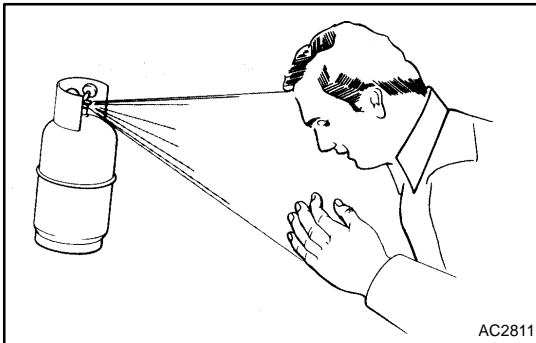


AIR CONDITIONING SYSTEM PRECAUTION

AC0W6-01

1. **DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME**
2. **ALWAYS WEAR EYE PROTECTION**



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

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

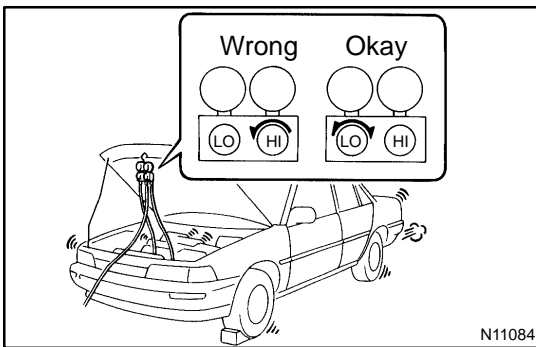
- (a) Wash the area with lots of cool water.

CAUTION:

Do not rub your eyes or skin.

- (b) Apply clean petroleum jelly to the skin.
- (c) Go immediately to a physician or hospital for professional treatment.

4. **NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME**
5. **BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPLY PHYSICAL SHOCKS TO IT**



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

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

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

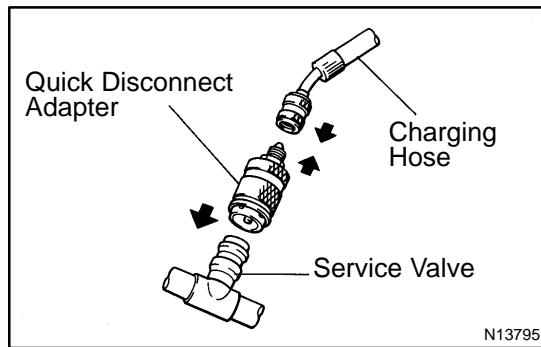
If the high pressure valves opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the only low pressure valve.

8. **BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT**

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

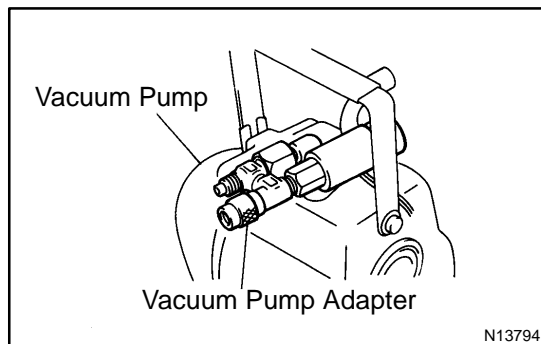
9. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Lexus GS 300/ 400 is equipped with an SRS (Supplemental Restraint System) such as the driver and passenger airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deployed during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following item carefully, then follow the correct procedure described in repair manual.

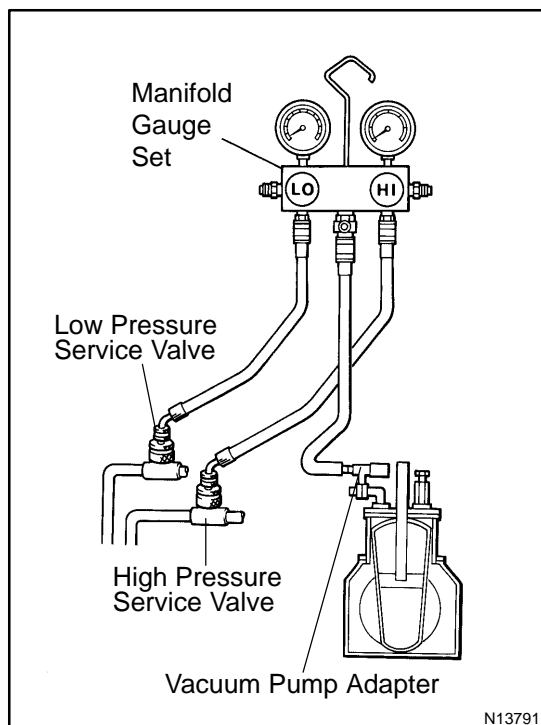


EVACUATING

1. **CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES**
2. **REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES**
3. **SET ON MANIFOLD GAUGE SET**
 - (a) Close both hand valves of manifold gauge set.
 - (b) Connect the quick disconnect adapters to the service valves.



4. **EVACUATE AIR FROM REFRIGERATION SYSTEM**
 - (a) Connect the vacuum pump adapter to the vacuum pump.

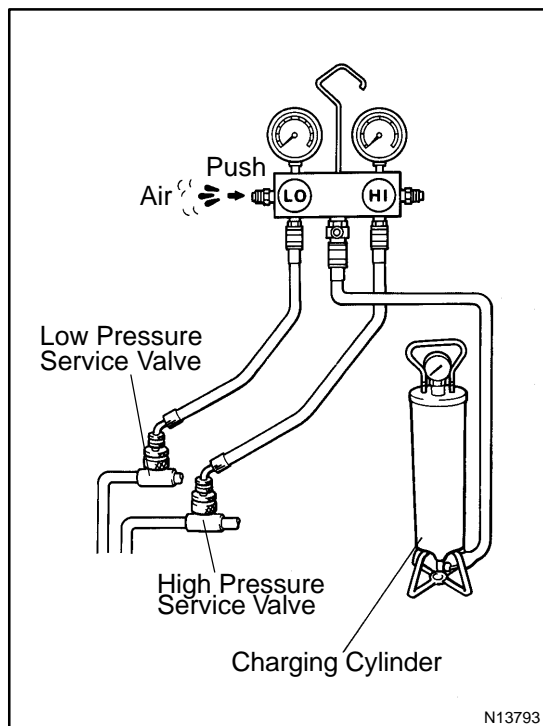


- (b) Connect the center hose of the manifold gauge set to the vacuum pump adapter.
- (c) Open both the high and low hand valves and run the vacuum pump.
- (d) After 10 minutes or more, check that the low pressure gauge indicates 750 mmHg (30 in. Hg) or more.

HINT:

If the reading is 750 mmHg (30 in. Hg) or more, close both hand valves of manifold gauge set and stop the vacuum pump. Check the system for leaks and repair if necessary.

- (e) Close both the high and low hand valves and stop the vacuum pump.
- (f) Leave the system in this condition for 5 minutes or more and check that there is no gauge indicator.



CHARGING

1. INSTALL CHARGING CYLINDER

HINT:

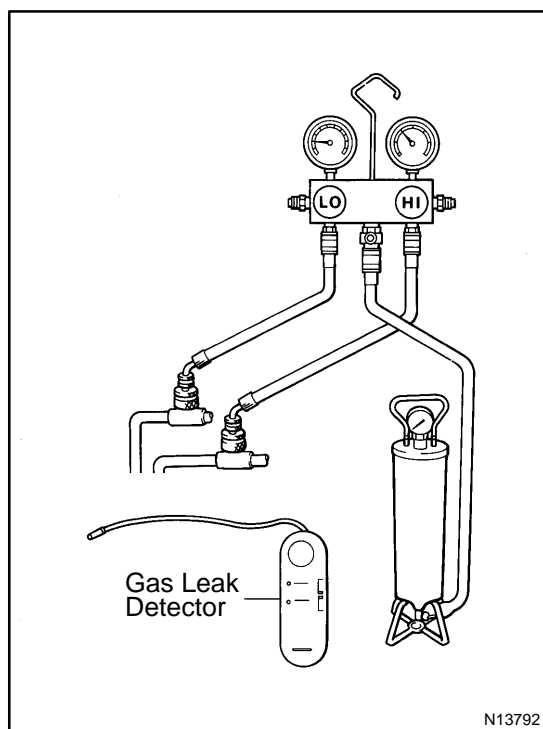
When handling the charging cylinder, always follow the directions given in the instruction manual.

- Charge the proper amount of refrigerant into the charging cylinder.
- Connect the center hose to the charging cylinder.

CAUTION:

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

- Open the valve of charging cylinder.
- Press the valve core on the side of manifold gauge and expel the air inside of the center hose.

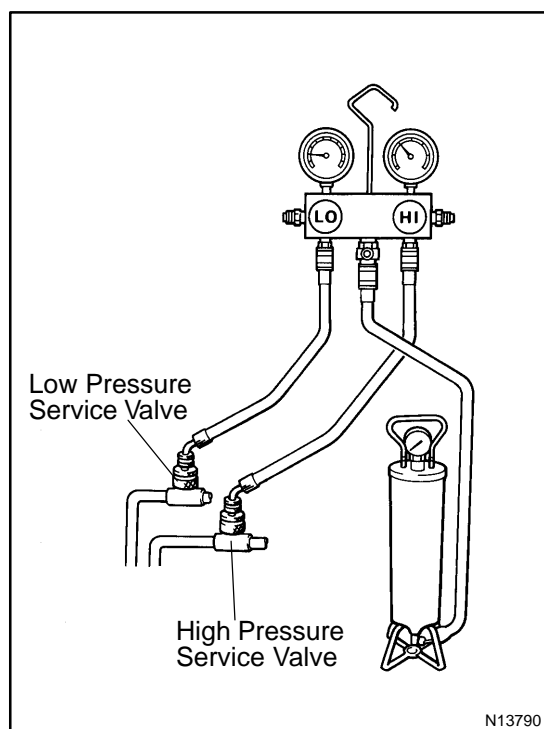


2. INSPECT REFRIGERATION SYSTEM FOR LEAKS

- Open the high pressure hand valve and charge refrigerant.
- When the low pressure gauge indicates 98 kPa (1 kgf/cm², 14 psi) close the high pressure hand valve.
- Using a gas leak detector, check the system for leakage. If leak is found, repair the faulty component or connection.

CAUTION:

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



3. INSTALL CHARGING CYLINDER

HINT:

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

- (a) Charge the proper amount of refrigerant into the charging cylinder.
- (b) Connect the center hose to the charging cylinder.

CAUTION:

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

- (c) Open the valve of charging cylinder.
- (d) Press the valve core on the side of manifold gauge and expel the air inside of the center hose.

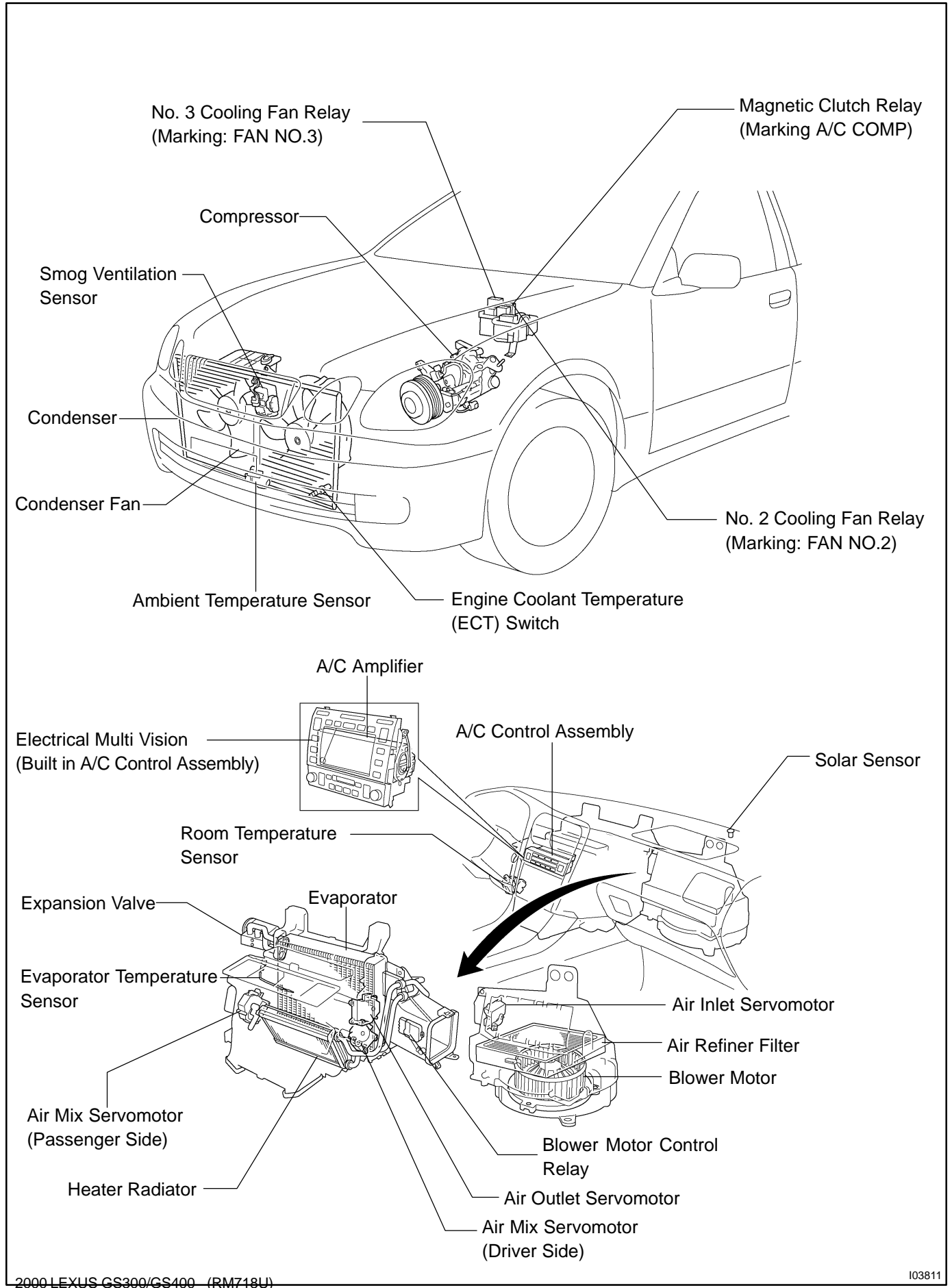
A fully charged system is indicated by the sight glass being free of any bubbles.

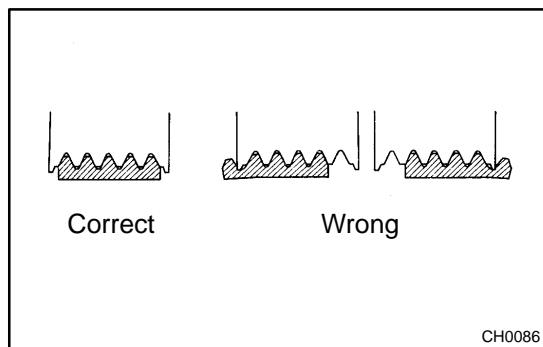
4. SET OFF MANIFOLD GAUGE SET

- (a) Close both hand valves of manifold gauge set.
- (b) Disconnect the quick disconnect adapters from the service valves.

5. INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINES

LOCATION



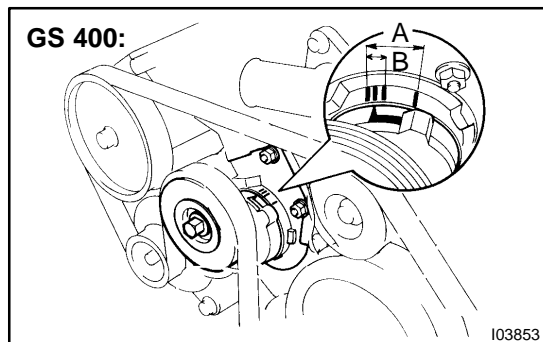


DRIVE BELT ON-VEHICLE INSPECTION

AC0WB-01

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

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



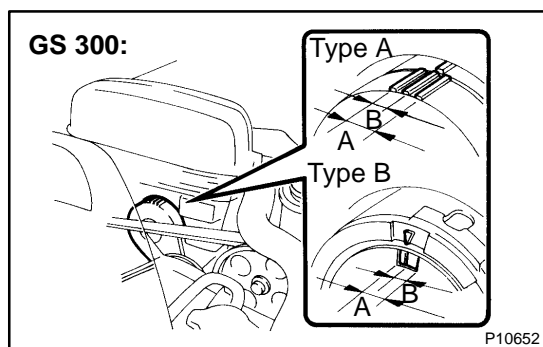
2. INSPECT DRIVE BELT TENSION

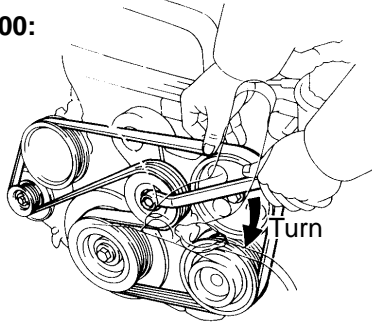
Check that the arrow mark on the belt tensioner falls within area "A" of the scale.

If it is out side area "A", replace the drive belt.

HINT:

When a new belt is installed, it should be lie within area B.

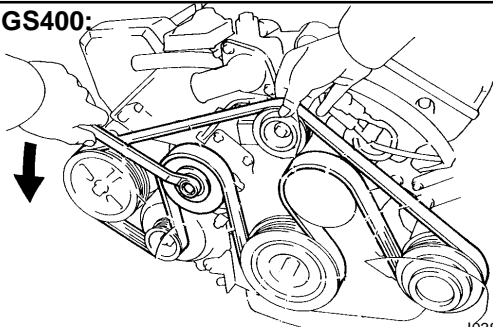


GS300:

I03854

REMOVAL**1. GS 300:
REMOVE DRIVE BELT**

Loosen the drive belt tension by turning the drive belt tensioner clockwise and remove the drive belt.

GS400:

I03855

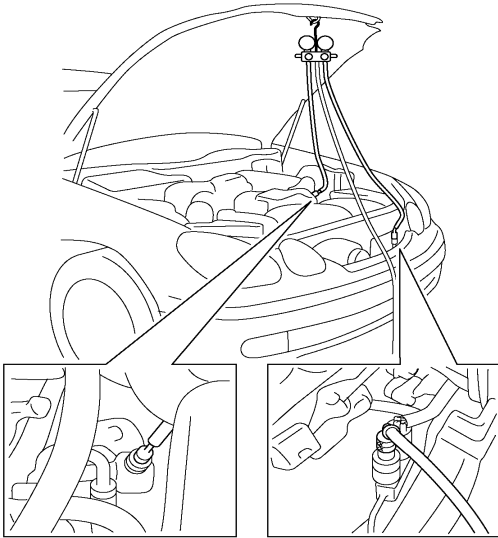
**2. GS 400:
REMOVE DRIVE BELT**

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise and remove the drive belt.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-15](#)).

AFTER INSTALLATION, CHECK DRIVE BELT'S INSTALLATION CONDITION

GS300:

Low Pressure
Charging Hose

High Pressure
Charging Hose

I02354

MANIFOLD GAUGE SET SET ON

1. CONNECT CHARGING HOSES TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

CAUTION:

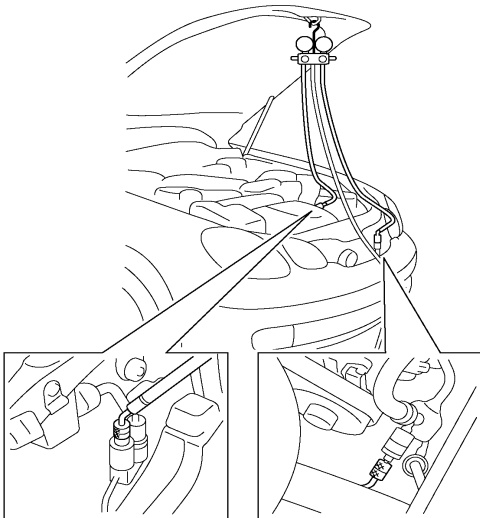
Do not connect the wrong hoses.

2. CONNECT QUICK DISCONNECT ADAPTERS TO CHARGING HOSES

Tighten the nuts by hand.

3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

4. REMOVE CAPS FROM SERVICE VALVE ON REFRIG- ERANT LINES

GS400:

Low Pressure
Charging Hose

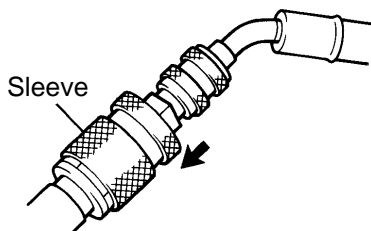
High Pressure
Charging Hose

I02353

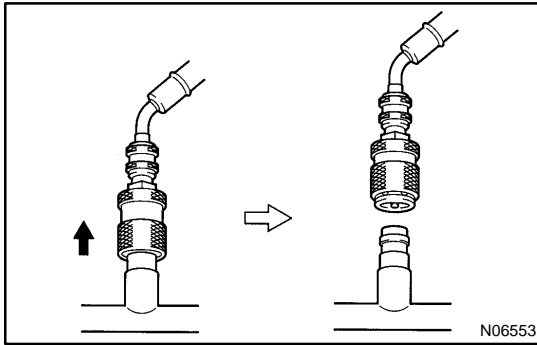
5. CONNECT QUICK DISCONNECT ADAPTERS TO SER- VICE VALVES

HINT:

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



N04392



SET OFF

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

HINT:

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

3. INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINES

REFRIGERANT LINE

AC0WG-01

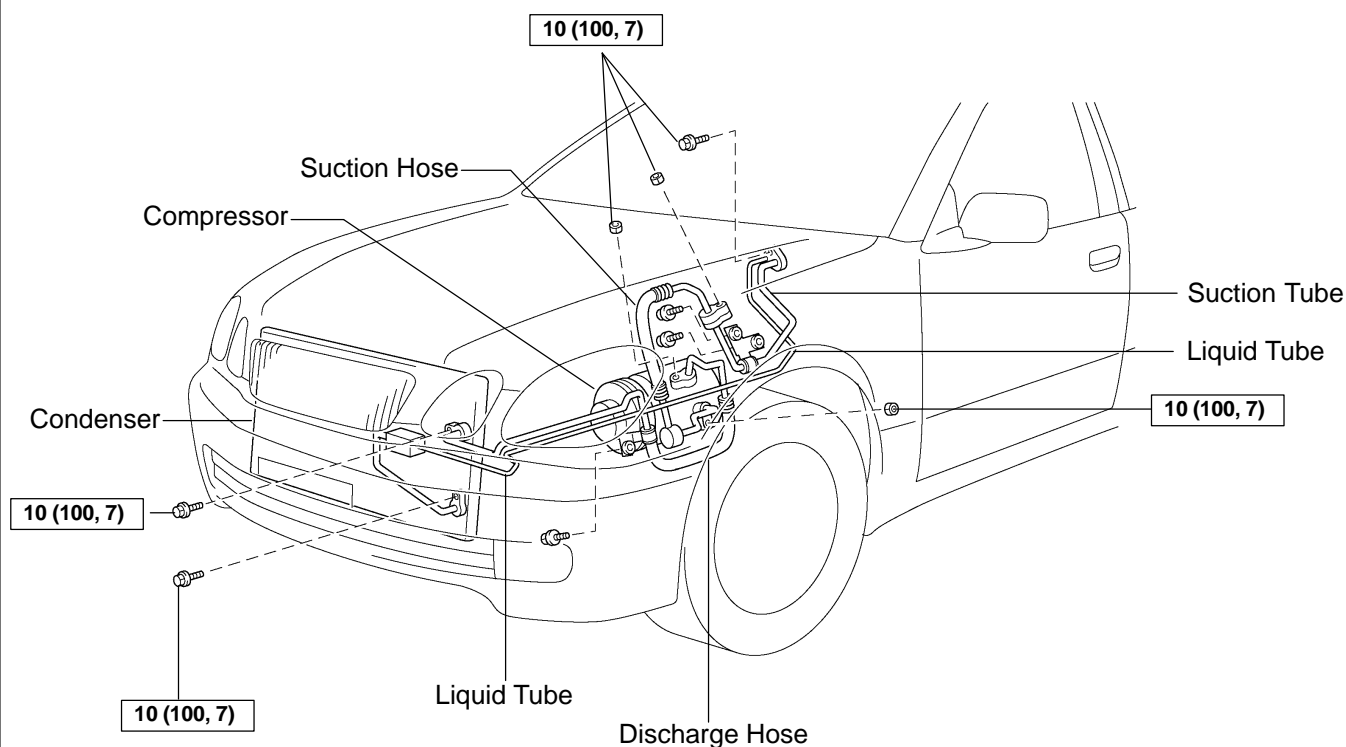
ON-VEHICLE INSPECTION

1. INSPECT HOSE AND TUBE CONNECTIONS FOR LOOSENESS
2. INSPECT HOSES AND TUBES FOR LEAKAGE

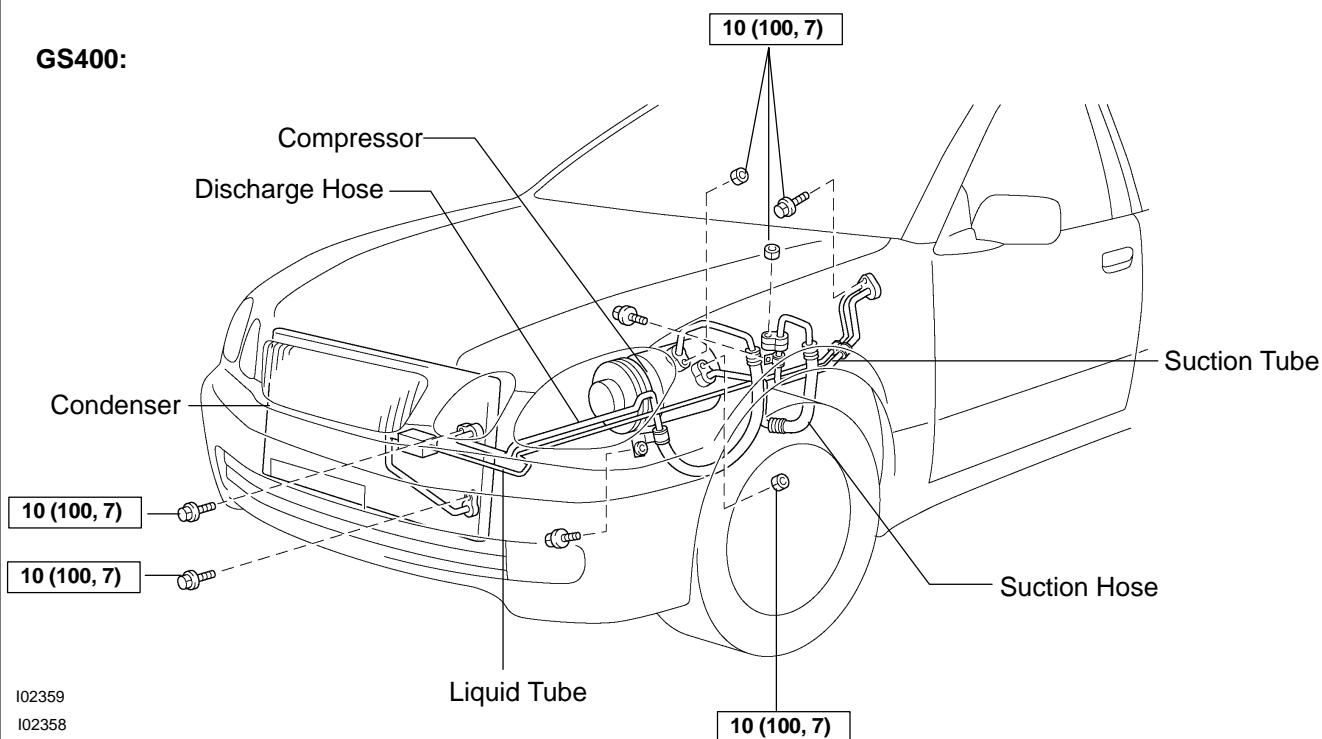
Using a gas leak detector, check for leakage of refrigerant.

COMPONENTS

GS300:



GS400:



I02359

I02358

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

I03812

REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

2. REPLACE FAULTY TUBE OR HOSE

NOTICE:

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

3. TIGHTEN JOINT OF BOLT OR NUT TO SPECIFIED TORQUE

NOTICE:

Connections should not be torqued tighter than the specified torqued.

Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	10	100	7
A/C unit x Liquid and Suction tubes	10	100	7
Expansion valve x Liquid and suction tube	4.1	42	36 in.·lbf
Evaporator x Liquid and suction tube	4.1	42	36 in.·lbf
Suction line (Block joint)	10	100	7

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

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

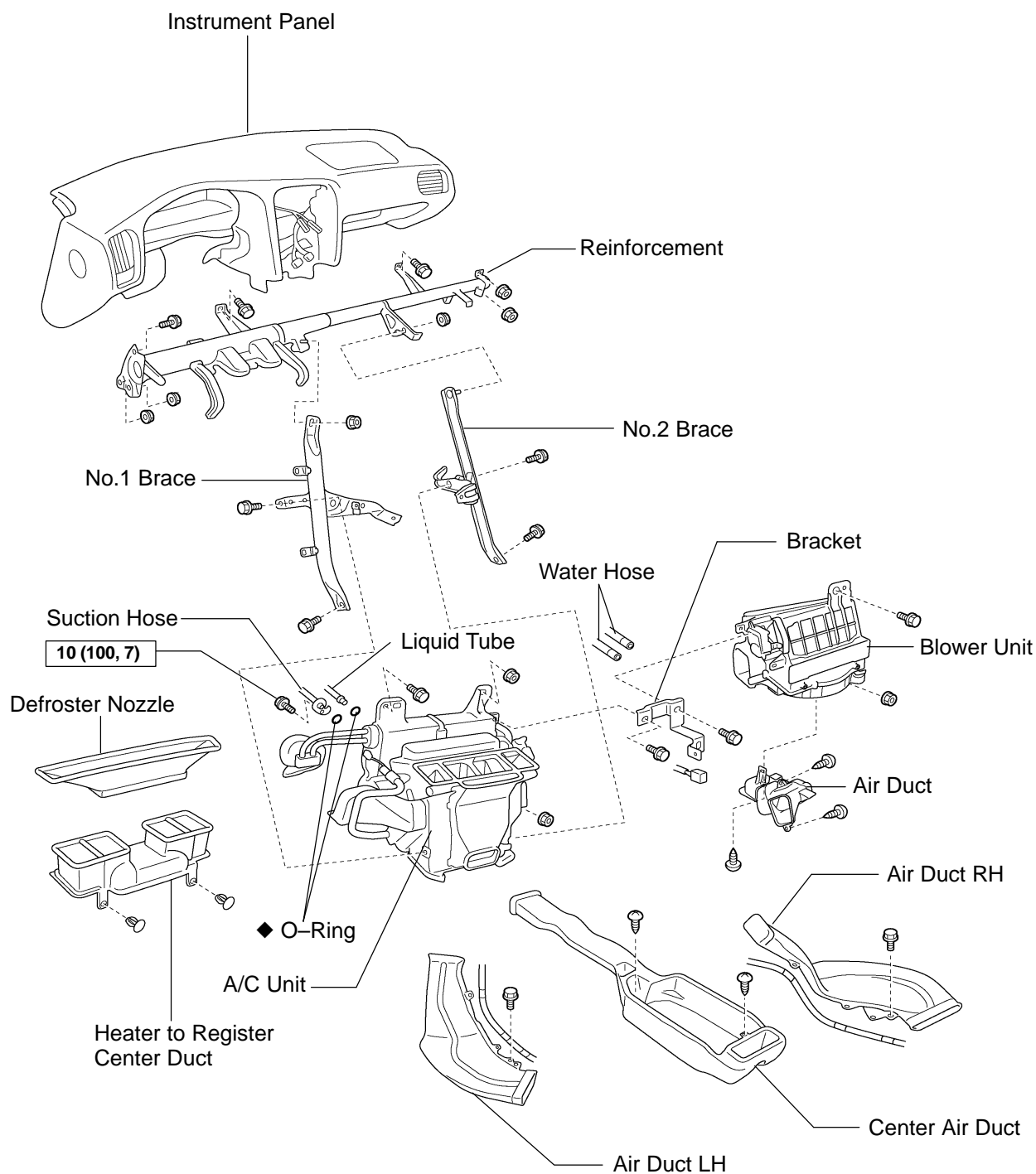
5. INSPECT FOR LEAKAGE OF REFRIGERANT

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

6. INSPECT AIR CONDITIONING OPERATION

AIR CONDITIONING UNIT COMPONENTS

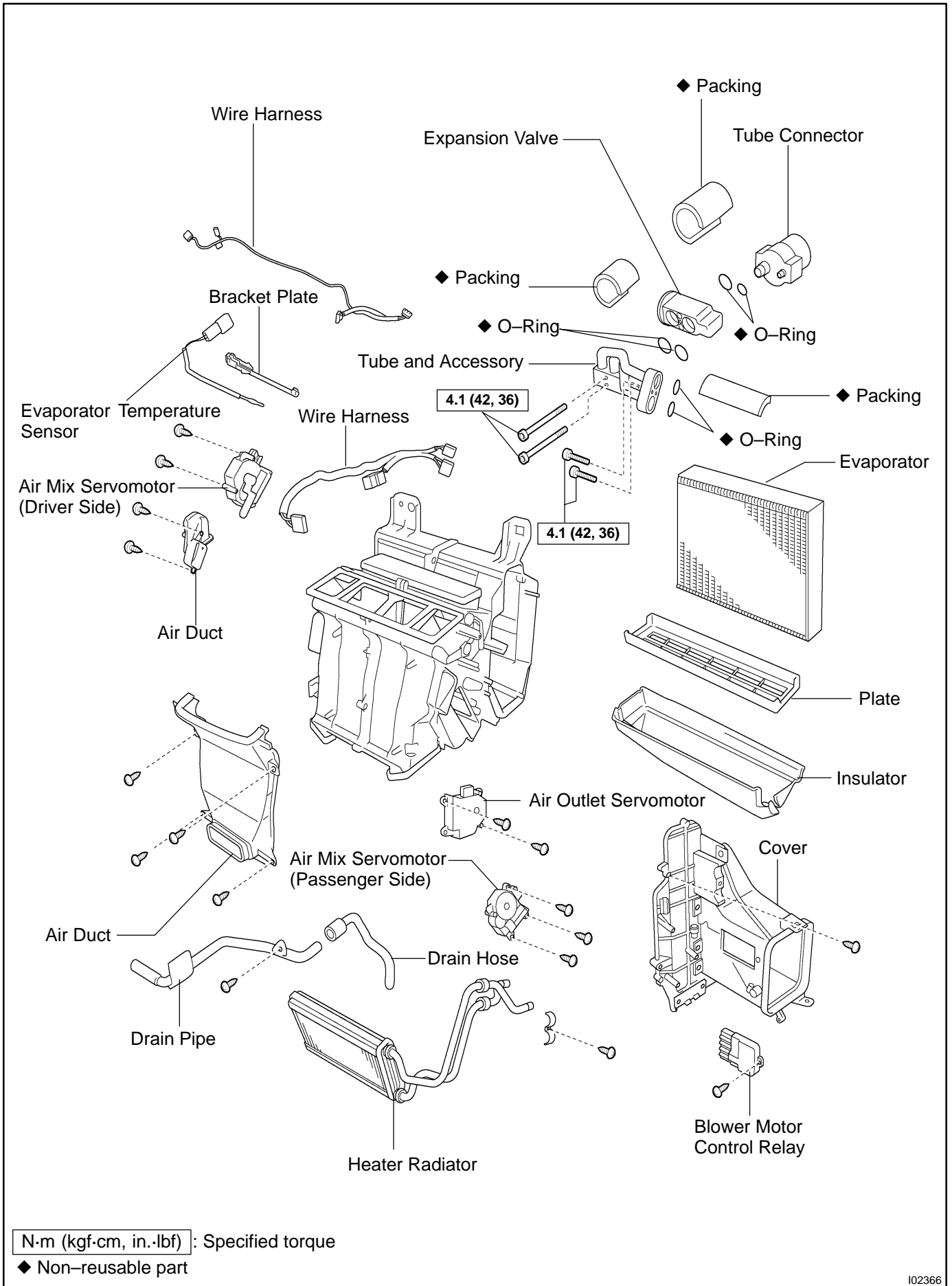
AC0WJ-01



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

◆ Non-reusable part

102365



102366

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

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

Evacuate air from refrigeration system.

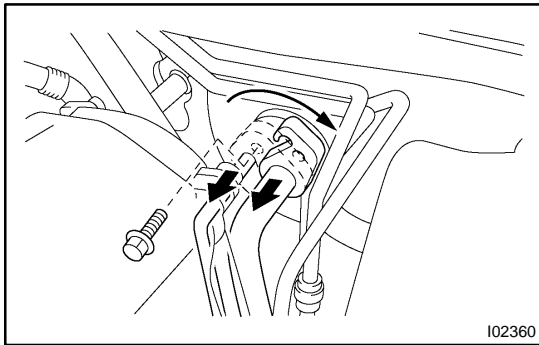
Charge system with refrigerant and inspect for leakage of refrigerant.

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

2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.



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

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

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

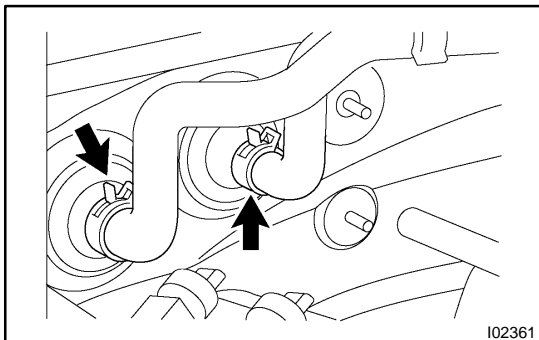
NOTICE:

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

HINT:

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

Lubricate 2 new O-rings with compressor oil and install them to the tubes.



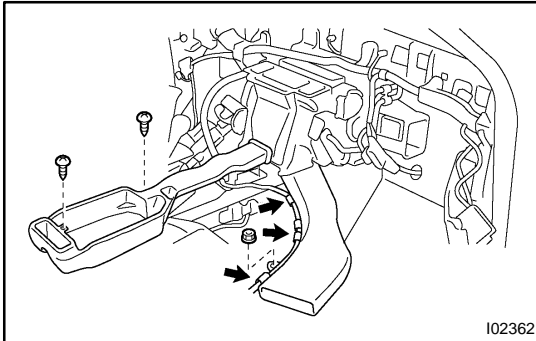
4. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

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

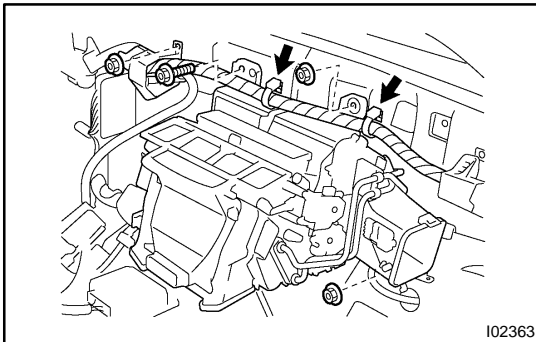
(b) Disconnect the water hose.

5. REMOVE THESE PARTS:

- (a) Cooler No.1 grommet
- (b) Heater pipe grommet
- (c) Drain hose grommet
- (d) Instrument panel and reinforcement
(See page [BO-91](#))
- (e) Blower unit
(See page [AC-30](#))

**6. REMOVE 3 AIR DUCTS**

- (a) Remove the 2 screws and center air duct.
- (b) Slide the floor carpet backward.
- (c) Disconnect the wire harness clamps.
- (d) Remove the 2 bolts and air ducts LH, RH.

**7. REMOVE A/C UNIT**

- (a) Disconnect the connector.
- (b) Remove the wire harness set nut.
- (c) Disconnect the wire harness clamps.
- (d) Remove the 2 nuts, bolt and A/C unit.

DISASSEMBLY

1. REMOVE THESE PARTS:

- (a) Wire harness
- (b) Drain hose

2. REMOVE HEATER RADIATOR

- (a) Remove the screw and clamp.
- (b) Pull out the heater radiator.

3. REMOVE BLOWER MOTOR CONTROL RELAY

Remove the screw and blower motor control relay.

4. REMOVE AIR MIX SERVOMOTORS

Remove the 6 screws and both servomotors.

5. REMOVE AIR OUTLET SERVOMOTOR

Remove the 2 screws and servomotor.

6. REMOVE EXPANSION VALVE

- (a) Pry out the packing.

HINT:

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

Do not reuse the packing.

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

SST 07110-61050

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

HINT:

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

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

7. REMOVE EVAPORATOR TEMPERATURE SENSOR

- (a) Disconnect the wire harness clamp.
- (b) Using a screwdriver, pull out the sensor with bracket plate.

HINT:

Tape the screwdriver tip before use.

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

8. REMOVE EVAPORATOR

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

SST 07110-61050

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

HINT:

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

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

- (b) Remove the 4 screws and cover.
- (c) Pull out the evaporator.
- (d) Remove the plate from evaporator.

HINT:

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

If evaporator is replaced, add compressor oil to evaporator.

Add 40 cc (1.4fl.oz.)

Compressor oil: ND-OIL 8 or equivalent

9. REMOVE INSULATOR FROM HEATER CASE

10. REMOVE AIR DUCT

Remove the 4 screws and duct.

REASSEMBLY

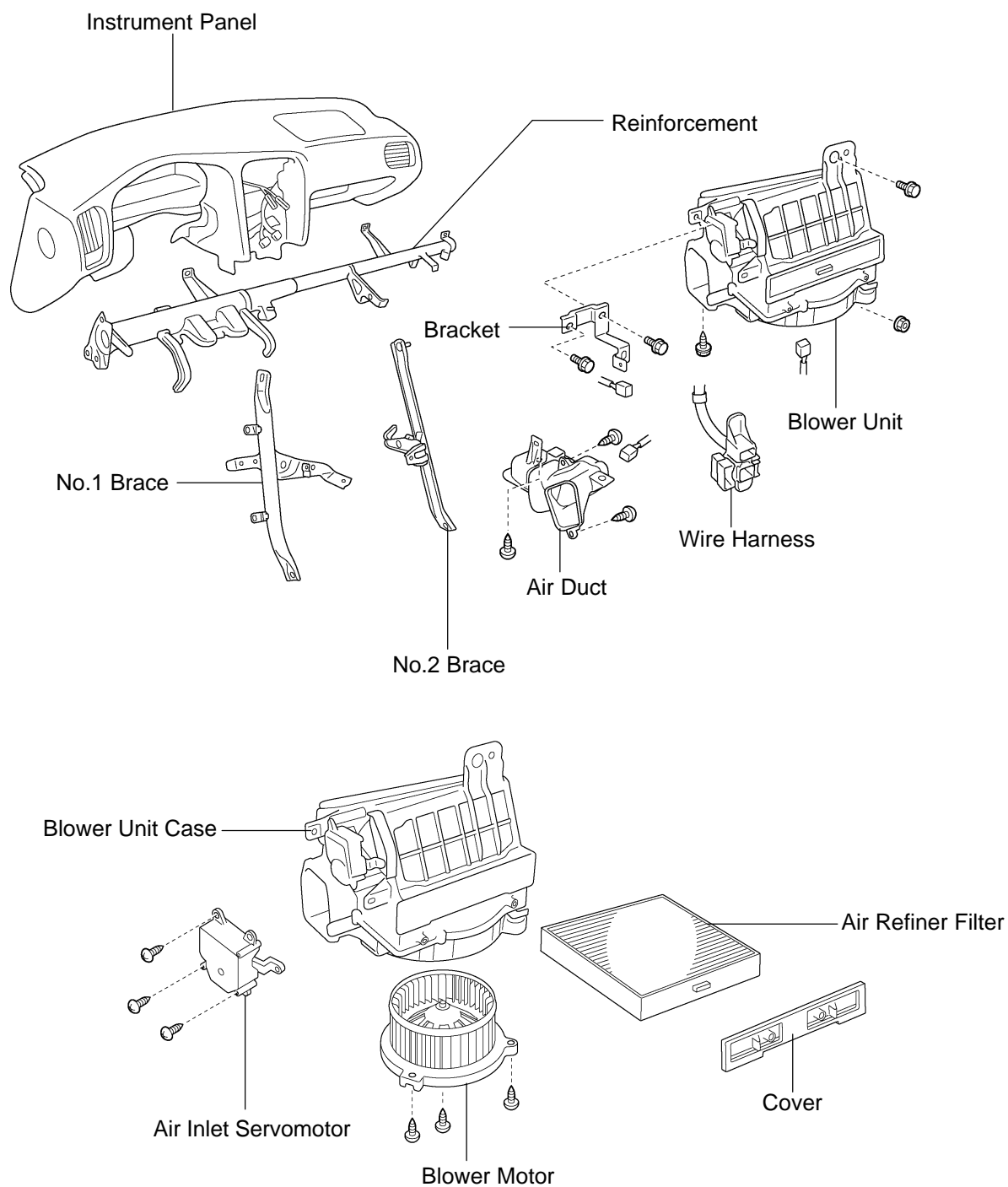
Reassembly is in the reverse order of disassembly (See page [AC-26](#)).

INSTALLATION

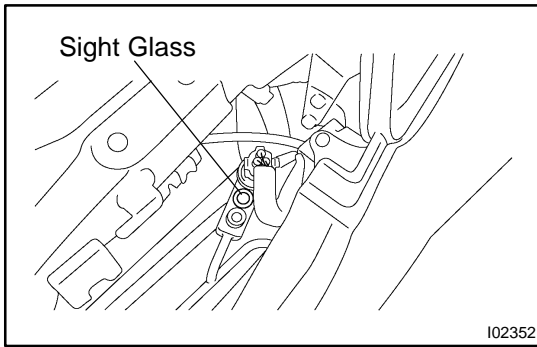
Installation is in the reverse order of removal (See page [AC-24](#)).

BLOWER UNIT COMPONENTS

AC0WO-01

I02370
I02371

I02372



ON-VEHICLE INSPECTION

1. INSPECT REFRIGERANT VOLUME

Observe the sight glass on the liquid tube.

Test conditions:

- Running engine at 1,500 rpm
- Blower speed control switch at "HI" position
- A/C switch ON
- Temperature control dial at "COOL" position
- Fully open the doors

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

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

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

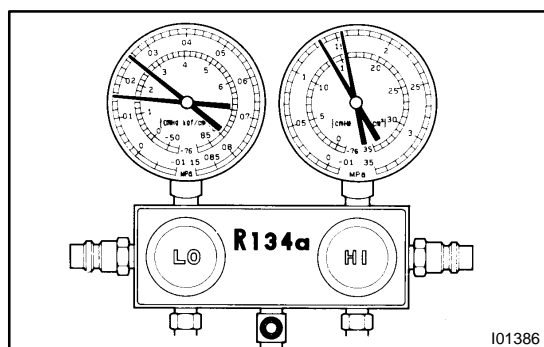
This is a method in which the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when these conditions are established.

Test conditions:

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

HINT:

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



(1) Normally functioning refrigeration system.

Gauge reading:

Low pressure side:

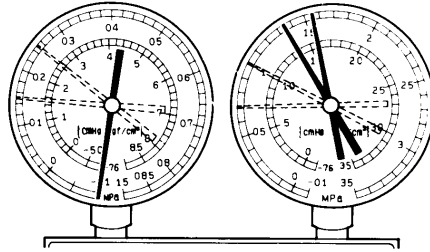
0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm²)

High pressure side:

1.37 – 1.57 MPa (14 – 15 kgf/cm²)

(2) Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

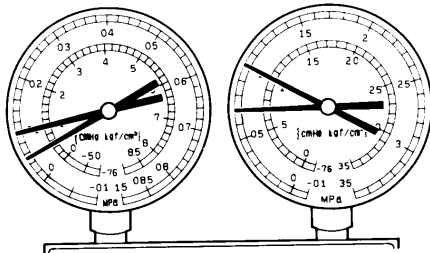


I01387

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	<ul style="list-style-type: none"> • Dryer in oversaturated state • Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant 	(1) Replace dryer (2) Remove moisture in cycle through repeatedly evacuating air (3) Charge proper amount of new refrigerant

(3) Insufficient cooling

Condition: Insufficient cooling

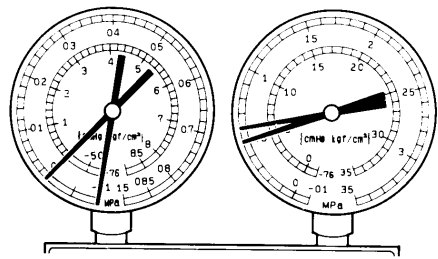


I01388

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> • Pressure low on both low and high pressure sides • Bubbles seen in sight glass continuously • Insufficient cooling performance 	Gas leakage at some place in refrigeration system	<ul style="list-style-type: none"> • Insufficient refrigerant in system • Refrigerant leaking 	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Charge proper amount of refrigerant (3) If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

(4) Poor circulation of refrigerant

Condition: Insufficient cooling

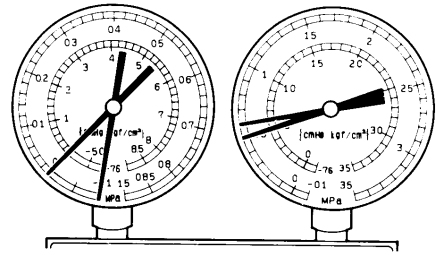


I01389

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none">• Pressure low in both low and high pressure sides• Frost on tube from condenser to unit	Refrigerant flow obstructed by dirt in condenser	condenser clogged	Replace condenser

(5) Refrigerant does not circulate

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

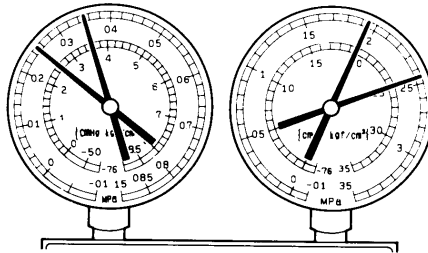


I01449

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none">• Vacuum indicated on low pressure side, very low pressure indicated on high pressure side• Frost or dew seen on piping before and after condenser/ dryer or expansion valve	<ul style="list-style-type: none">• Refrigerant flow obstructed by moisture or dirt in refrigeration system• Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	<ol style="list-style-type: none">(1) Check expansion valve(2) Clean out dirt in expansion valve by blowing with air(3) Replace condenser(4) Evacuate air and charge new refrigerant to proper amount(5) For gas leakage from expansion valve, replace expansion valve

(6) Refrigerant overcharged or insufficient cooling of condenser

Condition: Insufficient cooling

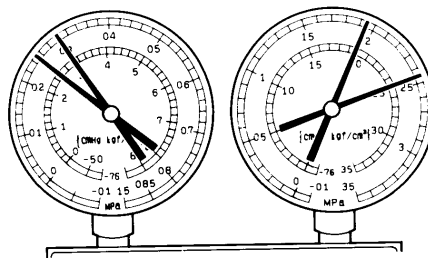


I01390

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure too high on both low and high pressure sides No air bubbles seen through the sight glass even when the engine rpm is lowered 	<ul style="list-style-type: none"> Unable to develop sufficient performance due to excessive refrigeration system Insufficient cooling of condenser 	<ul style="list-style-type: none"> Excessive refrigerant in cycle → refrigerant over charged Condenser cooling → condenser fins clogged of condenser fan faulty 	<ol style="list-style-type: none"> Clean condenser Check condenser fan motor operation If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant

(7) Air present in refrigeration system

Condition: Insufficient cooling



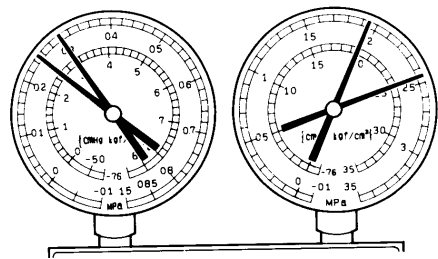
NOTE : These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

I01392

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure too high on both low and high pressure sides The low pressure piping hot to touch Bubbles seen in sight glass 	Air entered in refrigeration system	<ul style="list-style-type: none"> Air present in refrigeration system Insufficient vacuum purging 	<ol style="list-style-type: none"> Check compressor oil to see if it is dirty or insufficient Evacuate air and charge new refrigerant

(8) Expansion valve improperly

Condition: Insufficient cooling

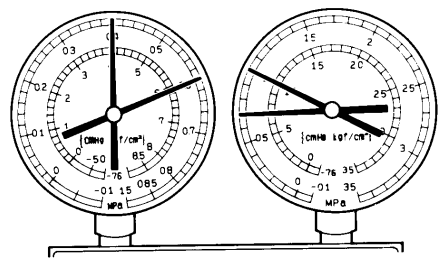


I01450

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none">• Pressure too high on both low and high pressure sides• Frost or large amount of dew on piping on low pressure side	Trouble in expansion valve	<ul style="list-style-type: none">• Excessive refrigerant in low pressure piping• Expansion valve opened too wide	<p>Check expansion valve</p> <p>Replace if defective</p>

(9) Defective compression compressor

Condition : Does not cool



I01393

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none">• Pressure too high on low and high pressure sides• Pressure too low on high pressure side	Internal leak in compressor	<ul style="list-style-type: none">• Compression defective• Valve leaking or broken sliding parts	Repair or replace compressor

3. INSPECT IDLE-UP SPEED

- (a) Warm up engine
- (b) Inspect idle-up speed when the these conditions are established.

Test conditions:

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

GS300:

Magnetic clutch condition	Idle-up speed
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	800 ± 50 rpm

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

GS400:

Magnetic clutch condition	Idle-up speed
Magnetic clutch not engaged	750 ± 50 rpm
Magnetic clutch engaged	800 ± 50 rpm

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

4. INSPECT FOR LEAKAGE OF REFRIGERANT

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

When compressor is OFF: approx. 392 – 588 kPa (4 – 6 kgf·cm², 57 – 85 psi)
- (b) Bring the gas leak detector close to the drain hose before performing the test.

HINT:

- After the blower motor has stopped, leave the cooling for more than 15 minutes.
- Expose the gas leak detector sensor under the drain hose.
- When bring the gas leak detector close to the drain hose, make sure that the gas leak detector does not react to the volatile gases.

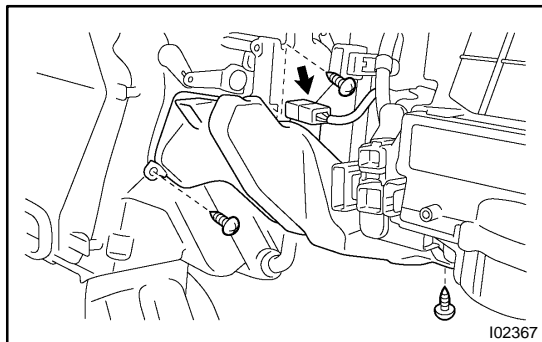
If such reaction is unavoidable, the vehicle must be lifted up.

- (c) If gas leak is not detected on the drain hose, remove the blower resistor from the cooling unit. Then insert the gas leak detector sensor into the unit and perform the test.
- (d) Disconnect the connector and leave the pressure switch for approx. 20 minutes. Then bring the gas leak detector close to the pressure switch and perform the test.
- (e) Bring the gas leak detector close to the refrigerant lines.

REMOVAL

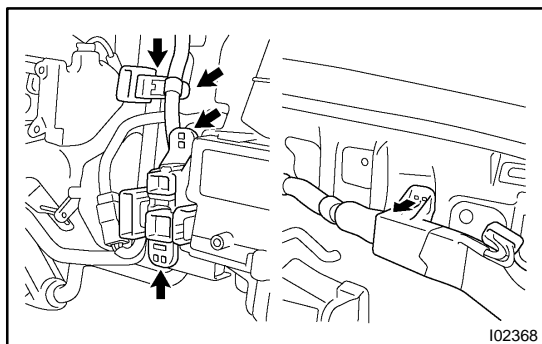
1. REMOVE INSTRUMENT PANEL AND REINFORCEMENT

(See page [BO-91](#))



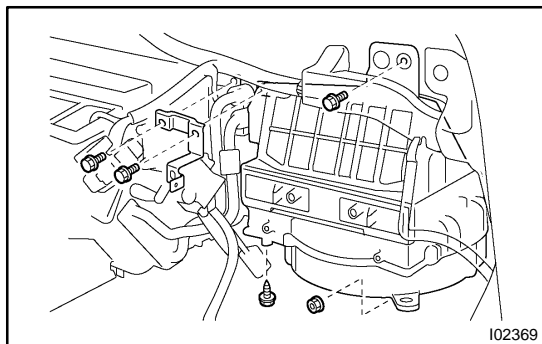
2. REMOVE AIR DUCT

- (a) Disconnect the connector clamp.
- (b) Remove the 3 screws and air duct.



3. DISCONNECT WIRE HARNESS

- (a) Release the claw of the connector bracket and disconnect the connector bracket.
- (b) Disconnect the wire harness set clamps.
- (c) Disconnect the wire harness.



4. REMOVE BLOWER UNIT

- (a) Disconnect the connectors.
- (b) Remove the 2 bolts and bracket.
- (c) Remove the bolt, screw and nut.
- (d) Remove the blower unit.

DISASSEMBLY

1. REMOVE AIR REFINER FILTER

- (a) Release the 4 claws and remove the cover.
- (b) Pull out the air refiner filter.

2. REMOVE AIR INLET SERVOMOTOR

Remove the 3 screws and servomotor.

3. REMOVE BLOWER MOTOR

Remove the 3 screws and blower motor.

4. REMOVE BRACKET

Remove the screw and bracket.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [AC-26](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [AC-30](#)).

COMPRESSOR AND MAGNETIC CLUTCH

AC0WT-01

ON-VEHICLE INSPECTION

1. INSPECT COMPRESSOR FOR METALLIC SOUND

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

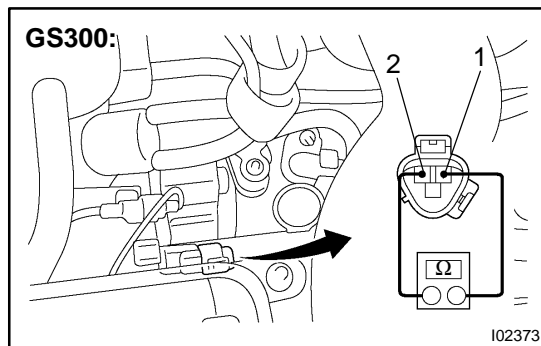
If abnormal metallic sound is heard, replace the compressor assembly.

2. INSPECT REFRIGERANT PRESSURE

(See page AC-3)

3. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant. If there is any leakage, replace the compressor assembly.



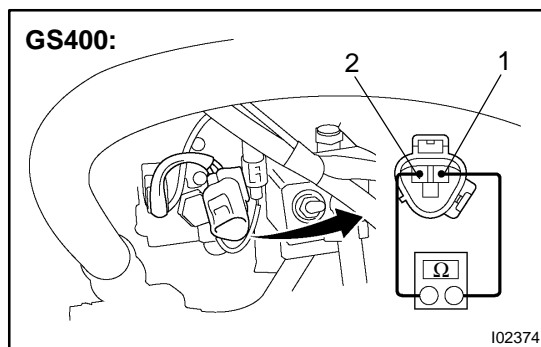
4. INSPECT COMPRESSOR LOCK SENSOR RESISTANCE

- (a) Disconnect the connector.
- (b) Measure resistance between terminals 1 and 2.

Standard resistance:

570 – 1,050 Ω at 20°C (68 °F)

If resistance is not as specified, replace the compressor.



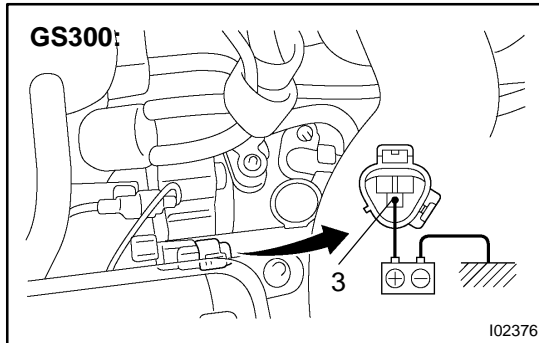
5. MAKE THESE VISUAL CHECKS:

- (a) Leakage of grease from the clutch bearing.
- (b) Signs of oil on the pressure plate or rotor.

6. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

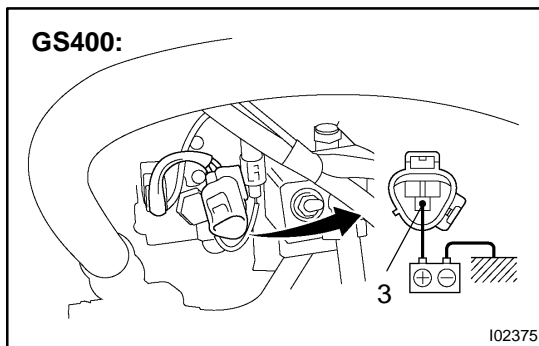
- (a) Start engine.
- (b) Check for abnormal noise from the compressor when the A/C switch is OFF.

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

**7. INSPECT MAGNETIC CLUTCH OPERATION**

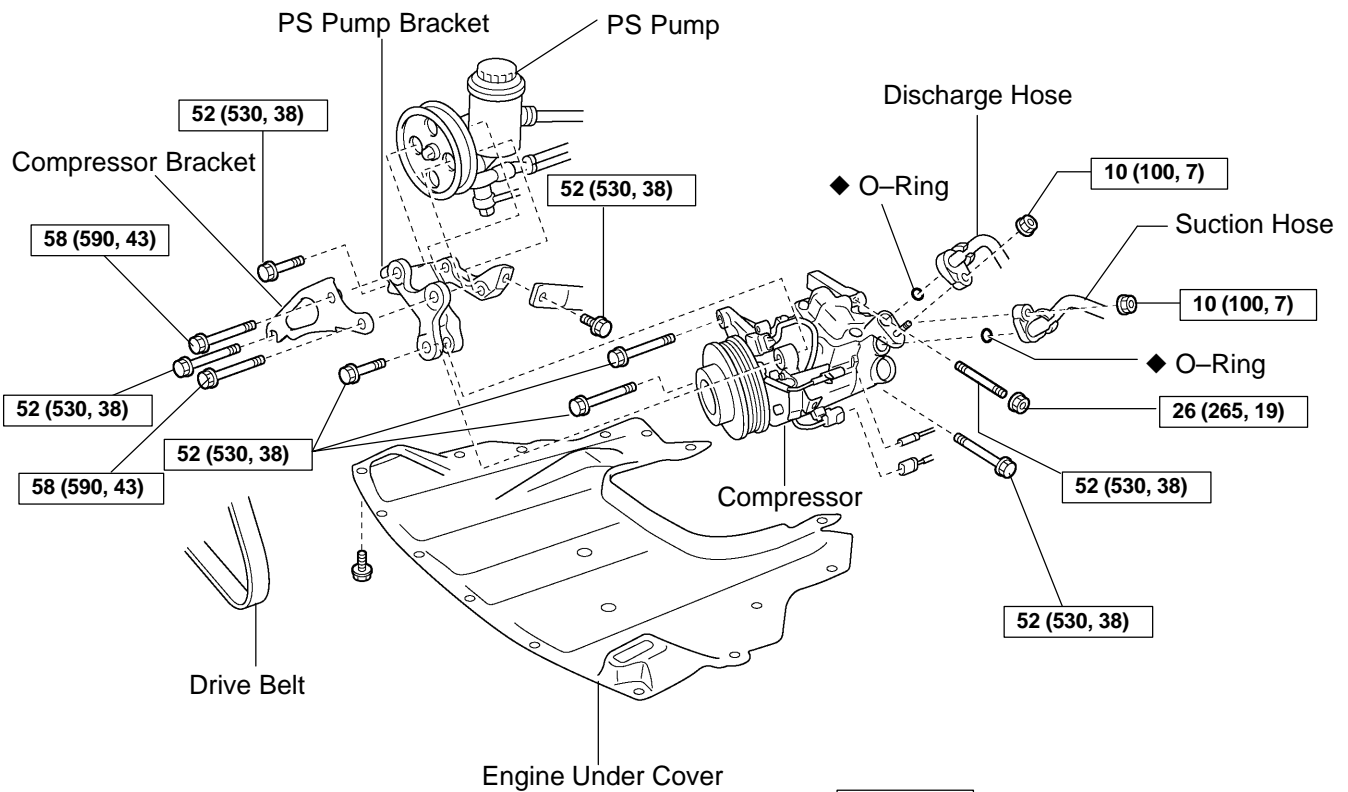
- (a) Disconnect the connector.
- (b) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to the body ground.
- (c) Check that the magnetic clutch is energized.

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

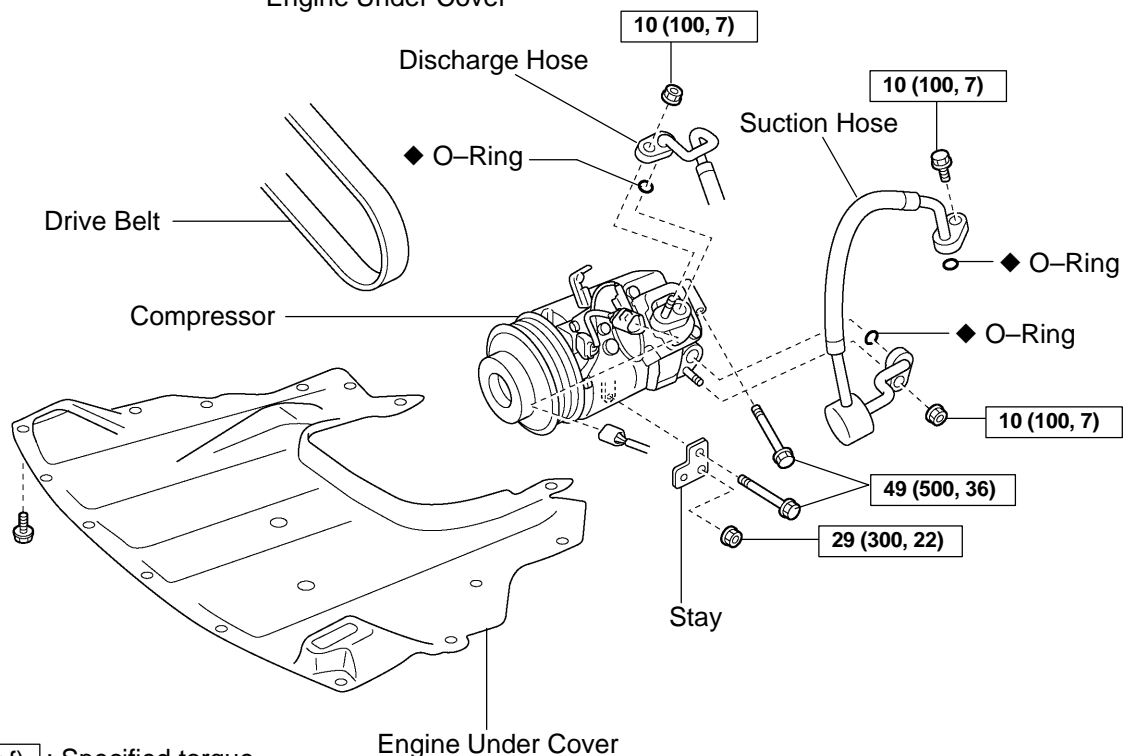


COMPONENTS

GS300:



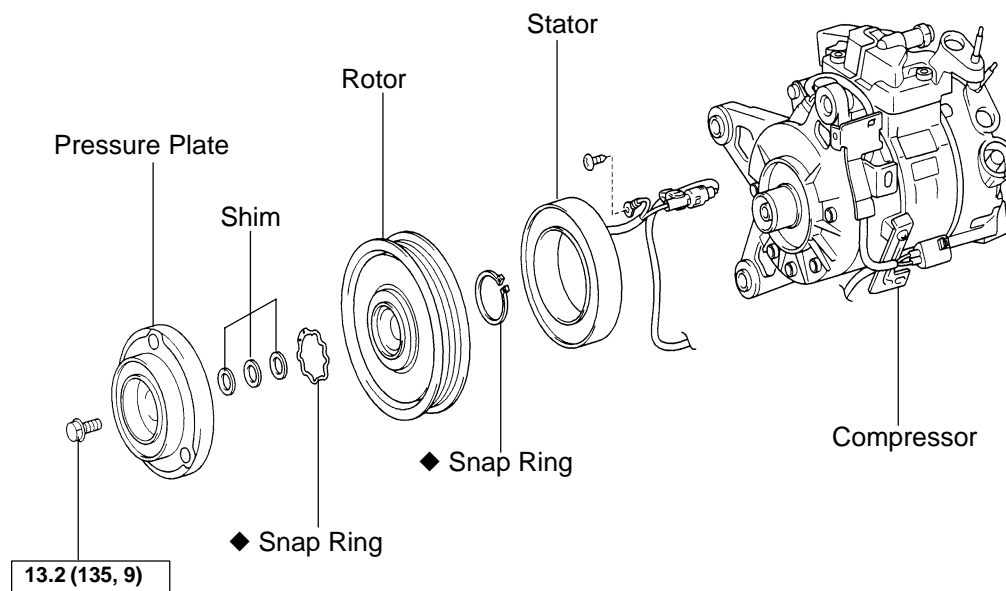
GS400:



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

◆ Non-reusable part

102379



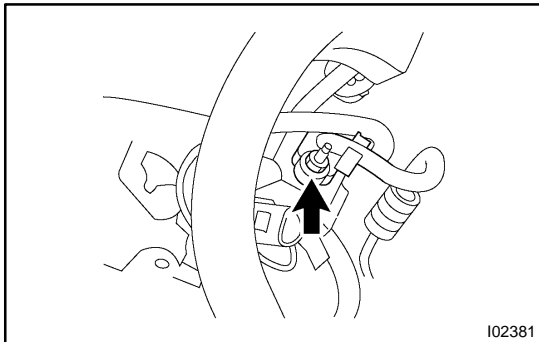
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

I05295

REMOVAL

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

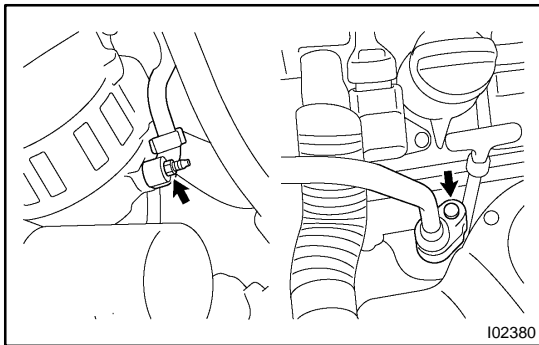


7. **GS400:**
DISCONNECT DISCHARGE HOSE

Remove the nut and disconnect the discharge hose.

NOTICE:

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

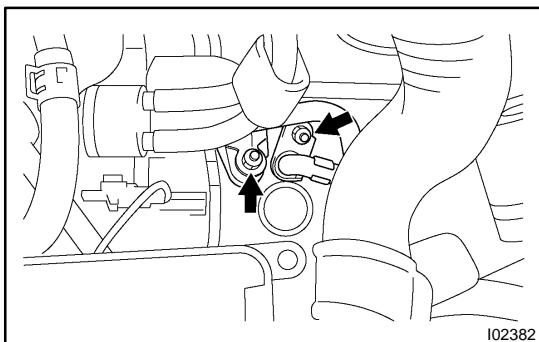


8. **GS400:**
REMOVE SUCTION HOSE

Remove the nut, bolt and suction hose.

NOTICE:

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

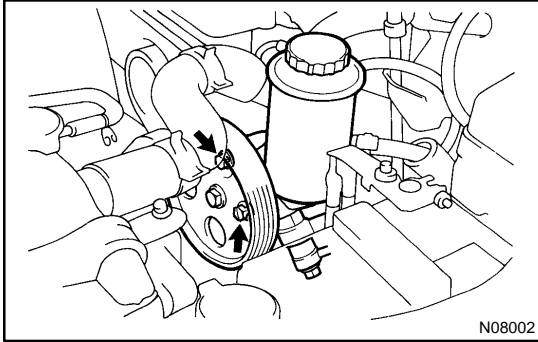


9. **GS300:**
DISCONNECT DISCHARGE AND SUCTION HOSES

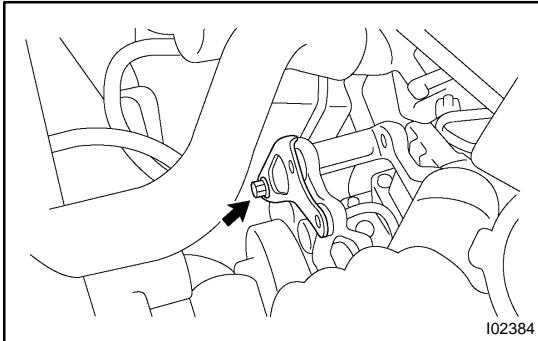
Remove the 2 nut and disconnect the both hoses.

NOTICE:

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

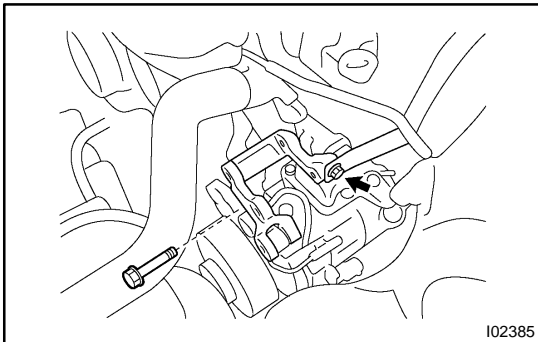


10. GS300:
REMOVE 2 PS PUMP SET BOLTS

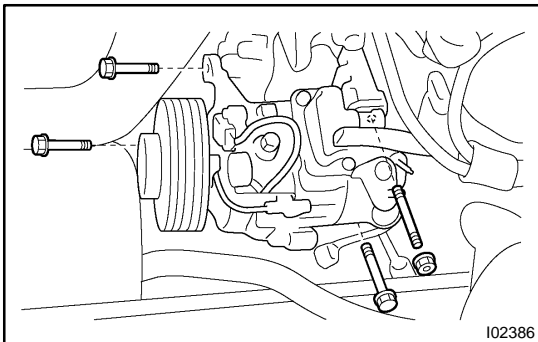


11. GS300:
REMOVE COMPRESSOR

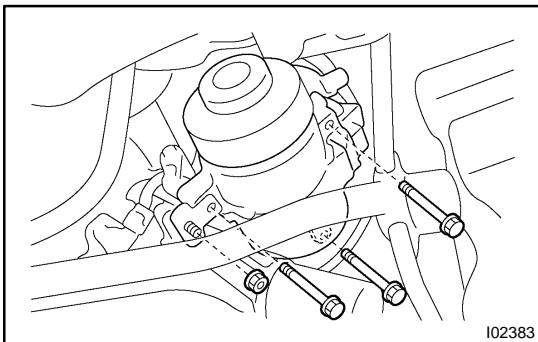
- (a) Remove the bolt and PS pump bracket.



- (b) Remove the 2 bolts and compressor bracket.
(c) Disconnect the connector.

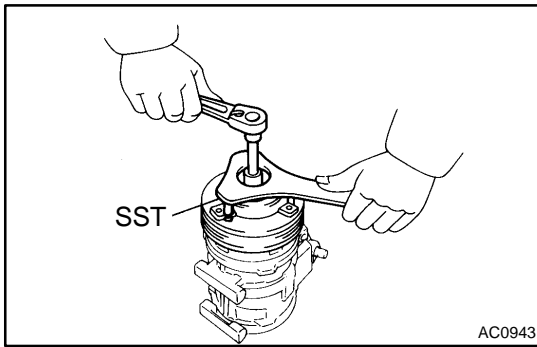


- (d) Remove the nut and 3 bolts.
(e) Using a torx socket (E10), remove the stud bolt and compressor.



12. GS400:
REMOVE COMPRESSOR

- (a) Disconnect the connector.
(b) Remove the nut, bolt and compressor stay.
(c) Remove the 2 bolts and compressor.



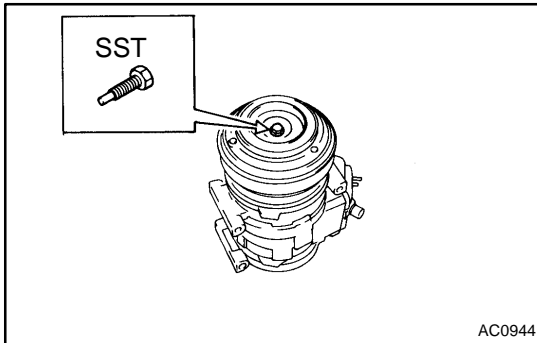
DISASSEMBLY

1. REMOVE PRESSURE PLATE

- (a) Using SST and a socket wrench, remove the shaft bolt.

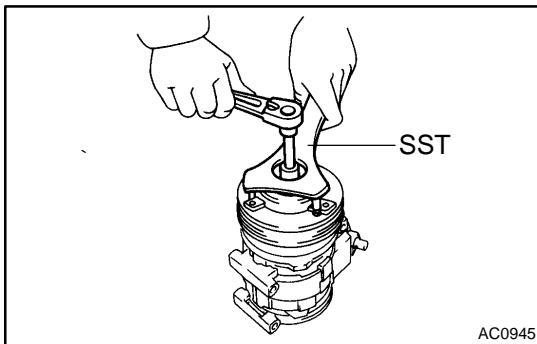
SST 07112-76060

Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)



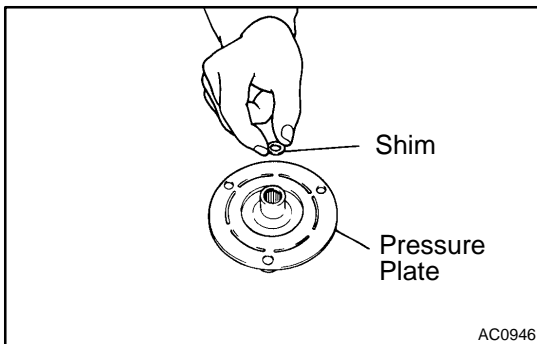
- (b) Install SST on the pressure plate.

SST 07112-66040

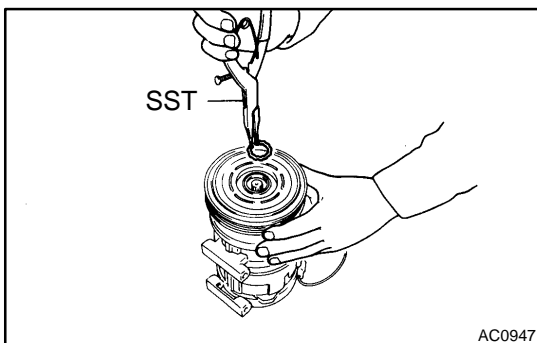


- (c) Using SST and socket wrench, remove the pressure plate.

SST 07112-66040, 07112-76060



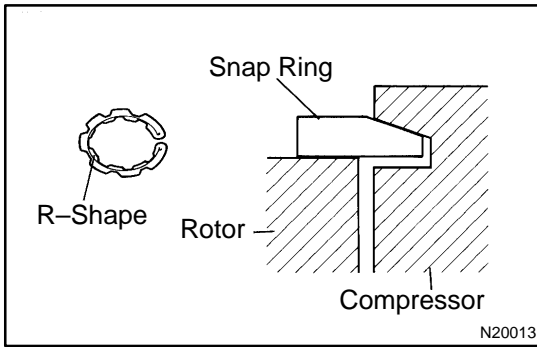
- (d) Remove the shims from the pressure plate.



2. REMOVE ROTOR

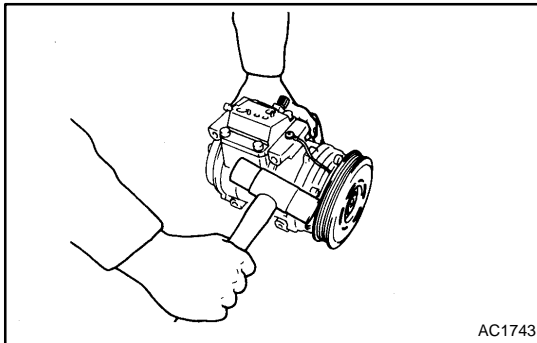
- (a) Using SST, remove the snap ring.

SST 07114-84020

**NOTICE:**

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

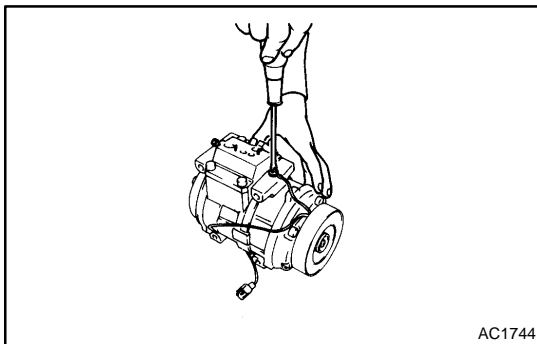
The snap ring should be installed so that beveled side faces up.



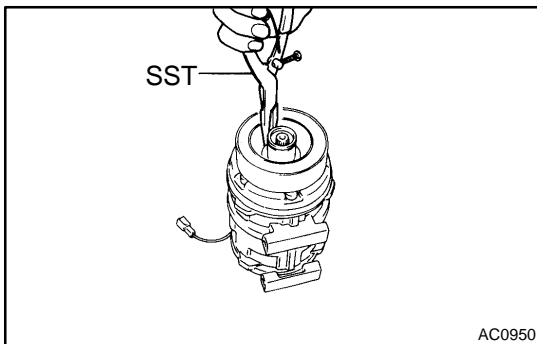
(b) Using a plastic hammer, tap the rotor off the shaft.

NOTICE:

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

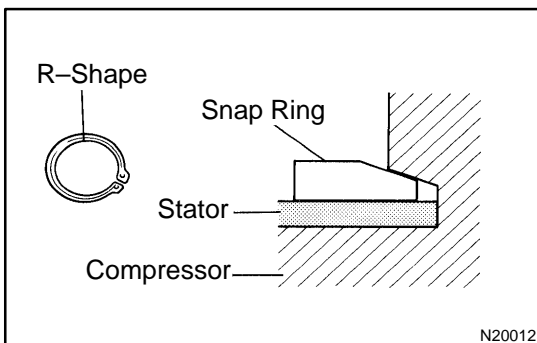
**3. REMOVE STATOR**

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



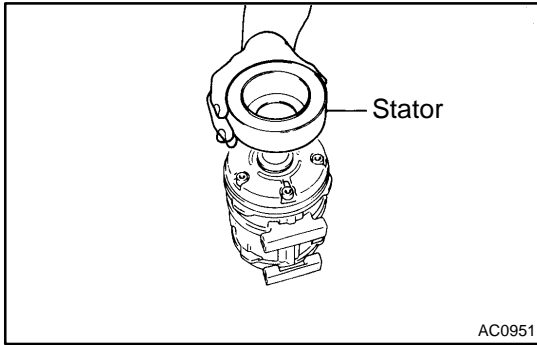
(b) Using SST, remove the snap ring.

SST 07114-84020

**NOTICE:**

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

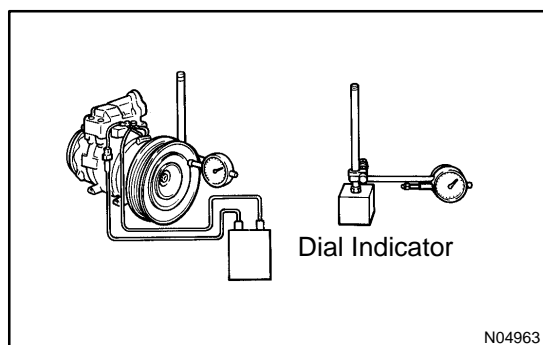
The snap ring should be installed so that its beveled side faces up.



(c) Remove the stator.

REASSEMBLY

Reassembly is in the reverse order of disassembly
(See page [AC-40](#)).



AFTER REASSEMBLY, CHECK MAGNETIC CLUTCH CLEARANCE

- Set the dial indicator to the pressure plate of the magnetic clutch.
- Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.
- Check the clearance between the pressure plate and rotor when connecting the negative (–) terminal to the battery.

Standard clearance:

0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

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

Shim thickness:

0.1 mm (0.004 in.)

0.3 mm (0.012 in.)

0.5 mm (0.020 in.)

INSTALLATION

1. GS400:

INSTALL COMPRESSOR

- (a) Install the compressor with the 2 bolts temporarily.
- (b) Install the compressor stay with the bolt and nut temporarily.
- (c) Tighten the nut and 3 bolts.

Torque:

Bolt: 49 N·m (500 kgf·cm, 36 ft·lbf)

Nut: 29 N·m (300 kgf·cm, 22 ft·lbf)

- (d) Connect the connector.

2. GS300:

INSTALL COMPRESSOR

- (a) Install the compressor with the stud bolt.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

- (b) Install the 3 bolts and nut.

Torque:

Bolt: 52 N·m (530 kgf·cm, 38 ft·lbf)

Nut: 26 N·m (265 kgf·cm, 19 ft·lbf)

- (c) Connect the connector.
- (d) Install the compressor bracket with the 2 bolts.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

- (e) Install the PS pump bracket with the 2 bolts.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

3. GS300:

INSTALL 2 PS PUMP SET BOLTS

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

4. GS 300:

CONNECT DISCHARGE AND SUCTION HOSES

Connect the both hoses with the 2 nut.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:

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

HINT:

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

5. GS400:

CONNECT DISCHARGE HOSE

Connect the discharge hose with the nut.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:

Hose should be connected immediately after the cap have been removed.

HINT:

Lubricate a new O-ring with compressor oil and install them to the hose.

6. GS400:**INSTALL SUCTION HOSE**

Install the suction hose with the bolt and nut.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:

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

HINT:

Lubricate 2 new O-rings with compressor oil and install them to the hose.

7. INSTALL DRIVE BELT

(See page [AC-16](#))

8. INSPECT DRIVE BELT TENSION

(See page [AC-14](#))

9. INSTALL ENGINE UNDER COVER**10. CONNECT NEGATIVE (–) TERMINAL CABLE TO BATTERY****11. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT**

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

12. INSPECT FOR LEAKAGE OF REFRIGERANT

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

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

13. INSPECT A/C OPERATION

CONDENSER

AC0WZ-01

ON-VEHICLE INSPECTION

1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE

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

NOTICE:

Be careful not to damage the fins.

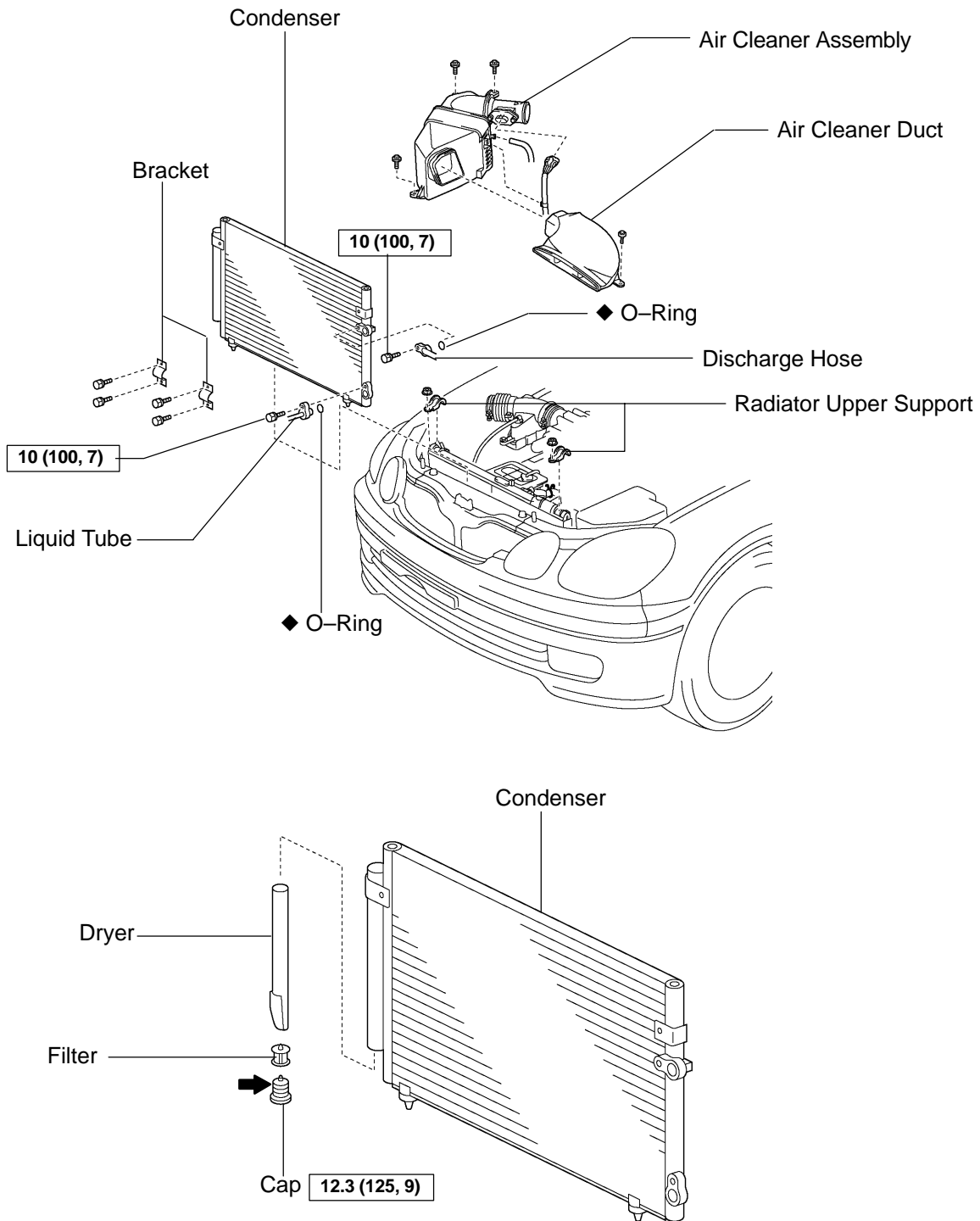
- If the fins are bent, straighten them with a screwdriver or pliers.

2. INSPECT CONDENSER AND FITTINGS FOR LEAKAGE OF REFRIGERANT

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

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

COMPONENTS



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

◆ Non-reusable part

➡ Compressor oil ND-OIL 8 or equivalent

109253
109252

I10327

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

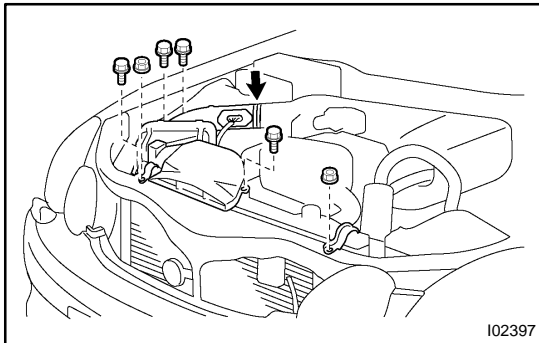
HINT:

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

Evacuate air from refrigeration system.

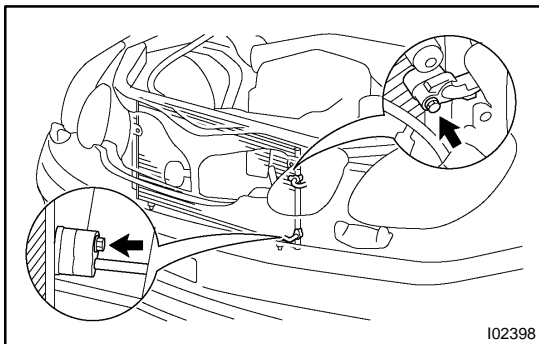
Charge system with refrigerant and inspect for leakage of refrigerant.

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



2. REMOVE THESE PARTS:

- (a) Air cleaner duct
- (b) Air cleaner assembly
- (c) 2 radiator upper supports



3. DISCONNECT DISCHARGE HOSE AND LIQUID TUBE

Remove the 2 bolts and disconnect the hose and tube.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

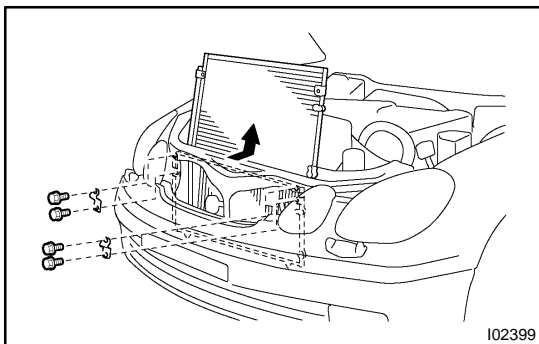
NOTICE:

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

HINT:

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

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



4. REMOVE CONDENSER

- (a) Remove the 4 bolts and 2 brackets.
- (b) Push the radiator toward engine.
- (c) Push the condenser toward radiator and pull it upward.

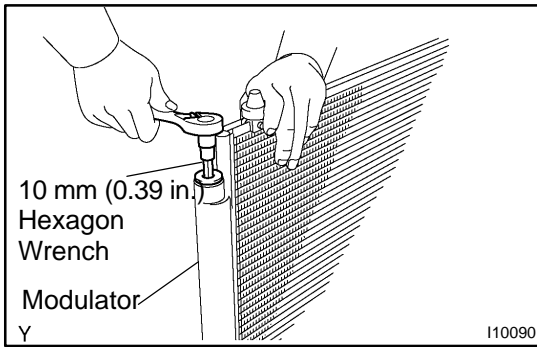
HINT:

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

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

Add 40 cc (1.4 fl. oz)

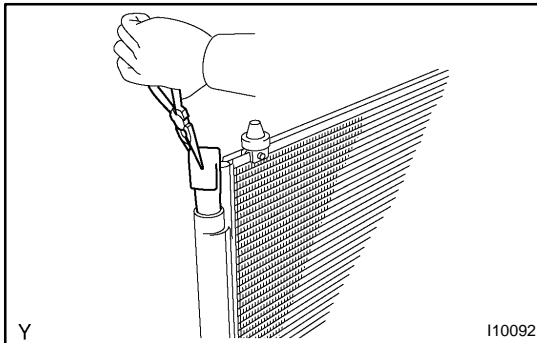
Compressor oil: ND – OIL 8 or equivalent



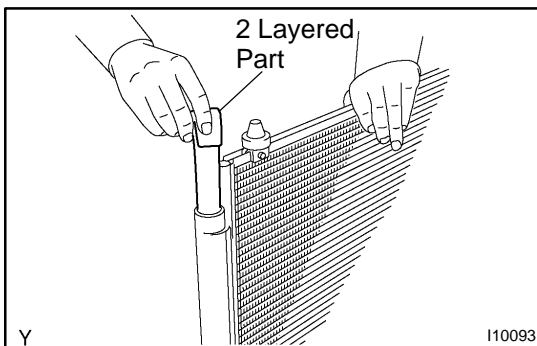
REPLACEMENT

REPLACE DRYER FROM MODULATOR

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



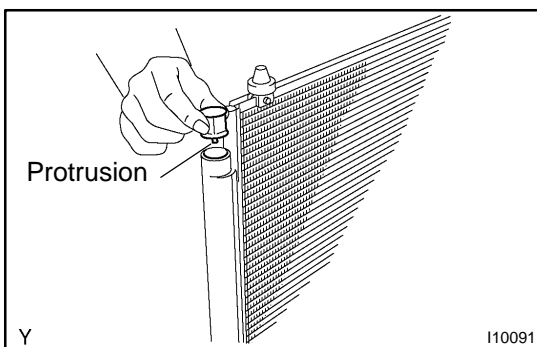
- Using pliers, remove the dryer.



- Insert a new dryer into the modulator.

NOTICE:

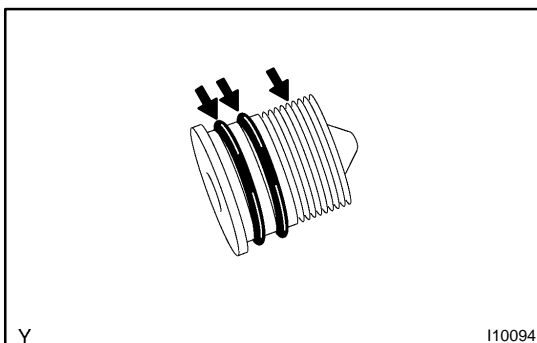
- Do not remove the dryer from a vinyl bag until inserting it into the modulator.
- Install the dryer with its 2 layered part faced upward to the modulator.



- Insert the filter into the modulator.

NOTICE:

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



- Install the cap to the modulator.

- Apply compressor oil to the o-rings and screw part of the cap.

Compressor oil: ND-OIL 8 or equivalent

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

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

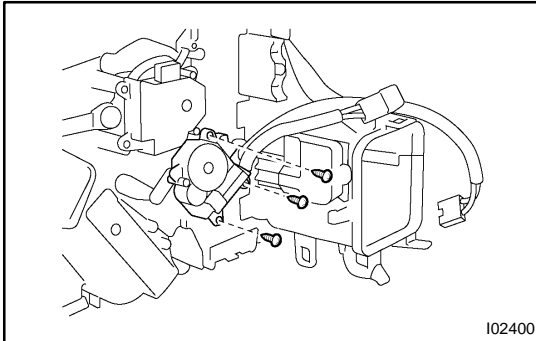
INSTALLATION

Installation is in the reverse order of removal (See page [AC-48](#)).

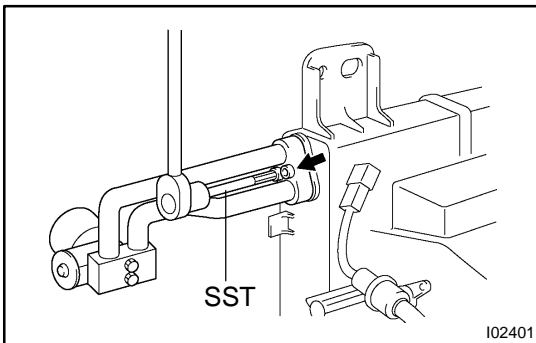
EVAPORATOR REMOVAL

AC0X2-01

1. REMOVE A/C UNIT
(See page AC-24)
2. REMOVE HEATER RADIATOR
(See page AC-55)



3. REMOVE AIR MIX SERVOMOTOR PASSENGER SIDE
 - (a) Disconnect the connector.
 - (b) Remove the 3 screws and servomotor.



4. REMOVE TUBE AND ACCESSORY

- (a) Pry out packing.

HINT:

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

Do not reuse the packing.

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

SST 07110-61050

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

NOTICE:

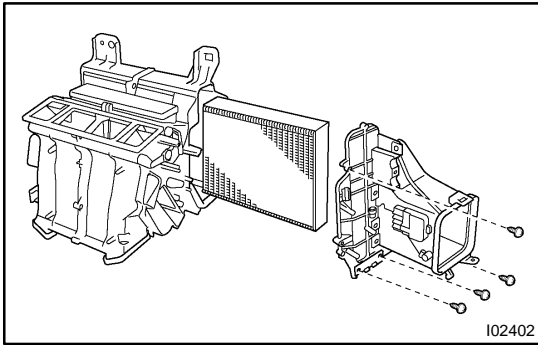
Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

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

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

- (c) Remove screw and drain pipe.

**5. REMOVE EVAPORATOR**

- (a) Disconnect the connector from blower motor control relay.
- (b) Remove the screw and drain hose.
- (c) Remove the 4 screws and cover.
- (d) Pull out the evaporator.

HINT:

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

If evaporator is replaced, add compressor oil to evaporator.

Add 40 cc (1.4 fl. oz.)

Compressor oil: ND-OIL 8 or equivalent

INSPECTION

1. CHECK EVAPORATOR FINS FOR BLOCKAGE

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

NOTICE:

Never use water to clean the evaporator.

2. CHECK FITTING FOR CRACKS OR SCRATCHES

If necessary, repair or replace.

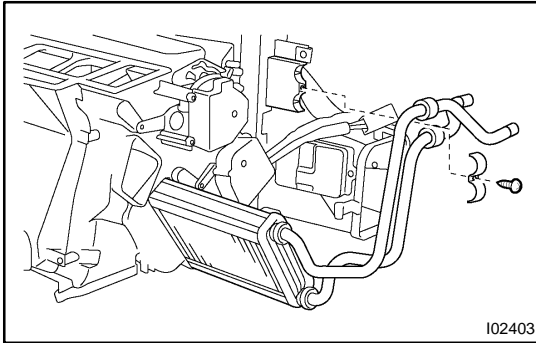
INSTALLATION

Installation is in the reverse order of removal (See page [AC-51](#)).

HEATER RADIATOR REMOVAL

AC0X5-01

1. REMOVE A/C UNIT (See page [AC-24](#))



2. REMOVE HEATER RADIATOR

- (a) Remove the screw and clamp.
- (b) Pull out the heater radiator.

INSPECTION

INSPECT FINS FOR BLOCKAGE

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

INSTALLATION

Installation is in the reverse order of removal (See page [AC-55](#)).

EXPANSION VALVE

AC0XB-01

ON-VEHICLE INSPECTION

1. CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE
2. SET ON MANIFOLD GAUGE SET
(See page [AC-17](#))

3. RUN ENGINE

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

Then check that the high pressure reading is 1.37 – 1.57 MPa (14 – 16 kgf/cm², 199 –228 psi).

4. CHECK EXPANSION VALVE

If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm², 0 psi).

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

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

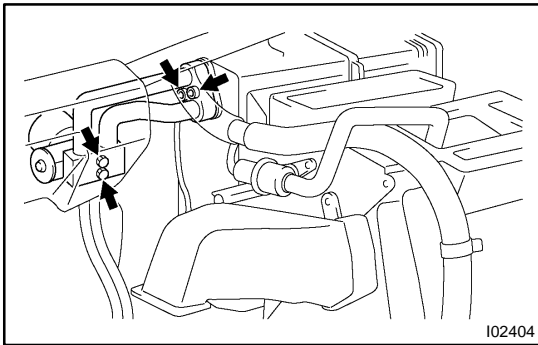
Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

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

2. REMOVE INSTRUMENT PANEL

(See page [BO-91](#))



3. REMOVE EXPANSION VALVE

- (a) Pry out the packings.

HINT:

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

Do not reuse the packing.

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

SST 07110-61050

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

NOTICE:

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

HINT:

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

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

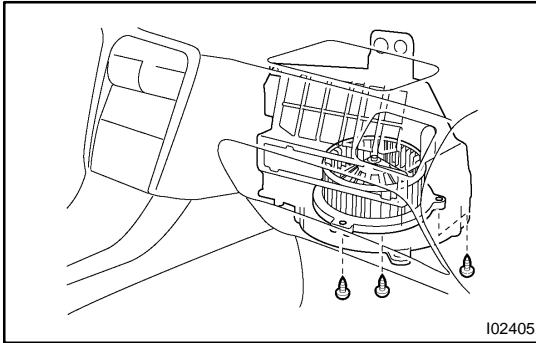
INSTALLATION

Installation is in the reverse order of removal (See page [AC-59](#)).

BLOWER MOTOR REMOVAL

AC0XB-01

1. REMOVE No.2 UNDER COVER
(See page [BO-91](#))



2. REMOVE BLOWER MOTOR
 - (a) Disconnect the connector.
 - (b) Remove the 3 screws and blower motor.

INSPECTION

INSPECT BLOWER MOTOR CIRCUIT

(See page [DI-1126](#))

INSTALLATION

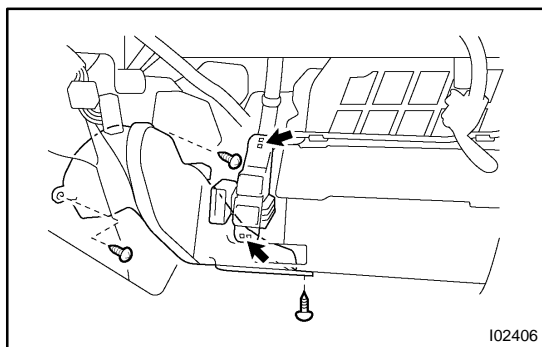
Installation is in the reverse order of removal (See page [AC-61](#)).

BLOWER MOTOR CONTROL RELAY REMOVAL

AC0XE-01

1. REMOVE THESE PARTS:

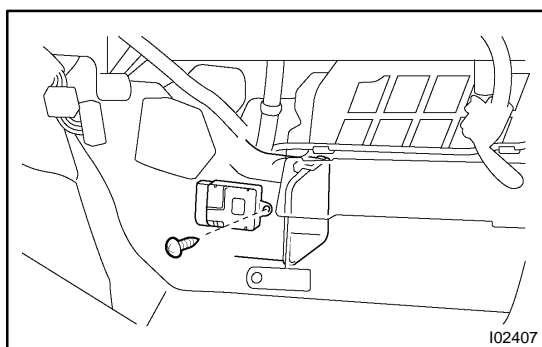
- (a) Front door scuff plate RH
 - (b) Cowl side trim RH
 - (c) No.2 under cover
 - (d) Glove compartment door
 - (e) Glove compartment panel
- (See page [BO-91](#))



2. REMOVE AIR DUCT

Remove the 3 screws and duct.

3. DISCONNECT WIRE HARNESS



4. REMOVE BLOWER MOTOR CONTROL RELAY

Remove the screw and blower motor control relay, then disconnect the connectors.

INSPECTION

INSPECT BLOWER MOTOR CONTROL RELAY CIRCUIT

(See page [DI-1126](#))

INSTALLATION

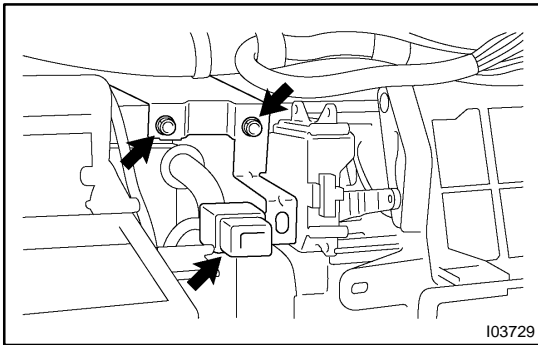
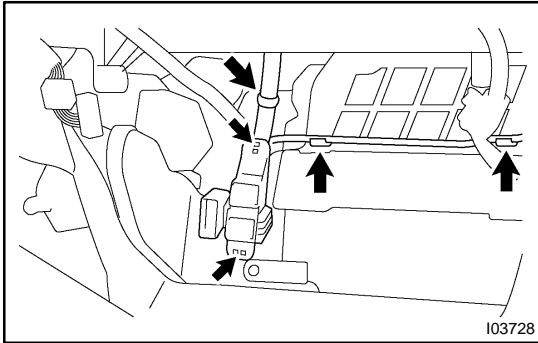
Installation is in the reverse order of removal (See page [AC-64](#)).

SERVOMOTOR REMOVAL

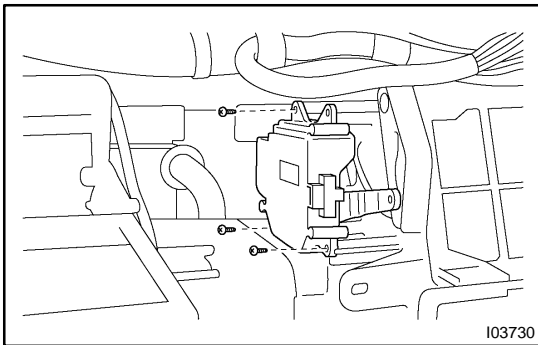
AC0XH-01

1. REMOVE AIR INLET SERVOMOTOR

- (a) Remove these parts:
 - (1) Front door scuff plate RH
 - (2) Cowl side trim RH
 - (3) No.2 under cover
 - (4) Glove compartment door
 - (5) Glove compartment panel (See page [BO-91](#))
- (b) Disconnect the wire harness.



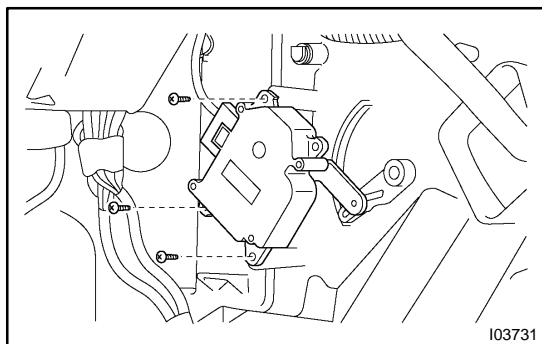
- (c) Remove the bracket.
 - (1) Disconnect wire harness clamp.
 - (2) Remove the 2 bolts and bracket.



- (d) Remove the air inlet servomotor.
 - (1) Disconnect the connector.
 - (2) Remove the 3 screws and servomotor.

2. REMOVE AIR MIX SERVOMOTOR (Driver Side)

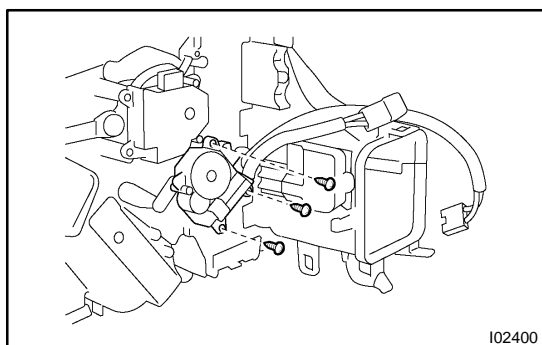
- (a) Remove these parts:
- (1) No.1 under cover
 - (2) No.1 safety pad (See page [BO-91](#))



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

3. REMOVE AIR MIX SERVOMOTOR (Passenger Side)

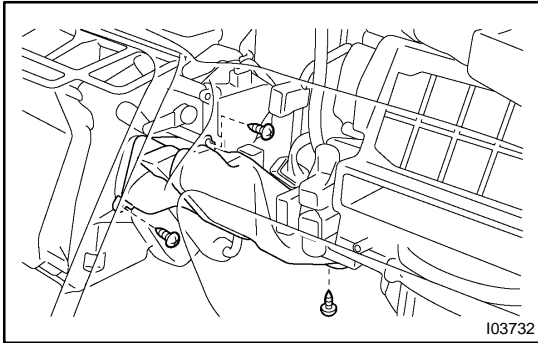
- (a) Remove heater radiator (See page [AC-55](#)).



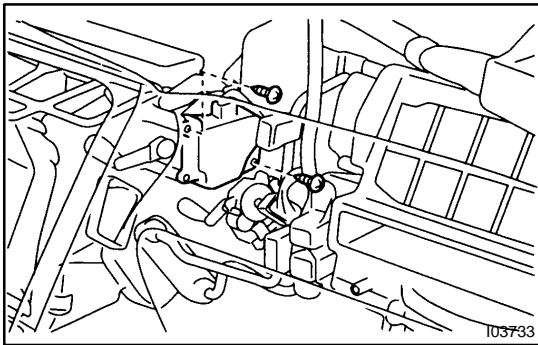
- (b) Remove the air mix servomotor.
- (1) Disconnect the connector.
 - (2) Remove the 3 screws and servomotor.

4. REMOVE AIR OUTLET SERVOMOTOR

- (a) Remove these parts:
- (1) No. 2 under cover
 - (2) Glove compartment door
 - (3) Glove compartment panel (See page [BO-91](#))



- (b) Remove the air duct.
Remove the 3 screws and air duct.



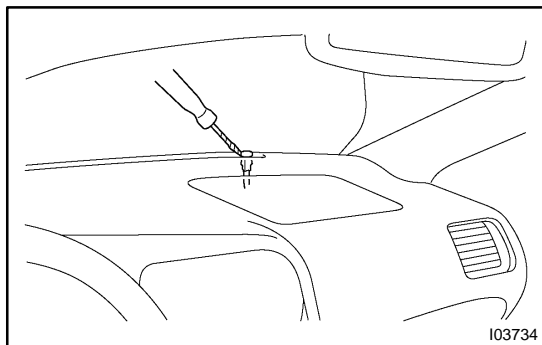
- (c) Remove air outlet servomotor.
- (1) Disconnect the connector.
 - (2) Remove the 2 screws and servomotor.

INSPECTION

1. INSPECT AIR INLET DAMPER POSITION SENSOR CIRCUIT
(See page [DI-1099](#))
2. INSPECT AIR INLET SERVOMOTOR OPERATION
(See page [DI-1111](#))
3. INSPECT AIR MIX DAMPER POSITION SENSOR CIRCUIT
(See page [DI-1096](#))
4. INSPECT AIR MIX SERVOMOTOR OPERATION
(See page [DI-1108](#))
5. INSPECT AIR OUTLET DAMPER POSITION SENSOR CIRCUIT
(See page [DI-1102](#))
6. INSPECT AIR OUTLET SERVOMOTOR OPERATION
(See page [DI-1114](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-67](#)).



SENSOR REMOVAL

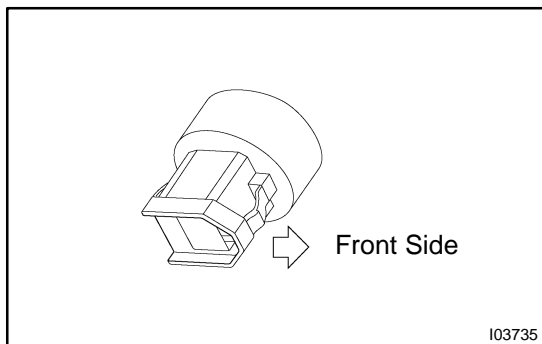
AC0XK-01

1. REMOVE SOLAR SENSOR

Using a screw driver, pull out the sensor and disconnect the connector.

HINT:

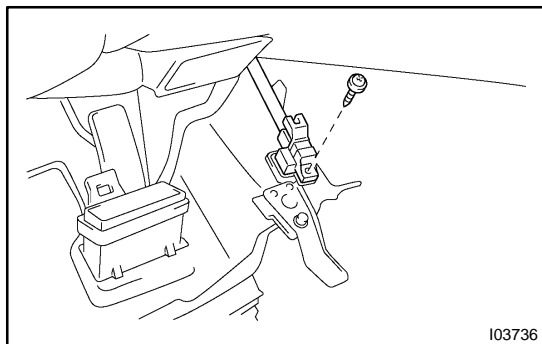
- Tape the screwdriver tip before use.
- At the time of installation, please refer to the following item.
Insert the sensor to instrument panel as shown in the illustration.



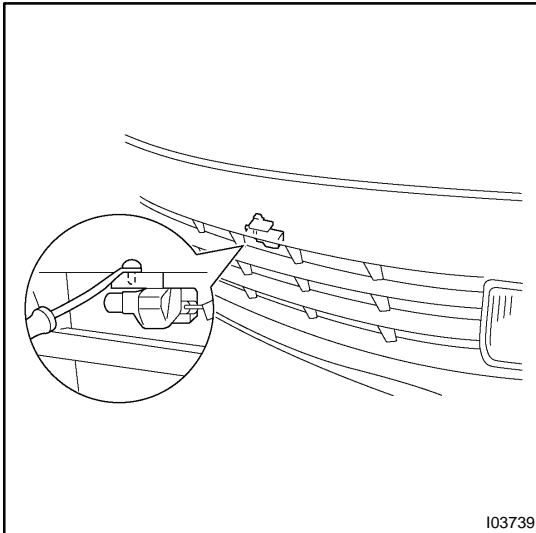
2. REMOVE ROOM TEMPERATURE SENSOR

(a) Remove the No. 1 under cover.

(See page [BO-91](#))



- (b) Remove the room temperature sensor.
- (1) Remove the No.1 safety pad set bolts and screws.
 - (2) Disconnect the connector and aspirator hose.
 - (3) Remove the screw and sensor.

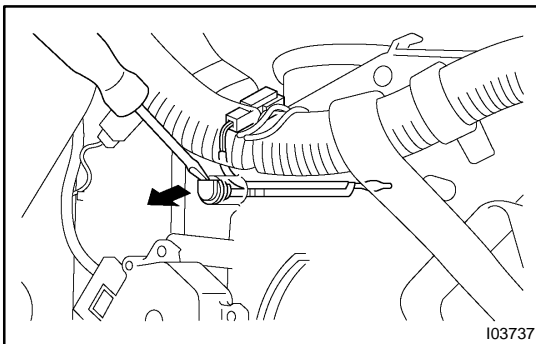


3. REMOVE AMBIENT TEMPERATURE SENSOR

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

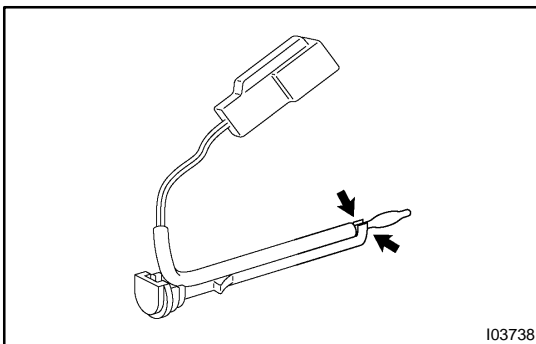
4. REMOVE EVAPORATOR TEMPERATURE SENSOR

- (a) Remove these parts:
 - (1) No.1 under cover
 - (2) No.1 safety pad
(See page [BO-91](#))
- (b) Remove the evaporator temperature sensor.
 - (1) Using a screwdriver, pull out the sensor with bracket plate.

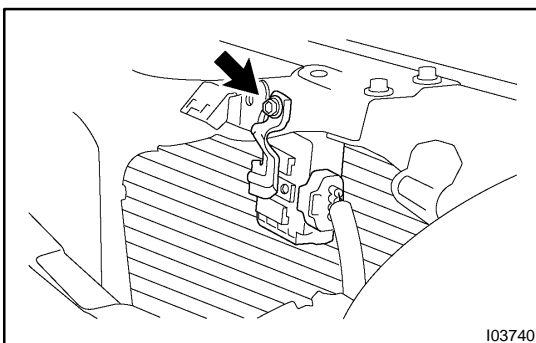


HINT:

Tape the screwdriver tip before use.



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



5. REMOVE SMOG VENTILATION SENSOR

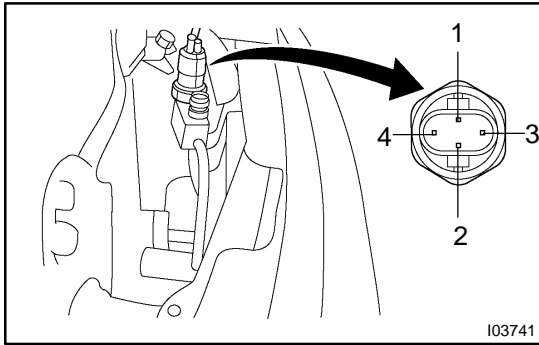
- (a) Disconnect the connector.
- (b) Remove the bolt and sensor.

INSPECTION

1. INSPECT SOLAR SENSOR CIRCUIT
Driver Side: (See page [DI-1093](#))
Passnger Side: (See page [DI-1084](#))
2. INSPECT ROOM TEMPERATURE SENSOR CIRCUIT
(See page [DI-1071](#))
3. INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT
(See page [DI-1074](#))
4. INSPECT EVAPORATOR TEMPERATURE SENSOR
(See page [DI-1078](#))
5. INSPECT SMOG VENTILATION SENSOR CIRCUIT
(See page [DI-1093](#))

INSTALLATION

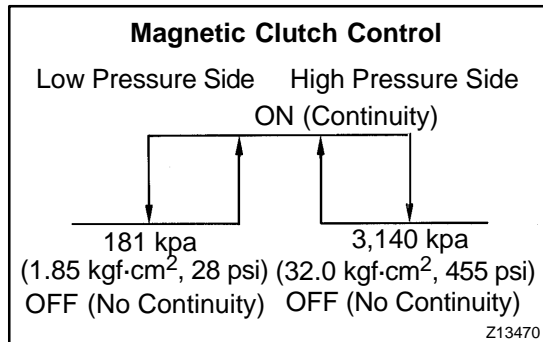
Installation is in the reverse order of removal (See page [AC-72](#)).



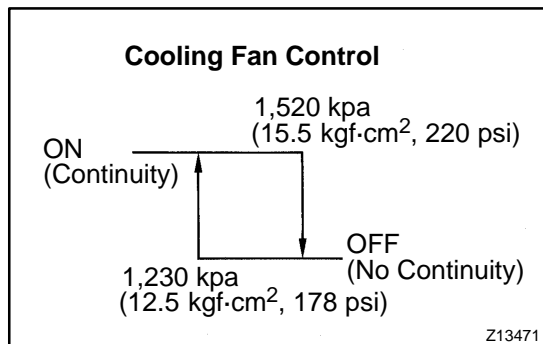
PRESSURE SWITCH ON-VEHICLE INSPECTION

AC0XN-01

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



4. **Magnetic Clutch Control:**
INSPECT PRESSURE SWITCH OPERATION
 - (a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 1.
 - (b) Check continuity between terminals when refrigerant pressure is changed, as shown in the illustration.
- If operation is not as specified, replace the pressure switch.



5. **Cooling Fan Control:**
INSPECT PRESSURE SWITCH OPERATION
 - (a) Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 3.
 - (b) Check continuity between terminals when refrigerant pressure is changed, as shown in the illustration.
- If operation is not as specified, replace the pressure switch.
6. **STOP ENGINE AND SET OFF MANIFOLD GAUGE SET**
 7. **CONNECT CONNECTOR TO PRESSURE SWITCH**

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

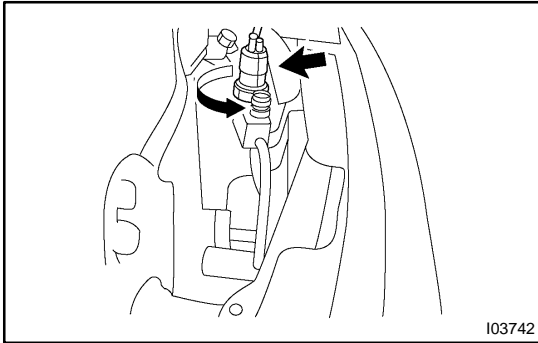
HINT:

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

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

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



2. REMOVE PRESSURE SWITCH FROM LIQUID TUBE

Disconnect the connector and remove the pressure switch.

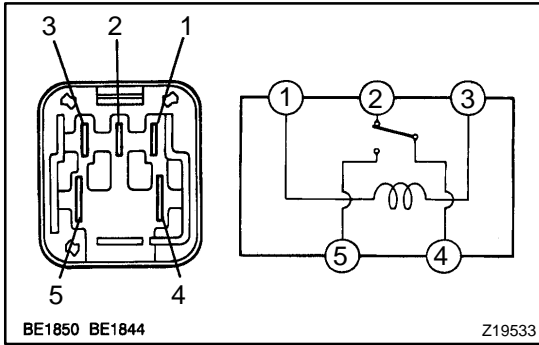
Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)

HINT:

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

INSTALLATION

Installtion is in the reverse order of removal (See page [AC-77](#)).



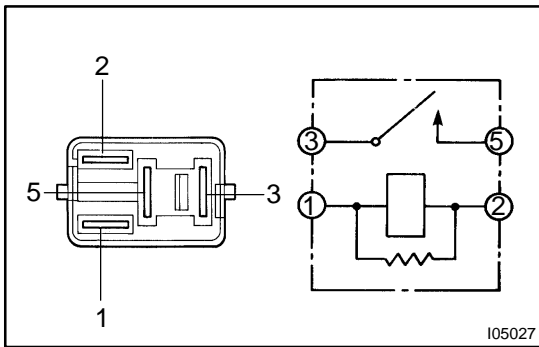
RELAY INSPECTION

AC0XQ-01

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

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

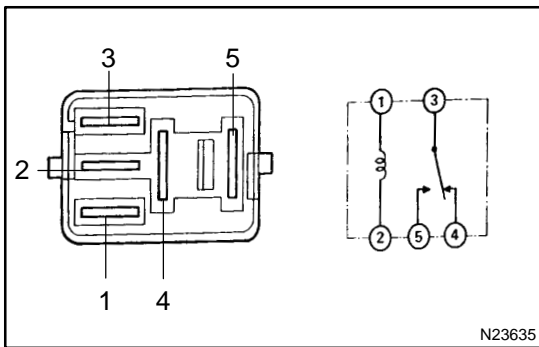
If continuity is not as specified, replace the relay.



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

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

If continuity is not as specified, replace the relay.



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

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

If continuity is not as specified, replace the relay.

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

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

CONDENSER FAN ON-VEHICLE INSPECTION

AC0Y2-01

1. INSPECT CONDENSER FAN OPERATION

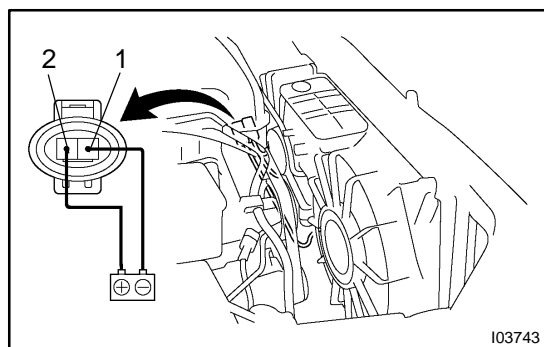
Inspect the fan operation, as shown in the chart below.

Test conditions:

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

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

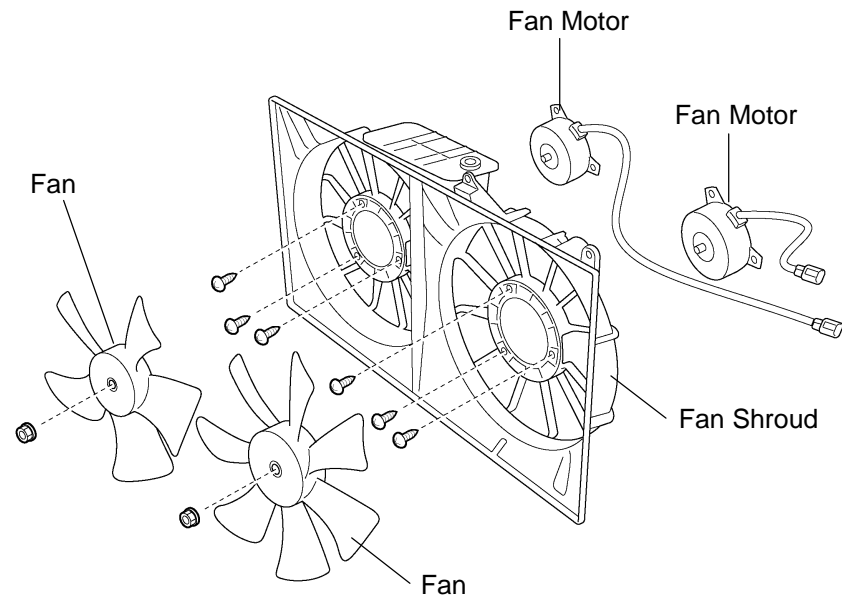
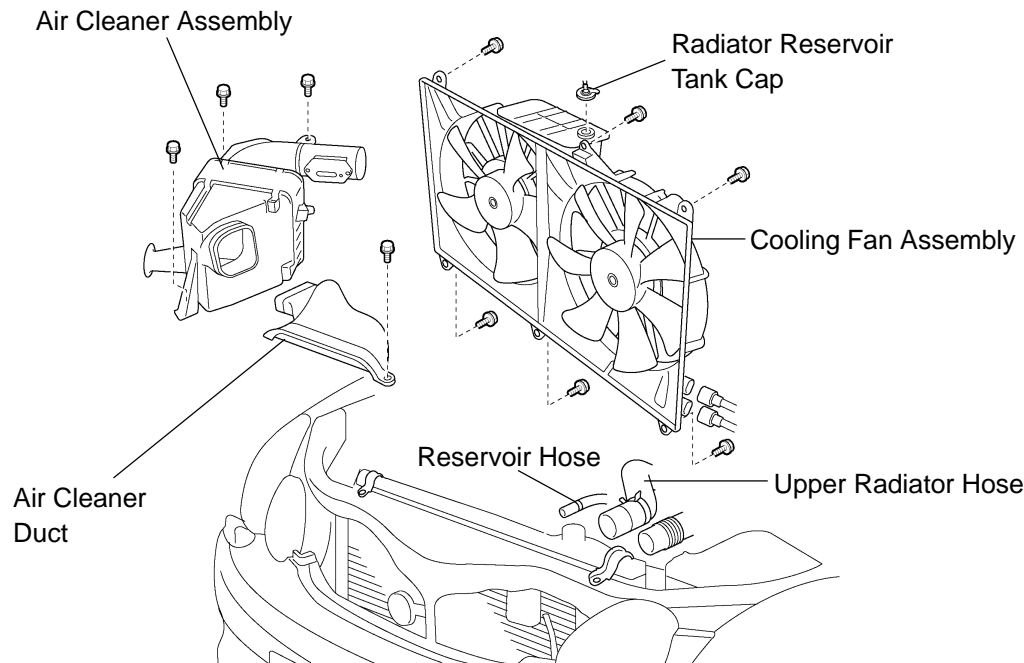
If operation is not as specified, proceed to the next inspection.



2. INSPECT CONDENSER FAN MOTOR OPERATION

- (a) Disconnect the fan connector.
- (b) Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1 then check that motor operations smoothly.
 - If operation is not as specified, replace the fan motor.
 - If operation is as specified, check the pressure switch, cooling fan relays and engine coolant temp. switch.

COMPONENTS



REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.

2. REMOVE THESE PARTS:

- (a) Air cleaner duct
- (b) Air cleaner assembly
- (c) Radiator reservoir tank cap

3. DISCONNECT THESE PARTS:

- (a) Upper radiator hose
- (b) Reservoir hose

4. REMOVE COOLING FAN

- (a) Disconnect the connectors.
- (b) Remove the 6 bolts cooling fan.

DISASSEMBLY

1. REMOVE COOLING FANS

Remove the 2 nuts and both fans.

2. REMOVE COOLING FAN MOTORS

- (a) Disconnect wire harness clamps.
- (b) Remove the 6 screws and both motors.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [AC-83](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [AC-82](#)).

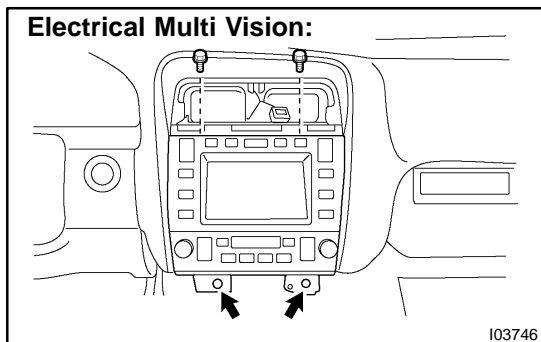
AIR CONDITIONING CONTROL ASSEMBLY REMOVAL

AC0XR-01

1. REMOVE THESE PARTS:

- (a) No.2 register
- (b) Cluster finish panel
(See page [BO-91](#))

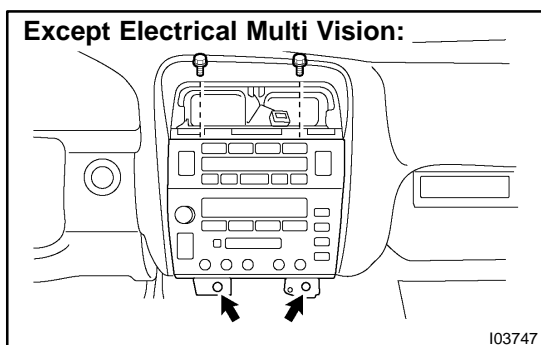
Electrical Multi Vision:



2. REMOVE A/C CONTROL ASSEMBLY WITH RADIO

Remove the 4 bolts and pull out the A/C control assembly, then disconnect the connectors.

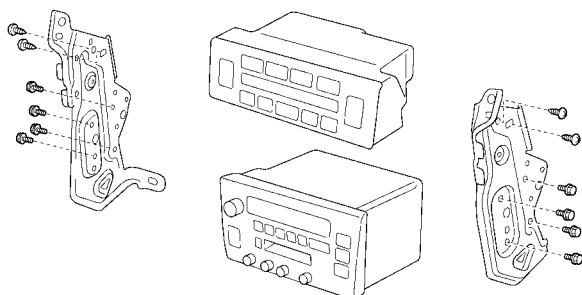
Except Electrical Multi Vision:



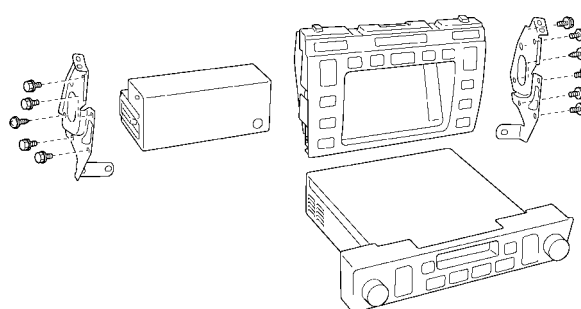
3. REMOVE A/C CONTROL ASSEMBLY FROM RADIO

Remove the 8 bolts, 2 screw and 2 brackets, then remove the A/C control assembly.

Except Electrical Multi Vision:



Electrical Multi Vision:



I04720

INSPECTION

INSPECT A/C CONTROL ASSEMBLY CIRCUIT

(See page [DI-1067](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-86](#)).

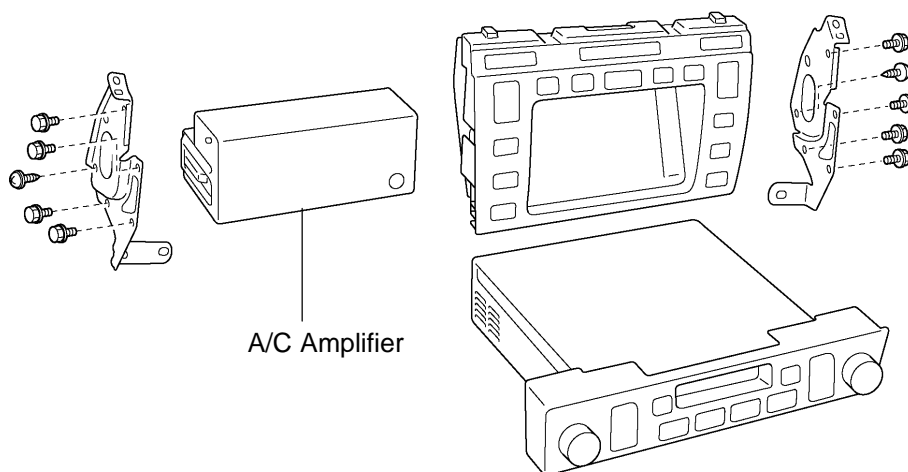
AIR CONDITIONING AMPLIFIER (Electrical Multi Vision) REMOVAL

AC0XU-01

1. REMOVE A/C CONTROL ASSEMBLY
(See page [AC-86](#))

2. REMOVE A/C AMPLIFIER

Remove the 8 bolts, 2 screws and 2 bracket, then remove the amplifier.



I02319

INSPECTION

INSPECT A/C AMPLIFIER CIRCUIT

(See page [DI-1067](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-89](#)).

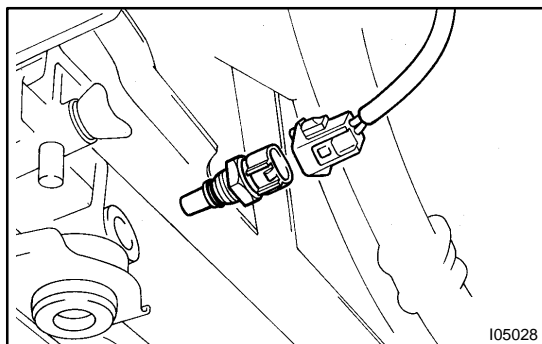
ENGINE COOLANT TEMPERATURE (ECT) SWITCH REMOVAL

AC0XX-01

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant



3. REMOVE ECT SWITCH

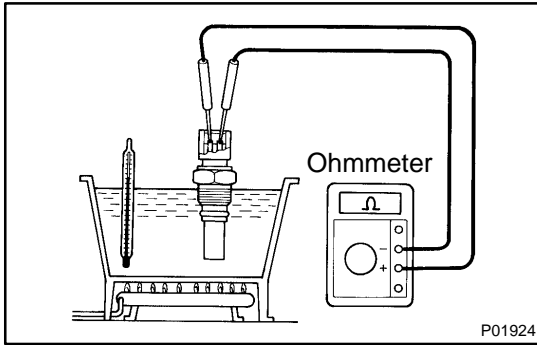
- (a) Disconnect the connector.
- (b) Remove the ECT switch.

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

- (c) Remove the O-ring from ECT switch.

HINT:

At the time of installation, please refer to the following item.
Lubricate a new O-ring with soapy water and install the switch.



INSPECTION

INSPECT ECT SWITCH

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

If continuity exists, replace the switch.

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

If there no continuity exists, replace the switch.

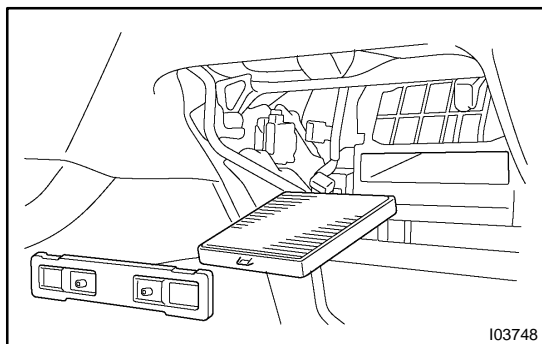
INSTALLATION

Installation is in the reverse order of removal (See page [AC-92](#)).

AIR REFINER FILTER REMOVAL

AC0Y0-01

1. REMOVE GLOVE COMPARTMENT DOOR
(See page [BO-91](#))



2. REMOVE AIR REFINER FILTER
 - (a) Remove the cover.
 - (b) Pull out the air refiner filter.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-95](#)).

AUTOMATIC TRANSMISSION SYSTEM

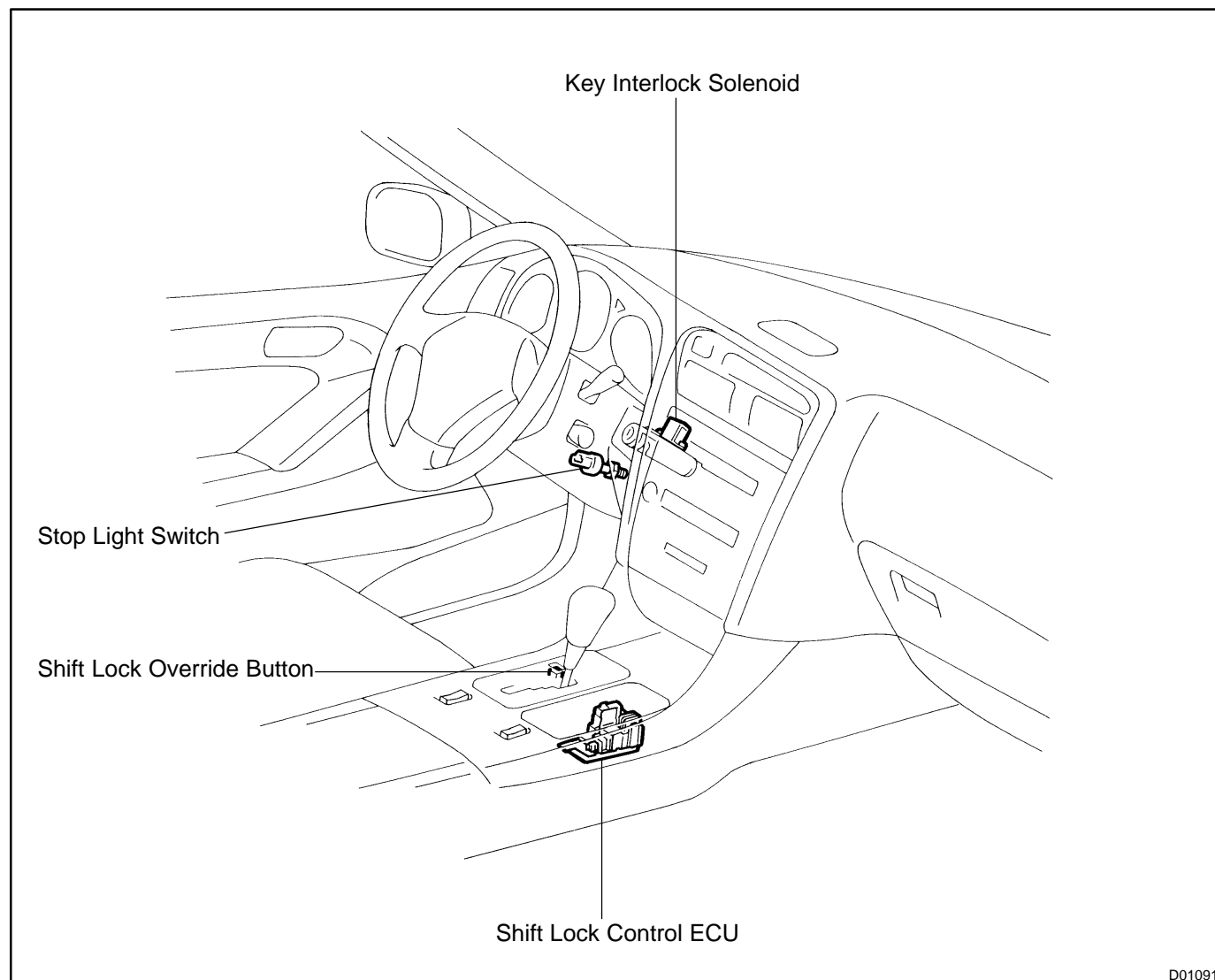
AT05V-01

PRECAUTION

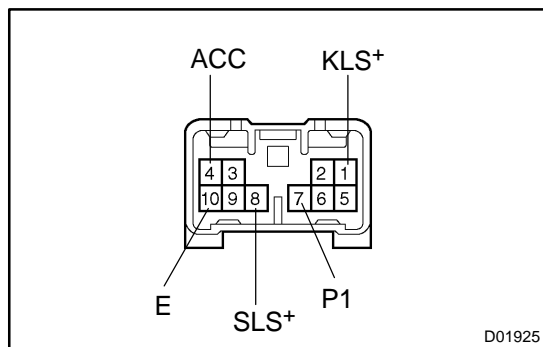
If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

SHIFT LOCK SYSTEM LOCATION

AT060-01



D01091



INSPECTION

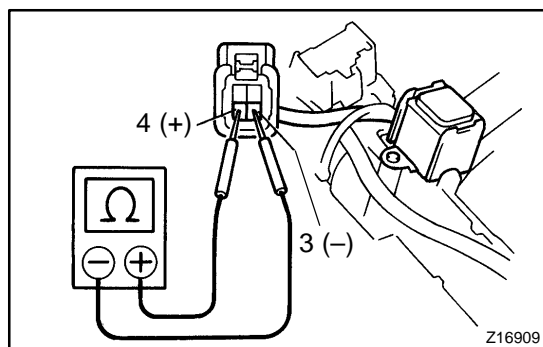
1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the ECU connector.

Terminal	Measuring Condition	Specified Condition
1 – 10 (KLS ₂ – E)	(1) IG SW ACC and shift lever P position	0 V
	(2) IG SW ACC and shift lever except P position	7.5 – 11V (about 1 second) after 6 – 9 V
4 – 10 (ACC – E)	(1) IG SW ON	10 – 14 V
	(2) IG SW ACC	10 – 14 V
7 – 10 (P1 – E)	(1) Shift lever P position	0 V
	(2) Shift lever except P position	10 – 14 V
8 – 10 (SLS ₂ – E)	(1) IG SW ON and shift lever P position	0 V
	(2) IG SW ON and depress brake pedal or shift lever N position	3 – 6 V
	(3) IG SW ON and release brake pedal or shift lever except P position	0 V
	(4) IG SW ACC and shift lever except P position	3 – 6 V
10 – Ground (E – Ground)	Constant	Continuity

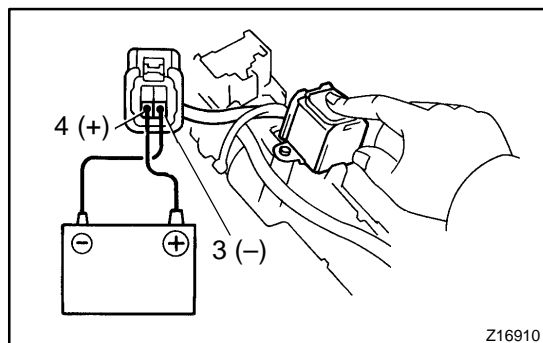


2. INSPECT KEY INTERLOCK SOLENOID

- Disconnect the solenoid connector.
- Using an ohmmeter, measure the resistance between terminals 3 and 4.

Standard resistance: 12 – 17 Ω

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

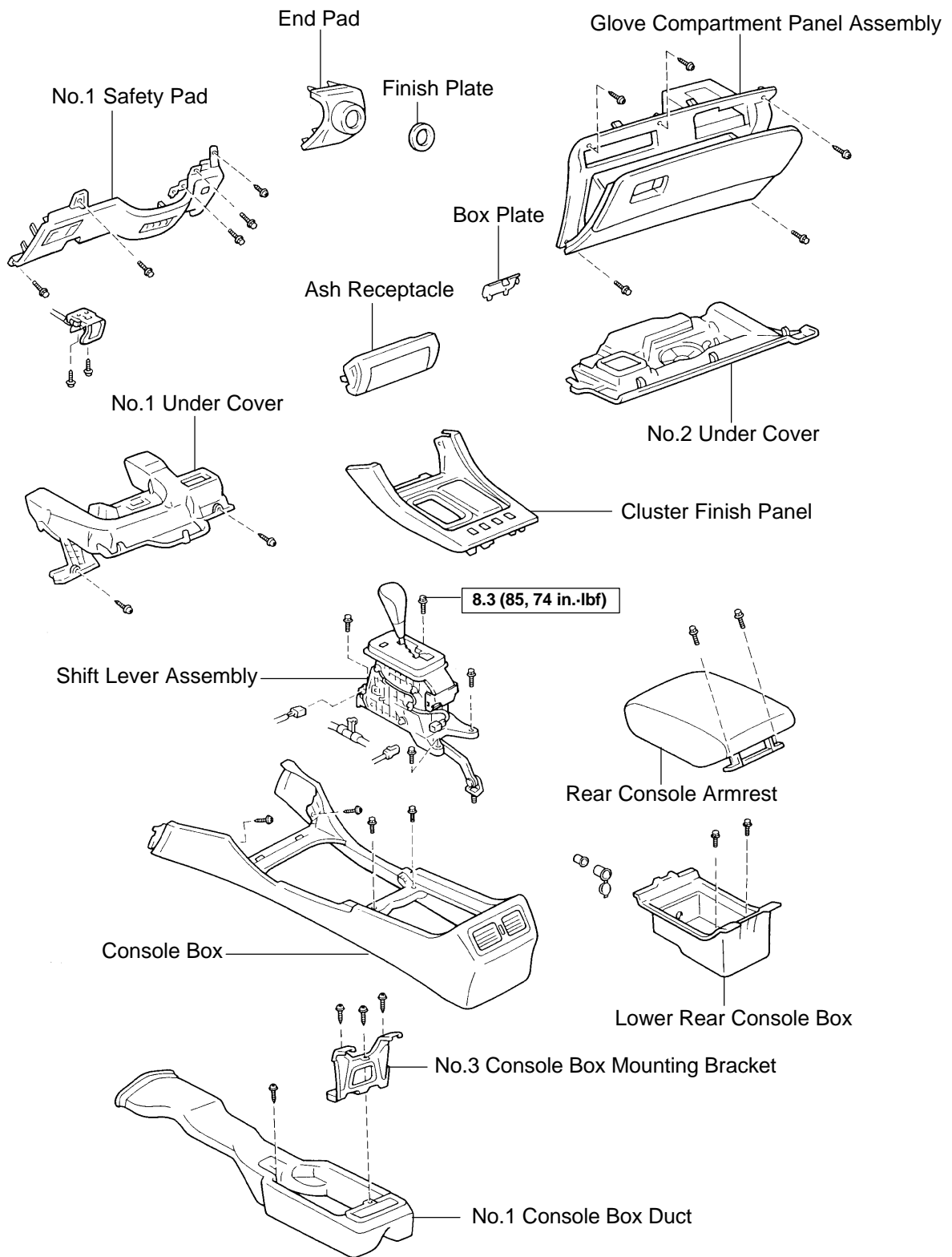


- Touch the solenoid with your finger and check that the solenoid operation can be felt when battery voltage is applied intermittently to terminals 3 and 4.

If the operation is not as specified, replace the solenoid.

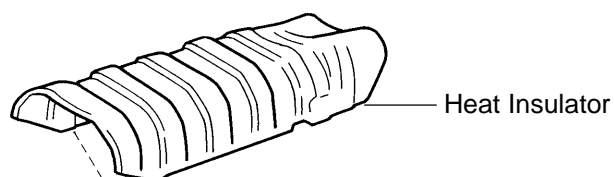
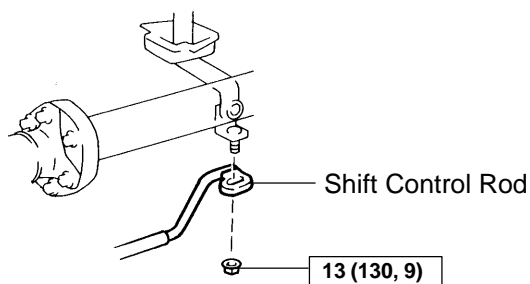
FLOOR SHIFT ASSEMBLY COMPONENTS

AT062-01



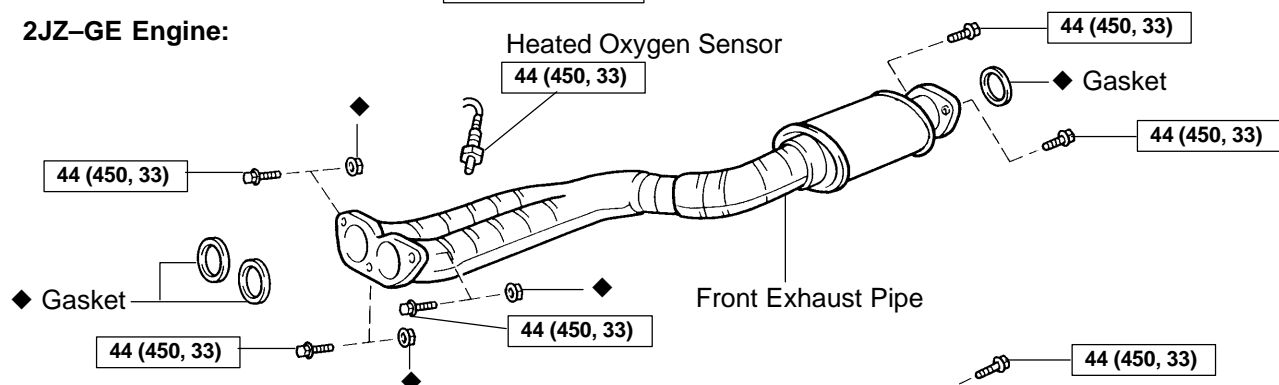
N·m (kgf·cm, ft·lbf) : Specified torque

D01037

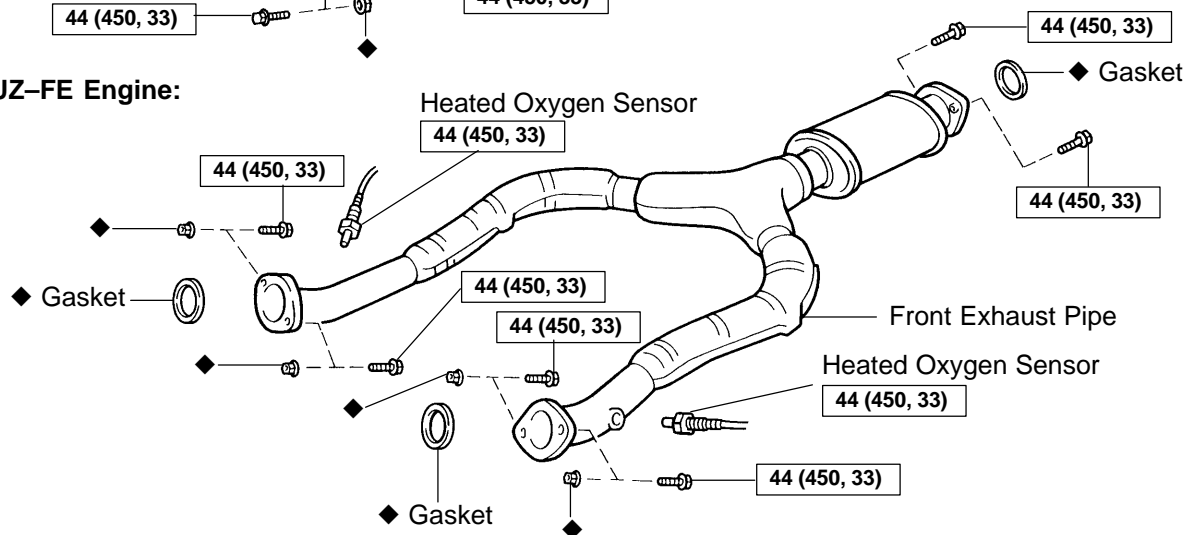


5.4 (55, 48 in.-lbf) x6

2JZ-GE Engine:



1UZ-FE Engine:



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

◆ Non-reusable part

D01038



REMOVAL

1. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

2. REMOVE FRONT EXHAUST PIPE

1UZ-FE Engine: (See page EM-120)

2JZ-GE Engine: (See page EM-97)

3. REMOVE HEAT INSULATOR

Remove the 6 bolts and heat insulator.

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

4. DISCONNECT SHIFT CONTROL ROD

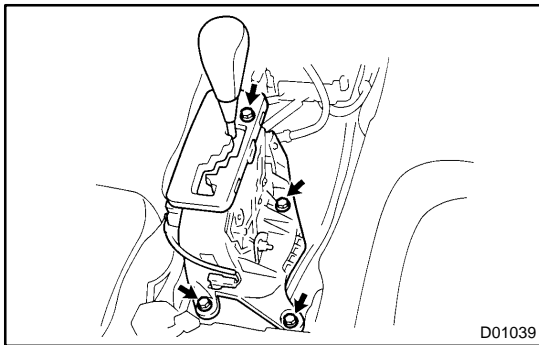
(See page AT-28)

5. LOWER VEHICLE

6. REMOVE THESE PARTS:

(See page BO-88)

- Grove compartment panel assembly
- Box plate
- No.2 under cover
- No.1 safety pad
- No.1 under cover
- Cluster finish panel
- Lower rear console box
- Console box and rear console armrest
- No.3 console box mounting bracket
- Ash receptacle
- No.1 console box duct
- Finish plate
- End pad



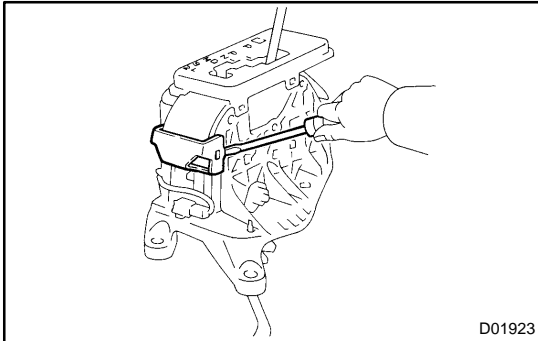
7. REMOVE SHIFT LEVER ASSEMBLY

- (a) Disconnect the connectors and wire harness from the shift lever assembly.
- (b) Remove the 4 bolts and shift lever assembly.

Torque: 8.3 N·m (85 kgf·cm, 74 in.-lbf)

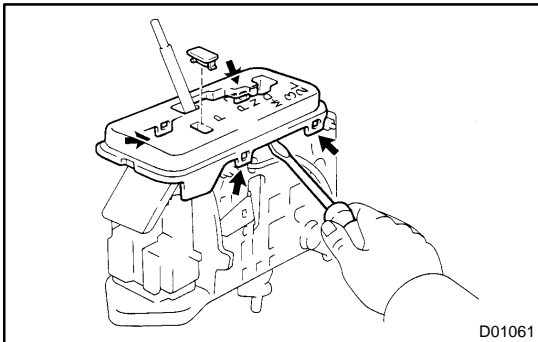
DISASSEMBLY

1. REMOVE SHIFT LEVER KNOB AND SHIFT LEVER KNOB COVER



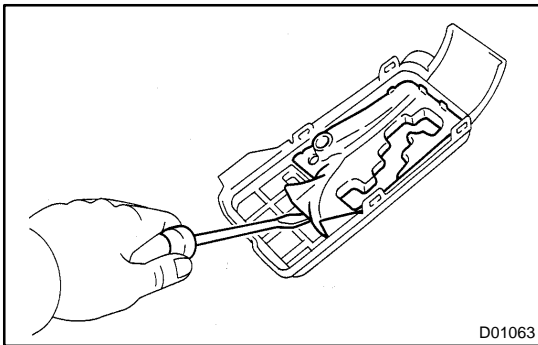
2. REMOVE WIRE PROTECTOR

Using a screwdriver, remove the wire protector.



3. REMOVE POSITION INDICATOR HOUSING

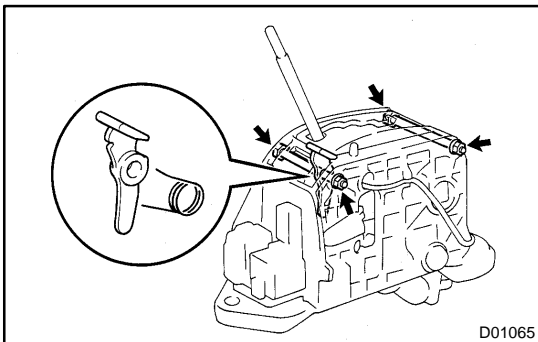
- (a) Using a screwdriver, remove the position indicator housing.
- (b) Using a screwdriver, remove the shift lever cap from the position indicator housing.



4. REMOVE POSITION INDICATOR LENS

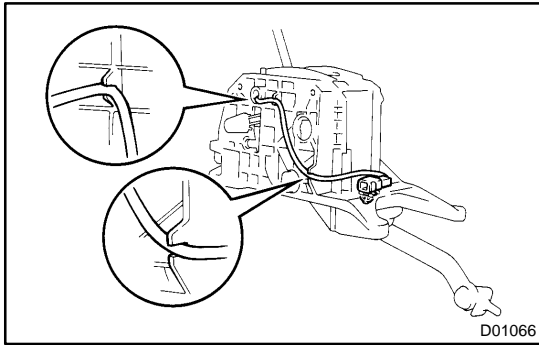
Using a screwdriver, remove the position indicator lens from the position indicator housing.

5. REMOVE SLIDE COVER



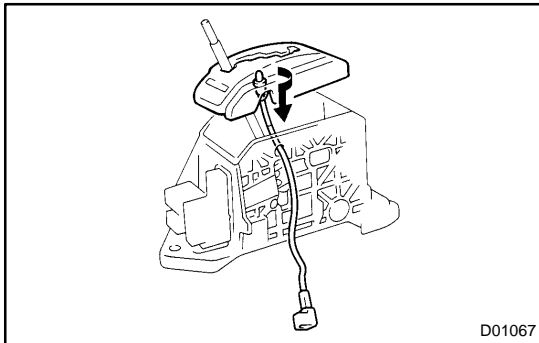
6. REMOVE SHIFT LOCK RELEASE LINK AND SPRING

- (a) Remove the 2 shift lever housing set bolts and nuts with the shift lock release link and spring.
- (b) Using a screwdriver, separate the shift lock release spring from the shift lock release link.

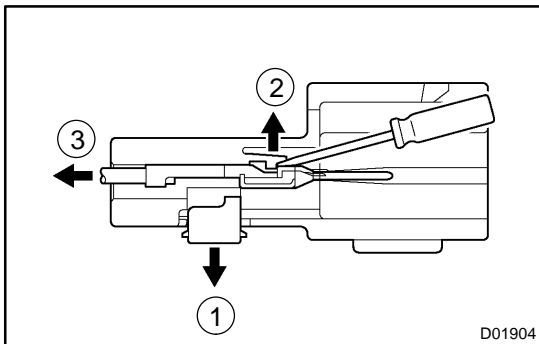


7. REMOVE SHIFT LEVER GUIDE HOUSING AND INDICATOR LAMP SUB-ASSEMBLY

- (a) Disconnect the indicator lamp wire and connector from the shift lever plate.

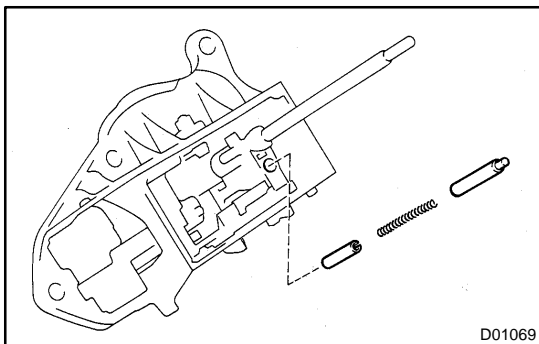


- (b) Remove the shift lever guide housing with the indicator lamp sub-assembly from the shift lever plate.
- (c) Remove the indicator lamp sub-assembly from the shift lever guide housing.

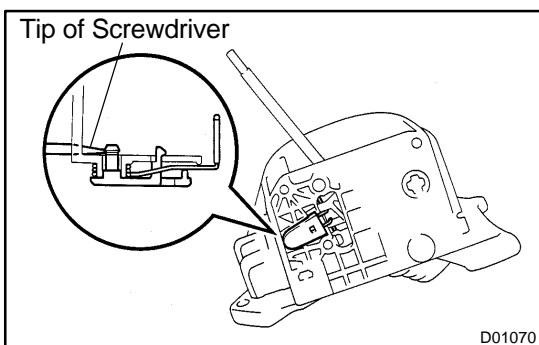


8. DISASSEMBLE INDICATOR LAMP SUB-ASSEMBLY

- (a) Remove the bulb from the indicator lamp wire sub-assembly.
- (b) Using a small screwdriver, remove the terminals of the indicator lamp wire sub-assembly from the connector, as shown in the illustration.

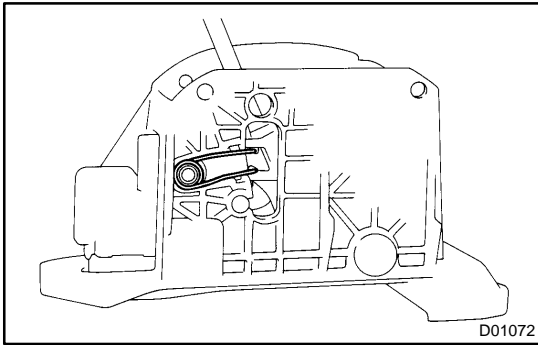


9. REMOVE SHIFT LEVER DETENT PIN, SHIFT LEVER SPRING DAMPER AND COMPRESSION SPRING FROM SHIFT LEVER SUB-ASSEMBLY

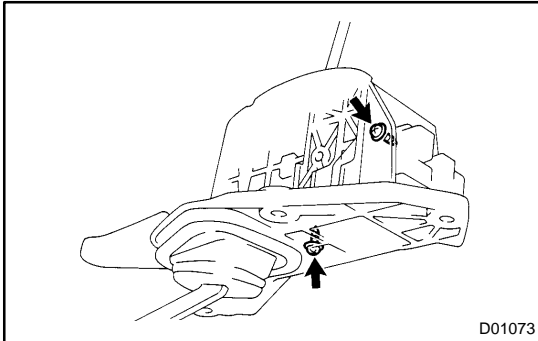


10. REMOVE SPRING HOLDER AND SHIFT LEVER TORSION SPRING

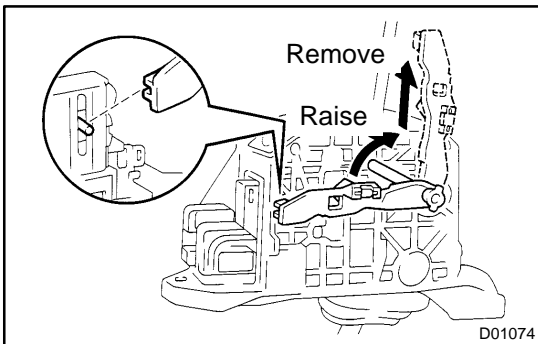
- (a) Using a screwdriver, remove the spring holder.



- (b) Remove the shift lever torsion spring.

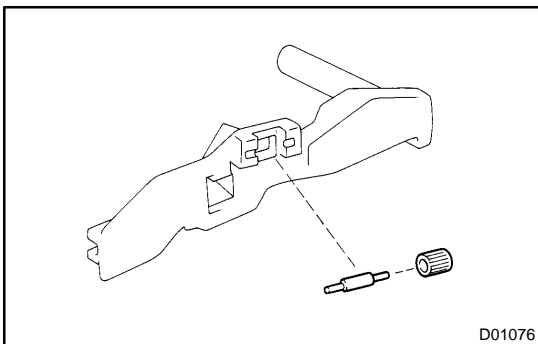


11. REMOVE 2 SHIFT LOCK CONTROL UNIT ASSEMBLY SET SCREWS

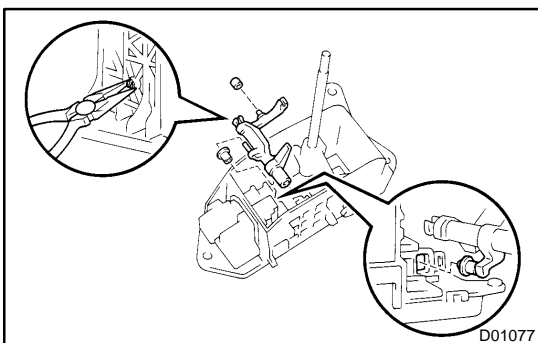


12. REMOVE NO.1 SHIFT LOCK SWITCH PLATE

- (a) Disconnect the groove of the No.1 shift lock switch plate from the projection of the shift lock control unit.
 (b) Raise the plate up to the direction shown in the illustration.
 (c) Remove the plate.

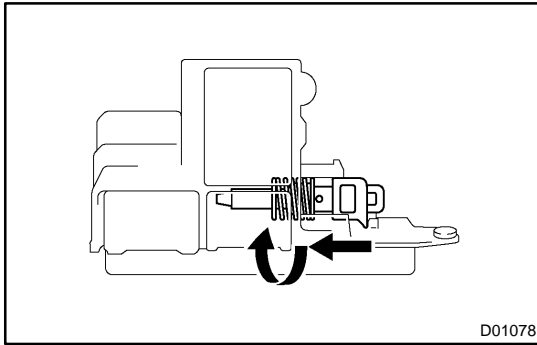


- (d) Remove the roller and shift lever anti-rattle cushion from the plate.
 (e) Separate the shift lever anti-rattle cushion from the roller.

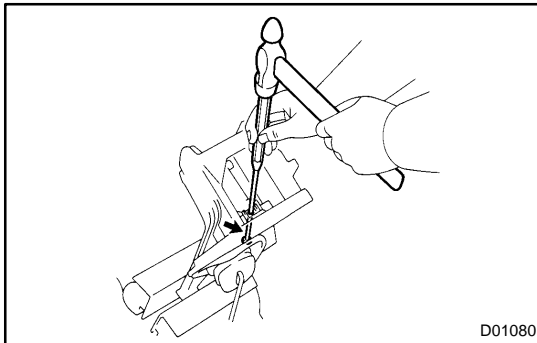


13. REMOVE SHIFT LOCK PLATE STOPPER

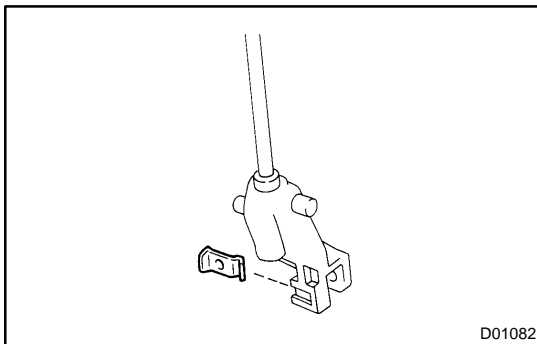
- (a) Using pliers, remove the stopper.
 (b) Remove the shift lever anti-rattle cushion and shift lock plate stopper cap from the stopper.

**14. REMOVE SHIFT LOCK CONTROL UNIT ASSEMBLY**

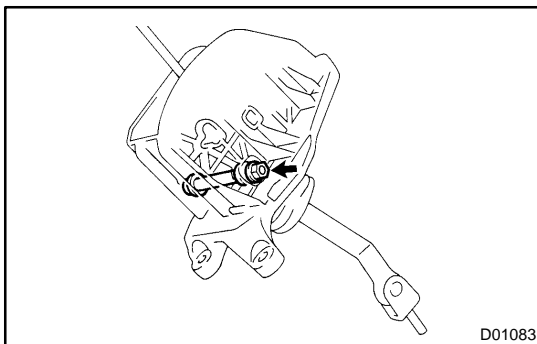
- (a) Remove the shift lock control unit assembly from the shift lever plate.
- (b) Push the shift lock solenoid link lightly, turn and remove it.
- (c) Remove the compression spring.
- (d) Remove the slotted spring pin and separate the shift lock solenoid link.

**15. REMOVE SHIFT LEVER SUB-ASSEMBLY**

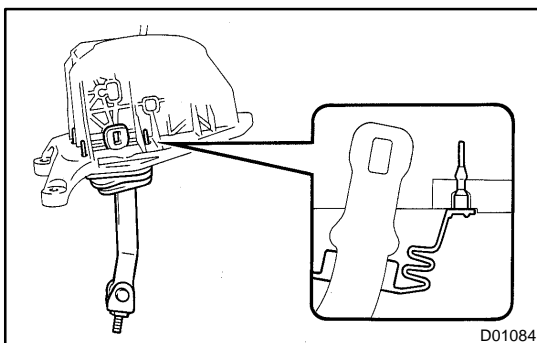
- (a) Using a pin punch and hammer, drive out the pin.
- (b) Remove the shift lever sub-assembly.



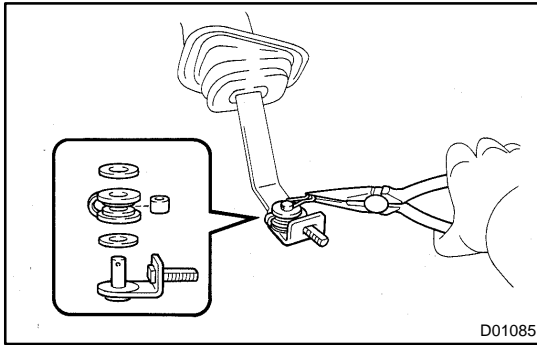
- (c) Remove the shift lever nut from the shift lever sub-assembly.

**16. REMOVE CONTROL LEVER, SPACER AND CONTROL SHAFT**

- (a) Remove the nut.
- (b) Remove the 2 spacers and control shaft from the shift lever plate.



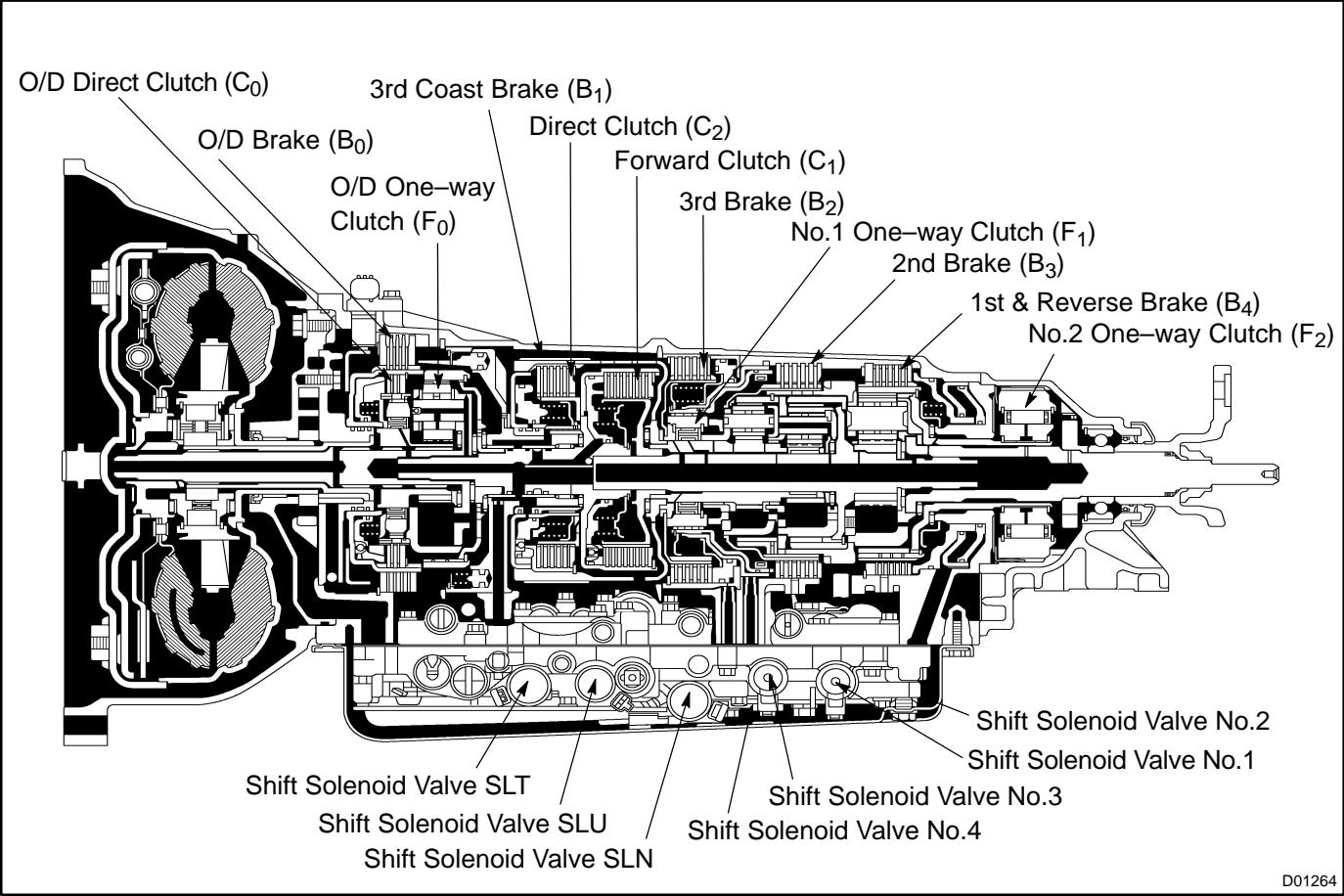
- (c) Disconnect the shift lever boot from shift lever plate.
- (d) Remove the control lever.



17. REMOVE CLIP, CONNECTING ROD SWIVEL, LOWER CONTROL SHAFT BUSHING, LOWER CONTROL SHAFT PIECE, PLATE WASHER AND SHIFT LEVER BOOT FROM CONTROL LEVER

- (a) Using pliers, remove the clip.
- (b) Remove the connecting rod swivel, lower control shaft bushing, lower control shaft piece, 2 plate washers and shift lever boot from the control lever.

OPERATION



D01264

Shift Lever Position	Gear Position	S1	S2	S3	S4	C ₀	C ₁	C ₂	B ₀	B ₁	B ₂	B ₃	B ₄	F ₀	F ₁	F ₂
P	Park	ON	OFF	ON	OFF	○										
R	Reverse	ON	OFF	OFF	OFF			○	○				○			
N	Neutral	ON	OFF	ON	OFF	○										
D	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
	5th	OFF	OFF	OFF	ON		○	○	○		○					
4	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
3	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	ON	OFF	○	○			○	○			○	○	
2	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
L	1st	ON	OFF	OFF	OFF	○	○						○	○		○

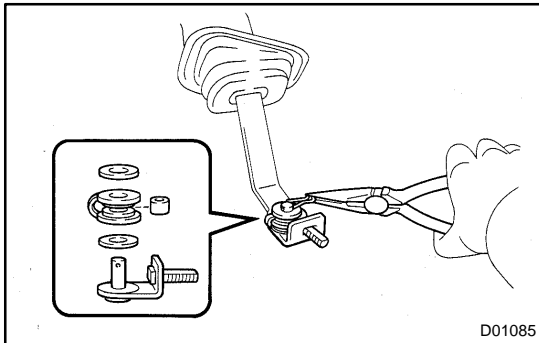
○ : Operating

REASSEMBLY

HINT:

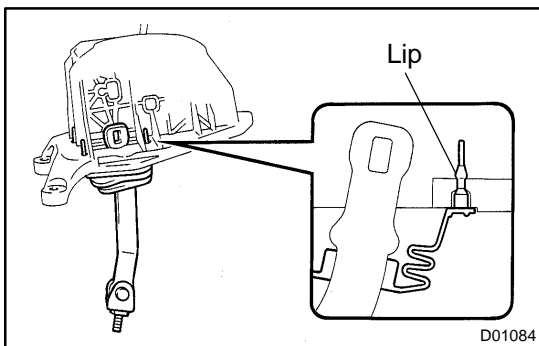
Before reassembly, apply MP grease to the parts indicated by arrows.

(See page [AT-13](#))



1. INSTALL CLIP, CONNECTING ROD SWIVEL, LOWER CONTROL SHAFT BUSHING, LOWER CONTROL SHAFT PIECE, PLATE WASHER AND SHIFT LEVER BOOT TO CONTROL LEVER

- (a) Install the shift lever boot, 2 plate washers, lower control shaft piece, lower control shaft bushing and connecting rod swivel to the control lever.
- (b) Using pliers, install the clip.

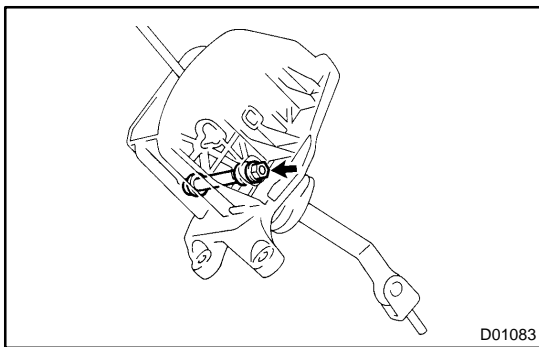


2. INSTALL CONTROL LEVER, SPACER AND CONTROL SHAFT

- (a) Connect the shift lever boot to the shift lever plate.

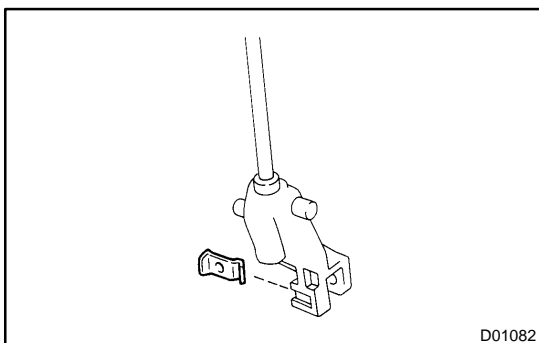
HINT:

Pull out the 3 lips of the shift lever boot securely, as shown in the illustration.



- (b) Install the control shaft and 2 spacers.
- (c) Install and torque the nut.

Torque: 13 N·m (128 kgf-cm, 9 ft-lbf)

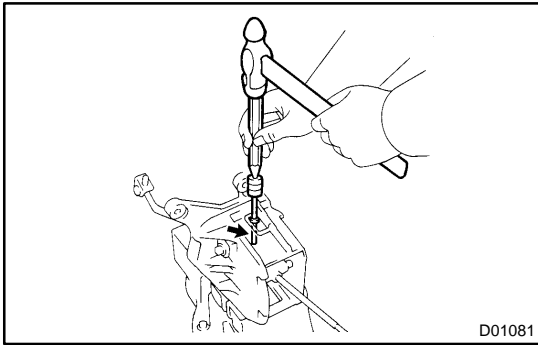


3. INSTALL SHIFT LEVER SUB-ASSEMBLY

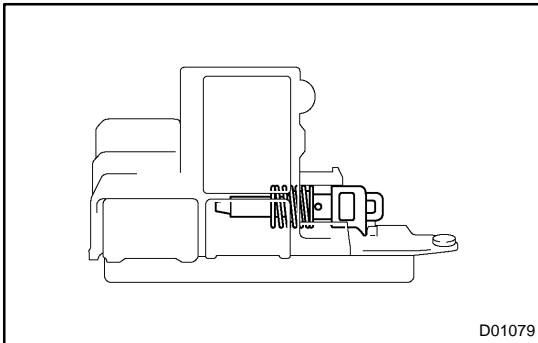
- (a) Install a new shift lever nut to the shift lever sub-assembly.

HINT:

Insert the shift lever nut securely until it fits and check there is no looseness.



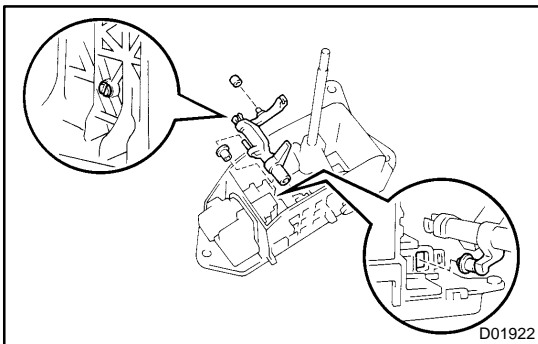
- (b) Install the shift lever sub-assembly.
- (c) Using a pin punch and hammer, drive in the pin.



- 4. INSTALL SHIFT LOCK CONTROL UNIT ASSEMBLY**
 - (a) Connect the shift lock solenoid link and install a new slotted spring pin.
 - (b) Install the compression spring to the shift lock solenoid link.
 - (c) Push and install the shift lock solenoid link with the compression spring to the shift lock control unit assembly.
 - (d) Install the shift lock control unit assembly.

HINT:

Do not torque the shift lock control unit assembly set screws.

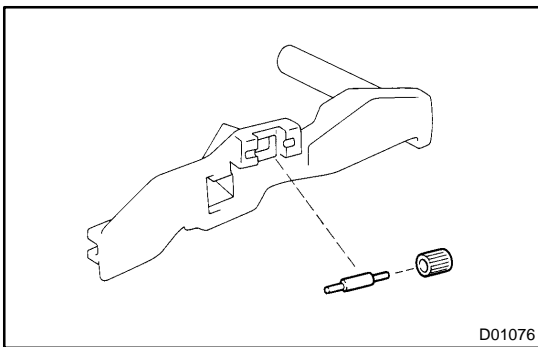


- 5. INSTALL SHIFT LOCK PLATE STOPPER**

- (a) Install the shift lever anti-rattle cushion and shift lock plate stopper cap to the stopper.
- (b) Install the stopper to the shift lever plate.

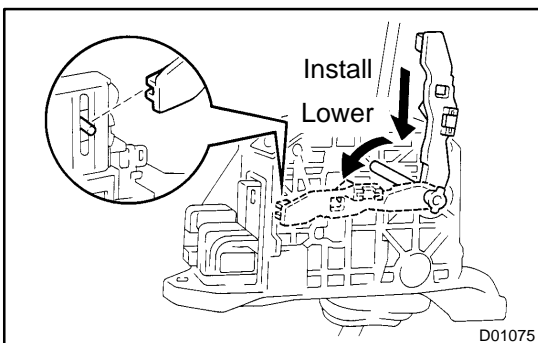
HINT:

- Check that the claw of the shift lock plate stopper firmly fits in and slides smoothly.
- Insert and connect the projection of the shift lock plate stopper into the square hole of the shift lock control unit assembly.



- 6. INSTALL NO.1 SHIFT LOCK SWITCH PLATE**

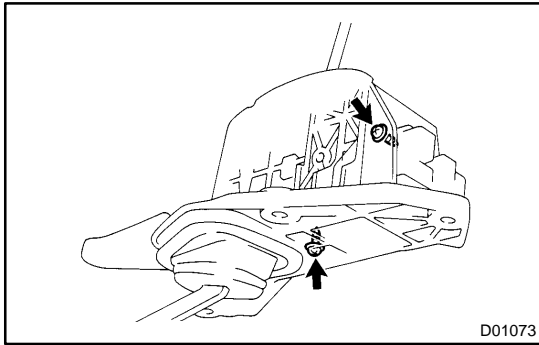
- (a) Install the shift lever anti-rattle cushion to the roller.
- (b) Install the roller and shift lever anti-rattle cushion to the plate.



- (c) Install the No.1 shift lock switch plate in the direction shown in the illustration and lower to the direction shown by an arrow.

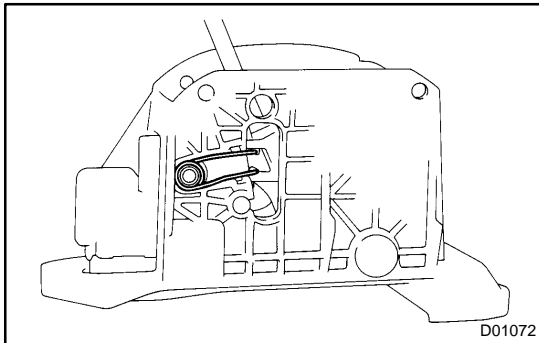
HINT:

Connect the groove of the No.1 shift lock switch plate to the projection of the shift lock control unit assembly.



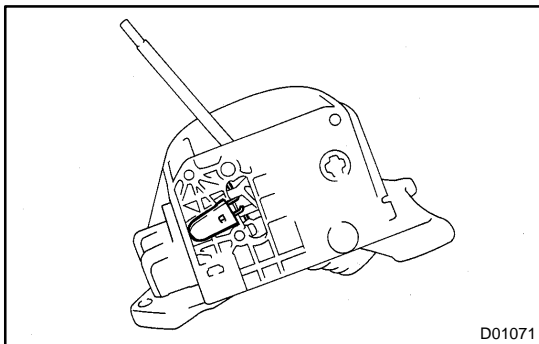
7. INSTALL AND TORQUE 2 SHIFT LOCK CONTROL UNIT ASSEMBLY SET SCREWS

Torque: 2.0 N·m (20 kgf·cm, 17 in.-lbf)

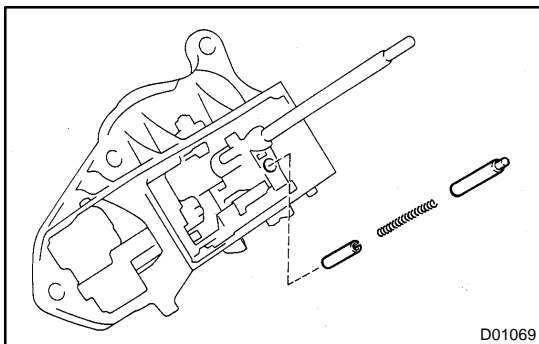


8. INSTALL SPRING HOLDER AND SHIFT LEVER TORSION SPRING

(a) Install the shift lever torsion spring.



(b) Install the spring holder.

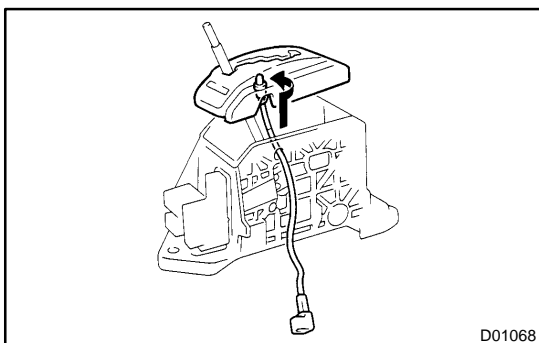


9. INSTALL SHIFT LEVER DETENT PIN, SHIFT LEVER SPRING DAMPER AND COMPRESSION SPRING TO SHIFT LEVER SUB-ASSEMBLY

10. ASSEMBLE INDICATOR LAMP SUB-ASSEMBLY

(a) Install the terminals of the indicator lamp wire sub-assembly to the connector.

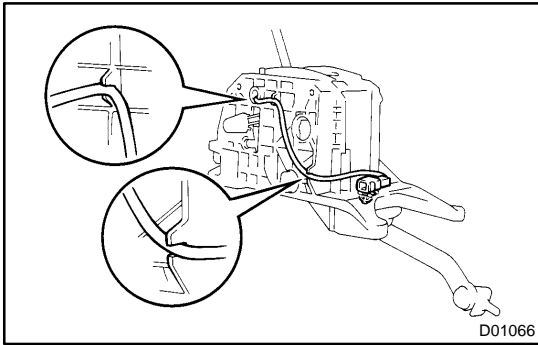
(b) Install the bulb to the indicator lamp wire sub-assembly.



11. INSTALL SHIFT LEVER GUIDE HOUSING AND INDICATOR LAMP SUB-ASSEMBLY

(a) Install the indicator lamp sub-assembly to the shift lever guide housing.

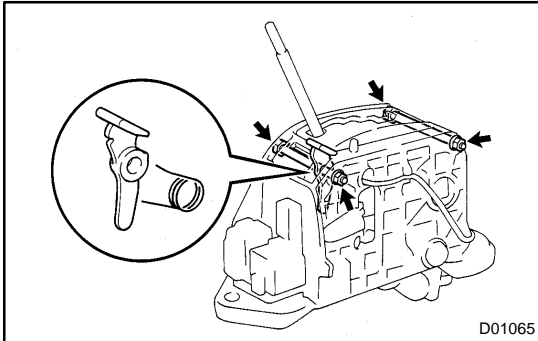
(b) Install the shift lever housing with the indicator lamp sub-assembly to the shift lever plate.



- (c) Connect the indicator lamp wire sub-assembly to the shift lever plate.

HINT:

Hook the indicator lamp wire sub-assembly securely on the retainer of the shift lock plate.

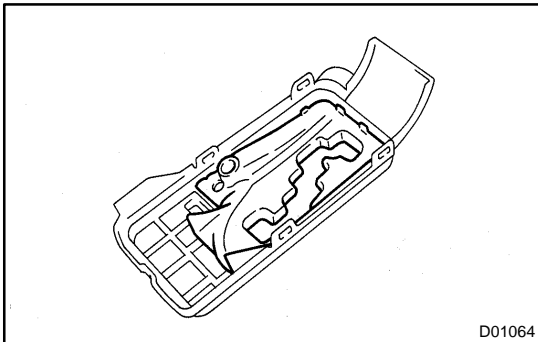


12. INSTALL SHIFT LOCK RELEASE LINK AND SPRING

- (a) Install the shift lock release spring to the shift lock release link.
(b) Install the 2 shift lever housing set bolts, nuts, shift lock release link and spring.
(c) Torque the 2 nuts.

Torque: 3.9 N·m (40 kgf·cm, 35 in.-lbf)

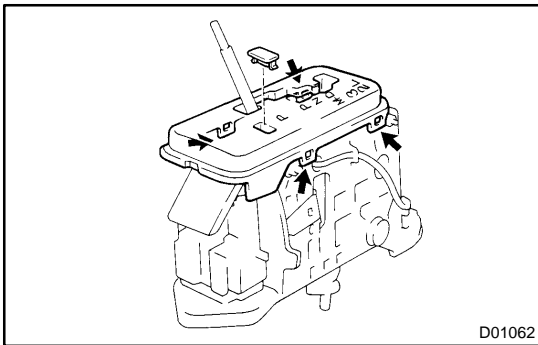
13. INSTALL SLIDE COVER



14. INSTALL POSITION INDICATOR LENS TO POSITION INDICATOR HOUSING

HINT:

Fit the 4 claws of the position indicator lens in the grooves of the position indicator housing securely.

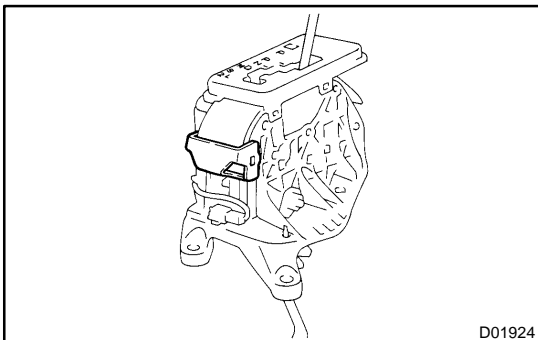


15. INSTALL POSITION INDICATOR HOUSING

- (a) Install the shift lever cap to the position indicator housing.
(b) Install the position indicator housing to the shift lever plate.

HINT:

Fit the 4 clips of the position indicator housing in the shift lever plate securely.



16. INSTALL WIRE PROTECTOR TO SHIFT LEVER PLATE

17. INSTALL SHIFT LEVER KNOB AND SHIFT LEVER KNOB COVER

INSTALLATION

Installation is in the reverse order of removal.

(See page [AT-16](#))

HINT:

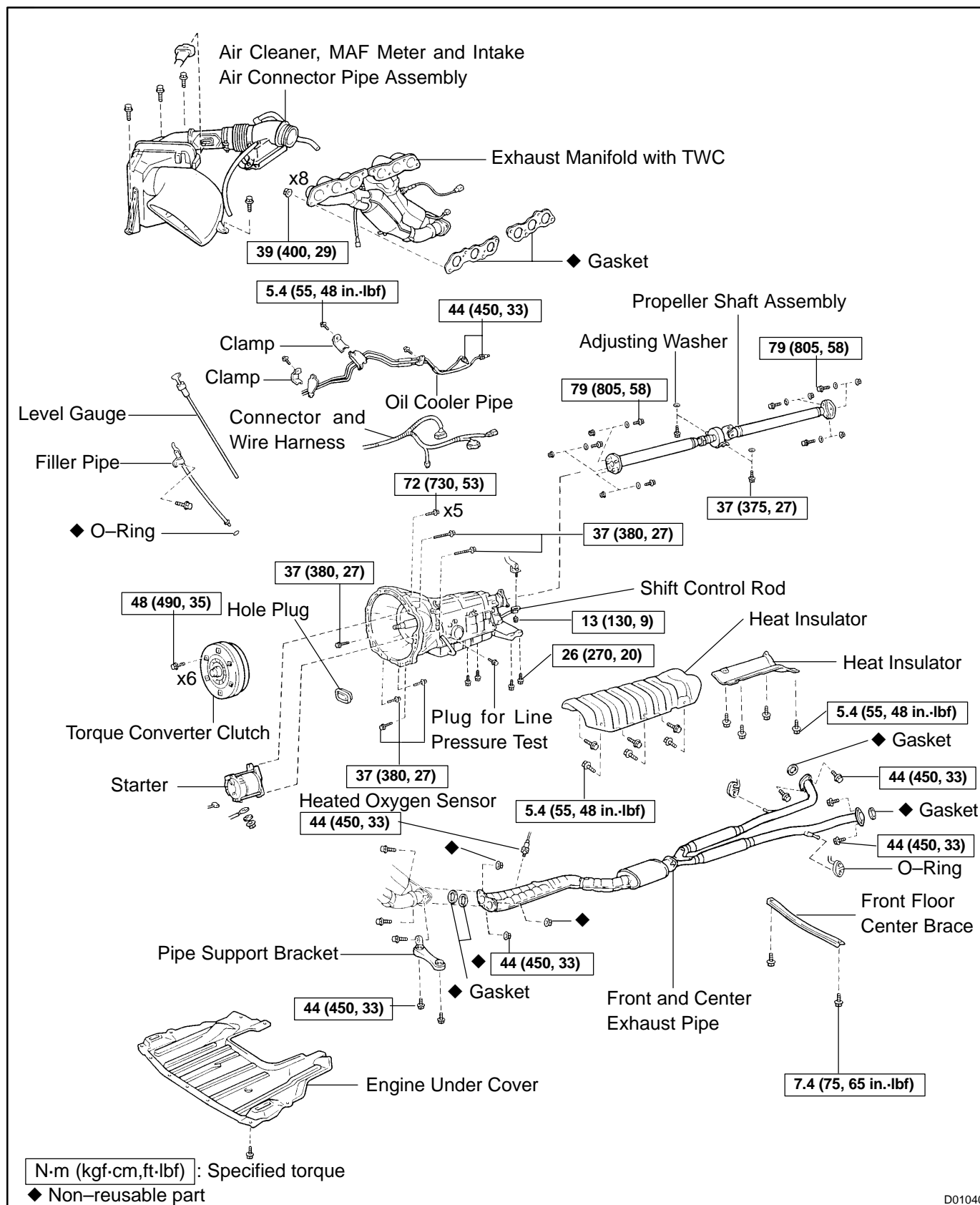
After installation, inspect the shift lever position.

- When shifting from P to R position only with ignition switch ON and brake pedal, make sure that the shifting lever moves smoothly and can be moderately operated.
- When starting engine, make sure that the vehicle moves forward when shifting from N to D position and moves rearward when shifting to R position.

AUTOMATIC TRANSMISSION UNIT (2JZ-GE)

COMPONENTS

AT067-01



D01040

REMOVAL

1. REMOVE LEVEL GAUGE

2. REMOVE FILLER PIPE

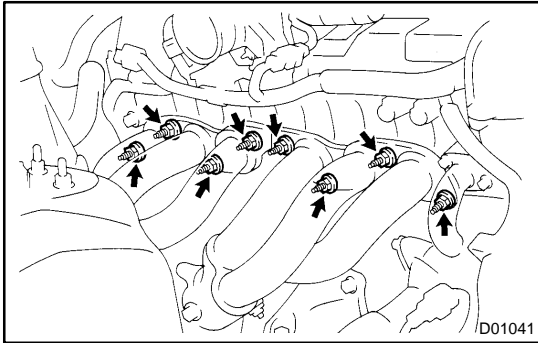
Remove the bolt and filler pipe with the O-ring.

HINT:

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

Replace the used O-ring with a new one.

3. REMOVE AIR CLEANER, MAF METER AND INTAKE AIR CONNECTOR PIPE ASSEMBLY



4. REMOVE EXHAUST MANIFOLD WITH TWC

Remove the 8 nuts, 2 gaskets and exhaust manifold with the TWC.

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

HINT:

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

Replace the used gaskets with new ones.

5. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

6. REMOVE ENGINE UNDER COVER

7. REMOVE FRONT AND CENTER EXHAUST PIPE

(a) Disconnect the heated oxygen sensor.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

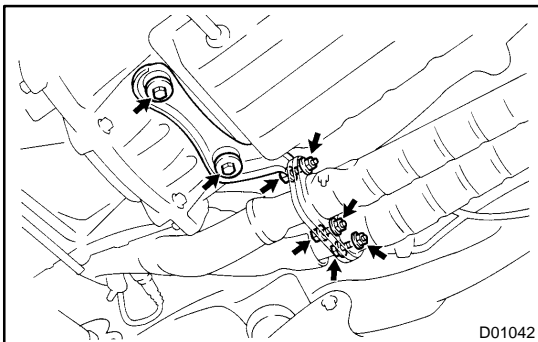
HINT:

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

- Before installing the heated oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing the heated oxygen sensor wire should not twist. If it is twisted, remove the heated oxygen sensor and reinstall it.

(b) Remove the 2 bolts and front floor center brace.

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



(c) Remove the 3 bolts, nuts and 2 gaskets.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

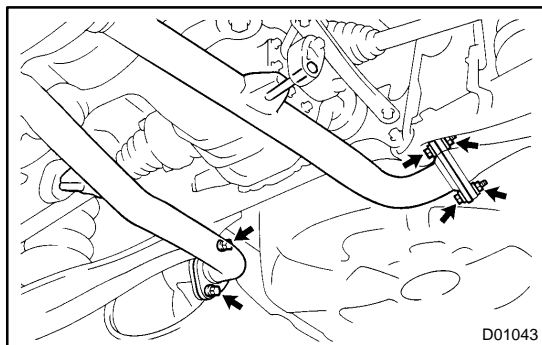
HINT:

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

Replace the used nuts and gaskets with new ones.

(d) Remove the 2 bolts and pipe support bracket.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)



- (e) Remove the 4 bolts and 2 gaskets from the tail pipe.
Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

HINT:

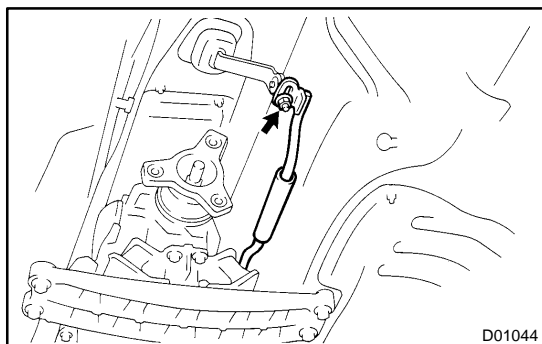
At the time of installation, please refer to the following item.
 Replace the used gaskets with new ones.

- (f) Disconnect the front and center exhaust pipe from the O-ring and remove it.

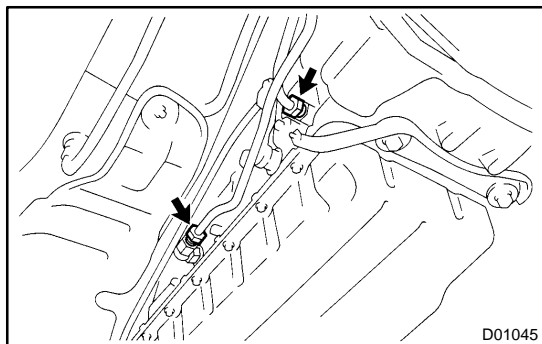
8. REMOVE 2 HEAT INSULATORS

- (a) Remove the 6 bolts and heat insulator.
Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)
 (b) Remove the 4 bolts and heat insulator.
Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

9. REMOVE PROPELLER SHAFT
 (See page [PR-4](#))



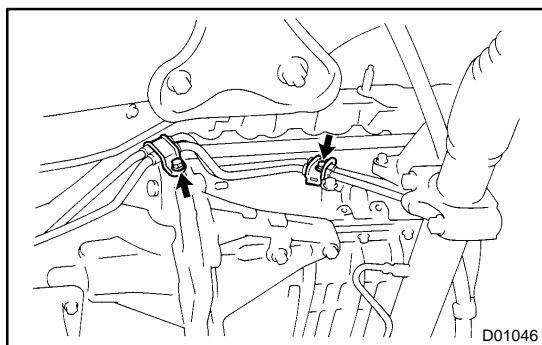
- 10. DISCONNECT SHIFT CONTROL ROD**
 Remove the nut and disconnect the rod.
Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)



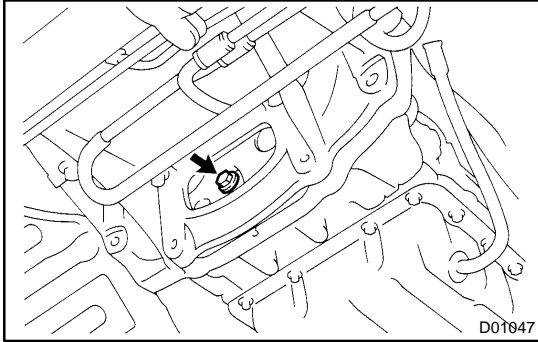
- 11. DISCONNECT OIL COOLER PIPE**
 (a) Loosen the 2 union nuts from the transmission.
Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

NOTICE:

Be careful not to damage the oil cooler pipe.



- (b) Disconnect the 3 set bolts of the clamp.
Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)
 (c) Disconnect the 2 oil cooler pipes from the transmission.



12. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT

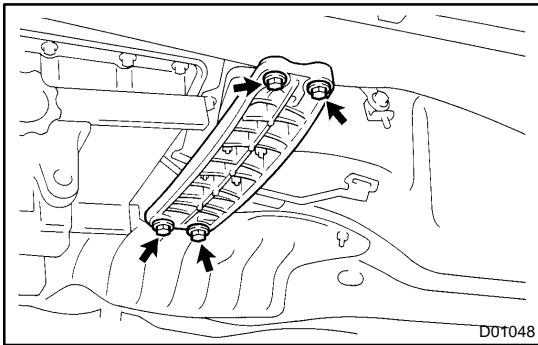
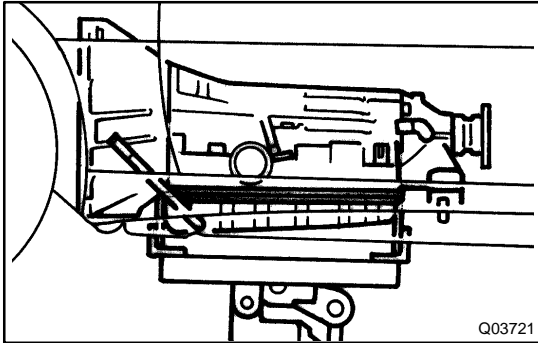
- Remove the hole plug.
- Turn the crankshaft to gain access to each bolt.
- Hold the crankshaft pulley nut with a wrench and remove the 6 bolts.

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

HINT:

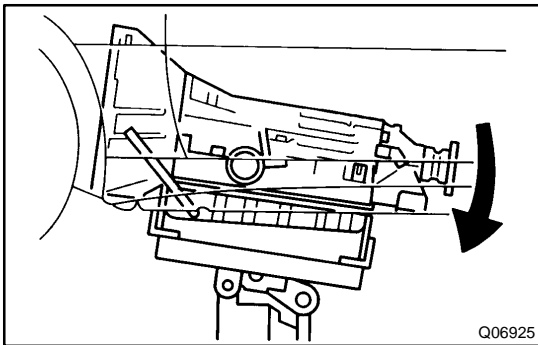
At the time of installation, please refer to the following item.
First install black colored bolt and then the 5 other bolts.

13. SUPPORT TRANSMISSION WITH JACK



14. REMOVE 4 ENGINE REAR MOUNTING SET BOLTS

Torque: 26 N·m (270 kgf-cm, 20 ft-lbf)



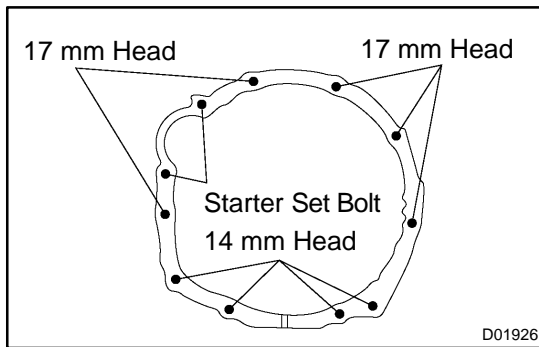
15. DISCONNECT CONNECTORS AND WIRE HARNESS

- Tilt down the transmission.

NOTICE:

Take care so that the cooling fan does not come in contact with the fan shroud.

- Disconnect the following connectors:
 - O/D direct clutch speed sensor connector
 - Vehicle speed sensor connector
 - Park/neutral position switch connector
 - Solenoid connector
- Disconnect the wire harness from the clamp on the transmission.

**16. REMOVE STARTER**

- (a) Disconnect the connector and wire from the starter.
- (b) Remove the 2 bolts and starter.

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

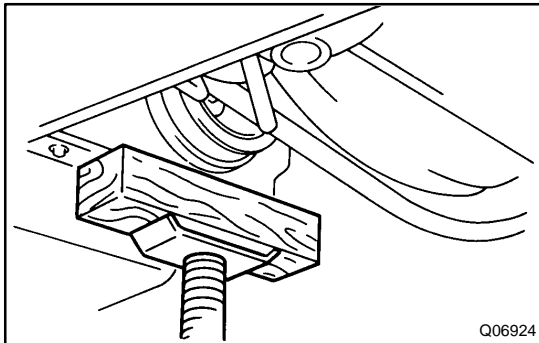
17. REMOVE TRANSMISSION

Remove the 9 bolts and transmission.

Torque:

17 mm head: 72 N·m (730 kgf·cm, 53 ft·lbf)

14 mm head: 37 N·m (380 kgf·cm, 27 ft·lbf)

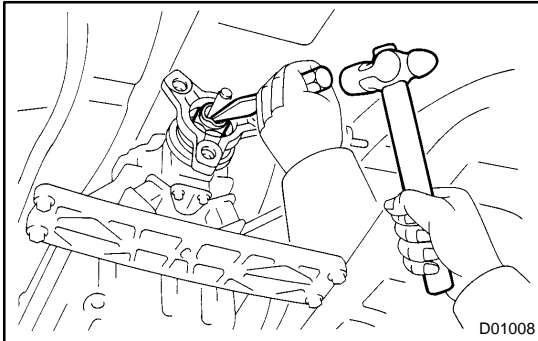
**HINT:**

At the time of installation, please refer to the following item.
Lift the front side of the engine.

EXTENSION HOUSING OIL SEAL ON-VEHICLE REPAIR

AT05X-01

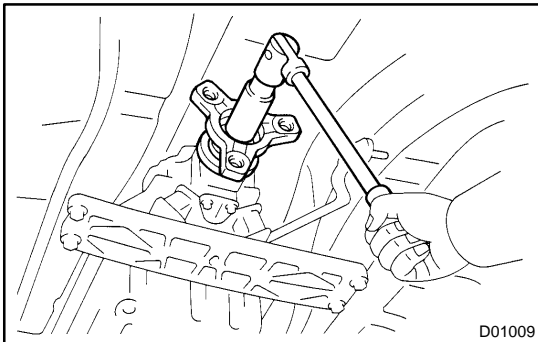
1. DRAIN ATF
2. REMOVE FRONT EXHAUST PIPE AND HEAT INSULATOR
1UZ-FE Engine: (See page EM-120)
2JZ-GE Engine: (See page EM-97)
3. REMOVE PROPELLER SHAFT
(See page [PR-4](#))



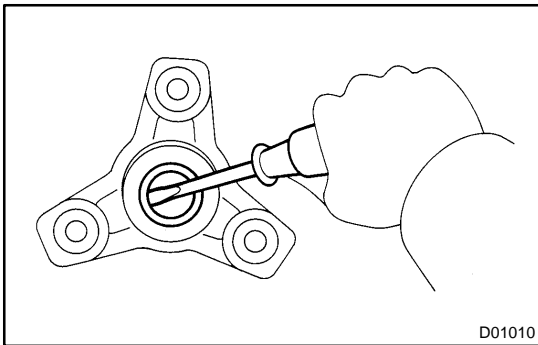
4. REMOVE TRANSMISSION OUTPUT FLANGE
 - (a) Using a chisel and hammer, loosen the staked part of the nut.

HINT:

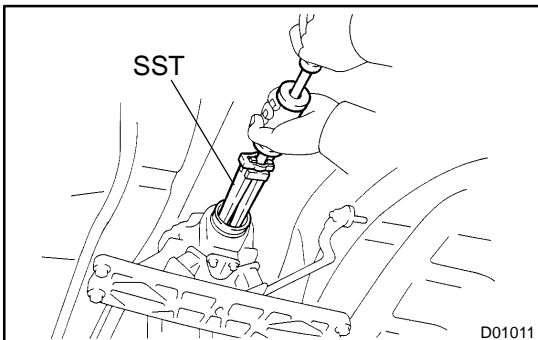
Shift the shift lever to the P position.



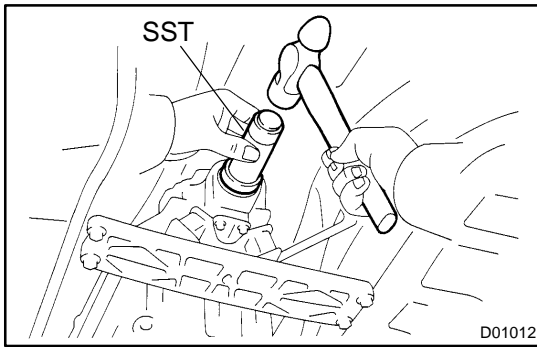
- (b) Using a 30 mm deeper socket wrench, remove the nut.
 - (c) Tap the output flange with a plastic hammer to remove it.



- (d) Using a screwdriver, remove the oil seal from the output flange.



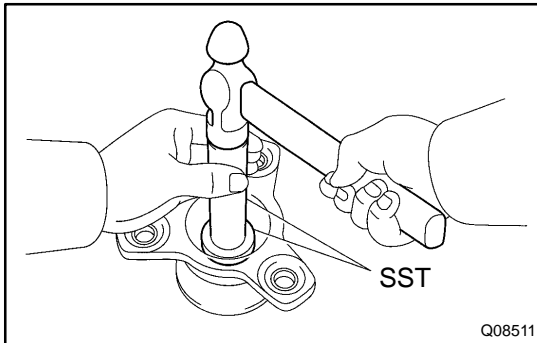
5. REMOVE EXTENSION HOUSING REAR OIL SEAL
Using SST, remove the oil seal.
SST 09308-00010



- 6. INSTALL EXTENSION HOUSING REAR OIL SEAL**
- (a) Coat the lip of a new oil seal with MP grease.
 - (b) Using SST and a hammer, drive in the oil seal with the lip facing downward.

SST 09309-37010

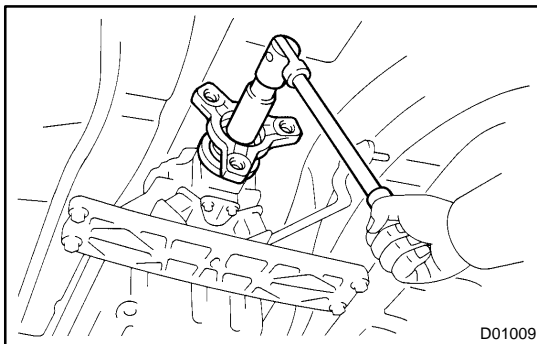
Oil seal depth from flat end: 2.0 mm (0.079 in.)



7. INSTALL TRANSMISSION OUTPUT FLANGE

- (a) Using SST and a hammer, drive in a new oil seal.

SST 09950-60010 (09951-00350), 09950-70010
(09951-07100)

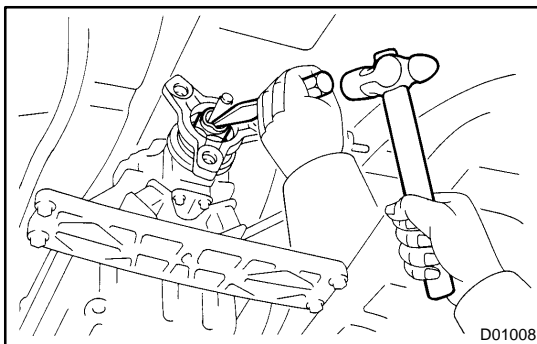


- (b) Install the output flange.
- (c) Using a 30 mm deeper socket wrench, install and torque a new nut.

Torque: 126 N·m (1,280 kgf·cm, 93 ft·lbf)

HINT:

Shift the shift lever to P position.



- (d) Using a chisel and hammer, stake the nut.

8. INSTALL PROPELLER SHAFT

(See page [PR-10](#))

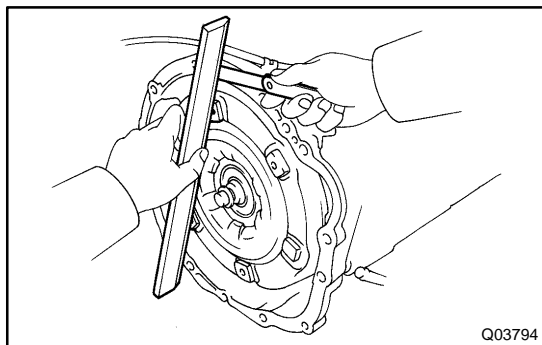
9. INSTALL FRONT EXHAUST PIPE AND HEAT INSULATOR

1UZ-FE Engine: (See page EM-120)

2JZ-GE Engine: (See page EM-97)

10. FILL AND CHECK FLUID LEVEL

(See page [DI-318](#))



INSTALLATION

1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

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

Correct distance: More than 0.1 mm (0.004 in.)

If the distance is less than the standard, check for an improper installation.

2. INSTALL TRANSMISSION

Installation is in the reverse order of removal.

(See page [AT-28](#))

HINT:

After installation, check and inspect items as follows.

- Adjust the shift lever position. (See page [DI-318](#))
- Fill ATF and check fluid level. (See page [DI-318](#))
- Do the road test. (See page [DI-318](#))

AT06A-01



REMOVAL

1. REMOVE LEVEL GAUGE

2. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

3. REMOVE ENGINE UNDER COVER

4. REMOVE FRONT AND CENTER EXHAUST PIPES

(a) Disconnect the 2 heated oxygen sensor.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

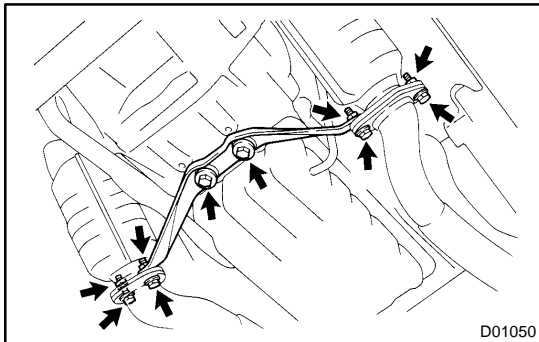
HINT:

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

- Before installing the heated oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing the heated oxygen sensor wire should not twist. If it is twisted, remove the heated oxygen sensor and reinstall it.

(b) Remove the 2 bolts and front floor center brace.

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



(c) Remove the 4 bolts, nuts and 2 gaskets from the LH and RH front TWC.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

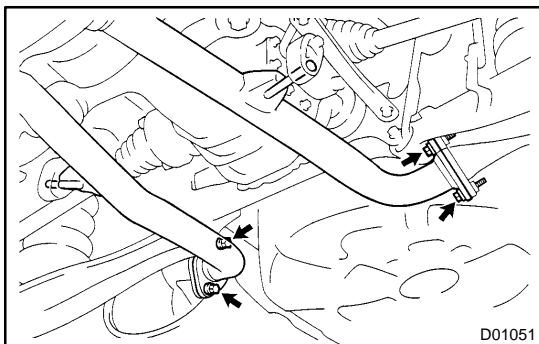
HINT:

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

Replace the used nuts and gaskets with new ones.

(d) Remove the 2 bolts and support bracket.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)



(e) Remove the 4 bolts and 2 gaskets from the tail pipe.

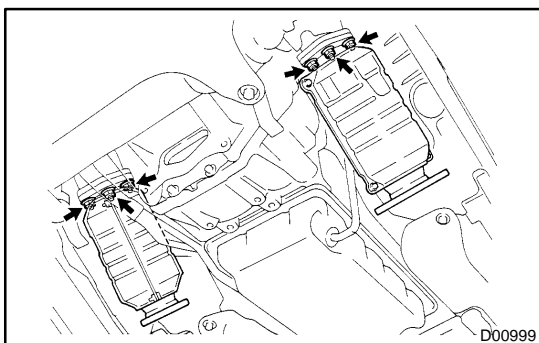
Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

HINT:

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

Replace the used gaskets with new ones.

(f) Disconnect the front and center exhaust pipes from the 2 O-rings and remove them.



5. REMOVE LH AND RH FRONT TWC

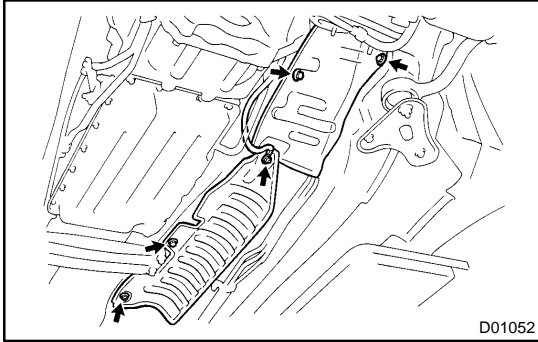
Remove the 6 nuts, 2 gaskets, LH and RH front TWC.

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

HINT:

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

Replace the used nuts and gaskets with new ones.



6. REMOVE HEAT INSULATOR

Remove the 2 nuts, 3 bolts and 2 heat insulators.

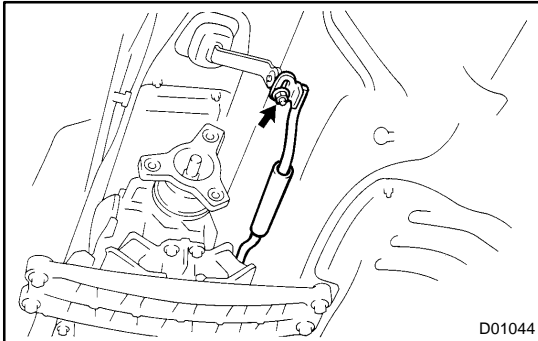
7. REMOVE BOLT AND FILLER PIPE

HINT:

At the time of installation, please refer to the following item.
Replace the used O-ring with a new one.

8. REMOVE PROPELLER SHAFT

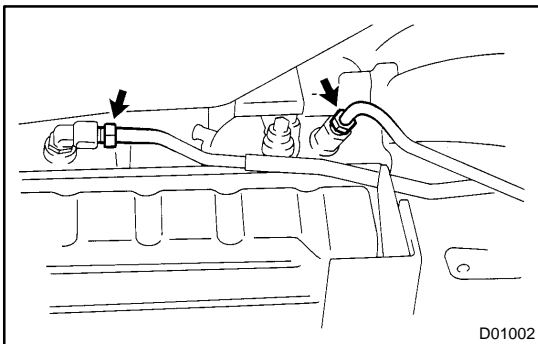
(See page [PR-4](#))



9. DISCONNECT SHIFT CONTROL ROD

Remove the nut and disconnect the rod.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)



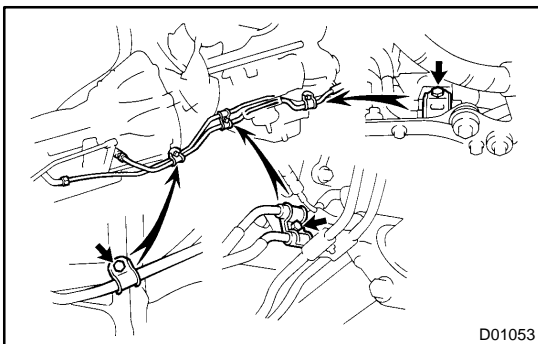
10. DISCONNECT OIL COOLER PIPE

(a) Loosen the 2 union nuts from the transmission.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

NOTICE:

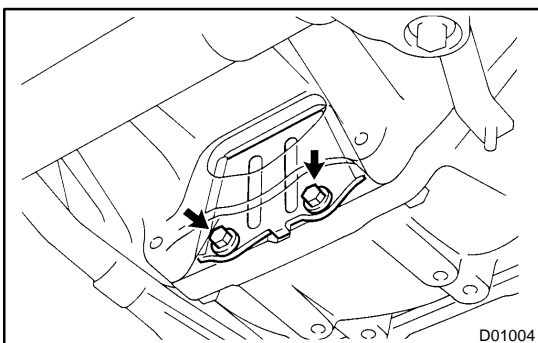
Be careful not to damage the oil cooler pipe.



(b) Disconnect the 3 set bolts of the clamp.

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

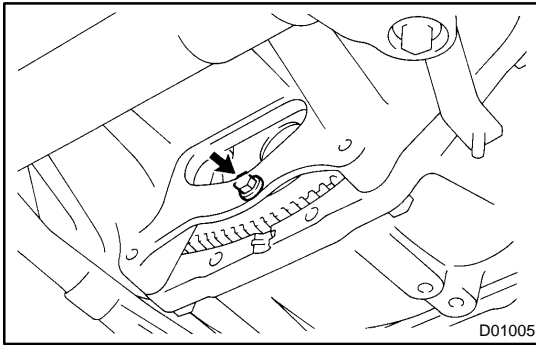
(c) Disconnect the 2 oil cooler pipes from the transmission.



11. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT

(a) Remove the 2 bolts and flywheel housing under cover.

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

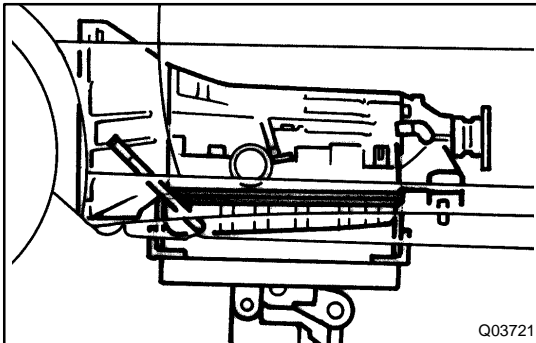


- (b) Turn the crankshaft to gain access to each bolt.
- (c) Hold the crankshaft pulley nut with a wrench and remove the 6 bolts.

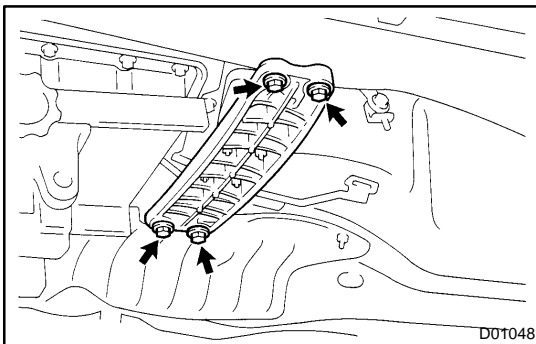
Torque: 48 N·m (490 kgf-cm, 35 ft-lbf)

HINT:

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

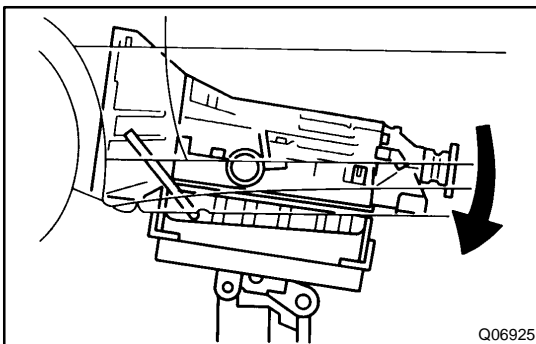


12. SUPPORT TRANSMISSION WITH JACK



13. REMOVE 4 ENGINE REAR MOUNTING SET BOLTS

Torque: 26 N·m (270 kgf-cm, 20 ft-lbf)



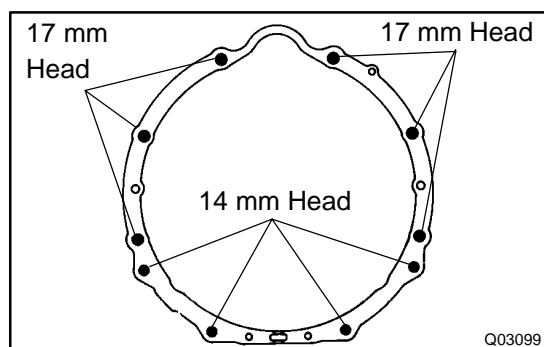
14. DISCONNECT CONNECTORS AND WIRE HARNESS

- (a) Tilt down the transmission.

NOTICE:

Take care so that the cooling fan does not come in contact with the fan shroud.

- (b) Disconnect the following connectors:
 - (1) O/D direct clutch speed sensor connector
 - (2) Vehicle speed sensor connector
 - (3) Park/neutral position switch connector
 - (4) Solenoid connector
- (c) Disconnect the wire harness from the clamp on the transmission.



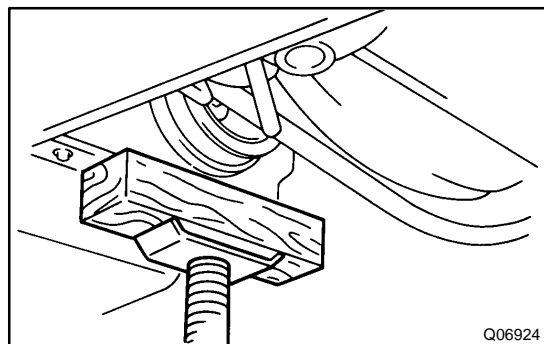
15. REMOVE TRANSMISSION

Remove the 10 bolts and transmission.

Torque:

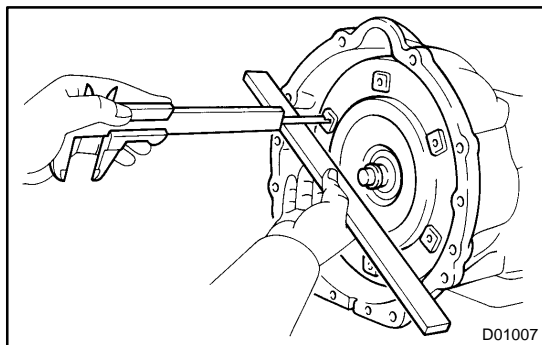
17 mm head: 72 N·m (730 kgf·cm, 53 ft·lbf)

14 mm head: 37 N·m (380 kgf·cm, 27 ft·lbf)



HINT:

At the time of installation, please refer to the following item.
Lift the front side of the engine.



INSTALLATION

1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

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

Correct distance: More than 17.1 mm (0.673 in.)

If the distance is less than the standard, check for an improper installation.

2. INSTALL TRANSMISSION

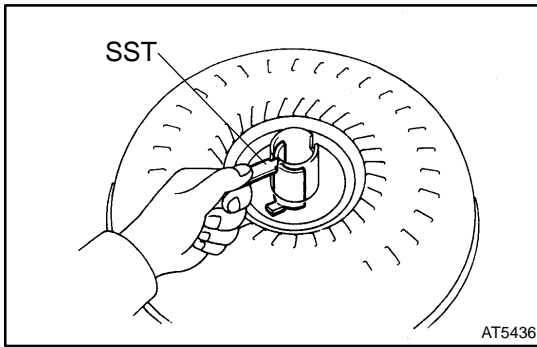
Installation is in the reverse order of removal.

(See page [AT-34](#))

HINT:

After installation, check and inspect items as follows.

- Adjust the shift lever position. (See page [DI-318](#))
- Fill ATF and check fluid level. (See page [DI-318](#))
- Do the road test. (See page [DI-318](#))

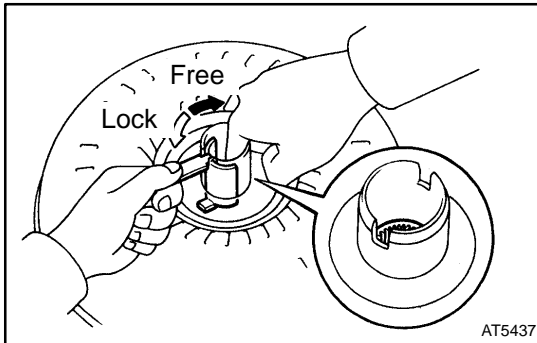


TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

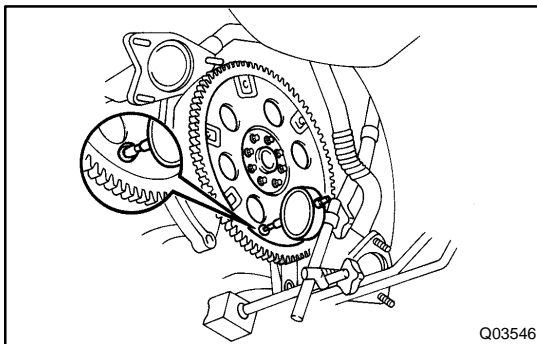
AT06D-01

1. INSPECT ONE-WAY CLUTCH

- (a) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.
SST 09350-30020 (09351-32020)



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



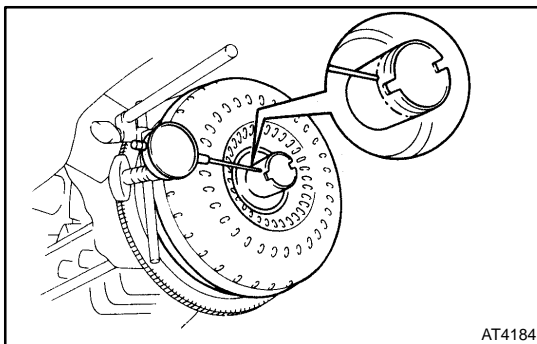
2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

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

Maximum runout: 0.20 mm (0.0079 in.)

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.

Maximum runout: 0.30 mm (0.0118 in.)

If runout exceeds 0.30 mm (0.0118 in.), try to correct by reorienting the installation of the torque converter clutch.

If excessive runout cannot be corrected, replace the torque converter clutch.

HINT:

Mark the position of the torque converter clutch to ensure correct installation.

- (b) Remove the torque converter clutch.

ATF TEMPERATURE SENSOR ON-VEHICLE REPAIR

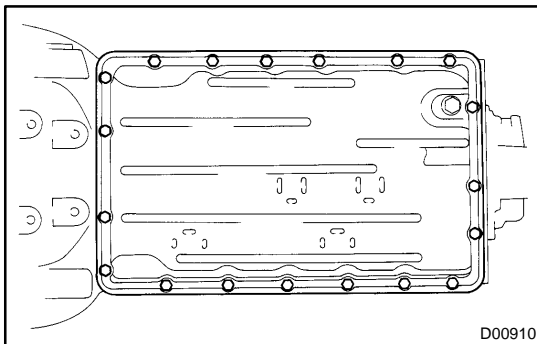
AT05Y-01

CAUTION:

When working with FIPG material, you must observe the following items.

- Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.
- Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.

1. REMOVE DRAIN PLUG WITH GASKET AND DRAIN ATF

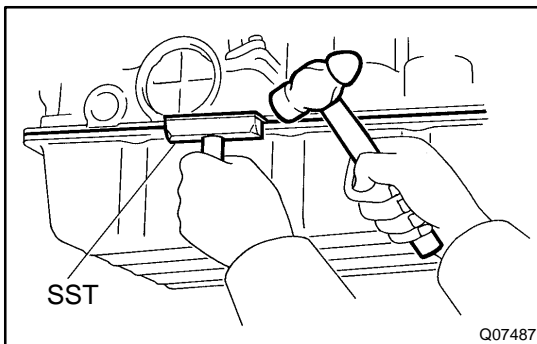


2. REMOVE OIL PAN

NOTICE:

Some fluid will remain in the oil pan.

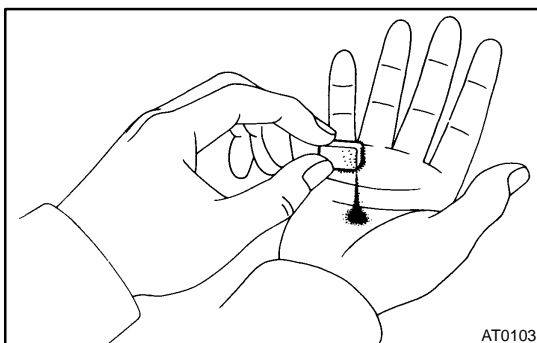
- (a) Remove the 19 bolts.



- (b) Install the blade of SST between the transmission case and oil pan, cut off applied sealer, and remove the oil pan.
SST 09032-00100

NOTICE:

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

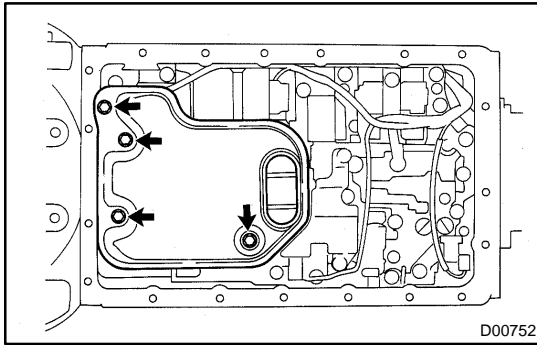


3. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

Steel (magnetic) ... bearing, gear and clutch plate wear

Brass (non-magnetic) ... bushing wear

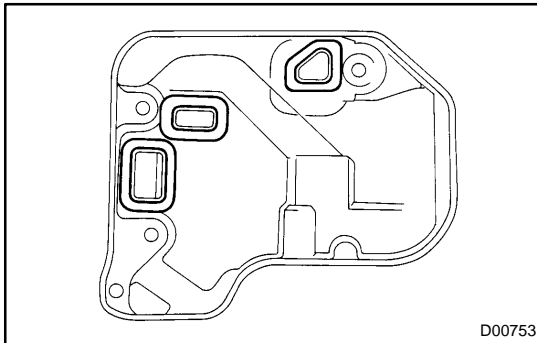


4. REMOVE OIL STRAINER

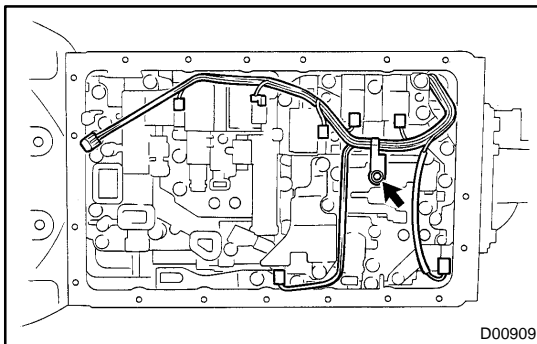
NOTICE:

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

- (a) Remove the 4 bolts and oil strainer.

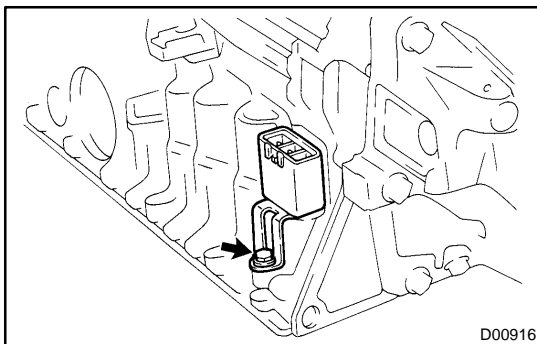


- (b) Remove the 3 gaskets from the oil strainer.



5. REMOVE SOLENOID WIRING WITH ATF TEMPERATURE SENSOR

- (a) Disconnect the ATF temperature sensor.
- (b) Remove the bolt and clamp.
- (c) Disconnect the 7 connectors from the solenoid valves.

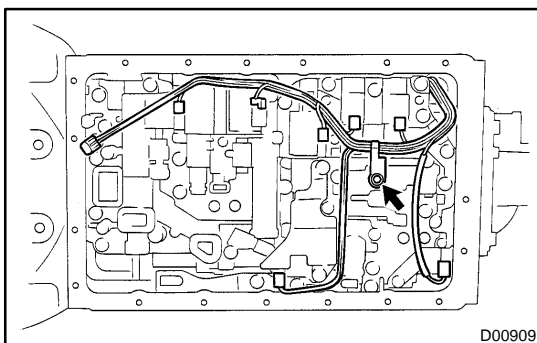


- (d) Remove the bolt and pull out the solenoid connector.

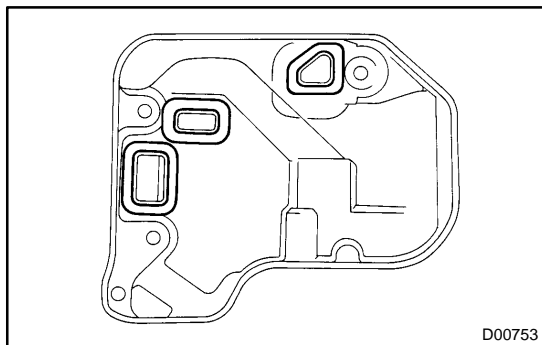
6. INSTALL SOLENOID WIRING WITH ATF TEMPERATURE SENSOR

- (a) Install the solenoid connector with the bolt.

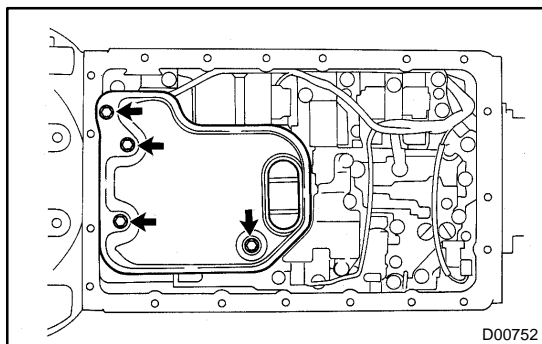
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)



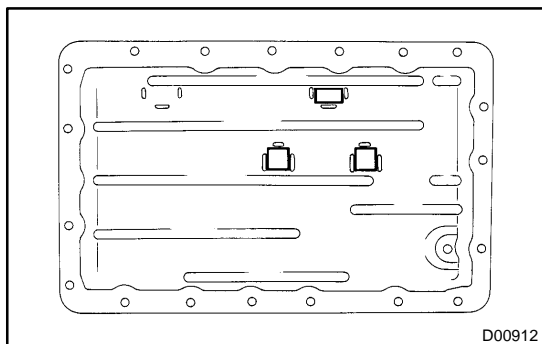
- (b) Connect the 7 connectors to the solenoid valves.
- (c) Install the clamp with the bolt.
- Torque: 6.4 N·m (65 kgf·cm, 56 in.-lbf)**
- (d) Connect the ATF temperature sensor.

**7. INSTALL OIL STRAINER**

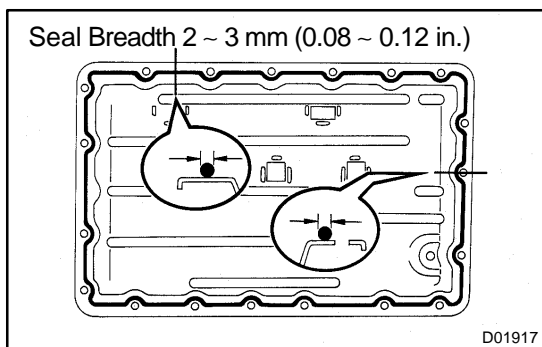
- (a) Install 3 new gaskets.



- (b) Install the oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

**8. INSTALL OIL PAN**

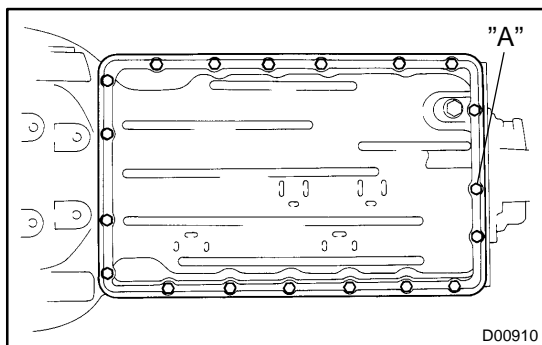
- (a) Install the 3 magnets in the indications of the oil pan.



- (b) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.
(c) Apply FIPG to the oil pan.

FIPG:

Part No. 08826 – 00090, THREE BOND 1281 or equivalent



- (d) Install the oil pan with the 19 bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

HINT:

Replace the only "A" bolt with a new one.

9. INSTALL DRAIN PLUG WITH NEW GASKET

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

10. FILL FLUID AND CHECK FLUID

(See page [DI-318](#))

VALVE BODY ASSEMBLY ON-VEHICLE REPAIR

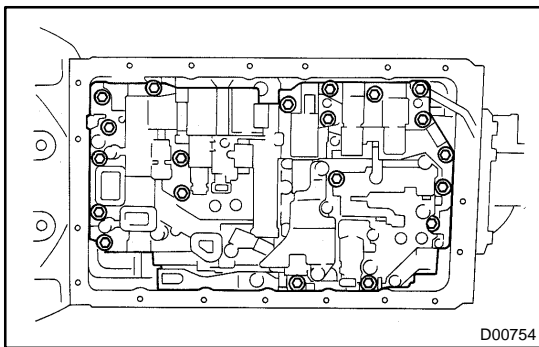
AT05Z-01

CAUTION:

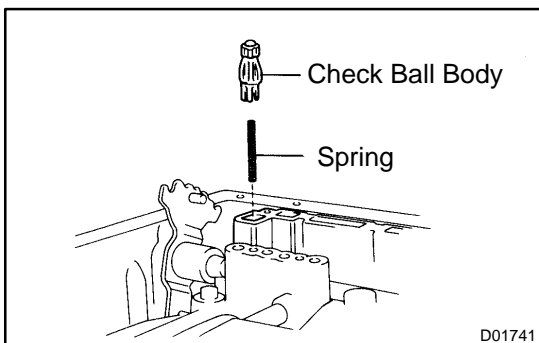
When working with FIPG material, you must observe the following items.

- Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.
- Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.

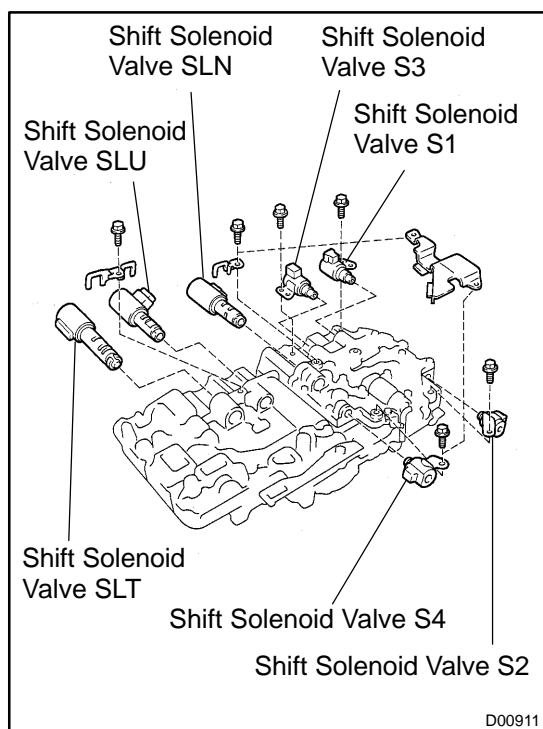
1. REMOVE DRAIN PLUG WITH GASKET AND DRAIN ATF
2. REMOVE OIL PAN (See page [AT-5](#))
3. EXAMINE PARTICLES IN PAN (See page [AT-5](#))
4. REMOVE OIL STRAINER (See page [AT-5](#))
5. REMOVE SOLENOID WIRING WITH ATF TEMPERATURE SENSOR (See page [AT-5](#))

**6. REMOVE VALVE BODY**

Remove the 21 bolts and valve body.

**7. REMOVE CHECK BALL BODY AND SPRING****NOTICE:**

Do not drop the check ball body and spring.



8. REMOVE SOLENOID VALVE

- Remove the 3 bolts and shift solenoid valve No.1, No.2 and No.3.
- Remove the 2 bolts, oil guide plate, lock plate, shift solenoid valve SLN and No.4.
- Remove the 6 O-rings from each shift solenoid valve.
- Remove the bolt, lock plate and shift solenoid valve SLU and SLT.

9. INSTALL SOLENOID VALVE

- Install the shift solenoid valve SLU and SLT and the lock plate with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 56 in.-lbf)

- Coat 6 new O-rings with ATF.
- Install the 6 O-rings to the each solenoid valve.
- Install the shift solenoid valve SLN, No.4, lock plate and oil guide plate with the 2 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

- Install the shift solenoid valve No.1, No.2 and No.3 with the 3 bolts.

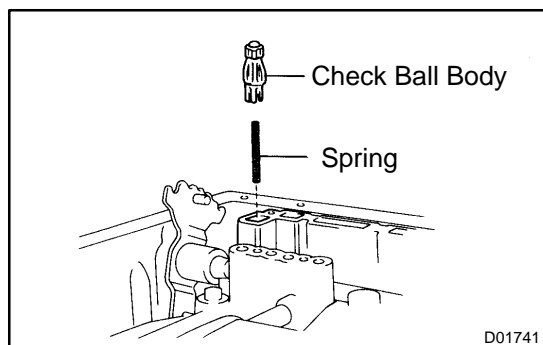
Torque:

Shift solenoid valve No.1 and No.3:

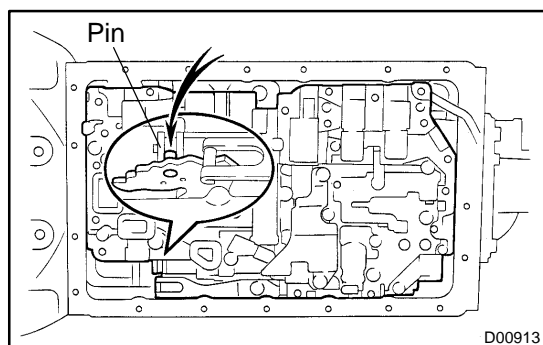
6.4 N·m (65 kgf·cm, 56 in.-lbf)

Shift solenoid valve No.2:

10 N·m (100 kgf·cm, 7 ft·lbf)

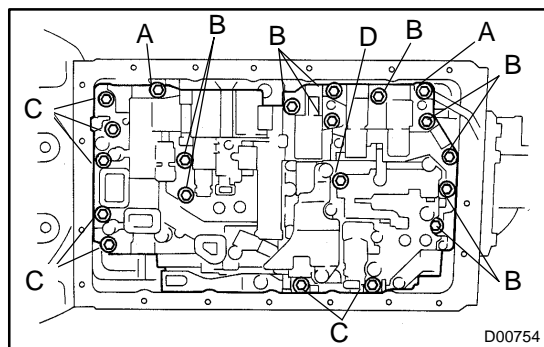


10. INSTALL CHECK BALL BODY AND SPRING



11. INSTALL VALVE BODY

- Align the groove of the manual valve to pin of the lever.



(b) Install the 21 bolts.

Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)

Bolt length:

Bolt A: 23 mm (0.91 in.)

Bolt B: 28 mm (1.10 in.)

Bolt C: 36 mm (1.42 in.)

Bolt D: 55 mm (2.17 in.)

12. **INSTALL SOLENOID WIRING WITH ATF TEMPERATURE SENSOR** (See page [AT-5](#))
13. **INSTALL OIL STRAINER** (See page [AT-5](#))
14. **INSTALL OIL PAN** (See page [AT-5](#))
15. **INSTALL DRAIN PLUG WITH NEW GASKET**
Torque: 20 N·m (205 kgf-cm, 15 ft-lbf)
16. **FILL FLUID AND CHECK FLUID** (See page [DI-318](#))

BODY ELECTRICAL SYSTEM

PRECAUTION

BE011-09

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

- Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.
- When high voltage socket of discharge headlight is touched with the light control switch HEAD, high voltage of 20,000 V is momentarily generated. This might lead to a serious accident.
- Never connect the tester to the high voltage socket of discharge headlight for measurement, as this leads to a serious accident because of high voltage.
- When performing operation related to the discharge headlight, make sure to do it in the place with no water or rain to prevent electric shock, with light control switch OFF, battery terminal removed, connector of light control ECU disconnected.
- When performing operation related to the discharge headlight, make sure to do it after assembling has been completely over and never light up without a bulb installed.
- Do not light up the discharge headlight using another power source except vehicle's.
- When there is a defect on the discharge headlight or any shock has been applied to it, replace the light with a new one.

Even if the light operates normally, there is a possibility that the fail-safe function works.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The LEXUS GS300/ 400 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. COMBINATION METER SYSTEM

The cold cathode tube connectors (Connector "K" and "L") in the combination meter are charged with high voltage AC current when power is supplied, so do not touch them when they are charged.

4. MICRO COMPUTER PRESET DRIVING POSITION SYSTEM**Power Seat Control System****Power Mirror Control System****Power Tilt and Telescopic Steering System**

If the battery negative (–) terminal is disconnected, the preset driving positions stored in memory are erased, so be sure to note the positions and reset them after the battery terminal is reconnected.

5. AUDIO SYSTEM

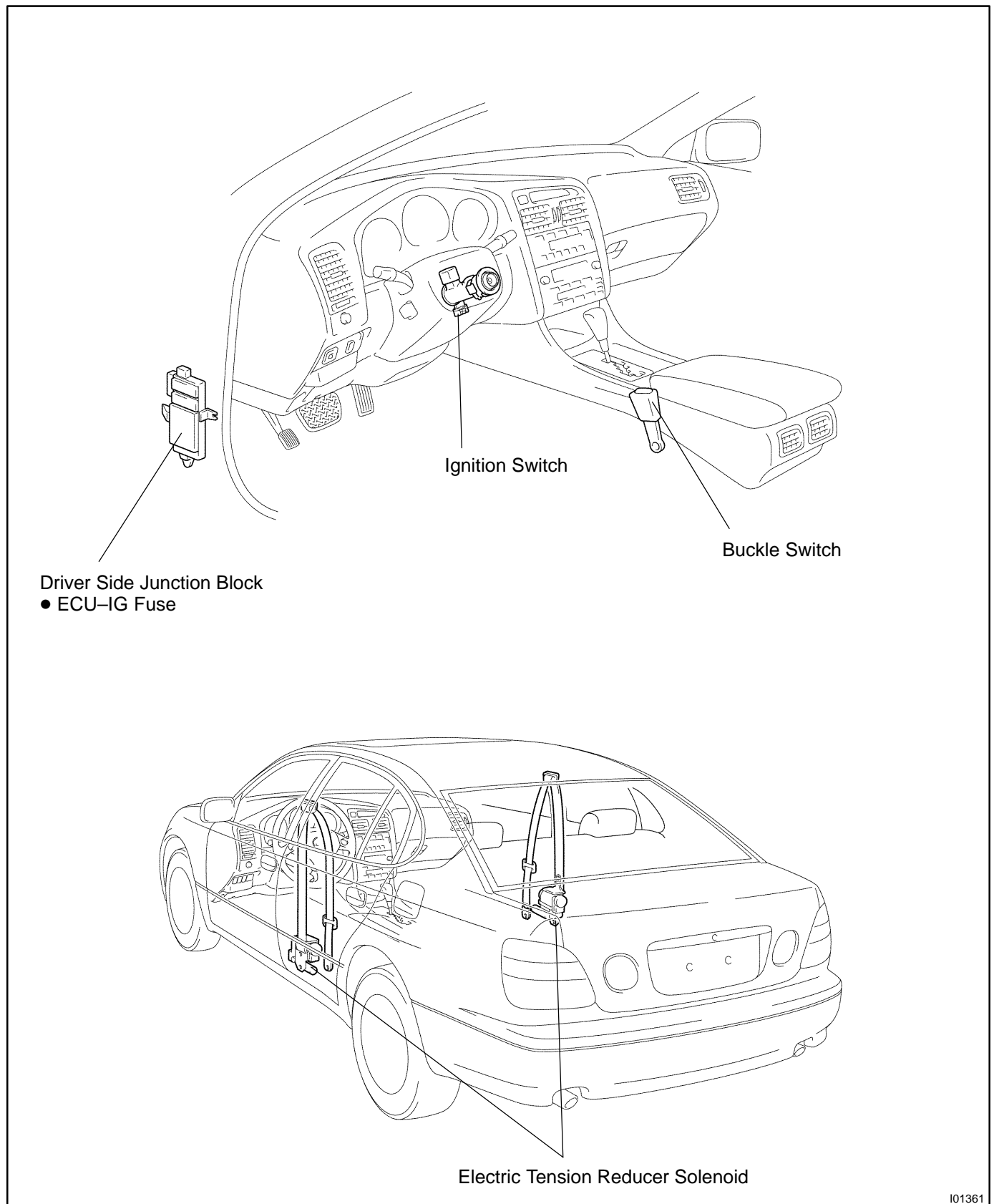
- If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to note the stations and reset them after the negative (–) terminal cable is reconnected to the battery.
- If the negative (–) terminal cable is disconnected from the battery, the "ANTI-THEFT SYSTEM" will operate when the cable is reconnected, but the radio, tape player and CD player will not operate. Be sure to input the correct ID number so that the radio, tape player and CD player can be operated again.

6. MOBILE COMMUNICATION SYSTEM

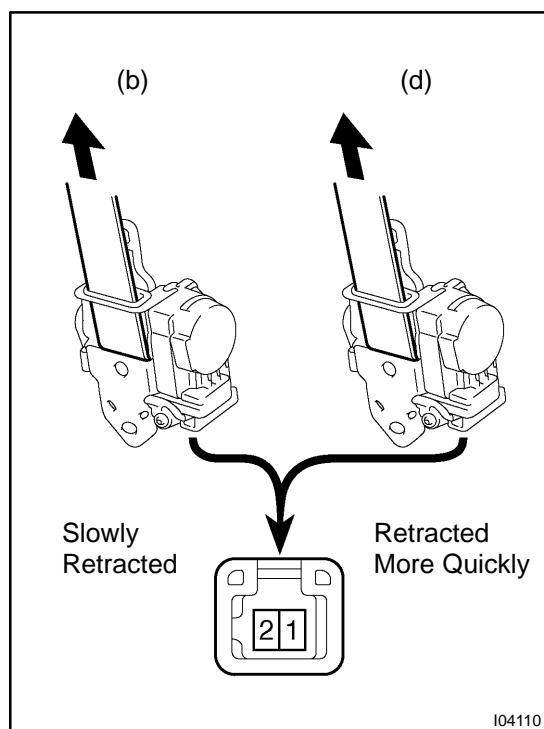
If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

ELECTRIC TENSION REDUCER SYSTEM LOCATION

BE0GU-05



I01361



INSPECTION

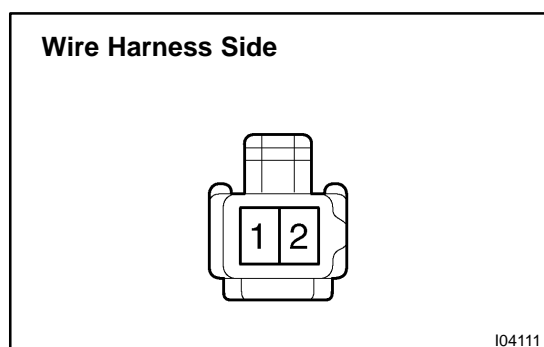
1. INSPECT TENSION REDUCER SOLENOID OPERATION

- Connect the positive (+) lead from the battery to terminal 1, and negative (–) lead to terminal 2.
- Pull the belt upward and check that the belt is slowly retracted when released.
- Disconnect the lead from the battery.
- Pull the belt upward and check that the belt is retracted more quickly when released than in (b).

HINT:

Do not tilt the retractor.

If the operation is not as specified, replace the front seat outer belt assembly.



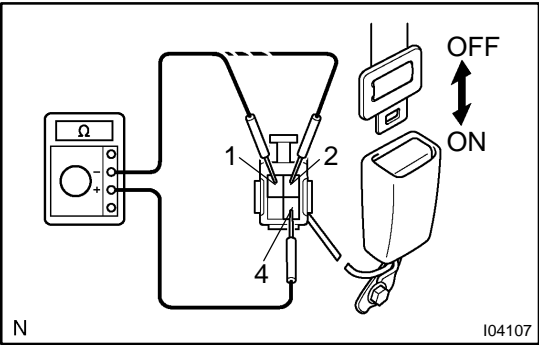
2. INSPECT TENSION REDUCER SOLENOID CIRCUIT

Disconnect the tension reducer solenoid connector and inspect the connector on wire harness side, as shown.

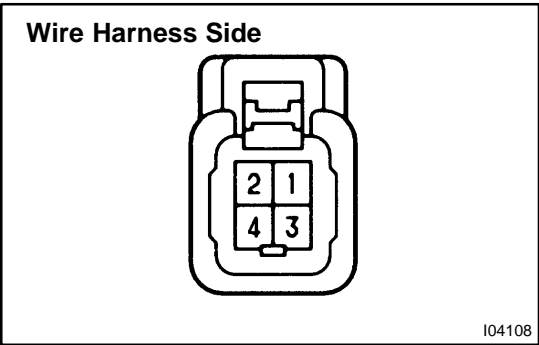
Tester connection	Condition	Specified condition
2 – Ground	Buckle switch position OFF (belt unfastened)	No continuity
2 – Ground	Buckle switch position ON (belt fastened)	Continuity
1 – Ground	Ignition switch ACC or LOCK	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage

If the circuit is specified, replace the front seat outer belt assembly.

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



- 3. INSPECT SEAT BELT BUCKLE SWITCH CONTINUITY**
- (a) Check that continuity exists between the terminals 1 and 4 on the switch side connector with the switch ON (belt fastened).
 - (b) Check that continuity exists between the terminals 2 and 4 on the switch side connector with the switch OFF (belt unfastened).
- If operation is not as specified, replace the switch.



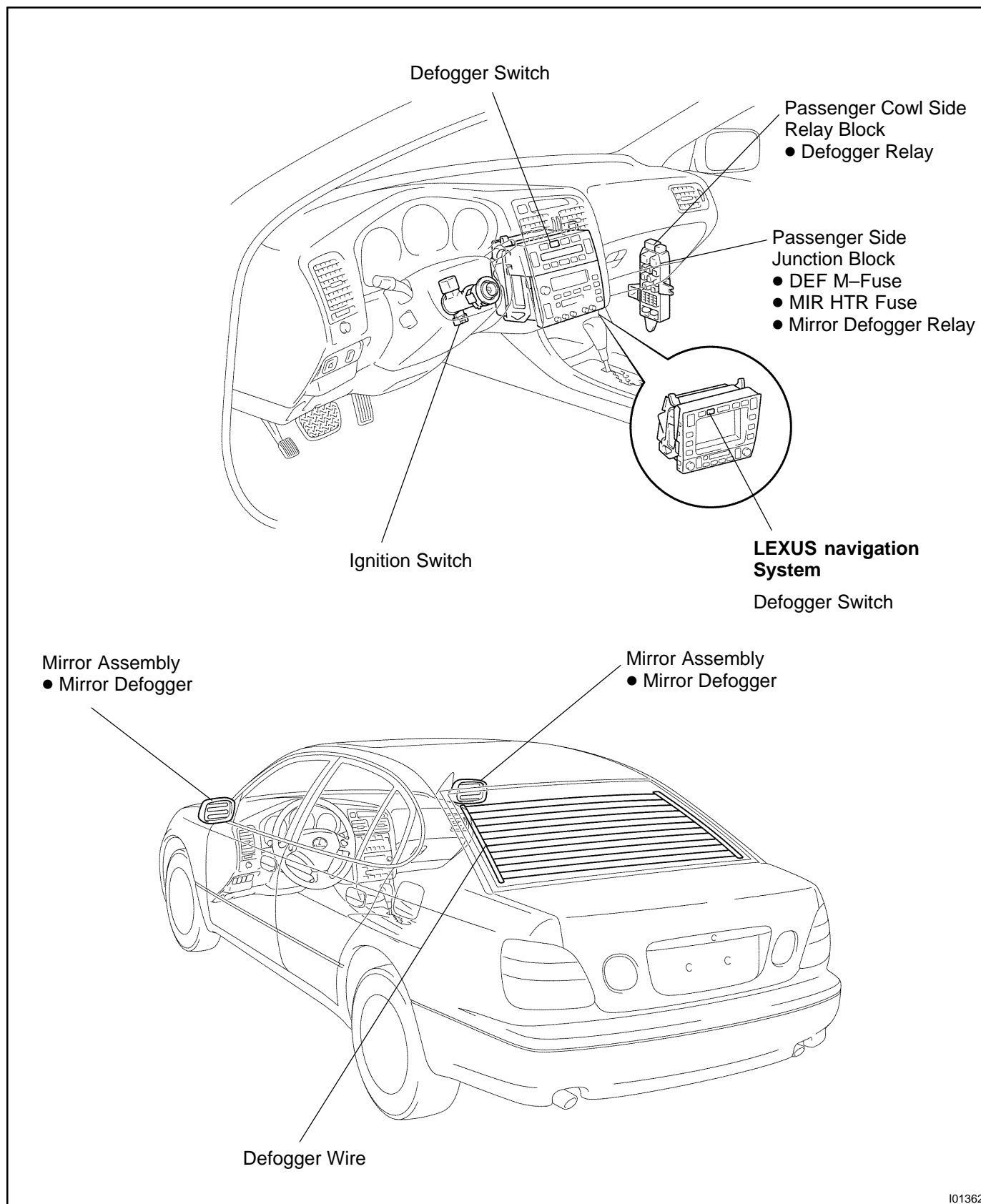
- 4. INSPECT SEAT BELT BUCKLE SWITCH CIRCUIT**
- Driver side: (See page [DI-830](#))**
- Passenger side: (See page [DI-785](#))**
- Disconnect the switch connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity

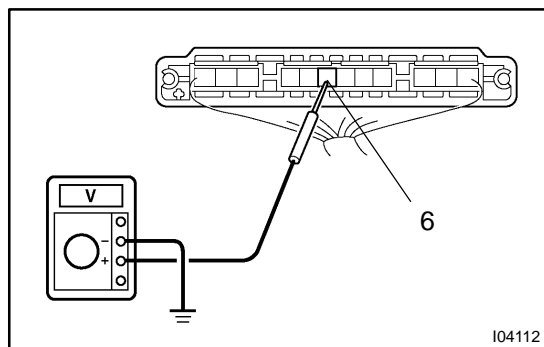
If continuity is not as specified, inspect the circuits connected to other parts.

DEFOGGER SYSTEM LOCATION

BE0GS-10



I01362

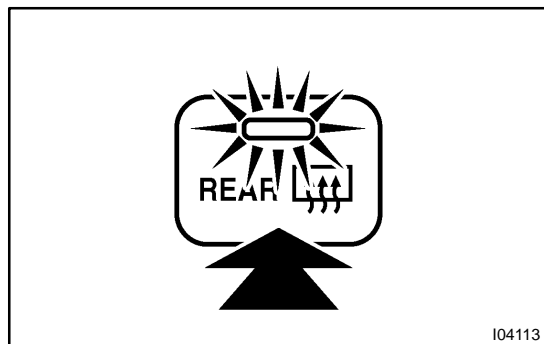


INSPECTION

1. INSPECT DEFOGGER TIMER OPERATION

- Connect the positive (+) lead from the voltmeter to terminal 6 of body ECU No.1 connector and negative (–) lead to body ground.
- When the switch is OFF, the voltage should be approx. 12V.
- Turn the defogger switch ON and check that the indicator lights up and that the voltage is less than 1 V.
- After 15 minutes, check that the switch is OFF and the voltage is approx. 12 V.

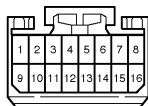
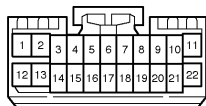
If operation is not as specified, replace the switch.



Wire Harness Side

Connector "A"

Connector "B"



I04114

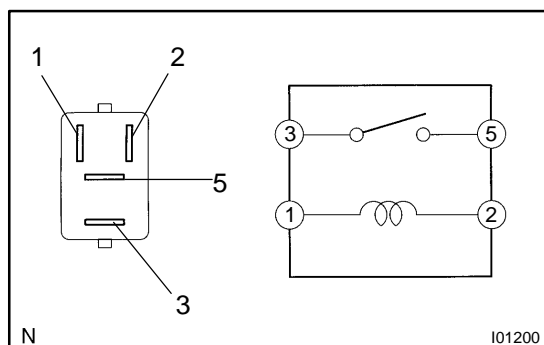
2. INSPECT DEFOGGER SWITCH (in PANEL SWITCH) CIRCUIT

Connector disconnected:

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

Tester connection	Condition	Specified condition
B10 – Ground	Constant	Continuity
A1 – Ground	Constant	Battery voltage
A2 – Ground	Ignition switch LOCK	No voltage
A2 – Ground	Ignition switch ACC or ON	Battery voltage

If the circuit is not as specified, replace the switch.

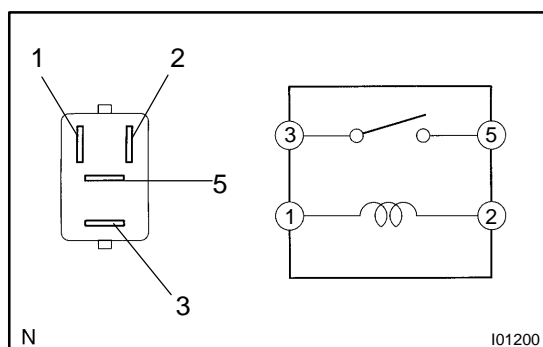


3. INSPECT DEFOGGER RELAY CONTINUITY

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

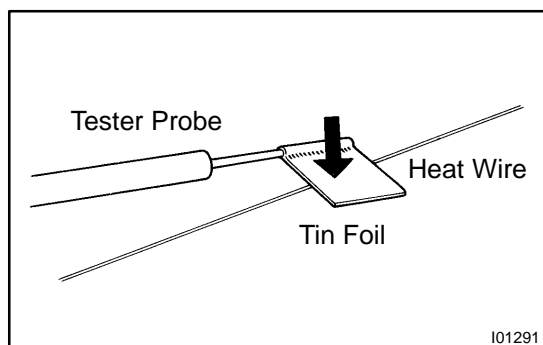
If continuity is not as specified, replace the relay.

4. INSPECT DEFOGGER RELAY CIRCUIT (See page DI-812 and BE-21)

**5. INSPECT MIRROR DEFOGGER RELAY CONTINUITY**

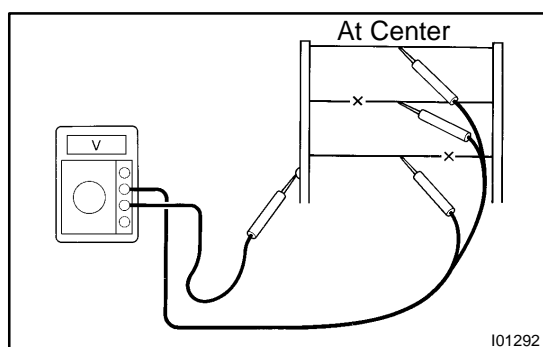
Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

6. INSPECT MIRROR DEFOGGER RELAY CIRCUIT
(See page BE-21)**7. INSPECT DEFOGGER WIRE****NOTICE:**

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

- Turn the ignition switch ON.
- Turn the defogger switch ON.
- Inspect the voltage at the center of each heat wire, as shown.



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

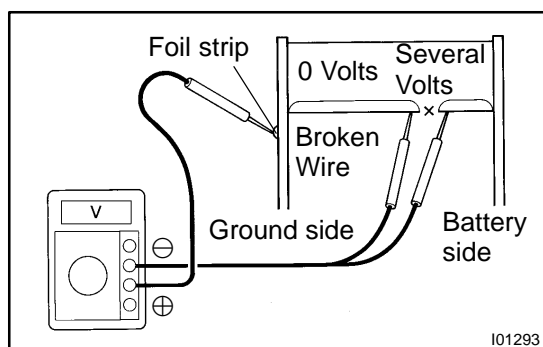
HINT:

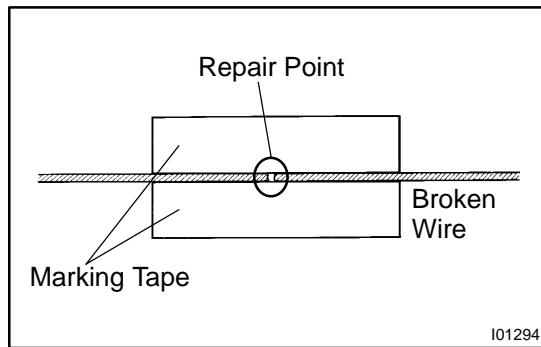
If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.

- Place the voltmeter positive (+) lead against the defogger wire on the battery side.
- Place the voltmeter negative (–) lead with the foil strip against the wire on the ground side.
- Slide the positive (+) lead from battery to ground side.
- The point where the voltmeter deflects from several V to zero V is the place where the defogger wire is broken.

HINT:

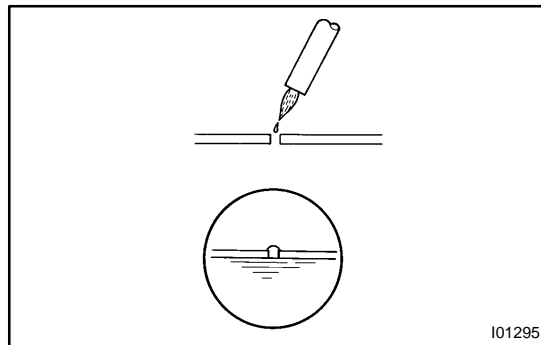
If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually increases to about 12 V as the meter probe moves to the other end.



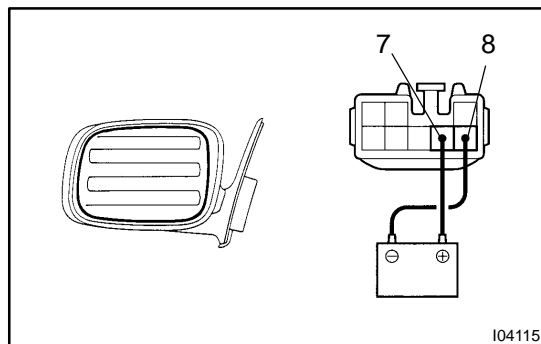


8. IF NECESSARY, REPAIR DEFOGGER WIRE

- Clean the broken wire tips with grease, wax and silicone remover.
- Place the masking tape along both sides of the wire for repair.
- Thoroughly mix the repair agent (Dupont paste No. 4817).



- Using a fine tip brush, apply a small amount of the agent to the wire.
- After a few minutes, remove the masking tape.
- Do not repair the defogger wire for at least 24 hours.

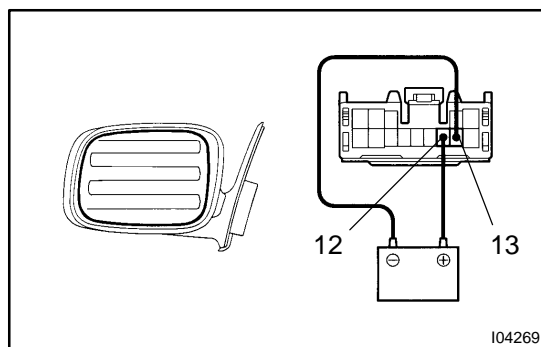


9. w/ Mirror heater (w/o Driving position memory): INSPECT MIRROR DEFOGGER OPERATION

- Connect the positive (+) lead from the battery to terminal 7 and the negative (–) lead to terminal 8.
- Check that the mirror becomes warm.

HINT:

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



10. w/ Mirror heater (w/ Driving position memory): INSPECT MIRROR DEFOGGER OPERATION

- Connect the positive (+) lead from the battery to terminal 12 and the negative (–) lead to terminal 13.
- Check that the mirror becomes warm.

HINT:

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

POWER WINDOW CONTROL SYSTEM

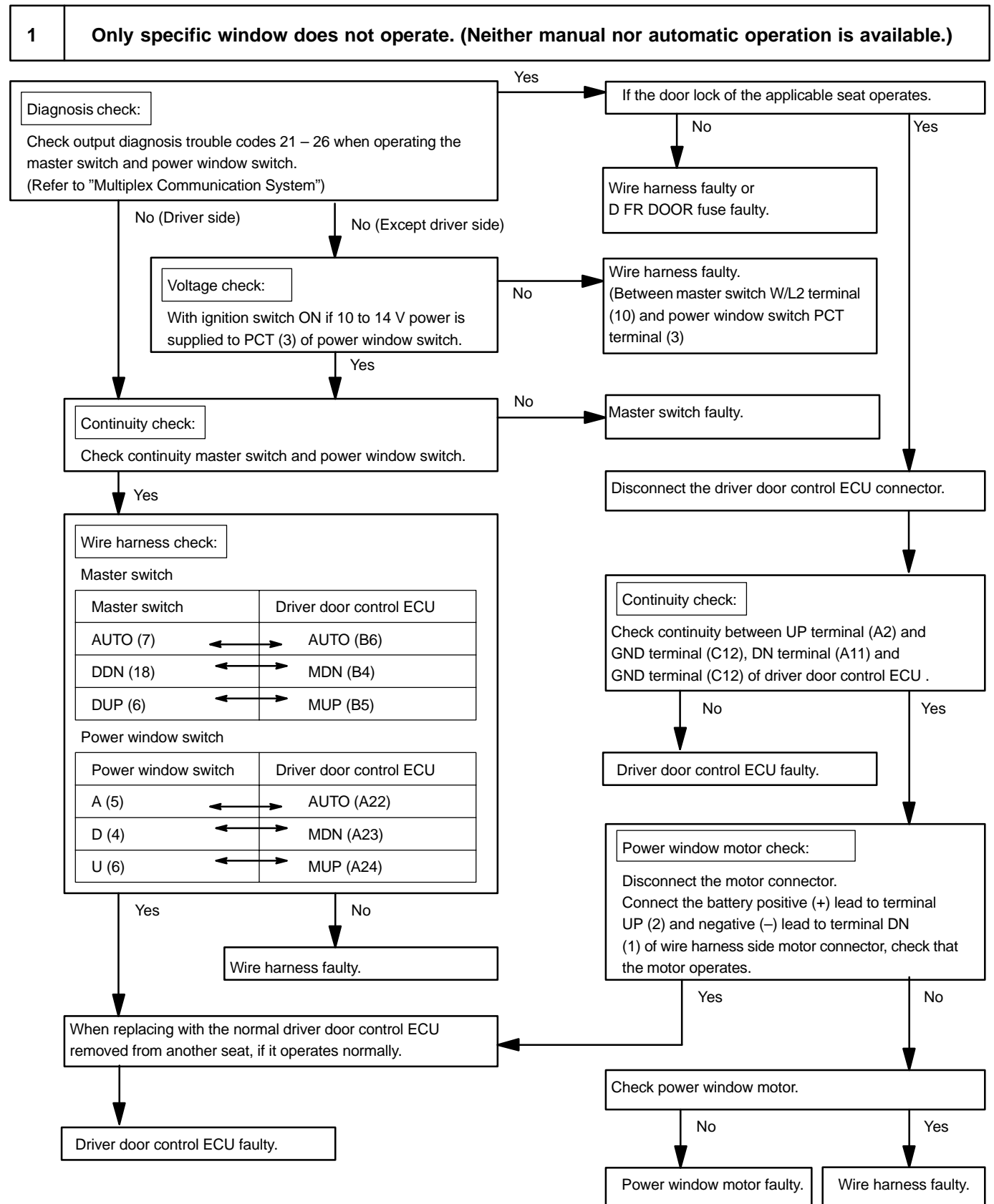
TROUBLESHOOTING

BE02C-02

1. WINDOW DOES NOT OPERATE WITH POWER WINDOW MASTER SWITCH. (MANUAL OR AUTOMATIC OPERATION CAN NOT BE PERFORMED.)

Trouble	Suspect Area (terminal No.)	Parts name
All windows do not operate with master switch of each window.	PWS terminal of body ECU does not output signal. • Body ECU PWS terminal (B8) output • Master Switch PW terminal (15) output • Check wire harness between PWS terminal and PW terminal (15)	• Body ECU • Master switch
Windows except driver's do not operate with master switch of each window.	Master switch (window lock circuit) faulty • Check continuity between master switch PW terminal (15) and W/L2 terminal (10) • Check wire harness between W/L2 terminal of master switch (10) and PCT terminals of each power window switch.	• Master switch
Only specific window does not operate. (Manual and automatic operation can not be performed.)	FLOW CHART <A>	—
Only specific window does not operate. (Automatic operation can not be performed.)	When "Jam Protection" sensor is defective, automatic function as a fail-safe function might be unable.	• Master switch • Power window switch • Door control ECU

FLOW CHART <A>



2. REMOTE CONTROL OF ALL WINDOWS (EXCEPT DRIVER'S) DOES NOT FUNCTION WITH MASTER SWITCH. (WINDOWS OPERATE NORMALLY WITH EACH OF MASTER SWITCHES.)

Trouble	Suspect Area (terminal No.)	Parts name
All windows (except driver's) do not operate by remote control.	Fail-safe mode caused by leaving the master switch ON or short circuit occurred in remote control switch of master switch. ● Check continuity of master switch.	● Master switch
Only passenger's door does not operate. (UP, DOWN and AUTO DOWN do not operate.)	Driver door control ECU DT1 terminal does not output. ● Driver door control ECU DT1 terminal (B3) ● Master switch DT1 terminal (3) ● Check wire harness between terminal DT1 (B3) and DT1 (3)	● Driver door control ECU ● Master switch
Only passenger's door does not operate. (Each operation does not operate.)	Master switch faulty ● Check continuity of master switch.	
Only rear right side door does not operate. (UP, DOWN and AUTO DOWN do not operate.)	Driver door control ECU DT2 terminal does not output. ● Driver door control ECU DT2 terminal (B2) ● Master switch DT2 terminal (11) ● Check wire harness between terminal DT2 (B2) and DT2 (11)	● Driver door control ECU ● Master switch
Only rear right side door does not operate. (Either UP, DOWN or AUTO DOWN does not operate.)	Master switch faulty ● Check continuity of master switch.	
Only rear left side door does not operate. (UP, DOWN and AUTO DOWN do not operate.)	Driver door control ECU DT3 terminal does not output. ● Driver door control ECU DT3 terminal (B1) ● Master switch DT3 terminal (14) ● Check wire harness between terminal DT3 (B1) and DT3 (14)	● Driver door control ECU ● Master switch
Only rear left side door does not operate. (Either UP, DOWN or AUTO DOWN does not operate.)	Master switch faulty ● Check continuity of master switch.	● Driver door control ECU ● Master switch
Only UP operation does not operate. (All window (Except driver side) doors.)	Master switch ON SC2 terminal does not output. Driver door control ECU SC2 terminal does not input. ● Master switch SC2 terminal (12) ● Driver door control ECU SC2 terminal (B10) ● Check wire harness between terminal SC2 (12) and SC2 (B10)	● Driver door control ECU ● Master switch
Only UP operation does not operate. (Only specific window does not operate.)	Master switch faulty ● Check continuity of master switch.	
Only DOWN operation does not operate. (All window (Except driver side) doors.)	Master switch ON SC1 terminal does not output. Driver door control ECU SC1 terminal does not input. ● Master switch SC1 terminal (4) ● Driver door control ECU SC1 terminal (B9) ● Check wire harness between terminal SC1 (4) and SC1 (B9)	● Driver door control ECU ● Master switch
Only DOWN operation does not operate. (Only specific window does not operate.)	Master switch faulty ● Check continuity of master switch.	

Only AUTO DOWN operation does not operate. (All window (Except driver side) doors.)	Master switch ON SC3 terminal does not output. Driver door control ECU SC3 terminal does not input. <ul style="list-style-type: none"> • Master switch SC3 terminal (13) • Driver door control ECU SC3 terminal (B11) • Check wire harness between terminal SC3 (13) and SC3 (B11) 	<ul style="list-style-type: none"> • Driver door control ECU • Master switch
Only AUTO DOWN operation does not operate. (Only specific window does not operate.)	Master switch faulty <ul style="list-style-type: none"> • Check continuity of master switch. 	

3. THE KEY RELATED POWER WINDOW OPERATION DOES NOT OPERATE WITH DRIVER SIDE DOOR KEY CYLINDER. (MASTER SWITCH OPERATION IS NORMAL.)

Trouble	Suspect Area (terminal No.)	Parts name
Door lock system does not operate with door key.	Refer to "POWER DOOR LOCK CONTROL SYSTEM".	–
Door lock system does not operate with door key.	Fail-safe mode caused by error on jam protection sensor of power window. (Operation of power window with multi-function transmitter is prohibited.) HINT: DTC 31 – 38 output	Refer to "Multiplex Communication System".

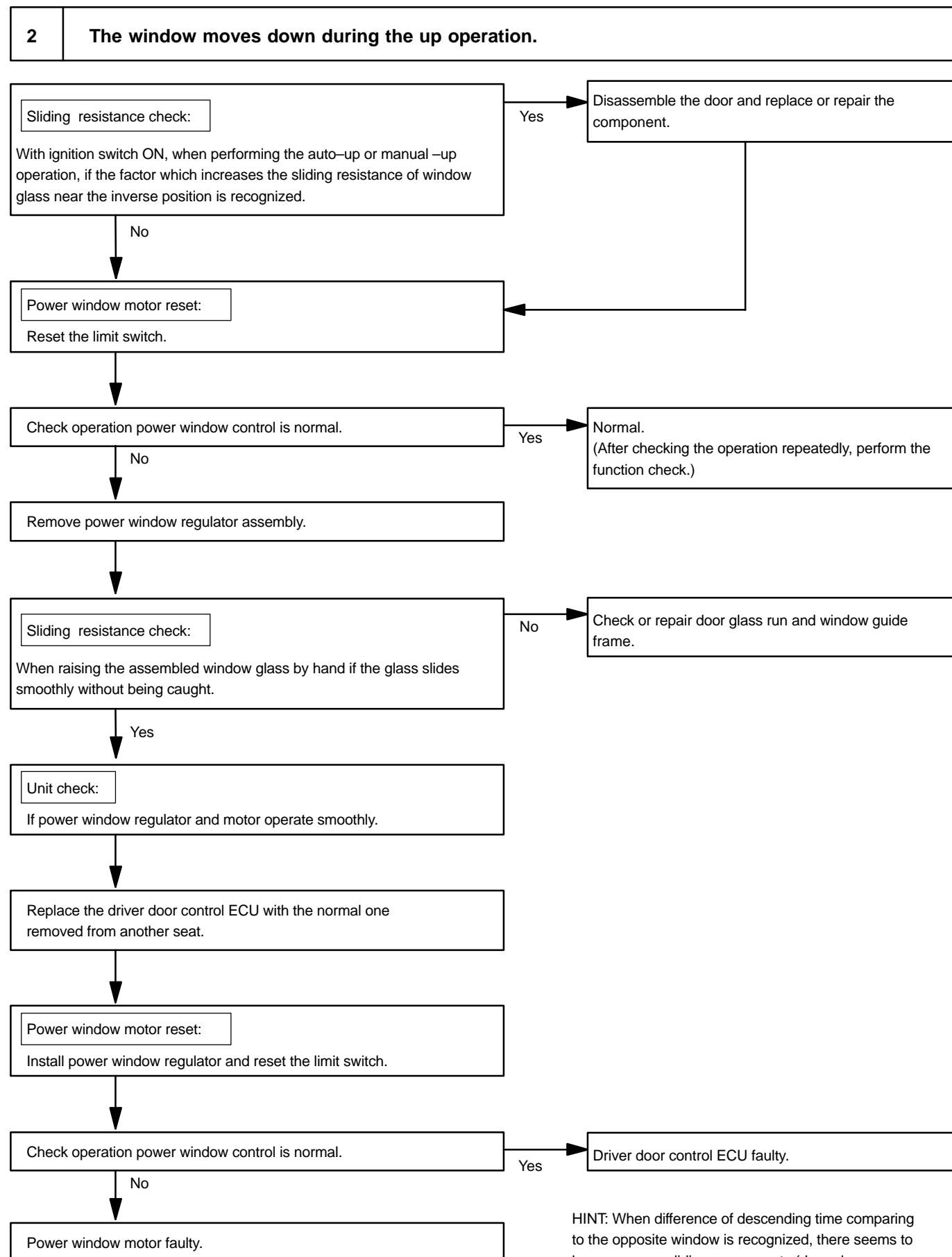
4. POWER WINDOW DOES NOT OPERATE WITH MULTI-FUNCTION TRANSMITTER. (WINDOWS OPERATE NORMALLY WITH MASTER SWITCH.)

Trouble	Suspect Area (terminal No.)	Parts name
Door lock and luggage compartment opener do not operate with multi-function transmitter.	Refer to "WIRELESS DOOR LOCK CONTROL SYSTEM".	–
Only luggage compartment opener operates with multi-function transmitter.	Wireless door lock transmitter faulty.	Check wireless door lock transmitter.
Door lock and luggage compartment opener operate with multi-function transmitter.	Fail-safe mode caused by error on jam protection sensor of power window. (Operation of power window with multi-function transmitter is prohibited.) HINT: DTC 31 – 38 output	Refer to "Multiplex Communication System".

