	1
Screws	90099–00263	'92–'95	VK13T, GK13T	2

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME*	OPN	T1	T2
883851	A/C Control Assembly R&R	0.4	55902–XXXXX	**	**
Combo “A”	A/C Panel Sub–Assembly R&R	0.2	55902–330XX	**	**
Combo “B”	R&R Night Illumination Bulb (all)	0.2	84999–604XX	**	**
Combo “C”	R&R Knob Illumination Bulb (all)	0.2	84999–60430	**	**
Combo “D”	R&R Control Computer/Amplifier	0.2	88650–33XXX	**	**
Combo “E”	R&R Flexible Flat Cable/Wire Harness	0.2	88484–33020	**	**
Combo “G”	R&R Control Switch	0.2	88601–330XX	**	**

* Listed time for sub–operations are to be added to base operation to R&R the A/C control Assembly and include all necessary checks and tests.

** As applicable per the Lexus Universal Flat Rate Manual.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: HEATING & AIR CONDITIONING
NO: AC007–96
DATE: NOVEMBER 29, 1996
MODEL: ALL MODELS

Effective January 1, 1996, the E.P.A. has officially banned the manufacture of Refrigerant 12 (Freon). As a result, surplus supplies of R–12 will begin to dwindle over the next several years until, eventually, R–12 will no longer be available.

This uncertainty about the availability of R–12 has caused significant concerns for Lexus dealers when servicing HVAC systems not using R–134a refrigerant. Similarly, the reduced availability of R–12 has prompted demands for R–134a retrofit kits and/or alternate refrigerants. This TSB will clarify Lexus's current recommendations for servicing and retrofitting HVAC systems on Lexus vehicles using R–12 refrigerant.

ALTERNATE REFRIGERANTS:

Previously, the E.P.A. has endorsed other alternative refrigerants. These endorsements, combined with the uncertain future availability of R–12, have lead to a limited acceptance of using alternative refrigerants when servicing or retrofitting R–12 HVAC systems. Use of these refrigerants can lead to several service related problems, including:

- Poor system performance and leak detection capabilities.
- Contamination of R–12 and R–134a during refrigerant recovery and recycling.

Recently the E.P.A. released a statement clarifying that approval of alternative refrigerants relates only to the toxicology, flammability, ozone depletion and global warming characteristics. The approval **does not imply acceptability of alternative refrigerants** use with respect to serviceability or performance.

TOYOTA MOTOR SALES, U.S.A. ENDORSES THE USE OF R–134a AS THE ONLY ACCEPTABLE ALTERNATIVE REFRIGERANT FOR VEHICLES USING R–12.

R–12 AVAILABILITY:

It is estimated that existing R–12 supplies will meet market demand in 1996. Beyond that, Lexus will supply R–12 to it's dealers from a strategic reserve. These strategic reserves are allocated specifically for distribution to Lexus dealers for repair of their customers' R–12 HVAC systems. TMS projects these reserves may meet dealer demand through early 1998. After that, we believe R–12 will no longer be readily available and dealers will begin to retrofit customer vehicles with R–134a.

RETROFIT ISSUES:

Lexus has completed development of retrofit parts for all later model Lexus vehicles using R–12 refrigerant. These parts will be produced in harmony with market demand, based on R–12 availability.

The parts necessary for a typical retrofit will generally include:

- Receiver Dryer
- O–Rings
- Fittings
- Labels
- Oil

A TSIB outlining retrofit procedures will be released when the retrofit kits become available.

For additional information, contact the Environmental Assistance Network Hotline at 1–800–542–3914.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: AUDIO

NO: AU001–96

MODEL: ALL MODELS

Title **STATIC NOISE ON WEAK AM STATIONS**

Some Lexus audio systems may exhibit audible electrical noise on weak AM stations when various electrical accesssories (turn signals, rear defogger, cruise control, brakes, etc.) are operated.

Poor antenna grounding can cause this condition.

To eliminate or reduce the intensity of the noise use the following repair procedure:

REPAIR PROCEDURE:

1. Play the radio on a strong, static–free AM station and slowly move the tip of the antenna mast forward and back approximately 2 inches (Fig. 1). If static noise is not heard, go to Step 2. If static noise is heard during antenna movement, replace the antenna mast and go to Step 3.

NOTE: Do not touch the antenna mast with your bare hands. Use a glove or non-metallic object to move the antenna. (If you touch the antenna with your hands, you will change the antenna sensitivity).

2. Remove the antenna mast and inspect the base of the mast for corrosion and damage. Clean with 1500 grit sandpaper (Fig. 2).

3. Remove the antenna assembly and inspect the inner fender around the antenna hole for corrosion. Clean with 1500 grit sandpaper (Fig. 3).

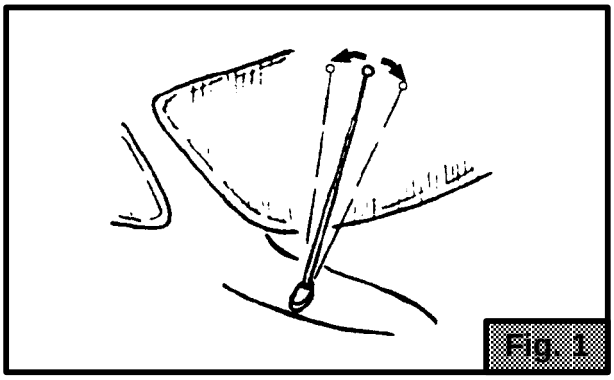


Fig. 1

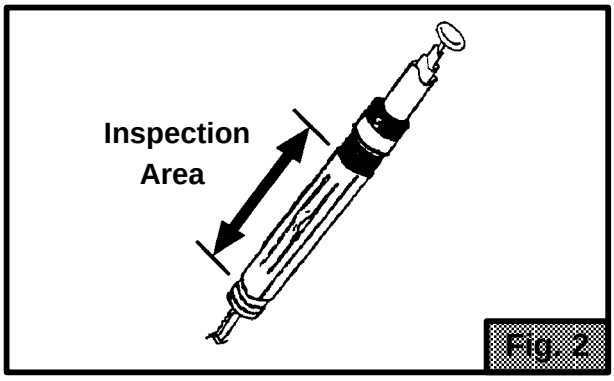


Fig. 2

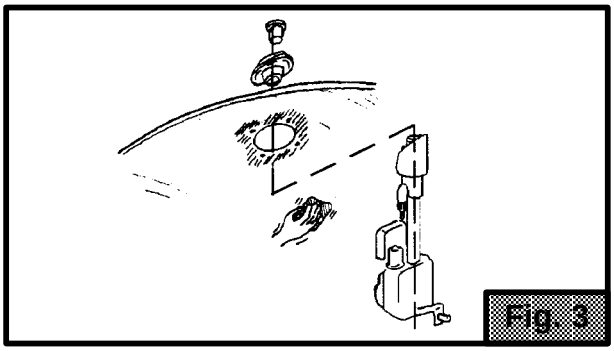
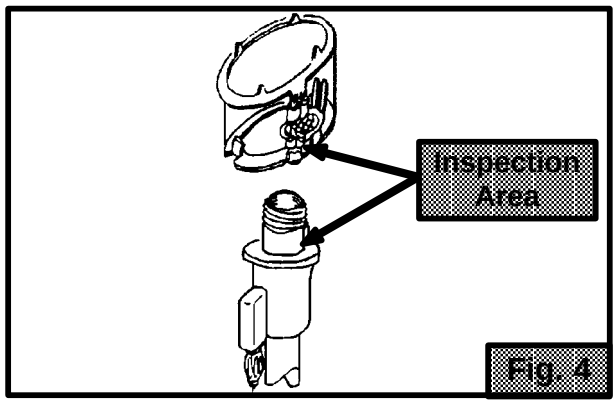


Fig. 3

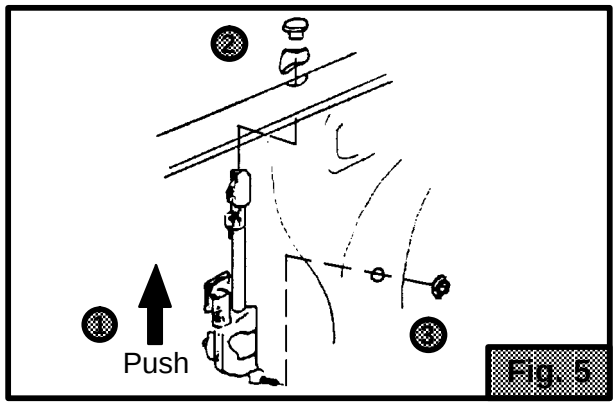
Lexus Supports ASE Certification

REPAIR PROCEDURE (Cont'd):

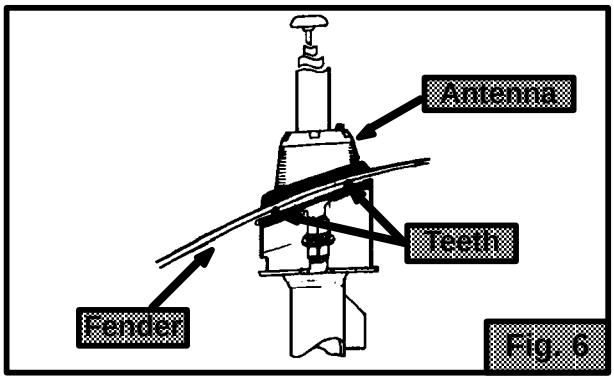
4. Remove the antenna spacer grommet at the top of the antenna assembly and inspect for corrosion. Clean with 1500 grit sandpaper (Fig. 4).



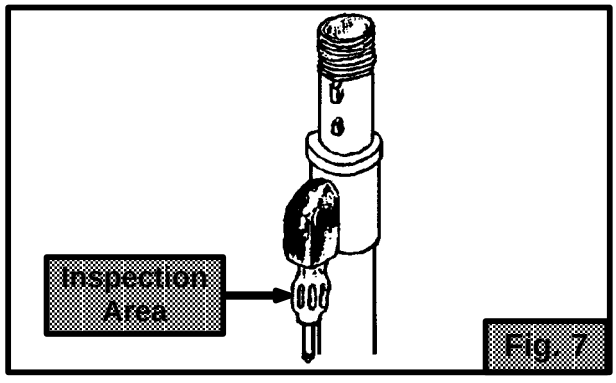
5. Reinstall the antenna assembly. Be sure to install the external antenna nut (escutcheon) first. Then install the nut which holds the assembly to the inner bracket (Fig. 5).



6. Check to make sure that the teeth on the antenna spacer grommet make good contact with the inner fender well (Fig. 6).



7. Inspect the antenna cable connection and clean as necessary. Reconnect the antenna cable, the wire harness and the drain hose (Fig. 7).



WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
EL5001	Listed TSIB repair procedure (All Items)	1.0	86300–XXXXX	76	73

LEXUS
Technical Service Information Bulletin
May 16, 1997

Title:

CLEANING CASSETTE TAPE HEADS AND CAPSTANS

Models:

All Models

TSIB
AUDIO
AU001–97
REVISED

Introduction

The cassette tape head and capstan should be cleaned regularly to prevent poor sound quality and/or cassettes from jamming.

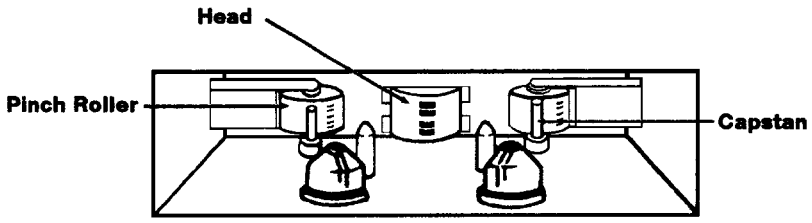


Fig. 1

Conditions

The following conditions can easily be avoided by regularly cleaning the head with a tape cleaner and only using good quality cassettes.

Poor Sound Quality due to Dirty Head

Since the tape head contacts the cassette tape, the tape head accumulates metal oxides and dirt particles from the tape. In time, a layer of dirt forms on the tape head resulting in poor transfer of information between the tape and the tape head. This typically causes a reduction of higher frequencies or a reduction of the brightness in sound quality.

Tape Speed

Tape speed is controlled by the tape capstan and pinch rollers. If the capstan and pinch rollers accumulate dirt, the tape may slip causing the music to play too fast or too slow.

Jamming

Dirt can make the capstans sticky, causing the tape to become entangled in the cassette mechanism. This can cause the cassette to become jammed in the player.

Cassette Tape Head Cleaners

To reduce the occurrence of these conditions, the following approved cassette cleaners are available through the non–parts system (Material Distribution Center).

TOOLS & MATERIALS	MATERIAL NUMBER	DESCRIPTION
Allsop 3 Cassette Recorder Cleaner	00113–AS710–00	Cleaning Cassette and Cleaning Solution with Instruction Sheet

NOTE:
Allow 15 minutes for the cleaning fluid to evaporate before playing a tape.

Cassette Tape Care Procedure

The following precautions should be taken to keep cassettes in good condition:

1. Remove the cassette from the player when the cassette is not in use.

2. Store the cassette in its case.

3. Store the cassette in a cool, dry area away from direct sunlight and magnetic components such as speakers.

4. Avoid touching the tape itself. This could result in poor sound quality or sound drop out.

5. Keep the tape tightly wound as shown in figure 2. Tape speed can be affected by loosely wound tape.

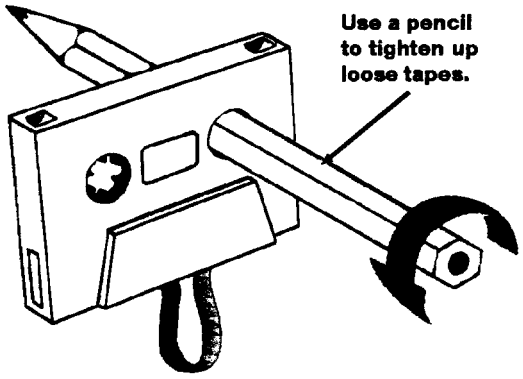


Fig. 2

6. Avoid inserting a cassette into the player if the cassette label is loose or peeling as shown in figure 3. This can cause a cassette to become stuck in the player.

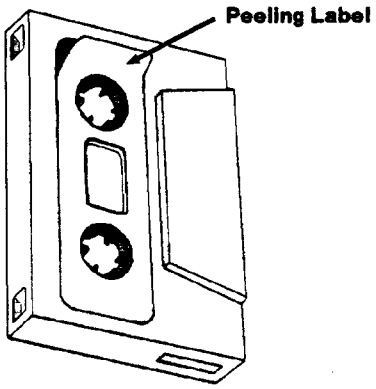


Fig. 3

7. Use cassettes that are 90 minutes or less in length. Cassettes over 90 minutes use extremely thin tape that is subject to stretch, resulting in poor sound quality.

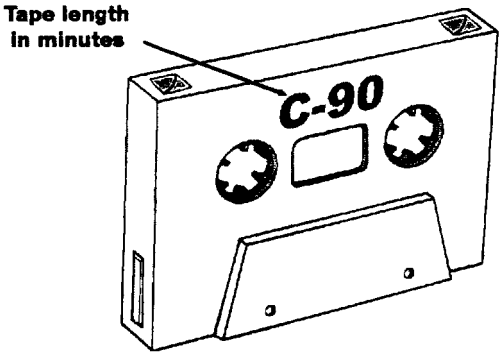


Fig. 4

Two–way communication equipment should work properly in Lexus vehicles when installed correctly and FCC regulations related to power output and spurious emissions are observed. Two–way radios can be defined as one of the following:

- Cellular Mobile Telephone
- Commercial FM Radio (ie, Police, Fire, Business)
- Citizen Band Radio (CB)
- Amateur Radio (HAM)

INSTALLATION PRECAUTIONS:

The following precautions should be taken in addition to instructions included in the installation manual of the two–way radio:

1) The antenna should be installed as far away as is reasonably possible from the ECM or other on–board computers/sensors. Refer to the appropriate sections of the Electrical Wiring Diagram to determine exact locations of these components.
2) The antenna cable must not be routed closer than 20 cm (approximately 8 inches) to any ECM or other on–board computers/sensors.
3) Antenna and power cables must not be routed alongside or in conjunction with vehicle wire harnesses.
4) Antenna and the power cable should be adjusted to obtain the lowest possible Standing Wave Radio (SWR).
5) Two–way radio needs to be operated within the legal limits for the applicable class of service.

A mudguard kit is now available for installation on 1992 ES 300s. Be sure to thoroughly clean all attachment areas and carefully follow the installation procedures below.

INSTALLATION PROCEDURE:

Front of vehicle

1. Take out screws 1 and 2 which secure the front fender liner (See Figure 1).

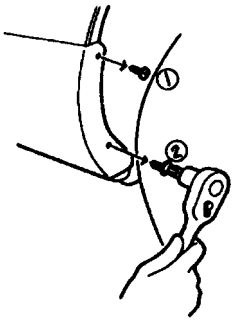


Figure 1

2. Insert the round flanged grommet (supplied in the kit) into hole, at point A, at bottom of fender well (See Figure 2).

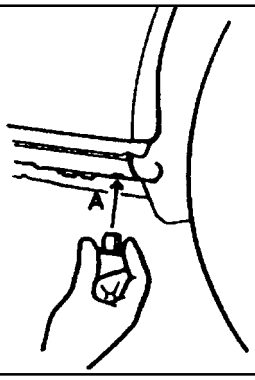


Figure 2

3. Re-using screws 1 and 2, install the mudguard at points 1 and 2, while holding the mudguard against body to ensure proper fit and tighten down screws (See Figure 3).

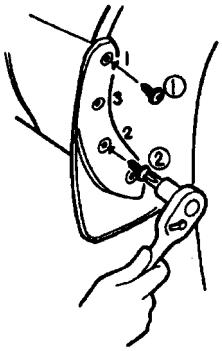


Figure 3

4. Using two screws (supplied in the kit), install the mudguard at points 3 and 4.

Note: There are no holes in plastic cladding at points 3 and 4, so please use mudguard as a template to locate proper location of holes and apply pressure firmly on the self-tapping screws to pierce cladding and tighten screws (See Figure 4).

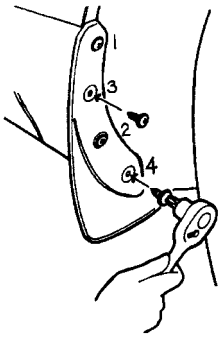


Figure 4

5. Using a screw and washer (supplied in the kit), install the mudguard at point A and tighten down screws (See Figure 5).

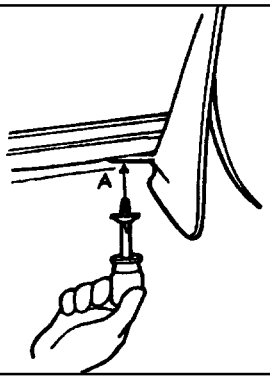


Figure 5

Rear of vehicle

1. Remove bolt B, found at lower body panel, to fender well attachment intersection (See Figure 6).

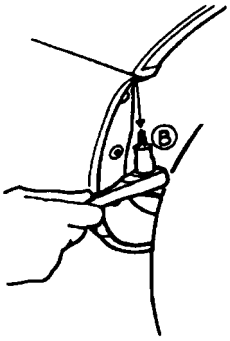


Figure 6

2. Re-using bolt B, install the attachment adaptor bracket at point B (See Figures 6 and 7).

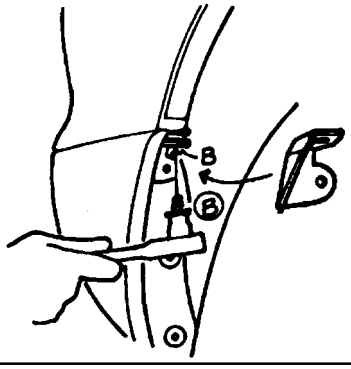


Figure 7

3. Insert the square flanged grommet (supplied in the kit), at point C, at bottom of fender well (See Figure 8).

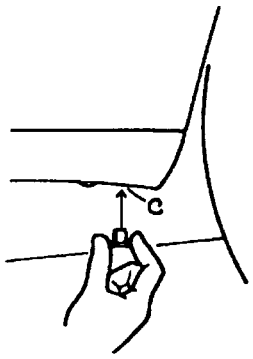


Figure 8

4. Using three screws (supplied in the kit), install the mudguard at points 5, 6, 7 and 8 while holding mudguard against body to insure proper fit and tighten down screws (See Figures 9 and 10).

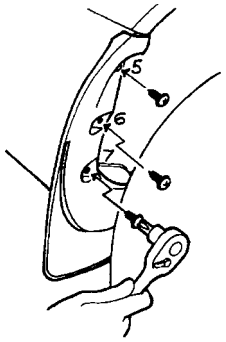


Figure 9

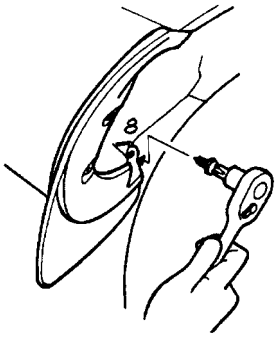


Figure 10

5. Using a screw (supplied in the kit), install the mudguard at point C and tighten down (See Figure 11).

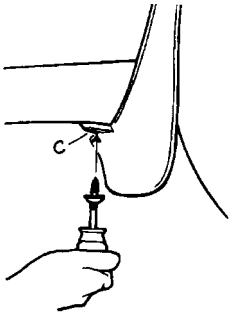


Figure 11

PART NUMBER INFORMATION

PART NUMBER	PART NAME	QTY
76621-39265	Front Mudguard Kit (RH)	1
76622-39265	Front Mudguard Kit (LH)	1
76625-39345	Rear Mudguard Kit (RH)	1
76626-39345	Rear Mudguard Kit (LH)	1

Lexus customers who find it necessary to increase the length of their seat belts may now obtain Seat Belt Extenders at no cost through their local Lexus dealer.

The extender is available in black only and in lengths of 6”, 9”, 12”, 15” and 18”.

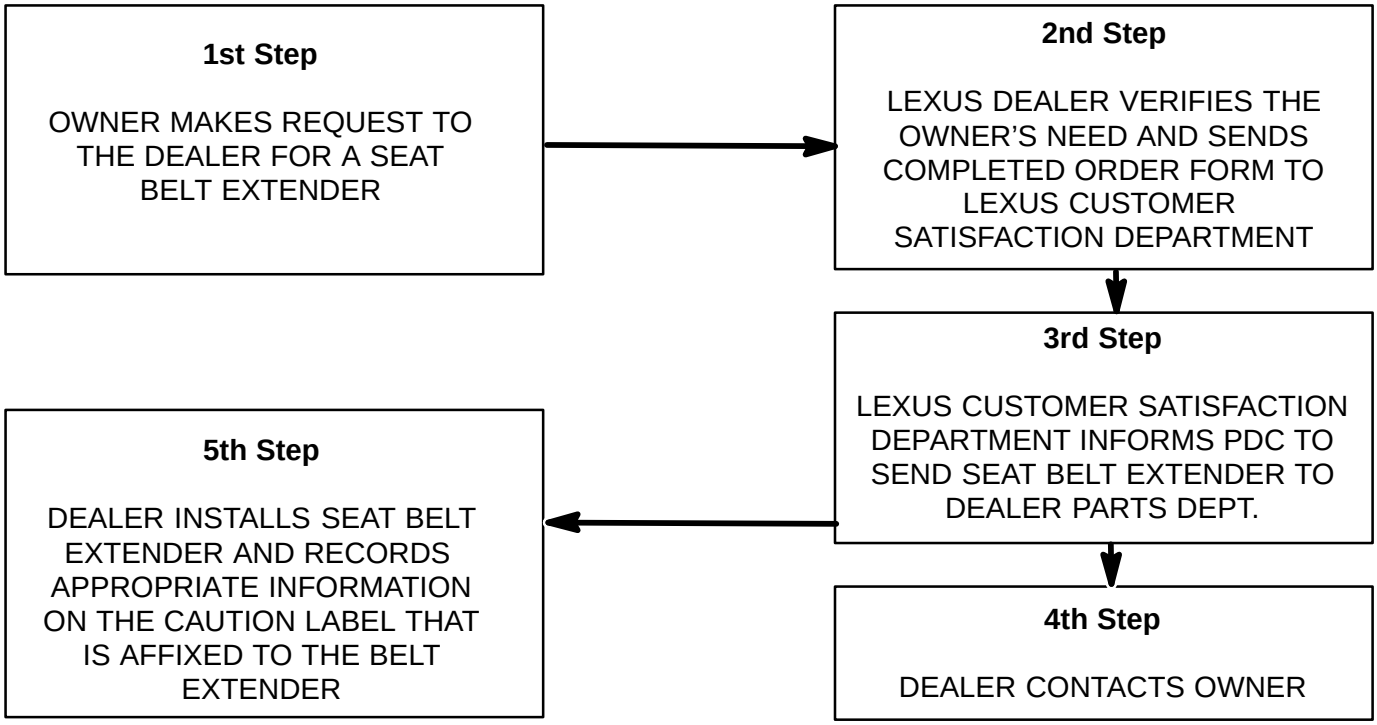
Customers must visit a Lexus Dealership for the required measurements and to complete an application form. The dealer should forward the form to the Lexus National Customer Satisfaction Department for order processing (see page 7). Additional application forms are available through the Lexus Area Offices or through the Support Material Ordering System which is accessed through your TDN System, “Factory Communication Options” screen, option FCD – Dealer Support Material and ordering part number **00241–00005–94**.

Attached for your information are the following guidelines and examples:

- Flow chart (Page 2)
- Seat belt extender application/part number chart (Page 4)
- Owner instruction sheet (Page 4)
- Statement included in Owner’s Manual (Page 6)
- Customer application for seat belt extender (Page 7)

The appropriate seat belt extender will be shipped to the Lexus Dealer’s Parts Department at no charge. The Lexus Dealer Service Department must fill in the appropriate customer and vehicle information on the extender label affixed to the seat belt extender. The proper use of the seat belt extender (described in the accompanying instruction sheet) must be reviewed with the customer by a designated dealer service person.

Please refer to page 7 for a sample of a properly completed seat belt extender form.



SEAT BELT LABEL

CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____
Customer Name

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____ Driver _____ Passenger _____ Front _____ Rear

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

(1) Owner makes request to dealer for a belt extender.

(2) Dealer verifies the condition and provides "Application for Seat Belt Extender." Dealer sends completed application form to Lexus National Customer Satisfaction Department, Attention: Technical Representative L203, 19001 So. Western Ave. Torrance, Ca 90509–2991

- Dealer retains copies 3 and 4 to process delivery to owner.

(3) Lexus Customer Satisfaction Department records receipt of the application form, copies 1 and 2.

- Retains files in computer and microfilm.
- Informs Lexus Parts Department to ship parts to dealer.

(4) Dealer advises owner to bring vehicle into the dealer for initial installation and formal instructions on the use and maintenance of the belt extender. Dealer completes the "CAUTION" label on the seat belt extender after the use and maintenance instructions have been explained to the user/ customer.

To determine the part number, locate the “series” on the following charts. Then refer to the chart on page 4 to locate the part number for the “series” and length.

FRONT SEAT EXTENDER APPLICATION TABLE (EXTENDER SERIES NUMBER)

MODEL	1995	1994	1993	1992	1991	1990
LS 400		R–3	R–3	R–3	R–3	R–3
GS 300		N–3*1 N–3*1	N–3			
SC 400	R–3	R–3	R–3	R–3		
SC 300	R–3	R–3	R–3	R–3		
ES 300		K–4	K–4	K–4		
ES 250					K–3	K–3

*1 Check I/D number on tongue of the vehicle seat belt.

If I/D = 5402 use extender series number N–3
If I/D = 5557 use extender series number N–4

REAR SEAT EXTENDER APPLICATION TABLE (EXTENDER SERIES NUMBER)

MODEL	1995	1994	1993	1992	1991	1990
LS 400		R–3	R–3	R–3	R–3	R–3
GS 300		K–4	K–4			
SC 400	R–3	R–3	R–3	R–3		
SC 300	R–3	R–3	R–3	R–3		
ES 300		R–3	R–3	R–3		
ES 250				R–1	R–1	

Note: **Seat belt extenders must not be used for the center rear seat belt on all models.**

PART NUMBER INFORMATION:

(73399–_____)

LENGTH					
SERIES	**6”**	**9”**	**12”**	**15”**	**18”**
K–3	–22060	–22070	–22080	–22090	–22100
K–4	–33050	–33040	–33030	–33020	–33010
N–3	–20010	–20020	–20030	–20040	–20050
N–4	–20011	–20021	–20031	–20041	–20051
R–1	–12010	–12020	–12030	–12040	–12050
R–3	–50010	–50020	–50030	–50040	–50050

OWNER INSTRUCTION
(FOR PERSONALIZED SEAT BELT EXTENDER)

Precaution when using the seat belt extenders:

1. Never use the seat belt extender if you can fasten the seat belt without it.

2. Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person and at a different seating position than specified.

3. When the seat belt extender is provided for a rear seat position (with automatic locking retractor), make sure the retractor is locked when in use.

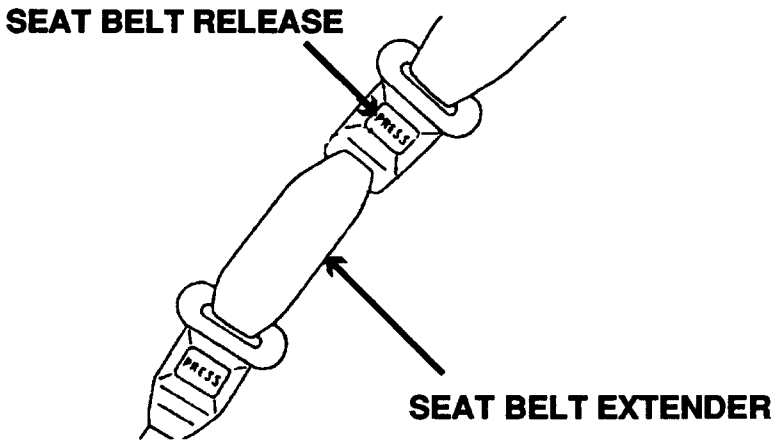
4. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN A LESS EFFECTIVE SEAT BELT RESTRAINT SYSTEM IN CASE OF A VEHICLE ACCIDENT, CAUSING PERSONAL INJURY.

Using The Seat Belt Extender:

1. Connect the extender to the seat belt by inserting the tab into the seat belt buckle so that the buckle–release buttons of the extender and the seat belt are located on the same side as shown. You will hear a click when the tab properly locks into the buckle.

2. MAKE SURE THAT THE CONNECTION IS SECURE AND THE SEAT BELT EXTENDER IS NOT TWISTED.

3. When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.



4. When not in use, remove the extender and store in the vehicle for future use.

OWNER'S MANUAL TEXT:

SEAT BELT EXTENDER

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

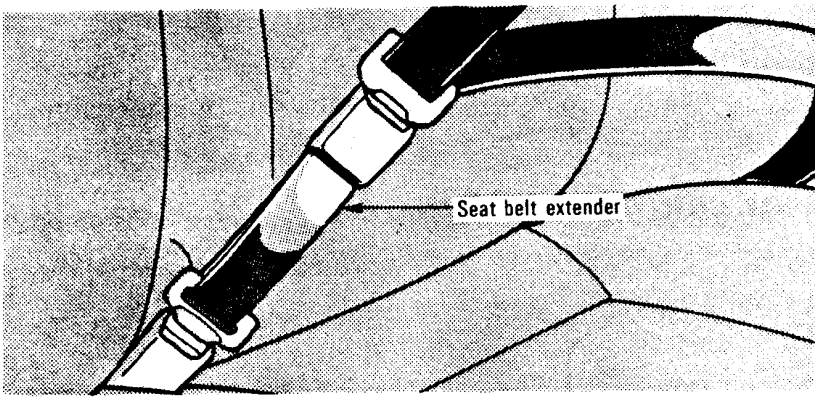
Please contact your local Lexus dealer so that the dealer can order an extender of the proper required length. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in a less effectiveness of the seat belt restraint system in case of a vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.

- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at different seating positions than specified.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the buckle release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle. When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

CAUTION:

After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

APPLICATION FOR SEAT BELT EXTENDER

(Only one extender can be processed per application form)

In order to provide a personalized extender for the seat belt, all of the following specific information must be provided regarding the individual and vehicle involved.

CAUTION: To minimize the chance and/or severity of injury in an accident, the seat belt extender **must not be used:**

- By anyone but the person for whom it was provided, and
- In any vehicle or seat specified other than the one for which it was provided.
- With any car seats for children.

When the seat belt extender is provided for rear seat position (with automatic locking retractor), make sure the retractor is locked when in use.

IMPORTANT: Application must be complete for processing.

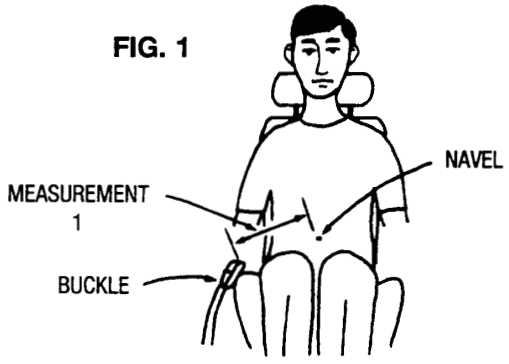
DEALER		PLEASE PRINT CLEARLY	APPLICANT		
DEALER CODE: 82430	DEALER NAME: LEXUS DEALER USA		NAME: JOE CUSTOMER		
ADDRESS: 12 AUTO CENTER DRIVE			ADDRESS: 8 MAIN ST.		
CITY AND STATE: LEXUS CITY CA	ZIP CODE:		CITY AND STATE: ANYTOWN CA	ZIP CODE: 99999	TELEPHONE: (310) 555–12121
DEALER EMPLOYEE NAME: J. SMITH – PARTS MGR.	MODEL YEAR: 1993	BODY TYPE: LS 400	SEAT POSITION: (F) / R	VEHICLE IDENTIFICATION NUMBER: JT8UF11E3R0186273	
				MILEAGE: 5,8236	DOFU: 9/17/93

3 POINT SEAT BELT MEASUREMENT

1. Place the seat in the position the occupant normally uses.
2. With occupant in the seat, extend the seat belt as much as possible and see if the seat belt does or does not latch.
3. If seat belt does not latch, then measure the distance from seat belt latch edge to the seat belt buckle, as shown in Figure 2, and note the dimension.
4. Measure the lap area directly below navel to the edge of the buckle, as shown in Figure 1 below, and note the dimension.
5. The difference between Figure 1 and Figure 2 measurement is the Allowable Margin. The customer satisfaction department will determine the extender length.

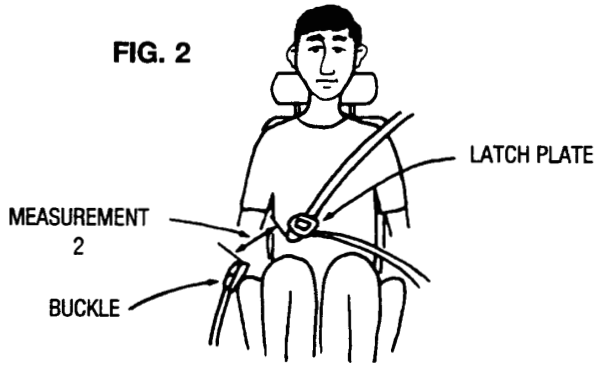
Dimension from navel to buckle

FIG. 1



Dimension from latch to buckle

FIG. 2



MEASUREMENT 1 (Figure 1) – MEASUREMENT 2 (Figure 2) = Allowable Margin

_____ – _____ = _____

FOR TMS USE ONLY		
EXTENDED LENGTH REQ.	PART NUMBER	
LEAVE BLANK	73399 -	LEAVE BLANK

NOTE: If the Allowable Margin is smaller than 6 inches, the seat belt extender will not be available due to design and construction features.

AUTHORIZATION

The same extender may be used for right and left seating applications. Each seat belt extender will be affixed with a label identifying the owner, vehicle VIN and seating position. The extender will be available only in one color.
Send completed form to Lexus Customer Satisfaction.

MUST HAVE CUSTOMER SIGN TO BE PROCESSED

_____ _____

APPLICANT'S SIGNATURE (actual user of the seat belt extender) DATE

LEXUS

Technical Service Information Bulletin

February 21, 1997

Title:

WIND NOISE REPAIR KIT

Models:

All Models

TSIB

BODY
BO001-97

Introduction

A kit containing special foam sponge material has been developed. This kit, when used in conjunction with procedures outlined in the Interior and Wind Noise Diagnosis Manual (P/N 00246-30015) and Lexus Service Information Bulletins, should enable effective wind noise repairs.

Affected Vehicles

- **All Models**

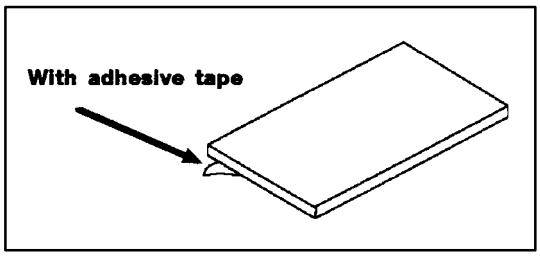
Parts Information

PART NUMBER	PART NAME	SIZE (MM)	QTY
08231-00810	Kit, Wind Noise	– – –	1
08231-00811*	Caulking Sponge Sealant No. 1	297 x 150 (T = 3.0)	2
08231-00812*	Caulking Sponge Sealant No. 2	297 x 150 (T = 5.0)	2
08231-00813*	Caulking Sponge Sealant No. 3	297 x 150 (T = 10.0)	2
08231-00814*	Caulking Sponge Sealant No. 4	297 x 150 (T = 3.0)	2
08231-00815*	Caulking Sponge Sealant No. 5	297 x 150 (T = 5.0)	2
08231-00816*	Caulking Sponge Sealant No. 6	297 x 150 (T = 5.0)	2

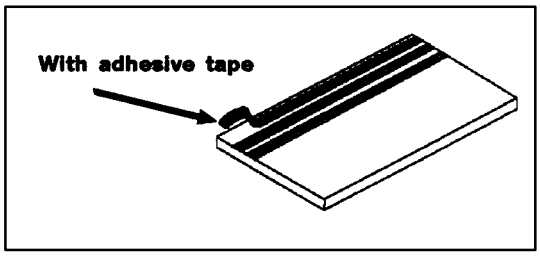
* All of these parts are included in the kit.

Kit Components

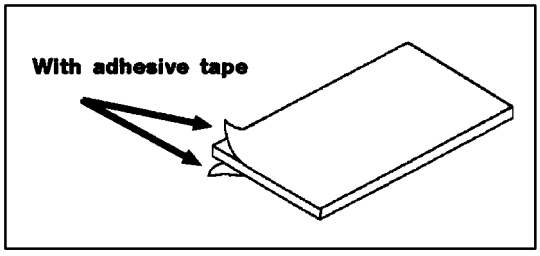
1. Caulking Sponge Sealant No. 1, No. 2 and No. 3 (Ept-sealer).



2. Caulking Sponge Sealant No. 4 and No. 5 (Ept-sealer). This sheet is divided into 27 strips, 5 mm wide.

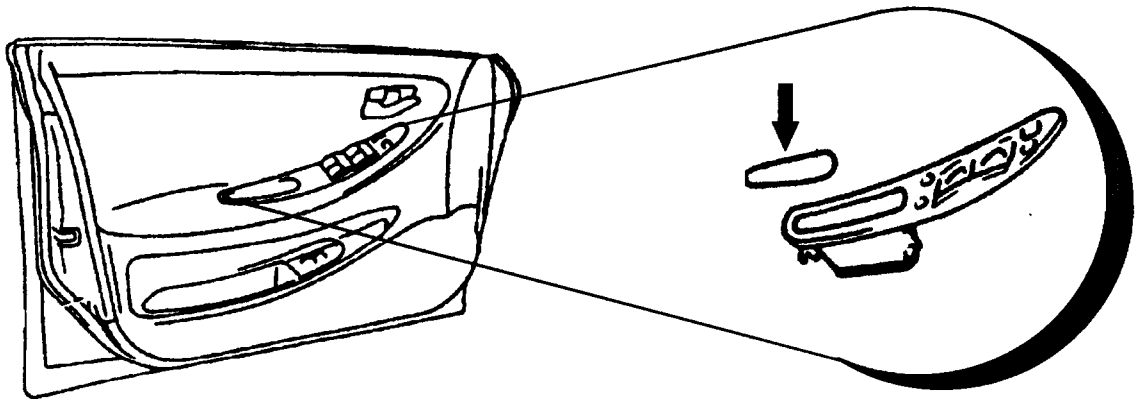


3. Caulking Sponge Sealant No. 6 (Ept-sealer).



Title **DOOR ARMREST PLUG**

The ensure that the door armrest plug stays seated inside the armrest base panel, the material shape and adhesive have been changed as follows:



PRODUCTION EFFECTIVE:

From VIN No.: JT8VK13T4P0162895 (November, 1992)

PART NUMBER INFORMATION:

Previous Part Name	New Part No.	Part Name
74221–33020	74221–33021	Plug, Front Door Armrest RH/LH
74261–33010	74261–33011	Plug, Front Door Armrest RH/LH

New Part is interchangeable with previous part.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: BODY

NO: BO003–96

DATE: NOVEMBER 15, 1996

MODEL: ALL MODELS

Title **SEAT BELT EXTENDERS FOR 1993 THROUGH 1997 MODELS**

Lexus customers who find it necessary to increase the length of their seat belts may obtain Seat Belt Extenders at no cost through their local Lexus dealer.

- The extender is available in black only, in 6, 9, 12, 15 and 18 inch lengths.
- Owners are informed of the seat belt extender availability through the Lexus Owner's Manual included in each vehicle.

The customer *(individual requiring the extender)* must visit a Lexus Dealership to have the required measurements made and to complete the seat belt extender worksheet. The worksheet will allow the proper fitting and selection of a seat belt extender for the customer. The dealership personnel should then determine the applicable part number and place a *Critical Order* through the *TDN Parts Network.*

Included in this bulletin is the information covering the1993 through 1997 model years:

Contents	Page
Flow Chart	2
Application/Part Number	3
Owner Instruction Sheet	4
Statement from Owner's Manual	5
Seat Belt Extender Worksheet	6

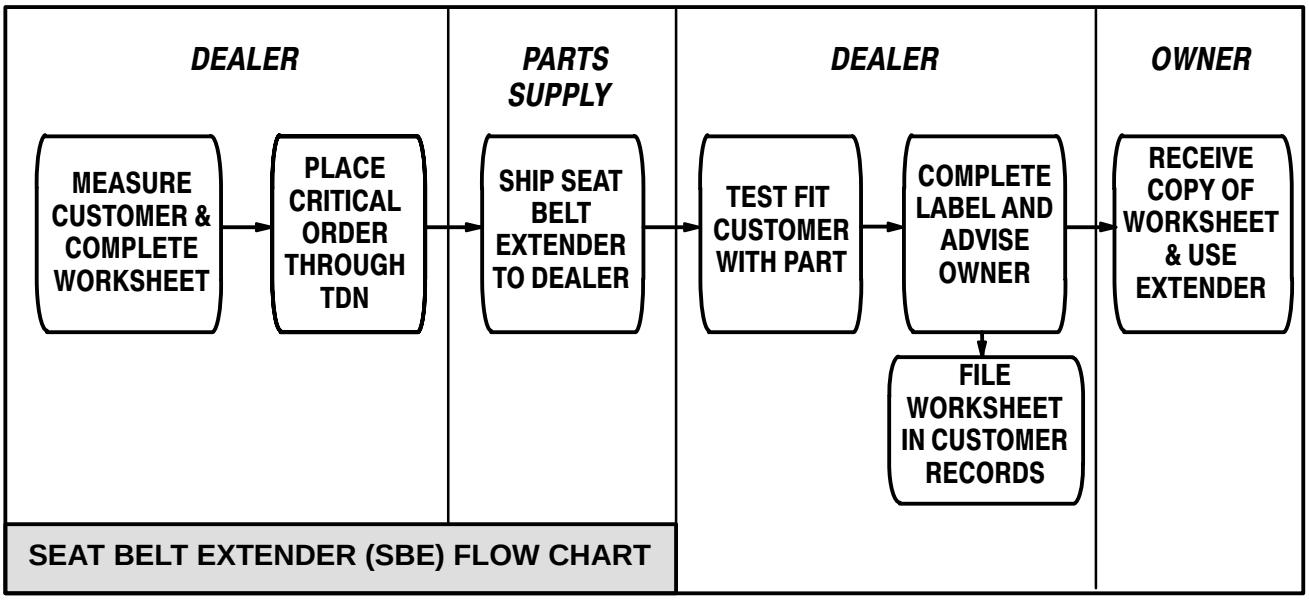
The dealership service department should complete the affixed Seat Belt Extender Label and review the "owner instruction sheet" with the customer. The dealership should give a copy of the completed worksheet to the customer and keep the original in the customer's file.

To assure utmost owner satisfaction, it is recommended that a dealership designate one person to coordinate all activities related to the seat belt extender issue.

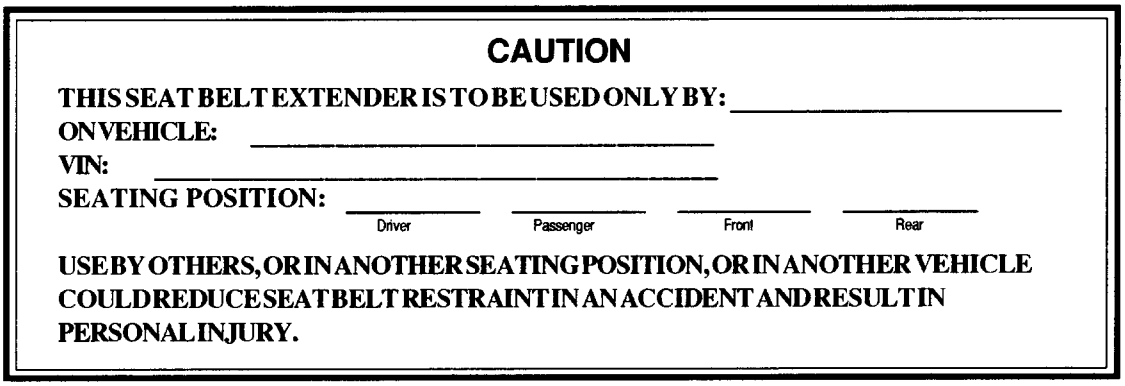
From past sales history, it is recommended that dealerships **do not** stock seat belt extenders due to low demand and the need for customer fitting.

PROCEDURE:

1. Owner requests a seat belt extender from the dealer.
2. Dealer verifies the need for a seat belt extender, obtains a current copy of the TSB, and copies the worksheet.
3. Dealer measures the customer and completes the worksheet. Dealer determines the correct part number and places a Critical Order for the part through the TDN Parts Network.
4. Dealer receives the seat belt extender and calls the customer in to check fit of the part.
5. If the seat belt extender fit is OK, dealership personnel complete the customer information label on the part, explains usage of the part to customer, then gives customer a copy of the completed worksheet.
6. Dealer places a copy of the completed worksheet in the customer's records.



SAMPLE SEAT BELT LABEL:



PART NUMBER INFORMATION:

Locate the series code on the ***series application*** charts, then use the ***part number by length*** chart to identify the correct part number for the specific customer.

FRONT SEAT EXTENDER SERIES APPLICATION TABLE:

Model	1997	1996	1995	1994	1993
LS 400	R-3	R-3	R-3	R-3	R-3
GS 300	N-3	N-3	N-3	N-3	N-3
SC 400	R-3	R-3	R-3	R-3	R-3
SC 300	R-3	R-3	R-3	R-3	R-3
ES 300	R-5	K-4	K-4	K-4	K-4
LX 450	R-3	R-3	-	-	-

REAR SEAT EXTENDER SERIES APPLICATION TABLE:

Model	1997	1996	1995	1994	1993
LS 400	R-3	R-3	R-3	R-3	R-3
GS 300	K-4	K-4	K-4	K-4	K-4
SC 400	R-3	R-3	R-3	R-3	R-3
SC 300	R-3	R-3	R-3	R-3	R-3
ES 300.. Right & Left	R-5	R-3	R-3	R-3	R-3
ES 300..Center	R-3*	-	-	-	-
LX 450	K-4**	K-4**	-	-	-

NOTE: **The extender must not be used for the center rear seat belt (except '97 model ES 300 as noted in the chart).*
***Includes third seat application.*

PART NUMBER BY REQUIRED LENGTH (73399–):

SERIES	6 INCH	9 INCH	12 INCH	15 INCH	18 INCH
K-4	33010	33020	33030	33040	33050
N-3	20011	20021	20031	20041	20051
R-3	50010	50020	50030	50040	50050
R-5	16060	16070	16080	16090	16100

OWNER INSTRUCTION FOR PERSONALIZED SEAT BELT EXTENDER:

CAUTION FOR USE OF SEAT BELT EXTENDERS:

1. Never use the seat belt extender if you can fasten the seat belt without it.

2. Remember the seat belt extender provided for you may not be safe when used in a different vehicle, or for another person or at a seating position different than specified.

3. When the seat belt extender is provided for a rear seat position (with automatic locking retractor), make sure the retractor is locked when in use.

4. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN A LESS EFFECTIVE SEAT BELT RESTRAINT SYSTEM IN CASE OF A VEHICLE ACCIDENT, CAUSING PERSONAL INJURY.

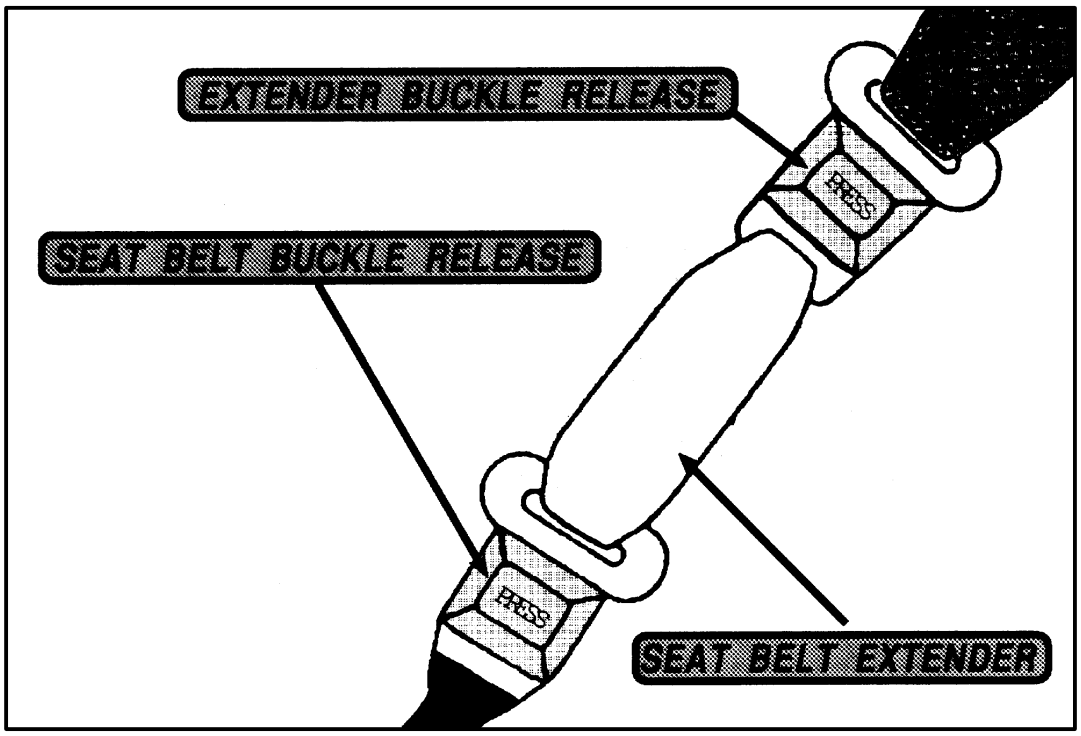
USING THE SEAT BELT EXTENDER:

1. Connect the seat belt extender to the seat belt by inserting the tab into the seat belt buckle so the buckle release buttons of the seat belt extender and the seat belt are located on the same side as shown in the illustration. You will hear a click when the tab properly locks into the buckle.

2. MAKE SURE THAT THE CONNECTION IS SECURE AND THE SEAT BELT EXTENDER IS NOT TWISTED.

3. When releasing the seat belt, press on the buckle release button on the seat belt extender, not on the seat belt. This helps prevent damage to the vehicle interior and seat belt extender.

4. When not in use, remove the extender and store in the vehicle.



OWNER'S MANUAL TEXT:

SEAT BELT EXTENDER

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

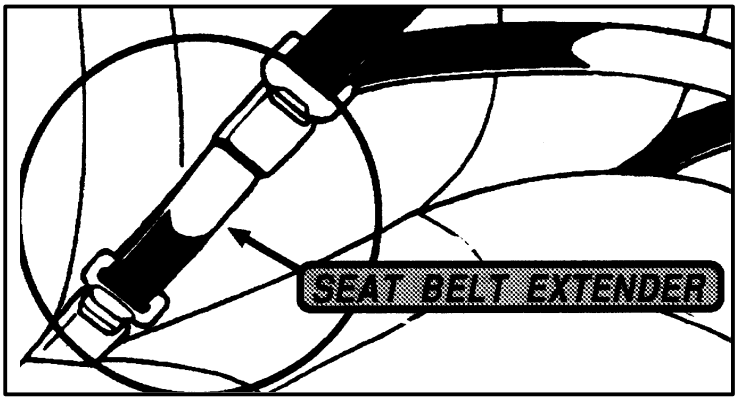
Please contact your local Lexus dealer so that the dealer can order a seat belt extender of the proper required length. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of a vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.

- Remember that the seat belt extender provided for you may not be safe when used on a different vehicle, or for another person and/or at different seating positions than specified.



To connect the seat belt extender to the seat belt, insert the tab into the seat belt buckle so that the buckle release buttons of the seat belt extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle. When releasing the seat belt, press on the buckle–release button on the seat belt extender, not on the seat belt. This helps prevent damage to the vehicle interior and seat belt extender itself.

When not in use, remove the seat belt extender and store in the vehicle for future use.

CAUTION:

After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

SEAT BELT EXTENDER WORKSHEET

Please copy this original worksheet for each extender needed.

CAUTION: To minimize the chance and/or severity of injury in an accident, the seat belt extender must not be used:

- By anyone but the person for whom it was provided, and
- In any vehicle or seat specified other than the one for which it was provided, and
- With any car child safety seats.

When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when in use.

In all cases seat belts must be worn below the abdomen by pregnant women.

DEALER	PLEASE PRINT CLEARLY	APPLICANT

DEALER CODE	DEALER NAME		APPLICANT NAME		
ADDRESS			ADDRESS		
CITY AND STATE		ZIP CODE	CITY AND STATE	ZIP CODE	TELEPHONE
DEALER EMPLOYEE NAME	MODEL YEAR	BODY TYPE	SEAT POSITION F / R	VEHICLE IDENTIFICATION NUMBER	

DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. Place the seat in the position the person normally uses.
2. With the person in the seat, extend the seat belt as much as possible and see if the belt latches.
3. If the buckle latches but has no slack remaining, the dimension for Figure 2 is zero. If the seat belt does not latch, measure the distance from the seat belt latch edge to the seat belt buckle as shown in Figure 2 below, and note the dimension.
4. Measure the lap area directly below the navel to the edge of the buckle as shown in Figure 1 and note the dimension.
5. The difference between Figure 1 and Figure 2 measurements is the "Allowable Margin". (Do not use this dimension for the extender length.)
6. Take the measurement in Figure 2 and round it up to the next extender size available, without exceeding the "Allowable Margin".

FIGURE 1
DIMENSION FROM NAVEL TO BUCKLE

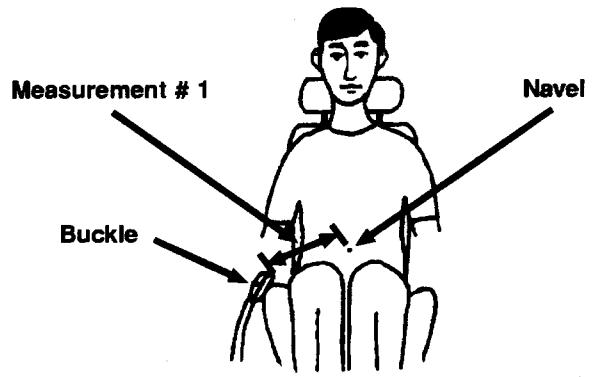
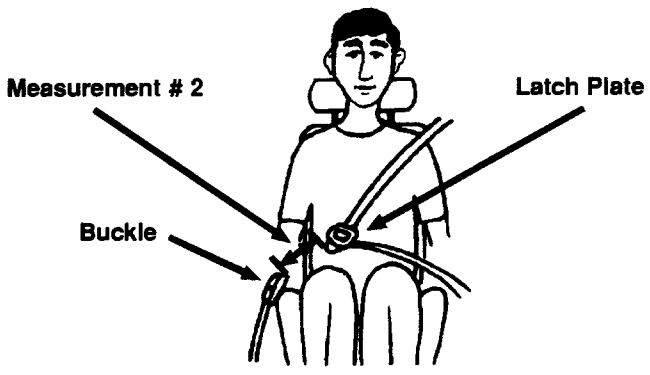


FIGURE 2
DIMENSION FROM LATCH TO BUCKLE



Measurement #1 (Figure 1) - Measurement #2 (Figure 2) = "Allowable Margin"

_____ - _____ = _____

NOTE: The length of the extender must not exceed the "Allowable Margin", due to design and construction features

AUTHORIZATION

The same extender can be used for right and left seating applications. Each seat belt extender will be affixed with a label identifying the owner, vehicle VIN and seating position. Extenders are available in one color only.

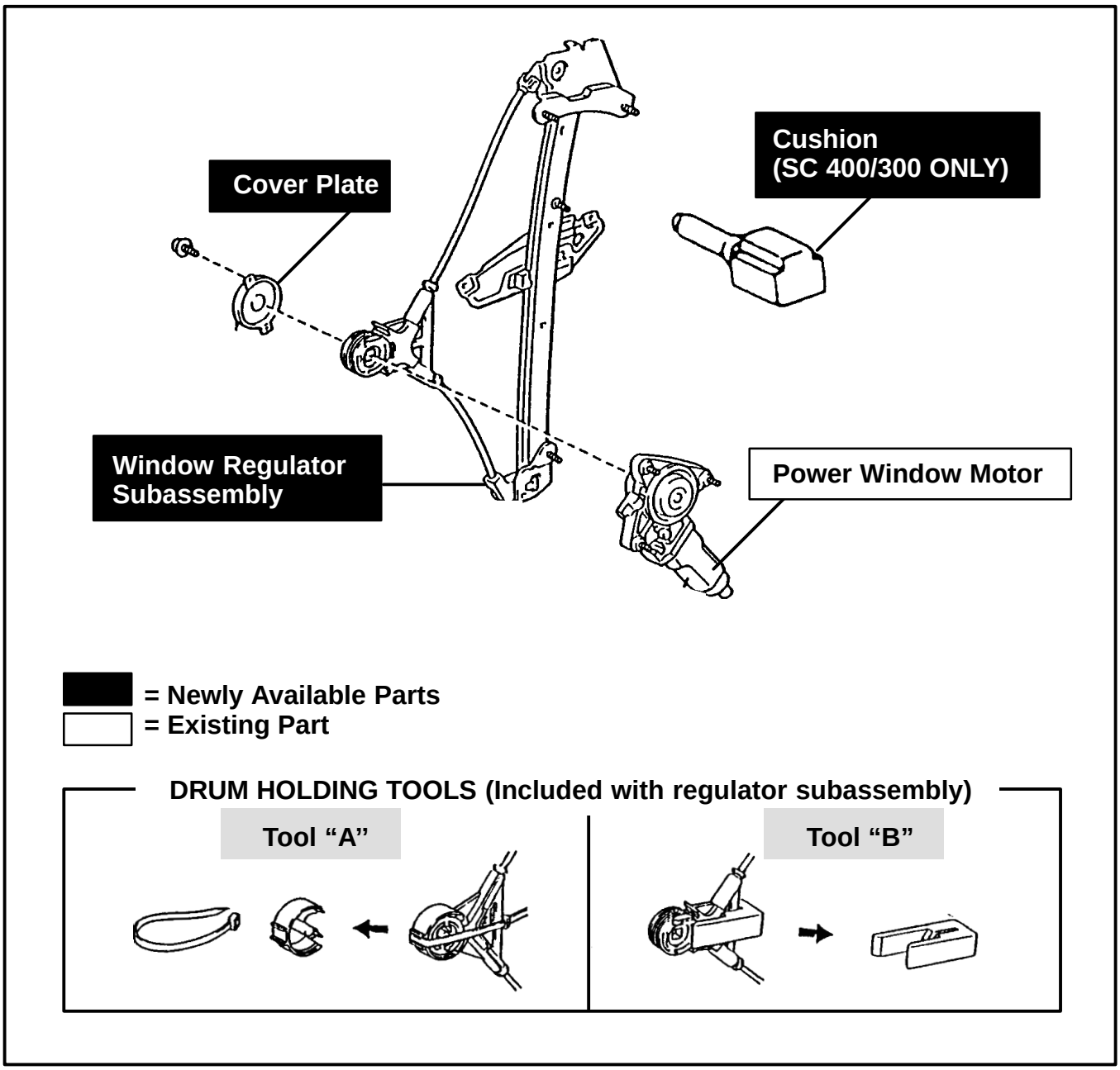
_____ APPLICANT'S SIGNATURE
(Actual user of seat belt extender)

_____ DATE

Title **WIRE TYPE REGULATOR SUBASSEMBLY, POWER DOOR WINDOW**

The information contained in this TSB supersedes BO94–004 dated October 21, 1994. The previous TSIB should be discarded.

To improve power door window serviceability on SC 400/300, GS 300 and ES 300, a wire regulator subassembly is now available as separate supply parts. See illustration below.



REPAIR PROCEDURES:

- Verify motor operates property.
- If the motor must be replaced, change the complete regulator assembly.
- If motor operation is correct, replace only the regulator subassembly.

Use the following procedures when replacing the subassembly. Refer to appropriate section of the repair manual for window regulator removal procedures.

WINDOW REGULATOR DISASSEMBLY:

1. Screw type cover plate:

- Remove the two screws and cover plate **see figure 1.**

Note: The screws and cover plate are reusable.

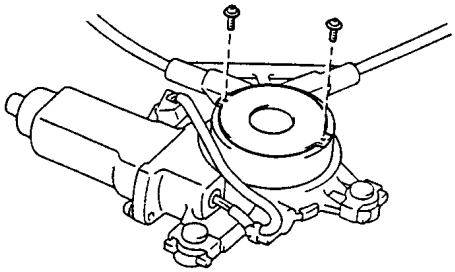


Fig. 1

Crimped type cover plate:

- Pry up the cover plate tab using a small flat–head screwdriver and remove the plate. Use care not to damage the motor housing **see Figure 2.**

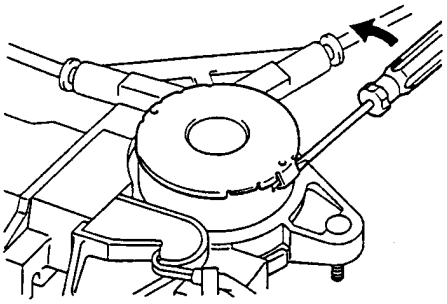


Fig. 2

Note: The cover plate is not reusable.

2. REMOVE WINDOW REGULATOR DRUM AND WIRE GUIDE FROM MOTOR HOUSING USING NEEDLE NOSE PLIERS (SEE FIGURE 3)

Caution: Do not use a flat–head screwdriver to remove the drum and wire guide.

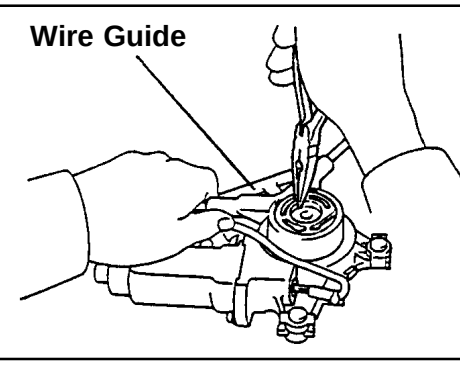


Fig. 3

WINDOW REGULATOR INSTALLATION:

1. INSERT THE WINDOW REGULATOR DRUM INTO THE MOTOR HOUSING.

Note:

- To prevent the window regulator drum and cable from coming off, do not tilt the drum, subject it to shocks or use force. If the cable comes off the drum, do not rewind the cable or reuse it. After the window regulator is installed, do not operate it manually (some window regulators do not utilize a stopper).
- Multipurpose grease **(P/N 00289–1WG00)** should be applied to all moving parts, especially inside the motor housing and sides of the window regulator drum.

Type "A" holding tool

- Apply grease inside the motor housing **see Figure 4.**
- Using **Holding Tool "A**,**"** match the holding tool with the motor housing **see Figure 5.**
- Push down on the wire guide and window regulator while inserting into motor housing **see Figure 5.**

Note: If you experience difficulty inserting the window regulator drum into the motor housing, slowly slide the window glass carrier bracket and align the drive shaft of the motor housing with the window regulator drum.

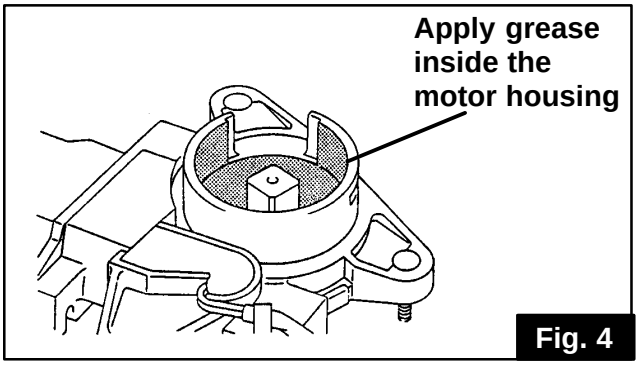


Fig. 4

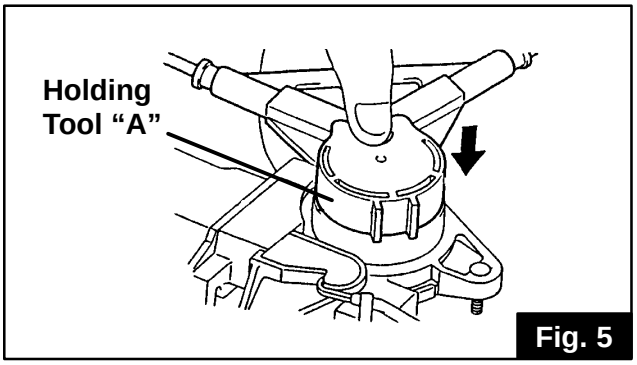


Fig. 5

Type "B" holding tool

- Apply grease inside the motor housing **see Figure 4.**
- Using **Holding Tool "B**,**"** partially insert the window regulator drum into the motor housing **see figure 6.**
- Remove **Holding Tool "B"** and push the window regulator drum into the motor housing.

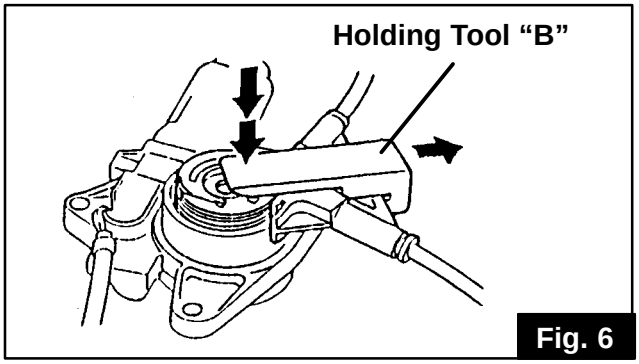


Fig. 6

Note: If you are experiencing difficulty inserting the window regulator drum into the motor housing, slowly slide the glass carrier bracket and align the drive shaft of the motor housing with the window regulator drum **see figure 5.**

- Apply grease to the sides of the window regulator drum.

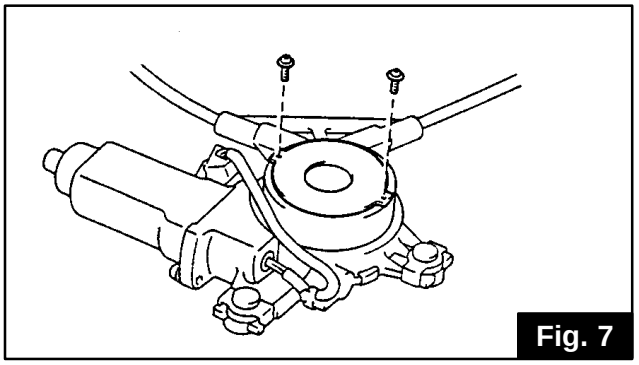


Fig. 7

2. INSTALL COVER PLATE.

Screw Type Cover Plate

- Install the original cover plate and screws **see figure 7.**

Crimped Type Cover Plate

- Use adjustable pliers to crimp the tab of the cover plate **see Figure 8.**

Note:

- Use a new cover plate.
- Do not hit the cover plate with a hammer, etc.
- Do not damage the motor housing.

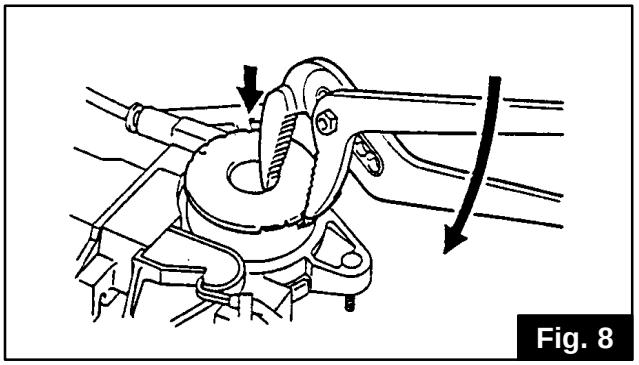


Fig. 8

PART NUMBER INFORMATION:

SC 300/400

Production Date	Part Name	Part No.
4/91~7/93	Regulator Subassembly Front Door Window RH	69801–24030*
	Regulator Subassembly Front Door Window LH	69802–24030**
7/93~1/94	Regulator Subassembly Front Door Window RH	69801–24031*
	Regulator Subassembly Front Door Window LH	69802–24031**
1/94~	Regulator Subassembly Front Door Window RH	69801–24040
	Regulator Subassembly Front Door Window LH	69802–24040
4/91~	Cover Plate, Window Regulator	69813–32030
	Cushion RH (Included W/Subassembly)	68119–24010
	Cushion LH (Included W/Subassembly	68119–24020
	Screw	93319–14010

*** P/N 69801–24030 is interchangeable with P/N 69801–24031**

**** P/N 69802–24030 is interchangeable with P/N 69802–24031**

GS 300

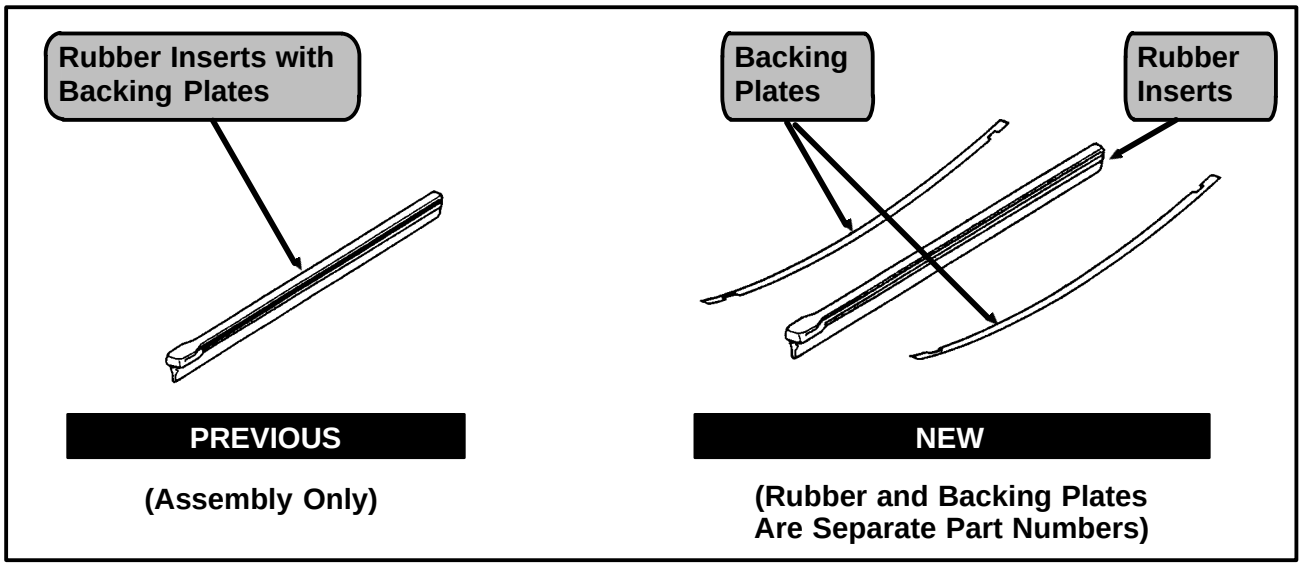
	Part Name	Part Number
	Regulator Subassembly, Front Door Window RH	69801–30190
	Regulator Subassembly, Front Door Window LH	69802–30190
	Regulator Subassembly, Rear Door Window RH	69803–30190
	Regulator Subassembly, Rear Door Window LH	69804–30190
	Cover Plate, Front Door Window Regulator***	69811–32040
	Cover Plate, Rear Door Window Regulator***	69813–32010

***** Nonreusable crimp type and included with subassembly**

ES 300

	Part Name	Part No.
	Regulator Subassembly Front Door Window RH	69801–32070
	Regulator Subassembly Front Door Window LH	69802–32070
	Regulator Subassembly Rear Door Window RH	69803–32060
	Regulator Subassembly Rear Door Window LH	69804–32060
	Cover Plate, Front Door Window Regulator	69811–32050
	Cover Plate, Rear Door Window Regulator	69813–32030
	Screw	93319–14010

To improve serviceability, the wiper blade rubber inserts will now be available separately from the steel backing plates as shown below.



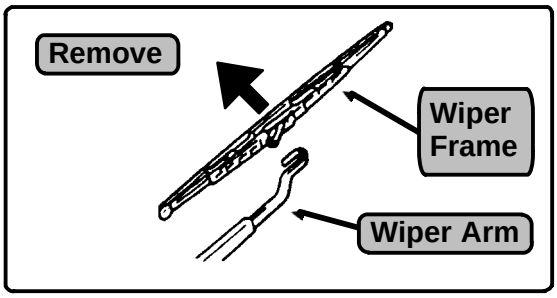
PART NUMBER INFORMATION:

Part Numbers of the new rubber inserts and steel backing plates which correspond to the previous complete assemblies are found in the Parts Operations Communications Update dated June 24, 1995.

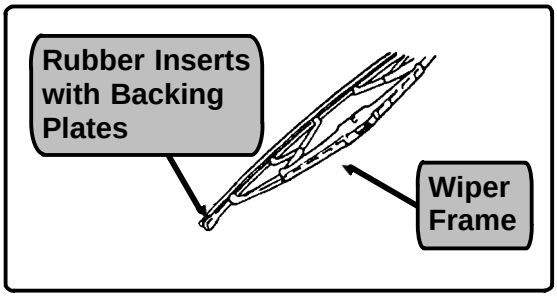
REPLACEMENT PROCEDURES:

1. Remove the wiper frame from the wiper arm.

NOTE: Put a towel or equivalent between the wiper arm end and the windshield glass to prevent damage to the glass.



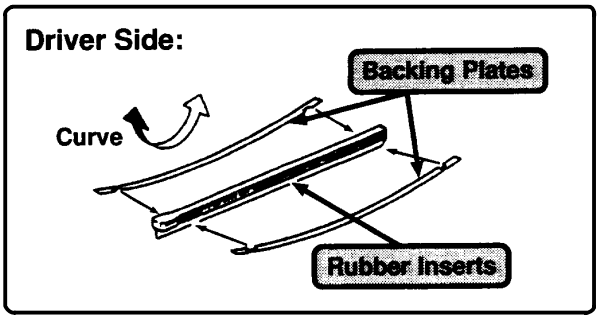
2. Remove the rubber insert, with the steel backing plates, from the wiper frame.



REPLACEMENT PROCEDURES: (Cont'd.)

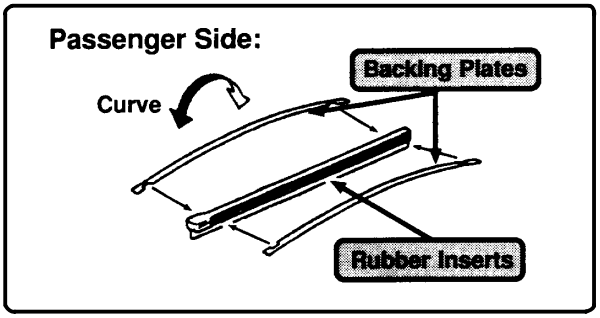
3. Remove the steel backing plates from the rubber inserts.

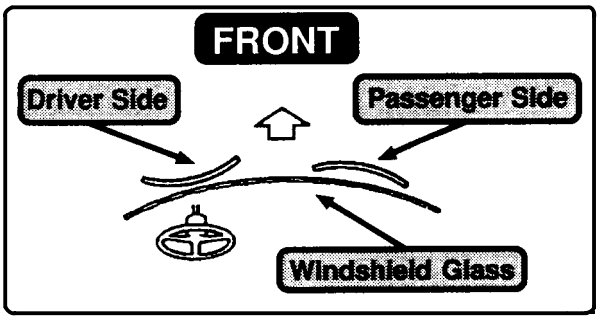
NOTE: The backing plates are to be reused unless damaged.



4. Install the backing plates on the new rubber inserts.

NOTE: The backing plates are slightly curved. Check and install the backing plates according to the illustration. Driver side and passenger side backing plates are oriented differently.

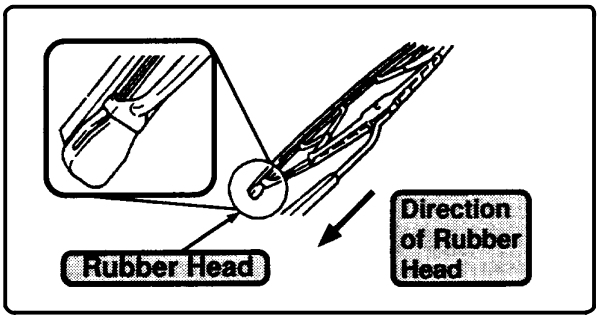




5. Install the rubber inserts, with the backing plates, onto the wiper frame.

6. Install the wiper frame on the wiper arm.

NOTE: Be sure to install the head (big end) of the insert toward the bottom as shown.



WARRANTY INFORMATION: *

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
850091	R&R Front Wiper Blade (Rubber only, both sides)	0.2	85214-XXXXX	75	41

* 12 months or 12,500 miles from the date–of–first–use or demo date, whichever occurs first. Coverage is extended to 18 months or 24,000 miles in New York due to "Lemon Law" legislation.

Lexus customers who find it necessary to increase the length of their seat belts may now obtain Seat Belt Extenders at no cost through their local Lexus dealer.

The extender is available in black only in the lengths of 6'', 9'', 12'', 15'' and 18''.

Customers must visit a Lexus Dealership for the required measurements and to complete an application form. The dealer should forward the form to the Lexus National Customer Satisfaction Department for order processing (see page 6). Additional application forms are available through the Lexus Area Offices or the Material Distribution Center Non–Parts Ordering System (MDC NPM) via part number **00241–00005.**

Attached for your information are the following guidelines and examples:

- Flow chart (Page 2)
- Seat belt extender application/Part number chart (Page 4)
- Owner instruction sheet (Page 4)
- Statement included in Owner's Manual (Page 6)
- Customer application for seat belt extender (Page 7)

The appropriate seat belt extender will be shipped to the Lexus Dealer's Parts Department at no charge. The Lexus Dealer Service Department must fill in the appropriate customer and vehicle information on the extender label affixed to the seat belt extender. The proper use of the seat belt extender (described in the accompanying instruction sheet) must be reviewed with the customer by a designated dealer service person.

Please refer to page 7 for a sample of a properly completed seat belt extender form.

1st Step

OWNER MAKES REQUEST TO THE DEALER FOR A SEAT BELT EXTENDER

2nd Step

LEXUS DEALER VERIFIES THE OWNER'S NEEDS AND SENDS COMPLETED ORDER FORM TO LEXUS CUSTOMER SATISFACTION DEPARTMENT

3rd Step

LEXUS CUSTOMER SATISFACTION DEPARTMENT INFORMS PDC TO SEND SEAT BELT EXTENDER TO DEALER PARTS DEPT.

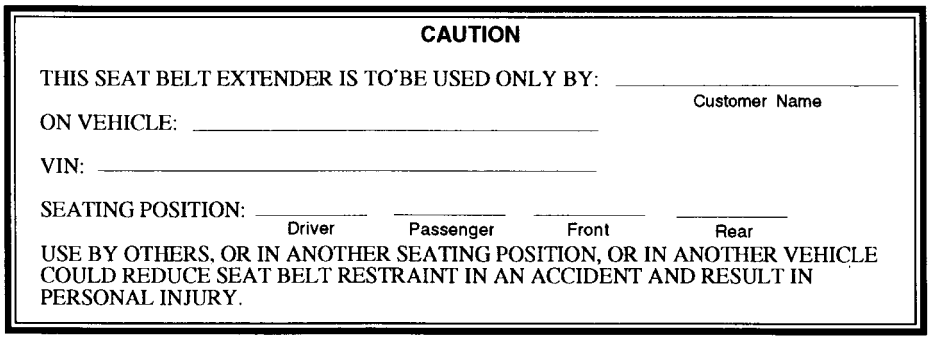
4th Step

DEALER CONTACTS OWNER

5th Step

DEALER INSTALLS SEAT BELT EXTENDER AND RECORDS APPROPRIATE INFORMATION ON THE CAUTION LABEL THAT IS AFFIXED TO THE BELT EXTENDER

SEAT BELT LABEL



CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____
Customer Name

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____ Driver _____ Passenger _____ Front _____ Rear

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

(1) Owner makes request to dealer for a belt extender.

(2) Dealer verifies the condition and provides "Application for Seat Belt Extender." Dealer sends completed application form to Lexus National Customer Satisfaction Department, Attention Technical Representative.

- Dealer retains copies 3 and 4 to process delivery to owner.

(3) Lexus Customer Satisfaction Department records receipt of the application form, copies 1 and 2.

- Retains files in computer and microfilm.
- Informs Lexus Parts Department to ship parts to dealer.

(4) Dealer advises owner to bring vehicle into the dealer for initial installation and formal instructions on the use and maintenance of the belt extender. Dealer completes the "CAUTION" label on the seat belt extender after the use and maintenance instructions have been explained to the user/customer.

To determine the part number, locate the ‘‘series’’ on the following charts. Then refer to the chart on page 4 to locate the part number for the ‘‘series’’ and length.

FRONT SEAT EXTENDER APPLICATION TABLE
(EXTENDER SERIES NUMBERS)

MODEL \ YEAR	1993	1992	1991	1990
LS 400	R–3	R–3	R–3	R–3
GS 300	N–3			
SC 400	R–3	R–3		
SC 300	R–3	R–3		
ES 300	R–3	R–3		
ES 250			K–3	K–3

REAR SEAT EXTENDER APPLICATION TABLE
(EXTENDER SERIES NUMBERS)

MODEL \ YEAR	1993	1992	1991	1990
LS 400	R–3	R–3	R–3	R–3
GS 300	K–4			
SC 400	R–3	R–3		
SC 300	R–3	R–3		
ES 300	R–3	R–3		
ES 250			R–1	R–1

PART NUMBER INFORMATION:

(73399–_____)

LENGTH					
SERIES	**6”**	**9”**	**12”**	**15”**	**18”**
R–1	–12010	–12020	–12030	–12040	–12050
R–3	–50010	–50020	–50030	–50040	–50050
K–3	–22060	–22070	–22080	–22090	–22100
K–4	–33050	–33040	–33030	–33020	–33010
N–3	–20010	–20020	–20030	–20040	–20050

OWNER INSTRUCTION
(FOR PERSONALIZED SEAT BELT EXTENDER)

Precaution when using the seat belt extenders:

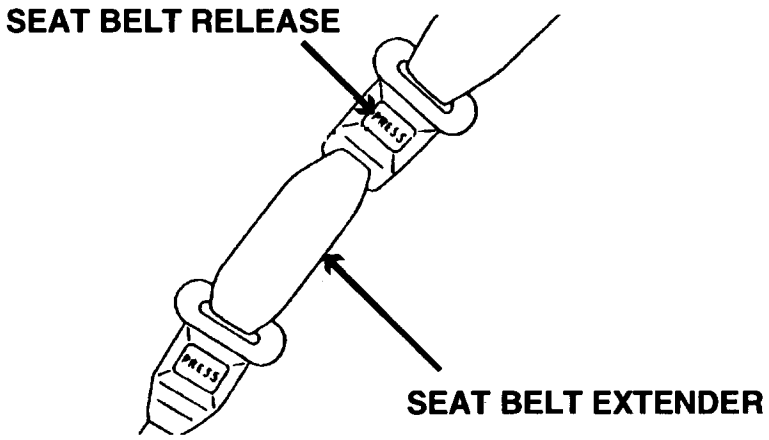
1. Never use the seat belt extender if you can fasten the seat belt without it.
2. Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person and at a different seating position than specified.
3. When the seat belt extender is provided for a rear seat position (with automatic locking retractor), make sure the retractor is locked when in use.
4. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN A LESS EFFECTIVE SEAT BELT RESTRAINT SYSTEM IN CASE OF A VEHICLE ACCIDENT, CAUSING PERSONAL INJURY.

Using The Seat Belt Extender:

1. Connect the extender to the seat belt by inserting the tab into the seat belt buckle so that the buckle–release buttons of the extender and the seat belt are located on the same side as shown. You will hear a click when the tab properly locks into the buckle.

2. MAKE SURE THAT THE CONNECTION IS SECURE AND THE SEAT BELT EXTENDER IS NOT TWISTED.

3. When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.



4. When not in use, remove the extender and store in the vehicle for future use.

OWNER'S MANUAL TEXT:

SEAT BELT EXTENDER

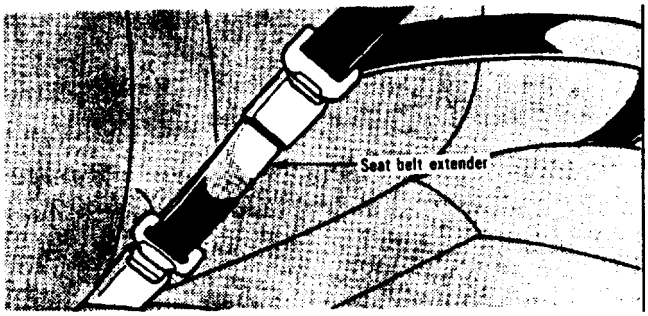
If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

Please contact your local Lexus dealer so that the dealer can order an extender of the proper required length. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in a less effective seat belt restraint system in case of a vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at different seating positions than specified.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the buckle release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle. When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

CAUTION:

After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

APPLICATION FOR SEAT BELT EXTENDER 00078

(ONLY ONE EXTENDER CAN BE PROCESSED PER APPLICATION FORM)

IN ORDER TO PROVIDE A PERSONALIZED EXTENDER FOR THE SEAT BELT, ALL OF THE FOLLOWING SPECIFIC INFORMATION MUST BE PROVIDED REGARDING THE INDIVIDUAL AND VEHICLE INVOLVED.

CAUTION: TO MINIMIZE THE CHANCE AND/OR SEVERITY OF INJURY IN AN ACCIDENT, THE SEAT BELT EXTENDER **MUST NOT BE USED:**

- BY ANY ONE BUT THE PERSON FOR WHOM IT WAS PROVIDED, AND
- IN ANY VEHICLE OR SEAT SPECIFIED OTHER THAN THE ONE FOR WHICH IT WAS PROVIDED.

WHEN THE SEAT BELT EXTENDER IS PROVIDED FOR REAR SEAT POSITION (WITH AUTOMATIC LOCKING RETRACTOR), MAKE SURE THE RETRACTOR IS LOCKED WHEN IN USE.

- WITH ANY CAR SEATS FOR CHILDREN.

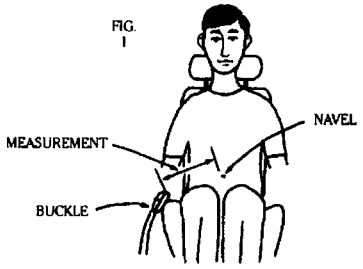
DEALER		APPLICANT			
DEALER CODE: 82430	DEALER NAME: LEXUS DEALER USA	NAME: JOE CUSTOMER			
ADDRESS: 12 AUTO CENTER DRIVE		ADDRESS: 8 MAIN ST.			
CITY AND STATE: LEXUS CITY CA 99999		CITY AND STATE: ANYTOWN CA 99999			TELEPHONE: (310) 555-1212
VEHICLE IDENTIFICATION NUMBER: JT8UF11EXP5000000	MODEL YEAR: 1993	BODY TYPE: LS 400	SEAT POSITION: LF	PART NUMBER: 733 99 –	

FRONT SEAT BELT MEASUREMENT

1. PLACE THE SEAT IN THE POSITION THE OCCUPANT NORMALLY USES.
2. WITH OCCUPANT IN THE SEAT, EXTEND THE SEAT BELT AS MUCH AS POSSIBLE AND SEE IF THE SEAT BELT DOES OR DOES NOT LATCH.
3. IF SEAT BELT DOES NOT LATCH, THEN MEASURE THE DISTANCE FROM SEAT BELT LATCH EDGE TO THE SEAT BELT BUCKLE, AS SHOWN IN FIGURE 2, AND NOTE THE DIMENSION.
4. MEASURE THE LAP AREA DIRECTLY BELOW NAVEL TO THE EDGE OF THE BUCKLE, AS SHOWN IN FIGURE 1 BELOW, AND NOTE THE DIMENSION.
5. THE DIFFERENCE BETWEEN FIGURE 1 AND FIGURE 2 MEASUREMENT IS THE ACTUAL MEASUREMENT. THE CUSTOMER SATISFACTION DEPARTMENT WILL DETERMINE THE EXTENDER LENGTH.

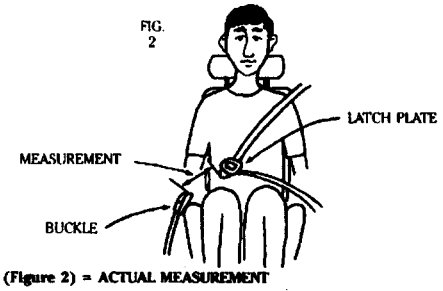
DIMENSION FROM NAVEL TO BUCKLE

FIG. 1



DIMENSION FROM LATCH TO BUCKLE

FIG. 2



MEASUREMENT (Figure 1) – MEASUREMENT (Figure 2) = ACTUAL MEASUREMENT

20 – 06 = 14

EXTENDER LENGTH REQUIRED
LEAVE BLANK

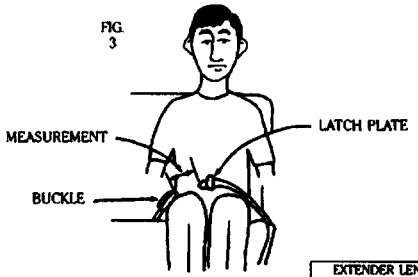
NOTE: IF THE DIFFERENCE FROM THE NAVEL TO BUCKLE DIMENSION (FIGURE 1) MINUS LATCH TO BUCKLE DIMENSION (FIGURE 2) IS SMALLER THAN 6 INCHES, THE SEAT BELT EXTENDER WILL NOT BE AVAILABLE DUE TO DESIGN AND CONSTRUCTION FEATURES.

LAP BELT MEASUREMENT

1. WITH OCCUPANT IN THE SEAT, EXTENT THE SEAT BELT AS MUCH AS POSSIBLE, AND SEE IF THE SEAT BELT DOES OR DOES NOT LATCH.
2. IF SEAT BELT DOES NOT LATCH, THEN MEASURE THE DISTANCE FROM SEAT BELT LATCH EDGE TO THE SEAT BELT BUCKLE, AS SHOWN IN FIGURE 3, AND NOTE THE DIMENSION.
3. THE CUSTOMER SATISFACTION DEPARTMENT WILL DETERMINE THE EXTENDER LENGTH.

DIMENSION FROM LATCH TO BUCKLE

FIG. 3



ACTUAL MEASUREMENT 06

EXTENDER LENGTH REQUIRED
LEAVE BLANK

THE SAME EXTENDER MAY BE USED FOR RIGHT AND LEFT SEATING APPLICATIONS.
EACH SEAT BELT EXTENDER WILL BE AFFIXED WITH A LABEL IDENTIFYING THE OWNER, VEHICLE VIN AND SEATING POSITION. THE EXTENDER WILL BE AVAILABLE ONLY IN THE COLOR BLACK.

APPLICANT'S SIGNATURE
(actual user of the seat belt extender)

DATE

00241-00005

90-LEX-113

1–LEXUS (CS)

Lexus customers who find it necessary to increase the length of their seat belts may now obtain Seat Belt Extenders at no cost through their local Lexus dealer.

The extender is available in black only and in lengths of 6”, 9”, 12”, 15” and 18”.

Owner’s are informed of the seat belt extender availability through the Lexus Owner’s Manual included in each vehicle (see page 6 for text of Owner’s Manual).

The user must visit a Lexus Dealership to have the required measurements made and complete the seat belt extender worksheet. The worksheet will allow the proper fitting and selection of a seat belt extender for the customer. The dealer should then determine the part number needed and place a Critical Order for the item through the TDN Parts Network.

Attached for your information are the following 1996 model year updated guides and examples:

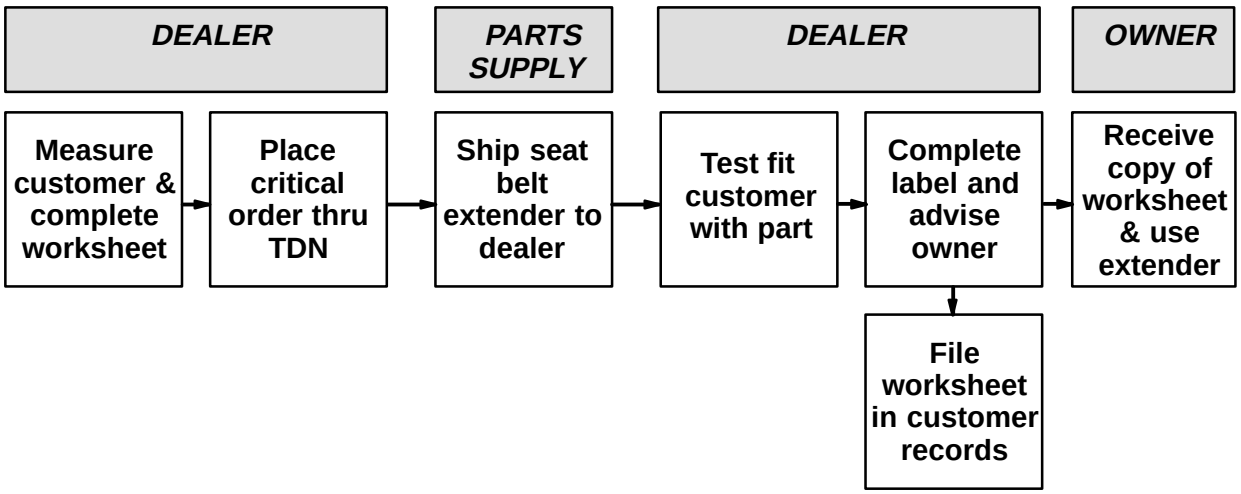
- Flow chart (Page 2)
- Seat belt extender application/part number chart (Pages 3 & 4)
- Owner instruction sheet (Page 4)
- Statement included in Owner’s Manual (Page 6)
- Seat Belt Extender Worksheet (Page 7)

The dealership service department should complete the affixed Seat Belt Extender Label and review the “owner instruction sheet” with the owner. The dealer should give a copy of the completed worksheet to the owner and keep the original in the customer’s file.

To assure utmost owner satisfaction, it is recommended that a dealer designate one person to coordinate all activities related to the seat belt extender issue.

Due to past sales history, it is recommended that dealers **DO NOT** stock seat belt extenders due to low demand for the parts and the need for custom fitting.

SEAT BELT EXTENDER (SBE) FLOW CHART:



SEAT BELT LABEL

CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____
Customer Name

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____ Driver _____ Passenger _____ Front _____ Rear

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

(1) Owner requests a seat belt extender from the dealer.

(2) Dealer verifies need for a seat belt extender, obtains current copy of TSIB and copies the worksheet.

(3) Dealer measures the customer and completes the worksheet. Dealer determines the correct part number needed and places a Critical Order for the part through the TDN Parts Network.

(4) Dealer receives seat belt extender and calls customer in to check fit of part.

(5) If seat belt extender fit is OK, dealer completes the customer information label on the part, explains usage of the part and gives the customer a copy of the completed worksheet.

(6) Dealer places a copy of the completed worksheet in the customer’s records.

To determine the part number, locate the “series” on the following charts. Then refer to the chart on page 4 to locate the part number for the “series” and length.

FRONT SEAT EXTENDER APPLICATION TABLE (EXTENDER SERIES NUMBER)

MODEL	1996	1995	1994	1993	1992	1991	1990
LS 400	R-3	R-3	R-3	R-3	R-3	R-3	R-3
GS 300	N-3	N-3	N-3	N-3			
SC 400	R-3	R-3	R-3	R-3	R-3		
SC 300	R-3	R-3	R-3	R-3	R-3		
ES 300	K-4	K-4	K-4	K-4	K-4		
ES 250						K-3	K-3
LX 450	R-3						

REAR SEAT EXTENDER APPLICATION TABLE (EXTENDER SERIES NUMBER)

MODEL	1996	1995	1994	1993	1992	1991	1990
LS 400	R-3	R-3	R-3	R-3	R-3	R-3	R-3
GS 300	K-4	K-4	K-4	K-4			
SC 400	R-3	R-3	R-3	R-3	R-3		
SC 300	R-3	R-3	R-3	R-3	R-3		
ES 300	R-3	R-3	R-3	R-3	R-3		
ES 250						R-1	R-1
LX 450	K-4*						

* Includes 3rd Seat Application.

Note: Seat belt extenders must not be used for the center rear seat belt on all models.

PART NUMBER INFORMATION:

(73399–_____)

LENGTH					
SERIES	**6”**	**9”**	**12”**	**15”**	**18”**
K–3	–22060	–22070	–22080	–22090	–22100
K–4	–33010	–33020	–33030	–33040	–33050
N–3	–20011	–20021	–20031	–20041	–20051
R–1	–12010	–12020	–12030	–12040	–12050
R–3	–50010	–50020	–50030	–50040	–50050

OWNER INSTRUCTION
(FOR PERSONALIZED SEAT BELT EXTENDER)

Precaution when using the seat belt extenders:

1. Never use the seat belt extender if you can fasten the seat belt without it.

2. Remember that the seat belt extender provided for you may not be safe when used on a different vehicle, or for another person and/or at a different seating position than specified.

3. When the seat belt extender is provided for a rear seat position (with automatic locking retractor), make sure the retractor is locked when in use.

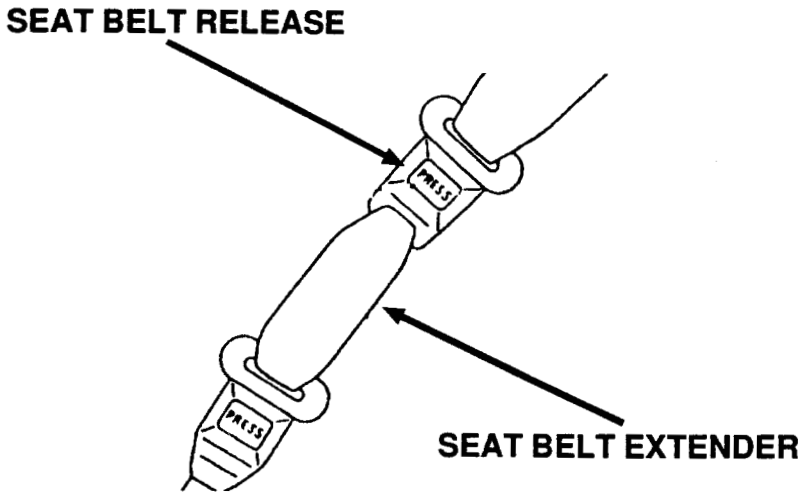
4. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN A LESS EFFECTIVE SEAT BELT RESTRAINT SYSTEM IN CASE OF A VEHICLE ACCIDENT, CAUSING PERSONAL INJURY.

Using The Seat Belt Extender:

1. Connect the seat belt extender to the seat belt by inserting the tab into the seat belt buckle so that the buckle–release buttons of the seat belt extender and the seat belt are located on the same side as shown. You will hear a click when the tab properly locks into the buckle.

2. MAKE SURE THAT THE CONNECTION IS SECURE AND THE SEAT BELT EXTENDER IS NOT TWISTED.

3. When releasing the seat belt, press on the buckle–release button on the seat belt extender, not on the seat belt. This helps prevent damage to the vehicle interior and seat belt extender itself.



4. When not in use, remove the extender and store in the vehicle for future use.

OWNER'S MANUAL TEXT:

SEAT BELT EXTENDER

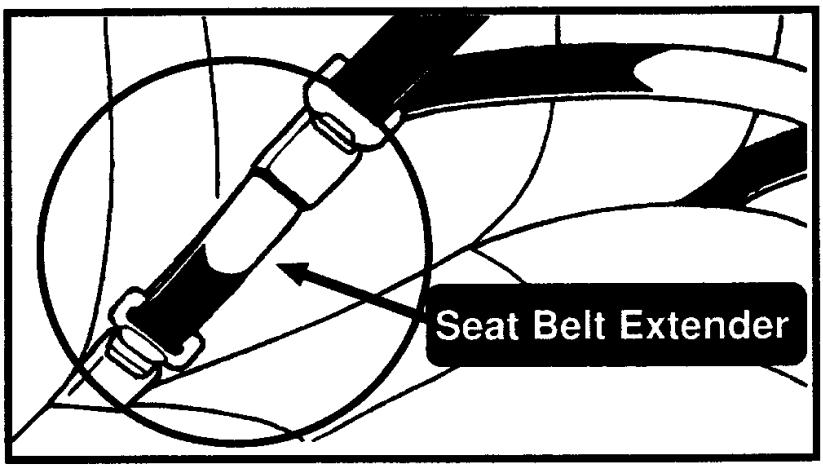
If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

Please contact your local Lexus dealer so that the dealer can order a seat belt extender of the proper required length. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of a vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the seat belt extender provided for you may not be safe when used on a different vehicle, or for another person and/or at different seating positions than specified.



To connect the seat belt extender to the seat belt, insert the tab into the seat belt buckle so that the buckle release buttons of the seat belt extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle. When releasing the seat belt, press on the buckle–release button on the seat belt extender, not on the seat belt. This helps prevent damage to the vehicle interior and seat belt extender itself.

When not in use, remove the seat belt extender and store in the vehicle for future use.

CAUTION:

After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

SEAT BELT EXTENDER WORKSHEET

Please copy this original worksheet for each extender needed.

CAUTION: To minimize the chance and/or severity of injury in an accident, the seat belt extender must not be used:

- By anyone but the person for whom it was provided, and
- In any vehicle or seat specified other than the one for which it was provided, and
- With any car child safety seats.

When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when in use.

In all cases seat belts must be worn below the abdomen by pregnant women.

DEALER	PLEASE PRINT CLEARLY	APPLICANT

DEALER CODE	DEALER NAME		APPLICANT NAME		
ADDRESS			ADDRESS		
CITY AND STATE		ZIP CODE	CITY AND STATE	ZIP CODE	TELEPHONE
DEALER EMPLOYEE NAME	MODEL YEAR	BODY TYPE	SEAT POSITION *F / R*	VEHICLE IDENTIFICATION NUMBER	

DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. Place the seat in the position the person normally uses.
2. With the person in the seat, extend the seat belt as much as possible and see if the belt latches.
3. If the buckle latches but has no slack remaining, the dimension for Figure 2 is zero. If the seat belt does not latch, measure the distance from the seat belt latch edge to the seat belt buckle as shown in Figure 2 below, and note the dimension.
4. Measure the lap area directly below the navel to the edge of the buckle as shown in Figure 1 and note the dimension.
5. The difference between Figure 1 and Figure 2 measurements is the "Allowable Margin". (Do not use this dimension for the extender length.)
6. Take the measurement in Figure 2 and round it up to the next extender size available, without exceeding the "Allowable Margin".

FIGURE 1
DIMENSION FROM NAVEL TO BUCKLE

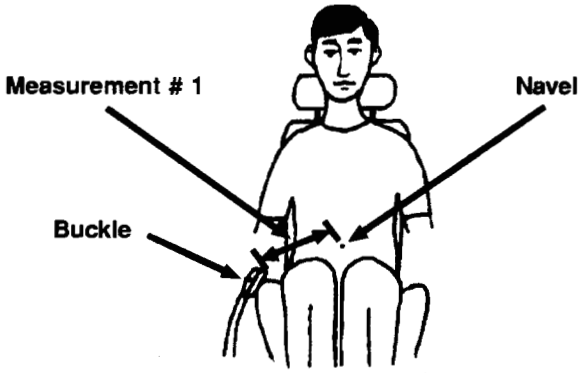
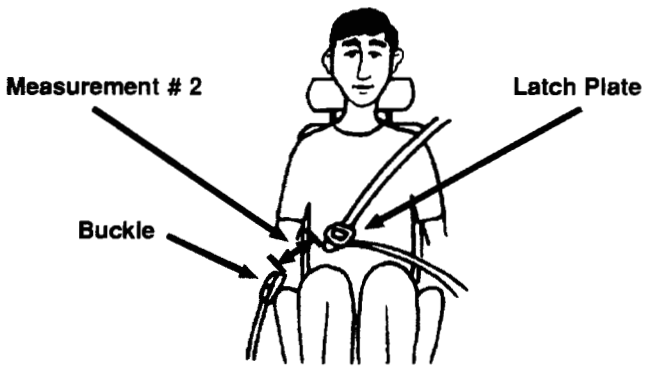


FIGURE 2
DIMENSION FROM LATCH TO BUCKLE



Measurement #1 (Figure 1) - Measurement #2 (Figure 2) = "Allowable Margin"

_____ - _____ = _____

NOTE: The length of the extender must not exceed the "Allowable Margin", due to design and construction features

AUTHORIZATION

The same extender can be used for right and left seating applications. Each seat belt extender will be affixed with a label identifying the owner, vehicle VIN and seating position. Extenders are available in one color only .

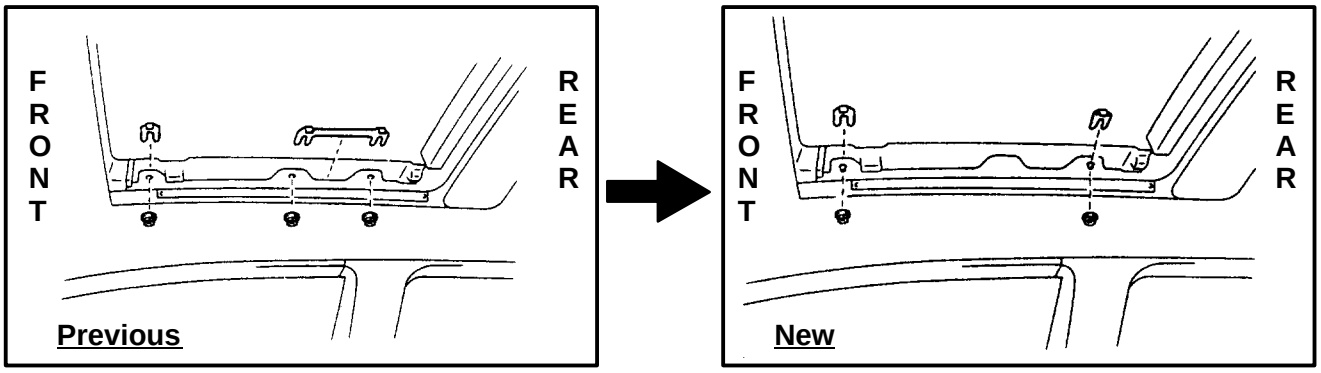
_____ _____

APPLICANT'S SIGNATURE
(Actual user of seat belt extender)

DATE

Title **MOONROOF PANEL SERVICE TIPS**

To limit internal stress on the moonroof panel glass, the six mounting studs have been reduced to four (see illustration below).



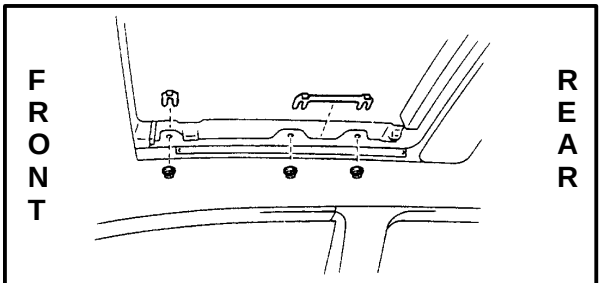
PRODUCTION EFFECTIVE:

PRODUCTION DATE	VIN JT8GK13T–	No. OF STUDS ON PANEL	REPAIR ADJUSTMENTS
Before 2/94	To R0041539	6	Do NOT install nuts on forward studs of double shims*
After 2/94	From R0041540	4	*

* Use torque setting values contained in table.

NOTE: The 4 and 6 stud moonroof panels are completely interchangeable and the part numbers have not been changed.

If adding or removing moonroof shims from a 6 stud moonroof panel (vehicles built prior to 2/94, VIN# JT8GK13T – R0041540) Discard stud nuts at forward position of the double shims.



Remove & Discard Stud Nuts at forward position of the double shims

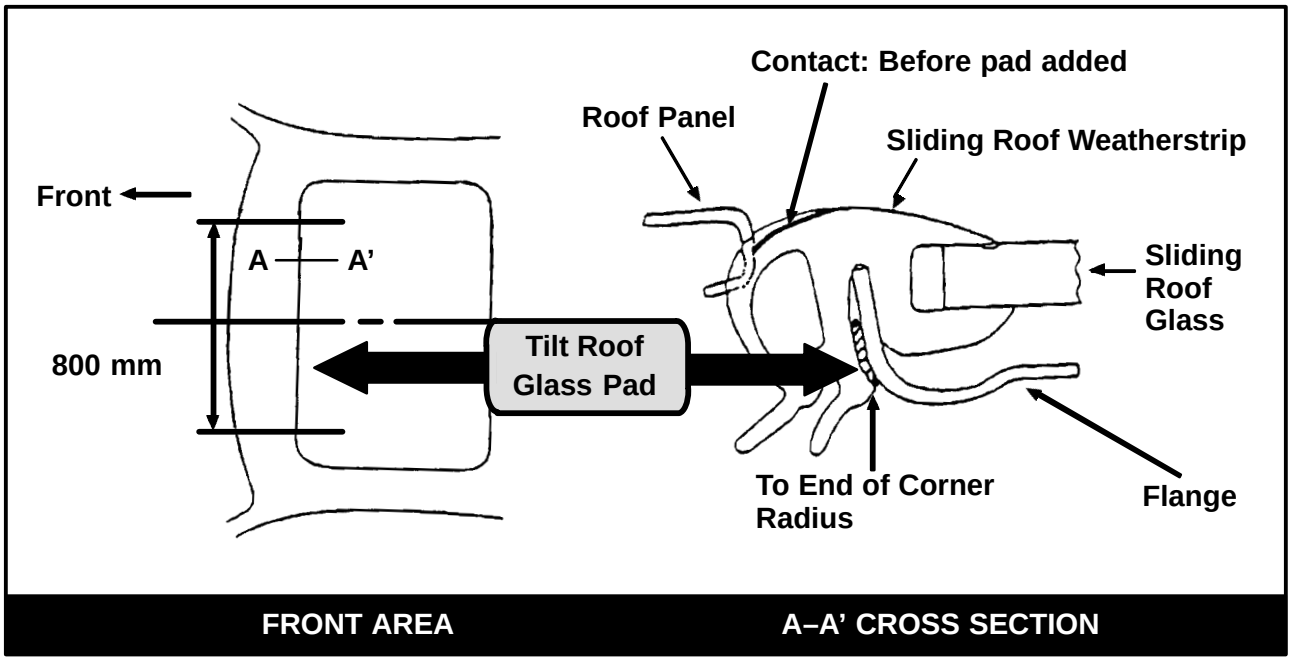
Torque settings for the stud nuts securing the moonroof have been revised as follows:

TORQUE SETTINGS	ft-lbs	N-m	kgf-cm
NEW	***3***	***4***	***40***
OLD	**7**	**9.5**	**97**

Call the Technical Hotline at 1-(800)-446–4740 for additional information.

Title **MOONROOF PANEL WIND NOISE**

On some ES 300 vehicles, wind noise from the moonroof panel may be present. In order to provide a tighter fit and more complete seal, the sliding roof glass panel has been improved. The improved sliding roof glass incorporates shim stock (Tilt Roof Glass Pad, 800 mm x 4 mm, t=0.9 mm) in the front of the flange on the sliding roof inner panel (see illustration below).



PRODUCTION EFFECTIVE:

Starting VIN: JT8GK13T–S0108922

REPAIR PROCEDURE:

Use the steps below to correct for wind noise:

STEP 1 – VERIFY CONDITION:

Determine the conditions at which the problem occurs (speed, wind direction, etc.). Test drive vehicle to identify the type of noise and confirm the location of the noise (front, rear, corners, etc.).

Moonroof closure (slide or tilt operation) may be a critical factor. If the problem occurs after one operation and not the other, make certain that the drive gear and drive rails are properly aligned (refer to repair manual for adjustment procedures).

REPAIR PROCEDURE: Cont'd

STEP 2 – VISUAL INSPECTION:

From a visual inspection, determine what type of field–fix repair is required:

- Over/under flushness of the moonroof panel to the roof panel (step 3A)
- Gaps between the weather–strip and the roof panel (step 3B)

NOTE: The following base adjustments must be correct before proceeding with moonroof panel field–fix repairs.
- positioning of moonroof panel to the cutout in the roof panel (front to rear, left to right and centering)
- "Match Mark" alignment (correct phasing of motor/drive cables, refer to repair manual for specific adjustment procedures).

STEP 3 – FIELD–FIX REPAIRS

METHOD A – FLUSHNESS (SHIMMING) ADJUSTMENT:

1. Measure and record the "before" and "after" readings on the repair order for flushness levels between the sliding roof weatherstrip and the roof panel to verify that they are within the following ranges:

- Front end +1.0 $\pm$1 mm
- Rear end 0 $\pm$1 mm

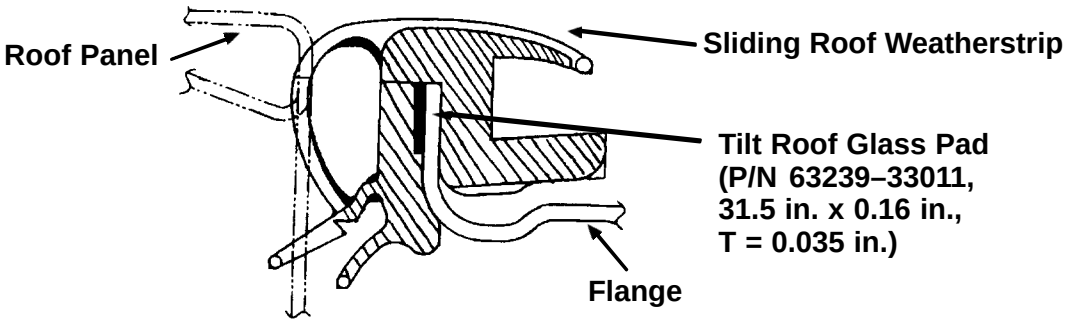
2. Adjust flushness by adding or removing shims (refer to TSB BO95–007 for torque values of nuts).

METHOD B – WEATHERSTRIP SEALING INSTRUCTIONS:

1. Remove moonroof panel as specified in the repair manual.

2. Insert section of shim stock (Tilt Roof Glass Pad, P/N 63239–33011) to front edge of the metal flange on the sliding roof inner panel (see figure below).

HINT: It may be easier to add the shim stock working from the center outward.



WARRANTY INFORMATION:

Method A –

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD5006	Sliding Roof Panel Shim R&R – includes all necessary checks and adjustments (1992–1993 Models)	0.5	63277–XXXXX	64	52
614261	Sliding Roof Panel Shim R&R – includes all necessary checks and adjustments (1994–On Models)	0.5	63277–XXXXX	64	52

Method B –

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD5007	Install Shimstock to front edge of panel (includes panel R&R and all necessary checks and adjustments)	1.0	63201–XXXXX	64	41

Call the Technical Hotline at 1-800-446–4740 for additional information.

On some ES 300s the front passenger floor carpet may become wet or damp after a heavy rain. Two sources of water entry have been identified:

(1) Water travels down SRS wire harness and enters through SRS wire harness grommet located on RH outer cowl side panel subassembly (side kick panel).

(2) Water flowing on the back side (underside) of cowl outer panel, enters by dripping into fresh air intake plenum.

PRODUCTION COUNTERMEASURE:

To prevent water entry into front passenger compartment, the following production countermeasures have been implemented.

(1) Water entry at SRS wire harness grommet

SRS wire harness grommet has been modified to prevent water from entering vehicle (see Figure 1).

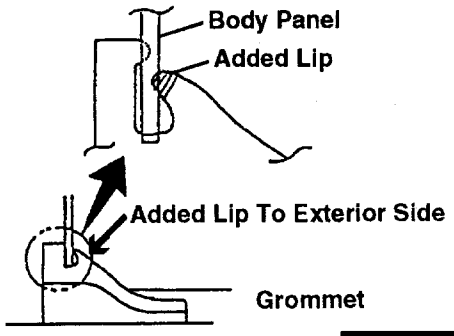


Figure 1

PRODUCTION EFFECTIVE:

VIN	P/D
JT8GK13T#R0001033	8/93

(2) Water entry through fresh air intake plenum.

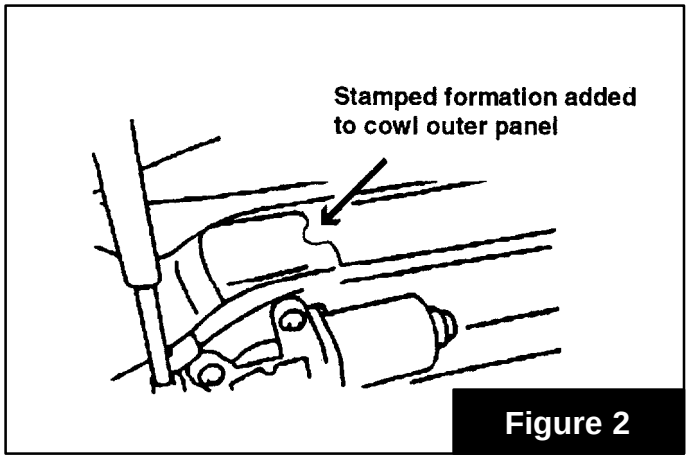


Figure 2

Stamped formation (drain channel) added to RH cowl outer panel to prevent water flow along back side of panel. (see Figure 2)

PRODUCTION EFFECTIVE:

VIN	P/D
JT8VK13T#N0117382	7/92

REPAIR PROCEDURES:

Should preliminary inspection confirm wet/damp passenger side carpet or silencer pad, the following repair procedures are recommended:

(1) For water entry at SRS wire harness grommet, seal SRS grommet to body panel

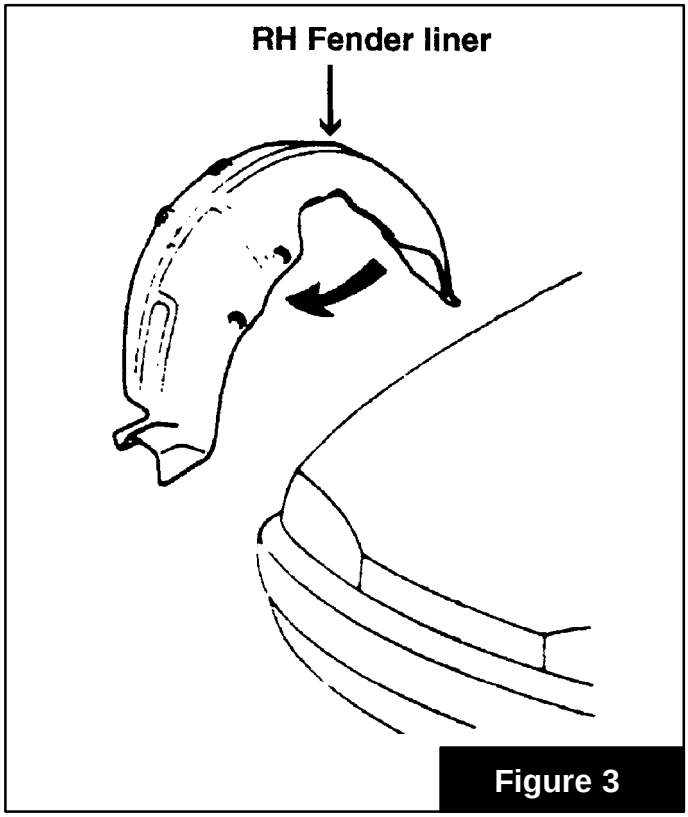


Figure 3

1. REMOVE RH FRONT TIRE.
2. REMOVE FRONT FENDER WHEEL OPENING MOULDING.
   Remove four screws and the moulding.
3. REMOVE RH FRONT FENDER LINER.
   Remove fasteners (12) RH front fender liner (as shown in Figure 3) to gain access to SRS wire harness grommet.
4. CLEAN AREA FOR APPLICATION OF SEALER.
   Clean area around SRS wire harness grommet opening in RH cowl side panel subassembly.

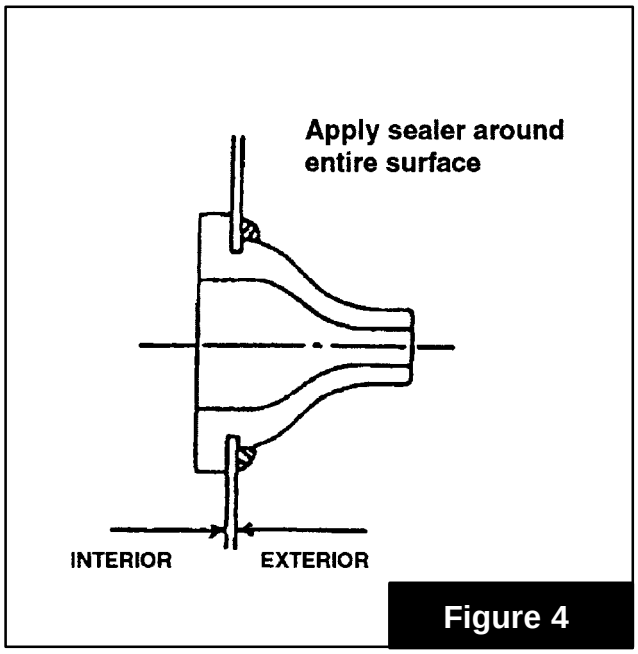


Figure 4

5. POSITION SRS WIRE HARNESS GROMMET.
   Ensure grommet is properly seated to opening in RH cowl side panel subassembly.

6. SEAL SURFACE BETWEEN GROMMET AND BODY PANEL.
   Recommend using **3M Ultrapro Auto Body Sealant (Clear) P/N 08302 or 3M All Around Auto Body Sealant (White) P/N 08500 or equivalent.**

   Apply sealer to surface between SRS wire harness grommet and body panel (as shown in Figure 4), to prevent water entry.

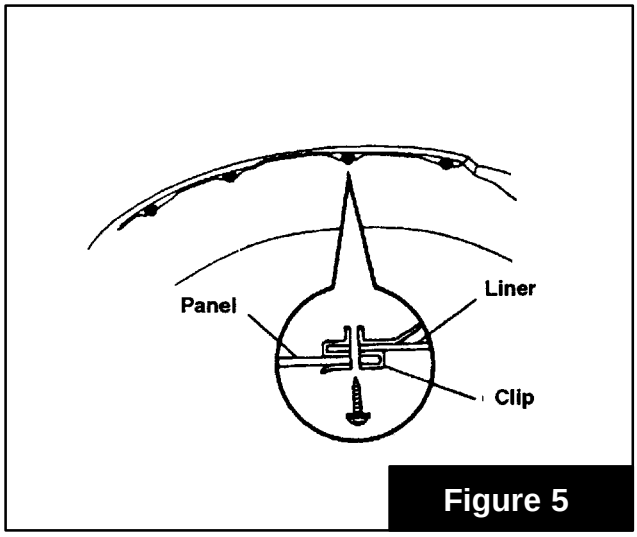


Figure 5

7. RE–INSTALL FENDER LINER.
   Install three clips so that the screw can be inserted in the manner shown in Figure 5.

8. RE–INSTALL FRONT FENDER WHEEL OPENING MOLDING.

2. For water entry through plenum fresh air intake, install countermeasure seal

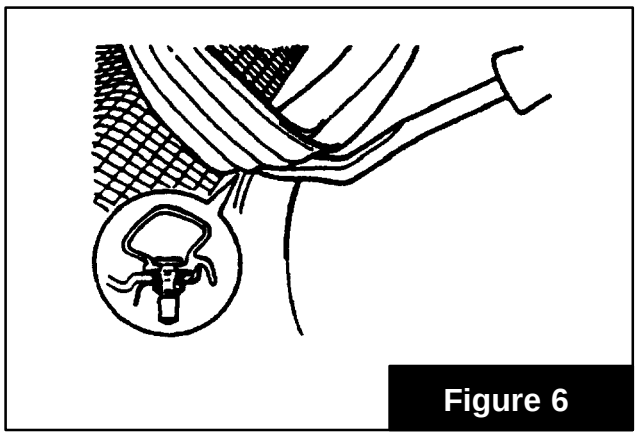


Figure 6

1. REMOVE RH COWL LOUVER (SCREEN)
   Operate windshield wiper and stop the arm at the upper position.

   Using a clip remover, remove attaching clips (5) for RH cowl louver and hood to cowl top weather–strip. (see Figure 6)

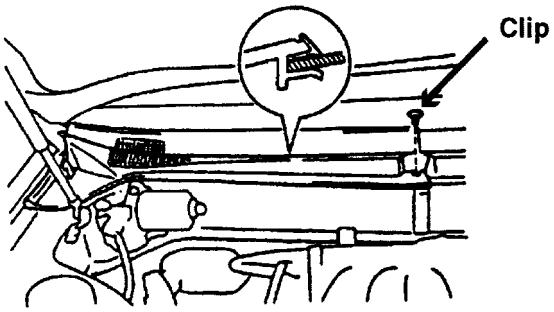


Figure 7

Using clip remover, remove additional clip securing RH cowl louver to LH cowl louver and cowl top (see Figure 7). Pull the cowl louver out forward to remove clip.

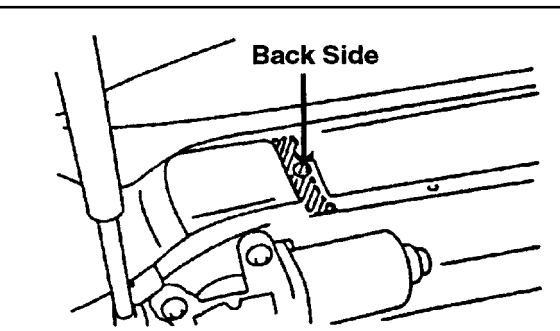


Figure 8

2. CLEAN AREA FOR INSTALLATION OF SEAL.
   Clean the back side of the cowl outer panel with isopropyl alcohol to promote adhesion (see Figure 8).

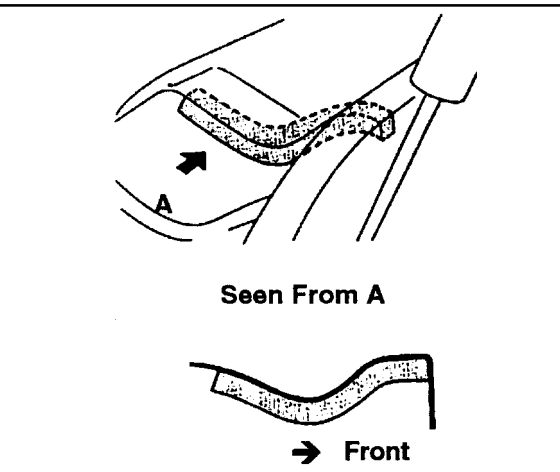


Figure 9

3. APPLY SEAL TO COWL OUTER PANEL.
   Recommend using Quarter Window **No. 2 Glass Seal (PN 68177–12020, Toyota Supply Part)**

   Cut strip of seal approximately 130 mm (5.12 in.) long.

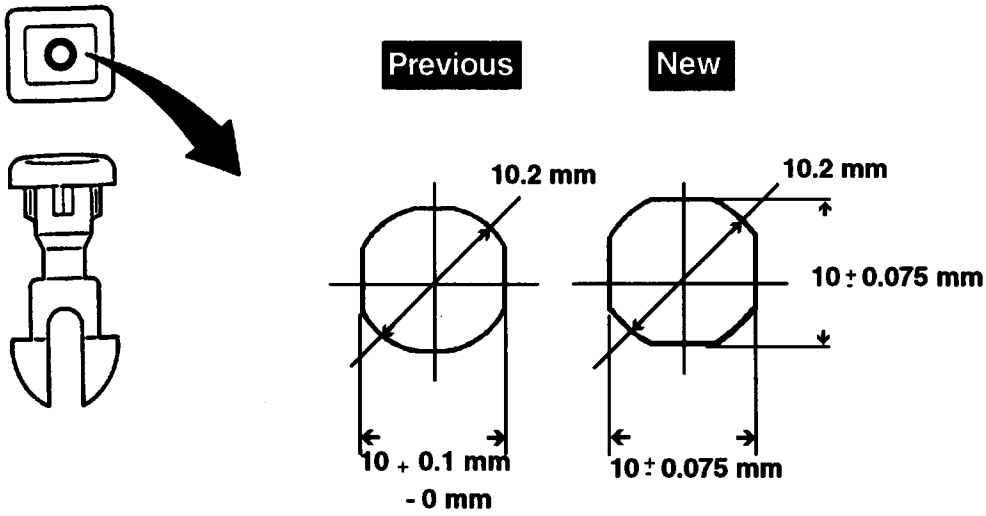
   Apply the seal to the bake side (underside) of the cowl top panel as shown, starting from the front end of the cowl top panel.

   Align the edge of the seal strip with the edge of the opening in the cowl top panel (see Figure 9).

4. REINSTALL RH COWL LOUVER (SCREEN).

Title **ES 300 FRONT SEAT HEADREST SUPPORT**

To prevent a rattling noise from the front seat headrest, the shape of the headrest support has been changed as follows:



PRODUCTION EFFECTIVE:

From VIN: JT8VK13T8P0136347 **Production Date:** 09/92

PART NUMBER INFORMATION:

Previous Part No.	New Part No.	Part Description	Color
71931–32010–01	71931–10020–22	Support, front seat headrest (w/o lock)	Black
71931–32010–04	71931–10020–W4	Support, front seat headrest (w/o lock)	Blue
71931–32010–08	71931–10020–A0	Support, front seat headrest (w/o lock)	Ivory
71931–32010–12	71931–10020–K1	Support, front seat headrest (w/o lock)	Medium Taupe

New Part is interchangeable with previous part

Title **INSTALLATION OF FRONT LICENSE PLATE MOUNTING BRACKET**

The new ES300 uses a front license plate mounting bracket which is shipped along with two bolts, in the luggage compartment. Please install the mounting bracket **as required** to the front bumper (Fig. 1) during PDS.

INSTALLATION PROCEDURE

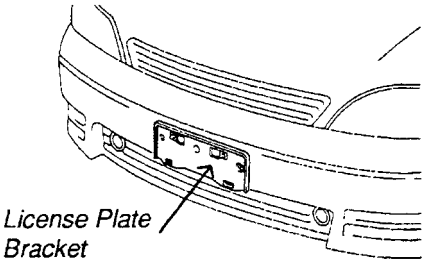


Figure 1

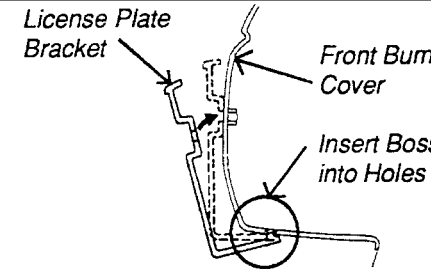


Figure 2

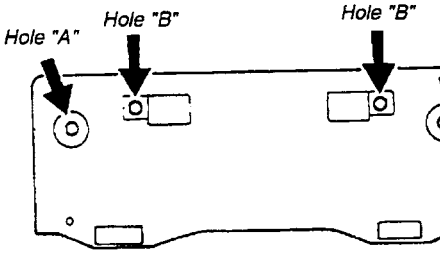


Figure 3

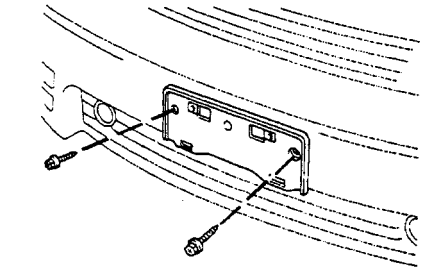


Figure 4

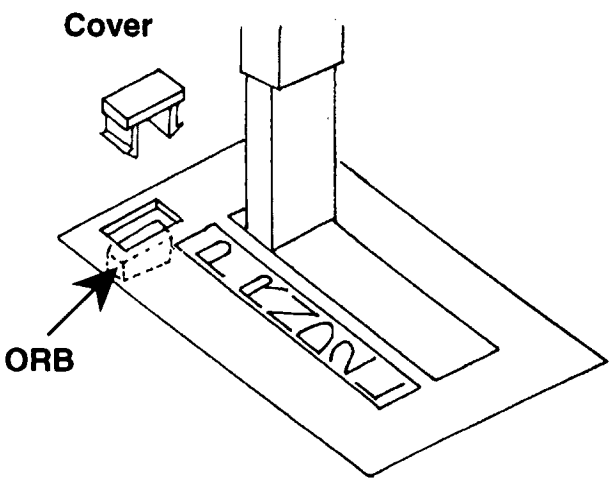
1. Insert the bosses on the bottom side of the license plate bracket into the front bumper holes (Fig. 2).
2. Position the license plate bracket on the front bumper cover. Mark the drilling location of hole “A” and “B” on the front bumper cover (Fig. 3).
   - Hole “A” is to install the license plate mounting bracket on the front bumper.
   - Hole “B” is a *through hole* for the bolt when the license plate is installed on the license plate bracket.
3. Remove the license plate bracket.
4. Drill four holes through the marks on the front bumper cover.

   Diameter of hole “A”: 9 mm (0.35 in.)
   Diameter of hole “B”: 11 mm (0.43 in.)

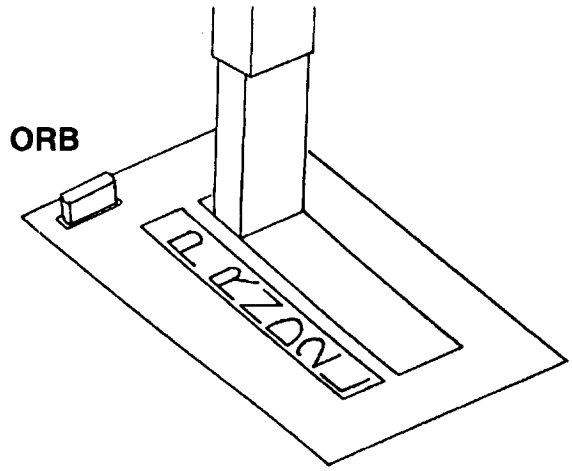
   Note: Use a drill stop positioned 4 mm (0.16 in.) from the end of the drill bit to prevent over drilling.
5. Install the license plate bracket (as shown in steps 1 and 2) and tighten the two 6 X 20 mm bolts supplied (Fig. 4).
6. Use the following bolt dimensions for installation of the front license plate:

   Nominal length: 15.0 mm (0.59 in.)
   Diameter: 6.0 mm (0.24 in.)

The position of the automatic transmission shift lock override button (ORB) has been changed and a cover added for increased theft protection in accordance with FMVSS No. 114.



NEW

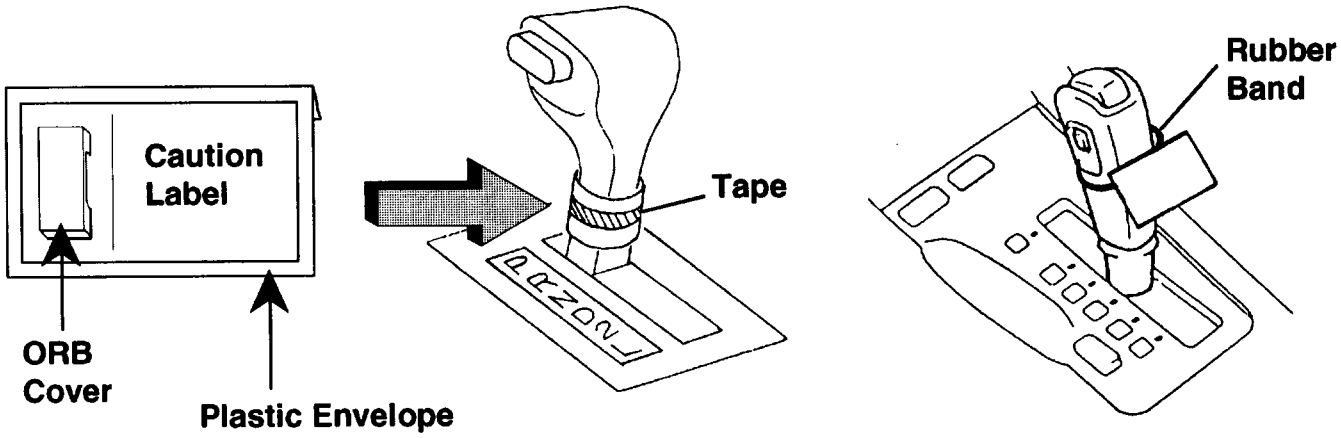


PREVIOUS

The ORB cover is packaged separately at the factory for transportation and must be installed during PDS (Pre-Delivery Service) according to the following procedure:

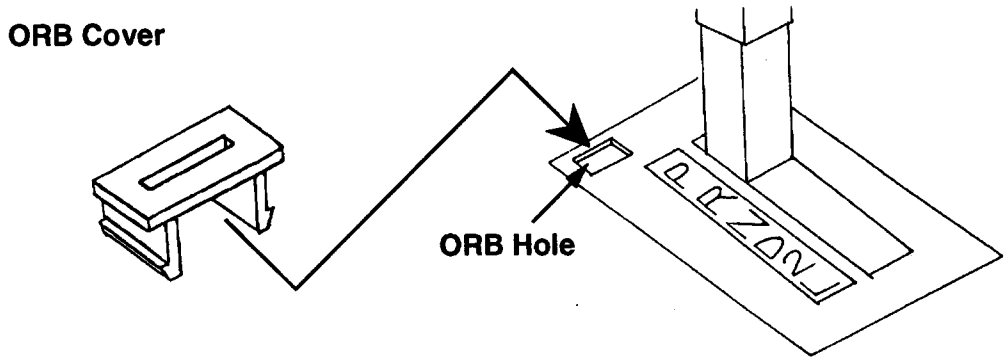
ORB COVER STORAGE:

The ORB cover is put in a plastic envelope with a caution label and is taped to the automatic transmission shift lever as shown below.

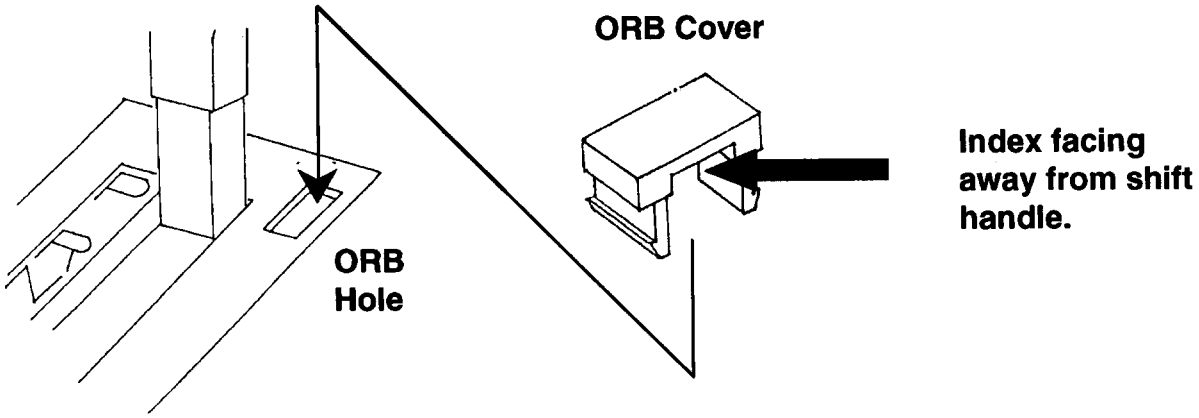


INSTALLATION OF ORB COVER:

For LS 400, SC 400 and SC 300, install the ORB cover in the ORB hole.



For ES 300, install the ORB cover with the index facing away from the shift handle.



PRODUCTION EFFECTIVE:

MODEL	PRODUCTION EFFECTIVE
LS 400	From '93 M/Y (August, 1992)
SC 400, 300	From '93 M/Y (September, 1992)
ES 300	From '93 M/Y (August, 1992)

CANCELLING SHIFT LOCK WITH ORB:

If a dead battery or similar problem occurs, the shift lever cannot be moved out of the "P" position even though the brake pedal is depressed with the ignition switch in the "ON" position.
Use the ORB to cancel the shift lock as follows:

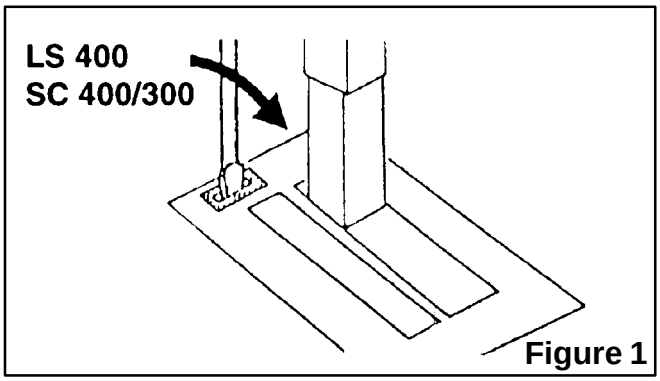


Figure 1

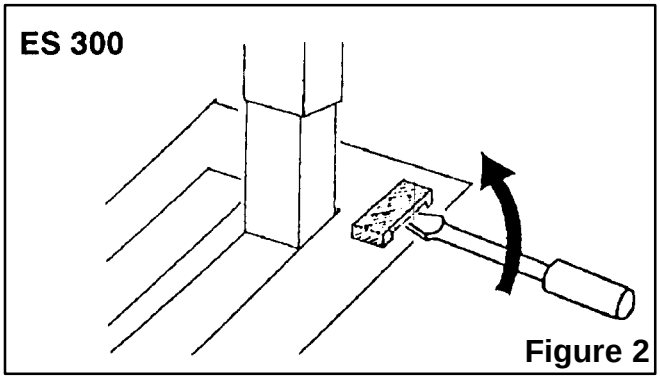


Figure 2

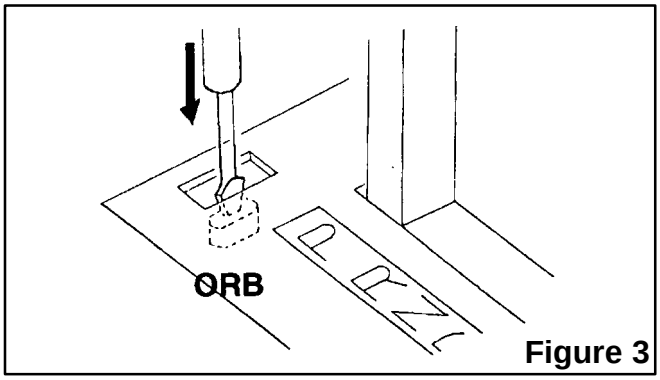


Figure 3

1. Apply the parking brake and turn the ignition key to the "OFF" position.

2. For LS 400, SC 400/300, insert a flat bladed screwdriver or equivalent into the index on top of the ORB cover and pry towards the shift handle (see Figure 1).

Note: Apply tape to tip of screwdriver to prevent damage to vehicle.

3. For ES 300, insert a flat–bladed screwdriver or equivalent into the index on the side of the ORB cover and pry it up (see Figure 2).

4. Use the same tool to push down the ORB while at the same time releasing the shift handle from the "P" position (see Figure 3).

This TSIB outlines the causes of brake vibration and pulsation as well as the best corrective measures to use.

CONTENTS

1) Symptoms of brake vibration and pulsation
2) Cause of vibration/pulsation problems
3) Advantages of using an on–car brake lathe
4) Rotor replacement and off–car brake lathe procedure

1) SYMPTOMS OF BRAKE VIBRATION AND PULSATION

Brake vibration problems generally involve one or both of two phenomena:

body vibration and/or pedal pulsation.

A. BRAKE VIBRATION:

Applying brakes causes vibration to occur in the instrument panel, steering column, steering wheel, and/or body of the vehicle **(see Figure 1 below).**

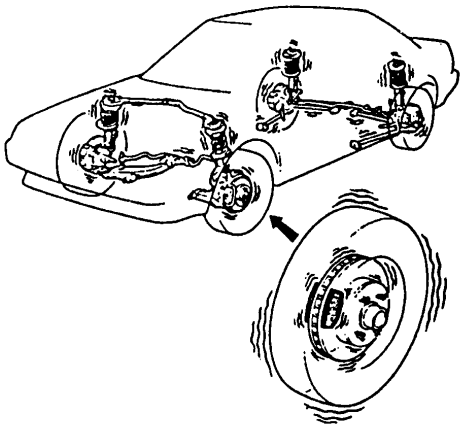


Figure 1

B. PEDAL PULSATION

Applying brakes causes the brake pedal to pulsate. This brake pulsation sometimes causes the steering wheel to oscillate when the brakes are applied **(see Figure 2 below).**

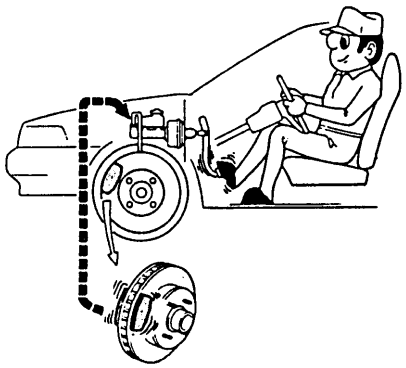
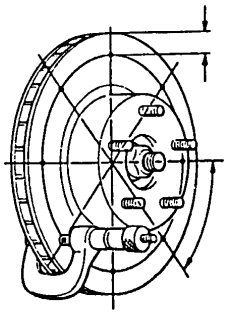


Figure 2

2) CAUSE OF VIBRATION/PULSATION PROBLEMS

Brake rotor thickness variation causes brake vibration due to changes in the braking force as thick/thin portions of the rotor pass the pads. Brake rotor thickness variation can be measured with a micrometer as shown in **Figure 3** below.



Thickness Variation = Maximum – Minimum

Figure 3

There are two factors which cause excessive rotor thickness variation:

A. ROTOR RUN–OUT

– **Rotor run–out** can be caused by poor mating of flanges between the hub and rotor when assembled as a unit. Manufacturing tolerance stack–up of the rotor and hub may also cause excessive rotor assembly run–out **(see Figure 4 below).**

– If there is rotor run–out, a portion of the rotor comes into contact with the brake pad on each rotor revolution. If left like this, the portion of the rotor that contacts the brake pad becomes worn, creating **thickness variation.**

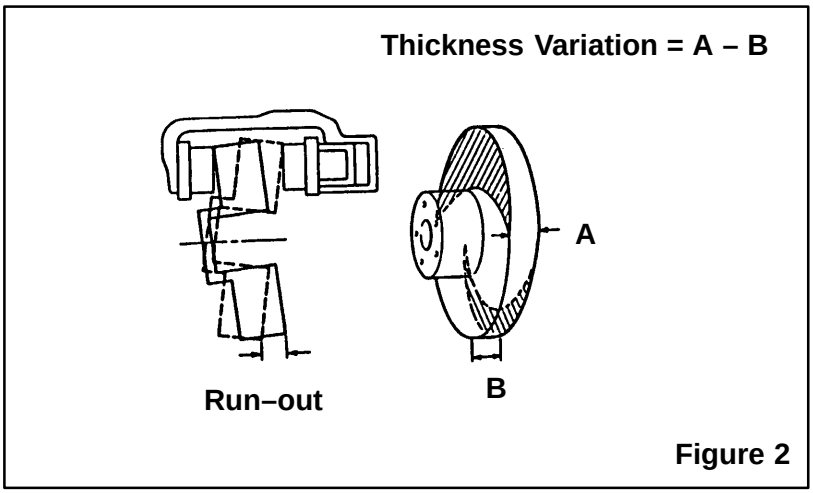


Figure 2

B. EXCESSIVE RUST OR CORROSION ON ROTOR SURFACE

– Driving in areas where salt is applied to road surfaces for winter conditions can cause rust and corrosion when the vehicle is parked for an extended period of time. This occurs on the area where the brake pads are not in contact with the rotor.

– When a vehicle is driven with rusted rotors, the area with corrosion wears at a different rate than the non–corroded areas, resulting in excessive thickness variation.

3) Advantages Of Using An On–Car Brake Lathe

Toyota Motor Corporation Engineers strongly recommend that an on–car brake lathe be used for repairing brake vibration and pulsation. This method improves rotor and hub combined run–out, and is the preferred method when compared to rotor replacement and off–the–car rotor machining.

A. Technical Advantage of Caliper Mounted Brake Lathe

- Installing the brake lathe in the same position as the caliper results in minimal run–out relative to the caliper.
- Eliminating this run–out minimizes the pad grinding on the rotor and reduces rotor thickness variation.

B. Practical Use Benefits

- Resurfacing rotors on vehicles with rotor/hub assemblies can be performed easily.
- Vehicles with corrosion between hub and rotor flanges can be machined without removing rotor from hub.

4) Rotor Replacement And Off–Car Brake Lathe Procedures

If an on–car brake lathe is not available at your dealership, it may be necessary to use an off–car lathe or replace rotors. In order to ensure proper brake vibration and pulsation repairs, pay close attention to the following precautions:

A. Off–Car Brake Lathe Precautions

- Perform routine maintenance of brake lathe components (clearance of arbor shaft to adapters may need to be repaired).
- Clean all adapters and shaft to maintain accuracy of equipment.
- When installing rotor to machine, clean mud, rust, and/or foreign material from the adapters and rotors.
- After installing rotor on machine, check rotor run–out using dial indicator. If run–out is excessive, determine the cause and correct it.
- Follow lathe manufacturer repair procedures. Do not cut excessive amounts off rotor during the first cut to save time.

Anytime a rotor is machined it must be measured for minimum rotor thickness.
The thickness for the rotor is never to be less than minimum thickness as specified in the appropriate repair manual.

B. Installation of Rotor

- Check wheel bearing pre–load. If excessive movement is found, adjust bearing pre–load.
- Using a dial indicator, measure the rotor 10 mm from the outside edge **(see Figure 5 below).**

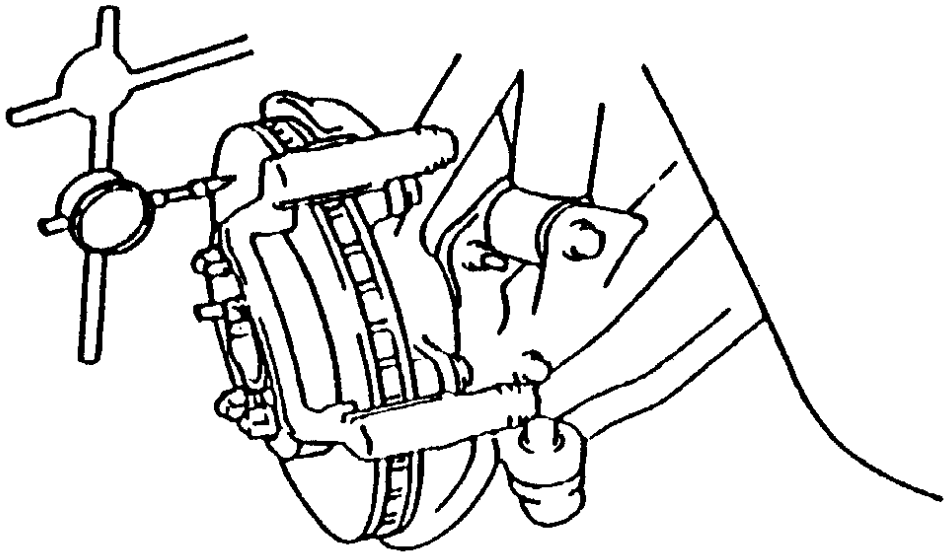


Figure 5

C. Phase Match Rotor To Hub

– If rotor run–out is at the maximum value or greater, (see appropriate repair manual) index the rotor one lug and measure the run–out again. Repeat this process, moving the rotor one lug each time, until the position is found where the run–out is at the minimum and within the maximum value listed in the appropriate repair manual **(see Figure 6 below).**

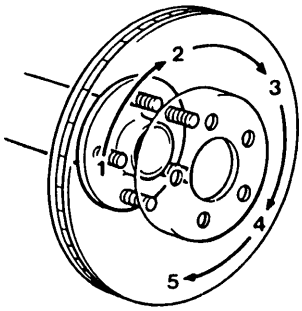
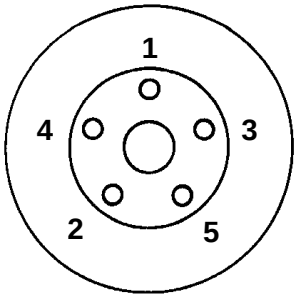


Figure 6

– Tighten lug nuts to the specified torque following a star sequence when installing wheel **(see Figure 7 below).**

Note: DO NOT USE AIR IMPACT WRENCH.



Five Holes

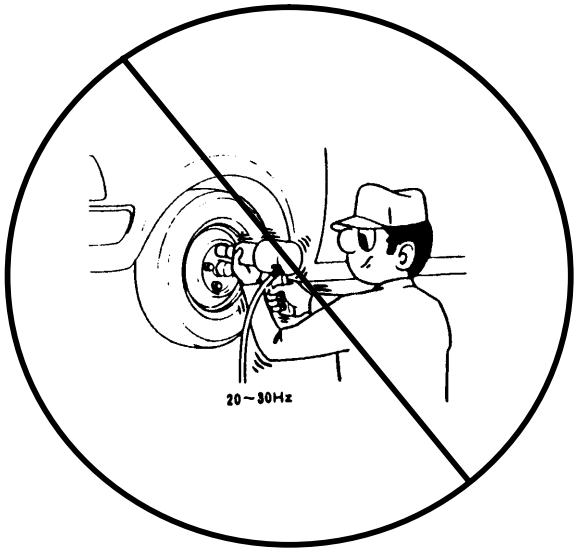


Figure 7

A new brake pad material is now available to reduce front brake groan/grinding noise on ‘92/‘93 ES 300s.

PRODUCTION EFFECTIVE:

TRANSMISSION	FROM VIN #	P/D
AUTOMATIC	JT8VK13T#P0130656	9/92
MANUAL	JT8VK13T#P0204772	4/93

PART NUMBER INFORMATION:

PREVIOUS P/N	NEW P/N	PART NAME
04491–33020	04491–33100	FRONT PAD, KIT

NOTE: Previous and new style parts are completely interchangeable.

Title **INTRODUCTION OF BRAKE SHIM KITS & BRAKE FITTING KITS**

Full brake kits, with complete hardware, have been discontinued. Shim kits and fitting kits for the front and rear brakes are now available separately, along with previously released pad kits.

SUPPLY PARTS CHANGES:

DISCONTINUED PARTS:

Full Kit

UNCHANGED PARTS:

Shim Kit

Fitting Kit

NEW PARTS:

Pad Kit

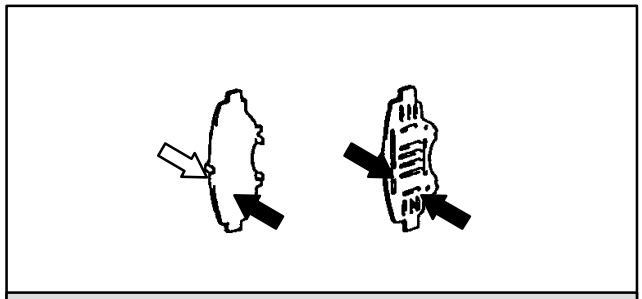
PART NUMBER INFORMATION:

For the part numbers of these pad kits, shim kits and fitting kits matrix, please consult the most recent Lexus Parts Operations Communications Bulletin.

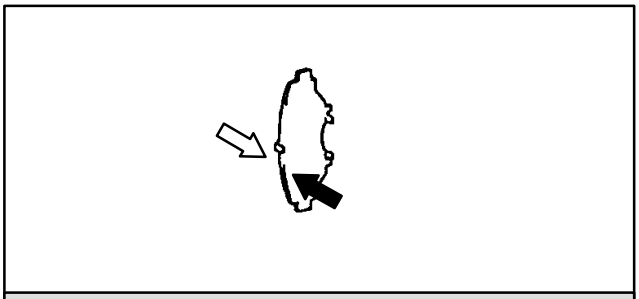
SERVICE INSTRUCTIONS:

1. All vehicles are to be inspected to insure that the integrity of the complete brake system is maintained. When replacing worn pads, you should replace the shims, wear indicators, (wear indicators may be riveted onto pads for some models) and shim grease at the same time using the pad kit and shim kit. Vehicles found to need extensive hardware replacement, including anti–squeal springs and support plates, should be repaired using the pad kit, shim kit and fitting kit, which together include all hardware components.

2. When applying shim grease, apply a thin layer over the shim faces as indicated below.



Grease application on double shim



Grease application on single shim

= Apply shim grease on this face.

= Do not apply shim grease on this face (piston side).

3. Anti–squeal springs and support plates my be reused if they are in good condition. When reusing anti–squeal springs and support plates inspect them for appropriate rebound and no deformation, burrs, cracks, wear, rust, or foreign materials.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: BRAKES

NO: BR002–96

DATE: MARCH 29, 1996

MODEL: ES 300

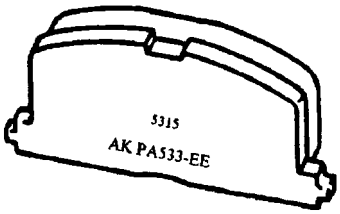
Title **ES 300 FRONT BRAKE GROAN NOISE**

To reduce front brake groan noise on ES 300s, the brake pad material has been changed.

IDENTIFICATION OF NEW PARTS:

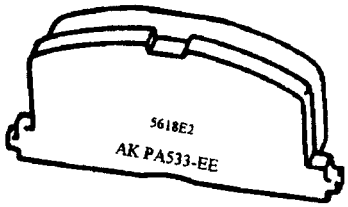
Check the lot number embossed on the metal backing plate of the brake pads, as shown below:

Previous Pads



4 digit lot number (Example "5315")

New Pads



6 digit lot number (Example "5618E2")

PRODUCTION EFFECTIVE:

MODEL	VIN
ES 300	JT8BF12G0T0133206

PART NUMBER INFORMATION:

Part number for ES 300 front brake pad kit (P/N 04465–33060) remains unchanged.

WARRANTY INFORMATION:*

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
473301	R&R front disc brake pads (both sides)	0.6	04465–33060	91	18

* Warrantable only for 12 months or 12,500 miles from date–of–first–use or demo date, whichever occurs first. Coverage is extended to 24 months or 18,000 miles, whichever occurs first, in the state of New York due to “Lemon Law” legislation.

NOTE: Replacement of the front brake pad kit and/or shims is limited to correction of a problem based upon a customer’s complaint and subject to all of the provisions of Toyota Warranty Policy Bulletin POL94–17 (Revised), dated November 4, 1994.

Lexus Supports ASE Certification

LEXUS
Technical Service Information Bulletin
January 17, 1997

Title:

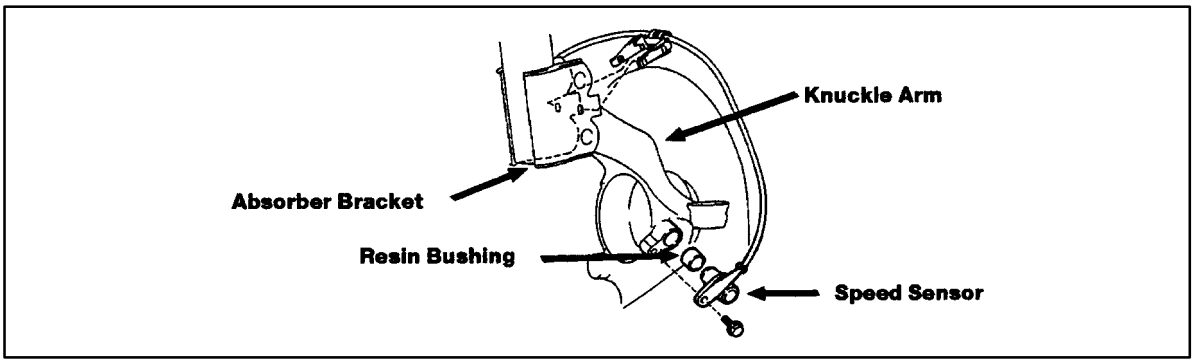
ABS FRONT WHEEL SPEED SENSOR

Models:

ES 300

TSIB

Introduction To improve serviceability of the front ABS Wheel Speed Sensor, the diameter of the speed sensor mounting hole, in the steering knuckle, has been increased. In addition, a resin bushing has been installed on the speed sensor.



Production Change Information **ES 300s** starting with **VIN JT8GK13T**0116357**.

Parts Information

PREVIOUS PART NUMBER	NEW PART NAME	PART NAME
N/A	90389-16020	Resin Bushing
43211-33010	43211-33011	Steering Knuckle (RH)
43212-33010	43212-33011	Steering Knuckle (LH)

NOTE:
New Steering Knuckles and Bushings must be replaced as a set.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
434211	Steering Knuckle, R&R (one side)	1.8	43211-33010	94	83
434211A	Steering Knuckle, R&R (both side)	2.9	43212-33010	94	83

Applicable Warranty Coverage: Basic Vehicle Warranty.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: BRAKES

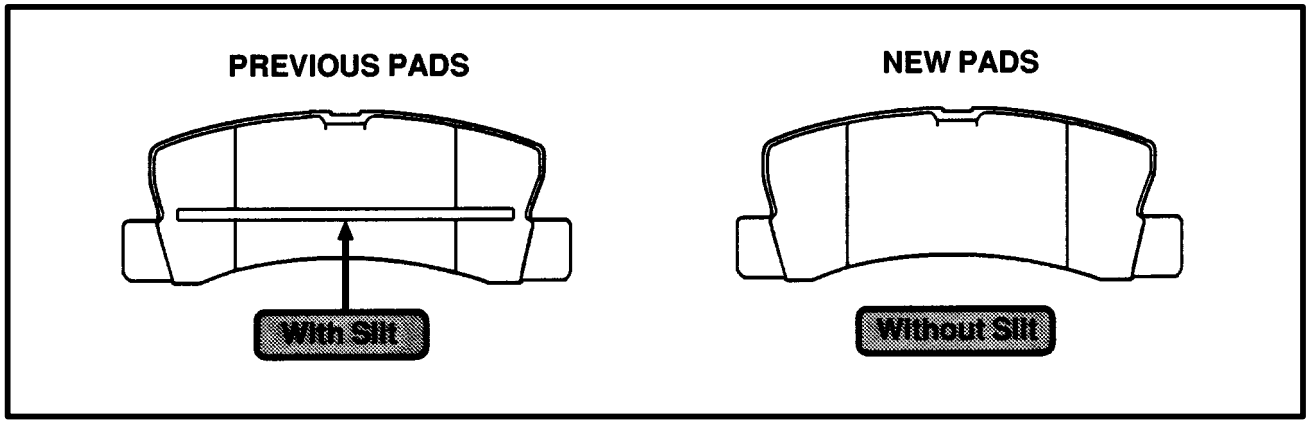
NO: BR004–96

DATE: MAY 31,1996

MODEL: ES 300

Title **REAR DISC BRAKE SQUEAK NOISE**

A new brake pad material is now available to reduce rear brake squeak noise.



PRODUCTION EFFECTIVE:

Starting VIN: JT8BF12G4T0134410

PART NUMBER INFORMATION:

PREVIOUS PART NUMBER	NEW PART NO.	PART NAME
04466–32010	Same	Pad Kit, Disc Brake Rear (pad only)

WARRANTY INFORMATION:*

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
473311	Rear disc brake pad and/or disc brake pad shim R&R (both sides)	0.6	04466–32010	36	99

* Warrantable only for 12 months or 12,500 miles from the date–of–first–use or demo date, whichever occurs first. Coverage is extended to 24 months or 18,000 miles, whichever occurs first, in the state of New York due to “Lemon Law” legislation.

NOTE: Replacement of the rear brake pad (pad only) kit under warranty is limited to the correction of a problem based upon a customer’s complaint and subject to all of the provisions of Lexus Warranty Policy Bulletin POL94–17, dated October 10, 1994.

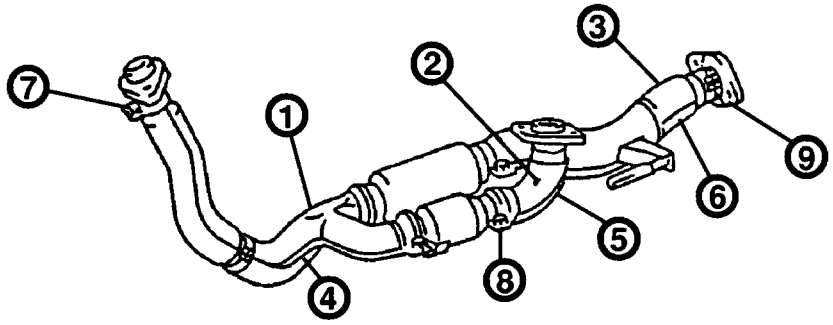
Lexus Supports ASE Certification

Title **EXHAUST PIPE PROTECTOR AND CLAMP**

For ES 300s with 1MZ–FE engines, exhaust pipe protectors and clamps are now available as separate supply parts. Part numbers and installation instructions for these parts are provided below.

PART NUMBER INFORMATION:

NUMBER	PART NAME	PART NUMBER	QUANTITY
1	Protector, Exhaust Pipe, Upper No. 2	17522–20010	1
2	Protector, Exhaust Pipe, Upper No. 3	17523–20010	1
3	Protector, Exhaust Pipe, Upper No. 4	17524–62020	1
4	Protector, Exhaust Pipe, Lower No. 2	17594–20010	1
5	Protector, Exhaust Pipe, Lower No. 3	17595–20010	1
6	Protector, Exhaust Pipe, Lower No. 4	17596–62020	1
7	Clamp	90461–12350	1
8	Clamp	90461–12385	1
9	Clamp	90461–12353	1



REPLACEMENT PROCEDURE:

Install protector so there is no noticeable gap or interference between exhaust pipe and protector.

Torque: 100 kgf-cm (7ft-lbs)

Title **WATER PUMP SEAL IMPROVEMENTS**

To improve seal durability and performance for Water Pump Assemblies, production changes were implemented as follows:

E/G SERIES	PRODUCTION CHANGE EFFECTIVE
1UZ–FE	February 14, 1994
2JZ–GE	January 14, 1994
1MZ–FE	March 17, 1994
3VZ–FE	November 17, 1993

PARTS INFORMATION:

- Part numbers remain the same.
- All Service Parts are of the new design (after countermeasure).

IMPORTANT NOTICE:

Prior to replacement of a failed Water Pump Assembly, the cooling system **must be flushed** and refilled using **Toyota Genuine Coolant** or similar **non–silicate** coolant.

WARRANTY INFORMATION:

Opcode	Description	Time	OPN	T1	T2
161011	Water Pump	Use Applicable Model Year Lexus Flat Rate Manual For Specific Time Allowance.	16100–xxxxx	99	41
APPLICABLE WARRANTY COVERAGE: 6 YEARS / 70,000 MILES					

LEXUS

TECHNICAL SERVICE INFORMATION

REF: ENGINE

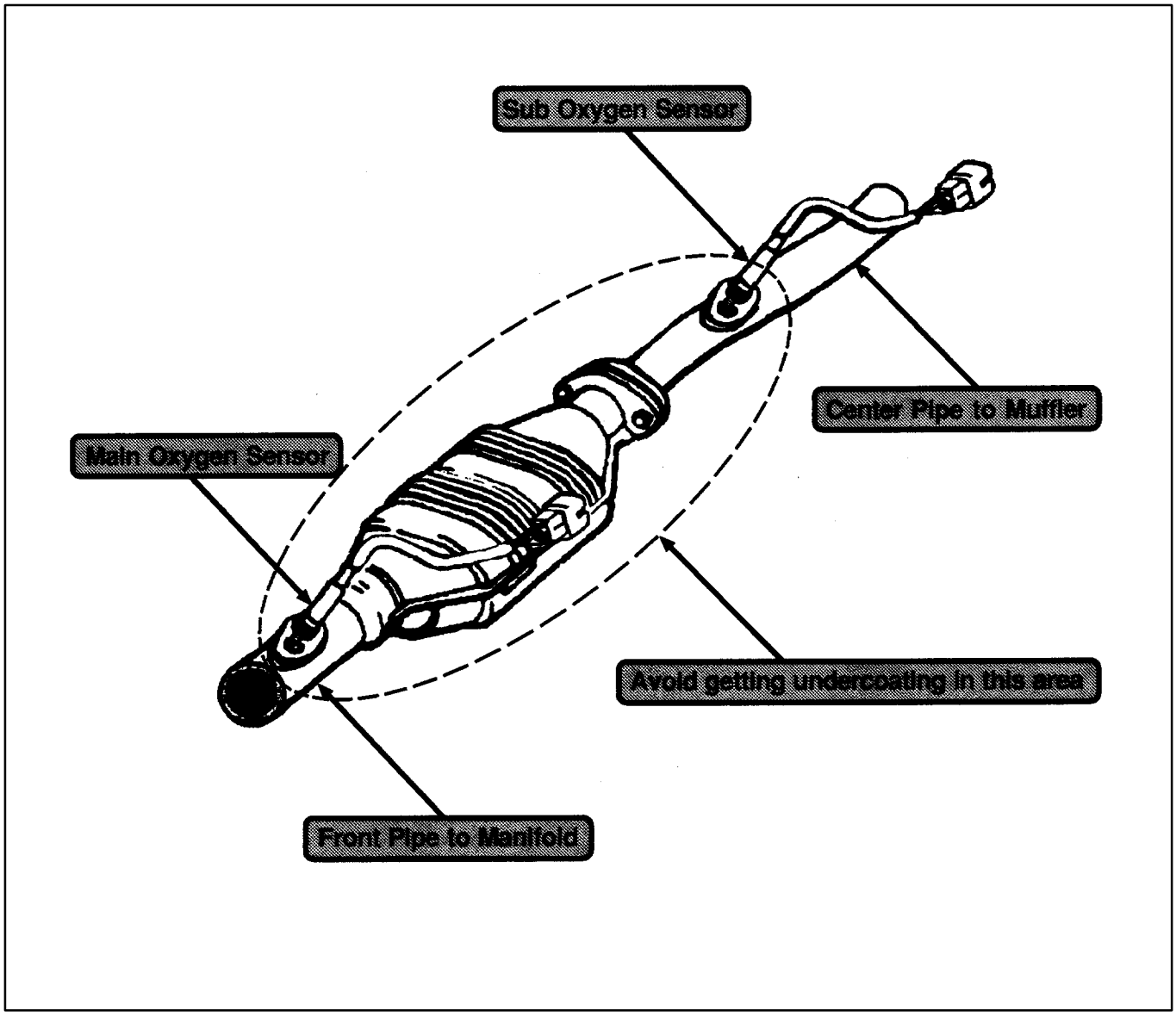
NO: EG004–96

DATE: OCTOBER 11, 1996

MODEL: ALL MODELS

Title **UNDERCOATING ON OXYGEN SENSORS**

During vehicle processing by Dealers, care must be taken to avoid applying undercoating in the area surrounding the Oxygen Sensors. Application of undercoating on or near the Oxygen Sensors can cause insufficient air to flow around the sensor, and inaccurate information storage by the ECM. If this condition occurs, the Malfunction Indicator Light (MIL) may illuminate.



Under certain driving conditions, minor engine ping, also referred to as "spark knock," is common for high compression engines such as those used in all Lexus models. Do not hesitate to inform customers of the following information included in their Lexus Owner's Manual:

> "If your engine knocks...
>
> If you detect heavy knocking, even when using the recommended fuel, or if you hear steady knocking while holding a steady speed on level roads, consult your Lexus dealer.
>
> However, now and then, you may notice light knocking for a short time while accelerating or driving up hills. This is no cause for concern."

This statement is included in all Lexus Owner's Manuals on the following pages:

MODEL	YEAR	PAGE
ES 250	1990	165
ES 250	1991	171
ES 300	1992	165
ES 300	1993	170
LS 400	1990	166
LS 400	1991	166
LS 400	1992	172
LS 400	1993	192
SC 400	1992	170
SC 400/SC 300	1992	170
SC 400/SC 300	1993	186

Because all Lexus models have knock sensors, the following question may arise:

Q: When I hear knocking, does it mean that the knock sensors are not working correctly?

A: Engine control systems with knock sensors operate by modifying ignition timing when knocking is detected. In other words, knocking must be present before the control system acts to modify the timing. This is usually noticeable by a short duration of a light knocking noise and is not cause for concern.

The Engine Control Module has been modified to improve the following conditions:
1. Hot soak restart.
2. Engine driveability during downhill operation.

Note: **Some vehicles may experience both conditions.**

PRODUCTION CHANGE EFFECTIVE:

VIN	**DATE**
JT8VK13T8P0120387	8/92 (1993 MY)

PART NUMBER INFORMATION:

APPLICATION		**PREVIOUS P/N**	**NEW P/N**
FED	M/T	89661–33110	89661–33111
	A/T	–33180	–33181
CAL	M/T	–33130	–33131
	A/T	–33190	–33191

New parts are interchangeable with 1992 MY vehicles.

All Lexus SRS systems are equipped with a back up power source so the air bag can still be deployed even if the vehicle battery is damaged in a collision.

During vehicle service this means that the air bag could be inadvertently deployed if work is started too soon after disconnecting the negative battery terminal.

Because of slight variations in the Supplemental Restraint System of each model, the period of time specified to wait after removal of the battery terminal now varies (from 20–90 seconds).

SRS service waiting time specification

To avoid a potential error during servicing of the SRS, the waiting time is being standardized for all models to 90 seconds regardless of what the specification is in the applicable repair manual. Work should not be started until after 90 seconds has passed from the time the ignition switch is turned to the lock position and the negative (–) terminal of the battery has been disconnected.

LEXUS

TECHNICAL SERVICE INFORMATION

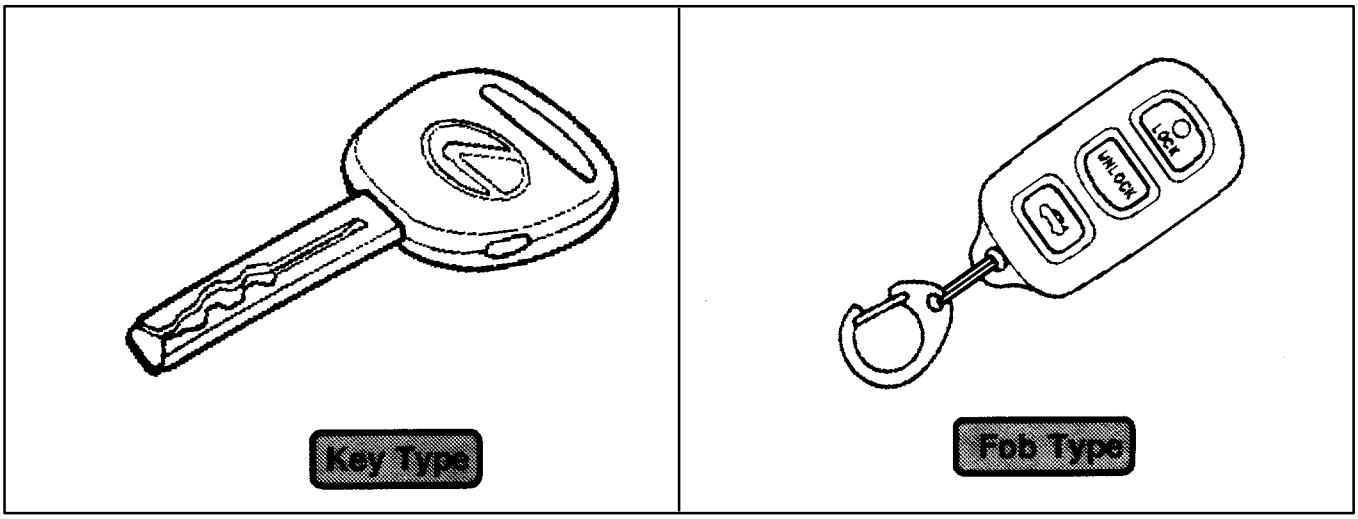
REF: ELECTRICAL

NO: EL003–96

DATE: AUGUST 9, 1996

MODEL: LS 400, GS 300, SC 300, SC 400, ES 300

The following information applies to all 1996 and previous models, except the LX 450, and to both transmitter types shown below:



FEATURES AND LIMITATIONS:

The following features and limitations of Lexus wireless door lock control systems must be thoroughly understood before proceeding with diagnosis.

In the following information, the word **"transmitter"** is used to describe the signal generating device that is an integral part of the key or fob and **"receiver"** is used to describe the wireless door lock ECU.

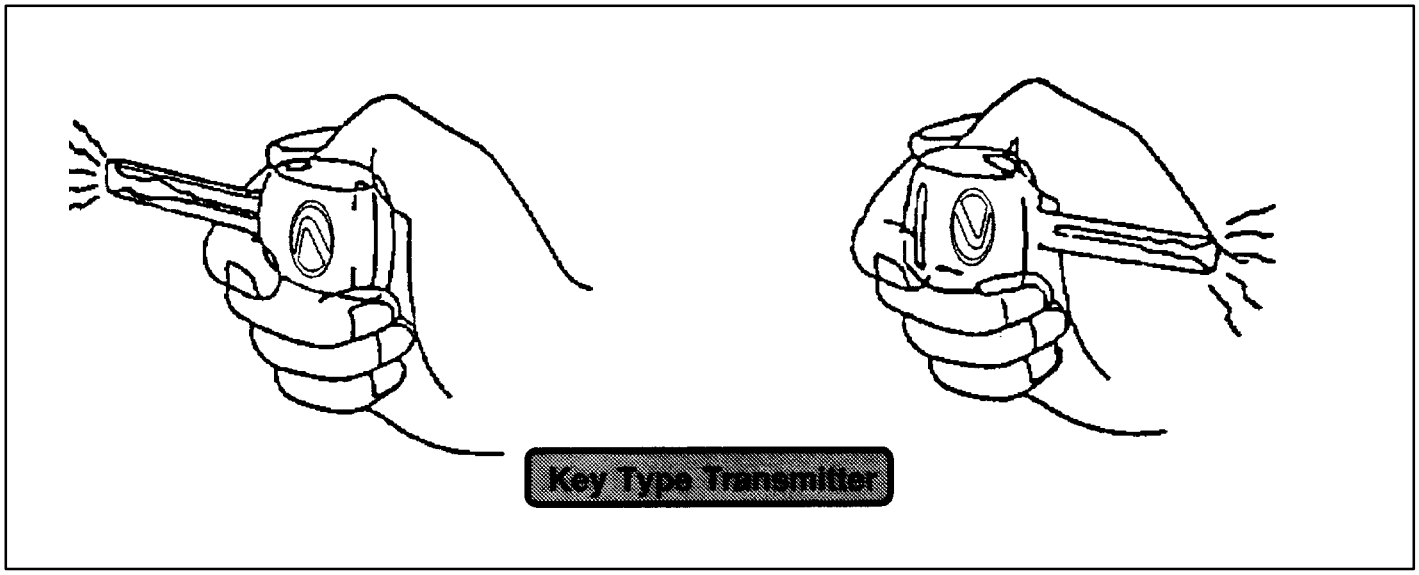
TRANSMITTER CHARACTERISTICS AND RANGE:

1. Weak radio frequency (RF) waves are used by the transmitter to operate the wireless door lock control system. Strong radio waves or RF noise from other sources may shorten the operating distance or prevent operation.

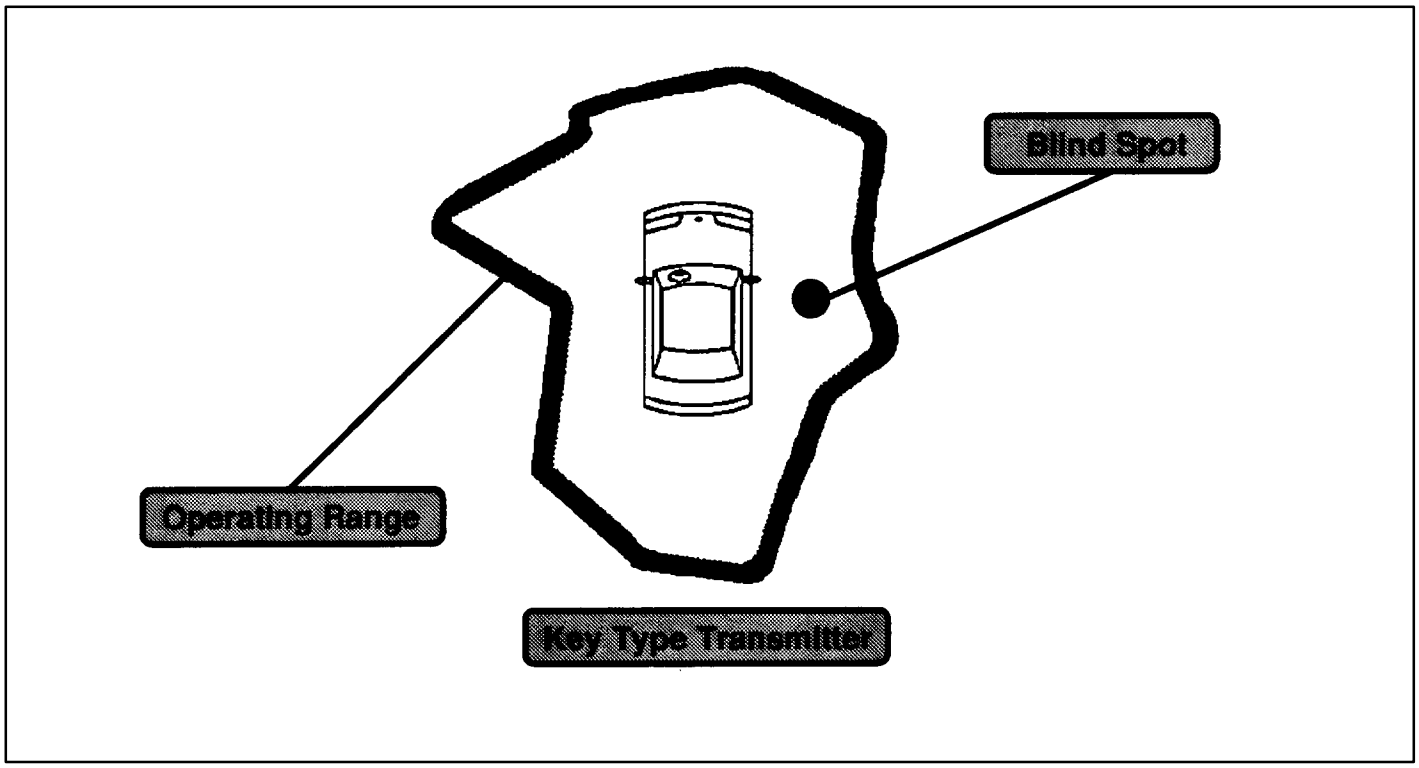
2. When the transmitter battery is weak, operation may be normal for the first one or two activations and then stop as the remaining battery capacity is depleted.

TRANSMITTER CHARACTERISTICS AND RANGE (Cont'd):

3. On key type transmitters, the metal portion of the key serves as an antenna during transmitter operation. For optimum performance, the path between the metal portion of the key and the vehicle should not be obstructed by the operator's hand or other objects.



4. On key type transmitters, the operating distance of the transmitter varies from front to back and side to side as shown below.



NOTE: Diagram represents only a generalized view which may vary depending on the model and operating conditions. Fob type transmitters accommodate a larger transmitter and battery which typically provide increased operating range.

SPECIAL FUNCTIONS:

1. Transmitter Auto Power Off Function *:

Transmitting stops automatically after continually pressing the transmitter button for a fixed amount of time.

- Key type transmitter *: 0.8 – 1.2 seconds
- Fob type transmitter: approximately 10 seconds

***** This power saving feature was added to key type transmitters after the following VINs:

PRODUCTION EFFECTIVE:

MODEL	VIN
SC 300	JT8JZ31C**0017065
SC 400	JT8UZ30C**0035393
GS 300	JT8JS47E**0021034
LS 400	JT8UF11E**0145224
ES 300	JT8GK13T**0001033

2. Auto Lock Function:

If the vehicle is unlocked with the transmitter, the doors will automatically relock if no door is opened within 30 seconds.

3. Chatter Prevention Function:

When the receiver picks up the correct specified code the first time, it rejects subsequent code signals. It stops reception until transmission is suspended for 0.5 seconds or longer to prevent door lock chattering.

4. Transmitter Switch Misoperation Prevention Function:

When the ignition key is in the ignition key cylinder, the receiver will suspend signal reception.

WIRELESS DOOR LOCK CONTROL SYSTEM DIAGNOSIS:

IMPORTANT: All wireless diagnosis must start at this point and proceed as directed. Diagnostic information from this point forward assumes that all preceding steps have been properly performed. If steps are performed improperly or started beyond this point, an erroneous diagnosis may be obtained.

Start here by performing the following power door lock control and theft deterrent system checks:

1. Verify that both interior power door lock control switches will lock and unlock **all** doors.
2. Verify that driver and passenger door key locks will lock and unlock* **all** doors.
3. Verify that the theft deterrent system will arm when all doors are closed and locked.

***** Driver's door key lock must be cycled twice to unlock all doors.

If any of the above items do not operate normally, refer to either the (Power) Door Lock Control System or Theft Deterrent System section of the repair manual for diagnosis. The wireless feature is an enhancement to the power door lock control system and is dependent on proper operation of the power door lock control and theft deterrent systems.

Choose the applicable problem area from the chart shown below and refer to the listed procedure for diagnosis.

Matrix Chart Of Problem Symptoms:

PROBLEM	PROCEDURE	PAGE NUMBER
Wireless inoperative at all times	A	5
Wireless intermittently inoperative	B	7
Wireless has reduced operating distance	B	7
Wireless inoperative at specific locations	C	8

PROCEDURE A – WIRELESS INOPERATIVE AT ALL TIMES:

1. Check battery capacity (See Page 9 – Battery Capacity Check Procedure).

2. Set FM radio to 94.9 MHz* and press the transmitter button while holding transmitter near radio antenna. If noise interference cannot be heard on the radio when the transmitter is depressed, the transmitter is faulty. This test is only used to identify a faulty transmitter, a positive result does not guarantee transmitter integrity or sufficient battery capacity.

* **This test cannot be performed on and does not apply to vehicles equipped with a fob type transmitter which uses a frequency that does not have a multiple in the FM frequency range.**

REMINDER: Transmitters equipped with the Auto Power Off Function quit transmitting 0.8 – 1.2 seconds after depressing the transmitter button (see Page 3).

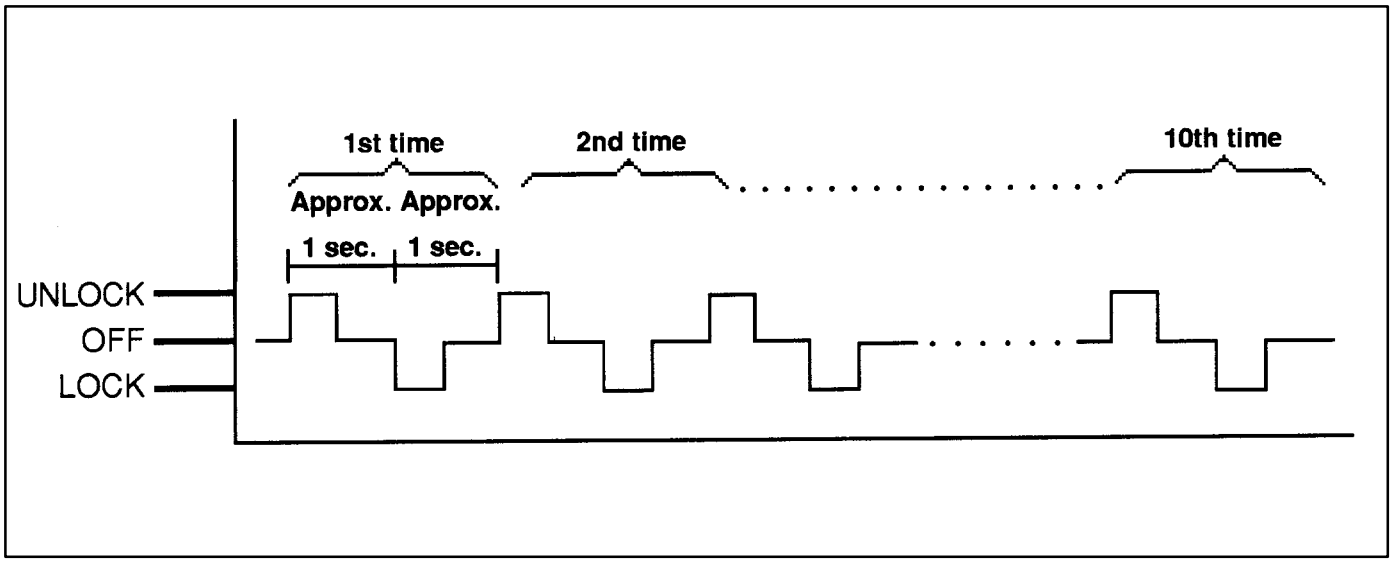
3. Enter diagnostic mode:

   a. Open driver's door.

   b. Lock all doors using the interior power door lock switch.

   c. Insert key in ignition once and remove.

   d. Cycle the door locks (unlock and lock = 1 cycle) using the interior power door lock switch 10 times as shown below (if door locks are cycled too slow or too fast, diagnostic mode will not be initiated).



4. Door locks should cycle (unlock/lock) one time automatically to confirm that diagnostic mode has been entered. If door locks do not cycle, repeat Step 3.

NOTE: If attempts to enter the diagnostic mode fail repeatedly, faulty vehicle harness wiring or a faulty receiver may be the cause. Refer to Matrix Chart of Problem Symptoms in the Wireless Door Lock Control System section of the repair manual for diagnosis.

PROCEDURE A – WIRELESS INOPERATIVE AT ALL TIMES (Cont'd):

5. Within 10 seconds of entering diagnostic mode, press the transmitter button once and count the number of door lock (unlock/lock) cycles. Refer to the applicable chart below:

Non–Programmable Type (Pre–1995):

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Wireless antenna, receiver or vehicle wiring harness problem	First perform antenna check (Page 12). If antenna is OK, refer to "Wireless Door Lock Control System" section of Repair Manual for diagnosis.
1	Mismatched key and ROM	Replace key and ROM.
2	Faulty transmitter	Replace transmitter.

Programmable Key Type (1995 and later):

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Wireless antenna, receiver or vehicle wiring harness problem	First perform antenna check (Page 12). If antenna is OK, refer to "Wireless Door Lock Control System" section of Repair Manual for diagnosis.
1	Normal	None
2	Transmitter not registered	Key Registration (see Page 11)

Programmable Fob Type (1995 and later):

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Faulty transmitter or receiver	Continue with procedure below
1	Transmitter not registered	Key Registration (see Page 11)

Repeat diagnostic mode initiation procedure (Steps 3 through 5) with a known good tranmitter. Do **NOT** register the transmitter first. Count the number of door lock cycles (unlock/lock) and refer to the table below:

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Faulty reciever	Replace
1	Original transmitter faulty	Replace original transmitter

PROCEDURE B – WIRELESS IS INTERMITTENTLY INOPERATIVE OR HAS REDUCED OPERATING DISTANCE:

1. Review the Transmitter Characteristics and Range section on Pages 1 and 2.

2. Check battery capacity (see Page 9 – Battery Capacity Check Procedure).

3. Inspect wireless antenna* (see Page 12 – Wireless Antenna Inspection Procedure).

***** This step only applies to key type transmitters (see illustration below). Fob type transmitter systems use an internal antenna in the receiver (1995 and later LS 400 and 1996 and later SC 300/400).

4. If a complaint of intermittent operation **can** be verified, the transmitter is faulty.

5. If a complaint of intermittent operation **cannot** be verified, check for intermittent sticking of the unlock warning switch using the following method:

   a. Insert key in ignition.

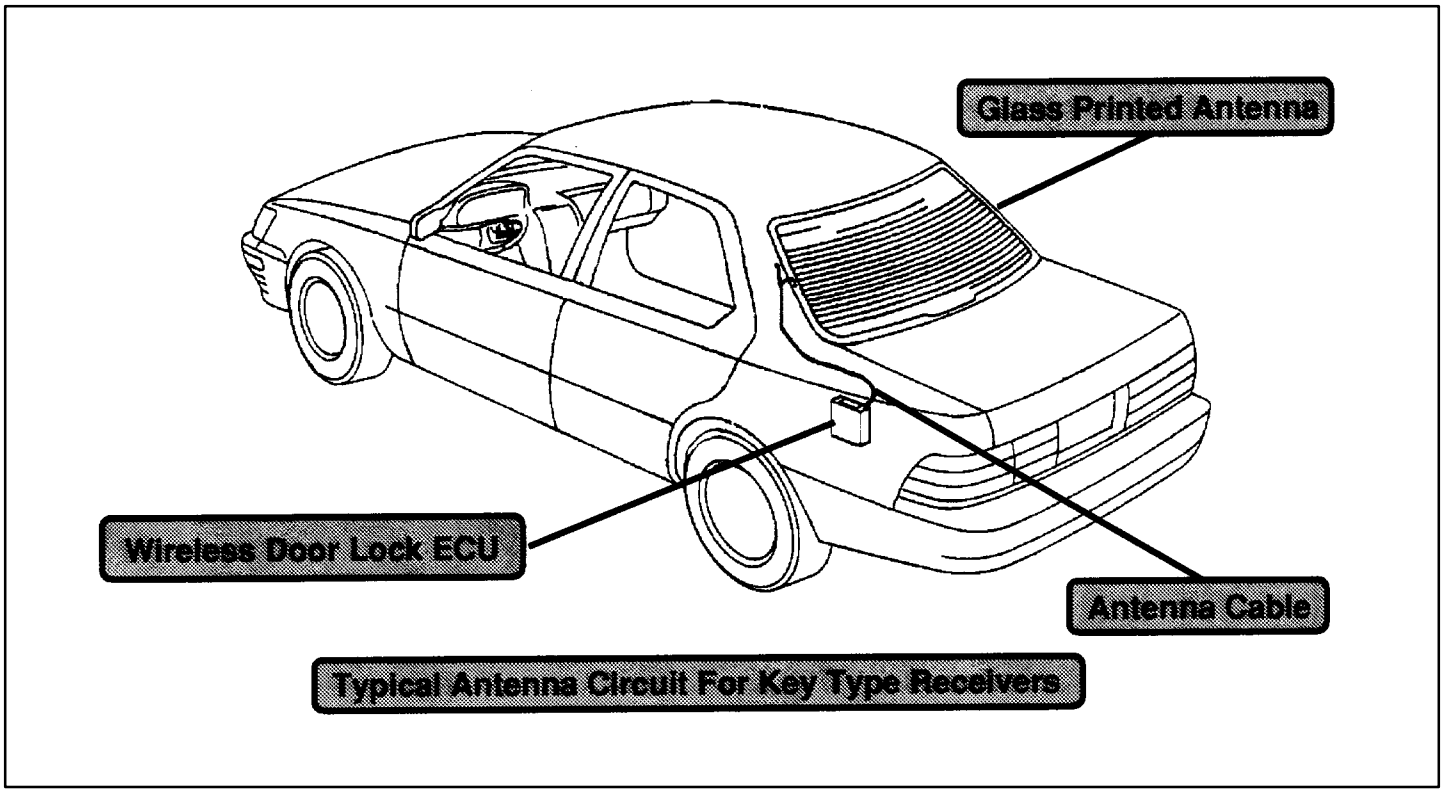
   b. Turn ignition switch from lock to accessory and back to lock.

   c. Remove key.

   d. Check remote lock/unlock operation.

   e. Repeat steps “a” – “d” at least 10 times.

   If remote becomes inoperative during step “d”, unlock detection switch or ignition key cylinder is faulty.



PROCEDURE C – WIRELESS INOPERATIVE AT SPECIFIC LOCATIONS:

This procedure is used to check for the presence of electrical interference at specific locations that may interfere with wireless transmitter/receiver operation. This test is used only to verify the presence of electrical interference at a specific location and **does not** lead to a repair.

IMPORTANT: Verify that the wireless door lock control system operation is normal in **non–compliant areas**. If the system is inoperative at all locations, do not continue with this procedure, refer to Procedure A – Wireless Inoperative At All Times.

Perform the following procedure in the area where the problem is occurring:

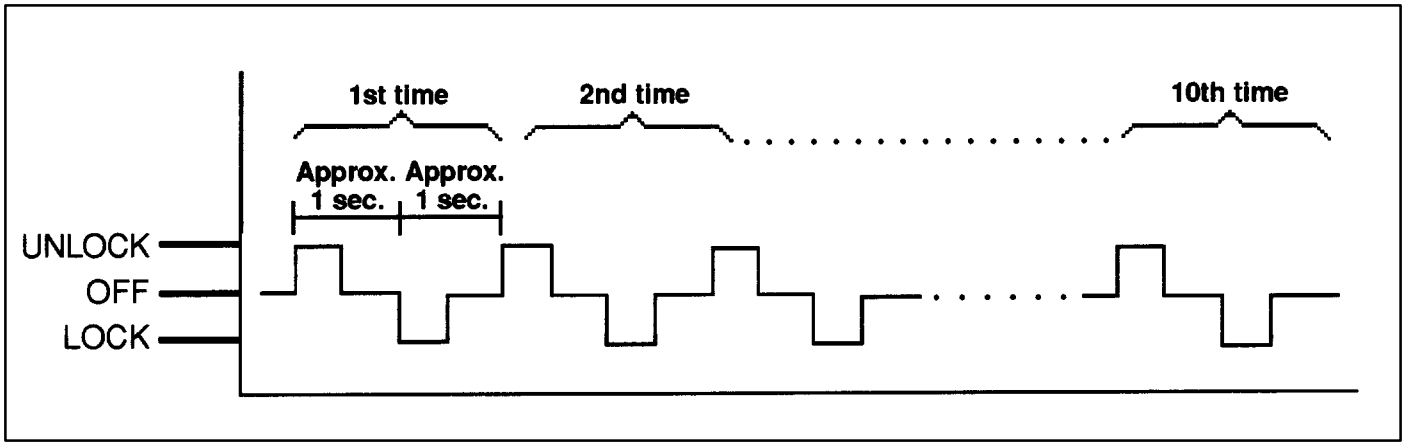
1. Enter the diagnostic mode:

   a. Open the driver's door.

   b. Lock all doors using the interior power door lock switch.

   c. Insert key in ignition once and remove.

   d. Cycle the door locks (unlock and lock = 1 cycle) using the interior power door lock switch 10 times as shown below (if door locks are cycled too slow or too fast, diagnostic mode will not be initiated).



2. Door locks should cycle (unlock/lock) one time automatically to confirm that diagnostic mode has been entered. If door locks do not cycle, repeat Step 1.

3. Within the next 10 seconds, count the number of door lock (unlock/lock) cycles and refer to the chart below:

DOOR LOCK CYCLES	DIAGNOSIS
0	No interference at this time
1 or 2	Outside electrical interference

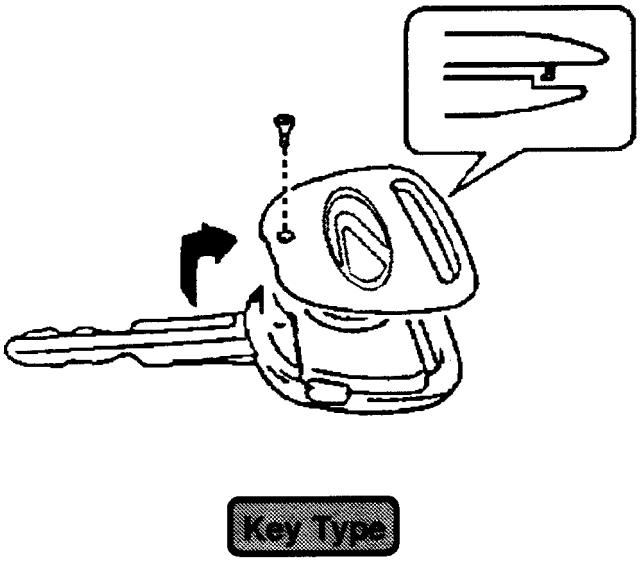
BATTERY CAPACITY CHECK PROCEDURE:

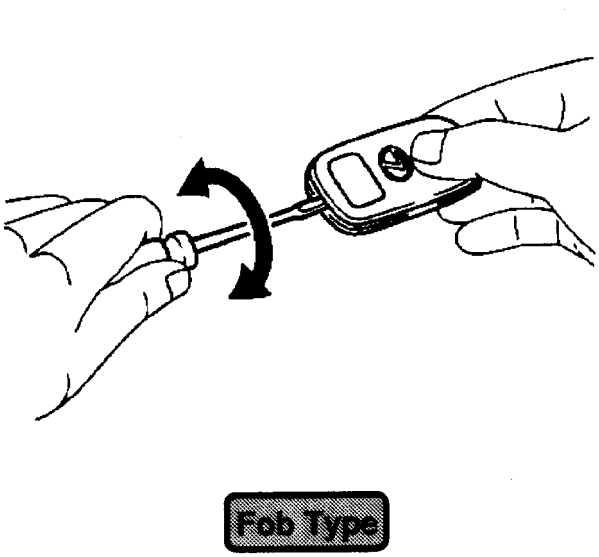
The lithium battery used in the transmitter will measure a voltage of 2.5 volts or more until the battery capacity is fully consumed. To accurately determine the remaining battery capacity, a load must be applied.

NOTE: Make all battery checks at room temperature (low temperatures may adversely affect output).

1. Key Type Transmitters:
   Remove screw, pry cover up slightly, and push cover away from portion of the key.

   Fob Type Transmitters:
   Insert a screwdriver and twist to remove cover.



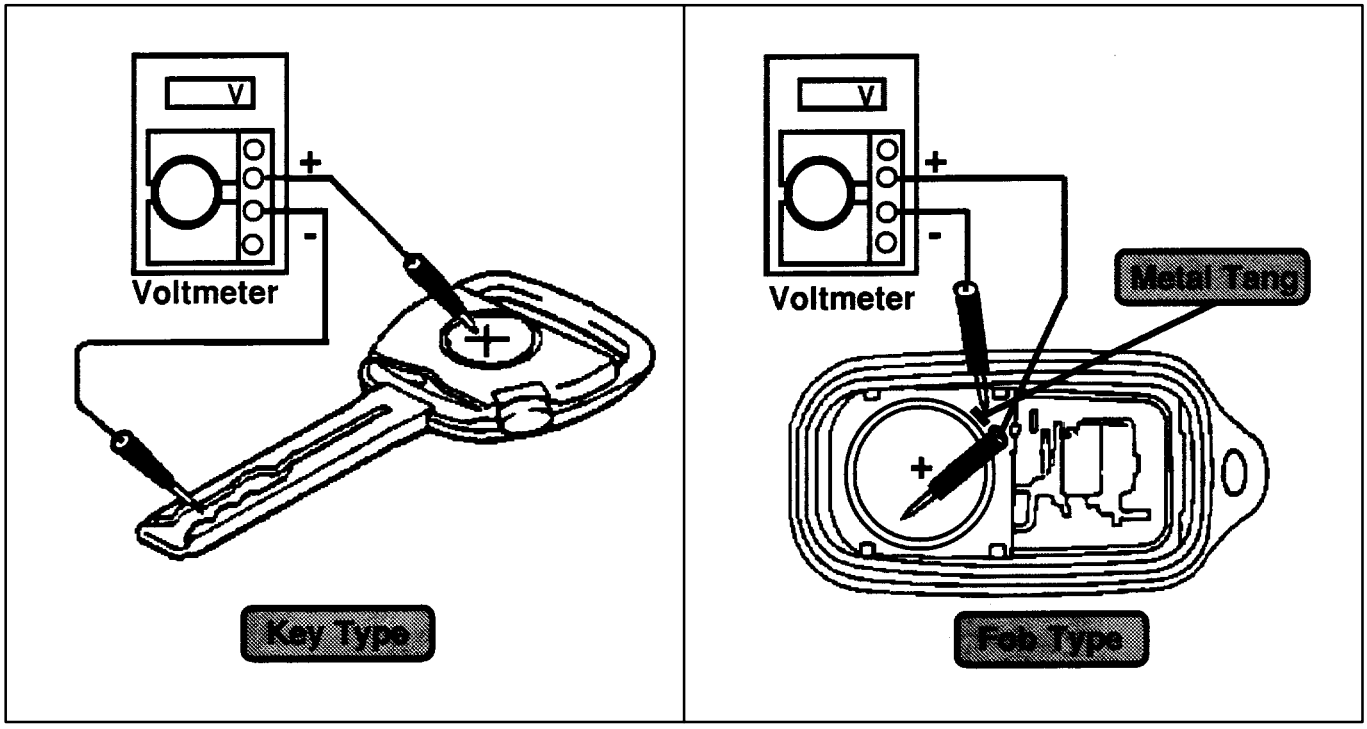


2. Inspect the battery terminals, transmitter case, and cover for corrosion or visible damage. Replace transmitter if necessary.

3. Depress the transmitter button for 1 second and then release for 1 second. Repeat this process 5 times.

BATTERY CAPACITY CHECK PROCEDURE (Cont'd):

4. Connect the positive (+) lead from the tester to the transmitter battery (+) and the negative (–) lead as shown.



5. Depress the transmitter button again and measure the voltage. Verify that the voltage drops when the transmitter button is depressed (no voltage drop may indicate a faulty transmitter). Transmitters equipped with the Auto Power Off Function (see Page 3) will only load the battery for 0.8 – 1.2 seconds after the transmitter button is depressed (voltage must be checked during this time). If loaded battery voltage is below 2.1 volts, replace the battery.

BATTERY INFORMATION:

TRANSMITTER TYPE	BATTERY PART NUMBER	BATTERY TYPE
Key	89706–50010	BR 1216
Fob	89745–50010	CR 2016

KEY REGISTRATION (1995 AND LATER MODELS):

Set initial conditions:

- Key out of ignition
- Driver's door open and unlocked
- All other doors closed and locked

Registration Procedure:

NOTE: Perform all steps with no more than a five second interval between steps.

1. Insert key into ignition for 1 second and remove.
2. Cycle (lock and unlock = 1 cycle) the driver's interior power door lock switch 5 times (1 second in each position).
3. Close and reopen driver's door.
4. Cycle the driver's interior power door lock switch 5 times (1 second in each position).
5. Insert key into ignition and cycle the ignition on and off:
   - One time to add a new code.
   - Two times to add a new code and erase all previously stored codes.
   - Three times to check how many codes are currently registered.
6. Remove key from ignition. Receiver should respond by cycling the door locks a corresponding number of times:
   - One time to add a new code.
   - Two times to add a new code and erase all previously stored codes.
   - One to four times (slowly) to indicate how many codes are registered (end).

NOTE: If no response is given, start over at the beginning of this procedure.

7. Press the transmitter button (any button on fob type transmitters) for 1 second.

NOTE: Receiver should respond by cycling door locks once. If no response is given, start over at the beginning of this procedure.

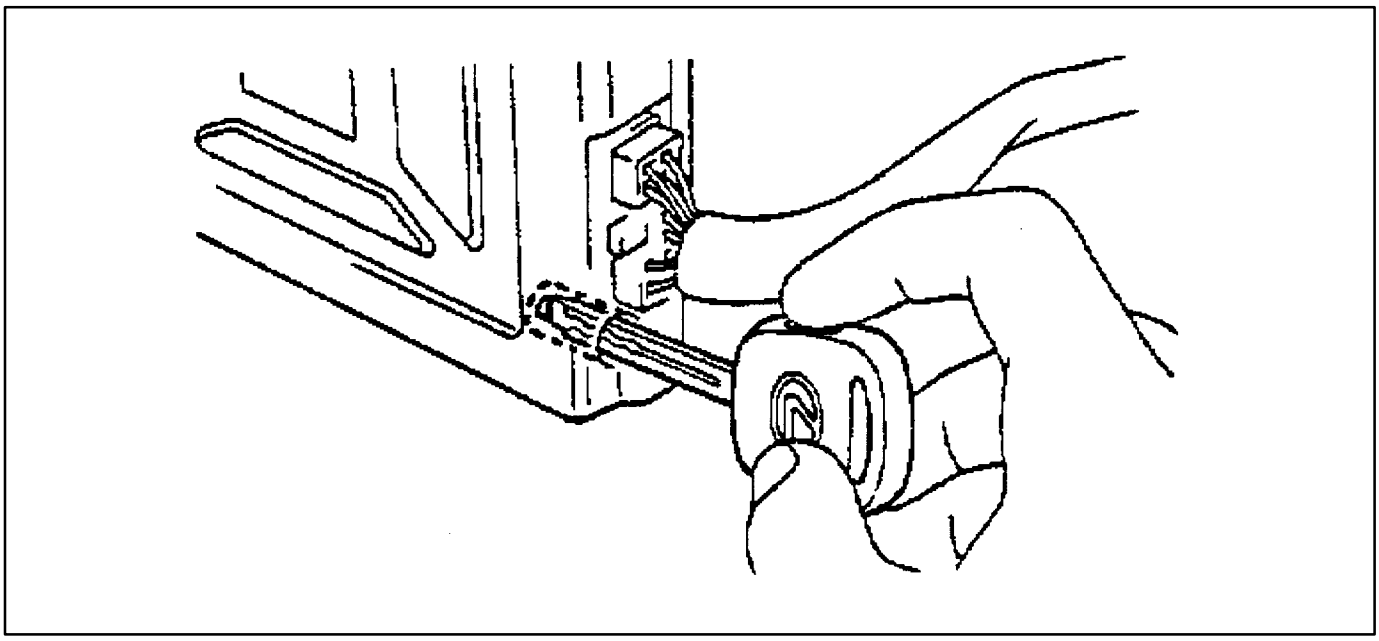
8. Close and reopen driver's door.
9. Press the transmitter button for 1 second. Receiver should respond by cycling door locks:
   - One time to confirm operation is complete.
   - Two times to signal that the code is already registered.

WIRELESS ANTENNA INSPECTION PROCEDURE:

If wireless operation is verifiably inoperative, use **Procedure A**, otherwise use **Procedure B**.

Procedure A:

Remove antenna cable from receiver. Insert key into receiver antenna port as shown below. Press transmitter button several times while monitoring door lock operation.



If door locks are still inoperative, the antenna circuit is not the primary problem.

If door lock operation is consistent:

1. Inspect rear glass for damaged or broken wires and replace glass if necessary.
2. If rear glass is OK, replace wireless antenna cable.

Procedure B:

Perform the following checks:

1. Inspect rear glass for damaged or broken wires and replace glass if necessary.
2. Inspect antenna cable connections at rear glass and at receiver.
3. Physically inspect antenna cable for pinches or breaks and replace cable if necessary.
4. Check continuity through inner coaxial cable wire and replace cable if necessary.

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
891101	Transmitter replacement includes key registration or installation of the ROM in the ECU where applicable and all necessary checks and tests	0.3	897XX–50XXX	95	71
EL6002	For VCV10 Transmitter replacement includes the ROM in the ECU where applicable and all necessary checks and tests	0.2	897XX–50XXX	95	71
EL6003	Receiver replacement including all necessary checks and tests	0.3	5974X–50XXX	95	71
830651	Ignition key cylinder R&R including all necessary checks and tests	*	84450–XXXXX	72	71
672101	Door key (unlock/lock) switch R&R including all necessary checks and tests	*	69052–XXXXX	95	71

NOTE: Replacement of the transmitter battery is not warrantable as per the Lexus Warranty Policy & Procedures Manual.

***** Refer to the specific model in the Lexus Flat Rate Manual for repair time.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: ELECTRICAL

NO: EL004–96

DATE: OCTOBER 11, 1996

MODEL: ES 300

Title **'92 – '96 ES 300 CD CHANGER WILL NOT EJECT MAGAZINE**

'92 through '96 ES 300 CD changer door may not open due to misalignment of the carpeted trim cover (P/N 86276–33010) that is placed on top of the CD changer. The cover may contact the CD changer door at the top and the side closest to the driver side fender as indicated in Figure 1.

The CD changer cover may become misaligned due to luggage or other objects bumping into the CD changer and cover.

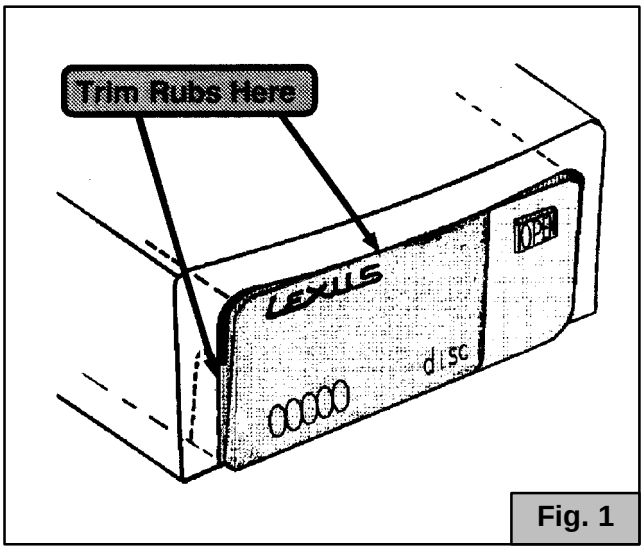


Fig. 1

PROCEDURE:

Check the following if the CD magazine will not eject:

1. Push the "OPEN" button and listen for the door open solenoid.
2. If the solenoid makes a click sound but the door does not open, make sure that the CD door is free from interference.
3. Make sure that the clips are on correctly so the cover will stay in place (Figure 2).

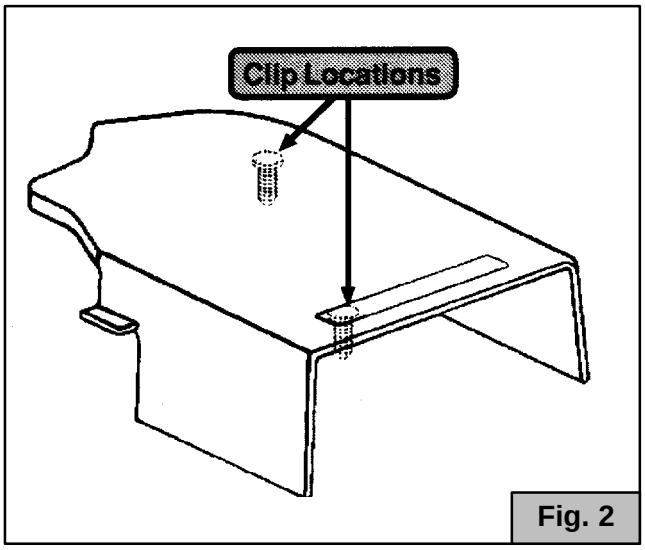


Fig. 2

Lexus Supports ASE Certification

PART NUMBER INFORMATION:

PART NUMBER	PART NAME	QTY
86276–33010	Cover, CD Changer	1
90467–10154	Clips	2
86275–33010	CD Changer	1

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
EL6004	ES 300 CD Changer Adjustment	0.2	86276–33010	95	83

Applicable Warranty Coverage: 12 Months or 12,500 Miles.

Title **1993 PAINT AND REFINISH CODES (UPDATED)**

The following is a listing of 1993 Lexus paint codes and corresponding refinish formula codes for 7 (seven) refinish paint companies — BASF, DuPont, PPG Industries, Sherwin Williams, Spies Hecker, Sikkens and Herberts–Standox (Paint and refinish formula codes are located on page 2.).

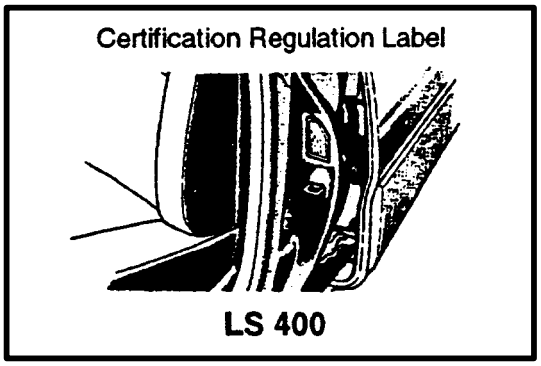
SIKKENS AND HERBERTS PAINT AND REFINISH FORMULA CODES:

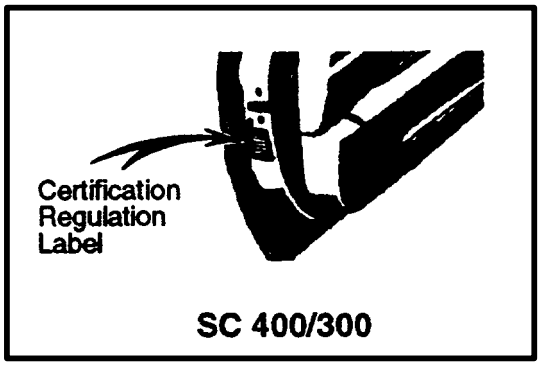
- For **SIKKENS** paint formulas, add "LEX" to the factory paint code.

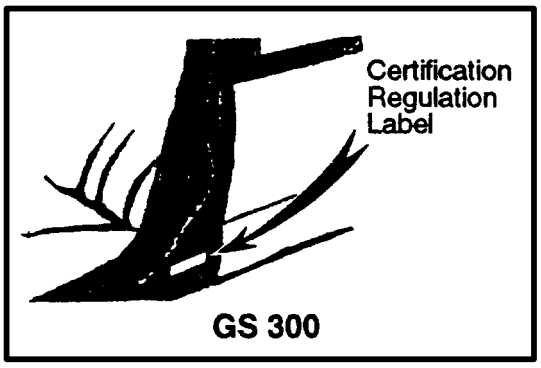
  Example: Lexus color code 202 becomes "LEX202."

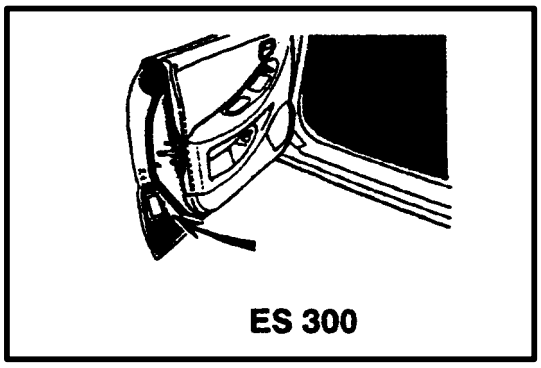
- **HERBERTS** uses the Lexus color code number as their paint code identification number. Example: The Herberts–Standox paint code number for Lexus color code 202 (Black) is 202.

NOTE: The body color code is indicated on the Certification Label which is located in the door area as shown below.









Contact Your Local Paint Representative For The Actual Paint Mixing Formulas Or For Additional Assistance On Color Matching.

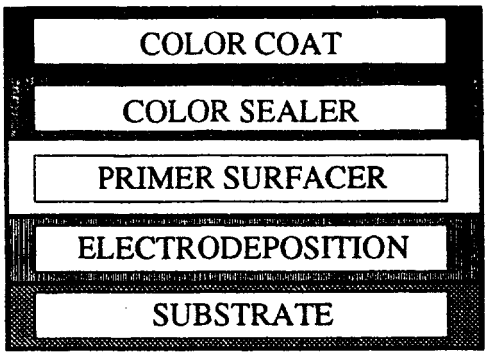
Please Provide A Copy Of This Information To Your Lexus Collision Repair Center.

BODY/ CLADDING	BODY COLOR NAME	BASF GLASURIT	DU PONT CRONAR	PPG DBU–DELTRON	SHERWIN WILLIAMS ULTRABASE	SPIES HECKER ––––––––
046 178	OPAL WHITE PEARL SILVER METALLIC	21225 TOY178	L9339(B) L9340(P) L9055	4397(B) 4398(P) 35706	44335(B) 44366(P)	10721 70763
051 UCA29	PEARL WHITE BASE SILVER METALLIC	TOY051 20563	L9246(B) L9247(P) H9399	90822(B) 90826(P) 85075	42872(B) 42873(P) 44105	98125 99418
172 UCA32	COBALT BLUE METALLIC DARK GRAY METALLIC	TOY172 20561	N8989 K9304	17099 35086	43477 44157	98226 99413
176 UCA31	SILVER MIST METALLIC LIGHT GRAY METALLIC	TOY176 20564	L9022 K9301	34692 35073	40888 44104	97244 99412
180 UCA31	FLINT GRAY PEARL SAPPHIRE METALLIC	TOY180 20562	N9199 H9398	34879 35060	42874 44155	98139 99424
182	BLUISH GRAY MET.	TOY182	L9241	34880	42867	98128
183	BLUE SLATE METALLIC	TOY183	K9318	35189	44338	70761
199	ALPINE SILVER MET.	TOY199	L9990	35710	48976	70762
202 UCA31	BLACK ONYX SAPPHIRE METALLIC	PKG1240 20562	99 H9398	09300 35060	01738 44155	79335 99424
3H8 3H8	BURGUNDY PEARL DEEP RED MICA	TOY3H8 20355	N9217 L9329	51504 73618	43480 43480	98798 98798
3H9 UCA33	TAUPE METALLIC DARK ROSE METALLIC	TOY3H9 20566	L9237 K9302	34881 51536	42875 44101	98141 99415
3J8	PRUSSIAN RED PEARL	TOY3J8	W9463	04596	46590	30208
3K1 UCA47	DK AMETHYST PEARL DK GRAY PURPLE MET.	TOY3K1 TOYUA47	W9435 H9753	04404 35425	45211 46755	99005 91348
3K3 138	GARNET RED PEARL DARK GRAY METALLIC	TOY3K3 TOY138	W9512 N8118	04478 33694	45929 32876	99681 94742
3K7 UCA47	SHADOW ROSE QTZ. DK GRAY PURPLE MET.	TOY3K7 TOYUA47	H9650 H9753	04615 35425	46620 46755	99745 91348
4J1 UCA46	ALMOND BEIGE MET. LIGHT GRAY BEIGE MET.	TOY4J1 TOYUA46	N9215 H9752	26847 27345	43481 46754	98197 91344
4K9	SANDSTONE BEIGE MET.	TOY4K9	N9216	26846	43482	98224
6K4	BLACK JADE PEARL	TOY6K4	N9259	46599	43483	98227
6M1 UCA45	DARK EMERALD PEARL DARK GRAY METALLIC	TOY6M1 TOYUA45	W9542 L9708	04595 35461	46589 46960	99746 92044
6M2	ROYAL JADE PEARL	TOY6M2	W9513	04476	45930	99680
6M3	SILVER SPRUCE MET.	TOY6M3	W9514	04474	45931	99679
8J4 UCA45	FROSTED SAPPHIRE DARK GRAY METALLIC	TOY8J4 TOYUA45	W9543 L9708	04600 35461	46592 46960	90398 92044
8J5	MIDNIGHT INDIGO PC	TOY8J5	W9515	04477	45932	99678
923 UCA54	SILVER TAUPE MET. TAUPE METALLIC	TOY923 TOY9415	W9544 W9890	04602 35637	46594 48522	90400 70574

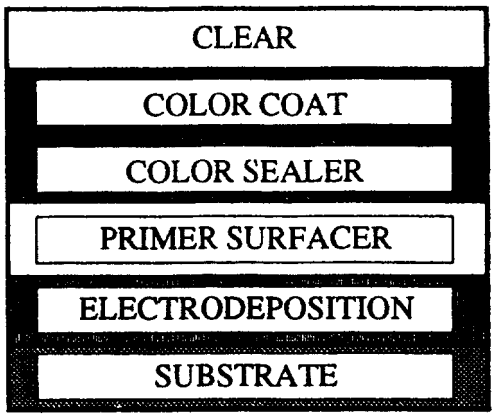
NOTE:
The prefix UCA used for Body Cladding Codes replaces the former prefix UA beginning M/Y 1993. The “C” stands for clear coat.

	Model Application					
	LS 400	GS 300	ES 300	SC 400	SC 300	PAINT TYPE
046						**4**
051						**4**
176						**2**
180						**2**
182						**7**
183						**7**
202						**1**
3J8						**7**
3K1						**2**
3K3						**2**
3K7						**2**
4J1						**2**
4K7						**7**
4K9						**2**
6K4						**5**
6M1						**2**
6M2						**3**
6M3						**2**
8J4						**2**
8J5						**6**
923						**7**

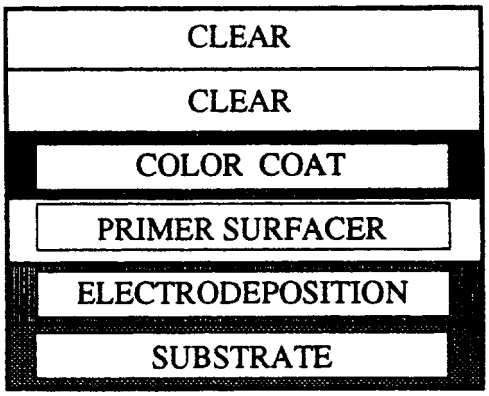
PAINT TYPE #1
Solid Color – Non Clear Coat
Codes: 202



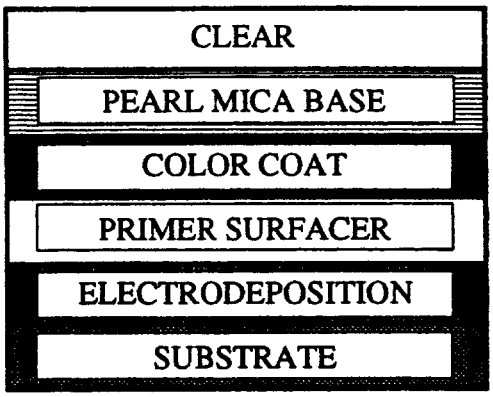
PAINT TYPE #2
Metallic or Mica Color – Clear Coat
Codes: 176, 180, 182, 3K1, 3K3, 3K7, 4J1, 4K7, 4K9, 6M1, 6M3, 8J4, 923



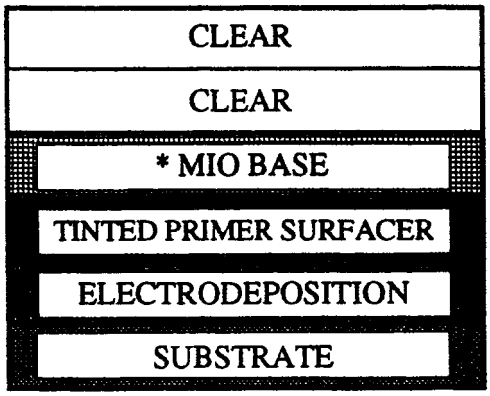
PAINT TYPE #3
Mica Color – Two Clear Coat
Codes: 6M2



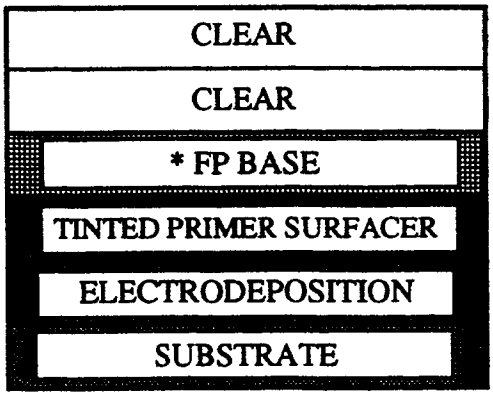
PAINT TYPE #4
Pearl Mica Color – One Clear Coat
Codes: 051



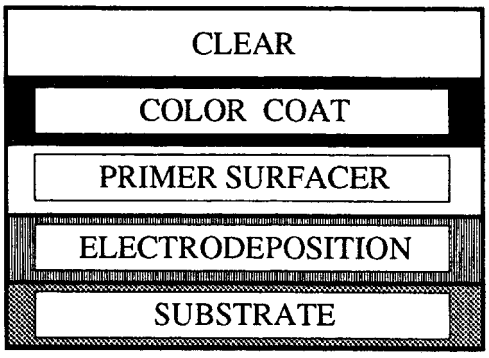
PAINT TYPE #5
Mio Color – Two Clear Coat
Codes: 6K4
* MIO = Micaceous Iron Oxide



PAINT TYPE #6
Flake Phthalocyanine Color – Two Clear Coat
Codes: 8J5
*FP=Flake Phthalocyanine



PAINT TYPE #7
Metallic – Clear Coat
Codes: 182, 183, 3J8, 4K7, 923



BACKGROUND:

Polyurethane bumper covers are formed by forcing liquid plastic material into a mold. Lubricant is added to the mold as a release agent to make it easier to separate the bumper from the mold.

MOLD LUBRICANT CHANGE:

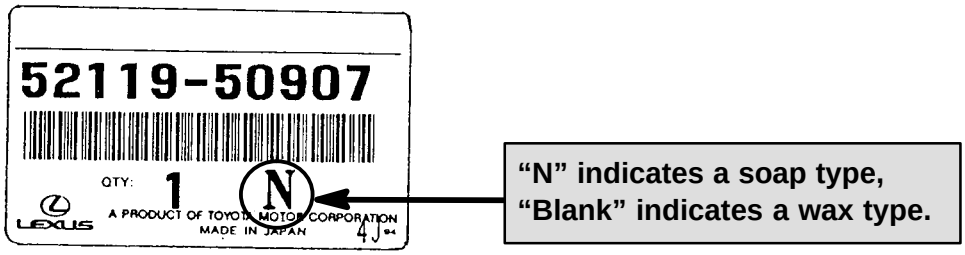
Recently, the mold lubricant (release agent) was changed from a **wax type to a soap type** on OEM supply parts. The wax lubricant was discontinued because wax removal from the bumper surface required the use of trichloroethane.

The new mold lubricant (soap type) is easily removed by using a water based cleaner, such as mild soap and water, and a photochemically non–reactive cleaning agent.

NOTE: Remove wax from wax type lubricant supply parts according to the paint manufacturer's recommendations.

BUMPER IDENTIFICATION:

Supply part bumper covers using Soap Type lubricant were introduced in June 1995. An "N" on the part label identifies the new Soap Type bumpers (see diagram). The "N" identifier on the part number label will be discontinued after July1996.



STANDARD PROCESS:

Washing → Drying → Sanding → Degreasing → Primer Surfacer → Top Coat

For further details on different paint types and application methods, refer to the paint suppliers' Technical Manual.

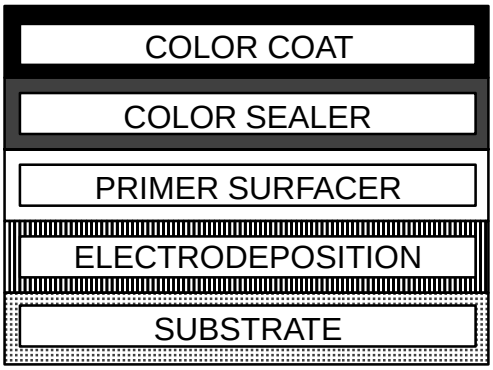
This bulletin provides information about the different types of paint and recommended repair procedures for Lexus vehicles. The actual number of refinish paint coat applications will vary depending upon the pigment, metallic and mica flakes, or the use of a clear coat which can be determined by the paint code on the vehicle. In order to properly make these repairs, the technician must:

Step 1	Locate the paint code on the vehicle.
Step 2	Reference the paint guide for paint code, model and paint type on page 2.
Step 3	Verify paint type on page 3.
Step 4	Reference the recommended repair procedure according to the type of paint on pages 4–8.

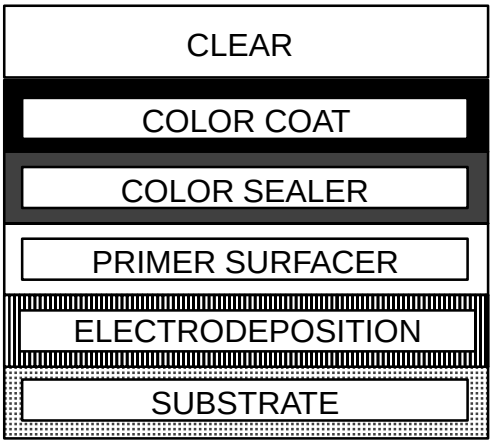
1993 LEXUS PAINT CODES AND APPLICATIONS

Paint Code	Model Application				
	LS400	SC400	SC300	ES 300	PAINT TYPE
051	■	■	■	■	4
176	■				2
180	■				2
182		■	■		2
202	■	■	■	■	1
3K1				■	2
3K3		■	■	■	2
3K7				■	2
4J1				■	2
4K7	■				2
4K9	■	■	■		2
6K4	■				5
6M1				■	2
6M2		■	■		3
6M3		■	■		2
8J4				■	2
8J5	■	■	■		6
923	■				2

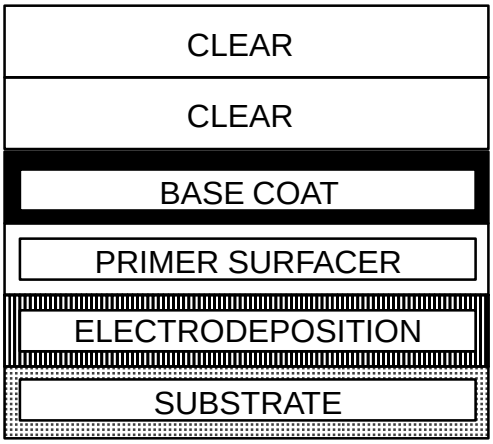
PAINT TYPE #1
Solid Color – Non Clear Coat
Codes: 202



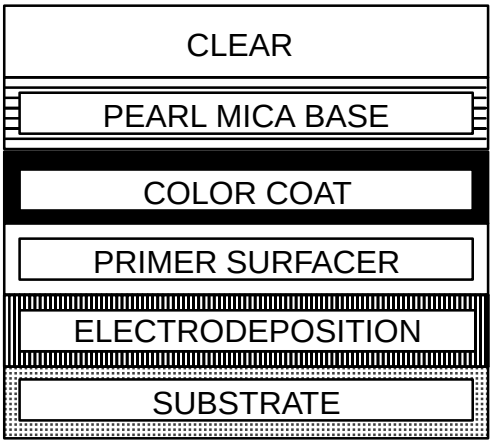
PAINT TYPE #2
Metallic or Mica Color – Clear Coat
Codes: 176, 180, 182, 3K1, 3K3, 3K7, 4J1, 4K7, 4K9, 6M1, 6M3, 8J4, 923



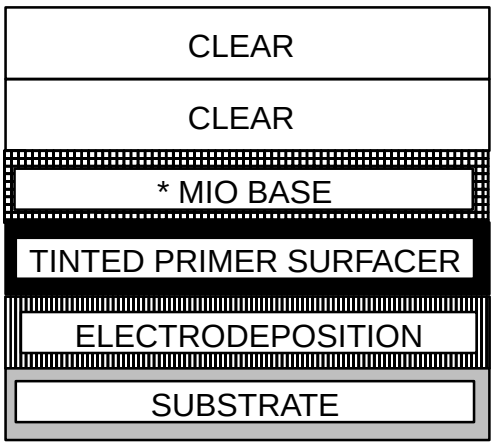
PAINT TYPE #3
Mica Color – Two Clear Coat
Code: 6M2



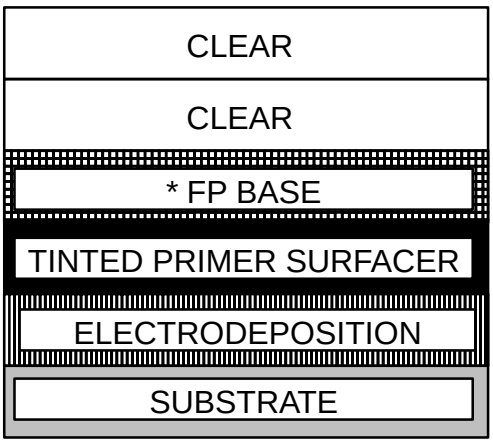
PAINT TYPE #4
Pearl Mica Color – One Clear Coat
Codes: 051



PAINT TYPE #5
Mio Color – Two Clear Coat
Code: 6K4
* MIO = Micaceous Iron Oxide



PAINT TYPE #6
Flake Phthalocyanine Color – Two Clear Coat
Code: 8J5
*FP=Flake Phthalocyanine



APPLICATION PROCESS FOR PAINT TYPE #1
(Solid Color – Non Clear Coat)

MATERIAL	PROCESS	SEQUENTIAL OPERATION PROCEDURE	IMPORTANT POINTS
PRIMER SURFACER	Application of UNDERCOAT	Apply primer–surfacer following manufacturers recommendations. Hand sand after recommended dry time, using 600 grit sandpaper (wet) or power sand using 500 grit sandpaper (dry).	Use a high quality 2 component primer–surfacer. Use of a tintable primer sealer may increase top coat hiding.
COLOR SEALER	Application of UNDERCOAT	Follow manufacturers recommendations.	Sanding not necessary. Follow manufacturers recommended dry time.
COLOR COAT	Application of COLOR TOP COAT	Use a spray–out panel to verify color match. Match texture to surrounding panels. Apply according to paint manufacturer's recommendation.	Apply only urethane color coats. To reduce orange peel use the four following steps: • Use slower evaporating solvent. • Use higher air pressure for better atomization. • Decrease spray gun travel speed. • Decrease spray gun distance to the panel.
	DRYING	Allow proper flash time BEFORE forced drying.	Allow panels to cool down naturally to room temperature before sanding or polishing.
	SANDING	Color sanding of the top coat can be performed, if necessary with 1500/2000 grit sandpaper (wet).	Use clean water with a mild detergent for abrasion resistance. Periodically check sanding progress with a squeegee.
	POLISHING	If necessary, finish the paint film so the adjacent panels have matching texture and luster.	Allow 24 hours dry time. Use a non–aggressive polishing system that eliminates any imperfections.
	EVALUATING	Evaluate your repair with the unrepaired portions of the vehicle.	Customer Satisfaction: if you can see a difference, so will the customer.

APPLICATION PROCESS FOR PAINT TYPE #2
(Metallic or Mica Color – Clear Coat)

MATERIAL	PROCESS	SEQUENTIAL OPERATION PROCEDURE	IMPORTANT POINTS
PRIMER SURFACER	Application of UNDERCOAT	Follow paint manufacturers recommendations. Hand sand after recommended dry time, using 600 grit sandpaper (wet) or power sand using 500 grit sandpaper (dry).	Use a high quality 2 component primer–surfacer. Use of a tintable primer sealer may increase top coat hiding.
COLOR COAT	Application of COLOR TOP COAT	Use a spray–out panel to verify color match. Spray two full wet coats according to instructions. Use air pressure appropriate to conditions.	*Do not over reduce with solvent.* Use the slowest drying solvent your shop conditions will allow.
CLEAR COAT	Application of CLEAR TOP COAT	Match texture to surrounding panels using paint manufacturers recommendations.	To reduce orange peel follow the four following steps: • Use slower evaporating solvent. • Use higher air pressure for better atomization. • Decrease spray gun travel speed. • Decrease spray gun distance to the panel.
	DRYING	Allow proper flash time BEFORE forced drying.	Allow panels to cool down naturally to room temperature before polishing procedures are started (normally 24 hours).
	SANDING	Color sanding of the top coat can be performed, if necessary with 1500/2000 grit sandpaper (wet).	Use clean water with a mild detergent for abrasion resistance. Periodically check sanding progress with a squeegee.
	POLISHING	If necessary, finish the paint film so the adjacent panels have matching texture and luster.	Use a non–aggressive polishing system that eliminates any imperfections.
	EVALUATING	Evaluate your repair with the unrepaired portions of the vehicle.	Customer Satisfaction: if you can see a difference, so will the customer.

APPLICATION PROCESS FOR SECOND CLEAR COAT TYPE #3 (Mica Color – Two Clear Coat)

PROCESS	SEQUENTIAL OPERATION PROCEDURE	IMPORTANT POINTS
CLEAR COAT Application Number 2	Apply two full wet coats of urethane clear ONLY.	Follow paint suppliers recommendations.
DRYING	Allow proper flashatime BEFORE forced drying.	Allow panels to cool down naturally to room temperature before additional repair procedures are started.
POLISHING	Allow at least 24 hours before polishing.	Use the least aggresive method to eliminate any imperfections.
ORANGE PEEL	Evaluate according to the unrepaired portions of the vehicle and the written evaluation criteria on page 3 of this bulletin.	To reduce orange peel follow the four following steps: • Use slower evaporating solvent. • Use higher air pressure for better atomization. • Decrease spray gun travel speed. • Decrease spray gun distance to the panel.

APPLICATION PROCESS FOR PAINT TYPE #4
(Pearl Mica Color – One Clear Coat)

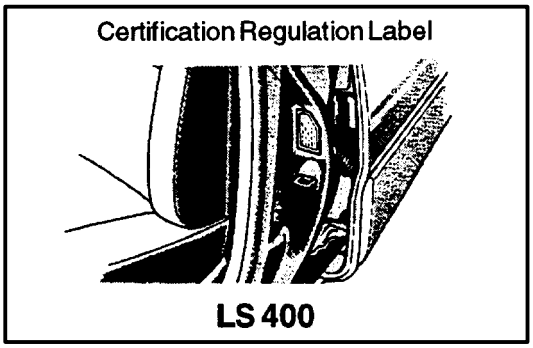
MATERIAL	PROCESS	SEQUENTIAL OPERATION PROCEDURE	IMPORTANT POINTS
PRIMER SURFACER	Application of UNDERCOAT	Follow paint manufacturers recommendations. Hand sand after recommended dry time, using 600 grit sandpaper (wet) or power sand using 500 grit sandpaper (dry).	Use a high quality 2 component primer–surfacer. Use of a tintable primer sealer may increase top coat hiding.
COLOR COAT	Application of COLOR TOP COAT	Apply urethane top coats only. Follow paint manufacturers recommendation. Manually sand with 600 grit sandpaper (wet).	*Do not over reduce with solvent.*
PEARL/MICA	Application of PEARL/MICA TOP COAT	Follow paint manufacturer's recommendations. Apply ONLY urethane clear coats.	Use spray out panel before applying pearl to vehicle. Paint viscosity should follow paint supplier recommendations.
CLEAR COAT	Application of CLEAR TOP COAT	Apply according to paint manufacturer recommendations.	Paint Viscosity should follow paint supplier recommendations. To reduce orange peel follow the four following steps: • Use slower evaporating solvent. • Use higher air pressure for better atomization. • Decrease spray gun travel speed. • Decrease spray gun distance to the panel.
	DRYING	Allow proper flash time BEFORE forced drying.	Allow panels to cool down naturally to room temperature before polishing procedures are started.
	SANDING	If necessary, use 1500 grit Wet Sand to smooth out orange peel.	Sand with extreme caution so as not to expose base color coat on body character lines.
	POLISHING	If necessary, finish the paint film so the adjacent panels have matching texture and luster.	Use a non–aggressive polishing system that eliminates any imperfections.
	EVALUATING	Evaluate your repair with the unrepaired portions of the vehicle.	Customer Satisfaction: if you can see a difference, so will the customer.

APPLICATION PROCESS FOR PAINT TYPE #5 & #6
Flake Phthalocyanine Color – Two Clear Coat

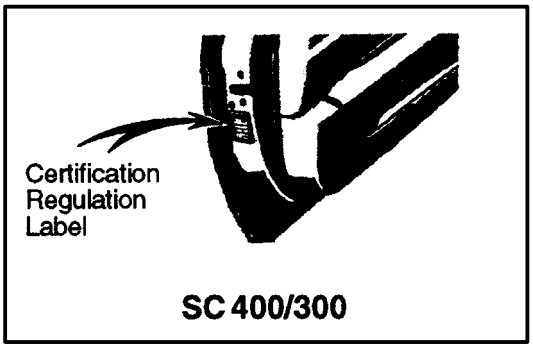
MATERIAL	PROCESS	SEQUENTIAL OPERATION PROCEDURE	IMPORTANT POINTS
PRIMER SURFACER	Application of UNDERCOAT	Follow paint manufacturers recommendations. Hand sand after recommended dry time, using 600 grit sandpaper (wet) or power sand using 500 grit sandpaper (dry).	Use a high quality 2 component primer–surfacer. Use of a tintable primer sealer may increase top coat hiding.
COLOR COAT	Application of COLOR TOP COAT	Use a spray–out panel to verify color match. Spray two full wet coats according to instructions. Use air pressure appropriate to conditions.	*Do not over reduce with solvent.* Use slowest dry solvent shop conditions will allow.
CLEAR COAT	Application of CLEAR TOP COAT	Match texture to surrounding panels using paint manufacturers recommendations.	To reduce orange peel follow the four following steps: • Use slower evaporating solvent. • Use higher air pressure for better atomization. • Decrease spray gun travel speed. • Decrease spray gun distance to the panel.
	DRYING	Allow proper flash time BEFORE forced drying.	Allow panels to cool down naturally to room temperature before polishing procedures are started (normally 24 hours).
	SANDING	Color sanding of the top coat can be performed, if necessary with 1500/2000 grit sandpaper (wet).	Use clean water with a mild detergent for abrasion resistance. Periodically check sanding progress with a squeegee.
	POLISHING	If necessary, finish the paint film so the adjacent panels have matching texture and luster.	Use a non–aggressive polishing system that eliminates any imperfections.
	EVALUATING	Evaluate your repair with the unrepaired portions of the vehicle.	Customer Satisfaction: if you can see a difference, so will the customer.

The following is a list of 1993 Lexus paint codes and corresponding refinish formula codes for 7 (seven) refinish paint manufacturers — BASF, DuPont, Herberts Standox, PPG Industries, Sherwin Williams, Sikkens and Spies Hecker (Paint and refinish formula codes are located on page 2.).

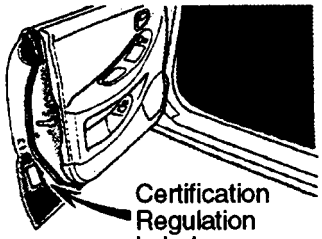
NOTE: The body color code is indicated on the Certification Label which is located in the left door area as shown below.



LS 400



SC 400/300



ES 300

HERBERTS STANDOX PAINT AND REFINISH FORMULA CODES:

- **HERBERTS STANDOX** uses the Lexus color code number as their paint code identification number.

Example: The Herberts Standox paint code number for Lexus color code 202 (Black) is 202.

Contact Your Local Paint Representative For The Actual Paint Mixing Formulas Or For Additional Assistance On Color Matching.

Please Provide A Copy Of This Information To Your Lexus Collision Repair Center.

BODY / CLAD	*BODY COLOR NAME*	*AKZO SIKKENS*	*BASF GLASURIT*	*DU PONT CRONAR*	*PPG DBU– DELTRON*	*SHERWIN WILLIAMS ULTRABASE*	*SPIES HECKER –––––––*
051	PEARL WHITE	LEX051	20318	L9246(B) L9247(P)	90822(B) 90826(P)	42872(B) 42873(P)	98125
UA29	SILVER MET.	LEX9403	20563	H9399	30575	44105	99418
176	SILVER MIST MET.	LEX176	19245	N9022	34692	40886	97244
UA30	LIGHT GRAY MET.	LEX9405	20564	K9301	35073	44104	99412
180	FLINT GRAY PEARL	LEX180	20319	N9199	34879	42874	98139
UA31	SAPPHIRE MET.	LEX9401	20562	H9398	35060	44155	99424
182	GRAY METALLIC	LEX182	20320	L9241	34880	42867	98128
202	BLACK ONYX	LEX202	PKG1240	99	9300	01738	79335
UA31	SAPPHIRE MET.	LEX9401	20562	H9398	35060	44155	99424
3K1	DK AMETHYST PEARL	LEX3K1	21240	W9435	04404	45211	99005
UA47	DK GRAY PURPLE MET.	LEX9411	TOYUA47	H9753	35425	46755	91348
3K3	GARNET RED PEARL	LEX3K3	22304	W9512	04478	45929	99681
138	DARK GRAY MET.	LEX138	TOY138	N8118	33571	32876	94742
3K7	SHADOW ROSE QTZ	LEX3K7	22311	H9650	04615	46620	99745
UA47	DK GRAY PURPLE MET.	LEX9411	TOYUA47	H9753	35425	46755	91348
4J1	ALMOND BEIGE MET.	LEX4J1	20353	N9215	26847	43481	98197
UA46	LIGHT GRAY BEIGE MET	LEX9410	TOYUA46	H9752	27345	46754	91344
4K7	TAUPE METALLIC	LEX4K7	19257	L9036	26606	40901	97750
UCA52	WARM BEIGE METALLIC	LEX9414	23220	W9889	27554	48521	20198
4K9	SANDSTONE BEIGE	LEX4K9	20356	N9216	26846	43482	98224
UC4D3	DARK BEIGE METALLIC	N/A	14301	K9303	25463	44404	20199
6K4	BLACK JADE PEARL	LEX6K4	20351	N9259	46599	43483(B) 43484(P)	98277
UA32	DARK GRAY METALLIC	LEX9401	20562	H9398	35060	44155	99424
6M1	DK EMERALD PEARL	LEX6M1	22312	W9542	04595	46589	99746
UA45	DK GRAY MET.	LEX9412	TOYUA45	L9708	35461	46960	92044
6M2	ROYAL JADE PEARL	LEX6M2	22307	W9513	04476	45930	99680
6M3	SILVER SPRUCE MET.	LEX6M3	22308	W9514	04474	45931	99679
8J4	FROSTED SPRUCE MET.	LEX8J4	22316	W9543	04600	46592	90398
UA45	DARK GRAY METALLIC	LRX9412	TOYUA45	L9708	35461	46960	92044
8J5	MIDNIGHT INDIGO PRL.	LEX8J5	22309	W9515	04477	45932	99678
UCA53	DARK BLUE METALLIC	LEX9413	23194	L9848	18606	47923	50591
923	SILVER TAUPE MET.	LEX923	22318	W9544	04602	46594	90400
UCA54	TAUPE METALLIC	LEX9415	23221	W9890	35637	48522	70574

Replacement VIN plates (riveted to dashboard) and Certification Labels (affixed to driver's door or door post) are available from Lexus providing the request meets one of the following criteria:

- The original label is incorrect (an incorrect Certification Label must accompany the request; an incorrect VIN plate must be returned after receipt of the new one).
- The vehicle is in an accident and the plate or label is damaged or is attached to a part that will be replaced during the repair* (the plate or label to be replaced must accompany the request).
- The plate or label is stolen.* Be sure to contact State Police or the Department of Motor Vehicles; in many cases they will issue a unique number so that the original can be included on stolen vehicle listings. When requesting a new plate or label to replace a stolen one, it is necessary to include a copy of the police or insurance company report.

* *All replacement plates and labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 781–3390.*

To request a replacement plate or label, complete the appropriate portion of the form on the second page. Note that damaged VIN plates or labels must accompany the request form. Your dealer parts account will be billed $10.00 for each replacement of a damaged plate or label. Replacements for incorrect plates or labels will be provided free of charge.

MAIL THE COMPLETED REQUEST FORM WITH THE REQUIRED ENCLOSURE TO:

TOYOTA MOTOR SALES, U.S.A., INC.
TECHNICAL COMPLIANCE DEPT. S203
19001 S. WESTERN AVENUE
TORRANCE, CA 90509–2991

APPLICATION FOR REPLACEMENT CERTIFICATION LABELS OR VIN PLATES

DEALER INFORMATION

Complete this section or your order can NOT be processed!

Dealer Code: ☐☐☐☐☐

Dealer Name: _____

Address: _____

City, State, Zip: _____

Contact Person: _____

Telephone #: _____

REPLACEMENT CERTIFICATION LABEL

Complete this section ONLY if you need a CERTIFICATION LABEL.

REASON FOR REPLACEMENT:

LABEL INCORRECT* ☐ ACCIDENT DAMAGE ☐ STOLEN ☐ (Allow extra time to process)

*Provide correct VIN ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

AFFIX ORIGINAL LABEL HERE OR ATTACH TO THIS FORM

*NOTE: ORIGINAL LABEL **MUST** ACCOMPANY THIS APPLICATION OR THE ORDER CAN NOT BE PROCESSED!*

REPLACEMENT VIN PLATE

Complete this section ONLY if you need a VIN PLATE.

VIN PLATE INCORRECT ☐ *Provide **INCORRECT** and **CORRECT** VIN information*

INCORRECT VIN: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

CORRECT VIN: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

*INCORRECT VIN plate **MUST** be returned after receipt of new VIN plate!!*

VIN PLATE DAMAGED ☐

*Damaged VIN plate **MUST** accompany this application*

Title **STANDARD BOLT TORQUE SPECIFICATIONS**

The following bolt mark and class identification information is currently not included in the Standard Bolt Torque Specifications found in the Introduction section of each Lexus Repair Manual.

BOLT		MARK	CLASS
	(Hexagon flange bolt or Hexagon bolt with washer)	**4 Protruding Lines**	**9T**
	(Hexagon flange bolt or Hexagon bolt with washer)	**5 Protruding Lines**	**10T**
	(Hexagon flange bolt or Hexagon bolt with washer)	**6 Protruding Lines**	**11T**

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
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1300	94	140	1450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1450	105	155	1600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1600	116	175	1800	130

LEXUS

TECHNICAL SERVICE INFORMATION

REF: PRODUCT GENERAL INFORMATION

NO: PG003–96

DATE: MAY 10, 1996

MODEL: ES 300, GS 300, LS 400

Title **PUBLICATION CORRECTION INFORMATION**

Corrections have been made in the Repair Manuals and Electrical Wiring Diagrams listed below. A brief description of each correction is provided. For further details, refer to the appropriate Correction Page (attached to this TSIB for Dealer Area Office distribution). These pages should be attached in the corresponding publication.

NOTE: When ordering a technical publication (i.e. Repair Manual, Electrical Wiring Diagram) from the MDC, any correction Page(s) associated with that particular publication, will be automatically included with your order.

Additional Correction Pages are available through the Dealer Support Material Network (MDC NPM System) via the corresponding part numbers from the following table:

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
'92 ES 300 R/M	RM319U	AC-55	Air Conditioning System – Troubleshooting – (Inspection Procedure) – Step 2 – "OK" Resistance Specification has been revised to: at 20°C (68°F): 65–125 Ohm.	00246-RM319-B3051
'93 GS 300 R/M	RM340U	AC-8	Air Conditions System – Description – (Electric Cooling Fan System) – The schematic contains numerous revisions.	00246-RM340-B3052
↑	↑	AC-54	Air Conditioning System – Troubleshooting – (DTC 23 Pressure Switch Circuit) – Wiring Diagram – The schematic has been revised to indicate use of a dual contact pressure switch vs. a single contact pressure switch as previously indicated.	↑
↑	↑	AC-143	Air Conditioning System – Pressure Switch – (On Vehicle Inspection) – Step 4 – Text & accompanying illustrations have been completely revised. Additionally, the Magnetic Clutch Control & Cooling Fan Control inspections are now indicated as separate procedures.	↑

Lexus Supports ASE Certification

PUBLICATION CORRECTION INFORMATION

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
'93 GS 300 R/M	RM340U	AC-145	Air Conditioning System – Electric Cooling Fan – (On Vehicle Inspection) – Procedure has been completely revised & expanded. Additionally, the Inspection Table has been replaced with procedure illustrations.	00246-RM340-B3052
'93 LS 400 R/M	RM300U	MA-2 MA-3	Maintenance – Maintenance Schedule – (Schedule A) & (Schedule B) – A "Clean Air Filter" category has been added to both schedules. Additionally, for Schedule A, #8 footnote mentions that this added maintenance procedure is not applicable in dusty areas.	00246-B9233
'93 LS 400 EWD	EWD164	39	Electrical Wiring Routing – (Connector Joining Wire Harness & Wire harness) – Illustrations for IL3, IL4, & IM1 have been revised. Additionally, the Connector Location table has been revised as follows: 1M1 – Cowl wire & Floor No. 1 Wire (Right Kick Panel).	00246-WD164-B3041

LEXUS
Technical Service Information Bulletin
July 18, 1997

Title:

REPLACEMENT CERTIFICATION LABELS

Models:

All Models

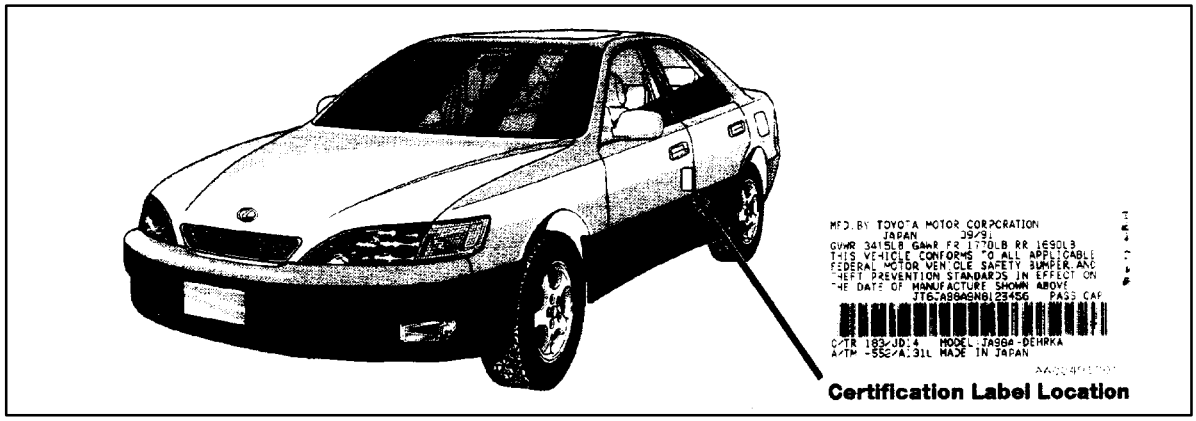
TSIB

PG003-97

PRODUCT GENERAL INFORMATION

Introduction

Replacement Certification Labels (vinyl label affixed to driver's door or door post) **may be** available from Lexus providing the request meets one of the criteria listed below.



Certification Label Location

Affected Vehicles

- All Lexus vehicles.

Certification Label Criteria

1. The vehicle is in an accident and the label is damaged or is attached to a part that will be replaced during the repair.

NOTE:
- **Processing a new label will be delayed if the old certification label is not available.**
- **A new label MAY NOT be available if the vehicle is more than five years old and the old label does not accompany this request.**

2. The label is stolen.

Procurement Procedure

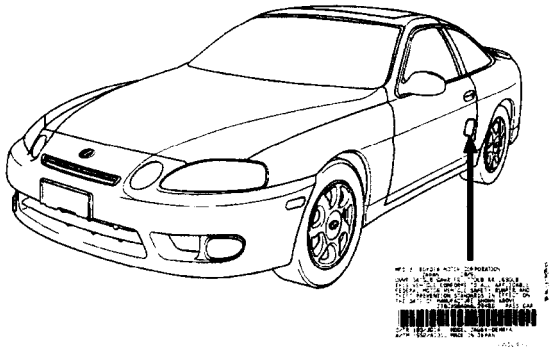
To request a replacement label, complete a copy of the form on the back of this bulletin. Your dealer parts account will be billed $10.00 for each replacement of a damaged or stolen label.

NOTE:
All replacement labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310)781-3390.

Warranty Information

- No applicable Warranty Information

APPLICATION FOR REPLACEMENT CERTIFICATION LABEL



REASON FOR REPLACEMENT:

☐ ACCIDENT DAMAGE

☐ STOLEN

☐ OTHER _____
REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ATTACH ORIGINAL LABEL HERE

NOTE:
Original label **MUST** accompany this application or order will be delayed.

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: (_____) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL *(DO NOT FAX)* THE COMPLETED REQUEST FORM WITH THE OLD LABEL TO:

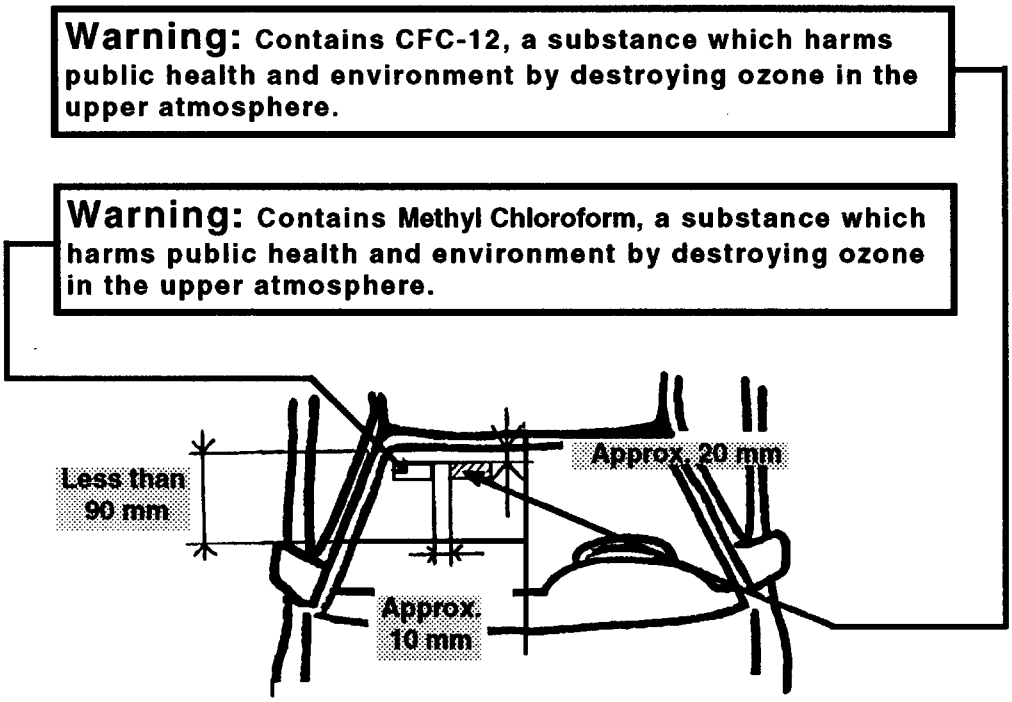
TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S203
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509-2991

Title **OZONE DEPLETING SUBSTANCE CAUTION LABELS**

Beginning with May 15, 1993 production, the EPA will require Ozone Depleting Substance (ODS) **Caution Labels** to be applied on every new vehicle when Methyl Chloroform is used in the manufacturing process and when the vehicle is equipped with air conditioning using R–12 (CFC–12).

- The Methyl Chloroform ODS label will be applied to vehicles at the manufacturing plant.
- Vehicles equipped with R–12 refrigerant gas A/C systems will also have the CFC–12 label applied at the manufacturing plant.

NOTE: Warning labels must be left on vehicle until delivery to a retail customer.



NOTE: To avoid obstruction of the driver's vision, the label should not extend beyond 90 mm below the upper edge of the windshield.

PART NUMBER INFORMATION:

Part Number	Part Name
74541–24010	ODS Caution Label, CFC–12

Title **PUBLICATION CORRECTION INFORMATION**

Corrections have been made in the Repair Manuals listed below. A brief description of each correction is provided. For further details, refer to the appropriate Correction Page(s). Once obtained, the Correction Page(s) should be attached in the corresponding publication(s).

NOTE: When ordering a technical publication (i.e. Repair Manual, Electrical Wiring Diagram) from the MDC, any Correction Page(s) associated with that particular publication, will be automatically included with your order.

Correction Pages are available through the **Dealer Support Material Network** (MDC NPM System) via the corresponding part numbers from the following table:

PUB. TITLE	*PUB. NO.*	*PAGE(S)*	*DESCRIPTION*	*PART NUMBER*
'93 ES 300 R/M	RM319U2	AC–26	Air Conditioning System – Troubleshoot–ing – (Diagnosis System) – The "List Of Operations Methods" diagram has been revised as follows: The statement in the right hand corner box now reads: "If both Auto switch and Recirculation/Fresh Air Switch are not pressed at the same time."	00246–B3003–RM319
↑	↑	AC–27	Air Conditioning System – Troubleshoot–ing – (Diagnosis System) – Indicator Check – Step 1 – Now reads: Turn the ignition switch on while pressing the air conditioner control Auto switch and Fan Recirculation/Fresh Air switch simultane–ously." In addition, the "F/R Switch" has been identified in the accompanying illustration.	↑
↑	↑	AC–27	Air Conditioning System – Troubleshoot–ing – (Diagnosis System) – Diagnostic Trouble Code Check (Sensor Check) – Step 2 has changed as follows: The second paragraph now reads: If the slower display is desired, press the Fan Blower Speed Reduction Switch and change it to stepped operation. Each time the Blower Speed Reduction Switch is pressed, the display changes by 1 step.	↑

PUB. TITLE	*PUB. NO.*	*PAGE(S)*	*DESCRIPTION*	*PART NUMBER*
’93 ES 300 R/M	RM319U2	AC–29	Air Conditioning System – Troubleshoot–ing – (Diagnostic Trouble Code Chart) – Hint 4 – Step 2 has been revised as follows: Press the Recirculation/Fresh Air Switch to enter actuator check mode, and set the operation to Step No. 3.	00246–B3003–M319
↑	↑	AC–30	Air Conditioning System – Troubleshoot–ing – (Actuator Check) – Several revisions have been made to the text, illustrations and accompanying table.	↑
’94–’95 A541E ATM R/M	RM393U	AX–11	Automatic Transaxle – Component Parts Installation – (Step 14 Install Second Coast Brake Band Guide) – The accom–panying illustration to Step 14 has been revised as follows: The tip of the Band Guide is now longer than previously shown.	00245–RM393–5015
’95 ES 300 R/M	RM407U1	MA–10	Maintenance – Maintenance Operations – Inspect Charcoal Canister – (Previously on Pages MA–10 & MA–11), has received major revisions to procedures and illustrations. All text and illustrations previously on Page MA–11, are now on Page MA–11–2.	00245–RM407–4048
↑	↑	EG–125 EG–126	Engine – Emission Control Systems – (Fuel Vapor Lines, Fuel Tank & Tank Cap Inspection) – Charcoal Canister inspection procedure has been deleted from EG–125. Major procedure and illustration changes have occurred on Page EG–126.	↑
’95 GS 300 R/M	RM406U2	SR–24	Steering – Power Tilt And Power Telescopic Steering Column –(Matrix Chart Of Problem Symptoms) – Several diagnostic additions to the “Manual And Return” category of the Matrix Chart.	00245–RM406–4056

PUB. TITLE	*PUB. NO.*	*PAGE(S)*	*DESCRIPTION*	*PART NUMBER*
’95 LS 400 R/M	RM405U1	SA–92 SA–93	Suspension And Axle – Electronic Modulated Air Suspension – (Diagnostic Trouble Code Check) – Several procedure and illustration changes to “Diagnostic Trouble Code Check” on Page SA–92 and “Diagnostic Trouble Code Check Using Hand Held Tester” on Page SA–93.	00245–RM405–5007
⬆	⬆	SA–98	Suspension And Axle – Electronic Modulated Air Suspension – (Input Signal Check – Test Mode Check) – Signal Check revisions include: Removal of the Dome–FR Fuse in the Engine Room J/B and opening of the driver’s door. A Dome–FR Fuse location illustration has been added.	⬆
’95 LS 400 R/M	RM405U2	SR–4 SR–5	Steering Preparation – (Special Service Tools) – Four SST’s have been added to the Preparation List as follows: Radial Ball Bearing (09951–00190), Rack Housing Oil Seal (09951–00410), Rack Housing Bearing (09951–00470), and Variable Pin Wrench Arm Assembly (09962–01000).	00245–RM405–5011
’95 LS 400 R/M	RM405U2	BE–188	Body Electrical System – Wireless Door Lock Control System – (Registration Of Recognition Mode) – Revisions are as follows: Step 1 – Driver door open and unlocked, no ignition key, (other doors are closed); Step 4 – Driver door: Closed ➡ Open.	00245–RM405–5013

LEXUS
Technical Service Information Bulletin
July 18, 1997

Title:
REPLACEMENT VIN PLATES

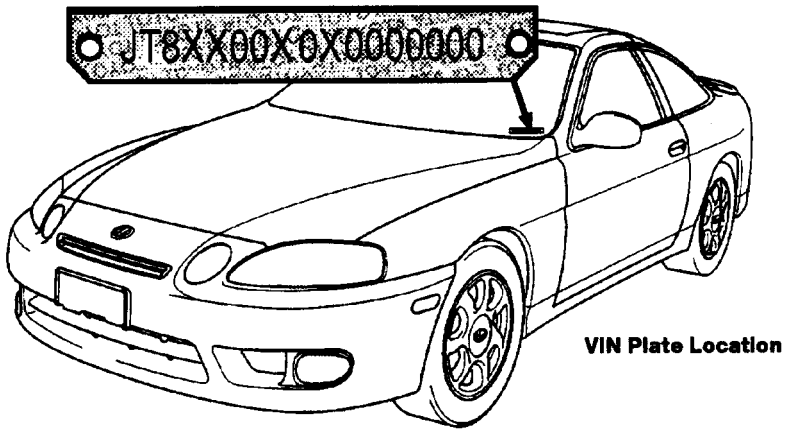
Models:
All Models

TSIB

PG004-97
PRODUCT GENERAL INFORMATION

Introduction

Replacement **VIN** plates (metal plate riveted to dashboard) **may be** available from Lexus providing the request meets one of the criteria listed below.



VIN Plate Location

Affected Vehicles

- All Lexus vehicles.

Replacement VIN Plate Criteria

- The vehicle is in an accident and the plate is damaged.

NOTE:
The plate to be replaced MUST accompany the request.

NOTE:
If a plate is stolen, be sure to contact the State Police or the Department of Motor Vehicles. In most cases the state will issue a unique number so that the original number can be included on stolen vehicle listings. If this is the case, a replacement VIN plate is NOT available from Lexus. However, the original VIN, NOT the state-issued VIN, must be used on all warranty claims.

Procurement Procedure

To request a replacement plate, complete a **copy** of the form on the back of this page. Note that damaged VIN plates must accompany the request form. Your dealer parts account will be billed $10.00 for each replacement of a damaged plate.

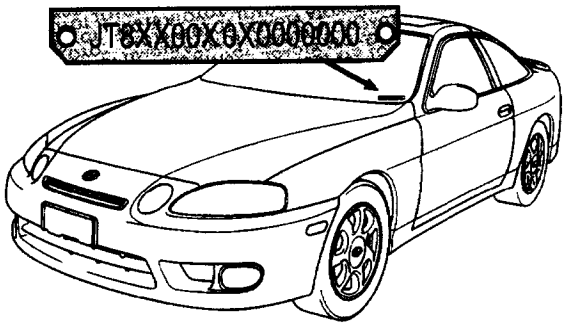
NOTE:
All replacement plates for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310)781-3390.

Warranty Information

- No applicable Warranty Information.

LEXUS

APPLICATION FOR REPLACEMENT VIN PLATE



REASON FOR REPLACEMENT:

☐ ACCIDENT DAMAGE

☐ OTHER _____

REASON OR EXPLANATION

PLEASE PROVIDE CORRECT VIN ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ATTACH DAMAGED PLATE HERE

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: (_____) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL *(DO NOT FAX)* THE COMPLETED REQUEST FORM WITH THE OLD PLATE TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S203
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509-2991

Title **PUBLICATION CORRECTION INFORMATION**

Corrections have been made in the Repair Manuals and Electrical Wiring Diagrams listed below. A brief description of each correction is provided. For further details, refer to the appropriate Correction Page (attached to this TSIB for Dealer and Area Office distribution). These pages should be attached in the corresponding publication.

NOTE: When ordering a technical publication (i.e. Repair Manual, Electrical Wiring Diagram) from the MDC, any Correction Page(s) associated with that particular publication, will be automatically included with your order.

Additional Correction Pages are available through the Dealer Support Material Network (MDC NPM System) via the corresponding part numbers from the following table:

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
'92 ES 300 EWD	EWD123U	178	System Circuits – (Cellular Mobile Telephone) – The wire color between Terminal "PH+" of the Tele–phone Transceiver & "PH1+" of the Telephone Microphone (Combina–tion Switch), has been corrected to indicate the color "blue".	00246–WD123–B3038
↑	↑	179	System Circuits – (Cellular Mobile Telephone) – The wire between "GND 2" of the Telephone Trans–ceiver & "GND 1" of the Cellular Telephone (Hand Set), has been corrected to indicate the color "black." The "IR1" Connector between the Telephone Transceiver & the Radio & Player, has been renum–bered to indicate # "20." The wire color between Terminal "RLI+" of the Telephone Trans–ceiver and Terminal "WR+" of the Stereo Component Amplifier, has been corrected to indicate "red."	↑

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
’92 ES 300 EWD	EWD123U	179	System Circuits – (Cellular Mobile Telephone) – The wire color between Terminal “RLI–” of the Telephone Transceiver & Terminal “WR–” of the Stereo Component Amplifier, has been corrected to indicate “white.”	00246–WD123–B3038
↑	↑	198	System Circuits – (Automatic Air Conditioner) – The component schematic of the A/C Power Tran–sistor has been completely revised.	↑
↑	↑	199	System Circuits –(Automatic Air Conditioner) – The following terminals of the Air Vent Mode Control Servo Motor (7, 6, 1, 2, 3, 4, & 5), have been corrected to: (1, 2, 8, 7, 6, 5, & 4) respectively.	↑
↑	↑	201	System Circuits – (Automatic Air Conditioner) – The following terminals of the Air Mix Control Servo Motor (3, 1, 4, 6, & 2), have been corrected to: (4, 5, 3, 2, & 1) respectively. The wire between the “I55” Splice & the # “3” Terminal of the Air Mix Con–trol Servo Motor, has been corrected to indicate the addition of Connector # “I3.” The wire color between the “I3” connector and the newly renumbered # “4” Terminal of the Air Mix Control Servo Motor has been corrected to indicate the color “yellow.”	↑
↑	↑	207	System Circuits – (Automatic Air Conditioner) – Graphics of Connectors “A25” & “A26” have been completely reconfigured.	↑
’93 ES 300	EWD159U	178	System Circuits – (Cellular Mobile Telephone) – The wire color between Terminal “PH+” of the Telephone Transceiver & “PH1+” of the Tele–phone Microphone (Combination Switch), have been corrected to indicate “blue.”	00226–WD123–B3038

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
'93 ES 300 EWD	EWD159U	179	System Circuits – (Cellular Mobile Telephone) – The wire color be–tween Terminal "GND 2" of the Telephone Transceiver & "GND 1" of the Cellular Phone (Hand Set), has been corrected to indicate "black." The "IR1" Connector between the Telephone Transceiver & the Radio & Player, has been re–numbered to indicate "20." The wire color between Terminal "RLI+" of the Telephone Trans–ceiver & "WR+" of the Stereo Component Amplifier, has been corrected to indicate "red." The wire color between Terminal "RLI–" of the Telephone Trans–ceiver & "WR–" of the Stereo Com–ponent Amplifier, has been cor–rected to indicate "white."	00246–WD123–B3038
↑	↑	199	System Circuits – (Automatic Air Conditioning) – The following terminals of the Air Vent Mode Control Servo Motor: (7, 6, 1, 2, 3, 4, & 5) have been corrected to: (1, 2, 8, 7, 6, 5, & 4) respectively.	↑
↑	↑	201	The following terminals of the Air Mix Control Servo Motor: (3, 1, 4, 6 & 2) have been corrected to: (4, 5, 3, 2, & 1) respectively. The wire between the "I55" Splice & the (newly renumbered) # "4" Terminal of the Air Mix Control Servo Motor, has been corrected to indicate the addition of a con–nector (I3).	↑

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
’93 ES 300 EWD	EWD159U	201	The wire color between the “I3” Connector & the newly renumbered # “4” Terminal of the Air Mix Control Servo Motor has been corrected to indicate the color “yellow.”	00246–WD123–B3038
↑	↑	207	System Circuits – (Automatic Air Conditioning) – Graphics of Connectors “A22” & “A23” have been completely reconfigured.	↑
’93 ES 300 R/M	RM319U2	AC–55	Air Conditioning System – Trouble–shooting – (Compressor Lock Sen–sor Circuit) – Inspection Procedure – Step 2 – The “OK” specification has changed as follows: resistance: at 20° C (68° F): 65 ~ 125 ohms.	00246–RM319–B3051
’93 ES 300 R/M	RM319U2	AB–47	SRS Airbag – Troubleshooting – (Inspection Procedure) – Step 7 – The “OK” specification table re–sistance measurements have changed as follows: Between Ter–minals “+S” & “+A” = below 1 ohm. Between Terminals “+S” & “–S” = 1 mega ohm or higher. Between “–S” & “–A” = 755 ~ 885 ohms.	00246–RM319–B3020
↑	↑	AB–69	SRS Airbag – Troubleshooting – (Inspection Procedure) – Step 4 – The “OK” specification table re–sistance measurements have changed as follows: Between Ter–minals“+S” & “+A” = below 1 ohm. Between Terminals “+S” & “–S” = 1 mega ohm or higher. Between “–S” & “–A” = 755 ~ 885 ohms.	↑
‘93 SC 300	RM302U1	BR117	Brake System – Anti–Lock Brake System (ABS) – Speed Sensor Cir–cuit – Wiring Diagram – The “BW1” Connector between the # “1” Ter–minal of the ABS Speed Sensor (Right Rear) & the “RR+” Terminal of the ABS (& TRAC) ECU, has now been numbered “6.”	00246–RM320–B2041

PUB. TITLE	PUB. NO.	PAGE(S)	DESCRIPTION	PART NUMBER
’93 SC 300 R/M	RM302U1	BR–117	Brake System – Anti–Lock Brake System (ABS) – Speed Sensor Circuit – Wiring Diagram – The “BW1” Con–nector between the # “2” Terminal of the ABS Speed Sensor (Right Rear) & the “RR–” Terminal of the ABS (& TRAC) ECU, has now been num–bered “5.”	00246–RM320–B2041
’93 GS 300 R/M	RM340U2	AC–8	Air Conditioning System – Description – Electric Cooling Fan System – Several revisions have been made throughout the schematic.	00246–RM340–B3052
↑	↑	AC–54	Air Conditioning System – Trouble–shooting – (Pressure Switch Circuit – Wiring Diagram – The (Single Type) Pressure Switch indicated in the schematic, has been changed to a (Dual type) Pressure Switch.	↑
↑	↑	AC–143	Air Conditioning System – Pressure Switch – (On Vehicle Inspection) – Step 3 – Revisions include: additional text and illustrations that provide detailed information of the Magnetic Clutch & Cooling Fan Controls.	↑
↑	↑	AC–145	Air Conditioning System – Electric Cooling Fan – (On Vehicle Inspection) – The text and illustrations for the entire procedure have been revised.	↑
’93 LS 400 EWD	EWD164U	39	Electrical Wiring Routing – (Connector Joining Wire Harness And Wire Harness) – Revisions include: reconfigured “IL3,” “IL4” & “IM1” Connector graphics. The “IH1” Code text in the Connector Location Table has also been revised as follows: The “IH1” Wire Harness to Wire Har–ness (Cowl Wire & # 1 Floor Wire) Connector location is at the right kick panel.	00246–WD164–B3041

Title **COIL SPRING COMPRESSOR SST # 09727-30020-02**

Please observe the following procedures each time this tool is used:

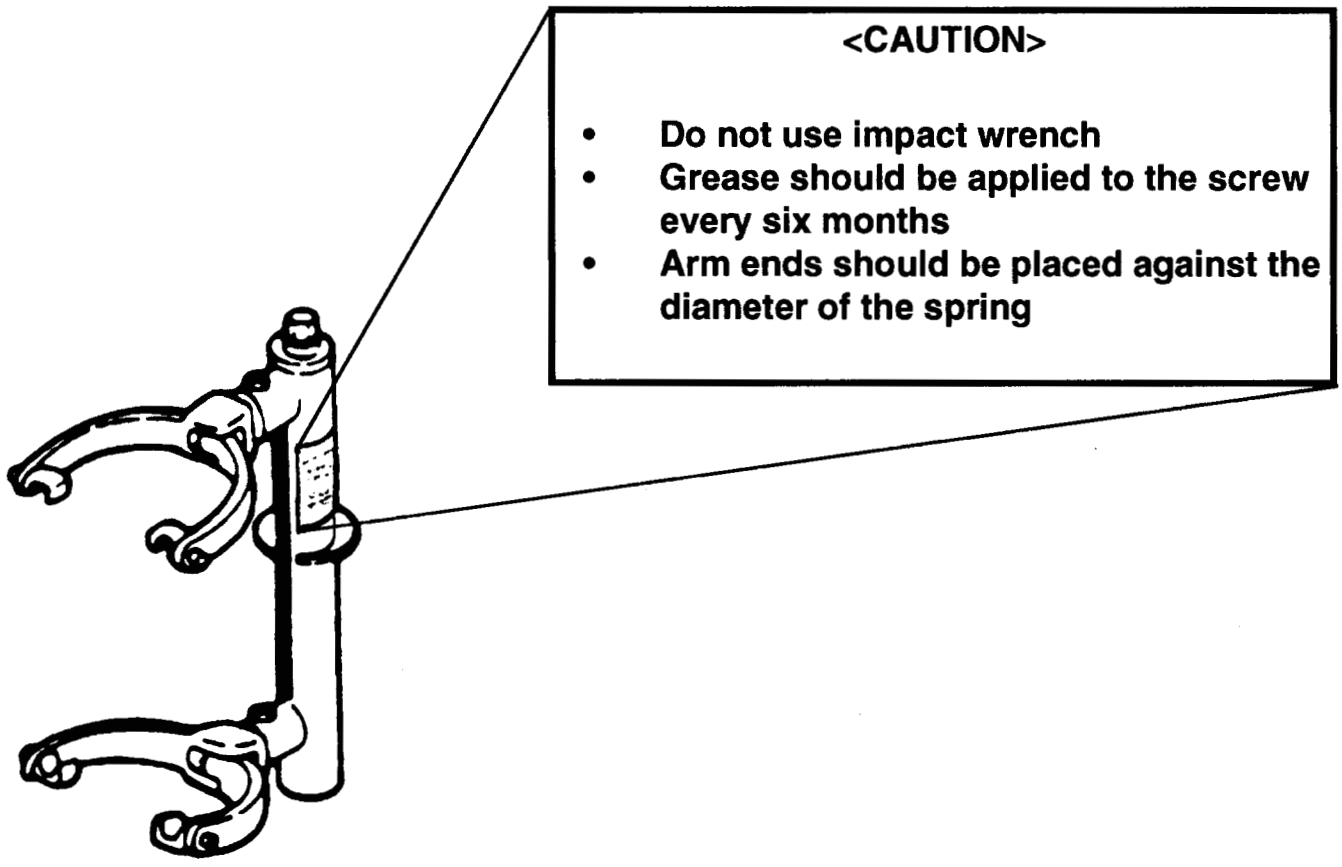
❶ **Carefully** inspect your spring compressor for cracks or other deformation **prior to each use.**

❷ **Use only on Lexus vehicles.** Use on other applications may exceed the tool design limits.

❸ Be sure spring is free from its seat (unstuck) prior to compressing.

❹ **Do not** compress the coil spring further than needed to facilitate the repair.

When using suspension coil spring compressor be sure to follow the instructions outlined in the repair manual as well as the **caution label** placed on the tool (see illustration below).



LEXUS

Technical Service Information Bulletin

September 26, 1997

Title:

BRAKE BOOSTER PUSH ROD GAUGE (SST)

Models:

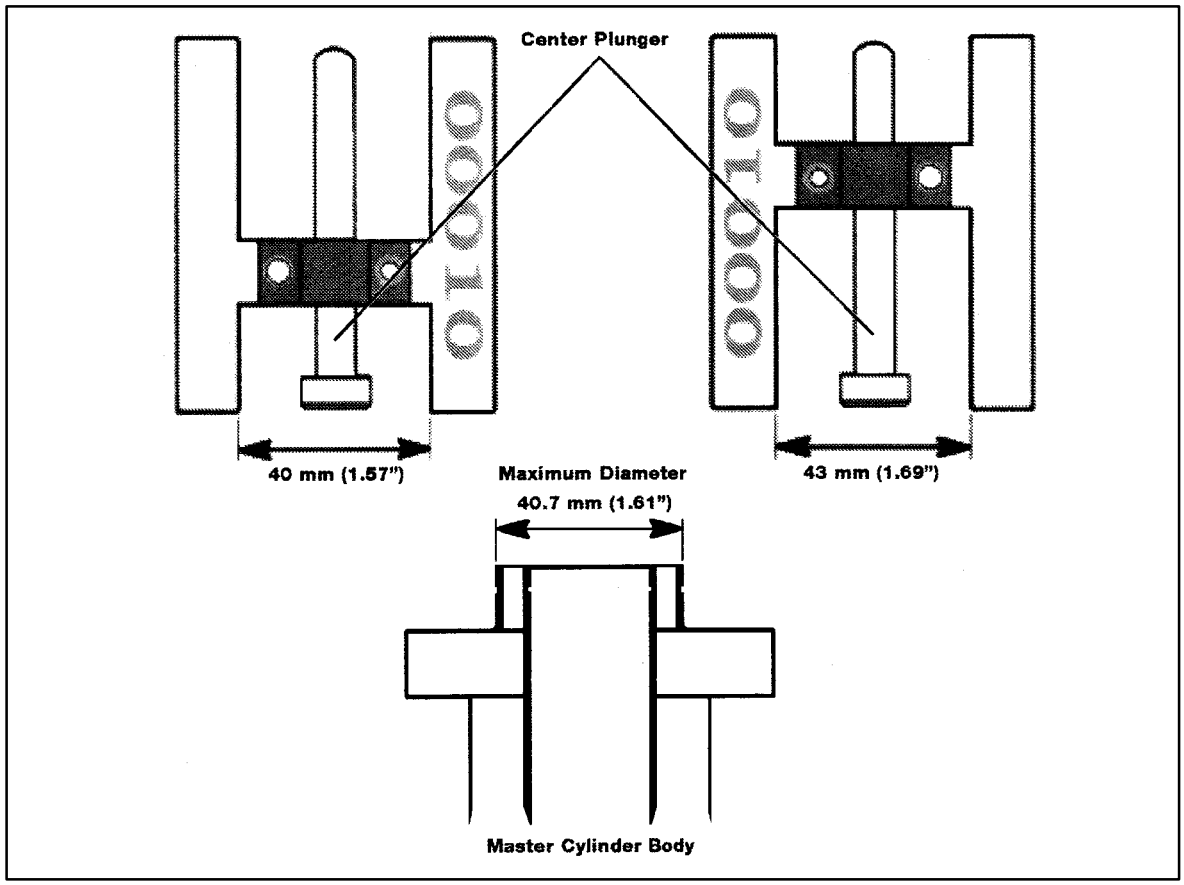
All Models

TSIB

SPECIAL SERVICE TOOLS SS001–97

Introduction

When inspecting or making brake booster push rod adjustments with SST 09737–00010, it is necessary to assure proper tool configuration prior to use. The SST has a reversible center plunger that allows it to function on a wide range of Lexus vehicles. Prior to using, verify that it is configured correctly for the application by checking the master cylinder outer diameter at the point illustrated below. The dimensions for the SST, Part Number 09737–00010, are also shown in the illustrations below.



Parts Information

PART NUMBER	PART NAME
09737–00010	Brake Booster Push Rod Gauge (SST)

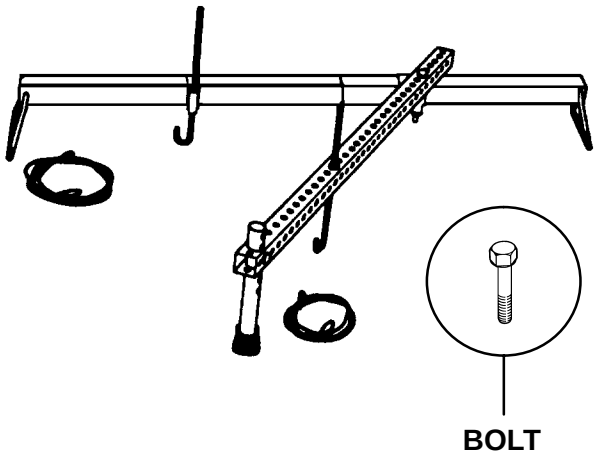
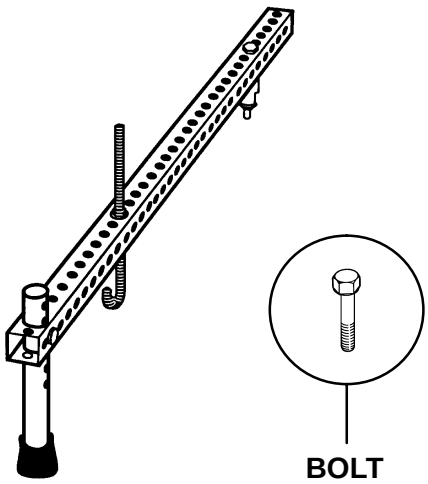
Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not applicable to warranty	–	–	–	–

Title **ENGINE SUPPORT BAR IMPROVEMENTS**

A new engine support bar, P/N 00002–01724, has been released by OTC. This new tripod design engine support bar, which is designed to support engine weight while transmission service is being performed, supersedes the current bipod engine support bar, P/N 00002–01722.

For dealers who currently own the 00002–01722 engine support bar, OTC has developed an upgrade kit, P/N 00002–01724–U which includes all necessary components and hardware to convert it to the new tripod design. **To avoid the potential for personal injury or property damage, do not use the existing engine support bar without the new upgrade kit.**

00002–01724 TRIPOD ENGINE SUPPORT BAR KIT	00002–01724–U TRIPOD UPGRADE KIT
	

DEALER PRICING IS AS FOLLOWS:

AVAILABLE SST'S		
TOOL NUMBER	**TOOL NAME**	**PRICE**
00002–01724	Tripod Engine Support Bar Kit	$165.35
00002–01724–U	Tripod Upgrade Kit	$ 77.25

For more information and to order these Special Service Tools, please call OTC at 800–933–8335.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: SUSPENSION

NO: SU001–96

DATE: MARCH 15, 1996

MODEL: ES 300

Title **REAR SUSPENSION SQUEAK/GROAN NOISE**

To reduce squeak, groan, rattle or tap noise from the rear suspension, the following components have been changed:

- Rear Spring Bumper
- Rear Suspension support assemblies

For repair of squeak or groan noise from another source, please refer toTSIB SU93–001 dated July 2, 1993 and TSIB SU95–002 dated February 24, 1995.

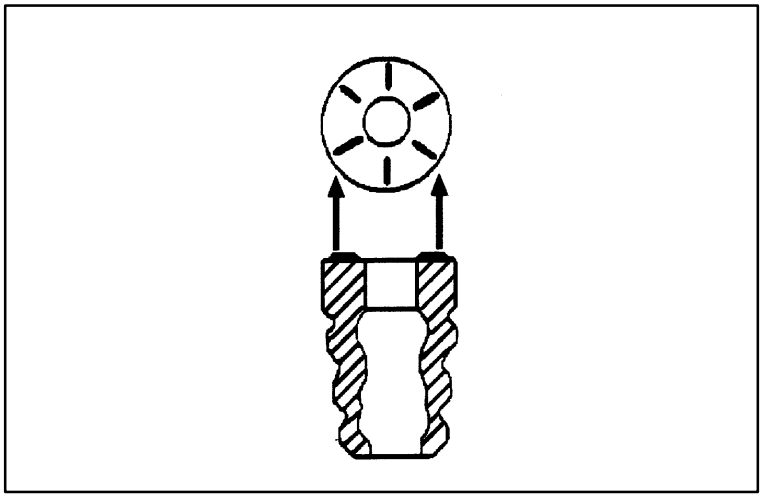
PART NUMBER INFORMATION:

PREVIOUS P/N	NEW P/N	PART NAME	SIDE	QTY
48341–32052	SAME	Rear Spring Bumper	N/A	2
48750–33010	48750–33011	Rear Suspension Support Assembly*	Right	1
48760–33010	48760–33011		Left	1

- New parts can be used on previous vehicles, previous parts should not be used on new vehicles.

PART IDENTIFICATION:

Six protrusions have been added on the top of the NEW Rear Spring Bumper as shown:



Lexus Supports ASE Certification

PART NUMBER INFORMATION:

COMPONENT	VIN (Reference Only)
Rear Spring Bumper	JT8GK13T–S0125886
Rear Suspension Support Assembly	JT8BF12G–T0134410

FIELD–FIX METHOD:

Confirm that the rear spring bumper and/or rear suspension support assemblies are the source of the noise and replace old style parts with the new ones.

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
482201A	R&R rear strut assembly and replace bumper and support (both sides)	*	487X0–33010	91	43
Combination Code ‘‘E’’ **	Adjust toe–in (MCV10 only)	+ 0.2	N/A	—	—
Combination Code ‘‘G’’ **	Adjust camber and toe–in (VCV10 only)	+ 0.3	N/A	—	—

* Refer to the applicable model in the Lexus Universal Flat Rate Manual.

** Combination code ‘‘E’’ and ‘‘G’’ in addition to the R&R of the affected parts, may only be claimed if:

- There is an alignment measurements/readings print–out BEFORE the actual repair showing the rear suspension was within specifications at the time, **and**
- There is an alignment measurements/readings print–out AFTER the work was done showing the alignment was altered by the work performed.

In addition, these print–outs need to be marked ‘‘BEFORE’’ and “AFTER,” and supported by an additional print–out confirming that the toe–in/camber (as applicable) was reset to specification.

LEXUS
Technical Service Information Bulletin
April 11, 1997

Title:
CAMBER ADJUSTING BOLTS

Models:
ES 300

TSIB

SUSPENSION
SU001-97

Introduction

To increase camber adjusting capability, the steering knuckle set bolts can be replaced with new camber adjusting bolts. These new camber adjusting bolts allow for greater movement between the steering knuckle and shock absorber assembly.

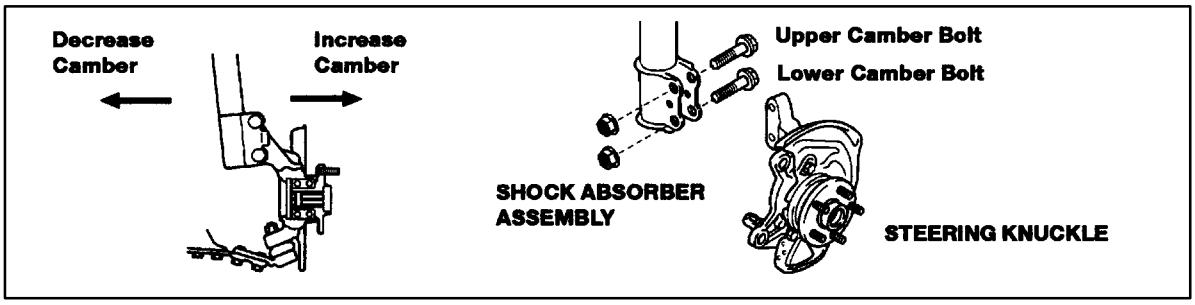
NOTE:
Vehicles which are out of alignment specifications due to a collision or worn out parts, should be inspected for damage and/or worn out parts before performing an alignment.

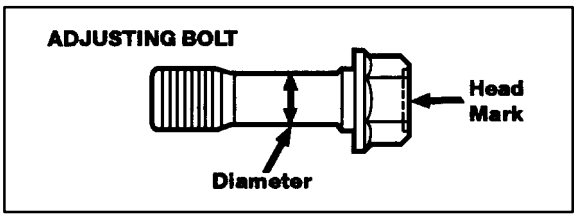
Affected Vehicles

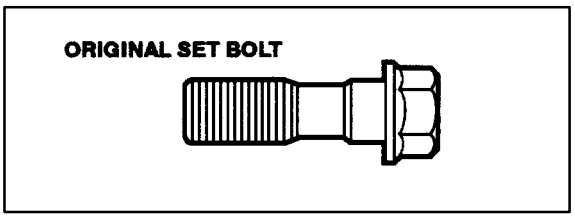
- **ES 300s.**

Adjustment Procedures

To change camber, install the adjusting bolt in the lower steering knuckle mounting hole. If a camber change greater than 0.75° (45') is required, camber bolts can be installed in both upper and lower steering knuckle holes for camber changes up to 1.50° (1°30'). See Camber Adjusting Bolt Table for model, part number and bolt selection.







Camber Adjusting Table

DIAMETER	PART NUMBER	ADJUSTABLE VALUE	HEAD MARK	REMARKS
15.9 mm (0.626 in.)	90105-17003	± 0.25° (15')	Dot ·11	The different camber adjusting bolts can be identified by the number of projecting dots on the bolt head.
15.0 mm (0.591 in.)	90105-17004	± 0.50° (30')	·11·	
14.0 mm (0.551 in.)	90105-17005	± 0.75° (45')	·11·	

Torque Specifications

MODEL	VDS	TORQUE SPECIFICATIONS
ES 300	BF12G BF22G GK13T VK13T	211 N·m (156 ft·lbs)

NOTE:
Camber adjusting bolt values, bolt identification and part number information for current production models can also be found in the SUSPENSION - WHEEL ALIGNMENT section of the applicable 1996 or later repair manuals.

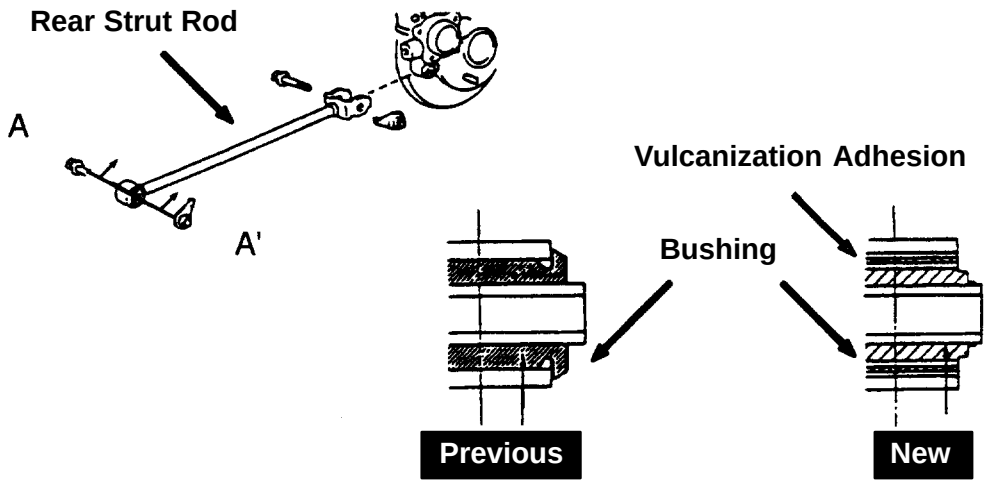
Warranty Information

NOTE:
No Warranty Applicable.

To reduce suspension squeak / groan noises, the following changes have been made:

- Rear Strut Rod Bushing – Design changed to vulcanization adhesion type
- Rear Stabilizer Bar Bushing – Material changed to an improved self–lubricating type
- Front Stabilizer Bar Bushing – Material changed to self–lubricating type

The design of the rear strut rod bushing has been changed to a vulcanization adhesion type.



A - A' Cross-Section

PRODUCTION EFFECTIVE:

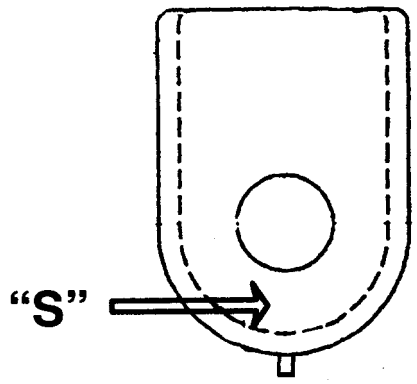
VIN	Production Date	Parts Effected
JT8GK1***R0010909	10/93	Rear Strut Rod Assembly
JT8GK1***R0036977	02/94	Rear Stabilizer Bar Bushing
JT8GK1***R0057070	05/94	Front Stabilizer Bar Bushing

PART NUMBER INFORMATION:

Previous Part Number	New Part Number	Part Name	Quantity
48780–12010	48780–33010	Assembly, Rear Strut Rod	2
48818–33011	No P/N Change	Bushing, Rear Stabilizer Bar	2
48815–33010	48815–33011	Bushing, Front	2

NOTE: **New parts can be used on vehicles built before and after production changes.**

The new rear stabilizer bar bushing utilizes the same part number, but can be identified by an "S" emboss as shown below.

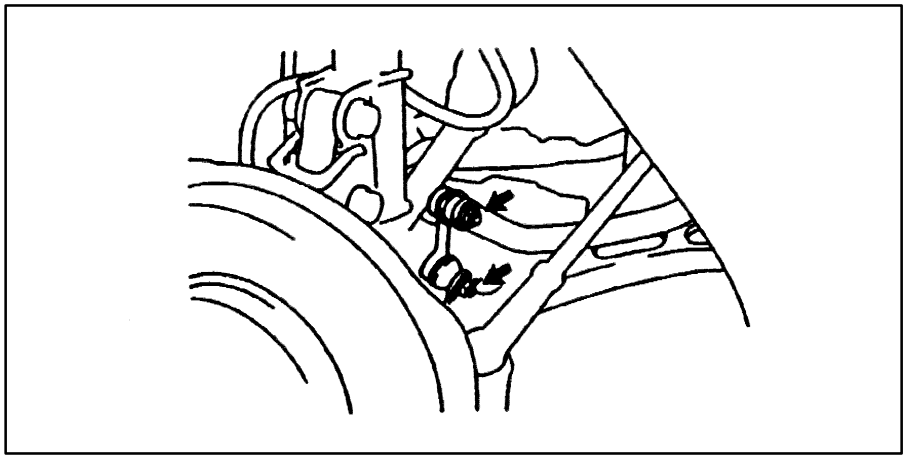


WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
431611	Front Stabilizer Bar Bushing (One Side R&R)	0.4	48815–xxxxx	91	55
431611A	Front Stabilizer Bar Bushing (Opposite Side)	0.2	48815–xxxxx	91	55
482411	Rear Stabilizer Bar Bushing (One Side R&R)	0.3	48818–xxxxx	91	55
482411A	Rear Stabilizer Bar Bushing (Opposite Side)	0.1	48818–xxxxx	91	55
482091	Rear Strut Rod Assembly (One Side R&R)	0.5	48780–33010	91	55
482091A	Rear Strut Rod Assembly (Opposite Side)	0.1	48780–33010	91	55
482091B	Toe – In	0.2			

Title **FRONT STABILIZER LINK SET NUT**

Due to a change in the surface treatment of the rear suspension member nuts, the nut tightening torque has been reduced and the part number has been changed for the '94 model year.



	Previous	New
Torque	64 N•m (650 kgf/cm, 47 ft.lbf)	39 N•m (400 kgf/cm, 29 ft.lbf)

PART NUMBER INFORMATION:

Previous Part Number	New Part Number	Part Name
90179–10054	90179–10183	Nut (Stabilizer To Stabilizer Link)
90179–10076	90179–10183	Nut (Stabilizer Link to Stabilizer End Bracket))

REPAIR PROCEDURE:

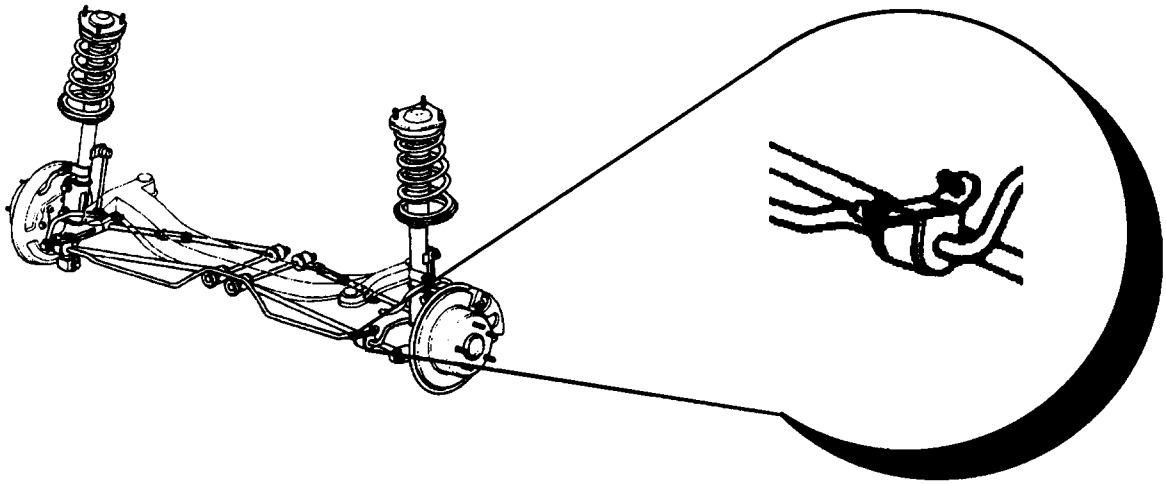
'93 and earlier ES 300s should continue to use the old style stabilizer nuts and torque specification. '94 and newer ES 300s must only use the new part number stabilizer bar nuts and torque specification.

PRODUCTION EFFECTIVE:

From August 1993 (1994 model year)

Title **REAR STABILIZER BAR BUSHING SQUEAK NOISES**

A new self–lubricating rear stabilizer bar bushing has been developed to eliminate the squeak noise coming from the rear stabilizer bar on ES 300s.



PART NUMBER INFORMATION:

Prev. Part No.	New. Part No.	Part Name	Model
48818–33010	48818–33011	Bushing, Stabilizer RR	ES 300

Note: Both rear bushings must be replaced as a set.

PRODUCTION DATE EFFECTIVE:

VIN NUMBER	MODEL	DATE
JT8VK13T#P0119837	ES 300	8/92

LEXUS

TECHNICAL SERVICE INFORMATION

REF: TRANSMISSION & CLUTCH

NO: TC002–96

DATE: JUNE 21, 1996

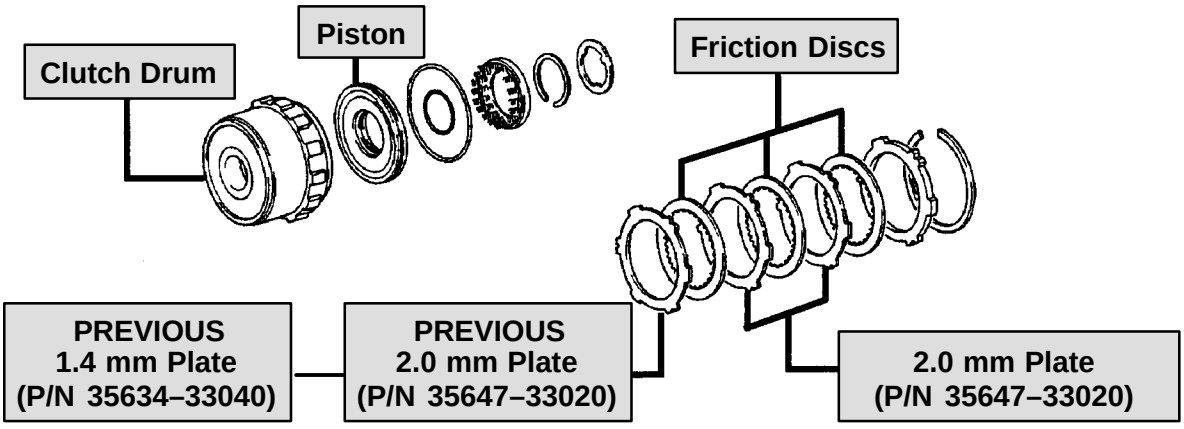
MODEL: ES 300

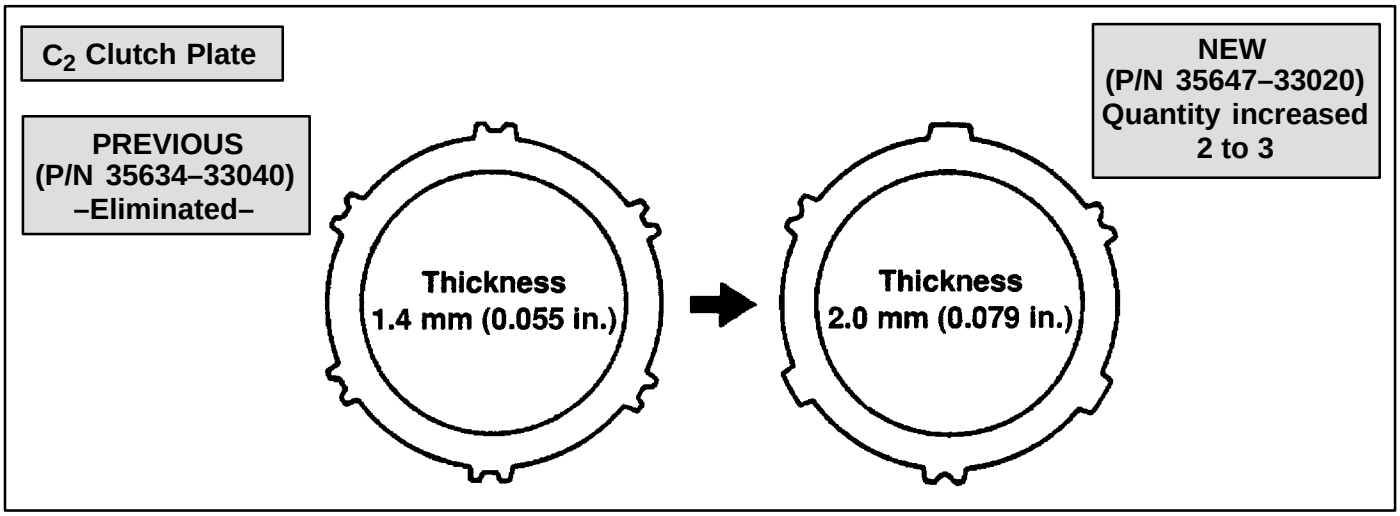
DIRECT CLUTCH (C2) IMPROVEMENTS–A541E ATM

Direct Clutch (C2) components have been changed on ES 300 models using the A541E ATM to improve shift engagement between "N" to "R" ranges. Changes to the C2 Clutch are as follows:

- C2 Clutch Plate (P/N 35634–33040) has been eliminated.
- C2 Clutch Plate (P/N 35647–33020) – Quantity increased from 2 to 3.
- C2 Clutch Drum wall thickness decreased (from 3.8 mm to 3.2 mm).
- C2 Piston wall thickness increased (from 3.1 mm to 3.7 mm).

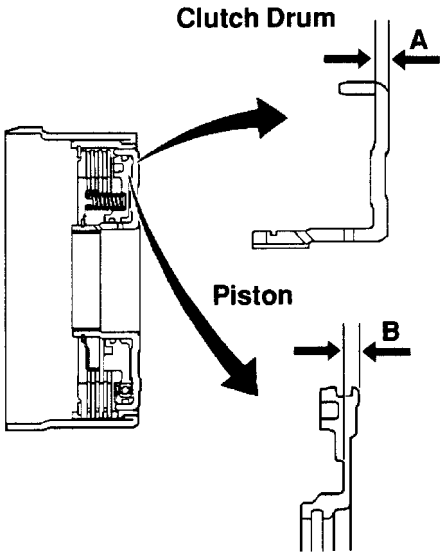
CLUTCH COMPONENTS:





Lexus Supports ASE Certification

CLUTCH COMPONENTS: (CONT.)



	Previous	New
Part No.	35605–33020	35605–33021
A	3.8 mm (0.150 in.)	3.2 mm (0.126 in.)

	Previous	New
Part No.	35606–32030	35606–32031
B	3.1 mm (0.122 in.)	3.7 mm (0.146 in.)

PRODUCTION EFFECTIVE:

ATM Serial#: C1204694

PART NUMBER INFORMATION:

Previous P/N	NEW P/N	PART NAME	QTY
30500–33201	30500–33202	Transaxle Assy, Automatic	1
N/A	35605–33H02	Drum Sub–Assy Set, Direct Clutch	1
35605–33020	35605–33021	Spring Sub–Assy, Direct Clutch	1
35606–32030	35606–32031	Piston Sub–Assy, Direct Clutch	1
35634–33040	Eliminated	Plate, Clutch (for Direct Mulitiple Disc Clutch)	N/A
35647–33020	Same	Plate, Clutch (for Direct Mulitiple Disc Clutch)	2→3

NOTE*:* Previous and new parts are interchangeable only as a set.

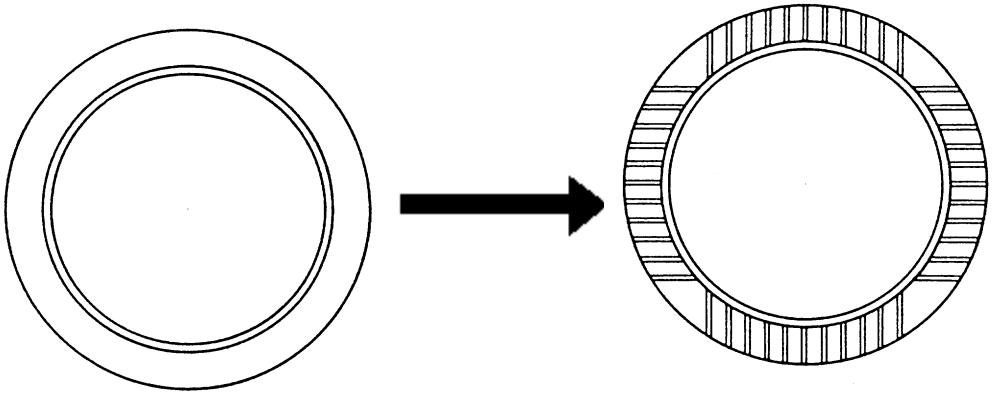
Title **GROOVED B2 CLUTCH DISC ON A540E ATM**

To improve B2 clutch durability, a grooved B2 Clutch Disc (2nd Coast Brake) has been adopted on the A540E ATM (ES 300 model).

MODIFICATION:

The new design grooved disc (shown below) allows increased ATF flow between B2 discs and B2 steel plates.

PREVIOUS **NEW**



PART NUMBER INFORMATION:

PART NAME	PREV. PART NO.	NEW PART NO.	QUANTITY
Clutch Disc (2nd Brake)	35677–33020	35677–33021	3
Kit, Transaxle Overhaul	04352–33022	04352–33023 (Ending ATM# E0301760) 04352–33041 (Starting ATM# E0301761)	1
Transaxle Assy., Automatic	30500–33063	30500–33064	1

NOTE: This change has also been adopted in the Reman Program.

INTERCHANGEABILITY:

Previous and new parts are interchangeable.

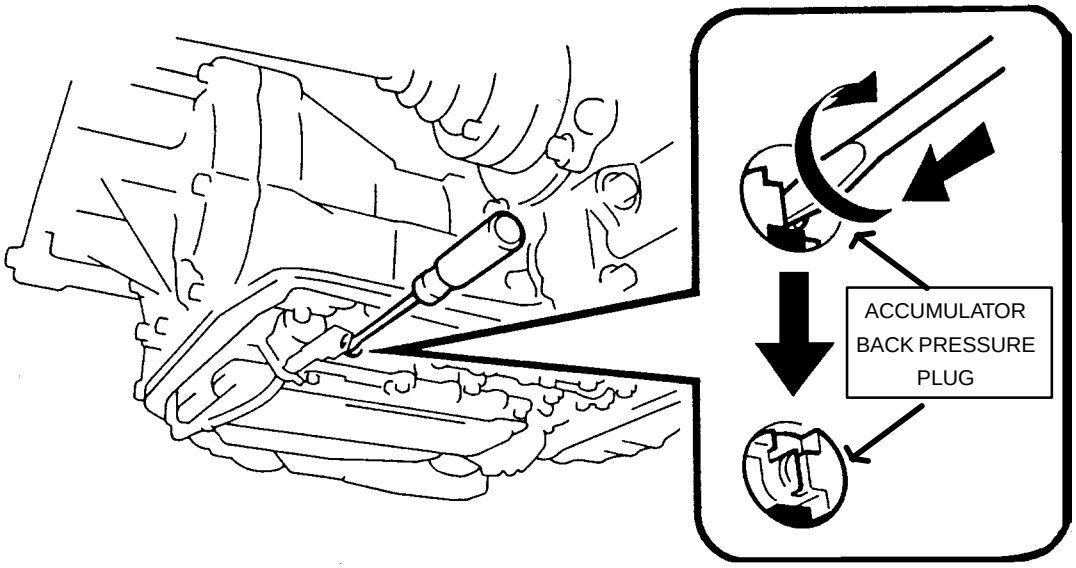
For customer complaints of harsh shift on '94 ES 300s, the following adjustment will improve 1~2, 2~3, & 3~4 upshift quality.

1. Confirm the customer's shift condition.

2. Check throttle cable adjustment. (Refer to Repair Manual).

3. Adjust the accumulator back–pressure control as indicated below.

   A. Drain the transmission fluid.
   B. Remove oil pan and gasket.
   C. Set the accumulator back–pressure to the lowest position. See illustration below.



NOTE: Depress the accumulator back–pressure plug slightly inward with a screwdriver and turn the plug to the full right position. The plug will then be set to the most protruded position (refer to illustration).

4. Install oil pan with new gasket and refill the transmission with ATF.

5. Reconfirm shift quality after a 30 minute test drive with the pattern select switch at the **"NORMAL"** position.

NOTE: **Because the ECU must relearn the logic, the vehicle should be driven under typical operating conditions for a full 30 minutes.**

WARRANTY INFORMATION:

SPECIAL OPCODE	DESCRIPTION	TIME	OPN	T1	T2
TC5001	Adjust accumulator back–pressure control including road tests and other necessary checks and adjustments	1.9	35410–33042	25	43

Title **EMISSION CONTROL LABEL ORDER FORM CALIFORNIA/50 STATE CERTIFIED**

Should a California / 50 State Certified Vehicle Emission Control Label be required, please abide by the regulations outlined in this TSB.

NOTE: California / 50 State Certified Vehicle Emission Control Labels cannot be ordered using normal parts ordering procedures.

REGULATIONS

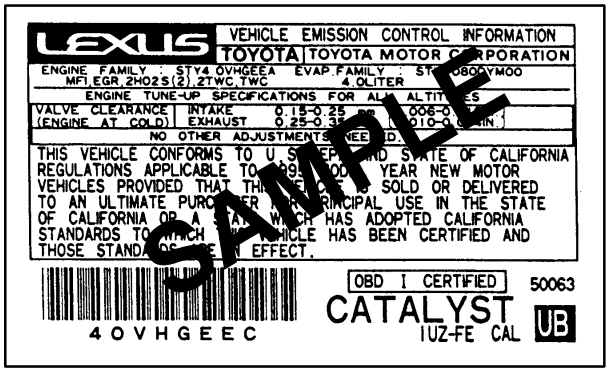
California Revenue and Taxation Code Section 6263 states that only vehicle manufacturers or persons authorized by a manufacturer may affix an Emission Control Information Label (see sample) to a vehicle. Any person who violates this regulation may be subject to a fine and / or imprisonment.

Personnel at franchised dealers are authorized to affix such labels to vehicles and are therefore subject to this regulation and the attendant penalties.

1. **DO NOT SELL LABELS OVER THE COUNTER, ALWAYS INSTALL THE LABEL ON THE VEHICLE.**
2. **NEVER INSTALL A LABEL ON A VEHICLE THAT IS NOT A CALIFORNIA / 50 STATE EMISSION CERTIFIED VEHICLE.**

To ensure the correct application of these labels, it is necessary to use the following special ordering procedures to obtain a replacement label.

- Make a copy of the form provided on page 2 of this bulletin.
- Fill in the required information and mail or fax the form to the address or number indicated.
- For questions regarding Vehicle Emission Control Information Labels for California / 50 State Certified, call (310) 781–3254.



Label No.

VEHICLE EMISSION CONTROL INFORMATION LABEL ORDER FORM
CALIFORNIA / 50 STATE CERTIFIED

IMPORTANT - PLEASE READ FIRST

Make a copy of this form, carefully complete all information and fax or mail the form to the address or fax number indicated below

TMS USE ONLY

VIN: | | | | | | | | | | | | | | | | | |

TMS USE ONLY

MILEAGE: | | | | | | | P/D: | / |

LABEL NUMBER (See example page 1): | | | | | |

PART NUMBER: | | | | | – | | | | |

TMS USE ONLY: | | | | | – | | | | |

REASON FOR REPLACEMENT:

_____

_____

_____

DEALER INFORMATION

DEALER NUMBER: | | | | | |

DEALER NAME: _____ CONTACT PERSON: _____

ADDRESS: _____

CITY _____ STATE _____ PHONE NUMBER _____

MAIL OR FAX THIS FORM TO:

TOYOTA MOTOR SALES, U.S.A. INC.
19001 S. Western Ave.
P.O. BOX 2991
Torrance, CA 90509–2991
Attn: Technical Planning and Coordination S202
Fax Number: (310) 781–3399

'95 CALIFORNIA EMISSION CONTROL LABELS

Model	Engine	P / N
SC 300	2JZ–FE	11298–46023
SC 400	1UZ–FE	11298–50063

'94 CALIFORNIA EMISSION CONTROL LABELS

ES 300	1MZ–FE	11298–20020
GS 300	2JZ–FE	11298–46081
SC 300	2JZ–FE	11298–46022
SC 400	1UZ–FE	11298–50062
LS 400	1UZ–FE (P/D 8/93–12/93) (P/D 1/94)	11298–50071 11298–50072

'93 CALIFORNIA EMISSION CONTROL LABELS

ES 300	3VZ–FE	11298–62190
GS 300	2JZ–FE	11298–46080
SC 300	2JZ–FE	11298–46021
SC 400	1UZ–FE	11298–50061
LS 400	1UZ–FE	11298–50070

'92 CALIFORNIA EMISSION CONTROL LABELS

ES 300	3VZ–FE	11298–62150
SC 300	2JZ–FE	11298–46020
SC 400	1UZ–FE	11298–50060
LS 400	1UZ–FE	11298–50022

'91 CALIFORNIA EMISSION CONTROL LABELS

ES 250	2VZ–FE	11298–62130
LS 400	1UZ–FE	11298–50021

'90 CALIFORNIA EMISSION CONTROL LABELS

ES 250	2V–FE	11298–62100
LS 400	1UZ–FE	11298–50020

LEXUS

Technical Service Information Bulletin

January 1, 1999

Title:

VOLUME 4 INFORMATION

Models:

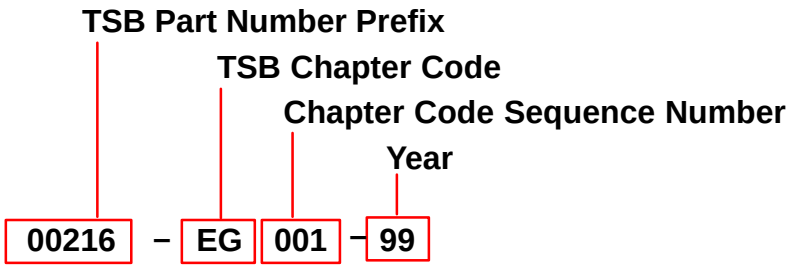
All Models

TSIB

Introduction

Lexus Technical Service Information Bulletins (TSIBs) continue to be one of the most current sources of technical information available. To ensure complete access to this reference source, use the following steps:

- Volume Four will begin with 1999 Technical Service Information Bulletins.
- Place this bulletin along with all 1999 TSIBs into the new binders received with this bulletin.
- Label this new binder “Volume Four“ using the labels provided with the binder.
- Additional copies of 1994 through 1999 TSIBs are available to all Lexus Dealerships through the Non–Parts System (MDC NPM System) by using the following Part Number designation:



Related TSIB Part Numbers

MATERIAL DESCRIPTION	PART NUMBER
1999 TSIB Binder complete with all bulletins issued to date	VOL4
New TSIB Binder and tabs only	00216–00001

LEXUS

Technical Service Information Bulletin

September 26, 2003

Title:

WARRANTY PARTS MARKING PROCEDURE

Models:

All Models

TSIB

Introduction

Effective September 1, 2003, all warranty parts (as indicated on the next page) must be marked in the area or location of the failure. The technician should complete this procedure after the failed part has been removed from the vehicle and before the part is placed in the 10–bin storage. (Exchanged parts and remanufactured parts are not included in this procedure.)