5. WINDOW MOVES DOWN WITHOUT BEING ORDERED DURING THE UP OPERATION

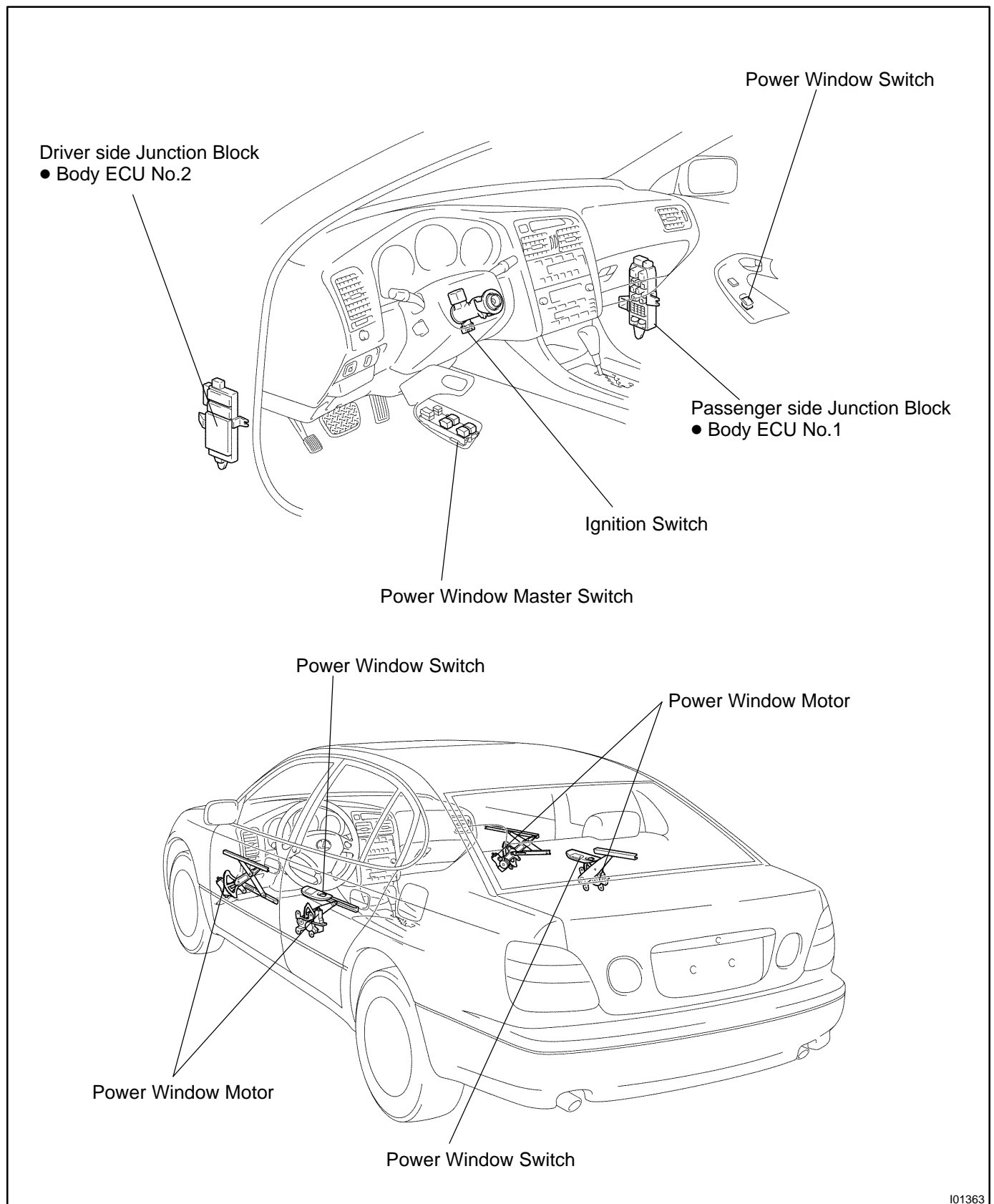
Trouble	Suspect Area (terminal No.)	Parts name
After the window is fully closed, it starts to move down.	Power window motor limit switch wire harness faulty. <ul style="list-style-type: none"> • Power window motor reset switch is reset. • Driver door control ECU LMT terminal (B12) 	<ul style="list-style-type: none"> • Driver door control ECU
The window moves down during the up operation.	FLOW CHART 	–

FLOW CHART

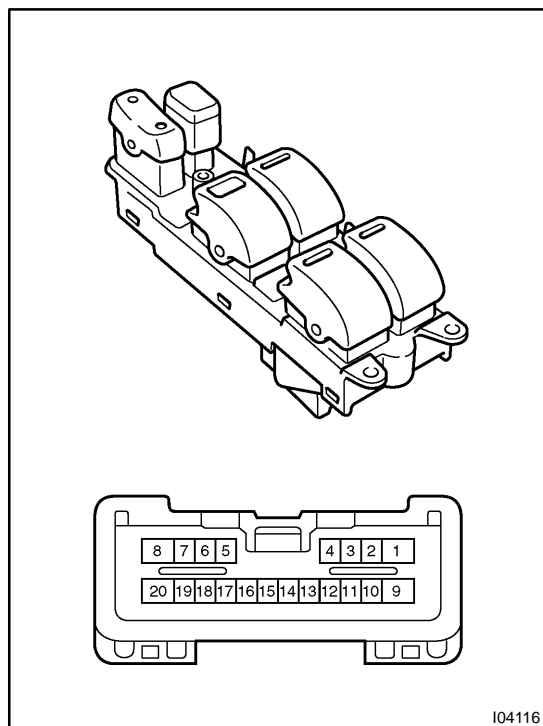


HINT: When difference of descending time comparing to the opposite window is recognized, there seems to be an error on sliding components (door glass run and window regulator.)

LOCATION



I01363



I04116

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

Front driver's switch:

Switch position	Tester connection	Specified condition
AUTO	7 – 16	Continuity
UP	6 – 16	Continuity
OFF	–	No continuity
DOWN	16 – 18	Continuity

Front passenger's switch:

Switch position	Tester connection	Specified condition
AUTO	3 – 13	Continuity
UP	3 – 12	Continuity
OFF	–	No continuity
DOWN	3 – 4	Continuity

Rear left switch:

Switch position	Tester connection	Specified condition
AUTO	13 – 14	Continuity
UP	12 – 14	Continuity
OFF	–	No continuity
DOWN	4 – 14	Continuity

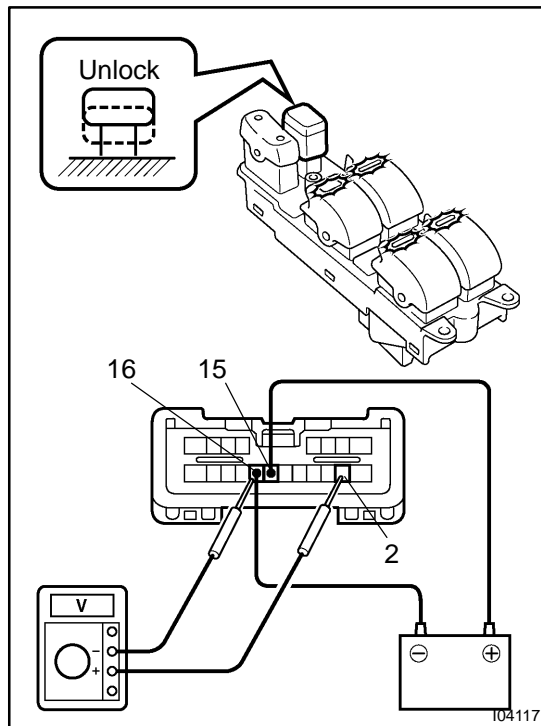
Rear right switch:

Switch position	Tester connection	Specified condition
UP AUTO	11 – 13	Continuity
UP	11 – 12	Continuity
OFF	–	No continuity
DOWN	4 – 11	Continuity

If continuity is not as specified, replace the master switch.

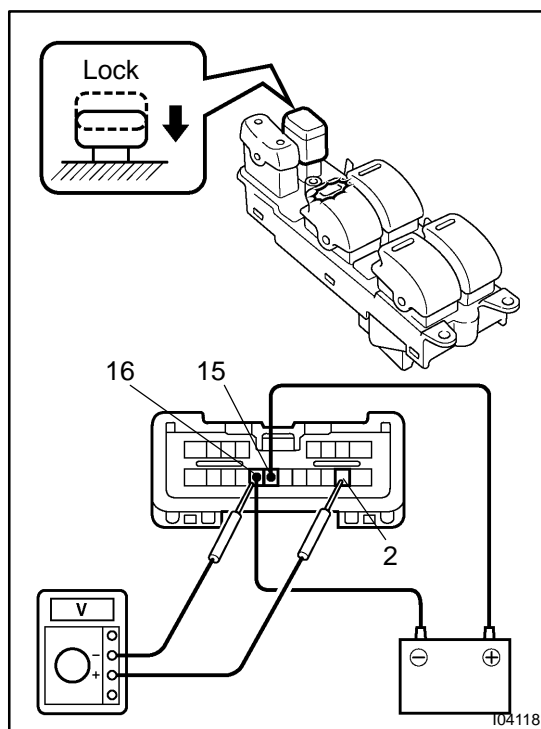
2. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

(See page [DI-866](#))



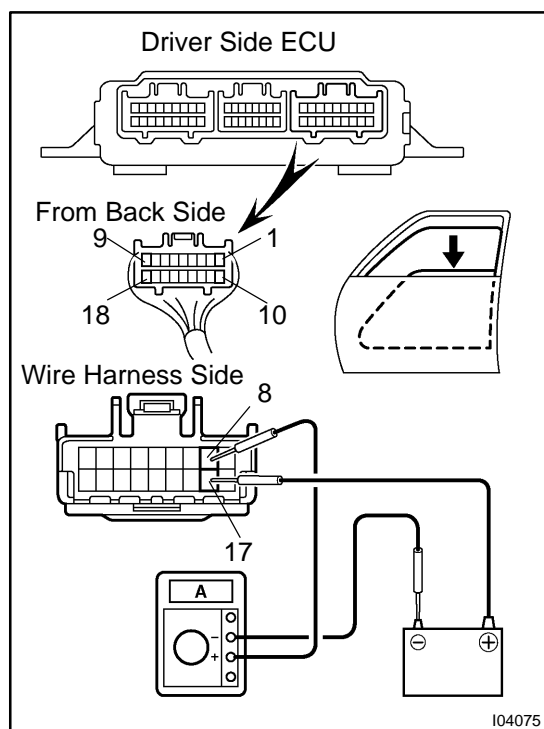
3. INSPECT POWER WINDOW MASTER SWITCH ILLUMINATION

- (a) Set the window lock switch to the unlock position.
- (b) Connect the positive (+) lead from the battery to terminal 15 and the negative (-) lead to terminal 16, and check that all the illuminations light up.
- (c) Connect the positive (+) lead from the voltmeter to terminal 15 and negative (-) lead to terminal 2, and check that the voltage meter needle indicates battery positive voltage.



- (d) Set the window lock switch to the lock position, check that all the passenger's power window switch illuminations go out.
- (e) Then, check that the voltage meter needle indicates no voltage.

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



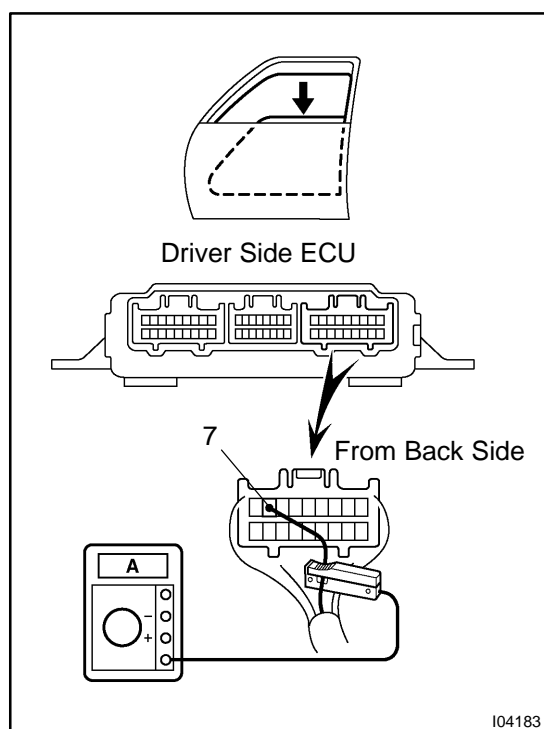
4. INSPECT ONE TOUCH POWER WINDOW SYSTEM/CURRENT OF CIRCUIT (Using an ammeter)

- Disconnect the connector from the driver door ECU.
- Connect the positive (+) lead from the ammeter to terminal 8 on the wire harness side connector and the negative (–) lead to negative (–) terminal of the battery.
- Connect the positive (+) lead from the battery to terminal 17 on the wire harness side connector.
- As the window goes down, check that the current flow is approximately 7 A.
- Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:

The PTC opens some 4 – 90 seconds after the window stops going down, so that check must be made before the PTC operates.

If the operation is as specified, replace the driver door ECU.



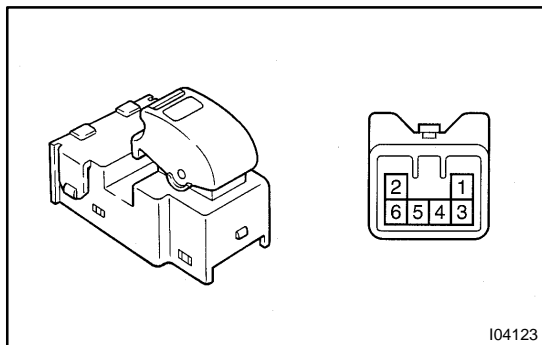
5. INSPECT ONE TOUCH POWER WINDOW SYSTEM/CURRENT OF CIRCUIT (Using an ammeter with a current-measuring probe)

- Remove the driver door ECU with connectors connected.
- Attach a current-measuring probe to terminal 7 of the wire harness.
- Turn the ignition switch ON and set the power window switch in the down position.
- As the window goes down, check that the current flow is approximately 7 A.
- Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:

The PTC opens some 4 – 90 seconds after the window stops going down, so that check must be made before the PTC operates.

If operation is as specified, replace the driver door ECU.

**6. INSPECT POWER WINDOW SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
AUTO	3 – 5	Continuity
UP	3 – 6	Continuity
OFF	–	No continuity
DOWN	3 – 4	Continuity

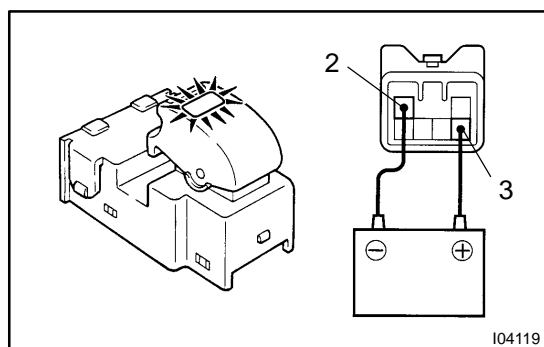
If continuity is not as specified, replace the switch.

7. INSPECT POWER WINDOW SWITCH CIRCUIT

Passenger side: (See page [DI-908](#))

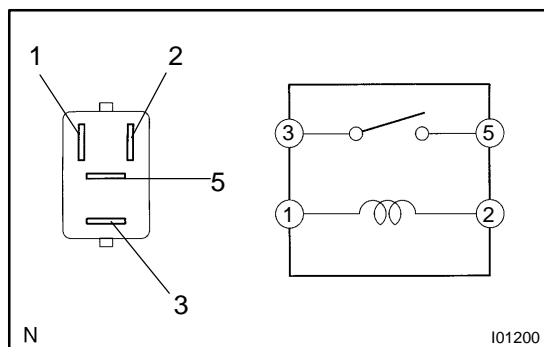
Rear LH side: (See page [DI-936](#))

Rear RH side: (See page [DI-953](#))

**8. INSPECT POWER WINDOW SWITCH ILLUMINATION**

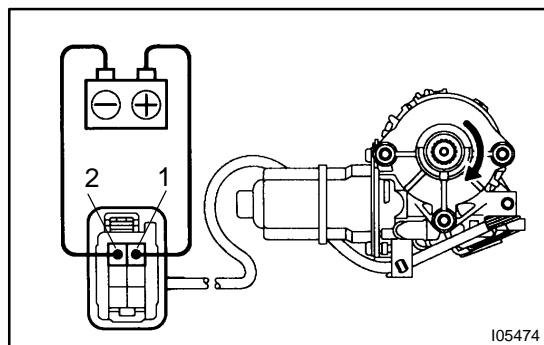
Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the indicator light lights up.

If operation is not as specified, replace the switch.

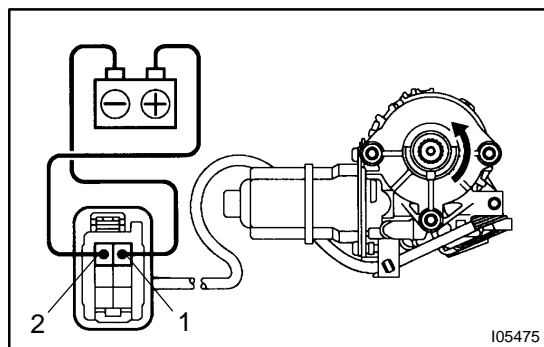
**9. INSPECT POWER MAIN RELAY CONTINUITY**

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

If continuity is not as specified, replace the relay.

10. INSPECT POWER MAIN RELAY CIRCUIT
(See page [BE-21](#))**11. Driver's door:****INSPECT POWER WINDOW MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.



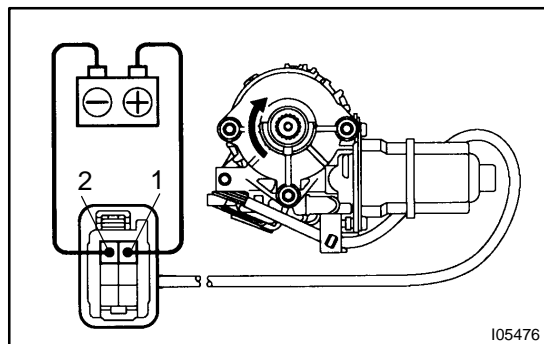
- (b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.

12. Driver's door:

INSPECT POWER WINDOW MOTOR CIRCUIT

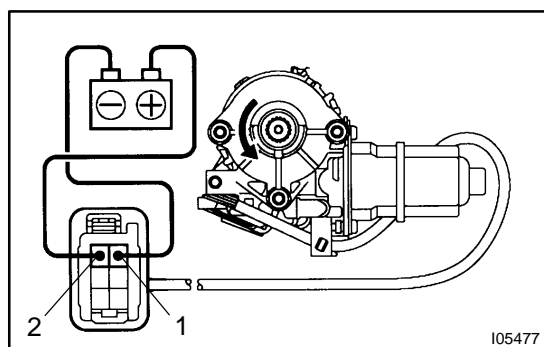
(See page [DI-876](#))



13. Front passenger's door:

INSPECT POWER WINDOW MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.



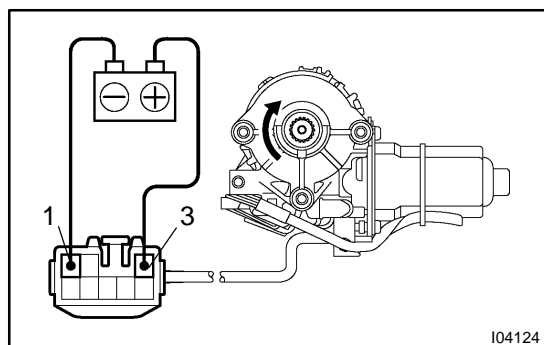
- (b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.

14. Front passenger's door:

INSPECT POWER WINDOW MOTOR CIRCUIT

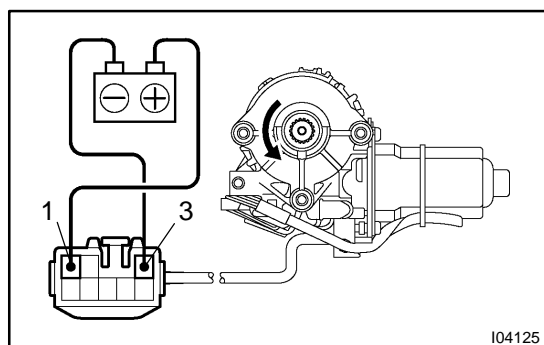
(See page [DI-910](#))



15. Rear left side door:

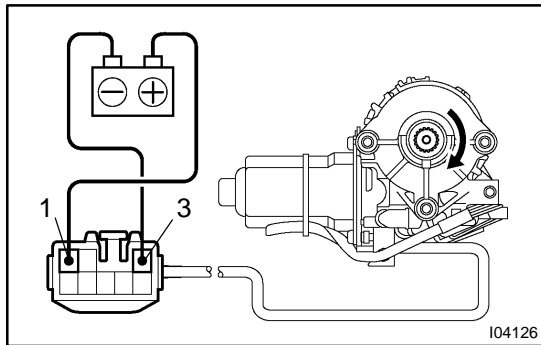
INSPECT POWER WINDOW MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 1, and check that the motor turns clockwise.

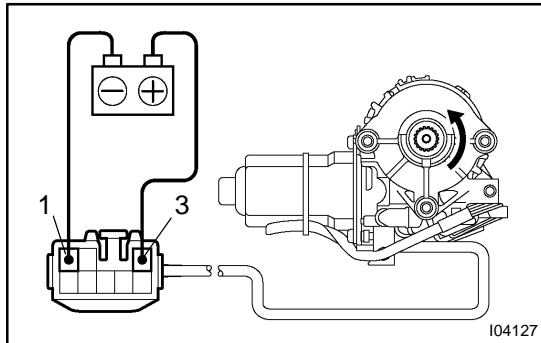


- (b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.

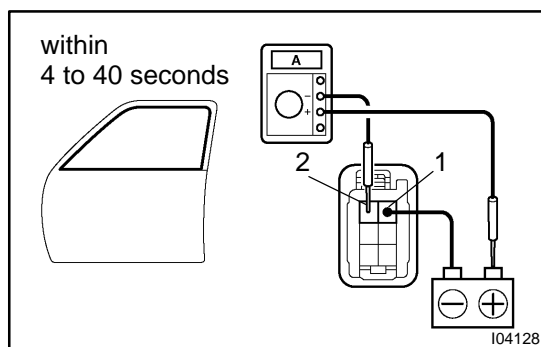
**16. Rear right side door:****INSPECT POWER WINDOW MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 3, and check that the motor turns clockwise.



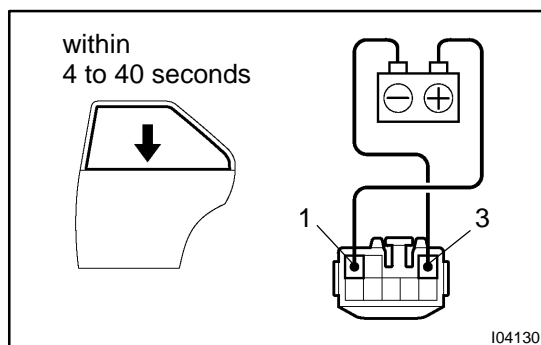
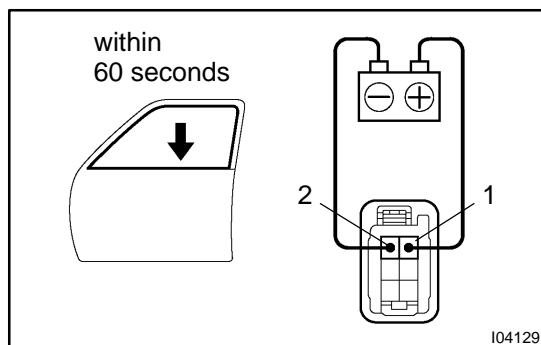
- (b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the motor.

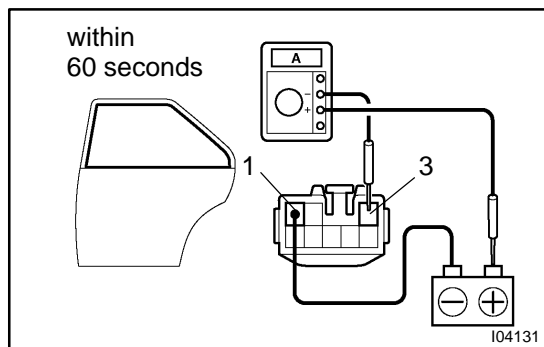
**17. Front door:****INSPECT POWER WINDOW MOTOR PTC OPERATION**

- (a) Disconnect the connector from the master switch.
 (b) Connect the positive (+) lead from the battery to terminal 2 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 PTC operation noise within approximately 4 to 90 seconds.
 (d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

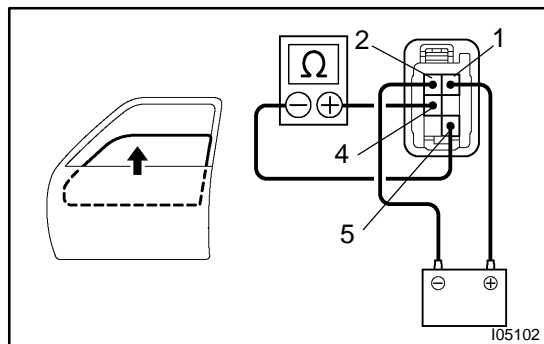
If operation is not as specified, replace the motor.

**18. Rear door:****INSPECT POWER WINDOW MOTOR PTC OPERATION**

- (a) Disconnect the connector from the rear door ECU.
 (b) Connect the positive (+) lead from the battery to terminal 3 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 PTC operation noise within approximately 4 to 90 seconds.

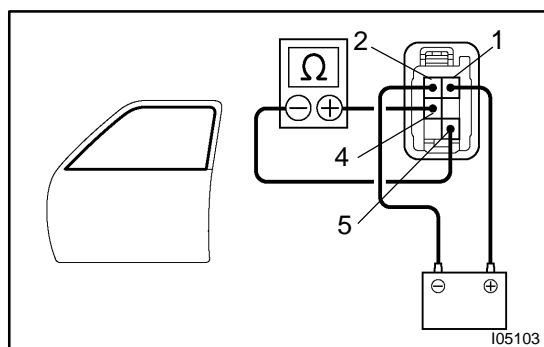


- (d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.
If operation is not as specified, replace the motor.



**19. Driver's door (window up):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- (a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 5.
(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
(c) Check that the continuity exists when the window goes up.

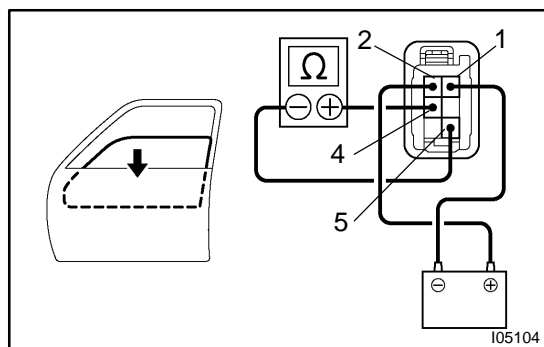


- (d) Check that no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

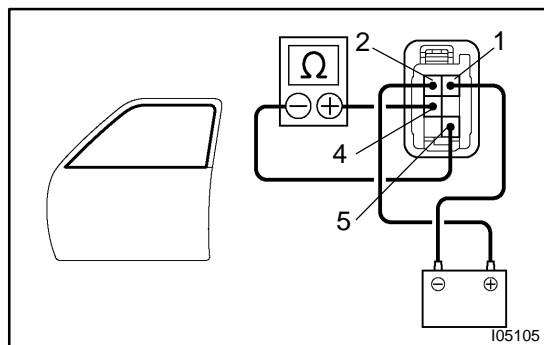
NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.



**20. Driver's door (window down):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- (a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 5.
(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
(c) Check that the continuity exists when the window goes down.



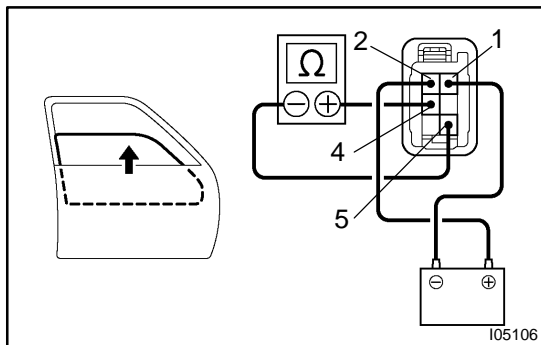
- (d) Check that no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.

NOTICE:

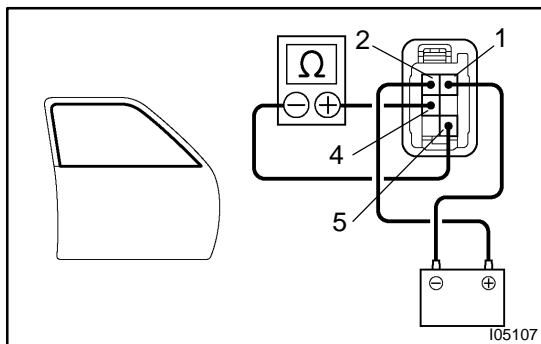
If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.

**21. Driver's Door:
INSPECT JAM PROTECTION LIMIT SWITCH CIRCUIT
(See page DI-878)**



**22. Front passenger's door (window up):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
- Check that the continuity exists when the window goes up.

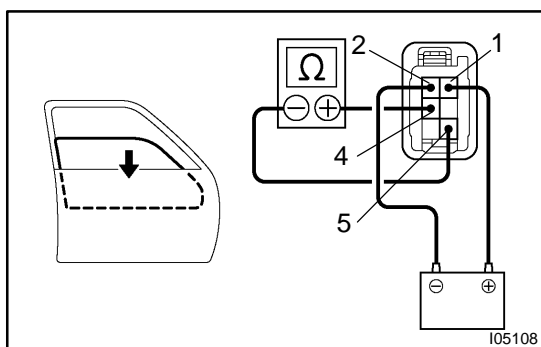


- Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

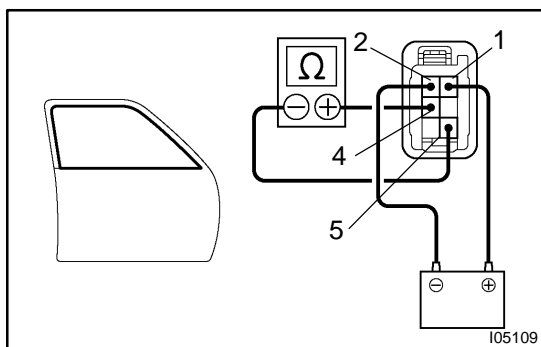
NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.



**23. Front passenger's door (window down):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
- Check that the continuity exists when the window goes down.



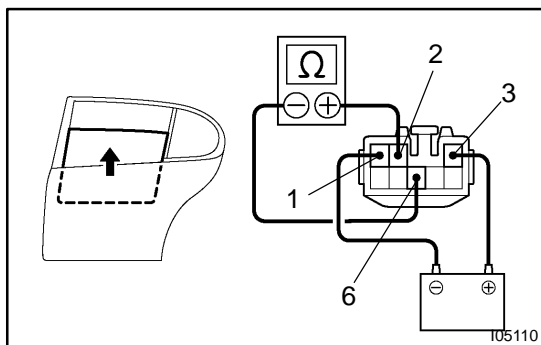
- Check that the no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.

NOTICE:

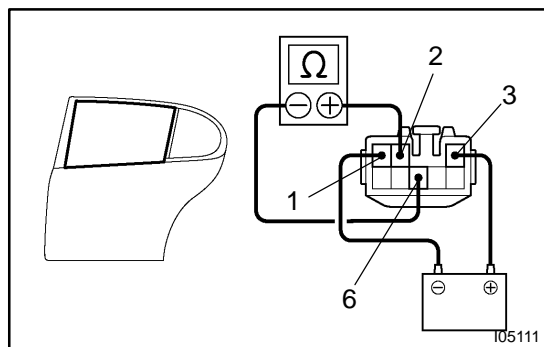
If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.

**24. Passenger's Door:
INSPECT JAM PROTECTION LIMIT SWITCH CIRCUIT
(See page DI-912)**



**25. Rear LH side door (window up):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 6.
- Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 1.
- Check that the continuity exists when the window goes up.

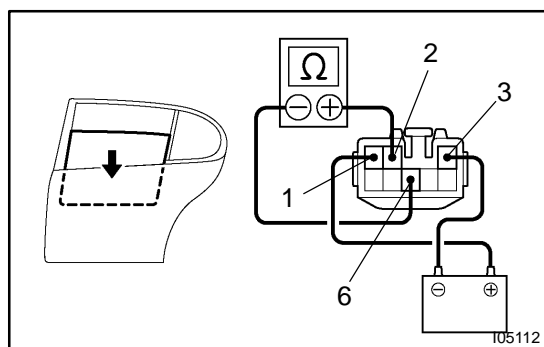


- (d) Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

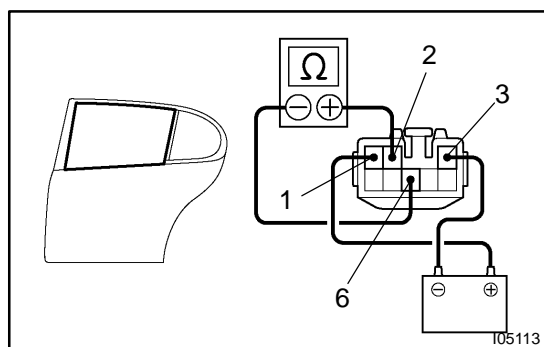
NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.



**26. Rear LH side door (window down):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 6.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3.
- Check that the continuity exists when the window goes down.

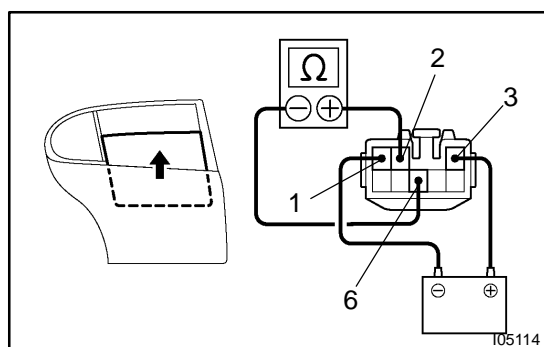


- (d) Check that the no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.

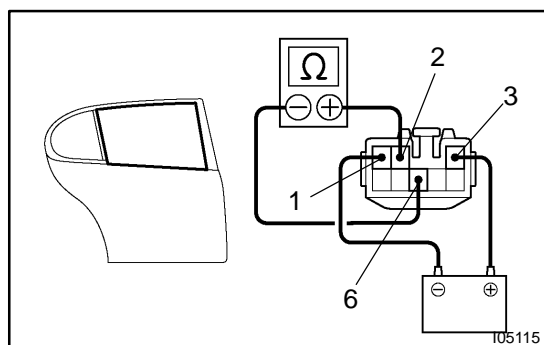
NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.



**27. Rear RH side door (window up):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 6.
- Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 1.
- Check that the continuity exists when the window goes up.

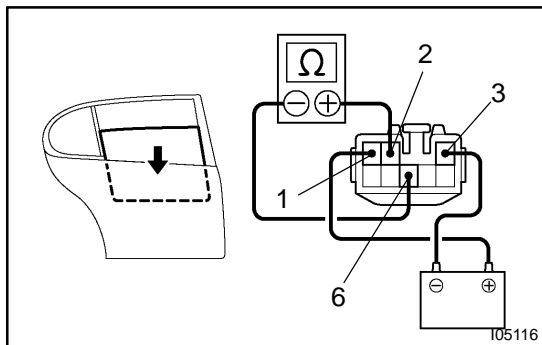


- (d) Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

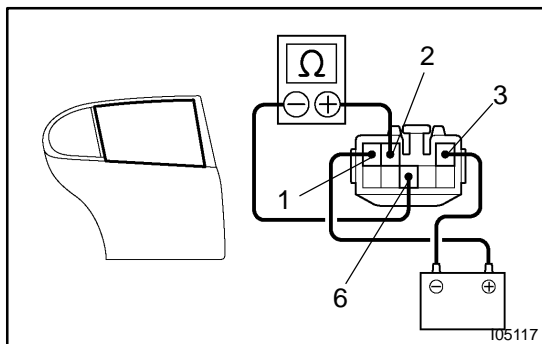
NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.



**28. Rear RH side door (window down):
INSPECT JAM PROTECTION LIMIT SWITCH OPERATION**

- Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 6.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3.
- Check that the continuity exists when the window goes down.

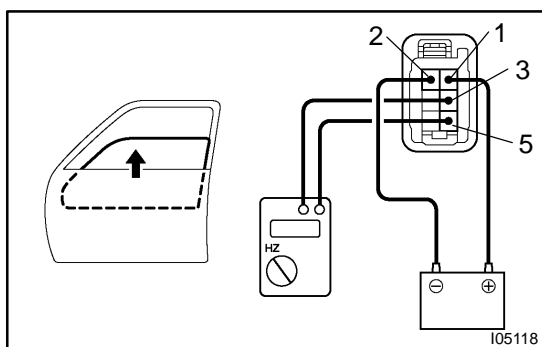


- Check that the no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.

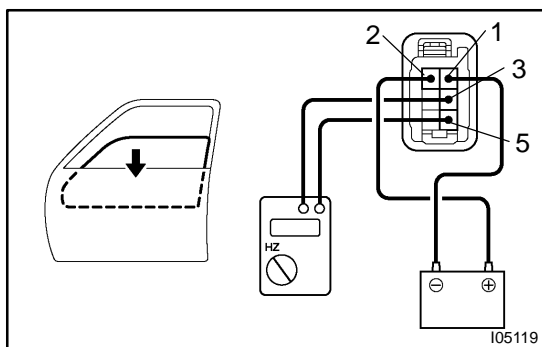
NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.



**29. Driver's door:
INSPECT JAM PROTECTION PULSE SWITCH OPERATION**

- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
- Check that pulse is generated during the motor running.

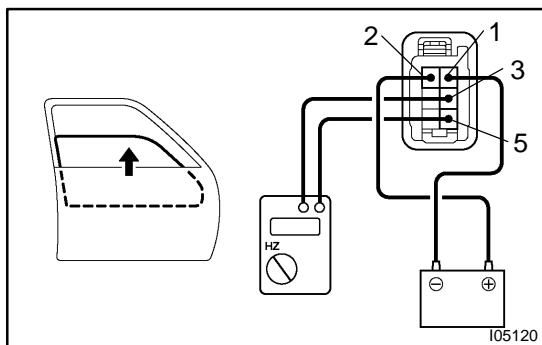


- Reverse the polarity and check that pulse is generated.
- If operation is not as specified, replace the motor.

NOTICE:

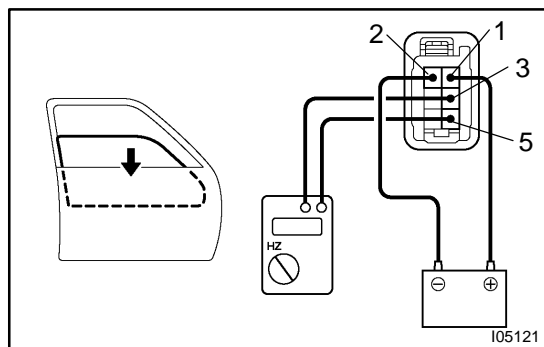
If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.

**30. Driver's door:
INSPECT JAM PROTECTION PULSE SWITCH CIRCUIT
(See page DI-880)**



**31. Front passenger's door:
INSPECT JAM PROTECTION PULSE SWITCH OPERATION**

- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
- Check that pulse is generated during the motor running.



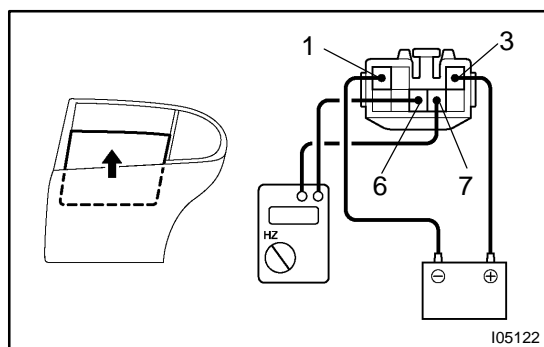
- (d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

NOTICE:

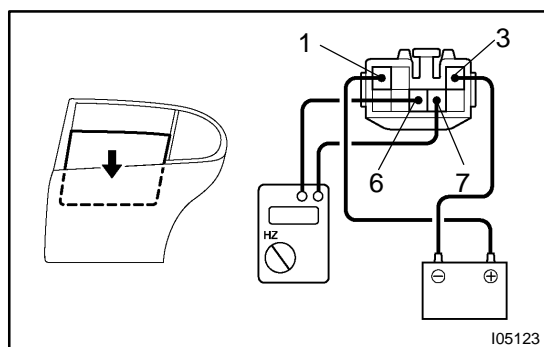
If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.

32. Front passenger's door:**INSPECT JAM PROTECTION PULSE SWITCH CIRCUIT**

(See page [DI-914](#))

**33. Rear LH side door:****INSPECT JAM PROTECTION PULSE SWITCH**

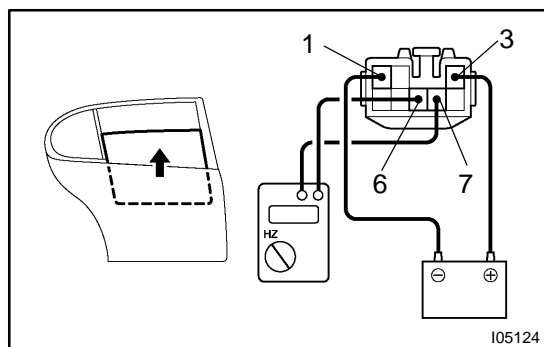
- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1.
- Check that pulse is generated during the motor running.



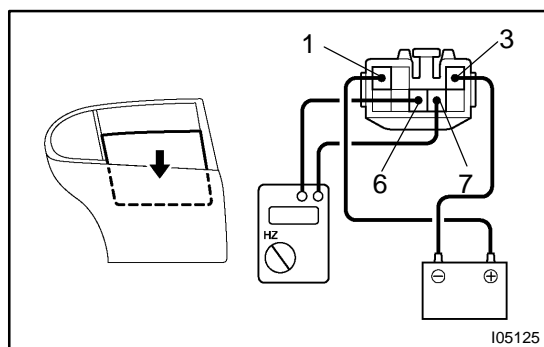
- (d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.

**34. Rear RH side door:****INSPECT JAM PROTECTION PULSE SWITCH**

- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Check that pulse is generated during the motor running.



- (d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

NOTICE:

If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.

35. CHECKING OF THE JAM PROTECTION FUNCTION**NOTICE:**

Never, ever be caught any part of your body when checking.

HINT:

In case of performing resetting of the limit switch, do checking after repeating up and down of the glass with automatic operation.

- (a) Confirmation of AUTO up operation:
Confirm that the window will be fully close with AUTO up operation.
- (b) Checking of the operation of the jam protection function:
 - (1) Move up the window with AUTO up operation and check that the window will go down when it touches the handle of the hammer setted.
 - (2) Confirm that the window will then stop going down about 200 mm.

HINT:

In case of removing the glass, glass guide, regulator and etc. be sure to perform checking of the jam protection function.

If the jam protection is not function properly, adjust power window motor reset switch and pulse switch.

ADJUSTMENT

HOW TO RESET POWER WINDOW MOTOR (RESET SWITCH AND PULSE SWITCH)

If the jam protection is not functioned properly, perform the following procedure.

HINT:

It is necessary to reset the power window motor (in initial position for the limit switch) when separating the window regulator from the power window motor or operating the window regulator with the door glass not installed.

(a) Remove the power window motor. (See page [BO-12](#), [BO-18](#))

HINT:

Place the matchmarks on the power window motor and window regulator gear.

(b) Connect the power window motor and power window switch to wire harness of the vehicle.

(c) Turn the ignition switch ON and operate the power window switch to idle the power window motor in UP side direction for more than 6 rotations or less than 10 rotates (4 seconds or more).

(d) Assemble the power window motor and regulator.

HINT:

- Install the motor when the regulator arm is below the middle point.
- Align the matchmarks on the power window motor and window regulator gear when install the power window motor.

(e) Assemble the power window regulator and door glass.

HINT:

Never rotate the motor to the down direction until the completion of the window glass installation.

(f) Connect power window switch to wire harness and turn the ignition switch ON.

(g) Repeat UP and DOWN operation several times manually.

(h) Check if AUTO UP → AUTO DOWN operates in automatic operation.

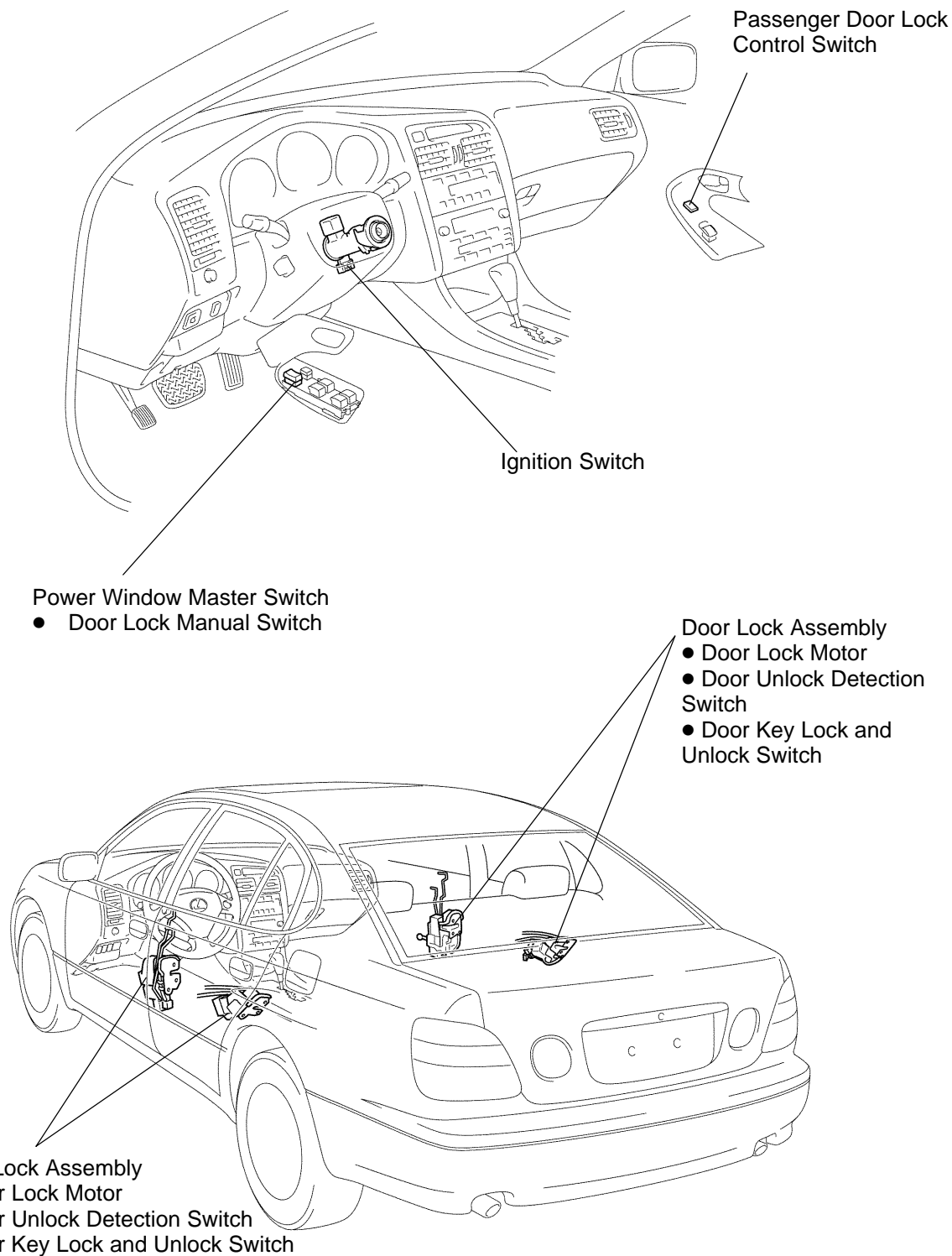
HINT:

- Take care that the jam protection function does not operate just after resetting.
 - Reset the regulator again when performing the reverse operating after closing the window fully by AUTO UP operation.
- (i) Check the power window function.

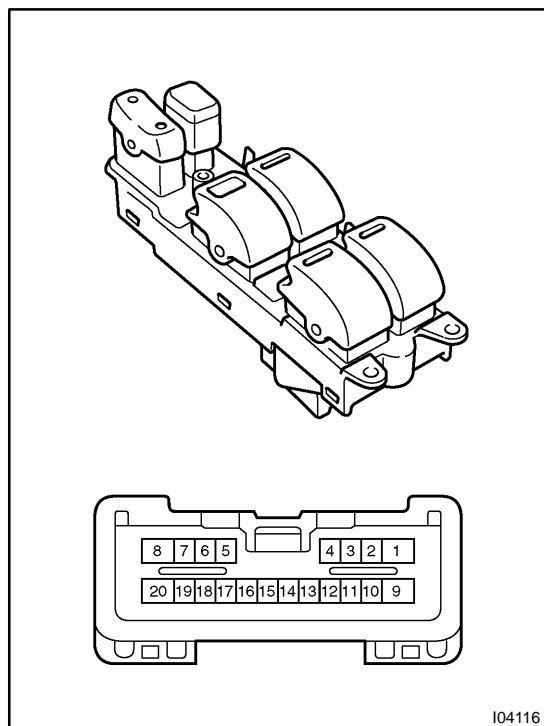
POWER DOOR LOCK CONTROL SYSTEM

LOCATION

BE0HQ-11



I01364



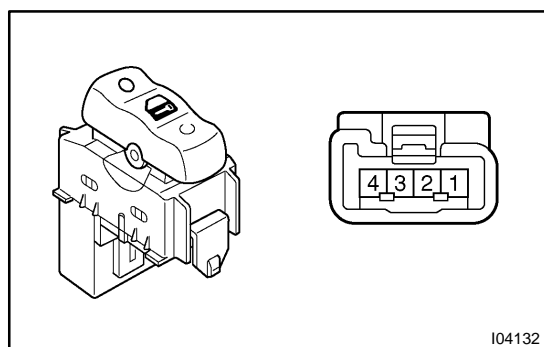
INSPECTION

1. **Master switch:**
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	5 – 16	Continuity
OFF	–	No continuity
UNLOCK	16 – 17	Continuity

If continuity is not as specified, replace the switch.

2. **Master switch:**
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CIRCUIT
(See page [DI-866](#))

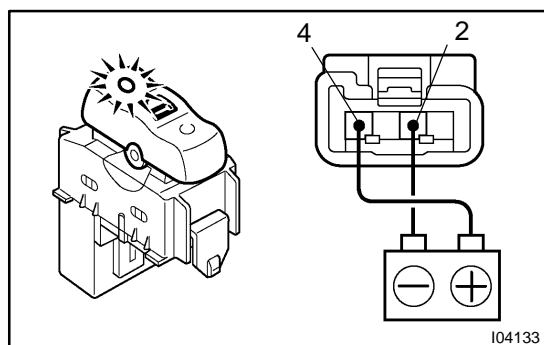


3. **INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
LOCK	2 – 3	Continuity
OFF	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

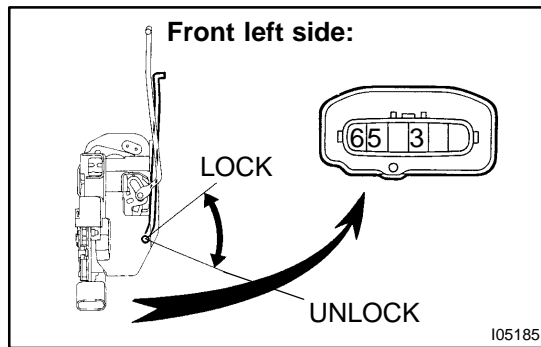
4. **INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CIRCUIT**
(See page [DI-898](#))



5. **INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH ILLUMINATION**

Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 2, and check that the indicator light lights up.

If operation is not as specified, replace the switch.

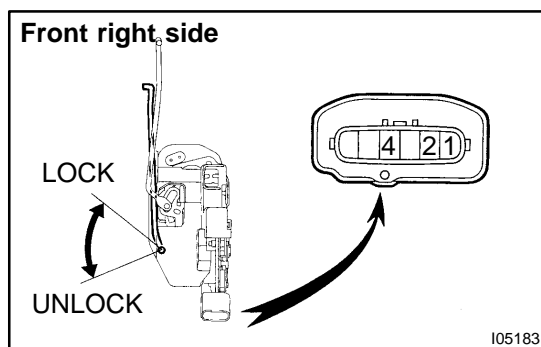


**6. Front left side door:
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH
CONTINUITY**

Switch position	Tester connection	Specified condition
LOCK	3 – 5	Continuity
OFF	–	No continuity
UNLOCK	3 – 6	Continuity

If continuity is not as specified, replace the switch.

**7. Front left side door:
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH
CIRCUIT
(See page [DI-872](#))**

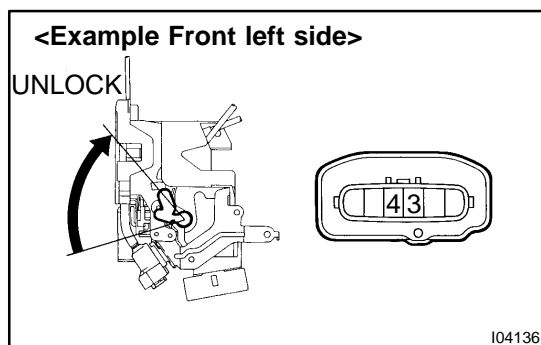


**8. Front right side door:
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH
CONTINUITY**

Switch position	Tester connection	Specified condition
LOCK	2 – 4	Continuity
OFF	–	No continuity
UNLOCK	1 – 4	Continuity

If continuity is not as specified, replace the switch.

**9. Front right side door:
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH
CIRCUIT
(See page [DI-904](#))**



**10. Front door:
INSPECT DOOR UNLOCK DETECTION SWITCH CON-
TINUITY**

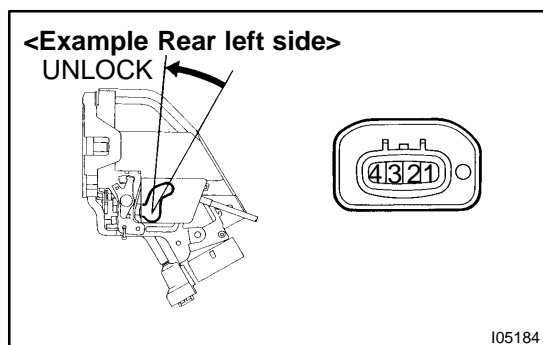
Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	3 – 4	Continuity

If continuity is not as specified, replace the switch.

11. Front door:
INSPECT DOOR UNLOCK DETECTION SWITCH CIRCUIT

Driver side: (See page [DI-870](#))

Passenger side (See page [DI-902](#))



12. Rear door:
INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

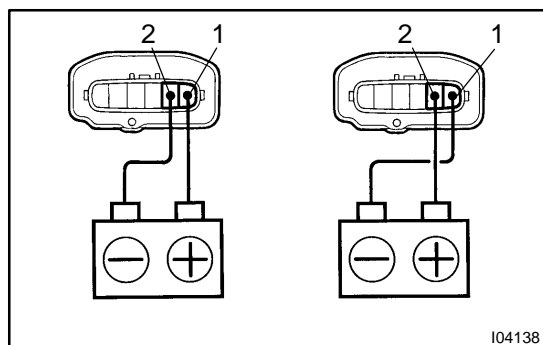
Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	—	No continuity
ON (Door Lock set to UNLOCK)	3 – 4 (Left side) 1 – 2 (right side)	Continuity

If continuity is not as specified, replace the switch.

13. Rear door:
INSPECT DOOR UNLOCK DETECTION SWITCH CIRCUIT

Rear LH side (See page [DI-932](#))

Rear RH side (See page [DI-949](#))

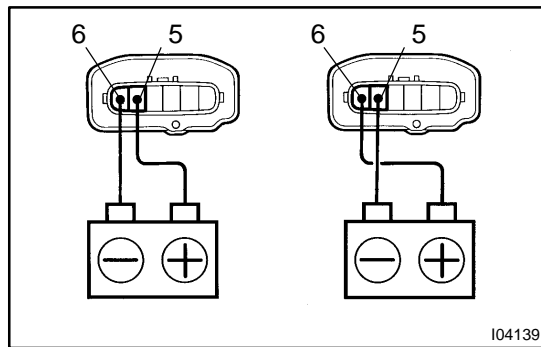


14. Front left side door:
INSPECT DOOR LOCK MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the door lock link moves to UNLOCK position.
- Reverse the polarity and check that the door lock link moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

15. Front left side door:
INSPECT DOOR LOCK MOTOR CIRCUIT
 (See page [DI-868](#))

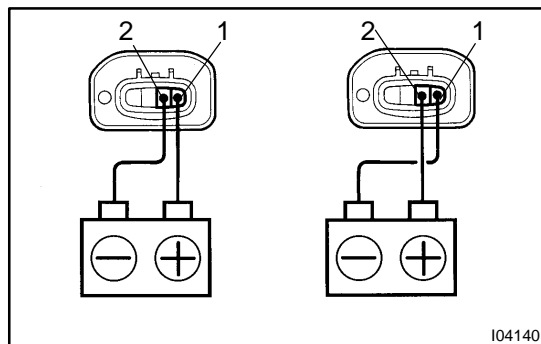
**16. Front right side door:****INSPECT DOOR LOCK MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 6, and check that the door lock link moves to UNLOCK position.
- (b) Reverse the polarity and check that the door lock link moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

17. Front right side door:**INSPECT DOOR LOCK MOTOR CIRCUIT**

(See page [DI-900](#))

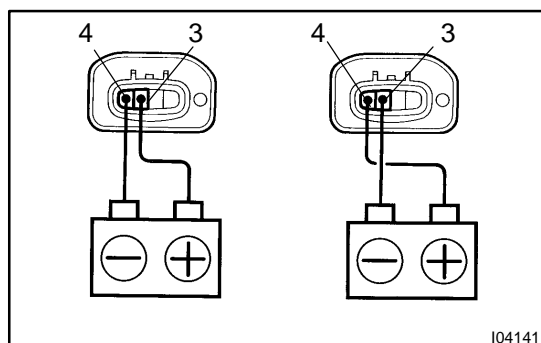
**18. Rear left side door:****INSPECT DOOR LOCK MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the door lock link moves to UNLOCK position.
- (b) Reverse the polarity and check that the door lock link moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

19. Rear left side door:**INSPECT DOOR LOCK MOTOR CIRCUIT**

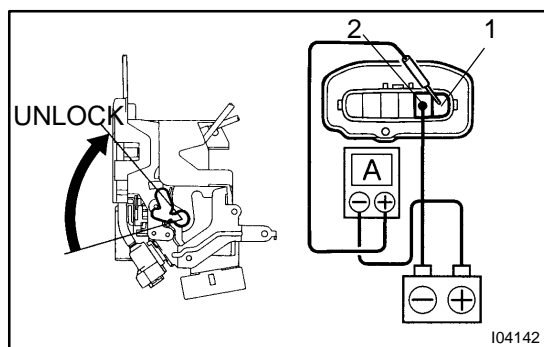
(See page [DI-930](#))

**20. Rear right side door:****INSPECT DOOR LOCK MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 4, and check that the door lock link moves to UNLOCK position.
- (b) Reverse the polarity and check that the door lock link moves to LOCK position.

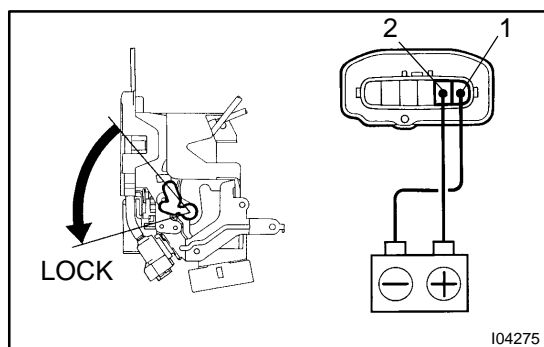
If operation is not as specified, replace the door lock assembly.

**21. Rear right side door:
INSPECT DOOR LOCK MOTOR CIRCUIT**
(See page [DI-947](#))



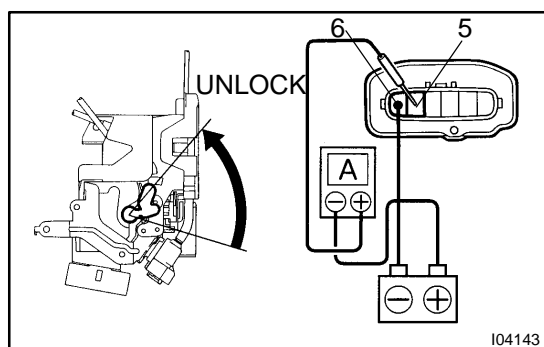
**22. Front left side door:
INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

- Connect the negative (–) lead from the battery to terminal 2.
- Connect the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



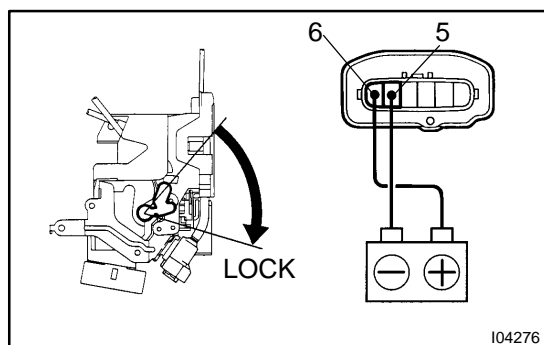
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.



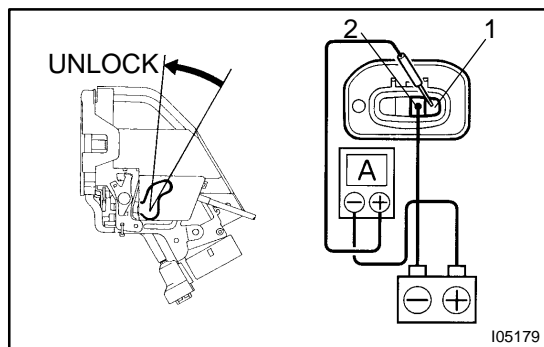
**23. Front right side door:
INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

- Connect the negative (–) lead from the battery to terminal 6.
- Connect the positive (+) lead from the ammeter to terminal 5 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



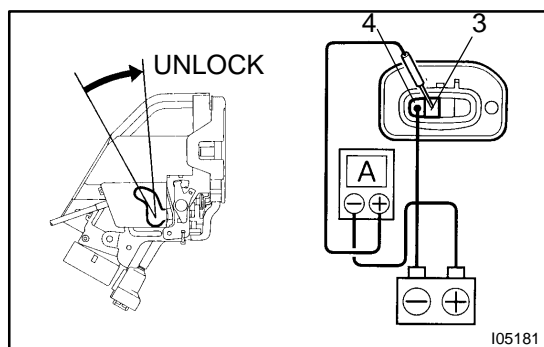
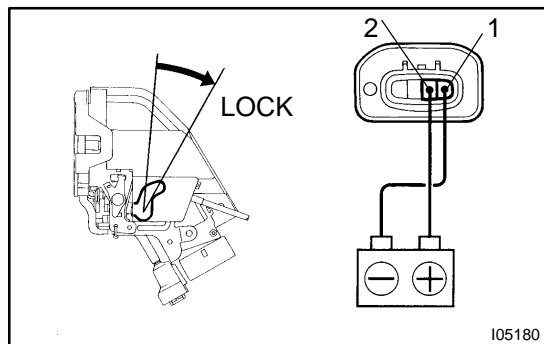
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 5, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.

**24. Rear left side door:****INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

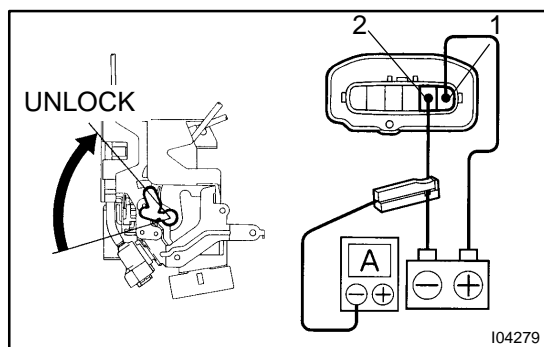
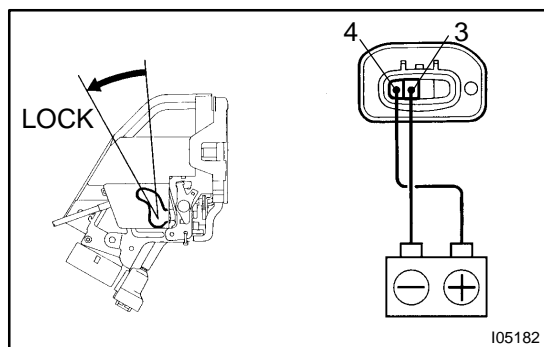
- Connect the negative (–) lead from the battery to terminal 2.
- Connect the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.

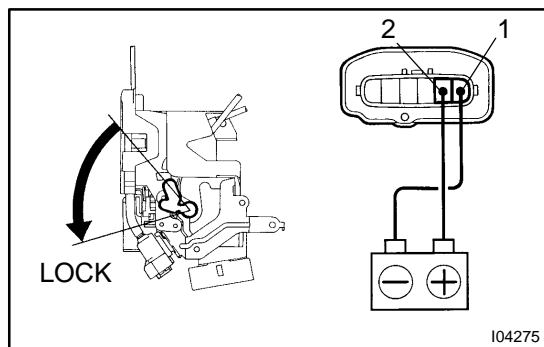
**25. Rear right side door:****INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

- Connect the negative (–) lead from the battery to terminal 4.
- Connect the positive (+) lead from the ammeter to terminal 3 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 3, and check that the door lock moves to the LOCK position.

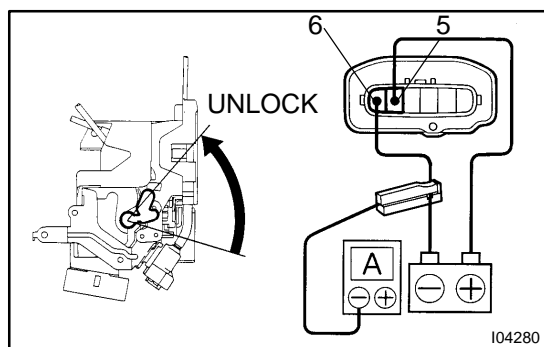
If operation is not as specified, replace the door lock assembly.

**26. Front left side door:****INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)**

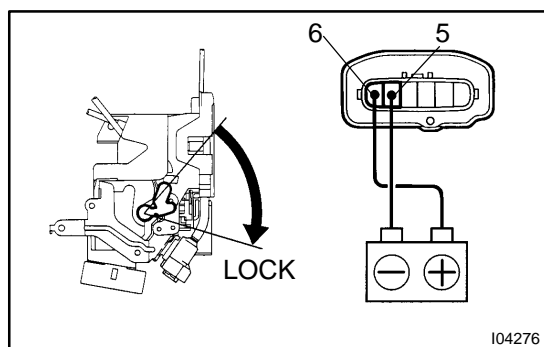
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
- Attach a current-measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



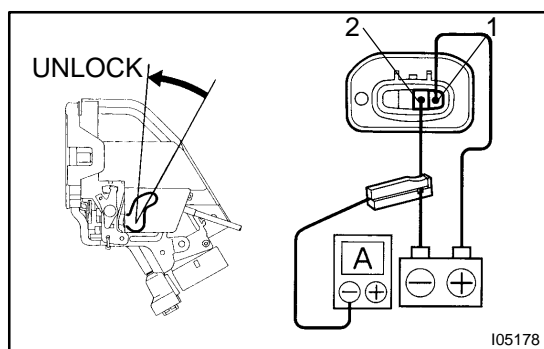
- (c) Disconnect the leads from terminals.
 - (d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.
- If operation is not as specified, replace the door lock assembly.



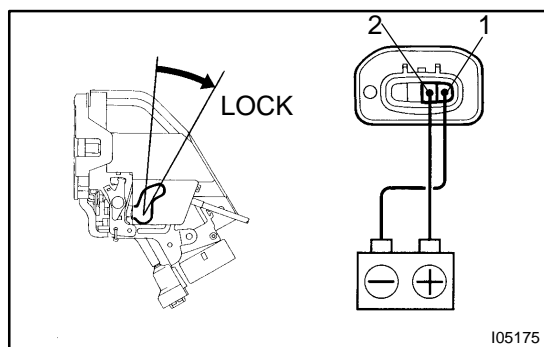
- 27. Front right side door:**
INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)
- (a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6.
 - (b) Attach a current-measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



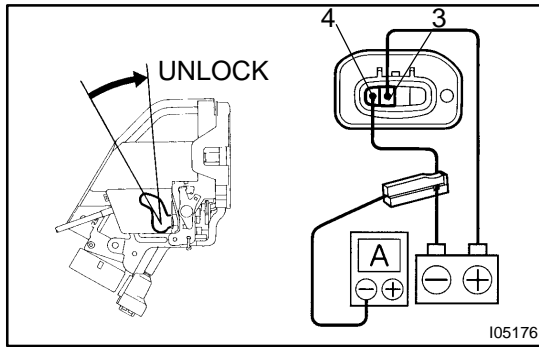
- (c) Disconnect the leads from terminals.
 - (d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.
- If operation is not as specified, replace the door lock assembly.



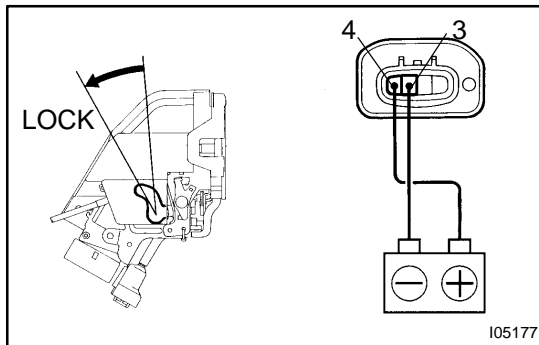
- 28. Rear left side door:**
INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
 - (b) Attach a current-measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



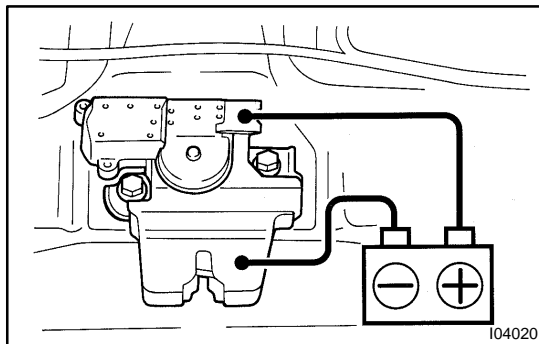
- (c) Disconnect the leads from terminals.
 - (d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.
- If operation is not as specified, replace the door lock assembly.

**29. Rear right side door:****INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)**

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 4.
- (b) Attach a current-measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



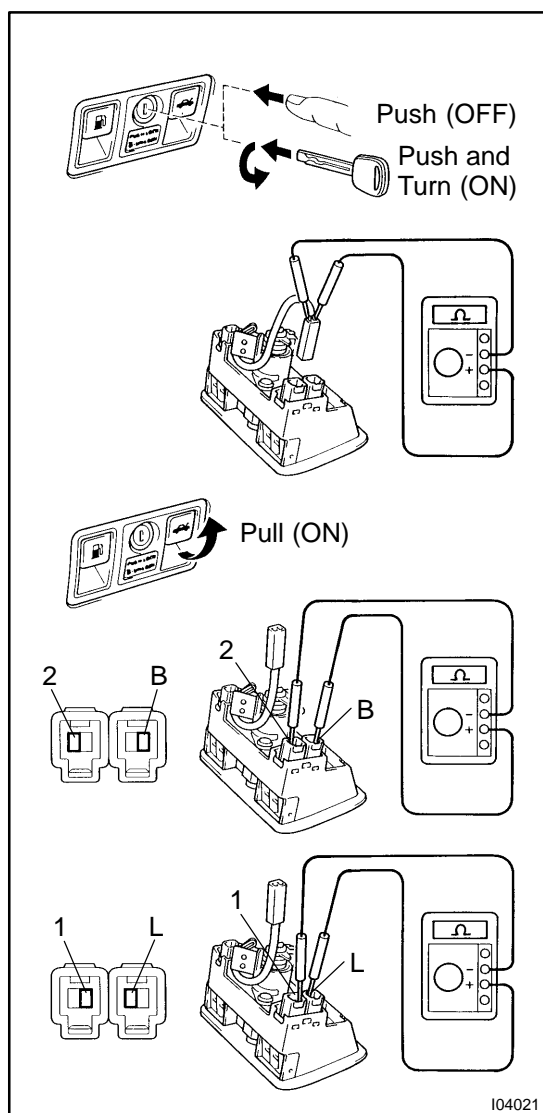
- (c) Disconnect the leads from terminals.
 - (d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.
- If operation is not as specified, replace the door lock assembly.

**30. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR OPERATION**

Connect positive (+) lead to the terminal 1 and negative (–) lead to the opener motor body, and check that the motor operates.

31. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR CIRCUIT

(See page [DI-802](#))



32. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH CONTINUITY

Switch operation	Tester connection	Specified condition
OFF (Push)	–	No continuity
ON (Push and turn)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

33. INSPECT LUGGAGE COMPARTMENT DOOR OPENER SWITCH CONTINUITY

Switch operation	Tester connection	Specified condition
OFF	2 – B	Continuity
ON (Pull)	1 – L 2 – B	Continuity

If continuity is not as specified, replace the switch.

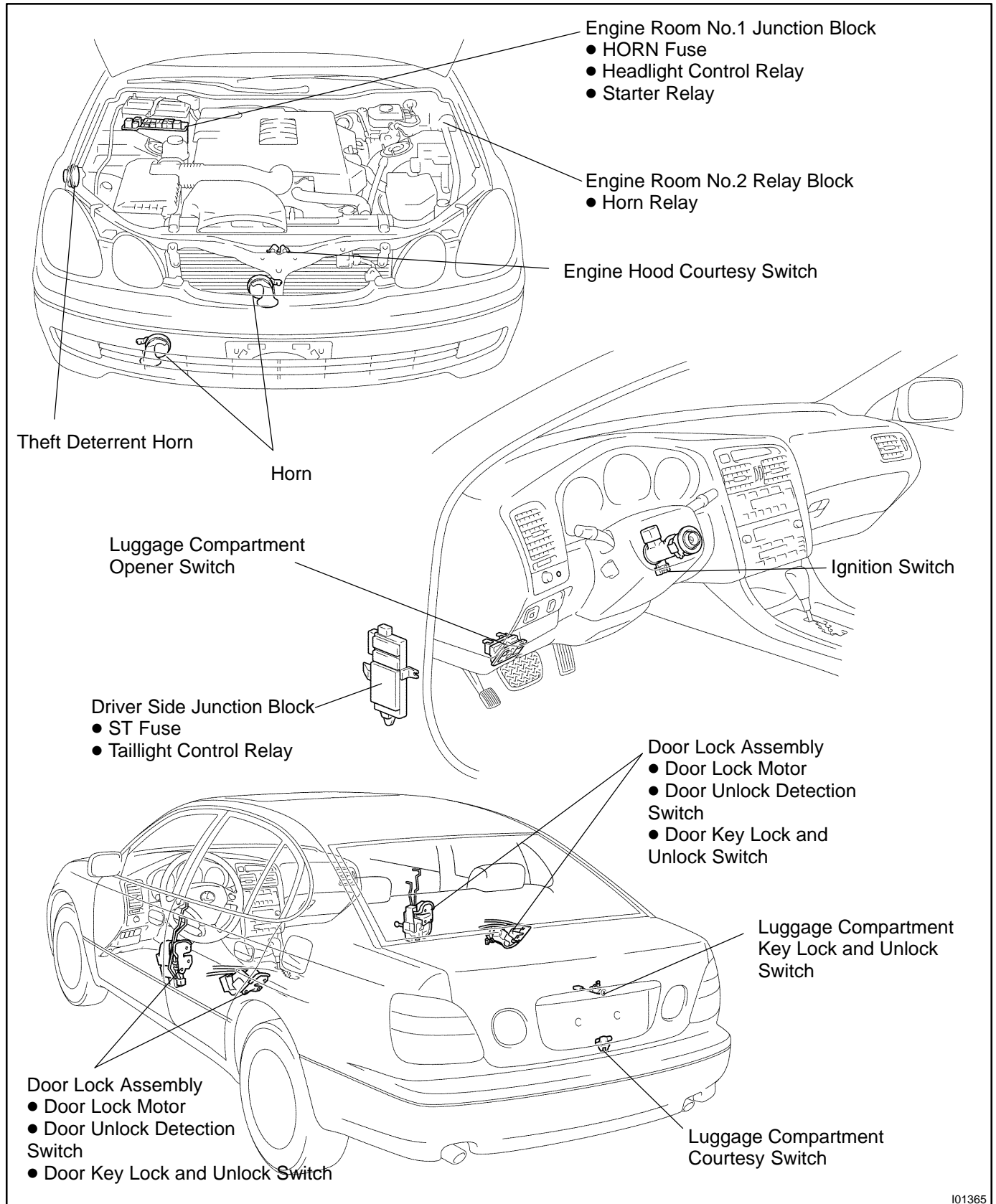
34. INSPECT LUGGAGE COMPARTMENT DOOR OPENER SWITCH AND MAIN SWITCH CIRCUIT (See page [DI-816](#))

THEFT DETERRENT SYSTEM

BE0GQ-03

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



101365

PRE-CHECK

1. THEFT DETERRENT SYSTEM

When the system is set to the theft deterrent mode and any of the following conditions are met, the system sounds the horns and flashes the headlights and the taillights for approx. 1 minute.

At the same time the system locks all doors (If all door are not locked at once, the system repeats door locking operation every 0.55 seconds during the one minute alarm time).

There are 2 modes in this system, which are active mode and passive mode.

All initial setting are performed in active mode. It can be switched to passive mode by specified operation. (See step 4. CHANGING METHOD OF PASSIVE MODE)

Condition:

- Any of the doors (Including the engine hood and luggage compartment door) is unlocked or opened without the key. *1
- The battery terminal is disconnected and reconnected.
- The system receives panic signal from remote keyless entry. *2

*1: Only active arming mode.

*2: When the ignition key is not inserted in the key cylinder.

There are 4 conditions in this system which are disarming condition, disarming preparation condition, arming condition and alarming condition.

(a) Disarming condition:

- (1) When a user is near the vehicle.
- (2) When the alarming function does not operate.
- (3) When theft deterrent function is not performed.

(b) Disarming preparation condition:

- (1) Time from a user locks a door to be leaves the vehicle.
- (2) Time until transferring to disarming condition.
- (3) Theft deterrent function is not performed.

(c) Arming condition:

- (1) When a user leaves the vehicle completely.
- (2) When theft deterrent function is possible.

(d) Alarming condition:

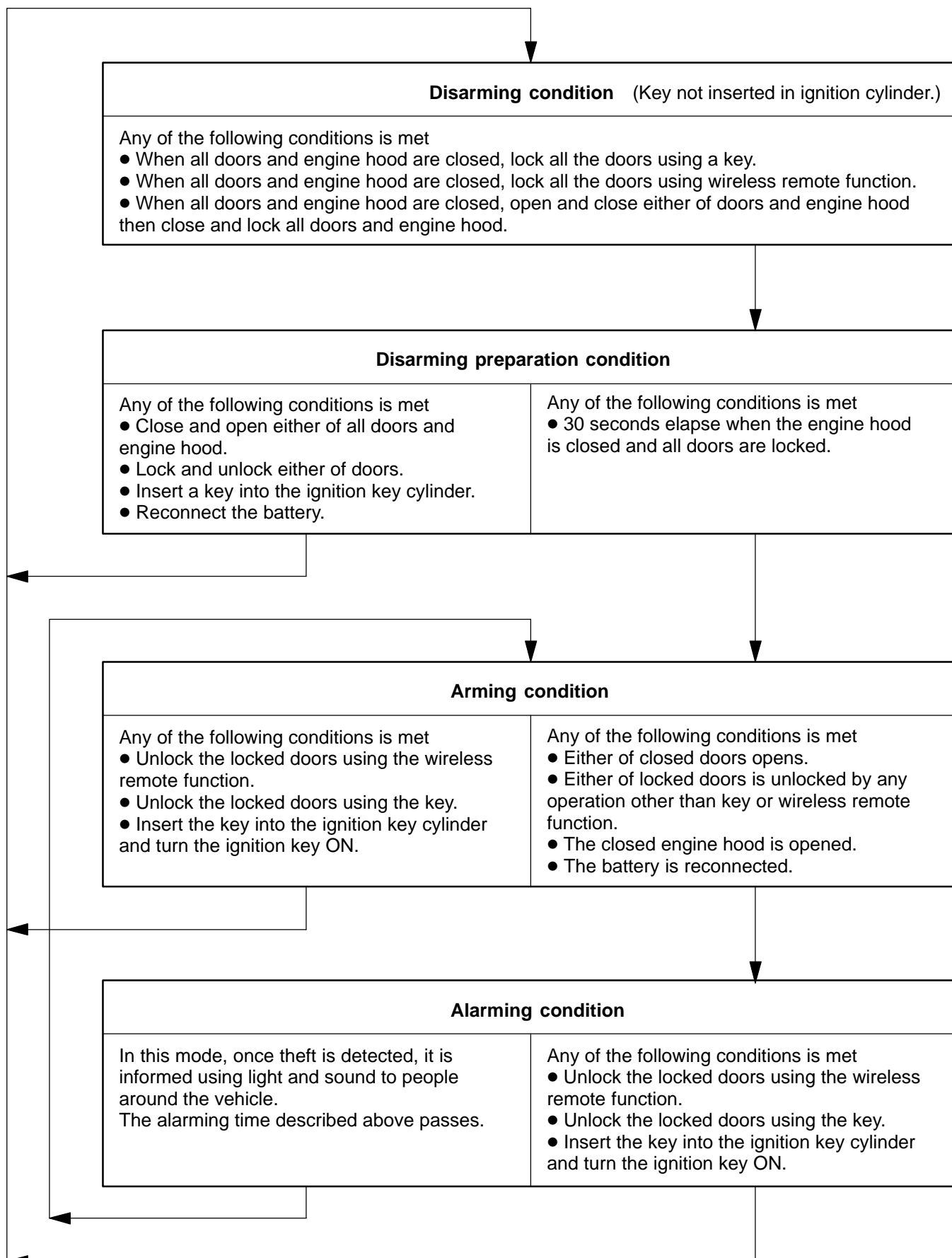
Is this condition, once theft is detected, it is informed using light and sound to people around the vehicle.

Refer to the table for alarming method or time.

Alarming method	Horn
	Security horn
	Headlight
	Taillight
Alarming time	60 seconds
Alarming output	Continuous 0.25 secs. (ON) 0.25 secs. (OFF)

In the arming condition when either of doors is unlocked and with not key in the key cylinder, force lock signal is output.

2. ACTIVE ARMING MODE



Indicator light output:

Condition	Indicator light
Disarming condition	OFF
Arming preparation condition	ON
Arming condition	OFF
Alarming condition	ON

HINT:

Even in disarming condition, the indicator light flash. (Due to the signal output from immobilizer system). The indicator always flashes receiving the signal from the immobilizer system at any time in the arming condition.

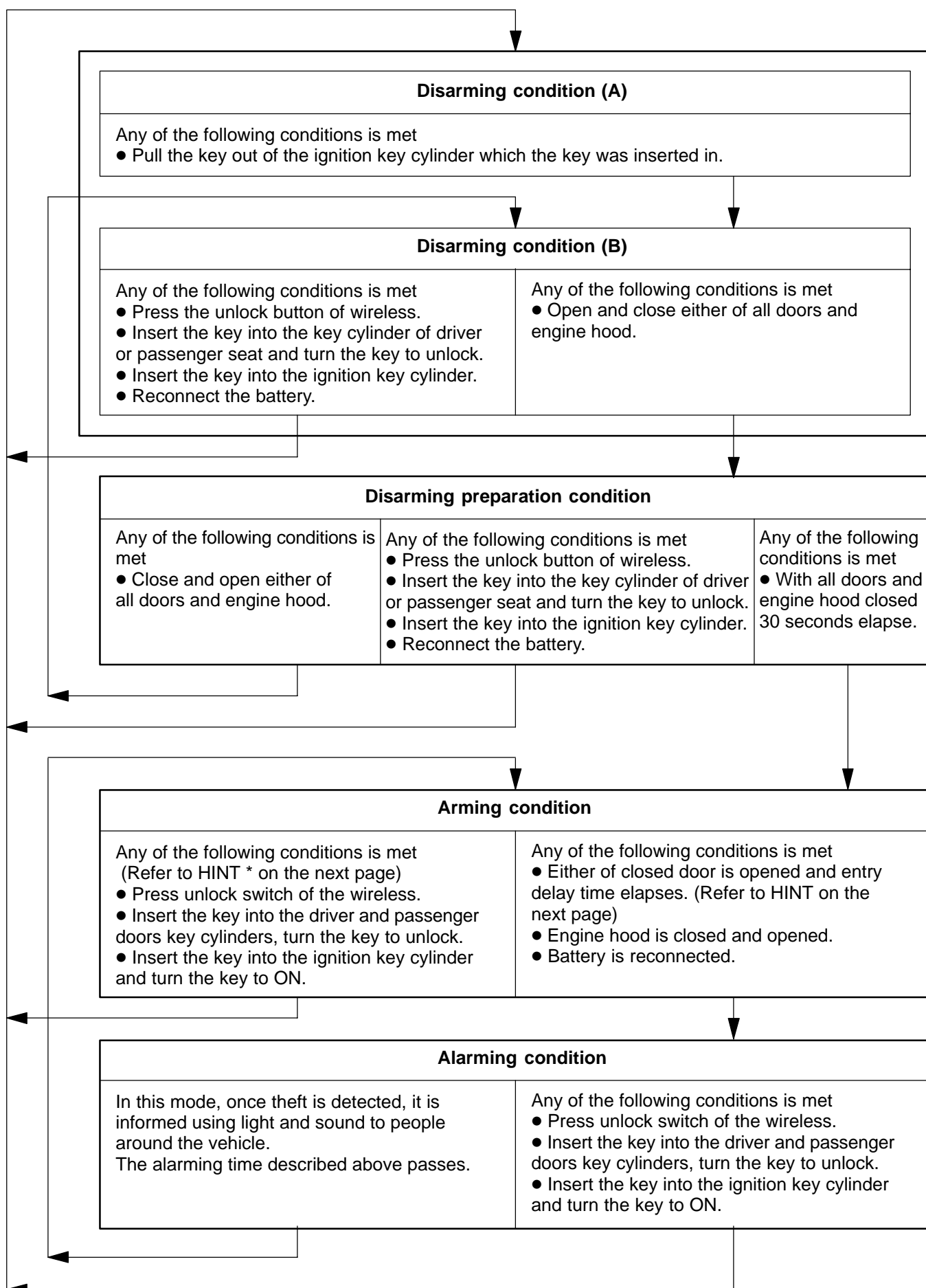
Flashing frequency:

0.75 seconds (ON)

1.25 seconds (OFF)

3. PASSIVE ARMING MODE

- This mode can be switched according to the specified operation.
- All initially set modes (when shipped from factory) are active mode. (No passive mode)

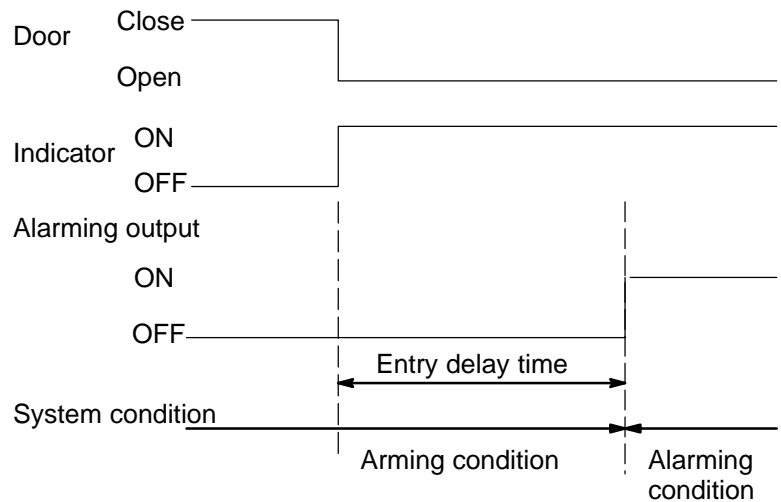


HINT:

In arming condition either closed door is opened, entry delay occurs. (15 secs.)

During this time, the mode transfers to disarming condition when the condition described above * is met.

When the condition is not met, the system judges theft occurs, the mode transfers to alarming condition.

**(a) Indicator light output:**

Condition	Indicator light
Disarming condition	OFF
Arming preparation condition	ON
Arming condition (Entry delay time)	OFF (ON)
Alarming condition	ON

HINT:

Even in disarming condition, the indicator light flash. (Due to the signal output from immobilizer system). The indicator always flashes receiving the signal from the immobilizer system at any time in the arming condition.

Flashing frequency:

0.75 seconds (ON)

1.25 seconds (OFF)

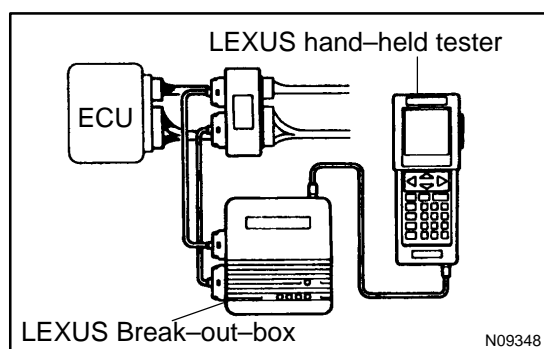
(b) Transfer to active mode:

In each passive mode, when "disarming condition of active mode → arming preparation transfer condition" is met, the active mode transfers to each condition. In this case, active mode continues till disarming condition.

Passive mode when transfer condition is met.	Active mode transfer condition
Disarming condition	Arming preparation condition
Arming preparation condition	Arming preparation condition
Arming condition (During entry delay time)	Arming condition (After alarming time has elapsed, arming condition)
Alarming condition	After alarming time has elapsed, arming condition

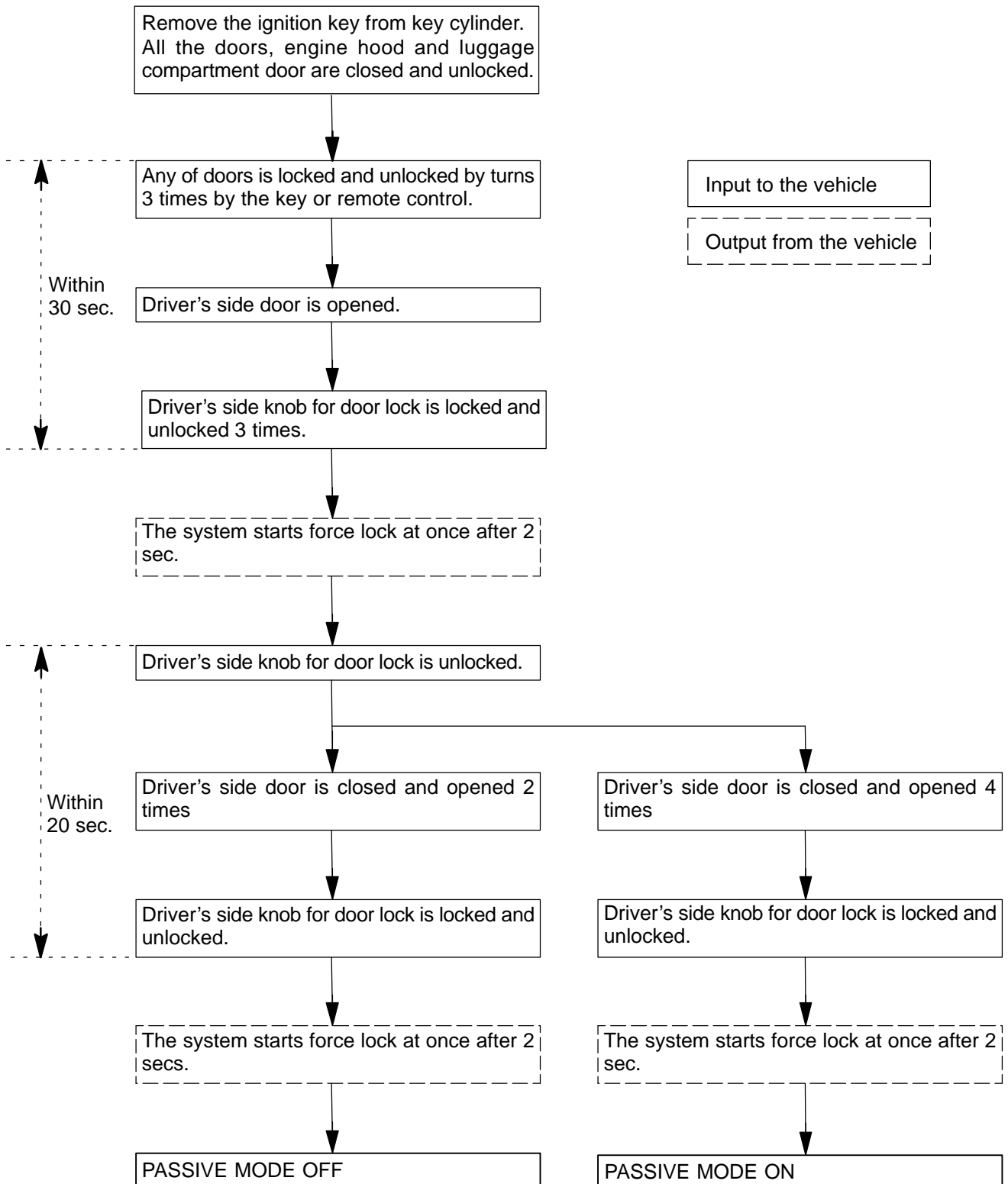
4. CHANGING METHOD OF PASSIVE MODE (ON or OFF)

Using a hand-held tester, the mode can be changed to the passive mode.

**5. ECU TERMINAL VALUES MEASUREMENT BY USING LEXUS BREAK-OUT-BOX AND LEXUS HAND-HELD TESTER**

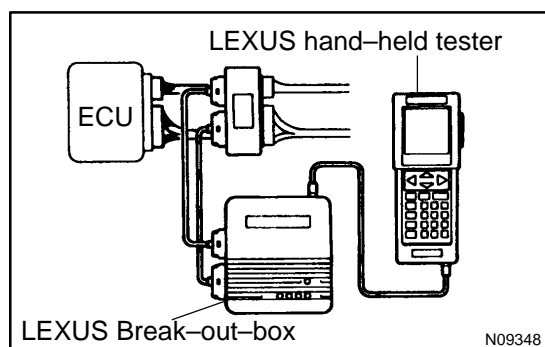
- Hook up the LEXUS break-out-box and LEXUS hand-held tester to the vehicle.
- Read the ECU input/ output values by following the prompts on the tester screen.
- Please refer to the LEXUS hand-held tester has a "Snapshot" function. This records the measured data and is effective in the diagnosis of intermittent problems.

6. CHANGING METHOD OF PASSIVE MODE (ON or OFF)



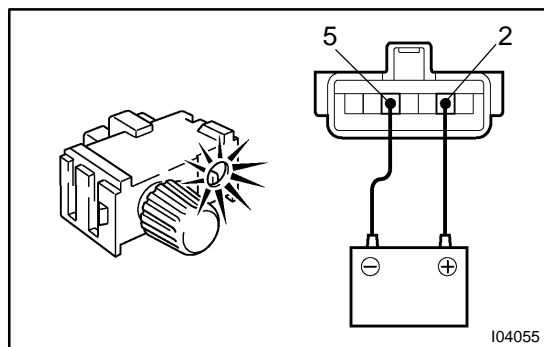
HINT:

- Initial mode is PASSIVE MODE OFF.
- If there is a different signal in the middle of changing. It is invalid.



7. ECU TERMINAL VALUES MEASUREMENT BY USING LEXUS BREAK-OUT-BOX AND LEXUS HAND-HELD TESTER

- (a) Hook up the LEXUS break-out-box and LEXUS hand-held tester to the vehicle.
- (b) Read the ECU input/ output values by following the prompts on the tester screen.
- (c) Please refer to the LEXUS hand-held tester has a "Snapshot" function. This records the measured data and is effective in the diagnosis of intermittent problems.



INSPECTION

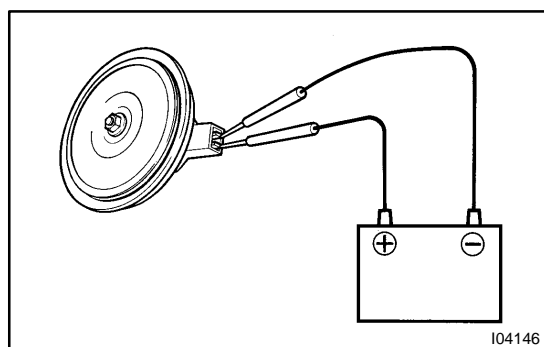
1. INSPECT THEFT DETERRENT INDICATOR LIGHT OPERATION

Connect the positive (+) lead from the battery terminal 2 and negative (–) lead to terminal 5, and check that the warning light lights up.

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

2. INSPECT THEFT DETERRENT INDICATOR LIGHT CIRCUIT

(See page [DI-808](#))



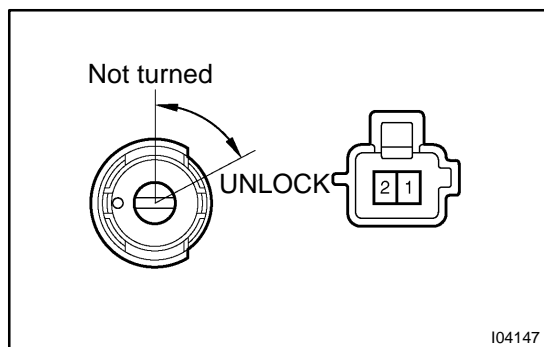
3. INSPECT THEFT DETERRENT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal 1 and negative (–) lead to theft deterrent horn body, and check that the theft deterrent horn blows.

If operation is not as specified, replace the horn.

4. INSPECT THEFT DETERRENT HORN CIRCUIT

(See page [DI-804](#))



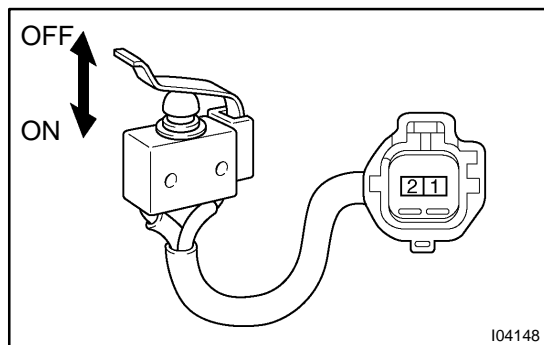
5. INSPECT LUGGAGE COMPARTMENT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Not turned	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

6. INSPECT LUGGAGE COMPARTMENT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT

(See page [DI-794](#))



7. INSPECT ENGINE HOOD COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

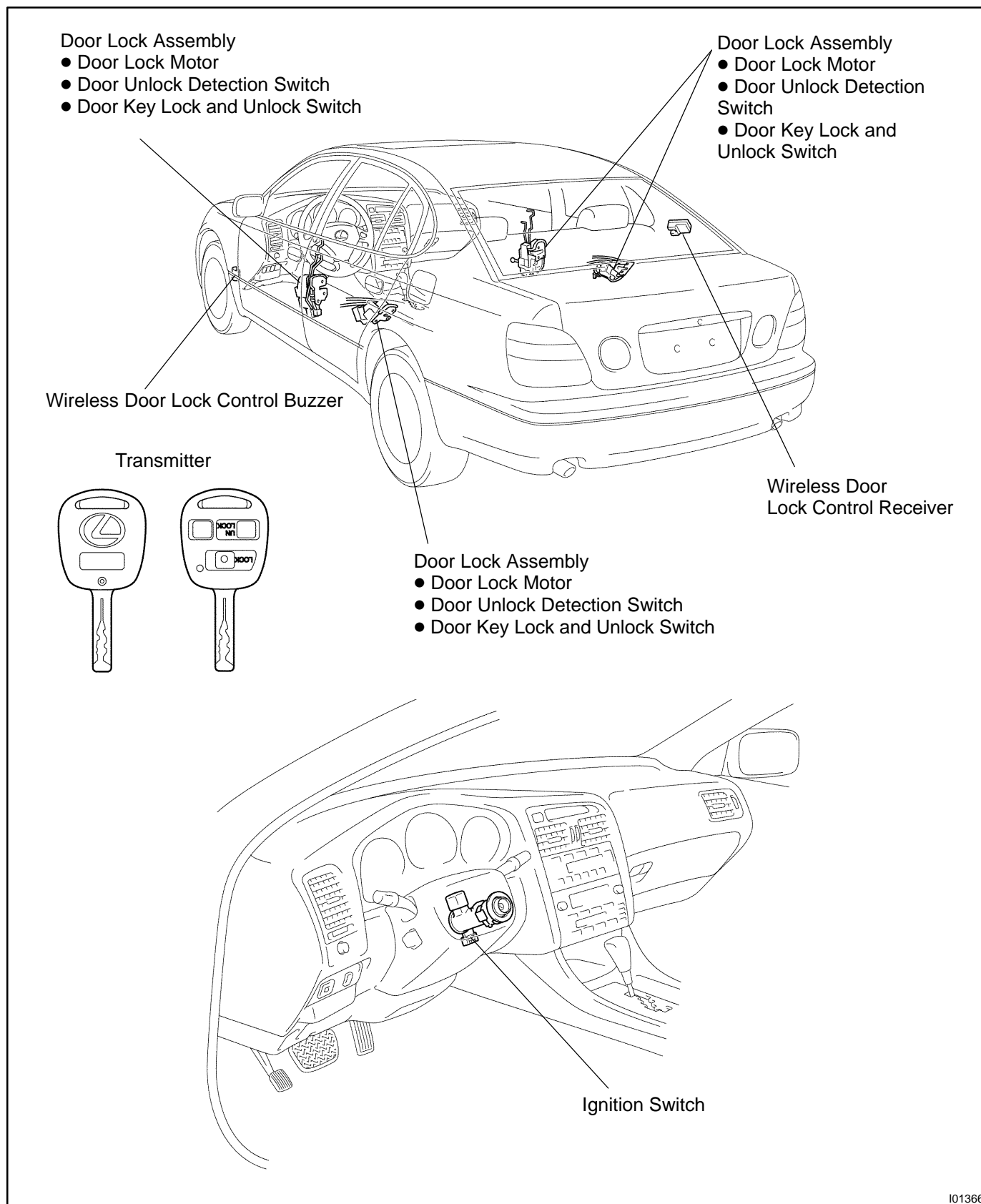
8. INSPECT ENGINE HOOD COURTESY SWITCH CIRCUIT

(See page [DI-790](#))

WIRELESS DOOR LOCK CONTROL SYSTEM

LOCATION

BE0GM-07



I01366

PRE-CHECK

Only wireless function (Remote control) will not operate.

(If a new transmitter or a transmitter of the same type that works properly with the vehicle is not available.)

Make the vehicle in the initialized condition:

The initialized condition is the condition when the following conditions are satisfied.

- (1) Key plate has not been inserted in the ignition key cylinder.
- (2) All the doors are closed. (Door warning light is OFF.)
- (3) All the doors are locked.
- (4) Wireless door lock control switch (Buzzer switch) is ON.

Basic function check:

Under the standard operation, when repeating UNLOCK and LOCK switch 3 times or more alternately, check the UNLOCK-LOCK operation from 3rd time onward.

- Following procedures are standard operation.

- (1) Keep about 1 M away to the right direction from the outside handle of a driver's seat.
- (2) Face the transmitter toward the vehicle and press one of transmitter switches for about 1 sec.

<Reference>

- As of the security function, even the wireless function is normal, there may be the case that only UNLOCK operation will not work.
- As of the body customize function, if "operation twice" has been set using LEXUS hand-held tester, only driver's seat is unlocked by unlock operation performed once.

No

Yes

Transmitter LED inspection:

Check when pressing UNLOCK switch and LOCK switch under standard operation, that the transmitter LED lights up once more.

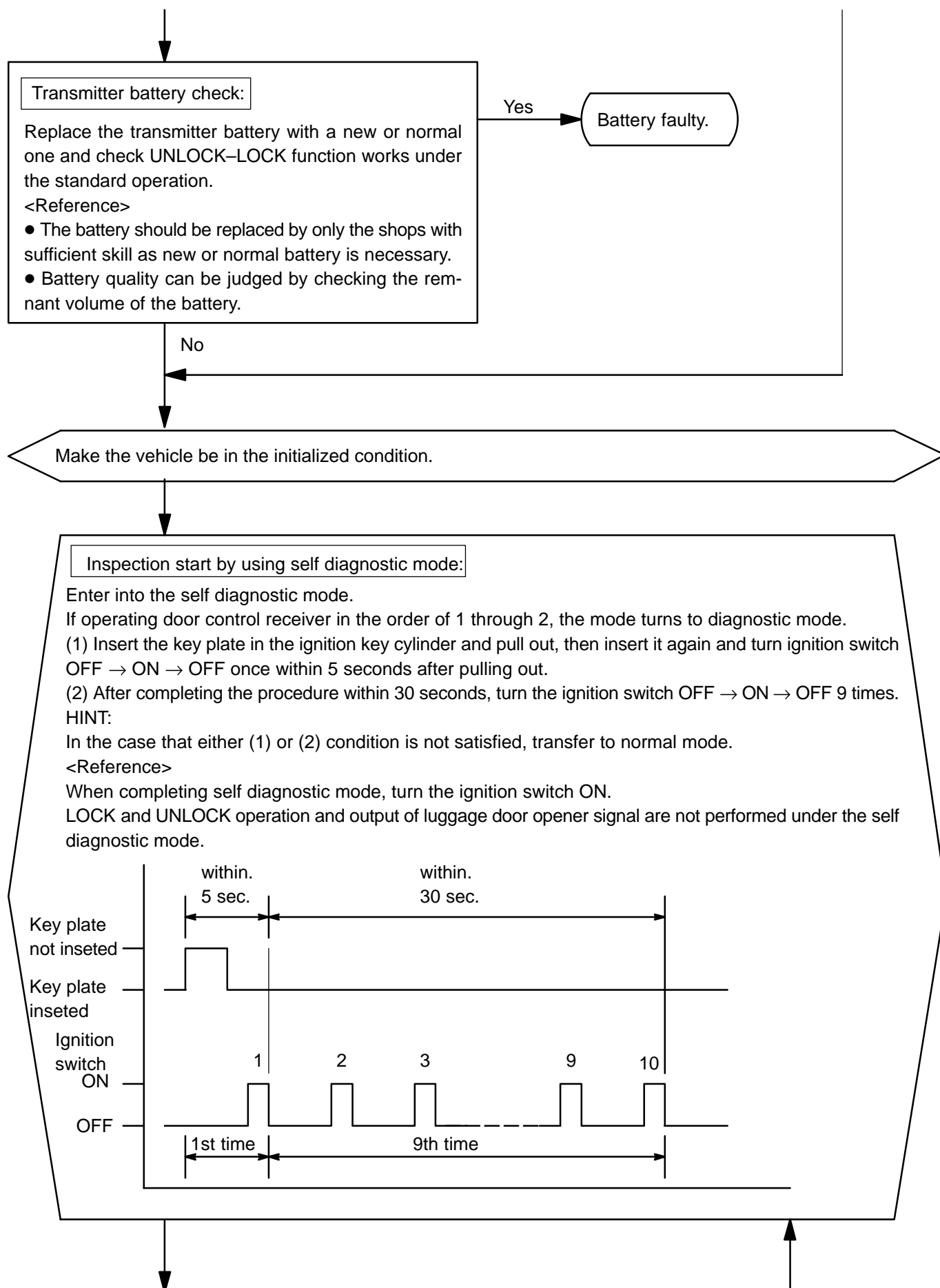
No

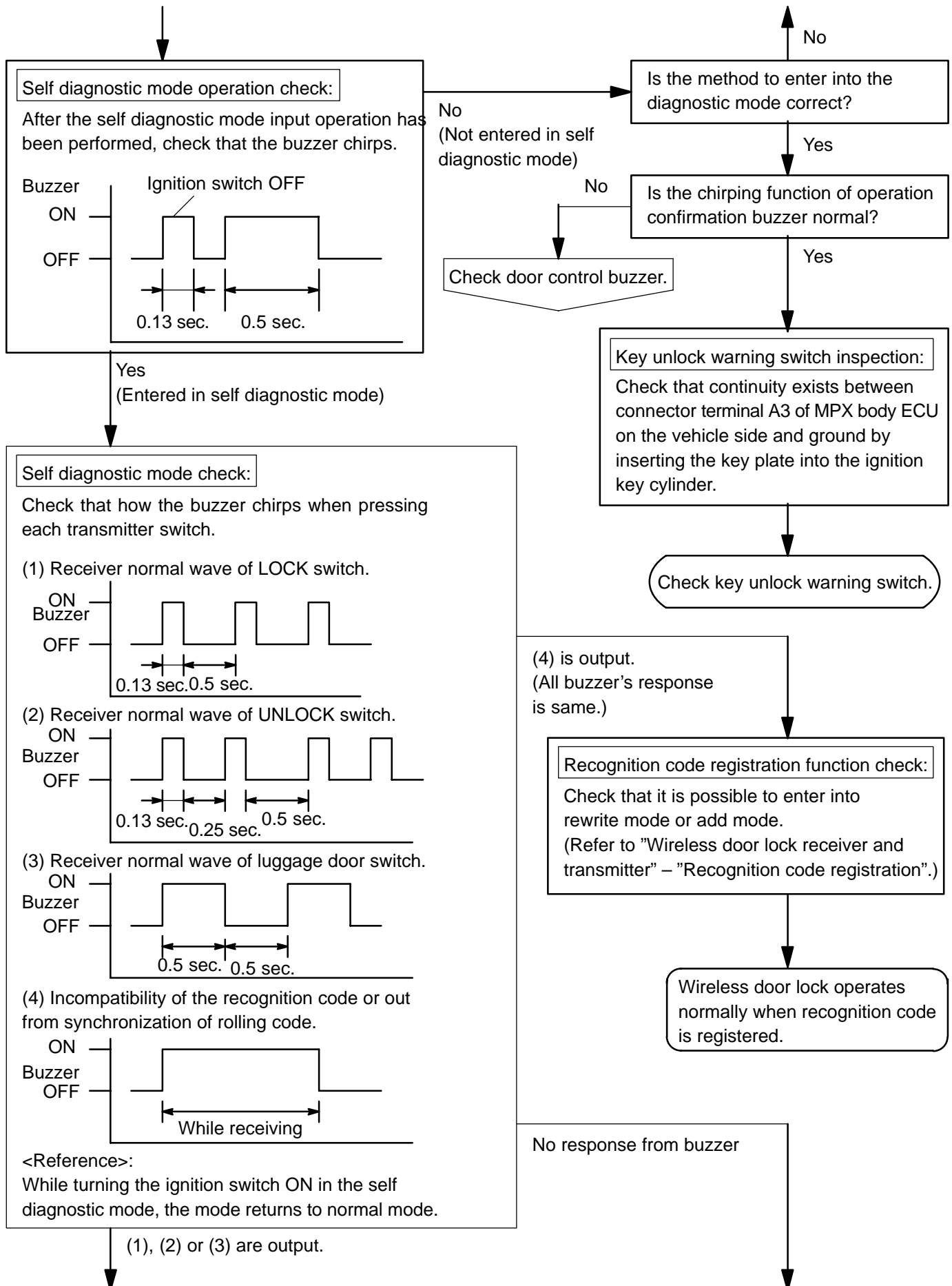
Yes

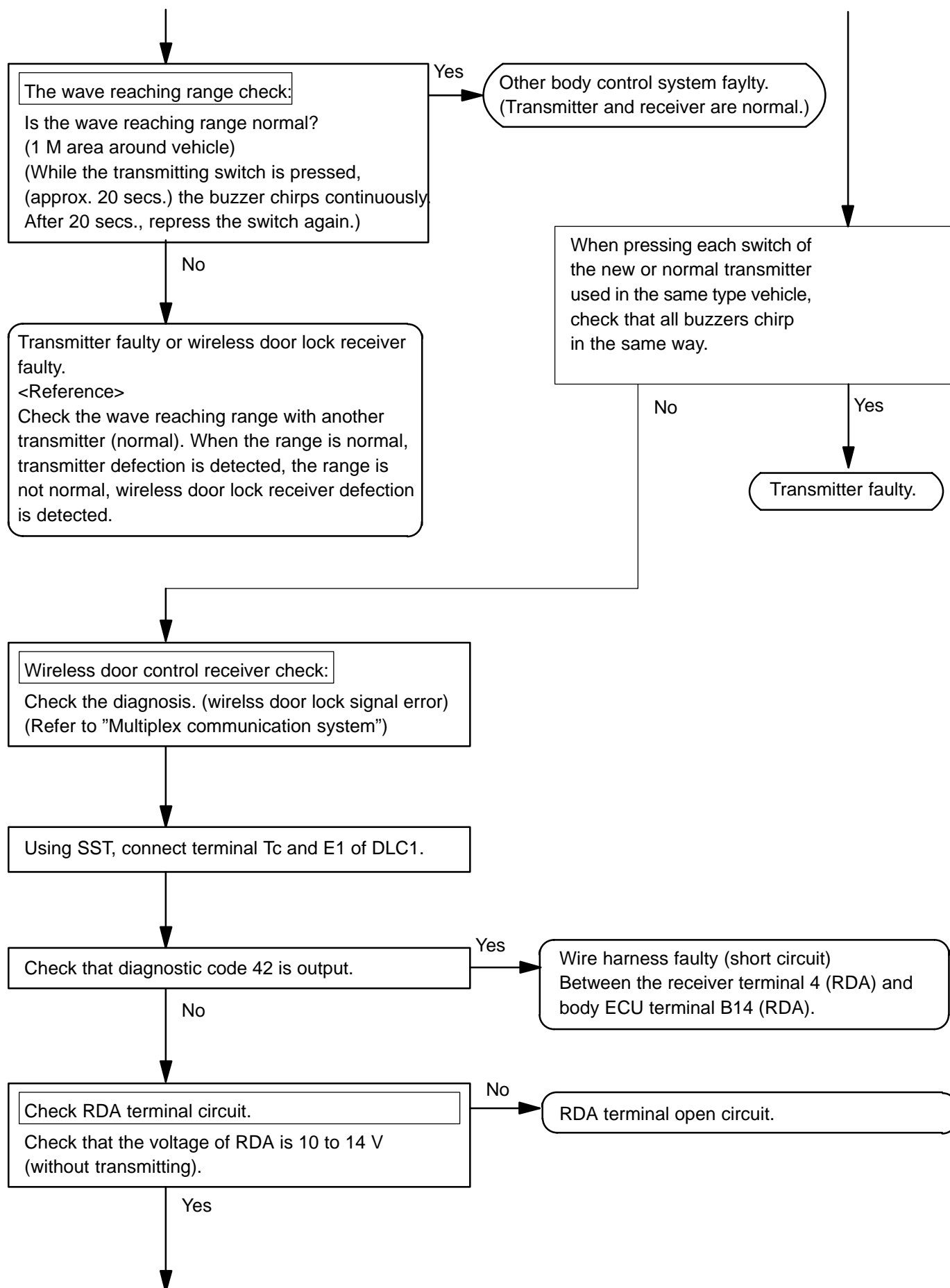
Normal

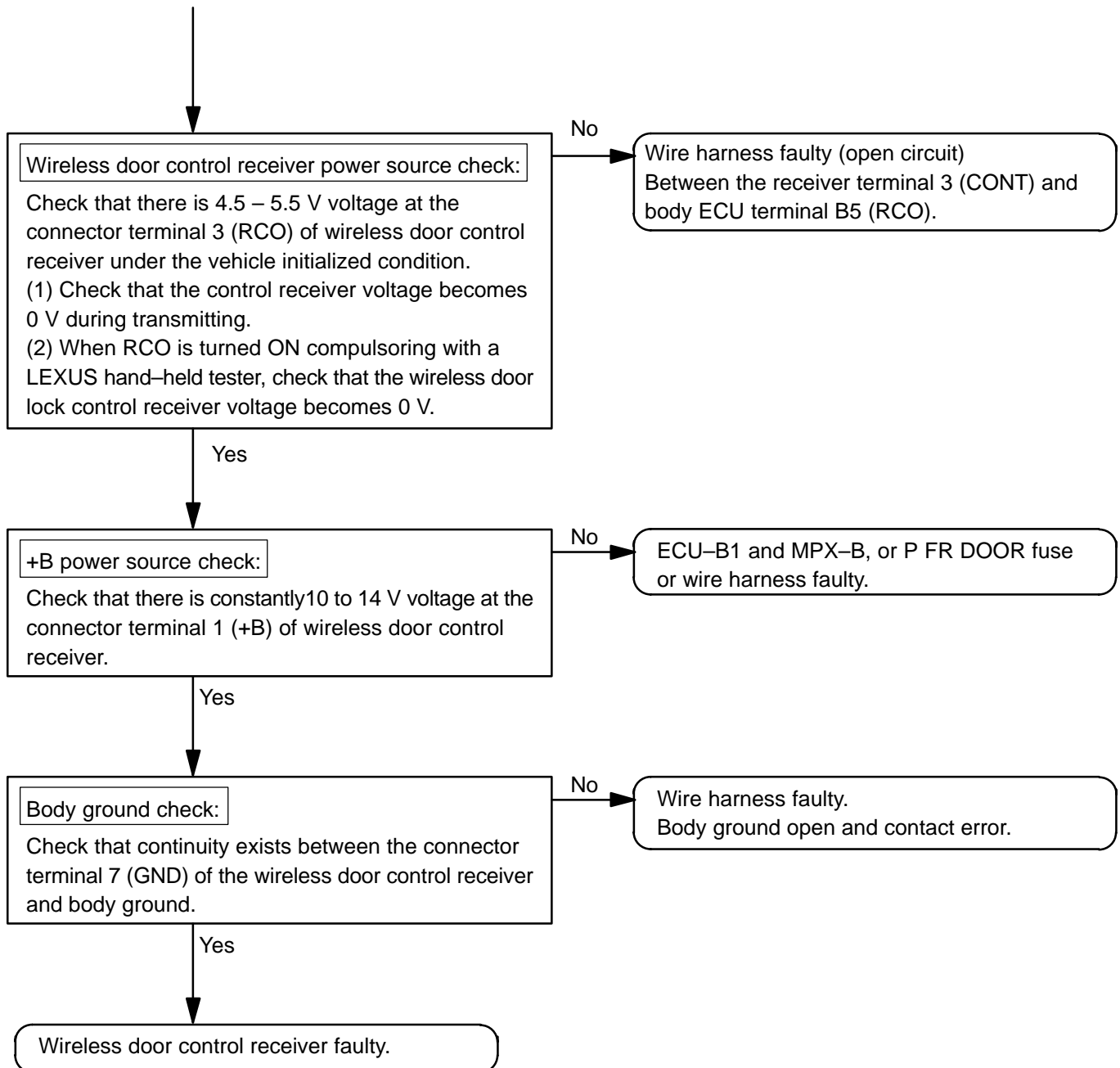
<Reference>

- Operative distance may differ according to an operator, the way of holding the transmitter or position.
- Because weak electric wave is used, when there is strong wave or noise in the used frequency, operation distance might be shortened.









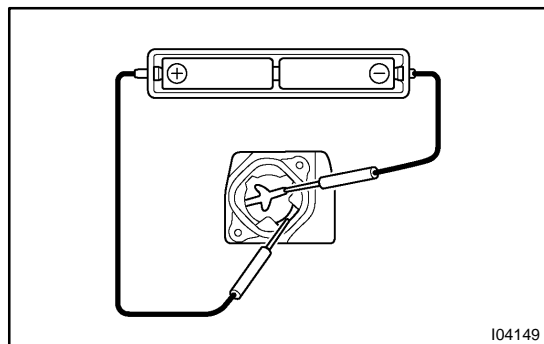
INSPECTION

1. INSPECT WIRELESS DOOR LOCK TRANSMITTER OPERATION

HINT:

Refer to "Wireless door lock control transmitter battery replacement" on page [BE-161](#).

- (a) Using a screwdriver, remove the screw and cover.
- (b) Remove the battery (lithium battery).



- (c) Install a new or normal battery (lithium battery).

HINT:

When a new or normal battery can not be obtained, connect 2 new 1.5 V batteries in series, connect the battery (+) to the battery receptacle side terminal and battery (–) to the bottom terminal, then apply 3 V voltage to the transmitter.

- (d) In the location where is approx. 1 M away from driver's outside handle in the right direction, face the key plate of the transmitter to the vehicle, and check the transmitter operation when pressing transmission switch on the side of the transmitter body.

Standard:

- **Remote control of vehicle door lock can be operated.**
- **LED lights up more than once.**

HINT:

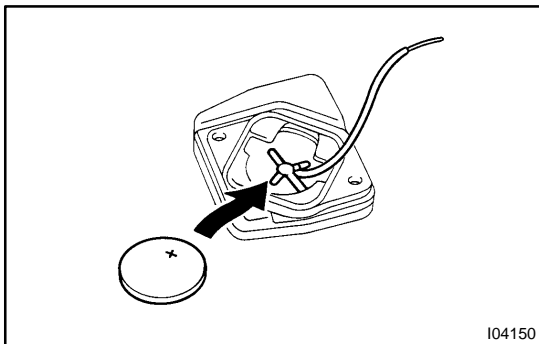
- The minimum operation distance differs according to operator, the way of holding the transmitter, and location.
 - As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.
- (e) Install the battery (lithium battery).
 - (f) Install a cover so that O–ring is not distorted or slipped off.
 - (g) Using a screwdriver, tighten the screw.

2. CHECK BATTERY CAPACITY

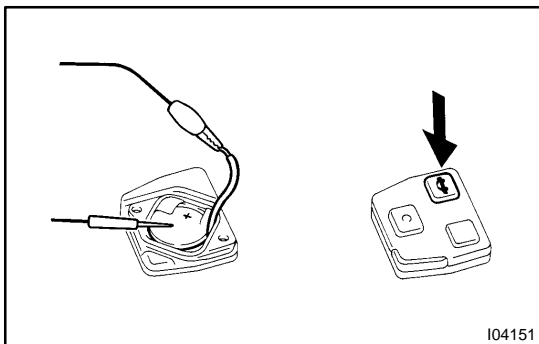
HINT:

- Make sure to use the TOYOTA electrical tester.
- With the battery unloaded, judge can not be made whether the battery is available or not on the test.
- When the transmitter is faulty, the energy amount left in the battery might not be checked correctly.
- On the lithium battery used for the transmitter, the voltage more than 2.5 V with the battery unloaded is shown on the tester until the energy is completely consumed.

Accordingly when inspecting the energy amount left in the battery, it is necessary to measure the voltage when the battery is loaded. (1.2 k Ω).



- Remove the screws and cover using a (–) driver.
- Remove the battery (lithium battery) from the transmitter.
- Connect the lead to the (–) terminal of the transmitter and install the battery.

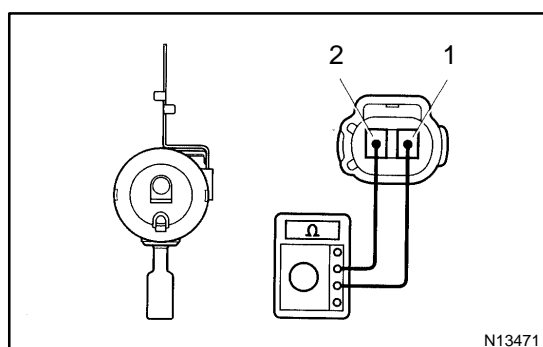


- Connect the (+) tester to the (+) battery (lithium battery), and (–) tester to the lead respectively.
- Press one of the transmitting switches on the transmitter for approx. 1 second.
- Press the transmitting switch on the transmitter again to check the voltage.

Standard: 2.1 V or more

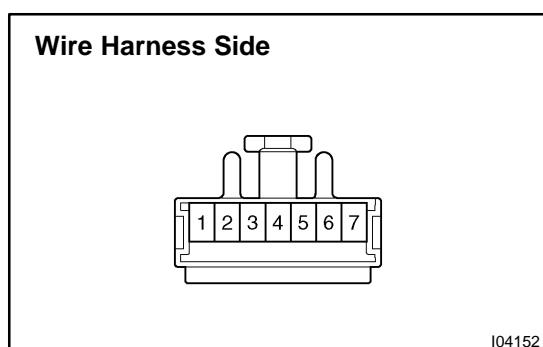
HINT:

- When the temperature of the battery is low, the judge can not be made correctly.
When the outcome of the test is less than 2.1 V, conduct the test again after leaving the battery in the place at 18 °C for more than 30 minutes.
 - By auto power off function, the voltage becomes no load voltage (more than 2.5 V) condition 0.8 seconds after the switch was pressed.
Make sure to read the voltage before of it.
 - High voltage might be shown 1 to 2 times after leaving the battery, judge should be made with the voltage shown at the 3rd time or later.
- (g) Disconnect the lead.
- (h) Set the battery (lithium battery) in the transmitter.
- (i) Install the cover, so that the O-ring is not distorted or slipped off.
- (j) Using a screwdriver, tighten the screws.

**3. INSPECT WIRELESS DOOR LOCK BUZZER OPERATION**

Connect the positive (+) lead from the ohmmeter to terminal 1 and the negative (–) lead to terminal 2, and measure resistance of approx. 1 kΩ.

If resistance is not as specified, replace the buzzer.

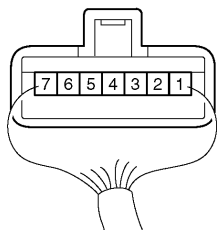
4. INSPECT WIRELESS DOOR LOCK BUZZER CIRCUIT (See page DI-800)**5. INSPECT WIRELESS DOOR LOCK CONTROL RECEIVER CIRCUIT (See page DI-788)****Connector disconnected:**

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

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

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

From Back Side



I04153

6. INSPECT WIRELESS DOOR LOCK CONTROL RECEIVER CIRCUIT

Connector connected:

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

Tester connection	Condition	Specified condition
3 – Ground	Ignition switch position OFF Key removed Transmitter OFF → ON	4.5 – 5.5 V → below 1 V
3 – Ground	Ignition switch position OFF Key removed Transmitter OFF → ON	4.5 – 5.5 V → below 1 V
4 – Ground	Ignition switch position OFF Key removed Transmitter ON	10 – 14 V

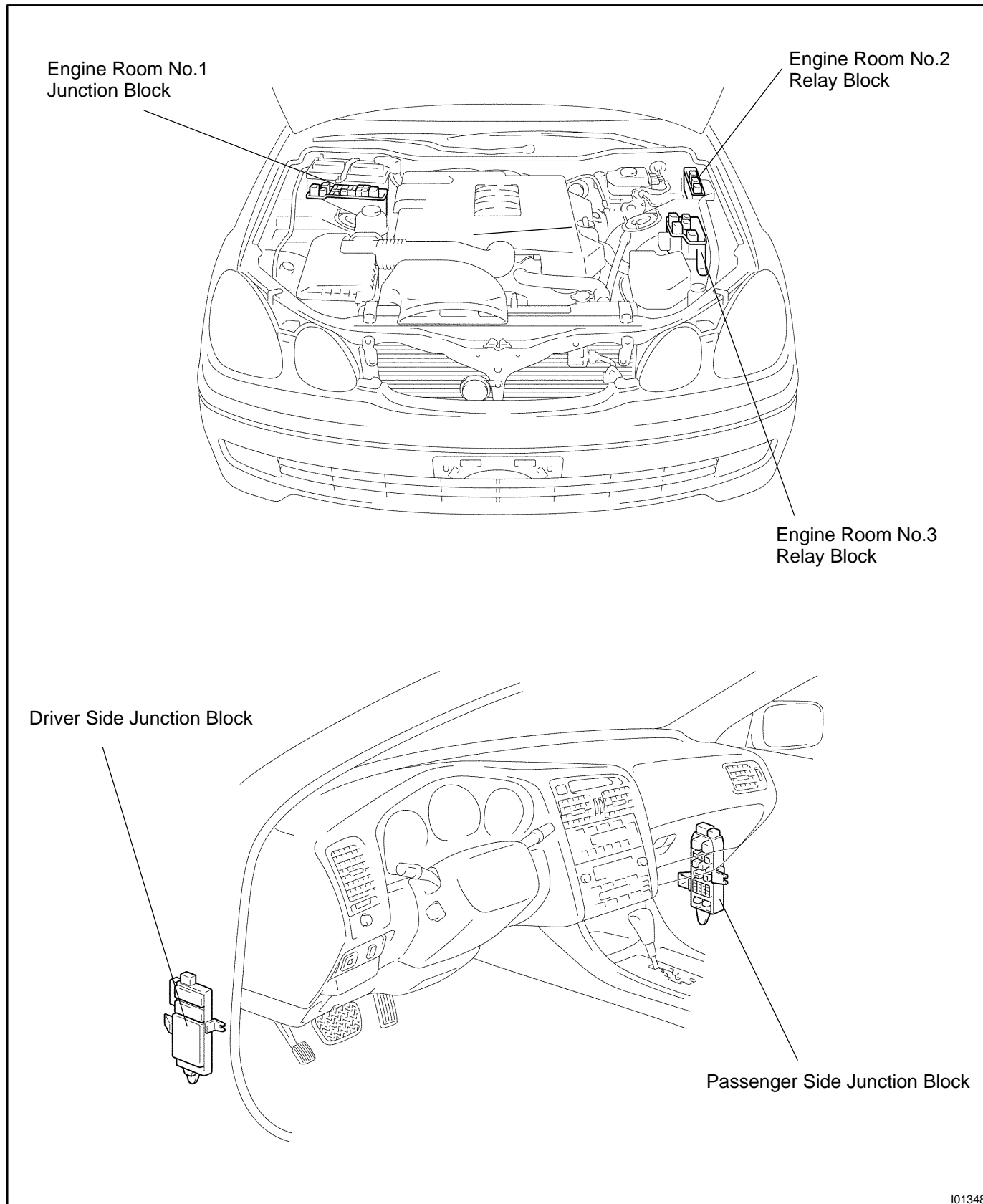
If circuit is as specified, replace the receiver.

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

POWER SOURCE LOCATION

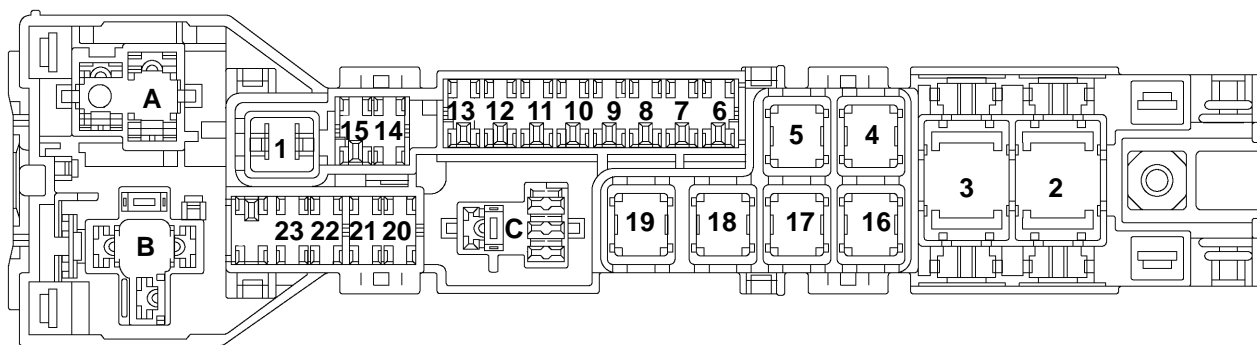
BE0H5-06

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01348

● Engine Room No.1 Junction Block



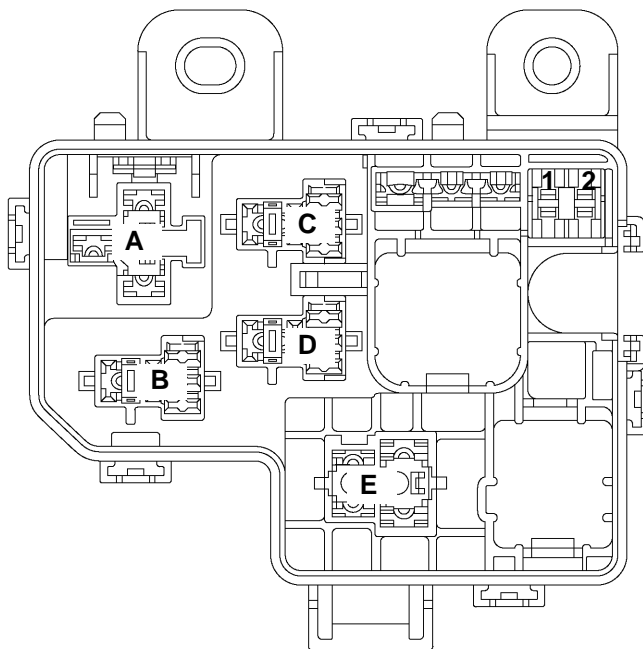
Fuses

1. MAIN H-Fuse
2. FL ABS NO.1 H-Fuse
3. ALT H-Fuse
4. ABS NO.2 H-Fuse
5. H-LP CLN H-Fuse
6. RAD NO.1 Fuse
7. ALT-S Fuse
8. EFI Fuse
9. TURN HAZ Fuse
10. TEL Fuse
11. AM2 Fuse
12. ETCS Fuse
13. HORN Fuse
14. MPX-B Fuse
15. ECU-B1 Fuse
16. HTR Fuse
17. FAN MAIN H-Fuse
18. CDS FAN H-Fuse
19. RAD FAN H-Fuse
20. H-LP R LWR Fuse
21. H-LP L LWR Fuse
22. H-LP R UPR Fuse
23. H-LP L UPR Fuse

Relays

- A. Headlight Control Relay
- B. Starter Relay
- C. EFI Relay

● Engine Room No.3 Relay Block



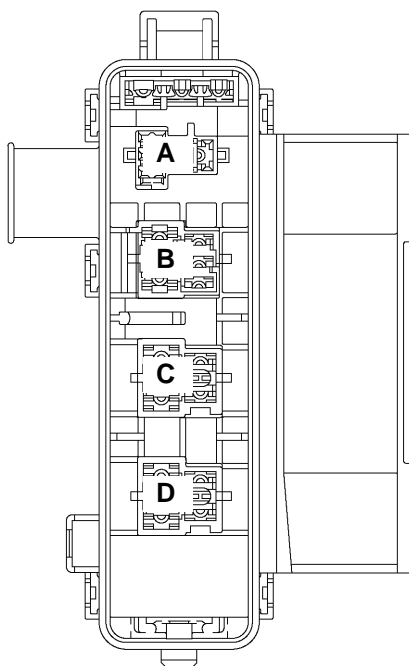
Relays

- A. FAN NO.1 Relay
- B. FAN NO.2 Relay
- C. A/C COMP Relay
- D. FAN NO.3 Relay
- E. Headlight Dimmer (Daytime Running Light No.2) Relay

Fuses

- 1. H-LP R UPR Fuse (w/ Daytime Running Light System)
- 2 H-LP L UPR Fuse (w/ Daytime Running Light System)

● Engine Room No.2 Relay Block



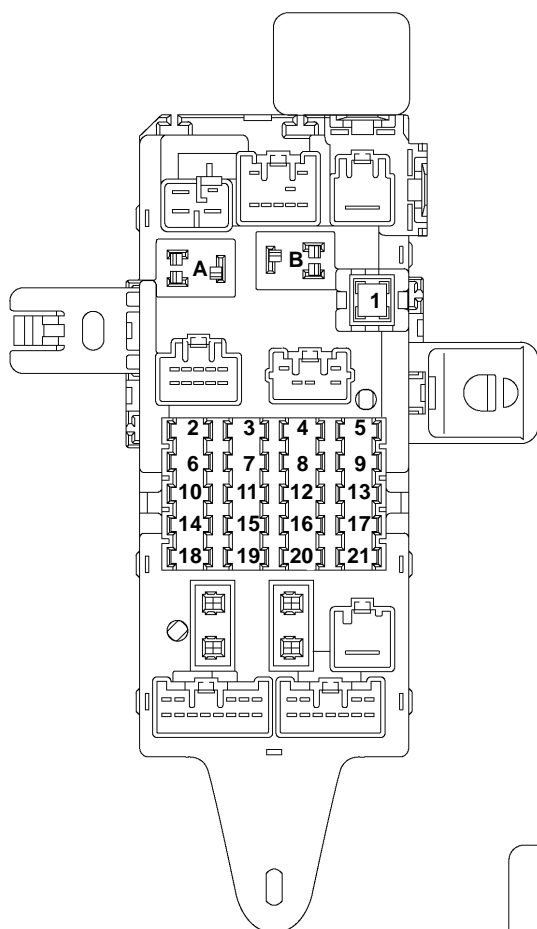
Relays

- A. Horn Relay
- B. ABS SOL Relay
- C. TRC MTR Relay
- D. ABS MTR Relay

I04027
I04028

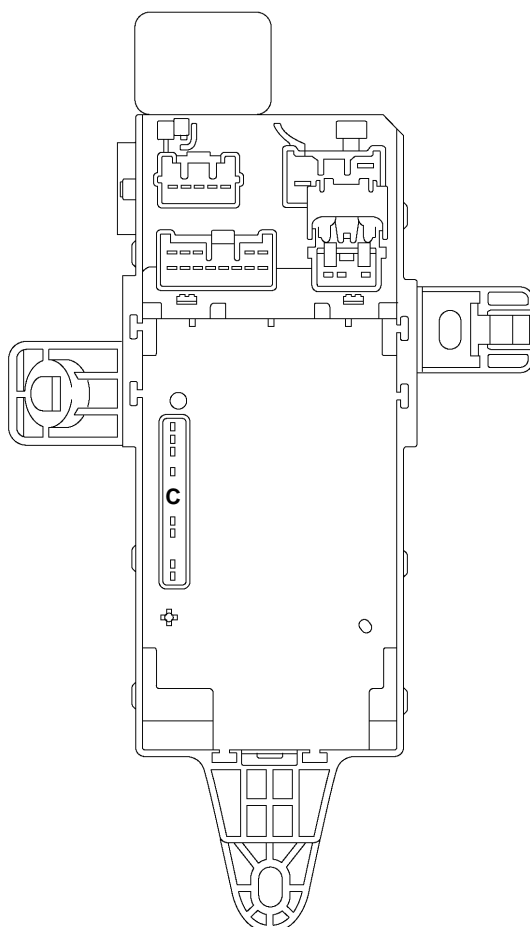
I04028

● Driver Side Instrument Panel Junction Block



Fuses

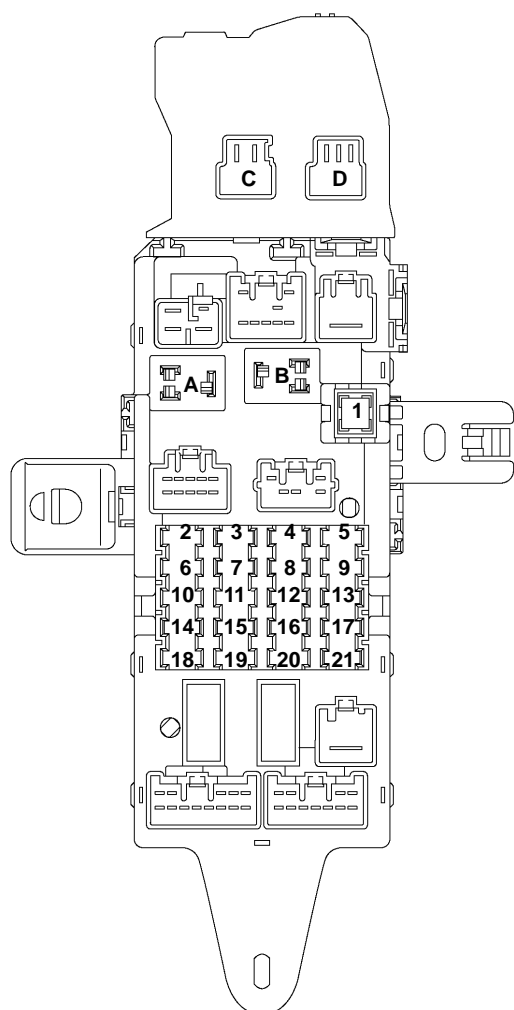
1. AM1 H-Fuse
2. WASHER Fuse
3. FOG Fuse
4. TAIL Fuse
5. SRS-ACC Fuse
6. GAUGE Fuse
7. FUEL OPN Fuse
8. D FR DOOR Fuse
9. PANEL Fuse
10. HTR Fuse
11. SRS-B Fuse
12. P/SEAT (D) Fuse
13. RAD NO.2 Fuse
14. WIP Fuse
15. OBD Fuse
16. STOP Fuse
17. CIG Fuse
18. ECU-IG Fuse
19. STARTER Fuse
20. IGN Fuse
21. D FR DOOR Fuse



Relays

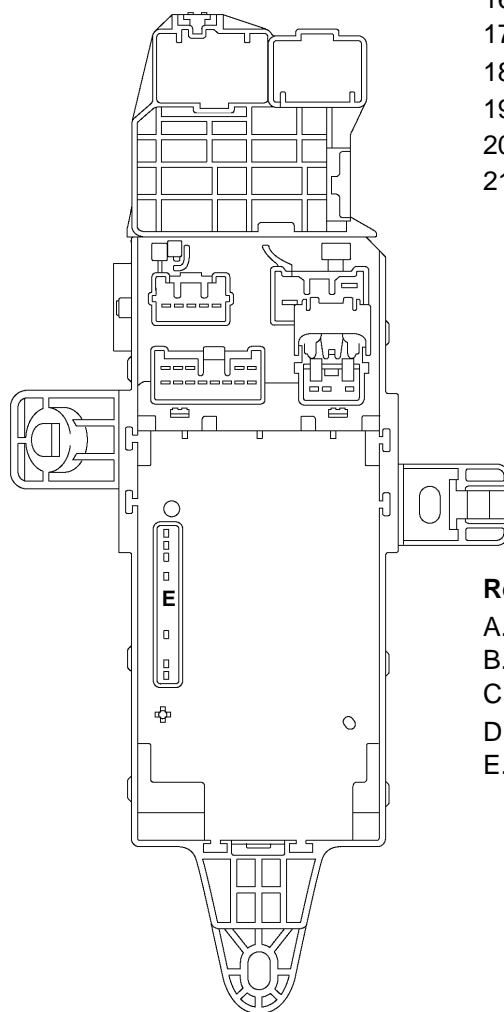
- A. Fog Light Relay
- B. Taillight Control Relay
- C. Body ECU No.2

● Passenger Side Instrument Panel Junction Block



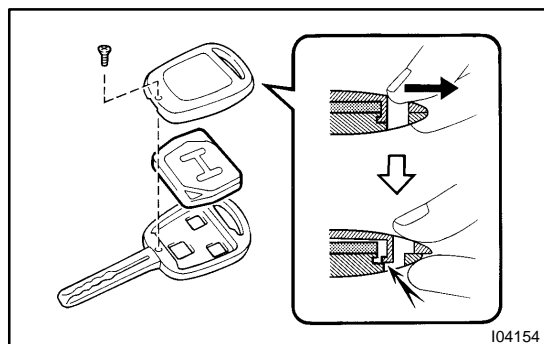
Fuses

1. DEF H-Fuse
2. -
3. -
4. MIR HTR Fuse
5. -
6. -
7. S/ROOF Fuse
8. P FR DOOR Fuse
9. -
10. -
11. -
12. P/SEAT (P) Fuse
13. DOME Fuse
14. SEAT HTR Fuse
15. -
16. TV Fuse
17. ECU-B2 Fuse
18. -
19. -
20. -
21. P FR DOOR Fuse



Relays

- A. Ignition Main Relay
- B. Mirror Heater Relay
- C. Defogger Relay
- D. Heater Relay
- E. Body ECU No.1



REPLACEMENT

1. REPLACE TRANSMITTER (LITHIUM) BATTERY

NOTICE:

Special caution should be taken for handling each component as they are precision electronic components.

(a) Using a screwdriver, remove the screw and cover.

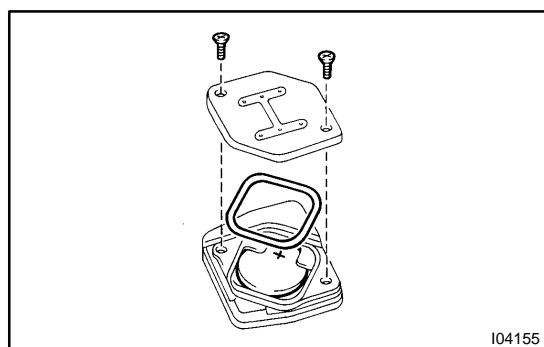
NOTICE:

Do not pry out the cover forcibly.

HINT:

Push the cover with a finger as shown in the illustration, so that there becomes clearance, then pry out the cover from that clearance.

(b) Remove the transmitter.

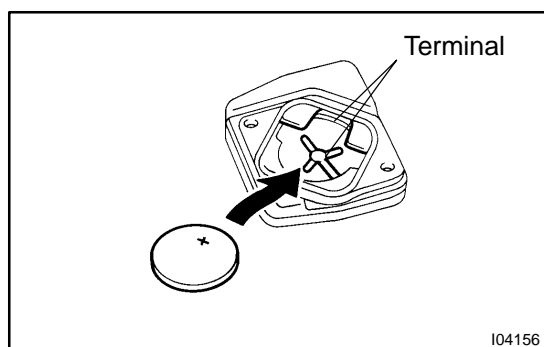


(c) Using a screwdriver, remove the 2 screws and cover.

(d) Remove the battery (lithium battery).

NOTICE:

- Do not push the terminals with a finger.
- If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.



(e) Install a battery (lithium battery) as shown in the illustration.

NOTICE:

Face the battery upward. Take care not to deform the terminals.

(f) Check that O-ring is not distorted or slipped off, and install the cover.

(g) Using a screwdriver, tighten the 2 screws.

NOTICE:

When the screws are tightened loosely, it might cause faulty contact of battery (lithium battery) and terminals.

(h) Assemble the transmitter to the key plate and the cover.

(i) Using a screwdriver, tighten the screw.

2. REPLACE DOOR CONTROL RECEIVER AND TRANSMITTER

NOTICE:

When replacing the door control receiver and transmitter, registration of recognition code is necessary because they are provided as single components.

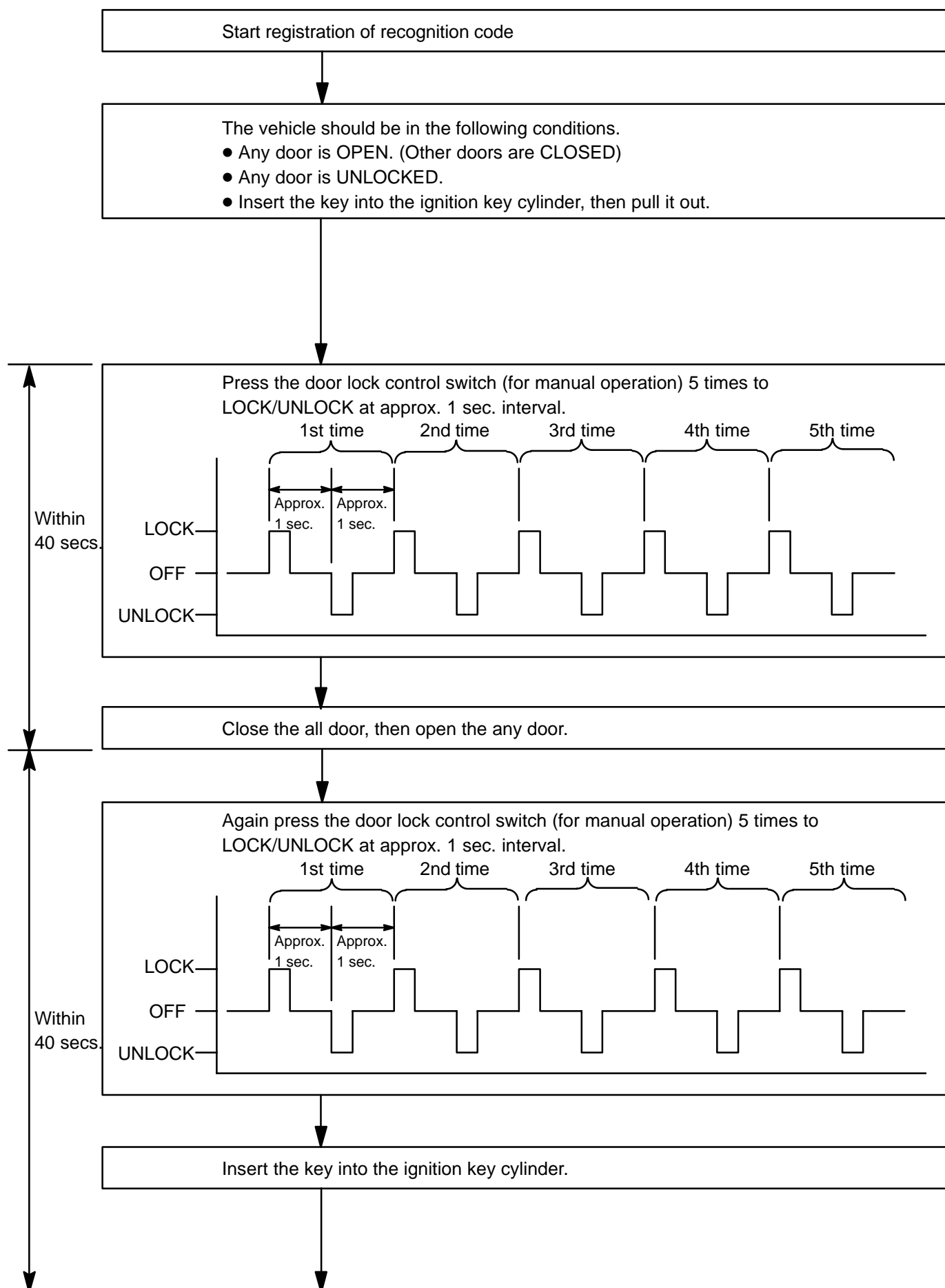
- (a) Select which operation mode should be performed from the following modes.
- Add mode
 - Rewrite mode
 - Prohibition mode
 - Confirmation mode

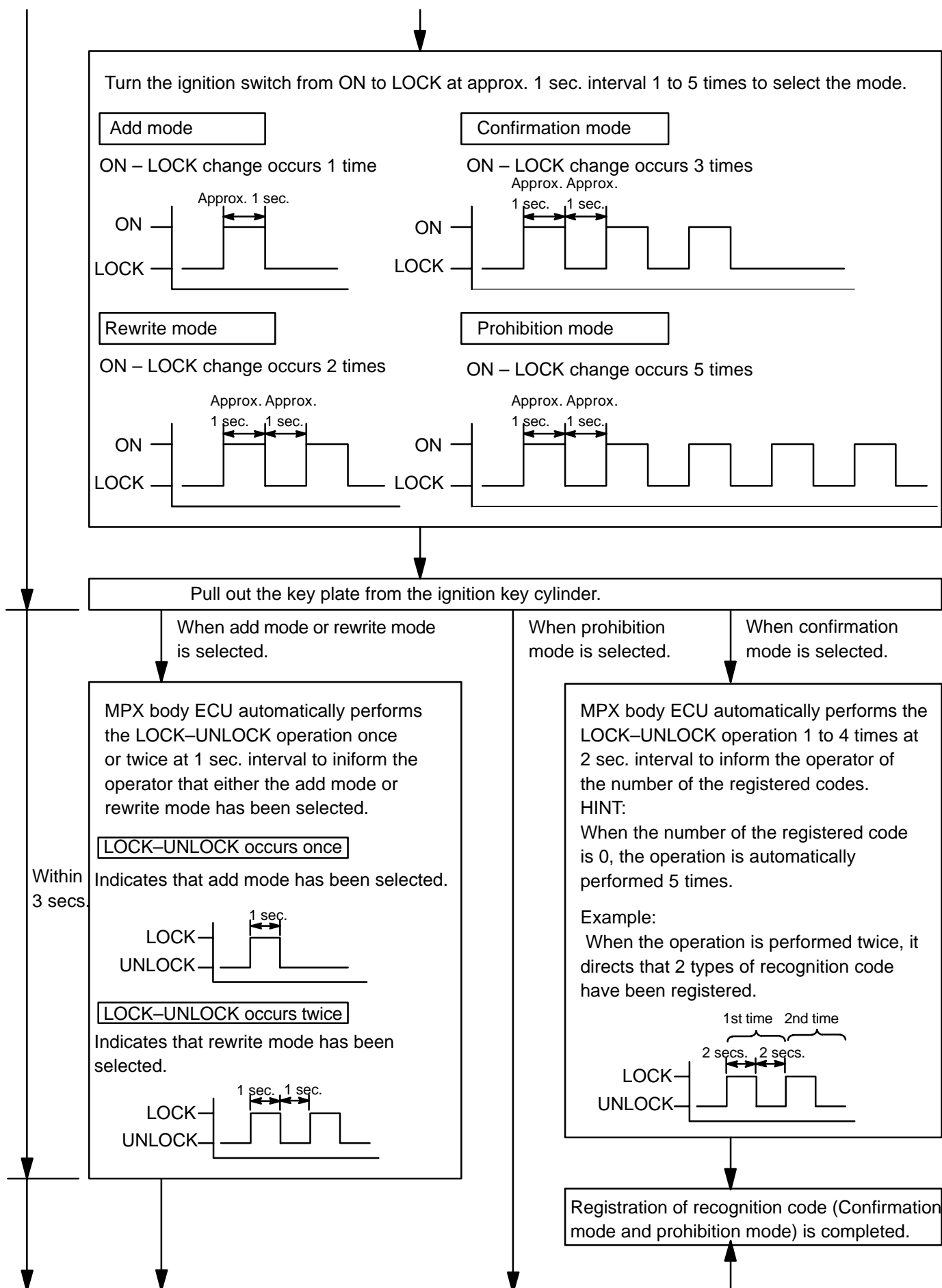
HINT:

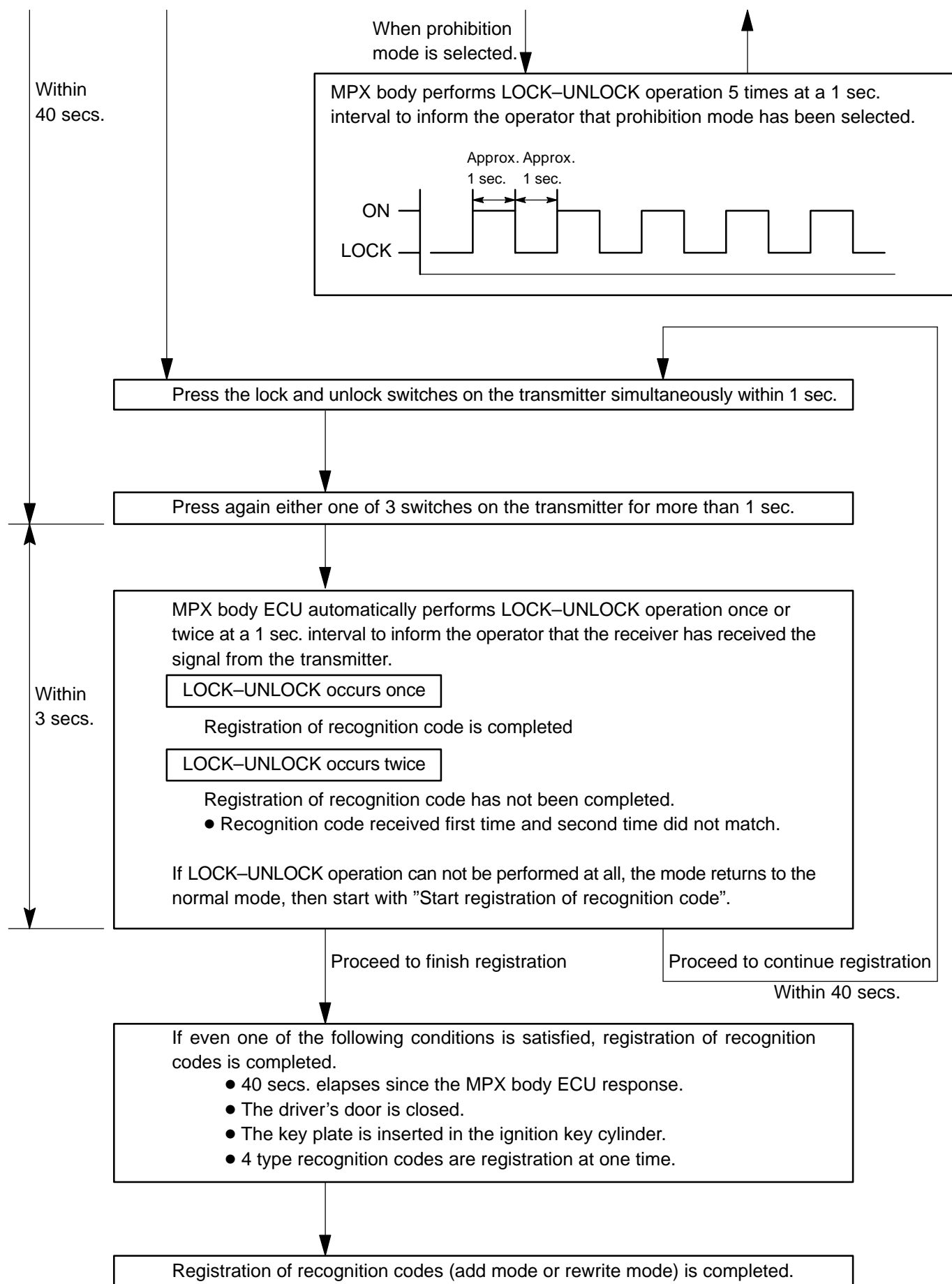
- The add mode is used to retain codes already registered while you register new recognition codes. This mode is used when adding a transmitter. However, if the number of registered codes exceeds 4 codes, previously registered codes are correspondingly erased in order, starting from the first registered code.
 - The rewrite mode is used to erase all previously registered codes and register only new recognition codes.
 - The prohibition mode is used to erase all registered codes and cancels the wireless door lock function. Use this mode when the transmitter is lost.
 - The confirmation mode is for confirming how many recognition codes are already registered before you register additional recognition codes.
- (b) Follow the chart on the following pages to register the transmitter recognition code at the wireless door lock control receiver.

HINT:

- When procedure is out of the specified, the operation returns to normal operation.
- Maximum 4 recognition codes can be registered.

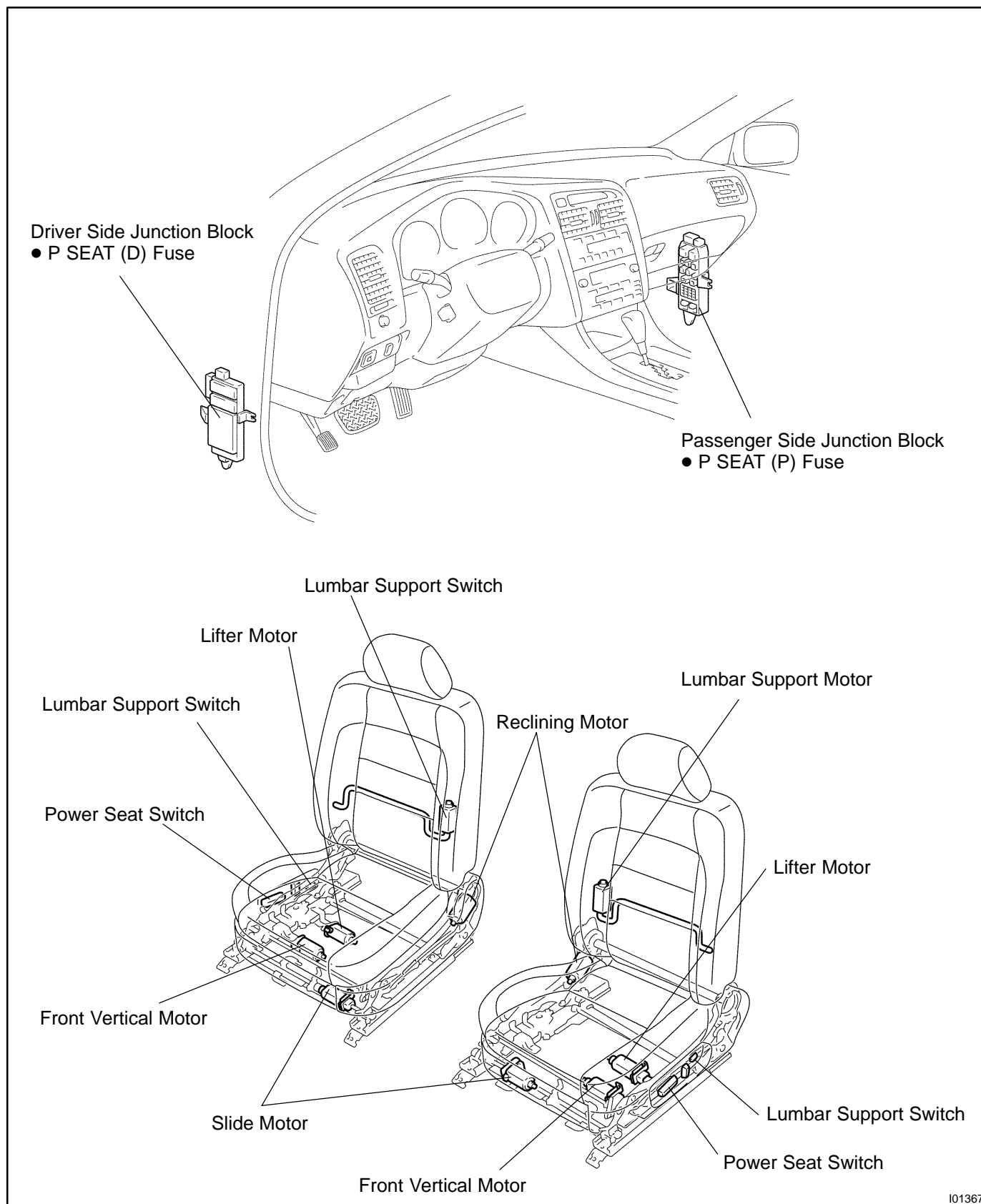




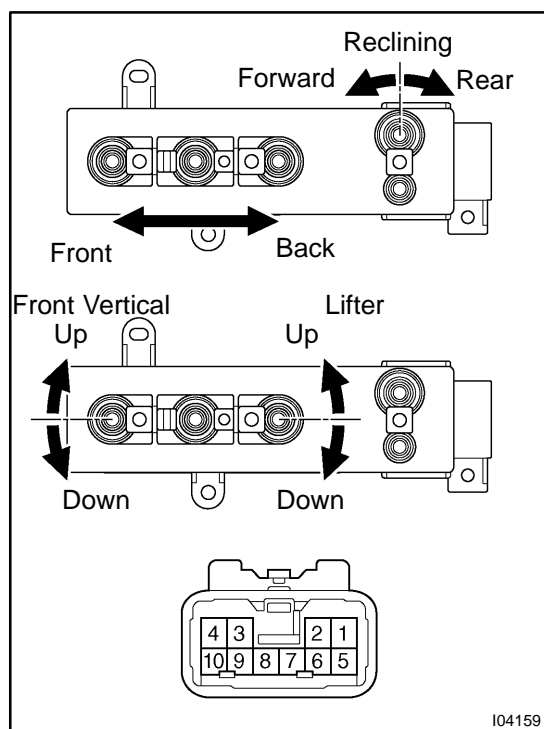


POWER SEAT CONTROL SYSTEM LOCATION

BE0GK-06



I01367



INSPECTION

1. INSPECT DRIVER'S POWER SEAT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FRONT	1 – 9 4 – 6	Continuity
OFF	4 – 6 4 – 9	Continuity
BACK	1 – 6 4 – 9	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 – 10 4 – 5	Continuity
OFF	4 – 5 4 – 10	Continuity
DOWN	1 – 5 4 – 10	Continuity

Lifter switch:

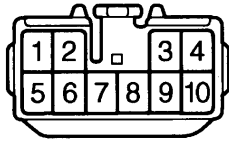
Switch position	Tester connection	Specified condition
UP	1 – 7 4 – 8	Continuity
OFF	4 – 7 4 – 8	Continuity
DOWN	1 – 8 4 – 7	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 3 2 – 4	Continuity
OFF	2 – 4 3 – 4	Continuity
REAR	1 – 2 3 – 4	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side



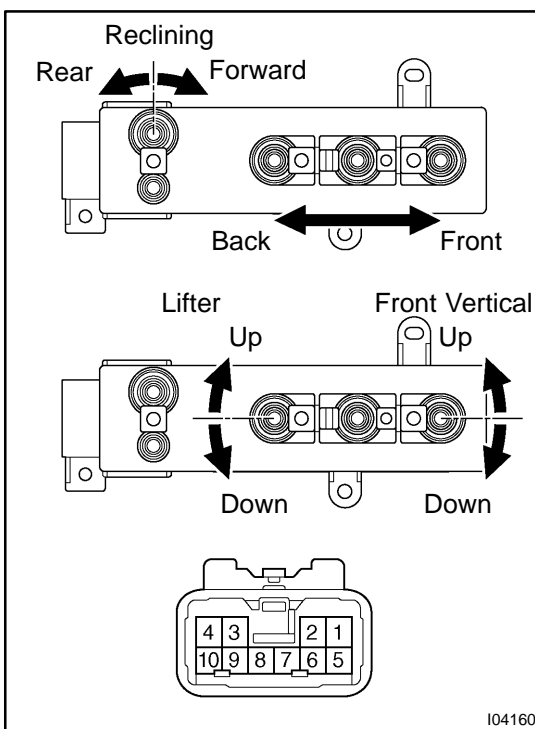
I05472

2. INSPECT DRIVER'S POWER SEAT SWITCH CIRCUIT

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side.

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

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



I04160

3. INSPECT PASSENGER'S POWER SEAT SWITCH CONTINUITY**Slide switch:**

Switch position	Tester connection	Specified condition
FRONT	1 – 9 4 – 6	Continuity
OFF	4 – 6 4 – 9	Continuity
BACK	1 – 6 4 – 9	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	1 – 5 4 – 10	Continuity
OFF	4 – 5 4 – 10	Continuity
DOWN	1 – 10 4 – 5	Continuity

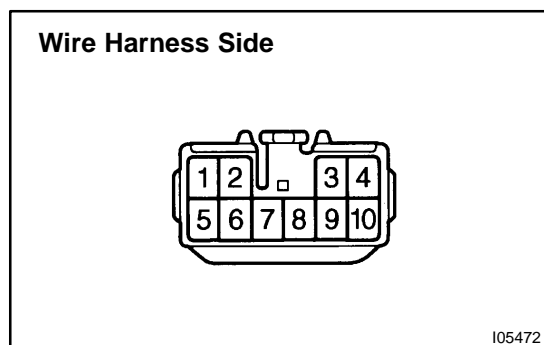
Lifter switch:

Switch position	Tester connection	Specified condition
UP	1 – 8 4 – 7	Continuity
OFF	4 – 7 4 – 8	Continuity
DOWN	1 – 7 4 – 8	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 3 2 – 4	Continuity
OFF	2 – 4 3 – 4	Continuity
REAR	1 – 2 3 – 4	Continuity

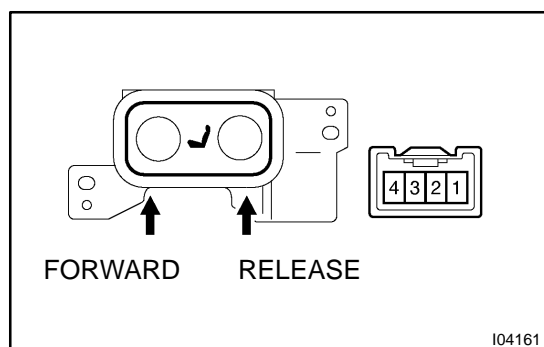
If continuity is not as specified, replace the switch.

**4. INSPECT PASSENGER'S POWER SEAT SWITCH CIRCUIT**

- Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- Inspect the connector on the wire harness side.

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

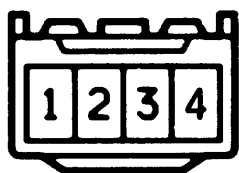
If circuit is not as specified, inspect the circuits connected to other parts.

**5. INSPECT DRIVER'S LUMBAR SUPPORT SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
FORWARD	1 – 4 2 – 3	Continuity
OFF	1 – 3 2 – 3	Continuity
RELEASE	1 – 3 2 – 4	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side



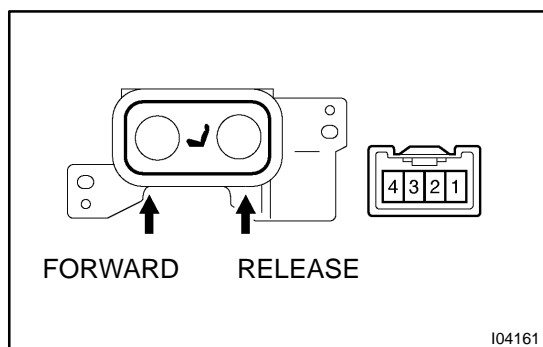
I04162

6. INSPECT DRIVER'S LUMBAR SUPPORT SWITCH CIRCUIT

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side.

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

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



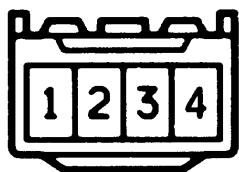
I04161

7. INSPECT PASSENGER'S LUMBAR SUPPORT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
FORWARD	1 – 4 2 – 3	Continuity
OFF	1 – 3 2 – 3	Continuity
RELEASE	1 – 3 2 – 4	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side



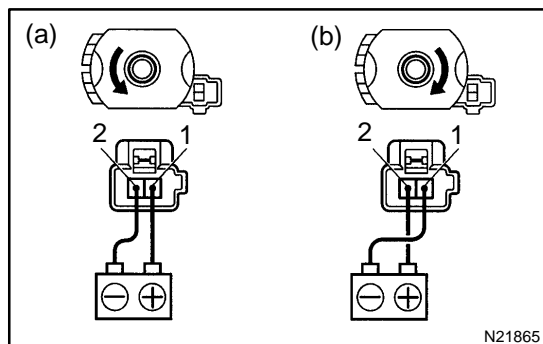
I04162

8. INSPECT PASSENGER'S LUMBAR SUPPORT SWITCH CIRCUIT

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side.

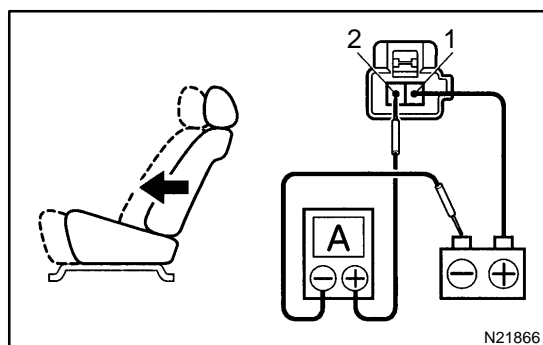
Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

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

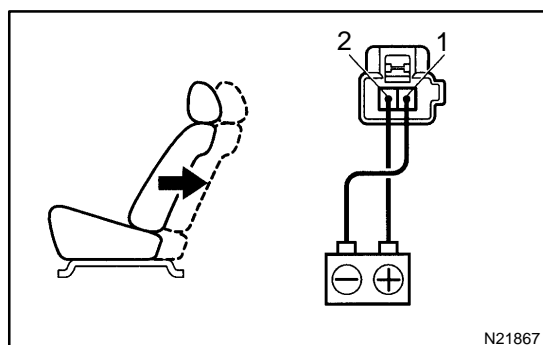
**9. INSPECT SLIDE MOTOR OPERATION**

- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns counterclockwise.
- Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.

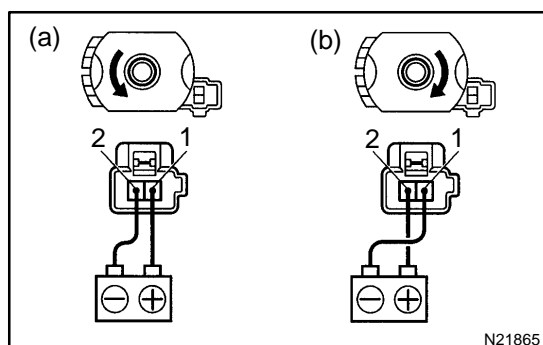
**10. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION****(): Passenger side**

- Connect the positive (+) lead from the battery to terminal 1 (2), the positive (+) lead from the ammeter to terminal 2 (1) and the negative (-) lead to the battery negative (-) terminal, then move the seat cushion to the front position.
- Continue to apply voltage, check that current changes to less than 1 ampere within 4 to 90 seconds.



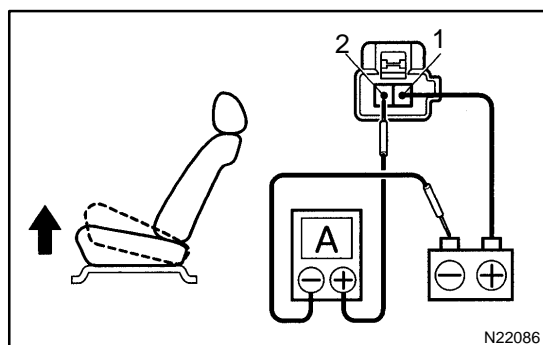
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 (1) and the negative (-) lead to terminal 1 (2), check that the seat cushion begins to move backwards.

If operation is not as specified, replace the seat adjuster.

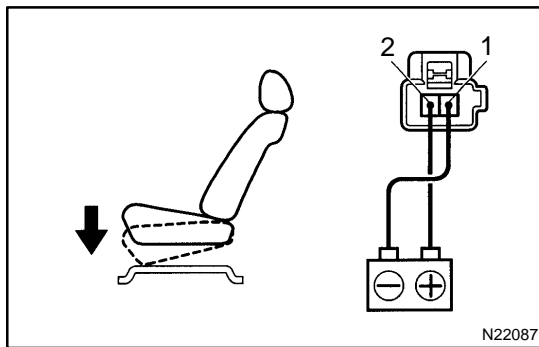
**11. INSPECT FRONT VERTICAL MOTOR OPERATION**

- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns counterclockwise.
- Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.

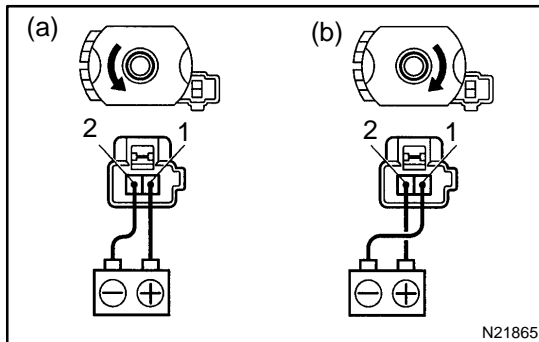
**12. INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION****(): Passenger side**

- Connect the positive (+) lead from the battery to terminal 1 (2), the positive (+) lead from the ammeter to terminal 2 (1) and the negative (-) lead to the battery negative (-) terminal, then move the seat cushion to the highest position.
- Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



- (c) Disconnect the leads from the terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 (1) and the negative (-) lead to terminal 1 (2), check that the seat cushion begins to descend.

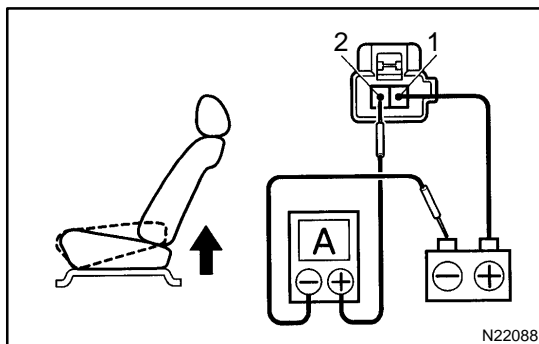
If operation is not as specified, replace the seat adjuster.



13. INSPECT LIFTER MOTOR OPERATION

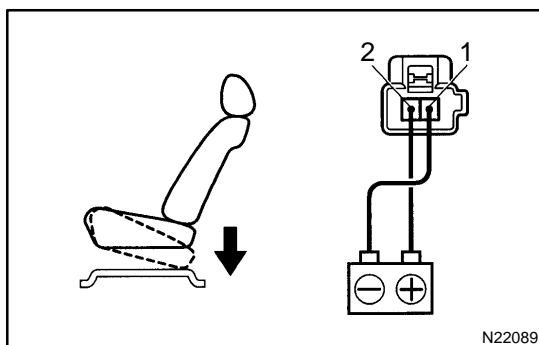
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns counterclockwise.
- (b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.



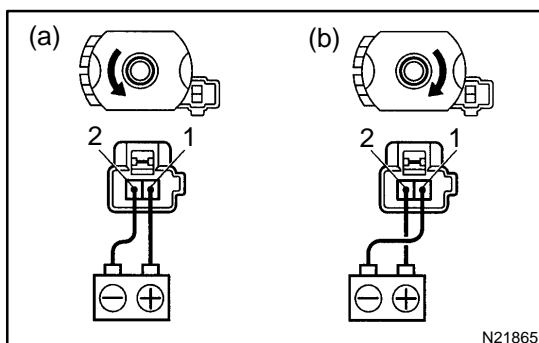
14. INSPECT LIFTER MOTOR PTC THERMISTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 2 (1), the positive (+) lead from the ammeter to terminal 1 (2) and the negative (-) lead to the battery negative (-) terminal, then move the seat cushion to the highest position.
- (b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



- (c) Disconnect the leads from the terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 (2) and the negative (-) lead to terminal 2 (1), check that the seat cushion begins to descend.

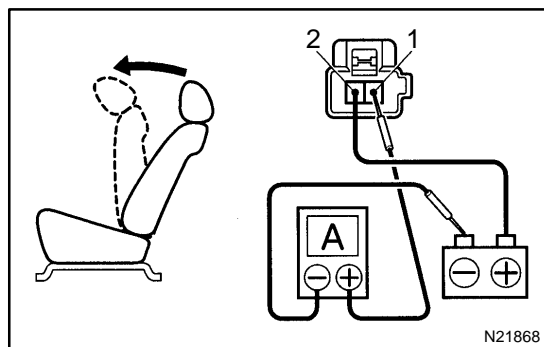
If operation is not as specified, replace the seat adjuster.



15. INSPECT RECLINING MOTOR OPERATION

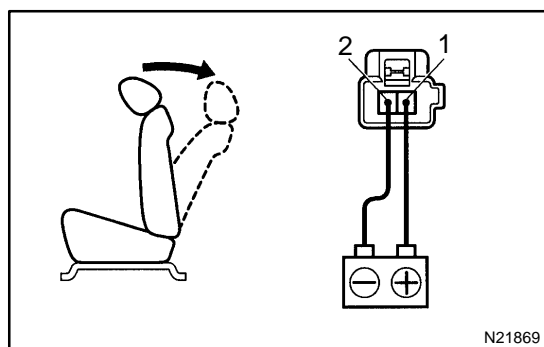
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns counterclockwise.
- (b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.



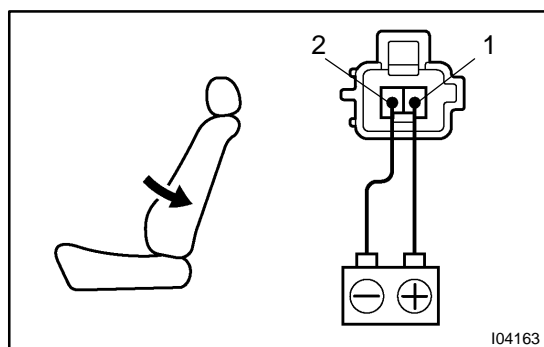
16. INSPECT RECLINING MOTOR PTC THERMISTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to the battery negative (–) terminal, then recline the seat back to the most forward position.
- (b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



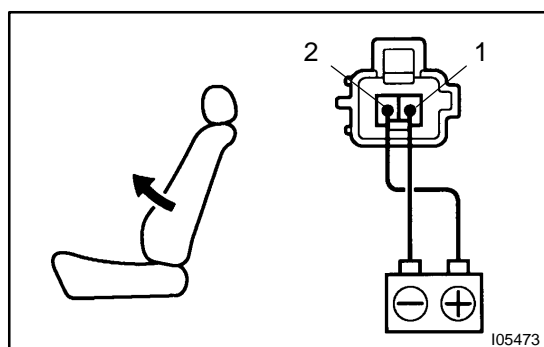
- (c) Disconnect the leads from the terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the seat back begins to fall backward.

If operation is not as specified, replace the seat adjuster.



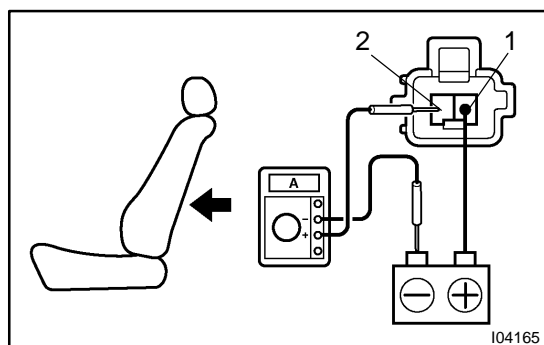
17. INSPECT LUMBAR SUPPORT MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the lumbar support moves to release side.



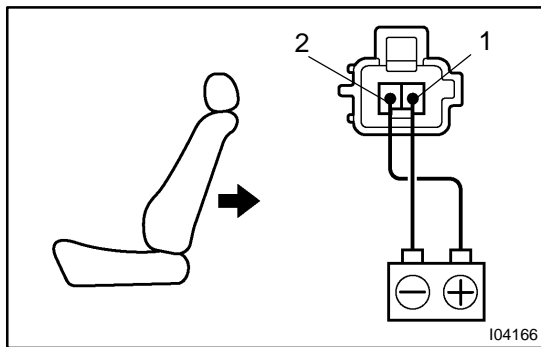
- (b) Reverse the polarity, check that the lumbar support moves forward.

If operation is not as specified, replace the seat adjuster.



18. INSPECT LUMBAR SUPPORT MOTOR CIRCUIT BREAKER OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1 on the lumbar support motor connector and move the lumbar support to front end position.

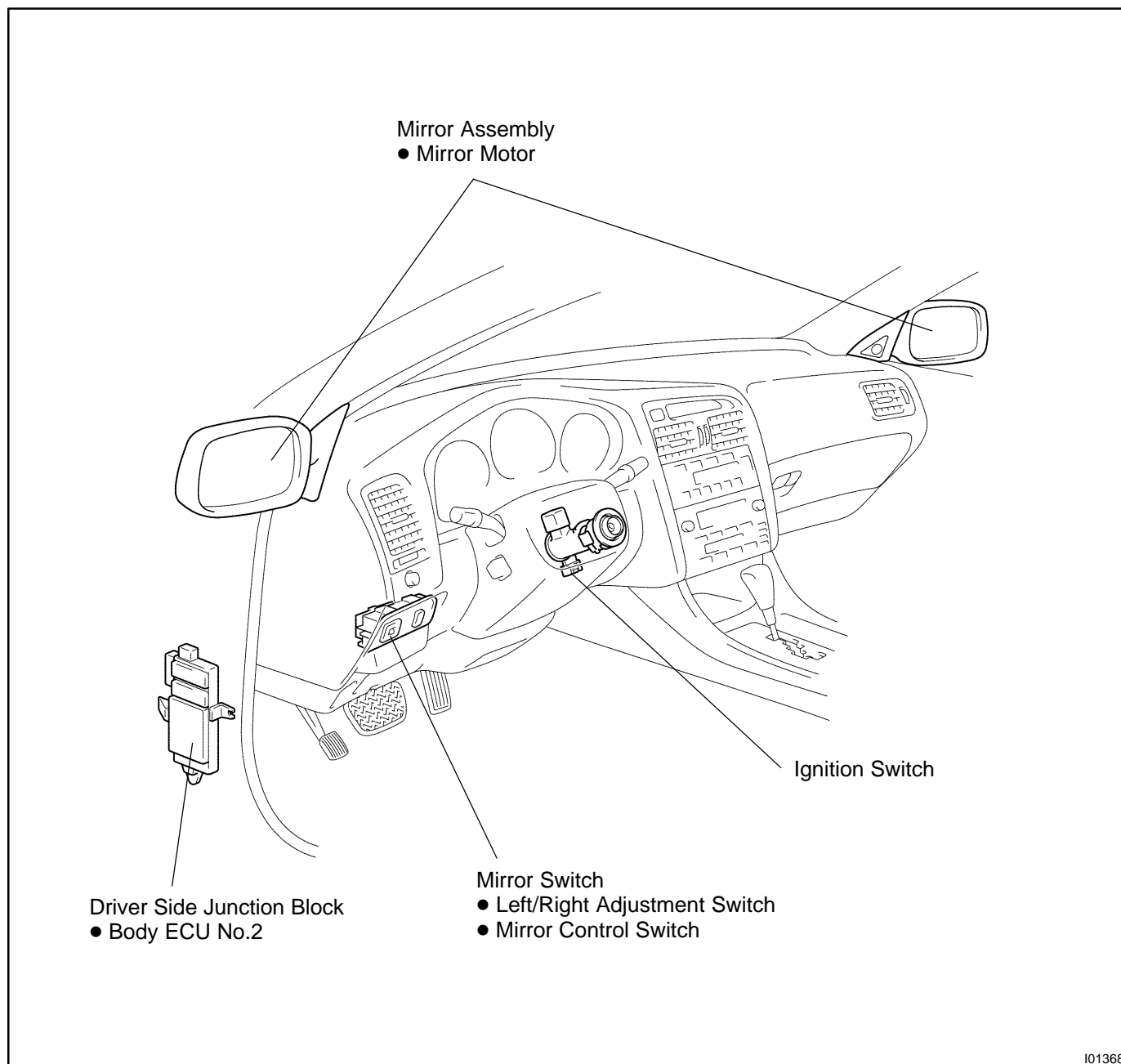


- (b) Continue to apply voltage, check that a circuit breaker operation noise can be heard within 4 to 60 seconds.
- (c) Reverse the polarity, check that the lumbar support begins to move release side with in spproximately 60 seconds.

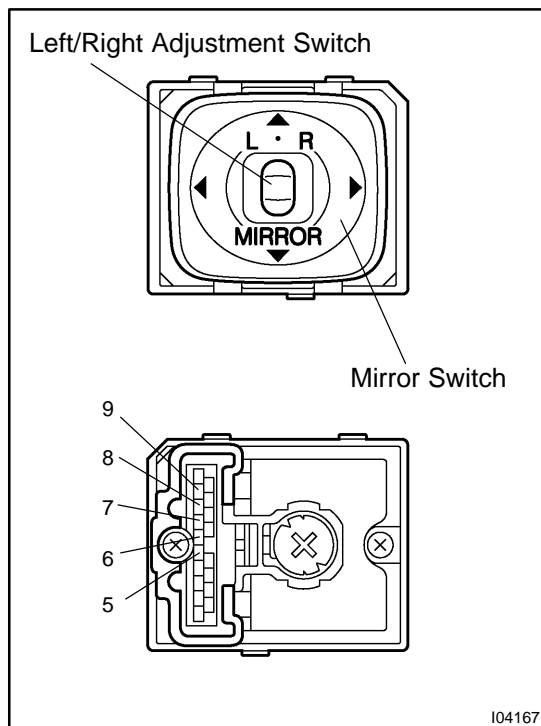
If operation is not as specified, replace the motor.

POWER MIRROR CONTROL SYSTEM LOCATION

BE02J-10



I01368



INSPECTION

1. USA/CANADA models:

INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Resistance (Ω)
LEFT	8 – 9	100
RIGHT	8 – 9	0
Illumination	5 – 6	Continuity

Measure resistance between terminals 7 and 9.

Switch position	Resistance (Ω)
UP	Approx. 100
RIGHT	250
DOWN	470
LEFT	800

If continuity is not as specified, replace the switch.

2. USA/CANADA models:

INSPECT MIRROR SWITCH CIRCUIT

(See page [DI-837](#))

3. TAIWAN model:

INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Resistance (Ω)
LEFT	8 – 9	100
RIGHT	8 – 9	0
Illumination	5 – 6	Continuity

Measure resistance between terminals 7 and 9.

Switch position	Resistance (Ω)
UP	Approx. 100
RIGHT	250
DOWN	470
LEFT	800

If continuity is not as specified, replace the switch.

4. TAIWAN model:

INSPECT RETRACT SWITCH CONTINUITY

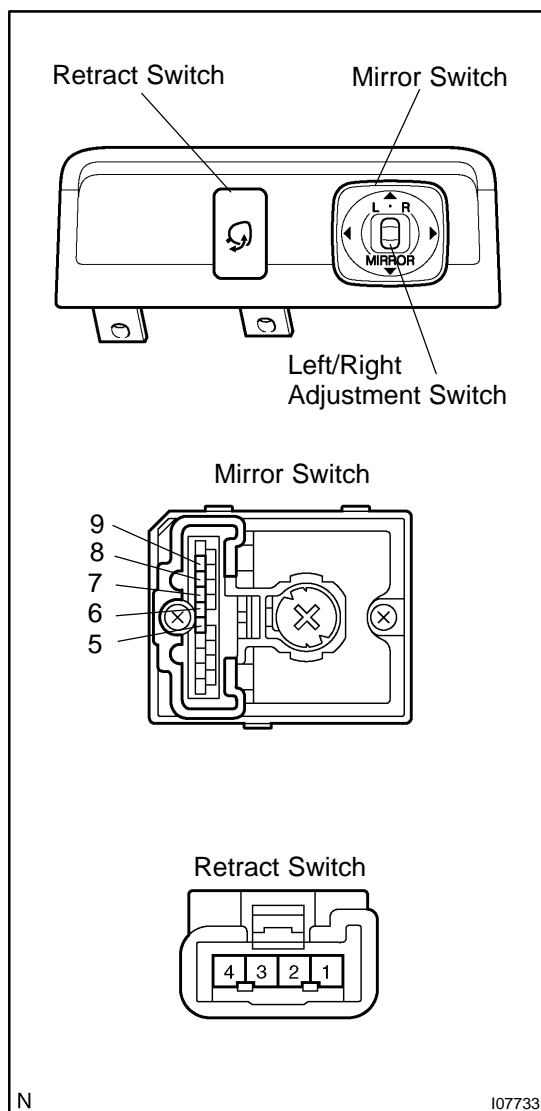
Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 2	Continuity

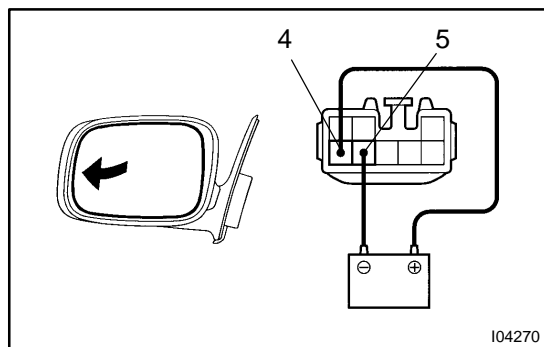
If continuity is not as specified, replace the switch.

5. TAIWAN model:

INSPECT MIRROR SWITCH CIRCUIT

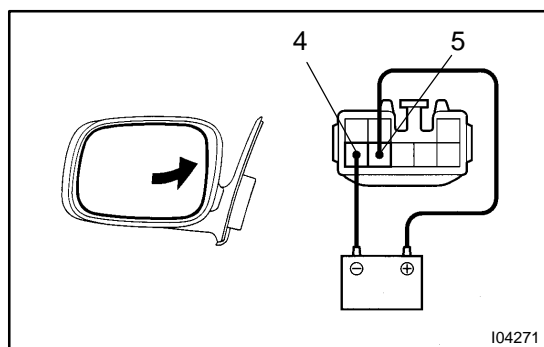
(See page [DI-837](#))



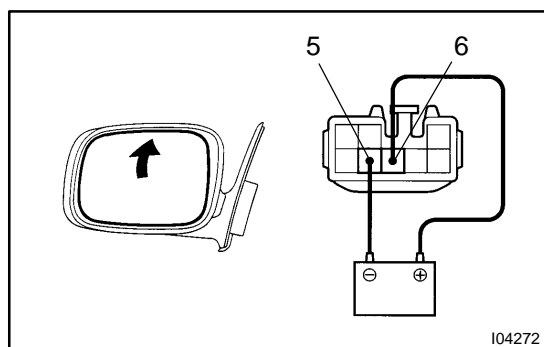


**6. w/o Driving position memory:
INSPECT MIRROR MOTOR OPERATION**

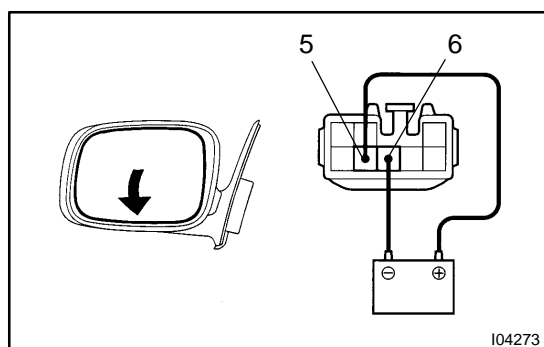
- (a) Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 5, and check that the mirror turns to the left side.



- (b) Reverse the polarity, and check that the mirror turns to the right side.



- (c) Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 6, and check that the mirror turns upward.



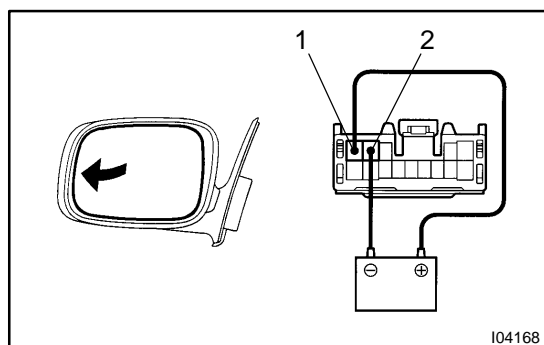
- (d) Reverse the polarity, and check that the mirror turns downward.

If operation is not as specified, replace the mirror assembly.

**7. w/o Driving position memory:
INSPECT MIRROR MOTOR CIRCUIT**

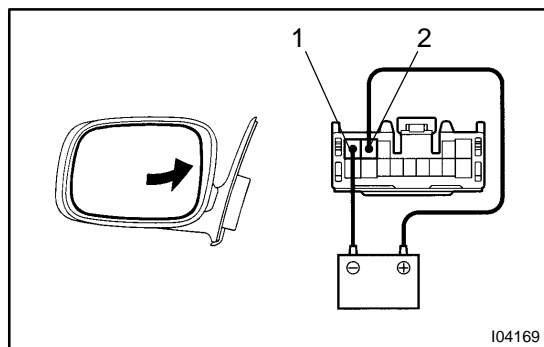
Left side: (See page [DI-882](#))

Right side: (See page [DI-916](#))

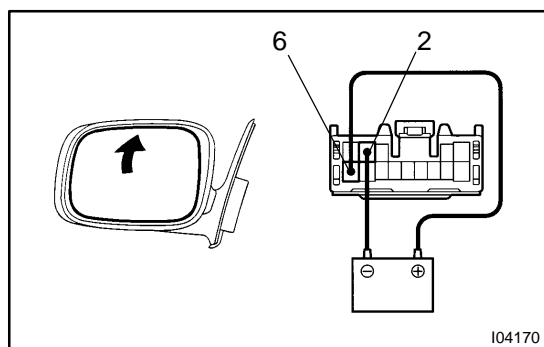


**8. w/ Driving position memory:
INSPECT MIRROR MOTOR OPERATION**

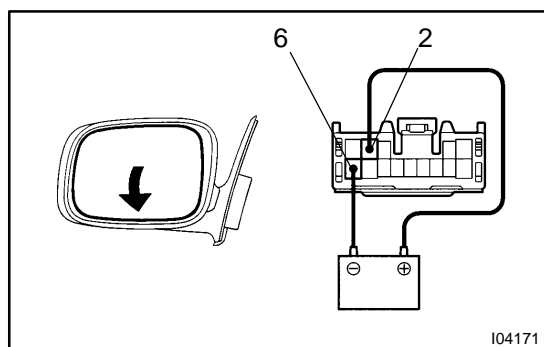
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the mirror turns to the left side.



- (b) Reverse the polarity, and check that the mirror turns to the right side.



- (c) Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 2, and check that the mirror turns upward.



- (d) Reverse the polarity, and check that the mirror turns downward.

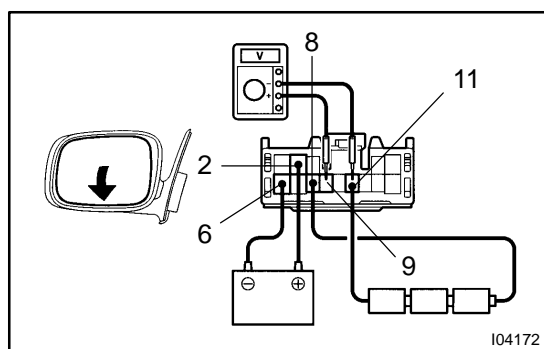
If operation is not as specified, replace the mirror assembly.

9. w/ Driving position memory:

INSPECT MIRROR MOTOR CIRCUIT

Left side: (See page [DI-882](#))

Right side: (See page [DI-916](#))



10. w/ Driving position memory only:

INSPECT MIRROR POSITION SENSORS OPERATION

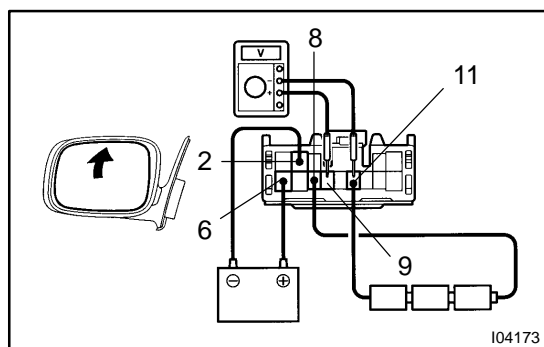
HINT:

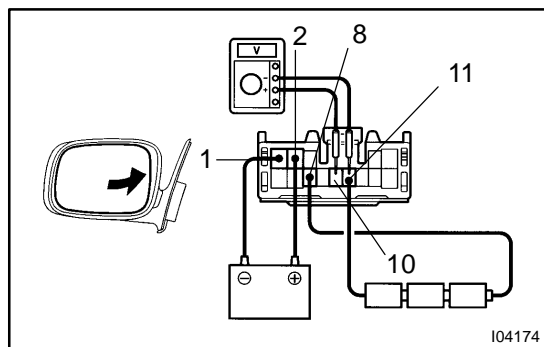
Strip off the vinyl tape of the connector and remove terminals 1, 2, 6, 8, 9, 10 and 11 from the connector housing.

- (a) Connect a series of three 1.5 V dry cell batteries.
 (b) Connect the positive (+) lead from the dry cell batteries to terminal 8 and the negative (-) lead to terminal 11.
 (c) Connect the positive (+) lead from the voltmeter to terminal 9 and the negative (-) lead to terminal 11.
 (d) Apply battery positive voltage to terminals 2 and 6, then check that the voltage gradually changes according to the table below while the mirror moves between the uppermost position and lowermost position.

Mirror position	Lowermost	Mirror position	Uppermost
Voltage	2.8 – 5.0	Changes gradually	0 – 1.8

If voltage value is not as specified, replace the motor assembly.





- (e) Disconnect the 4 leads of the battery and voltmeter.
- (f) Connect the positive (+) lead from the voltmeter to terminal 10 and negative (–) lead to terminal 11.
- (g) Apply battery positive voltage to terminals 1 and 2, then inspect that the voltage gradually changes according to the table below while the mirror moves between the left–most position and right–most position.

Mirror position	Left–most	Mirror position	Right–most
Voltage LEFT	2.8 – 5.0	Changes gradually	0 – 1.8
Voltage RIGHT	0 – 1.8	Changes gradually	2.8 – 5.0

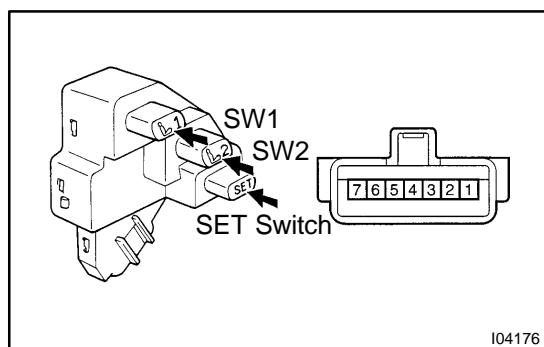
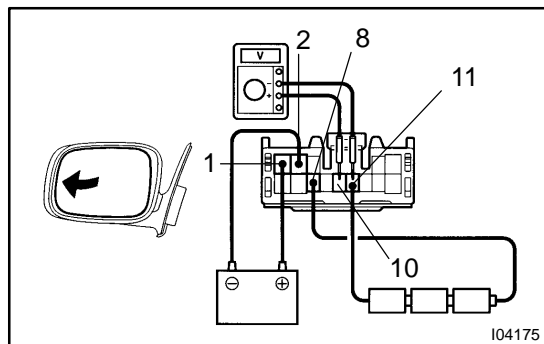
If voltage value is not as specified, replace the motor assembly.

11. w/ Driving position memory only:

INSPECT MIRROR POSITION SENSORS CIRCUIT

Left side: (See page [DI-884](#))

Right side (See page [DI-918](#))



12. INSPECT DRIVING POSITION MEMORY AND RETURN SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
SET switch ON	1 – 7	Continuity
Return SW1 ON	1 – 3	Continuity
Return SW2 ON	1 – 5	Continuity

If continuity is not as specified, replace the switch.

13. INSPECT DRIVING POSITION MEMORY AND RETURN SWITCH CIRCUIT (See page [DI-887](#))

14. TAIWAN models:

INSPECT ELECTRICAL RETRACT MOTOR OPERATION

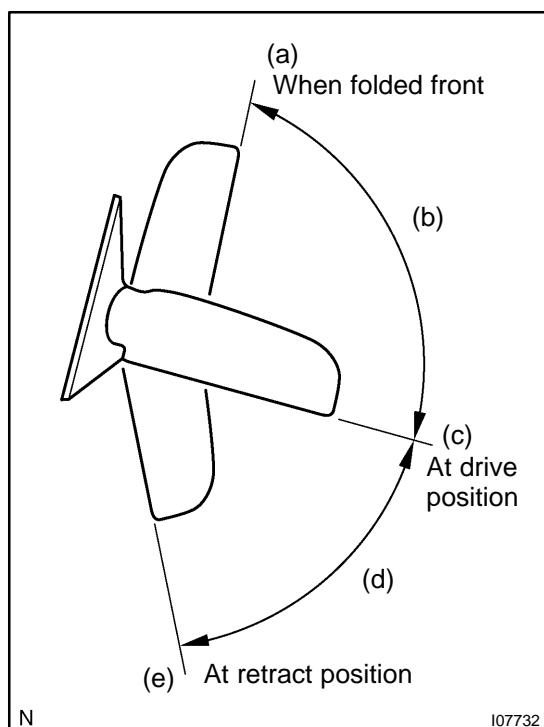
- (a) When folded front position:
 - (1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.
 - (2) Reverse the polarity, check that the mirror does not operate.

If operation is not as specified, replace the mirror assembly.

- (b) Between folded front position and driving position:

- (1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.
- (2) Reverse the polarity, check that the mirror operate at folded front position.

If operation is not as specified, replace the mirror assembly.



- (c) When driving position:
 - (1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.
 - (2) Reverse the polarity, check that the mirror does not operate.

If operation is not as specified, replace the mirror assembly.

- (d) Between driving position and retract position:
 - (1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror operates at retract position.
 - (2) Reverse the polarity, check that the mirror operate at return position (Stopping at driving position).

If operation is not as specified, replace the mirror assembly.

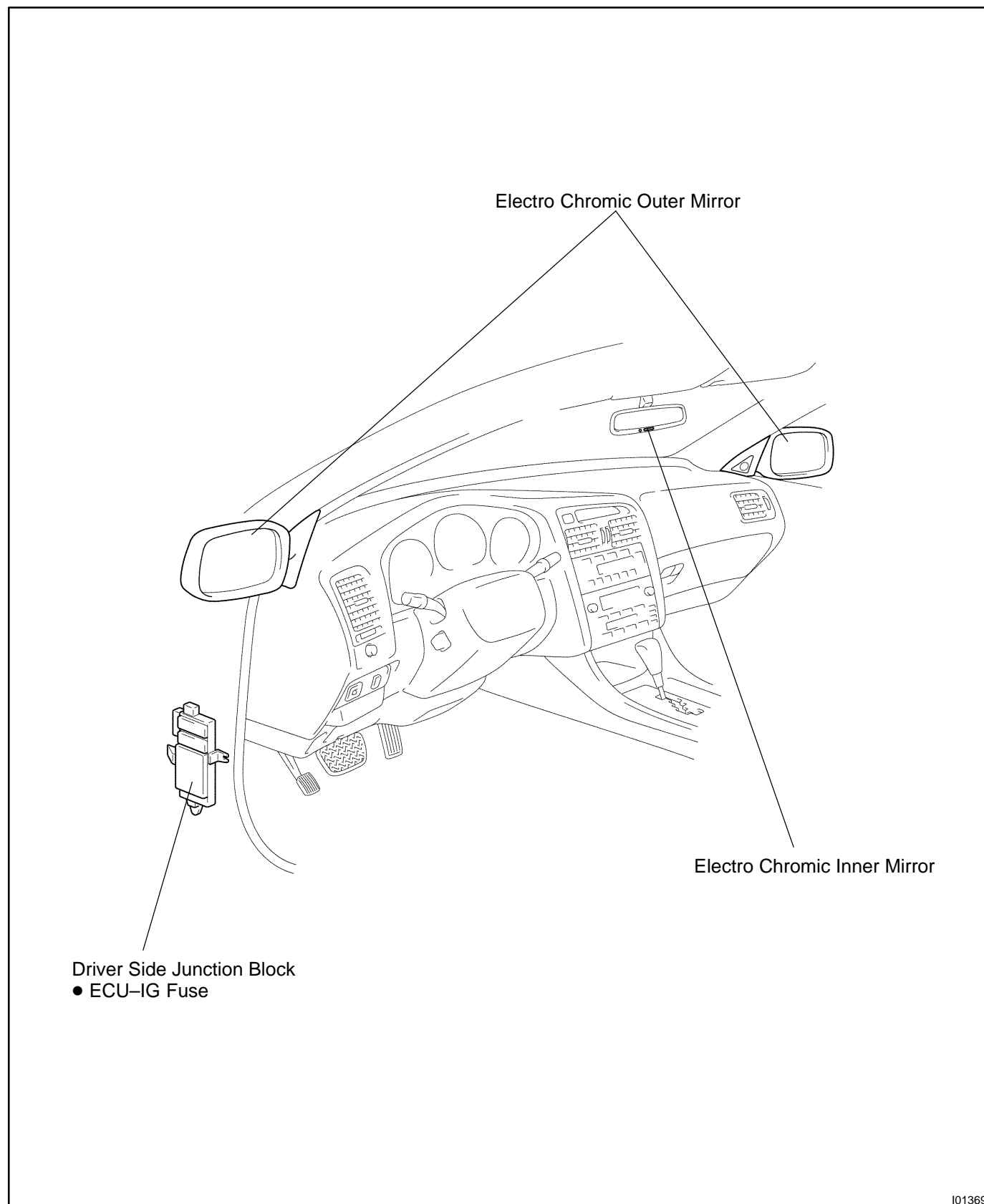
- (e) When retract position:
 - (1) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, check that the mirror does not operates.
 - (2) Reverse the polarity, check that the mirror operate at return position (Stopping at driving position).

If operation is not as specified, replace the mirror assembly.

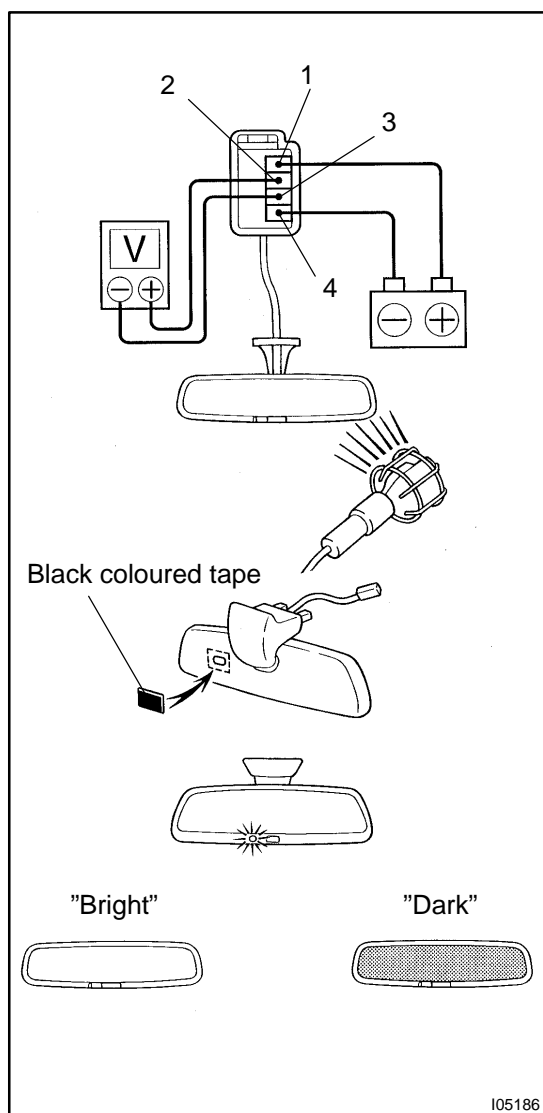
ELECTRO CHROMIC MIRROR SYSTEM

LOCATION

BE0HC-06



I01369

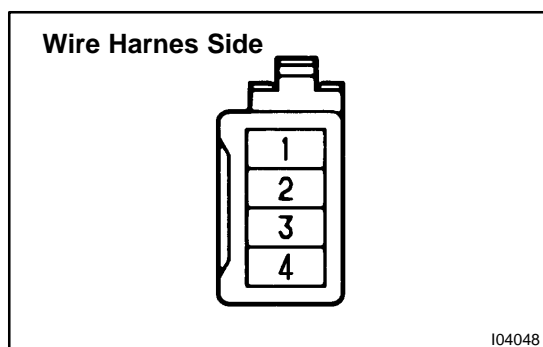


INSPECTION

1. INSPECT ELECTRO CHROMIC INNER MIRROR OPERATION

- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 4.
- Connect the positive (+) lead from the voltmeter to terminal 2 and the negative (–) lead to terminal 3.
- Attach a black coloured tape to forward sensor to prevent it from sensing.
- When the mode is turned to AUTO, check that indicator light lights up.
- Light up the mirror with an electric light, and check that there is battery positive voltage and mirror surface changes "bright" to "dark".

If operation is not as specified, replace the inner mirror.

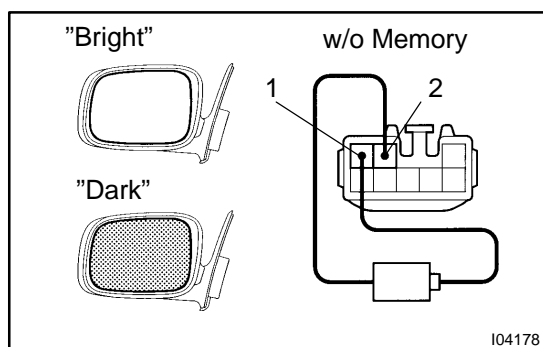


2. INSPECT ELECTRO CHROMIC INNER MIRROR CIRCUIT

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

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

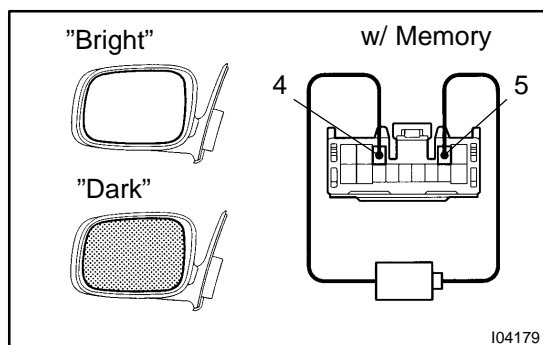
If circuit is not as specified, inspect the circuits connected to other parts.



**3. w/o Driving position memory:
INSPECT ELECTRO CHROMIC OUTER MIRROR OPERATION**

- Disconnect the outer mirror connector.
- Connect the positive (+) lead from the dry cell battery to terminal 2 and the negative (–) lead to terminal 1, then check that the mirror surface changes to "dark".
- Check the mirror turns to "bright" after disconnecting the battery.

If operation is not as specified, replace the mirror assembly.



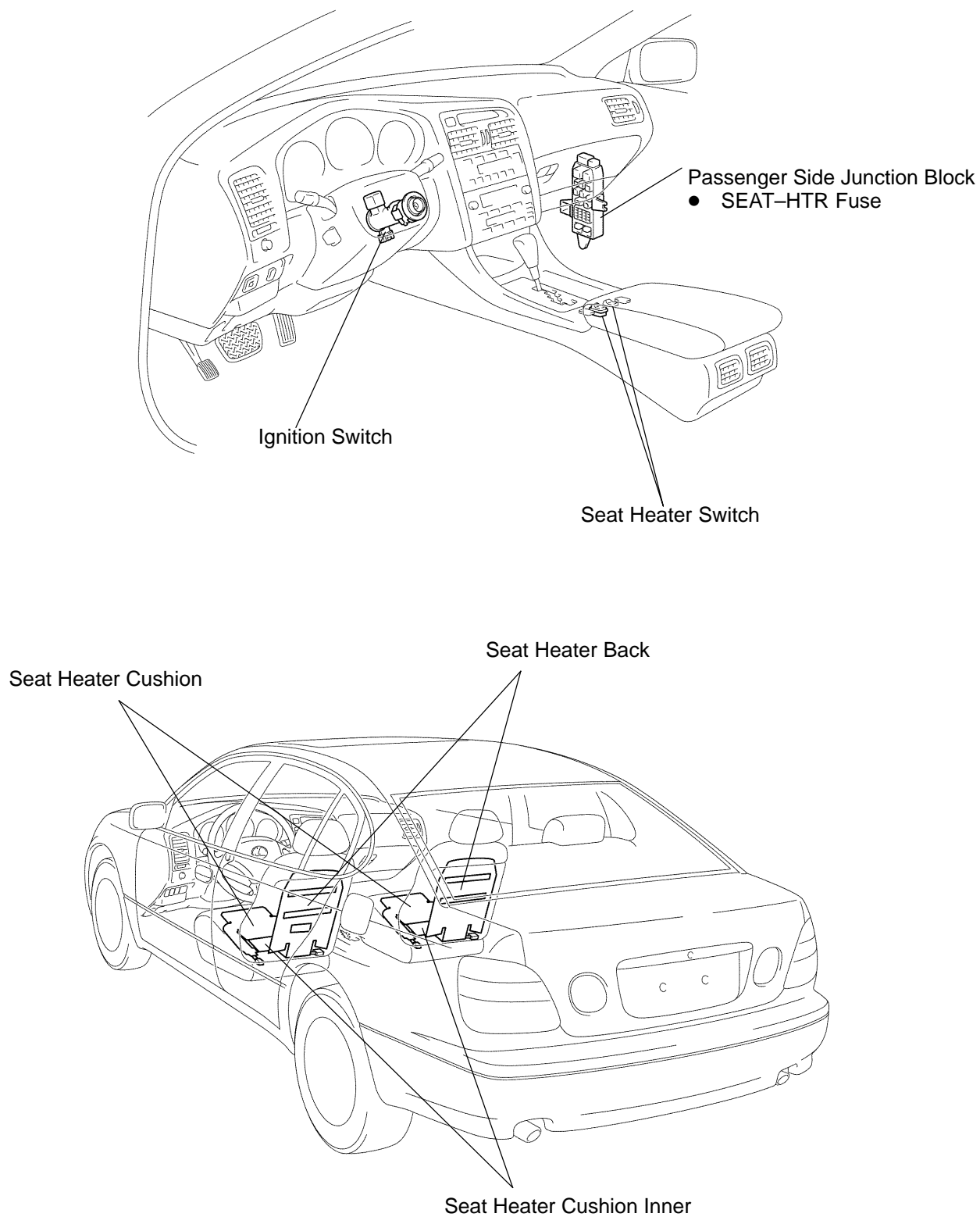
**4. w/ Driving position memory:
INSPECT ELECTRO CHROMIC OUTER MIRROR OPERATION**

- Disconnect the outer mirror connector.
- Connect the positive (+) lead from the dry cell battery to terminal 5 and the negative (–) lead to terminal 4, then check that the mirror surface changes to "dark".
- Check the mirror turns to "bright" after disconnecting the battery.

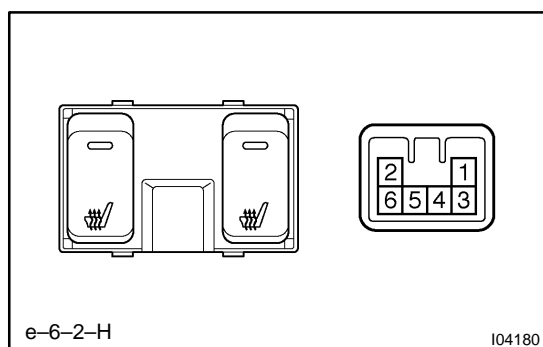
If operation is not as specified, replace the mirror assembly.

SEAT HEATER SYSTEM LOCATION

BE0GH-10



101370

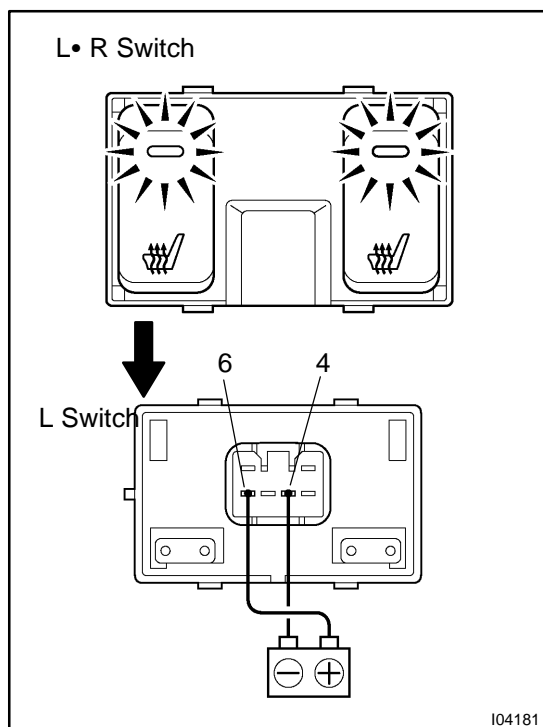


INSPECTION

1. INSPECT SEAT HEATER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Right side	3 – 4 – 6	Continuity
OFF	–	No continuity
Left side	2 – 4 – 6	Continuity
Illumination circuit	1 – 5	Continuity

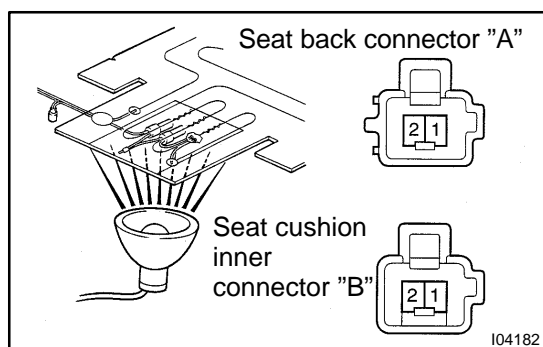
If continuity is not as specified, replace the switch.



2. INSPECT SEAT HEATER INDICATOR LIGHT OPERATION

- Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 4.
- Push the seat heater switch Right or Left side and check that the indicator light lights up.

If operation is not as specified, replace the switch and inspect the circuits connected to other parts.

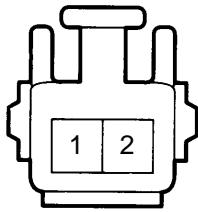


3. INSPECT SEAT HEATER CUSHION CONTINUITY

- Heat the thermostat with a light.
- Inspect the seat heater cushion continuity between terminals, as shown.

Tester connection	Condition	Specified condition
A2 – B1	Constant	Continuity
A1 – A2	Seat heater temperature below 25 °C (77 °F)	Continuity
B1 – B2	Seat heater temperature above 45 °C (113 °F)	No continuity

If continuity is not as specified, replace the seat cushion pad.

Wire Harness Side

e-2-1

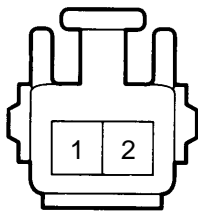
I01824

4. INSPECT SEAT HEATER CUSHION CONTINUITY

Inspect the seat heater inner cushion and front cushion continuity between terminals, as shown.

Tester connection	Condition	Specified condition
1 – Body ground	Seat heater switch ON	Battery positive volatage

If continuity is not as specified, replace the seat back pad.

Wire Harness Side

e-2-1

I01824

5. INSPECT SEAT BACK CONTINUITY

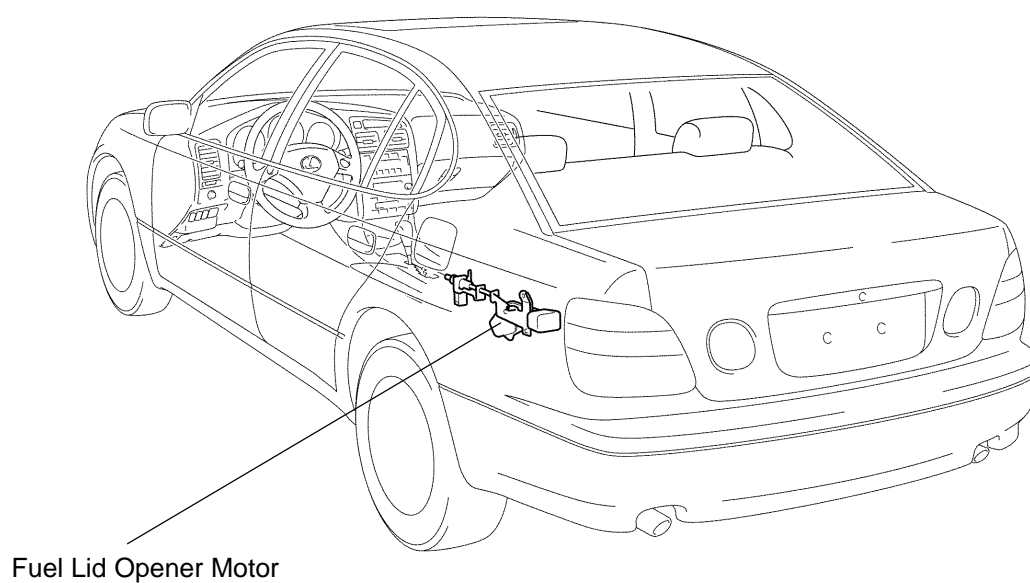
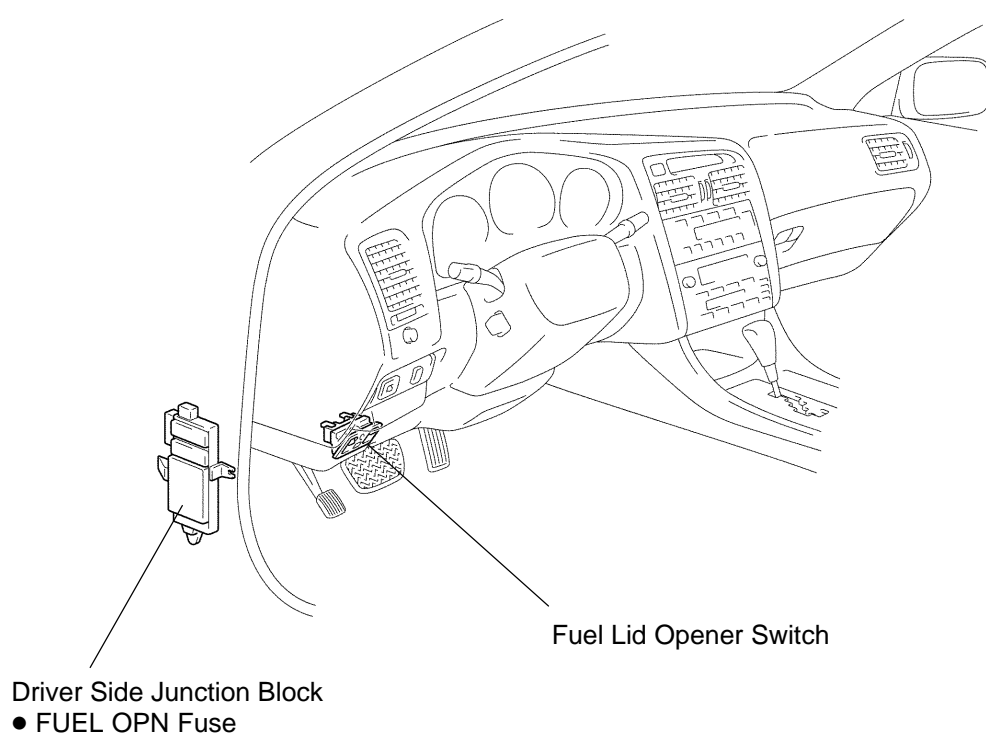
Inspect the seat back continuity between terminals, as shown.

Tester connection	Condition	Specified condition
2 – Body ground	Constant	Continuity

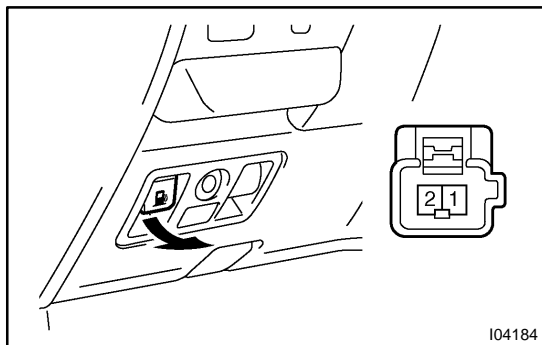
If continuity is not as specified, replace the seat back pad.

FUEL LID OPENER SYSTEM LOCATION

BE0GF-05



I01371



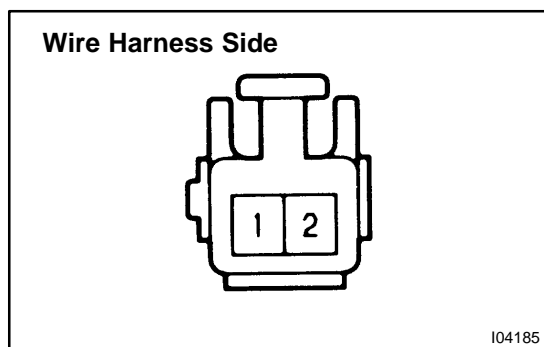
I04184

INSPECTION

1. INSPECT FUEL LID OPENER SWITCH CONTINUITY

- Check that continuity exists between terminals with the switch ON (Lever pulled).
- Check that no continuity exists between terminals with the switch OFF (Lever free).

If continuity is not as specified, replace the switch assembly.



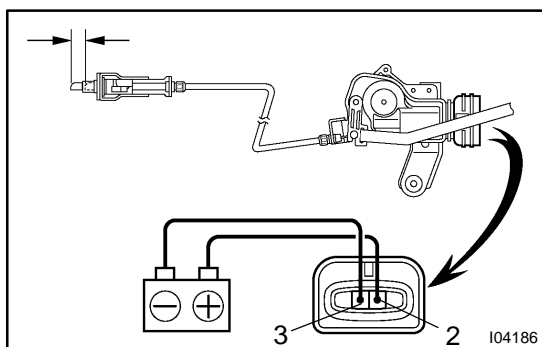
I04185

2. INSPECT FUEL LID OPENER SWITCH CIRCUIT

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

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

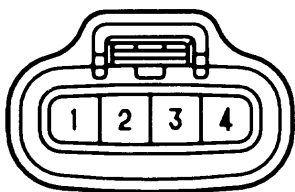
If circuit is not as specified, inspect the circuits connected to other parts.



I04186

3. INSPECT FUEL LID OPENER SOLENOID OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 3.
 - Check that the solenoid operates in the fuel lid opening.
- If operation is not as specified, replace the solenoid.

Wire Harness Side

I04187

4. INSPECT FUEL LID OPENER MOTOR CIRCUIT

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

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
2 – Ground	Fuel lid opener switch ON (Lever pulled)	Battery positive voltage

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

AUDIO SYSTEM

DESCRIPTION

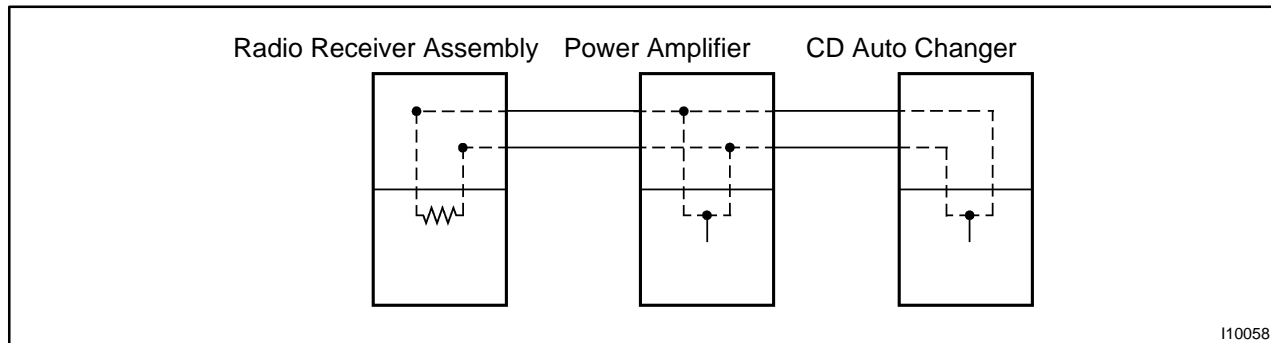
BE10X-03

1. OUTLINE OF AVC-LAN

(a) What is AVC-LAN?

AVC-LAN is the abbreviation, which stands for Audio Visual Communication–Local Area Network. This is a unified standard co-developed by 6 audio manufactures associated with Toyota Motor Corporation.

The Unified standard covers signals, such as audio signal, visual signal, signal for switch indication and communication signal.



(b) Objectives

Recently the car audio system has been rapidly developed and functions have been changed drastically. The conventional system has been switched to the multi-media type such as a navigation system. At the same time the level of customers needs to audio system has been upgraded. This lies behind this standardization.

The concrete objectives are explained below.

- (1) When products by different manufactures were combined together, there used to be a case that malfunction occurred such as sound did not come out. This problem has been resolved by standardization of signals.
- (2) Various types of after market products have been able to add or replace freely.
- (3) Because of the above (2), each manufacture has become able to concentrate on developing products in their strongest field. This has enabled many types of products provided inexpensively.
- (4) Conventionally, a new product developed by a manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy compatible products provided for them timely.

The above descriptions are the objectives to introduce AVC-LAN. By this standardization, development of new products will no longer cause systematic errors. Thus, this is very effective standard for a product in the future.

HINT:

- When +B short or GND short is detected in AVC-LAN circuit, communication stops. Accordingly the audio system does not function normally.
- When audio system is not equipped with a navigation system, audio head unit is the master unit. (When audio system is equipped with a navigation system, navigation ECU is the master unit.)
- The car audio system using AVC-LAN circuit has a diagnosis function.
- Each product has its own specified numbers called physical address. Numbers are also allotted to each function in one product, which are called logical address.

2. DIAGNOSIS FUNCTION (PIONEER made)

Error codes over tuner and connected equipment are displayed on the screen of tuner.

(a) Diagnosis start-up

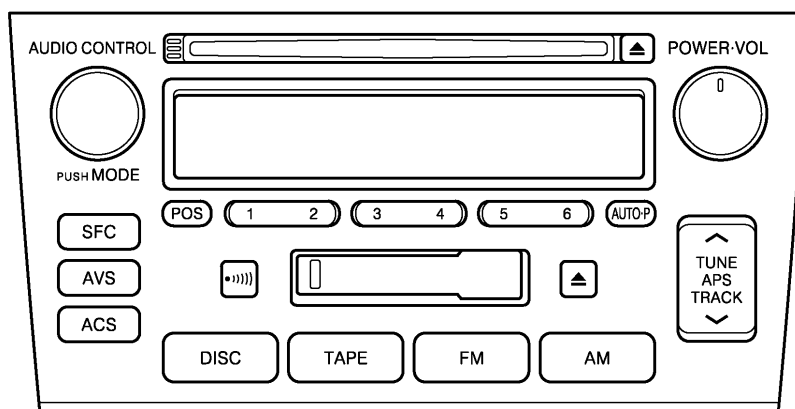
For shifting to diagnosis mode, push "CD" switch 3 times with pressing "1" and "6" of PRESET switch at the same time while the audio power is OFF and ACC is ON.

To exit from diagnosis mode, press "CD" switch for 2 seconds or turn the ignition key OFF.

(When "1-190" is displayed, the mode is transferred to LAN check mode.)

(b) LAN check

When starting up the diagnosis mode, the mode turns to LAN check mode, the screen displays the code numbers (physical address) of tuner and connected equipment. Smaller codes are displayed in order, displayed code numbers are switched by operating TUNE "UP" or "DOWN" switch. In LAN check mode, by pressing "5" of PRESET switch for more than 2 secs., diagnosis memory of each equipment can be deleted, when deletion is completed, the mode returns to LAN check mode.



N

107735

Code No. (physical address) List

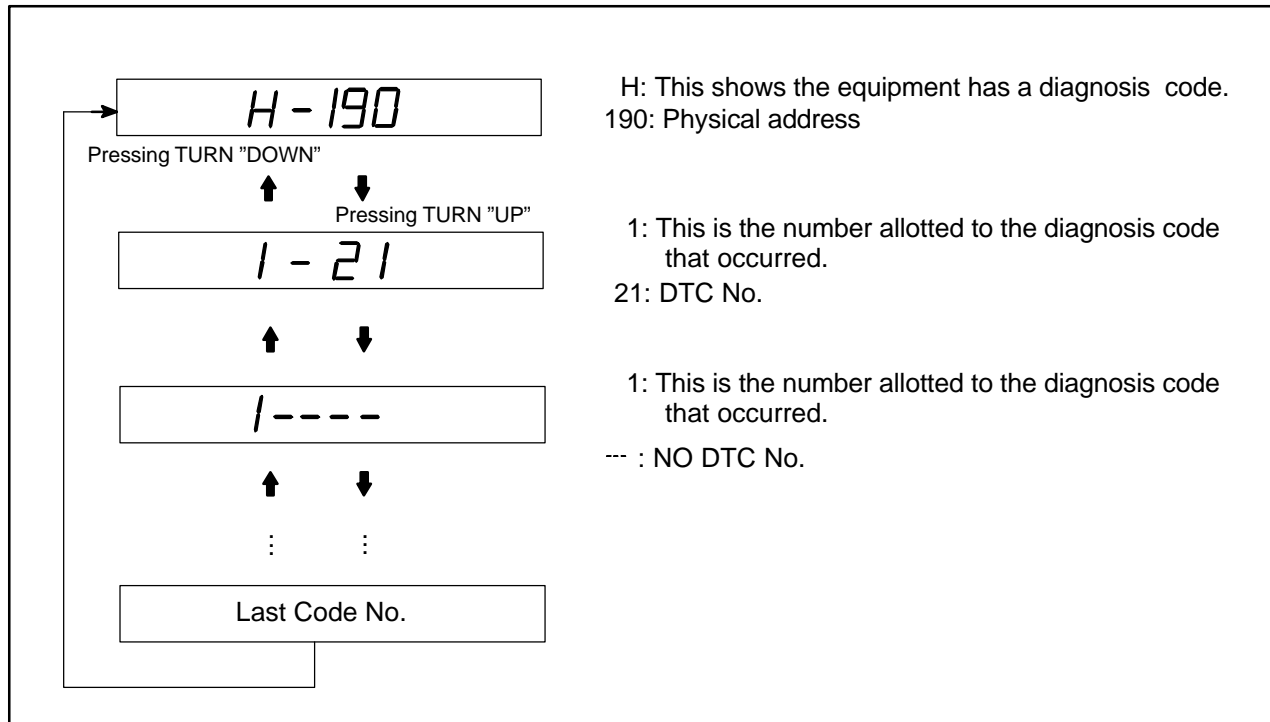
Code No. (physical address)	Equipment name
190	Radio receiver assembly (Audio head unit)
240	CD changer (in Luggage room)
360	CD changer (in center console and glove compartment box)
440	Power amplifier

(c) System check

- When pressing "1" of PRESET switch in LAN check mode, the mode turns to the system check mode, the system performs self diagnosis of connected equipment and displays the results. ("SYS" (showing the system is under detection) is displayed.)
- Perform the operation shown in the following illustration, then read the result of the inspection.

HINT:

- It sometimes takes approx. 40 secs. till the system inspection is completed.
- The chart below is an example of when diagnosis code "21" appears on the physical address (190) equipment. (ROM error occurs on the radio receiver.)
- The smaller code numbers (physical address) are displayed in order (code No., diagnosis code, support code of diagnosis code (object equipment)).
- When no error is detected in the system, "00" is displayed.
- When an error code is detected, up to 6 codes per one system are displayed. Pressing TUNE "UP" or "DOWN" switches the display.
- In the system check mode, when pressing "6" of PRESET switch the mode returns to LAN check mode.

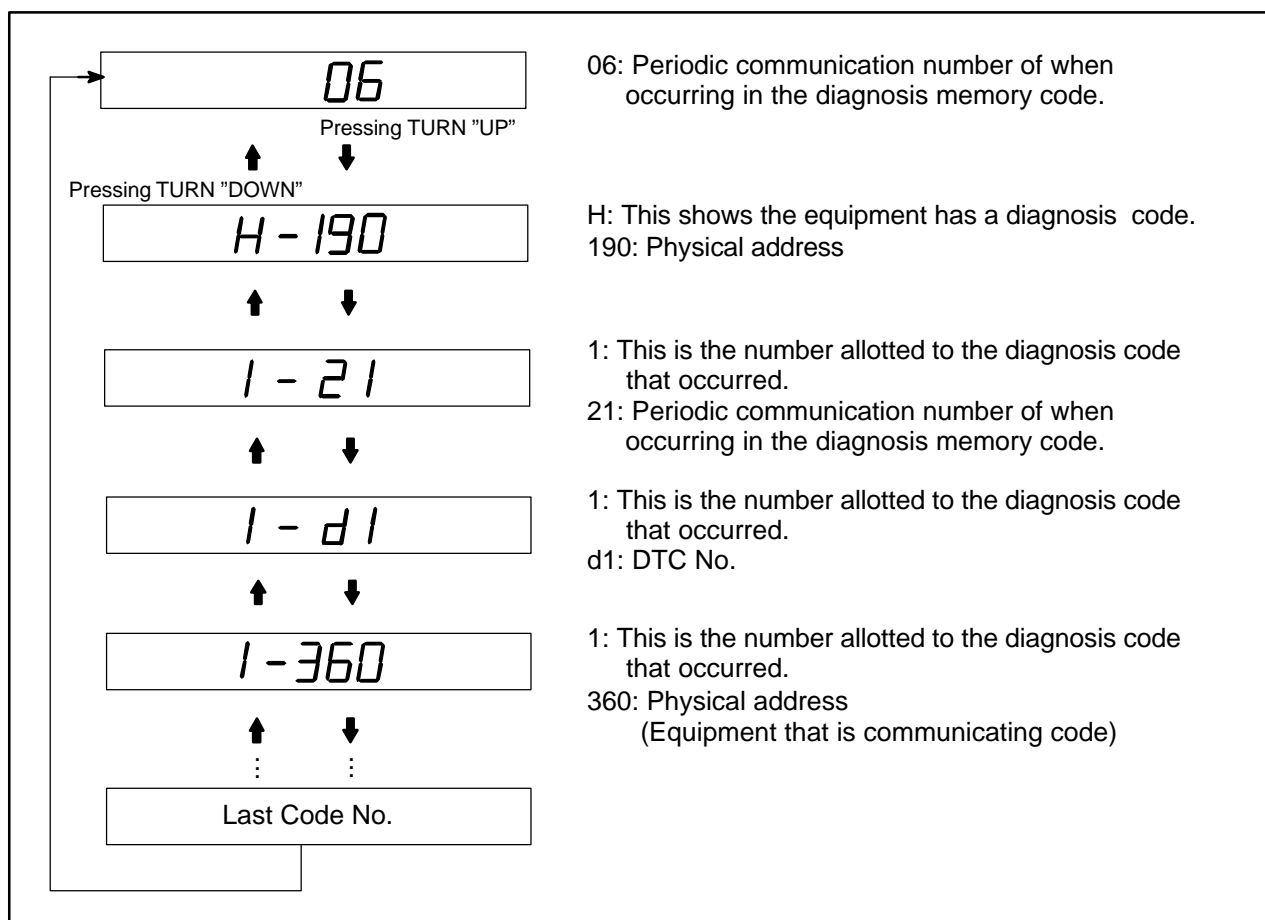


(d) Diagnosis memory

- (1) In LAN check mode, when pressing "2" of PRESET switch the mode turns to the diagnosis memory mode. ("CODE" is displayed.)
The results of self diagnosis performed over tuner and connected equipment are memorized and displayed.
- (2) Perform the operation shown in the following illustration, then read the result of the inspection.

HINT:

- The smaller code numbers (physical address) are displayed in order (code No. , periodic communication number when error occurs, diagnosis code, and support code of diagnosis code (object equipment)).
- When no error is detected in the system, "00" is displayed. When an error code is detected, up to 6 codes per one system are displayed. Pressing TUNE "UP" or "DOWN" switches the display. Each diagnosis code is same as code in the system check mode.
- When pressing "6" of PRESET switch, the mode returns to LAN check mode.
- The following illustration below is an example of when diagnosis code "D1" appears on the code (190) and (240 or 360) equipment. (Communication error occurs between the radio receiver and CD changer.)



(e) Diagnosis memory clear

- (1) After error is fixed, start up the diagnosis mode.
- (2) Continue pressing preset switch "5" for 2 secs. (CLr is displayed.)
- (3) Press the preset switch "2" and transfer to the diagnosis memory mode and check that the normal code (00) is output.

3. DIAGNOSIS CODE LIST

- If there is "O" in the column of system check, an error can be detected when the mode is switched to the system check mode.
- If there is "O" in the column of diagnosis mode, each unit is monitoring whether or not it has failure. In case of detecting failure, it memorizes DTC.

Parts Name	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
Head Unit (190)	42	FM tuner error	There is an error in FM tuner.	Radio receiver check.	X	○
	50	Cassette error	There is an error in cassette deck.		X	○
	51	Cassette eject error	Cassette can not be ejected from Head Unit.		X	○
	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.	Radio receiver check. Wire harness and connector check.	○	○
	D2	Periodic communication no response	Error in periodic communication.	● Wire harness and connector	X	○
	FF	Diagnosis no response	Result of diagnosis is not issued from start to finish.	Radio receiver check.	○	X
CD (240) (360)	60	CD error	Error codes other than 61–69 are detected.	CD changer check.	X	○
	61	EJECT error	CD is not ejected.	CD changer check. Magazine check.	X	○
	62	DISC inside out/flaw	CD is inserted inside out or it has a flaw.	CD check.	X	○
	63	Pickup temperature detection	High temperature of CD changer is detected.	CD changer check.	X	○
	64	Excessive current detection	Excessive current to CD changer is detected.		X	○
	67	Tray insertion/ discharging error	An error occurs in insertion and discharging operation of CD changer tray.	CD changer check. Magazine check.	X	○
	68	Elevator error	An error occurs in elevator of CD changer elevator.	CD changer check.	X	○
	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.		○	○
	D4	Periodic communication error	Connection confirmation has not come from the equipment that is communicating	● Radio receiver check. ● Wire harness check.	X	○

BODY ELECTRICAL – AUDIO SYSTEM

Parts Name	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts	System Check	Diagnosis memory
AMP (440)	D1	Transmitter error	Communication with the equipment that is communicating has failed successively.	Stereo component amplifier check.	<input type="radio"/>	<input type="radio"/>
	D4	Periodic communication error	Connection confirmation has not come from the equipment that is communicating	<ul style="list-style-type: none"> • Radio receiver check. • Wire harness check. 	X	<input type="radio"/>

TROUBLESHOOTING

NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT:

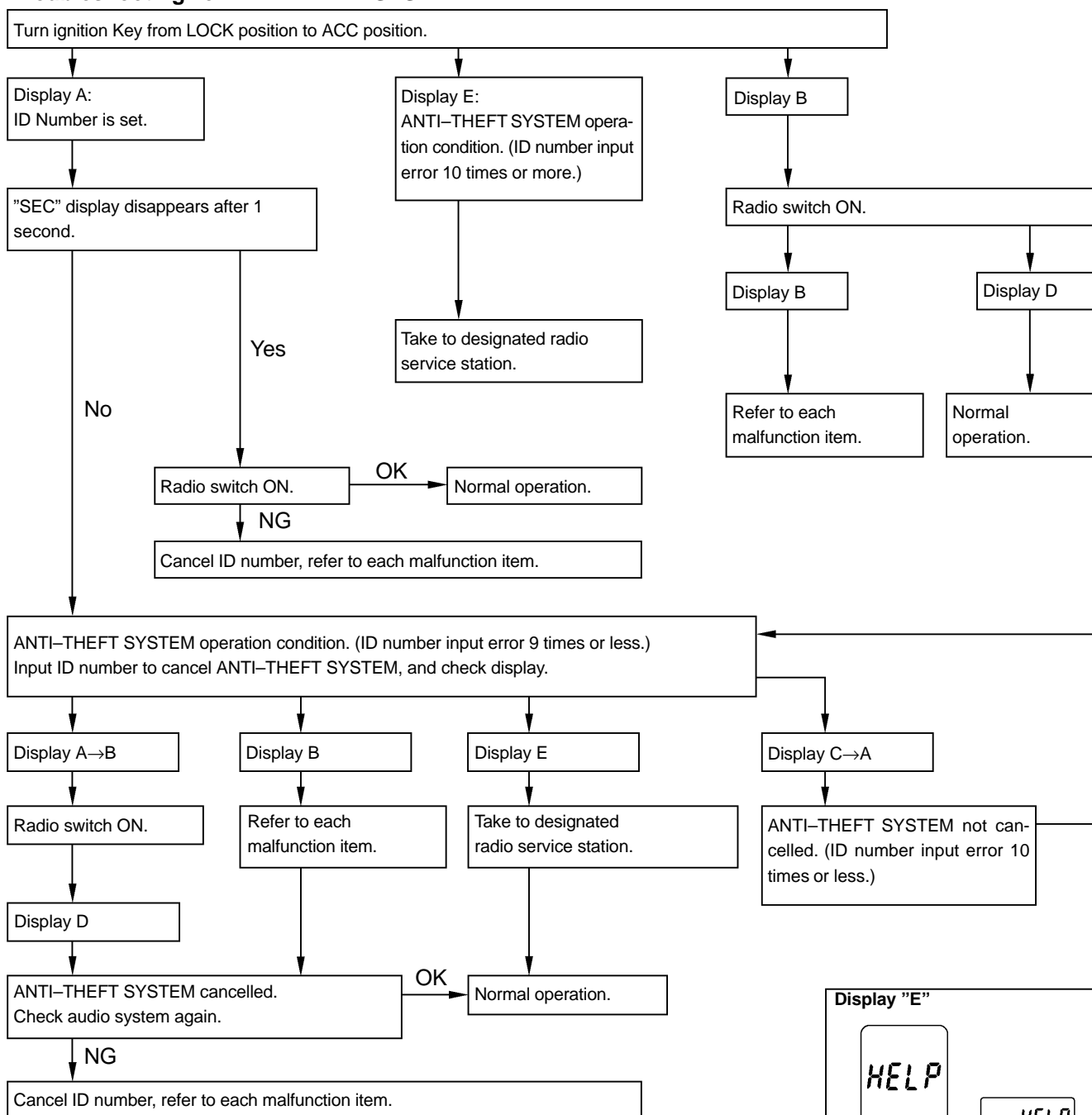
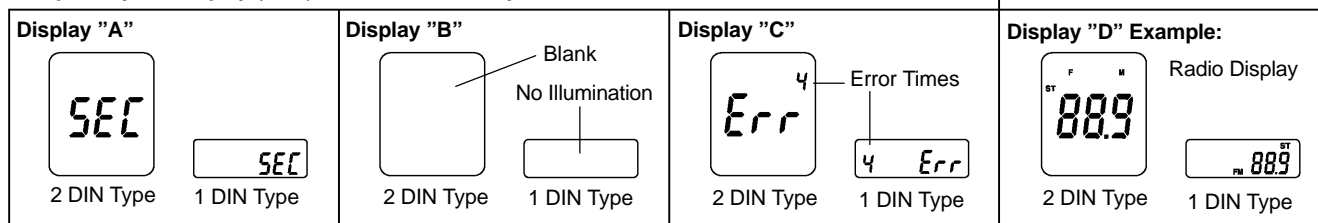
This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

Always inspect the trouble taking the following items into consideration.

- Open or short circuit of the wire harness
- Connector or terminal connection fault
- For audio systems with anti-theft system, troubleshooting items marked (*) indicate that "Troubleshooting for ANTI-THEFT SYSTEM" should be carried out first.

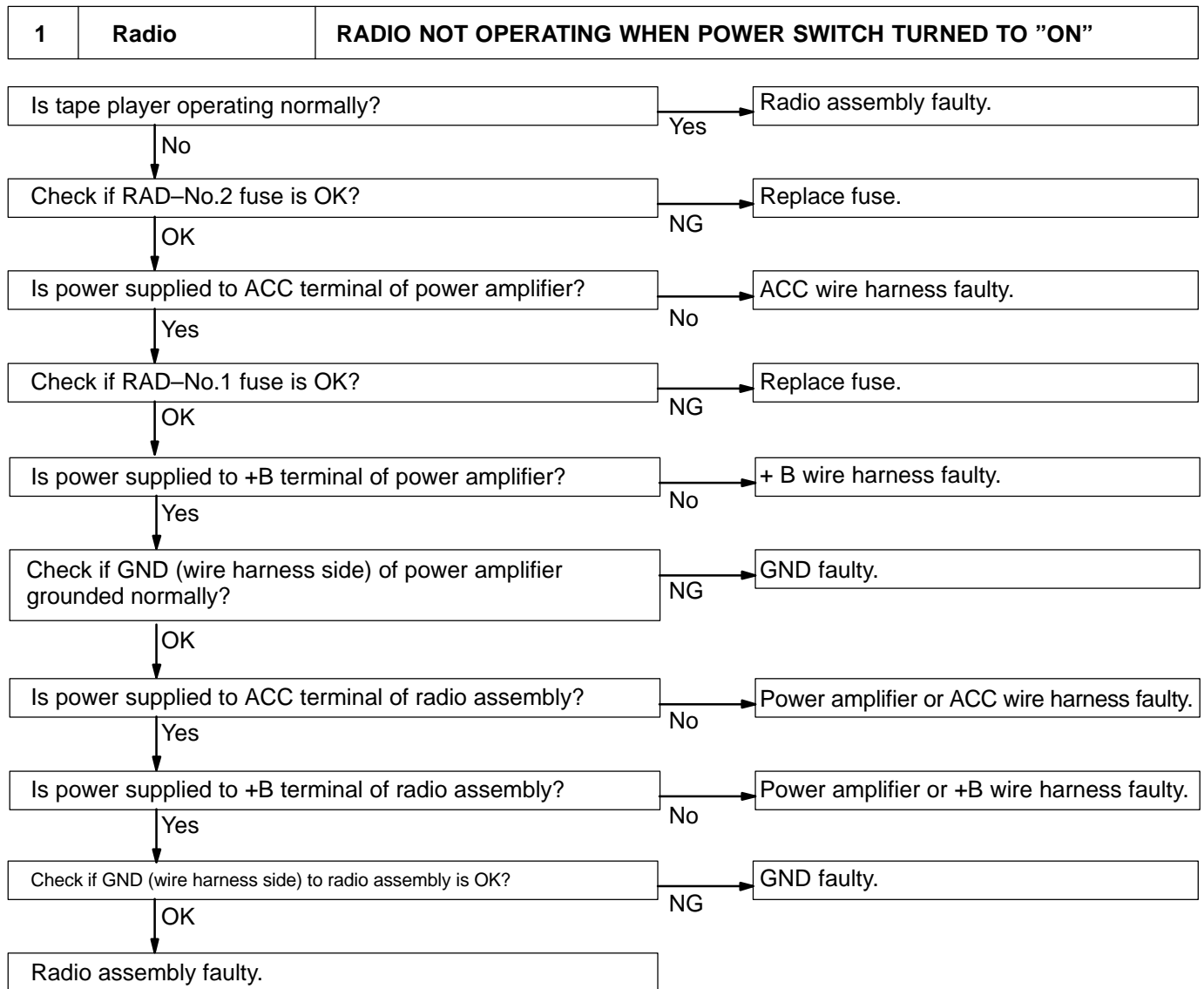
	Problem	No.
Radio	Radio not operating when power switch turned to 'ON'.	1
	Display indicates when power switch turned to 'ON', but no sound (including 'noise') is produced.	2
	Noise present, but AM – FM not operating.	3
	Any speaker does not work.	4
	Any AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
Tape Player	Preset memory disappears.	8
	Cassette tape cannot be inserted.	9
	Cassette tape inserted, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto-reverse.	14
	Cassette tape will not eject.	15
CD Player	CD cannot be inserted.	16
	CD inserted, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Power Amplifier	No power coming in.	23
	Power coming in, but power amplifier not operating.	24
	Any speaker does not work.	25
Noise	Noise occurs	26
	Noise produced by vibration or shock while driving.	27
	Noise produced when engine starts.	28

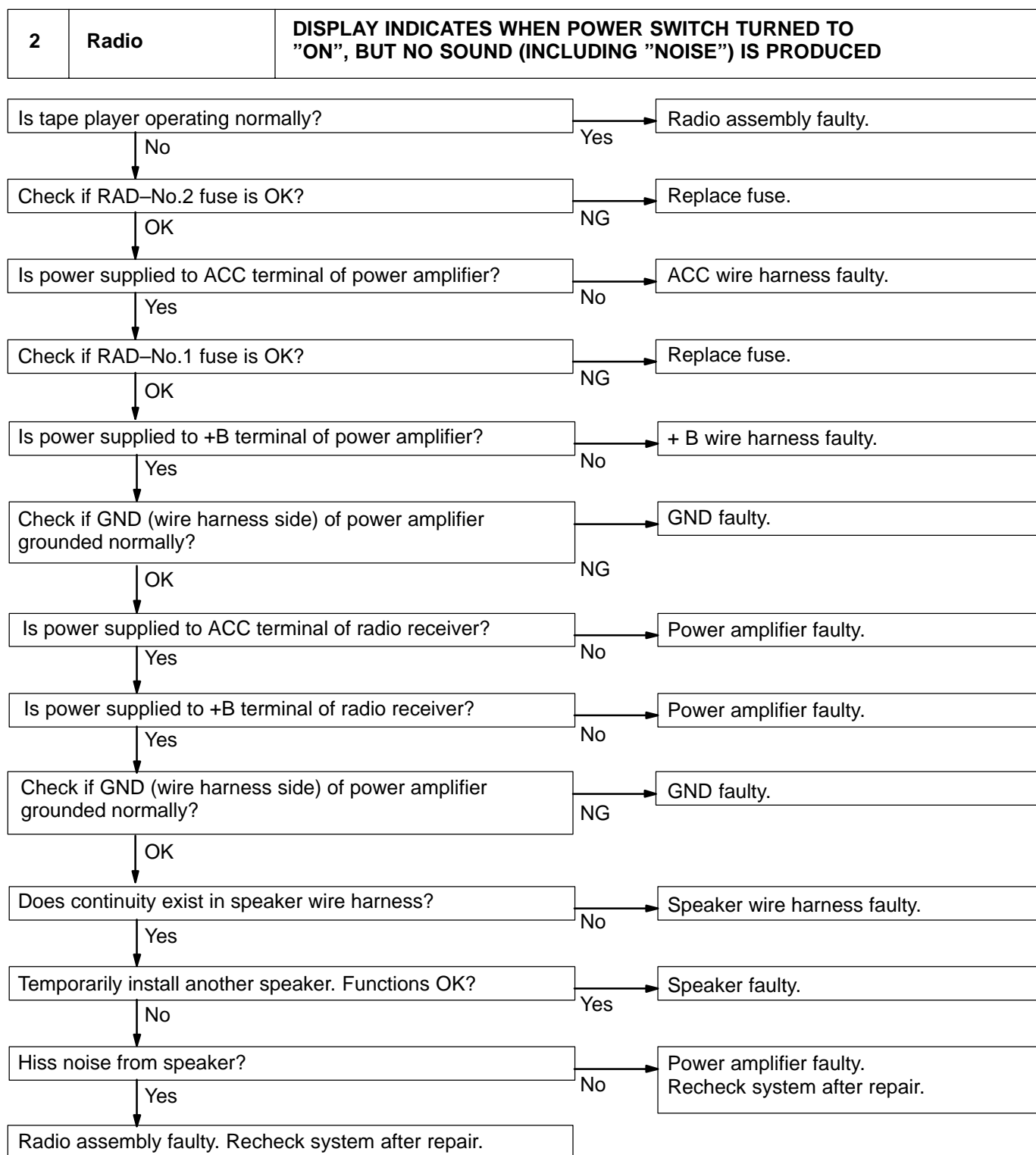
The term "AM" includes LW,MW and SW, and the term "FW" includes UKW.

Troubleshooting for ANTI-THEFT SYSTEM**② Liquid Crystal Display (LCD) or VFD for Audio System②****HINT:**

- Refer to Owner's Manual for operation details of ANTI-THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

V08418





3	Radio	NOISE PRESENT, BUT AM-FM NOT OPERATING
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Go to No.25

If radio side faulty.

Radio faulty.

4	Radio	ANY SPEAKER DOSE NOT WORK
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Is tape player operating normally?

Yes

Radio assembly faulty.

No

Is hiss noise produced by non-functioning speaker?

Yes

Radio assembly faulty.
Recheck system after repair.

No

Does continuity exist in speaker wire harness?

No

Speaker wire harness faulty.

Yes

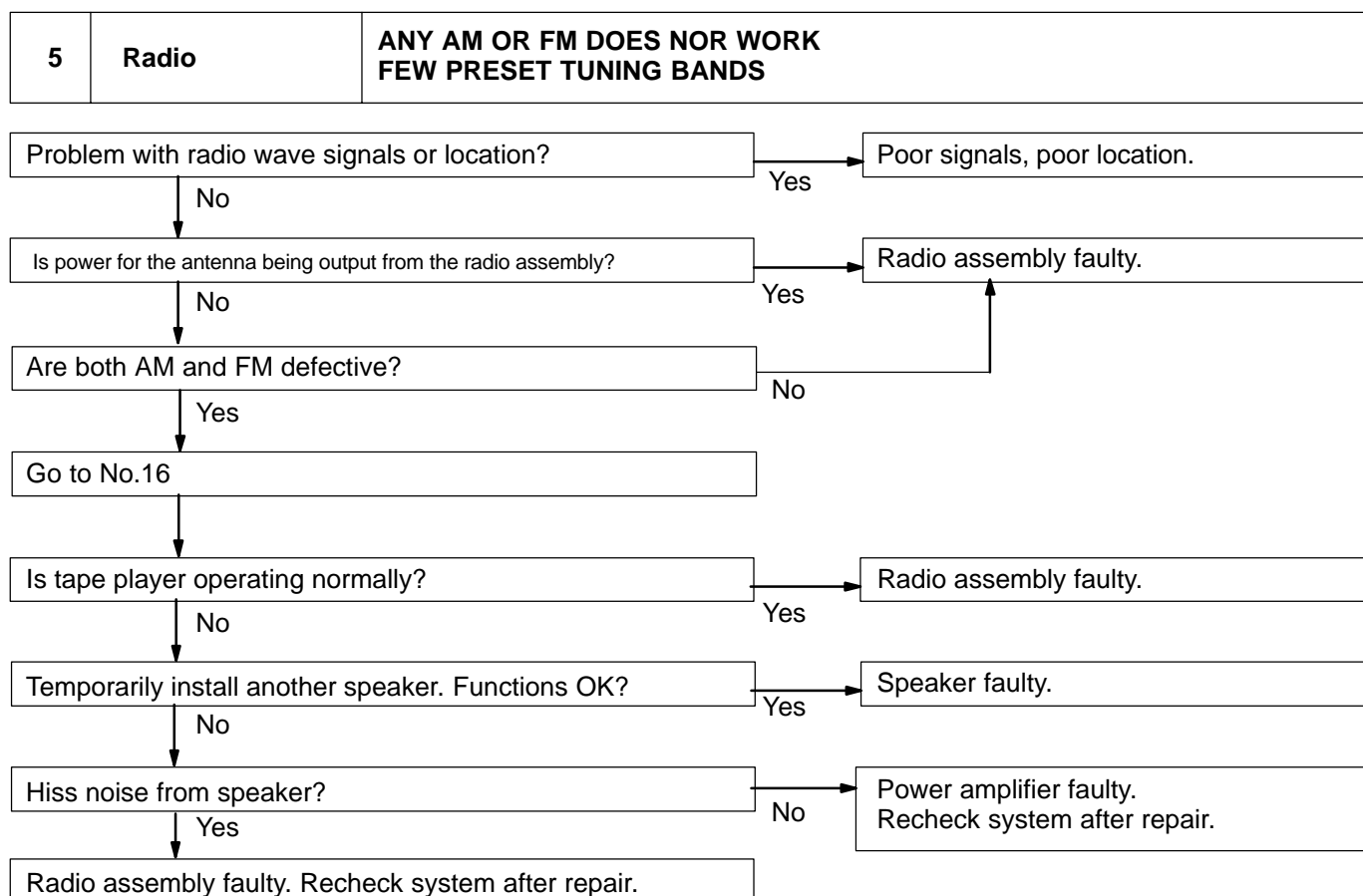
Temporarily install another speaker? Functions OK?

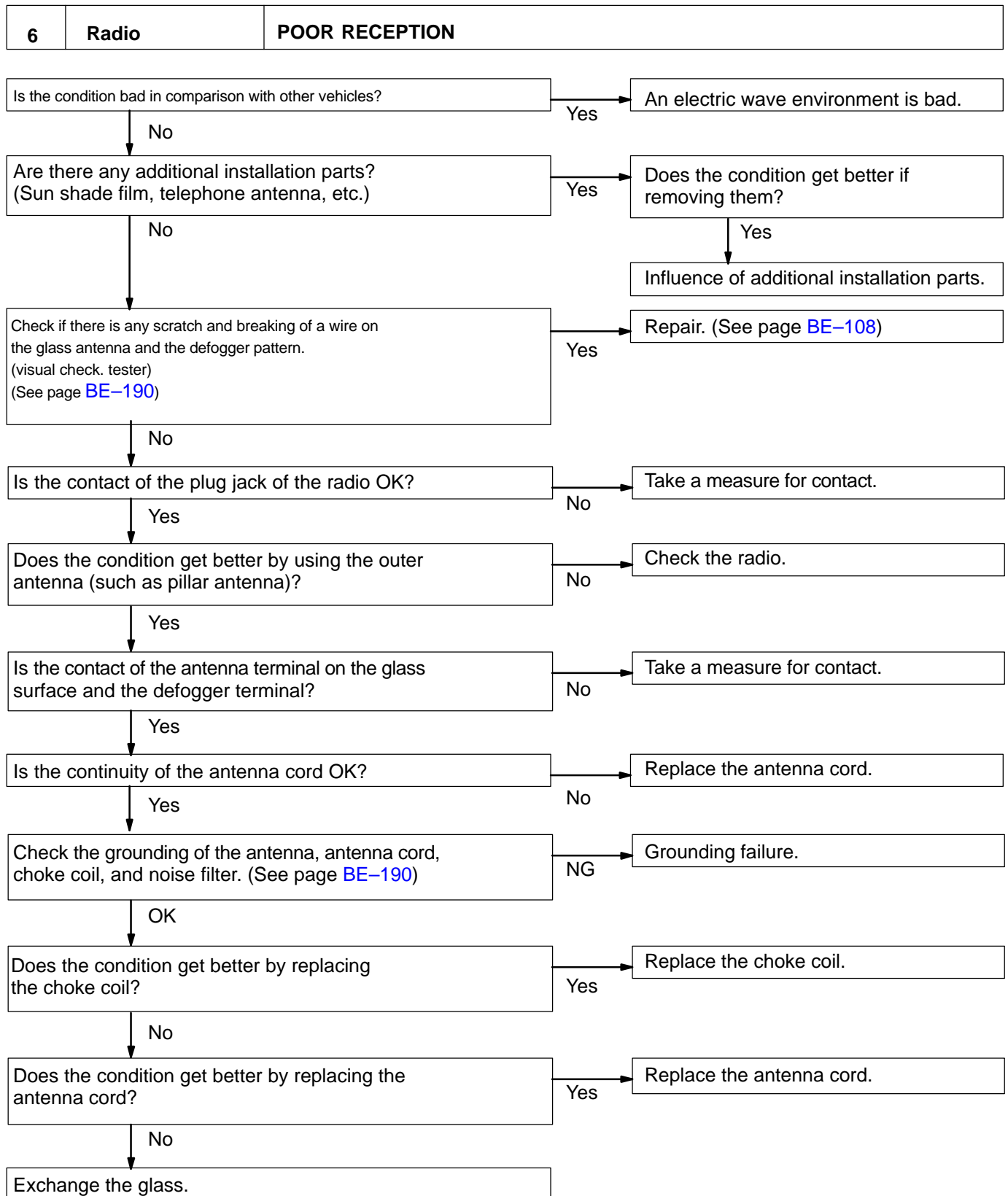
Yes

Speaker faulty.

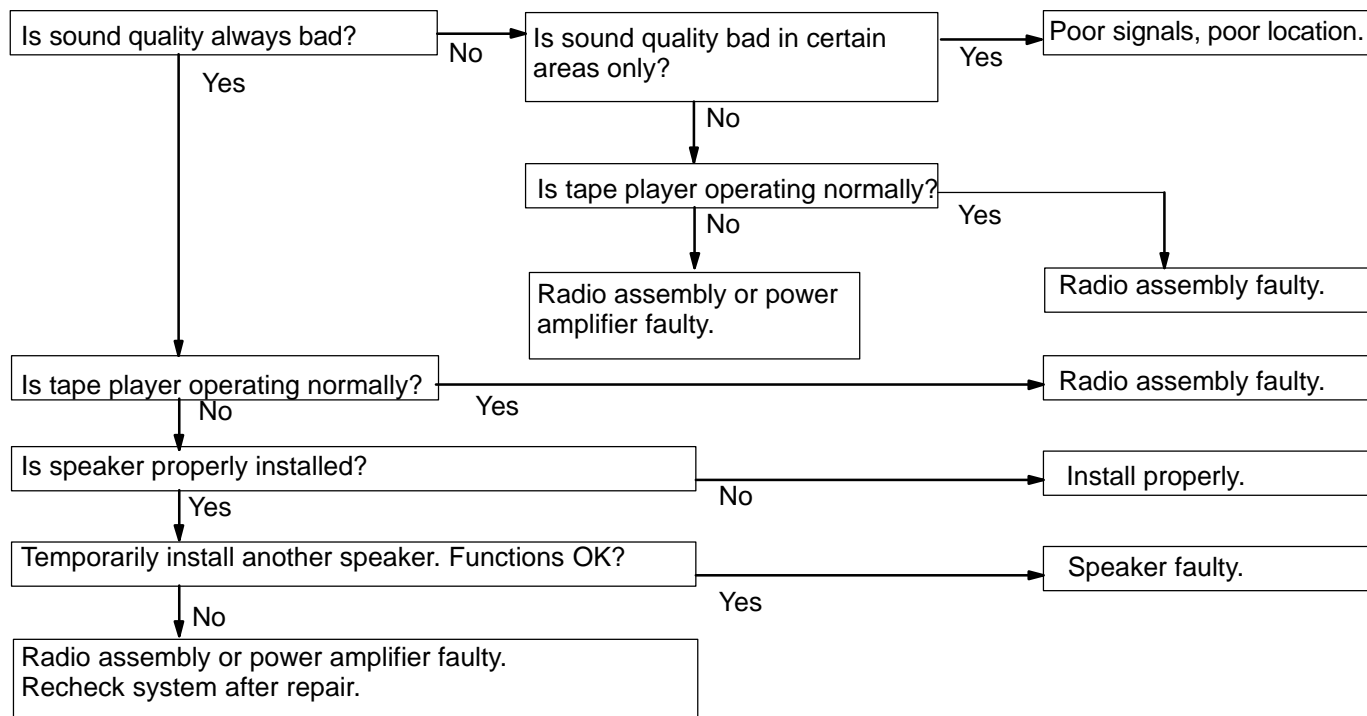
No

Power amplifier faulty. Recheck system after repair.