Failed parts marking will be beneficial in detecting and resolving product and parts quality issues. This will also offer additional opportunities to make future enhancements to our parts and products.

Parts are subject to random inspection in the dealership by field representatives to ensure compliance with this new policy.

Failure to comply with this policy may result in a debit of the corresponding warranty claim(s).

Applicable Vehicles

- All models.

Parts Marking Procedure

All technicians must follow these procedures to ensure proper parts marking:

- Wipe the part clean (no excess fluid should be present).
- Indicate area of defect or failure by marking the specific part(s) with a water resistant permanent marker. Use a color that can be easily seen against the background of the part being marked. For dark surfaces the color yellow is highly recommended as well as the color black for light surfaces.
- Mark the area of failure or defect by drawing a circle, a square, pointing an arrow or adhering tape with an indication of the failed or defect location.
- Attach a completed Warranty Parts Tag (M/N 00404–PRETN–TAGS) to the marked part.

All other parts recovery/shipping policies and procedures apply.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Parts Marking Requirement

Dealers are requested to mark the location of the failure of all warranty parts that are listed below. ***This list is not inclusive.*** There may be other components that can be marked in the area of failure. All other parts that can be marked should be marked.

Parts Marking List

- assist grip assy
- audio (blemish)
- back door garnish
- bumper covers
- cargo cover (retractable)
- carpet
- clutch disc
- clutch flywheel
- combination meter glass
- console and components
- cowl assy
- cowl side trim sub–assy
- cupholders
- cylinder head cover sub–assy
- dash panel insulator assy
- dashboard and trim
- disc wheel
- display panels
- door handle assy
- door moulding
- door trim panel & molding
- emblems
- engine oil pan
- exhaust manifold
- floor and cargo mats
- gear shift knob
- grills
- headlamps
- headliner
- hoses
- instrument panel safety pad sub–assy
- Interior light assemblies and covers
- knobs, levers, handles
- l/pulley pump assy
- mirrors (side and rearview)
- navigation or VES screens
- pillar garnish
- rack and pinion/power steering gear assy
- radiator
- room partition board
- rotors (mark where min. runout is exceeded or warped)
- seat covers/cushions
- seat tracks
- soft trim
- spare tire cover
- steering column cover
- steering wheel
- tail lamps and covers
- transmission oil pan
- visor
- washer jar
- wheel cap
- wheels

Parts Marking List (Continued)

NOTE:

The following parts do not have to be marked unless the technician can determine failure and location.

air induction/ejection systems
all computers
alternators
audio (internal)
batteries
bearings
belts
catalytic converter
crankshaft
cruise control
distributors
EGR systems
engine control systems
exchange parts
exhaust systems
fuel injection systems
fuel injectors
fuel pump
ignition system
internal engine components
internal transmission components
oil cooler
power door lock switches
remanufactured parts
starters
suspension components
valve covers
window regulators
wiper motors

Technical Service Information Bulletin
October 11, 2002

Title:
SUSPENSION BALL JOINT INSPECTION
Models:
Applicable Models

TSIB

Introduction

This Service Bulletin is to inform you of the inspection method, and free play specification figures for suspension ball joints. The on–vehicle inspection methods have been standardized.

Applicable Vehicles

- **1990 – 2000** model year **LS 400** vehicles.
- **2001 – 2003** model year **LS 430** vehicles.
- **1993 – 2003** model year **GS 300** vehicles.
- **1998 – 2000** model year **GS 400** vehicles.
- **2001 – 2003** model year **GS 430** vehicles.
- **1992 – 2000** model year **SC 300 & SC 400** vehicles.
- **2002 – 2003** model year **SC 430** vehicles.
- **2001 – 2003** model year **IS 300** vehicles.
- **1999 – 2003** model year **RX 300** vehicles.
- **1990 – 2003** model year **ES 250 & ES 300** vehicles.
- **1998 – 2003** model year **LX 470** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Inspection Information Table

MODEL	LOCATION	LOWER BALL JOINT OR SUSPENSION BALL JOINT			UPPER BALL JOINT		
		INSP. METHOD	MAX. PLAY	TURNING TORQUE	INSP. METHOD	MAX. PLAY	TURNING TORQUE
LS 400 (UCF10) 1990–1994	Front	1–(A)	0.016 in. (0.4) mm	4 in.•lbf (0.5 N•m) or Less	2	No Play Felt	31 in.•lbf (3.5 N•m) or Less
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
LS 400 (UCF20) 1995–2000	Front	1–(A)	0.016 in. (0.4) mm	22 in.•lbf (2.5 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
LS 430 (UCF30) 2001–2003	Front	1–(A)	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
GS 300 (JZS147) 1993–1997	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	1–(A)	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
GS 300, 400, 430 (JZS16#, UZS16#) 1998–2003	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
SC 300, 400 (JZZ31, UZZ30) 1992–2000	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	1–(A)	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
SC 430 (UZZ40) 2002–2003	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			

Inspection Information Table (Continued)

MODEL	LOCATION	LOWER BALL JOINT OR SUSPENSION BALL JOINT			UPPER BALL JOINT		
		INSP. METHOD	MAX. PLAY	TURNING TORQUE	INSP. METHOD	MAX. PLAY	TURNING TORQUE
IS 300 (JCE10) 2001–2003	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less	2	No Play Felt	31 in.•lbf (3.5 N•m) or Less
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			27 in.•lbf (3.0 N•m) or Less
RX 300 (MCU10, 15) 1999–2003	Front	1–(B)	No Play Felt	31 in.•lbf (3.5 N•m) or Less	N/A	N/A	N/A
	Rear	N/A	N/A	N/A	N/A	N/A	N/A
ES 250 & 300 (VZV21, MCV20, 30) 1990–2003	Front	1–(B)	No Play Felt	31 in.•lbf (3.5 N•m) or Less	N/A	N/A	N/A
	Rear	N/A	N/A	N/A	N/A	N/A	N/A
LX 470 (UZJ100) 1998–2003	Front	1–(A)	No Play Felt	27 in.•lbf (3.0 N•m) or Less	2	No Play Felt	40 in.•lbf (4.5 N•m) or Less
	Rear	N/A	N/A	N/A	N/A	N/A	N/A

Free Play Inspection

NOTE:
- **Be sure to check the table for the applicable inspection type based on the vehicle model.**
- **Refer to the table for the standard free play values.**

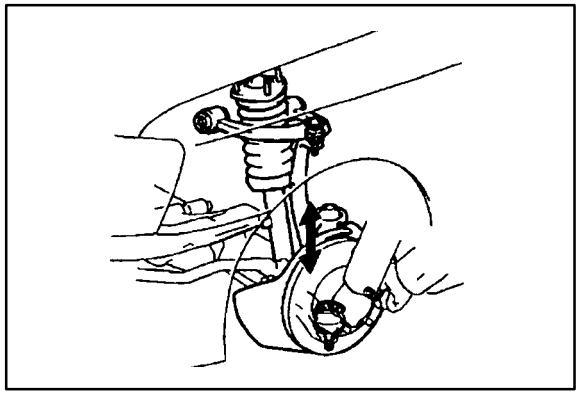
1. Inspect Lower Ball Joint Free Play

A. Move the hub up and down by hand (Most models with wish–bone suspension):

a. Remove the tire.

b. Install the 2 lug nuts.

c. Inspect the free play while moving the lug nuts up and down at a force of 67 lbf (294 N, 30 kgf).

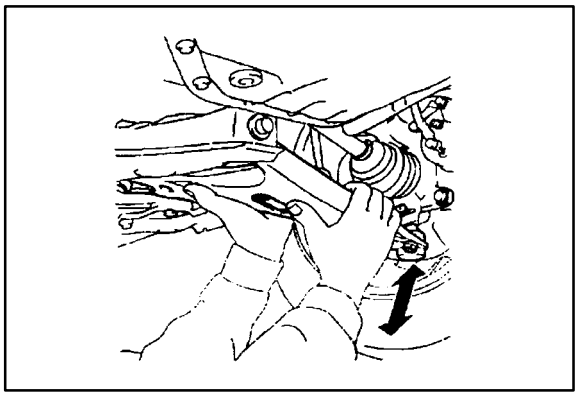


Free Play Inspection (Continued)

B. Move the lower arm by hand (All models with strut type suspension and some models with wish–bone type suspension):

a. Lift up the vehicle.

b. Inspect the free play while moving the lower arm up and down at a force of 67 lbf (294 N, 30 kgf).

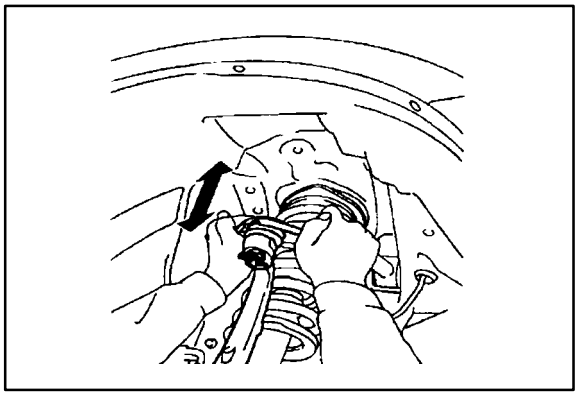


2. Inspect Upper Ball Joint Play

Move the upper arm by hand (Models where the **LOWER** control arm are linked by a torsion bar, and all models using a coil spring.

A. Remove the front tire.

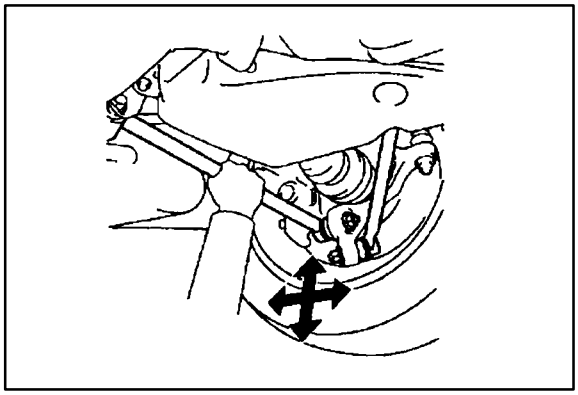
B. Inspect the free play while moving the upper arm up and down at a force of 67 lbf (294 N, 30 kgf).



3. Inspect the Suspension Arm Ball Joint Free Play

A. Lift up the vehicle.

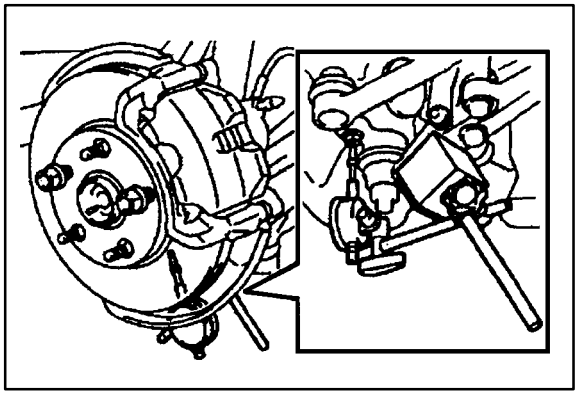
B. Inspect the free play while moving the control arm by hand.



(Reference)

Free Play Inspection Method (Gauge Installation)

- Position the dial gauge between the arm (upper or lower) and the knuckle, and measure free play.
  (This illustration shows how to measure free play for vehicles with double wishbone type suspension with coil spring).



Inspect Ball Joint Dust Cover

Check for cracks and grease leaks on the dust cover (boots).

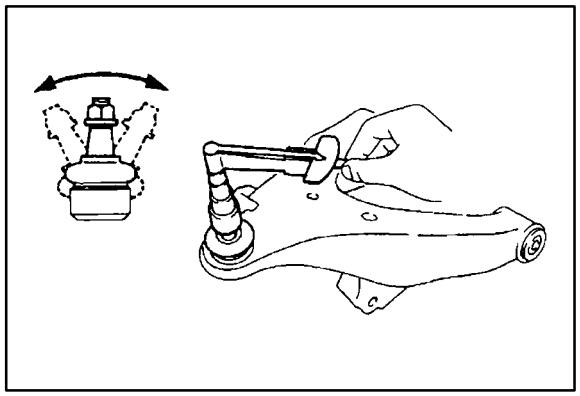
Turning Torque Inspection

Inspect Ball Joint Turning Torque

Move the stud back and forth 5 times, then turn the stud continuously at 3–5 seconds per turn, and measure the turning torque at the 5th turn.

HINT:

Refer to the table for standard values for the turning torque.



LEXUS

Technical Service Information Bulletin

May 4, 2001

Title:

REPLACEMENT CERTIFICATION LABELS

Models:

All Models

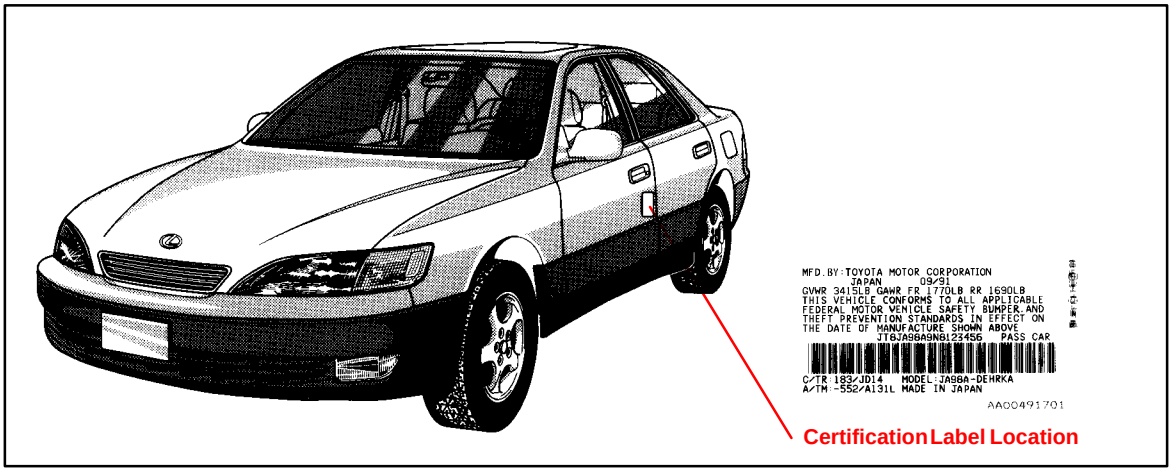
TSIB

PG015-01

PRODUCT GENERAL INFORMATION

Introduction

Replacement Certification Labels (vinyl label affixed to driver's door or door post) **may be** available from Toyota providing the request meets one of the criteria listed below.



Applicable Vehicles

- All Lexus vehicles.

Certification Label Criteria

1. The vehicle is in an accident and the label is damaged or is attached to a part that will be replaced during the repair.

NOTE:

- **Processing a new label *will be delayed significantly if the old certification label is not available.***
- **A replacement label MAY NOT be available if the vehicle is more than 5 years old and the old label does not accompany this request.**

2. The label is stolen.

Procurement Procedure

To request a replacement label, complete a copy of the form on the back of this bulletin. Your dealer parts account will be billed $10.00 for each replacement of a damaged or stolen label.

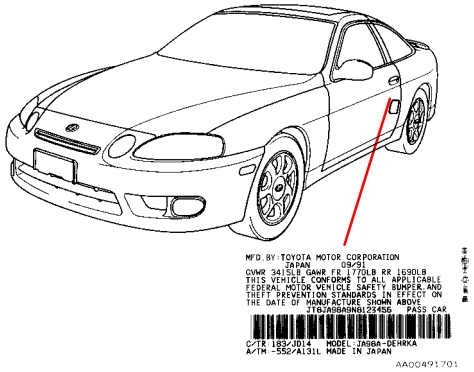
NOTE:

All replacement labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 468–3390.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

APPLICATION FOR REPLACEMENT CERTIFICATION LABEL



REASON FOR REPLACEMENT

- ☐ ACCIDENT DAMAGE
- ☐ STOLEN
- ☐ OTHER _____

REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

ATTACH ORIGINAL LABEL HERE

NOTE:
Original label MUST accompany this application or order will be significantly delayed.

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: ( ) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL (*DO NOT FAX*) THE COMPLETED REQUEST FORM WITH THE OLD LABEL TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S207
19001 S. WESTERN AVENUE
TORRANCE, CA 90509–2991

Technical Service Information Bulletin
May 4, 2001

Title:
REPLACEMENT VIN PLATES
Models:
All Models

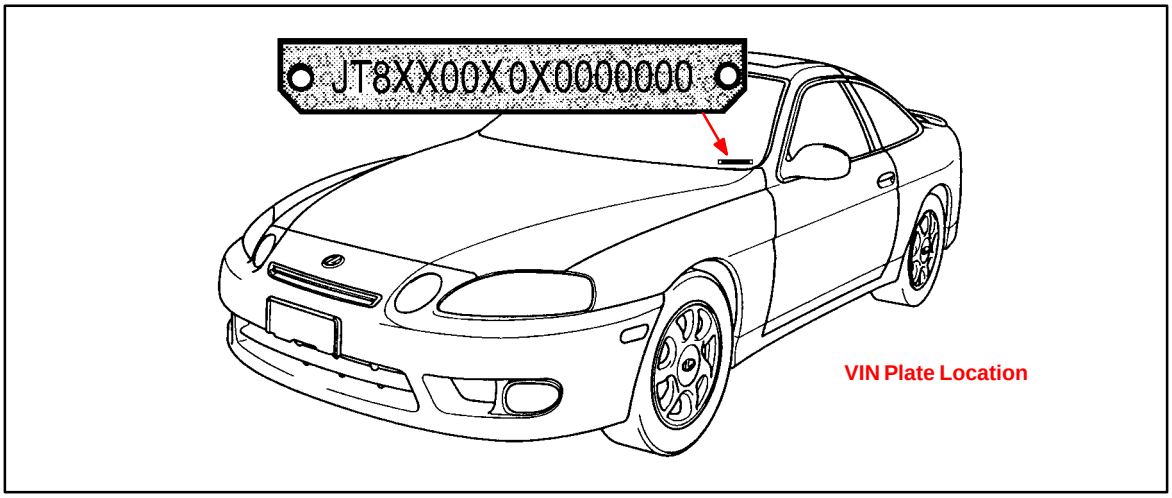
TSIB

PG016-01

PRODUCT GENERAL INFORMATION

Introduction

Replacement **VIN** plates (metal plates riveted to dashboard) **may be** available from Lexus providing the request meets the criteria listed below.



Applicable Vehicles

- All Lexus vehicles.

Replacement VIN Plate Criteria

- The vehicle is in an accident and the plate is damaged.

NOTE:
The original plate to be replaced MUST accompany the request.

NOTE:
If a plate is stolen, be sure to contact the State Police or your State's Department of Motor Vehicles (DMV). In most cases the State DMV will issue a unique number so that the original number can be included on stolen vehicle listings. If this is the case, a replacement plate is NOT available from Lexus. However, the original VIN, NOT the state issued VIN, must be used on all warranty claims.

Procurement Procedure

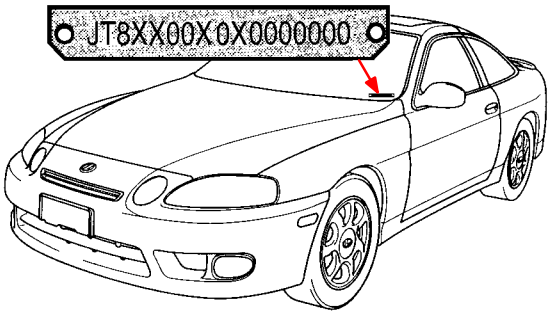
To request a replacement plate, complete a copy of the form on the back of this page. Note that the damaged VIN plate **MUST** accompany the request form. Your dealer parts account will be billed $10.00 for each replacement of a damaged plate.

NOTE:
All replacement plates for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 468–3390.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

APPLICATION FOR REPLACEMENT VIN PLATE



REASON FOR REPLACEMENT

☐ ACCIDENT DAMAGE

☐ OTHER _____

REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____

STREET ADDRESS

_____

CITY, STATE, ZIP CODE

TELEPHONE: ( ) _____

AREA CODE, TELEPHONE NUMBER

CONTACT: _____

FIRST NAME, LAST NAME

MAIL (*DO NOT FAX*) THE COMPLETED REQUEST FORM WITH THE OLD PLATE TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S207
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509–2991

LEXUS

Technical Service Information Bulletin

December 24, 1999

Title:

YEAR 200 READINESS DISCLOSURE

Models:

All Models

TSIB

Introduction

Based upon information we have obtained from our suppliers,[1] all factory–installed systems in Lexus cars and sports utility vehicles distributed and/or sold by Lexus ("Vehicles") will not be affected by the change of date from 1999 to the year 2000.

Lexus anticipates no problems with past, current or future Lexus brand vehicles or Genuine Lexus parts and accessories regarding year 2000 readiness. We hope the following information is helpful to you.

Please contact our Customer Service Department at 1–800–255–3987 should you have any other questions.

Applicable Vehicles

- **All Models**

Warranty

WARRANTY STATEMENT WITH RESPECT TO LEXUS BRAND VEHICLES

Lexus is pleased to confirm that the manufacturer's limited express warranty and Lexus' powertrain warranty warrant that all factory–installed systems in new Vehicles and Lexus Certified Pre–Owned Vehicles shall be free of any defect arising solely due to a change in date from the year 1999 to the year 2000.[2]

With respect to Vehicles no longer covered under such Lexus limited express warranty, Lexus is not aware of any operational safety or functional impact the year 2000 date change would have upon any factory–installed system in Lexus Vehicles. Should Lexus become aware of any material impact to the operational safety or functionality of such systems, Lexus shall publish such information promptly.

WARRANTY STATEMENT WITH RESPECT TO GENUINE LEXUS PARTS AND ACCESSORIES

Lexus is pleased to confirm that the manufacturer's limited express warranty warrants that all new Lexus Genuine Parts and Accessories shall be free of any defect arising solely due to a change in date from the year 1999 to the year 2000.[2]

With respect to products no longer covered under a Lexus limited express warranty, Lexus is not aware of any operational safety or functional impact the year 2000 date change would have upon such products. Should Lexus become aware of any material impact to the operational safety or functionality of such a product, Lexus shall publish such information promptly.

1 Lexus relies on the statements made by its suppliers and has not independently verified such information.

2 Please refer to terms of limited express warranty for disclaimers, limitations and restrictions.

Parts & Accessories

GENUINE LEXUS PARTS AND ACCESSORIES

Based upon information we have obtained from our suppliers,[1] all new Genuine Lexus Parts and Accessories will not be affected by the change of date from 1999 to the year 2000.

DEALER–INSTALLED AND OTHER THIRD PARTY–INSTALLED SYSTEMS/PRODUCTS

Our dealers and distributors may sell and/or install products that are not Genuine Lexus Parts and Accessories. Lexus can only determine the Year 2000 status of Genuine Lexus Parts and Accessories. Therefore, the above statements do not apply to products that are not Genuine Lexus Parts and Accessories or were not installed by the factory. We encourage you to contact your dealer or other relevant third party regarding products installed on your Lexus vehicle(s) that are not Genuine Lexus Parts and Accessories and/or were not installed by the factory to determine any Year 2000 issues associated with those products.

[1] Lexus relies on the statements made by its suppliers and has not independently verified such information.

LEXUS

Technical Service Information Bulletin

June 7, 2002

Title:

MIDTRONICS BATTERY TESTER SOFTWARE UPDATE

Models:

All Models & Model Years Through Current

TSIB

SS002-02

SPECIAL SERVICE TOOLS

Introduction

The internal software of the Midtronics Battery Tester can now be periodically updated to support future models. New updates will include new battery warranty codes and testing information.

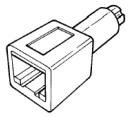
The Technical Information System (TIS) will be the primary distribution method for battery tester software updates. Utilizing the new Midtronics Update Wizard (MUW) and the new essential SST (Midtronics Battery Tester Adapter), you will be able to quickly and easily update your Midtronics Battery Tester.

This bulletin will show you how to use and install the Midtronics Update Wizard to update the Midtronics tester software.

Applicable Vehicles

- **All models and model years through current.**

Required Tools & Material

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Midtronics Battery Tester*	00002–MP815–L	1
Midtronics Battery Tester Adapter* 	00002–DMPUC	1

* Essential SSTs.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Process Overview

The Midtronics Battery Tester Software Update is a 2-step process:

1. **Installing the Midtronics Update Wizard (MUW).**
   The Midtronics Update Wizard (MUW) is an application that only needs to be installed on the PC one time. This bulletin will provide the steps to install the MUW.
2. **Using the Midtronics Update Wizard (MUW).**
   The Midtronics Update Wizard (MUW) will be used with each battery tester software update. The Update Wizard will walk you through each step to connect the PC to the tester and perform the update.

Operation Procedure: Preparation

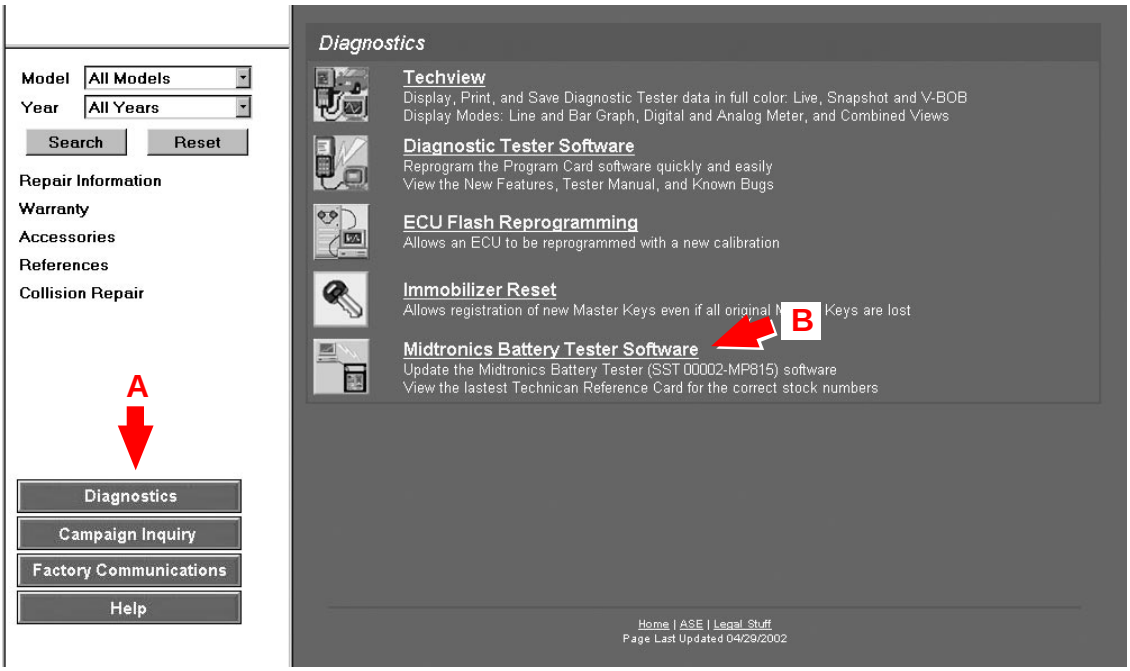
Before Installation or Use of the Midtronics Update Wizard (MUW):

Steps A and B are required to begin the update process. (Refer to Figure 1.)

A. Open TIS (Technical Information System) and go to the “Diagnostics” section.

B. Click on the text “Midtronics Battery Tester Software.”

FIGURE 1.



Operation Procedure

1. Installing the Midtronics Update Wizard (MUW).

NOTE:

The Midtronics Update Wizard only needs to be installed once and must be installed before the rest of the update process can take place. If this step is already complete, continue on to step 2.

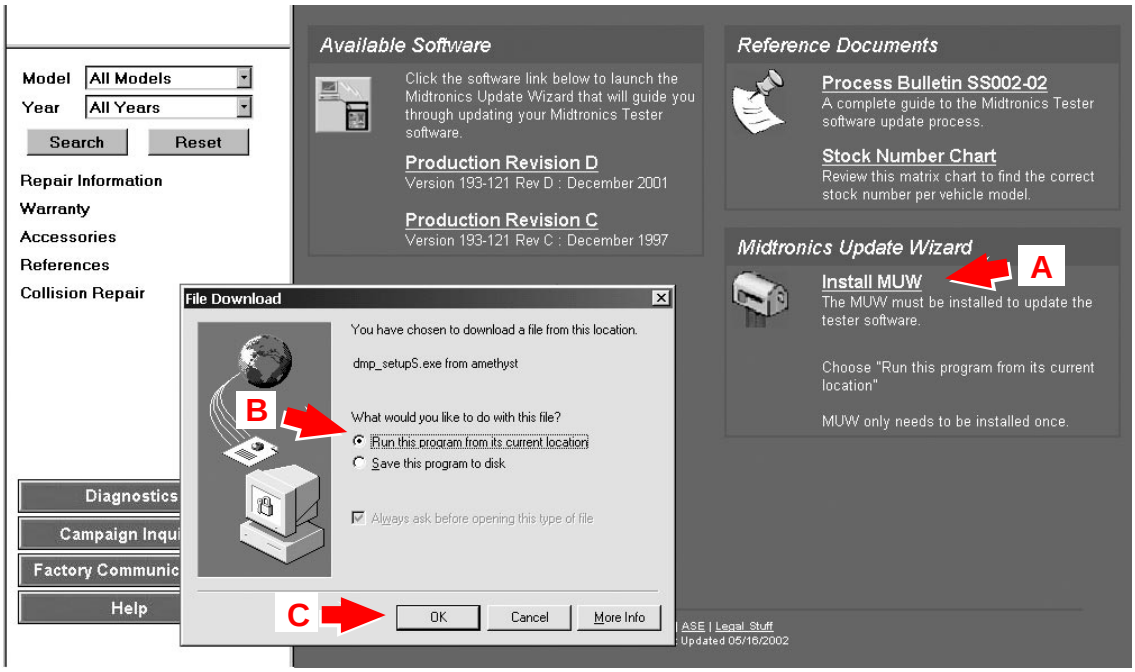
A. Click on the text “Install MUW.” (Figure 2.)

B. The file download window will appear. Click on “Run this program from it’s current location.”

C. Click the “OK” button.

D. Allow the Update Wizard to perform its self–installation. This will take only a few minutes.

FIGURE 2.



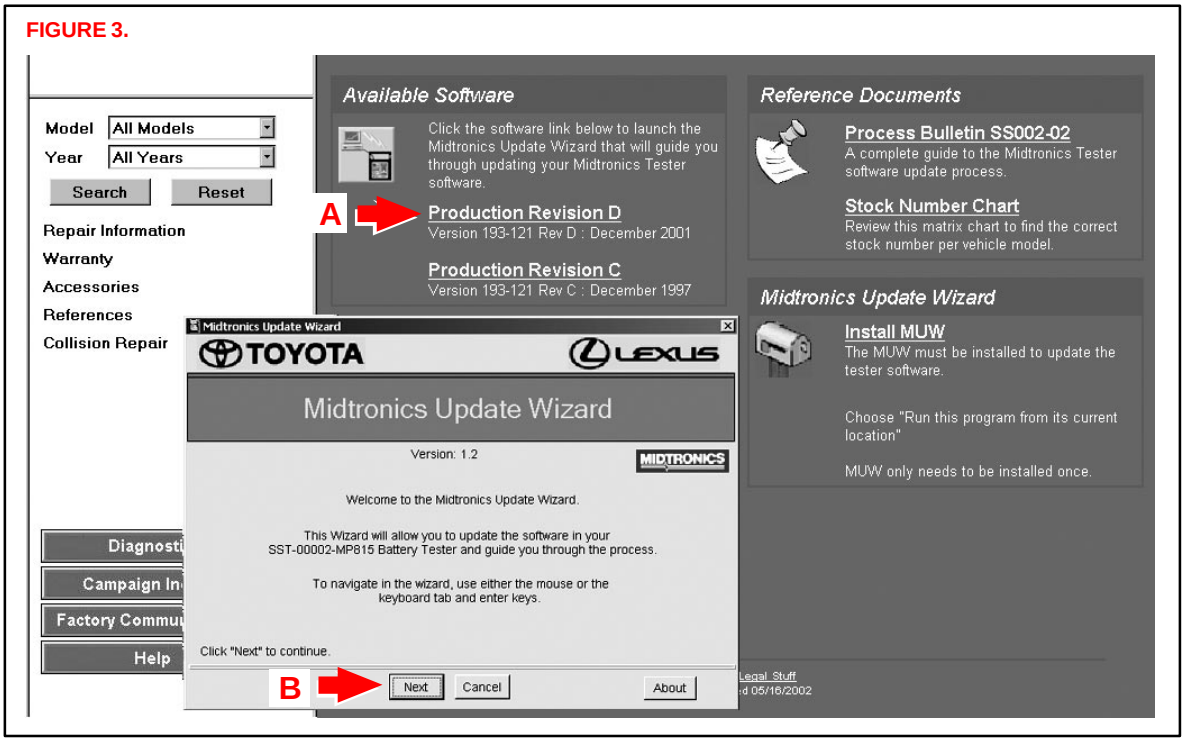
Operation Procedure (Continued)

2. Using the Midtronics Update Wizard (MUW).

A. Click on the latest version of production software. (Figure 3.) This will begin the software update process.

B. The next screen to appear will be the first screen of the software update. Click "Next" to continue.

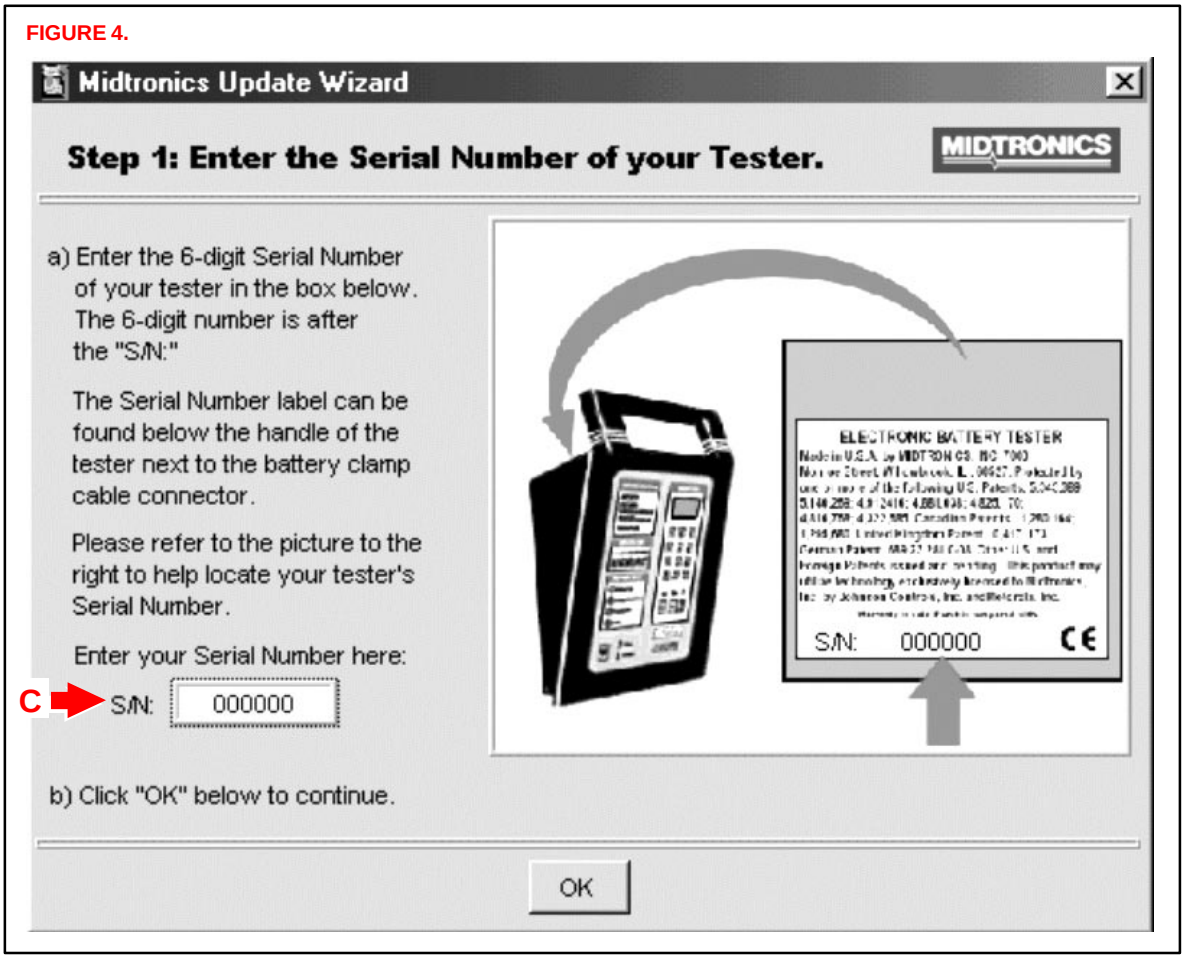
FIGURE 3.



Operation Procedure (Continued)

C. Enter the serial number of the battery tester then click “OK.” (Figure 4.)

FIGURE 4.



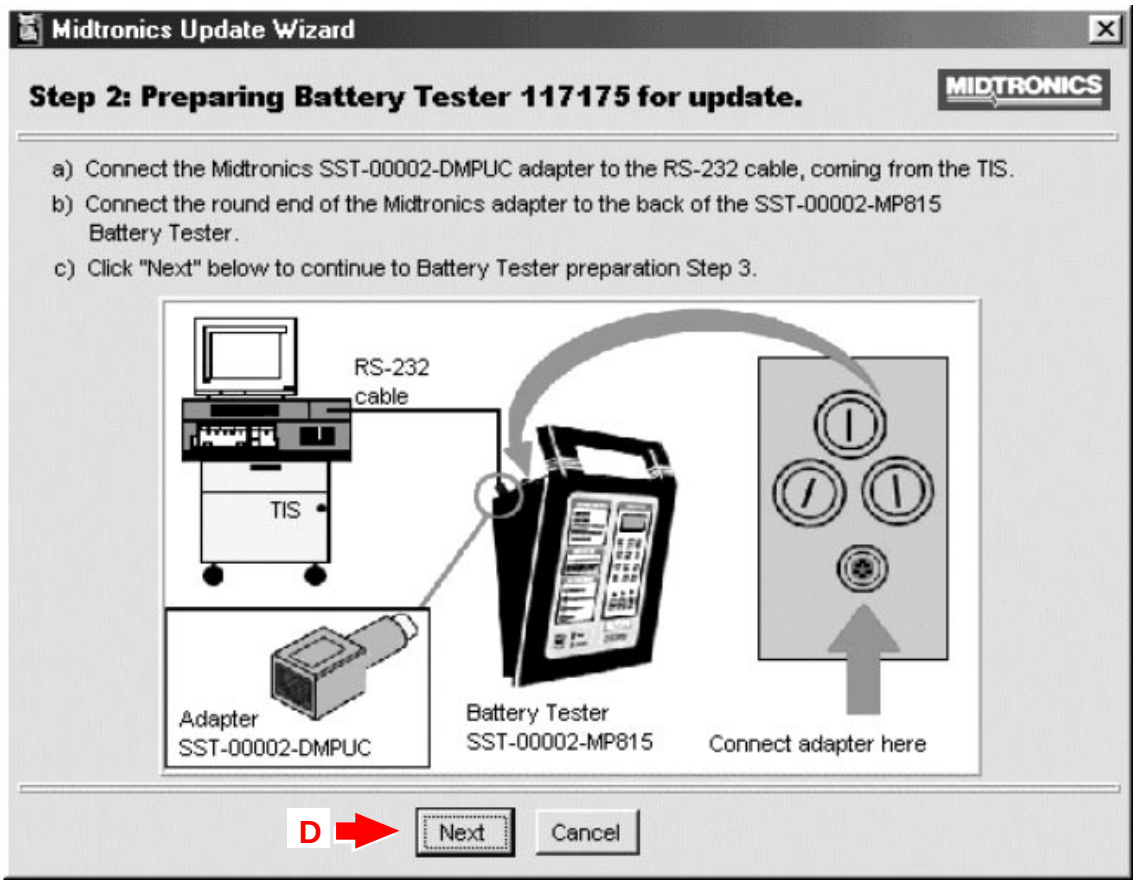
Operation Procedure (Continued)

D. Connect the Midtronics Battery Tester to TIS as instructed (Figure 5), then click "Next."

NOTE:

Connecting the Midtronics Battery Tester to the TIS station will require the use of SST 00002–DMPUC. This is an adapter that allows the TIS RS–232 cable to plug into the Battery Tester. (Figure 5.)

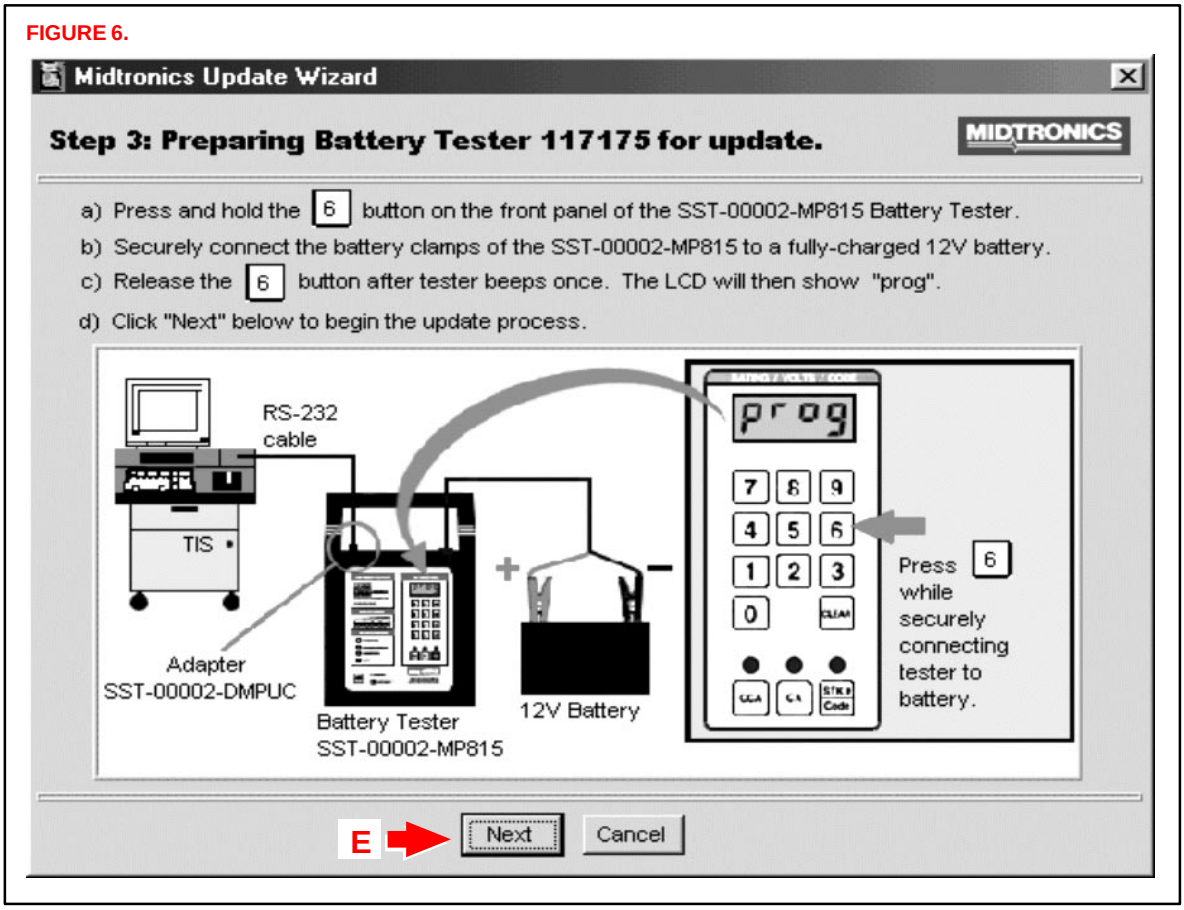
FIGURE 5.



Operation Procedure (Continued)

E. Follow the instructions to put the Midtronics Battery Tester into the correct mode (Figure 6), then click “Next.”

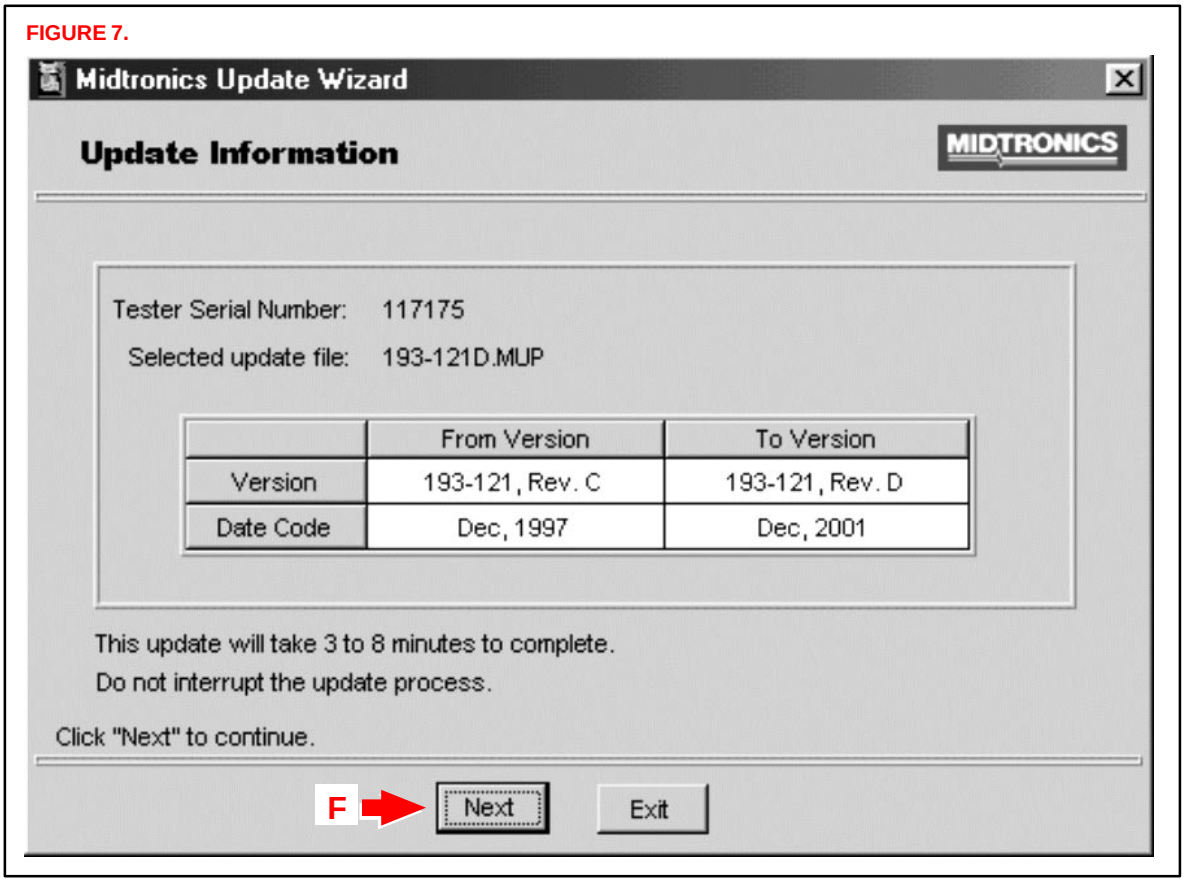
FIGURE 6.



Operation Procedure (Continued)

F. Confirm the software version and click “Next.” (Figure 7.)

FIGURE 7.



Figures 7–1 and 7–2 are confirmation dialogs that will pop up over the Update Information window (Figure 7) when:

- The update file is an older revision level than that found in the battery tester (Figure 7–1) or
- The update file is the same revision level as that found in the tester (Figure 7–2).

Click the “Yes” button to clear the pop–up dialog and continue with the update.

FIGURE 7–1.

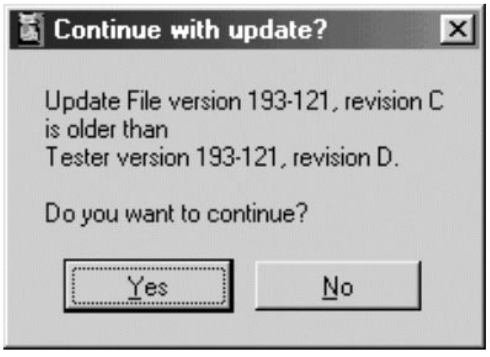
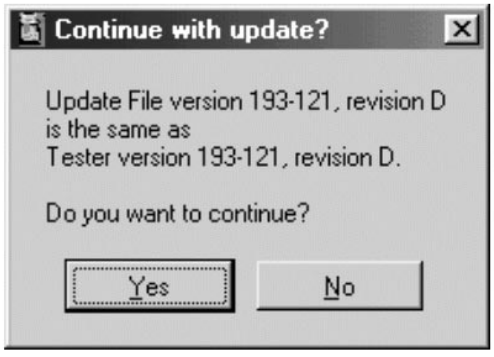


FIGURE 7–2.

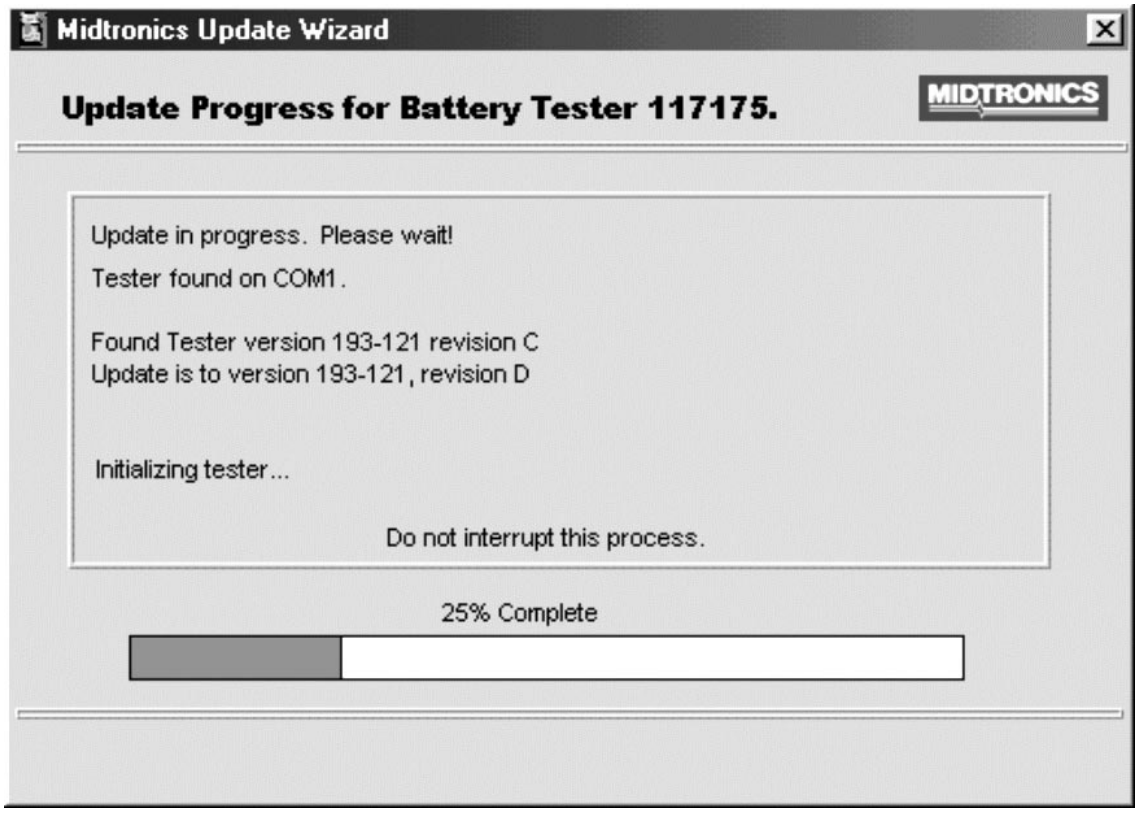


Operation Procedure (Continued)

G. The Midtronics Update Wizard (MUW) will now update the Midtronics Battery Tester software. (Figure 8.)

NOTE:
Do not interrupt this process (it will take approximately 5 minutes).

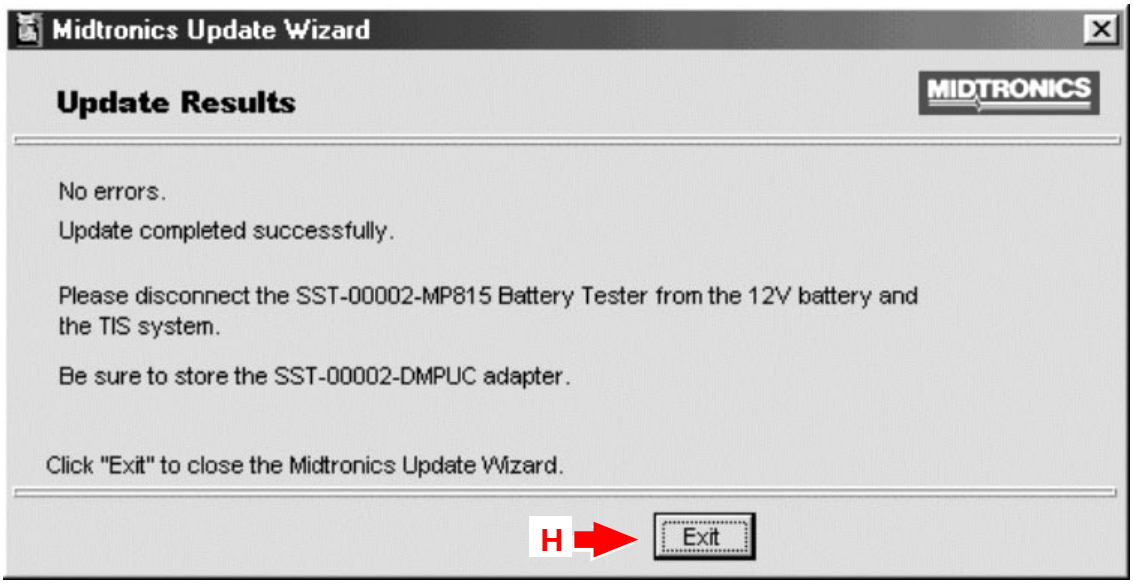
FIGURE 8.



Operation Procedure (Continued)

H. Upon successful completion, the Update Results screen will display “No errors” and the update is now complete. Click on the “Exit” button. (Figure 9.)

FIGURE 9.



Your Midtronics Battery Tester is now updated and ready for use.

NOTE:

BE SURE TO REGULARLY CHECK TIS FOR FUTURE UPDATES:

- **The Midtronics Battery Tester OE Stock Number Card will no longer be printed and shipped. It will be distributed through TIS from now on.**
- **Latest versions of Tester update software will be available on TIS.**

LEXUS

Technical Service Information Bulletin

December 8, 2000

Title:

DIAGNOSTIC TESTER COMMUNICATION ERROR WITH T.I.S.

Models:

All Models

TSIB

SS003-00

SPECIAL SERVICE TOOLS

Introduction

Certain Diagnostic Testers (SST P/N 02002019) may experience a communication error with the Technical Information System (T.I.S.). To correct this condition, the tester manufacturer, Vetronix Corporation, will recall and update affected units. The following explains how to determine which Diagnostic Testers may exhibit this problem and outlines the procedure to return the tester for repair.

Applicable Diagnostic Testers

Diagnostic Testers within the serial number range below are known to experience these communication errors.

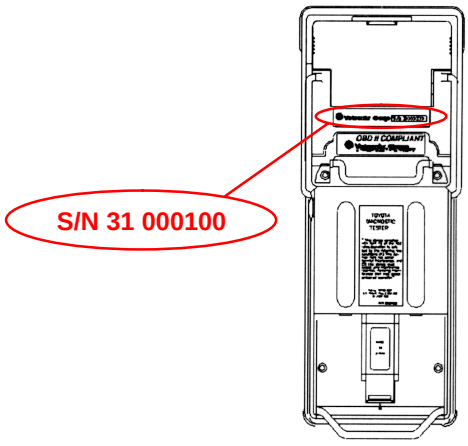
STARTING SERIAL NUMBER	ENDING SERIAL NUMBER
31 000000	31 000100

Repair Procedure

1. Determine the Diagnostic Tester serial number located on the back of the tester (see Figure 1).
2. If the serial number is within the range listed above, call Vetronix Toyota Customer Service at 1-800-321-4889, ext. 3123, to obtain a pre-paid shipping package for the Diagnostic Tester.
3. The shipping package will arrive within 2 business days. Secure the tester in the provided package following the enclosed shipping instructions.

   Diagnostic Testers are guaranteed to be returned within 3 business days from receipt at Vetronix (except over holidays).

Figure 1
Back View of Diagnostic Tester



NOTE:
This update will be performed free of charge.

Diagnostic Testers outside of the serial number range above are not affected and do not need this repair. If a Diagnostic Tester outside this range experiences a similar problem, please call Dealer Daily Support at 1-877-DL-DAILY or Vetronix Toyota Customer Service at 1-800-321-4889, ext. 3123.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

February 16, 2001

Title:

STEERING WHEEL NUT SERVICE SPECIFICATION

Models:

All Applicable Models

TSIB

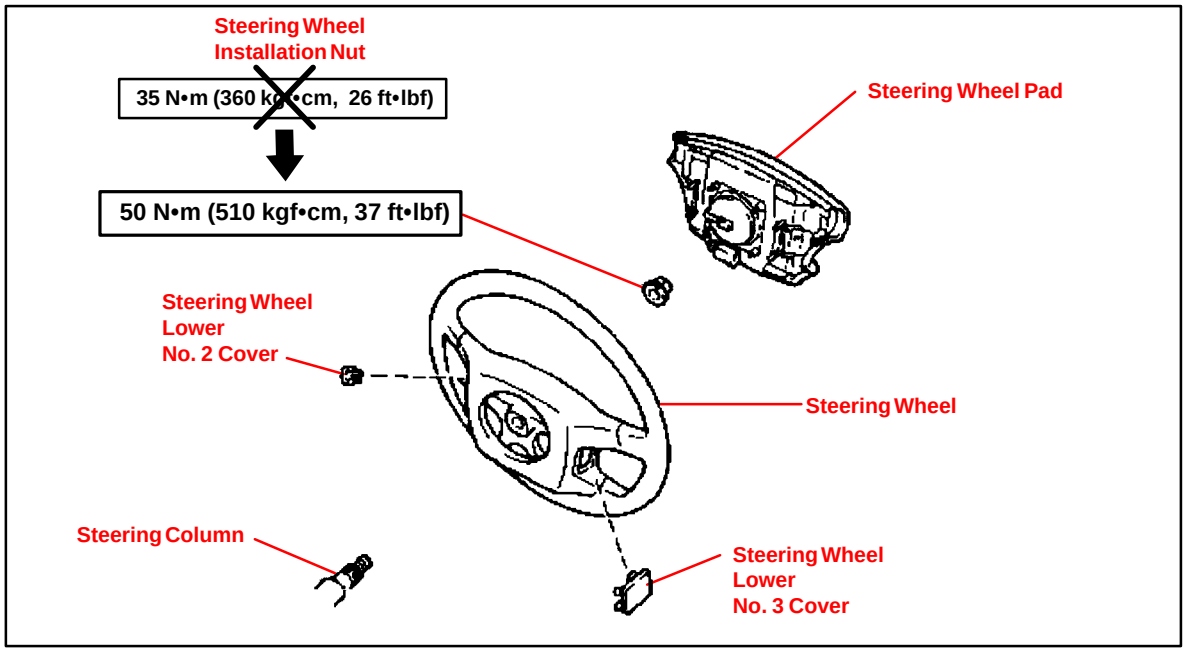
Introduction

To make the steering wheel installation procedure similar for all models, the steering wheel nut tightening torque has been standardized.

Applicable Vehicles

MODEL		MODEL YEARS
LS 400	UCF10, 20	1990 – 2000
SC 400/300	JZZ31, UZZ30	1992 – 2000
GS 400/300	JZS147, 160, UZS160	1993 – 2000
ES 300	MCV10, 20	1994 – 2000
LX 450	FZJ80	1996 – 1997
LX 470	UZJ100	1998 – 2000
RX 300	MCU10, 15	1999 – 2000
IS 300	JCE10	2001

Service Information



Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

STEERING GEAR/STEERING WHEEL REMOVAL AND INSTALLATION

Anytime the steering gear is removed on a vehicle equipped with an SRS airbag, the steering wheel must also be removed. Use of the following steps for reinstallation and re–centering of the steering wheel will prevent possible damage to the spiral cable.

REQUIRED STEPS FOR STEERING GEAR REMOVAL AND INSTALLATION:

Removal:

- Place front wheels facing straight ahead.
- Remove the steering wheel pad.
- Remove the steering wheel.

Installation:

- Place front wheels facing straight ahead.
- Center the spiral cable.
- Install the steering wheel.
- Install the steering wheel pad.

STEERING GEAR/STEERING WHEEL REMOVAL PROCEDURES:

Follow the steps below to remove the steering wheel, before removing the steering gear, from the vehicle.

1. Place front wheels in the straight ahead position.
2. With ignition switch in lock position, disconnect the negative terminal of the battery.
3. Remove Steering wheel pad.

NOTICE: If the airbag connector is disconnected with the ignition switch at “ON” or “ACC,” a “Diagnostic Trouble Code” will be recorded.

Never use airbag parts from another vehicle. When replacing parts, replace with new parts.

a. Remove the steering wheel lower cover.

STEERING GEAR/STEERING WHEEL REMOVAL PROCEDURES (CONT'D):

b. Using a torx socket wrench, loosen the torx screws until the groove along the screw circumference catches on the screw case. SST 09042–00010. (See Fig. 1)

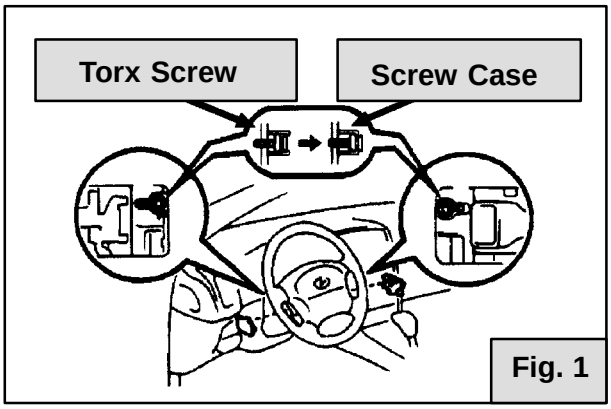


Fig. 1

c. Pull the wheel pad away from the steering wheel and disconnect the airbag connector. (See Fig. 2)

CAUTION: When storing the wheel pad, keep the upper surface of the pad facing up.

Never disassemble the wheel pad.

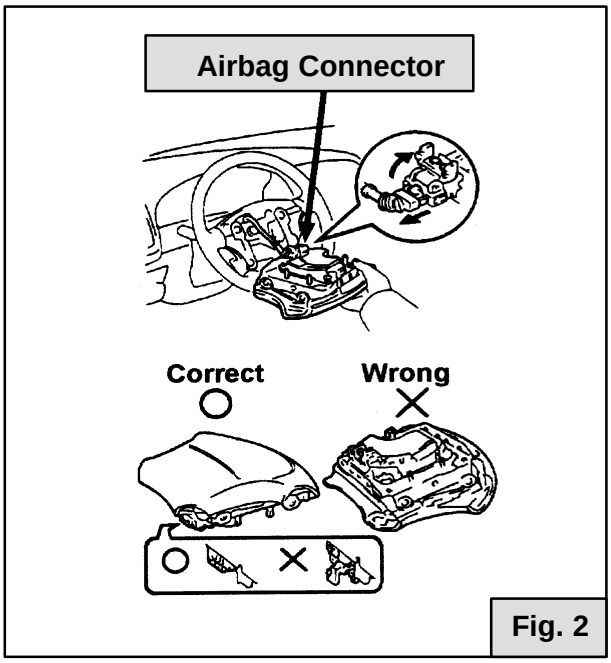


Fig. 2

NOTICE: When removing the wheel pad, take care not to pull the airbag wiring harness.

4. Remove the steering wheel.

a. Disconnect the spiral cable connector.

b. Remove the wheel set nut.

c. Place matchmarks on the wheel and steering main shaft. (See Fig. 3)

d. Using the appropriate SST, remove the wheel. SST 09950–50010 (set includes 09951–05010, 09952–05010, 09953–05020, 09954–05020)

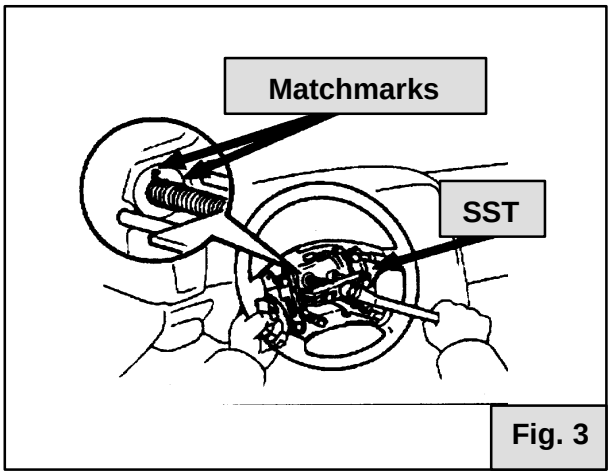


Fig. 3

For further disassembly of the steering column, refer to the Steering (SR) section of the Repair Manual.

STEERING GEAR/STEERING WHEEL INSTALLATION PROCEDURES:

Follow the steps below to install the steering wheel, after installing the steering gear.

1. Place front wheels in the straight ahead position.

STEERING GEAR/STEERING WHEEL INSTALLATION PROCEDURES (Cont'd):

2. Center spiral cable.
   a. Turn the cable counterclockwise by hand until it becomes harder to turn.
   b. Then rotate the cable clockwise about 2.5 or 3 turns to align the marks. (See Fig. 4)

NOTE: The number of turns clockwise varies by model. See the "SR" section of the vehicle's repair manual for the information.

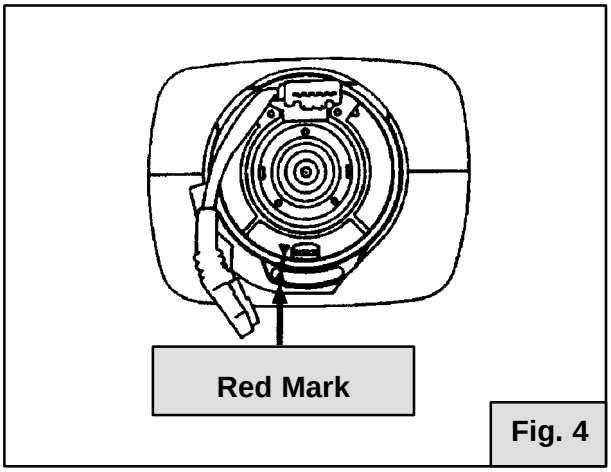


Fig. 4

3. Install the steering wheel.
   a. Align the matchmarks on the wheel and steering main shaft.
   b. Temporarily tighten the wheel set nut.
   c. Connect the spiral cable connector.

4. Bleed Power Steering System (when applicable).
5. Check steering wheel center point.
6. Torque steering wheel set nut. See the applicable vehicle's repair manual for the torque specification.
7. Install steering wheel pad.

NOTICE: Make Sure the pad is centered and installed to the specified torque.

If the pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.

When installing the pad, take care that the wiring does not interfere with other parts and is not pinched between other parts.

   a. Connect the airbag wiring connector.
   b. Install the pad after confirming that torx screws are in the screw case.
   c. Using a torx socket, torque the screws to the specification in the vehicle's repair manual.
      SST 09042–00010.
      (See Fig. 5)
   d. Install the steering wheel lower cover.

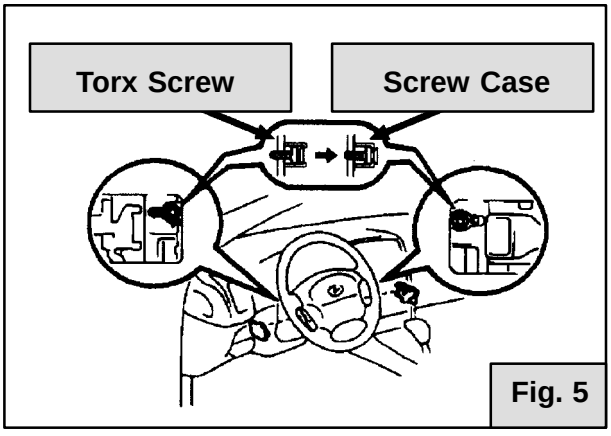
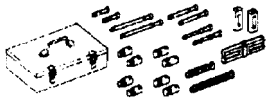
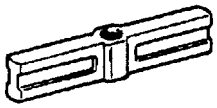
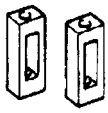
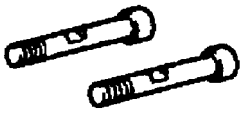


Fig. 5

SST (SPECIAL SERVICE TOOLS):

SSTs	TOOL NUMBER	TOOL NAME	APPLICATION
	09950–50010	Puller C Set	Power tilt/power telescoping steering column
	09951–05010	Hanger 150	
	09952–05010	Slide Arm	
	09953–05020	Center Bolt 150	
	09954–05020	Claw No. 2	

RECOMMENDED TOOLS AND NECESSARY EQUIPMENT:

TOOL	TOOL NUMBER	TOOL NAME	APPLICATION
	09042–00010	Torx Socket T 30	Steering wheel pad

EQUIPMENT: Torque Wrench

LUBRICANT: ATF DEXRON II or III

LEXUS

Technical Service Information Bulletin

April 9, 1999

Title:

REVISED DRIVE SHAFT GREASE

Models:

LS 400, GS 300/400, SC 300/400, ES 250/300 & RX 300

TSIB

Introduction

The greases supplied in replacement Inboard and Outboard Drive Shaft Boot Kits for the following models, has been revised.

With this revision, the grease compositions have been changed and are now both the **same color**. To correctly lubricate each joint, consult the Service Repair Manual as to which **size** packet of grease is designated for each Drive Shaft Joint Assembly.

NOTE:

Although Inboard and Outboard greases are now the same color, their compositions are different.

Affected Vehicles

- **All LS 400, GS 300/400, SC 300/400, ES 250/300 & RX 300 Models.**

Required Tools and Material

As outlined in the Service Repair Manual.

Repair Procedure

Refer to the appropriate Repair Manual for installation and lubrication information for Drive Shaft Joint Assemblies.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

September 10, 1999

Title:

AUTOMATIC TRANSMISSION FLUIDS

Models:

All Models

TSIB

REVISION NOTICE:

The information contained in this TSIB updates TC003–98 dated June 19, 1998.

Introduction

Automatic Transmission Fluid Type T–IV now replaces Type T–II fluid. Use Type T–IV for all applications that specify ATF Type T–II.

Please refer to the following table for the interchangeability between each ATF.

Applicable Vehicles

- **All vehicles produced after 1990 with Automatic Transmissions specified to use ATF Type T, T–II and T–IV.**

SPECIFIED ATF	TYPE OF ATF			
	DEXRON® II OR III	TYPE T	TYPE T–II	TYPE T–IV
DEXRON® II OR III	OK	X	X	X
TYPE T	X	OK	X	OK
TYPE T–II	X	X	OK	OK
TYPE T–IV	X	X	X	OK
X = NOT USABLE				

NOTICE:

With the exception of mixing ATF Type T with Type T–IV fluids, different types of fluids must not be mixed.

Parts Information

SIZE	NEW PART NUMBER	PART NAME
4 Liter	08886–01705	ATF Type T–IV

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

FOREWORD

This wiring diagram manual has been prepared to provide information on the electrical system of the 1993 LEXUS ES300.

Applicable models: VCV 10 Series

For service specifications and repair procedures of the above models other than those listed in this manual, refer to the following manuals;

Manual Name	Pub. No.
• 1992 LEXUS ES300Repair Manual Volume 1 Volume 2 • 1993 LEXUS New Car Features	 RM223U1 RM223U2 NCF089U

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

TOYOTA MOTOR CORPORATION

NOTICE

When handling supplemental restraint system components (removal, installation or inspection, etc.), always follow the direction given in the repair manuals listed above to prevent accidents and supplemental restraint system malfunction.

INTRODUCTION

This manual consists of the following 11 sections:

No.	Section	Description
A	INDEX	Index of the contents of this manual.
	INTRODUCTION	Brief explanation of each section.
B	HOW TO USE THIS MANUAL	Instructions on how to use this manual.
C	TROUBLE–SHOOTING	Describes the basic inspection procedures for electrical circuits.
D	ABBREVIATIONS	Defines the abbreviations used in this manual.
E	GLOSSARY OF TERMS AND SYMBOLS	Defines the symbols and functions of major parts.
F	RELAY LOCATIONS	Shows position of the Electronic Control Unit, Relays, Relay Block, etc. This section is closely related to the system circuit.
G	ELECTRICAL WIRING ROUTING	Describes position of Parts Connectors, Splice points, Ground points, etc. This section is closely related to the system circuit.
H	POWER SOURCE (Current Flow Chart)	Describes power distribution from the power supply to various electrical loads.
I	INDEX	Index of the system circuits.
	SYSTEM CIRCUITS	Electrical circuits of each system are shown from the power supply through ground points. Wiring connections and their positions are shown and classified by code according to the connection method. (Refer to the section, “How to use this manual”). The “System Outline” and “Service Hints” useful for troubleshooting are also contained in this section.
J	GROUND POINTS	Shows ground positions of all the parts described in this manual.
K	OVERALL WIRING DIAGRAM	Provides circuit diagrams showing the circuit connections.

This manual provides information on the electrical circuits installed on vehicles by dividing them into a circuit for each system.

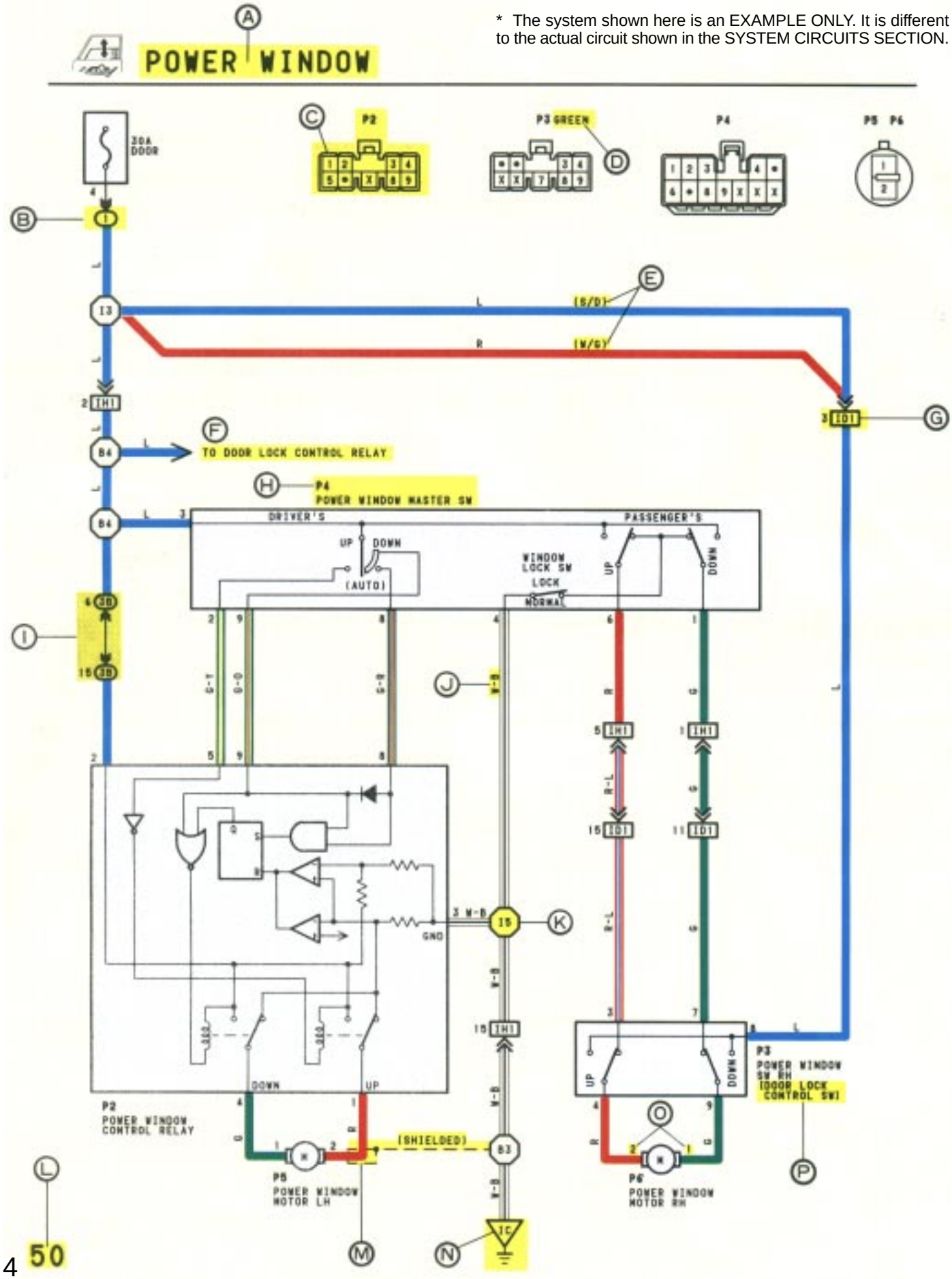
The actual wiring of each system circuit is shown from the point where the power source is received from the battery as far as each ground point. (All circuit diagrams are shown with the switches in the OFF position.)

When troubleshooting any problem, first understand the operation of the circuit where the problem was detected (see System Circuit section), the power source supplying power to that circuit (see Power Source section), and the ground points (see Ground Points section). See the System Outline to understand the circuit operation.

When the circuit operation is understood, begin troubleshooting of the problem circuit to isolate the cause. Use Relay Location and Electrical Wire Routing sections to find each part, junction block and wiring harness connectors, wiring harness and wiring harness connectors, splice points, and ground points of each system circuit. Internal wiring for each junction block is also provided for better understanding of connection within a junction block.

Wiring related to each system is indicated in each system circuit by arrows (from __ , to __). When overall connections are required, see the Overall Wiring Diagram at the end of this manual.

* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.



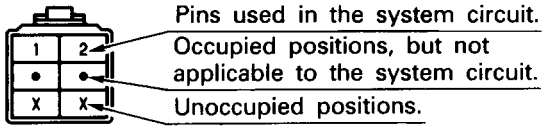
Ⓐ : System Title

Ⓑ : Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example: Indicates Relay Block No. 1.

Ⓒ : Indicates the connector to be connected to a part (the numeral indicates the pin No.)

Explanation of pin use.



The pins shown are only for the highest grade, or only include those in the specification.

Ⓓ : Connector Color

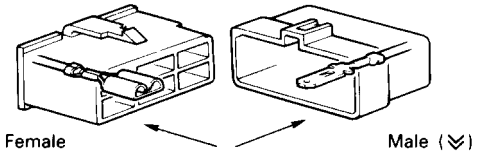
Connectors not indicated are milky white in color.

Ⓔ : ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

Ⓕ : Indicates related system.

Ⓖ : Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (⩔).

Outside numerals are pin numbers.



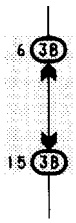
The first letter of the code for each wiring harness and wiring harness connector(s) indicates the component's location, e.g., "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

When more than one code has the first and second letters in common, followed by numbers (e.g., IH1, IH2), this indicates the same type of wiring harness and wiring harness connector.

Ⓗ : Represents a part (all parts are shown in sky blue). The code is the same as the code used in parts position.

Ⓘ : Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts (different junction blocks are shaded differently for further clarification).

Example:



3B indicates that it is inside Junction Block No. 3.

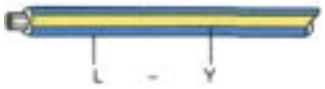
Ⓙ : Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

B	= Black	L	= Blue	R	= Red
BR	= Brown	LG	= Light Green	V	= Violet
G	= Green	O	= Orange	W	= White
GR	= Gray	P	= Pink	Y	= Yellow

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

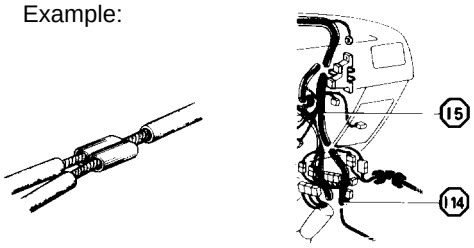
Example: L – Y



(Blue) (Yellow)

Ⓚ : Indicates a wiring Splice Point (Codes are "E" for the Engine Room, "I" for the Instrument Panel, and "B" for the Body).

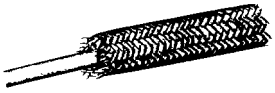
Example:



The Location of Splice Point I 5 is indicated by the shaded section.

Ⓛ : Page No.

Ⓜ : Indicates a shielded cable.



Ⓝ : Indicates a ground point.

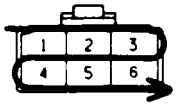
The first letter of the code for each ground point(s) indicates the component's location, e.g., "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

Ⓞ : Indicates the pin number of the connector.

The numbering system is different for female and male connectors.

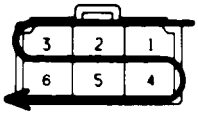
Example:

Numbered in order from upper left to lower right



Female

Numbered in order from upper right to lower left



Male

Ⓟ : When 2 parts both use one connector in common, the parts connector name used in the wire routing section is shown in square brackets [ ].

Q

SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO **TERMINAL 3** OF THE POWER WINDOW MASTER SW, **TERMINAL 2** OF THE POWER WINDOW CONTROL RELAY AND **TERMINAL 8** OF THE POWER WINDOW SW THROUGH THE **DOOR** FUSE.

1. DRIVER'S WINDOW "MANUAL UP" OPERATION BY MASTER SW

HOLDING MANUAL SW (DRIVER'S) ON "UP" POSITION LOCATED IN POWER WINDOW MASTER SW, THE CURRENT FLOWS TO **TERMINAL 5** OF THE POWER WINDOW CONTROL RELAY THROUGH **TERMINAL 3** OF THE MASTER SW → **TERMINAL 2** TO OPERATE A POWER WINDOW CONTROL RELAY. THUS THE CURRENT INSIDE THE RELAY FLOWS FROM **TERMINAL 2** OF THE RELAY → **TERMINAL 1** → **TERMINAL 2** OF THE POWER WINDOW MOTOR → **TERMINAL 1** → **TERMINAL 4** OF THE RELAY → **TERMINAL 3** → TO **GROUND**. THE MOTOR TURNS TO ASCENT THE WINDOW. RELEASING THIS SW, THE ROTATION OF MOTOR IS STOPPED AND THE WINDOWS CAN STOP AT WILL POINT.

(FOR THE "MANUAL DOWN" OPERATION, CURRENT FLOWS IN THE REVERSE DIRECTION BECAUSE THE TERMINALS WHERE IT FLOWS ARE CHANGED).

2. DRIVER'S WINDOW "AUTO DOWN" OPERATION BY MASTER SW

ONCE THE "AUTO DOWN" BUTTON OF THE MASTER SW IS PUSHED, THE CURRENT FLOWS **TERMINAL 9** OF THE POWER WINDOW CONTROL RELAY THROUGH **TERMINAL 3** OF THE MASTER SW → **TERMINALS 8** AND **9** TO OPERATE THE RELAY. THUS THE CURRENT INSIDE THE POWER WINDOW CONTROL RELAY FLOWS FROM **TERMINAL 2** OF THE RELAY → **TERMINAL 4** → **TERMINAL 1** OF THE POWER WINDOW MOTOR → **TERMINAL 2** → **TERMINAL 1** OF THE RELAY → **TERMINAL 3** → TO **GROUND**. THE MOTOR CONTINUES THE ROTATION ENABLING TO DESCENT THE WINDOW.

THE WINDOW DESCENDS TO THE END POSITION. THE CURRENT WILL BE CUT OFF TO RELEASE THE AUTO DOWN FUNCTION BASED ON THE INCREASING CURRENT BETWEEN **TERMINAL 2** OF THE RELAY AND **TERMINAL 1** IN RELAY.

3. DRIVER'S WINDOW AUTO DOWN RELEASE OPERATION BY MASTER SW

HOLDING THE MANUAL SW (DRIVER'S) ON "UP" POSITION IN OPERATING AUTO DOWN. THE CURRENT FROM **TERMINAL 3** OF THE MASTER SW PASSING **TERMINAL 2** FLOWS **TERMINAL 5** OF THE RELAY AND RELEASES THE AUTO DOWN FUNCTION IN THE POWER WINDOW CONTROL RELAY. RELEASING THE HAND FROM SW, WINDOW STOPS AND CONTINUING ON TOUCHING SW, THE FUNCTION SWITCHES TO MANUAL UP OPERATION.

4. PASSENGER'S WINDOW UP OPERATION (MASTER SW) AND WINDOW LOCK SW OPERATION

HOLDING PASSENGER'S WINDOW SW (MASTER SW) ON "UP", THE CURRENT FLOWS FROM **TERMINAL 3** OF THE MASTER SW PASSING **TERMINAL 6** TO **TERMINAL 3** OF THE POWER WINDOW SW (PASSENGER'S) → **TERMINAL 4** → **TERMINAL 2** OF THE MOTOR → **TERMINAL 1** → **TERMINAL 9** OF THE POWER WINDOW SW → **TERMINAL 7** → **TERMINAL 1** OF THE MASTER SW → **TERMINAL 4** TO **GROUND**. THE MOTOR RUNS TO ASCENT THE WINDOW. RELEASING THIS SW, THE ROTATION OF MOTOR IS STOPPED AND WINDOW CAN STOP AT WILL PLACE.

SWITCHING THE WINDOW LOCK SW IN "LOCK" POSITION, THE CIRCUIT IS OPENED AND STOPPED THE MOTOR ROTATION.

(FOR THE DOWN OPERATION, CURRENT FLOWS IN THE REVERSE DIRECTION BECAUSE THE TERMINALS WHERE IT FLOWS ARE CHANGED).

R

SERVICE HINTS

P 2 POWER WINDOW CONTROL RELAY

3–GROUND: ALWAYS CONTINUITY

2–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION

5–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION AND MASTER SW AT **UP** POSITION

8–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION AND MASTER SW AT **AUTO DOWN** POSITION

9–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION AND MASTER SW AT **DOWN** OR **AUTO DOWN** POSITION

P 4 POWER WINDOW MASTER SW

4–GROUND: ALWAYS CONTINUITY

3–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION

WINDOW LOCK SW

OPEN WITH THE WINDOW LOCK SW AT **LOCK** POSITION

S

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
P2	21	**P4**	21	**P6**	21
P3	21	**P5**	21		

T

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCK (RELAY BLOCK LOCATION)
1	16	R/B NO. 1 (INSTRUMENT PANEL LEFT SIDE)

U

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
3B	14	J/B NO. 3 AND COWL WIRE (INSTRUMENT PANEL LEFT SIDE)

V

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	26	FRONT DOOR RH WIRE AND COWL WIRE (RIGHT KICK PANEL)
IH1	26	FRONT DOOR LH WIRE AND COWL WIRE (LEFT KICK PANEL)

W

: GROUND POINTS

CODE	SEE PAGE	GROUND POINT LOCATION
IC	24	COWL LEFT

X

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 5	24	COWL WIRE

Ⓠ : Explains the system outline.

Ⓡ : Indicates values or explains the function for reference during troubleshooting.

Ⓢ : Indicates the reference page showing the position on the vehicle of the parts in the system circuit.

Example: Part “P4” (Power Window Master SW) is on page 21 of the manual.

* The letter in the code is from the first letter of the part, and the number indicates its order in parts starting with the letter.

Example: P 4

- P: Power Window Master SW
- 4: Part is 4th in order

Ⓣ : Indicates the reference page showing the position on the vehicle of Relay Block Connectors in the system circuit.

Example: Connector “1” is described on page 16 of this manual and is installed on the left side of the instrument panel.

Ⓤ : Indicates the reference page showing the position on the vehicle of J/B and Wire Harness in the system circuit.

Example: Connector “3B” connects the Cowl Wire and J/B No. 3. It is described on page 14 of this manual, and is installed on the instrument panel left side.

Ⓥ : Indicates the reference page describing the wiring harness and wiring harness connector (the female wiring harness is shown first, followed by the male wiring harness).

Example: Connector “ID1”connects the front door RH wire (female) and cowl wire (male). It is described on page 26 of this manual, and is installed on the right side kick panel.

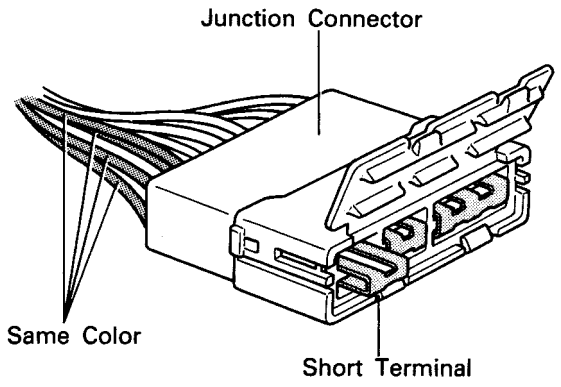
Ⓦ : Indicates the reference page showing the position of the ground points on the vehicle.

Example: Ground point “IC” is described on page 24 of this manual and is installed on the cowl left side.

Ⓧ : Indicates the reference page showing the position of the splice points on the vehicle.

Example: Splice point “I 5” is on the Cowl Wire Harness and is described on page 24 of this manual.

HINT



Junction connector (code: J1, J2, J3, J4, J5) in this manual include a short terminal which is connected to a number of wire harnesses. Always perform inspection with the short terminal installed. (When installing the wire harnesses, the harnesses can be connected to any position within the short terminal grouping. Accordingly, in other vehicles, the same wire harness form a different part.)

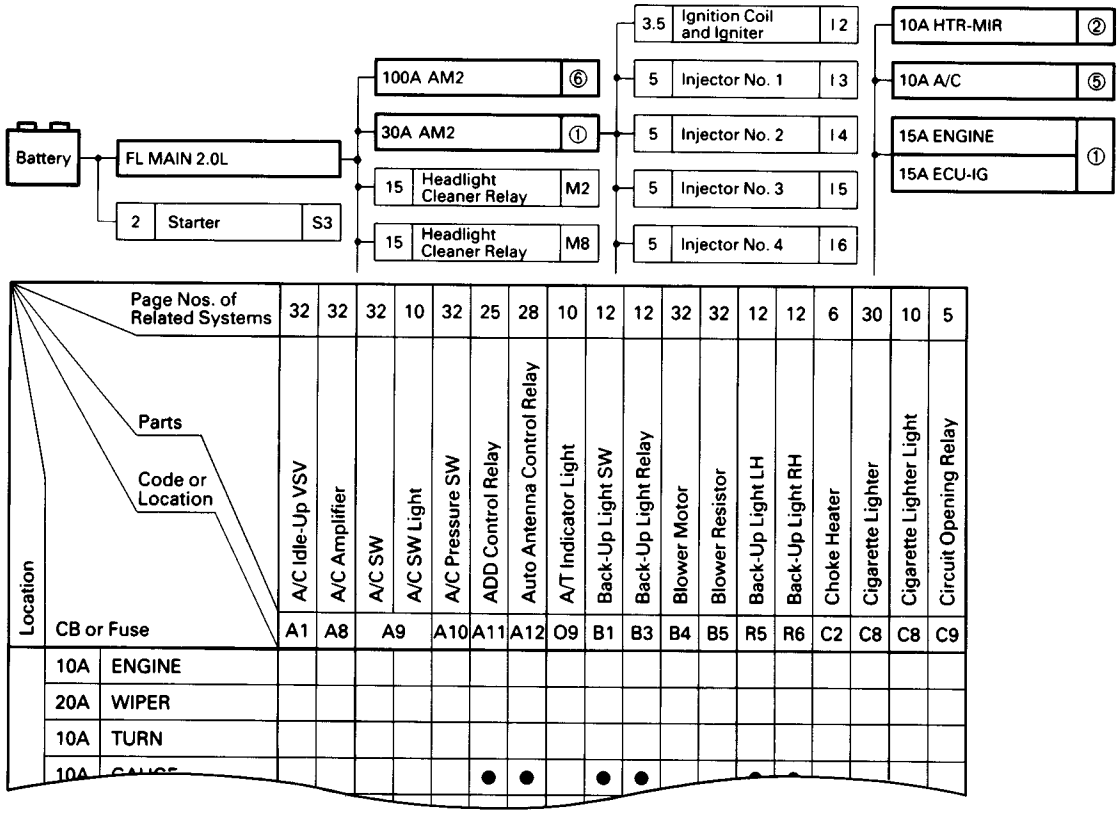
Wire harness sharing the same short terminal grouping have the same color.

The “Current Flow Chart” section, describes which parts each power source (fuses, fusible links, and circuit breakers) transmits current to. In the Power Source circuit diagram, the conditions when battery power is supplied to each system are explained. Since all System Circuit diagrams start from the power source, the power source system must be fully understood.

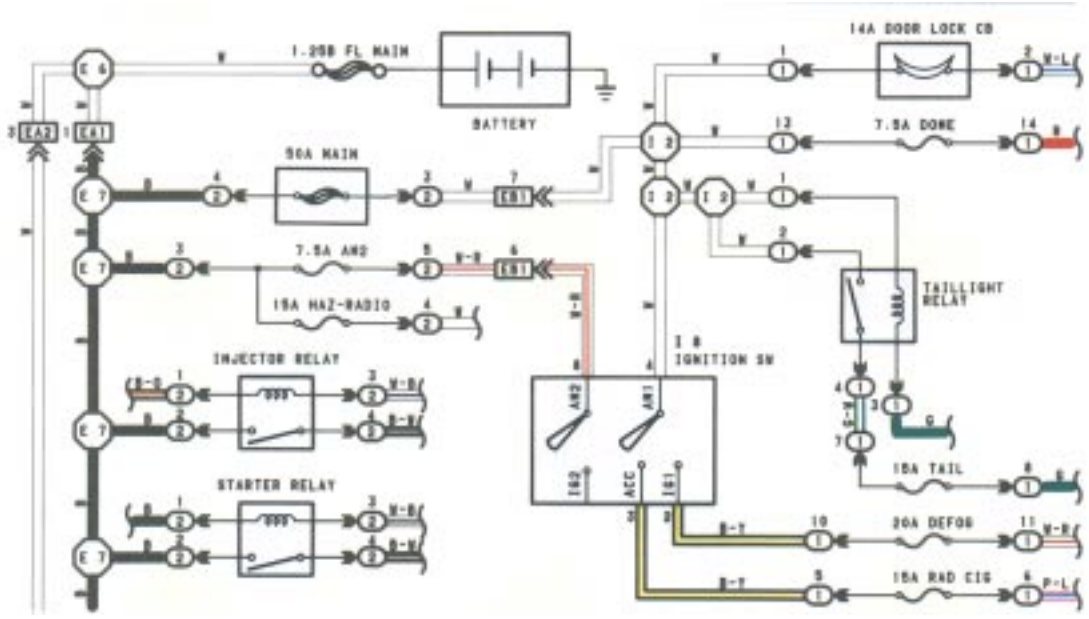
POWER SOURCE (Current Flow Chart)

The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.

The next page and following pages show the parts to which each electrical source outputs current.



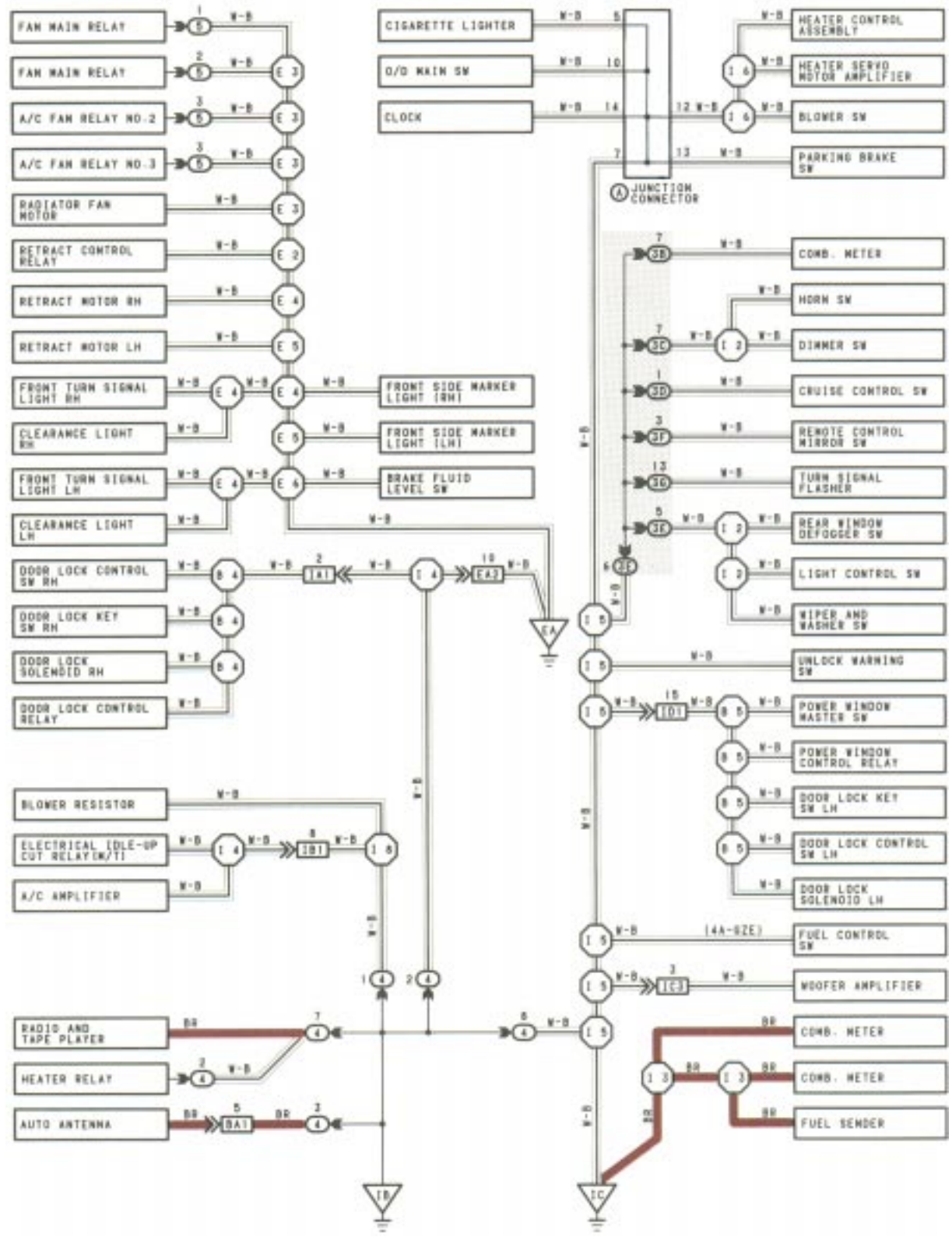
POWER SOURCE



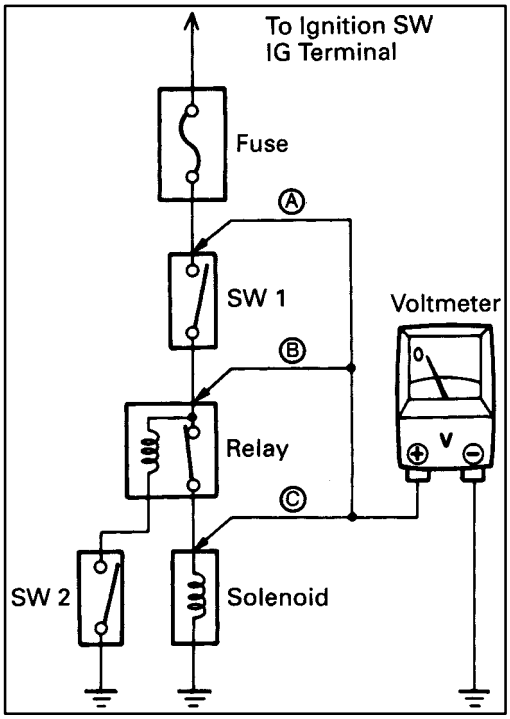
* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

The ground points circuit diagram shows the connections from all major parts to the respective ground points. When troubleshooting a faulty ground point, checking the system circuits which use a common ground may help you identify the problem ground quickly. The relationship between ground points (, , and shown below) can also be checked this way.

GROUND POINT



* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.



VOLTAGE CHECK

(a) Establish conditions in which voltage is present at the check point.

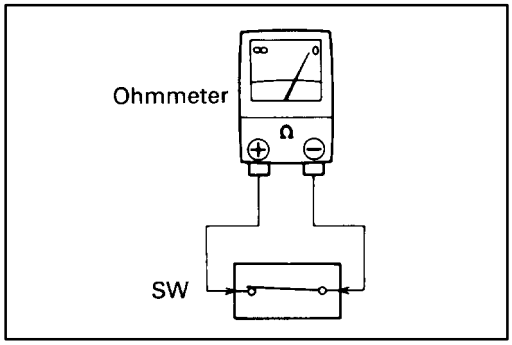
Example:

Ⓐ – Ignition SW on

Ⓑ – Ignition SW and SW 1 on

Ⓒ – Ignition SW, SW 1 and Relay on (SW 2 off)

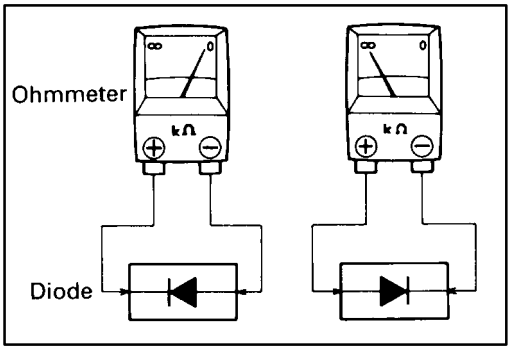
(b) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal, and the positive lead to the connector or component terminal. This check can be done with a test light instead of a voltmeter.



CONTINUITY AND RESISTANCE CHECK

(a) Disconnect the battery terminal or wire so there is no voltage between the check points.

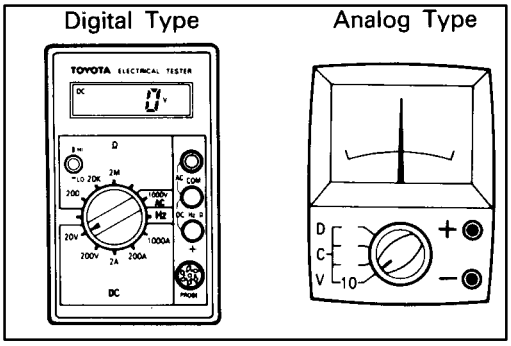
(b) Contact the two leads of an ohmmeter to each of the check points.



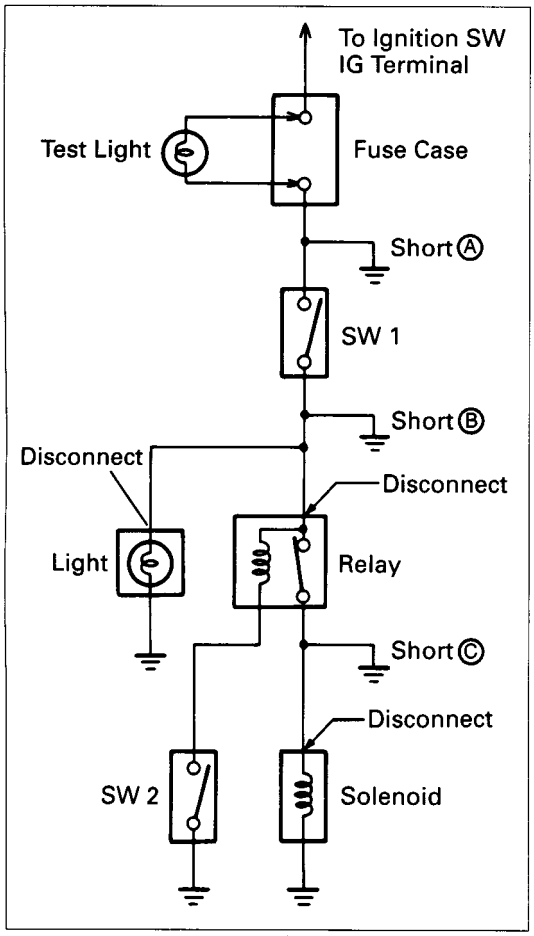
If the circuit has diodes, reverse the two leads and check again.

When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.

When contacting the two leads in reverse, there should be no continuity.



(c) Use the volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.



FINDING A SHORT CIRCUIT

(a) Remove the blown fuse and disconnect all loads of the fuse.

(b) Connect a test bulb in place of the fuse.

(c) Establish conditions in which the test bulb comes on.

Example:

Ⓐ – Ignition SW on

Ⓑ – Ignition SW and SW 1 on

Ⓒ – Ignition SW, SW 1 and Relay on (Connect the Relay) and SW 2 off (or Disconnect SW 2)

(d) Disconnect and reconnect the connectors while watching the test bulb.

The short lies between the connector where the test bulb stays lit and the connector where the bulb goes out.

(e) Find the exact location of the short by lightly shaking the problem wire along the body.

CAUTION

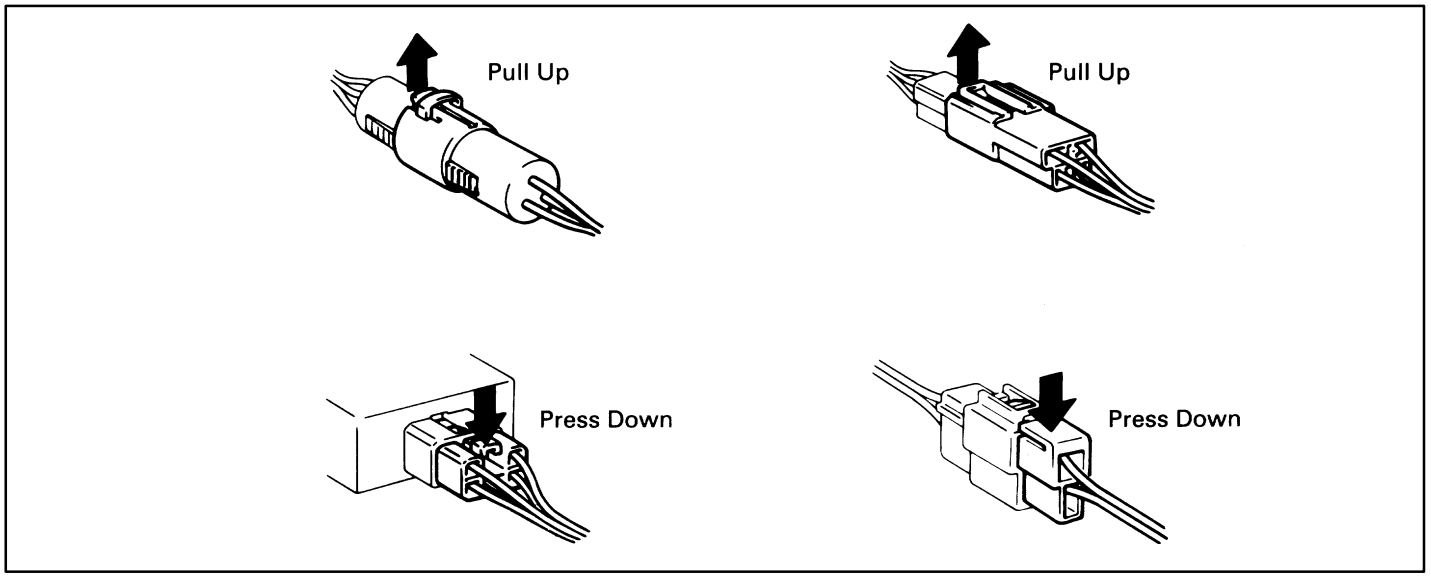
(a) Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

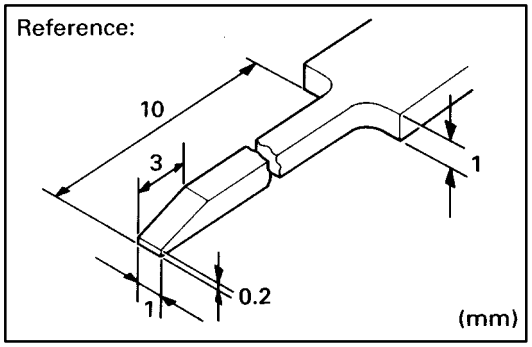
(b) When replacing the internal mechanism (ECU part) of the digital meter, be careful that no part of your body or clothing comes in contact with the terminals of leads from the IC, etc. of the replacement part (spare part).

DISCONNECTION OF MALE AND FEMALE CONNECTORS

To pull apart the connectors, pull on the connector itself, not the wire harness.

HINT: Check to see what kind of connector you are disconnecting before pulling apart.





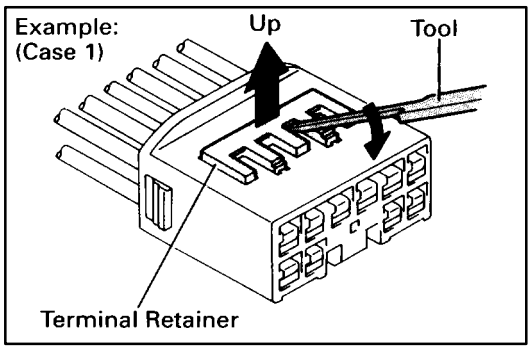
HOW TO REPLACE TERMINAL

(with terminal retainer or secondary locking device)

1. PREPARE THE SPECIAL TOOL

   HINT: To remove the terminal from the connector, please construct and use the special tool or like object shown on the left.

2. DISCONNECT CONNECTOR



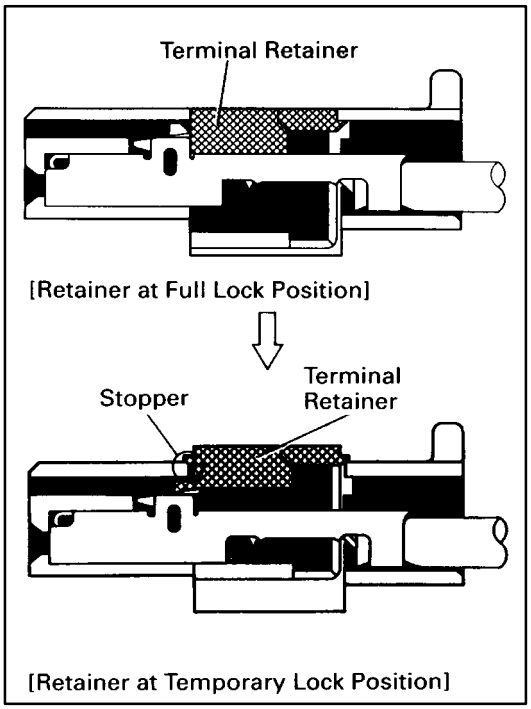
3. DISENGAGE THE SECONDARY LOCKING DEVICE OR TERMINAL RETAINER.

   (a) Locking device must be disengaged before the terminal locking clip can be released and the terminal removed from the connector.

   (b) Use a special tool or the terminal pick to unlock the secondary locking device or terminal retainer.

NOTICE:

Do not remove the terminal retainer from connector body.

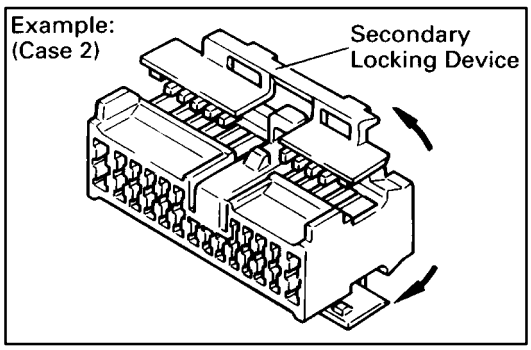


Ⓐ For Non–Waterproof Type Connector

HINT: The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

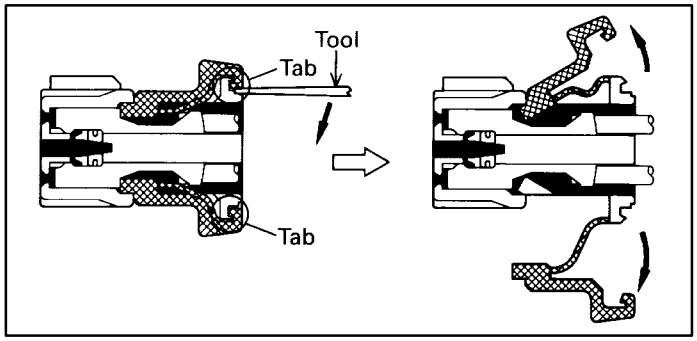
"Case 1"

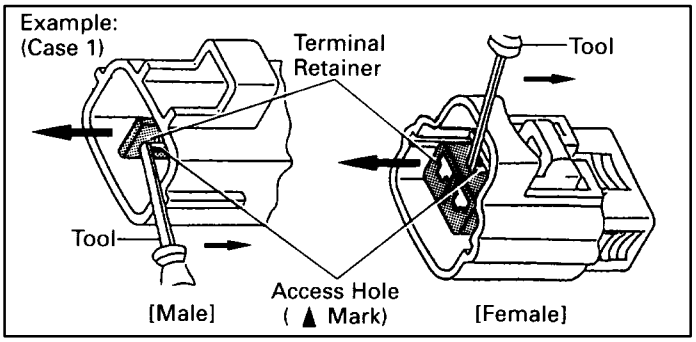
Raise the terminal retainer up to the temporary lock position.



"Case 2"

Open the secondary locking device.



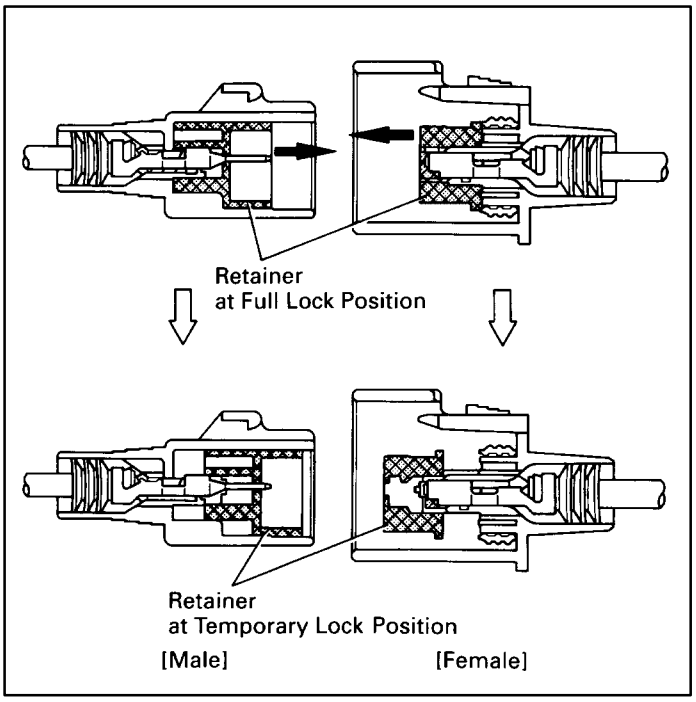


Ⓑ For Waterproof Type Connector

HINT: Terminal retainer color is different according to connector body.

Example:

Terminal Retainer	Connector Body
Black or White	: Gray
Black or White	: Dark Gray
Gray or White	: Black

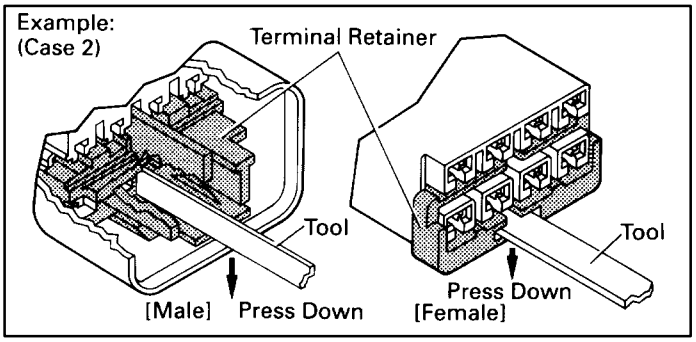


"Case 1"

Type where terminal retainer is pulled up to the temporary lock position (Pull Type).

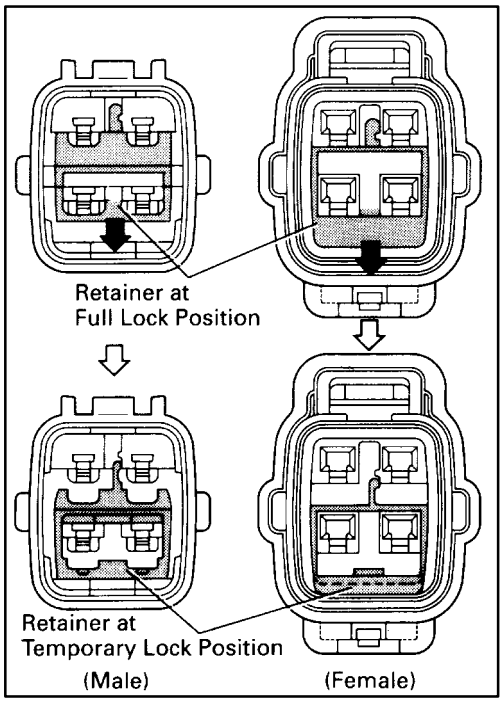
Insert the special tool into the terminal retainer access hole (▲ Mark) and pull the terminal retainer up to the temporary lock position.

HINT: The needle insertion position varies according to the connector's shape (Number of terminals, etc.), so check the position before inserting it.



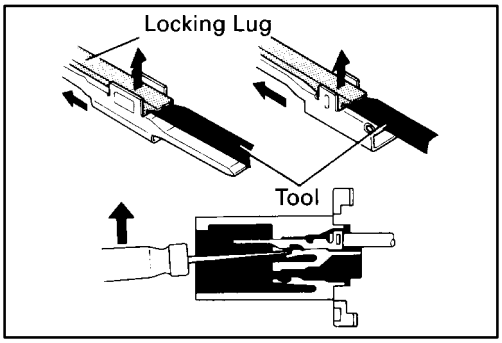
"Case 2"

Type which cannot be pulled as far as Power Lock

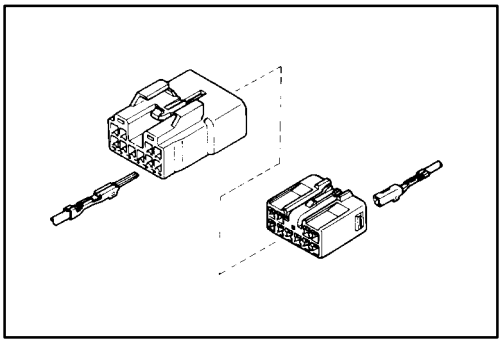


Insert the tool straight into the access hole of terminal retainer as shown.

Push the terminal retainer down to the temporary lock position.



(c) Release the locking lug from terminal and pull the terminal out from rear.

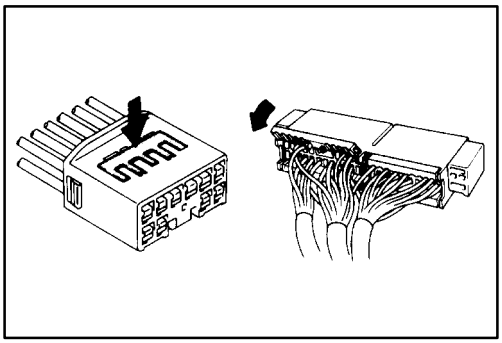


4. INSTALL TERMINAL TO CONNECTOR

(a) Insert the terminal.

HINT:

1. Make sure the terminal is positioned correctly.
2. Insert the terminal until the locking lug locks firmly.
3. Insert the terminal with terminal retainer in the temporary lock position.



(b) Push the secondary locking device or terminal retainer in to the full lock position.

5. CONNECT CONNECTOR

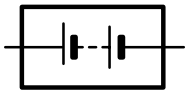
ABBREVIATIONS

The following abbreviations are used in this manual.

A/C	=	Air Conditioning
ABS	=	Anti–Lock Brake System
A/T	=	Automatic Transmission
CB	=	Circuit Breaker
COMB.	=	Combination
ECU	=	Electronic Control Unit
EFI	=	Electronic Fuel Injection
EGR	=	Exhaust Gas Recirculation
Ex.	=	Except
FL	=	Fusible Link
J/B	=	Junction Block
LH	=	Left-Hand
M/T	=	Manual Transmission
O/D	=	Overdrive
R/B	=	Relay Block
RH	=	Right–Hand
SRS	=	Supplemental Restraint System
SW	=	Switch
TDCL	=	Total Diagnostic Communication Link
TEMP.	=	Temperature
VSV	=	Vacuum Switching Valve
W/	=	With
W/O	=	Without

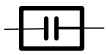
* The titles given inside the components are the names of the terminals (terminal codes) and are not treated as being abbreviations.

GLOSSARY OF TERMS AND SYMBOLS



BATTERY

Stores chemical energy and converts it into electrical energy. Provides DC current for the auto's various electrical circuits.



CAPACITOR (Condenser)

A small holding unit for temporary storage of electrical voltage.

CIGARETTE LIGHTER

An electric resistance heating element.

CIRCUIT BREAKER

Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.

DIODE

A semiconductor which allows current flow in only one direction.

DIODE, ZENER

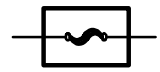
A diode which allows current flow in one direction but blocks reverse flow only up to a specific voltage. Above that potential, it passes the excess voltage. This acts as a simple voltage regulator.

DISTRIBUTOR, IIA

Channels high–voltage current from the ignition coil to the individual spark plugs.

FUSE

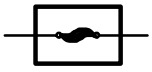
A thin metal strip which burns through when too much current flows through it, thereby stopping current flow and protecting a circuit from damage.



(for Medium Current Fuse)

FUSIBLE LINK

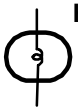
A heavy–gauge wire placed in high amperage circuits which burns through on overloads, thereby protecting the circuit. The numbers indicate the cross–section surface area of the wires.



(for High Current Fuse or Fusible Link.)

GROUND

The point at which wiring attaches to the Body, thereby providing a return path for an electrical circuit; without a ground, current cannot flow.



HEADLIGHTS

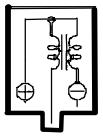
1. SINGLE FILAMENT

Current flow causes a headlight filament to heat up and emit light. A headlight may have either a single (1) filament or a double (2) filament.

2. DOUBLE FILAMENT

HORN

An electric device which sounds a loud audible signal.



IGNITION COIL

Converts low–voltage DC current into high–voltage ignition current for firing the spark plugs.

LIGHT

Current flow through a filament causes the filament to heat up and emit light.

LED (LIGHT EMITTING DIODE)

Upon current flow, these diodes emit light without producing the heat of a comparable light.

METER, ANALOG

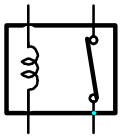
Current flow activates a magnetic coil which causes a needle to move, thereby providing a relative display against a background calibration.

METER, DIGITAL

Current flow activates one or many LED's, LCD's, or fluorescent displays, which provide a relative or digital display.

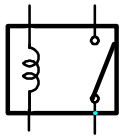
MOTOR

A power unit which converts electrical energy into mechanical energy, especially rotary motion.



RELAY

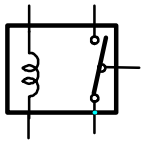
1. NORMALLY CLOSED



2. NORMALLY OPEN

Basically, an electrically operated switch which may be normally closed (1) or open (2).

Current flow through a small coil creates a magnetic field which either opens or closes an attached switch.



RELAY, DOUBLE THROW

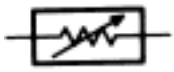
A relay which passes current through one set of contacts or the other.

RESISTOR

An electrical component with a fixed resistance, placed in a circuit to reduce voltage to a specific value.

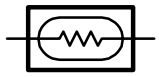
RESISTOR, TAPPED

A resistor which supplies two or more different non–adjustable resistance values.



RESISTOR, VARIABLE or RHEOSTAT

A controllable resistor with a variable rate of resistance. Also called a potentiometer or rheostat.



SENSOR (Thermistor)

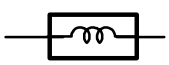
A resistor which varies its resistance with temperature.

SENSOR, ANALOG SPEED

Uses magnetic impulses to open and close a switch to create a signal for activation of other components.

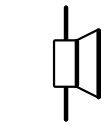
SHORT PIN

Used to provide an unbroken connection within a junction block.



SOLENOID

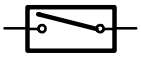
An electromagnetic coil which forms a magnetic field when current flows, to move a plunger, etc.



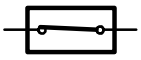
SPEAKER

An electromechanical device which creates sound waves from current flow.

SWITCH, MANUAL

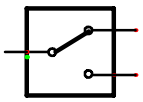


1. NORMALLY OPEN



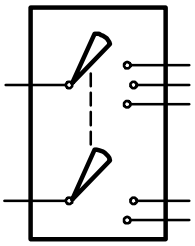
2. NORMALLY CLOSED

Opens and closes circuits, thereby stopping (1) or allowing (2) current flow.



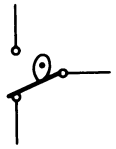
SWITCH, DOUBLE THROW

A switch which continuously passes current through one set of contacts or the other.



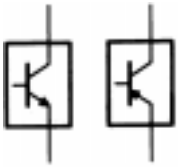
SWITCH, IGNITION

A key operated switch with several positions which allows various circuits, particularly the primary ignition circuit, to become operational.



SWITCH, WIPER PARK

Automatically returns wipers to the stop position when the wiper switch is turned off.

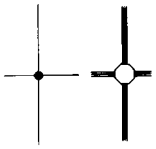


TRANSISTOR

A solidstate device typically used as an electronic relay; stops or passes current depending on the voltage applied at “base.”

WIRES

(1) NOT CONNECTED

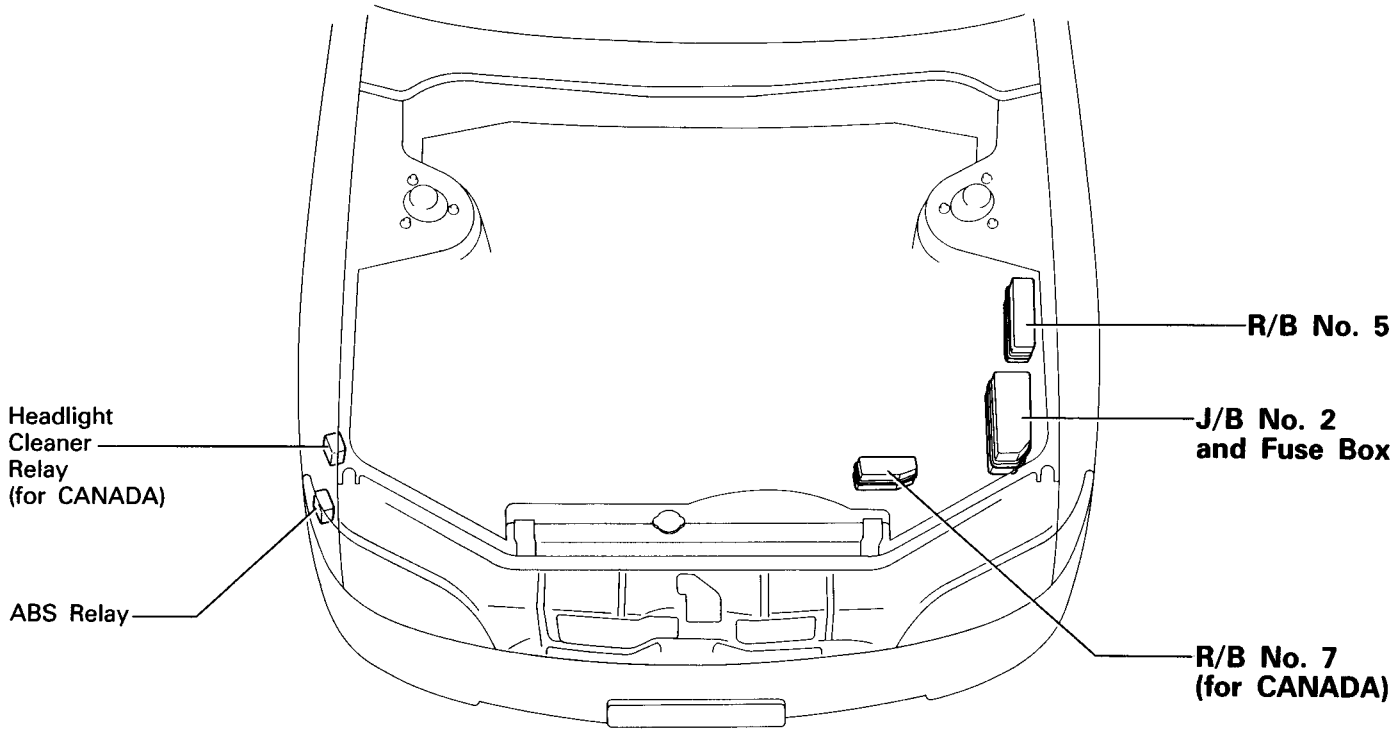


(2) SPLICED

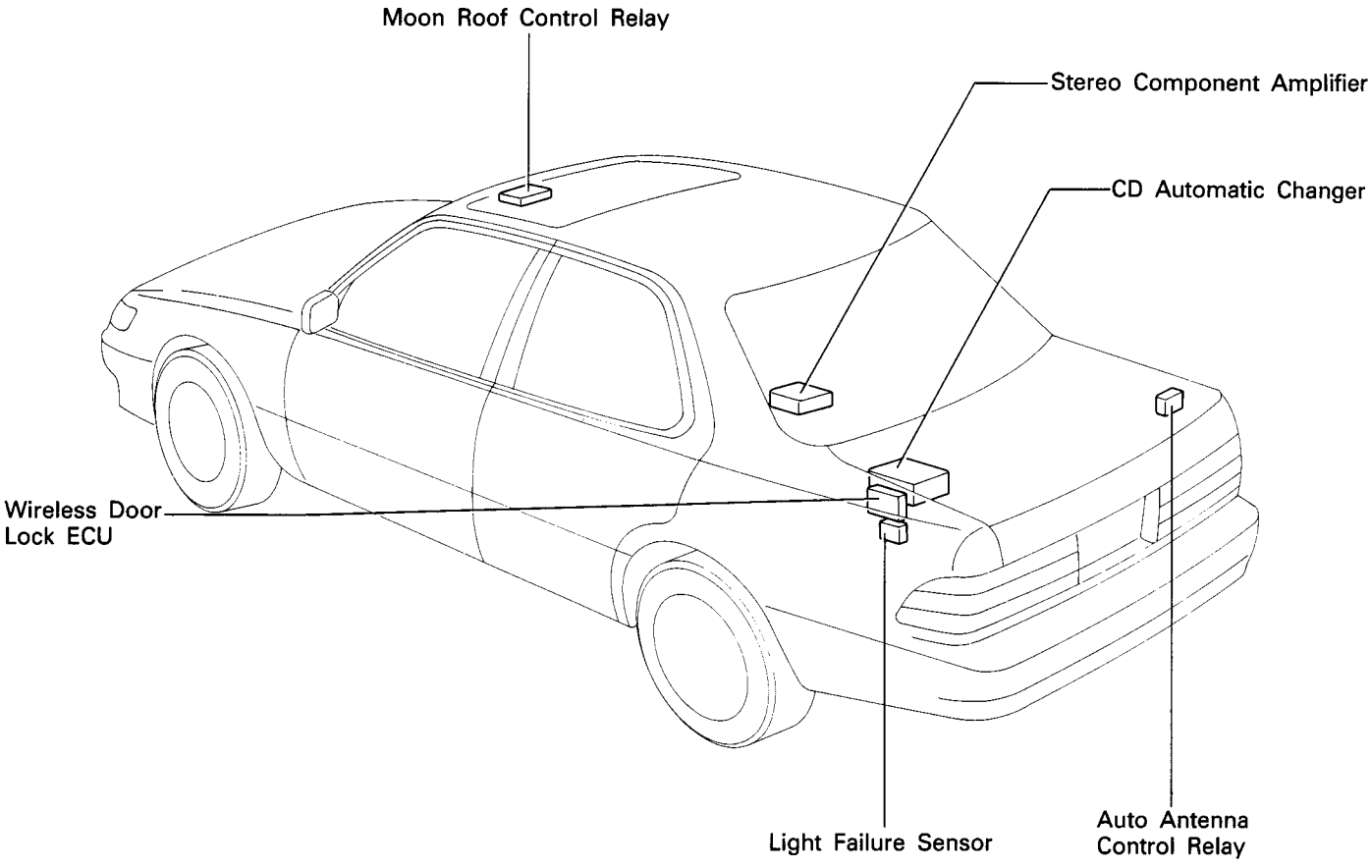
Wires are always drawn as straight lines on wiring diagrams. Crossed wires (1) without a black dot at the junction are not joined; crossed wires (2) with a black dot or octagonal (◯) mark at the junction are spliced (joined) connections.

RELAY LOCATIONS

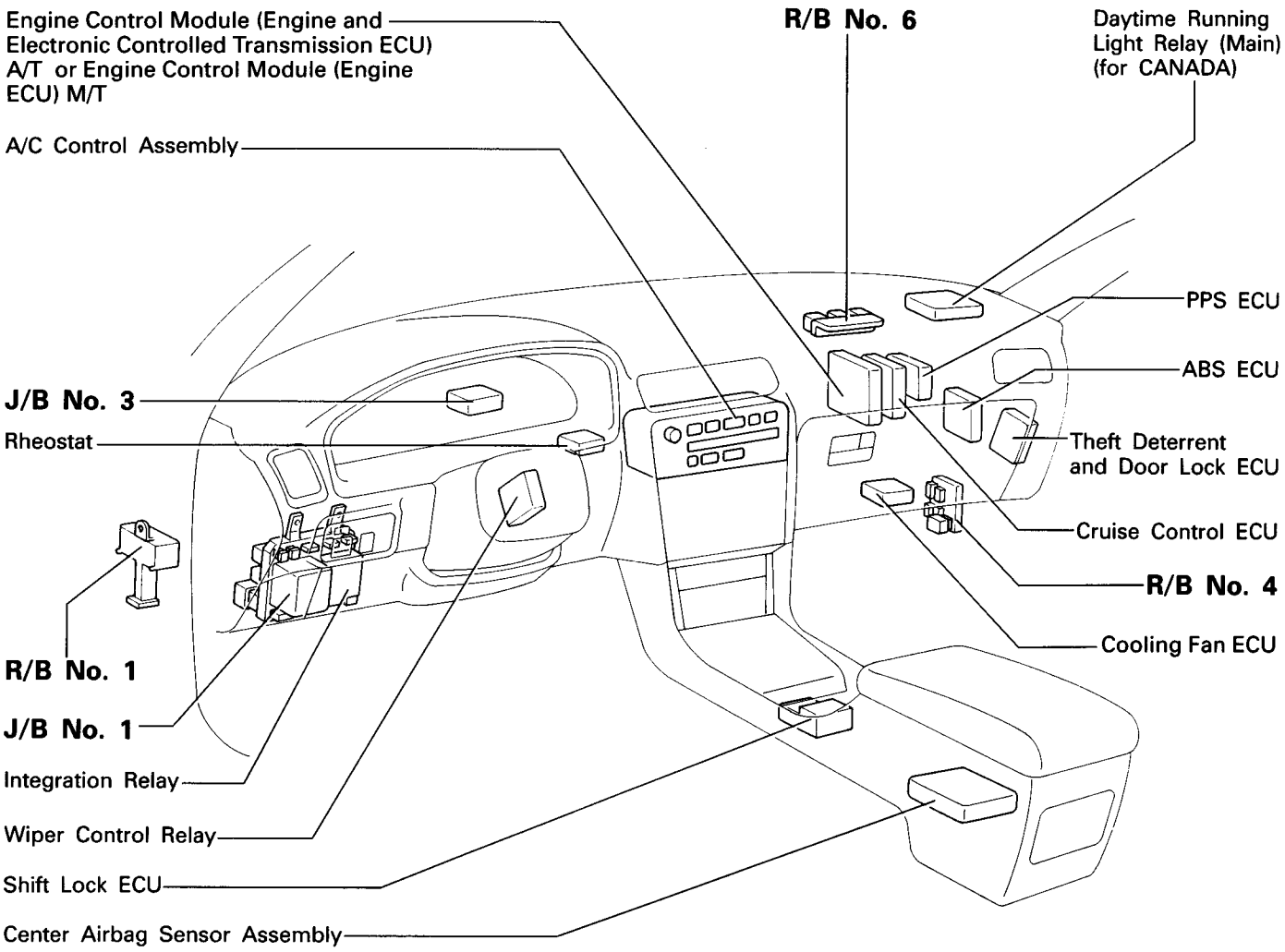
[Engine Compartment]



[Body]

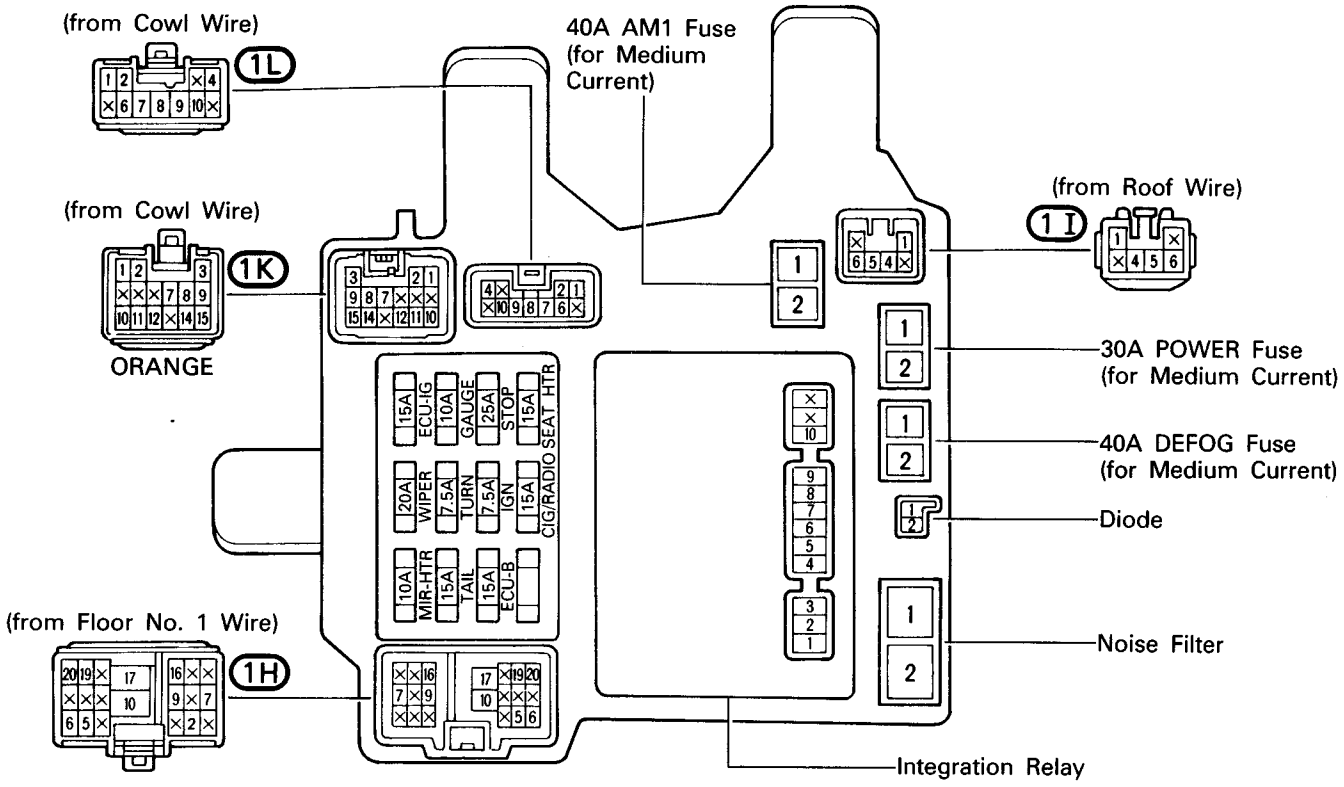


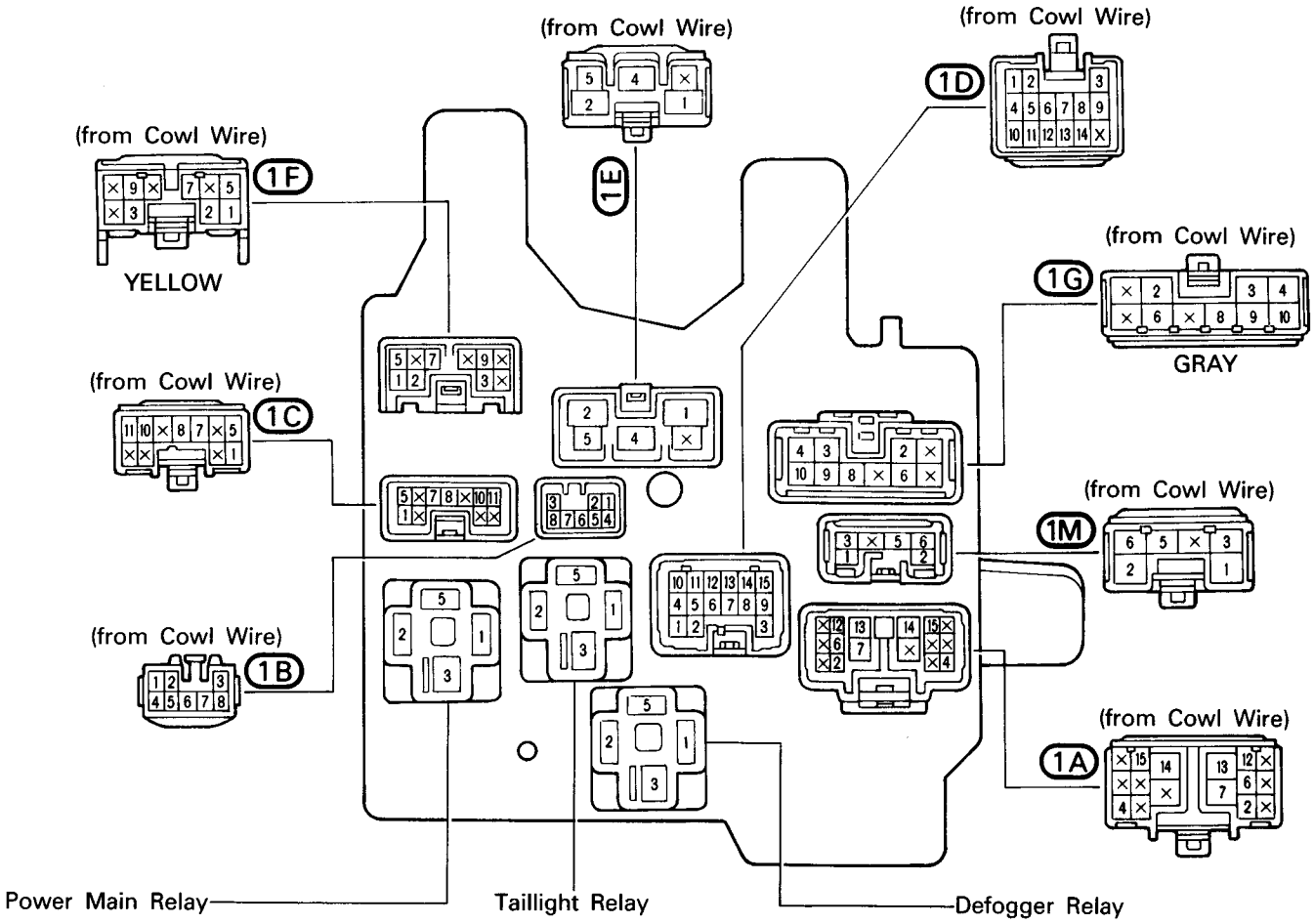
[Instrument Panel]



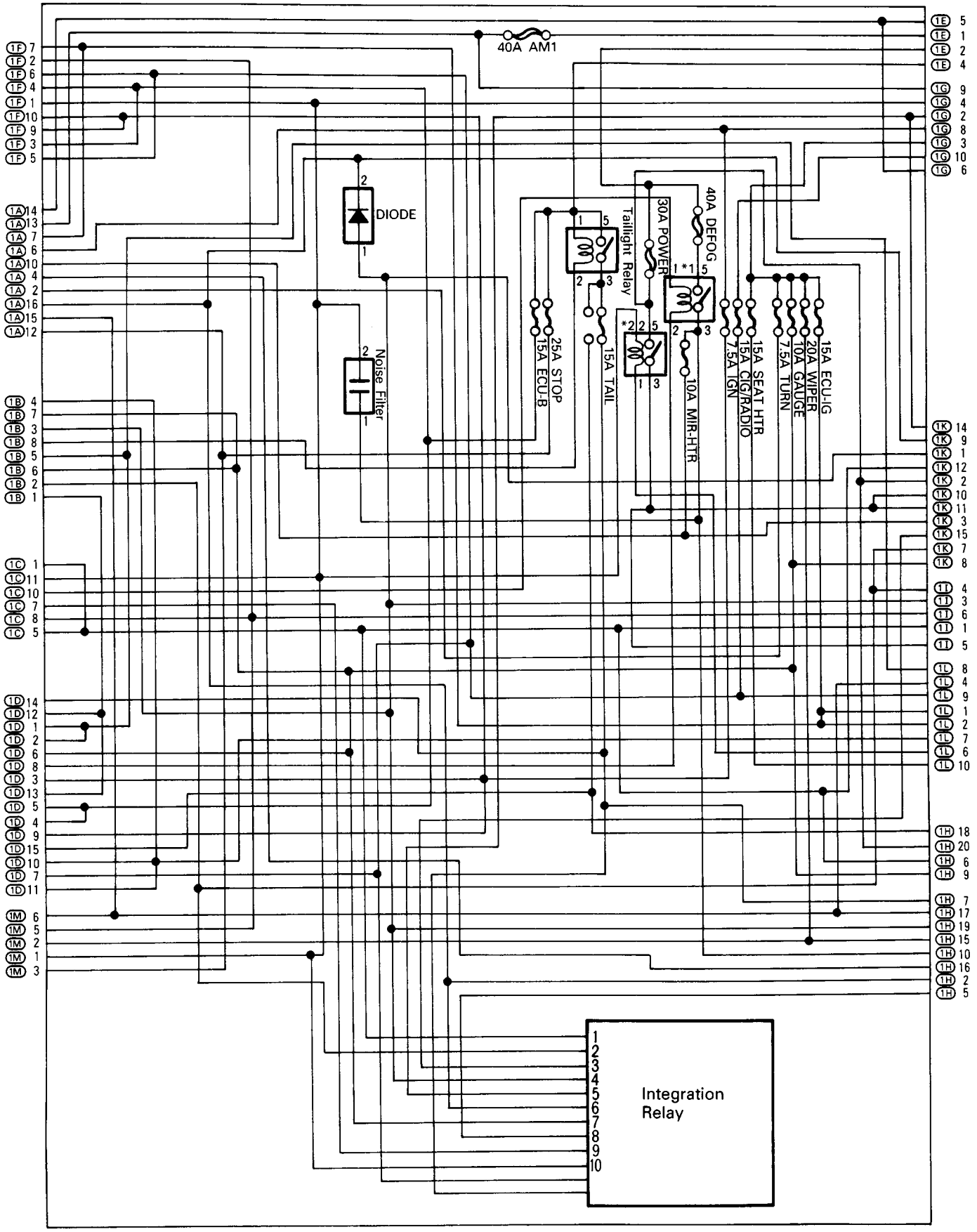
RELAY LOCATIONS

: J/B No. 1	Instrument Panel Left (See Page 19)





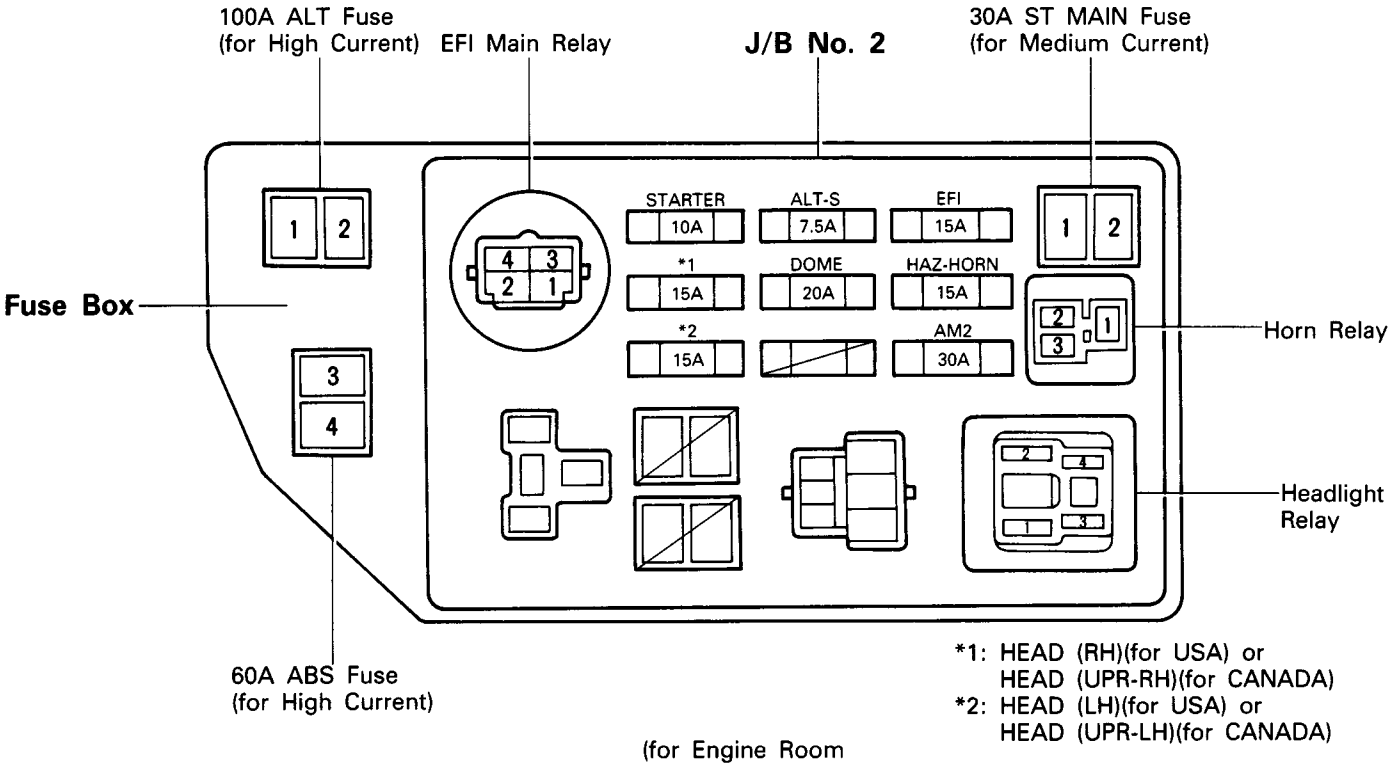
[J/B No. 1 Inner Circuit]

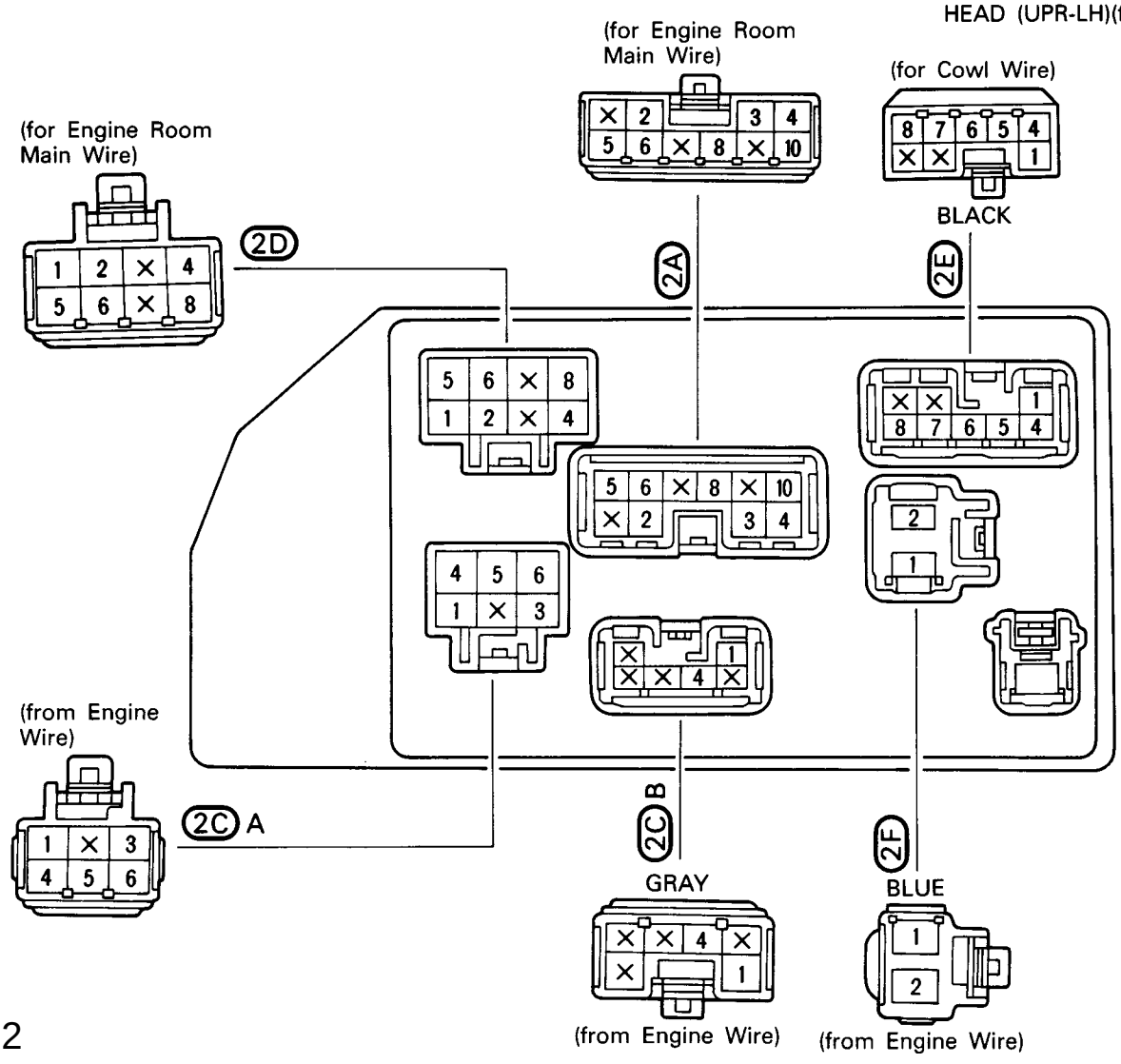


*1: Defogger Relay
*2: Power Main Relay

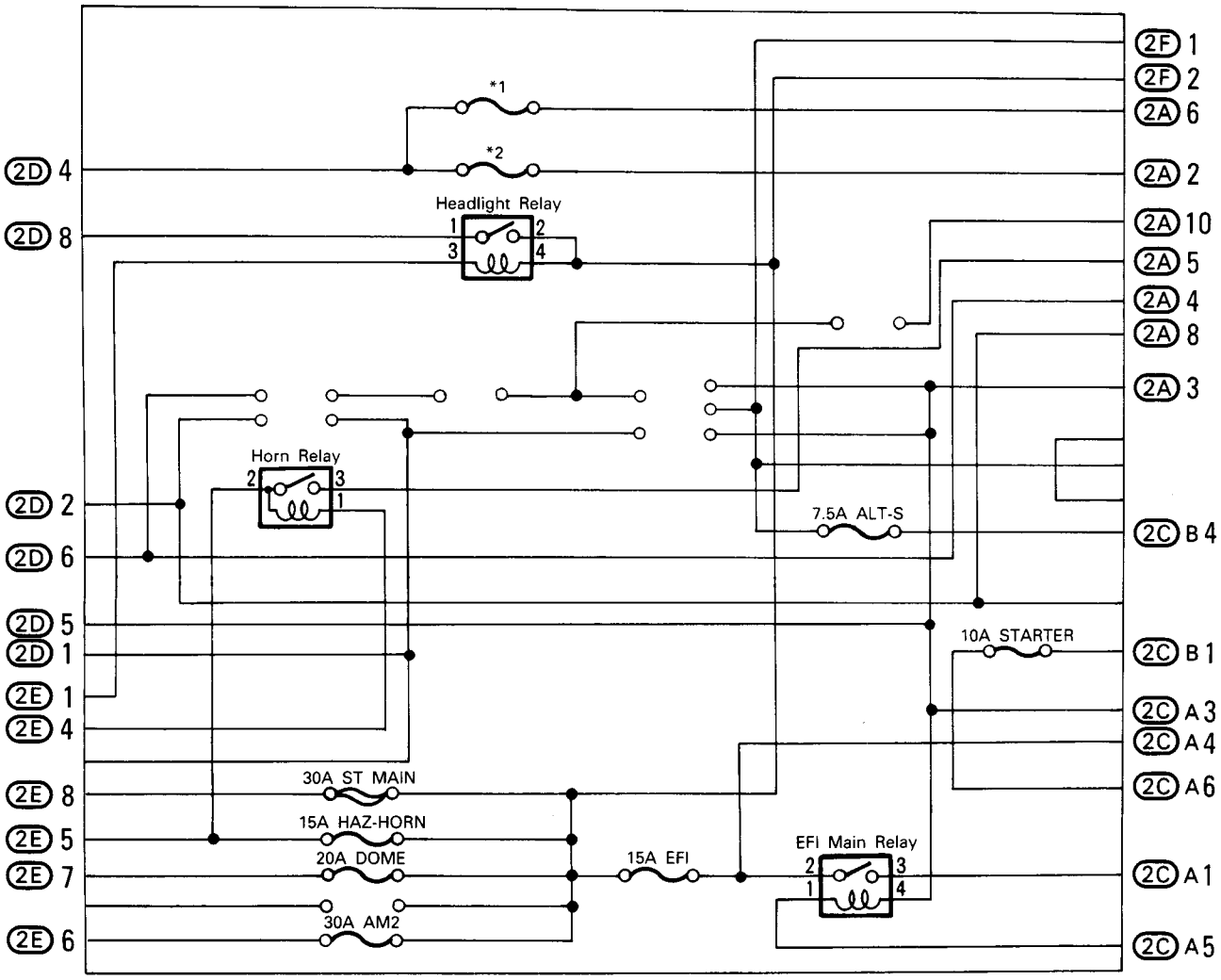
RELAY LOCATIONS

: J/B No. 2	Engine Compartment Left (See Page 18)





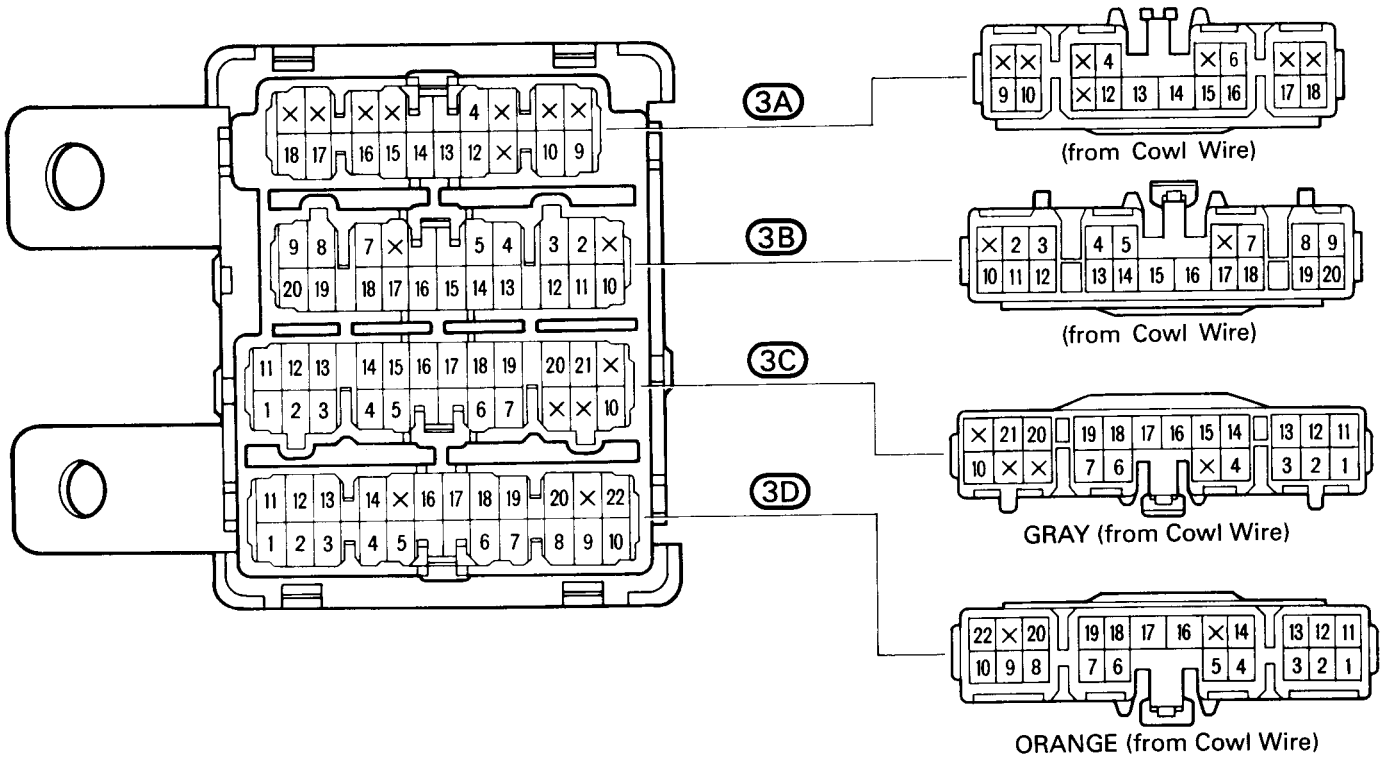
[J/B No. 2 Inner Circuit]



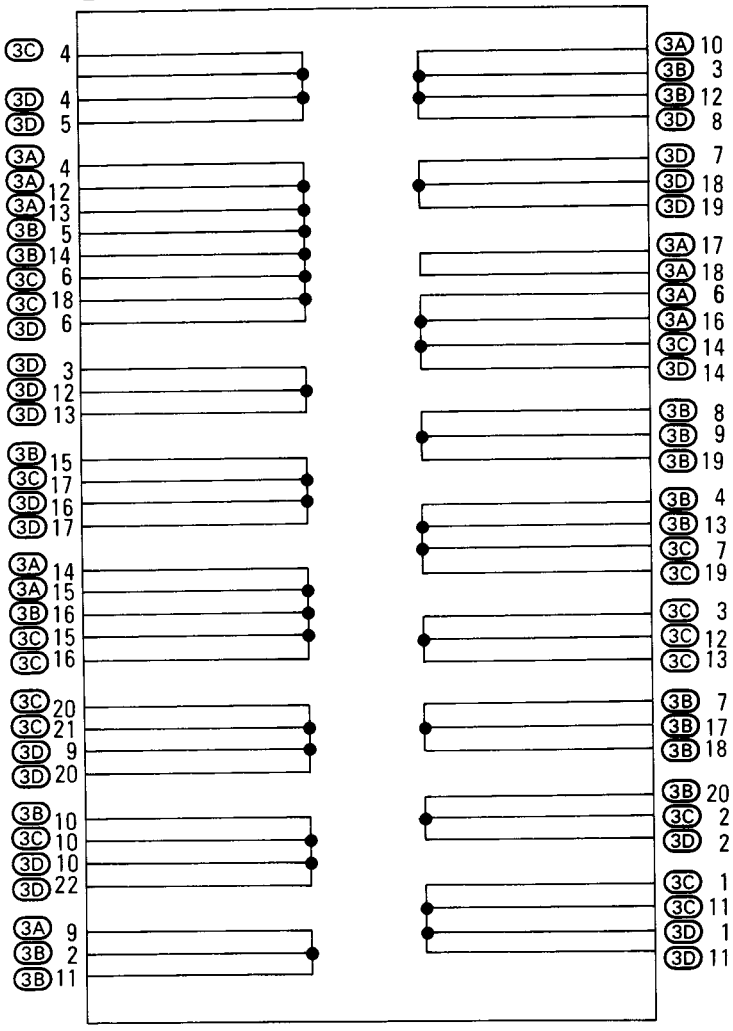
*1: 15A HEAD (RH)(for USA) or 15A HEAD (UPR-RH)(for CANADA)
*2: 15A HEAD (LH)(for USA) or 15A HEAD (UPR-LH)(for CANADA)

RELAY LOCATIONS

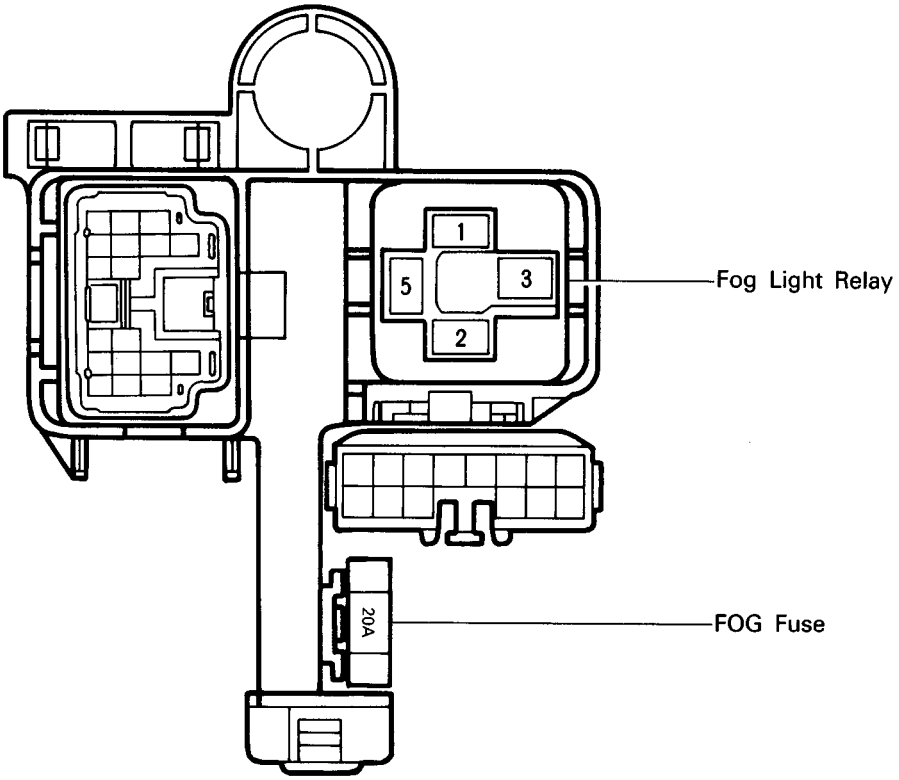
: J/B No. 3	Behind Combination Meter (See Page 19)



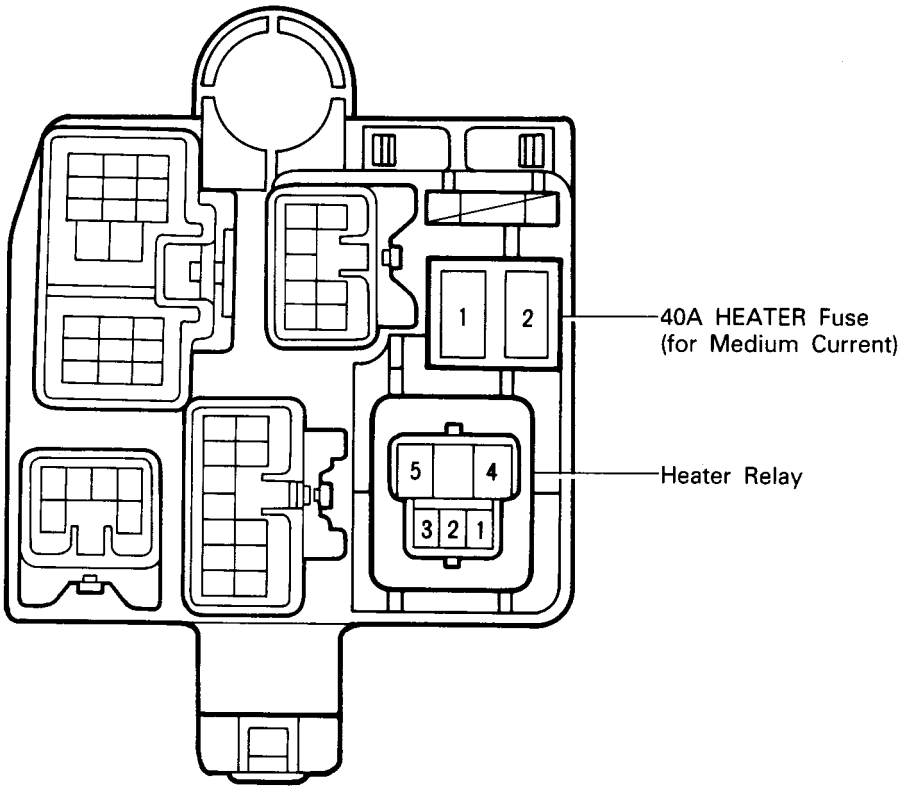
[J/B No. 3 Inner Circuit]



① : R/B No. 1	**Left Kick Panel** (See Page 19)

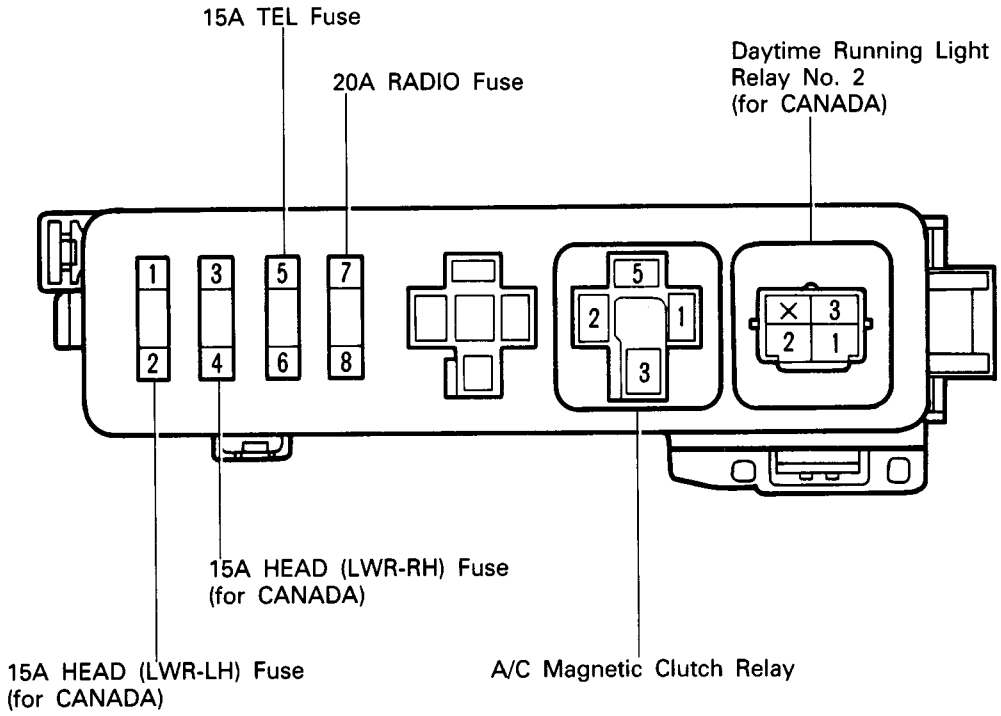


④ : R/B No. 4	**Right Kick Panel** (See Page 19)

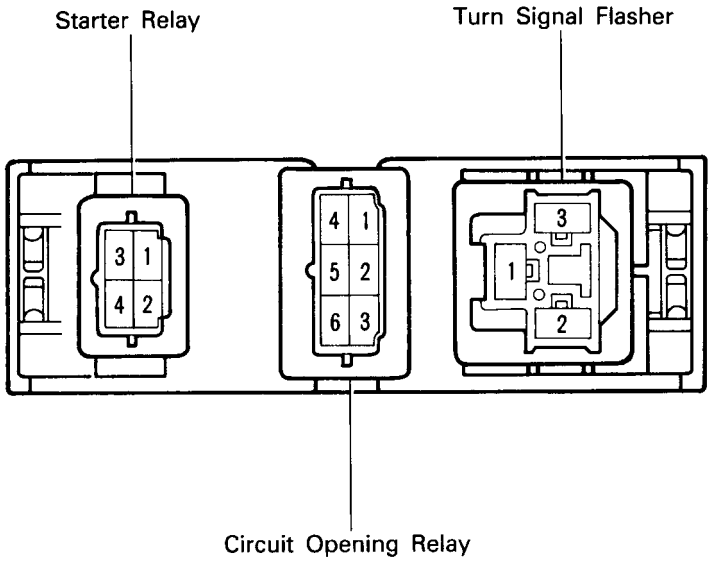


RELAY LOCATIONS

⑤ : R/B No. 5	**Engine Compartment Left** (See Page 18)

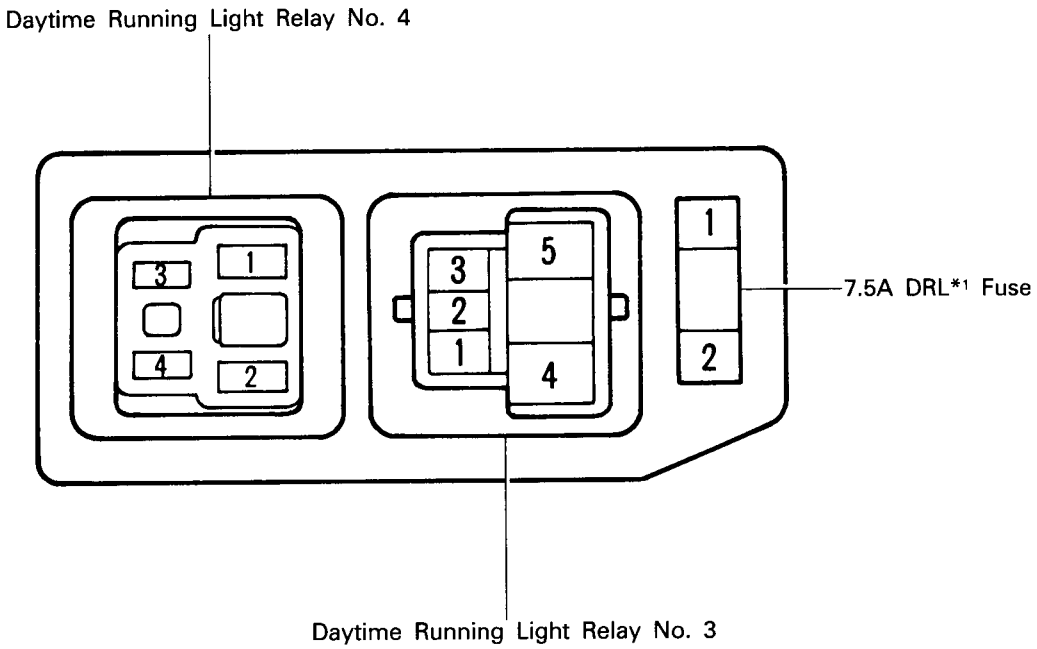


⑥ : R/B No. 6	**Behind Glove Box** (See Page 19)



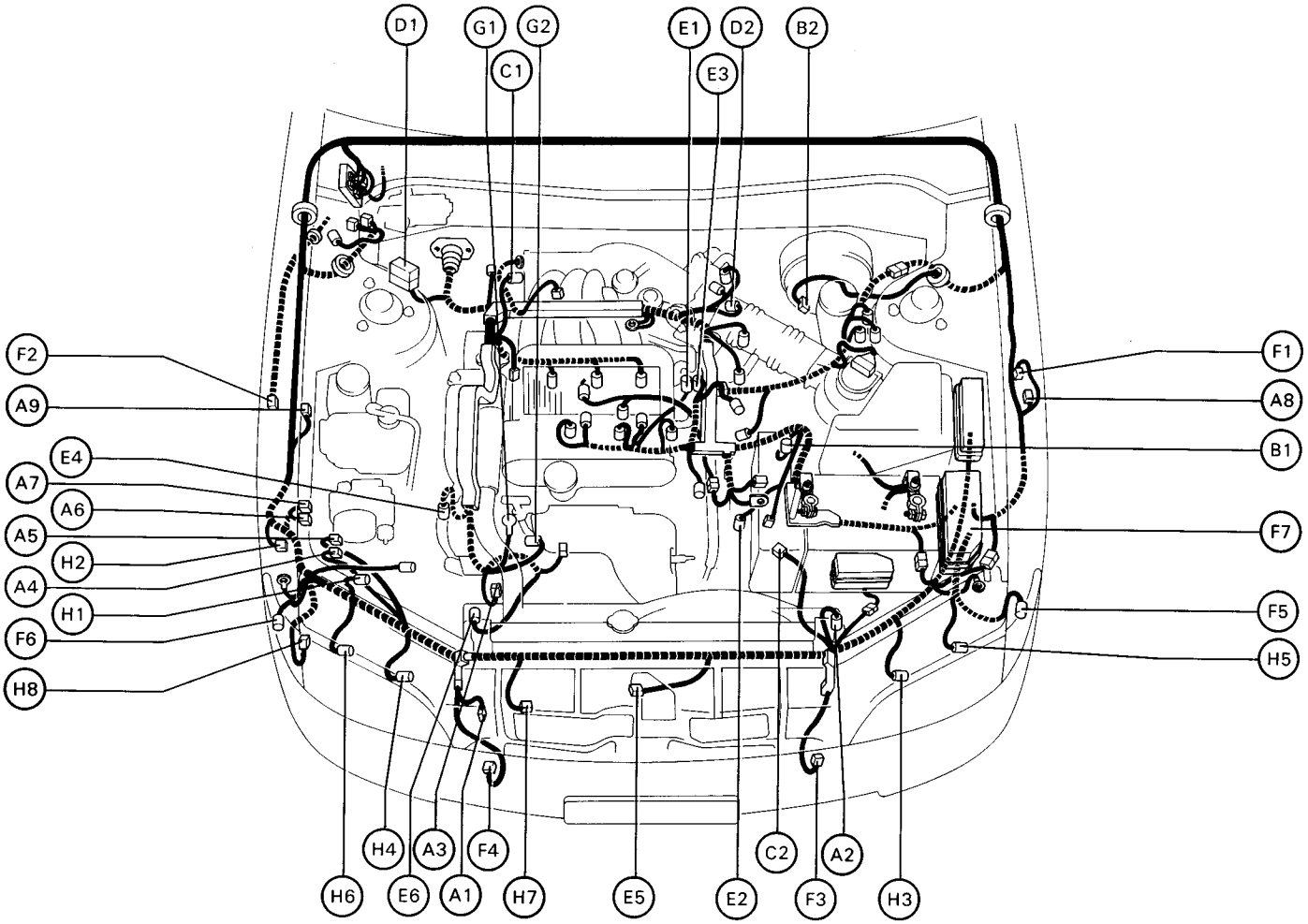
⑦ : R/B No. 7	**Near The Battery** (See Page 18)

(for CANADA)



(*1: Daytime Running Light)

Position of Parts in Engine Compartment



A 1 A/C Ambient Temp. Sensor
A 2 A/C Dual and High Pressure SW
A 3 A/C Magnetic Clutch and Lock Sensor
A 4 ABS Actuator
A 5 ABS Actuator
A 6 ABS Relay
A 7 ABS Relay
A 8 ABS Speed Sensor Front LH
A 9 ABS Speed Sensor Front RH

B 1 Back–Up Light SW (M/T)
B 2 Brake Fluid Level SW

C 1 Cold Start Injector
C 2 Cruise Control Actuator

D 1 Data Link Connector 1 (Check Connector)
D 2 Distributor

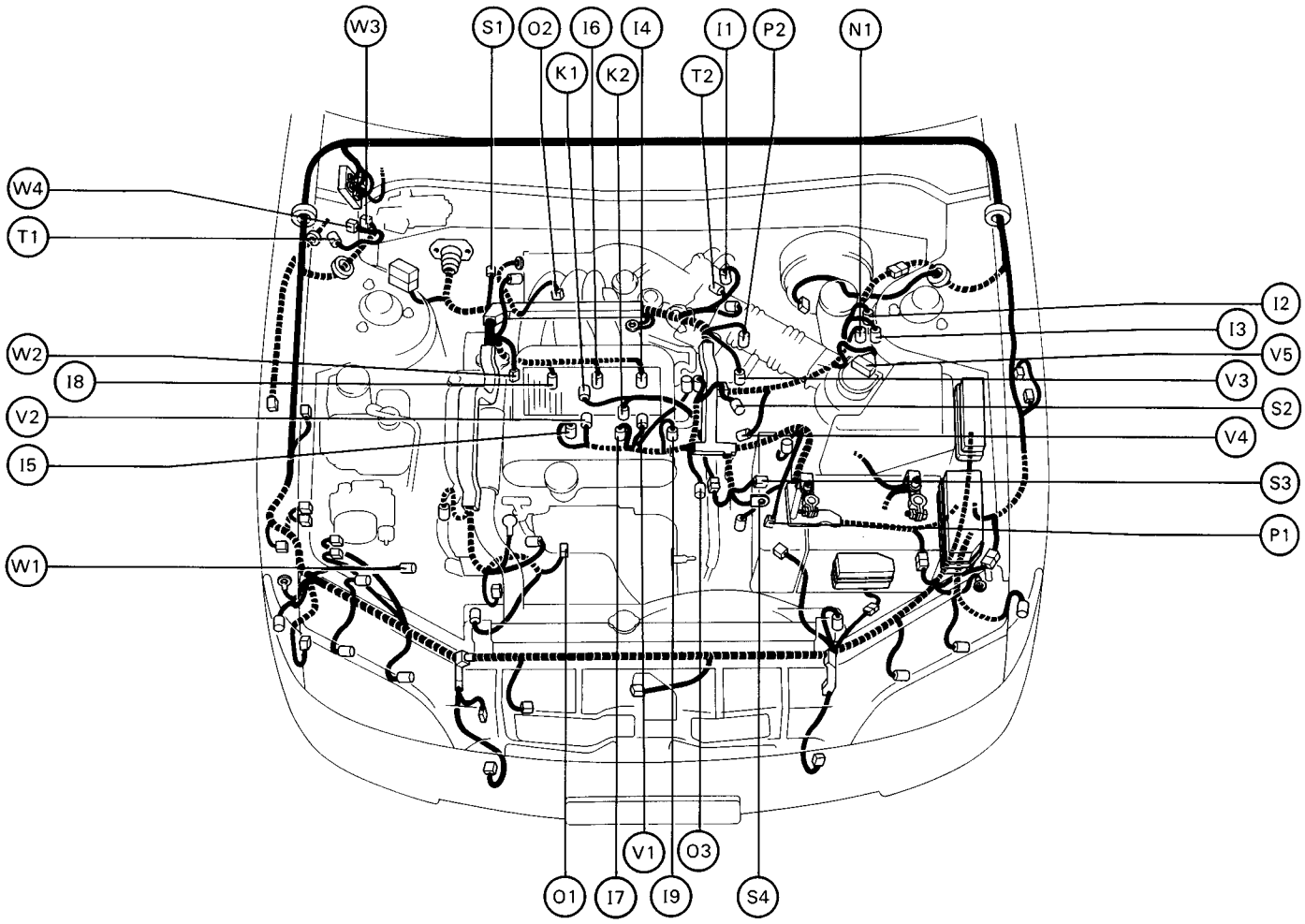
E 1 EGR Gas Temp. Sensor or Short Pin
E 2 Electronic Controlled Transmission Solenoid
E 3 Engine Coolant Temp. Sensor (EFI Water Temp. Sensor)
E 4 Engine Coolant Temp. Sensor [Water Temp. Sensor (for Cooling Fan)]
E 5 Engine Hood Courtesy SW
E 6 Engine Oil Level Warning SW

F 1 Front Airbag Sensor LH
F 2 Front Airbag Sensor RH
F 3 Front Fog Light LH
F 4 Front Fog Light RH
F 5 Front Turn Signal and Clearance Light LH
F 6 Front Turn Signal and Clearance Light RH
F 7 Fuse Box

G 1 Generator (Alternator)
G 2 Generator (Alternator)

H 1 Headlight Cleaner Motor
H 2 Headlight Cleaner Relay
H 3 Headlight Hi LH
H 4 Headlight Hi RH
H 5 Headlight Lo LH
H 6 Headlight Lo RH
H 7 Horn LH
H 8 Horn RH

Position of Parts in Engine Compartment



I 1 Idle Air Control Valve (ISC Valve)
I 2 Igniter
I 3 Ignition Coil
I 4 Injector No. 1
I 5 Injector No. 2
I 6 Injector No. 3
I 7 Injector No. 4
I 8 Injector No. 5
I 9 Injector No. 6

K 1 Knock Sensor No. 1
K 2 Knock Sensor No. 2

N 1 Noise Filter (for Ignition System)

O 1 Oil Pressure SW
O 2 Oxygen Sensor No. 1 (Main)
O 3 Oxygen Sensor No. 2 (Main)

P 1 Park/Neutral Position SW (Neutral Start SW)
P 2 PPS Solenoid

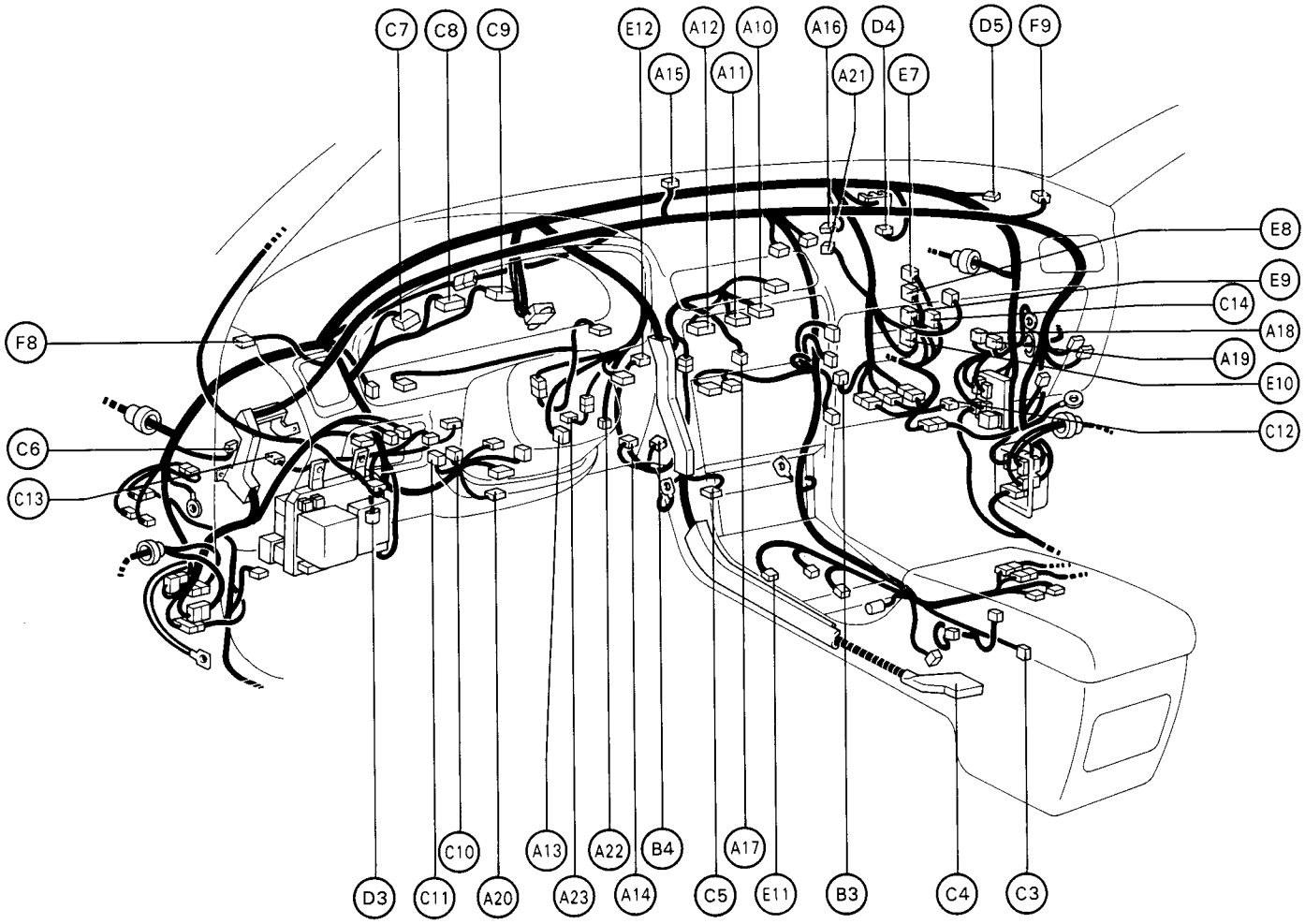
S 1 Solenoid Valve (for Hydraulic Motor)
S 2 Start Injector Time SW
S 3 Starter
S 4 Starter

T 1 Theft Deterrent Horn
T 2 Throttle Position Sensor

V 1 VSV (for Fuel Pressure Up)
V 2 VSV (for Intake Air Control)
V 3 Vehicle Speed Sensor (Speed Sensor)
V 4 Vehicle Speed Sensor (Speed Sensor) (for Electronic Controlled Transmission)
V 5 Volume Air Flow (Air Flow Meter)

W 1 Washer Motor
W 2 Water Temp. Sender
W 3 Wiper Angle Control Motor
W 4 Wiper Motor

Position of Parts in Instrument Panel



A 10 A/C Control Assembly
A 11 A/C Control Assembly
A 12 A/C Control Assembly
A 13 A/C Room Temp. Sensor
A 14 A/C Power Transistor
A 15 A/C Solar Sensor
A 16 A/C Evaporator Temp. Sensor
A 17 A/C Thermistor (Engine Coolant Temp. Sensor)
A 18 ABS ECU
A 19 ABS ECU
A 20 Airbag Squib
A 21 Air Inlet Control Servo Motor
A 22 Air Mix Control Servo Motor
A 23 Air Vent Mode Control Servo Motor

B 3 Blower Motor
B 4 Blower Resistor (for Low Speed)

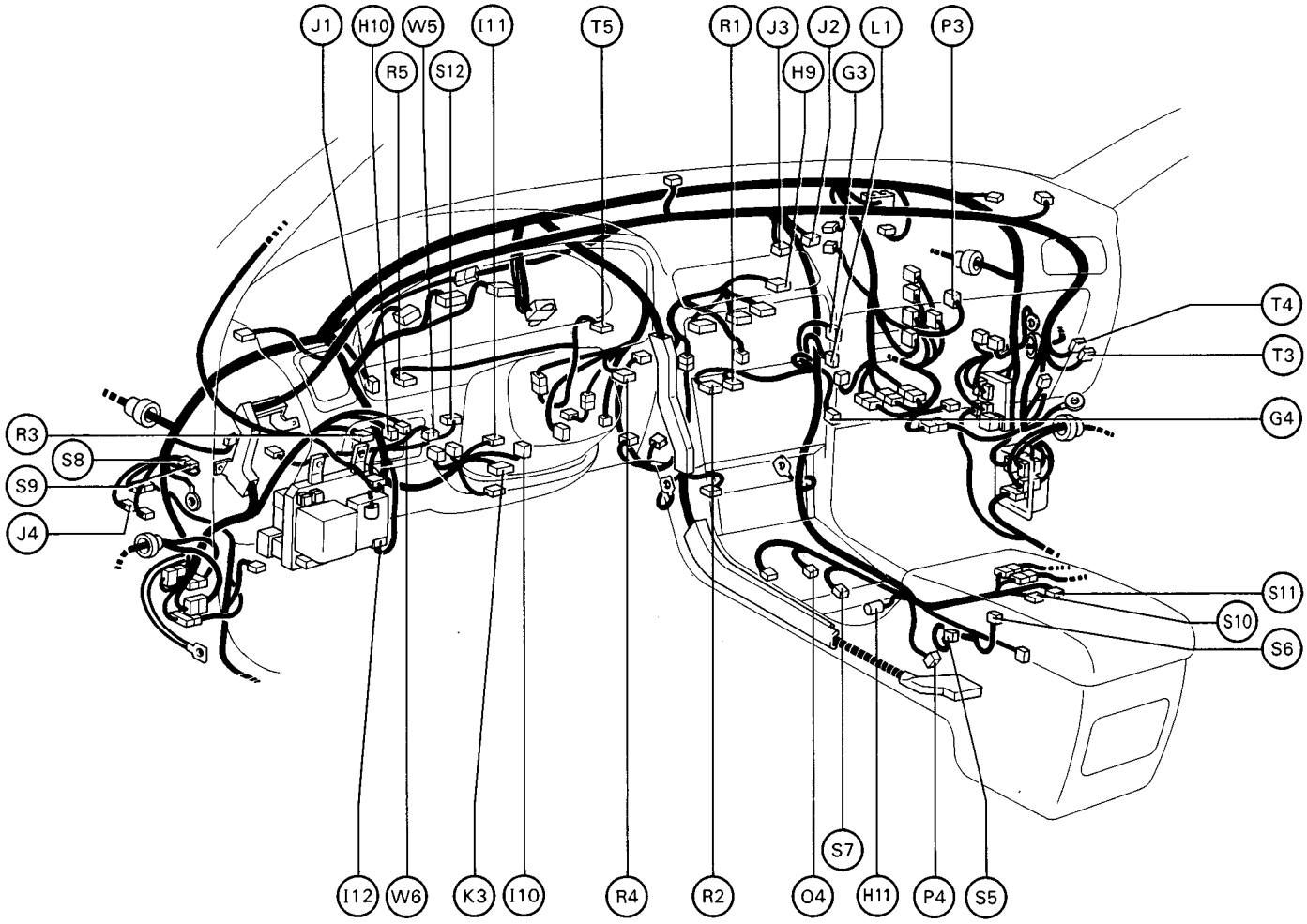
C 3 Cellular Phone (Hand Set)
C 4 Center Airbag Sensor Assembly
C 5 Cigarette Lighter and Ashtray Illumination
C 6 Clutch Start SW (M/T)
C 7 Combination Meter
C 8 Combination Meter
C 9 Combination Meter
C 10 Combination SW
C 11 Combination SW
C 12 Cooling Fan ECU
C 13 Cruise Control Clutch SW (M/T)
C 14 Cruise Control ECU

D 3 Data Link Connector 2 [TDCL (Total Diagnostic Communication Link)]
D 4 Daytime Running Light Relay (Main)
D 5 Diode (for Cruise Control)

E 7 Engine Control Module (Engine and Electronic Controlled Transmission ECU (A/T), Engine ECU M/T))
E 8 Engine Control Module (Engine and Electronic Controlled Transmission ECU (A/T), Engine ECU M/T))
E 9 Engine Control Module (Engine and Electronic Controlled Transmission ECU (A/T), Engine ECU (M/T))
E 10 Engine Control Module (Engine and Electronic Controlled Transmission ECU (A/T), Engine ECU (M/T))
E 11 Electronic Controlled Transmission Pattern Select SW
E 12 Extra High Speed Relay

F 8 Front Squawker (Speaker) LH
F 9 Front Squawker (Speaker) RH

Position of Parts in Instrument Panel



G 3 Glove Box Light
G 4 Glove Box Light SW

H 9 Hazard SW
H 10 Headlight Cleaner SW
H 11 Heated Oxygen Sensor (Oxygen Sensor (Sub))

I 10 Ignition Key Cylinder Light
I 11 Ignition SW and Unlock Warning SW
I 12 Integration Relay

J 1 Junction Connector
J 2 Junction Connector
J 3 Junction Connector
J 4 Junction Connector (for SRS)

K 3 Key Inter Lock Solenoid

L 1 Luggage Compartment Door Opener Main SW

O 4 O/D Main SW and A/T Indicator Light (Shift Lever)

P 3 PPS ECU
P 4 Parking Brake SW

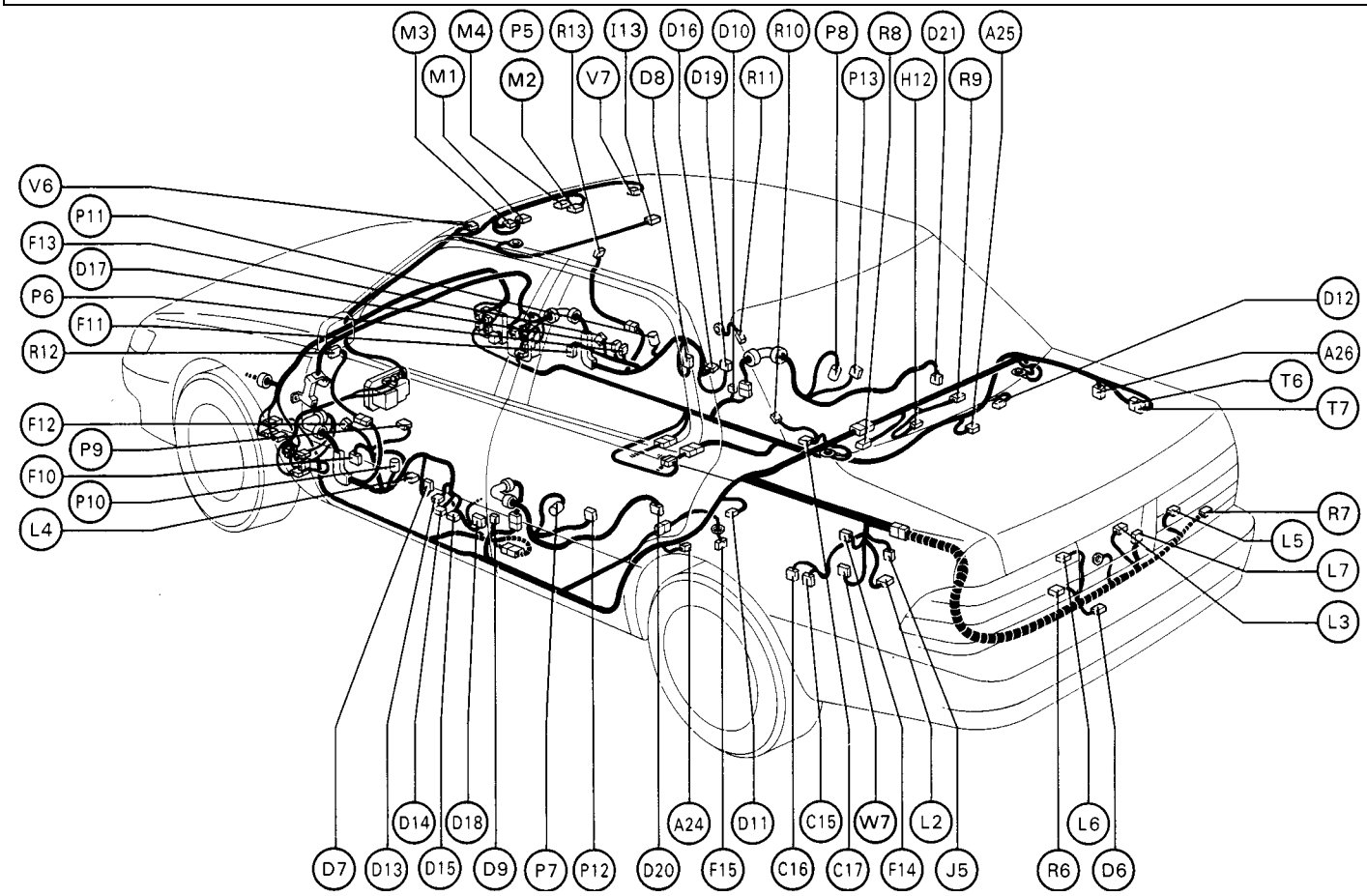
R 1 Radio and Player
R 2 Radio and Player
R 3 Remote Control Mirror SW
R 4 Rheostat
R 5 Rheostat Volume and Theft Deterrent Indicator Light

S 5 Seat Heater SW (Driver's)
S 6 Seat Heater SW (Passenger's)
S 7 Shift Lock ECU
S 8 Short Connector
S 9 Short Connector
S 10 Stereo Component Amplifier
S 11 Stereo Component Amplifier
S 12 Stop Light SW

T 3 Theft Deterrent and Door Lock ECU
T 4 Theft Deterrent and Door Lock ECU
T 5 Trip SW

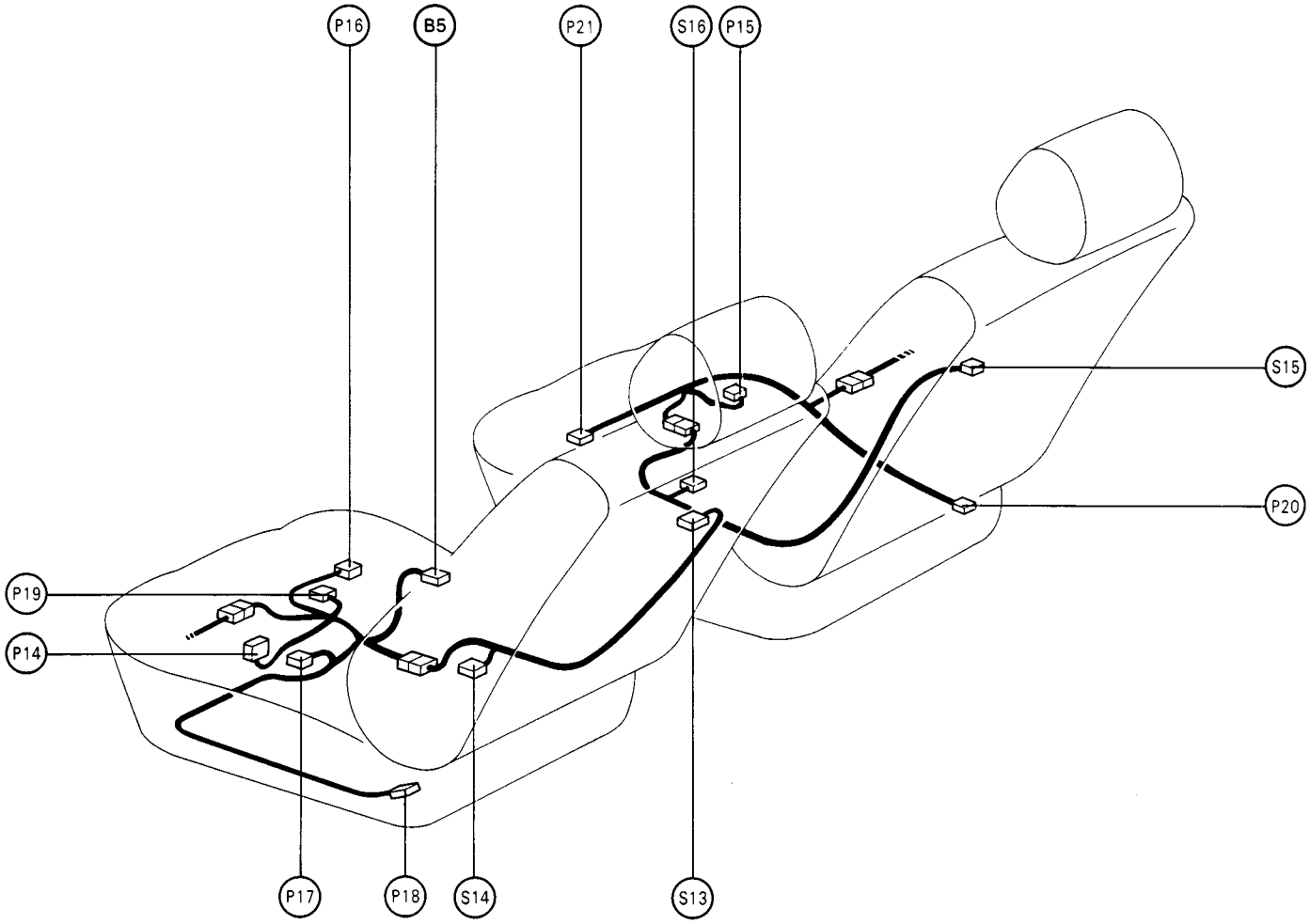
W 5 Wiper Control Relay
W 6 Wireless Door Lock Main SW

Position of Parts in Body



A 24 ABS Speed Sensor Rear LH
A 25 ABS Speed Sensor Rear RH
A 26 Auto Antenna Motor and Relay
C 15 CD Automatic Changer
C 16 CD Automatic Changer
C 17 Choke Coil
D 6 Diode
D 7 Door Courtesy Light Front LH
D 8 Door Courtesy Light Front RH
D 9 Door Courtesy SW Front LH
D 10 Door Courtesy SW Front RH
D 11 Door Courtesy SW Rear LH
D 12 Door Courtesy SW Rear RH
D 13 Door Handle SW
D 14 Door Key Cylinder Light
D 15 Door Key Lock and Unlock SW LH
D 16 Door Key Lock and Unlock SW RH
D 17 Door Lock Control SW RH
D 18 Door Lock Motor, Door Unlock and Open Detection SW Front LH
D 19 Door Lock Motor, Door Unlock and Open Detection SW Front RH
D 20 Door Lock Motor, Door Unlock and Open Detection SW Rear LH
D 21 Door Lock Motor, Door Unlock and Open Detection SW Rear RH
F 10 Front Door Speaker LH
F 11 Front Door Speaker RH
F 12 Front Tweeter (Speaker) LH
F 13 Front Tweeter (Speaker) RH
F 14 Fuel Lid Opener Motor
F 15 Fuel Pump and Sender
H 12 High Mount Stop Light
I 13 Interior Light
J 5 Junction Connector
L 2 Light Failure Sensor
L 3 Luggage Compartment Door Opener Motor
L 4 Luggage Compartment Door and Fuel Lid Opener SW
L 5 Luggage Compartment Key Unlock SW
L 6 Luggage Compartment Light
L 7 Luggage Compartment Light SW
M 1 Moon Roof Control Relay
M 2 Moon Roof Control SW and Personal Light (w/ Moon Roof)
M 3 Moon Roof Limit SW
M 4 Moon Roof Motor
P 5 Personal Light (w/o Moon Roof)
P 6 Power Window Control SW Front RH
P 7 Power Window Control SW Rear LH
P 8 Power Window Control SW Rear RH
P 9 Power Window Master SW and Door Lock Control SW LH
P 10 Power Window Motor Front LH
P 11 Power Window Motor Front RH
P 12 Power Window Motor Rear LH
P 13 Power Window Motor Rear RH
R 6 Rear Combination Light LH
R 7 Rear Combination Light RH
R 8 Rear Speaker LH
R 9 Rear Speaker RH
R 10 Rear Window Defogger (+)
R 11 Rear Window Defogger (–)
R 12 Remote Control Mirror and Mirror Heater LH
R 13 Remote Control Mirror and Mirror Heater RH
T 6 Telephone Transceiver and Speaker Relay
T 7 Telephone Transceiver and Speaker Relay
V 6 Vanity Light LH
V 7 Vanity Light RH
W 7 Wireless Door Lock ECU

Position of Parts in Seat



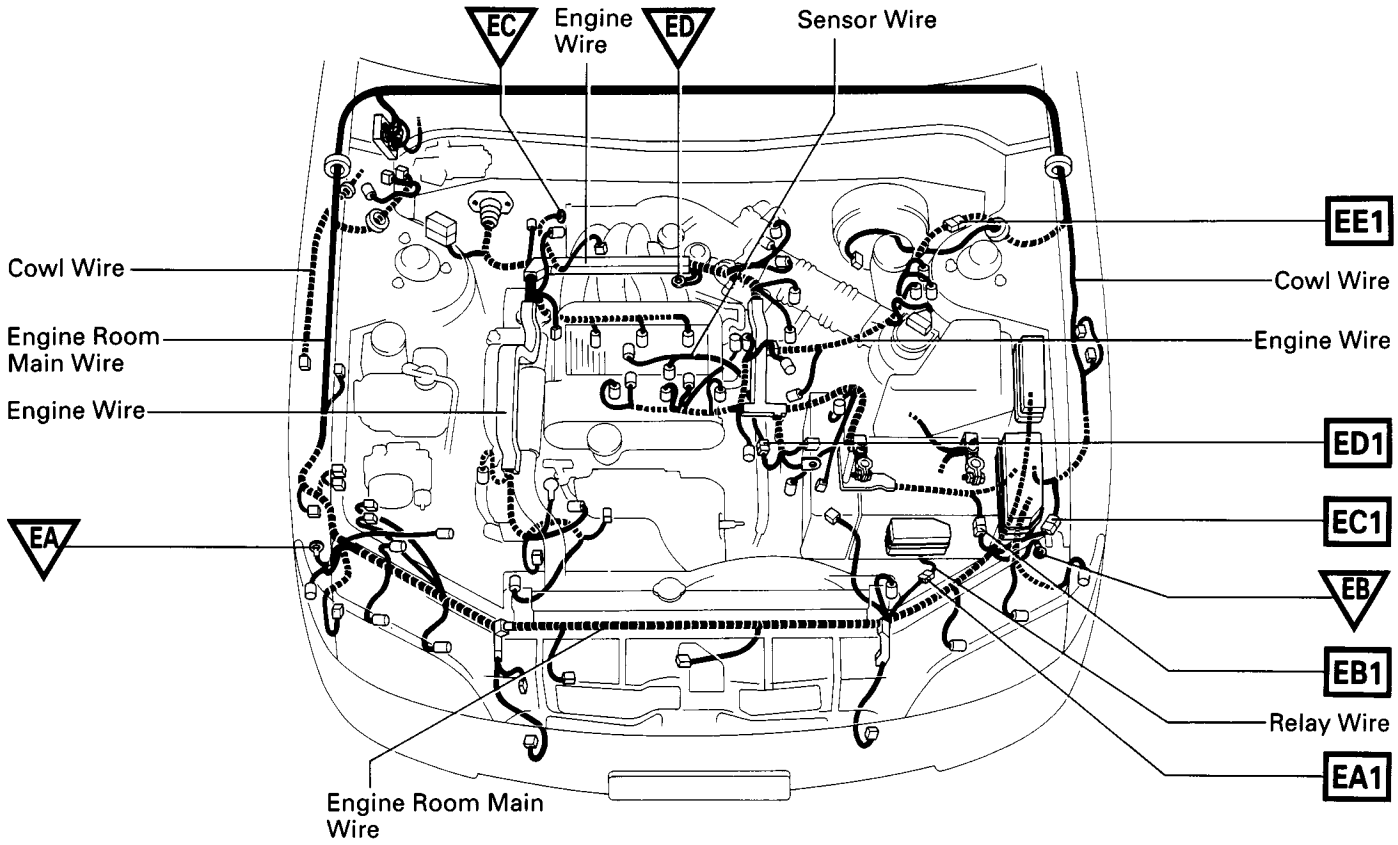
B 5 Buckle SW

P 14 Power Seat Control SW (for Driver's Seat)
P 15 Power Seat Control SW (for Passenger's Seat)
P 16 Power Seat Motor (for Driver's Seat Front Vertical Control)
P 17 Power Seat Motor (for Driver's Seat Rear Vertical Control)
P 18 Power Seat Motor (for Driver's Reclining Motor Control)
P 19 Power Seat Motor (for Driver's Seat Slide Control)
P 20 Power Seat Motor (for Passenger's Seat Reclining Control)
P 21 Power Seat Motor (for Passenger's Seat Slide Control)

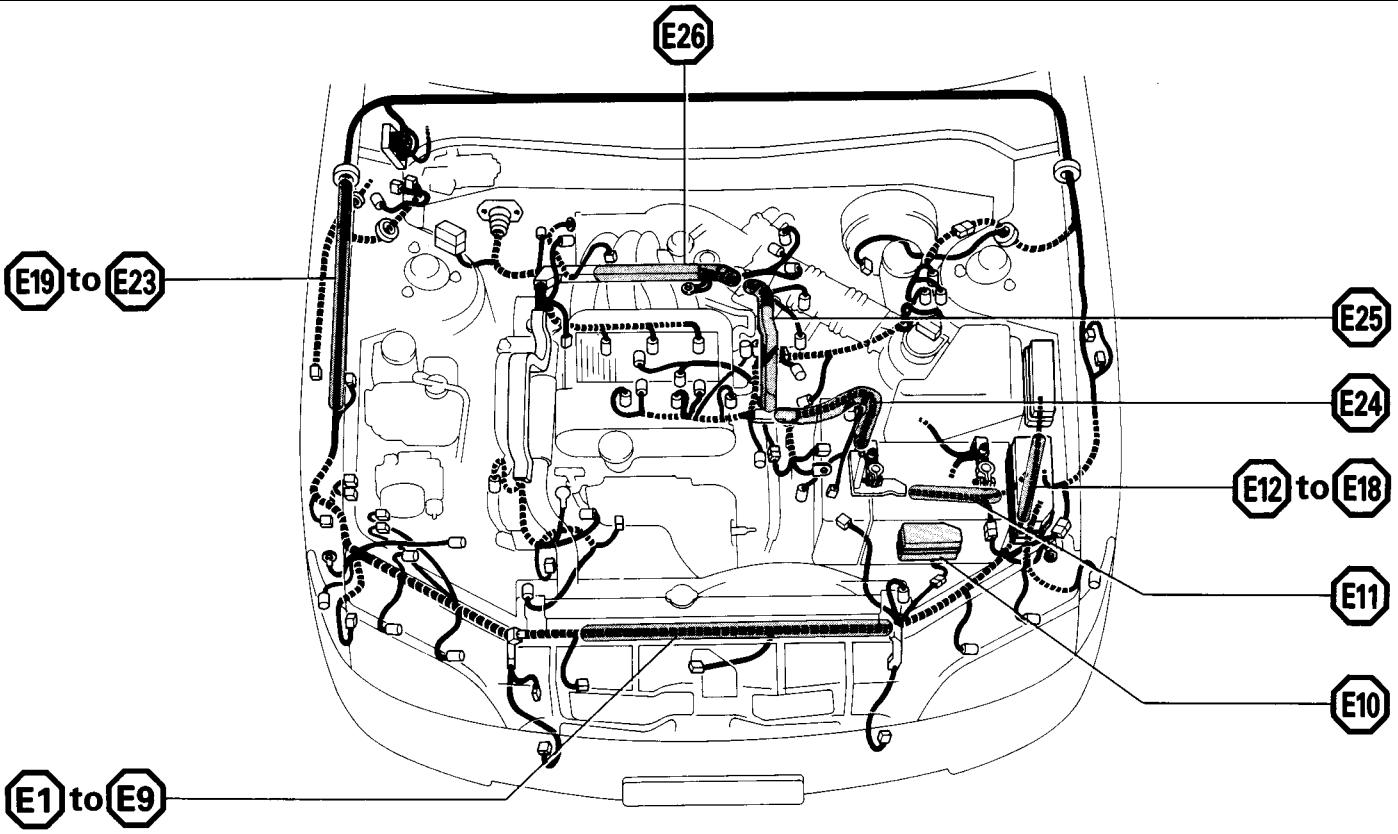
S 13 Seat Heater LH (for Seat Back)
S 14 Seat Heater LH (for Seat Cushion)
S 15 Seat Heater RH (for Seat Back)
S 16 Seat Heater RH (for Seat Cushion)

▭ : Location of Connector Joining Wire Harness and Wire Harness

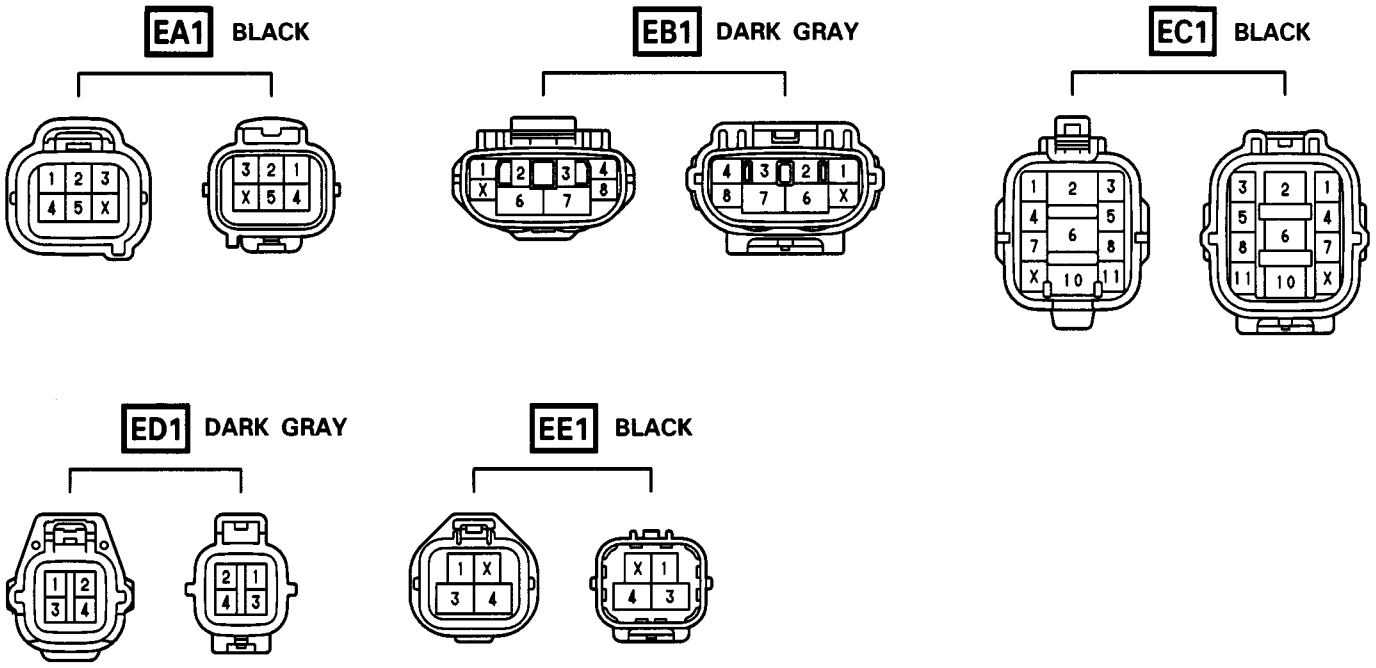
▽ : Location of Ground Points



○ : Location of Splice Points

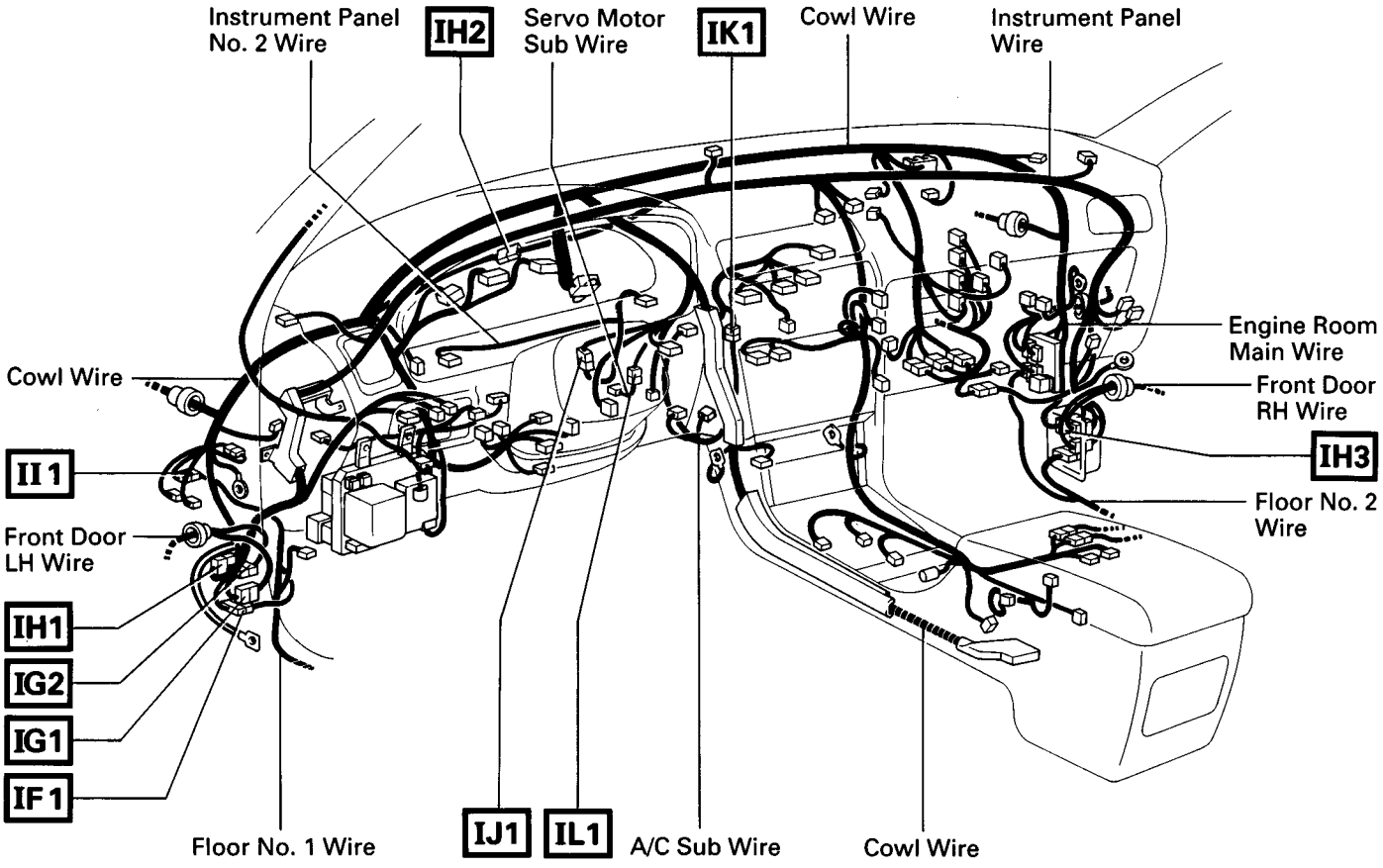


Connector Joining Wire Harness and Wire Harness

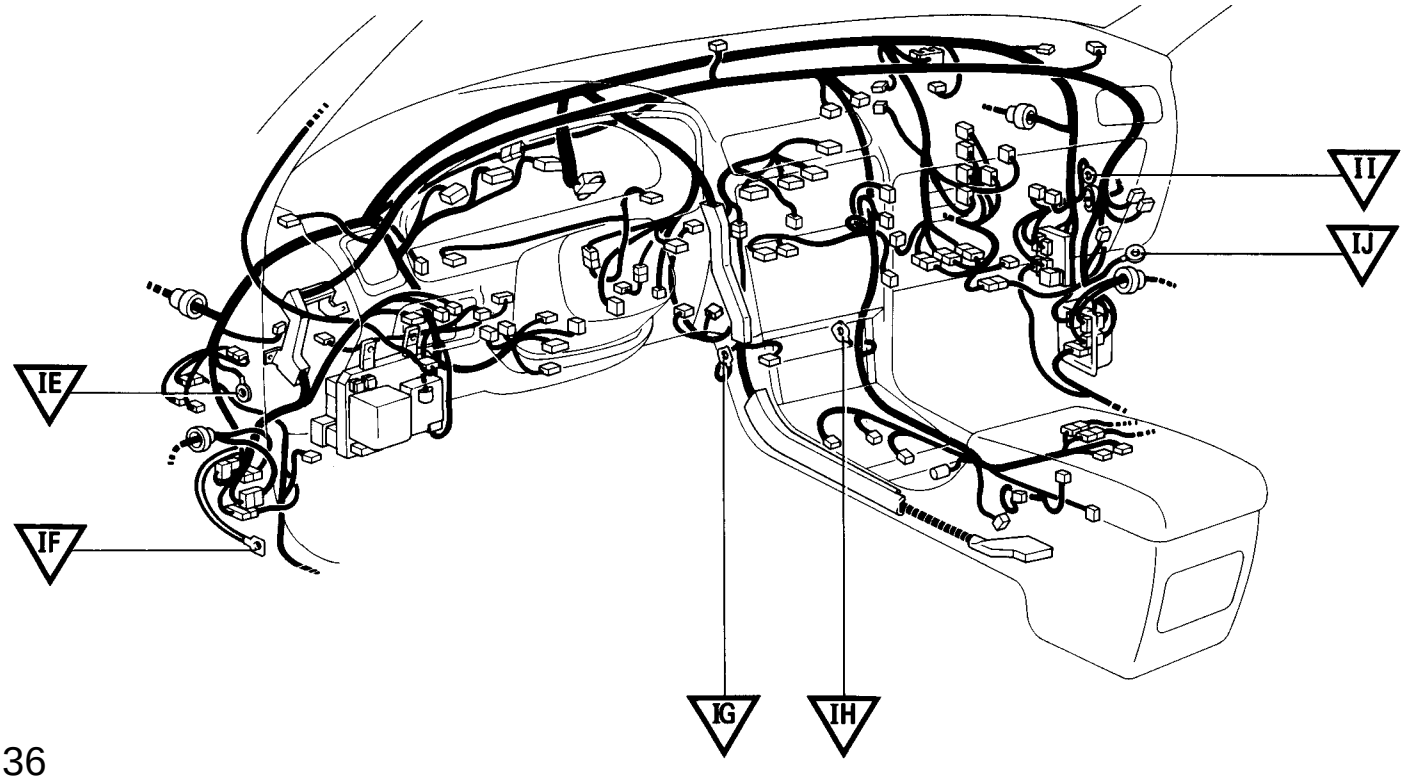


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	ENGINE ROOM MAIN WIRE AND RELAY WIRE (UNDER THE R/B NO. 7)
EB1	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
EC1	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
ED1	ENGINE WIRE AND SENSOR WIRE (SIDE OF FRONT CYLINDER HEAD)
EE1	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)

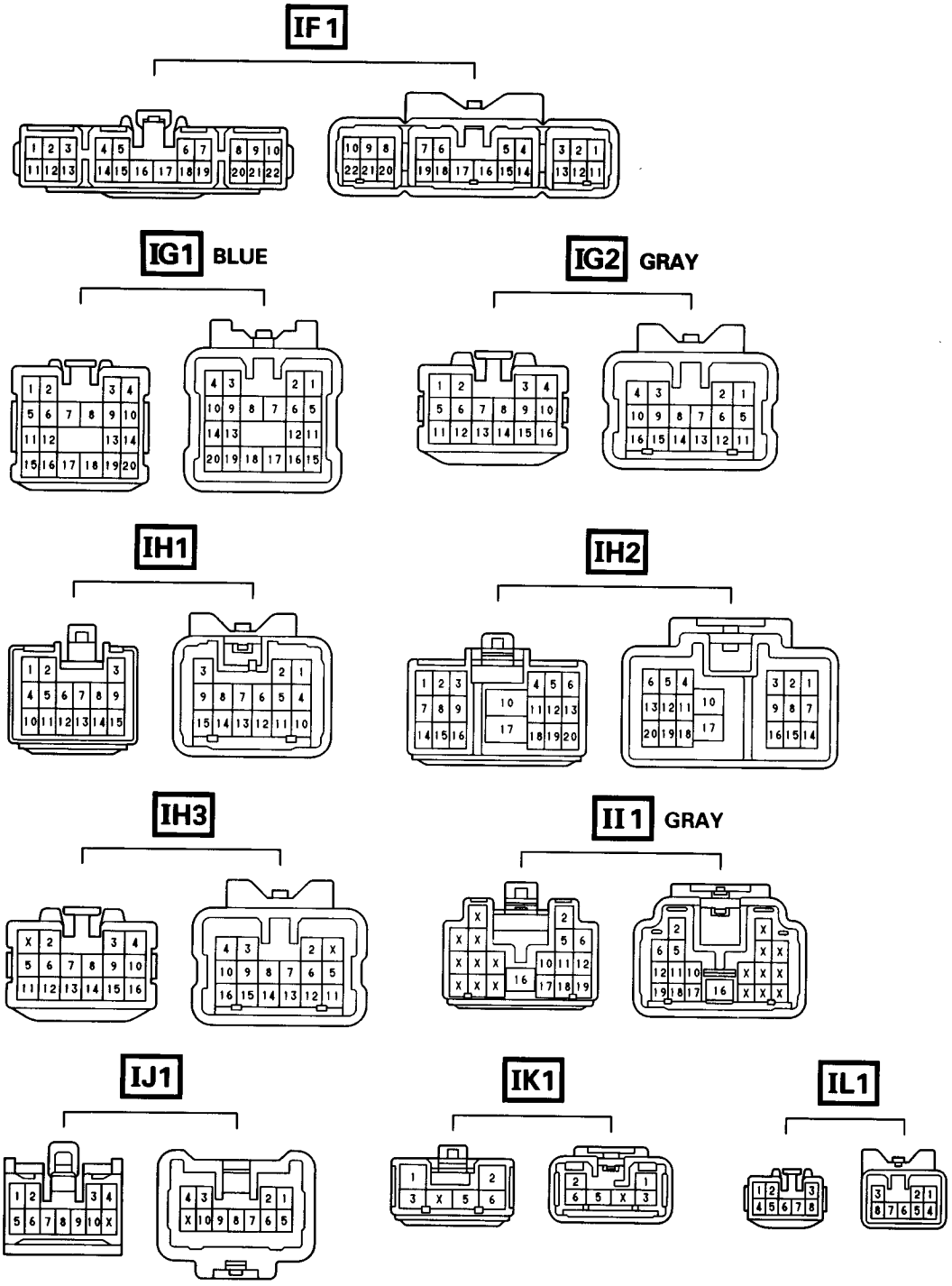
▭ : Location of Connector Joining Wire Harness and Wire Harness



▽ : Location of Ground Points

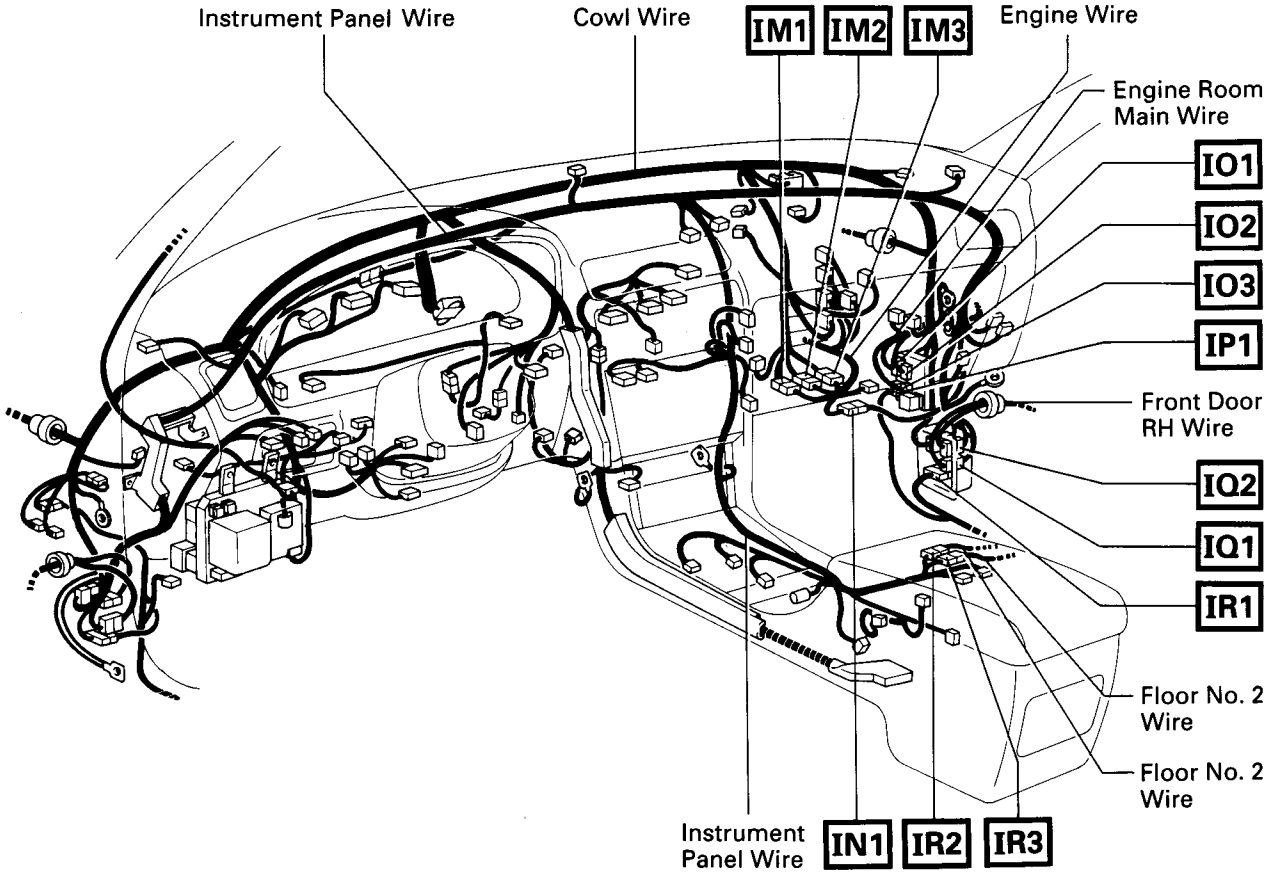


Connector Joining Wire Harness and Wire Harness

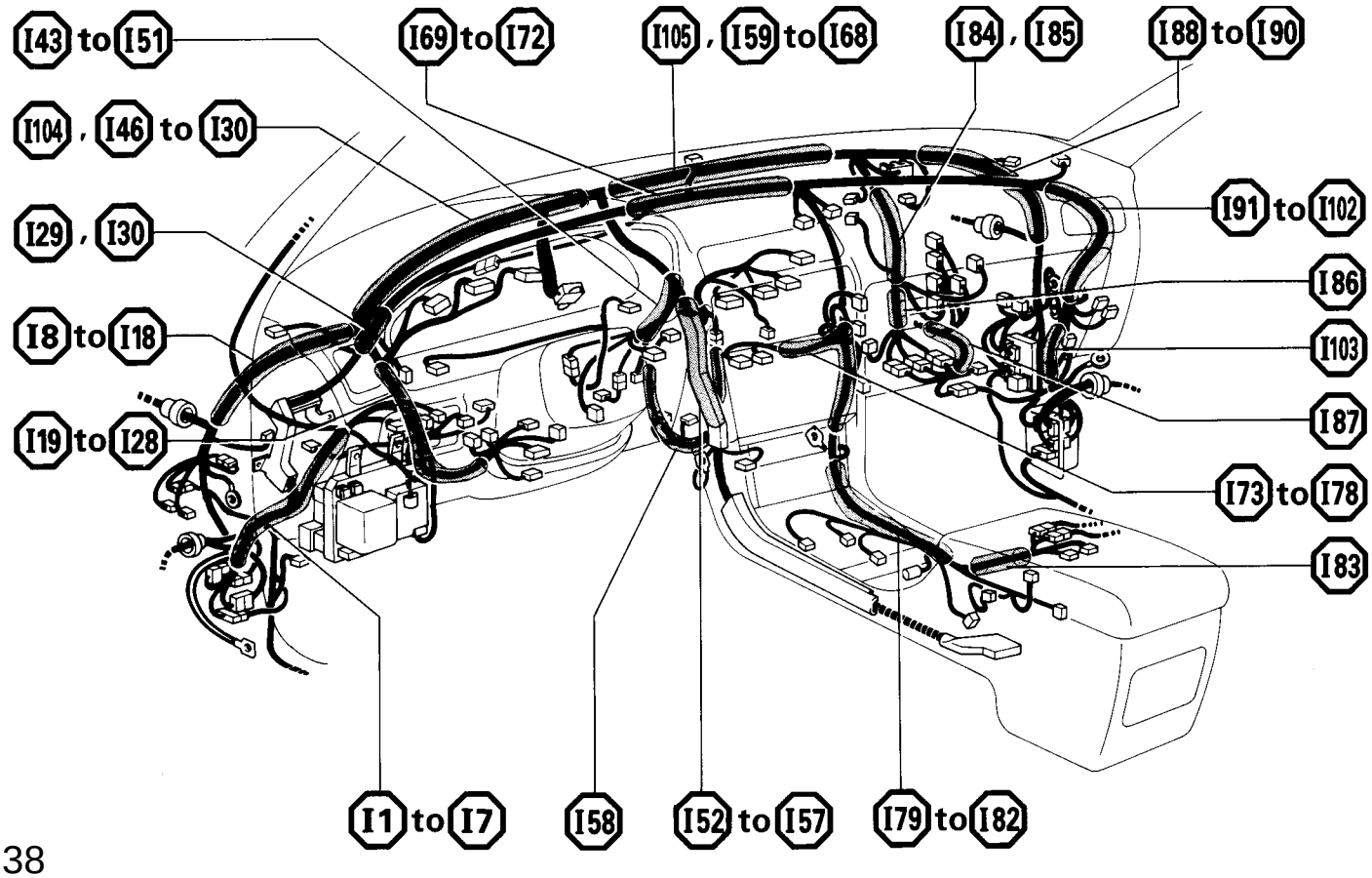


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF1	FLOOR NO. 1 WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG2	
IH1	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IH3	COWL WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
II1	FLOOR NO. 1 WIRE AND COWL WIRE (LEFT KICK PANEL)
IJ1	INSTRUMENT PANEL NO. 2 WIRE AND COWL WIRE (UNDER THE COMBINATION METER)
IK1	COWL WIRE AND A/C SUB WIRE (NEAR THE RADIO AND PLAYER)
IL1	COWL WIRE AND SERVO MOTOR SUB WIRE (BEHIND RADIO AND PLAYER)

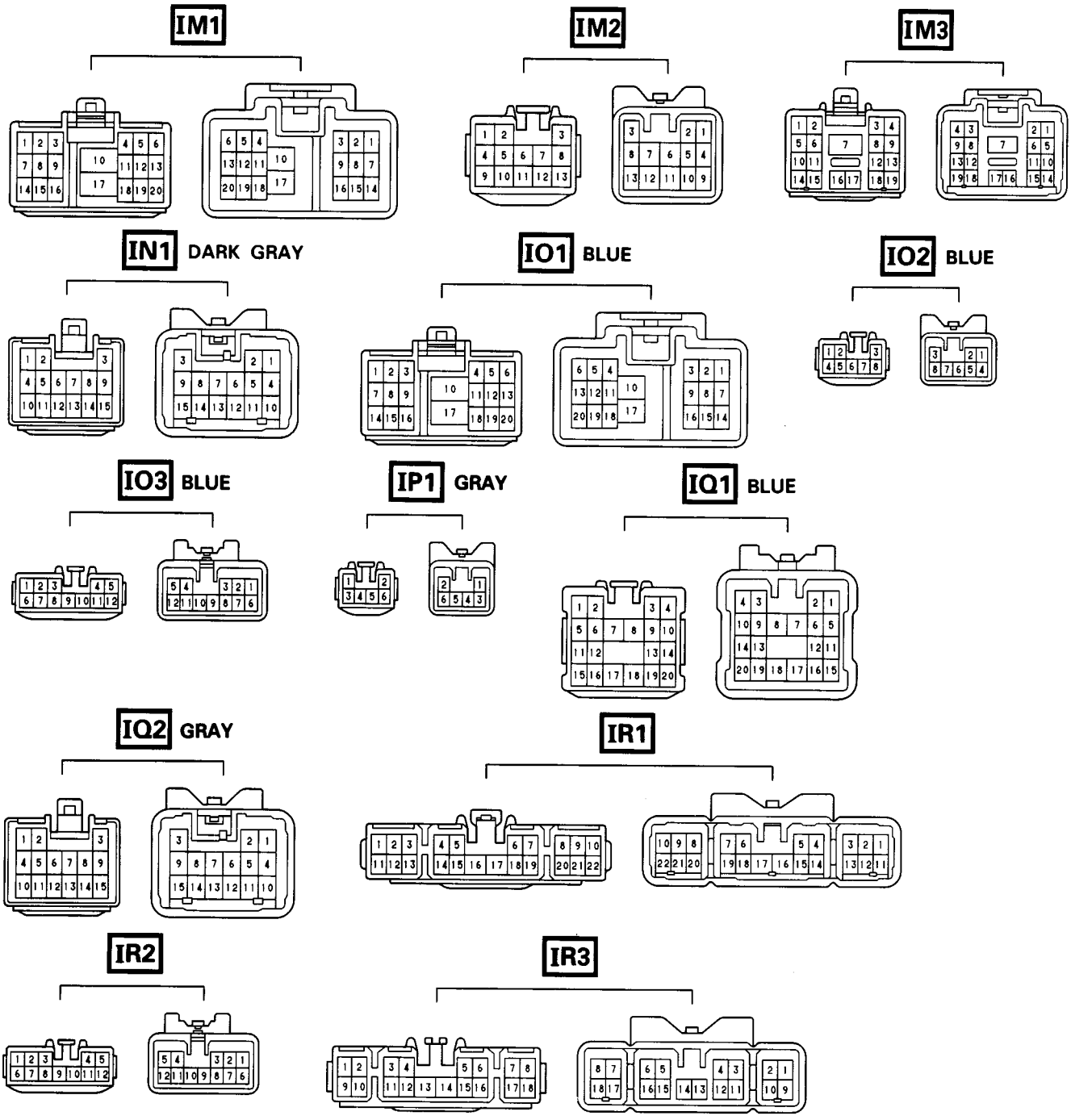
▭ : Location of Connector Joining Wire Harness and Wire Harness



◯ : Location of Splice Points



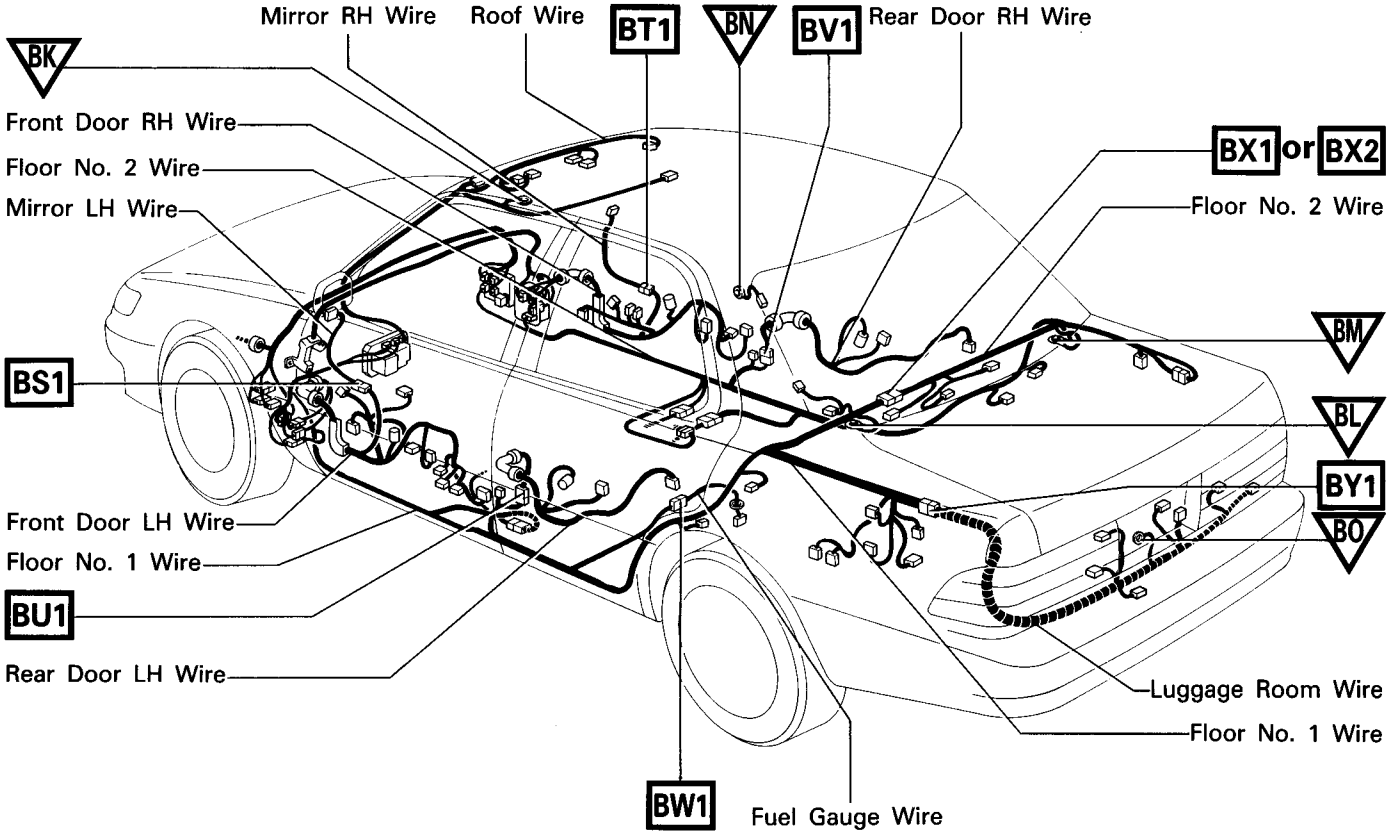
Connector Joining Wire Harness and Wire Harness



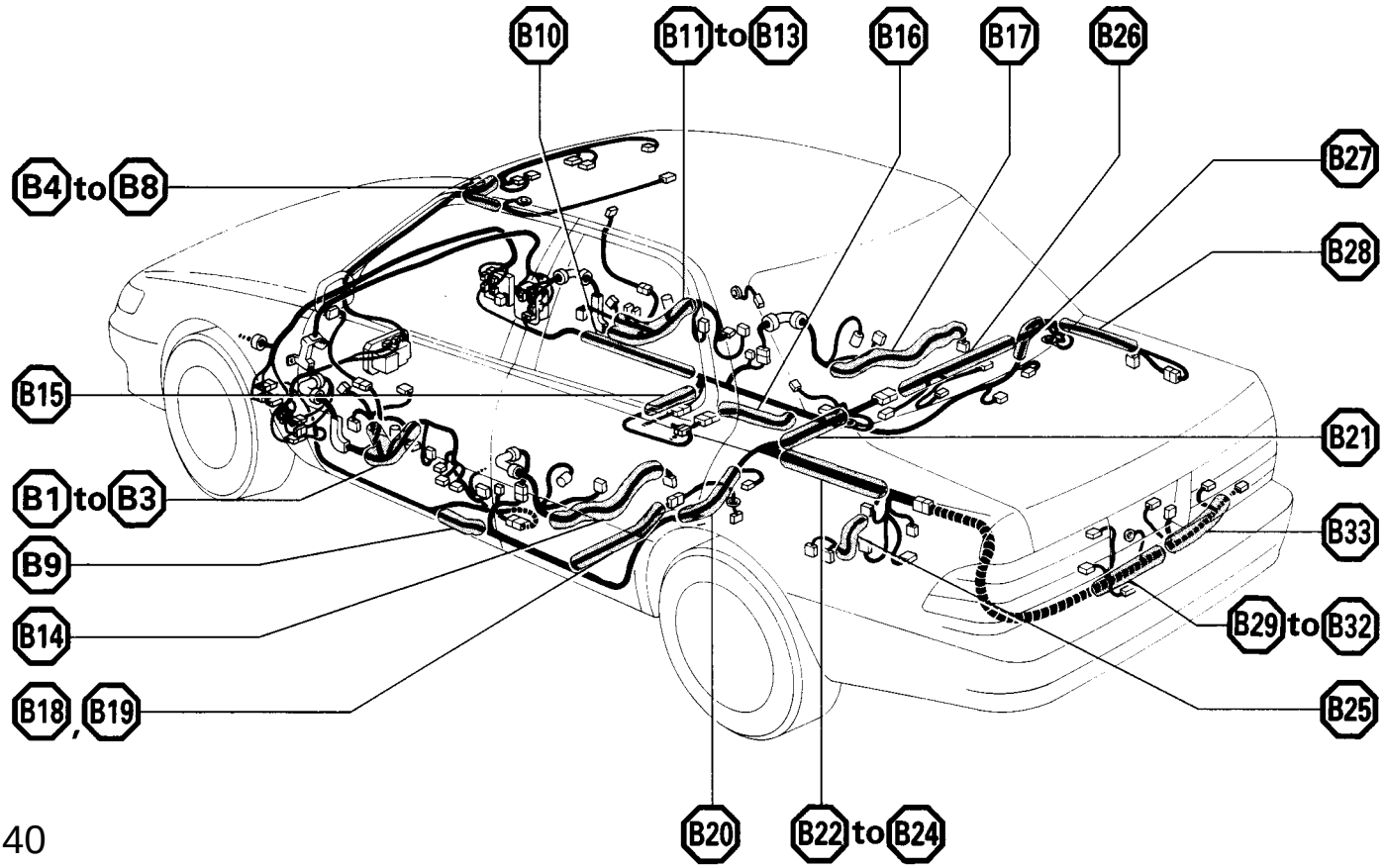
CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IM1	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM2	
IM3	
IN1	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)
I01	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
I02	
I03	
IP1	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)
IQ1	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IQ2	
IR1	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR2	INSTRUMENT PANEL WIRE AND FLOOR NO. 2 WIRE (UNDER THE PASSENGER'S SEAT)
IR3	

▭ : Location of Connector Joining Wire Harness and Wire Harness

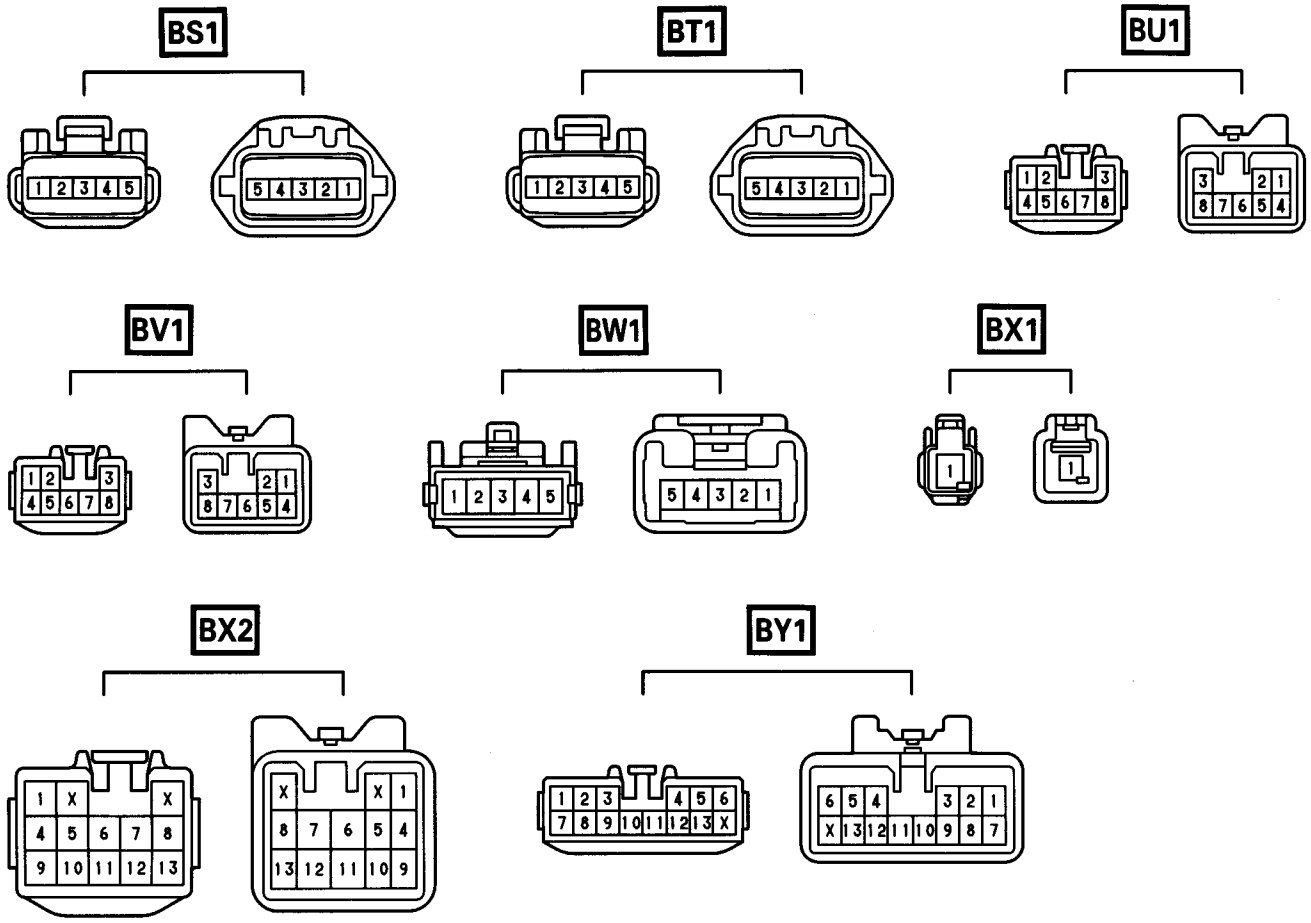
▽ : Location of Ground Points



○ : Location of Splice Points

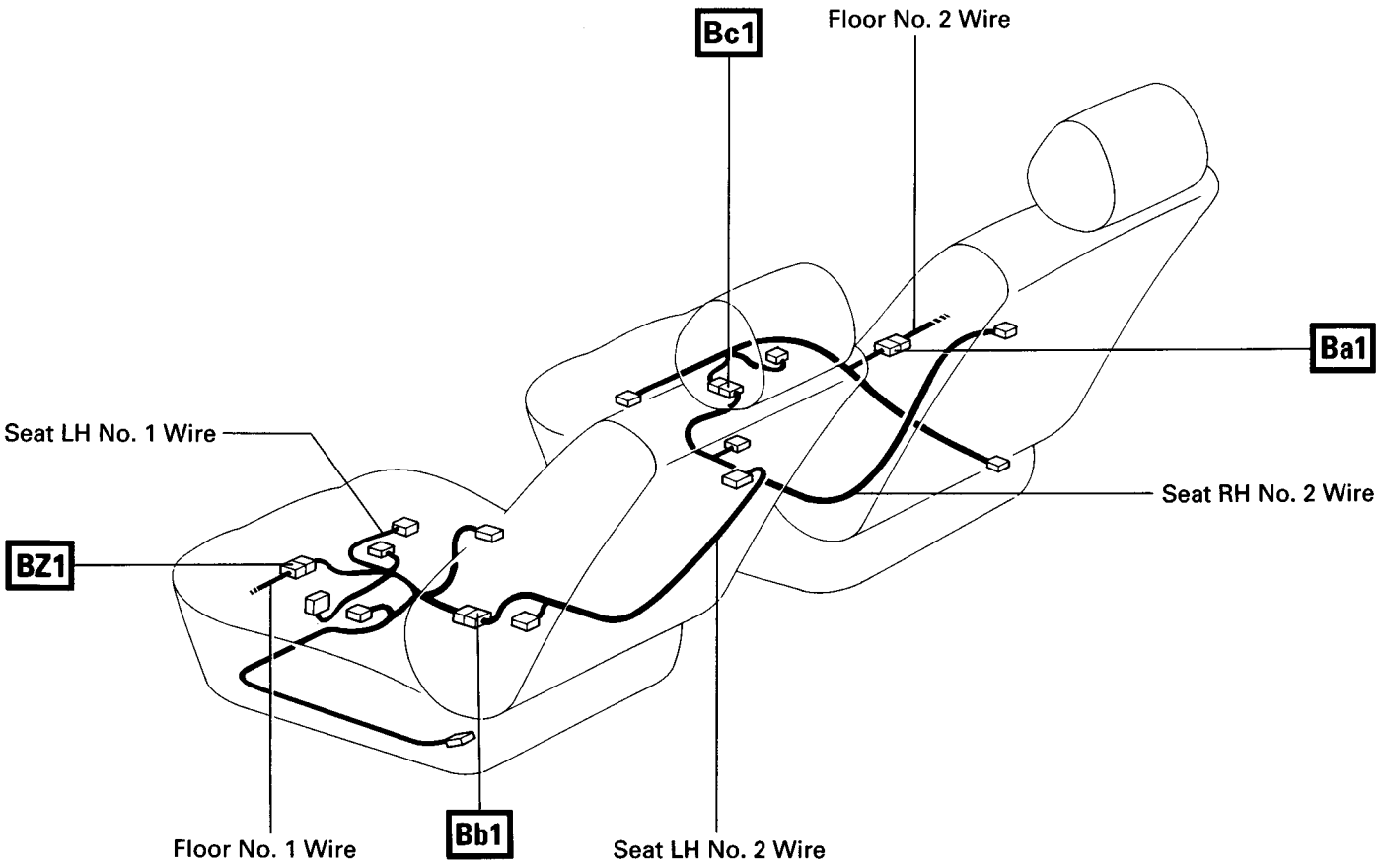


Connector Joining Wire Harness and Wire Harness

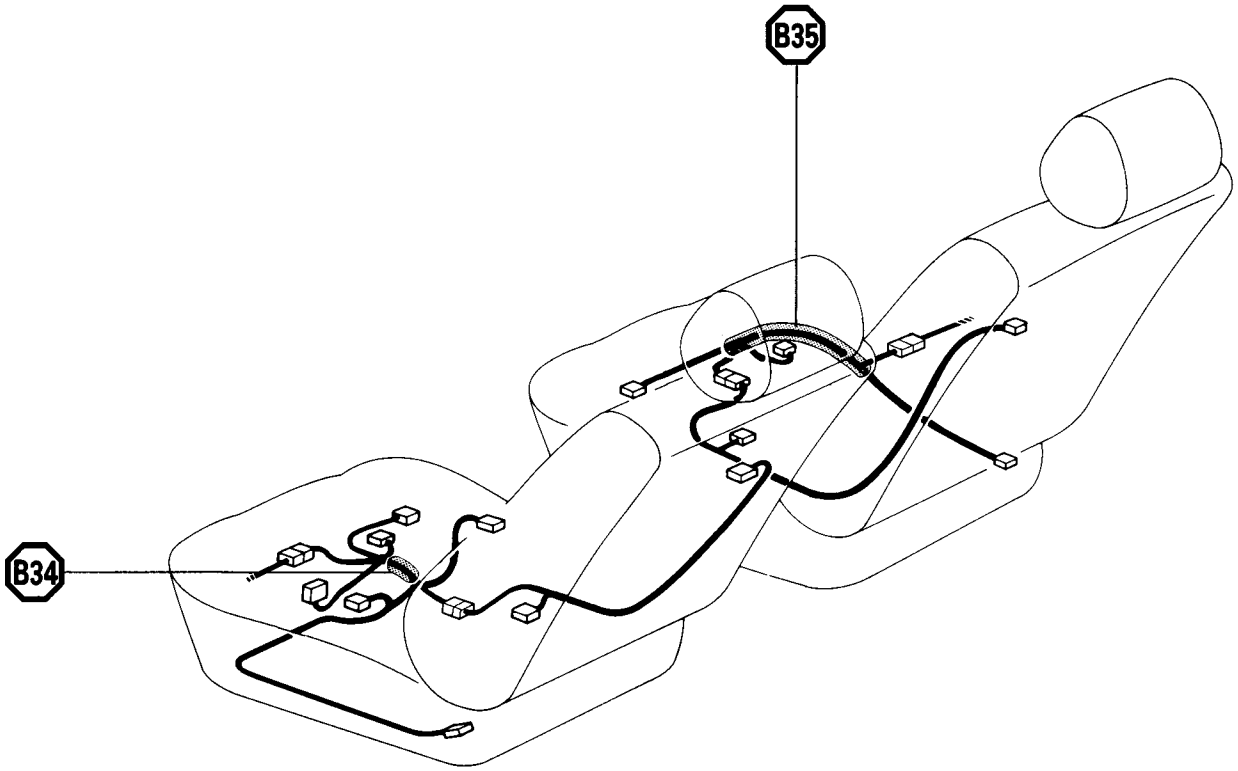


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
BS1	MIRROR LH WIRE AND FRONT DOOR LH WIRE (FRONT LH DOOR INSIDE)
BT1	MIRROR RH WIRE AND FRONT DOOR RH WIRE (FRONT RH DOOR INSIDE)
BU1	REAR DOOR LH WIRE AND FLOOR NO. 1 WIRE (LEFT CENTER PILLAR)
BV1	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)
BW1	FUEL GAUGE WIRE AND FLOOR NO. 1 WIRE (UNDER THE REAR SEAT CUSHION)
BX1	FLOOR NO. 1 WIRE AND FLOOR NO. 2 WIRE (BEHIND PACKAGE TRAY TRIM)
BX2	
BY1	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

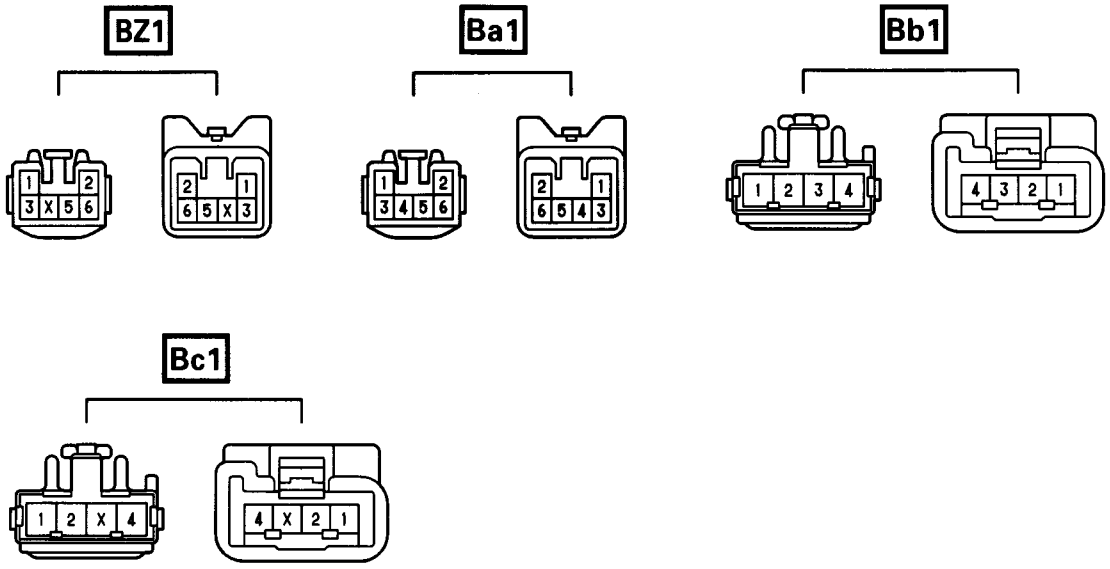
▭ : Location of Connector Joining Wire Harness and Wire Harness



⬡ : Location of Ground Points



Connector Joining Wire Harness and Wire Harness

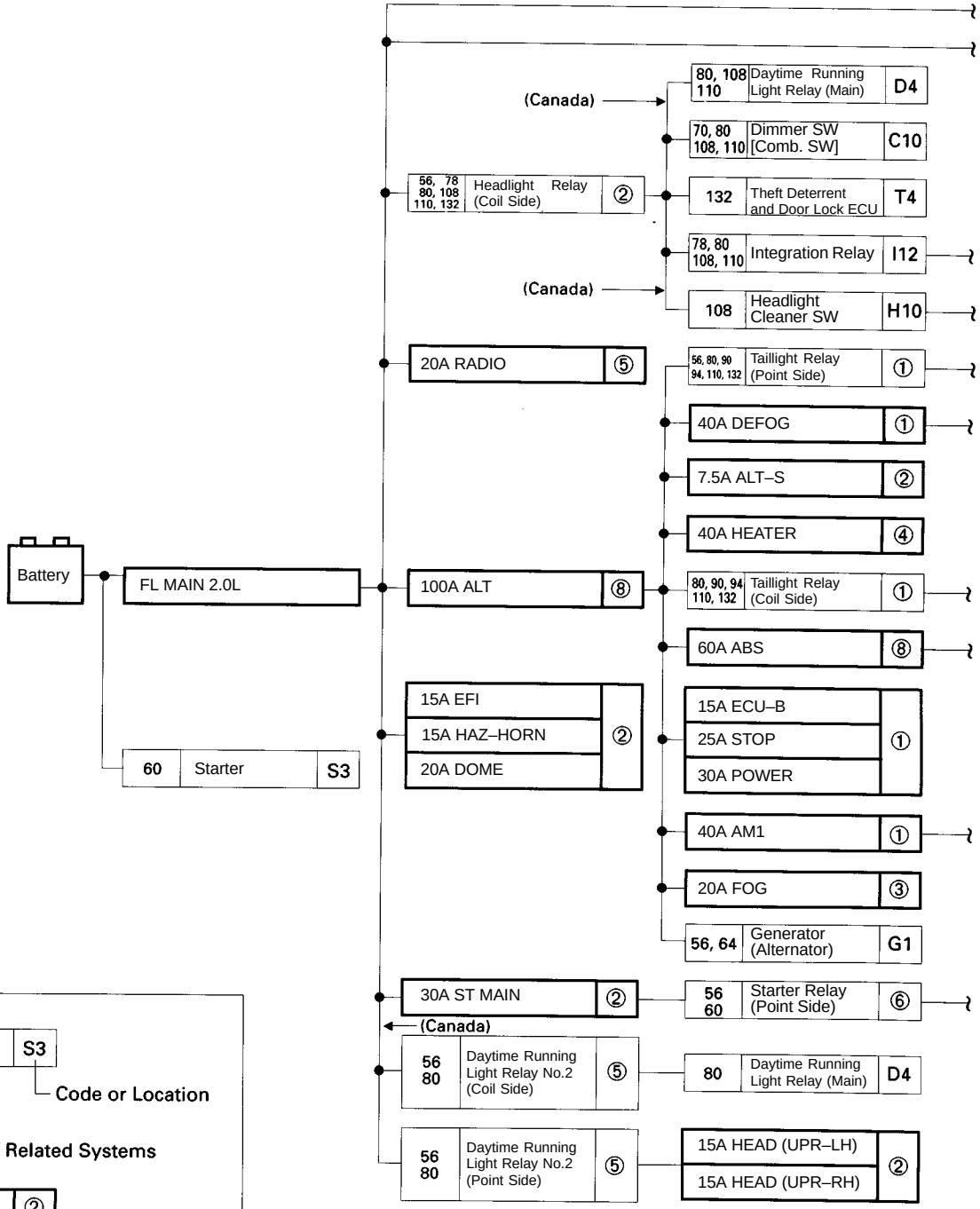


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
BZ1	FLOOR NO. 1 WIRE AND SEAT LH NO. 1 WIRE (UNDER THE DRIVER'S SEAT)
Ba1	FLOOR NO. 2 WIRE AND SEAT RH NO. 1 WIRE (UNDER THE PASSENGER'S SEAT)
Bb1	SEAT LH NO. 2 WIRE AND SEAT LH NO. 1 WIRE (UNDER THE DRIVER'S SEAT)
Bc1	SEAT RH NO. 2 WIRE AND SEAT RH NO. 1 WIRE (UNDER THE PASSENGER'S SEAT)

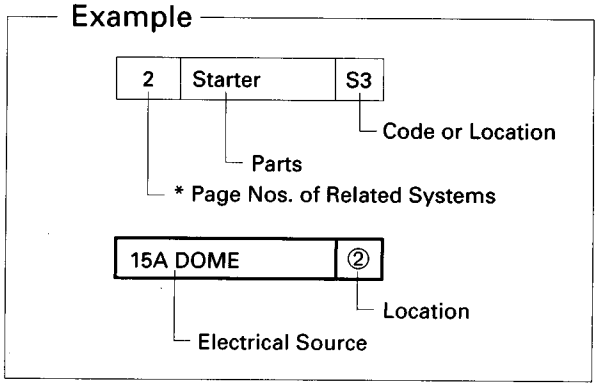
POWER SOURCE (Current Flow Chart)

The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.

The next page and following pages show the parts to which each electrical source outputs current.

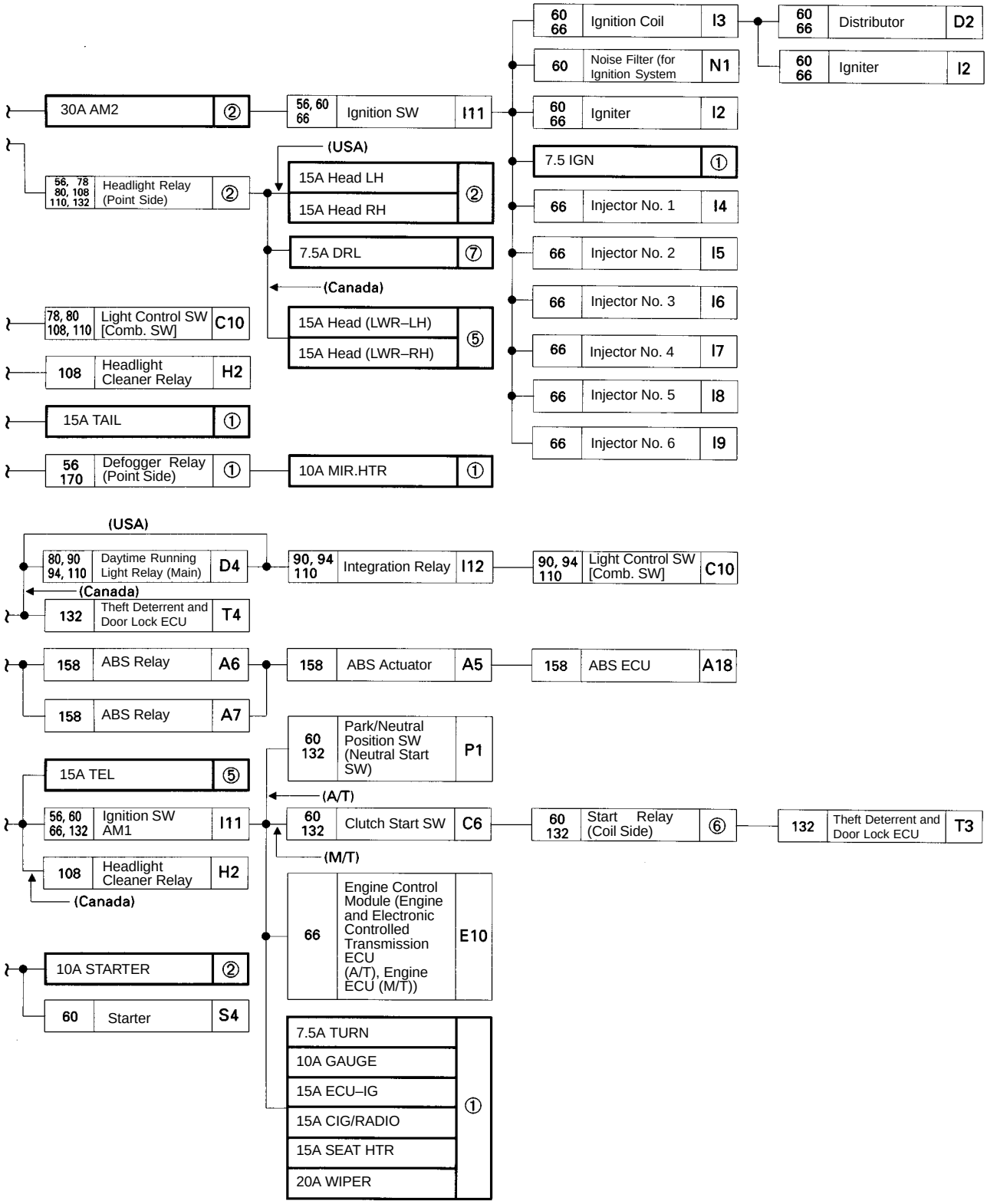


Example



* These are the page numbers of the first page on which the related system is shown.
The part indicated is located somewhere in the system, not necessarily on the page indicated here.

[LOCATION] (1) : J/B No. 1 (See page 20) (2) : J/B No. 2 (See page 22) (3) : R/B No. 1 (See page 25)
(7) : R/B No. 7 (See page 27) (8) : Fuse Box (F7 See on page 28)



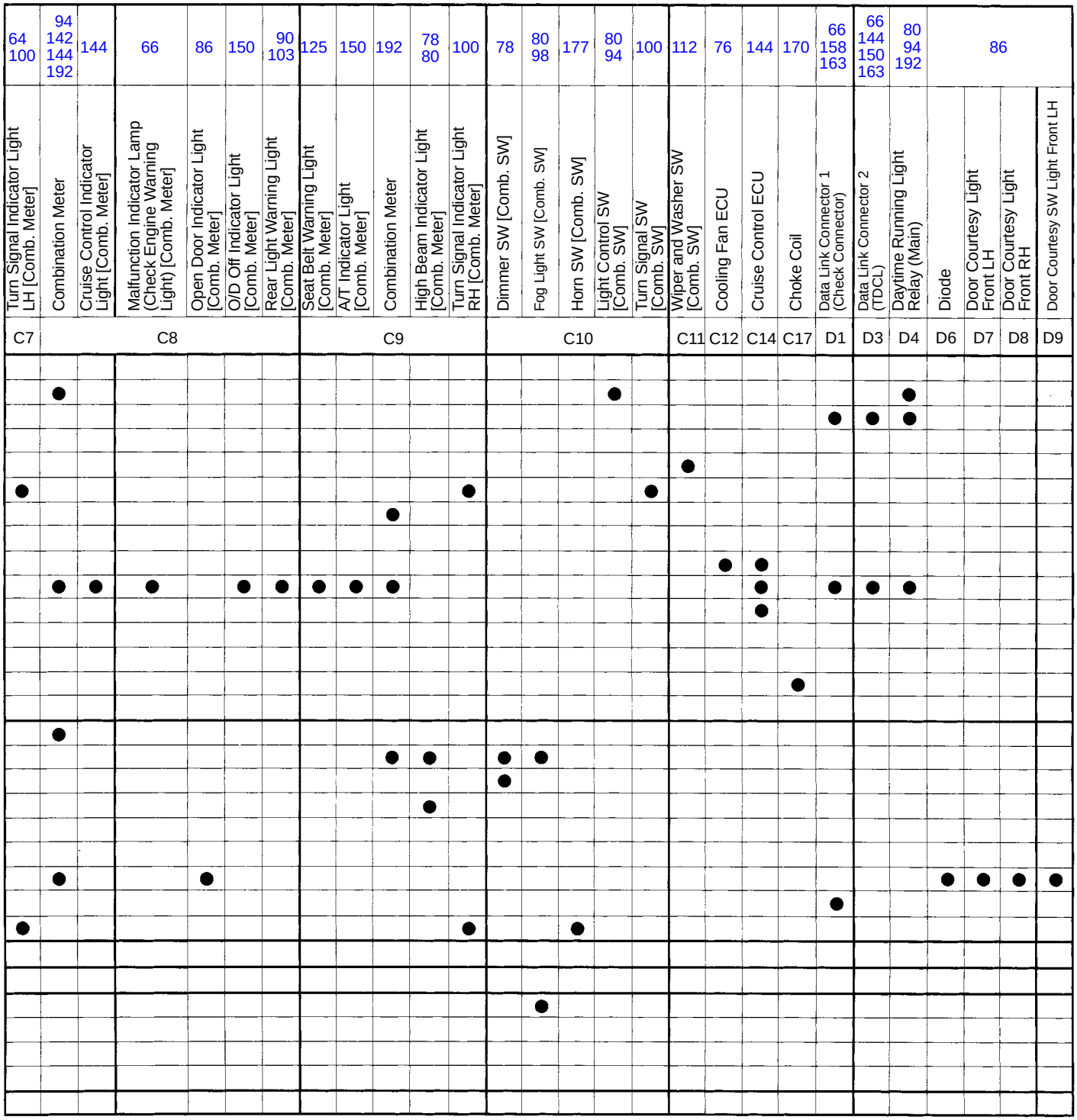
(4) : R/B No. 4 (See page 25) (5) : R/B No. 5 (See page 26) (6) : R/B No. 6 (See page 26)

POWER SOURCE (Current Flow Chart)

Location	CB or Fuse		*Page Nos. of Related Systems																											
			198	158			170 198	94 169 198	198	158		198	182	106	192	198	60	163	94 169	158	150	64	192	86	163
			Parts	A/C Magnetic Clutch and Lock Sensor	ABS Actuator	ABS Relay	A/C Control Assembly		A/C Power Transistor	ABS ECU	Air Vent Mode Control Servo Motor	Auto Antenna Motor and Relay	Back–Up Light SW (M/T)	Brake Fluid Level SW	Blower Motor	Cold Start Injector	Center Airbag Sensor Assembly	Cigarette Lighter and Ashtray Illumination	ABS Warning Light [Comb. Meter]	A/T Indicator Light [Comb. Meter]	Charge Warning Light [Comb. Meter]	Combination Meter	Open Door Warning Light [Comb. Meter]	SRS Warning Light [Comb. Meter]
			Code or Location	A3	A5	A7	A10	A12	A14	A18	A19	A23	A26	B1	B2	B3	C1	C4	C5	C7						
①	10A	MIR–HTR																												
	15A	TAIL						●											●											
	15A	ECU–B						●		●								●					●						●	
	15A	FOG																												
	20A	WIPER																												
	7.5A	TURN																												
	7.5A	IGN																●				●								
	15A	CIG/RADIO						●					●					●	●											
	15A	ECU–IG								●			●																	
	10A	GAUGE	●	●	●	●	●			●	●	●		●	●					●	●									
	25A	STOP									●																			
	15A	SEAT HTR																												
	30A	POWER																												
	40A	DEFOG																												
	40A	AM1																												
②	10A	STARTER															●													
	15A	HEAD(RH)(USA)																												
	15A	HEAD(LH)(USA)																												
	15A	HEAD (UPR–RH)(Canada)																												
	15A	HEAD (UPR–LH)(Canada)																												
	7.5A	ALT–S																												
	20A	DOME						●					●																	
	15A	EFI																												
	15A	HAZ–HORN																												
③	20A	FOG																												
④	40A	HEATER					●		●							●														
⑤	15A	HEAD (LWR–LH)(Canada)																												
	15A	HEAD (LWR–RH)(Canada)																												
	15A	TEL																												
	20A	RADIO																												
⑦	7.5A	DRL																												

* These are the page numbers of the first page on which the related system is shown.
The part indicated is located somewhere in the system, not necessarily on the page indicated here.

[LOCATION] (1) : J/B No. 1 (See page 20) (2) : J/B No. 2 (See page 22) (3) : R/B No. 1 (See page 25)
(7) : R/B No. 7 (See page 27) (8) : Fuse Box (F7 See on page 28)



(4) : R/B No. 4 (See page 25)

(5) : R/B No. 5 (See page 26)

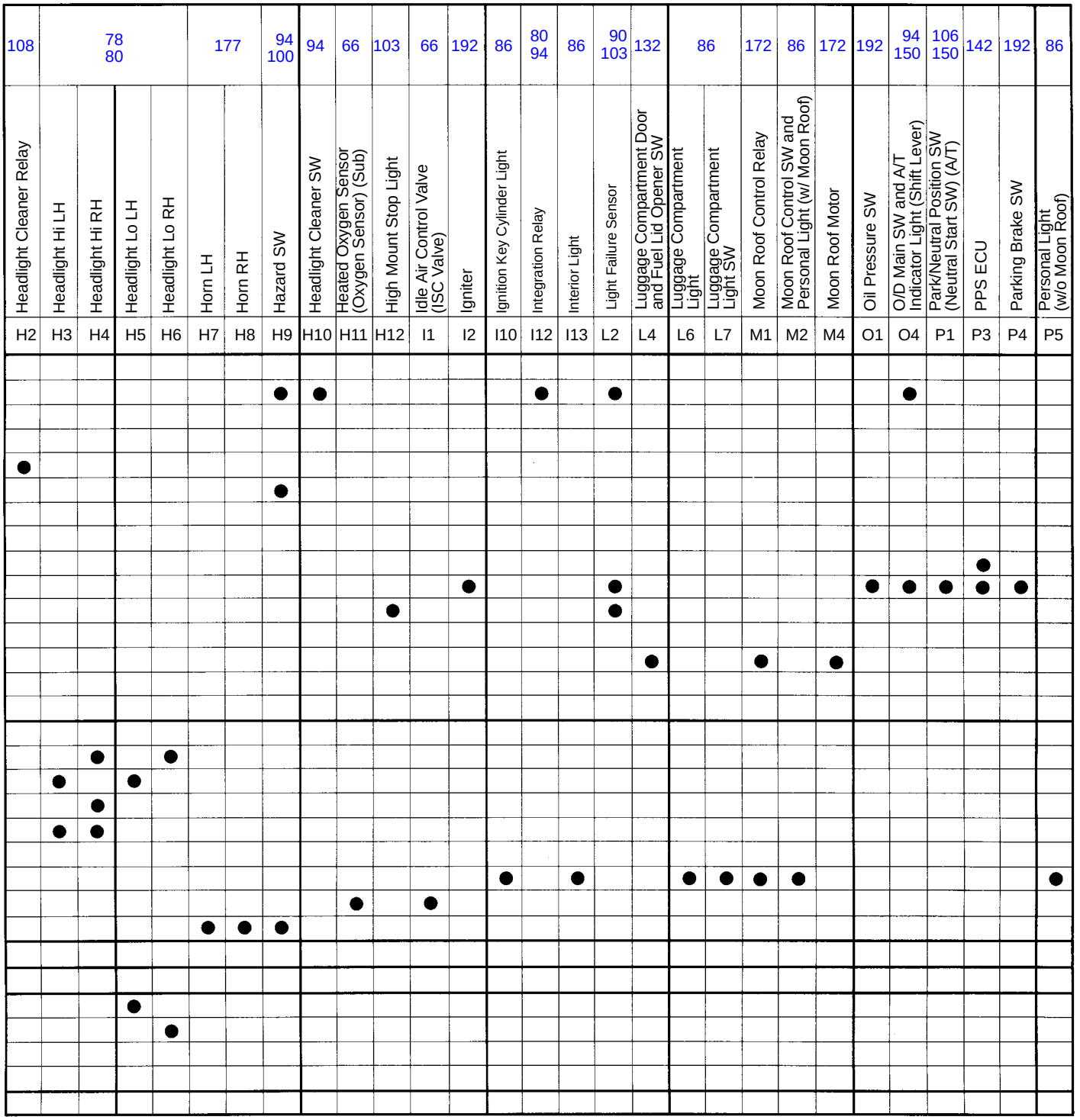
(6) : R/B No. 6 (See page 26)

POWER SOURCE (Current Flow Chart)

Location	CB or Fuse		*Page Nos. of Related Systems	86						192	66 150	66	66 150	94 150	198	80 98		90 100		132	66 192	64 192	94		108
			Parts	Door Courtesy SW Front RH	Door Courtesy SW Rear LH	Door Courtesy SW Rear RH	Door Key Cylinder Light	Door Lock Motor, Door Unlock and Open Detection SW Front LH	Door Lock Motor, Door Unlock and Open Door Detection SW Front RH	Engine Oil Level Warning SW	Engine Control Module (Engine and Electronic Controlled Transmission (A/T), Engine ECU (M/T))			Electronic Controlled Transmission Pattern Select SW	Extra High Speed Relay	Front Fog Light LH	Front Fog Light RH	Front Turn Signal and Clearance Light LH	Front Turn Signal and Clearance Light RH	Fuel Lid Opener Motor	Fuel Pump and Sender	Generator (Alternator)	Glove Box Light	Glove Box Light SW	Headlight Cleaner Motor
			Code or Location	D10	D11	D12	D14	D18	D19	E6	E7	E9	E10	E11	E12	F3	F4	F5	F6	F14	F15	G2	G3	G4	H1
①	10A	MIR–HTR																							
	15A	TAIL												●				●	●				●	●	
	15A	ECU–B																							
	15A	FOG																							
	20A	WIPER																							
	7.5A	TURN																●	●						
	7.5A	IGN											●									●			
	15A	CIG/RADIO																							
	15A	ECU–IG																							
	10A	GAUGE								●			●	●	●						●	●			
	25A	STOP											●												
	15A	SEAT HTR																							
	30A	POWER																		●					
	40A	DEFOG																							
	40A	AM1																							●
②	10A	STARTER											●												
	15A	HEAD(RH)(USA)																							
	15A	HEAD(LH)(USA)																							
	15A	HEAD (UPR–RH)(Canada)																							
	15A	HEAD (UPR–LH)(Canada)																							
	7.5A	ALT–S																				●			
	20A	DOME		●	●	●	●	●	●																
	15A	EFI									●	●	●								●				
	15A	HAZ–HORN																●	●						
③	20A	FOG														●	●								
④	40A	HEATER													●										
⑤	15A	HEAD (LWR–LH)(Canada)																							
	15A	HEAD (LWR–RH)(Canada)																							
	15A	TEL																							
	20A	RADIO																							
⑦	7.5A	DRL																							

* These are the page numbers of the first page on which the related system is shown.
The part indicated is located somewhere in the system, not necessarily on the page indicated here.

[LOCATION] (1) : J/B No. 1 (See page 20) (2) : J/B No. 2 (See page 22) (3) : R/B No. 1 (See page 25)
(7) : R/B No. 7 (See page 27) (8) : Fuse Box (F7 See on page 28)



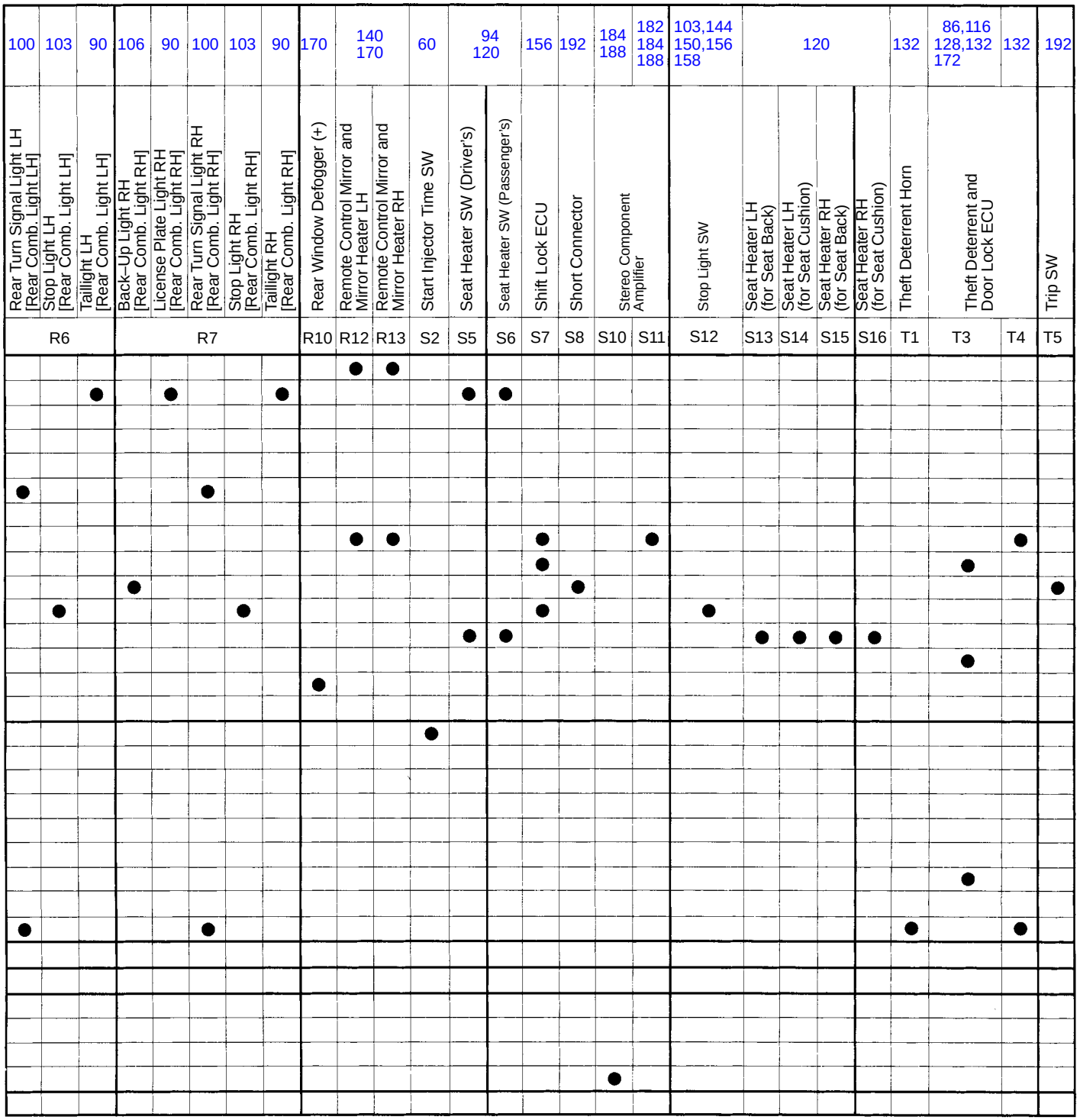
(4) : R/B No. 4 (See page 25) (5) : R/B No. 5 (See page 26) (6) : R/B No. 6 (See page 26)

POWER SOURCE (Current Flow Chart)

Location	CB or Fuse		*Page Nos. of Related Systems	116					122											94 182 184 188	140	94		106	90
			Parts	Power Window Control SW Front RH	Power Window Control SW Rear LH	Power Window Control SW Rear RH	Power Window Master SW and Door Lock Control SW	Power Window Control Front LH	Power Window Motor Front RH	Power Window Motor Rear LH	Power Window Motor Rear RH	Power Seat Control SW (for Driver's Seat)	Power Seat Control SW (for Passenger's Seat)	Power Seat Motor (for Driver's Seat Front Vertical Control)	Power Seat Motor (for Driver's Seat Rear Vertical Control)	Power Seat Motor (for Driver's Seat Reclining Motor Control)	Power Seat Motor (for Driver's Seat Slide Control)	Power Seat Motor (for Passenger's Seat Reclining Control)	Power Seat Motor (for Passenger's Seat Sliding Control)	Radio and Player	Remote Control Mirror SW	Rheostat	Rheostat Volume and Theft Deterrent Indicator Light	Back–Up Light LH [Rear Comb. Light LH]	License Plate Light LH [Rear Comb. Light LH]
			Code or Location	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	R1	R3	R4	R5	R6	
①	10A	MIR–HTR																							
	15A	TAIL																		●		●	●		●
	15A	ECU–B																							
	15A	FOG																							
	20A	WIPER																							
	7.5A	TURN																							
	7.5A	IGN																							
	15A	CIG/RADIO																		●	●				
	15A	ECU–IG																							
	10A	GAUGE																				●		●	
	25A	STOP																							
	15A	SEAT HTR																							
	30A	POWER		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
	40A	DEFOG																							
	40A	AM1																							
②	10A	STARTER																							
	15A	HEAD(RH)(USA)																							
	15A	HEAD(LH)(USA)																							
	15A	HEAD (UPR–RH)(Canada)																							
	15A	HEAD (UPR–LH)(Canada)																							
	7.5A	ALT–S																							
	20A	DOME																							
	15A	EFI																							
	15A	HAZ–HORN																							
③	20A	FOG																							
④	40A	HEATER																							
⑤	15A	HEAD (LWR–LH)(Canada)																							
	15A	HEAD (LWR–RH)(Canada)																							
	15A	TEL																							
	20A	RADIO																		●					
⑦	7.5A	DRL																							

* These are the page numbers of the first page on which the related system is shown.
The part indicated is located somewhere in the system, not necessarily on the page indicated here.

[LOCATION] (1) : J/B No. 1 (See page 20) (2) : J/B No. 2 (See page 22) (3) : R/B No. 1 (See page 25)
(7) : R/B No. 7 (See page 27) (8) : Fuse Box (F7 See on page 28)



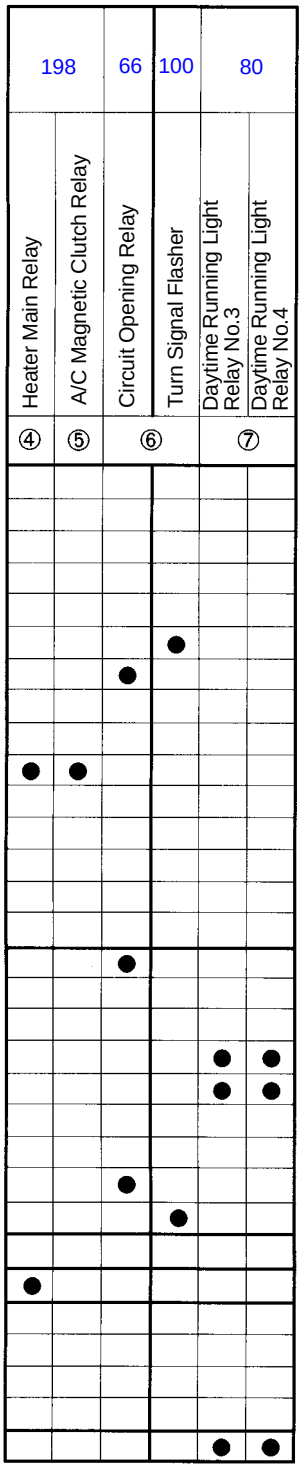
(4) : R/B No. 4 (See page 25) (5) : R/B No. 5 (See page 26) (6) : R/B No. 6 (See page 26)

POWER SOURCE (Current Flow Chart)

Location	CB or Fuse		*Page Nos. of Related Systems	178	66		66 142 150 192	66	86		112	192	112			128		56 170	86	86 110 125	170	56 116 172	66 150	132 177	80 98
			Parts	Telephone Transceiver and Speaker Relay	VSV (for Fuel Pressure Up)	VSV (for Intake Air Control)	Vehicle Speed Sensor (Speed Sensor)	Volume Air Flow (Air Flow Meter)	Vanity Light LH	Vanity Light RH	Washer Motor	Water Temp. Sender	Wiper Angle Control Motor	Wiper Motor	Wiper Control Relay	Wireless Door Lock Main SW	Wireless Door Lock ECU	Defogger Relay	Diode	Integration Relay	Noise Filter	Power Main Relay	EFI Main Relay	Horn Relay	Fog Light Relay
			Code or Location	T7	V1	V2	V3	V5	V6	V7	W1	W2	W3	W4	W5	W6	W7	①				②		③
①	10A	MIR–HTR																						
	15A	TAIL																						
	15A	ECU–B																						
	15A	FOG																						
	20A	WIPER									●		●	●	●									
	7.5A	TURN																						
	7.5A	IGN						●														●		
	15A	CIG/RADIO																						
	15A	ECU–IG	●																					
	10A	GAUGE					●					●						●		●				
	25A	STOP																						
	15A	SEAT HTR																						
	30A	POWER																			●			
	40A	DEFOG																●			●			
	40A	AM1																						
②	10A	STARTER																						
	15A	HEAD(RH)(USA)																						●
	15A	HEAD(LH)(USA)																						
	15A	HEAD (UPR–RH)(Canada)																						
	15A	HEAD (UPR–LH)(Canada)																						
	7.5A	ALT–S																						
	20A	DOME							●	●						●	●		●	●				
	15A	EFI		●	●																		●	
	15A	HAZ–HORN																						●
③	20A	FOG																						●
④	40A	HEATER																						
⑤	15A	HEAD (LWR–LH)(Canada)																						●
	15A	HEAD (LWR–RH)(Canada)																						
	15A	TEL	●																					
	20A	RADIO																						
⑦	7.5A	DRL																						

* These are the page numbers of the first page on which the related system is shown.
The part indicated is located somewhere in the system, not necessarily on the page indicated here.

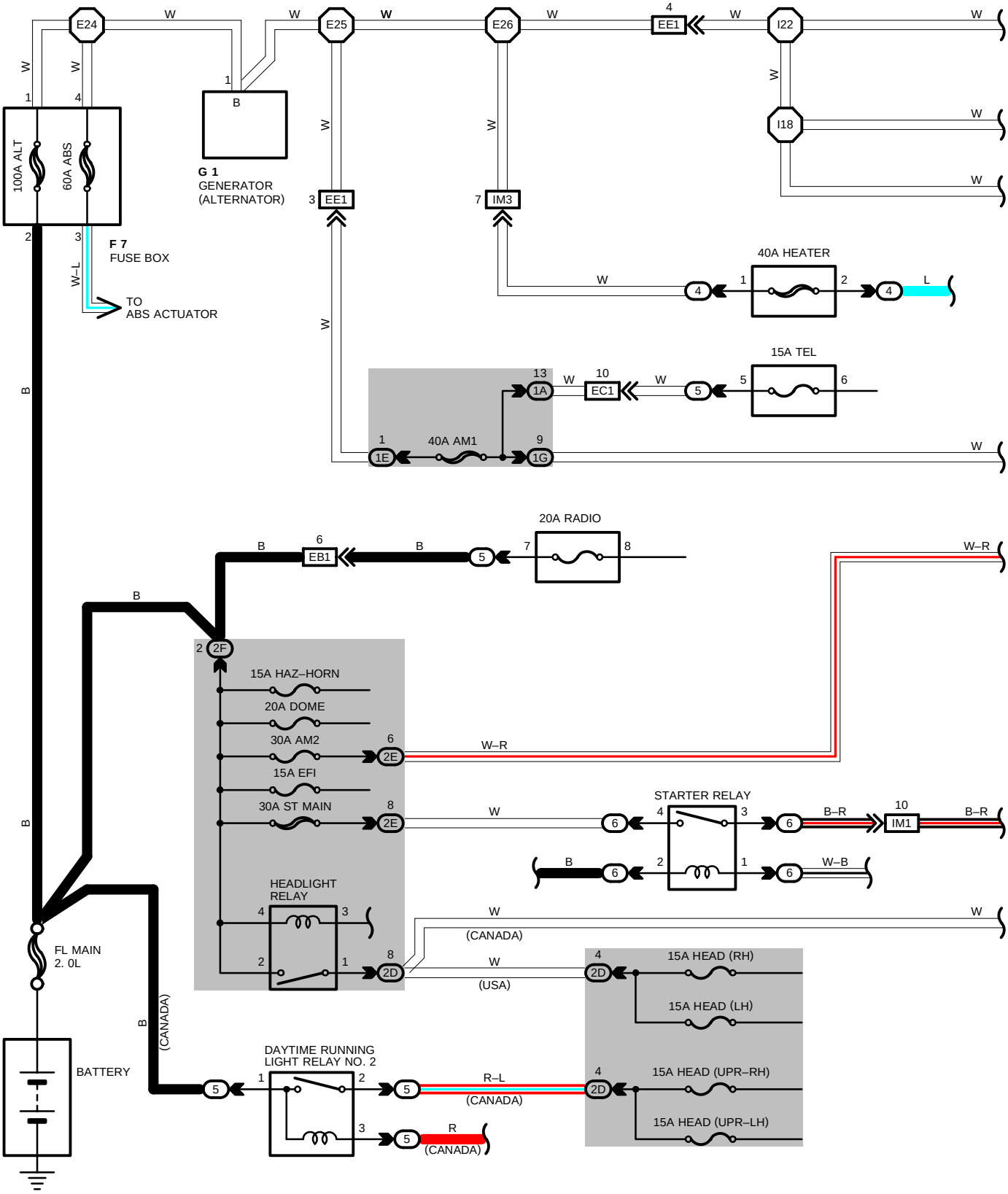
[LOCATION] (1) : J/B No. 1 (See page 20) (2) : J/B No. 2 (See page 22) (3) : R/B No. 1 (See page 25)
(7) : R/B No. 7 (See page 27) (8) : Fuse Box (F7 See on page 28)

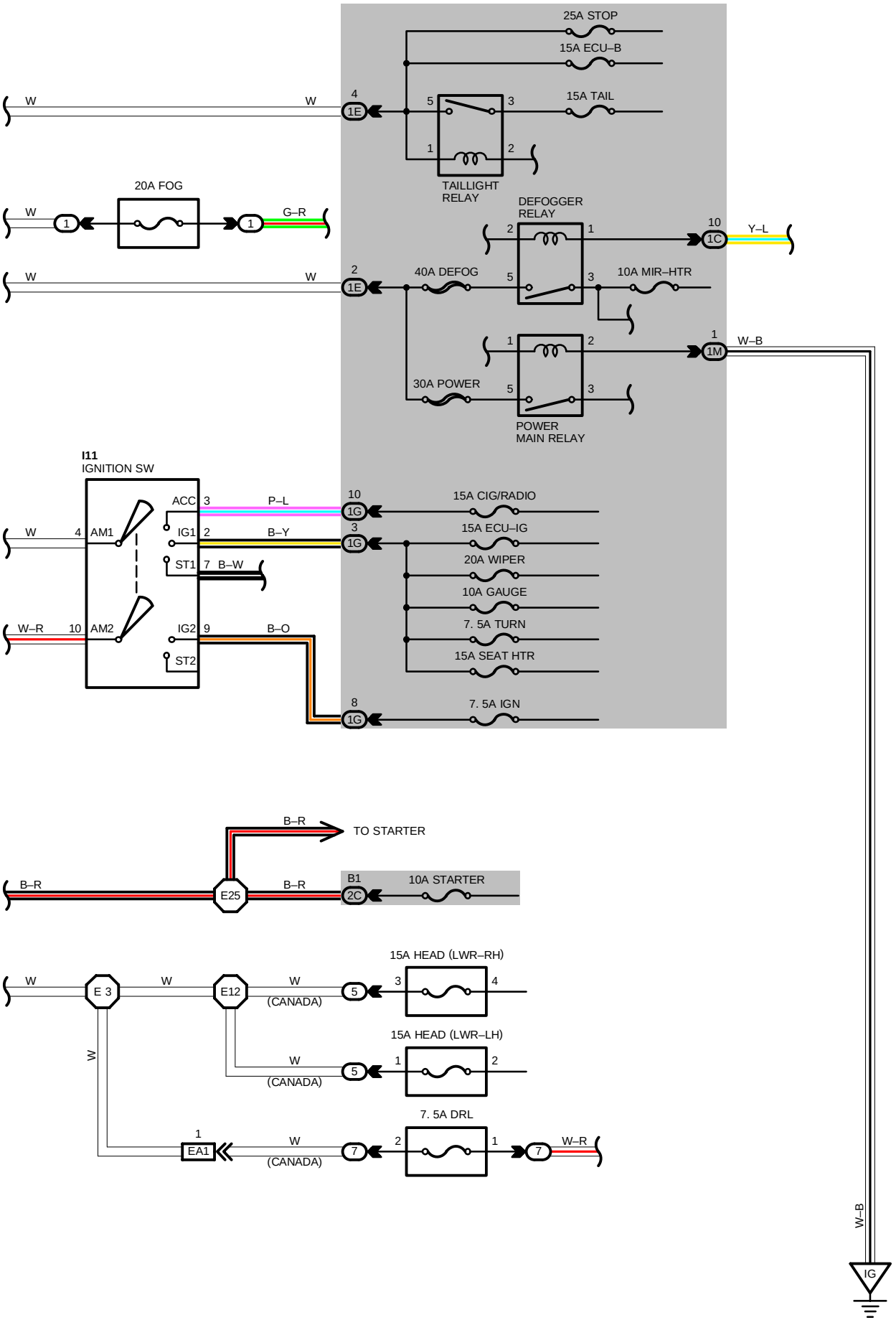


(4) : R/B No. 4 (See page 25)

(5) : R/B No. 5 (See page 26)

(6) : R/B No. 6 (See page 26)


E24
E25
E26
EE1
I22
I18
IM3
EE1
100A ALT
60A ABS
G 1
GENERATOR
(ALTERNATOR)
F 7
FUSE BOX
TO
ABS ACTUATOR
40A HEATER
15A TEL
EC1
1A
1E
1G
40A AM1
20A RADIO
EB1
2F
15A HAZ–HORN
20A DOME
30A AM2
15A EFI
30A ST MAIN
2E
STARTER RELAY
IM1
HEADLIGHT
RELAY
2D
(CANADA)
(USA)
15A HEAD (RH)
15A HEAD (LH)
15A HEAD (UPR–RH)
15A HEAD (UPR–LH)
FL MAIN
2. 0L
BATTERY
DAYTIME RUNNING
LIGHT RELAY NO. 2
R–L
W–R
B–R
W–B


25A STOP
15A ECU–B
15A TAIL
TAILLIGHT RELAY
20A FOG
DEFOGGER RELAY
40A DEFOG
10A MIR–HTR
30A POWER
POWER MAIN RELAY
W–B
I11
IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
P–L
B–Y
B–W
B–O
15A CIG/RADIO
15A ECU–IG
20A WIPER
10A GAUGE
7. 5A TURN
15A SEAT HTR
7. 5A IGN
B–R
TO STARTER
E25
B1
10A STARTER
15A HEAD (LWR–RH)
15A HEAD (LWR–LH)
E 3
E12
(CANADA)
7. 5A DRL
EA1
W–R
Y–L
G–R
IG

POWER SOURCE

SERVICE HINTS

TAILLIGHT RELAY

5–3 : CLOSED WITH LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION
CLOSED WITH ENGINE RUNNING AND PARKING BRAKE LEVER RELEASED (CANADA)

HEADLIGHT RELAY

2–1 : CLOSED WITH LIGHT CONTROL SW AT **HEAD** POSITION OR DIMMER SW AT **FLASH** POSITION
: CLOSED WITH ENGINE RUNNING AND PARKING BRAKE LEVER RELEASED (CANADA)

I11 IGNITION SW

4–3 : CLOSED WITH IGNITION KEY AT **ACC** OR **ON** POSITION
10–9, 4–2 : CLOSED WITH IGNITION KEY AT **ON** OR **ST** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
F 7	28	**G 1**	28	**I11**	31

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	25	R/B NO. 1 (LEFT KICK PANEL)
4	25	R/B NO. 4 (RIGHT KICK PANEL)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)
6	26	R/B NO. 6 (BEHIND GLOVE BOX)
7	27	R/B NO. 7 (NEAR THE BATTERY)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1E		
1G		
1M		
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2D	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

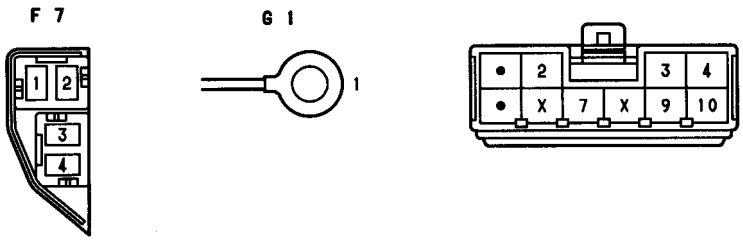
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	34	ENGINE ROOM MAIN WIRE AND RELAY WIRE (UNDER THE R/B NO. 7)
EB1	34	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		

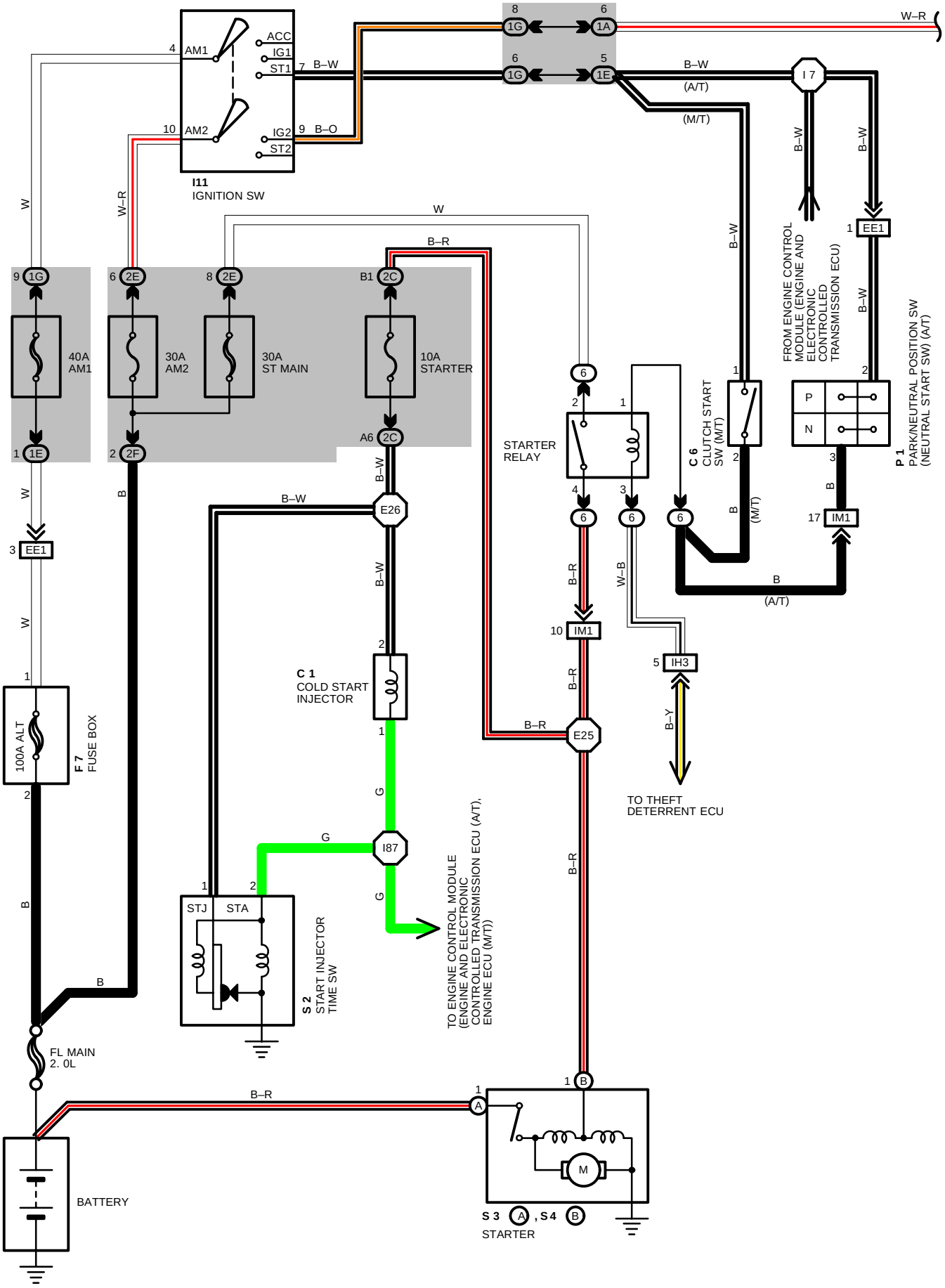
: GROUND POINTS

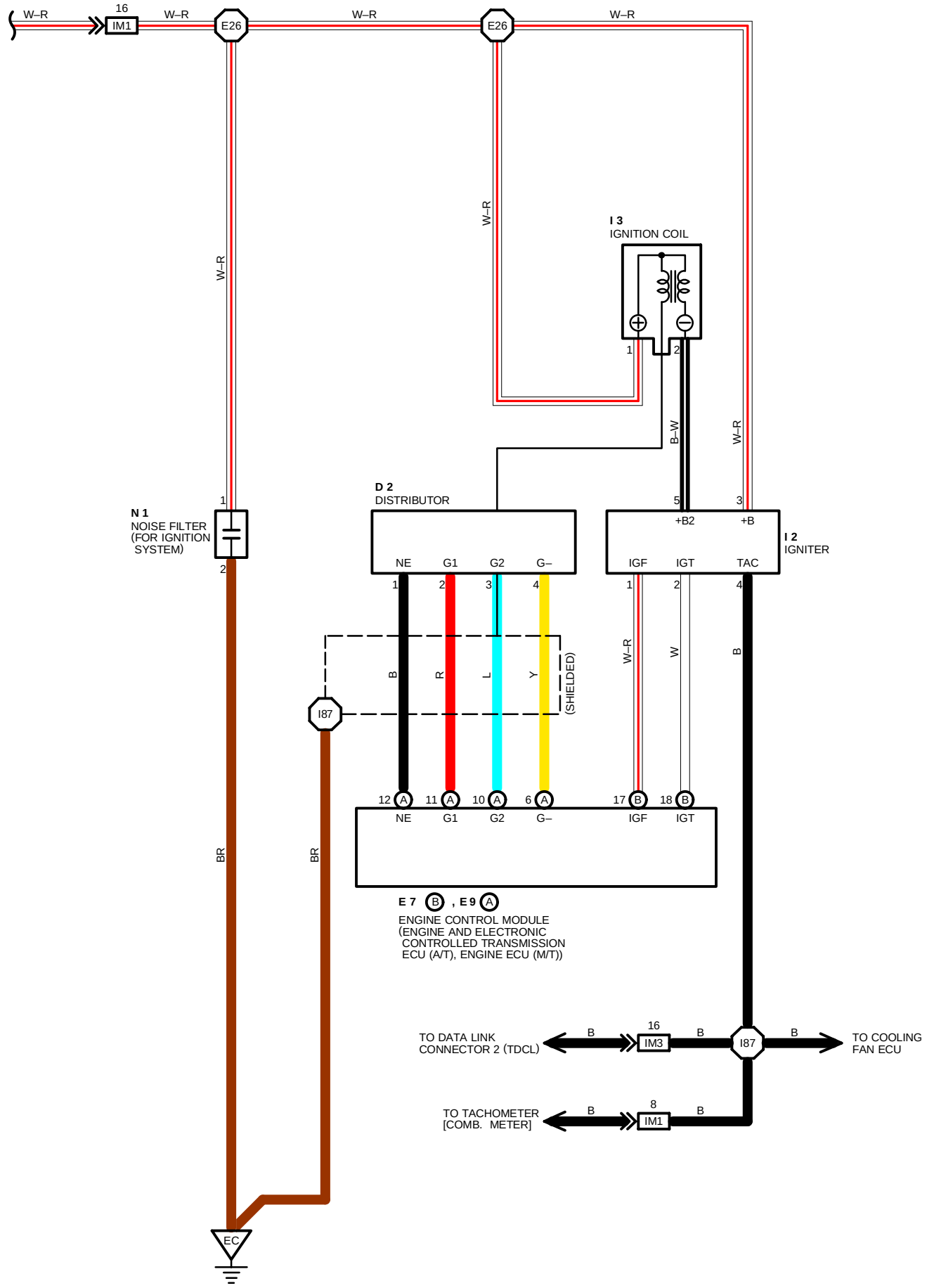
CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 3	34	ENGINE ROOM MAIN WIRE	**E 26**	34	ENGINE WIRE
E 12			**I 18**	38	COWL WIRE
E 24	34	ENGINE WIRE	**I 22**		
E 25					




I11
IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
W–R
B–W
B–O
W
B–R
B
G
40A
AM1
30A
AM2
30A
ST MAIN
10A
STARTER
F 7
FUSE BOX
100A ALT
FL MAIN
2. 0L
BATTERY
C 1
COLD START
INJECTOR
S 2
START INJECTOR
TIME SW
STJ
STA
TO ENGINE CONTROL MODULE
(ENGINE AND ELECTRONIC
CONTROLLED TRANSMISSION ECU (A/T),
ENGINE ECU (M/T))
STARTER
RELAY
C 6
CLUTCH START
SW (M/T)
FROM ENGINE CONTROL
MODULE (ENGINE AND
ELECTRONIC
CONTROLLED
TRANSMISSION ECU)
P 1
PARK/NEUTRAL POSITION SW
(NEUTRAL START SW) (A/T)
P
N
TO THEFT
DETERRENT ECU
S 3
S4
STARTER
(A/T)
(M/T)


W–R
16
IM1
W–R
E26
W–R
E26
W–R
W–R
W–R
I 3
IGNITION COIL
1
2
B–W
W–R
N 1
NOISE FILTER
(FOR IGNITION
SYSTEM)
1
2
D 2
DISTRIBUTOR
5
3
+B2
+B
I 2
IGNITER
NE
G1
G2
G–
IGF
IGT
TAC
1
2
3
4
1
2
4
B
R
L
Y
(SHIELDED)
W–R
W
B
I87
12 A
11 A
10 A
6 A
17 B
18 B
NE
G1
G2
G–
IGF
IGT
BR
BR
E 7 B , E 9 A
ENGINE CONTROL MODULE
(ENGINE AND ELECTRONIC
CONTROLLED TRANSMISSION
ECU (A/T), ENGINE ECU (M/T))
TO DATA LINK
CONNECTOR 2 (TDCL)
B
16
IM3
B
I87
B
TO COOLING
FAN ECU
TO TACHOMETER
[COMB. METER]
B
8
IM1
B
EC

STARTING AND IGNITION

SERVICE HINTS

I11 IGNITION SW
4–7 : CLOSED WITH IGNITION SW AT **ST** POSITION
10–9 CLOSED WITH IGNITION SW AT **ON** OR **ST** POSITION

C 6 CLUTCH START SW (M/T)
1–2 : CLOSED WITH CLUTCH PEDAL FULLY DEPRESSED

STARTER RELAY
(6) 4– (6) 2 : CLOSED WITH CLUTCH START SW ON AND IGNITION SW AT **ST** POSITION (M/T)
CLOSED WITH IGNITION SW AT **ST** POSITION (A/T)

S 3(A), S 4(B) STARTER
POINTS CLOSED WITH CLUTCH START SW ON AND IGNITION SW AT **ST** POSITION

P 1 PARK/NEUTRAL POSITION SW (NEUTRAL START SW) (A/T)
2–3 : CLOSED WITH A/T SHIFT LEVER IN **P** OR **N** POSITION

C 1 COLD START INJECTOR
2–1 : APPROX. **12** VOLTS WHILE START INJECTOR TIME SW IS CLOSED AND STARTER CRANKING

S 2 START INJECTOR TIME SW
POINTS OPEN ABOVE **35**˚C (**95**˚F)
2–1 : APPROX. **20–40** BELOW **30**˚C (**86**˚F)
2–1 : APPROX. **40–60** ABOVE **40**˚C (**104**˚F)
2–GROUND : APPROX. **20–80**

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 1	28	**F 7**	28	**P 1**	29
C 6	30	**I 2**	29	**S 2**	29
D 2	28	**I 3**	29	**S 3** A	29
E 7 B	30	**I11**	31	**S 4** B	29
E 9 A	30	**N 1**	29		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
6	26	R/B NO. 6 (BEHIND GLOVE BOX)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1E		
1G		
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
IH3	36	COWL WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		

: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	INTAKE MANIFOLD RH

: SPLICE POINTS

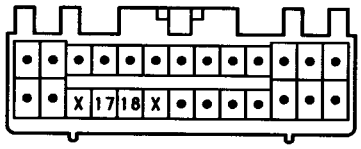
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 25	34	ENGINE WIRE	**I 7**	38	INSTRUMENT PANEL WIRE
E 26			**I 87**	38	ENGINE WIRE

C 1 BLACK

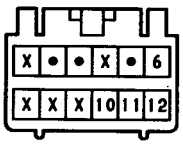
C 6

D 2 BLACK

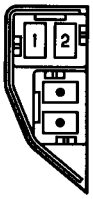
E 7 (B) DARK GRAY



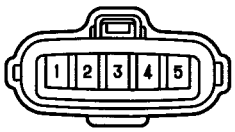
E 9 (A) DARK GRAY



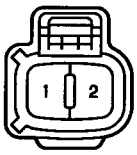
F 7



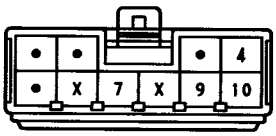
I 2 BLACK



I 3 BLACK



I11



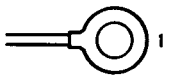
N 1 GRAY

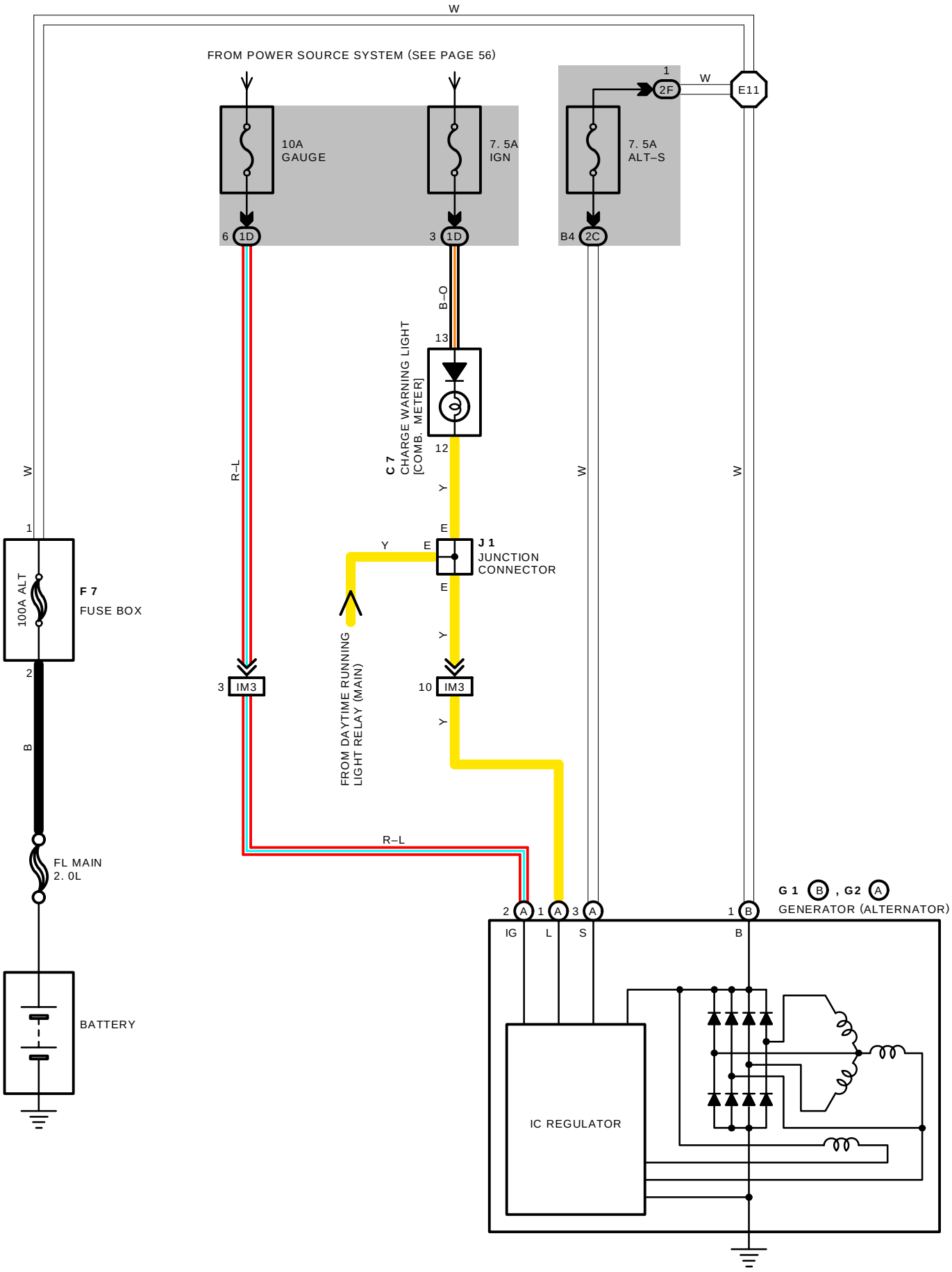
P 1 GRAY

S 2 DARK GRAY

S 3 (A) BLACK

S 4 (B)




W
FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
7. 5A
IGN
7. 5A
ALT–S
1
2F
W
E11
6 1D
3 1D
B4 2C
B–O
13
C 7
CHARGE WARNING LIGHT
[COMB. METER]
12
Y
E
J 1
JUNCTION
CONNECTOR
R–L
W
W
1
100A ALT
F 7
FUSE BOX
2
B
3 IM3
10 IM3
FROM DAYTIME RUNNING
LIGHT RELAY (MAIN)
R–L
FL MAIN
2. 0L
BATTERY
G 1 B , G2 A
GENERATOR (ALTERNATOR)
2 A 1 A 3 A
1 B
IG
L
S
B
IC REGULATOR

SERVICE HINTS

G 2(A) GENERATOR (ALTERNATOR)

(A) 1–GROUND: **13.9–15.1** VOLTS WITH ENGINE RUNNING AT **2000** RPM AND **25**˚C (**77**˚F)
13.5–14.3 VOLTS WITH ENGINE RUNNING AT **2000** RPM AND **115**˚C (**239**˚F)

(A) 2–GROUND: **0–4** VOLTS WITH IGNITION SW AT **ON** POSITION AND ENGINE NOT RUNNING

: PARTS LOCATION

CODE	SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
C 7	30	**G 1**	B	28	**J 1**	31
F 7	28	**G 2**	A	28		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F		

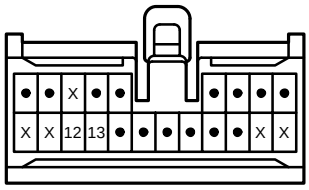
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IM3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)

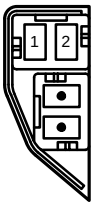
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 11	34	ENGINE WIRE			

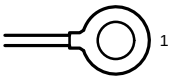
C 7 GRAY



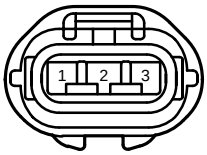
F 7



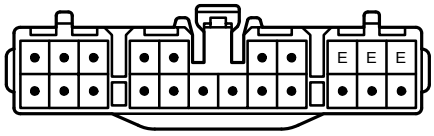
G 1 (B)



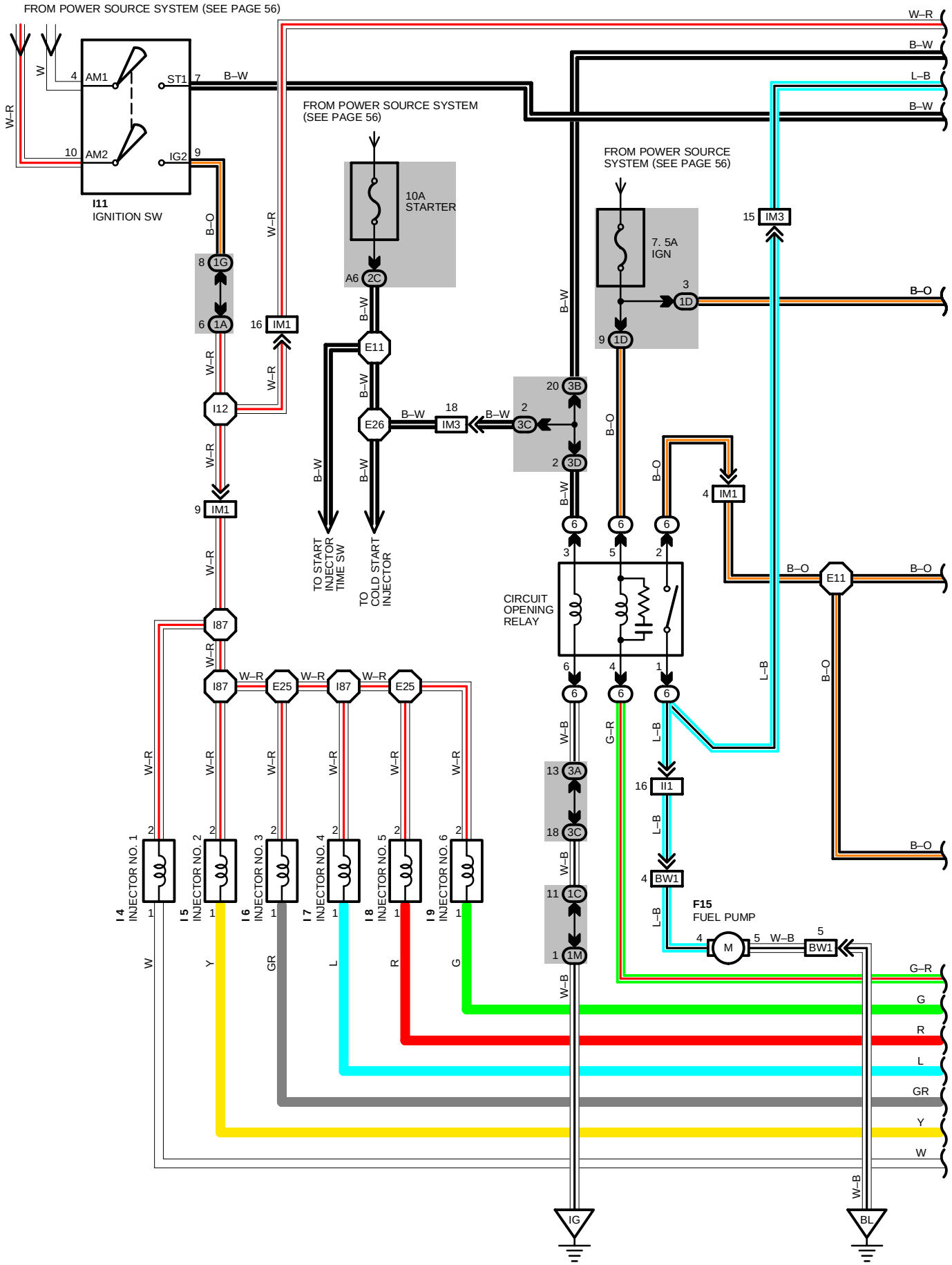
G 2 (A) GRAY

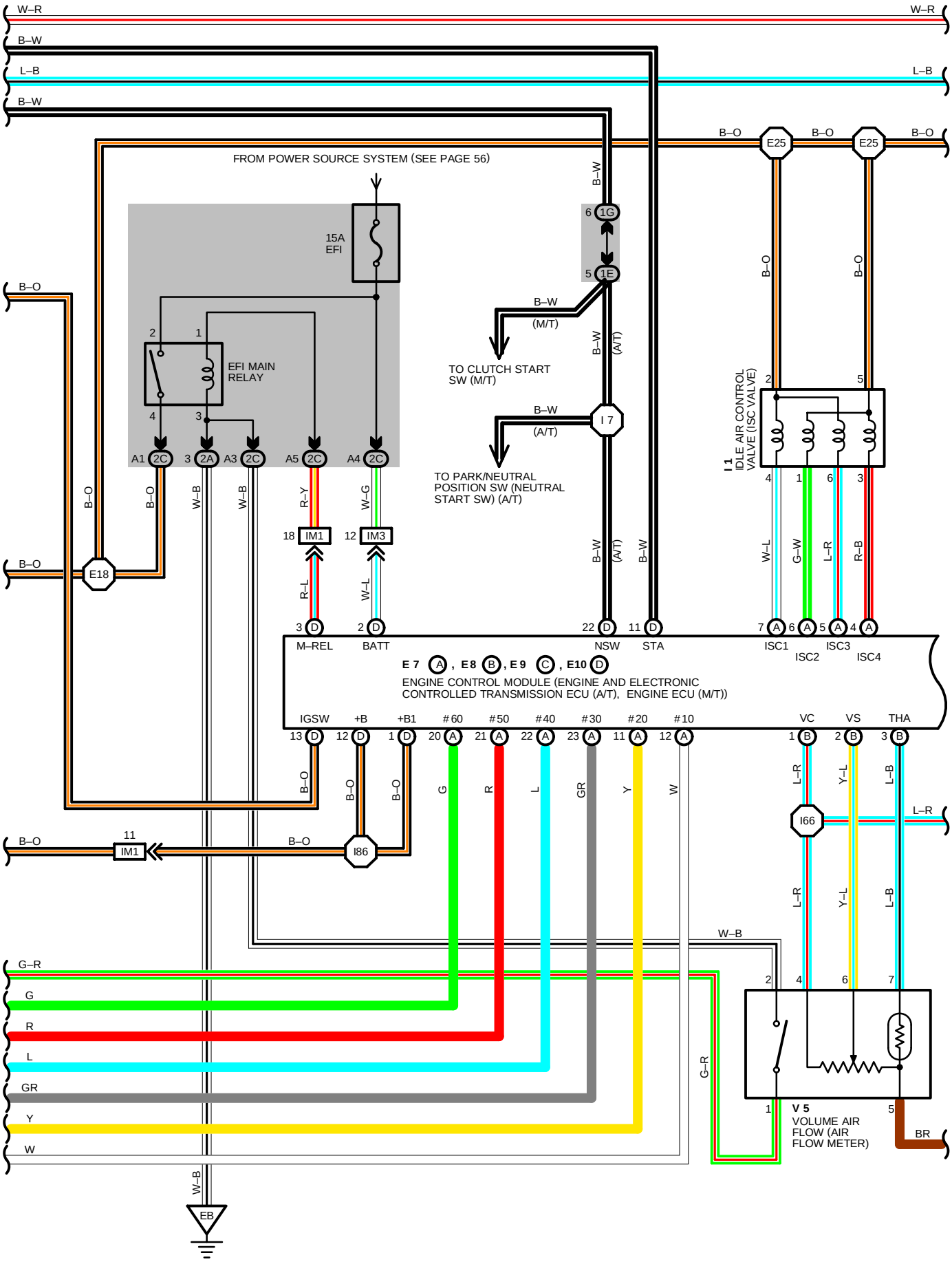


J 1 DARK GRAY

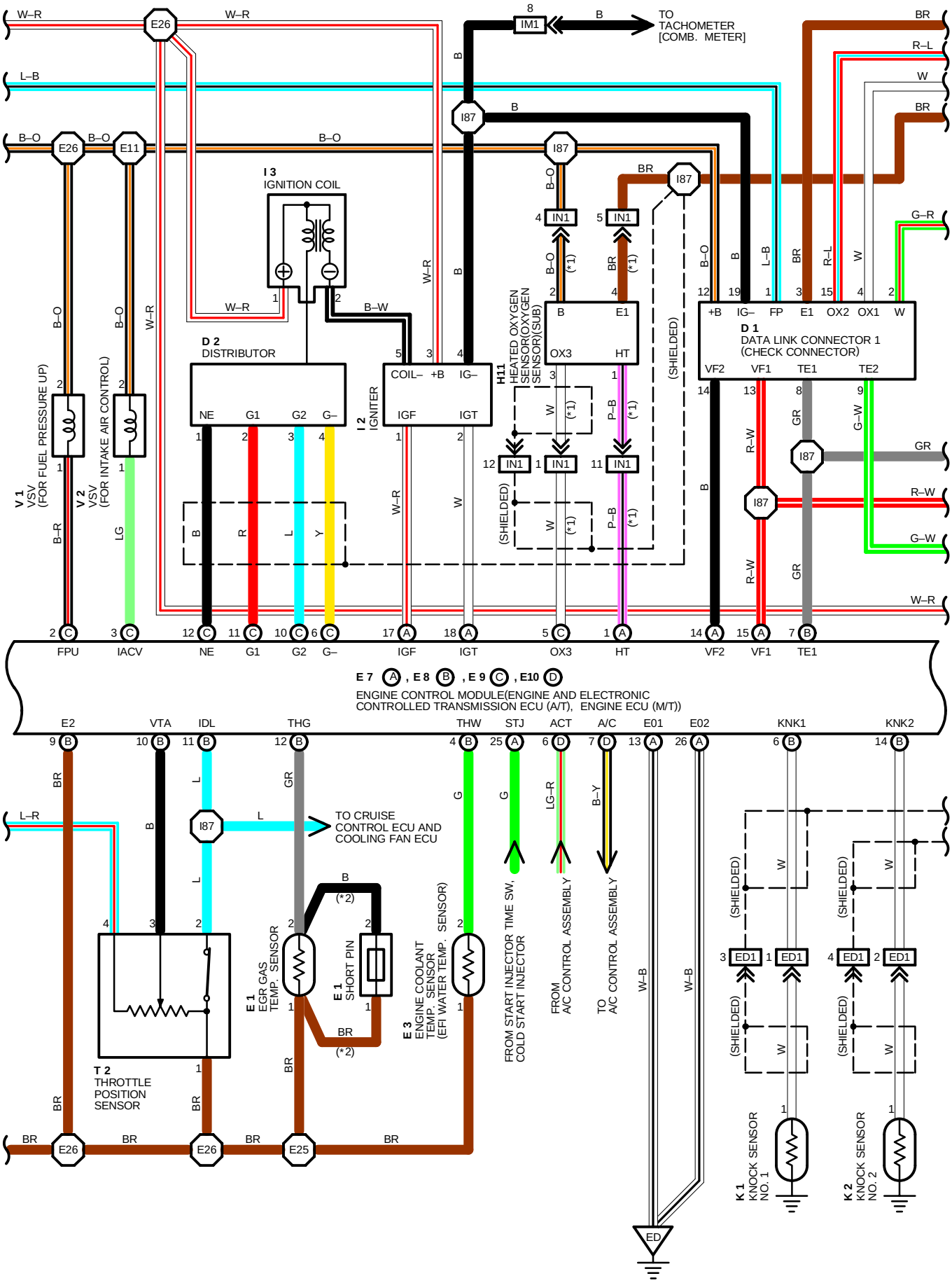


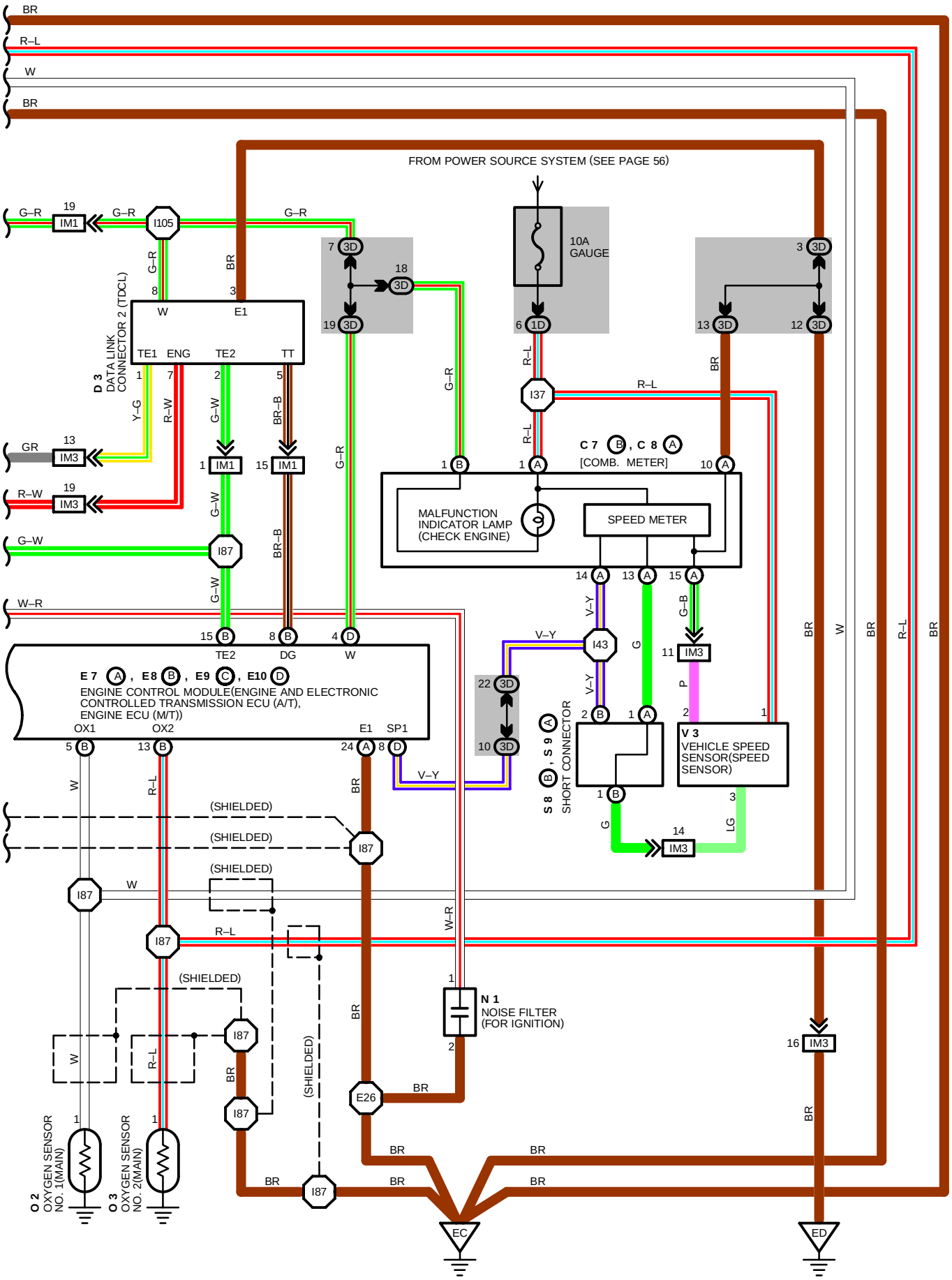
(HINT : SEE PAGE 7)


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
I11
IGNITION SW
AM1
AM2
ST1
IG2
10A
STARTER
7. 5A
IGN
FROM POWER SOURCE SYSTEM (SEE PAGE 56)
FROM POWER SOURCE SYSTEM (SEE PAGE 56)
TO START INJECTOR TIME SW
TO COLD START INJECTOR
CIRCUIT OPENING RELAY
F15
FUEL PUMP
I4 INJECTOR NO. 1
I5 INJECTOR NO. 2
I6 INJECTOR NO. 3
I7 INJECTOR NO. 4
I8 INJECTOR NO. 5
I9 INJECTOR NO. 6
IG
BL


W–R
B–W
L–B
B–W
FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
EFI
EFI MAIN
RELAY
B–O
E18
E25
1G
1E
I 7
B–W
(M/T)
(A/T)
TO CLUTCH START
SW (M/T)
TO PARK/NEUTRAL
POSITION SW (NEUTRAL
START SW) (A/T)
I 1
IDLE AIR CONTROL
VALVE (ISC VALVE)
W–L
G–W
L–R
R–B
R–Y
W–G
W–B
IM1
IM3
M–REL
BATT
NSW
STA
ISC1
ISC2
ISC3
ISC4
E 7 A , E 8 B , E 9 C , E10 D
ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC
CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T))
IGSW
+B
+B1
#60
#50
#40
#30
#20
#10
VC
VS
THA
I86
I66
G–R
G
R
L
GR
Y
W
V 5
VOLUME AIR
FLOW (AIR
FLOW METER)
BR
EB

*1 : CALIFORNIA
*2 : EX. CALIFORNIA




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A GAUGE
D 3 DATA LINK CONNECTOR 2 (TDCL)
TE1 ENG TE2 TT
MALFUNCTION INDICATOR LAMP (CHECK ENGINE)
SPEED METER
C 7 B, C 8 A [COMB. METER]
E 7 A, E8 B, E9 C, E10 D
ENGINE CONTROL MODULE(ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T))
OX1 OX2 E1 SP1 TE2 DG W
V 3 VEHICLE SPEED SENSOR(SPEED SENSOR)
S 8 A, S 9 B SHORT CONNECTOR
N 1 NOISE FILTER (FOR IGNITION)
O 2 OXYGEN SENSOR NO. 1(MAIN)
O 3 OXYGEN SENSOR NO. 2(MAIN)
(SHIELDED)
EC
ED

SYSTEM OUTLINE

THIS SYSTEM UTILIZES AN ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T)) AND MAINTAINS OVERALL CONTROL OF THE ENGINE, TRANSMISSION AND SO ON. AN OUTLINE OF THE ENGINE CONTROL IS EXPLAINED HERE.