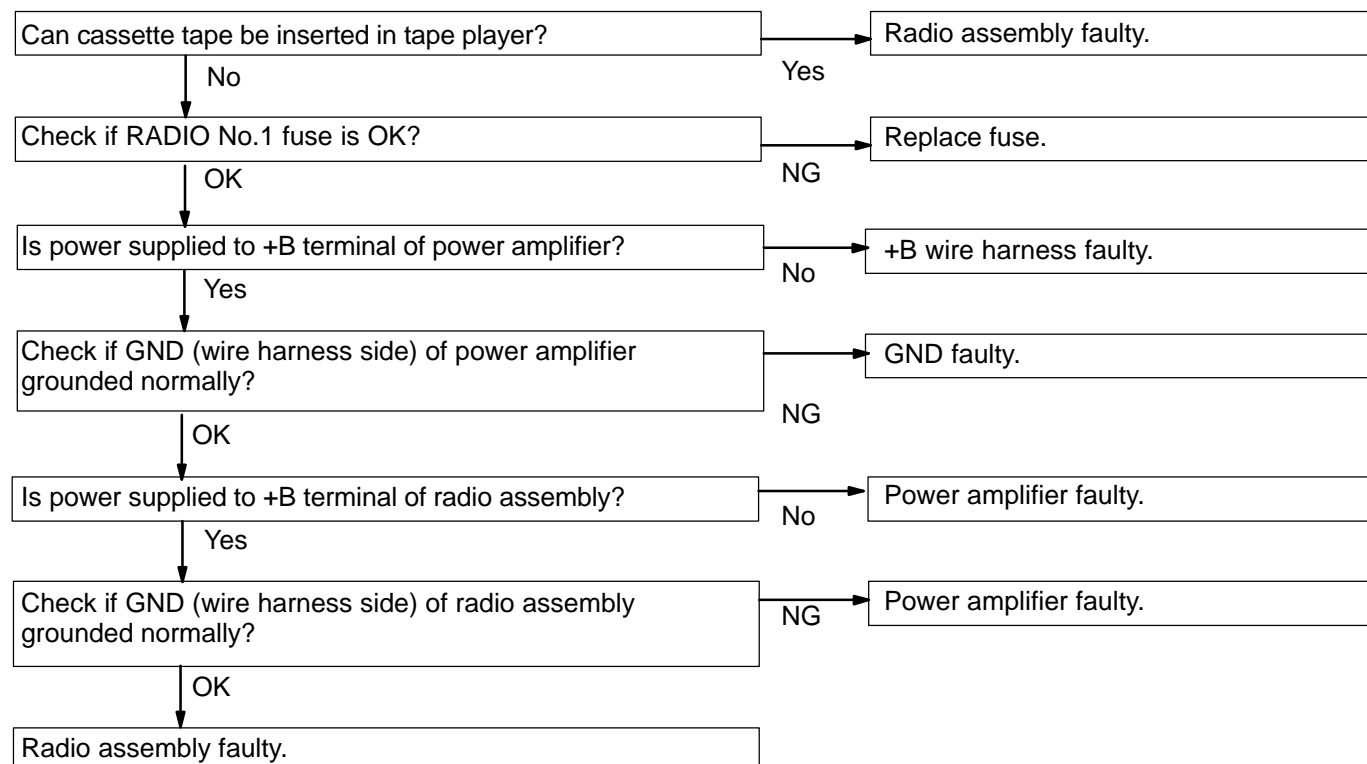




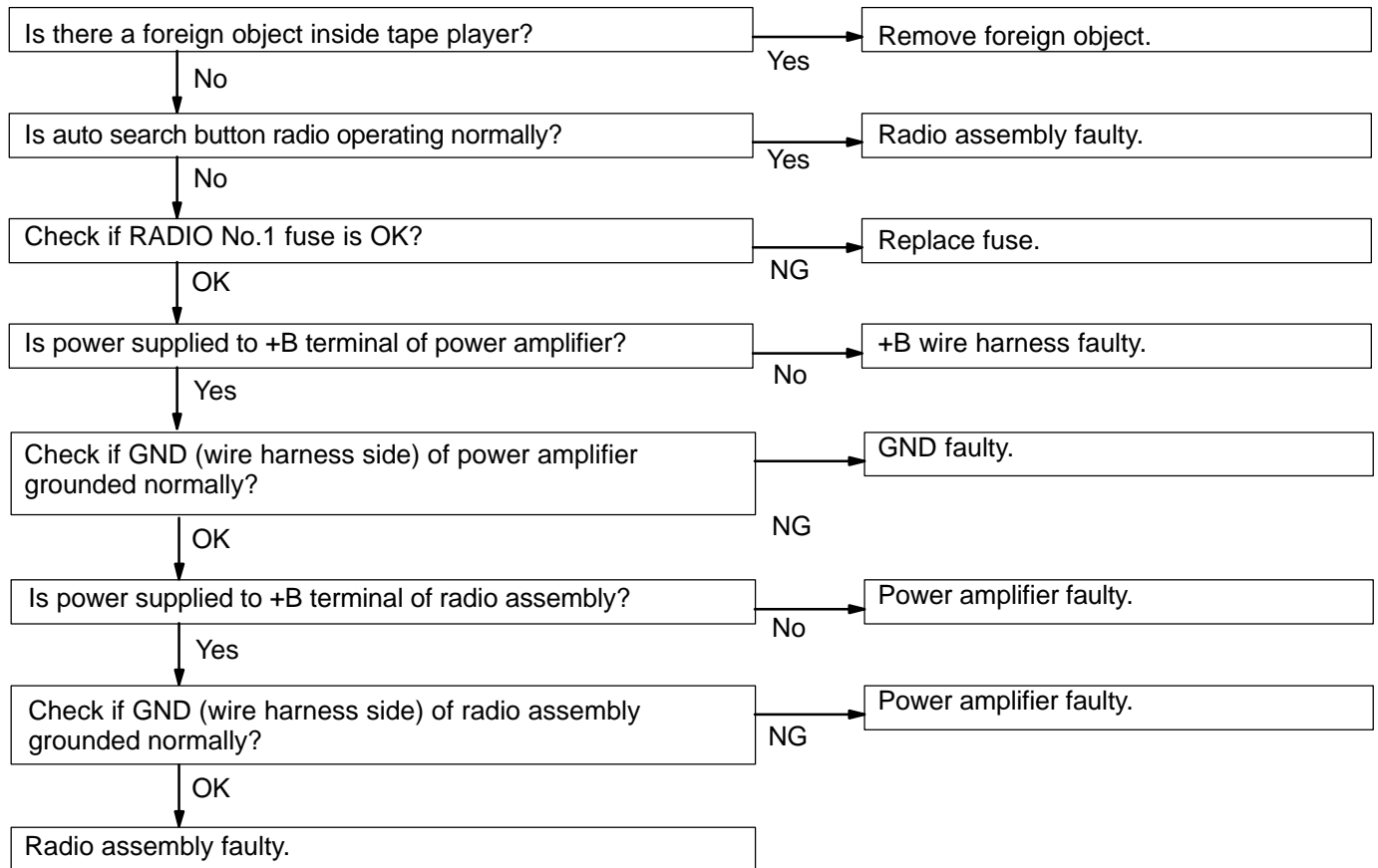
7	Radio	SOUND QUALITY POOR
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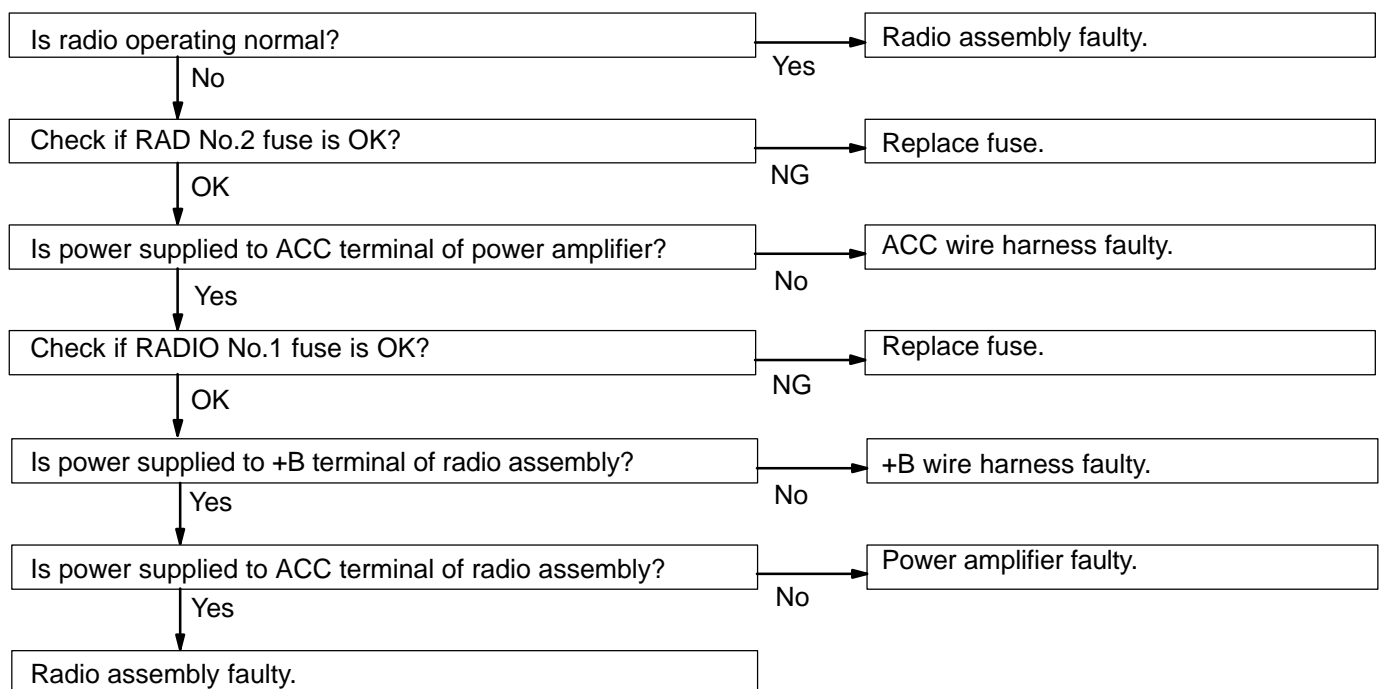
8	Radio	PRESET MEMORY DISAPPEARS
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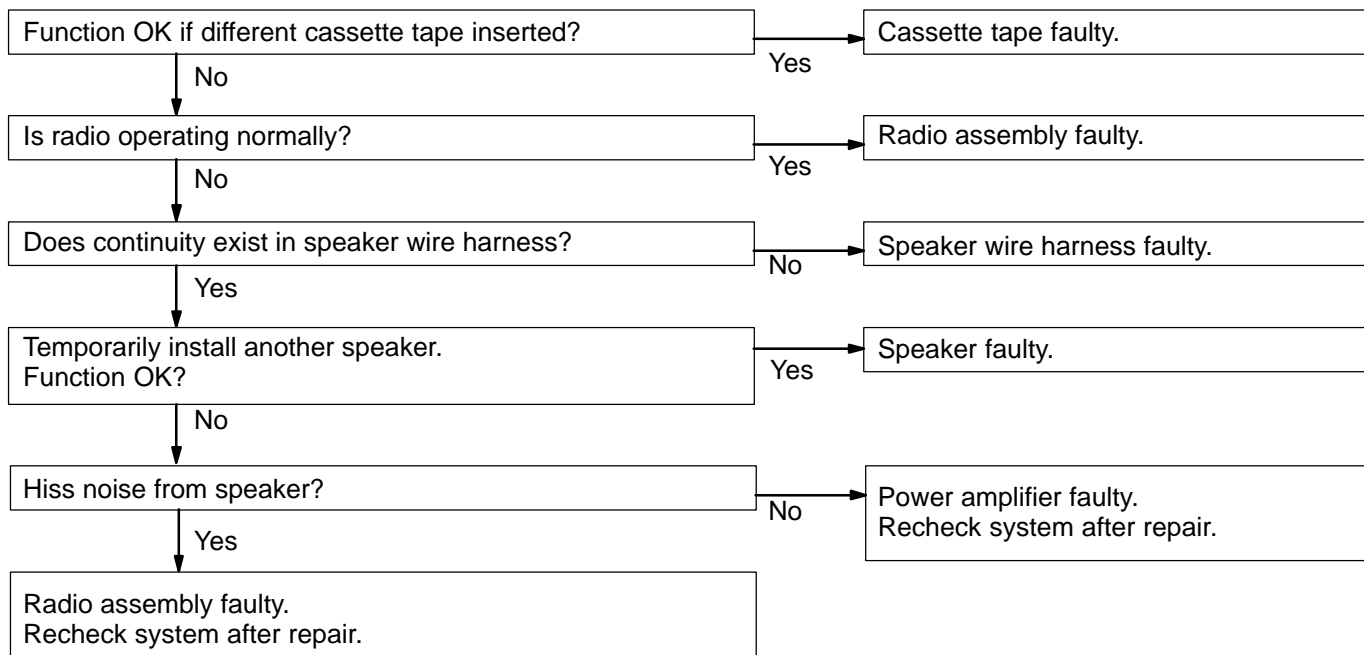
9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED
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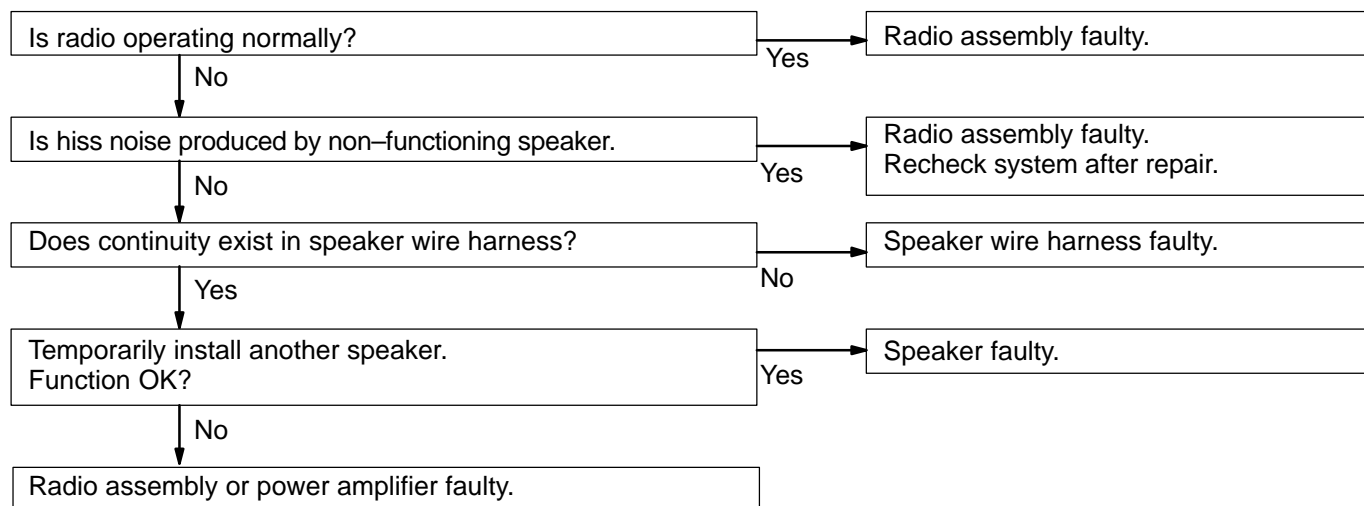
10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER
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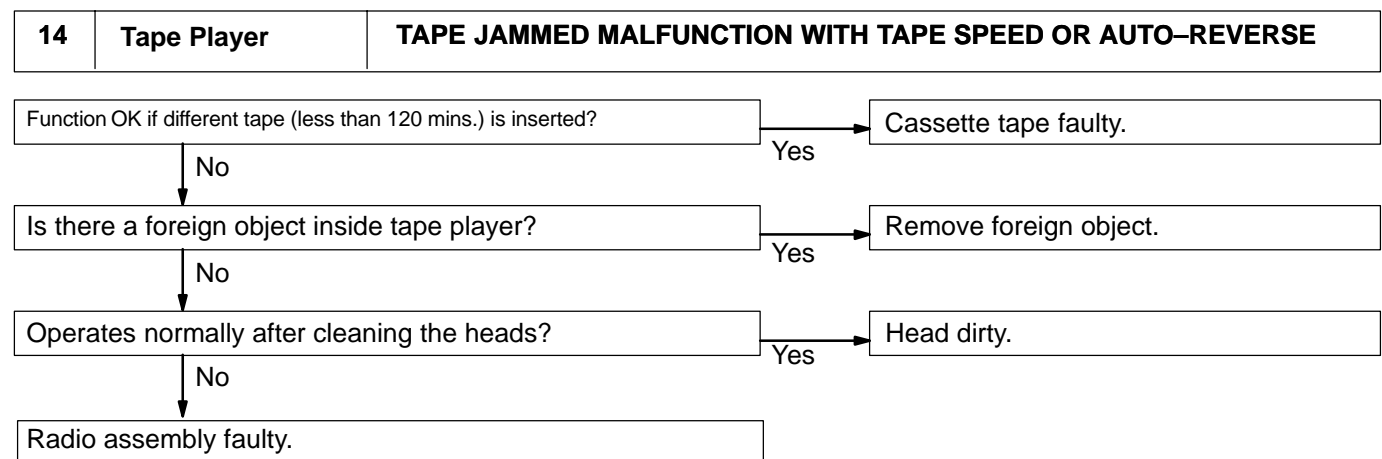
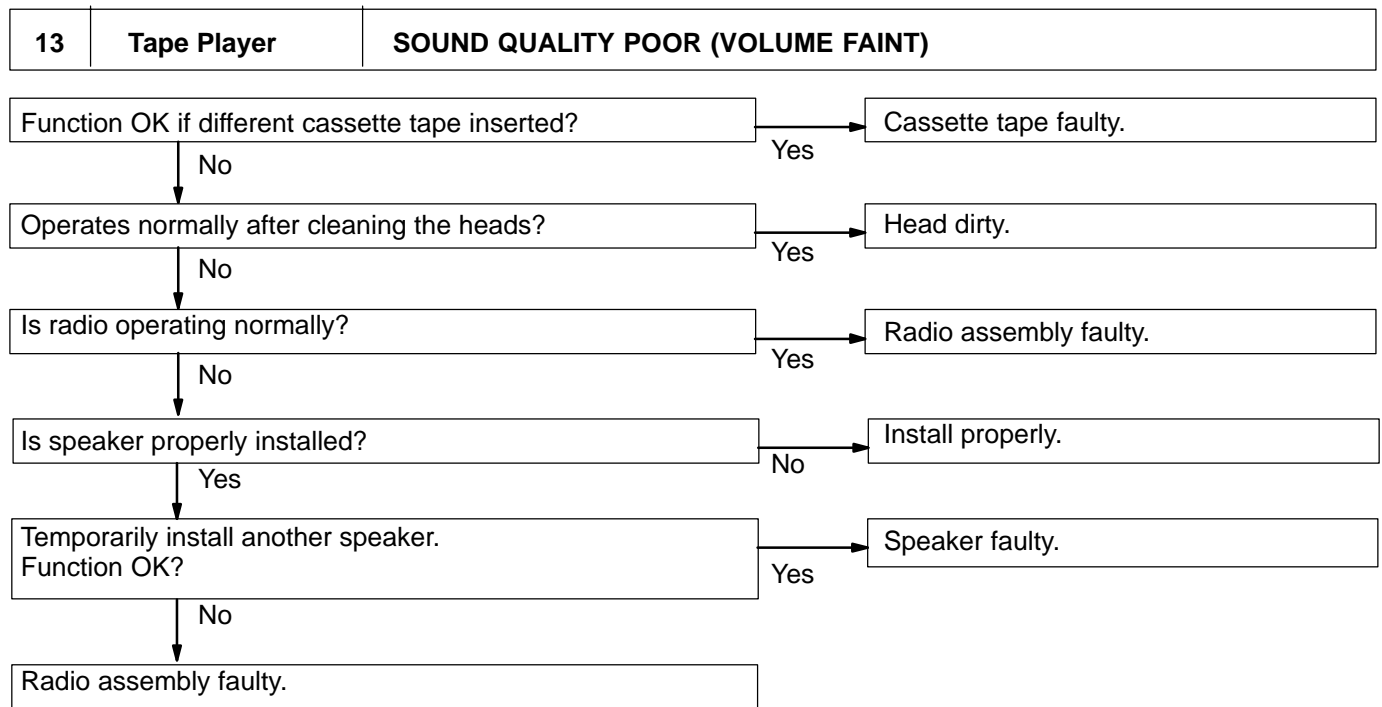


11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING
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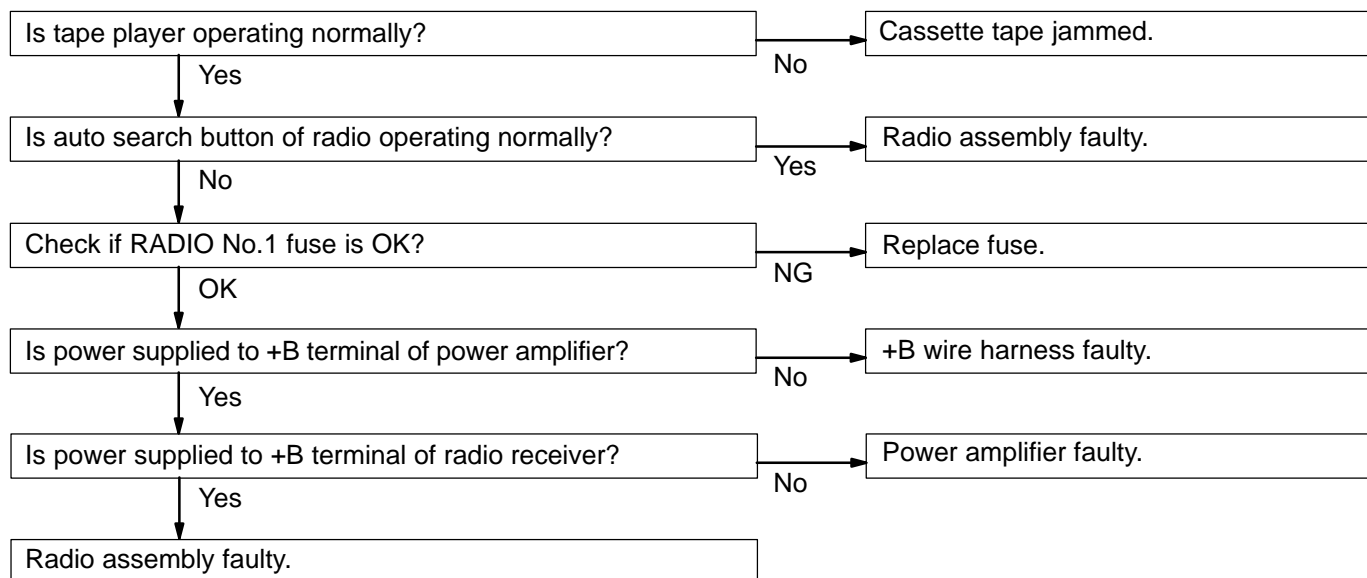


12	Tape Player	ANY SPEAKER DOES NOT WORK
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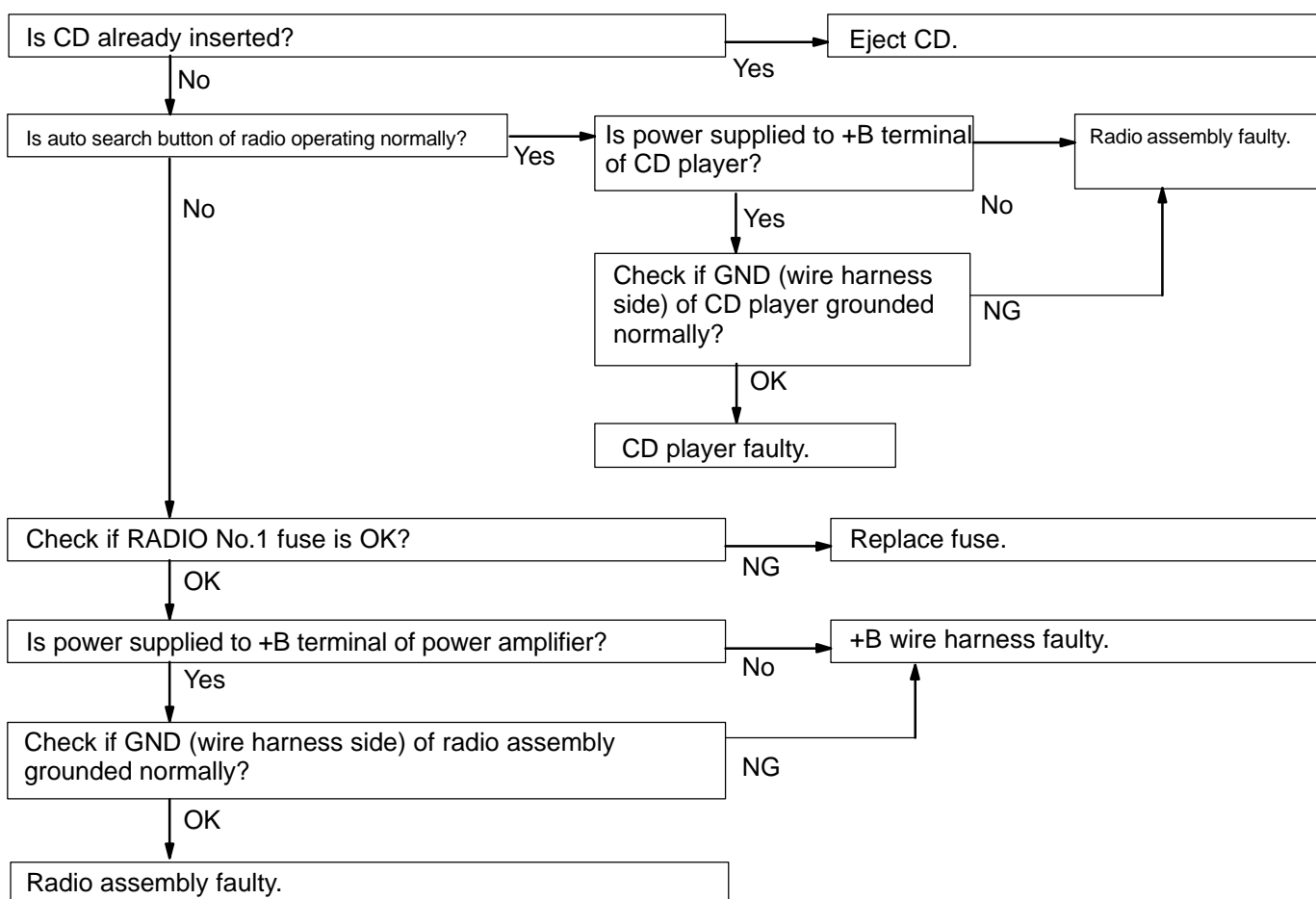




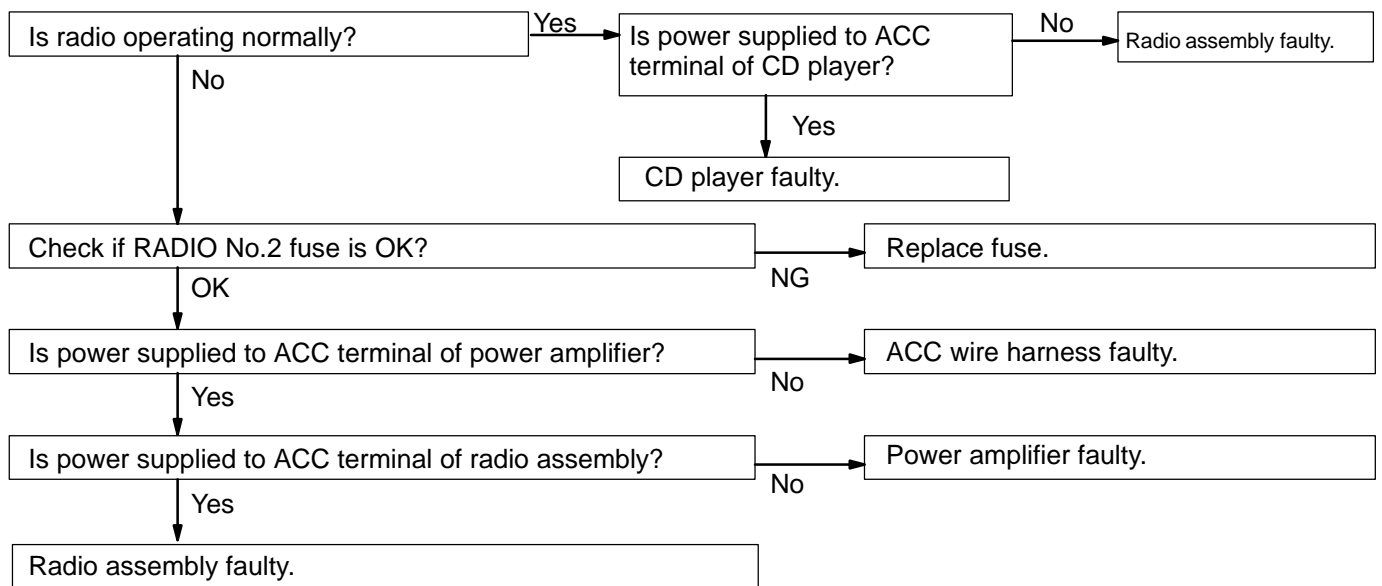
15	Tape Player	CASSETTE TAPE WILL NOT BE EJECTED
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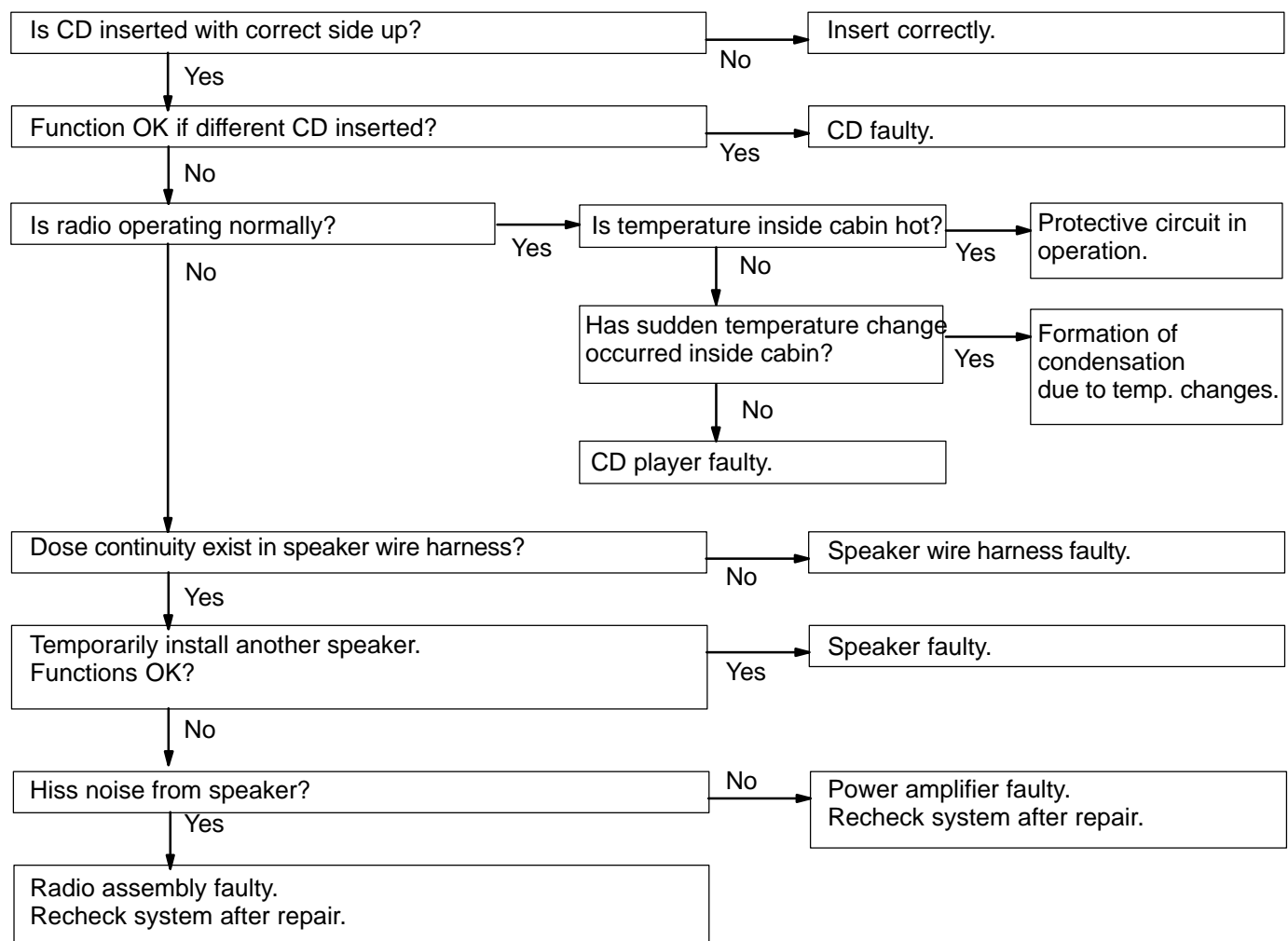
16	CD Player	CD CANNOT BE INSERTED
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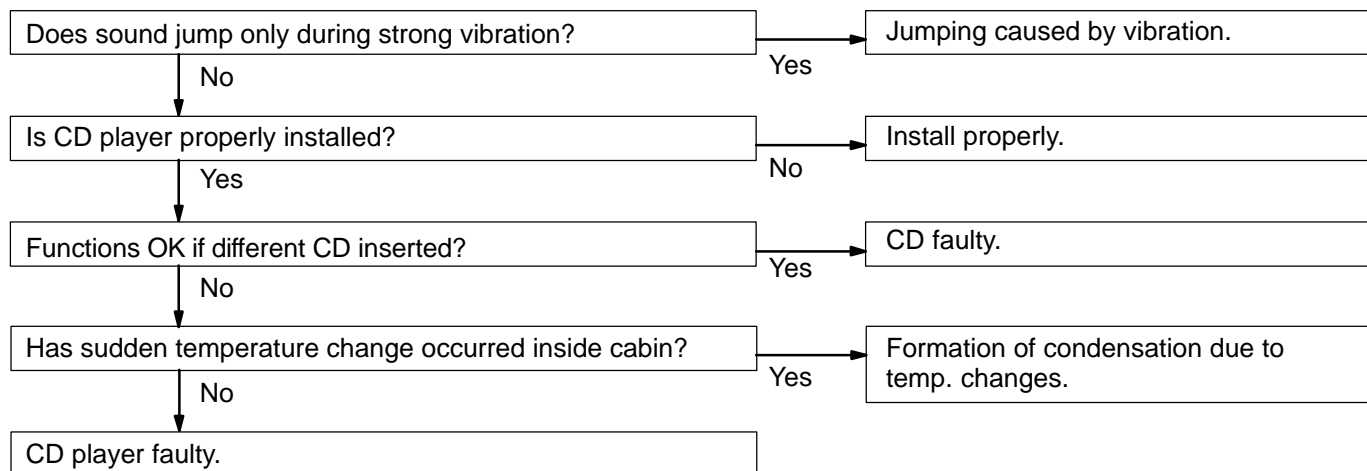
17	CD Player	CD INSERTED, BUT NO POWER
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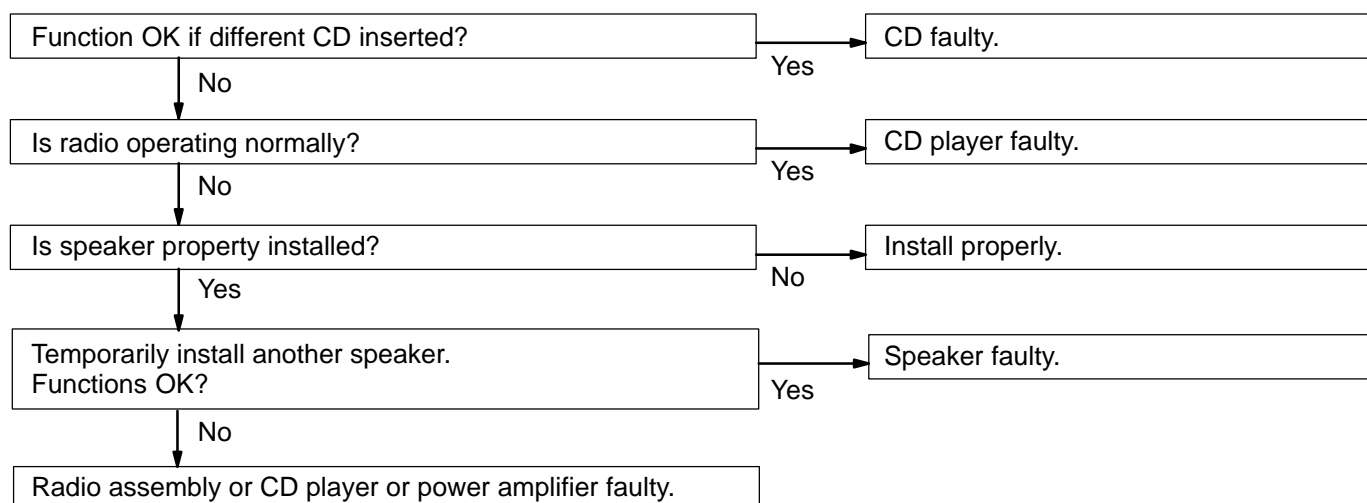
18	CD Player	POWER COMING IN, BUT CD PLAYER NOT OPERATING
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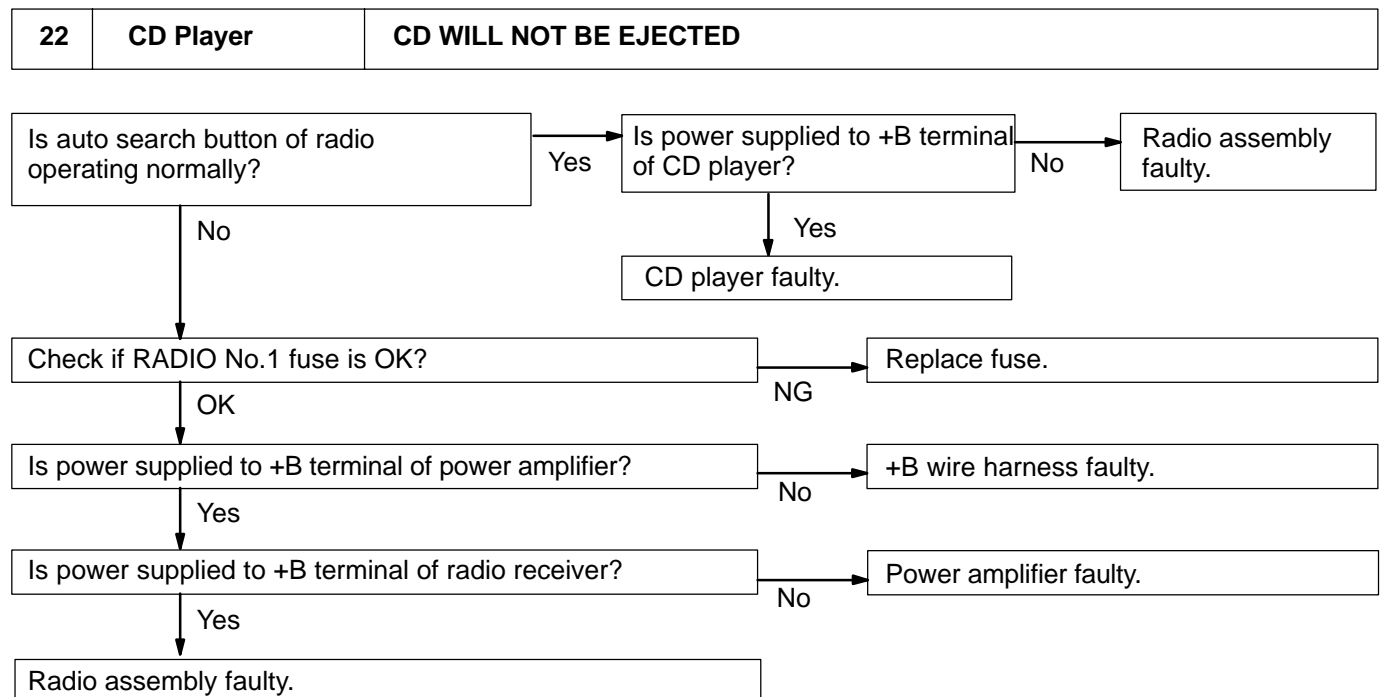
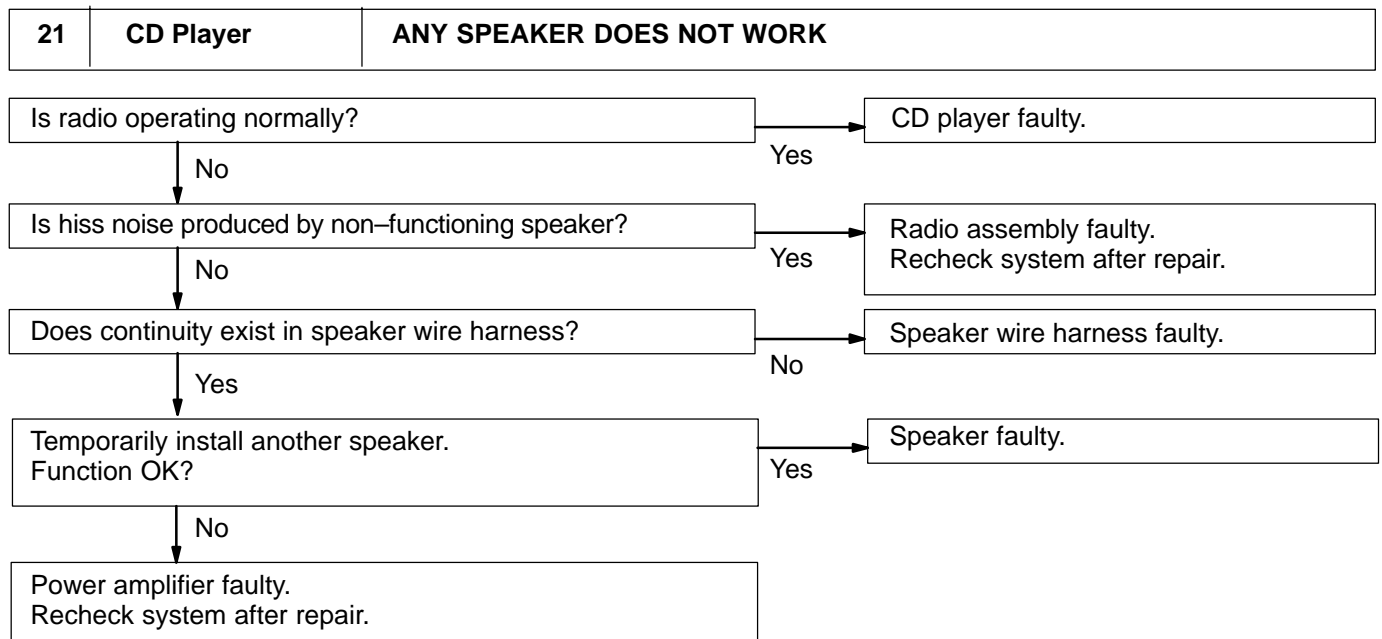


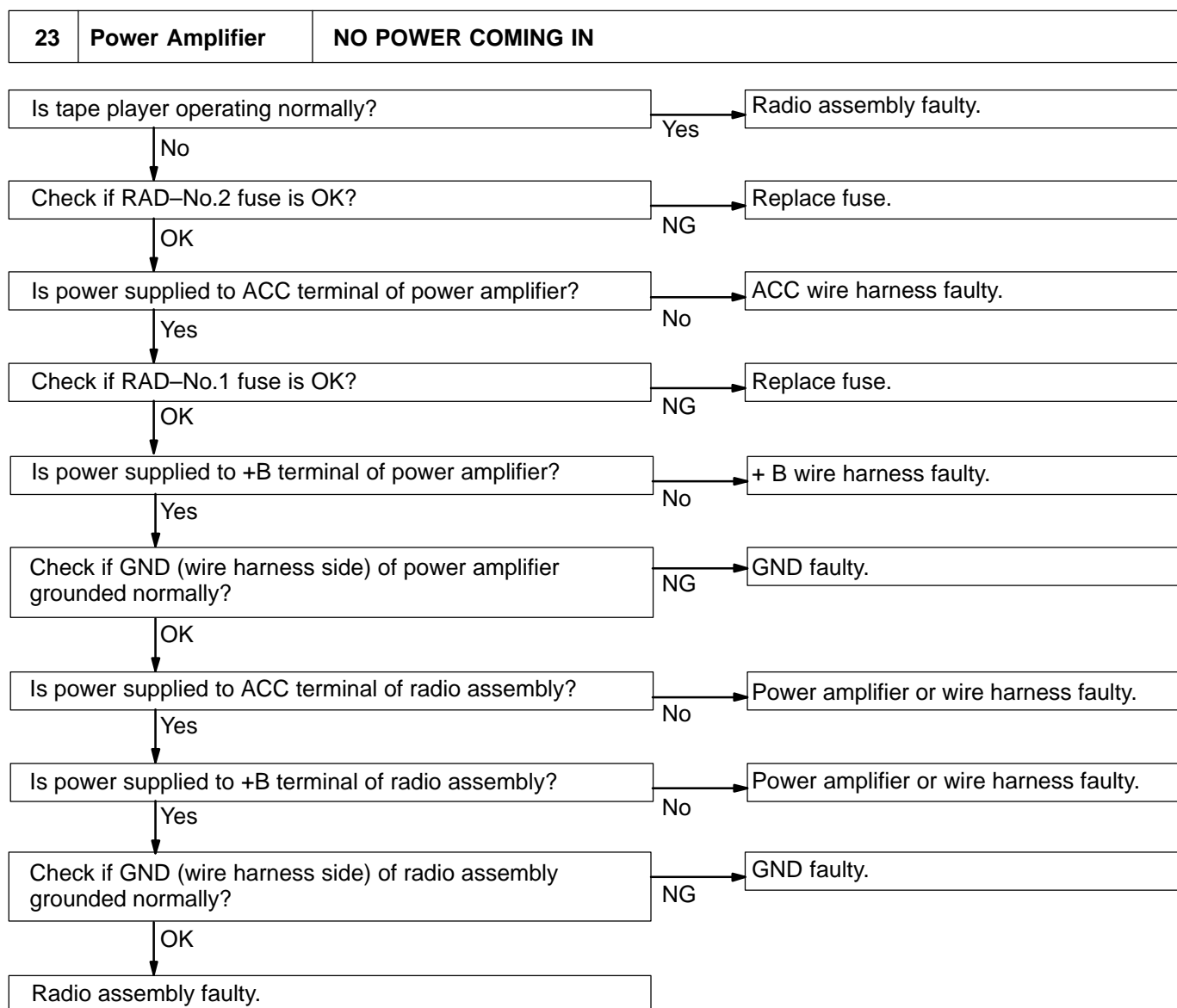
19	CD Player	SOUND JUMPS
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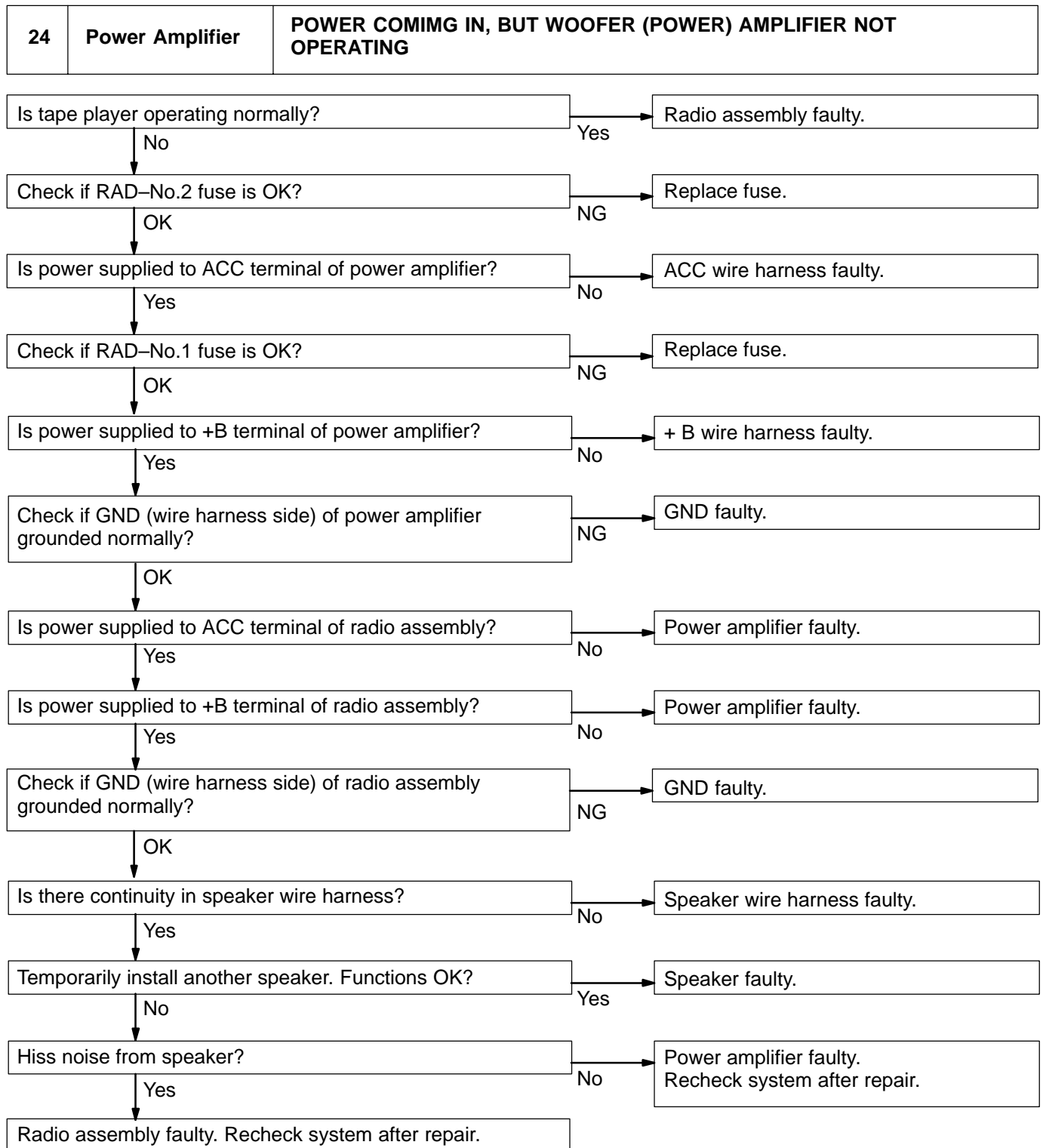


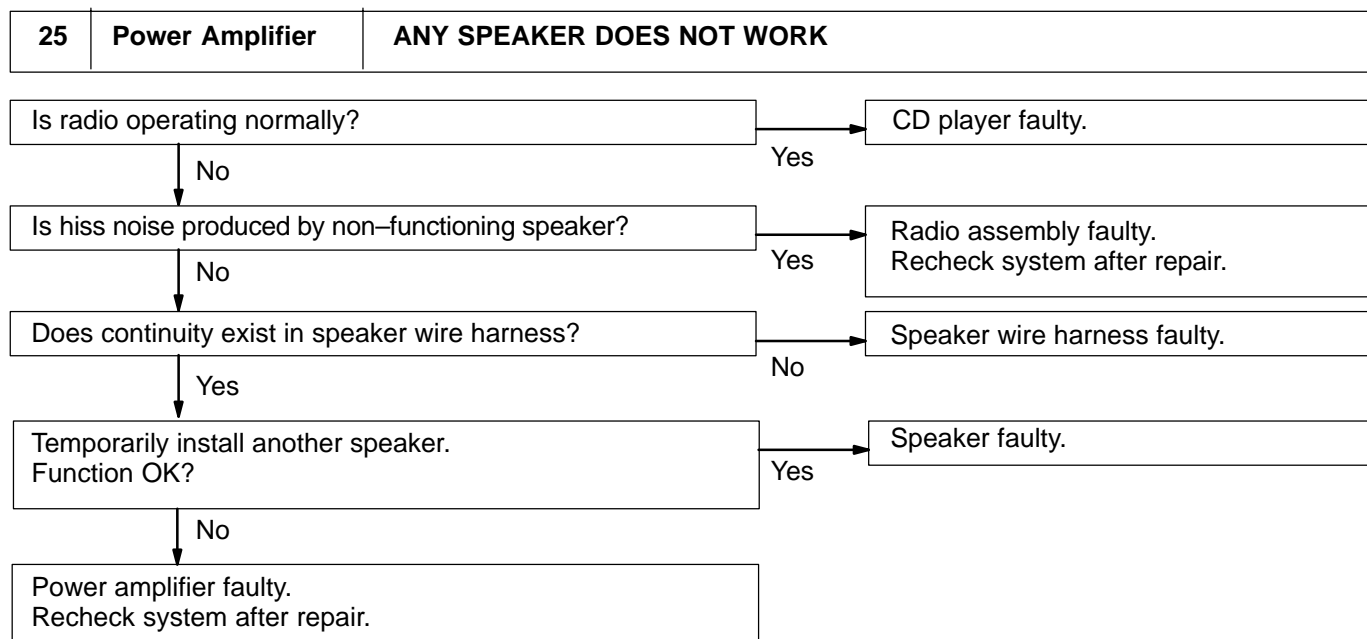
20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)
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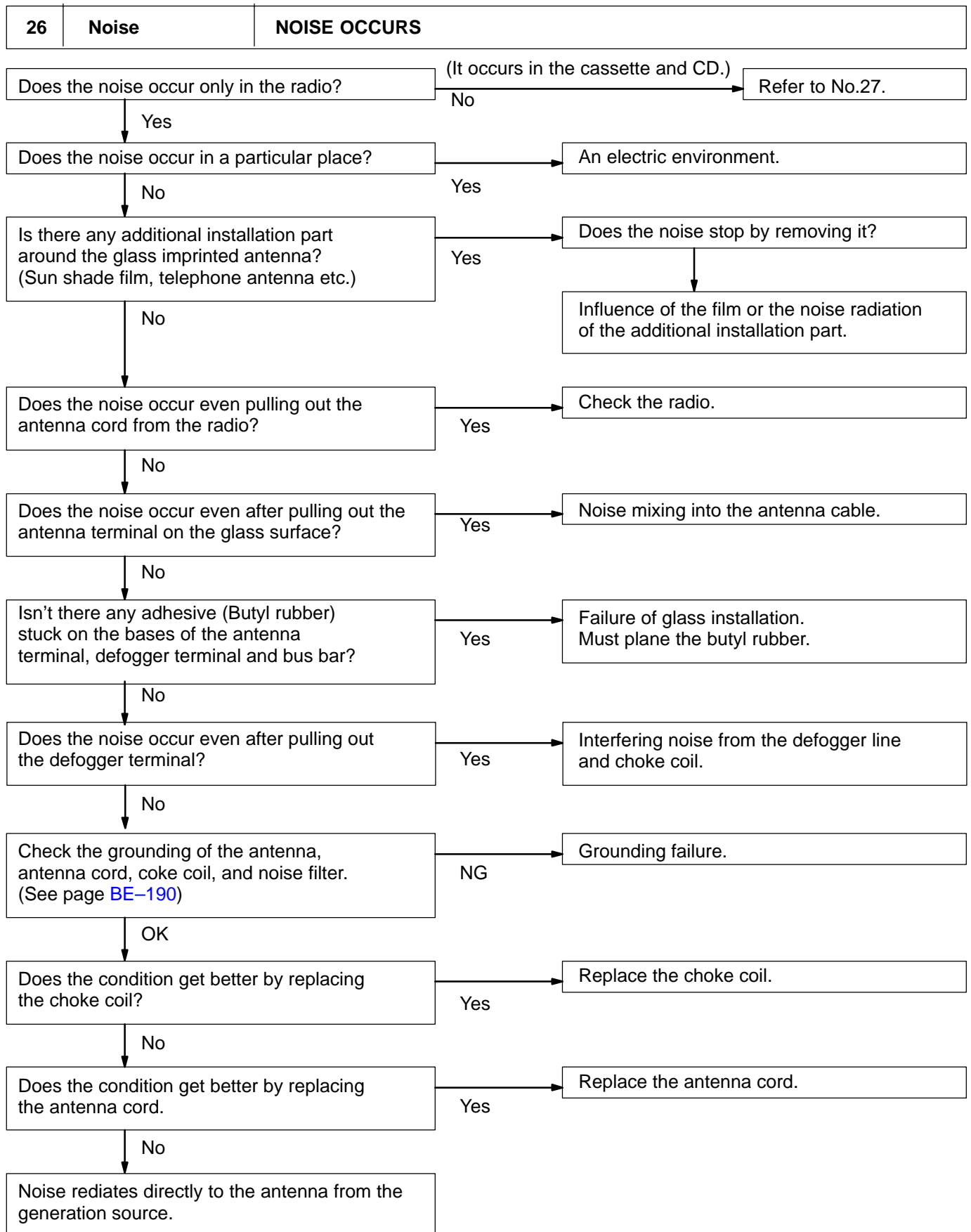




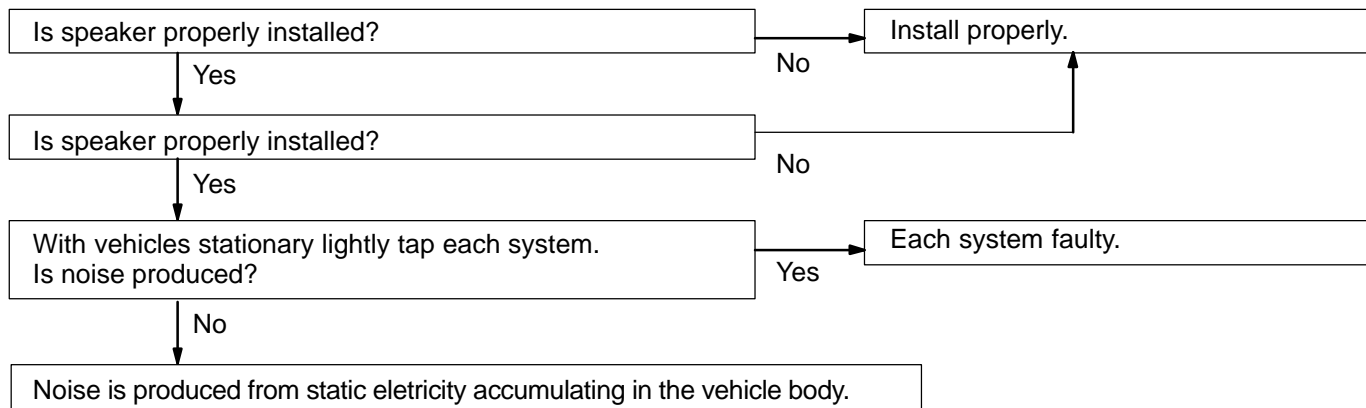




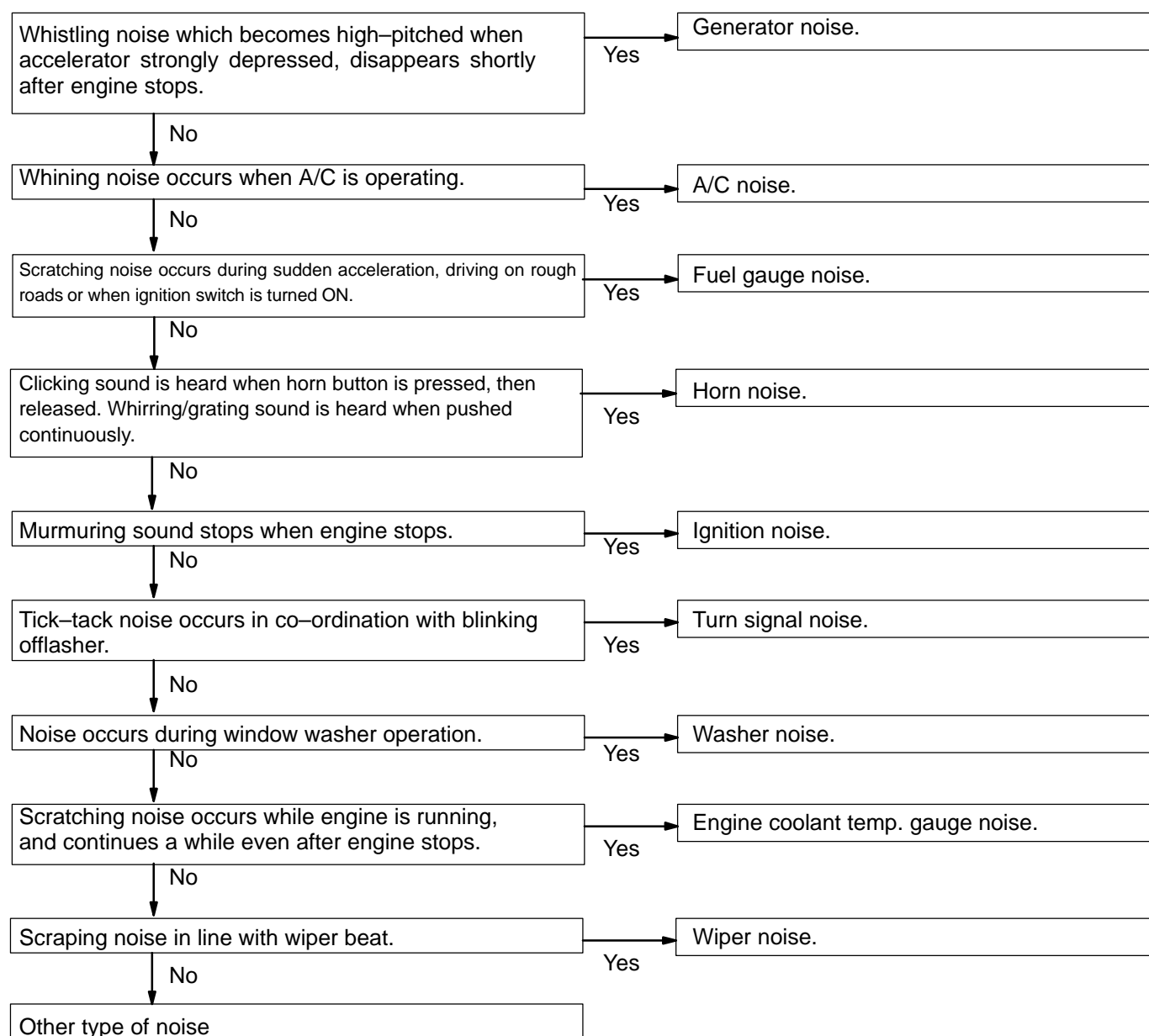




27	Noise	NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING
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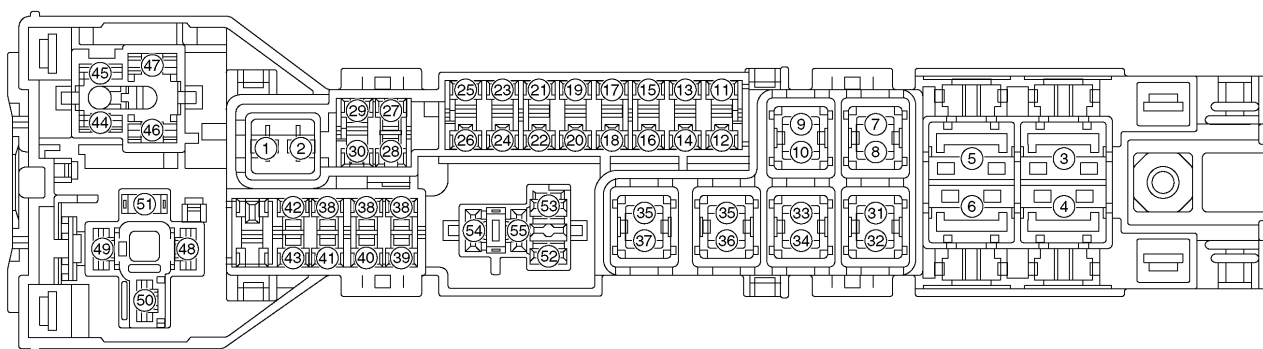


28	Noise	NOISE PRODUCED WHEN ENGINE STARTS
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INSPECTION

1. INSPECT ENGINE ROOM NO.1 JUNCTION BLOCK CIRCUIT



I05031

- (a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
MAIN	2 – Ground	Constant	Battery positive voltage
ABS NO.1	4 – Ground	Constant	Battery positive voltage
ALT	6 – Ground	Constant	Battery positive voltage
ABS	8 – Ground	Constant	Battery positive voltage
H-LP CLN	10 – Ground	Constant	Battery positive voltage
RAD NO.1	12 – Ground	Constant	Battery positive voltage
ALT-S	14 – Ground	Constant	Battery positive voltage
EFI	16 – Ground	Constant	Battery positive voltage
TURN HAZ	18 – Ground	Constant	Battery positive voltage
TEL	20 – Ground	Constant	Battery positive voltage
AM2	22 – Ground	Constant	Battery positive voltage
ETCS	24 – Ground	Constant	Battery positive voltage
HORN	26 – Ground	Constant	Battery positive voltage
MPX-B	27 – Ground	Constant	Battery positive voltage

ECU-B1	30 – Ground	Constant	Battery positive voltage
HTR	31 – Ground	Constant	Battery positive voltage
FAN MAIN	33 – Ground	Constant	Battery positive voltage
CDS FAN	35 – Ground	Ignition switch ON	Battery positive voltage
RAD FAN	35 – Ground	Ignition switch ON	Battery positive voltage
H-LP R LWR	38 – Ground	Light control switch HEAD	Battery positive voltage
H-LP L LWR	38 – Ground	Light control switch HEAD	Battery positive voltage
H-LP R UPR	38 – Ground	Light control switch HEAD	Battery positive voltage
H-LP L UPR	42 – Ground	Light control switch HEAD	Battery positive voltage

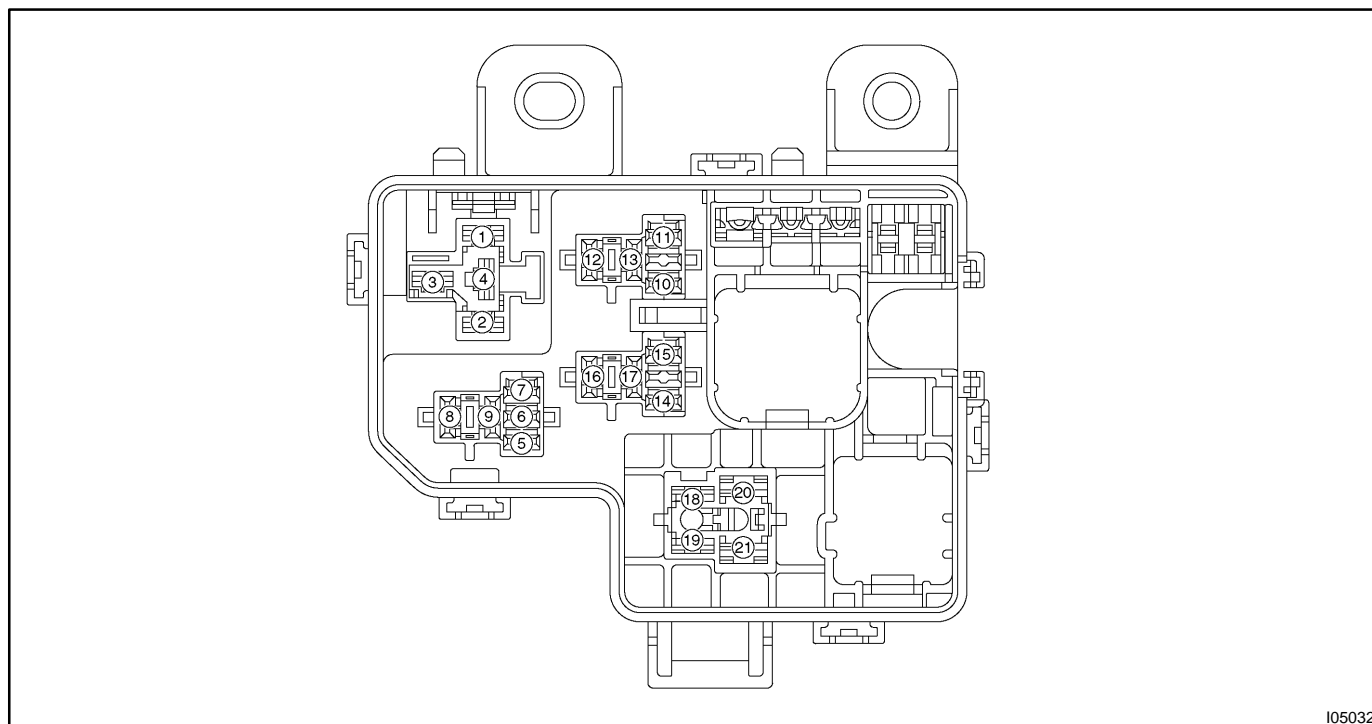
If the circuit is not as specified, inspect the circuits connected to other parts.

- (b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
H-LP	44 – Ground	Constant	Battery positive voltage
H-LP	46 – Ground	Constant	Battery positive voltage
ST	48 – Ground	Constant	Continuity
ST	51 – Ground	Constant	Battery positive voltage
EFI MAIN	53 – Ground	Constant	Continuity
EFI MAIN	55 – Ground	Constant	Battery positive voltage

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

2. INSPECT ENGINE ROOM No.3 RELAY BLOCK CIRCUIT

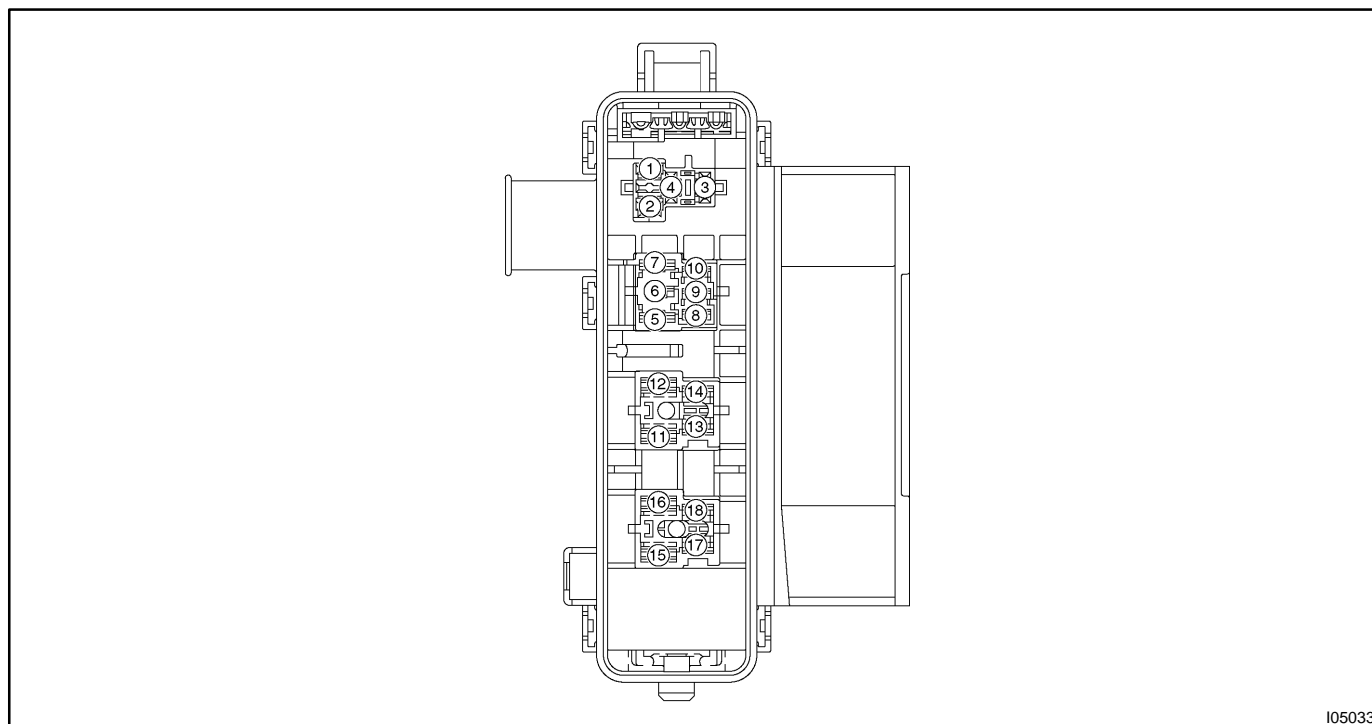


Remove the relay from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
FAN NO.1	3 – Ground	Ignition switch ON	Battery positive voltage
FAN NO.2	8 – Ground	Ignition switch ON	Battery positive voltage
A/C COMP	13 – Ground	Ignition switch ON	Battery positive voltage
FAN NO.3	17 – Ground	Ignition switch ON	Battery positive voltage
DIMMER	20 – Ground	Constant	Battery positive voltage

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

3. INSPECT ENGINE ROOM No.2 RELAY BLOCK CIRCUIT



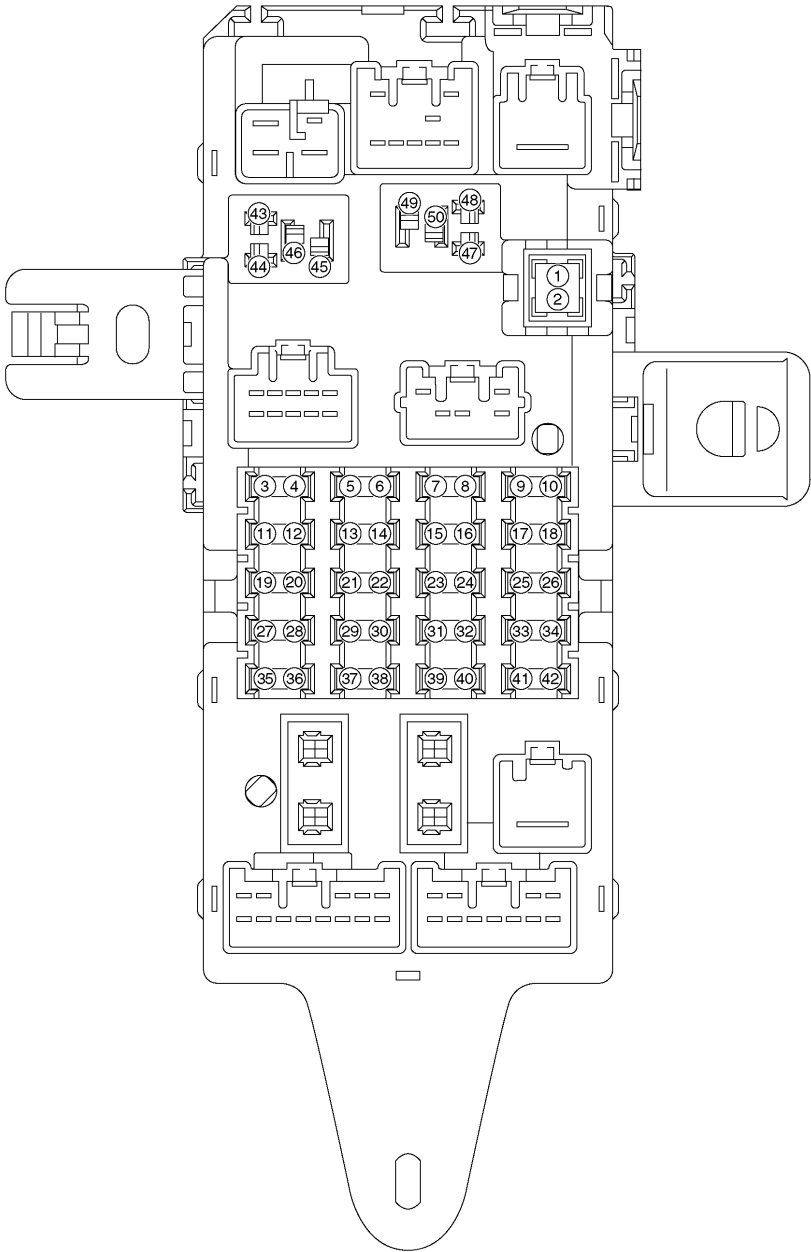
I05033

Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
HORN	1 – Ground	Constant	Battery positive voltage
HORN	2 – Ground	Horn switch ON	Continuity
HORN	4 – Ground	Constant	Battery positive voltage
ABS SOL	5 – Ground	Constant	Battery positive voltage
ABS SOL	6 – Ground	Constant	Continuity
TRC MTR	11 – Ground	Constant	Battery positive voltage
ABS MTR	15 – Ground	Constant	Battery positive voltage

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

4. INSPECT DRIVER SIDE JUNCTION BLOCK CIRCUIT



- (a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
AM1	1 – Ground	Constant	Battery positive voltage
WASHER	3 – Ground	Ignition switch ON	Battery positive voltage
FOG	5 – Ground	Constant	Battery positive voltage
TAIL	7 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
SRS-ACC	9 – Ground	Ignition switch ACC or ON	Battery positive voltage
GAUGE	11 – Ground	Ignition switch ON	Battery positive voltage
FUEL OPN	13 – Ground	Constant	Battery positive voltage
D FR DOOR	15 – Ground	Constant	Battery positive voltage
PANEL	17 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
HTR	19 – Ground	Ignition switch ON	Battery positive voltage
SRS-B	21 – Ground	Constant	Battery positive voltage
P/SEAT (D)	23 – Ground	Constant	Battery positive voltage
RAD NO.2	25 – Ground	Ignition switch ACC or ON	Battery positive voltage
WIP	27 – Ground	Ignition switch ON	Battery positive voltage
OBD	29 – Ground	Constant	Battery positive voltage
STOP	31 – Ground	Constant	Battery positive voltage
CIG	33 – Ground	Ignition switch ACC or ON	Battery positive voltage
ECU-IG	35 – Ground	Ignition switch ON	Battery positive voltage
ST	37 – Ground	Ignition switch ON	Battery positive voltage
IGN	39 – Ground	Ignition switch ON	Battery positive voltage
D RR DOOR	41 – Ground	Constant	Battery positive voltage

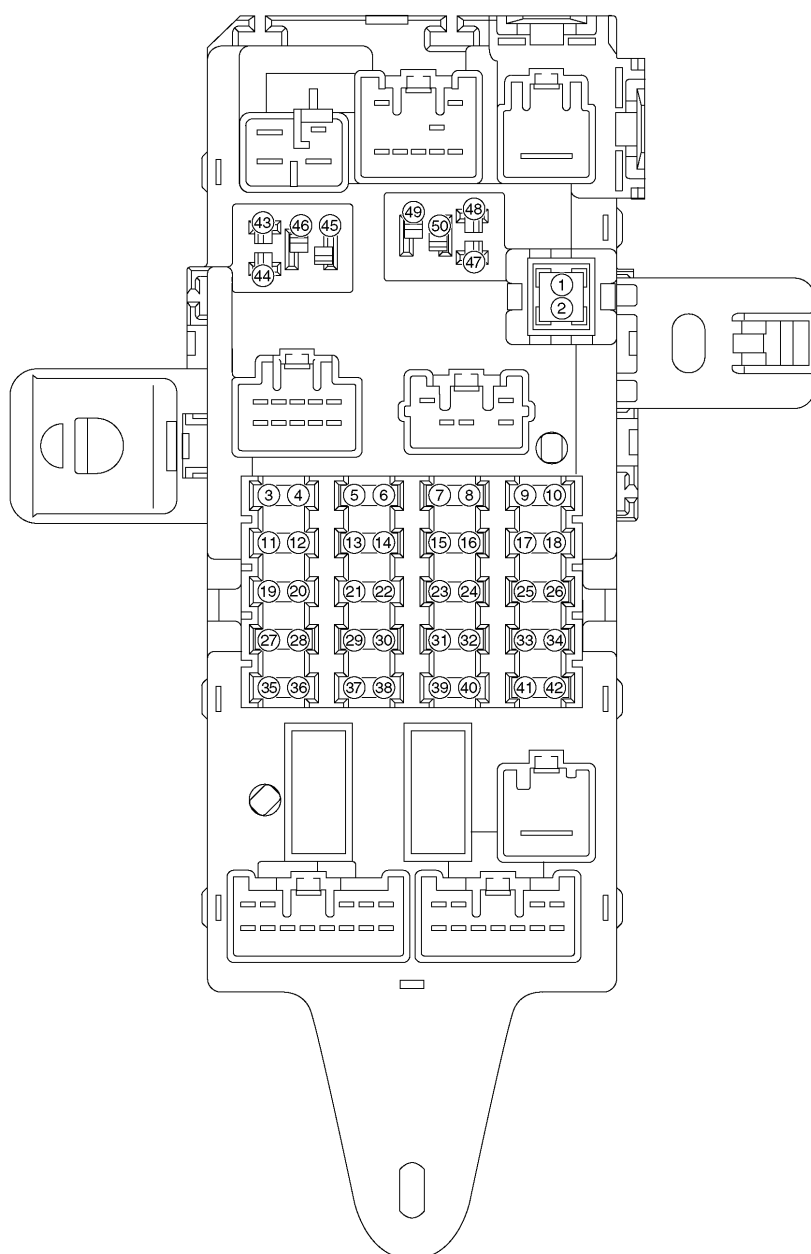
If the circuit is not as specified, inspect the circuits connected to other parts.

- (b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
Fog light	43 – Ground	Constant	Battery positive voltage
Fog light	44 – Ground	Constant	Continuity
Fog light	46 – Ground	Light control switch HEAD	Battery positive voltage
Taillight	47 – Ground	Constant	Battery positive voltage
Taillight	48 – Ground	Constant	Continuity
Taillight	50 – Ground	Constant	Continuity

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

5. INSPECT PASSENGER SIDE JUNCTION BLOCK CIRCUIT



- (a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
DEF	1 – Ground	Constant	Battery positive voltage
MIR HTR	7 – Ground	Ignition switch ON	Battery positive voltage
S/ROOF	13 – Ground	Constant	Battery positive voltage
P FR DOOR	15 – Ground	Constant	Battery positive voltage
P/SEAT (P)	23 – Ground	Constant	Battery positive voltage
DOME	25 – Ground	Constant	Battery positive voltage
S-HTR	27 – Ground	Ignition switch ON	Battery positive voltage
TV	31 – Ground	Constant	Battery positive voltage
ECU-B2	33 – Ground	Constant	Battery positive voltage
P FR DOOR	41 – Ground	Constant	Battery positive voltage

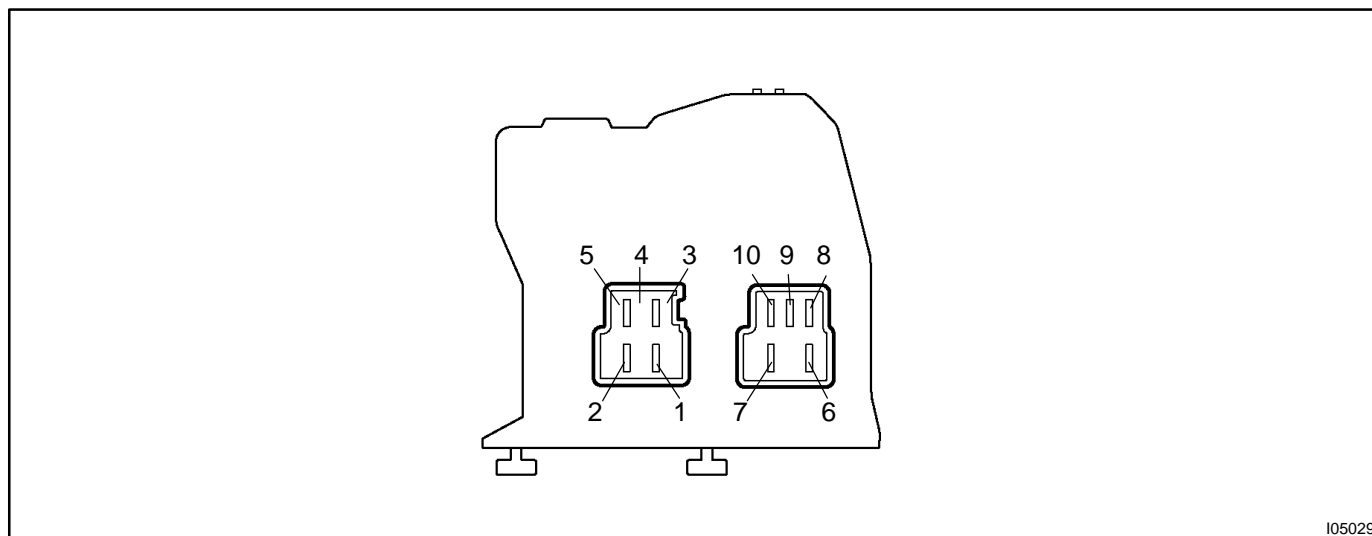
If the circuit is not as specified, inspect the circuits connected to other parts.

- (b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
Ignition Main	43 – Ground	Ignition switch ON	Battery positive voltage
Mirror Heater	47 – Ground	Ignition switch ON	Battery positive voltage
Mirror Heater	50 – Ground	Constant	Battery positive voltage

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

6. INSPECT PASSENGER COWL SIDE RELAY BLOCK CIRCUIT



I05029

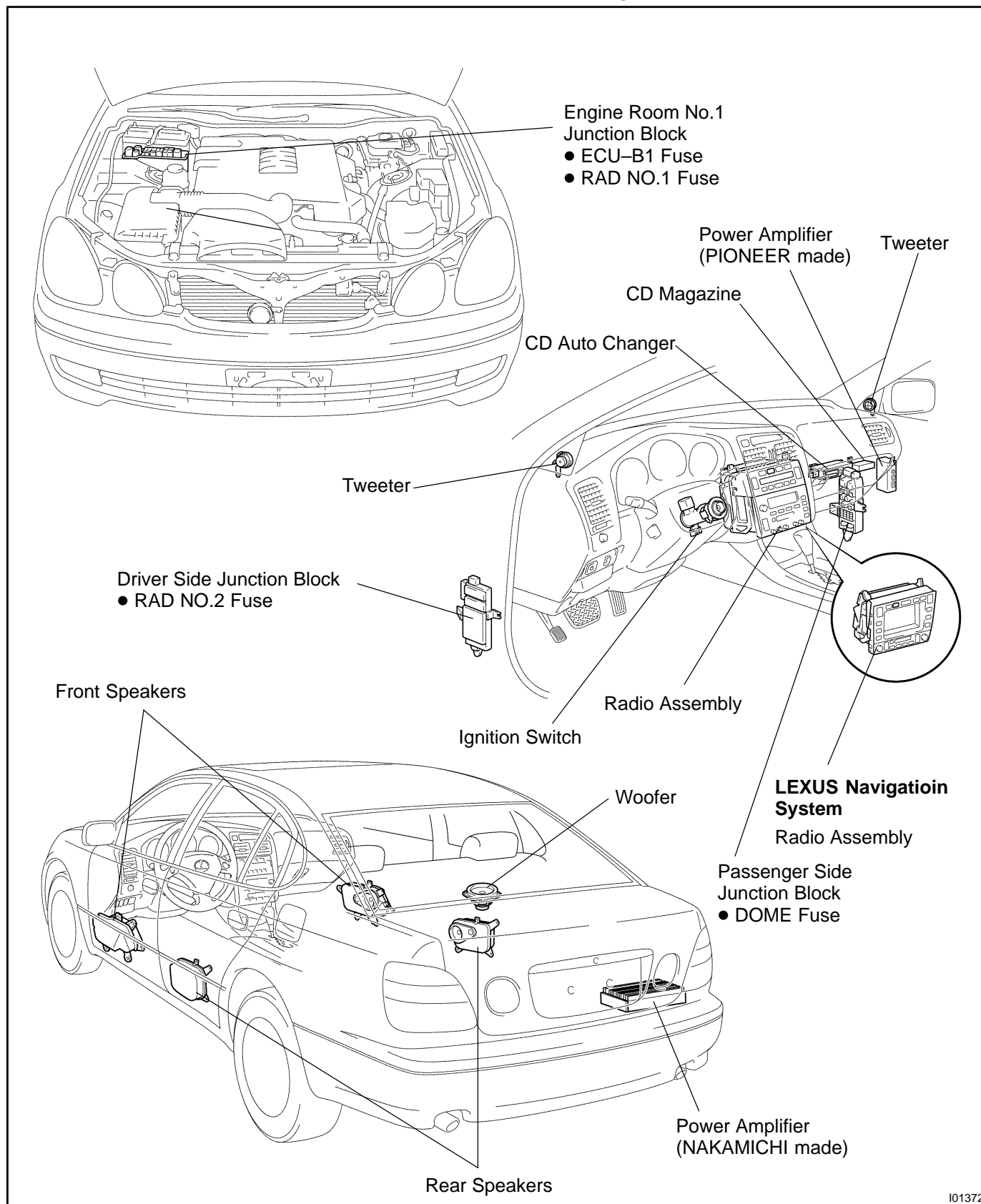
Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
DEF	1 – Ground	Constant	Battery positive voltage
HEATER	6 – Ground	Constant	Battery positive voltage

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

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01372

Wire Harness Side

I04310

INSPECTION
**1. Except NAKAMICHI made:
INSPECT CD AUTO CHANGER CIRCUIT**

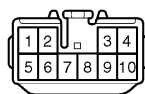
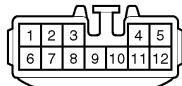
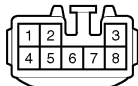
Disconnect connectors from CD auto changer and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
5 – Ground	Constant	Battery positive voltage
10 – Ground	Ignition switch LOCK	No voltage
10 – Ground	Ignition switch ACC or ON	Battery positive voltage

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

HINT:

- Check the wire harness between the radio receiver assembly and the CD auto changer.
- Since the signals to and from the MUTE, R⁻, R⁺, L⁻, L⁺, TX⁻ and TX⁺ terminals are serial signals, they cannot ordinarily be measured with a tester.

Wire Harness Side**Connector "A"****Connector "B"****Connector "C"****Connector "D"**

I04189

**2. Except NAKAMICHI made:
INSPECT POWER AMPLIFIER CIRCUIT**

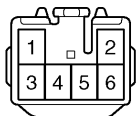
Disconnect the connector from power amplifier and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
B7 – Ground	Constant	Continuity
C12 – Ground	Ignition switch LOCK and radio switch ON	No voltage
C12 – Ground	Ignition switch ACC or ON and radio switch ON	Battery positive voltage
B4 – Ground	Constant	Battery positive voltage

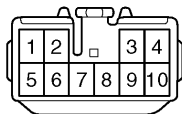
If the circuit is not as specified, inspect the circuits connected to other parts.

Wire Harness Side

Connector "A"



Connector "B"



I04190

3. Except NAKAMICHI made:**INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT**

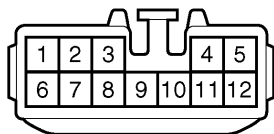
Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A2 – Ground	Constant	Continuity
A4 – Ground	Constant	Battery positive voltage
A1 – Ground	Ignition switch LOCK	No voltage
A1 – Ground	Ignition switch ACC or ON	Battery positive voltage

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

HINT:

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

Wire Harness Side

I04188

4. NAKAMICHI made: INSPECT CD AUTO CHANGER CIRCUIT

Disconnect connectors from CD auto changer and inspect the connector on the wire harness side.

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

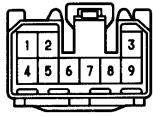
If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

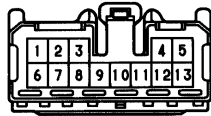
- Check the wire harness between the radio receiver assembly and the CD auto changer.
- Since the signals to and from the MUTE, R⁻, R⁺, L⁻, L⁺, TX⁻ and TX⁺ terminals are serial signals, they cannot ordinarily be measured with a tester.

Wire Harness Side

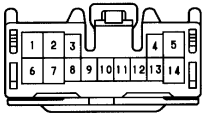
Connector "A"



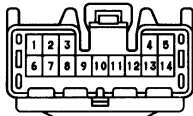
Connector "B"



Connector "C"



Connector "D"



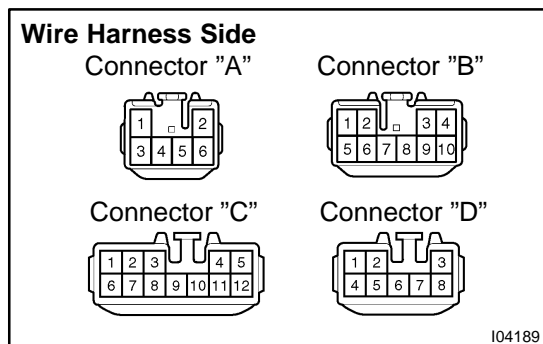
I04309

5. NAKAMICHI made: INSPECT POWER AMPLIFIER CIRCUIT

Disconnect the connector from power amplifier and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A1 – Ground A4 – Ground D1 – Ground	Constant	Continuity
A6 – Ground	Ignition switch LOCK and radio switch ON	No voltage
A6 – Ground	Ignition switch ACC or ON and radio switch ON	Battery positive voltage
A2 – Ground	Constant	Battery positive voltage
A5 – Ground	Constant	Battery positive voltage

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

**6. NAKAMICHI made:****INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT**

Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
D3 – Ground	Constant	Continuity
D4 – Ground	Constant	Battery positive voltage
D1 – Ground	Ignition switch LOCK	No voltage
D1 – Ground	Ignition switch ACC or ON	Battery positive voltage

*: w/ LEXUS navigation system

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

HINT:

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

7. INSPECT GLASS IMPRINTED ANTENNA

(Use same procedure as for "INSPECT DEFOGGER WIRES" on page [BE-108](#).)

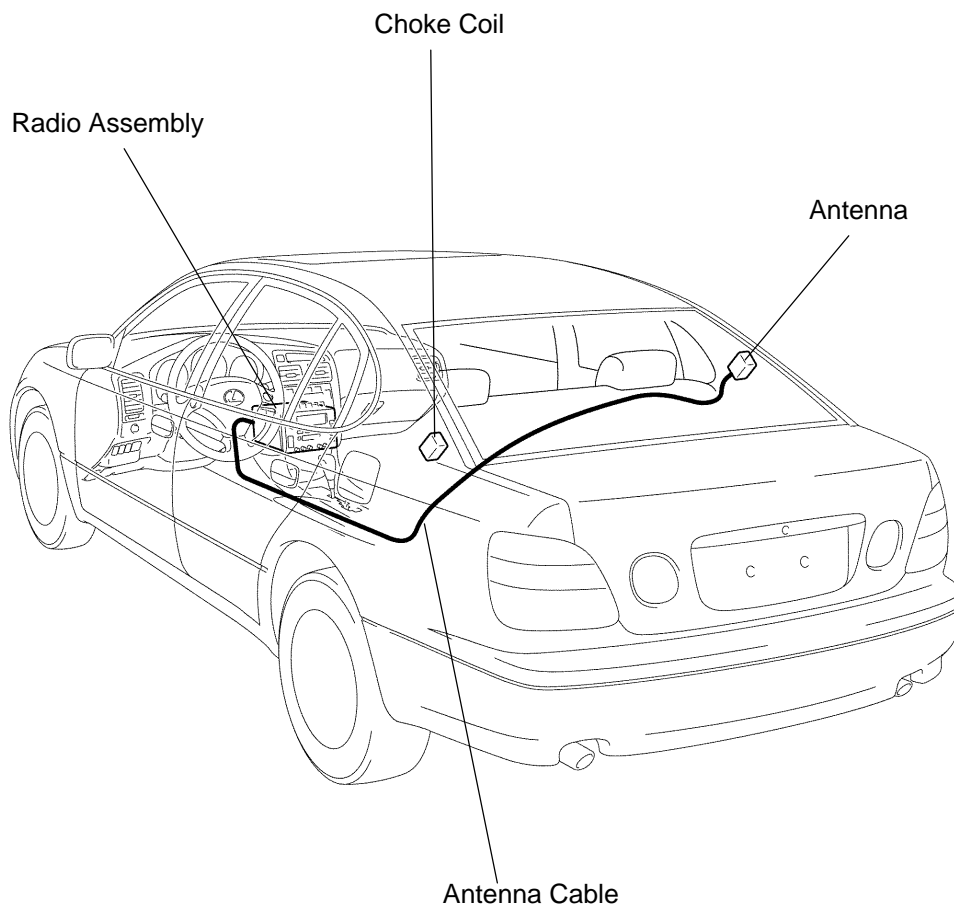
8. REPAIR GLASS IMPRINTED ANTENNA

(Use same procedure as for "REPAIR DEFOGGER WIRES" on page [BE-108](#).)

ANTENNA LOCATION

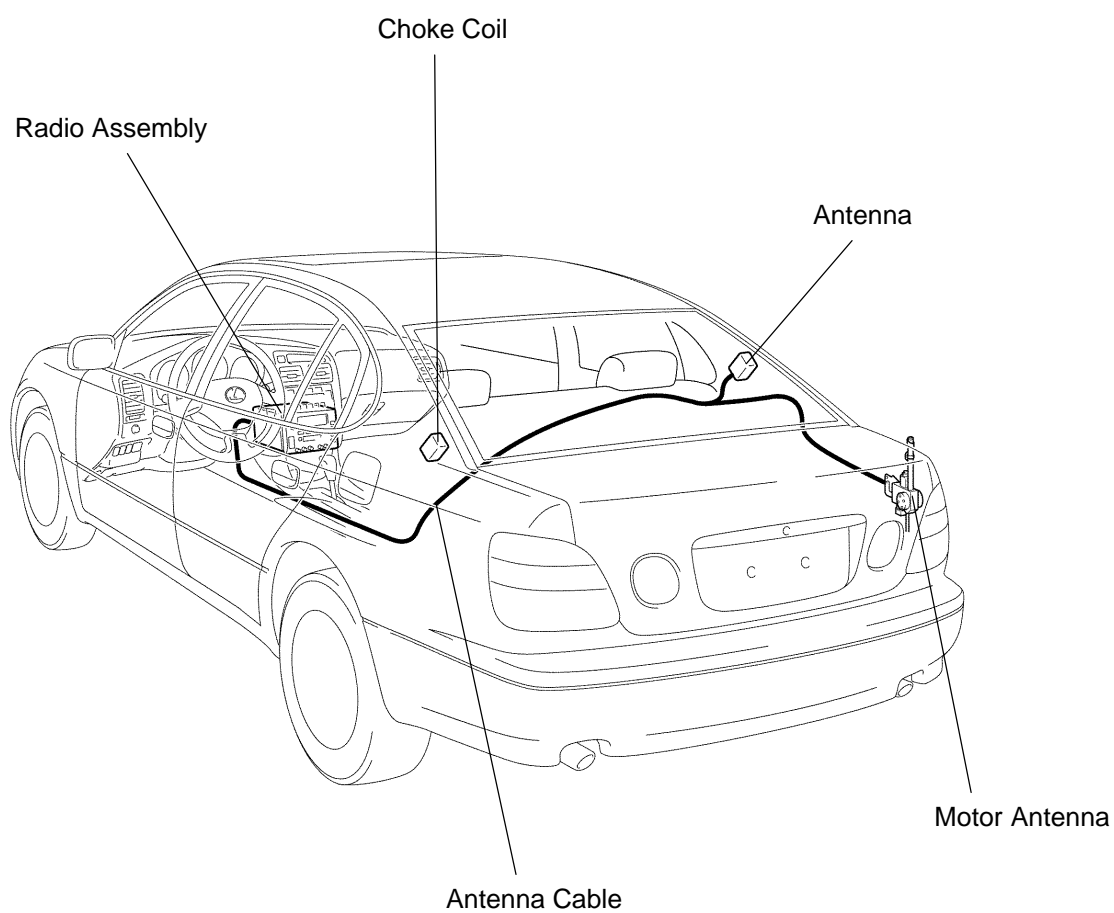
BE10Y-02

USA/CANADA Models



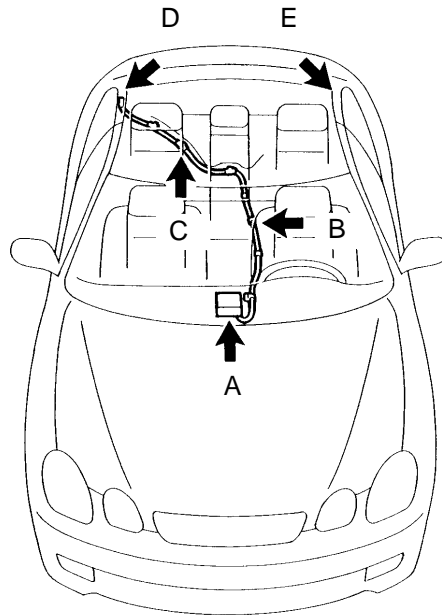
I01373

TAIWAN Models



I05320

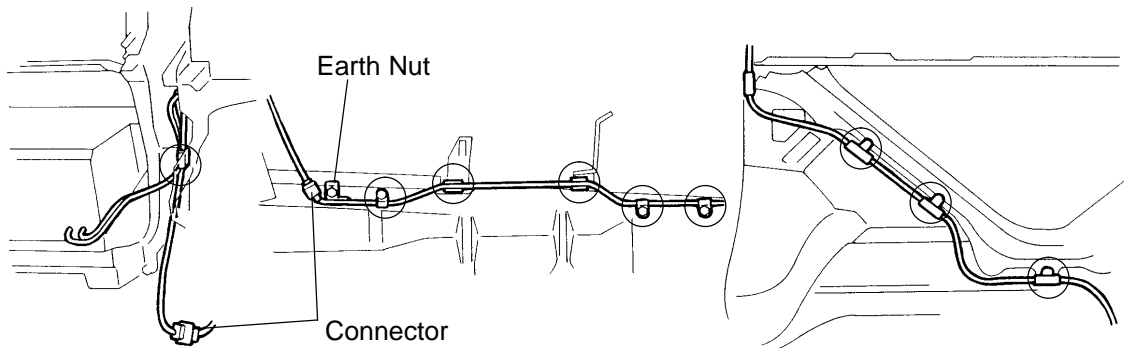
COMPONENTS



View "A"

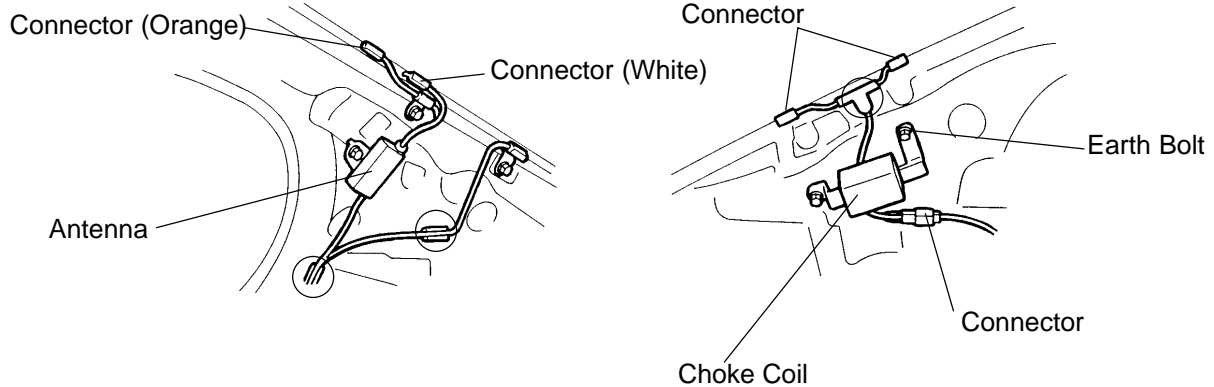
View "B"

View "C"

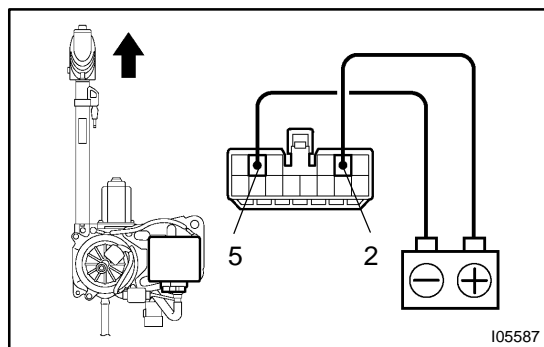


View "D"

View "E"



○ : Clamp



INSPECTION

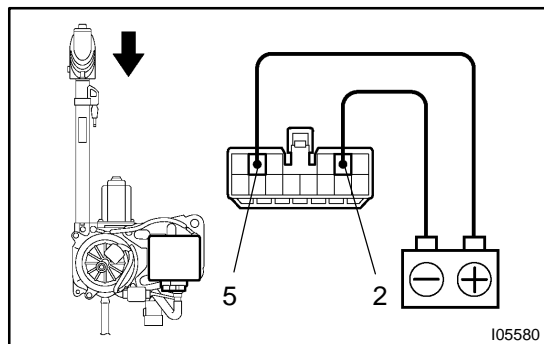
1. Auto Antenna Models:

INSPECT ANTENNA MOTOR

- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 5.
- Check that the motor turns (moves upward).

NOTICE:

These tests must be done quickly (within 3 – 5 seconds) to prevent the coil from burning out.

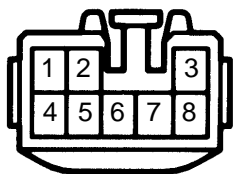


- Then, reverse the polarity, check that the motor turns the opposite way (moves downward).

NOTICE:

These tests must be done quickly (within 3 – 5 seconds) to prevent the coil from burning out.

Wire Harness Side



2. Auto Antenna Models:

INSPECT ANTENNA MOTOR CONTROL RELAY CIRCUIT

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

Tester connection	Condition	Specified condition
7 – Ground	Constant	Continuity
1 – Ground	Ignition switch ACC or ON, and radio switch ON and Others	No voltage
1 – Ground	Ignition switch ACC or ON, and radio switch ON and AM	Battery positive voltage
2 – Ground	Ignition switch ACC or ON, and radio or tape or CD switch OFF	No voltage
2 – Ground	Ignition switch ACC or ON, and radio or tape or CD switch ON	Battery positive voltage
3 – Ground	Constant	Battery positive voltage
4 – Ground	Ignition switch ACC or ON, and radio switch ON and Others	No voltage
4 – Ground	Ignition switch ACC or ON, and radio switch ON and AM or FM (87.9 – 96.0 MHz)	Battery positive voltage
5 – Ground	Ignition switch ACC or ON, and radio switch OFF	No voltage
5 – Ground	Ignition switch ACC or ON, and radio switch ON	Battery positive voltage

6 – Ground	Ignition switch ACC or LOCK	No voltage
6 – Ground	Ignition switch ON	Battery positive voltage
8 – Ground	Ignition switch LOCK	No voltage
8 – Ground	Ignition switch ACC or ON	Battery positive voltage

If circuit is as specified, replace the relay.

CLOCK

TROUBLESHOOTING

BE0G0-05

HINT:

Troubleshoot the clock according to the table below.

Troubleshooting	No.
Passenger seat belt warning light does not light up.	1
Clock will not operate	1
Clock loses or gains time	2

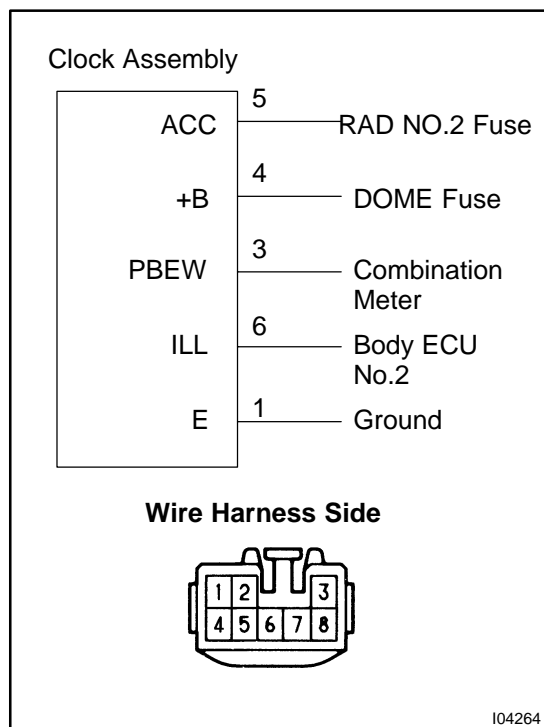
± 1.5 seconds / day

INSPECT CLOCK CIRCUIT

(See page [DI-849](#))

TROUBLESHOOTING NO.1

1	PASSENGER SEAT BELT WARNING LIGHT DOES NOT OPERATE
	CLOCK WILL NOT OPERATE



(a) Check that the battery positive voltage is 10 – 16 V.

If voltage is not as specified, replace the battery.

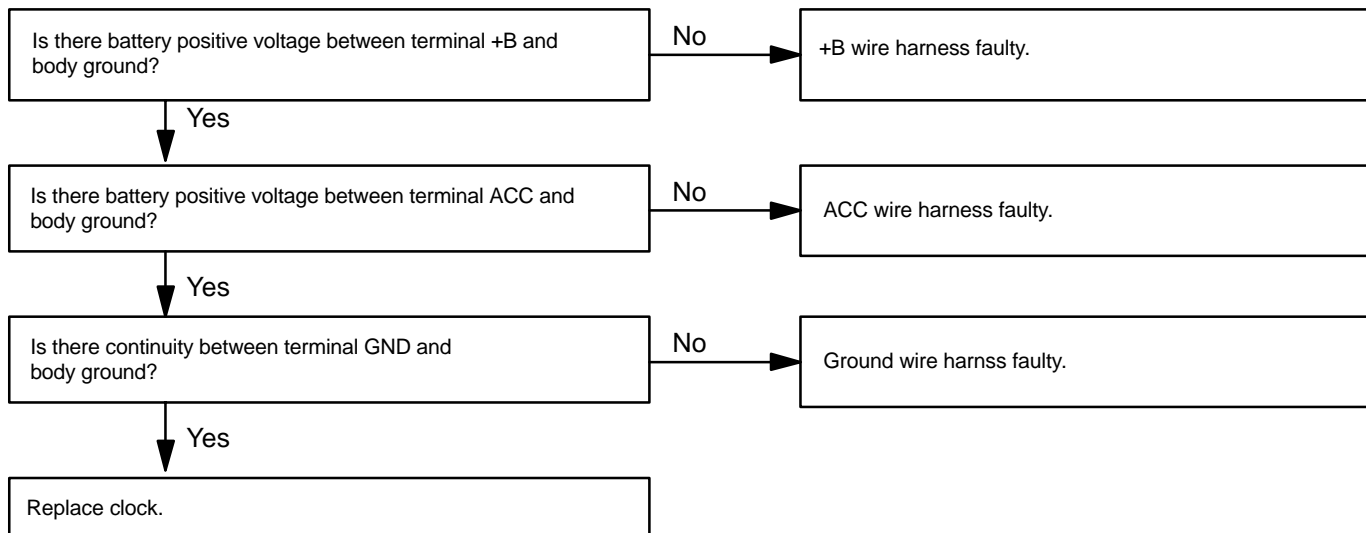
(b) Check that the DOME and RAD NO.2 fuses are not blown.

If the fuse is blown, replace the fuse and check for short.

(c) Troubleshoot the clock as follows.

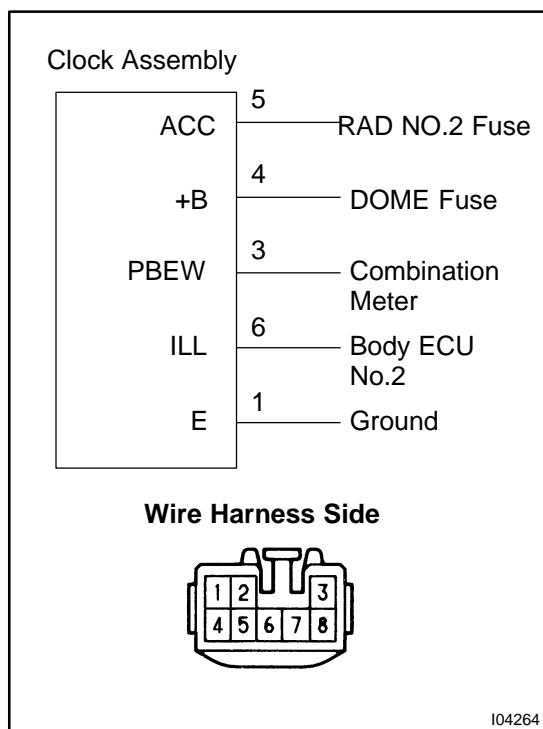
HINT:

Inspect the connector on the wire harness side.



TROUBLESHOOTING NO.2

2 CLOCK LOSES OR GAINS TIME



(a) Check that the battery positive voltage is 10 – 16 V. If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.

Allowable error (per day): ± 1.5 seconds

If the error exceeds the allowable error, replace the clock.

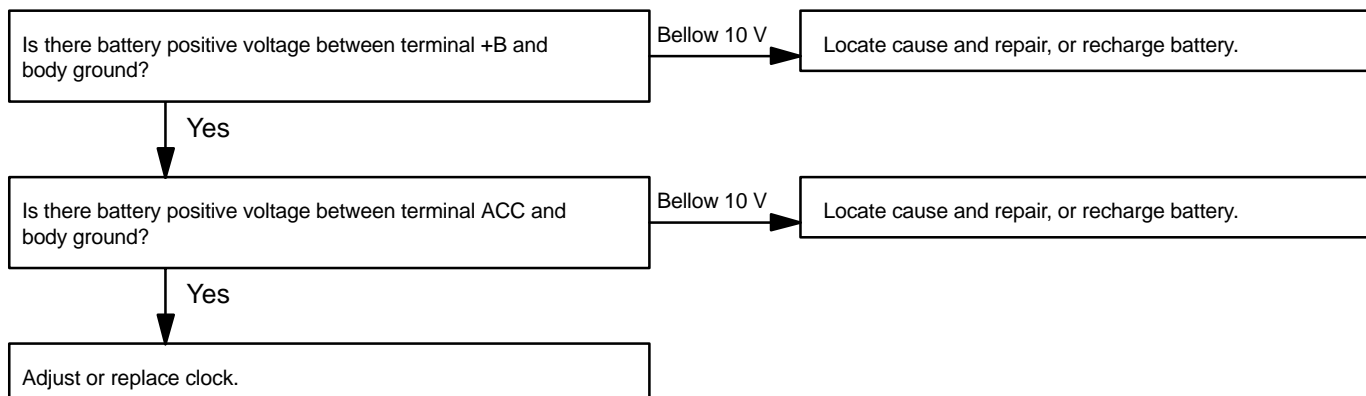
(c) Check that the clock adjusting button is sticking in position and has failed to return.

If the error exceeds the allowable error, replace the clock.

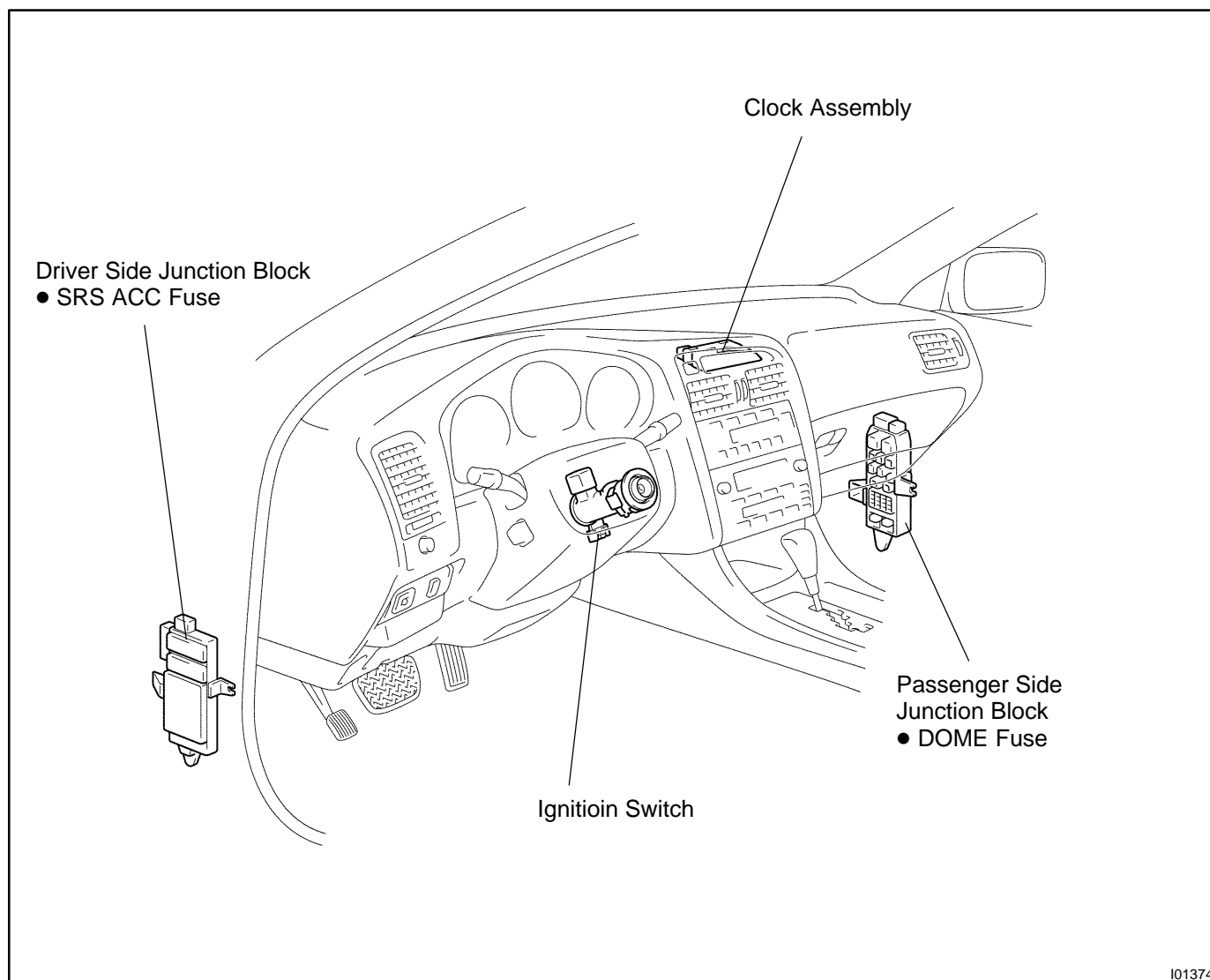
(d) Troubleshoot the clock as follows.

HINT:

Inspect the connector on the wire harness side.



LOCATION



I01374

GARAGE DOOR OPENER SYSTEM REGISTRATION PROCEDURE

BEOG2-03

1. NEW CODE REGISTRATION

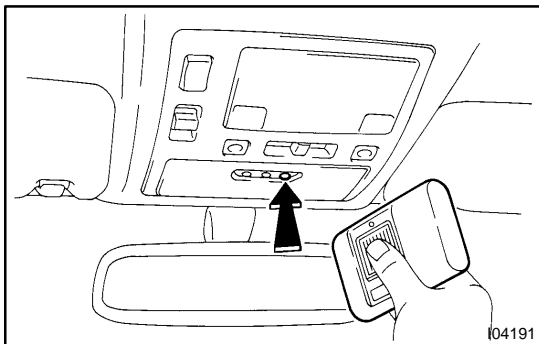
NOTICE:

- If pressing the switch of the original transmitter to register the code, the system might operate.
- When registering the transmitter codes such as for garage or gate, check that there is nobody around those places then register.

- (a) Press the switch for the item to be registered for 20 seconds

HINT:

When transferring to registration mode, LED (red) blinks in 1 Hz cycle.

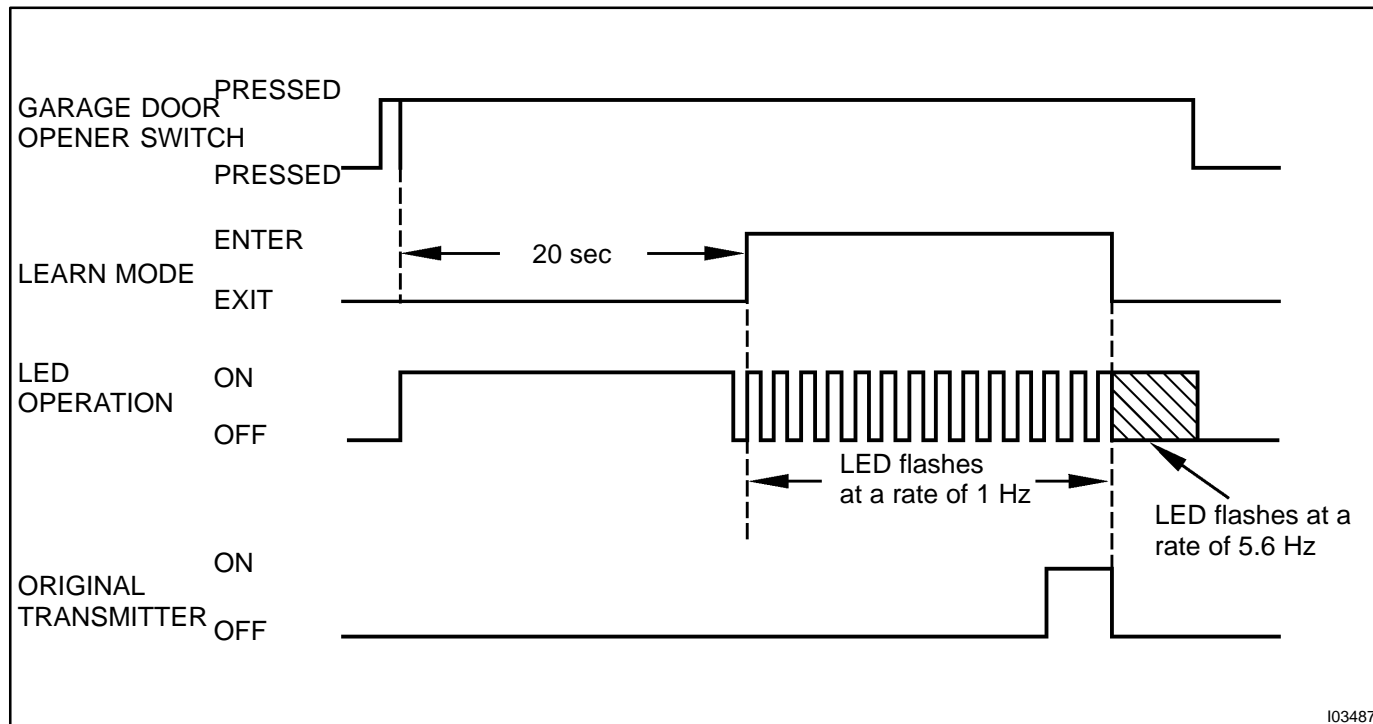


- (b) In the condition of (a), bring the original transmitter to within 1-inch area around the garage door opener and press the switch. (code transmitting).

HINT:

When code registration completes correctly, LED (red) blinks in 5.6 Hz cycle.

New code registration timing chart.



If a code can not be registered, observe the following conditions.

HINT:

- If the battery of original transmitter is consumed.
- Press the switch of the transmitter repeatedly in registration mode, as some transmitters stop transmitting for 1 to 2 seconds.
- This system is not applicable to the garage door opener which had been made before 1982.

2. CODE DELETION

- (a) Press the switches at both ends of garage door opener simultaneously for 20 seconds.

HINT:

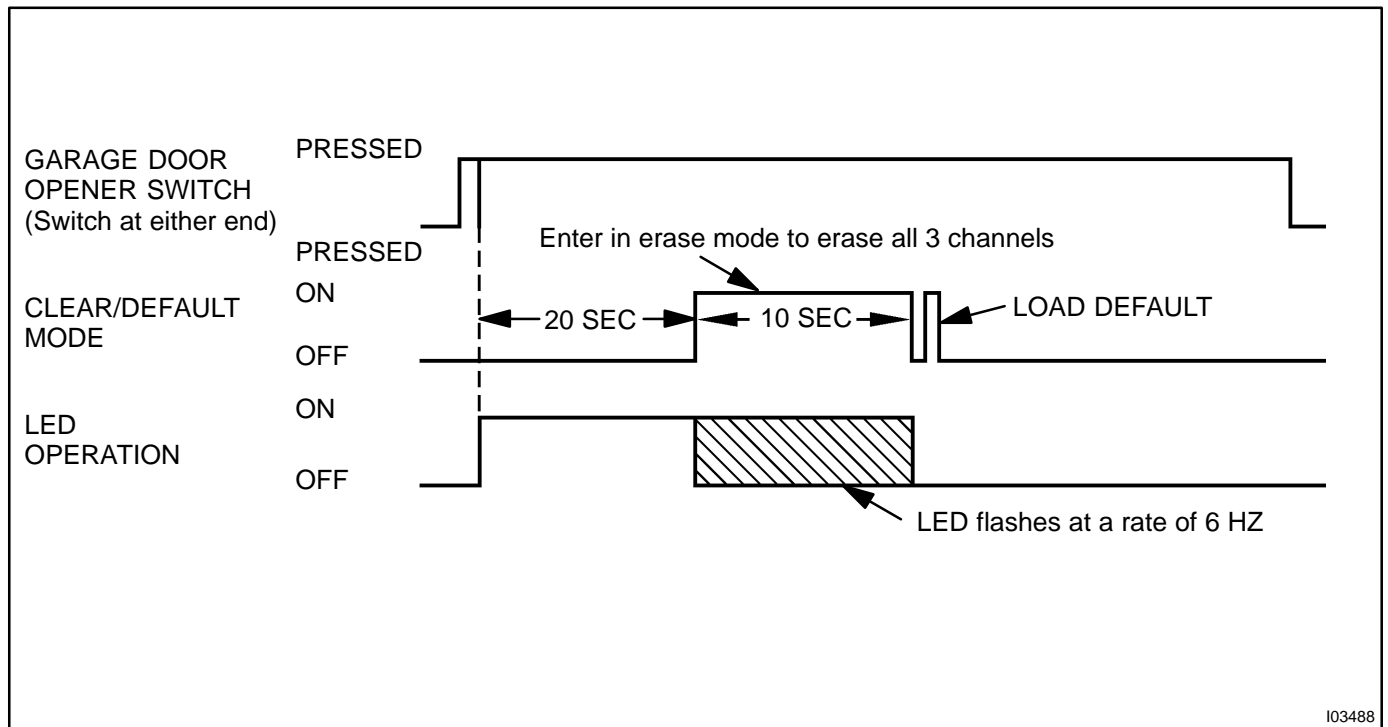
When transferring to deletion mode, LED (red) blinks in 6 Hz cycle.

- (b) When releasing the switch within 10 seconds after transferring to deletion mode, all the registered codes will be erased.

HINT:

Press the switch until blinking in 6 Hz cycle stops, so that the default code for check is set.

Code deletion timing chart



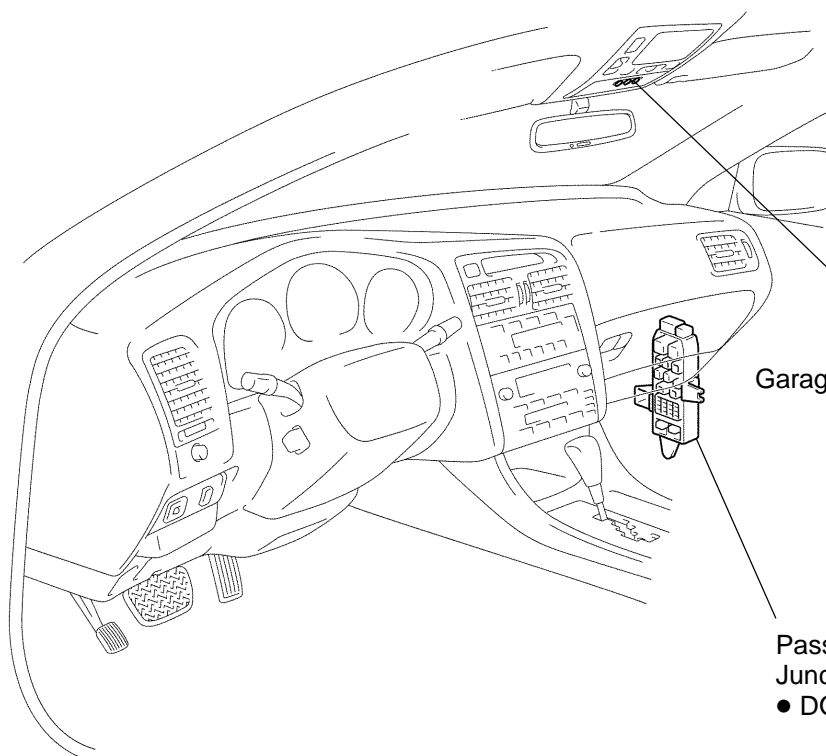
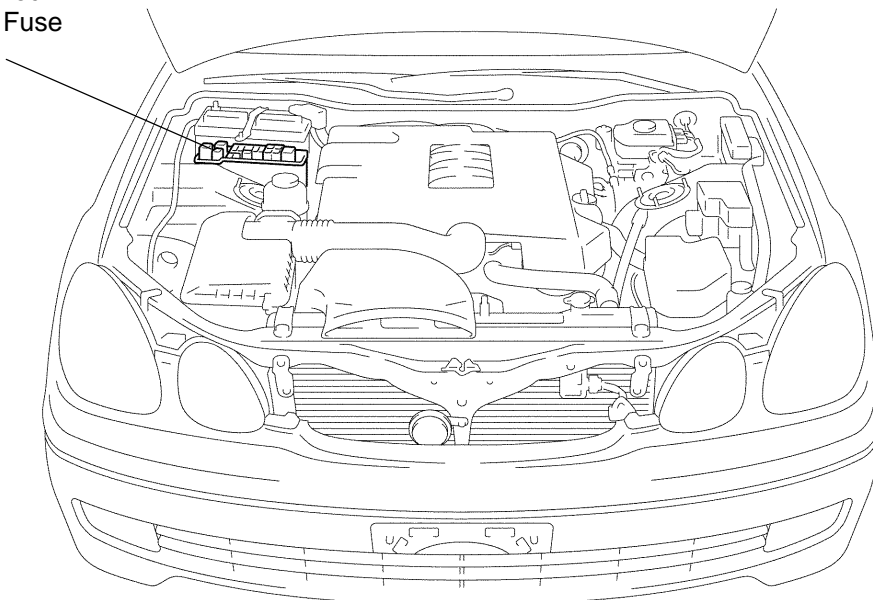
LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".

Engine Room No.1

Junction Block

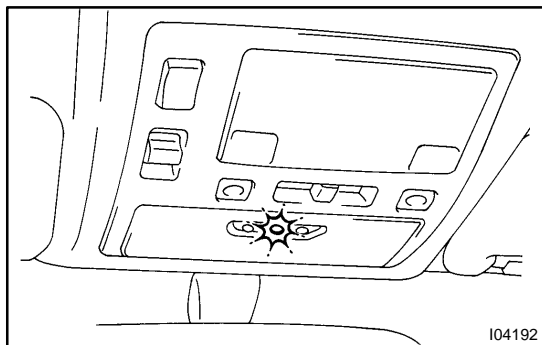
• ECU-B Fuse



I01375

REMOVAL

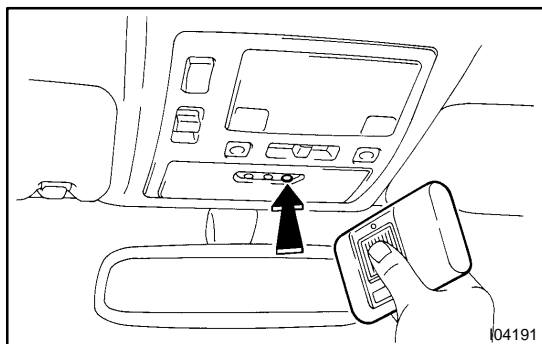
1. **REMOVE FRONT PERSONAL LIGHT LENS**
2. **REMOVE FRONT PERSONAL LIGHT**
 - (a) Remove the 3 screws.
 - (b) Disconnect the 2 connectors.
3. **REMOVE GARAGE DOOR OPENER SWITCH**



INSPECTION

1. INSPECT GARAGE DOOR OPENER SWITCH

Press the switch and check that each LED (red) lights up. Even if only one switch is found not to light up, replace it.



2. INSPECT GARAGE DOOR OPENER REGISTRATION AND TRANSMITTING

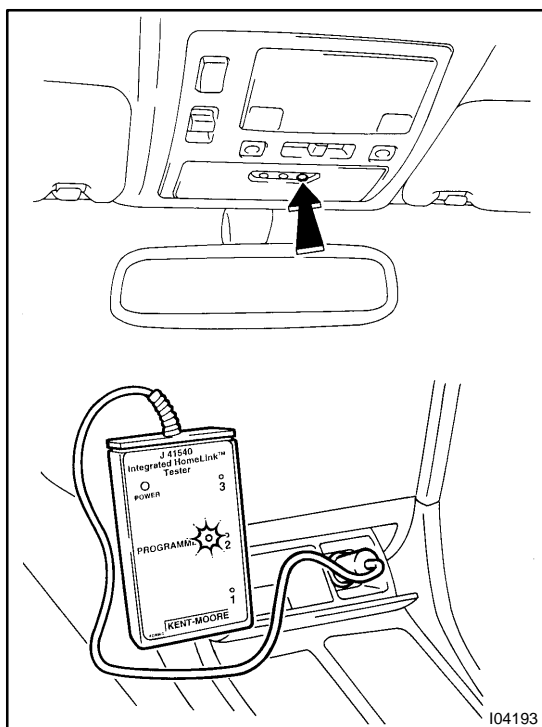
HINT:

Use the home link tester made by KENT MOORE for this test. As it is necessary to record the code of the hand held transmitter, customer's code will be erased. When the inspection completes, please register the customer's again.

- (a) Check that the code of hand held transmitter for inspection can be recorded.

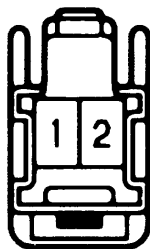
(See page

If the code can not be registered, replace garage door opener.



- (b) Press the switch which an inspection code has been registered for and check that LED (green) of the home link tester lights up.

If the LED (green) does not light up, replace the garage door opener.

Wire Harness Side

I04194

3. INSPECT GARAGE DOOR OPENER SWITCH CIRCUIT

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

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

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

INSTALLATION

1. **INSTALL GARAGE DOOR OPENER**
2. **INSTALL FRONT PERSONAL LIGHT**
 - (a) Connect the 2 connectors.
 - (b) Install the 3 screws.
3. **INSTALL FRONT PERSONAL LIGHT LENS**

ENGINE IMMOBILISER SYSTEM

REGISTRATION PROCEDURE

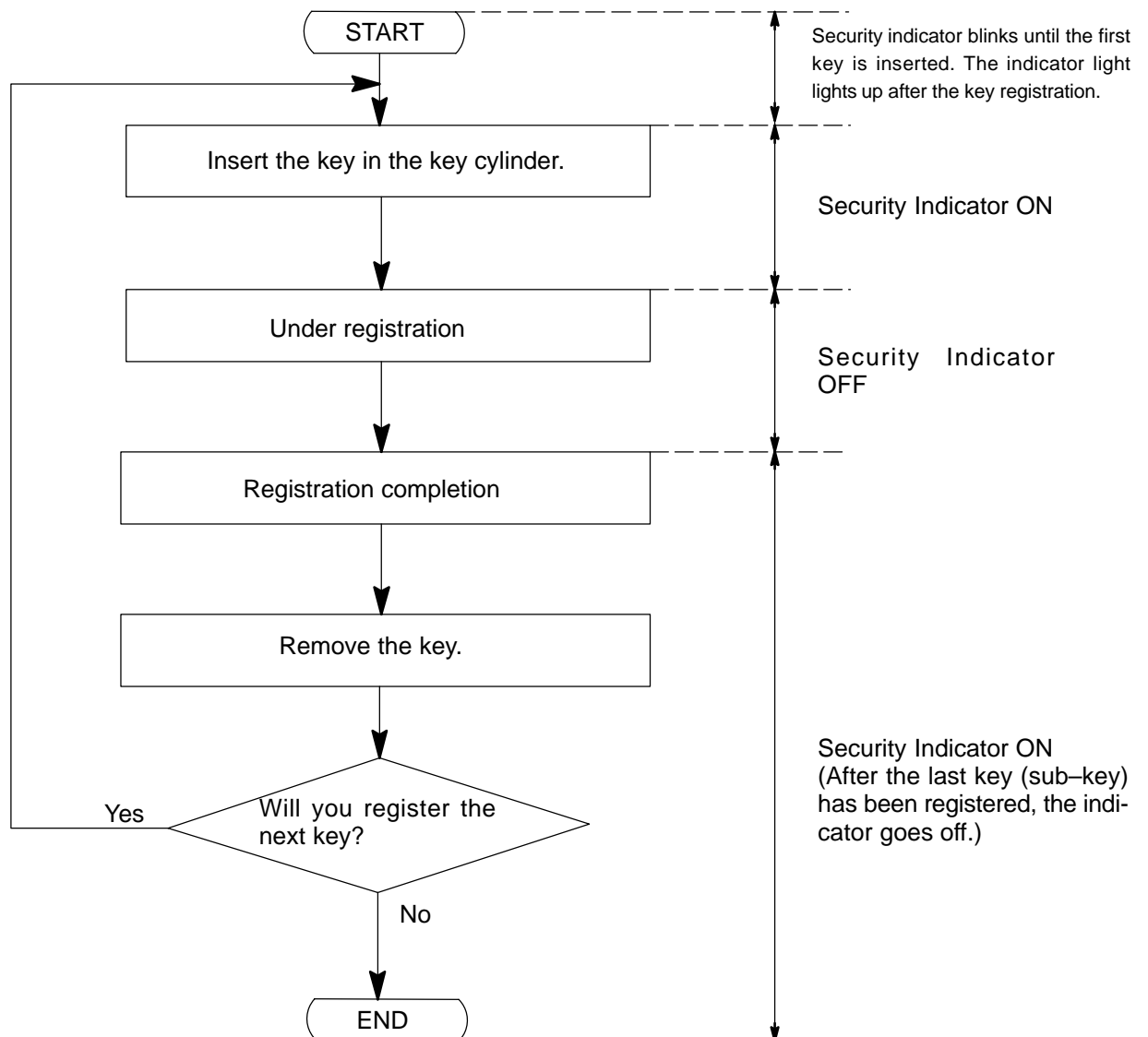
BE0G7-07

1. KEY REGISTRATION IN AUTOMATIC REGISTRATION MODE

(a) Registration of a new transponder key.

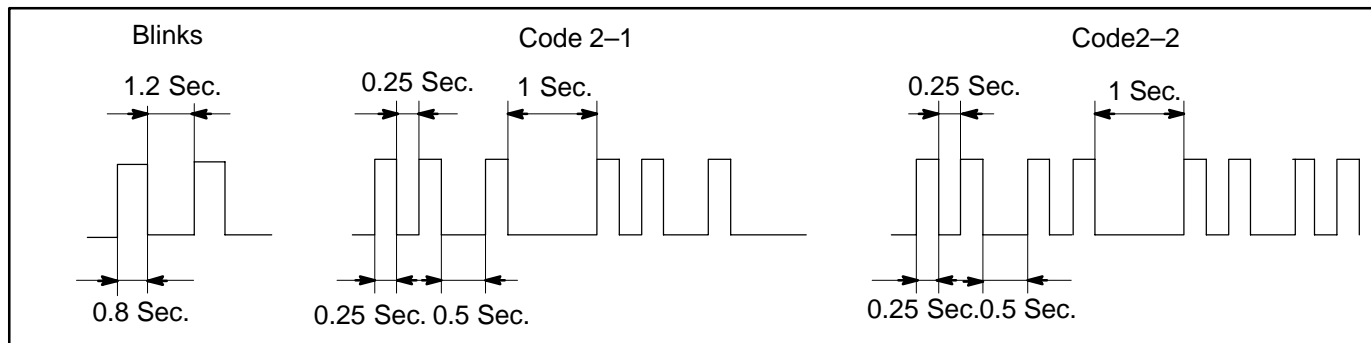
HINT:

- This must be done when you install a new ECM.
- The new ECM is in the automatic key code registration mode. The already fixed number of key codes for this ECM can be registered.
On this type of vehicle, up to 3 key codes can be registered.
- In the automatic registration mode, the key registered last becomes the sub-key.



HINT:

- When a key is not inserted in the key cylinder in the automatic registration mode, the security indicator always lights on.
- When the immobiliser system operates normally and the key is pulled out, the security indicator blinks.
- When key code registration could not be performed in the automatic registration mode, code 2-1 is output from the security indicator and when inserting the already registered key, code 2-2 is output.



(b) Automatic registration mode completion

If completing the mode forcibly when more than 1 key code have been registered in the automatic registration mode, perform the following procedures.

After 1 more key code have been registered with master key, perform step (1) or (2) without pulling the key out or inserting the already registered key.

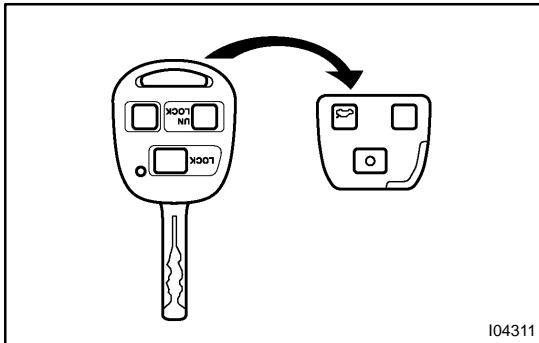
(1) Depress and release brake pedal 5 times or more within 15 sec.

(2) With the LEXUS hand-held tester, require automatic registration mode completion.

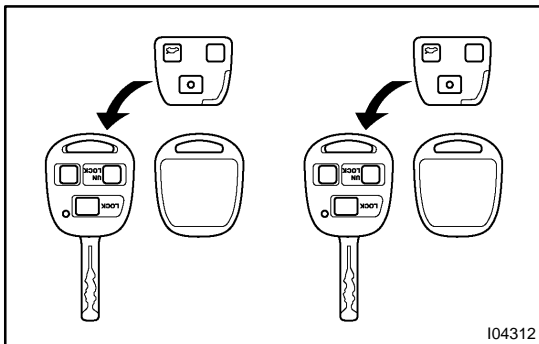
2. KEY REGISTRATION PROCEDURE WHEN KEY OR KEY CYLINDER HAS BEEN REPLACED.

HINT:

Key registration procedure of new master key and new sub-key on this vehicle when new ignition cylinder and key set, and new lock cylinder set including ignition key cylinder are installed is described below.



- (a) Removing wire-less and immobiliser module from original master key.



- (b) Making new master key.
After replacing and installing new ignition cylinder, install the removed original modules into new 2 key housings as supply parts.

- (c) Registration of supplied new sub-key and /or master key
Register supplied new sub-key and /or master key by using new master key.
(See step 3 and 4)

NOTICE:

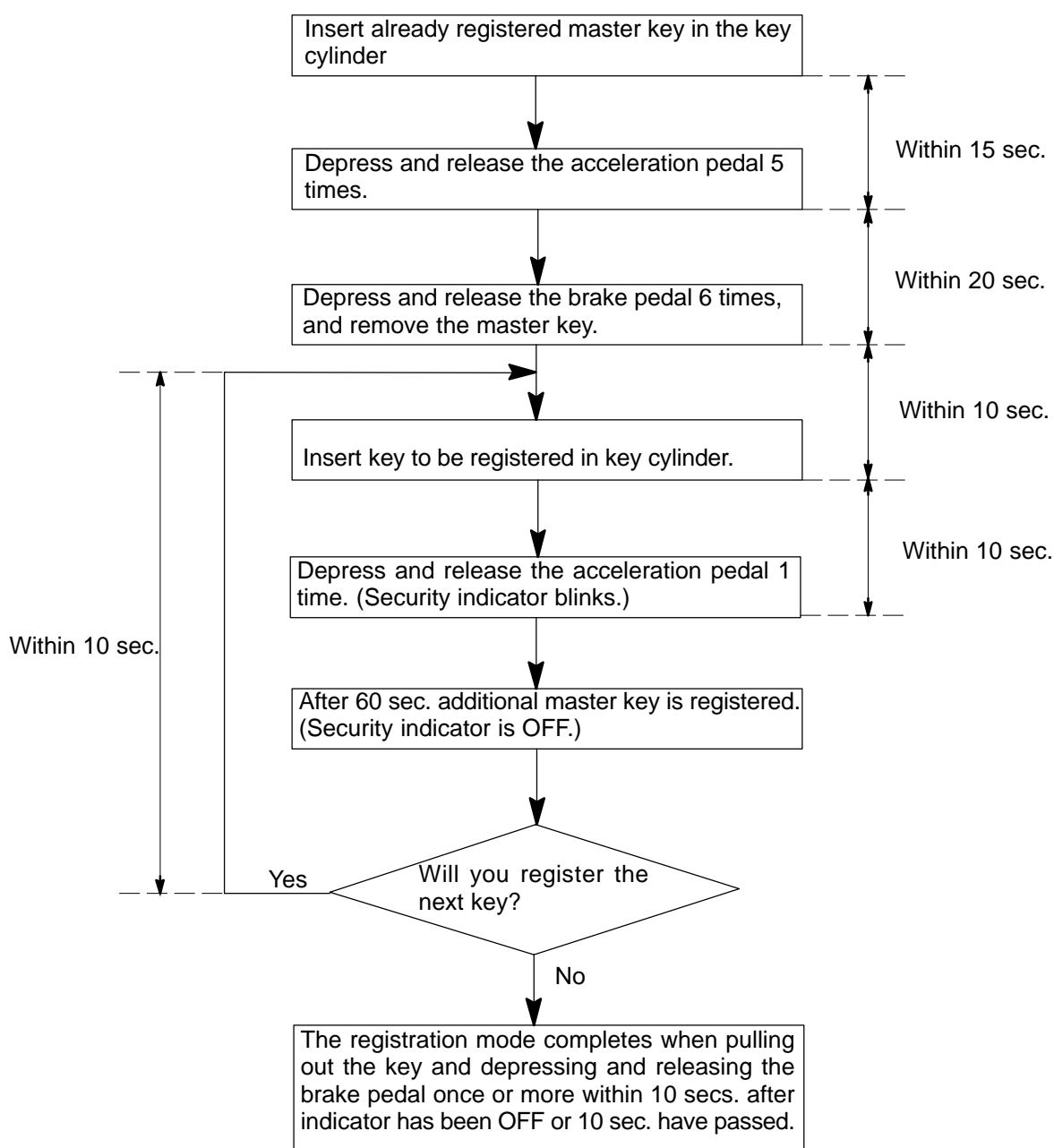
In case of replacing ignition cylinder and key set, door locks cannot be opened with new ignition keys. Therefore, to avoid any trouble caused by empty battery of transmitter of new ignition key, please bring the original key while driving.

- (d) There are 2 ways for registration of additional master key, one way is depressing brake pedal and acceleration pedal and the other way is using LEXUS hand-held tester.

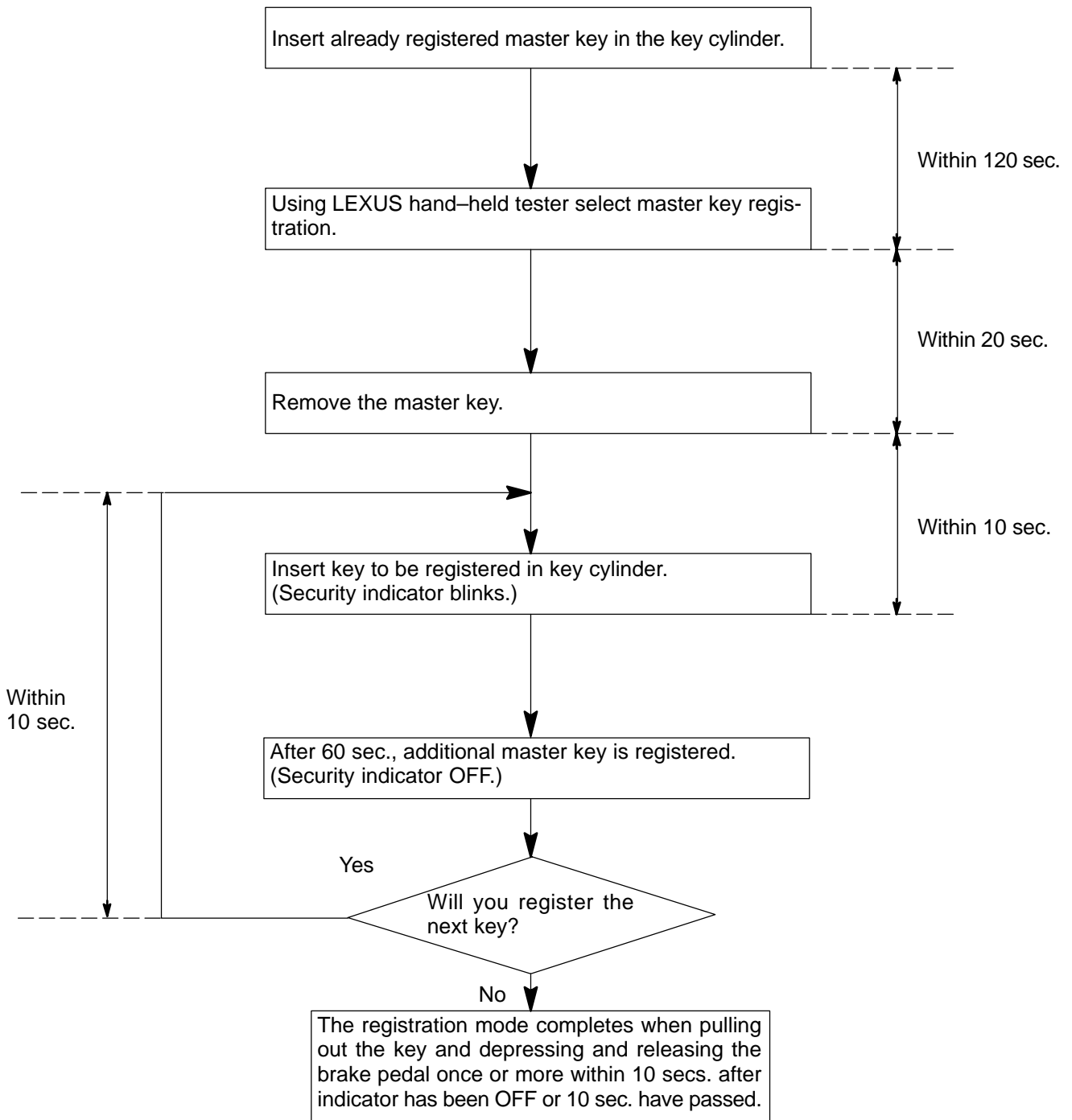
HINT:

- It is possible to register up to 7 master key codes including the already registered key code.
- When any operation time described below is over, registration mode completes.
- When the next procedure is performed while the timer is working, the timer completes counting time, then next timer starts.
- When replacing "Ignition Cylinder Key Set" or "Lock Cylinder Set" register according to the following procedure using the original master key. However, after the registration of the additional master key, as the original master key and the original sub-key are not necessary any more, erase registered of those key codes.

(1) Depressing brake pedal and acceleration pedal:



(2) Using LEXUS hand-held tester:



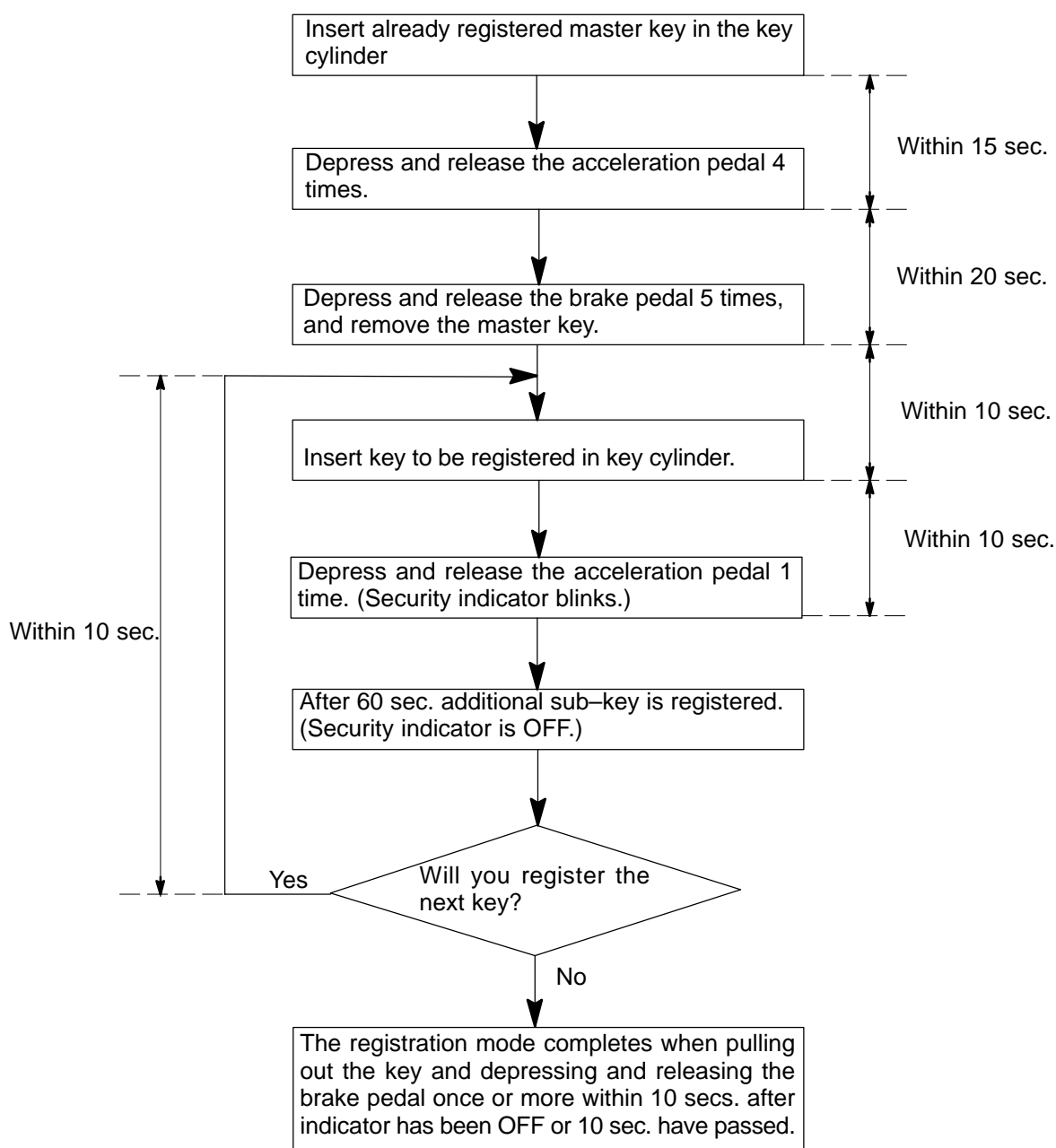
3. REGISTRATION OF ADDITIONAL SUB-KEY

There are 2 ways for registration of additional sub-key, one way is depressing brake pedal and acceleration pedal and the other way is using LEXUS hand-held tester.

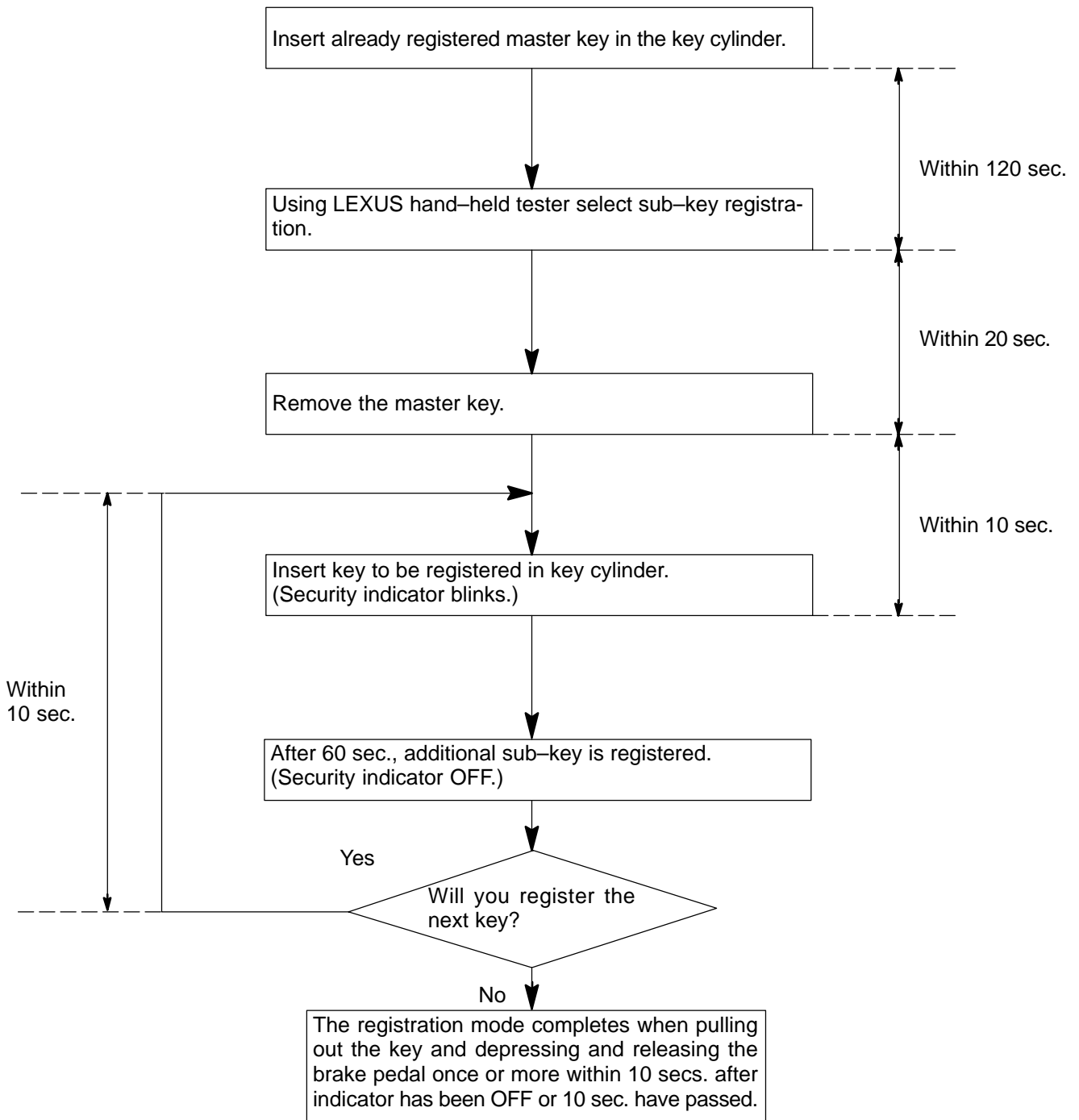
HINT:

- It is possible to register up to 3 sub-key codes including the already registered key code.
- When any operation time described below is over, registration mode completes.
- When the next procedure is performed while the timer is working, the timer completes counting time, then next timer starts.

(1) Depressing brake pedal and acceleration pedal:



(2) Using LEXUS hand-held tester:



4. ERASURE OF TRANSPONDER KEY CODE

There are 2 ways for erasure of transponder key code, one way is depressing brake pedal and acceleration pedal and the other way is using LEXUS hand-held tester.

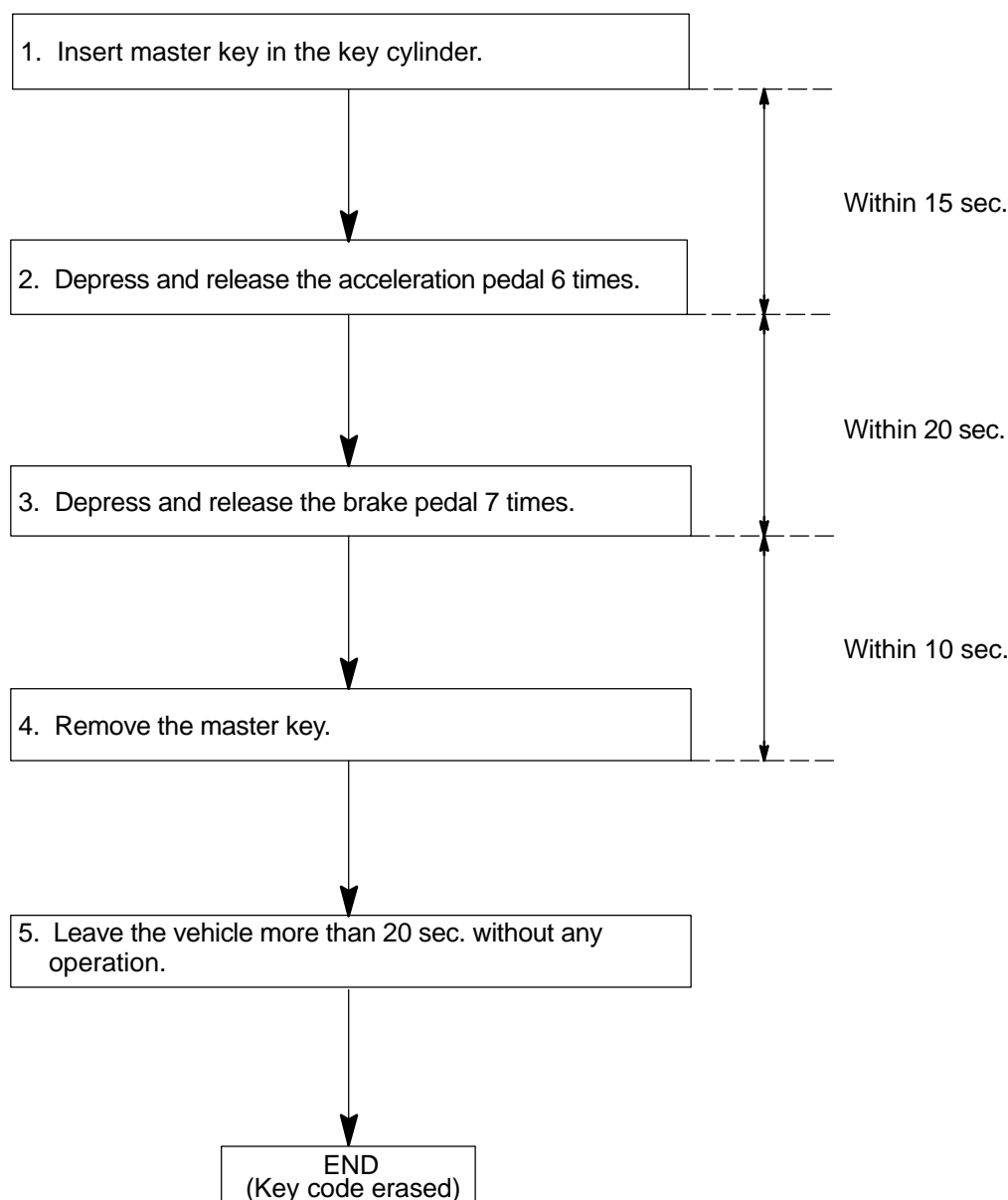
NOTICE:

Delete all other master and sub-key codes leaving the master key code to use the operation. When using the key which was used before deletion, it is necessary to register the code again.

HINT:

- When any operation time described below is over, registration mode completes.
- When the next procedure is performed while the timer is working, the timer completes counting time, then next timer starts.

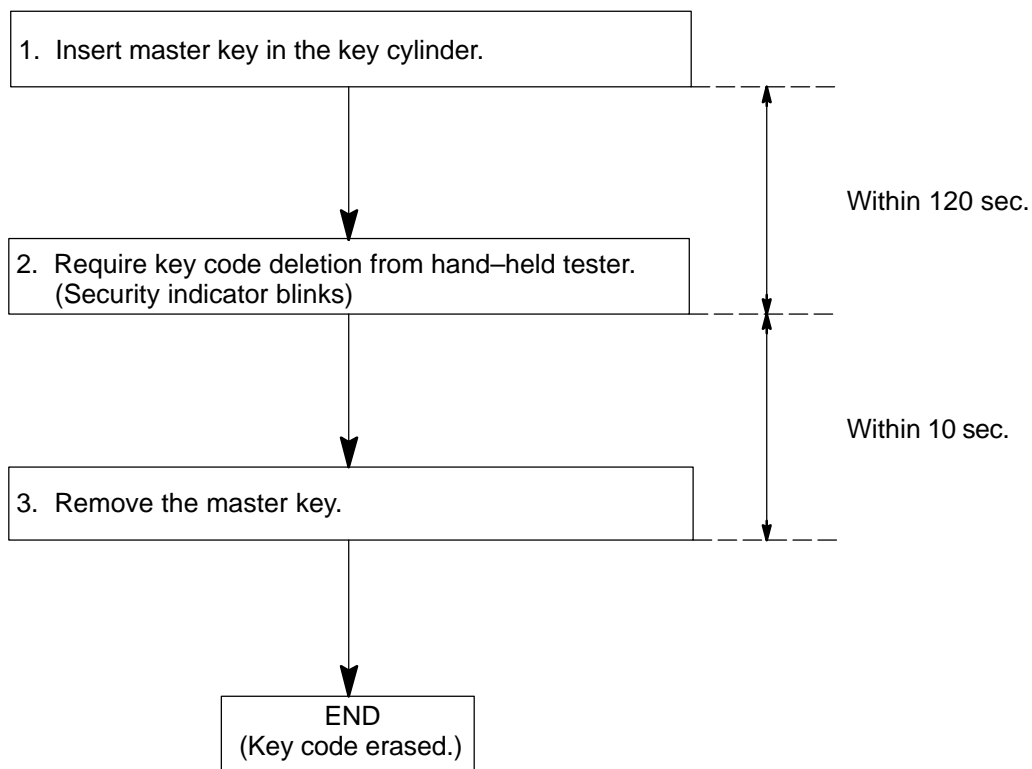
(1) Depressing brake pedal and acceleration pedal:



HINT:

If the key cannot be pulled out within 30 sec. from the first brake depression in the step 3, the key code deletion is canceled.

(2) Using LEXUS hand-held tester:

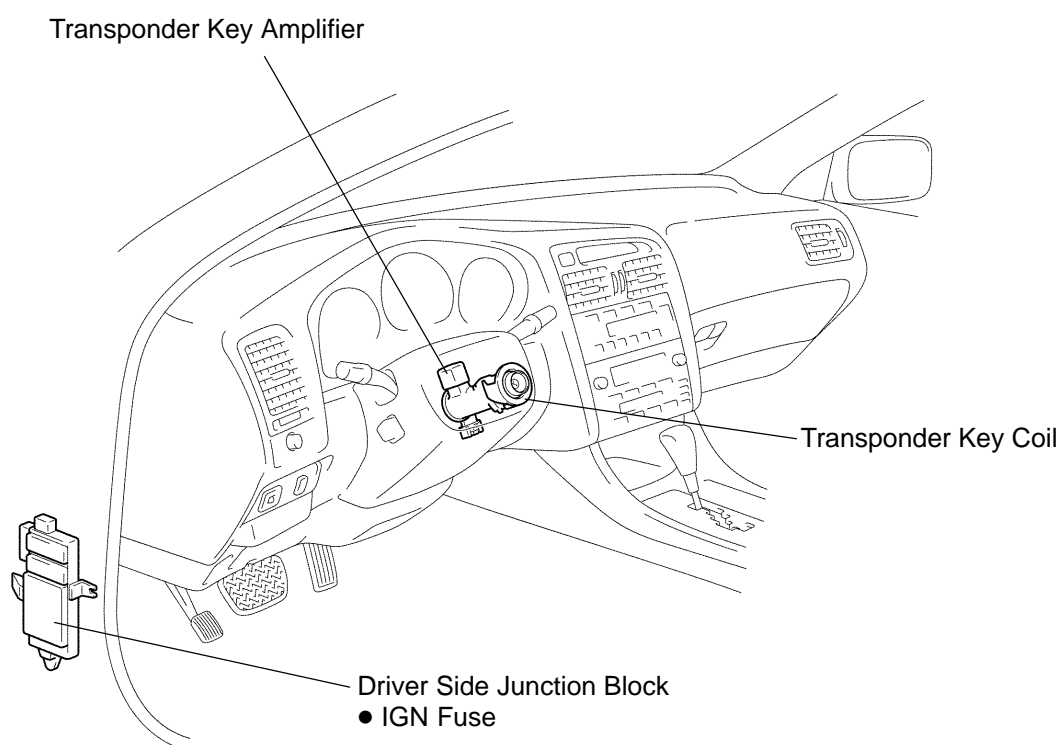
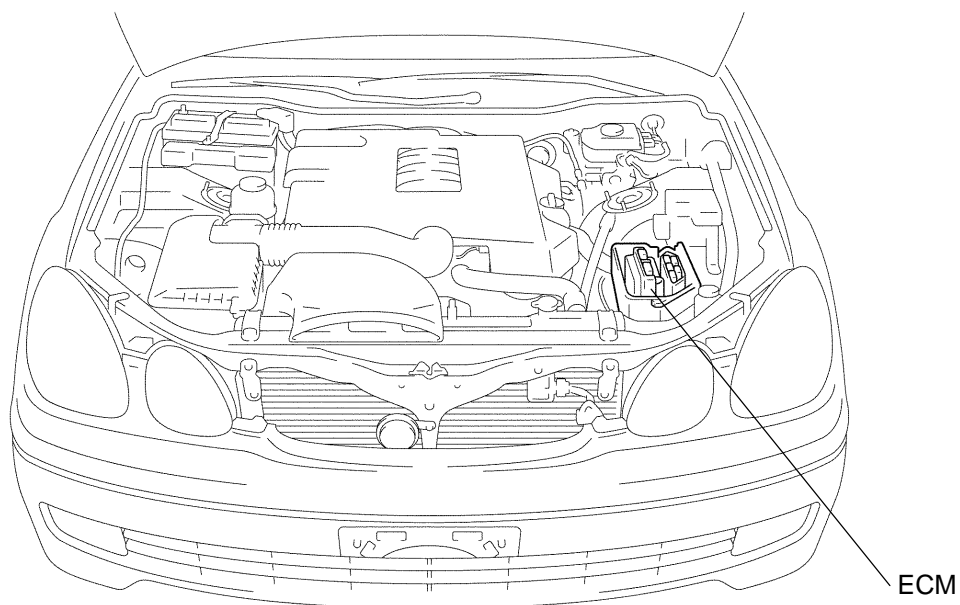


HINT:

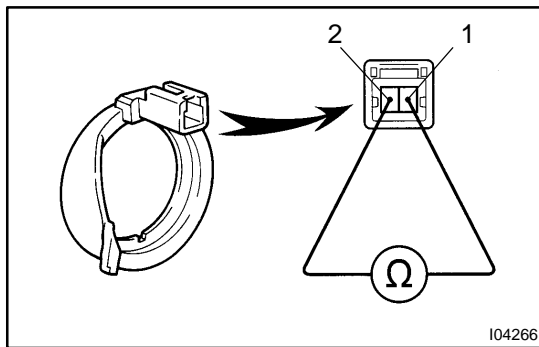
When the key cannot be pulled out in the step 3, key code deletion is canceled.
(Security indicator is OFF.)

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01376



INSPECTION

INSPECTION TRANSPONDER KEY COIL CONTINUITY

Check that continuity exists between terminals 1 and 2.

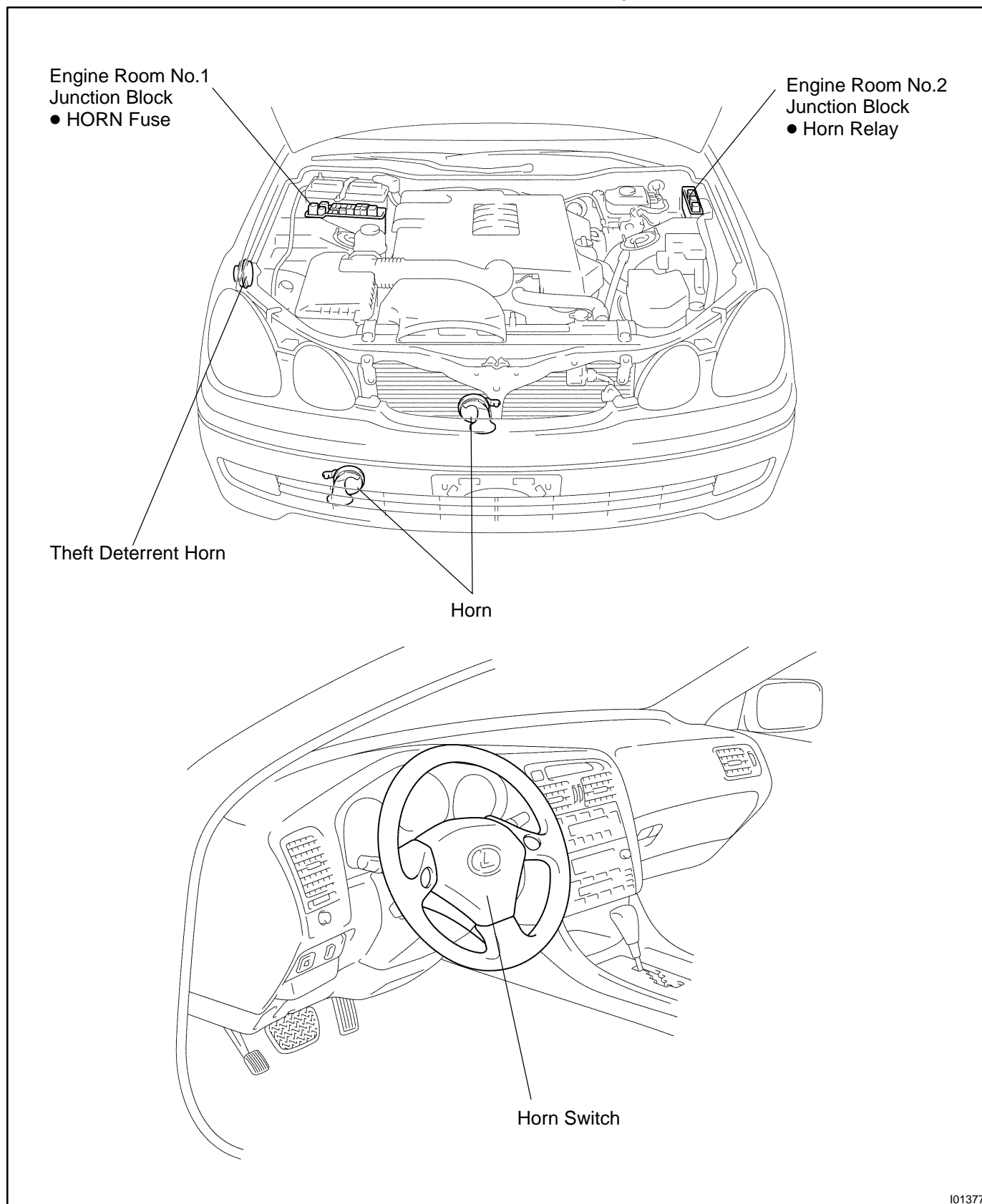
If continuity is not as specified, replace the coil.

HORN SYSTEM

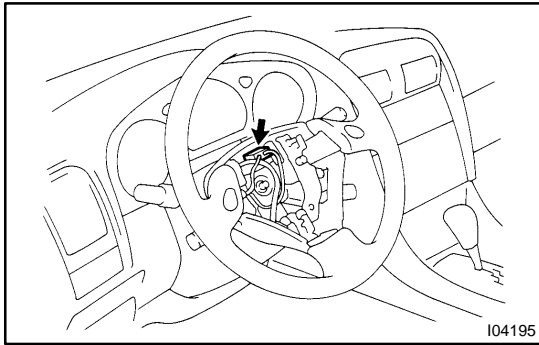
LOCATION

BE0FY-09

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01377



INSPECTION

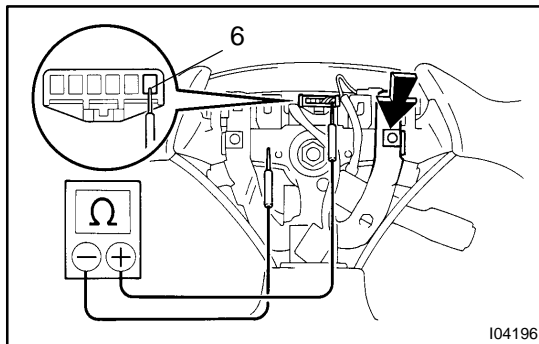
1. INSPECT HORN SWITCH

- Disconnect the negative (–) terminal from the battery.
- Remove the left and right covers from the steering wheel.
- Using a torx socket wrench, loosen the 2 bolts.
- Pull up the horn pad and place it on the steering column, as shown.

HINT:

Do not disconnect the connector from the horn pad.

- Disconnect the connector from the slip ring.



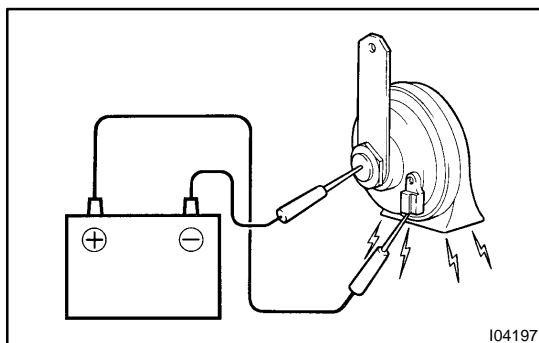
- Check that no continuity exists between terminal 6 of the connector and body ground.
- Check that continuity exists between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

- Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.

Torque: 7.1 N·m (72 kgf·cm, 62 in.-lbf)

- Install the left and right covers.
- Connect the negative (–) terminal to the battery.



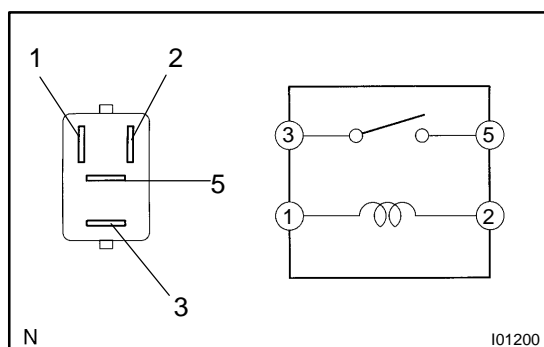
2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (–) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.

3. INSPECT HORN SWITCH CIRCUIT

(See page [DI-806](#))

**4. INSPECT HORN RELAY CONTINUITY**

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

If continuity is not as specified, replace the relay.

5. INSPECT HORN RELAY CIRCUIT
(See page [BE-21](#))

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BE19B-01

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

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

Ignition Switch:

Symptom	Suspect Area	See page
Ignition switch is not set to each position.	4. Ignition switch 5. Power source circuit	BE-31 –

Key Unlock Warning Switch:

Symptom	Suspect Area	See page
Key unlock warning system does not operate. (The buzzer does not sound when the driver's door is opened with the ignition OFF and key inserted)	1. Key Unlock Warning Switch 2. Door Courtesy Switch 3. Wire Harness	BE-31 BE-60 –
Key unlock warning system does not operate. (The buzzer sounds when the ignition key is ACC or ON)	1. Ignition Switch 2. Wire Harness	BE-31 –

HEADLIGHT AND TAILLIGHT SYSTEM:

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

HINT:

To inspect the bulb and light control ECU, replace them with the ones working normally and judge whether they work normally or not.

Symptom	Suspect Area	See page
"Automatic light control system" does not operate.	1. Automatic Light Control Sensor 2. Light Control Switch 3. Door Courtesy Switch 4. Wire Harness 5. Body No.2 ECU	BE-37 BE-37 BE-60 – DI-820
Auto turn-off system does not operate when the driver's door is opened.	1. Drivers Door Courtesy Switch	BE-60
Auto turn-off system: Headlight and taillight do not come on.	1. Body ECU No.2 2. Wire Harness	DI-820 –
Auto turn-off system: Headlight and taillight stay on.	1. Body ECU No.2 2. Wire Harness	DI-820 –

USA:

Symptom	Suspect Area	See page
Only one headlight comes on.	1. Bulb 2. *Light Control ECU 3. Wire Harness	– – –
"LO-Beam" does not light (All).	1. Headlight Control Relay 2. *Light Control ECU 3. Wire Harness	BE-37 – –
"LO-Beam" does not light (One side).	1. Bulb 2. H-LP L-LWR Fuse 3. H-LP R-LWR Fuse 4. *Light Control ECU 5. Wire Harness	– BE-21 BE-21 – –
"HI-Beam" does not light (All).	1. Headlight Dimmer Switch 2. Wire Harness	BE-37 –

"HI-Beam" does not light (One side).	1. Bulb 2. H-LP L-UPR Fuse 3. H-LP R-UPR Fuse 4. Wire Harness	– BE-21 BE-21 –
"Flash" does not light.	1. H-LP L-UPR Fuse 2. H-LP R-UPR Fuse 3. Headlight Dimmer Switch 4. *Light Control ECU 5. Wire Harness	BE-21 BE-21 BE-37 – –
"Flash" does not light.	1. Bulb 2. *Light Control ECU 3. Wire Harness	– – –
Headlight does not come on.	1. Headlight Control Relay 2. Light Control Switch 3. *Light Control ECU 4. Wire Harness	BE-37 BE-37 – –
Headlight does not come on.	1. Bulb 2. *Light Control ECU 3. Wire Harness	– – –
Headlight flickers.	1. Bulb 2. *Light Control ECU 3. Wire Harness	– – –
Headlight is dark.	1. Bulb 2. *Light control ECU 3. Wire Harness	– – –
Only one taillight comes on.	1. Bulb 2. Wire Harness	– –
Taillight does not come on. (Headlight is normal)	1. TAIL Fuse 2. GAUGE Fuse 3. Taillight Control Relay 4. Light Failure Relay 5. Light Control Switch 6. Wire Harness	BE-21 BE-21 BE-37 BE-92 BE-37 –
Taillight does not come on. (Headlight does not light)	1. Light Control Switch 2. Wire Harness	BE-37 –
Rear combination light does not come on.	1. Light Failure Relay 2. Wire Harness 3. Bulb	BE-92 – –

*: HID Type

CANADA:

Symptom	Suspect Area	See page
Only one headlight comes on.	1. Daytime Running Light No.2, 3, 4 Relay 2. Daytime Running Light Main Relay 3. Bulb 4. *Light Control ECU 5. Wire Harness	BE-37 BE-37 – – –
"LO-Beam" does not light (All).	1. Headlight Control Relay 2. *Light Control ECU 3. Wire Harness	BE-37 – –
"LO-Beam" does not light (One side).	1. Bulb 2. H-LP L-LWR Fuse 3. H-LP R-LWR Fuse 4. *Light Control ECU 5. Wire Harness	– BE-21 BE-21 – –

BODY ELECTRICAL – TROUBLESHOOTING

"HI-Beam" does not light (All).	1. Headlight Dimmer Switch 2. Daytime Running Light Main Relay 3. Wire Harness	BE-37 BE-37 —
"HI-Beam" does not light (One side).	1. Bulb 2. H-LP L-UPR Fuse 3. H-LP R-UPR Fuse 4. Daytime Running Light No.3 Relay 5. Wire Harness	— BE-21 BE-21 BE-37 —
"Flash" does not light.	1. Headlight Dimmer Switch 2. Daytime Running Light Main Relay 3. Wire Harness	BE-37 BE-37 —
Headlight does not come on.	1. Headlight Control Relay 2. Daytime Running Light Main Relay 3. Daytime Running Light No.2, 3, 4 Relay 4. Headlight Dimmer Switch 5. Light Control Switch 6. Wire Harness 7. *Light Control ECU 8. Bulb	BE-37 BE-37 BE-37 BE-37 BE-37 — — —
Headlight does not come on with light control switch in HEAD.	1. Light Control Switch 2. *Light Control ECU 3. Wire Harness	BE-37 — —
Headlight does not go out with light control switch in OFF.	1. Headlight Control Relay 2. *Light Control ECU 3. Wire Harness	BE-37 — —
Headlight flickers.	1. Bulb 2. *Light Control ECU 3. Wire Harness	— BE-37 —
Headlight is dark.	1. Bulb 2. *Light control ECU 3. Wire Harness	— — —
Taillight does not come on with light control switch in TAIL.	1. Taillight Control Relay (Instrument Panel J/B) 2. Light Control Switch 3. Wire Harness	BE-37 — —
Taillight does not go out with light control switch in OFF.	1. Taillight Control Relay 2. Light Control Switch 3. Wire Harness	BE-37 BE-37 —
Headlight does not come on with engine running and light control switch in OFF.	1. ECU-B Fuse 2. GAUGE Fuse 3. Daytime Running Light Main Relay 4. Daytime Running Light No.2, 3, 4 Relay 5. Generator L Terminal 6. Parking Brake Switch 7. Wire Harness	BE-21 BE-21 BE-37 BE-37 DI-853 BE-92 —

*: HID Type

HEADLIGHT BEAM LEVEL CONTROL SYSTEM

Symptom	Suspect Area	See page
Beam axis is not controlled. (It is not initialized.) Headlight Beam Level Control System does not operate.	1. ECU-IG Fuse 2. Headlight Beam Level Control Actuator 3. Headlight Beam Level Control ECU 4. Wire Harness Side	BE-21 BE-50 BE-50 –
Beam axis is not controlled. (It is initialized.) Headlight Beam Level Control System does not operate.	1. Height Control Sensor 2. Headlight Beam Level Control ECU 3. Wire Harness Side	BE-50 BE-50 –
Controlled angle of head light is unusual. (The angle is controlled.)	1. Height Control Sensor 2. Headlight Beam Level Control ECU 3. Headlights 4. Wire Harness Side	– BE-50 BE-3 –
Beam axis position is not stable during driving.	1. ABS System 2. Headlights 3. Wire Harness	DI-387 BE-3 –

FOG LIGHT SYSTEM

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

Symptom	Suspect Area	See page
Fog light does not light up with light control SW HEAD (Headlight is normal.)	1. FOG Fuse 2. Fog Light Relay 3. Fog Light Switch 4. Wire Harness 5. Body No.2 ECU	BE-21 BE-53 BE-53 – –
Fog light does not light up with light control SW HEAD (Headlight does not light).	1. *1 Other Parts 2. Wire Harness	– –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

*1: Inspect Headlight System

TURN SIGNAL AND HAZARD WARNING SYSTEM

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

Symptom	Suspect Area	See page
"Hazard" and "Turn" do not light up.	1. GAUGE Fuse 2. TURN HAZ Fuse 3. Ignition Switch 4. Turn Signal Flasher Relay 5. Wire Harness	BE-21 BE-21 BE-31 BE-56 –
Hazard warning light does not light up. (Turn is normal)	1. Hazard Warning Switch 2. Wire Harness	BE-56 –
Turn signal does not light up. (Hazard is normal)	1. Turn Signal Switch 2. Wire Harness	BE-56 –
Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE-56 –
Only one bulb does not light up.	1. Bulb 2. Wire Harness	– –

INTERIOR LIGHT SYSTEM

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

Symptom	Suspect Area	See page
All the lights do not come ON.	1. DOME Fuse 2. Body ECU NO.2	BE-21 –
The light does not come ON when the driver's door is opened.	1. Driver's Door Courtesy Switch 2. Wire Harness	BE-60 –
The light does not come ON when the passenger's door is opened.	1. Passenger's Door Courtesy Switch 2. Wire Harness	BE-60 –
The light does not come on when the rear-right door is opened.	1. Rear-Right Door Courtesy Switch 2. Wire Harness	BE-60 –
The light does not come on when the rear-left door is opened.	1. Rear-Left Door Courtesy Switch 2. Wire Harness	BE-60 –
Only one of the bulbs comes ON.	Bulb	–
The illumination does not fade out when all the doors are closed.	1. Courtesy Switch 2. Wire Harness	BE-60 –
The illumination does not fade out immediately when the ignition switch is turned to ACC or ON within 15 seconds after all the doors are closed.	1. Ignition Switch 2. RADIO NO.2 Fuse 3. GAUGE Fuse 4. Wire Harness	BE-31 BE-21 BE-21 –
The illumination does not fade out immediately when all the doors are locked within 15 seconds after they are closed.	1. Door Unlock Detection Switch 2. Wire Harness	BE-131 –
Interior light does not light up. (in front personal light)	1. Bulb 2. Front Personal Light 3. Wire Harness	– BE-60 –
Front personal light does not light up.	1. Bulb 2. Front Personal Light 3. Wire Harness	– BE-60 –
Rear personal light does not light up.	1. Bulb 2. Rear Personal Light 3. Wire Harness	– BE-60 –
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	– BE-60 –
Luggage compartment light does not light up.	1. Bulb 2. Luggage Compartment Door Courtesy Switch 3. Wire Harness	– BE-60 –
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	– BE-60 –

BACK-UP LIGHT SYSTEM

Symptom	Suspect Area	See page
Back-Up Light does not light up.	1. GAUGE Fuse 2. Ignition Switch 3. Wire Harness 4. Bulb	BE-21 BE-31 – –
Back-Up Light remains always on.	1. Park/ Neutral Position Switch 2. Wire Harness	DI-372 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse 2. Stop Light Switch 3. Light Failure Relay 4. Wire Harness	BE-21 BE-70 BE-92 –
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	BE-70 –
Only one light always lights up.	Wire Harness	–
Only one light does not light up.	1. Bulb 2. Wire Harness	– –

HEADLIGHT CLEANER SYSTEM

Symptom	Suspect Area	See page
"Headlight Cleaner System" does not operate (All)	1. H-LP CLN Fuse 2. WASHER Fuse 3. Ignition Switch 4. Headlight Cleaner Switch 5. Headlight Cleaner Relay 6. Headlight Cleaner Motor 7. Headlight Cleaner Nozzle and Hose 8. Wire Harness	BE-21 BE-21 BE-31 BE-73 BE-73 – – –
Washer fluid does not spray.	Headlight Cleaner Nozzle and Hose	–

WIPER AND WASHER SYSTEM

Symptom	Suspect Area	See page
Wipers and washer do not operate.	1. WIP Fuse 2. Wiper Switch 3. Wiper Motor 4. Wire Harness	BE-21 BE-77 BE-77 –
Wipers do not operate in LO, HI or MIST.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE-77 BE-77 –
Wipers do not operate in INT.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE-77 BE-77 –
Washer motor does not operate.	1. WASHER Fuse 2. Washer Switch 3. Washer Motor 4. Wire Harness	BE-21 BE-77 BE-77 –
Wipers do not operate when washer switch ON.	1. WASHER Fuse 2. Washer Switch 3. Wiper Motor 4. Wire Harness	BE-21 BE-77 BE-77 –

BODY ELECTRICAL – TROUBLESHOOTING

Washer fluid does not operate.	Washer Hose and Nozzle	–
<ul style="list-style-type: none"> When wiper switch is in HI position, the wiper blade is in contact with the body. When the wiper switch is OFF, the wiper blade does not retract or the retract position is wrong. 	1. Wiper Motor *1 2. Wire harness *1	BE-77 –

*1: Inspect wiper arm and blade set positions.

COMBINATION METER

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

Symptom	Suspect Area	See page
Driver seat belt warning light does not light up.	1. Bulb 2. Driver Buckle Switch Circuit 3. Meter Circuit Plate 4. Wire Harness 5. Body No.2 ECU	– BE-92 BE-92 – DI-820
Passenger seat belt warning light does not light up.	1. Clock System 2. Passenger Buckle Switch Circuit 3. Occupant Detection Sensor 4. Meter Circuit Plate 5. Wire Harness 6. Body No.1 ECU	BE-227 BE-92 BE-92 BE-92 – DI-776
SRS warning light does not light up.	1. MPX-B Fuse 2. SRS-B Fuse 3. Bulb 4. Meter Circuit Plate 5. Wire Harness 6. Airbag Sensor Assembly	BE-21 BE-21 – BE-92 – DI-550
Hi-beam indicator light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Headlight System	– BE-92 – BE-3
Turn indicator light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Turn Signal and Hazard Warning System	– BE-92 – BE-3
ABS warning light does not light up.	1. GAUGE Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. ABS, TRAC and VSC ECU	BE-21 – BE-92 – DI-387
TRAC warning light does not light up.	1. GAUGE Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. ABS, TRAC and VSC ECU	BE-21 – BE-92 – DI-473

Malfunction indicator light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. ECM (2JZ-GE) 5. ECM (1UZ-FE)	– BE-92 – DI-1 DI-156
Fuel level warning light does not light up.	1. Bulb 2. Fuel level warning sensor 3. Meter Circuit Plate 4. Wire Harness	– – BE-92 –

ELECTRIC TENSION REDUCER SYSTEM

Symptom	Suspect Area	See page
Tension Reducer does not operate. (Driver's and Passenger's)	1. ECU-IG Fuse 2. Wire Harness	BE-21 –
Tension Reducer does not operate. (Only one side)	1. Buckle Switch 2. Tension Reducer Solenoid 3. Wire Harness	BE-92 BE-92 –

DEFOGGER SYSTEM

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

Symptom	Suspect Area	See page
Rear window defogger does not operate.	1. HTR Fuse 2. DEF M-Fuse 3. Defogger Relay Circuit 4. Defogger Switch (in A/C Panel Switch) 5. Defogger Wire 6. Wire Harness 7. Body No.1 ECU	BE-21 BE-21 DI-812 BE-108 BE-108 – DI-776
Mirror defogger does not operate.	1. MIR-HTR Fuse (Passenger Side J/B) 2. Mirror Heater Relay 3. Mirror Heater 4. Wire Harness	BE-21 BE-108 BE-108 –

POWER WINDOW CONTROL SYSTEM

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

Symptom	Suspect Area	See page
All the power windows do not operate. (Power Door Lock System is normal.)	1. PWS terminal circuit 2. Power Window Master Switch 3. Wire Harness 4. Driver Door ECU 5. Body No.1 ECU	DI-818 BE-117 – DI-856 DI-776
Only the driver's window does not operate.	1. Power Window Master Switch 2. Power Window Switch 3. Power Window Motor 4. Wire Harness	BE-117 BE-117 BE-117 –
"Window lock function" does not operate.	1. Power Window Master Switch	BE-117
Window does not operate with power window master switch. (Manual or Automatic operation can be performed.)	TROUBLESHOOTING NO.1	BE-111
Remote control of all windows (Except driver's) does not functions with master switch. (Windows operate normally with each of master switch.)	TROUBLESHOOTING NO.2	BE-111

The Key related power window operations does not operate with driver side door key cylinder. (Master switch operation is normal.)	TROUBLESHOOTING NO.3	BE-111
Power window does not operate with multi-function transmitter. (Windows operate normally with master switch.)	TROUBLESHOOTING NO.4	BE-111
Window moves down without being ordered during the up operation.	TROUBLESHOOTING NO.5	BE-111

POWER DOOR LOCK CONTROL SYSTEM

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

Symptom	Suspect Area	See page
All the doors cannot be locked or unlocked. (Power Window Control System is normal.)	1. Door Lock Control Switch 2. Wire Harness 3. Body No.1 ECU	BE-131 – DI-776
Only one side door lock control does not operate.	1. Door Lock Motor 2. Wire Harness 3. Each Door ECU	BE-131 – –
Door key related function does not operate.	1. Door Key Lock and Unlock Switch 2. Wire Harness 3. Each Door ECU 4. Body No.1 ECU	BE-131 – – DI-776
Key confinement prevention function does not operate.	1. Key Unlock Warning Switch 2. Door Courtesy Switch 3. Wire Harness 4. Each Door ECU	BE-31 BE-60 – –
Luggage compartment door opener function does not operate.	1. Luggage Compartment Door Opener Switch 2. Luggage Compartment Door Opener Motor 3. Wire Harness 4. Body No.1 ECU	BE-131 BE-131 – DI-776

THEFT DETERRENT SYSTEM

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

Symptom	Suspect Area	See page
The system cannot be set.	1. Indicator Light 2. Key Unlock Warning Switch 3. Door Unlock Detection Switch 4. Engine Hood Courtesy Switch 5. Luggage Compartment Door Courtesy Switch 6. Wire Harness 7. Each Door ECU 8. Body No.1 ECU	BE-150 BE-31 BE-131 BE-150 BE-60 – – DI-776
The system cannot be canceled when the ignition switch is turned to ON with key.	1. Key Unlock Warning Switch 2. Ignition Switch 3. RAD NO.2 Fuse 4. Wire Harness 5. Body No.1 ECU	BE-31 BE-31 BE-21 – DI-776
The system cannot be canceled when the luggage compartment door is unlocked with key.	1. Luggage Compartment Door Courtesy Switch 2. Wire Harness 3. Body No.1 ECU	BE-60 – DI-776
The system does not operate when the engine hood is opened.	1. Engine Hood Courtesy Switch 2. Wire Harness 3. Body No.1 ECU	BE-150 – DI-776

The system does not operate when the ignition switch is turned to ACC without using a key or transmitter.	1. Ignition Switch 2. Key Unlock Warning Switch 3. Transmitter 4. Wire Harness 5. Body No.1 ECU	BE-31 BE-31 BE-157 – DI-776
Some of the system does not operate. (Headlight does not light up.)	1. Headlight System 2. Wire Harness 3. Body No.2 ECU 4. Body No.1 ECU	BE-3 – DI-820 DI-776
Some of the system does not operate. (Taillight does not light up.)	1. Taillight System 2. Wire Harness 3. Body No.2 ECU 4. Body No.1 ECU	BE-3 – DI-820 DI-776
Some of the system does not operate. (Theft Deterrent Horn or Horn does not sound.)	1. HORN Fuse 2. Theft Deterrent Horn 3. Horn 4. Horn Relay 5. Wire Harness 6. Body No.1 ECU	BE-21 BE-150 BE-250 BE-250 – DI-776
While the warning is given, the system cannot be canceled by unlocking the door with key or transmitter.	1. Door Key Lock and Unlock Switch 2. Wire Harness 3. Body No.1 ECU	BE-131 – DI-776
While the warning is given, the system cannot be canceled by turning the ignition switch to ACC or ON with key.	1. Ignition Switch 2. Key Unlock Warning Switch 3. RAD NO.2 Fuse 4. ECU-IG Fuse 5. Wire Harness 6. Body No.2 ECU 7. Body No.1 ECU	BE-31 BE-31 BE-21 BE-21 – DI-820 DI-776
The system operates for more than 60 seconds.	Body No.1 ECU	DI-776

WIRELESS DOOR LOCK CONTROL SYSTEM

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

HINT:

- Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system is operating normally.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check and replace the Wireless Door Lock Control Receiver as the last step.

Symptom	Suspect Area	See page
All functions of wireless door lock control system do not operate.	1. Transmitter 2. Wireless Door Lock Control Receiver 3. Wire Harness 4. Body No.1 ECU	BE-157 BE-157 – DI-776
Wireless door lock operates, but the buzzer does not sound. (The buzzer does not sound when the customize function prohibits.)	1. Wireless Door Lock Buzzer 2. Wireless Door Lock Control Receiver 3. Wire Harness	BE-157 BE-157 –

POWER SEAT CONTROL SYSTEM

Symptom	Suspect Area	See page
Both Driver and Passenger Power seats do not operate. (Door lock does not operate.)	1. ALT M-Fuse 2. Wire Harness	BE-21 –
Driver's seat does not operate.	1. P/SEAT (D) Fuse 2. Power Seat Switch (D) 3. Wire Harness	BE-21 BE-167 –
Passenger's seat does not operate.	1. P/SEAT (P) Fuse 2. Power Seat Switch (P) 3. Wire Harness	BE-21 BE-167 –
"Slide operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Slide Motor (D, P)	BE-167 – BE-167
"Front Vertical Operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Front Vertical Motor (D, P)	BE-167 – BE-167
"Lifter Operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Lifter Motor (D, P)	BE-167 – BE-167
"Reclining Operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Reclining Motor (D, P)	BE-167 – BE-167
"Lumbar Support Operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Lumbar Support Motor (D, P)	BE-167 – BE-167

(D): Driver's Seat

(P): Passenger's Seat

POWER MIRROR CONTROL SYSTEM

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

w/ Driving Position Memory System:

Symptom	Suspect Area	See page
Both right and left mirrors do not operate.	1. Mirror Switch 2. Wire Harness 3. Body No.2 ECU	BE-176 – DI-820
Only one side of mirror does not operate.	1. Mirror Motor 2. Wire Harness 3. Driver and Passenger Door ECU	BE-176 – DI-856 DI-889
The mirror does not return to the memorized position.	1. Mirror Position Sensor (Position is not set) 2. Wire Harness 3. Power Seat Control ECU	BE-176 – DI-683
The memorized position is moved.	1. Mirror Position Sensor (Position is not set) 2. Wire Harness	BE-176 –

w/o Driving Position Memory System:

Symptom	Suspect Area	See page
Mirror does not operate.	1. Mirror Switch 2. Wire Harness 3. Body No.2 ECU 4. Driver and Passenger Door ECU	BE-176 – DI-820 DI-856 DI-889
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness 4. Body No.2 ECU 5. Driver and Passenger Door ECU	BE-176 BE-176 – DI-820 DI-856 DI-889

ELECTRO CHROMIC MIRROR SYSTEM

Symptom	Suspect Area	See page
Electro Chromic Inner Mirror does not operate.	1. ECU-IG Fuse 2. Electro Chromic Inner Mirror 3. Wire Harness	BE-21 BE-182 –
Electro Chromic Outer Mirror does not operate.	1. ECU-IG Fuse 2. Electro Chromic Outer Mirror 3. Electro Chromic Inner Mirror 4. Wire Harness	BE-21 BE-182 BE-182 –

SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Seat heaters do not operate. (Driver's and Passenger's)	1. SEAT HTR Fuse 2. Seat Heater Switch (D, P) 3. Wire Harness 4. Seat Heater	BE-21 BE-185 – BE-185
Driver's seat heater does not operate.	1. Seat Heater Switch (D, P) 2. Wire Harness	BE-185 –
Passenger's seat heater does not operate.	1. Seat Heater Switch (D, P) 2. Wire Harness	BE-185 –
Seat heater temperature is too hot.	Seat Heater	BE-185

FUEL LID OPENER SYSTEM

Symptom	Suspect Area	See page
Fuel lid opener system does not operate.	1. FUEL OPN Fuse 2. Fuel Lid Opener Switch 3. Fuel Lid Opener Motor 4. Wire Harness	BE-21 BE-188 BE-188 –

AUDIO SYSTEM

Symptom	Suspect Area	See page
Audio system abnormal operation.	TROUBLESHOOTINGS	BE-196

CLOCK SYSTEM

Symptom	Suspect Area	See page
Passenger seat belt warning system does not light up.	TROUBLESHOOTING NO.1	BE-227
Clock will not operate.	TROUBLESHOOTING NO.1	BE-227
Clock loses or gains time.	TROUBLESHOOTING NO.2	BE-227

GARAGE DOOR OPENER SYSTEM

Symptom	Suspect Area	See page
The equipment of which code has been registered does not operate.	1. Garage Door Opener Switch 2. Wire Harness 3. *	BE-235 – –
LED does not light up. (Even though either switch is pressed.)	1. Garage Door Opener Switch 2. Wire Harness	BE-235 –
LED does not light up. (Only one switch is pressed.)	Garage Door Opener Switch	BE-235

* As the GARAGE DOOR OPENER on the vehicle side seems to be normal, check the OPENER on the equipment side, of which code has been registered.

ENGINE IMMOBILIZER SYSTEM

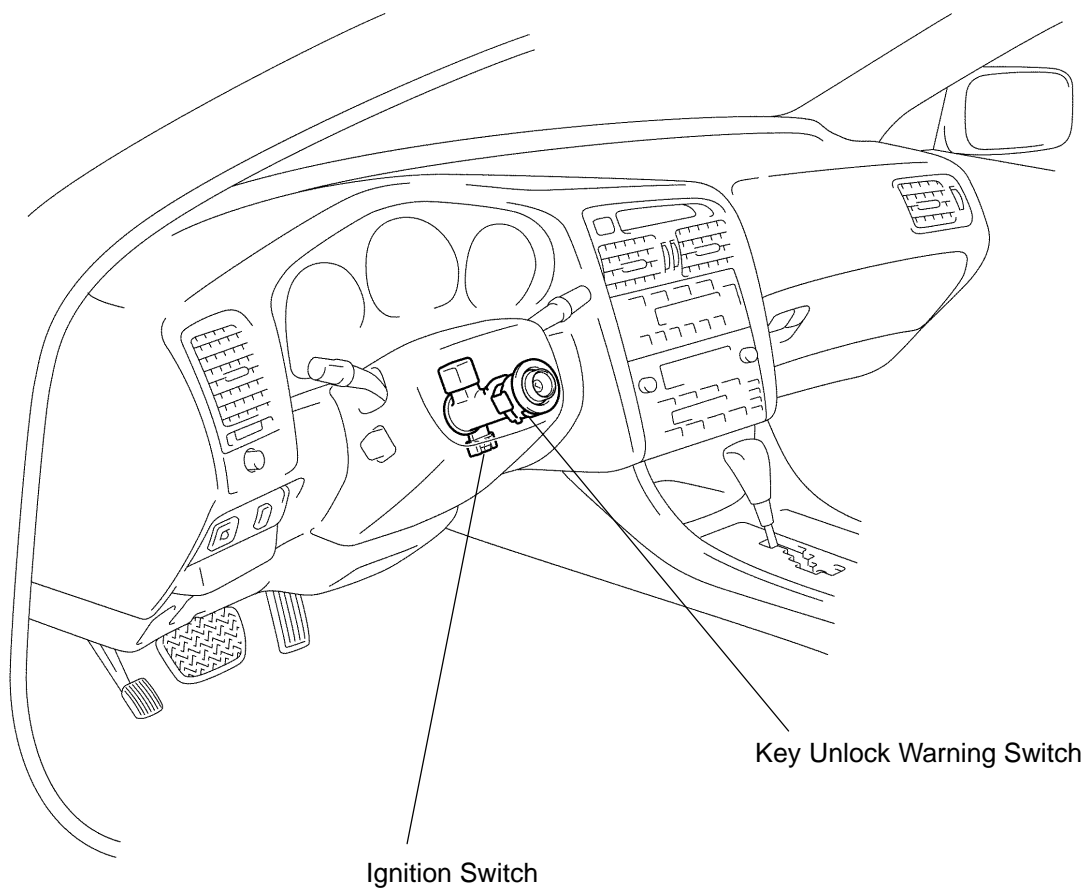
Symptom	Suspect Area	See page
Engine immobilizer system does not operate.	See DIAGNOSIS SYSTEM	DI-726

HORN SYSTEM

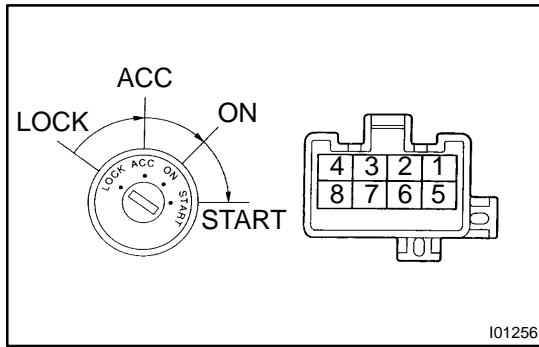
Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse 2. Horn Relay 3. Horn Switch 4. Horn 5. Wire Harness	BE-21 BE-250 BE-250 BE-250 –
Horns blow all the time.	1. Horn Relay 2. Horn Switch 3. Wire Harness	BE-250 BE-250 –
One horn operates but the other horn does not operate.	1. Horn 2. Wire Harness	BE-250 –
Horns operate abnormally.	1. Horn Relay 2. Horn 3. Wire Harness	BE-250 BE-250 –

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH LOCATION

BE01L-11



I01349

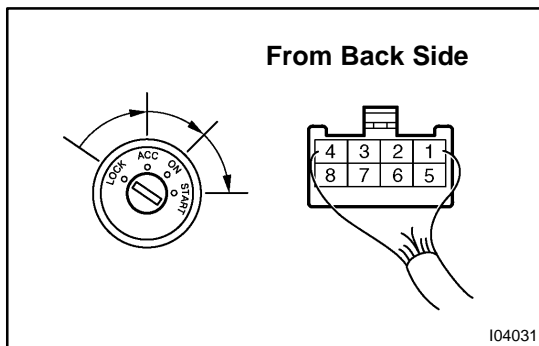


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
ACC	2 – 3	Continuity
ON	2 – 3 – 4 6 – 7	Continuity
START	1 – 2 – 4 6 – 7 – 8	Continuity

If continuity is not as specified, replace the switch.

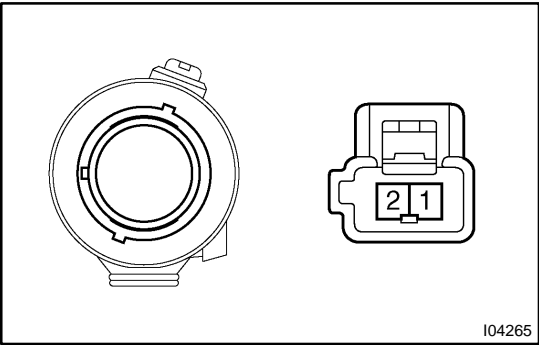


2. INSPECT IGNITION SWITCH CIRCUIT

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

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

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

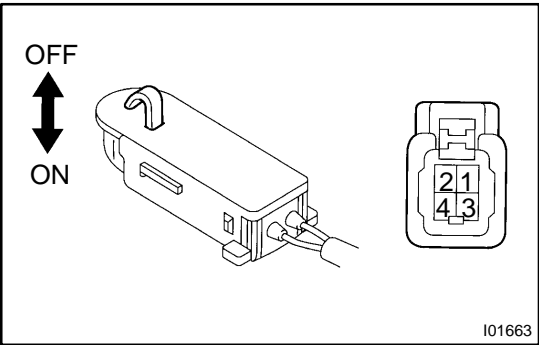


3. INSPECT IGNITION KEY ILLUMINATION OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the indicator light lights up.

If operation is not as specified, replace the switch.

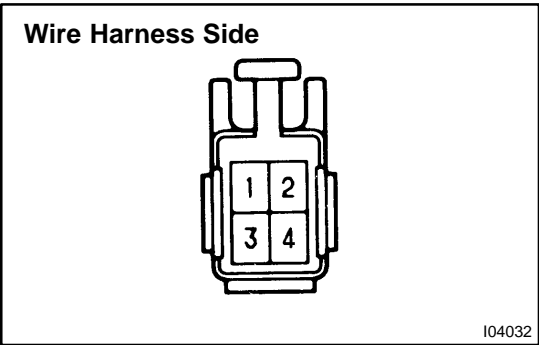
4. INSPECT IGNITION KEY ILLUMINATION CIRCUIT
(See page [DI-843](#))



5. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Key removed)	–	No continuity
ON (Key set)	1 – 2	Continuity

If continuity is not as specified, replace the switch.



6. INSPECT KEY UNLOCK WARNING SWITCH CIRCUIT
(See page [DI-828](#))

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

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity

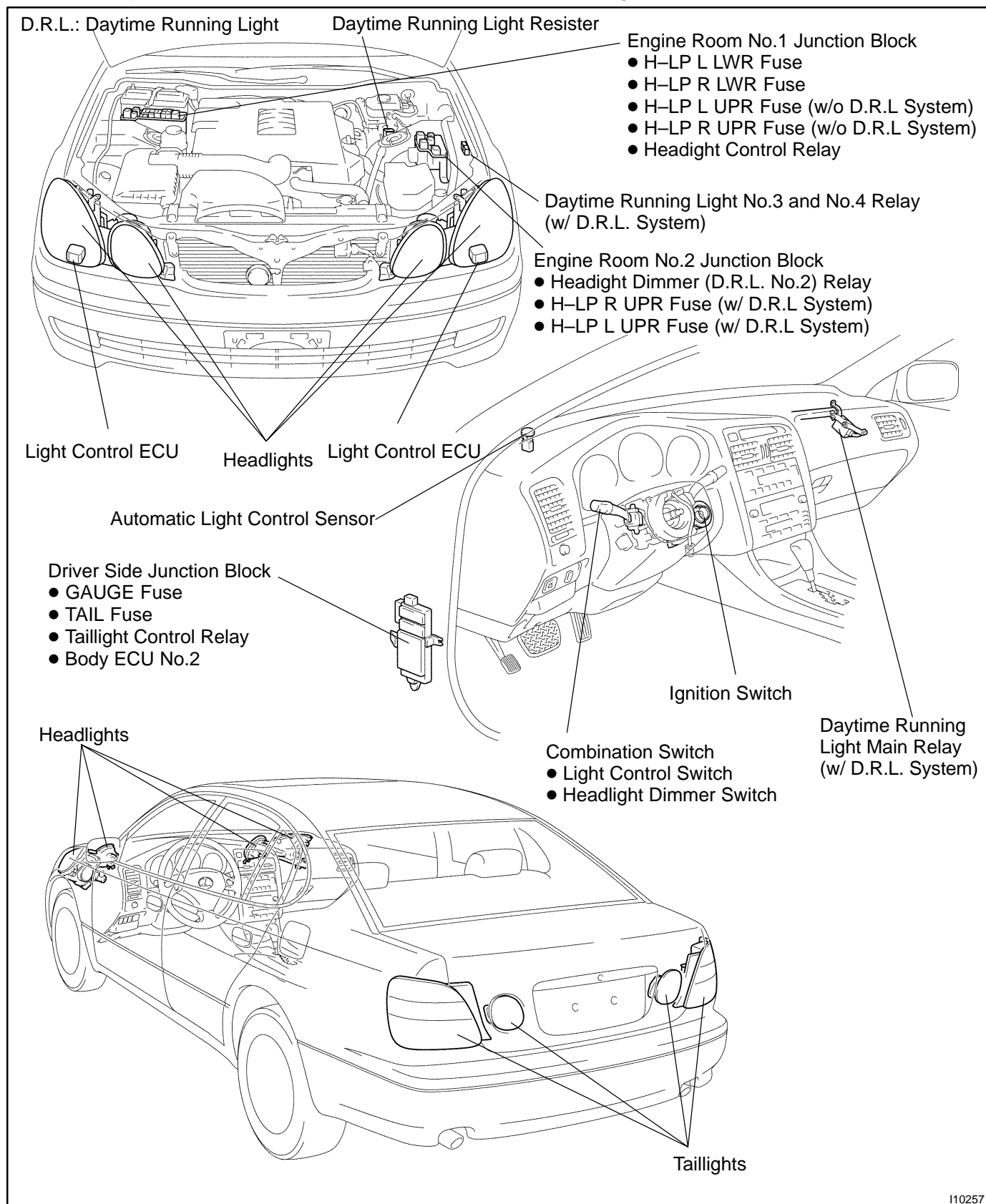
If circuit is not as specified, inspect the circuits connected to other parts.

HEADLIGHT AND TAILLIGHT SYSTEM

BE0H8-04

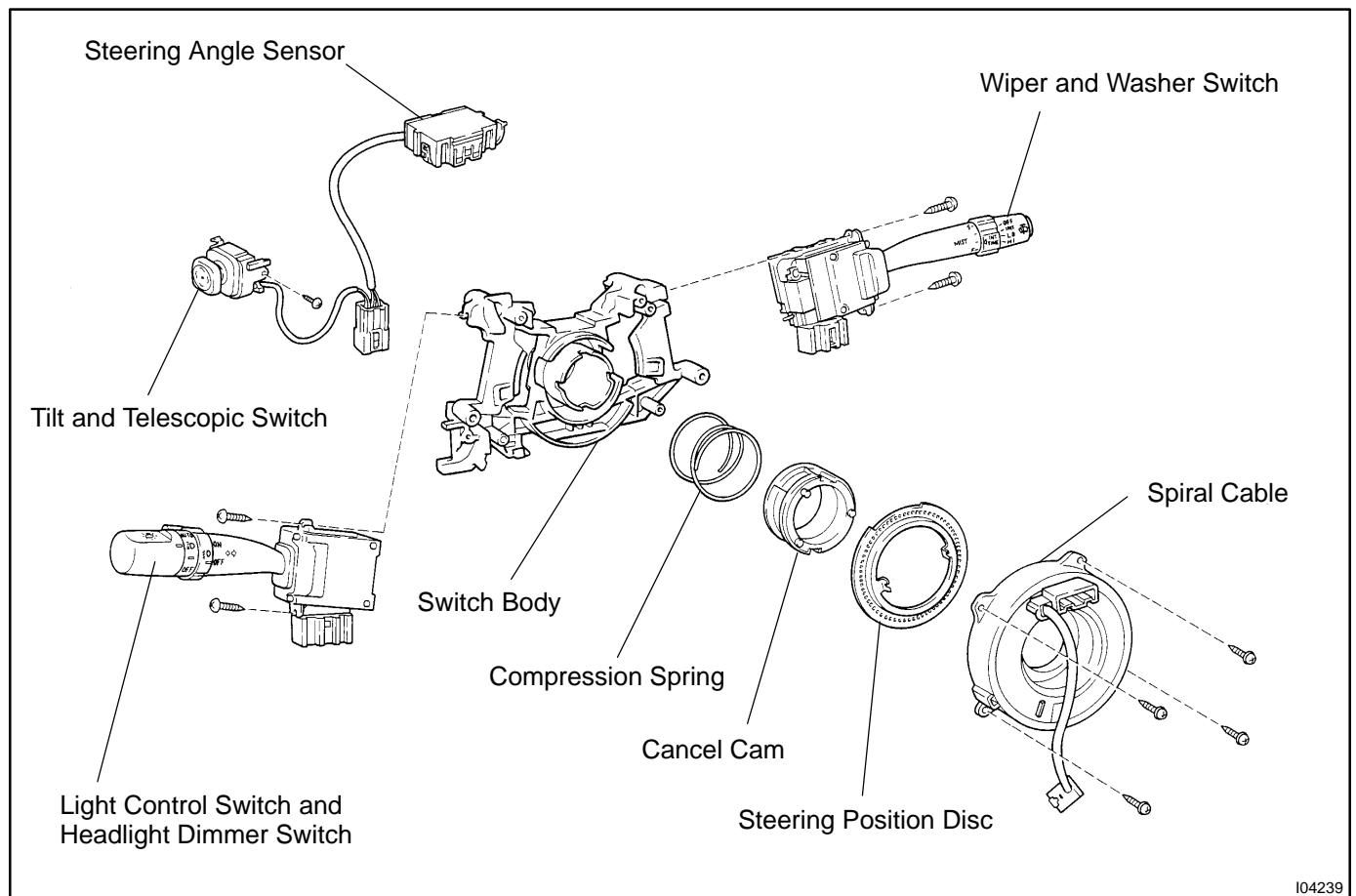
LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".

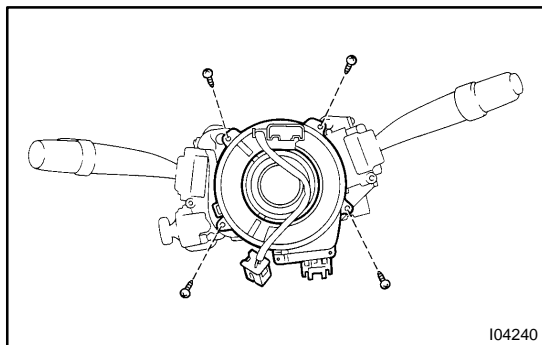


I10257

COMPONENTS



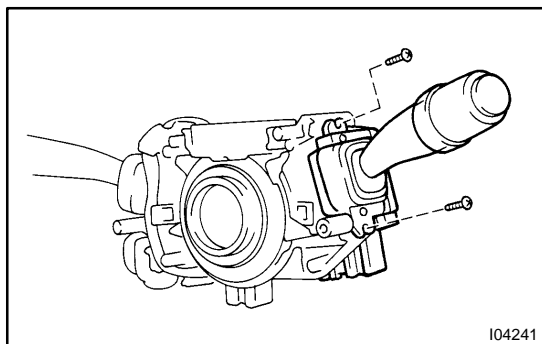
104239



REMOVAL

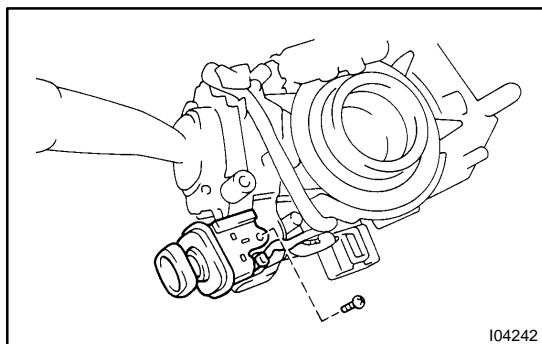
1. REMOVE SPIRAL CABLE

Remove the 4 screws and the spiral cable.



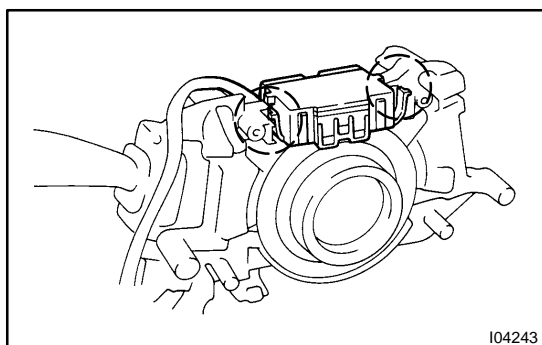
2. REMOVE WIPER AND WASHER SWITCH

Remove the 2 screws and the wiper and washer switch.



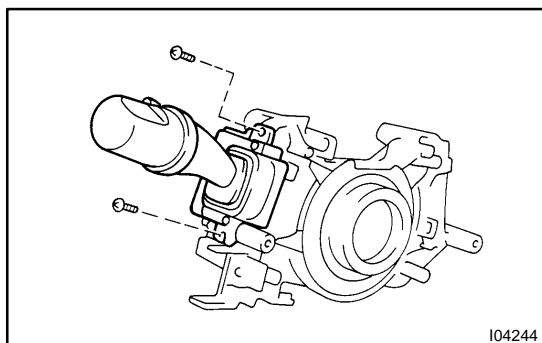
3. REMOVE TILT AND TELESCOPIC SWITCH

Remove a screw and the tilt and telescopic switch.



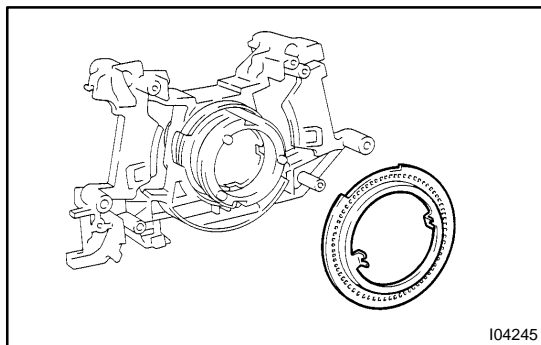
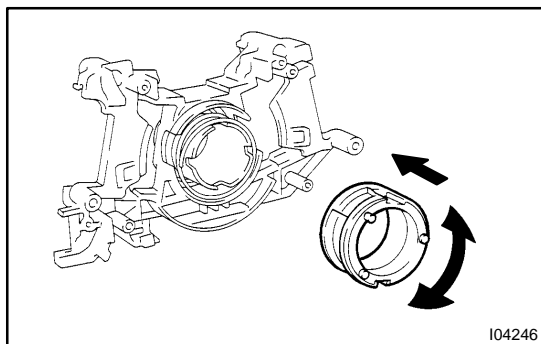
4. REMOVE STEERING ANGLE SENSOR

Disengage the 2 claws and the steering angle sensor.

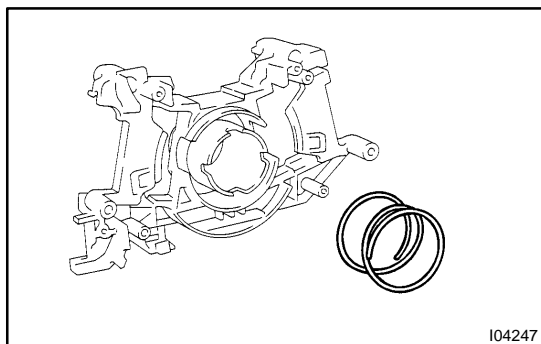


5. REMOVE LIGHT CONTROL SWITCH

Remove the 2 screws and the light control switch.

**6. REMOVE STEERING POSITION DISC****7. REMOVE CANCEL CAM**

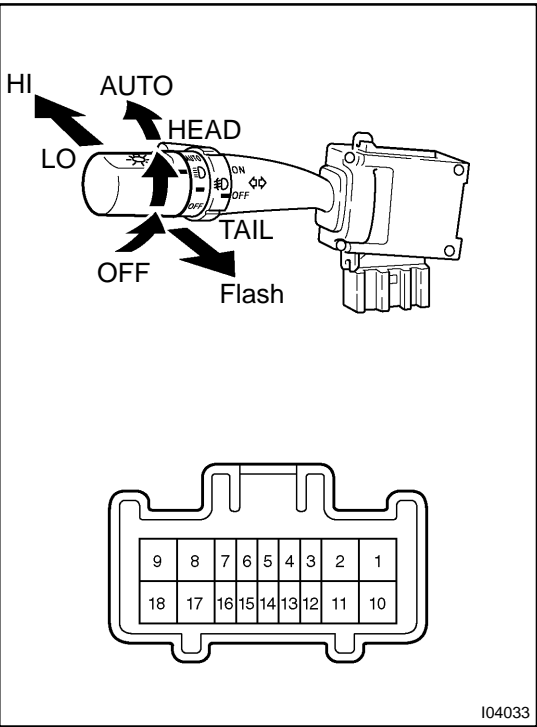
Turn the cancel cam with pressing it and pull it out.

**8. REMOVE COMPRESSION SPRING**

INSPECTION

1. FAIL-SAFE FUNCTION (Light Control ECU)

When input error is inspected.	When input voltage is not within the range of operation voltage (9 to 16 V), lighting of the headlight stops. As soon as the voltage comes within the range, it lights up again. However if the input voltage becomes low after lighting up, sufficient voltage is maintained until light of bulb completely goes off.
When output error is inspected (Open or short). When light flushing is inspected.	When an error occurs in the output voltage (open or short) or flushing symptom occurs on the bulb, lighting of the headlight stops, the condition is maintained until power is turned ON again (headlight dimmer switch OFF → ON). In this case, it can not be judged whether lighting malfunction is caused by an output error or other reasons (fuse blown out, etc.). Check that there is no error in fuse and wiring (including power source) and replace the bulb in the first place, when the error still appears, replace the light control ECU.



2. INSPECT LIGHT CONTROL SWITCH CONTINUITY

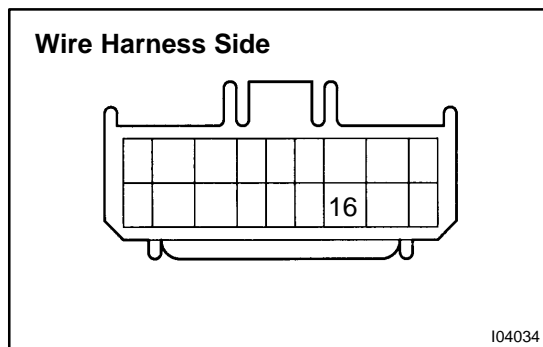
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	15 – 16	Continuity
HEAD	14 – 15 – 16	Continuity
AUTO	13 – 16	Continuity

If continuity is not as specified, replace the switch.

3. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	17 – 18	Continuity
High beam	8 – 17	Continuity
Flash	8 – 9 – 17	Continuity

If continuity is not as specified, replace the switch.



4. INSPECT LIGHT CONTROL SWITCH CIRCUIT

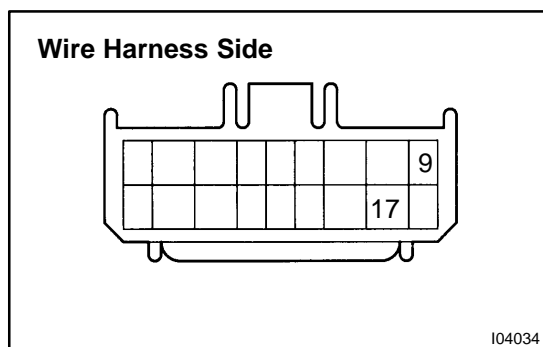
Connector disconnected:

(See page DI-832)

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

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity

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



5. INSPECT HEADLIGHT DIMMER SWITCH CIRCUIT

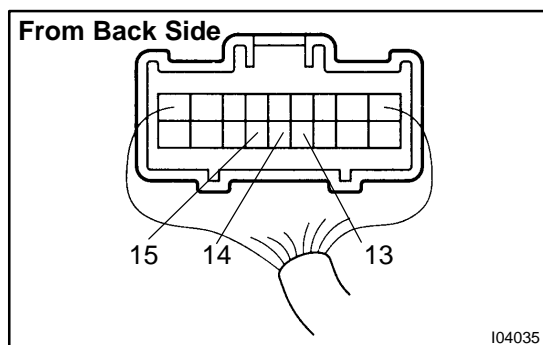
Connector disconnected:

(See page DI-832)

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

Tester connection	Condition	Specified condition
17 – Ground	Constant	Continuity
9 – Ground	Light control switch HEAD	Battery positive voltage

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



6. INSPECT LIGHT CONTROL SWITCH CIRCUIT

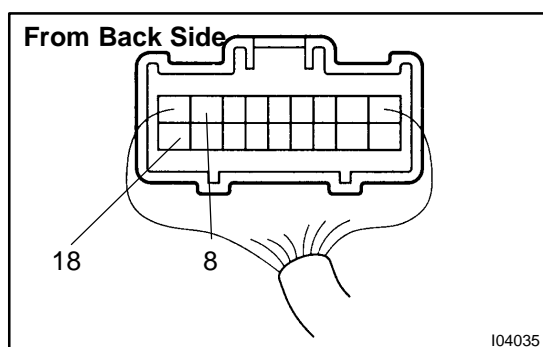
Connector connected:

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

BODY ELECTRICAL – HEADLIGHT AND TAILLIGHT SYSTEM

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

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



7. INSPECT HEADLIGHT DIMMER SWITCH CIRCUIT

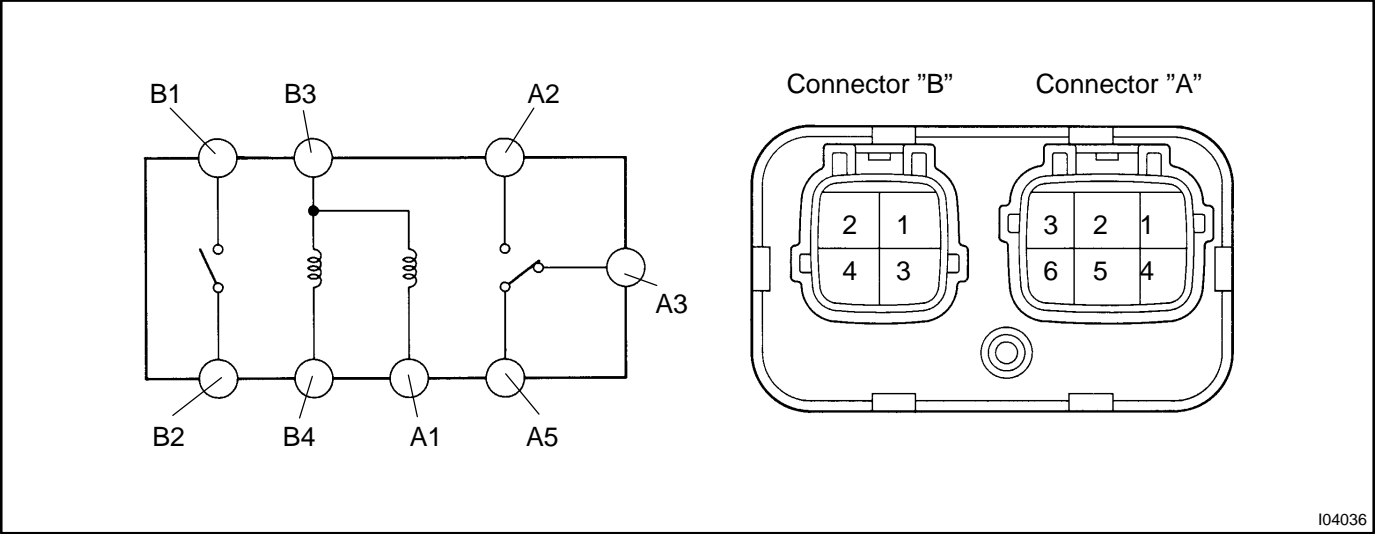
Connector connected:

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

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

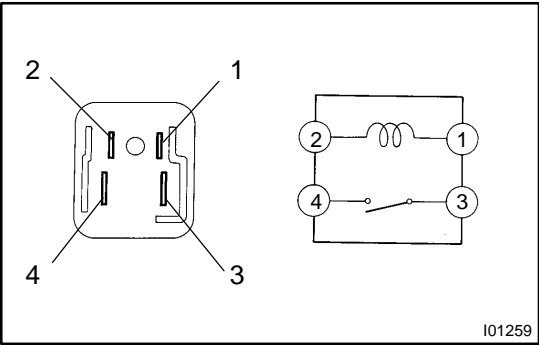
If circuit is not as specified, inspect the wire harness.

8. INSPECT DAYTIME RUNNING LIGHT NO.3 AND NO.4 RELAY CONTINUITY



Tester connection	Condition	Specified condition
A1 – B3	Constant	Continuity
A3 – A5	Constant	Continuity
B3 – B4	Constant	Continuity
A2 – A5	Apply battery positive voltage between terminals A1 and B3.	Continuity
B1 – B2	Apply battery positive voltage between terminals B3 and B4.	Continuity

If continuity is not as specified, replace the relay.

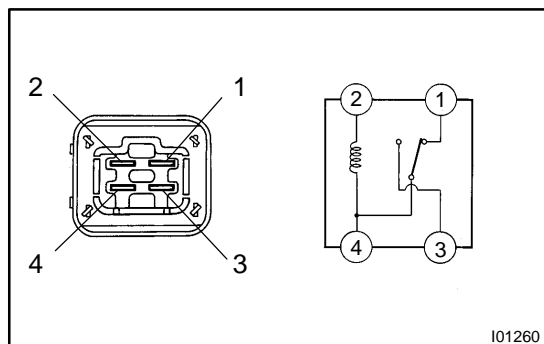


9. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

10. INSPECT HEADLIGHT CONTROL RELAY CIRCUIT
(See page DI-847 and BE-21)

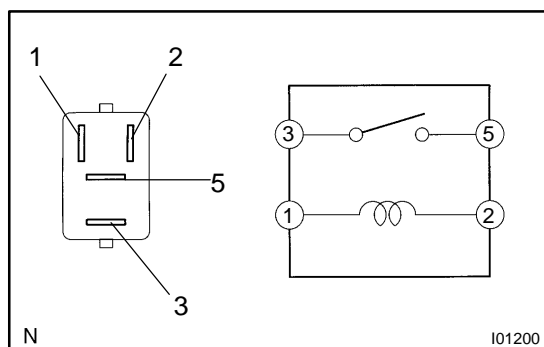


11. INSPECT HEADLIGHT DIMMER (DAYTIME RUNNING LIGHT NO.2) RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

12. INSPECT HEADLIGHT DIMMER (DAYTIME RUNNING LIGHT NO.2) RELAY CIRCUIT (See page BE-21)

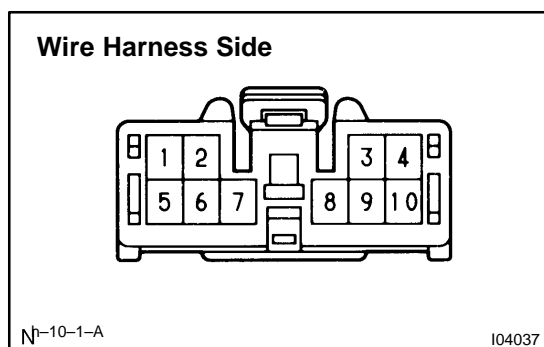


13. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

14. INSPECT TAILLIGHT CONTROL RELAY CIRCUIT (See page DI-845 and BE-21)



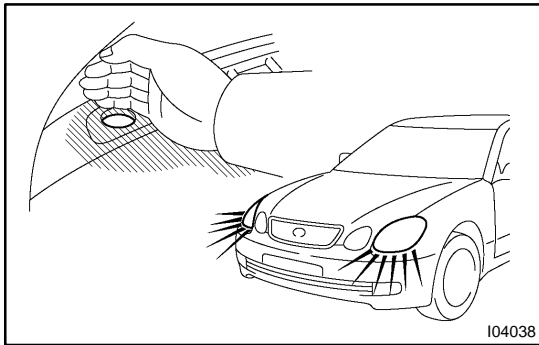
15. INSPECT DAYTIME RUNNING LIGHT MAIN RELAY CIRCUIT

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

Tester connection	Condition	Specified condition
2 – Ground	Light control switch OFF or TAIL	No continuity
2 – Ground	Light control switch HEAD	Continuity
4 – Ground	Parking brake switch OFF (Parking brake pedal released)	No continuity
4 – Ground	Parking brake switch ON (Parking brake pedal depressed)	Continuity
6 – Ground	Constant	Continuity
8 – Ground	Headlight dimmer switch LOW beam	No continuity

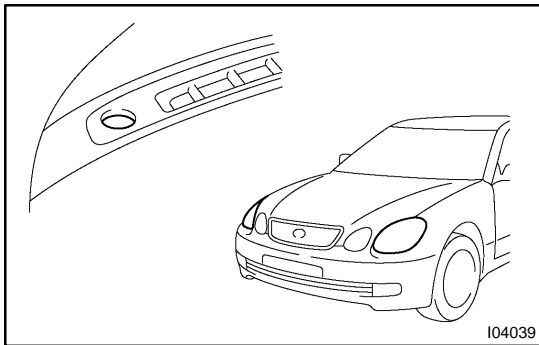
8 – Ground	Headlight dimmer switch HIGH beam or FLASH	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON or START	Battery positive voltage
5 – Ground	Engine Stop	No voltage
5 – Ground	Engine Running	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
9 – Ground	Constant	Battery positive voltage

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



16. INSPECT AUTOMATIC LIGHT CONTROL AUTO ON:

- Turn the ignition switch ON.
- Turn the light control switch to AUTO.
- Gradually cover the top of the sensor.
- Check the accessory lights and the headlights should turn ON.



17. INSPECT AUTOMATIC LIGHT CONTROL AUTO OFF:

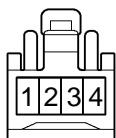
- Gradually expose the sensor.
- Check the headlights and the accessory lights should turn OFF.

18. INSPECT LIGHT-OFF CONDITION

- Turn the ignition switch ON.
- Gradually cover the top of the sensor.
Lights auto ON:
- Check that the lights go off under the following conditions.
 - Light control switch is OFF.
 - The area surrounding the sensor gets bright.
 - The driver's door is opened with the ignition switch OFF.

19. INSPECT LIGHTS-ON CONDITION

- (a) Open the driver's door while the ignition switch is OFF.
- (b) Turn the light control switch to AUTO leaving the door open and cover the top of the sensor, and verify that the lights go on when the ignition switch is turned ON.

Wire Harness Side

I01254

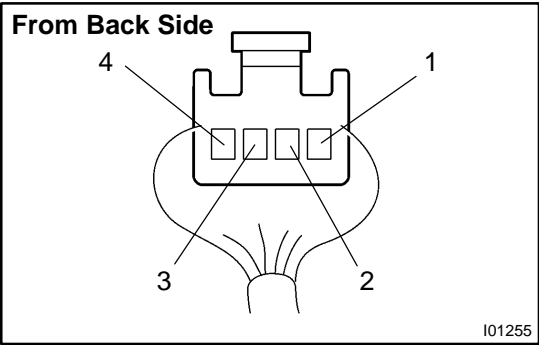
20. INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT**Connector disconnected:**

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

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

If circuit is as specified, perform the inspection on the following page.

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



21. INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT

Connector connected

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

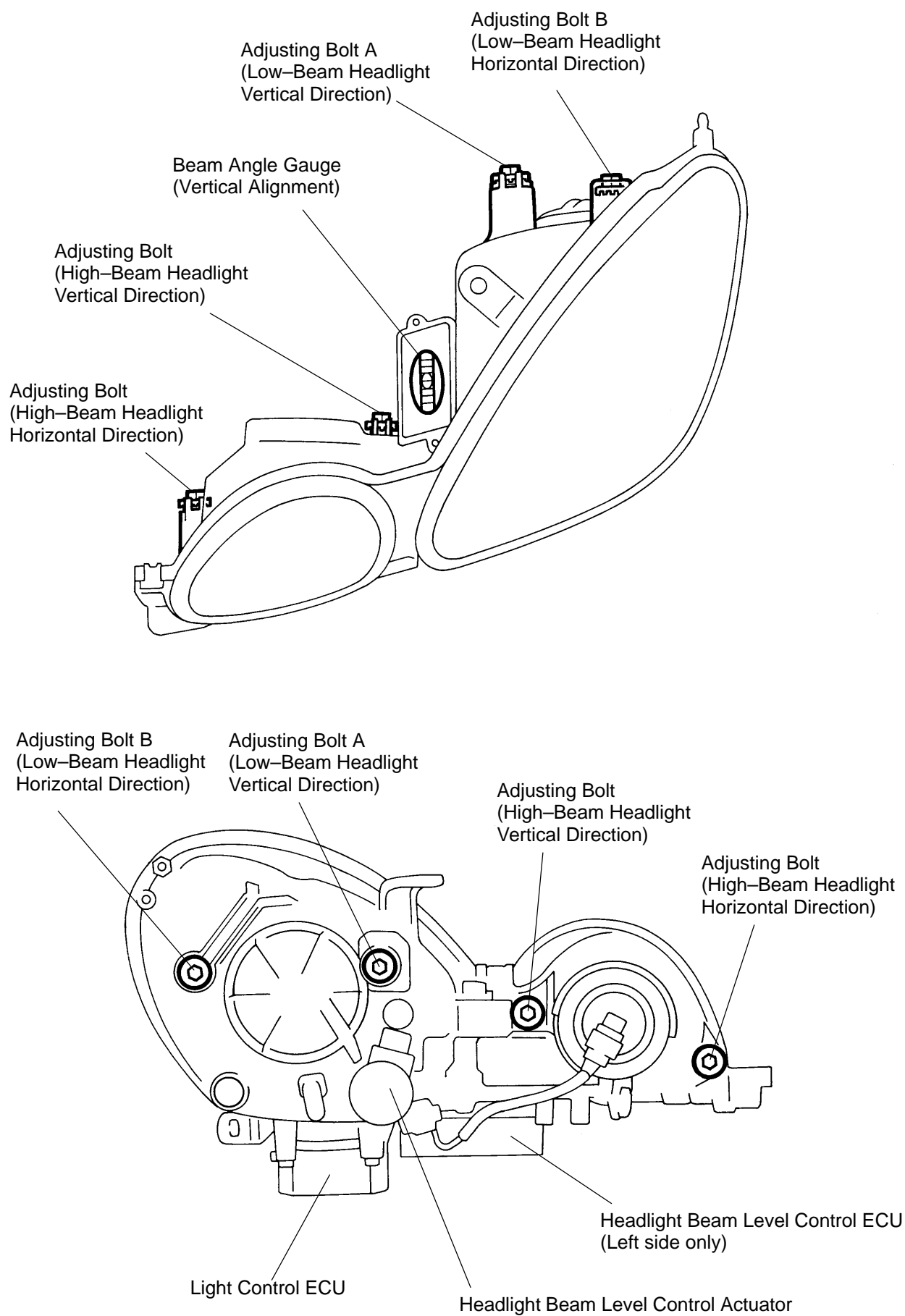
HINT:

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

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

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

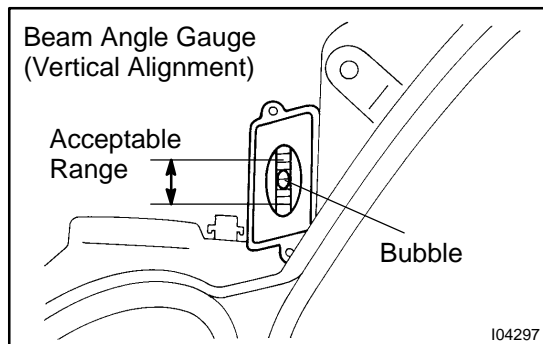
ADJUSTMENT



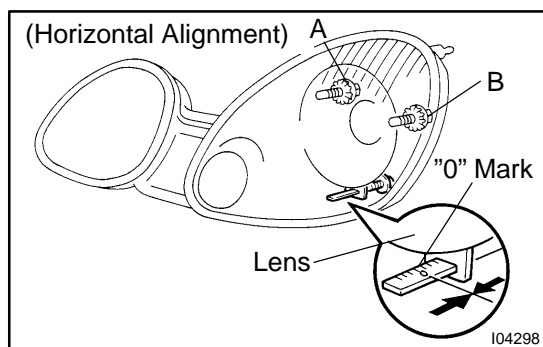
1. ADJUST HEADLIGHT AIMMING**(a) Inspect the headlight aiming.**

Do the following items before inspection.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.

**(b) Adjust the headlight aiming.**

- **Vertical Alignment:**
If the bubble is out of the acceptable range of the beam angle gauge, adjust it using bolt A.



- **Horizontal Alignment:**
If the edge of the lens does not match "0" mark, adjust the lens using bolt B.

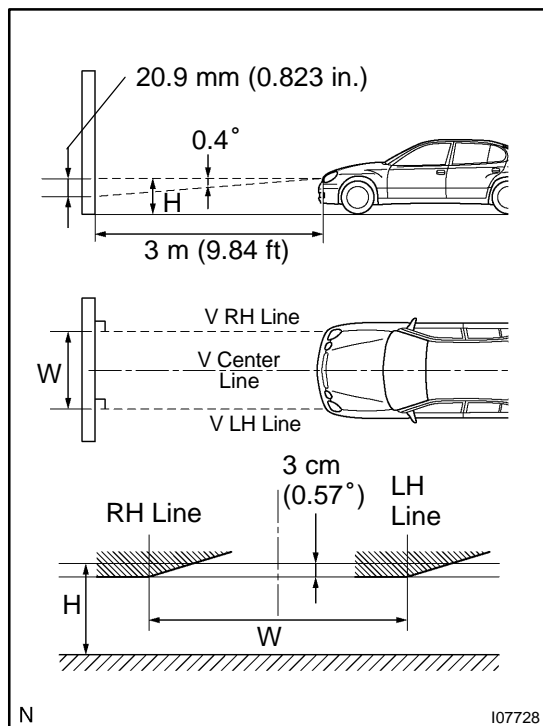
HINT:

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

2. REPLACE HEADLIGHT**(a) Replace the headlight.****(b) Inspect the headlight aiming.**

Do the following items before inspection.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



- (c) Check the headlight aiming.
- (1) Prepare the thick white colored paper.
 - (2) Stand the paper perpendicularly and ensure the distance from it to the head lights is 9.84 ft.
 - (3) Ensure that the center line of vehicle and the paper are at a 90 degree angle as shown in the illustration. (H line)
 - (4) Engine running.
 - (5) Draw a horizontal line on the paper where the head lights of the vehicle are to be.
 - (6) Draw a vertical line on the paper where the center line of the vehicle is to be. (V center line)
 - (7) Take an appropriate measure to avoid affecting the other light. (V RH and LH lines)

NOTICE:

- **Disconnect the connector of the other light to avoid heat affection from the light because the outer lens of the head light assembly is made of synthetic resin. When connecting the connector again take care not to wake the aiming out of adjustment.**
 - **When covering the headlight, finish it within 3 minutes.**
- (8) Turn the head lights ON.
 - (9) Check that the head lights light up the paper as shown in the illustration.
 - (10) When the paper is not lighted up properly, adjust the lights in the vertical or horizontal direction.

HINT:

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

- (d) Vertical Alignment:

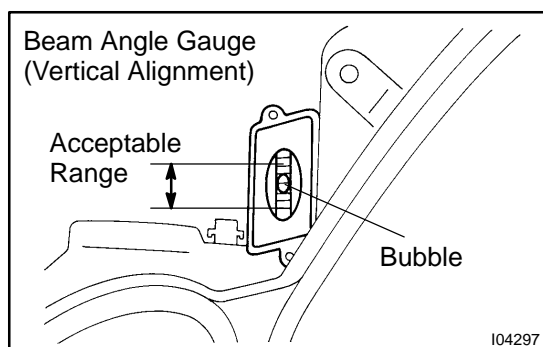
Adjust the headlight aiming.

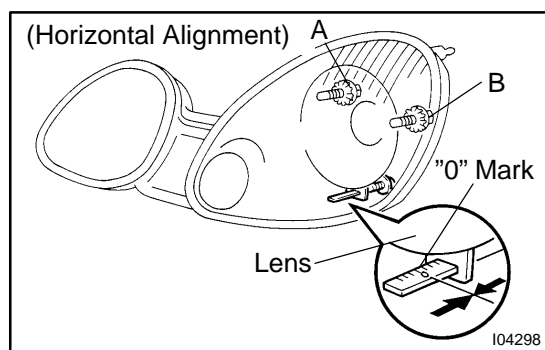
- (1) Using adjustment bolt A, adjust the headlight aiming to within the specifiations.
- (2) Make sure the gauge bubble is within the acceptable range.

HINT:

If the gauge bubble is outside the acceptable range, check that the vehicle is parked on a level spot.

Readjust the headlight aiming after parking the vehicle on a level spot.





- (e) Horizontal Alignment:
Adjust the headlight aiming.
If the edge of the lens does not match the paper as shown in the illustration, adjust the lens using bolt B. (See step 5)

HINT:

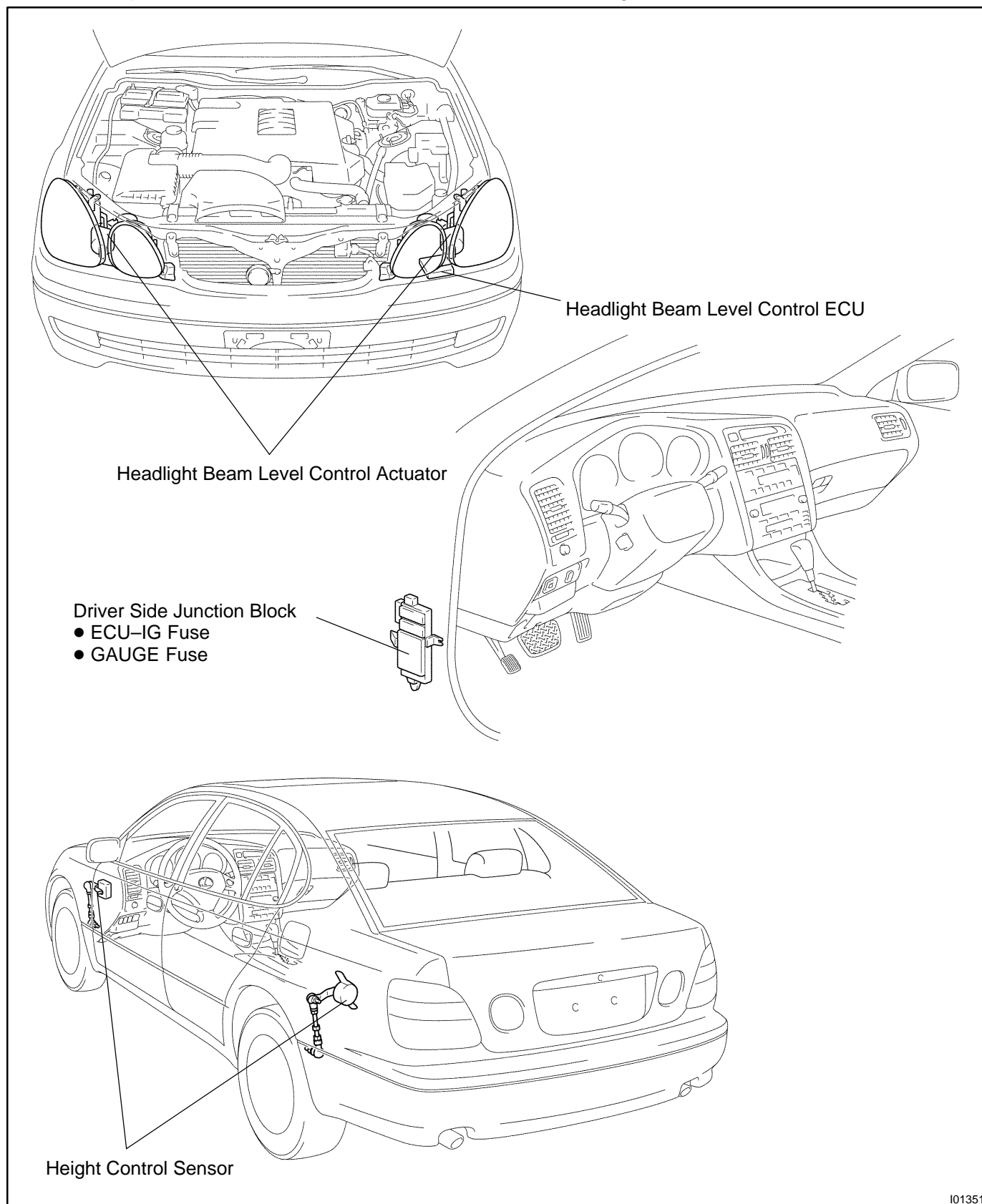
After adjusting the headlight in vertical direction, check that the light has been shifted from the adjusted position in the horizontal direction.

HEADLIGHT BEAM LEVEL CONTROL SYSTEM

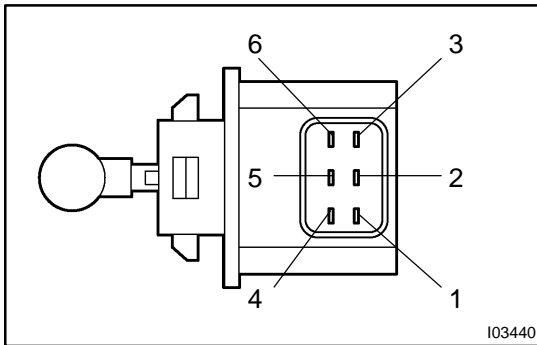
BE01R-06

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01351



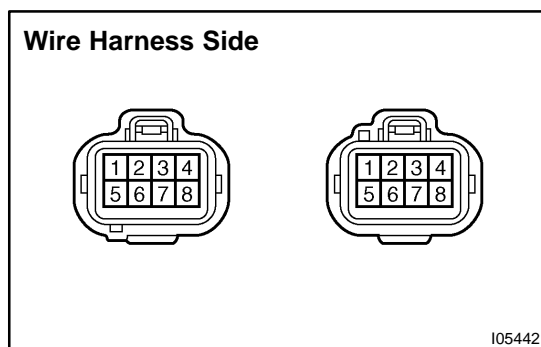
INSPECTION

1. INSPECT HEADLIGHT BEAM LEVEL CONTROL ACTUATOR RESISTANCE

- Check that continuity exists between terminals 2 and 5.
- Check that resistance exists between terminals, as shown in the chart.

Terminal	Resistance (Ω)
2 – 1	26 – 30
2 – 3	26 – 30
2 – 4	26 – 30
2 – 6	26 – 30
5 – 1	26 – 30
5 – 3	26 – 30
5 – 4	26 – 30
5 – 6	26 – 30

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



Wire Harness Side

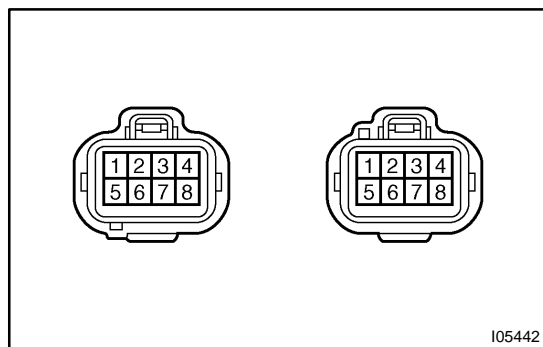
2. INSPECT HEADLIGHT BEAM LEVEL CONTROL ECU CIRCUIT

Connector disconnected:

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

Tester connection	Condition	Specified condition
A1 – A5	Ignition switch OFF	26 – 30 Ω
A1 – A6	Ignition switch OFF	26 – 30 Ω
A1 – A7	Ignition switch OFF	26 – 30 Ω
A1 – A8	Ignition switch OFF	26 – 30 Ω
A4 – B4	Ignition switch ON and light control switch HEAD	Below 1.5 V
B1 – B3	Ignition switch OFF	3.5 – 6.5 k Ω
B5 – B7	Ignition switch OFF	3.5 – 6.5 k Ω
A4 – Ground	Ignition switch OFF	Continuity

If circuit is not as specified, perform the inspection on the following pages.



3. INSPECT HEADLIGHT BEAM LEVEL CONTROL ECU CIRCUIT

Connector connected:

Connect the connector from the ECU and inspect the connector, as shown in the table.

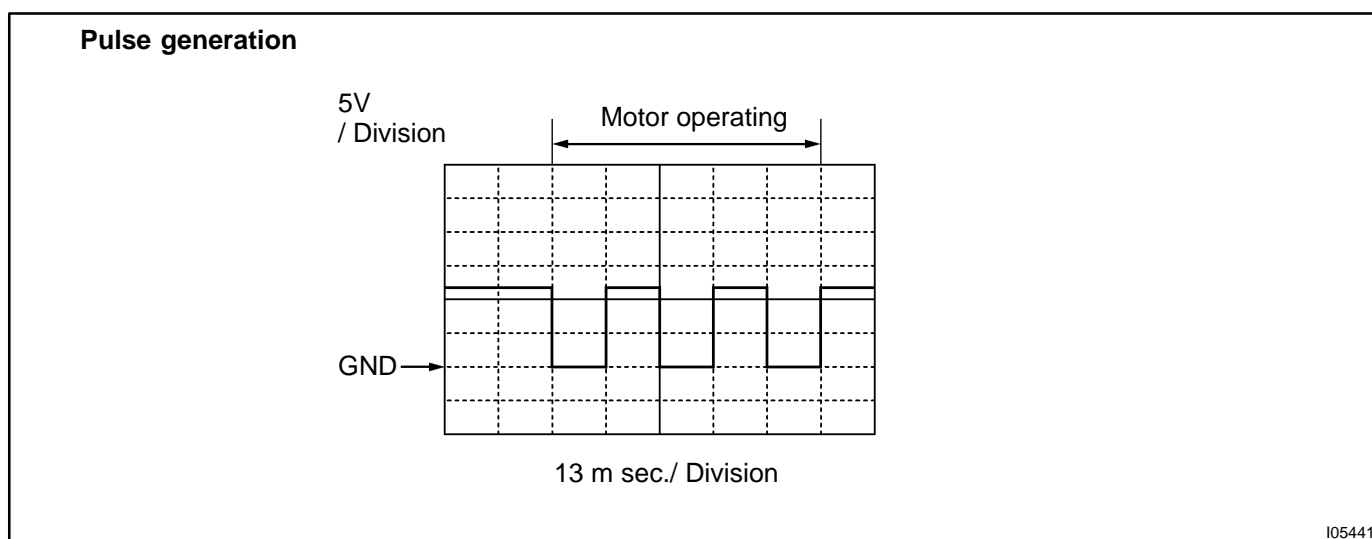
Tester connection	Condition	Specified condition
A1 – A4	Ignition switch ON	Battery positive voltage
A1 – A5	Ignition switch ON, when stopping and bouncing the vehicle.	Pulse generation
A1 – A6	Ignition switch ON, when stopping and bouncing the vehicle.	Pulse generation
A1 – A7	Ignition switch ON, when stopping and bouncing the vehicle.	Pulse generation
A1 – A8	Ignition switch ON, when stopping and bouncing the vehicle.	Pulse generation
B2 – B3	Ignition switch ON	Approx. 2.5 V
B6 – B7	Ignition switch ON	Approx. 2.5 V
B1 – B3 B5 – B7	Ignition switch ON	5 V

If the circuit is not as specified, replace the ECU.

Reference INSPECTION USING OSCILLOSCOPE

HINT:

The correct waveform is as shown in the illustration.

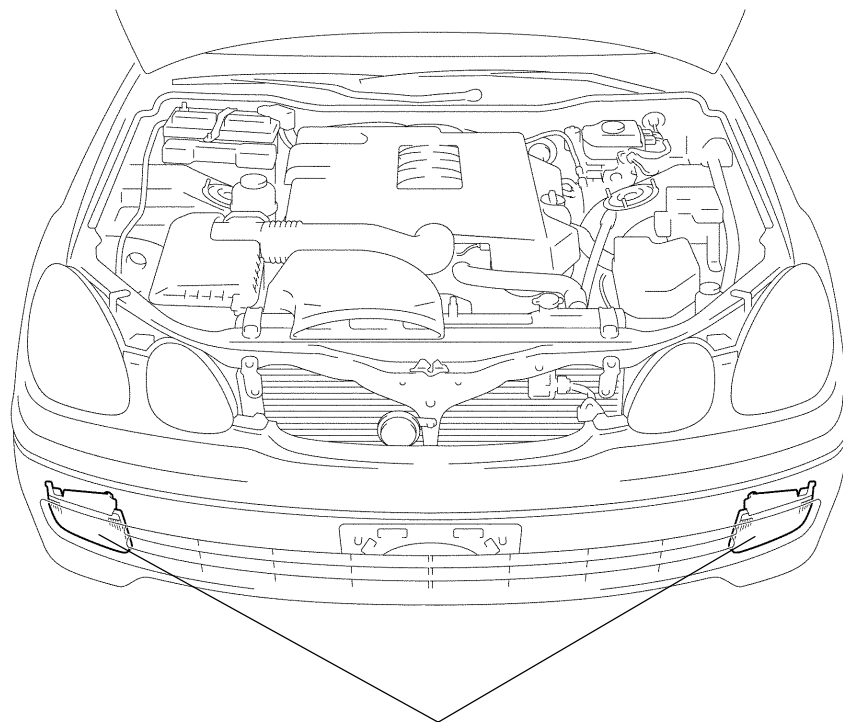


FOG LIGHT SYSTEM

BE0H2-08

LOCATION

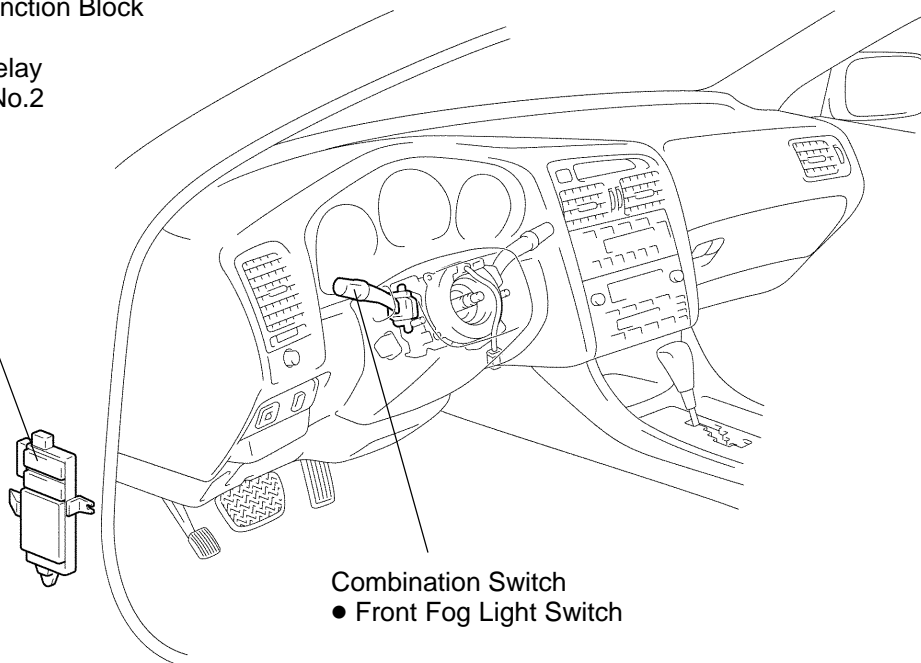
- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



Front Fog Lights

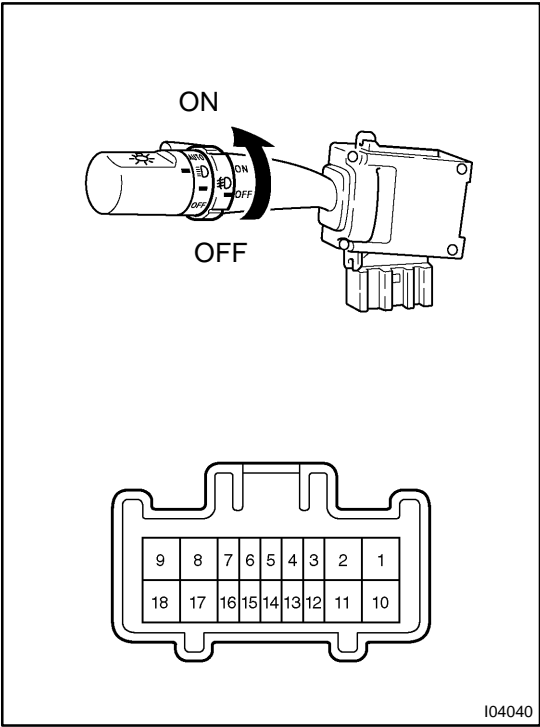
Driver Side Junction Block

- FOG Fuse
- Fog Light Relay
- Body ECU No.2



Combination Switch
• Front Fog Light Switch

I01352

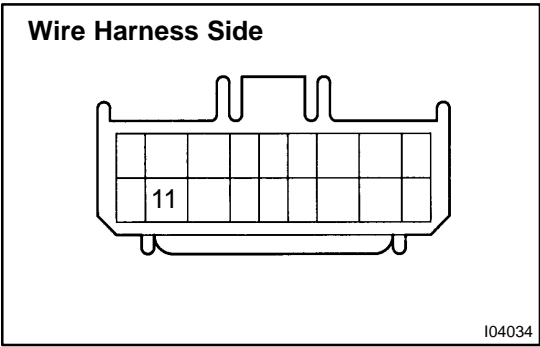


INSPECTION

1. INSPECT FOG LIGHT SWITCH CONTINUITY

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

If continuity is not as specified, replace the switch.



2. INSPECT FOG LIGHT SWITCH CIRCUIT

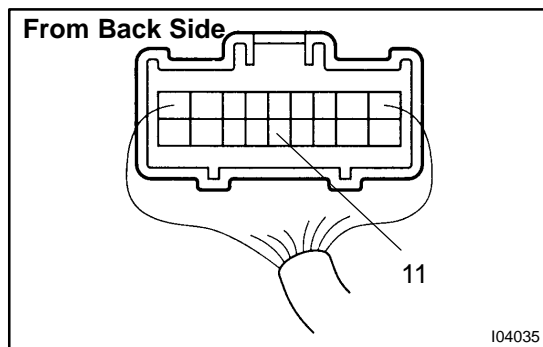
Connector disconnected:

(See page [DI-832](#))

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

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

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



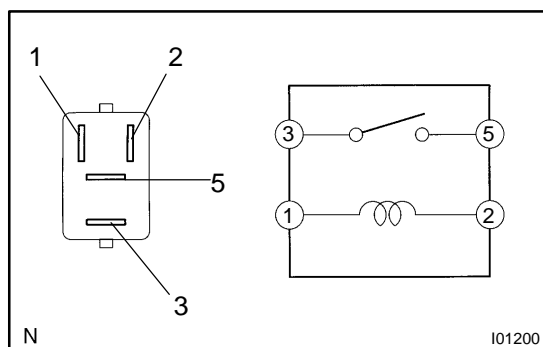
3. INSPECT FOG LIGHT SWITCH CIRCUIT

Connector connected:

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

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

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



4. INSPECT FOG LIGHT RELAY CONTINUITY

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

If continuity is not as specified, replace the relay.

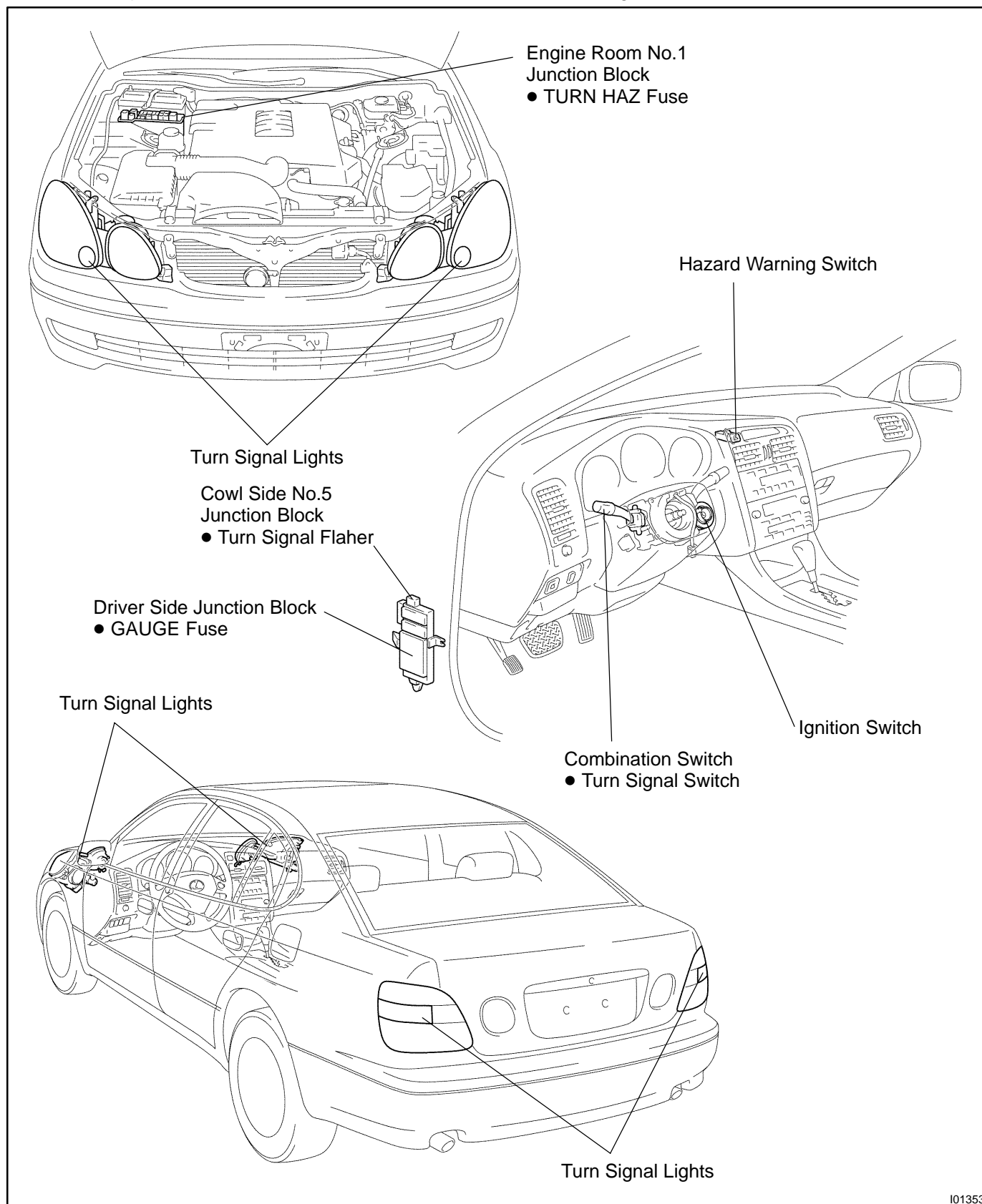
5. INSPECT FOG LIGHT RELAY CIRCUIT (See page BE-21)

TURN SIGNAL AND HAZARD WARNING SYSTEM

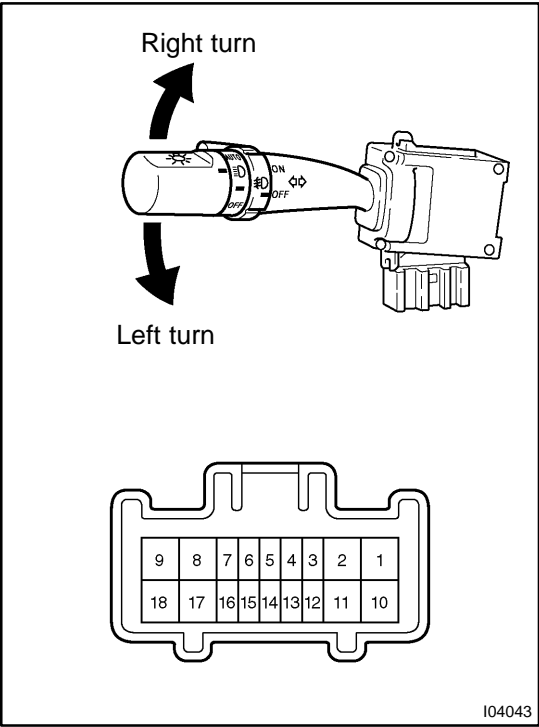
BE0H0-06

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01353

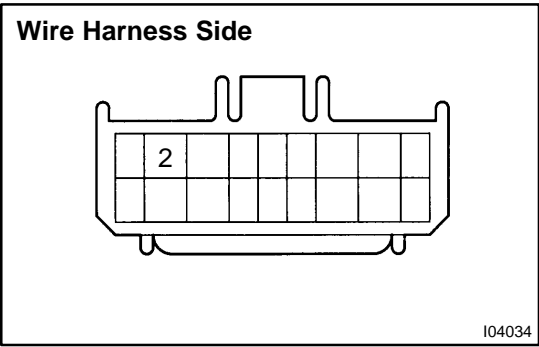


INSPECTION

1. INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	1 – 2	Continuity
Neutral	–	No continuity
Right turn	2 – 3	Continuity

If continuity is not as specified, replace the switch.



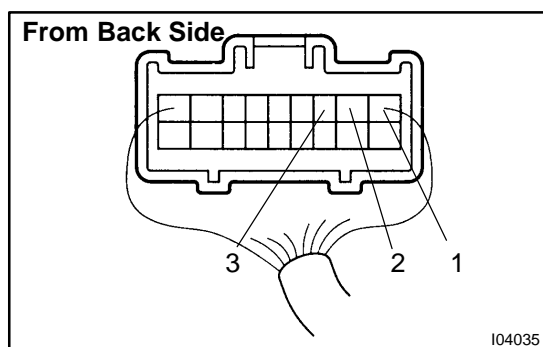
2. INSPECT TURN SIGNAL SWITCH CIRCUIT

Connector disconnected:

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

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

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



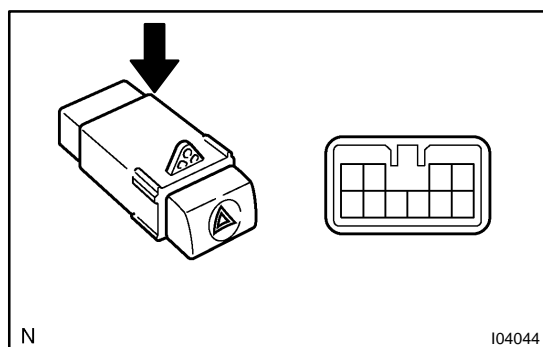
3. INSPECT TURN SIGNAL SWITCH CIRCUIT

Connector connected:

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

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

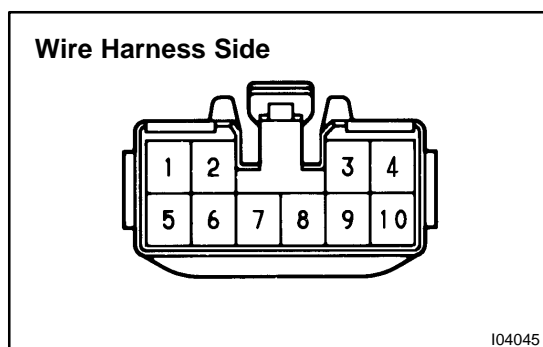
If circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT HAZARD WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	7 – 10	Continuity
Switch ON	7 – 8	Continuity
Illumination circuit	2 – 3	Continuity

If continuity is not as specified, replace the switch.



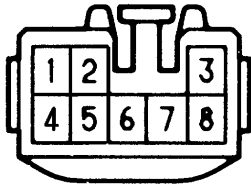
5. INSPECT HAZARD WARNING SWITCH CIRCUIT

(See page DI-814)

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

Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity

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

Wire Harness Side

I04046

6. INSPECT TURN SIGNAL FLASHER CIRCUIT

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

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

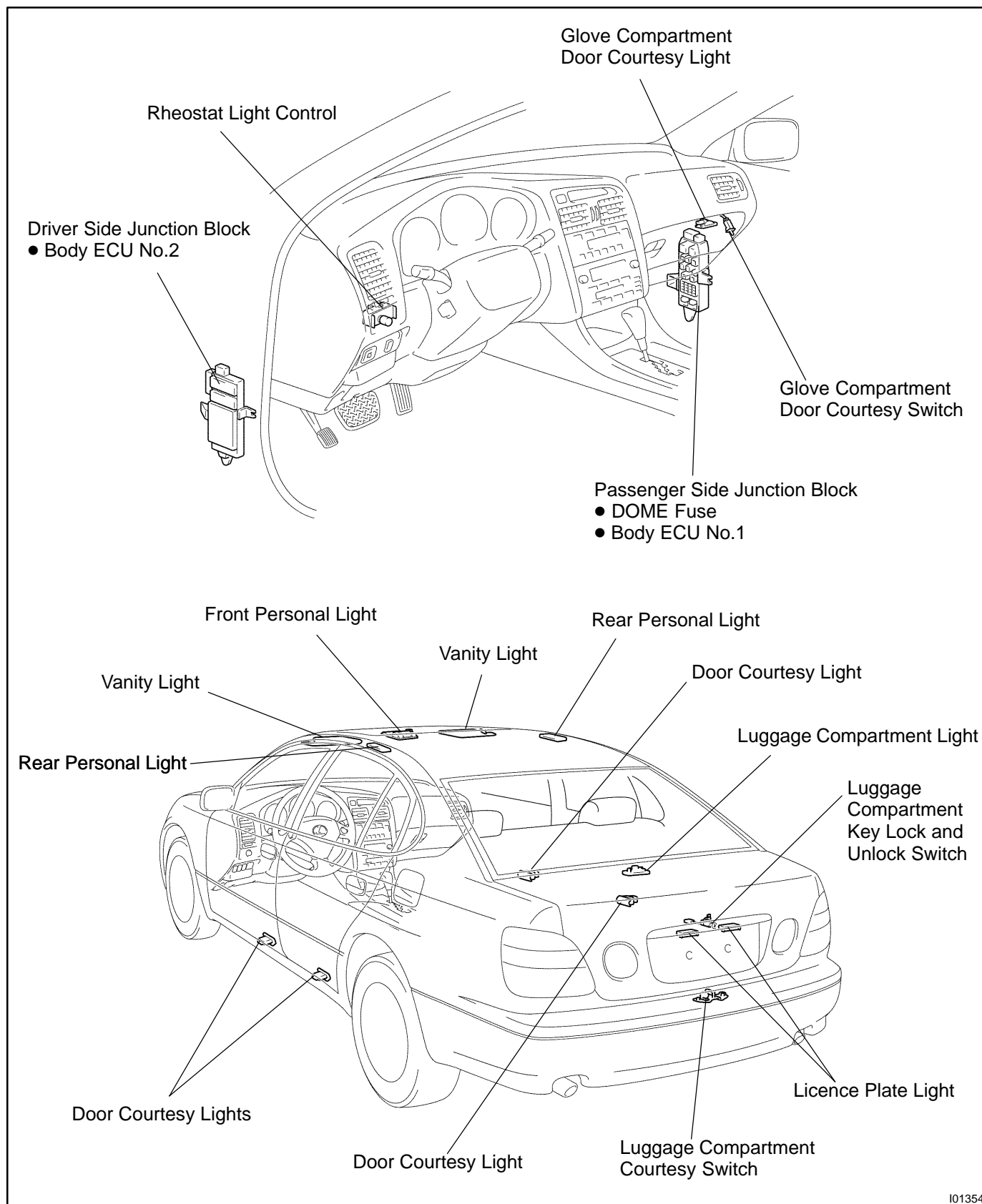
If circuit is as specified, replace the relay.

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

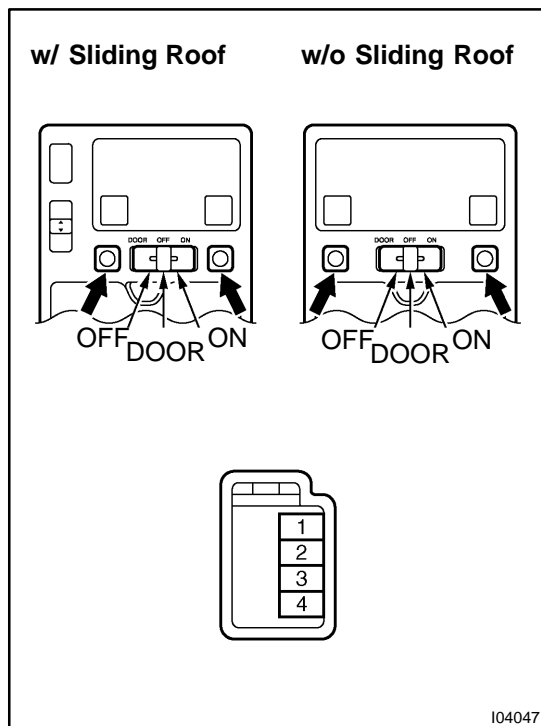
INTERIOR LIGHT SYSTEM

LOCATION

BEOGY-05



I01354



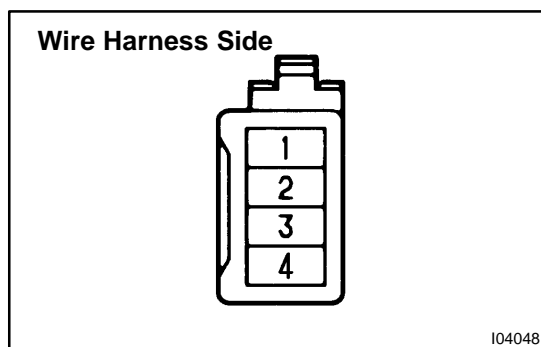
INSPECTION

1. INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Interior light switch OFF (Lever switch)	–	No continuity
Interior light switch DOOR (Lever switch)	1 – 3	Continuity
Interior light switch ON (Lever switch)	1 – 2	Continuity
*Personal light OFF (Push switch)	–	No continuity
*Personal light ON (Push switch)	1 – 2	Continuity

*: Set the interior light switch to OFF or DOOR.

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



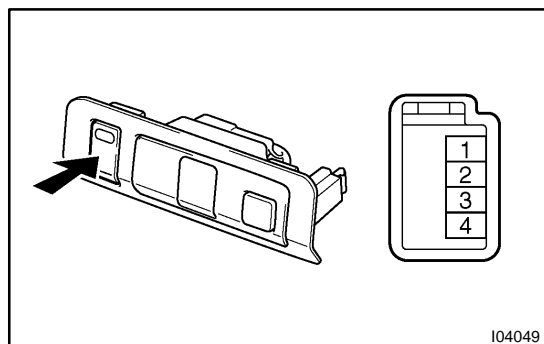
2. INSPECT FRONT PERSONAL LIGHT SWITCH CIRCUIT

(See page [DI-843](#))

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

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

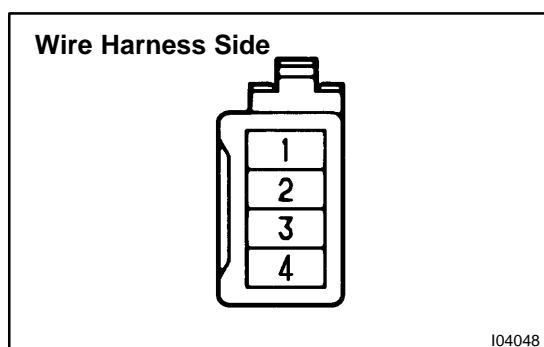
If circuit is not as specified, inspect power source or wire harness.



3. INSPECT REAR PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Room light switch OFF and door closed	–	No continuity
Room light switch ON and door closed	1 – 2	Continuity
Room light switch OFF or ON and door opened	1 – 3	Continuity

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

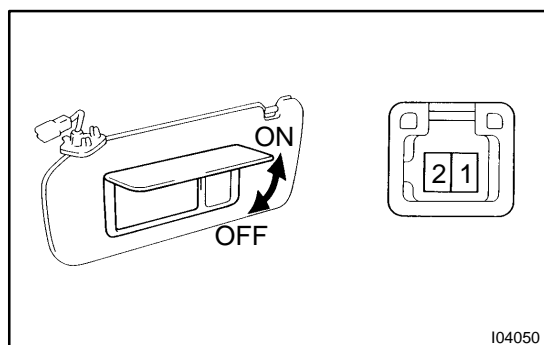


4. INSPECT REAR PERSONAL LIGHT SWITCH CIRCUIT

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

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

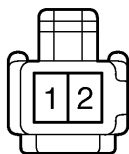
If circuit is not as specified, inspect power source or wire harness.



5. INSPECT VANITY LIGHT CONTINUITY

Switch position	Tester connection	Specified condition
OFF (closed)	–	No continuity
ON (opened)	1 – 2	Continuity

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

Wire Harness Side

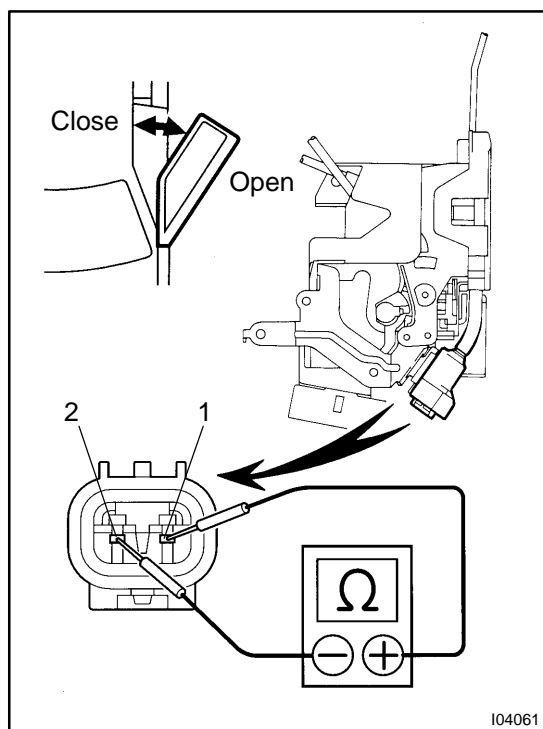
I04051

6. INSPECT VANITY LIGHT CIRCUIT

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

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

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



I04061

7. Front door:**INSPECT DOOR COURTESY SWITCH CONTINUITY**

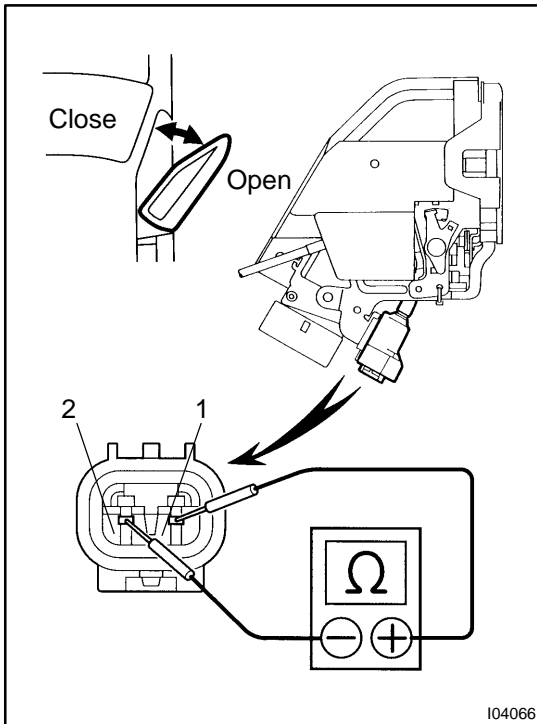
- Connect the connector to the front door ECU.
- Check that continuity exists between terminals 1 and 2 when door is opened.
- Check that no continuity exists between terminals 1 and 2 when door is closed.

If continuity is not as specified, replace the switch.

8. Front door:**INSPECT DOOR COURTESY SWITCH CIRCUIT**

Driver side: (See page [DI-868](#))

Passenger side: (See page [DI-900](#))

**9. Rear door:****INSPECT DOOR COURTESY SWITCH CONTINUITY**

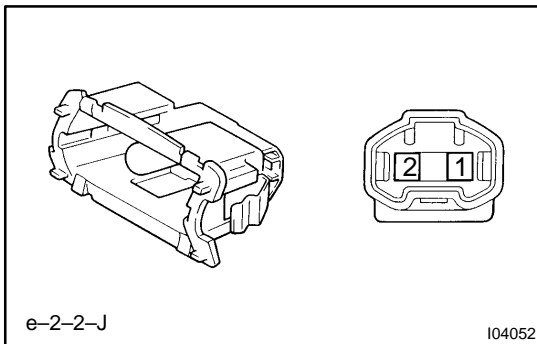
- Connect the connector to the rear door ECU.
- Check that continuity exists between terminals 1 and 2 when door is opened.
- Check that no continuity exists between terminals 1 and 2 when door is closed.

If continuity is not as specified, replace the switch.

10. Rear door:**INSPECT DOOR COURTESY SWITCH CIRCUIT**

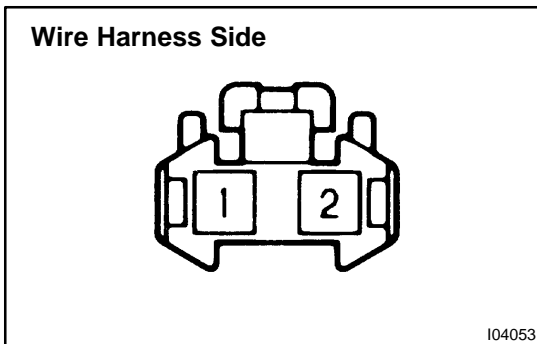
Rear LH side: (See page [DI-930](#))

Rear RH side: (See page [DI-947](#))

**11. INSPECT DOOR COURTESY LIGHT CONTINUITY**

Using an ohmmeter, check that continuity exists between terminals.

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

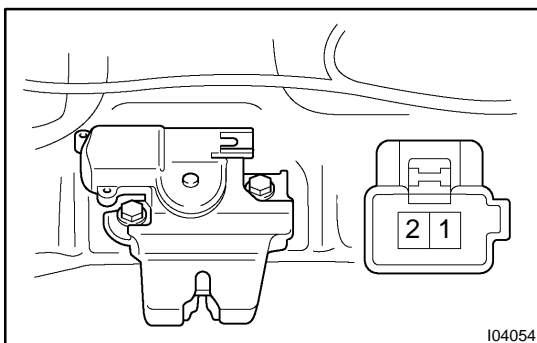
**12. INSPECT DOOR COURTESY LIGHT CIRCUIT**

Driver side: (See page [DI-874](#))

Passenger side: (See page [DI-906](#))

Rear LH side: (See page [DI-934](#))

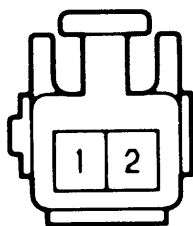
Rear RH side: (See page [DI-951](#))

**13. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY**

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

If continuity is not as specified, replace the switch.

Wire Harness Side



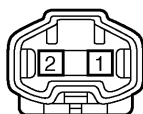
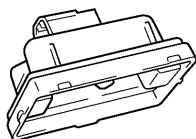
I04185

14. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CIRCUIT(See page [DI-792](#))

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

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

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



e-2-2-J

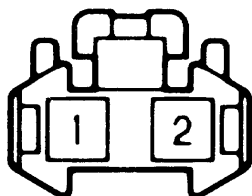
I04056

15. INSPECT LUGGAGE COMPARTMENT LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

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

Wire Harness Side



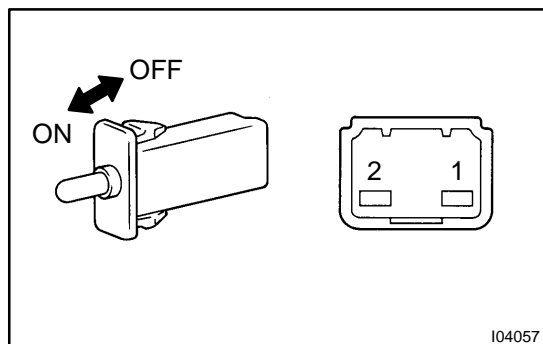
I04053

16. INSPECT LUGGAGE COMPARTMENT LIGHT CIRCUIT

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

Tester connection	Condition	Specified condition
1 – Body ground	Constant	Continuity

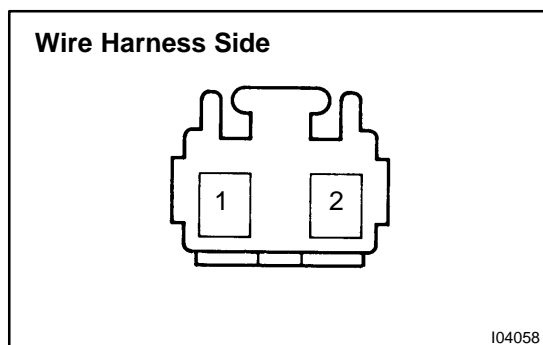
If circuit is not as specified, inspect power source or wire harness.



17. INSPECT GLOVE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (closed)	–	No continuity
ON (opened)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

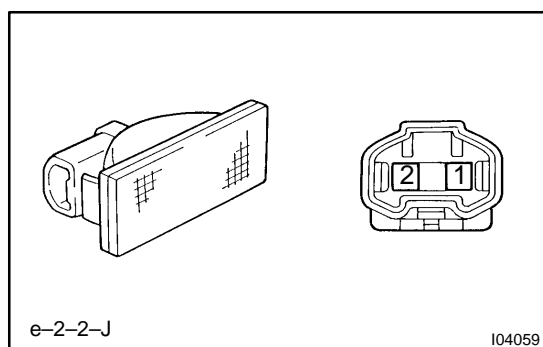


18. INSPECT GLOVE COMPARTMENT DOOR COURTESY SWITCH CIRCUIT

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

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Light control switch OFF	No voltage
1 – Ground	Light control switch TAIL or HEAD	Battery positive voltage

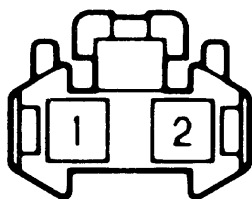
If circuit is not as specified, inspect power source or wire harness.



19. INSPECT GLOVE COMPARTMENT LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

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

Wire Harness Side

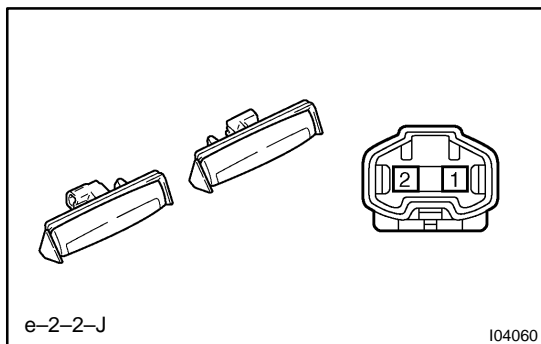
I04053

20. INSPECT GLOVE COMPARTMENT LIGHT CIRCUIT

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

Tester connection	Condition	Specified condition
2 – Ground	Glove compartment door courtesy switch ON	Continuity
1 – Ground	Light control switch in TAIL or HEAD	Battery positive voltage

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



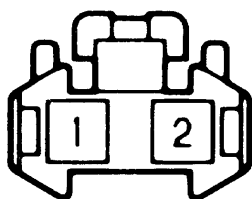
e-2-2-J

I04060

21. INSPECT LICENCE PLATE LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

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

Wire Harness Side

I04053

22. INSPECT LICENCE PLATE LIGHT CIRCUIT

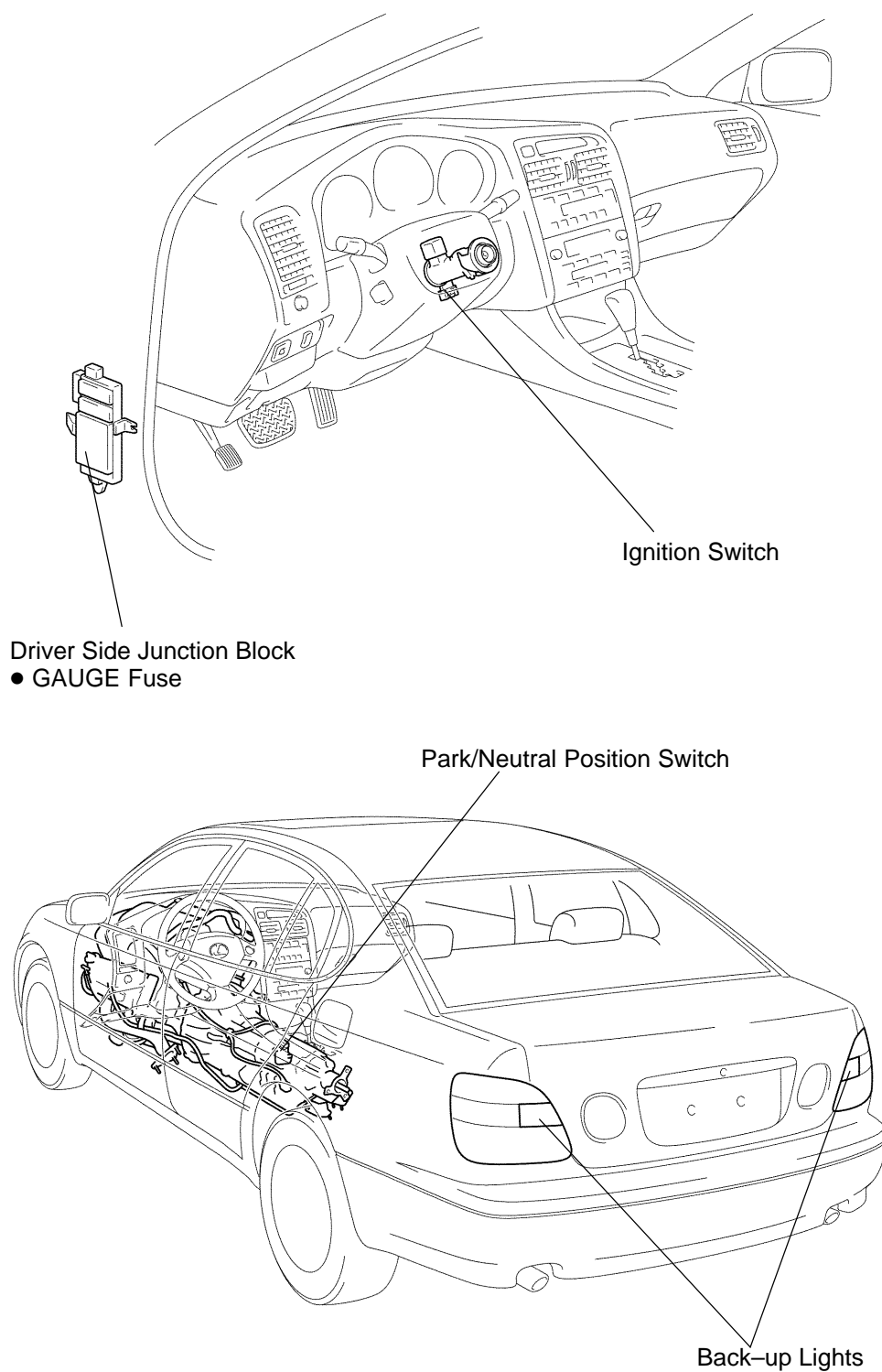
Disconnect the connector from the light and inspect the connector on the wire harness side, as shown.

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

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

BACK-UP LIGHT SYSTEM LOCATION

BEOGW-08



I01355

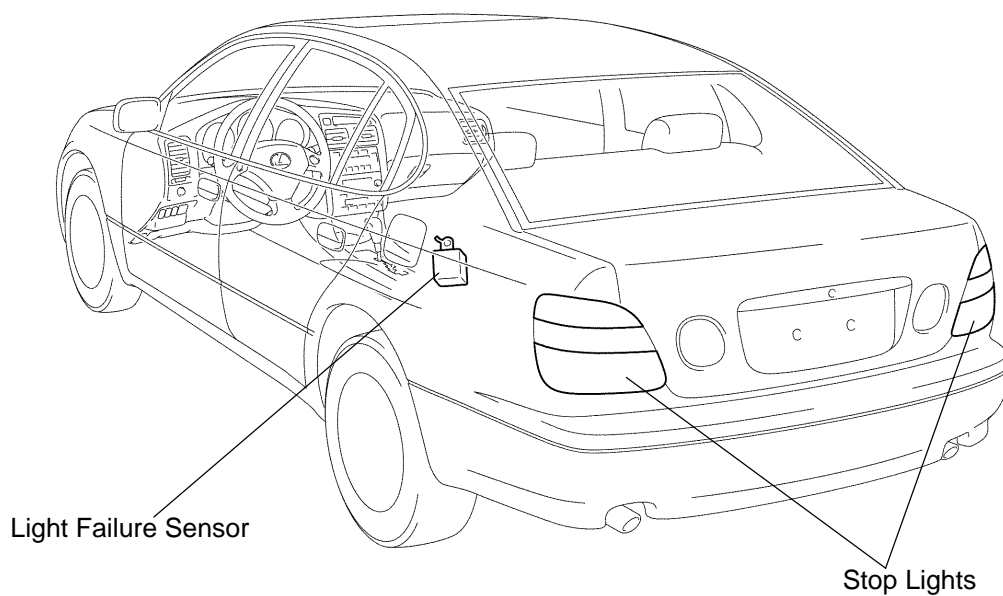
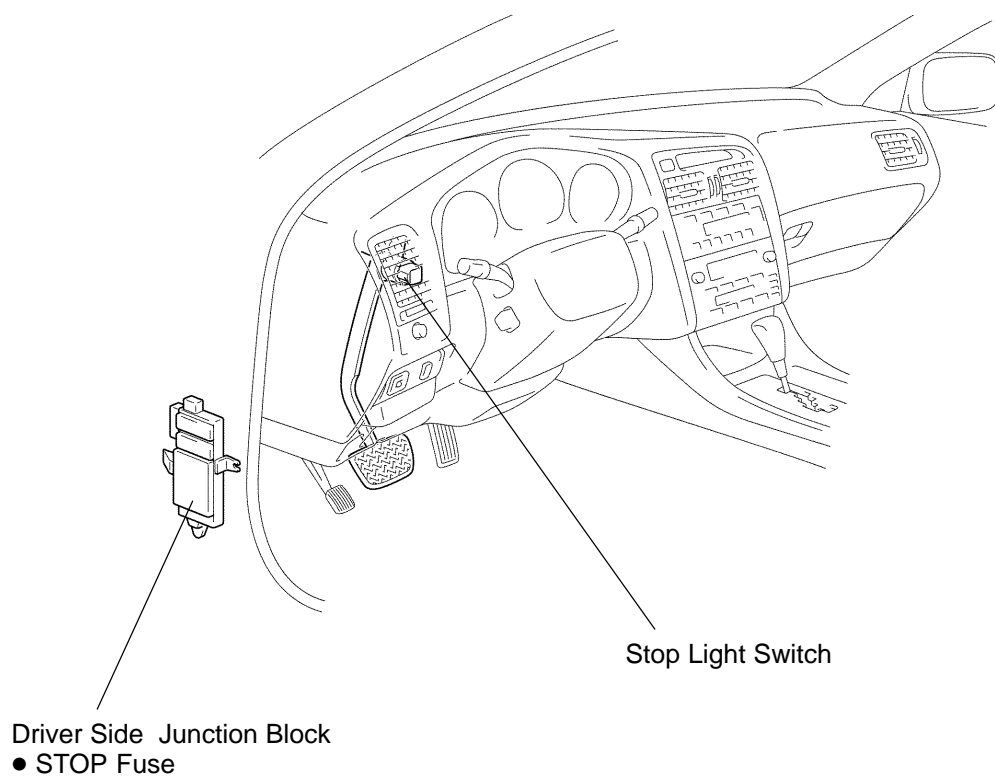
INSPECTION

INSPECT PARK/ NEUTRAL POSITION SWITCH CONTINUITY

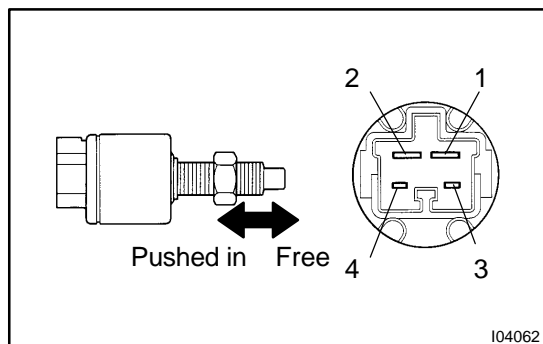
(See page [DI-372](#))

STOP LIGHT SYSTEM LOCATION

BE0H6-08



I01356

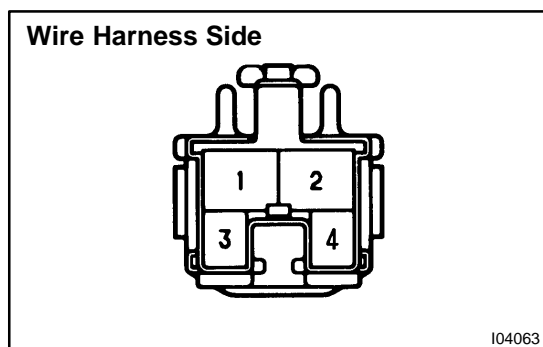


INSPECTION

1. INSPECT STOP LIGHT SWITCH CONTINUITY

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

If continuity is not as specified, replace the switch.

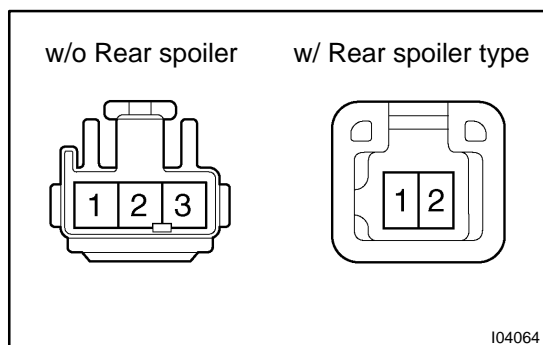


2. INSPECT STOP LIGHT SWITCH CIRCUIT (See page [DI-839](#))

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

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

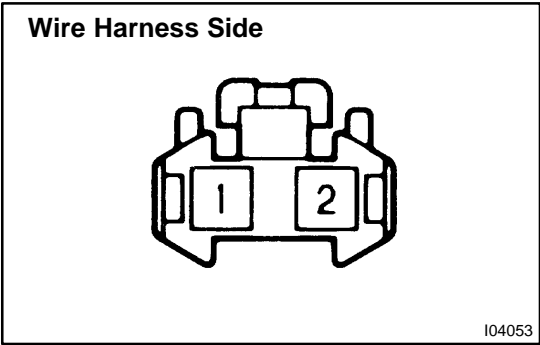
If circuit is not as specified, inspect the power source or wire harness.



3. INSPECT HI-MOUNTED STOP LIGHT CONTINUITY

Using an ohmmeter, check that continuity exists between terminals.