1. INPUT SIGNALS

(1) ENGINE COOLANT TEMP. (WATER TEMP.) SIGNAL CIRCUIT

THE ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR) DETECTS THE ENGINE COOLANT TEMP. AND HAS A BUILT–IN THERMISTOR WITH A RESISTANCE WHICH VARIES ACCORDING TO THE WATER TEMP. IS INPUT INTO **TERMINAL THW** OF ENGINE CONTROL MODULE (ECU) AS A CONTROL SIGNAL.

(2) INTAKE AIR TEMP. SIGNAL CIRCUIT

THE INTAKE AIR TEMP. SENSOR IS INSTALLED IN THE VOLUME AIR FLOW (AIR FLOW METER) AND DETECTS THE INTAKE AIR TEMP., WHICH IS INPUT AS A CONTROL SIGNAL TO **TERMINAL THA** OF ENGINE CONTROL MODULE (ECU).

(3) OXYGEN SENSOR SIGNAL SYSTEM

THE OXYGEN DENSITY IN THE EXHAUST GASES IS DETECTED AND INPUT AS A CONTROL SIGNAL TO **TERMINAL OX1, OX2** AND **OX3** (FOR CALIFORNIA) OF THE ENGINE CONTROL MODULE (ECU). TO MAINTAIN STABLE DETECTION PERFORMANCE BY THE OXYGEN SENSOR, A HEATER IS USED FOR WARMING THE SENSOR. THE HEATER IS ALSO CONTROLLED BY THE ENGINE CONTROL MODULE (ECU) (HT).

(4) RPM SIGNAL SYSTEM

CRANKSHAFT POSITION AND ENGINE RPM ARE DETECTED BY THE PICK–UP COIL INSTALLED INSIDE THE DISTRIBUTOR. CRANKSHAFT POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINALS G1** AND **G2** 0F THE ENGINE CONTROL MODULE (ECU), AND ENGINE RPM IS INPUT TO **TERMINAL NE.**

(5) THROTTLE SIGNAL CIRCUIT

THE THROTTLE POSITION SENSOR DETECTS THE THROTTLE VALVE OPENING ANGLE AS A CONTROL SIGNAL, WHICH IS INPUT INTO **TERMINAL VTA** OF THE ENGINE CONTROL MODULE (ECU). WHEN THE VALVE IS COMPLETELY CLOSED, THE CONTROL SIGNAL IS INPUT INTO **TERMINAL IDL.**

(6) VEHICLE SPEED SIGNAL SYSTEM

THE VEHICLE SPEED SENSOR (SPEED SENSOR), INSTALLED INSIDE THE COMBINATION METER, DETECTS THE VEHICLE SPEED AND INPUTS A CONTROL SIGNAL TO **TERMINAL SPD** OF THE ENGINE CONTROL MODULE (ECU).

(7) PARK/NEUTRAL POSITION SW (NEUTRAL START SW) SIGNAL SYSTEM (A/T)

THE PARK/NEUTRAL POSITION SW (NEUTRAL START SW) DETECTS WHETHER THE SHIFT POSITION ARE IN NEUTRAL AND PARKING OR NOT, AND INPUTS A CONTROL SIGNAL TO **TERMINAL NSW** OF THE ENGINE CONTROL MODULE (ECU).

(8) A/C SW SIGNAL SYSTEM

THE A/C AMPLIFIER INPUTS THE A/C OPERATIONS TO **TERMINAL A/C** OF THE ENGINE CONTROL MODULE (ECU) AS A CONTROL SIGNAL.

(9) BATTERY SIGNAL CIRCUIT

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE ENGINE CONTROL MODULE (ECU). WHEN THE IGNITION SW TURNED ON, VOLTAGE FOR ENGINE CONTROL MODULE (ECU) START–UP POWER SUPPLY IS APPLIED TO **TERMINALS +B** AND **+B1** OF ENGINE CONTROL MODULE (ECU) VIA EFI MAIN RELAY.

(10) INTAKE AIR VOLUME SIGNAL CIRCUIT

INTAKE AIR VOLUME IS DETECTED BY THE VOLUME AIR FLOW (AIR FLOW METER) AND THE SIGNAL IS INPUT TO **TERMINAL VS** OF THE ENGINE CONTROL MODULE (ECU). AS A CONTROL SIGNAL.

(11) STA SIGNAL CIRCUIT

TO CONFIRM WHETHER THE ENGINE IS CRANKING, THE VOLTAGE APPLIED TO THE STARTER MOTOR DURING CRANKING IS DETECTED AND THE SIGNAL IS INPUT INTO **TERMINAL STA** OF THE ENGINE CONTROL MODULE (ECU) AS A CONTROL SIGNAL.

(12) ENGINE KNOCK SIGNAL CIRCUIT

ENGINE KNOCKING IS DETECTED BY THE KNOCK SENSOR NO. 1 AND NO. 2 AND THE SIGNAL IS INPUT INTO **TERMINALS KNK1** AND **KNK2** AS A CONTROL SIGNAL.

2. CONTROL SYSTEM

* SFI (SEQUENTIAL MULTIPORT FUEL INJECTION) (EFI (ELECTRONIC FUEL INJECTION) SYSTEM

  THE EFI SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS INPUT FROM EACH SENSOR (INPUT SIGNALS FROM (1) TO (12) ETC.). THE BEST FUEL INJECTION VOLUME IS DECIDED BASED ON THIS DATA AND THE PROGRAM MEMORIZED BY THE ENGINE CONTROL MODULE (ECU), AND THE CONTROL SIGNAL IS OUTPUT TO **TERMINALS #10, #20, #30, #40, #50** AND **#60** OF THE ENGINE CONTROL MODULE (ECU) TO OPERATE THE INJECTOR (INJECT THE FUEL). THE EFI SYSTEM PRODUCES CONTROL OF FUEL INJECTION OPERATION BY THE ENGINE CONTROL MODULE (ECU) IN RESPONSE TO THE DRIVING CONDITIONS.

* ESA (ELECTRONIC SPARK ADVANCE) SYSTEM

  THE ESA SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS INPUT TO THE ENGINE CONTROL MODULE (ECU) FROM EACH SENSOR (INPUT SIGNALS FROM (1), (3), (4) TO (12) ETC.). THE BEST IGNITION TIMING IS DECIDED ACCORDING TO THIS DATA AND THE MEMORIZED DATA IN THE ENGINE CONTROL MODULE (ECU) AND THE CONTROL SIGNAL IS OUTPUT TO **TERMINAL IGT**. THIS SIGNAL CONTROLS THE IGNITER TO PROVIDE THE BEST IGNITION TIMING FOR THE DRIVING CONDITIONS.

* HEATED OXYGEN SENSOR (OXYGEN SENSOR) HEATER CONTROL SYSTEM

  THE OXYGEN SENSOR HEATER CONTROL SYSTEM TURNS THE HEATER ON WHEN THE INTAKE AIR VOLUME IS LOW (TEMP. OF EXHAUST EMISSIONS IS LOW), AND WARMS UP THE OXYGEN SENSOR (NO. 1 AND NO. 2) TO IMPROVE DETECTION PERFORMANCE OF THE SENSOR. THE ENGINE CONTROL MODULE (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS FROM (1), (4), (9) TO (10) ETC.), AND OUTPUT CURRENT TO **TERMINALS HT** AND CONTROL THE HEATER.

* IAC (IDLE AIR CONTROL (ISC)) SYSTEM

  THE IAC (ISC) SYSTEM (STEP MOTOR TYPE) INCREASES THE RPM AND PROVIDES IDLING STABILITY FOR FAST IDLE–UP WHEN THE ENGINE IS COLD, AND WHEN THE IDLE SPEED HAS DROPPED DUE TO ELECTRICAL LOAD AND SO ON, THE ENGINE CONTROL MODULE (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS FROM (1), (4), (5), (8), (9) ETC.), OUTPUTS CURRENT TO **TERMINALS ISC1, ISC2, ISC3** AND **ISC4** TO CONTROL IDLE AIR CONTROL VALVE.

* EGR CONTROL SYSTEM

  THE EGR CONTROL SYSTEM DETECTS THE SIGNAL FROM EACH SENSOR (INPUT SIGNALS FROM (1), (4), (9), (10), ETC)., AND OUTPUTS CURRENT TO **TERMINAL THG** TO CONTROL THE EGR VALVE.

* ACIS (ACOUSTIC CONTROL INDUCTION SYSTEM)

  ACIS INCLUDES A VALVE IN THE BULKHEAD SEPARATING THE SURGE TANK INTO TWO PARTS. THIS VALVE IS OPENED AND CLOSED IN ACCORDANCE WITH THE DRIVING CONDITIONS TO CONTROL THE INTAKE MANIFOLD LENGTH IN TWO STAGES FOR INCREASED ENGINE OUTPUT IN ALL RANGES FROM LOW TO HIGH SPEEDS.

  THE ENGINE CONTROL MODULE (ECU) JUDGES THE ENGINE SPEED BY THE SIGNALS ((4), (5)) FROM EACH SENSOR AND OUTPUTS SIGNALS TO THE **TERMINAL IACV** TO CONTROL THE VSV (FOR OPENING AND CLOSING THE INTAKE CONTROL VALVE).

3. DIAGNOSIS SYSTEM

WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTION IN THE ENGINE CONTROL MODULE (ECU) SIGNAL SYSTEM, THE MALFUNCTIONING SYSTEM IS RECORDED IN THE MEMORY. THE MALFUNCTIONING SYSTEM CAN BE FOUND BY READING THE CODE DISPLAYED BY THE MALFUNCTION INDICATOR LAMP (CHECK ENGINE WARNING LIGHT).

4. FAIL–SAFE SYSTEM

WHEN A MALFUNCTION HAS OCCURRED IN ANY SYSTEM, IF THERE IS A POSSIBILITY OF ENGINE TROUBLE BEING CAUSED BY CONTINUED CONTROL BASED ON THE SIGNALS FROM THAT SYSTEM, THE FAIL–SAFE SYSTEM EITHER CONTROLS THE SYSTEM BY USING DATA (STANDARD VALUES) RECORDED IN THE ENGINE CONTROL MODULE (ECU) MEMORY OR ELSE STOPS THE ENGINE.

SERVICE HINTS

CIRCUIT OPENING RELAY
1–2 : CLOSED WITH STARTER RUNNING OR MEASURING PLATE (VOLUME AIR FLOW (AIR FLOW METER)) OPEN

EFI MAIN RELAY
2–4 : CLOSED WITH IGNITION SW AT **ON** OR **ST** POSITION

V 5 VOLUME AIR FLOW (AIR FLOW METER)
1–2 : CLOSED WITH STARTER RUNNING OR MEASURING PLATE OPEN
5–6: **0.2 – 0.6**K (MEASURING PLATE FULLY CLOSED)
0.02 – 1.2K (MEASURING PLATE FULLY OPEN)
4–5: **0.2 – 0.4**K
5–7: **10.0 – 20.0**K (**–20**˚C, **–4**˚F)
4.0 – 7.0K (**0**˚C, **32**˚F)
2.0 – 3.0K (**20**˚C, **68**˚F)
0.9 – 1.3K (**40**˚C, **104**˚F)
0.4 – 0.7K (**60**˚C, **140**˚F)

E 1 ENGINE COOLANT TEMP. SENSOR (EFI WATER TEMP. SENSOR)
1–2: **10.0 – 20.0**K (**–20**˚C, **–4**˚F)
4.0 – 7.0K (**0**˚C, **32**˚F)
2.0 – 3.0K (**20**˚C, **68**˚F)
0.9 – 1.3K (**40**˚C, **104**˚F)
0 4 – 0.7K (**60**˚C, **140**˚F)
0 2 – 0.4K (**80**˚C, **176**˚F)

E 7(A), E 8(B), E 9(C), E10 (D) ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T))
VOLTAGE AT ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T)) WARNING CONNECTOR
BATT – E1 : ALWAYS **9.0** – **14.0** VOLTS
IGSW – E1 : **9.0– 14.0** VOLTS (IGNITION SW AT **ON** POSITION)
M–REL–E1 : **9.0– 14.0** VOLTS (IGNITION SW AT **ON** POSITION)
+B – E1 : **9.0 – 14.0** VOLTS (IGNITION SW AT **ON** POSITION)
+B1 – E1 : **9.0 – 14.0** VOLTS (IGNITION SW AT **ON** POSITION)
IDL – E2 : **9.0 – 14.0** VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY OPEN)
0 – 3.0 VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED)
VC – E2 : ALWAYS **5.5** VOLTS (IGNITION SW AT **ON** POSITION)
VTA – E2 : **0.3 – 0.8** VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED)
3.2 – 4.9 VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY OPEN)
VS – E2 : **4.0 – 5.5** VOLTS (IGNITION SW AT **ON** POSITION)
2.0 – 4.0 VOLTS (ENGINE IDLING)
THA – E2 : **0.5 – 3.4** VOLTS (IGNITION SW ON AND INTAKE AIR TEMP. **20**˚C, **68**˚F)
THW – E2 : **0.2 – 1.0** VOLTS (ENGINE IDLING AND COOLANT TEMP. **80**˚C, **176**˚F)
#10, #20, #30, #40, #50, #60
– E01: 9.0 – 14.0 VOLTS (IGNITION SW AT **ON** POSITION) PULSE GENERATION (ENGINE IDLING)
IGT – E1 : PULSE GENERATION (ENGINE IDLING)
IGF – E1 : 4.5– 5.5 VOLTS (IGNITION SW AT **ON** POSITION) PULSE GENERATION (ENGINE IDLING)
G1, G2 – G– : PULSE GENERATION (ENGINE IDLING)
NE – G– : PULSE GENERATION (ENGINE IDLING)
ISC1, ISC2, ISC3, ISC4 – E1 : PULSE GENERATION (ENGINE IDLING AND A/C OPERATION)
VF1, VF2 – E1 : 1.8 – 3.2 VOLTS (MAINTAIN ENGINE SPEED AT **2500**RPM FOR TWO MINUTES AFTER WARMING UP THEN RETURN TO IDLING)
OX1, OX2 – E1 : PULSE GENERATION (MAINTAIN ENGINE SPEED AT **2500**RPM FOR TWO MINUTES AFTER WARMING UP)
HT – E01 : **9.0– 14.0** VOLTS (ENGINE SPEED **4000** RPM, COOLANT TEMP. **20**˚C, **68**˚C OR HIGHER) BELOW **2.0** VOLTS (ENGINE IDLING)
KNK1, KNK2 – E1 : PULSE GENERATION (ENGINE IDLING)
NSW – E1: 10.0– 14.0 VOLTS (IGNITION SW ON AND OTHER SHIFT POSITION IN **P** OR **N** POSITION)
BELOW **3.0** VOLTS (IGNITION SW ON AND SHIFT POSITION IN **P** OR **N** POSITION)
SP1 – E1 : PULSE GENERATION (IGNITION SW ON AND ROTATE DRIVING WHEEL SLOWLY)
TE1 – E1 : 9.0– 14.0 VOLTS (IGNITION SW AT **ON** POSITION)
TE2 – E1 : 9.0– 14.0 VOLTS (IGNITION SW AT **ON** POSITION)
W – E1 : BELOW **3.0** VOLTS (MULFUNCTION INDICATOR LAMP ON)
9.0– 14.0 VOLTS (MULFUNCTION INDICATOR LAMP OFF AND ENGINE RUNNING)
OD1 – E1 : 4.5– 5.5 VOLTS (IGNITION SW AT **ON** POSITION)
A/C – E1 : BELOW **3.0** VOLTS (A/C SW ON)
9.0– 14.0 VOLTS (A/C SW OFF)
ACT – E1 : 9.0– 14.0 VOLTS (A/C SW ON)
0– 1.5 VOLTS (A/C SW OFF)
IACV – E01 : 9.0– 14.0 VOLTS (IGNITION SW AT **ON** POSITION)
STA – E1 : 6.0 VOLTS OR MORE (ENGINE CRANKING)
STJ – E01 : 9.0– 14.0 VOLTS (ENGINE STARTING)

I 4, I 5, I 6, I 7, I 8, I 9 INJECTOR
1–2 : APPROX. **13.4–14.2**

T 2 THROTTLE POSITION SENSOR
3–1 : **0.28–6.4**K WITH CLEARANCE BETWEEN LEVER AND STOP SCREW **0MM** (**0** IN.)
2–1 : LESS THAN **0.5**K WITH CLEARANCE BETWEEN LEVER AND STOP SCREW **0.35** MM (**0.014** IN.)
WITH CLEARANCE BETWEEN LEVER AND STOP SCREW **0.7MM** (**0.028** IN.)
3–1 : **2.0–11.6**K WITH THROTTLE VALVE FULLY OPEN

: PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
C 7	B	30	H11	31	K 2		29
C 8	A	30	I 1	29	N 1		29
D 1		28	I 2	29	O 2		29
D 2		28	I 3	29	O 3		29
D 3		31	I 4	29	S 8	B	31
E 1		28	I 5	29	S 9	A	31
E 3		28	I 6	29	T 2		29
E 7	A	30	I 7	29	V 1		29
E 8	B	30	I 8	29	V 2		29
E 9	C	30	I 9	29	V 3		29
E10	D	30	I11	31	V 5		28
F15		32	K 1	29			

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
6	26	R/B NO. 6 (BEHIND GLOVE BOX)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1D		
1E		
1G		
1M		
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3B		
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ED1	34	ENGINE WIRE AND SENSOR WIRE (SIDE OF FRONT CYLINDER HEAD)
II1	36	FLOOR NO. 1 WIRE AND COWL WIRE (LEFT KICK PANEL
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		
IN1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)
BW1	40	FUEL GAUGE WIRE AND FLOOR NO. 1 WIRE (UNDER THE REAR SEAT CUSHION)

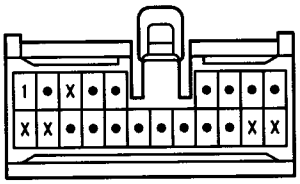
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
EC	34	INTAKE MANIFOLD RH
ED	34	INTAKE MANIFOLD LH
IG	36	INSTRUMENT PANEL BRACE LH
BL	40	UNDER THE LEFT QUARTER PILLAR

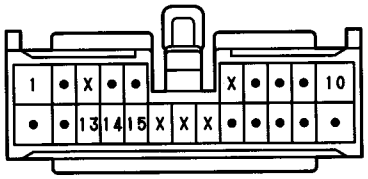
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 11	34	ENGINE WIRE	I 37	38	COWL WIRE
E 18	34	ENGINE ROOM MAIN WIRE	I 43		
E 25	34	ENGINE WIRE	I 66		
E 26			I 86		
I 7	38	INSTRUMENT PANEL WIRE	I 87	38	ENGINE WIRE
I 12	38	COWL WIRE	I105		

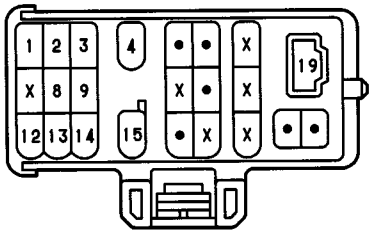
C 7 (B) GRAY



C 8 (A)

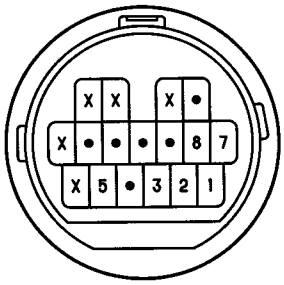


D 1 BLACK



D 2 BLACK

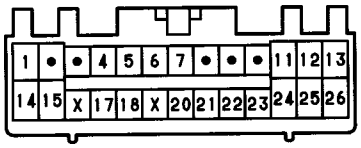
D 3 DARK GRAY



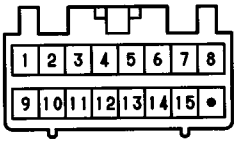
E 1 GRAY

E 3 GRAY

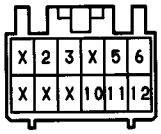
E 7 (A) DARK GRAY



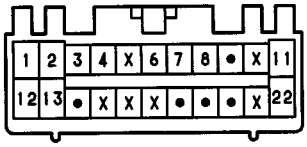
E 8 (B) DARK GRAY



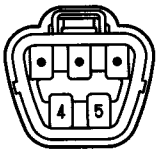
E 9 (C) DARK GRAY



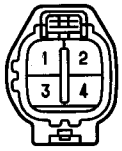
E10 (D) DARK GRAY



F15 DARK GRAY

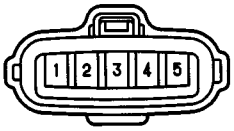


H11

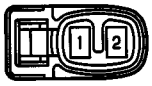


I 1 GRAY

I 2 BLACK

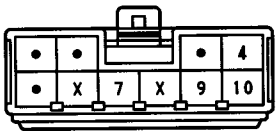


I 3 BLACK



I 4, I 5, I 6, I 7, I 8, I 9 GRAY

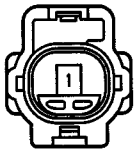
I11



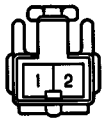
K 1, K 2 DARK GRAY

N 1 GRAY

O 2, O 3 DARK GRAY



S 8 (B)



S 9 (A)

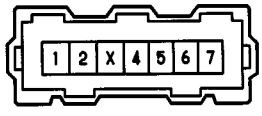
T 2 BLACK

V 1 BLUE

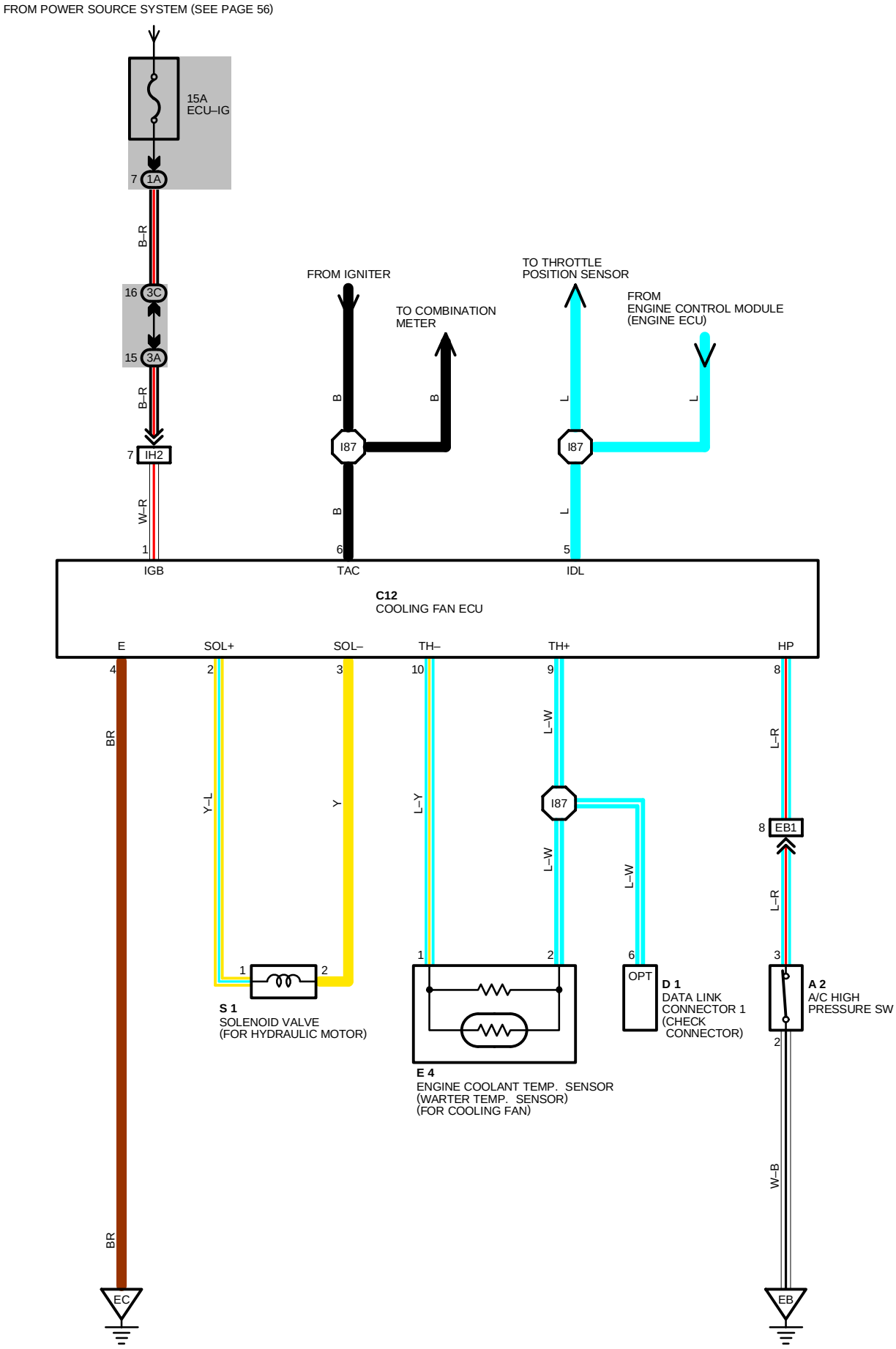
V 2 BROWN

V 3 BLACK

V 5 BLACK



ELECTRONICALLY CONTROLLED HYDRAULIC COOLING FAN



SYSTEM OUTLINE

THE COOLING FAN ECU RECEIVES VARIOUS SIGNALS, I.E., THE ENGINE RPM SIGNAL FROM THE IGNITOR, ENGINE IDLE SPEED SIGNAL FROM THE THROTTLE POSITION SENSOR, COOLANT TEMPERATURE SIGNAL FROM THE ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR), A/C REFRIGERANT PRESSURE SIGNAL FROM A/C PRESSURE SW.

THE COOLING FAN ECU JUDGES THE ENGINE TEMPERATURE BASED ON THE ABOVE–MENTIONED SIGNALS FROM ABOVE MENTION, DRIVES THE SOLENOID VALVE AND CONTROLS THE SPEED OF THE COOLING FAN STEPLESSLY.

FAIL–SAFE FUNCTION

WHEN A MALFUNCTION IS DETECTED BY THE ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR) OR SOLENOID VALVE. THE FAIL–SAFE FUNCTION OF THE COOLING FAN ECU EITHER RELIES ON THE DATA STORED IN ITS MEMORY TO ALLOW THE COOLING SYSTEM TO CONTINUE OPERATING.

SERVICE HINTS

A 2 A/C HIGH PRESSURE SW

2–3 : OPEN ABOVE APPROX. **15.58**KG/CM^2 (**221.2**PSI, **1527**KPA)
CLOSED BELOW APPROX. **12.56** KG/CM^2 (**178.4**PSI, **1231**KPA)

C12 COOLING FAN ECU

1–GROUND : APPROX. **10–14** VOLTS WITH THE IGNITION SW ON
9–10: **2.5** VOLTS AT **20**˚C (**68**˚F) AND IGNITION SW ON
1.2 VOLTS AT **80**˚C (**176**˚F) AND IGNITION SW ON
8– 4 : **10–14** VOLTS AT A/C PRESSURE SW ON (OPEN)
0–3 VOLTS AT A/C PRESSURE SW OFF (CLOSED)
4–GROUND : ALWAYS CONTINUITY

E 4 ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR)

1–2 : **1.5**K AT **80**˚C (**176**˚F)
0.7K AT **110**˚C (**230**˚F)

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A 2	28	**D 1**	28	**S 1**	29
C12	30	**E 4**	29		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3C		

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB1	34	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)

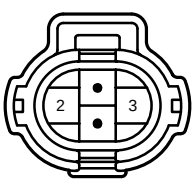
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
EC	34	INTAKE MANIFOLD RH

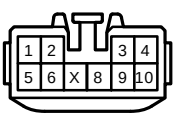
⯃ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 87	38	ENGINE WIRE			

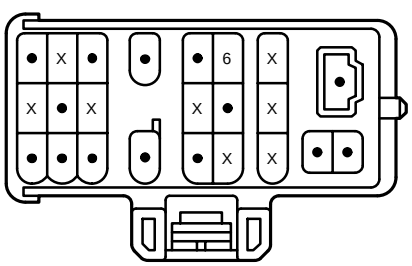
A 2 BLACK



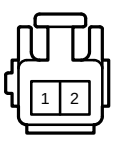
C12 GRAY



D 1 BLACK

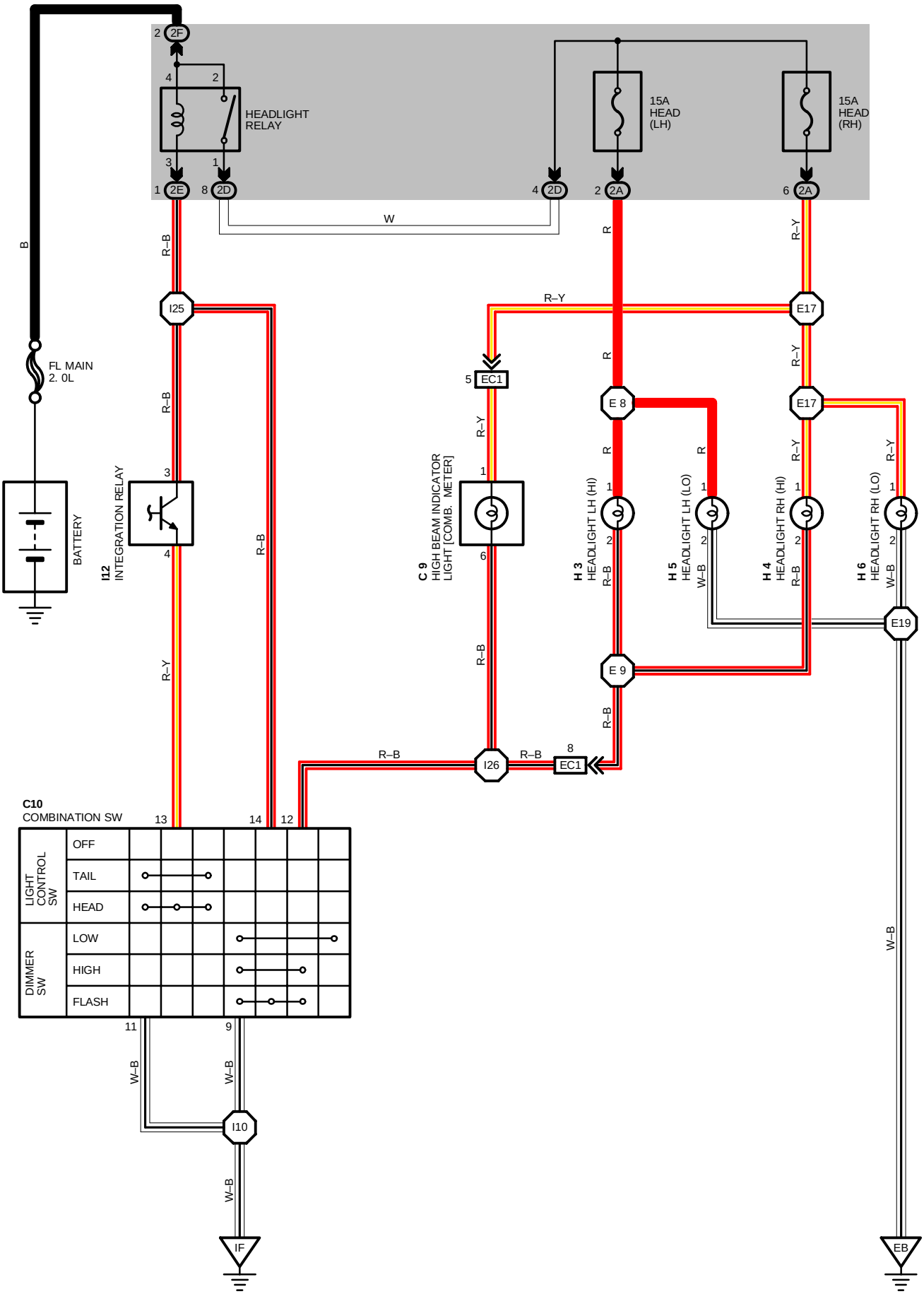


E 4



S 1

HEADLIGHT (FOR USA)



SERVICE HINTS

HEADLIGHT RELAY

2–1 : CLOSED WITH LIGHT CONTROL SW AT **HEAD** POSITION OR DIMMER SW AT **FLASH** POSITION

LIGHT AUTO TURN OFF OPERATION

PLEASE REFER TO THE LIGHT AUTO TURN OFF SYSTEM (SEE PAGE 100)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 9	30	**H 4**	28	**I12**	31
C10	30	**H 5**	28		
H 3	28	**H 6**	28		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2D		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)

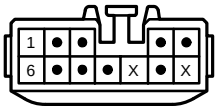
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
IF	36	LEFT KICK PANEL

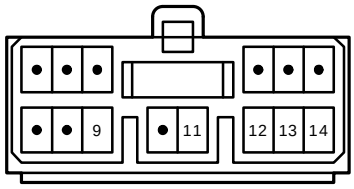
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 8	34	ENGINE ROOM MAIN WIRE	**I 10**	38	COWL WIRE
E 9			**I 25**		
E 17			**I 26**		
E 19					

C 9 BLUE



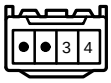
C10 BLACK



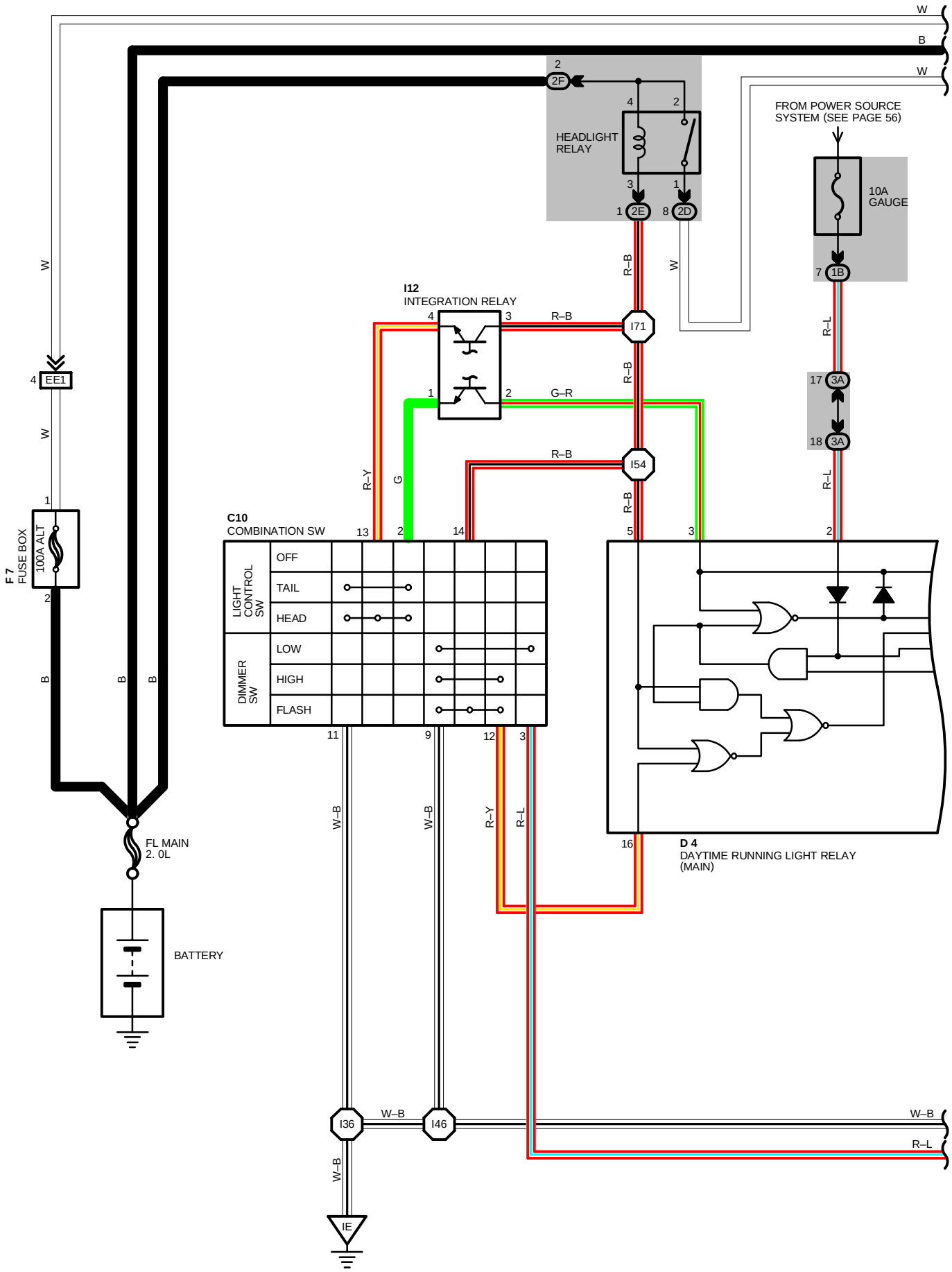
H 3, H 4 BLACK

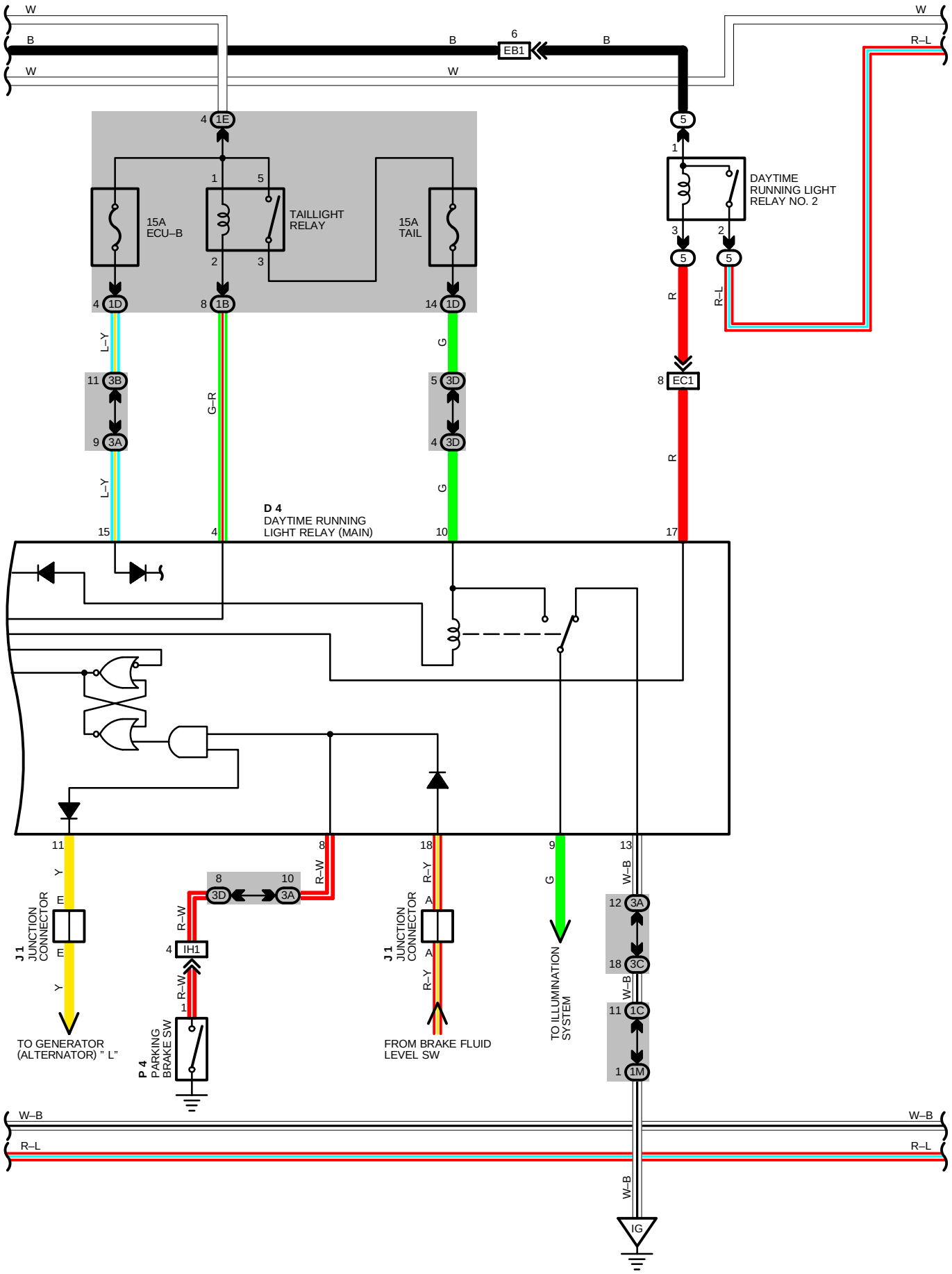
H 5, H 6 BLACK

I12

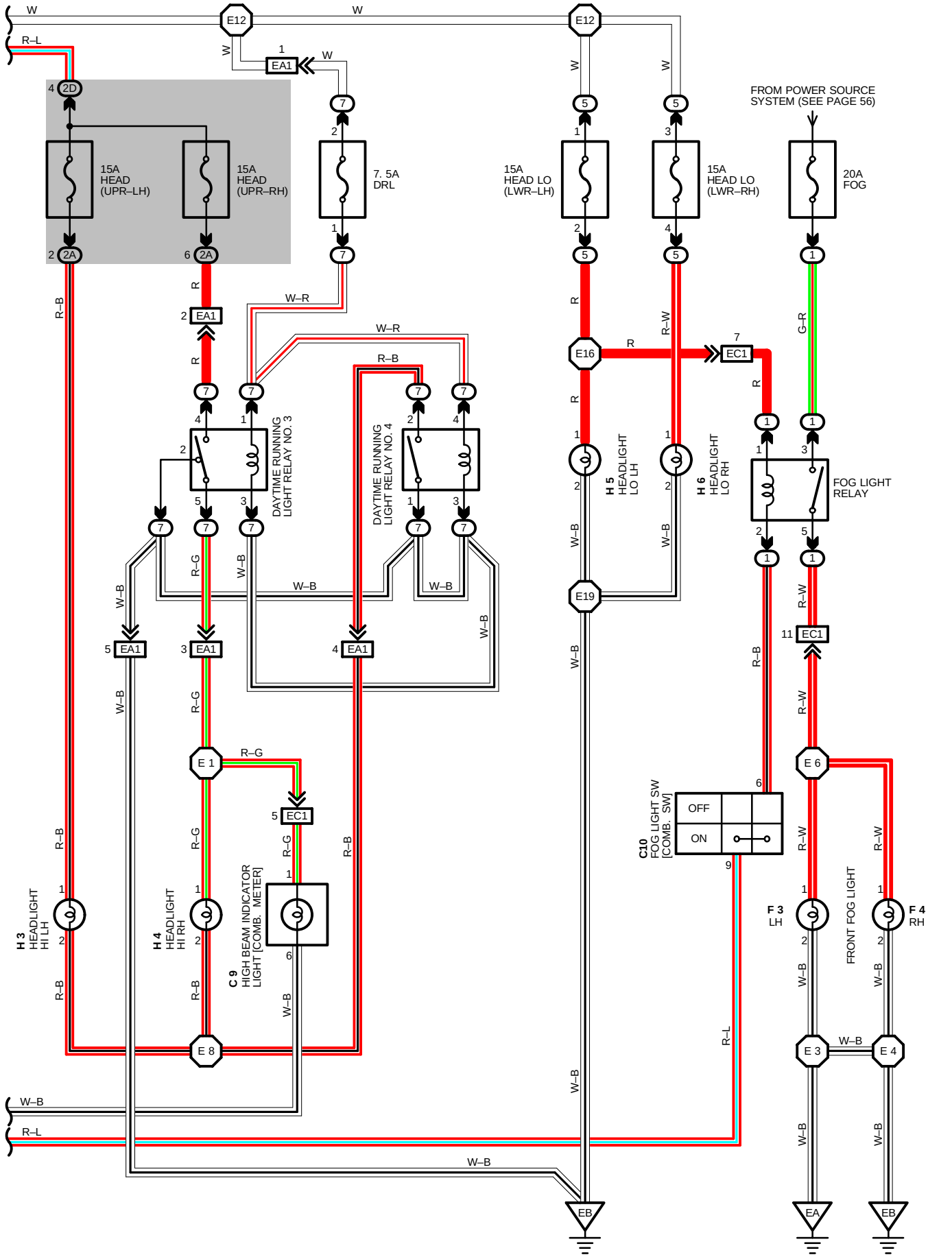


HEADLIGHT AND FOG LIGHT (FOR CANADA)




W
B
W
B
6
EB1
B
W
W
R–L
4
1E
1
5
15A
ECU–B
TAILLIGHT
RELAY
15A
TAIL
2
3
4
1D
8
1B
14
1D
L–Y
G–R
G
11
3B
9
3A
5
3D
4
3D
L–Y
G
15
4
10
D 4
DAYTIME RUNNING
LIGHT RELAY (MAIN)
17
1
DAYTIME
RUNNING LIGHT
RELAY NO. 2
3
2
5
5
R
R–L
8
EC1
R
11
Y
E
J1
JUNCTION
CONNECTOR
E
Y
TO GENERATOR
(ALTERNATOR) " L"
8
10
3D
3A
R–W
4
IH1
R–W
1
P 4
PARKING
BRAKE SW
18
R–Y
A
J1
JUNCTION
CONNECTOR
A
R–Y
FROM BRAKE FLUID
LEVEL SW
9
G
TO ILLUMINATION
SYSTEM
13
W–B
12
3A
18
3C
W–B
11
1C
1
1M
W–B
R–L
W–B
R–L
W–B
IG

HEADLIGHT AND FOG LIGHT (FOR CANADA)



SYSTEM OUTLINE

CURRENT FROM THE BATTERY IS ALWAYS FLOWING FROM THE FL MAIN → HEADLIGHT RELAY (COIL SIDE) → **TERMINAL 5** OF THE DAYTIME RUNNING LIGHT RELAY AND **TERMINAL 14** OF THE DIMMER SW, HEADLIGHT RELAY (COIL SIDE) → **TERMINAL 3** OF THE INTEGRATION RELAY → **TERMINAL 4** → **TERMINAL 13** OF THE LIGHT CONTROL SW, FL MAIN → DAYTIME RUNNING LIGHT RELAY NO. 2 (COIL SIDE) → **TERMINAL 17** OF THE DAYTIME RUNNING LIGHT RELAY, FL MAIN → **ALT** FUSE → TAILLIGHT RELAY (COIL SIDE) → **TERMINAL 4** OF THE DAYTIME RUNNING LIGHT RELAY.

1. DAYTIME RUNNING LIGHT OPERATION

WHEN THE ENGINE IS STARTED, VOLTAGE GENERATED AT **TERMINAL 'L'** OF THE GENERATOR (ALTERNATOR) IS APPLIED TO **TERMINAL 11** OF THE DAYTIME RUNNING LIGHT RELAY.

IF THE PARKING BRAKE LEVER IS PULLED UP (PARKING BRAKE SW ON) AT THIS TIME, THE RELAY IS NOT ENERGIZED, SO THE DAYTIME RUNNING LIGHT SYSTEM DOES NOT OPERATE. IF THE PARKING BRAKE LEVER IS RELEASED (PARKING BRAKE LEVER SW OFF), THE SIGNAL IS INPUT TO **TERMINAL 8** OF THE RELAY. THIS ACTIVATES THE RELAY AND CURRENT FROM FL MAIN FLOWS TO **ALT** FUSE → TAILLIGHT RELAY (POINT SIDE) → **TAIL** FUSE → TAIL, LICENCE AND FRONT CLEARANCE LIGHT → **GROUND.** ALSO, CURRENT FROM FL MAIN FLOWS TO DAYTIME RUNNING LIGHT RELAY NO. 2 (POINT SIDE) → **HEAD (UPR–LH)** FUSE → **TERMINAL 1** OF THE HEAD HI–LH → **TERMINAL 2** → **TERMINAL 2** OF THE HEAD HI–RH → **TERMINAL 1** → **TERMINAL 5** OF THE DAYTIME RUNNING LIGHT RELAY NO. 3 → **TERMINAL 2** → TO **GROUND,** SO BOTH TAIL AND HEADLIGHT UP.

THIS IS HOW THE DAYTIME RUNNING LIGHT SYSTEM OPERATES ONCE THE DAYTIME RUNNING LIGHT SYSTEM OPERATES AND TAIL, HEAD HAVE LIGHT UP, TAIL, HEAD REMAIN ON EVEN IF THE PARKING BRAKE LEVER IS PULLED UP (PARKING BRAKE SW ON).

EVEN IF THE ENGINE STALLS WITH THE IGNITION SW ON AND THERE IS NO VOLTAGE FROM **TERMINAL 'L'** OF THE GENERATOR (ALTERNATOR), TAIL, HEAD REMAIN ON. IF THE IGNITION SW IS THEN TURNED OFF, TAIL AND HEAD ARE TURNED OFF.

IF THE ENGINE IS STARTED WHILE THE PARKING BRAKE LEVER IS RELEASED (PARKING BRAKE SW OFF), THE DAYTIME RUNNING LIGHT SYSTEM OPERATES AND TAIL, HEAD LIGHT UP AS THE ENGINE STARTS.

2. HEADLIGHT OPERATION

*WHEN THE LIGHT CONTROL SW AT THE HEAD POSITION

WHEN THE LIGHT CONTROL SW IS SET TO **HEAD** POSITION, THE CURRENT FLOWING TO THE HEADLIGHT RELAY (COIL SIDE) FLOWS TO **TERMINAL 3** OF THE INTEGRATION RELAY → **TERMINAL 4** → **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL 11** → **GROUND,** TURNING THE HEADLIGHT RELAY ON.

THIS CAUSES THE CURRENT FLOWING TO THE HEADLIGHT RELAY (POINT SIDE) → **DRL** FUSE → DAYTIME RUNNING LIGHT RELAY NO. 3 (COIL SIDE) AND DAYTIME RUNNING LIGHT RELAY NO.4 (COIL SIDE) → **GROUND,** TURNING THE DAYTIME RUNNING LIGHT RELAY NO. 3 AND NO. 4 ON. ALSO, CURRENT FROM THE HEADLIGHT RELAY (POINT SIDE) TO **HEAD (LWR)** FUSES → **TERMINAL 1** OF THE HEADLIGHTS (LO) → **TERMINAL 2** → **GROUND,** SO THE HEADLIGHTS (LO SIDE) LIGHT UP.

*DIMMER SW AT FLASH POSITION

WHEN THE DIMMER SW IS SET TO **FLASH** POSITION, CURRENT FLOWS FROM HEADLIGHT RELAY (COIL SIDE) → **TERMINAL 14** OF THE DIMMER SW → **TERMINAL 9** → **GROUND,** TURNING THE HEADLIGHT RELAY ON. AT THE SAME TIME, SIGNALS ARE OUTPUT FROM **TERMINAL 12** AND **TERMINAL 14** OF THE DIMMER SW TO **TERMINAL 16** AND **TERMINAL 5** OF THE DAYTIME RUNNING LIGHT RELAY, ACTIVATING THE DAYTIME RUNNING LIGHT RELAY AND ALSO THE DAYTIME RUNNING LIGHT RELAY NO. 2 WHEN THE HEADLIGHT RELAY AND DAYTIME RUNNING LIGHT RELAY ARE ACTIVATED, THE HEADLIGHTS (LO AND HI) THEN LIGHT UP.

*DIMMER SW AT HIGH POSITION

WHEN THE LIGHT CONTROL SW IS SET TO **HEAD** POSITION, A SIGNAL IS OUTPUT FROM **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL 4** OF THE INTEGRATION RELAY → **TERMINAL 3** → **TERMINAL 5** OF THE DAYTIME RUNNING LIGHT RELAY. WHEN THE DIMMER SW IS SET TO **HIGH** POSITION, A SIGNAL IS OUTPUT FROM **TERMINAL 12** OF THE DIMMER SW TO **TERMINAL 16** OF THE DAYTIME RUNNING LIGHT RELAY. THESE SIGNALS ACTIVATE DAYTIME RUNNING LIGHT RELAY NO. 2, SO CURRENT FLOWS FROM DAYTIME RUNNING LIGHT RELAY NO. 2 (POINT SIDE) → **HEAD (UPR–LH)** FUSE → **TERMINAL 1** OF THE HEADLIGHT HI–LH → **TERMINAL 2** → DAYTIME RUNNING LIGHT RELAY NO.4 (POINT SIDE) → **GROUND,** AND CURRENT ALSO SIMULTANEOUSLY FLOWS FROM **HEAD (RH–UPR)** FUSE → DAYTIME RUNNING LIGHT RELAY NO. 3 (POINT SIDE) → **TERMINAL 1** OF THE HEADLIGHT RH–HI → **TERMINAL 2** → DAYTIME RUNNING LIGHT RELAY NO. 4 (POINT SIDE), CAUSING THE HEADLIGHTS (HI SIDE) TO LIGHT UP.

SERVICE HINTS

D 4 DAYTIME RUNNING LIGHT RELAY (MAIN)

2–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
15–GROUND : ALWAYS APPROX. **12** VOLTS
8–GROUND : CONTINUITY WITH THE PARKING BRAKE LEVER PULLED UP (PARKING BRAKE SW ON)
13–GROUND : ALWAYS CONTINUITY

HEADLIGHT AND FOG LIGHT (FOR CANADA)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 9	30	**F 7**	28	**I12**	31
C10	30	**H 3**	28	**J 1**	31
D 4	30	**H 4**	28	**P 4**	31
F 3	28	**H 5**	28		
F 4	28	**H 6**	28		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	25	R/B NO. 1 (LEFT KICK PANEL)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)
7	27	R/B NO. 7 (NEAR THE BATTERY)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1D		
1E		
1M		
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2D		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3B		
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	34	ENGINE ROOM MAIN WIRE AND RELAY WIRE (UNDER THE R/B NO. 7)
EB1	34	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)

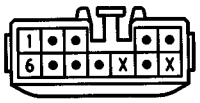
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
IE	36	LEFT KICK PANEL
IF		
IG	36	INSTRUMENT PANEL BRACE LH

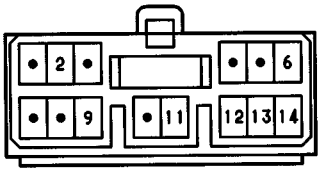
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 1	34	ENGINE ROOM MAIN WIRE	**E 16**	34	ENGINE ROOM MAIN WIRE
E 3			**E 19**		
E 4			**I 36**	38	COWL WIRE
E 6			**I 46**		
E 8			**I 54**		
E 12			**I 71**	38	INSTRUMENT PANEL WIRE

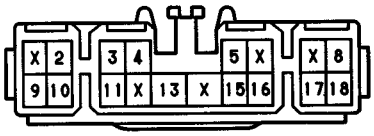
C 9 BLUE



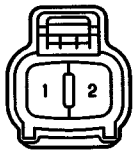
C10 BLACK



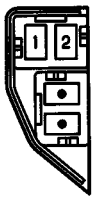
D 4 GRAY



F 3, F 4 BLACK



F 7

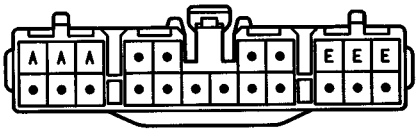


H 3, H 4 BLACK

H 5, H 6 BLACK

I12

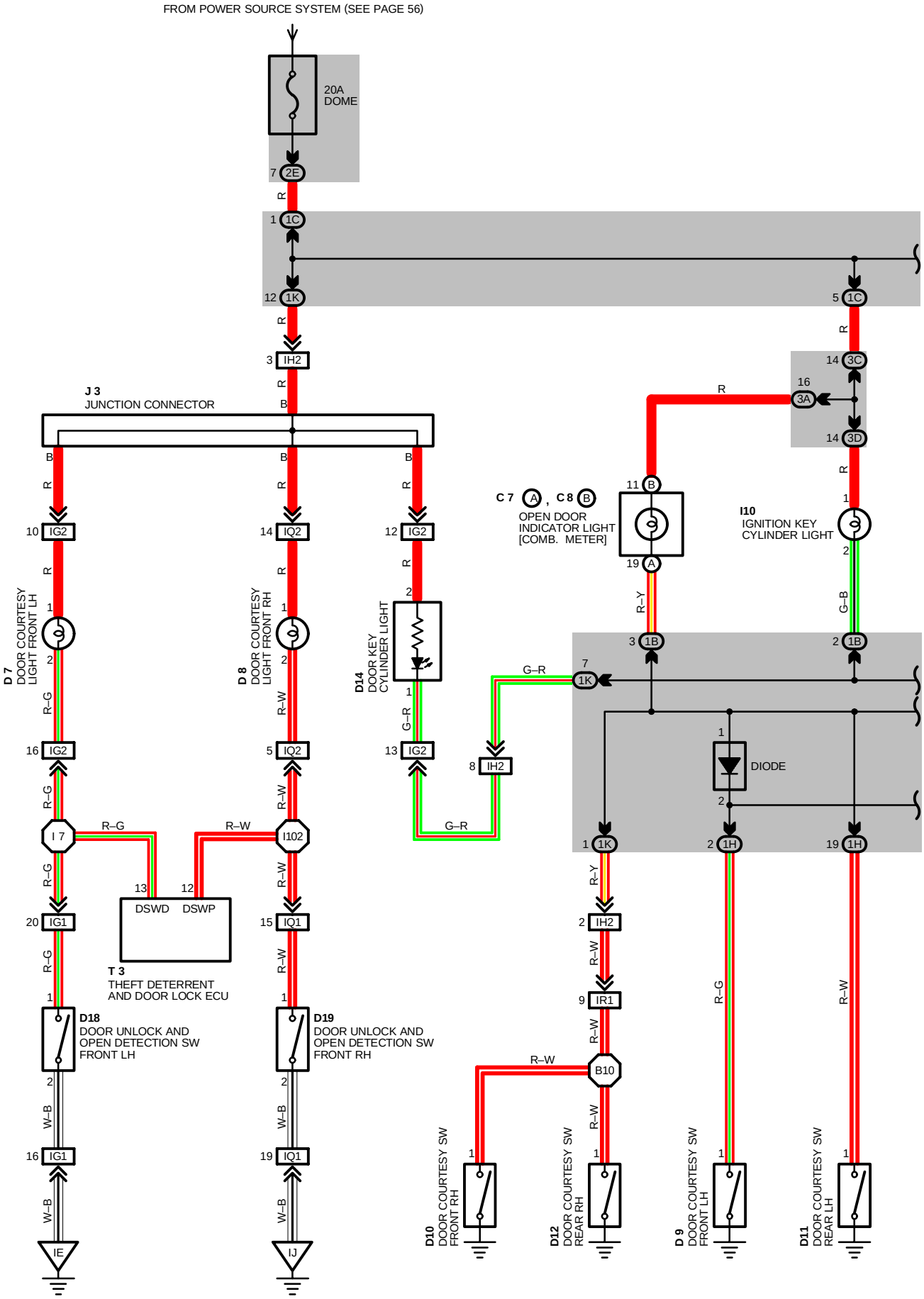
J 1

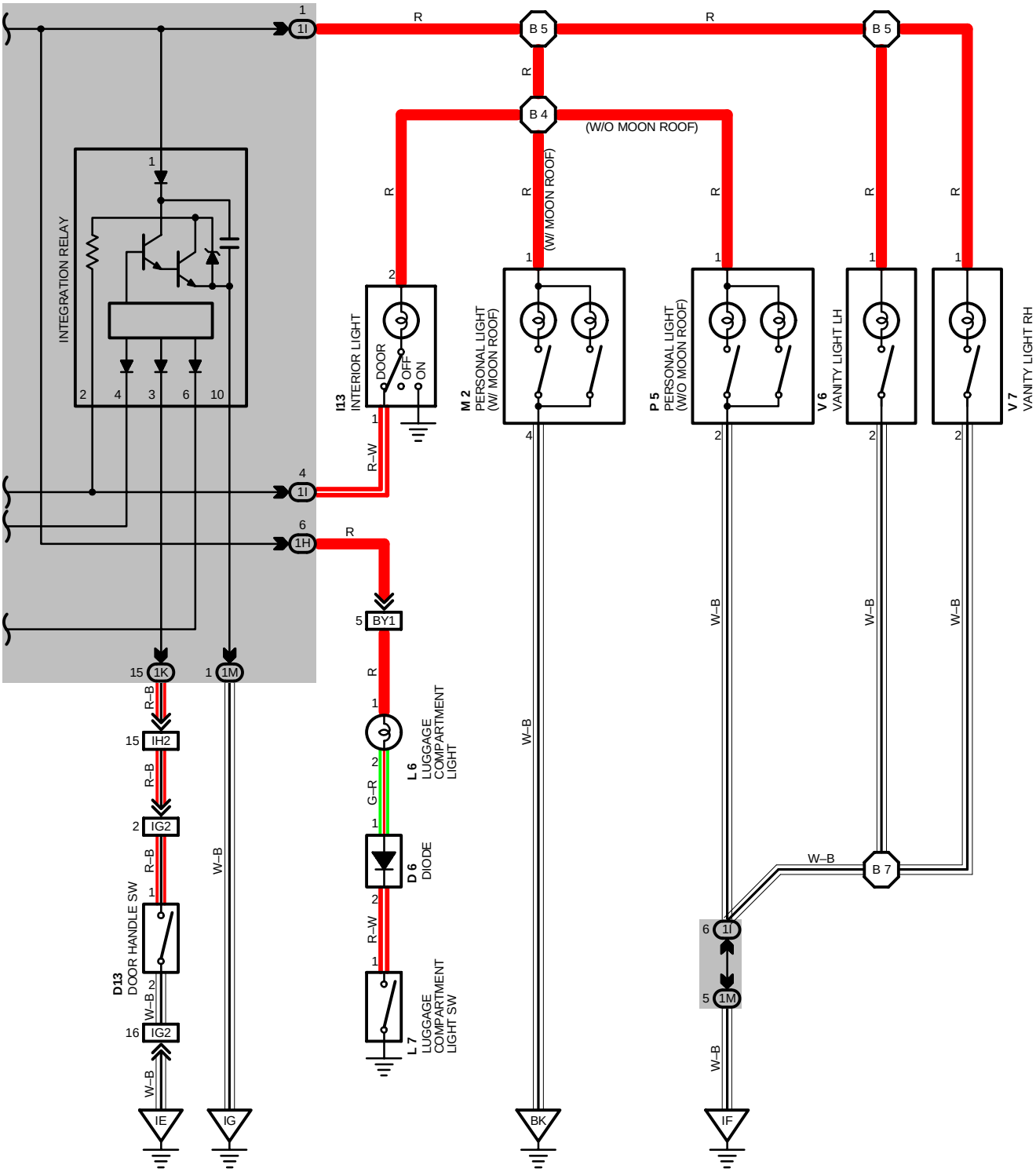


(HINT:SEE PAGE 7)

P 4

INTERIOR LIGHT




INTEGRATION RELAY
1I
1H
1K
1M
IH2
IG2
IE
IG
BK
IF
B 5
B 4
B 7
BY1
R
R–B
R–W
W–B
G–R
(W/O MOON ROOF)
(W/ MOON ROOF)
I13 INTERIOR LIGHT
DOOR
OFF
ON
M 2 PERSONAL LIGHT (W/ MOON ROOF)
P 5 PERSONAL LIGHT (W/O MOON ROOF)
V 6 VANITY LIGHT LH
V 7 VANITY LIGHT RH
D13 DOOR HANDLE SW
D 6 DIODE
L 6 LUGGAGE COMPARTMENT LIGHT
L 7 LUGGAGE COMPARTMENT LIGHT SW

INTERIOR LIGHT

SERVICE HINTS

INTEGRATION RELAY

1–GROUND : ALWAYS APPROX. **12** VOLTS
4–GROUND : CONTINUITY WITH EACH DOOR (FRONT LH AND RH, REAR LH AND RH) OPEN
2–GROUND : CONTINUITY WITH FRONT LH DOOR OPEN

D 9, D10, D11, D12 DOOR COURTESY SW

1–GROUND : CLOSED WITH DOOR OPEN

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 7	A	30	**D12**	32	**L 6**	32
C 8	B	30	**D13**	32	**L 7**	32
D 6		32	**D14**	32	**M 2**	32
D 7		32	**D18**	32	**P 5**	32
D 8		32	**D19**	32	**T 3**	31
D 9		32	**I10**	31	**V 6**	32
D10		32	**I13**	32	**V 7**	32
D11		32	**J 3**	31		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1I	20	ROOF WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1K	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3C		
3D		

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG2		
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IQ2		
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

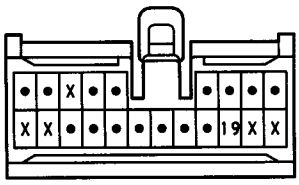
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL
IF		
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL
BK	40	ROOF LEFT

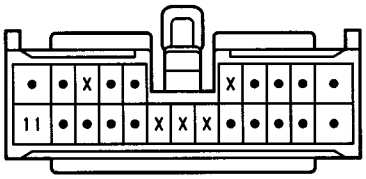
⯃ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 7	38	INSTRUMENT PANEL WIRE	**B 5**	40	ROOF WIRE
I102			**B 7**		
B 4	40	ROOF WIRE	**B 10**	40	FLOOR NO. 2 WIRE

C 7 (A) GRAY



C 8 (B)



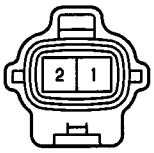
D 6

D 7, D 8

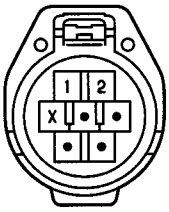
D 9, D10, D11, D12

D13 DARK GRAY

D14



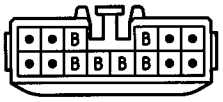
D18, D19 GRAY



I10 DARK GRAY

I13

J 3 DARK GRAY



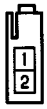
(HINT:SEE PAGE 7)

L 6 GRAY

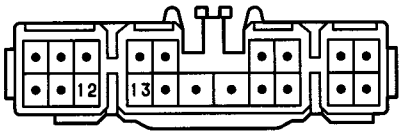
L 7 GRAY

M 2

P 5

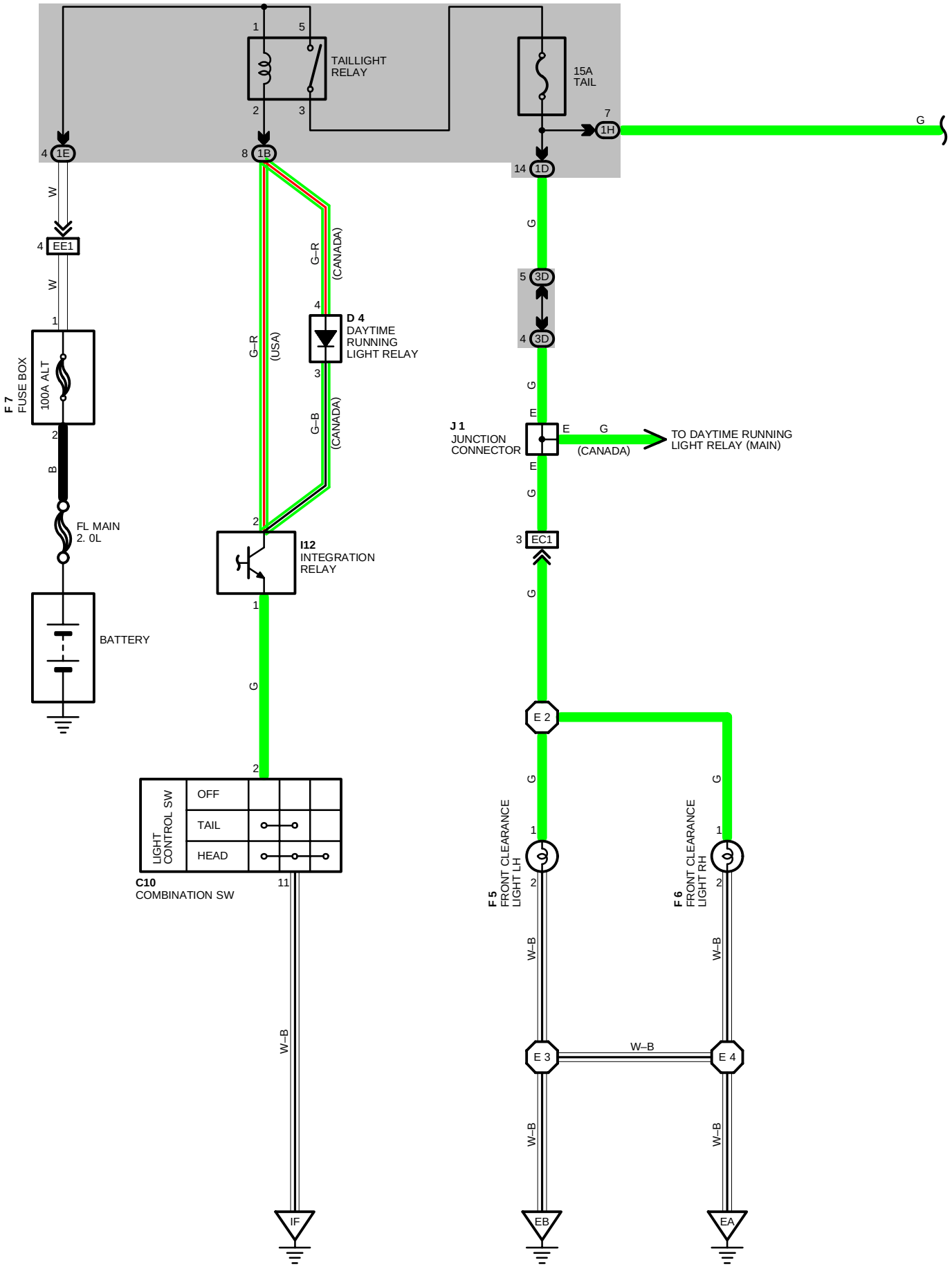


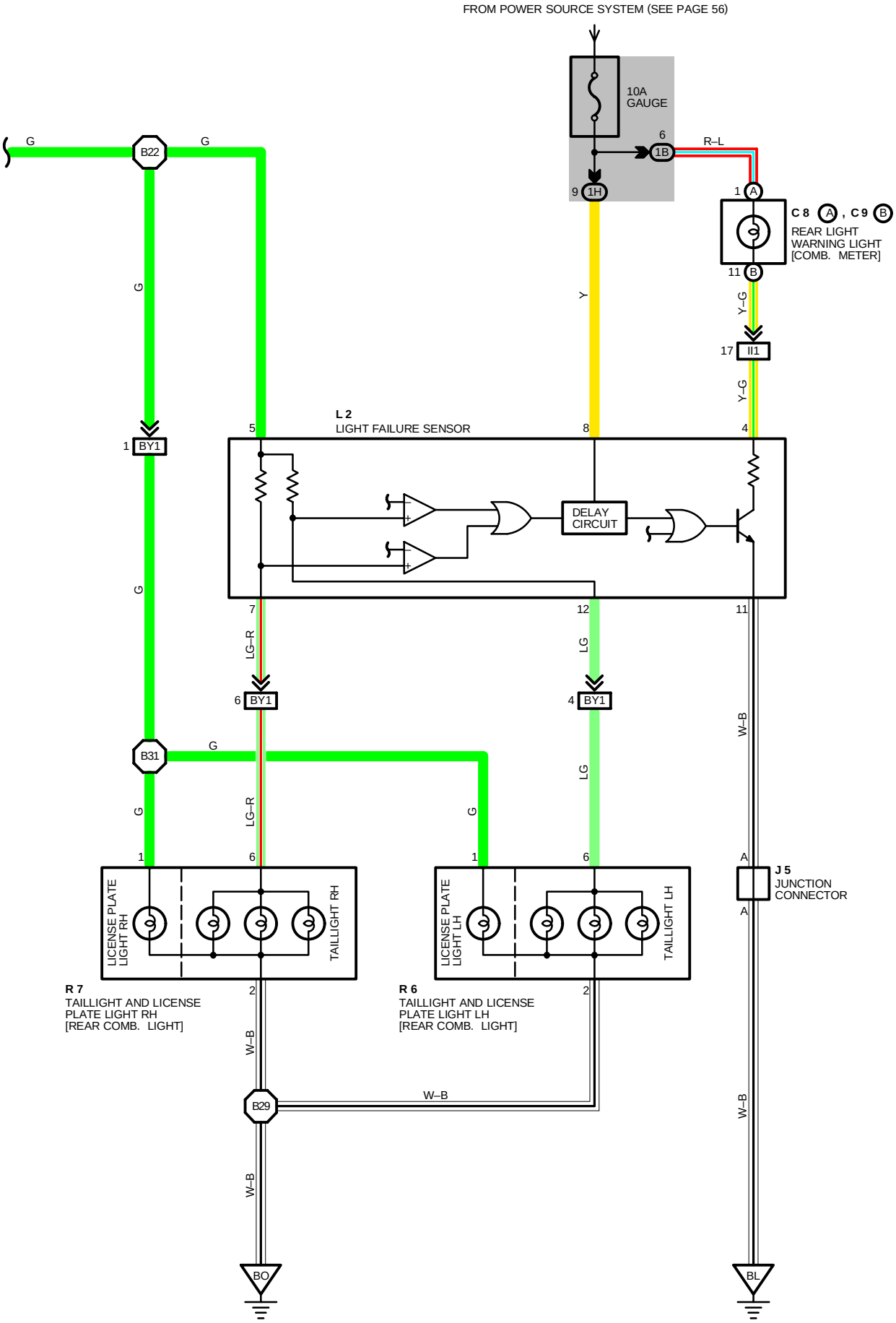
T 3 ORANGE



V 6, V 7

TAILLIGHT


TAILLIGHT RELAY
15A TAIL
1
5
2
3
4 1E
8 1B
14 1D
7 1H
G
W
4 EE1
W
1
F 7 FUSE BOX
100A ALT
2
B
FL MAIN 2. 0L
BATTERY
G–R (USA)
G–R (CANADA)
4
D 4 DAYTIME RUNNING LIGHT RELAY
3
G–B (CANADA)
2
I12 INTEGRATION RELAY
1
G
2
LIGHT CONTROL SW
OFF
TAIL
HEAD
C10 COMBINATION SW
11
W–B
IF
5 3D
4 3D
G
E
J 1 JUNCTION CONNECTOR
E
G
TO DAYTIME RUNNING LIGHT RELAY (MAIN)
(CANADA)
E
G
3 EC1
G
E 2
G
1
F 5 FRONT CLEARANCE LIGHT LH
2
W–B
G
1
F 6 FRONT CLEARANCE LIGHT RH
2
W–B
E 3
W–B
E 4
W–B
W–B
EB
EA


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
6
1B
R–L
9
1H
1
A
C 8 A , C 9 B
REAR LIGHT
WARNING LIGHT
[COMB. METER]
11
B
Y–G
17
II1
Y–G
Y
G
G
B22
G
1
BY1
L 2
LIGHT FAILURE SENSOR
5
8
4
DELAY
CIRCUIT
G
7
12
11
LG–R
LG
6
BY1
4
BY1
W–B
B31
G
G
LG–R
G
LG
1
6
1
6
A
J 5
JUNCTION
CONNECTOR
A
LICENSE PLATE
LIGHT RH
TAILLIGHT RH
LICENSE PLATE
LIGHT LH
TAILLIGHT LH
R 7
TAILLIGHT AND LICENSE
PLATE LIGHT RH
[REAR COMB. LIGHT]
2
R 6
TAILLIGHT AND LICENSE
PLATE LIGHT LH
[REAR COMB. LIGHT]
2
W–B
W–B
B29
W–B
W–B
BO
BL

TAILLIGHT

SYSTEM OUTLINE

WHEN THE LIGHT CONTROL SW IS TURNED TO **TAIL** OR **HEAD** POSITION, THE CURRENT FLOWS TO **TERMINAL 5** OF THE LIGHT FAILURE SENSOR THROUGH THE **TAIL** FUSE.

WHEN THE IGNITION SW IS TURNED ON, THE CURRENT FLOWS FROM THE **GAUGE** FUSE TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR, AND ALSO FLOWS THROUGH THE REAR LIGHTS WARNING LIGHT TO **TERMINAL 4** OF THE LIGHT FAILURE SENSOR.

TAILLIGHT DISCONNECTION WARNING

WITH THE IGNITION SW ON AND THE LIGHT CONTROL SW TURNED TO **TAIL** OR **HEAD** POSITION, IF THE TAILLIIGHT CIRCUIT IS OPEN, THE LIGHT FAILURE SENSOR DETECTS THE FAILURE BY THE CHANGE IN CURRENT FLOWING FROM **TERMINAL 5** OF THE LIGHT FAILURE SENSOR TO **TERMINAL 7, 12** AND THE WARNING CIRCUIT OF THE LIGHT FAILURE SENSOR IS ACTIVATED.

AS A RESULT, THE CURRENT FLOWS FROM **TERMINAL 4** OF THE LIGHT FAILURE SENSOR → **TERMINAL 11** → **GROUND** AND TURNS THE REAR LIGHT WARNING LIGHT ON, WHICH REMAINS ON UNTIL THE LIGHT CONTROL SW IS TURNED OFF.

SERVICE HINTS

TAILLIGHT RELAY

3–5: CLOSED WITH LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION

L 2 LIGHT FAILURE SENSOR

4, 8–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION

5–GROUND: APPROX. **12** VOLTS WITH LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION

11–GROUND: ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 8	A	30	**F 6**	28	**L 2**	32
C 9	B	30	**F 7**	28	**R 6**	32
C10		30	**I12**	31	**R 7**	32
D 4		30	**J 1**	32		
F 5		28	**J 5**	32		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1D		
1E		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
3D	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
II1	36	FLOOR NO. 1 WIRE AND COWL WIRE (LEFT KICK PANEL)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

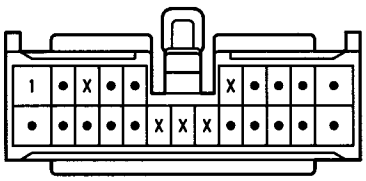
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
IF	36	LEFT KICK PANEL
BL	40	UNDER THE LEFT QUARTER PILLAR
BO	40	BACK PANEL CENTER

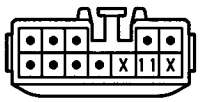
⯃ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	ENGINE ROOM MAIN WIRE	**B 22**	40	FLOOR NO. 1 WIRE
E 3			**B 29**	40	LUGGAGE ROOM WIRE
E 4			**B 31**		

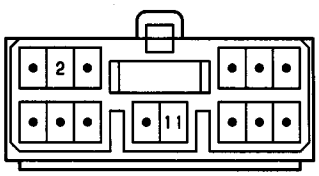
C 8 (A)



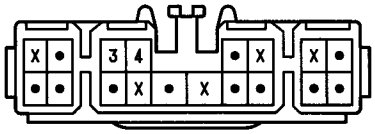
C 9 (B) BLUE



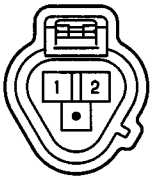
C10 BLACK



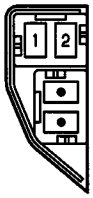
D 4 GRAY



F 5, F 6 GRAY

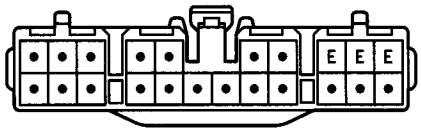


F 7



I12

J 1

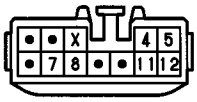


(HINT:SEE PAGE 7)

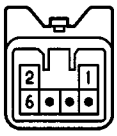
J 5

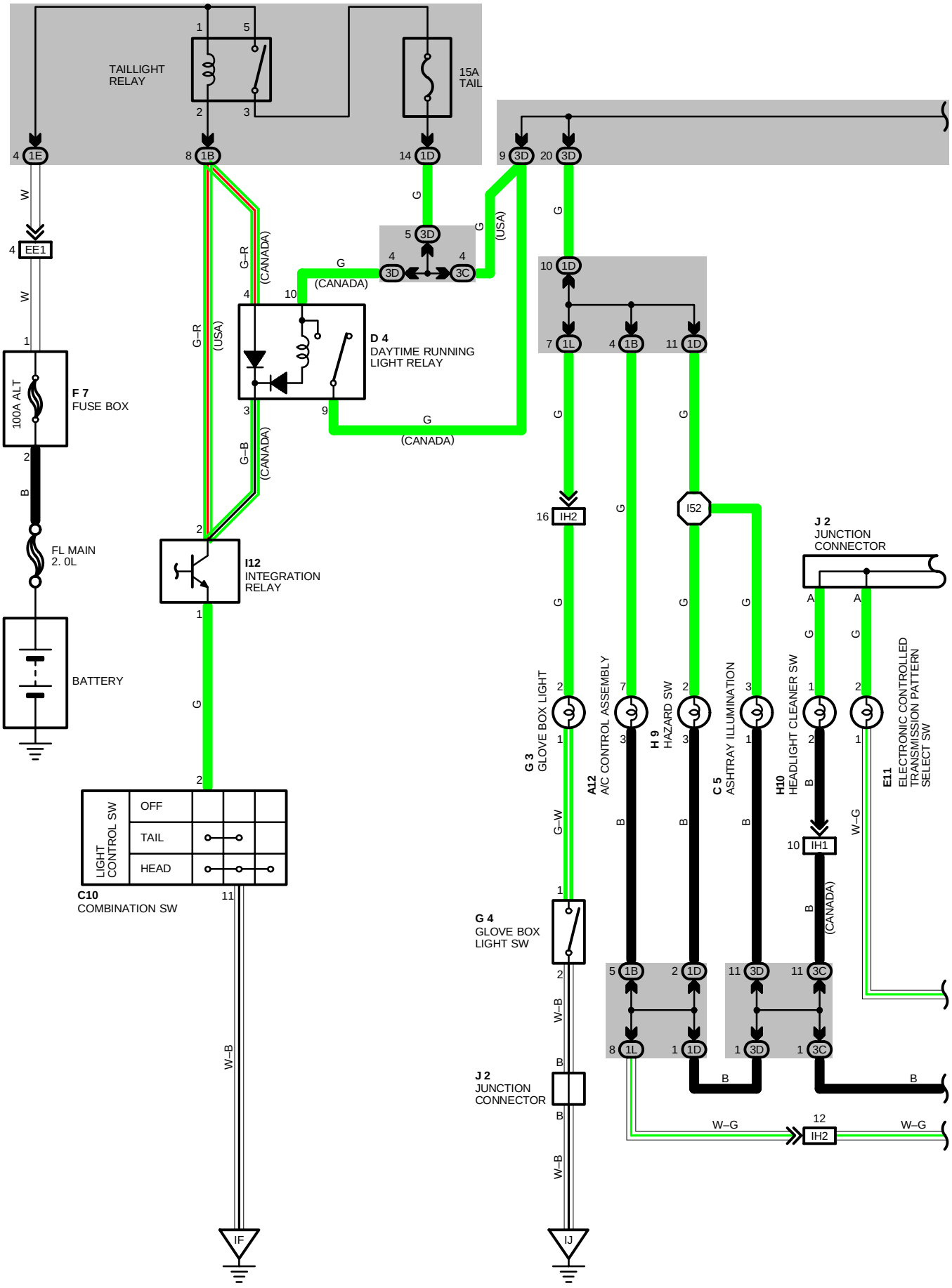
(HINT:SEE PAGE 7)

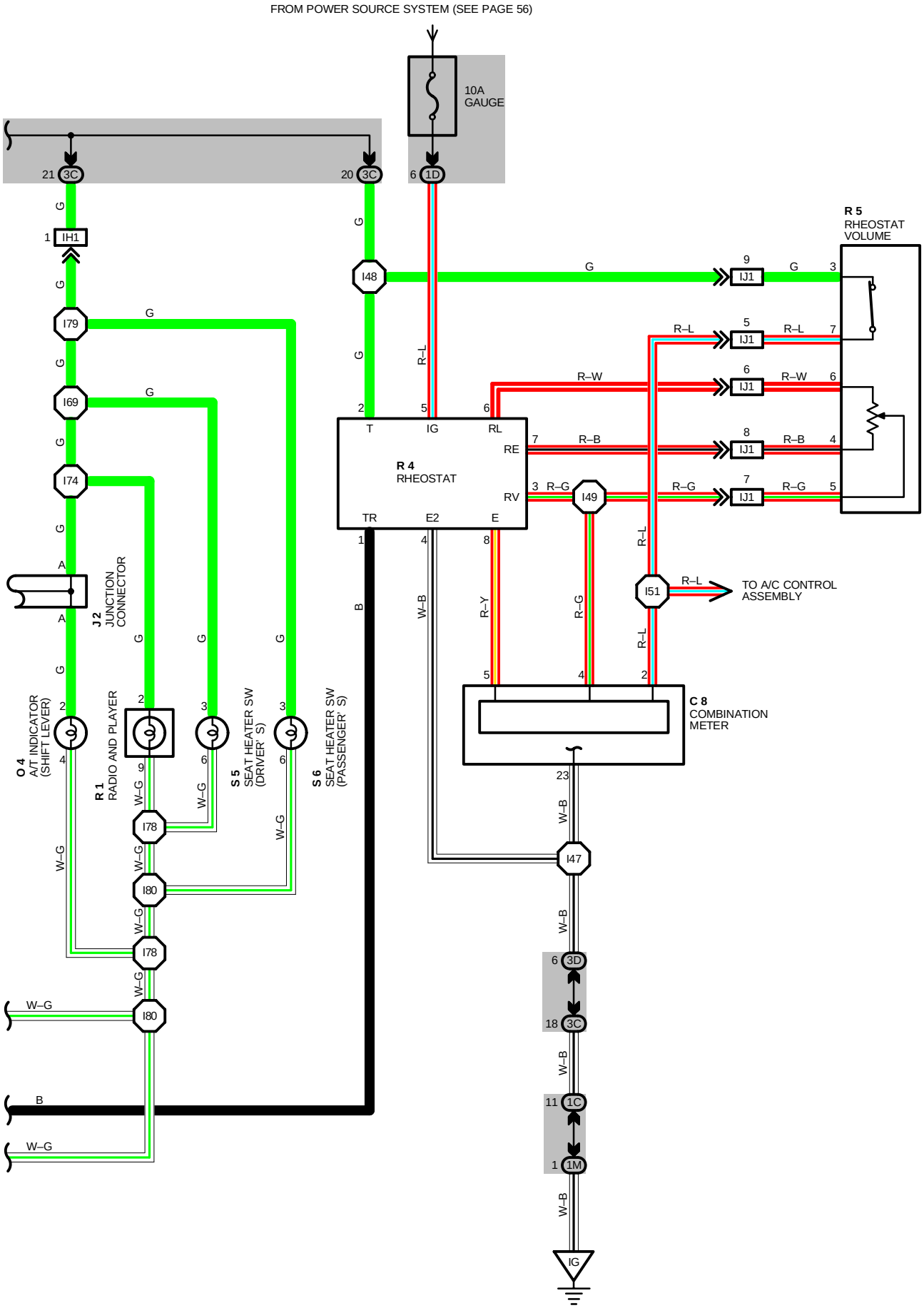
L 2



R 6, R 7




TAILLIGHT RELAY
15A TAIL
1
5
2
3
4 1E
8 1B
14 1D
9 3D
20 3D
W
4 EE1
W
1
100A ALT
F 7
FUSE BOX
2
B
FL MAIN 2. 0L
BATTERY
G
G–R (CANADA)
G–R (USA)
G–B (CANADA)
G (CANADA)
G (USA)
5 3D
4 3D
4 3C
10
4
3
9
D 4
DAYTIME RUNNING LIGHT RELAY
2
I12
INTEGRATION RELAY
1
2
LIGHT CONTROL SW
OFF
TAIL
HEAD
C10
COMBINATION SW
11
W–B
IF
10 1D
7 1L
4 1B
11 1D
16 IH2
I52
G 3
GLOVE BOX LIGHT
G–W
G 4
GLOVE BOX LIGHT SW
J 2
JUNCTION CONNECTOR
W–B
IJ
A12
A/C CONTROL ASSEMBLY
H 9
HAZARD SW
C 5
ASHTRAY ILLUMINATION
H10
HEADLIGHT CLEANER SW
(CANADA)
J 2
JUNCTION CONNECTOR
E11
ELECTRONIC CONTROLLED TRANSMISSION PATTERN SELECT SW
W–G
10 IH1
5 1B
2 1D
11 3D
11 3C
8 1L
1 1D
1 3D
1 3C
12 IH2


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
21 3C
20 3C
6 1D
1 IH1
I79
I69
I74
I48
J2
JUNCTION
CONNECTOR
O 4
A/T INDICATOR
(SHIFT LEVER)
R 1
RADIO AND PLAYER
S 5
SEAT HEATER SW
(DRIVER' S)
S 6
SEAT HEATER SW
(PASSENGER' S)
I78
I80
R 4
RHEOSTAT
T
IG
RL
RE
RV
TR
E2
E
I49
R 5
RHEOSTAT
VOLUME
IJ1
I51
TO A/C CONTROL
ASSEMBLY
C 8
COMBINATION
METER
I47
3D
3C
1C
1M
IG
G
R–L
R–W
R–B
R–G
R–Y
W–B
W–G
B

ILLUMINATION

SERVICE HINTS

TAILLIGHT RELAY

3–5 : CLOSED WITH LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION (WHEN LIGHT AUTO TURN OFF SYSTEM IS OFF)
CLOSED WITH ENGINE RUNNING AND PARKING BRAKE LEVER RELEASED (CANADA)

R 4 RHEOSTAT

2–4, 8 : APPROX. **12** VOLTS WITH RHEOSTAT FULLY TURNED COUNTERCLOCKWISE AND **0** VOLT WITH FULLY TURNED CLOCKWISE

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A12	30	**G 3**	31	**R 1**	31
C 5	30	**G 4**	31	**R 4**	31
C 8	30	**H 9**	31	**R 5**	31
C10	30	**H10**	31	**S 5**	31
D 4	30	**I12**	31	**S 6**	31
E11	30	**J 2**	31		
F 7	28	**O 4**	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1D		
1E		
1L		
1M		
3C	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IJ1	36	INSTRUMENT PANEL NO. 2 WIRE AND COWL WIRE (UNDER THE COMBINATION METER)

: GROUND POINTS

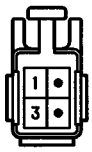
CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL

: SPLICE POINTS

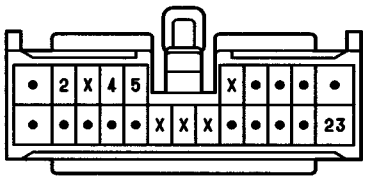
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 47	38	COWL WIRE	**I 69**	38	INSTRUMENT PANEL WIRE
I 48			**I 74**		
I 49			**I 78**		
I 51			**I 79**		
I 52			**I 80**		

A12 BLUE

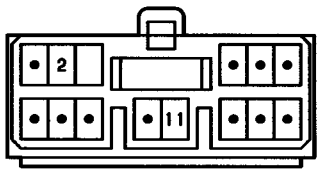
C 5



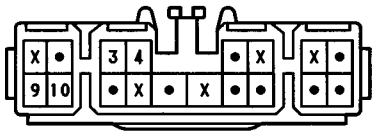
C 8



C10 BLACK

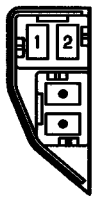


D 4 GRAY



E11

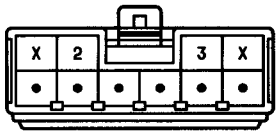
F 7



G 3 GRAY

G 4

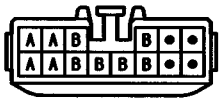
H 9 BLACK



H10 BLACK

I12

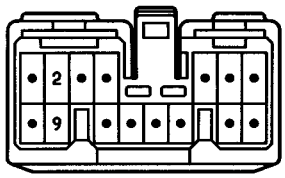
J 2



(HINT:SEE PAGE 7)

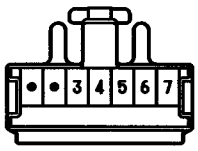
O 4 BLUE

R 1



R 4

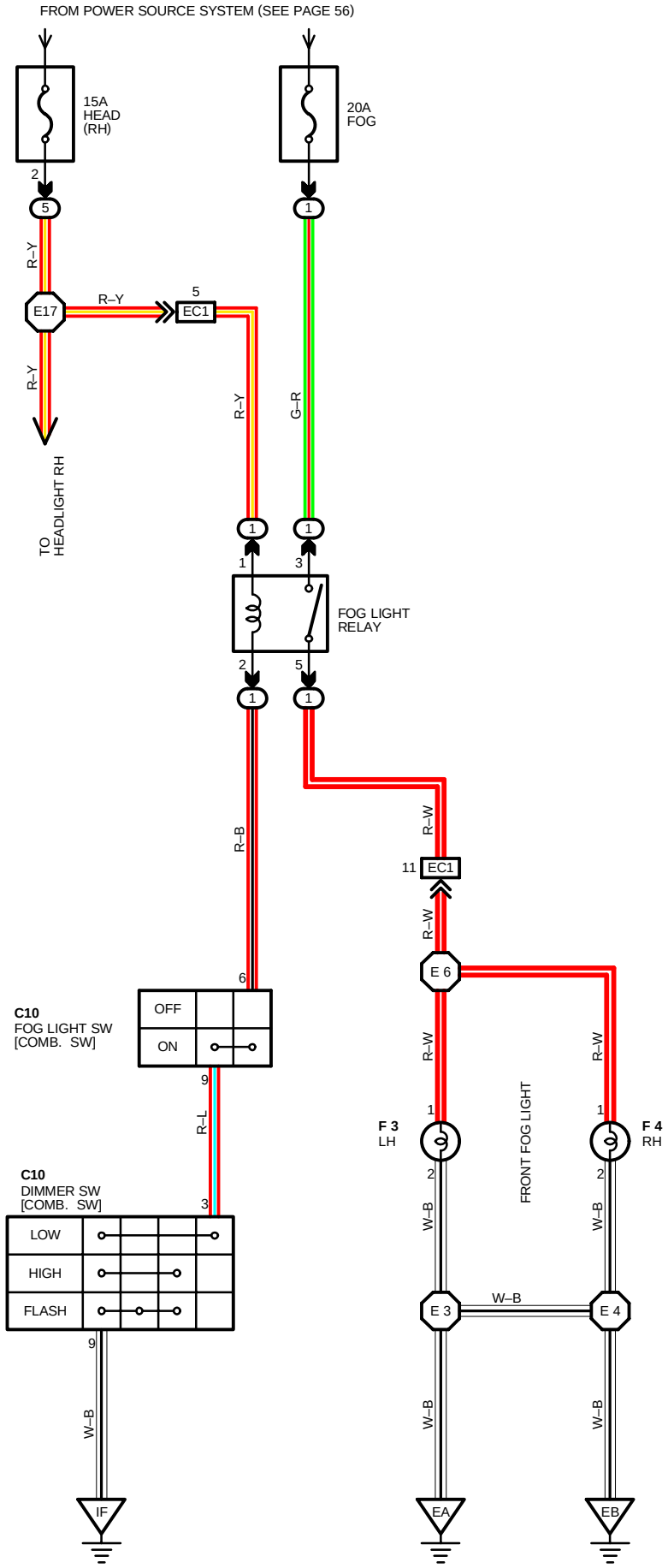
R 5



S 5

S 6 BLUE

FRONT FOG LIGHT (FOR USA)



SERVICE HINTS

(1) FOG LIGHT RELAY

3–5 : CLOSED WITH LIGHT CONTROL SW AT **HEAD** POSITION, DIMMER SW AT **LOW** POSITION AND FOG LIGHT SW ON

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C10	30	**F 3**	28	**F 4**	28

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	25	R/B NO. 1 (LEFT KICK PANEL)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)

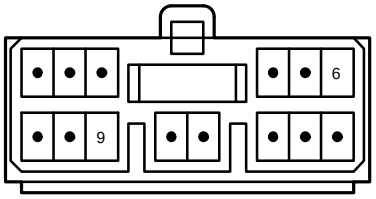
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
IF	36	LEFT KICK PANEL

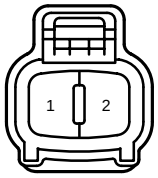
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 3	34	ENGINE ROOM MAIN WIRE	**E 6**	34	ENGINE ROOM MAIN WIRE
E 4			**E 17**		

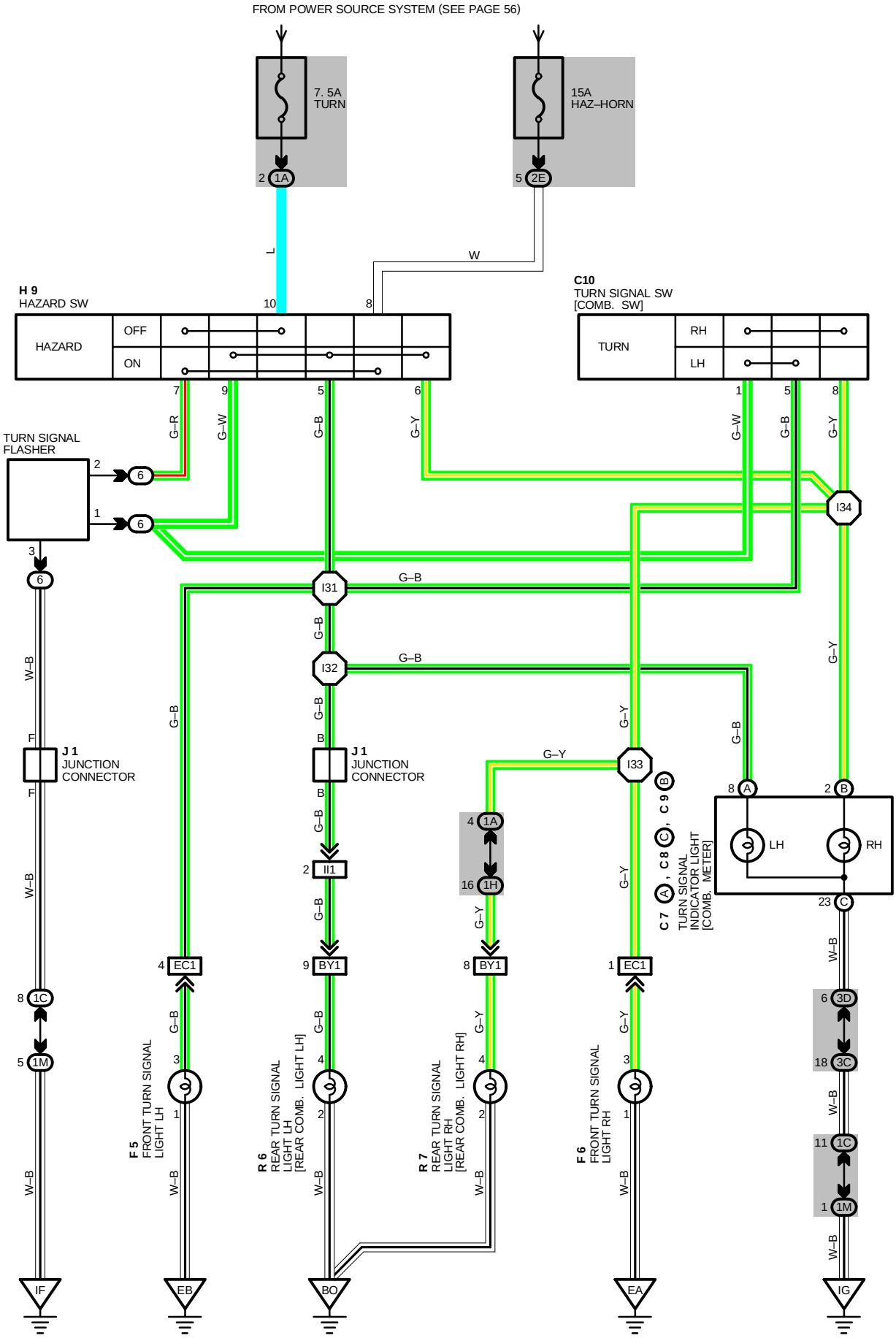
C10 BLACK



F 3, F 4 BLACK



TURN SIGNAL AND HAZARD WARNING LIGHT



SERVICE HINTS

TURN SIGNAL FLASHER

(6) 2–GROUND : APPROX. **12** VOLTS WITH IGNITION SW ON OR HAZARD SW ON

(6) 1–GROUND : CHANGES FROM APPROX. **12** TO **0** VOLTS WITH IGNITION SW ON AND TURN SIGNAL SW LEFT OR RIGHT, OR HAZARD SW ON

(6) 3–GROUND: ALWAYS CONTINUITY

: PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 7	A	30	**F 5**	28	**R 6**	32
C 8	C	30	**F 6**	28	**R 7**	32
C 9	B	30	**H 9**	31		
C10		30	**J 1**	31		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
6	26	R/B NO. 6 (BEHIND GLOVE BOX)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3C	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
II1	36	FLOOR NO. 1 WIRE AND COWL WIRE (LEFT KICK PANEL)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

: GROUND POINTS

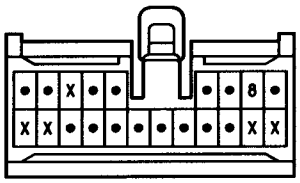
CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
BO	40	BACK PANEL CENTER

: SPLICE POINTS

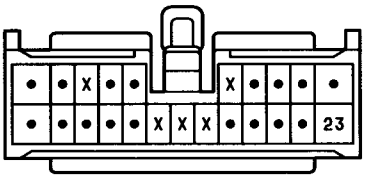
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 31	38	COWL WIRE	**I 33**	38	COWL WIRE
I 32			**I 34**		

TURN SIGNAL AND HAZARD WARNING LIGHT

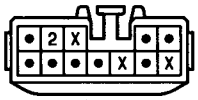
C 7 (A) GRAY



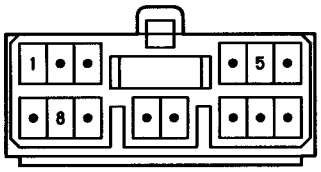
C 8 (C)



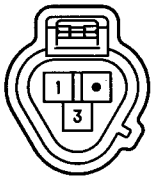
C 9 (B) BLUE



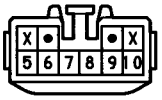
C10 BLACK



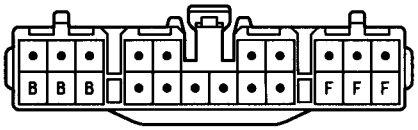
F 5, F 6 GRAY



H 9

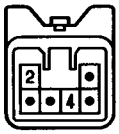


J 1

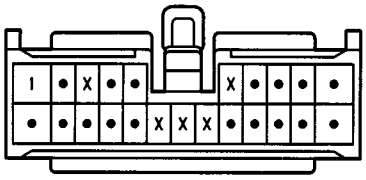


(HINT:SEE PAGE 7)

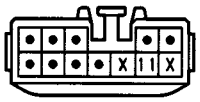
R 6, R 7



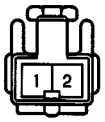
C 8 (A)



C 9 (B) BLUE



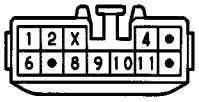
H12



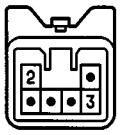
J 5

(HINT:SEE PAGE 7)

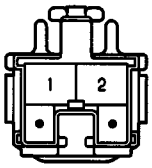
L 2 ORANGE



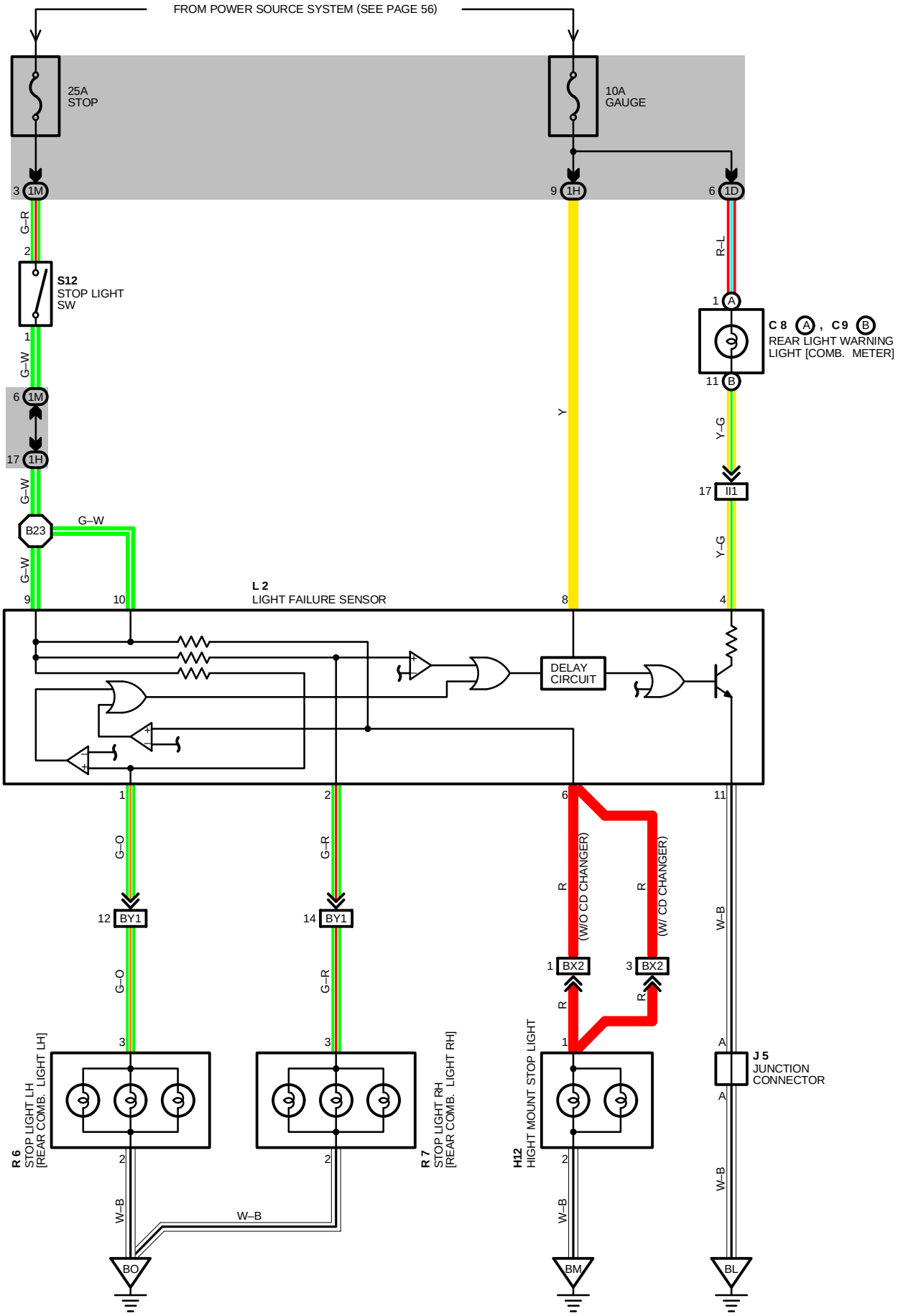
R 6, R 7



S12 BLUE



STOP LIGHT


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
25A
STOP
10A
GAUGE
3 1M
9 1H
6 1D
G–R
2
S12
STOP LIGHT
SW
1
G–W
6 1M
17 1H
G–W
B23
G–W
G–W
9
10
L 2
LIGHT FAILURE SENSOR
8
4
DELAY
CIRCUIT
R–L
1 A
C 8 A , C 9 B
REAR LIGHT WARNING
LIGHT [COMB. METER]
11 B
Y
Y–G
17 II1
Y–G
1
2
6
11
G–O
G–R
R
(W/O CD CHANGER)
R
(W/ CD CHANGER)
W–B
12 BY1
14 BY1
1 BX2
3 BX2
R
R
G–O
G–R
3
3
1
A
J 5
JUNCTION
CONNECTOR
A
R 6
STOP LIGHT LH
[REAR COMB. LIGHT LH]
R 7
STOP LIGHT RH
[REAR COMB. LIGHT RH]
H12
HIGHT MOUNT STOP LIGHT
2
2
2
W–B
W–B
W–B
BO
BM
BL

SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH A **STOP** FUSE TO **TERMINAL 2** OF THE STOP LIGHT SW. WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS FROM THE **GAUGE** FUSE TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR, AND ALSO FLOWS THROUGH THE REAR LIGHT WARNING LIGHT TO **TERMINAL 4** OF THE LIGHT FAILURE SENSOR.

STOP LIGHT DISCONNECTION WARNING

WHEN THE IGNITION SW IS TURNED ON AND THE BRAKE PEDAL IS PRESSED (STOP LIGHT SW ON), IF THE STOP LIGHT CIRCUIT IS OPEN, THE CURRENT FLOWING FROM **TERMINALS 9, 10** OF THE LIGHT FAILURE SENSOR TO **TERMINALS 1, 2, 6** CHANGES, SO THE LIGHT FAILURE SENSOR DETECTS THE DISCONNECTION AND THE WARNING CIRCUIT OF THE LIGHT FAILURE SENSOR IS ACTIVATED. AS A RESULT, THE CURRENT FLOWS FROM **TERMINAL 4** OF THE LIGHT FAILURE SENSOR → **TERMINAL 11** → **GROUND** AND TURNS THE REAR LIGHT WARNING LIGHT ON. BY PRESSING THE BRAKE PEDAL, THE CURRENT FLOWING TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR KEEPS THE WARNING CIRCUIT ON HOLD AND THE WARNING LIGHT ON UNTIL THE IGNITION SW IS TURNED OFF.

SERVICE HINTS

S12 STOP LIGHT SW

2–1: CLOSED WITH BRAKE PEDAL DEPRESSED

L 2 LIGHT FAILURE SENSOR

1, 2, 6, 9, 10–GROUND : APPROX. **12** VOLTS WITH STOP LIGHT SW ON

4, 8–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION

11–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 8	A	30	**J 5**	32	**R 7**	32
C 9	B	30	**L 2**	32	**S12**	31
H12		32	**R 6**	32		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
II1	36	FLOOR NO. 1 WIRE AND COWL WIRE (LEFT KICK PANEL)
BX2	40	FLOOR NO. 1 WIRE AND FLOOR NO. 2 WIRE (BEHIND PACKAGE TRAY TRIM)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

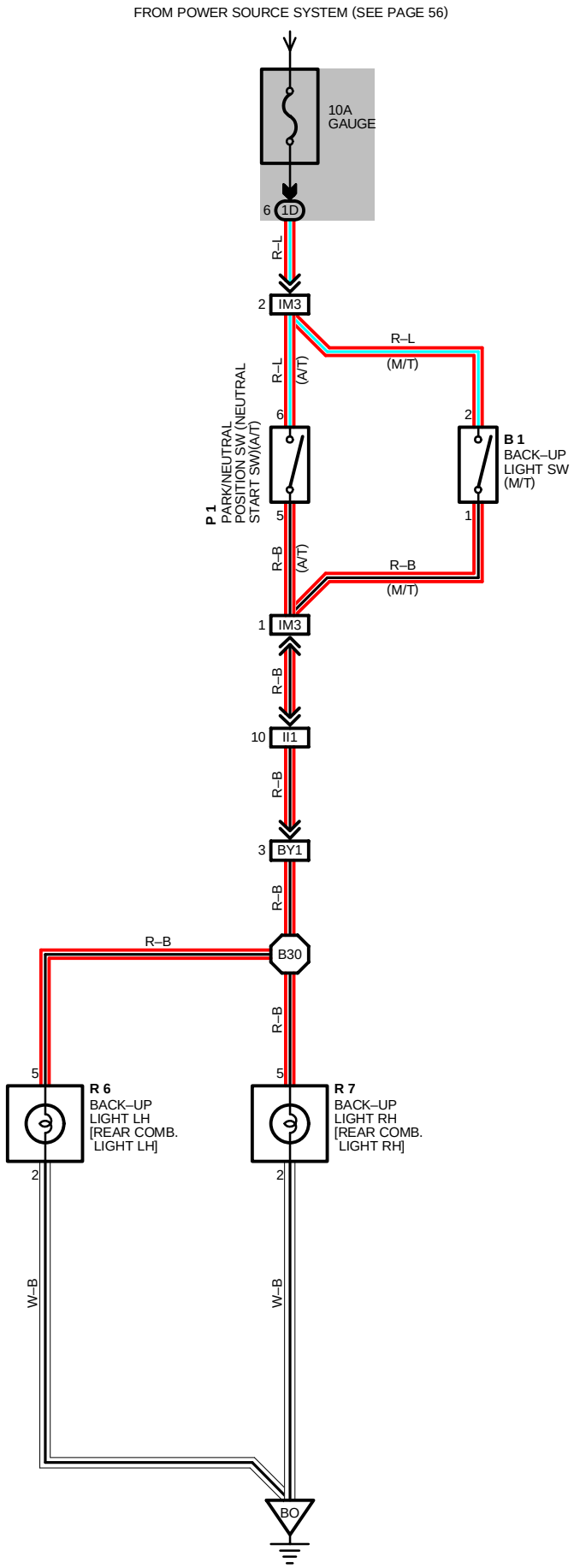
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
BL	40	UNDER THE LEFT QUARTER PILLAR
BM	40	UNDER THE RIGHT QUARTER PILLAR
BO	40	BACK PANEL CENTER

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 23	40	FLOOR NO. 1 WIRE			

BACK–UP LIGHT



SERVICE HINTS

B 1 BACK–UP LIGHT SW

2–1 : CLOSED WITH SHIFT LEVER IN **R** POSITION

P 1 BACK–UP LIGHT SW [PARK/NEUTRAL POSITION SW (NEUTRAL START SW)]

6–5 : CLOSED WITH SHIFT LEVER IN **R** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
B 1	28	**R 6**	32		
P 1	29	**R 7**	32		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
II1	36	FLOOR NO. 1 WIRE AND COWL WIRE
IM3	38	ENGINE WIRE AND COWL WIRE
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE

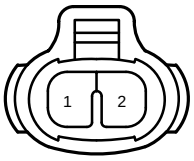
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
BO	40	BACK PANEL CENTER

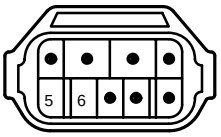
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B30	40	LUGGAGE ROOM MAIN WIRE			

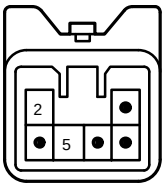
B 1 GRAY



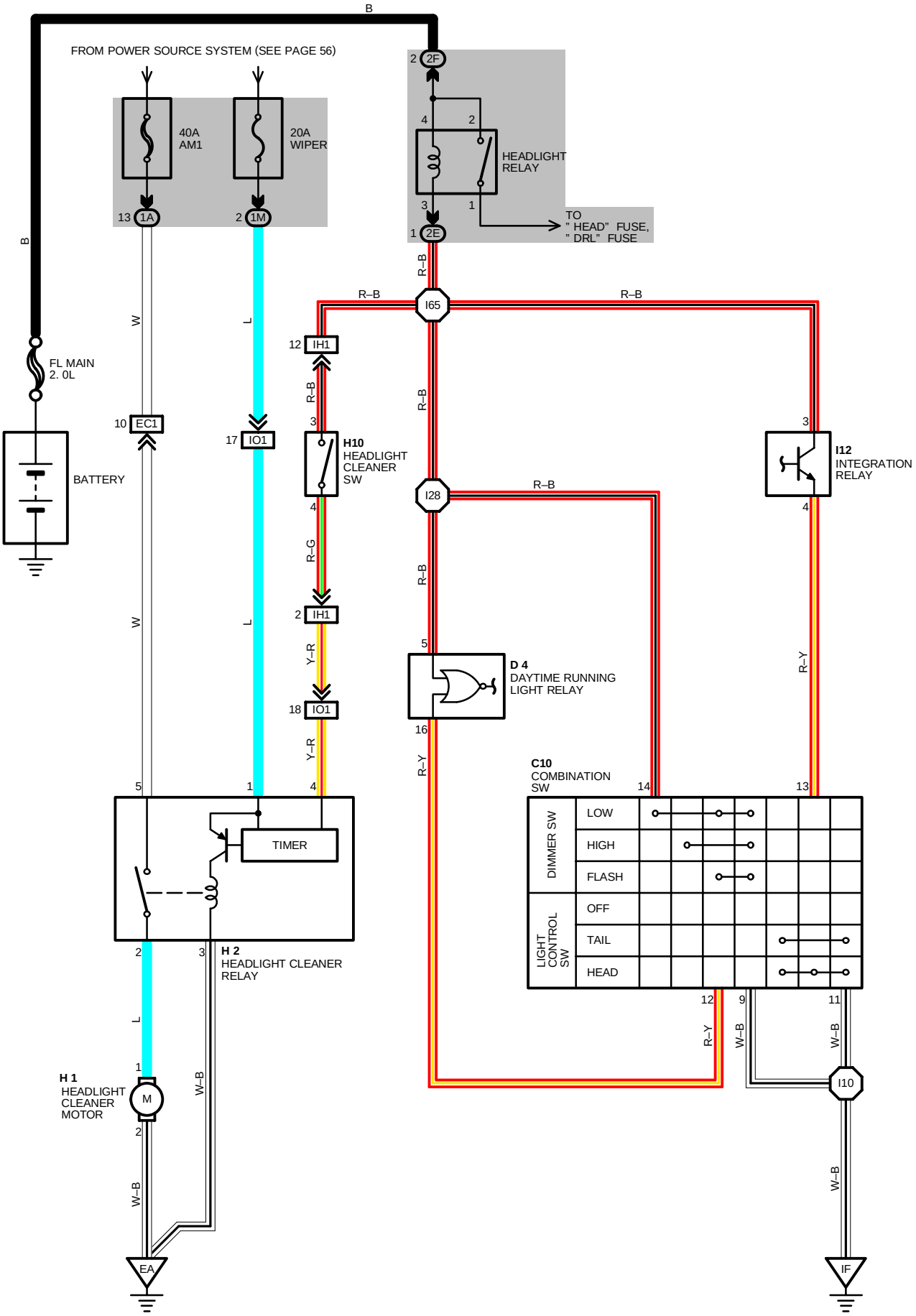
P 1 GRAY



R 6, R 7



HEADLIGHT CLEANER (FOR CANADA)



SERVICE HINTS

H 2 HEADLIGHT CLEANER RELAY

5–2 : CLOSED WITH LIGHT CONTROL SW AT **HEAD** POSITION AND HEADLIGHT CLEANER SW ON
CLOSED WITH DIMMER SW AT **FLASH** POSITION AND HEADLIGHT CLEANER SW ON

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C10	30	**H 1**	28	**H10**	31
D 4	30	**H 2**	28	**I12**	31

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EC1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
I01	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

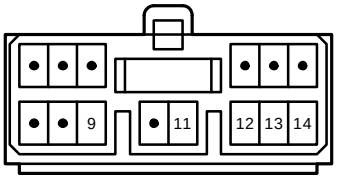
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
IF	36	LEFT KICK PANEL

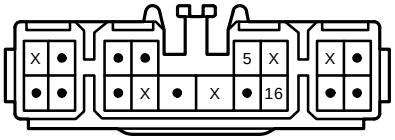
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 10	38	COWL WIRE	**I 65**	38	COWL WIRE
I 28					

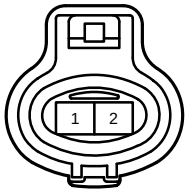
C10 BLACK



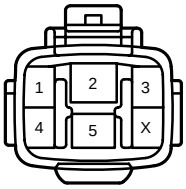
D 4 GRAY



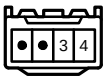
H 1 GRAY



H 2 BLACK

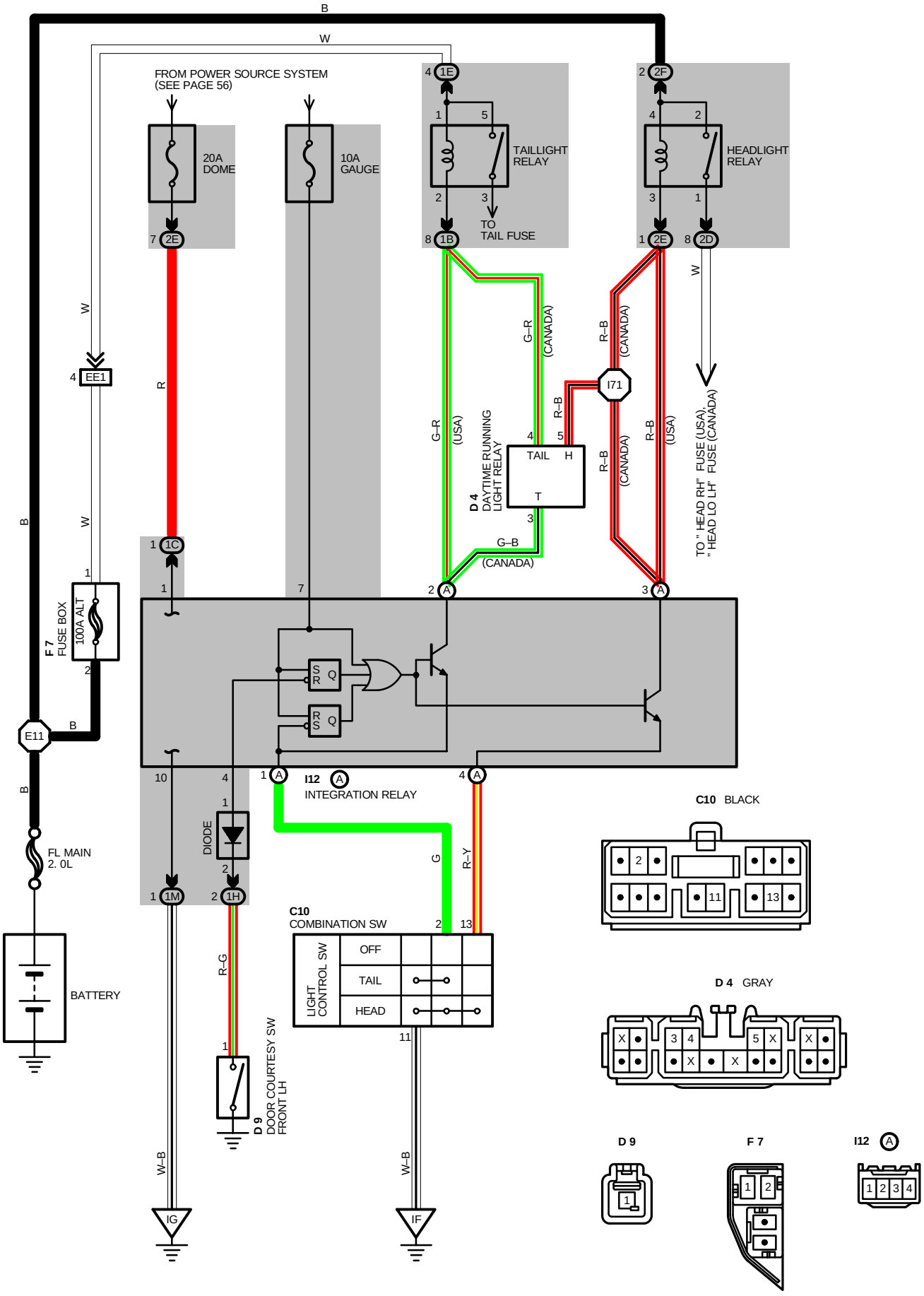


H10 BLACK



I12

LIGHT AUTO TURN OFF



SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO **TERMINAL 7** OF THE INTEGRATION RELAY THROUGH **GAUGE** FUSE.

VOLTAGE IS APPLIED AT ALL TIMES TO **TERMINAL (A)2** OF THE INTEGRATION RELAY THROUGH THE TAILLIGHT RELAY (COIL SIDE), AND TO **TERMINAL (A)3** THROUGH THE HEADLIGHT RELAY (COIL SIDE).

1. NORMAL LIGHTING OPERATION

(TURN TAILLIGHT ON)

WITH LIGHT CONTROL SW TURNED TO **TAIL** POSITION, A SIGNAL IS INPUT INTO **TERMINAL (A)1** OF THE INTEGRATION RELAY. ACCORDING TO THIS SIGNAL, THE CURRENT FLOWING TO **TERMINAL (A)2** OF THE RELAY FLOWS FROM **TERMINAL (A)1** → **TERMINAL 2** OF THE LIGHT CONTROL SW → **TERMINAL 11** → TO **GROUND** AND TAILLIGHT RELAY CAUSES TAILLIGHT TO TURN ON.

(TURN HEADLIGHT ON)

WITH LIGHT CONTROL SW TURNED TO **HEAD** POSITION, A SIGNAL IS INPUT INTO **TERMINALS (A)1** AND **(A)4** OF THE INTEGRATION RELAY. ACCORDING TO THIS SIGNAL, THE CURRENT FLOWING TO **TERMINAL (A)3** OF THE RELAY FLOWS TO **TERMINAL (A)4** → **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL 11** → TO **GROUND** IN THE HEADLIGHT CIRCUIT, AND CAUSES TAILLIGHT AND HEADLIGHT RELAY TO TURN THE LIGHT ON. THE TAILLIGHT CIRCUIT IS SAME AS ABOVE.

2. LIGHT AUTO TURN OFF OPERATION

WITH LIGHTS ON AND IGNITION SW TURNED OFF (INPUT SIGNAL GOES TO **TERMINAL 7** OF THE RELAY), WHEN DOOR ON DRIVER'S SIDE IS OPENED (INPUT SIGNAL GOES TO **TERMINAL 4** OF THE RELAY), THE RELAY OPERATES AND THE CURRENT IS CUT OFF WHICH FLOWS FROM **TERMINAL (A)2** OF THE RELAY TO **TERMINAL (A)1** IN TAILLIGHT CIRCUIT AND FROM **TERMINAL (A)3** TO **TERMINAL (A)4** IN HEADLIGHT CIRCUIT. AS A RESULT, ALL LIGHTS ARE TURNED OFF AUTOMATICALLY.

SERVICE HINTS

I12 INTEGRATION RELAY

7–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
1–GROUND : ALWAYS APPROX. **12** VOLTS
(A) 3–GROUND : APPROX. **12** VOLTS WITH LIGHT CONTROL SW AT **OFF** OR **TAIL** POSITION
(A) 2–GROUND : APPROX. **12** VOLTS WITH LIGHT CONTROL SW AT **OFF** POSITION
4–GROUND : CONTINUITY WITH FRONT LH DOOR OPEN
(A) 4–GROUND : CONTINUITY WITH LIGHT CONTROL SW AT **HEAD** POSITION
(A) 1–GROUND : CONTINUITY WITH LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION
10–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
C10	30	**D 9**	32	**I12**	A	31
D 4	30	**F 7**	28			

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1C		
1E		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2D	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2E	22	COWL WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

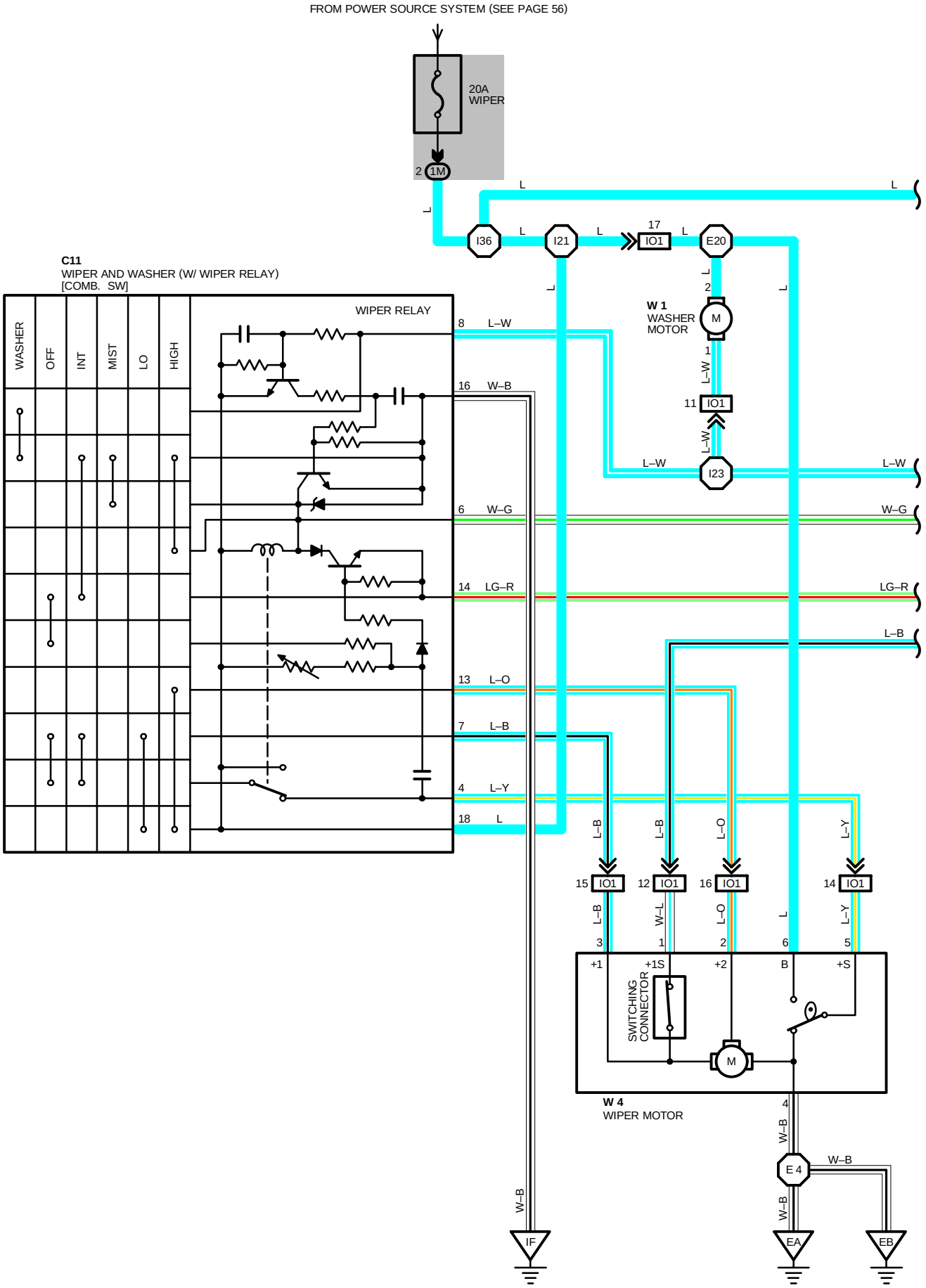
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)

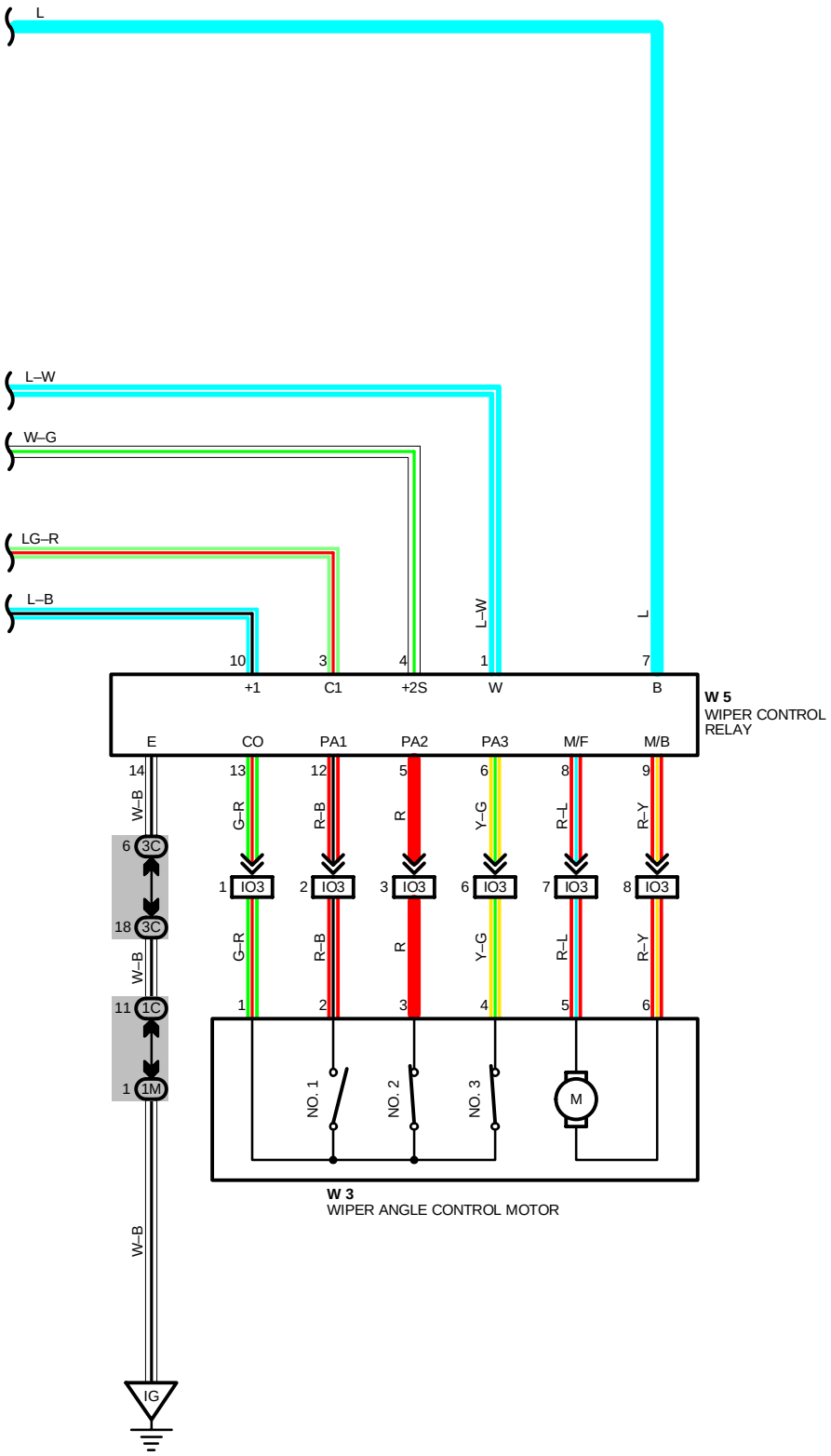
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 11	34	ENGINE WIRE	**I 71**	38	INSTRUMENT PANEL WIRE


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
20A
WIPER
2
1M
L
I36
I21
17
IO1
E20
C11
WIPER AND WASHER (W/ WIPER RELAY)
[COMB. SW]
WIPER RELAY
WASHER
OFF
INT
MIST
LO
HIGH
8 L–W
16 W–B
6 W–G
14 LG–R
13 L–O
7 L–B
4 L–Y
18 L
W 1
WASHER
MOTOR
M
1
L–W
11
I23
L–W
W–G
LG–R
L–B
15
12
16
14
L–B
W–L
L–O
L–Y
3
1
2
6
5
+1
+1S
+2
B
+S
SWITCHING
CONNECTOR
W 4
WIPER MOTOR
4
W–B
E 4
IF
EA
EB


L
L–W
W–G
LG–R
L–B
10
3
4
1
7
+1
C1
+2S
W
B
W 5
WIPER CONTROL
RELAY
E
CO
PA1
PA2
PA3
M/F
M/B
14
13
12
5
6
8
9
W–B
G–R
R–B
R
Y–G
R–L
R–Y
6
3C
18
3C
11
1C
1
1M
1
IO3
2
IO3
3
IO3
6
IO3
7
IO3
8
IO3
1
2
3
4
5
6
NO. 1
NO. 2
NO. 3
M
W 3
WIPER ANGLE CONTROL MOTOR
IG

WIPER AND WASHER

SYSTEM OUTLINE

1. LOW SPEED OPERATION

WHEN THE WIPER SW IS TURNED TO **LO** POSITION, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 3** OF THE WIPER MOTOR → **TERMINAL 4** → **GROUND**, CAUSING THE WIPER MOTOR TO OPERATE AT LOW SPEED. INPUT OF A SIGNAL TO **TERMINAL 10** OF THE WIPER CONTROL RELAY FROM **TERMINAL 1** OF THE WIPER MOTOR AT THIS TIME CAUSES THE WIPER CONTROL RELAY TO OPERATE AS EXPLAINED FOR **INT** POSITION OPERATION.

2. HIGH SPEED OPERATION

WHEN THE WIPER SW IS TURNED TO **HI** POSITION, A SIGNAL IS INPUT TO **TERMINAL 4** OF THE WIPER CONTROL RELAY FROM **TERMINAL 6** OF THE WIPER AND WASHER SW. THE WIPER CONTROL RELAY SENDS CURRENT FROM THE **WIPER** FUSE TO **TERMINAL 7** OF THE WIPER CONTROL RELAY → **TERMINAL 8** → **TERMINAL 5** OF WIPER ANGLE CONTROL MOTOR → **TERMINAL 6** → **TERMINAL 9** OF WIPER CONTROL RELAY → **TERMINAL 14** → **GROUND**, CAUSING THE WIPER ANGLE CONTROL MOTOR TO ROTATE UNTIL THE NO. 2 SW INSIDE THE WIPER ANGLE CONTROL MOTOR IS ON AND THE NO. 3 SW IS OFF. SIMULTANEOUSLY, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 13** → **TERMINAL 2** OF WIPER MOTOR → **TERMINAL 4** → **GROUND**, CAUSING THE WIPER MOTOR TO OPERATE AT HIGH SPEED.

3. INT POSITION

WHEN THE WIPER SW IS TURNED TO **INT** POSITION, CURRENT FLOWS FROM **TERMINAL 14** OF THE WIPER AND WASHER SW TO **TERMINAL 3** OF THE WIPER CONTROL RELAY. THE WIPER CONTROL RELAY DOSE NOT OPERATE WHEN NO. 1 SW INSIDE THE WIPER ANGLE CONTROL MOTOR IS ON. AT OTHER TIMES, WHEN NO. 3 SW INSIDE THE WIPER ANGLE CONTROL MOTOR IS ON, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 7** OF WIPER CONTROL RELAY → **TERMINAL 8** → **TERMINAL 5** OF WIPER ANGLE CONTROL MOTOR → **TERMINAL 6** → **TERMINAL 9** OF WIPER CONTROL RELAY → **TERMINAL 14** → **GROUND,** CAUSING THE WIPER ANGLE CONTROL MOTOR TO ROTATE UNTIL NO. 1 SW INSIDE THE WIPER ANGLE CONTROL MOTOR IS TURNED ON.

WHEN NO. 3 SW INSIDE WIPER ANGLE CONTROL MOTOR IS OFF, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 7** OF THE WIPER CONTROL RELAY → **TERMINAL 9** → **TERMINAL 6** OF WIPER ANGLE CONTROL MOTOR → **TERMINAL 5** → **TERMINAL 8** OF WIPER CONTROL RELAY → **TERMINAL 14** → **GROUND,** ROTATING THE WIPER ANGLE CONTROL MOTOR UNTIL NO. 1 SW INSIDE THE WIPER ANGLE CONTROL MOTOR IS TURNED ON. SIMULTANEOUSLY, CURRENT FROM THE **WIPER** FUSE FLOWS TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 16** → **GROUND,** ACTIVATING THE INTERMITTENT CIRCUIT OF THE WIPER RELAY. THIS CAUSES CURRENT TO FLOW FROM THE **WIPER** FUSE TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 3** OF WIPER MOTOR → **TERMINAL 4** → **GROUND,** ACTIVATING THE WIPER MOTOR. THE INTERMITTENT OPERATION IS CONTROLLED BY THE CHARGED/DISCHARGED STATE OF THE CONDENSER INSIDE THE WIPER RELAY.

BY ADJUSTING THE “INT TIME” CONTROL VOLUME SW, THE CONDENSER RECHARGE INTERVAL IS ADJUSTED, THEREBY CHARGING THE INTERMITTENT INTERVAL.

4. MIST POSITION

WHEN THE WIPER SW IS TURNED TO **MIST** POSITION, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 16** → **GROUND,** ACTIVATING THE MIST CIRCUIT OF THE WIPER RELAY. ACCORDINGLY, WHEN THE WIPER SW IS AT **OFF** OR **INT** POSITION ONLY, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 3** OF WIPER MOTOR → **TERMINAL 4** → **GROUND,** ACTIVATING THE WIPER MOTOR. AT THIS TIME, INPUT OF A SIGNAL TO **TERMINAL 10** OF THE WIPER CONTROL RELAY FROM **TERMINAL 1** OF THE WIPER MOTOR CAUSES THE WIPER CONTROL RELAY TO OPERATE AS DESCRIBED FOR **INT** POSITION OPERATION.

5. OFF POSITION

WHEN THE WIPER SW IS TURNED TO **OFF** POSITION FROM ANOTHER POSITION AND A SIGNAL IS OUTPUT FROM THE WIPER AND WASHER SW, AND A WIPER MOTOR STOP SIGNAL IS INPUT TO **TERMINAL 10** OF THE WIPER CONTROL RELAY FROM **TERMINAL 1** OF THE WIPER MOTOR THE WIPER CONTROL RELAY THEN SENDS CURRENT FROM THE **WIPER** FUSE TO **TERMINAL 7** OF THE WIPER CONTROL RELAY → **TERMINAL 9** → **TERMINAL 6** OF WIPER ANGLE CONTROL MOTOR → **TERMINAL 5** → **TERMINAL 8** OF WIPER CONTROL RELAY → **TERMINAL 14** → **GROUND,** CAUSING THE WIPER ANGLE CONTROL MOTOR TO ROTATE UNTIL THE NO. 2 SW AND NO. 3 SW INSIDE THE WIPER ANGLE CONTROL MOTOR BOTH TURN ON.

WHEN THE SWITCHING CONNECTOR ON THE WIPER MOTOR IS TURNED OFF, THE OPERATION EXPLAINED ABOVE IS CANCELLED.

SYSTEM OUTLINE

6. WASHER LINKED OPERATION

WHEN THE WASHER SW IS TURNED ON, CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 2** OF THE WASHER MOTOR → **TERMINAL 1** → **TERMINAL 8** OF WIPER AND WASHER SW → **TERMINAL 16** → **GROUND,** CAUSING THE WASHER TO OPERATE AND THE WINDSHIELD WASHER TO SPRAY.