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



4. INSPECT HI-MOUNTED STOP LIGHT CIRCUIT

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

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

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

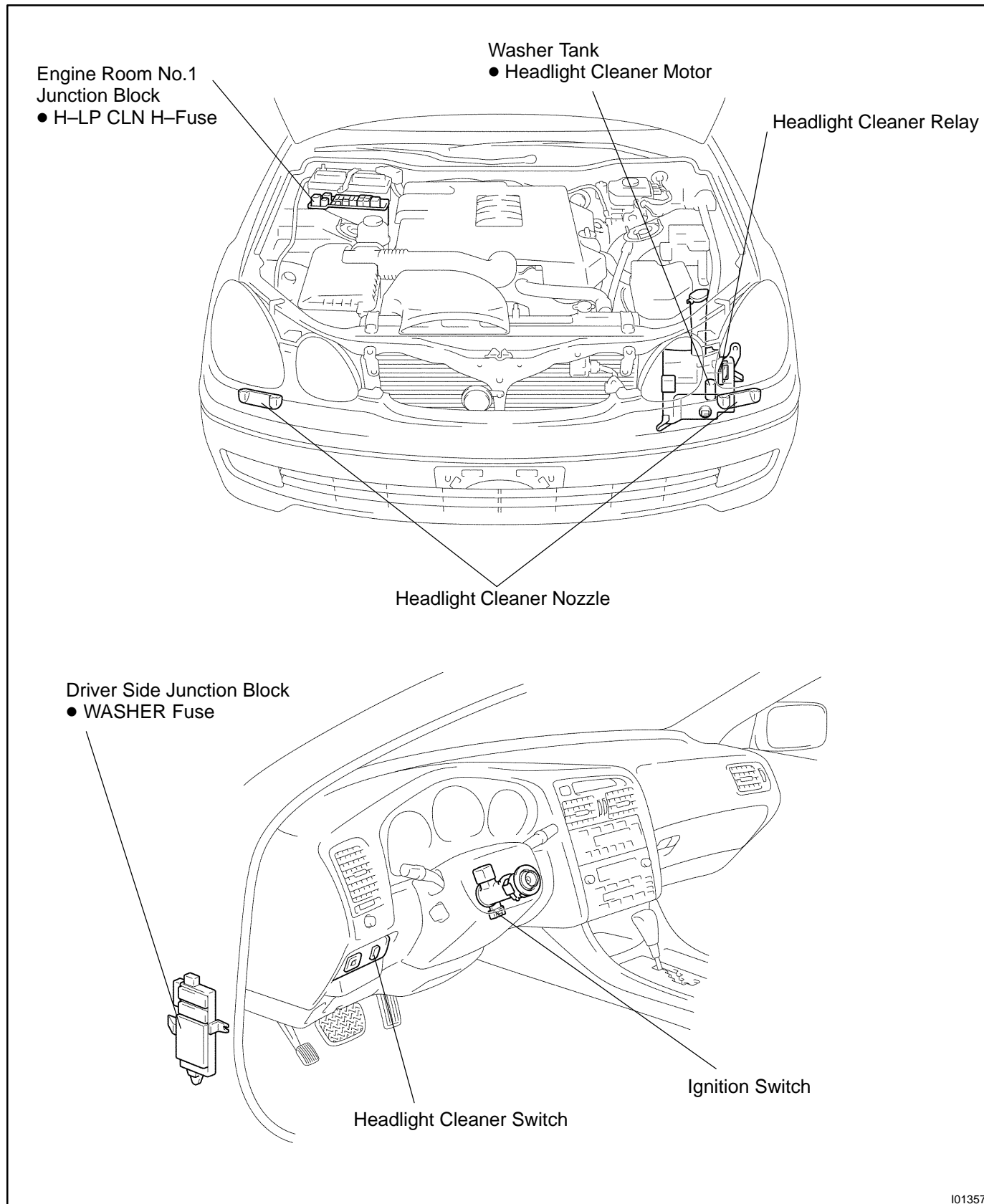
5. INSPECT LIGHT FAILURE SENSOR
(See page [DI-841](#) and [BE-92](#))

HEADLIGHT CLEANER SYSTEM

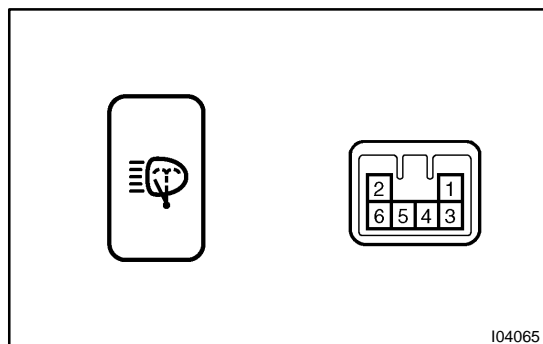
BE023-07

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01357

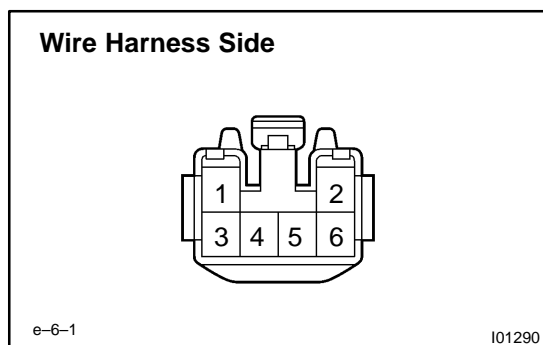


INSPECTION

1. INSPECT HEADLIGHT CLEANER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	2 – 4	Continuity
Illumination circuit	5 – 6	Continuity

If continuity is not as specified, replace the switch.

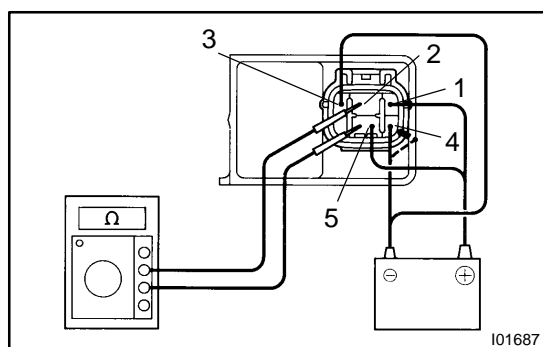


2. INSPECT HEADLIGHT CLEANER SWITCH CIRCUIT

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

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

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

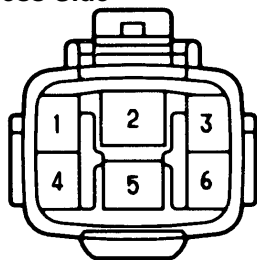


3. INSPECT HEADLIGHT CLEANER RELAY OPERATION

- Check that no continuity exists between terminals 2 and 5.
- Connect the positive (+) lead from the battery to terminals 1 and 5, and the negative (–) lead to terminal 3.
- Connect the negative (–) lead from the battery to terminal 4, and check that continuity exists between terminals 2 and 5 for 0.9 – 1.1 seconds, then no continuity exists.

If operation is not as specified, replace the motor.

Wire Harness Side



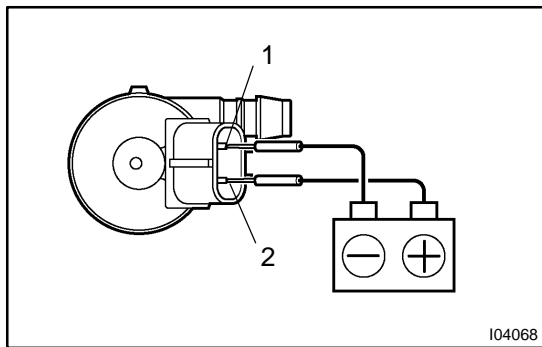
I04067

4. INSPECT HEADLIGHT CLEANER RELAY CIRCUIT

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

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

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



I04068

5. INSPECT HEADLIGHT CLEANER MOTOR OPERATION

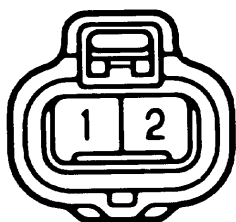
Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.

Wire Harness Side



I04069

6. INSPECT HEADLIGHT CLEANER MOTOR CIRCUIT

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

BODY ELECTRICAL – HEADLIGHT CLEANER SYSTEM

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

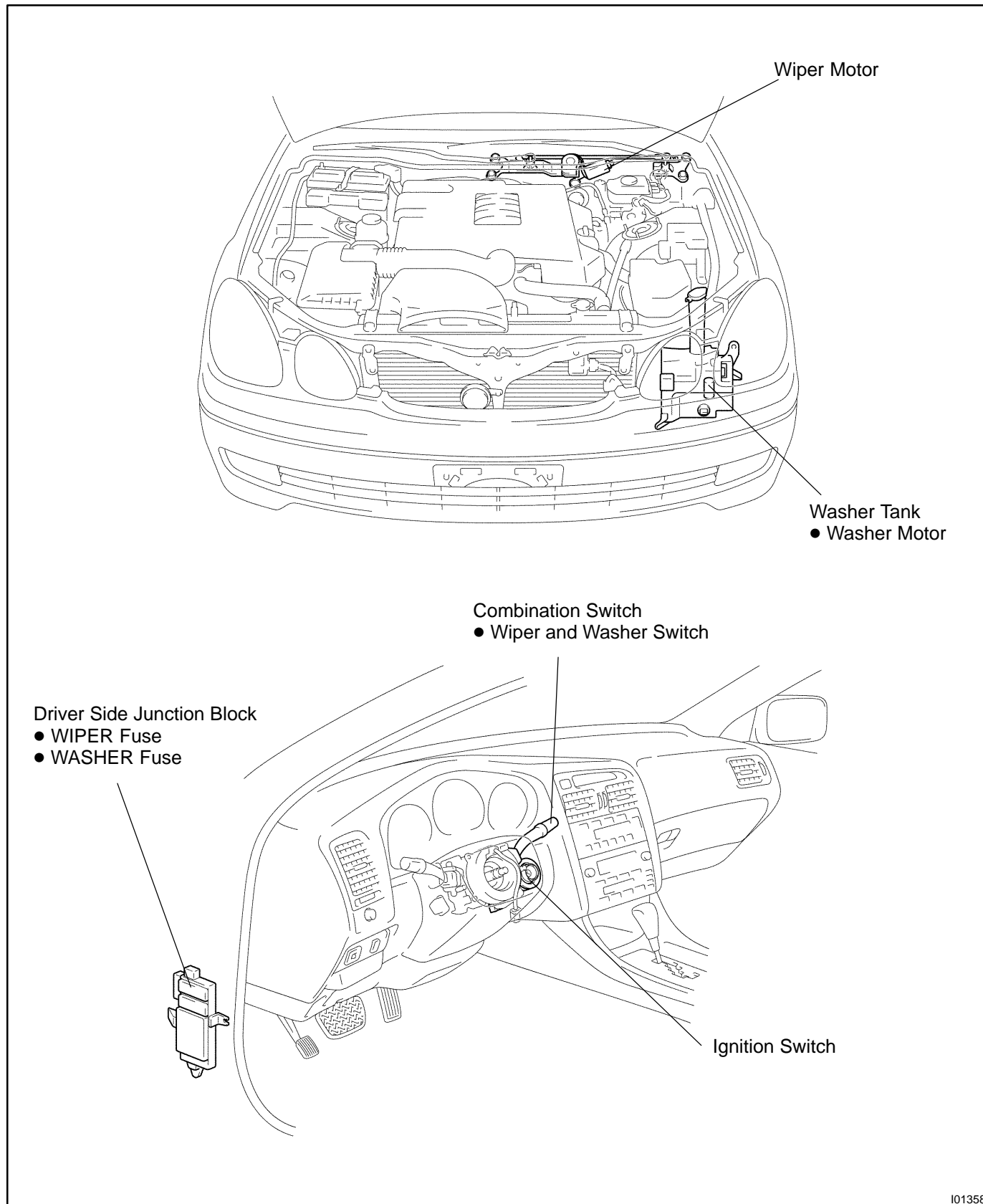
If circuit is not as specified, inspect the circuits connected to other parts.

WIPER AND WASHER SYSTEM

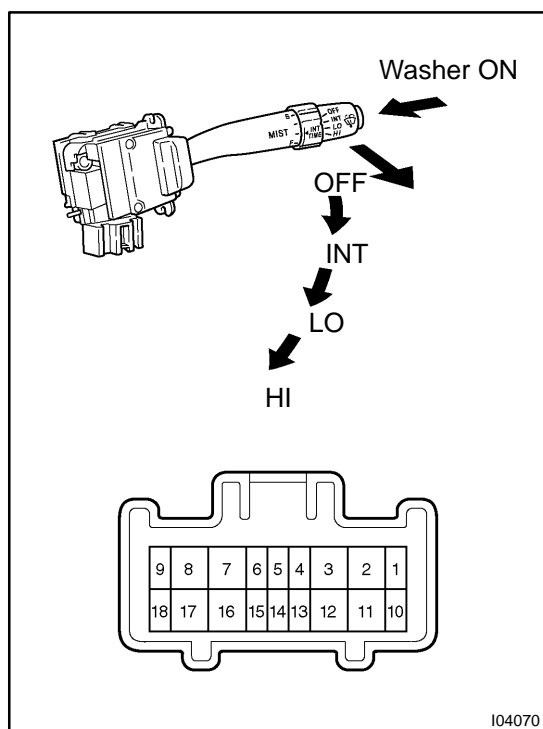
BE0HN-07

LOCATION

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".



I01358

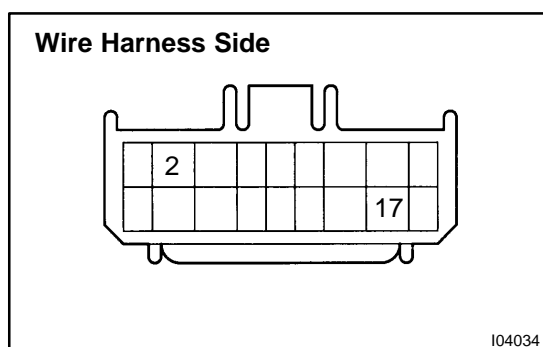


INSPECTION

1. INSPECT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	7 – 16	Continuity
INT	7 – 16	Continuity
LO	7 – 17	Continuity
HI	8 – 17	Continuity
Washer OFF	–	No continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.

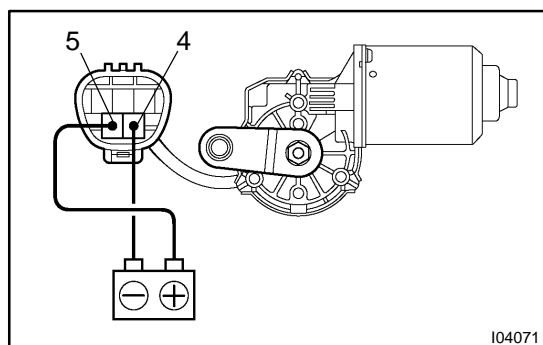


2. INSPECT WIPER AND WASHER SWITCH CIRCUIT Connector disconnected:

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

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

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

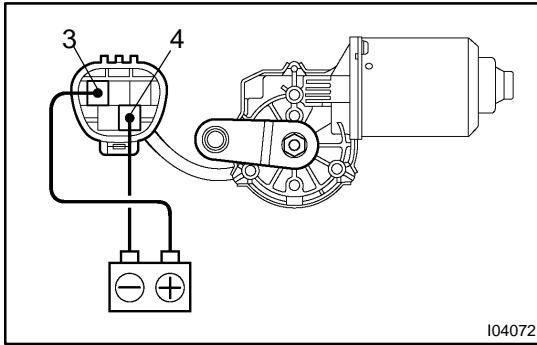


3. INSPECT WIPER MOTOR OPERATION

Low speed:

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

If operation is not as specified, replace the motor.

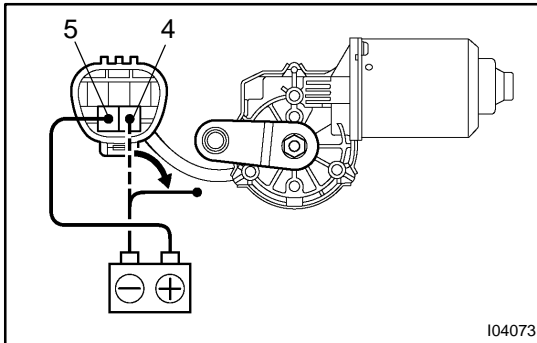


4. INSPECT WIPER MOTOR OPERATION

High speed:

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

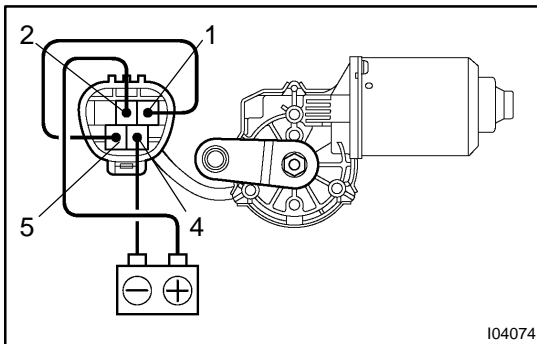
If operation is not as specified, replace the motor.



5. INSPECT WIPER MOTOR OPERATION

Stopping at stop position:

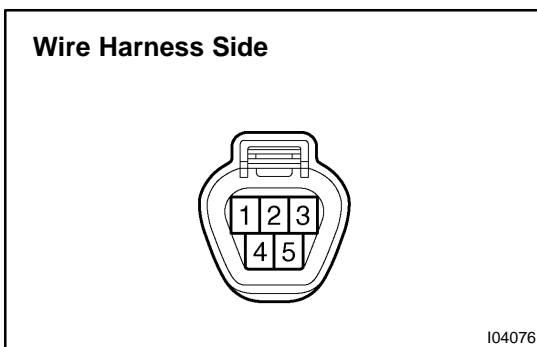
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 5.



(b) Connect terminals 1 and 5.

(c) Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 4, check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.



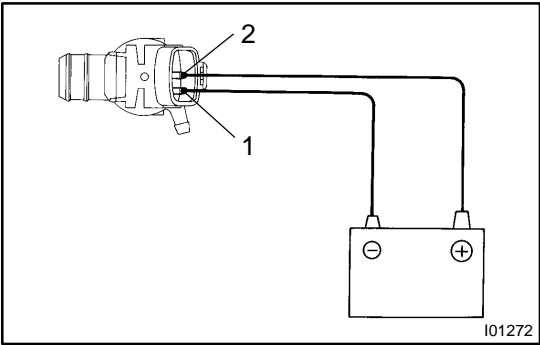
6. INSPECT WIPER MOTOR CIRCUIT

Connector disconnected:

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

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

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



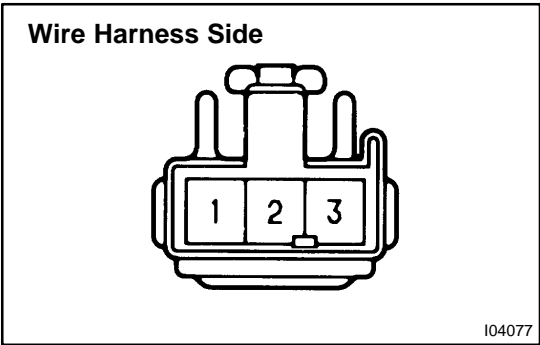
7. INSPECT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



8. INSPECT WASHER MOTOR CIRCUIT

Connector disconnected:

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

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

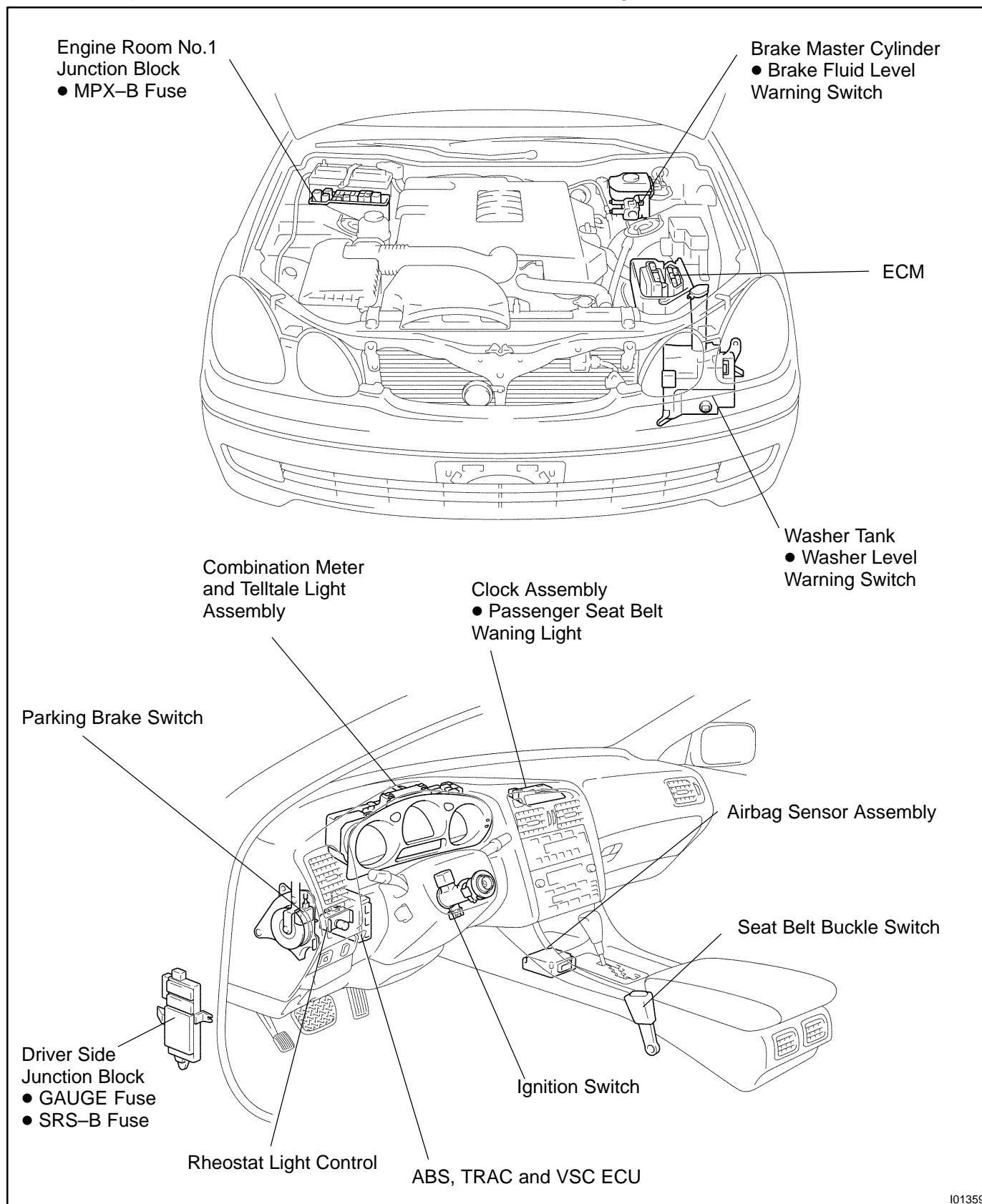
If circuit is not as specified, inspect the power source, wire harness and wiper switch.

COMBINATION METER

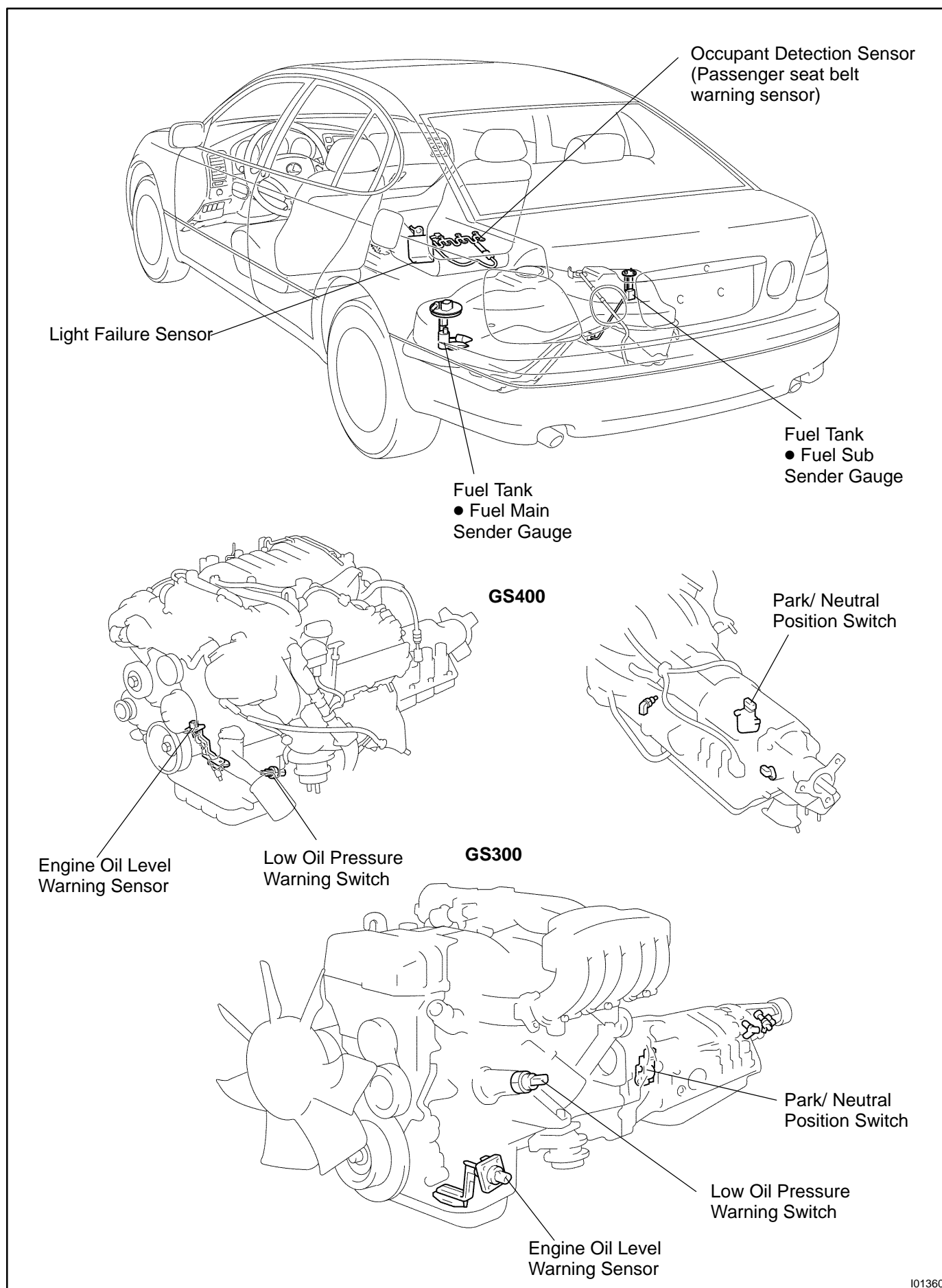
LOCATION

BE0HH-07

- The vehicle shown in this illustration is "GS400".
- All components of "GS300" other than the ones used for engine are same as "GS400".

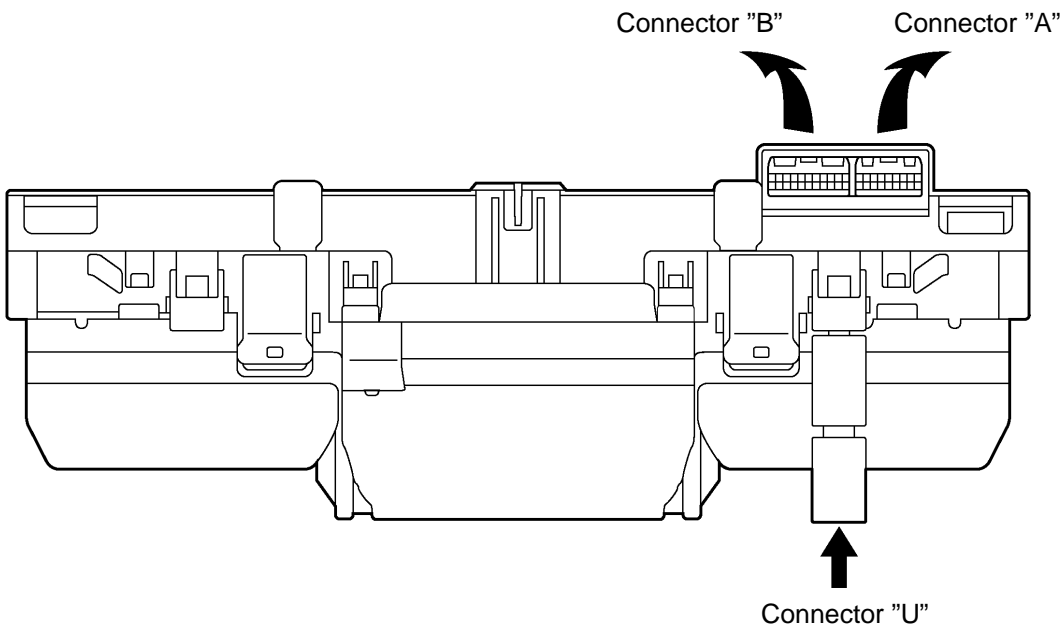
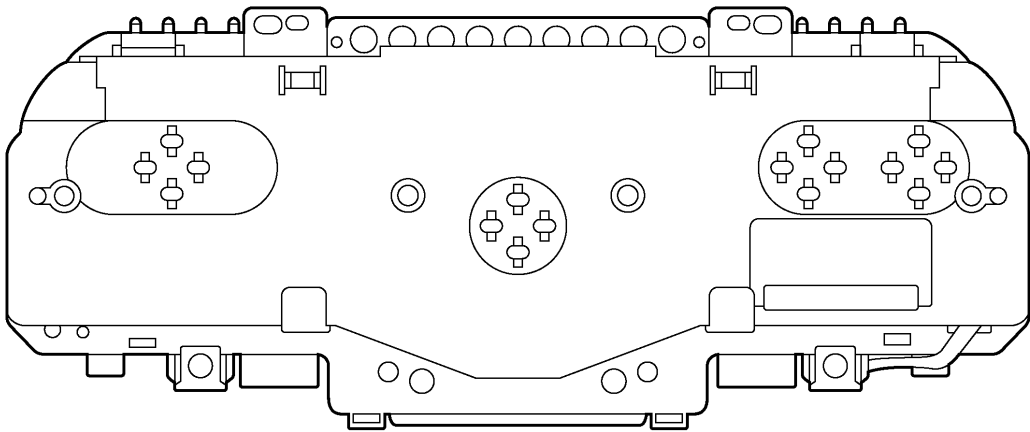


101359



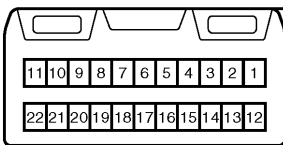
I01360

CIRCUIT

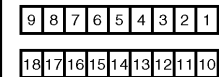


Combination Meter Wiring Circuit Connectors

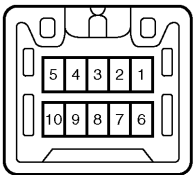
Connector "B"



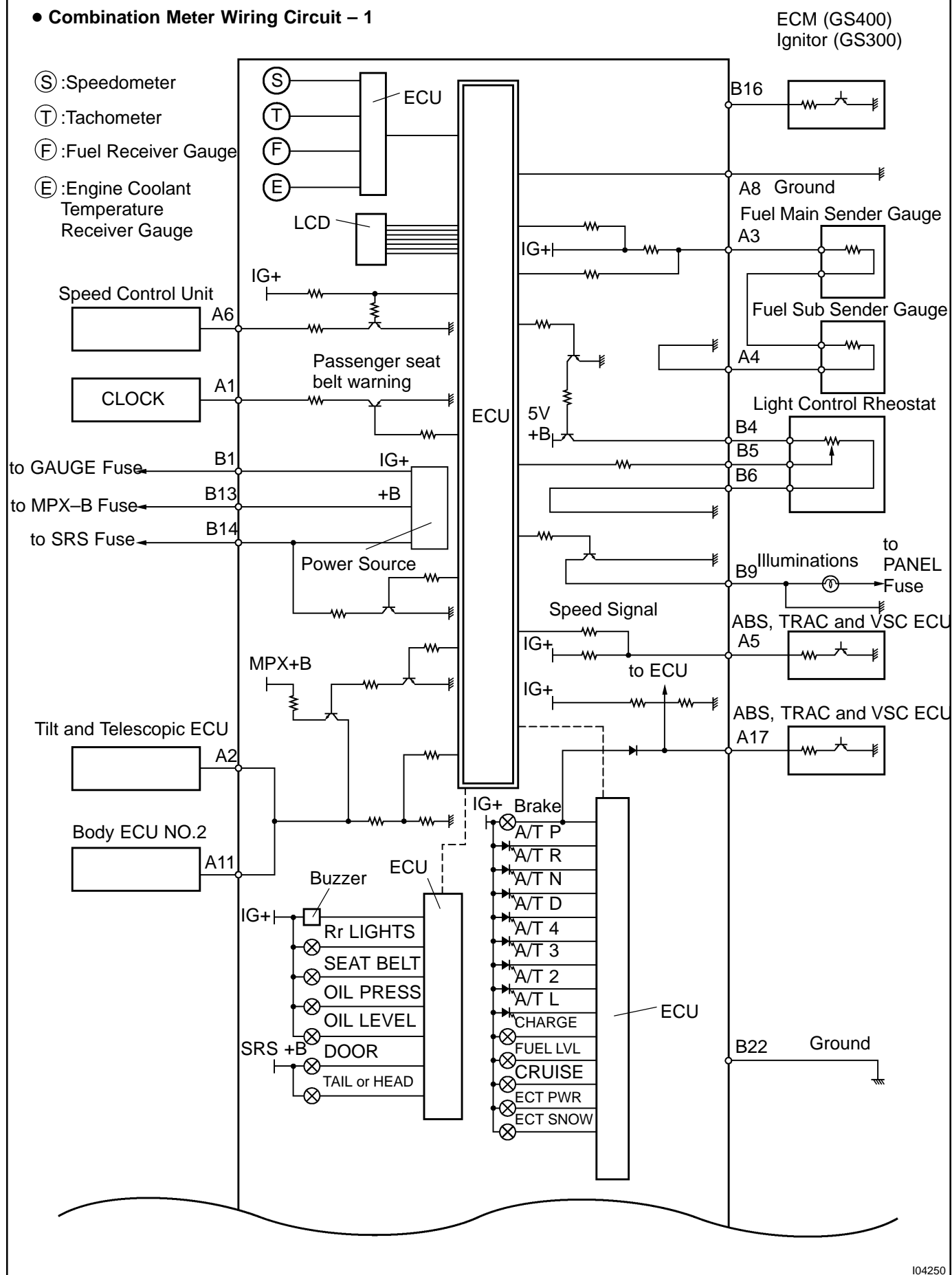
Connector "A"



Connector "U"

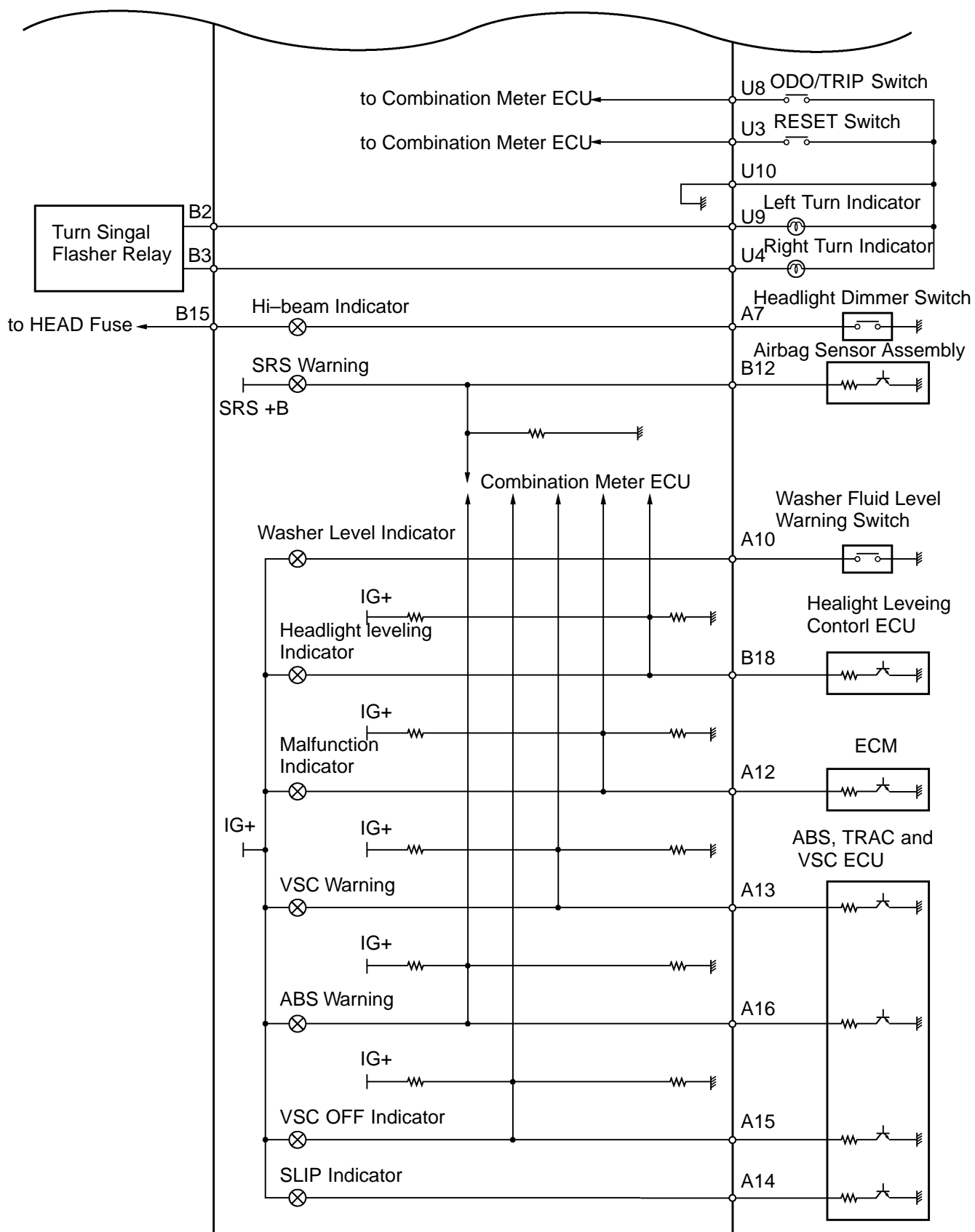


• Combination Meter Wiring Circuit - 1



104250

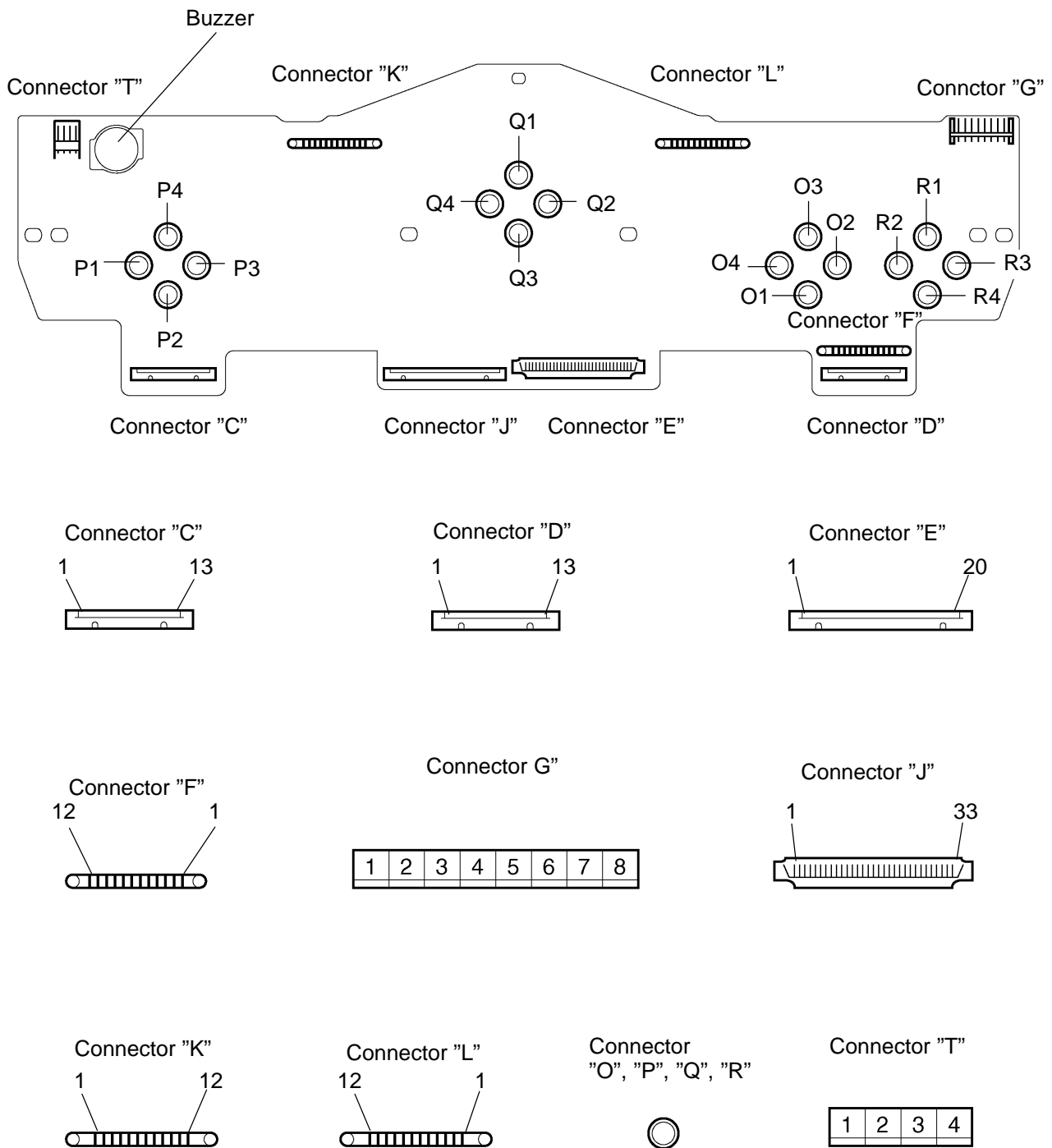
• Combination Meter Wiring Circuit – 2



I04251

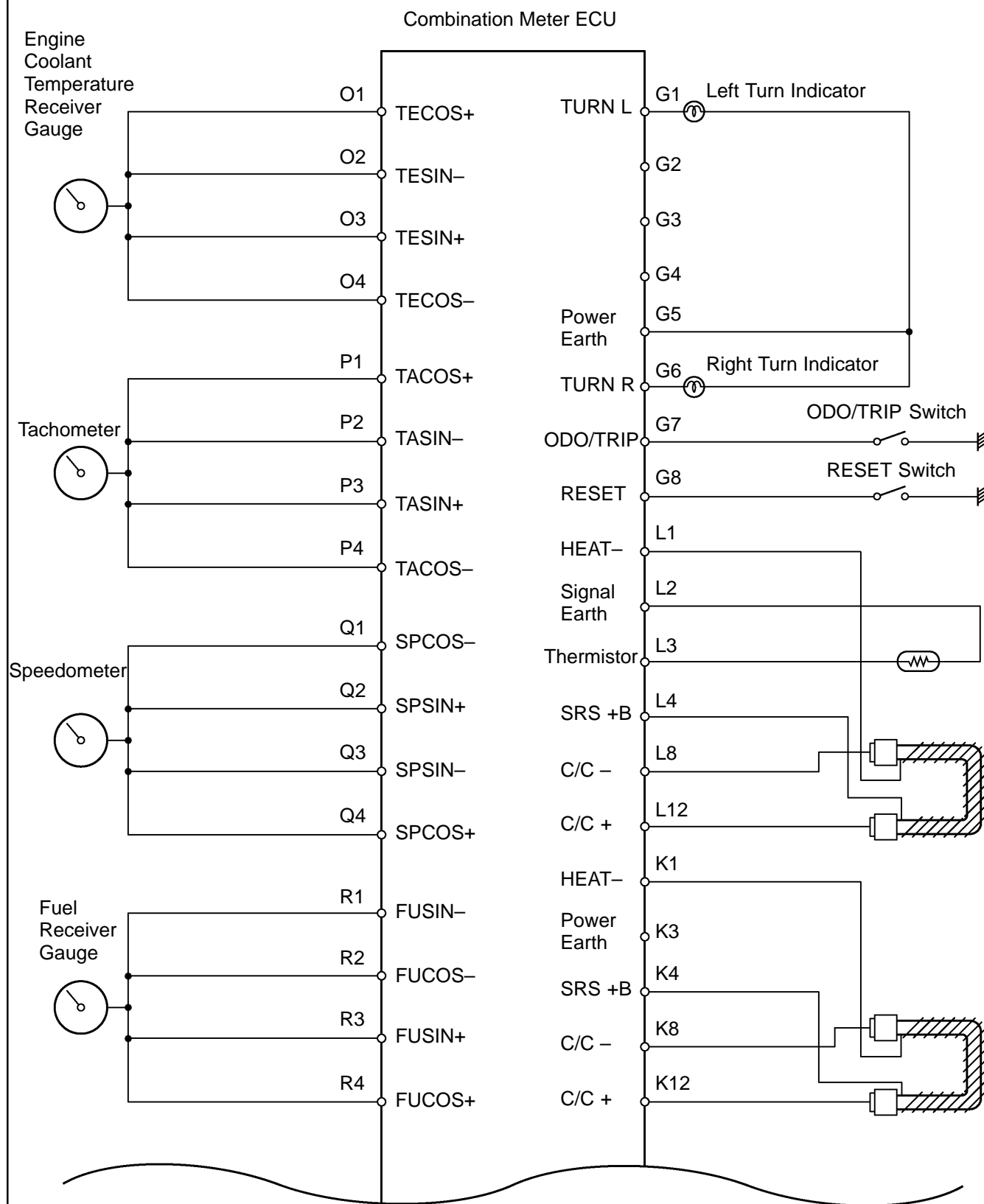
No.		Wiring connector side
A	1	Clock (Passenger seat belt warning light)
	2	Tilt and telescopic ECU
	3	Fuel main sender gauge
	4	Fuel sub sender gauge
	5	ABS, TRAC and VSC ECU (Speed signal)
	6	Speed control unit
	7	Headlight dimmer switch
	8	Ground
	10	Window washer level warning switch
	11	Body control No.2 ECU
	12	ECM
	13	ABS, TRAC and VSC ECU (VSC warning light)
	14	ABS, TRAC and VSC ECU (SLIP warning light)
	15	ABS, TRAC and VSC ECU (TRAC OFF warning light)
	16	ABS, TRAC and VSC ECU (ABS warning light)
	17	ABS, TRAC and VSC ECU (Brake warning light)
B	1	GAUGE fuse
	2	Turn signal flasher (Left turn side)
	3	Turn signal flasher (Right turn side)
	4	Light control rheostat (+B)
	5	Light control rheostat (Signal)
	6	Light control rheostat (Ground)
	9	PANEL fuse
	12	Airbag sensor assembly
	13	MPX+B fuse
	14	DOME+B fuse
	15	HEAD–RH fuse
	16	Igniter
	18	Headlight beam leveling control ECU
	22	Ground
U	1	Telltale light assembly (IG+)
	3	Telltale light assembly (ODO/TRIP switch)
	4	Telltale light assembly (Right turn signal)
	8	Telltale light assembly (RESET switch)
	9	Telltale light assembly (Left turn signal)
	10	Ground

● Combination Meter ECU Plate



I04249

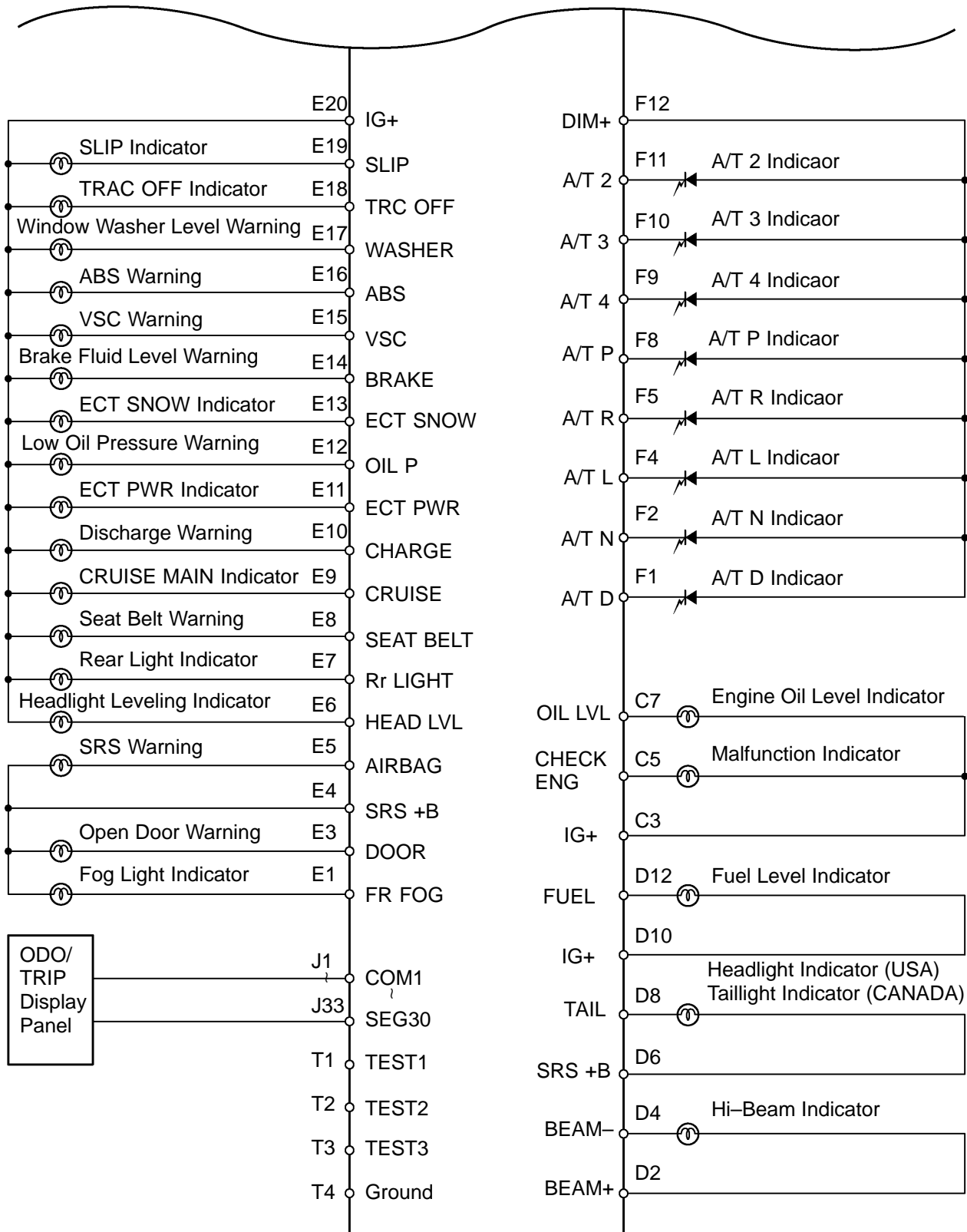
• Meter Circuit Plate - 1



I04252

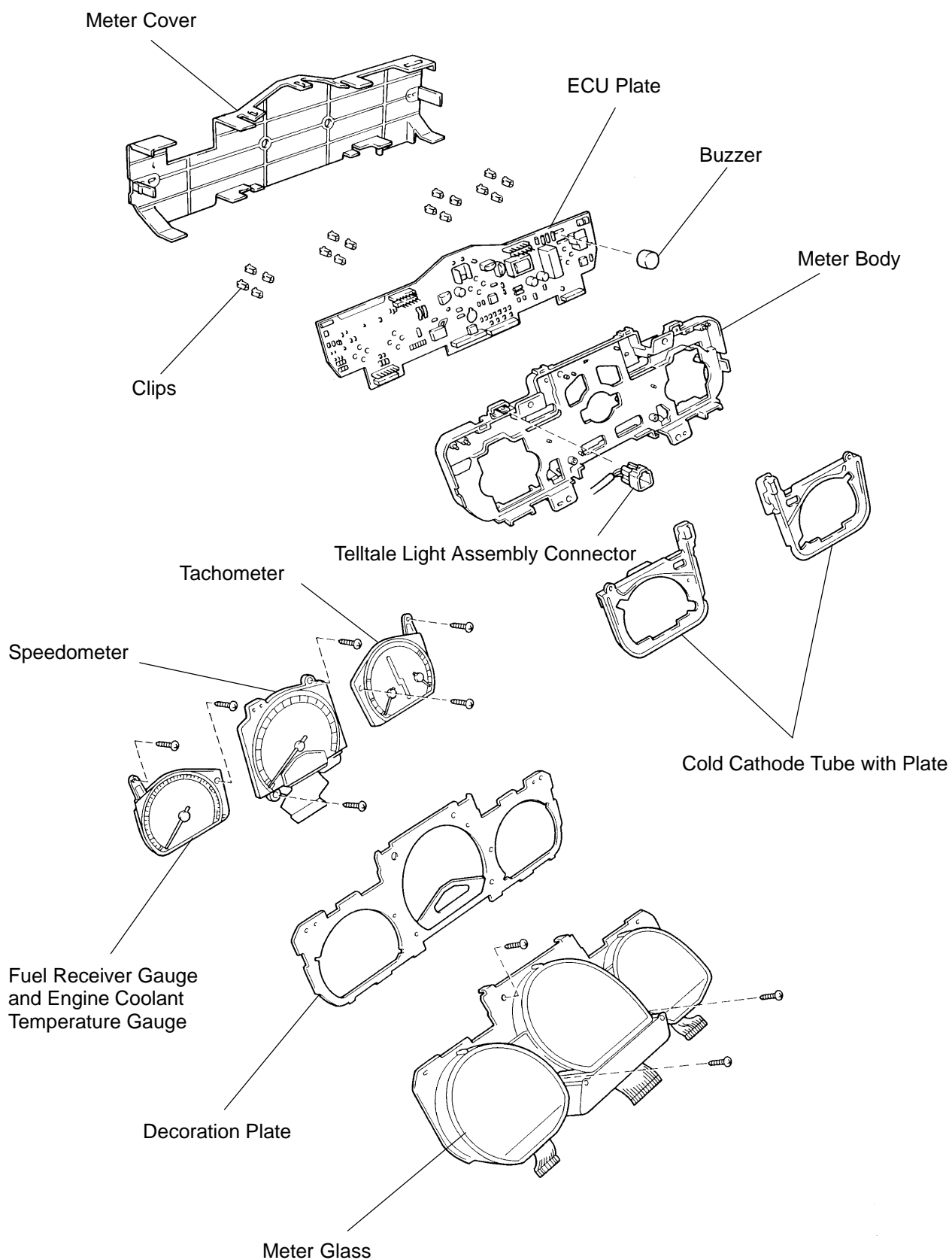
● Meter Circuit Plate – 2

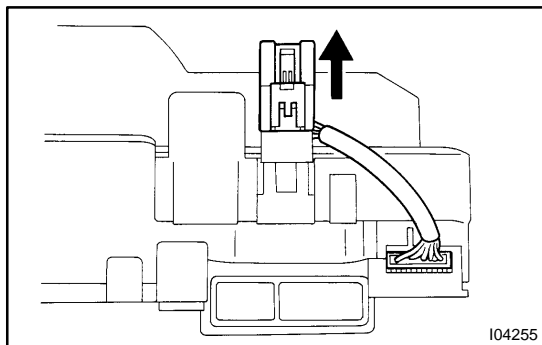
Combination Meter ECU



I04253

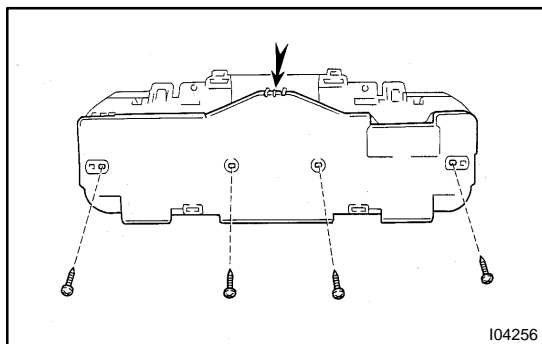
COMPONENTS





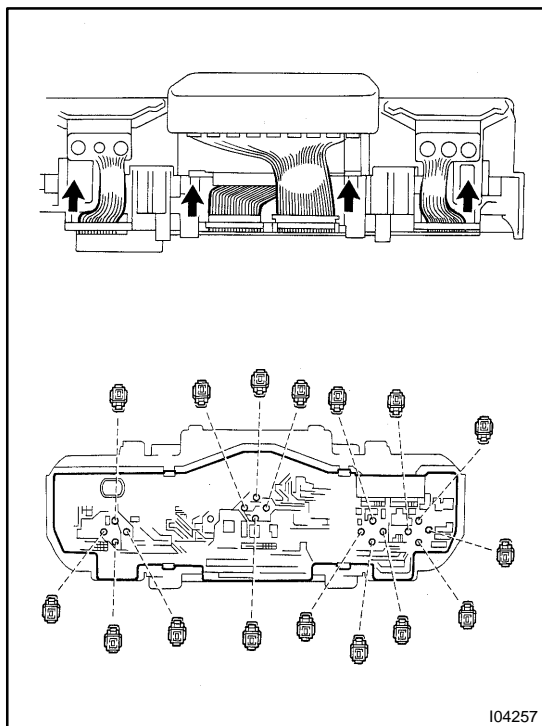
DISASSEMBLY

1. DISCONNECT TELLTALE LIGHT ASSEMBLY CONNECTOR



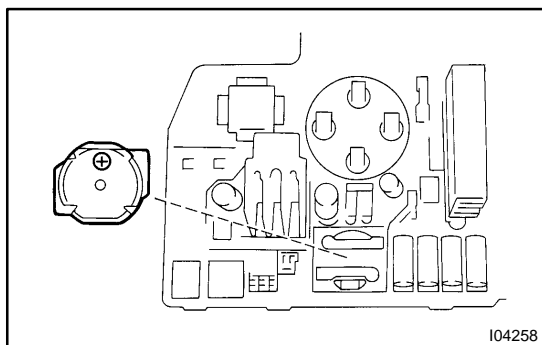
2. REMOVE METER COVER

- (a) Disengage a claw.
- (b) Remove the 4 screws and the meter cover.

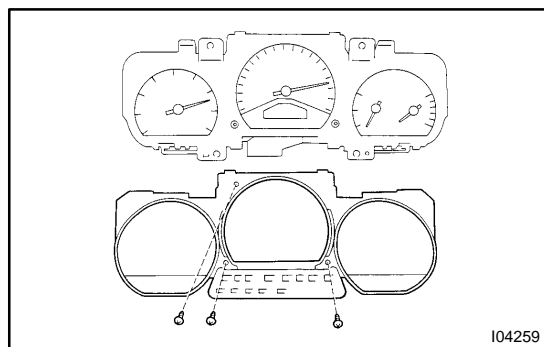


3. REMOVE ECU PLATE

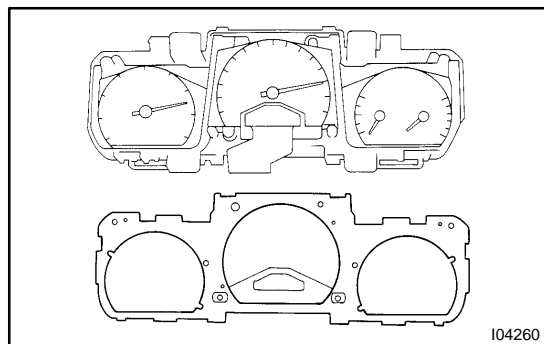
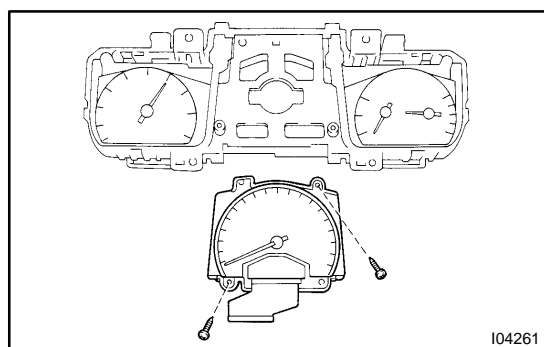
- (a) Disconnect the 4 flat circuit plates.
- (b) Remove the 16 clips and the ECU plate.



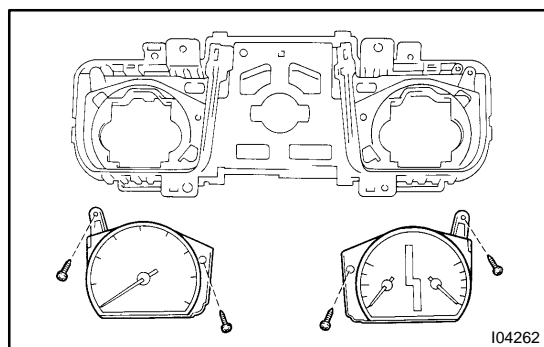
4. REMOVE BUZZER

**5. REMOVE METER GLASS**

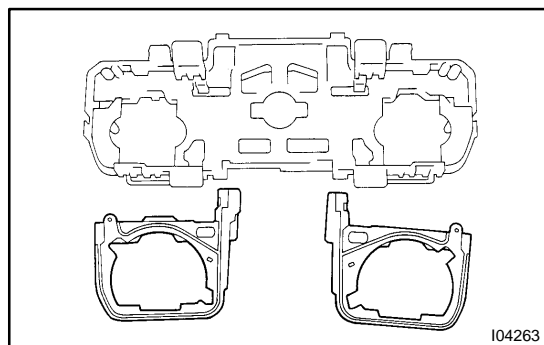
Remove the 3 screws and the meter glass.

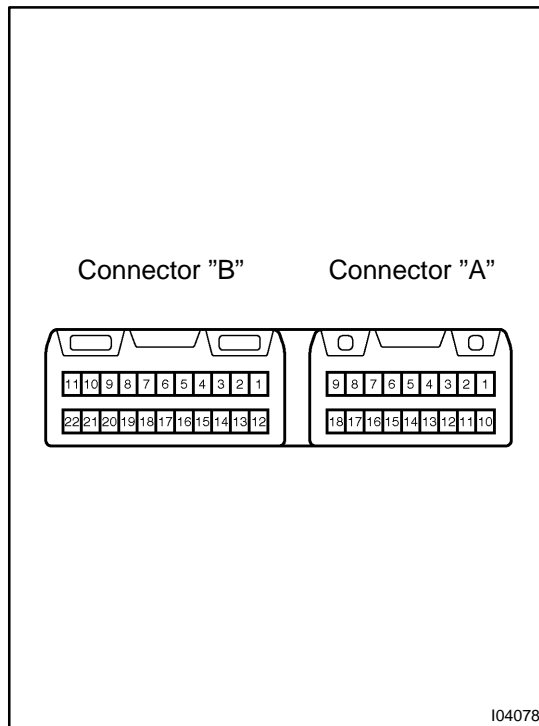
**6. REMOVE DECORATION PLATE****7. REMOVE SPEEDOMETER**

Remove the 2 screws.

**8. REMOVE TACHOMETER, FUEL RECEIVER GAUGE AND ENGINE COOLANT TEMPERATURE RECEIVER GAUGE**

Remove the 4 screws.

**9. REMOVE COLD CATHODE TUBE WITH PLATE**



INSPECTION

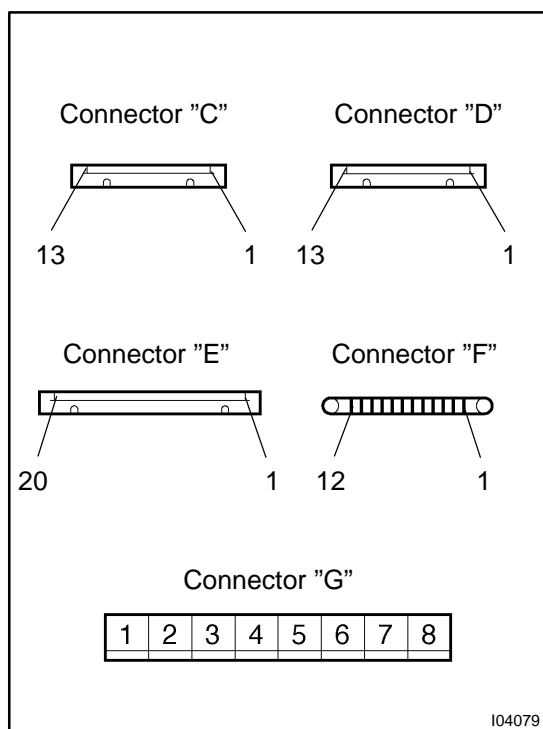
1. INSPECT COMBINATION METER CIRCUIT

Connector disconnected:

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

Tester connection	Condition	Specified condition
A1 – Ground	Ignition switch ON	Battery positive voltage
A3 – A4	Constant	Continuity
A7 – Ground	Light control switch HEAD and headlight dimmer switch HI	Continuity
A8 – Ground B22 – Ground	Constant	Continuity
A10 – Ground	Window washer level warning switch Float down	Continuity
B1 – Ground	Ignition switch ON	Battery positive voltage
B4 – B6	Constant	Approx. 10 kΩ
B13 – Ground	Constant	Battery positive voltage
B14 – Ground	Constant	Battery positive voltage
B15 – Ground	Light control switch in HEAD	Battery positive voltage

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



2. INSPECT COMBINATION METER CIRCUIT PLATE

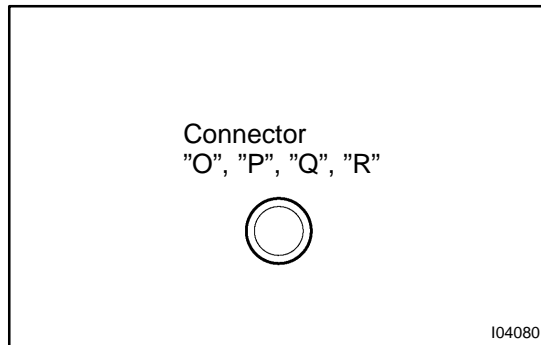
Warning light circuit plate:

- Remove meter cover.
- Disconnect connectors "C", "D", "E", "F" and "G" from the meter circuit plate and inspect the connectors on the wire harness side as shown in the table.

Tester connection	Check indicator light	Specified condition
D10 (+) – D12 (–)	Fuel level warning light	Continuity
D6 (+) – D8 (–)	Headlight indicator light (USA) Taillight indicator light (CANADA)	Continuity
D2 (+) – D4 (–)	Hi-beam indicator light	Continuity
C3 (+) – C7 (–)	Engine oil level warning light	Continuity
C3 (+) – C5 (–)	Malfunction indicator light	Continuity
E19 (–) – E20 (+)	Slip warning light	Continuity
E18 (–) – E20 (+)	TRAC OFF indicator light	Continuity
E17 (–) – E20 (+)	Window washer level warning light	Continuity
E16 (–) – E20 (+)	ABS warning light	Continuity
E15 (–) – E20 (+)	VSC OFF indicator light	Continuity
E14 (–) – E20 (+)	Brake warning light	Continuity
E13 (–) – E20 (+)	ECT SNOW indicator light	Continuity
E12 (–) – E20 (+)	Low oil pressure warning light	Continuity
E11 (–) – E20 (+)	ECT PWR indicator light	Continuity
E10 (–) – E20 (+)	Discharge warning light	Continuity
E9 (–) – E20 (+)	CRUISE MAIN indicator light	Continuity
E8 (–) – E20 (+)	Seat belt warning light	Continuity
E7 (–) – E20 (+)	Rear Lights warning light	Continuity
E6 (–) – E20 (+)	Headlight leveling indicator	Continuity
E4 (+) – E5 (–)	SRS warning light	Continuity
E3 (–) – E4 (+)	Open door warning light	Continuity
F4 (–) – F12 (+)	A/T shift indicator light (L)	Continuity
F11 (–) – F12 (+)	A/T shift indicator light (2)	Continuity
F10 (–) – F12 (+)	A/T shift indicator light (3)	Continuity
F8 (–) – F12 (+)	A/T shift indicator light (P)	Continuity

F5 (–) – F12 (+)	A/T shift indicator light (R)	Continuity
F2 (–) – F12 (+)	A/T shift indicator light (N)	Continuity
F1 (–) – F12 (+)	A/T shift indicator light (D)	Continuity
G1 (+) – G5 (–)	Left turn signal indicator light	Continuity
G6 (+) – G5 (–)	Right turn signal indicator light	Continuity

If circuit is not as specified, replace the bulb or circuit plate.



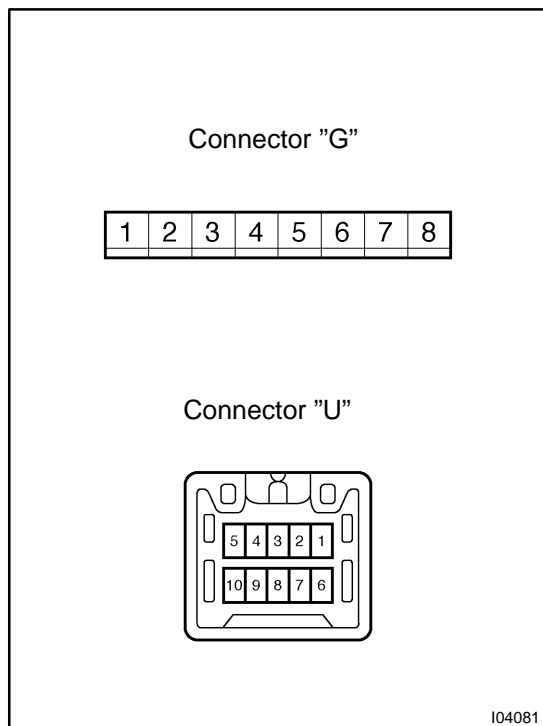
3. INSPECT COMBINATION METER CIRCUIT PLATE

From combination meter ECU to gauges:

Terminal	Resistance (Ω)
O1 – O3 (Engine coolant temperature receiver gauge)	Approx. 164.2
O2 – O4 (Engine coolant temperature receiver gauge)	Approx. 151.8
P1 – P4 (Tachometer)	Approx. 164.2
P2 – P3 (Tachometer)	Approx. 151.8
Q1 – Q4 (Speedometer)	Approx. 164.2
Q2 – Q3 (Speedometer)	Approx. 151.8
R1 – R4 (Fuel receiver gauge)	Approx. 164.2
R2 – R3 (Fuel receiver gauge)	Approx. 151.8

If circuit is not as specified, inspect the gauge or meter.
Then recheck system.

If circuit is not as specified, replace the circuit plate.



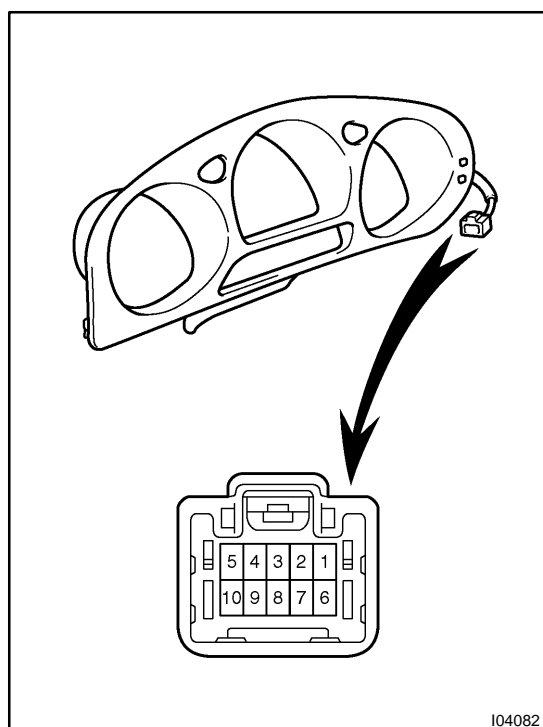
4. INSPECT COMBINATION METER CIRCUIT PLATE

From combination meter ECU to telltale light assembly:

Disconnect connector "G" and "U" from the meter circuit plate and inspect the connectors on the wire harness side as follows.

Tester connection	Specified condition
G1 – U9	Continuity
G3 – U1	Continuity
G5 – U10	Continuity
G6 – U4	Continuity
G7 – U3	Continuity
G8 – U8	Continuity

If circuit is not as specified, replace the circuit plate.



5. INSPECT TELLTALE LIGHT ASSEMBLY CONTINUITY

Switch position	Tester connection	Condition
ODO/ TRIP switch Free	3 – 10	No continuity
ODO/ TRIP switch Pushed in	3 – 10	Continuity
RESET switch Free	8 – 10	No continuity
RESET switch Pushed in	8 – 10	Continuity
Turn signal switch RIGHT	4 – 10	Continuity
Turn signal switch LEFT	9 – 10	Continuity

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

6. INSPECT SPEEDOMETER ON-VEHICLE

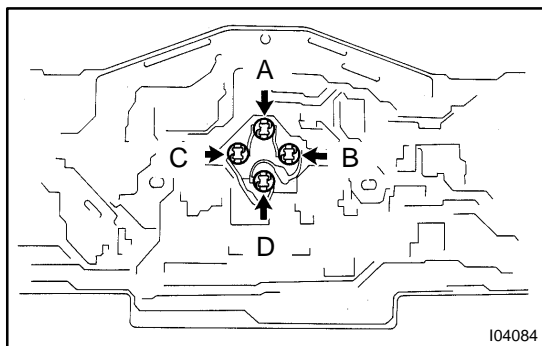
Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT:

Tire wear and tire over or under inflation will increase the indication error.

USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18 – 24	20	17 – 24
40	38 – 44	40	38 – 46
60	56 – 66	60	57.5 – 67
80	78 – 88	80	77 – 88
100	98 – 110	100	96 – 109
120	118 – 132	120	115 – 130
		140	134 – 151.5
		160	153 – 173

If error is excessive, replace the speedometer.



7. INSPECT SPEEDOMETER RESISTANCE

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

Tester connection	Resistance (Ω)
A – B	140 – 185
C – D	130 – 175

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

8. INSPECT TACHOMETER/ ON-VEHICLE

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

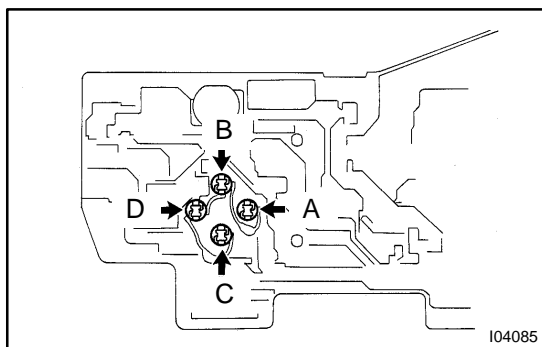
NOTICE:

- Reversing the connection of the tachometer will damage the transistors and diodes inside.
- When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.

- (b) Compare the tester and tachometer indications.

DC 13.5 V 25 °C at (77 °F)

Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,750 – 6,250
7,000	6,700 – 7,300

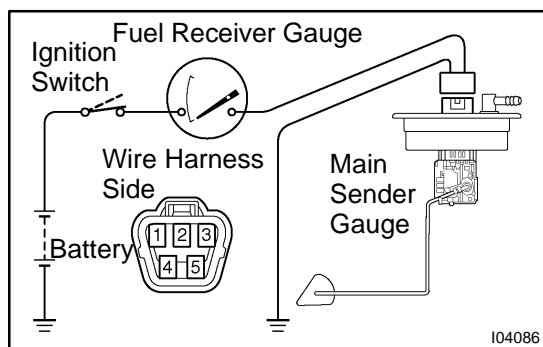


9. INSPECT TACHOMETER RESISTANCE

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

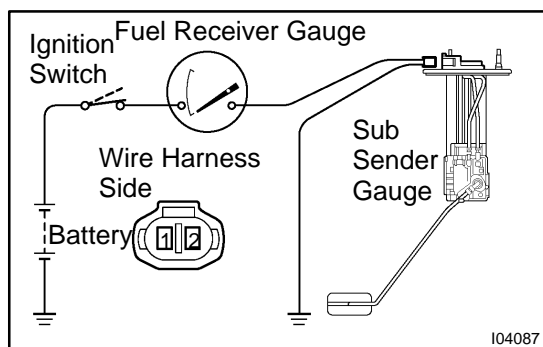
Tester connection	Resistance (Ω)
A – B	140 – 185
C – D	130 – 175

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



10. INSPECT FUEL RECEIVER GAUGE OPERATION (See page DI-752)

- Disconnect the connector from the main sender gauge.
- Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.

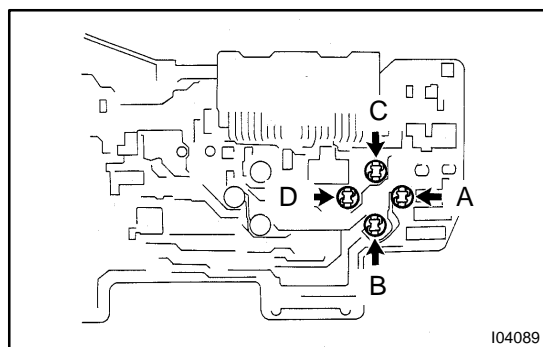


- Connect the main sender gauge.
- Disconnect the connector from the sub sender gauge.
- Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.

HINT:

Because of the silicon oil in the gauge, it will take a short time for needle to stabilize.

If operation is not as specified, inspect the receiver gauge resistance.

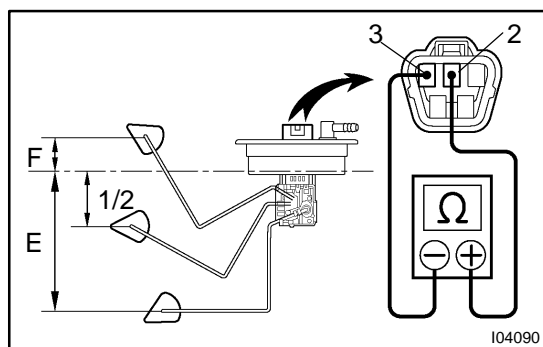


11. INSPECT FUEL RECEIVER GAUGE RESISTANCE

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

Tester connection	Resistance (Ω)
A – B	140 – 185
C – D	130 – 175

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

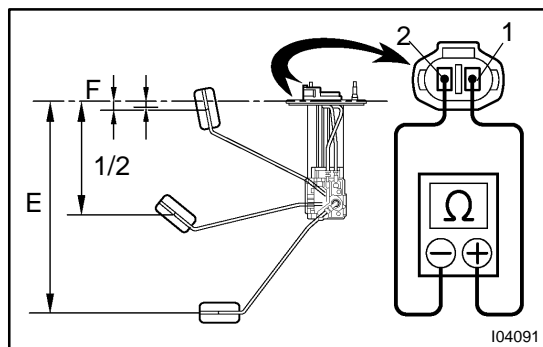


12. INSPECT FUEL MAIN SENDER GAUGE RESISTANCE

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

Float position mm (in.)	Resistance (Ω)
F: Approx. 34.6 (1.36) \pm 3 (0.12)	Approx. 2.0 \pm 1.0
1/2: Approx. 52.4 (2.06) \pm 3 (0.12)	Approx. 26.1 \pm 3.0
E: Approx. 134.9 (5.31) \pm 3 (0.12)	Approx. 48.7 \pm 1.0

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

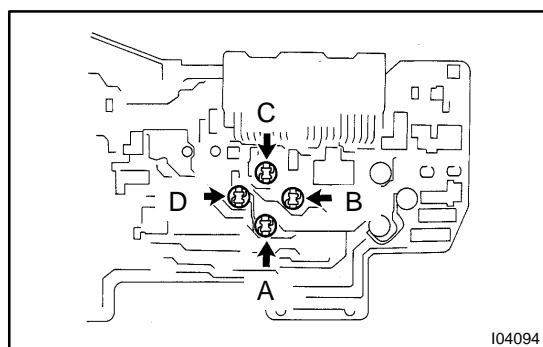


13. INSPECT FUEL SUB SENDER GAUGE RESISTANCE
Measure the resistance between terminals 1 and 2 for each float position.

Float position mm (in.)	Resistance (Ω)
F: Approx. 9.5 (0.37) \pm 3 (0.12)	Approx. 2.0 \pm 1.0
1/2: Approx. 110.5 (4.35) \pm 3 (0.12)	Approx. 33.0 \pm 3.0
E: Approx. 206.5 (8.13) \pm 3 (0.12)	Approx. 61.3 \pm 1.0

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

14. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION (See page DI-754)



15. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE RESISTANCE

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

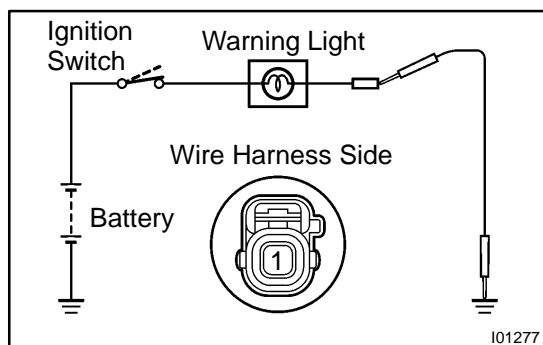
Tester connection	Resistance (Ω)
A – B	140 – 185
C – D	130 – 175

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

HINT:

This circuit includes the diode.

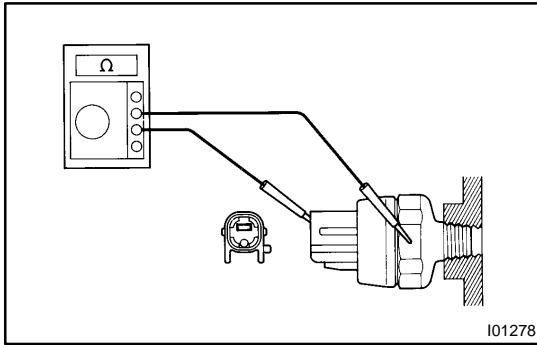
If resistance value is not as specified, replace the receiver gauge.



16. INSPECT LOW OIL PRESSURE WARNING LIGHT

- Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
- Turn the ignition switch ON and check that the warning light lights up.

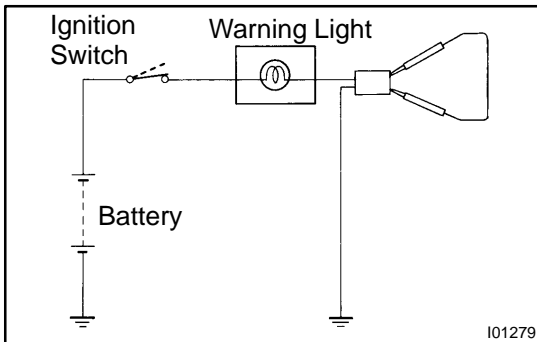
If the warning light does not light up, test the bulb.

**17. INSPECT LOW OIL PRESSURE SWITCH CONTINUITY**

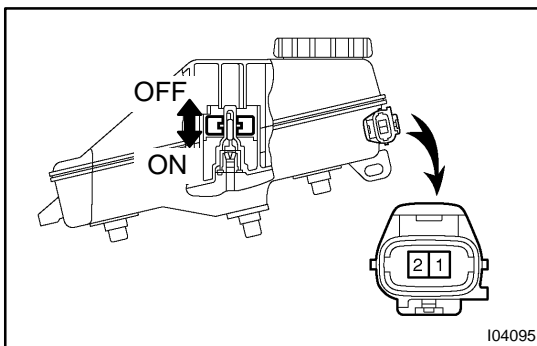
- (a) Disconnect the connector from the switch.
- (b) Check that continuity exists between terminal and ground with the engine stopped.
- (c) Check that no continuity exists between terminal and ground with the engine running.

HINT:

Oil pressure should be over 24.5 kPa (0.25 kgf/cm², 3.55 psi).
If operation is not as specified, replace the switch.

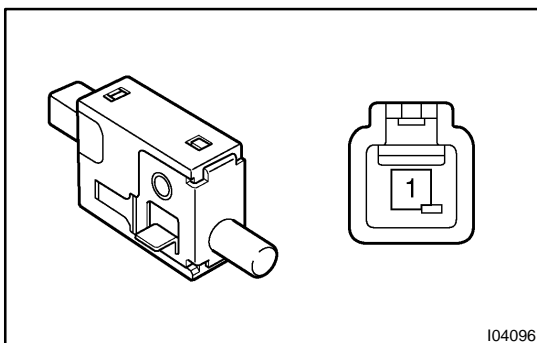
**18. INSPECT BRAKE WARNING LIGHT**

- (a) Disconnect the connector from the brake fluid warning switch.
- (b) Release the parking brake pedal.
- (c) Connect the terminals on the wire harness side of the level warning switch connector.
- (d) Start the engine, check that the warning light lights up.
If the warning light does not light up, test the bulb or wire harness.

**19. INSPECT BRAKE FLUID LEVEL WARNING SWITCH CONTINUITY**

- (a) Remove the reservoir tank cap and strainer.
- (b) Disconnect the connector.
- (c) Check that no continuity exists between the terminals with the switch OFF (float up).
- (d) Use siphon, etc. to take fluid out of the reservoir tank.
- (e) Check that continuity exists between the terminals with the switch ON (float down)
- (f) Pour the fluid back in the reservoir tank.

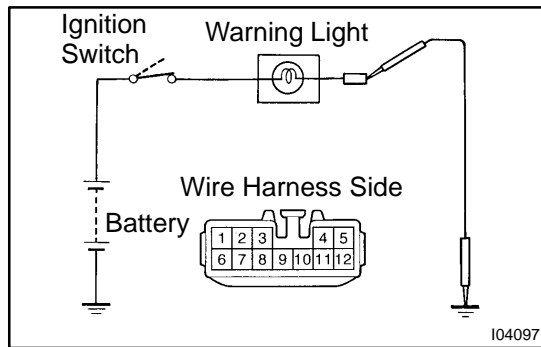
If operation is not as specified, replace the switch.

20. INSPECT BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT (See page [DI-835](#))**21. INSPECT PARKING BRAKE SWITCH CONTINUITY**

- (a) Check that continuity exists between the terminal and switch body with the switch ON (switch pin released).
- (b) Check that no continuity exists between the terminal and switch body with the switch OFF (switch pin pushed in).

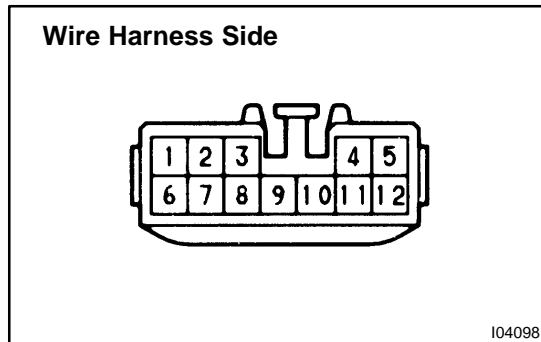
If operation is not as specified, replace the switch or inspect ground point.

22. INSPECT PARKING BRAKE SWITCH CIRCUIT (See page [DI-796](#))



23. INSPECT REAR LIGHTS WARNING LIGHT (See page DI-841)

- Disconnect the connector from the light failure sensor and ground terminal 3 on the wire harness side connector.
- Start the engine, check that the warning light lights up. If the warning light does not light up, inspect the bulb or wire harness.



24. INSPECT LIGHT FAILURE SENSOR CIRCUIT

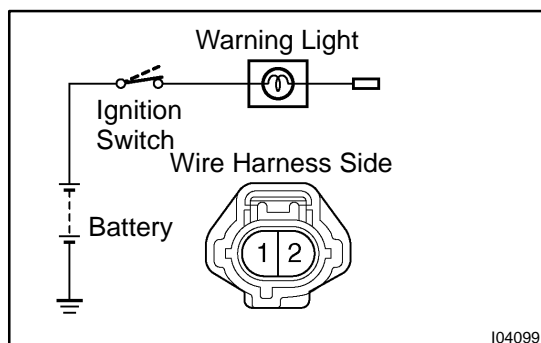
Disconnect connector from the light failure sensor and inspect the connectors on the wire harness side as follows.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity *
2 – Ground	Constant	Continuity *
6 – Ground	Constant	Continuity *
7 – Ground	Constant	Continuity *
11 – Ground	Constant	Continuity
12 – Ground	Constant	Continuity *
5 – Ground	Light control switch OFF	No voltage
5 – Ground	Light control switch in TAIL or HEAD	Battery positive voltage
8 – Ground	Ignition switch in LOCK or ACC	No voltage
8 – Ground	Ignition switch ON	Battery positive voltage
9, 10 – Ground	Stop light switch OFF	No voltage
9, 10 – Ground	Stop light switch ON	Battery positive voltage

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

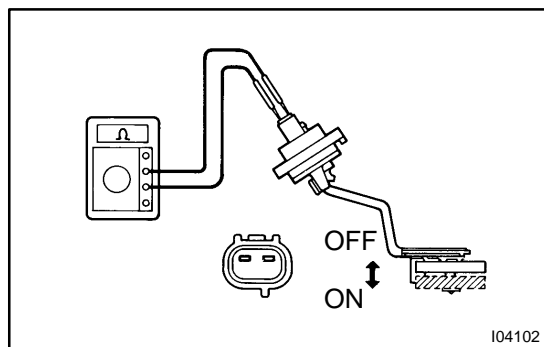
If circuit is as specified, replace the relay.

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



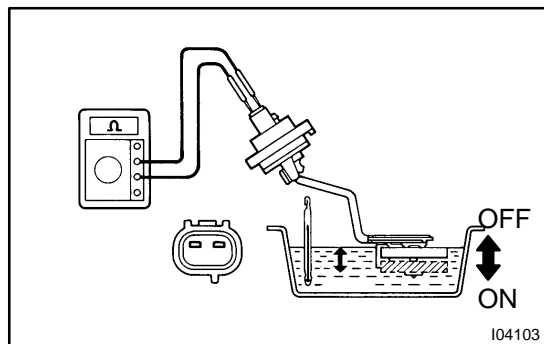
25. INSPECT ENGINE OIL LEVEL WARNING LIGHT

- Disconnect the connector from the switch.
 - Run the engine.
 - 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.



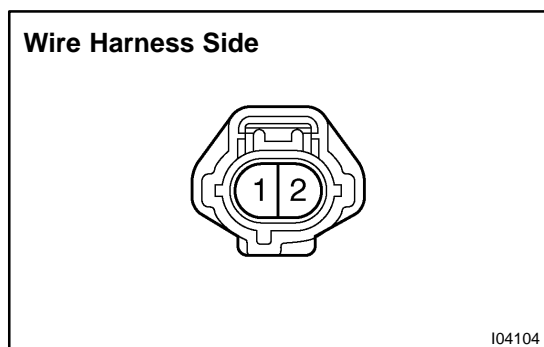
26. INSPECT ENGINE OIL LEVEL WARNING SENSOR

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



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

If operation is not as specified, replace the switch.

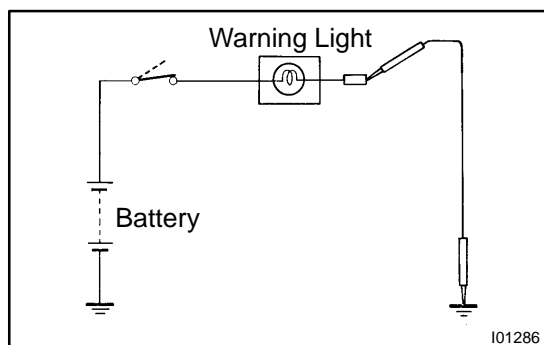


27. INSPECT ENGINE OIL LEVEL WARNING SENSOR CIRCUIT

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

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

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

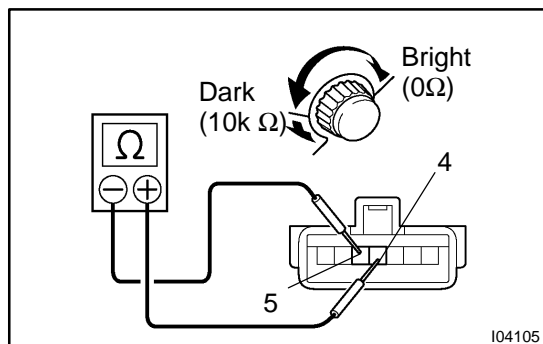


28. INSPECT OPEN DOOR WARNING LIGHT

Disconnect the connector from the door courtesy switch and ground terminal 1 on the wire harness side, and check that the warning light lights up.

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

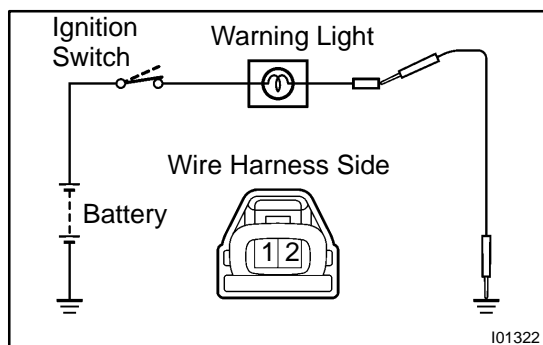
29. INSPECT DOOR COURTESY SWITCH CONTINUITY AND CIRCUIT (See page BE-60)



30. INSPECT LIGHT CONTROL RHEOSTAT OPERATION

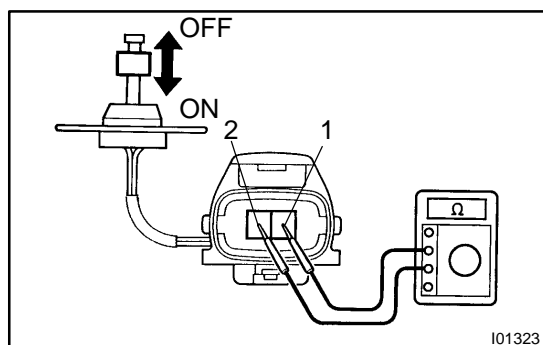
Gradually, turn the rheostat knob from the bright side to dark side and check that the resistance decreases from 10 kΩ to 0 Ω between terminal 4 and 5. (Rheostat knob turned to clockwise)

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



31. INSPECT WINDOW WASHER LEVEL WARNING LIGHT

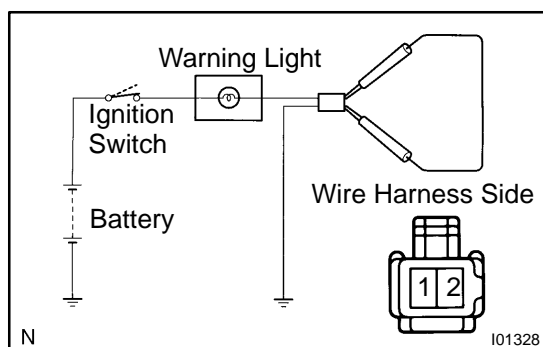
- Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
- Engine running and check that the warning light lights up. If the warning light does not light up, inspect the bulb or wire harness.



32. INSPECT WINDOW WASHER LEVEL WARNING SWITCH CONTINUITY

- Check that no continuity exists between the terminals with the switch OFF (float up).
- Check that continuity exists between the terminals with the switch ON (float down).

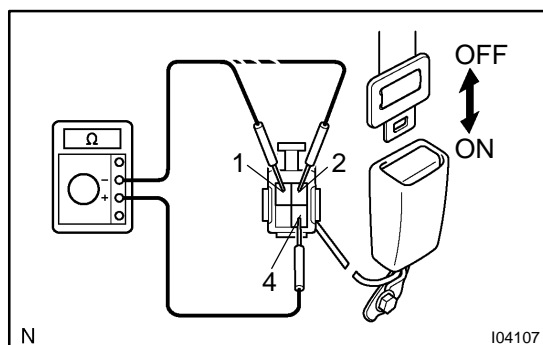
If operation is not as specified, replace the switch or inspect ground point.



33. INSPECT SEAT BELT WARNING LIGHT

- Disconnect the connector from the retractor switch and ground terminal on the wire harness side connector.
- Turn the ignition switch ON and check that the warning light lights up.

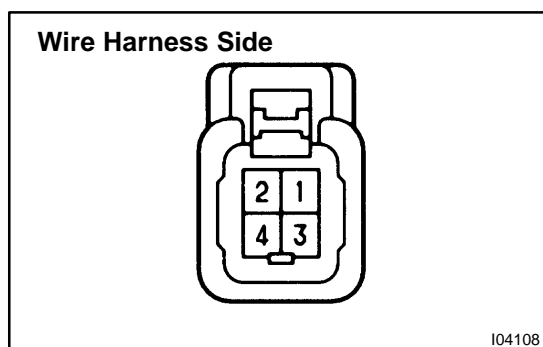
If the warning light does not light up, inspect the bulb or wire harness.



34. INSPECT SEAT BELT BUCKLE SWITCH CONTINUITY

- Check that continuity exists between the terminals 1 and 4 on the switch side connector with the switch ON (belt fastened).
- Check that continuity exists between the terminals 2 and 4 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the switch.

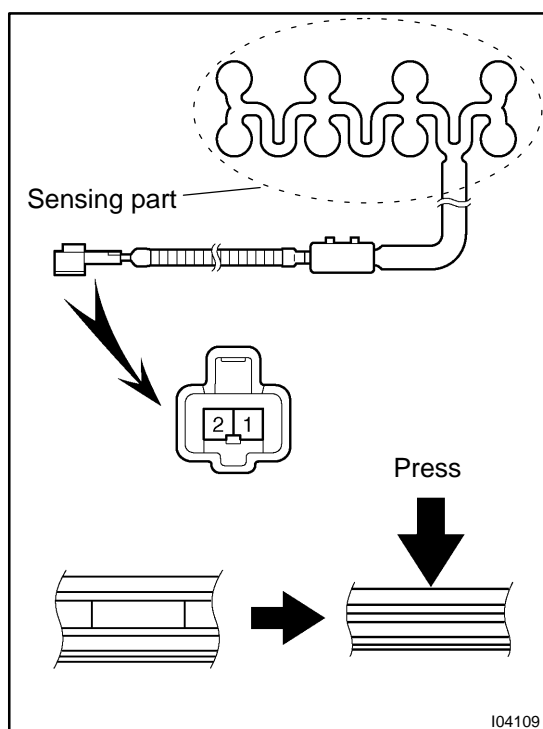


35. INSPECT SEAT BELT BUCKLE SWITCH CIRCUIT
Driver side: (See page DI-830)
Passenger side: (See page DI-785)

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

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity

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



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

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

If operation is not as specified, replace the sensor.

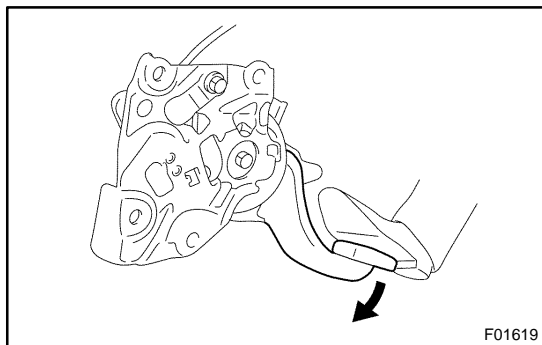
37. Passenger seat only:
INSPECT SEAT BELT WARNING OCCUPANT DETECTION SENSOR CIRCUIT (See page DI-785)

BRAKE SYSTEM

BR0J9-01

GENERAL DESCRIPTION

- Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.
- It is very important to keep parts and the area clean when repairing the brake system.
- If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.



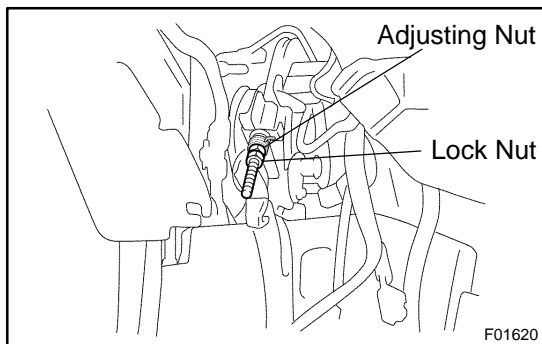
PARKING BRAKE PEDAL ON-VEHICLE INSPECTION

BRQJD-03

1. CHECK PARKING BRAKE PEDAL TRAVEL

Depress the parking brake pedal all the way and count the number of clicks.

**Parking brake lever travel at 294 N (30 kgf, 66.1 lbf):
7 – 9 clicks**



2. IF NECESSARY, ADJUST PARKING BRAKE

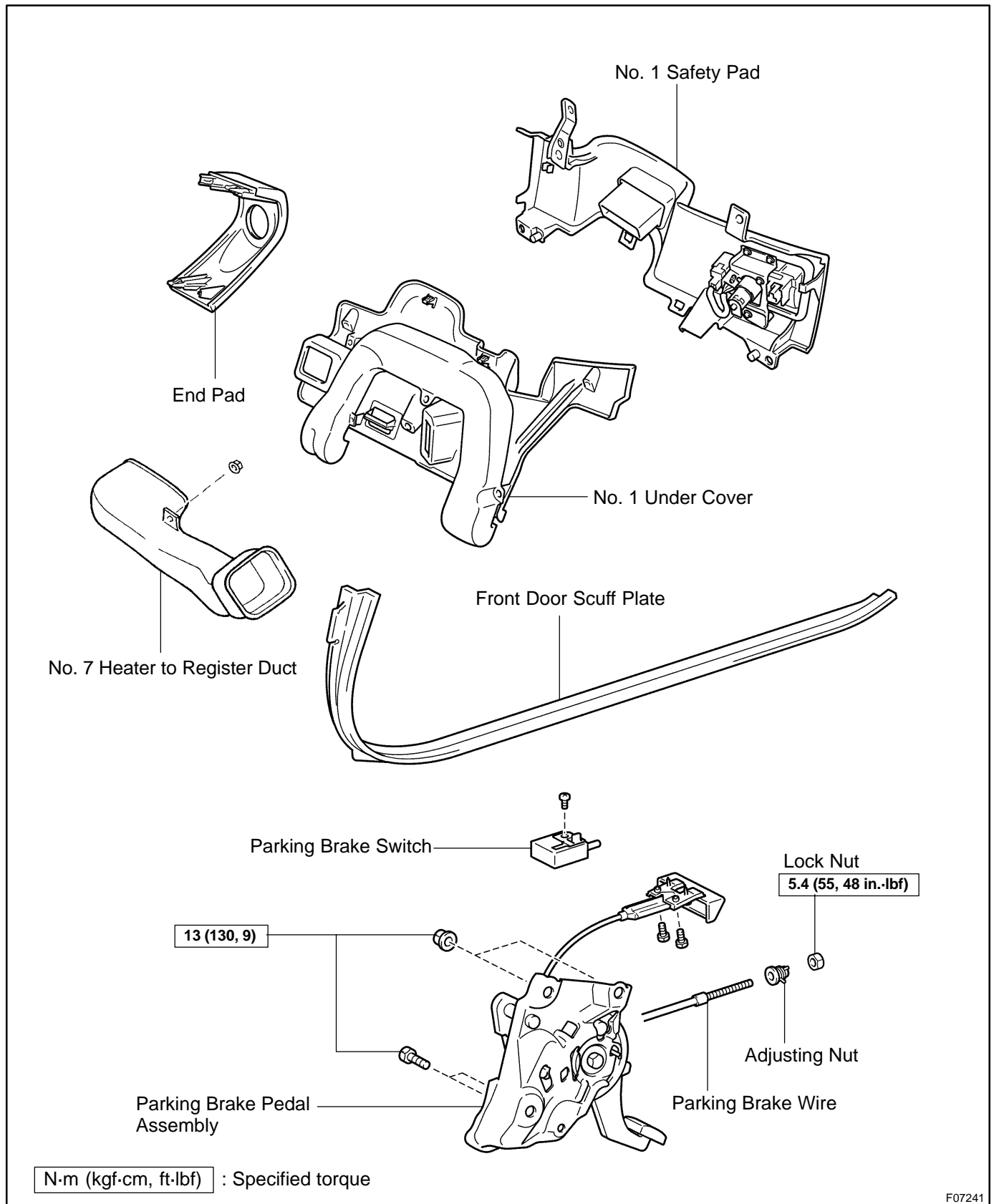
HINT:

Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted. For shoe clearance adjustment see page [BR-37](#).

- (a) Loosen the lock nut and turn the adjusting nut until the pedal travel is correct.
- (b) Tighten the lock nut.

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

COMPONENTS



F07241

REMOVAL

1. REMOVE FRONT DOOR SCUFF PLATE, END PAD, NO. 1 UNDER COVER, NO. 1 SAFETY PAD AND NO. 7 HEATER TO REGISTER DUCT (See page [BO-88](#))

2. REMOVE PARKING BRAKE PEDAL ASSEMBLY

- (a) Disconnect the parking brake switch connector.
- (b) Remove the 2 bolts, and disconnect the parking brake release lever from the safety pad.

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

- (c) Remove the lock nut and the adjusting nut from the parking brake wire.
- (d) Remove the parking brake wire.

- (e) Remove the 2 bolts, 2 nuts and parking brake pedal assembly.

Torque: 13 N·m (130 kgf·cm, 9 ft-lbf)

3. REMOVE PARKING BRAKE SWITCH

Remove the screw and parking brake switch from the parking brake pedal assembly.

INSTALLATION

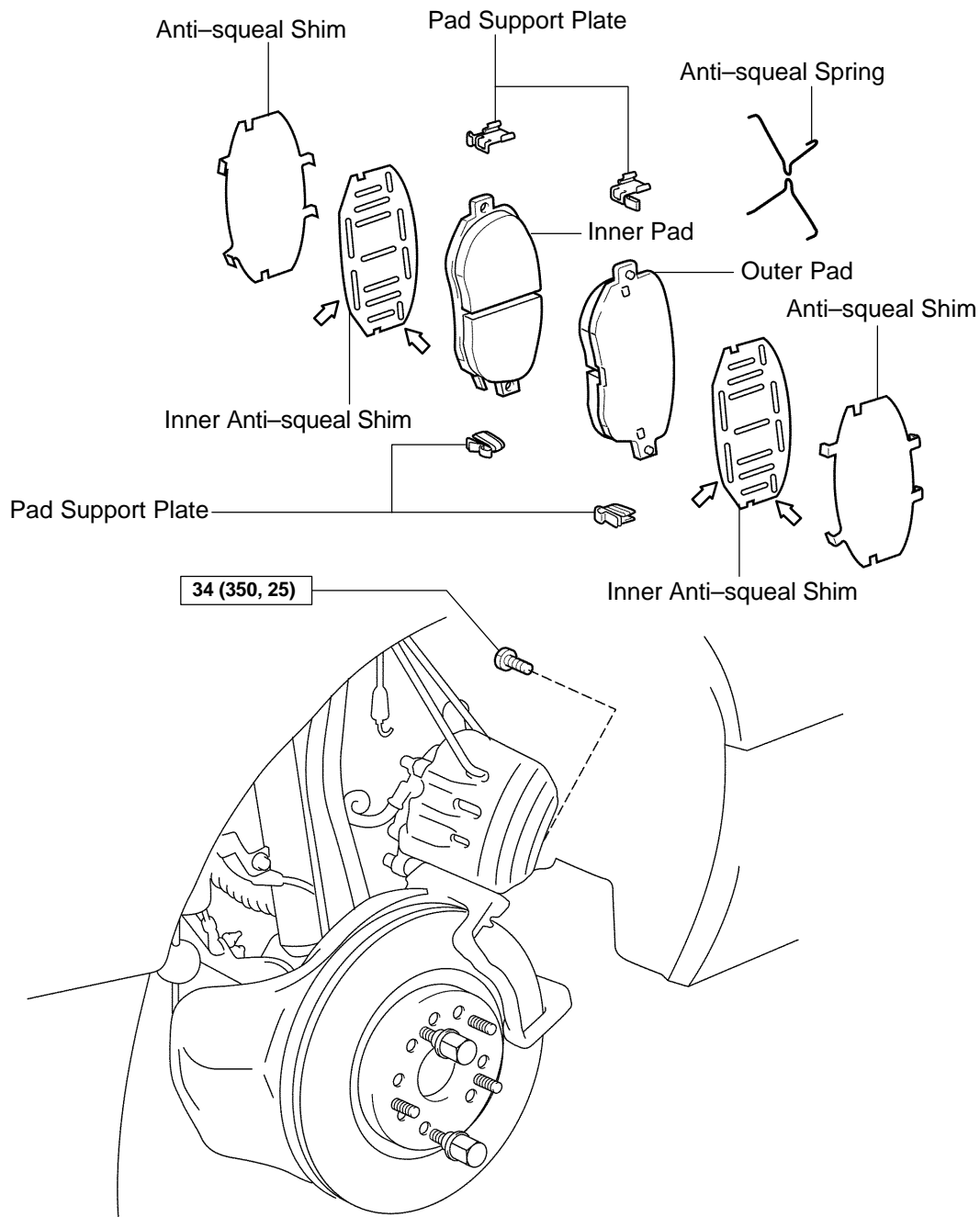
Installation is in the reverse order of removal (See page [BR-13](#)).

HINT:

After the installation, check and adjust parking brake pedal travel (See page [BR-11](#)).

FRONT BRAKE PAD COMPONENTS

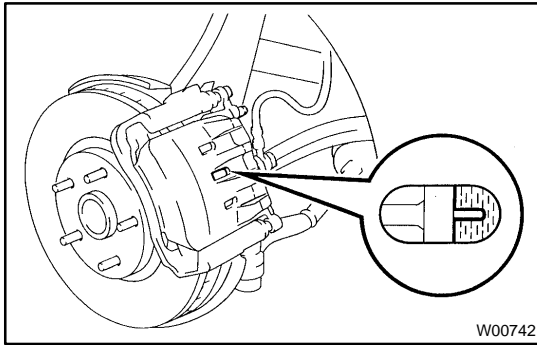
BR0JH-05



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

⇒ Disc brake grease

F01622

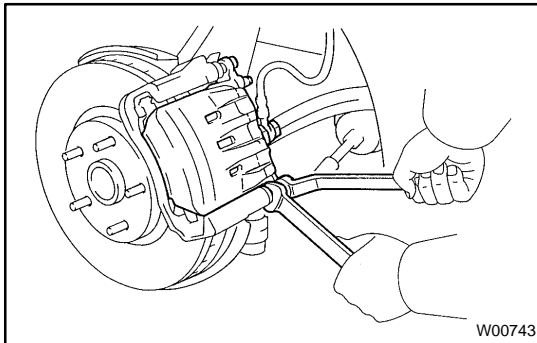


REPLACEMENT

1. **REMOVE FRONT WHEEL**
2. **INSPECT PAD LINING THICKNESS**

Check the pad thickness through the caliper inspection hole and replace the pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. **LIFT UP CALIPER**

- (a) Hold the sliding pin on the bottom and loosen the installation bolt.
- (b) Remove the installation bolt.
- (c) Lift up the caliper and suspend it securely.

HINT:

Do not disconnect the flexible hose from the caliper.

4. **REMOVE 2 ANTI- SQUEAL SPRINGS**
5. **REMOVE 2 BRAKE PADS WITH 4 ANTI-SQUEAL SHIMS**
6. **REMOVE 4 PAD SUPPORT PLATES**

NOTICE:

The anti-squeal springs and support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

7. **CHECK DISC THICKNESS AND RUNOUT**
(See page [BR-21](#))
8. **INSTALL 4 PAD SUPPORT PLATES**
9. **INSTALL NEW PADS**

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pad.

- (a) Install the 2 anti-squeal shims to each pad.

HINT:

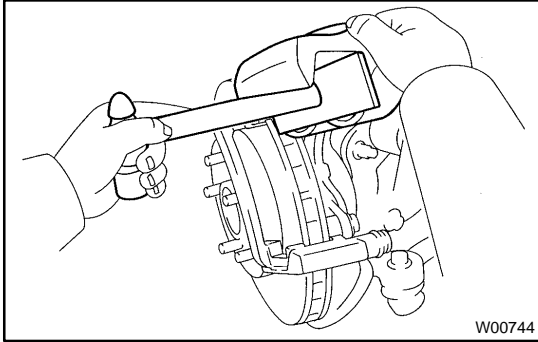
Apply disc brake grease to both sides of the inner anti-squeal shims (See page [BR-15](#)).

- (b) Install the inner pad with the pad wear indicator plates facing downward.
- (c) Install the outer pad.

NOTICE:

There should be no oil or grease adhering to the friction surfaces of the pads or the disc.

- (d) Install the 2 anti-squeal springs.

**10. INSTALL CALIPER**

- (a) Draw out a small amount of brake fluid from the reservoir.
- (b) Press in the pistons with a hammer handle or similar implement.

HINT:

If the pistons are difficult to push in, loosen the bleeder plug and push in the pistons while letting some brake fluid escape.

- (c) Install the caliper.
- (d) Hold the sliding pin and torque the installation bolt.

Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)

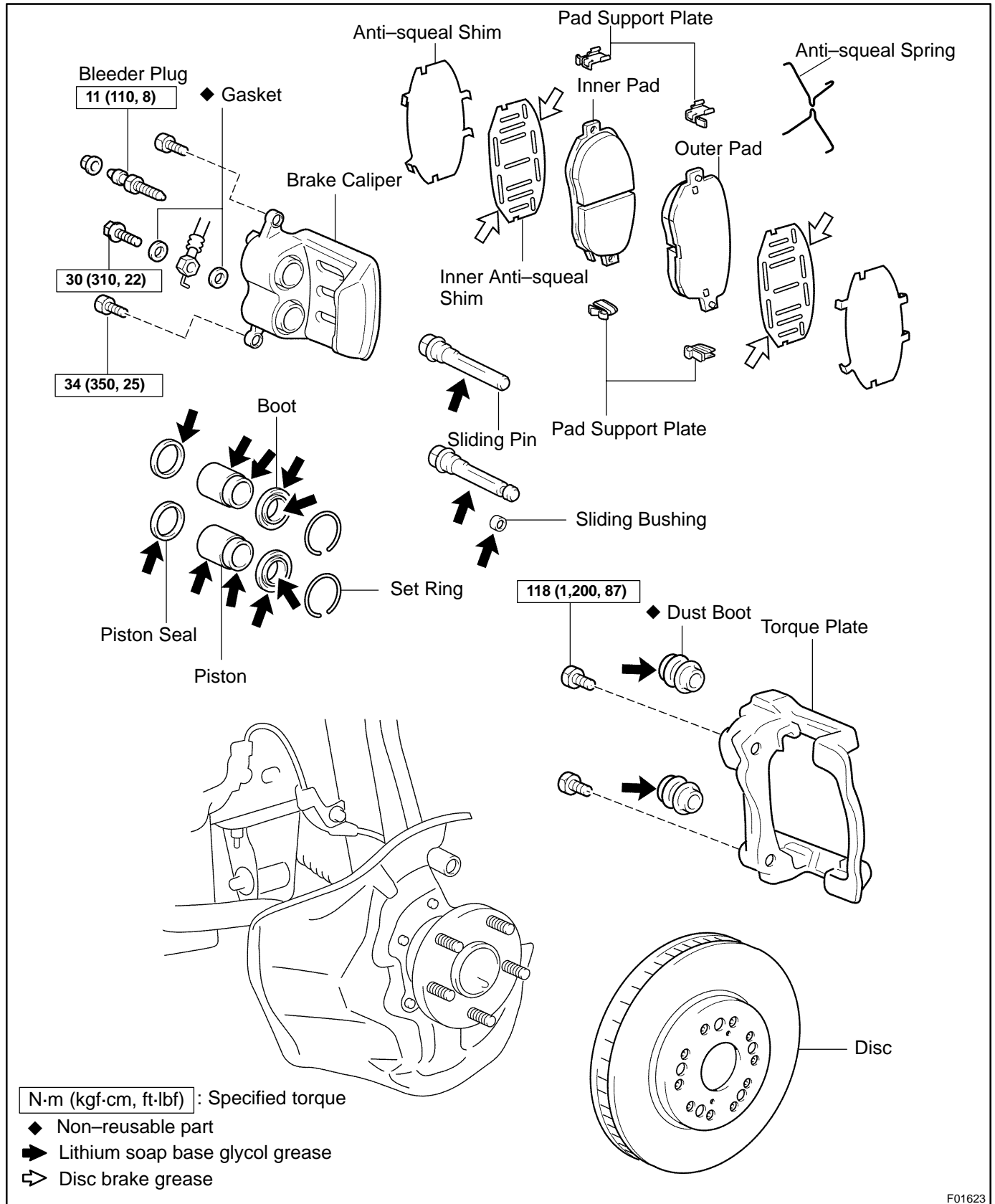
11. INSTALL FRONT WHEEL

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

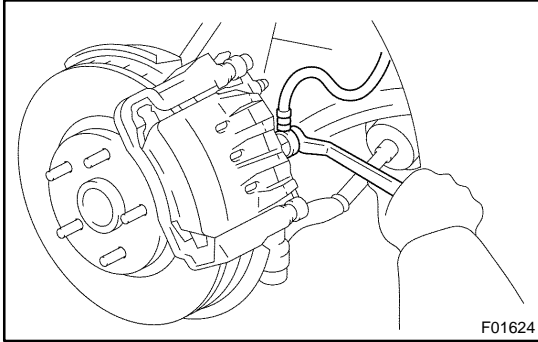
12. DEPRESS BRAKE PEDAL SEVERAL TIMES**13. CHECK THAT FLUID LEVEL IS AT MAX LINE**

FRONT BRAKE CALIPER COMPONENTS

BR0JJ-07



F01623



REMOVAL

1. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper. Use a container to catch brake fluid as it drains out.

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

HINT:

At the time of installation, install the flexible hose lock securely in the lock hole in the caliper.

2. REMOVE CALIPER

- (a) Hold the sliding pin and loosen the 2 installation bolts.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

- (b) Remove the 2 installation bolts.
(c) Remove the caliper from the torque plate.

3. REMOVE 2 ANTI-SQUEAL SPRINGS

4. REMOVE 2 BRAKE PADS WITH 4 ANTI-SQUEAL SHIMS

5. REMOVE 4 PAD SUPPORT PLATES

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BR0JA-09

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	6. Fluid leaks for brake system 7. Air in brake system 8. Piston seals (Worn or damaged) 9. Hydraulic brake booster (Faulty)	DI-516 BR-4 BR-18 BR-27 BR-38
Brake drag	1. Brake pedal freeplay (Minimum) 2. Parking brake pedal travel (Out of adjustment) 3. Parking brake wire (Sticking) 4. Parking brake (Shoe clearance out of adjustment) 5. Pad (Cracked or distorted) 6. Piston (Stuck) 7. Piston (Frozen) 8. Tension or return spring (Faulty) 9. Hydraulic brake booster (Faulty)	BR-9 BR-11 – BR-37 BR-15 BR-24 BR-18 BR-27 BR-18 BR-27 BR-33 BR-38
Brake pull	1. Piston (Stuck) 2. Pad (Cracked or distorted) 3. Piston (Frozen) 4. Disc (Scored) 5. Pad (Cracked or distorted) 6. Hydraulic brake booster (Faulty)	BR-18 BR-27 BR-15 BR-24 BR-18 BR-27 BR-18 BR-27 BR-15 BR-24 BR-38
Hard pedal but brake inefficient	1. Fluid leaks for brake system 2. Air in brake system 3. Pad (Worn) 4. Pad (Cracked or distorted) 5. Pad (Oily) 6. Pad (Glazed) 7. Disc (Scored) 8. Hydraulic brake booster (Faulty)	DI-516 BR-4 BR-15 BR-24 BR-15 BR-24 BR-15 BR-24 BR-15 BR-24 BR-18 BR-30 BR-38

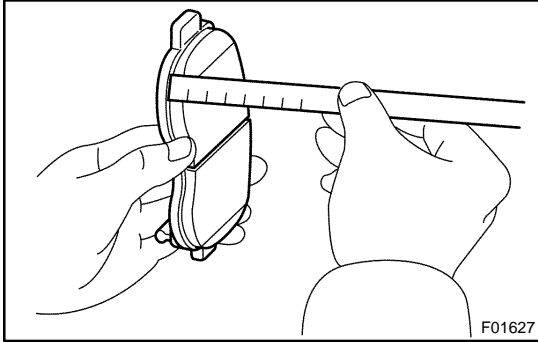
BRAKE – TROUBLESHOOTING

Noise from brakes	1. Pad (Cracked or distorted) 2. Installation bolt (Loose) 3. Disc (Scored) 4. Pad support plate (Loose) 5. Sliding pin (Worn) 6. Pad (Dirty) 7. Pad (Glazed) 8. Tension or return spring (Faulty) 9. Anti-squeal shim (Damaged) 10. Shoe hold-down spring (Damaged)	BR-15 BR-24 BR-15 BR-24 BR-18 BR-27 BR-18 BR-18 BR-15 BR-24 BR-15 BR-24 BR-33 BR-18 BR-27 BR-33
Noise from hydraulic brake booster (Abnormal pump motor operation noise)	Accumulator bracket clearance (Out or adjustment)	BR-56
Brake warning light lights up* ¹ (Parking brake pedal released)	1. Brake fluid level 2. Hydraulic brake booster power supply system (Faulty)	BR-38
Brake warning light lights up and brake warning buzzer sounds* ²	Hydraulic brake booster power supply system (Faulty)	BR-38
ABS warning light lights up* ³	1. Anti-lock brake system (Faulty) 2. Hydraulic brake booster power supply system (Faulty)	BR-38

*¹, *³: The light may stay on for about 60 seconds after the engine has been started. It is normal if it goes out after a while.

*², *³: Depressing the brake pedal repeatedly may turn on the warning light and buzzer. It is normal if the light goes out and the buzzer stops sounding after a few seconds.

*³: While ABS warning light is ON, both VSC warning light and VSC OFF indicator light come on.



INSPECTION

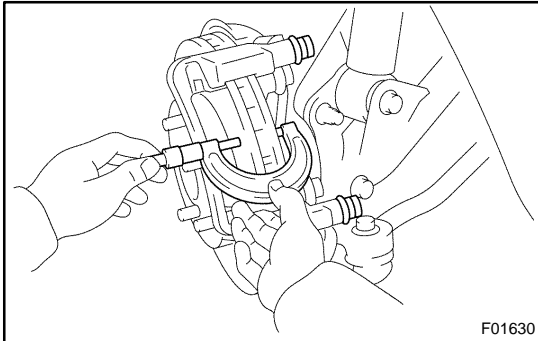
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 11.0 mm (0.433 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the thickness is less than the minimum (the 1.0 mm slit is no longer visible), or if it shows signs of uneven wear.



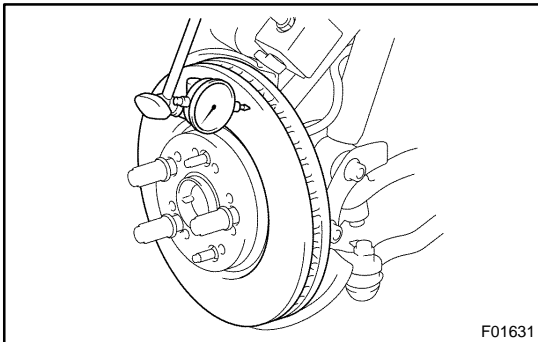
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 32.0 mm (1.260 in.)

Minimum thickness: 30.0 mm (1.181 in.)

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is scored or is worn unevenly.



3. MEASURE DISC RUNOUT

- Temporarily fasten the disc with the 3 hub nuts.
- Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) away from the out side edge.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page [SA-10](#)). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On-Car" brake lathe.

4. IF NECESSARY, ADJUST DISC RUNOUT

- Remove the 2 bolts and torque plate.
- Remove the 3 hub nuts and disc. Turn the disc 1/5 turn and reinstall the disc. Install and torque the 3 hub nuts.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
- Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.
- Repeat (b) until the disc has been installed on the 3 remaining hub positions.
- If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.
- If the minimum runout recorded in (b) and (c) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 3.
- Install the torque plate and torque the 2 bolts.
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-20](#)).

HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-18](#)).

INSTALLATION

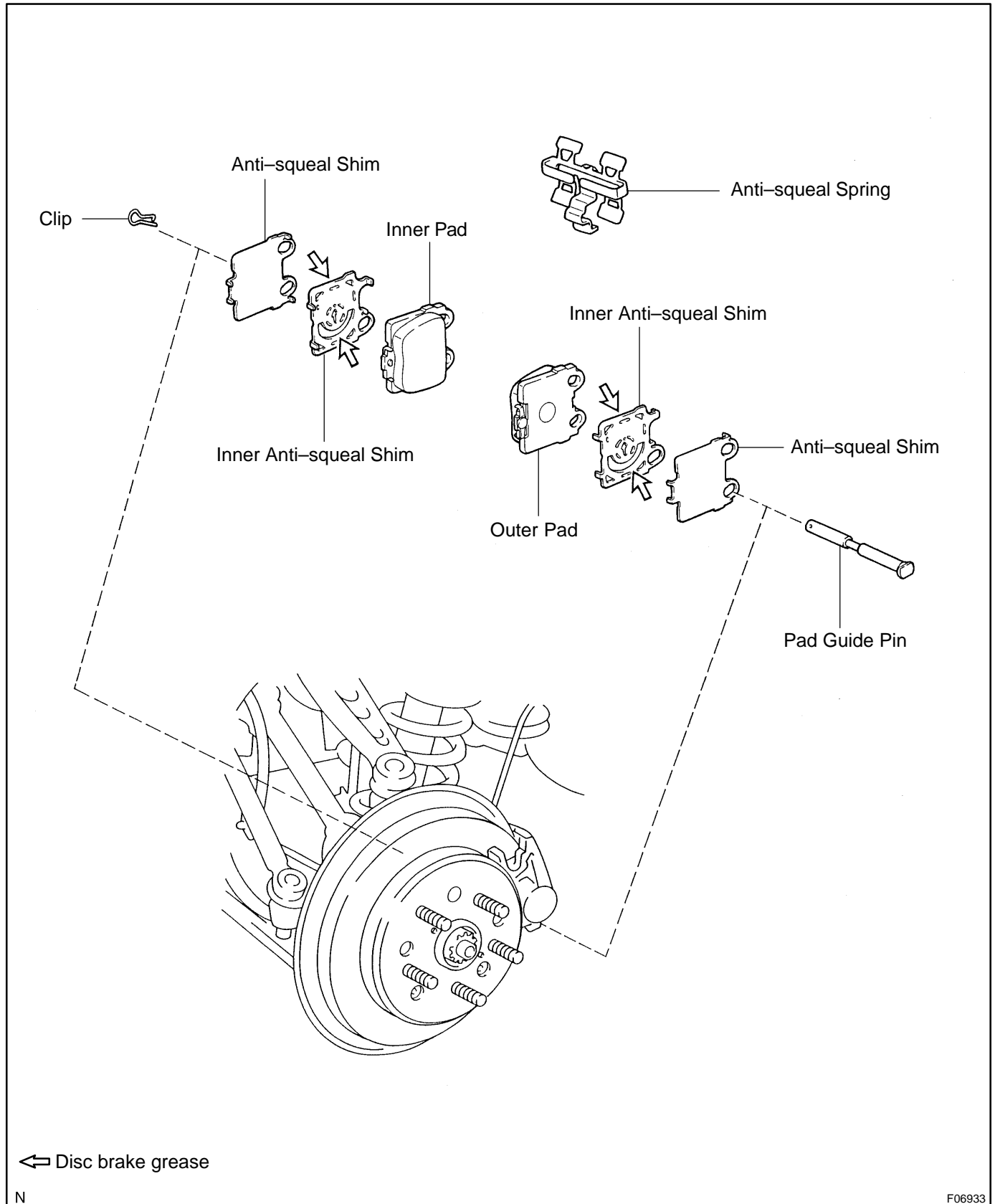
Installation is in the reverse order of removal (See page [BR-19](#)).

HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#)).
- Check for leaks.

REAR BRAKE PAD COMPONENTS

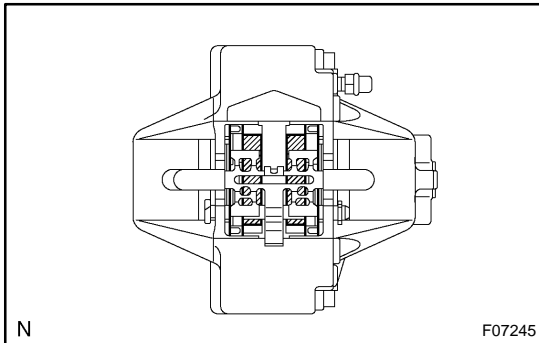
BR0JP-06



REPLACEMENT

1. REMOVE REAR WHEEL

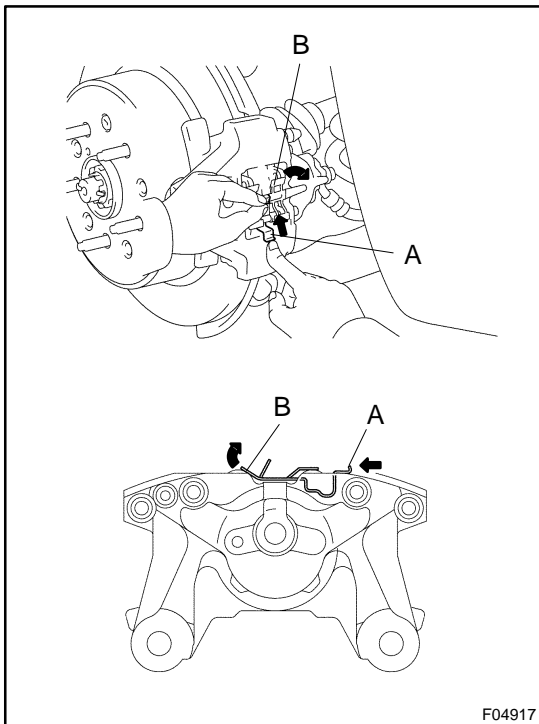
Remove the rear wheel and temporarily fasten the disc with the 3 hub nuts.



2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace pads if the thickness is not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. REMOVE ANTI-SQUEAL SPRING AND PAD GUIDE PIN

- (a) Raise the "B" portion with hand, push up the "A" portion and disengage the anti-squeal spring from brake caliper.
- (b) Remove the anti-squeal spring.

NOTICE:

- Do not deform the clip and anti-squeal spring.
- The clip and anti-squeal spring can be used again provided that they have sufficient rebound, no-deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

- (c) Remove the clip and pad guide pin.

4. REMOVE PADS AND ANTI-SQUEAL SHIMS

- (a) Remove the 2 pads.
- (b) Remove the 4 anti-squeal shims from each pad.

5. CHECK DISC THICKNESS AND RUNOUT

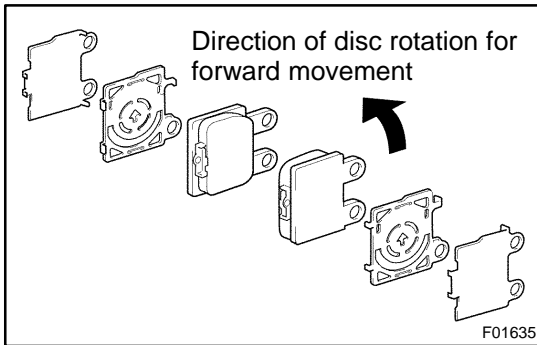
(See page [BR-30](#))

6. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

- (a) Apply disc brake grease to both sides of inner anti-squeal shims (See page [BR-24](#)).

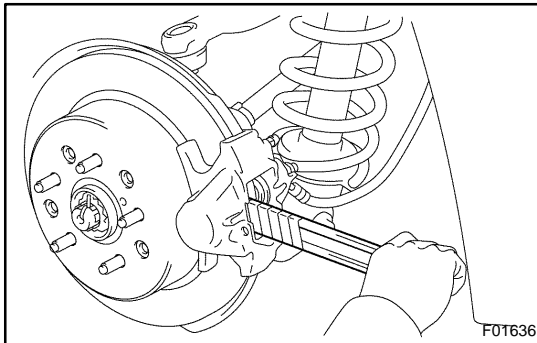


- (b) Install the 2 anti-squeal shims on each pad.

HINT:

Make sure the arrows on the inner anti-squeal shims facing to the direction of disc rotation as shown in the illustration.

- (c) Draw out a small amount of brake fluid from the reservoir.



- (d) Press in the pistons with a monkey wrench handle or equivalent.

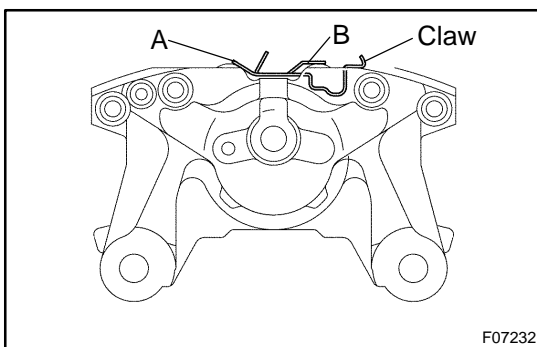
HINT:

- Tape the monkey wrench handle before use.
- If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

- (e) Install the 2 pads.

7. INSTALL PAD GUIDE PIN AND ANTI-SQUEAL SPRING

- (a) Install the pad guide pin and clip.



- (b) Install the anti-squeal spring.

HINT:

- Ensure that the claw of the anti-squeal spring is raised up on the caliper securely.
- Ensure that there is no gap between the pad guide pin and anti-squeal spring.
- Ensure that "A" and "B" portions of anti-squeal spring are attached to the pad.

8. INSTALL FRONT WHEEL

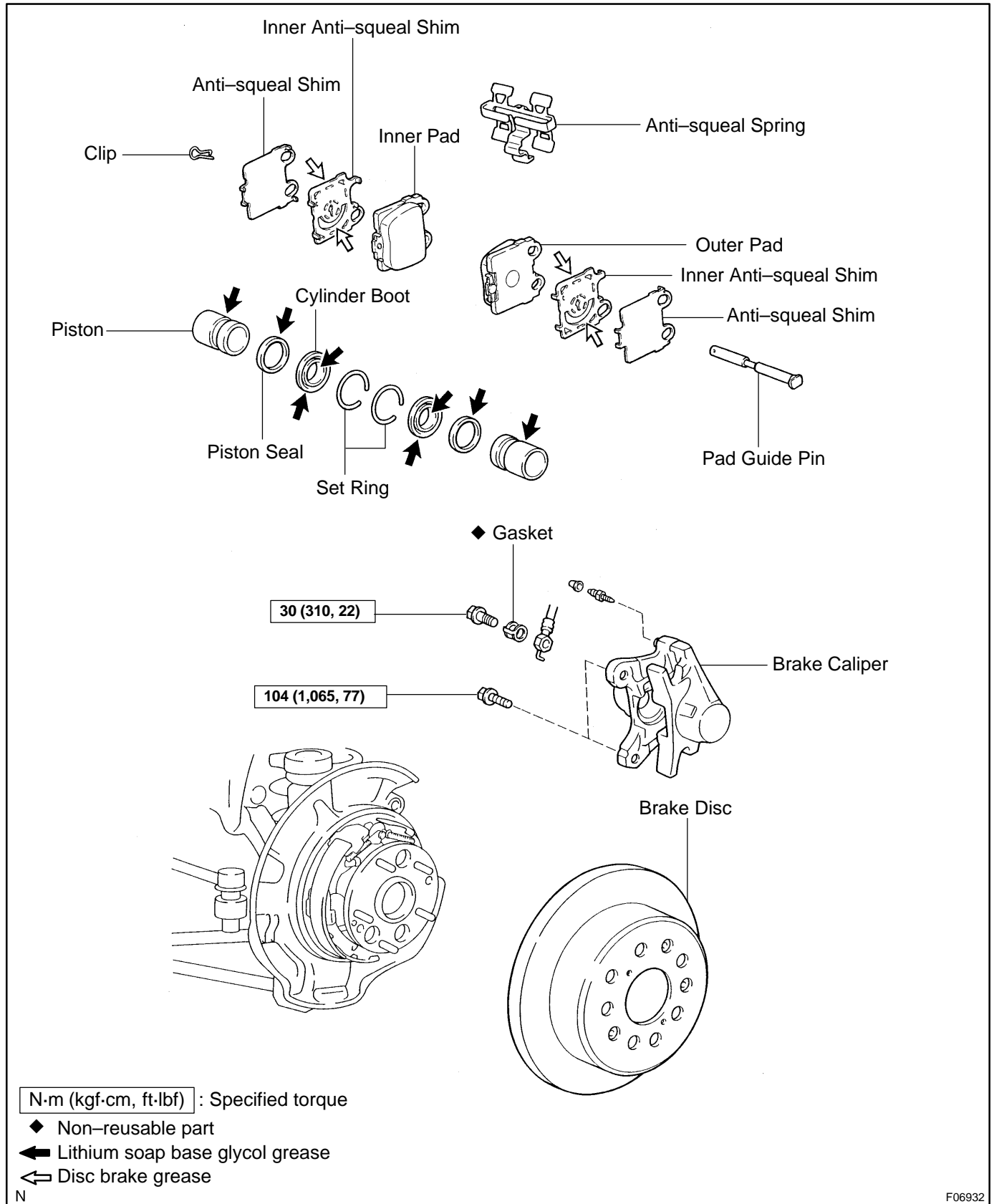
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

9. DEPRESS BRAKE PEDAL SEVERAL TIMES

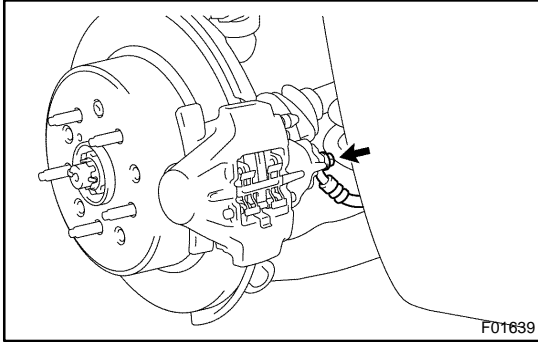
10. CHECK THAT FLUID LEVEL IS AT MAX LINE

REAR BRAKE CALIPER COMPONENTS

BRJR-07



F06932



REMOVAL

1. REMOVE REAR WHEEL

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

2. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper. Use a container to catch brake fluid as it drains out.

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

HINT:

At the time of installation, please refer to the following item. Install the flexible hose lock securely in the lock hole in the caliper.

3. REMOVE CALIPER

(a) Remove the 2 installation bolts.

Torque: 104 N·m (1,065 kgf-cm, 77 ft-lbf)

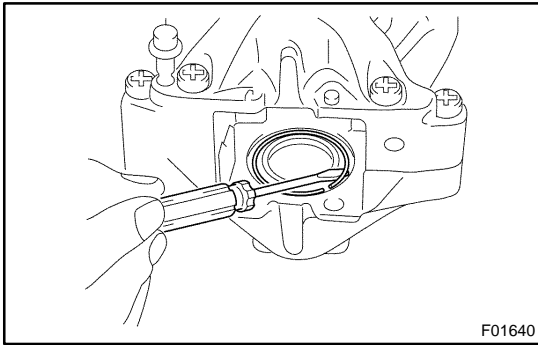
(b) Remove the caliper.

4. REMOVE BRAKE PADS (See page [BR-25](#))

(a) Remove the anti-squeal spring.

(b) Remove the clip and pad guide pin.

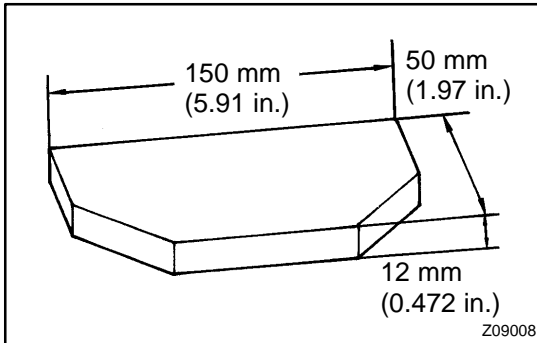
(c) Remove the 2 pads with the 4 anti-squeal shims.



DISASSEMBLY

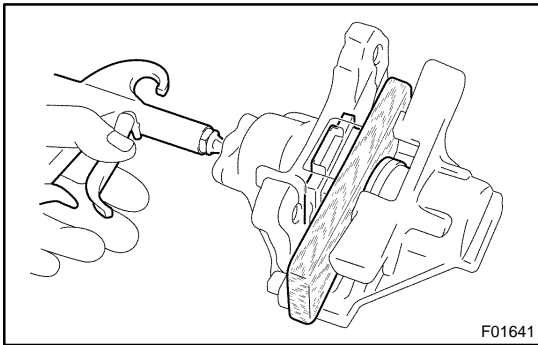
1. REMOVE SET RINGS AND BOOTS

Using a screwdriver, remove the 2 set rings and 2 boots.



2. REMOVE PISTONS FROM CYLINDER

(a) Prepare a wooden plate to hold the pistons.

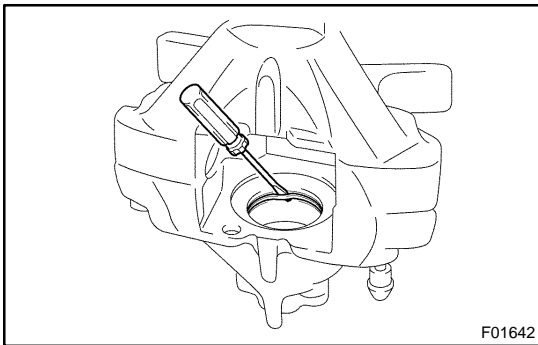


(b) Place the plate between the pistons and insert a pad on one side.

(c) Use compressed air to remove the pistons alternately from the caliper.

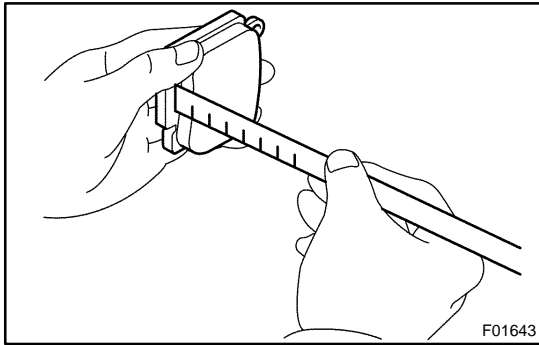
CAUTION:

Do not place your fingers in front of the piston when using compressed air.



3. REMOVE PISTON SEALS

Using a screwdriver, remove the 2 piston seals from the caliper.



INSPECTION

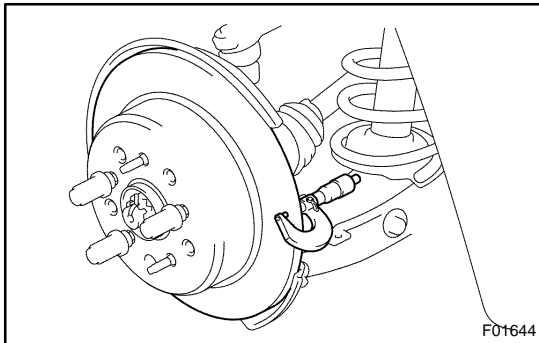
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 10.5 mm (0.413 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pads if the thickness is less than the minimum or if it shows signs of uneven wear.



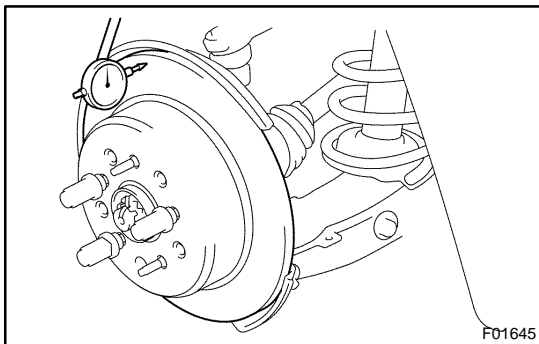
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 12.0 mm (0.472 in.)

Minimum thickness: 10.5 mm (0.413 in.)

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is badly scored or worn unevenly.



3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.394 in.) away from the out side edge.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page SA-44). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On-Car" brake lathe.

4. IF NECESSARY, ADJUST DISC RUNOUT

- (a) Remove the 3 hub nuts and disc. Turn the disc 1/5 and reinstall the disc. Install and torque the 3 hub nuts.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
- (b) Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.
- (c) Repeat (b) until the disc has been installed on the 3 remaining hub positions.
- (d) If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.
- (e) If the minimum runout recorded in (b) and (c) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 3.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-29](#)).

HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-27](#)).

INSTALLATION

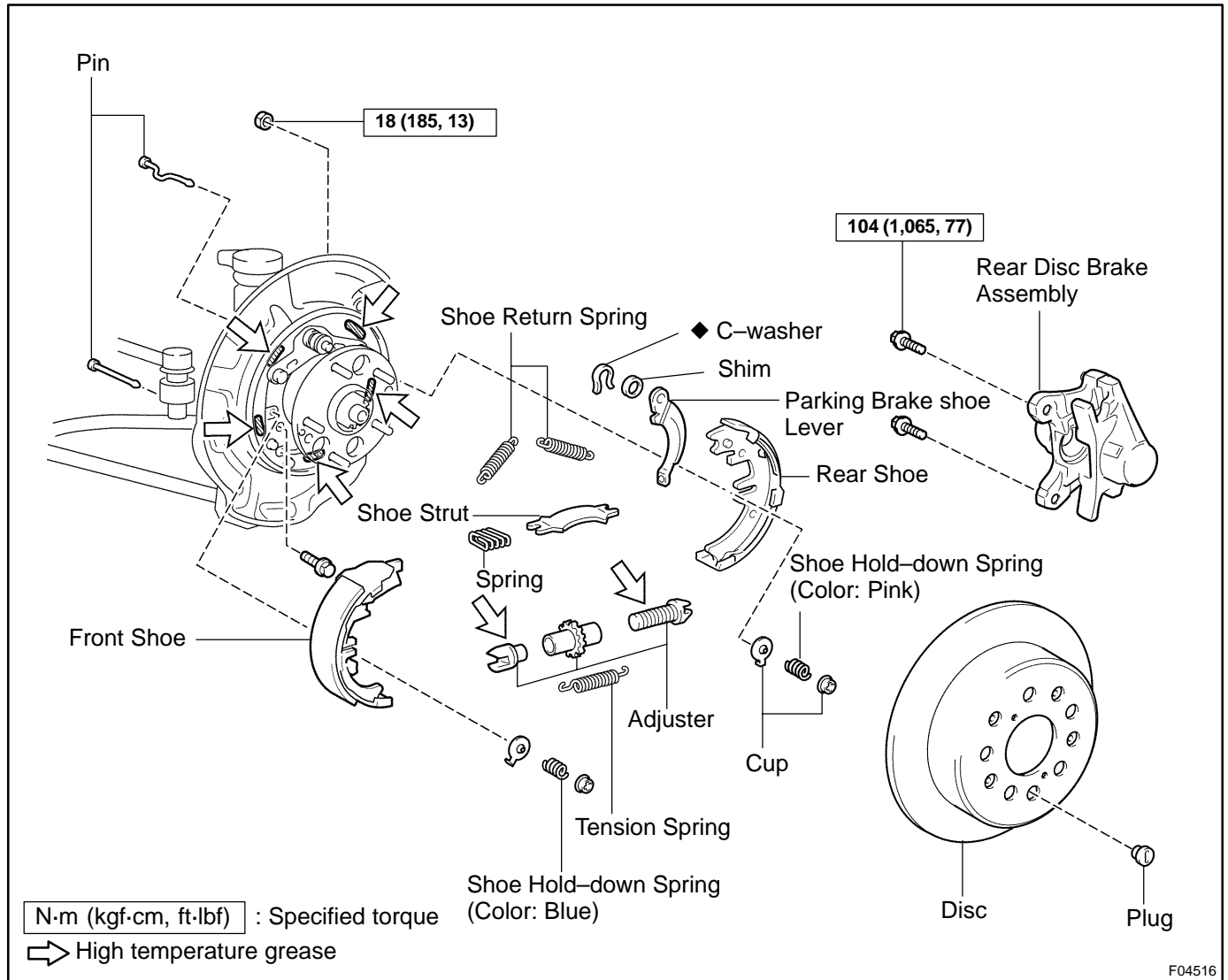
Installation is in the reverse order of removal (See page [BR-28](#)).

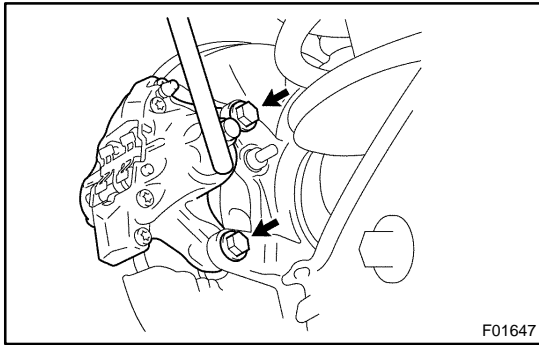
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#)).
- Check for leaks.

PARKING BRAKE COMPONENTS

BR0JX-06





F01647

DISASSEMBLY

1. REMOVE REAR WHEEL

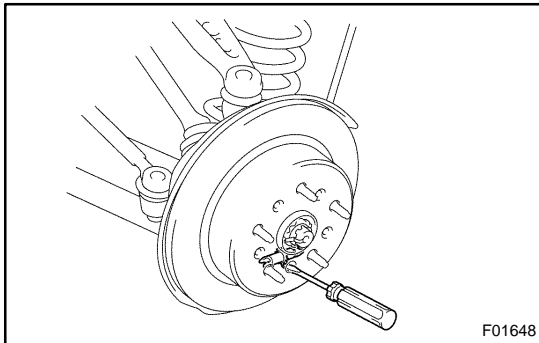
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE REAR DISC BRAKE ASSEMBLY

- (a) Remove the 2 mounting bolts and remove the disc brake assembly.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

- (b) Suspend the disc brake securely and so the hose is not stretched.



F01648

3. REMOVE DISC

- (a) Release the parking brake pedal.
(b) Place matchmarks on the disc and rear axle hub.
(c) Remove the disc.

HINT:

- If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.
- If there are no matchmarks, temporarily install the disc, then measure the disc runout and install the disc in position (See page [BR-30](#)).

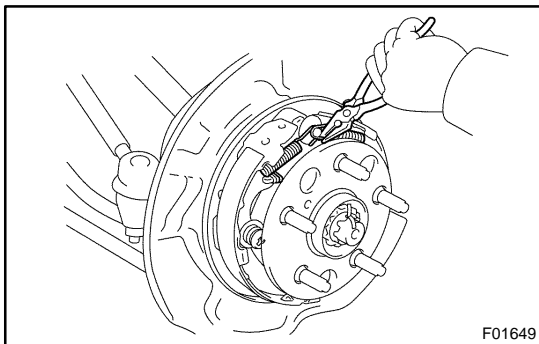
4. REMOVE SHOE RETURN SPRINGS

Using needle-nose pliers, remove the 2 shoe return springs.

5. REMOVE SHOE STRUT WITH SPRING

HINT:

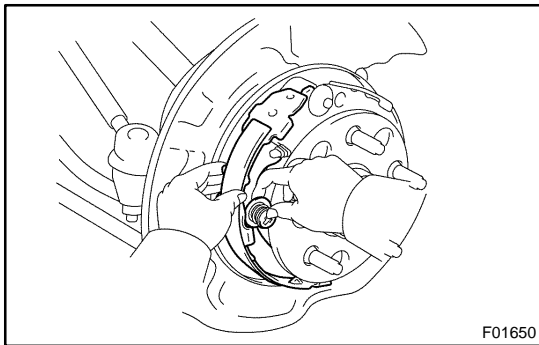
At the time of reassembly, install the strut with the spring facing forward.



F01649

6. REMOVE FRONT SHOE AND ADJUSTER

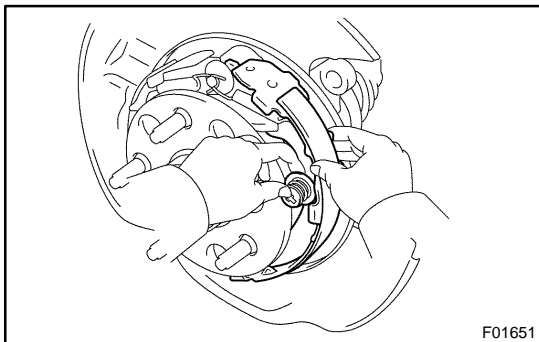
- (a) Slide out the front shoe and remove the shoe adjuster.
(b) Disconnect the tension spring and remove the front shoe.
(c) Remove the 2 cups, shoe hold-down spring and pin.



F01650

7. REMOVE REAR SHOE AND TENSION SPRING

- (a) Slide out the rear shoe.
(b) Remove the tension spring from the rear shoe.
(c) Disconnect the parking brake cable from the parking brake shoe lever.
(d) Remove the 2 cups, shoe hold-down spring and pin.

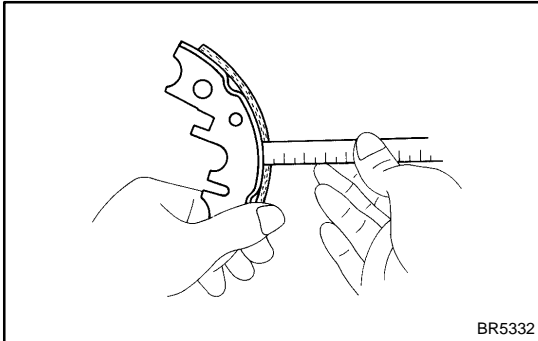


F01651

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



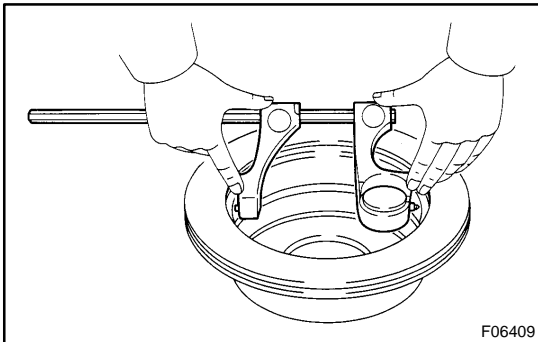
2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness: 2.5 mm (0.098 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is severe and uneven wear, replace the brake shoe.



3. MEASURE BRAKE DISC INSIDE DIAMETER

Using a brake drum gauge or equivalent, measure the inside diameter of the disc.

Standard inside diameter: 190 mm (7.48 in.)

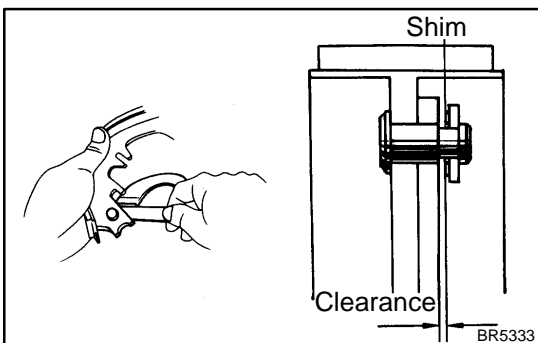
Maximum inside diameter: 191 mm (7.52 in.)

Replace the disc if the inside diameter is at the maximum value or more.

Replace the disc or grind it with a lathe if the disc is scored or worn unevenly.

4. INSPECT PARKING BRAKE SHOE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and the brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.



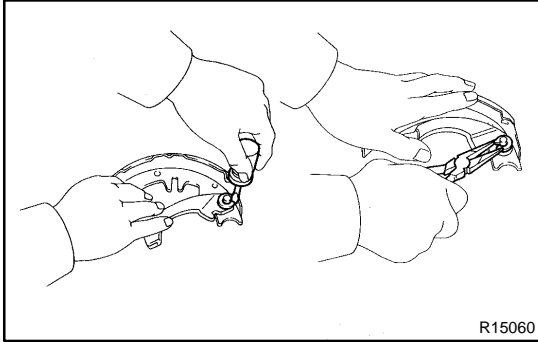
5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

Standard clearance: Less than 0.35 mm (0.0138 in.)

If the clearance is not within the specification, replace the shim with one of the correct size.

Thickness	mm (in.)	Thickness	mm (in.)
0.3	(0.012)	0.9	(0.035)
0.6	(0.024)	–	

**6. IF NECESSARY, REPLACE SHIM**

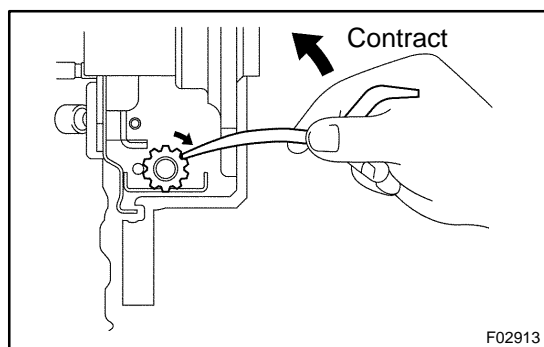
- (a) Using a screwdriver, remove the C-washer and shim.
- (b) Install the correct size shim.
- (c) Install a new C-washer.
- (d) Remeasure the clearance.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-34](#)).

HINT:

Apply high temperature grease to the parts indicated by the arrows (See page [BR-33](#)).



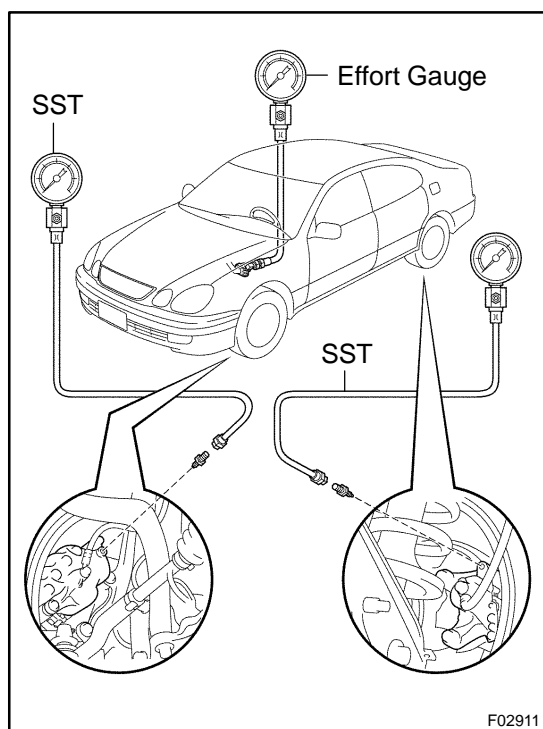
1. ADJUST PARKING BRAKE SHOE CLEARANCE

- (a) Temporarily install the 3 hub nuts.
- (b) Remove the hole plug.
- (c) Turn the adjuster and expand the shoes until the disc locks.
- (d) Return the adjuster 8 notches.
- (e) Install the hole plug.

2. SETTLING PARKING BRAKE SHOES AND DISC

- (a) Depress the parking brake pedal with a force of 147 N (15 kgf, 33 lbf).
- (b) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.
- (c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.
- (d) Repeat this procedure 2 or 3 times.

3. CHECK AND ADJUST PARKING BRAKE PEDAL TRAVEL (See page [BR-11](#))



HYDRAULIC BRAKE BOOSTER ON-VEHICLE INSPECTION

BR0K7-04

1. CHECK HYDRAULIC BRAKE BOOSTER FLUID PRESSURE CHANGE

- Inspect the battery positive voltage.
Battery positive voltage: 10 – 14 V
- Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- Install LSPV gauge (SST) and brake pedal effort gauge, bleed air.
SST 09709-29018
- When booster does not operate.
Depress the brake pedal and check fluid pressure.
At 245 N (25 kgf, 55 lbf):

Front brake pressure	Rear brake pressure
1,470 kPa (15 kgf/cm ² , 213 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

At 343 N (35 kgf, 77 lbf):

Front brake pressure	Rear brake pressure
2,059 kPa (21 kgf/cm ² , 299 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

- When booster operates.
 - Turn the ignition switch ON and wait until the pump motor has stopped.
 - Depress the brake pedal and check fluid pressure.
At 49 N (5 kgf, 11 lbf):

Front brake pressure	Rear brake pressure
794 – 1,814 kPa (8.1 – 18.5 kgf/cm ² , 115 – 263 psi)	961 – 2,148 kPa (9.8 – 21.9 kgf/cm ² , 139 – 311 psi)

At 98 N (10 kgf, 22 lbf):

Front brake pressure	Rear brake pressure
3,442 – 5,011 kPa (35.1 – 51.1 kgf/cm ² , 499 – 727 psi)	3,923 – 5,698 kPa (40 – 58.1 kgf/cm ² , 569 – 826 psi)

At 147 N (15 kgf, 33 lbf):

Front brake pressure	Rear brake pressure
5,629 – 7,845 kPa (57.4 – 80 kgf/cm ² , 816 – 1,138 psi)	6,237 – 8,640 kPa (63.6 – 88.1 kgf/cm ² , 905 – 1,253 psi)

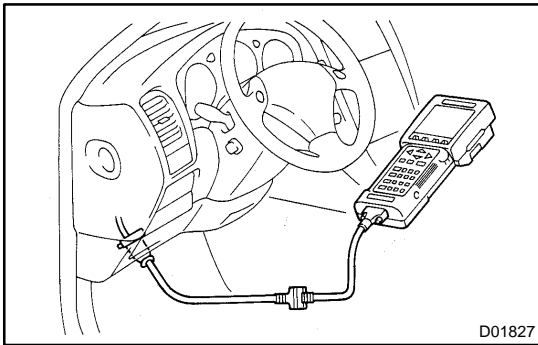
At 196 N (20 kgf, 44 lbf):

Front brake pressure	Rear brake pressure
8,002 – 10,591 kPa (81.6 – 108 kgf/cm ² , 1,161 – 1,536 psi)	8,718 – 11,572 kPa (88.9 – 118 kgf/cm ² , 1,264 – 1,678 psi)

2. IN CASE OF USING LEXUS HAND-HELD TESTER: INSPECT HYDRAULIC BRAKE BOOSTER OPERATION

- (a) Inspect the battery positive voltage.
Battery positive voltage: 10 – 14 V
- (b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- (c) Check that the brake pedal becomes heavy to depress. If the pedal does not become to be heavy to depress, check and replace the brake line and hydraulic brake booster.
- (d) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page [BR-53](#)).



- (e) Connect the LEXUS hand-held tester.
 - (1) Connect the LEXUS hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON.
 - (3) Select the "ACTIVE TEST" mode on the LEXUS hand-held tester.

HINT:

- Please refer to the LEXUS hand-held tester operator's manual for further details.
 - To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after every solenoid has been turned ON.
- (f) Inspect the front TRAC & VSC solenoid operation.
 - (1) Select "SA1" and "SA2" on the LEXUS hand-held tester.
 - (2) With "SA1" and "SA2" turned ON simultaneously with the LEXUS hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

HINT:

To protect the solenoids, LEXUS hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON. If the pedal can be depressed, replace the hydraulic brake booster.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

- (3) Once, release the brake pedal.

- (4) When the solenoids are OFF, after depressing the brake pedal again and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (g) Inspect the front ABS solenoid operation.
 - (1) Select "SFRH" and "SFLH" on the LEXUS hand-held tester.
 - (2) With "SFRH" and "SFLH" turned ON simultaneously with the LEXUS hand-held tester, depress the brake pedal with stable force and check that the brake pedal cannot be depressed.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

If the pedal can be depressed, replace the hydraulic brake booster.

- (3) Once, release the brake pedal when the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (4) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFRH and SFRR solenoids ON simultaneously.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (5) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (6) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFLH and SFLR solenoids ON simultaneously.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (7) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (h) Jack up and support the vehicle.
- (i) Release the parking brake pedal.
- (j) Shift the shift lever to "N" position and check that the rear wheels by rotating them by hand.
- (k) Inspect the rear TRAC & VSC solenoid operation.
 - (1) Select the "SA3" and "STR" on the LEXUS hand-held tester.

- (2) Turn the "SA3" and "STR" ON simultaneously with the LEXUS hand-held tester, and check that the rear wheels by does not rotate by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels rotate, replace the hydraulic brake booster.

- (3) Turn the "SA3" and "STR" OFF simultaneously, and check that the rear wheels by rotating them by hand.

HINT:

- To protect the solenoids, LEXUS hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

NOTICE:

When operating it continuously, set the interval of more than 20 secs.

If the rear wheels stop, replace the hydraulic brake booster.

- (l) Inspect the right rear ABS solenoid.
 - (1) Select the "SA3", "STR" and "SRRH", on the LEXUS hand-held tester.
 - (2) Turn the "SA3", "STR" and "SRRH" ON simultaneously with the LEXUS hand-held tester, and check that the right rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, LEXUS hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the rear wheels stop, replace the hydraulic brake booster.

- (3) Turn the "SA3", "STR" and "SRRH" OFF, and check that the right rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, LEXUS hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the right rear wheel stop, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRRH" and "SRRR" ON simultaneously.
- (5) When the solenoids are ON, check that the right rear wheel by rotating it by hand.
- (m) Inspect the left rear ABS solenoid operation.
 - (1) Select the "SA3", "STR" and "SRLH" on the LEXUS hand-held tester.
 - (2) Turn the "SA3", "STR" and "SRLH" ON with LEXUS hand-held tester, and check that the left rear wheel by rotating it by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels stop, replace the hydraulic brake booster.

- (3) Turn the "SA3", "STR" and "SRLH" OFF and check that the left rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, LEXUS hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the left rear wheel stop, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRLH" and "SRLR" ON simultaneously.

HINT:

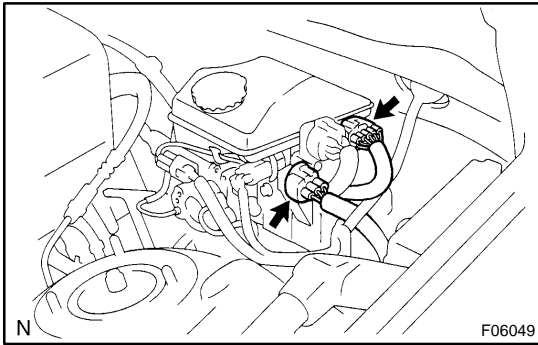
To protect the solenoids, LEXUS hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (5) When the solenoids are ON, check that the left rear wheel by rotating it by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

- (n) Lower the vehicle.
- (o) Disconnect the LEXUS hand-held tester.



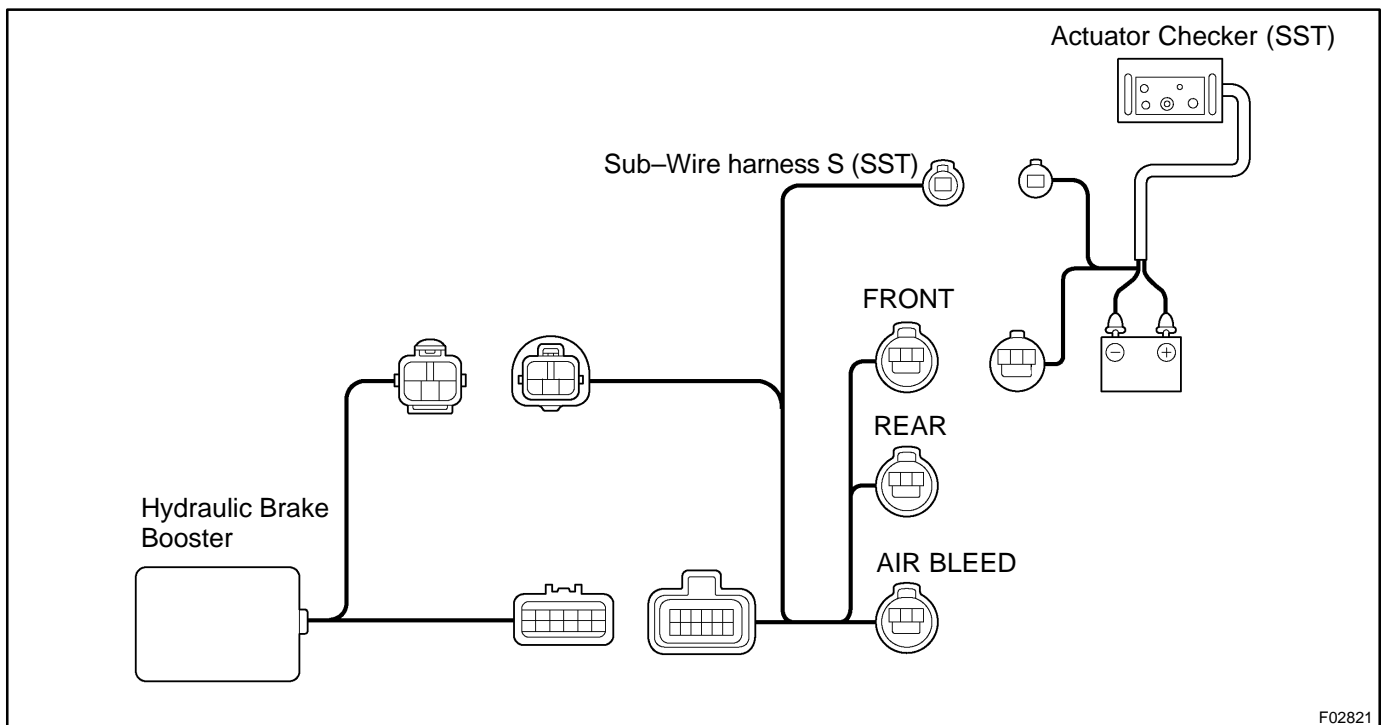
**3. IN CASE OF USING ABS ACTUATOR CHECKER:
INSPECT HYDRAULIC BRAKE BOOSTER OPERATION**

- (a) Inspect the battery positive voltage.
Battery positive voltage: 10 – 14 V
- (b) Disconnect the 2 connectors from hydraulic brake booster.
- (c) Connect the actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness S (SST), as shown in the chart below.
SST 09990-00150, 09990-00480

HINT:

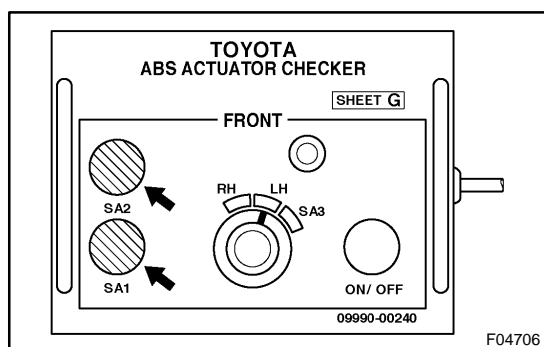
Connect the connector with the label of "FRONT" attached to the connector of actuator checker.

- (d) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



- (e) Place "SHEET G" (SST) of "FRONT" on actuator checker.
SST 09990-00240
- (f) Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- (g) Check that the brake pedal becomes heavy to depress. If the pedal does not become to be heavy to depress, check and replace the brake line and hydraulic brake booster.
- (h) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor.



- (i) Inspect the front TRAC & VSC solenoid operation.
- (1) Push in and hold the "SA1" and "SA2" switches simultaneously, depress strongly and hold the brake pedal with stable force.

NOTICE:

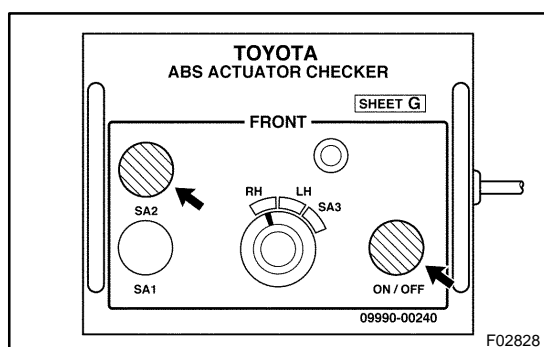
Do not keep the "SA1" and "SA2" pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (2) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.
- (3) Release the "SA1" switch and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (4) Release the "SA2" switch and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.



- (j) Inspect the right front ABS solenoid operation.
- (1) Turn the selector switch to "RH" position.
 - (2) Push and hold in the MAIN push switch and "SA2" switch simultaneously, depress and hold the brake pedal with stable force.

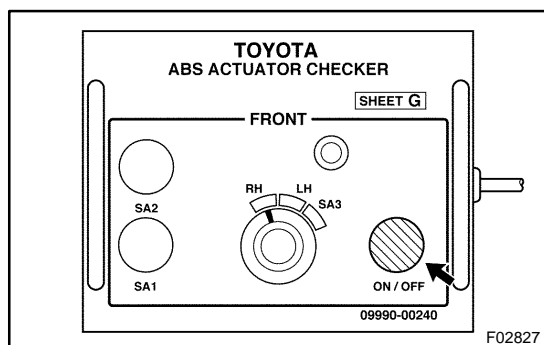
NOTICE:

Do not keep the MAIN push switch and "SA2" switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.
- (4) Release the MAIN push switch and "SA2" switch simultaneously and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.



- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

NOTICE:

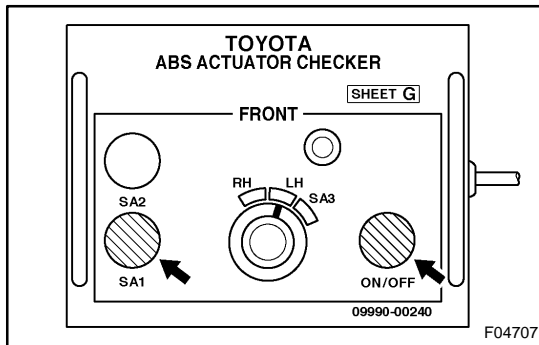
Do not keep the MAIN push switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (9) Release the brake pedal.



- (k) Inspect the left front ABS solenoid operation.

- (1) Turn the selector switch to "LH" position.
- (2) Push and hold in the MAIN push switch and "SA1" switch simultaneously, depress and hold the brake pedal with stable force.

NOTICE:

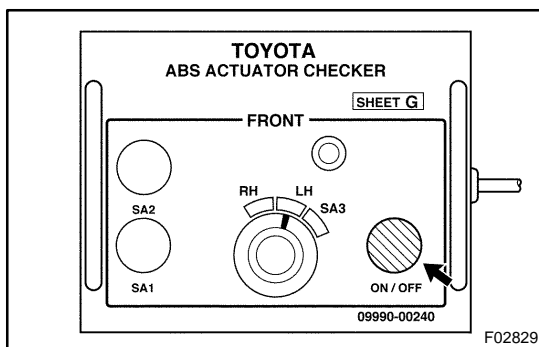
Do not keep the MAIN push switch and "SA1" switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA1" switch simultaneously, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.



- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

NOTICE:

Do not keep the MAIN push switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

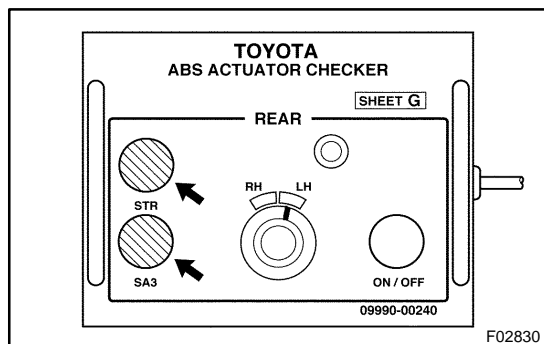
- (9) Release the brake pedal.

- (l) Turn the ignition switch OFF, then reconnect the connector of sub-wire harness from the one with label of "FRONT" to "REAR".

- (m) Place "SHEET G" of "REAR" on the actuator checker.

- (n) Jack up and support the vehicle.

- (o) Start the engine and run it at idle.



- (p) Inspect the rear TRAC & VSC solenoid.
- (1) Release the parking brake pedal and shift the shift lever to "L" position.
 - (2) Push and hold the "SA3" switch and "STR" switch simultaneously.

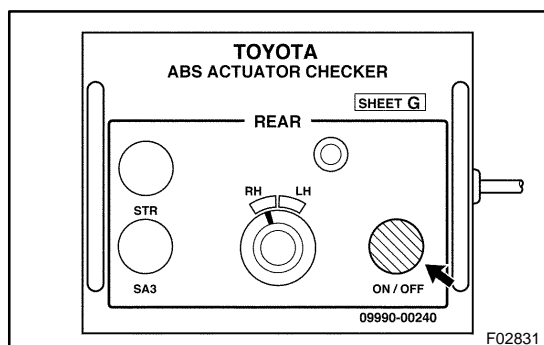
NOTICE:

- **Do not keep the "STR" switch pushed down for more than 10 seconds.**
 - **Do not keep the "SA3" switch pushed down for more than 5 seconds.**
 - **When operating it continuously, set the interval of more than 20 seconds.**
- (3) Check that the rear wheels stop.

If the rear wheels rotate, replace the hydraulic brake booster.

- (4) Release the "SA3" switch and "STR" switch simultaneously.
- (5) Check that the rear wheels rotate.

If the rear wheels stop, replace the hydraulic brake booster.



- (q) Inspect the right rear ABS solenoid.
- (1) Turn the selector switch to "RH" position.
 - (2) Depress the brake pedal several times and release the brake pedal when the pump begins rotating. Wait until the pump stops.
 - (3) Turn the ignition switch OFF.
 - (4) Depress the brake pedal with a force of 343 N (35 kgf, 77 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.
 - (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

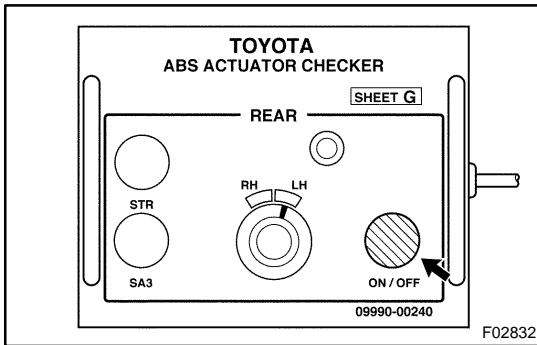
If the fluid surface level rises up, replace the hydraulic brake booster.

NOTICE:

Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 seconds.

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake pedal and shift the shift lever to "L" position.
- (9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
- (10) Check that the right rear wheel rotates.

If the right rear wheel stops, replace the hydraulic brake booster.



- (r) Inspect the left rear ABS solenoid.
- (1) Turn the selector switch to "LH" position.
 - (2) Depress the brake pedal several times and release the brake pedal when the pump begins rotating. Wait until the pump stops.
 - (3) Turn the ignition switch OFF.
 - (4) Depress the brake pedal with a force of 343 N (35 kgf, 77 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.
 - (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

If the fluid surface level rises up, replace the hydraulic brake booster.

NOTICE:

Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 seconds.

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake pedal and shift the shift lever to "L" position.
- (9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
- (10) Check that the left rear wheel rotates.

If the left rear wheel stops, replace the hydraulic brake booster.

- (s) Stop the engine and lower the vehicle.
- (t) Remove the "SHEET G" (SST) and disconnect the actuator checker (SST) and sub-wire harness S (SST) from the hydraulic brake booster.
- (u) Connect the 2 connectors to the actuator.
- (v) Clear the DTC (See page [DI-389](#)).

BRAKE FLUID BLEEDING

HINT:

- If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.
- When bleeding, keep the amount of the fluid within the line of reservoir between Min. and Max.

NOTICE:

- **Do not let brake fluid remain on painted surfaces. Wash it off immediately.**
- **With the reservoir cap removed, when depressing the brake pedal, the fluid will spray.**

1. FILL RESERVOIR WITH BRAKE FLUID

Fluid: SAE J1703 or FMVSS NO. 116 DOT3

2. IN CASE OF USING LEXUS HAND-HELD TESTER: BLEED HYDRAULIC BRAKE BOOSTER

HINT:

If the hydraulic brake booster has been disassembled, disconnect the brake line from the hydraulic brake booster or if the reservoir becomes empty, bleed the hydraulic brake booster.

- (a) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

- (b) Turn the ignition switch ON, check that the pump stops after approx. 30 to 40 seconds.

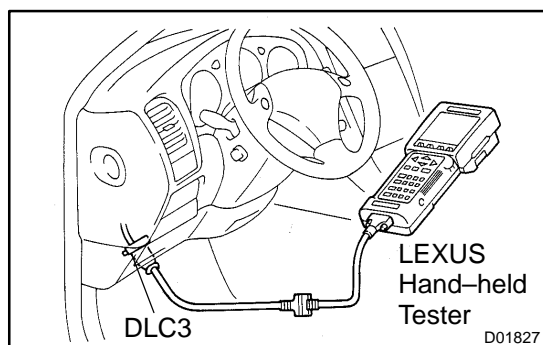
NOTICE:

When the pump does not stop, repeat step (a) and (b) again.

- (c) With the ignition switch remained ON, depress the brake pedal more than 20 times.
- (d) Observe the procedure in step 4 and bleed the right and left front brake caliper.
- (e) Holding the brake pedal depressed, bleed the right and left rear brake caliper.

HINT:

It is not necessary to depress the pedal continuously, as brake fluid flows out by first depressing.



- (f) Connect LEXUS hand-held tester.
- (1) Turn the ignition switch OFF, connect the LEXUS hand-held tester to DLC3.
- (2) Turn the ignition switch ON, and select "AIR BLEEDING" on the LEXUS hand-held tester.

HINT:

Please refer to the LEXUS hand-held tester operator's manual for further details.

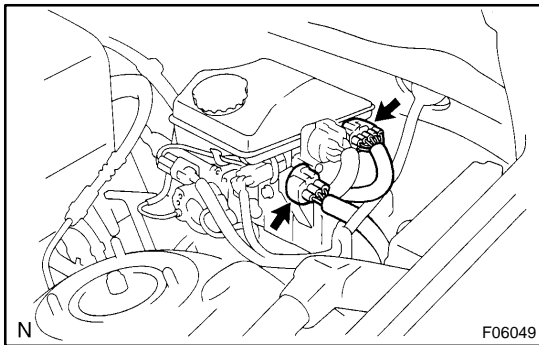
- (g) Bleed right front brake line.
 - (1) Select "FR LINE" on the LEXUS hand-held tester.
 - (2) With "FR LINE" turned ON with the LEXUS hand-held tester, depress the brake pedal and hold it to bleed the right front brake caliper.
 - (3) Repeat step (2) until there are no more air bubbles in the fluid.
- (h) Bleed left front brake line.
 - (1) Select "FL LINE" on the LEXUS hand-held tester.
 - (2) With "FL LINE" turned ON with the LEXUS hand-held tester, depress the brake pedal and hold it to bleed the left front brake caliper.
 - (3) Repeat step (2) until there are no more air bubbles in the fluid.
- (i) Bleed rear brake line.
 - (1) Select "RR LINE" on the LEXUS hand-held tester.
 - (2) With "RR LINE" turned ON with the LEXUS hand-held tester, bleed the left and right rear brake caliper.
- (j) Disconnect the LEXUS hand-held tester from DLC3.
- (k) Clear the DTC (See page [DI-389](#)).

3. IN CASE OF USING ABS ACTUATOR CHECKER (SST):

BLEED HYDRAULIC BRAKE BOOSTER

HINT:

If the hydraulic brake booster has been disassembled, disconnect the brake line from the hydraulic brake booster or if the reservoir becomes empty, bleed the hydraulic brake booster.



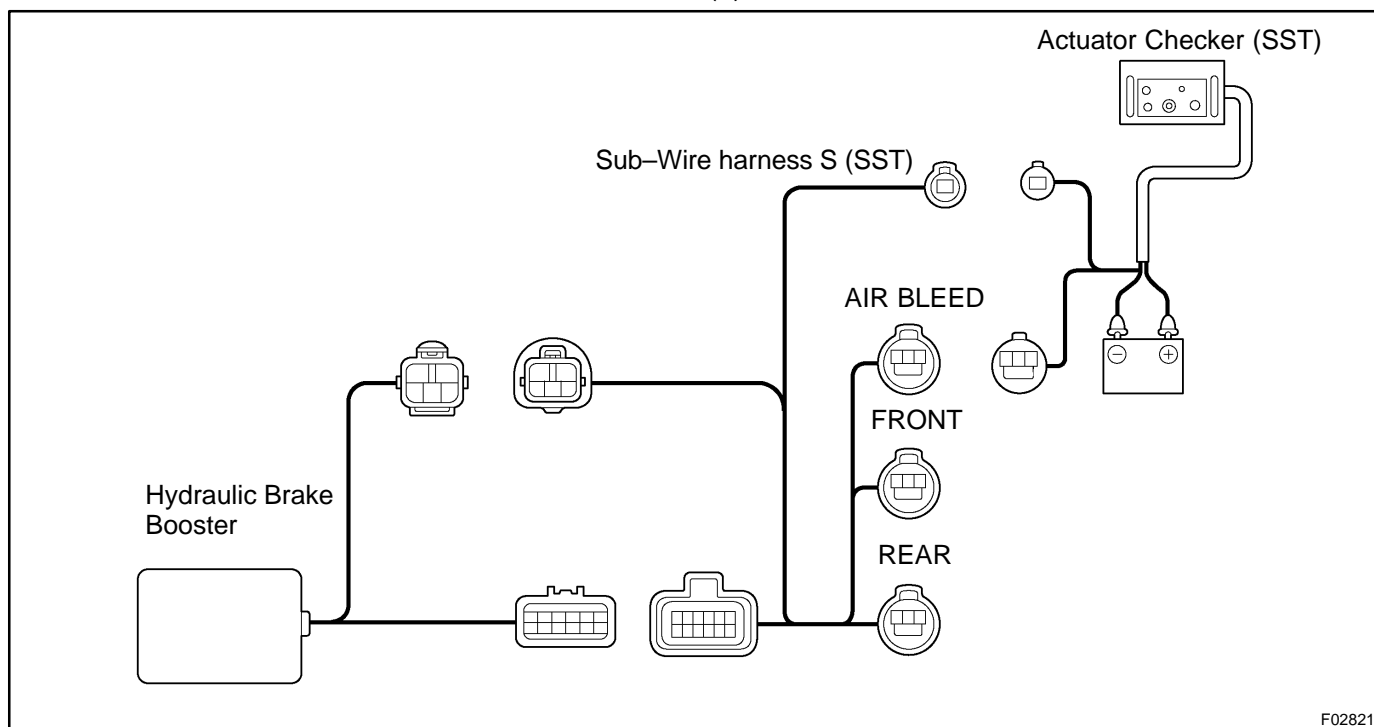
- (a) Disconnect the 2 connectors from the hydraulic brake booster.

- (b) Connect the actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness S (SST), as shown in the chart below.
SST 09990-00150, 09990-00480

HINT:

Connect the connector with the label of "AIR BLEED" attached to the connector of actuator checker.

- (c) Connect the red cable of the actuator checker to the battery positive (+) terminal and the black cable to the negative (–) terminal.



- (d) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

- (e) Turn the ignition switch ON, check that the pump stops after approx. 30 to 40 seconds.

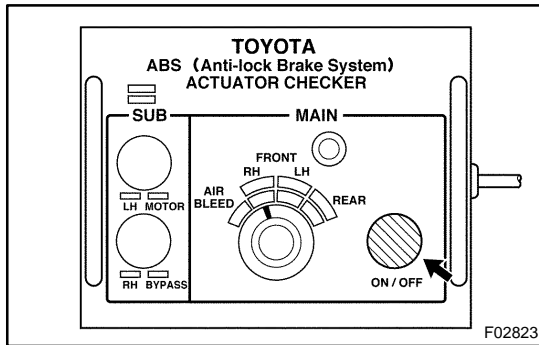
NOTICE:

When the pump does not stop, repeat step (d) and (e) again.

- (f) With the ignition switch remained ON, depress the brake pedal more than 20 times.
(g) Observe the procedure in step 4 and bleed the right and left front wheel caliper.
(h) Holding the brake pedal depressed, bleed the right and left rear wheel caliper.

HINT:

It is not necessary to depress the pedal continuously, as brake fluid flows out by first depressing.

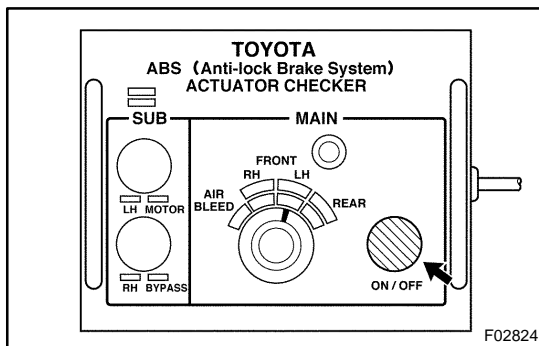


- (i) Bleed right front brake line.
- (1) Turn the selector switch of the actuator checker to the "FRONT RH" position.
 - (2) Push and hold in MAIN push switch, depress the brake pedal and hold it to bleed the right front brake caliper.

NOTICE:

Do not keep the MAIN switch pushed in for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (3) Repeat step (2) until there are no more air bubbles in the fluid.

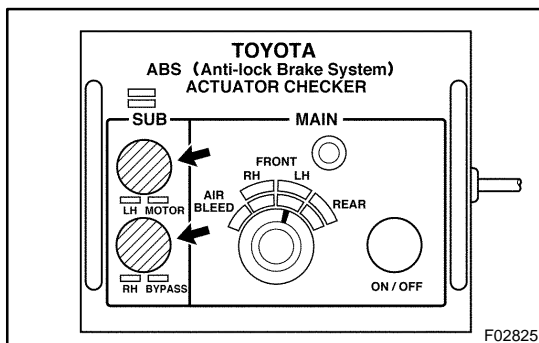


- (j) Bleed left front brake line.
- (1) Turn the selector switch of the actuator checker to the "FRONT LH" position.
 - (2) Push and hold in the MAIN push switch, depress the brake pedal and hold it to bleed the left front brake caliper.

NOTICE:

Do not keep the MAIN switch pushed in for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (3) Repeat step (2) until there are no more air bubbles in the fluid.



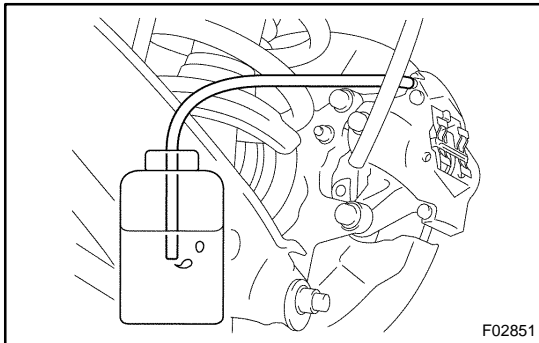
- (k) Bleed right rear brake line.
- (1) Push and hold in the "SUB LH" and "SUB RH" switches, bleed the right rear brake caliper.

NOTICE:

Do not keep the MAIN switch pushed in for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (2) Repeat step (1) until there are no more air bubbles in the fluid.

- (l) Observe the procedure in step (k) and bleed left rear brake line.
- (m) Disconnect the actuator checker (SST) and sub-wire harness (SST) from the actuator.
SST 09990-00150, 09990-00480
- (n) Connect the 2 connectors to the hydraulic brake booster.
- (o) Clear the DTC (See page [DI-389](#)).



4. BLEED BRAKE LINE

- (a) Connect the vinyl tube to the brake caliper.
- (b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.
- (c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.
- (d) Repeat (b) and (c) until all the air in the fluid has been bled out.
- (e) Repeat the above procedure to bleed the brake line for each wheel.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

5. CHECK FLUID LEVEL IN RESERVOIR

- (a) With the ignition switch OFF, depress the brake pedal more than 40 times.

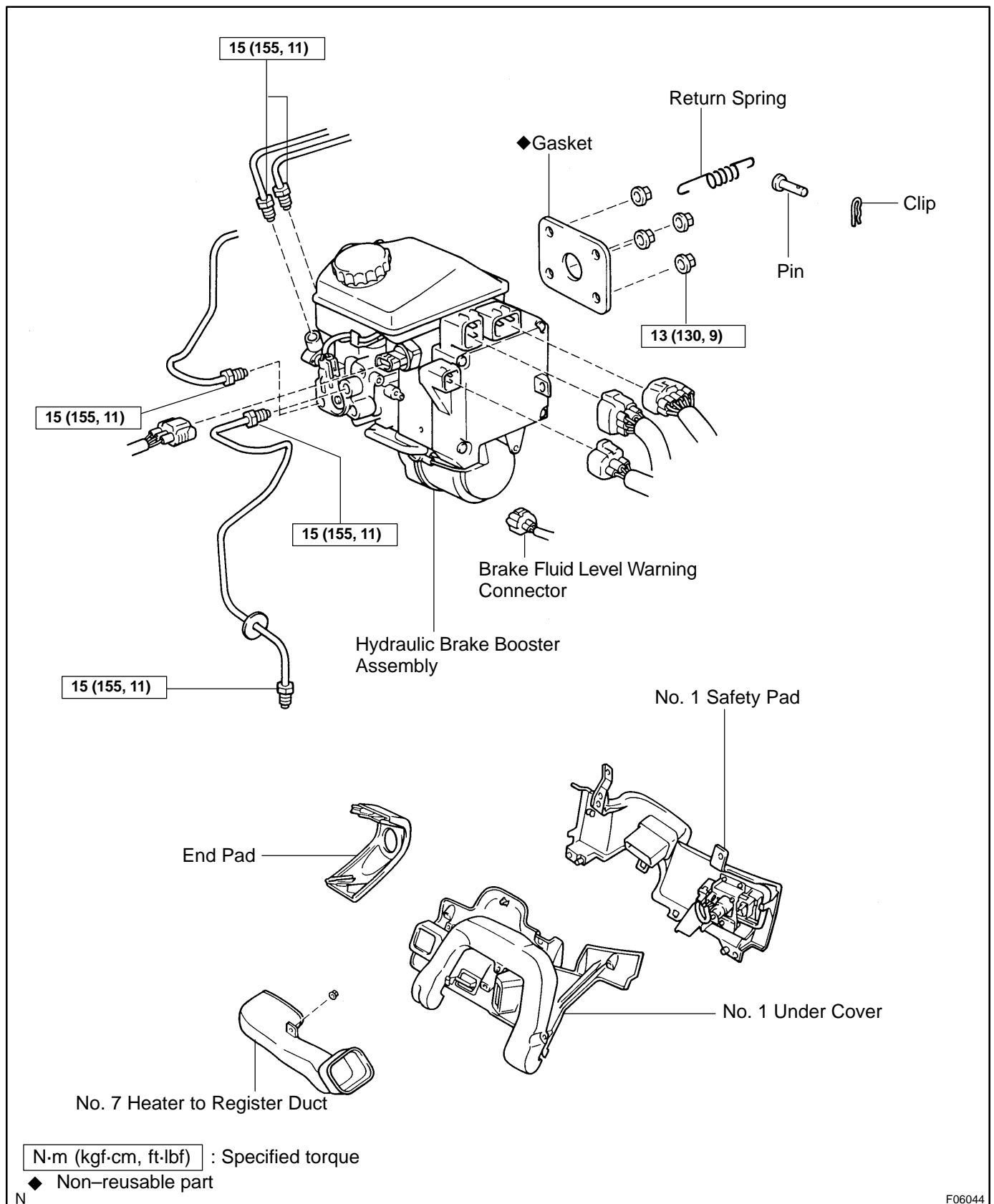
HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

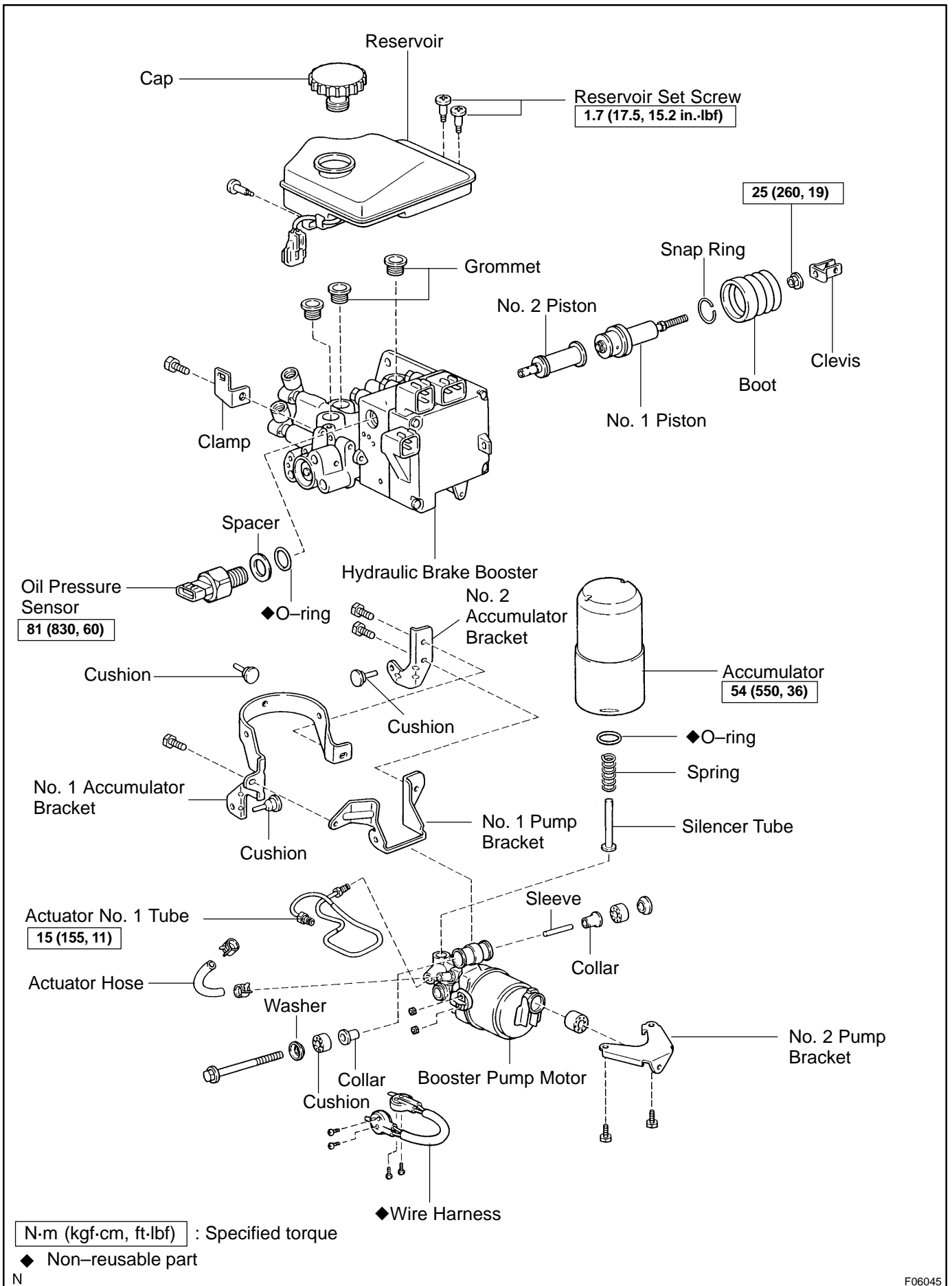
- (b) Remove the reservoir cap. Add brake fluid up to the "MAX" line.

Fluid: SAE J1703 or FMVSS NO. 116 DOT3

COMPONENTS



F06044



REMOVAL

NOTICE:

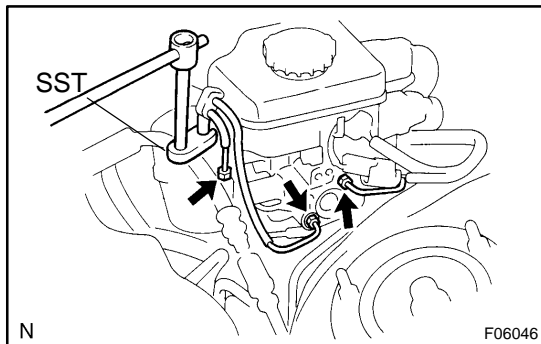
- Before starting the work, make sure that the ignition switch is OFF and depress the brake pedal more than 40 times.
- As high pressure is applied to the brake actuator tube No. 1, never deform it.
- Until the work is over, do not turn the ignition switch ON.

1. DRAW OUT FLUID WITH SYRINGE

NOTICE:

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

2. REMOVE NO. 1 UNDER COVER (See page [BO-88](#))
3. REMOVE END PAD AND NO. 1 SAFETY PAD
4. REMOVE NO. 7 HEATER TO REGISTER DUCT

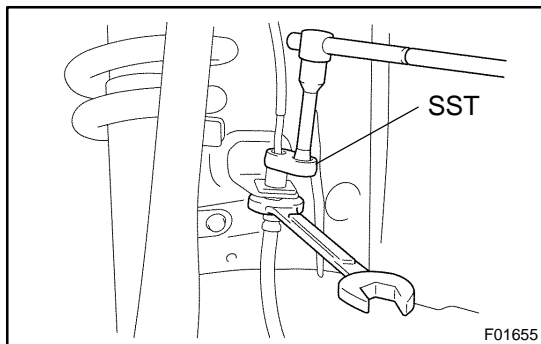


5. DISCONNECT BRAKE LINES

Using SST, disconnect the 4 brake lines.

SST 09023-00100

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



6. DISCONNECT LEFT FRONT WHEEL BRAKE LINE

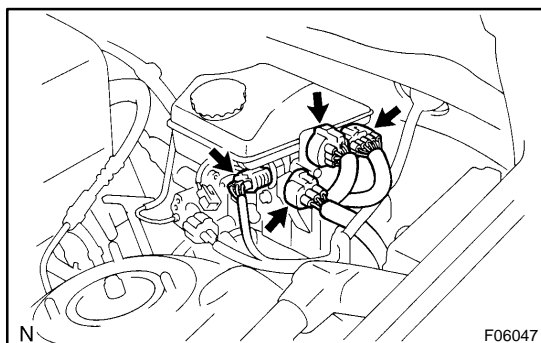
Using SST, disconnect the left front wheel brake line from the flexible hose.

SST 09023-00100

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

7. REMOVE 2 BRAKE LINE CLAMPS

8. DISCONNECT LEVEL WARNING SWITCH CONNECTOR



9. DISCONNECT 4 CONNECTORS

10. REMOVE PEDAL RETURN SPRING, CLIP AND CLEVIS PIN

11. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY

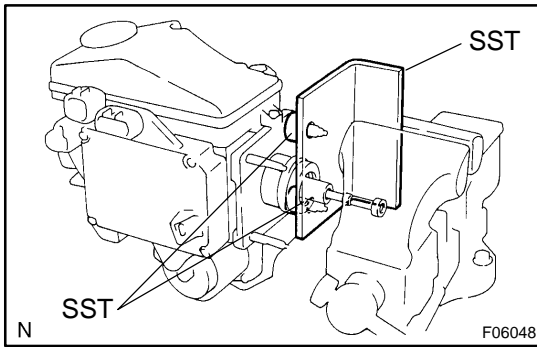
(a) Loosen the lock nut, then remove the clevis and lock nut.

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

(b) Remove the 4 booster installation nuts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(c) Remove the booster assembly and gasket.



DISASSEMBLY

1. PLACE HYDRAULIC BRAKE BOOSTER IN VISE

Using SST, set the hydraulic brake booster in vise.

SST 09630-00014 (09631-00142),
09950-60010 (09951-00180, 09951-00190)

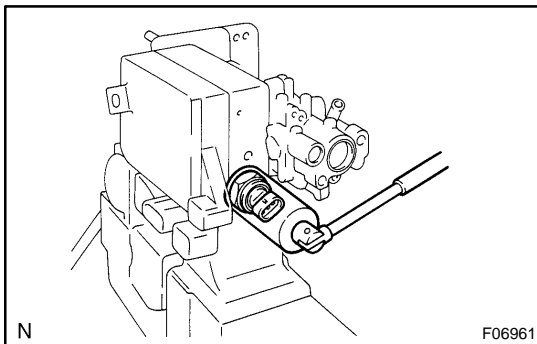
2. REMOVE RESERVOIR AND GROMMETS

- Remove the reservoir cap.
- Remove the 3 set screws and pull out the reservoir.

Torque: 1.7 N·m (17.5 kgf·cm, 15.2 in.-lbf)

- Remove the 3 grommets.

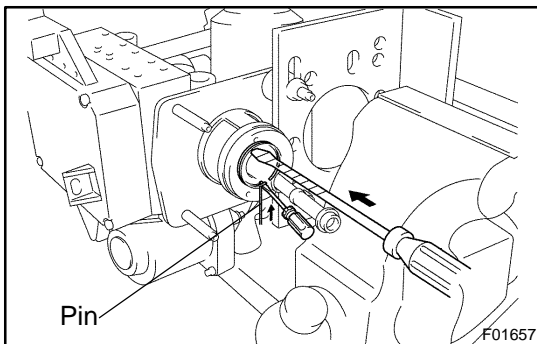
3. REMOVE CYLINDER BOOT



4. REMOVE OIL PRESSURE SENSOR

Using 30 mm deeper socket wrench and remove the oil pressure sensor, spacer and O-ring.

Torque: 81 N·m (830 kgf·cm, 60 ft-lbf)



5. REMOVE PISTONS

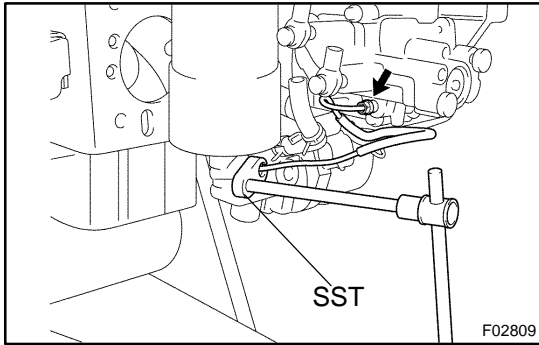
- Pressing the piston in with a screwdriver, use a pin or an equivalent to push the snap ring from the hole in the body then remove it with another screwdriver.
- Remove the No. 1 and No. 2 piston, pulling straight out, not at an angle.

NOTICE:

- If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.
- At the time of reassembly, be careful not to damage the rubber lips on the pistons.

6. DISCONNECT ACTUATOR HOSE

7. REMOVE 3 BOLTS, 2 HANGERS AND CLAMP

**8. REMOVE BRAKE ACTUATOR TUBE NO. 1**

Using SST, remove the brake actuator tube No. 1.

SST 09023-00100

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

9. REMOVE BOOSTER PUMP AND ACCUMULATOR

(a) Remove the 4 screws and wire harness.

HINT:

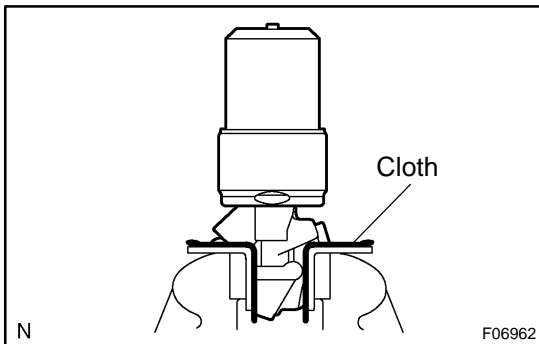
At the time of installation, please refer to the following item.

Replace the used wire harness with new one.

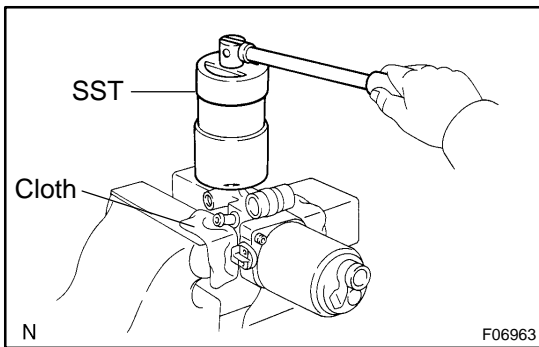
(b) Using 5 mm socket hexagon wrench, remove the 3 bolts, No. 1 accumulator bracket, No. 2 accumulator bracket, booster pump and accumulator with the No. 1 pump bracket.

(c) Remove the bolt and No. 1 pump bracket, and remove the 2 washers, 3 cushions, 2 collars and sleeve.

(d) Remove the 2 bolts and No. 2 pump bracket.

**10. PLACE BOOSTER PUMP IN VISE**

Place the booster pump with a cloth shown in the illustration on the left.

**11. REMOVE ACCUMULATOR FROM BOOSTER PUMP**

(a) Using SST, remove the accumulator.

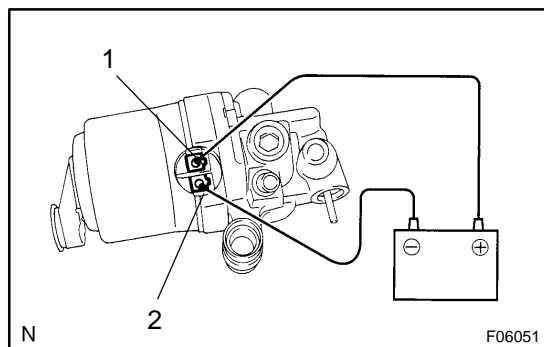
SST 09318-12010

Torque: 54 N·m (550 kgf-cm, 36 ft-lbf)

(b) Remove the silencer tube, spring and O-ring.

NOTICE:

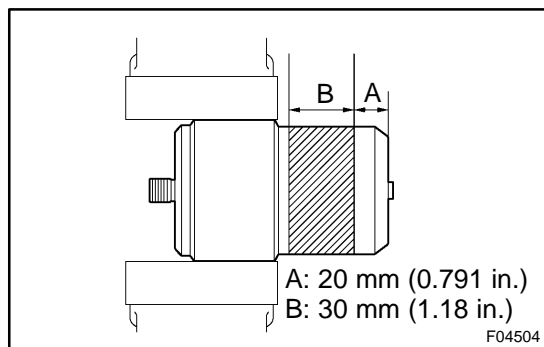
Ensure no foreign matter enters the pump.



INSPECTION

INSPECT HYDRAULIC BRAKE BOOSTER PUMP MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 of pump motor, and the negative (–) lead to terminal 2.
- (b) Check that the pump motor operation.



DISPOSAL

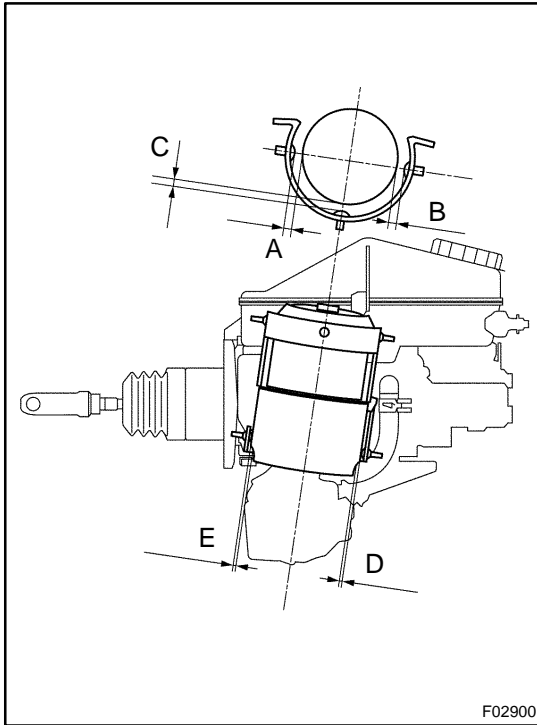
DISPOSAL METHOD OF ACCUMULATOR

- Follow the procedures described below and drain the high pressure gas from the accumulator.
- Place the accumulator in a vise, cover it with a cloth over a saw then cut the accumulator body slowly.

CAUTION:

Never cut at a stretch.

- When the outer body of the accumulator is cut, gas discharges.



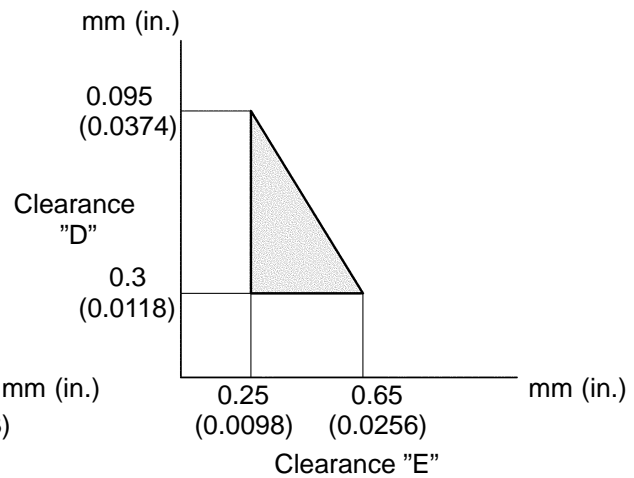
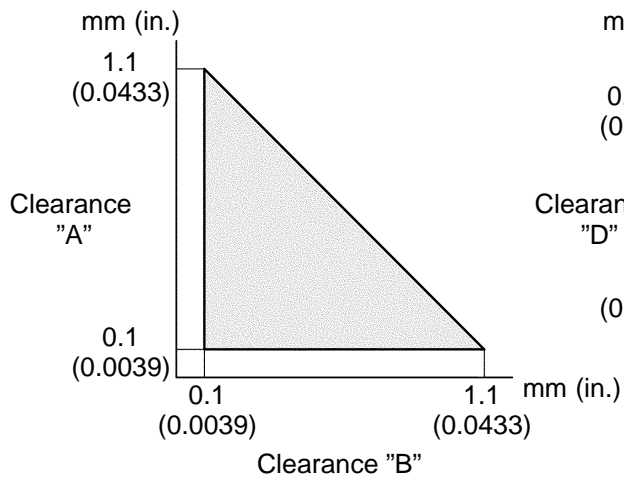
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-51](#)).

INSTALL ACCUMULATOR BRACKET

When installing the accumulator bracket, adjust to ensure that clearance (A, B, D and E) shown in the illustration on the left corresponds to each value in the graphs below and are within the C range, using a thickness gauge.

C Range: 0.1 – 0.4 mm (0.004 – 0.016 in.)



F02901

INSTALLATION

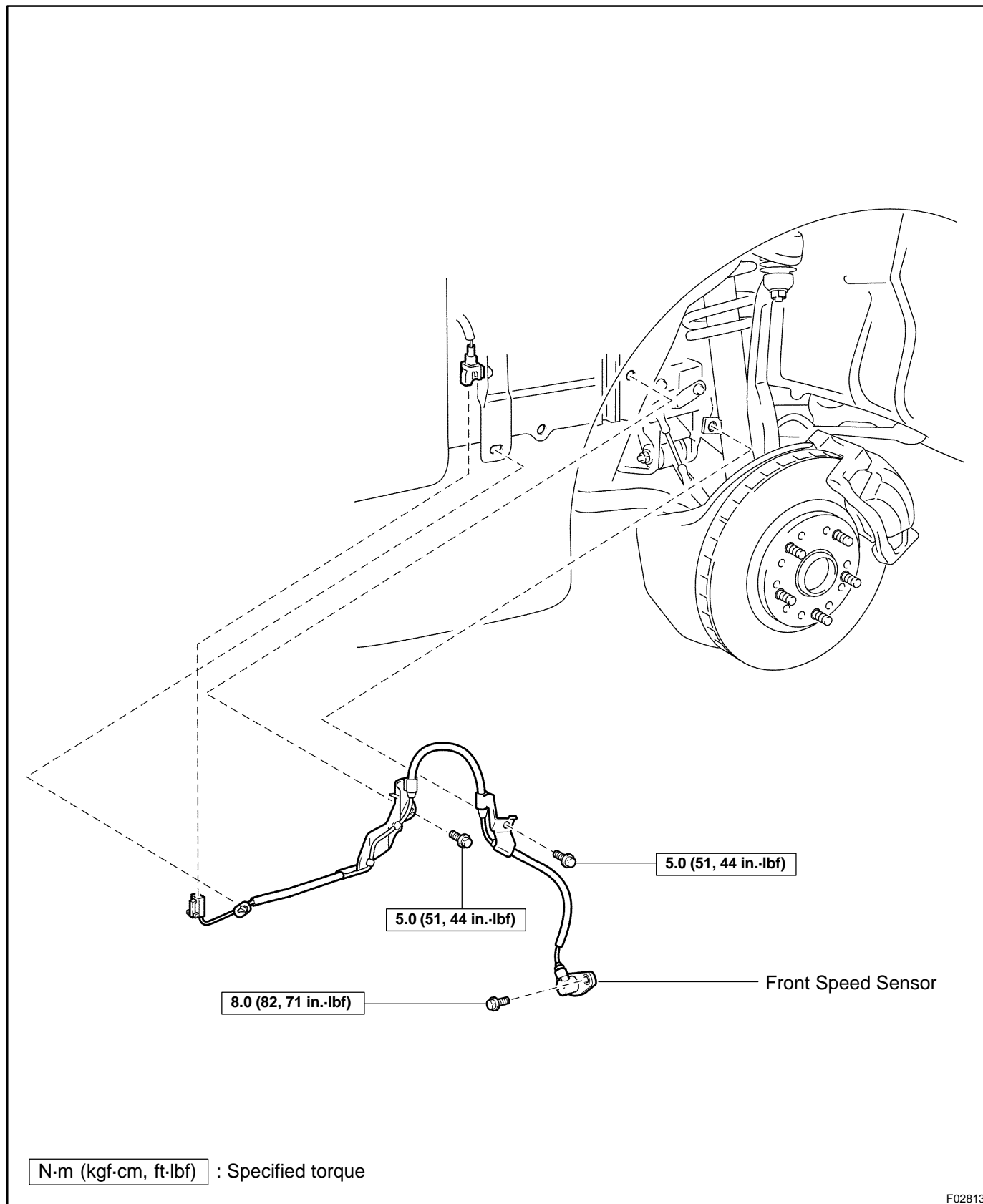
Installation is in the reverse order of removal (See page [BR-50](#)).

HINT:

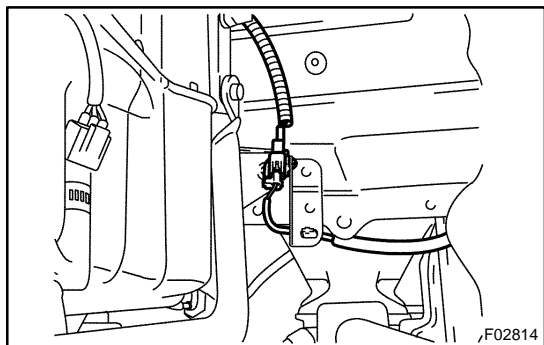
- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#)).
- Check for leaks.

FRONT SPEED SENSOR COMPONENTS

BR0K1-07

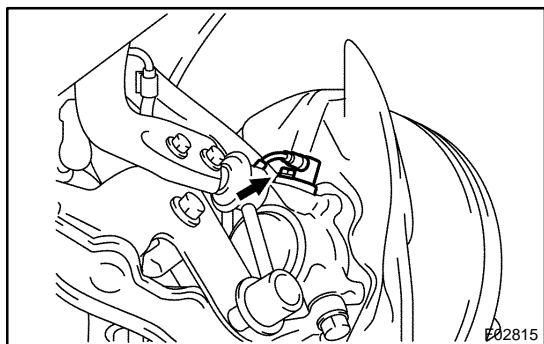


F02813



REMOVAL

1. **REMOVE FRONT WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **DISCONNECT SPEED SENSOR CONNECTOR**



3. **REMOVE SPEED SENSOR**
 - (a) Remove the resin clip and 2 clamp bolts holding the sensor harness to the body.
Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)
 - (b) Remove the bolt and speed sensor from the steering knuckle.
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

INSTALLATION

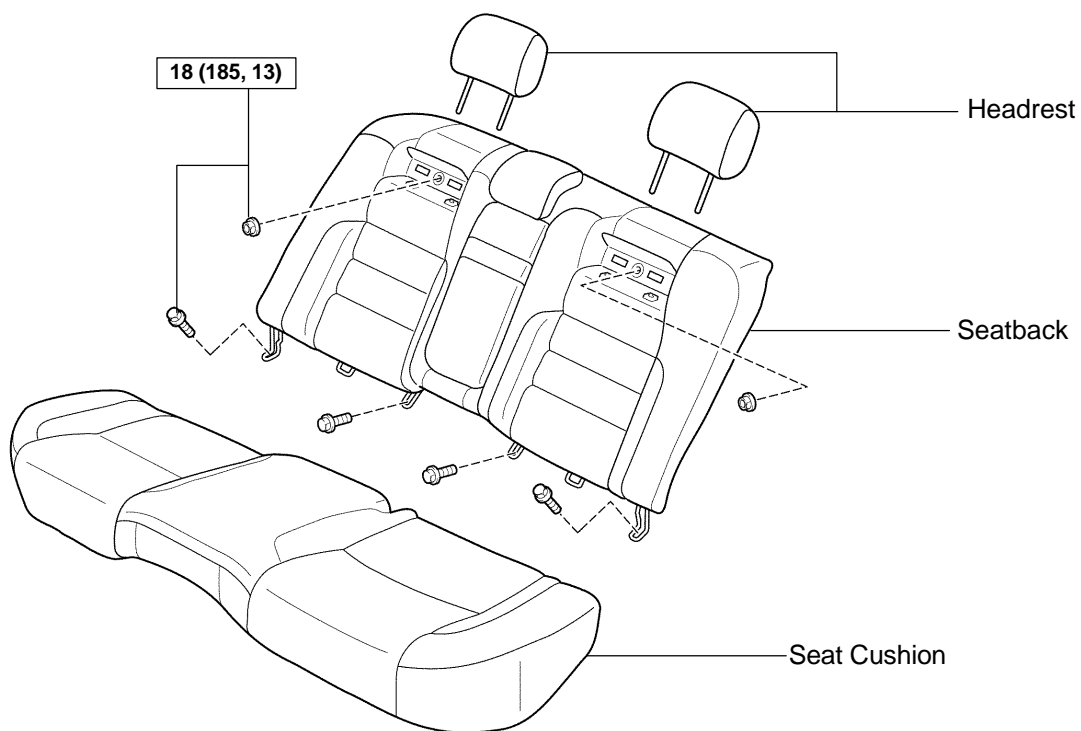
Installation is in the reverse order of removal (See page [BR-58](#)).

HINT:

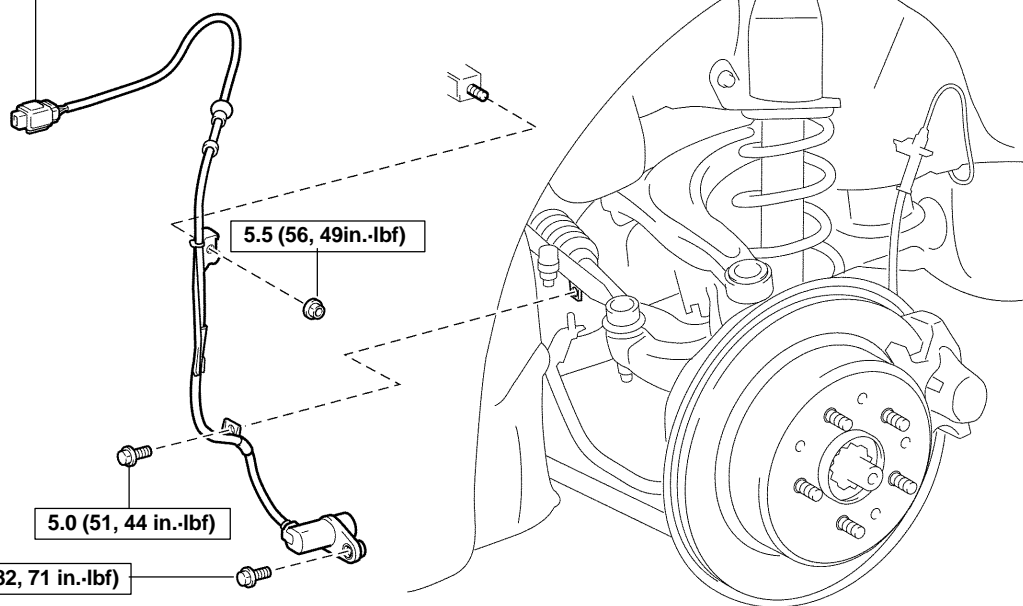
After installation, check speed sensor signal (See page [DI-389](#)).

REAR SPEED SENSOR COMPONENTS

BR0K4-07

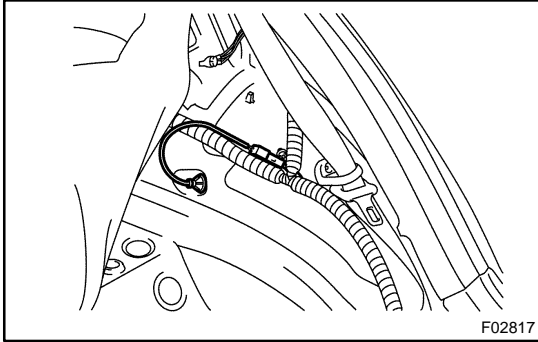


Rear Speed Sensor



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

F02816



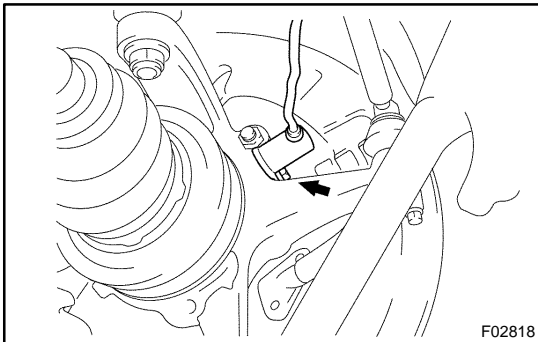
REMOVAL

1. DISCONNECT SPEED SENSOR CONNECTOR

- (a) Remove the seat cushion and 2 headrests.
- (b) Remove the 4 bolts, 2 nuts and seatback.
Torque: 18 N·m (185 kgf·cm, 13 in.-lbf)
- (c) Disconnect the speed sensor connector and pull out the sensor wire harness with the grommet.

2. REMOVE SPEED SENSOR

- (a) Remove the clamp bolt holding the sensor wire harness to the suspension arm No. 1.
Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)
- (b) Remove the clamp nut holding the sensor wire harness to the body.
Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)



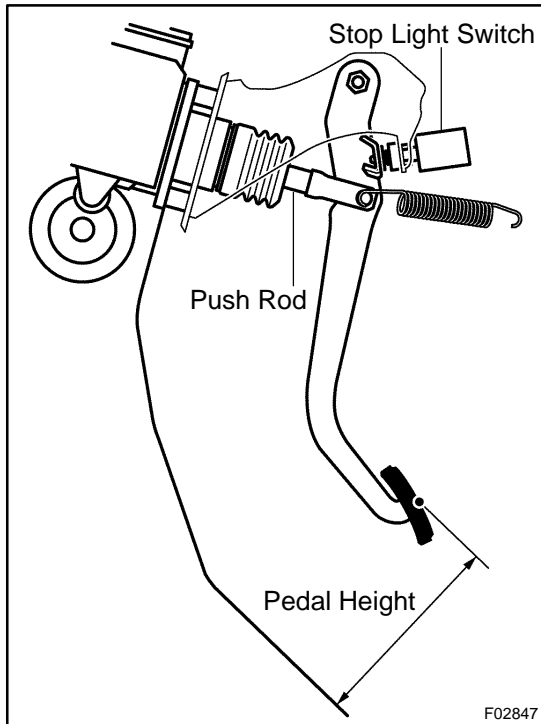
- (c) Remove the sensor installation bolt and speed sensor from the axle carrier.
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [BR-61](#)).

HINT:

After installation, check speed sensor signal (See page [DI-389](#)).



BRAKE PEDAL ON-VEHICLE INSPECTION

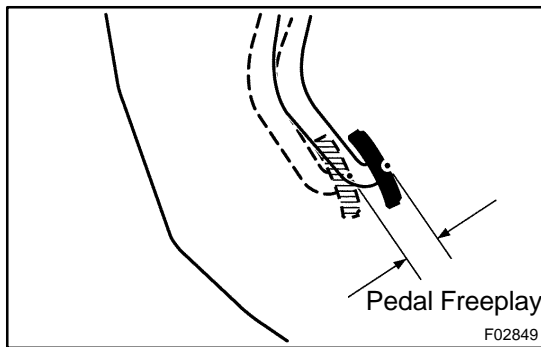
BRQJB-07

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:
150.0 – 160.0 mm (5.906 – 6.299 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

- Remove the No. 1 under cover, end pad, No. 1 safety pad and No. 7 heater to register duct (See page [BO-88](#)).
- Disconnect the connector from the stop light switch.
- Loosen the stop light switch lock nut and remove the stop light switch.
- Loosen the push rod lock nut.
- Adjust the pedal height by turning the pedal push rod.
- Tighten the push rod lock nut.
Torque: 25 N·m (260 kgf-cm, 19 ft-lbf)
- Install the stop light switch.
- Push in the brake pedal 5 – 15 mm (0.20 – 0.59 in.), turn the stop light switch to lock the nut in the position where the stop light goes off.
- Connect the connector to the stop light switch.
- After installation, push in the brake pedal 5 – 15 mm (0.20 – 0.59 in.), check that stop light lights up.
- After adjusting the pedal height, check the pedal freeplay.
- Install the No. 7 heater to register duct, No. 1 safety pad, end pad and No. 1 under cover.



3. CHECK PEDAL FREEPLAY

- Stop the engine and depress the brake pedal more than 40 times until there is no more pressure left in the booster.
- Push in the pedal by hand until the second point of resistance begins to be felt, then measure the distance, as shown.

Pedal freeplay: 0.2 – 2.0 mm (0.008 – 0.079 in.)

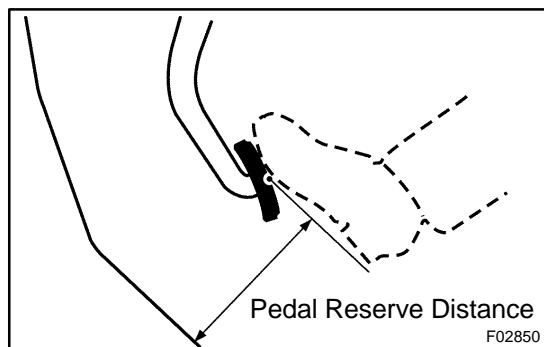
If incorrect, check the stop light switch clearance. If the clearance is OK, then troubleshoot the brake system.

Stop light switch clearance:

0.5 – 2.4 mm (0.020 – 0.094 in.)

HINT:

The freeplay to the 1st point of resistance is due to the play between the clevis and pin. It is 0.2 – 2.0 mm (0.008 – 0.079 in.) on the pedal.



4. CHECK PEDAL RESERVE DISTANCE

(a) Remove the floor carpet.

(b) Release the parking brake.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance at 196 N (20 kgf, 44.1 lbf):

More than 93 mm (3.66 in.)

If the reserve distance is incorrect, troubleshoot the brake system.

CHARGING SYSTEM

ON-VEHICLE INSPECTION

CH043-01

CAUTION:

- Check that the battery cables are connected to the correct terminals.
- Disconnect the battery cables when the battery is given a quick charge.
- Do not do tests with a high voltage insulation resistance tester.
- Never disconnect the battery while the engine is running.

1. CHECK BATTERY ELECTROLYTE LEVEL

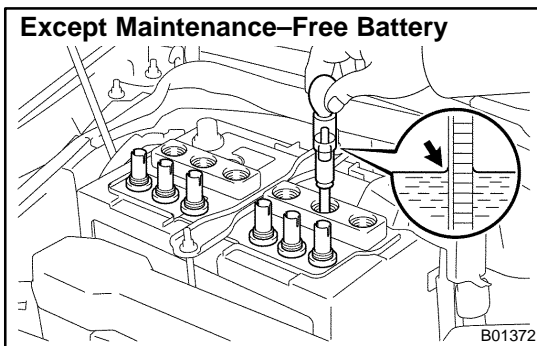
Check the electrolyte quantity of each cell.

Maintenance-Free Battery:

If under the lower level, replace the battery (or add distilled water if possible). Check the charging system.

Except Maintenance-Free Battery:

If under the lower level, add distilled water.

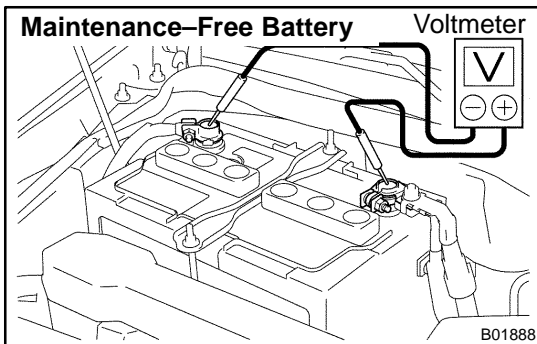


2. Except Maintenance-Free Battery: CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

Standard specific gravity: 1.25 – 1.29 at 20°C (68°F)

If the specific gravity is less than specification, charge the battery.



3. Maintenance-Free Battery: CHECK BATTERY POSITIVE VOLTAGE

- After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.
- Turn the ignition switch OFF and turn off the electrical systems.
- Measure the battery positive voltage between the negative (–) and positive (+) terminals of the battery.

Standard voltage: 12.5 – 12.9 V at 20°C (68°F)

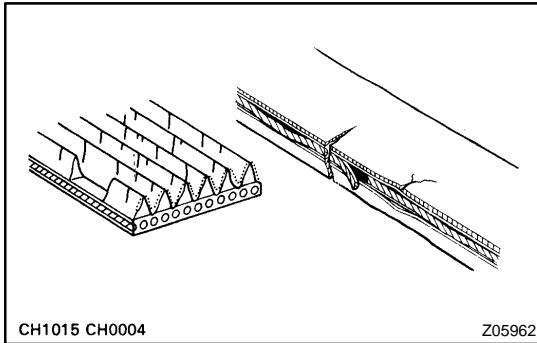
If the voltage is less than specification, charge the battery.

4. CHECK BATTERY TERMINALS AND FUSES

- Check that the battery terminals are not loose or corroded.

If the terminals are corroded, clean the terminals.

- Check the fusible link and fuses for continuity.



5. INSPECT DRIVE BELT

HINT:

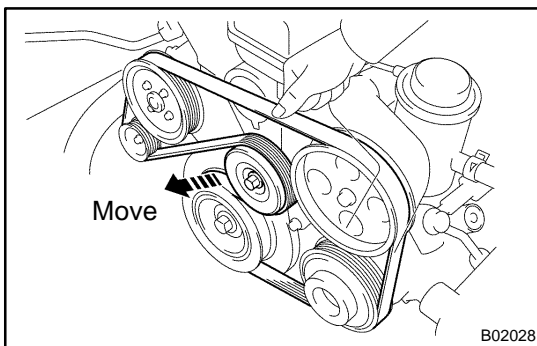
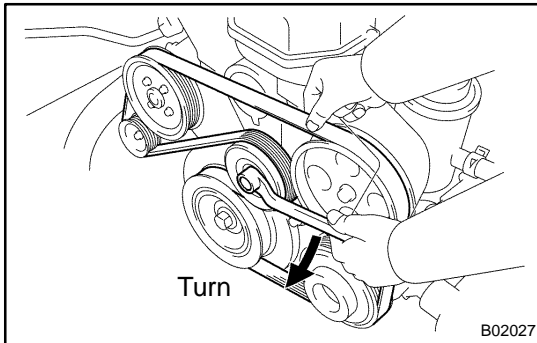
A belt tensioner is used, so checking the belt tension is not necessary.

- (a) Visually check the drive belt for excessive wear, frayed cords, etc.

If necessary, replace the drive belt.

HINT:

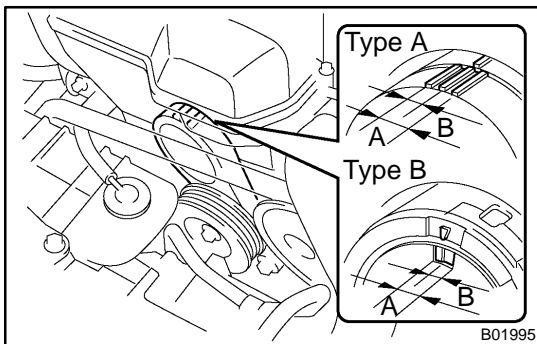
- Cracks on the rib side of a drive belt are considered acceptable. If the drive belt has chunks missing from the ribs, it should be replaced.
- The drive belt tension can be released by turning the belt tensioner clockwise.



- (b) Check the belt tensioner operation.

- Check that the belt tensioner moves downward when the drive belt is pressed down at the points indicated in the illustration with approx. 98 N (10 kgf, 22.0 lbf) of force.
- Check the alignment of the belt tensioner pulley to make sure the drive belt will not slip off the pulley.

If necessary, replace the belt tensioner.

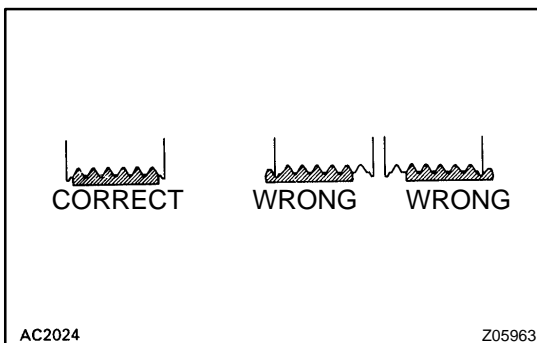


- Check that the arrow mark on the belt tensioner falls within area A of the scale.

If it is outside area A, replace the drive belt.

HINT:

- When a new belt is installed, it should lie within area B. If not, the drive belt is not correct.



- After installing a drive belt, check that it fits properly in the ribbed grooves.
- Check by hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

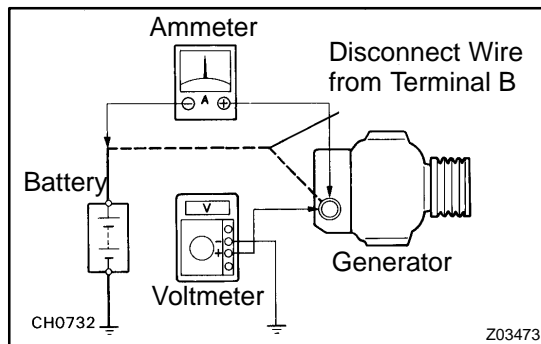
6. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

- (a) Check that the wiring is in good condition.
- (b) Check that there is no abnormal noise from the generator while the engine is running.

7. CHECK CHARGE WARNING LIGHT CIRCUIT

- Warm up the engine and then turn it off.
- Turn off all accessories.
- Turn the ignition switch "ON". Check that the charge warning light is lit.
- Start the engine. Check that the light goes off.

If the light does not go off as specified, troubleshoot the charge light circuit.

**8. INSPECT CHARGING CIRCUIT WITHOUT LOAD****HINT:**

If a battery/generator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

- 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 (–) probe of the ammeter.
 - Connect the positive (+) probe of the ammeter to terminal B of the generator.
 - Connect the positive (+) probe of the voltmeter to terminal B of the generator.
 - Ground the negative (–) probe of the voltmeter.
- Check the charging circuit as follows:
With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

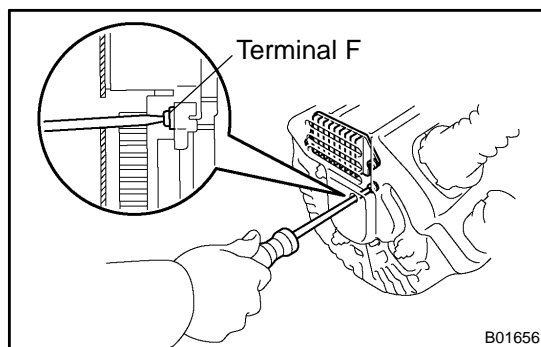
Standard amperage: 10 A or less

Standard voltage: 13.2 – 14.8 V

If the voltmeter reading is more than standard voltage, replace the voltage regulator.

If the voltmeter reading is less than standard voltage, check the voltage regulator and generator as follows:

- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than standard voltage, replace the voltage regulator.
- If the voltmeter reading is less than standard voltage, check the generator.

**9. INSPECT CHARGING CIRCUIT WITH LOAD**

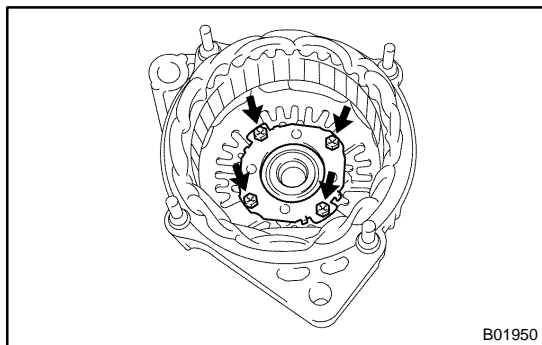
- With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "HI".
- Check the reading on the ammeter.

Standard amperage: 30 A or more

If the ammeter reading is less than the standard amperage, repair the generator.

HINT:

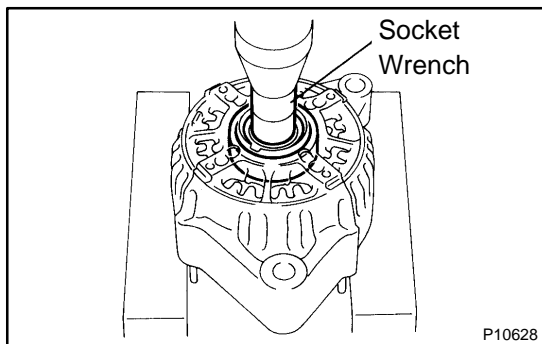
If the battery is fully charged, the indication will sometimes be less than standard amperage.



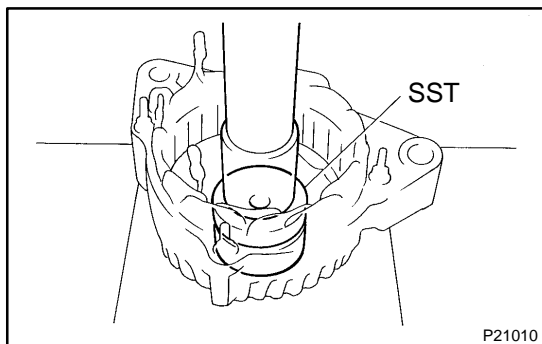
REPLACEMENT

1. REPLACE FRONT BEARING

- (a) Remove the 4 screws, bearing retainer and bearing.



- (b) Using a socket wrench and press, press out the bearing.

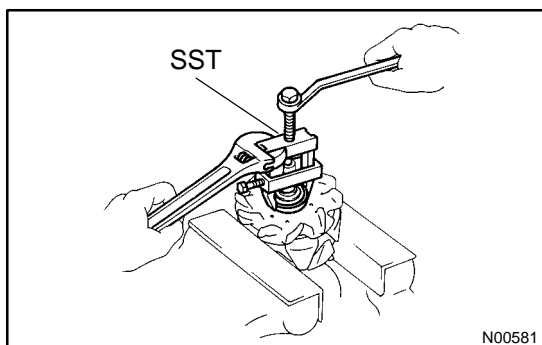


- (c) Using SST and a press, press in a new bearing.

SST 09950-60010 (09951-00500)

- (d) Install the bearing retainer with the 4 screws.

Torque: 3.0 N·m (31 kgf·cm 27 in.-lbf)



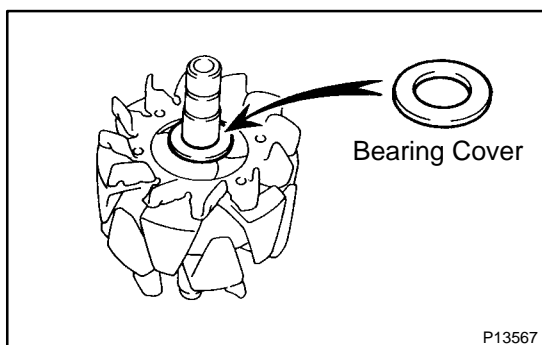
2. REPLACE REAR BEARING

- (a) Using SST, remove the bearing cover (outside) and bearing.

SST 09820-00021

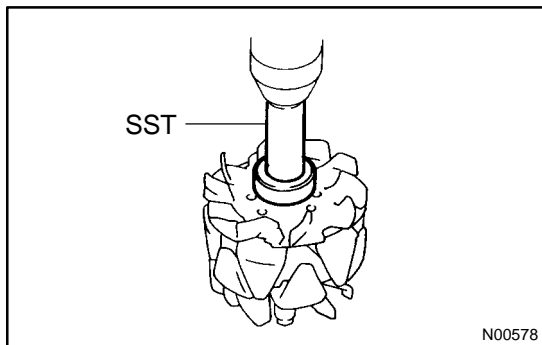
NOTICE:

Be careful not to damage the fan.

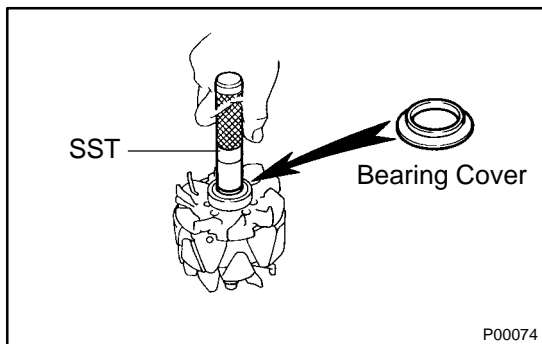


- (b) Remove the bearing cover (inside).

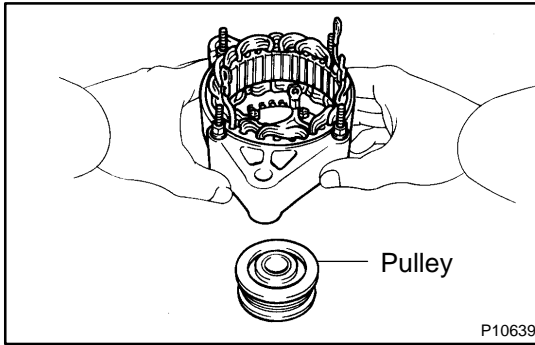
- (c) Place the bearing cover (inside) on the rotor.



- (d) Using SST and a press, press in a new bearing.
SST 09820-00030

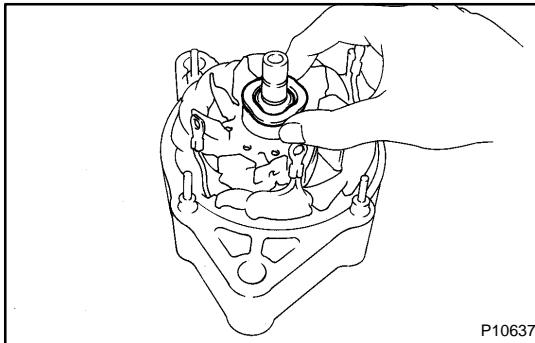


- (e) Using SST, push in the bearing cover (outside).
SST 09285-76010



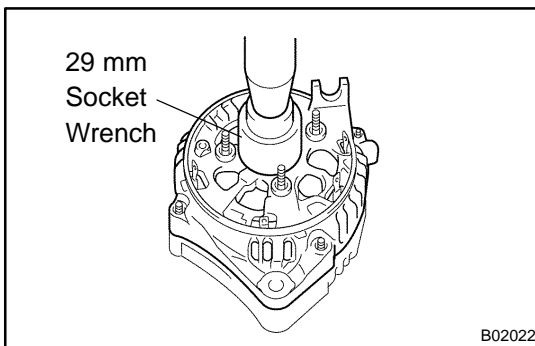
REASSEMBLY

1. PLACE DRIVE END FRAME ON PULLEY
2. INSTALL ROTOR TO DRIVE END FRAME

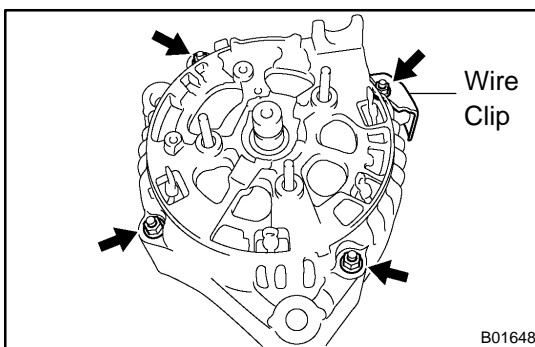


3. INSTALL RECTIFIER END FRAME

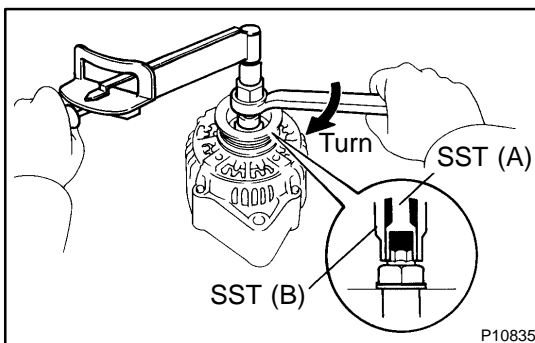
- (a) Place the generator washer on the rotor.



- (b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.

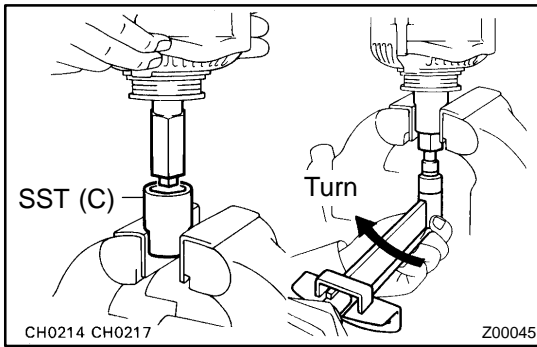


- (c) Install the 3 nuts.
Torque: 4.5 N·m (46 kgf·cm, 40 in.-lbf)
- (d) Install the wire clip with the nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

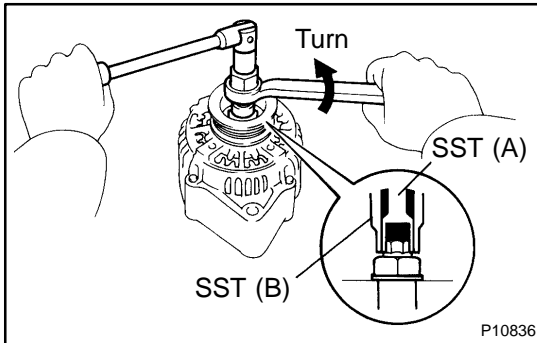


4. INSTALL PULLEY

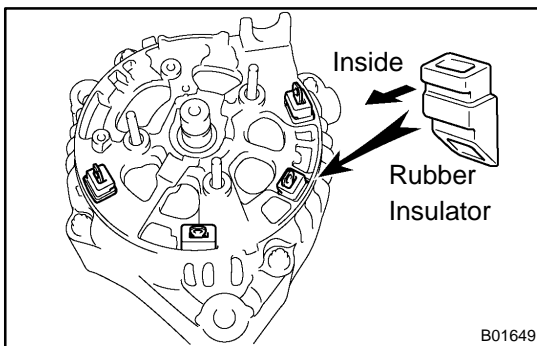
- (a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.
- (b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820-63010
Torque: 39 N·m (400 kgf·cm, 29 ft-lbf)
- (c) Check that SST (A) is secured to the pulley shaft.



- (d) Mount SST (C) in a vise.
- (e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).
- (f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110.5 N·m (1,125 kgf-cm, 81 ft-lbf)
- (g) Remove the generator from SST (C).

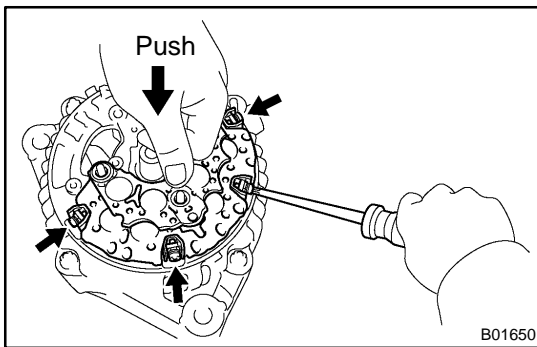


- (h) Turn SST (B), and remove SST (A and B).

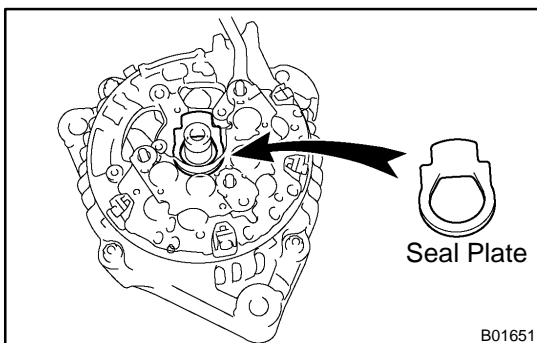


5. INSTALL RECTIFIER HOLDER

- (a) Install the 4 rubber insulators on the lead wires.

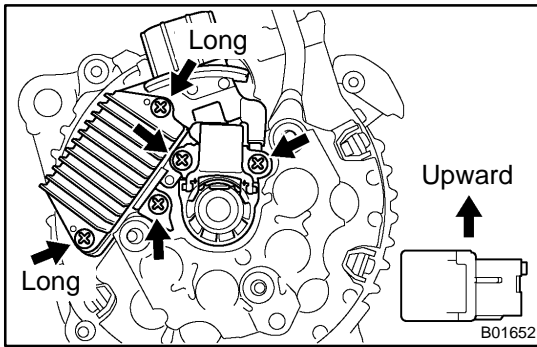


- (b) Install the rectifier holder while pushing it with the 4 screws.
Torque: 2.9 N·m (30 kgf-cm, 26 in.-lbf)



6. INSTALL VOLTAGE REGULATOR AND BRUSH HOLDER

- (a) Place the seal plate on the rectifier end frame.



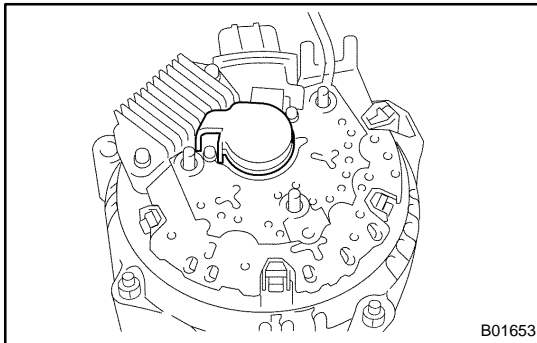
- (b) Place the voltage regulator and brush holder on the rectifier end frame.

NOTICE:

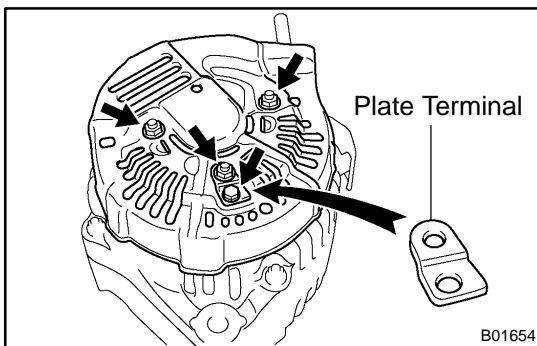
Be careful of the holder installation direction.

- (c) Install the 5 screws.

Torque: 2.0 N·m (20 kgf·cm, 18 in.-lbf)



- (d) Place the brush holder cover on the brush holder.

**7. INSTALL REAR END COVER**

- (a) Install the end cover and plate terminal with the bolt and 3 nuts.

Torque:

Nut 4.4 N·m (45 kgf·cm, 39 in.-lbf)

Bolt 3.9 N·m (39 kgf·cm, 35 in.-lbf)

- (b) Install the terminal insulator with the nut.

Torque: 6.5 N·m (67 kgf·cm, 58 in.-lbf)

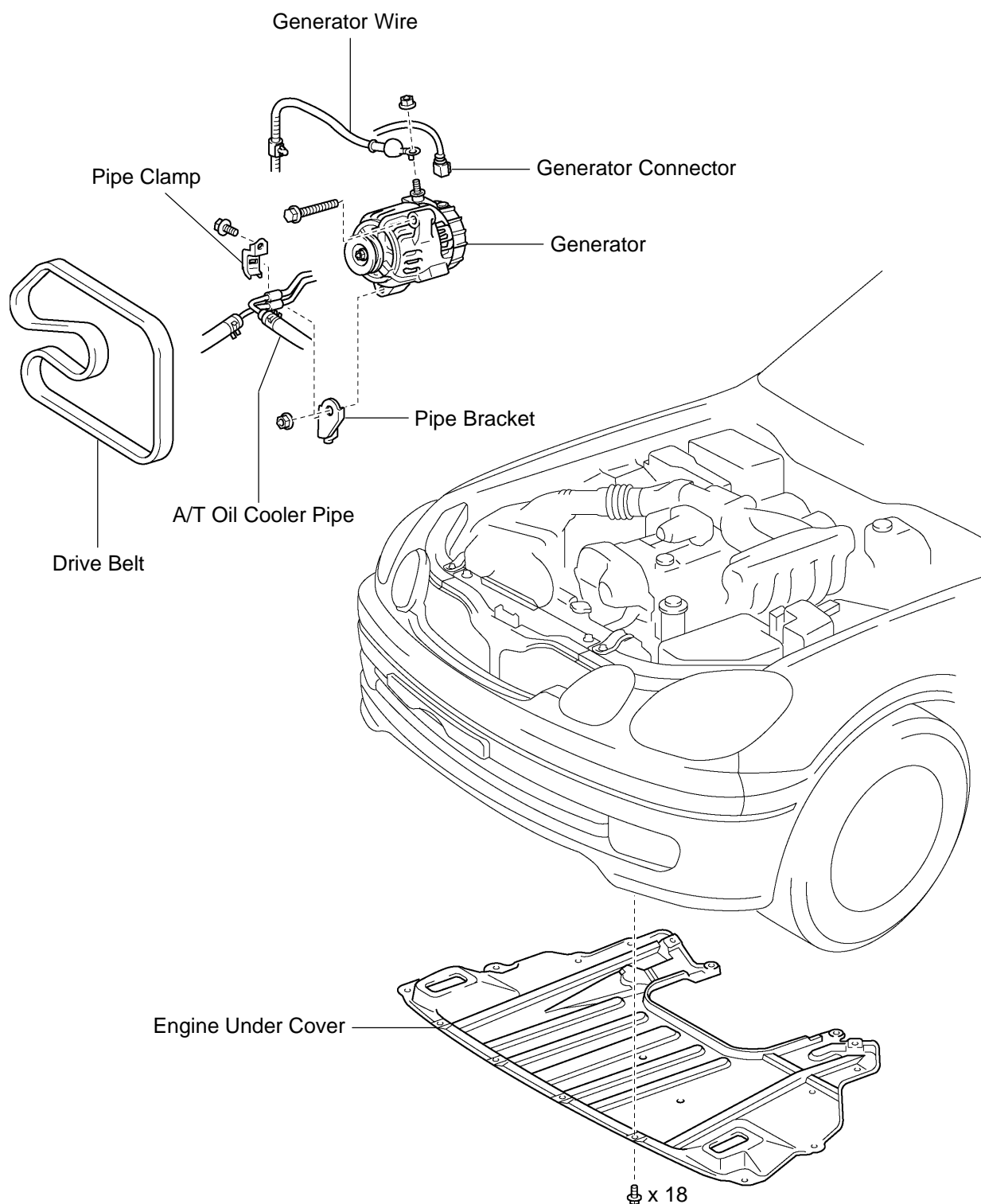
8. CHECK THAT ROTOR ROTATES SMOOTHLY

INSTALLATION

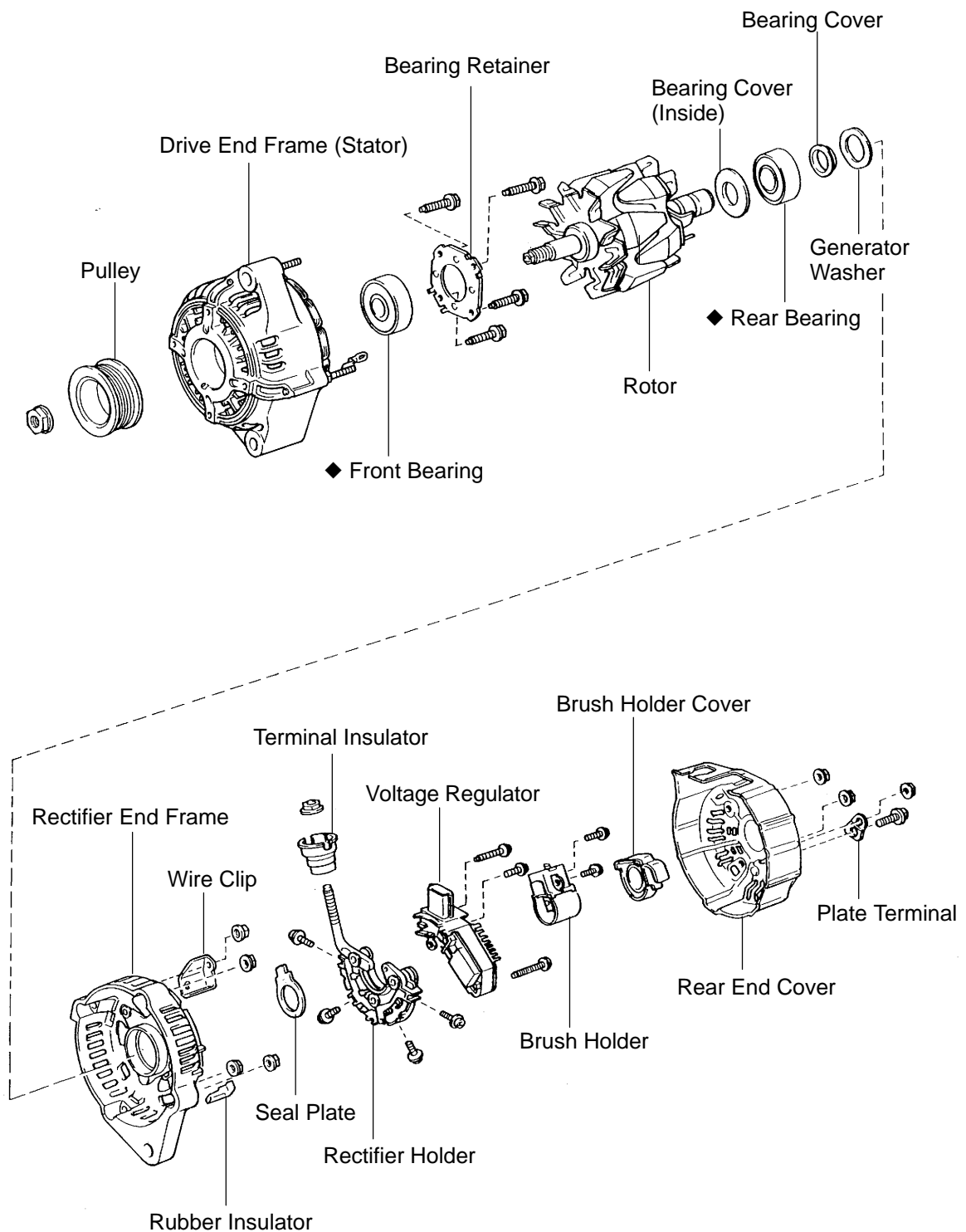
Installation is in the reverse order of removal. (See page [CH-6](#))

GENERATOR COMPONENTS

CH044-01

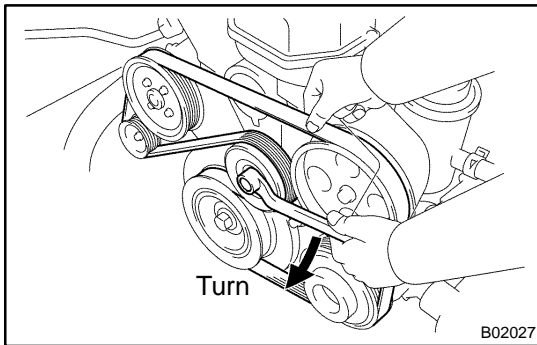


B01996



◆ Non-reusable part

B01642



REMOVAL

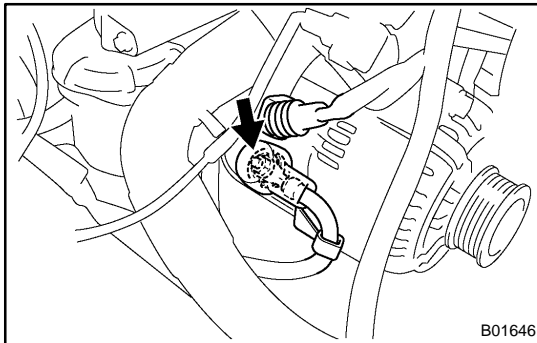
1. REMOVE ENGINE UNDER COVER

2. REMOVE DRIVE BELT

Loosen the belt tension by turning the drive belt tensioner clockwise, and remove the drive belt.

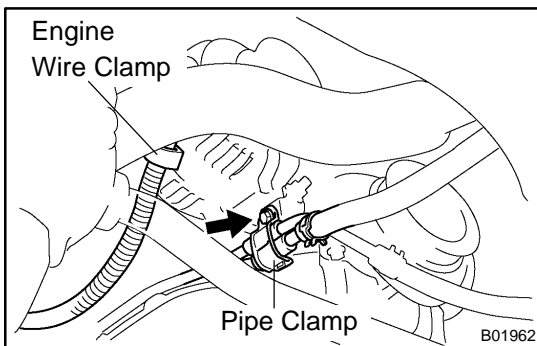
NOTICE:

At the time of installation, please refer to the following items. Do an on-vehicle inspection. (See page [CH-1](#))

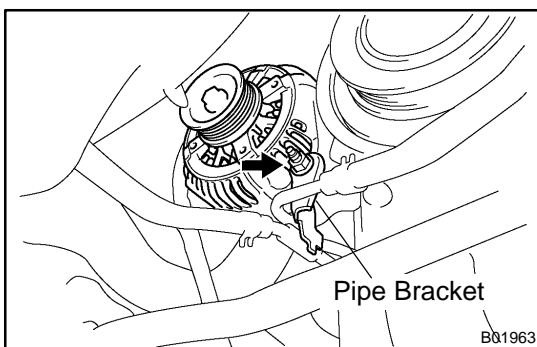


3. REMOVE GENERATOR

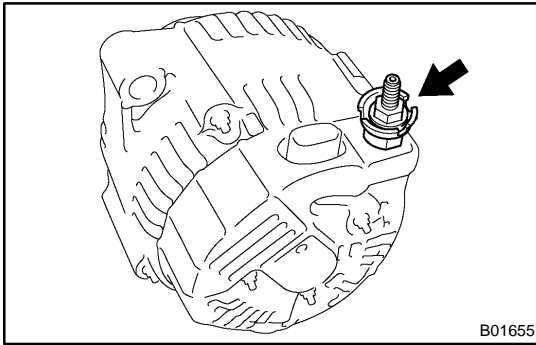
- (a) Disconnect the generator connector.
- (b) Remove the rubber cap and nut, and disconnect the generator wire.



- (c) Disconnect the engine wire clamp from the wire clip on the generator.
- (d) Remove the bolt and pipe clamp, and disconnect the 2 A/T oil cooler pipes from the generator.



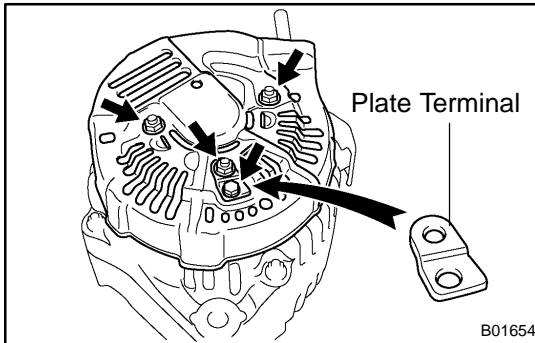
- (e) Remove the bolt, nut, pipe bracket and generator.
Torque: 40 N·m (400 kgf-cm, 30 ft-lbf)



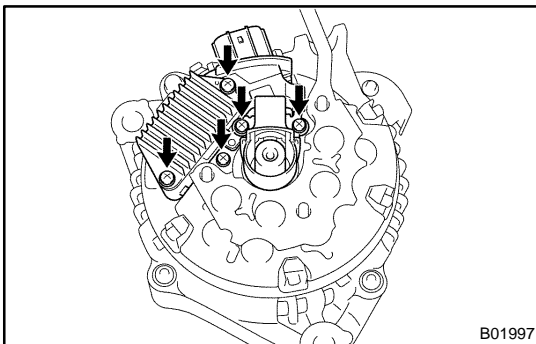
DISASSEMBLY

1. REMOVE REAR END COVER

- (a) Remove the nut and terminal insulator.

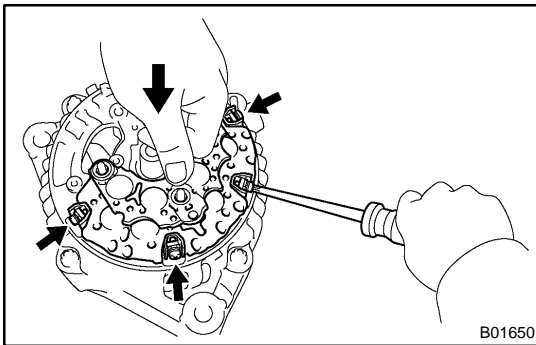


- (b) Remove the bolt, 3 nuts, plate terminal and end cover.



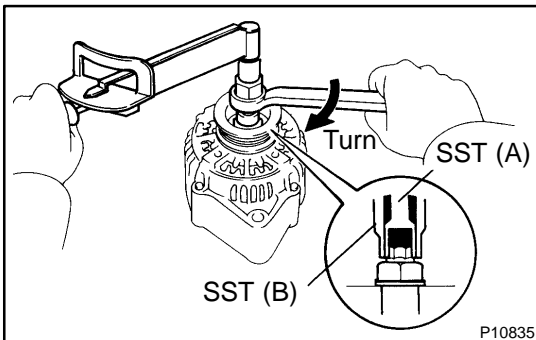
2. REMOVE BRUSH HOLDER AND VOLTAGE REGULATOR

- (a) Remove the brush holder cover from the brush holder.
 (b) Remove the 5 screws, brush holder and voltage regulator.
 (c) Remove the seal plate from the rectifier end frame.



3. REMOVE RECTIFIER HOLDER

- (a) Remove the 4 screws and rectifier holder.
 (b) Remove the 4 rubber insulators.



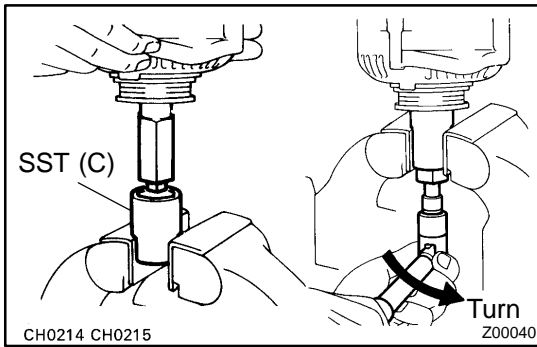
4. REMOVE PULLEY

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-63010

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

- (b) Check that SST (A) is secured to the rotor shaft.

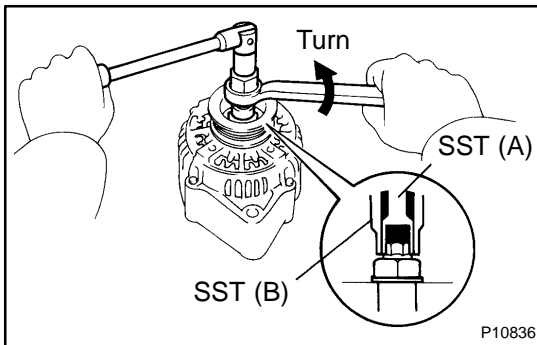


- (c) Mount SST (C) in a vise.
- (d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).
- (e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

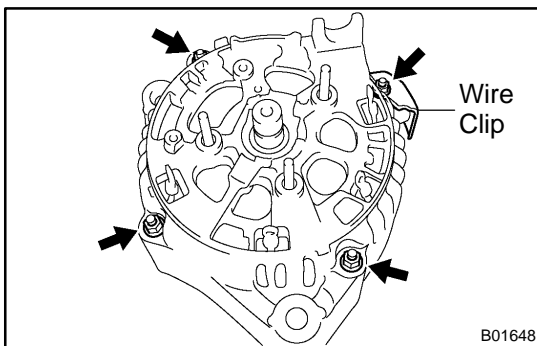
NOTICE:

To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.

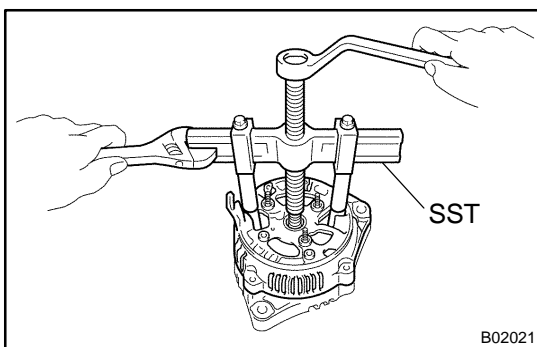
- (f) Remove the generator from SST (C).



- (g) Turn SST (B), and remove SST (A and B).
- (h) Remove the pulley nut and pulley.

**5. REMOVE RECTIFIER END FRAME**

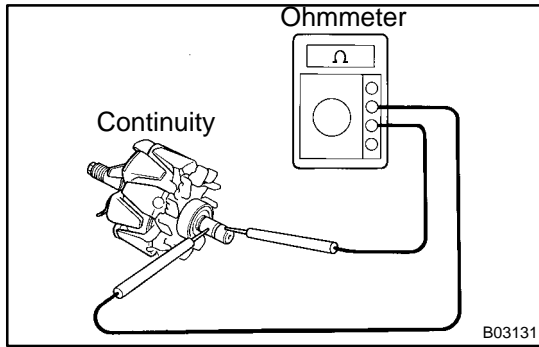
- (a) Remove the 4 nuts and wire clip.



- (b) Using SST, remove the rectifier end frame.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04041)

- (c) Remove the generator washer.

6. REMOVE ROTOR FROM DRIVE END FRAME



INSPECTION

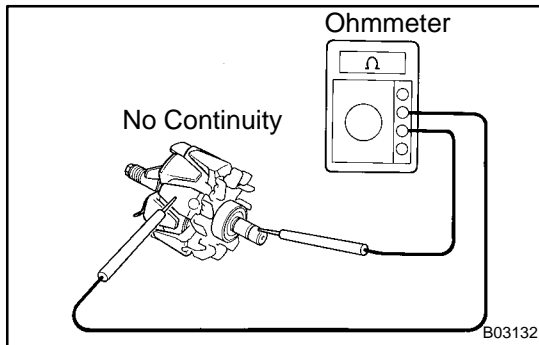
1. INSPECT ROTOR

- (a) Check rotor for open circuit.

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 2.2 – 2.4 Ω at 20°C (68°F)

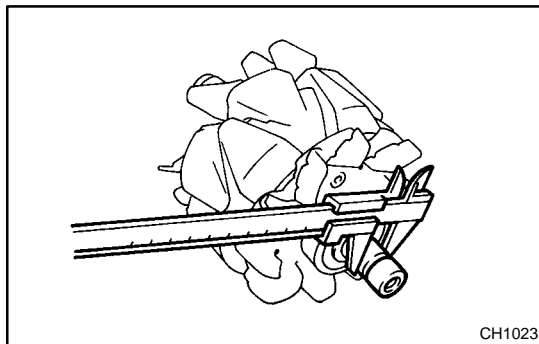
If there is no continuity, replace the rotor.



- (b) Check the rotor for ground.

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.



- (c) Check that the slip rings are not rough or scored.

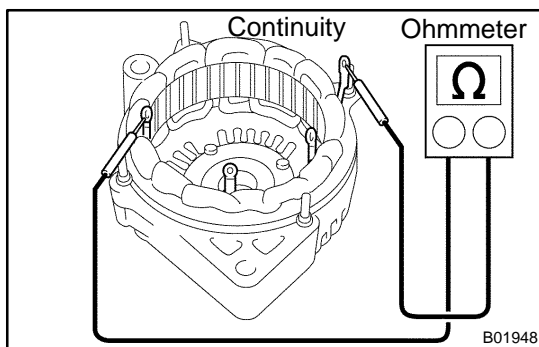
If rough or scored, replace the rotor.

- (d) Using vernier calipers, measure the slip ring diameter.

Standard diameter: 14.2 – 14.4 mm (0.559 – 0.567 in.)

Minimum diameter: 12.8 mm (0.504 in.)

If the diameter is less than minimum, replace the rotor.

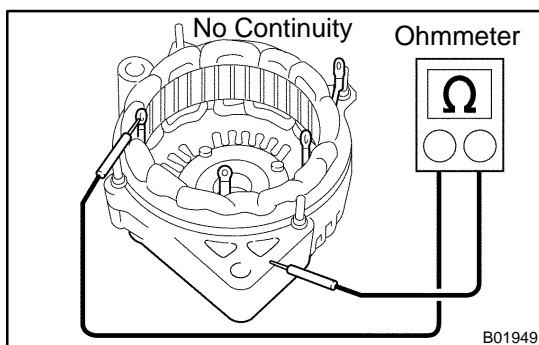


2. INSPECT STATOR (DRIVE END FRAME)

- (a) Check the stator for open circuit.

Using an ohmmeter, check that there is continuity between the coil leads.

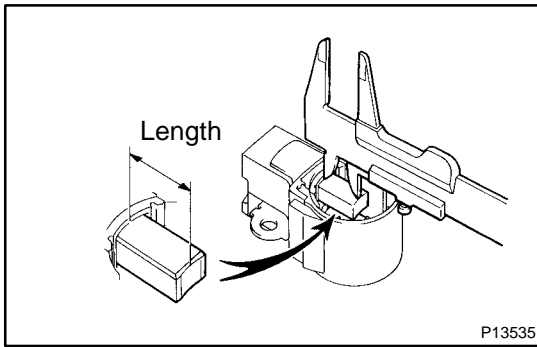
If there is no continuity, replace the drive end frame assembly.



- (b) Check the stator for ground.

Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly.



3. INSPECT BRUSHES

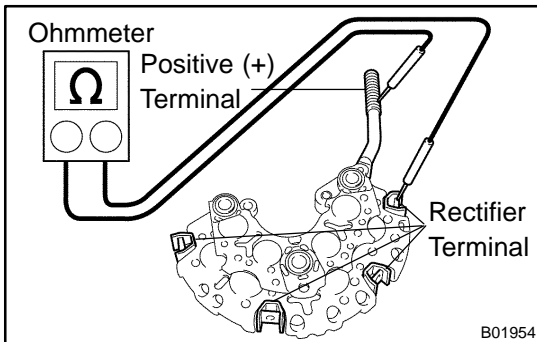
Using vernier calipers, measure the exposed brush length.

Standard exposed length:

9.5 – 11.5 mm (0.374 – 0.453 in.)

Minimum exposed length: 1.5 mm (0.059 in.)

If the exposed length is less than minimum, replace the brush holder assembly.

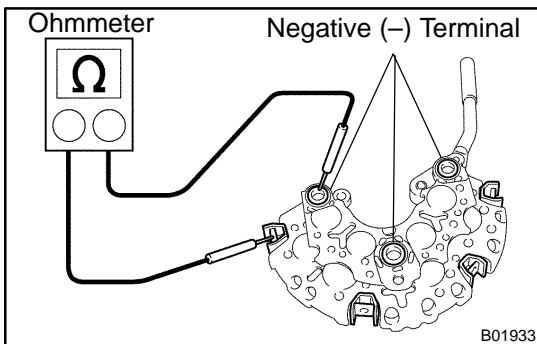


4. INSPECT RECTIFIERS (RECTIFIER HOLDER)

(a) Check the positive (+) rectifier.

- (1) Using an ohmmeter, connect one tester prob to the positive (+) terminal and the other to each rectifier terminal.
- (2) Reverse the polarity of the tester probes and repeat step (a).
- (3) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



(b) Check the negative (-) rectifier.

- (1) Using an ohmmeter, connect one tester probe to each negative (-) terminal and the other to each rectifier terminal.
- (2) Reverse the polarity of the tester probes and repeat step (a).
- (3) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

5. INSPECT BEARING

Check the bearing is not rough or worn.

If necessary, replace the bearing. (See page [CH-11](#))

COOLANT INSPECTION

CO09W-03

1. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

The engine coolant level should be between the "LOW" and "FULL" lines, when the engine is cold.
If low, check for leaks and add "Toyota Long Life Coolant" or equivalent up to the "FULL" line.

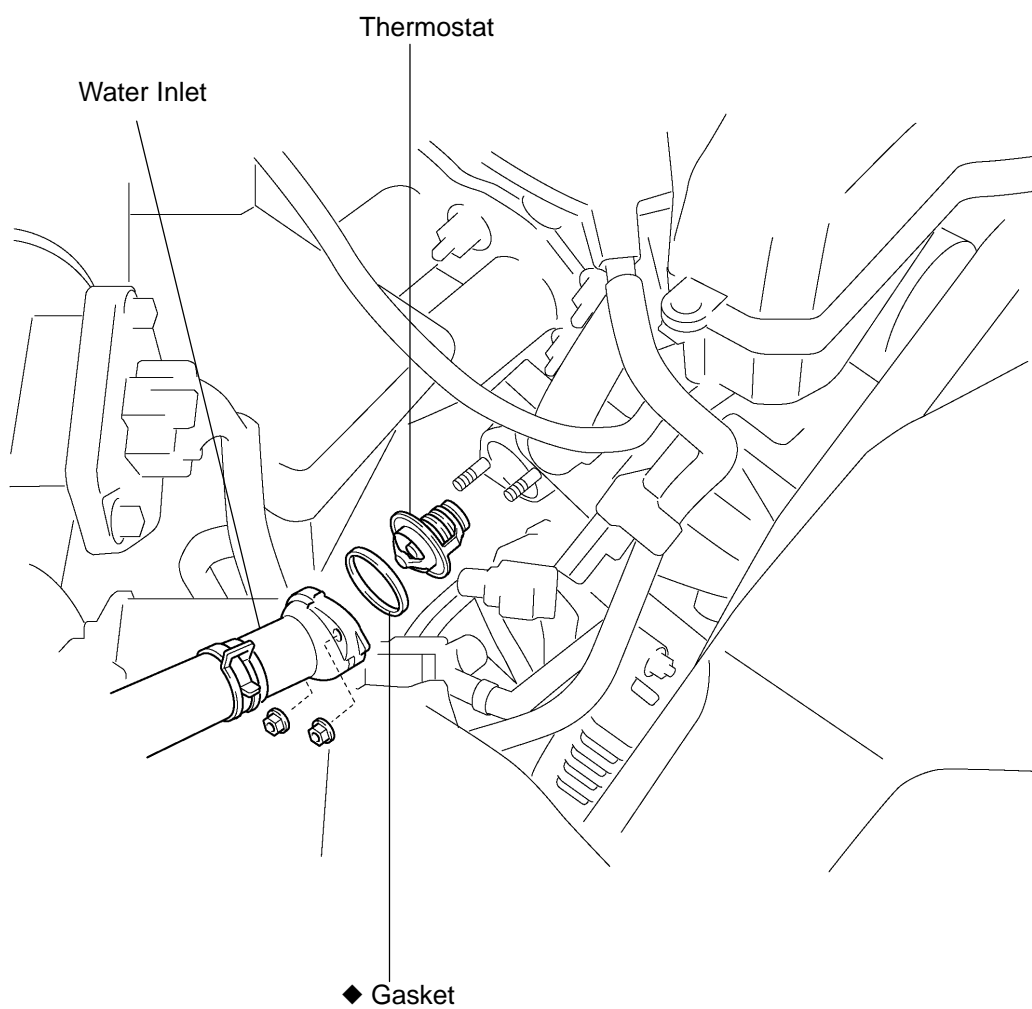
2. CHECK ENGINE COOLANT QUALITY

There should not be any excessive deposits of rust or scale around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If excessively dirty, replace the coolant.

THERMOSTAT COMPONENTS

C00A2-03



◆ Non-reusable part

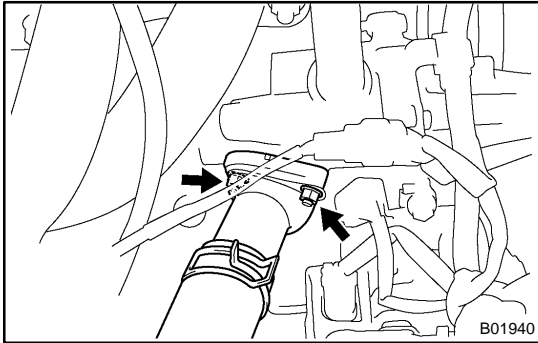
B01987

REMOVAL

HINT:

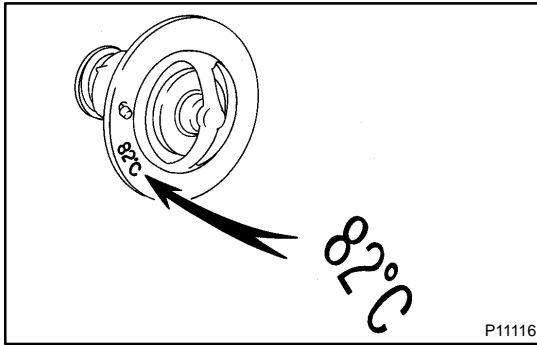
Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. DRAIN ENGINE COOLANT



2. DISCONNECT WATER INLET FROM WATER PUMP, AND REMOVE THERMOSTAT

- (a) Remove the 2 nuts holding the water inlet to the water pump, and disconnect the water inlet from the water pump.
- (b) Remove the thermostat.
- (c) Remove the gasket from the thermostat.

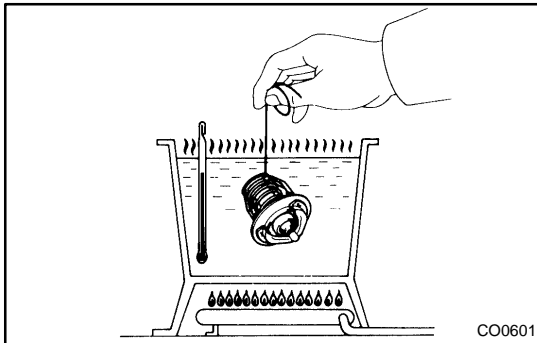


INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.

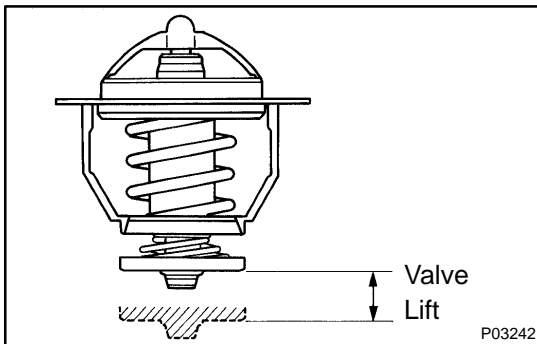


(a) Immerse the thermostat in water and gradually heat the water.

(b) Check the valve opening temperature.

Valve opening temperature: 80 – 84°C (176 – 183°F)

If the valve lift is not as specified, replace the thermostat.



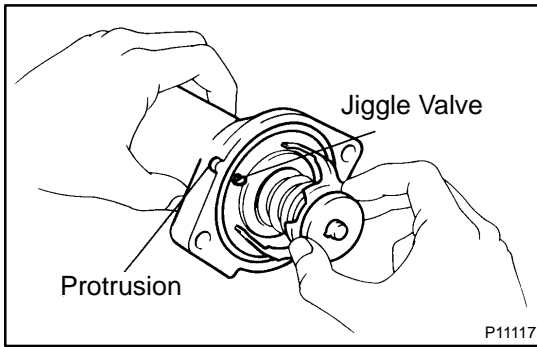
(c) Check the valve lift.

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 is fully closed when the thermostat is at low temperatures (below 40°C (104°F)).

If not closed, replace the thermostat.



INSTALLATION

1. PLACE THERMOSTAT IN WATER INLET

- (a) Install a new gasket to the thermostat.
- (b) Align the jiggle valve of the thermostat with the protrusion of the water inlet.

2. INSTALL WATER INLET

Install the water inlet with the 2 nuts.

Torque: 9.0 N·m (90 kgf·cm, 80 in.-lbf)

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR COOLANT LEAKS

RADIATOR

ON-VEHICLE CLEANING

C00A6-01

CLEAN RADIATOR

Using water or a steam cleaner, remove any mud or dirt from the radiator core.

NOTICE:

If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. (i.e. Maintain a distance between the cleaner nozzle and radiator core.)

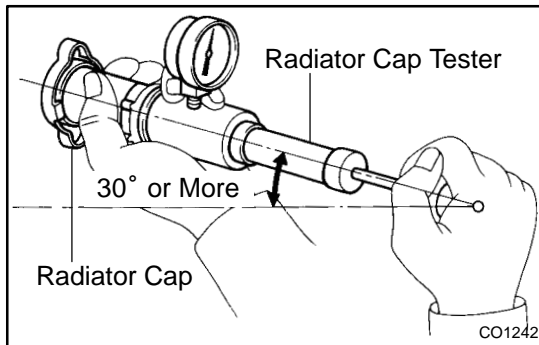
ON-VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

Remove the radiator cap from the radiator.

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



2. INSPECT RADIATOR CAP

NOTICE:

- If the radiator cap has contaminations, always rinse it with water.
 - Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.
 - When performing steps (a) and (b) below, keep the tester at an angle of over 30° above the horizontal.
- (a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push/(3 seconds or more)

NOTICE:

Push the pump at a constant speed.

If air is not coming from the vacuum valve, replace the radiator cap.

- (b) Pump the radiator cap tester, and measure the relief valve opening pressure.

Pump speed: 1 push within 1 second

NOTICE:

This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:

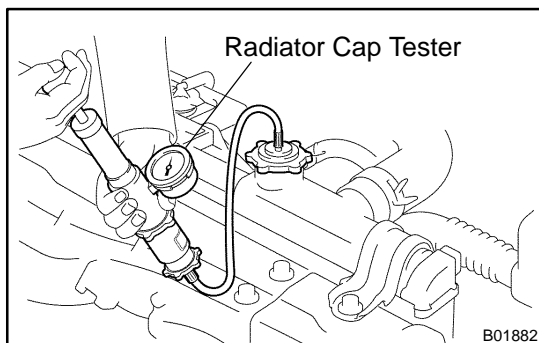
93 – 123 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.4 psi)

HINT:

Use the tester's maximum reading as the opening pressure. If the opening pressure is less than minimum, replace the radiator cap.



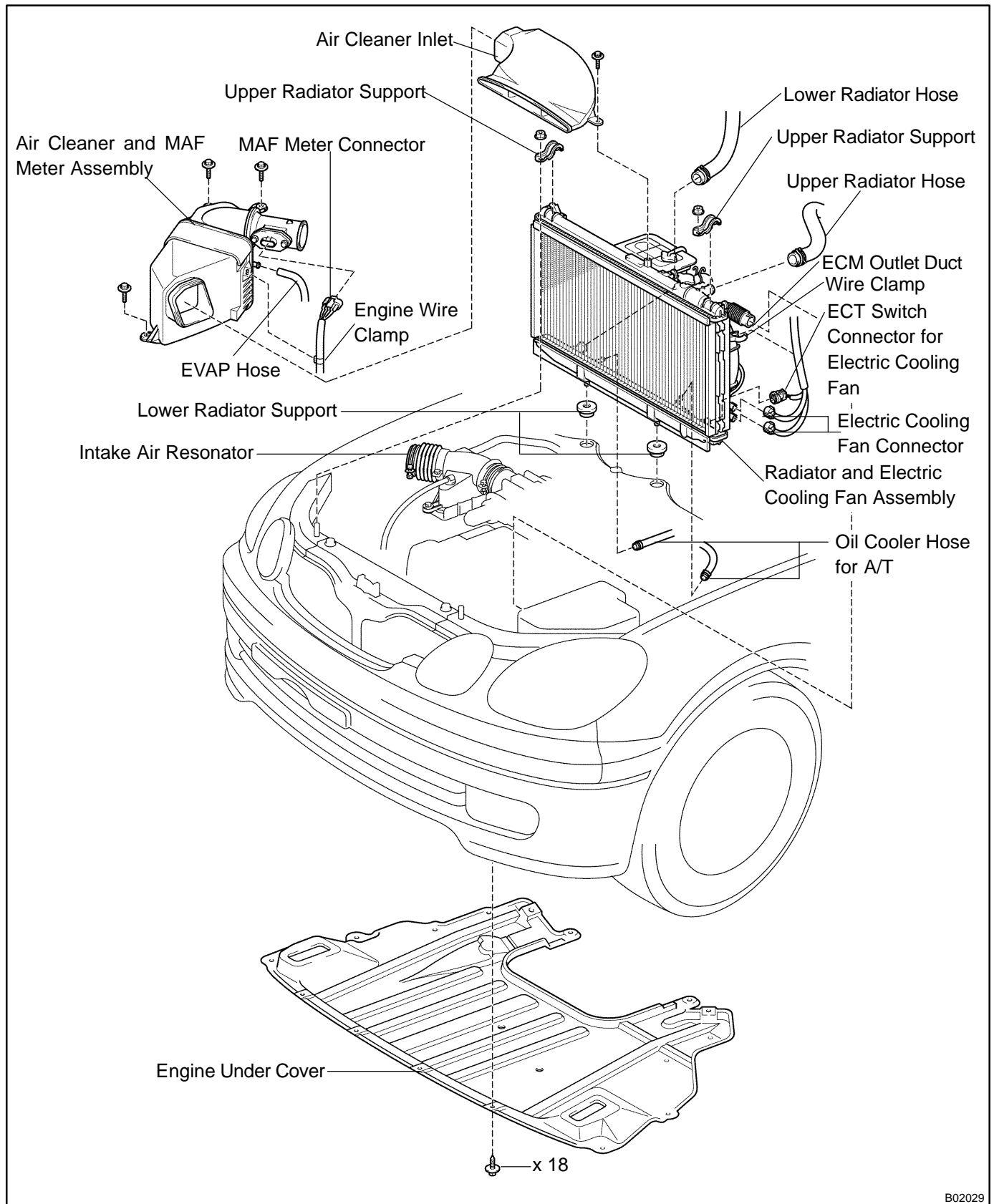
3. INSPECT COOLING SYSTEM FOR LEAKS

- (a) Fill the radiator with coolant and attach a radiator cap tester.
- (b) Warm up the engine.
- (c) Pump it to 118 kPa (1.2 kgf/cm², 17.1 psi), and check that the pressure does not drop.

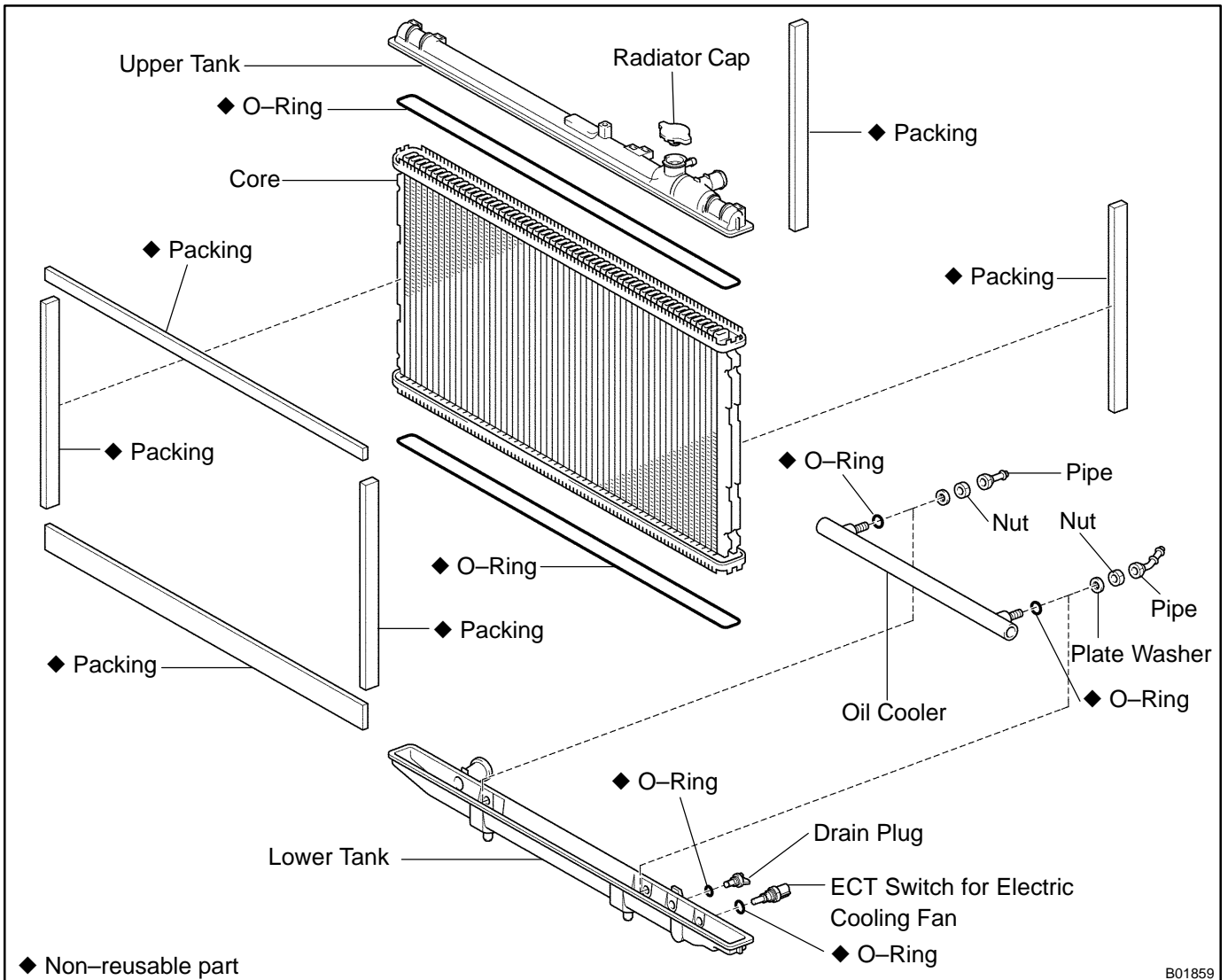
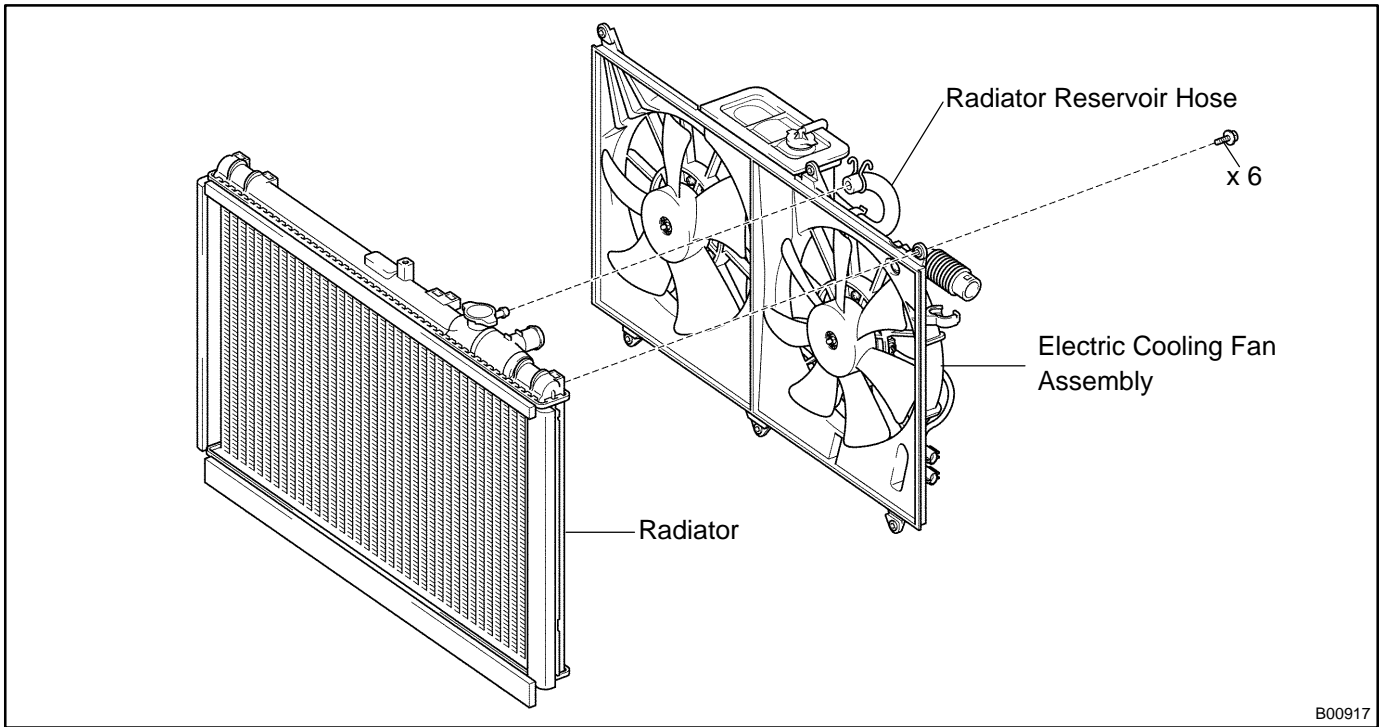
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

4. REINSTALL RADIATOR CAP

COMPONENTS

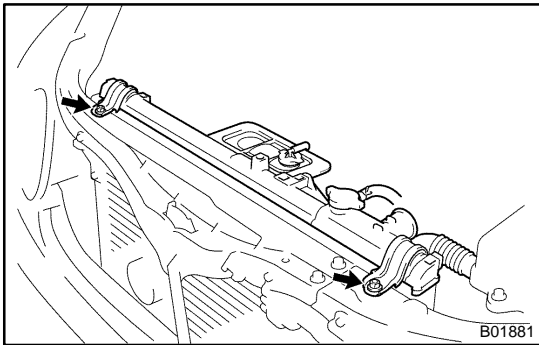


B02029



REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE AIR CLEANER INLET
4. REMOVE AIR CLEANER AND MAF METER ASSEMBLY
5. REMOVE RADIATOR AND ELECTRIC COOLING FAN ASSEMBLY
 - (a) Disconnect the upper radiator hose from the radiator.
 - (b) Disconnect the lower radiator hose from the radiator.
 - (c) Disconnect the ECM outlet duct from the ECM box.
 - (d) Disconnect the wire for electric cooling fan from the clamp on the electric cooling fan.
 - (e) Disconnect the 2 electric cooling fan connectors.
 - (f) Disconnect the ECT switch connector for electric cooling fan.
 - (g) Disconnect the 2 oil cooler hoses for A/T from the radiator.



- (h) Remove the 2 nuts and 2 upper radiator supports.
 - (i) Lift out the radiator and cooling fan assembly.
 - (j) Remove the 2 lower radiator supports.
6. REMOVE ELECTRIC COOLING FAN FROM RADIATOR
 - (a) Disconnect the radiator reservoir hose from the radiator.
 - (b) Remove the 6 bolts and electric cooling fan.

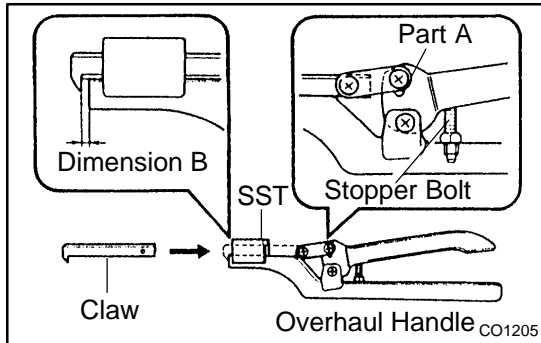
DISASSEMBLY

1. REMOVE PACKINGS
2. REMOVE RADIATOR CAP
3. REMOVE DRAIN PLUG

- (a) Remove the drain plug.
- (b) Remove the O-ring.

4. REMOVE ECT SWITCH

- (a) Remove the ECT switch.
- (b) Remove the O-ring.



5. ASSEMBLE SST

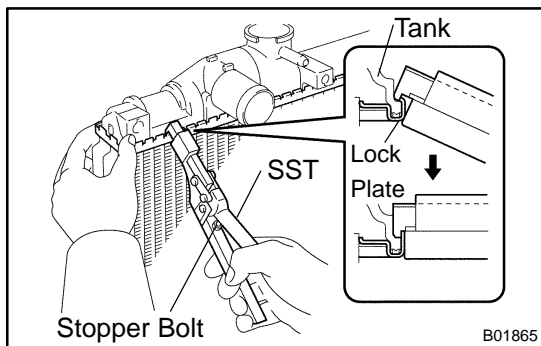
SST 09230-01010

- (a) Install the claw to the overhaul handle, inserting it in the hole in part A as shown in the diagram.
- (b) While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Dimension B: 0.2 – 0.3 mm (0.008 – 0.012 in.)

NOTICE:

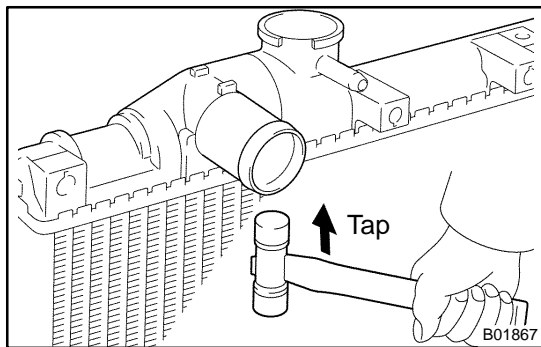
If this adjustment is not done the claw may be damaged.



6. UNCAULK LOCK PLATES

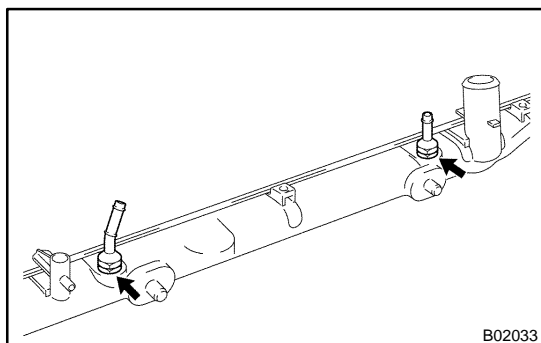
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230-01010



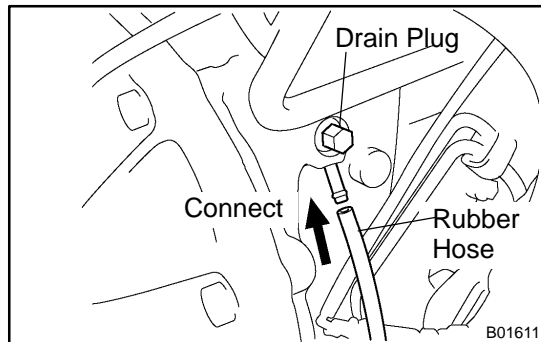
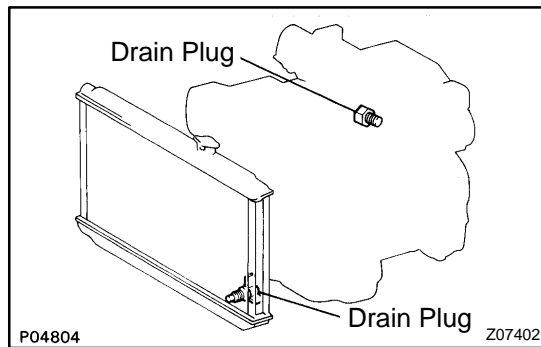
7. REMOVE TANKS AND O-RINGS

Lightly tap the bracket of the radiator (or radiator inlet or outlet) with a soft-faced hammer, and remove the tank and the O-ring.



8. REMOVE OIL COOLER FROM LOWER TANK

- (a) Loosen the nut, and remove the cooler pipe. Remove the 2 cooler pipes.
- (b) Remove the 2 nuts and 2 plate washers.
- (c) Remove the oil cooler and 2 O-rings.



REPLACEMENT

1. DRAIN ENGINE COOLANT

- (a) Remove the radiator cap.

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

- (b) Loosen the 2 drain plugs (for the engine and radiator), and drain the coolant.

HINT:

To prevent the coolant from spraying over the cylinder block, connect the rubber hose (inside diameter 6 – 8 mm) in the market to the union pipe under the drain plug.

- (c) Close the drain plugs.

Torque: 30 N·m (300 kgf·cm, 22 ft·lbf) for engine

2. FILL ENGINE COOLANT

- (a) Slowly fill the system with coolant.

- Use of improper coolants may damage engine cooling system.
- Use "Toyota Long Life Coolant" or equivalent and mix it with plain water according to the manufacturer's directions.
- Use of the coolant which includes more than 50% [freezing protection down to -35°C (-31°F)] or 60% [freezing protection down to -50°C (-58°F)] of ethylene glycol is recommended, but not more than 70%.

NOTICE:

- Do not use an alcohol type coolant or plain water alone.
- The coolant should be mixed with plain water (preferable demineralized water or distilled water).

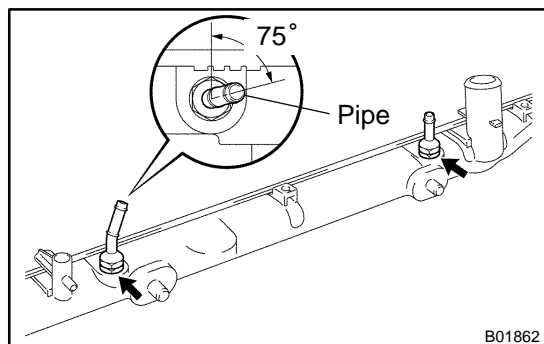
Capacity (w/ Heater):

7.7 liters (8.1 US qts, 6.8 Imp. qts)

- (b) Install the radiator cap.
 (c) Start the engine, and bleed the cooling system.
 (d) Refill the reservoir with coolant until it reaches the "FULL" line.

3. CHECK ENGINE COOLANT FOR LEAKS

4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY



REASSEMBLY

1. INSTALL OIL COOLER TO LOWER TANK

- Install 2 new O-rings to the oil cooler.
- Install the oil cooler to the lower tank with the 2 plate washers and 2 nuts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.-lbf)

- Install the cooler pipes in the direction indicated in the illustration.

Torque: 14.7 N·m (150 kgf·cm, 11 ft-lbf)

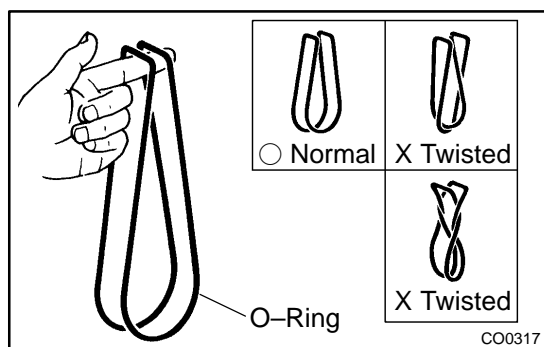
2. INSPECT LOCK PLATE FOR DAMAGE

HINT:

- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.
- Therefore, first correct any deformation with pliers or similar object. Water leakage will result if the bottom of the lock plate groove is damaged or dented.

NOTICE:

The radiator can only be recaulked 2 times. After the 2nd time, the radiator core must be replaced.

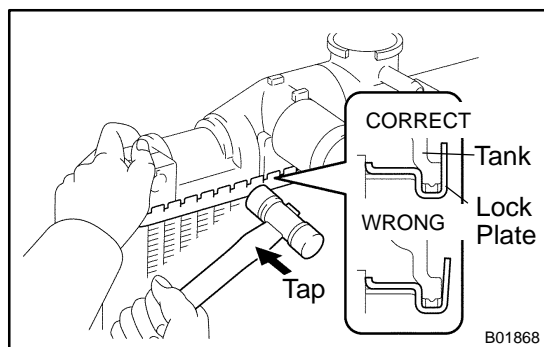


3. INSTALL NEW O-RINGS AND TANKS

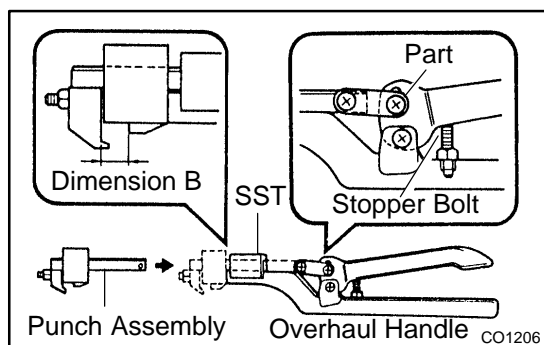
- After checking that there are no foreign objects in the lock plate groove, install a new O-ring without twisting it.

HINT:

When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.



- Install the tank without damaging the O-ring.
- Tap the lock plate with a soft-faced hammer so that there is no gap between it and the tank.

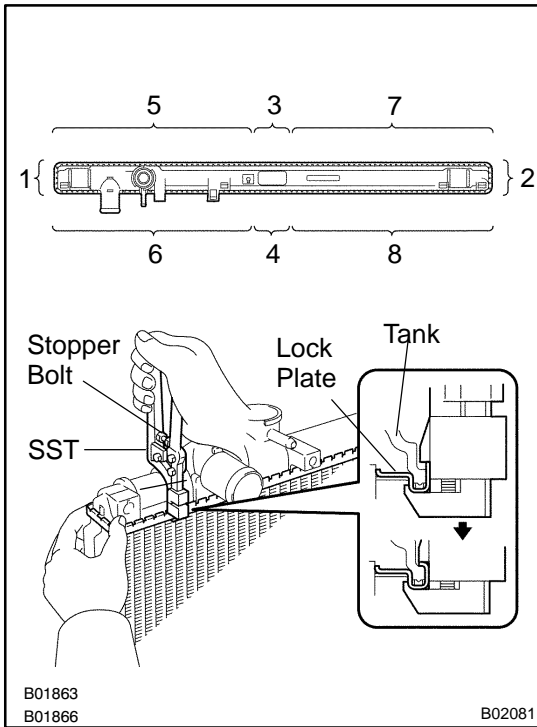


4. ASSEMBLE SST

SST 09230-01010, 09231-14010

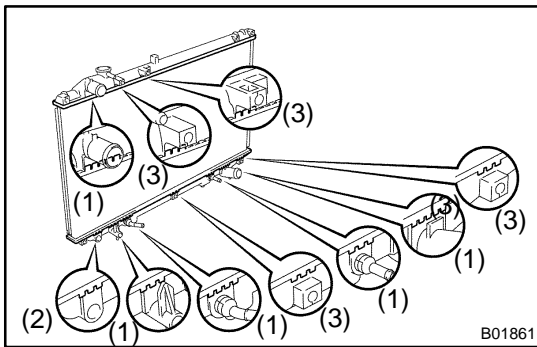
- Install the punch assembly to the overhaul handle, inserting it in the hole in part A as shown in the illustration.
- While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Dimension B: 8.4 mm (0.331 in.)



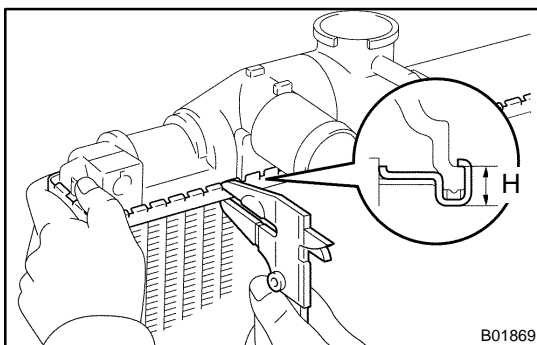
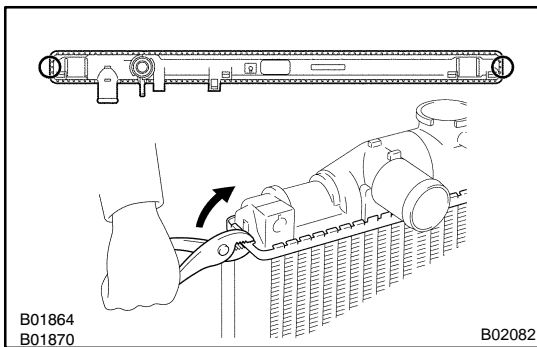
5. CAULK LOCK PLATE

- (a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.
SST 09230-01010



HINT:

- Do not stake the areas protruding around the ports (1), flange (2) and bracket (3).
- The points shown in the illustration cannot be staked with the SST. Use pliers or similar object and be careful not to damage the core plates.



- (b) Check the lock plate height (H) after completing the caulking.

Plate height (H): 7.40 – 7.80 mm (0.2913 – 0.3071 in.)

If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

6. INSTALL ECT SWITCH

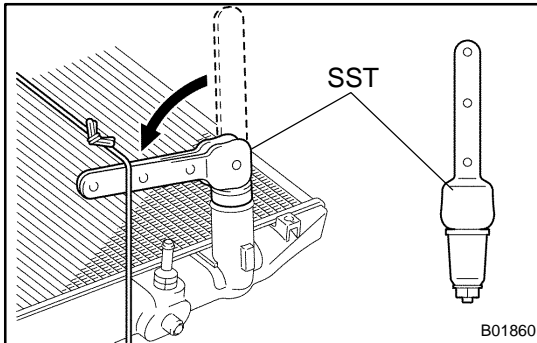
- (a) Install a new O-ring to the ECT switch.
(b) Install the ECT switch.

7. INSTALL DRAIN PLUG

- (a) Install a new O-ring to the drain plug.

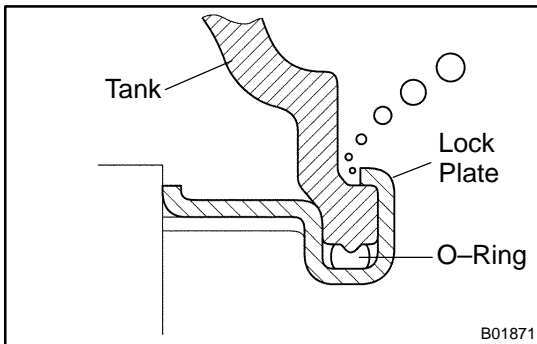
- (b) Install the drain plug.

8. INSTALL RADIATOR CAP



9. INSPECT FOR WATER LEAKS

- (a) Tighten the drain plug.
- (b) Plug the inlet pipes of the radiator with SST.
SST 09230-01010
- (c) Using a radiator cap tester, apply pressure to the radiator.
Test pressure: 177 kPa (1.8 kgf/cm², 26 psi)
- (d) Submerge the radiator in water.



- (e) Inspect for leaks.

HINT:

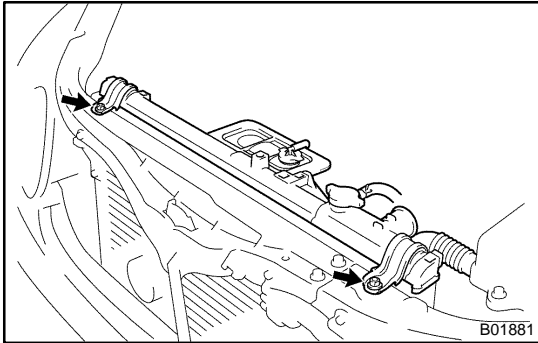
On radiators with resin tanks, there is a clearance between the tank and lock plate where a minute amount of air will remain, giving the appearance of an air leak when the radiator is submerged in water. Therefore, before doing the water leak test, first swish the radiator around in the water until all air bubbles disappear.

10. INSTALL NEW PACKINGS

INSTALLATION

1. INSTALL ELECTRIC COOLING FAN TO RADIATOR

- (a) Install the electric cooling fan with the 6 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.-lbf)
- (b) Connect the radiator reservoir hose to the radiator.



2. INSTALL RADIATOR AND ELECTRIC COOLING FAN ASSEMBLY

- (a) Install the 2 lower radiator supports to the radiator.
- (b) Attach the 2 lower radiator supports on the radiator to the body bracket.
- (c) Install the radiator and electric cooling fan assembly with the 2 upper radiator supports and 2 nuts.

Torque: 13.5 N·m (135 kgf·cm, 10 ft·lbf)

- (d) Connect these parts:
 - Upper radiator hose to radiator
 - Lower radiator hose to radiator
 - ECM outlet duct to ECM box
 - Wire for electric cooling fan to clamp on electric cooling fan
 - 2 electric cooling fan connectors
 - ECT switch connector for electric cooling fan
 - 2 oil cooler hoses for A/T to radiator

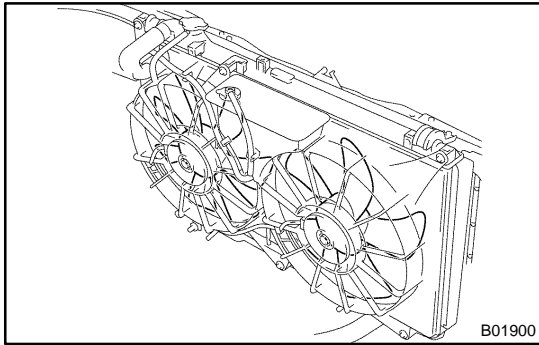
3. INSTALL AIR CLEANER AND MAF METER ASSEMBLY

4. INSTALL AIR CLEANER INLET

5. FILL WITH ENGINE COOLANT

6. START ENGINE AND CHECK FOR ENGINE COOLANT AND A/T FLUID LEAKS

7. INSTALL ENGINE UNDER COVER



ELECTRIC COOLING FAN ON-VEHICLE INSPECTION

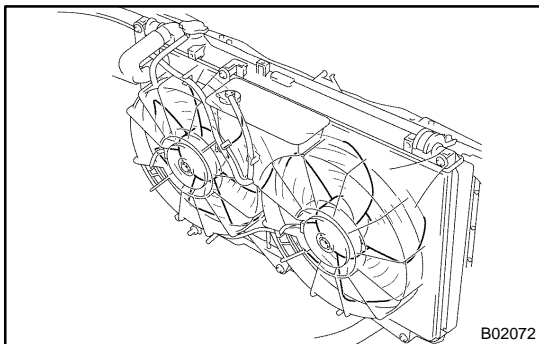
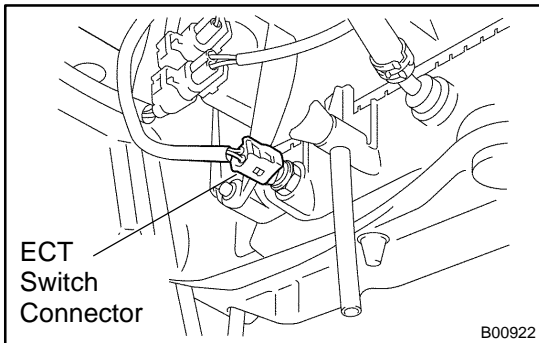
CO0AD-03

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83°C (181°F))

- Turn the ignition switch ON.
- Check that the cooling fan stops.

If not, check the cooling fan relay and ECT switch, and check for a separated connector or severed wire between the cooling fan relay and ECT switch.

- Disconnect the ECT switch connector.



- Check that the cooling fan rotates.

If not, check the fuses, radiator fan main relay, cooling fan relay, cooling fan, and check for a short circuit between the cooling fan relay and ECT switch.

- Reconnect the ECT switch connector.

2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 93°C (199°F))

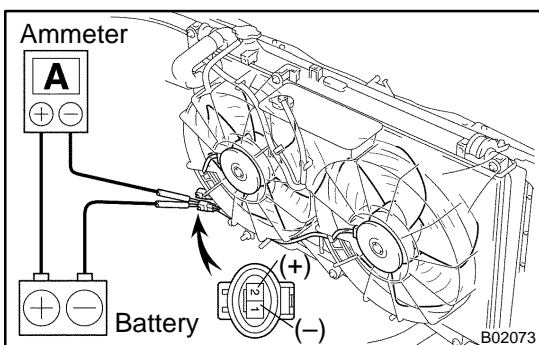
- Start the engine, and raise coolant temperature to above 93°C (199°F).

HINT:

Coolant temperature is the detected value by the ECT switch on the radiator lower tank.

- Check that the cooling fan rotates.

If not, replace the ECT switch.



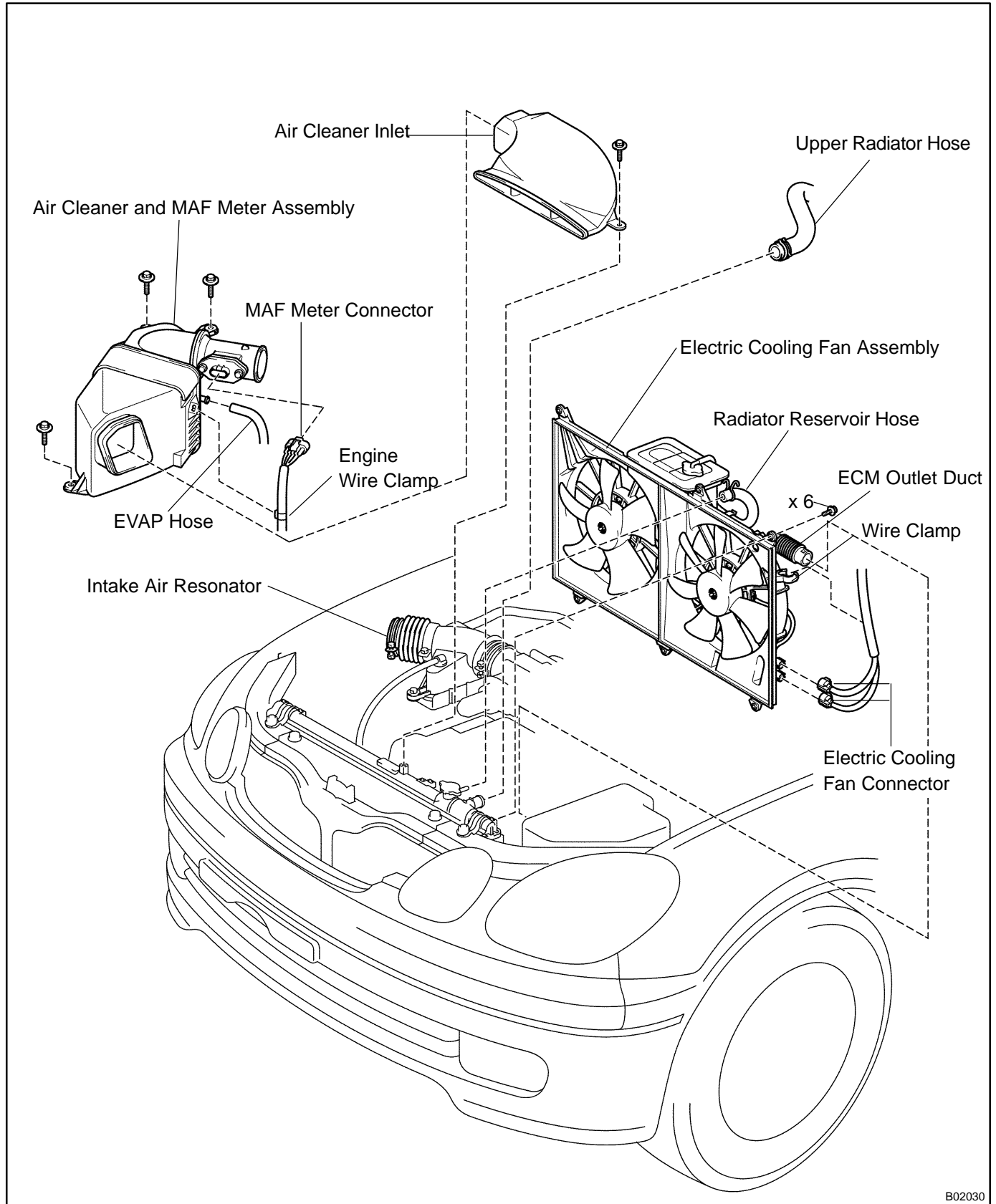
3. INSPECT COOLING FANS

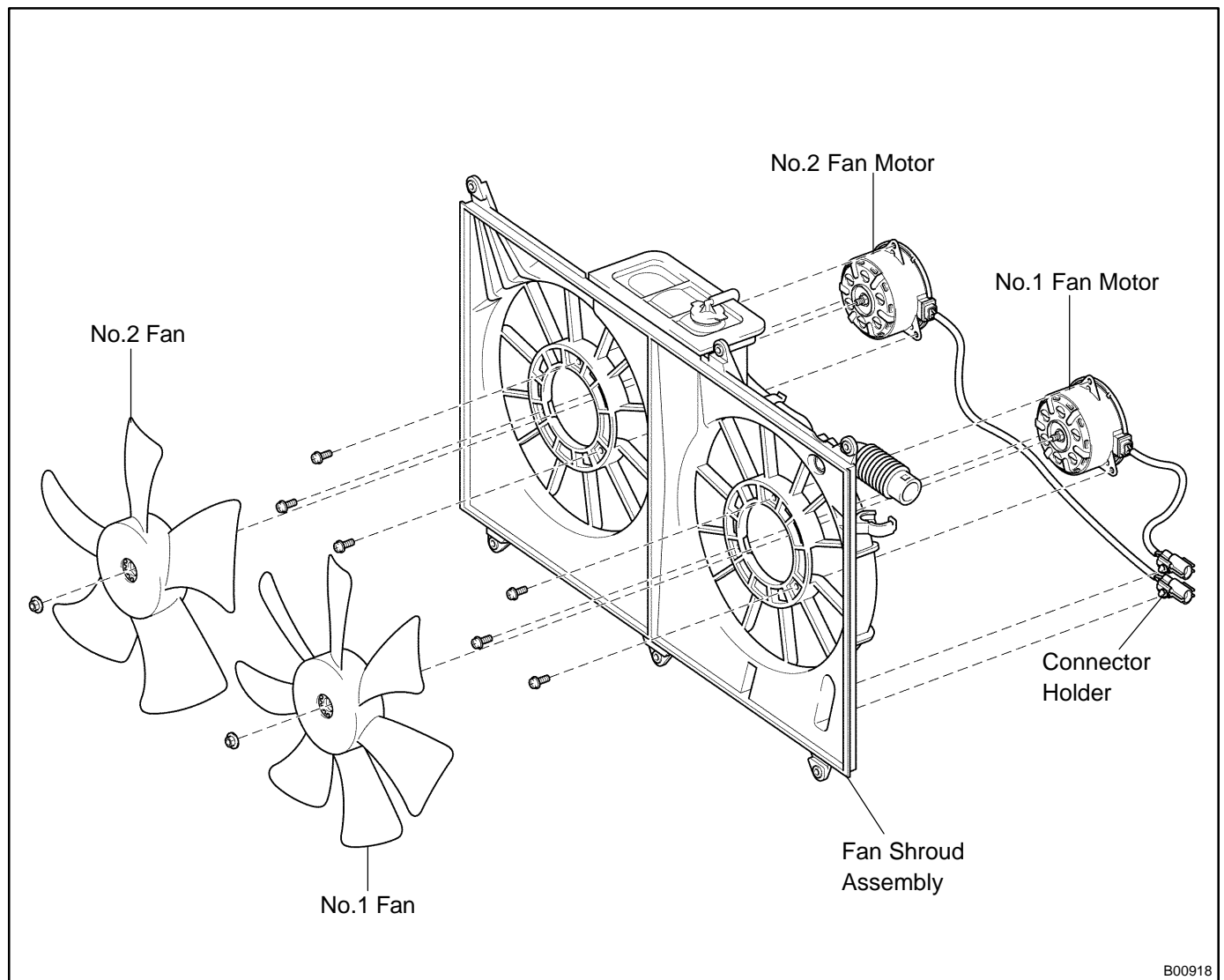
- Disconnect the cooling fan connector.
- Connect battery and ammeter to the cooling fan connector.
- Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

Standard amperage: 8.5 – 11.5 A at 20°C (68°F)

- Reconnect the cooling fan connector.

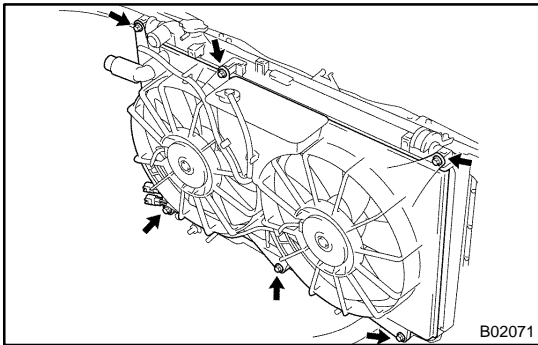
COMPONENTS



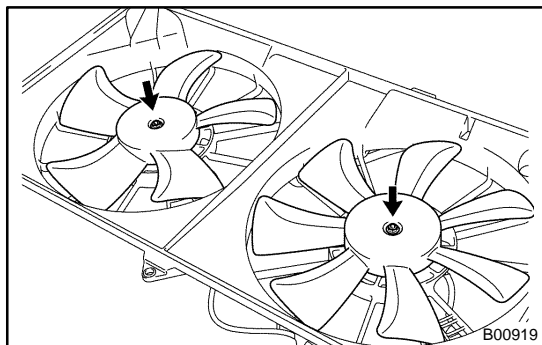


REMOVAL

1. DRAIN ENGINE COOLANT
2. REMOVE AIR CLEANER INLET
3. REMOVE AIR CLEANER AND MAF METER ASSEMBLY
4. REMOVE ELECTRIC COOLING FAN
 - (a) Disconnect the upper radiator hose from the radiator.
 - (b) Disconnect the ECM outlet duct from the ECM box.
 - (c) Disconnect the wire for electric cooling fan from the clamp on the electric cooling fan.
 - (d) Disconnect the 2 electric cooling fan connector.
 - (e) Disconnect the radiator reservoir hose from the radiator.



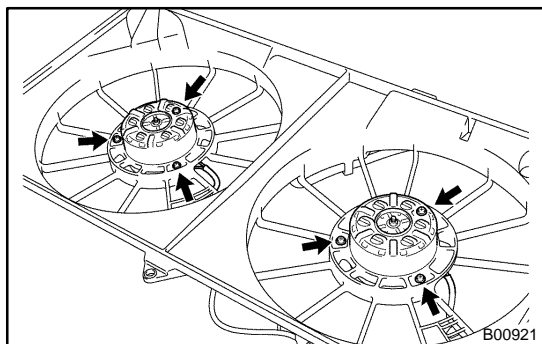
- (f) Remove the 6 bolts and electric cooling fan.



DISASSEMBLY

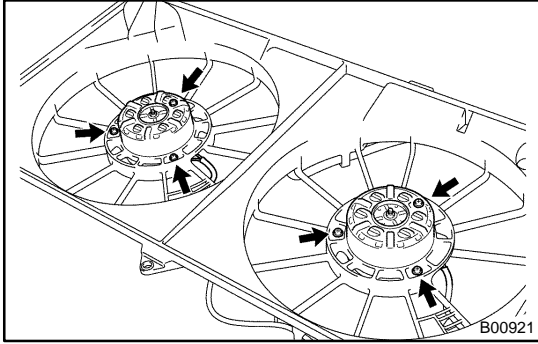
1. REMOVE FANS

Remove the nut and fan. Remove the 2 fans.



2. REMOVE FAN MOTORS

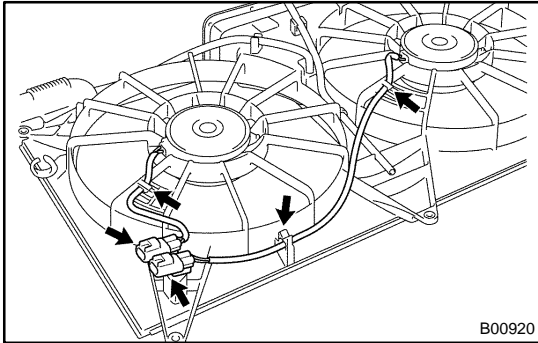
- (a) Disconnect the wires and connector holders from the fan shroud.
- (b) Remove the 3 screws and fan motor. Remove the 2 fan motors.



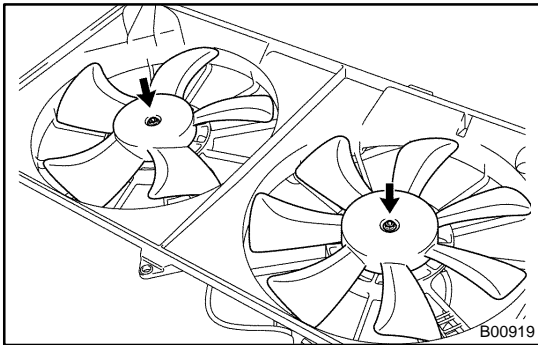
REASSEMBLY

1. INSTALL FAN MOTORS

- (a) Install the fan motor with the 3 screws. Install the 2 fan motors.



- (b) Install the wires and connector holders to the fan shroud as shown in the illustration.

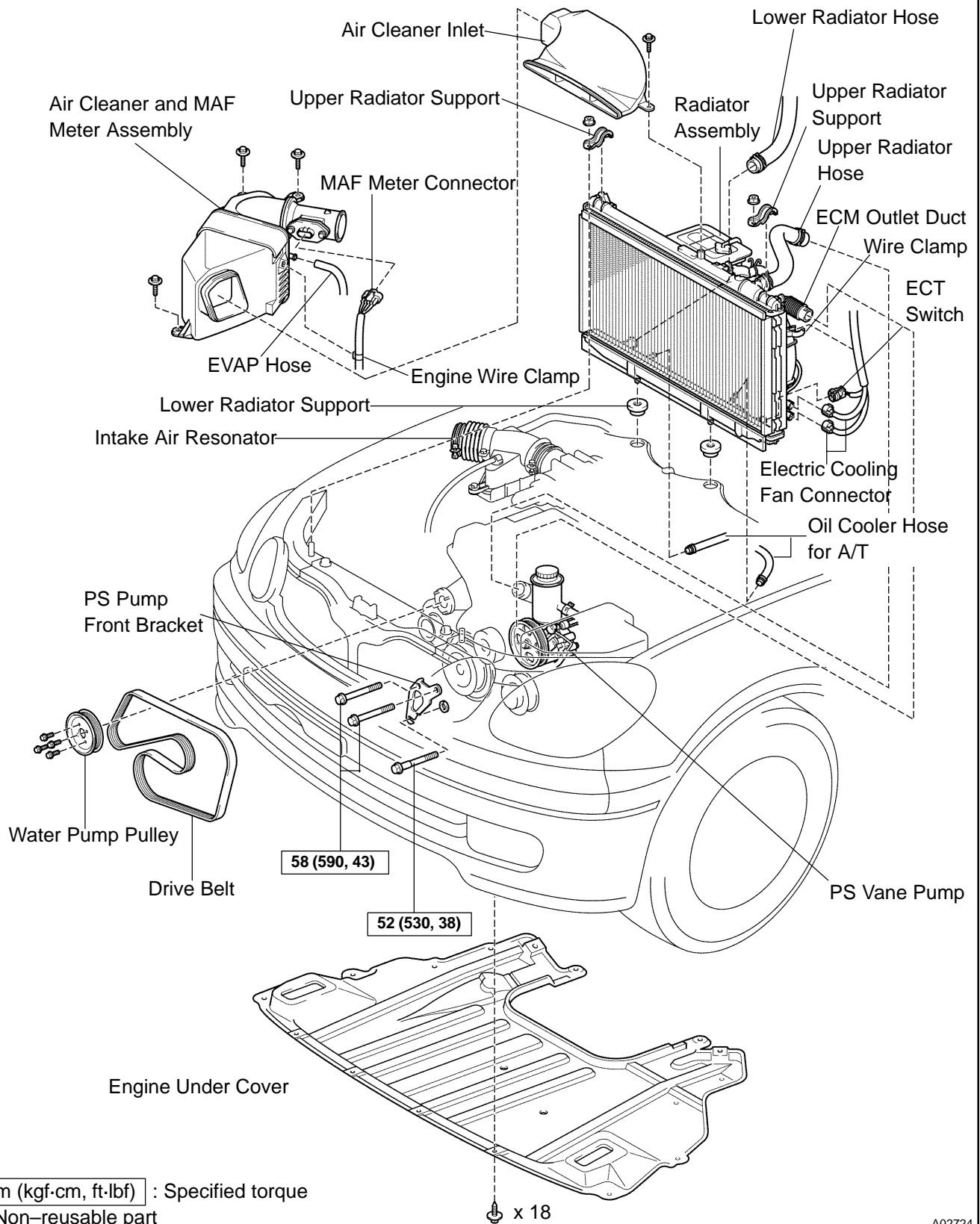


2. INSTALL FANS

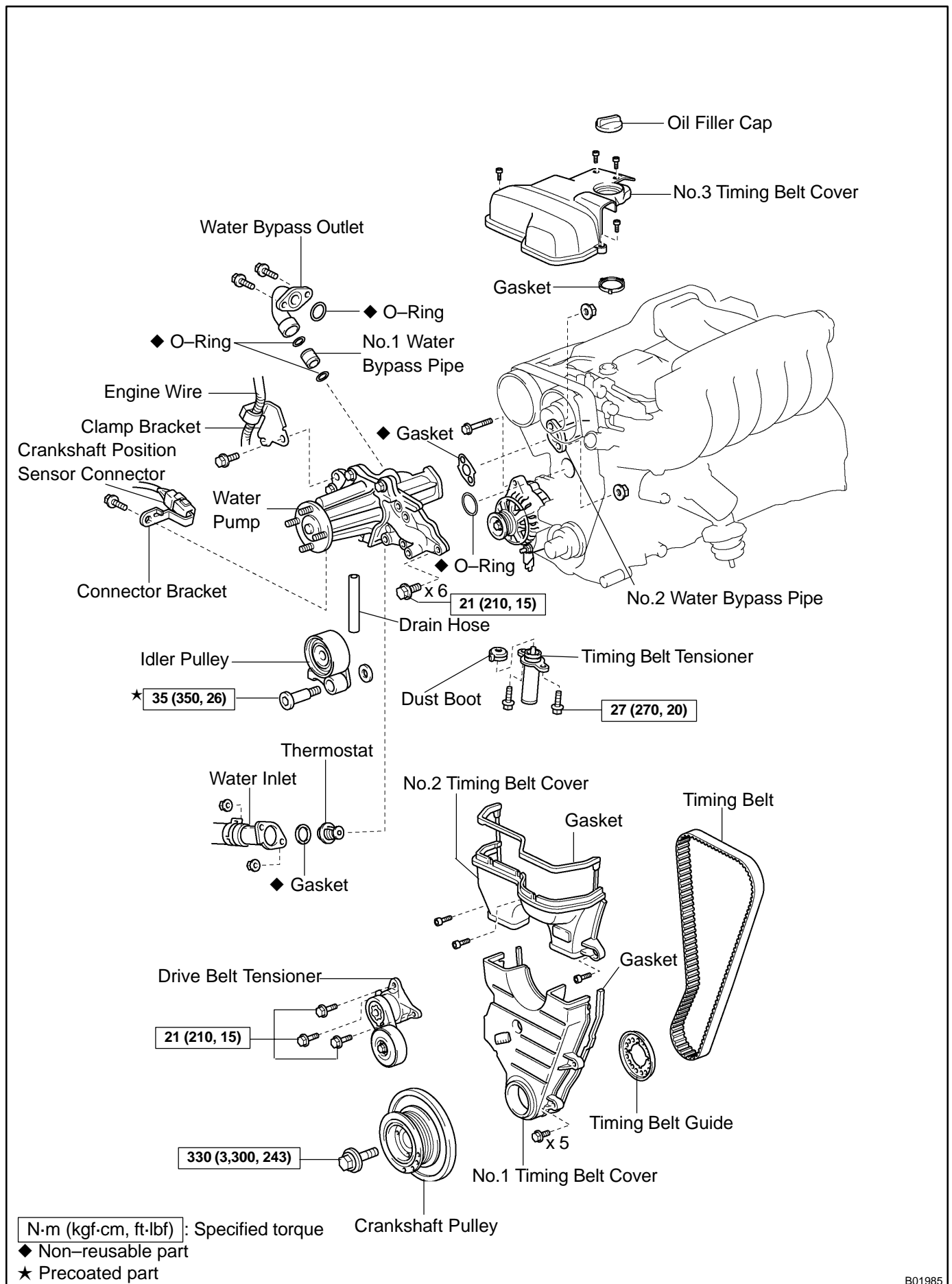
Install the fan with the nut. Install the 2 fans.

WATER PUMP COMPONENTS

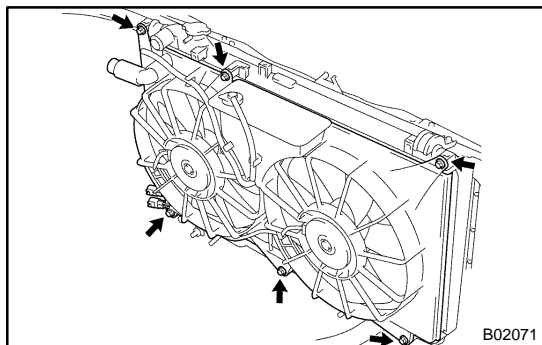
CO09Y-01



A02724



B01985



INSTALLATION

1. INSTALL ELECTRIC COOLING FAN

- (a) Install the electric cooling fan with the 6 bolts.

Torque: 5.0 N·m (50 kgf·cm, 44 in.-lbf)

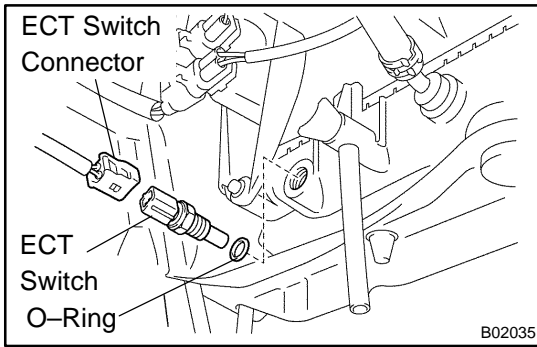
- (b) Connect the upper radiator hose to the radiator.
(c) Connect the ECM outlet duct to the ECM box.
(d) Connect the wire for electric cooling fan to clamp on the electric cooling fan.
(e) Connect the 2 electric cooling fan connectors.
(f) Connect the radiator reservoir hose to the radiator.

2. INSTALL AIR CLEANER AND MAF METER ASSEMBLY

3. INSTALL AIR CLEANER INLET

4. FILL WITH ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS



ENGINE COOLANT TEMPERATURE (ECT) SWITCH INSPECTION

C00AJ-01

1. DRAIN ENGINE COOLANT

2. REMOVE ECT SWITCH

- Disconnect the connector.
- Remove the ECT switch.
- Remove the O-ring from the ECT switch.

3. INSPECT ECT SWITCH

- Using an ohmmeter, check that there is no continuity between the terminals when the coolant temperature is above 93°C (199°F).

If there is continuity, replace the switch.

- Using an ohmmeter, check that there is continuity between the terminals when the coolant temperature is below 83°C (181°F).

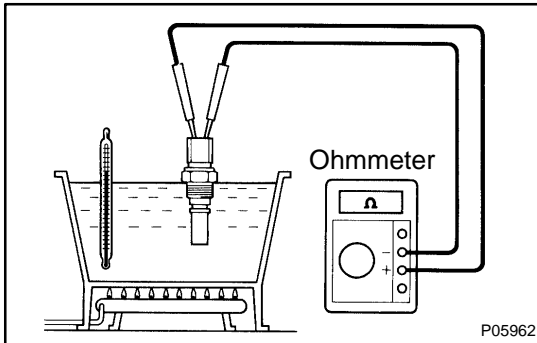
If there is no continuity, replace the switch.

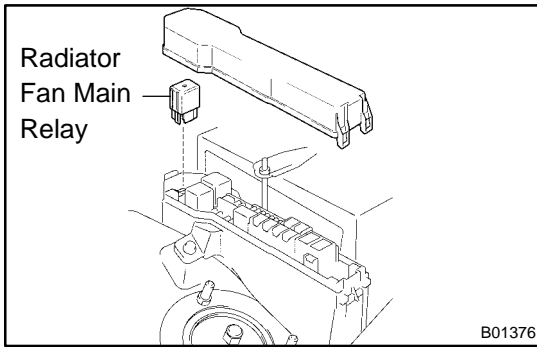
4. REINSTALL ECT SWITCH

- Install a new O-ring to the ECT switch.
- Install the ECT switch.
- Connect the connector.

5. REFILL WITH ENGINE COOLANT

6. START ENGINE AND CHECK FOR COOLANT LEAKS

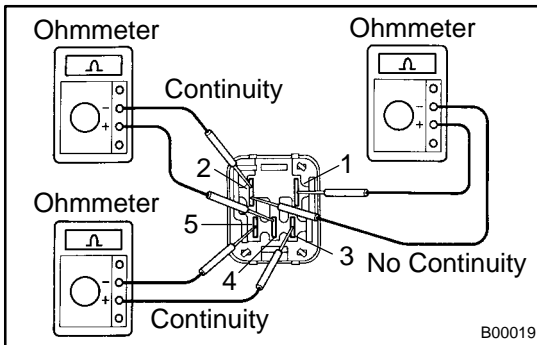




RADIATOR FAN MAIN RELAY INSPECTION

CO0AK-01

1. REMOVE RELAY BOX COVER
2. REMOVE RADIATOR FAN MAIN RELAY (Marking: RAD FAN MAIN)



3. INSPECT RADIATOR FAN MAIN RELAY

(a) Inspect the relay continuity.

- (1) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

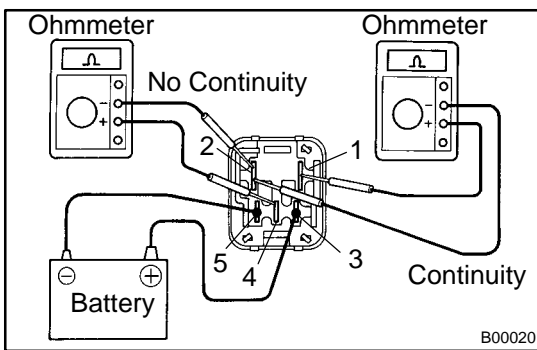
If there is no continuity, replace the relay.

- (2) Check that there is continuity between terminals 2 and 4.

If there is no continuity, replace the relay.

- (3) Check that there is no continuity between terminals 1 and 2.

If there is continuity, replace the relay.



(b) Inspect the relay operation.

- (1) Apply battery positive voltage across terminals 3 and 5.

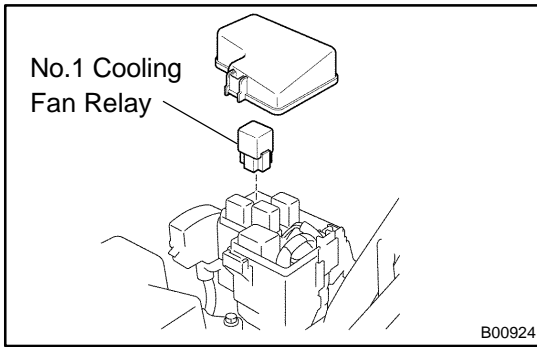
- (2) Using an ohmmeter, check that there is no continuity between terminals 2 and 4.

If there is continuity, replace the relay.

- (3) Check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

4. REINSTALL RADIATOR FAN MAIN RELAY
5. REINSTALL RELAY BOX COVER

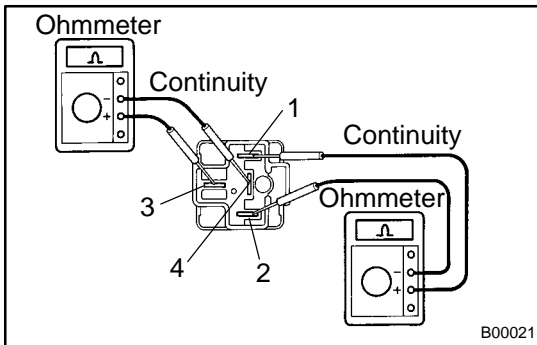


COOLING FAN RELAY INSPECTION

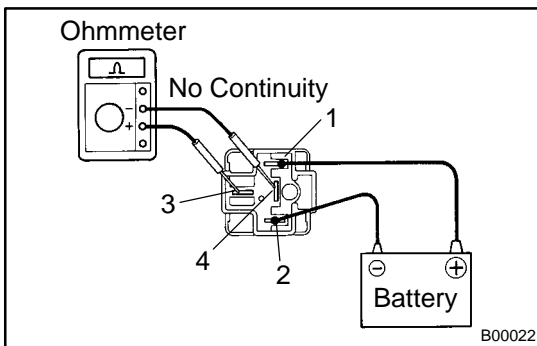
CO0AL-01

1. INSPECT NO.1 COOLING FAN RELAY

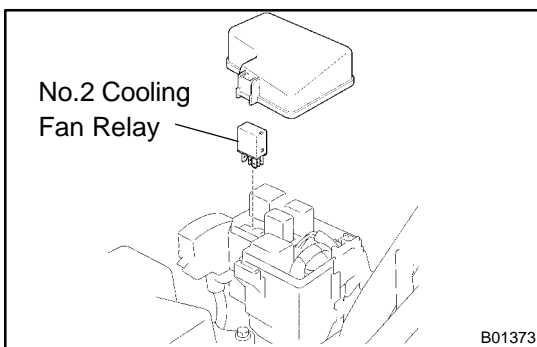
- Remove the relay box cover.
- Remove the No.1 cooling fan relay. (Marking: FAN NO.1)



- Inspect the No.1 cooling fan relay continuity.
 - Using an ohmmeter, check that there is continuity between terminals 1 and 2.
 If there is no continuity, replace the relay.
 - Check that there is continuity between terminals 3 and 4.
 If there is no continuity, replace the relay.

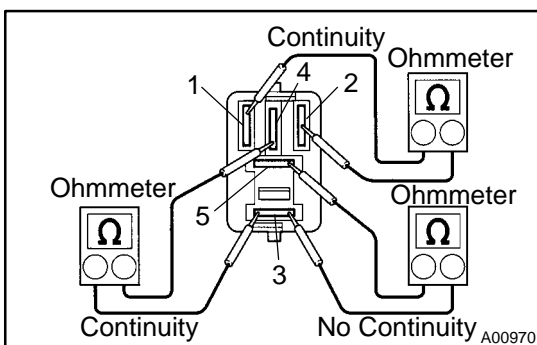


- Inspect the No.1 cooling fan relay operation.
 - Apply battery positive voltage across terminals 1 and 2.
 - Using an ohmmeter, check that there is no continuity between terminals 3 and 4.
 If there is continuity, replace the relay.
- Reinstall the No.1 cooling fan relay.
- Reinstall the relay box cover.

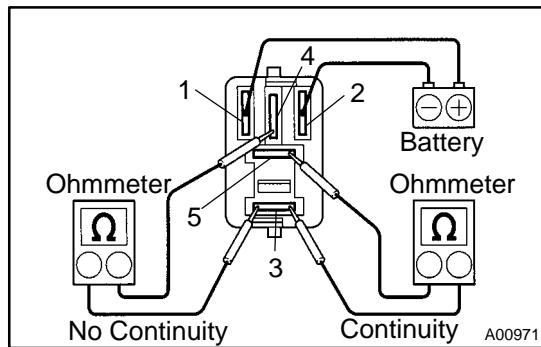


2. INSPECT NO.2 COOLING FAN RELAY

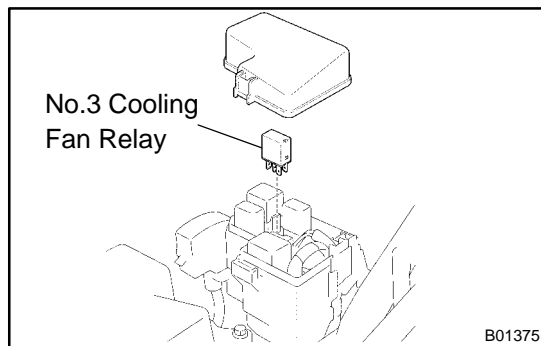
- Remove the relay box cover.
- Remove the No.2 cooling fan relay. (Marking: FAN NO.2)



- Inspect the No.2 cooling fan relay continuity.
 - Using an ohmmeter, check that there is continuity between terminals 1 and 2.
 If there is no continuity, replace the relay.
 - Check that there is continuity between terminals 3 and 4.
 If there is no continuity, replace the relay.
 - Check that there is no continuity between terminals 3 and 5.
 If there is continuity, replace the relay.

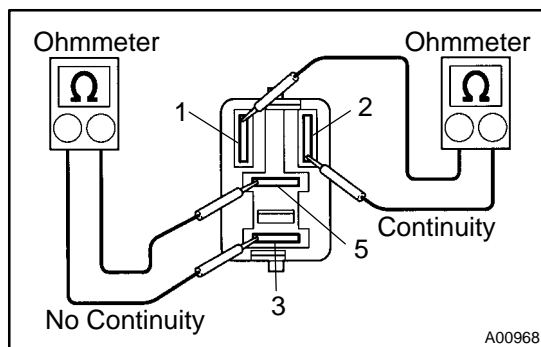


- (d) Inspect the No.2 cooling fan relay operation.
- (1) Apply battery positive voltage across terminals 1 and 2.
 - (2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.
- If there is continuity, replace the relay.
- (3) Using an ohmmeter, check that there is continuity between terminals 3 and 5.
- If there is no continuity, replace the relay.
- (e) Reinstall the No.2 cooling fan relay.
 - (f) Reinstall the relay box cover.

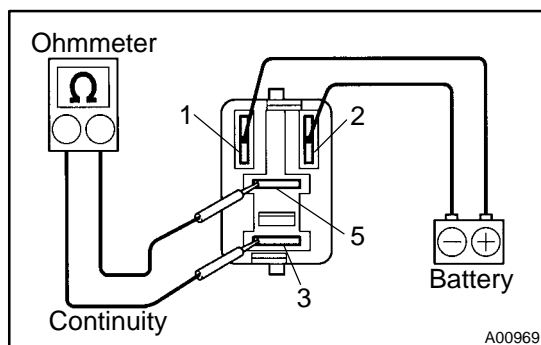


3. INSPECT NO.3 COOLING FAN RELAY

- (a) Remove the relay box cover.
- (b) Remove the No.3 cooling fan relay. (Marking: FAN NO.3)



- (c) Inspect the No.3 cooling fan relay continuity.
- (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- If there is no continuity, replace the relay.
- (2) Check that there is no continuity between terminals 3 and 5.
- If there is continuity, replace the relay.

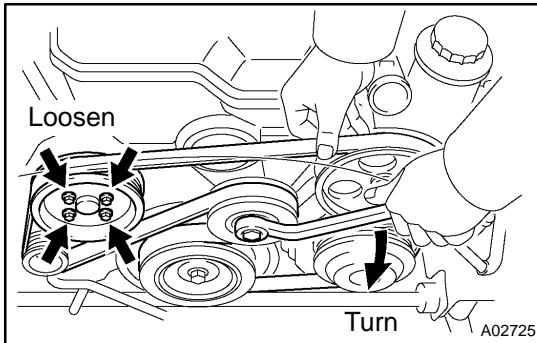


- (d) Inspect the No.3 cooling fan relay operation.
- (1) Apply battery positive voltage across terminals 1 and 2.
 - (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.
- If there is no continuity, replace the relay.
- (e) Reinstall the No.3 cooling fan relay.
 - (f) Reinstall the relay box cover.

REMOVAL

1. REMOVE RADIATOR ASSEMBLY

(See page [CO-18](#))

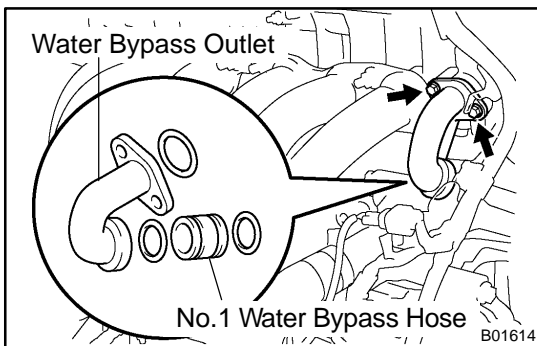


2. REMOVE DRIVE BELT AND WATER PUMP PULLEY

- Loosen the 4 nuts holding the water pump pulley to the water pump.
- Loosen the drive belt tension by turning the drive belt tensioner clockwise, and remove the drive belt.
- Remove the 4 nuts and water pump pulley.

3. REMOVE TIMING BELT AND IDLER PULLEY

(See page [EM-16](#))

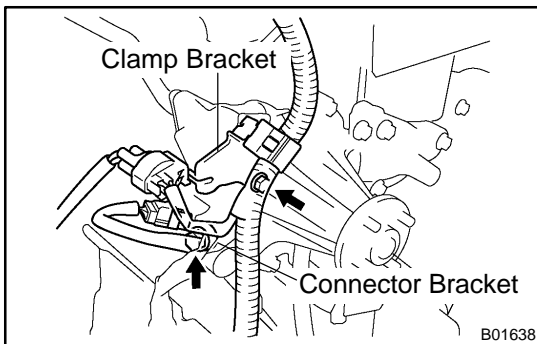


4. REMOVE WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE

- Remove the 2 bolts, water bypass outlet and No.1 water bypass pipe.
- Remove the 3 O-rings from the water bypass outlet and No.1 water bypass pipe.

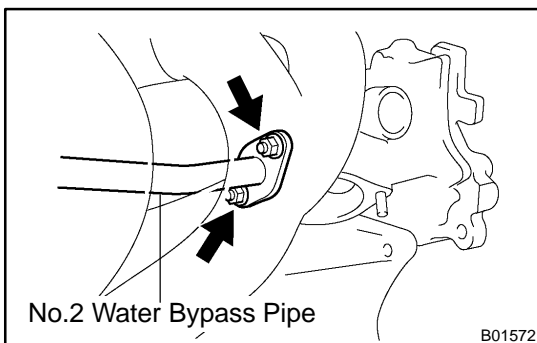
5. REMOVE WATER INLET AND THERMOSTAT

(See page [CO-11](#))

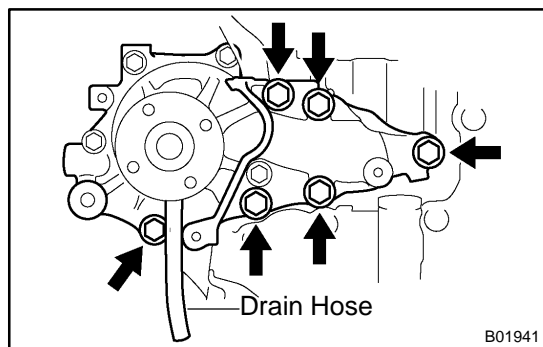


6. REMOVE WATER PUMP

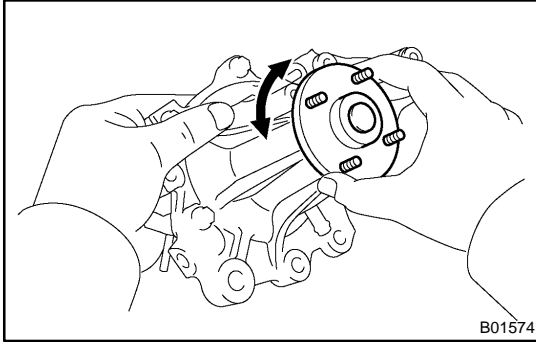
- Loosen the nut and remove the bolt, slide the generator away from the water pump.
- Remove the bolt, and disconnect the clamp bracket (for engine wire).
- Remove the bolt, and disconnect the connector bracket (for crankshaft position sensor connector).



- Remove the 2 nuts, and disconnect the No.2 water bypass pipe from the water pump.



- (e) Remove the 6 bolts, water pump and gasket.
- (f) Remove the drain hose.
- (g) Remove the O-ring from the cylinder block.

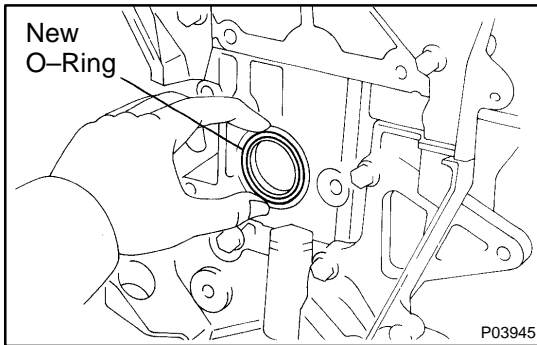


INSPECTION

INSPECT WATER PUMP

Turn the pulley seat, and check that the water pump bearing is not rough or noisy.

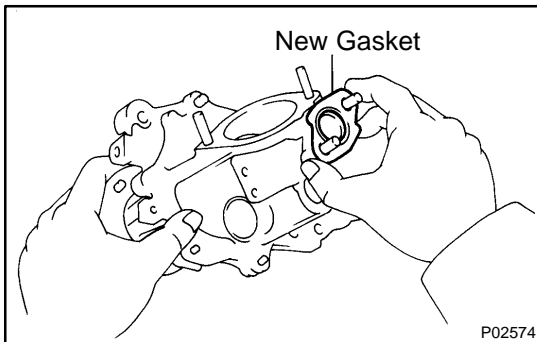
If necessary, replace the water pump.



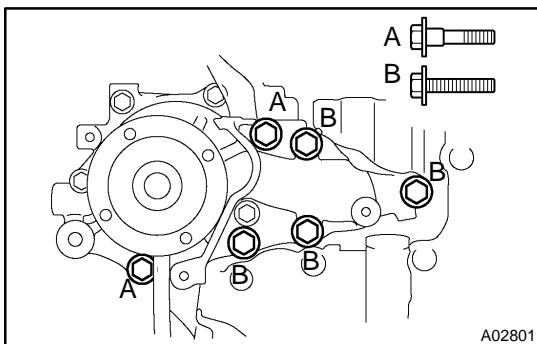
INSTALLATION

1. INSTALL WATER PUMP

- (a) Install a new O-ring to the cylinder block.
- (b) Install the drain hose.



- (c) Install a new gasket to the water pump.
- (d) Connect the water pump to the water bypass pipe. Do not install the nut yet.



- (e) Install the water pump with the 2 bolts (A) and 4 bolts (B).
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

HINT:

Hand tighten the (A) bolts first.

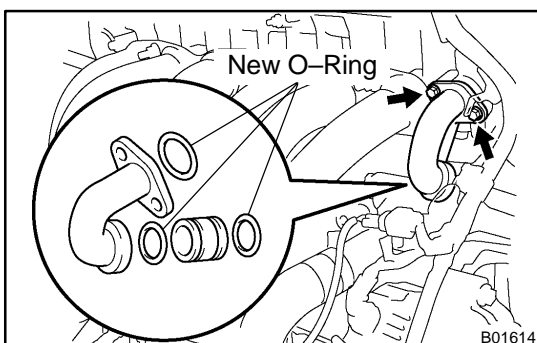
- (f) Install the 2 nuts holding the No.2 water bypass pipe to the water pump.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

- (g) Install the connector bracket (for crankshaft position sensor connector) with the bolt.
- (h) Install the clamp bracket (for engine wire) with the bolt.
- (i) Install the generator with the bolt and nut.

Torque: 40 N·m (400 kgf-cm, 30 ft-lbf)

2. **INSTALL THERMOSTAT AND WATER INLET**
(See page [CO-13](#))



3. **INSTALL NO.1 WATER BYPASS PIPE AND WATER BYPASS OUTLET**

- (a) Install 2 new O-rings to the No.1 water bypass pipe.
- (b) Install a new O-ring and the water bypass outlet with the 2 bolts.

Torque: 9.0 N·m (90 kgf-cm, 80 in.-lbf)

4. **INSTALL IDLER PULLEY AND TIMING BELT**
(See page [EM-23](#))

5. **INSTALL WATER PUMP PULLEY AND DRIVE BELT**
Torque: 14 N·m (140 kgf-cm, 10 ft-lbf)

6. INSTALL RADIATOR ASSEMBLY
(See page [CO-23](#))

EMISSION CONTROL SYSTEM

EC00B-05

PURPOSE

The emission control systems are installed to reduce the amount of CO, HC and NOx exhausted from the engine (3) and (4)), to prevent the atmospheric release of blow-by gas-containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).

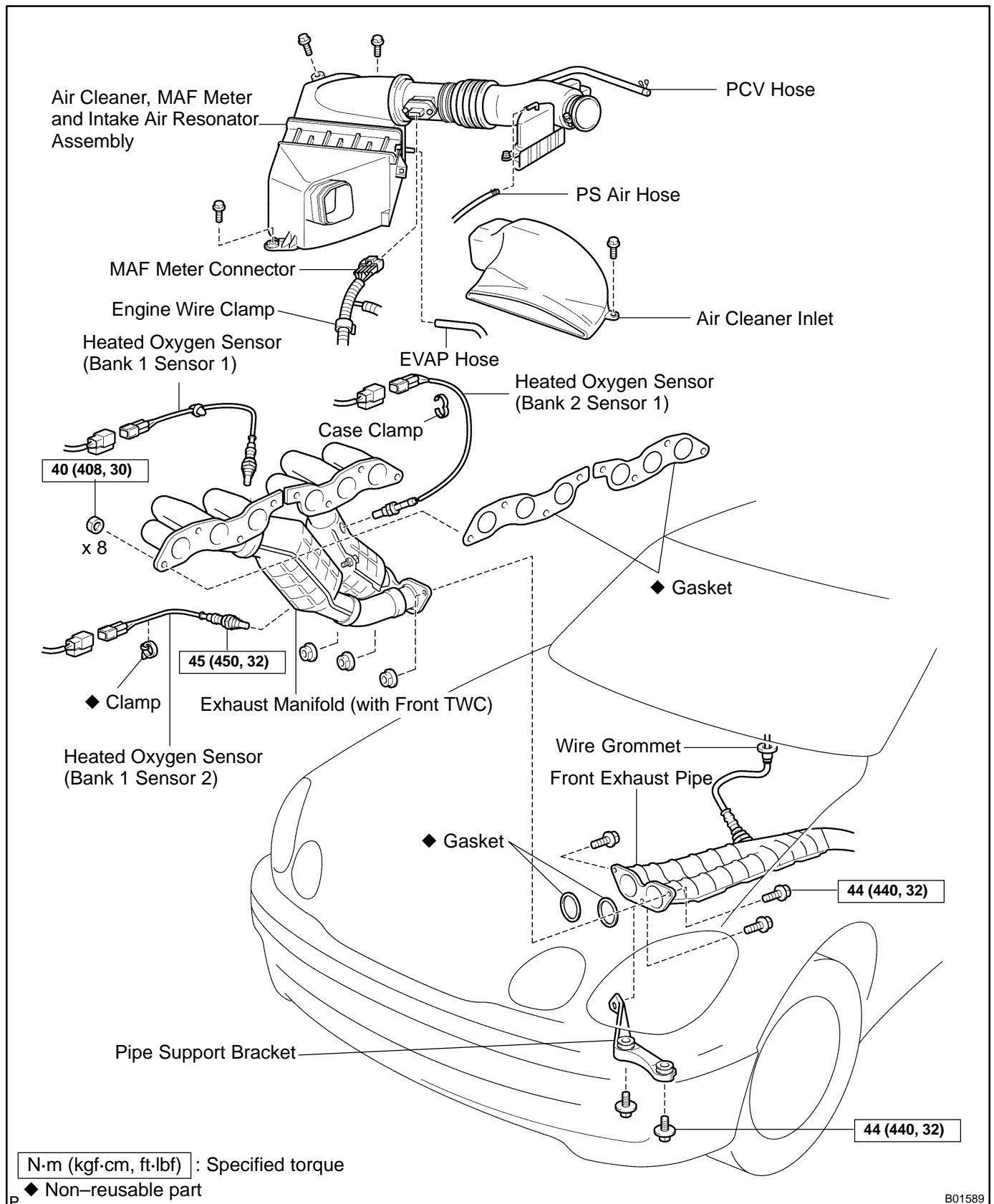
The function of each system is shown in these table.

System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces blow-by gas (HC)
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Three-Way Catalytic Converter	TWC	Reduces CO, HC and NOx
(4) Sequential Multiport Fuel Injection *	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

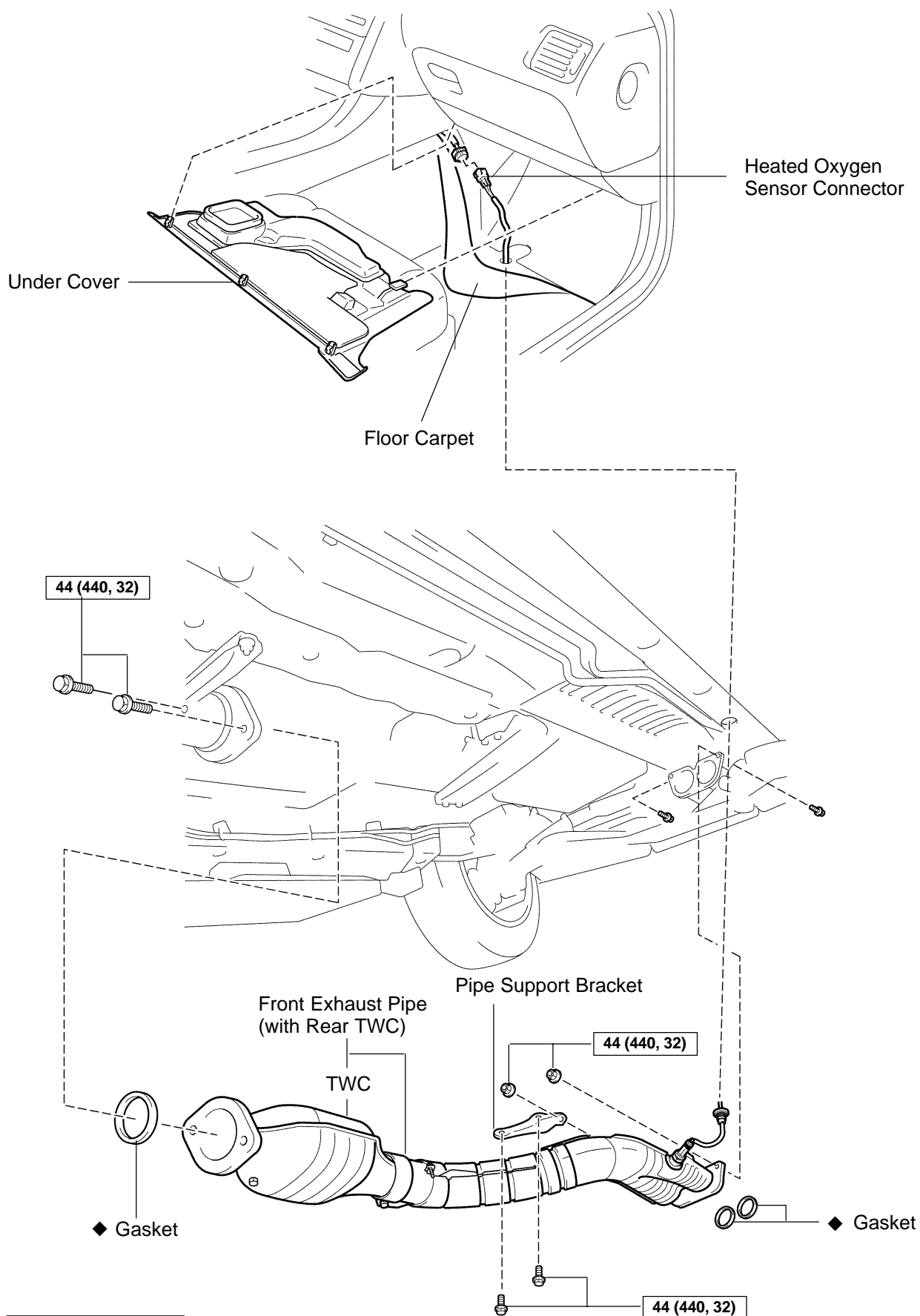
Remark: * For inspection and repair of the SFI system, refer to the SF section this manual.

THREE-WAY CATALYTIC CONVERTER (TWC) SYSTEM COMPONENTS

EC0DF-01



B01589



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

◆ Non-reusable part

B08609

INSPECTION

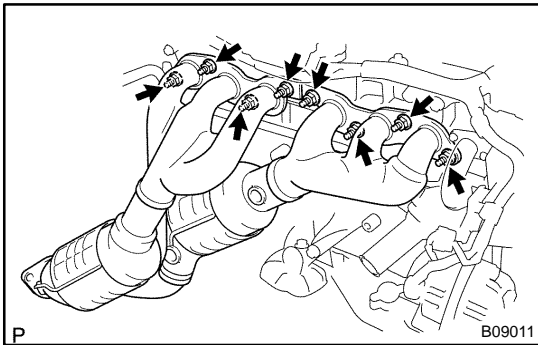
1. **CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE**
2. **CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE**
3. **CHECK FOR DENTS OR DAMAGE**

If any part of the protector is damaged or dented to the extent that it contacts the three-way catalytic converter, repair or replace it.

4. **CHECK HEAT INSULATOR FOR DAMAGE**
5. **CHECK FOR ADEQUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR**

REPLACEMENT

1. REMOVE ENGINE COVER
2. REMOVE AIR CLEANER INLET
3. REMOVE AIR CLEANER, MAF METER AND INTAKE AIR RESONATOR ASSEMBLY (See page [EM-62](#))
4. DISCONNECT HEATED OXYGEN SENSORS FROM EXHAUST MANIFOLD
 - (a) Disconnect the 3 oxygen sensor connectors.
 - (b) Disconnect the 2 oxygen sensors (bank 1 sensor 1, 2) from the exhaust manifold.
5. REMOVE FRONT EXHAUST PIPE (WITH REAR TWC)
 - (a) Take out the front side of the floor carpet.
 - (b) Disconnect the oxygen sensor connector.
 - (c) Remove the 2 bolts and pipe support bracket.
 - (d) Remove the 5 bolts, front exhaust pipe and 3 gaskets.

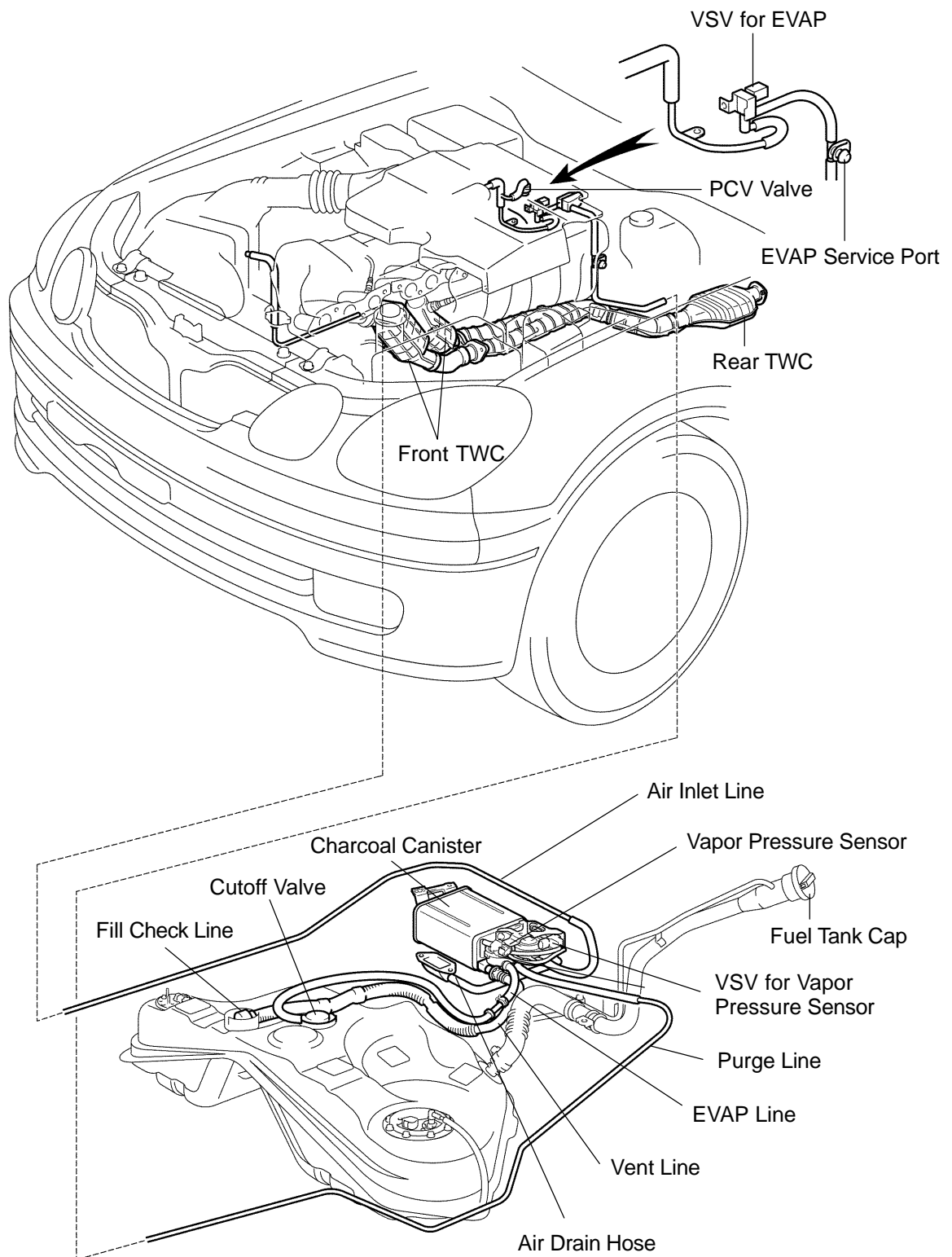


6. REMOVE EXHAUST MANIFOLD (WITH FRONT TWC)
 - (a) Using a 14 mm deep socket wrench, remove the 8 nuts, the exhaust manifold and 2 gaskets.
 - (b) Remove the heated oxygen sensor (bank 2 sensor 1) from the exhaust manifold.
7. REINSTALL NEX EXHAUST MANIFOLD (WITH FRONT TWC)
 - (a) Install the heated oxygen sensor (bank 2 sensor 1) to the exhaust manifold.
Torque: 45 N·m (450 kgf-cm, 33 ft-lbf)
 - (b) Install 2 new gaskets to the cylinder head.
 - (c) Using a 14 mm deep socket wrench, install new exhaust manifold with 8 new nuts. Uniformly tighten the nuts in several passes.
Torque: 40 N·m (408 kgf-cm, 30 ft-lbf)
8. REINSTALL FRONT EXHAUST PIPE (WITH REAR TWC)
 - (a) Reinstall new 3 gaskets, and front exhaust pipe with 5 bolts and support bracket.
 - (b) Reinstall the pipe support bracket with 2 bolts.
9. RECONNECT HEATED OXYGEN SENSORS TO EXHAUST MANIFOLD
 - (a) Install the 2 oxygen sensors (bank 1 sensor 1, 2) to the exhaust manifold.
Torque: 45 N·m (450 kgf-cm, 33 ft-lbf)
 - (b) Connect the 3 oxygen sensor connectors.
10. REINSTALL AIR CLEANER, MAF METER AND INTAKE AIR RESONATOR ASSEMBLY (See page [EM-68](#))
11. REINSTALL AIR CLEANER INLET
12. REINSTALL ENGINE COVER

PARTS LAYOUT AND SCHEMATIC DRAWING

LOCATION

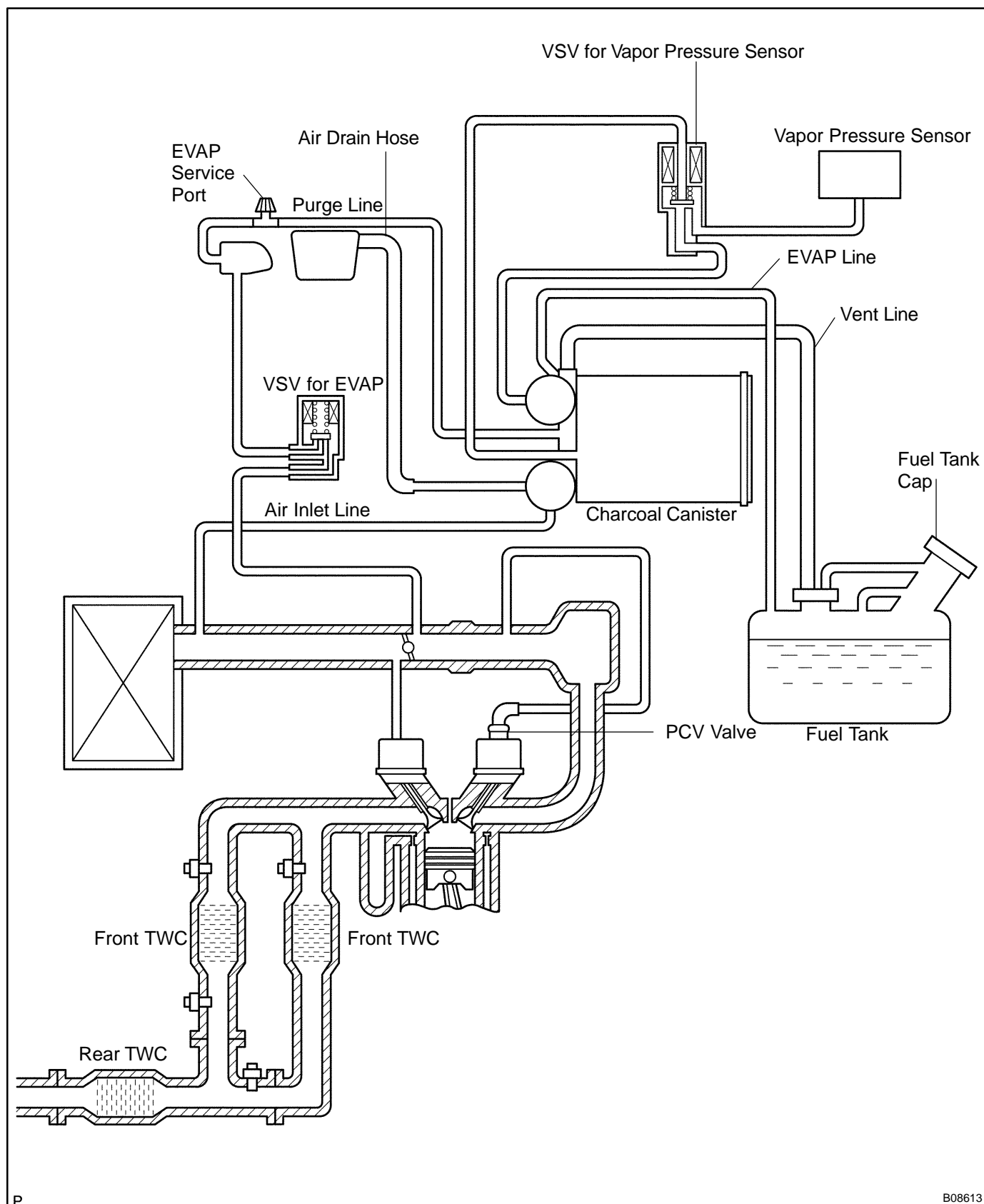
EC04V-06



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DRAWING

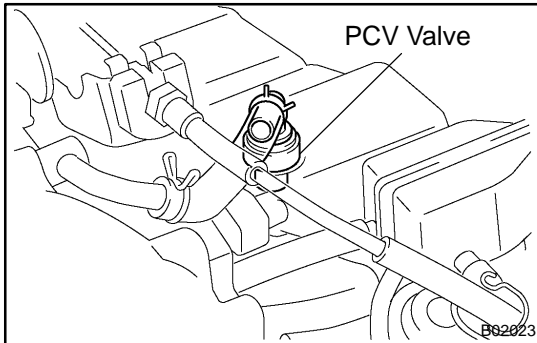


POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM INSPECTION

EC04X-05

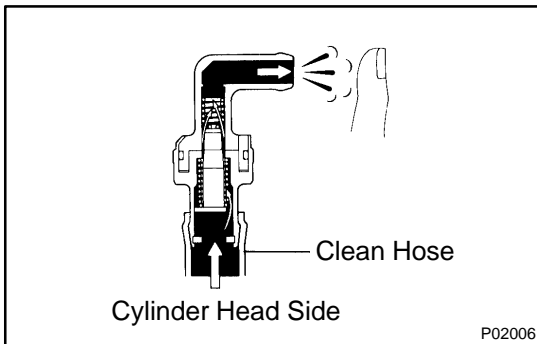
1. REMOVE ENGINE COVER

Remove 4 nuts and engine cover.



2. REMOVE PCV VALVE

- (a) Disconnect the PCV hose from the PCV valve.
- (b) Remove the PCV valve.



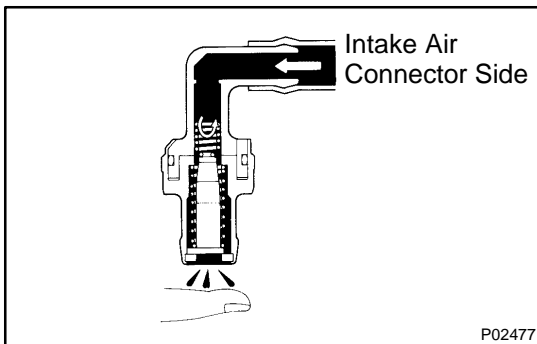
3. INSTALL CLEAN HOSE TO PCV VALVE

4. INSPECT PCV VALVE OPERATION

- (a) Blow air into the cylinder head side, and check that air passes through easily.

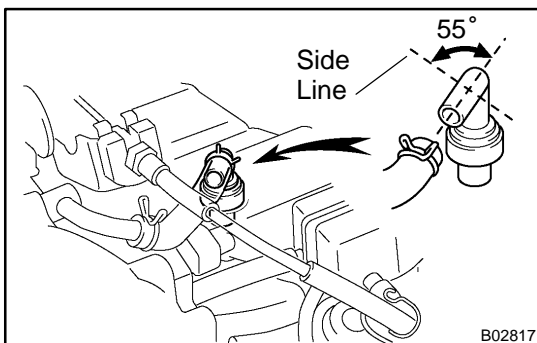
CAUTION:

- Do not suck air through the valve.
- Petroleum substances inside the valve are harmful.



- (b) Blow air into the intake air connector side, and check that air passes through with difficulty.

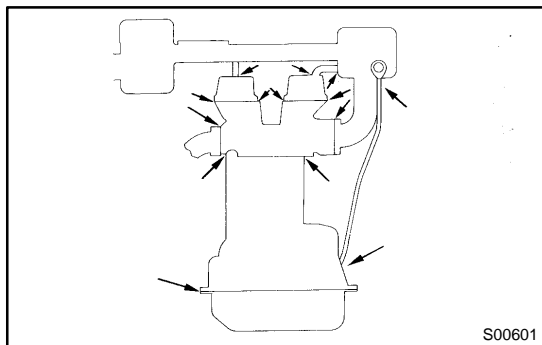
If operation is not as specified, replace the PCV valve.



5. REMOVE CLEAN HOSE FROM PCV VALVE

6. REINSTALL PCV VALVE

The port faces in the direction indicated in the illustration.



**7. VISUALLY INSPECT HOSES, CONNECTIONS
AND GASKETS**

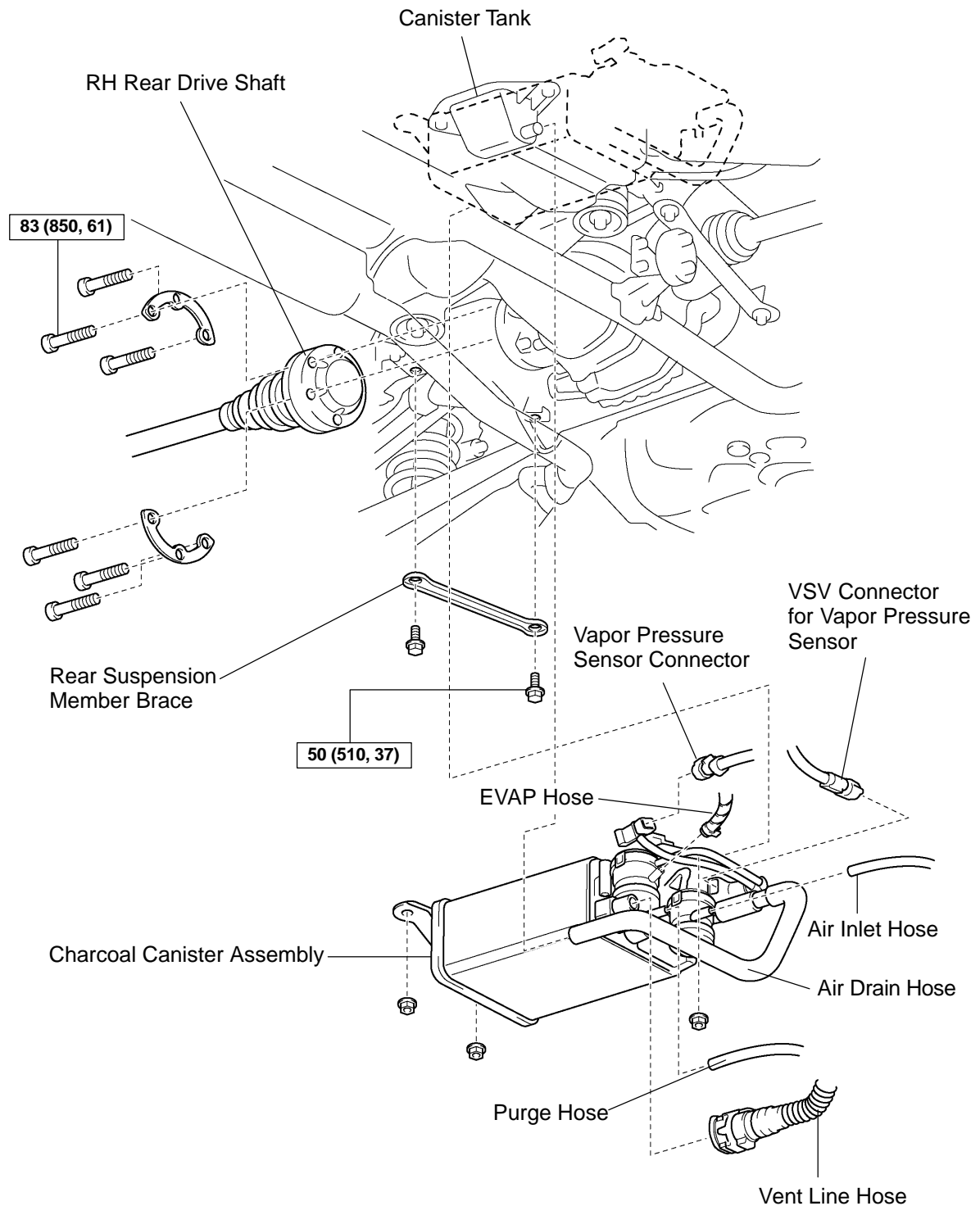
Check for cracks, leaks or damage.

8. REINSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM COMPONENTS

EC053-05



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

B06731

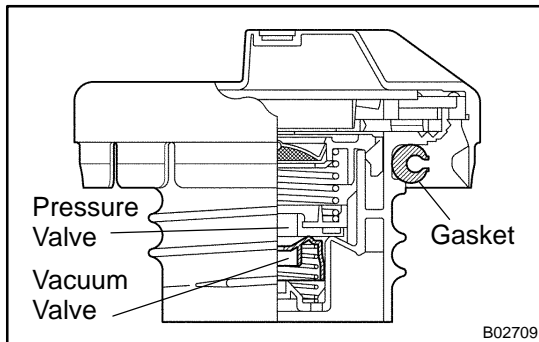
INSPECTION

1. INSPECT LINES AND CONNECTORS

Visually check for loose connections, sharp bends or damage.

2. INSPECT FUEL TANK FILLER PIPE

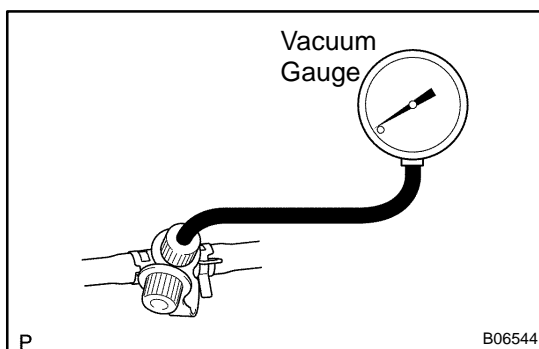
Visually check for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

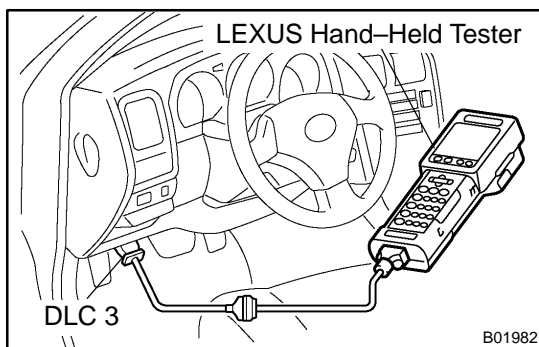
Check if the cap and/or gasket are deformed or damaged.

If necessary, repair or replace the cap.

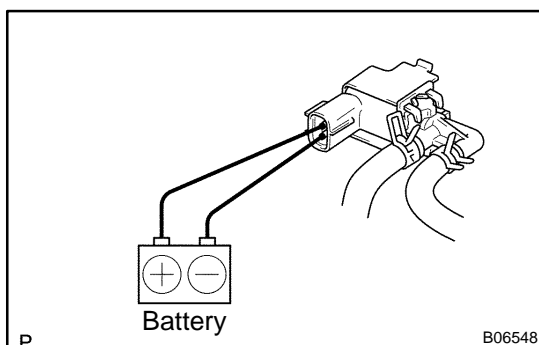


4. INSPECT EVAP SYSTEM LINE

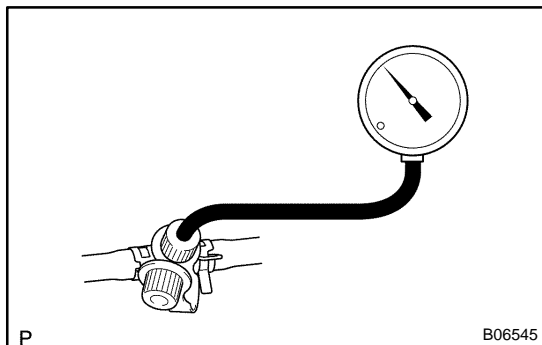
- (a) Warm up the engine and stop the engine.
Allow the engine to warm up to normal operating temperature.
- (b) Install a vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.



- (c) LEXUS Hand-Held Tester:
Forced driving of the VSV for the EVAP.
 - (1) Connect a LEXUS hand-held tester to the DLC3.
 - (2) Start the engine.
 - (3) Push the LEXUS hand-held tester main switch ON.
 - (4) Use the ACTIVE TEST mode on the LEXUS hand-held tester to operate the VSV for the EVAP.



- (d) If you have no LEXUS Hand-Held Tester:
Forced driving of the VSV for the EVAP.
 - (1) Disconnect the VSV connector for the EVAP.
 - (2) Connect the positive (+) and negative (–) leads from the battery to the VSV terminals for the EVAP.
 - (3) Start the engine.



- (e) Check the vacuum at idle.

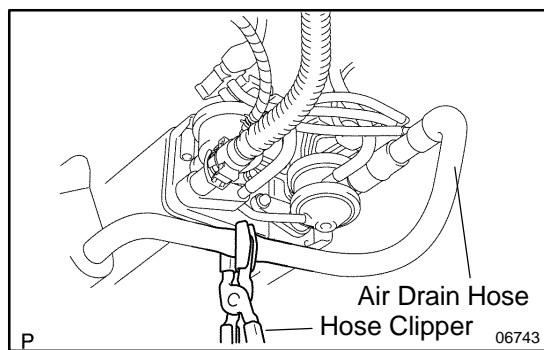
Vacuum:

Maintain at 0.368 – 19.713 in.Hg (5 – 268 in.Aq) for over 5 seconds

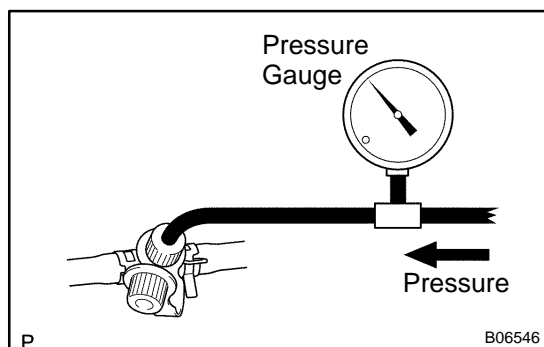
HINT:

If the vacuum does not change, you can conclude that the hose connecting the VSV to the service port has come loose or is blocked, or the VSV is malfunctioning.

- (f) LEXUS Hand-Held Tester:
Conclude forced driving of the VSV for the EVAP.
- (1) Stop the engine.
 - (2) Disconnect the LEXUS hand-held tester from the DLC3.
- (g) If you have no LEXUS Hand-Held Tester:
Conclude forced driving of the VSV for the EVAP.
- (1) Stop the engine.
 - (2) Disconnect the positive (+) and negative (–) leads from the battery from the VSV terminals for the EVAP.
 - (3) Connect the VSV connector for the EVAP.
- (h) Disconnect the vacuum gauge from the EVAP service port on the purge line.
- (i) Connect a pressure gauge to the EVAP service port on the purge line.



- (j) Check the pressure.
- (1) Close off the air drain hose at the marked position of the canister with a hose clipper or similar instrument.



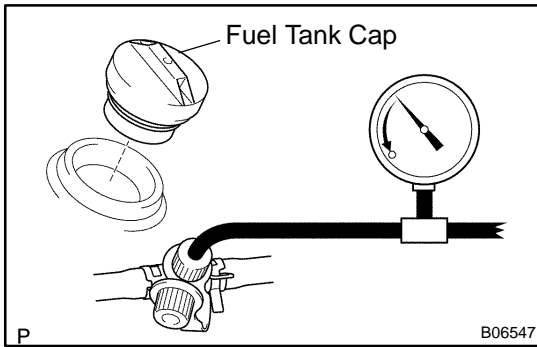
- (2) Add the pressure (13.5 – 15.5 in.Aq) from the EVAP service port.

Pressure:

2 minutes after the pressure is added, the gauge should be over 7.7 – 8.8 in.Aq.

HINT:

If you can't add pressure, you can conclude that the hose connecting the VSV ~ canister ~ fuel tank has slipped off or the VSV is open.

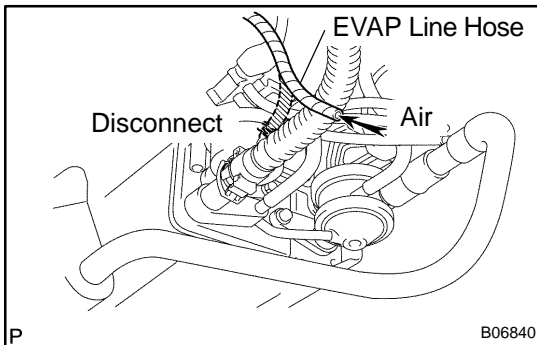


- (3) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

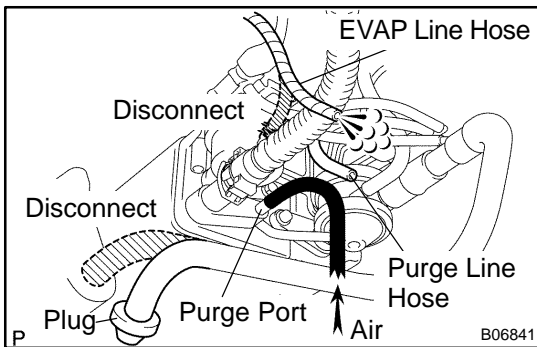
HINT:

If the pressure does not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

- (k) Disconnect the pressure gauge from the EVAP service port on the purge line.

**5. CHECK AIRTIGHTNESS IN FUEL TANK AND FILLER PIPE**

- Disconnect the EVAP line hose from the charcoal canister side and then pressurize and make the internal pressure in the fuel tank 4 kPa (41 gf/cm², 0.58 psi).
 - Check that the internal pressure of the fuel tank can be hold for 1 minute.
 - Check the connected portions of each hose and pipe.
 - Check the installed parts on the fuel tank.
- If there is no abnormality, replace the fuel tank and filler pipe.
- Reconnect the EVAP line hose to the charcoal canister.

**6. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE**

- Disconnect the purge line hose and EVAP line hose from the charcoal canister.
- Disconnect the air drain hose from the canister tank, and plug its.
- Pressurize 4 kPa (41 gf/cm², 0.58 psi) to the purge port and check that there is ventilation through the EVAP line hose.

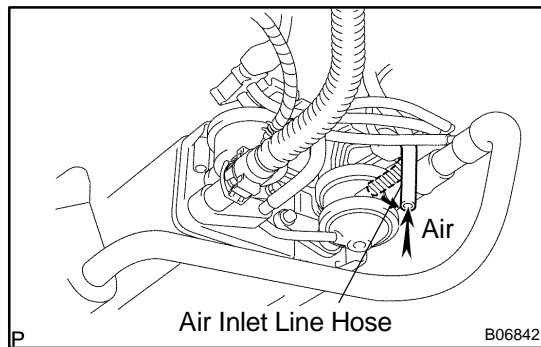
HINT:

In the condition that the fuel tank is full, as the float valve of the fill check valve is closed and has no ventilation, it is necessary to check the fuel amount (volume).

- Check if there is any stuck in the vent line hose and EVAP line hose.

If there is no stuck in hoses, replace the fuel cutoff valve and fill check valve.

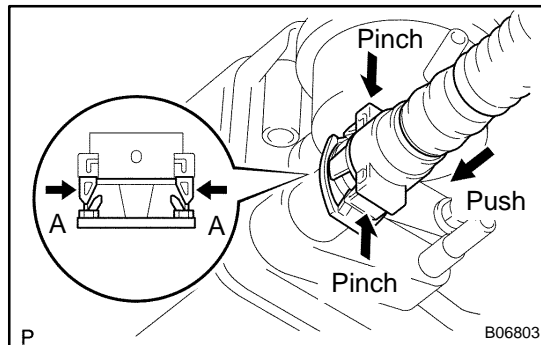
- Reconnect the purge line hose and EVAP line hose to the charcoal canister.
- Reconnect the air drain hose to the canister tank.

**7. CHECK AIR INLET LINE**

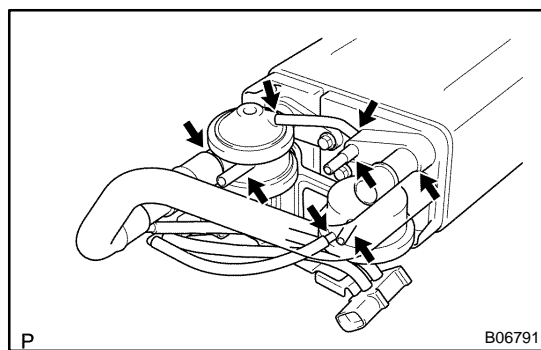
- (a) Disconnect the air inlet line hose from the charcoal canister.
- (b) Check that there is ventilation in the air inlet line.
- (c) Reconnect the air inlet line hose to the charcoal canister.

8. REMOVE CHARCOAL CANISTER ASSEMBLY

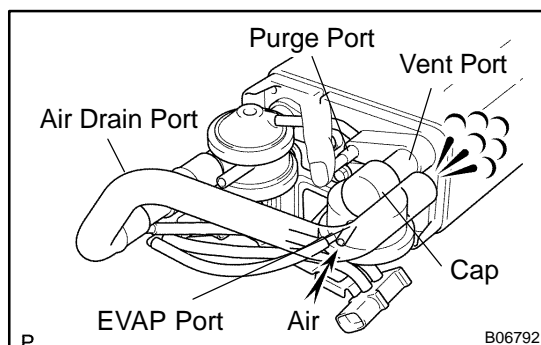
- (a) Disconnect the RH rear drive shaft from the differential. (See page [SA-52](#))



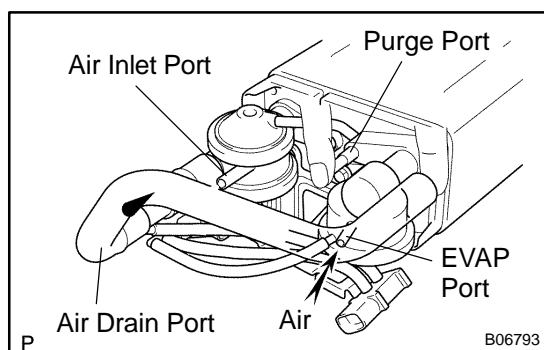
- (b) Remove the charcoal canister assembly.
 - (1) Disconnect the vapor pressure sensor connector.
 - (2) Disconnect the VSV connector for vapor pressure sensor.
 - (3) Disconnect the purge line hose, EVAP line hose and air inlet line from the charcoal canister.
 - (4) Disconnect the vent line hose from the charcoal canister.
Push the connector deep inside, pinch portion A, and pull out the connector.
 - (5) Disconnect the air drain hose from the charcoal tank.
 - (6) Remove the 3 nuts and the charcoal canister assembly.

**9. INSPECT CHARCOAL CANISTER**

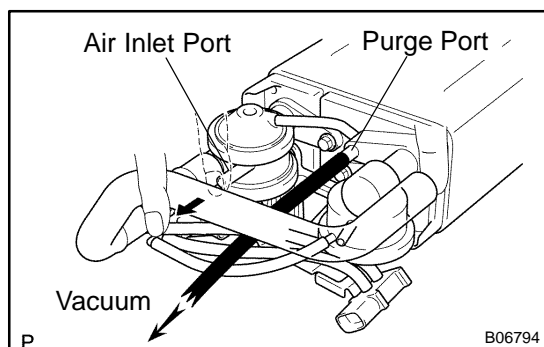
- (a) Visually check the charcoal canister for cracks or damage.



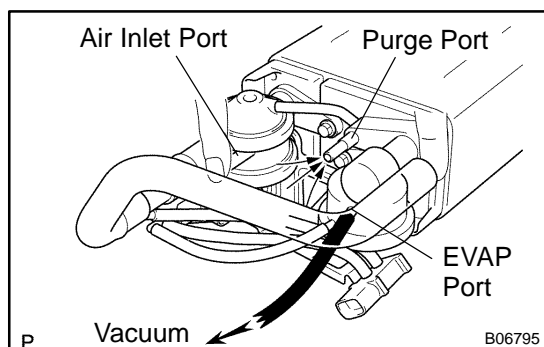
- (b) Inspect the charcoal canister operation.
 - (1) Plug the vent port with a cap.
 - (2) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm², 0.26 psi) into the EVAP port and check that air flows from the air drain port.



- (3) While holding the purge port and the air drain port closed, blow air (1.76 kPa, 18 gf/cm², 0.26 psi) into the EVAP port and check that air does not flow from the air inlet port.



- (4) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the purge port, check that the vacuum does not decrease when the air inlet port is closed, and check that the vacuum decreases when the air inlet port is released.



- (5) While holding the air inlet port closed, apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the EVAP port and check that air flows into the purge port.

If operation is not as specified, replace the charcoal canister.

10. **INSPECT VSV FOR EVAP**
(See page [SF-52](#))
11. **INSPECT VSV FOR VAPOR PRESSURE SENSOR**
(See page [SF-57](#))
12. **INSPECT VAPOR PRESSURE SENSOR**
(See page [SF-61](#))
13. **REINSTALL CHARCOAL CANISTER ASSEMBLY**
 - (a) Install the charcoal canister assembly.
 - (b) Connect the RH rear drive shaft to the differential.
(See page [SA-59](#))

CO/HC INSPECTION

EM000-01

HINT:

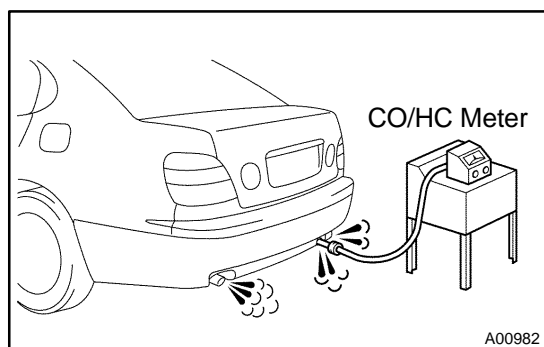
This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. INITIAL CONDITIONS

- (a) Engine at normal operating temperature
- (b) Air cleaner installed
- (c) All pipes and hoses of air induction system connected
- (d) All accessories switched OFF
- (e) All vacuum lines properly connected
- (f) SFI system wiring connectors fully plugged
- (g) Ignition timing checked correctly
- (h) Transmission in neutral position
- (i) Tachometer and CO/HC meter calibrated by hand

2. START ENGINE

3. RACE ENGINE AT 2,500 RPM FOR APPROX. 180 SECONDS



4. INSERT CO/HC METER TESTING PROBE AT LEAST 40 cm (1.3 ft) INTO TAILPIPE DURING IDLING

5. IMMEDIATELY CHECK CO/HC CONCENTRATION AT IDLE AND/OR 2,500 RPM

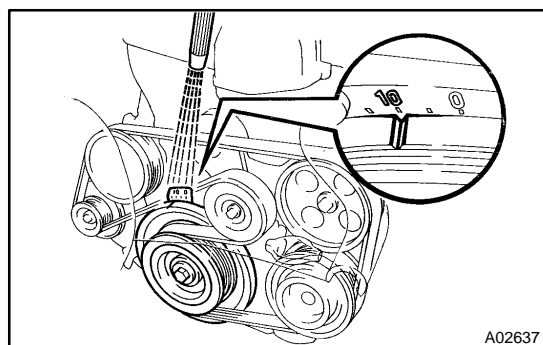
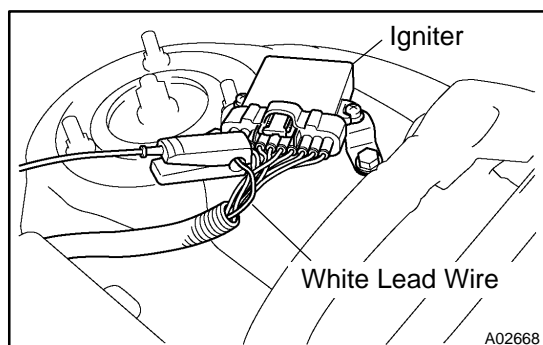
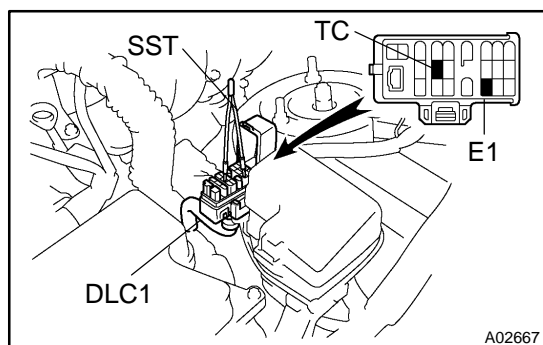
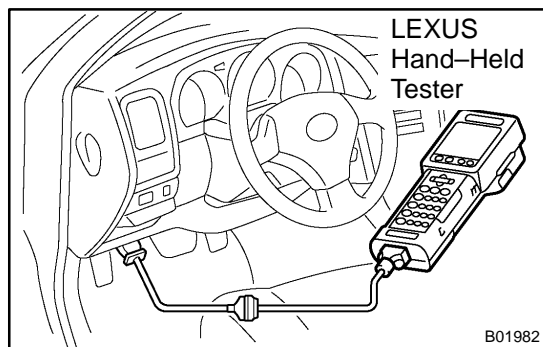
HINT:

When doing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.

If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.

- (a) Check heated oxygen sensors operation.
(See page [DI-44](#))
- (b) See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

HC	CO	Phenomenon	Causes
High	Normal	Rough idle	1. Faulty ignitions: <ul style="list-style-type: none"> • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed high-tension cords 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinder
High	Low	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: <ul style="list-style-type: none"> • PCV hose • Intake manifold • Throttle body • Cylinder head gasket 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty SFI systems: <ul style="list-style-type: none"> • Faulty pressure regulator • Faulty ECM • Faulty injector • Faulty throttle position sensor • Faulty mass air flow meter



IGNITION TIMING INSPECTION

EM03-02

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

2. CONNECT LEXUS HAND-HELD TESTER OR OBDII SCAN TOOL

(a) Connect the LEXUS hand-held tester or OBDII scan tool to the DLC3.

(b) Please refer to the LEXUS hand-held tester or OBDII scan tool operator's manual for further details.

3. CONNECT TIMING LIGHT TO ENGINE

4. CHECK IDLE SPEED (See page EM-13)

5. INSPECT IGNITION TIMING

(a) Using SST, connect terminals TC and E1 of the DLC1.
SST 09843-18020

(b) Connect the timing light clip to the white lead wire.

NOTICE:

Use a timing light that can detect the primary signal.

(c) Using a timing light, check the ignition timing.

Ignition timing: $10 \pm 2^\circ$ BTDC @ idle
(Transmission in neutral position)

(d) Remove the SST from the DLC1.

6. FURTHER CHECK IGNITION TIMING
Ignition timing: $6 - 16^\circ$ BTDC @ idle
(Transmission in neutral position)

HINT:

The timing mark moves in a range between 6° and 16° .

7. DISCONNECT TIMING LIGHT FROM ENGINE

8. DISCONNECT LEXUS HAND-HELD TESTER OR OBDII SCAN TOOL

IDLE SPEED INSPECTION

EMOD4-01

1. INITIAL CONDITIONS

- (a) Engine at normal operating temperature
- (b) Air cleaner installed
- (c) All pipes and hoses of air induction system connected
- (d) All accessories switched OFF
- (e) All vacuum lines properly connected
- (f) SFI system wiring connectors fully plugged
- (g) Ignition timing checked correctly
- (h) Transmission in neutral position

2. CONNECT LEXUS HAND-HELD TESTER OR OBDII SCAN TOOL (See page [EM-12](#))

3. INSPECT IDLE SPEED

- (a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
- (b) Check the idle speed.

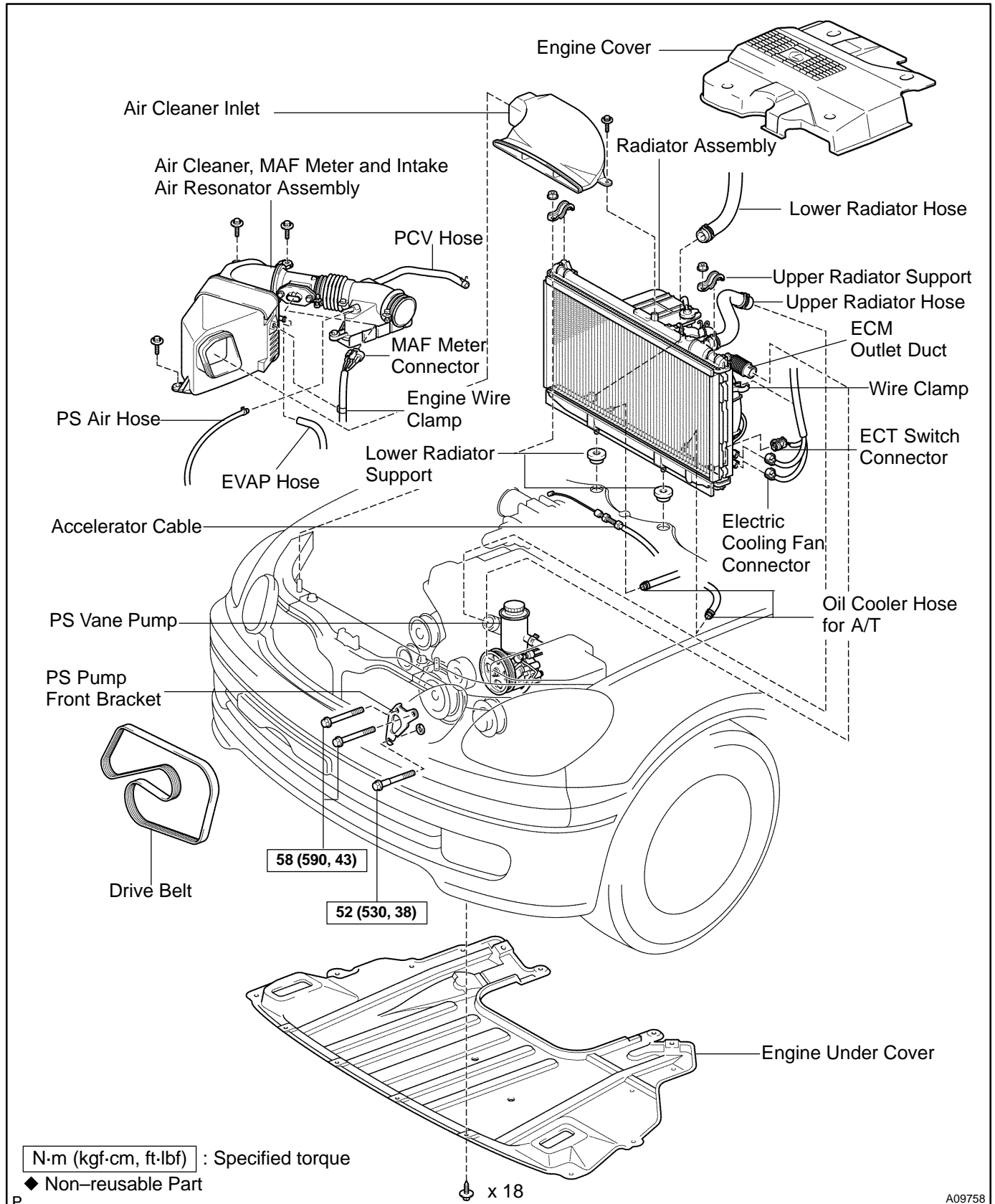
Idle speed: 700 ± 50 rpm

If the idle speed is not as specified, check the throttle body.

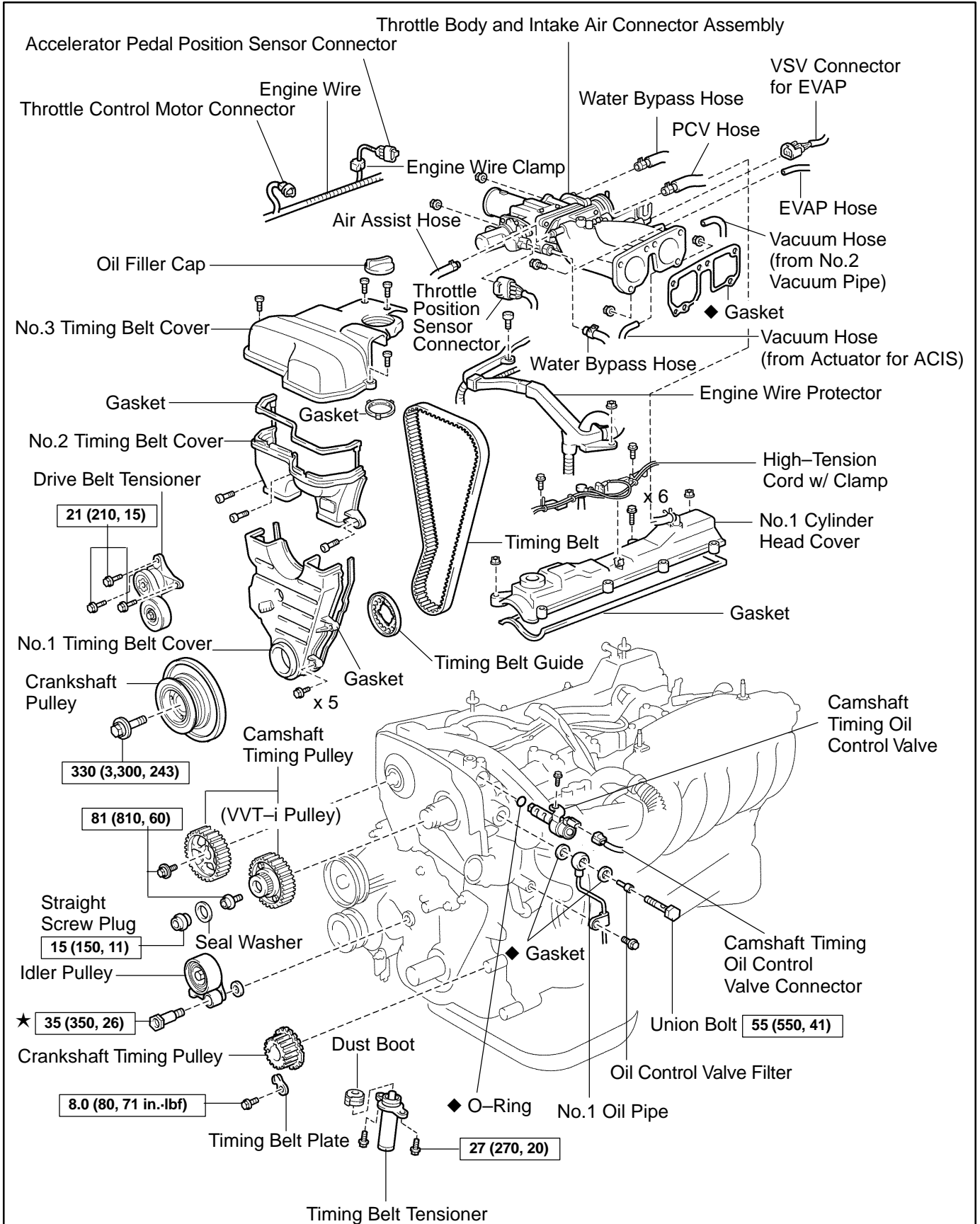
4. DISCONNECT LEXUS HAND-HELD TESTER OR OBDII SCAN TOOL

TIMING BELT COMPONENTS

EM05-03



A09758



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

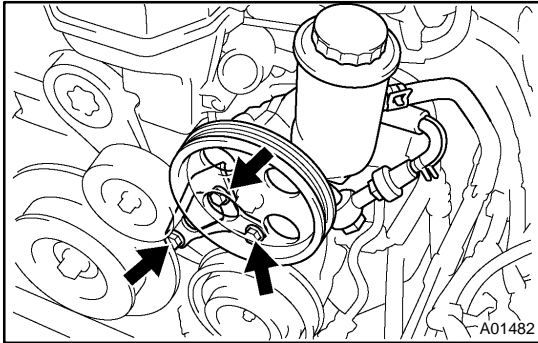
◆ Non-reusable part

★ Precoated part

A11128

REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE RADIATOR ASSEMBLY (See page [CO-18](#))
4. REMOVE DRIVE BELT (See page [CH-1](#))

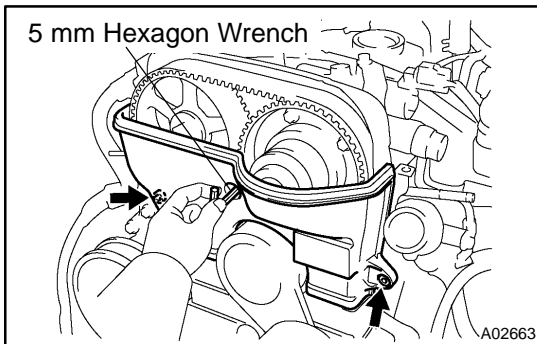


5. REMOVE PS PUMP AND FRONT BRACKET

- (a) Remove the 3 bolts, plate washer and pump front bracket.
- (b) Disconnect the vane pump from the bracket.

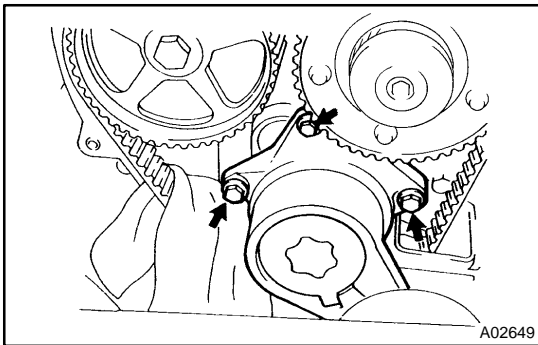
6. REMOVE NO.3 TIMING BELT COVER

Using a 5 mm hexagon wrench, remove the 4 bolts, oil filler cap, timing belt cover and gasket.



7. REMOVE NO.2 TIMING BELT COVER

Using a 5 mm hexagon wrench, remove the 3 bolts, timing belt cover and gasket.

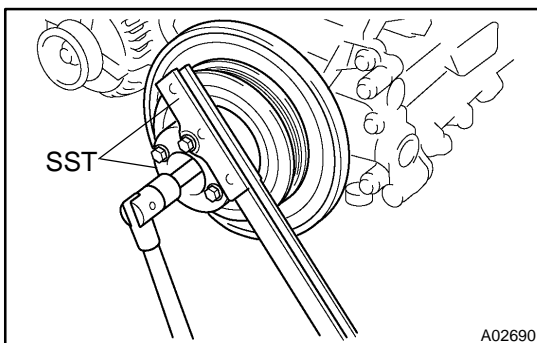


8. REMOVE DRIVE BELT TENSIONER

Remove the 3 bolts and tensioner.

NOTICE:

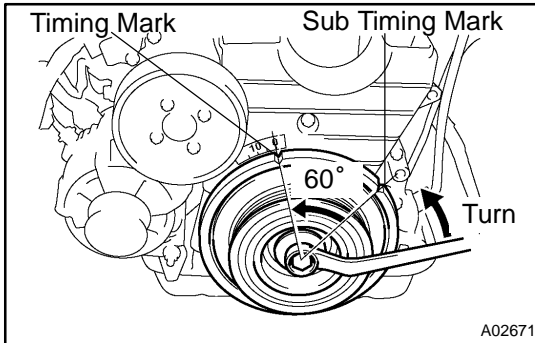
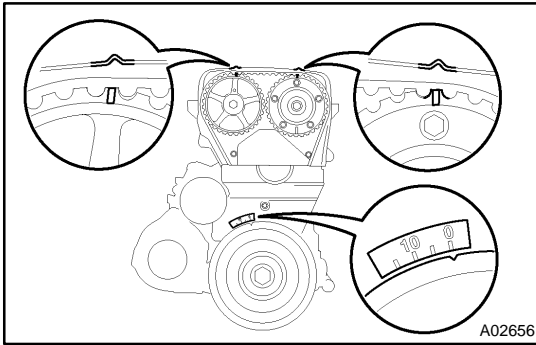
Be careful not to drop the bolts inside the timing belt cover.



9. LOOSEN CRANKSHAFT PULLEY BOLT

Using SST, loosen the pulley bolt.

SST 09213 – 70010, 09330 – 00021



10. SET NO.1 CYLINDER TO APPROX. 60° / BTDC COMPRESSION

- (a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the No.1 timing belt cover.

NOTICE:

Always turn the crankshaft clockwise.

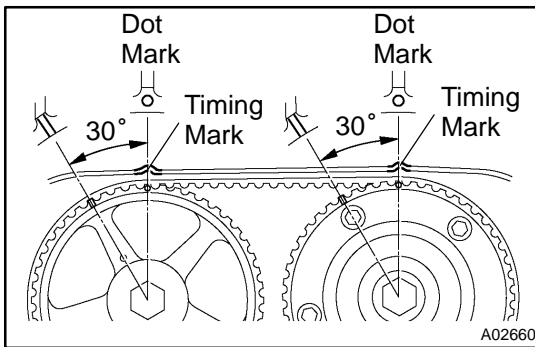
- (b) Check that the timing marks (TDC mark) of the camshaft timing pulleys are aligned with the timing marks of the No.4 timing belt cover.

If not, turn the crankshaft 1 revolution (360°).

- (c) Turn the crankshaft pulley 60° counterclockwise to place the sub timing mark (60° mark BTDC) on the crankshaft pulley at the timing mark "0" position of the No.1 timing belt cover.

NOTICE:

If the timing belt is disengaged, having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you remove the camshaft timing pulleys (steps 11 to 17), thus resulting damage. So, always set the crankshaft pulley at the correct angle.

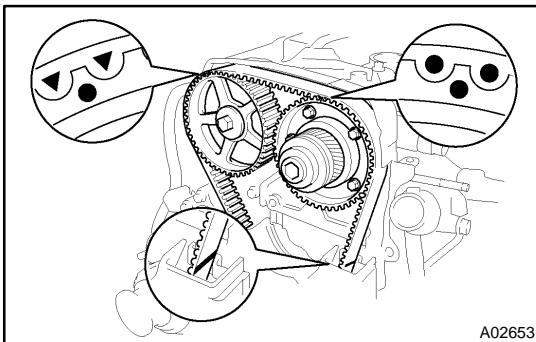


- (d) Check that the dot marks (60° mark BTDC) of the camshaft timing pulleys are aligned with the timing marks of the No.4 timing belt cover.

- (e) Remove the crankshaft pulley bolt.

NOTICE:

Do not turn the crankshaft pulley.

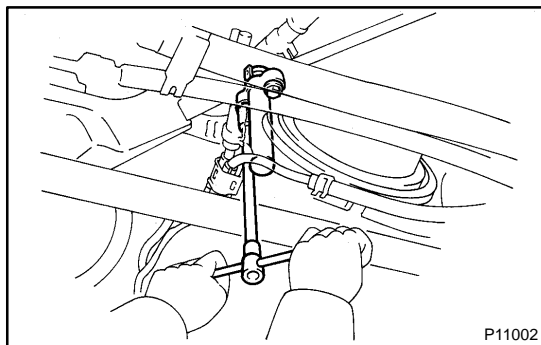


11. REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEYS

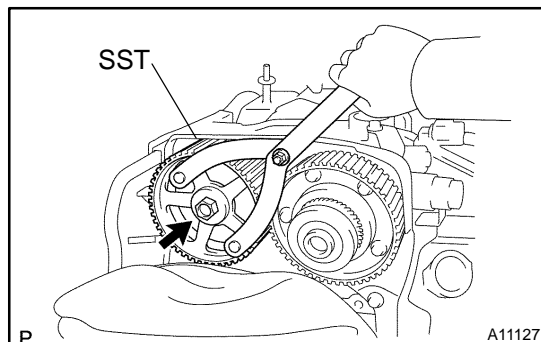
HINT:

(Re-using timing belt):

Place matchmarks on the timing belt and camshaft timing pulleys as shown in the illustration.



- (a) Alternately loosen the 2 bolts, and remove them, the tensioner and dust boot.
- (b) Disconnect the timing belt from the camshaft timing pulleys.



12. REMOVE EXHAUST CAMSHAFT TIMING PULLEY

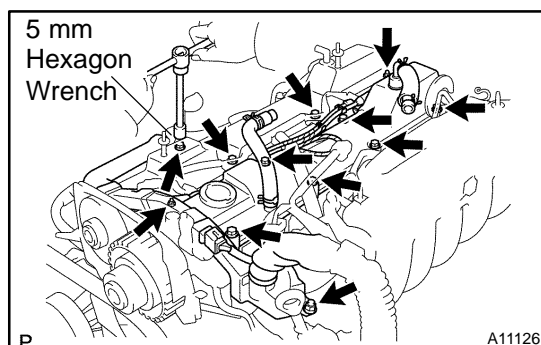
Using SST, remove the bolt and timing pulley.

SST 09960-10010 (09962-01000, 09963-01000)

13. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

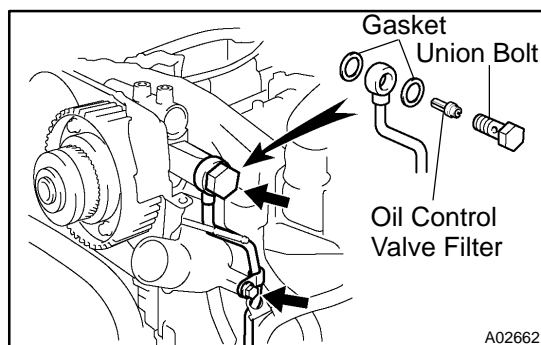
14. REMOVE THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page EM-5)



15. REMOVE NO.1 CYLINDER HEAD COVER

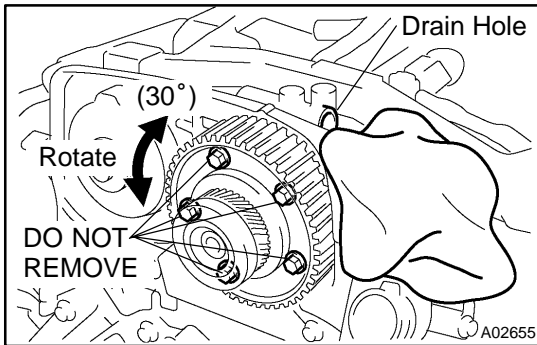
- (a) Using a 5 mm hexagon wrench, remove the bolts, and disconnect the engine wire protector from the No.2 cylinder head cover.
- (b) Remove the nut, and disconnect the engine wire protector from the intake manifold.
- (c) Remove the 2 bolts, and disconnect the high-tension cords with the clamp from the No.2 cylinder head.
- (d) Remove the 6 bolts, 2 nuts, No.1 cylinder head cover and gasket.

16. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (See page SF-43)



17. DISCONNECT NO.1 OIL PIPE

Remove the bolt, union bolt, oil control valve filter and 2 gaskets, and disconnect the No.1 oil pipe from the No.3 camshaft bearing cap.



18. REMOVE VVT-i (INTAKE CAMSHAFT TIMING) PULLEY

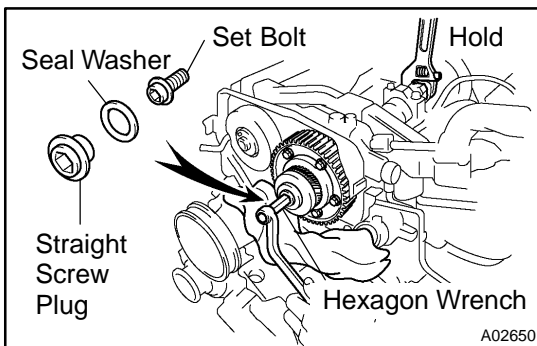
NOTICE:

- The 5 bolts shown in the illustration determine the backlash of the gear in the timing pulley, so do not remove them.
- If any of the 5 bolts are removed, install a new camshaft timing pulley assembly.
- When removing the straight screw plug, follow the prescribed procedure in order to avoid spilling oil on the timing system parts.

- Rotate the VVT-i pulley from left to right 2 to 3 times within its range of movement (30°) and use a waste cloth to collect the oil from the camshaft timing oil control valve installation hole.

NOTICE:

Approximately 20 cc (1.2 cu in.) of oil will be ejected, so take care not to spill it.

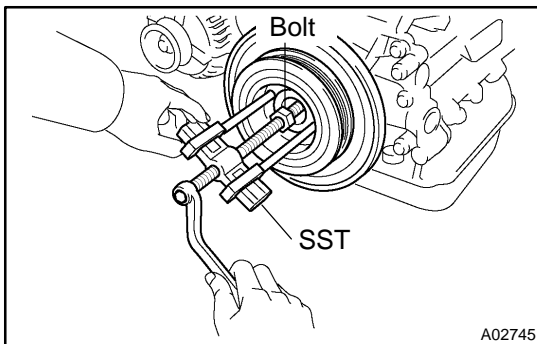


- Holding the hexagon portion of camshaft with a wrench.
- Using a 14 mm hexagon wrench, remove the straight screw plug and seal washer.

NOTICE:

Some oil may spill, so put a waster cloth below the plug while doing the operation.

- Using a 10 mm hexagon wrench, and remove the set bolt and VVT-i pulley.
- Remove the wrench.



19. REMOVE CRANKSHAFT PULLEY

Using SST and bolt (diameter: 8 mm, pitch: 1.5 mm), remove the crankshaft pulley.

SST 09950-50012 (09951-05010, 09552-05010, 09553-05020, 09554-05030)

Bolt: Part No. 90119-18001

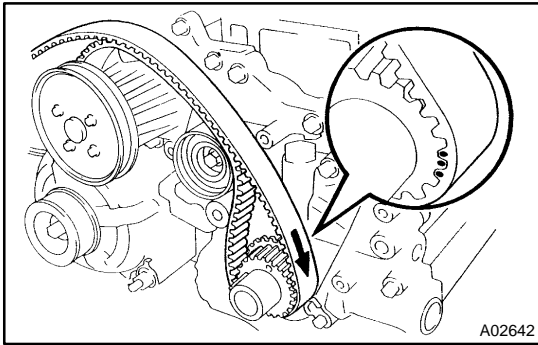
NOTICE:

Do not turn the crankshaft pulley.

20. REMOVE NO.1 TIMING BELT COVER

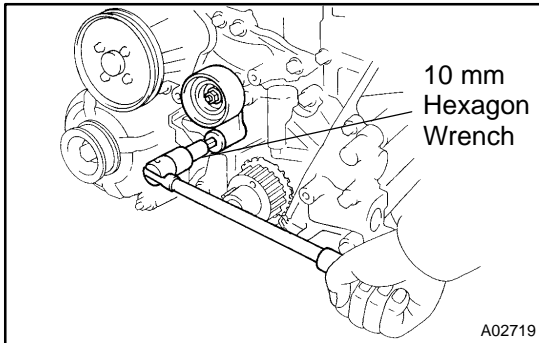
Remove the 5 bolts, timing belt cover and gasket.

21. REMOVE TIMING BELT GUIDE

**22. REMOVE TIMING BELT****HINT:**

(When re-using timing belt):

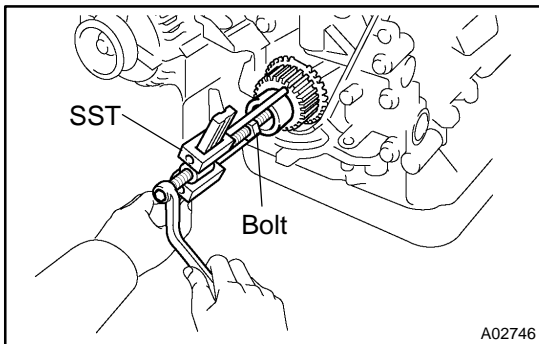
Draw an arrow on the timing belt in the direction of engine revolution, and place matchmarks on the timing belt and crankshaft timing pulley.

**23. REMOVE IDLER PULLEY**

Using a 10 mm hexagon wrench, remove the pivot bolt, plate washer and idler pulley.

24. REMOVE CRANKSHAFT TIMING PULLEY

(a) Remove the bolt and timing belt plate.



(b) Remove the crankshaft timing pulley.

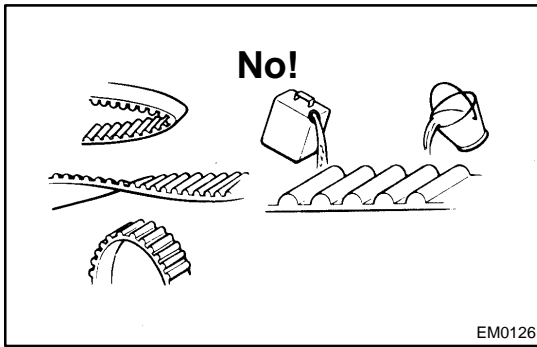
If the pulley cannot be removed by hand, use SST and bolt (diameter: 8 mm, pitch: 1.5 mm) to remove the crankshaft timing pulley.

SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05010)

Bolt: Part No. 90119-18001

NOTICE:

- Do not scratch the sensor part the crankshaft timing pulley.
- Do not turn the timing pulley.



INSPECTION

1. INSPECT TIMING BELT

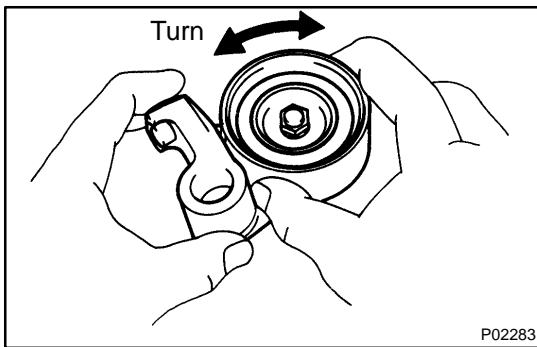
NOTICE:

- Do not bend, twist or turn the timing belt inside out. Do not allow the timing belt to come into contact with oil, water or steam.
- Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.

If there are any defects, as shown in the illustrations, check the following points.

- Premature parting
 - Check for proper installation.
 - Check the timing cover gasket for damage and proper installation.
- If the belt teeth are cracked or damaged, check to see if either camshaft is locked.
- 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.
- If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.
- If there is noticeable wear on the belt teeth, check timing cover for damage and check gasket has been installed correctly and for foreign material on the pulley teeth.

If necessary, replace the timing belt.



2. INSPECT IDLER PULLEY

- Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.

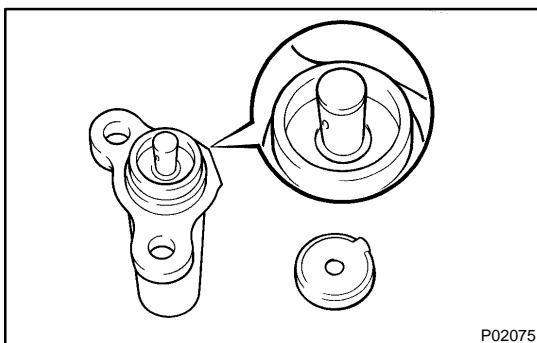
- Check the turning smoothness of the idler pulley.

If necessary, replace the idler pulley.

3. INSPECT DRIVE BELT TENSIONER

Check the turning smoothness of the tensioner.

If necessary, replace the tensioner.



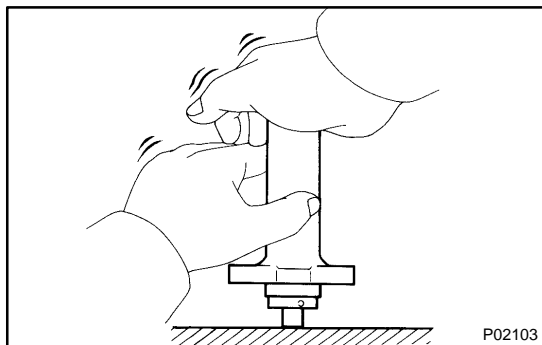
4. INSPECT TIMING BELT TENSIONER

- Visually check tensioner for oil leakage.

HINT:

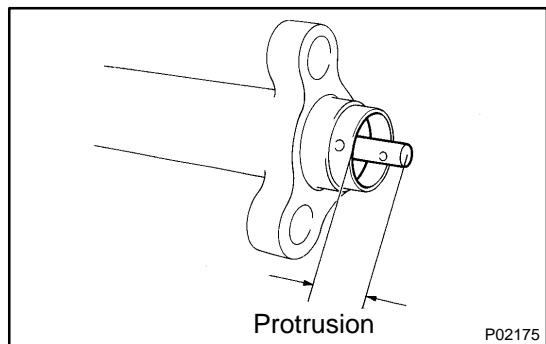
If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.

If leakage is found, replace 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.

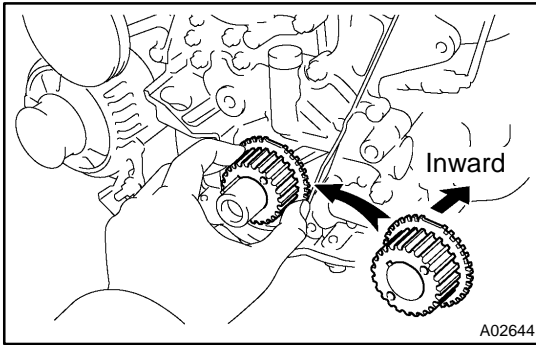
If the push rod moves, replace the tensioner.



- (c) Measure the protrusion of the push rod from the housing end.

Protrusion: 8.0 – 8.8 mm (0.315 – 0.346 in.)

If the protrusion is not as specified, replace the tensioner.



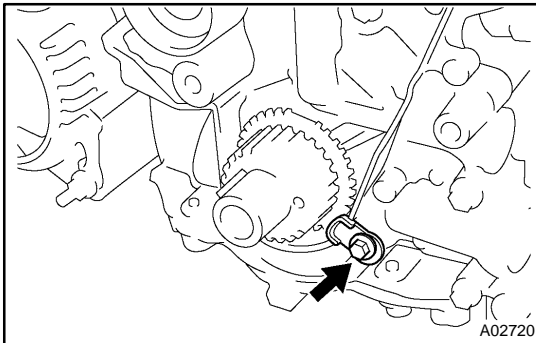
INSTALLATION

1. INSTALL CRANKSHAFT TIMING PULLEY

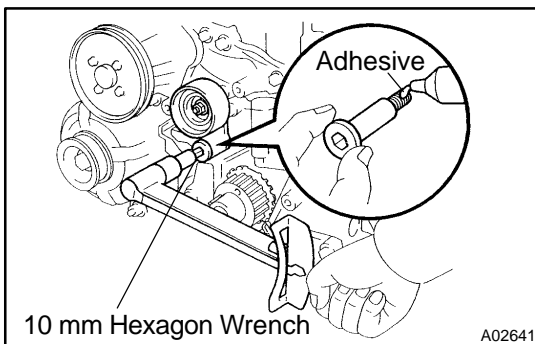
- Align the pulley set key with the key groove of the pulley.
- Slide on the timing pulley facing the flange side inward.

NOTICE:

Do not scratch the sensor part of the crankshaft timing pulley.

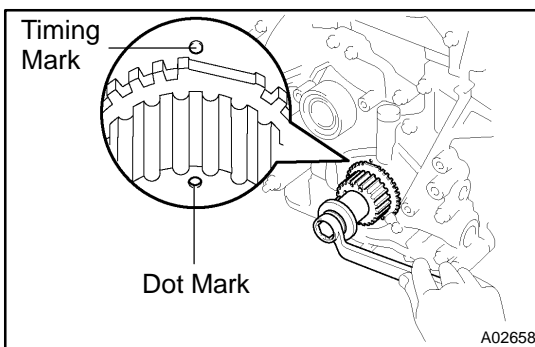


- Install the timing belt plate with the bolt.
Torque: 8.0 N·m (80 kgf·cm, 71 in·lbf)



2. INSTALL IDLER PULLEY

- Apply adhesive to 2 or 3 threads of the pivot bolt.
Adhesive:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
- Using a 10 mm hexagon wrench, install the plate washer and pulley with the pivot bolt.
Torque: 35 N·m (350 kgf·cm, 26 ft·lbf)
- Check that the pulley bracket moves smoothly.

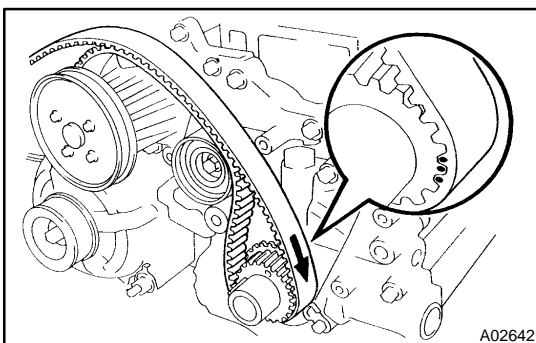


3. TEMPORARILY INSTALL TIMING BELT

NOTICE:

The engine should be cold.

- Use the crankshaft pulley bolt to turn the crankshaft, and align the dot mark on the crankshaft timing pulley and the timing mark on the oil pump body.
- Remove any oil or water on the crankshaft timing pulley and idler pulley, and keep them clean.

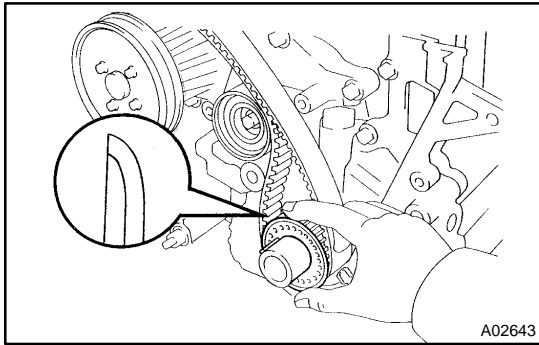


- Install the timing belt on the crankshaft timing pulley and idler pulley.

HINT:

When re-using timing belt:

Align the matchmarks of the crankshaft timing pulley and timing belt, and install the belt with the arrow pointing in the direction of engine revolution.

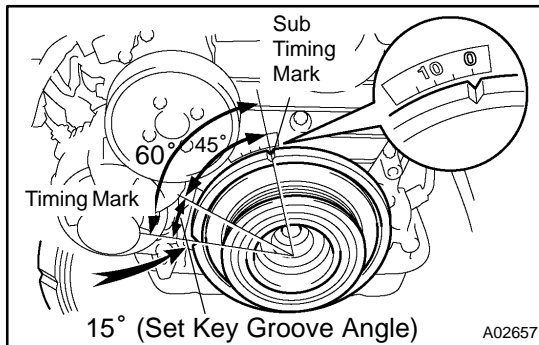
**4. INSTALL TIMING BELT GUIDE**

Install the 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 5 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

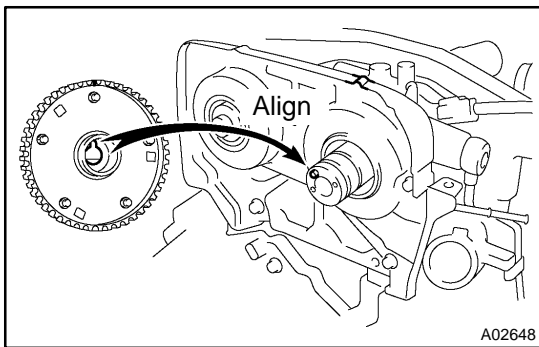
**6. INSTALL CRANKSHAFT PULLEY**

- (a) Align the pulley set key with the key groove of the pulley, and slide on the pulley.
- (b) Check that the sub timing mark (60° mark BTDC) of the crankshaft pulley is aligned with the timing mark "0" of the No.1 timing belt cover.

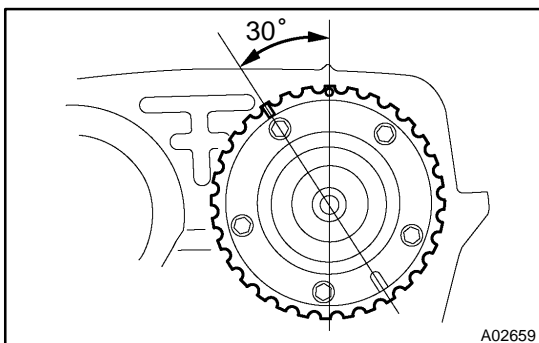
HINT:

At this time, the crankshaft pulley set key groove and the timing mark (TDC mark) of the crankshaft pulley are as shown the illustration.

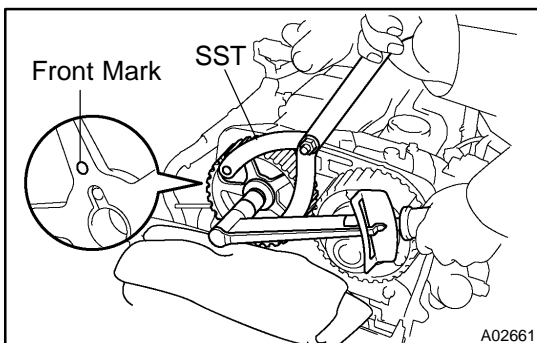
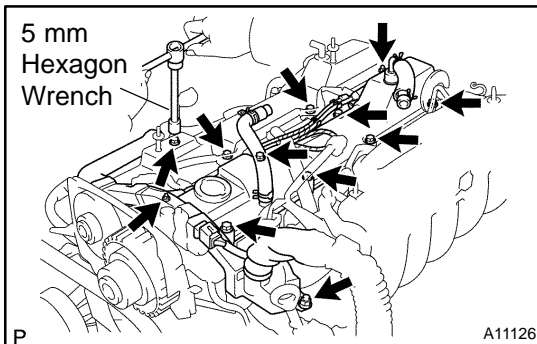
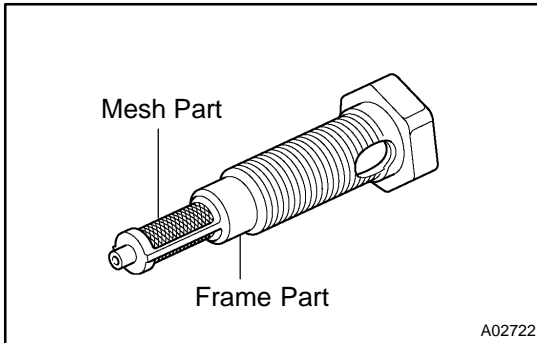
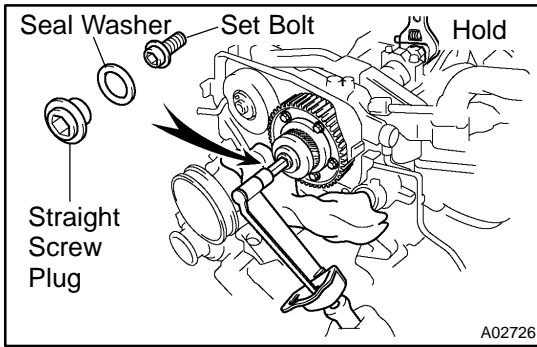
- (c) Temporarily install the pulley bolt.

**7. INSTALL VVT-i (INTAKE CAMSHAFT TIMING) PULLEY**

- (a) Align the camshaft knock pin with the VVT-i pulley, and push the VVT-i pulley by hand until you feel it touch the bottom.



- (b) Check that the outer circumference of the VVT-i pulley easily rotates through 30°.



- (c) Holding the hexagon portion of the camshaft with a wrench.
- (d) Using a 10 mm hexagon wrench, and the set bolt.
Torque: 81 N·m (810 kgf·cm, 60 ft·lbf)
- (e) Using a 14 mm hexagon wrench, install the straight screw plug with the seal washer to the set bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)
- (f) Align the dot mark on the camshaft timing pulley with the timing mark of the No.4 timing belt cover.
- (g) Remove the wrench.

8. CONNECT NO.1 OIL PIPE

- (a) Install the union bolt to the oil control valve filter.

NOTICE:

In case of touching the filter, avoid holding the mesh part and holding the frame part.

- (b) Install the oil pipe with 2 new gasket and the union bolt to the No.3 camshaft bearing cap.

Torque: 55 N·m (550 kgf·cm, 41 ft·lbf)

9. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (See page [SF-43](#))

10. INSTALL NO.1 CYLINDER HEAD COVER

- (a) Install the cylinder head and gasket with the 6 bolts and 2 nuts.

Torque: 8.5 N·m (85 kgf·cm, 75 in.-lbf)

- (b) Install the high-tension cords and clamps with the 2 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

- (c) Using a 5 mm hexagon wrench, install the engine wire protector with the bolt and nut.

11. INSTALL THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page [EM-5](#))

12. INSTALL ENGINE COVER

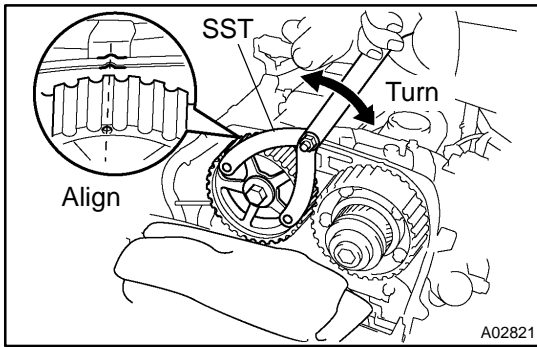
Install the engine cover with the 4 nuts.

13. INSTALL EXHAUST CAMSHAFT TIMING PULLEY

- (a) Align the camshaft knock pin with the groove on the pulley, and slide on the timing pulley.
- (b) Slide the timing pulley on the camshaft, facing the front mark forward.
- (c) Using SST, install the pulley bolt.

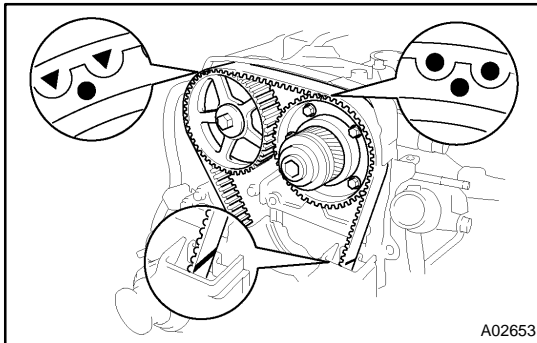
SST 09960-10010 (09962-01000, 09963-01000)

Torque: 81 N·m (810 kgf·cm, 60 ft·lbf)



- (d) Using SST, align the dot mark on the camshaft timing timing pulley with the timing mark of the No.4 timing belt cover.

SST 09960-10010 (09962-01000, 09963-01000)

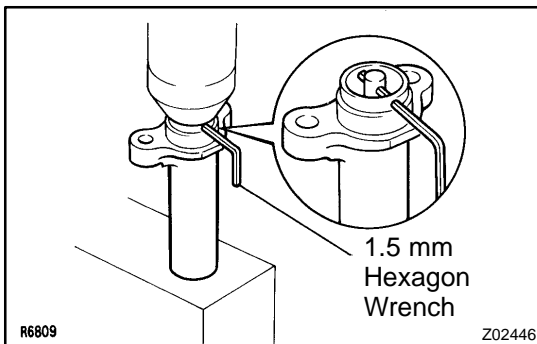
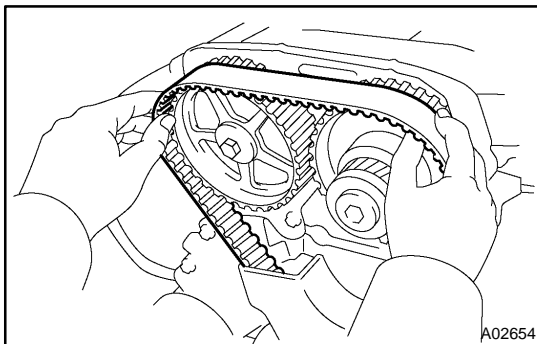


14. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS

HINT:

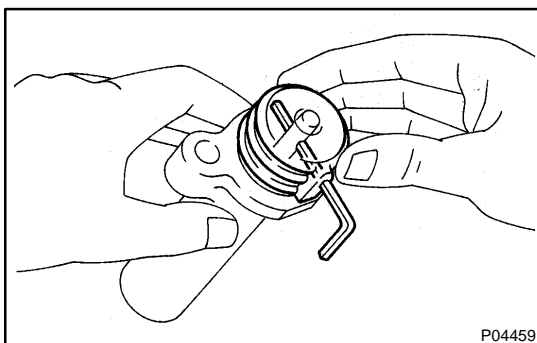
When re-using timing belt:

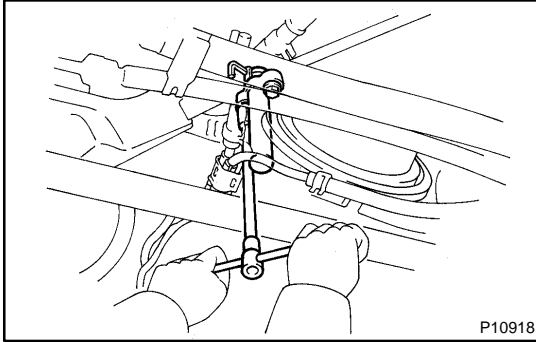
- Check that the matchmark on the timing belt matches the end of the No.1 timing belt cover.
If the matchmark does not align, shift the meshing of the timing belt and crankshaft timing pulley until they align.
 - Align the matchmarks of the timing belt and camshaft timing pulleys.
- (a) Remove any oil or water on the camshaft timing pulley, and keep it clean.
- (b) Install the timing belt, checking the tension between the crankshaft timing pulley and intake camshaft timing pulley.



15. SET TIMING BELT TENSIONER

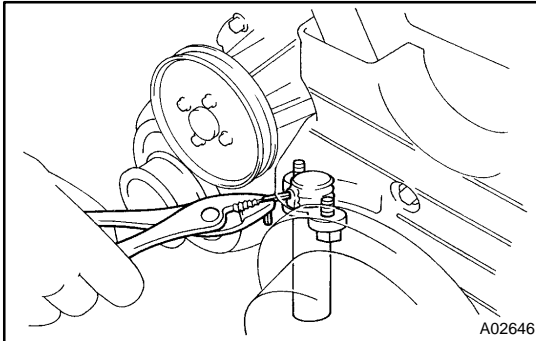
- (a) Using a press, slowly press in the push rod using 981 – 9,807 N (100 – 1,000 kgf, 220 – 2,205 lbf) of force.
- (b) Align the holes of the push rod and housing, pass a 1.5 mm hexagon wrench through the holes to keep the push rod retracted.
- (c) Release the press.
- (d) Install the dust boot onto the tensioner.



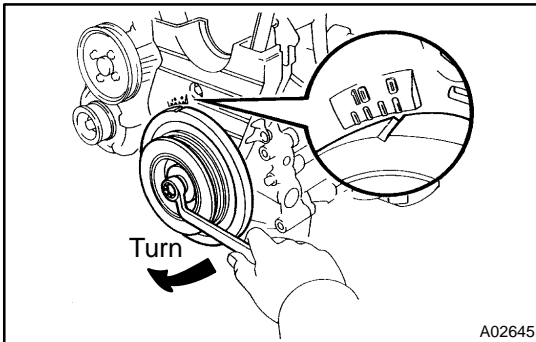
**16. INSTALL TIMING BELT TENSIONER**

- (a) Temporarily install the tensioner with the 2 bolts.
- (b) Alternately tighten the 2 bolts.

Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)



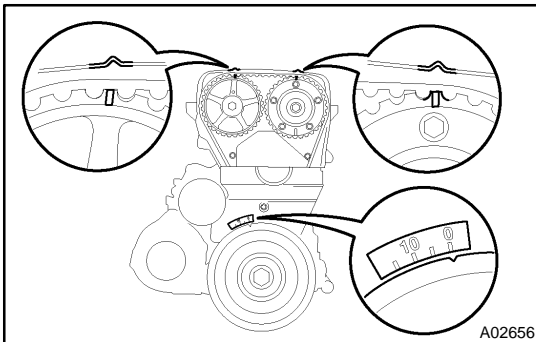
- (c) Remove the 1.5 mm hexagon wrench from the tensioner with pliers.

**17. CHECK VALVE TIMING**

- (a) Slowly turn the crankshaft pulley 2 revolutions from TDC to TDC.

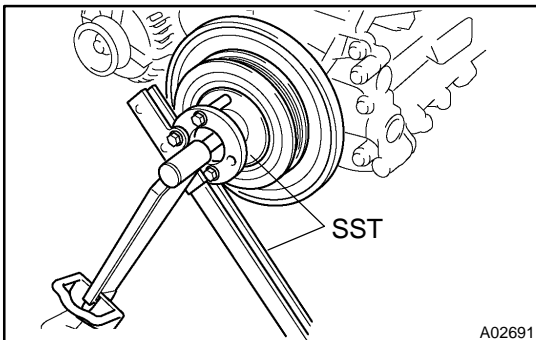
NOTICE:

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.

**18. TIGHTEN CRANKSHAFT PULLEY BOLT**

Using SST, install the pulley bolt.

SST 09213-70010, 09330-00021

Torque: 330 N·m (3,300 kgf·cm, 243 ft·lbf)

19. INSTALL DRIVE BELT TENSIONER

Install the tensioner with the 3 bolts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

NOTICE:

Be careful not to drop the bolts inside the timing belt cover.

20. INSTALL NO.2 TIMING BELT COVER

- (a) Install the gasket on the timing belt cover.
- (b) Using a 5 mm hexagon wrench, install the timing belt cover with the 3 bolts.

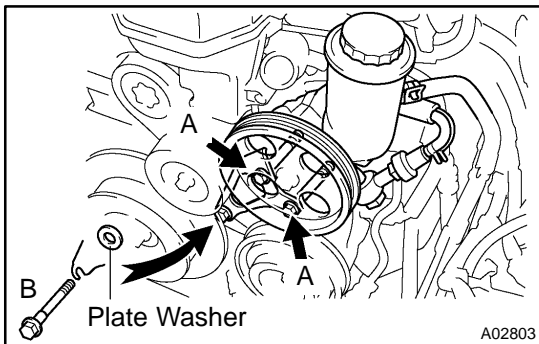
Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

21. INSTALL NO.3 TIMING BELT COVER

- (a) Install the gasket on the timing belt cover.
- (b) Using a 5 mm hexagon wrench, install the timing belt cover with the 4 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

- (c) Install the oil filler cap.

**22. INSTALL PS PUMP AND FRONT BRACKET**

- (a) Temporarily install the vane pump to the bracket.
- (b) Install the plate washer and front bracket with the 3 bolts.

Torque: 58 N·m (590 kgf·cm, 43 ft-lbf) for A bolts

52 N·m (530 kgf·cm, 38 ft-lbf) for B bolt

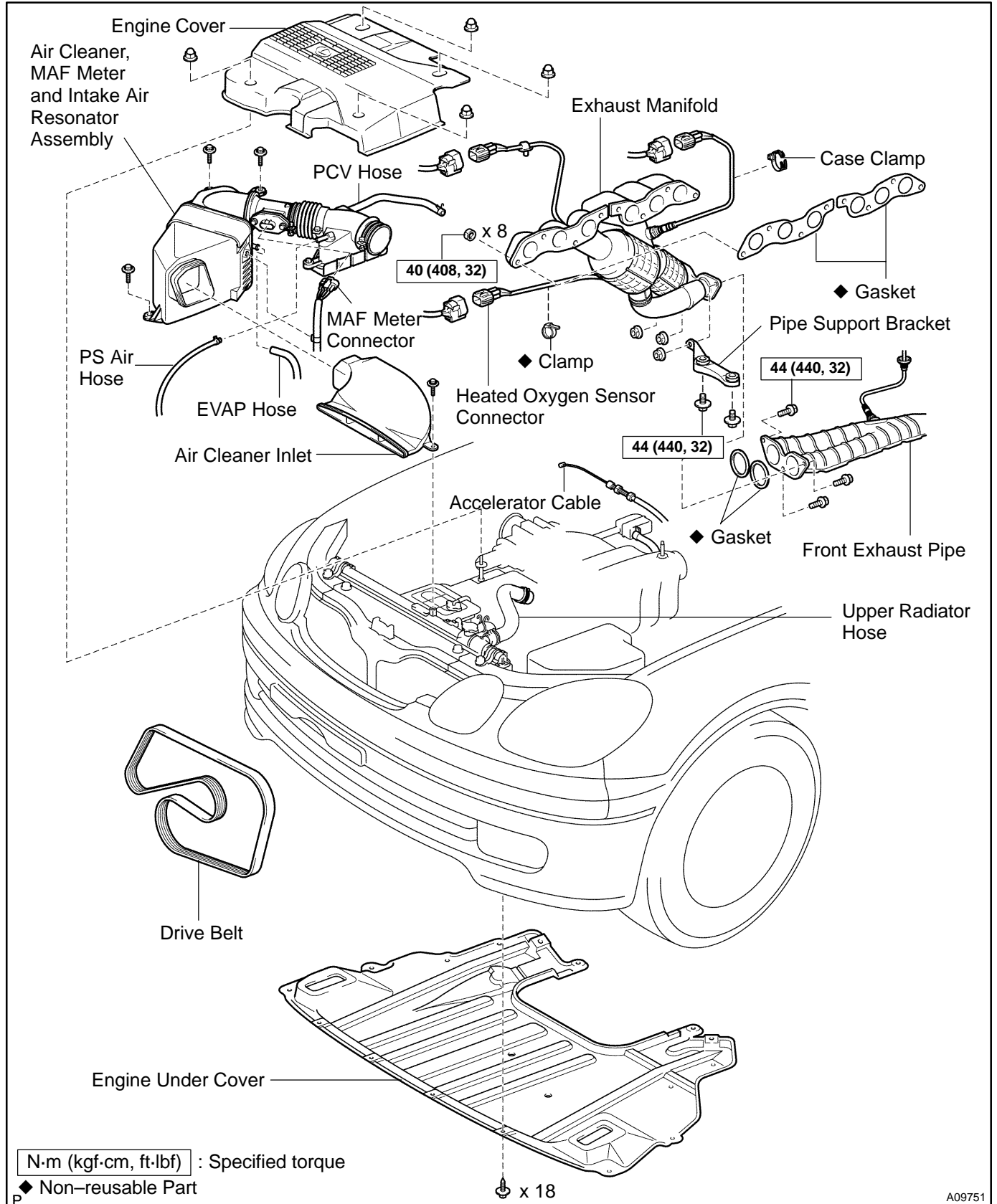
23. INSTALL DRIVE BELT (See page [CH-1](#))**24. INSTALL RADIATOR ASSEMBLY (See page [CO-23](#))****25. FILL ENGINE WITH COOLANT****26. START ENGINE CHECK FOR LEAKS****27. INSTALL ENGINE UNDER COVER****28. ROAD TEST**

Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

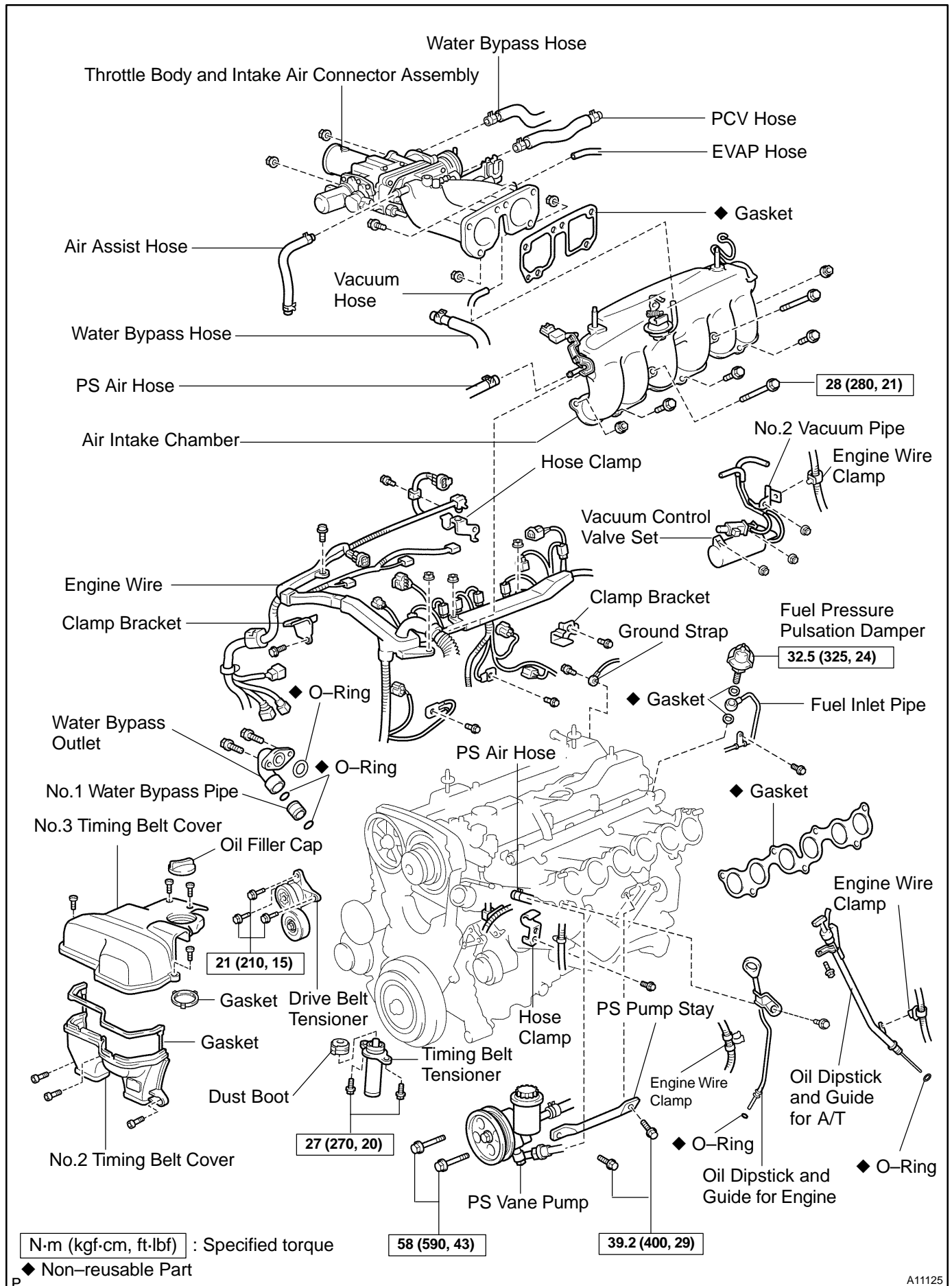
29. RECHECK ENGINE COOLANT LEVEL

CYLINDER HEAD COMPONENTS

EMOD9-04

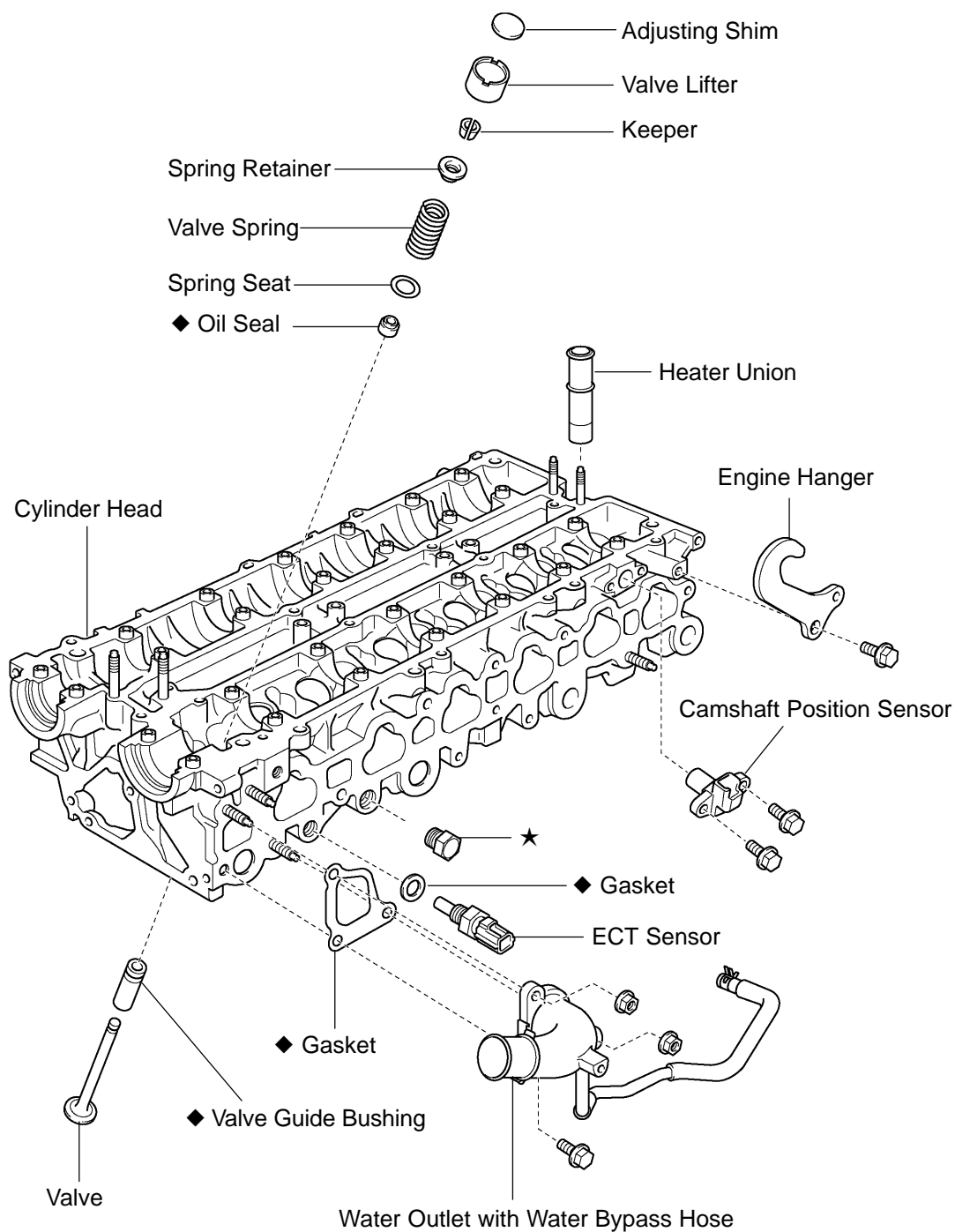


A09751



A11125





◆ Non-reusable part
 ★ Precoated part

A02822

COMPRESSION INSPECTION

EM0D1-05

HINT:

If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

1. WARM UP AND STOP ENGINE

Allow the engine to warm up to normal operating temperature.

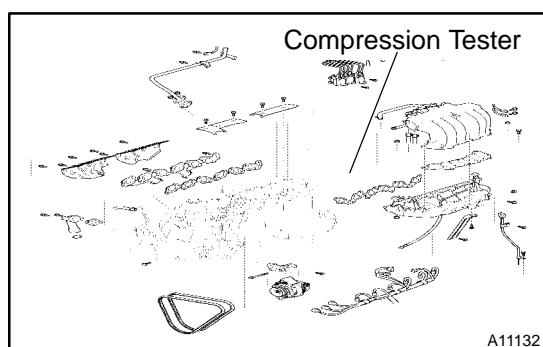
2. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

3. DISCONNECT IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-7)

4. REMOVE SPARK PLUGS

5. DISCONNECT INJECTOR CONNECTORS



6. CHECK CYLINDER COMPRESSION

- Insert a compression tester into the spark plug hole.
- While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain engine revolutions of 250 rpm or more.

- Repeat steps (a) through (b) for each cylinder.

NOTICE:

This measurement must be done in as short a time as possible.

Compression:

1,324 kPa (13.5 kgf/cm², 192 psi) or more

Minimum pressure:

1,079 kPa (11.0 kgf/cm², 156 psi)

Difference between each cylinder:

98 kPa (1.0 kgf/cm², 14 psi) or less

- If the cylinder compression in 1 or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) through (b) for the cylinder with low compression.
 - If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are probably worn or damaged.
 - If pressure stays low, a valve may be sticking or seating improper, or there may be leakage past the gasket.

7. RECONNECT INJECTOR CONNECTORS**HINT:**

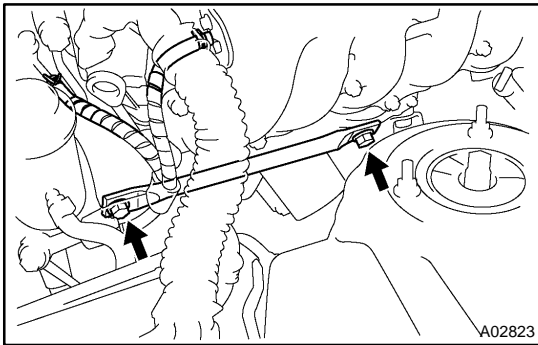
The Nos.1, 3, 5 injector connectors are dark gray, and the Nos.2, 4, 6 injector connectors are brown.

8. REINSTALL SPARK PLUGS**9. RECONNECT IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page [IG-9](#))****10. INSTALL ENGINE COVER**

Install the engine cover with the 4 nuts.

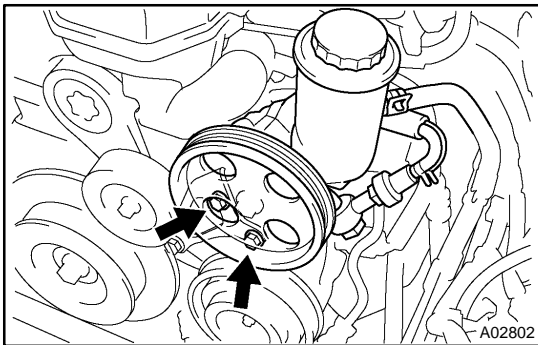
REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. DISCONNECT UPPER RADIATOR HOSE FROM WATER OUTLET
4. REMOVE ENGINE COVER
Remove the 4 nuts and engine cover.
5. REMOVE AIR CLEANER INLET
6. REMOVE AIR CLEANER, MAF METER AND INTAKE AIR RESONATOR ASSEMBLY (See page EM-62)
7. REMOVE DRIVE BELT (See page CH-1)



8. DISCONNECT PS PUMP WITHOUT DISCONNECTING HOSES

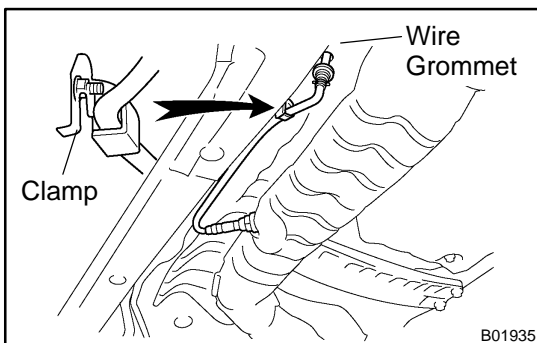
- (a) Disconnect the PS air hose from the No.4 timing belt cover.
- (b) Disconnect the PS air hose from the air intake chamber.
- (c) Remove the 2 bolts and pump rear stay.



- (d) Remove the 2 bolts, and disconnect the vane pump from the pump bracket.

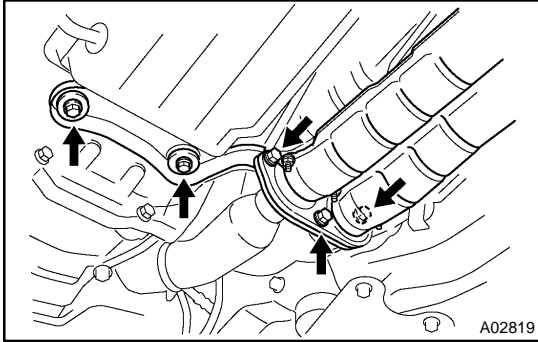
HINT:

Put aside the vane pump, and suspend it.

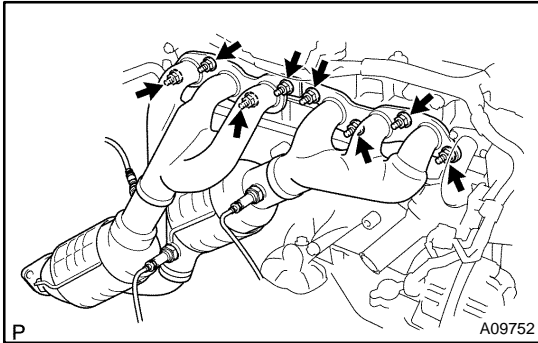


9. DISCONNECT FRONT EXHAUST PIPE FROM EXHAUST MANIFOLD

- (a) Disconnect the wire grommet and sensor wire of the heated oxygen sensor (bank 2 sensor 2) from the hole and clamp on the floor.



- (b) Remove the 3 bolts and nuts holding the front exhaust pipe to the exhaust manifold.
- (c) Remove the 2 bolts and pipe support bracket.
- (d) Disconnect the front exhaust pipe from the exhaust manifold, and remove the 2 gaskets.



10. REMOVE EXHAUST MANIFOLD

- (a) Disconnect the 3 heated oxygen sensor connectors and clamp.
- (b) Remove the clamp and case clamp.
- (c) Using a 14 mm deep socket wrench, remove the 8 nuts, exhaust manifold and 2 gaskets.

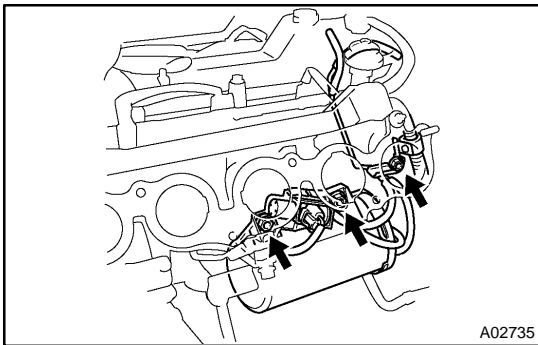
11. REMOVE WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE (See page [CO-11](#))

12. REMOVE THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page [EM-5](#))

13. REMOVE OIL DIPSTICK AND GUIDE FOR ENGINE (See page [LU-6](#))

14. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page [EM-62](#))

15. REMOVE AIR INTAKE CHAMBER (See page [SF-46](#))



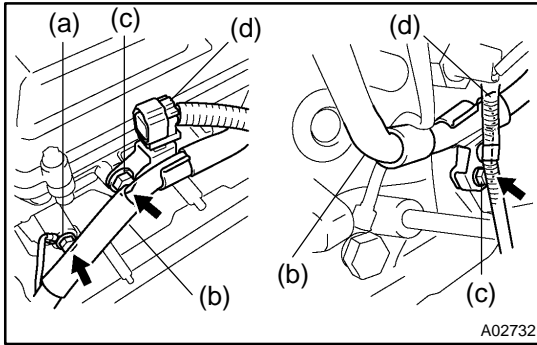
16. REMOVE VACUUM CONTROL VALVE SET AND NO.2 VACUUM PIPE

- (a) Disconnect the VSV connector for the ACIS.
- (b) Remove the 3 nuts, vacuum control valve set and No.2 vacuum pipe.
- (c) Disconnect the engine wire clamp from the clamp bracket of the No.2 vacuum pipe.

17. REMOVE NO.3 TIMING BELT COVER

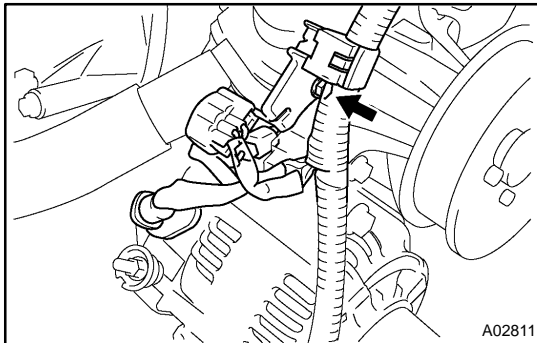
18. REMOVE IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page [IG-7](#))

19. REMOVE SPARK PLUGS

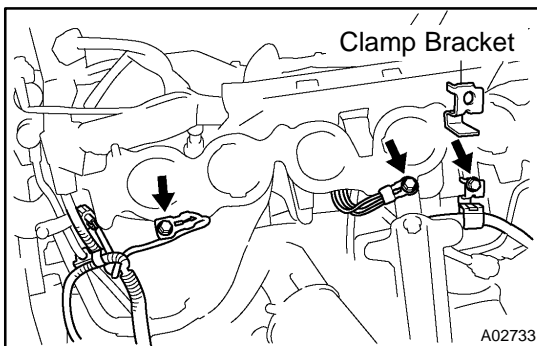


20. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD

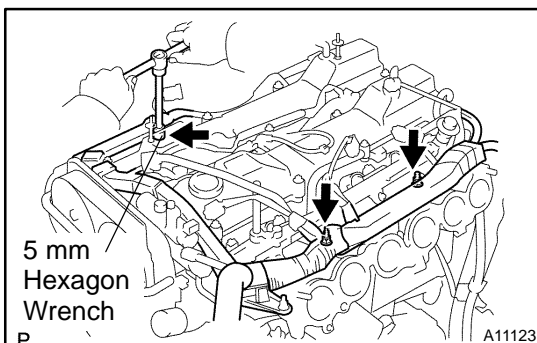
- (a) Disconnect the ground strap from the cylinder head.
- (b) Disconnect the 2 water bypass hoses from the hose clamps on the cylinder head and oil filter bracket.
- (c) Remove the 2 bolts and hose clamps.
- (d) Disconnect the heated oxygen sensor (bank 2 sensor 1) connector and engine wire clamp from the hose clamps.



- (e) Disconnect the heated oxygen sensor (bank 1 sensor 1) connector.
- (f) Disconnect the crankshaft position sensor connector.
- (g) Disconnect the generator connector.
- (h) Remove the bolt and clamp bracket, and disconnect the engine wire from the water pump.

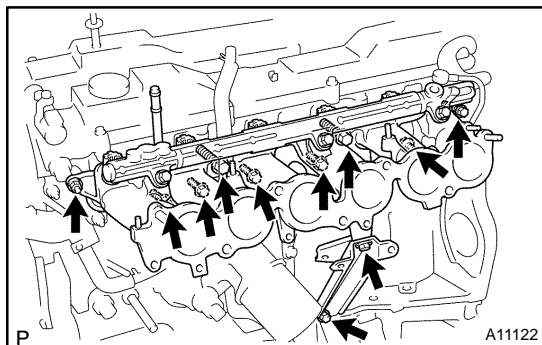


- (i) Disconnect the 2 ground terminals from the intake manifold.
- (j) Disconnect the 2 engine wire clamps from the No.1 oil pipe and clamp bracket on the intake manifold.
- (k) Remove the bolt and clamp bracket.
- (l) Disconnect the ECT sensor connector.
- (m) Remove the 2 knock sensor connectors.
- (n) Remove the oil pressure switch connector.
- (o) Remove the oil level sensor connector.
- (p) Remove the starter connector.
- (q) Remove the 6 injector connectors.
- (r) Remove the camshaft timing oil control valve connector.
- (s) Remove the camshaft position sensor connector.

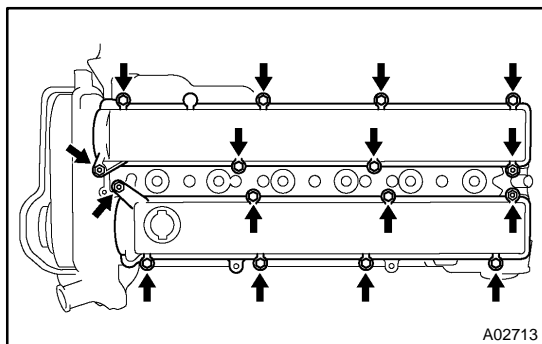


- (t) Using a 5 mm hexagon wrench, remove the bolt holding the engine wire protector to the No.2 cylinder head cover.
- (u) Remove the 3 nuts, and disconnect the engine wire protector from the intake manifold.

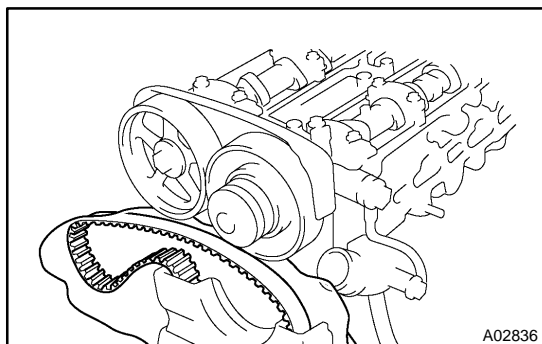
21. REMOVE FUEL PRESSURE PULSATION DAMPER (See page [SF-26](#))

**22. REMOVE INTAKE MANIFOLD ASSEMBLY**

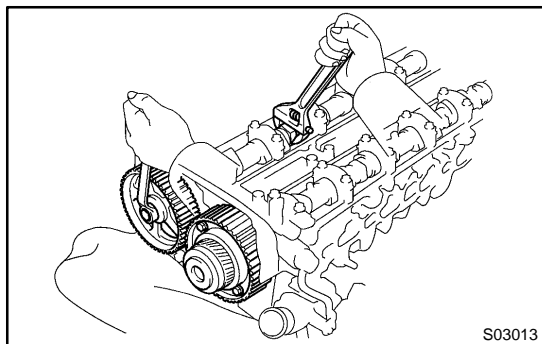
- (a) Disconnect the starter wire from the manifold stay.
- (b) Remove the 2 bolts and manifold stay.
- (c) Remove the 7 bolts, 2 nuts, intake manifold and delivery pipe assembly and gasket.

**23. REMOVE NO.1 AND NO.2 CYLINDER HEAD COVERS**

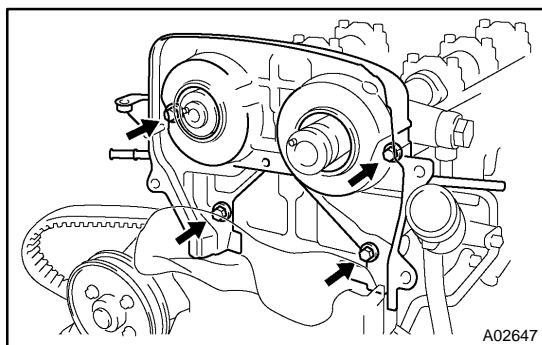
- (a) Remove the 12 bolts and 4 nuts.
- (b) Remove the cylinder head covers and gaskets.

**24. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS (See page EM-16)****NOTICE:**

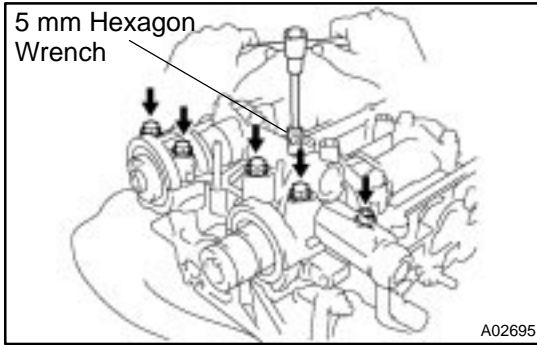
- Support the timing belt, so that the measuring of the crankshaft timing pulley and timing belt does not shift.
- Be careful not to drop anything inside the timing belt cover.
- Do not allow the timing belt to come into contact with oil, water or dust.

**25. REMOVE CAMSHAFT TIMING PULLEYS**

- (a) Remove the exhaust camshaft timing pulley. Hold the hexagon portion of the camshaft with a wrench, and remove the pulley bolt and camshaft pulley.
- (b) Remove the VVT-i (intake camshaft timing) pulley. (See page EM-16)

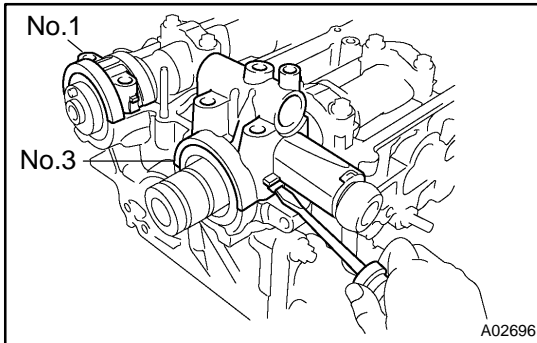
**26. REMOVE NO.4 TIMING BELT COVER**

Remove the 4 bolts and timing belt cover.



27. REMOVE CAMSHAFTS

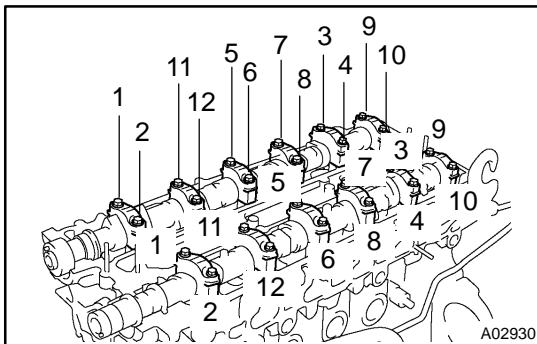
- Using a 5 mm hexagon wrench, the 2 No.3 camshaft bearing cap bolts.
- Uniformly loosen and remove the 4 camshaft bearing cap bolts.



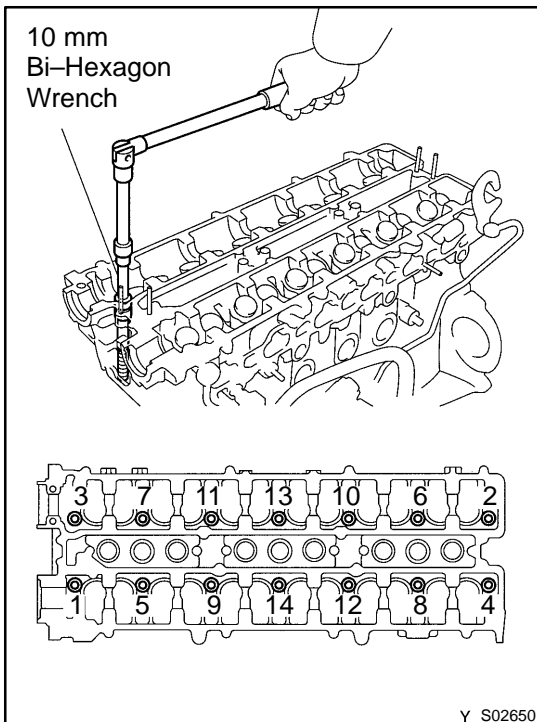
- Using a screwdriver, pry out the Nos.1, 3 camshaft bearing caps and oil seals.

NOTICE:

Be careful not to damage the cap. Tape the screwdriver tip.



- Uniformly loosen and remove the 12 camshaft bearing cap bolts, in several passes, in the sequence shown.
- Remove the 6 No.2 camshaft bearing caps and camshaft. Remove the intake and exhaust camshafts.



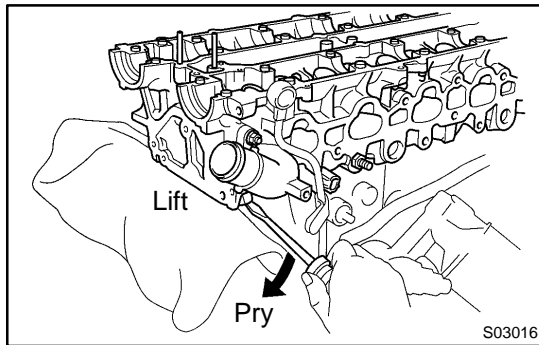
28. REMOVE CYLINDER HEAD ASSEMBLY

- Using a 10 mm bi-hexagon wrench, uniformly loosen and remove the 14 cylinder head bolts, in several passes, in the sequence shown.

NOTICE:

Cylinder head warpage or cranking could result from removing in incorrect order.

- Remove the 14 plate washers.



- (c) Lift the cylinder head from the dowels on the cylinder block.
- (d) Disconnect the heater hose from the heater union.
- (e) Place the head on wooden blocks on a bench.

If the cylinder head is difficult to lift off, pry with a screwdriver between the cylinder head and block projection.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

DISASSEMBLY

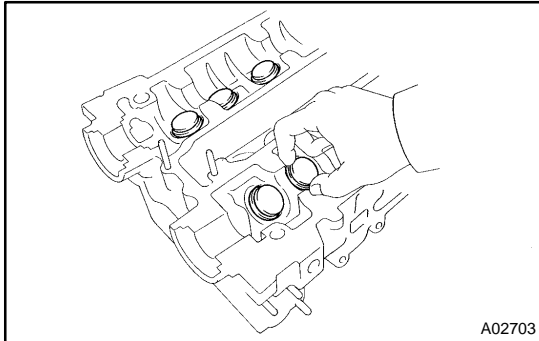
1. REMOVE WATER OUTLET WITH WATER BYPASS HOSE

Remove the 2 nuts, bolt, water outlet and gasket.

2. REMOVE ENGINE HANGER

3. REMOVE CAMSHAFT POSITION SENSOR

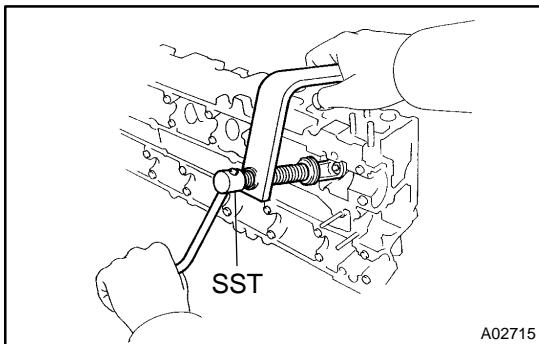
4. REMOVE ECT SENSOR



5. REMOVE VALVE LIFTERS AND SHIMS

HINT:

Store the valve lifters and shims in correct order.



6. REMOVE VALVES

- (a) Using SST, compress the valve spring and remove the 2 keepers.

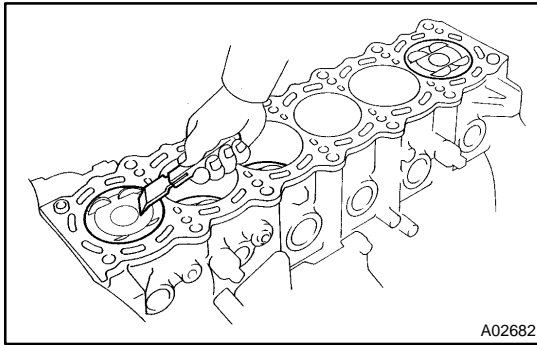
SST 09202-70020 (09202-00010)

- (b) Remove the spring retainer, valve spring, valve and spring seat.

HINT:

Store the valves, valve springs, spring seats and spring retainers in correct order.

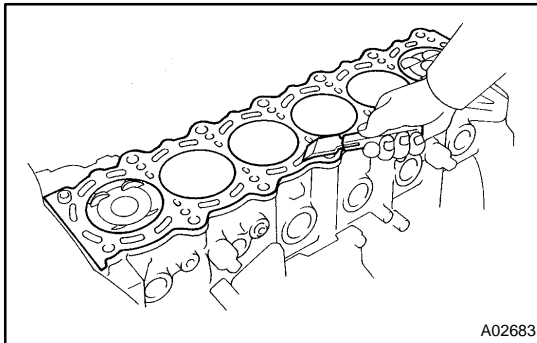
- (c) Using needle-nose pliers, remove the oil seal.



INSPECTION

1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

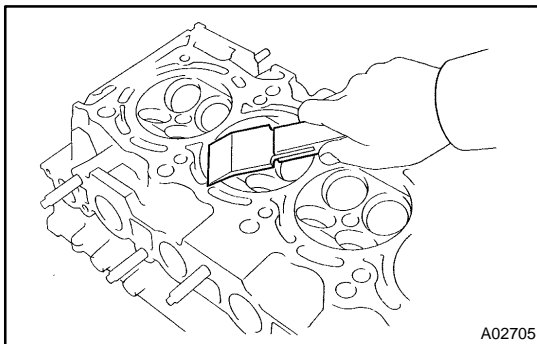
- (a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



- (b) Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high – pressure compressed air.

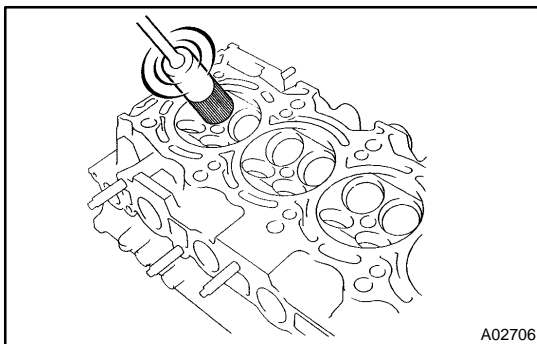


2. CLEAN CYLINDER HEAD

- (a) Remove the gasket material.
Using a gasket scraper, remove all the gasket material from the cylinder block surface.

NOTICE:

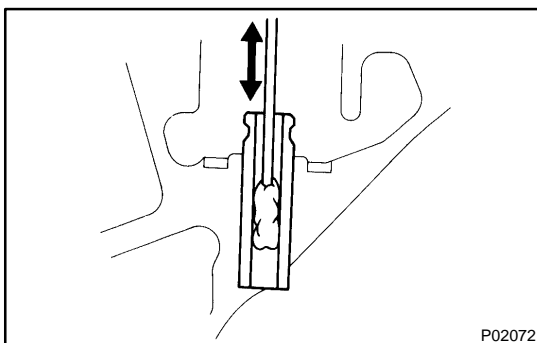
Be careful not to scratch the cylinder block contact surface.



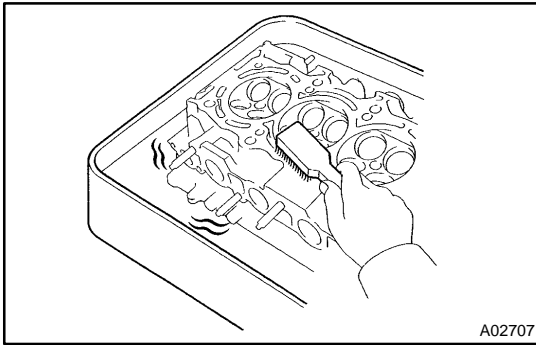
- (b) Clean the combustion chambers.
Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE:

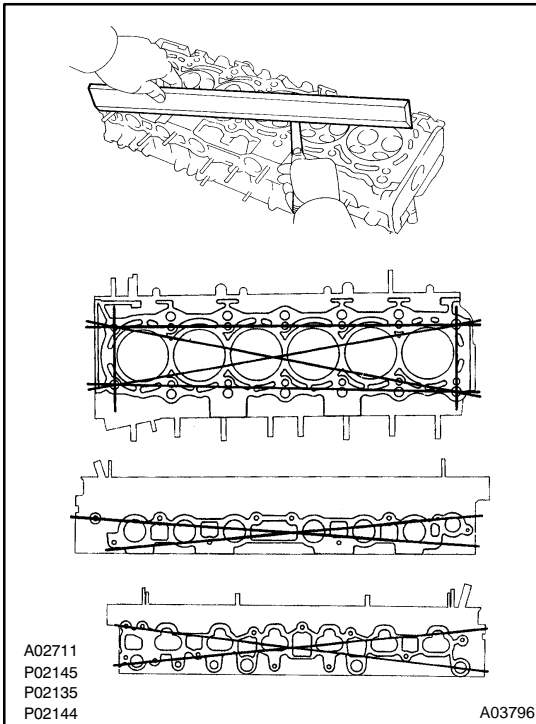
Be careful not to scratch the cylinder block contact surface.



- (c) Clean the valve guide bushings.
Using a valve guide bushing brush and solvent, clean all the guide bushings.

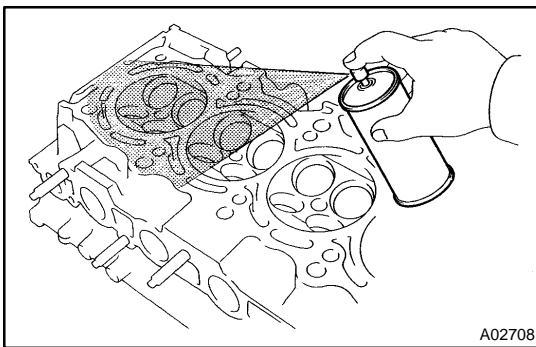


- (d) Clean the cylinder head.
Using a soft brush and solvent, thoroughly clean the cylinder head.

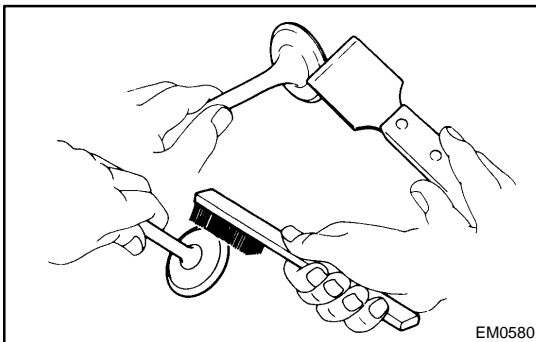


3. INSPECT CYLINDER HEAD

- (a) Inspect for the flatness.
Using precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block, intake and exhaust manifolds for warpage.
Maximum warpage: 0.10 mm (0.0039 in.)
If warpage is greater than maximum, replace the cylinder head.

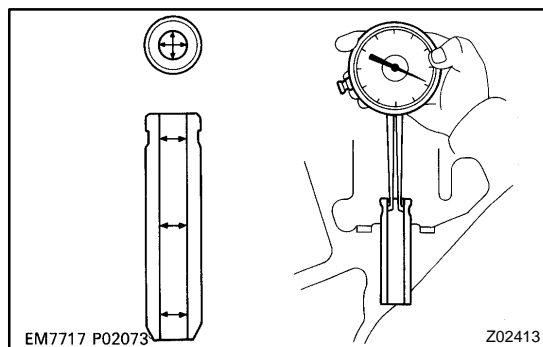


- (b) Inspect for the cracks.
Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.
If cracked, replace the cylinder head.



4. CLEAN VALVES

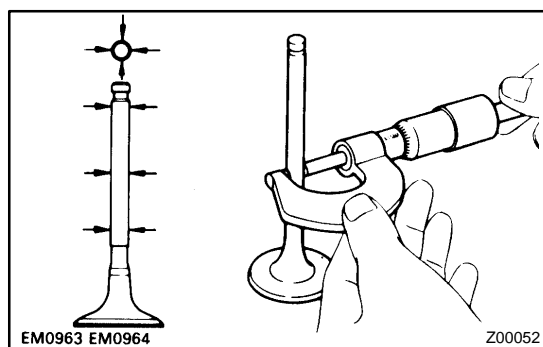
- (a) Using a gasket scraper, chip off any carbon from the valve head.
(b) Using a wire brush, thoroughly clean the valve.

**5. 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.

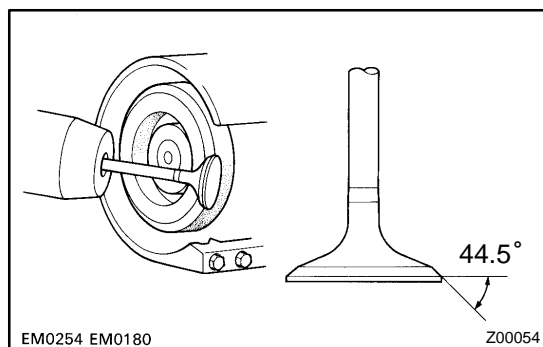
Standard oil clearance:

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:

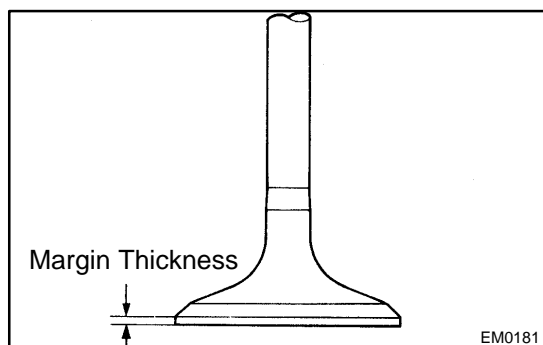
Intake	0.08 mm (0.0031 in.)
Exhaust	0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing. (See page [EM-48](#))

**6. INSPECT AND GRIND VALVES**

- (a) Grind the valve enough to remove pits and carbon.
 (b) Check that the valve is ground to the correct valve face angle.

Valve face angle: 44.5°



- (c) Check the valve head margin thickness.

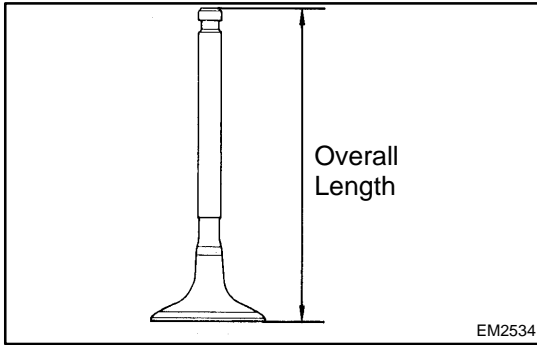
Standard margin thickness:

0.8 – 1.2 mm (0.031 – 0.047 in.)

Minimum margin thickness:

0.5 mm (0.020 in.)

If the margin thickness is less than minimum, replace the valve.



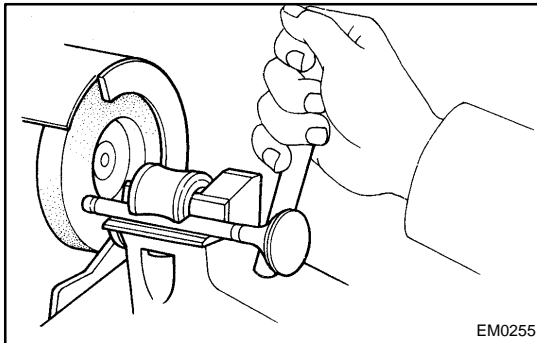
- (d) Check the valve overall length.

Standard overall length:

Intake	98.29 – 98.79 mm (3.8697 – 3.8894 in.)
Exhaust	98.84 – 99.34 mm (3.8913 – 3.9110 in.)

Minimum overall length:

Intake	98.19 mm (3.8657 in.)
Exhaust	98.74 mm (3.8874 in.)



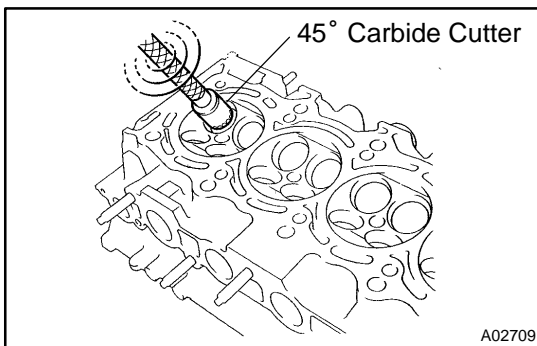
If the overall length is less than minimum, replace the valve.

- (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.

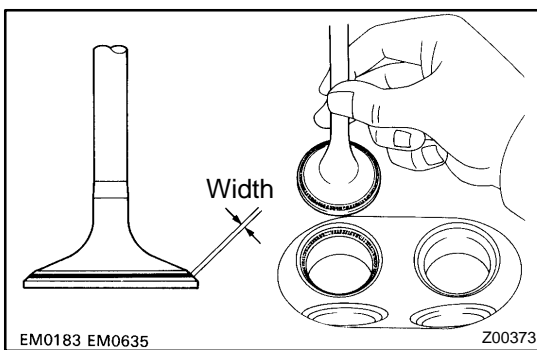
NOTICE:

Do not grind off more than the minimum overall length.



7. INSPECT AND CLEAN VALVE SEATS

- (a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.



- (b) Check the valve seating position.

Apply a thin coat of Prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate the valve.

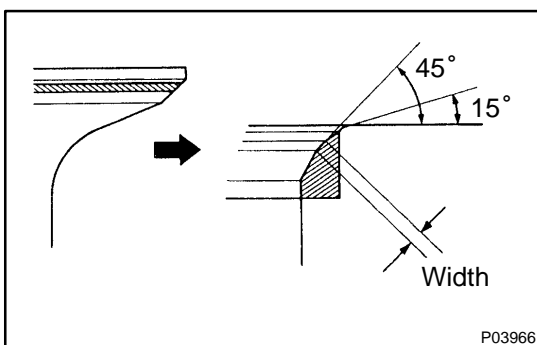
- (c) Check the valve face and seat for the following:

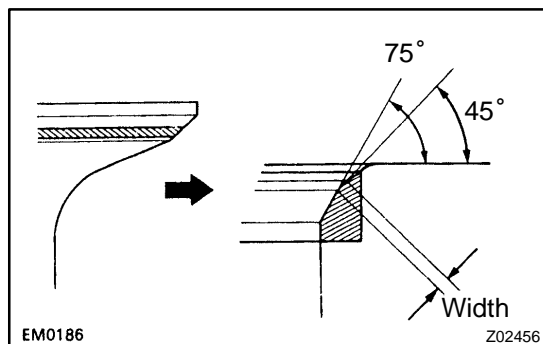
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:

If not, correct the valve seats as follows:

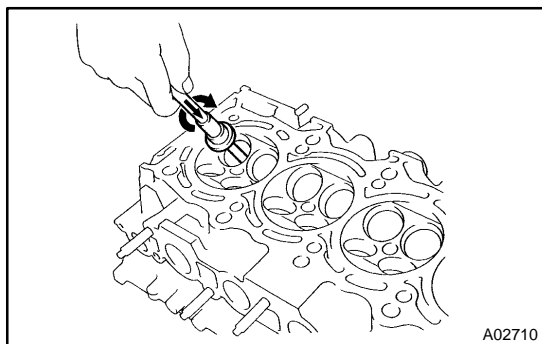
Intake	1.0 – 1.4 mm (0.039 – 0.055 in.)
Exhaust	1.2 – 1.6 mm (0.047 – 0.063 in.)

- (1) If the seating is too high on the valve face, use 15° and 45° cutters to correct the seat.

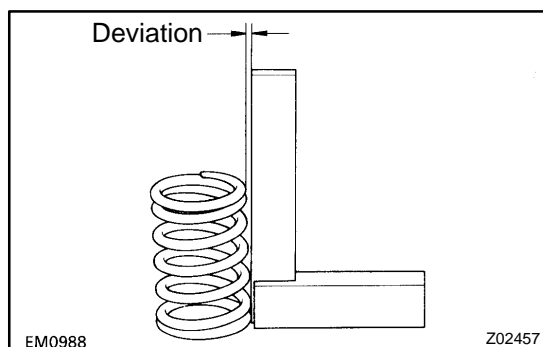




- (2) If the seating is too low on the valve face, use 75° and 45° cutters to correct the seat.



- (d) Hand-lap the valve and valve seat with an abrasive compound.
(e) After hand-lapping, clean the valve and valve seat.

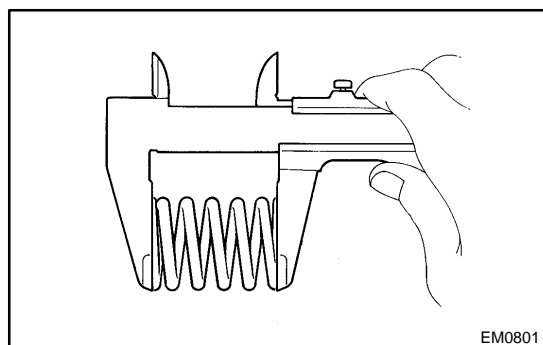


8. INSPECT VALVE SPRINGS

- (a) Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

If deviation is greater than maximum, replace the valve spring.

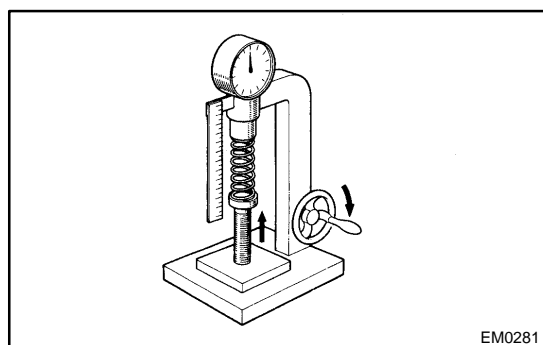


- (b) Using vernier calipers, measure the free length of the valve spring.

Free length:

Pink painted mark	43.71 mm (1.7209 in.)
Yellow painted mark	44.10 mm (1.7362 in.)

If the free length is not as specified, replace the valve spring.



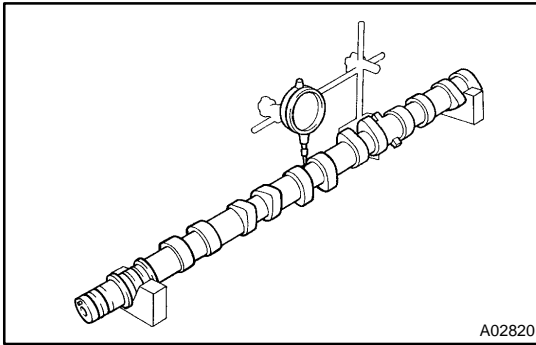
- (c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

186.2 – 205.8 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)

at 34.5 mm (1.358 in.)

If the installed tension is not as specified, replace the valve spring.

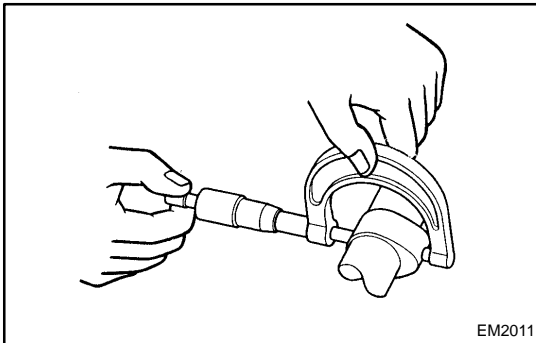


9. INSPECT CAMSHAFTS FOR RUNOUT

- Place the camshaft on V-blocks.
- Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.08 mm (0.0031 in.)

If the circle runout is greater than maximum, replace the camshaft.



10. INSPECT CAM LOBES

Using a micrometer, measure the cam lobe height.

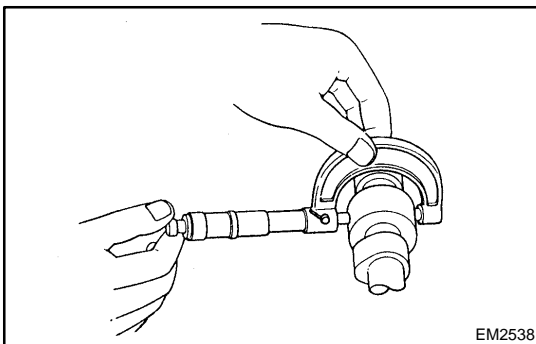
Standard cam lobe height:

Intake	44.310 – 44.360 mm (1.7445 – 1.7465 in.)
Exhaust	44.250 – 44.350 mm (1.7421 – 1.7461 in.)

Minimum cam lobe height:

Intake	44.16 mm (1.7386 in.)
Exhaust	44.10 mm (1.7362 in.)

If the cam lobe height is less than minimum, replace the camshaft.



11. INSPECT CAMSHAFT JOURNALS

Using a micrometer, measure the journal diameter.

Journal diameter:

28.949 – 28.965 mm (1.1397 – 1.1404 in.)

If the journal diameter is not as specified, check the oil clearance.

12. INSPECT CAMSHAFT BEARING

Check the bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

13. INSPECT CAMSHAFT JOURNAL OIL CLEARANCE

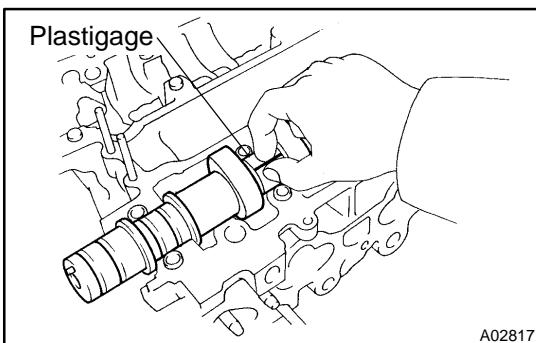
- Clean the bearing caps and camshaft journals.
- Place the camshafts on the cylinder head.
- Lay a strip of Plastigage across each of the camshaft journals.
- Install the bearing caps. (See page [EM-52](#))

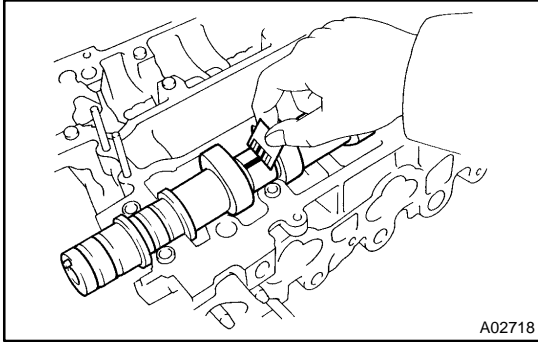
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

NOTICE:

Do not turn the camshaft.

- Remove the bearing caps.





- (f) Measure the Plastigage at its widest point.

Standard oil clearance:

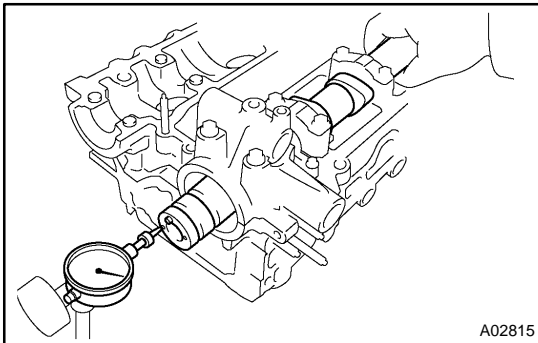
0.035 – 0.072 mm (0.0014 – 0.0028 in.)

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.



14. INSPECT CAMSHAFT THRUST CLEARANCE

- (a) Install the camshafts. (See page [EM-52](#))

- (b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

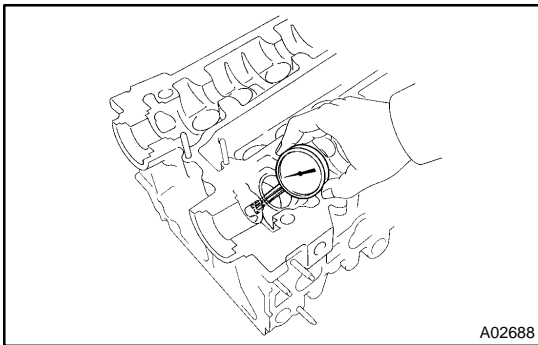
Standard thrust clearance:

0.080 – 0.190 mm (0.0031 – 0.0075 in.)

Maximum thrust clearance:

0.30 mm (0.0118 in.)

If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.



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 – 31.016 mm (1.2205 – 1.2211 in.)

- (b) Using a micrometer, measure the lifter diameter.

Lifter diameter:

30.966 – 30.976 mm (1.2191 – 1.2195 in.)

- (c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

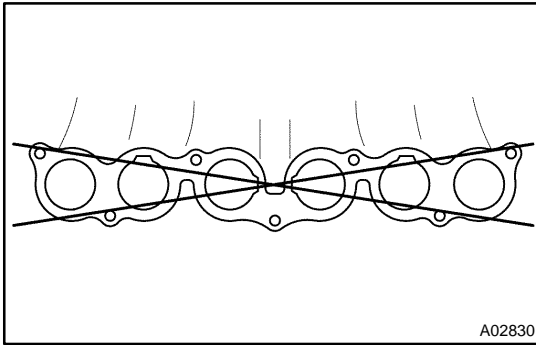
Standard oil clearance:

0.024 – 0.050 mm (0.0009 – 0.0020 in.)

Maximum oil clearance:

0.07 mm (0.0028 in.)

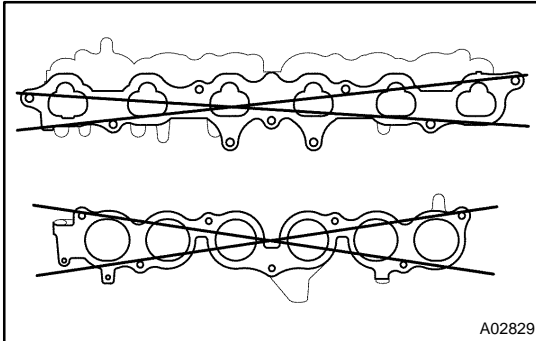
If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.

**16. INSPECT AIR INTAKE CHAMBER**

Using a precision straight edge and feeler gauge, measure the surfaces contacting the intake manifold for warpage.

Maximum warpage: 0.15 mm (0.0059 in.)

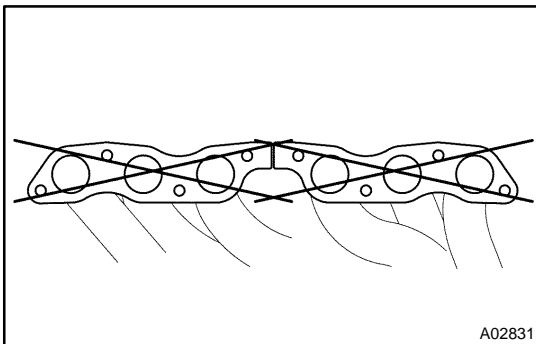
If warpage is greater than maximum, replace the chamber.

**17. INSPECT INTAKE MANIFOLD**

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head and air intake chamber for warpage.

Maximum warpage: 0.15 mm (0.0059 in.)

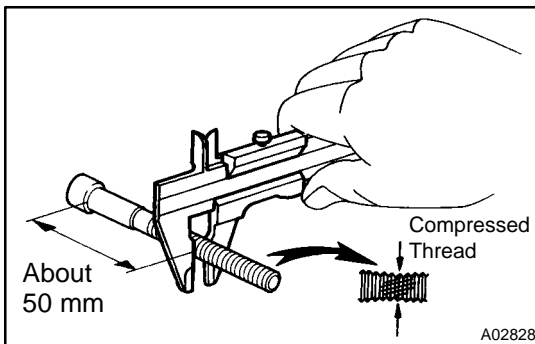
If warpage is greater than maximum, replace the manifold.

**18. INSPECT EXHAUST MANIFOLD**

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head for warpage.

Maximum warpage: 0.50 mm (0.0196 in.)

If warpage is greater than maximum, replace the manifold.

**19. INSPECT CYLINDER HEAD BOLTS**

Using a vernier caliper, measure the thread outside diameter of the bolt.

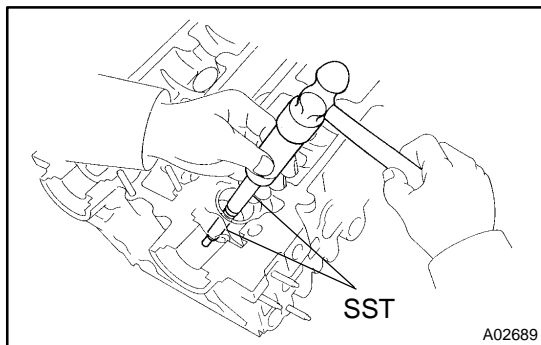
Standard outside diameter:

10.8 – 11.0 mm (0.425 – 0.433 in.)

Minimum outside diameter:

10.7 mm (0.421 in.)

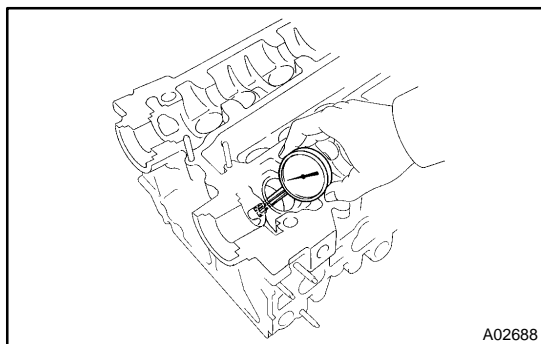
If the diameter is less than minimum, replace the bolt.



REPLACEMENT

REPLACE VALVE GUIDE BUSHINGS

- (a) Using SST and a hammer, tap out the guide bushing.
 SST 09201-10000 (09201-01060),
 09950-70010 (09951-07100)



- (b) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

Both intake and exhaust

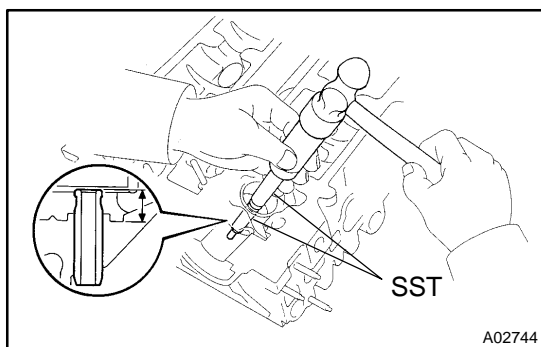
Bushing bore diameter mm (in.)	Bushing size
10.985 – 11.006 mm (0.4325 – 0.4333 in.)	Use STD
11.035 – 11.056 mm (0.4344 – 0.4353 in.)	Use O/S 0.05

- (c) Select a new guide bushing (STD or O/S 0.05).

If the bushing bore diameter of the cylinder head is greater than 11.006 mm (0.4333 in.), machine the bushing bore to the following dimension:

11.035 – 11.056 mm (0.4344 – 0.4353 in.)

If the bushing bore diameter of the cylinder head is greater than 11.056 mm (0.4353 in.), replace the cylinder head.

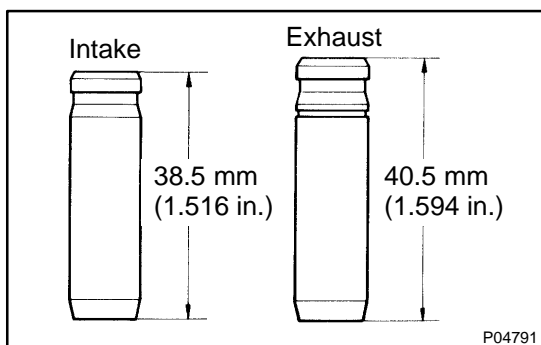


- (d) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.

SST 09201-10000 (09201-01060),
 09950-70010 (09951-07100)

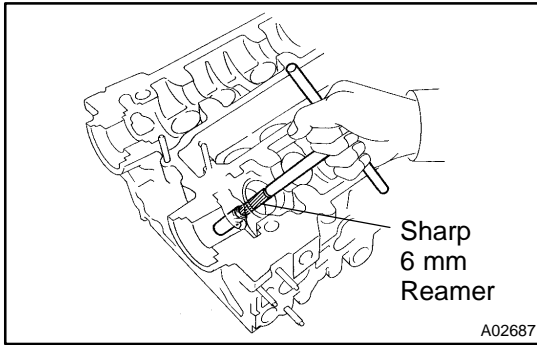
Protrusion height:

Intake	12.3 – 12.7 mm (0.484 – 0.500 in.)
Exhaust	11.4 – 11.8 mm (0.449 – 0.465 in.)



HINT:

Different bushings are used for the intake and exhaust.



- (e) Using a sharp 6 mm reamer, ream the guide bushing to obtain the standard specified clearance (See page [EM-40](#)) between the guide bushing and valve stem.

VALVE CLEARANCE ADJUSTMENT

EM02-04

HINT:

Inspect and adjust the valve clearance when the engine is cold.

1. REMOVE ENGINE COVER

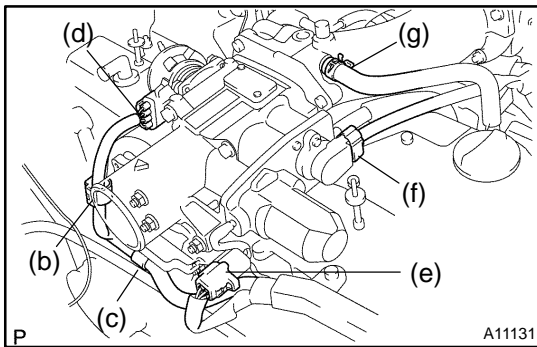
Remove the 4 nuts and engine cover.

2. DRAIN ENGINE COOLANT

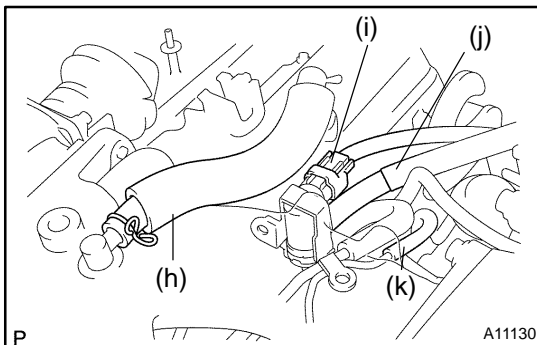
3. REMOVE INTAKE AIR RESONATOR

4. REMOVE THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY

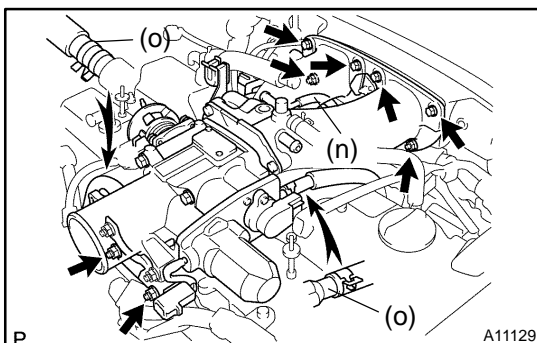
- (a) Disconnect the accelerator cable from the throttle body.



- (b) Disconnect the engine wire clamp from the clamp bracket of the throttle body.
(c) Disconnect the engine wire from the clamp on the throttle body bracket.
(d) Disconnect the accelerator pedal position sensor connector.
(e) Disconnect the throttle control motor connector.
(f) Disconnect the throttle position sensor connector.
(g) Disconnect the air assist hose from the intake air connector.



- (h) Disconnect the PCV hose from the intake air connector.
(i) Disconnect the VSV connector for EVAP.
(j) Disconnect the EVAP hose (from charcoal canister) from the VSV for EVAP.
(k) Disconnect the vacuum hose (from No.2 vacuum pipe) from the No.1 vacuum pipe.



- (l) Remove the 2 nuts holding the throttle body bracket to the cylinder head.
(m) Remove the 4 bolts and 2 nuts holding the intake air connector to the air intake chamber.
(n) Disconnect the vacuum hose (from actuator for ACIS) from the No.1 vacuum pipe.
(o) Disconnect the 2 water bypass hoses from the throttle body, and remove the throttle body together with the intake air connector and gasket.

5. REMOVE NO.3 TIMING BELT COVER

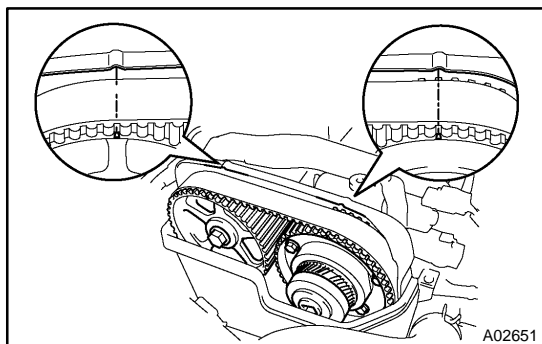
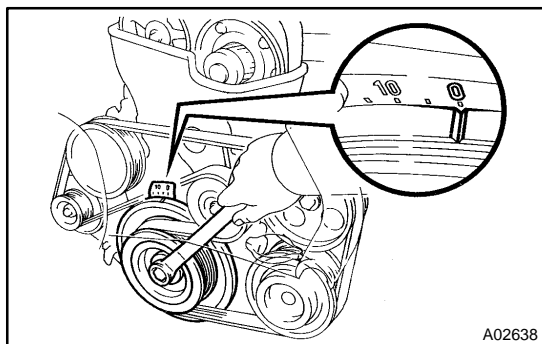
Using a 5 mm hexagon wrench, remove the 4 bolts, oil filler cap, timing belt cover and gasket.

6. REMOVE IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-7)**7. REMOVE SPARK PLUGS****8. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD COVERS****9. REMOVE CYLINDER HEAD COVERS (See page EM-33)****10. 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.

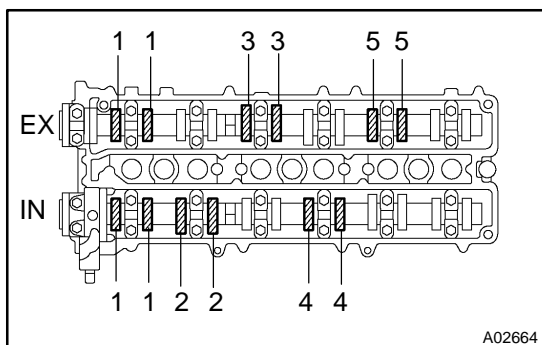
NOTICE:

Always turn the crankshaft clockwise.



- (b) Check that the timing marks of the camshaft timing pulleys are aligned with the timing marks of the No.4 timing belt cover.

If not, turn the crankshaft 1 revolution (360°).

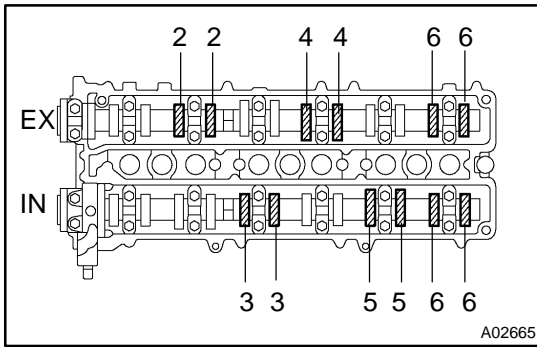
**11. INSPECT VALVE CLEARANCE**

- (a) Check only those valves indicated in the illustration.
- Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
 - Record the valve clearance measurements of those that are out of specification. They will be used later to determine the required replacement adjusting shim.

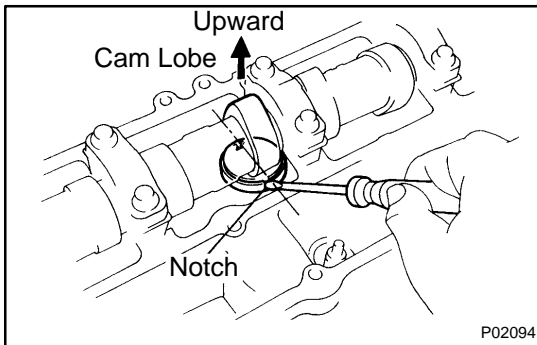
Valve clearance (Cold):

Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)

- (b) Turn the crankshaft pulley 1 revolution (360°), and align the groove with the timing mark "0" of the No.1 timing belt cover.

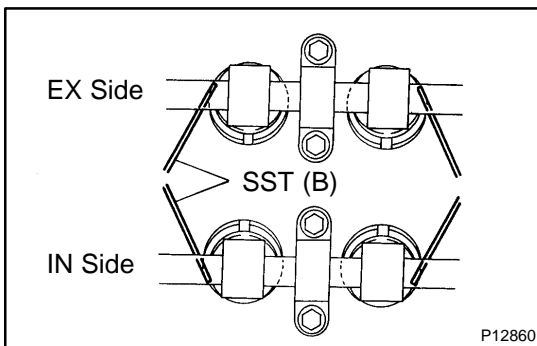


- (c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))

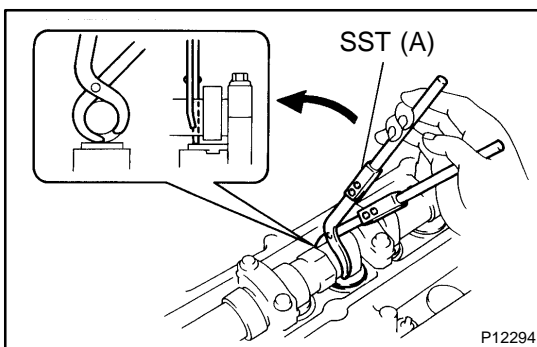


12. ADJUST VALVE CLEARANCE

- (a) Remove the adjusting shim.
- Turn the camshaft so that the cam lobe for the valve to be adjusted faces up.
 - Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.

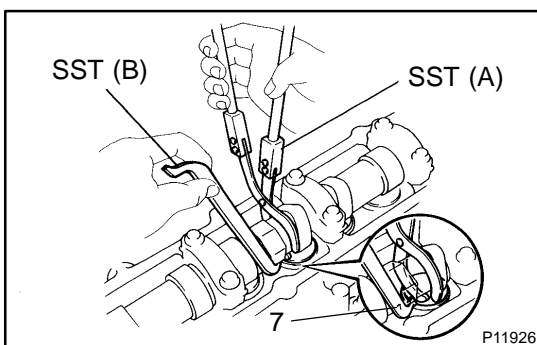


- Insert SST (B) gently from the inside as shown in the illustration.



- Using SST (A), hold the camshaft as shown in the illustration.

SST 09248-55040 (09248-05410)

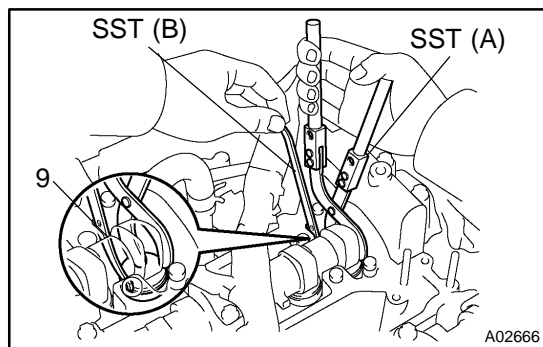


- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

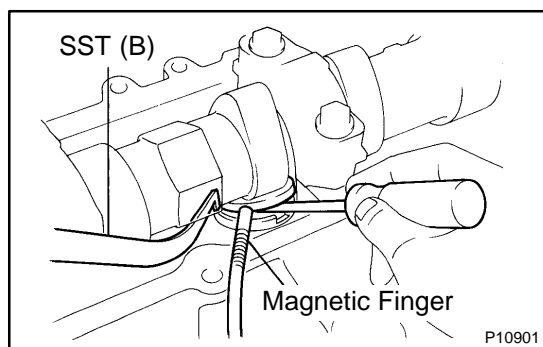
SST 09248-55040 (09248-05410, 09248-05420)

HINT:

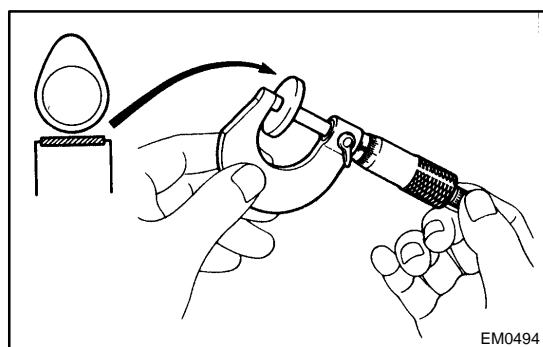
- Apply SST (B) at slight angle on the side marked with "7" or "9", at the position shown in the illustration.



- When the adjusting shim of the No.1 intake side replace, remove the No.2 or No.3 camshaft bearing cap, and insert SST as shown in the illustration.



- Using a small screwdriver and a magnetic finger, remove the adjusting shim.



- (b) Determine the replacement adjusting shim size according to the following formula or Charts:

- Using a micrometer, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so the valve clearance comes within specified value.
 T Thickness of used shim
 A Measured valve clearance
 N Thickness of new shim

Intake

$$N = T + (A - 0.20 \text{ mm (0.008 in.)})$$

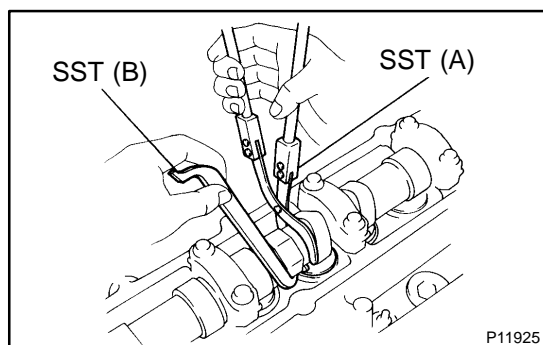
Exhaust

$$N = T + (A - 0.30 \text{ mm (0.012 in.)})$$

- Select a new shim with a thickness as close as possible to the calculated values.

HINT:

Shims are available in 17 sizes in increments of 0.050 mm (0.0020 in.), from 2.500 mm (0.0984 in.) to 3.300 mm (0.1299 in.).



- (c) Install a new adjusting shim.
- Place a new adjusting shim on the valve lifter, with imprinted numbers facing down.
 - Press down the valve lifter with SST (A), and remove SST (B).

SST 09248-55040

13. REINSTALL CYLINDER HEAD COVERS

(See page [EM-52](#))

14. RECONNECT ENGINE WIRE TO CYLINDER HEAD COVERS

15. REINSTALL SPARK PLUGS**16. REINSTALL IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-9)****17. REINSTALL NO.3 TIMING BELT COVER**

- (a) Install the gasket to the timing belt cover.
- (b) Using a 5 mm hexagon wrench, install the timing belt cover with the 4 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

- (c) Install the oil filler cap.

18. REINSTALL THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY

- (a) Install a new gasket to the air intake chamber.
- (b) Place the throttle body together with the intake air connector on the cylinder head.
- (c) Connect the vacuum hose (from actuator for ACIS) to the No.1 vacuum pipe.
- (d) Connect the 2 water bypass hoses to the throttle body.
- (e) Install the 4 bolts and 2 nuts holding the intake air connector to the air intake chamber.

Torque: 28 N·m (280 kgf·cm, 21 ft-lbf)

- (f) Install the 2 nuts holding the throttle body bracket to the cylinder head.

Torque: 21 N·m (210 kgf·cm, 15 ft-lbf)

- (g) Connect the air assist hose to the intake air connector.
- (h) Install the PCV hose to the intake air connector.
- (i) Install the EVAP hose (from charcoal canister) to the VSV for EVAP.
- (j) Install the vacuum hose (from No.2 vacuum pipe) to the No.1 vacuum pipe.
- (k) Install the throttle position sensor connector.
- (l) Install the accelerator pedal position sensor connector.
- (m) Install the throttle control motor connector.
- (n) Install the VSV connector for EVAP.
- (o) Secure the engine wire with the clamp on the throttle body bracket.
- (p) Install the engine wire clamp with the clamp bracket of the throttle body.
- (q) Connect the accelerator cable to the throttle body.

19. REINSTALL INTAKE AIR RESONATOR**20. REINSTALL ENGINE COVER**

Install the engine cover with the 4 nuts.

21. REFILL WITH ENGINE COOLANT**22. START ENGINE AND CHECK FOR LEAKS**

Adjusting Shim Selection Chart (Intake)

Installed Shim Thickness mm (in.)	Measured Clearance mm (in.)	2.500 (0.0984)	2.520 (0.0992)	2.540 (0.1000)	2.550 (0.1004)	2.560 (0.1008)	2.580 (0.1016)	2.600 (0.1024)	2.620 (0.1032)	2.640 (0.1040)	2.660 (0.1048)	2.680 (0.1056)	2.700 (0.1063)	2.720 (0.1071)	2.740 (0.1079)	2.760 (0.1087)	2.780 (0.1095)	2.800 (0.1102)	2.820 (0.1110)	2.830 (0.1114)	2.840 (0.1118)	2.850 (0.1122)	2.860 (0.1126)	2.870 (0.1130)	2.880 (0.1134)	2.890 (0.1138)	2.900 (0.1142)	2.910 (0.1146)	2.920 (0.1150)	2.930 (0.1154)	2.940 (0.1157)	2.950 (0.1161)	2.960 (0.1165)	2.970 (0.1169)	2.980 (0.1173)	2.990 (0.1177)	3.000 (0.1181)	3.010 (0.1185)	3.020 (0.1189)	3.030 (0.1193)	3.040 (0.1197)	3.050 (0.1201)	3.060 (0.1205)	3.070 (0.1209)	3.080 (0.1213)	3.090 (0.1217)	3.100 (0.1221)	3.110 (0.1225)	3.120 (0.1229)	3.130 (0.1233)	3.140 (0.1237)	3.150 (0.1241)	3.160 (0.1245)	3.170 (0.1249)	3.180 (0.1253)	3.190 (0.1257)	3.200 (0.1261)	3.210 (0.1265)	3.220 (0.1269)	3.230 (0.1273)	3.240 (0.1277)	3.250 (0.1281)	3.260 (0.1285)	3.270 (0.1289)	3.280 (0.1293)	3.290 (0.1297)	3.300 (0.1301)	3.310 (0.1305)	3.320 (0.1309)	3.330 (0.1313)	3.340 (0.1317)	3.350 (0.1321)	3.360 (0.1325)	3.370 (0.1329)	3.380 (0.1333)	3.390 (0.1337)	3.400 (0.1341)	3.410 (0.1345)	3.420 (0.1349)	3.430 (0.1353)	3.440 (0.1357)	3.450 (0.1361)	3.460 (0.1365)	3.470 (0.1369)	3.480 (0.1373)	3.490 (0.1377)	3.500 (0.1381)	3.510 (0.1385)	3.520 (0.1389)	3.530 (0.1393)	3.540 (0.1397)	3.550 (0.1401)	3.560 (0.1405)	3.570 (0.1409)	3.580 (0.1413)	3.590 (0.1417)	3.600 (0.1421)	3.610 (0.1425)	3.620 (0.1429)	3.630 (0.1433)	3.640 (0.1437)	3.650 (0.1441)	3.660 (0.1445)	3.670 (0.1449)	3.680 (0.1453)	3.690 (0.1457)	3.700 (0.1461)	3.710 (0.1465)	3.720 (0.1469)	3.730 (0.1473)	3.740 (0.1477)	3.750 (0.1481)	3.760 (0.1485)	3.770 (0.1489)	3.780 (0.1493)	3.790 (0.1497)	3.800 (0.1501)	3.810 (0.1505)	3.820 (0.1509)	3.830 (0.1513)	3.840 (0.1517)	3.850 (0.1521)	3.860 (0.1525)	3.870 (0.1529)	3.880 (0.1533)	3.890 (0.1537)	3.900 (0.1541)	3.910 (0.1545)	3.920 (0.1549)	3.930 (0.1553)	3.940 (0.1557)	3.950 (0.1561)	3.960 (0.1565)	3.970 (0.1569)	3.980 (0.1573)	3.990 (0.1577)	4.000 (0.1581)	4.010 (0.1585)	4.020 (0.1589)	4.030 (0.1593)	4.040 (0.1597)	4.050 (0.1601)	4.060 (0.1605)	4.070 (0.1609)	4.080 (0.1613)	4.090 (0.1617)	4.100 (0.1621)	4.110 (0.1625)	4.120 (0.1629)	4.130 (0.1633)	4.140 (0.1637)	4.150 (0.1641)	4.160 (0.1645)	4.170 (0.1649)	4.180 (0.1653)	4.190 (0.1657)	4.200 (0.1661)	4.210 (0.1665)	4.220 (0.1669)	4.230 (0.1673)	4.240 (0.1677)	4.250 (0.1681)	4.260 (0.1685)	4.270 (0.1689)	4.280 (0.1693)	4.290 (0.1697)	4.300 (0.1701)	4.310 (0.1705)	4.320 (0.1709)	4.330 (0.1713)	4.340 (0.1717)	4.350 (0.1721)	4.360 (0.1725)	4.370 (0.1729)	4.380 (0.1733)	4.390 (0.1737)	4.400 (0.1741)	4.410 (0.1745)	4.420 (0.1749)	4.430 (0.1753)	4.440 (0.1757)	4.450 (0.1761)	4.460 (0.1765)	4.470 (0.1769)	4.480 (0.1773)	4.490 (0.1777)	4.500 (0.1781)	4.510 (0.1785)	4.520 (0.1789)	4.530 (0.1793)	4.540 (0.1797)	4.550 (0.1801)	4.560 (0.1805)	4.570 (0.1809)	4.580 (0.1813)	4.590 (0.1817)	4.600 (0.1821)	4.610 (0.1825)	4.620 (0.1829)	4.630 (0.1833)	4.640 (0.1837)	4.650 (0.1841)	4.660 (0.1845)	4.670 (0.1849)	4.680 (0.1853)	4.690 (0.1857)	4.700 (0.1861)	4.710 (0.1865)	4.720 (0.1869)	4.730 (0.1873)	4.740 (0.1877)	4.750 (0.1881)	4.760 (0.1885)	4.770 (0.1889)	4.780 (0.1893)	4.790 (0.1897)	4.800 (0.1901)	4.810 (0.1905)	4.820 (0.1909)	4.830 (0.1913)	4.840 (0.1917)	4.850 (0.1921)	4.860 (0.1925)	4.870 (0.1929)	4.880 (0.1933)	4.890 (0.1937)	4.900 (0.1941)	4.910 (0.1945)	4.920 (0.1949)	4.930 (0.1953)	4.940 (0.1957)	4.950 (0.1961)	4.960 (0.1965)	4.970 (0.1969)	4.980 (0.1973)	4.990 (0.1977)	5.000 (0.1981)	5.010 (0.1985)	5.020 (0.1989)	5.030 (0.1993)	5.040 (0.1997)	5.050 (0.2001)	5.060 (0.2005)	5.070 (0.2009)	5.080 (0.2013)	5.090 (0.2017)	5.100 (0.2021)	5.110 (0.2025)	5.120 (0.2029)	5.130 (0.2033)	5.140 (0.2037)	5.150 (0.2041)	5.160 (0.2045)	5.170 (0.2049)	5.180 (0.2053)	5.190 (0.2057)	5.200 (0.2061)	5.210 (0.2065)	5.220 (0.2069)	5.230 (0.2073)	5.240 (0.2077)	5.250 (0.2081)	5.260 (0.2085)	5.270 (0.2089)	5.280 (0.2093)	5.290 (0.2097)	5.300 (0.2101)	5.310 (0.2105)	5.320 (0.2109)	5.330 (0.2113)	5.340 (0.2117)	5.350 (0.2121)	5.360 (0.2125)	5.370 (0.2129)	5.380 (0.2133)	5.390 (0.2137)	5.400 (0.2141)	5.410 (0.2145)	5.420 (0.2149)	5.430 (0.2153)	5.440 (0.2157)	5.450 (0.2161)	5.460 (0.2165)	5.470 (0.2169)	5.480 (0.2173)	5.490 (0.2177)	5.500 (0.2181)	5.510 (0.2185)	5.520 (0.2189)	5.530 (0.2193)	5.540 (0.2197)	5.550 (0.2201)	5.560 (0.2205)	5.570 (0.2209)	5.580 (0.2213)	5.590 (0.2217)	5.600 (0.2221)	5.610 (0.2225)	5.620 (0.2229)	5.630 (0.2233)	5.640 (0.2237)	5.650 (0.2241)	5.660 (0.2245)	5.670 (0.2249)	5.680 (0.2253)	5.690 (0.2257)	5.700 (0.2261)	5.710 (0.2265)	5.720 (0.2269)	5.730 (0.2273)	5.740 (0.2277)	5.750 (0.2281)	5.760 (0.2285)	5.770 (0.2289)	5.780 (0.2293)	5.790 (0.2297)	5.800 (0.2301)	5.810 (0.2305)	5.820 (0.2309)	5.830 (0.2313)	5.840 (0.2317)	5.850 (0.2321)	5.860 (0.2325)	5.870 (0.2329)	5.880 (0.2333)	5.890 (0.2337)	5.900 (0.2341)	5.910 (0.2345)	5.920 (0.2349)	5.930 (0.2353)	5.940 (0.2357)	5.950 (0.2361)	5.960 (0.2365)	5.970 (0.2369)	5.980 (0.2373)	5.990 (0.2377)	6.000 (0.2381)	6.010 (0.2385)	6.020 (0.2389)	6.030 (0.2393)	6.040 (0.2397)	6.050 (0.2401)	6.060 (0.2405)	6.070 (0.2409)	6.080 (0.2413)	6.090 (0.2417)	6.100 (0.2421)	6.110 (0.2425)	6.120 (0.2429)	6.130 (0.2433)	6.140 (0.2437)	6.150 (0.2441)	6.160 (0.2445)	6.170 (0.2449)	6.180 (0.2453)	6.190 (0.2457)	6.200 (0.2461)	6.210 (0.2465)	6.220 (0.2469)	6.230 (0.2473)	6.240 (0.2477)	6.250 (0.2481)	6.260 (0.2485)	6.270 (0.2489)	6.280 (0.2493)	6.290 (0.2497)	6.300 (0.2501)	6.310 (0.2505)	6.320 (0.2509)	6.330 (0.2513)	6.340 (0.2517)	6.350 (0.2521)	6.360 (0.2525)	6.370 (0.2529)	6.380 (0.2533)	6.390 (0.2537)	6.400 (0.2541)	6.410 (0.2545)	6.420 (0.2549)	6.430 (0.2553)	6.440 (0.2557)	6.450 (0.2561)	6.460 (0.2565)	6.470 (0.2569)	6.480 (0.2573)	6.490 (0.2577)	6.500 (0.2581)	6.510 (0.2585)	6.520 (0.2589)	6.530 (0.2593)	6.540 (0.2597)	6.550 (0.2601)	6.560 (0.2605)	6.570 (0.2609)	6.580 (0.2613)	6.590 (0.2617)	6.600 (0.2621)	6.610 (0.2625)	6.620 (0.2629)	6.630 (0.2633)	6.640 (0.2637)	6.650 (0.2641)	6.660 (0.2645)	6.670 (0.2649)	6.680 (0.2653)	6.690 (0.2657)	6.700 (0.2661)	6.710 (0.2665)	6.720 (0.2669)	6.730 (0.2673)	6.740 (0.2677)	6.750 (0.2681)	6.760 (0.2685)	6.770 (0.2689)	6.780 (0.2693)	6.790 (0.2697)	6.800 (0.2701)	6.810 (0.2705)	6.820 (0.2709)	6.830 (0.2713)	6.840 (0.2717)	6.850 (0.2721)	6.860 (0.2725)	6.870 (0.2729)	6.880 (0.2733)	6.890 (0.2737)	6.900 (0.2741)	6.910 (0.2745)	6.920 (0.2749)	6.930 (0.2753)	6.940 (0.2757)	6.950 (0.2761)	6.960 (0.2765)	6.970 (0.2769)	6.980 (0.2773)	6.990 (0.2777)	7.000 (0.2781)	7.010 (0.2785)	7.020 (0.2789)	7.030 (0.2793)	7.040 (0.2797)	7.050 (0.2801)	7.060 (0.2805)	7.070 (0.2809)	7.080 (0.2813)	7.090 (0.2817)	7.100 (0.2821)	7.110 (0.2825)	7.120 (0.2829)	7.130 (0.2833)	7.140 (0.2837)	7.150 (0.2841)	7.160 (0.2845)	7.170 (0.2849)	7.180 (0.2853)	7.190 (0.2857)	7.200 (0.2861)	7.210 (0.2865)	7.220 (0.2869)	7.230 (0.2873)	7.240 (0.2877)	7.250 (0.2881)	7.260 (0.2885)	7.270 (0.2889)	7.280 (0.2893)	7.290 (0.2897)	7.300 (0.2901)	7.310 (0.2905)	7.320 (0.2909)	7.330 (0.2913)	7.340 (0.2917)	7.350 (0.2921)	7.360 (0.2925)	7.370 (0.2929)	7.380 (0.2933)	7.390 (0.2937)	7.400 (0.2941)	7.410 (0.2945)	7.420 (0.2949)	7.430 (0.2953)	7.440 (0.2957)	7.450 (0.2961)	7.460 (0.2965)	7.470 (0.2969)	7.480 (0.2973)	7.490 (0.2977)	7.500 (0.2981)	7.510 (0.2985)	7.520 (0.2989)	7.530 (0.2993)	7.540 (0.2997)	7.550 (0.3001)	7.560 (0.3005)	7.570 (0.3009)	7.580 (0.3013)	7.590 (0.3017)	7.600 (0.3021)	7.610 (0.3025)	7.620 (0.3029)	7.630 (0.3033)	7.640 (0.3037)	7.650 (0.3041)	7.660 (0.3045)	7.670 (0.3049)	7.680 (0.3053)	7.690 (0.3057)	7.700 (0.3061)	7.710 (0.3065)	7.720 (0.3069)	7.730 (0.3073)	7.740 (0.3077)	7.750 (0.3081)	7.760 (0.3085)	7.770 (0.3089)	7.780 (0.3093)	7.790 (0.3097)	7.800 (0.3101)	7.810 (0.3105)	7.820 (0.3109)	7.830 (0.3113)	7.840 (0.3117)	7.850 (0.3121)	7.860 (0.3125)	7.870 (0.3129)	7.880 (0.3133)	7.890 (0.3137)	7.900 (0.3141)	7.910 (0.3145)	7.920 (0.3149)	7.930 (0.3153)	7.940 (0.3157)	7.950 (0.3161)	7.960 (0.3165)	7.970 (0.3169)	7.980 (0.3173)	7.990 (0.3177)	8.000 (0.3181)	8.010 (0.3185)	8.020 (0.3189)	8.030 (0.3193)	8.040 (0.3197)	8.050 (0.3201)	8.060 (0.3205)	8.070 (0.3209)	8.080 (0.3213)	8.090 (0.3217)	8.100 (0.3221)	8.110 (0.3225)	8.120 (0.3229)	8.130 (0.3233)	8.140 (0.3237)	8.150 (0.3241)	8.160 (0.3245)	8.170 (0.3249)	8.180 (0.3253)	8.190 (0.3257)	8.200 (0.3261)	8.210 (0.3265)	8.220 (0.3269)	8.230 (0.3273)	8.240 (0.3277)	8.250 (0.3281)	8.260 (0.3285)	8.270 (0.3289)	8.280 (0.3293)	8.290 (0.3297)	8.300 (0.3301)	8.310 (0.3305)	8.320 (0.3309)	8.330 (0.3313)	8.340 (0.3317)	8.350 (0.3321)	8.360 (0.3325)	8.370 (0.3329)	8.380 (0.3333)	8.390 (0.3337)	8.400 (0.3341)	8.410 (0.3345)	8.420 (0.3349)	8.430 (0.3353)	8.440 (0.3357)	8.450 (0.3361)	8.460 (0.3365)	8.470 (0.3369)	8.480 (0.3373)	8.490 (0.3377)	8.500 (0.3381)	8.510 (0.3385)	8.520 (0.3389)	8.530 (0.3393)	8.540 (0.3397)	8.550 (0.3401)	8.560 (0.3405)	8.570 (0.3409)	8.580 (0.3413)	8.590 (0.3417)	8.600 (0.3421)	8.610 (0.3425)	8.620 (0.3429)	8.630 (0.3433)	8.640 (0.3437)	8.650 (0.3441)	8.660 (0.3445)	8.670 (0.3449)	8.680 (0.3453)	8.690 (0.3457)	8.700 (0.3461)	8.710 (0.3465)	8.720 (0.3469)	8.730 (0.3473)	8.740 (0.3477)	8.750 (0.3481)	8.760 (0.3485)	8.770 (0.3489)	8.780 (0.3493)	8.790 (0.3497)	8.800 (0.3501)	8.810 (0.3505)	8.820 (0.3509)	8.830 (0.3513)	8.840 (0.3517)	8.850 (0.3521)	8.860 (0.3525)	8.870 (0.3529)	8.880 (0.3533)	8.890 (0.3537)	8.900 (0.3541)	8.910 (0.3545)	8.920 (0.3549)	8.930 (0.3553)	8.940 (0.3557)	8.950 (0.3561)	8.960 (0.3565)	8.970 (0.3569)	8.980 (0.3573)	8.990 (0.3577)	9.000 (0.3581)	9.010 (0.3585)	9.020 (0.3589)	9.030 (0.3593)	9.040 (0.3597)	9.050 (0.3601)	9.060 (0.3605)	9.070 (0.3609)	9.080 (0.3613)	9.090 (0.3617)	9.100 (0.3621)	9.110 (0.3625)	9.120 (0.3629)	9.130 (0.3633)	9.140 (0.3637)	9.150 (0.3641)	9.160 (0.3645)	9.170 (0.3649)	9.180 (0.3653)	9.190 (0.3657)	9.200 (0.3661)	9.210 (0.3665)	9.220 (0.3669)	9.230 (0.3673)	9.240 (0.3677)	9.250 (0.3681)	9.260 (0.3685)	9.270 (0.3689)	9.280 (0.3693)	9.290 (0.3697)	9.300 (0.3701)	9.310 (0.3705)	9.320 (0.3709)	9.330 (0.3713)	9.340 (0.3717)	9.350 (0.3721)	9.360 (0.3725)	9.370 (0.3729)	9.380 (0.3733)	9.390 (0.3737)	9.400 (0.3741)	9.410 (0.3745)	9.420 (0.3749)	9.430 (0.3753)	9.440 (0.3757)	9.450 (0.3761)	9.460 (0.3765)	9.470 (0.3769)	9.480 (0.3773)	9.490 (0.3777)	9.500 (0.3781)	9.510 (0.3785)	9.520 (0.3789)	9.530 (0.3793)	9.540 (0.3797)	9.550 (0.3801)	9.560 (0.3805)	9.570 (0.3809)	9.580 (0.3813)	9.590 (0.3817)	9.600 (0.3821)	9.610 (0.3825)	9.620 (0.3829)	9.630 (0.3833)	9.640 (0.3837)	9.650 (0.3841)	9.660 (0.3845)	9.670 (0.3849)	9.680 (0.3853)	9.690 (0.3857)	9.700 (0.3861)	9.710 (0.3865)	9.720 (0.3869)	9.730 (0.3873)	9.740 (0.3877)	9.750 (0.3881)	9.760 (0.3885)	9.770 (0.3889)	9.780 (0.3893)	9.790 (0.3897)	9.800 (0.3901)	9.810 (0.3905)	9.820 (0.3909)</
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New shim thickness mm (in.)

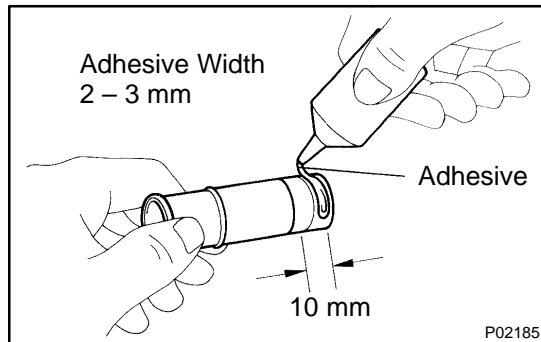
Shim No.	Thickness	Shim No.	Thickness
1	2.500 (0.0984)	10	2.950 (0.1161)
2	2.550 (0.1004)	11	3.000 (0.1181)
3	2.600 (0.1024)	12	3.050 (0.1201)
4	2.650 (0.1043)	13	3.100 (0.1220)
5	2.700 (0.1063)	14	3.150 (0.1240)
6	2.750 (0.1083)	15	3.200 (0.1260)
7	2.800 (0.1102)	16	3.250 (0.1280)
8	2.850 (0.1122)	17	3.300 (0.1299)
9	2.900 (0.1142)		

HINT: New shims have the thickness in millimeters imprinted on the face.

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



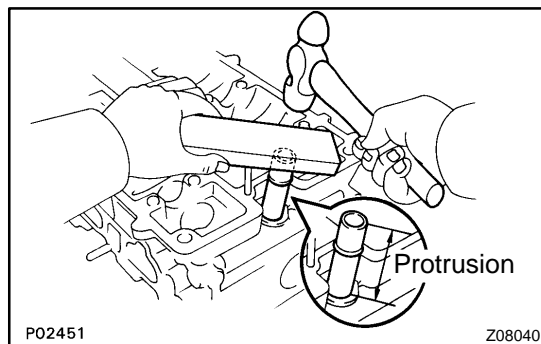
1. INSTALL HEATER UNION

HINT:

When using a new cylinder head, a new heater union must be installed.

- (a) Apply adhesive to the end of the heater union as shown in the illustration.

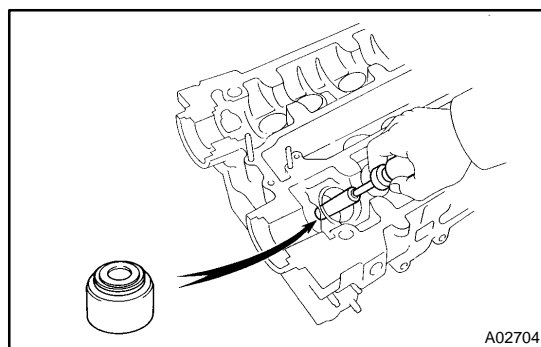
Adhesive: Part No.08833-00070, THREE BOND 1324 or equivalent



- (b) Using a wooden block and hammer, tap in a new heater union, leaving 48 mm (1.89 in.) protruding from the cylinder head.

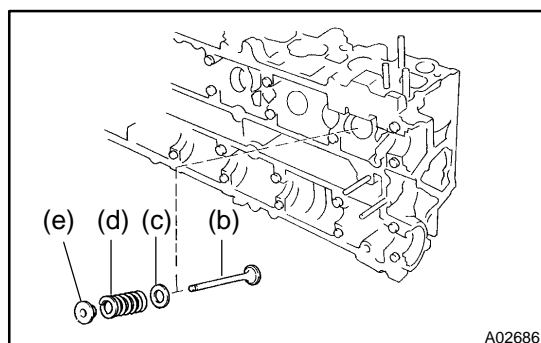
NOTICE:

Do not tap it in too far.

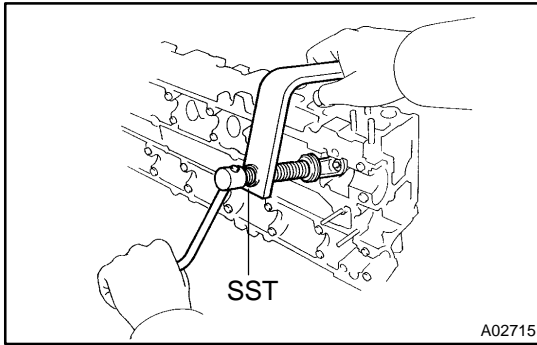


2. INSTALL VALVES

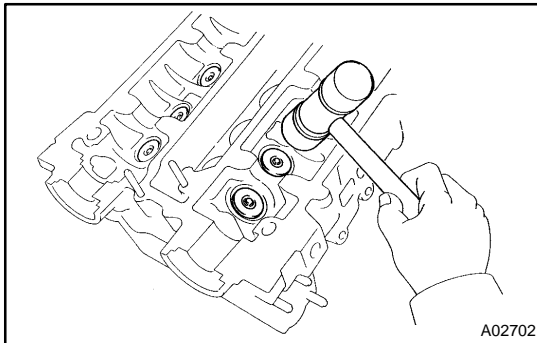
- (a) Install a new oil seal on the valve guide bushing.



- (b) Install the valve.
- (c) Install the spring seat.
- (d) Install the valve spring.
- (e) Install the spring retainer.



- (f) Using SST, compress the valve spring and place the 2 keepers around the valve stem.
SST 09202-70020 (09202-00010)



- (g) Using a plastic-faced hammer, lightly tap the valve stem tip to assure proper fit.

3. INSTALL VALVE LIFTERS AND SHIMS

- (a) Install the valve lifter and shim.
(b) Check that the valve lifter rotates smoothly by hand.

4. INSTALL ECT SENSOR

Torque: 19.6 N·m (200 kgf·cm, 14 ft·lbf)

5. INSTALL CAMSHAFT POSITION SENSOR

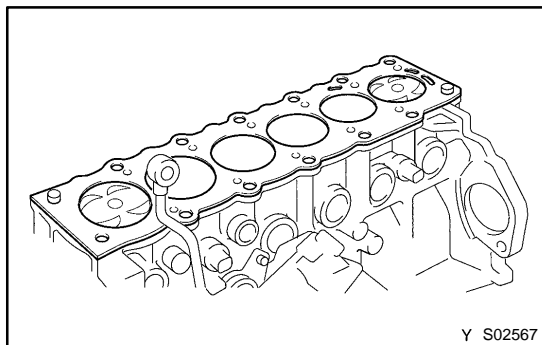
6. INSTALL ENGINE HANGER

Torque: 40 N·m (400 kgf·cm, 30 ft·lbf)

7. INSTALL WATER OUTLET WITH WATER BYPASS HOSE

Install a new gasket and the water outlet with the bolt and 2 nuts.

Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)



INSTALLATION

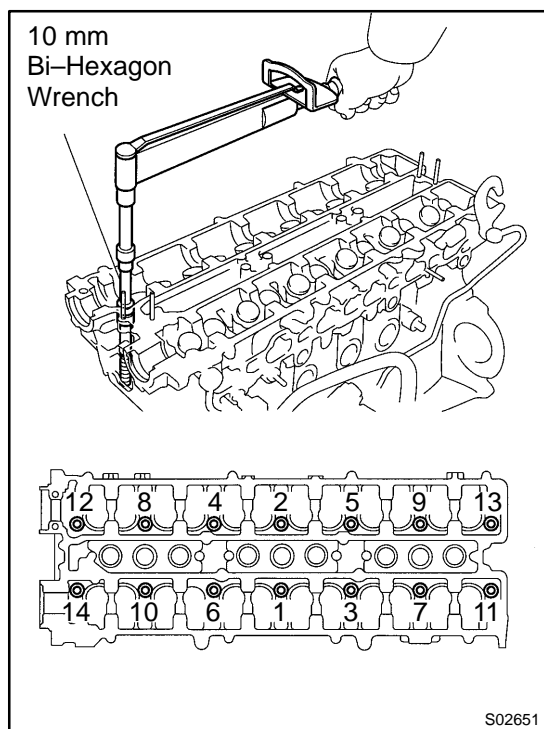
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- Place a new cylinder head gasket in position on the cylinder block.

NOTICE:

Be sure to install it correctly.

- Place the cylinder head in position on the cylinder head gasket.



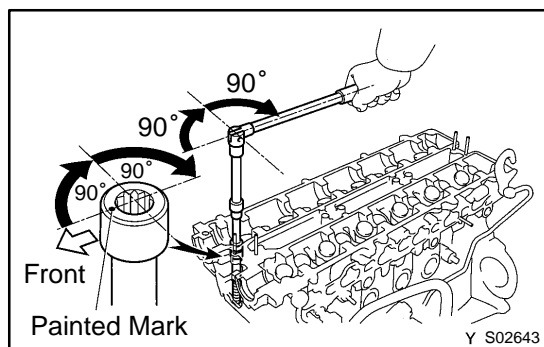
2. INSTALL CYLINDER HEAD BOLTS

HINT:

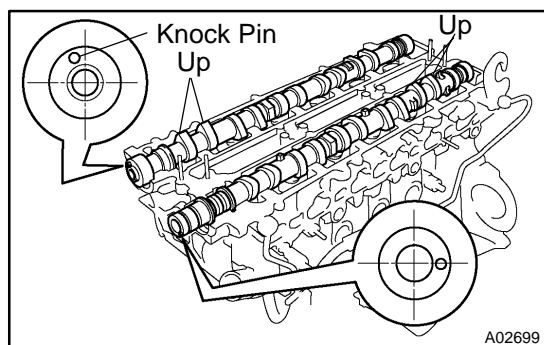
- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (f)).
 - If any of bolts break or deform, replace them.
- Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
 - Install the 14 plate washers to each cylinder head bolt.
 - Using a 10 mm bi-hexagon wrench, uniformly tighten the cylinder head bolts, in several passes, in the sequence shown.