THIS CURRENT FLOW ALSO ACTIVATES THE WASHER LINKED CIRCUIT OF THE WIPER RELAY, SO CURRENT FLOWS FROM THE **WIPER** FUSE TO **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 3** OF WIPER MOTOR → **TERMINAL 4** → **GROUND,** ACTIVATING THE WIPER MOTOR. AT THIS TIME, INPUT OF A SIGNAL TO **TERMINAL 10** OF THE WIPER CONTROL RELAY FROM **TERMINAL 1** OF THE WIPER MOTOR CAUSES THE WIPER CONTROL RELAY TO OPERATE AS DESCRIBED FOR **INT** POSITION OPERATION.

DUE TO THE OPERATION OF THE CONDENSER INSIDE THE WIPER RELAY, THE WIPER MOTOR DOES NOT IMMEDIATELY STOP WHEN THE WASHER SW IS TURNED OFF.

SERVICE HINTS

C11 WIPER AND WASHER SW (W/ WIPER RELAY)

16–GROUND : ALWAYS CONTINUITY
18–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
7–GROUND : APPROX. **12** VOLTS WITH WIPER AND WASHER SW AT **LOW** OR **MIST** POSITION
APPROX. **12** VOLTS **2** TO **11** SECONDS INTERMITTENTLY WITH WIPER SW AT **INT** POSITION
4–GROUND : APPROX. **12** VOLTS WITH IGNITION SW ON UNLESS WIPER MOTOR AT **STOP** POSITION
13–GROUND : APPROX. **12** VOLTS WITH WIPER AND WASHER SW AT **HIGH** POSITION

W 3 WIPER MOTOR

5–6 : CLOSED UNLESS WIPER MOTOR AT **STOP** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C11	30	**W 3**	29	**W 5**	31
W 1	29	**W 4**	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		
3C	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IO1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IO3		

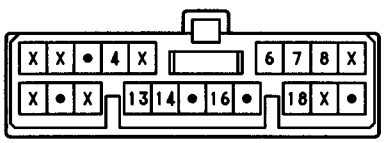
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH

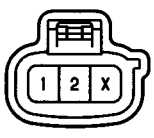
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 4	34	ENGINE ROOM MAIN WIRE	**I 23**	38	COWL WIRE
E 20			**I 36**		
I 21	38	COWL WIRE			

C11 BLACK



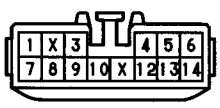
W 1 BLACK



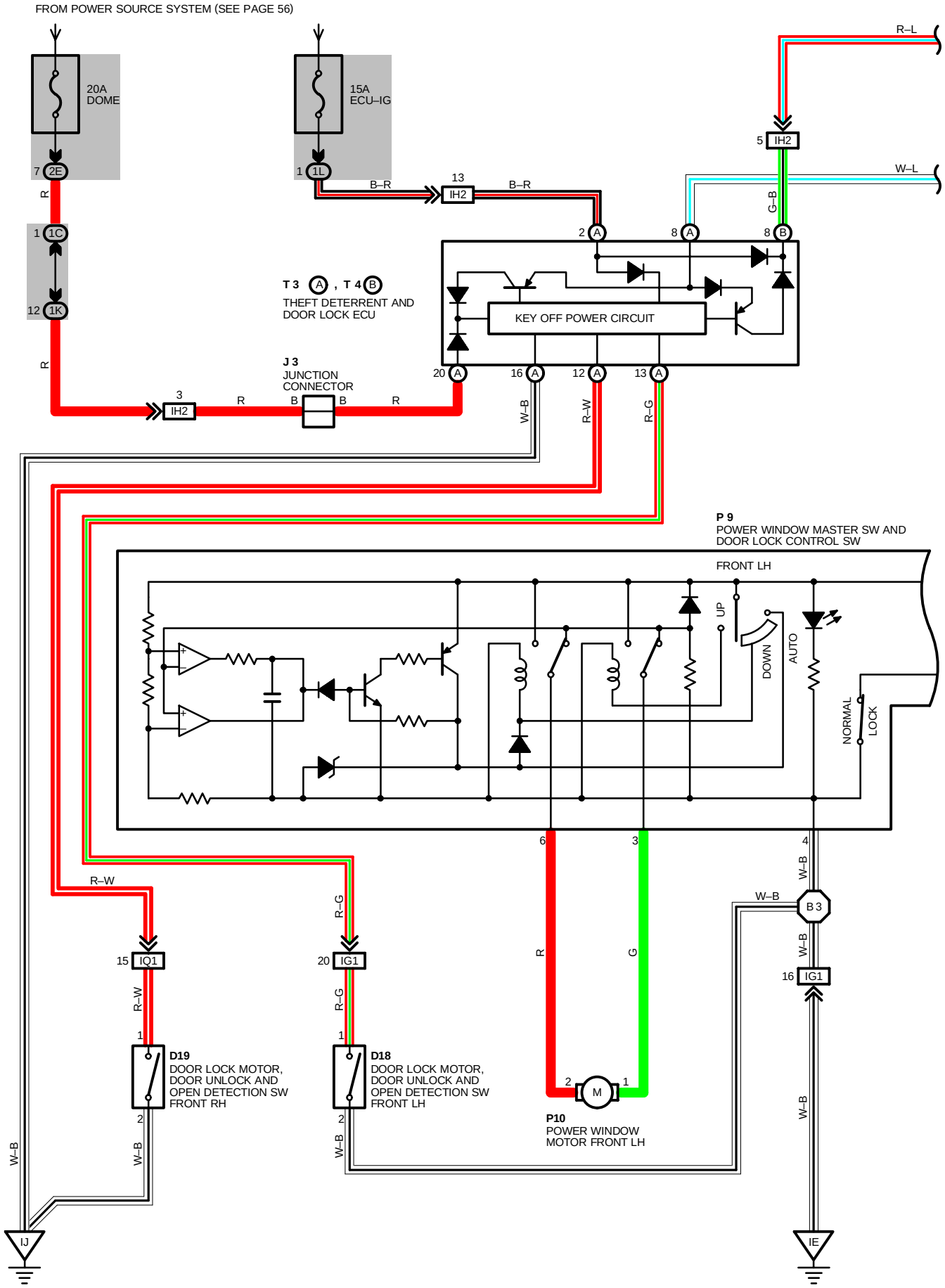
W 3 GRAY

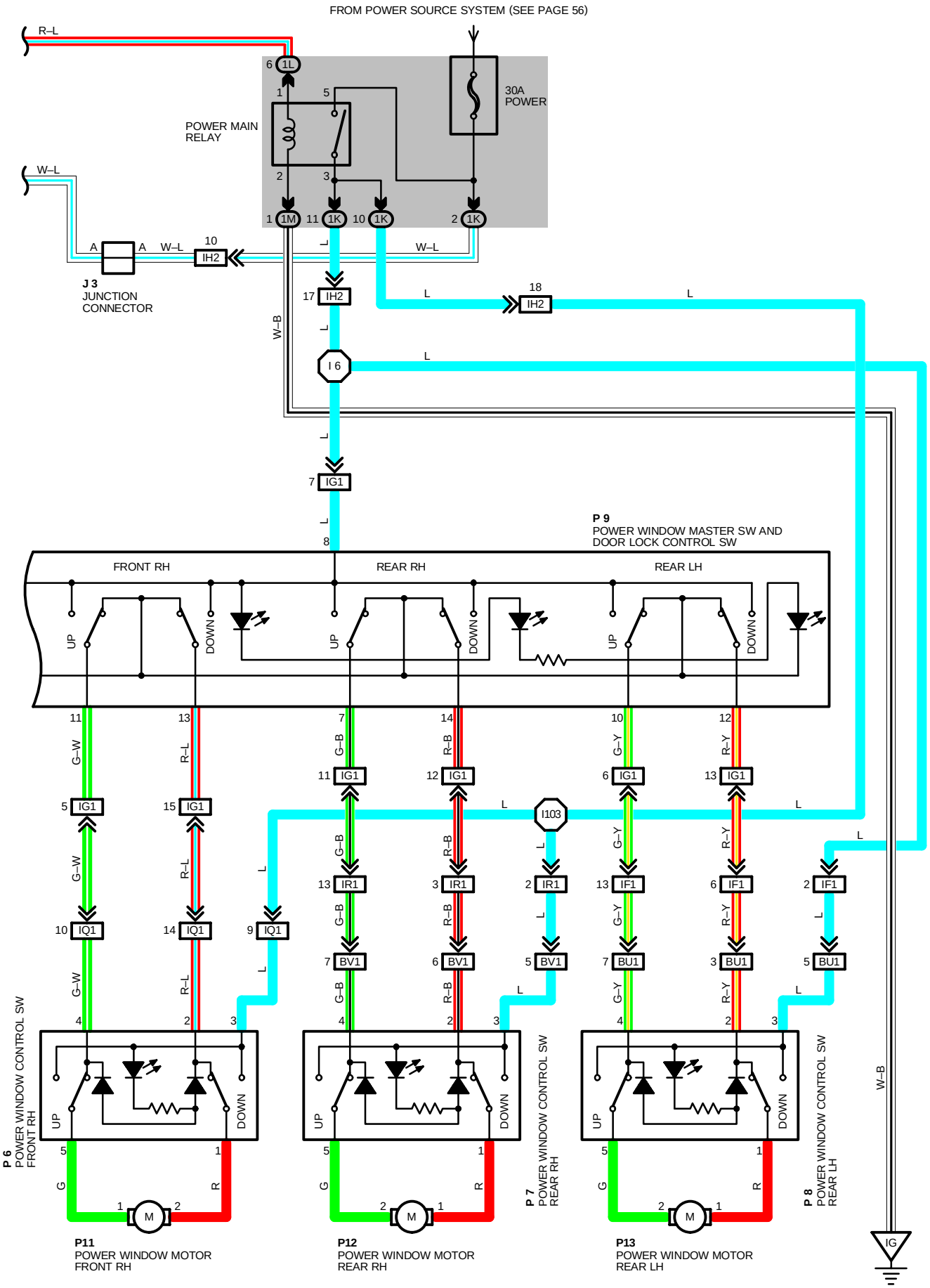
W 4

W 5



POWER WINDOW




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
R–L
6 1L
1
5
POWER MAIN RELAY
30A POWER
W–L
2
3
1 1M 11 1K 10 1K 2 1K
A A W–L 10 IH2
J 3 JUNCTION CONNECTOR
L
W–L
17 IH2
18 IH2
W–B
I 6
7 IG1
8
P 9 POWER WINDOW MASTER SW AND DOOR LOCK CONTROL SW
FRONT RH
REAR RH
REAR LH
UP
DOWN
11 G–W 13 R–L 7 G–B 14 R–B 10 G–Y 12 R–Y
5 IG1 15 IG1 11 IG1 12 IG1 6 IG1 13 IG1
I103
10 IQ1 14 IQ1 9 IQ1
13 IR1 3 IR1 2 IR1 13 IF1 6 IF1 2 IF1
7 BV1 6 BV1 5 BV1 7 BU1 3 BU1 5 BU1
P 6 POWER WINDOW CONTROL SW FRONT RH
P 7 POWER WINDOW CONTROL SW REAR RH
P 8 POWER WINDOW CONTROL SW REAR LH
G
R
M
P11 POWER WINDOW MOTOR FRONT RH
P12 POWER WINDOW MOTOR REAR RH
P13 POWER WINDOW MOTOR REAR LH
IG

POWER WINDOW

SYSTEM OUTLINE

WHEN THE IGNITION SW TURNED ON, CURRENT FLOWS THROUGH THE **ECU–IG** FUSE → **TERMINAL (A)2** OF THEFT DETERRENT AND DOOR LOCK ECU → **TERMINAL (B)8** → **TERMINAL 1** OF THE POWER MAIN RELAY → **TERMINAL 2** → **TO GROUND.** THIS ACTIVATES THE RELAY AND THE CURRENT FLOWING TO **TERMINAL 5** OF THE RELAY FROM **POWER** FUSE FLOWS TO **TERMINAL 3** OF THE RELAY → **TERMINAL 8** OF THE POWER WINDOW MASTER SW, **TERMINAL 3** (FRONT RH) AND **TERMINAL 3** (REAR LH, RH) OF THE POWER WINDOW SW.

1. MANUAL OPERATION (DRIVER'S WINDOW)

WITH THE IGNITION SW TURNED ON AND WITH THE POWER WINDOW MASTER SW (DRIVER'S) IN **UP** POSITION, THE CURRENT FLOWING TO **TERMINAL 8** OF THE POWER WINDOW MASTER SW FLOWS TO **TERMINAL 3** OF THE MASTER SW → **TERMINAL 1** OF THE POWER WINDOW MOTOR → **TERMINAL 2** → **TERMINAL 6** OF THE MASTER SW → **TERMINAL 4** → TO **GROUND** AND CAUSES THE POWER WINDOW MOTOR TO ROTATE IN THE UP DIRECTION. THE WINDOW ASCENDS ONLY WHILE THE SW IS BEING PUSHED. IN DOWN OPERATION, THE FLOW OF CURRENT FROM → **TERMINAL 8** OF THE POWER WINDOW MASTER SW TO **TERMINAL 6** OF THE MASTER SW CAUSES THE FLOW OF CURRENT FROM **TERMINAL 2** OF THE MOTOR → **TERMINAL 1** → **TERMINAL 3** OF THE MASTER SW → **TERMINAL 4** → TO **GROUND,** FLOWING IN THE OPPOSITE DIRECTION TO MANUAL UP OPERATION AND CAUSING THE MOTOR TO ROTATE IN REVERSE, LOWERING THE WINDOW.

2. AUTO DOWN OPERATION

WHEN THE DRIVER'S WINDOW SW IN THE POWER WINDOW MASTER SW IS PUSHED STRONGLY ON THE DOWN SIDE, CURRENT FLOWS FROM **TERMINAL 8** OF THE MASTER SW → **TERMINAL 6** → **TERMINAL 2** OF THE POWER WINDOW MOTOR → **TERMINAL 1** → **TERMINAL 3** OF THE MASTER SW → **TERMINAL 4** → **GROUND.** BECAUSE THE HOLD CIRCUIT INSIDE THE MASTER SW KEEPS THE RELAY ON THE DOWN SIDE ACTIVATED, THE POWER WINDOW MOTOR CONTINUES OPERATING EVEN IF THE POWER WINDOW MASTER SW IS RELEASED. WHEN THE DRIVER'S WINDOW IS FULLY LOWERED, THE HOLD CIRCUIT TURNS OFF AND THE RELAY ON THE DOWN SIDE TURNS OFF, SO AUTO DOWN OPERATION STOPS.

3. STOPPING OF AUTO DOWN AT DRIVER'S WINDOW

WHEN THE MANUAL SW (DRIVER'S) IS PULLED TO THE UP SIDE DURING AUTO DOWN OPERATION, A GROUND CIRCUIT OPENS IN THE MASTER SW AND CURRENT DOES NOT FLOW FROM **TERMINAL 3** OF THE MASTER SW → TO **TERMINAL 4**, SO THE MOTOR STOPS, CAUSING AUTO DOWN OPERATION TO STOP. IF THE MASTER SW IS PULLED CONTINUOUS, THE MOTOR ROTATES IN THE UP DIRECTION IN MANUAL UP OPERATION.

4. MANUAL OPERATION BY POWER WINDOW SW (PASSENGER'S WINDOW)

WITH POWER WINDOW SW (PASSENGER'S) PULLED TO THE UP SIDE, CURRENT FLOWING FROM **TERMINAL 3** OF THE POWER WINDOW SW FLOWS TO **TERMINAL 5** OF THE POWER WINDOW SW → **TERMINAL 1** OF THE POWER WINDOW MOTOR → **TERMINAL 2** → **TERMINAL 1** OF THE POWER WINDOW SW → **TERMINAL 2** → **TERMINAL 13** OF THE MASTER SW → **TERMINAL 4** → TO **GROUND** AND CAUSES THE POWER WINDOW MOTOR (PASSENGER'S) TO ROTATE IN THE UP DIRECTION. UP OPERATION CONTINUES ONLY WHILE THE POWER WINDOW SW IS PULLED TO THE UP SIDE. WHEN THE WINDOW DESCENDS, THE CURRENT FLOWING TO THE MOTOR FLOWS IN THE OPPOSITE DIRECTION, FROM **TERMINAL 1** TO **TERMINAL 2,** AND THE MOTOR ROTATES IN REVERSE. WHEN THE WINDOW LOCK SW IS PUSHED TO THE LOCK SIDE, THE GROUND CIRCUIT TO THE PASSENGER'S WINDOW BECOMES OPEN. AS A RESULT, EVEN IF OPEN/CLOSE OPERATION OF THE PASSENGER'S WINDOW IS TRIED, THE CURRENT FROM **TERMINAL 4** OF THE POWER WINDOW MASTER SW IS NOT GROUNDED AND THE MOTOR DOES NOT ROTATE, SO THE PASSENGER'S WINDOW CAN NOT BE OPERATED AND WINDOW LOCK OCCURS. FURTHERMORE REAR LH, RH WINDOW OPERATE THE SAME AS THE ABOVE CIRCUIT.

5. KEY OFF POWER WINDOW OPERATION

WITH IGNITION SW TURNED FROM ON TO OFF, THE THEFT DETERRENT AND DOOR LOCK ECU OPERATES AND CURRENT FLOWS FROM **POWER** FUSE TO **TERMINAL (A)8** OF THE ECU OR **DOME** FUSE TO **TERMINAL (A)20** OF THE ECU → **TERMINAL (B)8** → **TERMINAL 1** OF POWER MAIN RELAY → **TERMINAL 2** → TO **GROUND** FOR ABOUT **60** SECONDS. THE SAME AS NORMAL OPERATION, THE CURRENT FLOWS FROM POWER FUSE → **TERMINAL 5** OF THE POWER MAIN RELAY → **TERMINAL 3** → **TERMINAL 8** OF THE POWER WINDOW MASTER SW AND **TERMINAL 3** OF THE POWER MAIN RELAY → TO **TERMINAL 3** OF THE POWER WINDOW SW. AS A RESULT, FOR ABOUT **60** SECONDS AFTER THE IGNITION SW IS TURNED OFF, THE FUNCTIONING OF THIS RELAY MAKES IT POSSIBLE TO RAISE AND LOWER THE POWER WINDOW. ALSO, BY OPENING THE FRONT DOOR (DOOR OPEN DETECTION SW ON) WITHIN ABOUT **60** SECONDS AFTER TURNING THE IGNITION SW TO OFF, A SIGNAL IS INPUT TO **TERMINALS (A)12** OR **(A)13** OF THEFT DETERRENT AND DOOR LOOK ECU. AS A RESULT, THE ECU TURNS OFF AND UP AND DOWN MOVEMENT OF THE POWER WINDOW STOPS.

SERVICE HINTS

P 9 POWER WINDOW MASTER SW AND DOOR LOCK CONTROL SW

8–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
4–GROUND: ALWAYS CONTINUITY
3–GROUND: APPROX. **12** VOLTS WITH IGNITION SW ON AND MASTER SW (DRIVER'S WINDOW) UP
6–GROUND: APPROX. **12** VOLTS WITH IGNITION SW ON AND MASTER SW (DRIVER'S WINDOW) AT **DOWN** OR **AUTO DOWN** POSITION

WINDOW LOCK SW

OPEN WITH WINDOW LOCK SW AT **LOCK** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
D18	32	**P 8**	32	**P13**		32
D19	32	**P 9**	32	**T 3**	A	31
J 3	31	**P10**	32	**T 4**	B	31
P 6	32	**P11**	32			
P 7	32	**P12**	32			

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1K		
1L		
1M		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF1	34	FLOOR NO. 1 WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BW1	40	FUEL GAUGE WIRE AND FLOOR NO. 1 WIRE (UNDER THE REAR SEAT CUSHION)
BX1	40	FLOOR NO. 1 WIRE AND FLOOR NO. 2 WIRE (BEHIND PACKAGE TRAY TRIM)

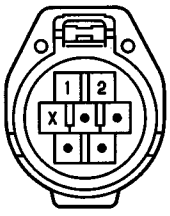
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL

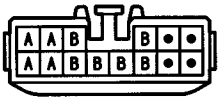
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 6	38	INSTRUMENT PANEL WIRE	**B 3**	40	FRONT DOOR LH WIRE
I103					

D18, D19 GRAY

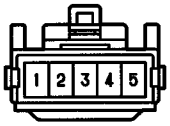


J 3 DARK GRAY

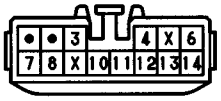


(HINT:SEE PAGE 7)

P 6, P 7, P 8

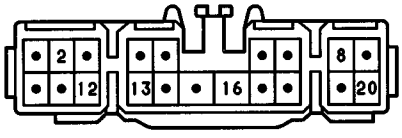


P 9

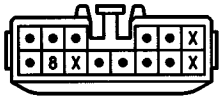


P10, P11, P12, P13

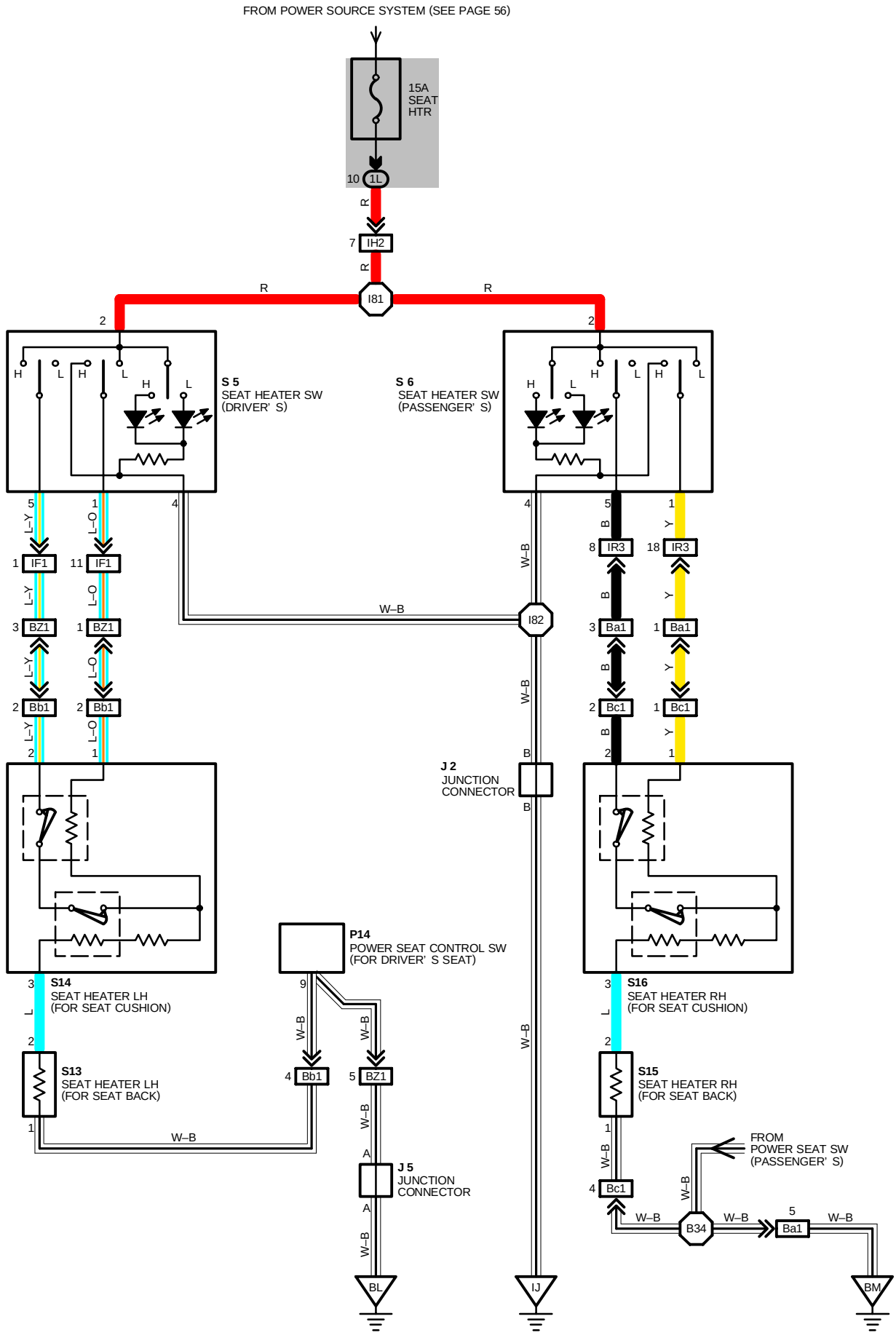
T 3 (A) ORANGE



T 4 (B) ORANGE



SEAT HEATER


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
SEAT
HTR
10
1L
R
7
IH2
R
I81
R
2
2
S 5
SEAT HEATER SW
(DRIVER' S)
S 6
SEAT HEATER SW
(PASSENGER' S)
H
L
5
L–Y
1
L–O
4
W–B
I82
1
IF1
11
IF1
3
BZ1
1
BZ1
2
Bb1
2
Bb1
2
1
J 2
JUNCTION
CONNECTOR
B
B
5
B
1
Y
8
IR3
18
IR3
3
Ba1
1
Ba1
2
Bc1
1
Bc1
2
1
P14
POWER SEAT CONTROL SW
(FOR DRIVER' S SEAT)
9
3
S14
SEAT HEATER LH
(FOR SEAT CUSHION)
L
2
S13
SEAT HEATER LH
(FOR SEAT BACK)
1
W–B
4
Bb1
5
BZ1
A
J 5
JUNCTION
CONNECTOR
A
BL
IJ
3
S16
SEAT HEATER RH
(FOR SEAT CUSHION)
2
S15
SEAT HEATER RH
(FOR SEAT BACK)
1
4
Bc1
FROM
POWER SEAT SW
(PASSENGER' S)
B34
5
Ba1
BM

SERVICE HINTS

S 5, S 6 SEAT HEATER SW

2–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
4–GROUND : ALWAYS CONTINUITY
2–5 : CONTINUITY WITH SEAT HEATER SW AT **HIGH** POSITION
2–1 : CONTINUITY WITH SEAT HEATER SW AT **LOW** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 2	31	**S 5**	31	**S14**	33
J 5	32	**S 6**	31	**S15**	33
P14	33	**S13**	33	**S16**	33

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1L	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF1	34	FLOOR NO.1 WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IR3	38	INSTRUMENT PANEL WIRE AND FLOOR NO. 2 WIRE (UNDER THE PASSENGER'S SEAT)
BZ1	42	FLOOR NO. 1 WIRE AND SEAT LH NO. 1 WIRE (UNDER THE DRIVER'S SEAT)
Ba1	42	FLOOR NO.2 WIRE AND SEAT RH NO.1 WIRE (UNDER THE PASSENGER'S SEAT)
Bb1	42	SEAT LH NO. 2 WIRE AND SEAT LH NO.1 WIRE (UNDER THE DRIVER'S SEAT)
Bc1	42	SEAT RH NO. 2 WIRE AND SEAT RH NO.1 WIRE (UNDER THE PASSENGER'S SEAT)

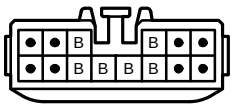
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IJ	36	RIGHT KICK PANEL
BL	40	UNDER THE LEFT QUARTER PILLAR
BM	40	UNDER THE RIGHT QUARTER PILLAR

: SPLICE POINTS

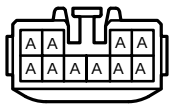
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 81	38	INSTRUMENT PANEL WIRE	**B 34**	42	SEAT LH NO. 1 WIRE
I 82					

J 2



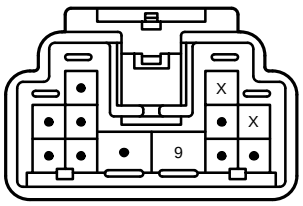
(HINT : SEE PAGE 7)

J 5



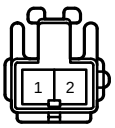
(HINT : SEE PAGE 7)

P14



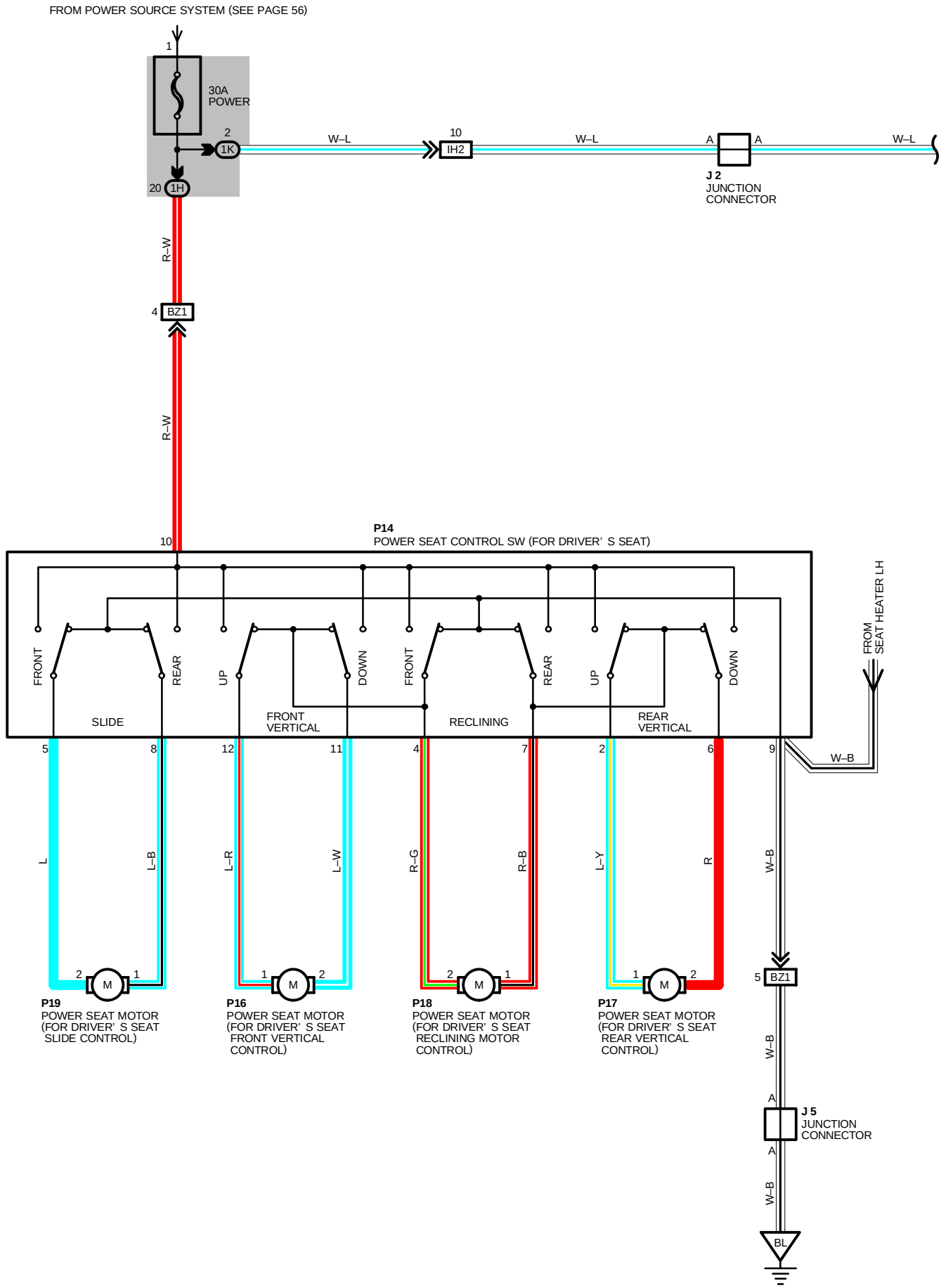
S 5, S 6

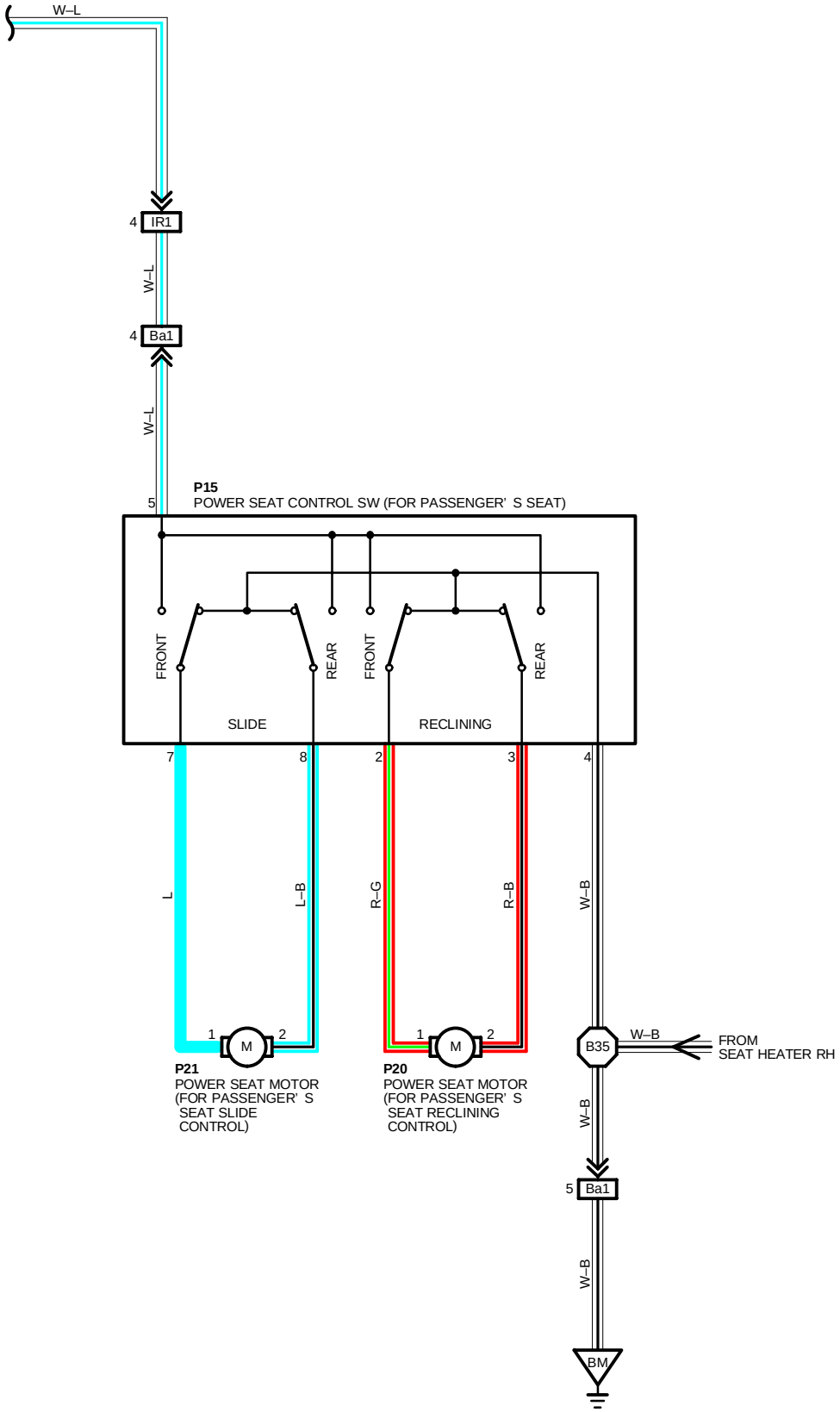
S13, S15



S14, S16

POWER SEAT


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
1
30A
POWER
2
1K
20
1H
W–L
10
IH2
W–L
A
A
W–L
J 2
JUNCTION
CONNECTOR
R–W
4
BZ1
R–W
10
P14
POWER SEAT CONTROL SW (FOR DRIVER' S SEAT)
FRONT
REAR
SLIDE
UP
DOWN
FRONT VERTICAL
FRONT
REAR
RECLINING
UP
DOWN
REAR VERTICAL
FROM
SEAT HEATER LH
W–B
5
8
12
11
4
7
2
6
9
L
L–B
L–R
L–W
R–G
R–B
L–Y
R
W–B
M
M
M
M
5
BZ1
W–B
A
J 5
JUNCTION
CONNECTOR
A
W–B
BL
P19
POWER SEAT MOTOR
(FOR DRIVER' S SEAT
SLIDE CONTROL)
P16
POWER SEAT MOTOR
(FOR DRIVER' S SEAT
FRONT VERTICAL
CONTROL)
P18
POWER SEAT MOTOR
(FOR DRIVER' S SEAT
RECLINING MOTOR
CONTROL)
P17
POWER SEAT MOTOR
(FOR DRIVER' S SEAT
REAR VERTICAL
CONTROL)


W–L
4
IR1
W–L
4
Ba1
W–L
5
P15
POWER SEAT CONTROL SW (FOR PASSENGER' S SEAT)
FRONT
REAR
FRONT
REAR
SLIDE
RECLINING
7
8
2
3
4
L
L–B
R–G
R–B
W–B
1
M
2
1
M
2
P21
POWER SEAT MOTOR
(FOR PASSENGER' S
SEAT SLIDE
CONTROL)
P20
POWER SEAT MOTOR
(FOR PASSENGER' S
SEAT RECLINING
CONTROL)
B35
W–B
FROM
SEAT HEATER RH
W–B
5
Ba1
W–B
BM

POWER SEAT

SERVICE HINTS

P14 POWER SEAT CONTROL SW (FOR DRIVER'S SEAT)
10–GROUND : ALWAYS APPROX. **12** VOLTS
9–GROUND : ALWAYS CONTINUITY

P15 POWER SEAT CONTROL SW (FOR PASSENGER'S SEAT)
5–GROUND : ALWAYS APPROX. **12** VOLTS
4–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 2	31	**P16**	33	**P20**	33
J 5	32	**P17**	33	**P21**	33
P14	33	**P18**	33		
P15	33	**P19**	33		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1K	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BZ1	42	FLOOR NO. 1 WIRE AND SEAT LH NO. 1 WIRE (UNDER THE DRIVER'S SEAT)
Ba1	42	FLOOR NO. 2 WIRE AND SEAT RH NO. 1 WIRE (UNDER THE PASSENGER'S SEAT)

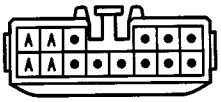
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
BL	40	UNDER THE LEFT QUARTER PILLAR
BM	40	UNDER THE RIGHT QUARTER PILLAR

⬡ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 35	42	SEAT RH NO. 1 WIRE			

J 2

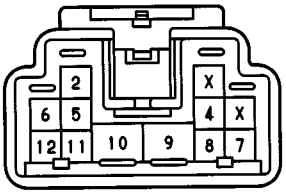


(HINT:SEE PAGE 7)

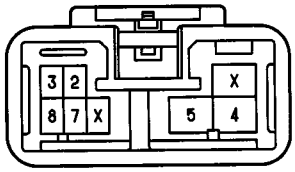
J 5

(HINT:SEE PAGE 7)

P14 WHITE



P15 WHITE

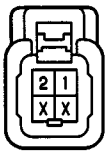


P16, P17 ORANGE

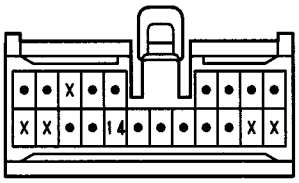
P18, P20 WHITE

P19, P21 GRAY

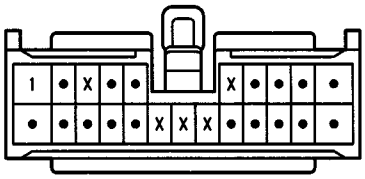
B 5 WHITE



C 7 (B) GRAY

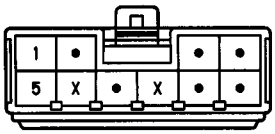


C 8 (A)



D 9

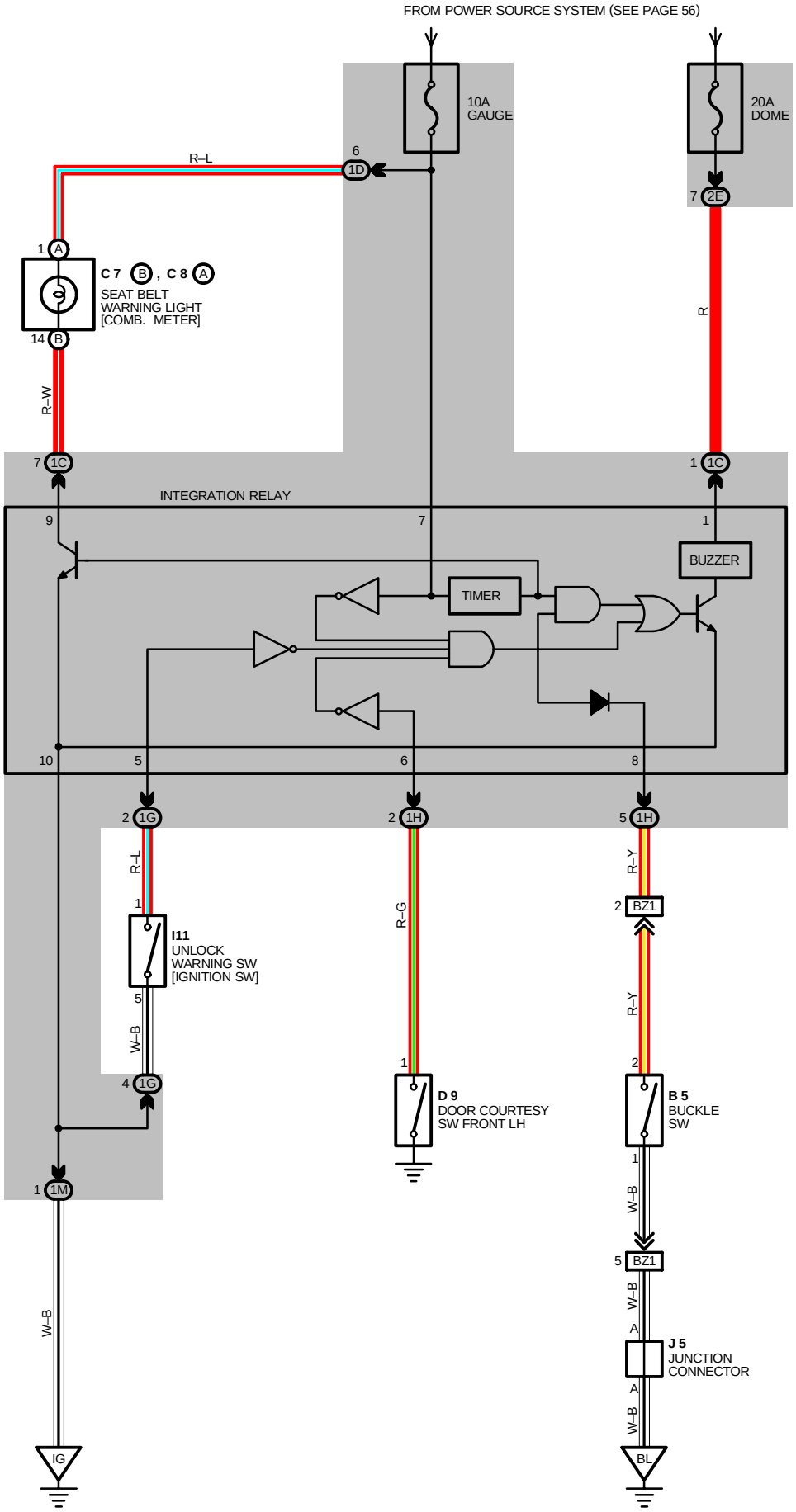
I11



J 5

(HINT:SEE PAGE 7)

UNLOCK AND SEAT BELT WARNING



SYSTEM OUTLINE

CURRENT ALWAYS FLOWS TO **TERMINAL 1** OF THE INTEGRATION RELAY THROUGH THE **DOME** FUSE.

1. SEAT BELT WARNING SYSTEM

WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS FROM THE **GAUGE** FUSE TO THE **TERMINAL 7** OF THE INTEGRATION RELAY AT THE SAME TIME, CURRENT FLOWS TO **TERMINAL 9** OF THE RELAY FROM THE **GAUGE** FUSE THROUGH THE SEAT BELT WARNING LIGHT. THIS CURRENT ACTIVATES THE SEAT BELT WARNING RELAY AND, FOR APPROX. **4–8** SECONDS, CURRENT FLOWING THROUGH THE WARNING LIGHT FLOWS FROM **TERMINAL 9** OF THE RELAY→ **TERMINAL 10** → **GROUND,** CAUSING THE WARNING LIGHT TO LIGHT UP. AT THE SAME AS THE WARNING LIGHT LIGHTS UP, A BUCKLE SW OFF SIGNAL IS INPUT TO **TERMINAL 8** OF THE RELAY, THE CURRENT FLOWING TO **TERMINAL 1** OF THE RELAY FLOWS FROM **TERMINAL 10** → **GROUND** AND THE SEAT BELT WARNING BUZZER SOUNDS FOR APPROX. **4–8** SECONDS. HOWEVER, IF SEAT BELT IS PUT ON DURING THIS PERIOD (WHILE THE BUZZER IS SOUNDING), SIGNAL INPUT TO **TERMINAL 4** OF THE RELAY STOPS AND THE CURRENT FLOW FROM **TERMINAL 1** OF THE RELAY → **TERMINAL 10** → **GROUND** IS CUT, CAUSING THE BUZZER TO STOP.

2. UNLOCK WARNING SYSTEM

WITH THE IGNITION KEY INSERTED IN THE KEY CYLINDER (UNLOCK WARNING SW ON), THE IGNITION SW STILL OFF AND DOOR OPEN (DOOR COURTESY SW ON), WHEN A SIGNAL IS INPUT **TERMINALS 5** AND **6** OF THE RELAY, THE INTEGRATION RELAY OPERATES, CURRENT FLOWS FROM **TERMINAL 1** OF THE RELAY → **TERMINAL 10** → **GROUND** AND THE UNLOCK WARNING BUZZER SOUNDS.

SERVICE HINTS

B 5 BUCKLE SW
1–2 : CLOSED WITH DRIVER'S LAP BELT USE

D 9 DOOR COURTESY SW FRONT LH
1–GROUND : CLOSED WITH FRONT LH DOOR OPEN

INTEGRATION RELAY
10–GROUND : ALWAYS CONTINUITY
6–GROUND : CONTINUITY WITH FRONT LH DOOR OPEN
5–GROUND : CONTINUITY WITH IGNITION KEY IN CYLINDER
8–GROUND : CONTINUITY UNLESS DRIVER'S LAP BELT IN USE
9–GROUND : **0** VOLTS FOR **4–8** SECONDS WITH IGNITION SW ON AND **12** VOLTS **4–8** SECONDS AFTER IGNITION SW ON
1–GROUND : ALWAYS APPROX. **12** VOLTS
7–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION

I11 UNLOCK WARNING SW [IGNITION SW]
1–5 : CLOSED WITH IGNITION KEY CYLINDER

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
B 5	33	**C 8** A	30	**I11**	31
C 7 B	30	**D 9**	32	**J 5**	32

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1D		
1G		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

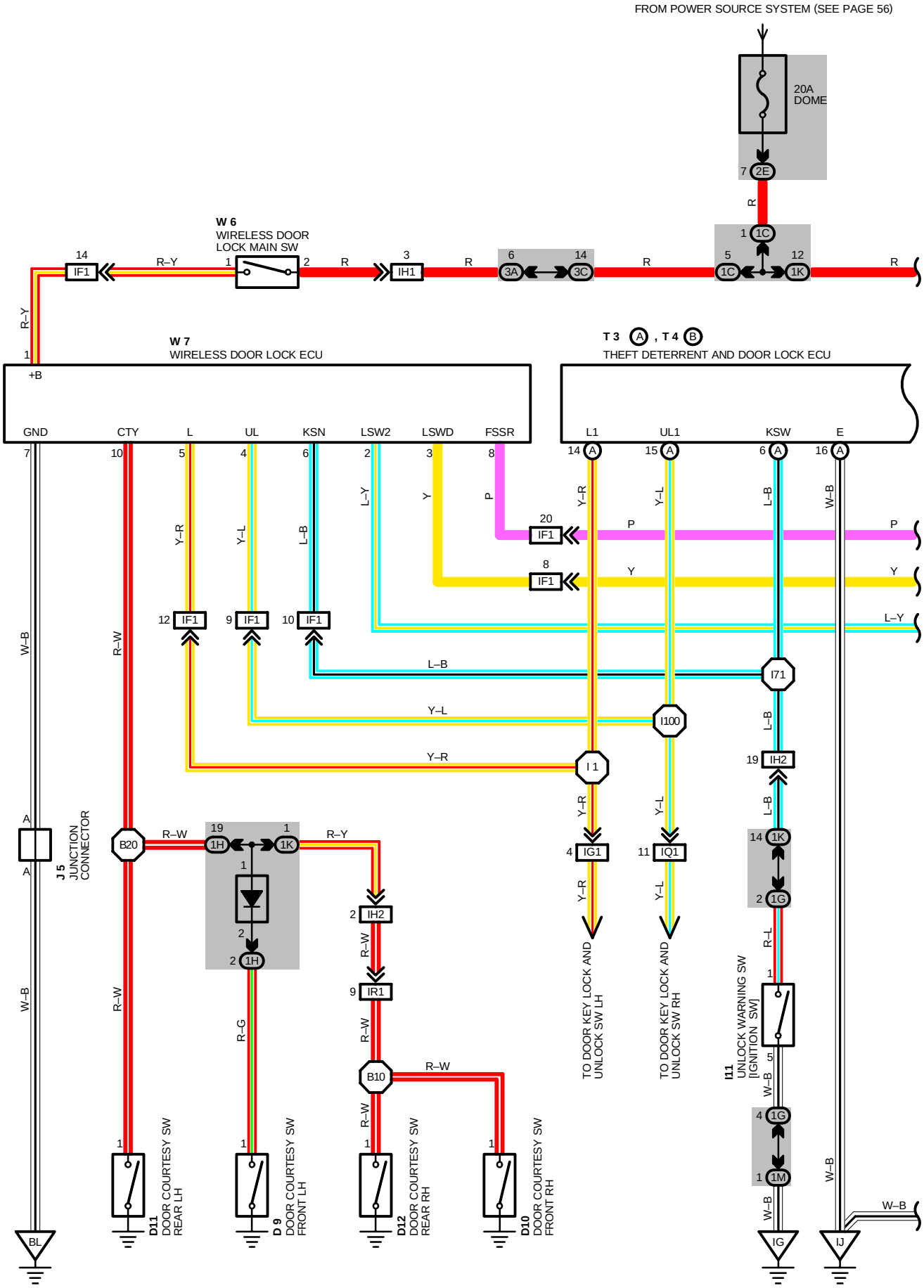
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

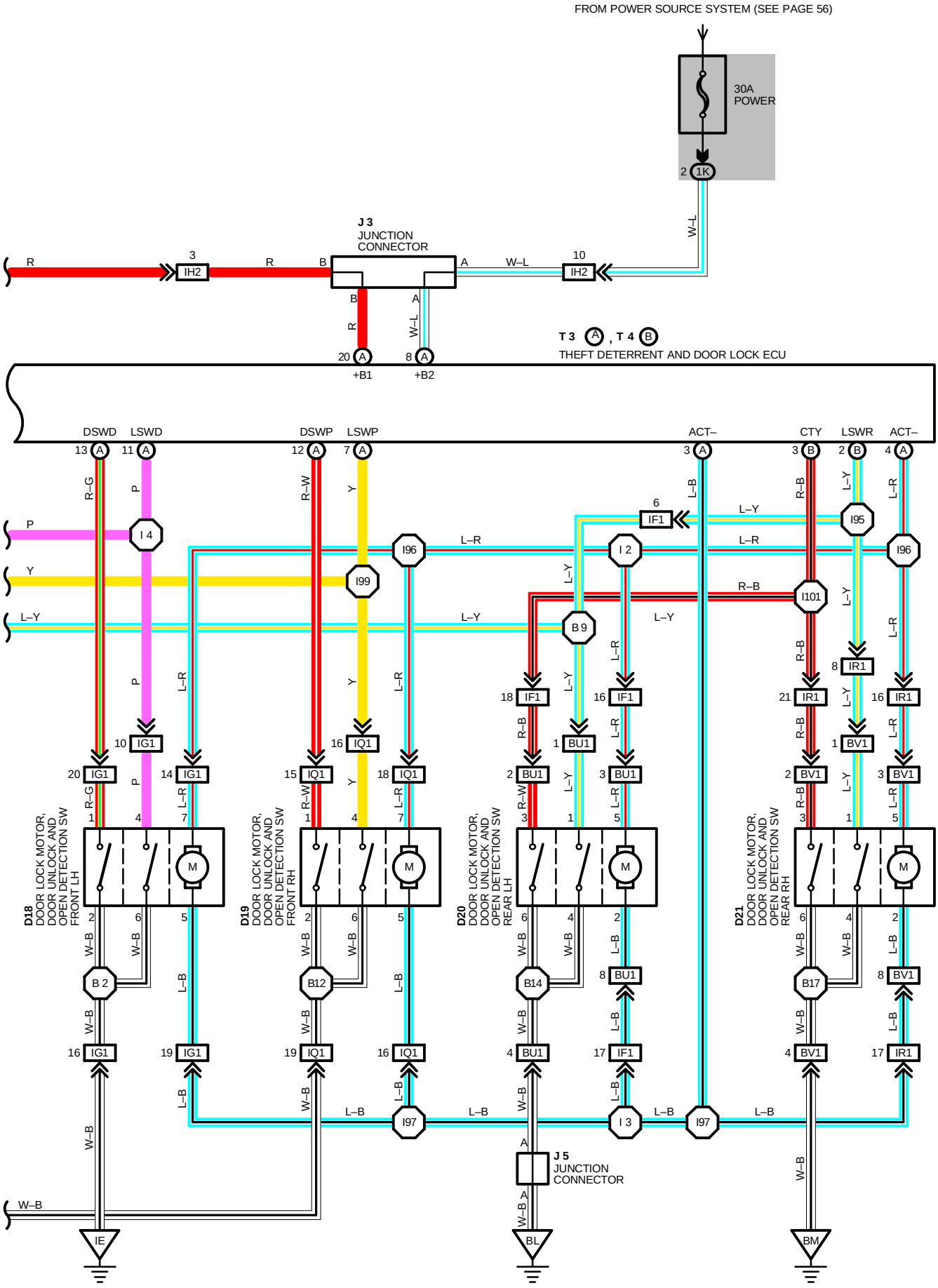
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
BZ1	42	FLOOR NO. 1 WIRE AND SEAT LH NO. 1 WIRE (UNDER THE DRIVER'S SEAT)

: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	INSTRUMENT PANEL BRACE LH
BL	40	UNDER THE LEFT QUARTER PILLAR

WIRELESS DOOR LOCK CONTROL




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
30A POWER
2 1K
W–L
J 3 JUNCTION CONNECTOR
R
3 IH2
R
B
A
W–L
10 IH2
B
R
20 A
+B1
A
W–L
8 A
+B2
T 3 A , T 4 B
THEFT DETERRENT AND DOOR LOCK ECU
DSWD
LSWD
DSWP
LSWP
ACT–
CTY
LSWR
ACT–
13 A
11 A
12 A
7 A
3 A
3 B
2 B
4 A
R–G
P
R–W
Y
L–B
R–B
L–Y
L–R
P
I 4
Y
I99
L–Y
I96
L–R
6 IF1
L–Y
I 2
L–R
I95
I96
R–B
I101
L–Y
B 9
L–Y
8 IR1
10 IG1
16 IQ1
18 IF1
16 IF1
1 BU1
21 IR1
1 BV1
20 IG1
14 IG1
15 IQ1
18 IQ1
2 BU1
3 BU1
2 BV1
3 BV1
D18 DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW FRONT LH
D19 DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW FRONT RH
D20 DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW REAR LH
D21 DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW REAR RH
M
W–B
B 2
B12
B14
B17
8 BU1
8 BV1
16 IG1
19 IG1
19 IQ1
16 IQ1
4 BU1
17 IF1
4 BV1
17 IR1
I97
I 3
I97
J 5 JUNCTION CONNECTOR
A
W–B
A
W–B
IE
BL
BM

WIRELESS DOOR LOCK CONTROL

SYSTEM OUTLINE

DOOR LOCK CONTROL (LOCK AND UNLOCK) IS PERFORMED BY REMOTE CONTROL, WITHOUT THE IGNITION KEY INSERTED IN THE DOOR KEY CYLINDER, USING LOW–POWER RADIO WAVES EMITTED BY A TRANSMITTER BUILT INTO IGNITION KEY.

1. WIRELESS DOOR LOCK OR UNLOCK NORMAL OPERATION

WITH THE WIRELESS DOOR LOCK MAIN SW ON, THE IGNITION KEY NOT INSERTED INTO THE IGNITION KEY CYLINDER (UNLOCK WARNING SW OFF) AND ALL THE DOORS COMPLETELY CLOSED, WHEN THE SW (TRANSMITTER) ON THE IGNITION KEY IS PUSHED, THE WIRELESS DOOR LOCK ECU RECEIVES THE ELECTRICAL WAVES FROM THE IGNITION KEY (TRANSMITTER), CAUSING IT TO OPERATE.

AS A RESULT, THE ECU JUDGES WHETHER THE DOOR IS LOCKED OR UNLOCKED BASED ON THE SIGNAL FROM THE DOOR LOCK MOTOR, AND SENDS A SIGNAL TO THE DOOR LOCK ECU TO SW THE CONDITION FROM LOCK TO UNLOCK OR VICE VERSA, CAUSING THE DOOR LOCK MOTOR TO OPERATE (FOR THE CURRENT FLOW DURING LOCK AND UNLOCK REFER TO THE DOOR LOCK CONTROL SYSTEM.)

2. AUTO LOCK OPERATION

AFTER PUSHING THE IGNITION KEY SW (TRANSMITTER) TO UNLOCK ALL THE DOORS, IF A DOOR IS NOT OPENED WITHIN **30** SECONDS, ALL OF THE DOORS ARE AUTOMATICALLY LOCKED AGAIN.

3. WIRELESS DOOR LOCK STOP FUNCTION

IF A DOOR IS OPEN (DOOR COURTESY SW ON), A SIGNAL IS INPUT FROM THE DOOR COURTESY SW TO THE WIRELESS DOOR LOCK ECU, STOPPING WIRELESS DOOR LOCK OR UNLOCK.

IF THE IGNITION KEY IS IN THE IGNITION KEY CYLINDER (UNLOCK WARNING SW ON), THE UNLOCK WARNING SW INPUT A SIGNAL TO THE WIRELESS DOOR LOCK ECU, STOPPING WIRELESS DOOR LOCK OR UNLOCK.

4. DOOR LOCK MOTOR PROTECTIVE FUNCTION

IF THE DOOR LOCK OR UNLOCK CONDITION DOES NOT CHANGE AFTER WIRELESS DOOR LOCK OR UNLOCK OPERATION, THE DOOR LOCK ECU SENDS CURRENT TEN TIMES TO THE DOOR LOCK MOTOR. IF THE DOOR LOCK CONDITION STILL HAS NOT CHANGED AS A RESULT THE WIRELESS DOOR LOCK ECU STOPS RECEPTION AND STOPS DOOR LOCK AND UNLOCK FUNCTION.

BY MANUALLY OPERATION THE DOOR LOCK OR UNLOCK, THE STOP CONDITION OF THE WIRELESS DOOR LOCK FUNCTION IS RELEASED.

SERVICE HINTS

D 9, D10, D11, D12 DOOR COURTESY SW
1–GROUND : CLOSED WITH DOOR OPENED

I11 UNLOCK WARNING SW [IGNITION SW]
1–5 : CLOSED WITH IGNITION KEY IN CYLINDER

W 7 WIRELESS DOOR LOCK ECU
1–GROUND: APPROX. **12** VOLTS WITH WIRELESS DOOR LOCK MAIN SW ON
7–GROUND: ALWAYS CONTINUITY
10–GROUND: CONTINUITY WITH EACH DOOR OPENED
6–GROUND: CONTINUITY WITH IGNITION KEY IN CYLINDER

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
D 9	32	**D19**	32	**J 5**		32
D10	32	**D20**	32	**T 3**	A	31
D11	32	**D21**	32	**T 4**	B	31
D12	32	**I11**	31	**W 6**		31
D18	32	**J 3**	31	**W 7**		32

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1G		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1K	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3C		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF1	34	FLOOR NO.1 WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BU1	40	REAR DOOR LH WIRE AND FLOOR NO. I WIRE (LEFT CENTER PILLAR)
BV1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)

: GROUND POINTS

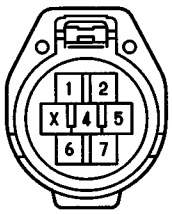
CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL
BL	40	UNDER THE LEFT QUARTER PILLAR
BM	40	UNDER THE RIGHT QUARTER PILLAR

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 1	38	INSTRUMENT PANEL WIRE	**I100**	38	INSTRUMENT PANEL WIRE
I 2			**I101**		
I 3			**B 2**	40	FRONT DOOR LH WIRE
I 4			**B 9**	40	FLOOR NO. 1 WIRE
I 71	38	INSTRUMENT PANEL WIRE	**B 10**	40	FLOOR NO. 2 WIRE
I 95	38	INSTRUMENT PANEL WIRE	**B 12**	40	FRONT DOOR RH WIRE
I 96			**B 14**	40	REAR DOOR LH WIRE
I 97			**B 17**	40	REAR DOOR RH WIRE
I 99			**B 20**	40	FLOOR NO. 1 WIRE

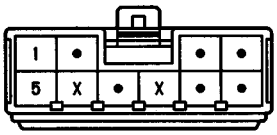
D 9, D10, D11, D12

D18, D19 GRAY

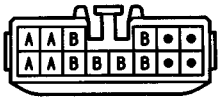


D20, D21

I11



J 3 DARK GRAY

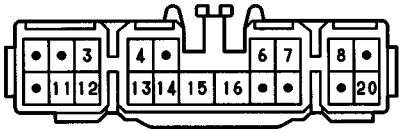


(HINT:SEE PAGE 7)

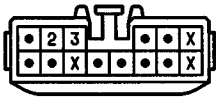
J 5

(HINT:SEE PAGE 7)

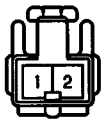
T 3 (A) ORANGE



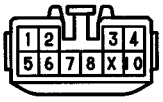
T 4 (B) ORANGE



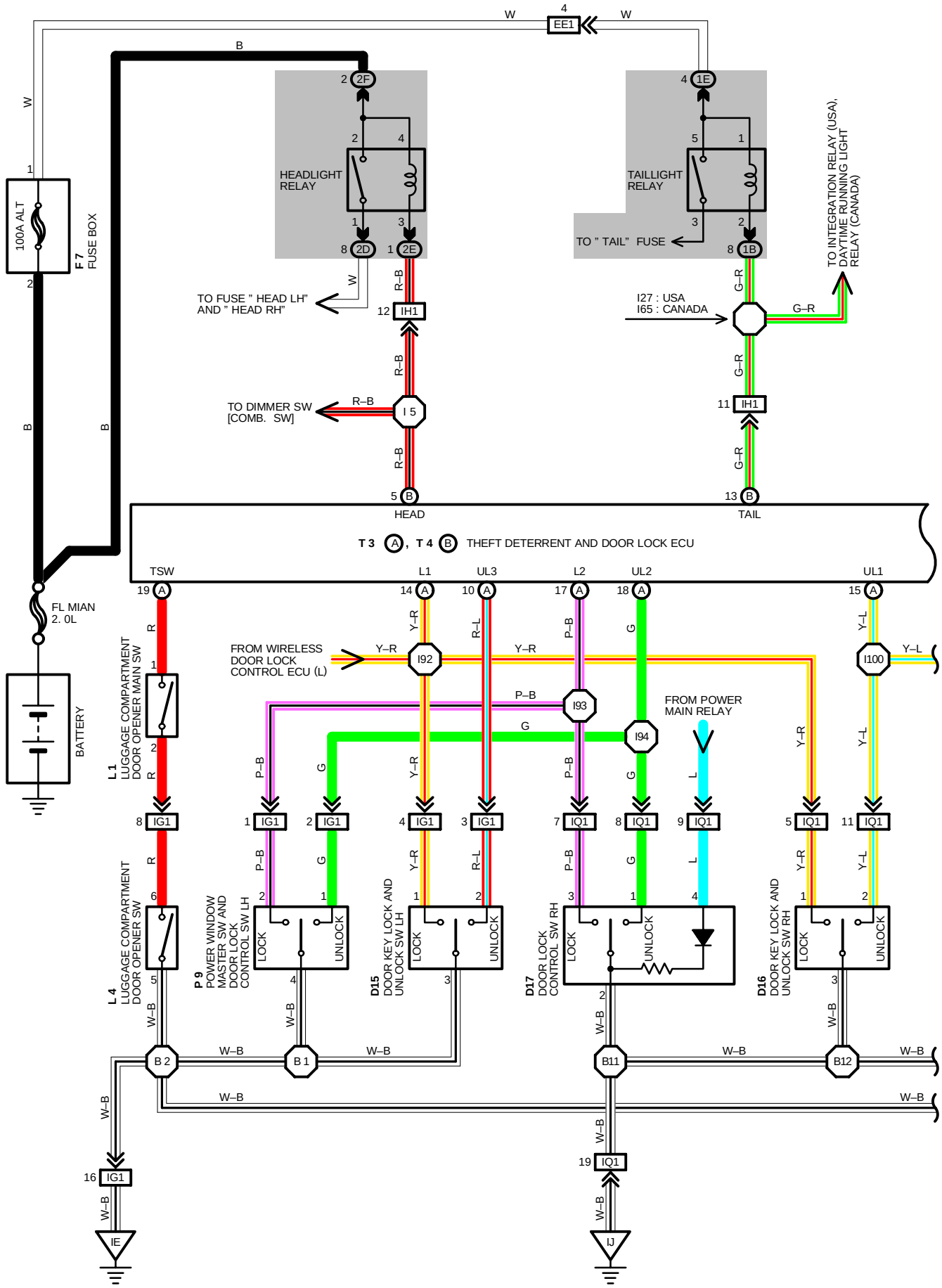
W 6

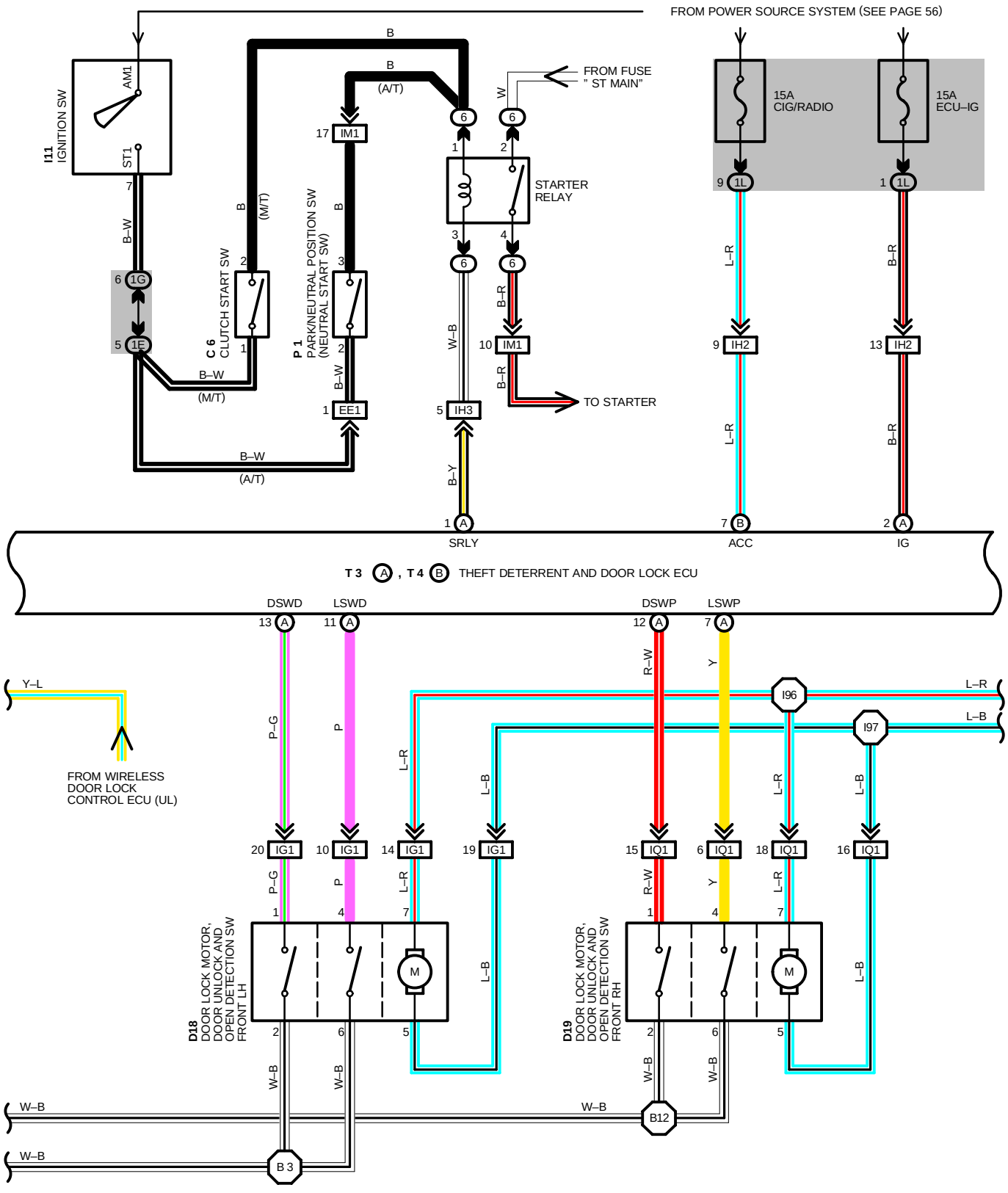


W 7

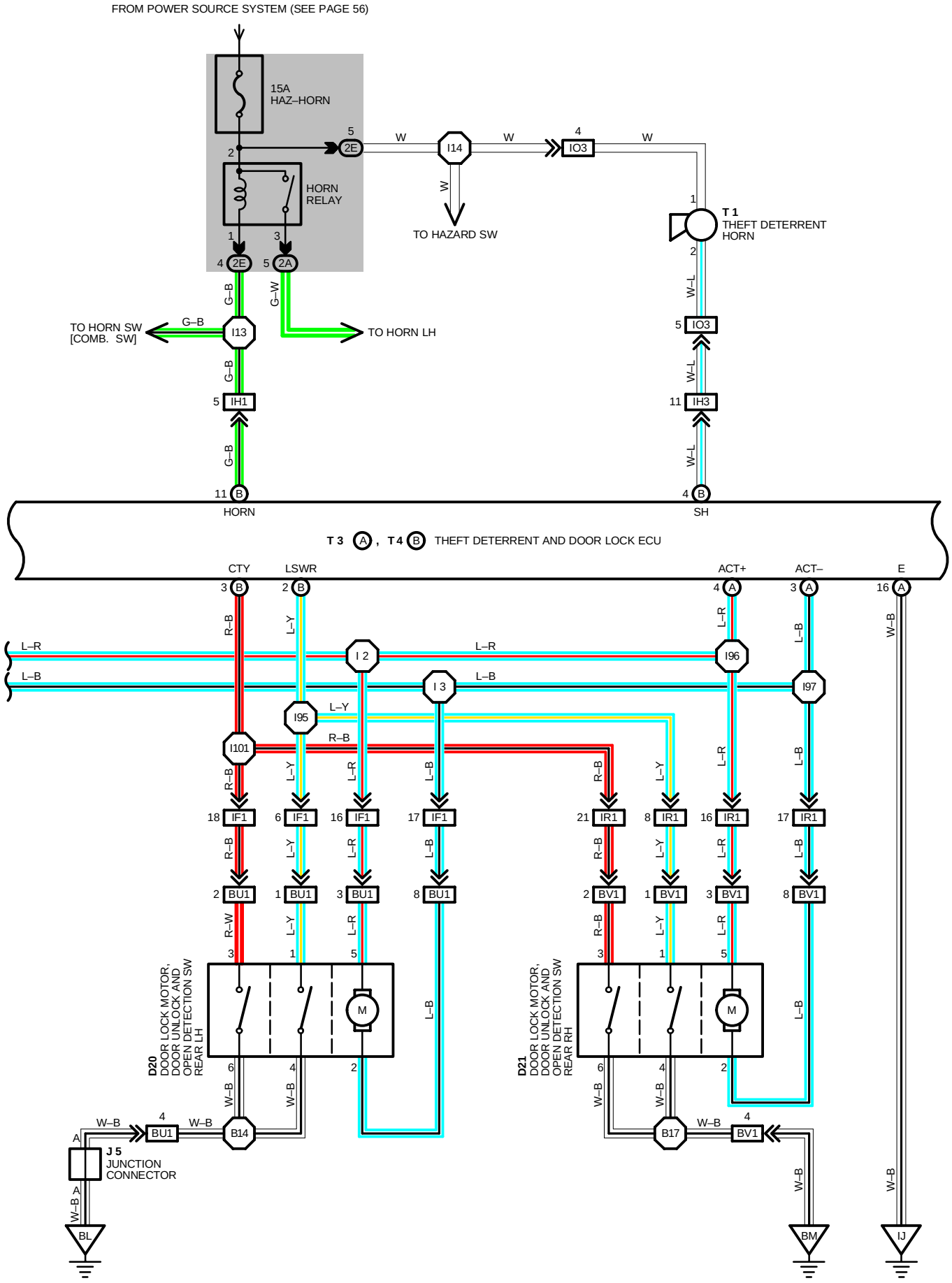


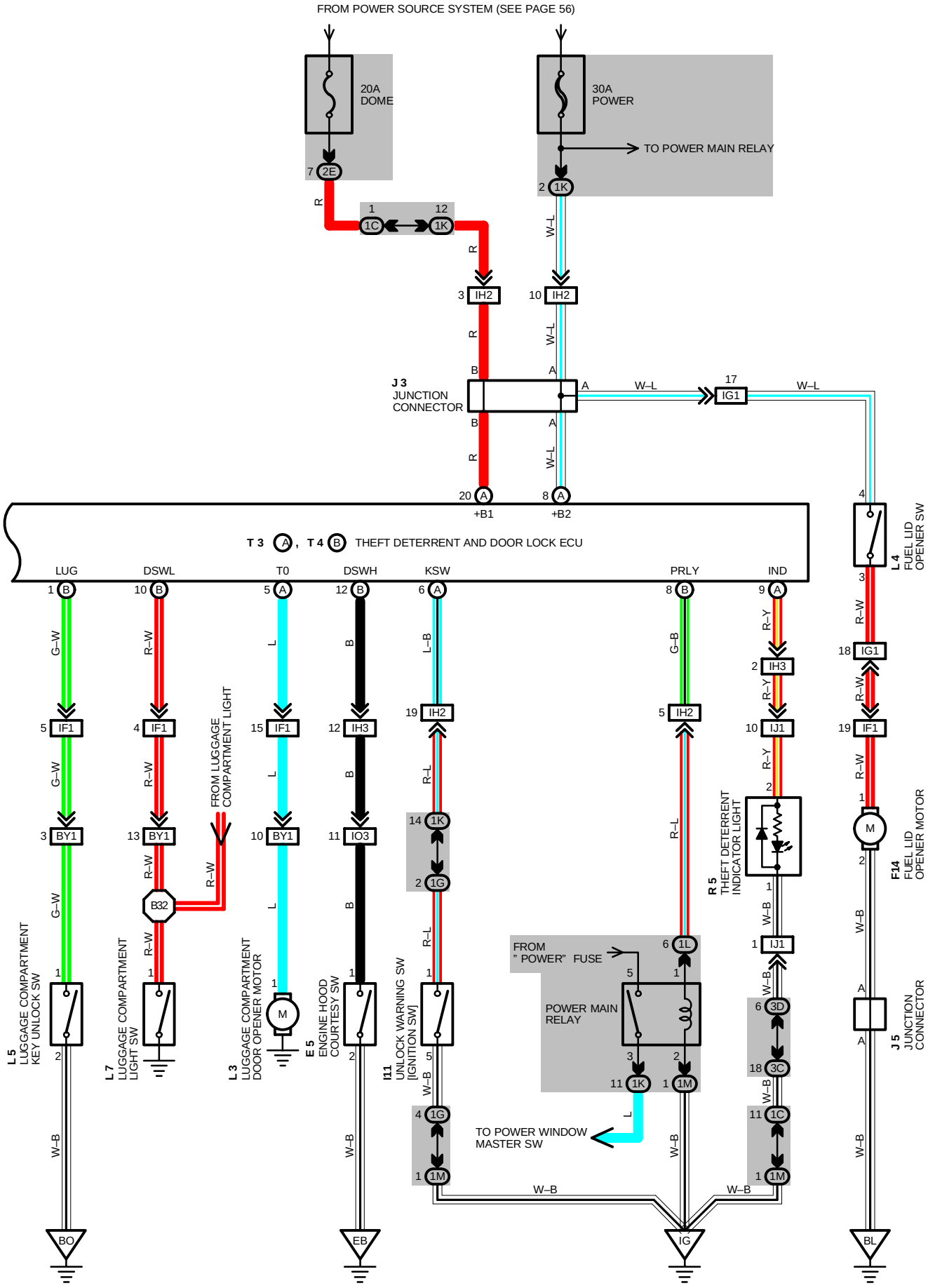
THEFT DETERRENT AND DOOR LOCK CONTROL




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
I11
IGNITION SW
AM1
ST1
B–W
B
(A/T)
B
(M/T)
C 6
CLUTCH START SW
B–W
(M/T)
B–W
(A/T)
P 1
PARK/NEUTRAL POSITION SW
(NEUTRAL START SW)
B–W
B
IM1
EE1
FROM FUSE
" ST MAIN"
W
STARTER
RELAY
W–B
B–R
IM1
TO STARTER
IH3
B–Y
15A
CIG/RADIO
15A
ECU–IG
L–R
B–R
IH2
SRLY
ACC
IG
T3 A , T4 B THEFT DETERRENT AND DOOR LOCK ECU
DSWD
LSWD
DSWP
LSWP
Y–L
FROM WIRELESS
DOOR LOCK
CONTROL ECU (UL)
P–G
P
L–R
L–B
R–W
Y
I96
I97
IG1
IQ1
D18
DOOR LOCK MOTOR,
DOOR UNLOCK AND
OPEN DETECTION SW
FRONT LH
D19
DOOR LOCK MOTOR,
DOOR UNLOCK AND
OPEN DETECTION SW
FRONT RH
M
W–B
B12
B 3

THEFT DETERRENT AND DOOR LOCK CONTROL




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
20A
DOME
30A
POWER
TO POWER MAIN RELAY
7 2E
2 1K
1 1C
12 1K
R
W–L
3 IH2
10 IH2
J 3
JUNCTION
CONNECTOR
B
A
17 IG1
20 A
+B1
8 A
+B2
T 3 A , T 4 B THEFT DETERRENT AND DOOR LOCK ECU
LUG
DSWL
T0
DSWH
KSW
PRLY
IND
1 B
10 B
5 A
12 B
6 A
8 B
9 A
G–W
R–W
L
B
L–B
G–B
R–Y
5 IF1
4 IF1
15 IF1
12 IH3
19 IH2
5 IH2
2 IH3
10 IJ1
3 BY1
13 BY1
10 BY1
11 IO3
14 1K
2 1G
R–L
FROM LUGGAGE
COMPARTMENT LIGHT
B32
L 5
LUGGAGE COMPARTMENT
KEY UNLOCK SW
L 7
LUGGAGE COMPARTMENT
LIGHT SW
L 3
LUGGAGE COMPARTMENT
DOOR OPENER MOTOR
E 5
ENGINE HOOD
COURTESY SW
I11
UNLOCK WARNING SW
[IGNITION SW]
FROM
" POWER" FUSE
6 1L
5
1
POWER MAIN
RELAY
3
2
11 1K
1 1M
TO POWER WINDOW
MASTER SW
R 5
THEFT DETERRENT
INDICATOR LIGHT
W–B
6 3D
18 3C
11 1C
4 1G
1 1M
L 4
FUEL LID
OPENER SW
18 IG1
19 IF1
F14
FUEL LID
OPENER MOTOR
J 5
JUNCTION
CONNECTOR
BO
EB
IG
BL

THEFT DETERRENT AND DOOR LOCK CONTROL

SYSTEM OUTLINE

CURRENT ALWAYS FLOWS TO **TERMINAL (A)8** OF THE DOOR LOCK ECU THROUGH THE **POWER** FUSE, AND TO **TERMINAL (A)20** THROUGH THE **DOME** FUSE.

WHEN THE IGNITION SW TURNED ON, THE CURRENT FLOWING THROUGH THE **ECU–IG** FUSE → **TERMINAL (A)2** OF THE ECU → **TERMINAL (B)8** FLOWS THROUGH THE COIL SIDE OF THE POWER MAIN RELAY TO **GROUND,** CAUSING THE RELAY TO OPERATE. THE CURRENT FLOWING THROUGH THE **POWER** FUSE FLOWS TO THE DOOR LOCK CONTROL SWITCHES, CAUSING THE INDICATOR LIGHT TO LIGHT UP.

1. MANUAL LOCK OPERATION

WHEN THE DOOR CONTROL SW OR KEY SW ARE PUSHED TO **LOCK** POSITION, A LOCK SIGNAL IS INPUT TO **TERMINAL (A)17, (A)14** (FOR KEY SW) OF THE DOOR LOCK ECU AND CAUSES THE ECU TO FUNCTION. CURRENT FLOWS FROM **TERMINAL (A)8** OF THE ECU → **TERMINAL (A)4** → **TERMINAL 7** (FRONT), **TERMINAL 5** (REAR) OF THE DOOR LOCK MOTORS → **TERMINAL 5** (FRONT), **2** (REAR) → **TERMINAL (A)3** OF THE ECU → **TERMINAL (A) 16** → TO **GROUND** AND THE DOOR LOCK MOTOR CAUSES THE DOOR TO LOCK.

2. MANUAL UNLOCK OPERATION

WHEN THE DOOR LOCK CONTROL SW OR KEY SW ARE PUSHED TO **UNLOCK** POSITION, AN UNLOCK SIGNAL IS INPUT TO **TERMINAL (A)18, (A)10** (FOR KEY SW LH) OR **(A)15** (FOR KEY SW RH) OF THE DOOR LOCK ECU AND CAUSES TO FUNCTION. CURRENT FLOWS FROM **TERMINAL (A)8** OF THE ECU → **TERMINAL (A)3** → **TERMINAL 5** (FRONT), **2** (REAR) OF THE DOOR LOCK MOTORS → **TERMINAL 7** (FRONT), **TERMINAL 5** (REAR) → **TERMINAL (A)4** OF THE ECU → **TERMINAL (A)16** → TO **GROUND** AND THE DOOR LOCK MOTOR CAUSES THE DOOR TO UNLOCK.

WHEN UNLOCK OPERATION OCCURS USING THE LH DOOR KEY SW, PERFORMING THE UNLOCK OPERATION ONCE UNLOCKS ONLY THE DRIVER'S DOOR. TO UNLOCK ALL THE OTHER DOORS TOGETHER, UNLOCK OPERATION MUST BE PERFORMED AGAIN WITHIN **3** SECONDS OF THE FIRST OPERATION.

3. IGNITION KEY REMINDER OPERATION

∗ OPERATION OF DOOR LOCK BUTTON (OPERATION OF DOOR LOCK MOTORS)

WHEN THE IGNITION KEY IS IN THE CYLINDER (UNLOCK WARNING SW ON) AND THE DOOR IS OPENED AND LOCKED USING DOOR LOCK BUTTON (DOOR LOCK MOTOR), THE DOOR IS LOCKED ONCE BUT EACH DOOR IS UNLOCKED SOON BY THE OPERATION OF THE ECU. AS A RESULT OF ECU ACTIVATION, THE CURRENT FLOWS FROM **TERMINAL (A)8** OF THE ECU → **TERMINAL (A)3** → **TERMINAL 5** (FRONT), **2** (REAR) OF THE DOOR LOCK MOTORS → **TERMINAL 7** (FRONT), **TERMINAL 5** (REAR) → **TERMINAL (A)4** OF THE ECU → **TERMINAL (A)16** → TO **GROUND** AND CAUSES ALL THE DOOR LOCK CONTROL SW AND DOOR LOCK KEY SW.

∗ KEY LESS LOCK OPERATION

WHEN THE IGNITION KEY IS STILL INSERTED IN THE CYLINDER (UNLOCK WARNING SW ON), THE DOOR IS OPEN AND UNLOCK OPERATION IS PREVENTED BY KEEPING THE DOOR LOCK BUTTON PRESSED TO THE LOCK SIDE, THE DOOR IS KEPT IN THE LOCK CONDITION. IF THE DOOR IS THEN CLOSED, A SIGNAL IS INPUT TO THE ECU FROM THE DOOR COURTESY SW. THIS ACTIVATES THE ECU AND EACH DOOR IS UNLOCKED.

SERVICE HINTS

D15, D16 DOOR KEY LOCK AND UNLOCK SW LH, RH
2–3 : CLOSED WITH DOOR LOCK CYLINDER UNLOCKED WITH KEY
1–3 : CLOSED WITH DOOR LOCK CYLINDER LOCKED WITH KEY

D18, D19 DOOR LOCK MOTOR FRONT LH, RH
4–6 : CLOSED WITH **UNLOCK** POSITION

D20, D21 DOOR LOCK MOTOR REAR LH, RH
1–4 : CLOSED WITH **UNLOCK** POSITION

E 5 ENGINE HOOD COURTESY SW
1–2 : CLOSED WITH ENGINE HOOD OPEN

I11 UNLOCK WARNING SW [IGNITION SW]
1–5 : CLOSED WITH IGNITION KEY IN CYLINDER

L 5 LUGGAGE COMPARTMENT KEY UNLOCK SW
1–2 : CLOSED WITH LUGGAGE COMPARTMENT DOOR LOCK CYLINDER UNLOCK WITH KEY

L 7 LUGGAGE COMPARTMENT LIGHT SW
1–GROUND: CLOSED WITH DOOR OPEN

T 3(A) THEFT DETERRENT AND DOOR LOCK ECU

1–GROUND: APPROX. **12** VOLTS WITH SHIFT LEVER IN **N** OR **P** POSITION AND IGNITION SW AT **ST** POSITION
2–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
6–GROUND: CONTINUITY WITH IGNITION KEY IN CYLINDER
7–GROUND: CONTINUITY WITH FRONT RH DOOR TO **UNLOCK** POSITION
8–GROUND: ALWAYS APPROX. **12** VOLTS
10–GROUND: CONTINUITY WITH DOOR LOCK KEY SW LH TO **UNLOCK** POSITION
11–GROUND: CONTINUITY WITH FRONT LH DOOR TO **UNLOCK** POSITION
12–GROUND: CONTINUITY WITH FRONT RH DOOR OPENED
13–GROUND: CONTINUITY WITH FRONT LH DOOR OPENED
14–GROUND: CONTINUITY WITH DOOR LOCK KEY SW RH TO **LOCK** POSITION
16–GROUND: ALWAYS CONTINUITY
15–GROUND: CONTINUITY WITH DOOR LOCK KEY SW RH TO **UNLOCK** POSITION
20–GROUND: ALWAYS APPROX. **12** VOLTS

T 4(B) THEFT DETERRENT AND DOOR LOCK ECU

1–GROUND: CONTINUITY WITH LUGGAGE COMPARTMENT DOOR TO **UNLOCK** POSITION
3–GROUND: CONTINUITY WITH DOOR OPEN
12–GROUND: CONTINUITY WITH ENGINE HOOD OPEN
10–GROUND: CONTINUITY WITH LUGGAGE COMPARTMENT DOOR OPEN
7–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
2–GROUND: CONTINUITY WITH REAR DOOR TO **UNLOCK** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
C 6	30	**F 7**	28	**L 7**		32
D15	32	**F14**	32	**P 1**		29
D16	32	**I11**	31	**P 9**		32
D17	32	**J 3**	31	**R 5**		31
D18	32	**J 5**	32	**T 1**		29
D19	32	**L 1**	31	**T 3**	A	31
D20	32	**L 3**	32	**T 4**	B	31
D21	32	**L 4**	32			
E 5	28	**L 5**	32			

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
6	26	R/B NO. 6 (BEHIND GLOVE BOX)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1C		
1E		
1G		
1K		
1L		
1M		
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2D		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3C	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3D		

THEFT DETERRENT AND DOOR LOCK CONTROL

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
IF1	34	FLOOR NO.1 WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IH3	36	COWL WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IJ1	36	INSTRUMENT PANEL NO. 2 WIRE AND COWL WIRE (UNDER THE COMBINATION METER)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IO3	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BU1	40	REAR DOOR LH WIRE AND FLOOR NO. 1 WIRE (LEFT CENTER PILLAR)
BV1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
IE	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL
BL	40	UNDER THE LEFT QUARTER PILLAR
BM	40	UNDER THE RIGHT QUARTER PILLAR
BO	40	BACK PANEL CENTER

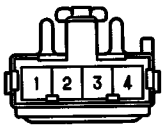
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 2	38	INSTRUMENT PANEL WIRE	**I 97**	38	INSTRUMENT PANEL WIRE
I 3			**I100**		
I 5			**I101**		
I 13	38	COWL WIRE	**B 1**	40	FRONT DOOR LH WIRE
I 14			**B 2**		
I 27			**B 3**		
I 65			**B 11**	40	FRONT DOOR RH WIRE
I 92	38	INSTRUMENT PANEL WIRE	**B 12**		
I 93			**B 14**	40	REAR DOOR LH WIRE
I 94			**B 17**	40	REAR DOOR RH WIRE
I 95			**B 32**	40	LUGGAGE ROOM WIRE
I 96					

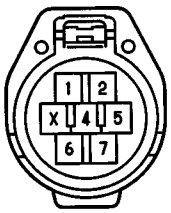
C 6

D15, D16 GRAY

D17



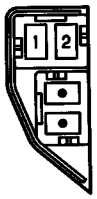
D18, D19 GRAY



D20, D21

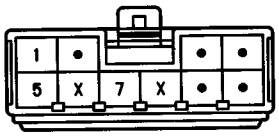
E 5

F 7

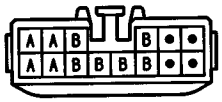


F14

I11



J 3 DARK GRAY



(HINT:SEE PAGE 7)

J 5

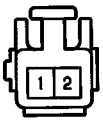
(HINT:SEE PAGE 7)

L 1

L 3

L 4 BLACK

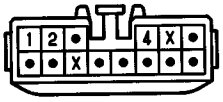
L 5



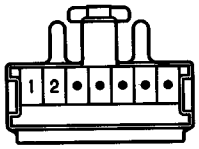
L 7 GRAY

P 1 GRAY

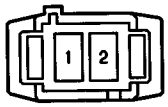
P 9



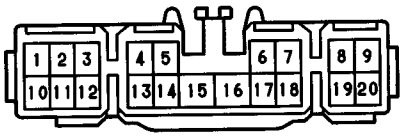
R 5



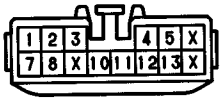
T 1 BLACK



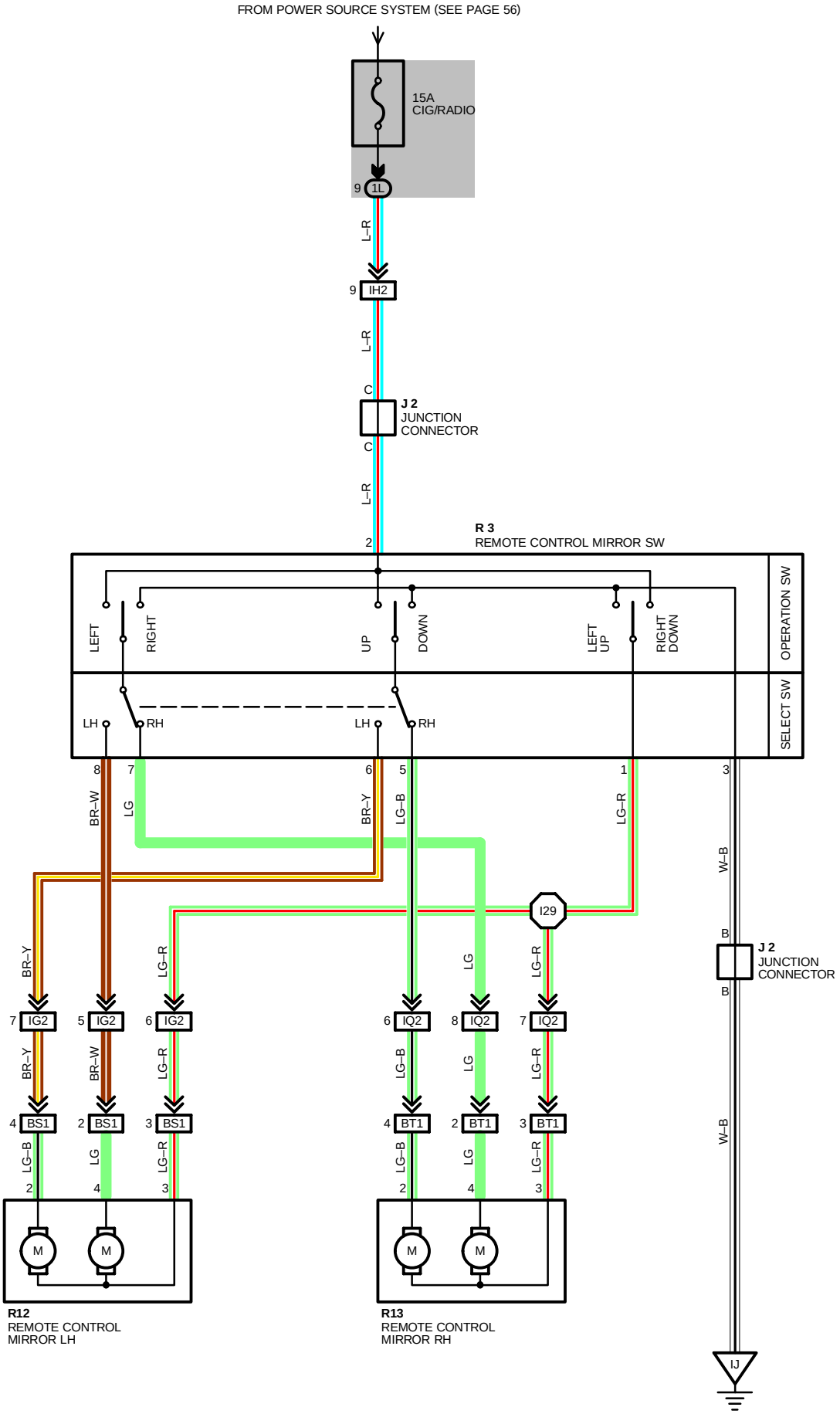
T 3 (A) ORANGE



T 4 (B) ORANGE



REMOTE CONTROL MIRROR



SERVICE HINTS

R 3 REMOTE CONTROL MIRROR SW

2–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
1–3 : CONTINUITY WITH OPERATION SW AT **UP** OR **LEFT** POSITION
1–2 : CONTINUITY WITH OPERATION SW AT **DOWN** OR **RIGHT** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 2	31	**R12**	32		
R 3	31	**R13**	32		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1L	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IQ2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BS1	40	MIRROR LH WIRE AND FRONT DOOR LH WIRE (FRONT LH DOOR INSIDE)
BT1	40	MIRROR RH WIRE AND FRONT DOOR RH WIRE (FRONT RH DOOR INSIDE)

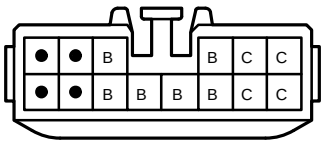
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IJ	36	RIGHT KICK PANEL

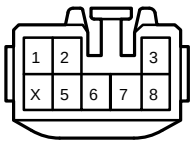
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 29	38	INSTRUMENT PANEL WIRE			

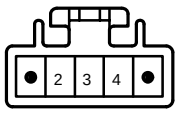
J 2



R 3

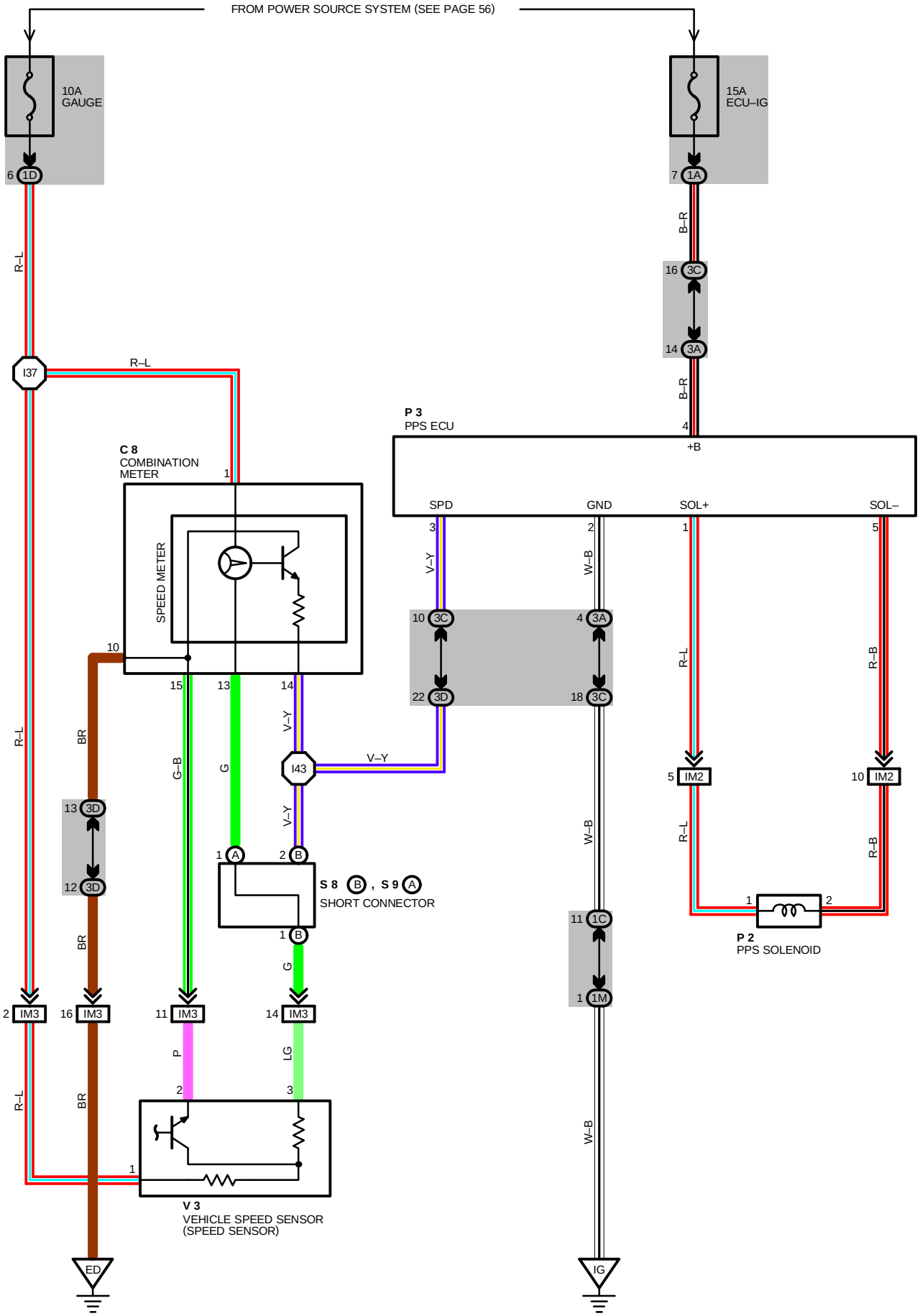


R 12, R 13



(HINT : SEE PAGE 7)

PPS (PROGRESSIVE POWER STEERING)



SYSTEM OUTLINE

THE PPS (HYDRAULIC REACTION TYPE) CONTROLS THE HYDRAULIC PRESSURE APPLIED TO THE HYDRAULIC REACTION CHAMBER IN THE GEAR BOX CONTROL UNIT USING THE PPS ECU, CHANGE THE STEERING FORCE AND PROVIDE OPTIMUM STEERING FEELING AT ANY VEHICLE SPEED AND UNDER ANY STEERING CONDITIONS.

(PPS OPERATION)

WHEN THE IGNITION SW IS TURNED ON THE STARTING CURRENT FLOWS FROM THE ECU–IG FUSE TO **TERMINAL 4** OF THE PPS ECU. THE SPEED SENSOR MONITORS THE VEHICLE SPEED AND TRANSMITS CONTROL SIGNALS TO **TERMINAL 3** OF THE ECU.

WHEN THE VEHICLE SPEED IS LOW, THE PPS ECU SENDS A HIGHER–CURRENT FROM **TERMINAL 1** OF THE ECU → **TERMINAL 1** OF THE SOLENOID VALVE → **TERMINAL 2** → **TERMINAL 5** OF THE ECU → **GROUND,** INCREASING THE SOLENOID VALVE OPENING ANGLE TO PROVIDE COMFORTABLE STEERING OPERATION. WHEN THE VEHICLE SPEED IS HIGH, THE PPS ECU DECREASES THE SOLENOID VALVE OPENING ANGLE BY REDUCING THE CURRENT TO THE VALVE TO PROVIDE RESPONSIVE STEERING FEELING.

SERVICE HINTS

P 3 PPS ECU

4–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION

2–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 8	30	**P 3**	31	**S 9** A	31
P 2	29	**S 8** B	31	**V 3**	29

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1D		
1M		
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IM2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		

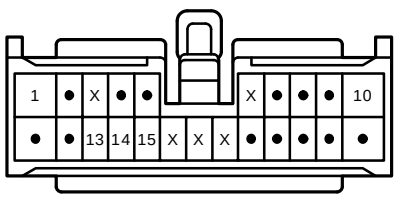
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
ED	34	INTAKE MANIFOLD LH
IG	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

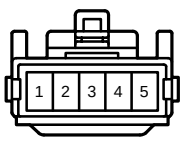
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 37	38	COWL WIRE	**I 43**	38	COWL WIRE

C 8

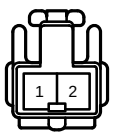


P 2 GRAY

P 3

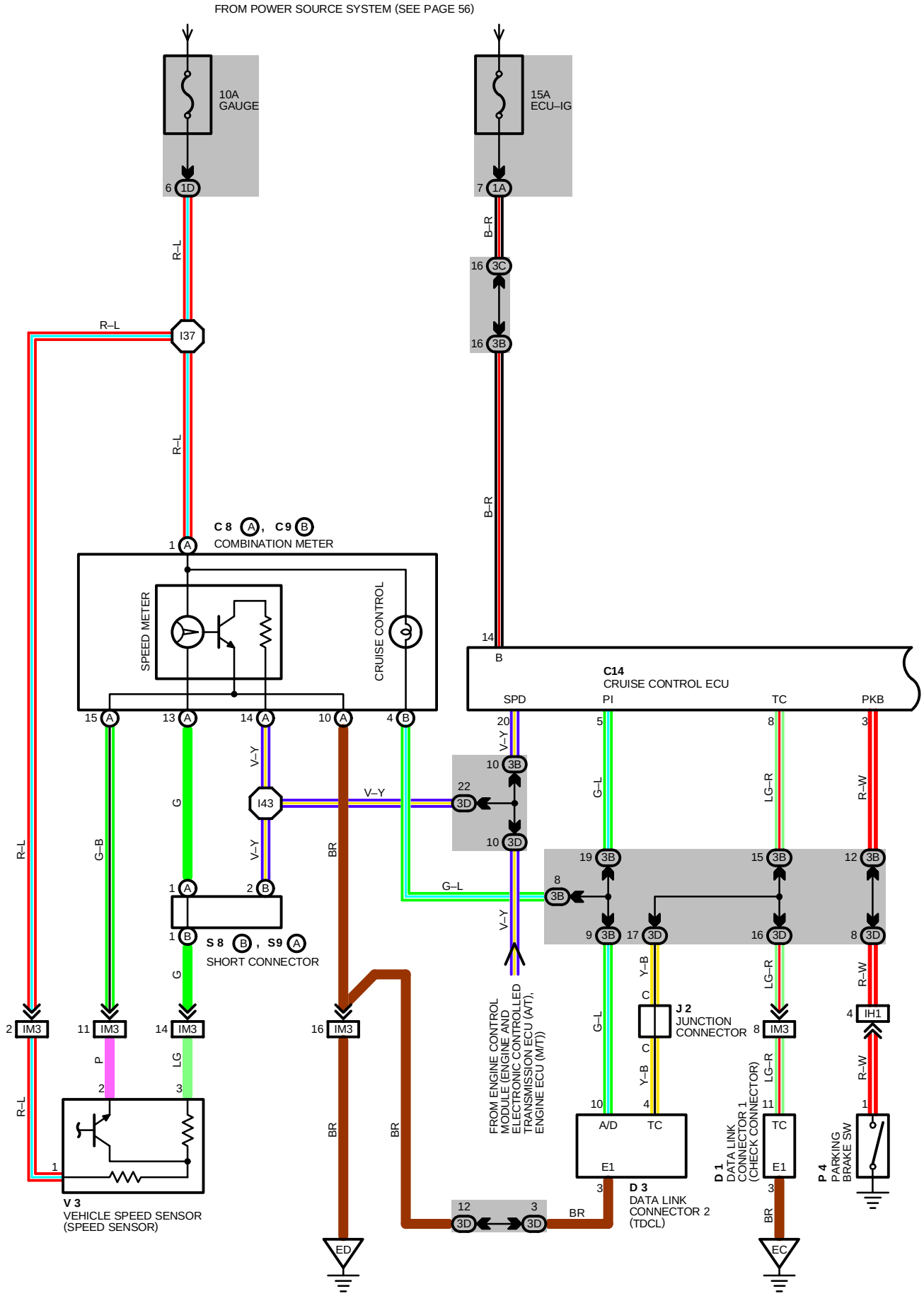


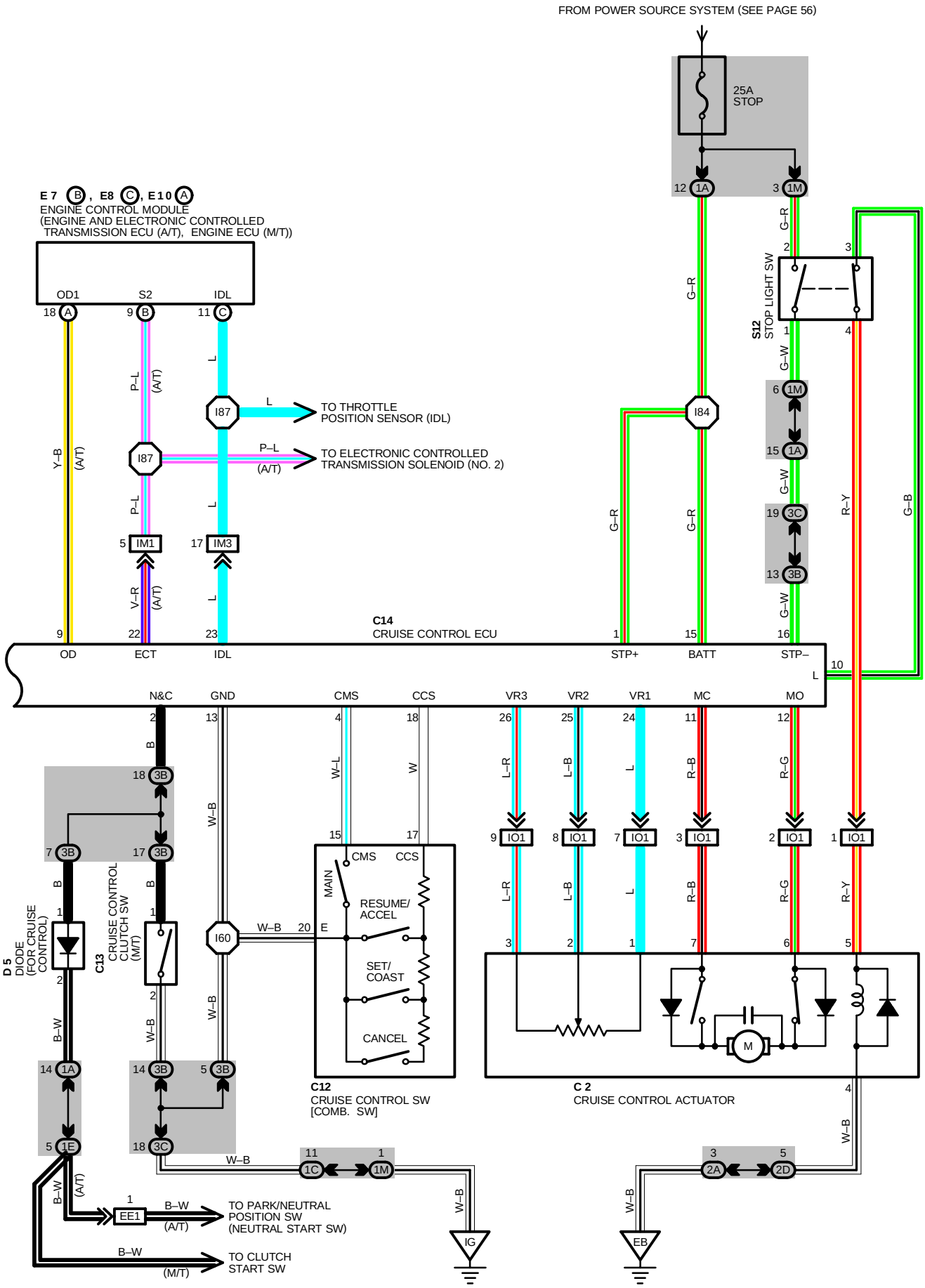
S 8 (B)



S 9 (A)

V 3 BLACK


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
15A
ECU–IG
6 1D
7 1A
R–L
B–R
16 3C
16 3B
I37
C 8 A , C 9 B
COMBINATION METER
SPEED METER
CRUISE CONTROL
C14
CRUISE CONTROL ECU
SPD
PI
TC
PKB
I43
S 8 B , S 9 A
SHORT CONNECTOR
G–B
G
V–Y
BR
G–L
Y–B
LG–R
R–W
IM3
IH1
J 2
JUNCTION
CONNECTOR
V 3
VEHICLE SPEED SENSOR
(SPEED SENSOR)
FROM ENGINE CONTROL
MODULE (ENGINE AND
ELECTRONIC CONTROLLED
TRANSMISSION ECU (A/T),
ENGINE ECU (M/T))
A/D
TC
E1
D 3
DATA LINK
CONNECTOR 2
(TDCL)
D 1
DATA LINK
CONNECTOR 1
(CHECK CONNECTOR)
P 4
PARKING
BRAKE SW
ED
EC


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
25A
STOP
E7 B, E8 C, E10 A
ENGINE CONTROL MODULE
(ENGINE AND ELECTRONIC CONTROLLED
TRANSMISSION ECU (A/T), ENGINE ECU (M/T))
OD1
S2
IDL
TO THROTTLE
POSITION SENSOR (IDL)
TO ELECTRONIC CONTROLLED
TRANSMISSION SOLENOID (NO. 2)
S12
STOP LIGHT SW
C14
CRUISE CONTROL ECU
OD
ECT
IDL
STP+
BATT
STP–
N&C
GND
CMS
CCS
VR3
VR2
VR1
MC
MO
D5
DIODE
(FOR CRUISE
CONTROL)
C13
CRUISE CONTROL
CLUTCH SW
(M/T)
MAIN
RESUME/
ACCEL
SET/
COAST
CANCEL
C12
CRUISE CONTROL SW
[COMB. SW]
C 2
CRUISE CONTROL ACTUATOR
TO PARK/NEUTRAL
POSITION SW
(NEUTRAL START SW)
TO CLUTCH
START SW
IG
EB

SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH **STOP** FUSE TO **TERMINAL 1** OF THE CRUISE CONTROL ECU AND **TERMINAL 2** OF STOP LIGHT SW, AND ALSO THROUGH THE **STOP** FUSE TO **TERMINAL 15** OF CRUISE CONTROL ECU.

WITH THE IGNITION SW TURNED TO ON, THE CURRENT FLOWS THROUGH **GAUGE** FUSE TO **TERMINAL (A)6** OF COMBINATION METER AND THE CURRENT THROUGH **ECU–IG** FUSE FLOWS TO **TERMINAL 14** OF CRUISE CONTROL ECU.

WHEN THE IGNITION SW IS ON AND THE CRUISE CONTROL MAIN SW IS TURNED ON, A SIGNAL IS INPUT FROM **TERMINAL 15** OF CRUISE CONTROL MAIN SW TO **TERMINAL 4** OF CRUISE CONTROL ECU. AS A RESULT, THE CRUISE CONTROL ECU FUNCTIONS AND THE CURRENT TO **TERMINAL 14** OF CRUISE CONTROL ECU TO **TERMINAL 13** OF CRUISE CONTROL ECU → **GROUND,** AND THE CRUISE CONTROL SYSTEM IS IN A CONDITION READY FOR OPERATION.

AT THE SAME TIME, THE CURRENT THROUGH THE **GAUGE** FUSE FLOWS FROM **TERMINAL (A)6** OF CRUISE CONTROL INDICATOR LIGHT → **TERMINAL (B)9** → **TERMINAL 5** OF CRUISE CONTROL ECU → **TERMINAL 13** → TO **GROUND,** CAUSING THE CRUISE CONTROL INDICATOR LIGHT TO LIGHT UP, INDICATING THAT THE CRUISE CONTROL IS READY FOR OPERATION.

1. SET OPERATION

WHEN THE CRUISE CONTROL MAIN SW IS TURNED ON AND THE SET SW IS TURNED WITH THE VEHICLE SPEED WITHIN THE SET LIMIT (APPROX. **40** KM/H, **25** MPH TO **200** KM/H, **124** MPH), A SIGNAL IS INPUT TO **TERMINAL 18** OF THE CRUISE CONTROL ECU AND THE VEHICLE SPEED AT THE TIME THE SET SW IS RELEASED IS MEMORIZED IN THE ECU AS THE SET SPEED.

2. SET SPEED CONTROL

DURING CRUISE CONTROL DRIVING, THE ECU COMPARES THE SET SPEED MEMORIZED IN THE ECU WITH THE ACTUAL VEHICLE SPEED INPUT INTO **TERMINAL 20** OF THE CRUISE CONTROL ECU FROM THE VEHICLE SPEED SENSOR (SPEED SENSOR), AND CONTROLS THE CRUISE CONTROL ACTUATOR TO MAINTAIN THE SET SPEED.

WHEN THE ACTUAL SPEED IS LOWER THAN THE SET SPEED, THE ECU CAUSES THE CURRENT TO THE CRUISE CONTROL ACTUATOR TO FLOW FROM **TERMINAL 12** → **TERMINAL 6** OF CRUISE CONTROL ACTUATOR → **TERMINAL 7** → **TERMINAL 11** OF CRUISE CONTROL ECU. AS A RESULT, THE MOTOR IN THE CRUISE CONTROL ACTUATOR IS ROTATED TO OPEN THE THROTTLE VALVE AND THE THROTTLE CABLE IS PULLED TO INCREASE THE VEHICLE SPEED. WHEN THE ACTUAL DRIVING SPEED IS HIGHER THAN THE SET SPEED, THE CURRENT TO CRUISE CONTROL ACTUATOR FLOWS FROM **TERMINAL 11** OF ECU → **TERMINAL 7** OF CRUISE CONTROL ACTUATOR → **TERMINAL 6** → **TERMINAL 12** OF CRUISE CONTROL ECU.

THIS CAUSES THE MOTOR IN THE CRUISE CONTROL ACTUATOR TO ROTATE TO CLOSE THE THROTTLE VALVE AND RETURN THE THROTTLE CABLE TO DECREASE THE VEHICLE SPEED.

3. COAST CONTROL

DURING THE CRUISE CONTROL DRIVING, WHILE THE COAST SW IS ON, THE CRUISE CONTROL ACTUATOR RETURNS THE THROTTLE CABLE TO CLOSE THE THROTTLE VALVE AND DECREASE THE DRIVING SPEED. THE VEHICLE SPEED WHEN THE COAST SW IS TURNED OFF IS MEMORIZED AND THE VEHICLE CONTINUES AT THE NEW SET SPEED.

4. ACCEL CONTROL

DURING CRUISE CONTROL DRIVING, WHILE THE ACCEL SW IS TURNED ON, THE CRUISE CONTROL ACTUATOR PULLS THE THROTTLE CABLE TO OPEN THE THROTTLE VALVE AND INCREASE THE DRIVING SPEED.

THE VEHICLE SPEED WHEN THE ACCEL SW IS TURNED OFF IS MEMORIZED AND THE VEHICLE CONTINUES AT THE NEW SET SPEED.

5. RESUME CONTROL

UNLESS THE VEHICLE SPEED FALLS BELOW THE MINIMUM SPEED LIMIT (APPROX. **40** KM/H, **25** MPH) AFTER CANCELING THE SET SPEED BY THE CANCEL SW, TURNING ON THE RESUME SW WILL CAUSE THE VEHICLE TO RESUME THE SPEED SET BEFORE CANCELLATION.

6. MANUAL CANCEL MECHANISM

IF ANY OF THE FOLLOWING OPERATIONS OCCURS DURING CRUISE CONTROL OPERATION, CURRENT FLOW TO MAGNETIC CLUTCH OF THE ACTUATOR IS CUT OFF AND THE MOTOR ROTATES TO CLOSE THE THROTTLE VALVE AND THE CRUISE CONTROL IS RELEASED.

- PLACING THE SHIFT LEVER IN “N” RANGE (NEUTRAL START SW ON). “SIGNAL INPUT TO **TERMINAL 2** OF ECU” (A/T)
- DEPRESSING THE BRAKE PEDAL (STOP LIGHT SW ON). “SIGNAL INPUT TO **TERMINAL 16** OF ECU”
- PUSH THE CANCEL SW (CANCEL SW ON). “SIGNAL INPUT TO **TERMINAL 18** OF ECU”
- DEPRESSING THE CLUTCH PEDAL (CLUTCH SW ON). “SIGNAL INPUT TO **TERMINAL 2** OF ECU” (M/T)
- PULLING THE PARKING BRAKE LEVER (PARKING BRAKE SW ON). “SIGNAL INPUT TO **TERMINAL 3** OF ECU”

7. AUTO CANCEL FUNCTION

A) IF ANY OF THE FOLLOWING OPERATING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE SET SPEED IS ERASED, CURRENT FLOW TO MAGNETIC CLUTCH IS CUT OFF AND THE CRUISE CONTROL IS RELEASED. (MAIN SW TURNS OFF).

WHEN THIS OCCURS, THE IGNITION SW MUST BE TURNED OFF ONCE BEFORE THE MAIN SW WILL TURN ON AGAIN.

- OVER CURRENT TO TRANSISTER DRIVING MOTOR AND/OR MAGNETIC CLUTCH.
- WHEN CURRENT CONTINUED TO FLOW TO THE MOTOR INSIDE THE ACTUATOR IN THE THROTTLE VALVE “OPEN” DIRECTION.
- OPEN CIRCUIT IN MOTOR AND/OR MAGNETIC CLUTCH.
- MOMENTARY INTERRUPTION OF VEHICLE SPEED SIGNAL.
- SHORT CIRCUIT IN CRUISE CONTROL SW.
- MOTOR DOES NOT OPERATE DESPITE THE MOTOR DRIVE SIGNAL BEING OUTPUT.

B) IF ANY OF THE FOLLOWING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE SET SPEED IS ERASED AND THE CRUISE CONTROL IS RELEASED. (CURRENT FLOW TO MAGNETIC CLUTCH IS CUT OFF UNTIL THE SET SW IS “ON” AGAIN.)

- WHEN THE VEHICLE SPEED HAS FALLEN BELOW THE MINIMUM SPEED LIMIT, APPROX. **40** KM/H (**2.5** MPH)
- WHEN THE VEHICLE SPEED HAS FALLEN MORE THAN **16** KM/H (**10** MPH) BELOW THE SET SPEED, E.G. ON AN UPWARD SLOPE.
- WHEN POWER TO THE CRUISE CONTROL SYSTEM IS MOMENTARILY CUT OFF.

C) IF ANY OF THE FOLLOWING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE CRUISE CONTROL IS RELEASED.

- OPEN CIRCUIT FOR **TERMINAL 1** OF CRUISE CONTROL ECU.

8. AUTOMATIC TRANSMISSION CONTROL FUNCTION

- IN OVERDRIVE. IF THE VEHICLE SPEED BECOMES LOWER THAN THE OVERDRIVE CUT SPEED (SET SPEED MINUS APPROX. **4** KM/H, **2.5** MPH) DURING CRUISE CONTROL OPERATION, SUCH AS DRIVING UP A HILL, THE OVERDRIVE IS RELEASED AND THE POWER INCREASED TO PREVENT A REDUCTION IN VEHICLE SPEED.
- AFTER RELEASING THE OVERDRIVE, IF VEHICLE SPEED BECOMES HIGHER THAN THE OVERDRIVE RETURN SPEED (SET SPEED MINUS APPROX. **2** KM/H, **1.2** MPH) AND THE ECU JUDGES BY THE SIGNALS FROM POTENTIOMETER OF THE ACTUATOR THAT THE UPWARD SLOPE HAS FINISHED, OVERDRIVE IS RESUMED AFTER A WHILE.

SERVICE HINTS

C2 CRUISE CONTROL ACTUATOR

1–3 : APPROX. **2**K
5–4 : APPROX. **38**

C11 CRUISE CONTROL SW MAIN [COMB. SW]

15–20 : CONTINUITY WITH MAIN SW ON
20–17 : APPROX. **418** WITH CANCEL SW ON
APPROX. **68** WITH RESUME/ACCEL SW ON
APPROX. **198** WITH SET/COAST SW ON

C14 CRUISE CONTROL ECU

14–GROUND: APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
1, 15–GROUND: ALWAYS APPROX. **12** VOLTS
3–GROUND : CONTINUITY WITH PARKING BRAKE SW ON (ONE OF THE CANCEL SW) OR BRAKE LEVEL WARNING SW ON
20–GROUND: **4** PULSE WITH **1** ROTATION OF ROTOR SHAFT (DRIVE SLOWLY)
18–GROUND: APPROX. **418** WITH CANCEL SW ON IN CONTROL SW
APPROX. **68** WITH RES/ACC SW ON IN CONTROL SW
APPROX. **198** WITH SET/COAST SW ON IN CONTROL SW
13–GROUND: ALWAYS CONTINUITY
2–GROUND : CONTINUITY WITH SHIFT LEVER AT **N** POSITION (A/T) OR CLUTCH PEDAL DEPRESSED (M/T)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 2	28	D 1	28	J 2	31
C 8 A	30	D 3	30	P 4	31
C 9 B	30	D 5	30	S10 B	31
C11	30	E 7 B	30	S11 A	31
C13	30	E 8 C	30	S12	31
C14	30	E10 A	30	V 3	29

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1C		
1D		
1E		
1M		
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2D		
3B	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EE1	34	ENGINE WIRE AND COWL WIRE (NEAR THE BRAKE MASTER CYLINDER)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		
IO1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

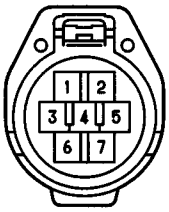
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
EC	34	INTAKE MANIFOLD RH
ED	34	INTAKE MANIFOLD LH
IG	36	INSTRUMENT PANEL BRACE LH

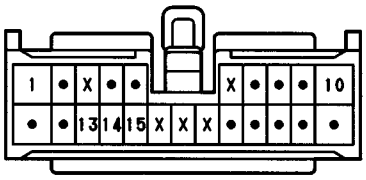
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 37	38	COWL WIRE	I 84	38	COWL WIRE
I 43			I 87	38	ENGINE WIRE
I 60					

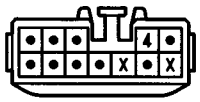
C 2 GRAY



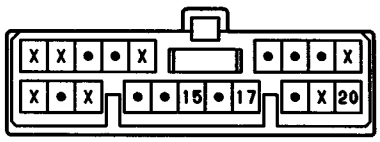
C 8 (A)



C 9 (B) BLUE

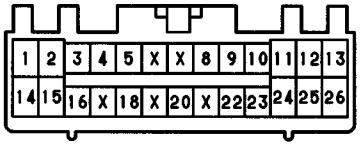


C11 BLACK

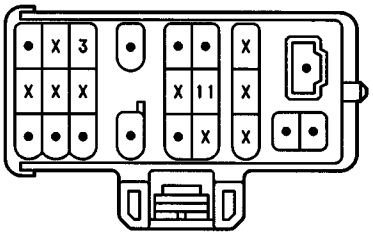


C13

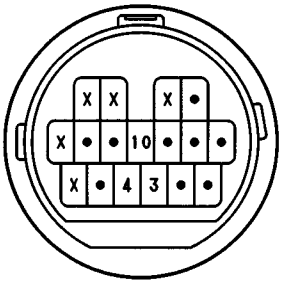
C14 GRAY



D 1 BLACK

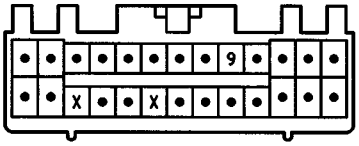


D 3 DARK GRAY

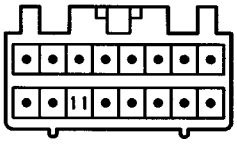


D 5

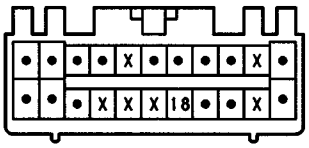
E 7 (B) DARK GRAY



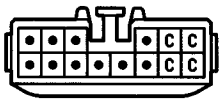
E 8 (C) DARK GRAY



E10 (A) DARK GRAY



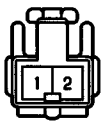
J 2



(HINT:SEE PAGE 7)

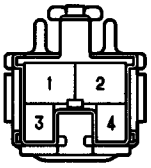
P 4

S 8 (B)



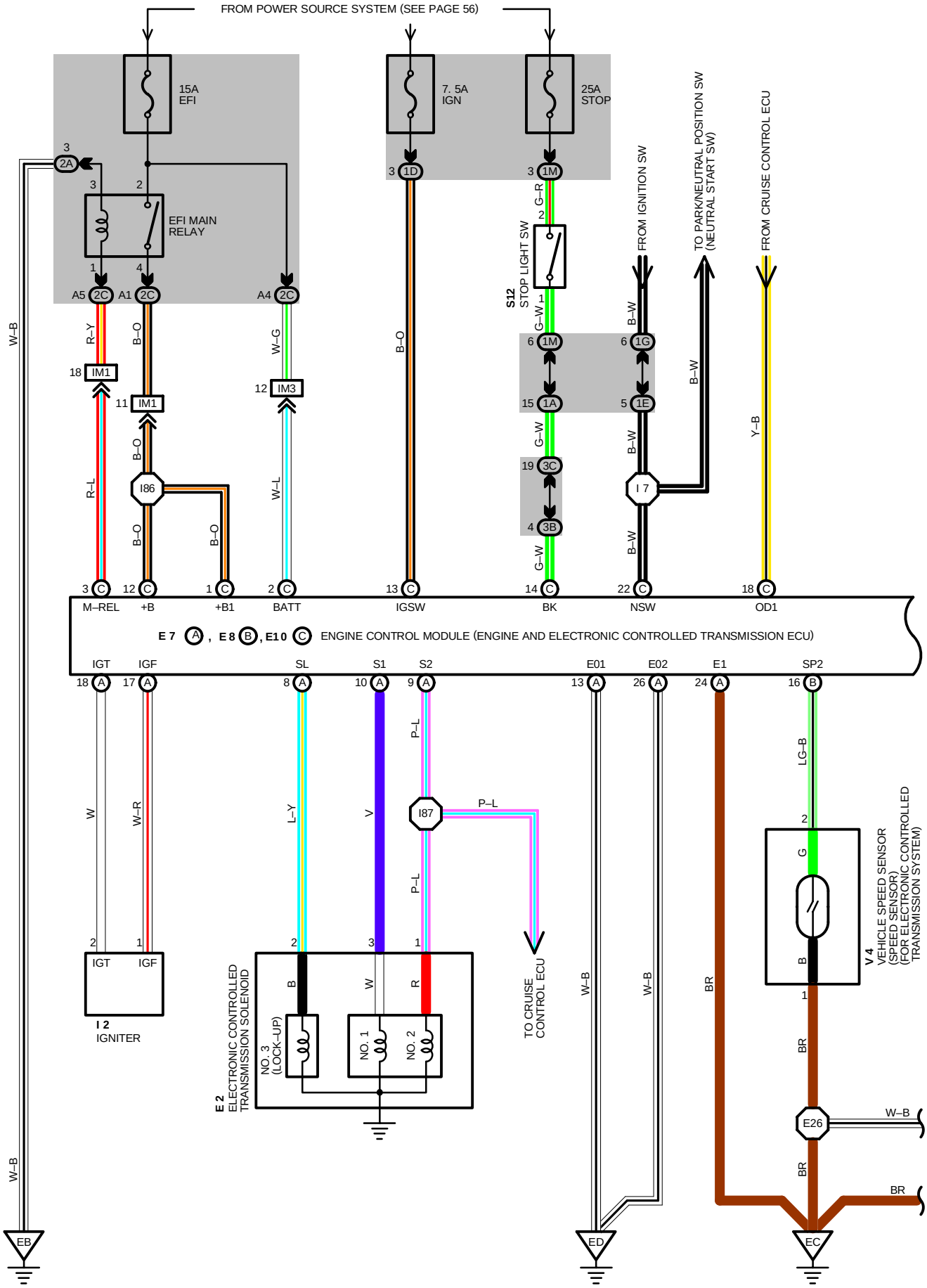
S 9 (A)

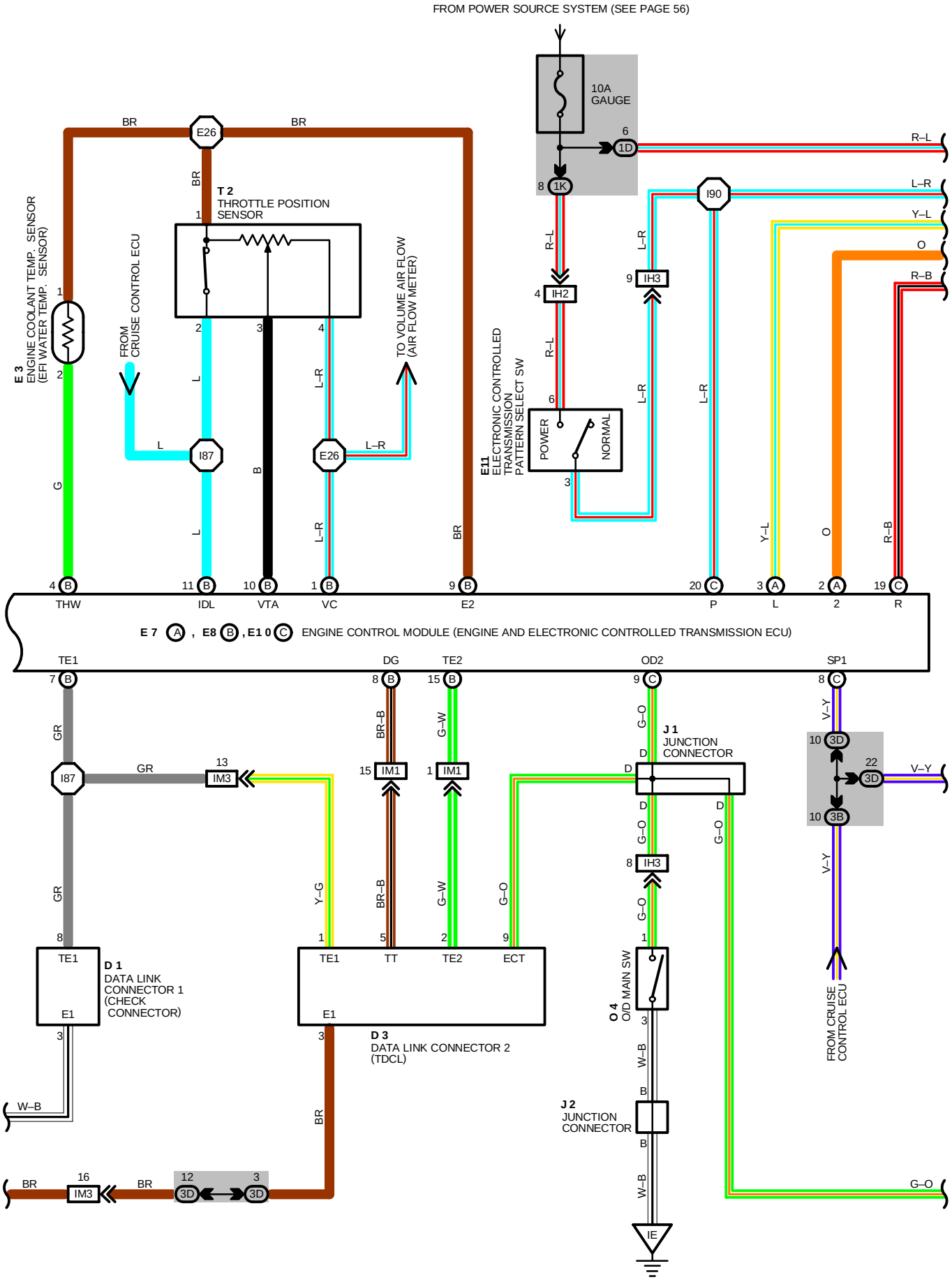
S12



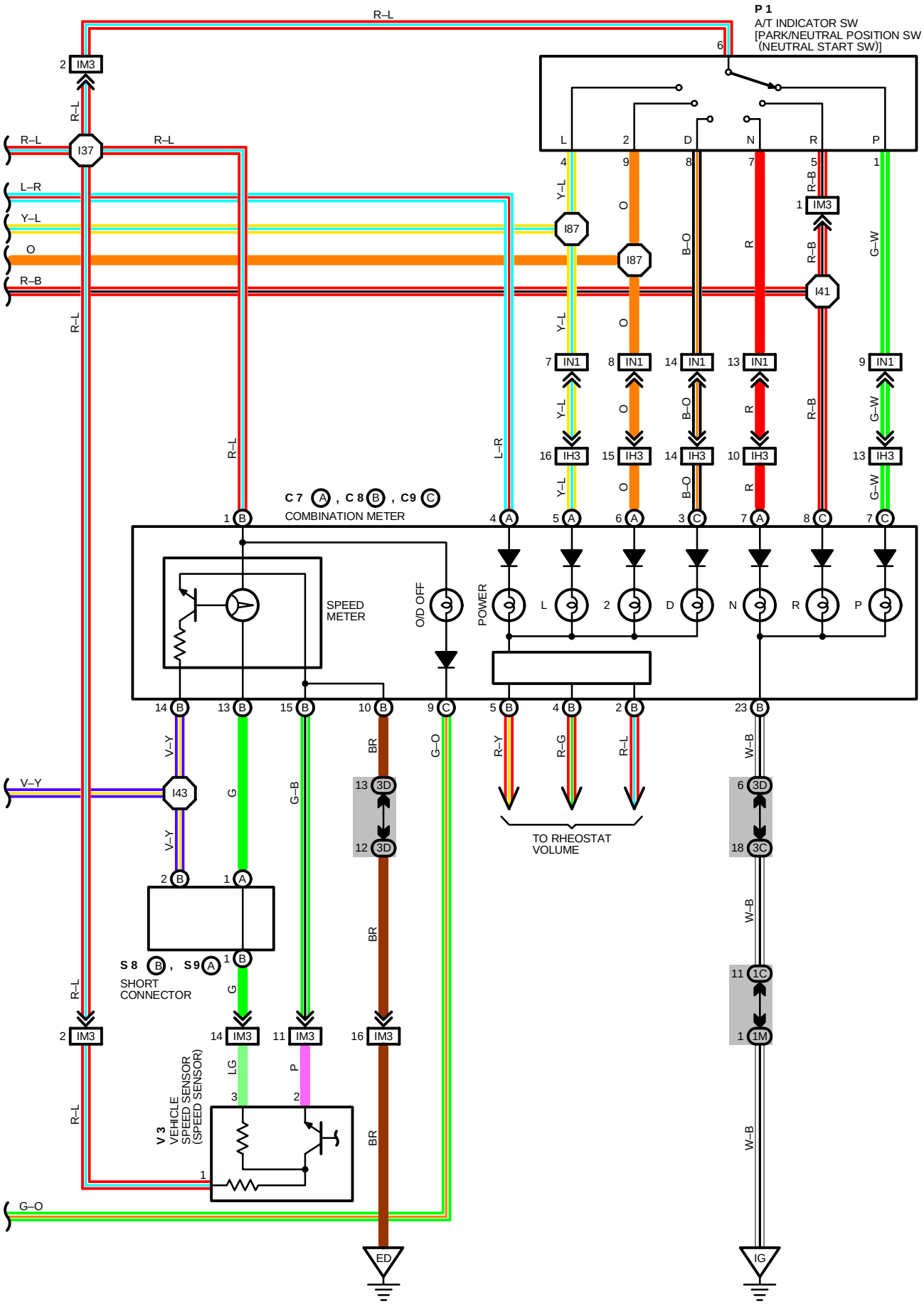
V 3 BLACK

ELECTRONICALLY CONTROLLED TRANSMISSION AND A/T INDICATOR




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A GAUGE
E26
T 2 THROTTLE POSITION SENSOR
E 3 ENGINE COOLANT TEMP. SENSOR (EFI WATER TEMP. SENSOR)
FROM CRUISE CONTROL ECU
TO VOLUME AIR FLOW (AIR FLOW METER)
I87
E26
I90
IH2
IH3
E11 ELECTRONIC CONTROLLED TRANSMISSION PATTERN SELECT SW
POWER
NORMAL
THW
IDL
VTA
VC
E2
P
L
2
R
E 7 A , E8 B , E10 C ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU)
TE1
DG
TE2
OD2
SP1
I87
IM3
IM1
J 1 JUNCTION CONNECTOR
3D
3B
D 1 DATA LINK CONNECTOR 1 (CHECK CONNECTOR)
D 3 DATA LINK CONNECTOR 2 (TDCL)
TT
ECT
O 4 O/D MAIN SW
J 2 JUNCTION CONNECTOR
FROM CRUISE CONTROL ECU
IE

ELECTRONICALLY CONTROLLED TRANSMISSION AND A/T INDICATOR



SYSTEM OUTLINE

THE ELECTRONIC CONTROLLED TRANSMISSION IS A SYSTEM WHICH PRECISELY CONTROLS GEAR SHIFT TIMING AND LOCK–UP TIMING IN THE RESPONSE TO THE VEHICLE'S DRIVING CONDITIONS AND THE ENGINE OPERATING CONDITIONS DETECTED BY VARIOUS SENSORS, MAKING SMOOTH DRIVING POSSIBLE BY SHIFT SELECTION FOR EACH GEAR WHICH IS THE MOST APPROPRIATE TO THE DRIVING CONDITIONS AT THAT TIME, AND CONTROLS THE ENGINE TORQUE DURING SHIFTING TO ACHIEVE OPTIMUM SHIFT FEELING.

1. GEAR SHIFT OPERATION

DURING DRIVING, THE ENGINE CONTROL MODULE (ECU) SELECTS THE SHIFT FOR EACH GEAR WHICH IS MOST APPROPRIATE TO THE DRIVING CONDITIONS, BASED ON INPUT SIGNALS FROM THE ENGINE COOLANT TEMP. SENSOR (EFI WATER TEMP. SENSOR) TO **TERMINAL THW** OF THE ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU), AND ALSO THE INPUT SIGNALS TO **TERMINAL SP2** OF THE ENGINE CONTROL MODULE (ECU) FROM THE VEHICLE SPEED SENSOR (SPEED SENSOR) DEVOTED TO THE ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU). CURRENT IS THEN OUTPUT TO THE ELECTRONIC CONTROLLED TRANSMISSION SOLENOIDS. WHEN SHIFTING TO 1ST SPEED, CURRENT FLOWS FROM **TERMINAL S1** OF THE ENGINE CONTROL MODULE (ECU) → **TERMINAL 3** OF THE ELECTRONIC CONTROLLED TRANSMISSION SOLENOIDS → **GROUND,** AND CONTINUITY TO THE NO.1 SOLENOID CAUSES THE SHIFT.

FOR 2ND SPEED, CURRENT FLOWS FROM **TERMINAL S1** OF THE ENGINE CONTROL MODULE (ECU) → **TERMINAL 3** OF THE ELECTRONIC CONTROLLED TRANSMISSION SOLENOIDS → **GROUND,** AND FROM **TERMINAL S2** OF THE ENGINE CONTROL MODULE (ECU) → **TERMINAL 1** OF THE ELECTRONIC CONTROLLED TRANSMISSION SOLENOIDS → **GROUND,** AND CONTINUITY TO SOLENOIDS NO.1 AND NO.2 CAUSES THE SHIFT.

FOR 3RD SPEED, THERE IS NO CONTINUITY TO NO. 1 SOLENOID, ONLY TO NO. 2, CAUSING THE SHIFT.

SHIFTING INTO 4TH SPEED (OVERDRIVE) TAKES PLACE WHEN THERE IS NO CONTINUITY TO EITHER NO. 1 OR NO. 2 SOLENOID.

2. LOCK–UP OPERATION

WHEN THE ENGINE CONTROL MODULE (ECU) JUDGES FROM EACH SIGNAL THAT LOCK–UP OPERATION CONDITIONS HAVE BEEN MET, CURRENT FLOWS FROM **TERMINAL SL** OF THE ENGINE CONTROL MODULE (ECU) → **TERMINAL 2** OF THE ELECTRONIC CONTROLLED TRANSMISSION SOLENOID → **GROUND,** CAUSING CONTINUITY TO THE LOCK–UP SOLENOID AND CAUSING LOCK–UP OPERATION.

3. STOP LIGHT SW CIRCUIT

IF THE BRAKE PEDAL IS DEPRESSED (STOP LIGHT SW ON) WHEN DRIVING IN LOCK–UP CONDITION, A SIGNAL IS INPUT TO **TERMINAL BK** OF THE ENGINE CONTROL MODULE (ECU), THE ENGINE CONTROL MODULE (ECU) OPERATES AND CONTINUITY TO THE LOCK–UP SOLENOID IS CUT.

4. OVERDRIVE CIRCUIT

***** O/D MAIN SW ON

WHEN THE O/D MAIN SW IS TURNED ON (O/D OFF INDICATOR LIGHT TURNS OFF), A SIGNAL IS INPUT TO **TERMINAL OD2** OF THE ENGINE CONTROL MODULE (ECU) AND ENGINE CONTROL MODULE (ECU) OPERATION CAUSES GEAR SHIFT WHEN THE CONDITIONS FOR OVERDRIVE ARE MET.

***** O/D MAIN SW OFF

WHEN THE O/D MAIN SW IS TURNED TO OFF, THE CURRENT FLOWING THROUGH THE O/D OFF INDICATOR LIGHT FLOWS THROUGH THE O/D MAIN SW TO GROUND. CAUSING THE INDICATOR LIGHT TO LIGHT UP. AT THE SAME TIME, A SIGNAL IS INPUT TO **TERMINAL OD2** OF THE ENGINE CONTROL MODULE (ECU) AND ENGINE CONTROL MODULE (ECU) OPERATION PREVENTS SHIFT INTO OVERDRIVE.

5. ELECTRONIC CONTROLLED TRANSMISSION PATTERN SELECT SW CIRCUIT

IF THE ELECTRONIC CONTROLLED TRANSMISSION PATTERN SELECT SW IS CHANGED FROM NORMAL TO POWER, THE CURRENT FLOWING THROUGH THE POWER INDICATOR FLOWS TO **GROUND,** CURRENT FLOWS TO **TERMINAL P** OF THE ENGINE CONTROL MODULE (ECU), THE ENGINE CONTROL MODULE (ECU) OPERATES, AND SHIFT UP AND SHIFT DOWN OCCUR AT HIGHER VEHICLE SPEEDS THAN WHEN THE SW IS IN **NORMAL** POSITION.

ELECTRONICALLY CONTROLLED TRANSMISSION AND A/T INDICATOR

SERVICE HINTS

E 7(A), E 8(B), E10(C) ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU) (TURN ON THE IGNITION SW)

S1, S2 – E1 : 9.0–14.0 VOLTS WITH SOLENOID ON
0–1.5 VOLTS WITH SOLENOID OFF
P – E1 : 7.5–14.0 VOLTS WITH IGNITION SW ON AND PATTERN SELECT SW AT **POWER** POSITION
L – E1 : 7.5–14.0 VOLTS WITH SHIFT LEVER AT **L** POSITION
2 – E1 : 7.5–14.0 VOLTS WITH SHIFT LEVER AT **2** POSITION
R – E1 : 7.5–14.0 VOLTS WITH SHIFT LEVER AT **R** POSITION
BK – E1 : 9.0–14.0 VOLTS WITH BRAKE PEDAL DEPRESSED
THW – E2 : 0.2–1.0 VOLTS WITH ENGINE COOLANT TEMP. **60**˚C (**140**˚F) –**120**˚C (**248**˚F)
IDL – E2 : 0–1.5 VOLTS WITH THROTTLE VALVE FULLY CLOSED
9.0–14.0 VOLTS WITH THROTTLE VALVE FULLY OPENED
VTA – E2 : 0.3–0.8 VOLTS WITH THROTTLE VALVE FULLY CLOSED
3.2–4.9 VOLTS WITH THROTTLE VALVE FULLY OPENED
VC – E2 : 4.5–5.5 VOLTS WITH IGNITION SW AT **ON** POSITION
0/D1 – E1 : 4.5–5.5 VOLTS WITH IGNITION SW AT **ON** POSITION
0/D2 – E1 : 9.0–14.0 VOLTS WITH O/D MAIN SW TURNED OFF
0–3.0 VOLTS WITH O/D MAIN SW TURNED ON
IGSW – E1 : 9.0–14.0 VOLTS WITH IGNITION SW AT **ON** POSITION
+B – E1 : 9.0–14.0 VOLTS WITH IGNITION SW AT **ON** POSITION
+B1 – E1 : 9.0–14.0 VOLTS WITH IGNITION SW AT **ON** POSITION
M–REL– E1 : 9.0–14.0 VOLTS WITH IGNITION SW AT **ON** POSITION

E 2 ELECTRONIC CONTROLLED TRANSMISSION SOLENOID
1, 2, 3–GROUND : EACH **11–15**

O 4 O/D MAIN SW
1–3 : CLOSED WITH O/D MAIN SW OFF, OPEN WITH O/D MAIN SW ON

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 7 A	30	E 8 B	28	S 8 B	31
C 8 B	30	E10 C	30	S 9 A	31
C 9 C	30	E11	30	S12	31
D 1	28	I 2	29	T 2	29
D 3	30	J 1	31	V 3	29
E 2	28	J 2	31	V 4	29
E 3	28	O 4	31		
E 7 A	28	P 1	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A, 1C, 1D, 1E, 1G, 1K, 1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3B, 3C, 3D	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IH3	36	COWL WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IM1, IM3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IN1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)

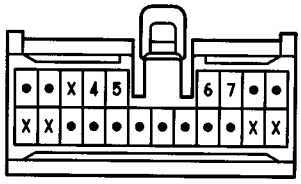
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
EC	34	INTAKE MANIFOLD RH
ED	34	INTAKE MANIFOLD LH
IE	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH

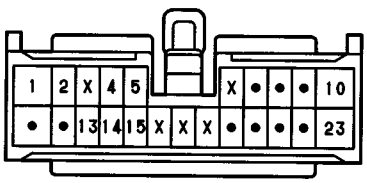
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 26	34	ENGINE WIRE	I 43	38	COWL WIRE
I 7	38	INSTRUMENT PANEL WIRE	I 86		
I 37	38	COWL WIRE	I 87	38	ENGINE WIRE
I 41			I 90	38	COWL WIRE

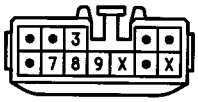
C 7 (A) GRAY



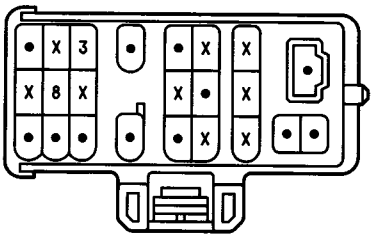
C 8 (B)



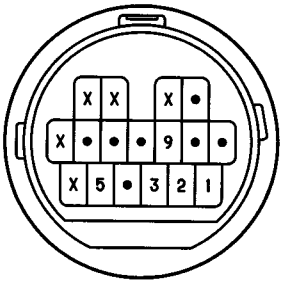
C 9 (C) BLUE



D 1 BLACK



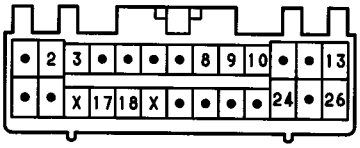
D 3 DARK GRAY



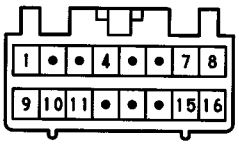
E 2 BLACK

E 3 GREEN

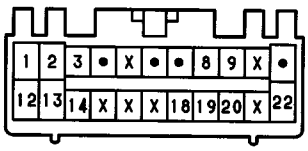
E 7 (A) DARK GRAY



E 8 (B) DARK GRAY

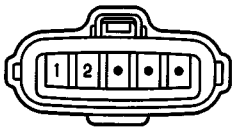


E10 (C) DARK GRAY

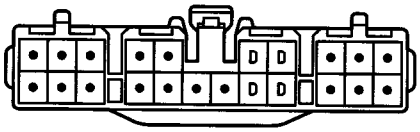


E11

I 2 BLACK

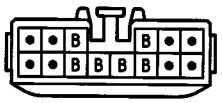


J 1 DARK GRAY



(HINT:SEE PAGE 7)

J 2

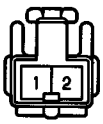


(HINT:SEE PAGE 7)

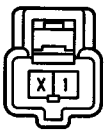
O 4 BLUE

P 1 GRAY

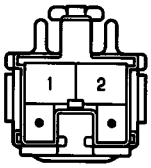
S 8 (B)



S 9 (A)



S12

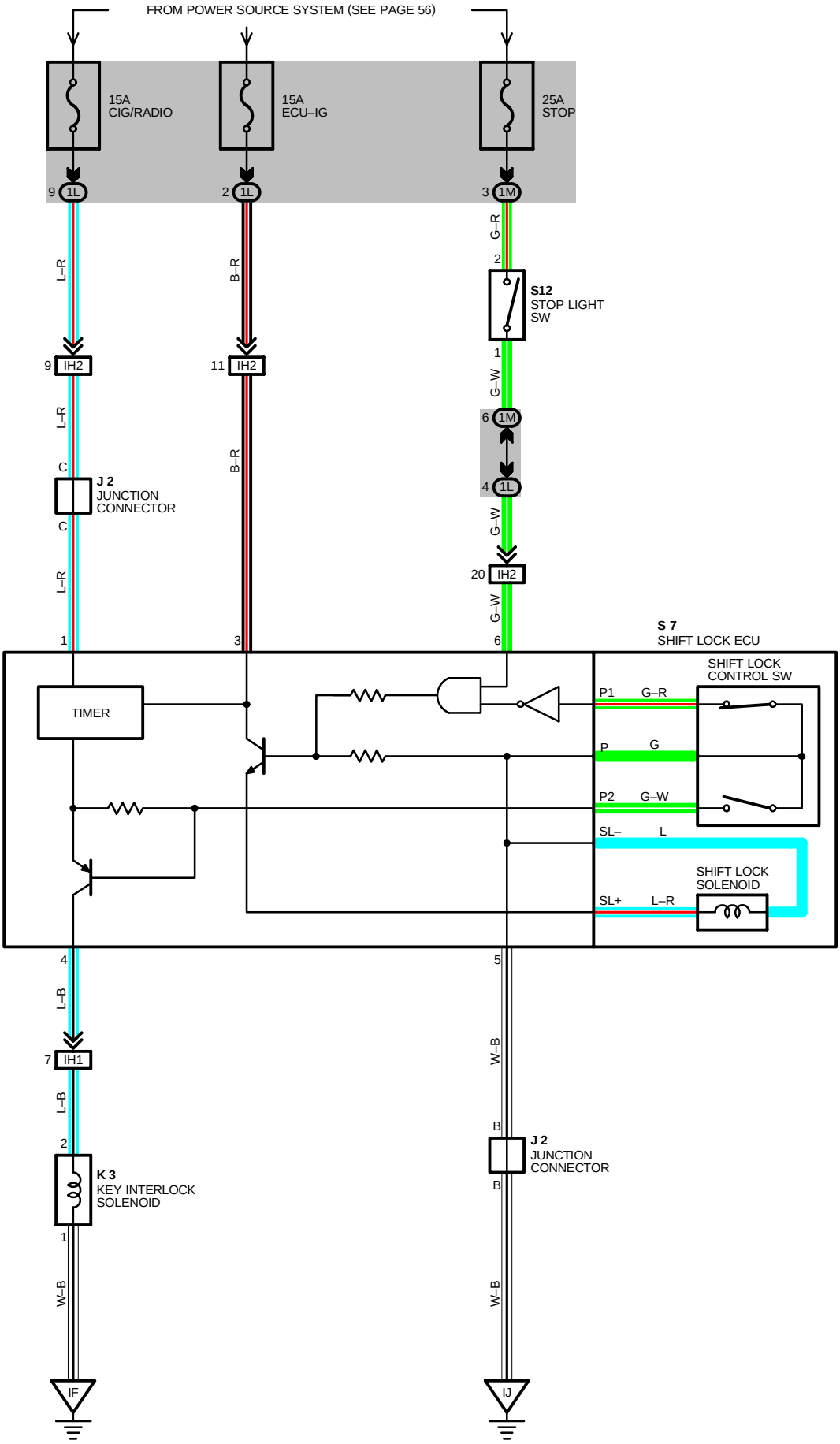


T 2 BLACK

V 3 BLACK

V 4

SHIFT LOCK


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
CIG/RADIO
15A
ECU–IG
25A
STOP
9 1L
2 1L
3 1M
L–R
B–R
G–R
2
S12
STOP LIGHT
SW
1
G–W
9 IH2
11 IH2
6 1M
4 1L
L–R
B–R
C
J 2
JUNCTION
CONNECTOR
C
20 IH2
G–W
L–R
1
3
6
S 7
SHIFT LOCK ECU
SHIFT LOCK
CONTROL SW
TIMER
P1
G–R
P
G
P2
G–W
SL–
L
SHIFT LOCK
SOLENOID
SL+
L–R
4
5
L–B
W–B
7 IH1
L–B
B
2
J 2
JUNCTION
CONNECTOR
B
K 3
KEY INTERLOCK
SOLENOID
1
W–B
W–B
IF
IJ

SYSTEM OUTLINE

WHEN THE IGNITION SW IS TURNED TO **ACC** POSITION THE CURRENT FROM THE **CIG/RADIO** FUSE FLOWS TO **TERMINAL 1** OF THE SHIFT LOCK ECU. WHEN THE IGNITION SW IS TURNED TO **ON** POSITION THE CURRENT FROM THE **ECU–IG** FUSE FLOWS TO **TERMINAL 3** OF THE ECU.

1. SHIFT LOCK MECHANISM

WITH THE IGNITION SW ON, WHEN A SIGNAL THAT THE BRAKE PEDAL IS DEPRESSED (STOP LIGHT SW ON) AND A SIGNAL THAT THE SHIFT LEVER IS PUT IN "P" POSITION (CONTINUITY BETWEEN P1 AND P OF THE SHIFT LOCK CONTROL SW) ARE INPUT TO THE ECU, THE ECU OPERATES AND CURRENT FLOWS FROM **TERMINAL 3** OF THE ECU → **TERMINAL SL+** OF THE SHIFT LOCK SOLENOID → SOLENOID → **TERMINAL SL–** → **TERMINAL 5** OF THE ECU → **GROUND.** THIS CAUSES THE SHIFT LOCK SOLENOID TO TURN ON (PLATE STOPPER DISENGAGES) AND THE SHIFT LEVER CAN SHIFT INTO OTHER RANGE THAN THE "P" POSITION.

2. KEY INTERLOCK MECHANISM

WITH THE IGNITION SW IN **ON** OR **ACC** POSITION, WHEN THE SHIFT LEVER IS PUT IN "P" POSITION (NO CONTINUITY BETWEEN P2 AND P OF SHIFT LOCK CONTROL SW), THE CURRENT FLOWING FROM **TERMINAL 4** OF THE ECU → KEY INTERLOCK SOLENOID IS CUT OFF. THIS CAUSES THE KEY INTERLOCK SOLENOID TO TURN OFF (LOCK LEVER DISENGAGES FROM **LOCK** POSITION) AND THE IGNITION KEY CAN BE TURNED FROM **ACC** TO **LOCK** POSITION. IF THE IGNITION IS LEFT IN **ACC** OR **ON** POSITION WITH THE SHIFT LEVER IN OTHER THAN "P" POSITION, THEN AFTER APPROX. ONE HOUR THE ECU OPERATES TO RELEASE THE LOCK.

SERVICE HINTS

S 9 SHIFT LOCK ECU

1–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
3–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
5–GROUND : ALWAYS CONTINUITY
6–GROUND : APPROX. **12** VOLTS WITH BRAKE PEDAL DEPRESSED
4–GROUND : **0** VOLTS WITH IGNITION SW AT **ACC** POSITION AND SHIFT LEVER POSITION IN **P** POSITION
6–12 VOLTS WITH IGNITION SW AT ACC POSITION AND SHIFT LEVER POSITION IN EXCEPT **P** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 2	31	**S 7**	31		
K 3	31	**S12**	31		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1L	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		

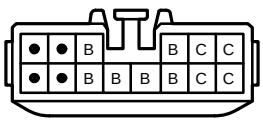
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)

▽ : GROUND POINTS

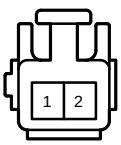
CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	LEFT KICK PANEL
IJ	36	RIGHT KICK PANEL

J 2

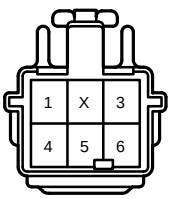


(HINT : SEE PAGE 7)

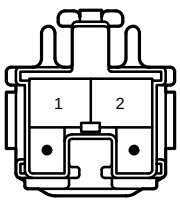
K 3



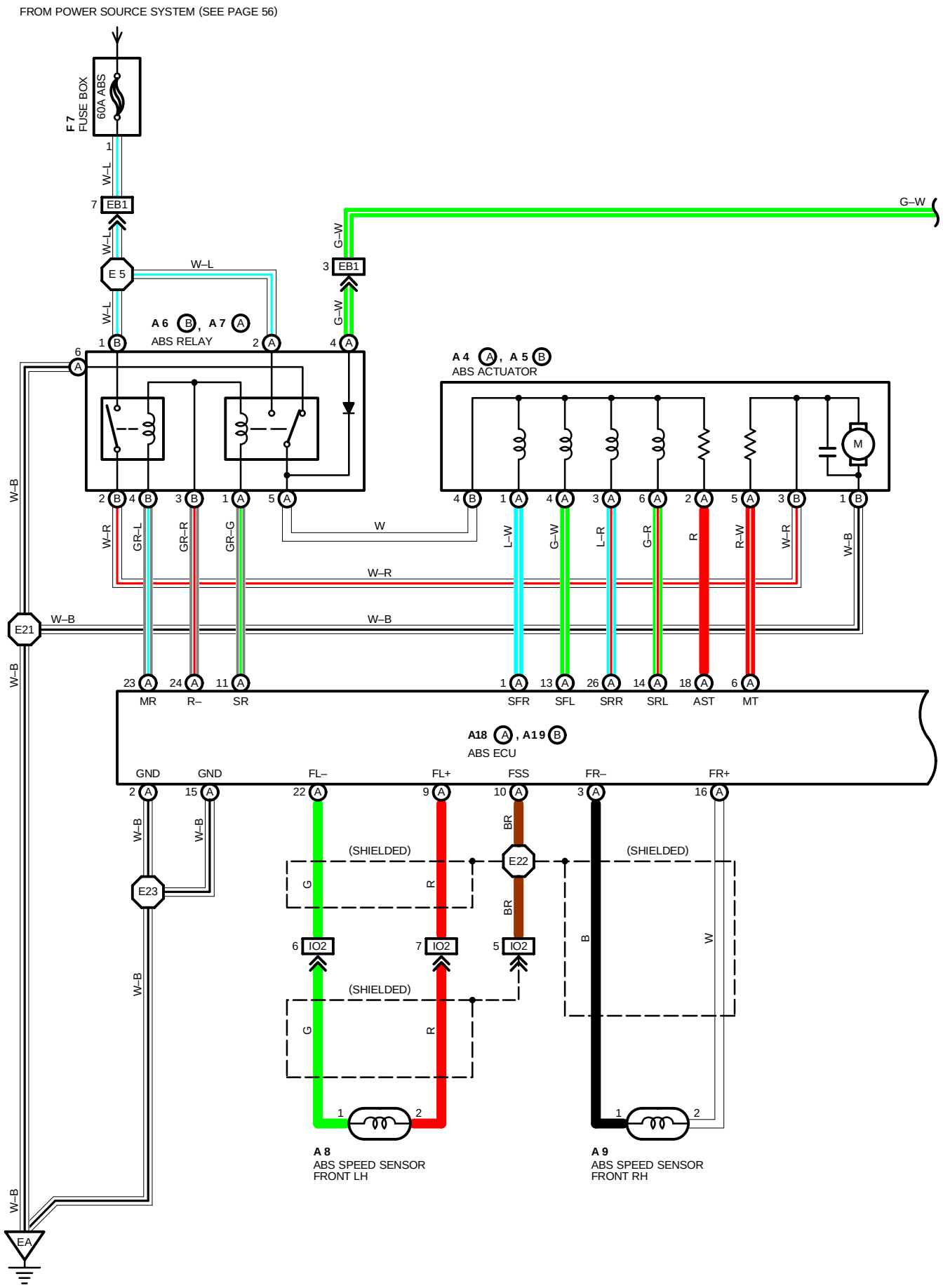
S 7

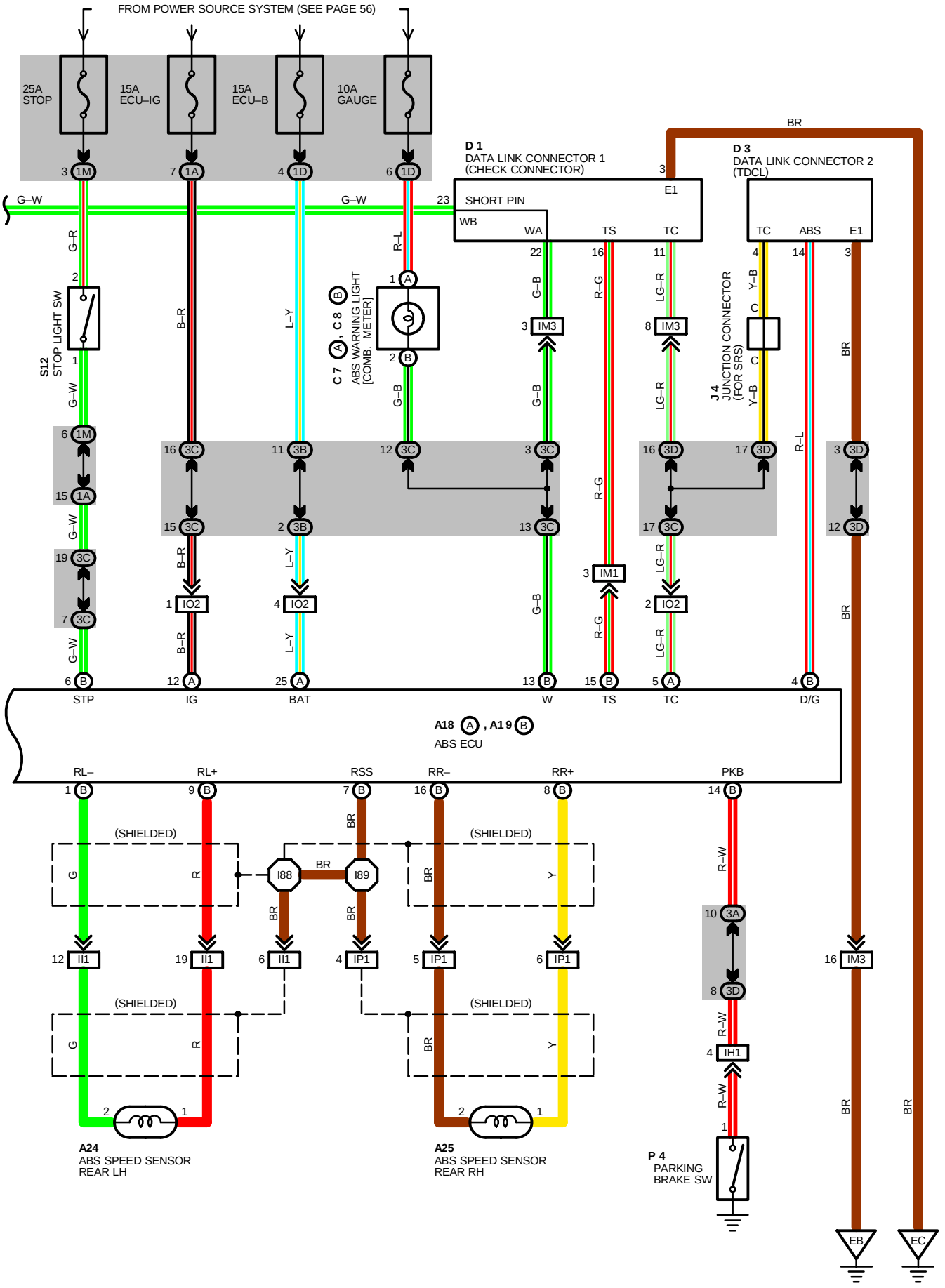


S12



ABS (ANTI–LOCK BRAKE SYSTEM)




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
25A STOP
15A ECU–IG
15A ECU–B
10A GAUGE
D 1
DATA LINK CONNECTOR 1
(CHECK CONNECTOR)
SHORT PIN
D 3
DATA LINK CONNECTOR 2
(TDCL)
BR
G–W
G–R
B–R
L–Y
R–L
G–B
R–G
LG–R
Y–B
S12
STOP LIGHT SW
C 7 , C 8
ABS WARNING LIGHT
[COMB. METER]
J 4
JUNCTION CONNECTOR
(FOR SRS)
STP
IG
BAT
W
TS
TC
D/G
A18 , A19
ABS ECU
RL–
RL+
RSS
RR–
RR+
PKB
(SHIELDED)
I88
I89
A24
ABS SPEED SENSOR
REAR LH
A25
ABS SPEED SENSOR
REAR RH
P 4
PARKING
BRAKE SW
EB
EC

ABS (ANTI–LOCK BRAKE SYSTEM)

SYSTEM OUTLINE

THIS SYSTEM CONTROLS THE RESPECTIVE BRAKE FLUID PRESSURES ACTING ON THE DISC BRAKE CYLINDERS OF THE RIGHT FRONT WHEEL, LEFT FRONT WHEEL AND REAR WHEELS WHEN THE BRAKES ARE APPLIED IN A PANIC STOP SO THAT THE WHEELS DO NOT LOCK. THIS RESULTS IN IMPROVED DIRECTIONAL STABILITY AND STEERABILITY DURING PANIC BRAKING.