Torque: 35 N·m (350 kgf-cm, 26 ft-lbf)

If any of the bolts do not meet the torque specification, replace the bolt.

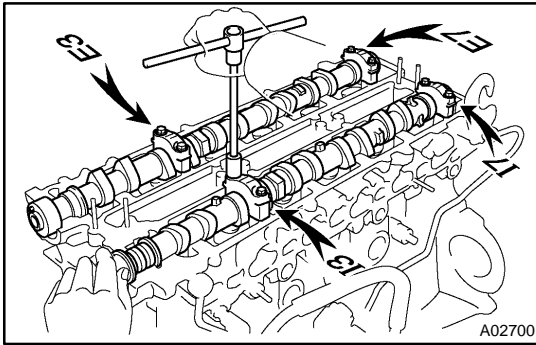


- Mark the front of the cylinder head bolt head with paint.
- Retighten the cylinder head bolts 90° in the numerical order shown.
- Retighten cylinder head bolts by an additional 90° shown.
- Check that the painted mark is now turned to the rear.

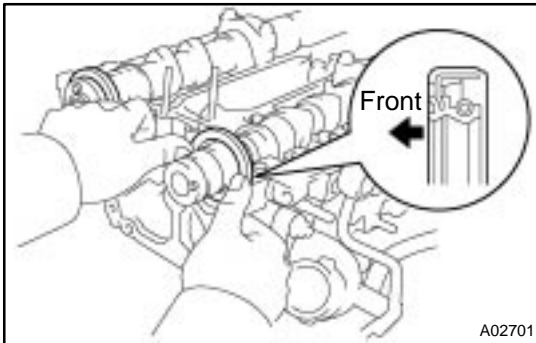


3. INSTALL CAMSHAFTS

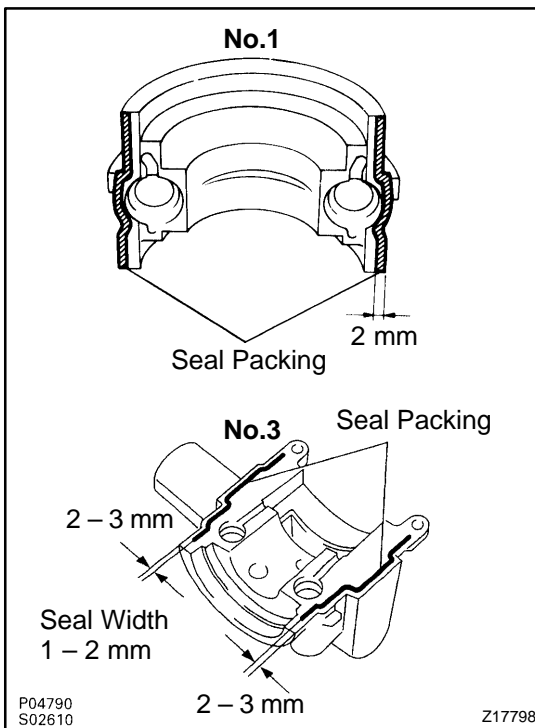
- Apply engine oil to the thrust portion of the camshaft.
- Place the camshaft on the cylinder head with the cam lobe facing up as shown.



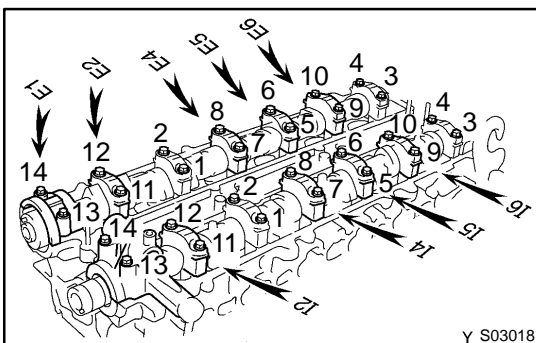
- (c) Place the (Nos. 3, 7 journal) camshaft bearing caps in their proper location.
- (d) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
- (e) Temporarily tighten these bearing cap bolts uniformly and alternately, in several passes, until the bearing caps are snug with the cylinder head.



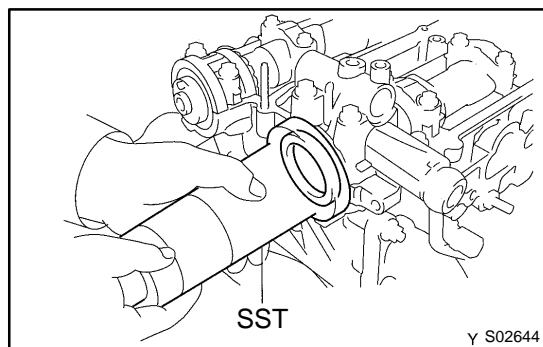
- (f) Apply MP grease to a new camshaft oil seal lip.
- (g) Install the 2 oil seals to the camshafts.



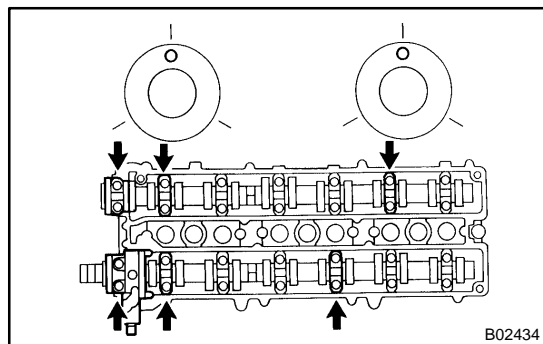
- (h) Clean the installed surfaces of the Nos.1, 3 camshaft bearing cap and cylinder head with cleaner.
- (i) Apply seal packing to the bearing caps as shown.
Seal packing: Part No. 08826-00080 or equivalent



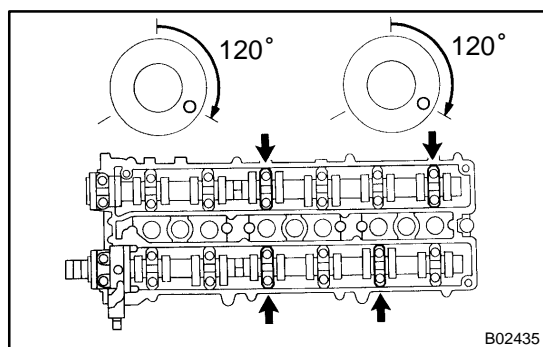
- (j) Install the other bearing caps in their proper locations.
- (k) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
- (l) Install and uniformly tighten the 14 bearing cap bolts on one side, in several passes, in the sequence shown.
Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)
- (m) Using a 5 mm hexagon wrench, the 2 No.3 camshaft bearing cap bolts.
Torque: 5.0 N·m (50 kgf-cm, 44 in.-lbf)



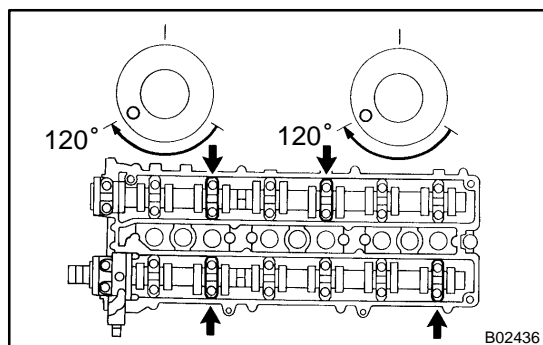
- (n) Using SST, push the 2 oil seals in as far as they can go.
SST 09316-60011 (09316-00011, 09316-00051)



- (o) Rotate the camshaft with a wrench at the hexagon position, bring the forward straight pin up.
(p) Loosen the 12 bearing cap bolts as shown, until they can be turned by hand; retighten in several passes.
Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)



- (q) Turn the camshaft 1/3 of a revolution.
(r) Loosen the 8 bearing cap bolts as shown, until they can be turned by hand; retighten in several passes.
Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)



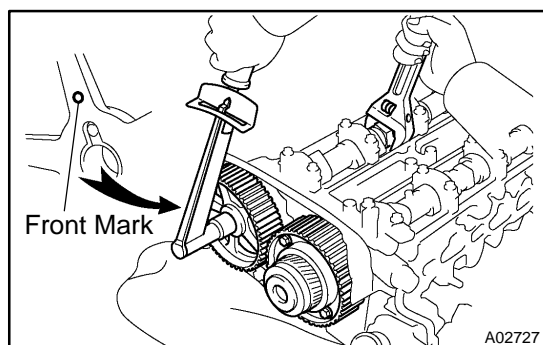
- (s) Turn the camshaft a further 1/3 of a revolution.
(t) Loosen the 8 bearing cap bolts as shown, until they can be turned by hand; retighten in several passes.
Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)

4. CHECK AND ADJUST VALVE CLEARANCE (See page [EM-5](#))

5. INSTALL NO.4 TIMING BELT COVER

Install the timing belt cover with 4 bolts.

Torque: 8.0 N·m (80 kgf-cm, 71 in.-lbf)

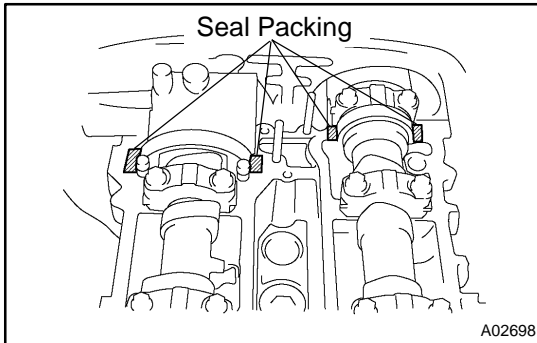


6. INSTALL CAMSHAFT TIMING PULLEYS

- (a) Install the exhaust camshaft timing pulley.
- (1) Align the camshaft knock pin with the groove in the pulley, and slide on the pulley.
 - (2) Slide the timing pulley on the camshaft, facing the front mark forward.
 - (3) Hold the hexagon portion of the camshaft with a wrench, and tighten the timing pulley bolt.
- Torque: 81 N·m (810 kgf-cm, 60 ft-lbf)**

- (b) Install the VV-i (intake camshaft timing) pulley.
(See page [EM-23](#))

7. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS (See page [EM-23](#))

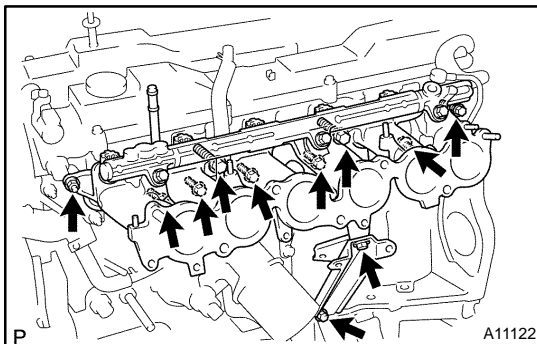


- 8. INSTALL NO.1 AND NO.2 CYLINDER HEAD COVERS**
- (a) Remove the any old packing (FIPG) material.
 - (b) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- (c) Install the gaskets to the cylinder head covers.
- (d) Install the cylinder head covers with the 12 bolts and 4 nuts.

Torque: 8.5 N·m (85 kgf·cm, 75 in.-lbf)



9. INSTALL INTAKE MANIFOLD ASSEMBLY

- (a) Install a new gasket and the intake manifold and delivery pipe assembly with the 7 bolts and 2 nuts.

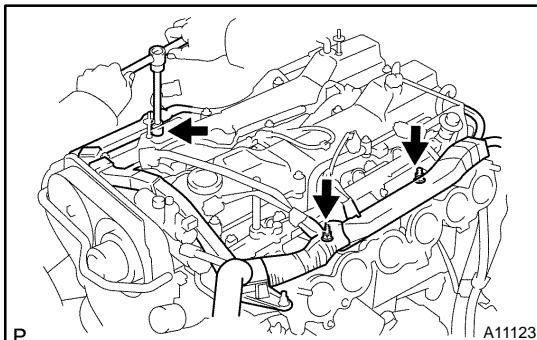
Torque: 28 N·m (280 kgf·cm, 21 ft-lbf)

- (b) Pass the water bypass hose between the No.2, No.3 intake ports of the manifold and delivery pipe.
- (c) Install the manifold stay with the 2 bolts.

Torque: 40 N·m (400 kgf·cm, 30 ft-lbf)

- (d) Install the starter wire to the manifold stay.

10. INSTALL FUEL PRESSURE PULSATION DAMPER (See page [SF-27](#))



11. CONNECT ENGINE WIRE TO CYLINDER HEAD

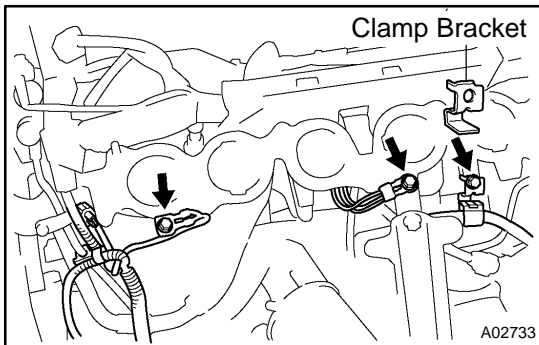
- (a) Install the engine wire protector with the 3 nuts.
- (b) Using a 5 mm hexagon wrench, install the bolt holding the engine wire protector to the No.2 cylinder head cover.
- (c) Connect the 6 injector connectors.

HINT:

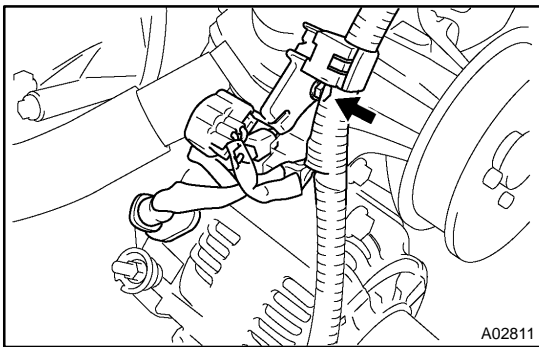
The Nos.1, 3, 5 injector connectors and dark gray, and the Nos.2, 4, 6 injector connectors are brown.

- (d) Connect the camshaft timing oil control valve connector.
- (e) Connect the camshaft position sensor connector.
- (f) Connect the ECT sensor connector.

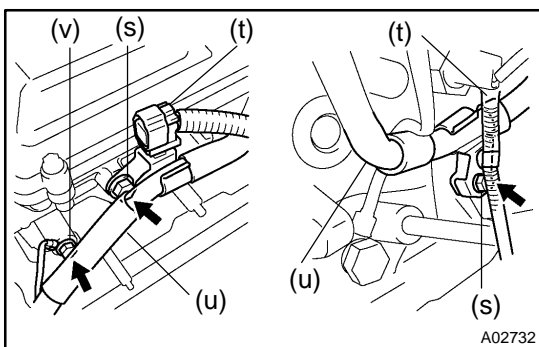
- (g) Connect the 2 knock sensor connector.
- (h) Connect the starter connector.
- (i) Connect the oil pressure switch connector.
- (j) Connect the oil level sensor connector.



- (k) Install the clamp bracket to the intake manifold.
- (l) Connect the 2 wire clamps to the No.1 oil pipe and clamp bracket on the intake manifold.
- (m) Install the 2 ground terminals to the intake manifold. Tighten so that each calking part should face inside.



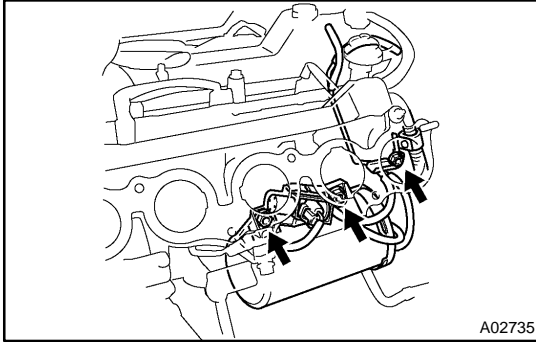
- (n) Install the clamp bracket to the water pump.
- (o) Connect the generator connector.
- (p) Connect the crankshaft position sensor connector.
- (q) Connect the heated oxygen sensor (bank 1 sensor 1) connector.
- (r) Secure the engine wire with the clamp.



- (s) Install the 2 hose clamps to the cylinder head and oil filter bracket.
- (t) Install the heated oxygen sensor (bank 2 sensor 1) connector and engine wire clamp to the hose clamps.
- (u) Install the 2 water bypass hoses to the hose clamps on the cylinder head and oil filter bracket.
- (v) Install the ground strap to the cylinder head.

- 12. INSTALL SPARK PLUGS**
- 13. INSTALL IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-9)**

- 14. INSTALL NO.3 TIMING BELT COVER**
Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)



15. INSTALL VACUUM CONTROL VALVE SET AND NO.2 VACUUM PIPE

- (a) Install the vacuum control valve set and No.2 vacuum pipe with the 3 nuts.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

- (b) Install the engine wire clamp to the clamp bracket of the No.2 vacuum pipe.
 (c) Connect the VSV connector for the ACIS.

16. INSTALL AIR INTAKE CHAMBER (See page SF-49)

17. INSTALL OIL DIPSTICK AND GUIDE FOR A/T

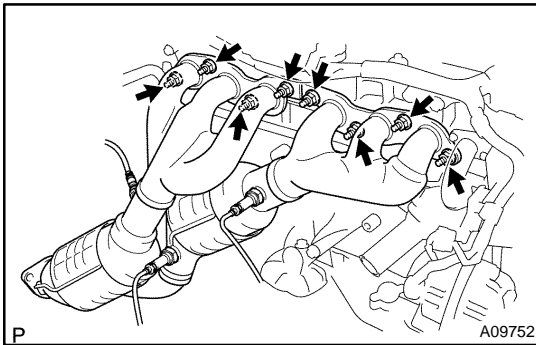
(See page EM-68)

18. INSTALL OIL DIPSTICK AND GUIDE FOR ENGINE

(See page LU-12)

19. INSTALL THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page EM-5)

20. INSTALL WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE (See page CO-13)

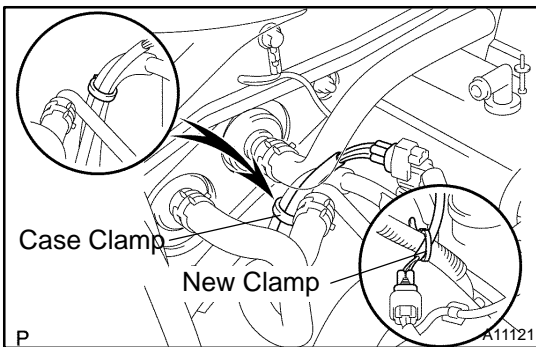


21. INSTALL EXHAUST MANIFOLD

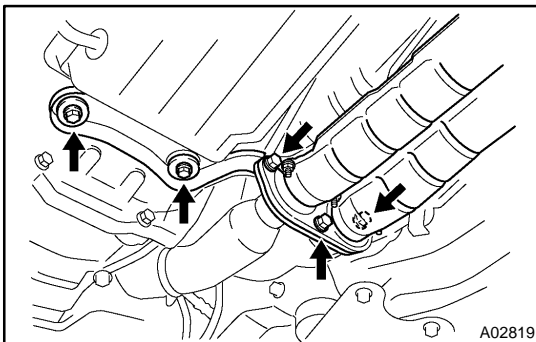
- (a) Install 2 new gaskets to the cylinder head.
 (b) Using a 14 mm deep socket wrench, install the exhaust manifold with the 8 nuts. Uniformly tighten the nuts in several passes.

Torque: 40 N·m (408 kgf-cm, 30 ft-lbf)

- (c) Connect the 3 heated oxygen sensor connectors and clamp.



- (d) Install a new clamp and the case clamp as shown in the illustration.

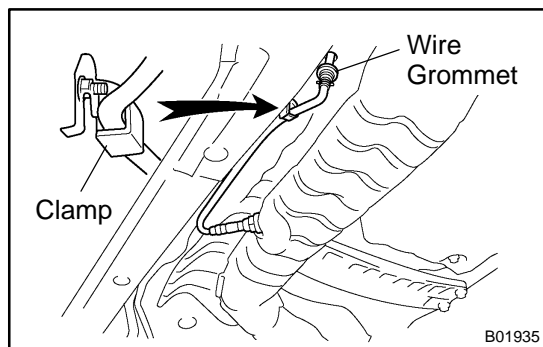


22. CONNECT FRONT EXHAUST PIPE TO EXHAUST MANIFOLD

- (a) Temporarily install the pipe support bracket to the transmission with the 2 bolts.
 (b) Install 2 new gaskets to front end of the front exhaust pipe, and connect the front exhaust pipe to the exhaust manifold with the 3 bolts and nuts.

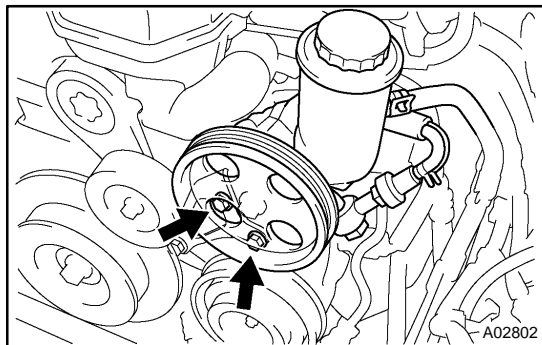
Torque: 44 N·m (440 kgf-cm, 32 ft-lbf)

- (c) Tighten the 2 bolts holding the pipe support bracket to the transmission.



Torque: 44 N·m (440 kgf-cm, 32 ft-lbf)

- (d) Connect the wire grommet and sensor wire of the the heated oxygen sensor (bank 2 sensor 2) to the hole and clamp on the floor.



23. INSTALL PS PUMP

- (a) Install the vane pump with the 2 bolts.
Torque: 58 N·m (590 kgf-cm, 43 ft-lbf)
 (b) Install the pump rear stay with the 2 bolts.
Torque: 39.2 N·m (400 kgf-cm, 29 ft-lbf)
 (c) Connect the PS air hose to the No.4 timing belt cover.
 (d) Connect the PS air hose to the air intake chamber.

24. INSTALL DRIVE BELT (See page CH-1)

25. INSTALL AIR CLEANER, MAF METER AND INTAKE AIR RESONATOR ASSEMBLY (See page EM-68)

26. INSTALL AIR CLEANER INLET

27. CONNECT UPPER RADIATOR HOSE TO WATER OUT-LET

28. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

29. FILL WITH ENGINE COOLANT

30. START ENGINE AND CHECK FOR LEAKS

31. INSTALL ENGINE UNDER COVER

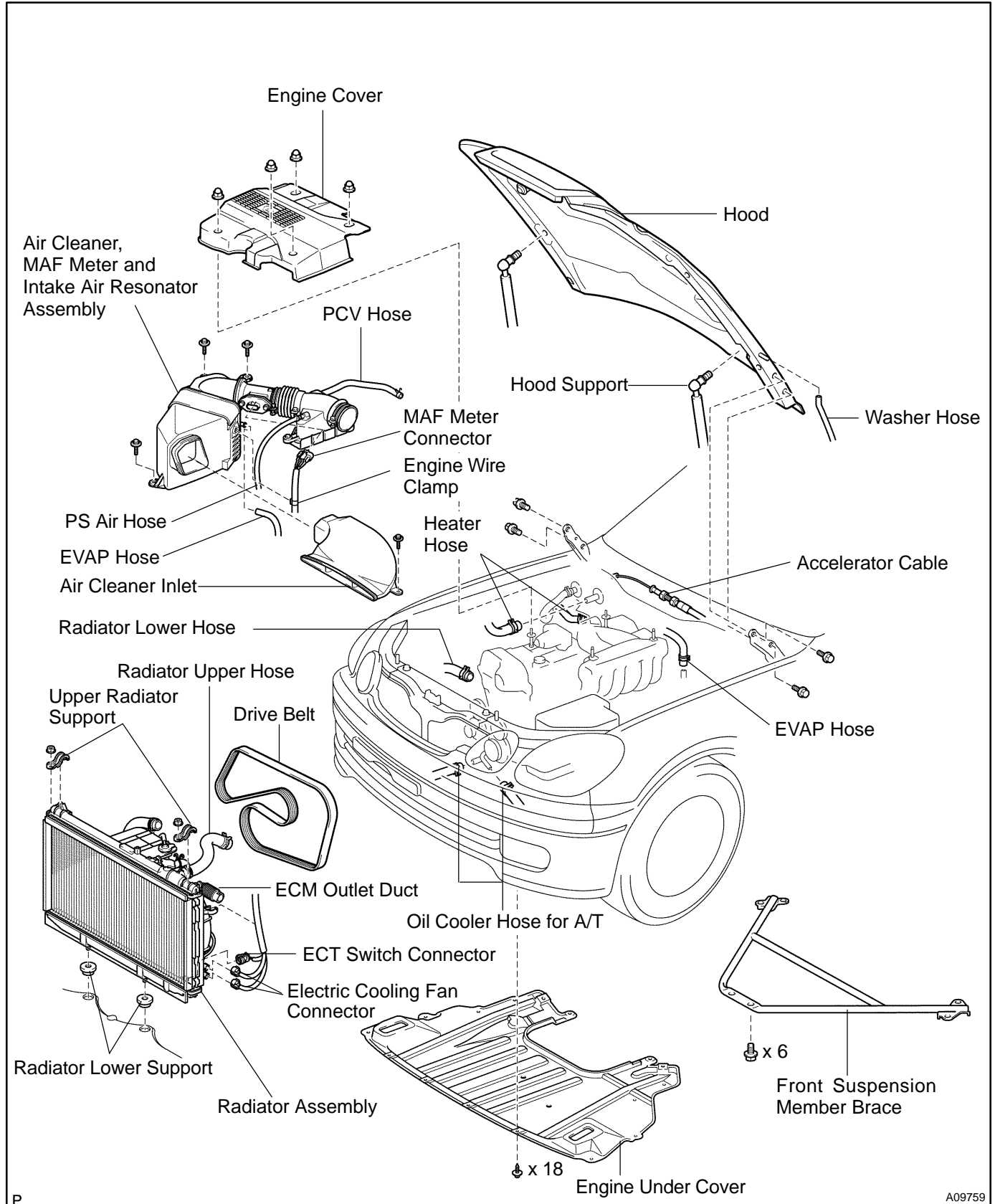
32. ROAD TEST

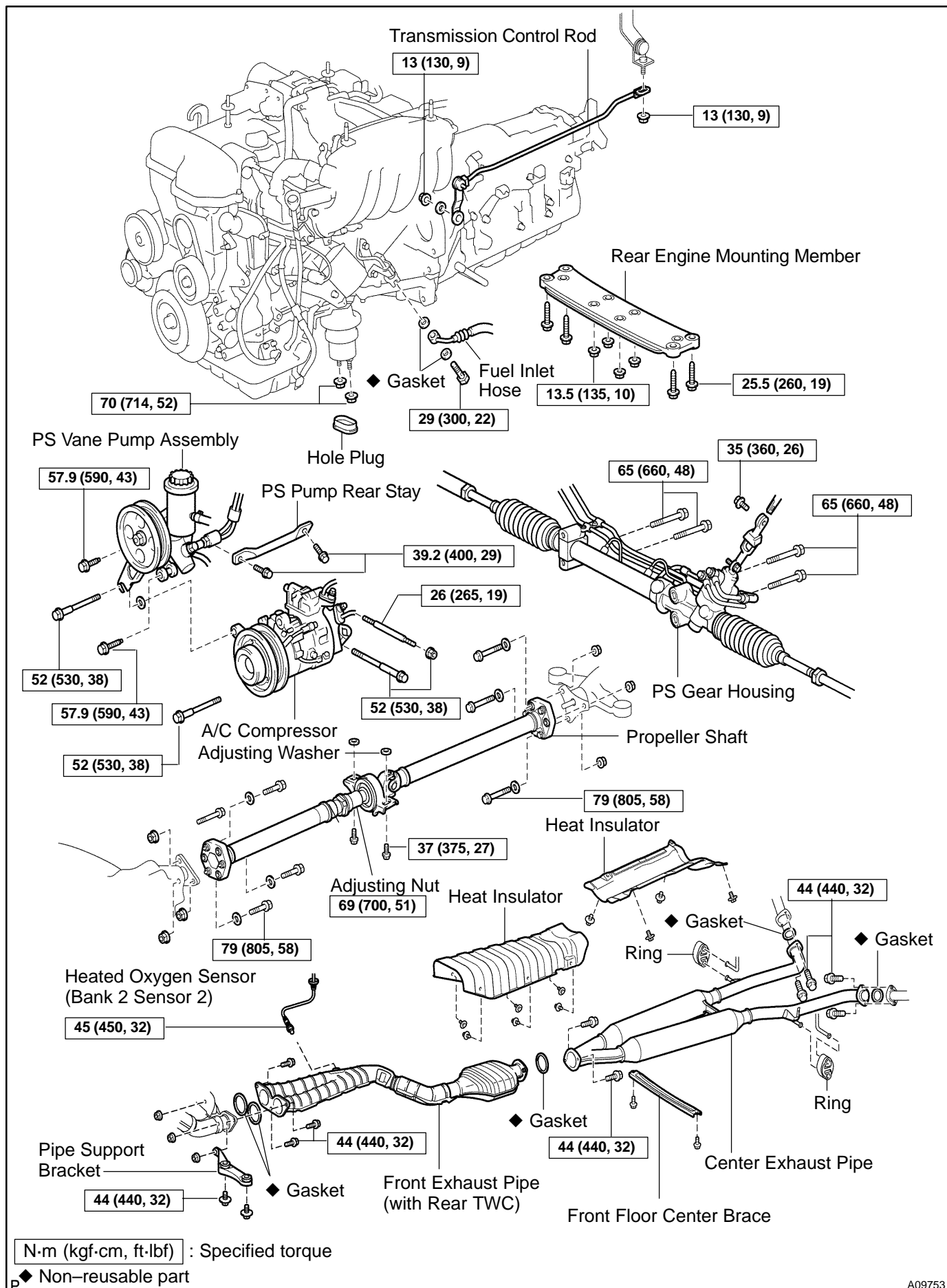
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

33. RECHECK ENGINE COOLANT LEVEL

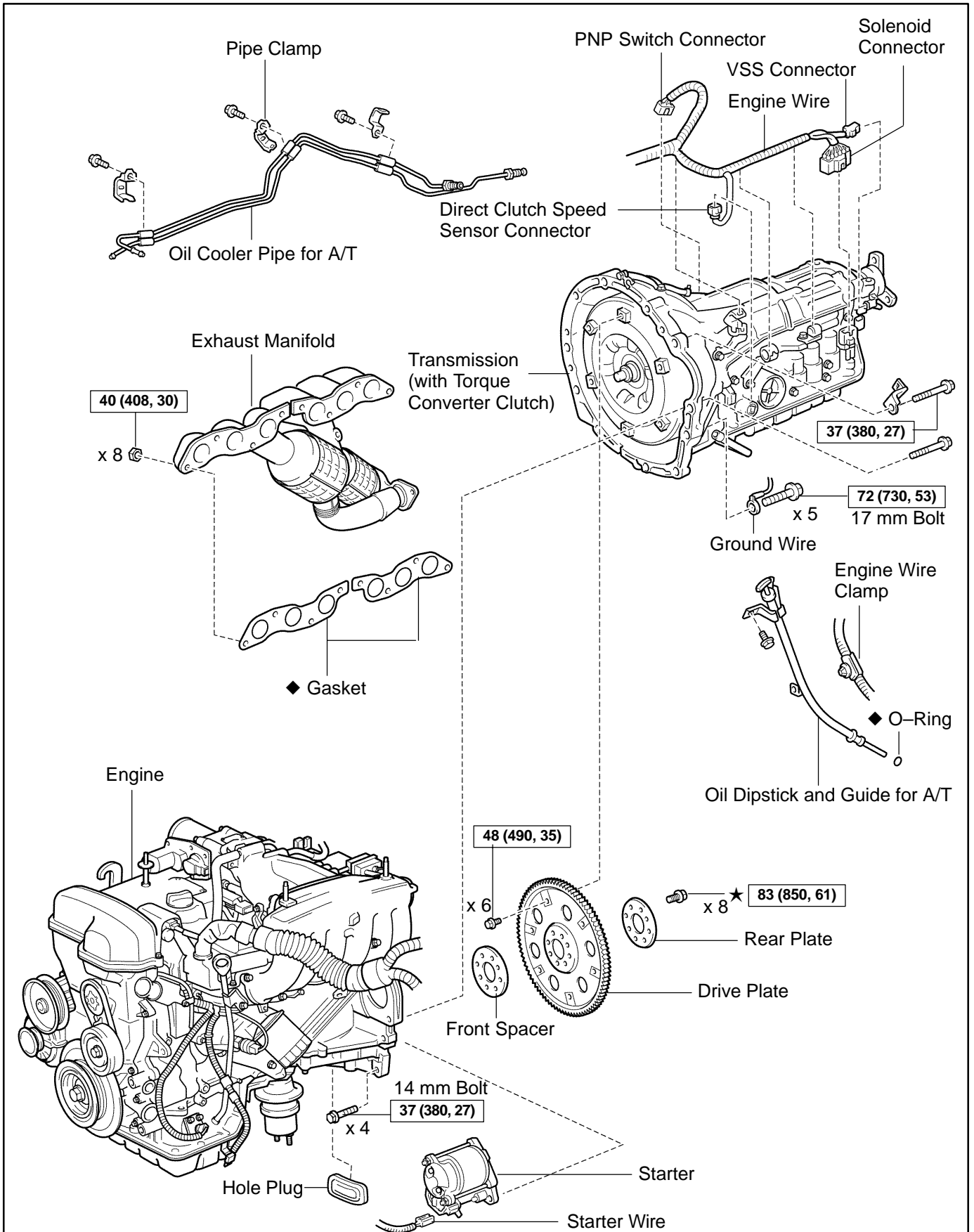
ENGINE UNIT COMPONENTS

EM0DG-03





A09753



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

A09754

REMOVAL

1. REMOVE HOOD

NOTICE:

Be careful not to damage the body or glass with the hood end.

2. REMOVE ENGINE UNDER COVER

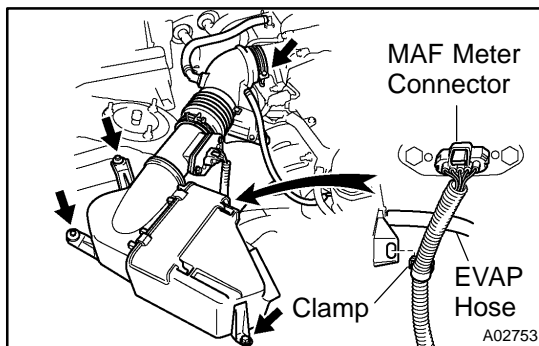
3. DRAIN ENGINE COOLANT

4. DRAIN ENGINE OIL

5. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

6. REMOVE AIR CLEANER INLET



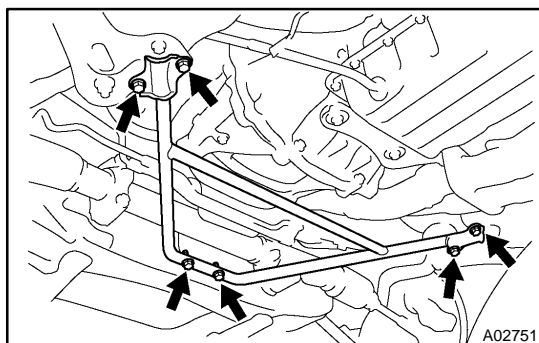
7. REMOVE AIR CLEANER, MAF METER AND INTAKE AIR RESONATOR ASSEMBLY

- Disconnect the MAF meter connector.
- Disconnect the engine wire clamp from the air cleaner case.
- Disconnect the EVAP hose from the air cleaner case.
- Disconnect the PS air hose from the No.4 timing belt cover.
- Disconnect the PCV hose from the No.2 cylinder head cover.
- Loosen the hose clamp bolt holding the intake air resonator to the throttle body.
- Remove the 3 bolts, the air cleaner, MAF meter and intake air resonator assembly.

8. DISCONNECT ACCELERATOR CABLE FROM ENGINE

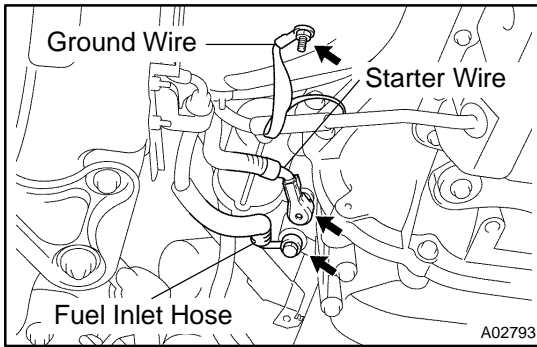
9. REMOVE RADIATOR ASSEMBLY (See page [CO-18](#))

10. REMOVE DRIVE BELT (See page [CH-1](#))



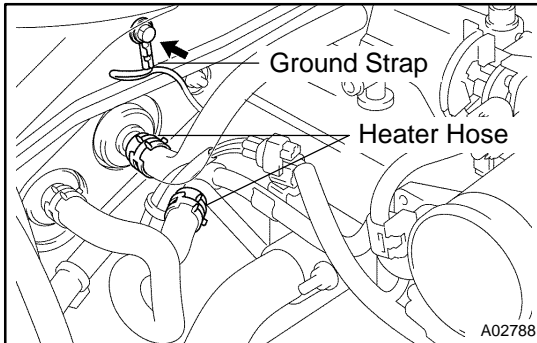
11. REMOVE FRONT SUSPENSION MEMBER BRACE

Remove the 6 bolts and brace.

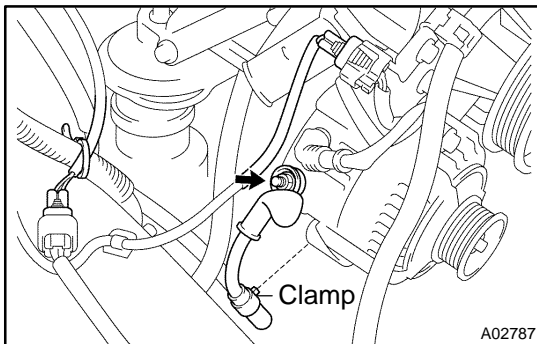


12. DISCONNECT WIRES, CABLE, STRAP, CONNECTORS, HOSES AND CLAMPS

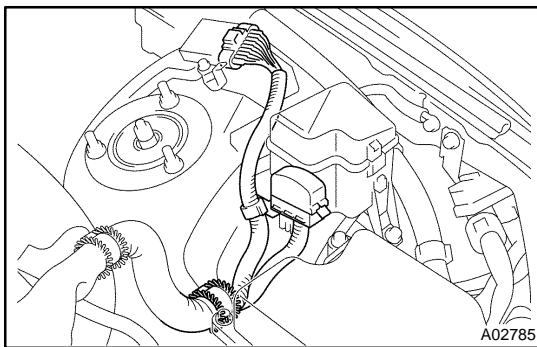
- (a) Disconnect the ground wire from the floor.
- (b) Disconnect the starter wire from the terminal and manifold stay.
- (c) Disconnect the fuel inlet hose from the fuel pipe support.



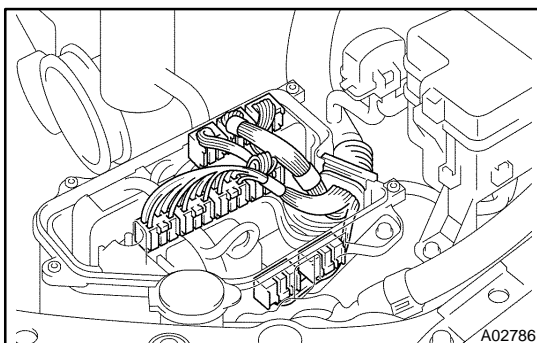
- (d) Disconnect the ground strap from the dash panel.
- (e) Disconnect the heater hose from the heater pipe.
- (f) Disconnect the heater hose from the water bypass pipe.
- (g) Disconnect the EVAP hose from the pipe (from charcoal canister).



- (h) Disconnect the heater oxygen sensor (bank 1 sensor 1) connector.
- (i) Disconnect the heater oxygen sensor (bank 1 sensor 2) connector.
- (j) Disconnect the generator wire.
- (k) Disconnect the engine wire clamp from the wire clip of generator.
- (l) Disconnect the ground cable from the bracket on the cylinder block.

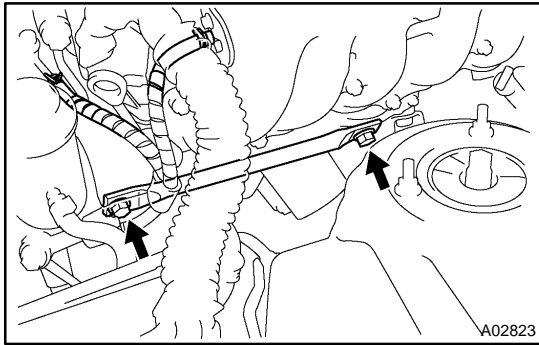


- (m) Disconnect the igniter connector.
- (n) Disconnect the DLC1.
- (o) Disconnect the 2 engine wire clamps from the clamp brackets.



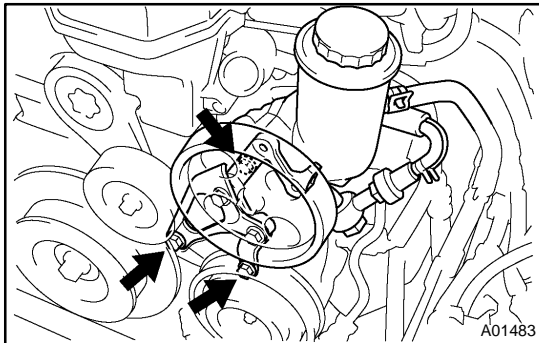
13. DISCONNECT ENGINE WIRE FROM ECM BOX

- (a) Remove the ECM hood and ECM cover.
- (b) Disconnect the 3 ECM connectors.
- (c) Disconnect the 4 wire harness connectors.
- (d) Disconnect the 2 junction connectors.
- (e) Disconnect the grommet and engine wire from the ECM box.

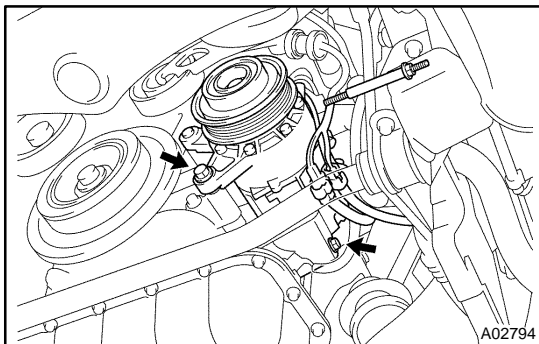


14. DISCONNECT PS PUMP AND A/C COMPRESSOR WITHOUT DISCONNECTING HOSES

- Disconnect the PS air hose from the No.4 timing belt cover.
- Disconnect the PS air hose from the air intake chamber.
- Remove the 2 bolts and pump rear stay.



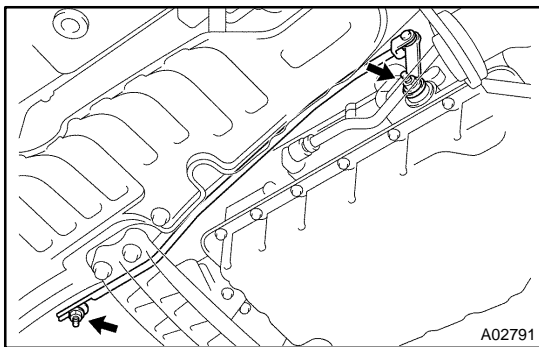
- Remove the 3 bolts and plate washer, and disconnect the vane pump assembly from the engine.



- Loosen the nut.
- Using a torx socket (E10), remove the stud bolt and nut.
- Disconnect the PPS solenoid valve connector.
- Disconnect the A/C compressor connector.
- Remove the 2 bolts, and disconnect the compressor from the engine.

HINT:

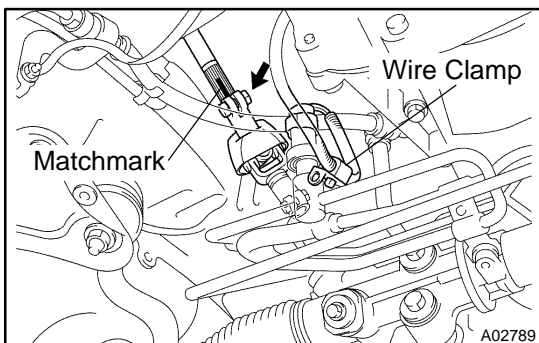
Put aside the vane pump and compressor, and suspend it securely.



15. REMOVE PROPELLER SHAFT (See page [PR-4](#))

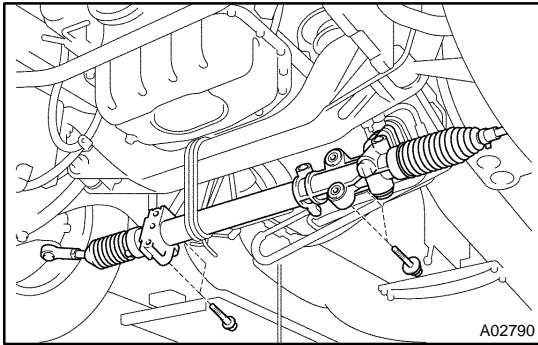
16. REMOVE TRANSMISSION CONTROL ROD

Remove the 2 nuts and control rod.



17. DISCONNECT PS GEAR HOUSING

- Check the steering wheel at the straight-ahead position, and place matchmarks on the sliding yoke and intermediate shaft.
- Remove the bolt holding the sliding yoke to the steering intermediate shaft.
- Disconnect the PS pressure switch connector and wire clamp.

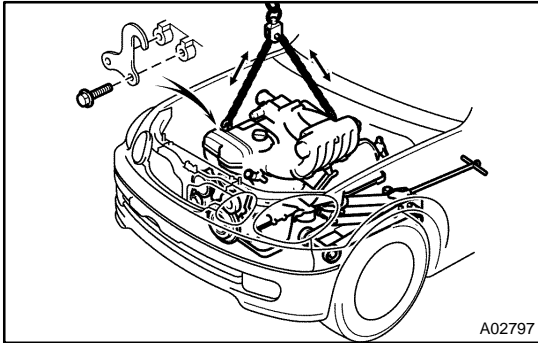


- (d) Remove the 4 bolts, and disconnect the PS housing from the front frame.

- (e) Disconnect the sliding yoke from the intermediate shaft.

HINT:

Suspend the PS gear housing securely.



18. REMOVE ENGINE AND TRANSMISSION ASSEMBLY FROM VEHICLE

- (a) Install the No.1 engine hanger in the correct direction.

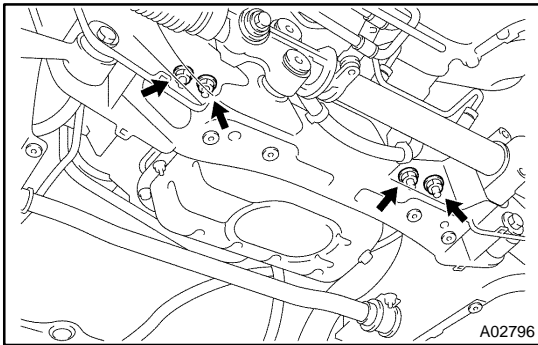
Part No.:

No.1 engine hanger 12281-46050

Bolt 90105-10345

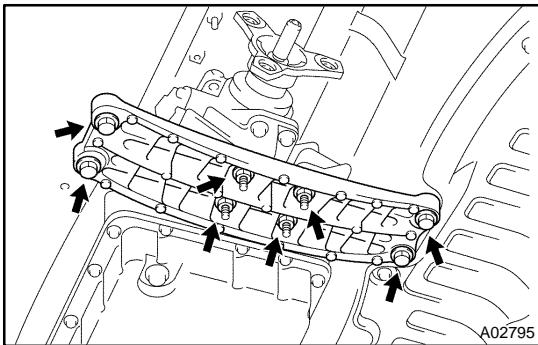
Torque: 40 N·m (400 kgf-cm, 30 ft-lbf)

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

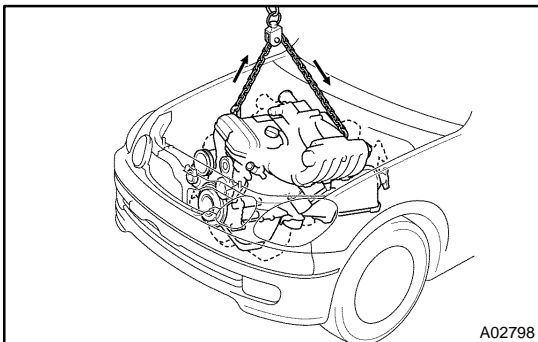


- (c) Remove the 2 hole plugs.

- (d) Remove the 4 nuts holding the engine mounting insulators to the front suspension crossmember.



- (e) Remove the 4 bolts, 4 nuts and rear engine mounting member.

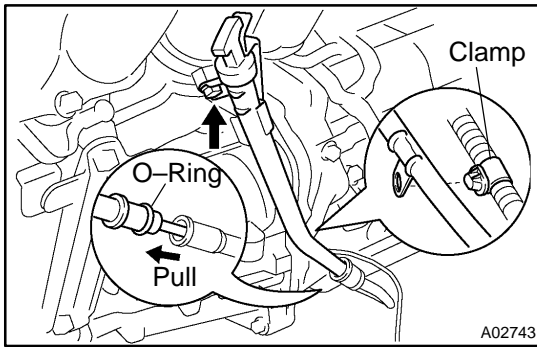


- (f) Lift the engine out of the vehicle slowly and carefully.

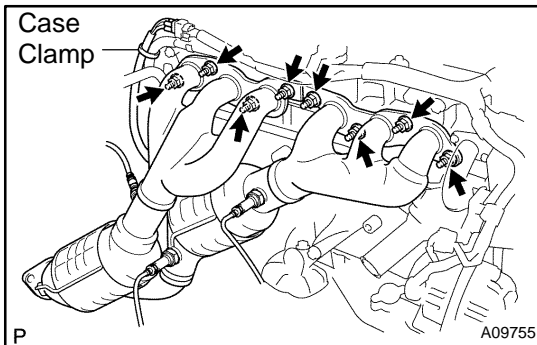
HINT:

Make sure the engine is clear of all wiring, hoses and cables.

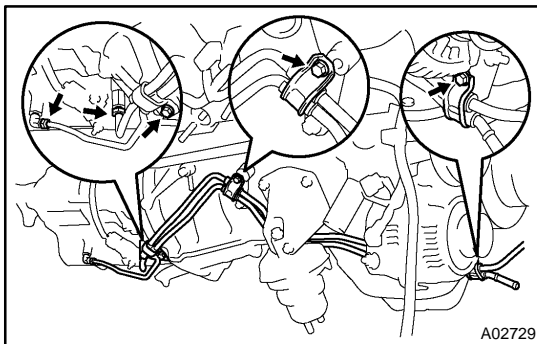
- (g) Place the engine and transmission assembly onto the stand.

**19. REMOVE OIL DIPSTICK AND GUIDE FOR A/T**

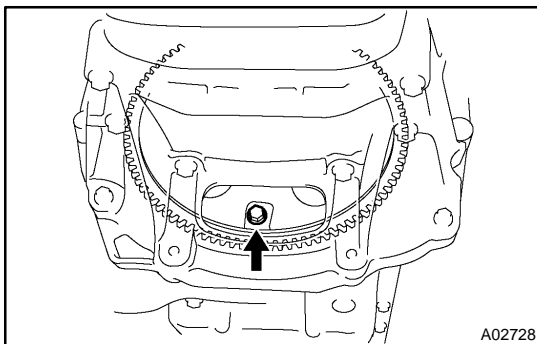
- Disconnect the engine wire clamp from the dipstick guide.
- Remove the bolt.
- Pull out the dipstick guide and dipstick from the dipstick tube.
- Remove the O-ring from the dipstick guide.

**20. REMOVE EXHAUST MANIFOLD**

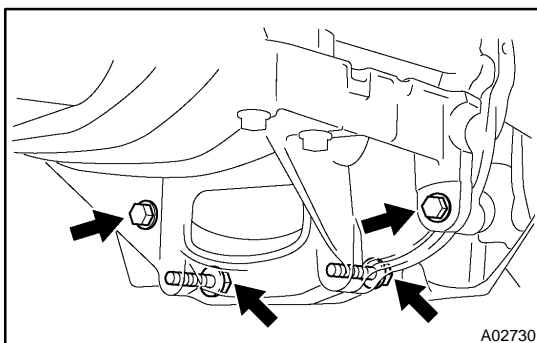
- Remove the case clamp.
- Disconnect the heated oxygen sensor (bank 2 sensor 1) connector.
- Remove the 8 nuts, exhaust manifold and 2 gaskets.

**21. REMOVE OIL COOLER PIPES FOR A/T**

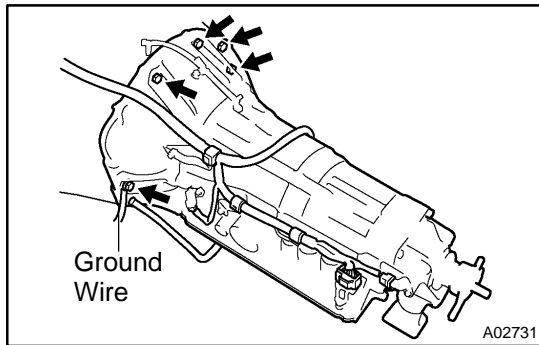
- Remove the 3 bolts and pipe clamps.
- Loosen the 2 union nuts, and remove the 2 oil cooler pipes.

**22. REMOVE TORQUE CONVERTER CLUTCH BOLTS**

- Remove the hole plug.
- Turn the crankshaft pulley bolt to gain access to each bolt.
- Hold the crankshaft pulley bolt with a wrench, and remove the 6 bolts.

**23. REMOVE 4 BOLTS HOLDING NO.1 OIL PAN TO TRANSMISSION****24. REMOVE STARTER**

- Disconnect the starter connector.
- Remove the 2 bolts, clamp bracket and starter.

**25. DISCONNECT ENGINE WIRE FROM TRANSMISSION**

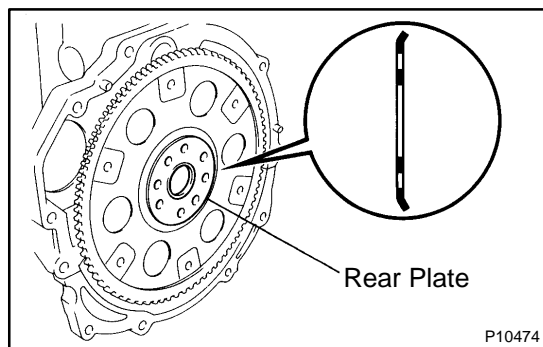
- (a) Disconnect the VSS connector.
- (b) Disconnect the PNP switch connector.
- (c) Disconnect the solenoid connector.
- (d) Disconnect the direct clutch speed sensor connector.
- (e) Disconnect the engine wire from the 3 wire clamps.

26. REMOVE TRANSMISSION FROM ENGINE

- (a) Remove the 5 bolts and ground wire.
- (b) Remove the transmission together with the torque converter clutch from the engine.

27. REMOVE DRIVE PLATE

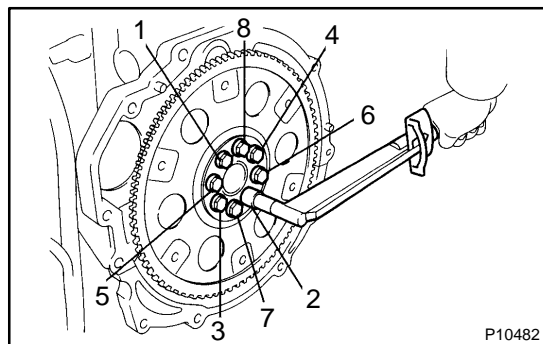
Remove the 8 bolts, rear plate, drive plate and front spacer.



INSTALLATION

1. INSTALL DRIVE PLATE

- (a) Install the front spacer, drive plate and rear plate on the crankshaft.



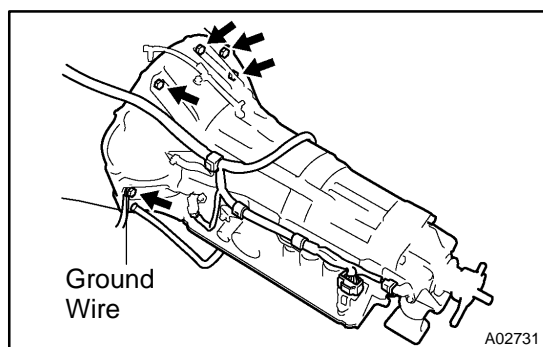
- (b) Apply adhesive to 2 or 3 threads of the mounting bolt end.

Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent

- (c) Install the uniformly tighten the 8 mounting bolts, in several passes, in the sequence shown.

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



2. INSTALL TRANSMISSION TO ENGINE

- (a) Check the torque converter clutch installation.
(See page [AT-39](#))

- (b) Attach the transmission to the engine.

- (c) Install the ground wire and 5 bolts.

Torque: 72 N·m (730 kgf-cm, 53 ft-lbf)

3. CONNECT ENGINE WIRE TO TRANSMISSION

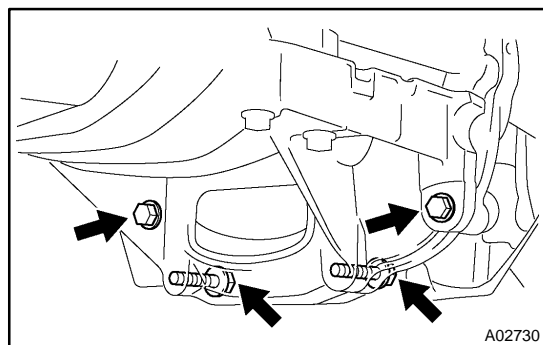
- (a) Connect the VSS connector.
- (b) Connect the PNP switch connector.
- (c) Connect the solenoid connector.
- (d) Connect the direct clutch speed sensor connector.
- (e) Connect the engine wire to the 3 wire clamps.

4. INSTALL STARTER

- (a) Install the starter and clamp bracket with the 2 bolts.

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

- (b) Connect the starter connector.



5. INSTALL 4 BOLTS HOLDING NO.1 OIL PAN TO TRANSMISSION

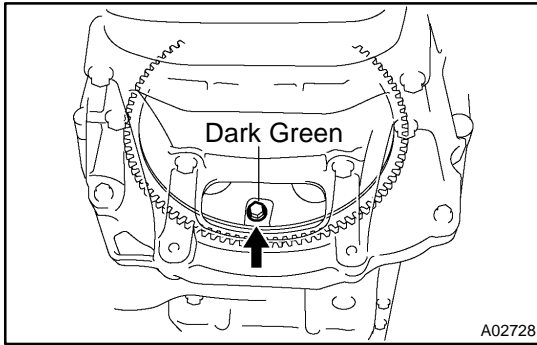
Torque: 37 N·m (380 kgf-cm, 27 ft-lbf)

6. INSTALL TORQUE CONVERTER CLUTCH BOLTS

- (a) Apply adhesive to 2 or 3 threads of the bolt end.

Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent



- (b) Hold the crankshaft pulley bolt with a wrench, and install the 6 bolts evenly.

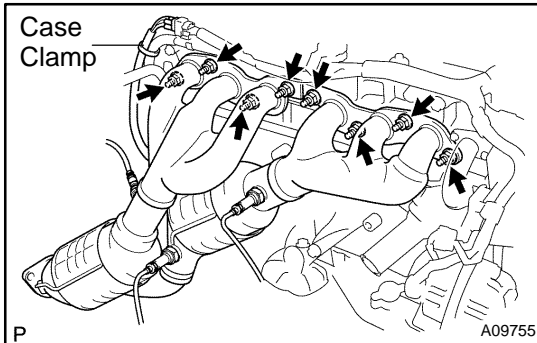
Torque: 48 N·m (490 kgf-cm, 35 ft-lbf)

HINT:

First install the dark green colored bolt, install the other bolts.

- (c) Install the hole plug.

7. INSTALL OIL COOLER PIPE FOR A/T



8. INSTALL EXHAUST MANIFOLD

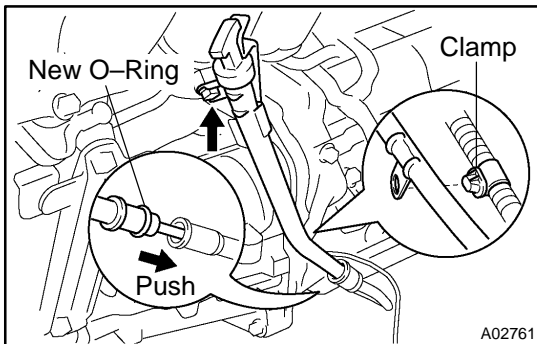
- (a) Install 2 new gaskets to the cylinder head.

- (b) Using a 14 mm deep socket wrench, install the exhaust manifold with the 8 nuts. Uniformly tighten the nuts in several passes.

Torque: 40 N·m (408 kgf-cm, 30 ft-lbf)

- (c) Connect the heated oxygen sensor (bank 2 sensor 1) connector.

- (d) Install the case clamp.



9. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK FOR A/T

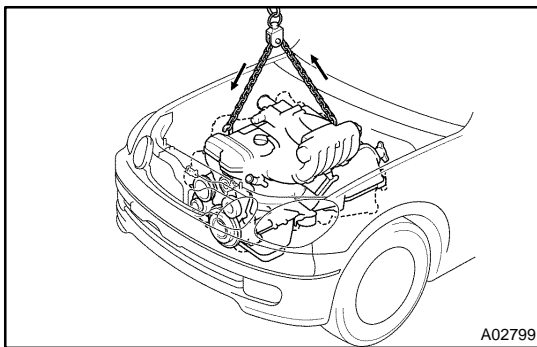
- (a) Install a new O-ring to the dipstick guide.

- (b) Push in the dipstick guide end to the dipstick tube of the oil pan.

- (c) Install the dipstick guide with the bolt.

- (d) Connect the engine wire clamp to the dipstick guide.

- (e) Install the dipstick.



10. INSTALL ENGINE AND TRANSMISSION ASSEMBLY IN VEHICLE

- (a) Attach the engine chain hoist to the engine hangers.

- (b) Slowly lower the engine and transmission assembly into the engine compartment.

- (c) Insert the stud bolts of the front engine mounting brackets into the stud bolt holes of the front suspension crossmember.

- (d) Keep the engine level.

- (e) Install the rear engine mounting member with the 4 bolts and 4 nuts.

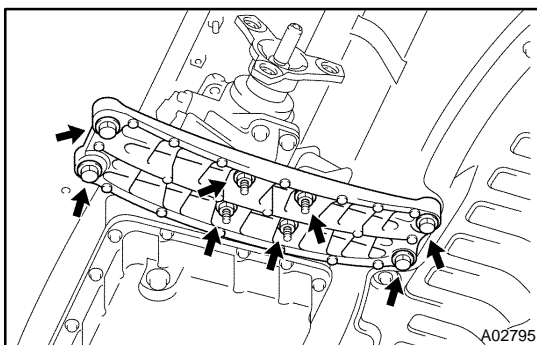
Torque:

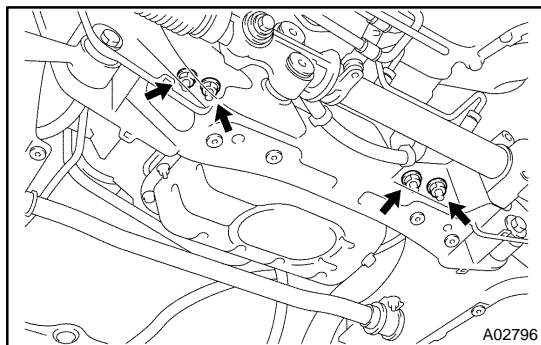
25.5 N·m (260 kgf-cm, 19 ft-lbf) for bolts

13.5 N·m (135 kgf-cm 10 ft-lbf) for nuts

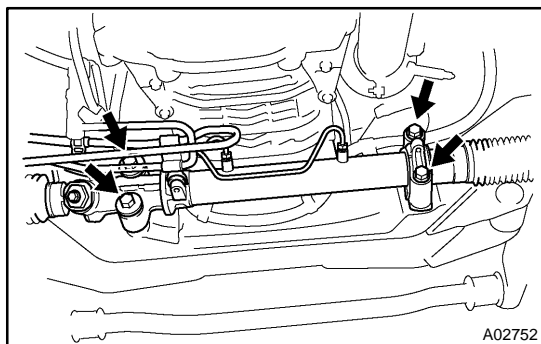
NOTICE:

Be careful of installation direction.



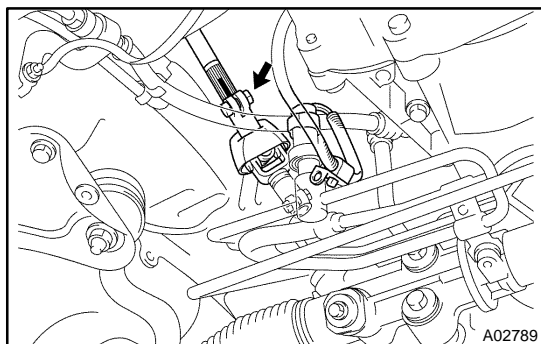


- (f) Install the 4 nuts holding the engine mounting brackets to the front suspension crossmember.
Torque: 70 N·m (714 kgf-cm, 52 ft-lbf)
- (g) Install the 2 hole plugs.
- (h) Remove the engine chain hoist.
- (i) Remove the bolt and No.1 engine hanger.

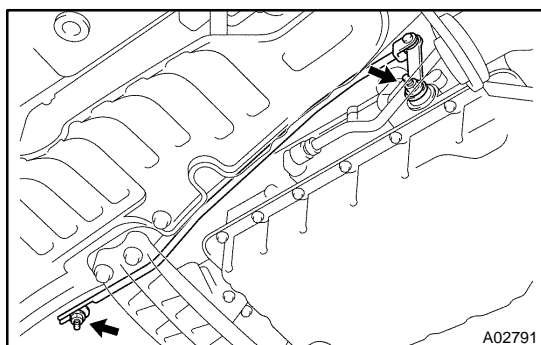


11. INSTALL PS GEAR HOUSING

- (a) Align the matchmarks and connect the sliding yoke to the steering intermediate shaft.
- (b) Install the PS gear housing with the 4 bolts.
Torque: 65 N·m (660 kgf-cm, 48 ft-lbf)



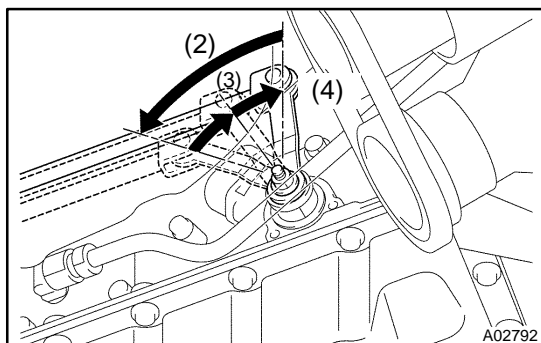
- (c) Install the bolt holding the sliding yoke to the steering intermediate shaft.
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)
- (d) Connect the PS pressure switch and wire clamp.



12. INSTALL TRANSMISSION CONTROL ROD

Install the control rod with the 2 nuts.

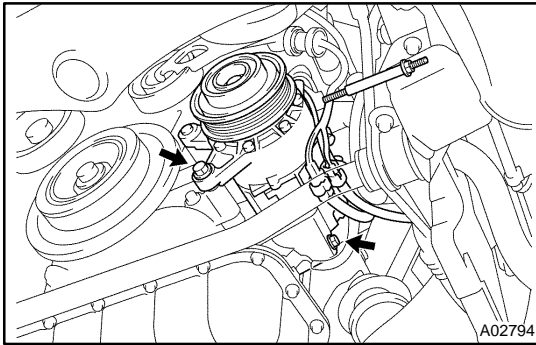
Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)



If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

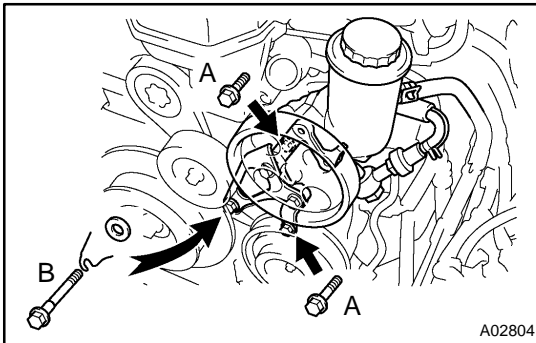
- (1) Loosen the nut on the shift lever.
- (2) Push the control shaft lever fully rearward.
- (3) Return the control shaft lever 2 notches to the N position.
- (4) Set the shift lever to the N position.
- (5) While holding the shift lever lightly toward the R position side, tighten the nut.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

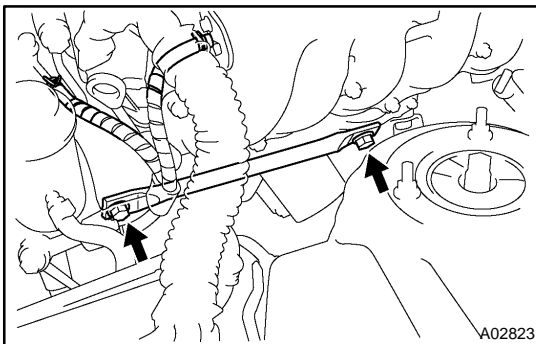


13. INSTALL A/C COMPRESSOR AND PS PUMP

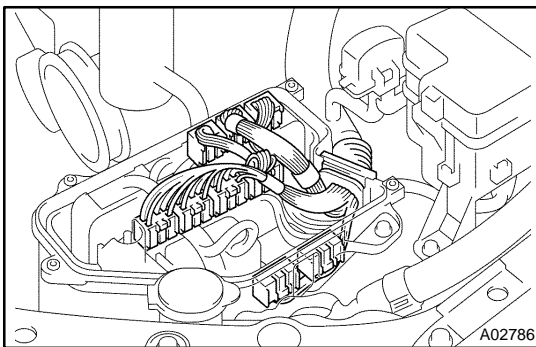
- (a) Temporarily install the compressor with the 2 bolts.
- (b) Using a torx socket (E10), install the stud bolt.
Torque: 26 N·m (265 kgf-cm, 19 ft-lbf)
- (c) Tighten the nut and 2 bolts.
Torque: 52 N·m (530 kgf-cm, 38 ft-lbf)
- (d) Connect the compressor connector.
- (e) Connect the PPS solenoid valve connector.



- (f) Install the vane pump assembly with the 3 bolts and plate washer.
Torque:
57.9 N·m (590 kgf-cm, 43 ft-lbf) for A bolts
52 N·m (530 kgf-cm, 38 ft-lbf) for B bolt

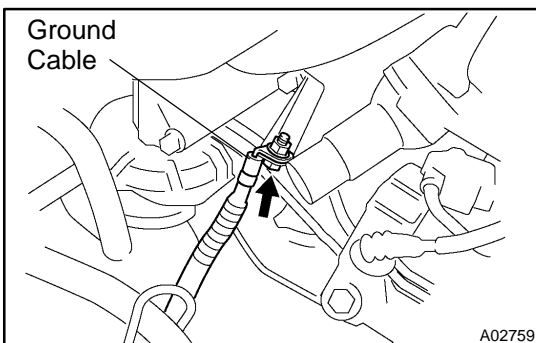


- (g) Install the pump rear stay with the 2 bolts.
Torque: 39.2 N·m (400 kgf-cm, 29 ft-lbf)
- (h) Connect the PS air hose to the No.4 timing belt cover.
- (i) Connect the PS air hose to the air intake chamber.



14. CONNECT ENGINE WIRE TO ECM BOX

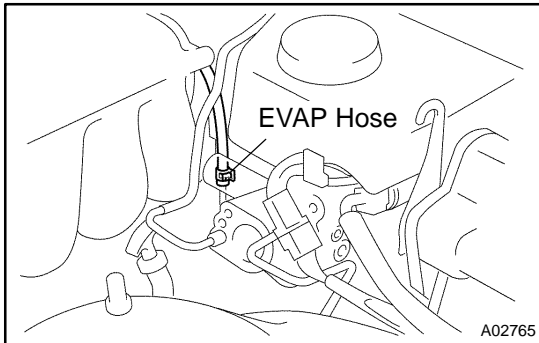
- (a) Install the engine wire grommet to the ECM box.
- (b) Connect the 3 ECM connectors.
- (c) Connect the 4 wire harness connectors.
- (d) Connect the 2 junction connectors.
- (e) Install the ECM cover and ECM hood.



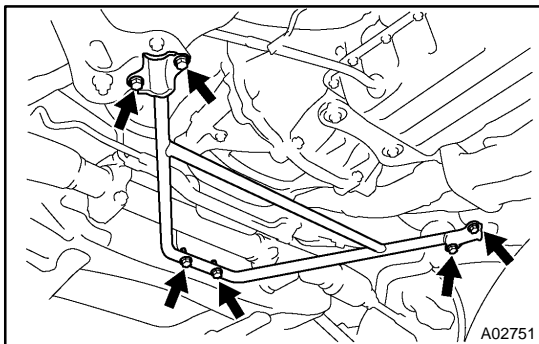
15. CONNECT CLAMPS, WIRES, CONNECTORS, HOSES, CABLE AND STRAP

- (a) Connect the 2 engine wire clamps to the clamp brackets.
- (b) Connect the DLC1.
- (c) Connect the igniter connector.
- (d) Connect the ground cable to the bracket on the cylinder block.
- (e) Connect the engine wire clamp to the wire clip of the generator.
- (f) Connect the generator wire.

- (g) Connect the heated oxygen sensor (bank 1 sensor 1) connector.
- (h) Connect the heated oxygen sensor (bank 1 sensor 2) connector.



- (i) Connect the EVAP hose to the pipe (from charcoal canister).
 - (j) Connect the heater hose to the heater pipe.
 - (k) Connect the heater hose to the water bypass pipe.
 - (l) Connect the ground strap to the dash panel.
 - (m) Connect the fuel inlet hose to the fuel pipe support.
- Torque: 29 N·m (300 kgf-cm, 22 ft-lbf)**
- (n) Connect the starter wire to the terminal and manifold stay.
 - (o) Connect the ground wire to the floor.



16. INSTALL FRONT SUSPENSION MEMBER BRACE

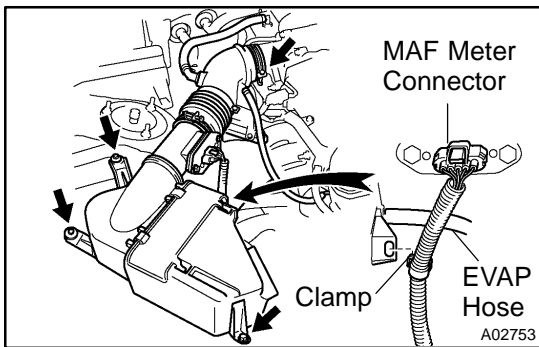
Install the brace with the 6 bolts.

Torque: 58 N·m (590 kgf-cm, 43 ft-lbf)

17. INSTALL DRIVE BELT (See page CH-1)

18. INSTALL RADIATOR ASSEMBLY (See page CO-23)

19. CONNECT ACCELERATOR CABLE TO ENGINE



20. INSTALL AIR CLEANER, MAF METER AND INTAKE AIR CONNECTOR PIPE ASSEMBLY

- (a) Connect the intake air resonator to the throttle body.
- (b) Install the air cleaner case with the 3 bolts.
- (c) Tighten the hose clamp bolt holding the intake air resonator to the throttle body.
- (d) Connect the MAF meter connector.
- (e) Connect the engine wire clamp to the air cleaner case.
- (f) Connect the EVAP hose to the air cleaner case.
- (g) Connect the PS air hose to the No.4 timing belt cover.
- (h) Connect the PCV hose to the No.2 cylinder head cover.

21. INSTALL AIR CLEANER INLET

22. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

23. FILL WITH ENGINE COOLANT

24. FILL WITH ENGINE OIL

25. START ENGINE AND CHECK FOR LEAKS

26. INSTALL ENGINE UNDER COVER

27. INSTALL HOOD**NOTICE:**

Be careful not to damage the body or glass with the hood end.

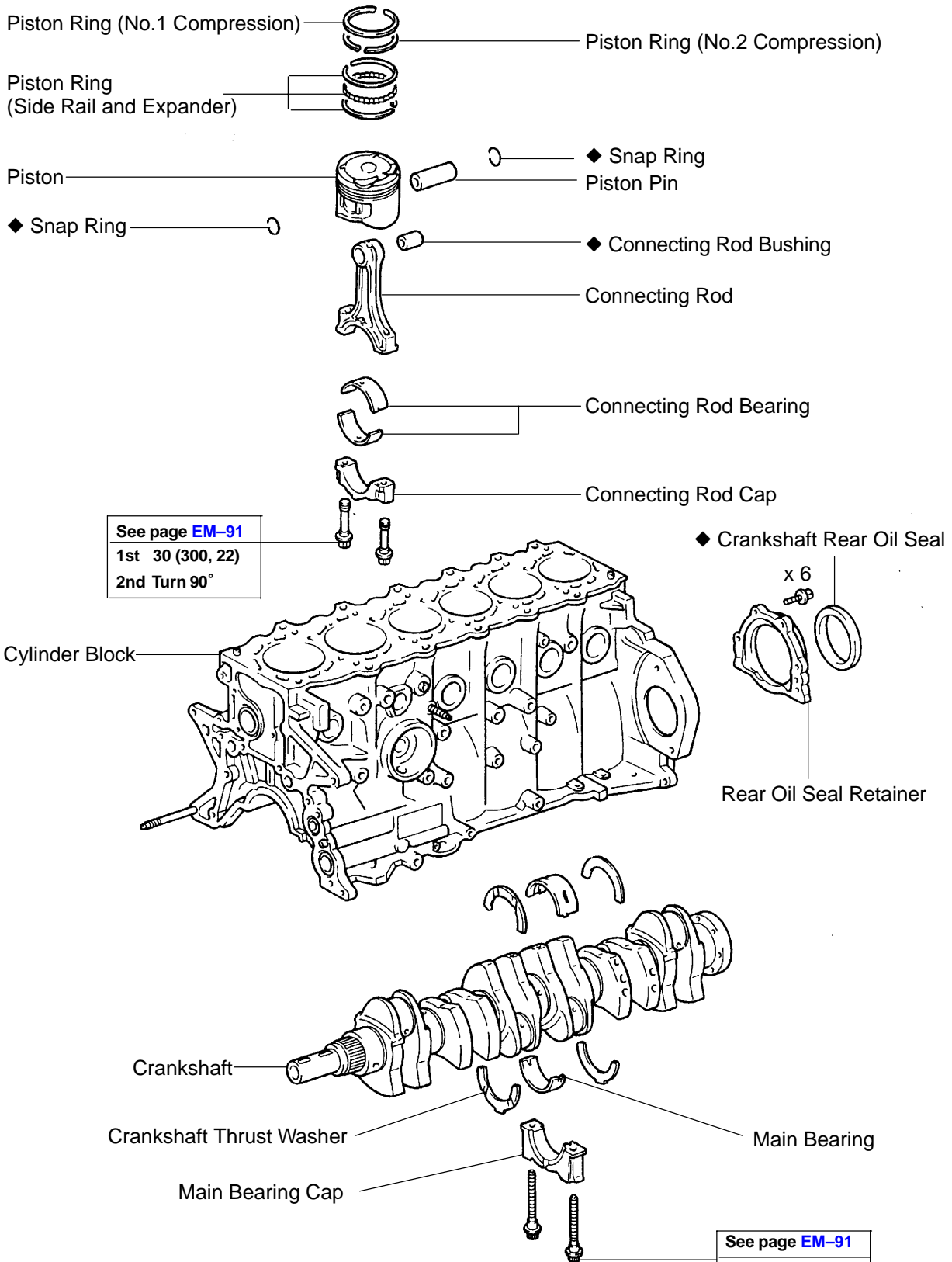
28. PERFORM ROAD TEST

Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

29. RECHECK ENGINE COOLANT AND OIL LEVELS

EM0DJ-03





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

A02806

DISASSEMBLY

1. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY

2. REMOVE GENERATOR

Remove the bolt, nut, pipe bracket and generator.

3. REMOVE TIMING BELT AND PULLEYS (See page EM-16)

4. REMOVE NO.2 WATER BYPASS PIPE WITH HOSE

Remove the bolt, 2 nuts, No.2 water bypass pipe and gasket.

5. REMOVE WATER PUMP

Remove the 6 bolts, water pump and O-ring.

6. REMOVE CYLINDER HEAD (See page EM-33)

7. REMOVE OIL PRESSURE SWITCH AND KNOCK SENSORS

Using SST, remove the switch and sensors.

SST 09816-30010

8. REMOVE OIL FILTER AND BRACKET ASSEMBLY

(a) Remove the union bolt and oil filter bracket.

(b) Remove the gasket from the union bolt.

(c) Remove the O-ring from the oil filter bracket.

9. REMOVE NO.1 OIL PIPE

Remove the union bolt, No.1 oil pipe and 2 gaskets.

10. REMOVE FUEL INLET PIPE

Remove the 2 bolts and fuel inlet pipe.

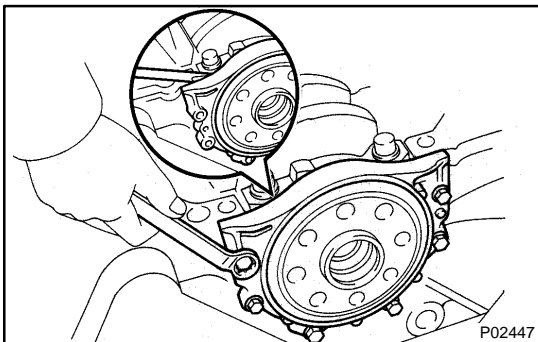
11. REMOVE LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Remove the 4 bolts and mounting bracket.

12. REMOVE RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Remove the 4 bolts and mounting bracket.

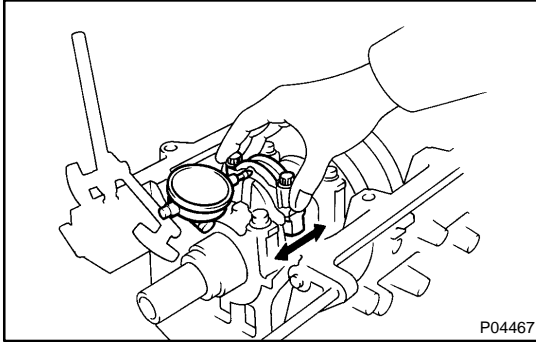
13. REMOVE OIL PUMP (See page LU-6)



14. REMOVE REAR OIL SEAL RETAINER

(a) Remove the 6 bolts of the retainer.

(b) Remove the oil seal retainer by prying the area between the oil seal retainer and main bearing cap with a screwdriver.



15. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rods back and forth.

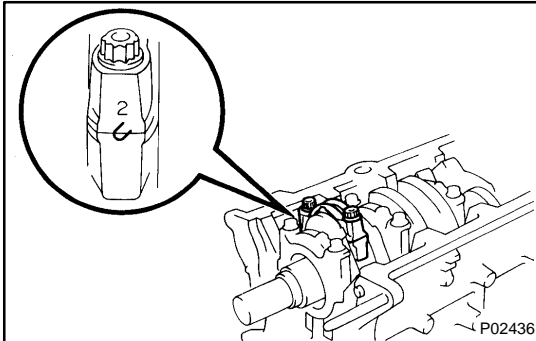
Standard thrust clearance:

0.250 – 0.402 mm (0.0098 – 0.0158 in.)

Maximum thrust clearance:

0.50 mm (0.0197 in.)

If the thrust clearance is greater than maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.

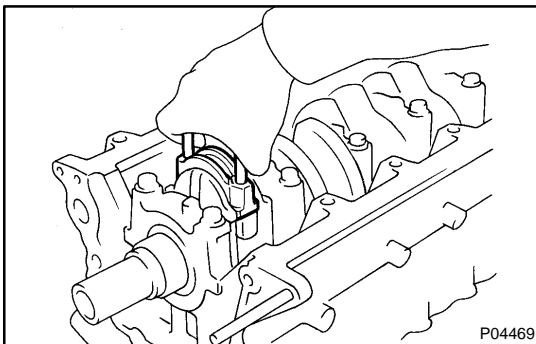


Connecting rod thickness:

25.898 – 25.950 mm (1.0196 – 1.0217 in.)

16. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

- (a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.
- (b) Remove the connecting rod cap bolts.

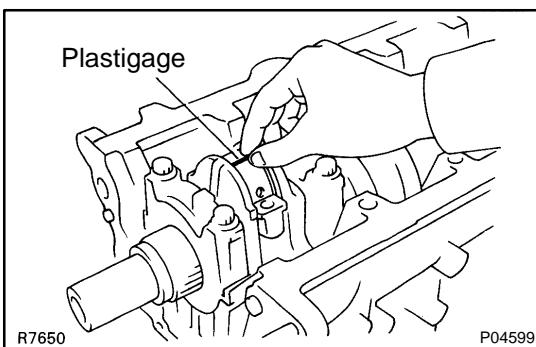


- (c) Using the 2 removed connecting rod bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

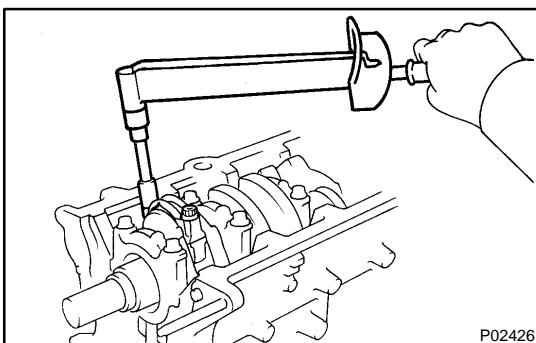
HINT:

Keep the lower bearing inserted with the connecting rod cap.

- (d) Clean the crank pin and bearings.
- (e) Check the crank pin and bearing for pitting and scratches. If the crank pin or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



- (f) Lay a strip of Plastigage across the crank pin.



- (g) Install the connecting rod cap with the 2 bolts. (See page [EM-91](#))

Torque:

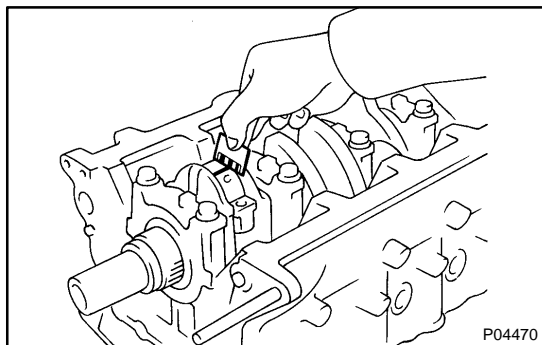
1st 30 N·m (300 kgf·cm, 22 ft·lbf)

2nd Turn extra 90°

NOTICE:

Do not turn the crankshaft.

- (h) Remove the 2 bolts, connecting rod cap and lower bearing. (See procedure (b) and (c) above)



- (i) Measure the Plastigage at its widest point.

Standard oil clearance:

STD	0.023 – 0.041 mm (0.0009 – 0.0016 in.)
U/S 0.25	0.028 – 0.066 mm (0.0011 – 0.0026 in.)

Maximum oil clearance:

STD	0.07 mm (0.0027 in.)
U/S 0.25	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. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the connecting rod cap and crankshaft, then selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly.

	Number mark								
Connecting rod cap	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: Connecting rod cap "3" + Crankshaft "1"
= Total number 4 (Use bearing "4")

Reference

Connecting rod big end inside diameter:

Mark "1"	55.025 – 55.031 mm (2.1663 – 2.1666 in.)
Mark "2"	55.031 – 55.037 mm (2.1666 – 2.1668 in.)
Mark "3"	55.037 – 55.043 mm (2.1668 – 2.1670 in.)

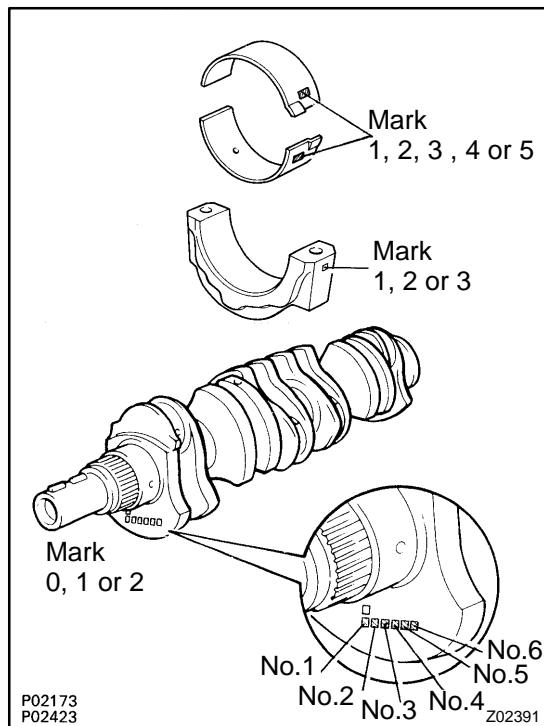
Crankshaft crank pin diameter:

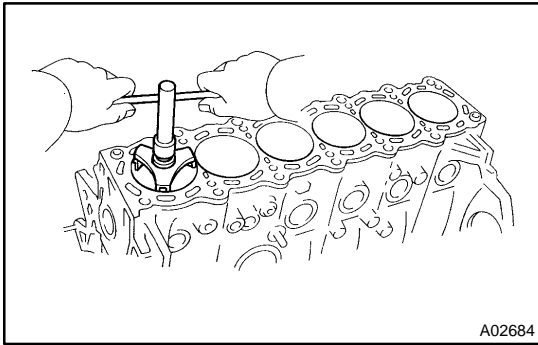
Mark "0"	51.994 – 52.000 mm (2.0470 – 2.0472 in.)
Mark "1"	51.988 – 51.994 mm (2.0468 – 2.0470 in.)
Mark "2"	51.982 – 51.988 mm (2.0465 – 2.0468 in.)

Standard sized bearing center wall thickness:

Mark "1"	1.498 – 1.501 mm (0.0590 – 0.0591 in.)
Mark "2"	1.501 – 1.504 mm (0.0591 – 0.0592 in.)
Mark "3"	1.504 – 1.507 mm (0.0592 – 0.0593 in.)
Mark "4"	1.507 – 1.510 mm (0.0593 – 0.0594 in.)
Mark "5"	1.510 – 1.513 mm (0.0594 – 0.0596 in.)

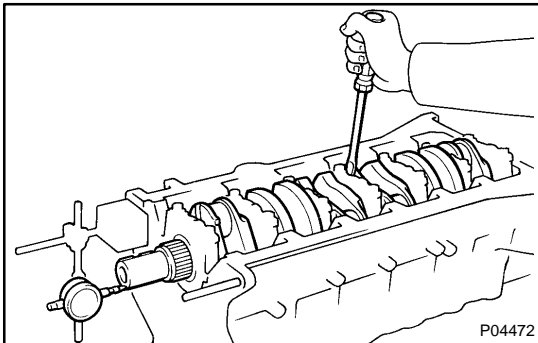
- (j) Completely remove the Plastigage.





17. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

- (a) Using a ridge reamer, remove all the carbon from the top of the cylinder.
- (b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.
 - Keep the bearings, connecting rod and cap together.
 - Arrange the piston and connecting rod assemblies in correct order.



18. 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.)

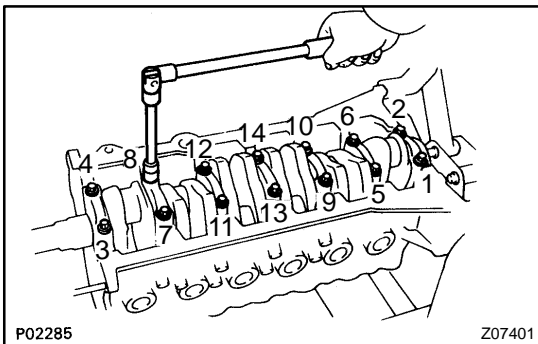
If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:

1.940 – 1.990 mm (0.0764 – 0.0783 in.)

19. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

- (a) Uniformly loosen and remove the 14 main bearing cap bolts, in several passes, in the sequence shown.



- (b) Using the removed main bearing cap bolts, pry the main bearing cap back and forth, and remove the main bearing caps, lower bearings and lower thrust washers (No.4 main bearing cap only).

HINT:

- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.

- (c) Lift out the crankshaft.

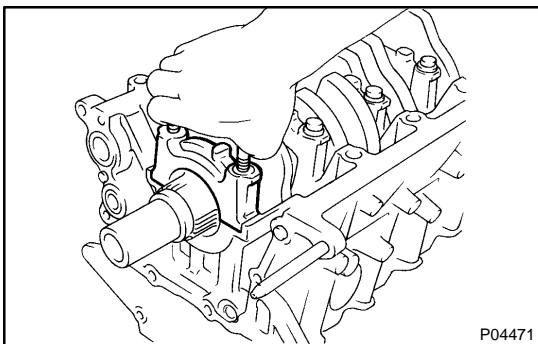
HINT:

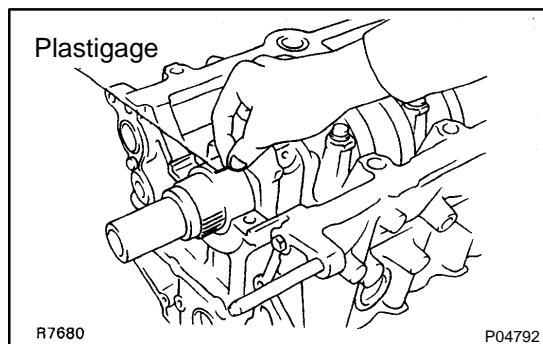
Keep the upper bearing and upper thrust washers together with the cylinder block.

- (d) Clean each main journal and bearing.
- (e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

- (f) Place the crankshaft on the cylinder block.





- (g) Lay a strip of Plastigage across each journal.
 (h) Install the main bearing caps. (See page EM-91)

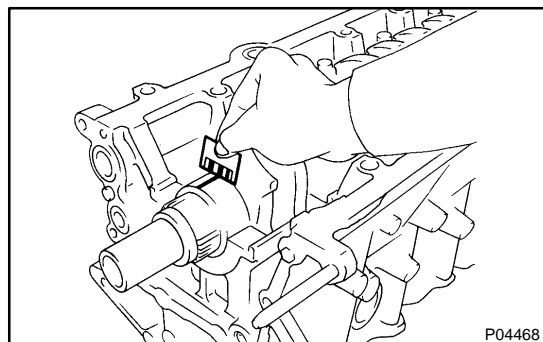
Torque:

- 1st 45 N·m (450 kgf-cm, 33 ft-lbf)**
2nd Turn extra 90°

NOTICE:

Do not turn the crankshaft.

- (i) Remove the main bearing caps.
 (See procedures (a) and (b) above)



- (j) Measure the Plastigage at its widest point.

Standard clearance:

STD	0.026 – 0.040 mm (0.0010 – 0.0016 in.)
U/S 0.25	0.025 – 0.061 mm (0.0010 – 0.0024 in.)

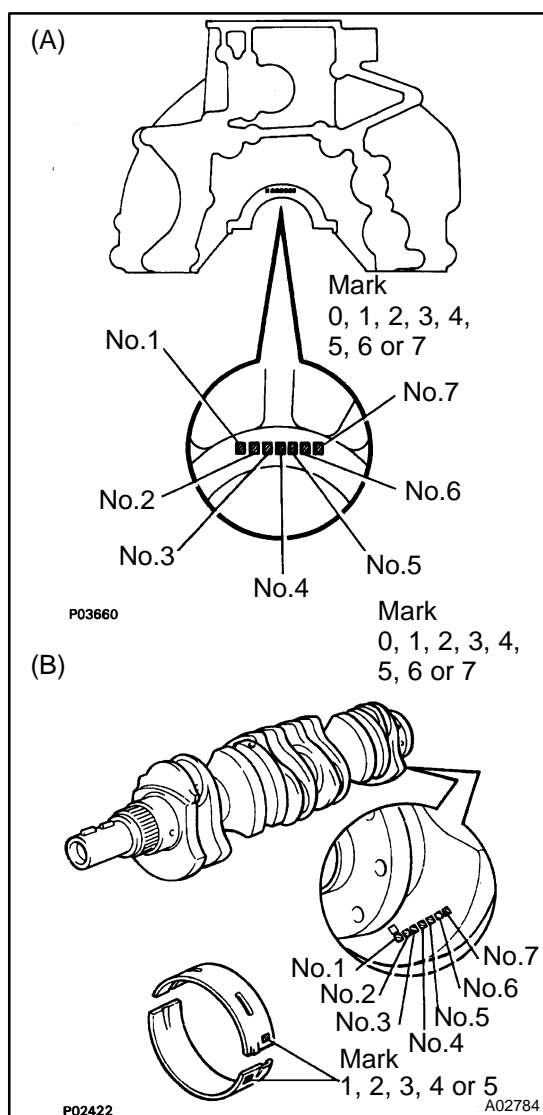
Maximum clearance:

STD	0.06 mm (0.0024 in.)
U/S 0.25	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. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then refer to the table below for the appropriate bearing number. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly.



	Total number " " : Number mark				
Cylinder block (A) + Crankshaft (B) =	0-2	3-5	6-8	9-11	12-14
Use bearing	"1"	"2"	"3"	"4"	"5"

EXAMPLE: Cylinder block "3" (A)

+ Crankshaft "4" (B)

= Total number 7 (Use bearing "3")

Standard sized bearing selection chart:

Crankshaft number mark	Cylinder block number mark							
	0	1	2	3	4	5	6	7
0	1	1	1	2	2	2	3	3
1	1	1	2	2	2	3	3	3
2	1	2	2	2	3	3	3	4
3	2	2	2	3	3	3	4	4
4	2	2	3	3	3	4	4	4
5	2	3	3	3	4	4	4	4
6	3	3	3	4	4	5	5	5
7	3	3	4	4	5	5	5	5

EXAMPLE: Cylinder block "3" Crankshaft "4"
= Use bearing "3"

Reference**Cylinder block main journal bore diameter (A):**

Mark "0"	66.020 – 66.022 mm (2.59922 – 2.59929 in.)
Mark "1"	66.022 – 66.024 mm (2.59929 – 2.59936 in.)
Mark "2"	66.024 – 66.026 mm (2.59936 – 2.59944 in.)
Mark "3"	66.026 – 66.028 mm (2.59944 – 2.59952 in.)
Mark "4"	66.028 – 66.030 mm (2.59952 – 2.59960 in.)
Mark "5"	66.030 – 66.032 mm (2.59960 – 2.59968 in.)
Mark "6"	66.032 – 66.034 mm (2.59968 – 2.59976 in.)
Mark "7"	66.034 – 66.036 mm (2.59976 – 2.59984 in.)

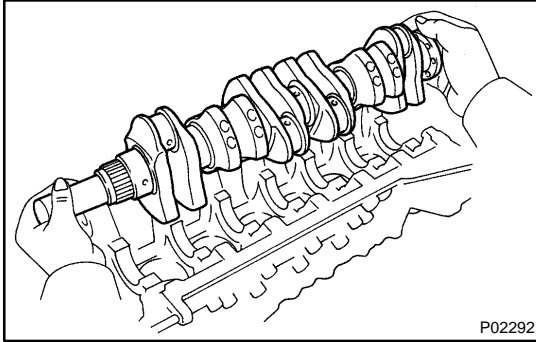
Crankshaft main journal diameter (B):

Mark "0"	61.998 – 62.000 mm (2.44086 – 2.44094 in.)
Mark "1"	61.996 – 61.998 mm (2.44078 – 2.44086 in.)
Mark "2"	61.994 – 61.996 mm (2.44070 – 2.44078 in.)
Mark "3"	61.992 – 61.994 mm (2.44063 – 2.44070 in.)
Mark "4"	61.990 – 61.992 mm (2.44055 – 2.44063 in.)
Mark "5"	61.988 – 61.990 mm (2.44047 – 2.44055 in.)
Mark "6"	61.986 – 61.988 mm (2.44039 – 2.44047 in.)
Mark "7"	61.984 – 61.986 mm (2.44031 – 2.44039 in.)

Standard bearing center wall thickness:

Mark "1"	1.994 – 1.997 mm (0.0785 – 0.0786 in.)
Mark "2"	1.997 – 2.000 mm (0.0786 – 0.0787 in.)
Mark "3"	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
Mark "4"	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
Mark "5"	2.006 – 2.009 mm (0.0790 – 0.0791 in.)

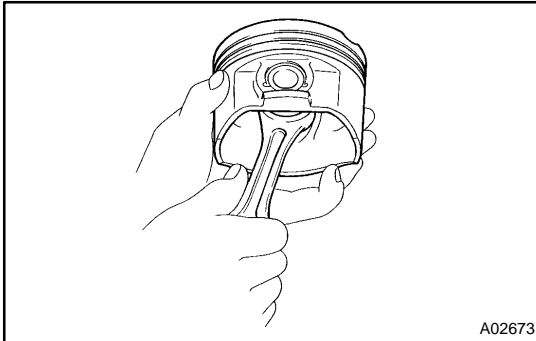
(k) Completely remove the Plastigage.

**20. REMOVE CRANKSHAFT**

- (a) Lift out the crankshaft
- (b) Remove the upper bearings and upper thrust washers from the cylinder block.

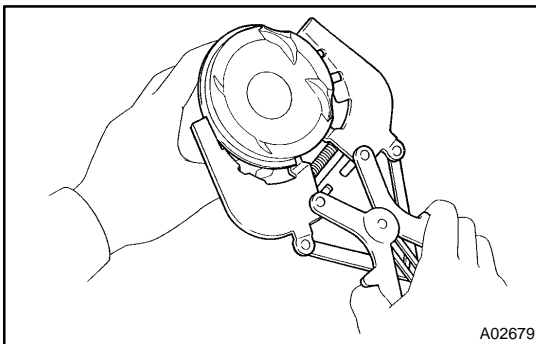
HINT:

Arrange the main bearing caps, bearings and thrust washers in the correct order.

**21. CHECK FIT BETWEEN PISTON AND PISTON PIN**

Try to move the piston back and forth on the piston pin.

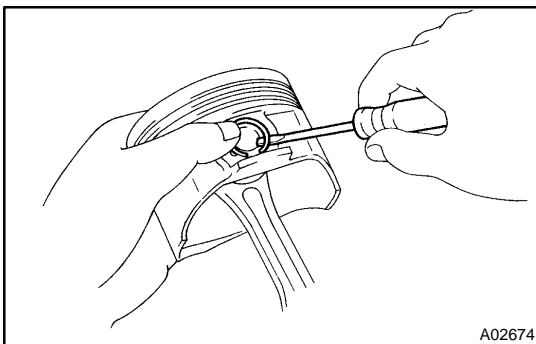
If any movement is felt, replace the piston and pin as a set.

**22. REMOVE PISTON RINGS**

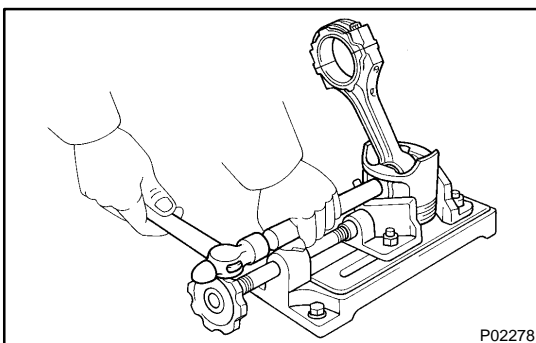
- (a) Using a piston ring expander, remove the 2 compression rings.
- (b) Remove the 2 side rails and oil ring expander by hand.

HINT:

Arrange the piston rings in correct order only.

**23. DISCONNECT CONNECTING ROD FROM PISTON**

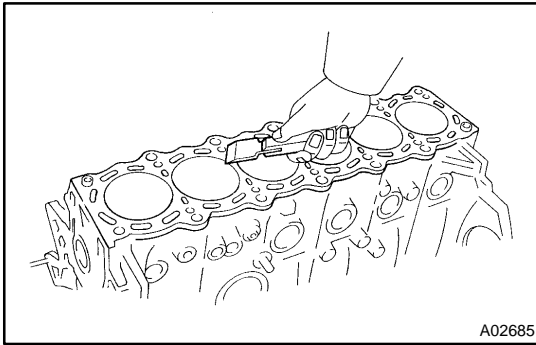
- (a) Using a small screwdriver, remove the 2 snap rings.
- (b) Gradually heat the piston to about 80°C (176°F).



- (c) Using a plastic-faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

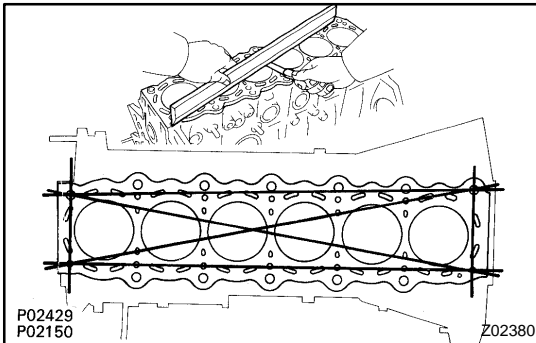
- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.



INSPECTION

1. CLEAN CYLINDER BLOCK

- (a) Remove gasket material
Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (b) Clean cylinder block
Using a soft brush and solvent, thoroughly clean the cylinder block.

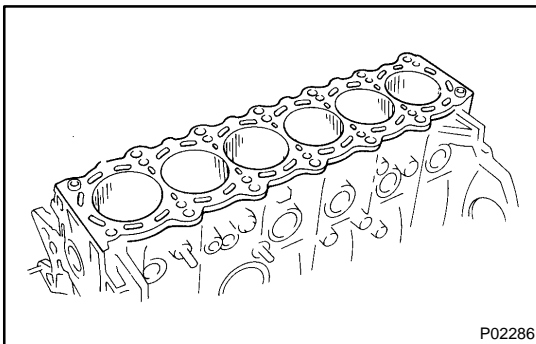


2. INSPECT CYLINDER BLOCK SURFACE FOR FLATNESS

Using precision straight edge and feeler gauge, measure the top surfaces of the cylinder block for warpage.

Maximum warpage: 0.07 mm (0.0028 in.)

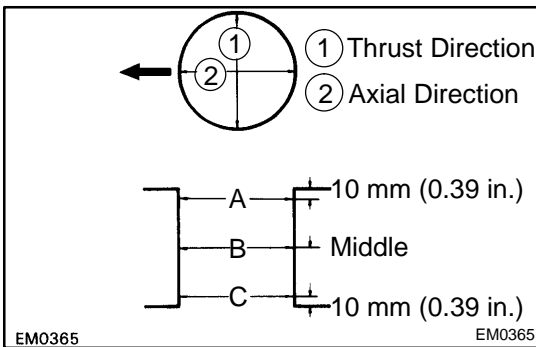
If warpage is greater than maximum, replace the cylinder block.



3. INSPECT CYLINDER FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

If deep scratches are present, replace the cylinder block.



4. INSPECT CYLINDER BORE DIAMETER

Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

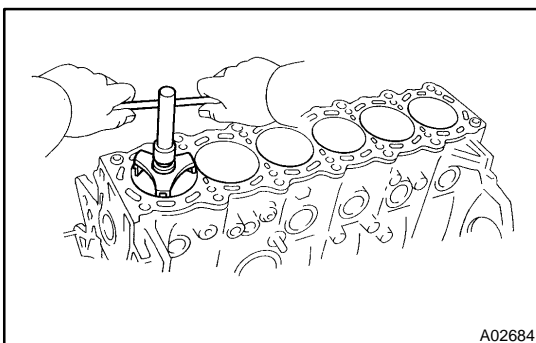
Standard diameter:

86.000 – 86.013 mm (3.3858 – 3.3863 in.)

Maximum diameter:

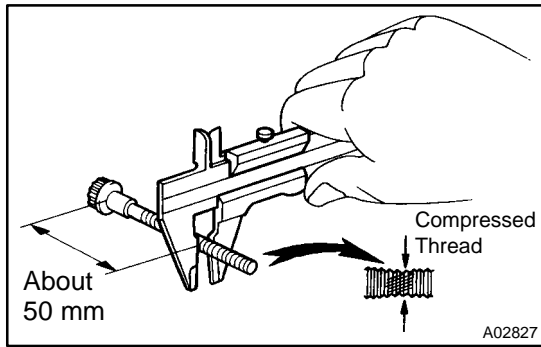
86.02 mm (3.3866 in.)

If the diameter is greater than maximum, replace the cylinder block.



5. 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.



6. INSPECT MAIN BEARING CAP BOLTS

Using vernier calipers, measure the minimum diameter of the compressed thread at the measuring point.

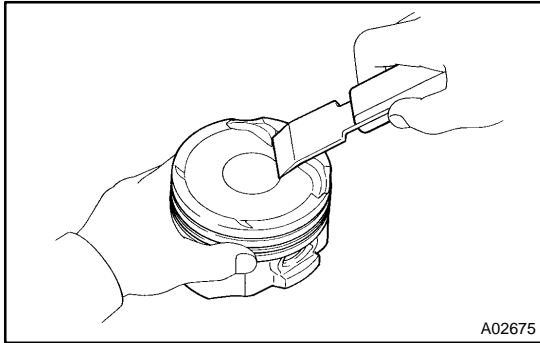
Standard diameter:

9.96 – 9.97 mm (0.3921 – 0.3925 in.)

Minimum diameter:

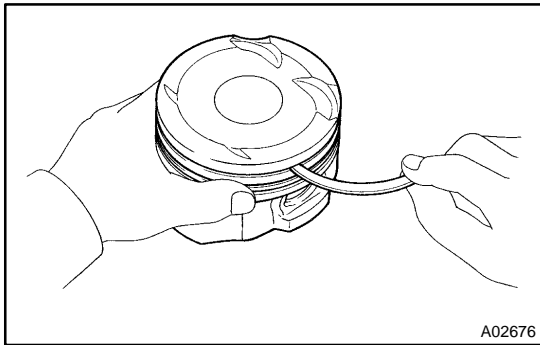
9.7 mm (0.382 in.)

If the diameter is less than minimum, replace the bolt.



7. CLEAN PISTON

- (a) Using a gasket scraper, remove the carbon from the piston top.

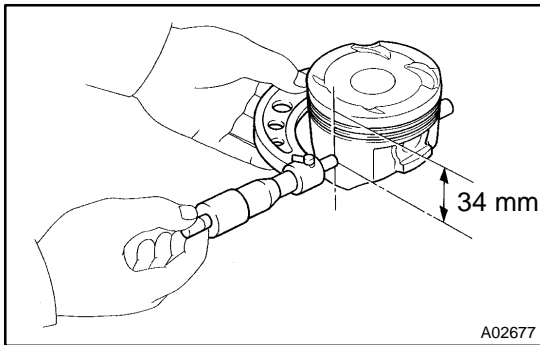


- (b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.

- (c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



8. INSPECT PISTON OIL CLEARANCE

- (a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 34 mm (1.34 in.) from the piston head.

Piston diameter:

85.945 – 85.965 mm (3.3837 – 3.3844 in.)

- (b) Measure the cylinder bore diameter in the thrust directions. (See step 4)

- (c) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

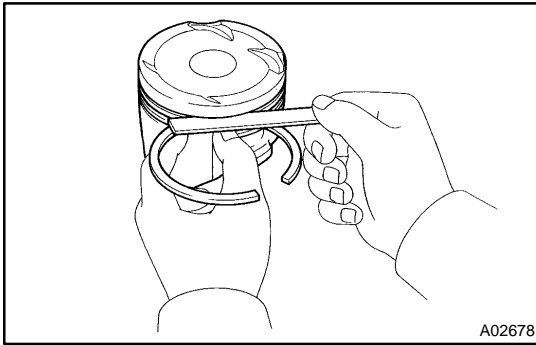
Standard oil clearance:

0.035 – 0.068 mm (0.0014 – 0.0027 in.)

Maximum oil clearance:

0.10 mm (0.0039 in.)

If the oil clearance is greater than maximum, replace all the 6 pistons. If necessary, replace the cylinder block.



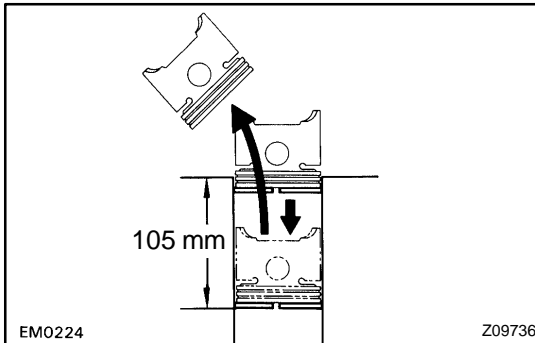
9. INSPECT PISTON RING GROOVE CLEARANCE

Using a feeler gauge, measure the clearance between new piston ring and the wall of the piston ring groove.

Ring groove clearance:

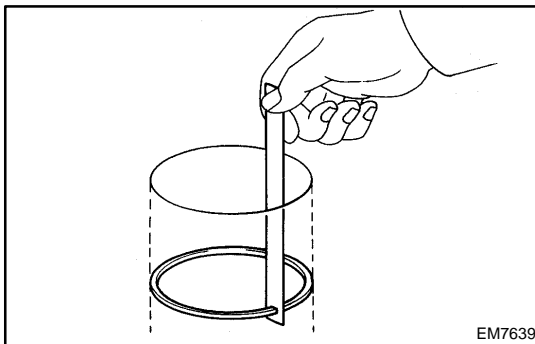
No.1	0.011 – 0.070 mm (0.0004 – 0.0028 in.)
No.2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)

If the clearance is not as specified, replace the piston.



10. INSPECT PISTON RING END GAP

- (a) Insert the piston ring into the cylinder bore.
- (b) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 105 mm (4.13 in.) from the top of the cylinder block.



- (c) Using a feeler gauge, measure the ring end gap.

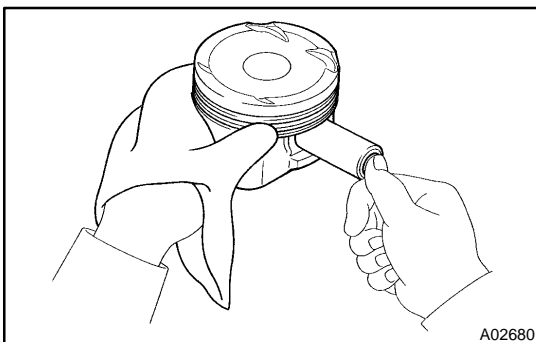
Standard ring end gap:

No.1	0.300 – 0.470 mm (0.0118 – 0.0185 in.)
No.2	0.350 – 0.520 mm (0.0138 – 0.0205 in.)
Oil (Side rail)	0.130 – 0.450 mm (0.0051 – 0.0177 in.)

Maximum ring end gap:

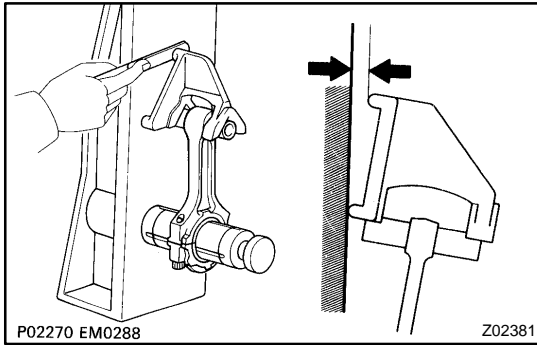
No.1	1.07 mm (0.0421 in.)
No.2	1.12 mm (0.0441 in.)
Oil (Side rail)	1.05 mm (0.0413 in.)

If the end gap is greater than maximum, replace the piston ring.
If the end gap is greater than maximum, even with a new piston ring, replace the cylinder block.



11. INSPECT PISTON PIN FIT

At 80°C (176°F), you should be able to push the piston pin into the piston pin hole with your thumb.



12. INSPECT CONNECTING ROD ALIGNMENT

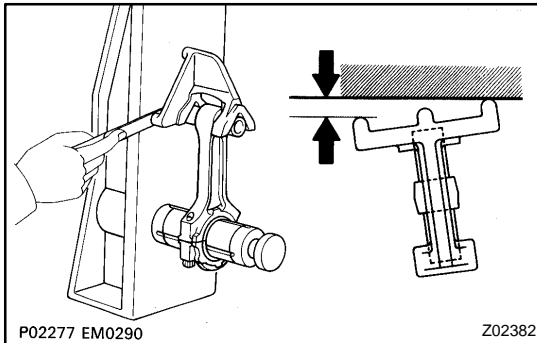
Using a feeler gauge and rod aligner, check the connecting rod alignment.

- Check for out-of-alignment

Maximum out-of-alignment:

0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If out-of-alignment is greater than maximum, replace the connecting rod assembly.

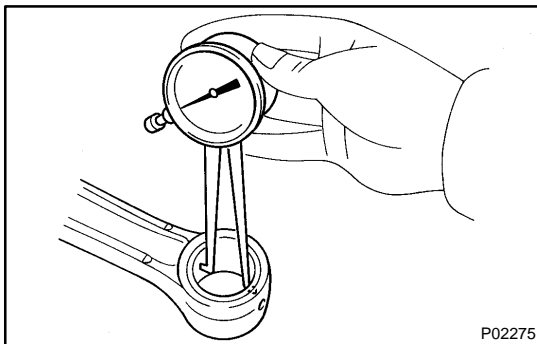


- Check for twist

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twist is greater than maximum, replace the connecting rod assembly.

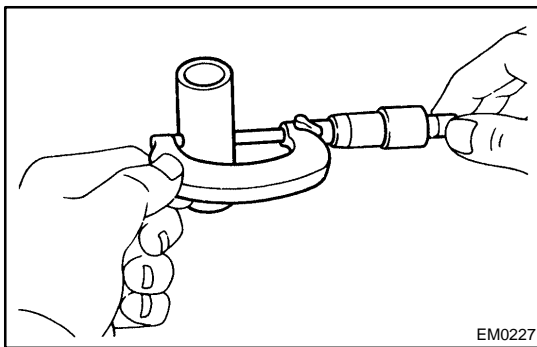


13. INSPECT PISTON PIN OIL CLEARANCE

- (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.

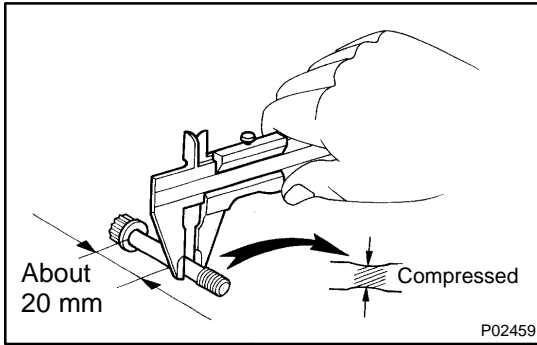
Standard oil clearance:

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.



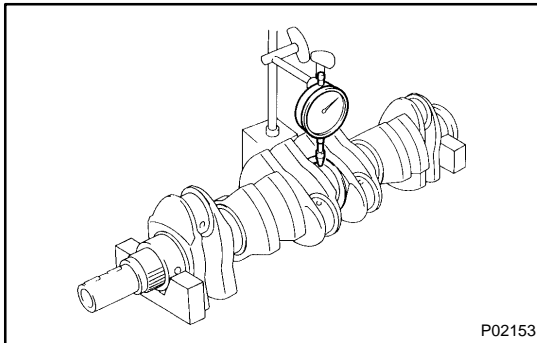
14. INSPECT CONNECTING ROD BOLTS

Using vernier calipers, measure the minimum diameter of the compressed bolt at the measuring point.

Standard diameter: 8.1 – 8.3 mm (0.319 – 0.327 in.)

Minimum diameter: 8.0 mm (0.315 in.)

If the diameter is less than minimum, replace the connecting rod bolt.



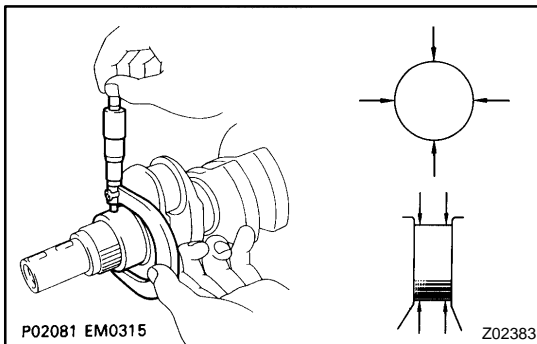
15. INSPECT CRANKSHAFT FOR RUNOUT

(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.



16. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

STD	61.984 – 62.000 mm (2.4403 – 2.4409 in.)
U/S 0.25	61.745 – 61.755 mm (2.4309 – 2.4313 in.)

Crank pin diameter:

STD	51.982 – 52.000 mm (2.0465 – 2.0472 in.)
U/S 0.25	51.745 – 51.755 mm (2.0372 – 2.0376 in.)

If the diameter is not as specified, check the oil clearance.

(See page [EM-76](#))

(b) Check each main journal and crank pin for taper and out-of-round as shown.

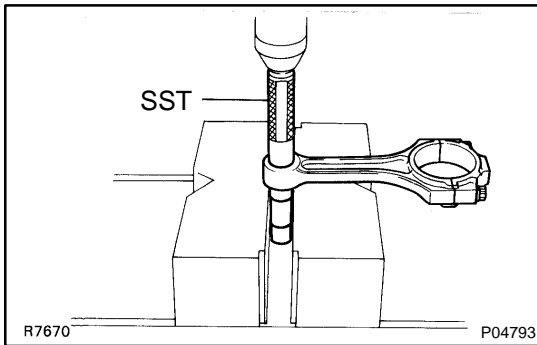
Maximum taper and out-of round:

0.02 mm (0.0008 in.)

If the taper or out-of-round is greater than maximum, grind or replace the crankshaft.

17. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

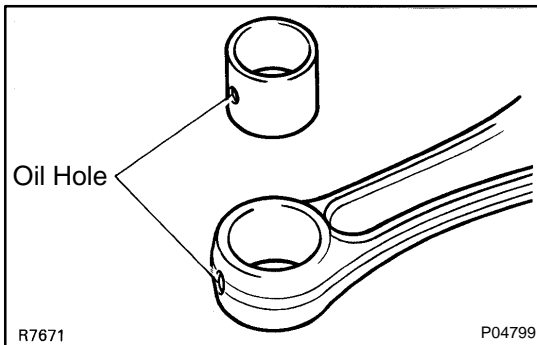
- Grind and hone the main journals and/or crank pins to the finished undersized diameter (See procedure step 16).
- Install new main journal and/or crank pin undersized bearings.



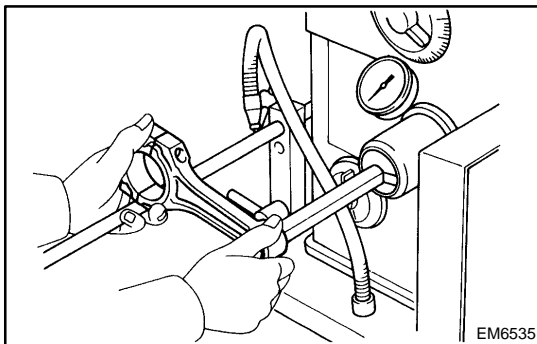
REPLACEMENT

1. REPLACE CONNECTING ROD BUSHING

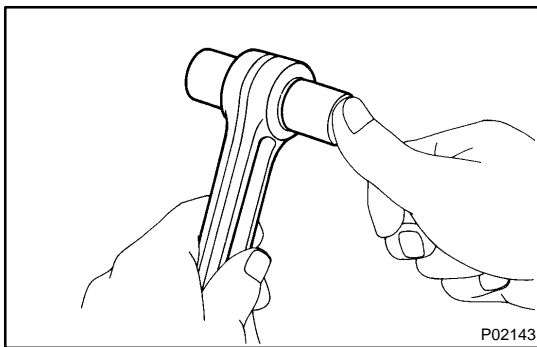
- (a) Using SST and a press, press out the bushing.
SST 09222-30010



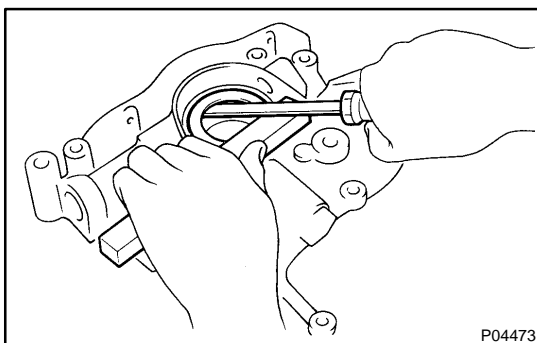
- (b) Align the oil holes of a new bushing and the connecting rod.
(c) Using SST and a press, press in the bushing.
SST 09222-30010



- (d) Using a pin hole grinder, bore the bushing to obtain the standard specified clearance (See page EM-83) between the bushing and piston pin.



- (e) Check the piston pin fit at room temperature.
Coat the piston pin with engine oil and push it into the connecting rod with your thumb.

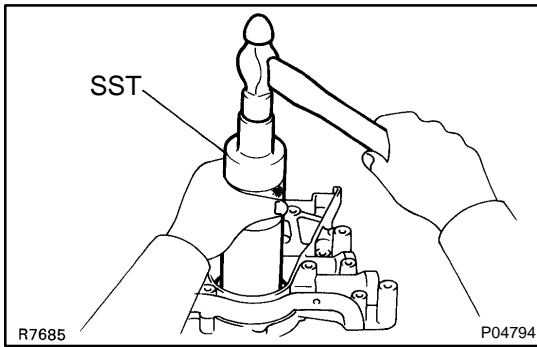


2. REPLACE CRANKSHAFT FRONT OIL SEAL

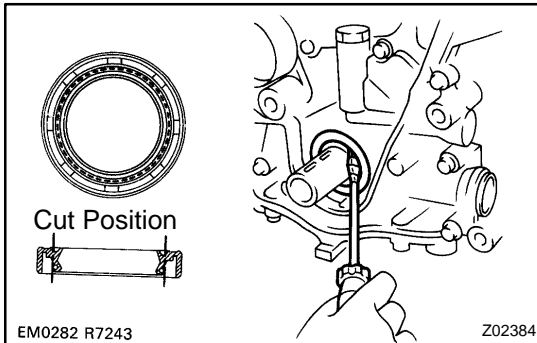
HINT:

There are 2 methods (a) and (b) to replace the oil seal as follows:

- (a) If the oil pump is removed from the cylinder block.
(1) Using a screwdriver, pry out the oil seal.



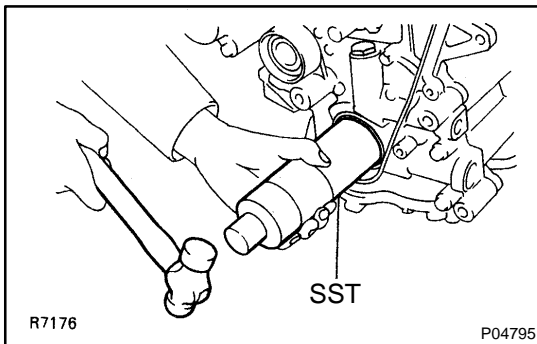
- (2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.
- SST 09316-60011 (09316-00011)
- (3) Apply MP grease to the oil seal lip.



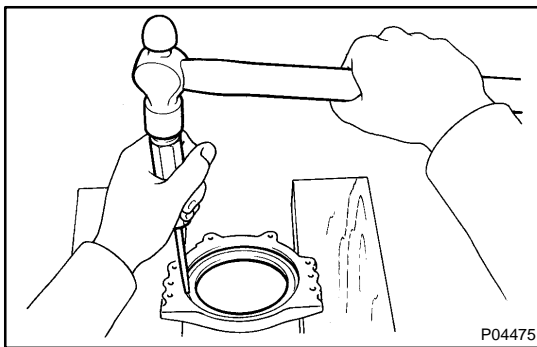
- (b) If the pump is installed on the cylinder block.
 - (1) Using a knife, cut off the oil seal lip.
 - (2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.

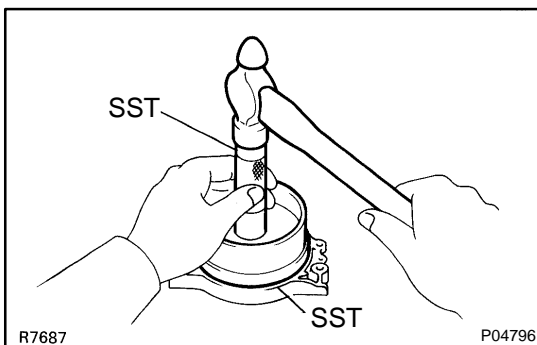


- (3) Apply MP grease to a new oil seal lip.
- (4) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
- SST 09316-60011 (09316-00011)

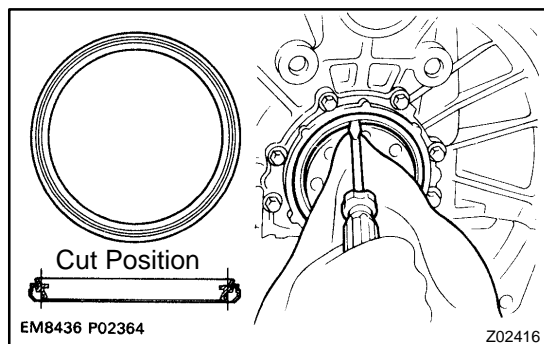
**3. REPLACE CRANKSHAFT REAR OIL SEAL****HINT:**

There are 2 methods (a) and (b) to replace the oil seal as follows:

- (a) If the rear oil seal retainer is removed from the cylinder block.
 - (1) Using a screwdriver and hammer, tap out the oil seal.



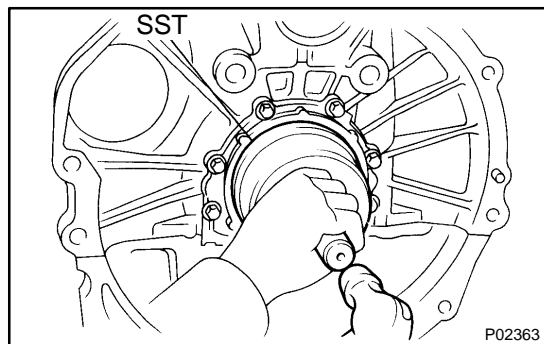
- (2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
- SST 09223-15030, 09950-70010 (09951-07100)
- (3) Apply MP grease to the oil seal lip.



- (b) If the rear seal retainer is installed on the cylinder block.
- (1) Using a knife, cut off the oil seal lip.
 - (2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.



- (3) Apply MP grease to a new oil seal lip.
 - (4) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
- SST 09223-15030, 09950-70010 (09951-07100)

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O-rings and oil seals with new parts.

NOTICE:

Apply a generous amount of oil on the sliding surface of the bearing, and not on the back of it or on the surface to which it is installed.

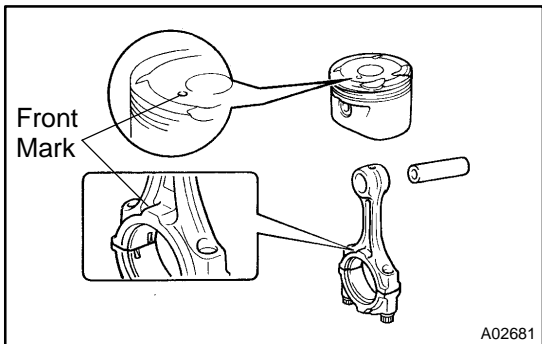
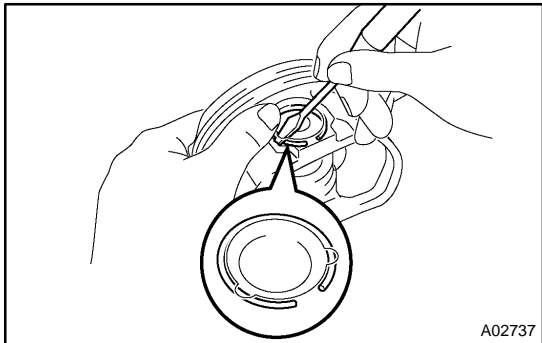
1. ASSEMBLE PISTON AND CONNECTING ROD

- Using a small screwdriver, 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.

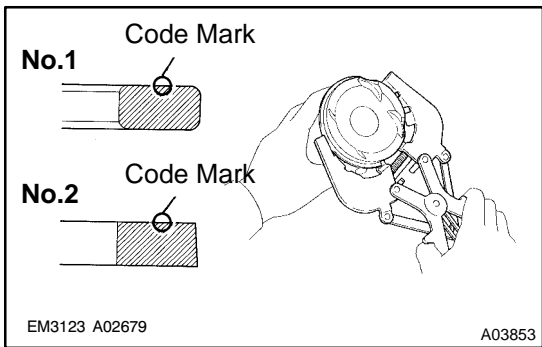
- Gradually heat the piston to about 80°C (176°F).



- Coat the piston pin with engine oil.
- Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.
- Install a new snap ring at the other end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

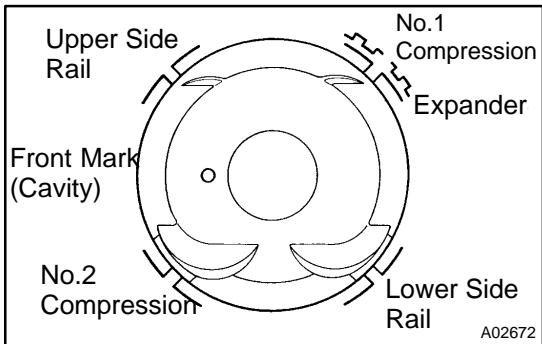


2. INSTALL PISTON RINGS

- Install the oil ring expander and 2 side rails by hand.
- Using a piston ring expander, install the 2 compression rings with the code mark facing up.

Code mark:

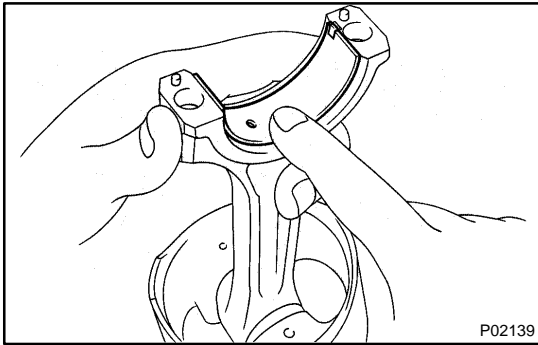
No.1	1T
No.2	2T



- Position the piston rings so that the ring ends are as shown.

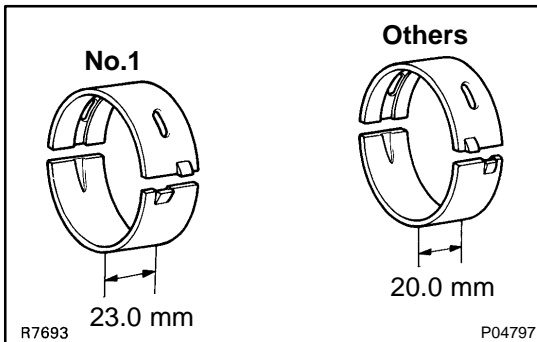
NOTICE:

Do not align the piston ring ends.



3. INSTALL BEARINGS

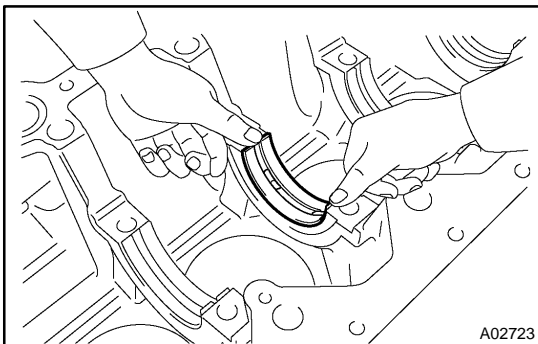
- Align the bearing claw with the groove of the connecting rod and connecting rod cap.
- Install the bearings in the connecting rod and connecting rod cap.



4. INSTALL MAIN BEARINGS

HINT:

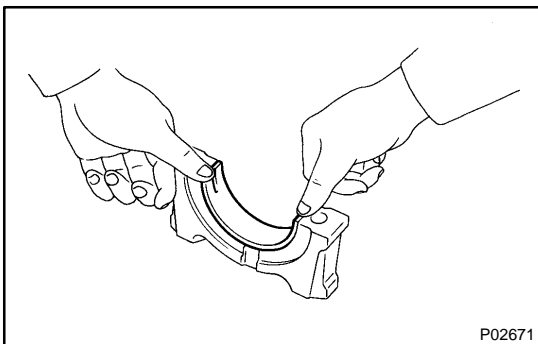
- Main bearings come in widths of 20.0 mm (0.787 in.) and 23.0 mm (0.906 in.). Install the 23.0 mm bearings in the No.1 cylinder block journal position with the main bearing cap. Install the 20.0 mm bearings in the other positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.



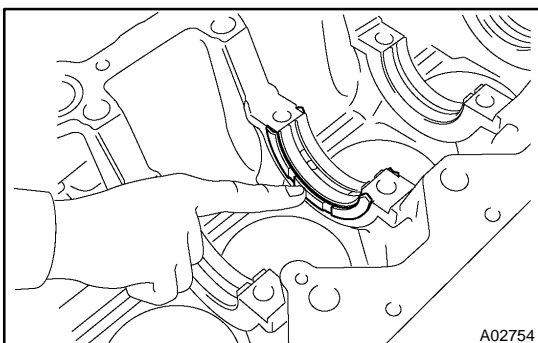
- Align the bearing claw with the claw groove of the main bearing cap or cylinder block.

NOTICE:

Install the bearing with the oil hole in the cylinder block.



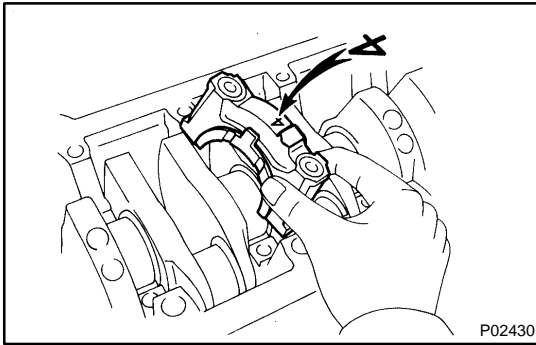
- Install the bearings in the cylinder block and main bearing caps.



5. INSTALL UPPER THRUST WASHERS

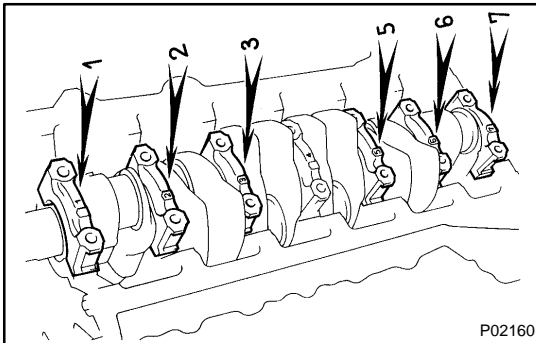
Install the 2 thrust washers under the No.4 main journal position of the cylinder block with the oil grooves facing outward.

6. PLACE CRANKSHAFT ON CYLINDER BLOCK



7. PLACE MAIN BEARING CAP AND LOWER THRUST WASHERS ON CYLINDER BLOCK

- (a) Install the lower thrust washers on the No.4 main bearing with the grooves facing outward.

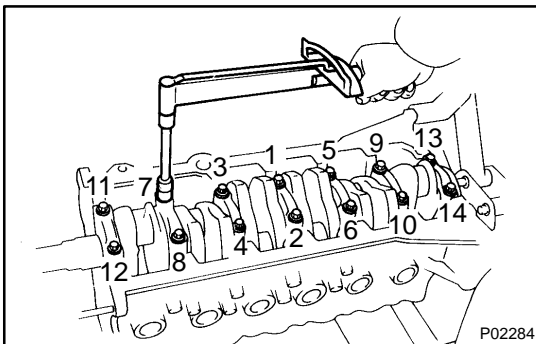


- (b) Install the main bearing caps in numerical order with the arrows facing forward.

8. INSTALL MAIN BEARING CAP BOLTS

HINT:

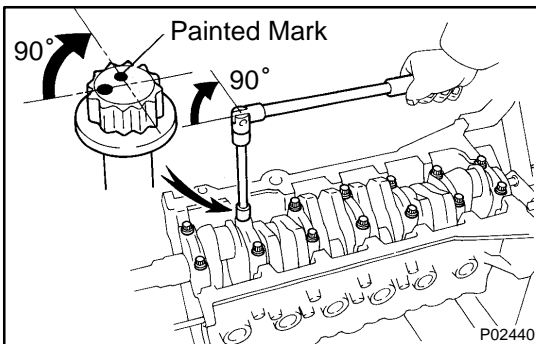
- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any of the main bearing bolts break or deform, replace them.



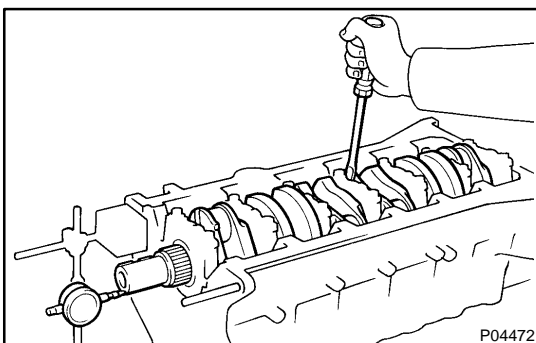
- (a) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.
- (b) Install and uniformly tighten the 14 main bearing cap bolts, in several passes, in the sequence shown.

Torque: 45 N·m (450 kgf-cm, 33 ft-lbf)

If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.



- (c) Mark the front of the main bearing cap bolt head with paint.
- (d) Retighten the main bearing cap bolts 90° in the numerical order shown above.
- (e) Check that the painted mark is now at a 90° angle to the front.
- (f) Check that the crankshaft turns smoothly.



9. 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:

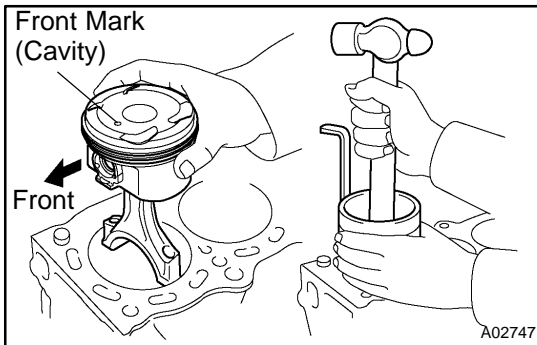
0.020 – 0.220 mm (0.0008 – 0.0087 in.)

Maximum thrust clearance:

0.30 mm (0.0118 in.)

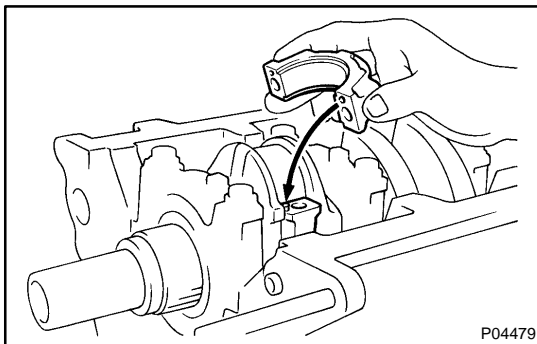
If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:
1.940 – 1.990 mm (0.0764 – 0.0783 in.)



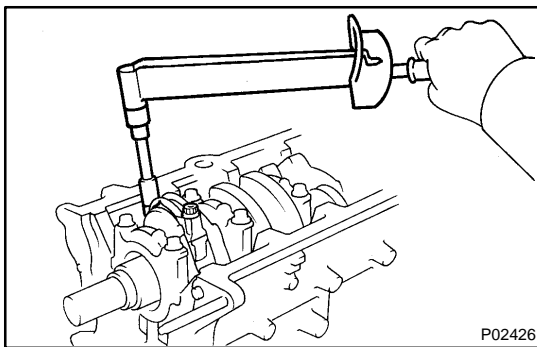
10. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

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.



11. PLACE CONNECTING ROD CAP ON CONNECTING ROD

- Match the numbered connecting rod cap with the connecting rod.
- Install the connecting rod cap with by aligning the dowel pin to the corresponding hole.



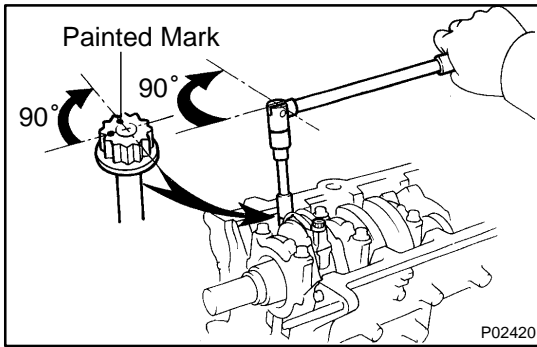
12. INSTALL CONNECTING ROD CAP BOLTS

HINT:

- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any of the connecting rod bolts break or deform, replace them.
- Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.
 - Install and alternately tighten the bolts of the connecting rod cap in several passes.

Torque: 30 N·m (300 kgf-cm, 22 ft-lbf)

If any one of the connecting rod cap bolts does not meet the torque specification, replace the cap bolt.

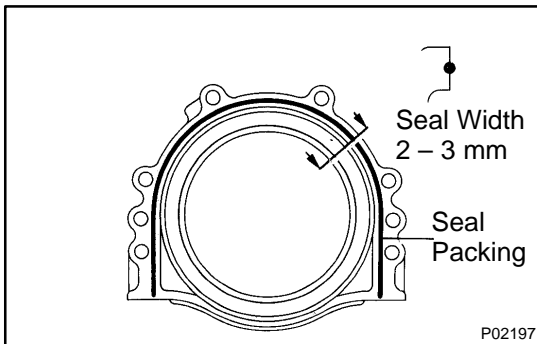


- (c) Mark the front of the connecting rod cap bolt with paint.
- (d) Retighten the connecting rod cap bolts 90° in the numerical order shown.
- (e) Check that the painted mark is now at a 90° angle to the front.
- (f) Check that the crankshaft turns smoothly.

13. CHECK CONNECTING ROD THRUST CLEARANCE
(See page [EM-76](#))

14. 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 debris.
 - 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.
 - Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
 - Immediately remove nozzle from the tube and reinstall cap.
- (c) Install the retainer with the 6 bolts.
Torque: 6.0 N·m (60 kgf·cm, 53 in.-lbf)
- 15. INSTALL OIL PUMP (See page [LU-12](#))**
- 16. INSTALL RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY**
- Install the mounting bracket with the 4 bolts.
Torque: 59 N·m (590 kgf·cm, 44 ft-lbf)
- 17. INSTALL LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY**
- Install the mounting bracket with the 4 bolts.
Torque: 59 N·m (590 kgf·cm, 44 ft-lbf)
- 18. INSTALL FUEL INLET PIPE**
- Install the fuel inlet pipe with the 2 bolts.
Torque: 29 N·m (290 kgf·cm, 21 ft-lbf)
- 19. INSTALL NO.1 OIL PIPE**
- Install the No.1 oil pipe with 2 new gaskets and the union bolt.
Torque: 55 N·m (550 kgf·cm, 41 ft-lbf)

- 20. INSTALL OIL FILTER AND BRACKET ASSEMBLY**
 - (a) Install a new O-ring to the oil filter bracket.
 - (b) Install a new gasket to the union bolt.
 - (c) Install the oil filter bracket with the union bolt.
Torque: 90 N·m (900 kgf-cm, 65 ft-lbf)
- 21. INSTALL OIL PRESSURE SWITCH AND KNOCK SENSORS (See page [LU-1](#), [SF-63](#))**
- 22. INSTALL CYLINDER HEAD (See page [EM-52](#))**
- 23. INSTALL WATER PUMP (See page [CO-8](#))**
- 24. INSTALL NO.2 WATER BYPASS PIPE WITH HOSE**
 - (a) Install the water bypass pipe with the bolt and 2 nuts.
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)
 - (b) Connect the water bypass hose to the hose clamp.
- 25. INSTALL TIMING PULLEYS AND BELT (See page [EM-23](#))**
- 26. INSTALL GENERATOR**

Install the generator and pipe bracket with the bolt and nut.
Torque: 40 N·m (400 kgf-cm, 30 ft-lbf)
- 27. REMOVE ENGINE STAND FROM ENGINE**

EMODO-03



HOW TO USE THIS MANUAL

IN00U-35

GENERAL INFORMATION

1. INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the section title and major heading are given at the top of every page.

2. PRECAUTION

At the beginning of each section, a PRECAUTION is given that pertains to all repair operations contained in that section.

Read these precautions before starting any repair task.

3. TROUBLESHOOTING

TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause. The fundamentals of how to proceed with troubleshooting are described on page [IN-21](#).

Be sure to read this before performing troubleshooting.

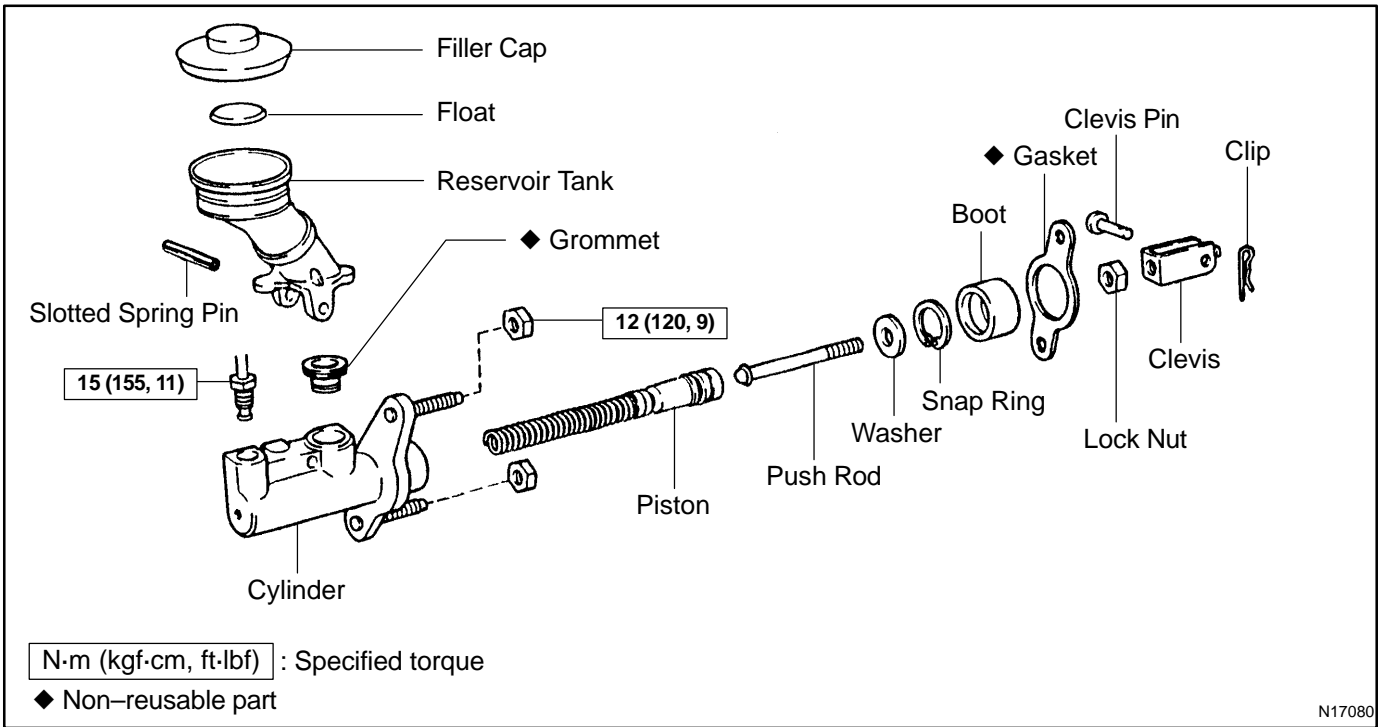
4. PREPARATION

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

5. REPAIR PROCEDURES

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

Example:



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

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

Example:

*Illustration:
what to do and where*

Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

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

SST 09350-30020 (09350-06120)

Set part No.

Component part No.

Detailed text : how to do task

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

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

Specification

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

6. REFERENCES

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

7. SPECIFICATIONS

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

8. CAUTIONS, NOTICES, HINTS:

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

9. SI UNIT

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

Example:

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

FOR ALL OF VEHICLES PRECAUTION

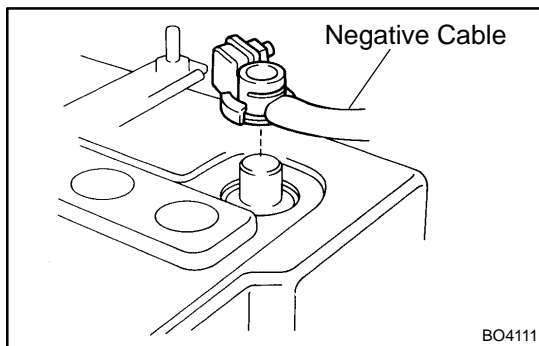
IN0E1-01

1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

- (a) The LEXUS GS400/GS300 is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag assembly, side airbag assembly and seat belt pretensioners.

Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident.

Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.



(b) GENERAL NOTICE

- (1) Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery (See page [DI-552](#)).

- (2) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

(The supplemental restraint system is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (–) terminal cable from the battery, the SRS may deploy.)

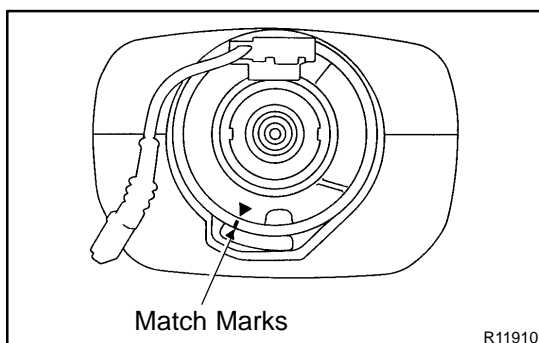
When the negative (–) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the each memory system. Then when work is finished, reset the clock and audio systems as before. This vehicle has power tilt and power telescopic steering, power seat and power outside rear view mirror, 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 another battery.

- (3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor and seat belt pretensioner should be inspected (See page [RS-15](#), [RS-29](#), [RS-42](#), [RS-60](#), [RS-65](#) and [BO-125](#)).
- (4) Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- (5) Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- (6) Never disassemble and repair the airbag sensor assembly, side airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor or seat belt pretensioner.
- (7) If the airbag sensor assembly, side airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor or seat belt pretensioner has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- (8) Do not directly expose the airbag sensor assembly, side airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, front airbag sensor, side airbag sensor or seat belt pretensioner to hot air or flames.
- (9) Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting of the electrical circuit.
- (10) Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- (11) After work on the supplemental restraint system is completed, check the SRS warning light (See page [DI-552](#)).

(c) SPIRAL CABLE (in Combination Switch)

The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may result. Refer to [SR-17](#) of this manual concerning correct steering wheel installation.

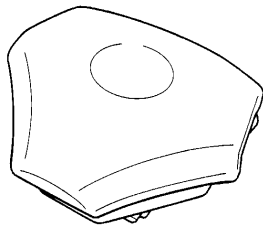


(d) STEERING WHEEL PAD (with Airbag)

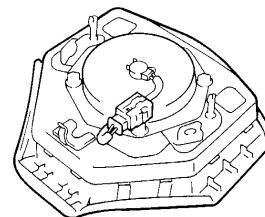
- (1) When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.
Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag deploys for some reason. In addition do not store a steering wheel pad on top of another one.
- (2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
- (3) Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
- (4) Store the steering wheel pad where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.
- (6) When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See page [RS-17](#)).
Carry out the operation in a safe place away from electrical noise.

Example:

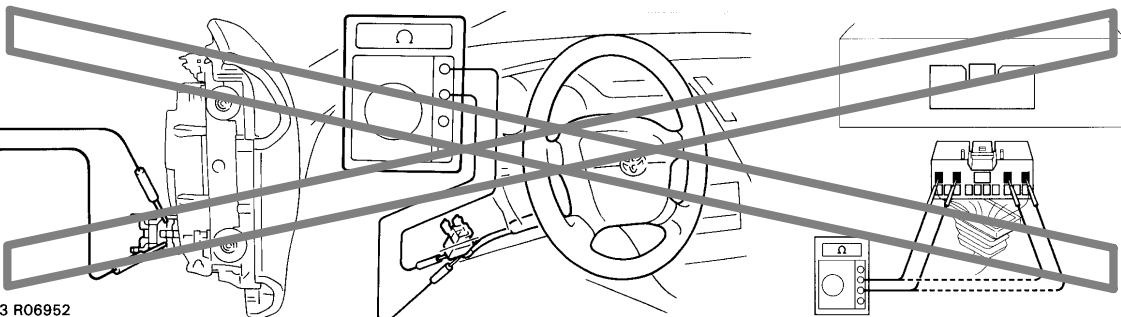
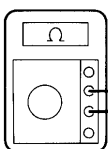
Correct



Wrong



B02398

Example:

R05643 R06953 R06952

Z13950

(e) FRONT PASSENGER AIRBAG ASSEMBLY

- (1) Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.

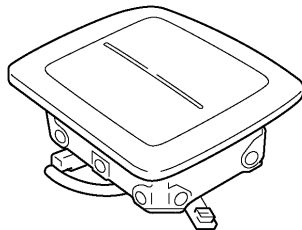
Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag deploys.

- (2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
- (3) Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the assembly before starting work.
- (6) When disposing of a vehicle or the airbag assembly alone, the airbag should be deployed using an SST before disposal (See page [RS-31](#)).

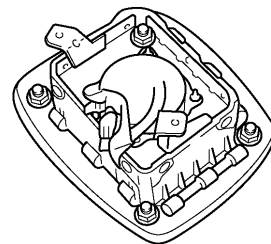
Perform the operation in a safe place away from electrical noise.

Example:

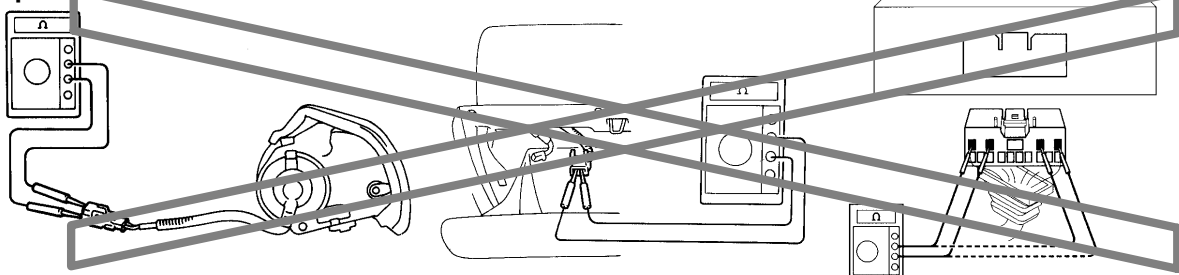
Correct



Wrong



B00696

Example:

R05648 R05649 R06952

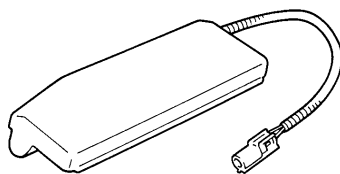
Z13951

(f) SIDE AIRBAG ASSEMBLY

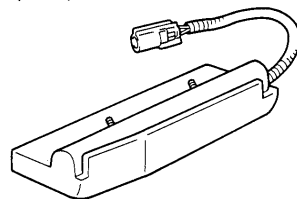
- (1) Always store a removed or new side airbag assembly with the airbag deployment direction facing up. Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag deploys.
- (2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
- (3) Grease should not be applied to the side airbag assembly and the surface should not be cleaned with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the seat before starting work.
- (6) When disposing of a vehicle or the side airbag assembly alone, the airbag should be deployed using an SST before disposal (See page [RS-43](#)). Perform the operation in a safe place away from electrical noise.

Example:

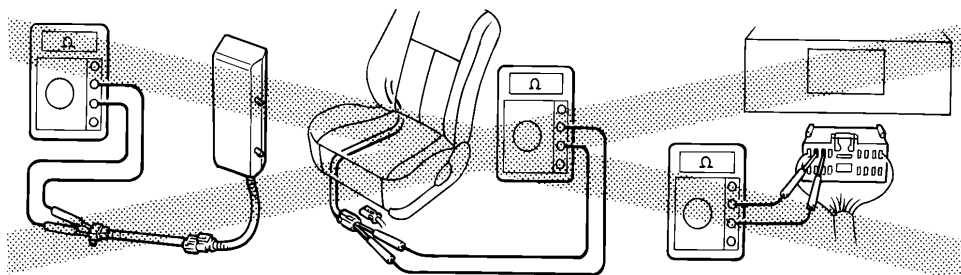
Correct



Wrong



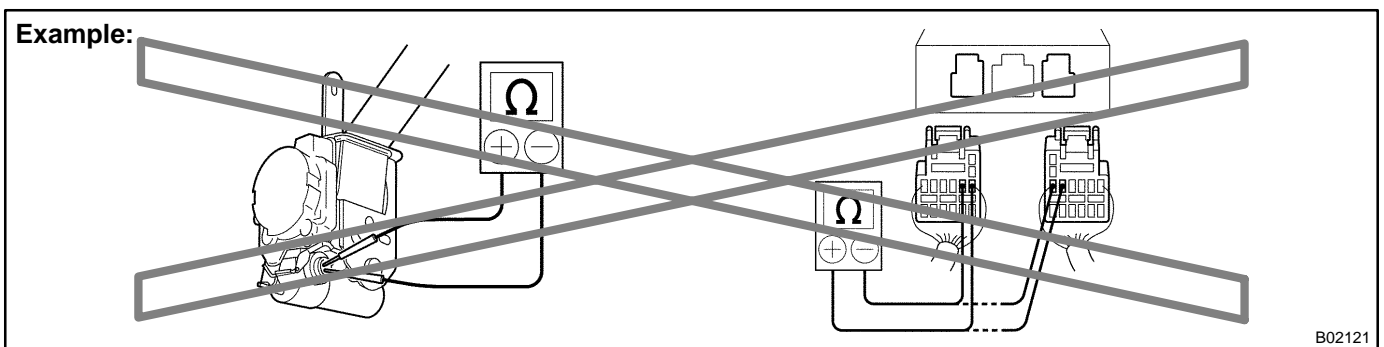
B02129

Example:

B01546

(g) SEAT BELT PRETENSIONER

- (1) Never measure the resistance of the seat belt pretensioner. (This may cause the seat belt pretensioner to activate, which is very dangerous.)
- (2) Never disassemble the seat belt pretensioner.
- (3) Never install the seat belt pretensioner in another vehicle.
- (4) Store the seat belt pretensioner where the ambient temperature remains below 80°C (176°F) and away from electrical noise without high humidity.
- (5) When using electric welding, first disconnect the connector (yellow color and 2 pins) before starting work.
- (6) When disposing of a vehicle or the seat belt pretensioner alone, the seat belt pretensioner should be activated before disposal (See page BO-130). Perform the operation in a safe place away from electrical noise.
- (7) The seat belt pretensioner is hot after activation, so let it cool down sufficiently before the disposal. However never apply water to the seat belt pretensioner.
- (8) Oil or water should not be put on the front seat outer belt and the front seat outer belt should not be cleaned with detergents of any kind.



(h) AIRBAG SENSOR ASSEMBLY

- (1) Never reuse the airbag sensor assembly involved in a collision when the SRS has deployed.
- (2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the supplemental restraint system.
- (3) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.

(i) WIRE HARNESS AND CONNECTOR

The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page [RS-68](#).

2. FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

CAUTION:

If large amount of unburned gasoline flows into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

- (a) Use only unleaded gasoline.
- (b) Avoid prolonged idling.
Avoid running the engine at idle speed for more than 20 minutes.
- (c) Avoid spark jump test.
 - (1) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
 - (2) While testing, never race the engine.
- (d) Avoid prolonged engine compression measurement.
Engine compression tests must be done as rapidly as possible.
- (e) Do not run engine when fuel tank is nearly empty.
This may cause the engine to misfire and create an extra load on the converter.
- (f) Avoid coasting with ignition turned off.
- (g) Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

3. IF VEHICLE IS EQUIPPED WITH MOBILE COMMUNICATION SYSTEM

For vehicles with mobile communication systems such as two-way radios and cellular telephones, observe the following precautions.

- (1) Install the antenna as far as possible away from the ECU and sensors of the vehicle's electronic system.
- (2) Install the antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle's electronic systems. For details about ECU and sensors locations, refer to the section on the applicable component.
- (3) Avoid winding the antenna feeder together with other wiring as much as possible, and also avoid running the antenna feeder parallel with other wire harnesses.
- (4) Check that the antenna and feeder are correctly adjusted.
- (5) Do not install powerful mobile communications system.

4. FOR USING OBD II SCAN TOOL OR LEXUS HAND-HELD TESTER

CAUTION:

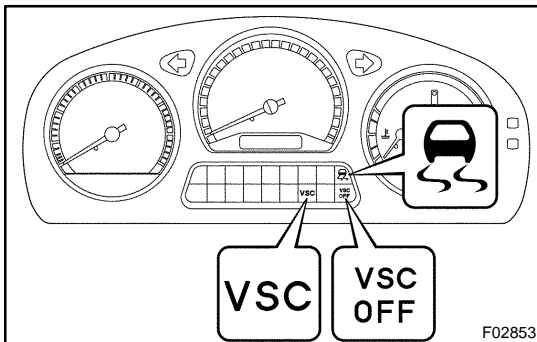
Observe the following items for safety reasons:

- Before using the OBD II scan tool or LEXUS hand-held tester, the OBD II scan tool's instruction book or LEXUS hand-held tester's operator manual should be read thoroughly.
- Be sure to route all cables securely when driving with the OBD II scan tool or LEXUS hand-held tester connected to the vehicle. (i.e. Keep cables away from feet, pedals, steering wheel and shift lever.)
- Two persons are required when test driving with the OBD II scan tool or LEXUS hand-held tester, one person to drive the vehicle and the other person to operate the OBD II scan tool or LEXUS hand-held tester.

5. FOR VEHICLES EQUIPPED WITH VEHICLE SKID CONTROL (VSC) SYSTEM

NOTICE:

When using a 2-wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the rear wheels and driving the wheels, always push in the TRAC & VSC cut switch and turn the TRAC & VSC system OFF.

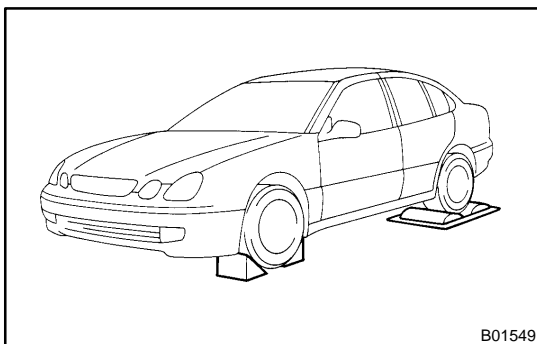


(a) Press the VSC OFF switch.

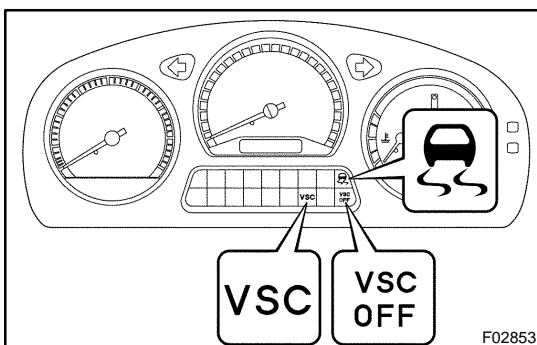
(b) Check that the VSC OFF indicator light comes ON.

HINT:

The VSC OFF indicator light should be always OFF when the engine is restarted.



(c) Begin measurements.



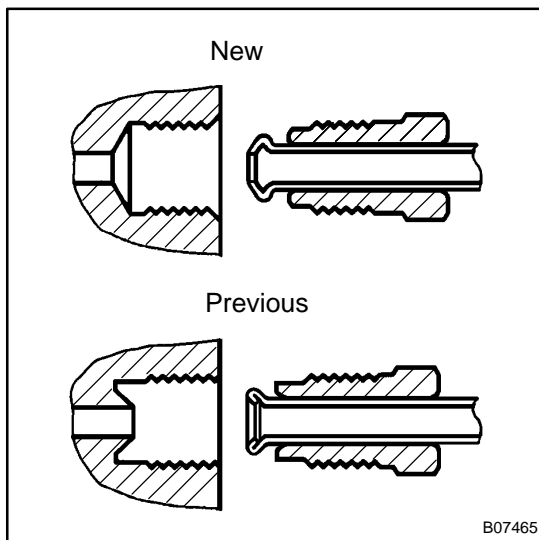
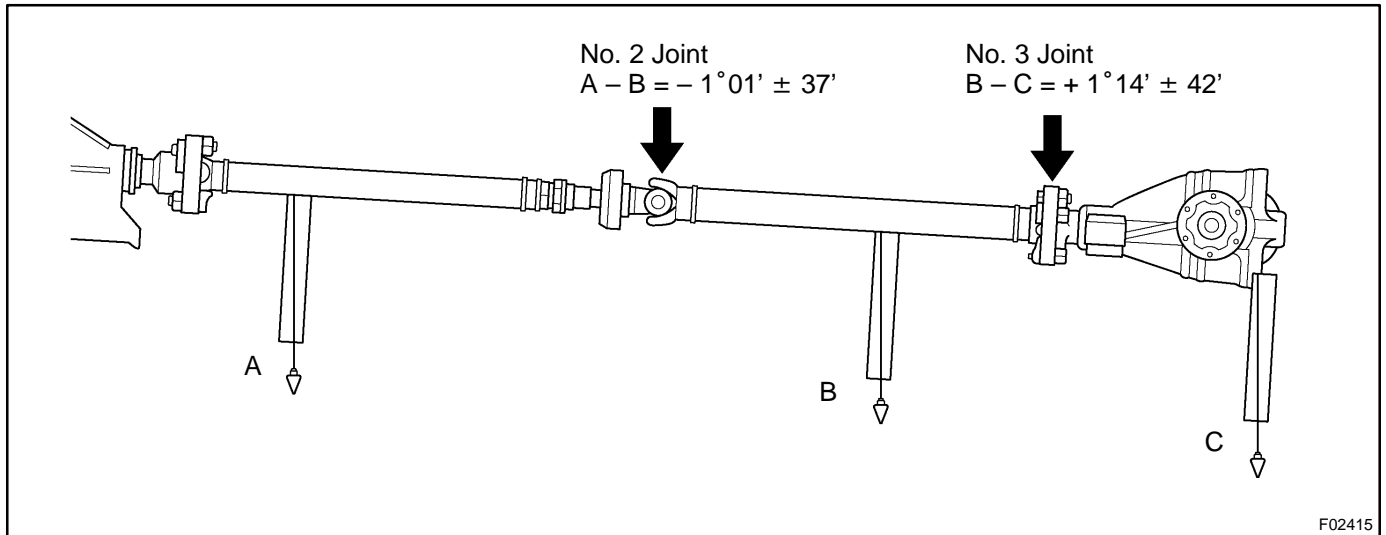
(d) Press the VSC OFF switch again to change the TRAC & VSC system to operational condition and check that the VSC OFF indicator light goes off.

HINT:

The SLIP indicator light blinks when the TRAC system is operational.

6. INSPECTION AND ADJUSTMENT OF JOINT ANGLE DURING REMOVAL AND INSTALLATION OF PROPELLER SHAFT

When performing operations which involve the removal and installation of the propeller shaft, always check the joint angle. Make adjustments if necessary (See page [PR-12](#)).



7. FOR VEHICLES EQUIPPED WITH BRAKE PIPE FITTING OF NEW STANDARD

A flare shape of a new standard is used for the brake pipe fitting from this changed models.

NOTICE:

- When ordering or replacing the parts, please be sure to check and use the fitting of the same flare type.
- Do not over-tighten them more than the standard torque.

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

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

GENERAL INFORMATION

IN04S-10

A large number of ECU controlled systems are used in the LEXUS GS400/GS300. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. However, the fact is that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems:

The troubleshooting procedure and how to make use of it are described on the following pages.

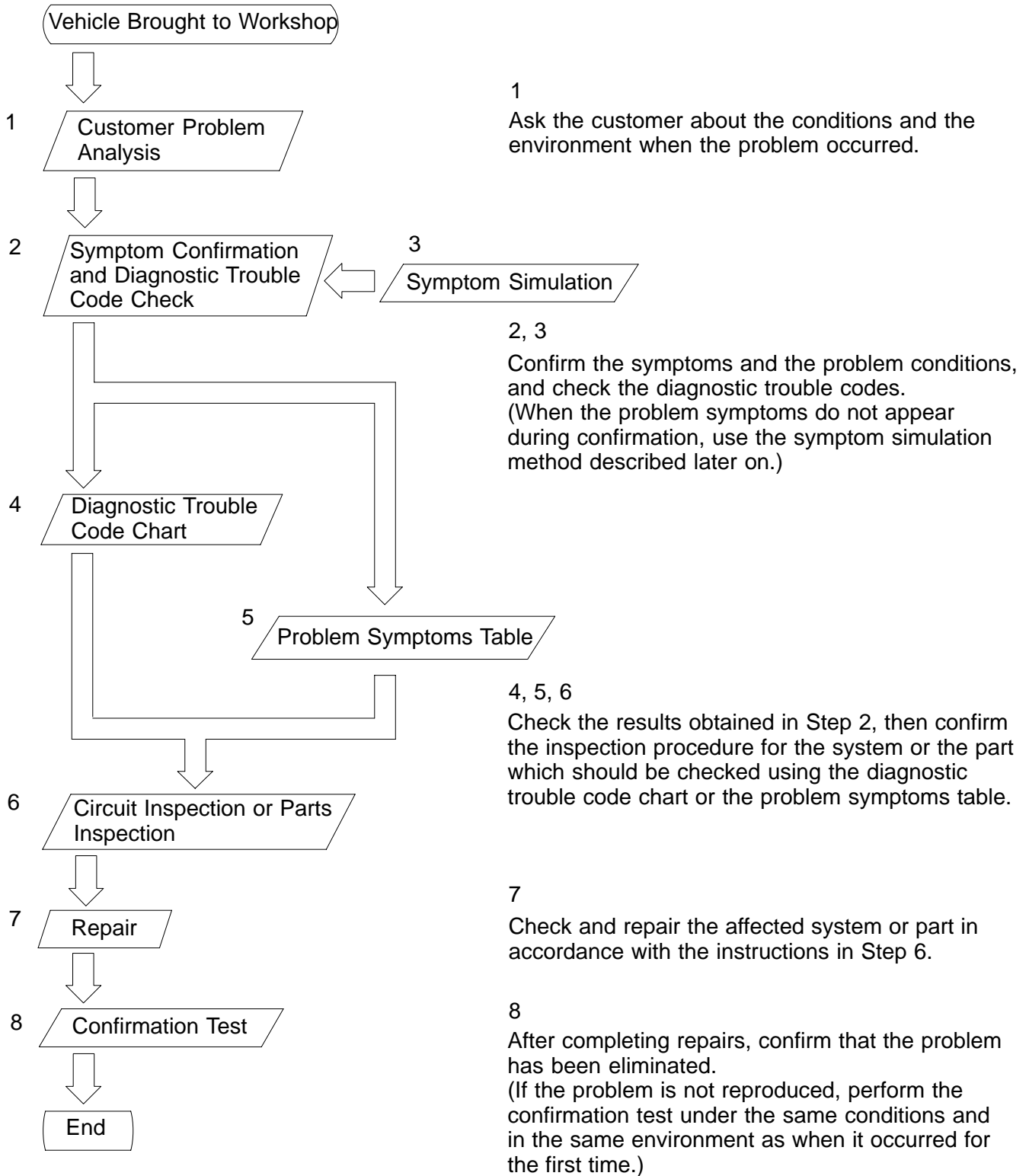
System	Page
1. Engine 2JZ – GE	DI-1
2. Engine 1UZ – FE	DI-156
3. Automatic Transmission	DI-316
4. ABS & Hydraulic Brake Booster Power Supply System	DI-387
5. Vehicle Skid Control (VSC) & Brake Assist (BA) System	DI-473
6. Power Tilt and Power Telescopic Steering Column	DI-517
7. Supplemental Restraint System	DI-550
8. Power Seat Control System	DI-683
9. Cruise Control System	DI-704
10.Engine Immobiliser System	DI-726
11.Combination Meter System	DI-744
12.Sliding Roof System	DI-764
13.Body No. 1 Control System	DI-776
14.Body No. 2 Control System	DI-820
15.Driver Door Control System	DI-856
16.Passenger Door Control System	DI-889
17.Rear Left Door Control System	DI-921
18.Rear Right Door Control System	DI-938
19.Multiplex Communication System	DI-955
20.LEXUS Navigation System	DI-1022
21.Air Conditioning System	DI-1059

FOR USING OBDII SCAN TOOL OR LEXUS HAND-HELD TESTER

- Before using the scan tool or tester, the scan tool's instruction book or tester's operator manual should be read thoroughly.
- If the scan tool or tester cannot communicate with ECU controlled systems when you have connected the cable of the scan tool or tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.
 - If communication is normal when the tool is connected to another vehicle, inspect the diagnosis data link line (Bus \oplus line) or ECU power circuit of the vehicle.
 - If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so perform the Self Test procedures outline in the Tester Operator's Manual.

HOW TO PROCEED WITH TROUBLESHOOTING

Carry out troubleshooting in accordance with the procedure on the following page. Here, only the basic procedure is shown. Details are provided in Diagnostics section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



1. CUSTOMER PROBLEM ANALYSIS

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgment. To ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.

Important Point in the Problem Analysis:

The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases, so as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in Diagnostics section for each system for your use.

Important Points in the Customer Problem Analysis

- What ——— Vehicle model, system name
- When ——— Date, time, occurrence frequency
- Where ——— Road conditions
- Under what conditions? ——— Running conditions, driving conditions, weather conditions
- How did it happen? ——— Problem symptoms

(Sample) Engine control system check sheet.

ENGINE CONTROL SYSTEM Check Sheet				Inspector's Name
Customer's Name		Model and Model Year		
Driver's Name		Frame No.		
Data Vehicle Brought in		Engine Model		
License No.		Odometer Reading	km miles	

Problem Symptoms	<input type="checkbox"/> Engine does not Start	<input type="checkbox"/> Engine does not crank	<input type="checkbox"/> No initial combustion	<input type="checkbox"/> No complete combustion	
	<input type="checkbox"/> Difficult to Start	<input type="checkbox"/> Engine cranks slowly <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Poor Idling	<input type="checkbox"/> Incorrect first idle <input type="checkbox"/> Idling rpm is abnormal <input type="checkbox"/> High (rpm) <input type="checkbox"/> Low (rpm) <input type="checkbox"/> Rough idling <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Poor Drive ability	<input type="checkbox"/> Hesitation <input type="checkbox"/> Back fire <input type="checkbox"/> Muffler explosion (after-fire) <input type="checkbox"/> Surging <input type="checkbox"/> Knocking <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Engine Stall	<input type="checkbox"/> Soon after starting <input type="checkbox"/> After accelerator pedal depressed <input type="checkbox"/> After accelerator pedal released <input type="checkbox"/> During A/C operation <input type="checkbox"/> Shifting from N to D <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Others				

☐ Constant ☐ Sometimes (times per day/month)





2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the LEXUS GS400/GS300 fulfills various functions. The first function is the Diagnostic Trouble Code Check in which a malfunction in the signal circuits to the ECU is stored in code in the ECU memory at the time of occurrence, to be output by the technician during troubleshooting. Another function is the Input Signal Check which checks if the signals from various switches are sent to the ECU correctly. By using these check functions, the problem areas can be narrowed down quickly and troubleshooting can be performed effectively. Diagnostic functions are incorporated in the following systems in the LEXUS GS400/GS300.

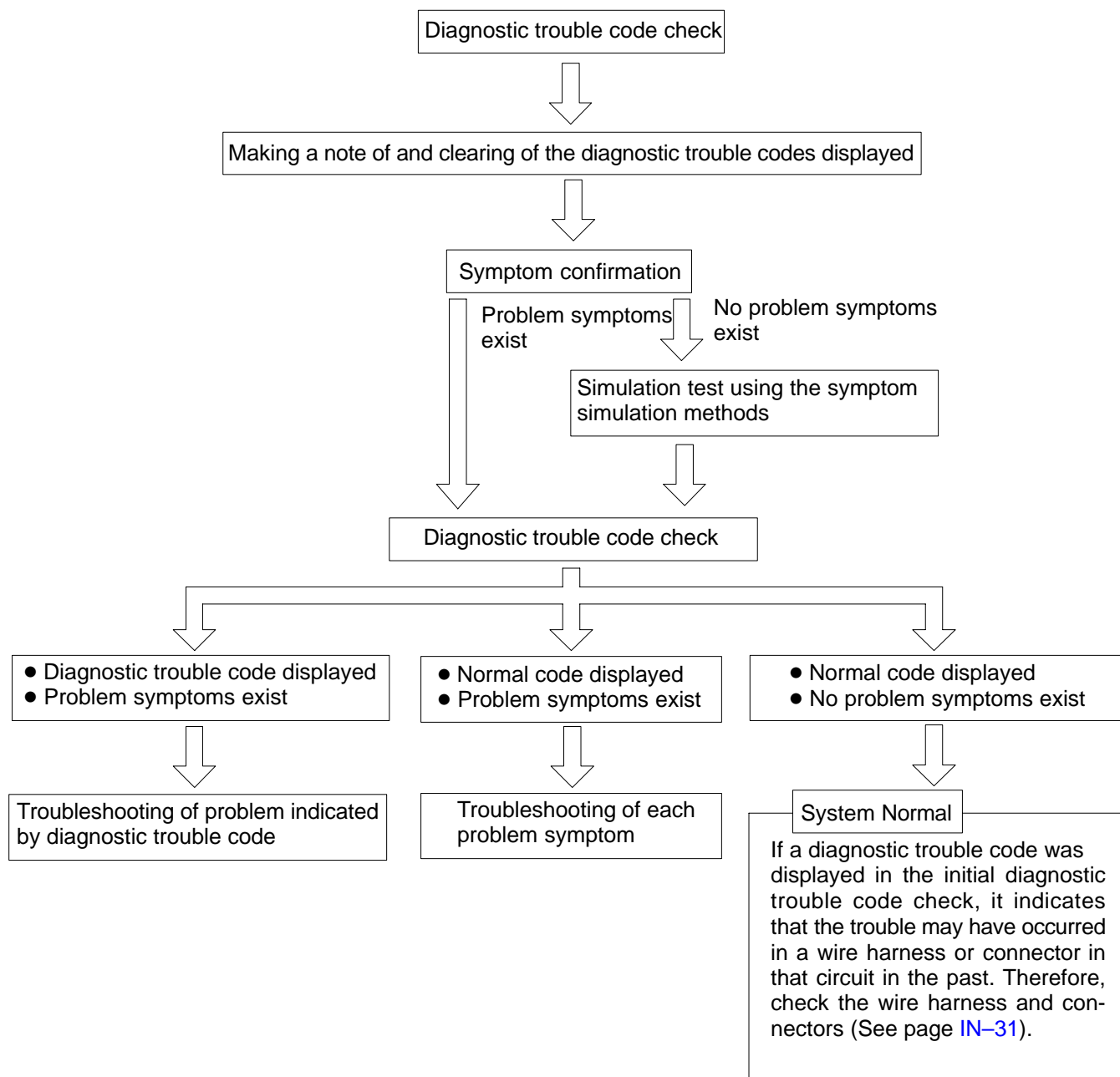
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
Engine (2JZ-GE)	○(with check Mode)	○	○
Engine (1UZ-FE)	○(with check Mode)	○	○
Automatic Transmission	○(with check Mode)	○	
ABS & Hydraulic Brake Booster Power Supply System	○	○	
Vehicle Skid Control (VSC) & Brake Assist (BA) System	○	○	
Power Tilt and Power Telescopic Steering Column	○		
Supplemental Restraint System	○		
Cruise Control System	○	○	
Engine Immobiliser System	○		
Multiplex Communication System	○		
LEXUS Navigation System	○		
Air Conditioning System	○		

In diagnostic trouble code check, it is very important to determine whether the problem indicated by the diagnostic trouble code is still occurring or occurred in the past but returned to normal at present. In addition, it must be checked in the problem symptom check whether the malfunction indicated by the diagnostic trouble code is directly related to the problem symptom or not. For this reason, the diagnostic trouble codes should be checked before and after the symptom confirmation to determine the current conditions, as shown in the table below. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, thus making it more difficult to locate the problem, or in repairs not pertinent to the problem. Therefore, always follow the procedure in correct order and perform the diagnostic trouble code check.

DIAGNOSTIC TROUBLE CODE CHECK PROCEDURE

Diagnostic Trouble Code Check (Make a note of and then clear)	Confirmation of Symptoms	Diagnostic Trouble Code Check	Problem Condition
Diagnostic Trouble Code Display 	Problem symptoms exist	Same diagnostic trouble code is displayed	Problem is still occurring in the diagnostic circuit
		Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit (The diagnostic trouble code displayed first is either for a past problem or it is a secondary problem)
	 No problem symptoms exist		The problem occurred in the diagnostic circuit in the past
Normal Code Display 	Problem symptoms exist	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit
	 No problem symptoms exist	Normal code is displayed	The problem occurred in a place other than in the diagnostic circuit in the past

Taking into account the points on the previous page, a flow chart showing how to proceed with troubleshooting using the diagnostic trouble code check is shown below. This flow chart shows how to utilize the diagnostic trouble code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic trouble code troubleshooting or to troubleshooting of problem symptoms table.

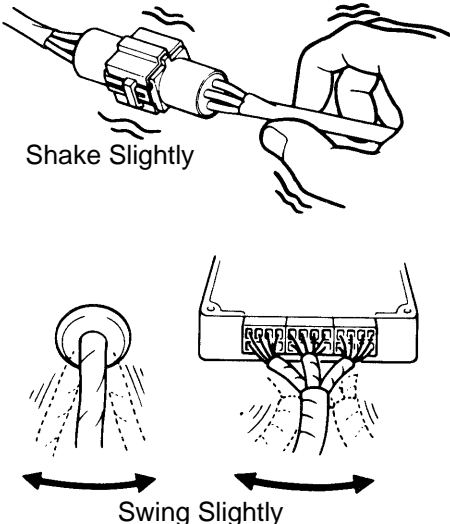
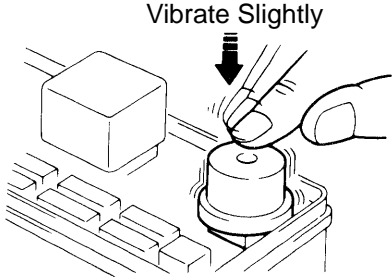


3. SYMPTOM SIMULATION

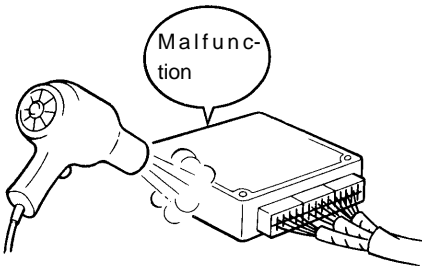

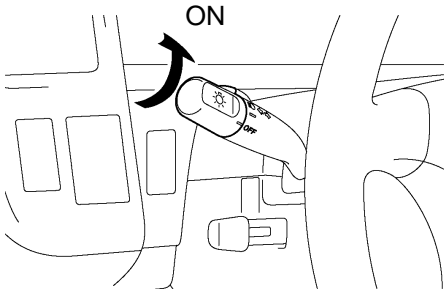
The most difficult case in troubleshooting is when there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out, then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he may be, if he proceeds to troubleshoot without confirming the problem symptoms he will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the engine is cold, or for a problem which occurs due to vibration caused by the road during driving, etc., the problem can never be determined so long as the symptoms are confirmed with the engine hot condition or the vehicle at a standstill. Since vibration, heat or water penetration (moisture) is likely cause for problem which is difficult to reproduce, the symptom simulation tests introduced here are effective measures in that the external causes are applied to the vehicle in a stopped condition.

Important Points in the Symptom Simulation Test:

In the symptom simulation test, the problem symptoms should of course be confirmed, but the problem area or parts must also be found out. To do this, narrow down the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the problem symptoms table for each system to narrow down the possible causes of the symptom.

1	VIBRATION METHOD: When vibration seems to be the major cause.	
<p>CONNECTORS Slightly shake the connector vertically and horizontally.</p> <p>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.</p>	 <p>FI2331 FI2332</p>	
	 <p>FI2330</p>	

V07268

2	HEAT METHOD: When the problem seems to occur when the suspect area is heated.
<p>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.</p> <p>NOTICE:</p> <p>(1) Do not heat to more than 60 °C (140 °F). (Temperature is limited not to damage the components.)</p> <p>(2) Do not apply heat directly to parts in the ECU.</p>	 <p>FI2334</p>
3	WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.
<p>Sprinkle water onto the vehicle and check to see if the malfunction occurs.</p> <p>NOTICE:</p> <p>(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.</p> <p>(2) Never apply water directly onto the electronic components.</p> <p>HINT:</p> <p>If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.</p>	 <p>FI6649</p>
4	OTHER: When a malfunction seems to occur when electrical load is excessive.
<p>Turn on all electrical loads including the heater blower, head lights, rear window defogger, etc. and check to see if the malfunction occurs.</p>	 <p>B02389</p>

B02390

4. DIAGNOSTIC TROUBLE CODE CHART

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code check. Proceed with troubleshooting in accordance with the inspection procedure given in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The engine diagnostic trouble code chart is shown below as an example.

- **DTC No.**
Indicates the diagnostic trouble code.
- **Page or Instructions**
Indicates the page where the inspection procedure for each circuit is to be found, or gives instructions for checking and repairs.

- **Trouble Area**
Indicates the suspect area of the problem.

- **Detection Item**
Indicates the system of the problem or contents of the problem.

DTC CHART (SAE Controlled)

HINT:
Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check mode, check the circuit for that code listed in the table below. For details of each code, turn to the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P0100 (DI-24)	Mass Air Flow Circuit Malfunction	<ul style="list-style-type: none"> ● Open or short in mass air flow meter circuit ● Mass air flow meter ● ECM 	○	○
P0101 (DI-28)	Mass Air Flow Circuit Range/ Performance Problem	<ul style="list-style-type: none"> ● Mass air flow meter 	○	○
P0110 (DI-29)	Intake Air Temp. Circuit Malfunction	<ul style="list-style-type: none"> ● Open or short in intake air temp. sensor circuit ● Intake air temp. sensor ● ECM 	○	○
P0115 (DI-33)	Engine Coolant Temp. Circuit Malfunction	<ul style="list-style-type: none"> ● Open or short in engine coolant temp. sensor circuit ● Engine coolant temp. sensor ● ECM 	○	○
P0116 (DI-37)	Engine Coolant Temp. Circuit Range/ Performance Problem	<ul style="list-style-type: none"> ● Engine coolant temp. sensor ● Cooling system 	○	○
	Throttle Position Sensor/Switch Malfunction	<ul style="list-style-type: none"> ● Open or short in throttle position sensor circuit ● Throttle position sensor ● ECM 		
	Throttle Position Sensor/ Switch Range/ Performance Problem	<ul style="list-style-type: none"> ● Throttle position sensor 		

5. PROBLEM SYMPTOMS TABLE

The suspected circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a "Normal" code is displayed in the diagnostic trouble code check but the problem is still occurring. Numbers in the table indicate the inspection order in which the circuits or parts should be checked.

HINT:

When the problem is not detected by the diagnostic system even though the problem symptom is present, it is considered that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a system other than the diagnostic system.

● Page
Indicates the page where the flow chart for each circuit is located.

● Circuit Inspection, Inspection Order
Indicates the circuit which needs to be checked for each problem symptom. Check in the order indicated by the numbers.

● Problem Symptom

● Circuit or Part Name
Indicates the circuit or part which needs to be checked.

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST-2 ST-17
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI-147 DI-151 IN-29
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-151
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-144 DI-151 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-144 DI-151
Hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI-144 DI-151
Engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	AC-88
Engine idle speed (Poor idling)	1. A/C signal circuit 2. Fuel pump control circuit	
Engine idle speed (Poor idling)	1. Compression 2. Fuel pump control circuit	

6. CIRCUIT INSPECTION

How to read and use each page is shown below.

● Diagnostic Trouble Code No. and Detection Item

● Circuit Description
The major role and operation, etc. of the circuit and its component parts are explained.

DTC	P0325	Knock Sensor 1 Circuit Malfunction
------------	--------------	---

CIRCUIT DESCRIPTION

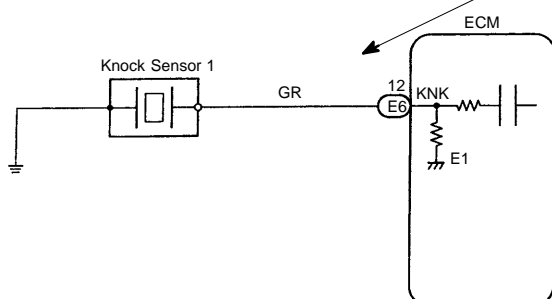
Knock sensor is fitted to the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed 1,200 rpm or more.	<ul style="list-style-type: none"> Open or short in knock sensor1 circuit Knock sensor 1 (looseness) ECM

If the ECM detects the above diagnosis conditions, it operates the fail safe function in which the corrective retard angle value is set to the maximum value.

● Indicates the diagnostic trouble code, diagnostic trouble code set parameter and suspect area of the problem.

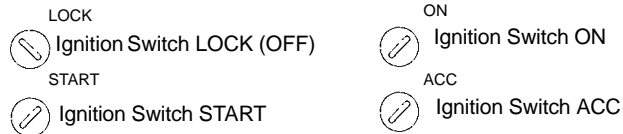
WIRING DIAGRAM



- Wiring Diagram
This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.
Wire colors are indicated by an alphabetical code.
B = Black, L = Blue, R = Red, BR = Brown, LG = Light Green, V = Violet, G = Green, O = Orange, W = White, GR = Gray, P = Pink, Y = Yellow, SB = Sky Blue
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

V08423

- Indicates the position of the ignition switch during the check.

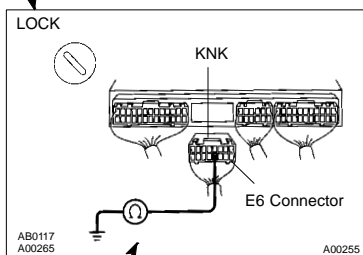


- Inspection Procedure

Use the inspection procedure to determine if the circuit is normal or abnormal, and, if it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

INSPECTION PROCEDURE

- 1 Check continuity between terminal KNK of ECM connector and body ground.



PREPARATION:

- Remove the glove compartment (See page SF-68).
- Disconnect the E6 connector of ECM.

CHECK:

Measure resistance between terminal KNK of ECM connector and body ground.

OK:

Resistance: 1 MΩ or higher

OK

Go to step 3.

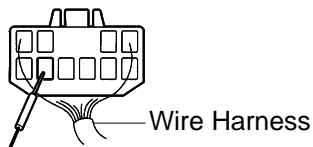
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- 2 Check knock sensor (See page SF-61).

OK

Replace knock sensor.

- Indicates the place to check the voltage or resistance.
- Indicates the connector position to be checked, from the front or back side.

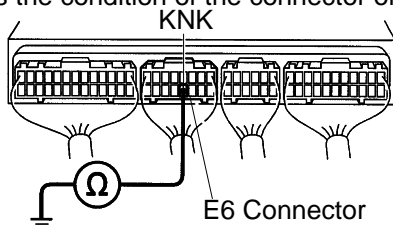


Check from the connector back side.
(with harness)

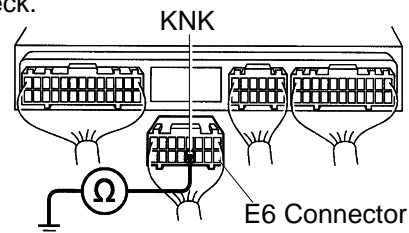


Check from the connector front side. (without harness)
In this case, care must be taken not to bend the terminals.

- Indicates the condition of the connector of ECU during the check.



Connector being checked is connected.

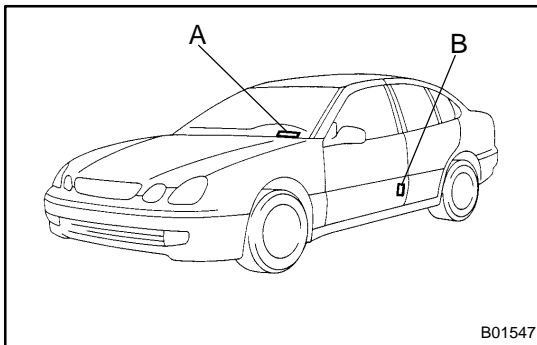


Connector being checked is disconnected.

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER

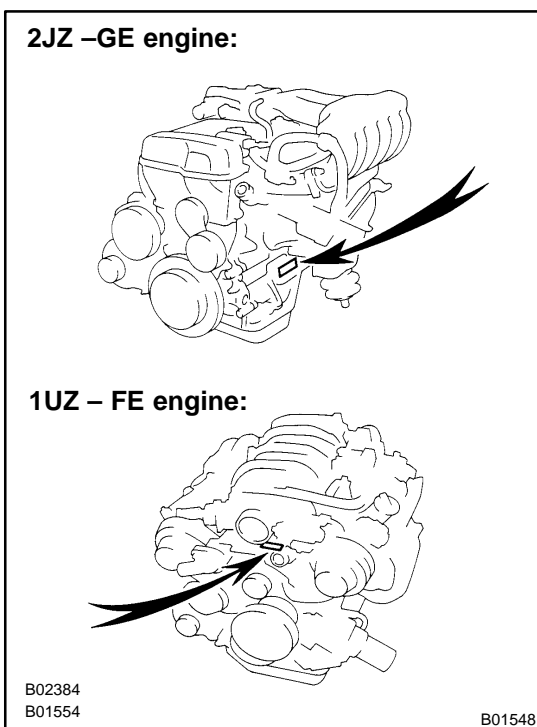
IN04P-03



1. VEHICLE IDENTIFICATION NUMBER

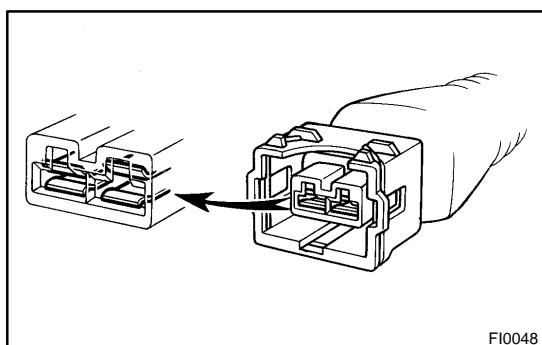
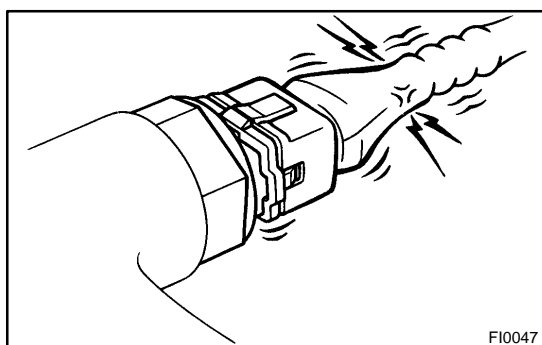
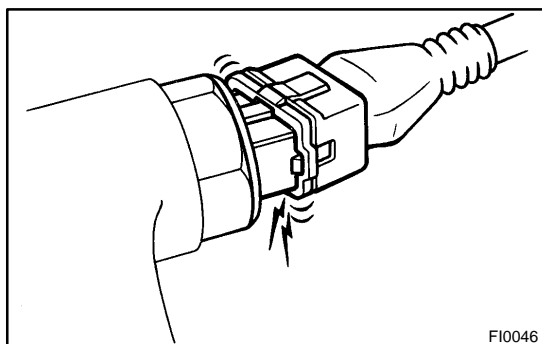
The vehicle identification number is stamped on the vehicle identification number plate and the certification label, as shown in the illustration.

- A: Vehicle Identification Number Plate
- B: Certification Label



2. ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block, as shown in the illustration.



HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

1. CONNECTOR CONNECTION AND TERMINAL INSPECTION

- For troubleshooting, diagnostic trouble code charts or problem symptom table are provided for each circuit with detailed inspection procedures on the following pages.
- When all the component parts, wire harnesses and connectors of each circuit except the ECU are found to be normal in troubleshooting, then it is determined that the problem is in the ECU. So always confirm that the problem symptoms are occurring, or proceed with inspection while using the symptom simulation method.
- The instructions "Check wire harness and connector" and "Check and replace ECU" which appear in the inspection procedure, are common and applicable to all diagnostic trouble codes. Follow the procedure outlined below whenever these instructions appear.

OPEN CIRCUIT:

This could be due to a disconnected wire harness, faulty contact in the connector, and a connector terminal pulled out, etc.

HINT:

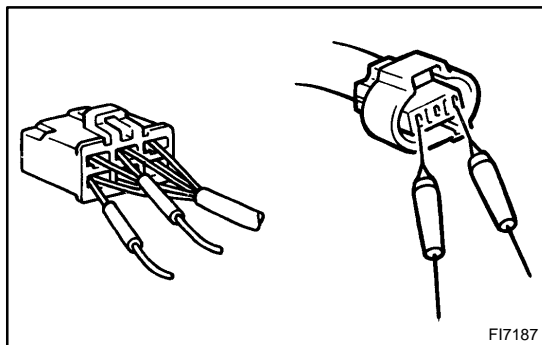
- It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators
- Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of connector terminals. Simply disconnecting and reconnecting the connectors once changes the condition of the connection and may result in a return to normal operation. Therefore, in troubleshooting, if no abnormality is found in the wire harness and connector check, but the problem disappears after the check, then the cause is considered to be in the wire harness or connectors.

SHORT CIRCUIT:

This could be due to a contact between wire harness and the body ground or to a short circuit occurred inside the switch, etc.

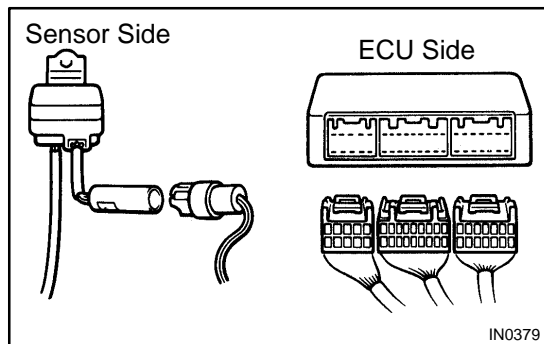
HINT:

When there is a short circuit between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.



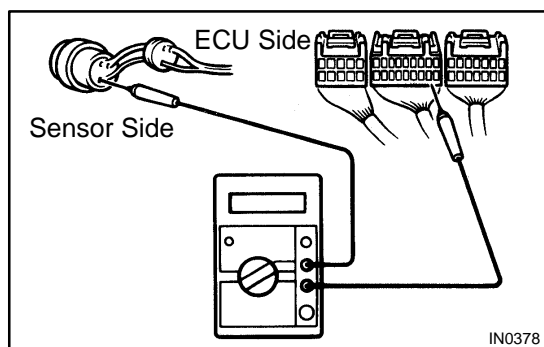
2. CONNECTOR HANDLING

When inserting tester probes into a connector, insert them from the rear of the connector. When necessary, use mini test leads. For water resistant connectors which cannot be accessed from behind, take good care not to deform the connector terminals.



3. CONTINUITY CHECK (OPEN CIRCUIT CHECK)

- (a) Disconnect the connectors at both ECU and sensor sides.

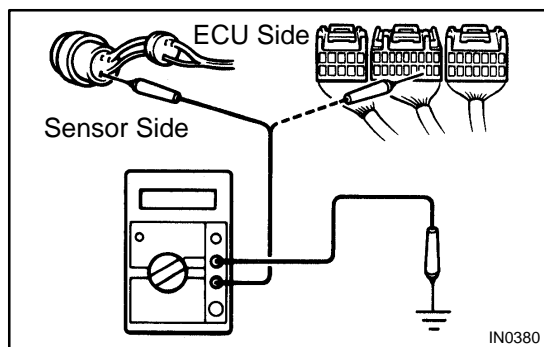


- (b) Measure the resistance between the applicable terminals of the connectors.

Resistance: 1 Ω or less

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



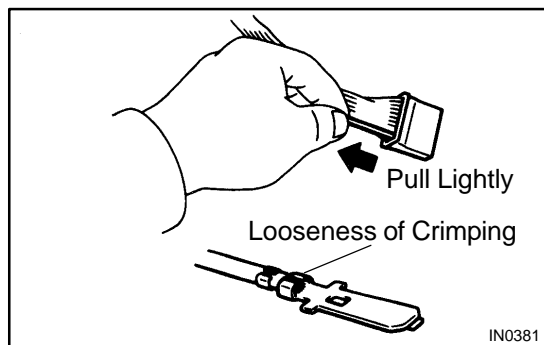
4. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

- (a) Disconnect the connectors on both ends.
- (b) Measure the resistance between the applicable terminals of the connectors and body ground. Be sure to carry out this check on the connectors on both ends.

Resistance: 1 M Ω or higher

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



5. VISUAL CHECK AND CONTACT PRESSURE CHECK

- (a) Disconnect the connectors at both ends.
- (b) Check for rust or foreign material, etc. in the terminals of the connectors.
- (c) Check crimped portions for looseness or damage and check that the terminals are secured in lock portion.

HINT:

The terminals should not come out when pulled lightly from the back.

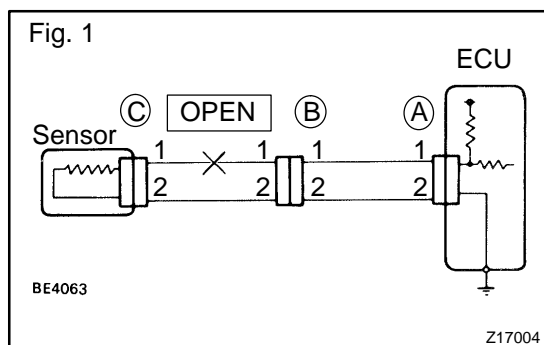
- (d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

NOTICE:

When testing a gold-plated female terminal, always use a gold-plated male terminal.

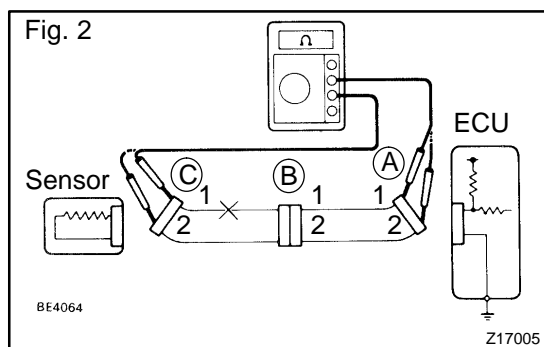
HINT:

When the test terminal is pulled out more easily than others, there may be poor contact in that section.

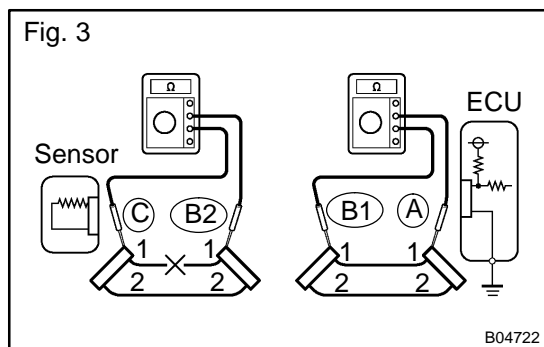


6. CHECK OPEN CIRCUIT

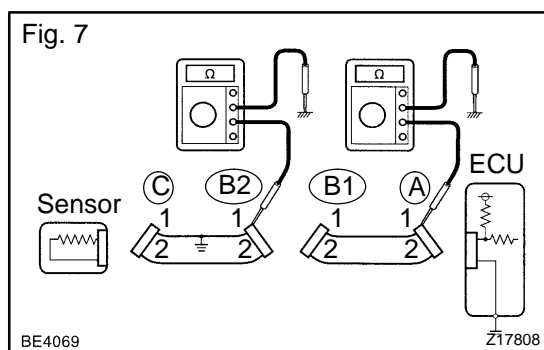
For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.



- (a) Check the continuity.
- 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".



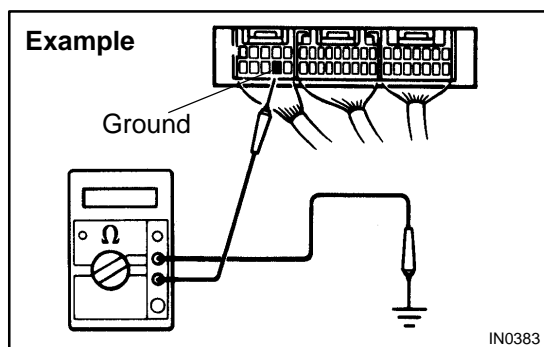
- Disconnect connector "B" and measure the resistance between the connectors.
In the case of Fig. 3,
Between terminal 1 of connector "A" and terminal 1 of connector "B1" → Continuity
Between terminal 1 of connector "B2" and terminal 1 of connector "C" → No continuity (open)
Therefore, it is found out that there is an open circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".



- (2) Disconnect connector "B" and measure the resistance between terminal 1 of connector "A" and body ground, and terminal 1 of connector "B2" and body ground.
 Between terminal 1 of connector "A" and body ground → No continuity
 Between terminal 1 of connector "B2" and body ground → Continuity (short)
 Therefore, it is found out that there is a short circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".

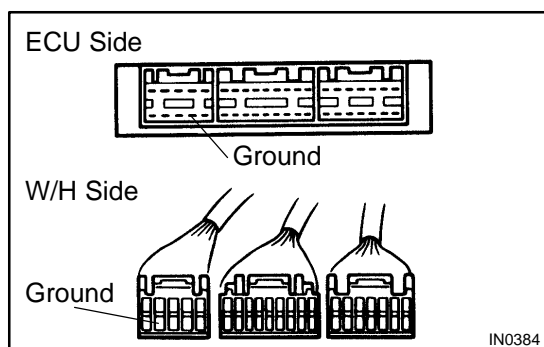
8. CHECK AND REPLACE ECU

First check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty, so replace the ECU with a normal functioning one and check that the symptoms appear.



- (1) Measure the resistance between the ECU ground terminal and the body ground.

Resistance: 1 Ω or less



- (2) Disconnect the ECU connector, check the ground terminals on the ECU side and the wire harness side for bend and check the contact pressure.

TERMS

ABBREVIATIONS USED IN THIS MANUAL

IN04Q-07

Abbreviations	Meaning
ABS	Anti-Lock Brake System
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACSD	Automatic Cold Start Device
A.D.D.	Automatic Disconnecting Differential
A/F	Air-Fuel Ratio
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
A/T	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
B/L	Bi-Level
B/S	Bore-Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
Calif.	California
CB	Circuit Breaker
CCo	Catalytic Converter For Oxidation
CD	Compact Disc
CF	Cornering Force
CG	Center Of Gravity
CH	Channel
COMB.	Combination
CPE	Coupe
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve

INTRODUCTION – TERMS

CW	Curb Weight
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
D/INJ	Direct Injection
DLI	Distributorless Ignition
DOHC	Double Over Head Cam
DP	Dash Pot
DS	Dead Soak
DSP	Digital Signal Processor
EBD	Electronic Brake Force Distribution
ECAM	Engine Control And Measurement System
ECD	Electronic Controlled Diesel
ECDY	Eddy Current Dynamometer
ECU	Electronic Control Unit
ED	Electro-Deposited Coating
EDIC	Electric Diesel Injection Control
EDU	Electronic Driving Unit
EFI	Electronic Fuel Injection
E/G	Engine
EGR-VM	Egr-Vacuum Modulator
ELR	Emergency Locking Retractor
ENG	Engine
ESA	Electronic Spark Advance
ETCS	Electronic Throttle Control System
EVP	Evaporator
E-VRV	Electric Vacuum Regulating Valve
EXH	Exhaust
FE	Fuel Economy
FF	Front-Engine Front-Wheel-Drive
F/G	Fuel Gage
FIPG	Formed In Place Gasket
FL	Fusible Link
F/P	Fuel Pump
FPU	Fuel Pressure Up
Fr	Front
FR	Front-Engine Rear-Wheel-Drive
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GND	Ground
HAC	High Altitude Compensator
H/B	Hatchback

2000 LEXUS GS300/GS400 (RM718U)

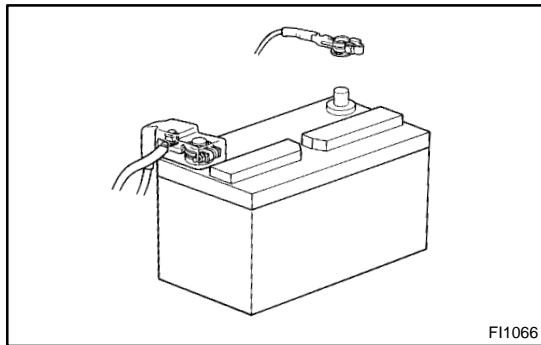
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Head Lamp)
HSG	Housing
HT	Hard Top
HWS	Heated Windshield System
IAC	Idle Air Control
IC	Integrated circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
IIA	Integrated Ignition Assembly
IN	Intake (Manifold, Valve)
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
J/B	Junction Block
J/C	Junction Connector
KD	Kick-Down
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
L/H/W	Length, Height, Width
LLC	Long-Life Coolant
LNG	Liquified Natural Gas
LO	Low
LPG	Liquified Petroleum Gas
LSD	Limited Slip Differential
LSP & PV	Load Sensing Proportioning And Bypass Valve
LSPV	Load Sensing Proportioning Valve
MAX.	Maximum
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MP	Multipurpose
MPX	Multiplex Communication System
M/T	Manual Transmission
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
No.	Number
O/D	Overdrive

INTRODUCTION – TERMS

OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
O/S	Oversize
P & BV	Proportioning And Bypass Valve
PCS	Power Control System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PS	Power Steering
PTO	Power Take-Off
R & P	Rack And Pinion
R/B	Relay Block
RBS	Recirculating Ball Type Steering
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RLY	Relay
ROM	Read Only Memory
Rr	Rear
RR	Rear-Engine Rear-Wheel Drive
RRS	Rigid Rear Suspension
RWD	Rear-Wheel Drive
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
TACH	Tachometer
TBI	Throttle Body Electronic Fuel Injection
TC	Turbocharger
TCCS	TOYOTA Computer-Controlled System
TCV	Timing Control Valve
TDC	Top Dead Center

2000 LEXUS GS300/GS400 (RM718U)

TEMP.	Temperature
TEMS	TOYOTA Electronic Modulated Suspension
TIS	Total Information System For Vehicle Development
T/M	Transmission
TMC	TOYOTA Motor Corporation
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TRAC	Traction Control System
TURBO	Turbocharge
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Skid Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
w/	With
WGN	Wagon
W/H	Wire Harness
w/o	Without
1st	First
2nd	Second
2WD	Two Wheel Drive Vehicle (4x2)
4WD	Four Wheel Drive Vehicle (4x4)



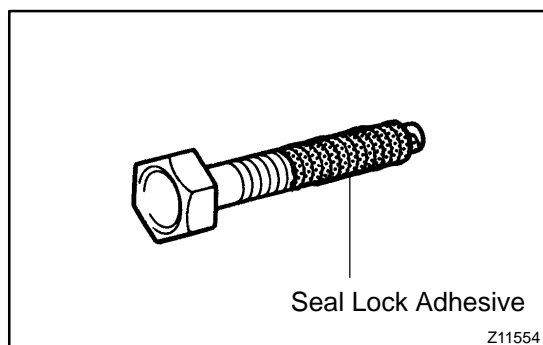
REPAIR INSTRUCTIONS

GENERAL INFORMATION

IN00C-01

BASIC REPAIR HINT

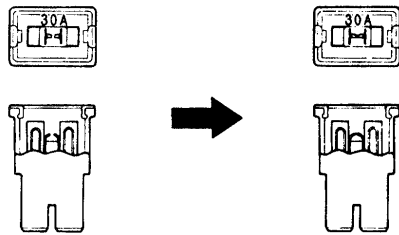
- (a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
- (b) During disassembly, keep parts in the appropriate order to facilitate reassembly.
- (c) Installation and removal of battery terminal:
 - (1) Before performing electrical work, disconnect the negative (–) terminal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



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

- (3) Precoated parts are indicated in the component illustrations by the "★" symbol.
- (g) When necessary, use a sealer on gaskets to prevent leaks.
- (h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
- (i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in Preparation section in this manual.

Medium Current Fuse and High Current Fuse Equal Amperage Rating

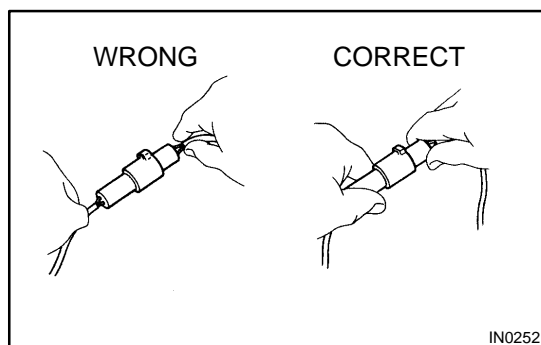
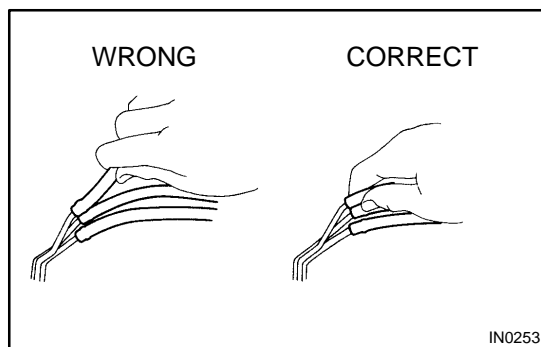


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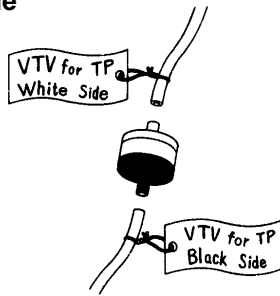
- (j) When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

Illustration	Symbol	Part Name	Abbreviation
 BE5594	 IN0365	FUSE	FUSE
 BE5595	 IN0366	MEDIUM CURRENT FUSE	M-FUSE
 BE5596	 IN0367	HIGH CURRENT FUSE	H-FUSE
 BE5597	 IN0367	FUSIBLE LINK	FL
 BE5598	 IN0368	CIRCUIT BREAKER	CB

- (k) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page [IN-8](#)).
- Cancel the parking brake on the level place and shift the transmission in Neutral (or N position).
 - When jacking up the front wheels of the vehicle, at first place stoppers behind the rear wheels.
 - When jacking up the rear wheels of the vehicle, at first place stoppers before the front wheels.
 - When either the front or rear wheels only should be jacked up, set rigid racks and place stoppers in front and behind the other wheels on the ground.
 - After the vehicle is jacked up, be sure to support it on rigid racks. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.
- (l) Observe the following precautions to avoid damage to the following parts:
- (1) Do not open the cover or case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)



- (2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.
- (3) To pull apart electrical connectors, pull on the connector itself, not the wires.
- (4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
- (5) When steam cleaning an engine, protect the electronic components, air filter and emission-related components from water.
- (6) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (7) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
- (8) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter for adjustment. Once the hose has been stretched, it may leak air.

Example

IN0002

- (m) Installation and removal of vacuum hose:
 - (1) When disconnecting vacuum hoses, use tags to identify where they should be reconnected to.
 - (2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.
- (n) Bleeding of hydraulic brake booster:

When repairing the hydraulic brake booster or ABS, TRAC and VSC system, bleeding the air out of the hydraulic brake booster (See page [BR-4](#)).
- (o) Unless otherwise stated, all resistance is measured at an ambient temperature of 20°C (68°F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.

GLOSSARY OF SAE AND LEXUS TERMS

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

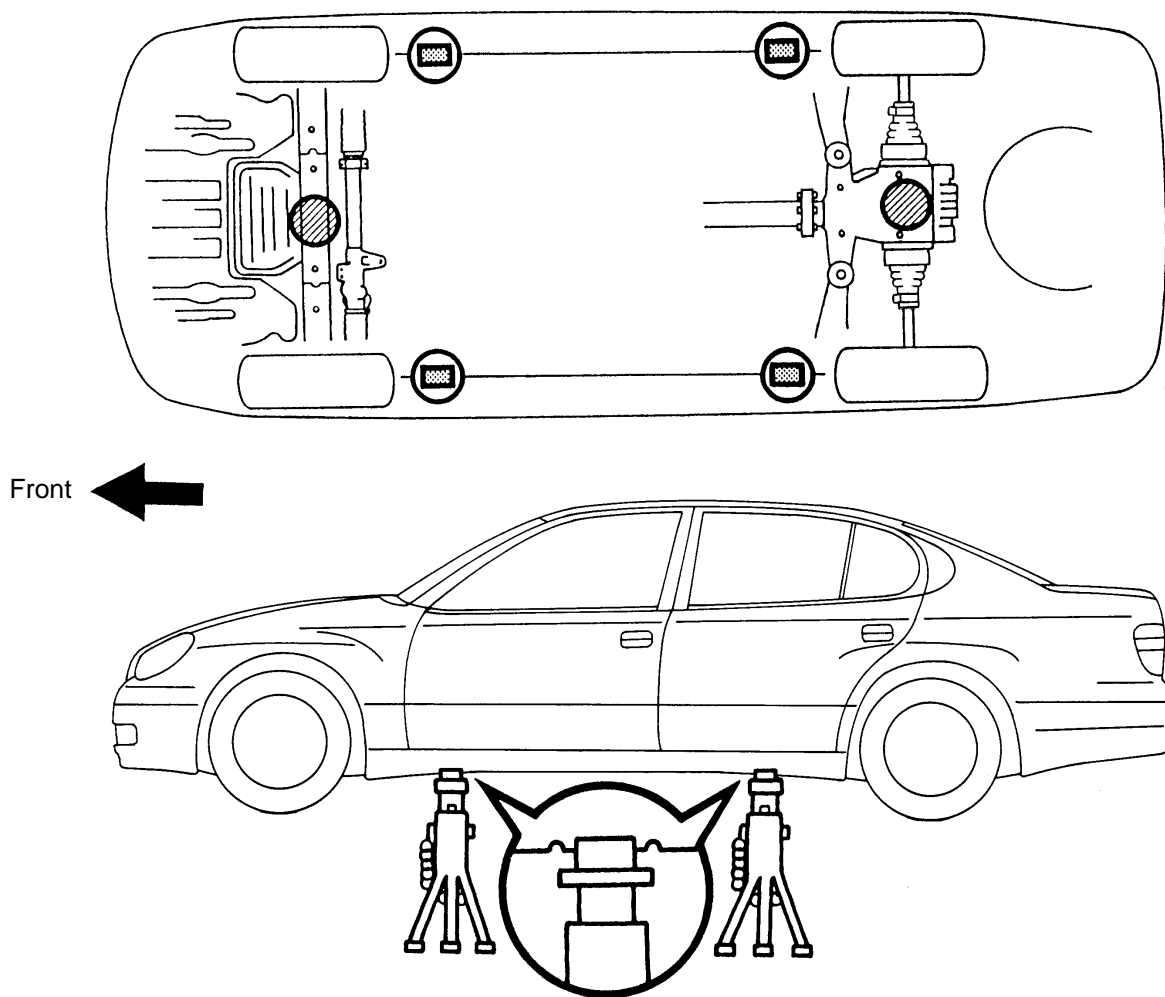
SAE ABBREVIATIONS	SAE TERMS	LEXUS TERMS ()—ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner, A/CL
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	—
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	HAC
CAC	Charge Air Cooler	Intercooler
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	LL ON, Idle ON
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	—
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis 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)

HO ₂ S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO ₂ S)
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 (IDL)
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 Lamp
MST	Manifold Surface Temperature	–
MVZ	Manifold Vacuum Zone	–
NVRAM	Non-Volatile Random Access Memory	–
O ₂ S	Oxygen Sensor	Oxygen Sensor, O ₂ Sensor (O ₂ S)
OBD	On-Board Diagnostic	On-Board Diagnostic System (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Convert (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	E-ABV
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

INTRODUCTION – TERMS

TCM	Transmission Control Module	Transmission ECU, ECT ECU
TP	Throttle Position	Throttle Position
TR	Transmission Range	–
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter 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
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	–
WU-TWC	Warm Up Three-Way Catalytic Converter	–
3GR	Third Gear	–
4GR	Fourth Gear	–

VEHICLE LIFT AND SUPPORT LOCATIONS



JACK POSITION

Front ----- Front crossmember
 Rear ----- Differential carrier

CAUTION : When jacking-up the front and rear, make sure the car is not carrying any extra weight.

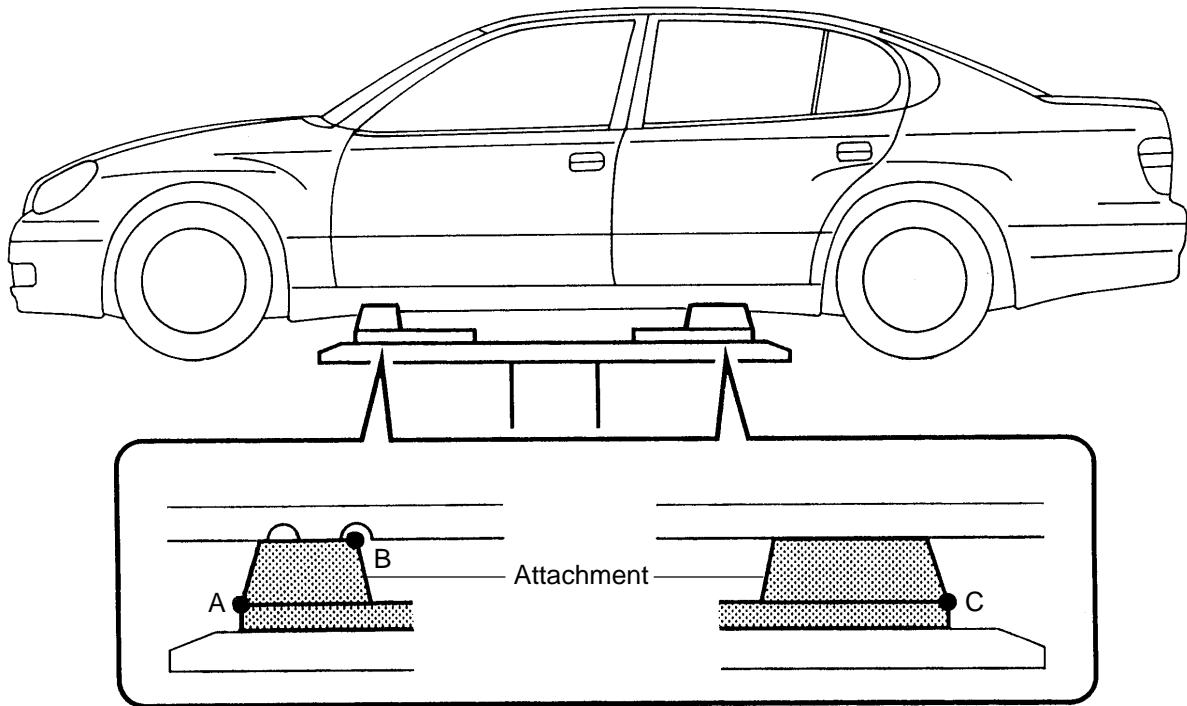
PANTOGRAPH JACK POSITION

SUPPORT POSITION

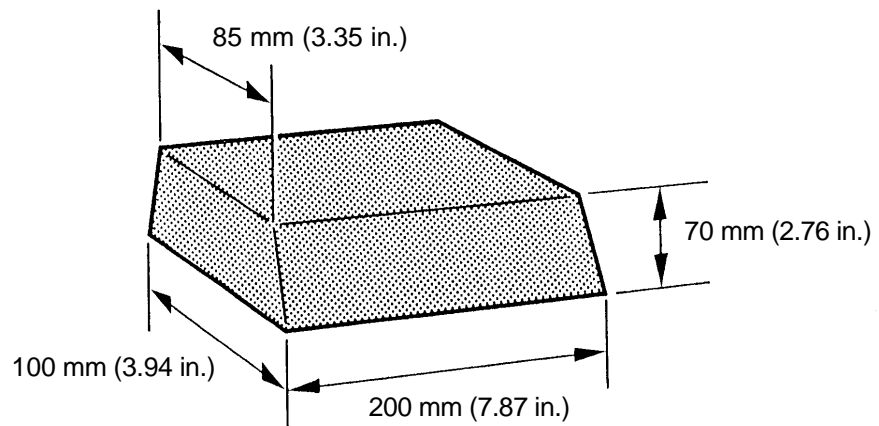
Safety stand and swing arm type lift -----



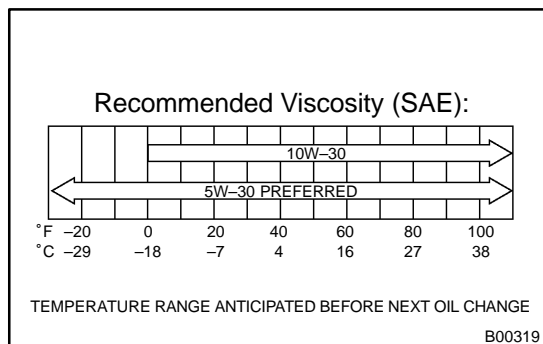
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Plate type lift**HINT :**

- | | |
|-----------------------------|--|
| Left and right set position | Place the vehicle over the center of the lift. |
| Front and rear set position | <ul style="list-style-type: none"> • When using attachments, place the one for front side vertically and the one for rear side horizontally to the vehicle. • Align the cushion gum ends of the plate with the attachment lower ends (A, C). • Align the attachment upper end (B) with the rocker flange rear side notch. |

Attachment dimensions

B02135



OIL AND FILTER INSPECTION

LU05G-04

1. CHECK OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If oil quality is visibly poor, replace the oil.

Oil grade:

API grade SJ, Energy-Conserving or ILSAC multi-grade engine oil. SAE 5W-30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.

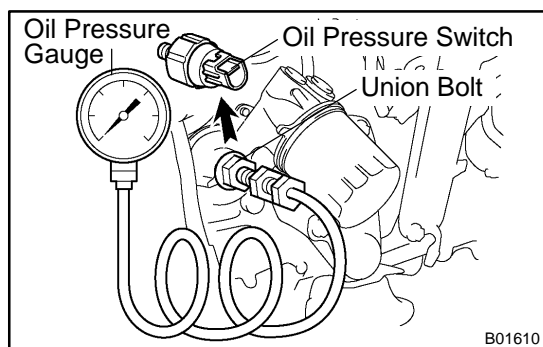
2. CHECK ENGINE OIL LEVEL

After warming up the engine and then 5 minutes after the engine stop, oil level should be between the low level and full level marks of the dipstick.

If low, check for leakage and add oil up to the full level mark.

NOTICE:

Do not fill with engine oil above the full level mark.



3. REMOVE OIL PRESSURE SWITCH, AND INSTALL OIL PRESSURE GAUGE

- Disconnect the oil pressure switch connector.
- Using SST, remove the oil pressure switch.
SST 09816-30010
- Install an oil pressure gauge.

4. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

5. CHECK OIL PRESSURE

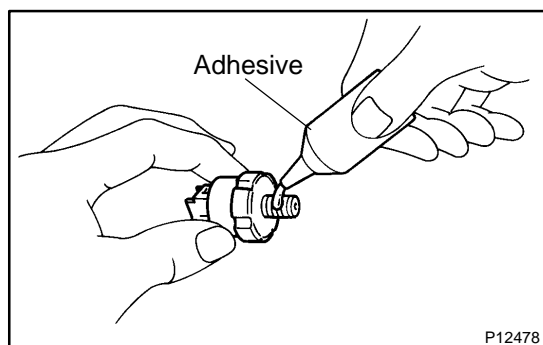
Oil pressure:

At idle	49 kPa (0.5 kgf/cm ² , 7 psi) or more
At 3,000 rpm	324 kPa (3.3 kgf/cm ² , 47 psi) or more

6. REMOVE OIL PRESSURE GAUGE AND REINSTALL OIL PRESSURE SWITCH

- Remove the oil pressure gauge.
- Tighten the union bolt.

Torque: 90 N·m (900 kgf·cm, 66 ft·lbf)



- Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- Using SST, install the oil pressure switch.
SST 09816-30010

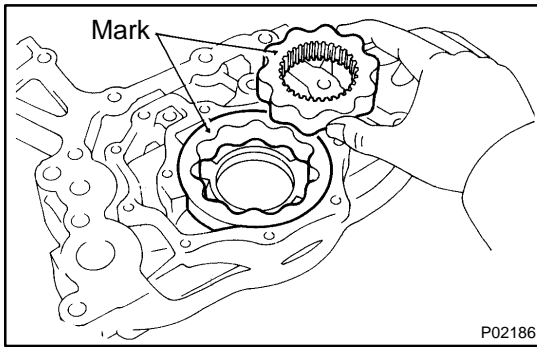
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

- Connect the oil pressure switch connector.

7. START ENGINE AND CHECK FOR LEAKS

REPLACEMENT

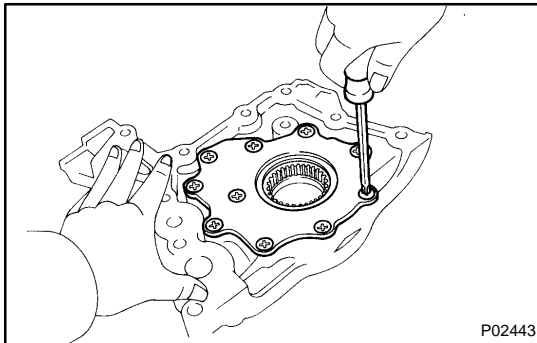
REPLACE FRONT CRANKSHAFT OIL SEAL (See page [EM-88](#)).



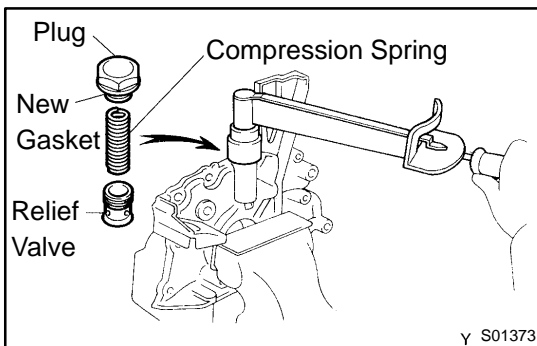
REASSEMBLY

1. INSTALL DRIVE AND DRIVEN ROTORS

- (a) Place the drive and driven rotors into oil pump body with the mark facing upward.



- (b) Install the pump body cover with the 10 screws.
Torque: 10 N·m (105 kgf-cm, 8 ft-lbf)



2. INSTALL RELIEF VALVE

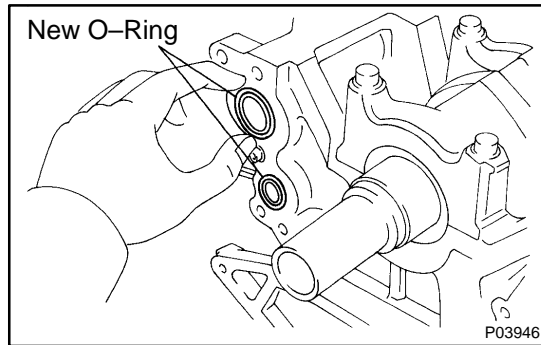
- (a) Carefully mount the pump body in a soft jaw vise.

NOTICE:

Be careful not to damage the pump body.

- (b) Insert the relief valve and compression spring into the oil pump body hole.
- (c) Install the plug with a new gasket.

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



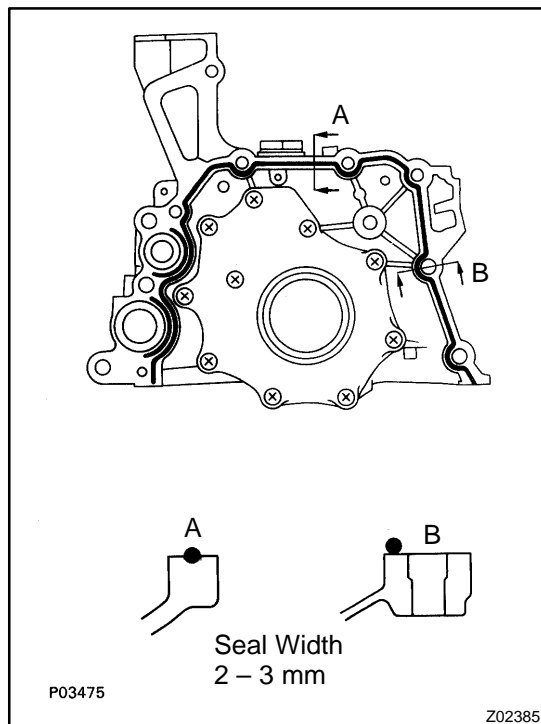
INSTALLATION

1. INSTALL OIL PUMP

- Place 2 new O-rings in position on the cylinder block.
- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.
 - Using a razor blade gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the debris.
 - Using a non-residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



- Apply seal packing to the oil pump as shown in the illustration.

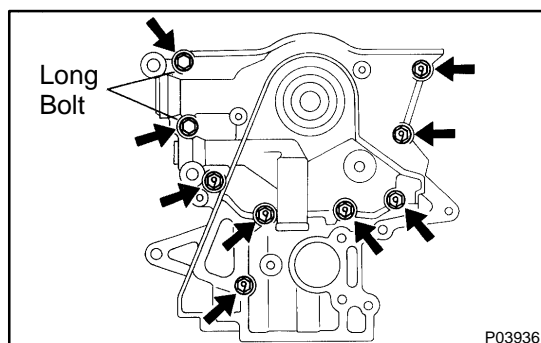
Seal packing: Part No.08826-00080 or equivalent

- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.

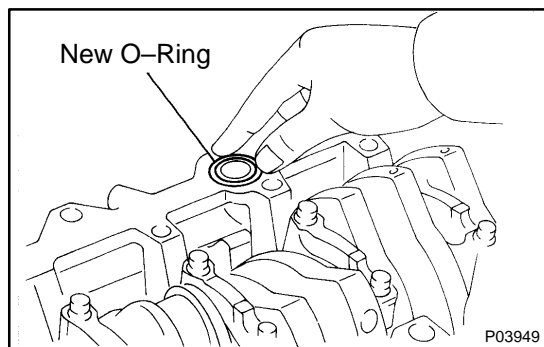
HINT:

Avoid applying an excessive amount to the surface. Be particularly careful near oil passages.

- 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.



- Install the oil pump with the 9 bolts.
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

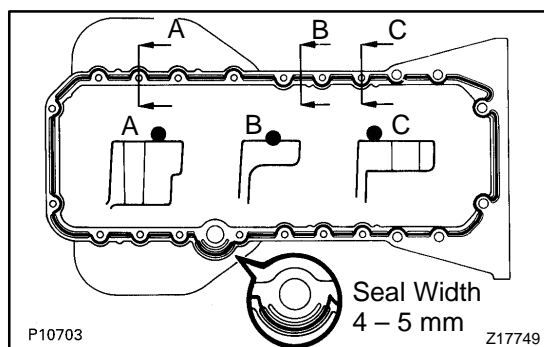


2. INSTALL NO.1 OIL PAN

- (a) Place a new O-ring in the position on the cylinder block.
- (b) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 oil pan and cylinder block.
 - Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the debris.
 - Using a non-residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



- (c) Apply seal packing to the No.1 oil pan as shown in the illustration.

Seal packing: Part No.08826-00080 or equivalent

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

- (d) Install the No.1 oil pan with the 22 bolts.

Torque:

12 mm head 21 N·m (210 kgf·cm, 15 ft·lbf)

14 mm head 40 N·m (400 kgf·cm, 30 ft·lbf)

3. INSTALL OIL PAN BAFFLE PLATE

Torque: 9.0 N·m (90 kgf·cm, 80 in·lbf)

4. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the bolt and 2 nuts.

Torque: 9.0 N·m (90 kgf·cm, 80 in·lbf)

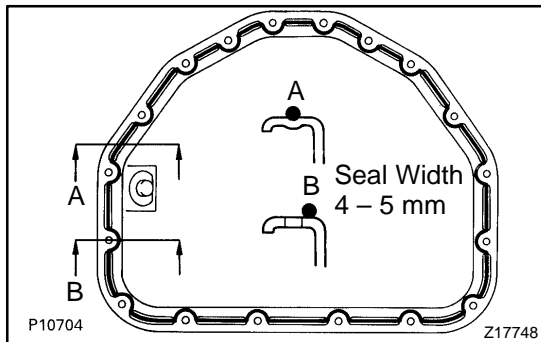
5. INSTALL NO.2 OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 and No.2 oil pans.
 - Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the debris.

- Using a non-residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



- (b) Apply seal packing to the No.2 oil pan as shown in the illustration.

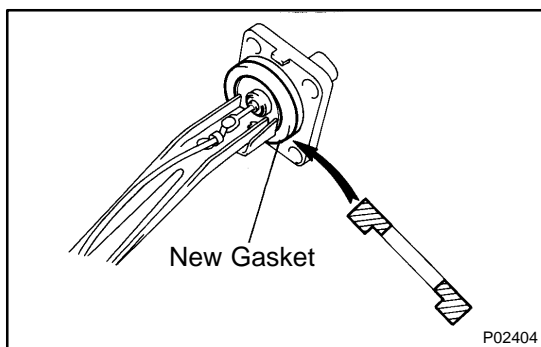
Seal packing: Part No.08826-00080 or equivalent

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

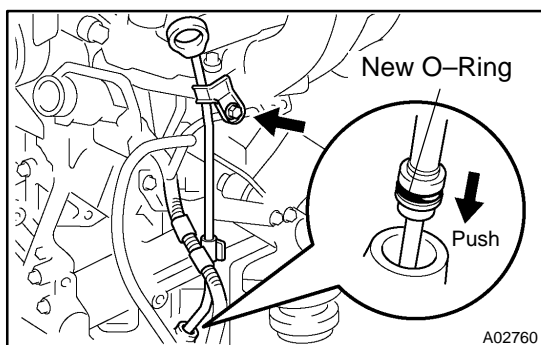
HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
 - Immediately remove nozzle from the tube and reinstall cap.
- (c) Install the No.2 oil pan with the 16 bolts and 2 nuts.
Torque: 9.0 N·m (90 kgf·cm, 80 in.-lbf)

**6. INSTALL OIL LEVEL SENSOR**

- (a) Install a new gasket to the level sensor.
(b) Install the level sensor with the 4 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
(c) Connect the level sensor connector.

**7. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK**

- (a) Install a new O-ring on the dipstick guide.
(b) Apply soapy water on the O-ring.
(c) Push in the dipstick guide into the guide hole of the No.1 oil pan.
(d) Install the dipstick guide with the bolt.
(e) Install the dipstick.
(f) Connect the engine wire clamp to the dipstick guide.

8. INSTALL CRANKSHAFT TIMING PULLEY, IDLER PULLEY AND TIMING BELT (See page EM-23)

9. **INSTALL CRANKSHAFT POSITION SENSOR**
Torque: 9.0 N·m (90 kgf·cm, 80 in.-lbf)
10. **REMOVE ENGINE STAND FROM ENGINE**
11. **ASSEMBLY ENGINE AND TRANSMISSION**
(See page [EM-68](#))
12. **INSTALL ENGINE WITH TRANSMISSION**
(See page [EM-68](#))

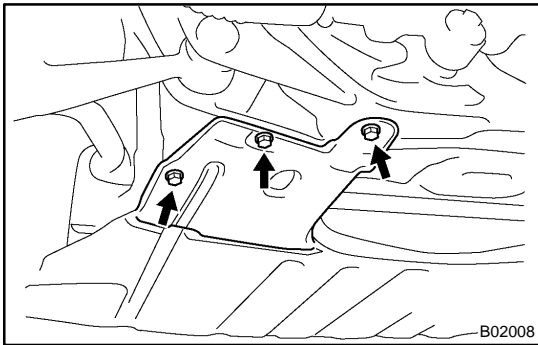
REPLACEMENT

CAUTION:

- Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.
- In order to preserve the environment, used oil and used oil filters must be disposed of only at designated disposal sites.

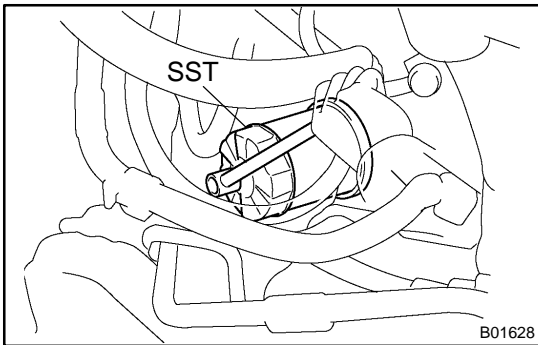
1. DRAIN ENGINE OIL

- Remove the oil filler cap.
- Remove the oil drain plug, and drain the oil into a container.

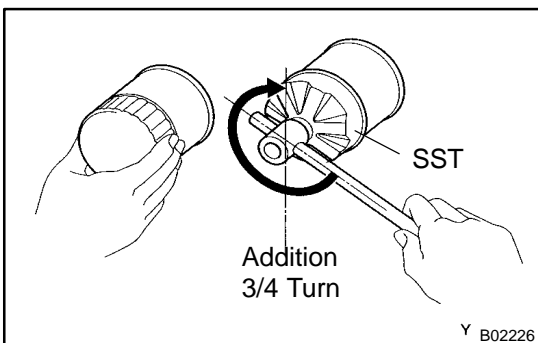


2. REPLACE OIL FILTER

- Remove the 3 screws, and bend the engine under cover.



- Using SST, remove the oil filter.
SST 09228-07501
- Clean the oil filter contact surface on the oil filter mounting.
- Lubricate the filter rubber gasket with clean engine oil.



- Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.
- Using SST, tighten it an additional 3/4 turn to seat the filter.

SST 09228-07501

- Reinstall the engine under cover with the 3 screws.

3. FILL WITH ENGINE OIL

- Clean and install the oil drain plug with a new gasket.

Torque: 38 N·m (380 kgf-cm, 28 ft-lbf)

(b) Fill with fresh engine oil.

Capacity:

Drain and refill	w/ Oil filter change	5.4 liters (5.7 US qts, 4.8 Imp. qts)
	w/o Oil filter change	5.1 liters (5.4 US qts, 4.5 Imp. qts)
Dry fill		6.5 liters (6.9 US qts, 5.7 Imp. qts)

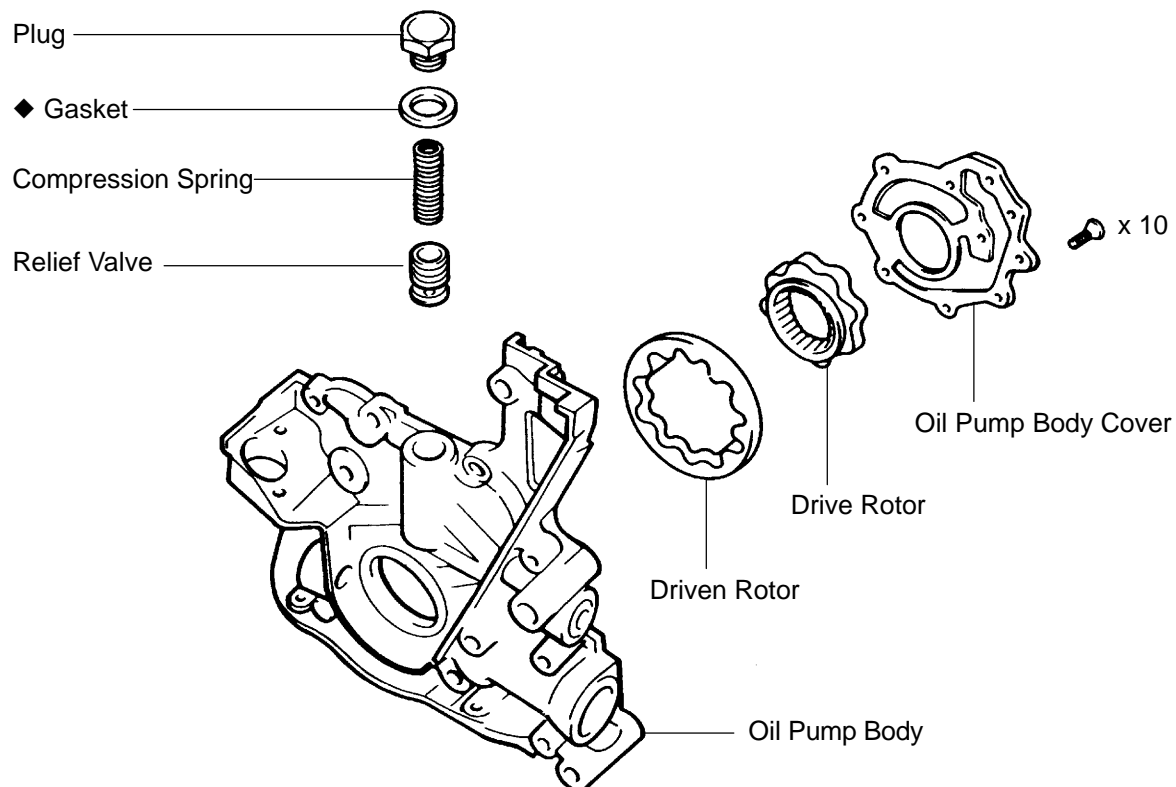
(c) Reinstall the oil filler cap.

4. START ENGINE AND CHECK FOR OIL LEAKS

5. RECHECK ENGINE OIL LEVEL

111051-01





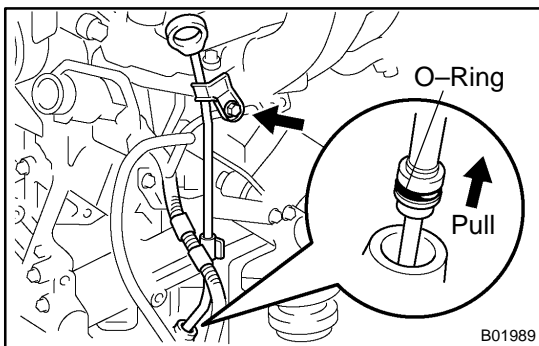
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REMOVAL

HINT:

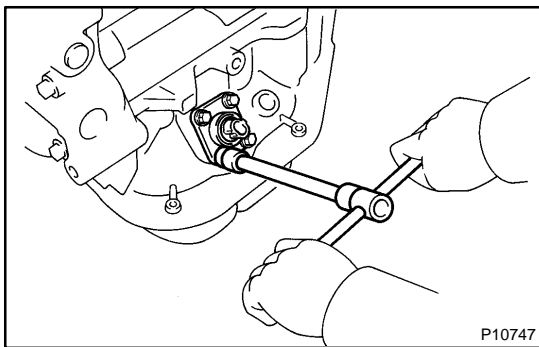
When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

1. **REMOVE ENGINE WITH TRANSMISSION**
(See page [EM-62](#))
2. **SEPARATE ENGINE AND TRANSMISSION**
(See page [EM-62](#))
3. **INSTALL ENGINE TO ENGINE STAND FOR REMOVAL**
4. **REMOVE CRANKSHAFT POSITION SENSOR**
5. **REMOVE TIMING BELT, IDLER PULLEY AND CRANKSHAFT TIMING PULLEY** (See page [EM-16](#))



6. REMOVE OIL DIPSTICK AND GUIDE

- (a) Disconnect the engine wire clamp from the dipstick guide.
- (b) Remove the bolt.
- (c) Pull out the dipstick guide together with the dipstick.
- (d) Remove the O-ring from the dipstick guide.



7. REMOVE OIL LEVEL SENSOR

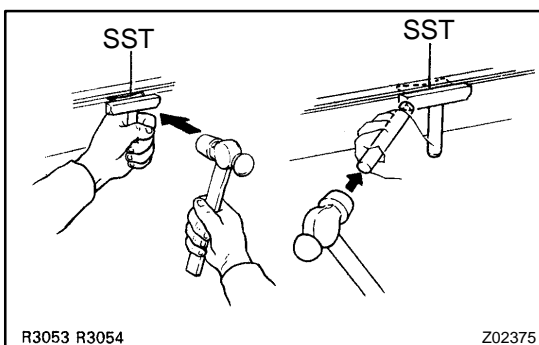
- (a) Disconnect the level sensor connector.
- (b) Remove the 4 bolts and level sensor.
- (c) Remove the gasket from the level sensor.

NOTICE:

Be careful not to drop the oil level sensor when removing it.

8. REMOVE NO.2 OIL PAN

- (a) Remove the 16 bolts and 2 nuts.

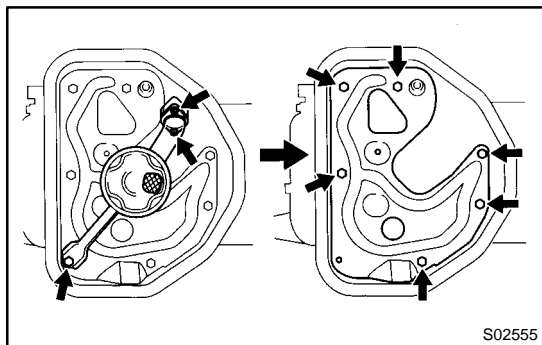


- (b) Insert the blade of SST between the No.1 and No.2 oil pan, break the seal of the applied sealer and remove the No.2 oil pan.

SST 09032-00100

NOTICE:

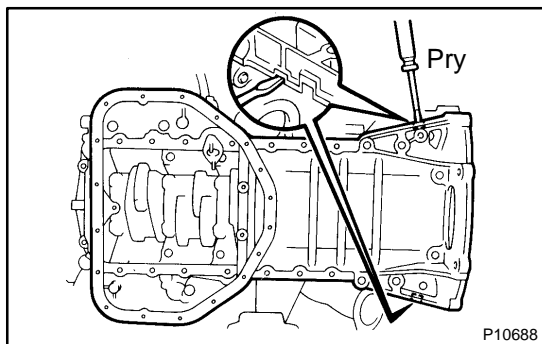
Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan. Be careful not to damage the oil pan flange.

**9. REMOVE OIL STRAINER**

Remove the bolt, 2 nuts, oil strainer and gasket.

10. REMOVE OIL PAN BAFFLE PLATE

Remove the 6 bolts and baffle plate.

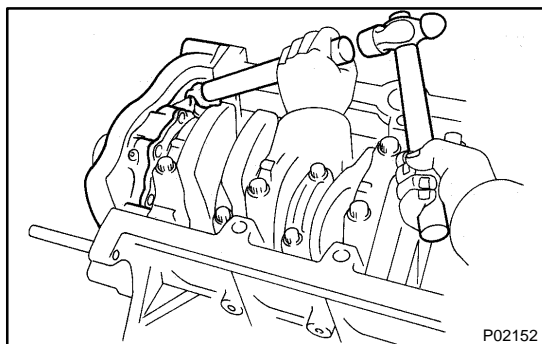
**11. REMOVE NO.1 OIL PAN**

- (a) Remove the 22 bolts.
- (b) Remove the No.1 oil pan by prying the portions between the cylinder block and No.1 oil pan with a screwdriver.

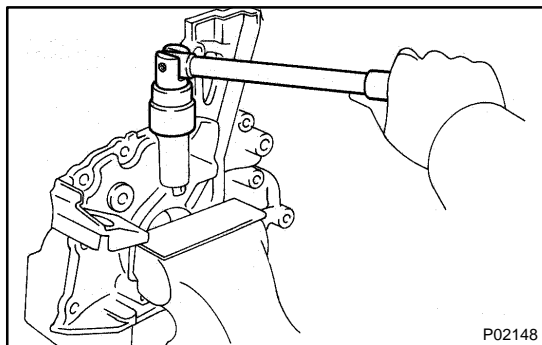
NOTICE:

Be careful not to damage the contact surfaces of the cylinder block and No.1 oil pan.

- (c) Remove the O-ring from the cylinder block.

**12. REMOVE OIL PUMP**

- (a) Remove the 9 bolts.
- (b) Using a hammer and a brass bar, remove the oil pump by carefully tapping the oil pump body.
- (c) Remove the 2 O-rings from the cylinder block.



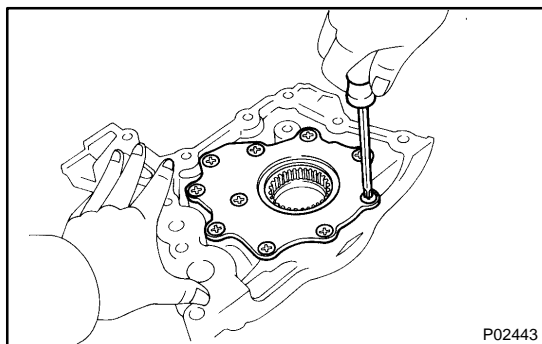
DISASSEMBLY

1. REMOVE RELIEF VALVE

- (a) Carefully mount the pump body in a soft jaw vise.
- (b) Remove the plug, gasket, compression spring and relief valve.

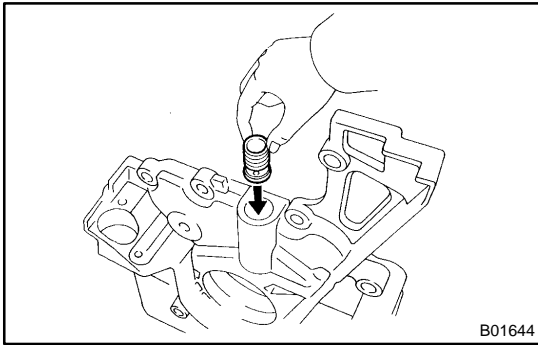
NOTICE:

Be careful not to damage the pump body.



2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the 10 screws, pump body cover, the drive and driven rotors.

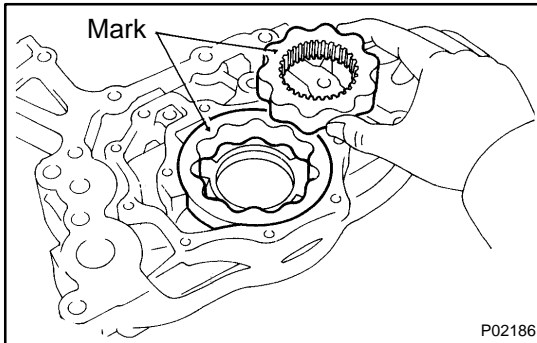


INSPECTION

1. INSPECT RELIEF VALVE

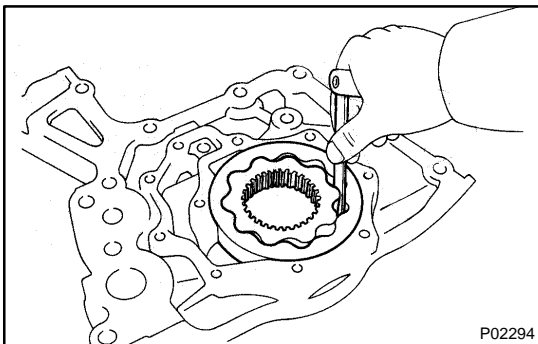
Coat the valve with engine oil and check that it falls smoothly into the valve hole under its own weight.

If it doesn't, replace the relief valve. If necessary, replace the oil pump assembly.



2. PLACE DRIVE AND DRIVEN ROTORS INTO OIL PUMP BODY

The marks on the rotors must face up.



3. INSPECT ROTOR TIP CLEARANCE

Using a feeler gauge, measure the clearance between the drive and driven rotors.

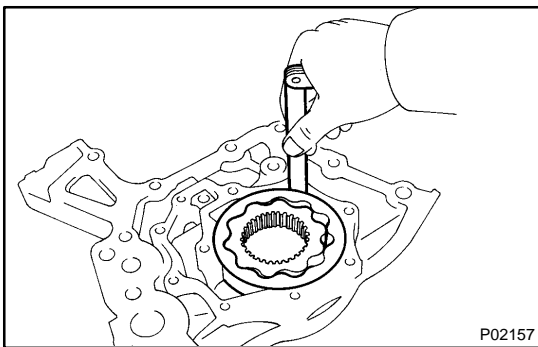
Standard tip clearance:

0.060 – 0.240 mm (0.0024 – 0.0094 in.)

Maximum tip clearance:

0.30 mm (0.0118 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.



4. INSPECT ROTOR BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven rotor and pump body.

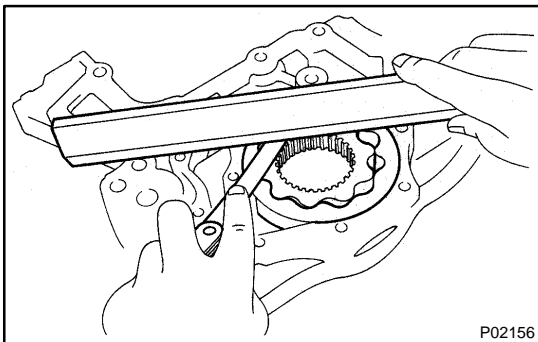
Standard body clearance:

0.100 – 0.175 mm (0.0039 – 0.0069 in.)

Maximum body clearance:

0.20 mm (0.0079 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



5. INSPECT ROTOR SIDE CLEARANCE

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:

0.030 – 0.090 mm (0.0012 – 0.0035 in.)

Maximum side clearance:

0.12 mm (0.0047 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

6. REMOVE DRIVE AND DRIVEN ROTORS

OUTSIDE VEHICLE

GENERAL MAINTENANCE

MA001-07

These are maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.

These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do.

Items and procedures for general maintenance are as follows.

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.

2. TIRES

- (a) Check the pressure with a gauge. If necessary, adjust.
- (b) Check for cuts, damage or excessive wear.

3. WHEEL NUTS

When checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

4. TIRE ROTATION

Check the owner's manual supplement in which the maintenance schedule is shown.

5. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do not wipe clean. If necessary, replace.

6. FLUID LEAKS

- (a) Check underneath for leaking fuel, oil, water or other fluid.
- (b) If you smell gasoline fumes or notice any leak, have the cause found and corrected.

7. DOORS AND ENGINE HOOD

- (a) Check that all doors and the tailgate 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

GENERAL MAINTENANCE

These are maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.

These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do.

Items and procedures for general maintenance are as follows.

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- Maintenance service 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.

2. LIGHTS

- (a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights are all working.
- (b) Check the headlight aiming.

3. WARNING LIGHTS AND BUZZERS

Check that all warning lights and buzzers function properly.

4. HORN

Check that it is working.

5. WINDSHIELD GLASS

Check for scratches, pits or abrasions.

6. WINDSHIELD WIPER AND WASHER

- (a) Check operation of the wipers and washer.
- (b) Check that the wipers do not streak.

7. WINDSHIELD DEFROSTER

Check that air comes out from the defroster outlet when operating the heater or air conditioner.

8. REAR VIEW MIRROR

Check that it is mounted securely.

9. SUN VISORS

Check that they move freely and are mounted securely.

10. STEERING WHEEL

Check that it has the specified freeplay. Be alert for changes in steering condition, such as hard steering, excessive freeplay or strange noises.

11. SEATS

- (a) Check that all front seat controls such as seat adjusters, seatback recliner, etc. operate smoothly.
- (b) Check that all latches lock securely in any position.
- (c) Check that the 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 any latches position.
- (e) For folding-down rear seat backs, check that the latches lock securely.

12. SEAT BELTS

- (a) Check that the seat belt system such as the buckles, retractors and anchors operate properly and smoothly.
- (b) Check that the belt webbing is not cut, frayed, worn or damaged.

13. ACCELERATOR PEDAL

Check the pedal for smooth operation and uneven pedal effort or catching.

14. BRAKE PEDAL (See page BR-9)

- (a) Check the pedal for smooth operation.
- (b) Check that the pedal has the proper reserve distance and freeplay.
- (c) Check the brake booster function.

15. BRAKES

At a safe place, check that the brakes do not pull to one side when applied.

16. PARKING BRAKE (See page BR-11)

- (a) Check that the lever has the proper travel.
- (b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

17. AUTOMATIC TRANSMISSION "PARK" MECHANISM

On a safe incline, check that the vehicle is held securely with the selector lever in "P" position and all brakes released.

UNDER HOOD

MA003-06

GENERAL MAINTENANCE

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.

2. WINDSHIELD WASHER FLUID

Check that there is sufficient fluid in the tank.

3. ENGINE COOLANT LEVEL

Check that the coolant level is between the "FULL" and "LOW" lines on the see-through reservoir.

4. RADIATOR AND HOSES

- (a) Check that the front of the radiator is clean and not blocked with leaves, dirt or bugs.
- (b) Check the hoses for cracks, kinks, rot or loose connections.

5. BATTERY ELECTROLYTE LEVEL

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case.

6. BRAKE FLUID LEVEL

Check that the brake fluid levels are near the upper level line on the see-through reservoirs.

7. ENGINE DRIVE BELT

Check drive belt for fraying, cracks, wear or oiliness.

8. ENGINE OIL LEVEL

Check the level on the dipstick with the engine turned off.

9. POWER STEERING FLUID LEVEL

- Check the level on the dipstick.
- The level should be in the "HOT" or "COLD" range depending on the fluid temperature.

10. AUTOMATIC TRANSMISSION FLUID LEVEL

- (a) Park the vehicle on a level surface.
- (b) With the engine idling and the parking brake applied, shift the selector into all positions from "P" to "L", and then shift into "P" position.
- (c) Pull out the dipstick and wipe off the fluid with a clean rag. Re-insert the dipstick and check that the fluid level is in the HOT range.
- (d) Do this check with the fluid at normal driving temperature (70 – 80°C, 158 – 176°F).

HINT:

Wait until the engine cools down (approx. 30 min.) before checking the fluid level after extended driving at high speeds, in hot weather, in heavy traffic or pulling a trailer.

11. EXHAUST SYSTEM

If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, have the cause located and corrected.

ENGINE INSPECTION

MA004-04

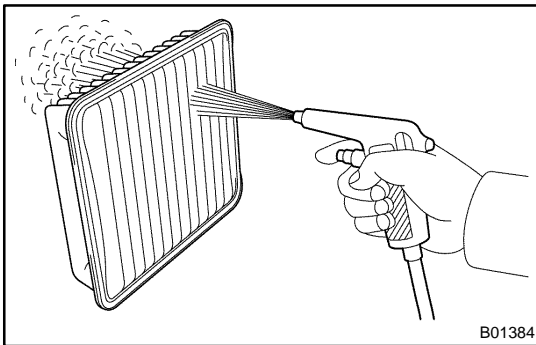
HINT:

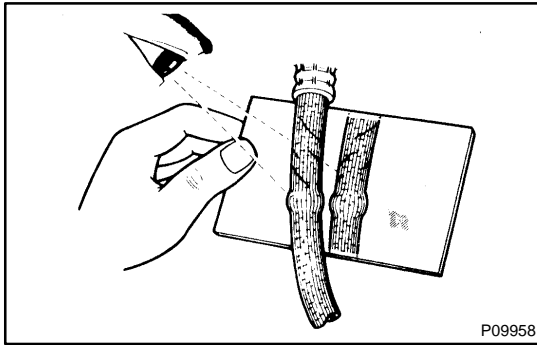
Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT**
(2JZ-GE ENGINE: See page [EM-16](#))
(1UZ-FE ENGINE: See page [EM-14](#))
2. **INSPECT DRIVE BELT**
(2JZ-GE ENGINE: See page [CH-1](#))
(1UZ-FE ENGINE: See page [CH-1](#))
3. **REPLACE SPARK PLUGS**
(2JZ-GE ENGINE: See page [IG-1](#))
(1UZ-FE ENGINE: See page [IG-1](#))
4. **INSPECT AIR FILTER**
 - (a) Remove the air filter.
 - (b) Visually check that the air filter is not excessively damaged or oily.

If necessary, replace the air filter.

 - (c) Clean the filter with compressed air.
First blow from the inside thoroughly, then blow the outside of the filter.
 - (d) Reinstall the air filter.
5. **REPLACE AIR FILTER**
Replace the air filter with a new one.
6. **REPLACE ENGINE OIL AND OIL FILTER**
(2JZ-GE ENGINE: See page [LU-2](#))
(1UZ-FE ENGINE: See page [LU-3](#))
7. **REPLACE ENGINE COOLANT**
(2JZ-GE ENGINE: See page [CO-2](#))
(1UZ-FE ENGINE: See page [CO-2](#))
8. **REPLACE GASKET IN FUEL TANK CAP**
(2JZ-GE ENGINE: See page [EC-7](#))
(1UZ-FE ENGINE: See page [EC-7](#))
9. **INSPECT FUEL LINES AND CONNECTIONS**
Visually check the fuel lines for cracks, leakage, loose connections, deformation or tank band looseness.
10. **INSPECT EXHAUST PIPES AND MOUNTINGS**
Visually check the pipes, hangers and connections for severe corrosion, leaks or damage.
11. **ADJUST VALVE CLEARANCE**
(2JZ-GE ENGINE: See page [EM-5](#))
(1UZ-FE ENGINE: See page [EM-4](#))





BRAKE INSPECTION

MA01R-01

1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

Check in a well lighted area. Check the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before checking the front brake.

- (a) Check 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 install in grommets pass through the center of the grommets.

2. INSPECT FRONT AND REAR BRAKE PADS AND DISCS

(FRONT PADS: See page [BR-16](#))

(REAR PADS: See page [BR-25](#))

(FRONT DISCS: See page [BR-21](#))

(REAR DISCS: See page [BR-30](#))

3. INSPECT PARKING BRAKE LININGS AND DRUMS

(See page [BR-35](#))

4. INSPECT OR CHANGE BRAKE FLUID

(See page [BR-4](#))

Fluid: SAE J1703 or FMVSS No.116 DOT3

CHASSIS INSPECTION

MA01S-01

1. INSPECT STEERING LINKAGE

- (a) Check the steering wheel freeplay.
(See page [SR-8](#))
- (b) Check the steering linkage for looseness or damage.
Check that:
 - Tie rod ends do not have excessive play.
 - Dust seals and boots are not damaged.
 - Boot clamps are not loose.

2. INSPECT SRS AIRBAG

(DRIVER'S SIDE: See page [RS-15](#))

(PASSENGER'S SIDE: See page [RS-29](#))

3. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.

4. INSPECT LOWER BALL JOINTS AND DUST COVERS

- (a) Jack up the front of the vehicle and support it with stands.
- (b) Make sure the front wheels are in a straight-ahead position, and depress the brake pedal.
- (c) Jack up the lower suspension arm until there is about half a load on the front coil spring.
- (d) Inspect the dust cover for damage.

5. CHECK AUTOMATIC TRANSMISSION AND DIFFERENTIAL

Visually check the automatic transmission and differential for oil leakage.

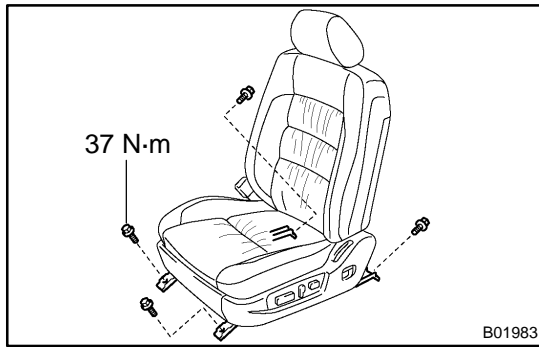
If leakage is found, check for the cause and repair it.

6. REPLACE AUTOMATIC TRANSMISSION FLUID

(See page [DI-318](#))

7. REPLACE DIFFERENTIAL OIL

(See page [SA-61](#))



BODY INSPECTION

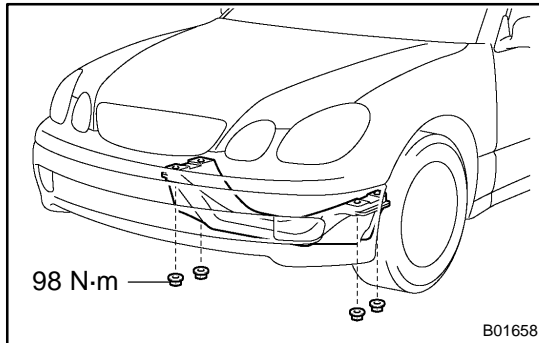
MA01T-01

1. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

Tighten these parts:

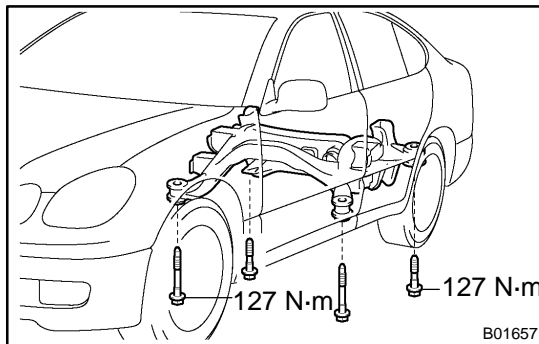
- Front seat mounting bolts

Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)



- Front suspension member-to-body mounting nuts

Torque: 98 N·m (1,000 kgf-cm, 72 ft-lbf)



- Rear suspension member-to-body mounting bolts

Torque: 127 N·m (1,300 kgf-cm, 94 ft-lbf)

2. BODY INSPECTION

- Check the body exterior for dents, scratches and rust.
- Check the underbody for rust and damage.

If necessary, replace or repair.

3. ROAD TEST

- Check the engine and chassis for abnormal noises.
- Check that the vehicle does not wander or pull to one side.
- Check that the brakes work properly and do not drag.
- Do setting of the parking brake shoes and drum.

4. FINAL INSPECTION

- Check the operation of the body parts:
 - Hood
 - Auxiliary catch operates properly
 - Hood locks securely when closed
 - Front and rear doors
 - Door locks operate properly
 - Doors close properly
 - Luggage compartment door
 - Door lock operates properly
 - Seat adjusts easily and locks securely in any position
 - Front seat back locks securely in any position
 - Folding-down rear seat backs lock securely

(b) Be sure to deliver a clean car. Especially check:

- Steering wheel
- Shift lever knob
- All switch knobs
- Seats

MAINTENANCE EQUIPMENT


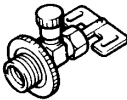






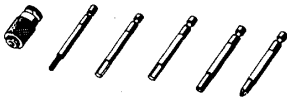



PP0Q1-02

Mirror	Brake hose
Torque wrench	

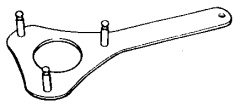
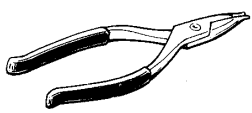
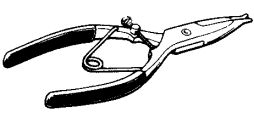
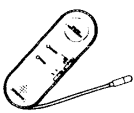
AIR CONDITIONING

SST (Special Service Tools)

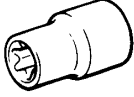

PPOSN-01

	07110-58060 Air Conditioner Service Tool Set	
	(07117-58060) Refrigerant Drain Service Valve	
	(07117-58070) T-Joint	
	(07117-58080) Quick Disconnect Adapter	High pressure side
	(07117-58090) Quick Disconnect Adapter	Low pressure side
	(07117-88060) Refrigerant Charging Hose	High pressure side (Color: Red)
	(07117-88070) Refrigerant Charging Hose	Low pressure side (Color: Blue)
	(07117-88080) Refrigerant Charging Hose	Utility (Color: Green)
	07110-61050 Wrench Set	Expansion valve
	(07111-21020) Holder	
	(07111-32020) Hexagon Wrench	5 mm (0.20 in.)
	07112-66040 Magnetic Clutch Remover	

PREPARATION – AIR CONDITIONING

	07112-76060 Magnetic Clutch Stopper	
	07114-84010 Snap Ring Pliers	
	07114-84020 Snap Ring Pliers	
	07116-38360 Gas Leak Detector Assembly	

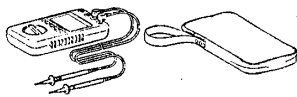
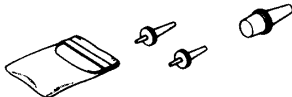
RECOMMENDED TOOLS

	09044-00020 Torx Socket E10 .	Compressor (GS300)
	09082-00040 TOYOTA Electrical Tester.	

LUBRICANT

Item	Capacity	Classification
Compressor oil	–	ND-OIL 8 or equivalent
When replacing condenser	40 cc (1.4 fl. oz.)	
When replacing evaporator	40 cc (1.4 fl. oz.)	

RECOMMENDED TOOLS

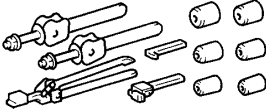

	09082-00040 TOYOTA Electrical Tester.	
	09258-00030 Hose Plug Set .	

EQUIPMENT

Graduated cylinder	Injector
Heater	ECT sensor
OBDII scan tool	
Sound scope	Injector
Thermometer	ECT sensor
Torque wrench	
Vacuum gauge	



COOLING (2JZ-GE)
SST (Special Service Tools)

PP0TK-01

	09230-01010 Radiator Service Tool Set	
	09231-14010 Punch	

RECOMMENDED TOOLS

PP0TL-01

	09082-00040 TOYOTA Electrical Tester.	
	09258-00030 Hose Plug Set .	

EQUIPMENT

Heater	Thermostat, ECT switch
Radiator cap tester	
Rubber hose (Inside diameter 6 – 8 mm)	
Soft – faced hammer	
Thermometer	Thermostat, ECT switch
Torque wrench	
Vernier calipers	

COOLANT

PP0TN-01

Item	Capacity	Classification
Engine coolant (w/ Heater)	7.7 liters (8.1 US qts, 6.8 Imp. qts)	Ethylene-glycol base

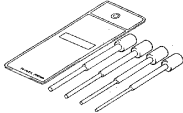
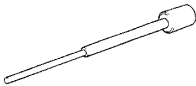
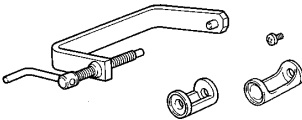
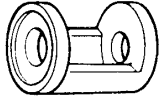

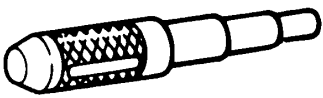

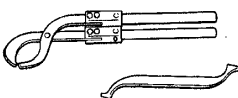
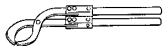

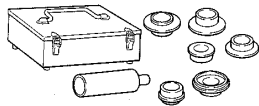
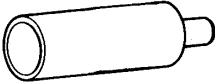
EQUIPMENT

Oil pressure gauge	
Precision straight edge	Oil pump
Torque wrench	





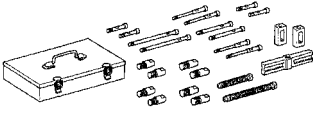
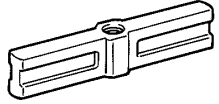
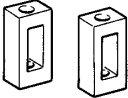
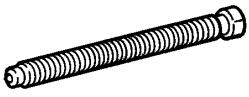
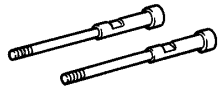
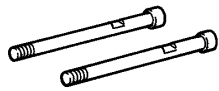
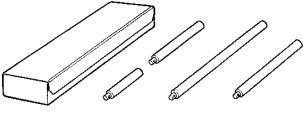

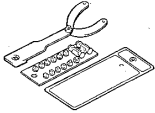
ENGINE MECHANICAL (2JZ-GE)

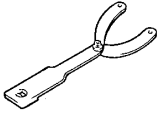
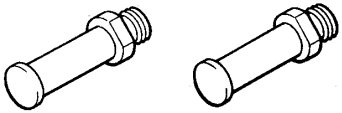
SST (Special Service Tools)

PP0TD-02

	09201-10000 Valve Guide Bushing Remover & Replacer Set	
	(09201-01060) Valve Guide Bushing Remover & Replacer 6	
	09202-70020 Valve Spring Compressor	
	(09202-00010) Attachment	
	09213-70010 Crankshaft Pulley Holding Tool	
	09222-30010 Connecting Rod Bushing Remover & Replacer	
	09223-15030 Oil Seal & Bearing Replacer	Crankshaft rear oil seal
	09248-55040 Valve Clearance Adjust Tool Set	
	(09248-05410) Valve Lifter Press	
	(09248-05420) Valve Lifter Stopper	
	09316-60011 Transmission & Transfer Bearing Replacer	
	(09316-00011) Replacer Pipe	Crankshaft front oil seal Camshaft oil seal

PREPARATION – ENGINE MECHANICAL (2JZ-GE)

	(09316-00051) Replacer "D"	Camshaft oil seal
	09330-00021 Companion Flange Holding Tool	Crankshaft pulley
	09816-30010 Oil Pressure Switch Socket	Knock sensor Oil pressure switch
	09843-18020 Diagnosis Check Wire	
	09950-50012 Puller C Set	
	(09951-05010) Hanger 150	Crankshaft pulley Crankshaft timing pulley
	(09952-05010) Slide Arm	Crankshaft pulley Crankshaft timing pulley
	(09953-05020) Center Bolt 150	Crankshaft pulley Crankshaft timing pulley
	(09954-05010) Claw No.1	Crankshaft timing pulley
	(09954-05030) Claw No.3	Crankshaft pulley
	09950-70010 Handle Set	
	(09951-07100) Handle 100	Valve guide bushing Crankshaft rear oil seal
	09960-10010 Variable Pin Wrench Set	

	(09962-01000) Variable Pin Wrench Arm Assy	Camshaft timing pulley
	(09963-01000) Pin 10	Camshaft timing pulley

LUBRICANT

Item	Capacity	Classification
Engine oil		API grade SJ, Energy-Conserving or ILSAC multi-grade engine oil. SAE 5W-30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.
Dry fill	6.5 liters (6.9 US qts, 5.7 Imp. qts)	
Drain and refill		
w/ Oil filter change	5.4 liters (5.7 US qts, 4.8 Imp. qts)	
w/o Oil filter change	5.1 liters (5.4 US qts, 4.5 Imp. qts)	

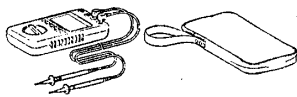
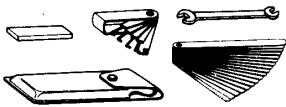
SSM (Special Service Materials)

08826-00080	Seal Packing Black or equivalent (FIPG)	Oil pump No.1 oil pan No.2 oil pan
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Oil pressure switch

IGNITION (2JZ-GE)

RECOMMENDED TOOLS

PP0TT-01

	09082-00040 TOYOTA Electrical Tester.	
	09200-00010 Engine Adjust Kit .	

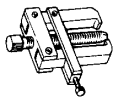
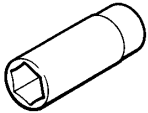

EQUIPMENT

Megger insulation resistance meter	Spark plug
Spark plug cleaner	
Torque wrench	

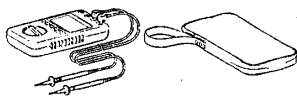
STARTING (2JZ-GE)

SST (Special Service Tools)

PP0TV-01

	09286-46011 Injection Pump Spline Shaft Puller	Armature bearing
	09810-38140 Starter Magnet Switch Nut Wrench 14	Terminal nut
	09820-00030 Alternator Rear Bearing Replacer	Armature rear bearing

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
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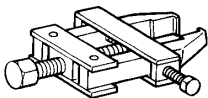

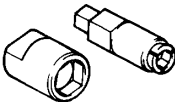

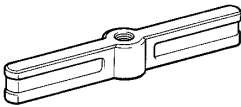
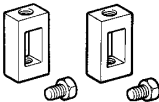
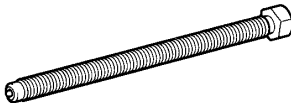
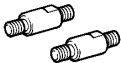
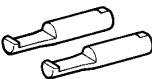
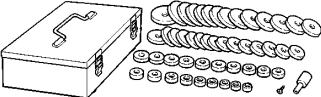

EQUIPMENT

Dial indicator	Commutator runout
Magnetic finger	Steel ball
Press	Magnetic switch terminal kit
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V-block	Commutator
Vernier calipers	Commutator, Brush

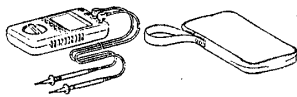
CHARGING (2JZ-GE)

SST (Special Service Tools)

PP0TY-04

	09285-76010 Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09820-00021 Alternator Rear Bearing Puller	
	09820-00030 Alternator Rear Bearing Replacer	Rotor rear bearing
	09820-63010 Alternator Pulley Set Nut Wrench Set	
	09950-40011 Puller B Set	
	(09951-04020) Hanger 200	Rectifier end frame
	(09952-04010) Slide Arm	Rectifier end frame
	(09953-04030) Center Bolt 200	Rectifier end frame
	(09954-04010) Arm 25	Rectifier end frame
	(09955-04041) Claw No.4	Rectifier end frame
	09950-60010 Replacer Set	
	(09951-00500) Replacer 50	Rotor front bearing

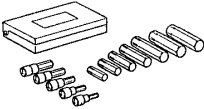
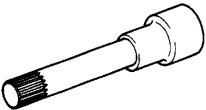
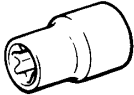

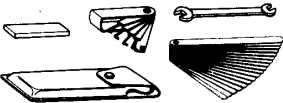
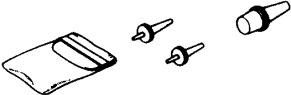
RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
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EQUIPMENT

Ammeter (A)	
Battery specific gravity gauge	Except maintenance-free battery
Torque wrench	
Vernier calipers	Rotor (Slip ring)





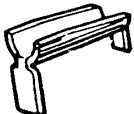
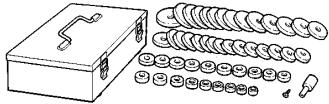

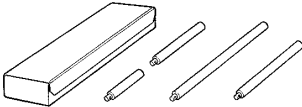

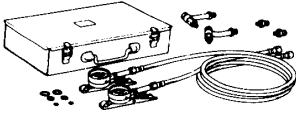


RECOMMENDED TOOLS

	09040-00011 Hexagon Wrench Set .	
	09043-50100 Bi-hexagon Wrench 10 mm .	Cylinder head bolt
	09044-00020 Torx Socket E10 .	A/C compressor stud bolt
	09090-04020 Engine Sling Device	For suspending engine
	09200-00010 Engine Adjust Kit .	
	09258-00030 Hose Plug Set .	

AUTOMATIC TRANSMISSION

SST (Special Service Tools)

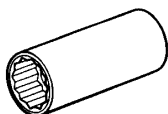

PP0N4-02

	09032-00100 Oil Pan Seal Cutter	Oil pan
	09308-00010 Oil Seal Puller	Extension housing rear oil seal
	09309-37010 Transmission Bearing Replacer	Extension housing rear oil seal
	09350-30020 TOYOTA Automatic Transmission Tool Set	
	(09351-32020) Stator Stopper	
	09950-60010 Replacer Set	
	(09951-00350) Replacer 35	
	09950-70010 Handle Set	
	(09951-07100) Handle 100	
	09992-00095 Automatic Transmission Oil Pressure Gauge Set	
	(09992-00231) Adaptor C	
	(09992-00271) Gauge Assy	

EQUIPMENT

Abrasive compound	Valve
Bolt (Part No. 90105 – 10345)	For suspending engine
Bolt (Part No. 90119 – 18001)	Crankshaft pulley, Crankshaft timing pulley
Caliper gauge	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune-up tester	
Heater	
Micrometer	
Mirror	
Magnetic finger	
No.1 engine hanger (Part No. 12281 – 46050)	For suspending engine
OBDII scan tool	
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Press	
Ridge reamer	Cylinder
Soft brash	
Solvent	
Spring tester	Valve spring
Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
Vernier calipers	
V-block	
Wire brush	

RECOMMENDED TOOLS

	09017-12301 Deep Socket Wrench 30 mm .	
	09082-00040 TOYOTA Electrical Tester.	

EQUIPMENT

OBD II scan tool	
Dial indicator or dial indicator with magnetic base	Output shaft, Major bushing
Straight edge	
Torque wrench	

LUBRICANT

Item	Capacity	Classification
Automatic transmission fluid		
Dry fill	8.4 liters (8.9 US qts, 7.4 Imp. qts)	ATF TYPE T-IV
Drain and refill	1.9 liters (2.0 US qts, 1.7 Imp. qts)	


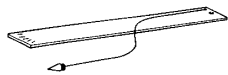
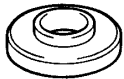
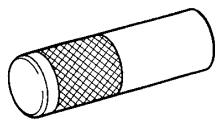
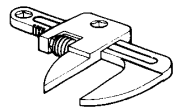
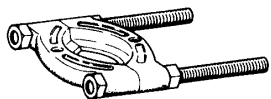
SSM (Special Service Materials)

08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Transmission case x Oil pan
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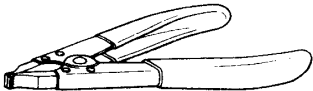
PROPELLER SHAFT

SST (Special Service Tools)

PP0SR-01

	09330-50010 Propeller Shaft Center Bearing Replacer	
	09370-50010 Drive Line Angle Gauge	
	09608-00071 Drive Pinion Rear Bearing Cone Replacer	
	09608-06041 Front Hub Inner Bearing Cone Replacer	
	09922-10010 Variable Open Wrench	Adjusting nut
	09950-00020 Bearing Remover	

RECOMMENDED TOOLS

	09905-00012 Snap Ring No.1 Expander .	
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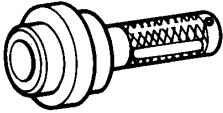
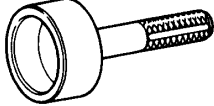
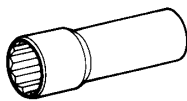
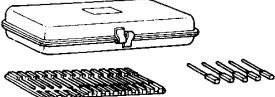
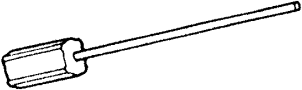


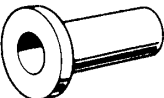

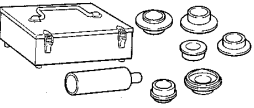


EQUIPMENT





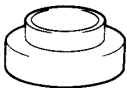
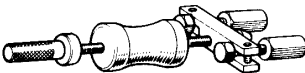
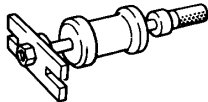
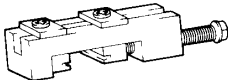



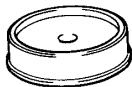
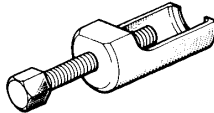
Dial indicator	
Torque wrench	
Vernier calipers	

SUSPENSION AND AXLE

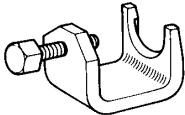
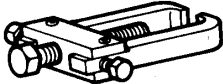

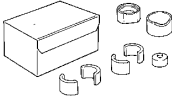

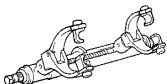
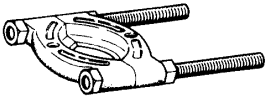

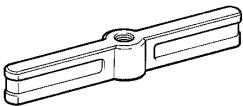
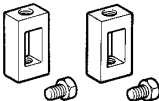
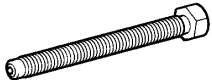
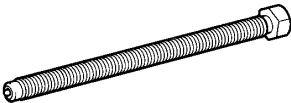
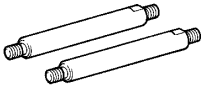
SST (Special Service Tools)

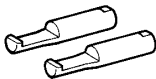
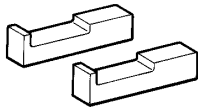
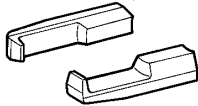

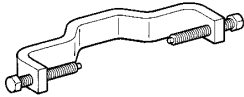
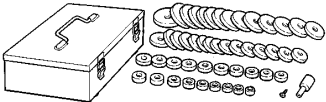





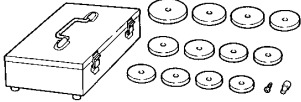
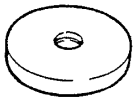
PP0T1-04

	09223-46011	Crankshaft Front Oil Seal Replacer	Rear differential
	09223-56010	Crankshaft Rear Oil Seal Replacer	Rear differential
	09229-55010	Oil Cooler Relief Valve Wrench	Rear differential
	09240-00020	Wire Gauge Set	Rear drive shaft
	(09242-00080)	Wire Gauge	
	09255-10012	Crankshaft Rear Bearing Remover & Replacer	Rear differential
	09308-00010	Oil Seal Puller	Front axle Rear differential
	09309-36010	Transmission Rear Bearing Replacer	Front axle Rear drive shaft
	09316-12010	Transfer Bearing Replacer	Differential mounting cushion
	09316-60011	Transmission & Transfer Bearing Replacer	Front axle Rear differential
	(09316-00011)	Replacer Pipe	
	(09316-00041)	Replacer "C"	

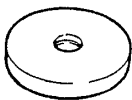




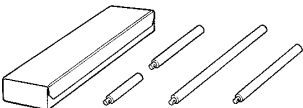


	(09316-00071) Replacer "F"	
	09325-40010 Transmission Oil Plug	Rear differential
	09330-00021 Companion Flange Holding Tool	Rear differential
	09502-12010 Differential Bearing Replacer	Rear drive shaft Rear differential
	09502-24010 Bearing Replacer	Rear differential
	09520-00031 Rear Axle Shaft Puller	Rear axle
	09520-24010 Differential Side Gear Shaft Puller	Rear differential
	09521-24010 Drive Shaft Boot Clamping Tool	Rear drive shaft
	09527-17011 Rear Axle Shaft Bearing Remover	Rear axle
	09570-24010 Differential Mounting Cushion Remover & Replacer	Differential mounting cushion
	09608-04031 Front Hub Inner Bearing Cone Replacer	Rear differential
	09608-32010 Steering Knuckle Oil Seal Replacer	Front axle Rear differential
	09610-20012 Pitman Arm Puller	Front axle Front suspension Rear axle

PREPARATION – SUSPENSION AND AXLE

	09628-10011 Ball Joint Puller	Front wheel hub bolt Rear wheel hub bolt
	09628-62011 Ball Joint Puller	Front suspension Rear axle Rear suspension
	09710-30050 Suspension Arm Bushing Replacer	Rear differential
	09726-12023 Lower Suspension Arm Bushing Remover & Replacer	Rear drive shaft
	(09726-01031) Spacer	
	09727-30021 Coil Spring Compressor	Front suspension Rear suspension
	09950-00020 Bearing Remover	Rear axle Rear differential
	09950-40011 Puller B Set	Front axle Rear axle Rear differential
	(09951-04020) Hanger 200	
	(09952-04010) Slide Arm	
	(09953-04020) Center Bolt 150	
	(09953-04030) Center Bolt 200	
	(09954-04020) Arm 100	

	(09955-04041) Claw No.4	
	(09955-04051) Claw No.5	
	(09955-04061) Claw No.6	
	(09957-04010) Attachment	
	(09958-04011) Holder	
	09950-60010 Replacer Set	Front axle Rear axle Rear differential
	(09951-00450) Replacer 45	
	(09951-00480) Replacer 48	
	(09951-00510) Replacer 51	
	(09951-00560) Replacer 56	
	(09951-00650) Replacer 65	
	09950-60020 Replacer Set No.2	Front axle Rear axle Rear differential
	(09951-00710) Replacer 71	

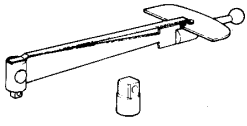
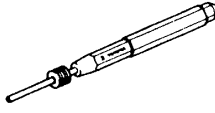
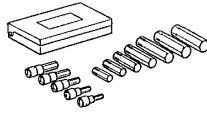
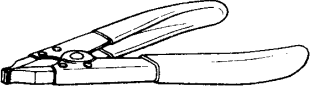
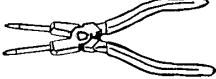
PREPARATION – SUSPENSION AND AXLE

	(09951-00720) Replacer 72	
	(09951-00780) Replacer 78	
	(09951-00810) Replacer 81	
	(09951-00890) Replacer 89	
	(09951-01030) Replacer 103	
	09950-70010 Handle Set	Front axle Rear axle Rear differential
	(09951-07100) Handle 100	
	(09951-07150) Handle 150	

SSM (Special Service Materials)

08826-00080	Seal Packing Black or equivalent (FIPG)	No.1, No.3 camshaft bearing cap Cylinder head cover Rear oil seal retainer
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	Drive plate bolt Heater union Torque converter clutch bolt
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Idler pulley povot bolt

RECOMMENDED TOOLS

	09025-00010 Torque Wrench (30 kgf-cm)	
	09031-00030 Pin Punch .	
	09040-00011 Hexagon Wrench Set .	
	09905-00012 Snap Ring No.1 Expander .	
	09905-00013 Snap Ring Pliers .	

EQUIPMENT

Dial indicator with magnetic base	
Torque wrench	
Micrometer	

LUBRICANT




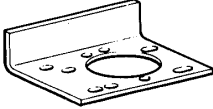


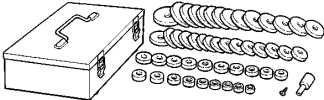


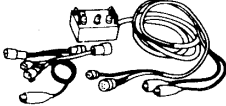

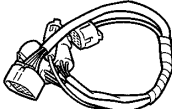
Item	Capacity	Classification
Outboard joint	100 – 105 g (0.22 – 0.23 lb, 3.5 – 3.7 oz.)	
Inboard joint	100 – 105 g (0.22 – 0.23 lb, 3.5 – 3.7 oz.)	
End cover	50 – 55 g (0.11 – 0.12 lb, 1.8 – 1.9 oz.)	
Differential oil	1.35 liters (1.43 US qts, 1.19 Imp qts)	Hypoid gear oil API GL-5 Above –18°C (0°F) SAE 90 Below –18°C (0°F) SAE 80W-90 or 80W

SSM (Special Service Materials)

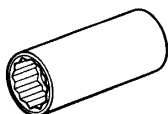
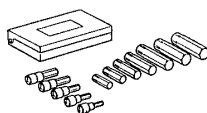
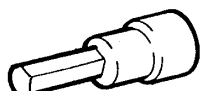
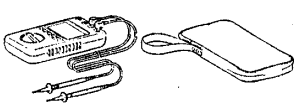
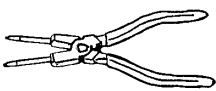
08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	
08826-00801	Seal packing 1121, THREE BOND 1121 or equivalent (FIPG)	
08833-00100	THREE BOND 1360K or equivalent	

BRAKE**SST (Special Service Tools)**

PP1Z3-01

	09023-00100 Union Nut Wrench 10 mm	
	09318-12010 Transfer Bearing Adjusting Nut Wrench	
	09630-00014 Power Steering Gear Housing Overhaul Tool Set	
	(09631-00142) Overhaul Stand	
	09709-29018 LSPV Gauge Set	
	09843-18020 Diagnosis Check Wire	
	09950-60010 Replacer Set	
	(09951-00180) Replacer 18	
	(09951-00190) Replacer 19	
	09990-00150 ABS Actuator Checker and Sub-harness	
	09990-00240 ABS Actuator Checker Sheet "G"	
	09990-00480 ABS Actuator Checker Sub-harness "S"	

RECOMMENDED TOOLS

	09017-12301 Deep Socket Wrench 30 mm .	
	09040-00011 Hexagon Wrench Set .	
	(09043-20050) Socket Hexagon Wrench 5.	
	09082-00040 TOYOTA Electrical Tester.	
	09905-00013 Snap Ring Pliers .	

EQUIPMENT

Torque wrench	
Effort gauge	
Micrometer	Brake disc
Dial indicator	Brake disc
Brake drum gauge	Brake disc

LUBRICANT

Item	Capacity	Classification
Brake fluid	–	SAE J1703 or FMVSS No. 116 DOT3

EMISSION CONTROL (2JZ-GE)

EQUIPMENT

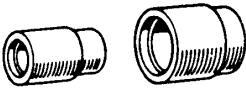
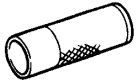
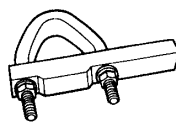

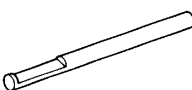
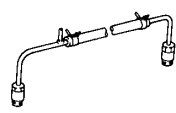

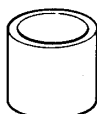
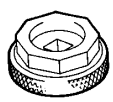
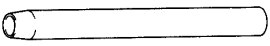
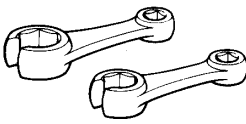
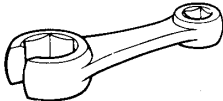
PP0TH-03

Hose clipper	
Pressure gauge	
Torque wrench	
Vacuum gauge	

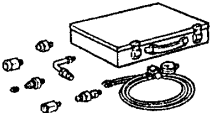
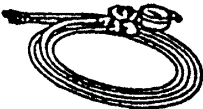

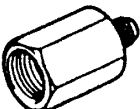
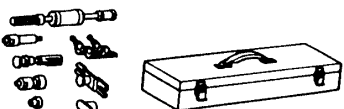

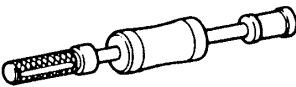
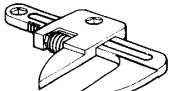
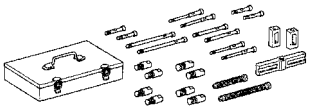
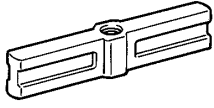
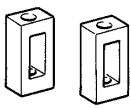
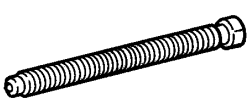
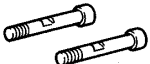
STEERING

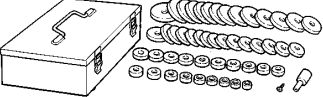









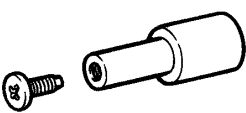
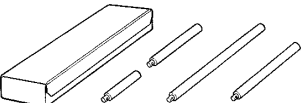

SST (Special Service Tools)

PP0SM-02



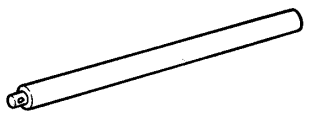
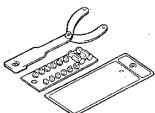
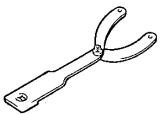

	09238-47012	Water Pump Bearing Remover & Replacer	PS vane pump (1UZ-FE)
	09608-04031	Front Hub Inner Bearing Cone Replacer	PS vane pump (2JZ-GE)
	09612-00012	Rack & Pinion Steering Rack Housing Stand	PS gear
	09616-00010	Steering Worm Bearing Adjusting Socket	PS gear
	09631-10030	Oil Seal Remover	PS vane pump
	09631-12071	Steering Rack Oil Seal Test Tool	PS gear
	09631-20060	Bearing Guide Nut Wrench	PS gear
	09631-20081	Seal Ring Tool	PS gear
	09631-20090	Cylinder End Stopper Nut Wrench	PS gear
	09631-20102	Steering Rack Cover "H"	PS gear
	09631-22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	Power steering fluid
	09633-00020	Power Steering Hose Nut Wrench	PS gear

PREPARATION – STEERING

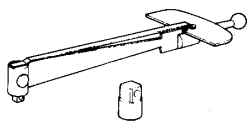
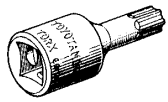
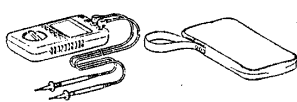
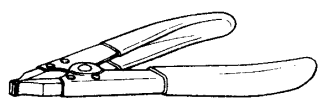
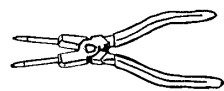
	09640-10010 Power Steering Pressure Gauge Set	
	(09641-01010) Gauge Assy	Power steering fluid
	(09641-01030) Attachment B	Power steering fluid
	(09641-01060) Attachment E	Power steering fluid
	09910-00015 Puller Set	
	(09911-00011) Puller Clamp	PS vane pump (1UZ-FE)
	(09912-00010) Puller Slide Hammer	PS vane pump (1UZ-FE)
	09922-10010 Variable Open Wrench	PS vane pump PS gear
	09950-50012 Puller C Set	
	(09951-05010) Hanger 150	Power tilt and power telescopic steering column
	(09952-05010) Slide Arm	Power tilt and power telescopic steering column
	(09953-05020) Center Bolt 150	Power tilt and power telescopic steering column
	(09954-05020) Claw No.2	Power tilt and power telescopic steering column

	09950-60010 Replacer Set	
	(09951-00180) Replacer 18	PS vane pump (1UZ-FE) PS gear
	(09951-00260) Replacer 26	PS gear
	(09951-00280) Replacer 28	PS gear
	(09951-00300) Replacer 30	PS vane pump (1UZ-FE)
	(09951-00320) Replacer 32	PS gear
	(09951-00330) Replacer 33	PS vane pump (2JZ-GE) PS gear
	(09951-00360) Replacer 36	PS gear
	(09951-00420) Replacer 42	PS gear
	(09951-00490) Replacer 49	PS gear
	(09952-06010) Adapter	PS vane pump (1UZ-FE) PS gear
	09950-70010 Handle Set	
	(09951-07100) Handle 100	PS vane pump PS gear

PREPARATION – STEERING

	(09951-07150) Handle 150	PS gear
	(09951-07200) Handle 200	PS gear
	(09951-07360) Handle 360	PS gear
	09960-10010 Variable Pin Wrench Set	
	(09962-01000) Variable Pin Wrench Arm Assy	PS vane pump
	(09963-01000) Pin 10	PS vane pump

RECOMMENDED TOOLS

	09025-00010 Torque Wrench (30 kgf-cm)	PS vane pump PS gear
	09042-00010 Torx Socket T30 .	Power tilt and power telescopic steering column
	09082-00040 TOYOTA Electrical Tester.	Progressive power steering (PPS)
	09905-00012 Snap Ring No.1 Expander .	
	09905-00013 Snap Ring Pliers .	

EQUIPMENT

Caliper gauge	PS vane pump
Calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

LUBRICANT

Item		Capacity	Classification
Power steering fluid	Total	1.0 liters (1.1 US qts, 0.9 Imp.qts)	ATF DEXRON® II or III

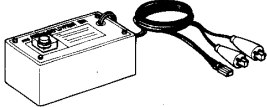
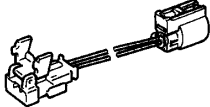
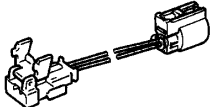

SSM (Special Service Materials)

08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	PS gear
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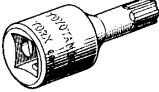
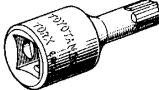
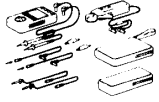
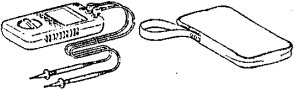
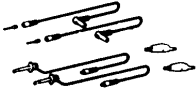
SUPPLEMENTAL RESTRAINT SYSTEM

SST (Special Service Tools)

PP0SY-01

	09082-00700 SRS Airbag Deployment Tool	
	09082-00750 Airbag Deployment Wire Sub-harness No.3	for Side Airbag Assembly
	09082-00760 Airbag Deployment Wire Sub-harness No.4	for Driver's and Front Passenger Airbag Assembly
	09843-18020 Diagnosis Check Wire	

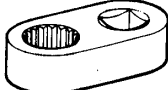
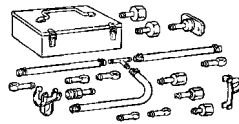
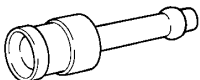

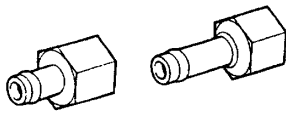
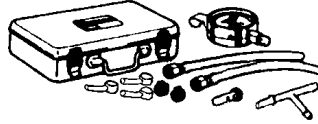
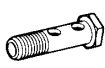

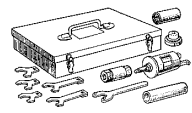
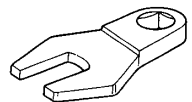
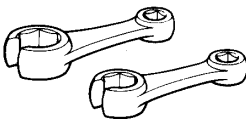

RECOMMENDED TOOLS


	09042-00010 Torx Socket T30 .	
	09042-00020 Torx Socket T40 .	
	09082-00050 TOYOTA Electrical Tester Set.	
	09082-00040 TOYOTA Electrical Tester.	
	(09083-00150) Test Lead Set	Seat belt pretensioner connector

SFI (2JZ-GE)

SST (Special Service Tools)

PP0UD-01

	09205-76030 Cylinder Head Setting Bolt Tightening Adaptor	ECT sensor
	09268-41047 Injection Measuring Tool Set	
	(09268-41110) Adaptor	
	(09268-41300) Clamp	
	(09268-52011) Injection Measuring Attachment	
	09268-45014 EFI Fuel Pressure Gauge	
	(09268-41190) Adaptor	
	(90405-06167) I Union	
	09612-24014 Steering Gear Housing Overhaul Tool Set	
	(09617-24011) Steering Rack Wrench	Fuel pressure pulsation damper
	09631-22020 Power Steering Hose Nut 14 x 17 mm Wrench Set	Fuel line flare nut
	09816-30010 Oil Pressure Switch Socket	Knock sensor


	09842-30070 Wiring "F" EFI Inspection	Injector
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EQUIPMENT

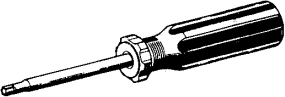
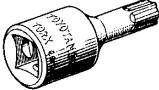

Torque wrench	
Bolt: Length: 35 mm (1.38 in.) Pitch: 1.0 mm (0.039 in.) Diam: 6.0 mm (0.236 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Vinyl bag	Airbag disposal

BODY ELECTRICAL
SST (Special Service Tools)

PP000-02

	09843-18020 Diagnosis Check Wire
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RECOMMENDED TOOLS

	09041-00030 Torx Driver T30 .	For removing and installing steering wheel pad
	09042-00010 Torx Socket T30 .	For removing and installing steering wheel pad
	09082-00040 TOYOTA Electrical Tester.	

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Engine coolant temperature sender gauge, Engine oil level warning switch, Seat heater
Syphon	Brake fluid level warning switch
Oil bath	Engine oil level warning switch
Bulb (1.4 W)	Defogger switch
Bulb (3.4 W)	Fuel sender gauge, Engine coolant temperature receiver gauge, Seat belt warning relay
Dry cell battery	Fuel sender gauge, Power mirror
Heat light	Seat heater
Hexagon wrench (6 mm)	Power seat
Torque wrench	
Clip remover	For removing cowl louver
Masking tape	Rear window defogger wire
Tin foil	Rear window defogger wire


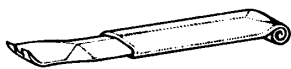
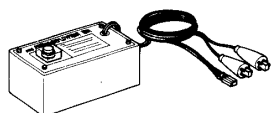
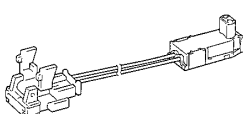
SSM (Special Service Materials)

08888-88888	DuPont Paste No. 4817 or equivalent	Rear window defogger
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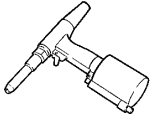


BODY

SST (Special Service Tools)

PP078-01

	09812-00010 Door Hinge Set Bolt Wrench	
	09806-30010 Windshield Moulding Remover	
	09082-00700 SRS Airbag Deployment Tool	
	09082-00740 Airbag Deployment Wire Sub-harness No.2	

RECOMMENDED TOOLS

	09070-20010 Moulding Remover .	
	09050-20010 Air Riveter.	
	(09050-02010) Dust Cap.	
	(09050-02040) Nose Piece No.3.	

EQUIPMENT

Clip remover	
Torque wrench	
Hexagon wrench (6 mm)	
Torx driver	
Hog ring pliers	
Drill	
Hand riveter	
Tape	To avoid surface damage
Adhesive tape	To avoid surface damage
Double-stick tape	
Adhesive	
Cleaner	
Shop rag	
Knife	
Sealer gun	
Brush	
Putty spatula	
Wooden block or similar object	For tying both piano wire ends
Plastic sheet	To avoid surface damage
Rope (no projections, difficult to break)	Seat belt pretensioner disposal
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner disposal
Tire with disc wheel Width: 185mm (7.28 in.) Inner diam 360 mm (14.17 in.)	Seat belt pretensioner disposal
Vinyl bag	Seat belt pretensioner disposal

LUBRICANT

Item	Capacity	Classification
MP grease	–	–

SSM (Special Service Materials)

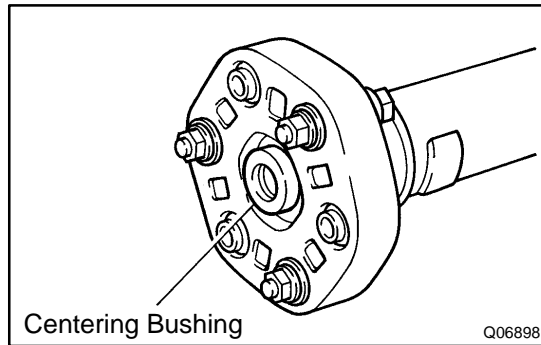
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	
08833-00030	Three cement black or equivalent	
08850-00801	Windshield Glass Adhesive Set or equivalent	

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

PR02W-04

Symptom	Suspect Area	See page
Noise	2. Center bearing (Worn) 3. Flexible rubber coupling (Worn) 4. Spider bearing (Worn or stuck)	PR-6 PR-6 PR-7
Vibration	1. Transmission extension housing rear bushing (Worn) 2. Flexible coupling (Worn) 3. Propeller shaft (Runout) 4. Propeller shaft (Imbalance)	– PR-6 PR-7 –



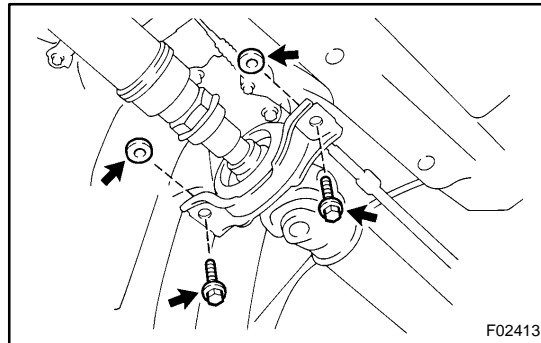
INSTALLATION

1. INSTALL PROPELLER SHAFT

- (a) Apply grease to the flexible coupling centering bushings.

Grease:

Molybdenum disulphide lithium base, NLGI No.2



- (b) Install the propeller shaft from the vehicle's rear and connect the transmission and differential.

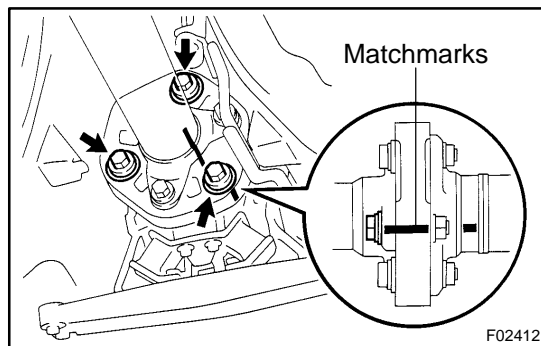
NOTICE:

Support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.

- (c) Temporarily install the 2 center support bearing set bolts with the adjusting washers.

HINT:

Use the adjusting washers which were removed.



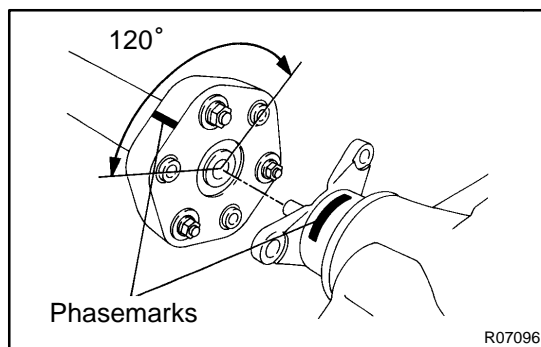
- (d) Align the matchmarks and connect the propeller shaft to the transmission/differential.

- (e) Install and torque the 3 bolts, washers and nuts.

NOTICE:

The bolts should be installed from the propeller shaft side.

Torque: 79 N·m (805 kgf-cm, 58 ft-lbf)



- (f) If using a new propeller shaft (w/ Phasemarks):
Install the propeller shaft phasemarks and differential/transmission phasemarks so that their respective alignment phasemarks match.

If the propeller shaft phasemarks and differential/transmission phasemarks do not align, install the propeller shaft and differential alignment phasemarks as close together as possible.

- (g) If using a new propeller shaft (w/o Phasemarks):
Install the propeller shaft.

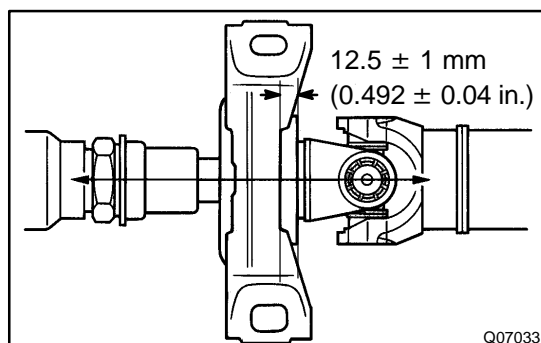
- (h) Torque the 2 center support bearing set bolts.

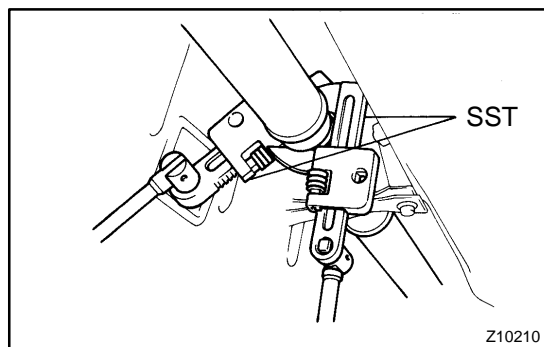
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)

HINT:

Adjust the center support bearing to keep the intervals as shown with the vehicle in the unladen condition.

Under the same condition, check if the center line of the center support bearing is at right angles to the shaft axial direction.





- (i) Using SST, tighten the adjusting nut.
SST 09922-10010

Torque: 50 N·m (515 kgf-cm, 37 ft-lbf)

HINT:

Use a torque wrench with a fulcrum length of 34.5 cm (13.6 in.).

2. INSPECT JOINT ANGLE (See page PR-12)

NOTICE:

The joint angle should by all means be checked when the propeller shaft is removed and installed.

3. INSTALL 2 HEAT INSULATORS

- (a) Install the heat insulator and torque the 4 bolts.

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

- (b) Install the heat insulator and torque the 6 bolts.

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

4. INSTALL EXHAUST PIPE ASSEMBLY

- (a) Connect the exhaust pipe assembly to the O-rings.

- (b) 2JZ-GE Engine:

Install the 3 bolts, nuts and 2 gaskets to the exhaust manifold. Torque the bolts.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

- (c) 1UZ-FE Engine:

Install the 4 bolts, nuts and 2 gaskets to the exhaust manifold. Torque the bolts.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

- (d) Install the front floor center brace and torque the 2 bolts.

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

- (e) Connect the heated oxygen sensor.

Torque: 44 N·m (450 kgf-cm, 33 ft-lbf)

HINT:

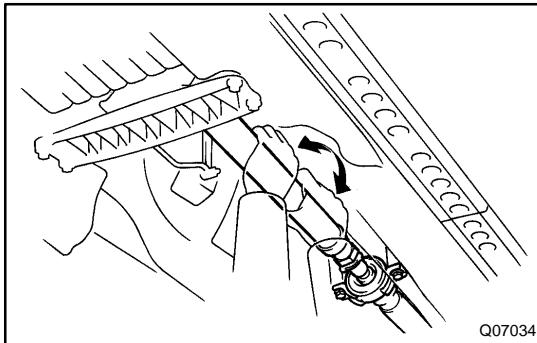
- Before installing the oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing oxygen sensor, check that the sensor wire should not twist. If it is twisted, remove the oxygen sensor and reinstall it.

JOINT ANGLE INSPECTION

PR032-01

NOTICE:

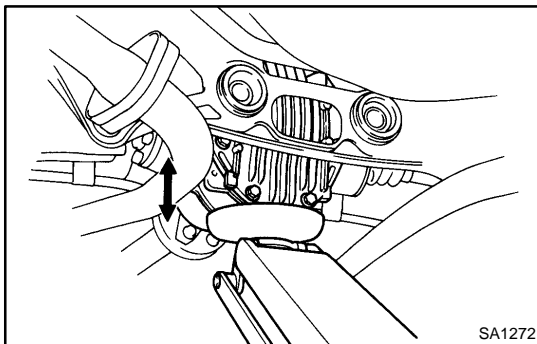
When performing operations which involve the removal and installation of the propeller shaft, always check the joint angle. Make adjustments if necessary.



Q07034

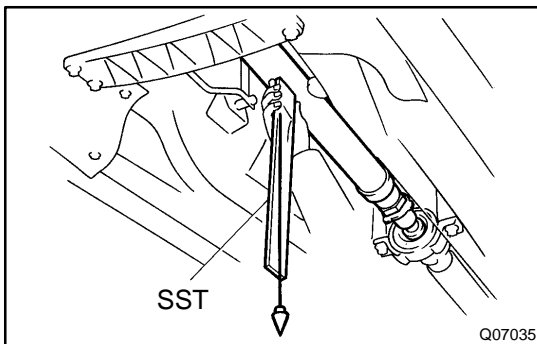
1. STABILIZE PROPELLER SHAFT AND DIFFERENTIAL

- (a) Turn the propeller shaft several times by hand to stabilize the center support bearing and flexible couplings.



SA1272

- (b) Using a jack, raise and lower the differential to stabilize the differential mounting cushion.



Q07035

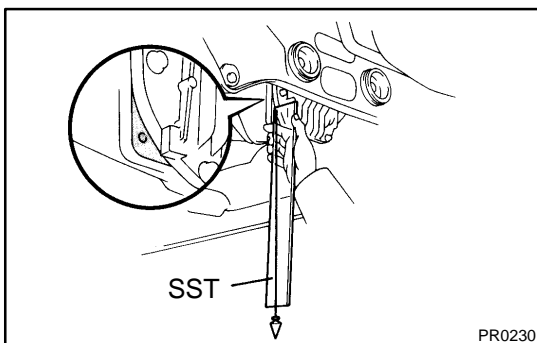
2. CHECK NO.2 AND NO.3 JOINT ANGLE

- (a) Using SST, measure the installation angle of the intermediate shaft and propeller shaft.

SST 09370-50010

HINT:

The SST should be directly underneath the tube.



PR0230

- (b) Using SST, measure the installation angle of the differential.

SST 09370-50010

HINT:

Measure the installation angle by placing the SST in the position, as shown in the illustration.

- (c) Calculate the No.2 joint angle.

No.2 joint angle:

$$A-B = -1^{\circ}01' \pm 37'$$

A: Intermediate shaft installation angle

B: Propeller shaft installation angle

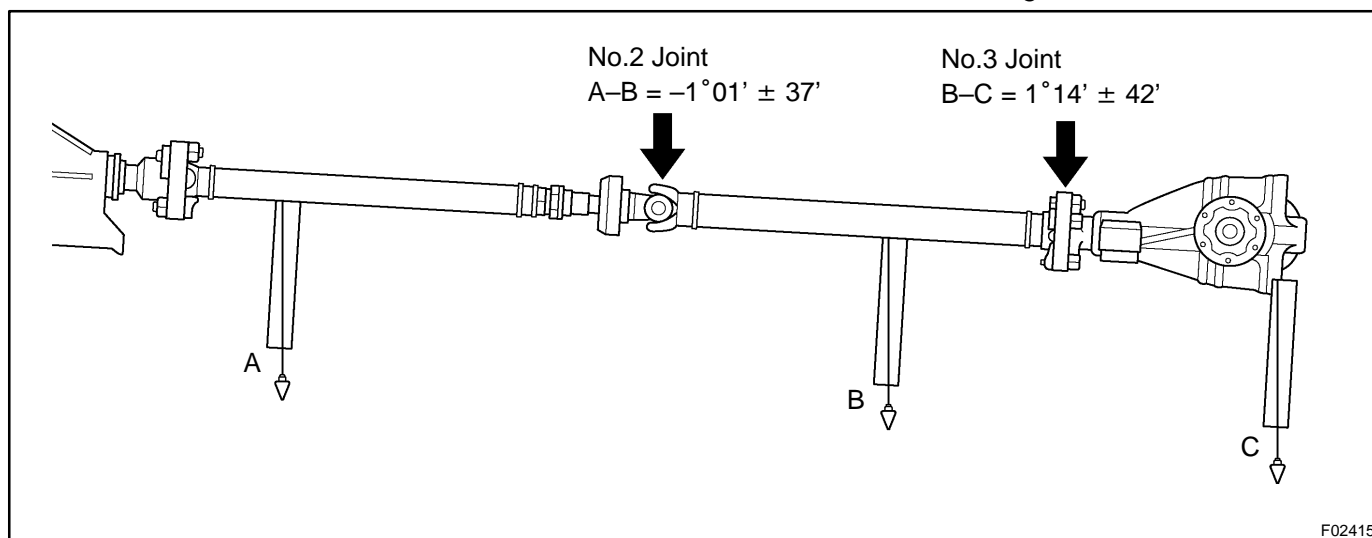
- (d) Calculate the No.3 joint angle.

No.3 joint angle:

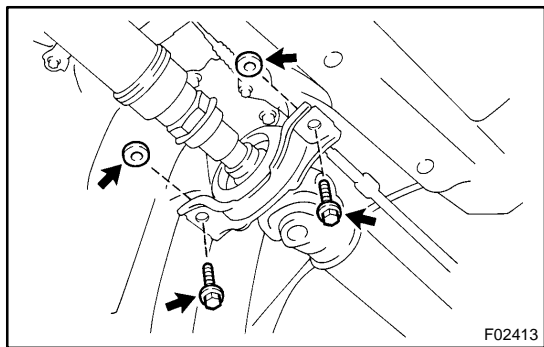
$$B-C = 1^{\circ}14' \pm 42'$$

B: Propeller shaft installation angle

C: Differential installation angle



If the measured angle is not within the specification, adjust it with the center support bearing adjusting washer.



3. ADJUST NO.2 JOINT ANGLE

Select the proper shaft center support bearing adjusting washer for adjustment.

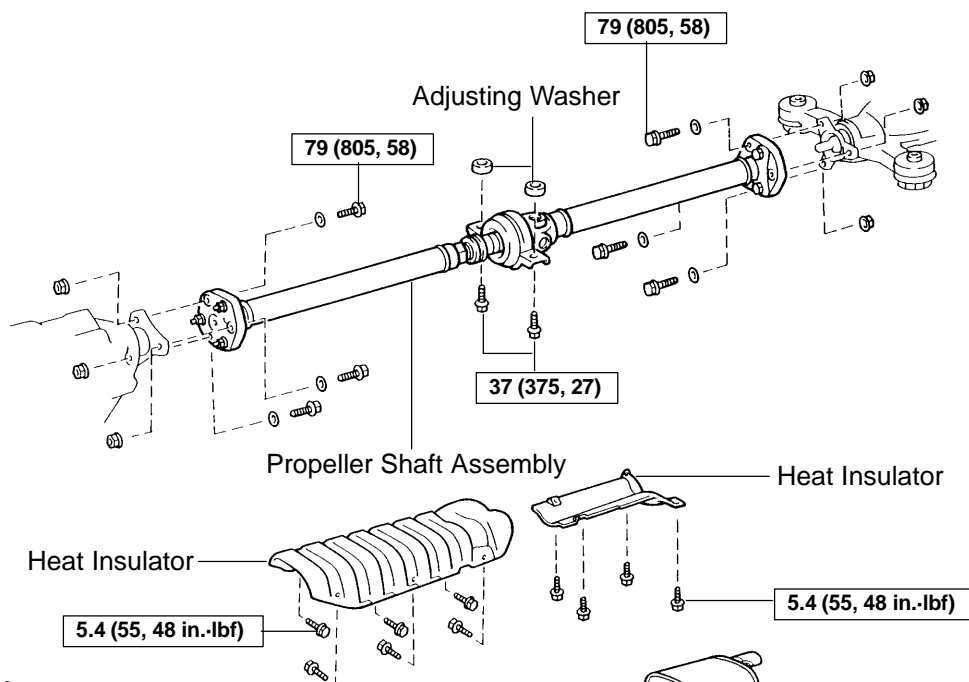
Thickness mm (in.)	Thickness mm (in.)
1.0 (0.039)	3.6 (0.142)
2.0 (0.079)	4.0 (0.157)
2.5 (0.098)	4.5 (0.177)
3.0 (0.118)	—

HINT:

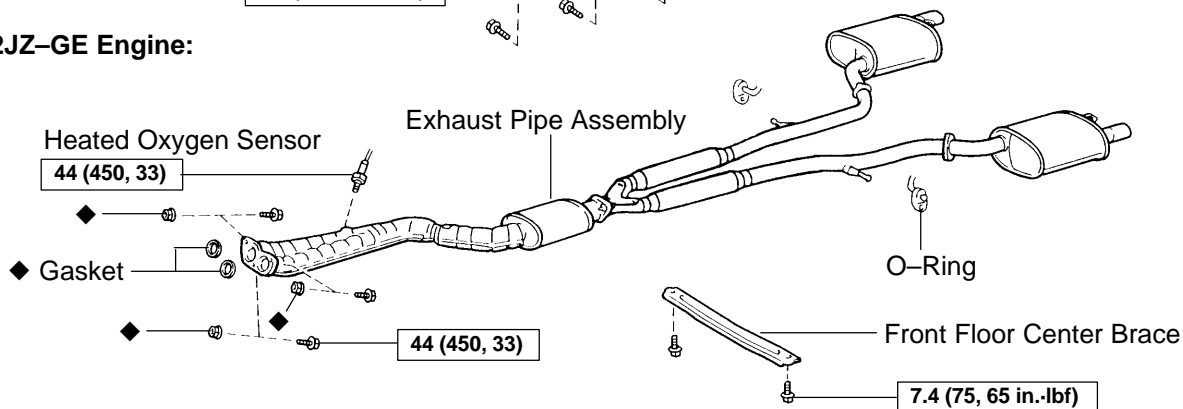
- Left and right washers should be the same thickness.
- 2 washers should not be assembled together.

PROPELLER SHAFT ASSEMBLY COMPONENTS

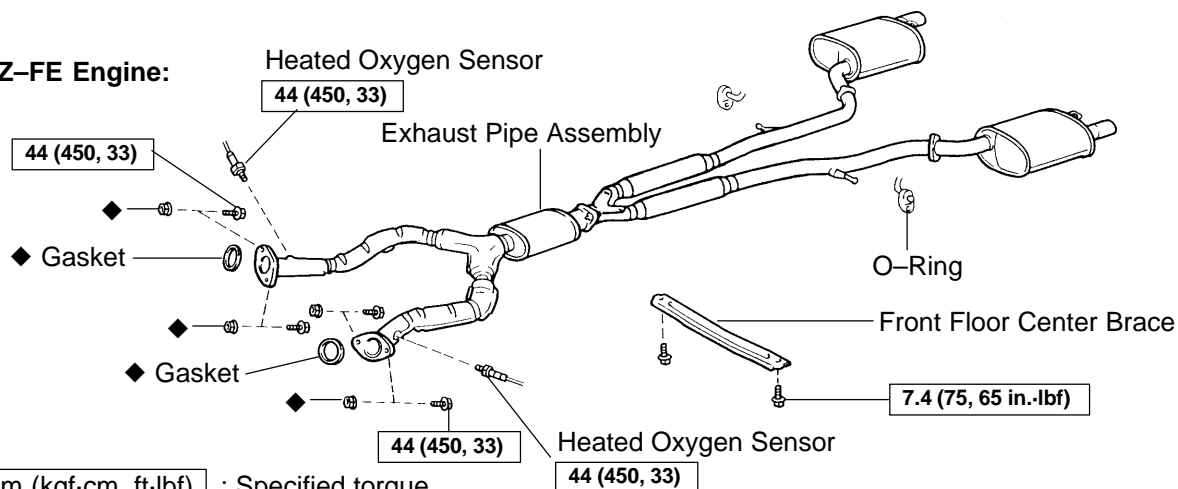
PR02X-01



2JZ-GE Engine:



1UZ-FE Engine:

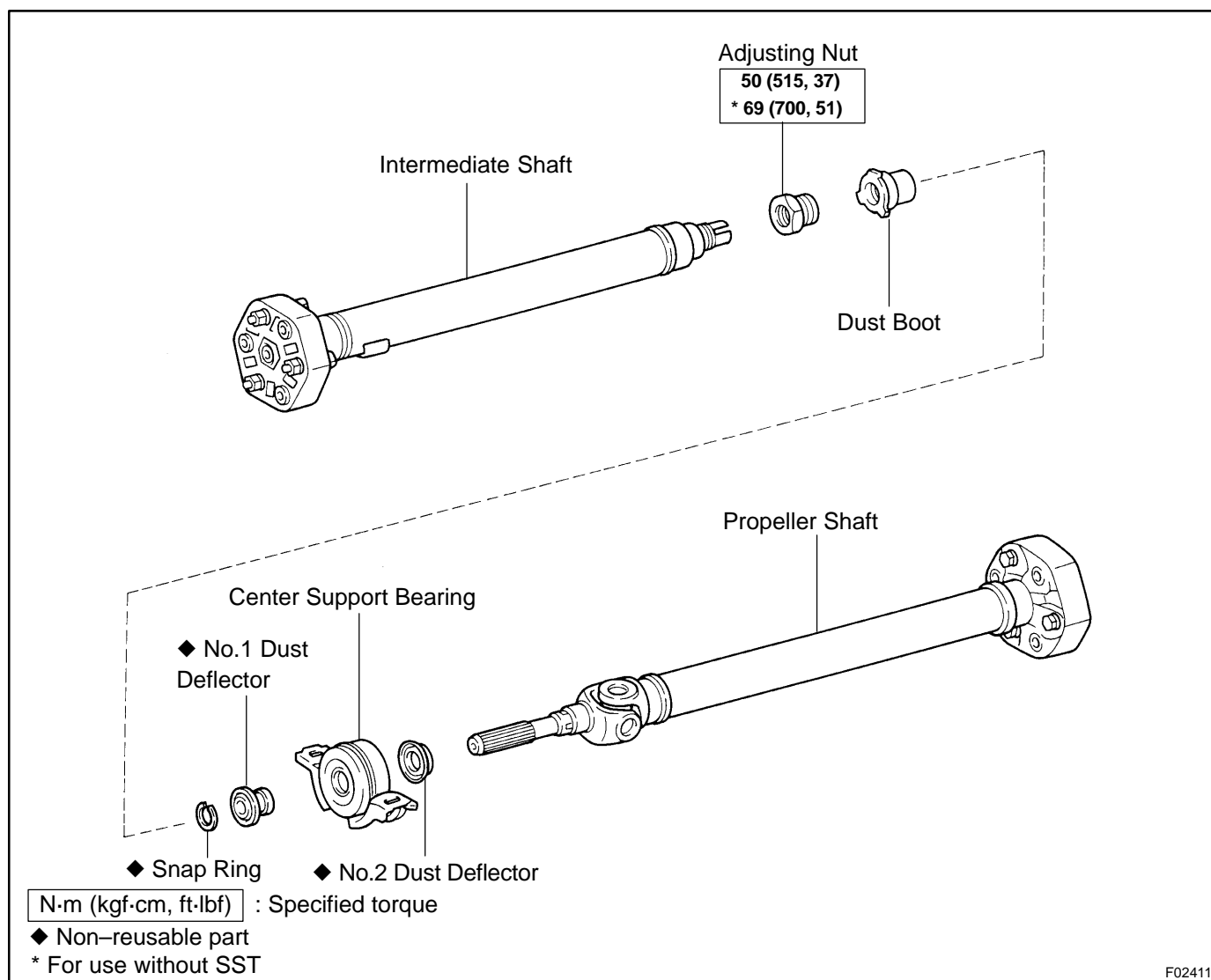


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

F02410

PROPELLER SHAFT - PROPELLER SHAFT ASSEMBLY



F02411

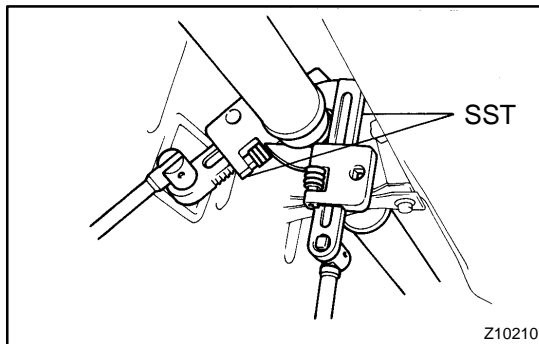
REMOVAL

1. REMOVE EXHAUST PIPE ASSEMBLY

- (a) Disconnect the heated oxygen sensor.
- (b) Remove the 2 bolts and front floor center brace.
- (c) Disconnect the exhaust pipe assembly from the O-rings.
- (d) 2JZ-GE Engine:
Remove the 3 bolts, nuts and 2 gaskets from the exhaust manifold.
- (e) 1UZ-FE Engine:
Remove the 4 bolts, nuts and 2 gaskets from the exhaust manifold.
- (f) Remove the exhaust pipe assembly.

2. REMOVE 2 HEAT INSULATORS

- (a) Remove the 6 bolts and heat insulator.
- (b) Remove the 4 bolts and heat insulator.

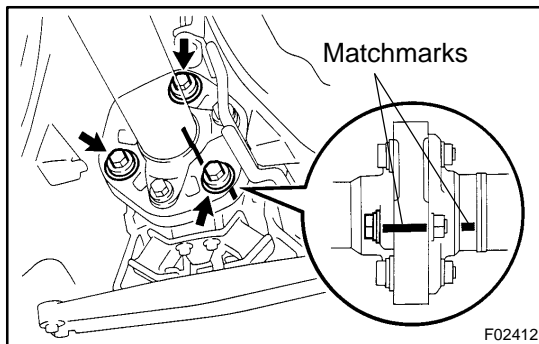


3. REMOVE PROPELLER SHAFT

- (a) Using SST, loosen the adjusting nut until it can be turned by hand.
SST 09922-10010

HINT:

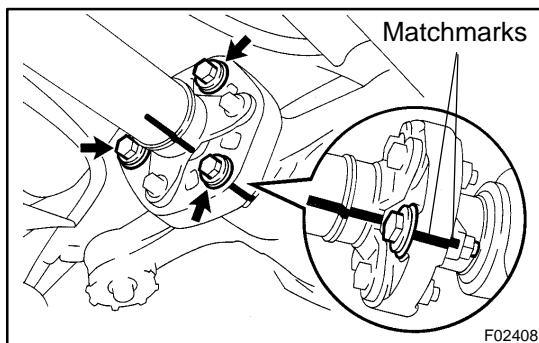
Use 2 of the same type of SST.



- (b) Place matchmarks on the transmission companion flange and flexible coupling.
- (c) Remove the 3 bolts installed from the transmission side.

NOTICE:

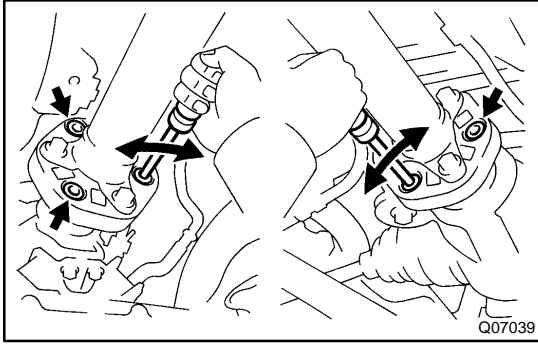
The bolts installed from the propeller shaft side should not be removed.



- (d) Place matchmarks on the differential companion flange and flexible coupling.
- (e) Remove the 3 bolts installed from the differential side.

NOTICE:

The bolts installed from the propeller shaft side should not be removed.



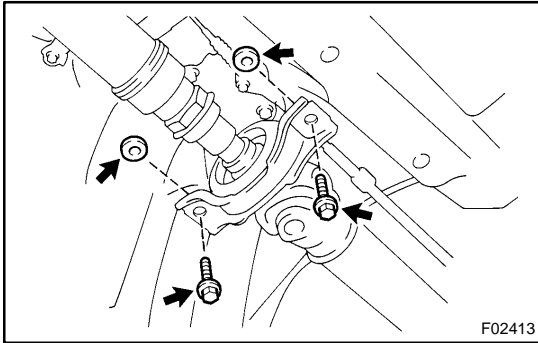
- (f) Separate the flexible couplings from the transmission and differential.

HINT:

If the flexible coupling cannot be easily separated by hand, insert a screwdriver into the bolt hole of the flexible coupling as shown in the illustration, then pry the coupling out.

NOTICE:

Do not bring the screwdriver blade in direct contact with the flexible coupling's rubber portion.



- (g) Remove the 2 center support bearing set bolts and adjusting washers.

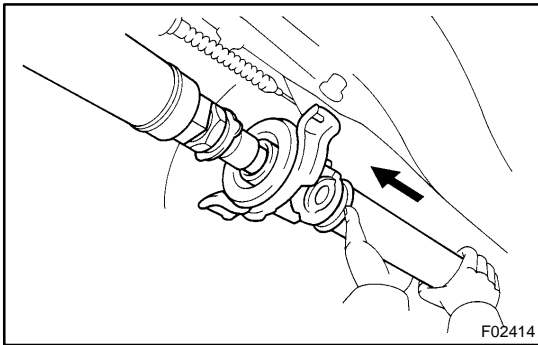
HINT:

Some vehicles are not equipped with an adjusting washer.

NOTICE:

When removing the set bolts, support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.

Maximum joint angle: 5°



- (h) Push the rear propeller shaft straight forward to compress the propeller shaft and pull out the propeller shaft from the centering pin of the differential.

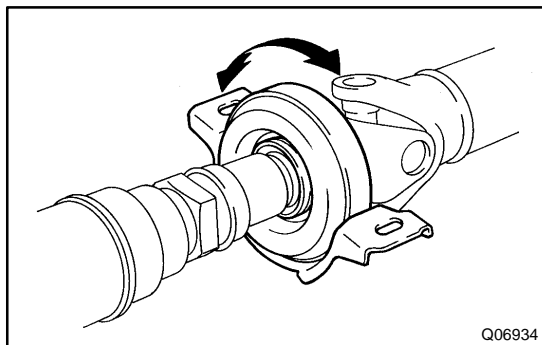
NOTICE:

Press the propeller shaft straight ahead to keep the transmission and intermediate shaft aligned straight.

- (i) Pull the propeller shaft out toward the vehicle's rear.

NOTICE:

The intermediate shaft and propeller shaft should not be separated.

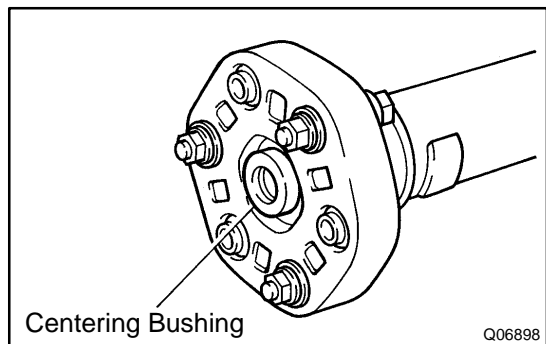


INSPECTION

1. INSPECT CENTER SUPPORT BEARING

- (a) Check for cracks in or damage to the cushion.
- (b) Check if the bearing turns smoothly.

If the center support bearing is damaged, worn or does not turn smoothly, replace it.



2. INSPECT FLEXIBLE COUPLINGS

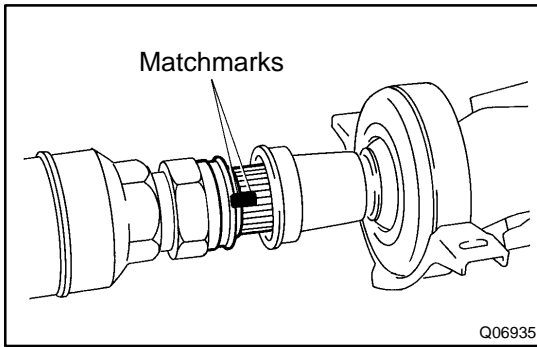
Check for cracks in or damage to the front and rear flexible couplings.

If the flexible coupling is damaged, replace the propeller shaft assembly.

3. INSPECT FLEXIBLE COUPLING CENTERING BUSHING

Check for damage to the bushing.

If the bushing is damaged, replace the propeller shaft assembly.



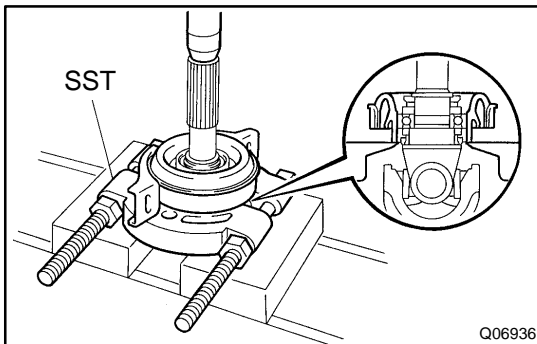
REPLACEMENT

1. SEPARATE INTERMEDIATE SHAFT AND PROPELLER SHAFT

- Place matchmarks on the intermediate shaft and propeller shaft.
- Separate the intermediate shaft and propeller shaft.
- Remove the dust boot from the propeller shaft.

HINT:

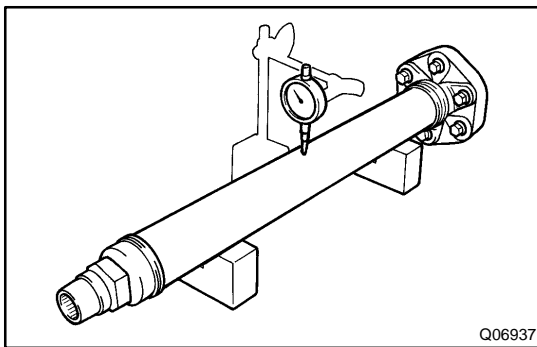
If the dust boot is reused, remove it after wrapping vinyl tape around the spline, so it will not be damaged.



2. REMOVE CENTER SUPPORT BEARING

- Using a snap ring expander, remove the snap ring.
- Using SST and a press, remove the center support bearing and dust deflector.

SST 09950-00020

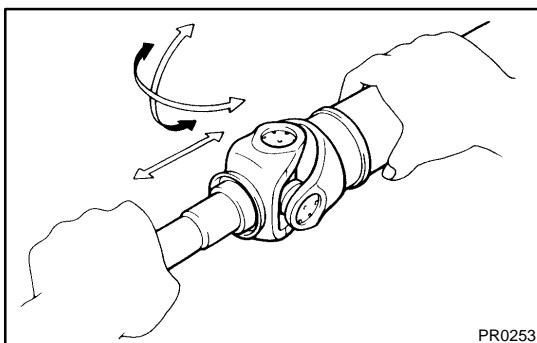


3. INSPECT INTERMEDIATE SHAFT AND PROPELLER SHAFT RUNOUT

Using a dial indicator, check the runout of the shafts.

Maximum runout: 0.8 mm (0.031 in.)

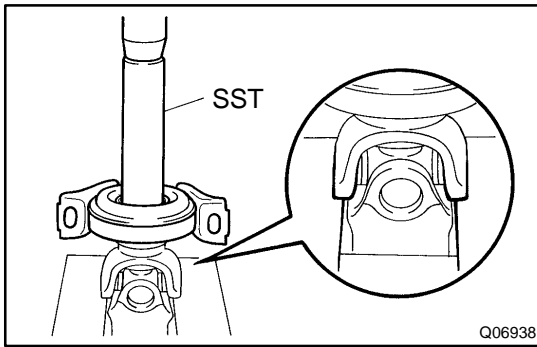
If the runout exceeds the maximum, replace the propeller shaft assembly.



4. INSPECT SPIDER BEARING

- Check if the spider bearing rotates smoothly.
- Check if there is any play in the spider bearing.

If necessary, replace the propeller shaft.

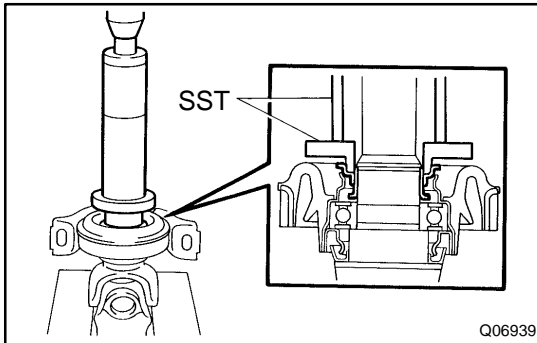


5. INSTALL CENTER SUPPORT BEARING

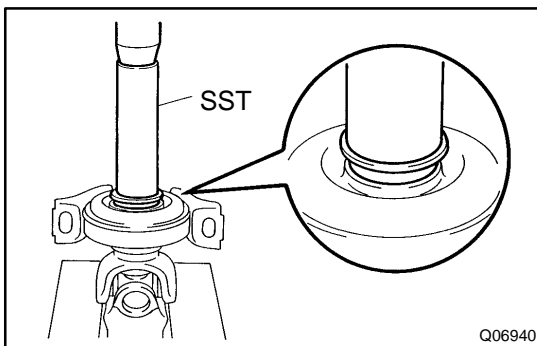
NOTICE:

Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

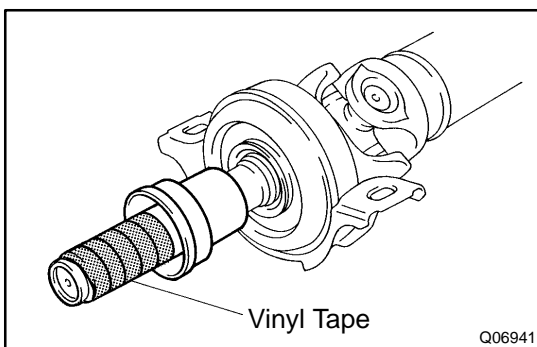
- (a) Using SST and a press, install the center support bearing.
SST 09330-50010



- (b) Using SST and a press, insert a new dust deflector until it almost touches the rubber of the center support bearing.
SST 09608-00071, 09608-06041



- (c) Using SST and a press, install a new dust deflector.
SST 09330-50010
- (d) Using a snap ring expander, install a new snap ring.



6. ASSEMBLE INTERMEDIATE SHAFT AND PROPELLER SHAFT

- (a) Install the dust boot.

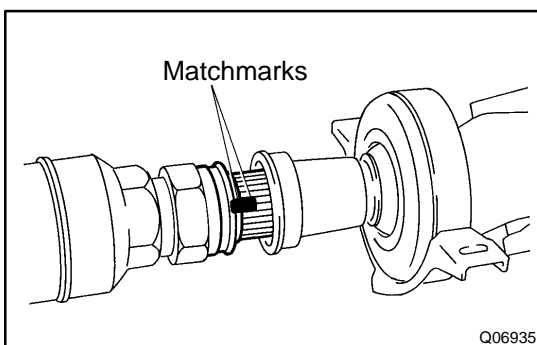
NOTICE:

Assemble after wrapping vinyl tape around the spline so it will not damage the boot.

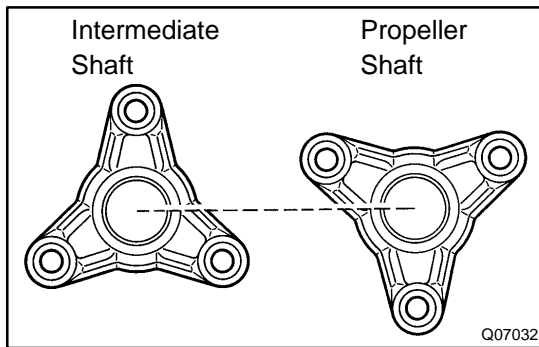
- (b) Apply grease to the spline.

Grease:

Molybdenum disulphide lithium base, NLGI No.2



- (c) Align the matchmarks and assemble the intermediate shaft and propeller shaft.
- (d) Cover the adjusting nut with the dust boot.

**NOTICE:**

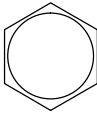
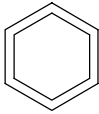
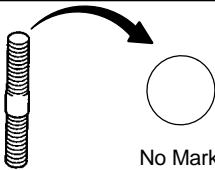
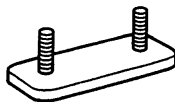
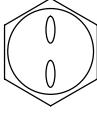
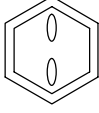
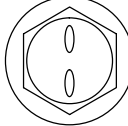
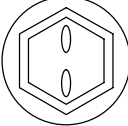




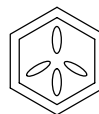




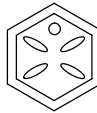

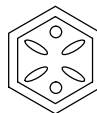
The directions of the intermediate shaft companion flange and the propeller shaft companion flange should differ by **180°**.

- (e) Tighten the adjusting nut fully by hand.

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS02S-01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
<div><div>4</div><div></div><div>No Mark</div></div>	<div><div></div><div>No Mark</div></div>	<div><div></div><div>No Mark</div></div>	<div><div></div></div>	4T
<div><div>5</div><div></div></div>	<div><div></div></div>			5T
<div><div>6</div><div></div><div>w/ Washer</div></div>	<div><div></div><div>w/ Washer</div></div>	<div><div></div></div>		6T
<div><div>7</div><div></div></div>	<div><div></div><div></div></div>			7T
<div><div>8</div></div>	<div><div></div></div>	<div><div></div><div></div></div>		8T
<div><div>9</div></div>	<div><div></div></div>			9T
<div><div>10</div></div>	<div><div></div><div></div></div>			10T
<div><div>11</div></div>	<div><div></div><div></div></div>			11T

B06431

EMISSION CONTROL (2JZ-GE)

TORQUE SPECIFICATION

SS0FJ-05

Part tightened	N·m	kgf·cm	ft·lbf
RH rear drive shaft x Differential	83	850	61
Rear suspension member brace x Rear suspension member	50	510	37
Heated oxygen sensor x Exhaust manifold	45	450	33
Exhaust manifold x Cylinder head	40	408	30
Front exhaust pipe (with rear TWC) x Exhaust manifold	44	440	32
Front exhaust pipe (with rear TWC) x Center Exhaust Pipe	44	440	32
Pipe support bracket x Transmission	44	440	32

SFI (2JZ-GE)

SERVICE DATA

SS0FK-01

Fuel pressure regulator	Fuel pressure	301 – 347 kPa (3.1 – 3.5 kgf/cm ² , 44 – 50 psi)
Fuel pump	Resistance at 20°C (68°F)	0.2 – 3.0 Ω
Injector	Resistance at 20°C (68°F) Injection volume Difference between each cylinder Fuel leakage	13.4 – 14.2 Ω 60 – 73 cm ³ (3.7 – 4.5 cu in.) per 15 sec. 13 cm ³ (0.8 cu in.) or less 1 drop or less per 12 minutes
MAF meter	Resistance (THA – E2) at –20°C (–4°F) at 20°C (68°F) at 60°C (140°F)	13.6 – 18.4kΩ 2.21 – 2.69 kΩ 0.493 – 0.667 kΩ
Throttle body	Throttle body fully closed angle	3.5°
Throttle control motor	Motor (M+ – M–) at 20°C (68°F) Clutch (CL+ – CL–) at 20°C (68°F)	0.3 – 100 Ω 4.2 – 5.2 Ω
Throttle position sensor	Resistance (VC – E2) at 20°C (68°F) Throttle valve opening percentage STD	1.2 – 3.2 kΩ 15.6 ± 1.2 %
Accelerator pedal position sensor	Resistance (VC – E2) at 20°C (68°F) Accelerator pedal position voltage STD	1.2 – 3.2 kΩ 0.3 – 0.9 V
Camshaft timing oil control valve	Resistance at 20°C (68°F)	5.5 – 12 Ω
VSV for EVAP	Resistance at 20°C (68°F)	33 – 39 Ω
VSV for acoustic control induction system (ACIS)	Resistance at 20°C (68°F)	38.5 – 44.5 Ω
VSV for vapor pressure sensor	Resistance at 20°C (68°F)	33 – 39 Ω
ECT sensor	Resistance at –20°C (–4°F) 0°C (32°F) 20°C (68°F) 40°C (104°F) 60°C (140°F) 80°C (176°F)	10 – 20 kΩ 4 – 7 kΩ 2 – 3 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ 0.2 – 0.4 kΩ
Vapor pressure sensor	Power source voltage	4.5 – 5.5 V
Heated oxygen sensor	Heater coil resistance at 20°C (68°F)	11 – 16 Ω
Fuel cut rpm	Fuel return rpm	1,000 rpm

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fuel line for union bolt for flare nut (for using SST)	29 38 (30)	300 387 (310)	22 28 (22)
Fuel tank vent tube set plate x Fuel tank	3.5	36	31 in.·lbf
Fuel inlet hose x Body	9.0	90	80 in.·lbf
Delivery pipe x Intake manifold	21	210	15
Fuel pressure pulsation damper x Fuel pipe support	32.5	325	24
Fuel inlet pipe x Intake manifold	9.0	90	80 in.·lbf
No.2 vacuum pipe x Intake manifold	21	210	15
Fuel sender gauge x Fuel tank	1.5	15	13 in.·lbf
Fuel tank band x Body	39	400	31
MAF meter x Air cleaner	10.7	109	8
Throttle body bracket x Throttle body	21	210	15
Throttle body bracket x Cylinder head	21	210	15
Throttle position sensor x Throttle body	1.7	17.5	15 in.·lbf
Throttle control motor x Throttle body	3.7	37.5	33 in.·lbf
Throttle control motor cover x Throttle body	1.7	17.5	15 in.·lbf
Accelerator pedal position sensor x Throttle body	3.7	37.5	33 in.·lbf
Camshaft timing oil control valve x No.3 camshaft bearing cap	8.0	80	71 in.·lbf
No.3 timing belt cover x Cylinder head cover	8.0	80	71 in.·lbf
Intake air connector x Air intake chamber	28	280	21
Air intake chamber x Intake manifold	28	280	21
Vacuum control valve set x Intake manifold	21	210	15
ECT sensor x Cylinder head	19.6	200	14
Knock sensor x Cylinder block	44	450	33
PS pump rear stay x Manifold stay	39.2	400	29
PS pump rear stay x PS pump bracket	39.2	400	29
Heated oxygen sensor x Exhaust manifold	45	450	33
Heated oxygen sensor x Front exhaust pipe	45	450	33

COOLING (2JZ-GE)

SERVICE DATA

SS0FM-01

Thermostat	Valve opening temperature	80 – 84°C (176 – 183°F)
	Valve lift at 95°C (203°F)	8.5 mm (0.335 in.) or more
Radiator cap	Relief valve opening pressure	93 – 123 kPa (0.95 – 1.25 kgf/cm ² , 13.5 – 17.8 psi)
	STD Minimum	78 kPa (0.8 kgf/cm ² , 11.4 psi)
Electric cooling fan	Rotating amperage at 20°C (68°F)	8.5 – 11.5 A

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Engine drain plug x Cylinder block	30	300	22
Water pump x Cylinder block	21	210	15
Water pump x No.2 water bypass pipe	21	210	15
Generator x Water pump	40	400	30
Generator x Cylinder block	40	400	30
Water bypass outlet x Cylinder head	9.0	90	80 in.·lbf
Water pump pulley x Water pump	14	140	10
Water inlet x Water pump	9.0	90	80 in.·lbf
Oil cooler x Radiator lower tank	8.3	85	74 in.·lbf
Oil cooler x Oil cooler pipe	14.7	150	11
Upper radiator support x Body	13.5	135	10
Electric cooling fan x Radiator	5.0	50	44 in.·lbf

LUBRICATION (2JZ-GE)

SERVICE DATA

SS0DY-02

Oil pressure		at idle speed at 3,000 rpm	49 kPa (0.5 kgf/cm ² , 7 psi) or more 324 kPa (3.3 kgf/cm ² , 47 psi) or more
Oil pump	Tip clearance	STD Maximum	0.060 – 0.240 mm (0.0024 – 0.0094 in.) 0.30 mm (0.0118 in.)
	Body clearance	STD Maximum	0.100 – 0.175 mm (0.0039 – 0.0069 in.) 0.20 mm (0.0079 in.)
	Side clearance	STD Maximum	0.030 – 0.090 mm (0.0012 – 0.0035 in.) 0.12 mm (0.0047 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Union bolt x Cylinder block	90	900	66
Oil pressure switch x Union bolt	15	150	11
Oil drain plug x No.2 oil pan	38	380	28
Oil pump body cover x Oil pump body	10	105	8
Plug x Oil pump body	49	500	36
Oil pump x Cylinder block	21	210	15
No.1 oil pan x Cylinder block	12 mm head	21	15
	14 mm head	40	30
Oil pan baffle plate x No.1 oil pan	9.0	90	80 in.·lbf
Oil strainer x No.1 oil pan	9.0	90	80 in.·lbf
No.2 oil pan x No.1 oil pan	9.0	90	80 in.·lbf
Oil level sensor x No.1 oil pan	5.4	55	48 in.·lbf
Crankshaft position sensor x Oil pump	9.0	90	80 in.·lbf

IGNITION (2JZ-GE)

SERVICE DATA

SS0FO-04

High-tension cord	Resistance	Maximum	25 kΩ per cord
Spark plug	Recommended spark plug	DENSO made NGK made	PK16JR11 BKR5EKP11
	Correct electrode gap for new plug		1.1 mm (0.043 in.)
	Maximum electrode gap for used plug		1.3 mm (0.051 in.)
Ignition coil	Primary coil resistance	at cold at hot	0.33 – 0.52 Ω 0.42 – 0.61 Ω
	Secondary coil resistance	at cold at hot	8.5 – 14.7 kΩ 10.8 – 17.2 kΩ
Camshaft position sensor	Resistance	at cold at hot	835 – 1,400 Ω 1,060 – 1,645 Ω
Crankshaft position sensor	Resistance	at cold at hot	1,630 – 2,740 Ω 2,065 – 3,225 Ω

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	18	180	13
Throttle body x Intake air connector	21	210	15
Throttle body bracket x Cylinder head	21	210	15
Throttle body bracket x Throttle body	21	210	15
Throttle body gasket x Intake air connector	21	210	15
Ignition coils and high-tension cord set assembly x Cylinder head	8.0	80	71 in.·lbf
PS pump rear stay x Manifold stay	39.2	400	29
PS pump rear stay x PS pump bracket	39.2	400	29
Camshaft position sensor x Cylinder head	9.0	90	80 in.·lbf
Crankshaft position sensor x Oil pump	9.0	90	80 in.·lbf

STARTING (2JZ-GE)

SERVICE DATA

SS0FQ-01

Starter	Rated voltage and output power		12 V 1.4 kW
	No-load characteristics	Current	90 A or less at 11.5 V
		rpm	3,000 rpm or more
	Brush length	STD	15.5 mm (0.610 in.)
		Minimum	10.0 mm (0.394 in.)
	Spring installed load	STD	17.6 – 23.5 N (1.8 – 2.4 kgf, 3.9 – 5.3 lbf)
		Minimum	11.8 N (1.2 kgf, 2.6 lbf)
	Commutator		
	Diameter	STD	30.0 mm (1.181 in.)
		Minimum	29.0 mm (1.412 in.)
	Undercut depth	STD	0.6 mm (0.024 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Magnetic switch		
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)

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

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Starter x Transmission	37	380	27
Lead wire x Terminal C of starter	5.9	60	52 in.·lbf
Field frame x Armature assembly	5.9	60	52 in.·lbf
Starter housing x Magnetic switch	5.9	60	52 in.·lbf
End cover x Field frame	1.5	15	13 in.·lbf
Terminal nut x Terminal 30 of starter	17	173	13
Terminal nut x Terminal C of starter	17	173	13
Magnetic switch end cover x Magnetic switch	2.5	26	22 in.·lbf

CHARGING (2JZ-GE)

SERVICE DATA

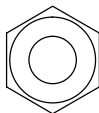
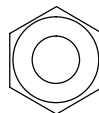
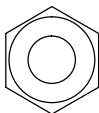

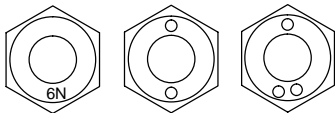
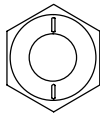
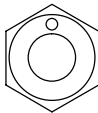
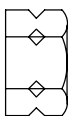
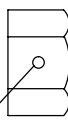
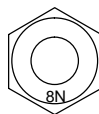
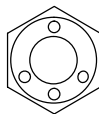

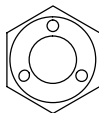
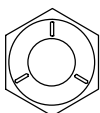
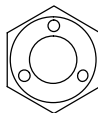

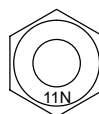
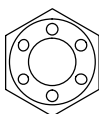

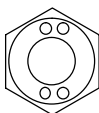
SS0E6-02

Battery	Voltage (Maintenance-free battery) at 20°C (68°F)	12.5 – 12.9 V
	Specific gravity (Except maintenance-free battery) at 20°C (68°F)	1.25 – 1.29
Generator	Rated output	12 V 80 A
	Rotor coil resistance at 20°C (68°C)	2.2 – 2.4 Ω
	Slip ring diameter STD	14.2 – 14.4 mm (0.559 – 0.567 in.)
	Minimum	12.8 mm (0.504 in.)
	Brush exposed length STD	9.5 – 11.5 mm (0.374 – 0.453 in.)
	Minimum	1.5 mm (0.059 in.)
Voltage regulator	Regulating voltage	13.2 – 14.8 V

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Generator x Water pump	40	400	30
Generator x Cylinder block	40	400	30
Bearing retainer x Drive end frame	3.0	31	27 in·lbf
Rectifier end frame x Drive end frame	4.5	46	40 in·lbf
Wire clip x Rectifier end frame	5.4	55	48 in·lbf
Generator pulley x Rotor	110.5	1,125	81
Rectifier holder x Coil lead on rectifier end frame	2.9	30	26 in·lbf
Voltage regulator x Rectifier end frame	2.0	20	18 in·lbf
Voltage regulator x Rectifier holder	2.0	20	18 in·lbf
Brush holder x Rectifier holder	2.0	20	18 in·lbf
Brush holder x Voltage regulator	2.0	20	18 in·lbf
Rear end cover x Rectifier holder	4.4	45	39 in·lbf
Plate terminal x Rectifier holder	Nut	4.4	45
	Bolt	3.9	40
Terminal insulator x Rectifier holder	6.5	67	58 in·lbf

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
			6N
	 	 	7N (5T)
 			8N
 	 	 No Mark	10N (7T)
 			11N
 			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

2000 LEXUS GS300/GS400 (RM718U)

MAINTENANCE

TORQUE SPECIFICATION

SS0FG-01

Part tightened	N·m	kgf·cm	ft·lbf
Front seat x Body	37	375	27
Front suspension member x Body	98	1,000	72
Rear suspension member x Body	127	1,300	94

AUTOMATIC TRANSMISSION

SERVICE DATA

SS0C5-02

Line pressure (Wheel locked)	Idling	
	D position	395 – 455 kPa (4.0 – 4.6 kgf-cm ² , 57 – 65 psi)
	R position	0
	Stall	
	D position	1,200 – 1,360 kPa (12.2 – 13.8 kgf-cm ² , 174 – 196 psi)
	R position	1,655 – 1,960 kPa (16.9 – 19.8 kgf-cm ² , 240 – 282 psi)
Engine stall revolution (D position)	1UZ-FE	2,250 ± 150 rpm
	2JZ-GE	2,700 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (N position and A/C OFF)	1UZ-FE	750 ± 50 rpm
	2JZ-GE	700 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch sleeve runout	Max.	0.30 mm (0.0118 in.)
Torque converter clutch installation (Correct distance)	1UZ-FE	More than 17.1 mm (0.673 in.)
	2JZ-GE	More than 0.1 mm (0.004 in.)
Extension housing oil seal drive in depth from flat end		2.0 mm (0.079 in.)
Shift schedule (1UZ-FE / NORM and PWR mode)		
Differential gear ratio 3.266		
D, 4 position (Throttle valve fully opened)	1 → 2	63 – 73 km/h (39 – 45 mph)
	2 → 3	93 – 105 km/h (58 – 65 mph)
	3 → 4	143 – 161 km/h (89 – 100 mph)
	4 → 5	209 – 230 km/h (130 – 143 mph)
	5 → 4	202 – 218 km/h (126 – 135 mph)
	4 → 3	135 – 148 km/h (84 – 92 mph)
	3 → 2	79 – 87 km/h (49 – 54 mph)
	2 → 1	42 – 49 km/h (26 – 30 mph)
	4 → 5	33 – 39 km/h (21 – 24 mph)
	5 → 4	24 – 30 km/h (15 – 19 mph)
	1 → 2	63 – 73 km/h (39 – 45 mph)
	2 → 3	93 – 105 km/h (58 – 65 mph)
	4 → 3	152 – 167 km/h (94 – 104 mph)
	3 → 2	79 – 87 km/h (49 – 54 mph)
3 position (Throttle valve fully opened)	2 → 1	42 – 49 km/h (26 – 30 mph)
	1 → 2	63 – 73 km/h (39 – 45 mph)
	3 → 2	103 – 111 km/h (64 – 69 mph)
2 position (Throttle valve fully opened)	2 → 1	42 – 49 km/h (26 – 30 mph)
	1 → 2	63 – 73 km/h (39 – 45 mph)
L position (Throttle valve fully opened)	2 → 1	17 – 23 km/h (11 – 14 mph)
	1 → 2	63 – 73 km/h (39 – 45 mph)

SERVICE SPECIFICATIONS – AUTOMATIC TRANSMISSION

Shift schedule (1UZ-FE / SNOW mode)		
Differential gear ratio 3.266		
D, 4 position		
(Throttle valve fully opened)	1 → 2	42 – 56 km/h (26 – 35 mph)
	2 → 3	72 – 89 km/h (45 – 55 mph)
	3 → 4	109 – 135 km/h (68 – 84 mph)
	4 → 5	145 – 174 km/h (90 – 108 mph)
	5 → 4	96 – 119 km/h (60 – 74 mph)
	4 → 3	47 – 64 km/h (29 – 40 mph)
	3 → 2	22 – 32 km/h (17 – 20 mph)
	2 → 1	5 – 10 km/h (3 – 6 mph)
(Throttle valve fully closed)	4 → 5	33 – 39 km/h (21 – 24 mph)
	5 → 4	24 – 30 km/h (15 – 19 mph)
3 position		
(Throttle valve fully opened)	1 → 2	42 – 56 km/h (26 – 35 mph)
	2 → 3	72 – 89 km/h (45 – 55 mph)
	4 → 3	152 – 167 km/h (94 – 104 mph)
	3 → 2	22 – 32 km/h (17 – 20 mph)
	2 → 1	5 – 10 km/h (3 – 6 mph)
2 position		
(Throttle valve fully opened)	1 → 2	42 – 56 km/h (26 – 35 mph)
	3 → 2	103 – 111 km/h (64 – 69 mph)
	2 → 1	5 – 10 km/h (3 – 6 mph)
L position		
(Throttle valve fully opened)	2 → 1	17 – 23 km/h (11 – 14 mph)
Shift schedule (2JZ-GE / NORM and PWR mode)		
Differential gear ratio 3.916		
D, 4 position		
(Throttle valve fully opened)	1 → 2	53 – 61 km/h (33 – 38 mph)
	2 → 3	81 – 91 km/h (50 – 57 mph)
	3 → 4	124 – 138 km/h (77 – 86 mph)
	4 → 5	177 – 191 km/h (110 – 119 mph)
	5 → 4	171 – 182 km/h (106 – 113 mph)
	4 → 3	112 – 122 km/h (70 – 76 mph)
	3 → 2	63 – 68 km/h (39 – 42 mph)
	2 → 1	34 – 39 km/h (21 – 24 mph)
(Throttle valve fully closed)	4 → 5	39 – 44 km/h (24 – 27 mph)
	5 → 4	22 – 27 km/h (14 – 17 mph)
3 position		
(Throttle valve fully opened)	1 → 2	53 – 61 km/h (33 – 38 mph)
	2 → 3	81 – 91 km/h (50 – 57 mph)
	4 → 3	129 – 139 km/h (80 – 86 mph)
	3 → 2	63 – 68 km/h (39 – 42 mph)
	2 → 1	34 – 39 km/h (21 – 24 mph)
2 position		
(Throttle valve fully opened)	1 → 2	53 – 61 km/h (33 – 38 mph)
	3 → 2	87 – 93 km/h (54 – 58 mph)
	2 → 1	34 – 39 km/h (21 – 24 mph)
L position		
(Throttle valve fully opened)	2 → 1	16 – 21 km/h (10 – 13 mph)

Shift schedule (2JZ-GE / SNOW mode)		
Differential gear ratio 3.916		
D, 4 position		
(Throttle valve fully opened)	1 → 2	39 – 50 km/h (24 – 31 mph)
	2 → 3	62 – 74 km/h (39 – 46 mph)
	3 → 4	94 – 112 km/h (58 – 70 mph)
	4 → 5	136 – 157 km/h (85 – 98 mph)
	5 → 4	77 – 91 km/h (48 – 57 mph)
	4 → 3	45 – 55 km/h (28 – 34 mph)
	3 → 2	23 – 31 km/h (14 – 19 mph)
	2 → 1	4 – 8 km/h (2 – 5 mph)
(Throttle valve fully closed)	4 → 5	39 – 44 km/h (24 – 27 mph)
	5 → 4	22 – 27 km/h (14 – 17 mph)
3 position		
(Throttle valve fully opened)	1 → 2	39 – 50 km/h (24 – 31 mph)
	2 → 3	62 – 74 km/h (39 – 46 mph)
	4 → 3	129 – 139 km/h (80 – 86 mph)
	3 → 2	23 – 31 km/h (14 – 19 mph)
	2 → 1	4 – 8 km/h (2 – 5 mph)
2 position		
(Throttle valve fully opened)	1 → 2	39 – 50 km/h (24 – 31 mph)
	3 → 2	87 – 93 km/h (54 – 58 mph)
	2 → 1	4 – 8 km/h (2 – 5 mph)
L position		
(Throttle valve fully opened)	2 → 1	16 – 21 km/h (10 – 13 mph)
Lock-up point (1UZ-FE) (Throttle valve opening 5 %)		
5th gear (D position)	Lock-up ON	58 – 65 km/h (36 – 40 mph)
	Lock-up OFF	55 – 61 km/h (34 – 38 mph)
4th gear (4 position)	Lock-up ON	140 – 150 km/h (87 – 93 mph)
	Lock-up OFF	133 – 143 km/h (83 – 89 mph)
Flex lock-up point (1UZ-FE) (Throttle valve opening 3 %)		
D position (When accelerating)	Lock-up ON	47 – 53 km/h (29 – 33 mph)
	Lock-up OFF	45 – 51 km/h (28 – 32 mph)
4 position (When accelerating)	Lock-up ON	35 – 41 km/h (22 – 25 mph)
	Lock-up OFF	33 – 39 km/h (21 – 24 mph)
Lock-up point (2JZ-GE) (Throttle valve opening 5 %)		
5th gear (D position)	Lock-up ON	56 – 61 km/h (35 – 38 mph)
	Lock-up OFF	54 – 60 km/h (34 – 37 mph)
4th gear (4 position)	Lock-up ON	56 – 61 km/h (35 – 38 mph)
	Lock-up OFF	54 – 60 km/h (34 – 37 mph)

SERVICE SPECIFICATIONS – AUTOMATIC TRANSMISSION

Flex lock-up point (2JZ-GE)		
(Throttle valve opening 3 %)		
D position (When accelerating)		
5th gear	Lock-up ON	39 – 44 km/h (24 – 27 mph)
	Lock-up OFF	38 – 43 km/h (24 – 27 mph)
4th gear	Lock-up ON	30 – 34 km/h (19 – 21 mph)
	Lock-up OFF	28 – 33 km/h (17 – 21 mph)
4 position (When accelerating)		
4th gear	Lock-up ON	39 – 44 km/h (24 – 27 mph)
	Lock-up OFF	37 – 42 km/h (23 – 26 mph)
(Throttle valve fully closed)		
D position (When deceleration / A/C ON)		
5th gear	Lock-up ON	93 – 102 km/h (58 – 63 mph)
	Lock-up OFF	32 – 53 km/h (20 – 33 mph)
4 position (When deceleration / A/C ON)		
4th gear	Lock-up ON	93 – 102 km/h (58 – 63 mph)
	Lock-up OFF	24 – 40 km/h (15 – 25 mph)
D position (When deceleration / A/C OFF)		
5th gear	Lock-up ON	93 – 102 km/h (58 – 63 mph)
	Lock-up OFF	32 – 37 km/h (20 – 23 mph)
4 position (When deceleration / A/C OFF)		
4th gear	Lock-up OFF	21 – 28 km/h (13 – 17 mph)

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Transmission output flange x Output shaft		126	1,280	93
Extension housing x Transmission case		34	345	25
Solenoid wiring clamp set bolt		10	100	7
Oil strainer x Valve body		10	100	7
Oil pan x Transmission case		7.4	75	65 in.·lbf
Drain plug		20	205	15
Shift solenoid valve SLU and SLN lock plate set bolt		10	100	7
Shift solenoid valve SLT lock plate set bolt		10	100	7
Shift solenoid valve x Valve body		10	100	7
Valve body x Transmission case		10	100	7
Shift lever assembly x Body		8.3	85	74 in.·lbf
Control shaft x Control lever		13	128	9
Shift lock control unit assembly x Shift lever plate		2.0	20	17 in.·lbf
Shift lever housing set bolt and nut		3.9	40	35 in.·lbf
Exhaust manifold with TWC set nut	2JZ-GE	39	400	29
Heated oxygen sensor x Front exhaust pipe		44	450	33
Front floor center brace x Body		7.4	75	65 in.·lbf
Front exhaust pipe x Exhaust manifold	2JZ-GE	44	450	33
Front exhaust pipe x Front TWC	1UZ-FE	44	450	33
Front TWC x Exhaust manifold	1UZ-FE	62	630	46
Pipe support bracket x Transmission		44	450	33
Center exhaust pipe x Tail pipe		44	450	33
Front exhaust pipe x Center exhaust pipe		44	450	33
Heat insulator x Body		5.4	55	48 in.·lbf
Shift control rod x Shift lever assembly		13	130	9
Oil cooler pipe union nut		44	450	33
Oil cooler pipe clamp set bolt		5.4	55	48 in.·lbf
Flywheel housing under cover x Transmission housing	1UZ-FE	18	185	13
Torque converter clutch x Drive plate		48	490	35
Engine rear mounting x Body		26	270	20
Starter x Transmission	2JZ-GE	37	380	27
Transmission x Engine	17 mm head	72	730	53
	14 mm head	37	380	27
Drive plate x Crankshaft		83	850	61

PROPELLER SHAFT

SS0F7-02

SERVICE DATA

Shaft runout	Max.	0.8 mm (0.031 in.)
Joint angle	No.2 joint No.3 joint	$-1^{\circ}01' \pm 37'$ $1^{\circ}14' \pm 42'$
Center support bearing adjusting washer thickness		1.0 mm (0.039 in.) 2.0 mm (0.079 in.) 2.5 mm (0.098 in.) 3.0 mm (0.118 in.) 3.6 mm (0.142 in.) 4.0 mm (0.157 in.) 4.5 mm (0.177 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Intermediate shaft x Transmission	79	805	58
Propeller shaft x Differential	79	805	58
Heat insulator x Body	5.4	55	48 in.·lbf
Exhaust pipe assembly x Exhaust manifold	44	450	33
Front floor center brace x Body	7.4	75	65 in.·lbf
Heated oxygen sensor x Exhaust pipe assembly	44	450	33
Center support bearing x Body	37	375	27
Propeller shaft adjusting nut	50 (69)	515 (700)	37 (51)

(): For use without SST

SUSPENSION AND AXLE

SERVICE DATA

SS0FD-01

Cold tire inflation pressure (GS 400)	Tire size 225/55R16 94V	*1Front	220 kPa (2.2 kgf/cm ² or bar, 32 psi)
		*1Rear	220 kPa (2.2 kgf/cm ² or bar, 32 psi)
		*2Front	290 kPa (2.9 kgf/cm ² or bar, 42 psi)
		*2Rear	290 kPa (2.9 kgf/cm ² or bar, 42 psi)
	235/45ZR17	*1Front	230 kPa (2.3 kgf/cm ² or bar, 33 psi)
		*1Rear	230 kPa (2.3 kgf/cm ² or bar, 33 psi)
		*2Front	300 kPa (3.0 kgf/cm ² or bar, 44 psi)
		*2Rear	300 kPa (3.0 kgf/cm ² or bar, 44 psi)
Cold tire inflation pressure (GS 300)	Tire size P215/60R16 94V	*1Front	210 kPa (2.1 kgf/cm ² or bar, 30 psi)
		*1Rear	210 kPa (2.1 kgf/cm ² or bar, 30 psi)
		*2Front	300 kPa (3.0 kgf/cm ² or bar, 44 psi)
		*2Rear	300 kPa (3.0 kgf/cm ² or bar, 44 psi)
	225/55R16 94V	*1Front	220 kPa (2.2 kgf/cm ² or bar, 32 psi)
		*1Rear	220 kPa (2.2 kgf/cm ² or bar, 32 psi)
		*2Front	300 kPa (3.0 kgf/cm ² or bar, 44 psi)
		*2Rear	300 kPa (3.0 kgf/cm ² or bar, 44 psi)
Front wheel alignment	Vehicle height P215/60R16	*3Front	243 mm (9.63 in.)
		*4Rear	226 mm (8.90 in.)
	225/55R16	*3Front	240 mm (9.45 in.)
		*4Rear	221 mm (8.70 in.)
	235/45ZR17	*3Front	238 mm (9.37 in.)
		*4Rear	219 mm (8.62 in.)
	Camber Left-right error		−0° 16' ± 30' (−0.27° ± 0.5°) 30' (0.5°) or less
	Caster Left-right error		7° 33' ± 30' (7.55° ± 0.5°) 30' (0.5°) or less
	Steering axis inclination Left-right error		8° 52' ± 30' (8.87° ± 0.5°) 30' (0.5°) or less
	Toe-in (total) Rack end length difference		0° 09' ± 12' (0.15° ± 0.2°, 1.5 ± 2 mm, 0.06 ± 0.08 in.) 1.5 mm (0.059 in.) or less
	Wheel angle Inside wheel Outside wheel: Reference		38° 51' (36° 51' – 39° 51') 38.85° (36.85° – 39.85°) 32° 05' 32.08°
Rear wheel alignment	Camber Left-right error		−0° 47' ± 30' (−0.78° ± 0.5°) 30' (0.5°) or less
	Toe-in (total) Link and arm length difference		0° 08' ± 12' (0.13° ± 0.2°, 1.4 ± 2 mm, 0.056 ± 0.08 in.) 4.0 mm (0.16 in.) or less
Front axle	Wheel bearing backlash		0.05 mm (0.0020 in.)
	Axle hub deviation		0.05 mm (0.0020 in.)

*1: For driving under 160 km/h (100 mph)

*2: For driving at 160 km/h (100 mph) or over

*3: Measure from the ground to the center of the lower suspension arm mounting bolt.

*4: Measure from the ground to the center of the No.2 lower suspension arm mounting bolt.

Front suspension	Upper ball joint turning torque		1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.·lbf)
	Lower ball joint turning torque		0.1 – 2.0 N·m (1 – 20 kgf·cm, 0.9 – 17 in.·lbf)
	Lower ball joint excessive play		0.9 mm (0.035 in.)
	Stabilizer bar link ball joint turning torque		0.05 – 1.5 N·m (0.5 – 15 kgf·cm, 0.4 – 13 in.·lbf)
Rear axle	Wheel bearing backlash		0.05 mm (0.0020 in.)
	Axle hub deviation		0.07 mm (0.0028 in.)
Rear drive shaft	Drive shaft length	RH	598.5 mm (23.563 in.)
		LH	553.5 mm (21.791 in.)
Rear suspension	Upper ball joint turning torque		1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.·lbf)
	Toe control link ball joint turning torque		1.0 – 2.5 N·m (10 – 25 kgf·cm, 9 – 22 in.·lbf)
	Stabilizer bar link ball joint turning torque		0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 9 in.·lbf)
Rear differential	Drive pinion shaft runout	Maximum	0.08 mm (0.0031 in.)
	Ring gear runout	Maximum	0.05 mm (0.0020 in.)
	Ring gear backlash	Maximum	0.08 – 0.13 mm (0.0031 – 0.0051 in.)
	Drive pinion bearing (at starting)	New bearing Reused bearing	1.5 – 1.8 N·m (15 – 18 kgf·cm, 13.0 – 15.6 in.·lbf) 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)
	Total preload (at starting)		Drive pinion preload plus 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)
	Pinion gear backlash	Maximum	0.15 mm (0.0059 in.)
	Pinion gear backlash adjusting thrust washer		1.50 mm (0.059 in.)
			1.55 mm (0.061 in.)
			1.60 mm (0.063 in.)
			1.65 mm (0.065 in.)
			1.70 mm (0.067 in.)
			1.75 mm (0.069 in.)
			1.80 mm (0.071 in.)
			1.85 mm (0.073 in.)
			1.90 mm (0.075 in.)

SERVICE SPECIFICATIONS – SUSPENSION AND AXLE

Rear differential (cont'd)	Ring gear backlash adjusting washer	No.	
		02	2.02 mm (0.0795 in.)
		04	2.04 mm (0.0803 in.)
		06	2.06 mm (0.0811 in.)
		08	2.08 mm (0.0819 in.)
		10	2.10 mm (0.0827 in.)
		12	2.12 mm (0.0835 in.)
		14	2.14 mm (0.0843 in.)
		16	2.16 mm (0.0850 in.)
		18	2.18 mm (0.0858 in.)
		20	2.20 mm (0.0866 in.)
		22	2.22 mm (0.0874 in.)
		24	2.24 mm (0.0882 in.)
		26	2.26 mm (0.0890 in.)
		28	2.28 mm (0.0898 in.)
		30	2.30 mm (0.0906 in.)
		32	2.32 mm (0.0913 in.)
		34	2.34 mm (0.0921 in.)
		36	2.36 mm (0.0929 in.)
		38	2.38 mm (0.0937 in.)
		40	2.40 mm (0.0945 in.)
		42	2.42 mm (0.0953 in.)
		44	2.44 mm (0.0961 in.)
		46	2.46 mm (0.0969 in.)
		48	2.48 mm (0.0976 in.)
		50	2.50 mm (0.0984 in.)
		52	2.52 mm (0.0992 in.)
		54	2.54 mm (0.1000 in.)
		56	2.56 mm (0.1008 in.)
		58	2.58 mm (0.1016 in.)
		60	2.60 mm (0.1024 in.)
		62	2.62 mm (0.1031 in.)
		64	2.64 mm (0.1039 in.)
		66	2.66 mm (0.1047 in.)
		68	2.68 mm (0.1055 in.)
		70	2.70 mm (0.1063 in.)
		72	2.72 mm (0.1071 in.)
		74	2.74 mm (0.1079 in.)
		76	2.76 mm (0.1087 in.)
		78	2.78 mm (0.1094 in.)
		80	2.80 mm (0.1102 in.)
		82	2.82 mm (0.1100 in.)
		84	2.84 mm (0.1118 in.)
		86	2.86 mm (0.1126 in.)

Rear differential (cont'd)	Tooth contact pattern adjusting washer	No.	
		87	1.87 mm (0.0736 in.)
		88	1.88 mm (0.0740 in.)
		89	1.89 mm (0.0744 in.)
		90	1.90 mm (0.0748 in.)
		91	1.91 mm (0.0752 in.)
		92	1.92 mm (0.0756 in.)
		93	1.93 mm (0.0760 in.)
		94	1.94 mm (0.0764 in.)
		95	1.95 mm (0.0768 in.)
		96	1.96 mm (0.0772 in.)
		97	1.97 mm (0.0776 in.)
		98	1.98 mm (0.0780 in.)
		99	1.99 mm (0.0784 in.)
		00	2.00 mm (0.0788 in.)
		01	2.01 mm (0.0791 in.)
		02	2.02 mm (0.0795 in.)
		03	2.03 mm (0.0799 in.)
		04	2.04 mm (0.0803 in.)
		05	2.05 mm (0.0807 in.)
		06	2.06 mm (0.0811 in.)
		07	2.07 mm (0.0815 in.)
		08	2.08 mm (0.0819 in.)
		09	2.09 mm (0.0823 in.)
		10	2.10 mm (0.0827 in.)
		11	2.11 mm (0.0831 in.)
		12	2.12 mm (0.0835 in.)
		13	2.13 mm (0.0839 in.)
		14	2.14 mm (0.0843 in.)
		15	2.15 mm (0.0846 in.)
		16	2.16 mm (0.0850 in.)
		17	2.17 mm (0.0854 in.)
		18	2.18 mm (0.0858 in.)
		19	2.19 mm (0.0862 in.)
		20	2.20 mm (0.0866 in.)
		21	2.21 mm (0.0870 in.)
		22	2.22 mm (0.0874 in.)
		23	2.23 mm (0.0878 in.)
		24	2.24 mm (0.0882 in.)
		25	2.25 mm (0.0886 in.)
		26	2.26 mm (0.0890 in.)
		27	2.27 mm (0.0894 in.)
		28	2.28 mm (0.0898 in.)

ENGINE MECHANICAL (2JZ-GE)

SS0FH-05

SERVICE DATA

Compression pressure	at 250 rpm STD Minimum Difference of pressure between each cylinder	1,324 kPa (13.5 kgf/cm ² , 192 psi) or more 1,079 kPa (11.0 kgf/cm ² , 156 psi) 98 kPa (1.0 kgf/cm ² , 14 psi) or less
Valve clearance	at cold Intake Exhaust Adjusting shim (for repair part) Mark 2.500 Mark 2.550 Mark 2.600 Mark 2.650 Mark 2.700 Mark 2.750 Mark 2.800 Mark 2.850 Mark 2.900 Mark 2.950 Mark 3.000 Mark 3.050 Mark 3.100 Mark 3.150 Mark 3.200 Mark 3.250 Mark 3.300	0.15 – 0.25 mm (0.006 – 0.010 in.) 0.25 – 0.35 mm (0.010 – 0.014 in.) 2.500 mm (0.0984 in.) 2.550 mm (0.1004 in.) 2.600 mm (0.1024 in.) 2.650 mm (0.1043 in.) 2.700 mm (0.1063 in.) 2.750 mm (0.1083 in.) 2.800 mm (0.1102 in.) 2.850 mm (0.1122 in.) 2.900 mm (0.1142 in.) 2.950 mm (0.1161 in.) 3.000 mm (0.1181 in.) 3.050 mm (0.1201 in.) 3.100 mm (0.1220 in.) 3.150 mm (0.1240 in.) 3.200 mm (0.1260 in.) 3.250 mm (0.1280 in.) 3.300 mm (0.1299 in.)
Ignition timing	w/ Terminals TE and E1 connected of DLC1	10° ± 2° BTDC @ idle
Idle speed		700 ± 50 rpm
Timing belt tensioner	Protrusion (from housing side)	8.0 – 8.8 mm (0.315 – 0.346 in.)
Cylinder head	Warpage Cylinder block side Intake manifold side Exhaust manifold side Valve guide bore diameter Valve seat Refacing angle Contacting angle Contacting width Cylinder head bolt diameter	Maximum Maximum Maximum STD O/S 0.05 15°, 45°, 75° 45° Intake Exhaust STD Minimum 0.10 mm (0.0039 in.) 0.10 mm (0.0039 in.) 0.10 mm (0.0039 in.) 10.985 – 11.006 mm (0.4325 – 0.4333 in.) 11.035 – 11.056 mm (0.4344 – 0.4353 in.) 1.0 – 1.4 mm (0.039 – 0.055 in.) 1.2 – 1.6 mm (0.047 – 0.063 in.) 10.8 – 11.0 mm (0.425 – 0.433 in.) 10.7 mm (0.421 in.)
Valve guide bushing	Inside diameter Outside diameter (for repair part) STD O/S 0.05	6.010 – 6.030 mm (0.2366 – 0.2374 in.) 11.033 – 11.044 mm (0.4344 – 0.4348 in.) 11.083 – 11.094 mm (0.4363 – 0.4368 in.)
Valve	Valve overall length STD Intake Exhaust Minimum Intake Exhaust Valve face angle Stem diameter Intake Exhaust	98.29 – 98.79 mm (3.8697 – 3.8894 in.) 98.84 – 99.34 mm (3.8913 – 3.9110 in.) 98.19 mm (3.8657 in.) 98.74 mm (3.8874 in.) 44.5° 5.970 – 5.985 mm (0.2350 – 0.2356 in.) 5.965 – 5.980 mm (0.2348 – 0.2354 in.)

Valve (cont'd)	Stem oil clearance	STD Intake	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
		Exhaust	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
	Margin thickness	Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
		STD	0.8 – 1.2 mm (0.031 – 0.047 in.)
		Minimum	0.5 mm (0.020 in.)
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length	Pink painted mark	43.71 mm (1.7209 in.)
		Yellow painted mark	44.10 mm (1.7362 in.)
	Installed tension at 34.5 mm (1.358 in.)		186.2 – 205.8 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)
Valve lifter	Lifter diameter		30.966 – 30.976 mm (1.2191 – 1.2195 in.)
	Lifter bore diameter		31.000 – 31.016 mm (1.2205 – 1.2211 in.)
	Oil clearance	STD	0.024 – 0.050 mm (0.0009 – 0.0020 in.)
		Maximum	0.07 mm (0.0028 in.)
Camshaft	Thrust clearance	STD	0.080 – 0.190 mm (0.0031 – 0.0075 in.)
		Maximum	0.30 mm (0.0118 in.)
	Cam lobe height	STD Intake	44.310 – 44.360 mm (1.7445 – 1.7465 in.)
		Exhaust	44.250 – 44.350 mm (1.7421 – 1.7461 in.)
		Maximum Intake	44.16 mm (1.7386 in.)
		Exhaust	44.10 mm (1.7362 in.)
	Journal diameter		28.949 – 28.965 mm (1.1397 – 1.1404 in.)
	Journal oil clearance	STD	0.035 – 0.072 mm (0.0014 – 0.0028 in.)
		Maximum	0.10 mm (0.0039 in.)
	Circle runout	Maximum	0.08 mm (0.0031 in.)
Air intake chamber	Warpage	Maximum	0.15 mm (0.0059 in.)
Manifold	Warpage	Maximum Intake	0.15 mm (0.0059 in.)
		Exhaust	0.50 mm (0.0196 in.)
Cylinder block	Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
	Cylinder bore diameter	STD	86.000 – 86.013 mm (3.3858 – 3.3863 in.)
		Maximum	86.02 mm (3.3866 in.)
	Main bearing bolt diameter	STD	9.96 – 9.97 mm (0.3921 – 0.3925 in.)
		Minimum	9.7 mm (0.382 in.)
Connecting rod	Thrust clearance	STD	0.250 – 0.402 mm (0.0098 – 0.0158 in.)
		Maximum	0.50 mm (0.0197 in.)
	Connecting bolt diameter	STD	8.1 – 8.3 mm (0.319 – 0.327 in.)
		Minimum	8.0 mm (0.315 in.)
	Connecting rod oil clearance	STD STD	0.023 – 0.041 mm (0.0009 – 0.0016 in.)
		U/S 0.25	0.028 – 0.066 mm (0.0011 – 0.0026 in.)
		Maximum STD	0.07 mm (0.0027 in.)
		U/S 0.25	0.08 mm (0.0031 in.)
	Connecting rod bearing center wall thickness (Reference)	STD Mark 1	1.498 – 1.501 mm (0.0590 – 0.0591 in.)
		Mark 2	1.501 – 1.504 mm (0.0591 – 0.0592 in.)
		Mark 3	1.504 – 1.507 mm (0.0592 – 0.0593 in.)
		Mark 4	1.507 – 1.510 mm (0.0593 – 0.0594 in.)
		Mark 5	1.510 – 1.513 mm (0.0594 – 0.0596 in.)
	Bushing inside diameter		22.005 – 22.014 mm (0.8663 – 0.8667 in.)
	Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 in.)
	Piston pin oil clearance	STD	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
		Maximum	0.05 mm (0.0020 in.)
	Rod out – of alignment	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL (2JZ-GE)

Piston and Piston ring	Piston diameter		85.935 – 85.945 mm (3.3833 – 3.3837 in.)
	Piston oil clearance	STD	0.055 – 0.078 mm (0.0022 – 0.0031 in.)
		Maximum	0.10 mm (0.0039 in.)
	Piston ring groove clearance	No.1	0.011 – 0.070 mm (0.0004 – 0.0028 in.)
		No.2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
	Piston ring end gap	STD No.1	0.300 – 0.470 mm (0.0118 – 0.0185 in.)
		No.2	0.350 – 0.520 mm (0.0138 – 0.0205 in.)
		Oil	0.130 – 0.450 mm (0.0051 – 0.0177 in.)
		Maximum No.1	1.07 mm (0.0421 in.)
		No.2	1.12 mm (0.0441 in.)
Crankshaft		Oil	1.05 mm (0.0413 in.)
	Thrust clearance	STD	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness	STD	1.940 – 1.990 mm (0.0764 – 0.0783 in.)
	Main journal oil clearance	STD STD	0.026 – 0.040 mm (0.0010 – 0.0016 in.)
		U/S 0.25	0.025 – 0.061 mm (0.0010 – 0.0024 in.)
		Maximum STD	0.06 mm (0.0024 in.)
		U/S 0.25	0.08 mm (0.0031 in.)
	Main journal diameter	STD	61.984 – 62.000 mm (2.4403 – 2.4409 in.)
		U/S 0.25	61.745 – 61.755 mm (2.4309 – 2.4313 in.)
	Main bearing center wall thickness (Reference)		
		Mark 1	1.994 – 1.997 mm (0.0785 – 0.0786 in.)
		Mark 2	1.997 – 2.000 mm (0.0786 – 0.0787 in.)
		Mark 3	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
		Mark 4	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
		Mark 5	2.006 – 2.009 mm (0.0790 – 0.0791 in.)
	Crank pin diameter	STD	51.982 – 52.000 mm (2.0465 – 2.0472 in.)
		U/S 0.25	51.745 – 51.755 mm (2.0372 – 2.0376 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
	Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)

TORQUE SPECIFICATION

Part tighten	N·m	kgf·cm	ft·lbf
FRONT			
Hub nut	103	1,050	76
Brake caliper x Steering knuckle	118	1,200	87
ABS speed sensor x Steering knuckle	7.8	80	69 in.·lbf
Steering knuckle x Upper suspension arm	87	890	64
Lower ball joint x Steering knuckle	113	1,150	83
Brake dust cover x Steering knuckle	8.3	85	74 in.·lbf
ABS speed sensor wire harness x Shock absorber	5.0	55	48 in.·lbf
Stabilizer bar x Stabilizer bar link	55	560	41
Shock absorber bracket x Shock absorber	157	1,600	116
Piston rod x Suspension support No.2	27	280	20
Suspension support No.1 x Body	56	570	41
Upper suspension arm x Body	53	540	39
Stabilizer bar link x No.2 lower suspension arm	113	1,150	83
Height control link x Shock absorber bracket	5.4	55	48 in.·lbf
No.2 lower suspension arm x No.1 lower suspension arm	245	2,500	180
No.2 lower suspension arm x Lower ball joint	162	1,650	119
Strut bar bracket x Body	A	58	43
	B	152	112
No.2 lower suspension arm x Body	95	970	70
Shock absorber bracket x No.2 lower suspension arm	25	250	18
Tie rod end x Lower ball joint	87	890	64
Stabilizer bar bracket x Body	28	290	21
Tie rod end lock nut	56	570	41
Axle hub lock nut	199	2,030	147

Part tighten		N-m	kgf-cm	ft-lbf
REAR				
Hub nut		103	1,050	76
Brake caliper x Axle carrier		104	1,065	77
Axle carrier x Upper suspension arm		108	1,100	80
Backing plate x Axle carrier		59	600	43
Drive shaft x Axle hub		289	2,950	213
No.2 lower suspension arm x Axle carrier		110	1,120	81
No.1 lower suspension arm x Axle carrier		75	765	55
Drive shaft x Differential side gear shaft		68	695	50
Differential drain plug		49	500	39
Differential filler plug		49	500	39
Differential mounting bolt	Front	123	1,250	90
	Rear	142	1,450	105
Ring gear set bolt		See page SA-73		
Companion flange lock nut		See page SA-73		
Differential carrier retainer set bolt		22	225	16
Differential carrier cover set bolt		47	475	34
Breather plug		21	210	15
Suspension support x Body	Upper side	64	650	47
	Lower side	18	185	13
Piston rod x Suspension support		27	280	20
Upper suspension arm x Body		88	900	65
No.1 lower suspension arm x Body		75	765	55
No.2 lower suspension arm x Stabilizer bar link x Height control sensor link		30	305	22
No.2 lower suspension arm x Shock absorber		110	1,120	81
No.2 lower suspension arm x Body		110	1,120	81
ABS speed sensor wire harness x Toe control link		5.4	55	48 in.-lbf
Toe control link x Axle carrier		59	600	44
Toe control link x Body		59	600	44
Stabilizer bar x Stabilizer bar link		65	660	48
Stabilizer bar bracket x Body		18	185	13
ABS speed sensor x Axle carrier		7.8	80	69 in.-lbf
Parking brake cable x Backing plate		7.8	80	69 in.-lbf
Suspension member brace x Body		50	510	37
Differential x Propeller shaft		79	805	58
Oil deflector x Differential carrier cover		7.0	70	62 in.-lbf

BRAKE

SERVICE DATA

SS062-07

Brake pedal height (from asphalt sheet)		150.0 – 160.0 mm (5.906 – 6.299 in.)
Brake pedal freeplay		0.2 – 2.0 mm (0.008 – 0.079 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)		More than 93 mm (3.66 in.)
Front brake pad thickness	STD	11.0 mm (0.433 in.)
Front brake pad thickness	Minimum	1.0 mm (0.039 in.)
Front brake disc thickness	STD	32.0 mm (1.260 in.)
Front brake disc thickness	Minimum	30.0 mm (1.181 in.)
Front brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake pad thickness	STD	10.5 mm (0.413 in.)
Rear brake pad thickness	Minimum	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	12.0 mm (0.472 in.)
Rear brake disc thickness	Minimum	10.5 mm (0.413 in.)
Rear brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake disc inside diameter	STD	190 mm (7.48 in.)
Rear brake disc inside diameter	Maximum	191 mm (7.52 in.)
Parking brake shoe lining thickness for rear disc brake	STD	2.5 mm (0.098 in.)
Parking brake shoe lining thickness for rear disc brake	Minimum	1.0 mm (0.039 in.)
Parking brake pedal travel at 294 N (30 kgf, 66.1 lbf)		7 – 9 clicks
Parking brake clearance between rear shoe and lever		Less than 0.35 mm (0.0138 in.)
Parking brake adjusting shim thickness for rear disc brake		0.3 mm (0.012 in.) 0.6 mm (0.024 in.) 0.9 mm (0.035 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Brake line union nut	15	155	11
Hydraulic brake booster clevis lock nut	25	260	19
Hydraulic brake booster x Pedal bracket	13	130	9
Bleeder plug	11	110	8
Parking brake pedal assembly x Body	13	130	9
Front brake caliper installation bolt	34	350	25
Front disc brake caliper x Flexible hose	30	310	22
Front disc brake torque plate x Steering knuckle	118	1,200	87
Rear disc brake caliper x Flexible hose	30	310	22
Rear disc brake caliper x Rear axle carrier	104	1,065	77
Reservoir set screw	1.7	17.5	15.2 in·lbf
Oil pressure sensor x Hydraulic brake booster	81	830	60
Accumulator x Booster pump motor	54	550	36
Front speed sensor installation bolt	8.0	82	71 in·lbf
Front speed sensor harness clamp bolt	5.0	51	44 in·lbf
Rear speed sensor installation bolt	8.0	82	71 in·lbf
Rear speed sensor harness x Body	5.5	56	49 in·lbf
Rear speed sensor harness x Toe control arm	5.0	51	44 in·lbf
Rear seatback x Body	18	185	13

STEERING

SERVICE DATA

SS0F3-01

POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed	Minimum	8,336 kPa (85 kgf/cm ² , 1,209 psi)
STEERING WHEEL		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering effort at idle speed	Maximum	7 N·m (70 kgf·cm, 61 in.-lbf)
PS VANE PUMP		
2JZ-GE Engine:		
Vane pump rotating torque	Maximum	0.25 N·m (2.5 kgf·cm, 2.2 in.-lbf)
Oil clearance between pump shaft and bushing	STD	0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Oil clearance between pump shaft and bushing	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.6 mm (0.339 in.)
Vane plate thickness	Minimum	1.40 mm (0.0551 in.)
Vane plate length	Minimum	14.99 mm (0.5902 in.)
Clearance between the rotor groove and plate	Maximum	0.033 mm (0.0013 in.)
Vane plate length	Pump rotor and cam ring mark	
	NONE	14.999 – 15.001 mm (0.59051 – 0.59059 in.)
	1	14.997 – 14.999 mm (0.59043 – 0.59051 in.)
	2	14.995 – 14.997 mm (0.59035 – 0.59043 in.)
	3	14.993 – 14.995 mm (0.59027 – 0.59035 in.)
	4	14.991 – 14.993 mm (0.59020 – 0.59027 in.)
Spring free length	Minimum	33.2 mm (1.307 in.)
1UZ-FE Engine:		
Vane pump rotating torque	Maximum	0.25 N·m (2.5 kgf·cm, 2.2 in.-lbf)
Oil clearance between pump shaft and bushing	STD	0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Oil clearance between pump shaft and bushing	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.0 mm (0.315 in.)
Vane plate thickness	Minimum	1.77 mm (0.0697 in.)
Vane plate length	Minimum	14.97 mm (0.5894 in.)
Clearance between the rotor groove and plate	Maximum	0.035 mm (0.0014 in.)
Vane plate length	Pump rotor and cam ring mark	
	NONE	14.996 – 14.998 mm (0.59039 – 0.59047 in.)
	1	14.994 – 14.996 mm (0.59032 – 0.59039 in.)
	2	14.992 – 14.994 mm (0.59024 – 0.59032 in.)
	3	14.990 – 14.992 mm (0.59016 – 0.59024 in.)
	4	14.988 – 14.990 mm (0.59008 – 0.59016 in.)
Spring free length	Minimum	36.0 mm (1.42 in.)
POWER STEERING GEAR		
Steering rack runout	Maximum	0.30 mm (0.0118 in.)
Total preload (Control valve rotating torque)		0.5 – 1.7 N·m (4.7 – 17.2 kgf·cm, 4.1 – 14.9 in.-lbf)
PROGRESSIVE POWER STEERING (PPS)		
PPS solenoid valve resistance		6 – 11 Ω

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
STEERING COLUMN			
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.·lbf
Steering wheel set nut	35	360	26
Intermediate shaft assembly x Control valve shaft	35	360	26
No.2 intermediate shaft assembly x Intermediate shaft assembly	35	360	26
Column assembly set nut	25	260	19
No.2 intermediate shaft assembly x Main shaft	35	360	26
Column tube support set bolt	20	204	15
Tilt slider assembly set bolt	23	230	17
POWER STEERING VANE PUMP			
2JZ-GE Engine:			
Union bolt	49	500	36
Pump assembly set bolt	58	590	43
Vane pump pulley set nut	43	440	32
Front housing x Rear housing	24	240	17
Oil reservoir set bolt	Front Rear	13	9
		24	17
Solenoid valve x Front housing		51 (69)	524 (700)
1UZ-FE Engine:			
Union bolt	49	500	36
Pump assembly set bolt	43	440	32
Pump assembly set nut	43	440	32
Vane pump pulley set nut	43	440	32
Front housing x Rear bracket	39	400	29
Suction port union set bolt	13	130	9
Air control valve	29	300	22
Solenoid valve x Front housing	51 (69)	524 (700)	38 (51)
POWER STEERING GEAR			
Intermediate shaft assembly x Control valve shaft	35	360	26
Pressure feed and return tube set union bolt	42	430	31
PS gear assembly set bolt	65	660	48
Tube clamp set bolt	5	55	48 in.·lbf
Turn pressure tube	20 (25)	203 (250)	15 (18)
Tie rod end Lock nut	55	560	41
Rack end x Steering rack	76 (103)	770 (1,050)	56 (76)
Rack guide spring cap lock nut	51 (69)	521 (700)	38 (51)
Rack guide spring cap	25	250	18
Control valve assembly set bolt	18	185	13
Bearing guide nut	25	250	18
Cylinder end stopper	59	600	43

(): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

SS0FC-03

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	35	360	26
Steering wheel pad	7.1	72	63 in·lbf
Front passenger airbag assembly x Instrument panel	5.6	57	49 in·lbf
Front passenger airbag assembly x Instrument panel reinforcement	20	205	15
Seatback assembly x Seat adjuster	61	622	45
Seat cushion assembly x Seat adjuster	19	194	14
Front seat x body	37	375	27
Front seat outer belt x Front seat	42	430	31
Airbag sensor assembly	20	200	14
Front airbag sensor	20	200	14
Side airbag sensor assembly	20	200	14

BODY ELECTRICAL

SERVICE DATA

SSOCN-02

DAYTIME RUNNING LIGHT RELAY (MAIN) (Wire Harness Side)	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON or START)	Battery positive voltage
5 – Ground (Engine Stop)	No voltage
5 – Ground (Engine Running)	Battery positive voltage
7 – Ground (Constant)	Battery positive voltage
9 – Ground (Constant)	Battery positive voltage
AUTOMATIC LIGHT CONTROL SENSOR	
(Connector disconnected)	
4 – Ground (Ignition switch position LOCK or ACC)	No voltage
4 – Ground (Ignition switch position ON)	5.2 – 9.0 V
(Connector connected)	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON)	9.5 V or more
HEADLIGHT BEAM LEVEL CONTROL ECU	
(Connector disconnected)	
A1 – A5 (Ignition switch position OFF)	26 – 30 Ω
A1 – A6 (Ignition switch position OFF)	26 – 30 Ω
A1 – A7 (Ignition switch position OFF)	26 – 30 Ω
A1 – A8 (Ignition switch position OFF)	26 – 30 Ω
A4 – B4 (Ignition switch position ON and light control switch HEAD)	Below 1.5 V
B1 – B3 (Ignition switch position OFF)	3.5 k – 6.5 k Ω
B5 – B7 (Ignition switch position OFF)	3.5 k – 6.5 k Ω
(Connector disconnected)	
B2 – B3 (Ignition switch position ON)	Approx. 2.5 V
B6 – B7 (Ignition switch position ON)	Approx. 2.5 V
B1 – B3 (Ignition switch position ON)	5V
B5 – B7 (Ignition switch position ON)	5V
TURN SIGNAL FLASHER	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON)	Battery positive voltage
4 – Ground (Constant)	Battery positive voltage
LIGHT FAILURE RELAY (Wire Harness Side)	
5 – Ground (Light control switch position OFF)	No voltage
5 – Ground (Light control switch position TAIL or HEAD)	Battery positive voltage
8 – Ground (Ignition switch position LOCK or ACC)	No voltage
8 – Ground (Ignition switch position ON)	Battery positive voltage
9 – Ground (Stop light switch position OFF)	No voltage
9 – Ground (Stop light switch position ON)	Battery positive voltage
10 – Ground (Stop light switch position OFF)	No voltage
10 – Ground (Stop light switch position ON)	Battery positive voltage
SPEEDOMETER (ON-VEHICLE)	
USA:	

2000 LEXUS GS300/GS400 (RM718U)

SERVICE SPECIFICATIONS – BODY ELECTRICAL

Standard indication (mph)	Allowable range (mph)
20	18 – 24
40	38 – 44
60	56 – 66
80	78 – 88
100	98 – 110
120	118 – 132
CANADA:	
Standard indication (km/h)	Allowable range (km/h)
20	17 – 24
40	38 – 46
60	57.5 – 67
80	77 – 88
100	96 – 109
120	115 – 130
160	134 – 151.5
Speedometer	Resistance (Ω)
A – B	140 – 185 Ω
C – D	130 – 175 Ω
TACHOMETER (ON-VEHICLE)/ DC 13.5 V 25 °C at (77 °F)	
Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,750 – 6,250
7,000	6,700 – 7,300
Tachometer	Resistance (Ω)
A – B	140 – 185 Ω
C – D	130 – 175 Ω
FUEL RECEIVER GAUGE	Resistance (Ω)
A – B	140 – 185 Ω
C – D	130 – 175 Ω
FUEL MAIN SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 34.6 (1.36) \pm 3 (0.12)	Approx. 2.0 \pm 1.0
1/2: Approx. 52.4 (2.06) \pm 3 (0.12)	Approx. 26.1 \pm 3.0
E: Approx. 134.9 (5.31) \pm 3 (0.12)	Approx. 48.7 \pm 1.0
FUEL SUB SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 9.5 (0.37) \pm 3 (0.12)	Approx. 2.0 \pm 1.0
1/2: Approx. 110.5 (4.35) \pm 3 (0.12)	Approx. 33.0 \pm 3.0
E: Approx. 206.5 (8.13) \pm 3 (0.12)	Approx. 61.3 \pm 1.0
ENGINE COOLANT TEMPERATURE RECEIVER GAUGE (Resistance)	Resistance (Ω)

2000 LEXUS GS300/GS400 (RM718U)

A – B	140 – 185 Ω
C – D	130 – 175 Ω
ENGINE COOLANT TEMPERATURE SENDER GAUGE (Resistance)	
Temperature °C (°F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2
DEFOGGER SWITCH (wire harness side)	
A2 – Ground (Ignition switch position LOCK or ACC)	No voltage
A2 – Ground (Ignition switch position ON)	Battery positive voltage
WIRELESS DOOR LOCK CONTROL RECEIVER	
(Connector disconnected)	
7 – Ground (Constant)	Battery positive voltage
(Connector connected)	
3 – Ground (Ignition switch position OFF, Key removed, Transmitter OFF → ON)	4.5 – 5.5 V → below 1 V
3 – Ground (Ignition switch position OFF, Key removed, Transmitter OFF → ON)	4.5 – 5.5 V → below 1 V
4 – Ground (Ignition switch position OFF, Key removed, Transmitter OFF)	10 – 14 V
CD AUTO CHANGER	
(Except Nakamichi made)	
5 – Ground (Constant)	Battery positive voltage
12 – Ground (Ignition switch position LOCK)	No voltage
12 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
POWER AMPLIFIER	
(Except Nakamichi made)	
B4 – Ground (Constant)	Battery positive voltage
C12 – Ground (Ignition switch position LOCK)	No voltage
C12 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
RADIO RECEIVER	
(Except Nakamichi made)	
A4 – Ground (Constant)	Battery positive voltage
A1 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
A1 – Ground (Ignition switch position LOCK)	No voltage
CD AUTO CHANGER	
(Nakamichi made)	
5 – Ground (Constant)	Battery positive voltage
4 – Ground (Ignition switch position LOCK)	No voltage
4 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
POWER AMPLIFIER	
(Nakamichi made)	
A2 – Ground (Constant)	Battery positive voltage
A5 – Ground (Constant)	Battery positive voltage
A6 – Ground (Ignition switch position OFF)	Battery positive voltage
A6 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
RADIO RECEIVER	

SERVICE SPECIFICATIONS – BODY ELECTRICAL

(Nakamichi made)	
D1 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
D1 – Ground (Ignition switch position LOCK)	No voltage
D4 – Ground (Constant)	Battery positive voltage

BODY

TORQUE SPECIFICATION

SSOFF-03

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER	–	–	–
Front bumper cover x Body	5.4	55	48 in·lbf
Reinforcement x Body	29	300	22
REAR BUMPER	–	–	–
Reinforcement x Body	28	290	21
HOOD	–	–	–
Hood support x Hood	22	225	16
Hood x Hood hinge	26	265	19
Radiator support upper seal x Door lock	8.0	82	71
Hood lock nut x Hood lock	8.0	82	71
FRONT DOOR	–	–	–
Outside handle x Door panel	5.5	56	49 in·lbf
Door lock striker x Door panel	23	235	17
Door hinge x Body	32.5	331	24
Door hinge x Door panel	32.5	331	24
Window regulator x Door panel	11	112	8
Door lock x Door panel	5.5	56	49 in·lbf
REAR DOOR	–	–	–
Outside handle x Door panel	5.5	56	49 in·lbf
Door hinge x Door panel	32.5	331	24
Door hinge x Body	32.5	331	24
Window regulator x Door panel	5.4	55	48 in·lbf
Door lock x Door panel	5.4	55	48 in·lbf
OUTSIDE REAR VIEW MIRROR	–	–	–
Outside rear view mirror x Door panel	5.4	55	48 in·lbf
LUGGAGE COMPARTMENT DOOR AND HINGE	–	–	–
Door hinge x Door panel	8.0	82	71 in·lbf
Door lock striker x Body	5.5	56	49 in·lbf
Door hinge x Body	12.5	127	9
FUEL LID	–	–	–
Lock retainer x Opening lid	5.5	56	49 in·lbf
Fuel lid lock assembly x Body	Luggage side nut: 5.5	56	49 in·lbf
	Fuel lid side nut: 8.0	82	71 in·lbf
FRONT WIPER AND WASHER	–	–	–
Wiper arm x Wiper link	22	220	16
Wiper link x Body	5.4	55	48 in·lbf
SLIDING ROOF	–	–	–
Drive rail x Bracket	5.5	56	49 in·lbf
Sliding roof housing x Body	5.5	56	49 in·lbf
Drive rail x Bracket	8.0	82	71 in·lbf
Bracket x Body	8.0	82	71 in·lbf
Sliding roof glass x Drive gear	5.5	56	49 in·lbf

SERVICE SPECIFICATIONS – BODY

INSTRUMENT PANEL	—	—	—
Steering wheel nut	35	360	26
Front passenger airbag assembly x reinforcement	5.6	57	50 in.·lbf
FRONT SEAT	—	—	—
Side airbag assembly x Seatback frame	5.4	55	48 in.·lbf
Seat x Body	37	375	27
Seatback x Seat adjuster	61	622	45
Seat cushion x Seat adjuster	19	194	14
REAR SEAT	—	—	—
Seatback x Body	18	185	13
SEAT BELT	—	—	—
Front Seat Belt:	—	—	—
Adjustable anchor x Body	42	430	31
Shoulder anchor x Adjustable anchor	42	430	31
Outer belt x Front seat	42	430	31
Retractor x Body	Upper Bolt:	7.5	76
	Lower Bolt:	42	430
Inner belt x Seat	42	430	31
Rear Seat Belt:	—	—	—
Floor anchor x Body	42	430	31
Inner belt x Body	42	430	31
Retractor x Body	42	430	31
Tether anchor x Body	20	204	14

AIR CONDITIONING

SERVICE DATA

SS0F5-01

Refrigerant volume		600 ± 50 g (21.16 ± 1.76 oz.)
Idle-up Speed (GS300)	Magnetic clutch not engaged	700 ± 50 rpm
	Magnetic clutch engaged	800 ± 50 rpm
Idle-up Speed (GS400)	Magnetic clutch not engaged	750 ± 50 rpm
	Magnetic clutch engaged	800 ± 50 rpm
Magnetic clutch clearance		0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Compressor x Engine (GS300)	Bolt Nut	52	38
		26	19
Compressor x Engine (GS400)	49	500	36
PS pump x Engine (GS300)	58	590	43
PS pump bracket x Engine (GS300)	52	530	38
Compressor bracket x PS pump bracket	52	530	38
Stay x Engine (GS400)	29	300	22
Pressure plate x Compressor	13.2	135	9
A/C unit x Liquid and suction tube	10	100	7
Evaporator x Tube and accessory	4.1	42	36 in.·lbf
Expansion valve x Tube and accessory	4.1	42	36 in.·lbf
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	10	100	7
Pressure switch x Liquid tube	10	100	7
ECT switch x Radiator	7.4	75	65 in.·lbf
Suction line	10	100	7

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
No.3 timing belt cover x Cylinder head	8.0	80	71 in.·lbf
Intake air connector x Air intake chamber	28	280	21
Throttle body bracket x Cylinder head	21	210	15
Timing belt plate x Oil pump	8.0	80	71 in.·lbf
Idle pulley x Oil pump	35	350	26
No.1 timing belt cover x Oil pump	8.0	80	71 in.·lbf
Camshaft timing pulley x Camshaft	81	810	60
Straight screw plug x Camshaft timing pulley	15	150	11
No.1 oil pipe x No.3 camshaft bearing cap	55	550	41
Cylinder head cover x Cylinder head	8.5	85	75 in.·lbf
High-tension cord x Cylinder head cover	8.0	80	71 in.·lbf
Timing belt tensioner x Oil pump	27	270	20
Crankshaft pulley x Crankshaft	330	3,300	243
Drive belt tensioner x Cylinder head	21	210	15
No.2 timing belt cover x Cylinder head	8.0	80	71 in.·lbf
PS pump front bracket x PS vane pump	58	590	43
PS pump front bracket x Cylinder block	52	530	38
Camshaft bearing cap x Cylinder head	20	200	14
ECT sensor x Cylinder head	19.6	200	14
Engine hanger x Cylinder head	40	400	30
Water outlet x Cylinder head	28	280	21
Cylinder head x Cylinder head	1st 35 2nd Turn 90° 3rd Turn 90°	350 Turn 90° Turn 90°	26 Turn 90° Turn 90°
No.3 camshaft bearing cap x Cylinder head Hexagon bolt	5.0	50	44 in.·lbf
No.4 timing belt cover x Cylinder head	8.0	80	71 in.·lbf
Cylinder head cover x Cylinder head	8.5	85	75 in.·lbf
Intake manifold x Cylinder head	28	280	21
Manifold stay x Intake manifold	40	400	30
Manifold stay x Cylinder block	40	400	30
Vacuum control valve set x Intake manifold	21	210	15
Exhaust manifold x Cylinder head	40	408	30
Front exhaust pipe x Exhaust manifold	44	440	32
Pipe support bracket x Transmission	44	440	32
PS vane pump x Cylinder block	57.9	590	43
PS vane pump x A/C compressor	57.9	590	43
PS pump rear stay x PS pump bracket	39.2	400	29
PS pump rear stay x Manifold stay	39.2	400	30
Engine hanger x Cylinder head	40	400	30
Rear support member x Body	25.5	260	19
Drive plate x Crankshaft	83	850	61
Transmission x Cylinder block	72	730	53
Starter x Transmission	37	380	27
No.1 oil pan x Transmission	37	380	27

2000 LEXUS GS300/GS400 (RM718U)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL (2JZ-GE)

Part tightened		N-m	kgf-cm	ft-lbf
Drive plate x Torque converter clutch		48	490	35
Rear support member x Engine rear mounting insulator		13.5	135	10
Front suspension crossmember x Engine mounting insulator		70	714	52
PS gear housing x Front suspension member		65	660	48
Sliding yoke x Steering intermediate shaft		35	360	26
Transmission control rod x Shift lever		13	130	9
Transmission control rod x Transmission		13	130	9
A/C compressor x Cylinder block	Stud bolt	26	265	19
	Bolt and nut	52	530	38
Fuel inlet hose x Fuel pipe support		29	300	22
Front suspension member brace x Front suspension member		58	590	43
Front suspension member brace x Strut bar bracket plate		58	590	43
Connecting rod cap x Connecting rod	1st	30	300	22
	2nd	Turn 90°	Turn 90°	Turn 90°
Main bearing cap x Cylinder block	1st	45	450	33
	2nd	Turn 90°	Turn 90°	Turn 90°
Rear oil seal retainer x Cylinder block		6.0	60	53
Engine mounting bracket x Cylinder block		59	590	44
Fuel inlet pipe x Cylinder block		29	290	21
No.1 oil pipe x Cylinder block		55	550	41
Oil filter bracket x Cylinder block		90	900	66
No.2 water bypass pipe x Water pump		21	210	15
No.2 water bypass pipe x Cylinder block		21	210	15
Generator x Water pump		40	400	30
Generator x Cylinder block		40	400	30
Front exhaust pipe x Center exhaust pipe		44	440	32
Center exhaust pipe x Tailpipe		44	440	32
Heated oxygen sensor x Front exhaust pipe		45	450	33

SFI SYSTEM PRECAUTION

SF0N1-03

1. BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY

HINT:

Any diagnostic trouble code retained by the ECM will be erased when the battery negative (–) terminal cable is removed from the battery.

Therefore, if necessary, read the diagnostic trouble code(s) before removing the negative (–) terminal cable from the battery.

2. DO NOT SMOKE OR WORK NEAR AN OPEN FLAME WHEN WORKING ON FUEL SYSTEM

3. KEEP GASOLINE AWAY FROM RUBBER OR LEATHER PARTS

4. MAINTENANCE PRECAUTIONS

- (a) Precaution when the connecting gauge.
Use battery as the power source for the timing light, etc.
- (b) In the event of engine misfire, these precautions should be taken.
 - (1) Check proper connection of battery terminals, etc.
 - (2) Handle high-tension cords carefully.
 - (3) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
 - (4) When cleaning the engine compartment, be especially careful to protect the electrical system from water.
- (c) Precautions when the handling heated oxygen sensors.
 - (1) Do not allow oxygen sensor to drop or hit against an object.
 - (2) Do not allow the sensor to come into contact with water.

5. IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

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

6. AIR INDUCTION SYSTEM

- (a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.
- (b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will cause air suction and cause the engine to run out of tune.

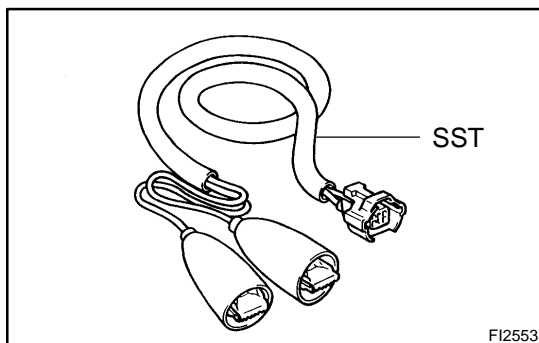
7. ELECTRONIC CONTROL SYSTEM

- (a) Before removing SFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF or disconnecting the negative (–) terminal cable from the battery.

HINT:

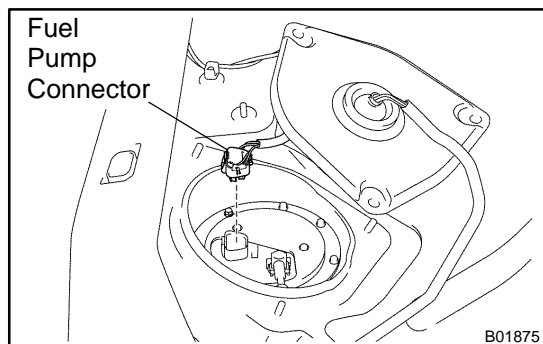
Always check the diagnostic trouble code before disconnecting the negative (–) terminal cable from the battery.

- (b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cable terminals.
- (c) Do not permit parts to receive a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.
- (d) Do not be careless during troubleshooting as there are numerous transistor circuits and even slight terminal contact can further troubles.
- (e) Do not open the ECM cover.
- (f) When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the SFI parts and wiring connectors.
- (g) Parts should be replaced as an assembly.
- (h) Care is required when pulling out and inserting wiring connectors.
 - (1) Release the lock and pull out the connector, pulling on the connectors.
 - (2) Fully insert the connector and check that it is locked.
- (i) When inspecting a connector with a volt/ohmmeter.
 - (1) Carefully take out the water-proofing rubber if it is a water-proof type connector.
 - (2) Insert the test probe into the connector from wiring side when checking the continuity, amperage or voltage.
 - (3) Do not apply unnecessary force to the terminal.
 - (4) After checking, install the water-proofing rubber on the connector securely.



- (5) Use SST for inspection or test of the injector or its wiring connector.

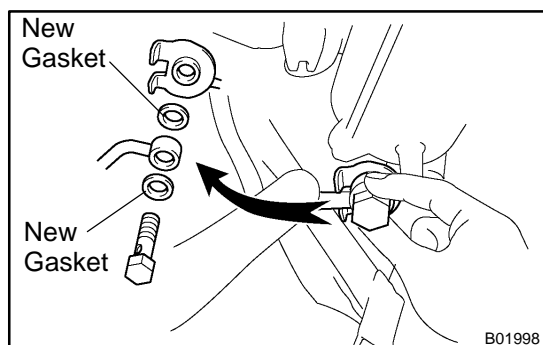
SST 09842–30070



8. FUEL SYSTEM

- (a) When disconnecting the high pressure fuel line, a large amount of gasoline will spill out, so observe these procedures:

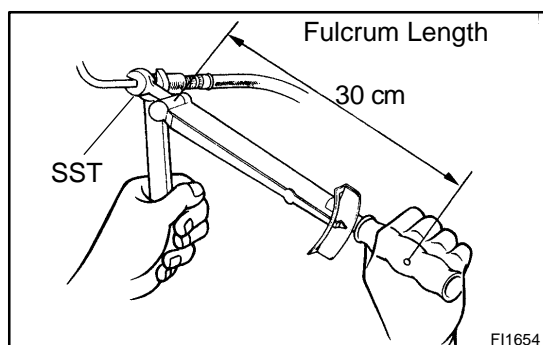
- (1) Disconnect the fuel pump connector.
- (2) Start the engine. After the engine has stopped on its own, turn the ignition switch OFF.
- (3) Put a container under the connection.
- (4) Slowly loosen the connection.
- (5) Disconnect the connection.
- (6) Plug the connection with a rubber plug.
- (7) Reconnect the fuel pump connector.



- (b) When connecting the flare nut or union bolt on the high pressure pipe union, observe these procedures:

- (1) Union Bolt Type:
Always use a new gasket.
- (2) Union Bolt Type:
Tighten the union bolt by hand.
- (3) Union Bolt Type:
Tighten the union bolt to the specified torque.

Torque: 29 N·m (300 kgf-cm, 22 ft-lbf)



- (4) Flare Nut Type:
Apply a light coat of engine oil to the flare and tighten the flare nut by hand.
- (5) Flare Nut Type:
Using SST, tighten the flare nut to the specified torque.

SST 09631-22020

NOTICE:

Do not rotate the fuel pipe, when tightening the flare nut.

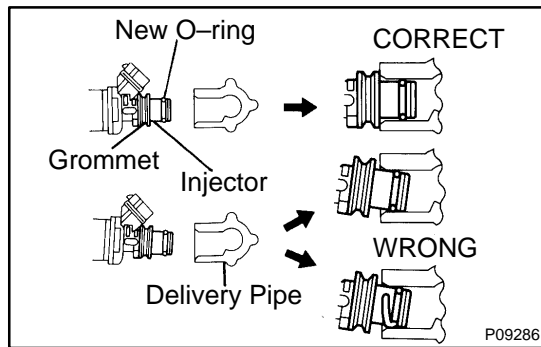
Torque:

30 N·m (310 kgf-cm, 22 ft-lbf) for using SST

38 N·m (387 kgf-cm, 28 ft-lbf)

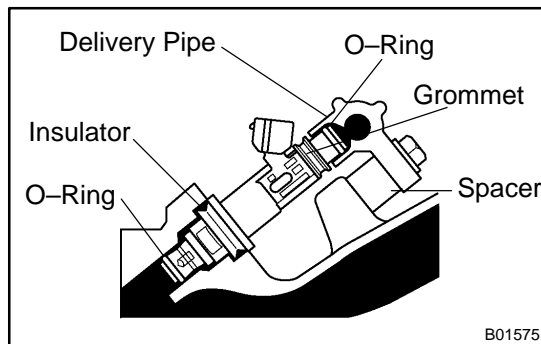
HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



- (c) Observe these precautions when removing and installing the injectors.

- (1) Never reuse the O-ring.
- (2) When placing a new O-ring on the injector, take care not to damage it in any way.
- (3) Coat a new O-ring with spindle oil or gasoline before installing—never use engine, gear or brake oil.

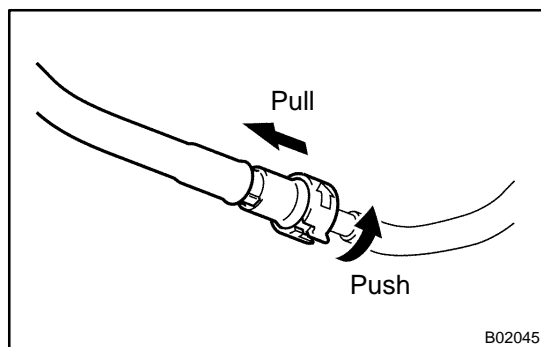


- (d) Install the injector to the delivery pipe and intake manifold as shown in the illustration.

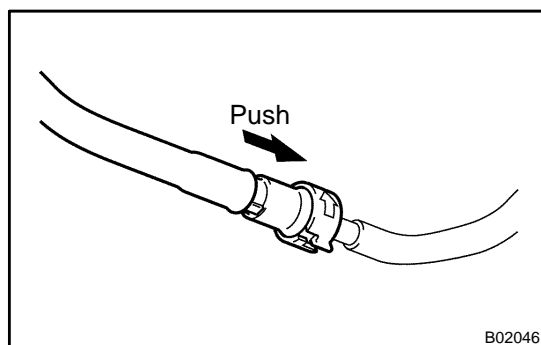
Before installing the injector, must apply spindle oil or gasoline on the place where a delivery pipe or an intake manifold touches an O-ring of the injector.

- (e) Observe these precautions when disconnecting the fuel tube connector (quick type):

- (1) Check if there is any dirt like mud on the pipe and around the connector before disconnecting them and clean the dirt away.
- (2) Be sure to disconnect with hands.

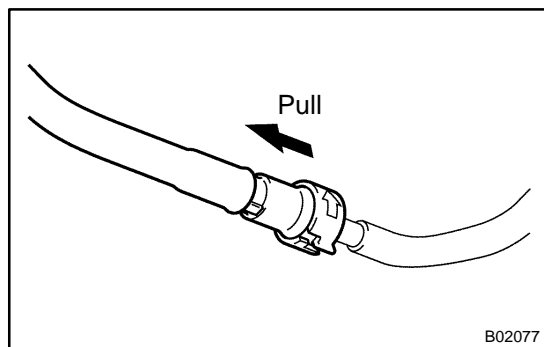


- (3) When the connector and the pipe are stuck, push and pull the connector to free to disconnect and pull it out. Do not use any tool at this time.
- (4) Inspect if there is any dirt or the likes on the seal surface of the disconnected pipe and clean it away.
- (5) Prevent the disconnected pipe and connector from damaging and mixing foreign objects by covering them with a vinyl bag.

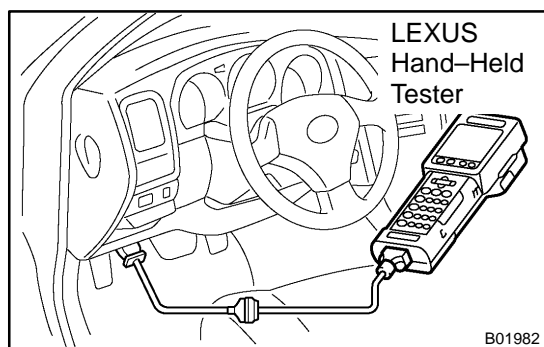


- (f) Observe these precautions when connecting the fuel tube connector (quick type):

- (1) Check if there is any damage or foreign objects on the connected part of the pipe.
- (2) Match the axis of the connector with axis of the pipe, and push in the connector until the connector makes a "click" sound. In case the connections is tight, apply little amount of new engine oil on the tip of the pipe.



- (3) After having finished the connection, check if the pipe and the connector are securely connected by pulling them.
- (4) Check if there is any fuel leakage.
- (g) Observe these precautions when handling nylon tube.
 - (1) Pay attention not to turn the connected part of the nylon tube and quick connector with force when connecting them.
 - (2) Pay attention not to kink the nylon tube.
 - (3) Do not remove the EPDM protector on the outside of the nylon tube.
 - (4) Must not close the piping with the nylon tube by bending it.



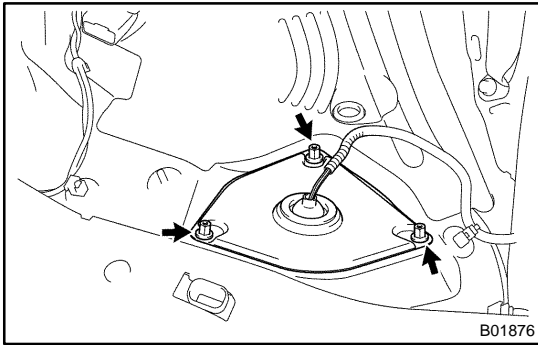
- (h) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
 - (1) Connect a LEXUS hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON and push the LEXUS hand-held tester main switch ON.

NOTICE:**Do not start the engine.**

- (3) Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- (4) Please refer to the LEXUS hand-held tester operator's manual for further details.
- (5) If you have no LEXUS hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector.
(See page [SF-6](#))
- (6) Check that there are no leaks from any part of the fuel system.
- (7) Turn the ignition switch OFF.
- (8) Disconnect the LEXUS hand-held tester from the DLC3.
- (9) Start the engine.

NOTICE:**Keep cranking the engine until the air is removed from the fuel line.**

- (10) After the engine starts, check again that there are no fuel leaks.



REMOVAL

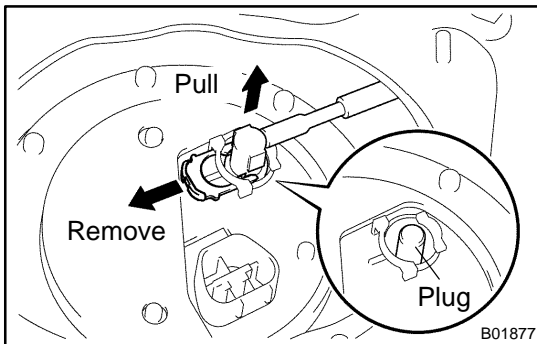
CAUTION:

Do not smoke or work near an open flame when working the fuel pump.

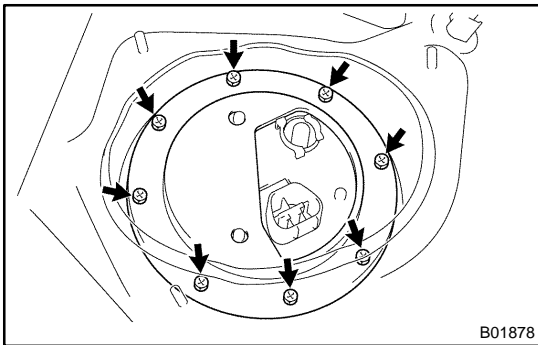
1. REMOVE REAR SEAT CUSHION
2. REMOVE FLOOR SERVICE HOLE COVER
Remove the 3 cap nuts and service hole cover.
3. DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR
4. DISCONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) FROM FUEL SECTION PLATE

CAUTION:

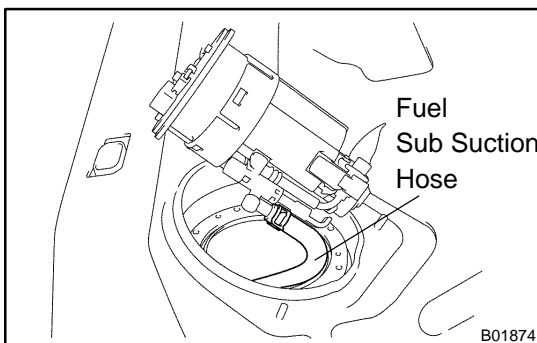
- Perform disconnecting operation of the fuel tube connector (quick type) after observing precaution. (See page [SF-1](#))
- As there is retained pressure in the fuel line, prevent it from splashing inside the vehicle compartment.



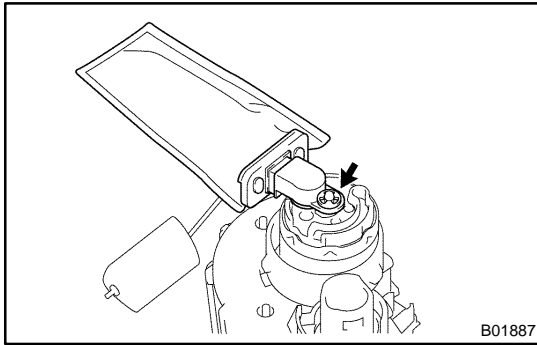
- (a) Remove the tube joint clip.
- (b) Pull out the fuel main tube.
- (c) Plug the port of the fuel suction plate with a clean rubber cap.



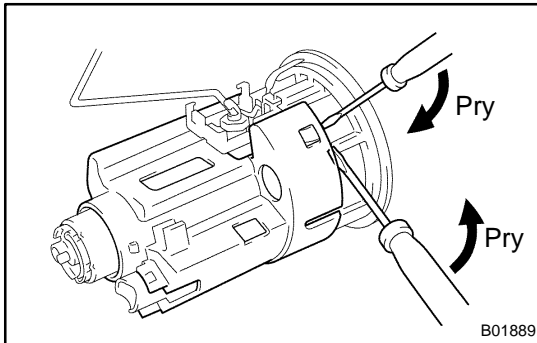
5. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK
 - (a) Remove the 8 bolts and fuel tank vent tube set plate.



- (b) Lift up the fuel pump and sender gauge assembly, and disconnect the fuel sub suction hose from the fuel return jet tube and remove the fuel pump, sender gauge assembly and gasket.
6. REMOVE NO.2 FUEL SUCTION SUPPORT
(See page [SF-17](#))
7. REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY (See page [SF-17](#))

**8. REMOVE FUEL SUCTION FILTER**

- (a) Remove the clip.
- (b) Pull out the suction filter.

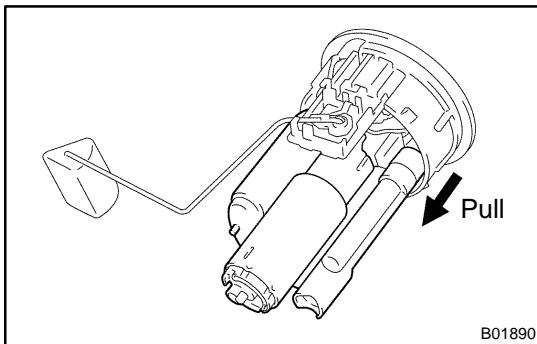
**9. REMOVE NO.1 FUEL SUCTION SUPPORT**

- (a) Using 2 screwdrivers, disconnect the 4 snap claws from the claw holes and remove the fuel suction support.

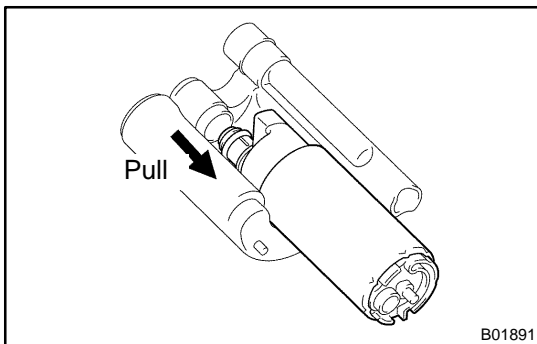
NOTICE:

Be careful not to damage the suction support and suction plate.

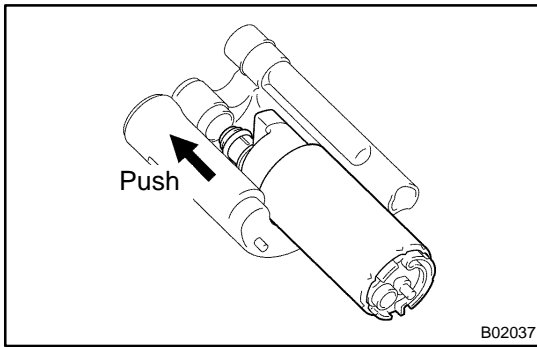
- (b) Remove the No.2 fuel filter cushion.

**10. REMOVE FUEL FILTER AND FUEL PUMP ASSEMBLY**

- (a) Disconnect the fuel pump connector from the fuel pump.
- (b) Pull out the fuel filter and fuel pump assembly.
- (c) Remove the No.1 fuel filter cushion.
- (d) Remove the O-ring from the fuel poet of the fuel suction plate.

**11. REMOVE FUEL PUMP FROM FUEL FILTER**

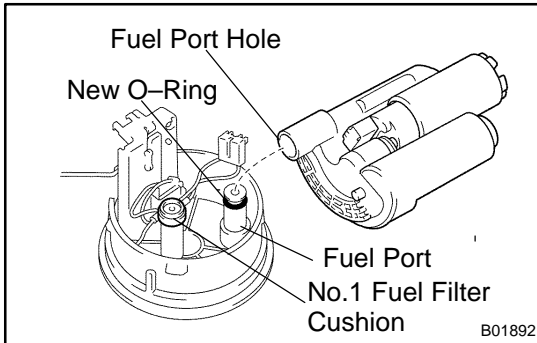
Pull out the fuel pump.



INSTALLATION

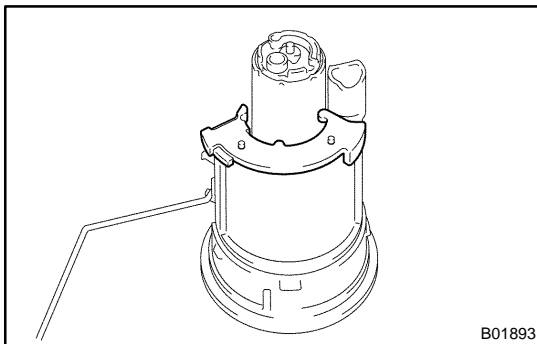
1. INSTALL FUEL PUMP TO FUEL FILTER

Push in the fuel pump.



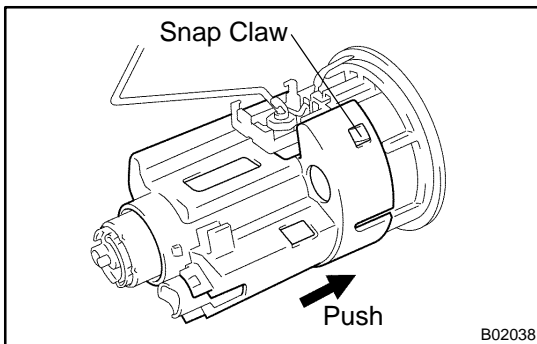
2. INSTALL FUEL FILTER AND FUEL PUMP ASSEMBLY

- Install the No.1 fuel filter cushion to the fuel suction plate.
- Apply a light coat of gasoline to a new O-ring and install it to the fuel port of the fuel suction plate.
- Align the fuel port of the fuel suction plate with the fuel port hole of the fuel filter.
- Push in the fuel filter.
- Connect the fuel pump connector.

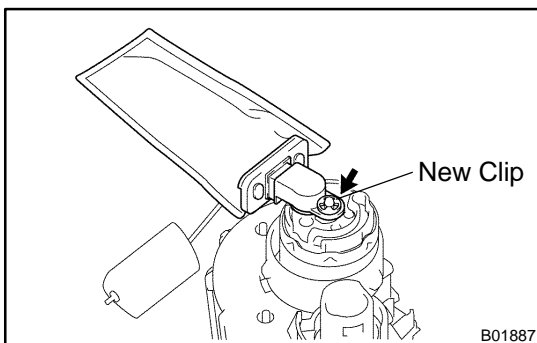


3. INSTALL NO.1 FUEL SUCTION SUPPORT

- Install the No.2 fuel filter cushion to the fuel filter.



- Push the fuel suction support, and attach the 4 snap claws to the claw holes.

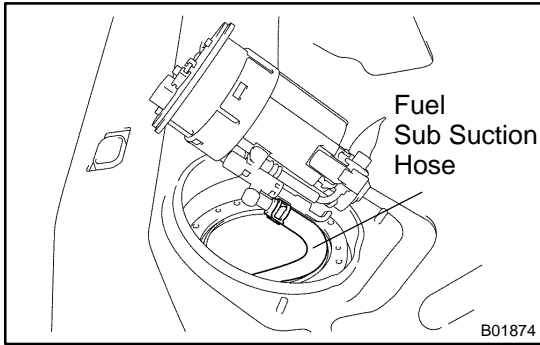


4. INSTALL FUEL SUCTION FILTER

Install the suction filter with a new clip.

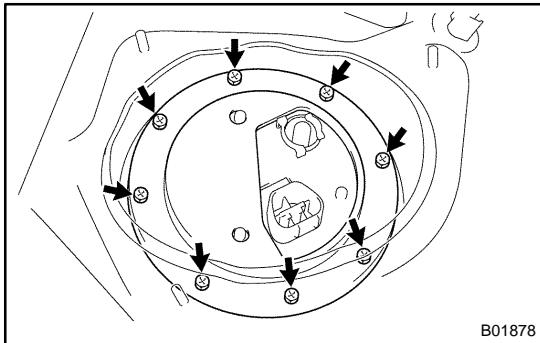
5. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY (See page [SF-18](#))

6. INSTALL NO.2 FUEL SUCTION SUPPORT (See page [SF-18](#))

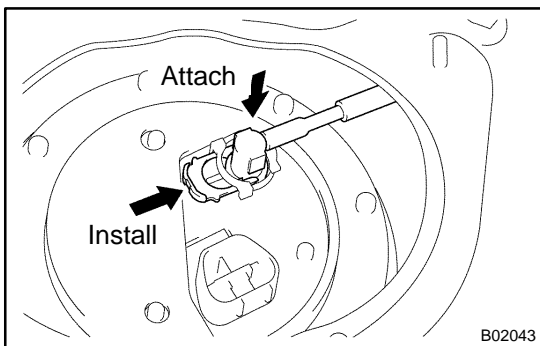


7. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK

- (a) Install a new gasket to the fuel suction plate.
- (b) Connect the fuel sub suction hose to the fuel return jet tube.
- (c) Attach the fuel pump and sender gauge assembly to the fuel tank.



- (d) Install the fuel tank vent tube set plate with the 8 bolts.
Torque: 3.5 N·m (36 kgf·cm, 31 in.-lbf)

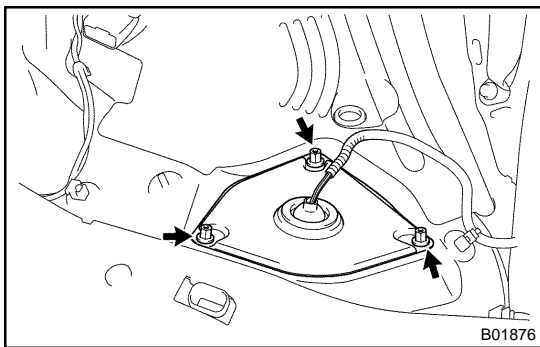


8. CONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) TO FUEL SUCTION PLATE

- (a) Attach the fuel tube connector to the port of the fuel suction plate.
- (b) Install the tube joint clip.

9. CONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

10. CHECK FOR FUEL LEAKS (See page [SF-1](#))



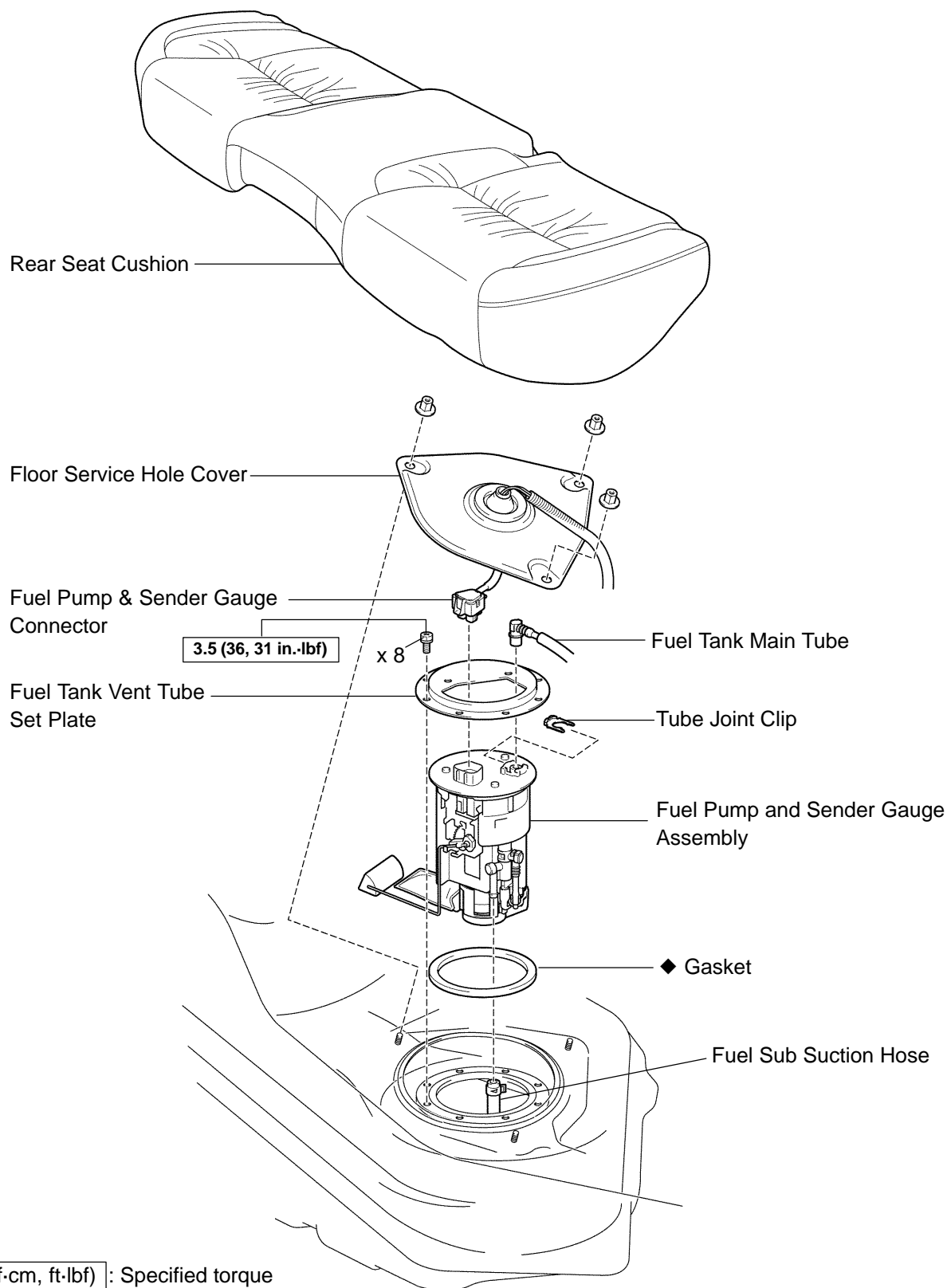
11. INSTALL FLOOR SERVICE HOLE COVER

Install the service hole cover with the 3 cap nuts.

12. INSTALL REAR SEAT CUSHION

FUEL PRESSURE REGULATOR COMPONENTS

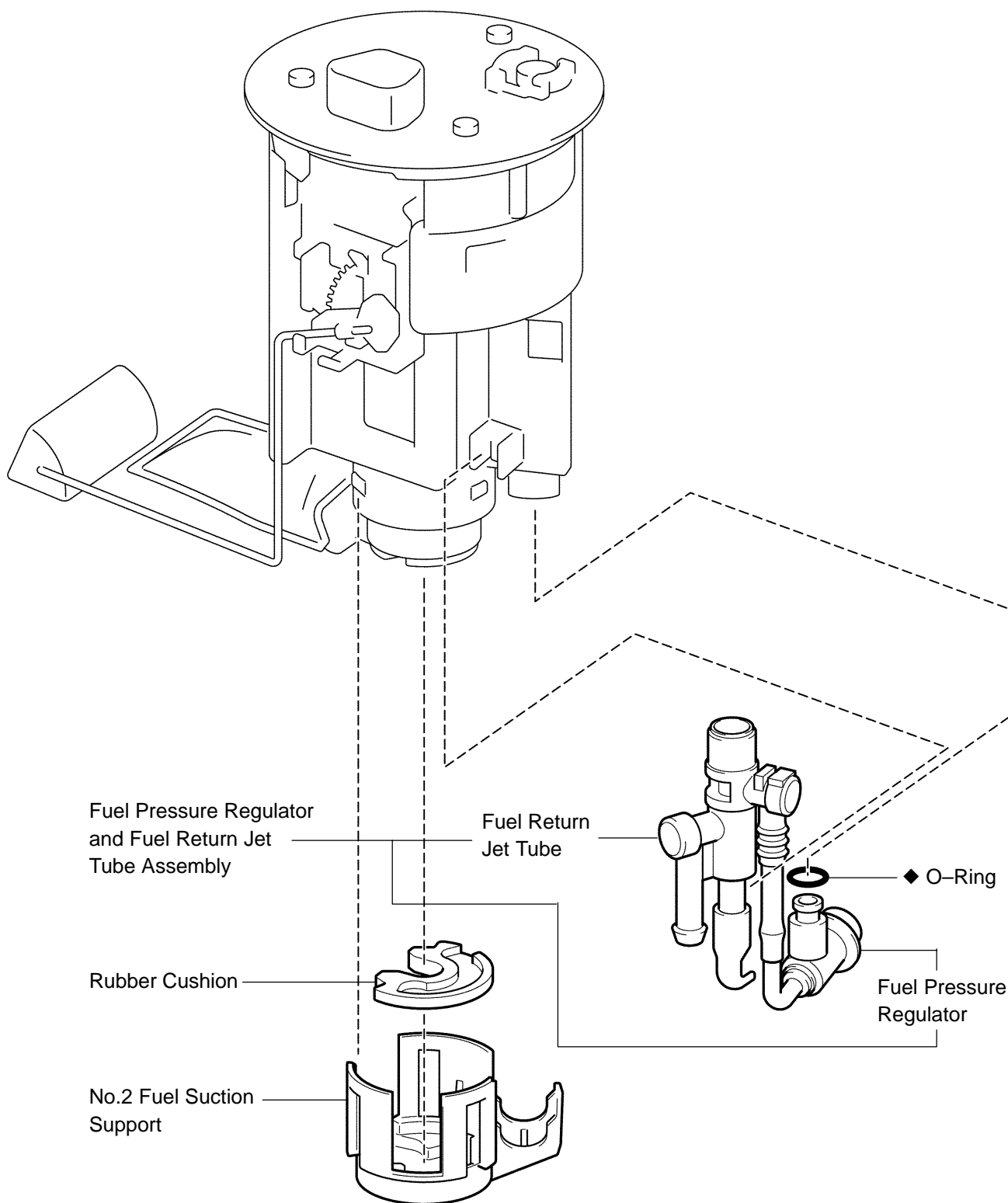
SF0N6-01



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

◆ Non-reusable part

B01873

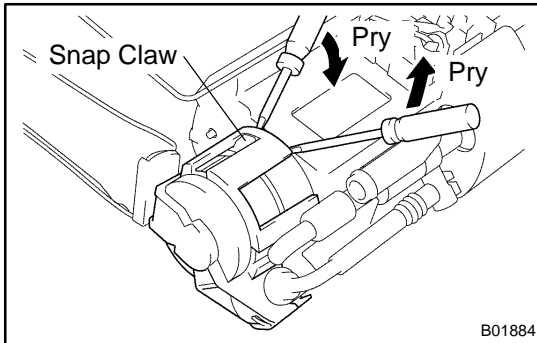


◆ Non-reusable part

B01883

REMOVAL

1. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK (See page [SF-11](#))



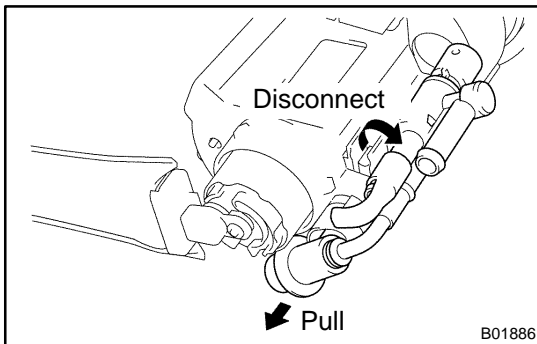
2. REMOVE NO.2 FUEL SUCTION SUPPORT

- (a) Using 2 screwdrivers, disconnect the 4 snap claws from the claw holes and remove the fuel suction support.

NOTICE:

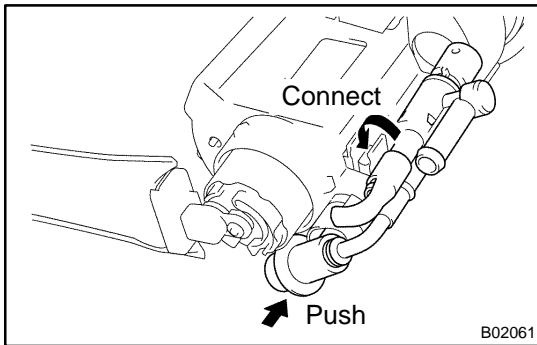
Be careful not to damage the suction supports.

- (b) Remove the rubber cushion.



3. REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

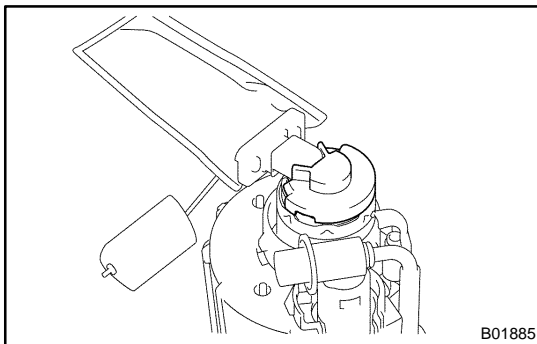
- (a) Disconnect the fuel return jet tube from the clamp of the No.2 fuel suction support.
- (b) Pull out the fuel pressure regulator from the fuel filter, and remove the fuel pressure regulator and fuel return jet tube assembly.
- (c) Remove the O-ring from the fuel pressure regulator.



INSTALLATION

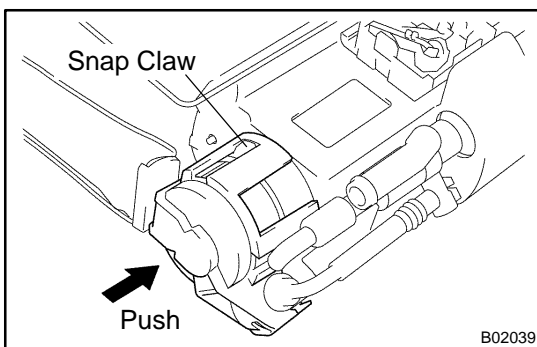
1. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

- (a) Apply a light coat of gasoline to a new O-ring, and install it to the fuel pressure regulator.
- (b) Push in the fuel pressure regulator to the fuel filter.
- (c) Check that the fuel pressure regulator rotates smoothly. If it does not rotate smoothly, the O-ring may be pinched, so remove the fuel pressure regulator and perform again steps (b) and (c) above.
- (d) Connect the fuel return jet tube to the clamp of the No.2 fuel suction support.



2. INSTALL NO.2 FUEL SUCTION SUPPORT

- (a) Install the rubber cushion to the fuel pump.



- (b) Push the fuel suction support, and attach the 4 snap claws to the claw holes.
- ### 3. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK (See page [SF-13](#))

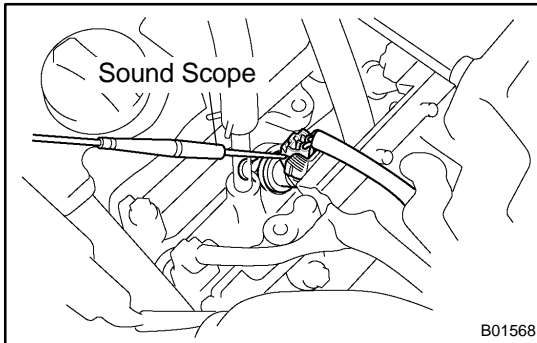
INJECTOR

ON-VEHICLE INSPECTION

SF0N9-04

1. REMOVE ENGINE COVER

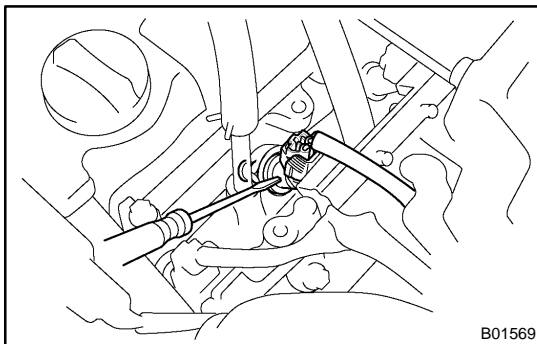
Remove 4 nuts and engine cover.



2. INSPECT INJECTOR OPERATION

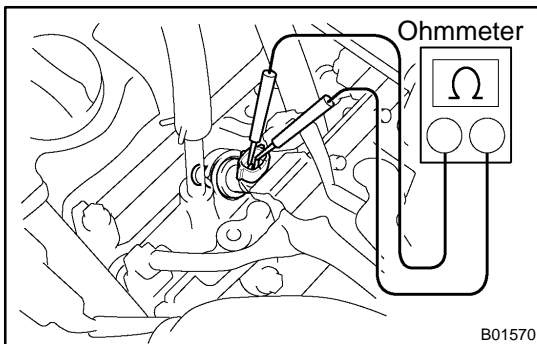
Check operation sound from each injector.

- (1) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine speed.



- (2) If you have no sound scope, you can check the injector transmission operation with a screwdriver.

If no sound or an unusual sound is heard, check the wiring connector, injector or injection signal from the ECM.



3. INSPECT INJECTOR RESISTANCE

- (a) Disconnect the injector connectors.
- (b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 13.4 – 14.2 Ω at 20°C (68°F)

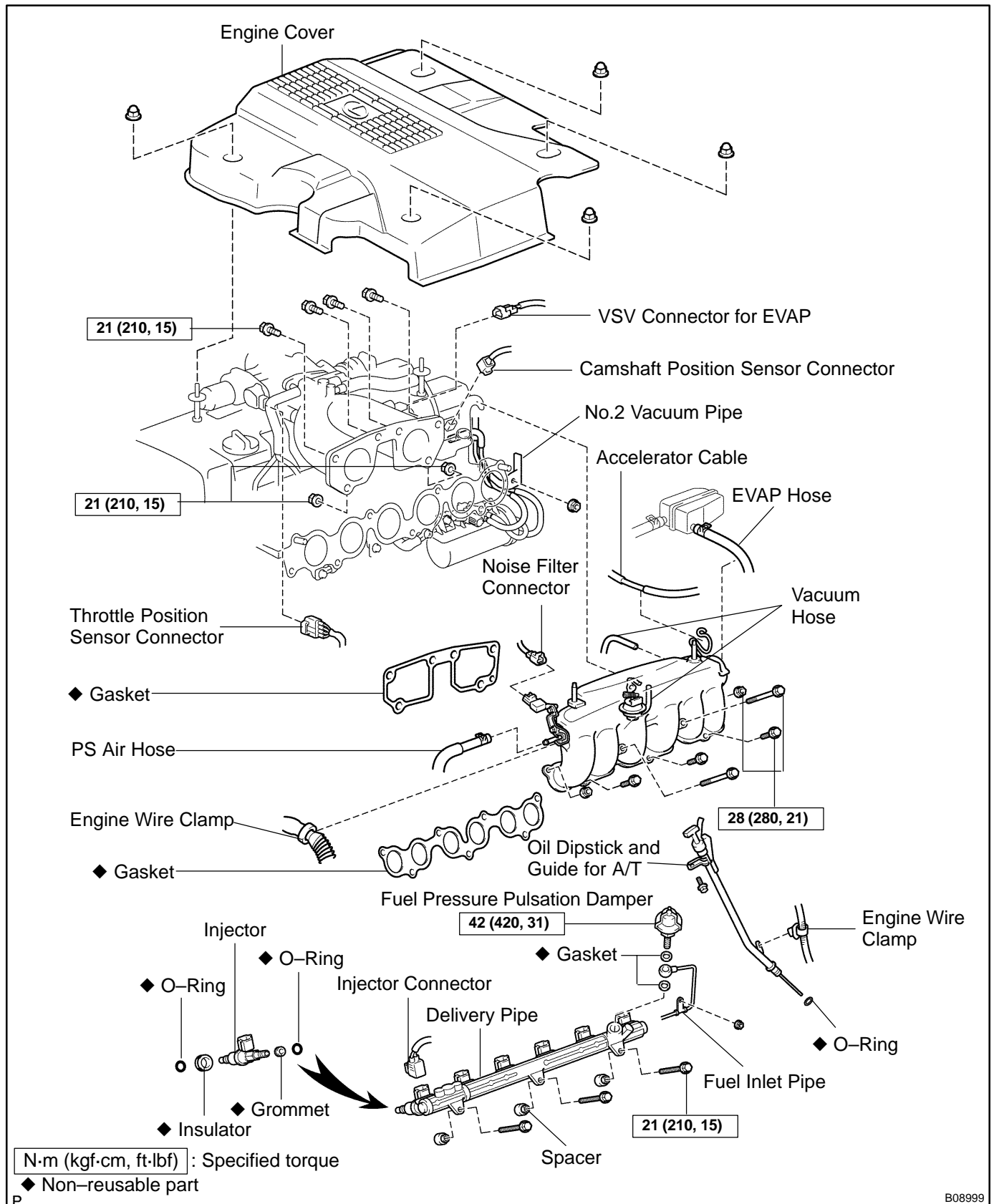
If the resistance is not as specified, replace the injector.

- (c) Reconnect the injector connectors.

4. REINSTALL ENGINE COVER

Reinstall the 4 engine cover with the 4 nuts.

COMPONENTS



REMOVAL

1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

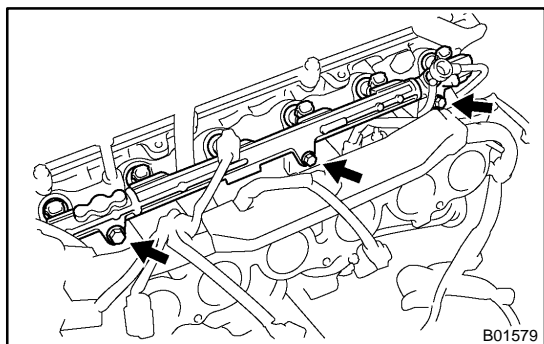
2. REMOVE AIR INTAKE CHAMBER (See page [SF-46](#))

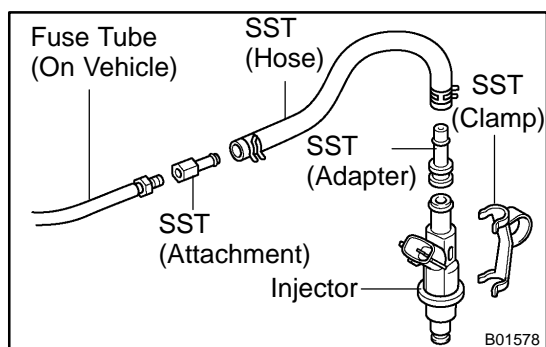
3. REMOVE FUEL PRESSURE PULSATION DAMPER (See page [SF-26](#))

4. REMOVE DELIVERY PIPE AND INJECTORS

NOTICE:

- Be careful not to drop the injectors when removing the delivery pipe.
 - Pay attention to put any hung load on the injector to and from the side direction.
- (a) Disconnect the 6 injector connectors.
 - (b) Disconnect the camshaft position sensor connector.
 - (c) Disconnect the throttle position sensor connector.
 - (d) Disconnect the VSV connector for EVAP.
 - (e) Remove the 3 bolts and delivery pipe together with the 6 injectors.
 - (f) Pull out the 6 injectors from the delivery pipe.
 - (g) Remove the O-rings, grommet and insulator from each injector.
 - (h) Remove the 3 spacers from the intake manifold.



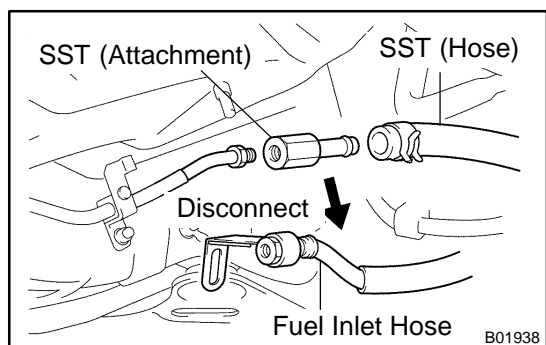


INSPECTION

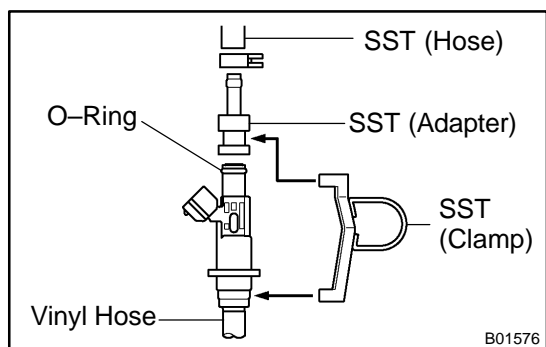
1. INSPECT INJECTOR INJECTION

CAUTION:

Keep injector clear of sparks during the test.



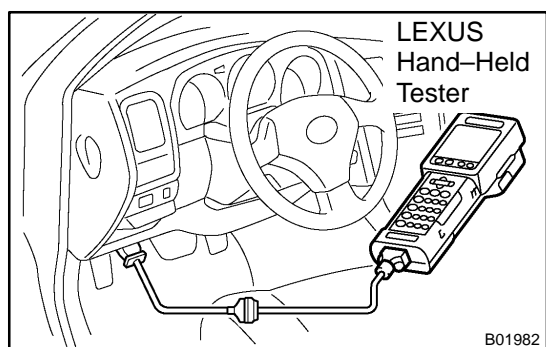
- (a) Remove the nut, and disconnect the fuel inlet hose from the fuel main tube.
- (b) Temporarily install SST (attachment) to the fuel main tube.
SST 09268-41047 (09268-52011)
- (c) Tighten the flare nut on the fuel main tube.
(See page [SF-1](#))
- (d) Connect SST (hose) to the SST (attachment).
SST 09268-41047



- (e) Install the O-ring to the injector.
- (f) Connect SST (hose) to the injector with SST (adapter), and hold the injector and adapter with SST (clamp).
SST 09268-41047 (09268-41110, 09268-41300)
- (g) Put the injector into the graduated cylinder.

CAUTION:

Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.

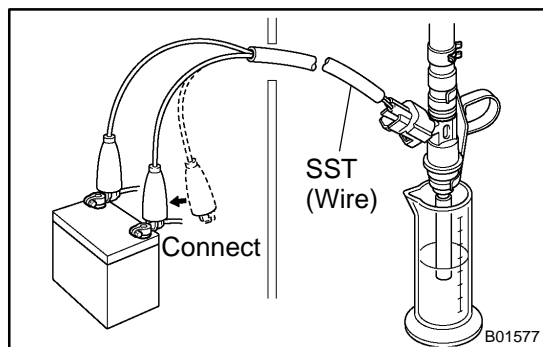


- (h) Connect the LEXUS hand-held tester to the DLC3.
- (i) Connect the battery negative (–) terminal cable to the battery.
- (j) Turn the ignition switch ON and LEXUS hand-held tester main switch ON.

NOTICE:

Do not start the engine.

- (k) Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- (l) Please refer to the LEXUS hand-held tester operator's manual for further details.
- (m) If you have no LEXUS hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See page [SF-6](#))



- (n) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector 2 or 3 times.

SST 09842-30070

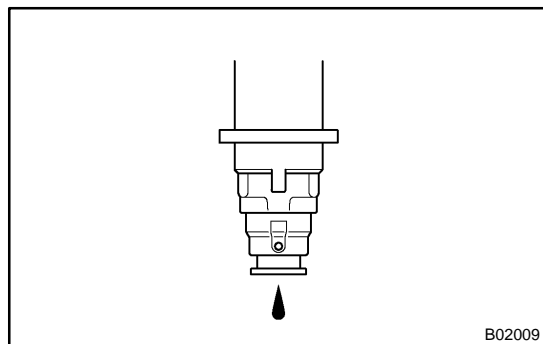
Injection volume:

60 – 73 cm³ (3.7 – 4.5 cu in.) per 15 seconds

Difference between each injector:

13 cm³ (0.8 cu in.) or less

If the injection volume is not as specified, replace the injector.



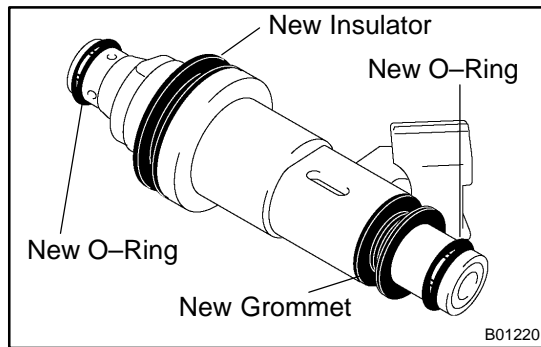
2. INSPECT LEAKAGE

- (a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.

SST 09842-30070

Fuel drop: 1 drop or less per 12 minutes

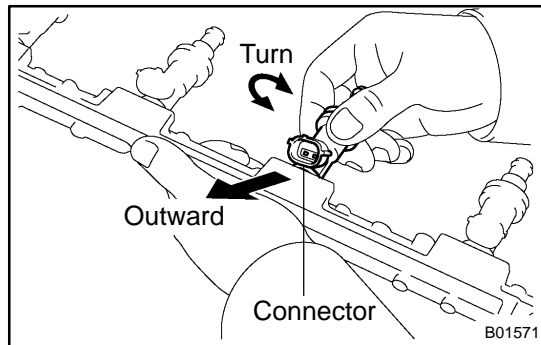
- (b) Turn the ignition switch OFF.
- (c) Disconnect the negative (–) terminal cable from the battery.
- (d) Remove the SST.
SST 09268-41047, 09842-30070
- (e) Reconnect the fuel inlet hose to the fuel main tube.
(See page [SF-1](#))
- (f) Install the fuel inlet hose with the nut.
Torque: 9 N·m (90 kgf-cm, 80 in.-lbf)
- (g) Disconnect the LEXUS hand-held tester from the DLC3.



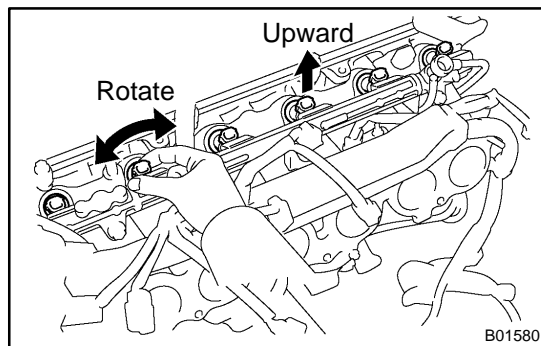
INSTALLATION

1. INSTALL INJECTORS AND DELIVERY PIPE

- Install new insulator and grommet to each injector.
- Apply a light coat of spindle oil or gasoline to 2 new O-rings and install them to each injector.
- Apply a light coat of spindle oil or gasoline on the place where a delivery pipe touches an O-ring of the injector.



- While turning the injector clockwise and counterclockwise, push it to the delivery pipe. Install the 6 injectors.
- Position the injector connector outward.
- Place the 3 spacers in position on the intake manifold.
- Apply a light coat of spindle oil or gasoline on the place where a intake manifold touches an O-ring of the injector.
- Place the 6 injectors together with the delivery pipe and 3 bolts in position on the intake manifold.
- Temporarily install the 3 bolts holding the delivery pipe to the intake manifold.



- 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.

- Position the injector connector upward.
- Connect the 6 injector connectors.

HINT:

The Nos.1, 3, 5 injector connectors are dark gray, and the Nos.2, 4, 6 injector connectors are brown.

- Tighten the 3 bolts holding the delivery pipe to the intake manifold.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

- Connect the camshaft position sensor connector.
- Connect the throttle position sensor connector.
- Connect the VSV connector for EVAP.

2. INSTALL FUEL PRESSURE PULSATION DAMPER (See page SF-27)

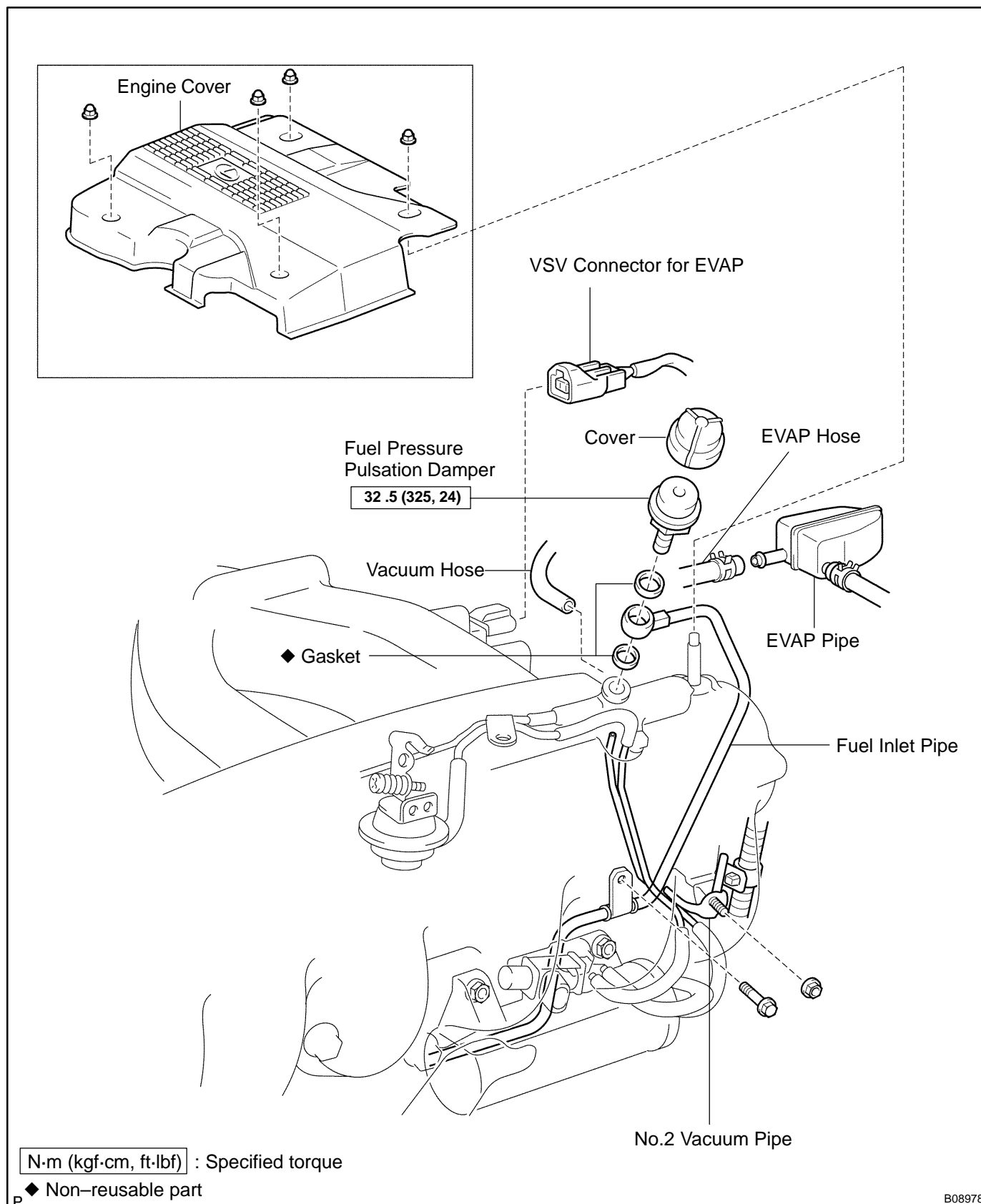
3. INSTALL AIR INTAKE CHAMBER (See page SF-49)

4. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

FUEL PRESSURE PULSATION DAMPER COMPONENTS

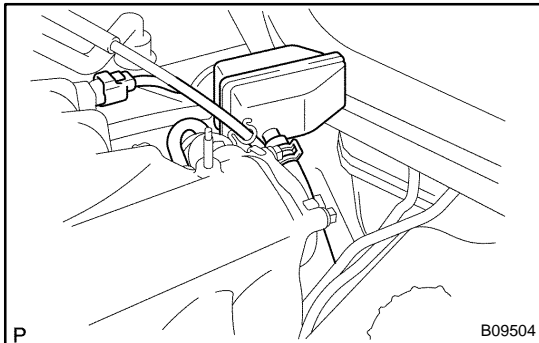
SF0NE-05



REMOVAL

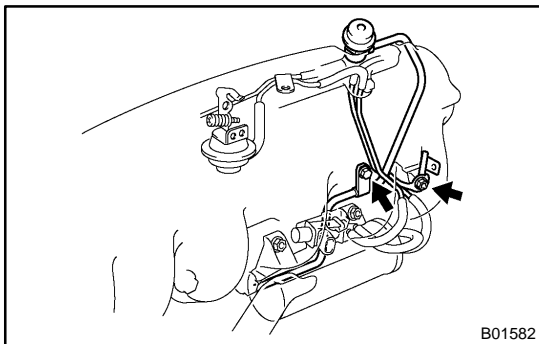
1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



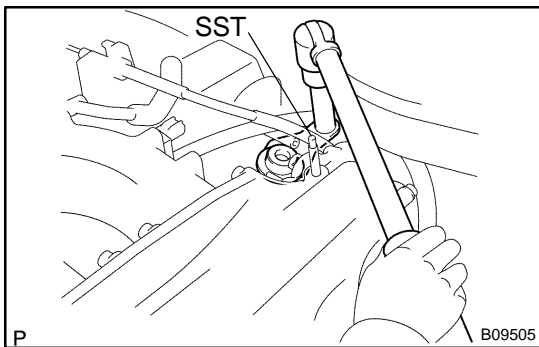
2. DISCONNECT CONNECTOR AND HOSES

- Disconnect the VSV connector for the EVAP.
- Disconnect the EVAP hose from the EVAP pipe.
- Disconnect the vacuum hose (from No.2 vacuum pipe) from the air intake chamber.



3. REMOVE FUEL PRESSURE PULSATION DAMPER

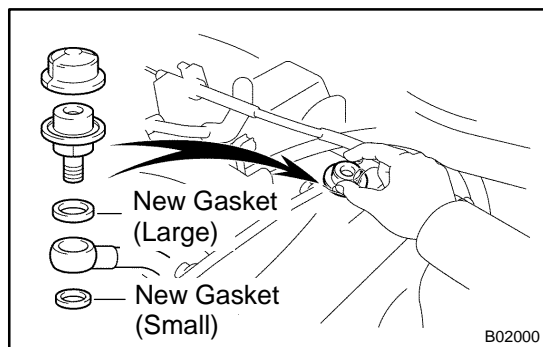
- Remove the nut holding the No.2 vacuum pipe to the intake manifold.
- Remove the bolt holding the fuel inlet pipe to the intake manifold.



- Using SST, remove the pulsation damper and 2 gaskets.
SST 09612-24014 (09617-24011)

CAUTION:

- Put a shop towel under the delivery pipe.
- Slowly loosen the pulsation damper.



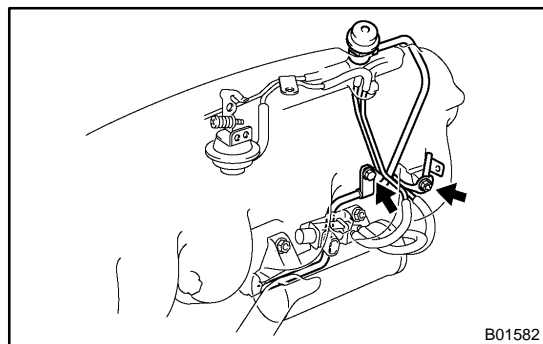
INSTALLATION

1. INSTALL FUEL PRESSURE PULSATION DAMPER

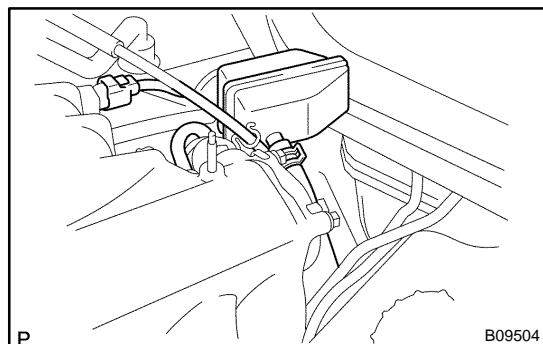
- (a) Install the fuel inlet pipe and pulsation damper with 2 new gaskets.

HINT:

Different the gaskets are used for the upper (large side) and lower (small side).



- (b) Using SST, tighten the pulsation damper.
SST 09612 – 24014 (09617 – 24011)
Torque: 32.5 N·m (325 kgf·cm, 24 ft·lbf)
- (c) Install the bolt holding the fuel inlet pipe to the intake manifold.
Torque: 9.0 N·m (90 kgf·cm, 80 in.-lbf)
- (d) Install the nut holding the No. 2 vacuum pipe to the intake manifold.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



2. CONNECT CONNECTOR AND HOSES

- (a) Connect the vacuum hose (from No.2 vacuum pipe) to the air intake chamber.
- (b) Connect the EVAP hose to the EVAP pipe.
- (c) Connect the VSV connector for the EVAP.

3. INSTALL ENGINE COVER

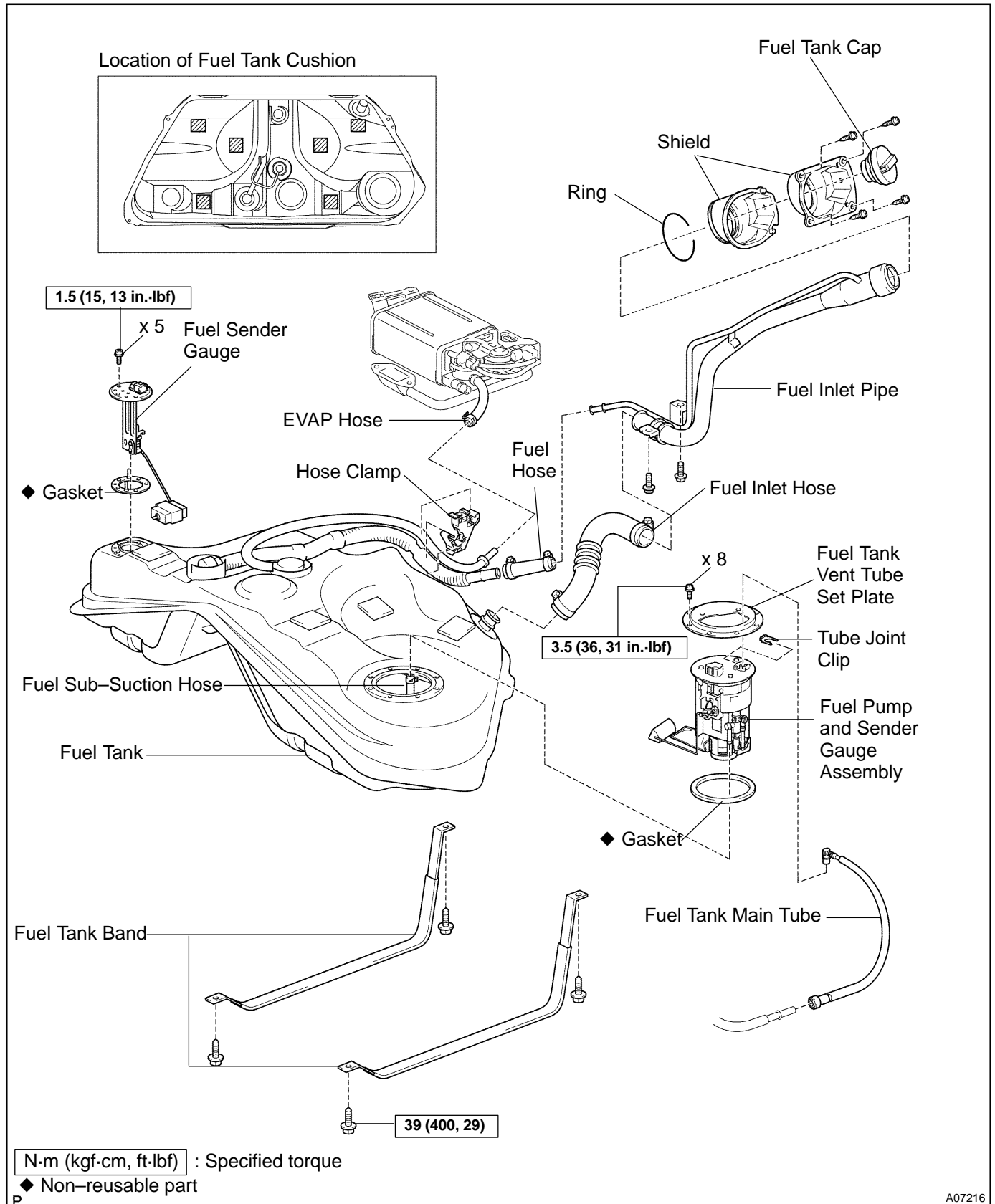
Install the engine cover with the 4 nuts.

FUEL TANK AND LINE COMPONENTS

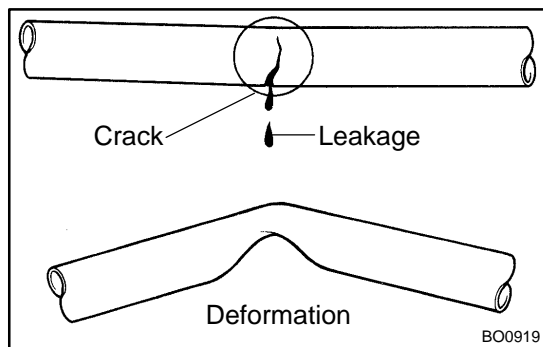
SF0NH-02

CAUTION:

- Always use new gaskets when replacing the fuel tank or component parts.
- Apply the proper torque to all parts tightened



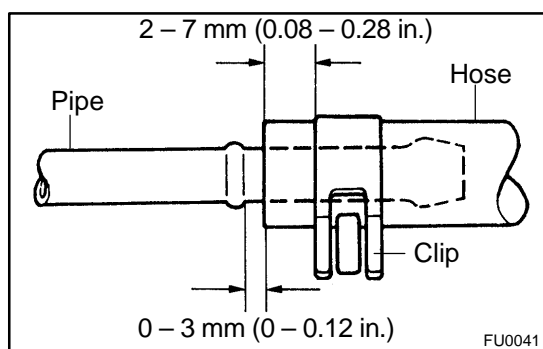
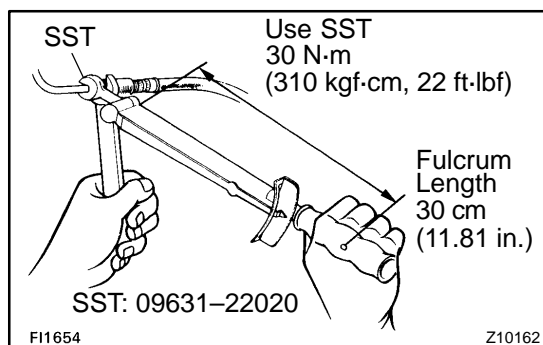
A07216



INSPECTION

INSPECT FUEL TANK AND LINE

- Check the fuel lines for cracks or leakage, and all connections for deformation.
- Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.
- Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
- Check the filler neck for damage or fuel leakage.

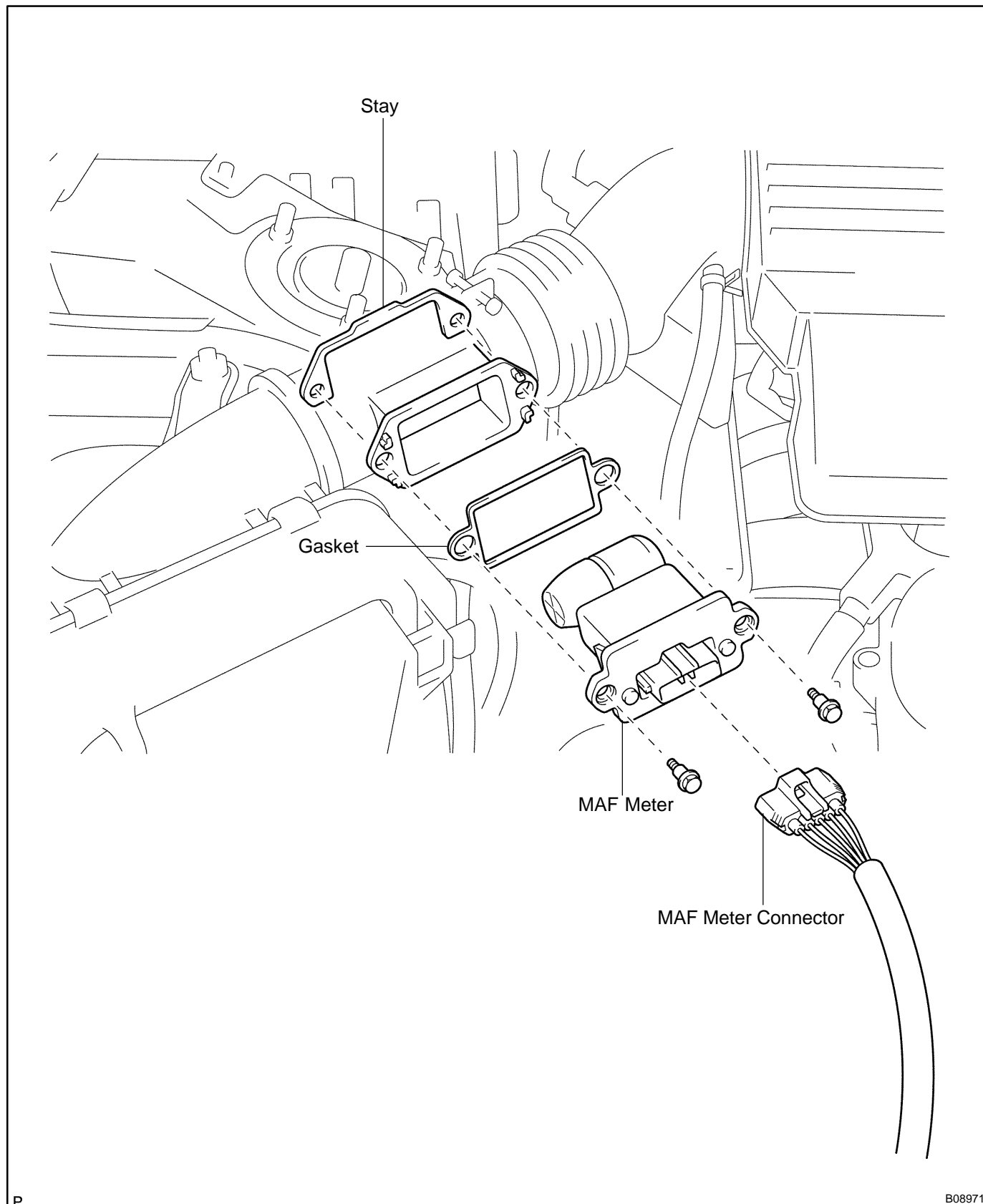


- Hose and pipe connections are as shown in the illustration.

If a problem is found, repair or replace the parts as necessary.

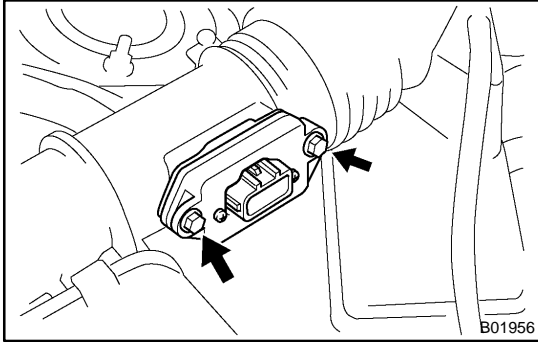
MASS AIR FLOW (MAF) METER COMPONENTS

SF0NJ-04



P

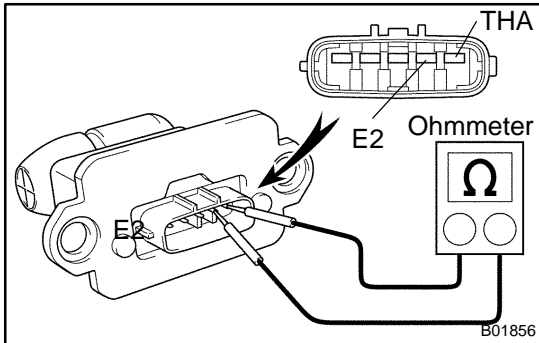
B08971



INSPECTION

1. REMOVE MAF METER

- Disconnect the MAF meter connector.
- Remove the 2 bolts, MAF meter, gasket and stay.

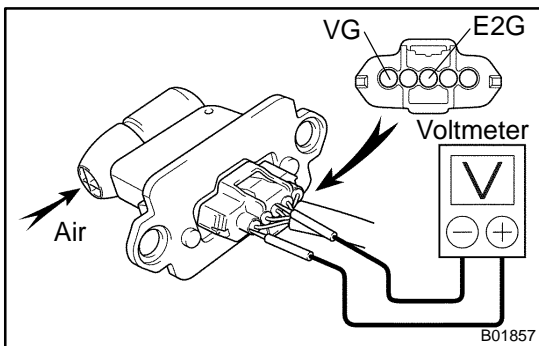


2. INSPECT MAF METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Terminals	Resistance	Temperature
THA-E2	13.6 – 18.4 k Ω	-20°C (-4°F)
THA-E2	2.21 – 2.69 k Ω	20°C (68°F)
THA-E2	0.493 – 0.667 k Ω	60°C (140°F)

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



3. INSPECT MAF METER OPERATION

- Connect the MAF meter connector.
- Connect the negative (-) terminal cable to the battery.
- Turn the ignition switch ON.
- Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (-) tester probe to terminal E2G.
- Blow air into the MAF meter, and check that the voltage fluctuates.

If operation is not as specified, replace the MAF meter.

- Turn the ignition switch OFF.
- Disconnect the negative (-) terminal cable from the battery.
- Disconnect the MAF meter connector.

4. REINSTALL MAF METER

- Install the gasket to the MAF meter.
- Install the MAF meter with the 2 bolts and stay.

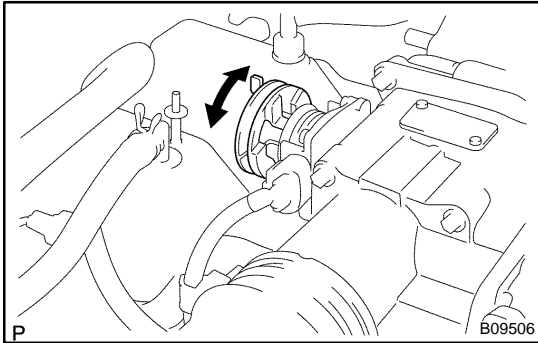
Torque: 10.7 N·m (109 kgf·cm 8 ft·lbf)

- Connect the MAF meter connector.

THROTTLE BODY ON-VEHICLE INSPECTION

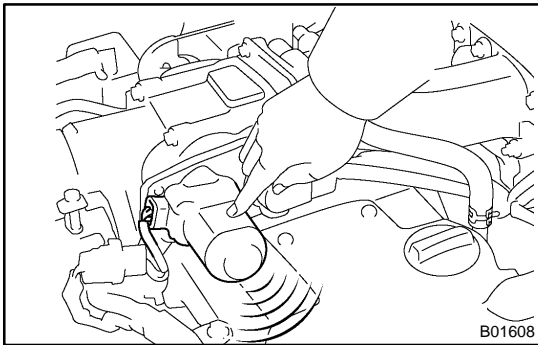
1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



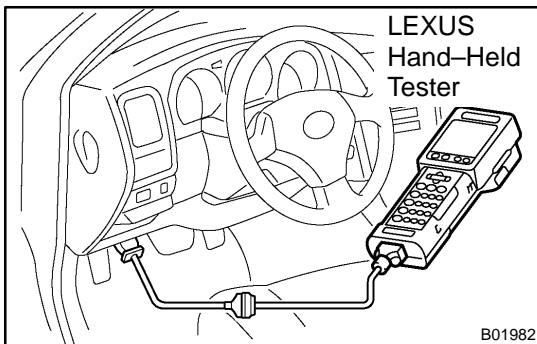
2. INSPECT SYSTEM OPERATION

(a) Check that the throttle linkage moves smoothly.



- (b) Inspect the throttle control motor for operating sound.
- (1) Turn the ignition switch ON.
 - (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

If operation is not as specified, check the throttle control motor, wiring and ECM.



(c) Inspect the throttle position sensor and accelerator pedal position sensor function.

- (1) Connect the LEXUS hand-held tester to the DLC3.
- (2) When turning the accelerator pedal position sensor lever to the full-open position, check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA shows the standard value.

Throttle valve opening percentage: 60 % or more

If operation is not as specified, check that the throttle position sensor, accelerator pedal position sensor, wiring and ECM.

- (d) Start the engine, and check that the Malfunction Indicator Lamp (MIL) does not light up.
- (e) Inspect the air assist system.
 - (1) Allow the engine to warm up to normal operating temperature.

- (2) Turn the A/C switch ON and OFF, and check the idle speed.

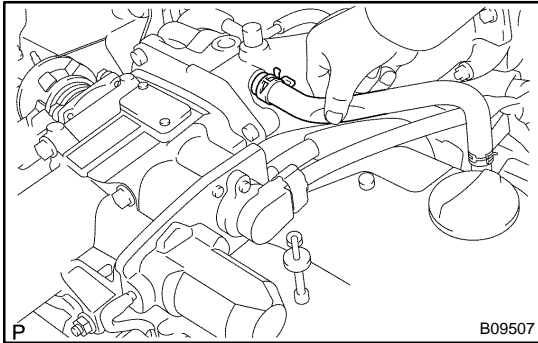
Idle speed (Transmission in neutral):

700 ± 50 rpm (A/C OFF)

750 ± 50 rpm (A/C ON)

NOTICE:

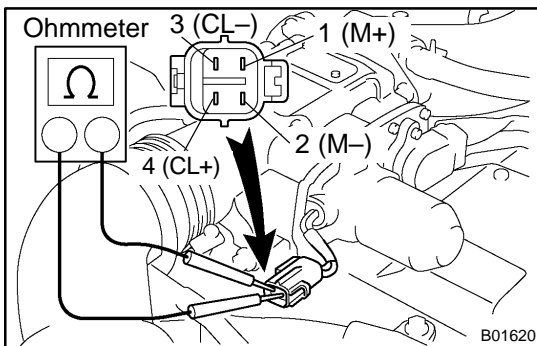
Perform inspection under condition without electrical load.



- (3) With engine idling, pinch the air assist hose and check that engine speed drops, and then returns back up to idle speed.

If operation is not as specified, check the throttle body, wiring and ECM.

- (f) After checking the above (b) to (e), perform the diving test and check that there is no sense of incongruity.



3. INSPECT THROTTLE CONTROL MOTOR

- (a) Disconnect the throttle control motor connector.
(b) Using an ohmmeter, measure the resistance between terminal 3 (CL-) and 4 (CL+).

Resistance: 4.2 – 5.2 Ω at 20°C (68°F)

- (c) Using an ohmmeter, measure the resistance between terminal 1 (M+) and 2 (M-).

Resistance: 0.3 – 100 Ω at 20°C (68°F)

If the resistance is not as specified, replace the throttle control motor. (See page [SF-37](#))

- (d) Reconnect the throttle control motor connector.

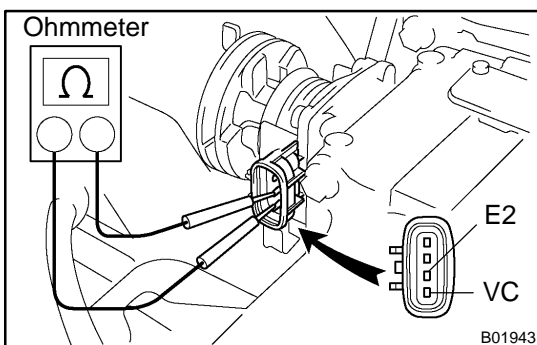
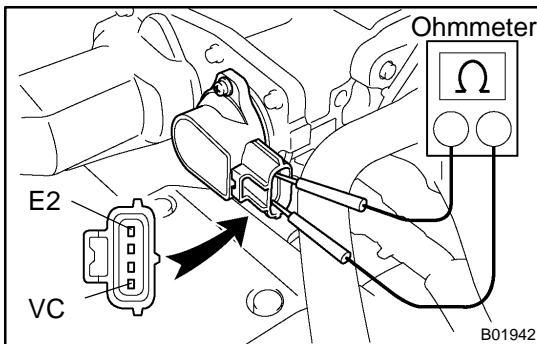
4. INSPECT THROTTLE POSITION SENSOR

- (a) Disconnect the throttle position sensor connector.
(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: 1.2 – 3.2 kΩ at 20°C (68°F)

If the resistance is not as specified, replace the throttle position sensor. (See page [SF-37](#))

- (c) Reconnect the throttle position sensor connector.



5. INSPECT ACCELERATOR PEDAL POSITION SENSOR

- (a) Disconnect the accelerator pedal position sensor connector.
(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: 1.2 – 3.2 kΩ at 20°C (68°F)

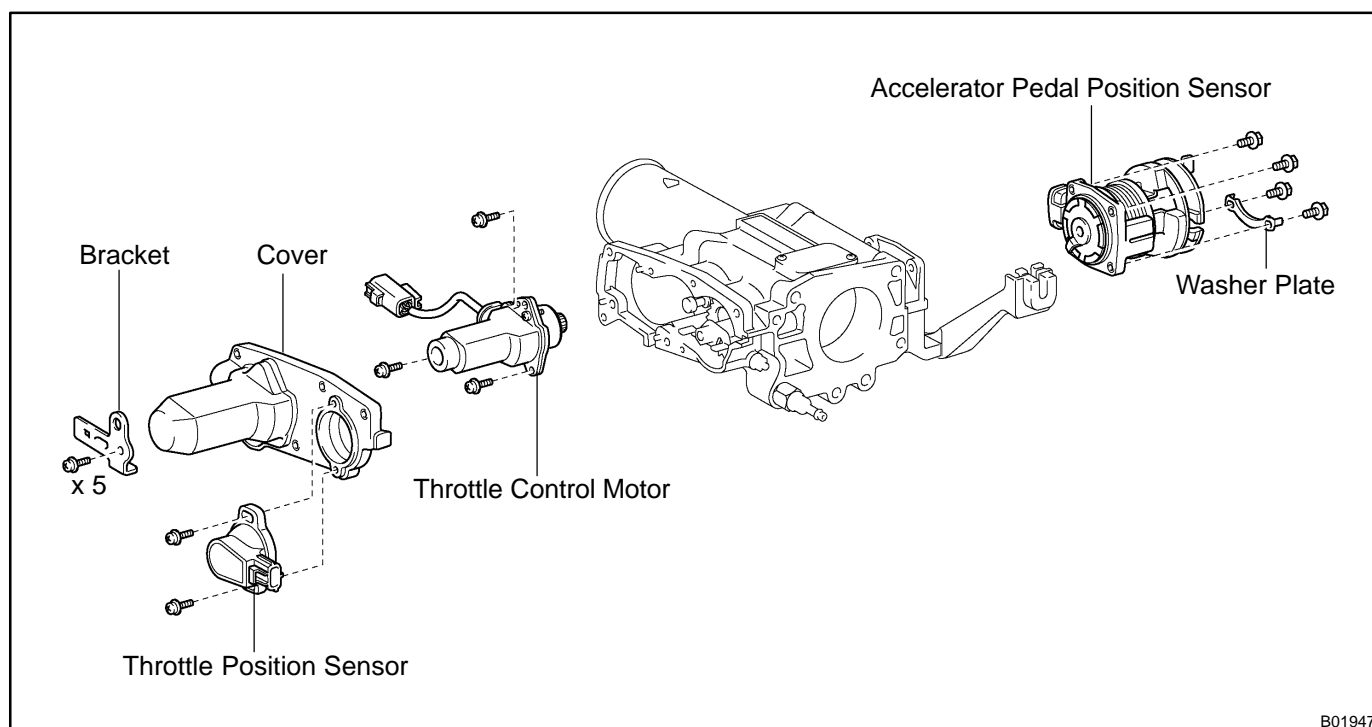
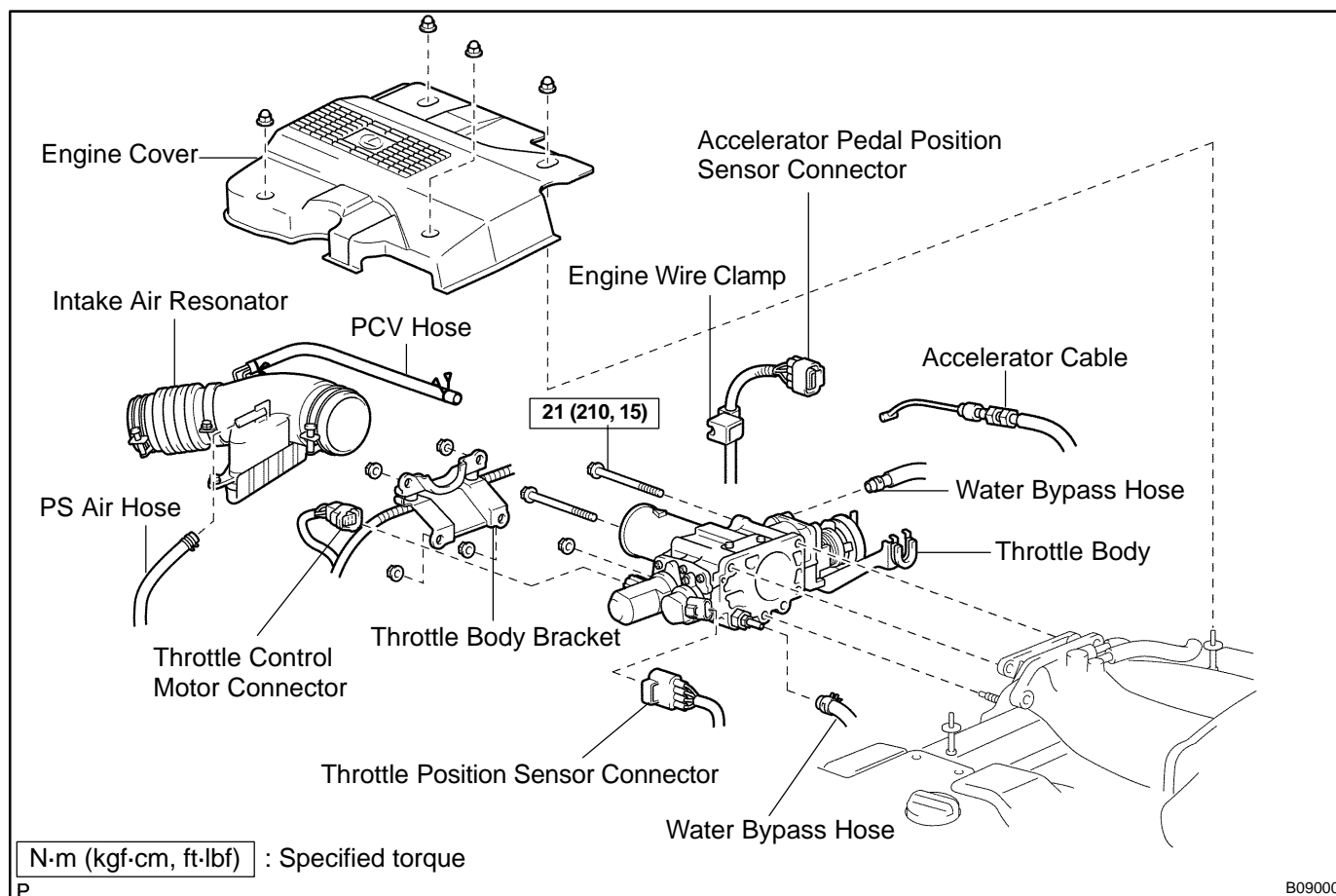
If the resistance is not as specified, replace the accelerator pedal position sensor. (See page [SF-37](#))

- (c) Reconnect the accelerator pedal position sensor connector.

6. REINSTALL ENGINE COVER

Reinstall the engine cover with the 4 nuts.

COMPONENTS



REMOVAL

1. DRAIN ENGINE COOLANT

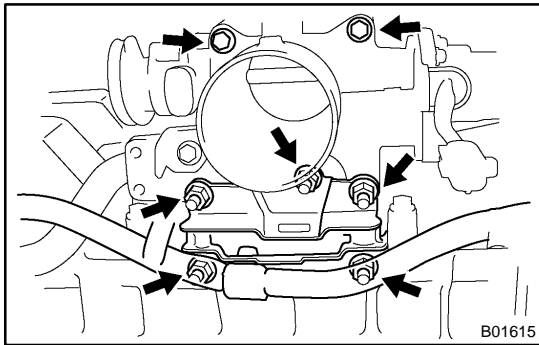
2. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

3. REMOVE INTAKE AIR RESONATOR

4. REMOVE THROTTLE BODY BRACKET AND THROTTLE BODY

- Disconnect the accelerator cable.
- Disconnect the throttle position sensor connector.
- Disconnect the throttle control motor connector.
- Disconnect the accelerator pedal position sensor connector.
- Disconnect the engine wire clamp from the clamp bracket of throttle body.



- Remove the 2 bolts and nut holding the throttle body to the intake air connector.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

- Remove the 4 nuts and throttle body bracket.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

- Slightly slide the throttle body away from the intake air connector.

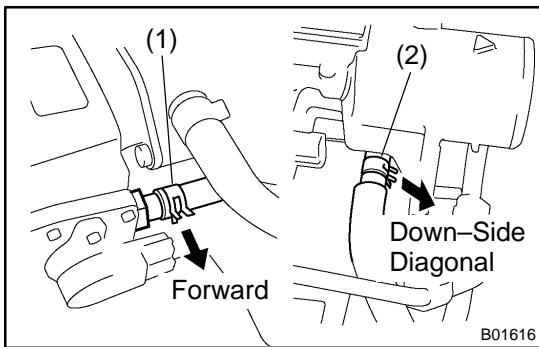
NOTICE:

When putting up the throttle body, do not hold the motor part.

- Disconnect the 2 water bypass hoses from the throttle body, and remove the throttle body.

HINT:

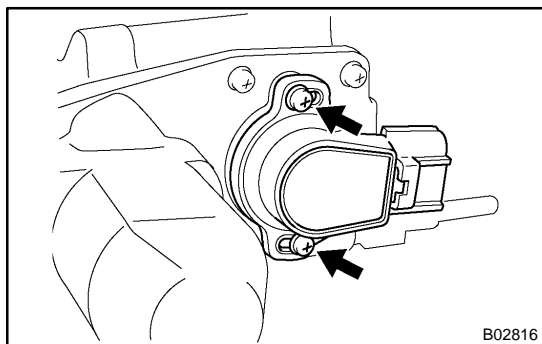
- At the time of installation, please refer to the following items.
- Connect the water bypass hose with its discrimination mark downward.
- Install the with its crawl direction for (1) forward and down-side diagonal (engine side about 45°) for (2).



REPLACEMENT

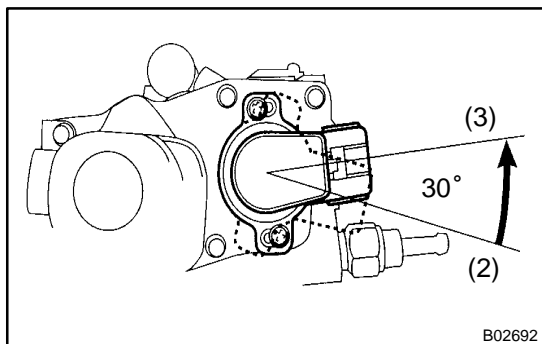
NOTICE:

- To prevent deterioration, do not shock the throttle position sensor and accelerator pedal position sensor.
- Mixing of the foreign objects may cause the gear locking, so thoroughly check that there is no stuck of any foreign objects and clean up if any.

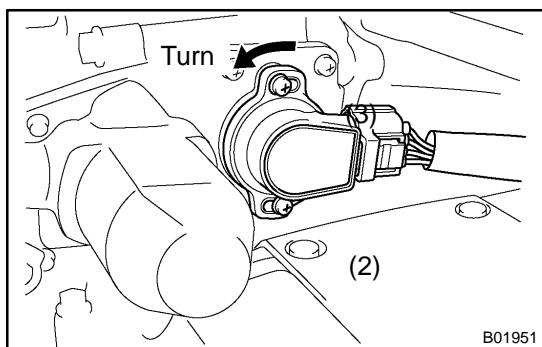


1. REPLACE THROTTLE POSITION SENSOR

- Remove the 2 set screws and throttle position sensor.
- Reinstall the throttle position sensor.
 - Check that the throttle valve is under the condition of the opener opening angle (about 3.5°).



- Install the sensor to the place where is at 30° rotated to the right from the specified installation position.
- Gradually turn sensor counterclockwise until it touches the throttle valve shaft and temporarily torque the 2 set screws.



- Adjust the throttle position sensor.
 - Connect the throttle position sensor connector.

NOTICE:

At this time, do not connect the throttle control motor connector.

- Connect the LEXUS hand-held tester or OBDII scan tool to the DLC3.
- Turn the ignition switch ON.

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

- While reading the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA, turn the throttle position sensor slowly to left and set the sensor at the center value of the standard value, and then torque the screws.

Torque: 1.7 N·m (17.5 kgf·cm, 15 in·lbf)

**Standard throttle valve opening percentage:
14.8 ± 0.8 %**

NOTICE:

At the time of tightening the screw, as the sensor itself tends to turn causing to slanting, check that it is within the standard value after having finished the torque.

- (5) Fully close the throttle valve with a screwdriver and check that the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA stays with the standard value.

Standard throttle valve opening percentage:

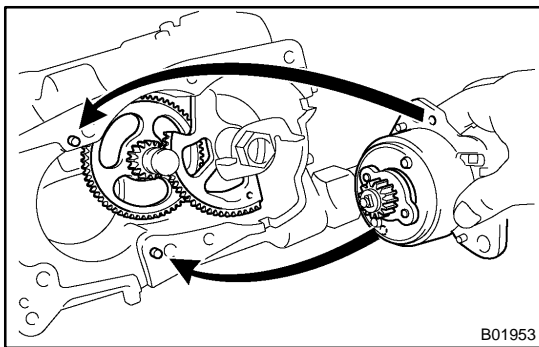
10 – 14 %

If the throttle valve opening percentage is not as specified, repeat steps (4) through (5).

- (6) Paint the sensor set screws.
- (7) Turn the ignition switch OFF.
- (8) Disconnect the LEXUS hand-held tester or OBDII scan tool from the DLC3.
- (9) Disconnect the throttle position sensor connector.

2. REPLACE THROTTLE CONTROL MOTOR

- (a) Remove the throttle position sensor.
- (b) Remove the throttle control motor.
 - (1) Disconnect the connector from the bracket.
 - (2) Remove the 5 screws, bracket and cover.
 - (3) Remove the 3 screws and throttle control motor.



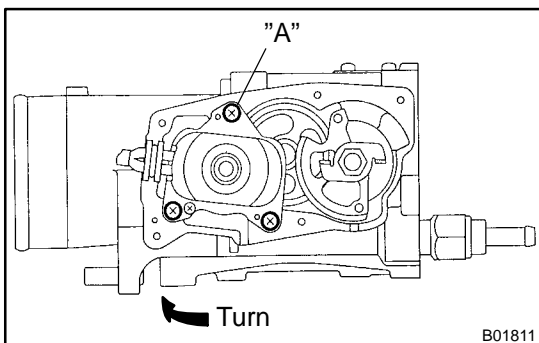
- (c) Reinstall the throttle control motor.
 - (1) Apply the grease thinly on the whole surface of the gear teeth.

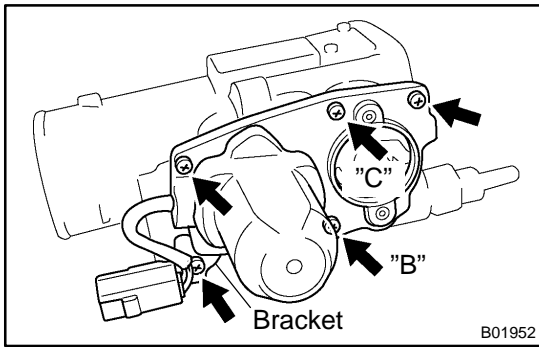
NOTICE:

Do not apply the grease other than specified because grease has been already applied to the component to be replaced.

- (2) Align the protrusions of the motor with the positioning pin holes of the throttle body.
- (3) Rotate the motor to the direction marked with an arrow and temporarily install the set screw "A" under the condition that there is no wobbles in the motor and the positioning pin.
- (4) Tighten the 3 set screws.

Torque: 3.7 N·m (37.5 kgf-cm, 33 in.-lbf)





- (5) Temporarily install the cover with the 2 screws "B" and "C".

NOTICE:

The grommet of motor not be caught.

- (6) Tighten the 5 screws.

Torque: 1.7 N·m (17.5 kgf·cm, 15 in.-lbf)

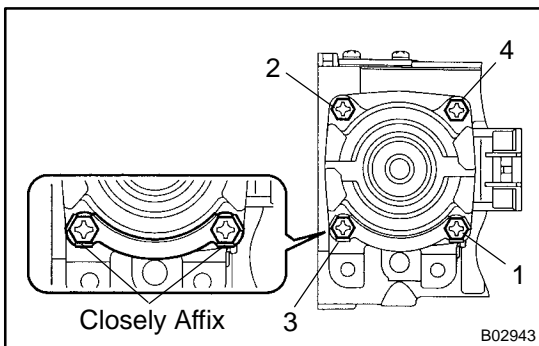
- (7) Connect the connector to the bracket.

- (d) Reinstall and adjust the throttle position sensor. (See step 1)

3. REPLACE ACCELERATOR PEDAL POSITION SENSOR

- (a) Remove the accelerator pedal position sensor.

- (1) Using a small screwdriver, pry the 4 stoppers of the washer plate.
 (2) Remove the 4 set bolts, washer plate and accelerator pedal position sensor.



- (b) Reinstall the accelerator pedal position sensor.

- (1) Install the accelerator pedal position sensor to the throttle body.
 (2) Torque the 4 bolts in the order shown in the illustration through the washer plate.

Torque: 3.7 N·m (37.5 kgf·cm, 33 in.-lbf)

- (3) Bend the stopper of the washer plate and closely affix to the bolts.

- (c) Inspect the accelerator pedal position sensor.

- (1) Connect the accelerator pedal position sensor connector.
 (2) Connect the LEXUS hand-held tester or OBDII scan tool to the DLC3.
 (3) Turn the ignition switch ON.

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

- (4) Check that the ACCEL POS #1 (VPA) voltage of the CURRENT DATA shows the standard value.

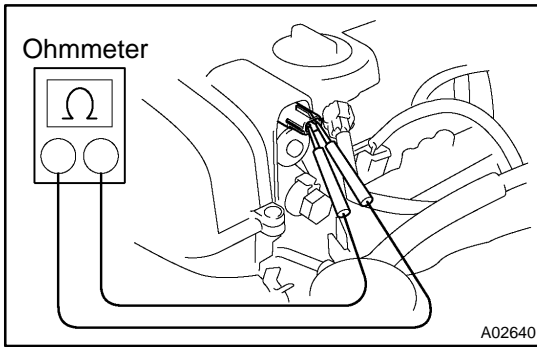
Standard accelerator pedal position voltage:

0.3 – 0.9 V

4. AFTER INSTALL THROTTLE BODY, INSPECT SYSTEM OPERATION (See page SF-32)

INSTALLATION

Installation is in the reverse order of removal. (See page [SF-36](#))



CAMSHAFT TIMING OIL CONTROL VALVE

SF0NR-03

ON-VEHICLE INSPECTION

1. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE RESISTANCE

- Disconnect the oil control valve connector.
- Using an ohmmeter, measure the resistance between the terminals.

Resistance: 5.5 – 12 Ω at 20°C (68°F)

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

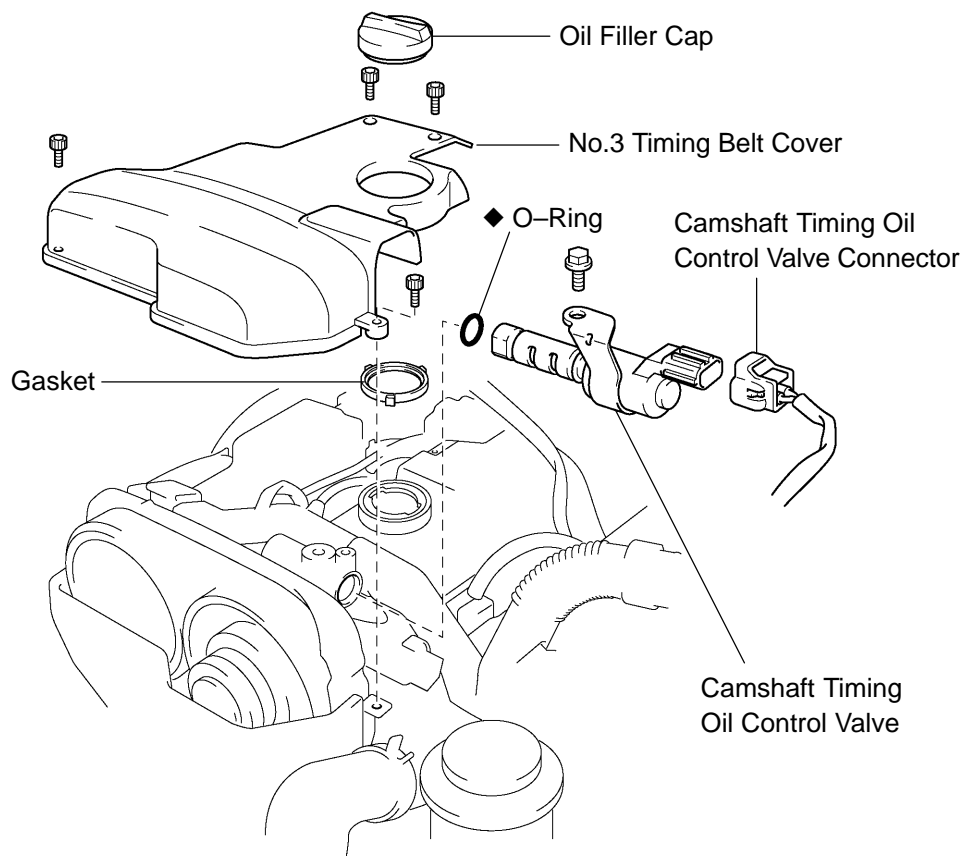
- Reconnect the oil control valve connector.

2. INSPECT VVT-i OPERATION

- Allow the engine to warm up to normal operating temperature.
- Check that the engine stalls or becomes in rough-idling state when the battery positive voltage is applied to the oil control valve with the engine idling.

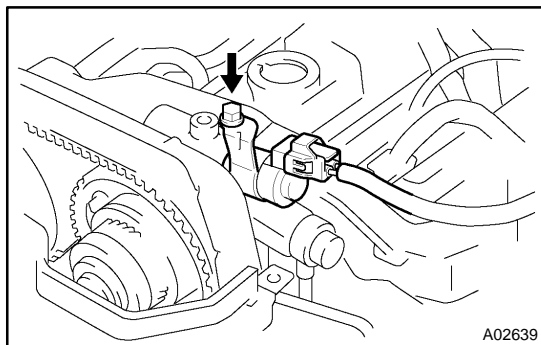
If operation is not as specified, check the oil control valve (see page [SF-43](#)), VVT-i pulley, intake camshaft, wiring and ECM.

COMPONENTS



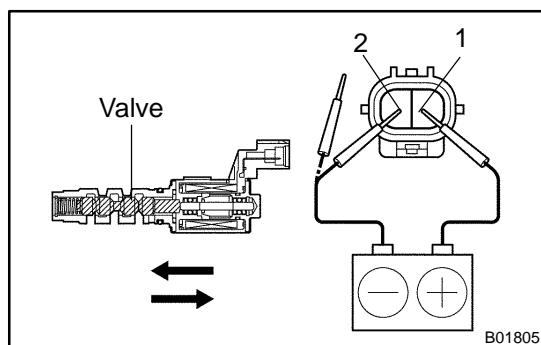
◆ Non-reusable part

B01613





INSPECTION

1. **REMOVE NO.3 TIMING BELT COVER**
2. **REMOVE CAMSHAFT TIMING OIL CONTROL VALVE**
 - (a) Disconnect the oil control valve connector.
 - (b) Remove the bolt, oil control valve and O-ring.



3. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE OPERATION

Connect positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2, and check the movement of the valve.

Battery positive voltage is applied	Valve moves in  direction
Battery positive voltage is cut off	Valve moves in  direction

If operation is not as specified, replace the valve.

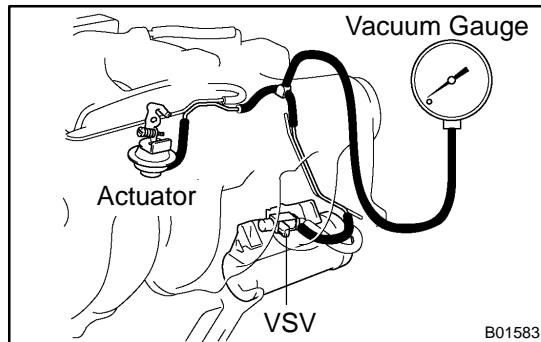
4. **REINSTALL CAMSHAFT TIMING OIL CONTROL VALVE**
 - (a) Install a new O-ring to the oil control valve.
 - (b) Install the oil control valve with the bolt.
Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)
 - (c) Connect the oil control valve connector.
5. **REINSTALL NO.3 TIMING BELT COVER**
Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS) ON-VEHICLE INSPECTION

SF0NT-03

1. REMOVE ENGINE COVER

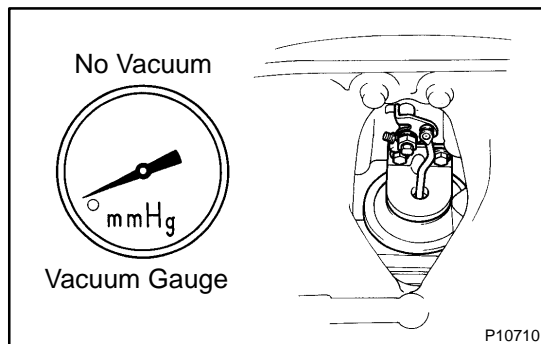
Remove the 4 nuts and engine cover.



2. CONNECT VACUUM GAUGE

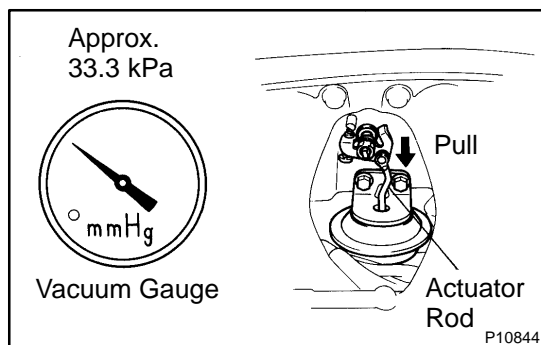
Using a 3-way connector, connect vacuum gauge to the hose between the actuator and VSV.

3. START ENGINE



4. INSPECT INTAKE AIR CONTROL VALVE

(a) While the engine is idling, check that the vacuum gauge needle does not move.



(b) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle momentarily fluctuates approx. 33.3 kPa (250 mmHg, 9.84 in.Hg) or more. (The actuator rod is pulled down.)

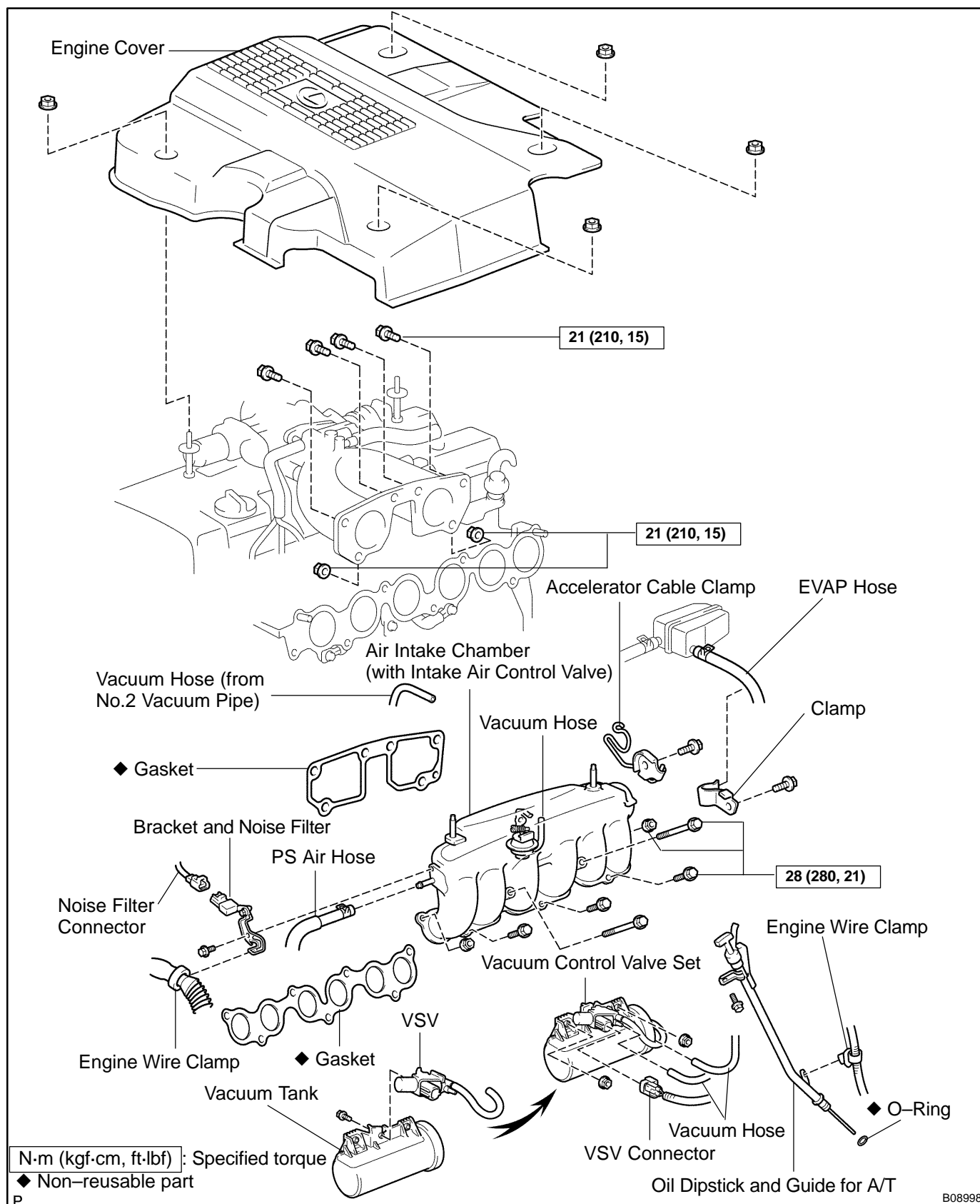
5. REMOVE VACUUM GAUGE

Remove the vacuum gauge, and reconnect the vacuum hoses to their proper locations.

6. REINSTALL ENGINE COVER

Reinstall the engine cover with the 4 nuts.

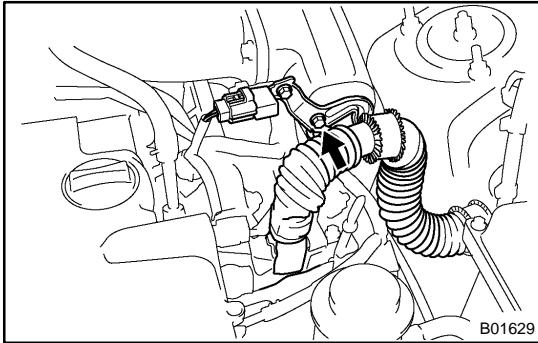
COMPONENTS



REMOVAL

1. REMOVE ENGINE COVER

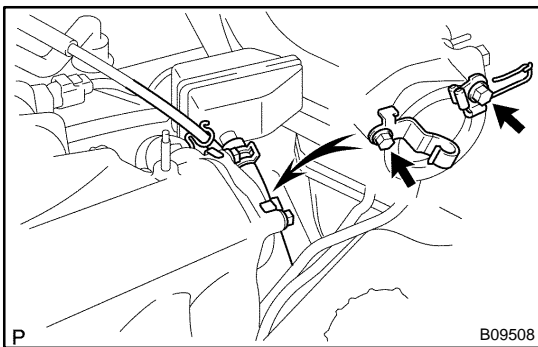
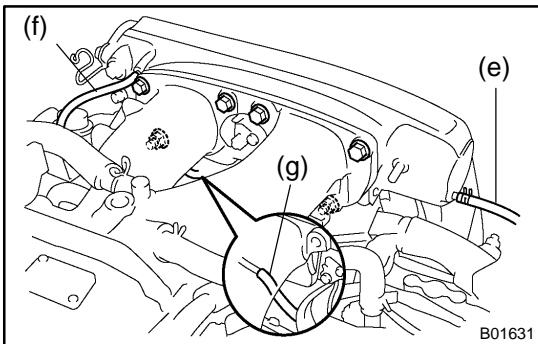
Remove the engine cover and 4 nuts.



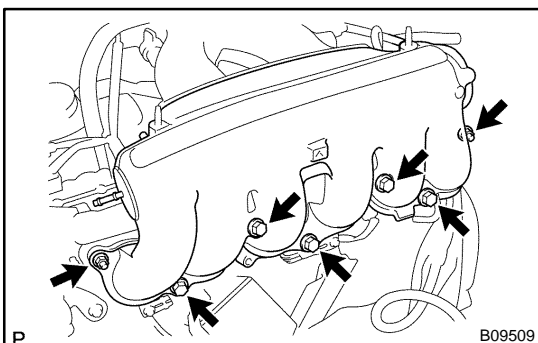
2. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM-62)

3. REMOVE AIR INTAKE CHAMBER (WITH INTAKE AIR CONTROL VALVE)

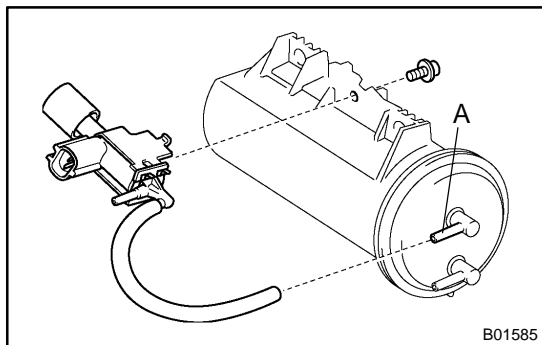
- Disconnect the noise filter connector.
- Disconnect the engine wire clamp from the bracket.
- Remove the bolt, bracket and noise filter.
- Remove the 4 bolts and 2 nuts holding the intake air connector to the air intake chamber,
Torque: 28 N·m (280 kgf-cm, 21 ft-lbf)
- Disconnect the PS air hose from the air intake chamber.
- Disconnect the vacuum hose (from No.2 vacuum pipe) from the air intake chamber.
- Disconnect the vacuum hose (from actuator for ACIS) from the No.1 vacuum pipe.



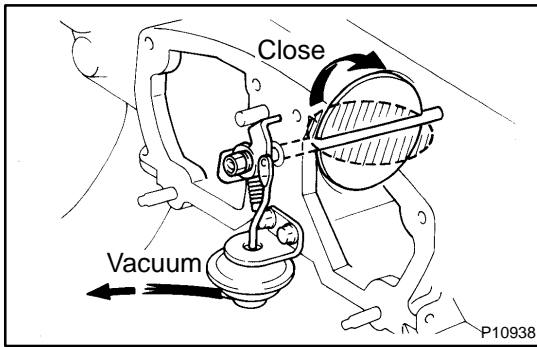
- Disconnect the accelerator cable, and remove the bolt and accelerator cable clamp.
- Disconnect the EVAP hose, and remove the bolt and clamp.



- Remove the 5 bolts, 2 nuts, air intake chamber and 2 gas-kets.
Torque: 28 N·m (280 kgf-cm, 21 ft-lbf)
- ### 4. REMOVE VACUUM CONTROL VALVE SET (See page SF-54)

**5. REMOVE VSV FROM VACUUM TANK**

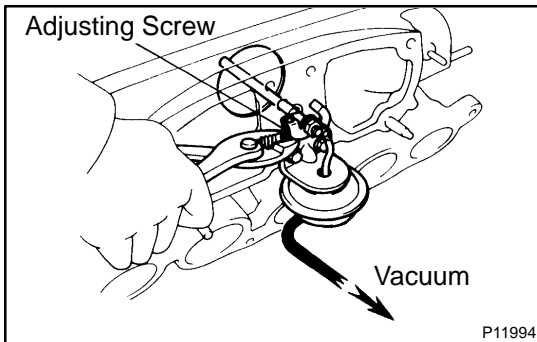
- (a) Disconnect the vacuum hose from port A of the vacuum tank.
- (b) Remove the screw and VSV.



INSPECTION

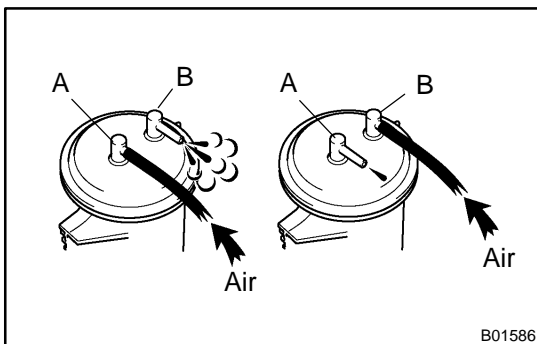
1. INSPECT INTAKE AIR CONTROL VALVE

- (a) With 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.



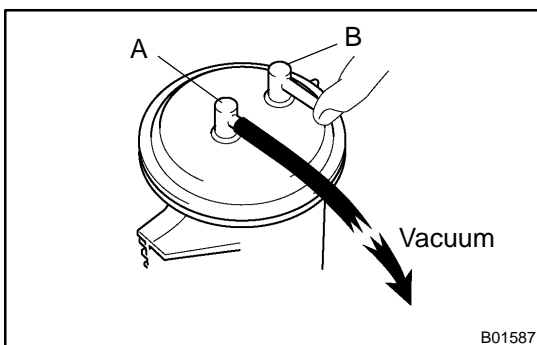
If operation is not as specified, turn the adjusting screw.

- (b) 1 minute after applying the vacuum in (a), check that the actuator rod does not return.



2. INSPECT VACUUM TANK

- (a) Check that air flows from ports A to B.
(b) Check that air does not flow ports B to A.



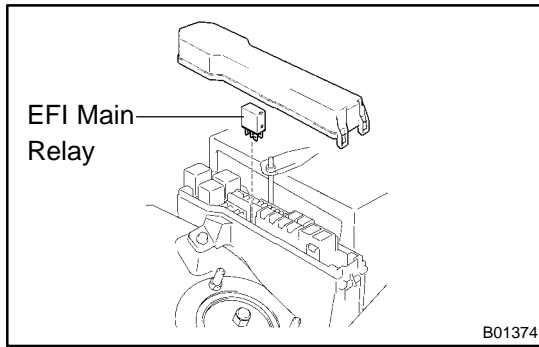
- (c) Plug port B with your finger, and apply 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum to port A, and check that there is no change in vacuum after 1 minute.

If operation is not as specified, replace the vacuum tank.

3. INSPECT VSV (See page [SF-54](#))

INSTALLATION

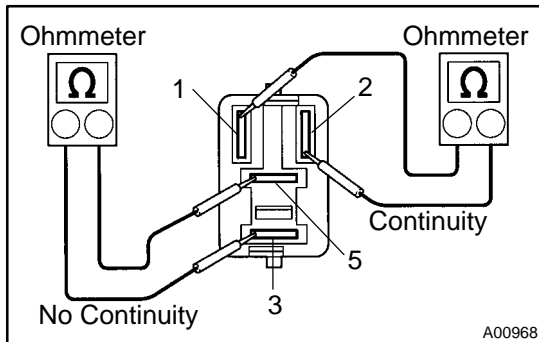
Installation is in the reverse order of removal. (See page [SF-46](#))



EFI MAIN RELAY INSPECTION

SF0NY-01

1. REMOVE RELAY BOX COVER
2. REMOVE EFI MAIN RELAY (Marking:EFI)

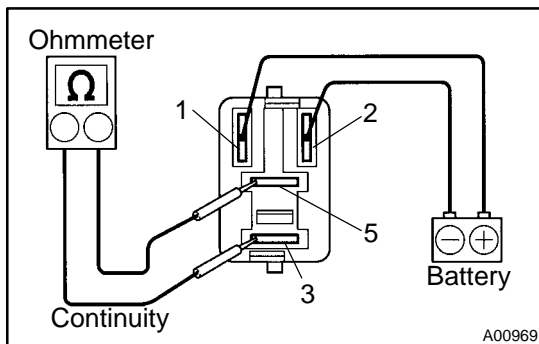


3. INSPECT EFI MAIN RELAY

- (a) Inspect the relay continuity.
 - (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
 - (2) Check that there is no continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

If there is continuity, replace the relay.



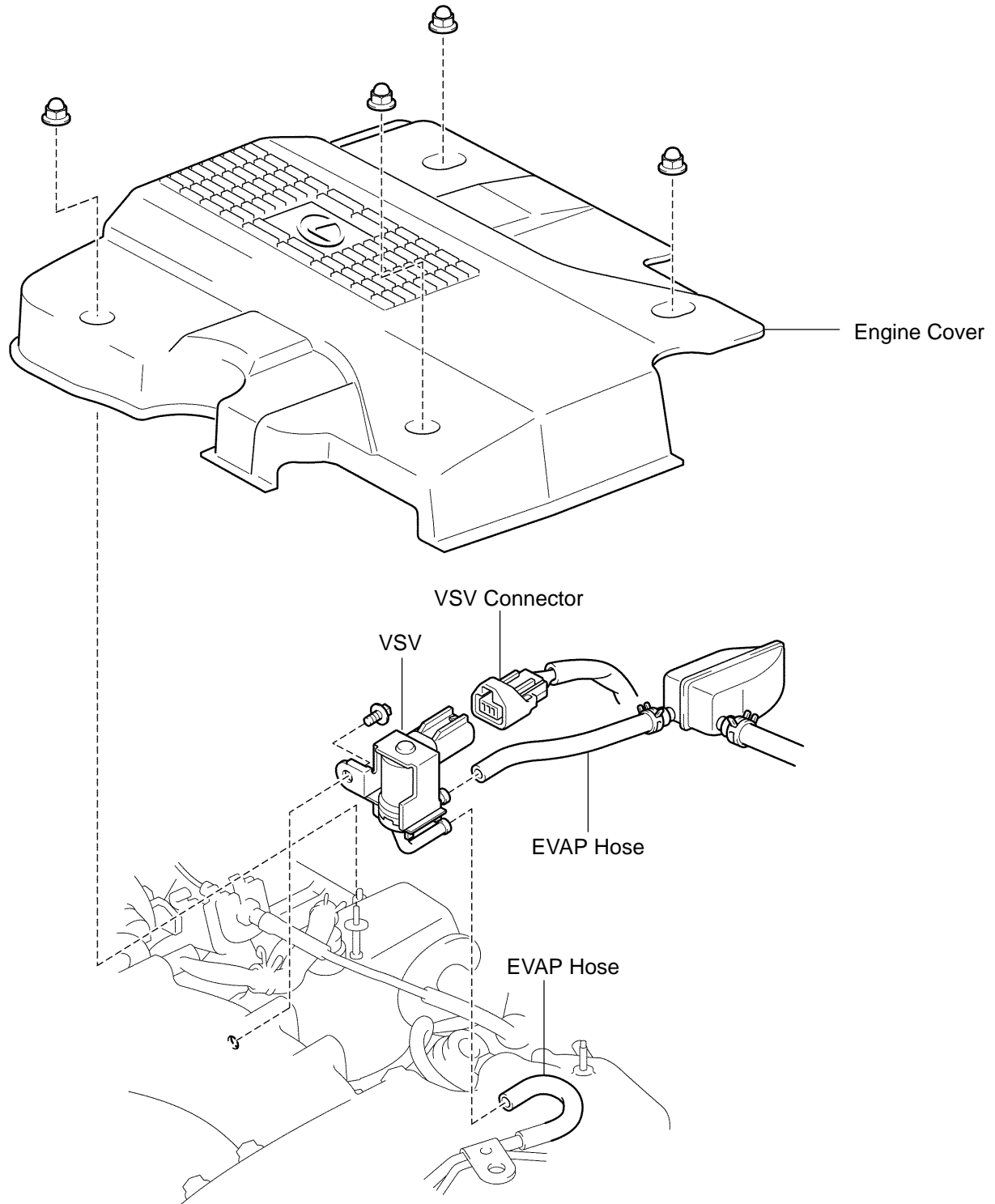
- (b) Inspect the relay operation.
 - (1) Apply battery positive voltage across terminals 1 and 2.
 - (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL EFI MAIN RELAY
5. REINSTALL RELAY BOX COVER

VSV FOR EVAPORATIVE EMISSION (EVAP) COMPONENTS

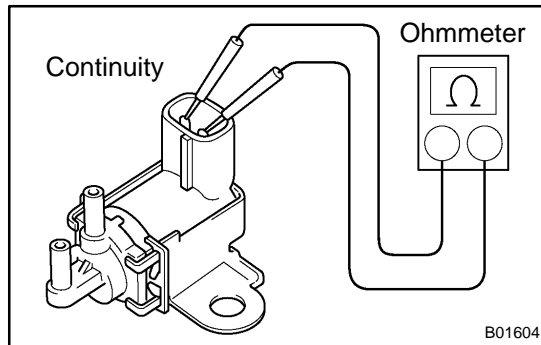
SF0NZ-03



INSPECTION

1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



2. REMOVE VSV

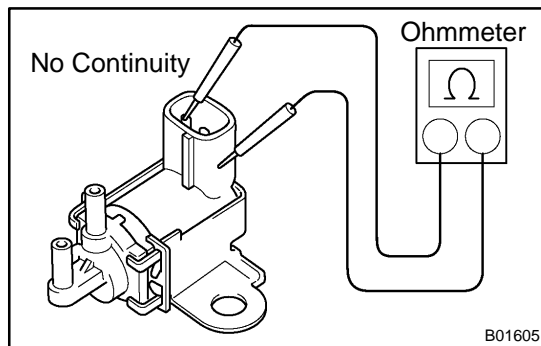
3. INSPECT VSV

(a) Inspect the VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20°C (68°F)

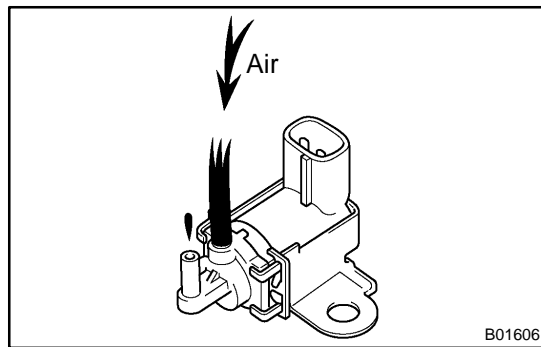
If there is no continuity, replace the VSV.



(b) Inspect the VSV for ground.

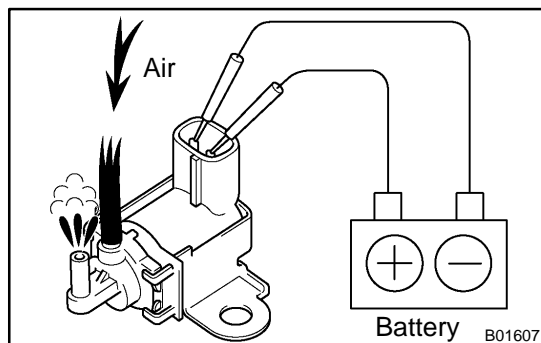
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(c) Inspect the VSV operation.

(1) Check that air does not flow from the ports.



(2) Apply battery positive voltage across the terminals.

(3) Check that air flows from the ports.

If operation is not specified, replace the VSV.

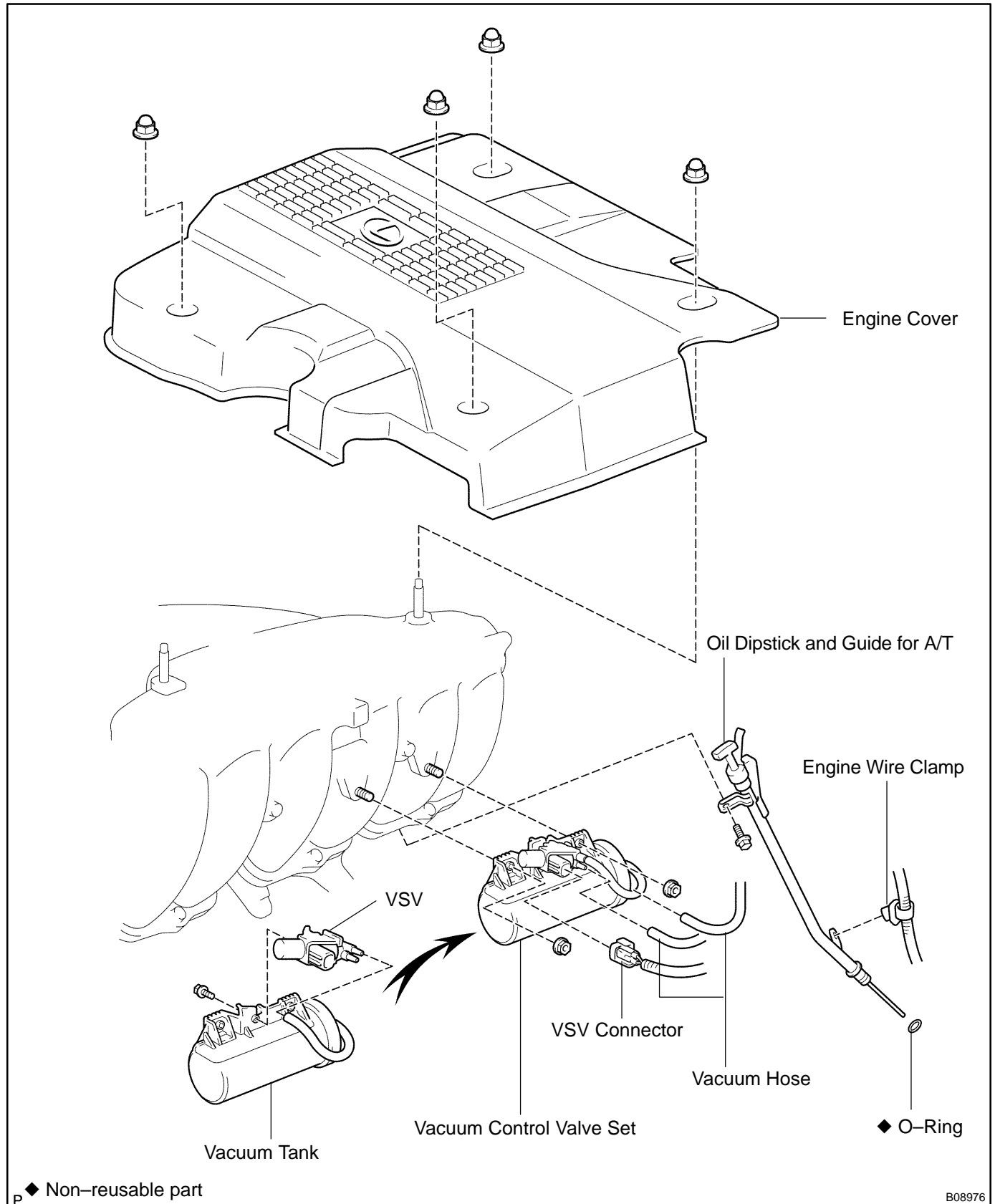
4. REINSTALL VSV

5. REINSTALL ENGINE COVER

Reinstall the engine cover with the 4 nuts.

VSV FOR ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS) COMPONENTS

SF001-02



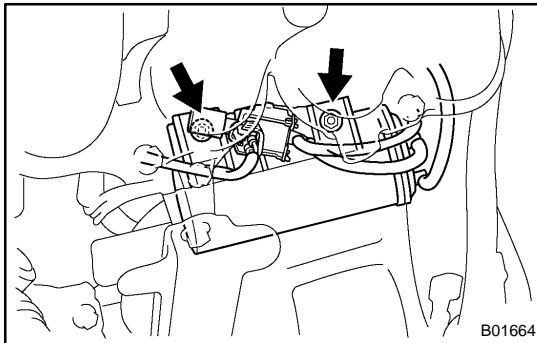
B08976

INSPECTION

1. REMOVE ENGINE COVER

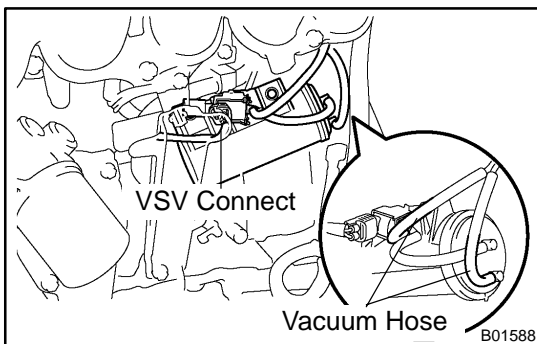
Remove the 4 nuts and engine cover.

2. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page [EM-62](#))



3. REMOVE VACUUM CONTROL VALVE SET

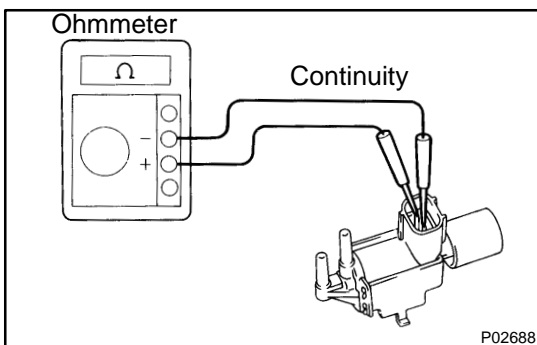
- (a) Remove the 2 nuts, and disconnect the vacuum tank from the intake manifold.



- (b) Disconnect VSV connector and vacuum hoses, and remove the vacuum control valve set.

4. REMOVE VSV

Remove the screw, vacuum hose and VSV.

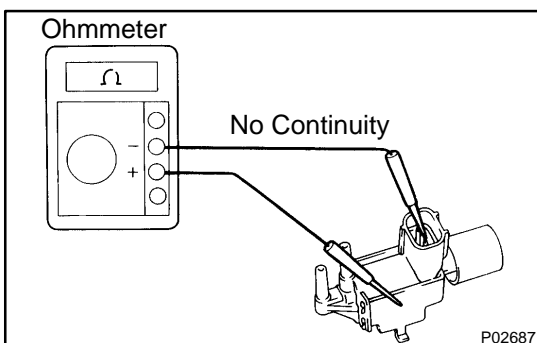


5. INSPECT VSV

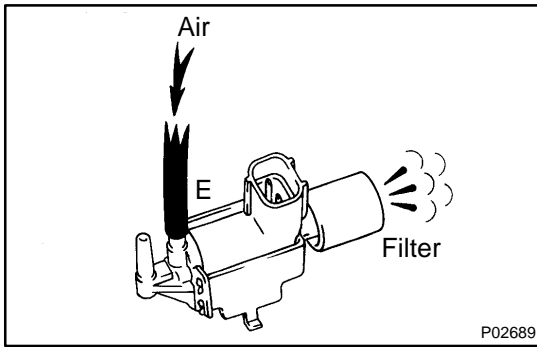
- (a) Inspect the VSV for open circuit.
Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 38.5 – 44.5 Ω at 20°C (68°F)

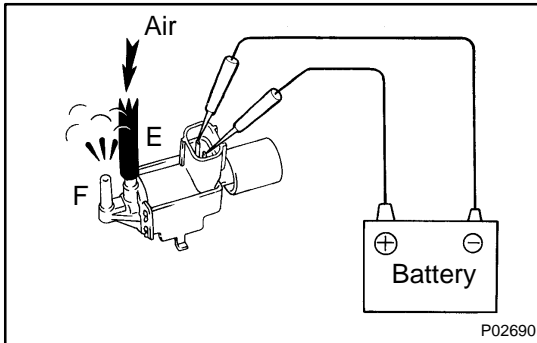
If there is no continuity, replace the VSV.



- (b) Inspect the VSV for ground.
Using an ohmmeter, check that there is no continuity between each terminal and the body.
If there is continuity, replace the VSV.



- (c) Inspect the VSV operation.
(1) Check that air flows from port E to the filter.



- (2) Apply battery positive voltage across the terminals.
(3) Check that air flows from ports E to F.

6. REINSTALL VSV

- (a) Install the VSV with the screw to the vacuum tank.
(b) Install the vacuum hose.

7. REINSTALL VACUUM CONTROL VALVE SET

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

8. REINSTALL OIL DIPSTICK AND GUIDE FOR A/T

HINT:

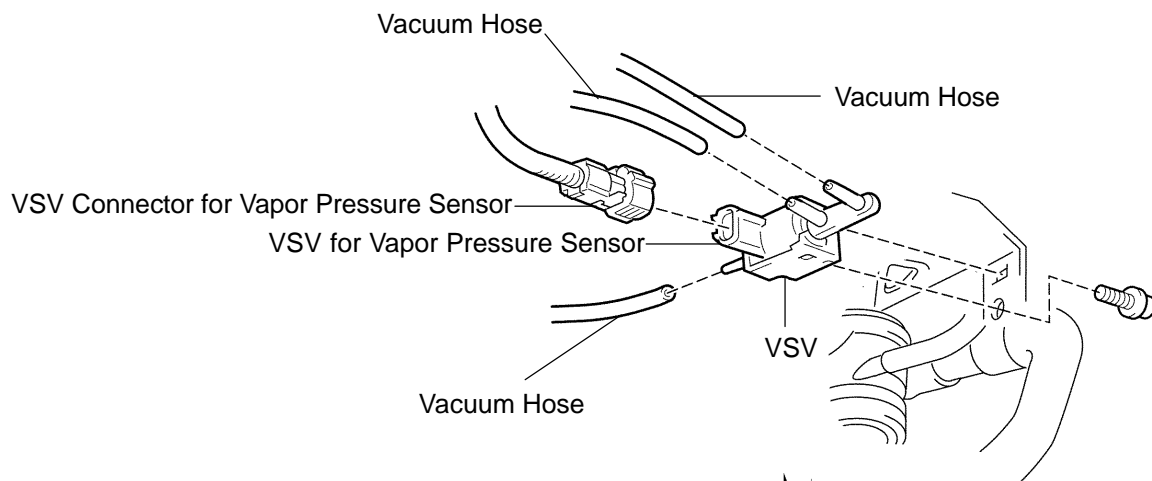
Using a new O-ring.

9. REINSTALL SEGINE COVER

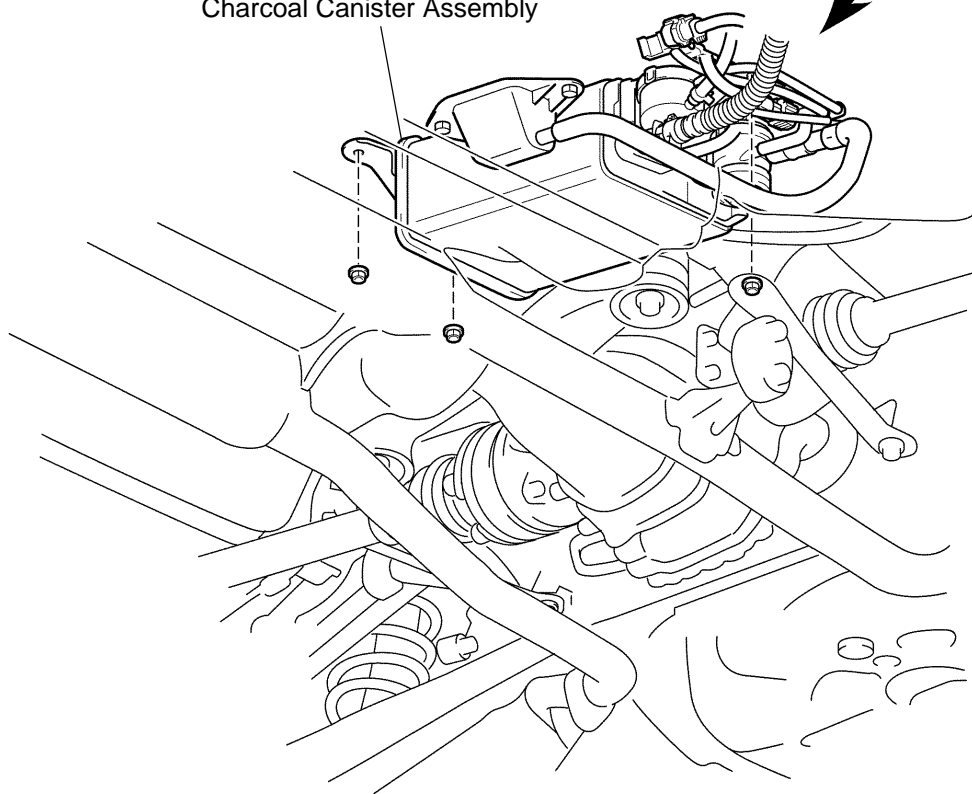
Reinstall the engine cover with the 4 nuts.

VSV FOR VAPOR PRESSURE SENSOR COMPONENTS

SF003-03



Charcoal Canister Assembly



INSPECTION

1. DISCONNECT CHARCOAL CANISTER ASSEMBLY FROM BODY

Remove the 3 nuts, and disconnect the charcoal canister from the body.

2. REMOVE VSV

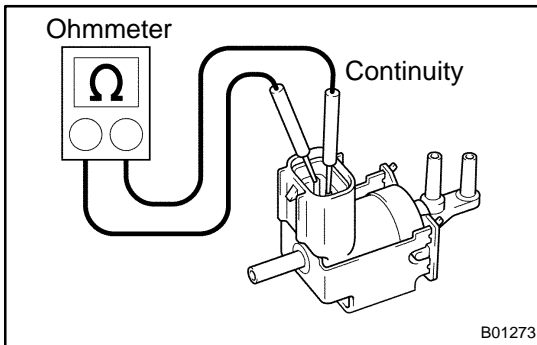
3. INSPECT VSV

(a) Inspect the VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 33 – 39 Ω at 20°C (68°F)

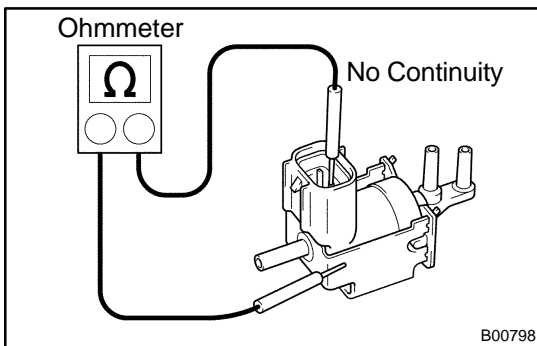
If there is no continuity, replace the VSV.



(b) Inspect the VSV for ground.

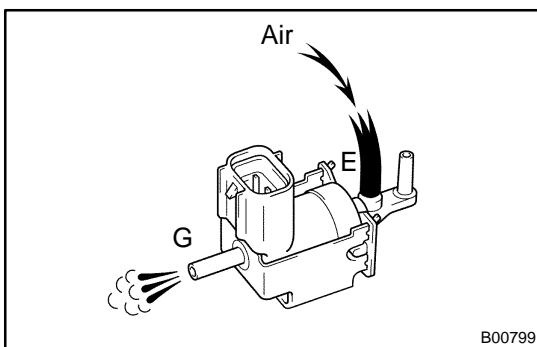
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(c) Inspect the VSV operation.

(1) Check that air flows from ports E to G.



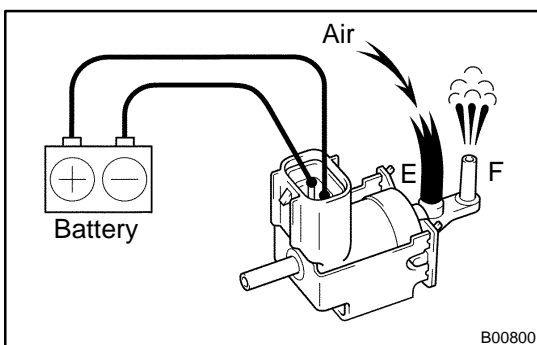
(2) Apply battery positive voltage across the terminals.

(3) Check that air flows from ports E to F.

If operation is not as specified, replace the VSV.

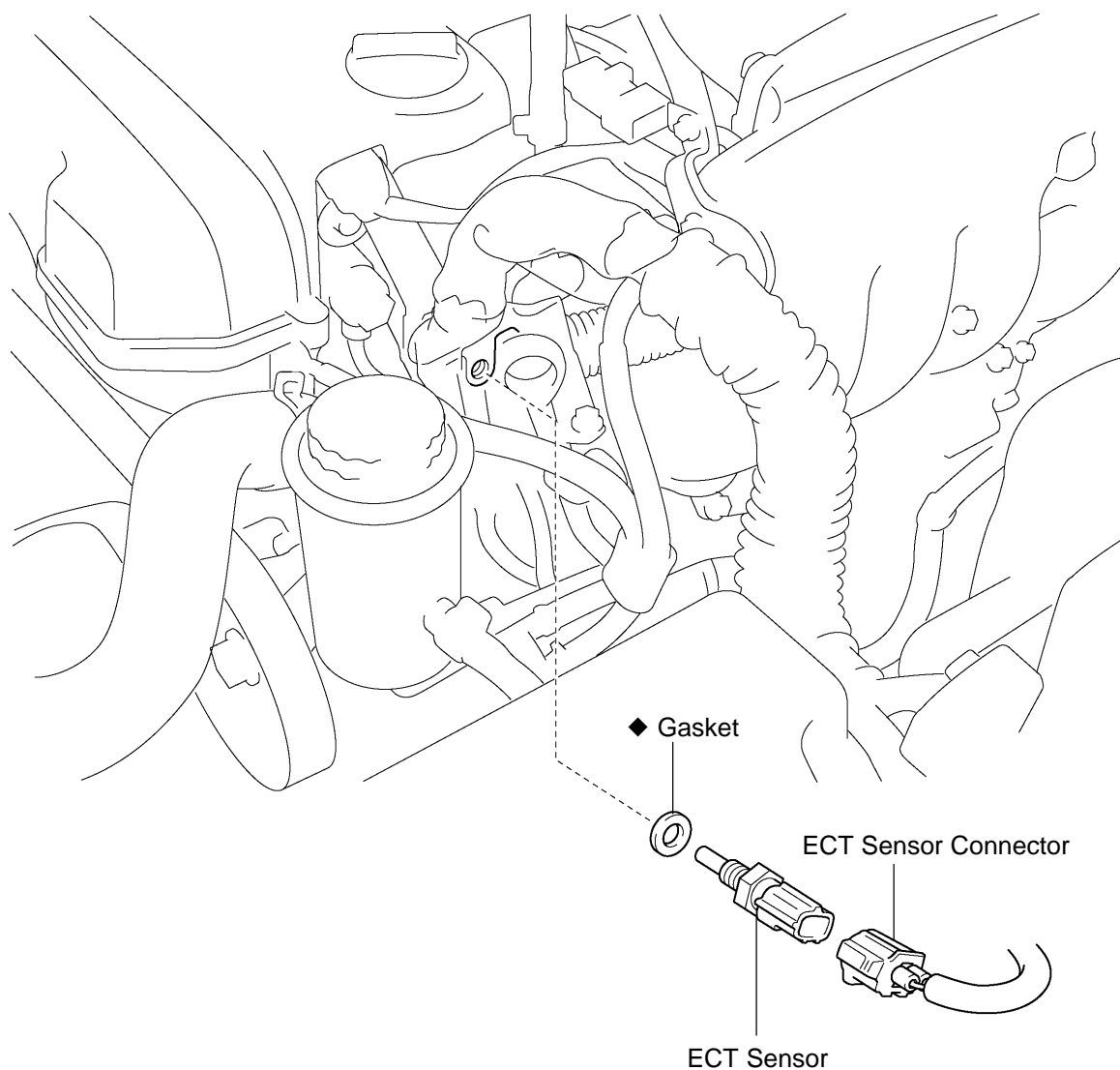
4. REINSTALL VSV

5. REINSTALL CHARCOAL CANISTER ASSEMBLY



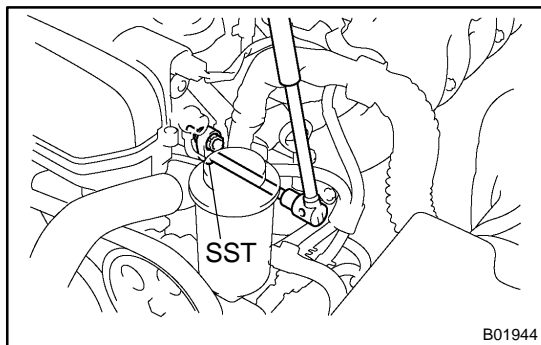
ENGINE COOLANT TEMPERATURE (ECT) SENSOR COMPONENTS

SF005-01



◆ Non-reusable part

B02006



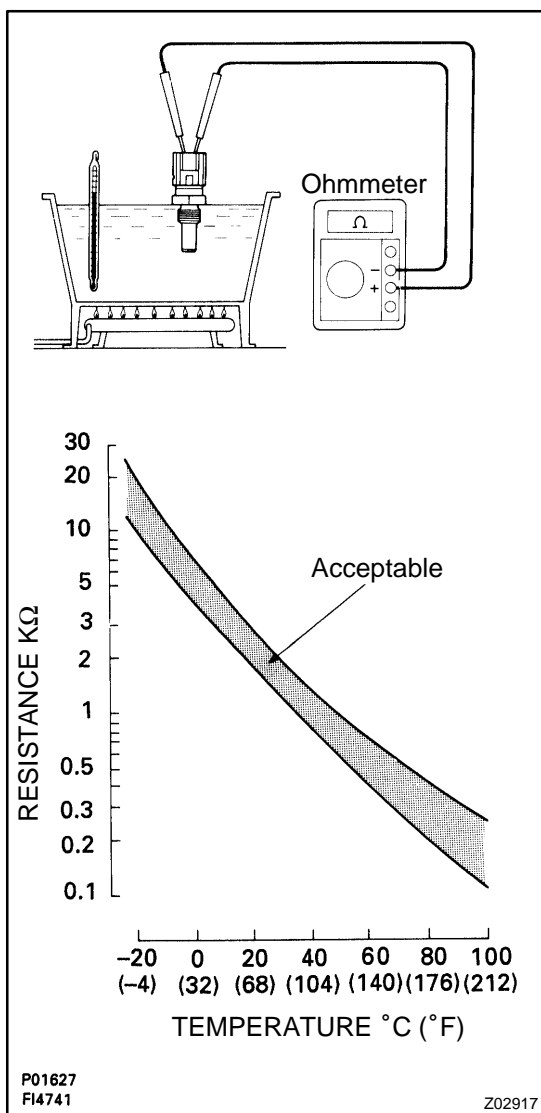
INSPECTION

1. DRAIN ENGINE COOLANT

2. REMOVE ECT SENSOR

- Disconnect the ECT sensor connector.
- Using SST, remove the ECT sensor and gasket.