1. INPUT SIGNALS

(1) SPEED SENSOR SIGNAL
THE SPEED OF THE WHEELS IS DETECTED AND INPUT TO **TERMINALS FL+, FR+, RL+** AND **RR+** OF THE ABS ECU.

(2) STOP LIGHT SW SIGNAL
A SIGNAL IS INPUT TO **TERMINAL STP** OF THE ABS ECU WHEN THE BRAKE PEDAL IS OPERATED.

(3) PARKING BRAKE SW SIGNAL
A SIGNAL IS INPUT TO **TERMINAL PKB** OF THE ABS ECU WHEN THE PARKING BRAKE IS OPERATED.

2. SYSTEM OPERATION

DURING SUDDEN BRAKING THE ABS ECU, WHICH HAS SIGNALS INPUT FROM EACH SENSOR, CONTROLS THE CURRENT FLOWING TO THE SOLENOID INSIDE THE ACTUATOR AND LETS THE HYDRAULIC PRESSURE ACTING ON EACH WHEEL CYLINDER ESCAPE TO THE RESERVOIR. THE PUMP INSIDE THE ACTUATOR IS ALSO OPERATING AT THIS TIME AND IT RETURNS THE BRAKE FLUID FROM THE RESERVOIR TO THE MASTER CYLINDER, THUS PREVENTING LOCKING OF THE VEHICLE WHEELS.

IF THE ECU JUDGES THAT THE HYDRAULIC PRESSURE ACTING ON THE WHEEL CYLINDER IS INSUFFICIENT, THE CURRENT ACTING ON THE SOLENOID IS CONTROLLED AND THE HYDRAULIC PRESSURE IS INCREASED. HOLDING OF THE HYDRAULIC PRESSURE IS ALSO CONTROLLED BY THE ECU, BY THE SAME METHOD AS ABOVE. BY REPEATED PRESSURE REDUCTION, HOLDING AND INCREASE ARE REPEATED TO MAINTAIN VEHICLE STABILITY AND TO IMPROVE STEERABILITY DURING SUDDEN BRAKING.

SERVICE HINTS

A18(A), A19(B) ABS ECU
(CONNECT THE ECU CONNECTOR)
(A) 5–GROUND } APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION AND DATA LINK CONNECTOR 1 (CHECK CONNECTOR)
(B)15–GROUND } **TS –E1** NOT CONNECTED
(A)11–GROUND, **(A)** 13–GROUND :
(A)14–GROUND, **(A)** 1–GROUND : } APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION ABS WARNING LIGHT GOES OFF
(A)26–GROUND, **(A)** 18–GROUND :
(A) 2–GROUND } ALWAYS CONTINUITY
(A)15–GROUND }
(A)12–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
(B) 6–GROUND : APPROX. **12** VOLTS WITH BRAKE PEDAL DEPRESSED
(A)25–GROUND : ALWAYS APPROX. **12** VOLTS
(A)14–GROUND : APPROX. **12** VOLTS WITH ENGINE RUNNING AND PARKING BRAKE PEDAL DEPRESSED OR PARKING LEVER PULLED UP

A 6(B), A 7(A) ABS RELAY
(B) 1, **(A)** 2–GROUND : ALWAYS APPROX. **12** VOLTS
(A) 6–GROUND : ALWAYS CONTINUITY

A 4(A), A 5(B) ABS ACTUATOR
(A) 2–GROUND : APPROX. **5** (IGNITION SW OFF)
(A) 1, **(A)** 3, **(A)** 4, **(A)** 6–GROUND : APPROX. **1.15** (IGNITION SW OFF)
(B) 1–GROUND : ALWAYS CONTINUITY

A 8, A 9 ABS SPEED SENSOR FRONT LH, RH
1–2 : APPROX. **1.07**K (**20**˚C, **68**˚F)

A24, A25 ABS SPEED SENSOR REAR LH, RH
1–2 : APPROX. **1.25**K (**20**˚C, **68**˚F)

P 4 PARKING BRAKE SW
1–GROUND : CLOSED WITH PARKING BRAKE LEVER PULLED UP

S10 STOP LIGHT SW
2–1 : CLOSED WITH BRAKE PEDAL DEPRESSED

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
A 4	A	28	A18	A	30	D 1	28
A 5	B	28	A19	B	30	D 3	30
A 6	B	28	A24		32	F 7	28
A 7	A	28	A25		32	J 4	31
A 8		28	C 7	A	30	P 4	31
A 9		28	C 8	B	30	S12	31

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1D		
1M		
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3B		
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

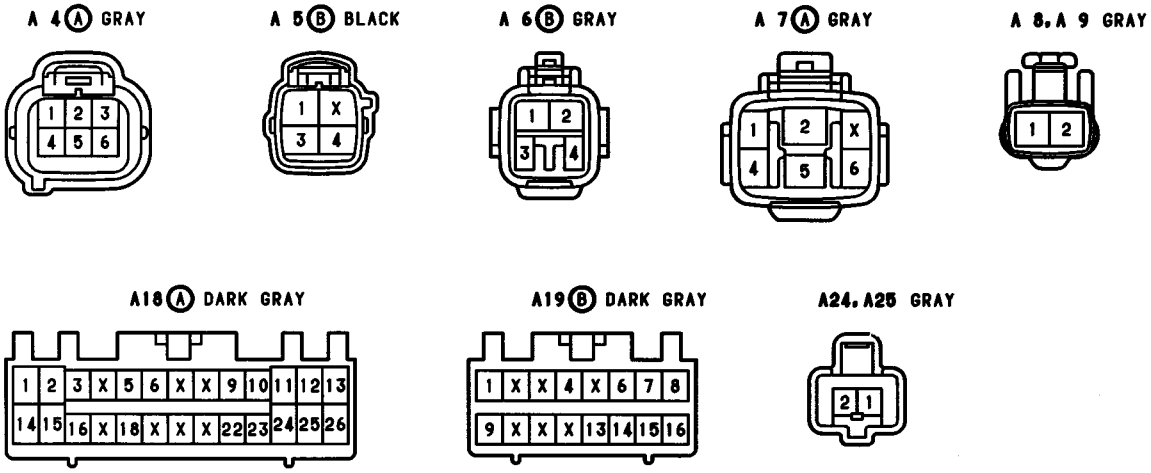
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB1	34	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
II1	36	FLOOR NO. 1 WIRE AND COWL WIRE (LEFT KICK PANEL)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		
IO2	38	ENGINE ROOM MAIN WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)

: GROUND POINTS

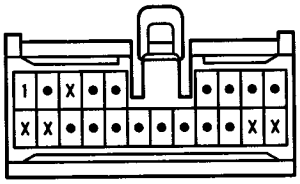
CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
EC	34	INTAKE MANIFOLD RH

: SPLICE POINTS

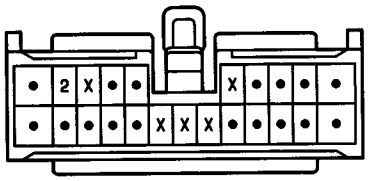
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 5	34	ENGINE ROOM MAIN WIRE	E 23	34	ENGINE ROOM MAIN WIRE
E 21			I 88	38	COWL WIRE
E 22			I 89		



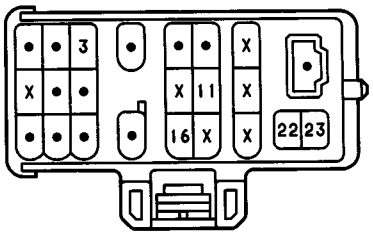
C 7 (A) GRAY



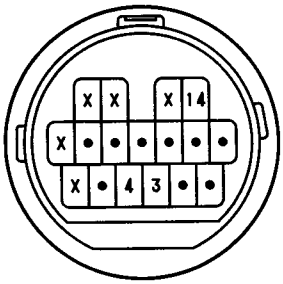
C 8 (B)



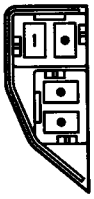
D 1 BLACK



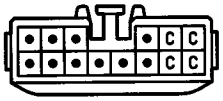
D 3 DARK GRAY



F 7



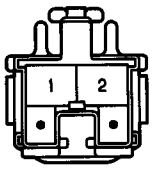
J 4



(HINT:SEE PAGE 7)

P 4

S12



NOTICE: When inspecting or repairing the SRS (supplemental restraint system), perform the operation in accordance with the following precautionary instructions and the procedure and precautions in the Repair Manual for the applicable model year.

- Malfunction symptoms of the 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.

- Work must be started after 90 seconds from the time the Ignition SW is set 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 of the battery, the SRS may be activated.)

  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 each memory system. When work is finished, reset the clock and audio system as before and adjust the clock. This vehicle has tilt and telescopic steering, power seat and outside rear view mirror and power shoulder belt anchorage, which are all equipped with memory function, it is not possible to make a record of the memory contents. So when the work is finished, therefore it will be necessary to explain this fact to the customer, and ask the customer to adjust the features and reset the memory.

  To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.

- When removing the steering wheel pad or handling a new steering wheel pad, keep the pad upper surface facing upward. Also, lock the lock lever of the twin lock type connector at the rear of the pad and take care not to damage the connector.

  (Storing the pad with its metallic surface up may lead to a serious accident if the SRS inflates for some reason.)

- Store the steering wheel pad where the ambient temperature remains below 93˚C (200˚F), without high humidity and away from electrical noise.

- Never use SRS parts from another vehicle. When replacing SRS parts, replace them with new parts.

- Never disassemble and repair the steering wheel pad, center SRS sensor assembly or front airbag sensors.

- Before repairing the body, remove the airbag sensors if during repair shocks are likely to be applied to the sensors due to vibration of the body or direct tapping with tools or other parts.

- Do not reuse a steering wheel pad or front airbag sensors.

  After evaluating whether the center airbag sensor assembly is damaged or not, decide whether or not to reuse it. (See the Repair Manual for the method for evaluating the center airbag sensor assembly.)

- When troubleshooting the supplemental restraint system, use a high–impedance (Min. 10k /V) tester.

- The wire harness of the supplemental restraint system is integrated with the cowl wire harness assembly, engine room main wire harness assembly and cowl No. 2 wire harness assembly.

  The vehicle wiring harness exclusively for the airbag system is distinguished by corrugated yellow tubing, as are the connectors.

- Do not measure the resistance of the airbag squib.

  (It is possible this will deploy the airbag and is very dangerous.)

- If the wire harness used in the supplemental restraint system is damaged, replace the whole wire harness assembly.

  When the connector to the airbag front sensors can be repaired alone (when there is no damage to the wire harness), use the repair wire specially designed for the purpose.

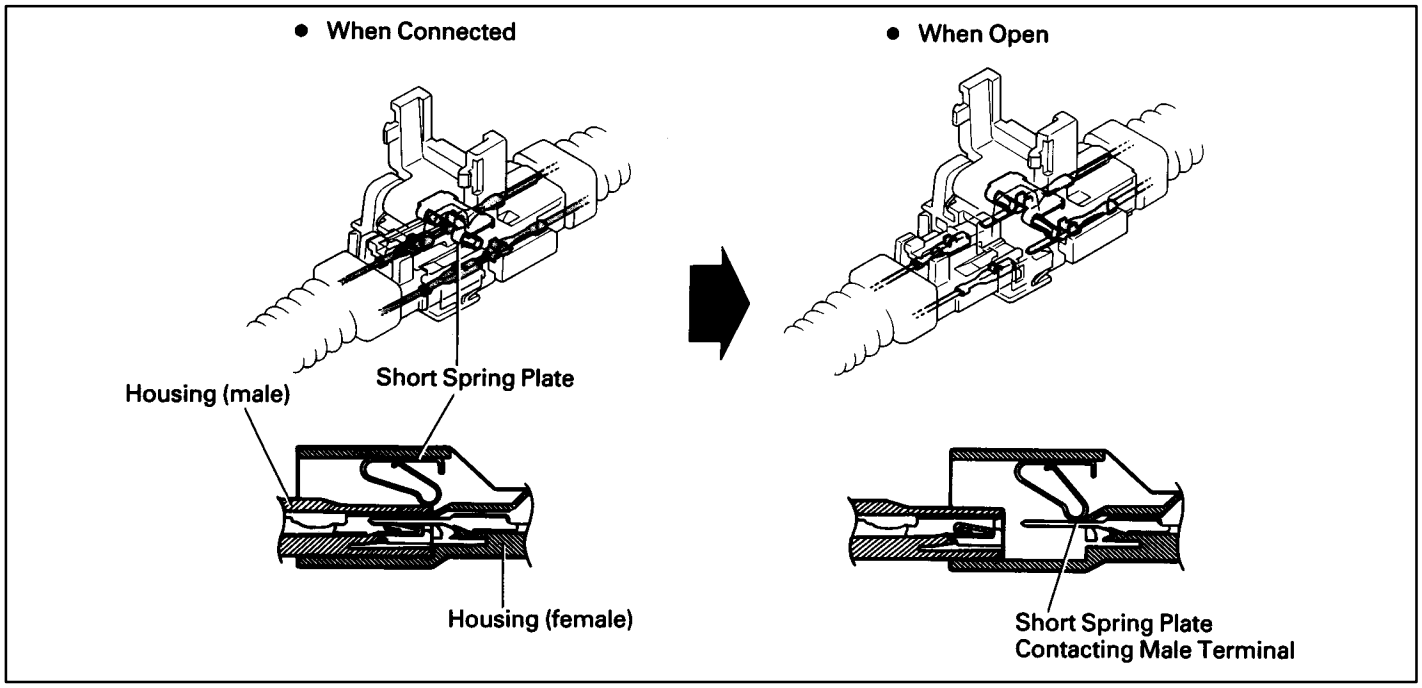
  (Refer to the Repair Manual for the applicable Model year for details of the replacement method.)

- INFORMATION LABELS (NOTICES) are attached to the periphery of the SRS components. Follow the instructions on the notices.

The supplemental restraint system has connectors which possess the functions described below:

1. SRS ACTIVATION PREVENTION MECHANISM

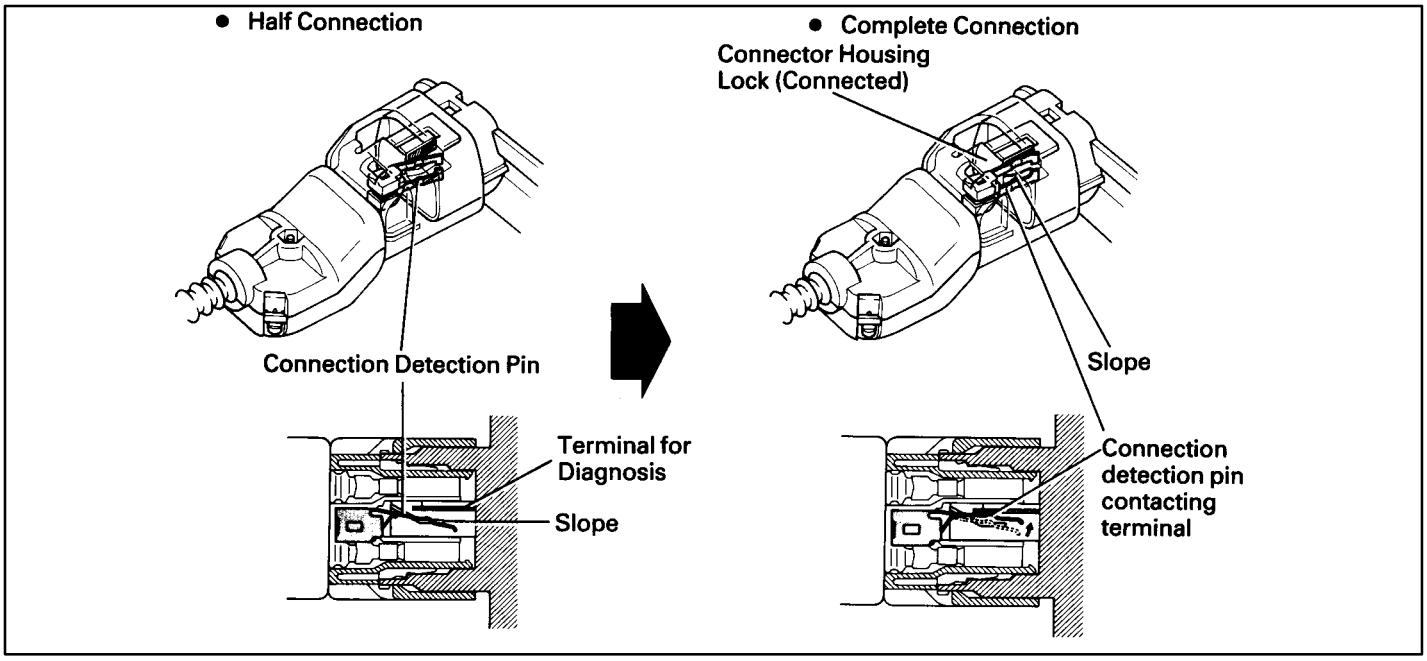
   Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the power source and grounding terminals of the squib to preclude a potential difference between the terminals.



2. ELECTRICAL CONNECTION CHECK MECHANISM

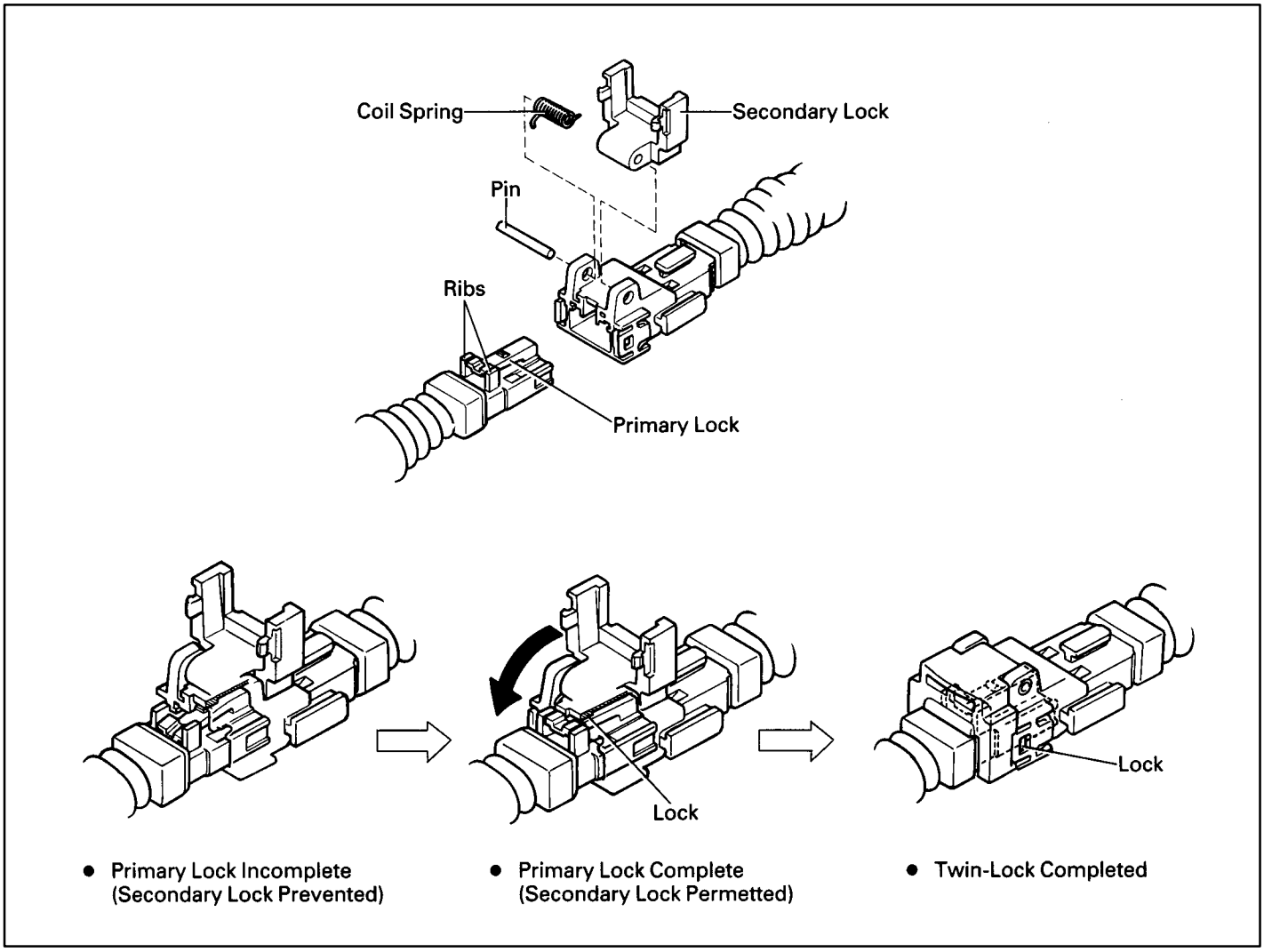
   This mechanism is designed to electrically check if connectors are connected correctly and completely.

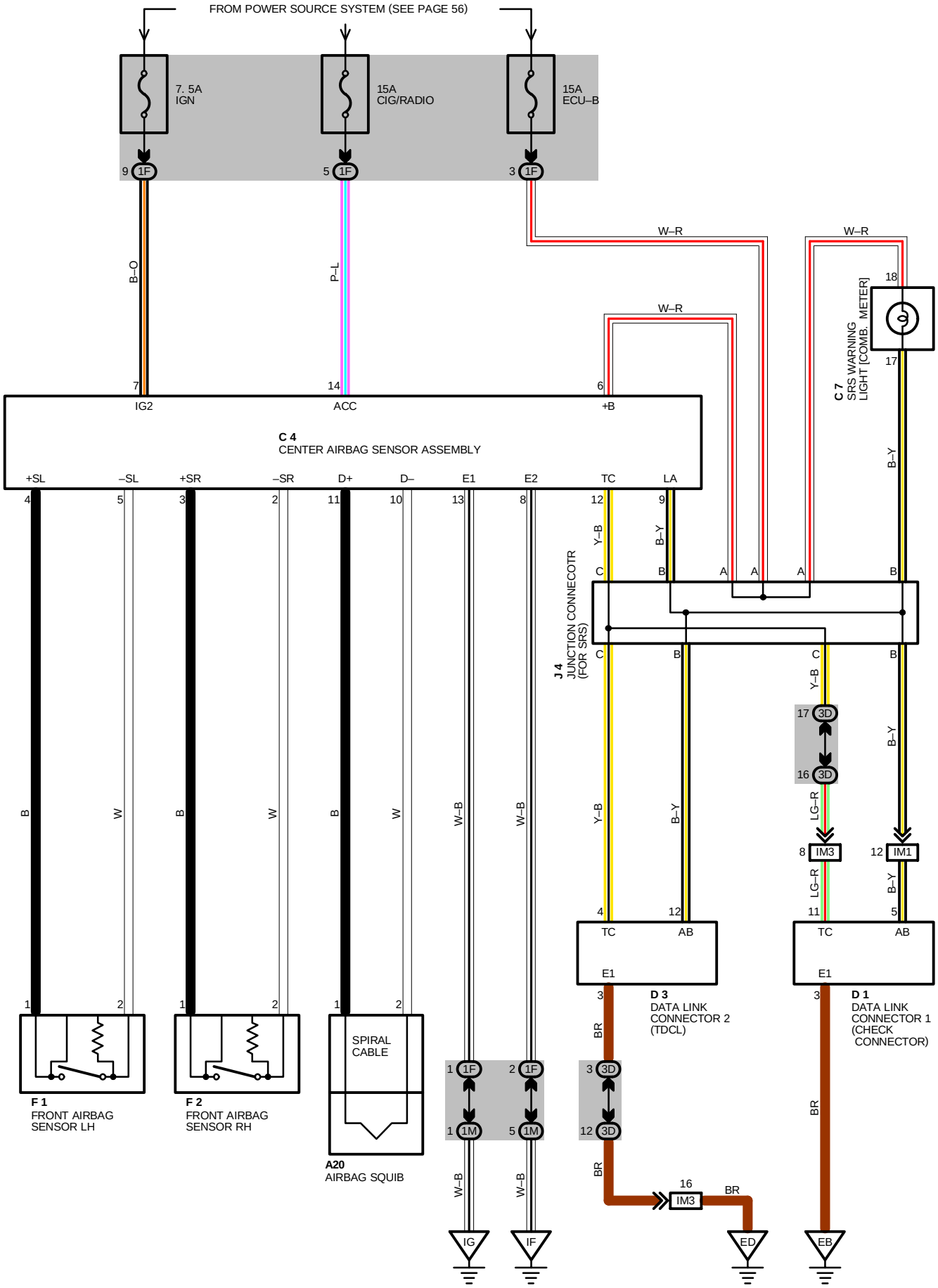
   The electrical connection check mechanism is designed so that the connection detection pin connects with the diagnosis terminals when the connector housing lock is in the locked condition.



3. CONNECTOR TWIN–LOCK MECHANISM

With this mechanism connectors (male and female connectors) are locked by two locking devices to increase connection reliability. If the primary lock is incomplete, ribs interfere and prevent the secondary lock.




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
7. 5A
IGN
15A
CIG/RADIO
15A
ECU–B
9 1F
5 1F
3 1F
B–O
P–L
W–R
W–R
W–R
7
IG2
14
ACC
6
+B
C 4
CENTER AIRBAG SENSOR ASSEMBLY
+SL
–SL
+SR
–SR
D+
D–
E1
E2
TC
LA
4
5
3
2
11
10
13
8
12
9
B
W
B
W
B
W
W–B
W–B
Y–B
B–Y
C
B
A
A
A
B
J 4
JUNCTION CONNECOTR
(FOR SRS)
C 7
SRS WARNING
LIGHT [COMB. METER]
18
17
B–Y
Y–B
17 3D
16 3D
LG–R
8 IM3
12 IM1
LG–R
B–Y
11
5
4
12
TC
AB
E1
3
BR
D 3
DATA LINK
CONNECTOR 2
(TDCL)
D 1
DATA LINK
CONNECTOR 1
(CHECK
CONNECTOR)
BR
1
2
1
2
1
2
SPIRAL
CABLE
1 1F
2 1F
1 1M
5 1M
3 3D
12 3D
BR
16
IM3
BR
W–B
W–B
IG
IF
ED
EB
F 1
FRONT AIRBAG
SENSOR LH
F 2
FRONT AIRBAG
SENSOR RH
A20
AIRBAG SQUIB

SYSTEM OUTLINE

THE SRS (SUPPLEMENTAL RESTRAINT SYSTEM) IS A DRIVER PROTECTION DEVICE WHICH HAS A SUPPLEMENTAL ROLE TO THE SEAT BELTS.
CURRENT FLOWS CONSTANTLY TO **TERMINAL 6** OF THE CENTER AIRBAG SENSOR ASSEMBLY. WHEN THE IGNITION SW IS TURNED TO ACC OR ON, CURRENT FROM THE **CIG/RADIO** FUSE FLOWS TO **TERMINAL 14** OF THE CENTER AIRBAG SENSOR ASSEMBLY. ONLY WHEN THE IGNITION SW IS ON DOES THE CURRENT FROM THE **IGN** FUSE TO **TERMINAL 7**.

IF AN ACCIDENT OCCURS WHILE DRIVING, DECELERATION CAUSED BY A FRONTAL IMPACT IS DETECTED BY EACH SENSOR AND SWITCH, AND WHEN THE FRONTAL IMPACT EXCEEDS A SET LEVEL (WHEN THE SAFING SENSOR BUILT INTO THE CENTER AIRBAG SENSOR ASSEMBLY IS ON AND THE CENTER AIRBAG SENSOR IS ON, FRONT AIRBAG SENSORS ARE OFF), CURRENT FROM THE **CIG** OR **IGN** FUSE FLOWS TO **TERMINAL 11** OF THE CENTER AIRBAG SENSOR ASSEMBLY → **TERMINAL 1** OF THE AIRBAG SQUIB → SQUIB → **TERMINAL 2** → **TERMINAL 10** OF CENTER AIRBAG SENSOR ASSEMBLY → **TERMINAL 8, TERMINAL 13** OR **BODY GROUND** → **GROUND.**
WHEN THE SAFING SENSOR BUILT INTO THE CENTER AIRBAG SENSOR ASSEMBLY IS ON AND THE FRONT AIRBAG SENSOR LH OR RH IS ON, CENTER AIRBAG SENSOR IS OFF CURRENT FROM THE **CIG/RADIO** OR **IGN** FUSE FLOWS TO **TERMINAL 11** OF THE CENTER AIRBAG SENSOR ASSEMBLY → **TERMINAL 1** OF THE AIRBAG SQUIB → SQUIB → **TERMINAL 2** → **TERMINAL 10** OF CENTER AIRBAG SENSOR ASSEMBLY → **TERMINAL 4** OR **3** → **TERMINAL 1** OF FRONT AIRBAG SENSOR → **TERMINAL 2** → **TERMINAL 5** OR **2** OF CENTER AIRBAG SENSOR ASSEMBLY → **TERMINAL 8, TERMINAL 13** OR **BODY GROUND** → **GROUND.**
WHEN THE SAFING SENSOR BUILT INTO THE CENTER AIRBAG SENSOR ASSEMBLY IS ON, AND THE FRONT AIRBAG SENSOR LH OR RH IS ON AND CENTER AIRBAG SENSOR IS ON ONE OF THE ABOVE–MENTIONED CIRCUITS IS ACTIVATED SO THAT CURRENT FLOWS TO THE AIRBAG SQUIB AND CAUSES IT TO OPERATE. THE BAG STORED INSIDE THE STEERING WHEEL PAD IS INSTANTANEOUSLY EXPANDED TO SOFTEN THE SHOCK TO THE DRIVER.

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A20	30	**D 1**	28	**F 2**	28
C 4	28	**D 3**	30	**J 4**	31
C 7	30	**F 1**	28		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1F	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		
3D	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)

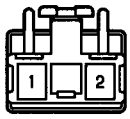
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		

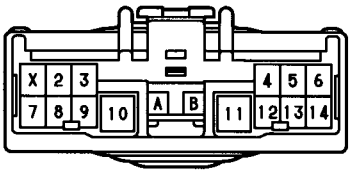
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
ED	34	INTAKE MANIFOLD LH
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH

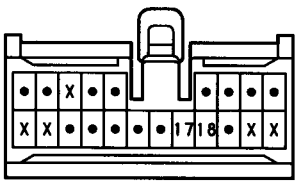
A20 YELLOW



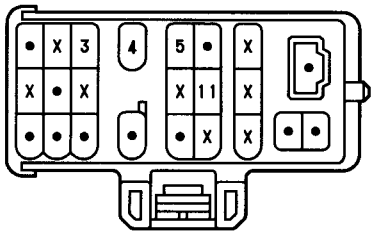
C 4 YELLOW



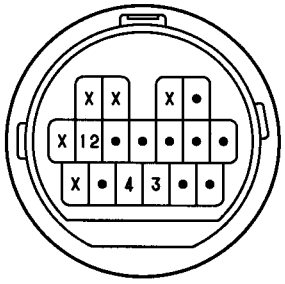
C 7 GRAY



D 1 BLACK

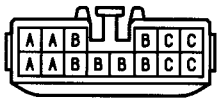


D 3 DARK GRAY

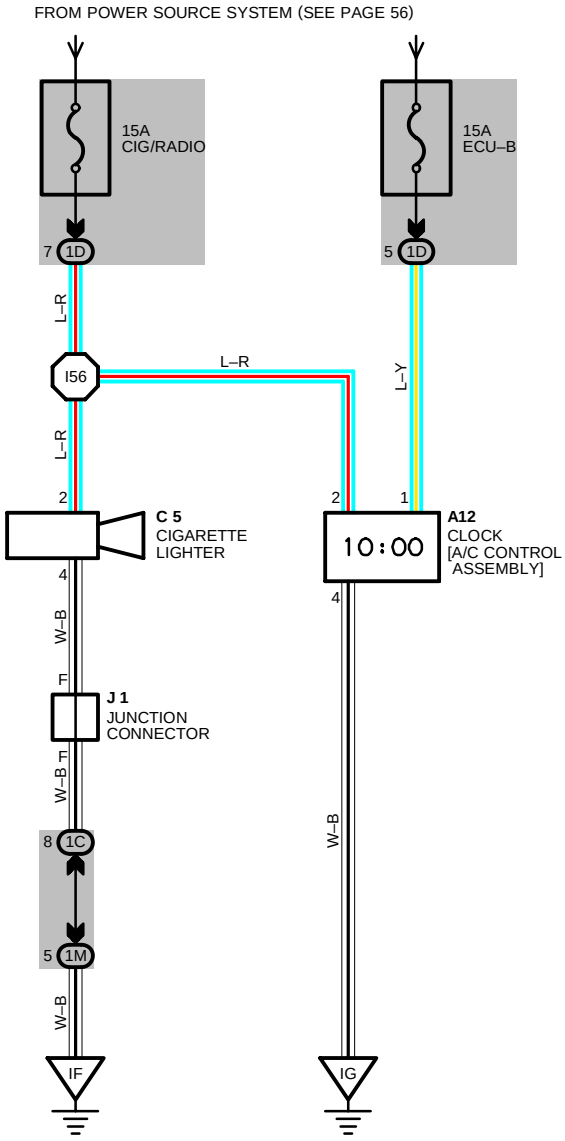


F 1, F 2 YELLOW

J 4



(HINT:SEE PAGE 7)



SERVICE HINTS

C 5 CIGARETTE LIGHTER

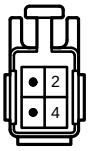
2–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
4–GROUND : ALWAYS CONTINUITY

A12 CLOCK

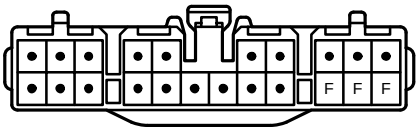
1–GROUND : ALWAYS **12** VOLTS(POWER FOR CLOCK)
2–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION (POWER FOR INDICATION)
4–GROUND : ALWAYS CONTINUITY

A12 BLUE

C 5 DARK GRAY



J 1 DARK GRAY



(HINT : SEE PAGE 7)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A12	30	**C 5**	30	**J 1**	31

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1D		
1M		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

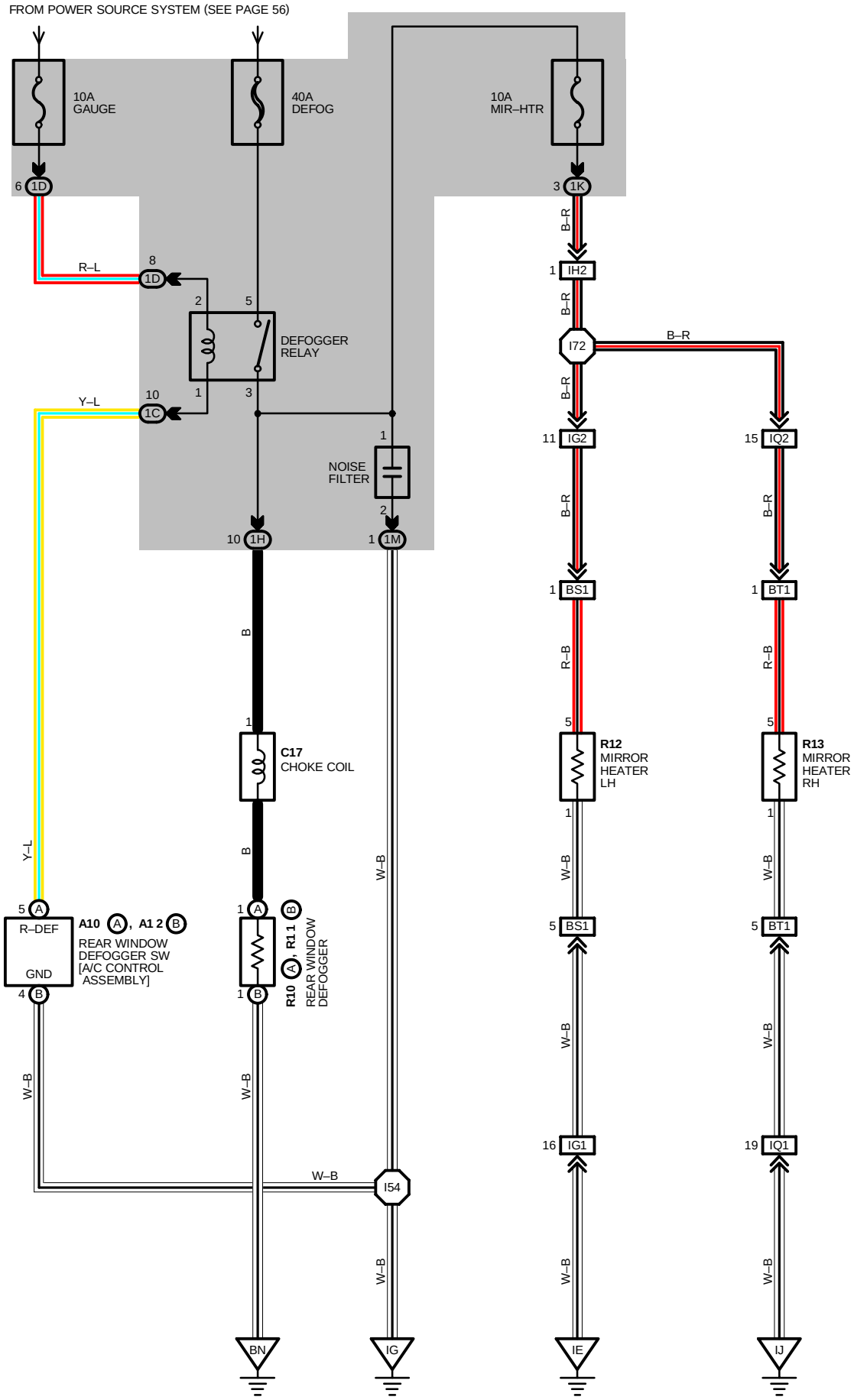
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I56	38	COWL WIRE			

REAR WINDOW DEFOGGER AND MIRROR HEATER



SERVICE HINTS

DEFOGGER RELAY

5–3 : CLOSED WITH IGNITION SW AT **ON** POSITION AND DEFOGGER SW (A/C CONTROL ASSEMBLY) ON

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
A10	A	30	**R10**	A	32	**R13**	32
A12	B	30	**R11**	B	32		
C17		32	**R12**		32		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1D		
1H	20	FLOOR NO. 1 WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1K	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

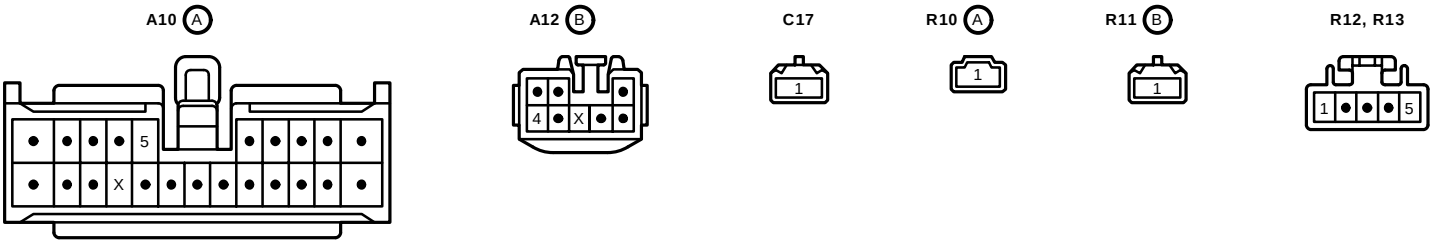
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG2		
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IQ2		
BS1	40	MIRROR LH WIRE AND FRONT DOOR LH WIRE (FRONT LH DOOR INSIDE)
BT1	40	MIRROR RH WIRE AND FRONT DOOR RH WIRE (FRONT RH DOOR INSIDE)

: GROUND POINTS

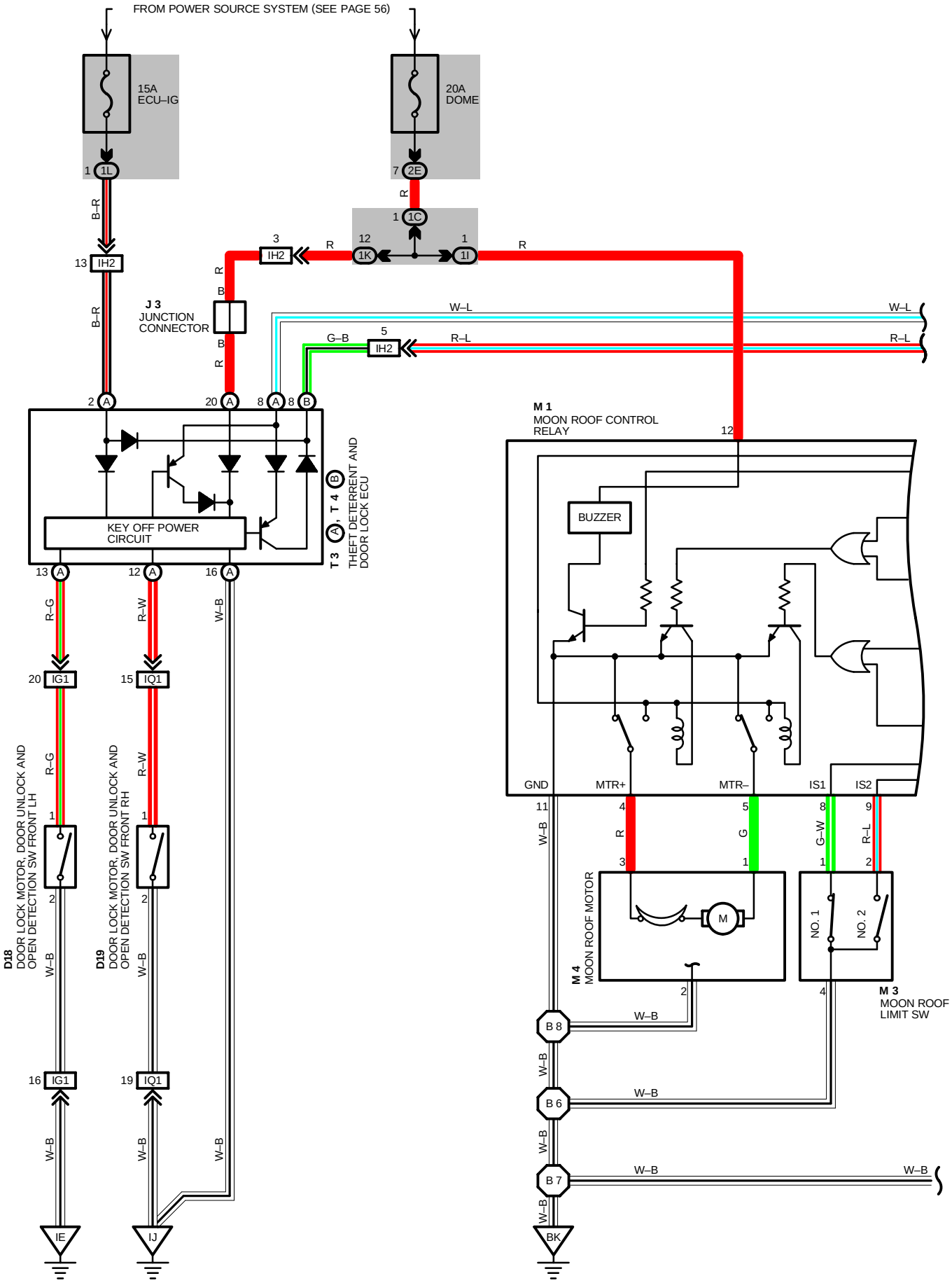
CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL
BN	36	LEFT QUARTER PILLAR

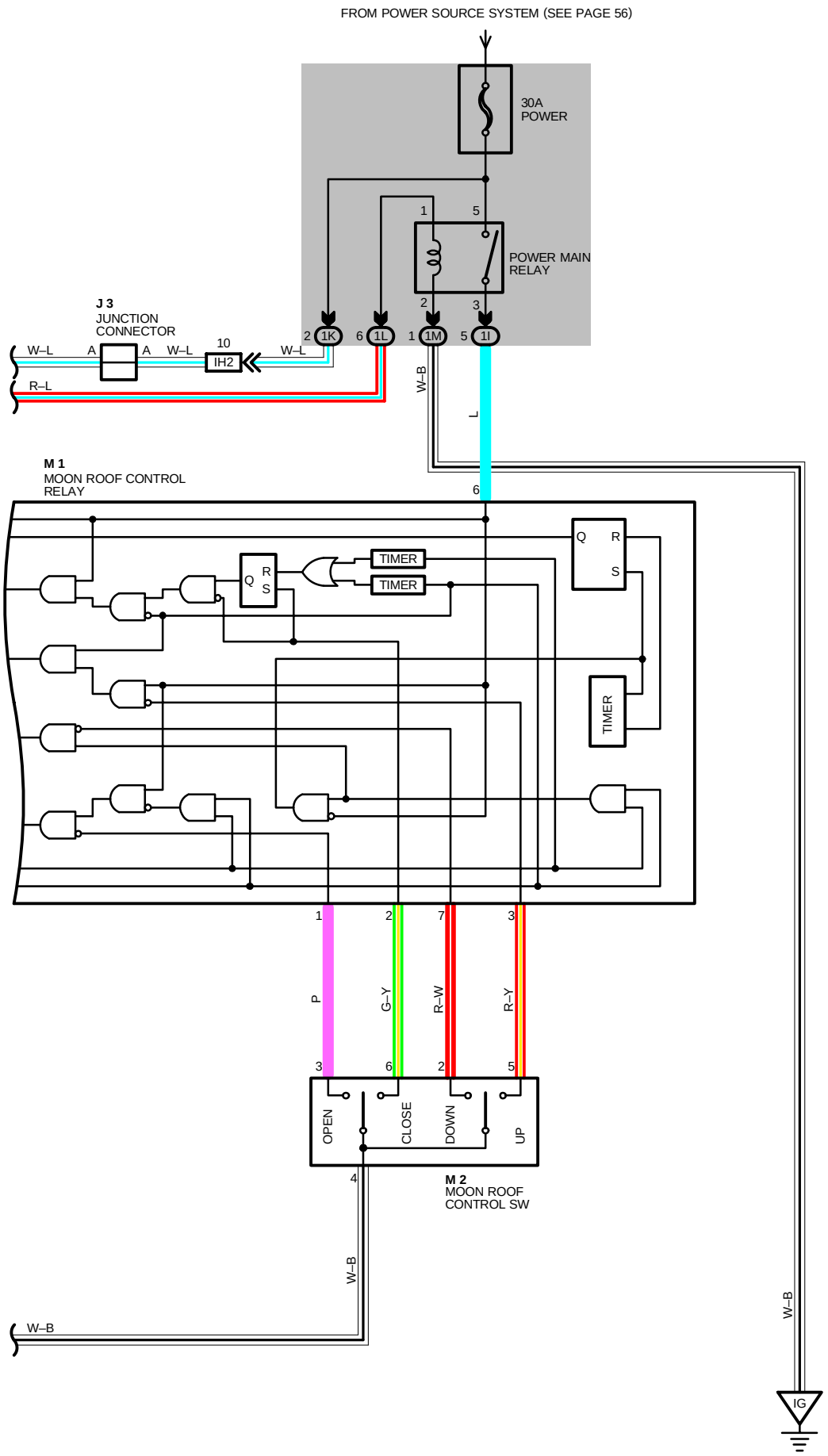
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 54	38	COWL WIRE	**I 72**	38	INSTRUMENT PANEL WIRE



MOON ROOF


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
ECU–IG
20A
DOME
1L
2E
1C
IH2
1K
1I
J 3
JUNCTION
CONNECTOR
W–L
G–B
R–L
KEY OFF POWER
CIRCUIT
T 3 , T 4
THEFT DETERRENT AND
DOOR LOCK ECU
M 1
MOON ROOF CONTROL
RELAY
BUZZER
GND
MTR+
MTR–
IS1
IS2
IG1
IQ1
D18
DOOR LOCK MOTOR, DOOR UNLOCK AND
OPEN DETECTION SW FRONT LH
D19
DOOR LOCK MOTOR, DOOR UNLOCK AND
OPEN DETECTION SW FRONT RH
M 4
MOON ROOF MOTOR
M 3
MOON ROOF
LIMIT SW
NO. 1
NO. 2
B 8
B 6
B 7
IE
IJ
BK


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
30A
POWER
1
5
POWER MAIN
RELAY
2
3
J 3
JUNCTION
CONNECTOR
W–L
A
A
W–L
10
IH2
W–L
R–L
2 1K
6 1L
1 1M
5 1I
W–B
L
M 1
MOON ROOF CONTROL
RELAY
6
Q
R
S
TIMER
TIMER
TIMER
1
2
7
3
P
G–Y
R–W
R–Y
3
6
2
5
OPEN
CLOSE
DOWN
UP
4
M 2
MOON ROOF
CONTROL SW
W–B
W–B
W–B
IG

MOON ROOF

SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH **POWER** FUSE TO **TERMINAL 5** OF POWER MAIN RELAY AND ALSO THROUGH **DOME** FUSE TO **TERMINAL 12** OF MOON ROOF CONTROL RELAY.

WHEN THE IGNITION SW TURNED ON, THE CURRENT FLOWS FROM **TERMINAL 1** OF POWER MAIN RELAY → **TERMINAL 2** → TO **GROUND** THROUGH **ECU–IG** FUSE. AS A RESULT, POWER MAIN RELAY IS ACTIVATED AND THE CURRENT TO **TERMINAL 5** OF POWER MAIN RELAY FLOWS FROM **TERMINAL 3** OF RELAY TO **TERMINAL 6** OF MOON ROOF CONTROL RELAY.

1. SLIDE OPEN OPERATION

WHEN THE IGNITION SW IS TURNED ON AND THE MOON ROOF CONTROL SW IS PUSHED TO THE **OPEN** POSITION, A SIGNAL IS INPUT FROM **TERMINAL 3** OF MOON ROOF CONTROL SW TO **TERMINAL 1** OF MOON ROOF CONTROL RELAY. WHEN THIS OCCURS, THE RELAY IS ACTIVATED AND THE CURRENT TO **TERMINAL 6** OF MOON ROOF CONTROL RELAY FLOWS FROM **TERMINAL 5** → **TERMINAL 1** OF MOON ROOF MOTOR → **TERMINAL 3** → **TERMINAL 4** OF MOON ROOF CONTROL RELAY → **TERMINAL 11** → TO **GROUND** AND ROTATES THE MOTOR TO OPEN THE MOON ROOF WHILE THE SW IS BEING PUSHED TO **OPEN** POSITION.

2. SLIDE CLOSE OPERATION

WITH THE IGNITION SW TURNED ON, THE MOON ROOF COMPLETELY OPEN AND MOON ROOF LIMIT SW NO.1 AND NO. 2 BOTH ON, WHEN THE MOON ROOF CONTROL SW IS PUSHED TO THE **CLOSE** POSITION A SIGNAL IS INPUT FROM **TERMINAL 6** OF MOON ROOF CONTROL SW TO **TERMINAL 2** OF MOON ROOF CONTROL RELAY.

WHEN THIS OCCURS, THE RELAY IS ACTIVATED AND THE CURRENT TO **TERMINAL 6** OF MOON ROOF CONTROL RELAY FLOWS FROM **TERMINAL 4** → **TERMINAL 3** OF MOON ROOF MOTOR → **TERMINAL 1** → **TERMINAL 5** OF MOON ROOF CONTROL RELAY → **TERMINAL 11** → TO **GROUND** AND ROTATES THE MOTOR TO CLOSE THE MOON ROOF WHILE THE SW IS BEING PUSHED TO **CLOSE** POSITION.

MOON ROOF LIMIT SW NO. 1 TURNS OFF (LIMIT SW NO. 2 IS ON) AND A **100MM** BEFORE FULLY **CLOSE** POSITION, SIGNAL IS INPUT FROM **TERMINAL 1** OF LIMIT SW NO. 1 TO **TERMINAL 8** OF MOON ROOF CONTROL RELAY. THIS SIGNAL ACTIVATES THE RELAY AND STOPS CONTINUITY FROM **TERMINAL 6** OF MOON ROOF CONTROL RELAY TO **TERMINAL 11**. AS A RESULT, THE MOON ROOF STOPS AT THIS POSITION.

TO CLOSE THE MOON ROOF COMPLETELY, PUSHING THE MOON ROOF CONTROL SW AGAIN TO THE CLOSE SIDE CAUSES A SIGNAL TO BE INPUT AGAIN TO **TERMINAL 2** OF MOON ROOF CONTROL RELAY. THIS ACTIVATES THE RELAY AND THE MOON ROOF WILL CLOSE AS LONG AS THE MOON ROOF CONTROL SW IS BEING PUSHED, ALLOWING THE MOON ROOF TO FULLY CLOSE.

3. TILT UP OPERATION

WHEN THE MOON ROOF CONTROL SW IS PUSHED TO **TILT UP** POSITION, WITH THE IGNITION SW TURNED ON AND THE MOON ROOF COMPLETELY CLOSED (MOON ROOF LIMIT SW NO. 2 IS OFF), A SIGNAL IS INPUT FROM **TERMINAL 5** OF MOON ROOF CONTROL SW TO **TERMINAL 3** OF MOON ROOF CONTROL RELAY. AS A RESULT, THE RELAY IS ACTIVATED AND THE CURRENT TO **TERMINAL 6** OF RELAY FLOWS FROM **TERMINAL 4** OF RELAY → **TERMINAL 3** OF MOON ROOF MOTOR → **TERMINAL 1** → **TERMINAL 5** OF RELAY → **TERMINAL 11** TO **GROUND** AND ROTATES THE MOTOR SO THAT TILT UP OPERATION OCCURS AS LONG AS THE MOON ROOF CONTROL SW IS PUSHED ON THE TILT UP SIDE.

4. TILT DOWN OPERATION

WHEN THE MOON ROOF CONTROL SW IS PUSHED TO **TILT DOWN** POSITION, WITH THE IGNITION SW TURNED ON AND THE MOON ROOF TILTED UP (NO. 1 AND NO. 2 MOON ROOF LIMIT SWITCHES ARE BOTH OFF), A SIGNAL IS INPUT FROM **TERMINAL 2** OF MOON ROOF CONTROL SW TO **TERMINAL 7** OF MOON ROOF CONTROL RELAY.

AS THE RESULT, THE RELAY IS ACTIVATED AND THE CURRENT TO **TERMINAL 6** OF RELAY FLOWS FROM **TERMINAL 5** OF RELAY → **TERMINAL 1** OF MOON ROOF MOTOR → **TERMINAL 3** → **TERMINAL 4** OF RELAY → **TERMINAL 11** → TO **GROUND** AND ROTATES THE MOTOR SO THAT TILT DOWN OPERATION OCCURS AS LONG AS THE MOON ROOF CONTROL SW IS PUSHED ON THE TILT DOWN SIDE. (DURING TILT DOWN, LIMIT SW NO. 1 IS CHANGED OFF TO ON.)

5. KEY OFF MOON ROOF OPERATION

WITH THE IGNITION SW TURNED FROM ON TO OFF, THE THEFT DETERRENT AND DOOR LOCK ECU OPERATES AND CURRENT FLOWS FROM POWER FUSE TO **TERMINAL (A)8** OF THE ECU OR **DOME** FUSE TO **TERMINAL (A)20** OF THE ECU → **TERMINAL (B)8** → **TERMINAL 1** OF POWER MAIN RELAY → **TERMINAL 2** → TO **GROUND** FOR ABOUT **60** SECONDS. THE SAME AS NORMAL OPERATION, THE CURRENT FLOWS FROM POWER FUSE → **TERMINAL 5** OF THE POWER MAIN RELAY → **TERMINAL 3** → **TERMINAL 6** OF THE MOON ROOF CONTROL RELAY. AS A RESULT, FOR ABOUT **60** SECONDS AFTER THE IGNITION SW IS TURNED OFF, THE FUNCTIONING OF THIS RELAY MAKES IT POSSIBLE TO OPEN AND CLOSE THE MOON ROOF. ALSO, BY OPENING THE FRONT DOOR (DOOR DETECT SW ON) WITHIN ABOUT **60** SECONDS AFTER TURNING THE IGNITION SW TO OFF, A SIGNAL IS INPUT TO **TERMINAL (A)12** OR **(A)13** OF THEFT DETERRENT AND DOOR LOCK ECU. AS A RESULT, THE ECU TURNS OFF AND OPEN AND CLOSE MOVEMENT OF THE MOON ROOF STOPS.

SYSTEM OUTLINE

6. TILT UP REMINDER SYSTEM

WITH THE IGNITION SW IS SWITCHED FROM **ON** TO **ACC** OR **OFF**, AND **60** SECONDS THEN ELAPSES OR THE FRONT DOOR IS OPENED, A SIGNAL IS INPUT TO **TERMINAL 6** OF THE MOON ROOF CONTROL RELAY. AT THIS TIME, MOON ROOF LIMIT SW NO. 1 AND NO. 2 ARE OFF, SO SIGNALS ARE INPUT TO **TERMINALS 8** AND **9** OF MOON ROOF CONTROL RELAY THAT THE MOON ROOF IS IN THE TILT OPERATION POSITION. WHEN THESE SIGNALS ARE INPUT TO THE MOON ROOF CONTROL RELAY, THE TIMER BUILT INTO THE RELAY OPERATES.

THUS THE CURRENT TO **TERMINAL 12** OF MOON ROOF CONTROL RELAY FLOWS THROUGH BUZZER OF MOON ROOF CONTROL RELAY AND **TERMINAL 11** OF MOON ROOF CONTROL RELAY TO **GROUND** AND THE BUZZER SOUNDS ABOUT **8** TIMES TO NOTIFY THAT THE MOON ROOF IS STILL IN THE TILT UP CONDITION.

SERVICE HINTS

POWER MAIN RELAY

5–3 : CLOSED WITH IGNITION SW AT **ON** POSITION

M 1 MOON ROOF CONTROL RELAY

11–GROUND : ALWAYS CONTINUITY
6–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
4–GROUND : APPROX. **12** VOLTS WITH IGNITION SW ON, AND MOON ROOF CONTROL SW AT **CLOSE** OR **UP** POSITION (EXCEPT APPROX. **100 MM** (**3.941** IN.) BEFORE FULLY **CLOSED** POSITION
5–GROUND : APPROX. **12** VOLTS WITH IGNITION SW ON, AND MOON ROOF CONTROL SW AT **OPEN** OR **DOWN** POSITION
12–GROUND : ALWAYS APPROX. **12** VOLTS

M 2 MOON ROOF CONTROL SW

5–4 : CLOSED WITH MOON ROOF CONTROL SW AT **UP** POSITION
6–4 : CLOSED WITH MOON ROOF CONTROL SW AT **CLOSE** POSITION
2–4 : CLOSED WITH MOON ROOF CONTROL SW AT **DOWN** POSITION
3–4 : CLOSED WITH MOON ROOF CONTROL SW AT **OPEN** POSITION
4–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
D18	32	**M 1**	32	**M 4**		32
D19	32	**M 2**	32	**T 3**	A	31
J 3	31	**M 3**	32	**T 4**	B	31

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1I	20	ROOF WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1K	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1L		
1M		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

▽ : GROUND POINTS

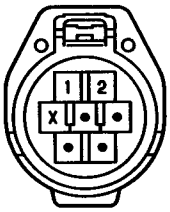
CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH
IJ	36	RIGHT KICK PANEL
BK	40	ROOF LEFT

⯃ : SPLICE POINTS

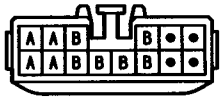
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 6	40	ROOF WIRE	**B 8**	40	ROOF WIRE
B 7					

MOON ROOF

D18, D19 GRAY

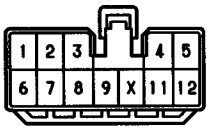


J 3 DARK GRAY



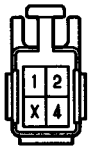
(HINT:SEE PAGE 7)

M 1



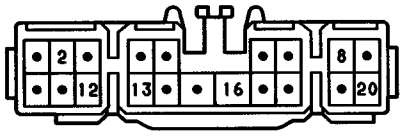
M 2

M 3

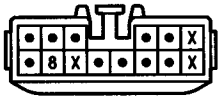


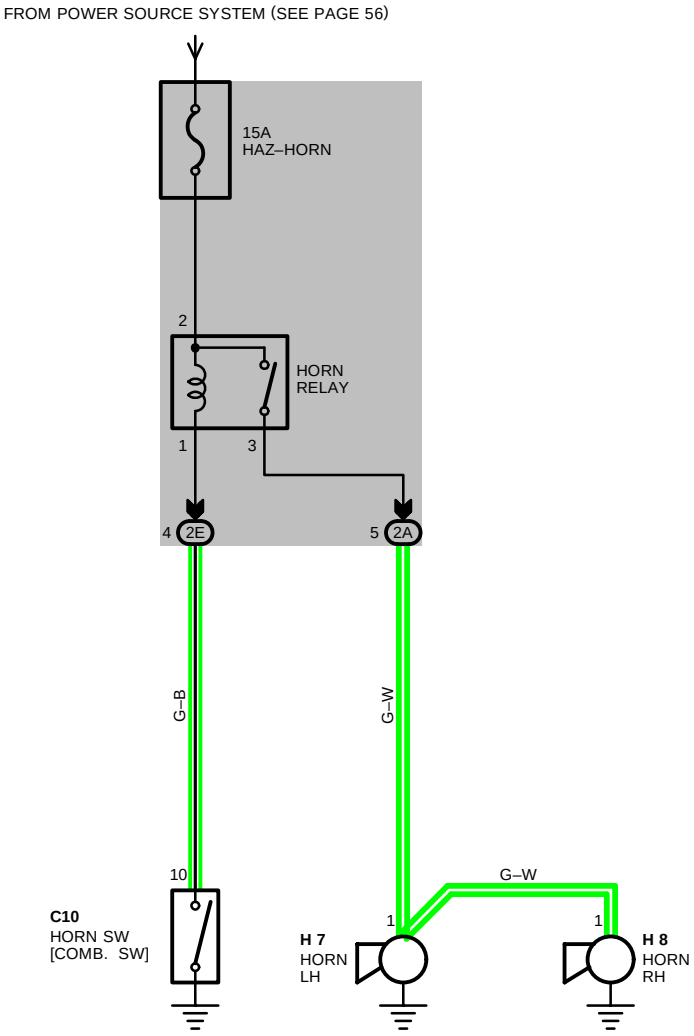
M 4

T 3 (A) ORANGE



T 4 (B) ORANGE





SERVICE HINTS

HORN RELAY

2–3 : CLOSED WITH HORN SW ON

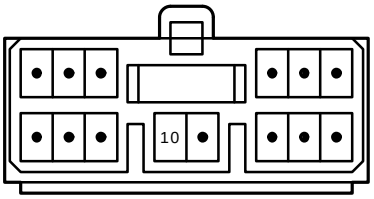
: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C10	30	**H 7**	28	**H 8**	28

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

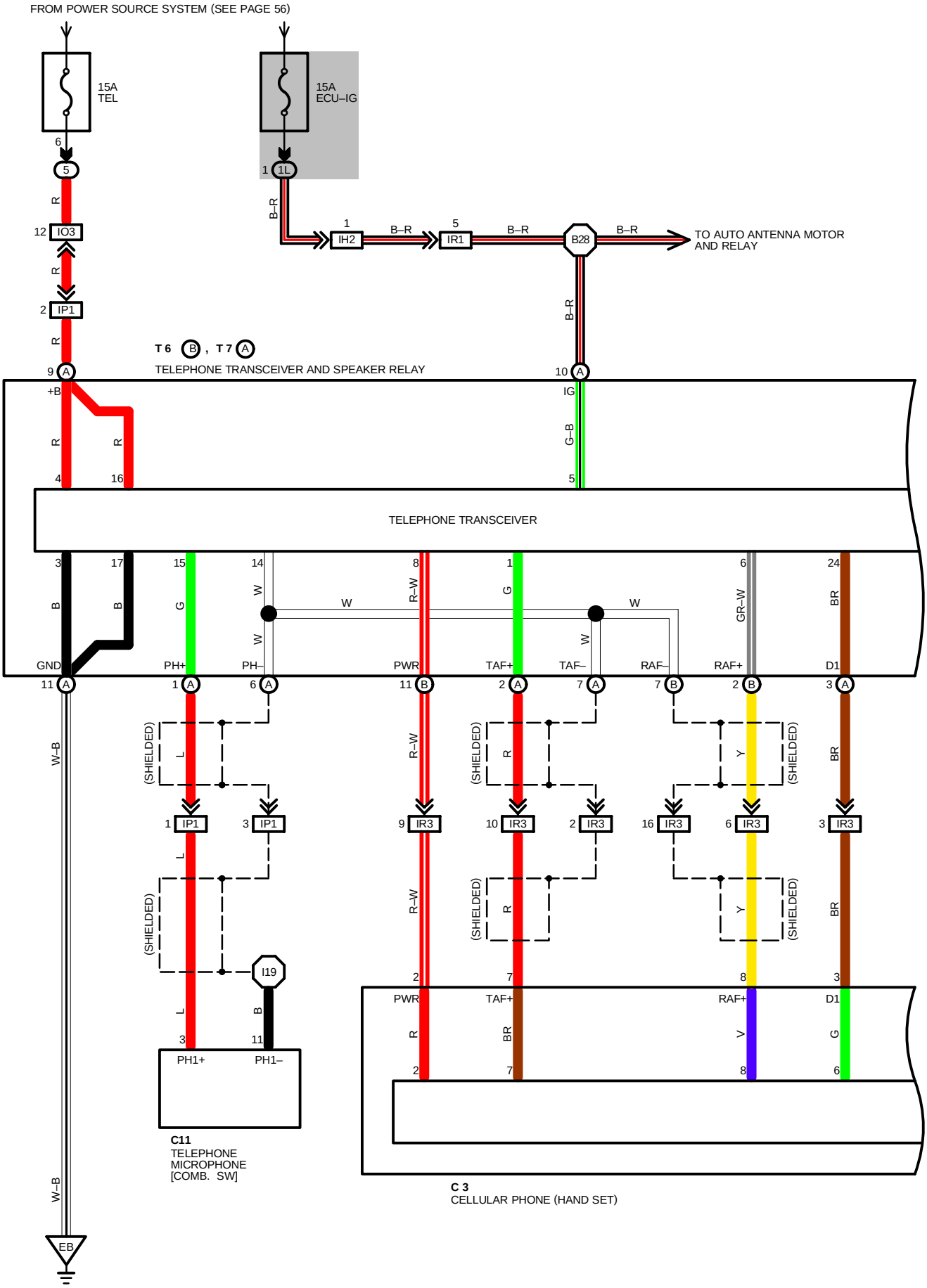
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

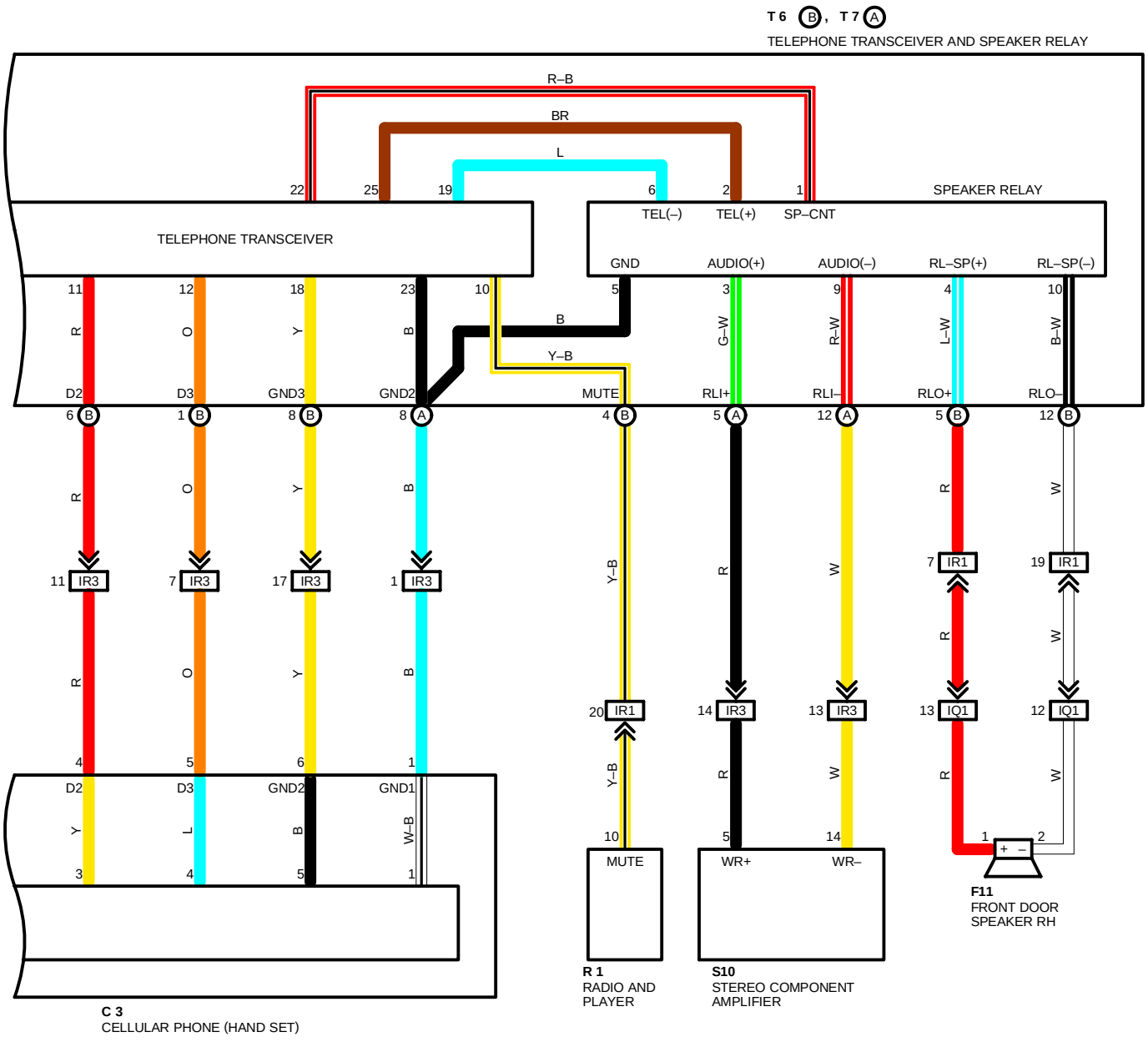
C10 BLACK



H 7, H 8

CELLULAR MOBILE TELEPHONE




T6 B, T7 A
TELEPHONE TRANSCEIVER AND SPEAKER RELAY
R–B
BR
L
22
25
19
6
2
1
SPEAKER RELAY
TEL(–)
TEL(+)
SP–CNT
TELEPHONE TRANSCEIVER
GND
AUDIO(+)
AUDIO(–)
RL–SP(+)
RL–SP(–)
11 R D2 6 B
12 O D3 1 B
18 Y GND3 8 B
23 B GND2 8 A
10
5
3 G–W RLI+ 5 A
9 R–W RLI– 12 A
4 L–W RLO+ 5 B
10 B–W RLO– 12 B
B
Y–B
MUTE 4 B
11 IR3
7 IR3
17 IR3
1 IR3
20 IR1
14 IR3
13 IR3
7 IR1
19 IR1
13 IQ1
12 IQ1
4 D2 Y 3
5 D3 L 4
6 GND2 B 5
1 GND1 W–B 1
10 MUTE
5 WR+
14 WR–
1
2
+ –
C 3
CELLULAR PHONE (HAND SET)
R 1
RADIO AND PLAYER
S10
STEREO COMPONENT AMPLIFIER
F11
FRONT DOOR SPEAKER RH

CELLULAR MOBILE TELEPHONE

SERVICE HINTS

T 7(A) TELEPHONE TRANSCEIVER AND SPEAKER RELAY
(A) 9–GROUND : ALWAYS APPROX. **12** VOLTS
(A) 10–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
(A) 11–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 3	30	**R 1**	31	**T 7** A	32
C11	30	**S10**	31		
F11	32	**T 6** B	32		

⬭ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1L	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

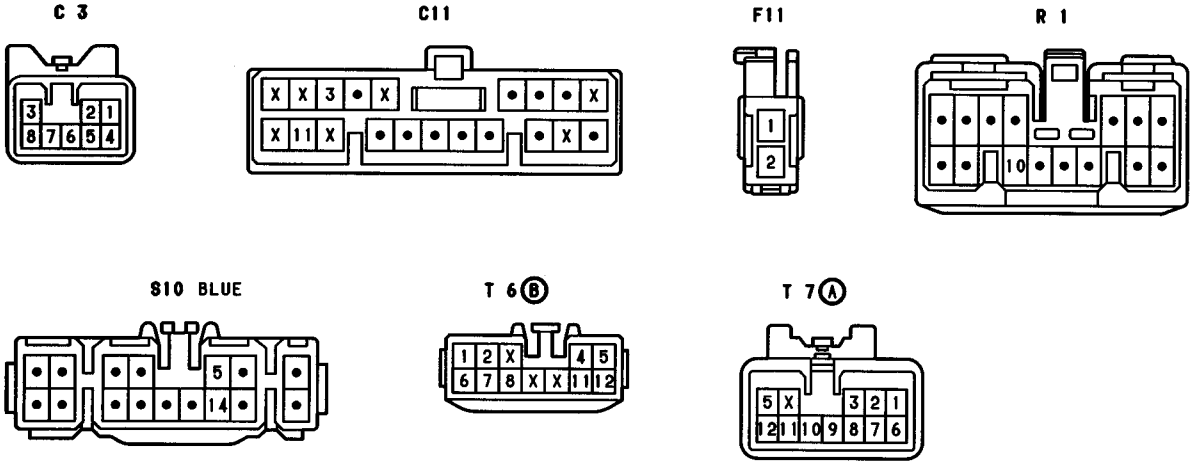
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IO3	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR3	38	INSTRUMENT PANEL WIRE AND FLOOR NO. 2 WIRE (UNDER THE PASSENGER'S SEAT)

▽ : GROUND POINTS

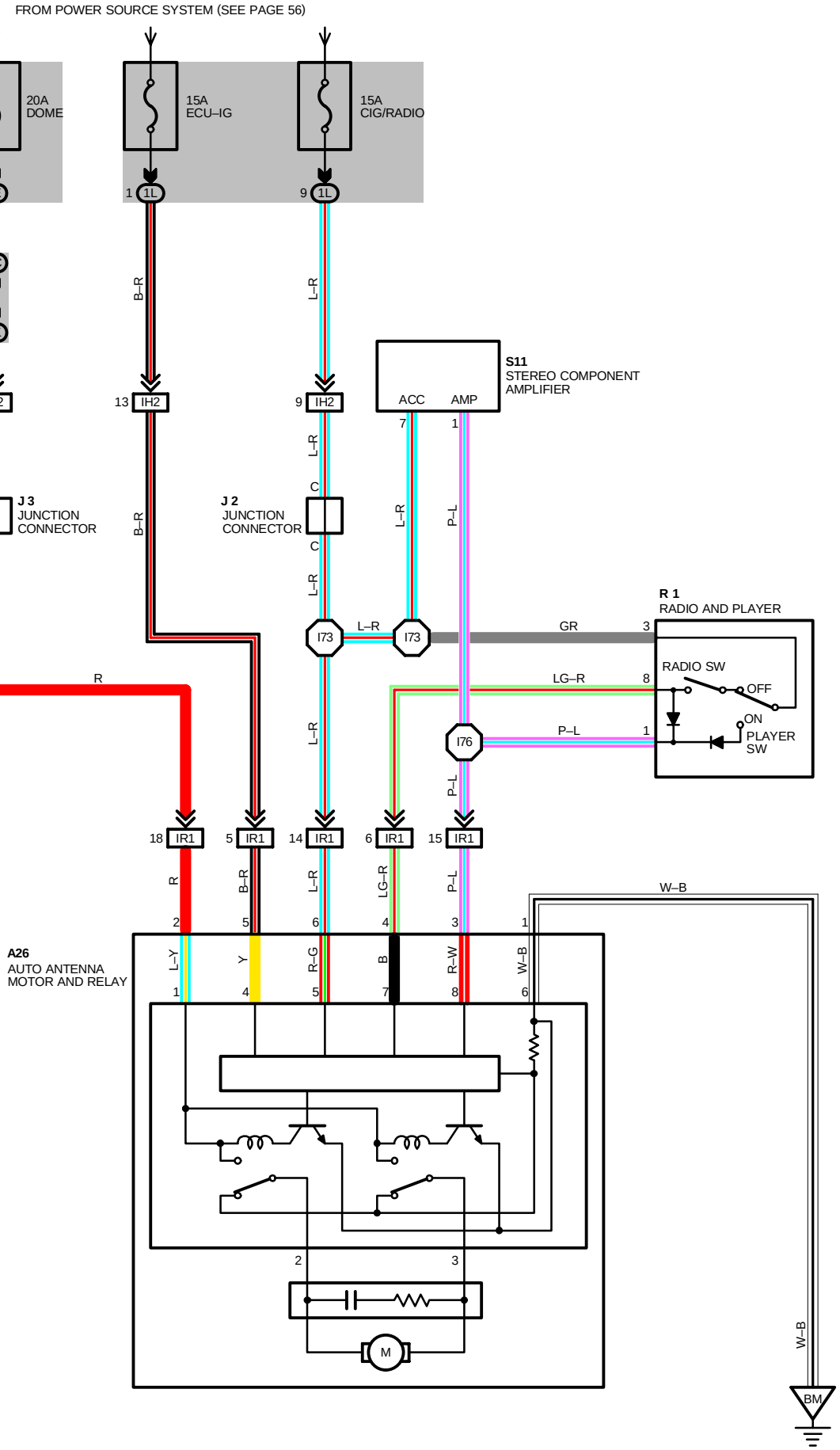
CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER

⬡ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 19	38	COWL WIRE	**B 28**	40	FLOOR NO. 2 WIRE



AUTO ANTENNA



SERVICE HINTS

A26 AUTO ANTENNA MOTOR AND RELAY

5–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
6–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
2–GROUND : ALWAYS APPROX. **12** VOLTS
4–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION AND RADIO SW ON
1–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A26	32	**J 3**	31	**S 11**	31
J 2	31	**R 1**	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1K		
1L		
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

: GROUND POINTS

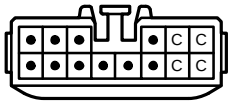
CODE	SEE PAGE	GROUND POINTS LOCATION
BM	40	UNDER THE RIGHT QUARTER PILLAR

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 73	38	INSTRUMENT PANEL WIRE	**I 76**	38	INSTRUMENT PANEL WIRE

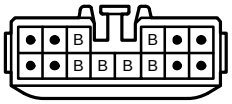
A26

J 2



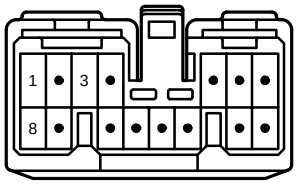
(HINT : SEE PAGE 7)

J 3 DARK GRAY

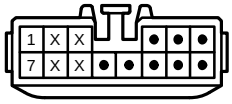


(HINT : SEE PAGE 7)

R 1

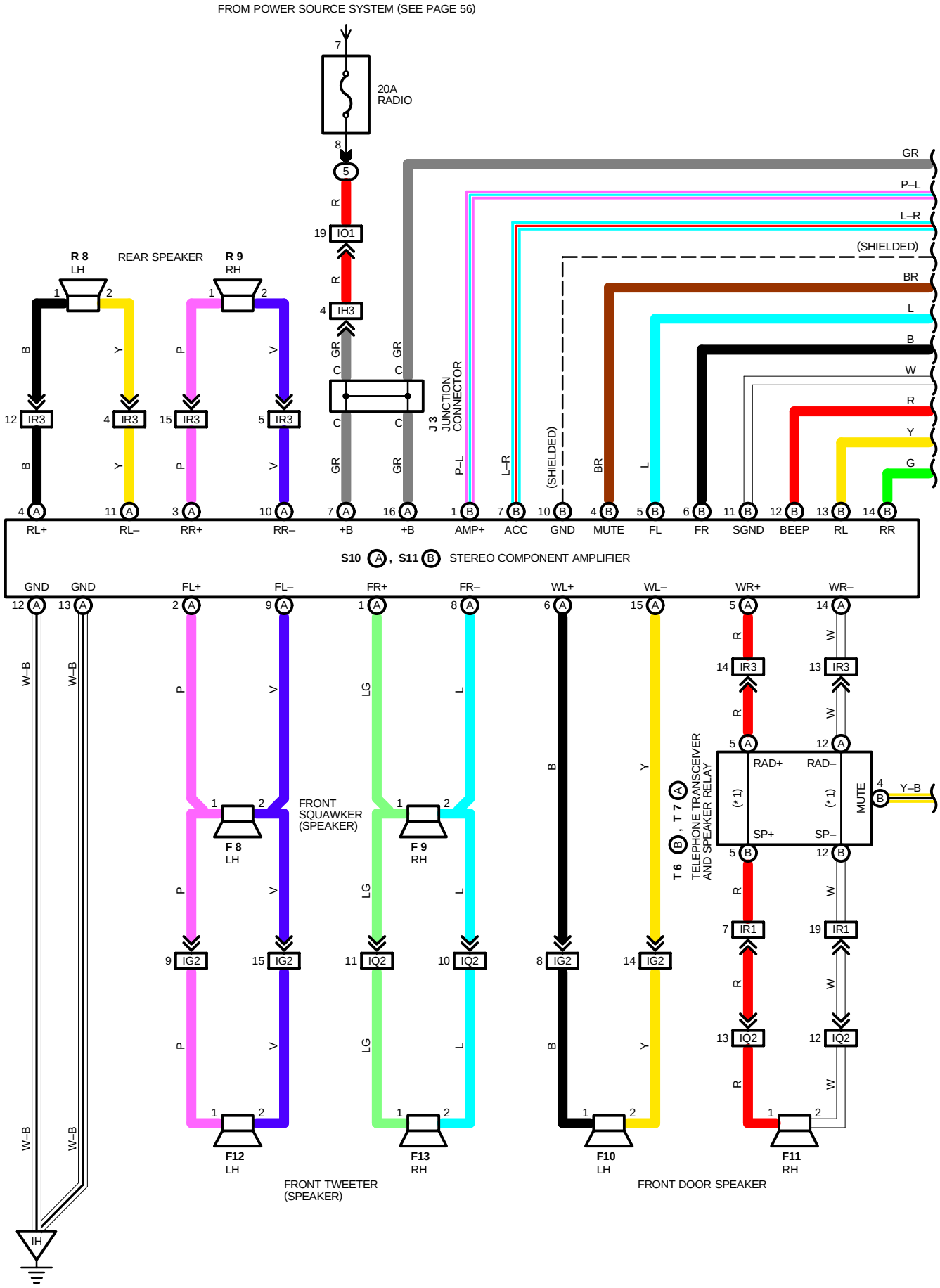


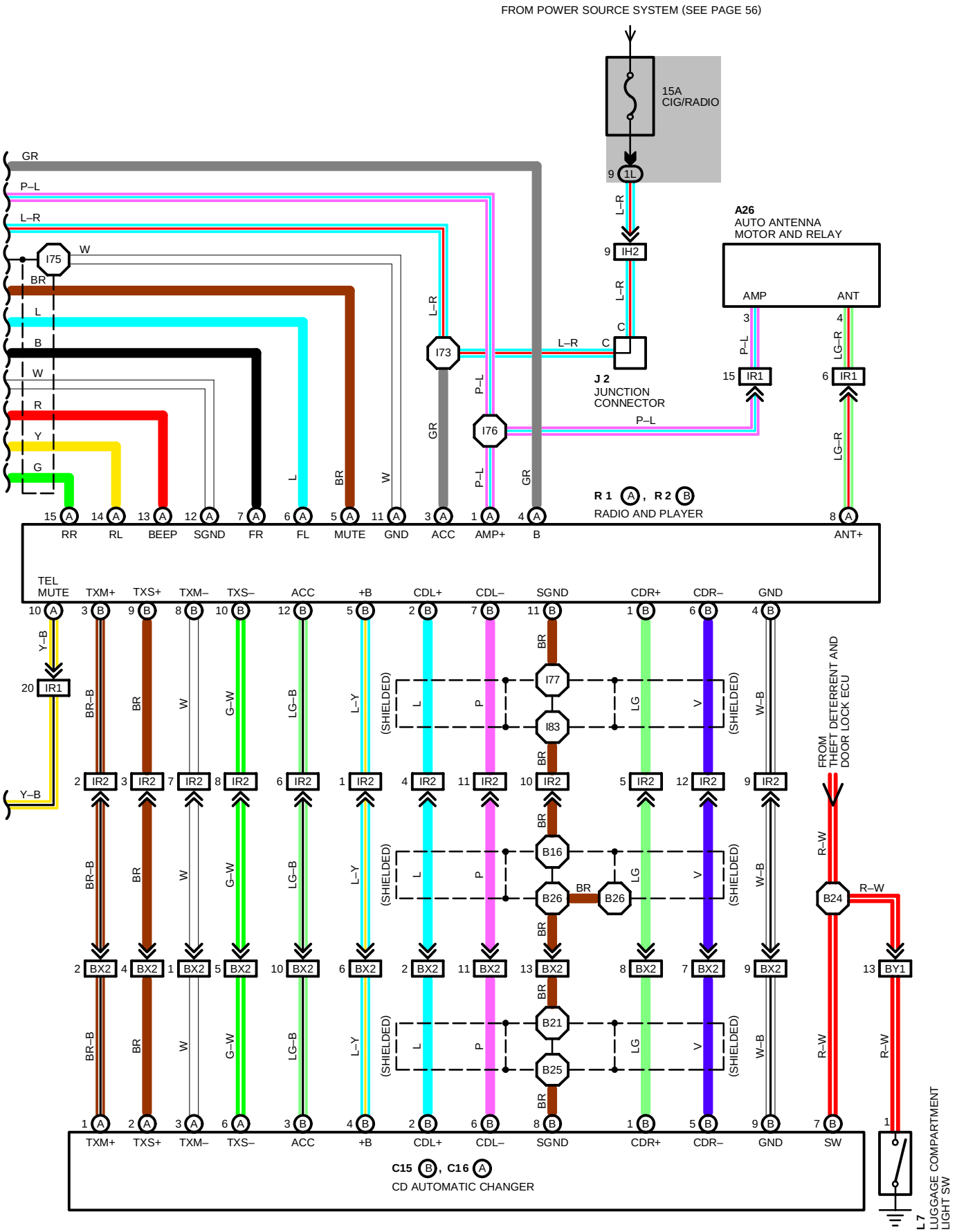
S11 GRAY



RADIO AND PLAYER (w/ CD CHANGER)

*1 : W/O TELEPHONE




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
CIG/RADIO
9 1L
9 IH2
L–R
A26
AUTO ANTENNA
MOTOR AND RELAY
AMP
ANT
3
4
P–L
LG–R
15 IR1
6 IR1
J 2
JUNCTION
CONNECTOR
I75
I73
I76
C
GR
P–L
L–R
W
BR
L
B
W
R
Y
G
R 1 A , R 2 B
RADIO AND PLAYER
15 A RR
14 A RL
13 A BEEP
12 A SGND
7 A FR
6 A FL
5 A MUTE
11 A GND
3 A ACC
1 A AMP+
4 A B
8 A ANT+
TEL MUTE
TXM+
TXS+
TXM–
TXS–
ACC
+B
CDL+
CDL–
SGND
CDR+
CDR–
GND
10 A
3 B
9 B
8 B
10 B
12 B
5 B
2 B
7 B
11 B
1 B
6 B
4 B
Y–B
20 IR1
BR–B
BR
W
G–W
LG–B
L–Y
(SHIELDED)
L
P
LG
V
W–B
I77
I83
B16
B26
B21
B25
2 IR2
3 IR2
7 IR2
8 IR2
6 IR2
1 IR2
4 IR2
11 IR2
10 IR2
5 IR2
12 IR2
9 IR2
2 BX2
4 BX2
1 BX2
5 BX2
10 BX2
6 BX2
2 BX2
11 BX2
13 BX2
8 BX2
7 BX2
9 BX2
1 A TXM+
2 A TXS+
3 A TXM–
6 A TXS–
3 B ACC
4 B +B
2 B CDL+
6 B CDL–
8 B SGND
1 B CDR+
5 B CDR–
9 B GND
7 B SW
C15 B , C16 A
CD AUTOMATIC CHANGER
FROM THEFT DETERRENT AND DOOR LOCK ECU
R–W
B24
13 BY1
1
L 7
LUGGAGE COMPARTMENT LIGHT SW

RADIO AND PLAYER (w/ CD CHANGER)

SERVICE HINTS

R 1(A) RADIO AND PLAYER
(A) 3–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** OR **ACC** POSITION
(A) 4–GROUND : ALWAYS APPROX. **12** VOLTS

S12(A), S13(B) STEREO COMPONENT AMPLIFIER
(A)12, (A) 13–GROUND : ALWAYS CONTINUITY
(B) 7–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** OR **ACC** POSITION
(A)16, (A) 17–GROUND : ALWAYS APPROX. **12** VOLTS

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
A26		32	**F12**		32	**R 8**		32
C15	B	32	**F13**		32	**R 9**		32
C16	A	32	**J 2**		31	**S10**	A	31
F 8		30	**J 3**		31	**S11**	B	31
F 9		30	**L 7**		32	**T 6**	B	32
F10		32	**R 1**	A	31	**T 7**	A	32
F11		32	**R 2**	B	31			

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IL	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IH3	36	COWL WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IO1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IQ2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR2	38	INSTRUMENT PANEL WIRE AND FLOOR NO. 2 WIRE (UNDER THE PASSENGER'S SEAT)
IR3		
BX2	40	FLOOR NO. 1 WIRE AND FLOOR NO. 2 WIRE (BEHIND PACKAGE TRAY TRIM)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)

: GROUND POINTS

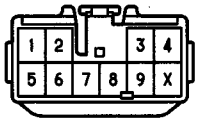
CODE	SEE PAGE	GROUND POINTS LOCATION
IH	36	INSTRUMENT PANEL BRACE RH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 73	38	INSTRUMENT PANEL WIRE	**B 16**	40	FLOOR NO. 2 WIRE
I 75			**B 21**	40	FLOOR NO. 1 WIRE
I 76			**B 24**		
I 77			**B 25**		
I 83			**B 26**	40	FLOOR NO. 2 WIRE

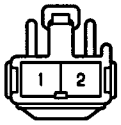
A26

C15 (B)



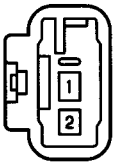
C16 (A)

F 8, F 9 BLUE

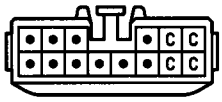


F10, F11

F12, F13 BLUE

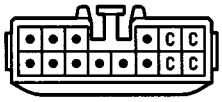


J 2



(HINT:SEE PAGE 7)

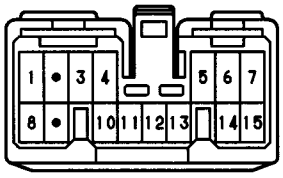
J 3 DARK GRAY



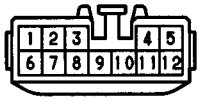
(HINT:SEE PAGE 7)

L 7 GRAY

R 1 (A)

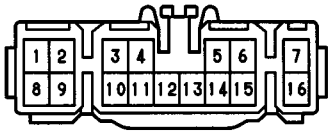


R 2 (B)

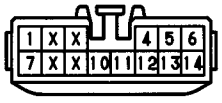


R 8, R 9

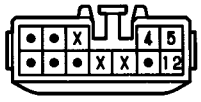
S10 (A) BLUE



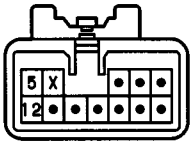
S11 (B) GRAY



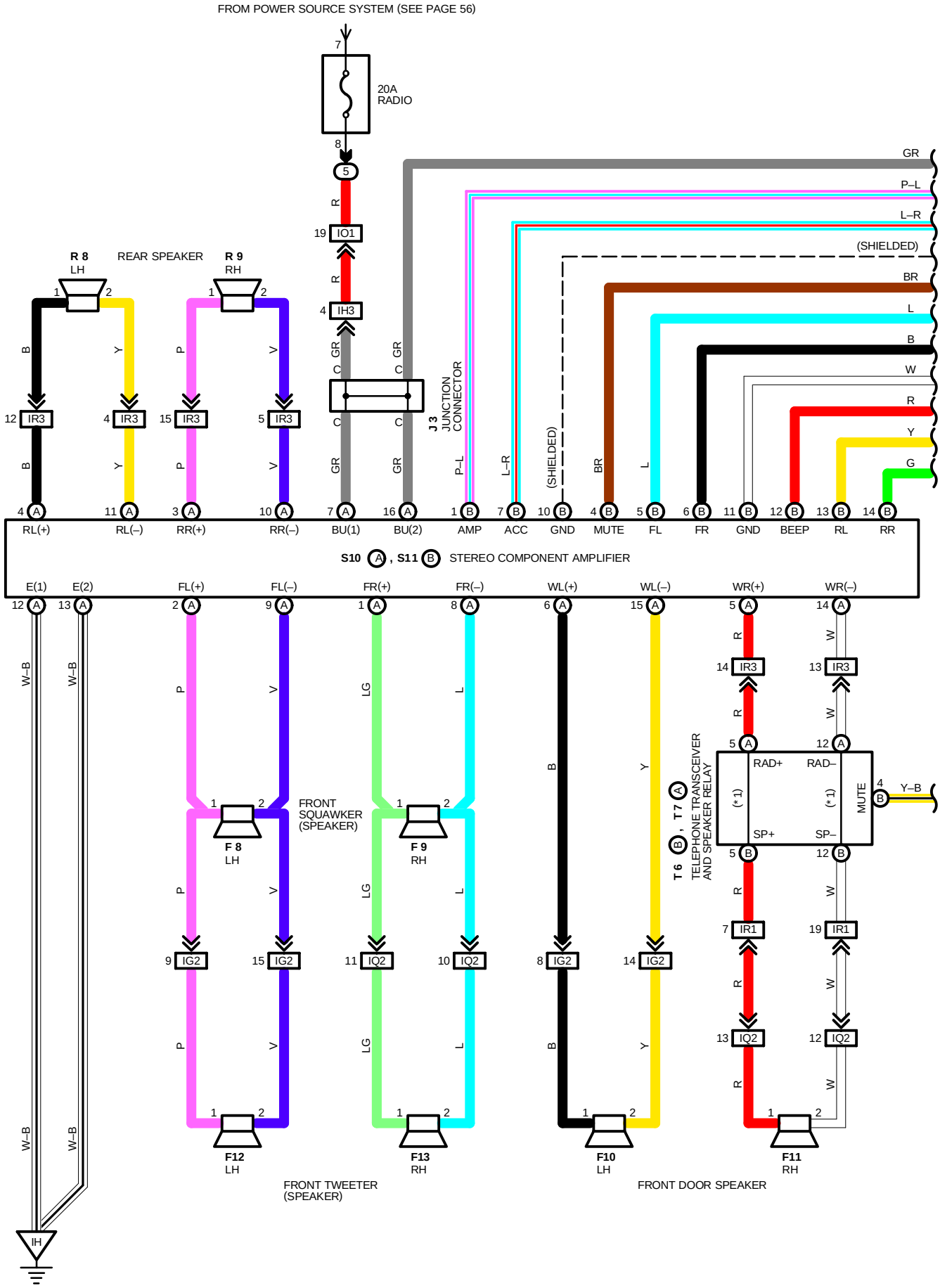
T 6 (B)

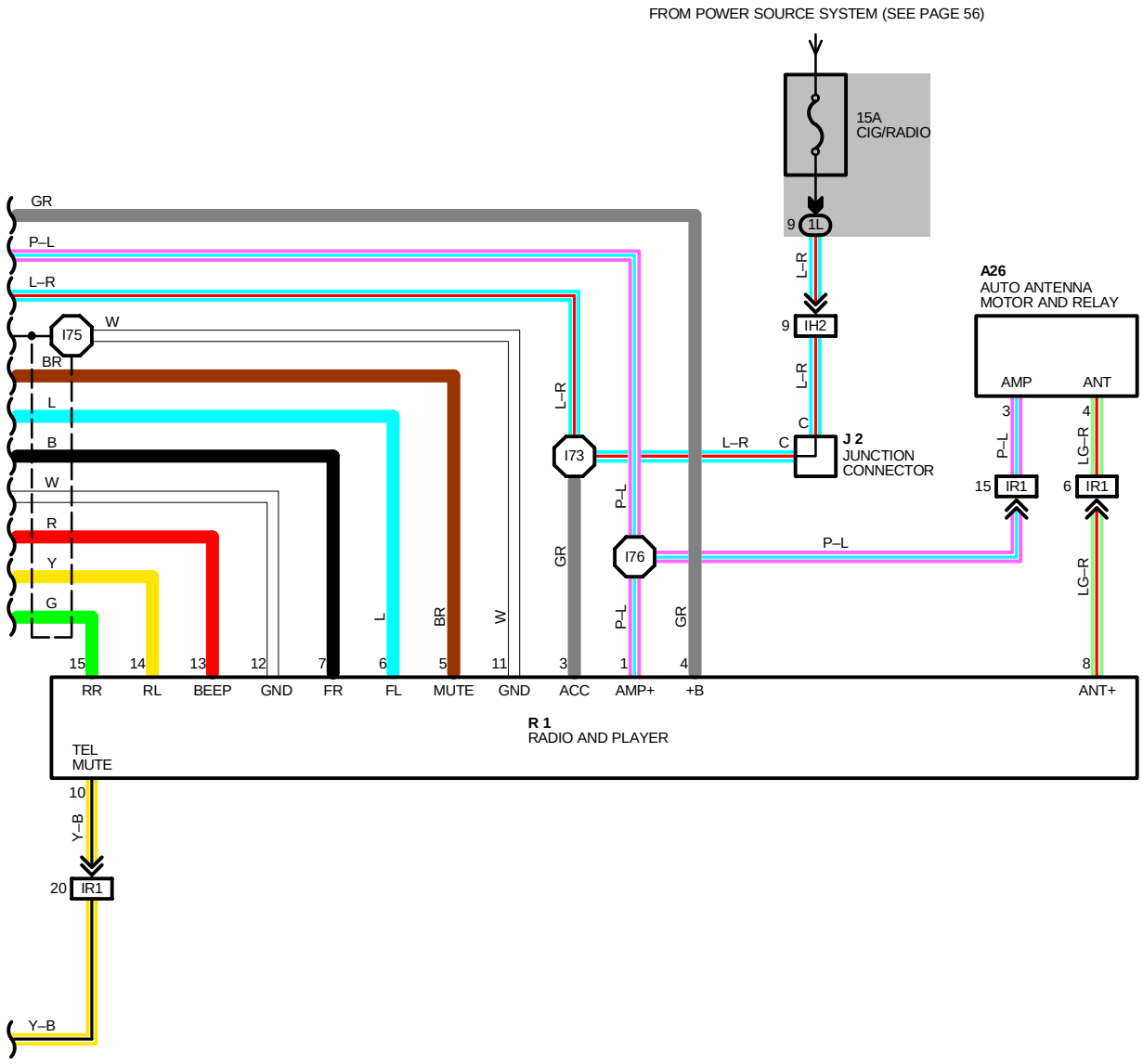


T 7 (A)



RADIO AND PLAYER (w/o CD CHANGER)




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
CIG/RADIO
9 1L
L–R
9 IH2
L–R
C
J 2
JUNCTION
CONNECTOR
A26
AUTO ANTENNA
MOTOR AND RELAY
AMP
ANT
3
4
P–L
LG–R
15 IR1
6 IR1
LG–R
GR
P–L
I75
W
BR
L
B
W
R
Y
G
I73
L–R
C
P–L
I76
P–L
GR
P–L
GR
15 14 13 12 7 6 5 11 3 1 4 8
RR RL BEEP GND FR FL MUTE GND ACC AMP+ +B ANT+
R 1
RADIO AND PLAYER
TEL
MUTE
10
Y–B
20 IR1
Y–B

RADIO AND PLAYER (w/o CD CHANGER)

SERVICE HINTS

S10(A), S11(B) STEREO COMPONENT AMPLIFIER

(A) 7, **(A)**16–GROUND : ALWAYS APPROX. **12** VOLTS
(B) 7–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** OR **ACC** POSITION
(A)12, **(A)**13–GROUND : ALWAYS CONTINUITY

R 1 RADIO AND PLAYER

3–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** OR **ACC** POSITION
4–GROUND : ALWAYS APPROX. **12** VOLTS

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
A26	32	**F13**	32	**S10**	A	31
F 8	30	**J 2**	31	**S11**	B	31
F 9	30	**J 3**	31	**T 6**	B	32
F10	32	**R 1**	31	**T 7**	A	32
F11	32	**R 8**	32			
F12	32	**R 9**	32			

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IL	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (INSTRUMENT PANEL LEFT)
IH3	36	COWL WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IO1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IQ2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IR3	38	INSTRUMENT PANEL WIRE AND FLOOR NO. 2 WIRE (UNDER THE PASSENGER'S SEAT)

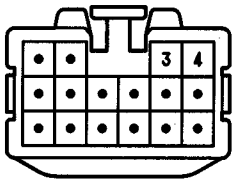
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IH	36	INSTRUMENT PANEL BRACE RH

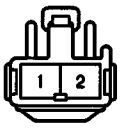
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 73	38	INSTRUMENT PANEL WIRE	**I 76**	38	INSTRUMENT PANEL WIRE
I 75					

A26

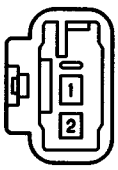


F 8, F 9 BLUE

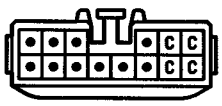


F10, F11 BLUE

F12, F13

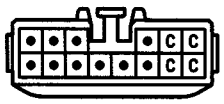


J 2



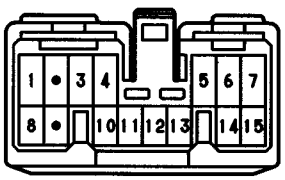
(HINT: SEE PAGE 7)

J 3 DARK GRAY



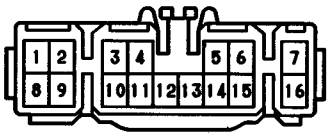
(HINT: SEE PAGE 7)

R 1

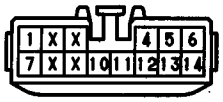


R 8, R 9

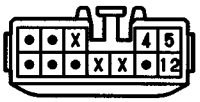
S10 (A) BLUE



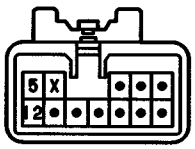
S11 (B) GRAY



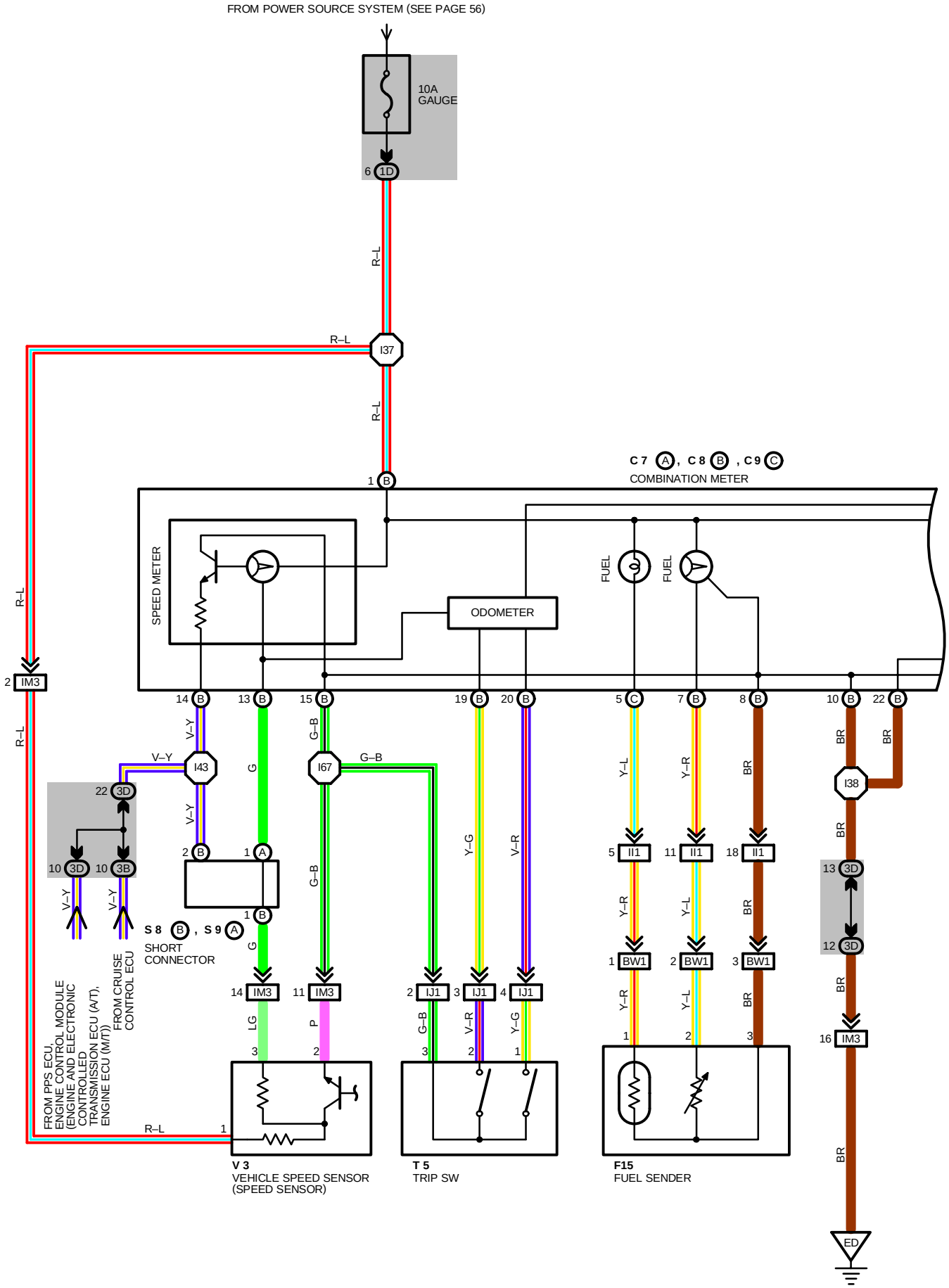
T 6 (B)

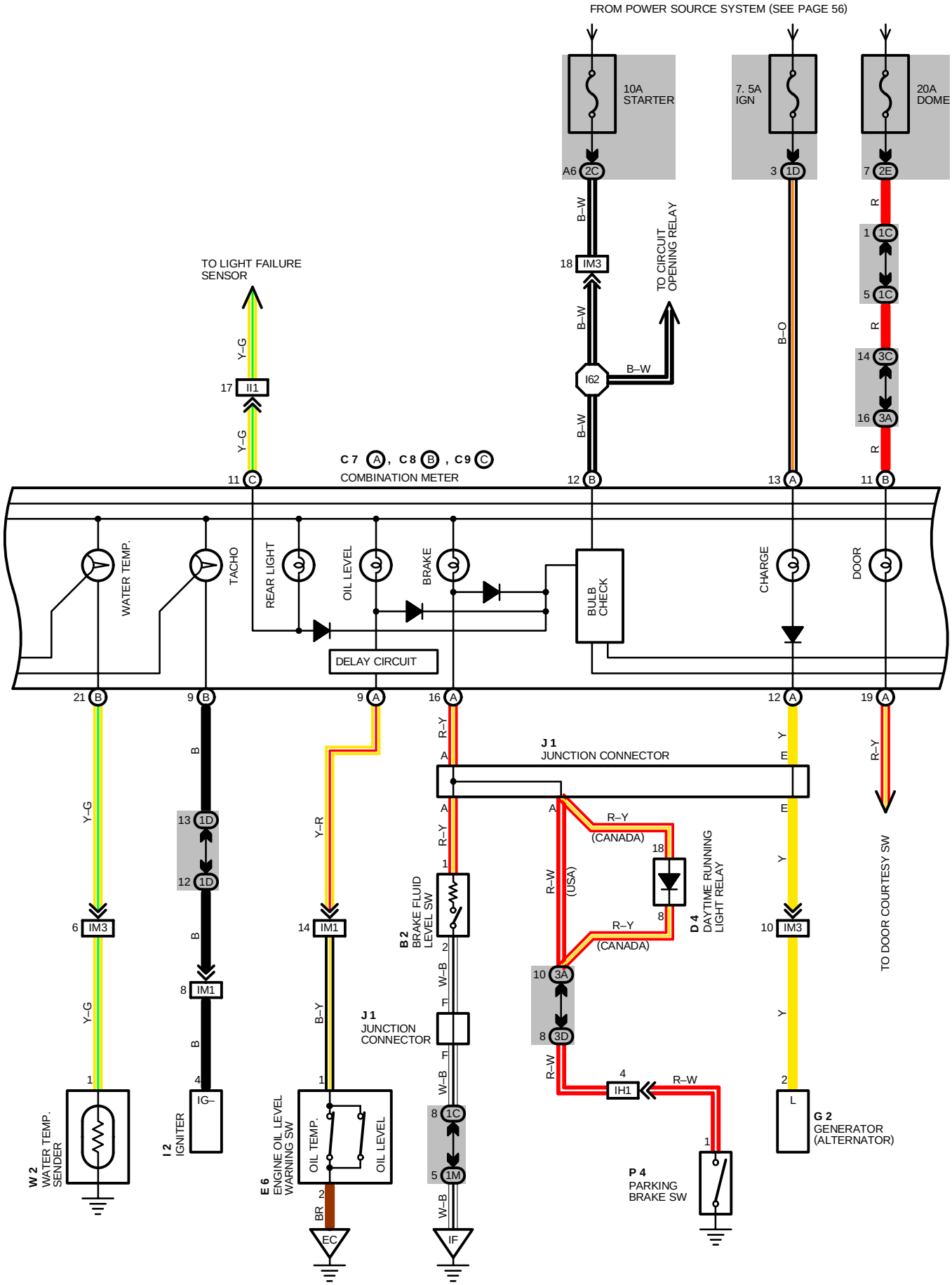


T 7 (A)

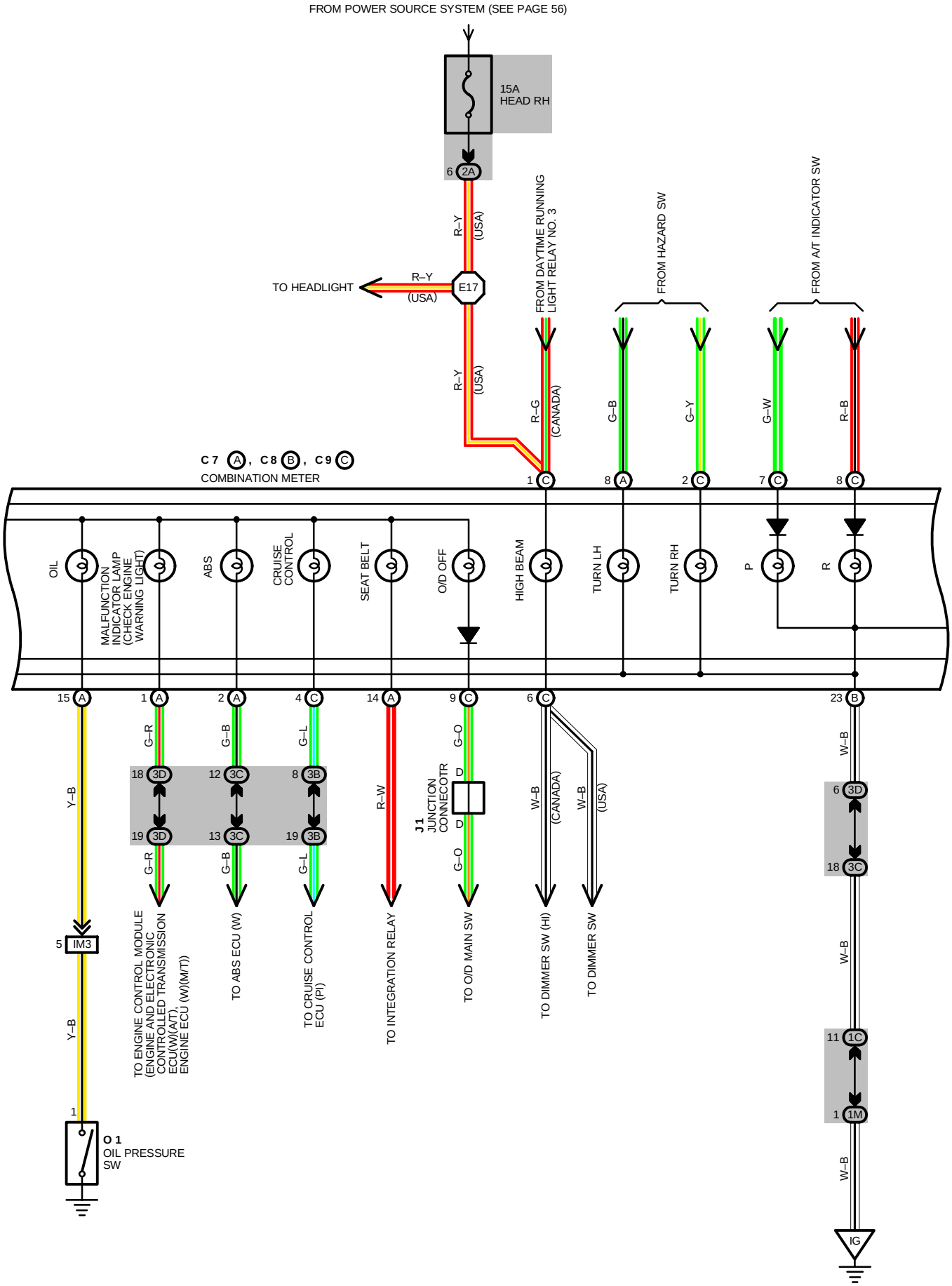


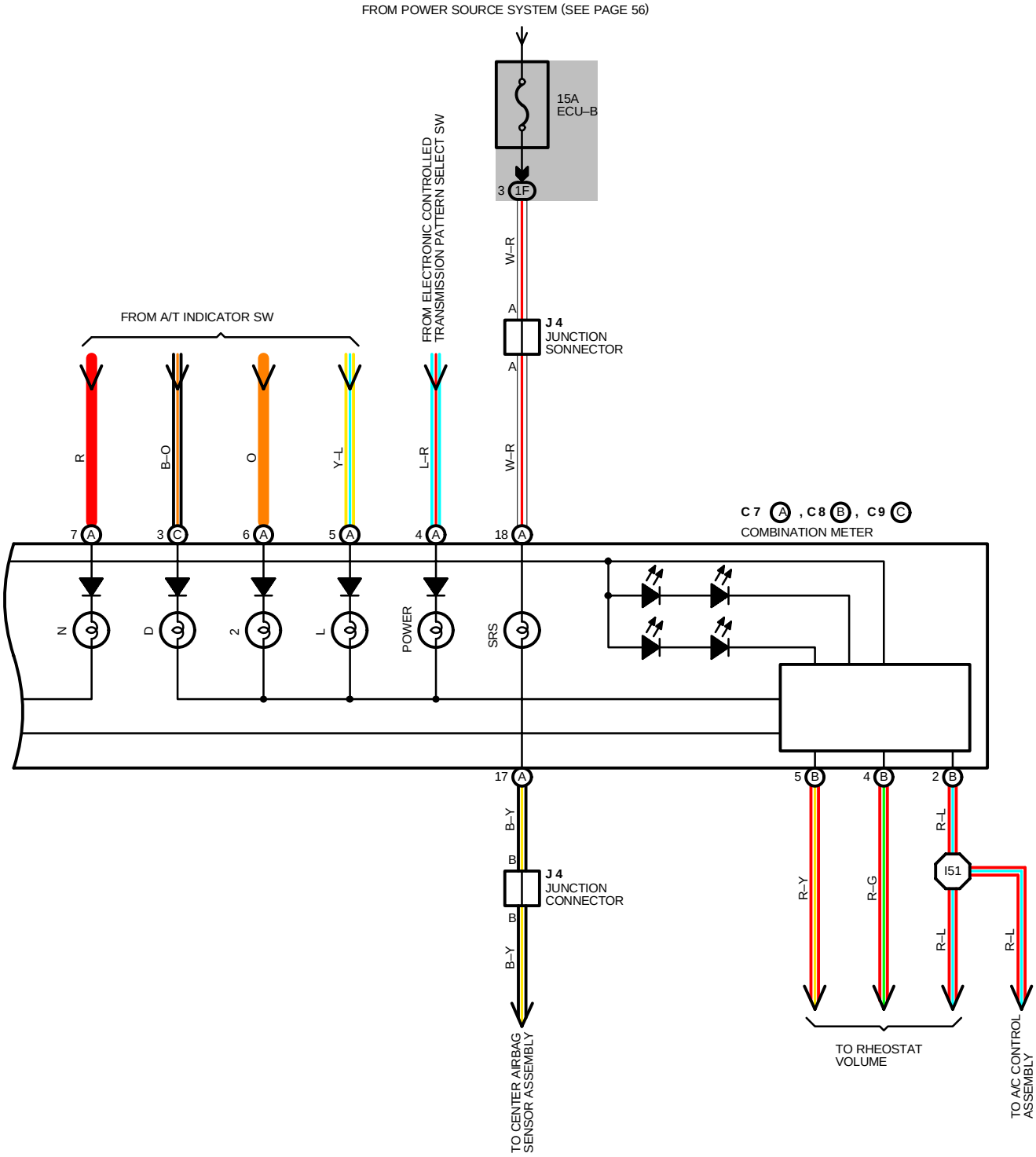
COMBINATION METER




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A STARTER
7. 5A IGN
20A DOME
A6 2C
3 1D
7 2E
B–W
18 IM3
TO CIRCUIT OPENING RELAY
B–W
I62
B–W
B–W
B–O
R
1 1C
5 1C
R
14 3C
16 3A
R
TO LIGHT FAILURE SENSOR
Y–G
17 II1
Y–G
11 C
C7 A, C8 B, C9 C
COMBINATION METER
12 B
13 A
11 B
WATER TEMP.
TACHO
REAR LIGHT
OIL LEVEL
BRAKE
BULB CHECK
CHARGE
DOOR
DELAY CIRCUIT
21 B
9 B
9 A
16 A
12 A
19 A
R–Y
A
J1
JUNCTION CONNECTOR
Y
E
R–Y
TO DOOR COURTESY SW
Y–G
13 1D
12 1D
B
B
8 IM1
B
4
IG–
I2
IGNITER
6 IM3
Y–G
Y–G
1
W2
WATER TEMP. SENDER
Y–R
14 IM1
B–Y
1
E6
ENGINE OIL LEVEL WARNING SW
OIL TEMP.
OIL LEVEL
2
BR
EC
A
R–Y
1
B2
BRAKE FLUID LEVEL SW
2
W–B
F
J1
JUNCTION CONNECTOR
F
W–B
8 1C
5 1M
W–B
IF
A
R–Y
(CANADA)
18
8
D4
DAYTIME RUNNING LIGHT RELAY
R–W
(USA)
R–Y
(CANADA)
10 3A
8 3D
R–W
4
IH1
R–W
1
P4
PARKING BRAKE SW
E
Y
10 IM3
Y
2
L
G2
GENERATOR (ALTERNATOR)

COMBINATION METER




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
ECU–B
3 1F
W–R
FROM ELECTRONIC CONTROLLED
TRANSMISSION PATTERN SELECT SW
A
J 4
JUNCTION
SONNECTOR
A
FROM A/T INDICATOR SW
R
B–O
O
Y–L
L–R
W–R
C 7 A , C 8 B , C 9 C
COMBINATION METER
7 A
3 C
6 A
5 A
4 A
18 A
N
D
2
L
POWER
SRS
17 A
B–Y
B
J 4
JUNCTION
CONNECTOR
B
B–Y
TO CENTER AIRBAG
SENSOR ASSEMBLY
5 B
4 B
2 B
R–Y
R–G
R–L
I51
R–L
R–L
TO RHEOSTAT
VOLUME
TO A/C CONTROL
ASSEMBLY

COMBINATION METER

SERVICE HINTS

B 2 BRAKE FLUID LEVEL SW
1–2 : CLOSED WITH FLOAT DOWN

P 4 PARKING BRAKE SW
1–GROUND : CLOSED WITH PARKING BRAKE LEVER PULLED UP

O 1 OIL PRESSURE SW
1–GROUND : CLOSED WITH OIL PRESSURE BELOW APPROX. **0.2** KG/CM^2 (**2.8** PSI, **20** KPA)

W 2 WATER TEMP. SENDER
1–GROUND : APPROX. **226** (**50**˚C, **122**˚F)
APPROX. **25** (**115**˚C, **239**˚F)

E 6 ENGINE OIL LEVEL WARNING SW
1–2 : CLOSED WITH FLOAT UP AND ENGINE OIL TEMP. AT BELOW APPROX. **55**˚C (**131**˚F)
OPEN WITH FLOAT DOWN AND ENGINE OIL TEMP. AT BELOW APPROX. **60**˚C (**140**˚F)

F15 FUEL SENDER
2–3 : APPROX. **3** AT FUEL FULL
APPROX. **110** AT FUEL EMPTY

C 8(B), C 9(C) COMBINATION METER
(B) 1–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** POSITION
(B)10–GROUND : ALWAYS CONTINUITY
(B)22–GROUND : ALWAYS CONTINUITY
(B)11–GROUND : ALWAYS APPROX. **12** VOLTS

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
B 2	28	**F15**	32	**P 4**	31
C 7 A	30	**G 2**	28	**S 8** B	31
C 8 B	30	**I 2**	29	**S 9** A	31
C 9 C	30	**J 1**	31	**T 5**	31
D 4	30	**J 4**	31	**V 3**	29
E 6	28	**O 1**	29	**W 2**	29

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1D		
1F		
1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2E	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3B		
3C		
3D		

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
II1	36	FLOOR NO.1 WIRE AND COWL WIRE (LEFT KICK PANEL)
IJ1	36	INSTRUMENT PANEL NO. 2 WIRE AND COWL WIRE (UNDER THE COMBINATION METER)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		
BW1	40	FUEL GAUGE WIRE AND FLOOR NO. 1 WIRE (UNDER THE REAR SEAT CUSHION)

▽ : GROUND POINTS

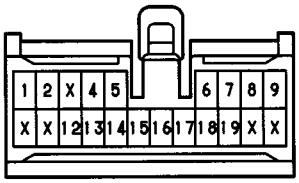
CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	INTAKE MANIFOLD RH
ED	34	INTAKE MANIFOLD LH
IF	36	LEFT KICK PANEL
IG	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

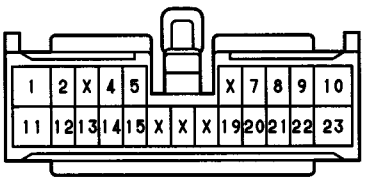
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 17	34	ENGINE ROOM MAIN WIRE	**I 51**	38	COWL WIRE
I 37	38	COWL WIRE	**I 62**		
I 38			**I 67**		
I 43					

B 2 GRAY

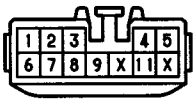
C 7 (A) GRAY



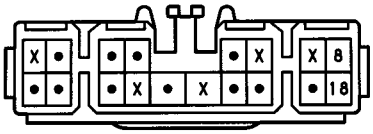
C 8 (B)



C 9 (C) BLUE



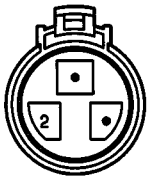
D 4 GRAY



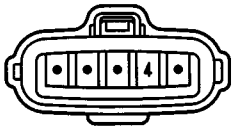
E 6

F15 DARK GRAY

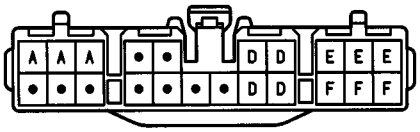
G 2 GRAY



I 2 BLACK

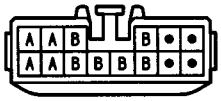


J 1 DARK GRAY



(HINT:SEE PAGE 7)

J 4

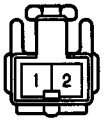


(HINT:SEE PAGE 7)

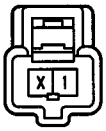
O 1

P 4

S 8 (B)



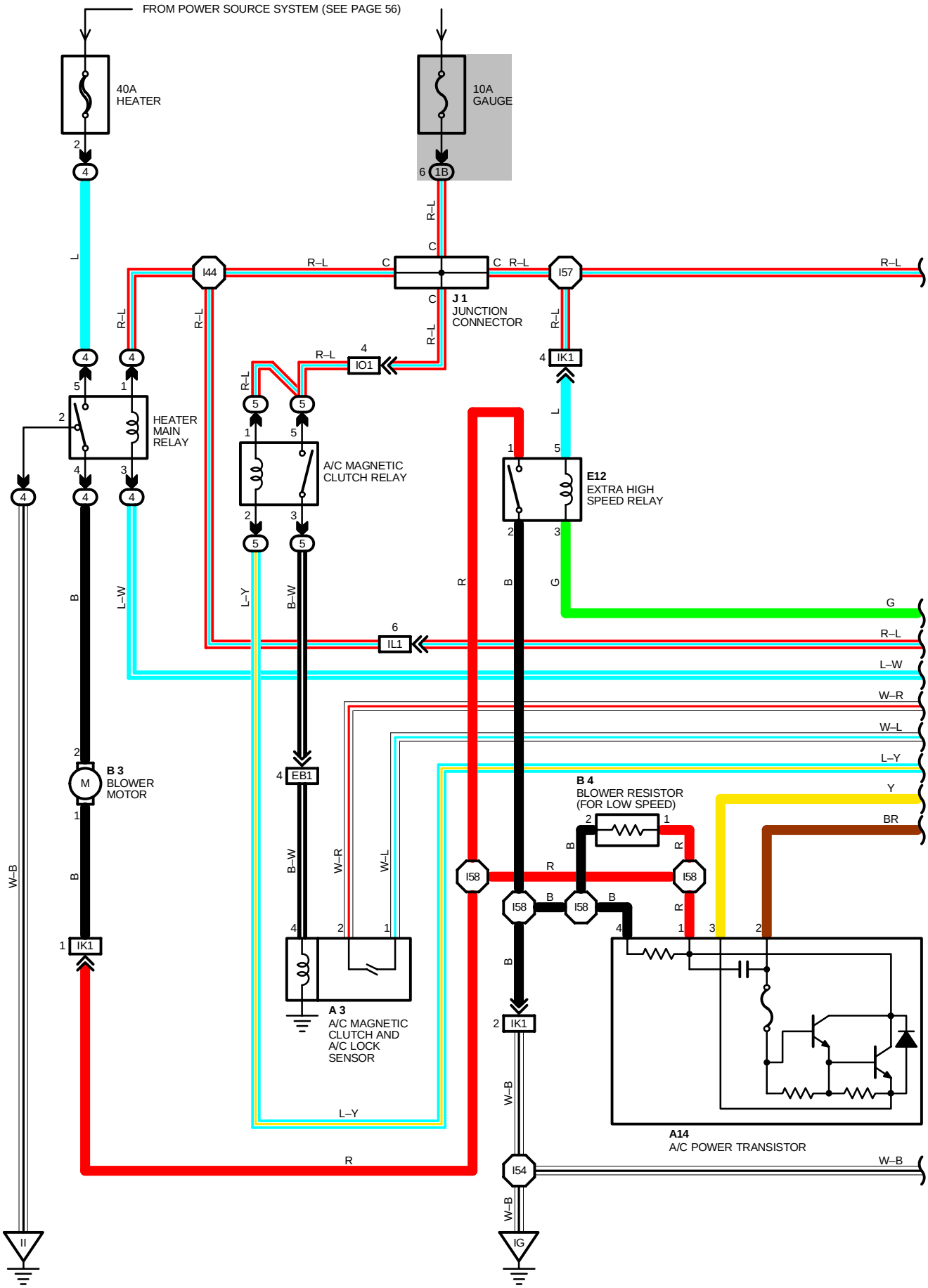
S 9 (A)

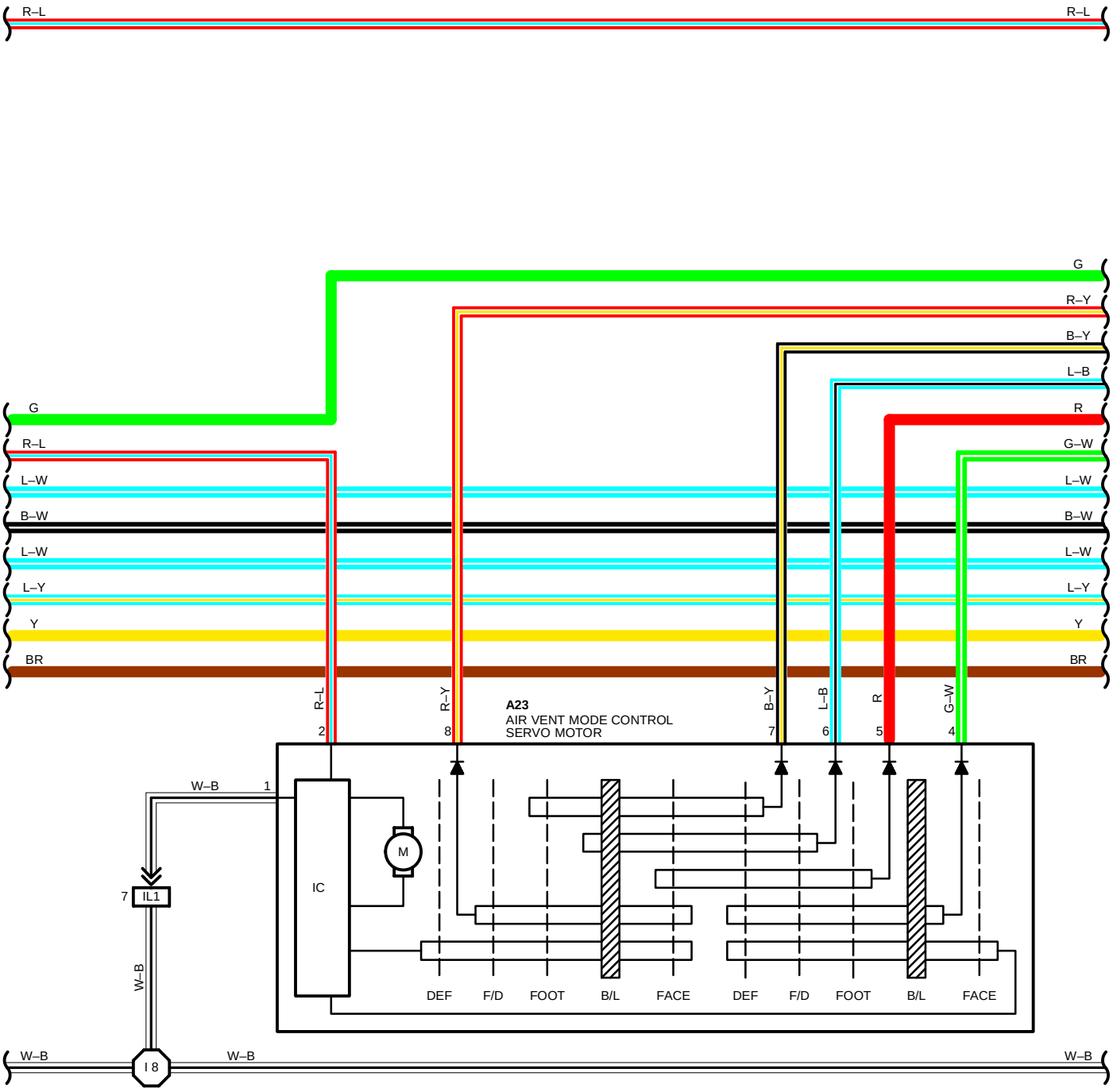


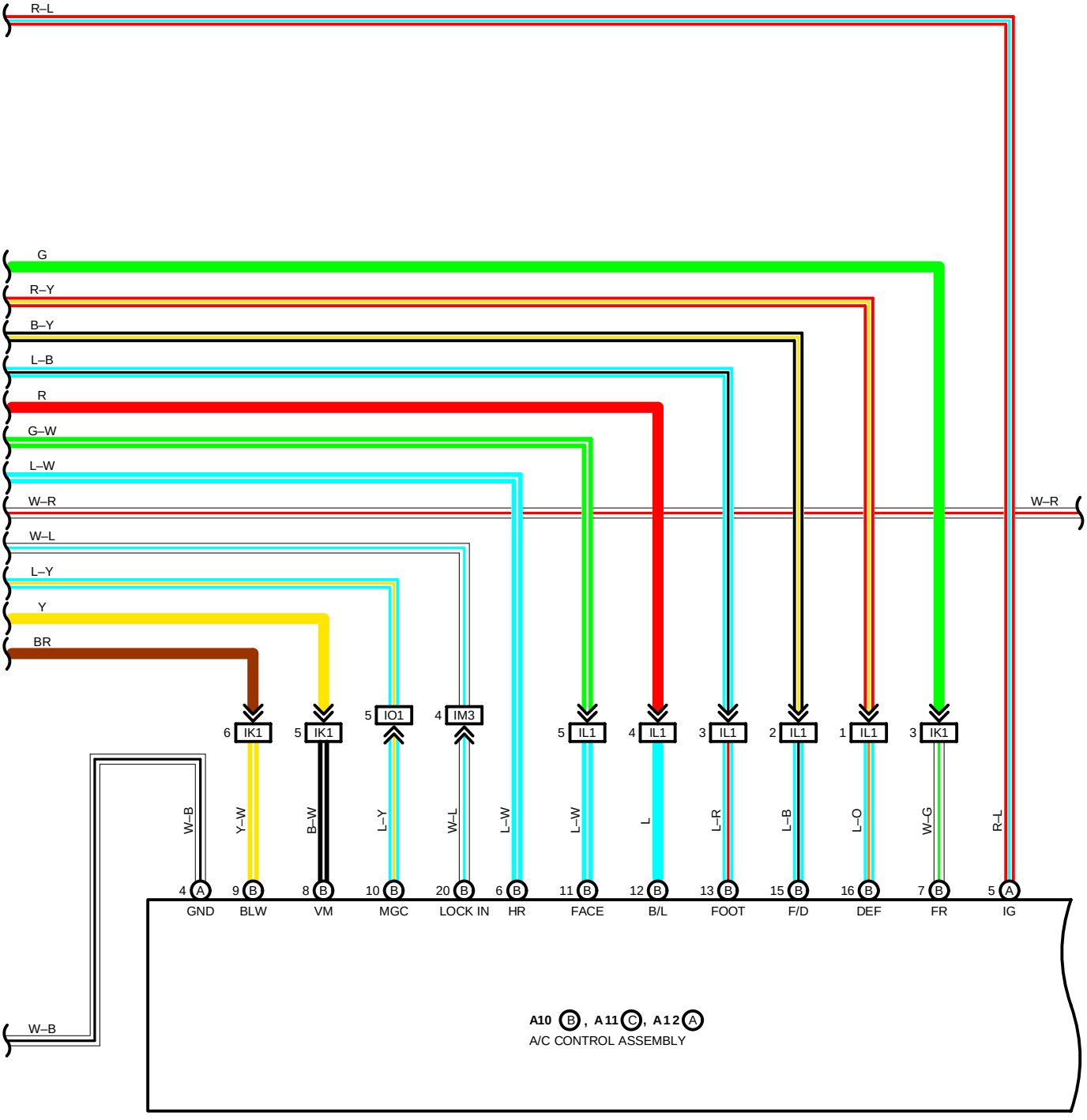
T 5

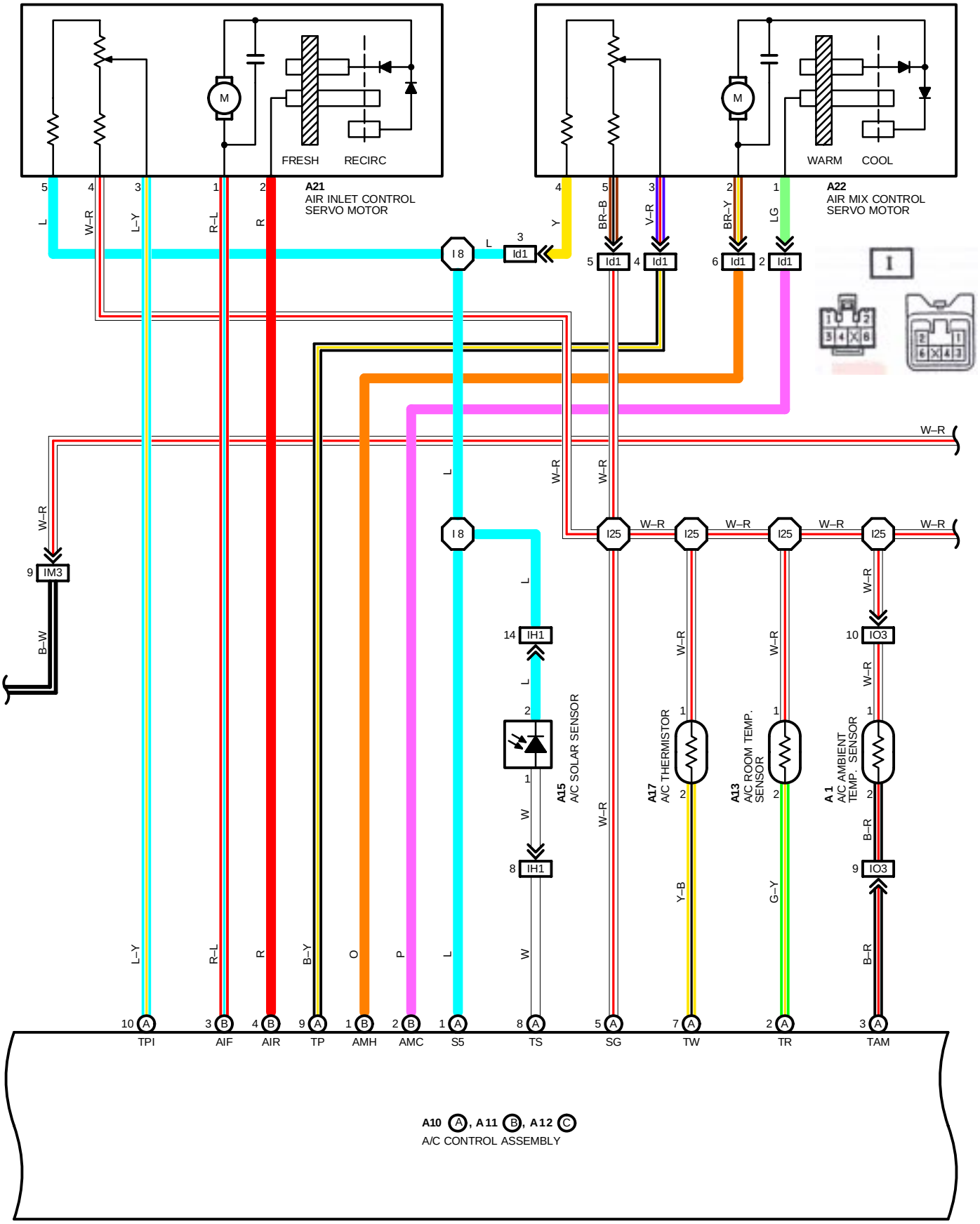
V 3 BLACK

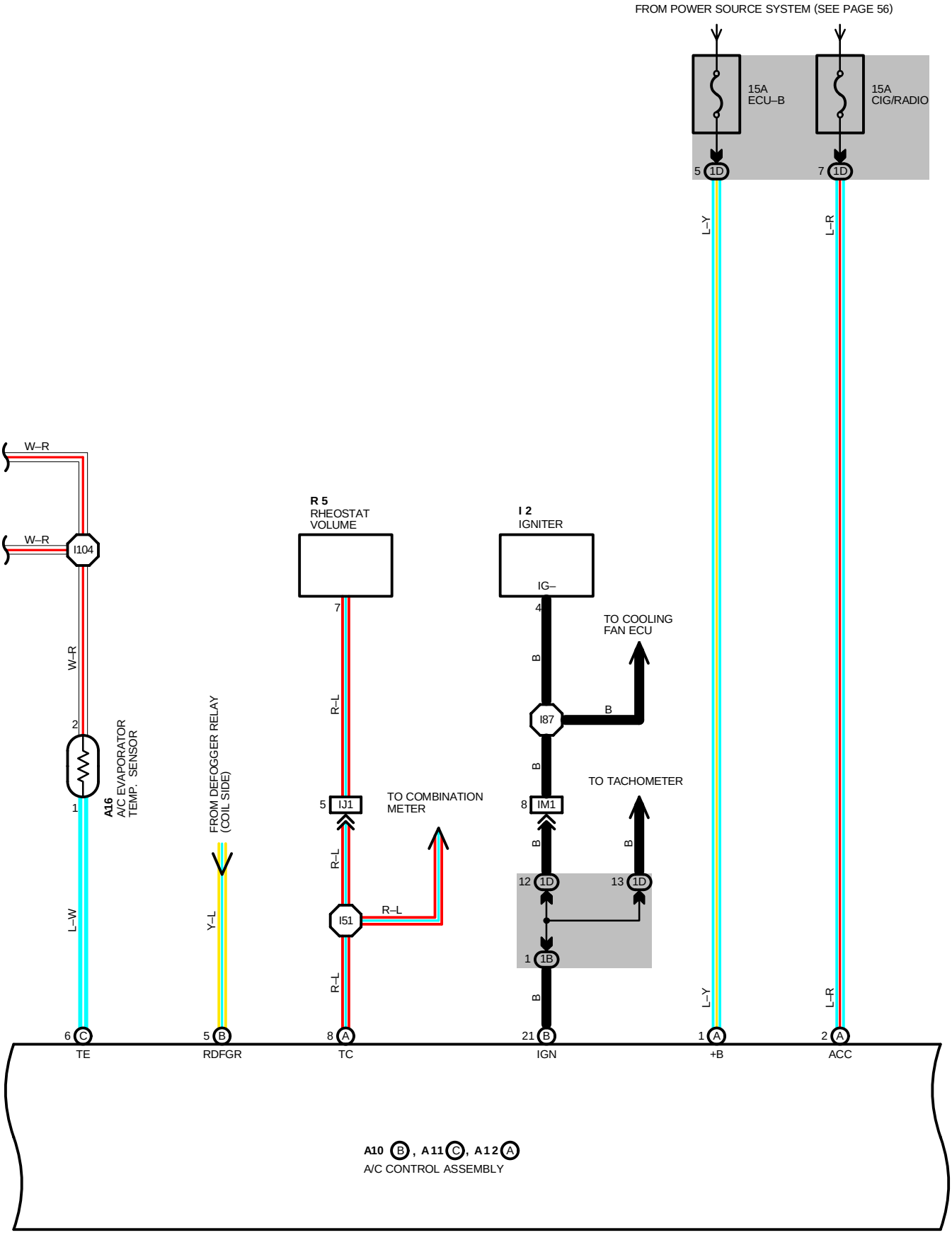
W 2 BLACK

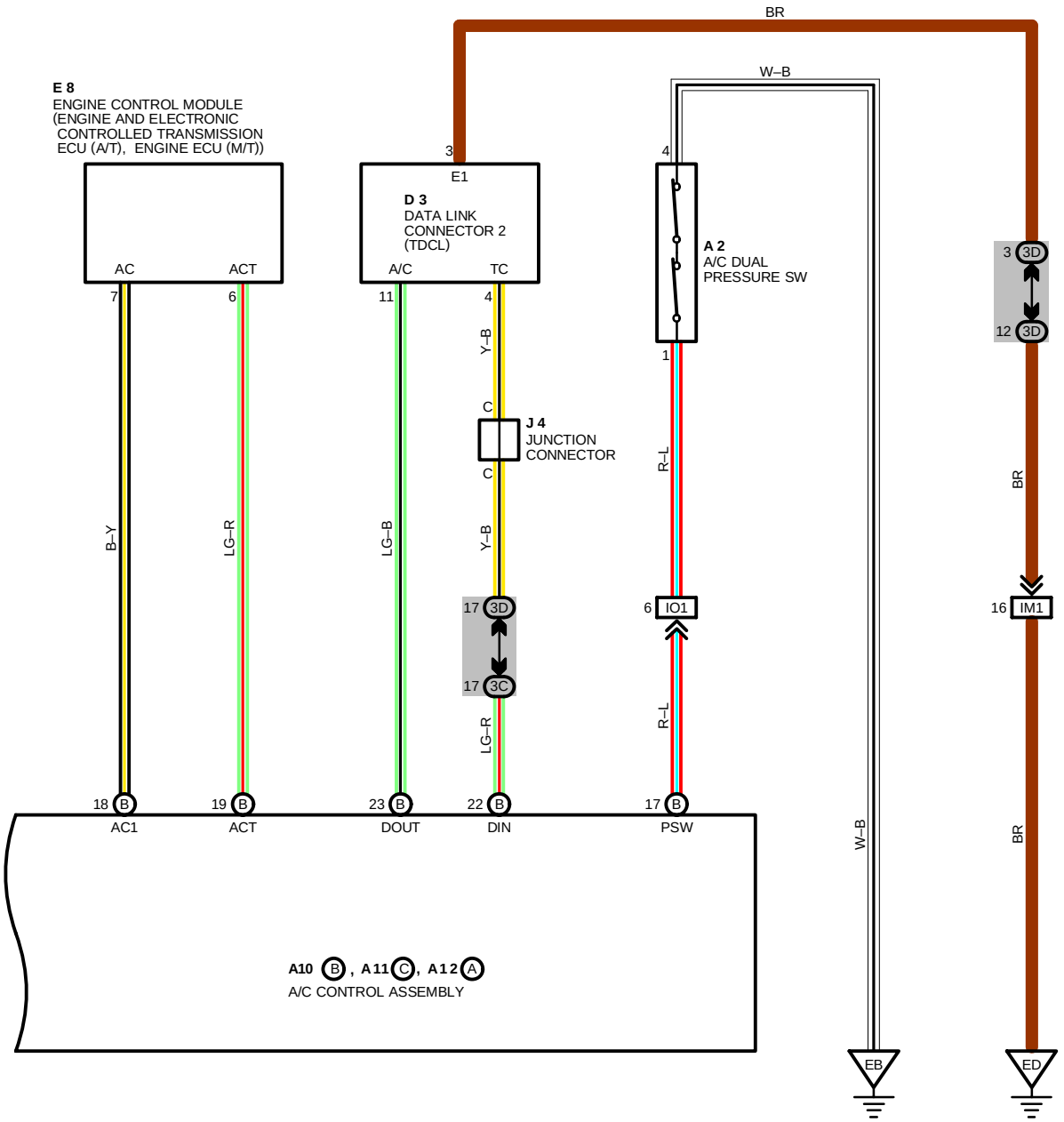

FROM POWER SOURCE SYSTEM (SEE PAGE 56)
40A
HEATER
10A
GAUGE
1B
I44
I57
J 1
JUNCTION
CONNECTOR
IO1
IK1
HEATER
MAIN
RELAY
A/C MAGNETIC
CLUTCH RELAY
E12
EXTRA HIGH
SPEED RELAY
IL1
EB1
B 3
BLOWER
MOTOR
B 4
BLOWER RESISTOR
(FOR LOW SPEED)
I58
A 3
A/C MAGNETIC
CLUTCH AND
A/C LOCK
SENSOR
A14
A/C POWER TRANSISTOR
I54
II
IG
R–L
L
L–W
B–W
L–Y
W–R
W–L
W–B
R
B
G
Y
BR


R–L
R–L
G
R–Y
B–Y
L–B
R
G–W
L–W
B–W
L–Y
Y
BR
G
R–L
L–W
B–W
L–W
L–Y
Y
BR
R–L
2
R–Y
8
A23
AIR VENT MODE CONTROL
SERVO MOTOR
B–Y
7
L–B
6
R
5
G–W
4
W–B
1
M
IC
7
IL1
W–B
DEF
F/D
FOOT
B/L
FACE
DEF
F/D
FOOT
B/L
FACE
W–B
I 8
W–B
W–B


R–L
G
R–Y
B–Y
L–B
R
G–W
L–W
W–R
W–L
L–Y
Y
BR
W–R
6 IK1
5 IK1
5 IO1
4 IM3
5 IL1
4 IL1
3 IL1
2 IL1
1 IL1
3 IK1
W–B
Y–W
B–W
L–Y
W–L
L–W
L–W
L
L–R
L–B
L–O
W–G
R–L
4 A
9 B
8 B
10 B
20 B
6 B
11 B
12 B
13 B
15 B
16 B
7 B
5 A
GND
BLW
VM
MGC
LOCK IN
HR
FACE
B/L
FOOT
F/D
DEF
FR
IG
W–B
A10 B, A11 C, A12 A
A/C CONTROL ASSEMBLY


FRESH
RECIRC
A21
AIR INLET CONTROL
SERVO MOTOR
WARM
COOL
A22
AIR MIX CONTROL
SERVO MOTOR
I8
Id1
I25
IM3
IH1
IO3
A15
A/C SOLAR SENSOR
A17
A/C THERMISTOR
A13
A/C ROOM TEMP.
SENSOR
A 1
A/C AMBIENT
TEMP. SENSOR
TPI
AIF
AIR
TP
AMH
AMC
S5
TS
SG
TW
TR
TAM
A10 A, A11 B, A12 C
A/C CONTROL ASSEMBLY


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
ECU–B
15A
CIG/RADIO
5 1D
7 1D
L–Y
L–R
W–R
W–R
I104
W–R
2
1
A16
A/C EVAPORATOR
TEMP. SENSOR
L–W
FROM DEFOGGER RELAY
(COIL SIDE)
Y–L
R 5
RHEOSTAT
VOLUME
7
R–L
5 IJ1
TO COMBINATION
METER
R–L
I51
R–L
R–L
I 2
IGNITER
IG–
4
B
TO COOLING
FAN ECU
B
I87
B
TO TACHOMETER
8 IM1
B
B
12 1D
13 1D
1 1B
B
6 C
TE
5 B
RDFGR
8 A
TC
21 B
IGN
1 A
+B
2 A
ACC
A10 B , A11 C , A12 A
A/C CONTROL ASSEMBLY


BR
W–B
E 8
ENGINE CONTROL MODULE
(ENGINE AND ELECTRONIC
CONTROLLED TRANSMISSION
ECU (A/T), ENGINE ECU (M/T))
AC
ACT
7
6
B–Y
LG–R
18 B
19 B
AC1
ACT
3
E1
D 3
DATA LINK
CONNECTOR 2
(TDCL)
A/C
TC
11
4
LG–B
Y–B
C
J 4
JUNCTION
CONNECTOR
C
Y–B
17 3D
17 3C
LG–R
23 B
22 B
DOUT
DIN
4
A 2
A/C DUAL
PRESSURE SW
1
R–L
6 IO1
R–L
17 B
PSW
3 3D
12 3D
BR
16 IM1
BR
W–B
EB
ED
A10 B , A11 C , A12 A
A/C CONTROL ASSEMBLY

SYSTEM OUTLINE

1. HEATER BLOWER MOTOR OPERATION

CURRENT IS APPLIED AT ALL TIMES THROUGH **HEATER** FUSE TO **TERMINAL 5** OF HEATER RELAY. WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS THROUGH **GAUGE** FUSE TO **TERMINAL 1** OF HEATER RELAY → **TERMINAL 3** → **TERMINAL HR** OF A/C CONTROL ASSEMBLY. AT THE SAME TIME, CURRENT ALSO FLOWS FROM **GAUGE** FUSE TO **TERMINAL IG** OF A/C CONTROL ASSEMBLY AND **TERMINAL 1** OF EXTRA HIGH SPEED RELAY → **TERMINAL 3** → **TERMINAL FR** OF A/C CONTROL ASSEMBLY.

∗ LOW SPEED OPERATION

WHEN THE BLOWER SW (A/C CONTROL ASSEMBLY) IS MOVED TO **LOW SPEED** POSITION, THE CURRENT TO **TERMINAL HR** OF A/C CONTROL ASSEMBLY FLOWS TO **TERMINAL GND** OF A/C CONTROL ASSEMBLY → **GROUND** AND TURNS THE HEATER RELAY ON. AS A RESULT, THE CURRENT TO **TERMINAL 5** OF HEATER RELAY FLOWS TO **TERMINAL 4** OF RELAY → **TERMINAL 2** OF BLOWER MOTOR → **TERMINAL 1** → **TERMINAL 1** OF POWER TRANSISTOR → **TERMINAL 4** → **GROUND** AND CAUSES THE BLOWER MOTOR TO ROTATE AT LOW SPEED.

∗ HIGH SPEED OPERATION

WHEN THE BLOWER SW (A/C CONTROL ASSEMBLY) IS MOVED TO **HIGH SPEED** POSITION, THE CURRENT TO **TERMINAL HR** OF A/C CONTROL ASSEMBLY FLOWS TO **TERMINAL GND** OF A/C CONTROL ASSEMBLY → **GROUND** AND TURNS THE HEATER RELAY ON. AT THE SAME TIME, THE CURRENT TO **TERMINAL 1** OF EXTRA HIGH SPEED RELAY ALSO TO **TERMINAL 3** OF RELAY **TERMINAL FR** OF A/C CONTROL ASSEMBLY → **TERMINAL GND** → **GROUND** AND TURNS THE EXTRA HIGH SPEED RELAY ON. AS A RESULT, THE CURRENT TO **TERMINAL 5** OF HEATER RELAY FLOWS TO **TERMINAL 4** → **TERMINAL 2** OF BLOWER MOTOR → **TERMINAL 1** → **TERMINAL 2** OF EXTRA HIGH SPEED RELAY → **TERMINAL 4** → **GROUND** WITHOUT PASSING THROUGH THE BLOWER RESISTOR, CAUSING THE BLOWER MOTOR TO ROTATE AT HIGH SPEED.

∗ MEDIUM SPEED OPERATION

WHEN THE BLOWER SW (A/C CONTROL ASSEMBLY) IS MOVED TO **MED** POSITION, THE CURRENT TO **TERMINAL HR** OF A/C CONTROL ASSEMBLY FLOWS TO **TERMINAL GND** → **GROUND** AND TURNS THE HEATER RELAY ON. THEN, THE CURRENT TO **TERMINAL IG** OF A/C CONTROL ASSEMBLY FLOWS TO **TERMINAL BLW** → **TERMINAL 2** OF POWER TRANSISTOR → **TERMINAL 1** → **GROUND.**

AS A RESULT, THE CURRENT TO **TERMINAL 5** OF HEATER RELAY FLOWS TO **TERMINAL 4** → **TERMINAL 2** OF BLOWER MOTOR → **TERMINAL 1** → **TERMINAL 1** OF POWER TRANSISTOR → **TERMINAL 4** → **GROUND** AND BLOWER MOTOR IS ROTATED AT MEDIUM SPEED BY THE A/C CONTROL ASSEMBLY CONTROLLING THE CURRENT FLOW FROM **TERMINAL 2** OF POWER TRANSISTOR TO **TERMINAL 4.**

∗ AUTO FUNCTION

WHEN THE AUTO SW IN HEATER CONTROL SW (A/C CONTROL ASSEMBLY) IS SELECTED, THE CURRENT FLOW IS THE SAME FOR MED POSITION, BUT THE A/C CONTROL ASSEMBLY DECIDES THE APPROPRIATE AIR FLOW VOLUME ACCORDING TO THE SET TEMPERATURE AND THE INPUT SIGNALS FROM EACH SENSOR. BY CONTROLLING THE CURRENT FLOW FROM **TERMINAL BLW** OF THE A/C CONTROL ASSEMBLY TO **TERMINAL 2** OF POWER TRANSISTOR → **TERMINAL 4** → **GROUND,** THE A/C CONTROL ASSEMBLY CONTROLS THE BLOWER MOTOR STEPLESSLY.

2. OPERATION AIR INLET CONTROL SERVO MOTOR

(SWITCHING FROM FRESH TO RECIRC)

WITH IGNITION SW TURNED ON, THE CURRENT FLOWS FROM **GAUGE** FUSE TO **TERMINAL IG** OF A/C CONTROL ASSEMBLY → **TERMINAL AIR** → **TERMINAL 2** OF AIR INLET CONTROL SERVO MOTOR → **TERMINAL 1** → **TERMINAL AIF** OF A/C CONTROL ASSEMBLY → **TERMINAL GND** → **GROUND,** THE MOTOR ROTATES AND THE DAMPER MOVES TO THE **RECIRC** SIDE. WHEN THE DAMPER OPERATES WITH THE A/C SW AT **RECIRC** POSITION, THE DAMPER POSITION SIGNAL IS INPUT FROM **TERMINAL 3** OF THE SERVO MOTOR TO **TERMINAL TPI** OF THE ECU (BUILT INTO THE A/C CONTROL ASSEMBLY). AS A RESULT, CURRENT TO THE SERVO M0TOR CIRCUIT IS CUT OFF BY THE ECU, SO THE DAMPER STOPS AT THAT POSITION.

(SWITCHING FROM RECIRC TO FRESH)

WITH IGNITION SW TURNED ON, WHEN THE RECIRC/FRESH SW IS SWITCHED TO THE FRESH SIDE, THE CURRENT FLOWS FROM **TERMINAL IG** OF A/C CONTROL ASSEMBLY → **TERMINAL AIF** → **TERMINAL 1** OF AIR INLET CONTROL SERVO MOTOR → **TERMINAL 2** → **TERMINAL AIR** OF A/C CONTROL ASSEMBLY → **TERMINAL GND** → **GROUND,** THE MOTOR ROTATES AND THE DAMPER STOPS AT THAT POSITION.

3. OPERATION OF AIR VENT MODE CONTROL SERVO MOTOR

WITH IGNITION SW TURNED ON, THE CURRENT FLOWS FROM **GAUGE** FUSE TO **TERMINAL IG** OF A/C CONTROL ASSEMBLY.

(SWITCHING FROM DEF TO FACE)

THE CURRENT FLOWS FROM **TERMINAL FACE** OF A/C CONTROL ASSEMBLY → **TERMINAL 5** OF AIR VENT MODE CONTROL SERVO MOTOR → **TERMINAL 1** → **TERMINAL DEF** OF A/C CONTROL ASSEMBLY → **TERMINAL GND** → **GROUND.** THE MOTOR ROTATES AND THE DAMPER MOVES TO THE FACE SIDE. WHEN THE DAMPER OPERATES WITH THE A/C SW AT **FACE** POSITION, THE DAMPER POSITION SIGNAL IS INPUT FROM **TERMINAL 1** OF THE SERVO MOTOR TO THE **TERMINAL TPM** OF THE ECU (BUILT INTO THE A/C CONTROL ASEMBLY). AS A RESULT, CURRENT TO THE SERVO MOTOR CIRCUIT IS CUT OFF BY THE ECU, SO THE DAMPER STOPS AT THAT POSITION.

(SWITCHING FROM FACE TO DEF)

THE CURRENT FLOWS FROM **TERMINAL DEF** OF A/C CONTROL ASSEMBLY → **TERMINAL 1** OF AIR VENT CONTROL SERVO MOTOR → **TERMINAL 5** → **TERMINAL FACE** OF A/C CONTROL ASSEMBLY → **TERMINAL GND** → **GROUND,** THE MOTOR ROTATES AND THE DAMPER STOPS AT THAT POSITION.

4. OPERATION OF AIR MIX CONTROL SERVO MOTOR

WHEN THE TEMPERATURE SW IS TURNED TO “COOL” SIDE THE CURRENT FLOWS FROM **TERMINAL AMC** OF A/C CONTROL ASSEMBLY → **TERMINAL 2** OF AIR MIX CONTROL SERVO MOTOR → MOTOR → **TERMINAL 6** → **TERMINAL AMH** OF A/C CONTROL ASSEMBLY → **GROUND** AND THE MOTOR ROTATES. THE DAMPER OPENING ANGLE AT THIS TIME IS INPUT FROM **TERMINAL 4** OF SERVO MOTOR TO **TERMINAL TP** OF A/C CONTROL ASSEMBLY, THIS IS USED TO DETERMINE THE **DAMPER STOP** POSITION AND MAINTAIN THE SET TEMPERATURE.

WHEN THE TEMPERATURE CONTROL SW IS TURNED TO THE “HOT” SIDE, THE CURRENT FLOWS FROM SERVO MOTOR → **TERMINAL AMH** OF A/C CONTROL ASSEMBLY → **TERMINAL 6** OF AIR MIX CONTROL SERVO MOTOR → MOTOR → **TERMINAL 2** → **TERMINAL AMC** OF A/C CONTROL ASSEMBLY, ROTATING THE MOTOR IN REVERSE AND SWITCHING THE DAMPER FROM “COOL“ TO “HOT” SIDE.

5. AIR CONDITIONING OPERATION

THE A/C CONTROL ASSEMBLY RECEIVES VARIOUS SIGNALS, I.E., THE ENGINE RPM FROM THE IGNITER, OUTLET TEMPERATURE SIGNAL FROM THE A/C AMBIENT TEMP. SENSOR, COOLANT TEMPERATURE FROM THE A/C THERMISTOR AND THE LOCK SIGNAL FROM THE A/C COMPRESSOR, ETC.

WHEN THE ENGINE IS STARTED AND THE A/C SW (A/C CONTROL ASSEMBLY) IS ON, A SIGNAL IS INPUT TO THE ECU. (BUILT IN THE A/C CONTROL ASSEMBLY).

AS A RESULT, THE GROUND CIRCUIT IN A/C CONTROL ASSEMBLY IS CLOSED AND CURRENT FLOWS FROM **GAUGE** FUSE TO **TERMINAL 1** OF A/C MAGNETIC CLUTCH RELAY → **TERMINAL 2** → **TERMINAL MGC** OF A/C CONTROL ASSEMBLY → **TERMINAL GND** → **GROUND,** TURNING THE A/C MAGNETIC RELAY ON, SO THAT THE MAGNETIC CLUTCH IS ON AND THE A/C COMPRESSOR OPERATES.

AT THE SAME TIME, THE ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION). DETECTS THE MAGNETIC CLUTCH IS ON AND THE A/C COMPRESSOR OPERATES.

OPEN DIRECTION TO AVOID LOWERING THE ENGINE RPM DURING A/C OPERATING.

IF THE A/C CONTROL ASSEMBLY DETECTS THE FOLLOWING CONDITIONS, IT STOPS THE AIR CONDITIONING:

* THE TEMPERATURE AT THE AIR VENTS IS LOW.
* THERE IS A MARKED DIFFERENCE BETWEEN THE COMPRESSOR SPEED AND THE ENGINE SPEED.
* THE REFRIGERANT PRESSURE IS ABNORMALLY HIGH OR ABNORMALLY LOW.
* THE ENGINE SPEED DECREASES.
* RAPID ACCELERATION OCCURS.

SERVICE HINTS

A 2 A/C DUAL PRESSURE SW
4–1 : OPEN ABOVE APPROX. **15.5**KG/CM^2 (**30** PSI, **206** KPA) OR **27**KG/CM^2 (**384**PSI**, 2648**KPA)
A 3 A/C MAGNETIC CLUTCH
4–GROUND : APPROX. **3.7**
A10(B), A11(C), A12(A) A/C CONTROL ASSEMBLY
+B – GROUND: ALWAYS APPROX. **10–14** VOLTS
IG – GROUND: APPROX. **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION
HR – GROUND: APPROX. **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND DO NOT TURN THE BLOWER MOTOR
BELOW **1** VOLTS WITH IGNITION SW AT **ON** POSITION AND TURN THE BLOWER MOTOR
PSW – BELOW **1** VOLTS WITH IGNITION SW AT **ON**
ACC – GROUND: APPROX. **10–14** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
AC1 – GROUND: BELOW **1** VOLTS AT START THE ENGINE, OPERATE THE COMPRESSOR
+OR MORE VOLTS AT START THE ENGINE, DO NOT OPERATE THE COMPRESSOR
BLW – GROUND: BELOW **1.5** VOLTS WITH THE IGNITION SW ON AND TURN THE BLOWER MOTOR
S5 – SG : **4–6** VOLTS WITH THE IGNITION SW ON
SG – GROUND: ALWAYS CONTINUITY
AMH – AMC : **13–19** VOLTS WITH THE IGNITION SW OFF
AIF – GROUND: APPROX. **12** VOLTS WITH FRESH SW ON
AIR – GROUND: APPROX. **12** VOLTS WITH RECIRC SW ON
FACE – GROUND: APPROX. **12** VOLTS WITH FACE SW ON
DEF – GROUND: APPROX. **12** VOLTS WITH DEF SW ON
GND – GROUND: ALWAYS CONTINUITY
A14 A/C POWER TRANSISTOR
1–2 : APPROX. **2.0–2.4**K

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A 1		28	**A15**	30	**D 3**	30
A 2		28	**A16**	30	**E 8**	30
A 3		28	**A17**	30	**E12**	30
A10	B	30	**A21**	30	**I 2**	29
A11	C	30	**A22**	30	**J 1**	31
A12	A	30	**A23**	30	**J 4**	31
A13		30	**B 3**	30	**R 5**	31
A14		30	**B 4**	30		

⬭ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
4	25	R/B NO. 4 (RIGHT KICK PANEL)
5	26	R/B NO. 5 (ENGINE COMPARTMENT LEFT)

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1D		
3C	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3D		

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

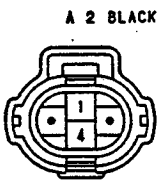
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB1	34	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE J/B NO. 1)
IH1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IJ1	36	INSTRUMENT PANEL NO. 2 WIRE AND COWL WIRE (UNDER THE COMBINATION METER)
IK1	36	COWL WIRE AND A/C SUB WIRE (NEAR THE RADIO AND PLAYER)
IL1	36	COWL WIRE AND SERVO MOTOR SUB WIRE (BEHIND RADIO AND PLAYER)
IM1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3		
IO1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IO3		

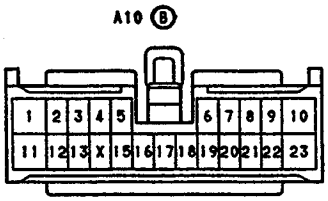
: GROUND POINTS

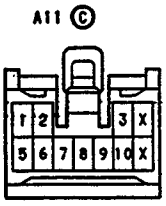
CODE	SEE PAGE	GROUND POINTS LOCATION
EB	34	FRONT LEFT FENDER
ED	34	INTAKE MANIFOLD LH
IG	36	INSTRUMENT PANEL BRACE LH
II	36	RIGHT KICK PANEL

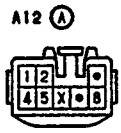
: SPLICE POINTS

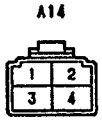
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 44			**I 57**	38	COWL WIRE
I 51			**I 58**	38	A/C SUB WIRE
I 53	38	COWL WIRE	**I 87**	38	ENGINE WIRE
I 54			**I104**	38	COWL WIRE
I 55					

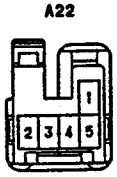


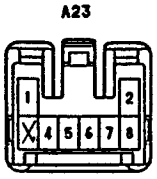


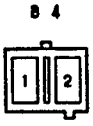


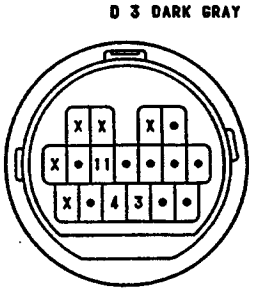


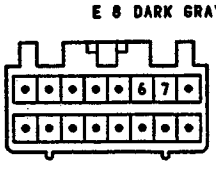


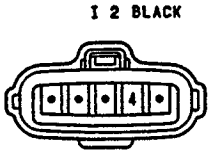


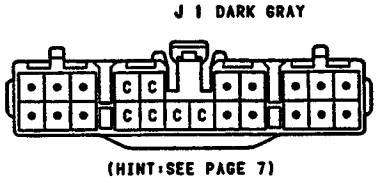


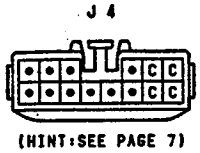


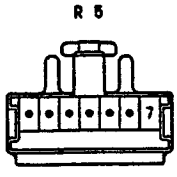




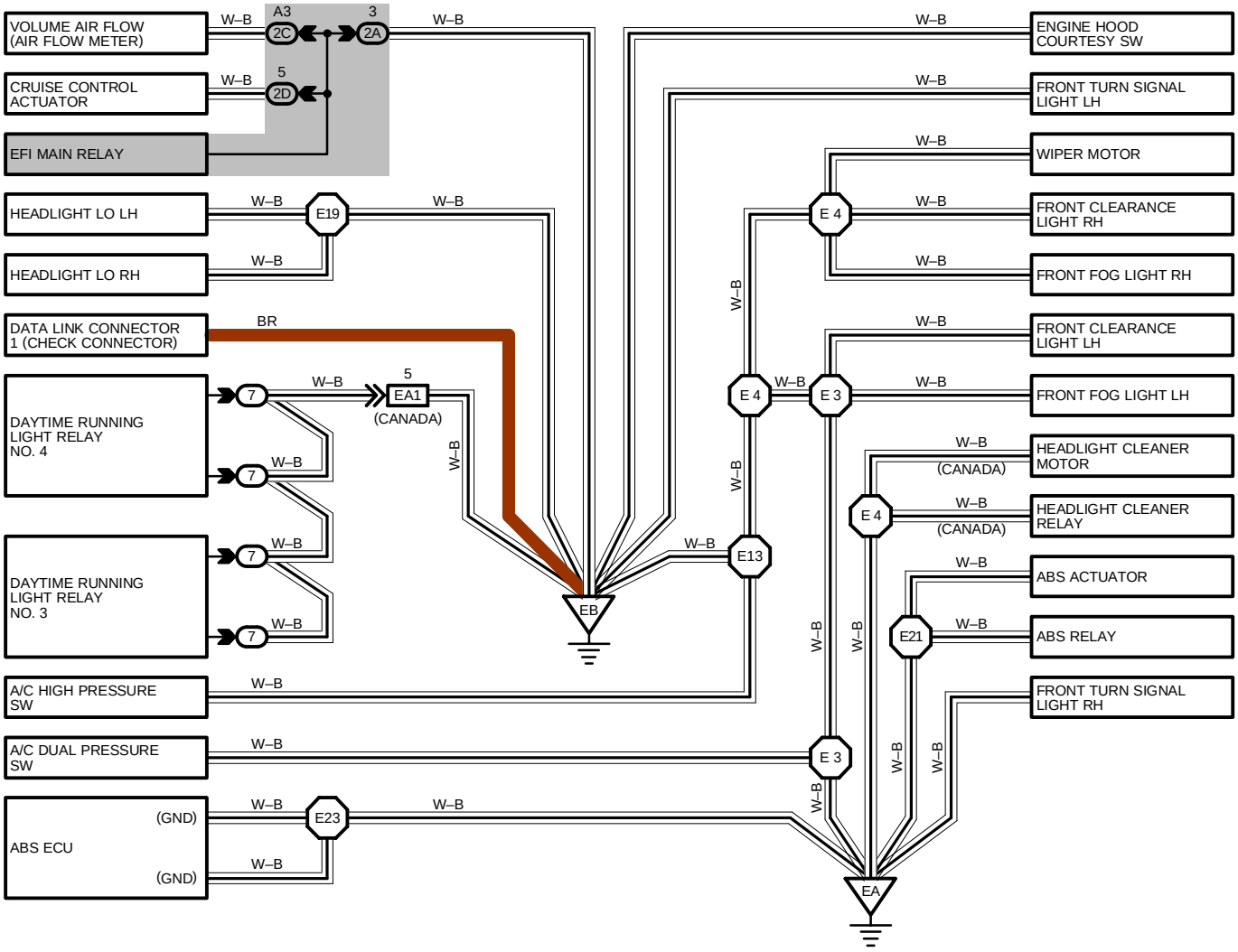


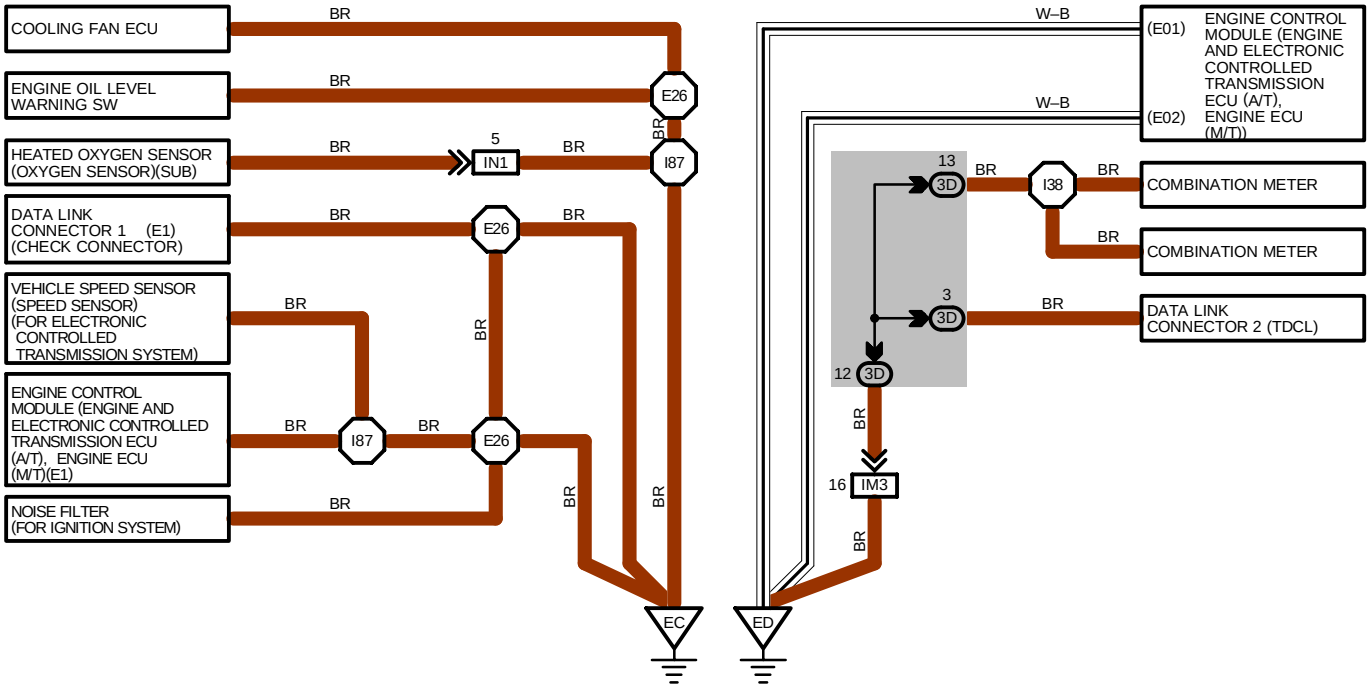


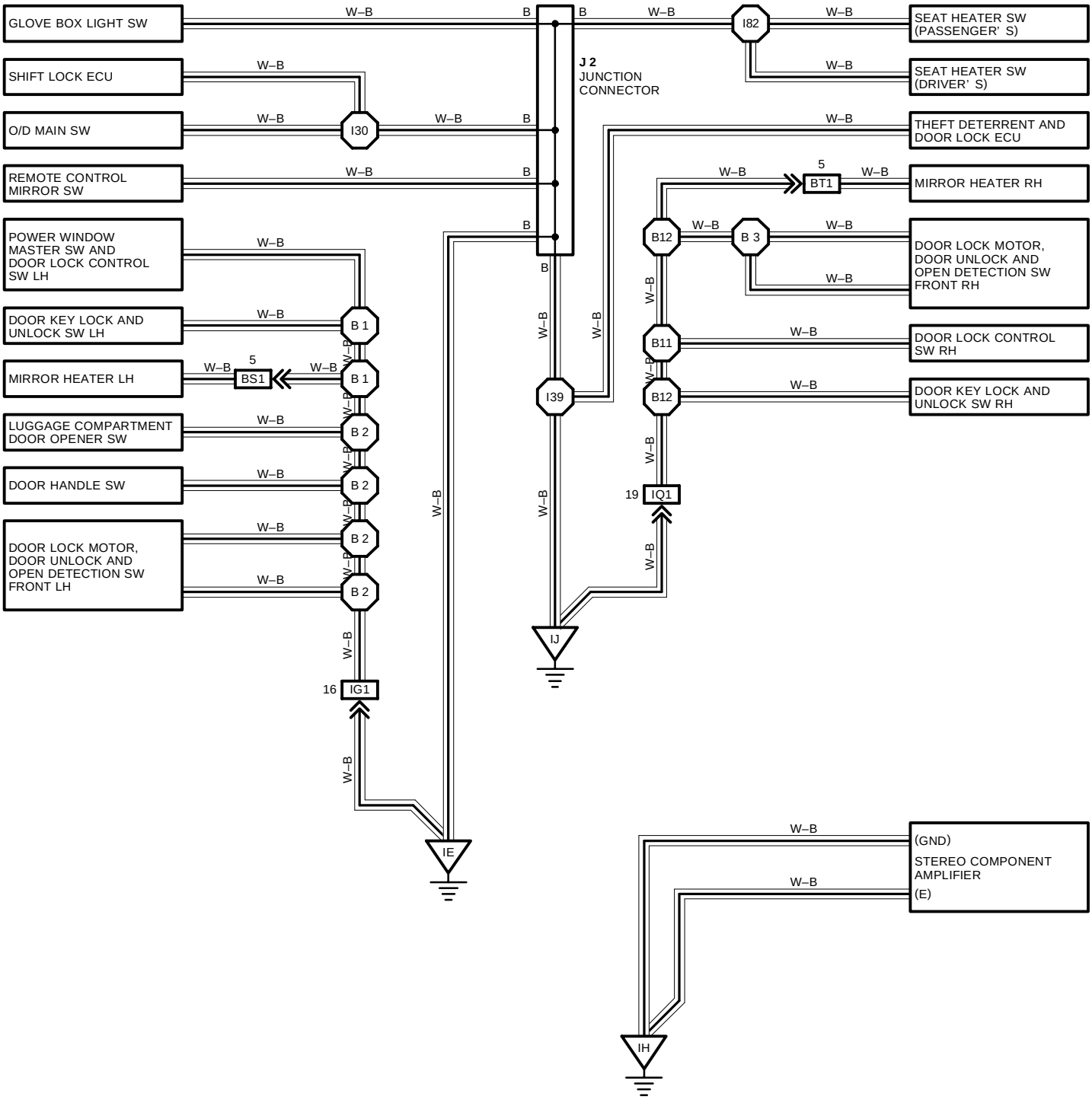




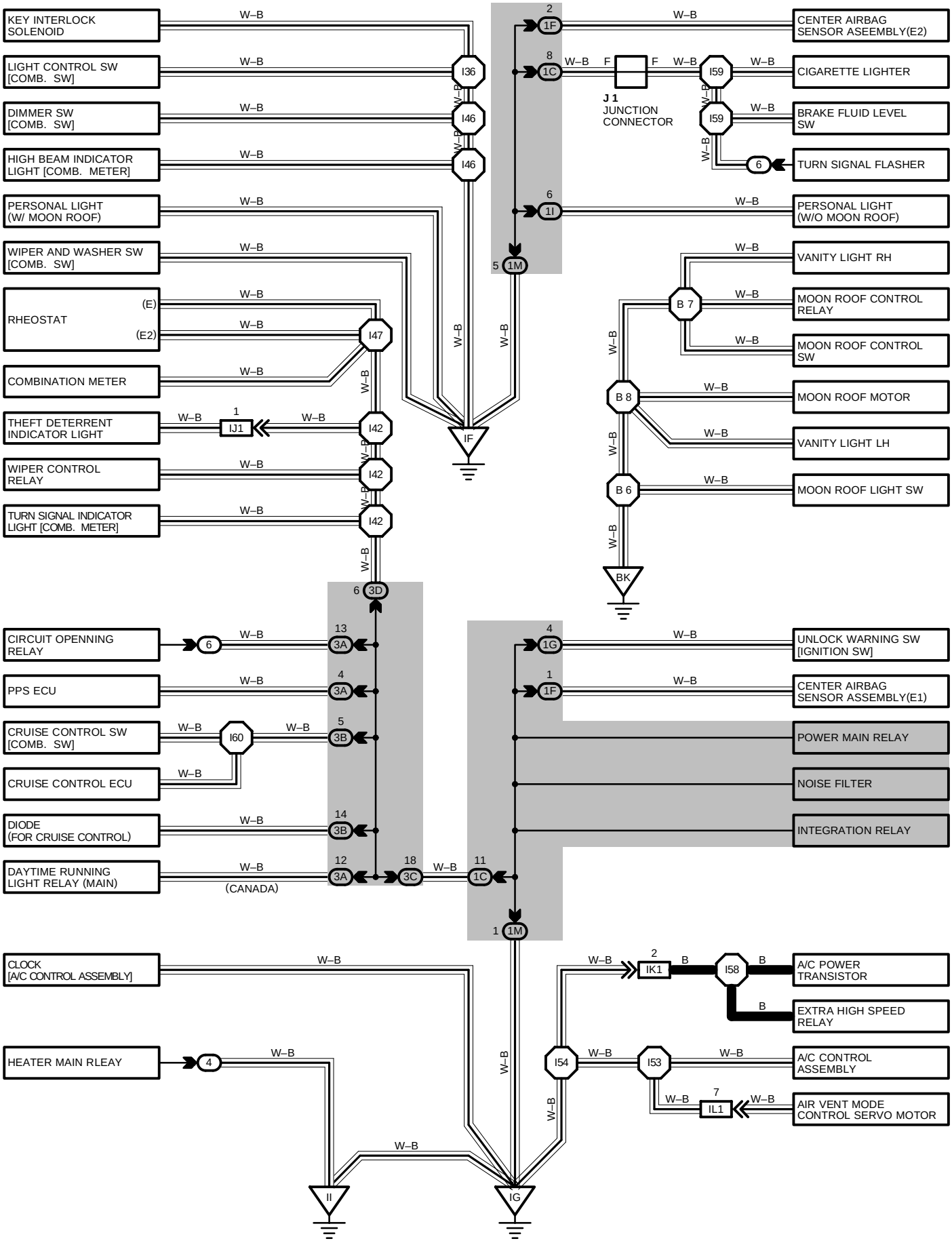
GROUND POINT

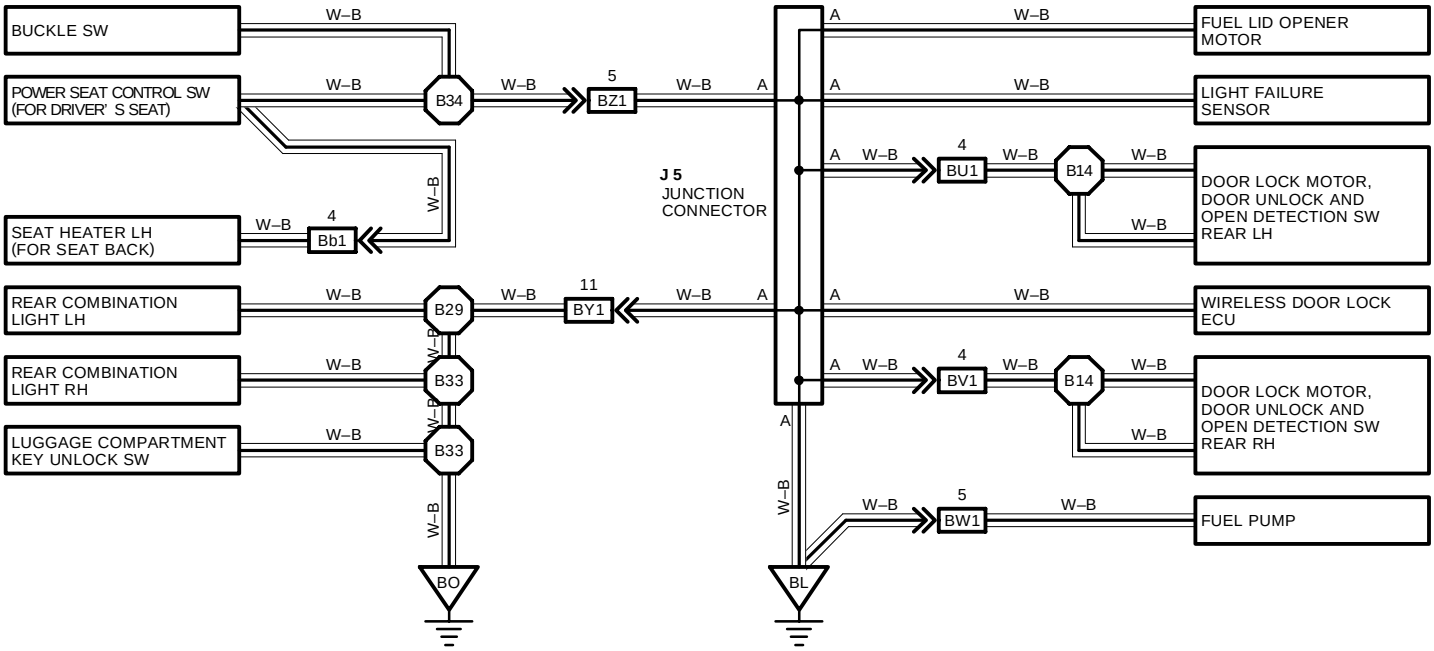


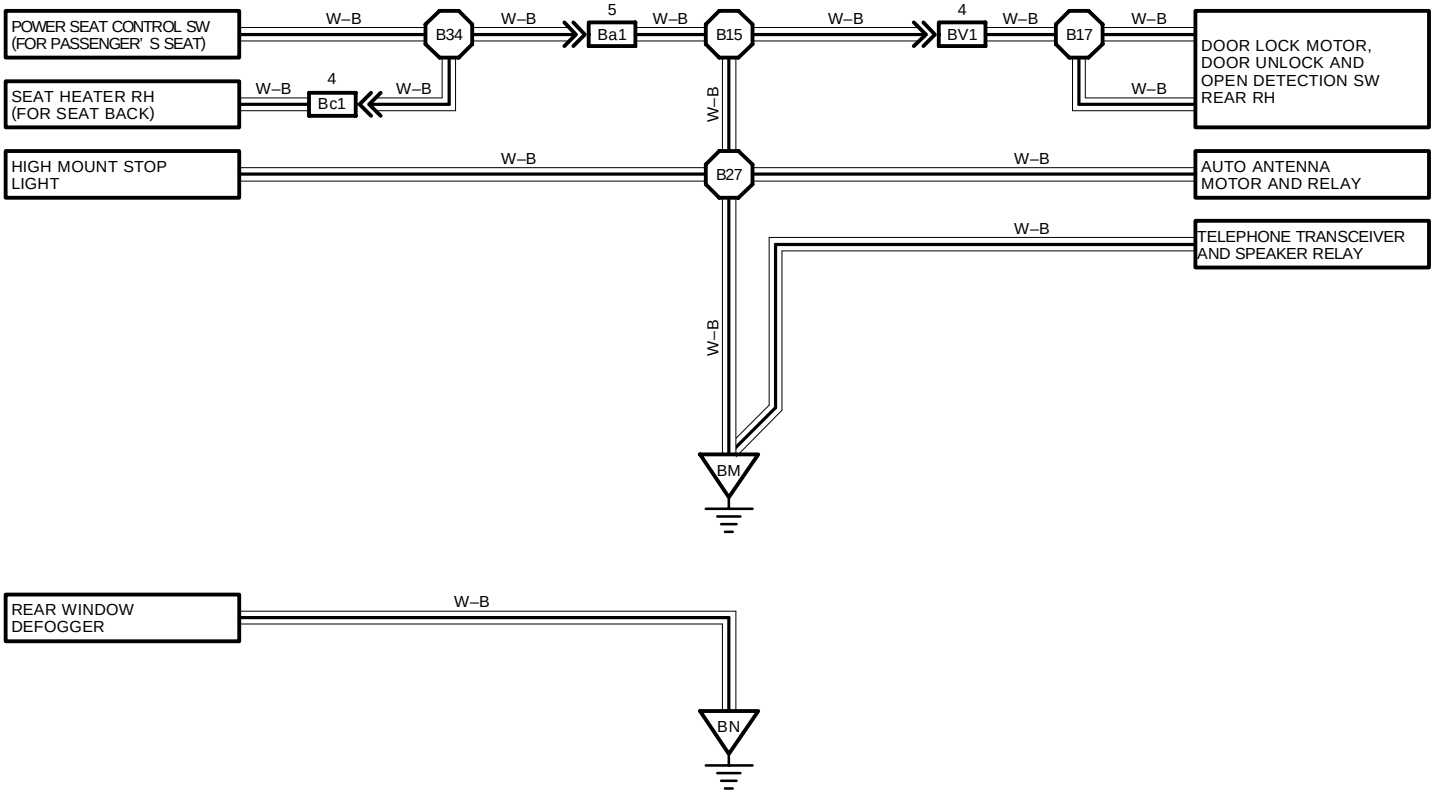



GLOVE BOX LIGHT SW
SHIFT LOCK ECU
O/D MAIN SW
REMOTE CONTROL MIRROR SW
POWER WINDOW MASTER SW AND DOOR LOCK CONTROL SW LH
DOOR KEY LOCK AND UNLOCK SW LH
MIRROR HEATER LH
LUGGAGE COMPARTMENT DOOR OPENER SW
DOOR HANDLE SW
DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW FRONT LH
W–B
B
I30
J 2
JUNCTION CONNECTOR
I82
SEAT HEATER SW (PASSENGER' S)
SEAT HEATER SW (DRIVER' S)
THEFT DETERRENT AND DOOR LOCK ECU
MIRROR HEATER RH
BT1
5
B12
B 3
DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW FRONT RH
B11
DOOR LOCK CONTROL SW RH
DOOR KEY LOCK AND UNLOCK SW RH
I39
19 IQ1
IJ
B 1
B 2
BS1
16 IG1
IE
IH
(GND)
STEREO COMPONENT AMPLIFIER
(E)

GROUND POINT




BUCKLE SW
POWER SEAT CONTROL SW (FOR DRIVER' S SEAT)
SEAT HEATER LH (FOR SEAT BACK)
REAR COMBINATION LIGHT LH
REAR COMBINATION LIGHT RH
LUGGAGE COMPARTMENT KEY UNLOCK SW
W–B
B34
B29
B33
B33
Bb1
BZ1
BY1
BO
J 5
JUNCTION CONNECTOR
A
BL
FUEL LID OPENER MOTOR
LIGHT FAILURE SENSOR
BU1
B14
DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW REAR LH
WIRELESS DOOR LOCK ECU
BV1
B14
DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW REAR RH
BW1
FUEL PUMP


POWER SEAT CONTROL SW (FOR PASSENGER' S SEAT)
SEAT HEATER RH (FOR SEAT BACK)
HIGH MOUNT STOP LIGHT
W–B
B34
Bc1
Ba1
B15
B27
BM
BV1
B17
DOOR LOCK MOTOR, DOOR UNLOCK AND OPEN DETECTION SW REAR RH
AUTO ANTENNA MOTOR AND RELAY
TELEPHONE TRANSCEIVER AND SPEAKER RELAY

REAR WINDOW DEFOGGER
W–B
BN

GROUND POINT

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 1	31	**J 2**	31	**J 5**	32

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
4	25	R/B NO. 4 (RIGHT KICK PANEL)
6	26	R/B NO. 6 (BEHIND GLOVE BOX)
7	27	R/B NO. 7 (NEAR THE BATTERY)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1F		
1G		
1I	20	ROOF WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO. 1 (INSTRUMENT PANEL LEFT)
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2C	22	ENGINE WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2D	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (BEHIND COMBINATION METER)
3A	24	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3B		
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	34	ENGINE ROOM MAIN WIRE AND RELAY WIRE (UNDER THE R/B NO.7)
IG1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IJ1	36	INSTRUMENT PANEL NO. 2 WIRE AND COWL WIRE (UNDER THE COMBINATION METER)
IK1	36	COWL WIRE AND A/C SUB WIRE (NEAR THE RADIO AND PLAYER)
IL1	36	COWL WIRE AND SERVO MOTOR SUB WIRE (BEHIND RADIO AND PLAYER)
IM3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IN1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)
IQ1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BS1	40	MIRROR LH WIRE AND FRONT DOOR LH WIRE (FRONT LH DOOR INSIDE)
BT1	40	MIRROR RH WIRE AND FRONT DOOR RH WIRE (FRONT RH DOOR INSIDE)
BU1	40	REAR DOOR LH WIRE AND FLOOR NO.1 WIRE (LEFT CENTER PILLAR)
BV1	40	REAR DOOR RH WIRE AND FLOOR NO.2 WIRE (RIGHT CENTER PILLAR)
BW1	40	FUEL GAUGE WIRE FLOOR NO. 1 WIRE (UNDER THE REAR SEAT CUSHION)
BY1	40	LUGGAGE ROOM WIRE AND FLOOR NO. 1 WIRE (LUGGAGE ROOM LEFT)
BZ1	42	FLOOR NO. 1 WIRE AND SEAT LH NO.1 WIRE (UNDER THE DRIVER'S SEAT)
Ba1	42	FLOOR NO. 2 WIRE AND SEAT RH NO.1 WIRE (UNDER THE PASSENGER'S SEAT)
Bb1	42	SEAT LH NO. 2 WIRE AND SEAT LH NO. 1 WIRE (UNDER THE DRIVER'S SEAT)
Bc1	42	SEAT RH NO.2 WIRE AND SEAT RH NO.1 WIRE (UNDER THE PASSENGER'S SEAT)

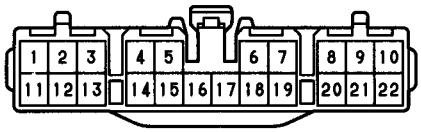
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
EC	34	INTAKE MANIFOLD RH
ED	34	INTAKE MANIFOLD LH
IE	36	LEFT KICK PANEL
IF		
IG	36	INSTRUMENT PANEL BRACE LH
IH	36	INSTRUMENT PANEL BRACE RH
II	36	RIGHT KICK PANEL
IJ		
BK	40	ROOF LEFT
BL	40	UNDER THE LEFT QUARTER PILLAR
BM	40	UNDER THE RIGHT QUARTER PILLAR
BN	40	LEFT QUARTER PILLAR
BO	40	BACK PANEL CENTER

: **SPLICE POINTS**

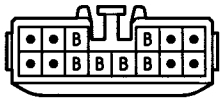
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 3	34	ENGINE ROOM MAIN WIRE	**I 60**	38	COWL WIRE
E 4			**I 82**	38	INSTRUMENT PANEL WIRE
E 10	34	RELAY WIRE	**I 87**	38	ENGINE WIRE
E 13	34	ENGINE ROOM MAIN WIRE	**B 1**	40	FRONT DOOR LH WIRE
E 19			**B 2**		
E 21			**B 3**		
E 23			**B 6**	40	ROOF WIRE
E 26	34	ENGINE WIRE	**B 7**		
I 30	38	COWL WIRE	**B 8**		
I 36			**B 11**	40	FRONT DOOR RH WIRE
I 38			**B 12**		
I 39			**B 14**	40	REAR DOOR LH WIRE
I 42			**B 15**	40	FLOOR NO. 2 WIRE
I 46			**B 17**	40	REAR DOOR RH WIRE
I 47			**B 27**	40	FLOOR NO .2 WIRE
I 53			**B 29**	40	LUGGAGE ROOM WIRE
I 54			**B 33**		
I 58	38	A/C SUB WIRE	**B 34**	42	SEAT LH NO. 1 WIRE
I 59	38	COWL WIRE			

J 1 DARK GRAY



(HINT:SEE PAGE 7)

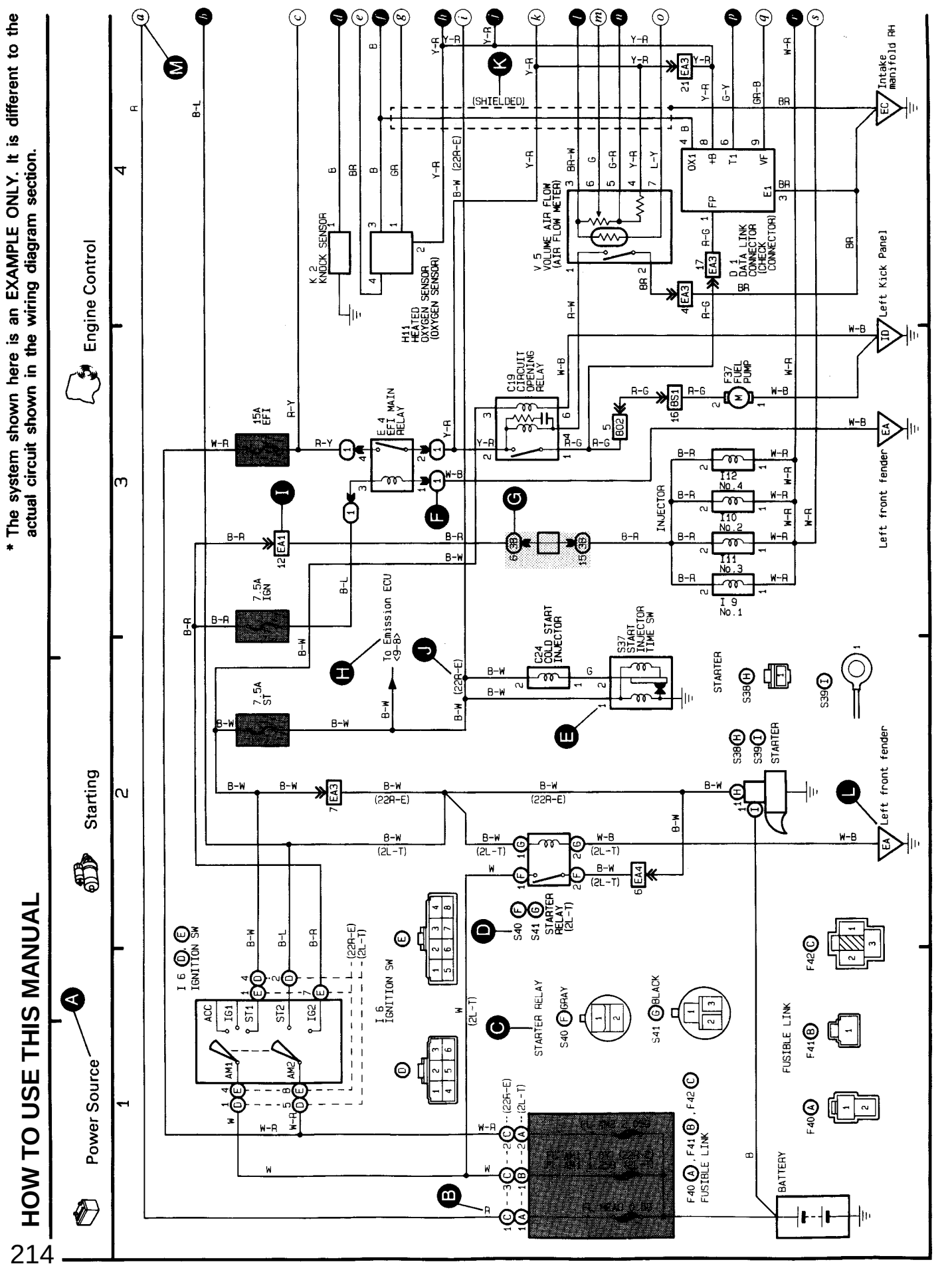
J 2



(HINT:SEE PAGE 7)

J 5

(HINT:SEE PAGE 7)


* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the wiring diagram section.
HOW TO USE THIS MANUAL
Power Source
Starting
Engine Control
Intake manifold RH
Left Kick Panel
Left front fender
STARTER
FUSIBLE LINK
BATTERY
IGNITION SW
STARTER RELAY
DATA LINK CONNECTOR (CHECK CONNECTOR)
VOLUME AIR FLOW (AIR FLOW METER)
KNOCK SENSOR
HEATED OXYGEN SENSOR (OXYGEN SENSOR)
CIRCUIT OPENING RELAY
EFI MAIN RELAY
FUEL PUMP
INJECTOR
COLD START INJECTOR
START INJECTOR TIME SW
To Emission ECU <9-B>
(SHIELDED)

Ⓐ: System Title

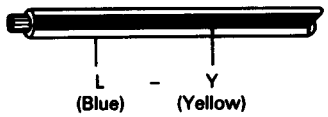
Ⓑ: Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

B	= Black	L	= Blue	R	= Red
BR	= Brown	LG	= Light Green	V	= Violet
G	= Green	O	= Orange	W	= White
GR	= Gray	P	= Pink	Y	= Yellow

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

Example: L – Y

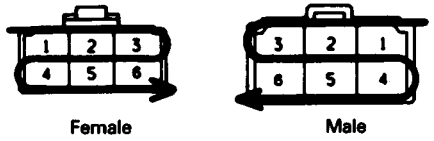


Ⓒ: Indicates the connector to be connected to a part (the numeral indicates the pin No.)

Ⓓ: The position of the parts is the same as shown in the wiring diagram and wire routing.

Ⓔ: Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example: **Numbered in order from upper left to lower right** **Numbered in order from upper right to lower left**



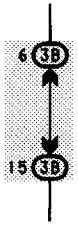
The numbering system for the overall wiring diagram is the same as above.

Ⓕ: Indicates a Relay Block. No Shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example: ① Indicates Relay Block No. 1.

Ⓖ: Junction Block (The number in the circle is the J/B No. and connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts (different junction blocks are shaded differently for further clarification.).

Example:

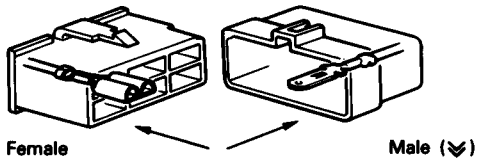


3B indicates that it is inside Junction Block No. 3.

Ⓗ: Indicates related system.

Ⓘ: Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows **(≫).**

Outside numerals are pin numbers.



Ⓙ: ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

Ⓚ: Indicates a shielded cable.

Ⓛ: Indicates and located on ground point.

Ⓜ: The same code occuring on the next page indicates that the wire harness is continuous.

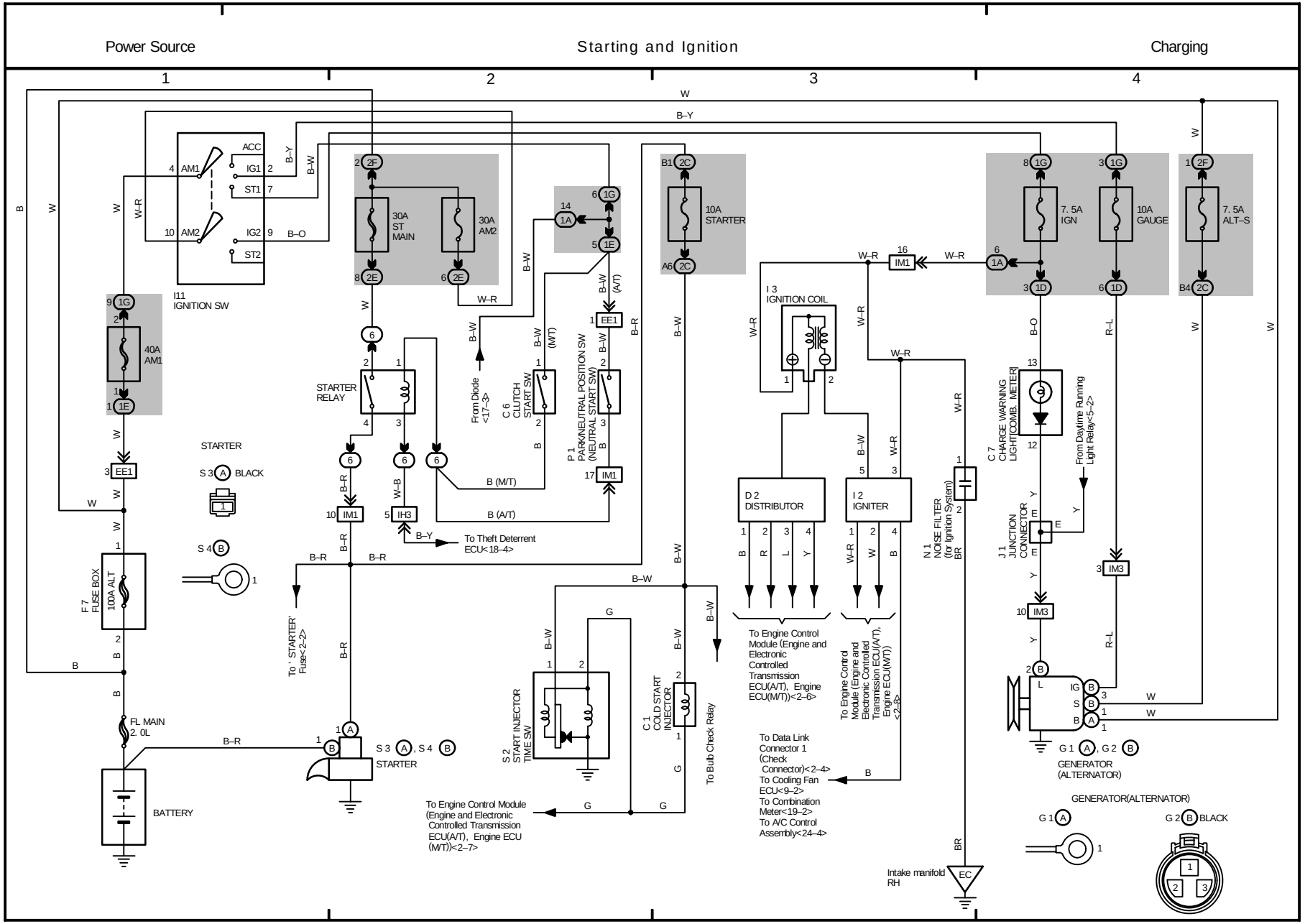
SYSTEM INDEX

SYSTEMS	LOCATION
ABS (Anti–Lock Brake System)	16–2
Auto Antenna	15–2
Automatic Air Conditioning	24–2
Back–Up Light	3–7
Cellular Mobile Telephone	20–3
Charging	1–4
Cigarette Lighter and Clock	11–4
Combination Meter	19–2
Cruise Control	17–2
Electronic Controlled Transmission and A/T Indicator	3–2
Electronically Controlled Hydraulic Cooling Fan	9–2
Engine Control	2–2
Front Fog Light	4–4

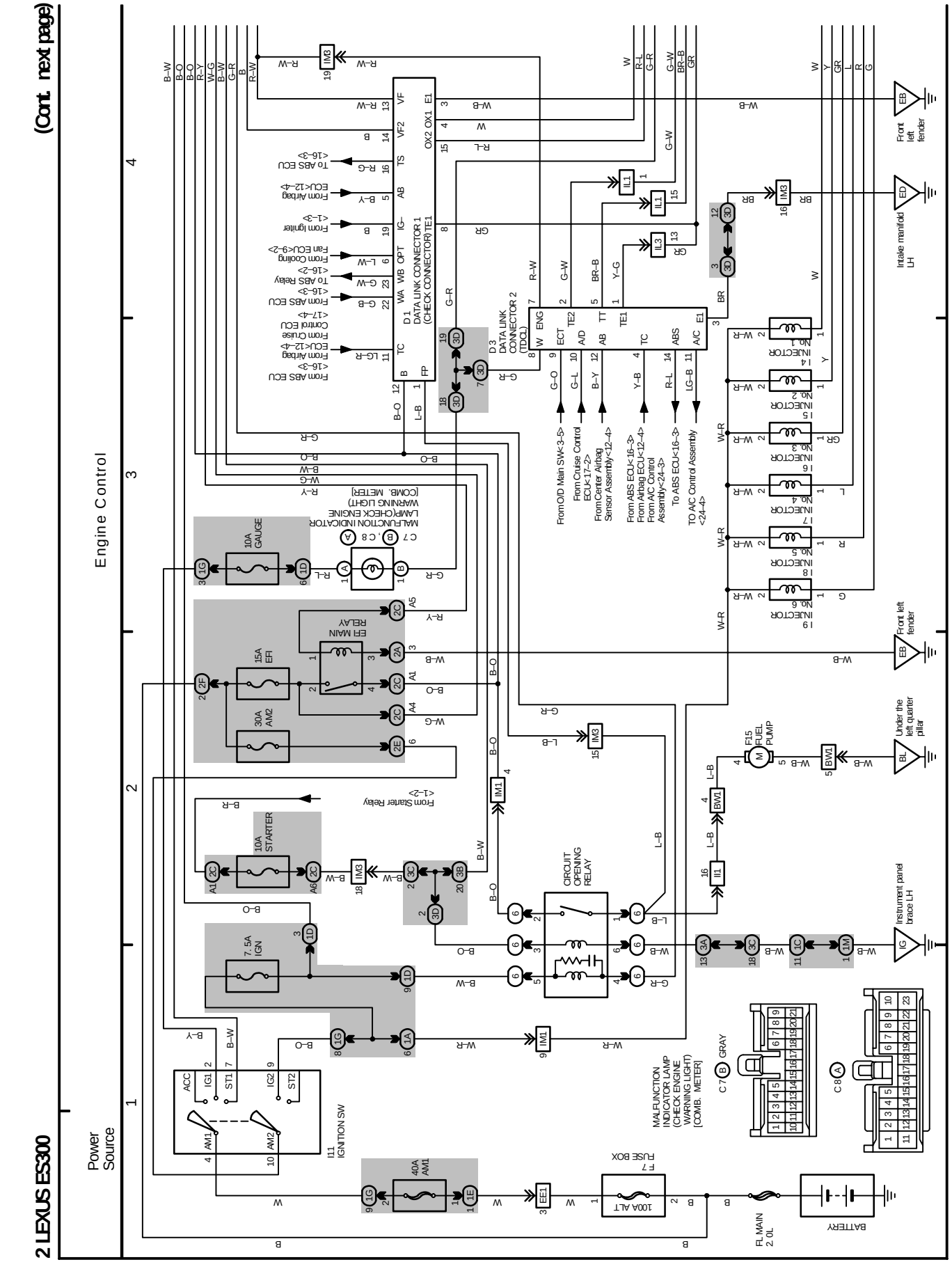
SYSTEMS	LOCATION
Headlight (for USA)	4–2
Headlight Cleaner (for Canada)	5–2
Headlight Cleaner	10–2
Horn	9–4
Illumination	7–2
Interior Light	8–2
Light Auto Turn Off	20–2
Moon Roof	13–2
Power Seat	14–2
Power Source	1~24–1
Power Window	13–3
PPS (Progressive Power Steering)	12–2
Radio and Player	21–2 (w/ CD Player) 22–2 (w/o CD Player

SYSTEMS	LOCATION
Remote Window Defogger and Mirror Heater	10–4
Remote Control Mirror	15–3
Seat Heater	11–2
Shift Lock	12–2
SRS (Supplemental Restraint System)	12–3
Starting and Ignition	1–2
Stop Light	6–4
Taillight	6–2
Theft Deterrent and Door Lock	18–2
Turn Signal and Hazard Warning Light	9–3
Unlock and Seat Belt Warning	10–3
Wiper and Washer	23–2
Wireless Door Lock Remote Control	18–8

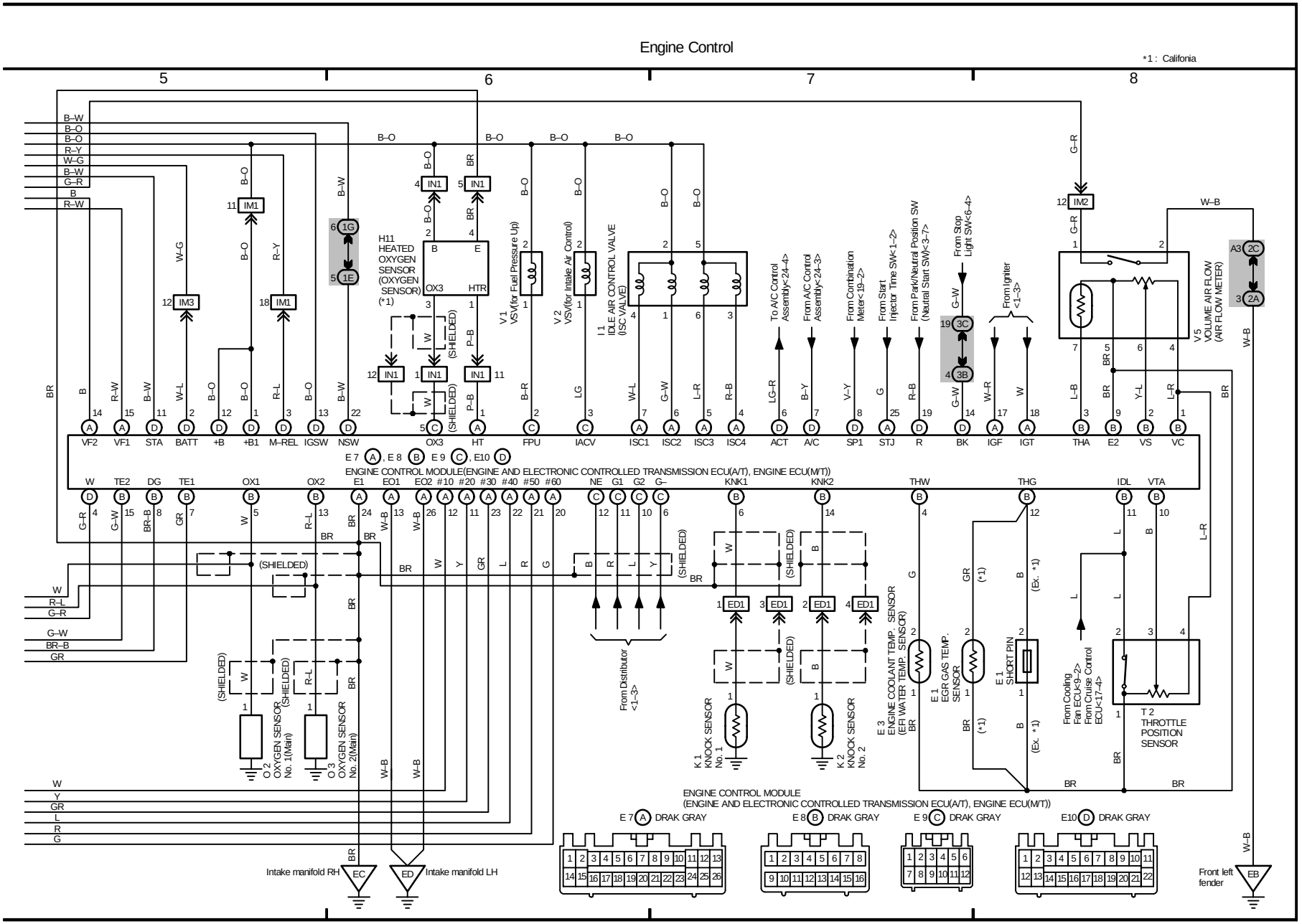
1 LEXUS ES300 ELECTRICAL WIRING DIAGRAM



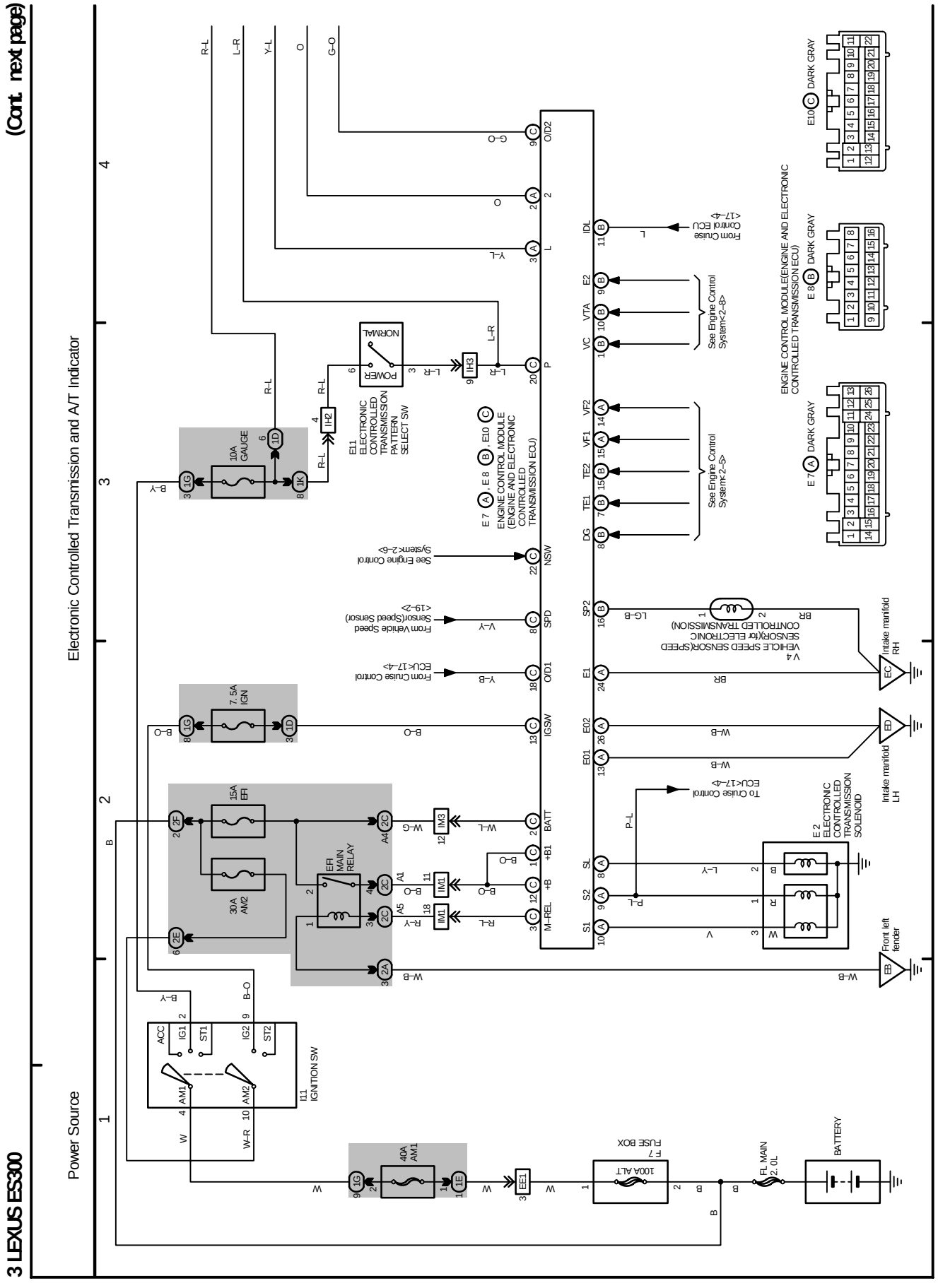
OVERALL ELECTRICAL WIRING DIAGRAM



2 LEXUS ES300(Cont' d)



OVERALL ELECTRICAL WIRING DIAGRAM

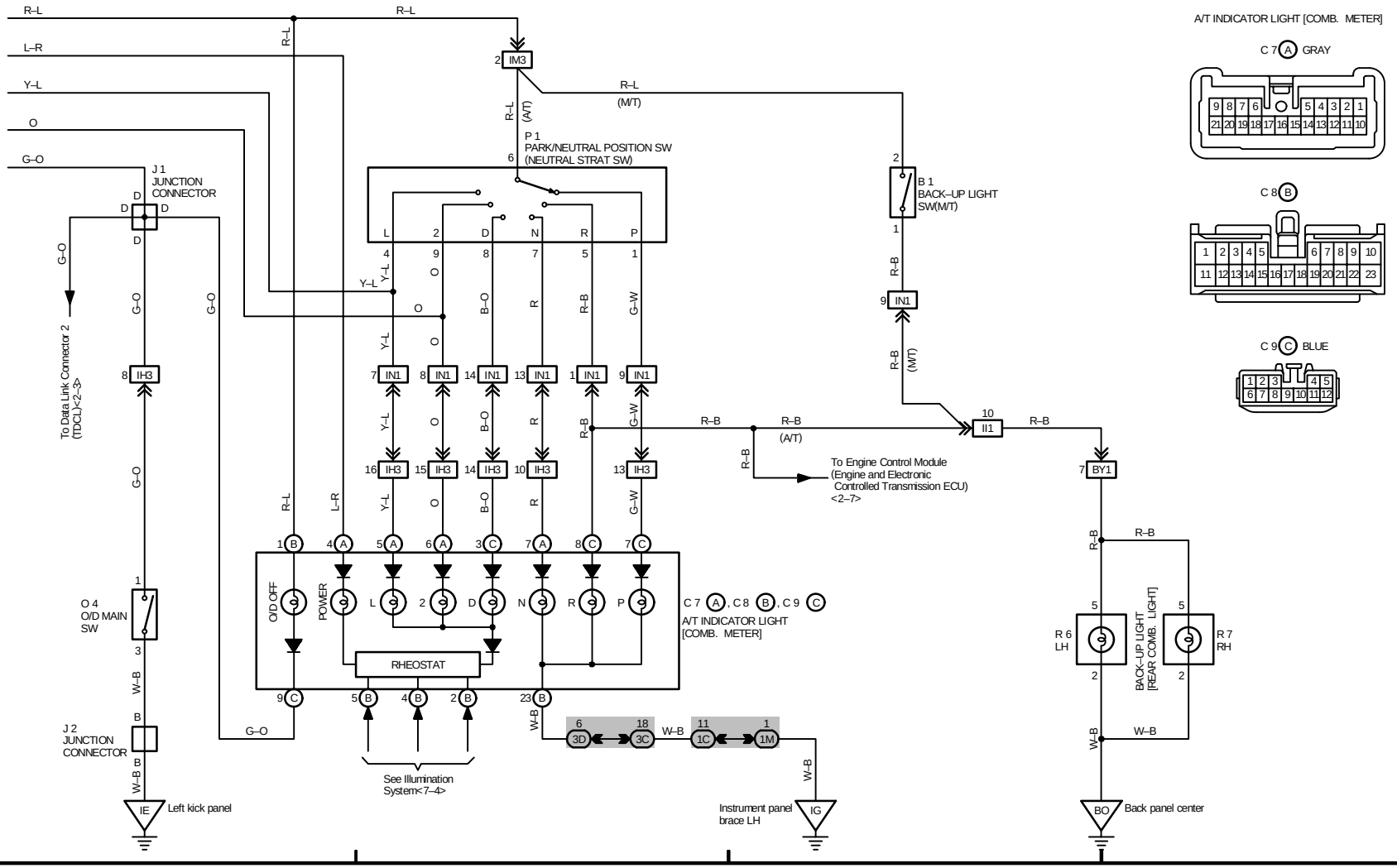


3 LEXUS ES300(Cont' d)

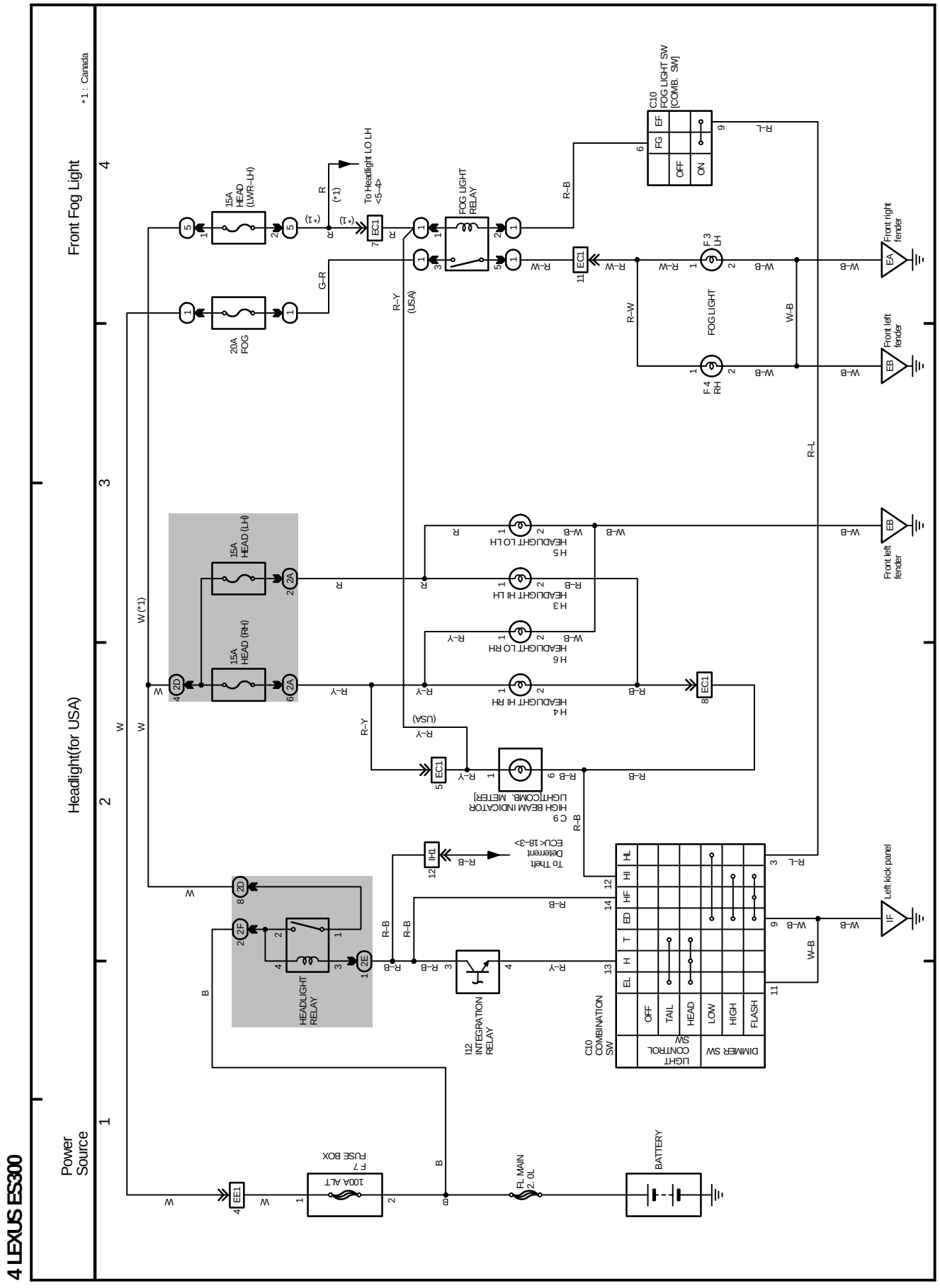
Electronic Controlled Transmission and A/T Indicator

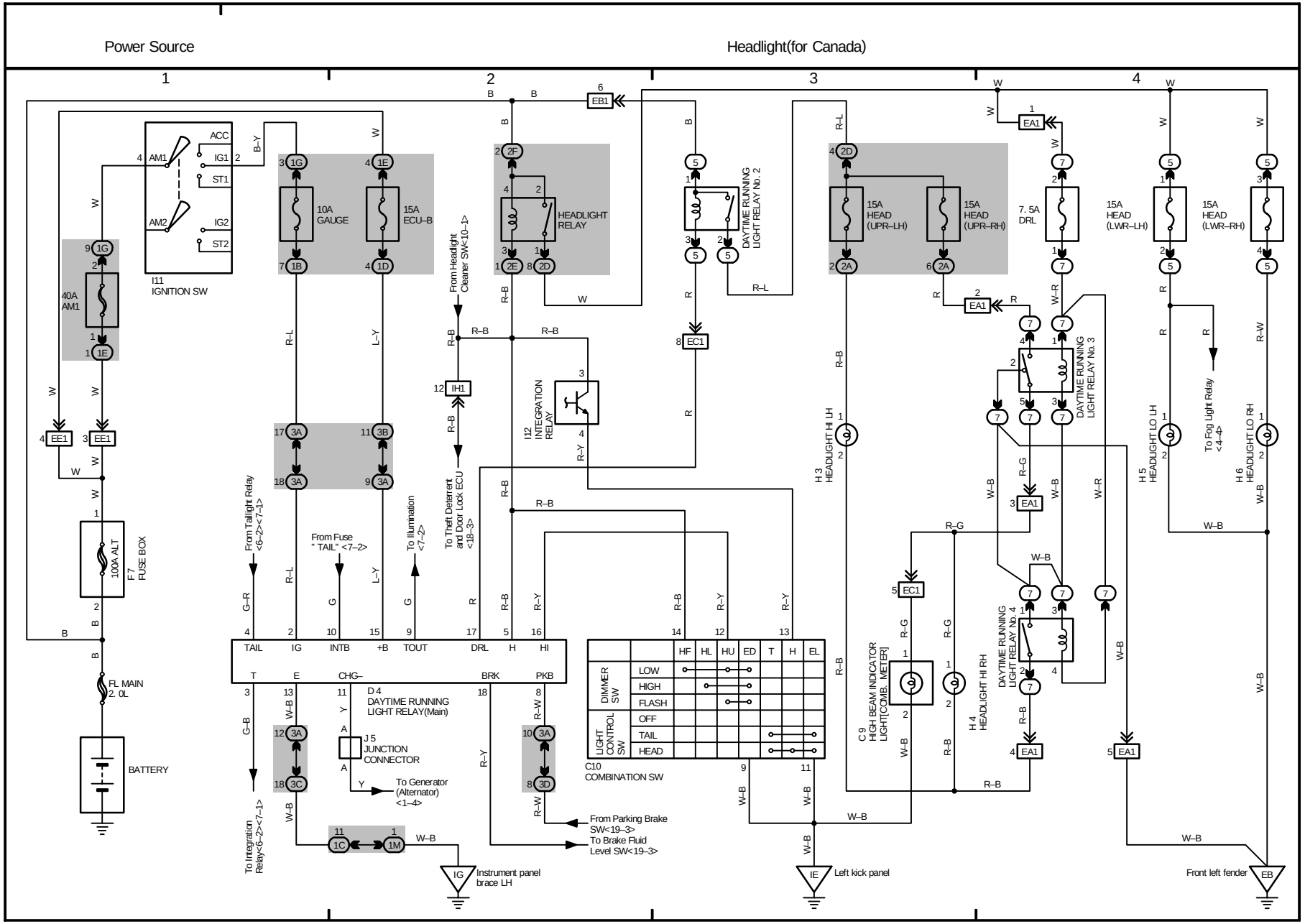
Back–Up Light

5 6 7 8

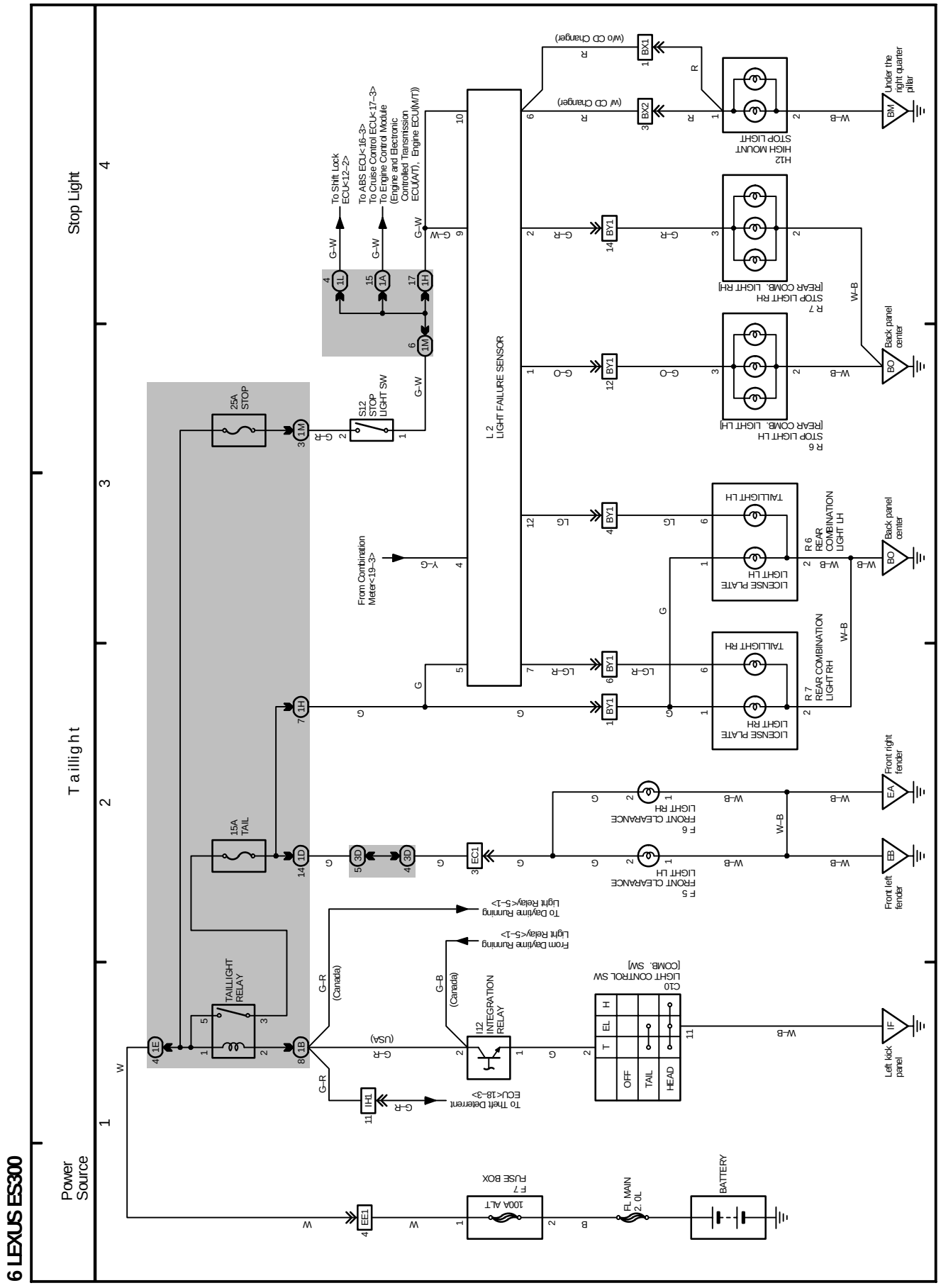


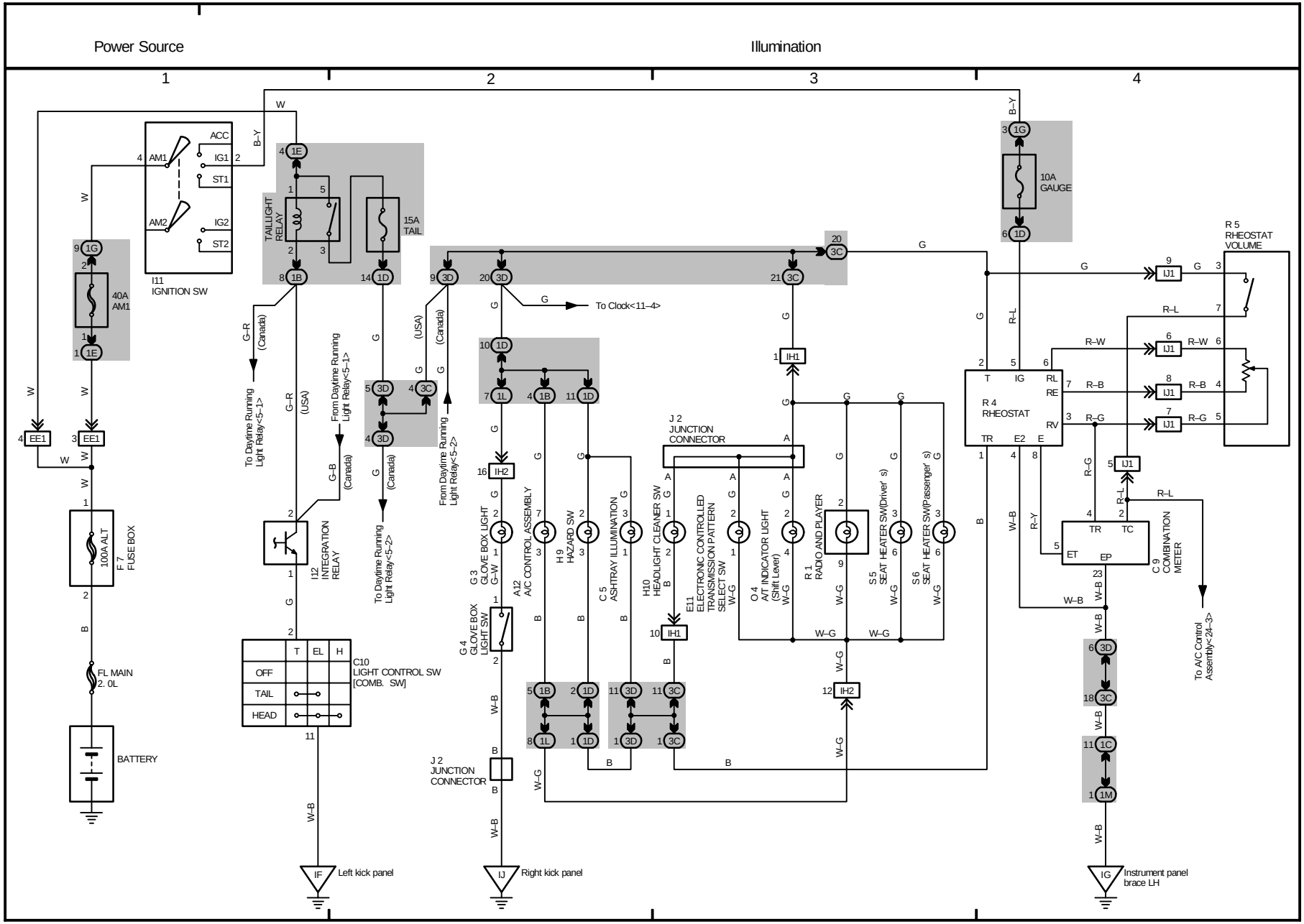
OVERALL ELECTRICAL WIRING DIAGRAM



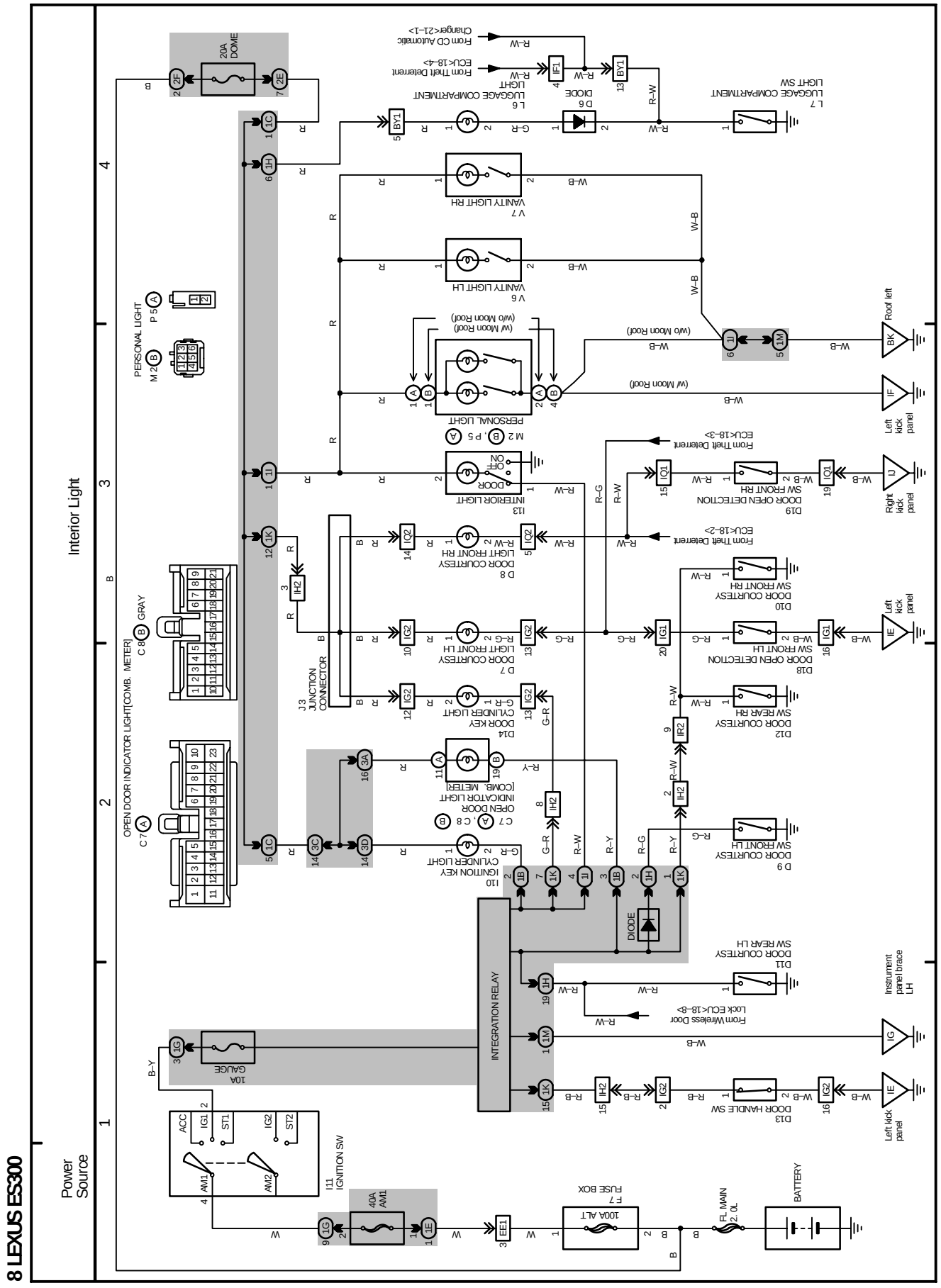

Power Source
Headlight(for Canada)
1
2
3
4
ACC
IG1
ST1
IG2
ST2
AM1
AM2
I11
IGNITION SW
40A
AM1
10A
GAUGE
15A
ECU–B
HEADLIGHT
RELAY
From Headlight
Cleaner SW<10–1>
DAYTIME RUNNING
LIGHT RELAY No. 2
15A
HEAD
(UPR–LH)
15A
HEAD
(UPR–RH)
7. 5A
DRL
15A
HEAD
(LWR–LH)
15A
HEAD
(LWR–RH)
EB1
EA1
EC1
IH1
I12
INTEGRATION
RELAY
To Theft Deterrent
and Door Lock ECU
<18–3>
To Illumination
<7–2>
From Fuse
" TAIL" <7–2>
From Taillight Relay
<6–2><7–1>
DAYTIME RUNNING
LIGHT RELAY No. 3
DAYTIME RUNNING
LIGHT RELAY No. 4
To Fog Light Relay
<4–4>
H 3
HEADLIGHT HI LH
H 4
HEADLIGHT HI RH
H 5
HEADLIGHT LO LH
H 6
HEADLIGHT LO RH
C 9
HIGH BEAM INDICATOR
LIGHT[COMB. METER]
EE1
F 7
FUSE BOX
100A ALT
FL MAIN
2. 0L
BATTERY
TAIL
IG
INTB
+B
TOUT
DRL
H
HI
T
E
CHG–
BRK
PKB
D 4
DAYTIME RUNNING
LIGHT RELAY(Main)
J 5
JUNCTION
CONNECTOR
To Generator
(Alternator)
<1–4>
To Integration
Relay<6–2><7–1>
C10
COMBINATION SW
DIMMER
SW
LIGHT
CONTROL
SW
HF
HL
HU
ED
T
H
EL
LOW
HIGH
FLASH
OFF
TAIL
HEAD
From Parking Brake
SW<19–3>
To Brake Fluid
Level SW<19–3>
IG
Instrument panel
brace LH
IE
Left kick panel
Front left fender
EB

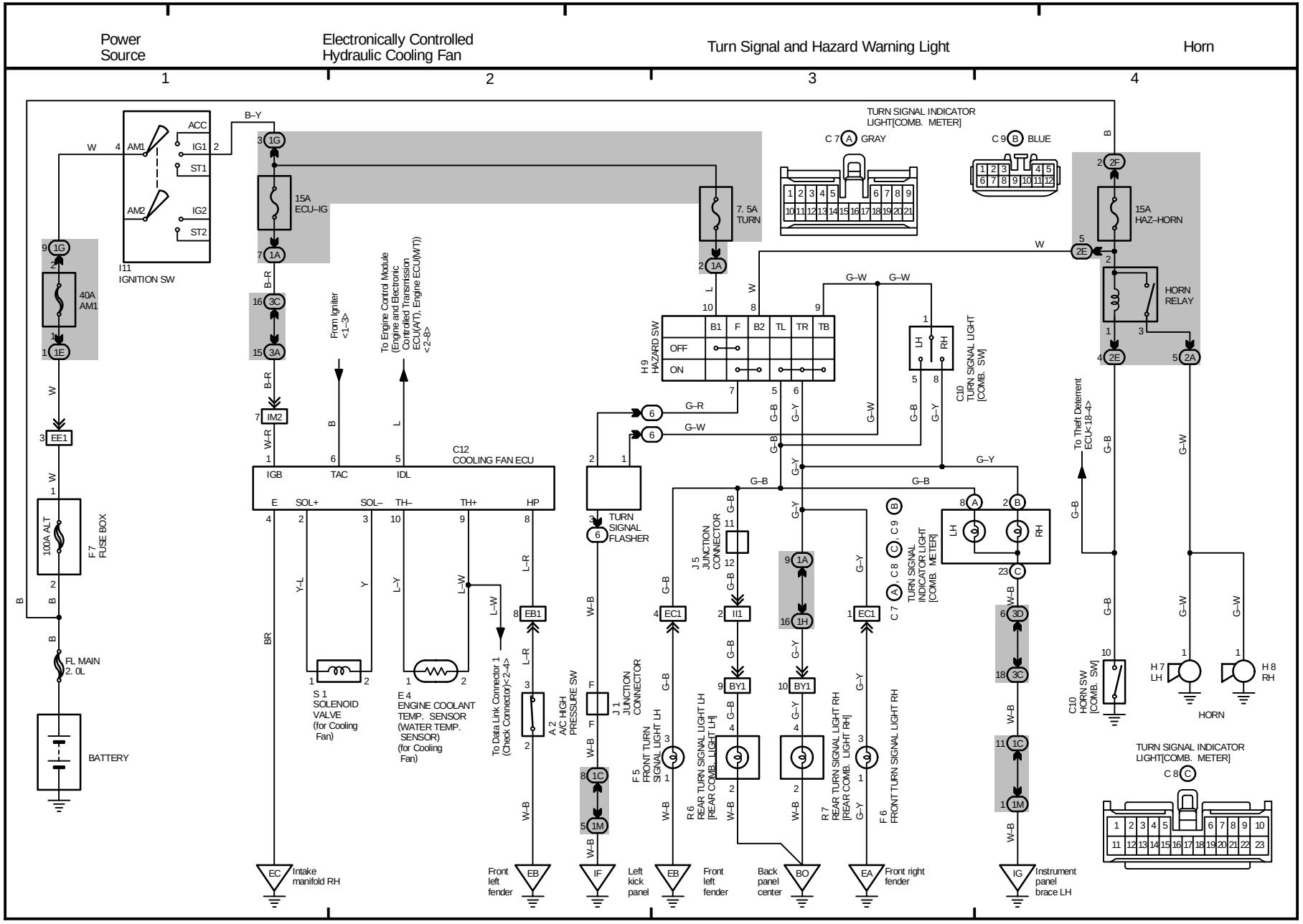
OVERALL ELECTRICAL WIRING DIAGRAM



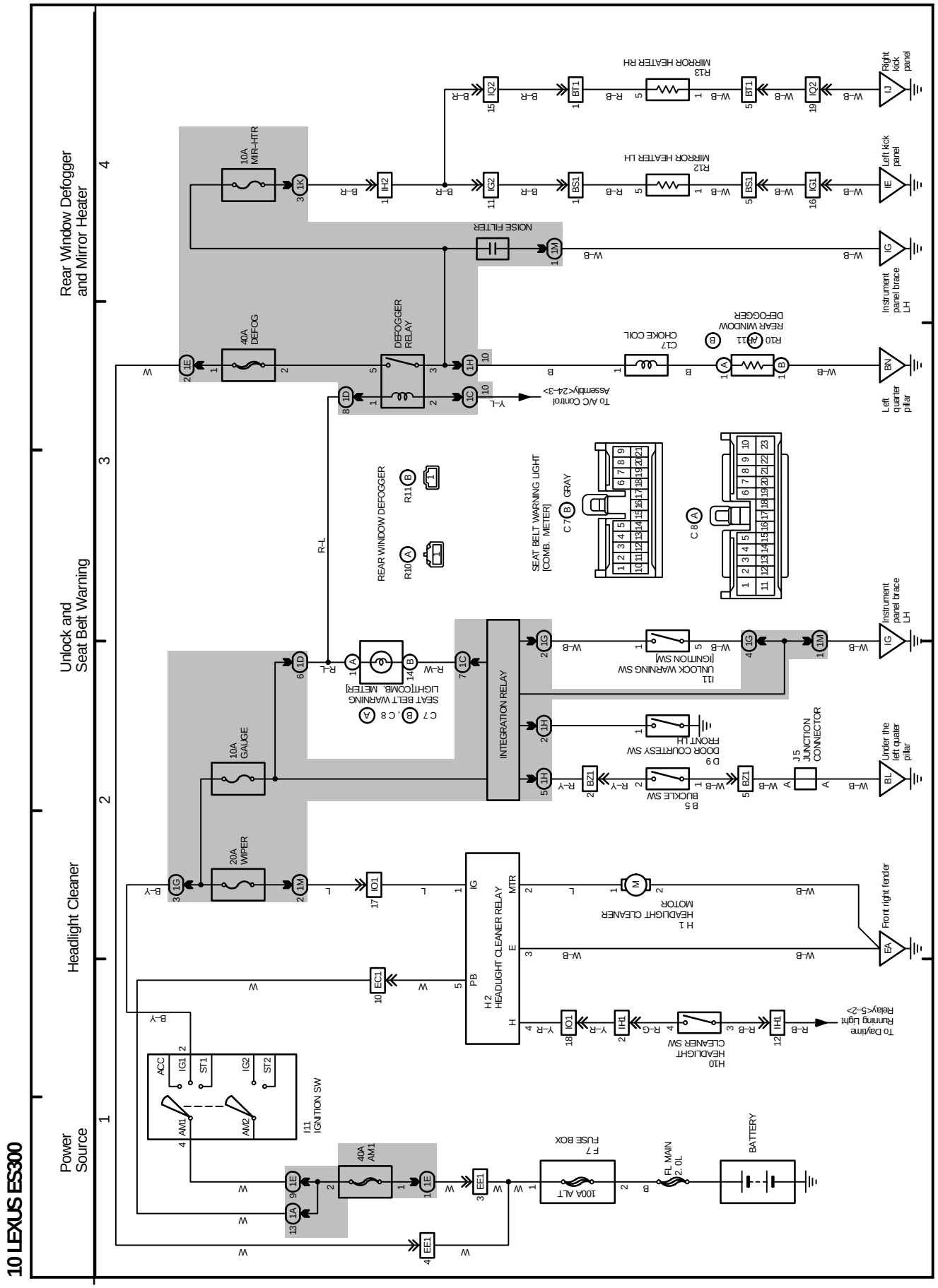

Power Source
Illumination
1
2
3
4
I11
IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
40A
AM1
TAIL LIGHT
RELAY
15A
TAIL
10A
GAUGE
F 7
FUSE BOX
100A ALT
FL MAIN
2. 0L
BATTERY
I12
INTEGRATION
RELAY
C10
LIGHT CONTROL SW
[COMB. SW]
T
EL
H
OFF
TAIL
HEAD
To Daytime Running
Light Relay<5–1>
From Daytime Running
Light Relay<5–1>
To Daytime Running
Light Relay<5–2>
From Daytime Running
Light Relay<5–2>
(Canada)
(USA)
To Clock<11–4>
J 2
JUNCTION
CONNECTOR
G 3
GLOVE BOX LIGHT
G 4
GLOVE BOX
LIGHT SW
A12
A/C CONTROL ASSEMBLY
H 9
HAZARD SW
C 5
ASHTRAY ILLUMINATION
H10
HEADLIGHT CLEANER SW
E11
ELECTRONIC CONTROLLED
TRANSMISSION PATTERN
SELECT SW
O 4
A/T INDICATOR LIGHT
(Shift Lever)
R 1
RADIO AND PLAYER
S 5
SEAT HEATER SW(Driver's)
S 6
SEAT HEATER SW(Passenger's)
R 4
RHEOSTAT
R 5
RHEOSTAT
VOLUME
C 9
COMBINATION
METER
To A/C Control
Assembly<24–3>
IF
Left kick panel
IJ
Right kick panel
IG
Instrument panel
brace LH

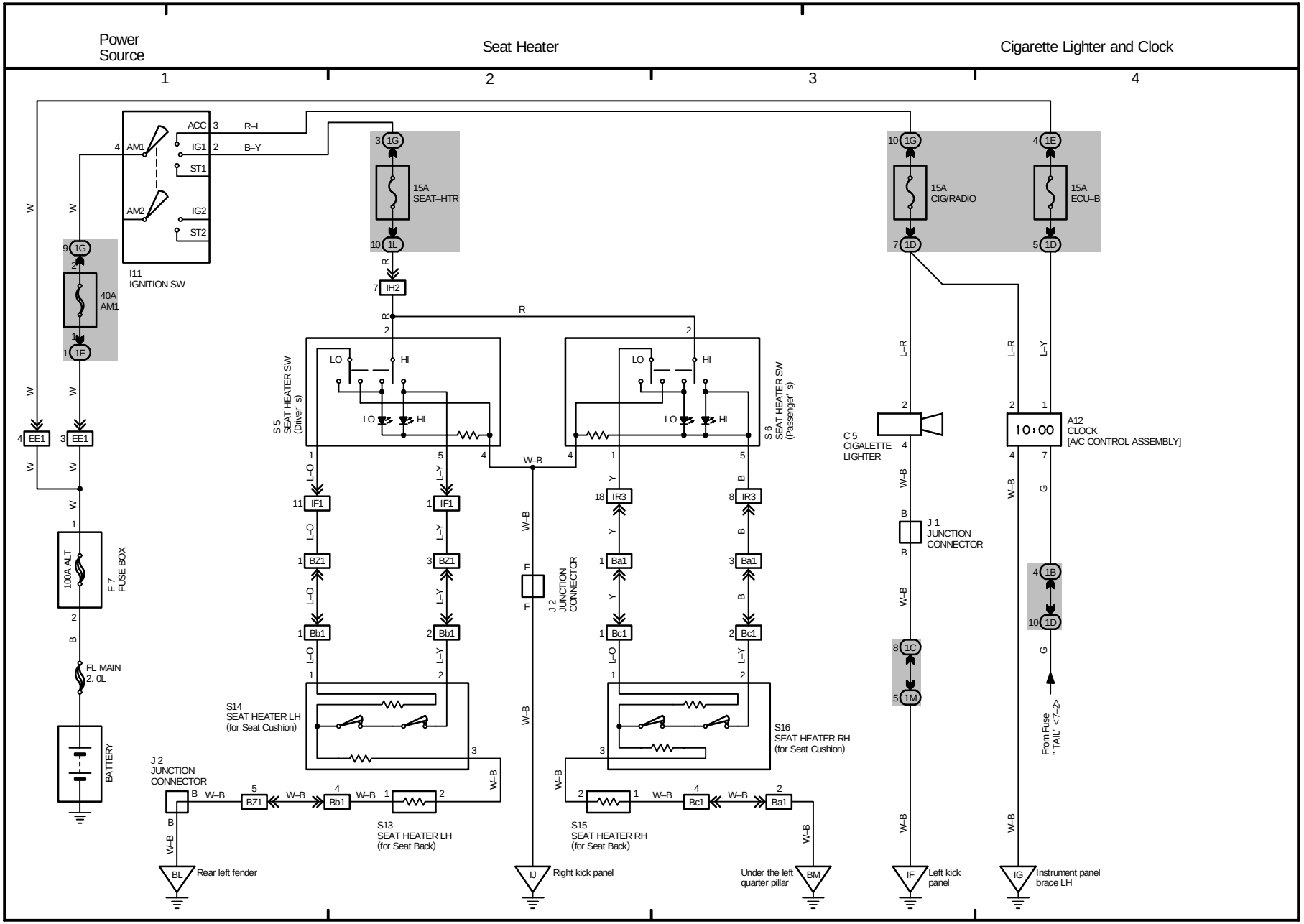
OVERALL ELECTRICAL WIRING DIAGRAM



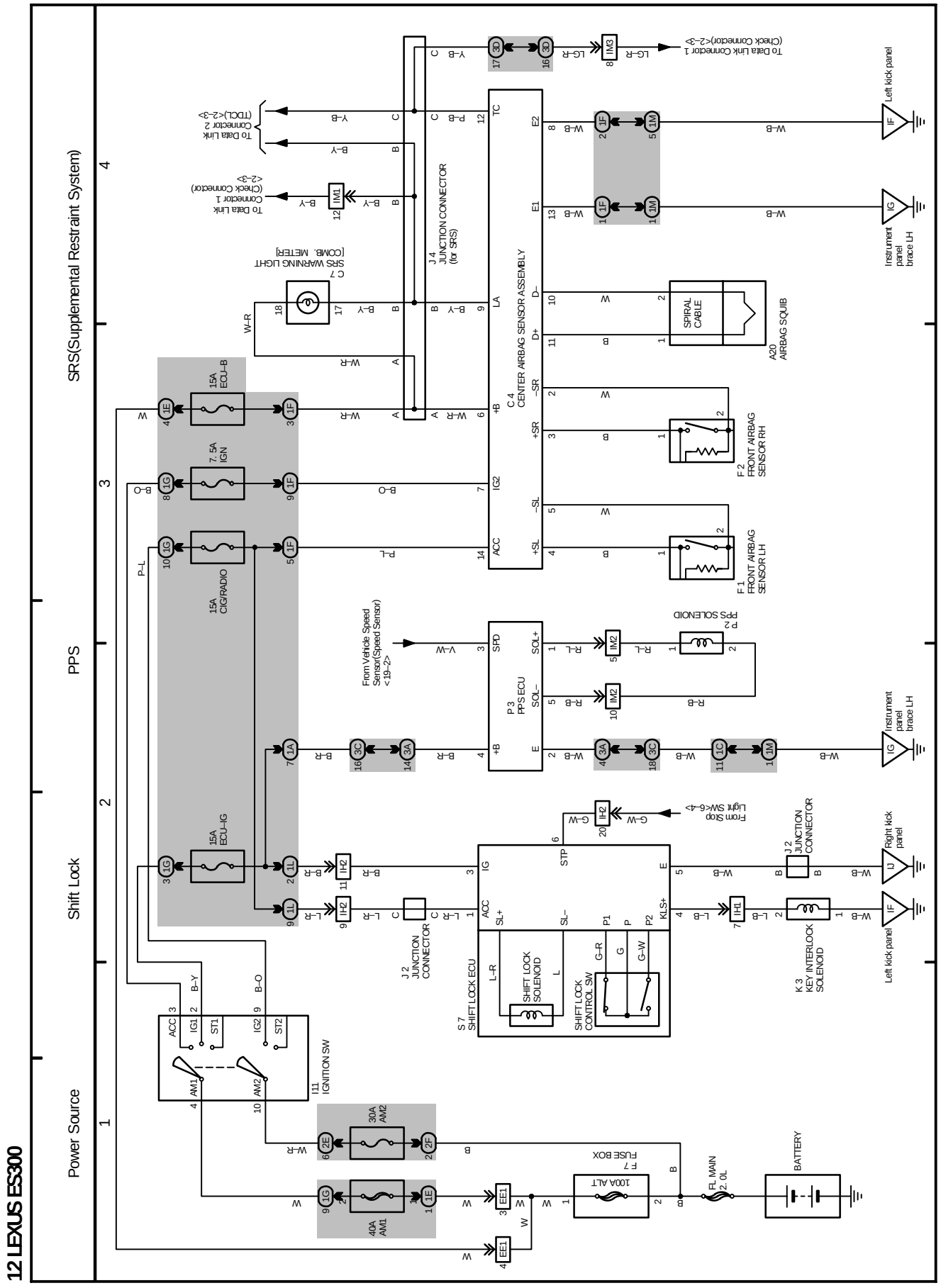

Power Source
Electronically Controlled Hydraulic Cooling Fan
Turn Signal and Hazard Warning Light
Horn
1
2
3
4
I11 IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
40A AM1
15A ECU–IG
7. 5A TURN
15A HAZ–HORN
HORN RELAY
100A ALT
F7 FUSE BOX
FL MAIN 2. 0L
BATTERY
C12 COOLING FAN ECU
IGB
TAC
IDL
E
SOL+
SOL–
TH–
TH+
HP
From Igniter <1–3>
To Engine Control Module (Engine and Electronic Controlled Transmission ECU(A/T), Engine ECU(M/T)) <2–5>
S 1 SOLENOID VALVE (for Cooling Fan)
E 4 ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR) (for Cooling Fan)
To Data Link Connector 1 (Check Connector)<2–4>
A 2 A/C HIGH PRESSURE SW
H 9 HAZARD SW
B1
F
B2
TL
TR
TB
OFF
ON
C10 TURN SIGNAL LIGHT [COMB. SW]
TURN SIGNAL FLASHER
J 1 JUNCTION CONNECTOR
J 5 JUNCTION CONNECTOR
TURN SIGNAL INDICATOR LIGHT[COMB. METER]
C 7 A GRAY
C 9 B BLUE
C 8 C
F 5 FRONT TURN SIGNAL LIGHT LH
R 6 REAR TURN SIGNAL LIGHT LH [REAR COMB. LIGHT LH]
R 7 REAR TURN SIGNAL LIGHT RH [REAR COMB. LIGHT RH]
F 6 FRONT TURN SIGNAL LIGHT RH
To Theft Deterrent ECU<18–4>
C10 HORN SW [COMB. SW]
H 7 LH
H 8 RH
HORN
Intake manifold RH
Front left fender
Left kick panel
Front left fender
Back panel center
Front right fender
Instrument panel brace LH

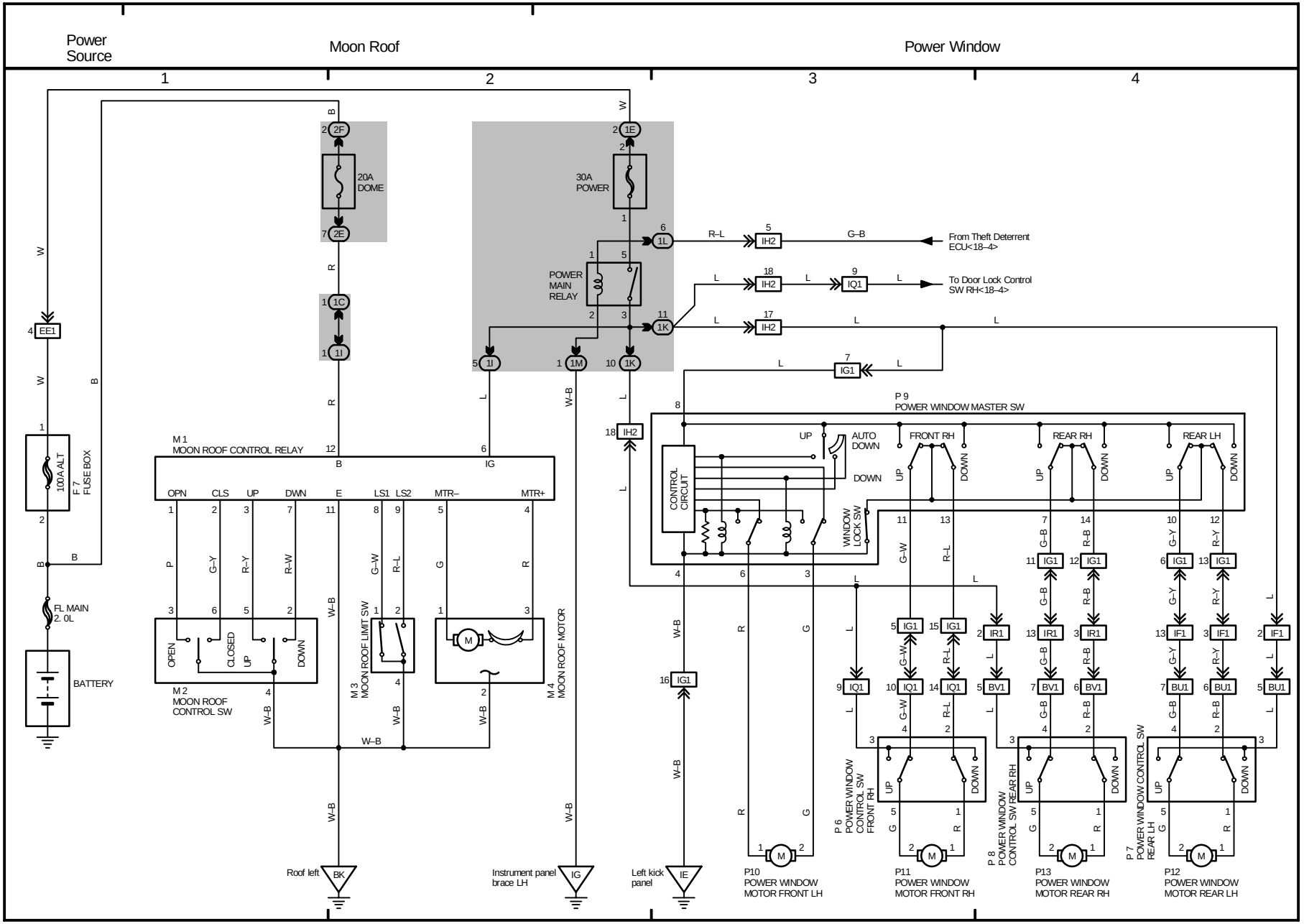
OVERALL ELECTRICAL WIRING DIAGRAM



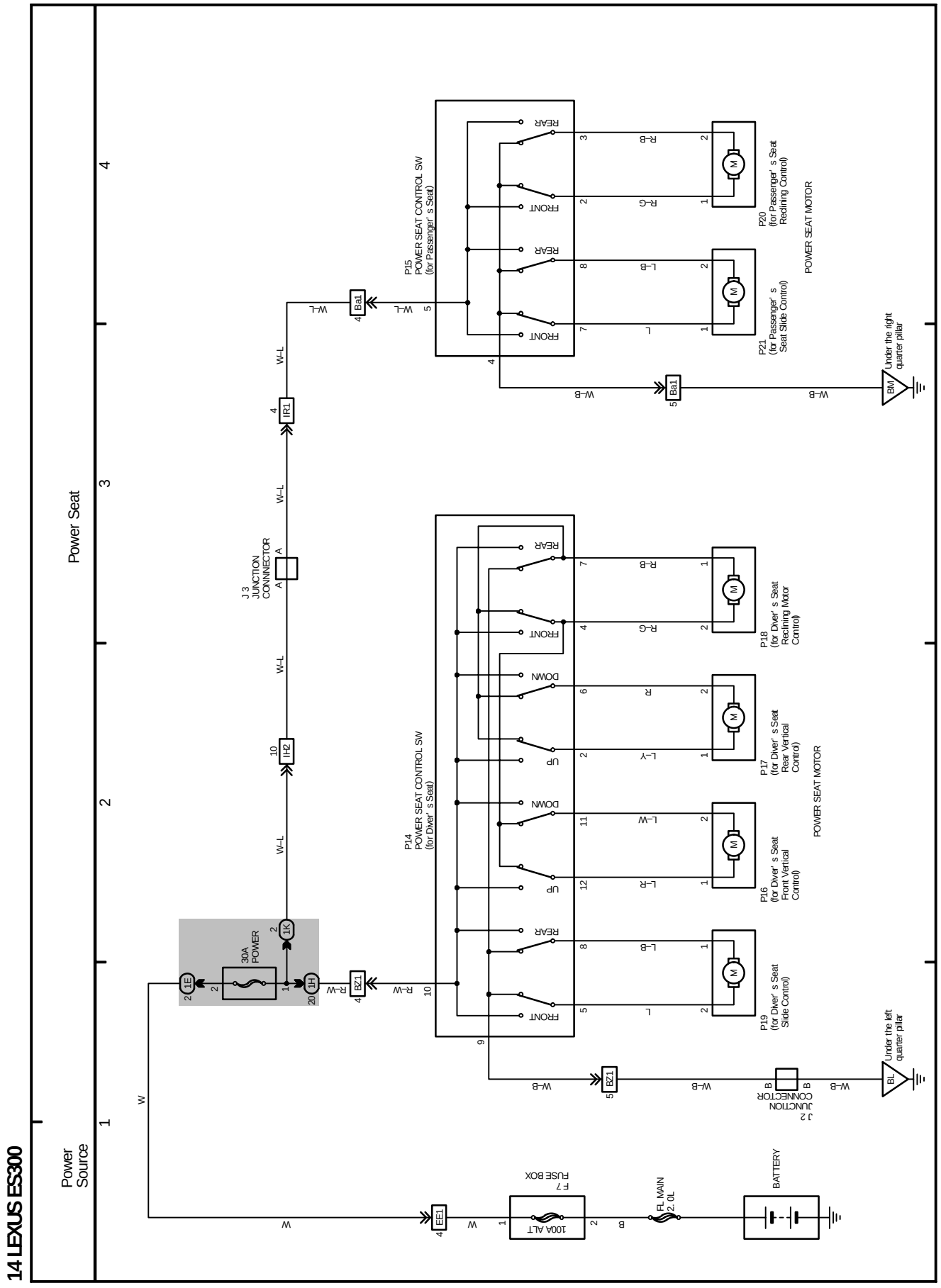

Power Source
Seat Heater
Cigarette Lighter and Clock
1
2
3
4
I11 IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
R–L
B–Y
40A AM1
15A SEAT–HTR
15A CIG/RADIO
15A ECU–B
F 7 FUSE BOX
100A ALT
FL MAIN 2. 0L
BATTERY
S 5 SEAT HEATER SW (Driver s)
S 6 SEAT HEATER SW (Passenger s)
LO
HI
S14 SEAT HEATER LH (for Seat Cushion)
S16 SEAT HEATER RH (for Seat Cushion)
S13 SEAT HEATER LH (for Seat Back)
S15 SEAT HEATER RH (for Seat Back)
J 2 JUNCTION CONNECTOR
J 1 JUNCTION CONNECTOR
C 5 CIGALETTE LIGHTER
A12 CLOCK [A/C CONTROL ASSEMBLY]
10:00
From Fuse " TAIL" <7–2>
BL Rear left fender
IJ Right kick panel
Under the left quarter pillar
BM
IF Left kick panel
IG Instrument panel brace LH

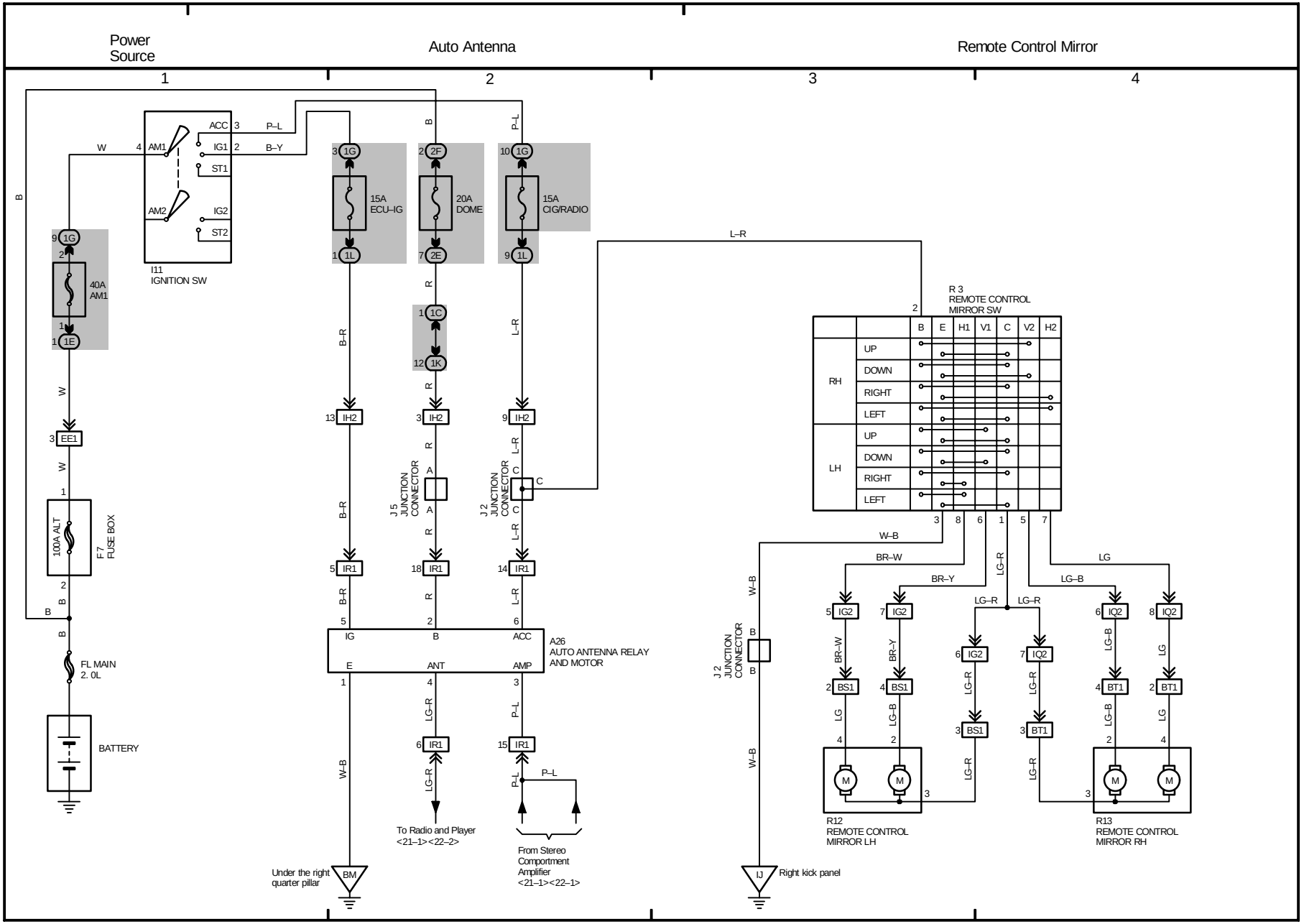
OVERALL ELECTRICAL WIRING DIAGRAM



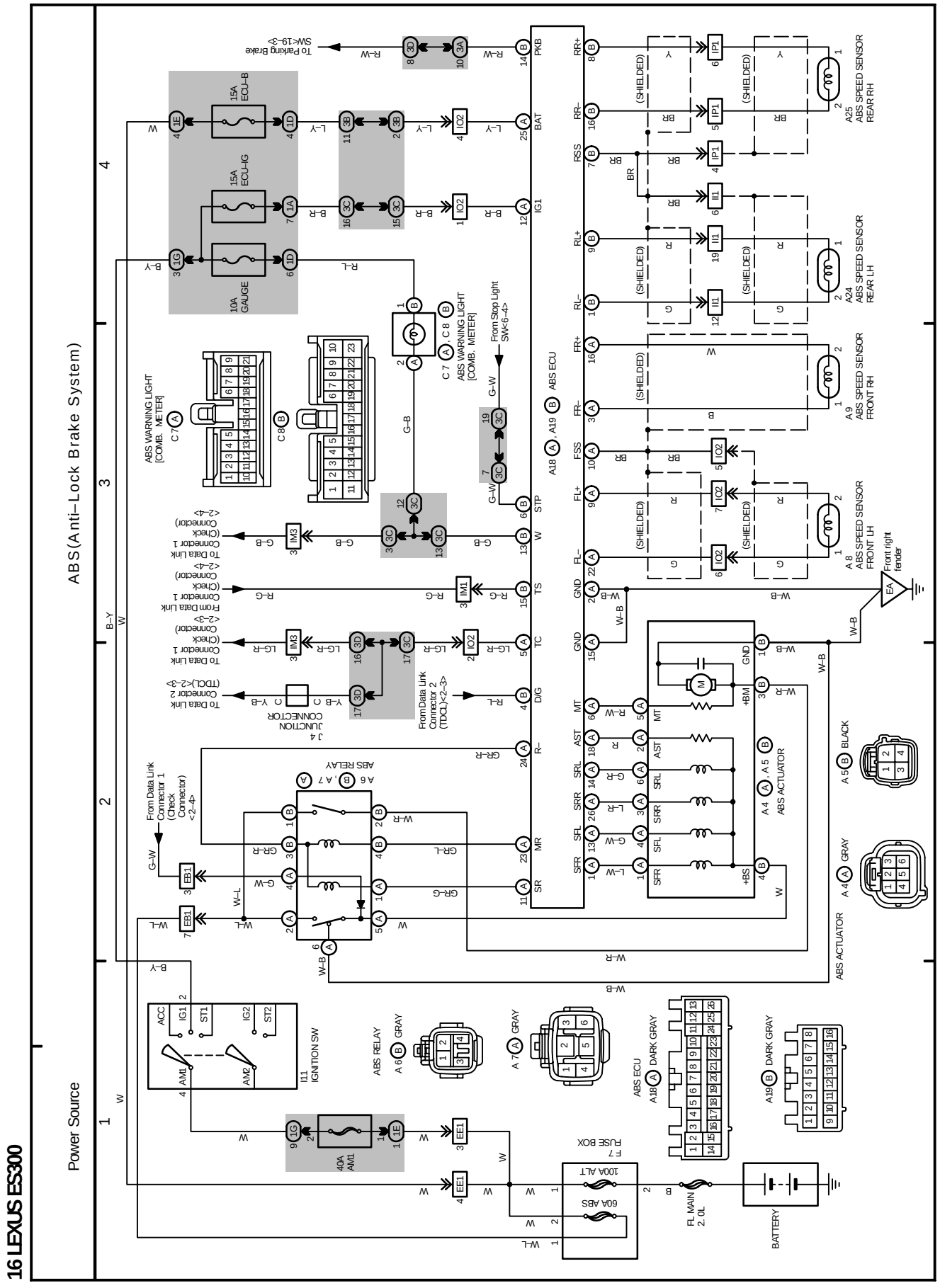

Power Source
Moon Roof
Power Window
1
2
3
4
20A DOME
30A POWER
POWER MAIN RELAY
100A ALT
F 7 FUSE BOX
FL MAIN 2. 0L
BATTERY
M 1 MOON ROOF CONTROL RELAY
OPN CLS UP DWN E LS1 LS2 MTR– MTR+
M 2 MOON ROOF CONTROL SW
OPEN CLOSED UP DOWN
M 3 MOON ROOF LIMIT SW
M 4 MOON ROOF MOTOR
From Theft Deterrent ECU<18–4>
To Door Lock Control SW RH<18–4>
P 9 POWER WINDOW MASTER SW
CONTROL CIRCUIT
WINDOW LOCK SW
UP
AUTO DOWN
DOWN
FRONT RH
REAR RH
REAR LH
P 6 POWER WINDOW CONTROL SW FRONT RH
P 8 POWER WINDOW CONTROL SW REAR RH
P 7 POWER WINDOW CONTROL SW REAR LH
Roof left
Instrument panel brace LH
Left kick panel
P10 POWER WINDOW MOTOR FRONT LH
P11 POWER WINDOW MOTOR FRONT RH
P13 POWER WINDOW MOTOR REAR RH
P12 POWER WINDOW MOTOR REAR LH

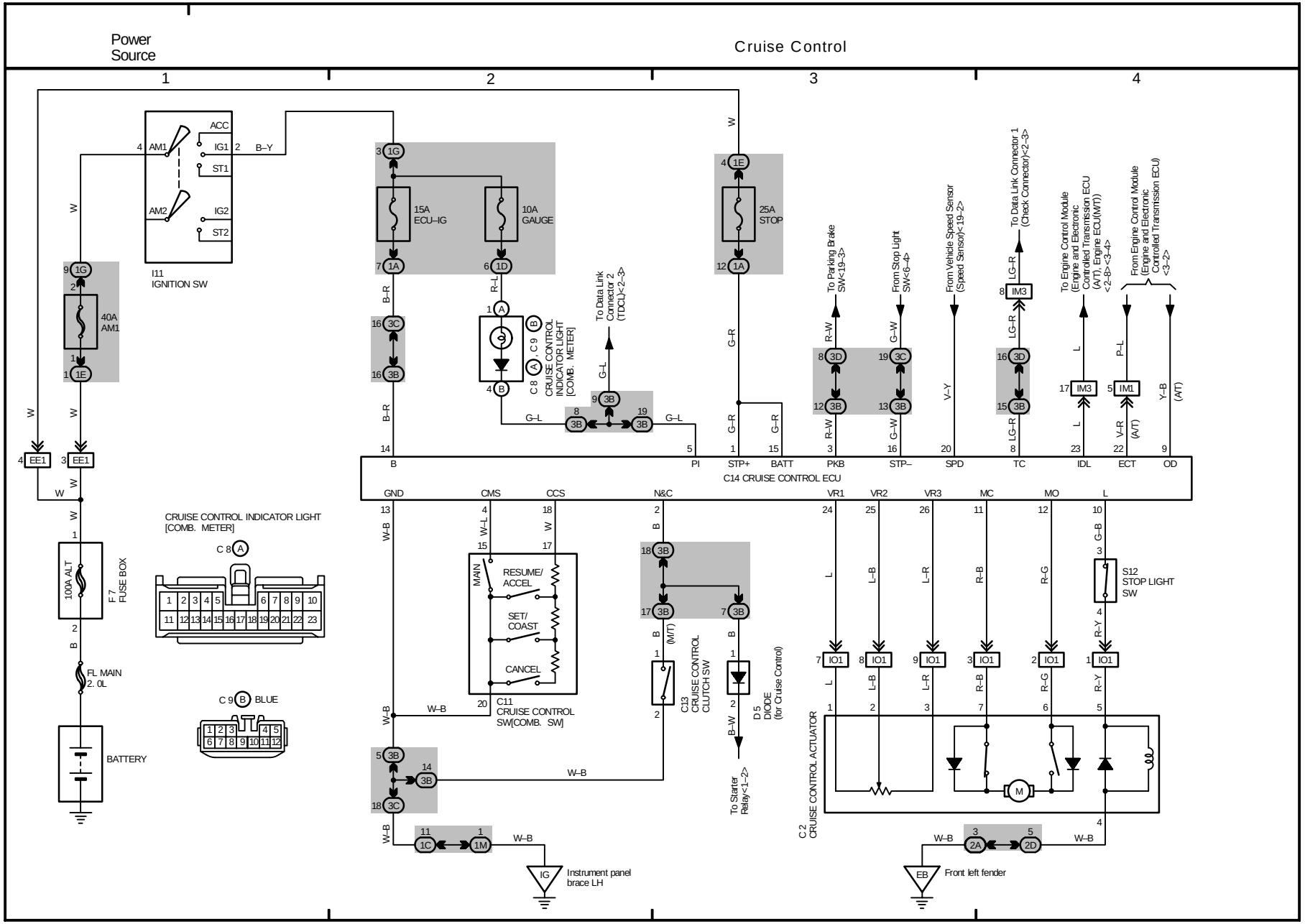
OVERALL ELECTRICAL WIRING DIAGRAM



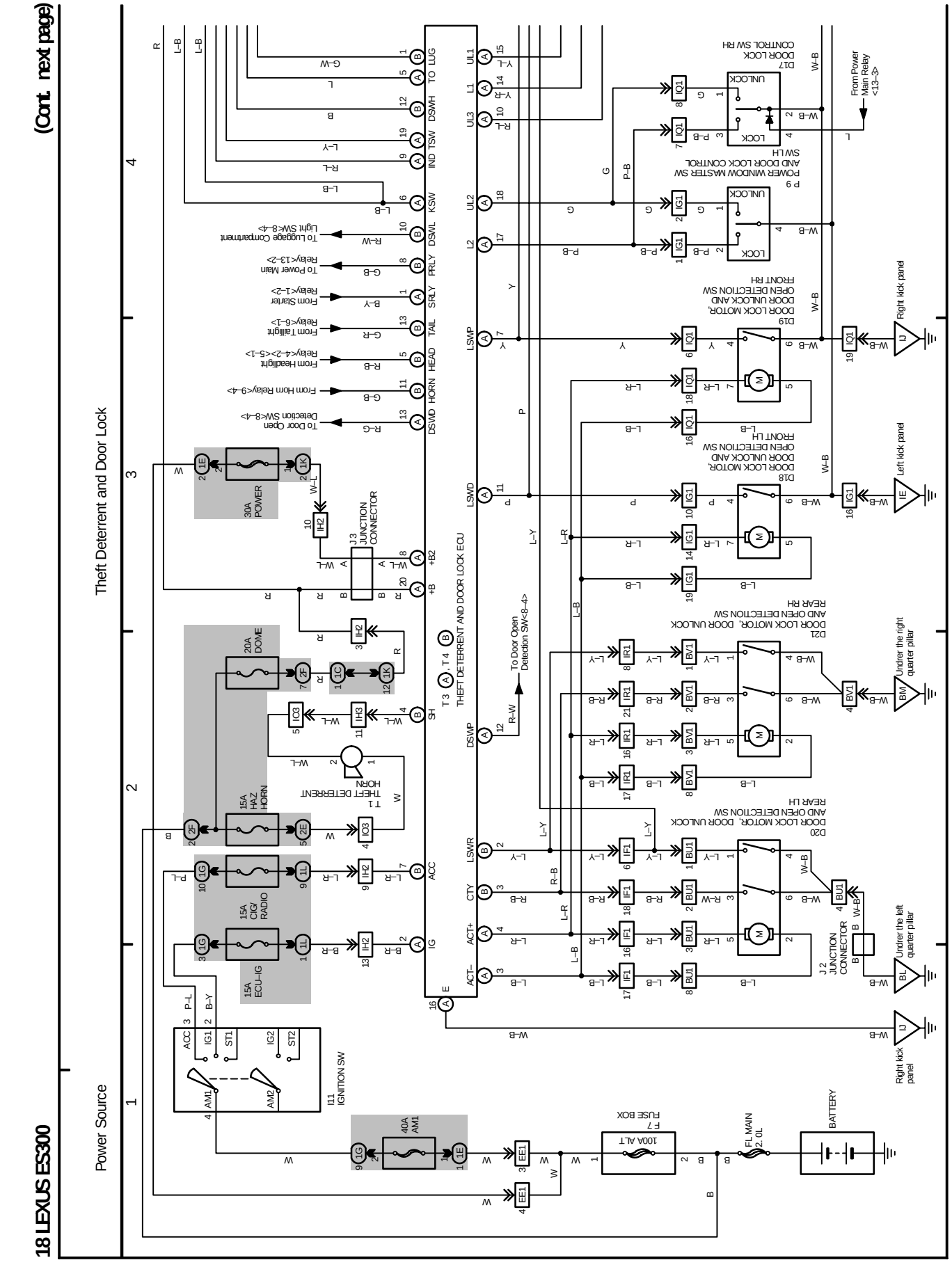

Power Source
Auto Antenna
Remote Control Mirror
1
2
3
4
I11
IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
40A AM1
15A ECU–IG
20A DOME
15A CIG/RADIO
F7 FUSE BOX
100A ALT
FL MAIN 2. 0L
BATTERY
J5 JUNCTION CONNECTOR
J2 JUNCTION CONNECTOR
A26
AUTO ANTENNA RELAY AND MOTOR
IG
B
ACC
E
ANT
AMP
To Radio and Player <21–1><22–2>
From Stereo Comportment Amplifier <21–1><22–1>
Under the right quarter pillar
BM
R 3
REMOTE CONTROL MIRROR SW
B
E
H1
V1
C
V2
H2
RH
LH
UP
DOWN
RIGHT
LEFT
J2 JUNCTION CONNECTOR
IJ
Right kick panel
R12
REMOTE CONTROL MIRROR LH
R13
REMOTE CONTROL MIRROR RH

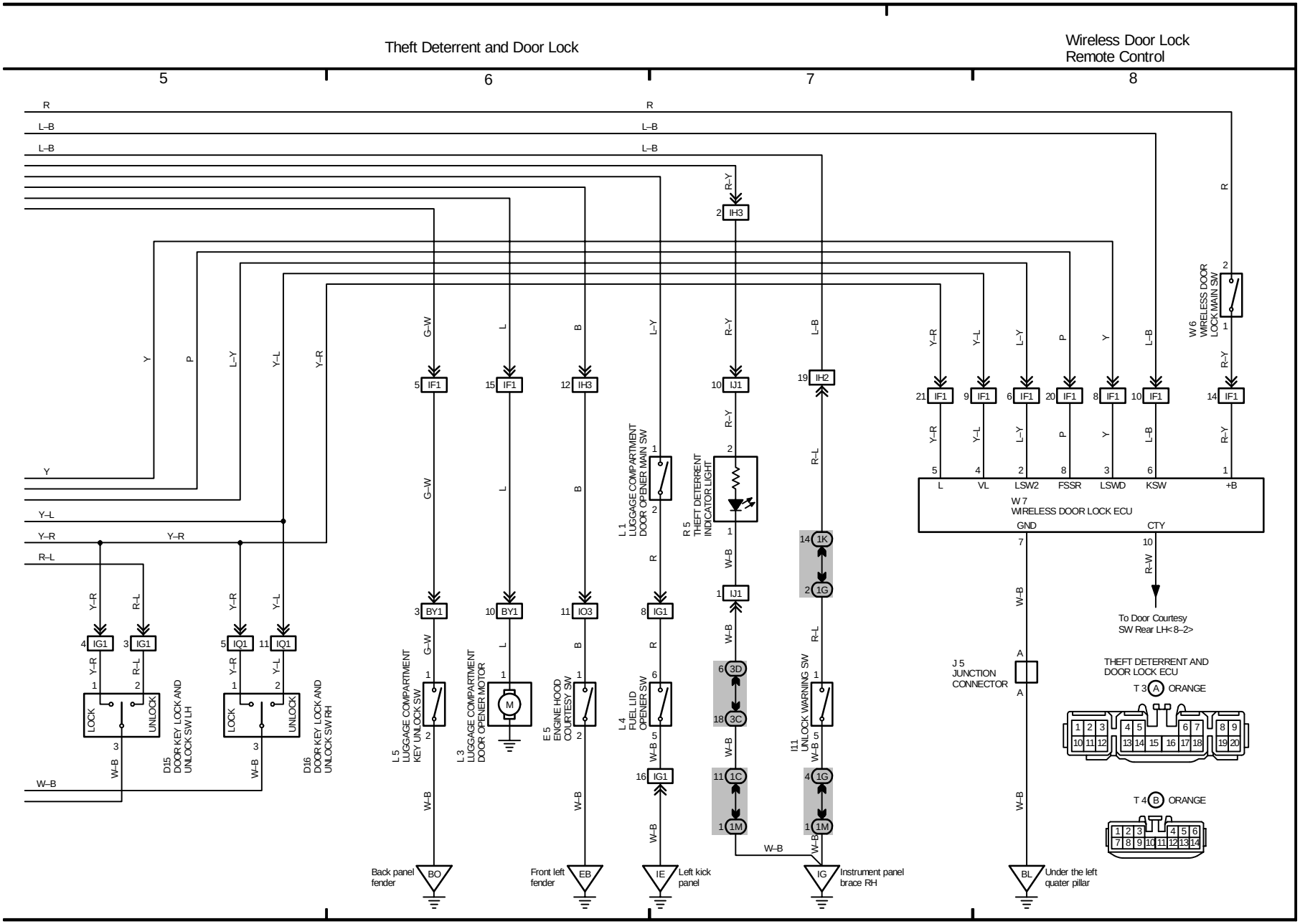
OVERALL ELECTRICAL WIRING DIAGRAM



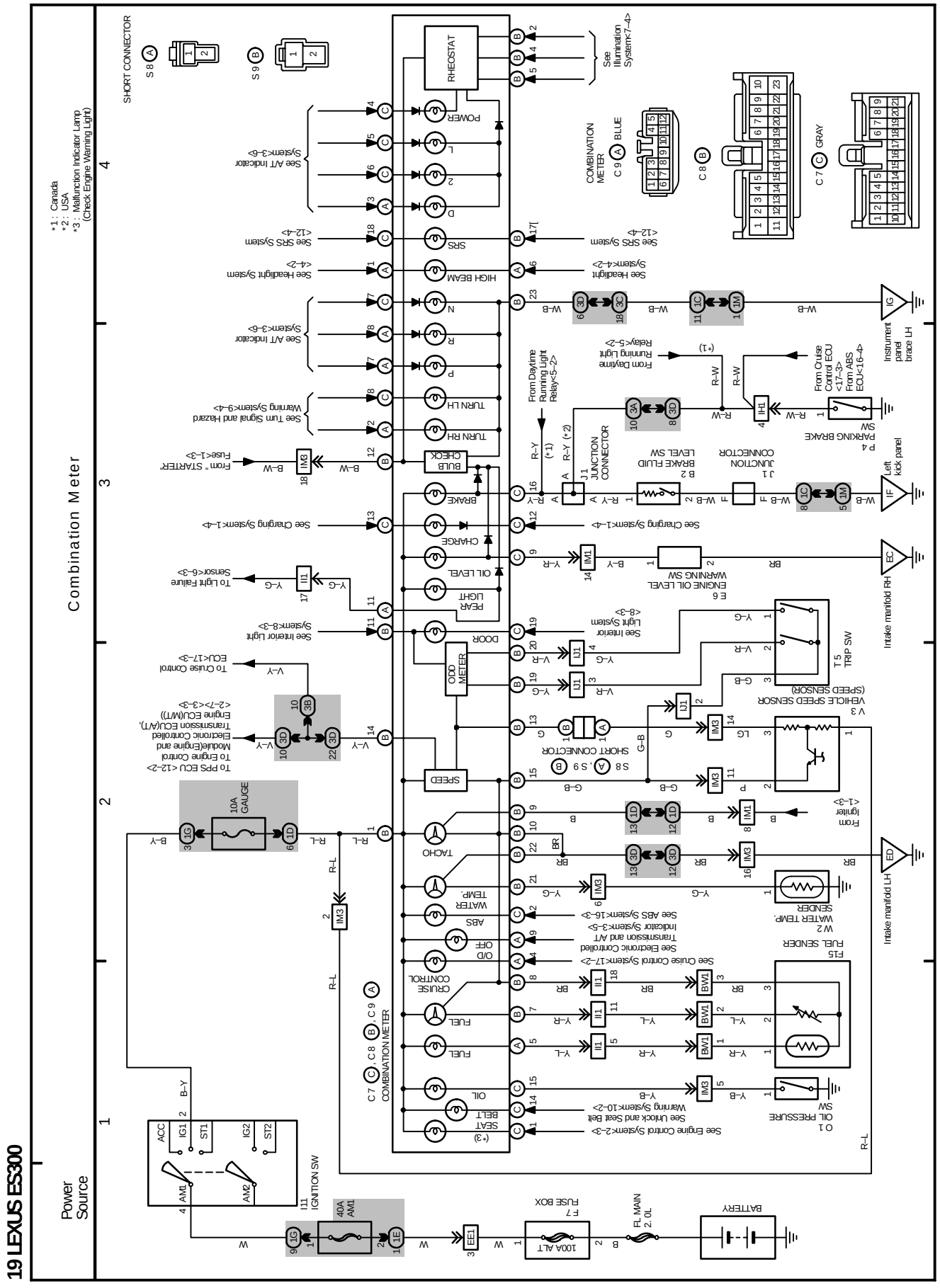

Power Source
Cruise Control
1
2
3
4
ACC
IG1
ST1
IG2
ST2
AM1
AM2
I11
IGNITION SW
B–Y
W
15A ECU–IG
10A GAUGE
25A STOP
40A AM1
100A ALT
F 7 FUSE BOX
FL MAIN 2. 0L
BATTERY
EE1
CRUISE CONTROL INDICATOR LIGHT [COMB. METER]
C 8 A
C 9 B BLUE
CRUISE CONTROL INDICATOR LIGHT [COMB. METER]
To Data Link Connector 2 (TDCL)<2–3>
To Parking Brake SW<19–3>
From Stop Light SW<6–4>
From Vehicle Speed Sensor (Speed Sensor)<19–2>
To Data Link Connector 1 (Check Connector)<2–3>
To Engine Control Module (Engine and Electronic Controlled Transmission ECU (A/T), Engine ECU(M/T) <2–8><3–4>
From Engine Control Module (Engine and Electronic Controlled Transmission ECU) <3–2>
B
PI
STP+
BATT
PKB
STP–
SPD
TC
IDL
ECT
OD
C14 CRUISE CONTROL ECU
GND
CMS
CCS
N&C
VR1
VR2
VR3
MC
MO
L
MAIN
RESUME/ ACCEL
SET/ COAST
CANCEL
C11 CRUISE CONTROL SW[COMB. SW]
C13 CRUISE CONTROL CLUTCH SW
(M/T)
D 5 DIODE (for Cruise Control)
To Starter Relay<1–2>
S12 STOP LIGHT SW
C2 CRUISE CONTROL ACTUATOR
IG
Instrument panel brace LH
EB
Front left fender

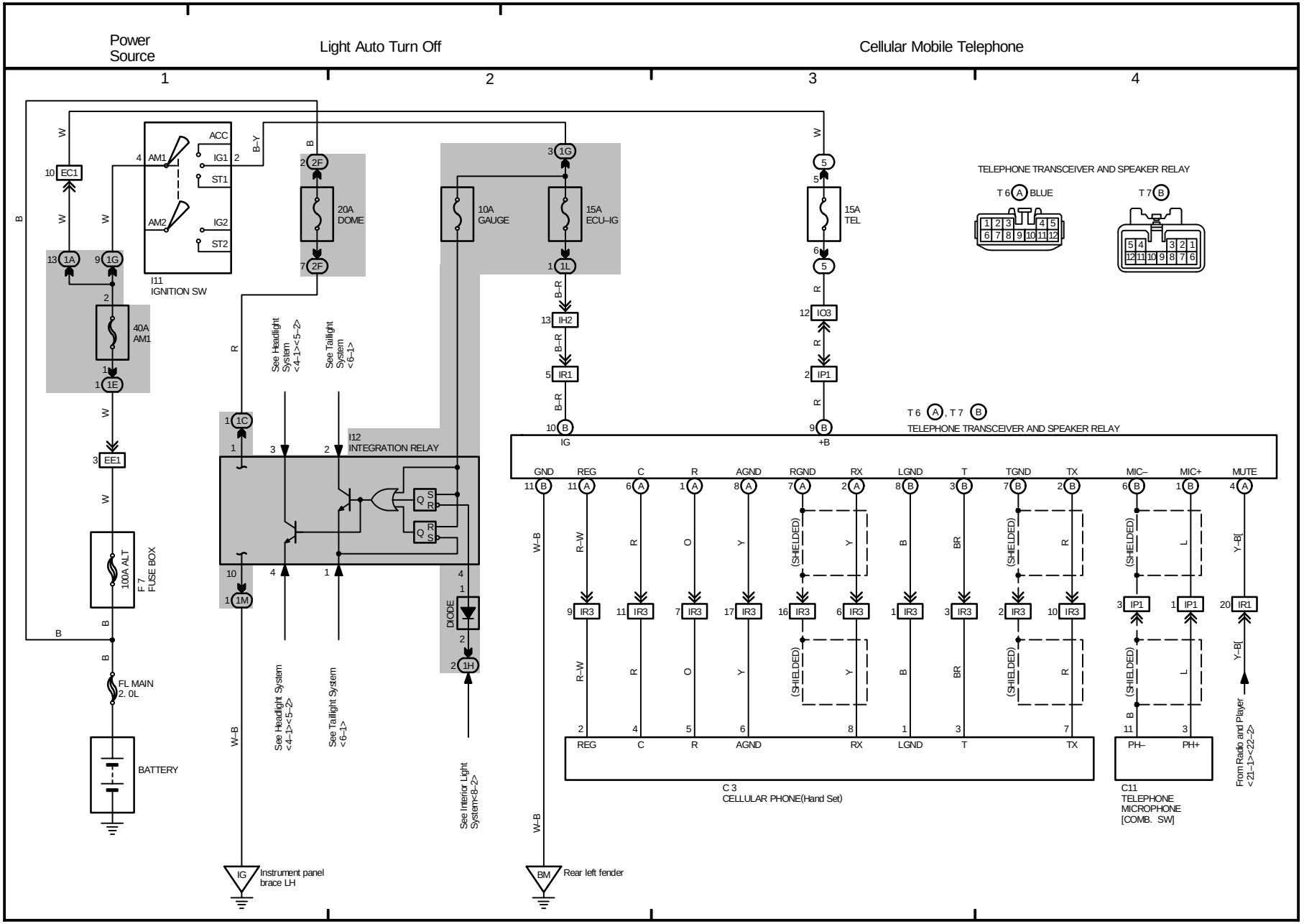
OVERALL ELECTRICAL WIRING DIAGRAM



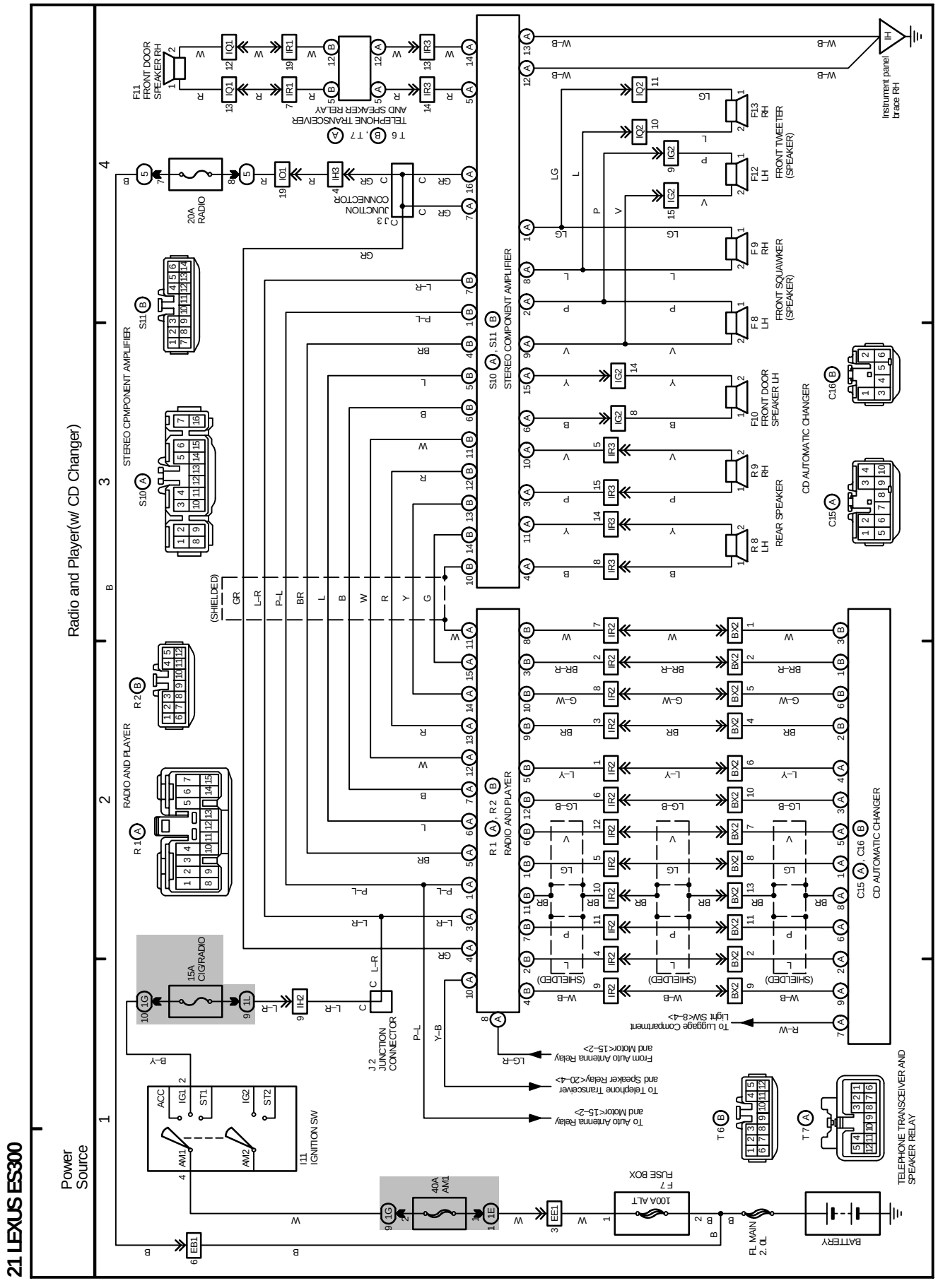

Theft Deterrent and Door Lock
Wireless Door Lock
Remote Control
5
6
7
8
R
L–B
Y
P
L–Y
Y–L
Y–R
R–L
W–B
G–W
L
B
R–Y
R–L
W6 WIRELESS DOOR LOCK MAIN SW
L1 LUGGAGE COMPARTMENT DOOR OPENER MAIN SW
R5 THEFT DETERRENT INDICATOR LIGHT
W7 WIRELESS DOOR LOCK ECU
L
VL
LSW2
FSSR
LSWD
KSW
+B
GND
CTY
R–W
To Door Courtesy SW Rear LH<8–2>
J5 JUNCTION CONNECTOR
THEFT DETERRENT AND DOOR LOCK ECU
T3 A ORANGE
T4 B ORANGE
D15 DOOR KEY LOCK AND UNLOCK SW LH
D16 DOOR KEY LOCK AND UNLOCK SW RH
LOCK
UNLOCK
L5 LUGGAGE COMPARTMENT KEY UNLOCK SW
L3 LUGGAGE COMPARTMENT DOOR OPENER MOTOR
E5 ENGINE HOOD COURTESY SW
L4 FUEL LID OPENER SW
I11 UNLOCK WARNING SW
Back panel fender
Front left fender
Left kick panel
Instrument panel brace RH
Under the left quater pillar

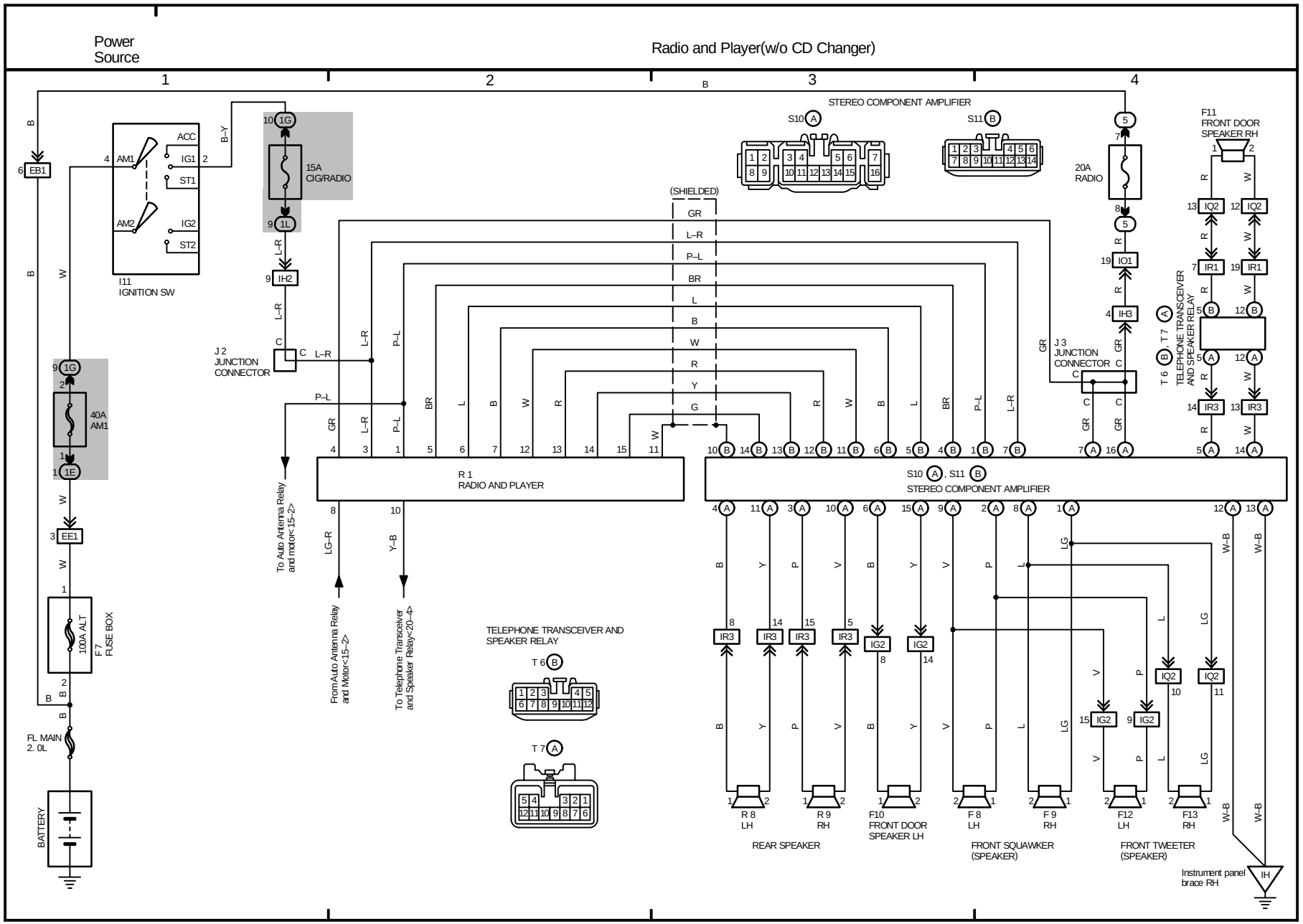
OVERALL ELECTRICAL WIRING DIAGRAM



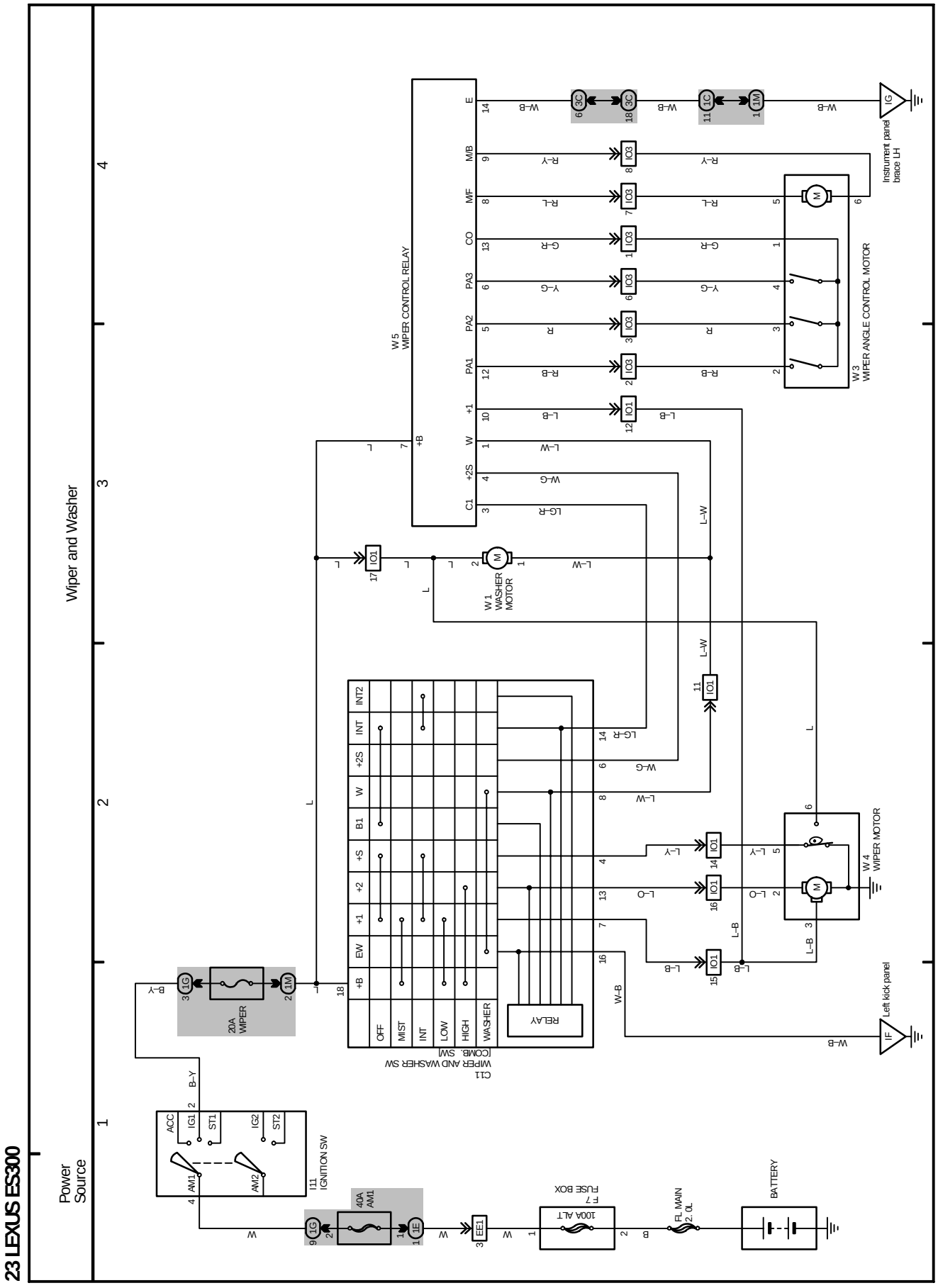

Power Source
Light Auto Turn Off
Cellular Mobile Telephone
1
2
3
4
I11
IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
20A DOME
10A GAUGE
15A ECU-IG
15A TEL
40A AM1
100A ALT
F 7 FUSE BOX
FL MAIN 2. 0L
BATTERY
I12
INTEGRATION RELAY
DIODE
See Headlight System <4-1><5-2>
See Taillight System <6-1>
See Interior Light System<8-2>
IG
Instrument panel brace LH
BM
Rear left fender
TELEPHONE TRANSCEIVER AND SPEAKER RELAY
T6 A BLUE
T7 B
T6 A, T7 B
TELEPHONE TRANSCEIVER AND SPEAKER RELAY
GND
REG
C
R
AGND
RGND
RX
LGND
T
TGND
TX
MIC–
MIC+
MUTE
(SHIELDED)
C 3
CELLULAR PHONE(Hand Set)
C11
TELEPHONE MICROPHONE [COMB. SW]
From Radio and Player <21-1><22-2>

OVERALL ELECTRICAL WIRING DIAGRAM

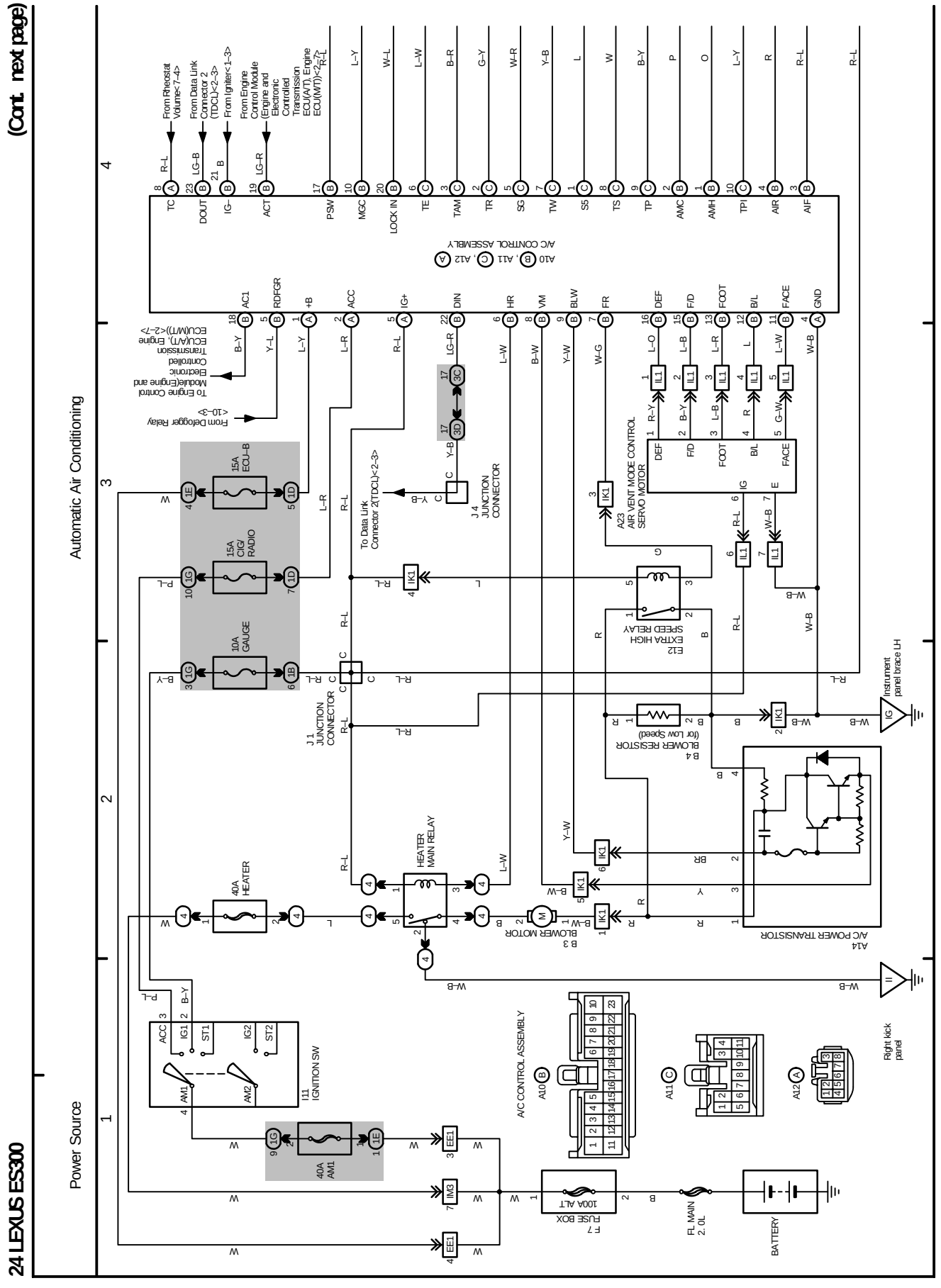



Power Source
Radio and Player(w/o CD Changer)
1
2
3
4
STEREO COMPONENT AMPLIFIER
S10 A
S11 B
F11 FRONT DOOR SPEAKER RH
20A RADIO
15A CIG/RADIO
40A AM1
100A ALT
F7 FUSE BOX
FL MAIN 2. 0L
BATTERY
I11 IGNITION SW
ACC
IG1
ST1
IG2
ST2
AM1
AM2
J2 JUNCTION CONNECTOR
J3 JUNCTION CONNECTOR
(SHIELDED)
R 1 RADIO AND PLAYER
S10 A, S11 B STEREO COMPONENT AMPLIFIER
To Auto Antenna Relay and motor<15-2>
From Auto Antenna Relay and Motor<15-2>
To Telephone Transceiver and Speaker Relay<20-4>
TELEPHONE TRANSCEIVER AND SPEAKER RELAY
T 6 B
T 7 A
R 8 LH
R 9 RH
F10 FRONT DOOR SPEAKER LH
F 8 LH
F 9 RH
F12 LH
F13 RH
REAR SPEAKER
FRONT SQUAWKER (SPEAKER)
FRONT TWEETER (SPEAKER)
Instrument panel brace RH
IH

OVERALL ELECTRICAL WIRING DIAGRAM



OVERALL ELECTRICAL WIRING DIAGRAM



Automatic Air Conditioning