SST 09205-76030



3. INSPECT ECT SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the graph

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

4. REINSTALL ECT SENSOR

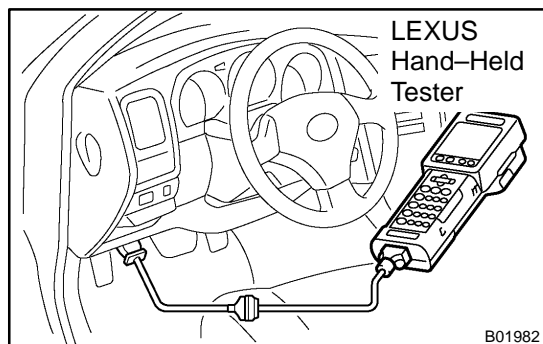
- Install a new gasket to the ECT sensor.
- Using SST, install the ECT sensor.

SST 09205-76030

Torque: 19.6 N·m (200 kgf·cm, 14 ft·lbf)

- Connect the ECT sensor connector.

5. REFILL WITH ENGINE COOLANT



FUEL PUMP ON-VEHICLE INSPECTION

SF0N2-05

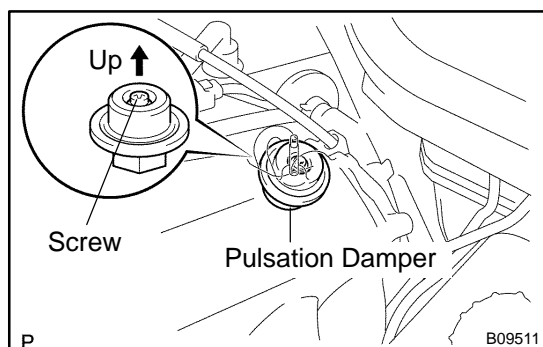
1. CHECK FUEL PUMP OPERATION

- Connect a LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON and LEXUS hand-held tester main switch ON.

NOTICE:

Do not start the engine.

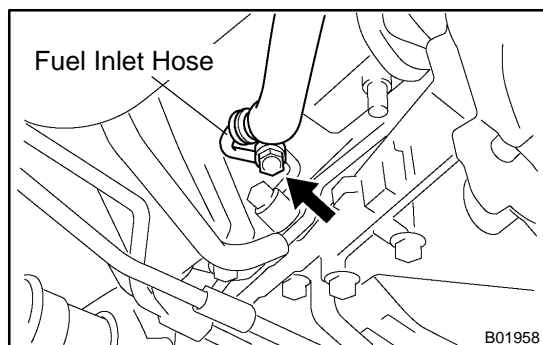
- Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- Please refer to the LEXUS hand-held tester operator's manual for further details.
- If you have no LEXUS hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See step 3)



- Check that the pulsation damper screw rises up when the fuel pump operates.

If there is no pressure, check the fusible link, fuses, EFI main relay, fuel pump ECU, fuel pump, ECM and wiring connections.

- Turn the ignition switch OFF.
- Disconnect the LEXUS hand-held tester from the DLC3.

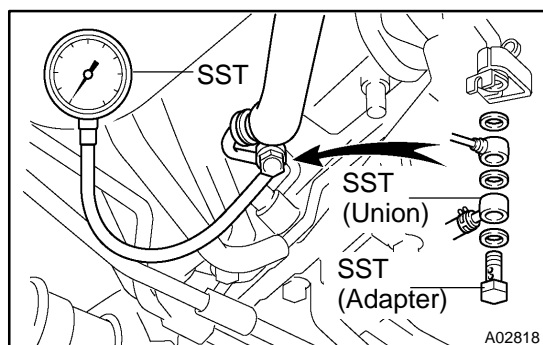


2. CHECK FUEL PRESSURE

- Check the battery positive voltage is above 12 V.
- Disconnect the negative (–) terminal cable from the battery.
- Remove the union bolt and 2 gaskets, and disconnect the fuel inlet hose from the fuel pipe support.

NOTICE:

- Put a shop towel under the fuel pipe support.
- Slowly loosen the union bolt.

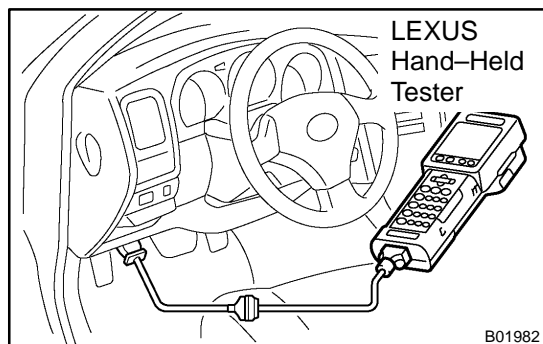


- Install the fuel inlet hose and SST (pressure gauge) to the fuel pipe support with the 3 gaskets and SST (union and adapter).

SST 09268–45014 (09268–41190, 90405–06167)

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

- Wipe off any splattered gasoline.



- (f) Connect a LEXUS hand-held tester to the DLC3.
(See step 1 in check fuel pump operation (a) to (e))
- (g) Measure the fuel pressure.

Fuel pressure:

304 – 343 kPa (3.1 – 3.5 kgf/cm², 44 – 50 psi)

If pressure is high, replace the fuel pressure regulator.

If pressure is low, check the fuel hoses and connections, fuel pump, fuel filter and fuel pressure regulator.

- (h) Disconnect the LEXUS hand-held tester from the DLC3.
- (i) Start the engine.
- (j) Measure the fuel pressure at idle.

Fuel pressure:

304 – 343 kPa (3.1 – 3.5 kgf/cm², 44 – 50 psi)

- (k) Stop the engine.

- (l) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.

Fuel pressure: 147 kPa (1.5 kgf/cm², 21 psi) or more

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

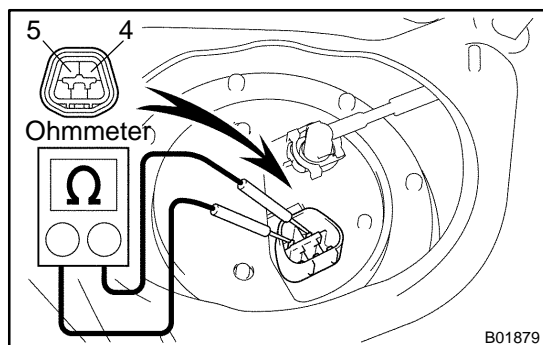
- (m) After checking fuel pressure, disconnect the negative (–) terminal cable from the battery and carefully remove SST to prevent gasoline from splashing.

SST 09268–45014

- (n) Reconnect the fuel inlet hose to the fuel pipe support with 2 new gaskets and the union bolt.

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

- (o) Reconnect the negative (–) terminal cable to the battery.
- (p) Check for fuel leaks.

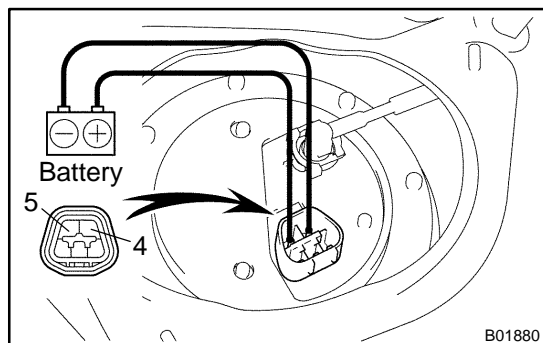


3. INSPECT FUEL PUMP

- (a) Remove the rear seat cushion.
- (b) Remove the 3 cap nuts and floor service hole cover.
- (c) Disconnect the fuel pump & sender gauge connector.
- (d) Using an ohmmeter, measure the resistance between terminals 4 and 5.

Resistance: 0.2 – 3.0 Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel pump.



- (e) Inspect the fuel pump operation.
Connect the positive (+) lead from the battery to terminal 4 of the connector, and the negative (–) lead to terminal 5. Check that the fuel pump operates.

NOTICE:

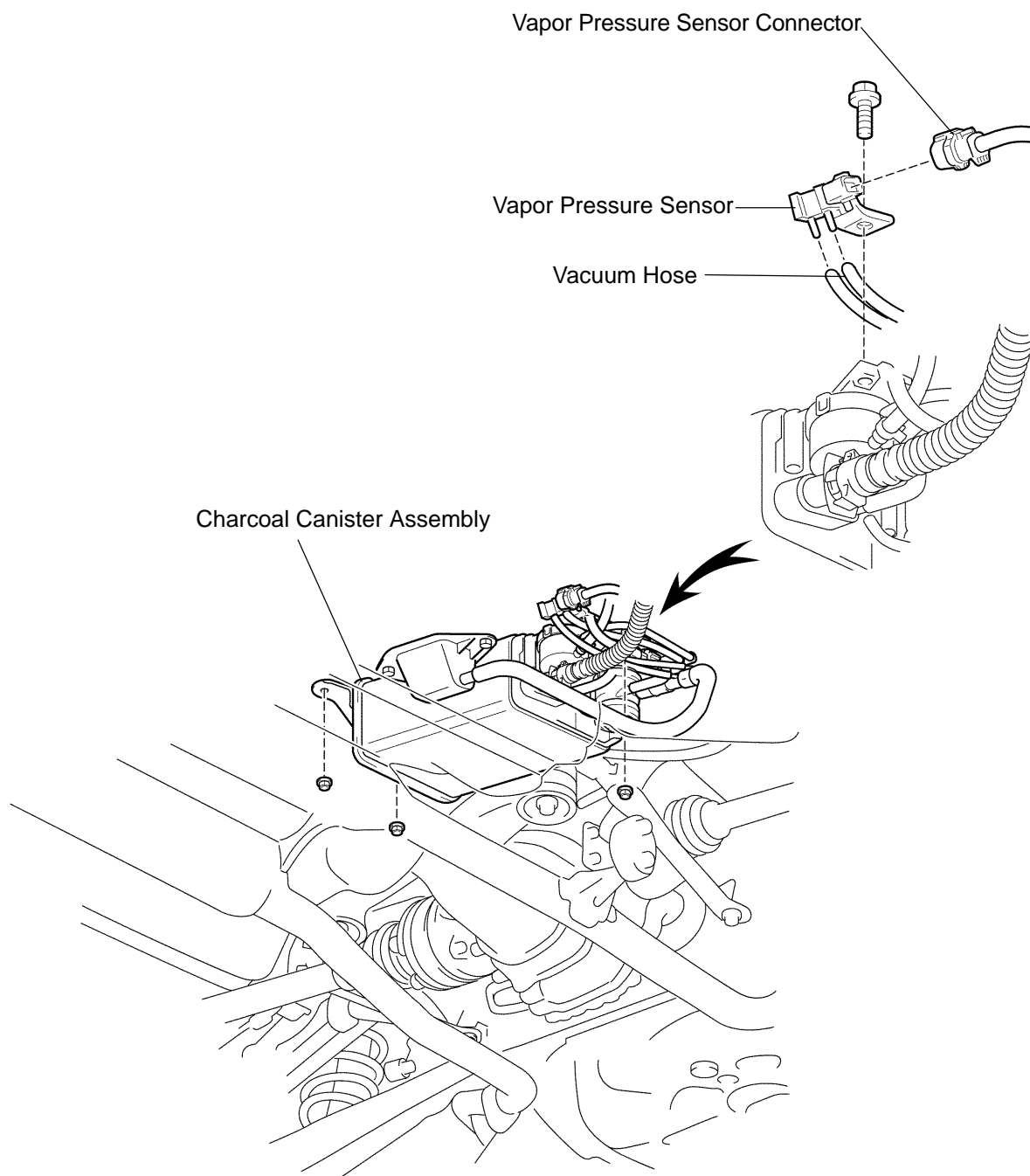
- These tests must be done quickly (within 10 seconds) to prevent the coil burning out.
- Keep the fuel pump as far away from the battery as possible.
- Always do the switching at the battery side.

If operation is not as specified, replace the fuel pump.

- (f) Reconnect the fuel pump & sender gauge connector.
- (g) Reinstall the floor service hole cover with the cap nuts.
- (h) Reinstall the rear seat cushion.

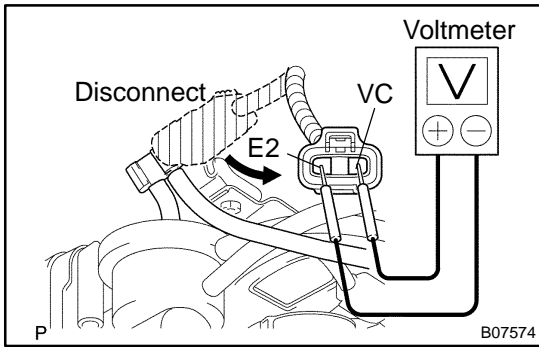
VAPOR PRESSURE SENSOR COMPONENTS

SF02Q-02



P

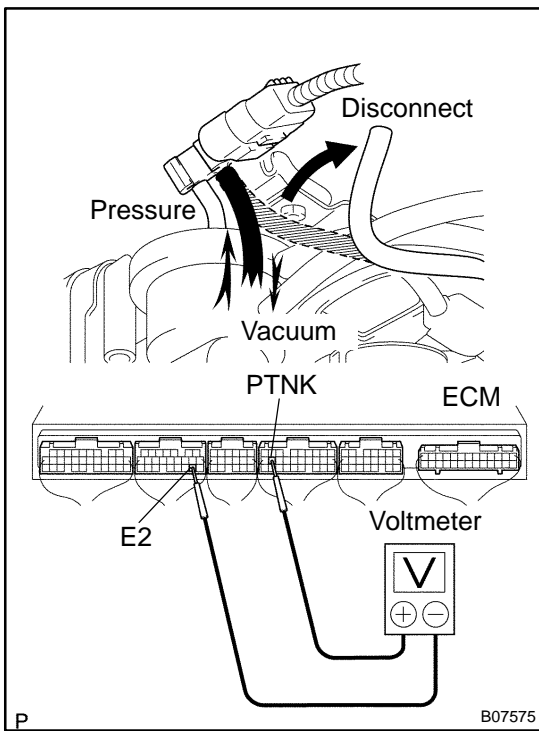
B07573



INSPECTION

1. INSPECT POWER SOURCE VOLTAGE OF VAPOR PRESSURE SENSOR

- Disconnect the vapor pressure sensor connector.
- Turn the ignition switch ON.
- Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.
Voltage: 4.5 – 5.5 V
- Turn the ignition switch OFF.
- Reconnect the vapor pressure sensor connector.

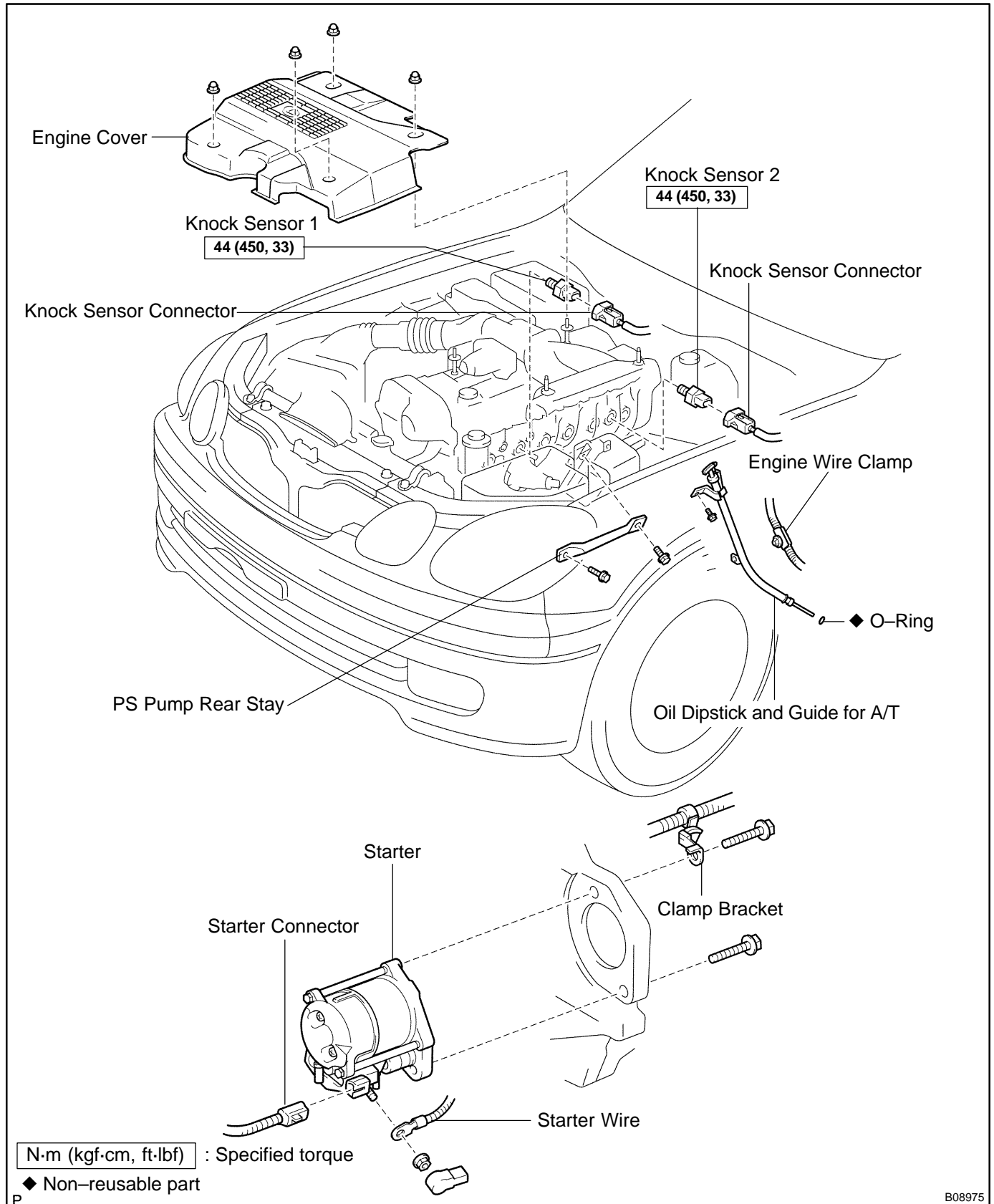


2. INSPECT POWER OUTPUT OF VAPOR PRESSURE SENSOR

- Turn the ignition switch ON.
- Disconnect the vacuum hose from the vapor pressure sensor.
- Connect a voltmeter to terminals PTNK and E2 of the ECM, and measure the output voltage under these conditions:
 - Apply vacuum (2.0 kPa (15 mmHg, 0.59 in.Hg)) to the vapor pressure sensor.
Voltage: 1.3 – 2.1 V
 - Release the vacuum from the vapor pressure sensor.
Voltage: 3.0 – 3.6 V
 - Apply pressure (1.5 kPa (15 gf/cm², 0.22 psi)) to the vapor pressure sensor.
Voltage: 4.2 – 4.8 V
- Turn the ignition switch OFF.
- Reconnect the vacuum hose to the vapor pressure sensor.

KNOCK SENSOR COMPONENTS

SF009-04

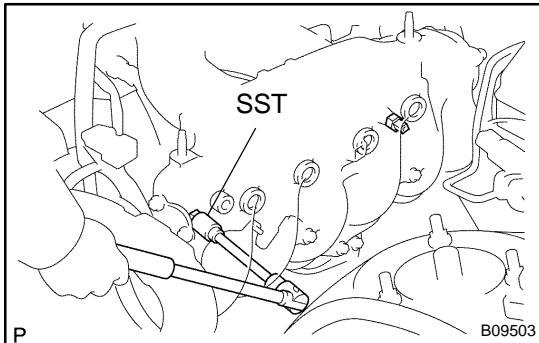


B08975

INSPECTION

1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



2. REMOVE PS PUMP REAR STAY

3. REMOVE KNOCK SENSOR 1

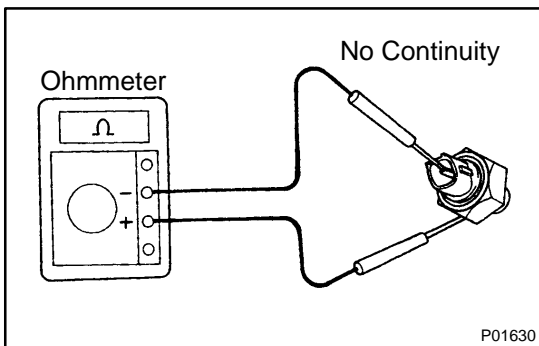
- (a) Disconnect the knock sensor connector.
- (b) Using SST, remove the knock sensor.

SST 09816-30010

4. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM-62)

5. REMOVE STARTER (See page ST-4)

6. REMOVE KNOCK SENSOR 2 (See step 2)



7. INSPECT KNOCK SENSORS

Using an ohmmeter, check that there is no continuity between the terminal and body.

If there is continuity, replace the sensor.

8. REINSTALL KNOCK SENSORS

- (a) Using SST, install the knock sensor.

SST 09816-30010

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

- (b) Connect the knock sensor connector.

9. REINSTALL STARTER (See page ST-16)

10. REINSTALL OIL DIPSTICK AND GUIDE FOR A/T

HINT:

Use a new O-ring.

11. REINSTALL PS PUMP REAR STAY

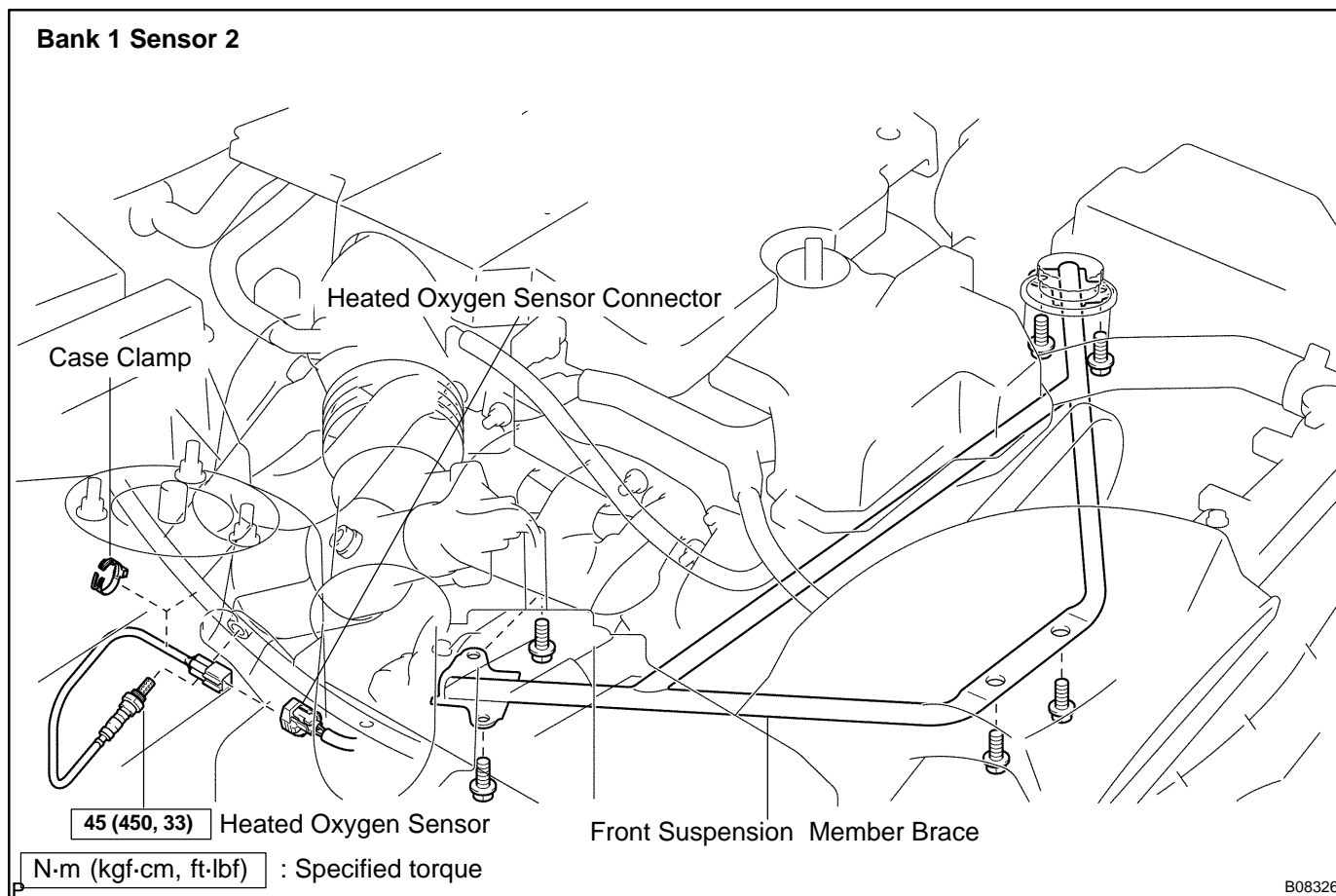
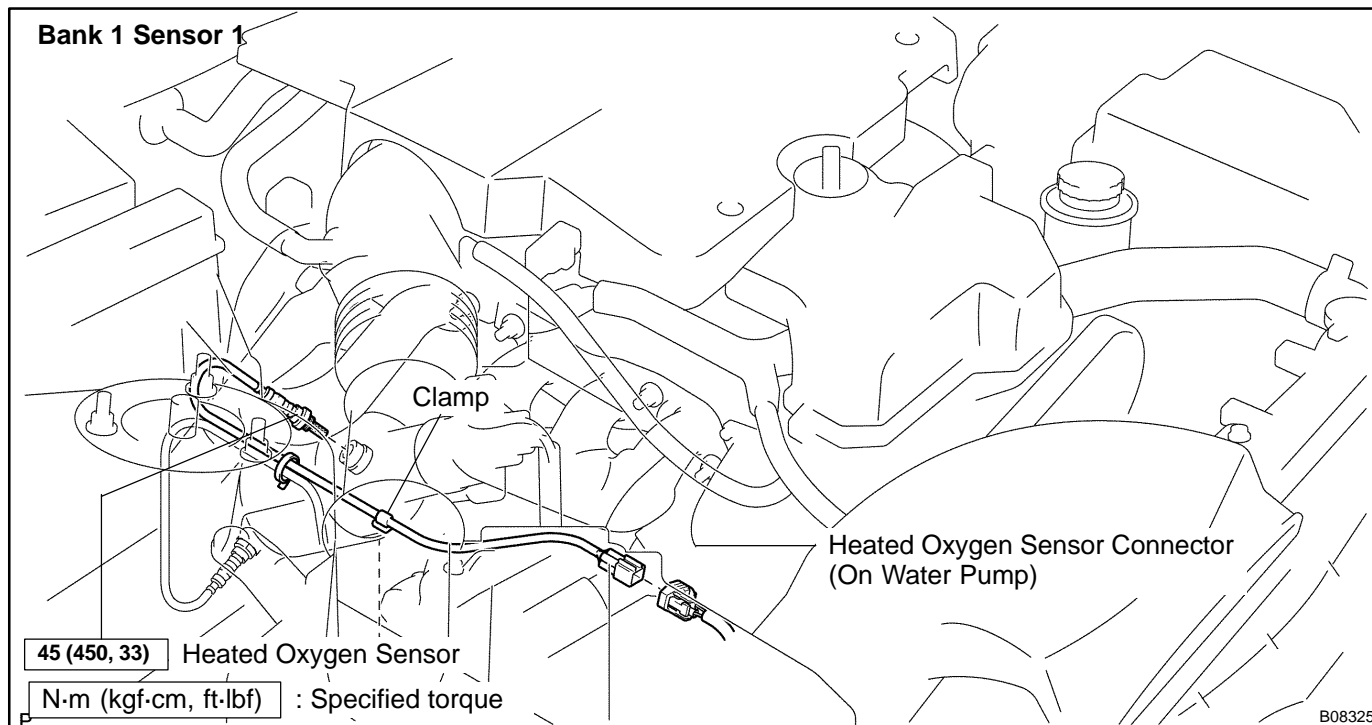
Torque: 39.2 N·m (400 kgf·cm, 29 ft·lbf)

12. REINSTALL ENGINE COVER

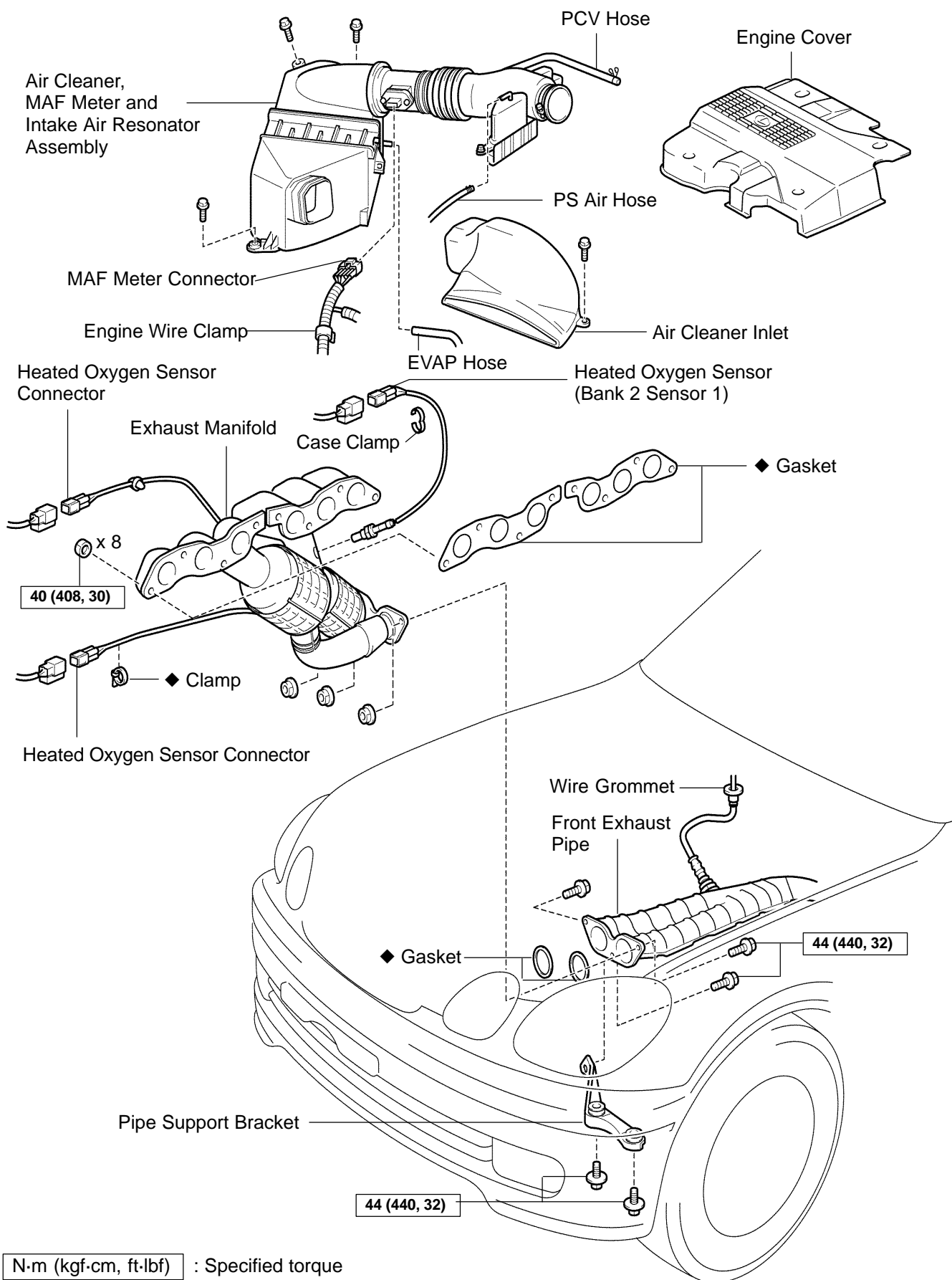
Reinstall the engine cover with the 4 nuts.

HEATED OXYGEN SENSOR COMPONENTS

SF00B-03

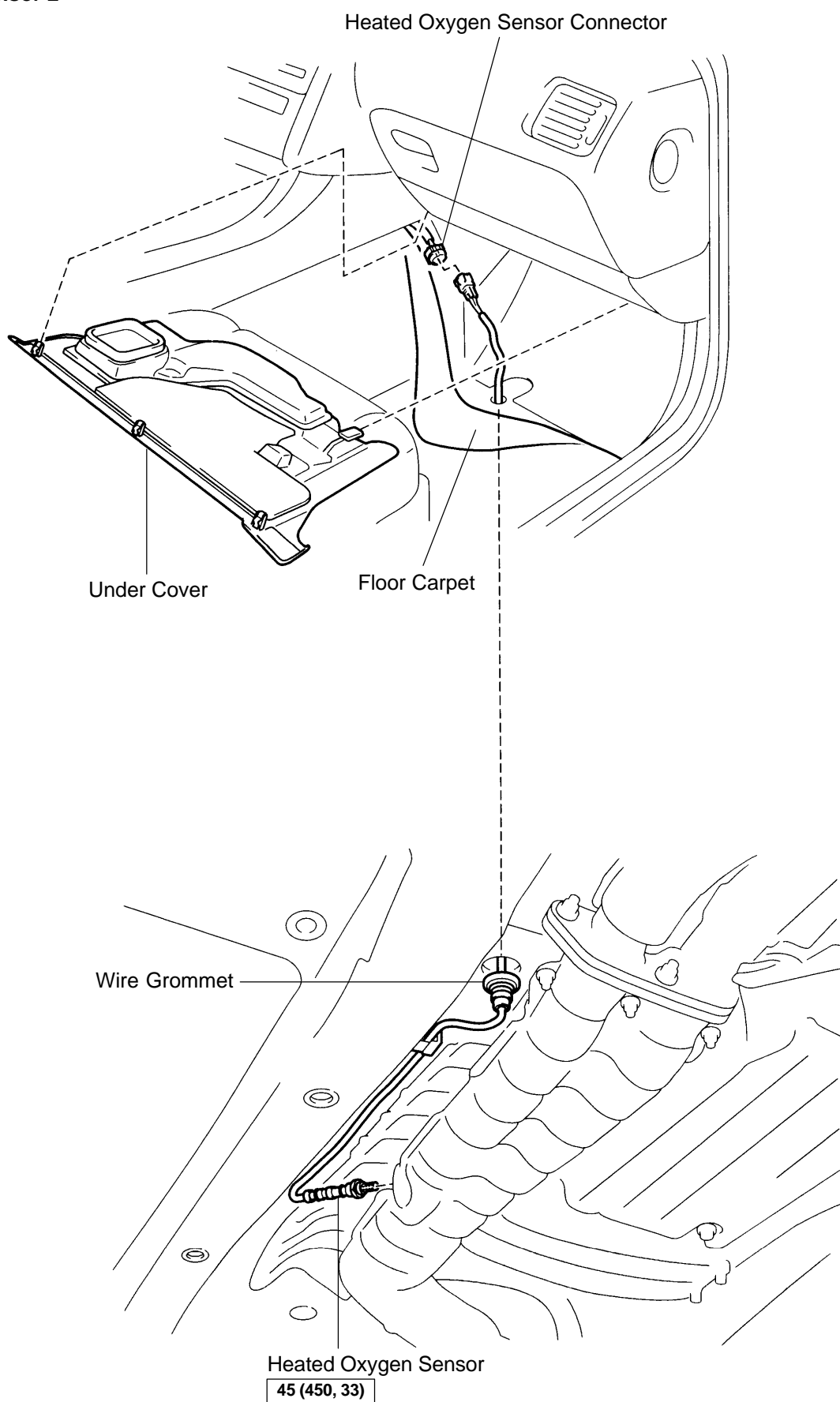


Bank 2 Sensor 1



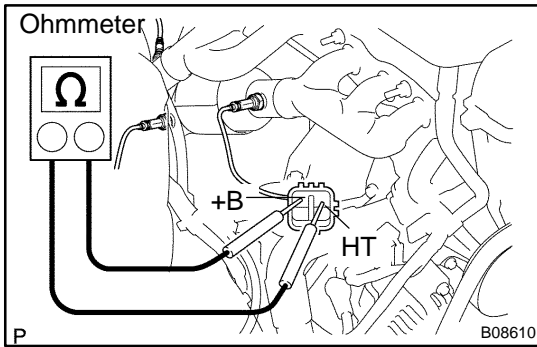
B08327

Bank 2 Sensor 2



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

B02815



INSPECTION

1. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSORS (BANK 1, 2 SENSOR 1 AND BANK 1 SENSOR 2)

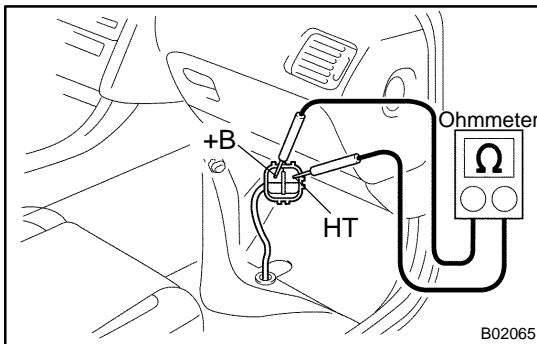
- Disconnect the oxygen sensor connectors.
- Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

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

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

- Reconnect the oxygen sensor connectors.



2. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR (BANK 2 SENSOR 2)

- Take out the front side of the floor carpet.
- Disconnect the oxygen sensor connector. Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

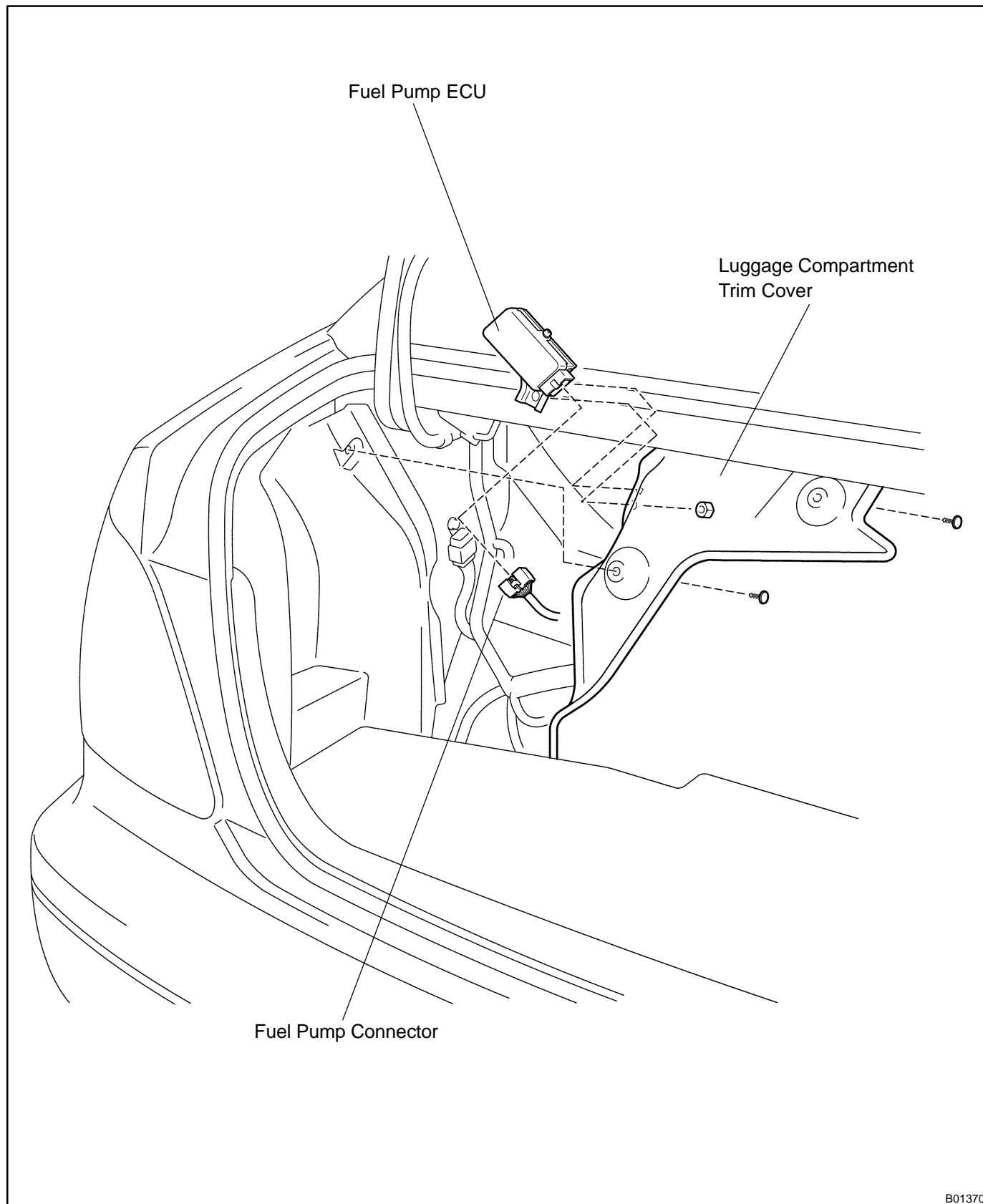
If the resistance is not as specified, replace the sensor.

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

- Reconnect the oxygen sensor connector.
 - Reinstall the floor carpet.
- ### 3. INSPECT OPERATION OF HEATED OXYGEN SENSOR (See page [DI-44](#))

FUEL PUMP ECU COMPONENTS

SF00D-01



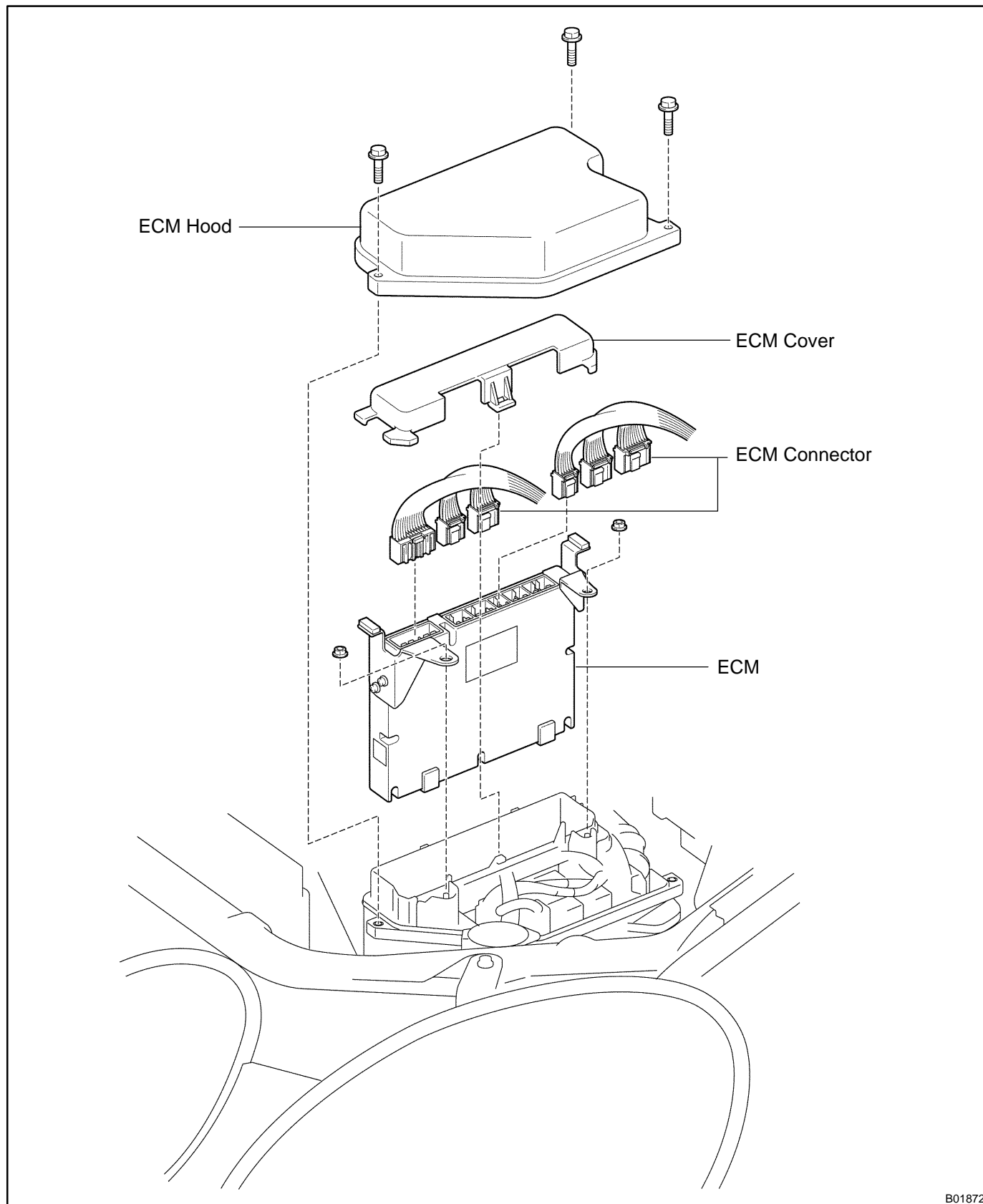
B01370

INSPECTION

1. REMOVE FUEL PUMP ECU
2. INSPECT FUEL PUMP ECU (See page [DI-150](#))
3. REINSTALL FUEL PUMP ECU

ENGINE CONTROL MODULE (ECM) COMPONENTS

SF00F-01



B01872

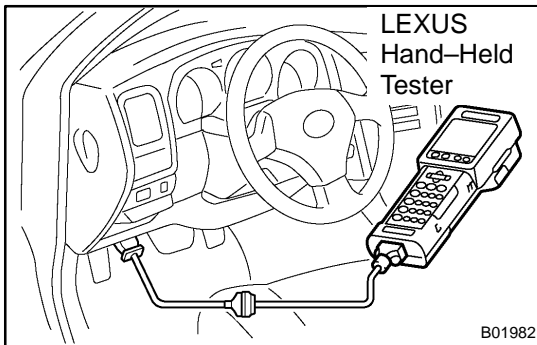
INSPECTION

1. REMOVE ECM
2. INSPECT ECM (See page [DI-20](#))
3. REINSTALL ECM

FUEL CUT RPM INSPECTION

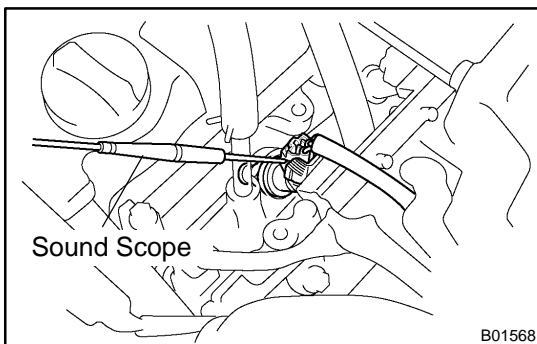
1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.



2. CONNECT LEXUS HAND-HELD TESTER OR OBDII SCAN TOOL

- Connect the LEXUS hand-held tester or OBDII scan tool to the DLC3.
- Please refer to the LEXUS hand-held tester or OBDII scan tool operator's manual for further details.



3. INSPECT FUEL CUT-OFF OPERATION

- Increase the engine speed to at least 3,000 rpm.
- Check for injector operating noise.
- Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

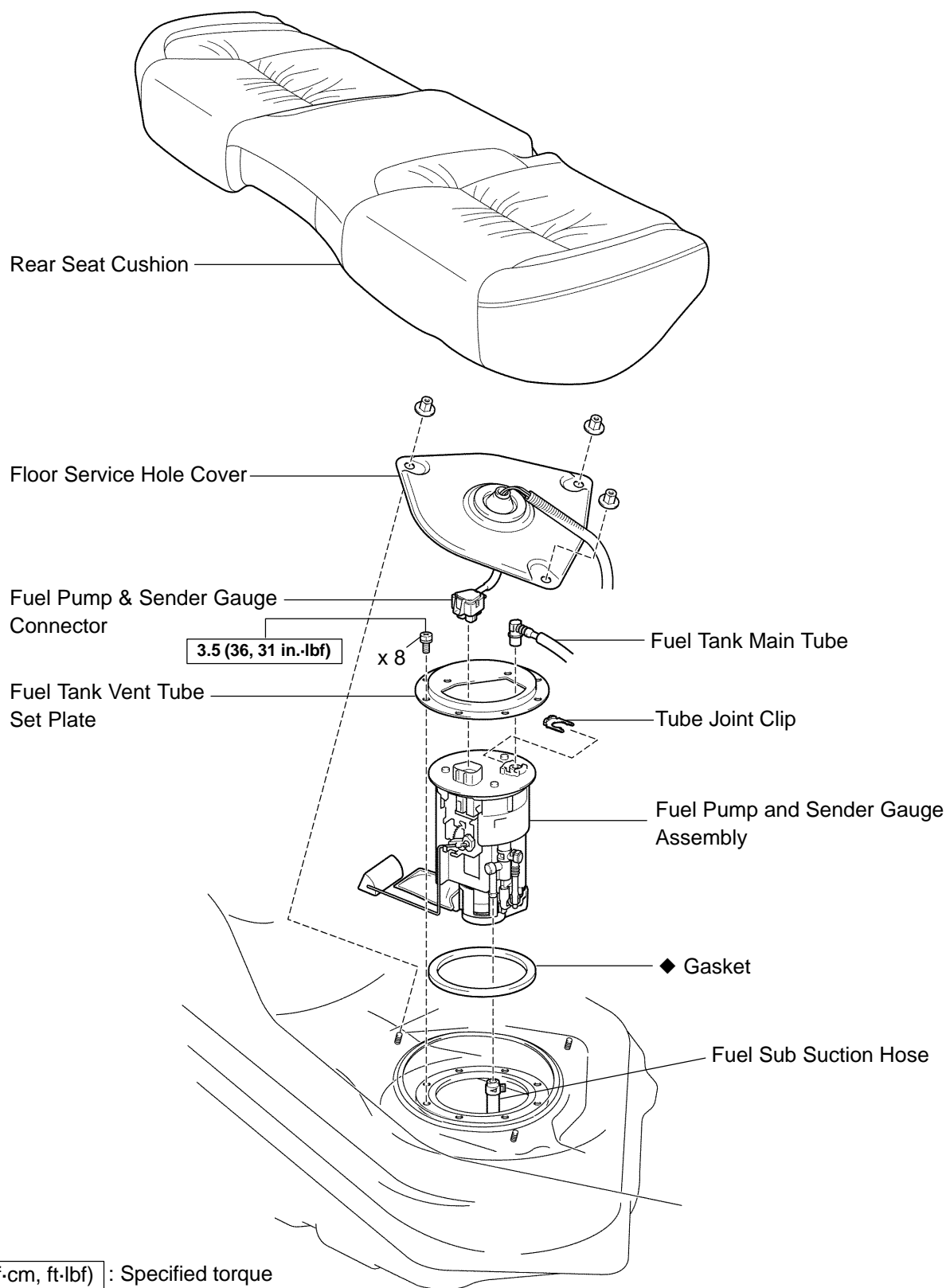
HINT:

Measure with the A/C OFF.

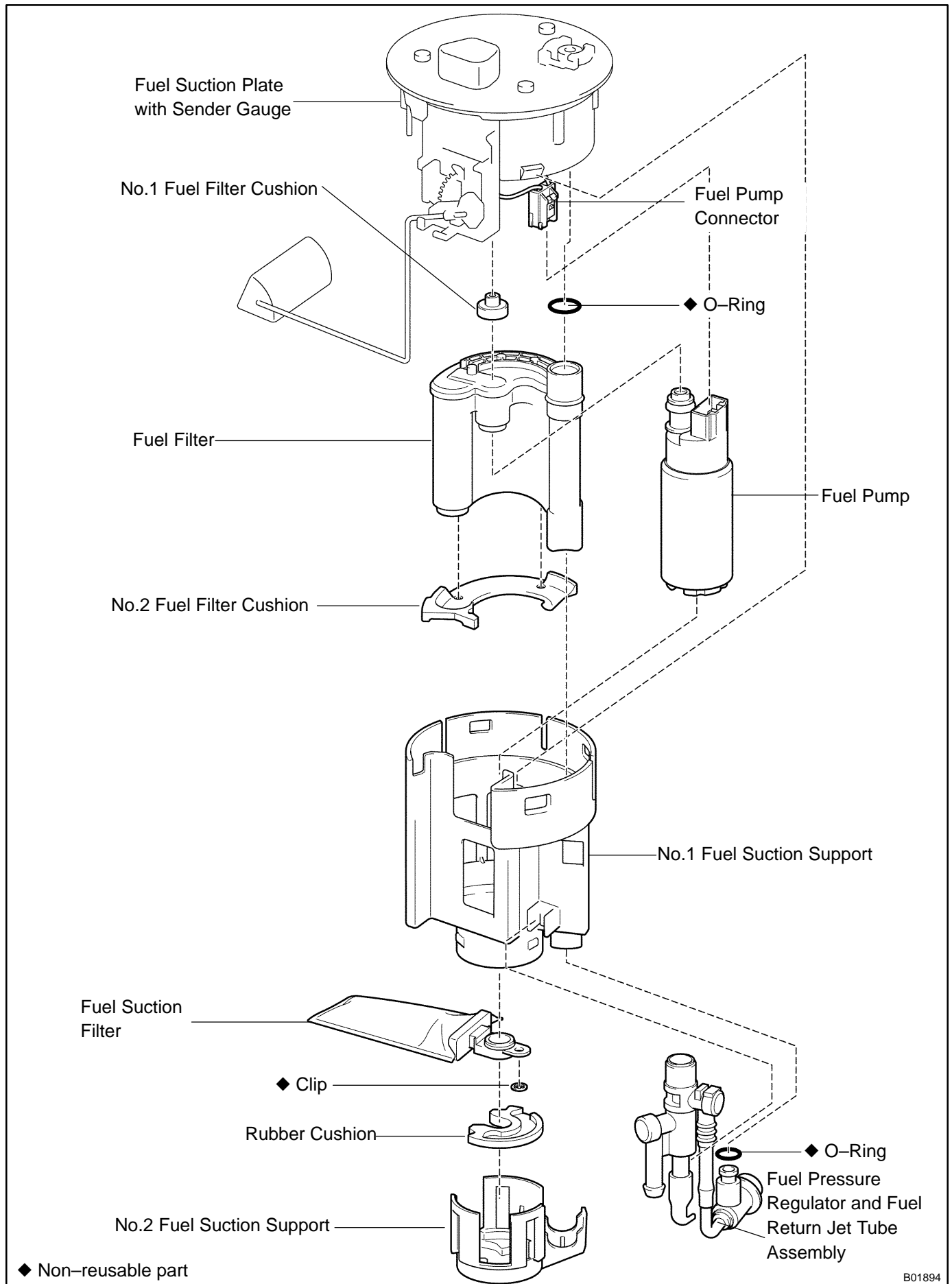
Fuel return rpm: 1,000 rpm

4. DISCONNECT LEXUS HAND-HELD TESTER OR OBDII SCAN TOOL

COMPONENTS



B01873



B01894

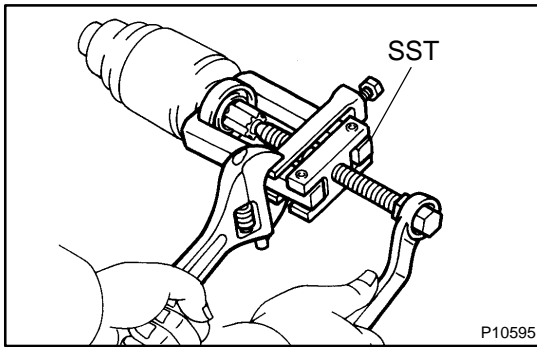
STARTING SYSTEM

ON-VEHICLE INSPECTION

ST04X-01

NOTICE:

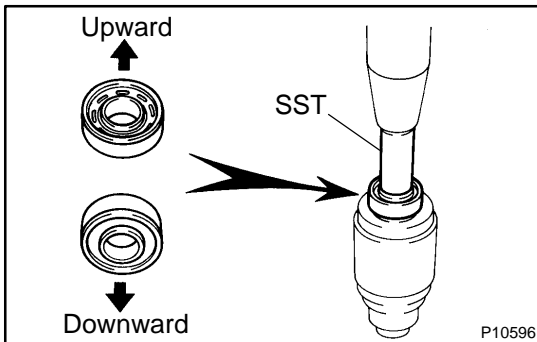
- Before changing the starter, check the following items again:
- Connector connection
- Accessory installation, e.g.: theft deterrent system



REPLACEMENT

1. REPLACE FRONT BEARING

- (a) Using SST, remove the bearing.
SST 09286-46011

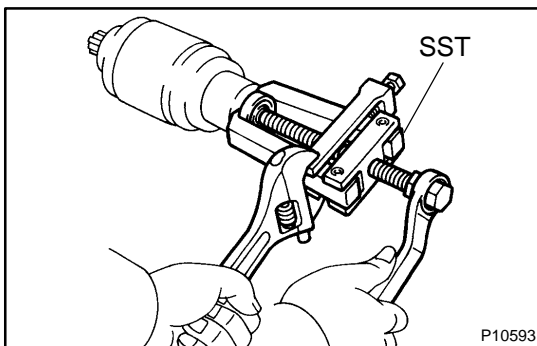


- (b) Using SST and a press, press in a new bearing.

NOTICE:

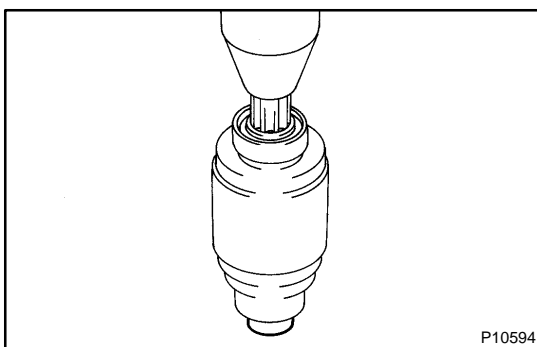
Be careful of the bearing installation direction.

SST 09820-00030

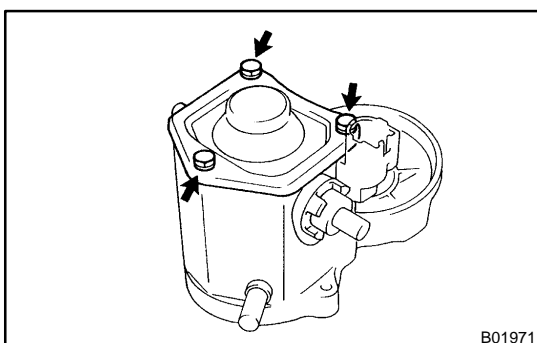


2. REPLACE REAR BEARING

- (a) Using SST, remove the bearing.
SST 09286-46011

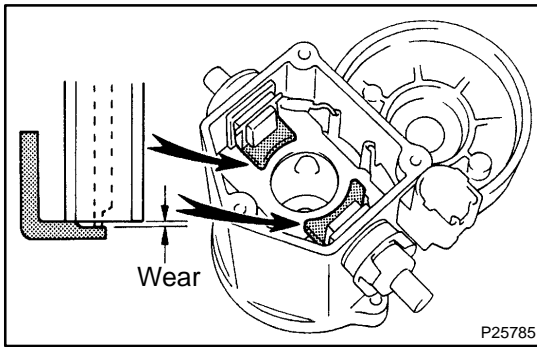


- (b) Using a press, press in a new rear bearing.



3. REPLACE MAGNETIC SWITCH TERMINAL PARTS

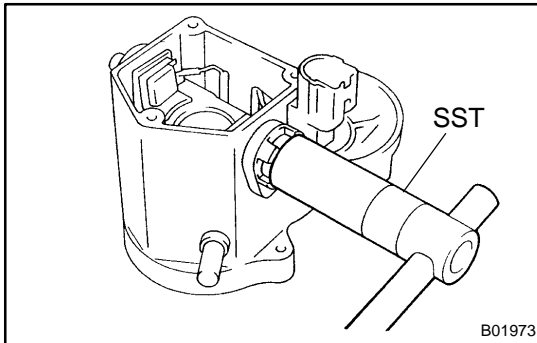
- (a) Remove the 3 bolts, end cover, gasket and plunger.



- (b) Using vernier calipers, measure the contact plate for depth of wear.

Maximum wear: 0.9 mm (0.035 in.)

If the depth of wear is greater than the maximum, replace the contact plate.



- (c) Remove the terminal kit parts.
(1) Using SST, loosen the terminal nuts.

SST 09810-38140

- (2) Terminal C:

Remove the terminal nut, wave washer, terminal insulator (outside), O-ring, terminal bolt, contact plate and terminal insulator (inside).

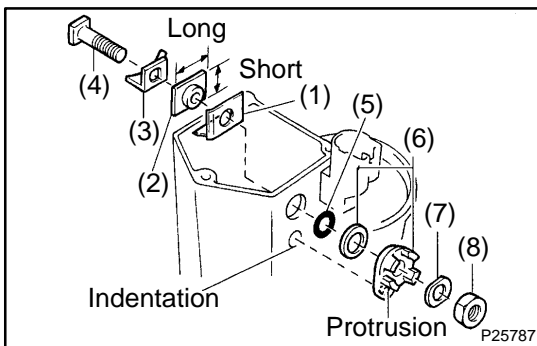
- (3) Terminal 30:

Remove the terminal nut, wave washer, terminal insulator (outside), packing, O-ring, terminal bolt, contact plate, terminal insulator (inside) and insulation paper.

- (d) Temporarily install these new terminal 30 kit parts:

- (1) Insulation paper
- (2) Terminal insulator (inside)
- (3) Contact plate
- (4) Terminal bolt
- (5) O-ring
- (6) Packing and terminal insulator (outside)

Install the packing to the terminal insulator, and install them.



HINT:

Match the protrusion of the insulator with the indentation of the housing.

- (7) Wave washer
- (8) Terminal nut

NOTICE:

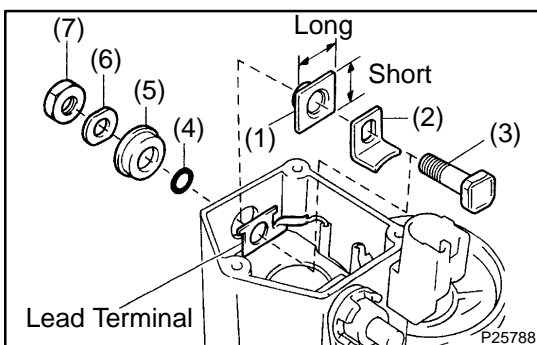
Be careful to install the terminal insulators in the correct direction.

- (e) Temporarily install these new terminal C kit parts:

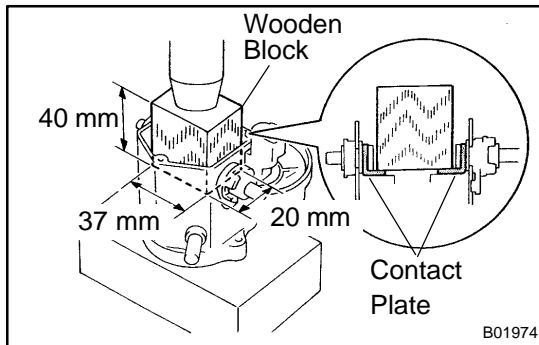
- (1) Terminal insulator (inside)
- (2) Contact plate
- (3) Terminal bolt
- (4) O-ring
- (5) Terminal insulator (outside)
- (6) Wave washer
- (7) Terminal nut

NOTICE:

Be careful to install the terminal insulators in the correct direction.



- (f) Temporarily tighten the terminal nuts.



- (g) Tighten the terminal nut
 (1) Put a wooden block on the contact plate and press it down with a hand press.

Dimensions of wooden block:

20 x 37 x 40 mm (0.79 x 1.46 x 1.57 in.)

Press force:

981 N (100 kgf, 221 lbf)

NOTICE:

- Check the diameter of the hand press ram. Then calculate the gauge pressure of the press when 981 N (100 kgf, 221 lbf) of force is applied.

Gauge pressure:

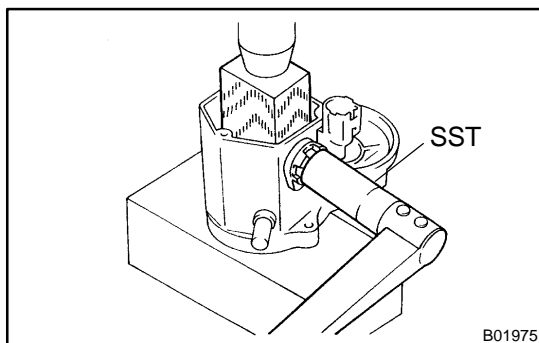
$$(\text{kgf/cm}^2) = \frac{100 \text{ kgf}}{\left(\frac{\text{Ram diameter (cm)}}{2} \right)^2 \times 3.14 (\pi)}$$

$$(\text{psi}) = \frac{221 \text{ lbf}}{\left(\frac{\text{Ram diameter (in.)}}{2} \right)^2 \times 3.14 (\pi)}$$

$$(\text{kPa}) = (\text{kgf/cm}^2) \times 98.1$$

$$(\text{kPa}) = (\text{psi}) \times 6.9$$

- If the contact plate is not pressed down with the specified pressure, the contact plate may tilt due to coil deformation or the tightening of the nut.

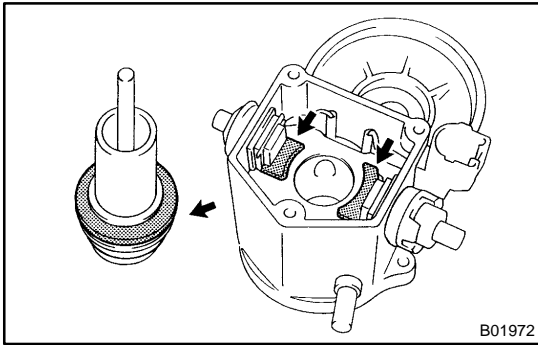


- (2) Using SST, tighten the nuts to the specified torque.
 SST 09810-38140

Torque: 17 N·m (173 kgf-cm, 13 ft-lbf)

NOTICE:

If the nut is over tightened, it may cause cracks on the inside of the insulator.



- (h) Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.
- (i) Reinstall the plunger, new gasket, end cover and lead clamp with the 3 bolts.

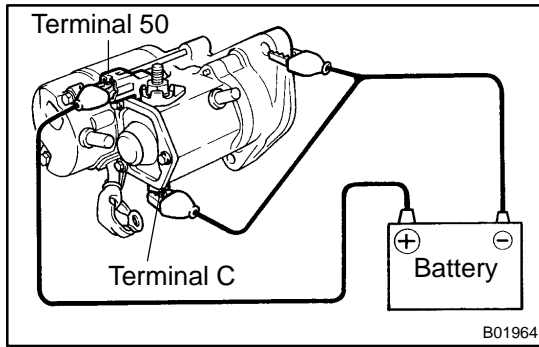
Torque: 2.5 N·m (26 kgf·cm, 22 in.-lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [ST-5](#)).

HINT:

Use high-temperature grease to lubricate the bearings and gears when assembling the starter.



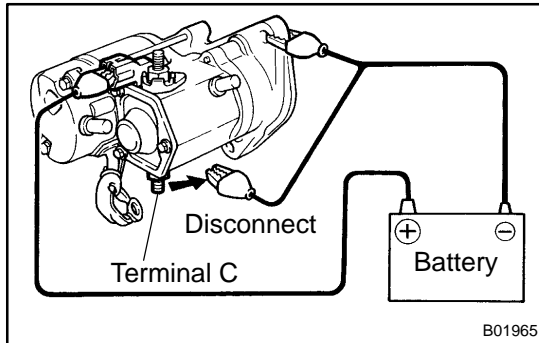
TEST

NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

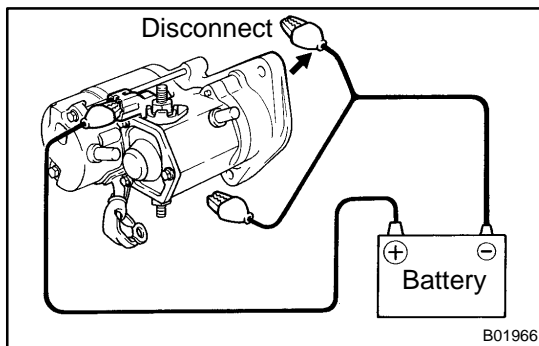
1. DO PULL-IN TEST

- Disconnect the field coil lead wire from terminal C.
- Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.



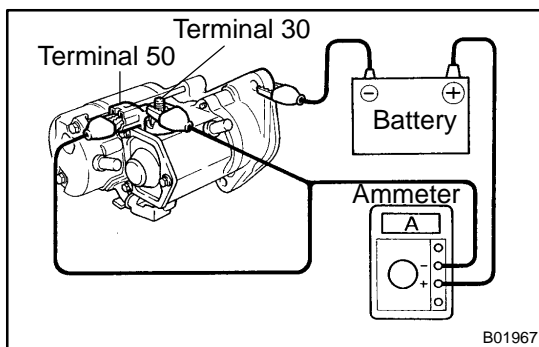
2. DO HOLD-IN TEST

While connected as above with the pinion gear out, disconnect the negative (–) lead from terminal C. Check that the pinion gear remains out.



3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (–) lead from the starter body. Check that the pinion gear returns inward.



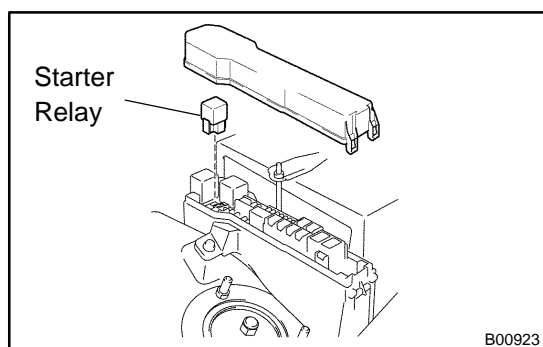
4. DO NO-LOAD PERFORMANCE TEST

- Connect the battery and ammeter to the starter as shown.
- 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

INSTALLATION

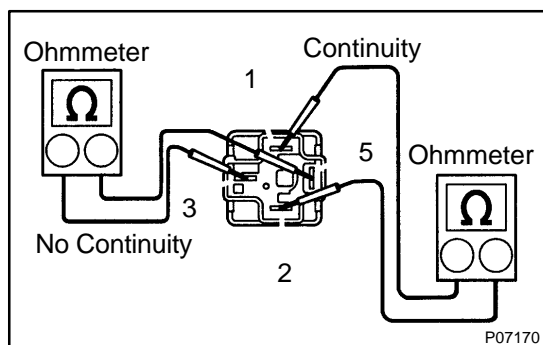
Installation is in the reverse order of removal. (See page [ST-4](#))



STARTER RELAY INSPECTION

ST056-01

1. REMOVE RELAY BOX COVER
2. REMOVE STARTER RELAY



3. INSPECT STARTER RELAY

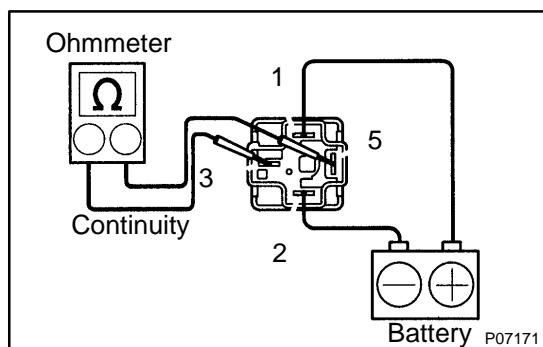
- (a) Inspect the relay continuity.

- (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



- (b) Inspect the relay operation.

- (1) Apply battery positive voltage across terminals 1 and 2.

- (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

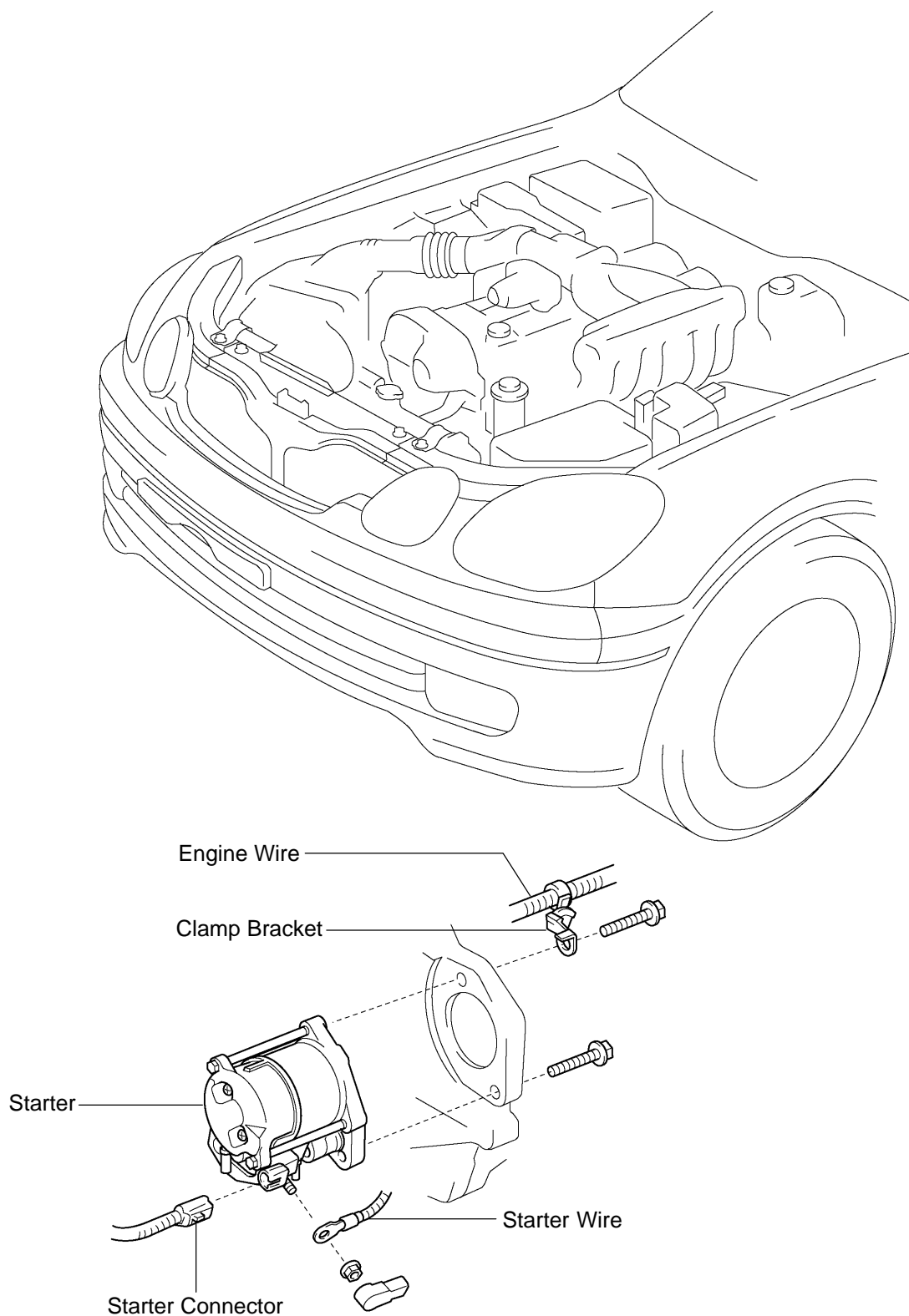
If there is no continuity, replace the relay.

4. REINSTALL STARTER RELAY

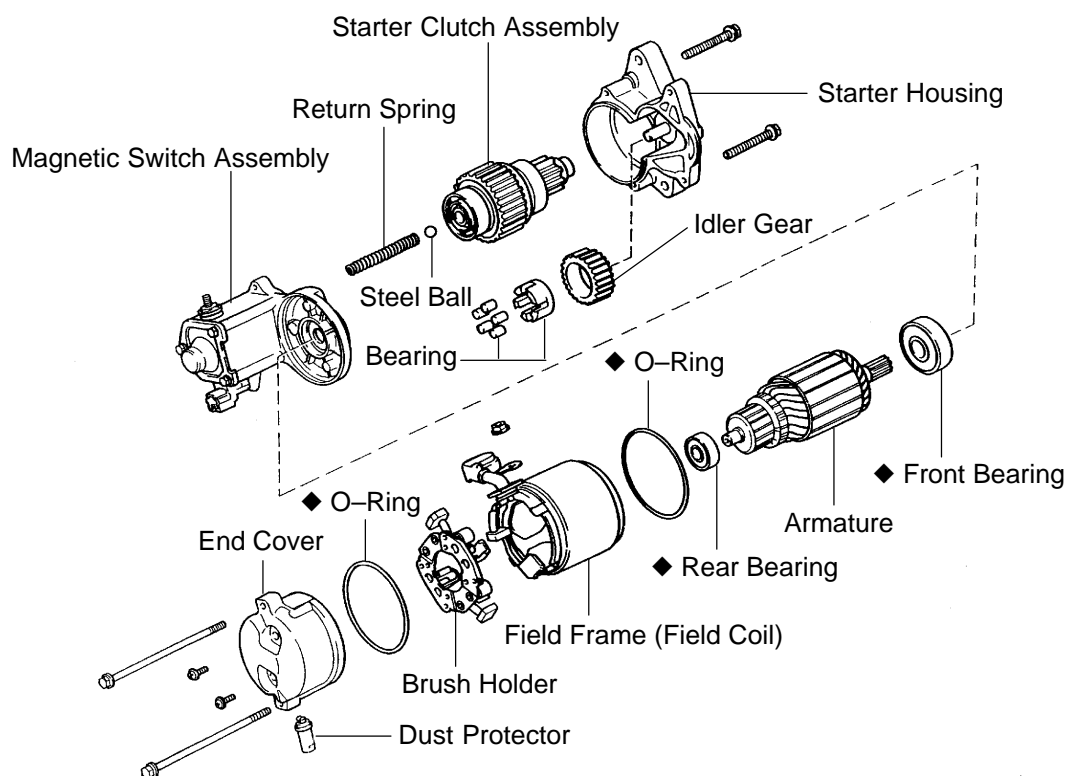
5. REINSTALL RELAY BOX COVER

STARTER COMPONENTS

ST04Y-01



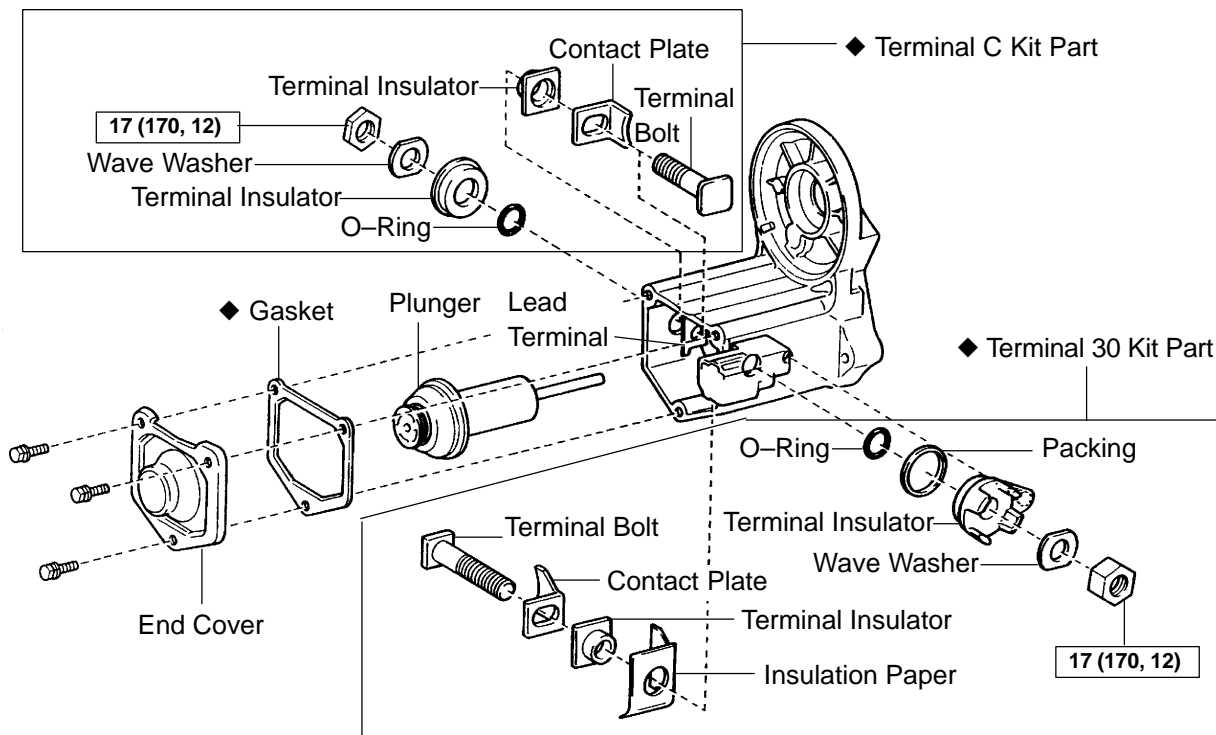
B02010



◆ Non-reusable part

B01640

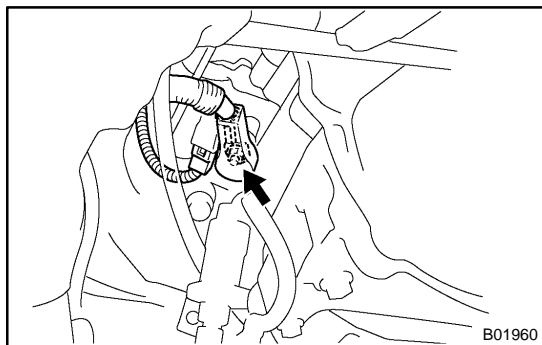
Magnetic Switch Assembly



17 (170, 12) : Specified torque

◆ Non-reusable part

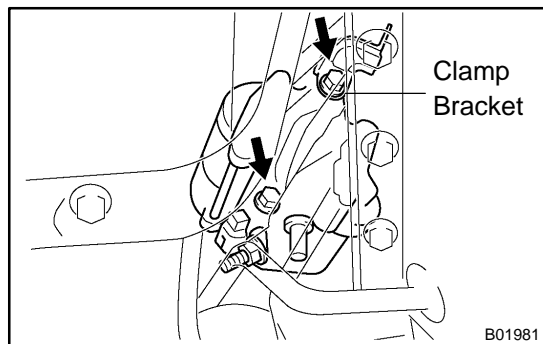
B01641



REMOVAL

REMOVE STARTER

- (a) Remove the rubber cap and nut, and disconnect the starter wire.
- (b) Disconnect the starter connector.

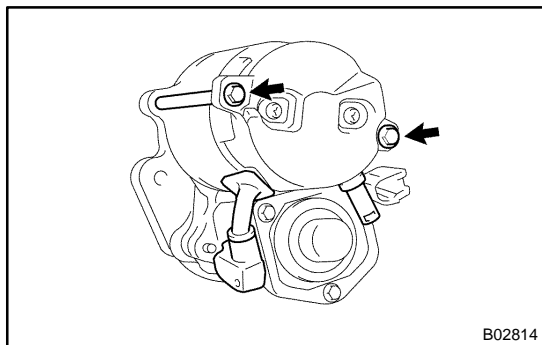


- (c) Remove the 2 bolts and starter.

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

HINT:

At time of the installation, place refer to the following item.
When installing the upper bolt, tighten it together with the clamp bracket.



DISASSEMBLY

1. REMOVE DUST PROTECTOR

2. REMOVE FIELD FRAME AND ARMATURE

- (a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.

Torque: 5.9 N·m (60 kgf·cm, 52 in.-lbf)

- (b) Remove the 2 through bolts.

Torque: 5.9 N·m (60 kgf·cm, 52 in.-lbf)

- (c) Pull out the field frame together with the armature.

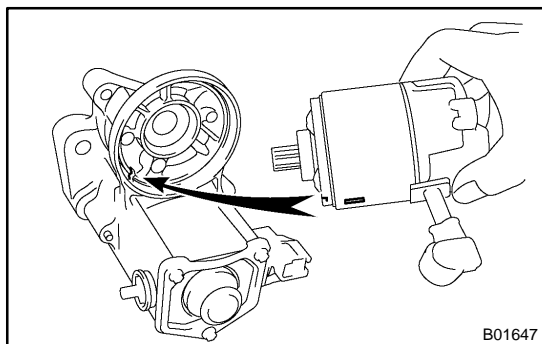
HINT:

Align the protrusion of the field frame with the groove of the magnetic switch.

- (d) Remove the O-ring from the field frame.

HINT:

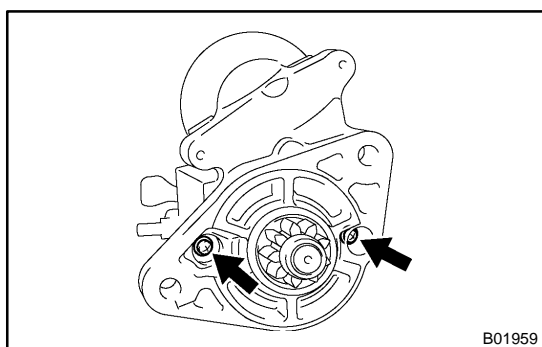
At the time of installation, please refer to the following items. Use a new O-ring.



3. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

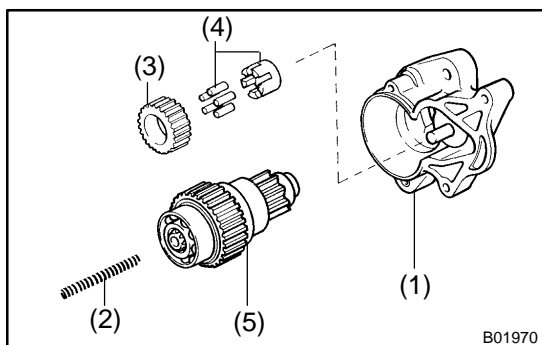
- (a) Remove the 2 bolts.

Torque: 5.9 N·m (60 kgf·cm, 52 in.-lbf)



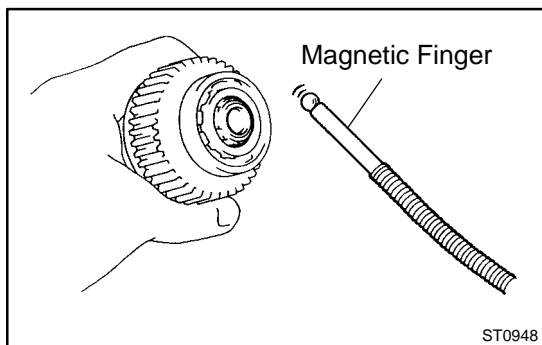
- (b) Remove these parts from the magnetic switch:

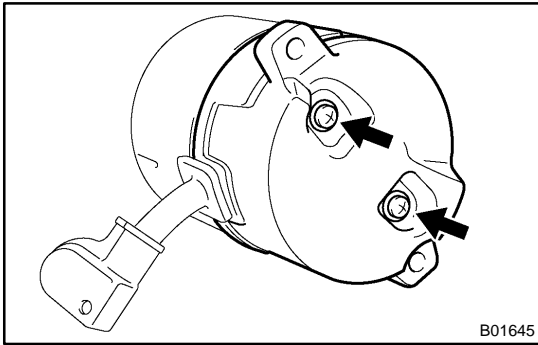
- (1) Starter housing
- (2) Return spring
- (3) Idler gear
- (4) Bearing
- (5) Clutch assembly



4. REMOVE STEEL BALL

Using a magnetic finger, remove the steel ball from the clutch shaft hole.



**5. REMOVE BRUSH HOLDER**

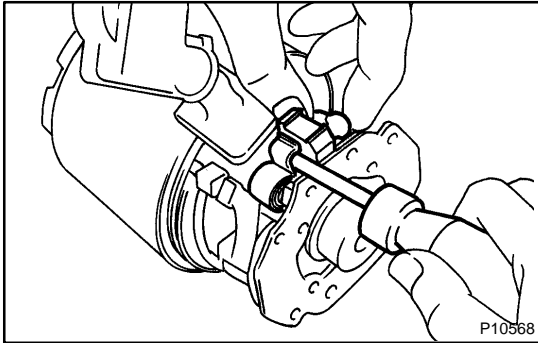
- (a) Remove the 2 screws and end cover from the field frame.

Torque: 1.5 N·m (15 kgf·cm, 13 in.-lbf)

- (b) Remove the O-ring from the field frame.

HINT:

At the time of installation, please refer to the following items.
Use a new O-ring.

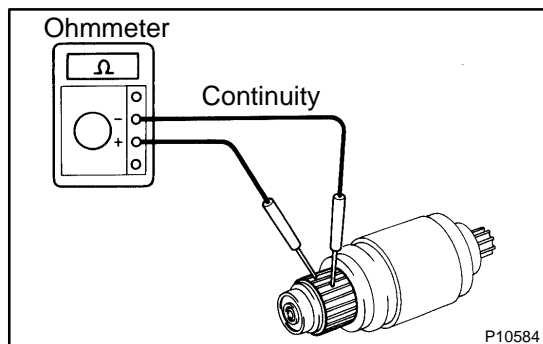


- (c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder. Disconnect the 4 brushes, and remove the brush holder.

NOTICE:

Check that the positive (+) lead wires are not grounded.

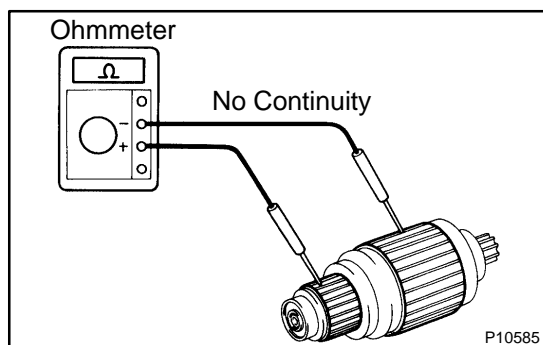
6. REMOVE ARMATURE FROM FIELD FRAME



INSPECTION

1. INSPECT ARMATURE COIL

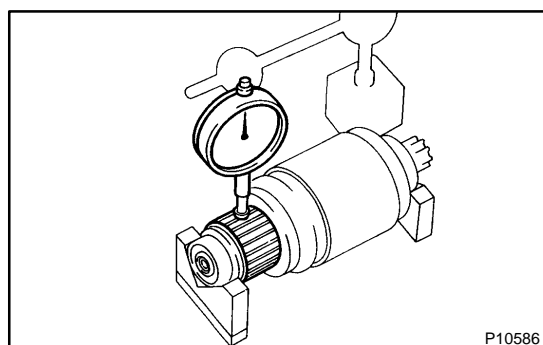
- (a) Check the commutator for open circuit.
Using an ohmmeter, check that there is continuity between the segments of the commutator.
If there is no continuity between any segment, replace the armature.



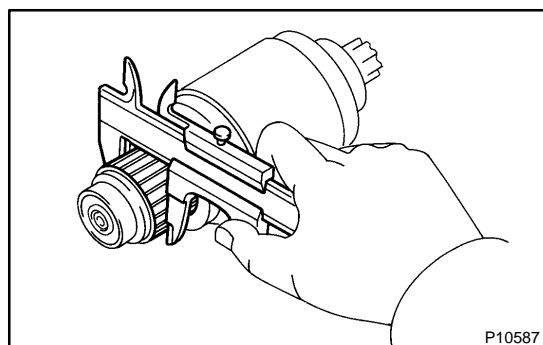
- (b) Check the commutator for ground.
Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.
If there is no continuity, replace the armature.

2. INSPECT COMMUTATOR

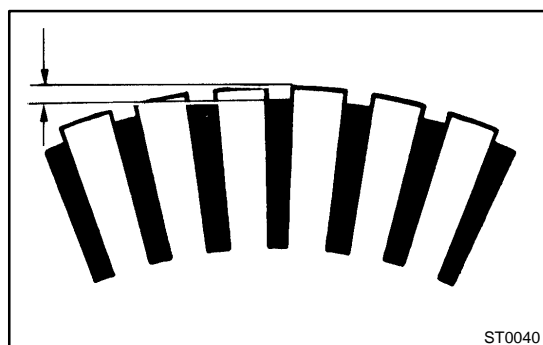
- (a) Check the commutator for the dirty and burnt surfaces.
If the surface is dirty or burnt, correct it with sandpaper (No.400) or on a table.



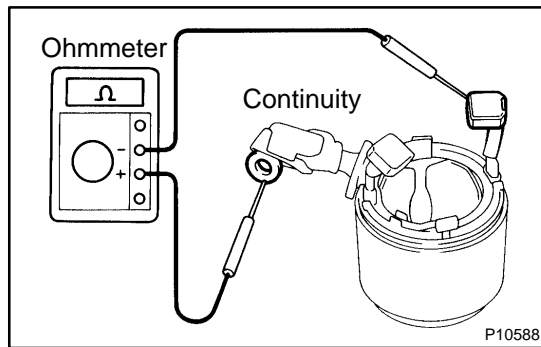
- (b) Check for the commutator circle runout.
(1) Place the commutator on V-blocks.
(2) Using a dial gauge, measure the circle runout.
Maximum circle runout: 0.05 mm (0.0020 in.)
If the circle runout is greater than maximum, correct it on a lathe.



- (c) Using a vernier caliper, measure the commutator diameter.
Standard diameter: 30.0 mm (1.181 in.)
Minimum diameter: 29.0 mm (1.412 in.)
If the diameter is less than minimum, replace the armature.



- (d) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.
Standard undercut depth: 0.6 mm (0.024 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)
If the undercut depth is less than minimum, correct it with a hacksaw blade.

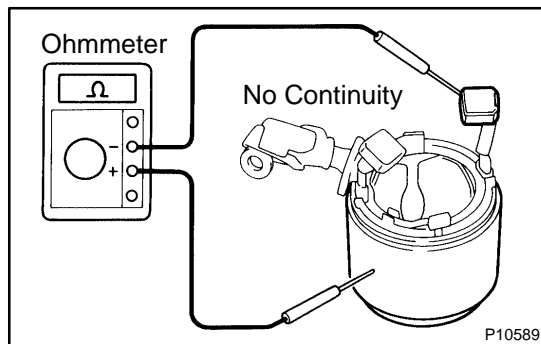


3. INSPECT FIELD COIL

- (a) Check the field coil for open circuit.

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

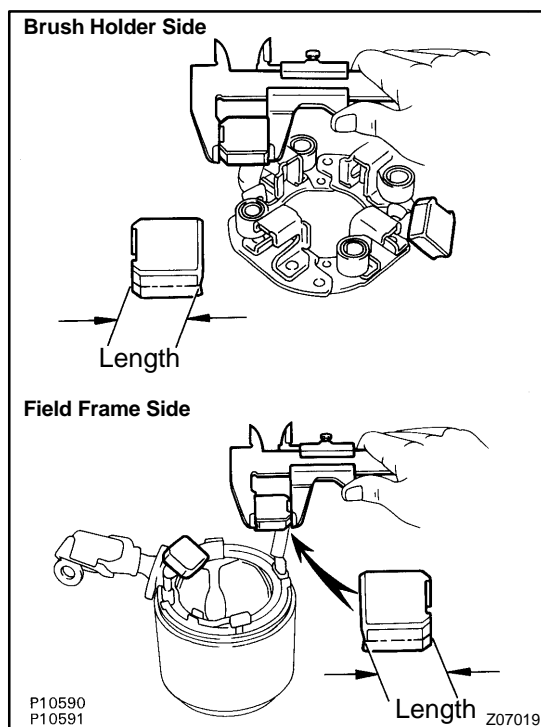
If there is no continuity, replace the field frame.



- (b) Check the field coil for ground.

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, replace the field frame.



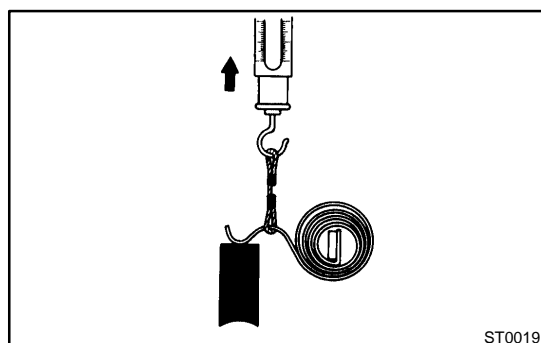
4. INSPECT BRUSHES

Using a vernier caliper, measure the brush length.

Standard length: 15.5 mm (0.610 in.)

Minimum length: 10.0 mm (0.394 in.)

If the length is less than minimum, replace the brush holder and field frame.



5. INSPECT BRUSH SPRINGS

Check the brush spring load. Take the pull scale reading the instant the brush spring separates from the brush.

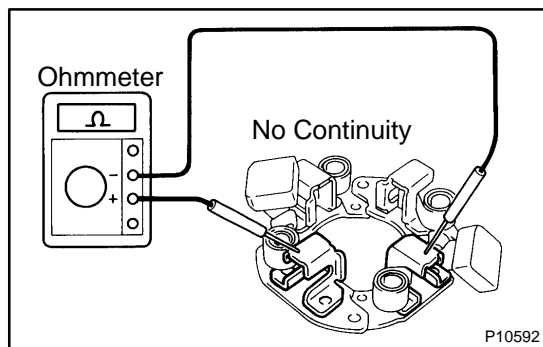
Standard spring installed load:

17.6 – 23.5 N (1.8 – 2.4 kgf, 3.9 – 5.3 lbf)

Minimum spring installed load:

11.8 N (1.2 kgf, 2.6 lbf)

If the installed load is less than minimum, replace the brush springs.



6. INSPECT BRUSH HOLDER

Check the brush holder insulator. Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

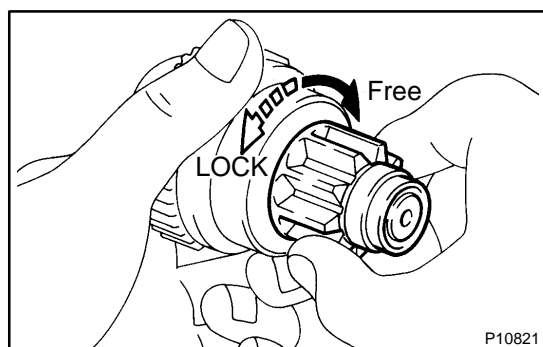
If there is continuity, repair or replace the brush holder.

7. INSPECT CLUTCH AND GEAR

- (a) Check the gear teeth on the pinion gear, idle gear and the clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

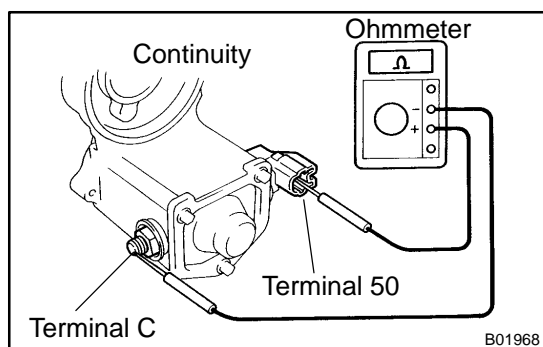
If damaged, also check the drive plate ring gear for wear or damage.



- (b) Check the clutch pinion gear.

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.

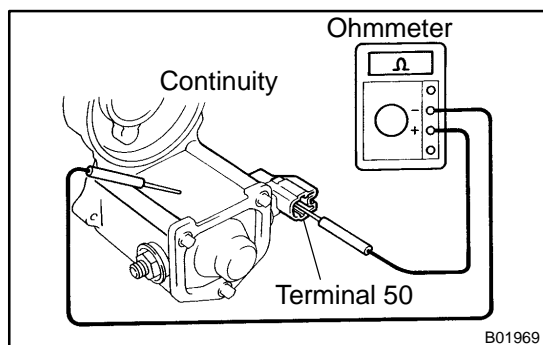


8. INSPECT MAGNETIC SWITCH

- (a) Check the pull –in coil for open circuit.

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.



- (b) Check the hold–in coil for open circuit.

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

If there is no continuity, replace the magnetic switch.

9. INSPECT BEARING

Turn the bearing by hand and while apply inward force.

If resistance is felt or bearing sticks, replace the bearing.

(See page [ST-10](#))

STEERING SYSTEM

SR0DE-01

PRECAUTION

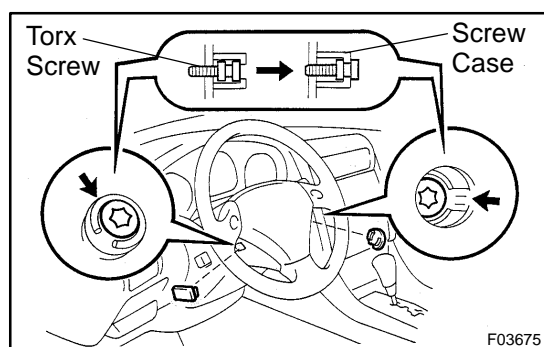
- Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.
- The LEXUS GS400/300 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deployed during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTICE:

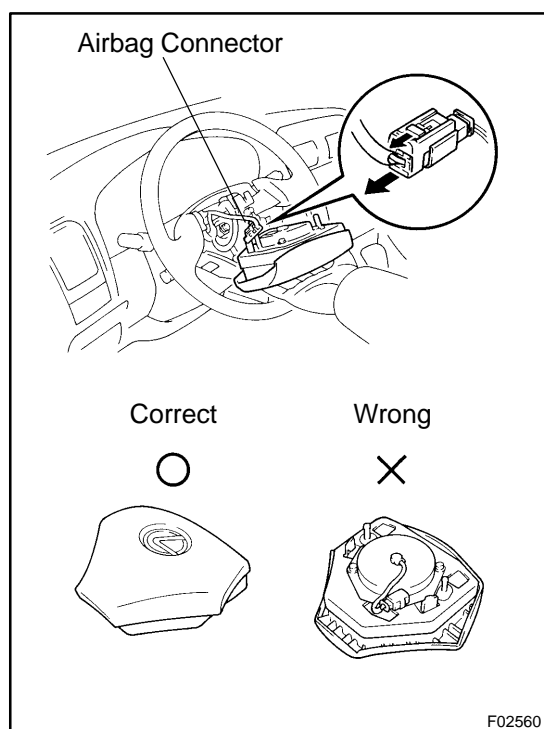
- If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.
- Never use airbag parts from another vehicle. When replacing parts, replace with new ones.



- Place the front wheels facing straight ahead.
- Remove the steering wheel lower No.2 and No.3 covers.
- Using a torx socket wrench, loosen the 2 torx screws.

HINT:

Loosen the 2 screws until the groove along the screw circumference catches on the screw case.



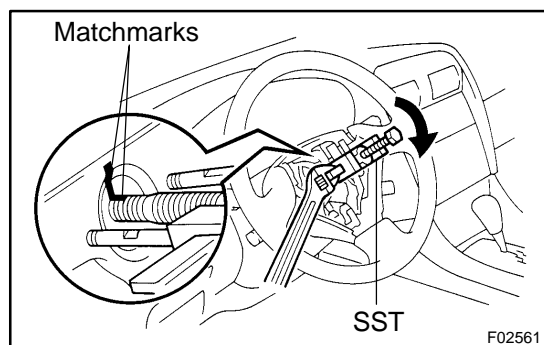
- Pull the pad out from the steering wheel and disconnect the airbag connector.

CAUTION:

- When storing the wheel pad, keep the upper surface of the pad facing upward.
- Never disassemble the wheel pad.

NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



2. REMOVE STEERING WHEEL

- Disconnect the connector.
- Remove the steering wheel set nut.
- Place matchmarks on the steering wheel and main shaft assembly.
- Using SST, remove the wheel.

SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05020)

3. REMOVE UPPER AND LOWER COLUMN COVERS

Remove the 3 screws.

4. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

- (a) Disconnect the 4 connectors.
- (b) Disconnect the airbag connector.
- (c) Remove the 3 screws.

5. REMOVE SPIRAL CABLE (See page BE-34)**NOTICE:**

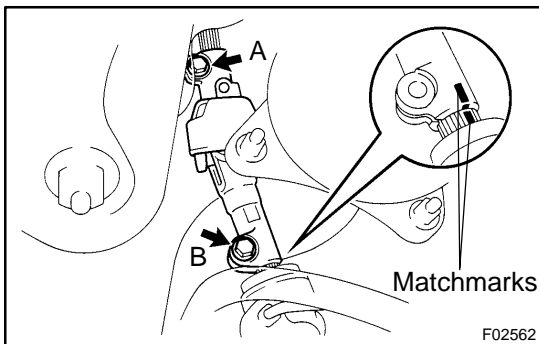
Do not disassemble the cable or apply oil to it.

6. REMOVE NO.1 UNDER COVER

- (a) Remove the 3 screws.
- (b) Disconnect the OBD II.
- (c) Disconnect the connectors.

7. REMOVE FINISH PLATE AND END PAD**8. REMOVE NO.1 SAFETY PAD**

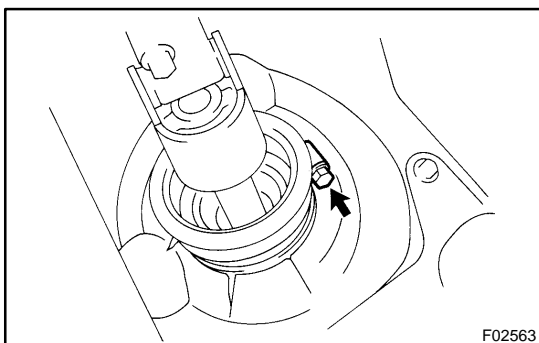
- (a) Remove the 2 screws and disconnect the hood lock release lever from the panel.
- (b) Remove 4 pad set bolts and screw.

9. REMOVE HEATER TO REGISTER DUCT NO.7**10. DISCONNECT INTERMEDIATE SHAFT ASSEMBLY**

- (a) Place matchmarks on the intermediate shaft and control valve shaft.
- (b) Loosen the bolt A and remove the bolt B.

11. REMOVE STEERING COLUMN ASSEMBLY

- (a) Disconnect the connectors.
- (b) Remove the brake pedal return spring.



- (c) Loosen the hole cover clamp.
- (d) Remove the 4 column assembly set nuts.

12. REMOVE INTERMEDIATE SHAFT ASSEMBLY

Remove the bolt A.

13. REMOVE DUST COVER

DISASSEMBLY

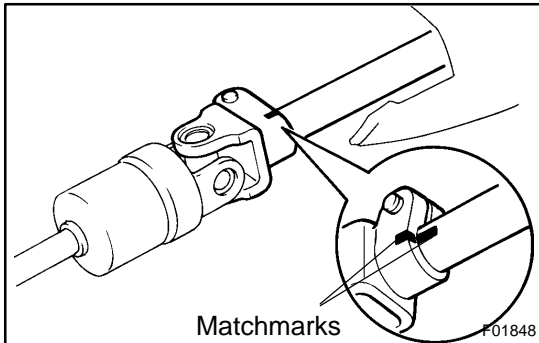
NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY COIL

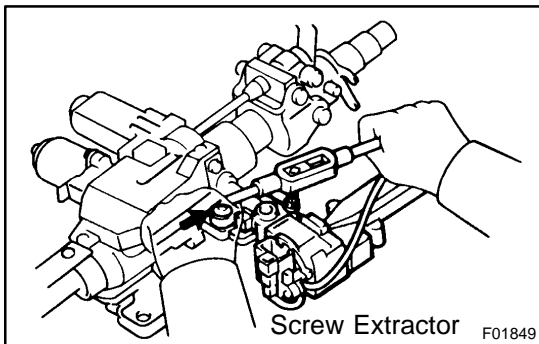
Remove the screw and transponder key coil.

2. REMOVE KEY CYLINDER LAMP ILLUMINATION



3. REMOVE NO.2 INTERMEDIATE SHAFT ASSEMBLY

- Place matchmarks on the No.2 shaft and main shaft.
- Remove the bolt and No.2 intermediate shaft assembly.



4. REMOVE COLUMN UPPER BRACKET

- Using a centering punch, mark the center of the 2 tapered-head bolts.
- Using a 4–5 mm (0.16–0.20 in.) drill, drill into the 2 bolts.
- Using a screw extractor, remove the 2 bolts and column upper bracket.

5. REMOVE COLUMN TUBE SUPPORT

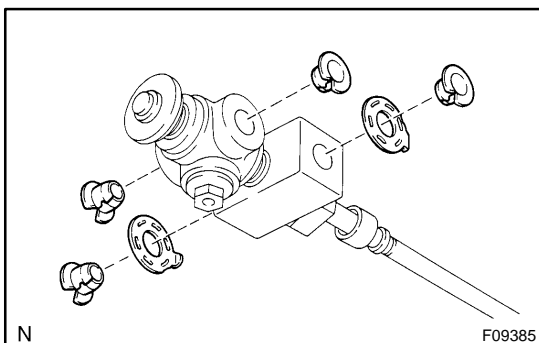
- Remove the bolt and column tube support.
- Remove the tube support with tube attachment.
- Remove the tube attachment from the tube support.

6. REMOVE TURN SIGNAL BRACKET

Remove the 3 bolts and turn signal bracket.

7. REMOVE STEERING COLUMN PROTECTOR

Remove the 2 bolts and steering column protector.



8. REMOVE TILT SLIDER ASSEMBLY

- Using a hexagon wrench, remove the 4 bolts, 2 washers and tilt slider assembly.
- Remove the 4 bushings, 2 plates from tilt slider assembly.

9. REMOVE NO.1 BRACKET

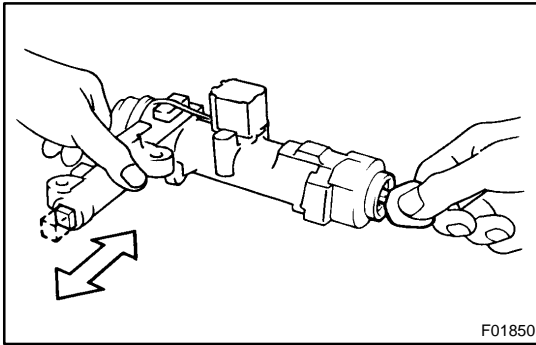
Remove the bolt and No.1 bracket.

10. REMOVE NO.2 BRACKET

Remove the bolt and No.2 bracket.

11. REMOVE TILT AND TELESCOPIC ECU

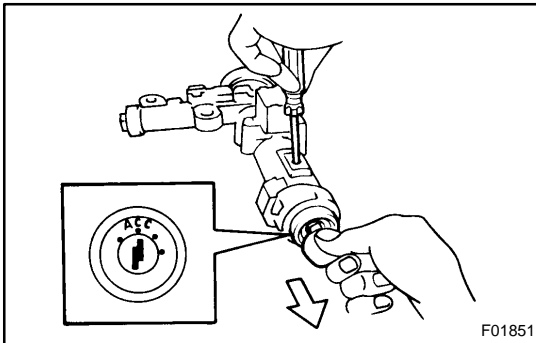
Remove the 2 bolts and tilt and telescopic ECU.



INSPECTION

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

- Place the ignition key at the ACC position.
- Push down the stop pin with a screwdriver, and pull out the cylinder.
- Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH

(See page [BE-31](#))

4. IF NECESSARY, REPLACE IGNITION SWITCH

- remove the 2 screws.
- Install a new switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH

(See page [BE-31](#))

6. INSPECT KEY INTERLOCK SOLENOID

(See page [AT-12](#))

7. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH WITH KEY INTERLOCK SOLENOID

- Remove the 2 screws.
- Install a new switch with solenoid with the 2 screws.

8. INSPECT TRANSPONDER KEY COIL

(See page [BE-248](#))

9. IF NECESSARY, REPLACE TRANSPONDER KEY COIL

10. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

- remove the screw.
- Install a new key amplifier with the bolt.

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. INSTALL TILT AND TELESCOPIC ECU

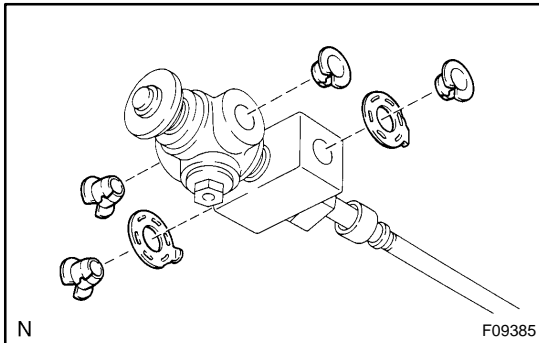
Install the tilt and telescopic ECU with the 2 screws.

2. INSTALL NO.2 BRACKET

Install the No.2 bracket with the bolt.

3. INSTALL NO.1 BRACKET

Install the No.1 bracket with the bolt.



4. INSTALL TILT SLIDER ASSEMBLY

- (a) Install 2 new plates and 4 new bushings to the tilt slider assembly in the direction shown in the illustration.

HINT:

Install the bushings with their cuts facing downward.

- (b) Using a hexagon wrench, install the tilt slider assembly with the 2 washers and 4 bolts.

Torque: 23 N·m (230 kgf-cm, 17 ft-lbf)

HINT:

- When replacing a tilt slider assembly with new one, apply grease on the removed tilt slider assembly to the shaft of the new tilt slider assembly.
- Install the tilt slider assembly with the bolt portion of the tilt slider faced downward.
- Do not let the grease be stuck on the thread part of the bolt in order to prevent the bolt from slipping.

5. INSTALL STEERING COLUMN PROTECTOR

Install the steering column protector.

6. INSTALL TURN SIGNAL BRACKET

Install the turn signal bracket with the 3 bolts.

7. INSTALL COLUMN TUBE SUPPORT

NOTICE:

If the attachment or support is deformed, replace it with a new one.

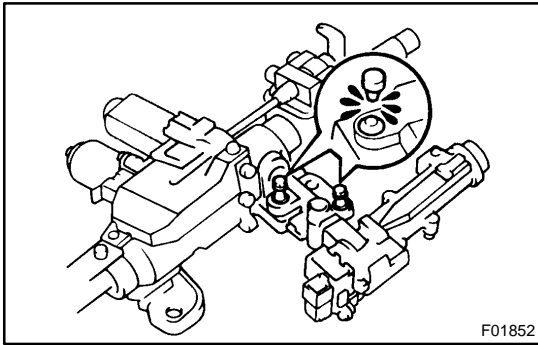
- (a) Install the tube attachment to the tube support.
(b) Install the column tube support with the bolt.

Torque: 20 N·m (204 kgf-cm, 15 ft-lbf)

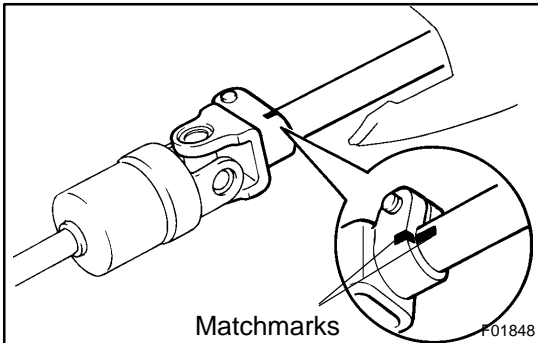
NOTICE:

Make sure to install the support facing the correct direction (See page [SR-9](#)).

- Tighten the bolt while holding the support to prevent it turning too.
- Be sure to tighten the bolt with the specified torque.

**8. INSTALL COLUMN UPPER BRACKET**

- (a) Install the column upper bracket with 2 new tapered-head bolts.
- (b) Tighten the 2 tapered-head bolts until the bolt heads break off.

**9. INSTALL NO.2 INTERMEDIATE SHAFT ASSEMBLY**

- (a) Align the matchmarks on the No.2 shaft and main shaft.
- (b) Install the bolt.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

10. INSTALL KEY CYLINDER ILLUMINATION**11. INSTALL TRANSPONDER KEY COIL**

Install the transponder key coil with the screw.

INSTALLATION

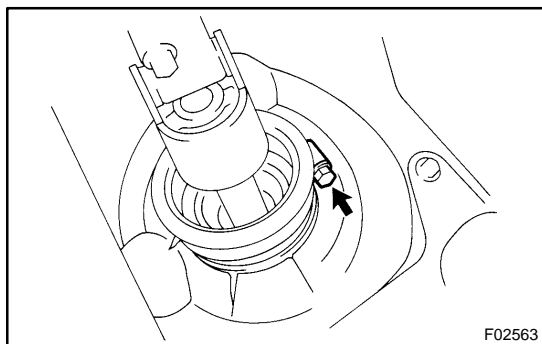
1. **INSTALL DUST COVER**
2. **INSTALL INTERMEDIATE SHAFT ASSEMBLY**

Temporarily tighten the bolt A.

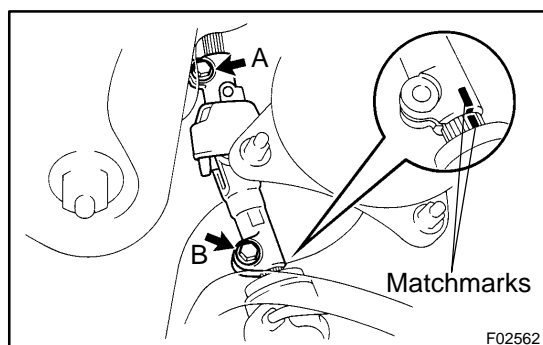
3. **INSTALL STEERING COLUMN ASSEMBLY**

- (a) Torque the 4 column assembly set nuts.

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



- (b) Tighten the hole cover clamp.
 - (c) Install the brake pedal return spring.
 - (d) Connect the connectors.



4. **CONNECT INTERMEDIATE SHAFT ASSEMBLY**

- (a) Align the matchmarks on the intermediate shaft and control valve shaft.

- (b) Torque the bolt B.

Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)

- (c) Torque the bolt A.

Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)

5. **INSTALL HEATER TO REGISTER DUCT NO.7**

6. **INSTALL NO.1 SAFETY PAD**

- (a) Install the 4 pad set bolts and screw.

- (b) Install the 2 screws and connect the hood lock release lever to the panel.

7. **INSTALL FINISH PLATE AND END PAD**

8. **INSTALL NO.1 UNDER COVER**

- (a) Connect the connectors.

- (b) Connect the OBD II.

- (c) Tighten the 3 screws.

9. **INSTALL SPIRAL CABLE**

(See page [BE-34](#))

10. **INSTALL COMBINATION SWITCH WITH SPIRAL CABLE**

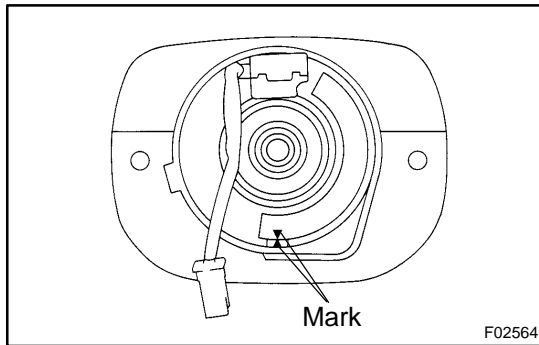
- (a) Tighten the 3 screws.

- (b) Connect the airbag connector.

- (c) Connect the 4 connectors.

11. **INSTALL UPPER AND LOWER COLUMN COVERS**

Tighten the 3 screws.

**12. CENTER SPIRAL CABLE**

- (a) Check that the front wheels are facing straight ahead.
- (b) Turn the cable counterclockwise by hand until it becomes harder to turn the cable.
- (c) Then rotate the cable clockwise about 3 turns to align the mark.

HINT:

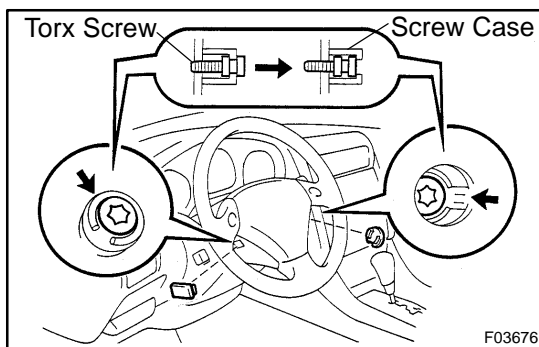
The cable will rotate about 3 turns to either left or right of the center.

13. INSTALL STEERING WHEEL

- (a) Align the matchmarks on the wheel and main shaft.
- (b) Torque the wheel set nut.
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)
- (c) Connect the connector.

14. INSTALL STEERING WHEEL PAD**NOTICE:**

- Make sure the wheel pad is installed to the specified torque.
- If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.
- When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.

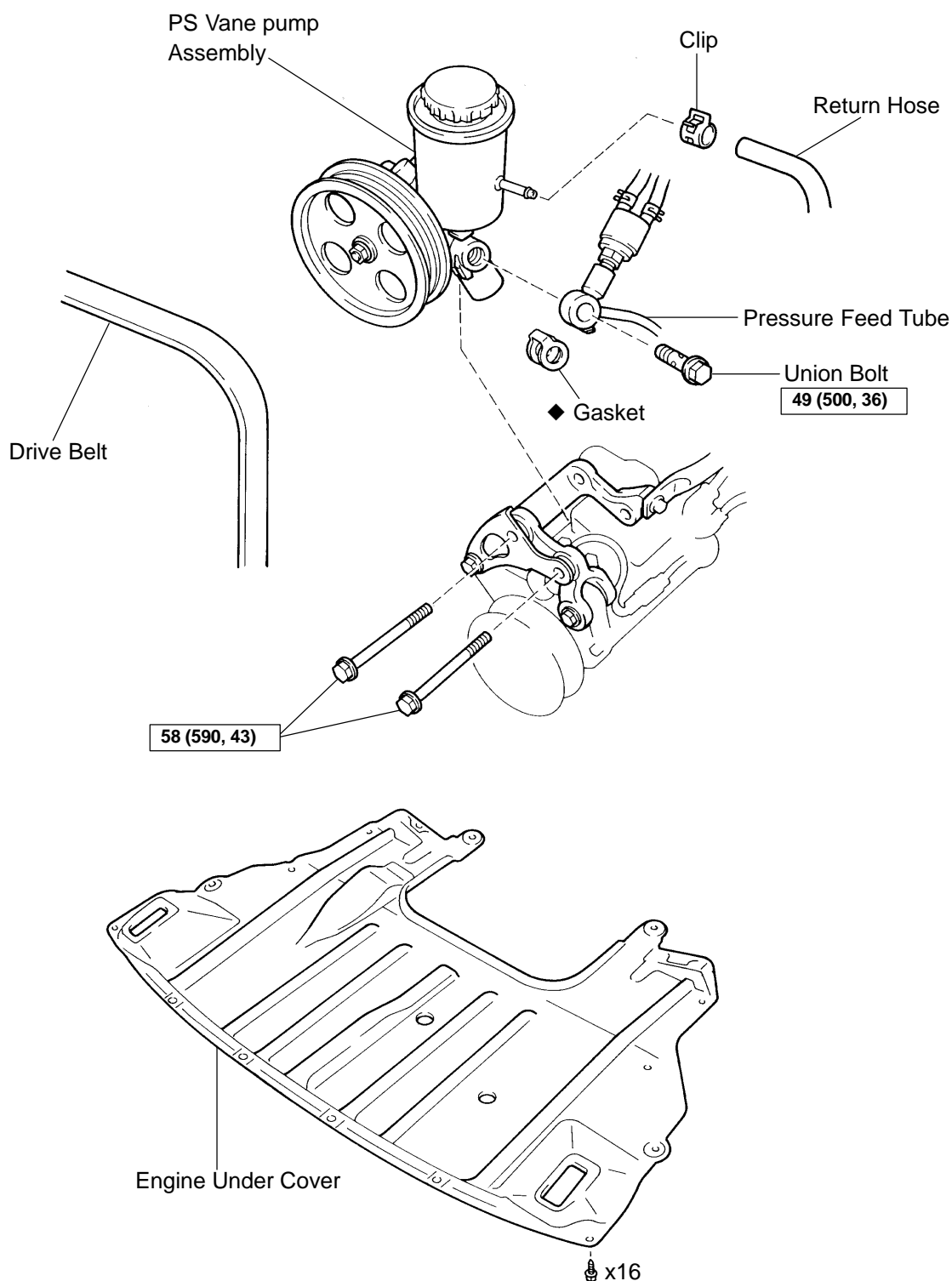


- (a) Connect the airbag connector.
- (b) Install the pad after confirming that the circumference groove of the torx screw is caught on the screw case.
- (c) Using a torx socket wrench, torque the 2 screws.
Torque: 8.8 N·m (90 kgf-cm, 78 in.-lbf)
- (d) Install the steering wheel lower No.2 and No.3 covers.

15. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP (2JZ-GE) COMPONENTS

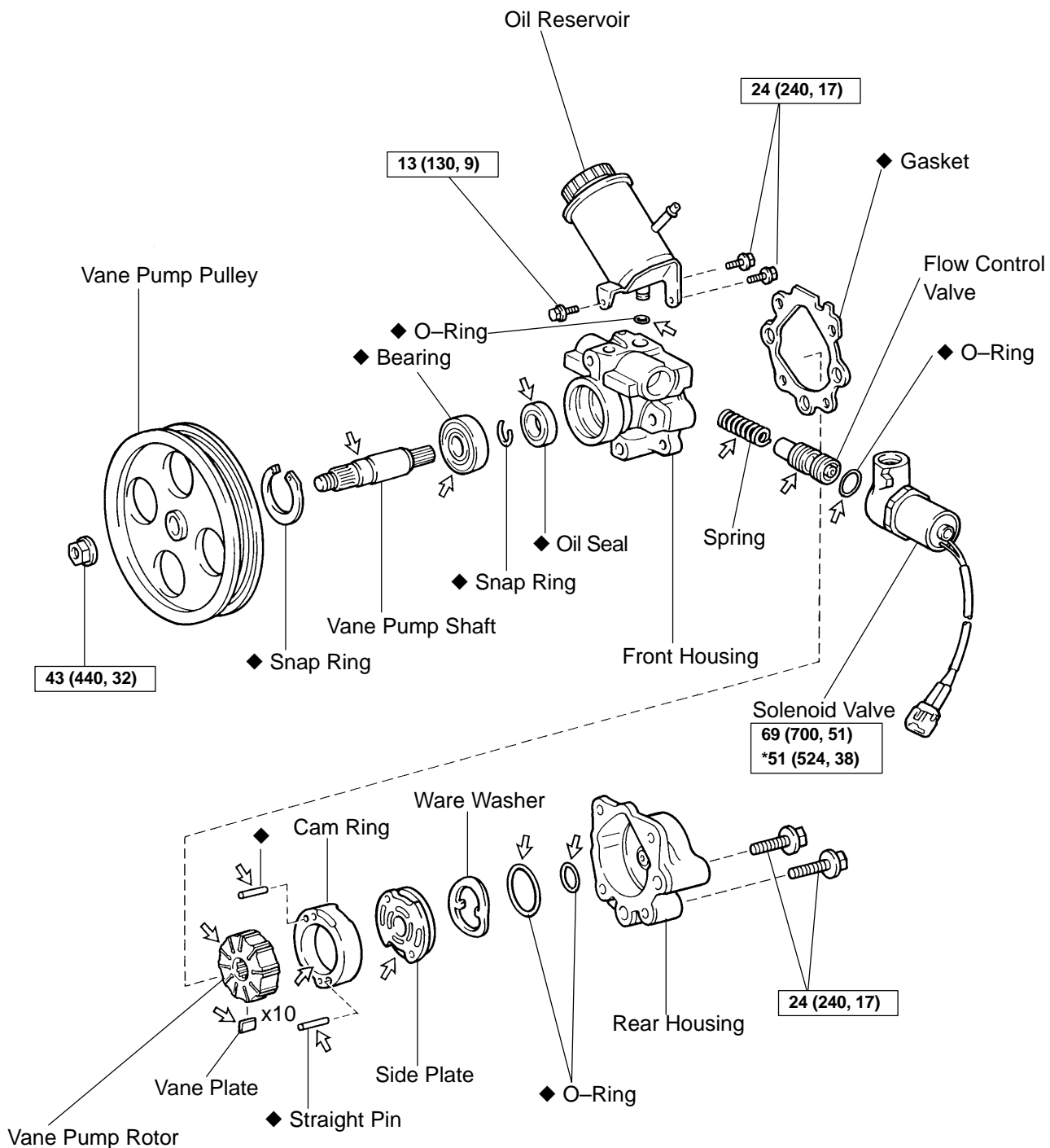
SR0DQ-01



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

◆ Non-reusable part

F02555



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

◆ Non-reusable part
 ⇐ Power steering fluid

* For use with SST

F02549

TROUBLESHOOTING

SR0DF-03

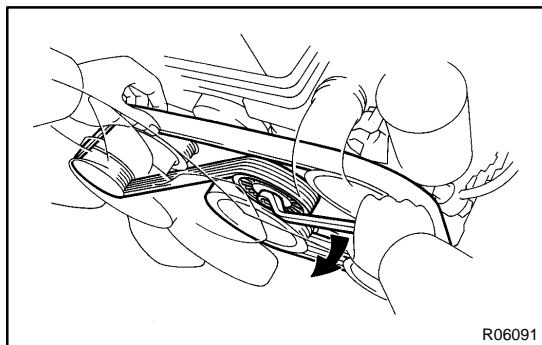
PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	3. Tires (Improperly inflated) 4. Power steering fluid level (Low) 5. Drive belt (Loose) 6. Front wheel alignment (Incorrect) 7. Steering system joints (Worn) 8. Suspension arm ball joints (Worn) 9. Steering column (Binding) 10. Power steering gear 11. PPS system	SA-2 SR-4 – SA-4 – SA-27 SA-37 – SR-42 SR-59
Poor return	1. Tires (Improperly inflated) 2. Front wheel alignment (Incorrect) 3. Steering column (Binding) 4. Power steering gear	SA-2 SA-4 – SR-42
Excessive play	1. Steering system joints (Worn) 2. Suspension arm ball joints (Worn) 3. Intermediate shaft, Universal joint, Sliding yoke (Worn) 4. Front wheel bearing (Worn) 5. Power steering gear 6. PPS system	– SA-27 SA-37 – SA-10 SR-42 SR-59
Abnormal noise	1. Power steering fluid level (Low) 2. Steering system joints (Worn) 3. Power steering gear	SR-4 – SR-42

HINT:

When the problem occurs on the power tilt and telescopic steering system, refer to the DI section.
 (See page [DI-517](#))



REMOVAL

1. REMOVE ENGINE UNDER COVER

Remove the 16 bolts.

2. REMOVE DRIVE BELT

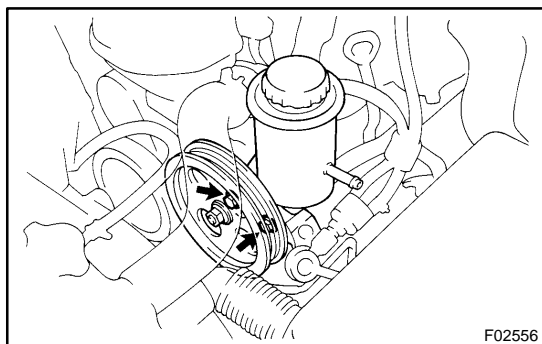
Loosen the drive belt tension by turning the drive belt tensioner clockwise, and remove the belt.

3. REMOVE RETURN HOSE

Remove the clip and disconnect the hose.

4. REMOVE PRESSURE FEED TUBE

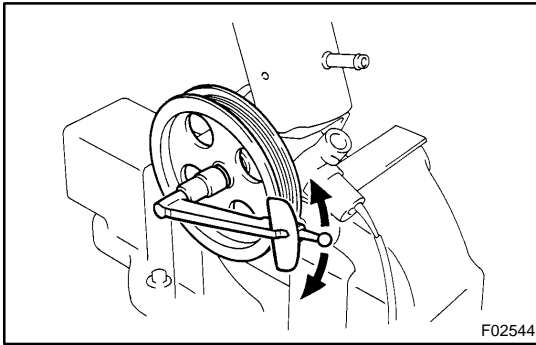
Remove the union bolt and gasket.



5. REMOVE PS VANE PUMP ASSEMBLY

(a) Disconnect the connector.

(b) Remove the 2 bolts.



DISASSEMBLY

NOTICE:

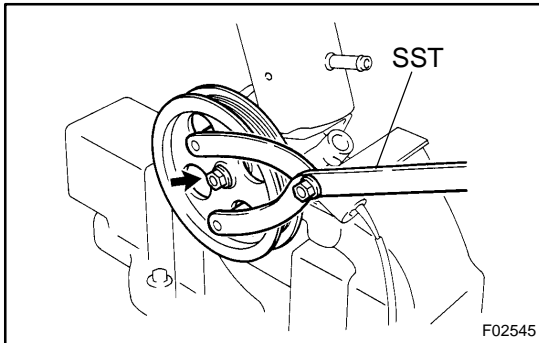
When using a vise, do not overtighten it.

1. MEASURE PS VANE PUMP ROTATING TORQUE

- Check that the pump rotates smoothly without abnormal noise.
- Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.25 N·m (2.5 kgf·cm, 2.2 in.-lbf) or less



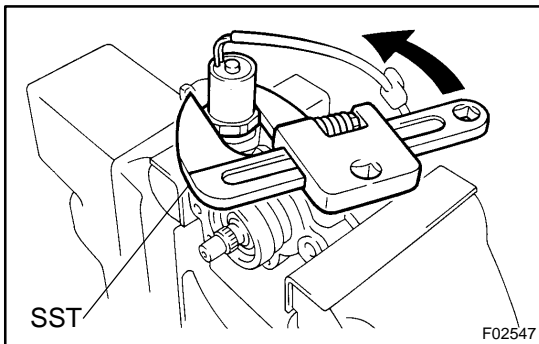
2. REMOVE VANE PUMP PULLEY

Using SST to stop the pulley rotating, remove the pulley set nut.

SST 09960-10010 (09962-01000, 09963-01000)

3. REMOVE OIL RESERVOIR

- Remove the 3 bolts and oil reservoir.
- Remove the O-ring from the oil reservoir.



4. REMOVE SOLENOID VALVE

- Using SST, remove the valve.

SST 09922-10010

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

- Remove the O-ring from the valve.

5. REMOVE FLOW CONTROL VALVE AND SPRING

6. REMOVE REAR HOUSING

- Remove the 2 bolts.
- Remove the 2 O-rings from the housing.

7. REMOVE WAVE WASHER

8. REMOVE SIDE PLATE

9. REMOVE CAM RING, 10 VANE PLATES AND VANE PUMP ROTOR

NOTICE:

Be careful not to drop the plate.

10. REMOVE STRAIGHT PINS

Remove the 2 pins from the front housing.

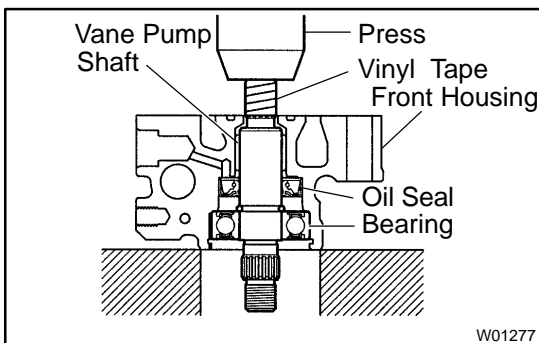
11. REMOVE GASKET

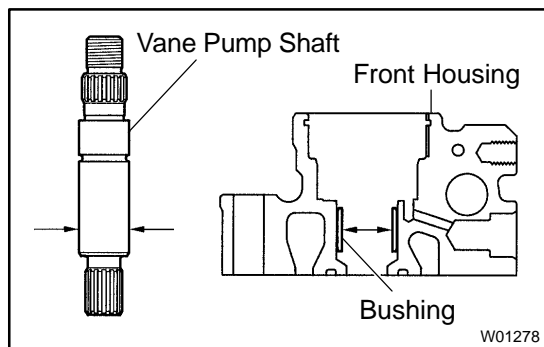
12. REMOVE VANE PUMP SHAFT WITH BEARING

- Using snap ring pliers, remove the snap ring from the front housing.
- Wind vinyl tape on the serrated part of the vane pump shaft.
- Press out the shaft with the bearing.

NOTICE:

Be careful not to damage the oil seal lip.





INSPECTION

NOTICE:

When using a vise, do not overtighten it.

1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

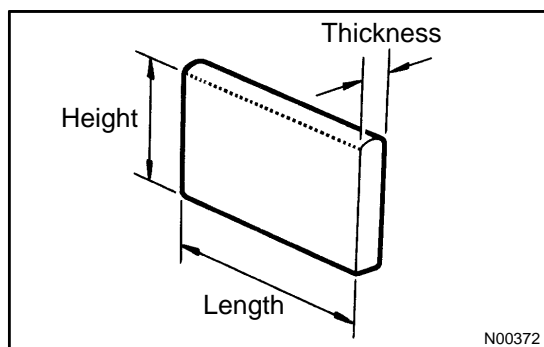
Using a micrometer and caliper gauge, measure the oil clearance.

Standard clearance:

0.03 – 0.05 mm (0.0012 – 0.0020 in.)

Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the shaft and front housing.



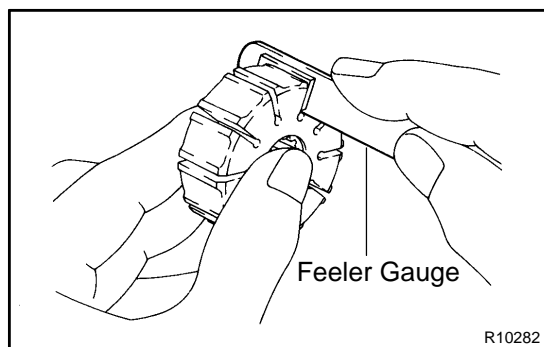
2. INSPECT VANE PUMP ROTOR AND VANE PLATES

- (a) Using a micrometer, measure the height, thickness and length of the 10 plates.

Minimum height: 8.6 mm (0.339 in.)

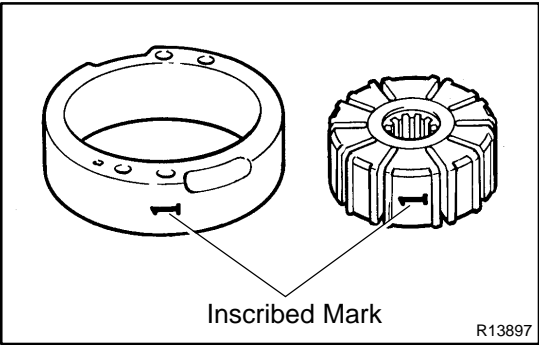
Minimum thickness: 1.40 mm (0.0551 in.)

Minimum length: 14.99 mm (0.5902 in.)



- (b) Using a feeler gauge, measure the clearance between the rotor groove and plate.

Maximum clearance: 0.033 mm (0.0013 in.)



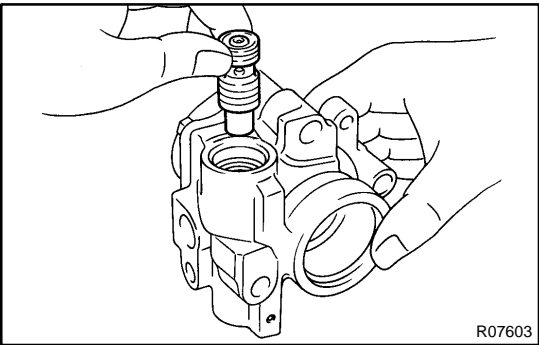
If it is more than the maximum, replace the plate and/or rotor with one having the same mark stamped on the cam ring.

Inscribed mark: 1, 2, 3, 4 or None

HINT:

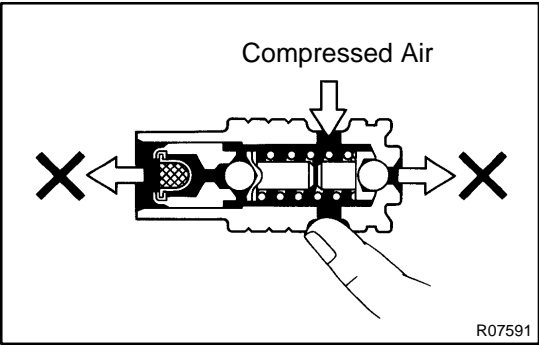
There are 5 vane plate lengths with the following rotor and cam ring marks:

Rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345-26010	14.999-15.001 (0.59051-0.59059)
1	44345-26020	14.997-14.999 (0.59043-0.59051)
2	44345-26030	14.995-14.997 (0.59035-0.59043)
3	44345-26040	14.993-14.995 (0.59027-0.59035)
4	44345-26050	14.991-14.993 (0.59020-0.59027)

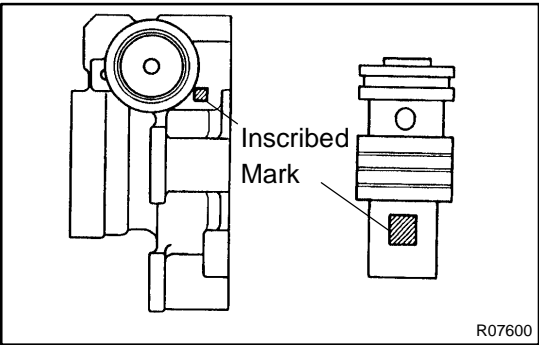


3. INSPECT FLOW CONTROL VALVE

(a) Coat the valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.

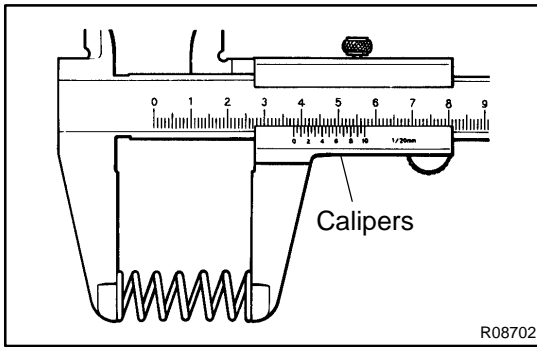


(b) Check the flow control valve for leakage. Close one of the holes and apply compressed air 392-490 kPa (4-5 kgf/cm², 57-71 psi) into the opposite side, and confirm that air does not come out from the end holes.



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

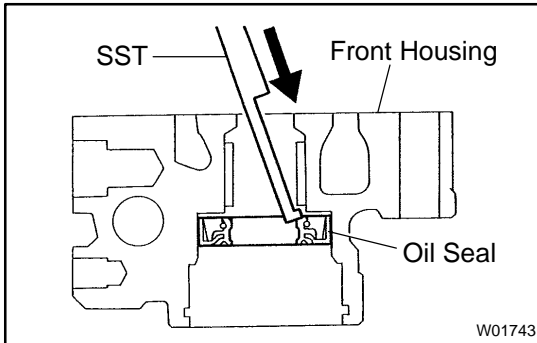


4. INSPECT SPRING

Using calipers, measure the free length of the spring.

Minimum free length: 33.2 mm (1.307 in.)

If it is not within the specification, replace the spring.



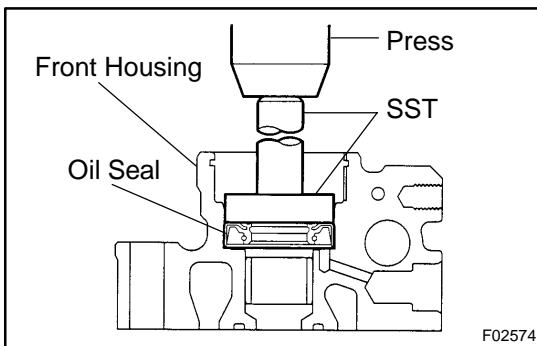
5. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST, tap out the oil seal from the front housing.

SST 09631-10030

NOTICE:

Be careful not to damage the bushing of the front housing.



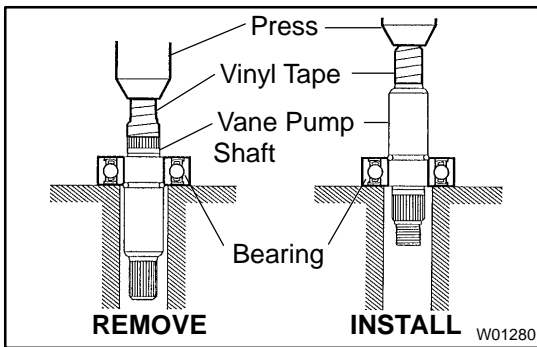
(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00330),
09950-70010 (09951-07100)

NOTICE:

Make sure to install the oil seal facing the correct direction.



6. IF NECESSARY, REPLACE BEARING

(a) Press out the bearing from the vane pump shaft.

(b) Using snap ring expander, replace the snap ring with new one.

NOTICE:

Be careful not to damage the shaft.

(c) Coat a new bearing with power steering fluid.

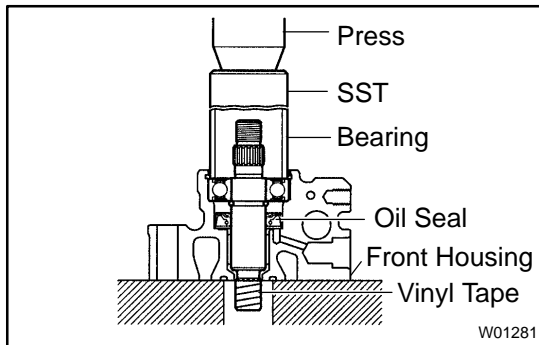
(d) Press in the bearing to the shaft.

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. **COAT WITH POWER STEERING FLUID**
(See page [SR-19](#))



2. **INSTALL VANE PUMP SHAFT WITH BEARING**

- (a) Wind vinyl tape on the serrated part of the vane pump shaft.
- (b) Using SST, press in the shaft with the bearing.
SST 09608-04031

NOTICE:

Be careful not to damage the oil seal.

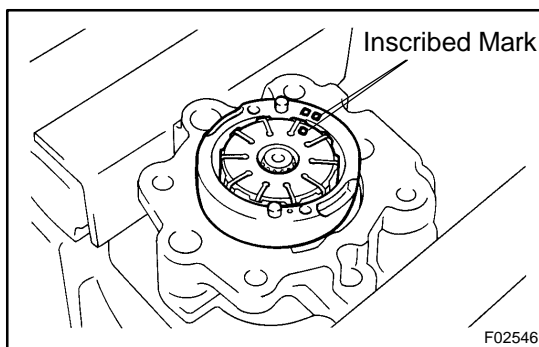
- (c) Using snap ring pliers, install a new snap ring to the front housing.

3. **INSTALL STRAIGHT PINS**

Using a plastic hammer, tap in 2 new pins to the front housing.

NOTICE:

Be careful not to damage the pins.



4. **INSTALL CAM RING**

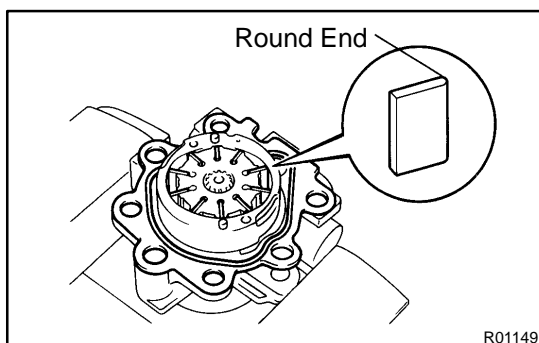
Install the ring with the inscribed mark facing outward.

HINT:

Align the holes of the cam ring with the straight pins.

5. **INSTALL VANE PUMP ROTOR**

Install the rotor with the inscribed mark facing outward.



6. **INSTALL VANE PLATES AND GASKET**

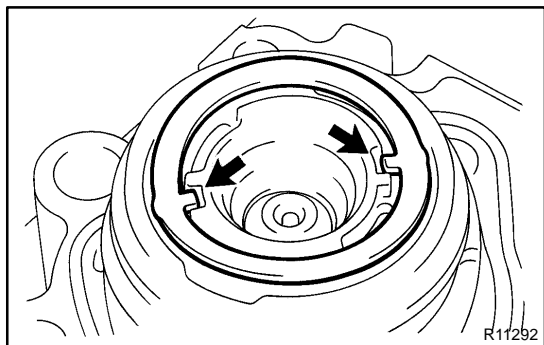
- (a) Install the 10 plates with the round end facing outward.
- (b) Install a new gasket on the front housing.

NOTICE:

Be careful the direction of the gasket.

7. **INSTALL SIDE PLATE**

Align the holes of the plate and 2 straight pins.

**8. INSTALL WAVE WASHER**

Install the washer so that its protrusions fit into the slots in the side plate.

9. INSTALL REAR HOUSING

(a) Coat 2 new O-rings with power steering fluid and install them to the housing.

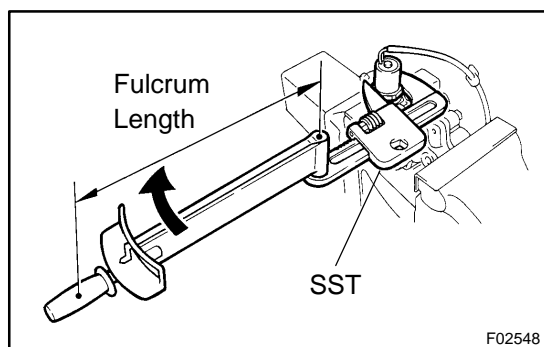
(b) Torque the 2 bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

10. INSTALL SPRING AND FLOW CONTROL VALVE

Install the valve facing the correct direction.

(See page [SR-19](#))

**11. INSTALL SOLENOID VALVE**

(a) Install a new O-ring with power steering fluid and install it to the valve.

(b) Using SST, install the valve.

SST 09922-10010

Torque: 51 N·m (524 kgf·cm, 38 ft·lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

12. INSTALL OIL RESERVOIR

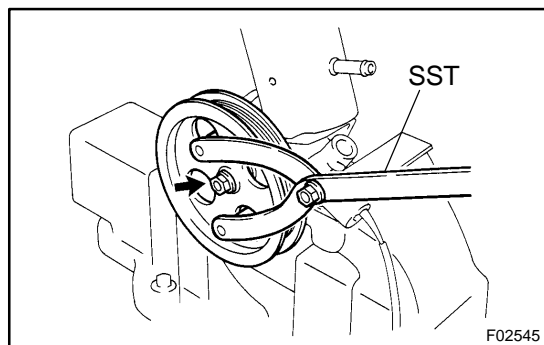
(a) Coat a new O-ring with power steering fluid and install it to the oil reservoir.

(b) Torque the 3 bolts.

Torque:

Front side bolt: 13 N·m (130 kgf·cm, 9 ft·lbf)

Rear side bolts: 24 N·m (240 kgf·cm, 17 ft·lbf)

**13. INSTALL VANE PUMP PULLEY**

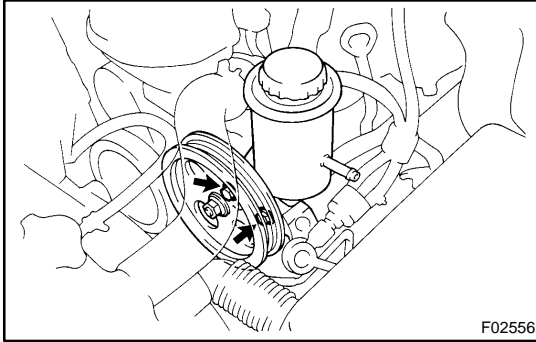
Using SST to stop the pulley rotating, torque the pulley set nut.

SST 09960-10010 (09962-01000, 09963-01000)

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

14. MEASURE PS VANE PUMP ROTATING TORQUE

(See page [SR-22](#))



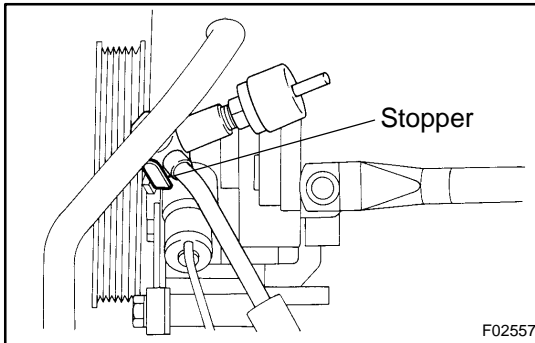
INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

- (a) Torque the 2 bolts.

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

- (b) Connect the connector.



2. CONNECT PRESSURE FEED TUBE

Torque the union bolt over a new gasket.

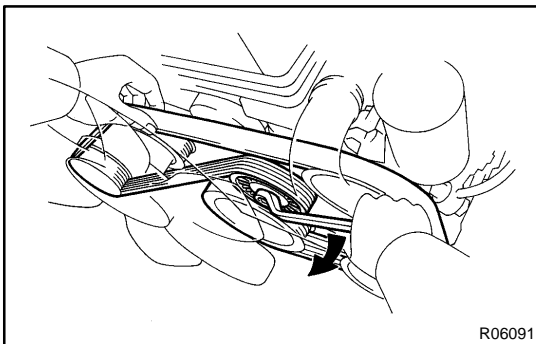
HINT:

Make sure that the stopper of the tube is touching the PS vane pump body, as shown, before torquing the bolt.

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

3. CONNECT RETURN HOSE

Connect the hose with the clip.



4. INSTALL DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner clockwise, and install the belt.

5. INSTALL ENGINE UNDER COVER

Tighten the 16 bolts.

6. BLEED POWER STEERING SYSTEM

(See page [SR-3](#))

POWER STEERING FLUID BLEEDING

SR0DG-01

1. **CHECK FLUID LEVEL**
(See page [SR-4](#))
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**
3. **TURN STEERING WHEEL**

With the engine stopped, turn the wheel slowly from lock to lock several times.

4. **LOWER VEHICLE**
5. **START ENGINE**

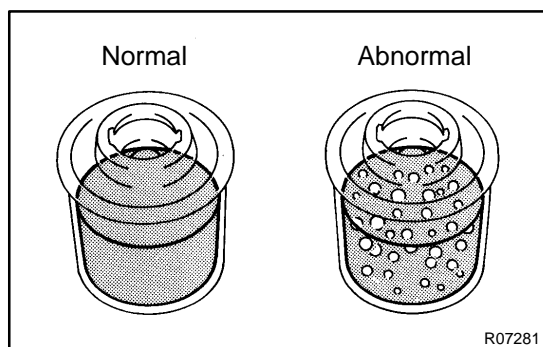
Run the engine at idle for a few minutes.

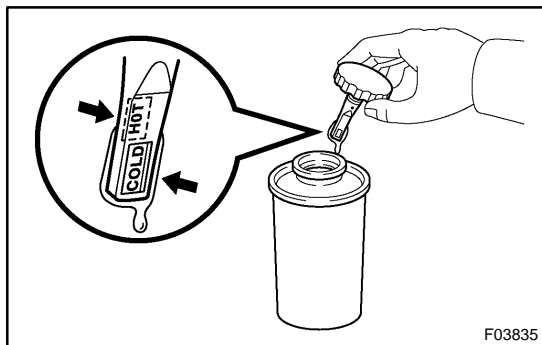
6. **TURN STEERING WHEEL**
 - (a) With the engine at idling, turn the wheel to left or right full lock position and keep it there for 2–3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2–3 seconds.
 - (b) Repeat (a) several times.
7. **STOP ENGINE**

8. **CHECK FOR FOAMING OR EMULSIFICATION**

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. **CHECK FLUID LEVEL**
(See page [SR-4](#))





INSPECTION

1. CHECK FLUID LEVEL

- Keep the vehicle level.
- With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

Fluid: ATF DEXRON® II or III

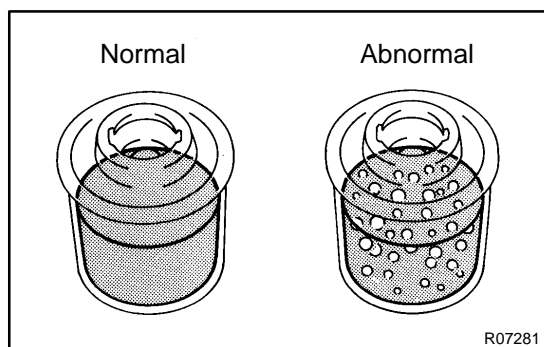
HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir cap dipstick.

If the fluid is cold, check that it is within the COLD LEVEL range.

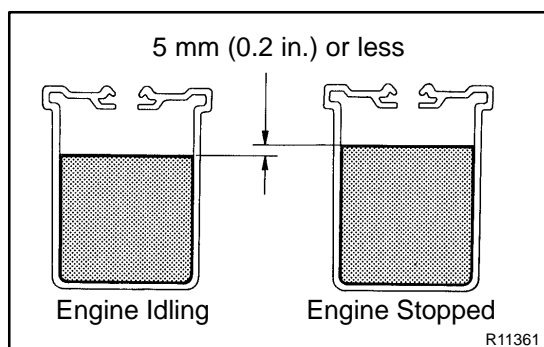
- Start the engine and run it at idle.
- Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80°C (176°F)



- Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system. (See page [SR-3](#))



- With the engine idling, measure the fluid level in the oil reservoir.

- Stop the engine.

- Wait a few minutes and remeasure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed power steering system.

(See page [SR-3](#))

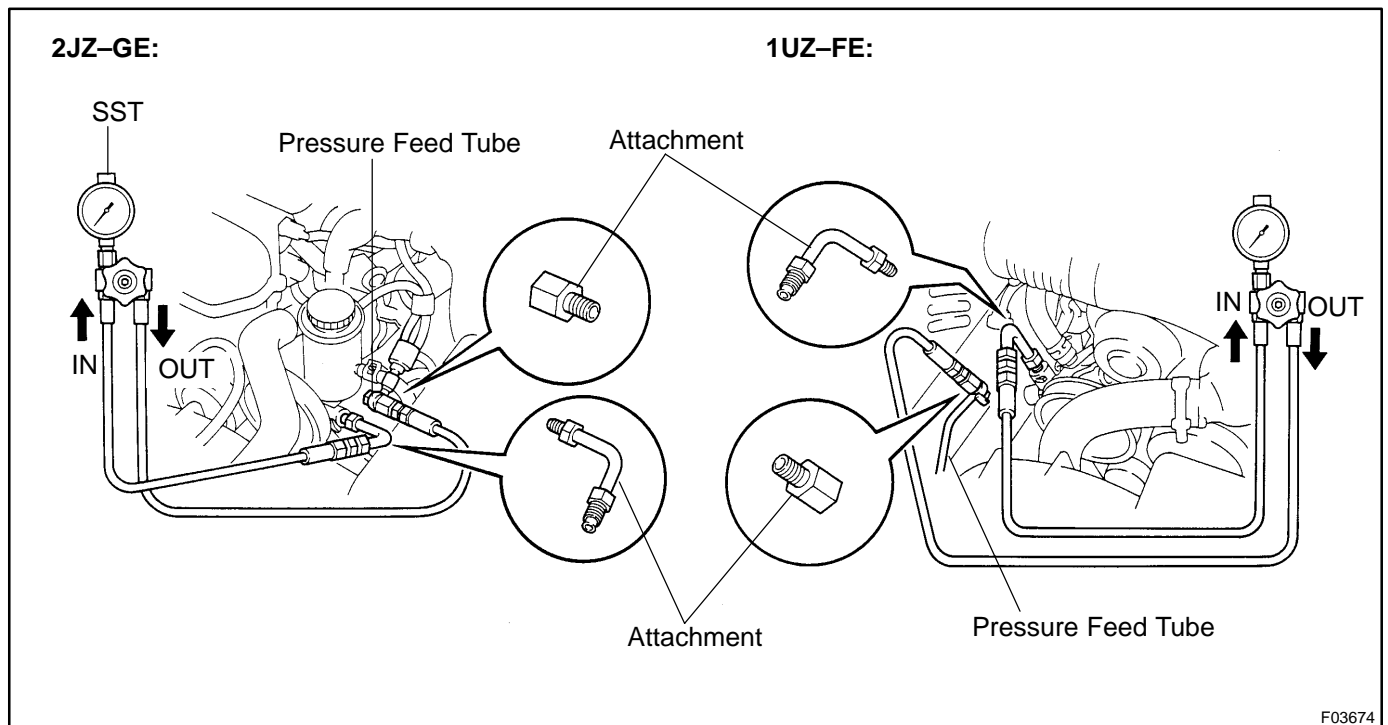
- Check the fluid level.

2. CHECK STEERING FLUID PRESSURE

- (a) 1UZ-FE:
Remove the air cleaner inlet.
- (b) 1UZ-FE:
Remove the air cleaner assembly with air cleaner hose.
(See page [SR-31](#))
- (c) Disconnect the pressure feed tube from the PS vane pump.
(2JZ-GE Engine: See page [SR-21](#))
(1UZ-FE Engine: See page [SR-31](#))
SST 09631-22020
- (d) Connect SST, as shown below.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

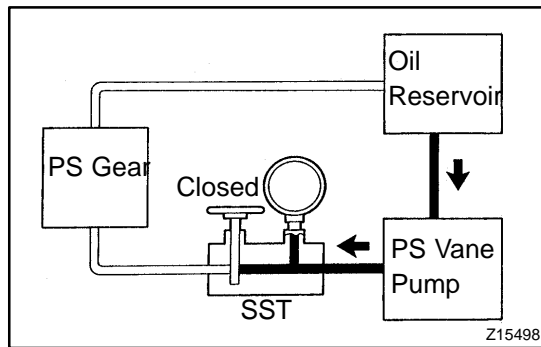
NOTICE:

Check that the valve of the SST is in the open position.



F03674

- (e) Bleed the power steering system.
(See page [SR-3](#))
- (f) Start the engine and run it at idle.
- (g) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 °C (176 °F)



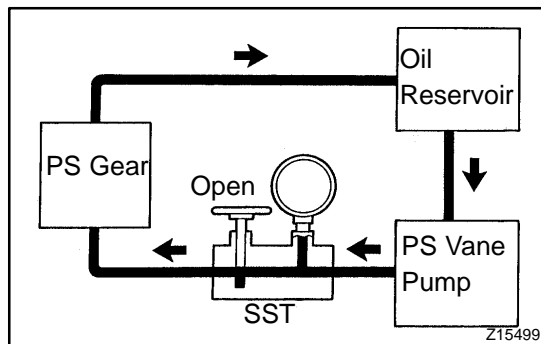
- (h) With the engine idling, close the valve of the SST and observe the reading on the SST.

Minimum fluid pressure:

8,336 kPa (85 kgf/cm², 1,209 psi)

NOTICE:

- Do not keep the valve closed for more than 10 seconds.
- Do not let the fluid temperature become too high.



- (i) With the engine idling, open the valve fully.

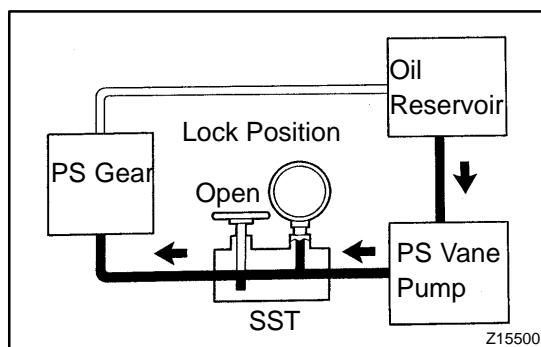
- (j) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Difference fluid pressure:

490 kPa (5 kgf/cm², 71 psi) or less

NOTICE:

Do not turn the steering wheel.



- (k) With the engine idling and valve fully opened, turn the steering wheel to full lock.

Minimum fluid pressure:

8,336 kPa (85 kgf/cm², 1,209 psi)

NOTICE:

- Do not maintain lock position for more than 10 seconds.
- Do not let the fluid temperature become too high.

- (l) Disconnect the SST.

- (m) Connect the pressure feed tube.

(2JZ–GE Engine: See page [SR-28](#))

(1UZ–FE Engine: See page [SR-41](#))

- (n) 1UZ–FE Engine:

Install the air cleaner assembly with air cleaner hose.

(See page [SR-41](#))

- (o) 1UZ–FE Engine:

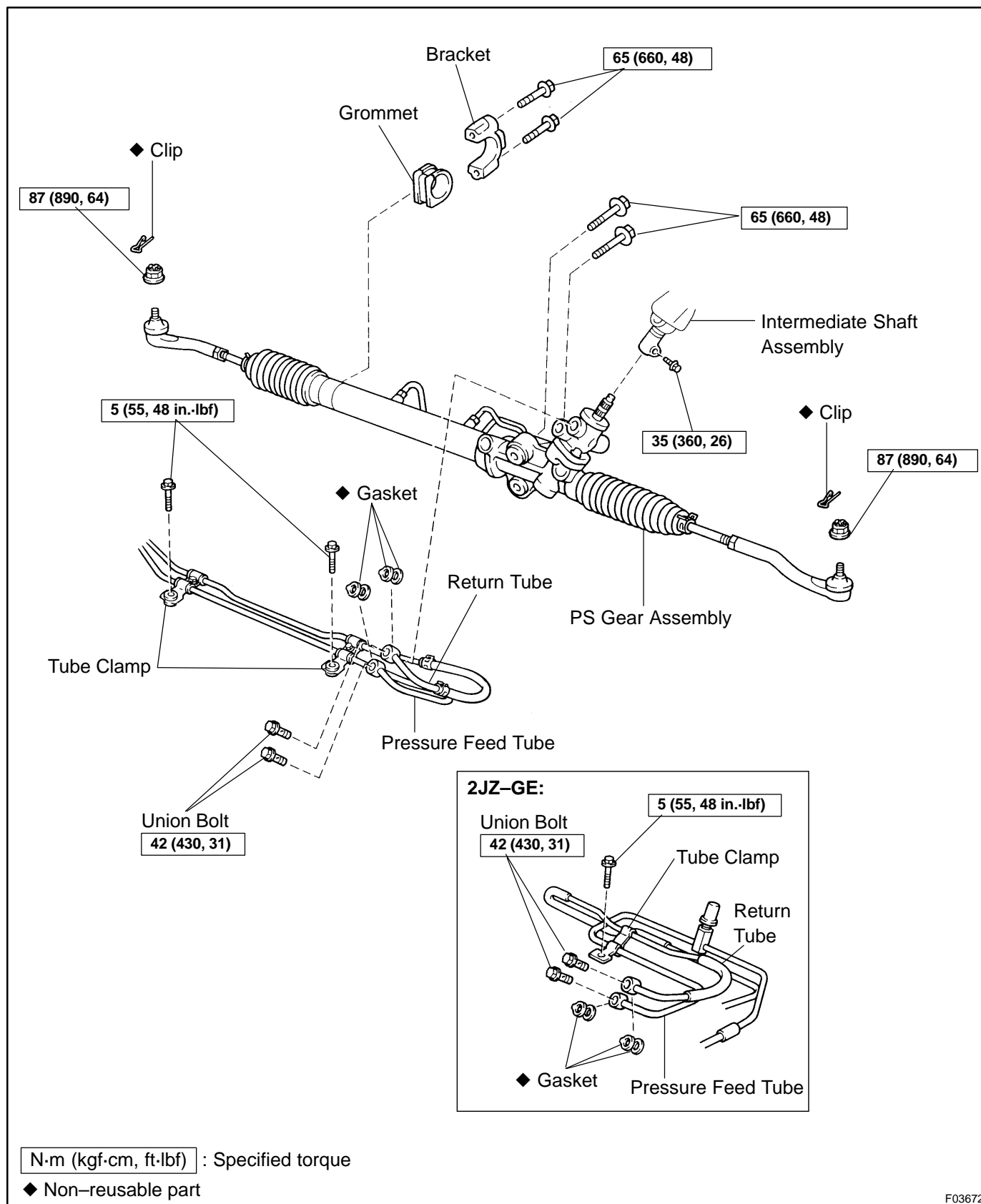
Install the air cleaner inlet.

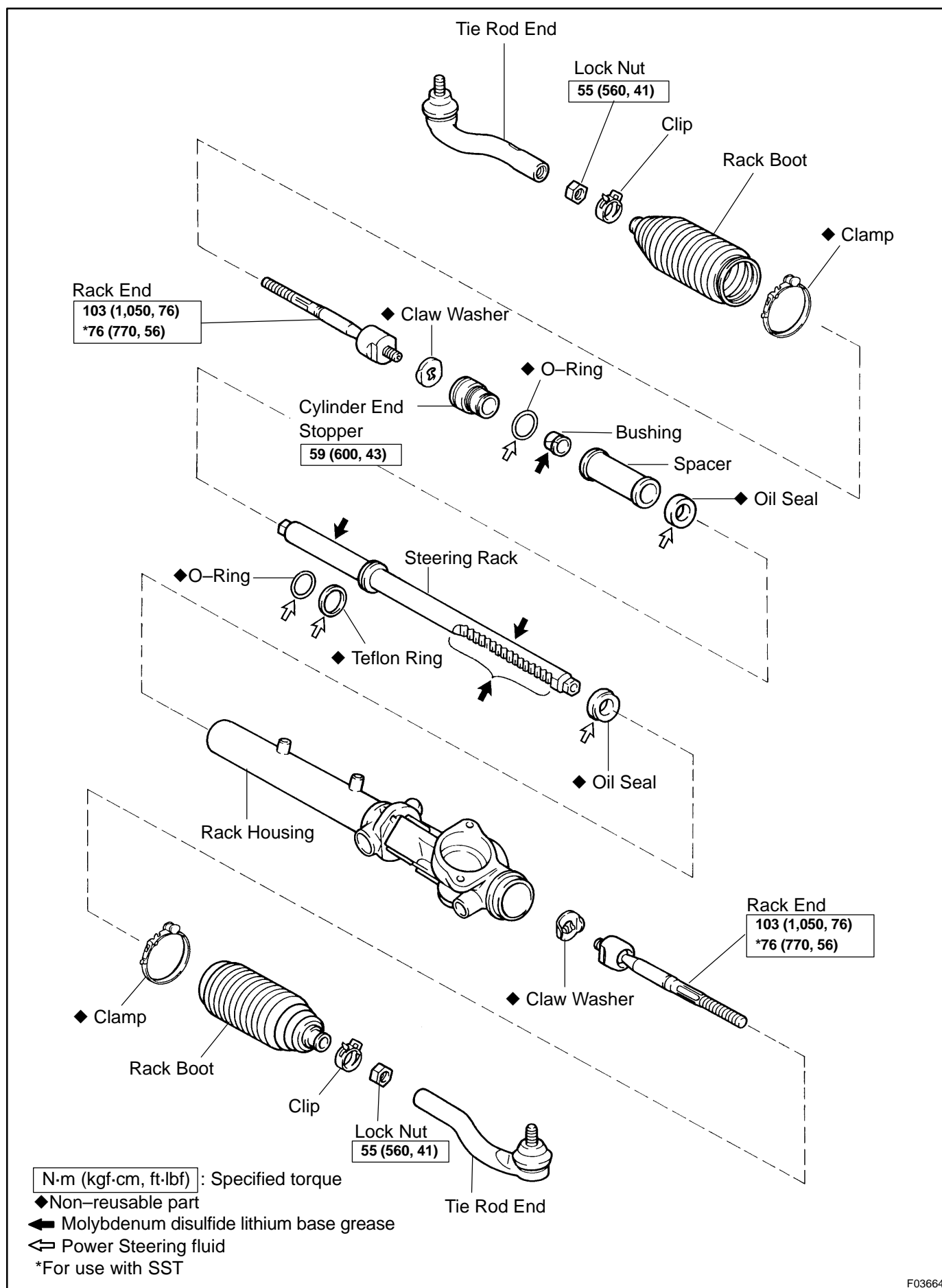
- (p) Bleed the power steering system.

(See page [SR-3](#))

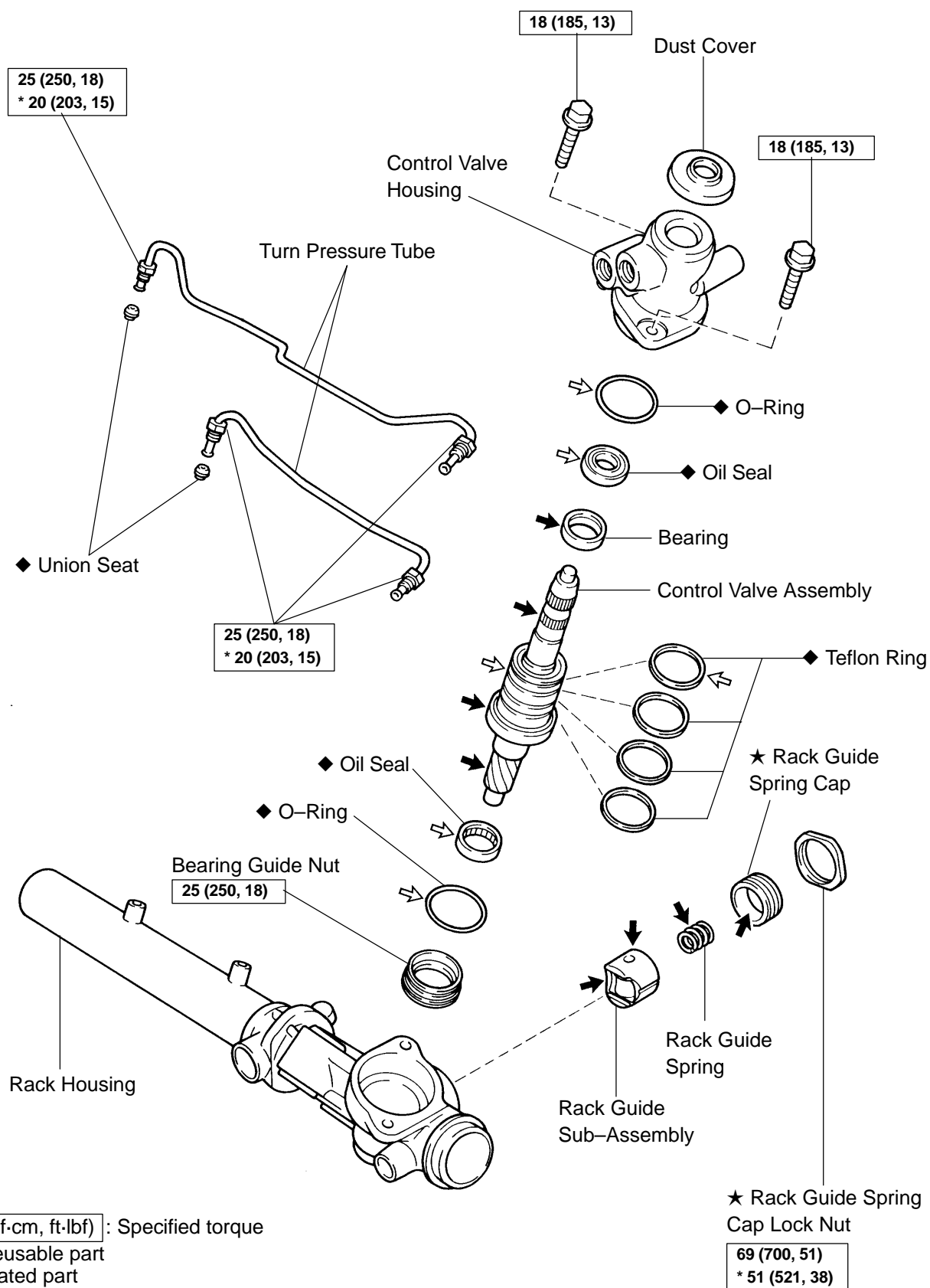
POWER STEERING GEAR COMPONENTS

SR0E2-01





F03664



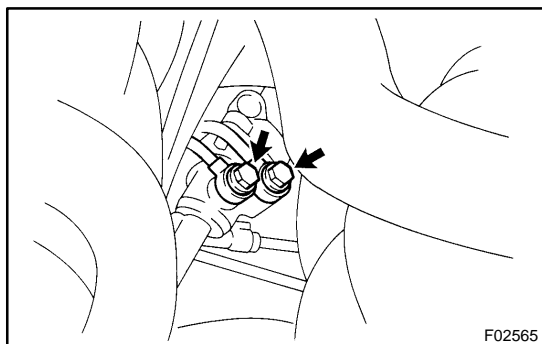
F03665

REMOVAL

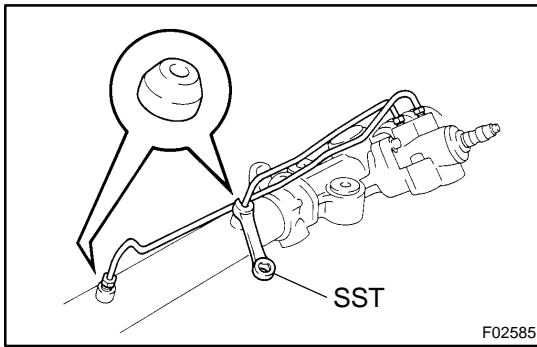
NOTICE:

Remove the steering wheel assembly before the steering gear removal, because there is possibility of breaking of the spiral cable.

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD
(See page [SR-11](#))
3. REMOVE STEERING WHEEL
(See page [SR-11](#))
4. DISCONNECT RH AND LH TIE ROD ENDS
(See page [SA-9](#))
5. DISCONNECT INTERMEDIATE SHAFT ASSEMBLY
(See page [SR-11](#))



6. DISCONNECT PRESSURE FEED AND RETURN TUBES
 - (a) Pressure feed tube:
Remove the union bolt and gasket.
 - (b) Return tube:
Remove the union bolt and 2 gaskets.
7. **2JZ-GE Engine:**
DISCONNECT TUBE CLAMP
Remove the bolt.
8. **1UZ-FE Engine:**
DISCONNECT 2 TUBE CLAMPS
Remove the bolt.
9. REMOVE PS GEAR ASSEMBLY
 - (a) Disconnect the connector.
 - (b) Remove the 4 gear assembly set bolts.
10. REMOVE BRACKET AND GROMMET



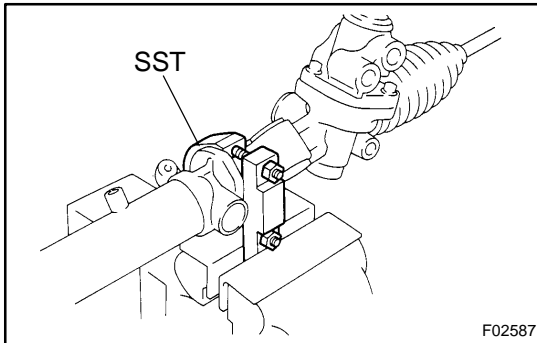
DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE 2 TURN PRESSURE TUBES

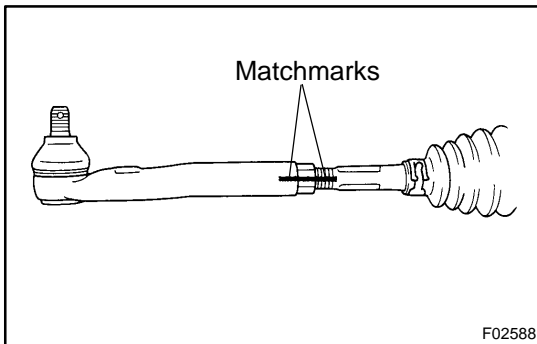
- Using SST, remove the tube.
SST 09633-00020
- Remove the union seat from the rack housing.



2. SECURE PS GEAR ASSEMBLY IN VISE

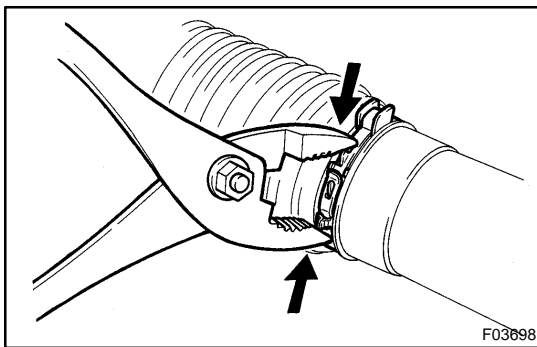
Using SST, secure the gear assembly in a vise, as shown in the illustration.

SST 09612-00012



3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

Place matchmarks on the tie rod end and rack end.

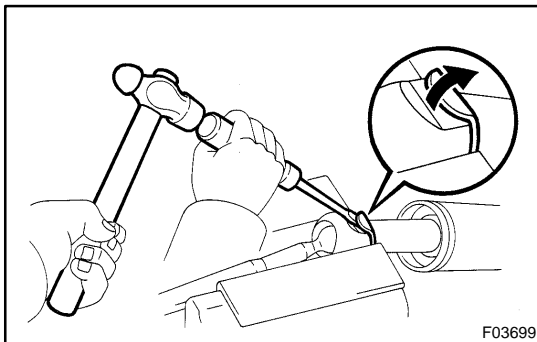


4. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

Using pliers, loosen the clamp, as shown in the illustration.

NOTICE:

- Be careful not to damage the boot.
- Mark the RH and LH boots.

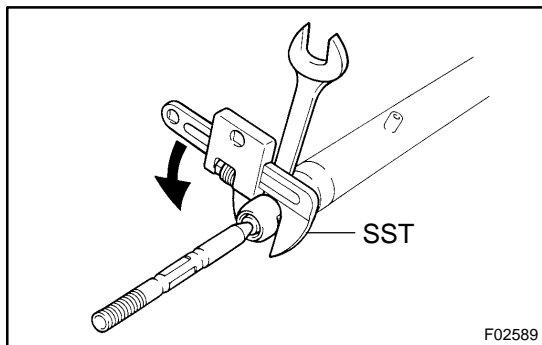


5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

- Using a screwdriver and hammer, stake back the washer.

NOTICE:

Avoid any impact to the steering rack.

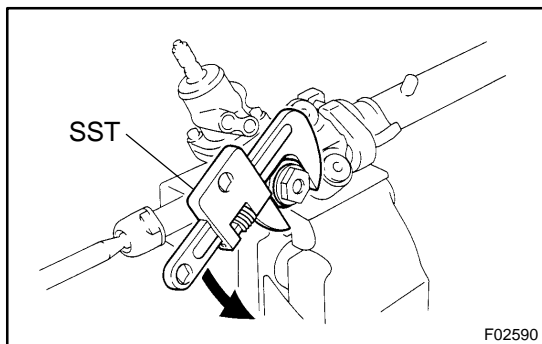


- (b) Using a spanner to hold the steering rack steady, and using SST, remove the rack end.

SST 09922-10010

NOTICE:

- Use SST 09922-10010 in the direction shown in the illustration.
- Mark the RH and LH rack ends.



6. REMOVE RACK GUIDE SPRING CAP LOCK NUT

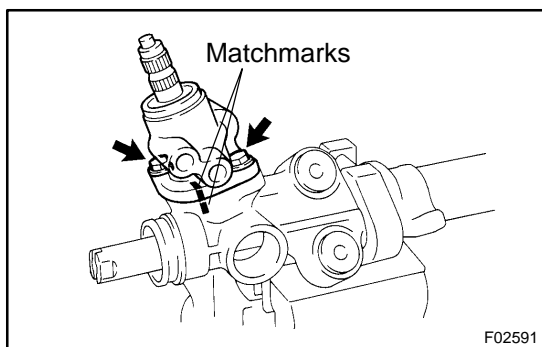
Using SST, remove the nut.

SST 09922-10010

NOTICE:

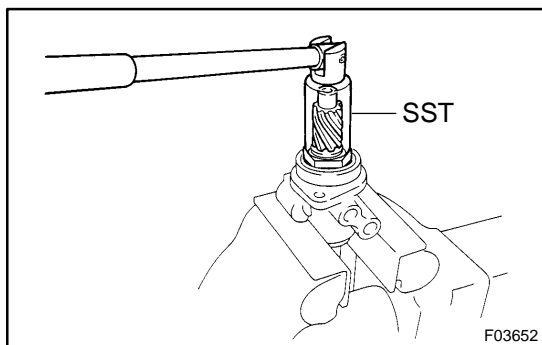
Use SST 09922-10010 in the direction shown in the illustration.

- 7. REMOVE RACK GUIDE SPRING CAP**
- 8. REMOVE RACK GUIDE SPRING AND RACK GUIDE SUB-ASSEMBLY**
- 9. REMOVE DUST COVER**



10. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

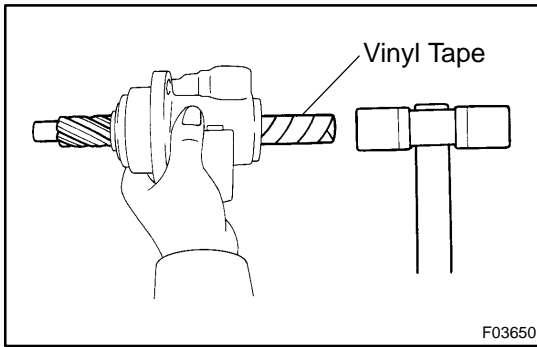
- Place matchmarks on the valve housing and rack housing.
- Remove the 2 bolts.
- Pull out the control valve assembly with the valve housing.
- Remove the O-ring from the rack housing.



11. REMOVE CONTROL VALVE ASSEMBLY

- Using SST, loosen the bearing guide nut.

SST 09631-20060



- (b) Wind vinyl tape to the control valve shaft.
- (c) Using a plastic hammer, tap out the valve assembly with the nut from the control valve housing.

NOTICE:

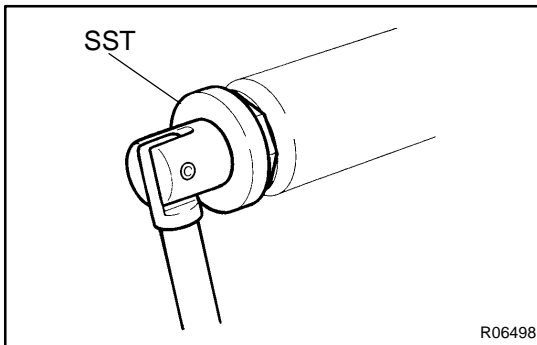
Be careful not to damage the oil seal lip.

- (d) Remove the nut from the valve assembly.

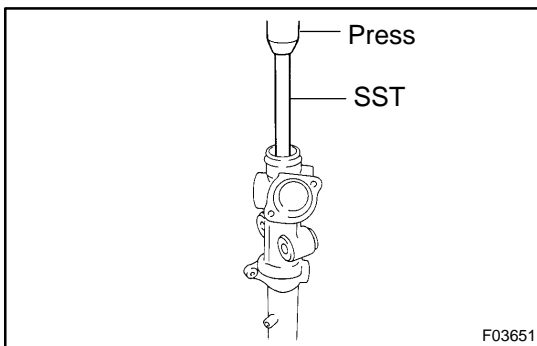
NOTICE:

Be careful not to damage the oil seal lip.

- (e) Remove the O-ring from the nut.

**12. REMOVE CYLINDER END STOPPER AND SPACER**

- (a) Using SST, remove the stopper.
SST 09631-20090
- (b) Remove the O-ring from the stopper.

**13. REMOVE STEERING RACK AND OIL SEAL**

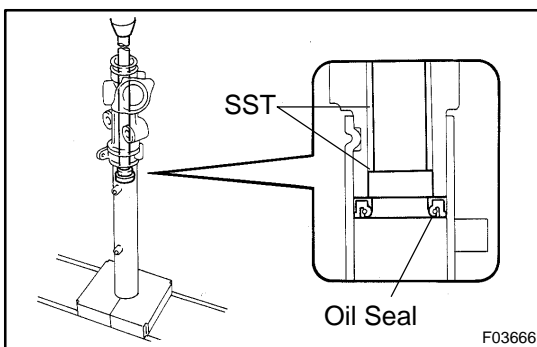
- (a) Using SST, press out the rack and oil seal.

NOTICE:

Take care not to drop the rack.

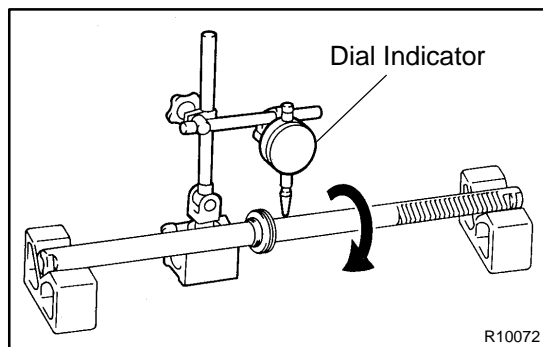
SST 09950-70010 (09951-07200)

- (b) Remove the oil seal from the rack.

**14. REMOVE OIL SEAL**

Using SST, press out the oil seal.

SST 09950-60010 (09951-00280),
09950-70010 (09951-07360)



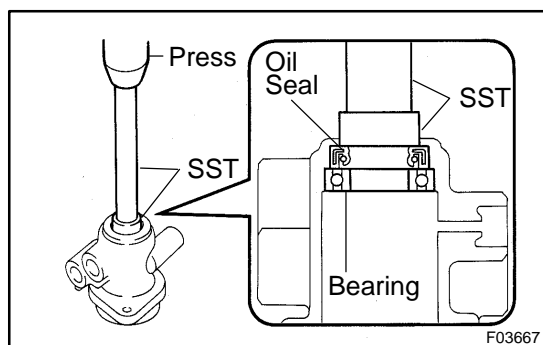
INSPECTION

1. INSPECT STEERING RACK

- (a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

Maximum runout: 0.03 mm (0.0118 in.)

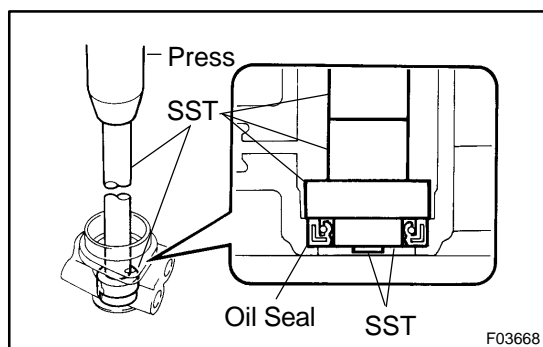
- (b) Check the back surface for wear and damage.



2. IF NECESSARY, REPLACE OIL SEAL AND BEARING

- (a) Using SST, press out the oil seal and bearing from the control valve housing.

SST 09950-60010 (09951-00260),
09950-70010 (09951-07150)



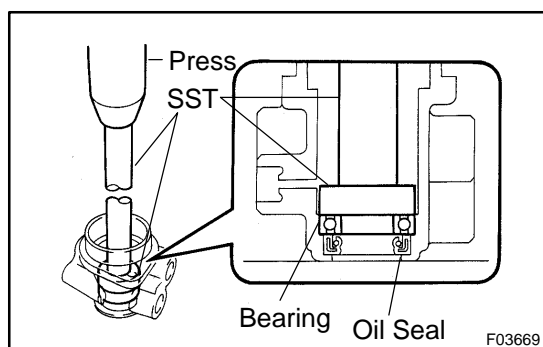
- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00180, 09951-00330,
09952-06010), 09950-70010 (09951-07150)

NOTICE:

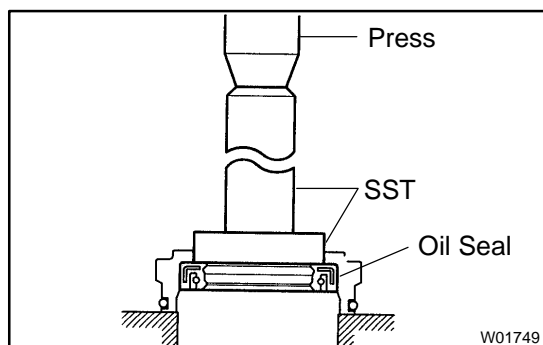
Make sure to install the oil seal facing the correct direction.



- (d) Coat a new bearing with molybdenum disulfide lithium base grease.

- (e) Using SST, press in the bearing.

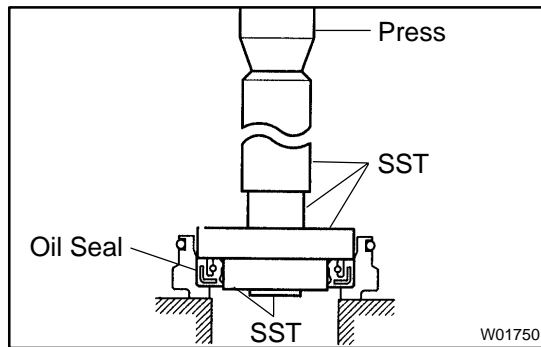
SST 09950-60010 (09951-00330),
09950-70010 (09951-07150)



3. IF NECESSARY, REPLACE OIL SEAL

- (a) Using SST, press out the oil seal from the bearing guide nut.

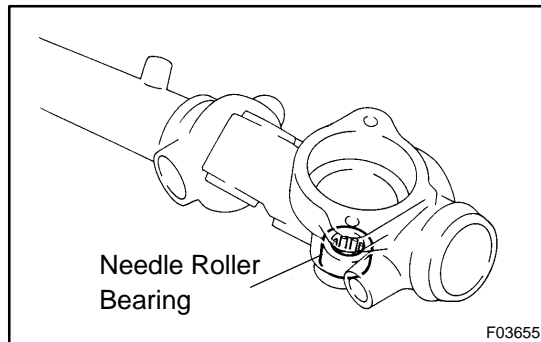
SST 09950-60010 (09951-00320),
09950-70010 (09951-07100)



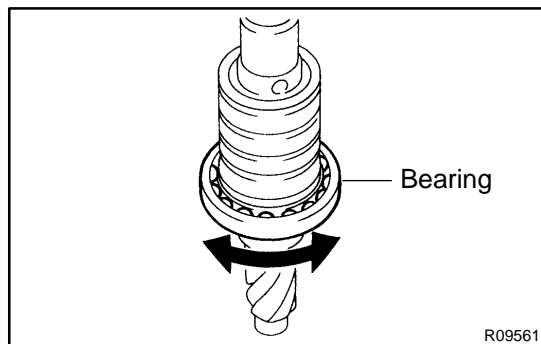
- (b) Coat a new oil seal lip with power steering fluid.
- (c) Using SST, press in the oil seal.
SST 09950-60010 (09951-00280, 09951-00360, 09952-06010), 09950-70010 (09951-07100)

NOTICE:

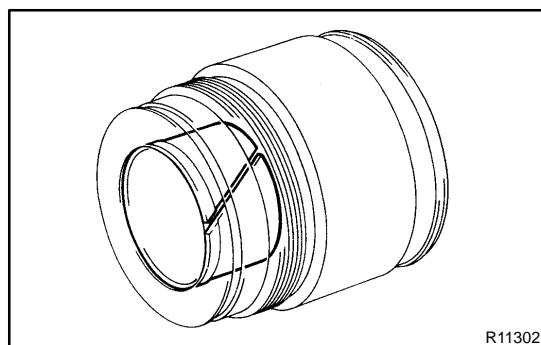
Make sure to install the oil seal facing the correct direction.

**4. INSPECT BEARING**

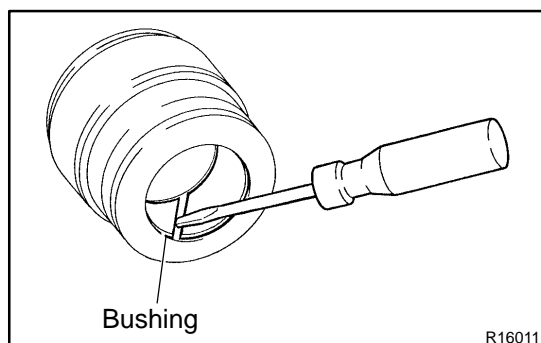
- (a) Check the needle roller bearing of the rack housing for pit-marks or damage.
If faulty, replace the rack housing.
- (b) Coat the inside of the bearing with molybdenum disulfide lithium base grease.

**5. INSPECT BEARING**

- (a) Check the bearing rotation condition and check for abnormal noise.
If the bearing is worn or damaged, replace the control valve assembly.
- (b) Coat the bearing with molybdenum disulfide lithium base grease.

**6. INSPECT BUSHING**

- (a) Check the inside of the bushing of the cylinder end stopper for cracks. If faulty, replace the bushing.
- (b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.

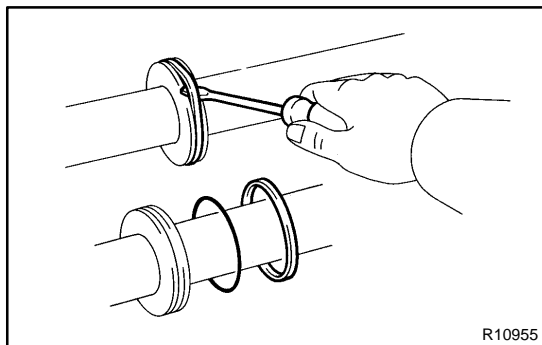
**7. IF NECESSARY, REPLACE BUSHING**

- (a) Using a screwdriver, remove the bushing from the cylinder end stopper.

NOTICE:

Be careful not to damage the cylinder end stopper.

- (b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.
- (c) Install the bushing.



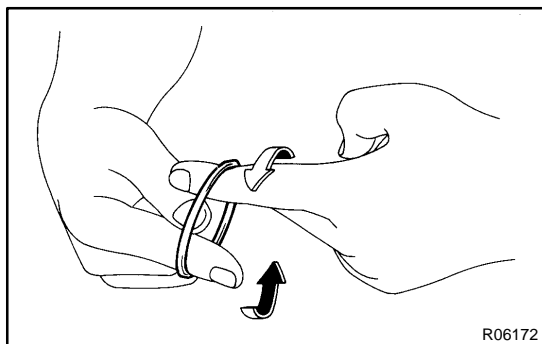
8. IF NECESSARY, REPLACE TEFLON RING AND O-RING

- (a) Using a screwdriver, remove the teflon ring and O-ring from the steering rack.

NOTICE:

Be careful not to damage the groove for the ring.

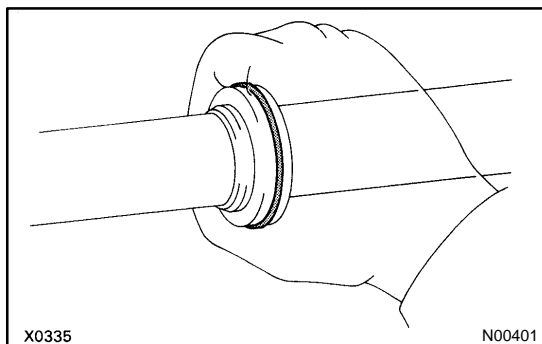
- (b) Coat a new O-ring with power steering fluid and install it.



- (c) Expand a new teflon ring with your fingers.

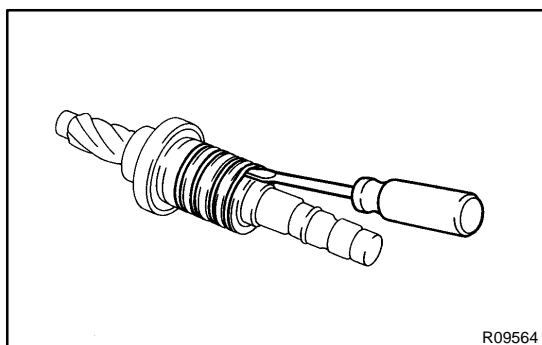
NOTICE:

Be careful not to overexpand the ring.



- (d) Coat the ring with power steering fluid.

- (e) Install the ring to the rack, and settle it down with your fingers.



9. IF NECESSARY, REPLACE TEFLON RINGS

- (a) Using a screwdriver, remove the 4 rings from the control valve assembly.

NOTICE:

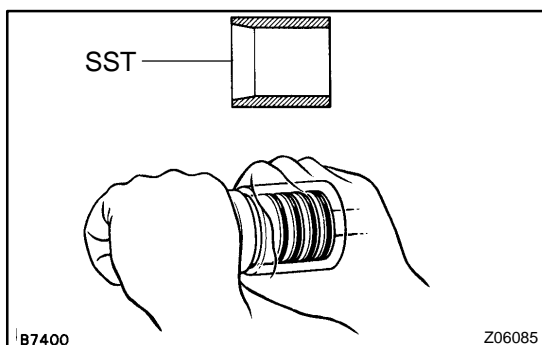
Be careful not to damage the grooves for the ring.

- (b) Expand 4 new rings with your fingers.

NOTICE:

Be careful not to overexpand the ring.

- (c) Coat the rings with power steering fluid.



- (d) Install the rings to the control valve assembly, and settle them down with your fingers.

- (e) Carefully slide the tapered end of SST over the rings until the ring fits to the steering rack.

SST 09631-20081

NOTICE:

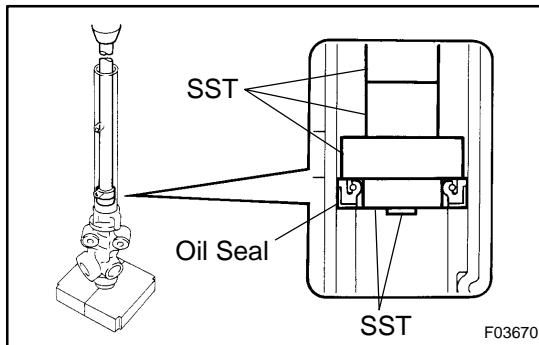
Be careful not to damage the rings.

REASSEMBLY

NOTICE:

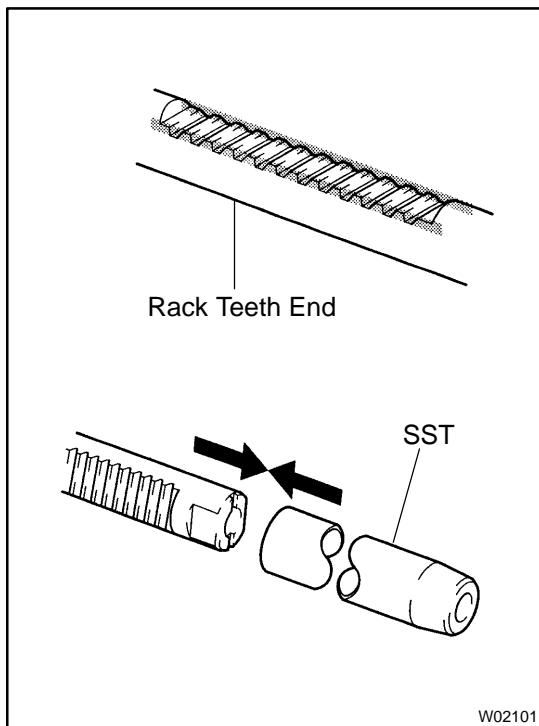
When using a vise, do not overtighten it.

1. **COAT WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE**
(See page [SR-42](#))



2. INSTALL OIL SEAL

- (a) Coat a new oil seal lip with power steering fluid.
- (b) Using SST, press in the oil seal.
SST 09951-60010 (09951-00330, 09951-00490, 09952-06010), 09950-70010 (09951-07360)
 - **Make sure to install the oil seal facing the correct direction.**
 - **Take care that the oil seal does not get reversed as you install it.**



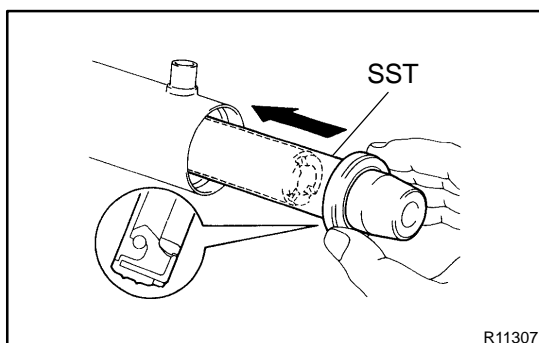
3. INSTALL STEERING RACK

- (a) Install SST to the rack.
SST 09631-20102

HINT:

If necessary, scrape the burrs off the rack teeth end and bur-nish.

- (b) Coat SST with power steering fluid.
- (c) Install the rack into the rack housing.
- (d) Remove the SST.



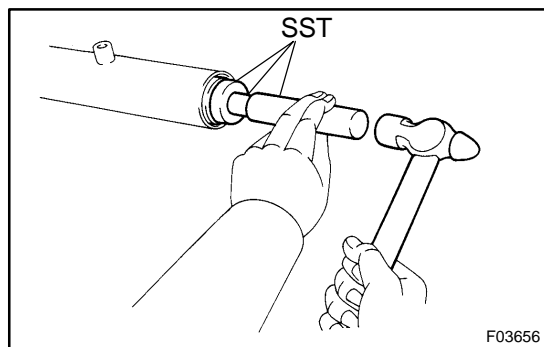
4. INSTALL OIL SEAL

- (a) Install SST to the steering rack opposite end.
SST 09631-20102
- (b) Coat SST with power steering fluid.
- (c) Coat a new oil seal lip with power steering fluid.
- (d) Install the oil seal by pushing it onto the SST without tilt-ing.

NOTICE:

Make sure to install the oil seal facing the correct direction.

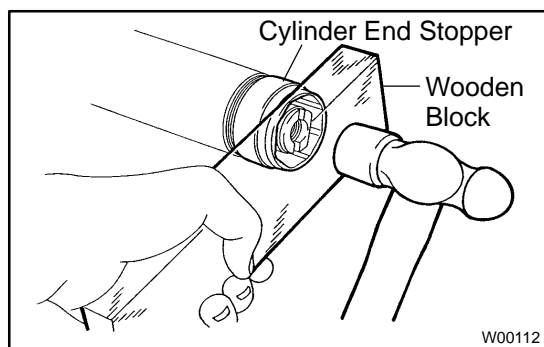
- (e) Remove the SST.



5. INSTALL SPACER AND CYLINDER END STOPPER

- (a) Using SST and a hammer, drive in the spacer.

SST 09950-60010 (09951-00280, 09951-00420, 09952-06010), 09950-70010 (09951-07200)

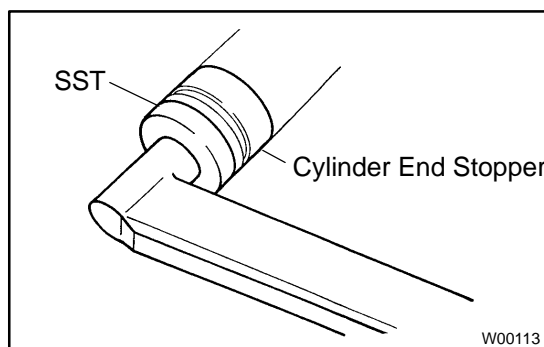


- (b) Coat a new O-ring with power steering fluid, and install it to the stopper.

- (c) Using a wooden block and hammer, drive in the stopper until it is tightly installed.

NOTICE:

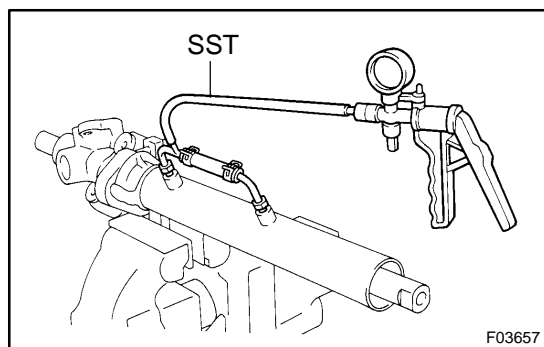
Be careful not to damage the O-ring.



- (d) Using SST, torque the stopper.

SST 09631-20120

Torque: 59 N·m (600 kgf-cm, 43 ft-lbf)



6. AIR TIGHTNESS TEST

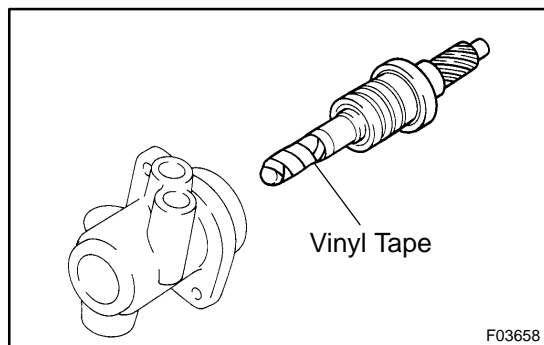
- (a) Install SST to the unions of the rack housing.

SST 09631-12071

- (b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.

- (c) Check that there is no change in the vacuum.

If there is change in the vacuum, check the installation of the oil seals.



7. INSTALL CONTROL VALVE ASSEMBLY

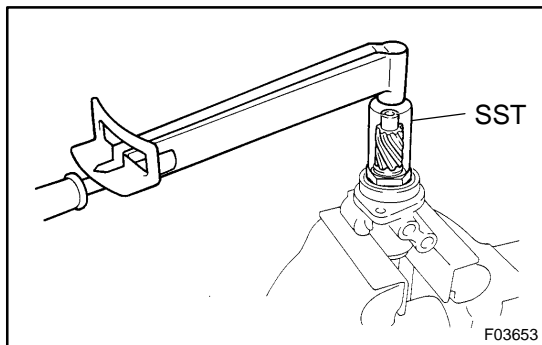
- (a) Coat the teflon rings with power steering fluid.

- (b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.

- (c) Push the valve assembly into the control valve housing.

NOTICE:

Be careful not to damage the teflon rings and oil seal lip.

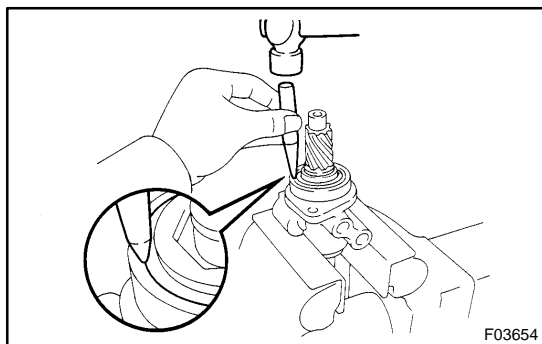


- (d) Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.
- (e) Using SST, torque the nut.
SST 09631-20060

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

NOTICE:

Be careful not to damage the oil seal lip.



- (f) Using a punch, stake the nut.

8. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

- (a) Coat a new O-ring with power steering fluid, and install it to the valve housing.
- (b) Align the matchmarks on the valve housing and rack housing, and install the valve housing with the valve assembly to the rack housing.
- (c) Torque the 2 bolts.

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

9. INSTALL DUST COVER

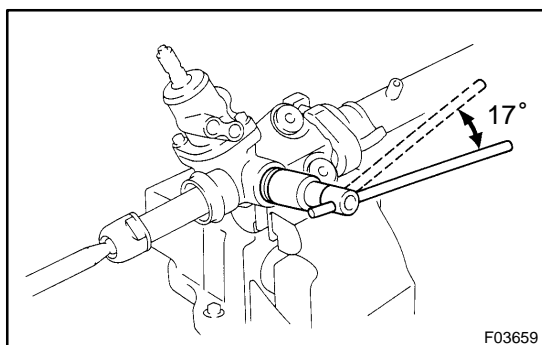
10. INSTALL RACK GUIDE SUB-ASSEMBLY, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP

- (a) Apply sealant to 2 or 3 threads of the cap.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Temporarily install the cap.

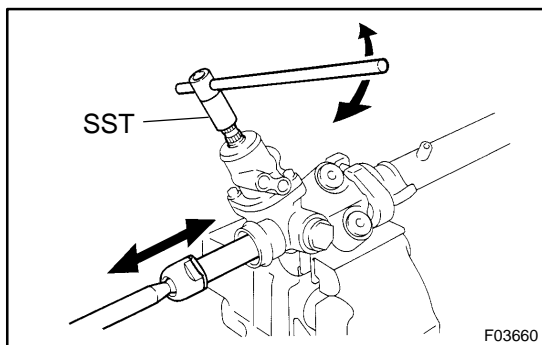


11. ADJUST TOTAL PRELOAD

- (a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.
- (b) Torque the rack guide spring cap.

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

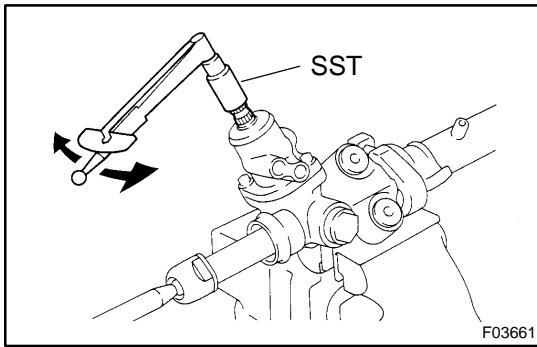
- (c) Return the cap 17°.



- (d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616-00010

- (e) Loosen the cap until the rack guide spring is not functioning.

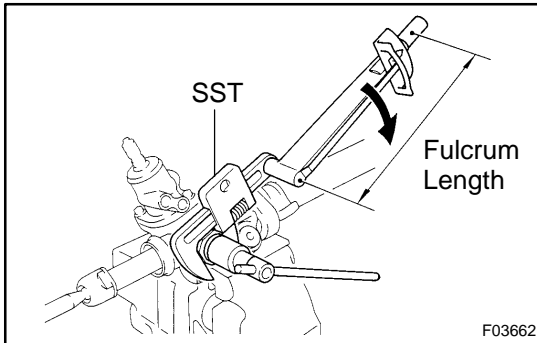


- (f) Using SST and a torque wrench, tighten the cap until the preload is within specification.

SST 09616-00010

Preload (turning):

0.5 –1.7 N·m (4.7–17.2 kgf·cm, 4.1–14.9 in.-lbf)



12. INSTALL RACK GUIDE SPRING CAP LOCK NUT

- (a) Apply sealant to 2 or 3 threads of the nut.

Sealant:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Holding the rack guide spring cap rotating, and using SST, torque the nut.

SST 09922-10010

Torque: 51 N·m (521 kgf·cm, 38 ft-lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

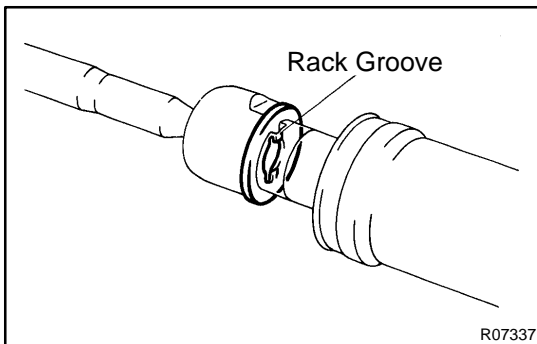
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (c) Recheck the total preload.

Preload (turning):

0.5 –1.7 N·m (4.7–17.2 kgf·cm, 4.1–14.9 in.-lbf)

- (d) Remove the RH and LH rack ends.

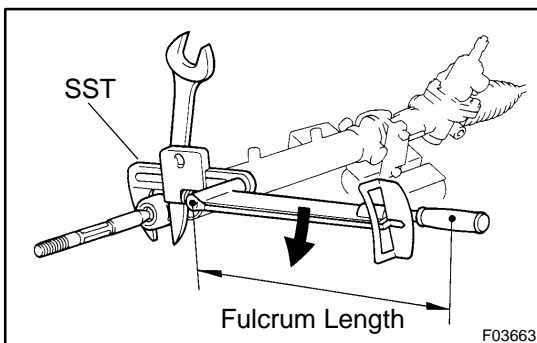


13. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

- (a) Install a new washer, and temporarily tighten the rack end.

HINT:

Align the claws of the washer with the steering rack grooves.



- (b) Using a spanner to hold the steering rack steady, and using SST, torque the rack end.

SST 09922-10010

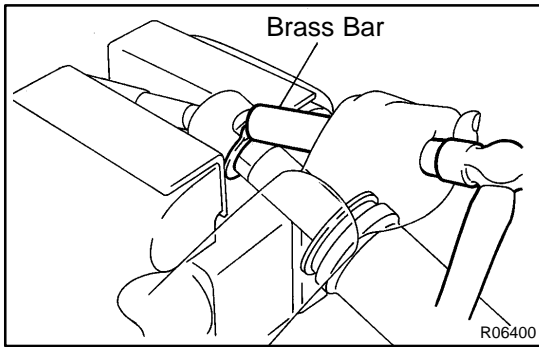
Torque: 76 N·m (770 kgf·cm, 56 ft-lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

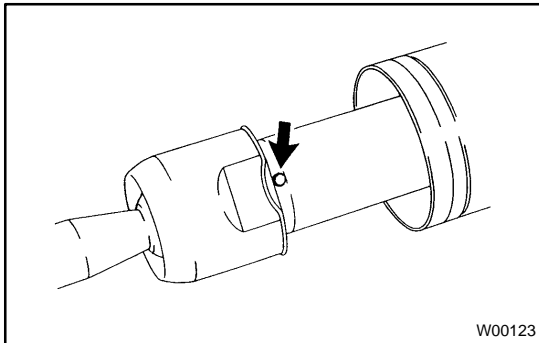
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



- (c) Using a brass bar and hammer, stake the washer.

NOTICE:

Avoid any impact to the rack.

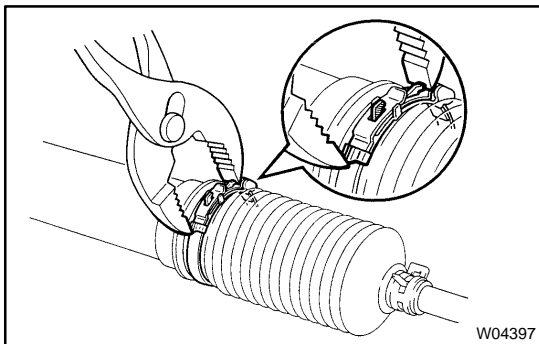


14. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

- (a) Ensure 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 is turned.



- (b) Install the boot.

NOTICE:

Be careful not to damage or twist the boot.

- (c) Using pliers tighten a new clamp, as shown in the illustration.

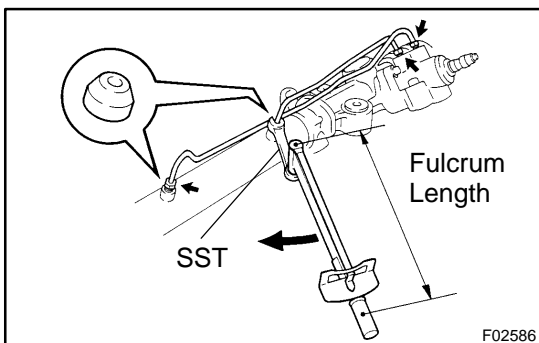
15. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

- (a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

- (b) After adjusting toe-in, torque the nut.

(See page [SA-4](#))

Torque: 55 N·m (560 kgf-cm, 41 ft-lbf)



16. INSTALL 2 TURN PRESSURE TUBES

- (a) Install a new union seat to the rack housing.

- (b) Using SST, install the tube.

SST 09633-00020

Torque: 20 N·m (203 kgf-cm, 15 ft-lbf)

HINT:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

INSTALLATION

1. INSTALL GROMMET AND BRACKET

2. INSTALL PS GEAR ASSEMBLY

- (a) Torque the 4 gear assembly set bolts.

Torque: 65 N·m (660 kgf-cm, 48 ft-lbf)

- (b) Connect the connector.

3. 2JZ-GE Engine:

CONNECT TUBE CLAMP

Torque the bolt.

Torque: 5 N·m (55 kgf-cm, 48 in.-lbf)

4. 1UZ-FE Engine:

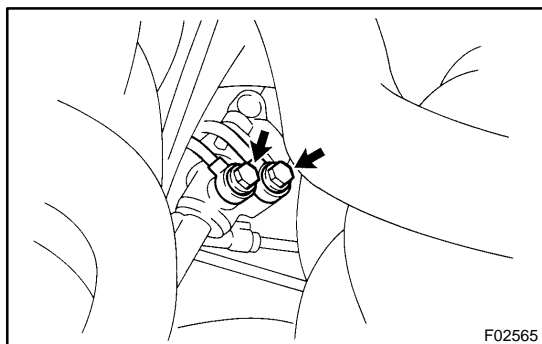
CONNECT 2 TUBE CLAMPS

Torque the bolt.

Torque: 5 N·m (55 kgf-cm, 48 in.-lbf)

5. CONNECT INTERMEDIATE SHAFT ASSEMBLY

(See page [SR-17](#))



6. CONNECT PRESSURE FEED AND RETURN TUBES

- (a) Pressure feed tube:

Torque the union bolt over a new gaskets.

Torque: 42 N·m (430 kgf-cm, 31 ft-lbf)

- (b) Return tube:

Torque the union bolt with a new gasket on each side of the tube.

Torque: 42 N·m (430 kgf-cm, 31 ft-lbf)

7. CONNECT RH AND LH TIE ROD ENDS

(See page [SA-9](#))

8. POSITION FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

9. CENTER SPIRAL CABLE

(See page [SR-17](#))

10. INSTALL STEERING WHEEL

- (a) Align the matchmarks on the wheel and steering column main shaft.

- (b) Temporarily tighten the wheel set nut.

- (c) Connect the connector.

11. BLEED POWER STEERING SYSTEM

(See page [SR-3](#))

12. CHECK STEERING WHEEL CENTER POINT

13. TORQUE STEERING WHEEL SET NUT

Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)

14. INSTALL STEERING WHEEL PAD

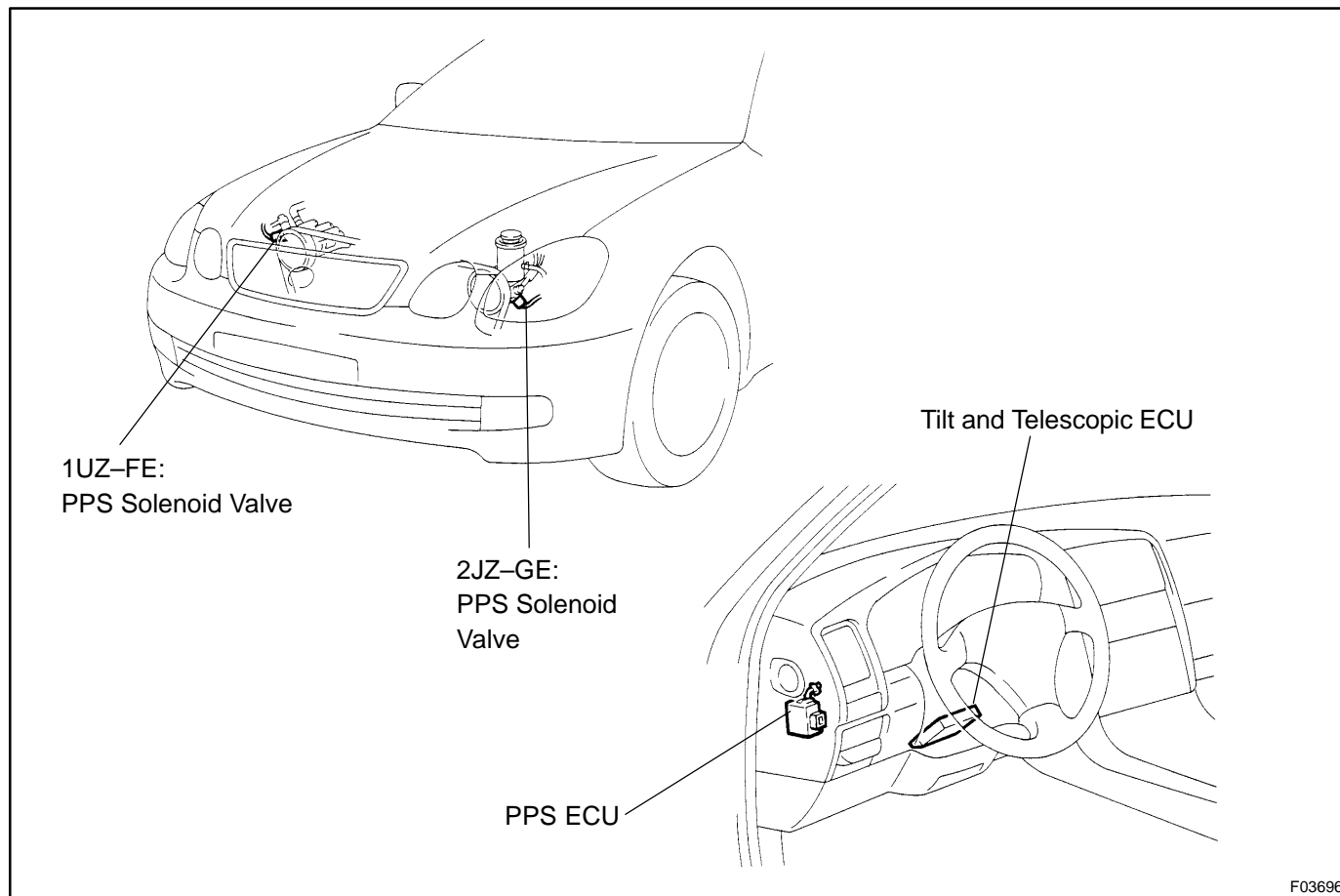
(See page [SR-17](#))

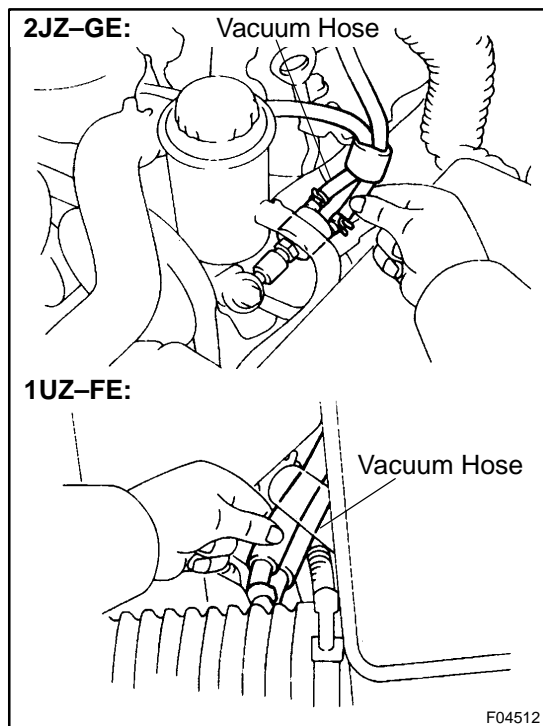
15. CHECK FRONT WHEEL ALIGNMENT

(See page [SA-4](#))

PROGRESSIVE POWER STEERING (PPS) LOCATION

SR0E8-01

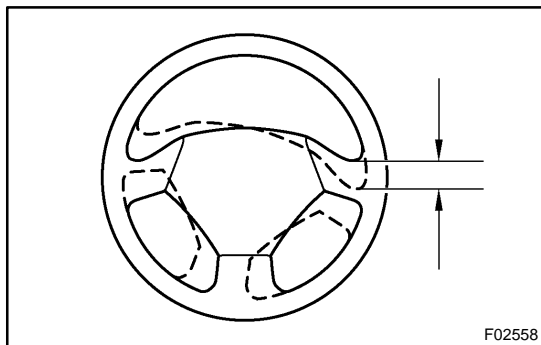




AIR CONTROL VALVE INSPECTION

SR0DI-01

- 1. TURN AIR CONDITIONING SWITCH OFF**
- 2. CHECK IDLE-UP**
 - (a) Start the engine and run it at idle.
 - (b) Fully turn the steering wheel.
 - (c) Check that the engine rpm decreases when the vacuum hose of the air control valve is pinched.
 - (d) Check that the engine rpm increases when the hose is released.



F02558

STEERING WHEEL INSPECTION

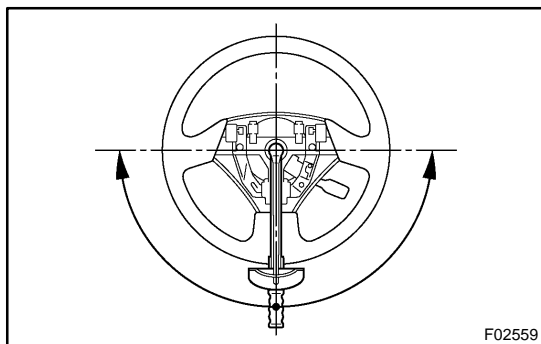
SR0DJ-01

1. CHECK STEERING WHEEL FREEPLAY

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: 30 mm (1.18 in.)



F02559

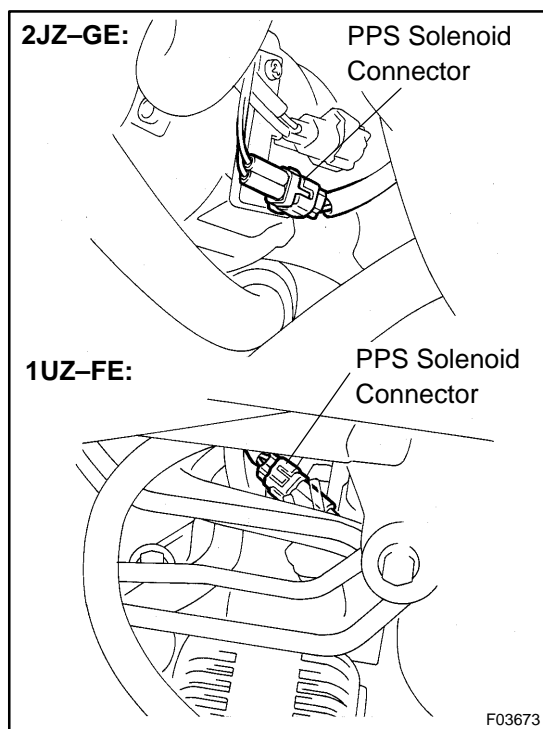
2. CHECK STEERING EFFORT

- Center the steering wheel.
- Remove the steering wheel pad. (See page [SR-11](#))
- Start the engine and run it at idle.
- Measure the steering effort in both directions.

Reference: 7 N·m (70 kgf·cm, 61 in.-lbf)

HINT:

Be sure to consider the tire type, pressure and contact surface before making your diagnosis.



F03673

- Disconnect the PPS solenoid connector.
- Measure the steering effort in both directions and check that the steering effort exceeds the reference value in (d), and that the power assist is operating. If steering effort is not heavier than (d), check the solenoid.

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

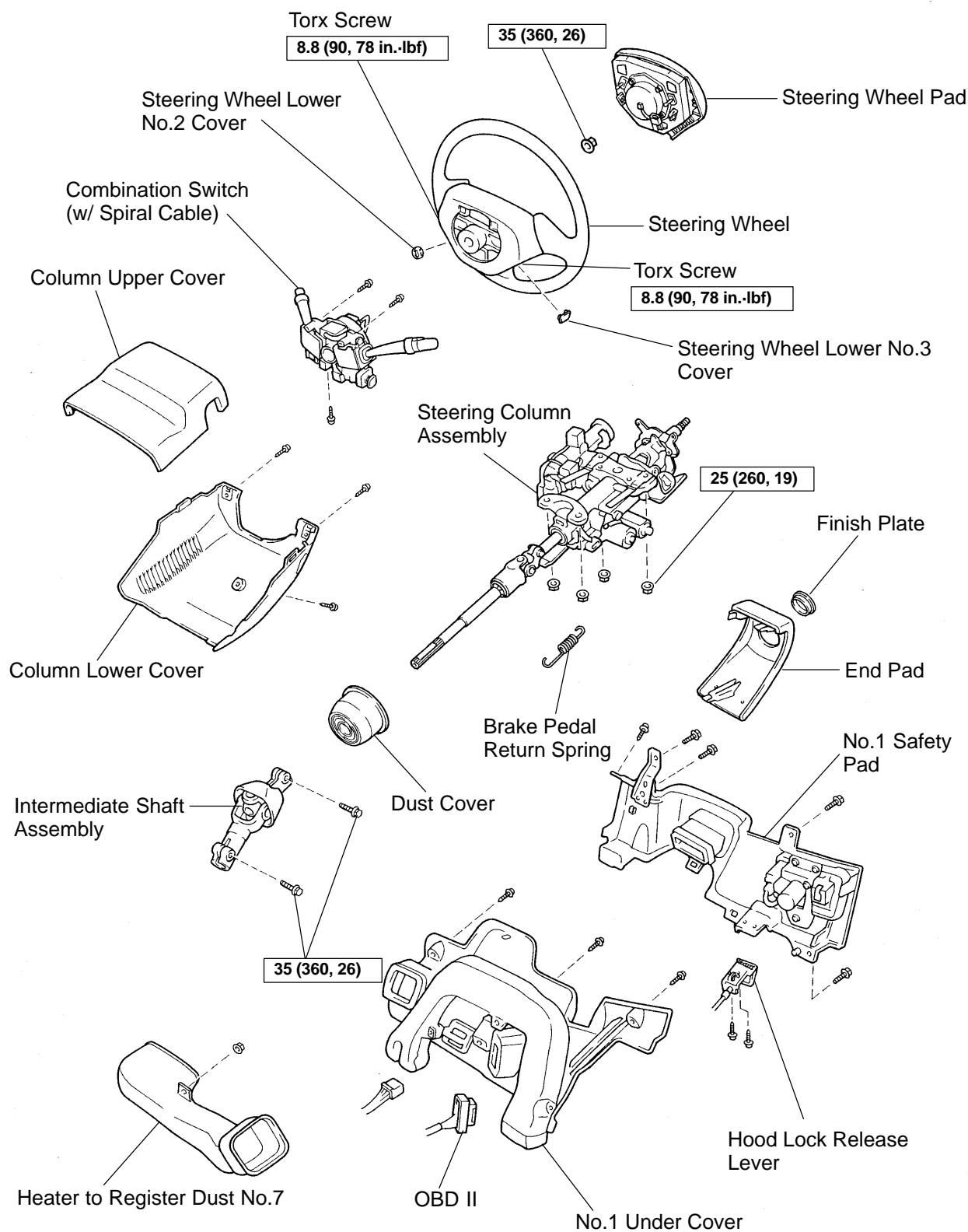
- Connect the connector.
- Torque the steering wheel set nut.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

- Install the steering wheel pad.
(See page [SR-17](#))

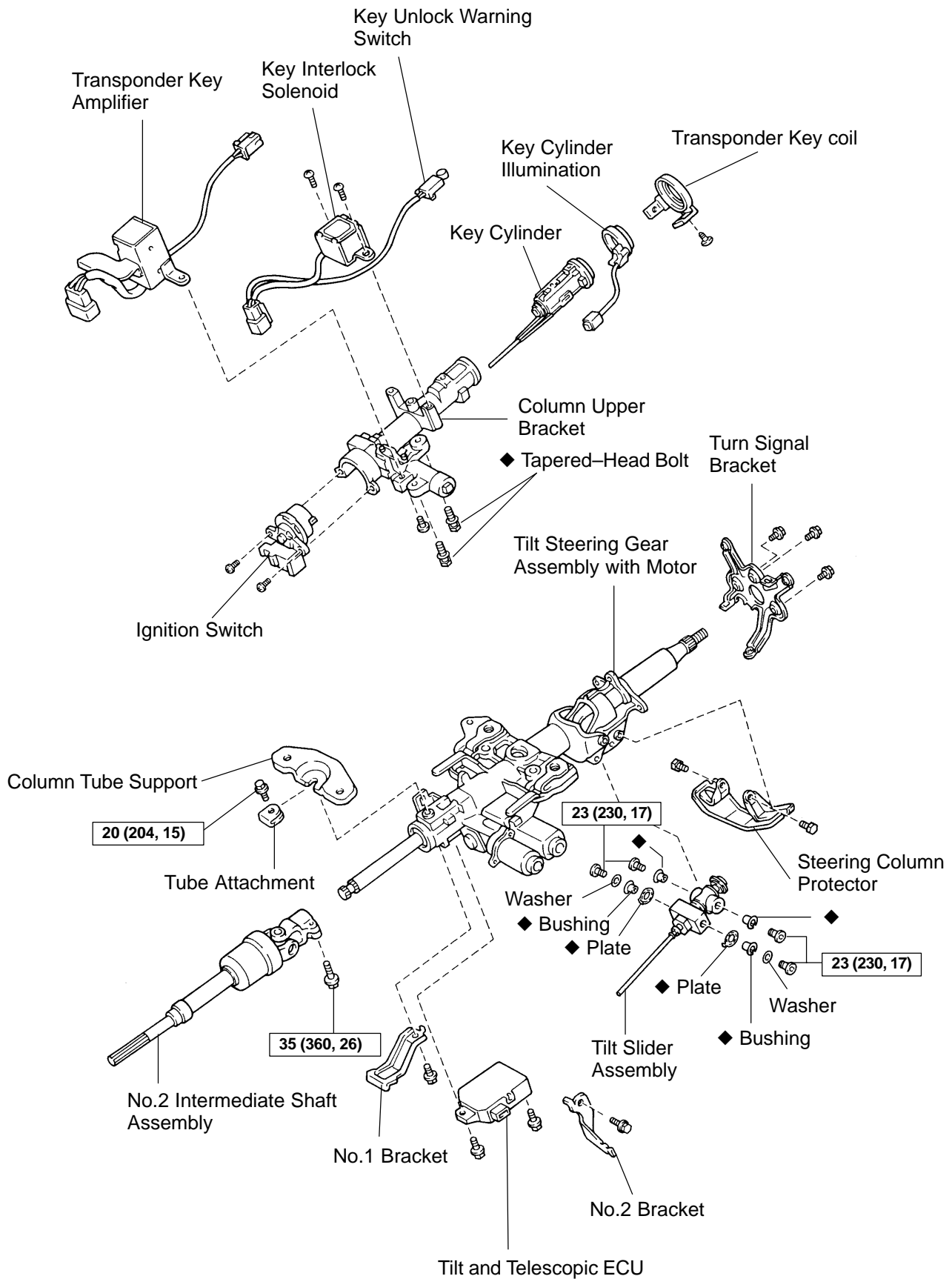
POWER TILT AND POWER TELESCOPIC STEERING COLUMN COMPONENTS

SR00K-03



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

F03671



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

◆ Non-reusable part

F09281

SRS AIRBAG

PRECAUTION

RS01Y-06

NOTICE:

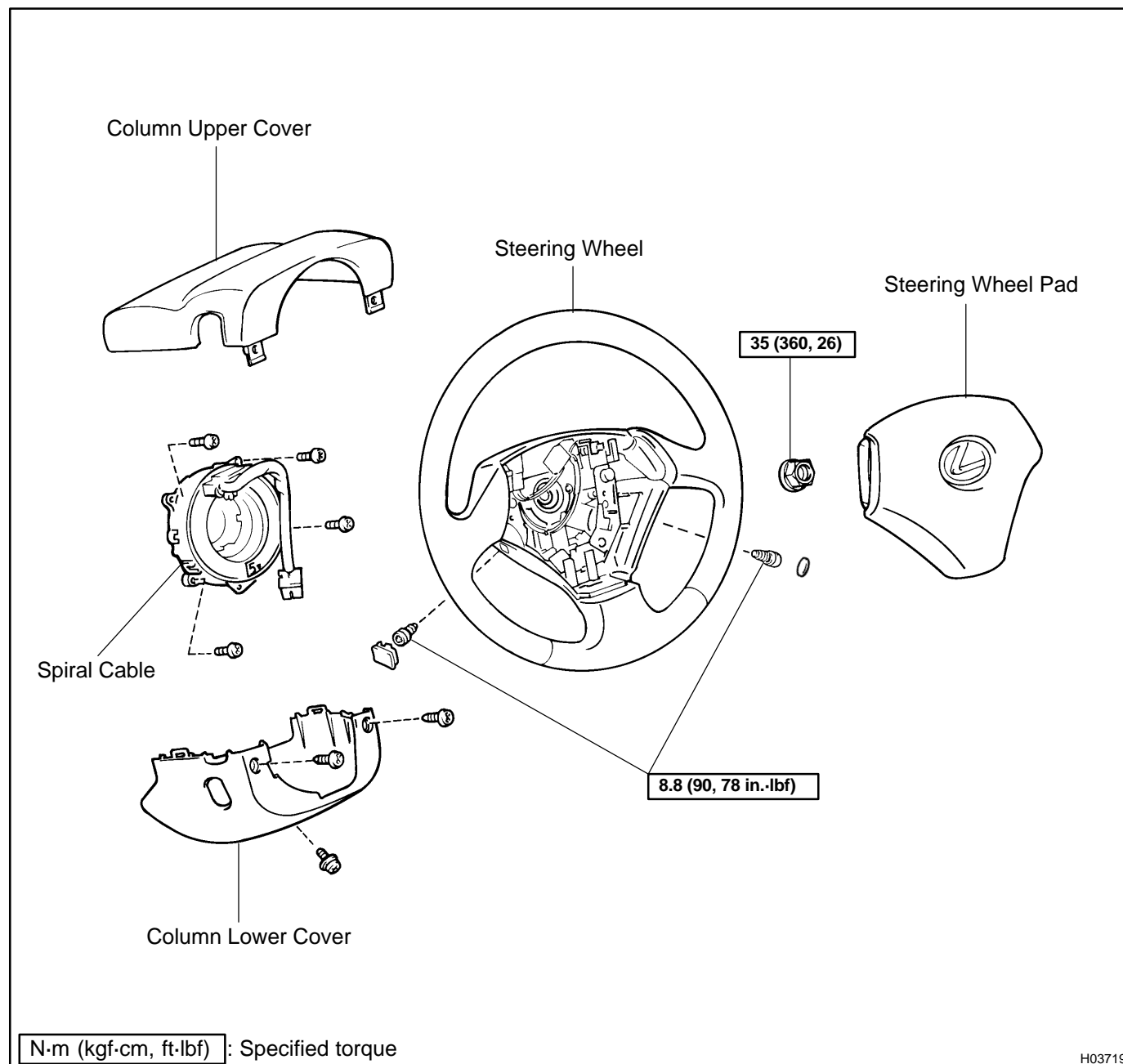
- The LEXUS GS 400/300 is equipped with SRS, which comprises a driver airbag, front passenger airbag and side airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible that the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedures described in the repair manual.
- Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor and side airbag sensor assembly should be inspected (See page [RS-15](#), [RS-29](#), [RS-42](#), [RS-60](#) and [RS-65](#)).
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never disassemble and repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor or side airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor or side airbag sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting the system's electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- After work on the SRS is completed, perform the SRS warning light check or SRS side airbag warning light check (See page [DI-552](#)).
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

CAUTION:

- Work must be started after 90 seconds from when the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery. (The SRS is equipped with a back-up power source so that if work is started within 90 seconds from disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
- When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. To avoid erasing the memory in each memory system, never use a back-up power supply from outside the vehicle.
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Do not expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor or side airbag sensor assembly directly to hot air or flames.

STEERING WHEEL PAD AND SPIRAL CABLE COMPONENTS

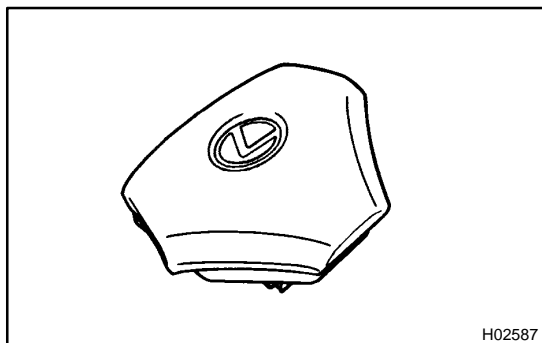
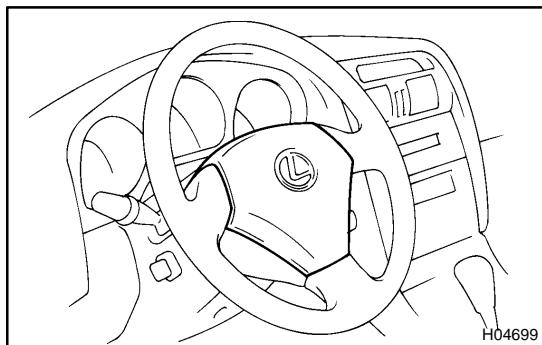
RS087-02



H03719

REMOVAL

REMOVE STEERING WHEEL AND SPIRAL CABLE (See page [SR-11](#))



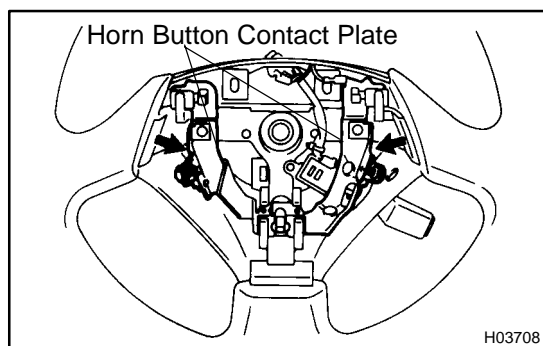
INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

- (a) Do a diagnostic system check.
(See page [DI-552](#))
- (b) Do a visual check which includes the following items with the steering wheel pad (with airbag) installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.

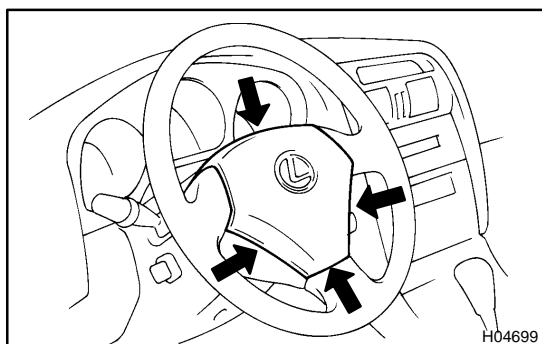
2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

- (a) Do a diagnostic system check.
(See page [DI-552](#))
- (b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
 - Check for cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
 - Check for cuts and cracks in wire harness, and chipping in connectors.
 - Check for the deformation of the horn button contact plate of the steering wheel.



HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly with a new one.



- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

CAUTION:

For removal and installation of the steering wheel pad, see the SR section and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

- (a) Do a diagnostic system check.
(See page [DI-552](#))
- (b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
 - Check for the deformation on the horn button contact plate of the steering wheel.
 - Check for the damage on the spiral cable connector and wire harness.

HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly with a new one.
- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

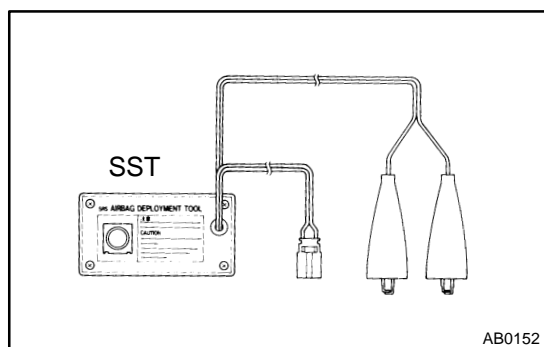
DISPOSAL

HINT:

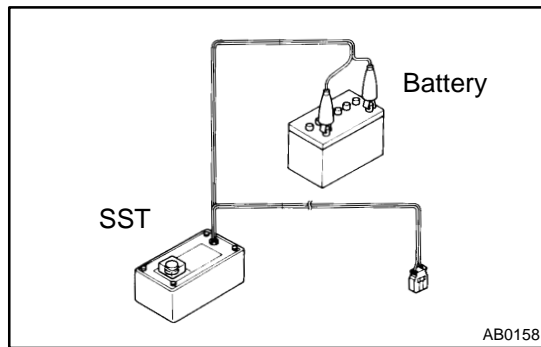
When scrapping vehicle equipped with an SRS or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the DISTRIBUTOR. When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given in step 1-(g) in "DISPOSAL".

CAUTION:

- **Never dispose of a steering wheel pad which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.**



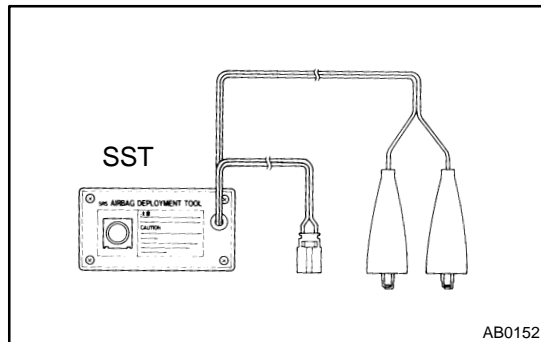
- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
SST 09082-00700, 09082-00760
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.**
- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

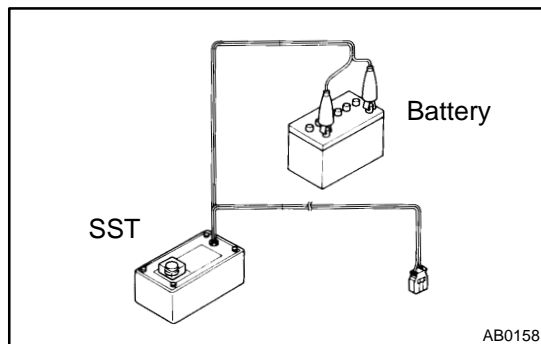


(a) Check functioning of SST

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082-00700

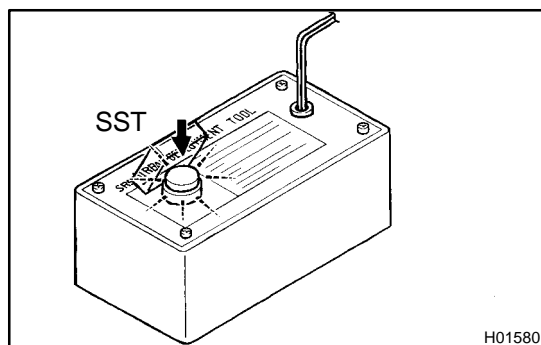


(1) Connect the SST battery.

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

HINT:

Do not connect the yellow connector which will be connected with the supplemental restraint system.

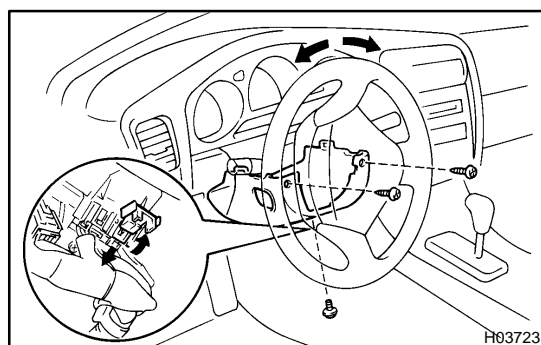


(2) Check functioning of SST.

Press the SST activation switch, and check that the LED of the SST activation switch lights up.

CAUTION:

If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.



(b) Install the SST.

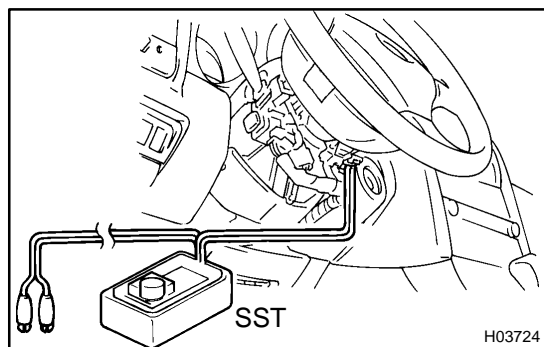
CAUTION:

Check that there is no looseness in the steering wheel and steering wheel pad.

(1) Remove the steering column lower cover.

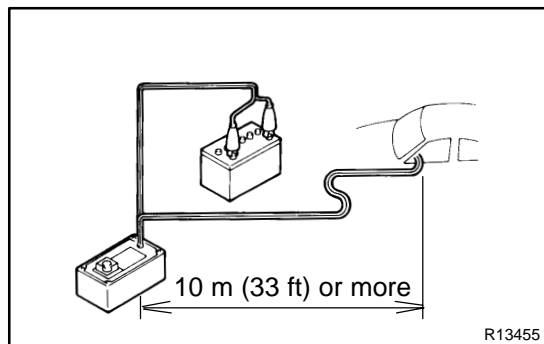
Remove the 3 screws and steering column lower cover as shown in the illustration.

(2) Disconnect the airbag connector of the spiral cable.



- (3) Connect the SST connector to the airbag connector of the spiral cable.

SST 09082-00700



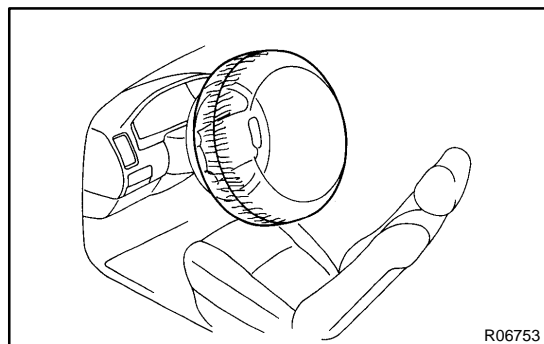
- (4) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

- (5) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (6) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (-) terminal.



- (c) Deploy the airbag.

- (1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

- (2) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

- (d) Dispose of steering wheel pad (with airbag).

CAUTION:

- The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
 - Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.
 - Always wash your hands with water after completing the operation.
 - Do not apply water, etc. to a steering wheel pad with the deployed airbag.
- (1) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the steering wheel pad still installed.
- (2) When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.

2. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD ONLY

NOTICE:

- When disposing of the steering wheel pad (with airbag) only, never use the customer's vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

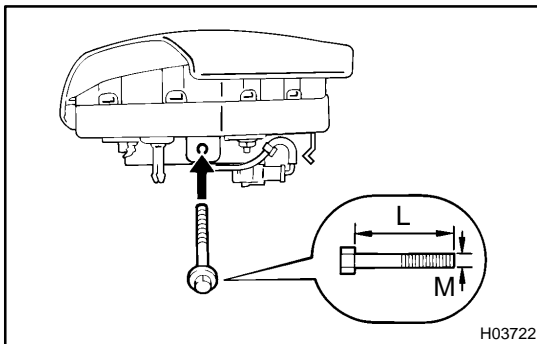
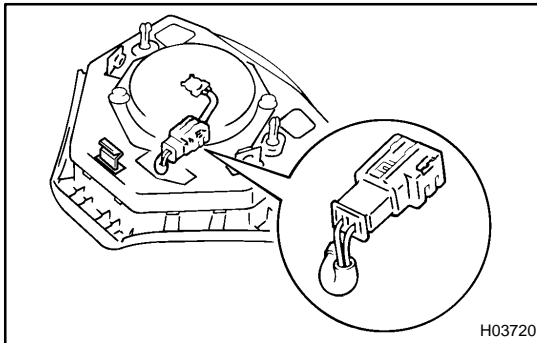
Have a battery ready as the power source to deploy the airbag.

- (a) Remove the steering wheel pad (See page [SR-11](#)).

CAUTION:

When storing the steering wheel pad, keep the upper surface of the pad facing upward.

- (b) Remove the steering wheel pad connector.
Remove the connector on the rear surface of the steering wheel pad from the bracket.



- (c) Fix steering wheel pad to disc wheel with tire.
(1) Install the 2 bolt with washers in the 2 bolt holes on the steering wheel pad.

Bolt:

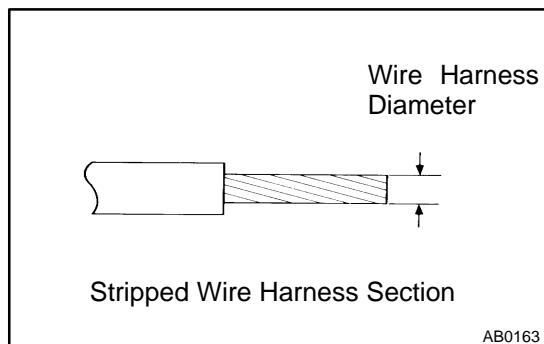
L: 35. mm (1.387 in.)

M: 6.0 mm (0.236 in.)

Pitch: 1.0 mm (0.039 in.)

NOTICE:

- Tighten the bolts by hand until the bolts become difficult to turn.
- Do not tighten the bolts too much.



- (2) Using a service-purpose wire harness tie down the steering wheel pad to the disc wheel.

Wire harness: Stripped wire harness section 1.25 mm² or more (0.0019 in². or more).

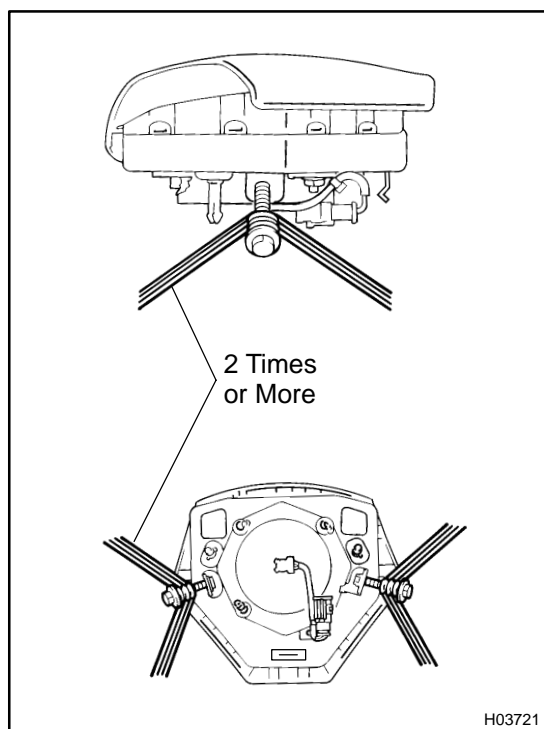
HINT:

To calculate the square of the stripped wire harness section:

Square = $3.14 \times (\text{Diameter})^2$ divided by 4

CAUTION:

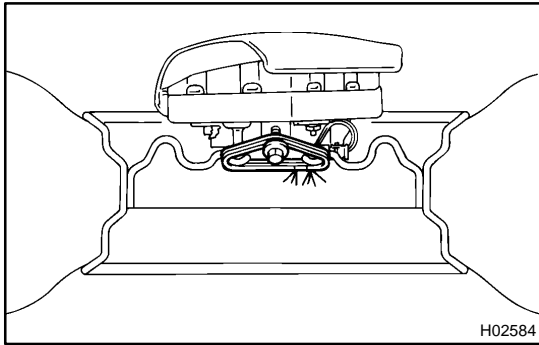
If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm² (0.0019 in²).



- (3) Using 3 wire harness, wind the wire harness at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.

CAUTION:

- **Tightly wind the wire harness around the bolts so that there is no slack.**
- **If there is 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.**



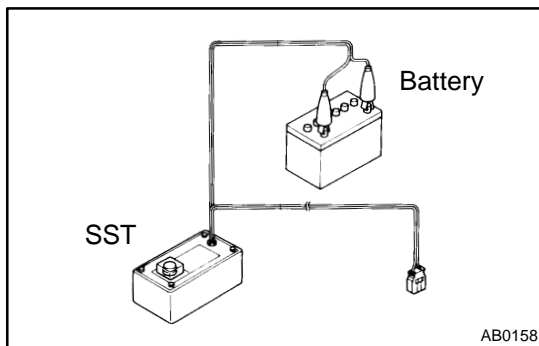
- (4) Face the upper surface of the steering wheel pad upward. Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes. Position the steering wheel pad connector so that it hangs downward through a hub hole in the disc wheel.

CAUTION:

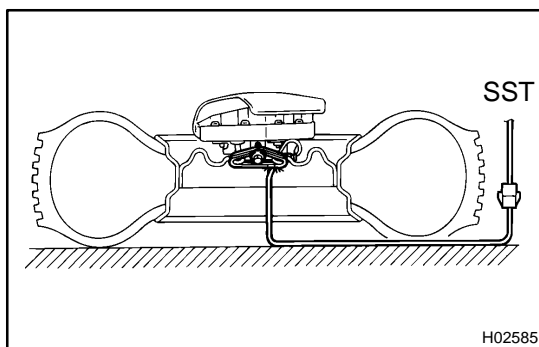
- Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free through the shock from the airbag deploying.
- Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous when the steering wheel pad is tied down with the metal surface facing upward and the steering wheel pad will be thrown into the air.

NOTICE:

The disc wheel will be marked by airbag deployment, so use the redundant disc wheel.



- (d) Check functioning of SST.
SST 09082-00700, 09082-00760



- (e) Install the SST

CAUTION:

Place the disc wheel on the level ground.

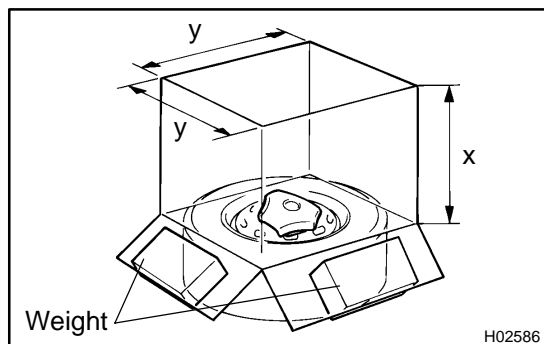
- (1) Connect the 2 SST each other, then connect them to the steering wheel pad connector.

SST 09082-00700, 09082-00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the disc wheel.

- (2) Move the SST to at least 10 m (33 ft) away from steering wheel pad tied down on the disc wheel.



- (f) Cover steering wheel pad with cardboard box or tires.
- Covering method using cardboard box:
Cover the steering wheel pad with the cardboard box and weight the cardboard box down in 4 places with at least 190 N (20 kg, 44 lb).

Size of cardboard box:

Must exceed the following dimensions:

x=460 mm (18.11 in.)

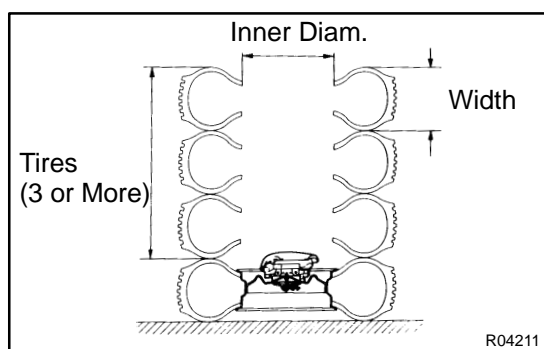
When dimension of the cardboard box exceeds the diameter of the disc wheel with tire which the steering wheel pad is tied to–

x=460 mm (18.11 in.) + width of tire

y= 650 mm (25.59 in.)

NOTICE:

If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the air-bag deployment.



- Covering method using tires:
Place at least 3 tires without disc wheel on top of the disc wheel with tire to which the steering wheel pad is tied.

Tire size: Must exceed the following dimensions–

Width: 185 mm (7.87 in.)

Inner diameter: 360 mm (14.17 in.)

CAUTION:

Do not use tires with disc wheels.

NOTICE:

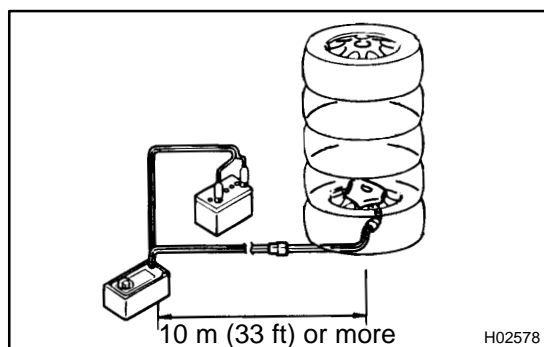
The tires may be marked by the airbag deployment, so use the redundant tires.

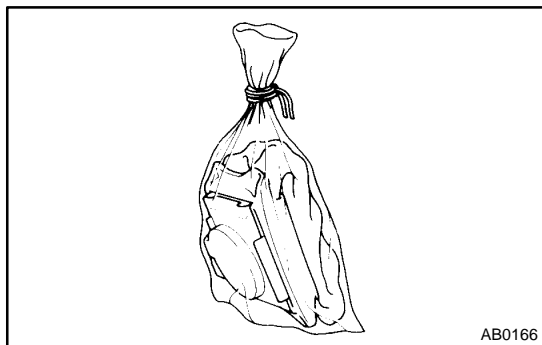
- (g) Deploy the airbag.
- Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
 - Check that no one is within 10 m (33 ft) area around the disc wheel which the steering wheel pad is tied to.

- Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

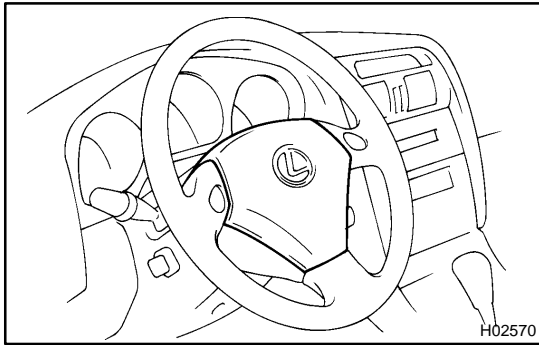




(h) Dispose of the steering wheel pad (with airbag).

CAUTION:

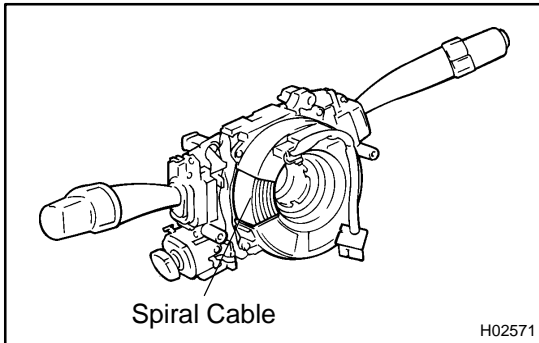
- The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
 - Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.
 - Always wash your hands with water after completing the operation.
 - Do not apply water, etc. to a steering wheel pad with deployed airbag.
- (1) Remove the steering wheel pad from the disc wheel.
 - (2) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



OPERATION

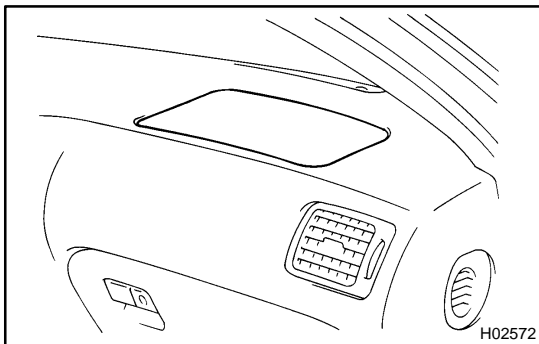
1. STEERING WHEEL PAD (with AIRBAG)

The inflator and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflator contains a squib, igniter charge, gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



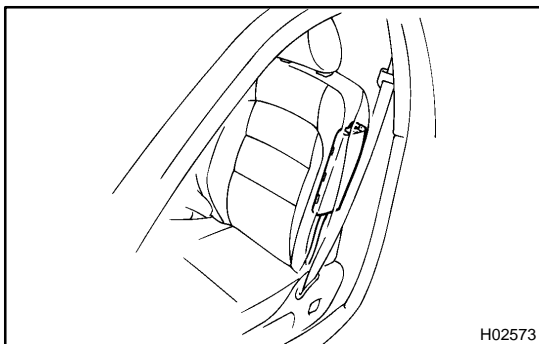
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



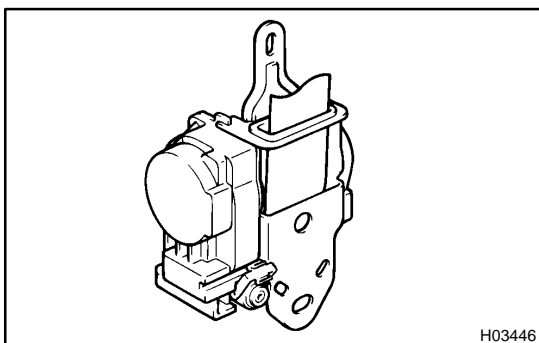
3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflator and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge, gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



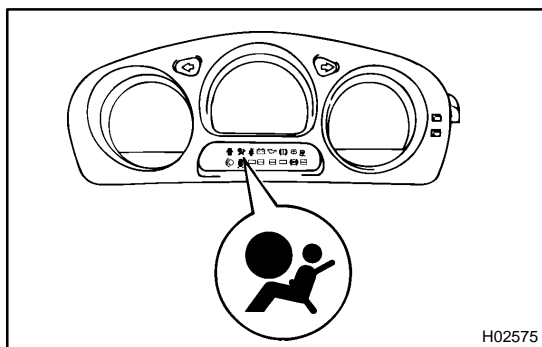
4. SIDE AIRBAG ASSEMBLY

The inflator and bag of the SRS side airbag are stored in the side airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge, gas generant, etc., and inflates the bag when instructed by the side airbag sensor assembly.



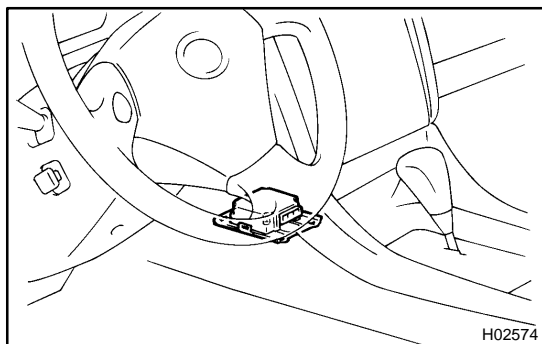
5. SEAT BELT PRETENSIONER

The seat belt pretensioner system is a component of the front seat outer belt. The pretensioner contains a squib, gas generant, wire, piston, etc., and operates in the event of a frontal collision.



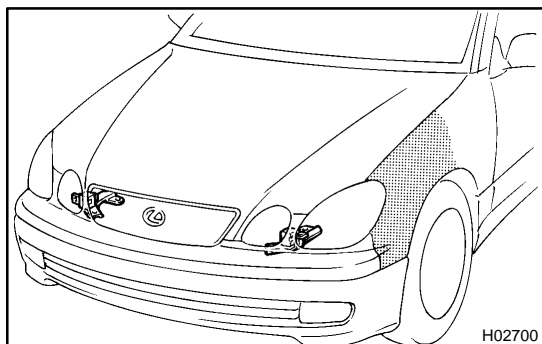
6. SRS WARNING LIGHT

The SRS warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the airbag sensor assembly. In normal operation conditions when the ignition switch is turned to the ACC or ON position, the light goes on for approx. 6 seconds and then goes off.



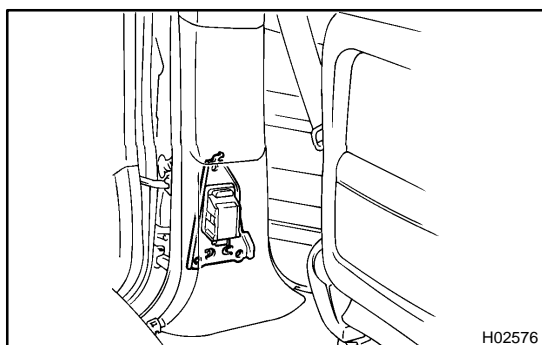
7. AIRBAG SENSOR ASSEMBLY

The airbag sensor assembly is mounted on the floor inside the lower center finish panel. The airbag sensor assembly consists of an airbag sensor, safing sensor, diagnosis circuit, ignition control and drive circuit, etc. It receives signals from the airbag sensor and judges whether the SRS must be activated or not.



8. FRONT AIRBAG SENSOR

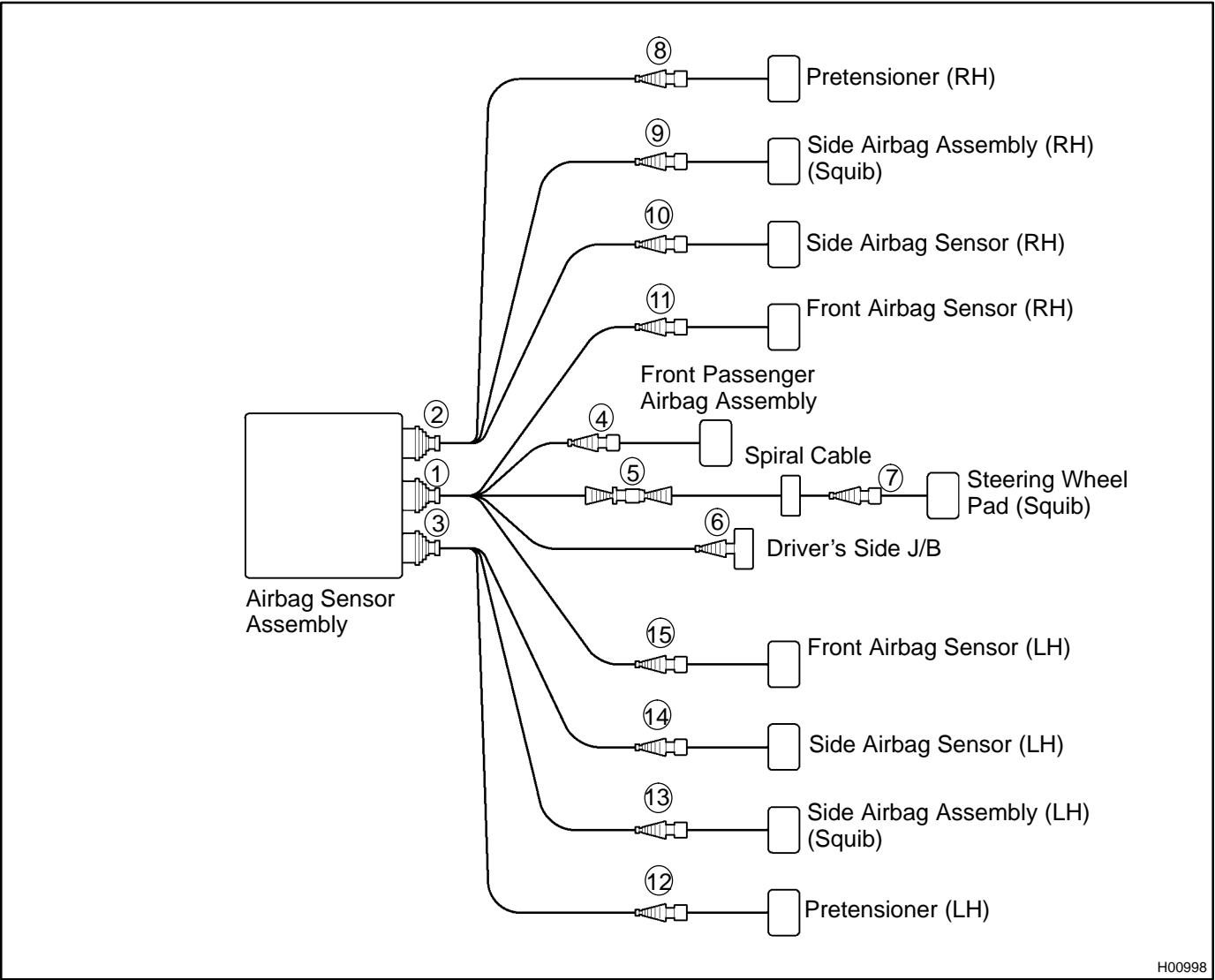
The front airbag sensor is mounted inside each of the front members. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit, contact is made in the sensor, sending a signal to the airbag sensor assembly. The sensor cannot be disassembled.



9. SIDE AIRBAG SENSOR ASSEMBLY

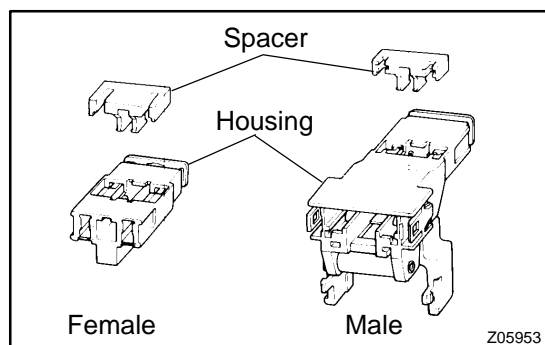
The side airbag sensor assembly is mounted in the LH and RH center pillar. The side airbag sensor assembly consists of a side airbag sensor, safing sensor, diagnosis circuit, ignition control and drive circuit, etc. It receives signals from the side airbag sensors and judges whether the SRS side airbag must be activated or not.

10. SRS CONNECTORS

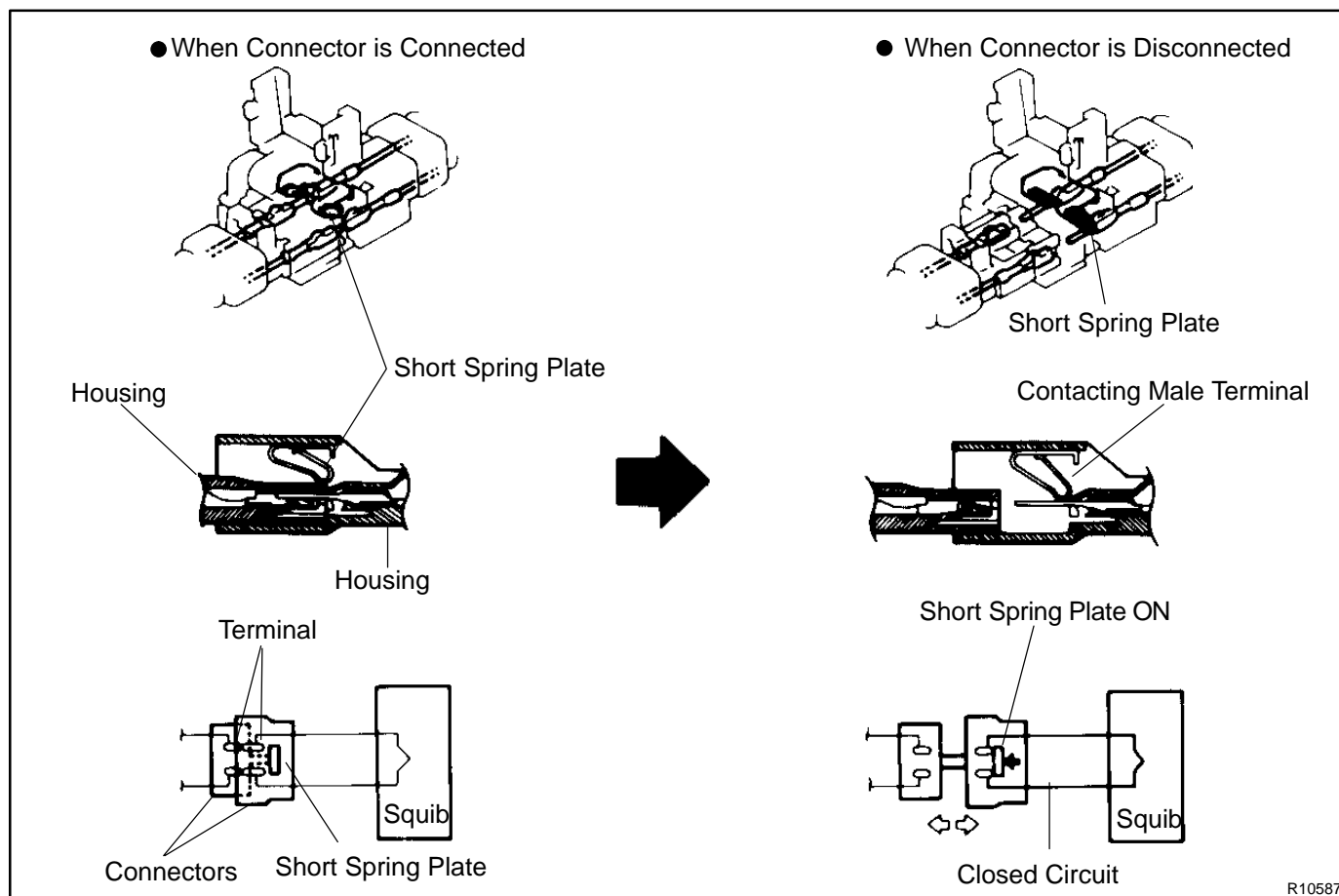


No.	Item	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15
(2)	Airbag Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 5, 7, 8, 9, 12, 13
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3
(4)	Connector Twin-Lock Mechanism	Connectors 5

- (a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for the SRS are used in the locations shown in the diagram on the previous page to ensure high reliability. These connectors use durable gold-plated terminals.



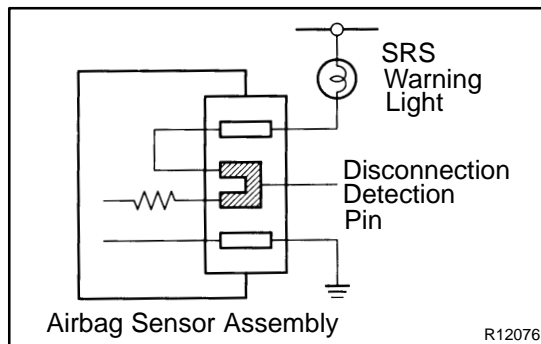
- (1) **Terminal Twin-Lock Mechanism**
Each connector has a two-piece component consisting of a housing and a spacer. This design secures the locking of the terminal by two locking devices (the retainer and the lance) to prevent terminals from coming out.
- (2) **Airbag Activation Prevention Mechanism**
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the power source and grounding terminals of the squib.



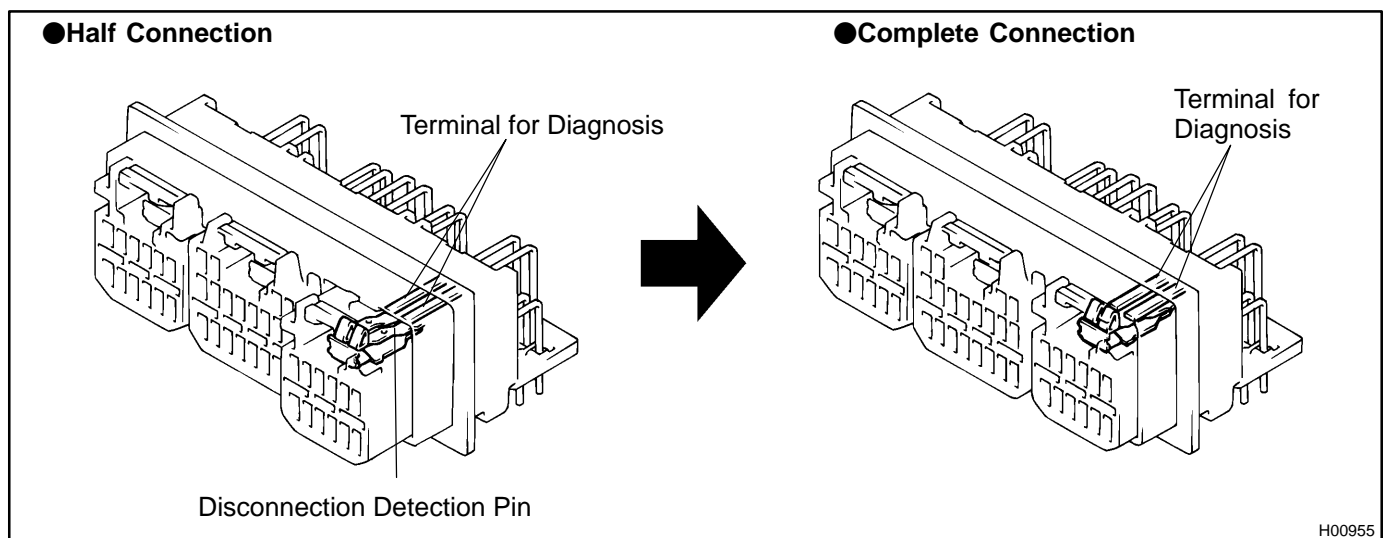
R10587

HINT:

The type of connector shown on the previous page is used for the spiral cable connector "5" on the airbag sensor assembly side.

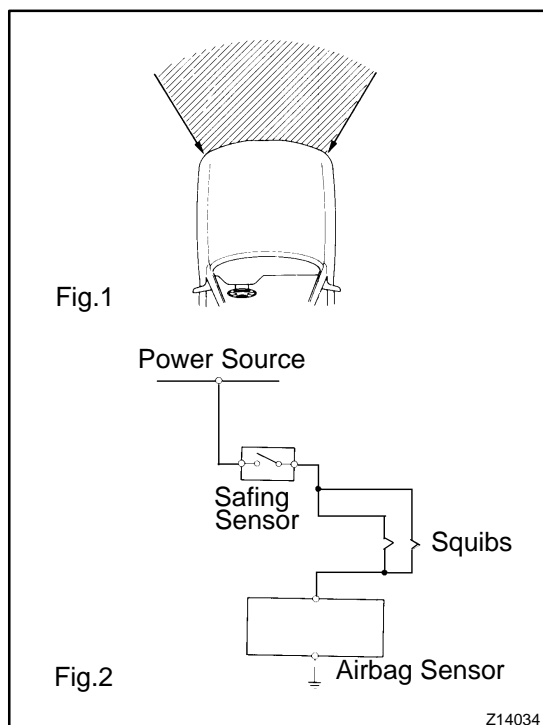
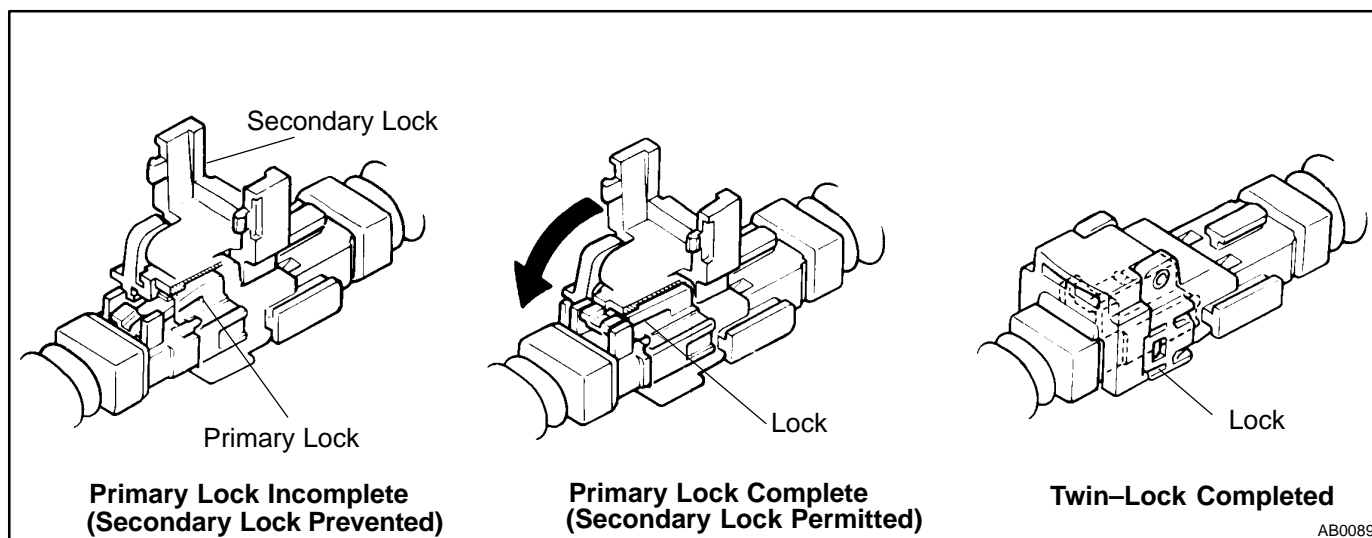


- (3) **Electrical Connection Check Mechanism**
 This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects with the diagnosis terminals when the connector housing lock is locked.

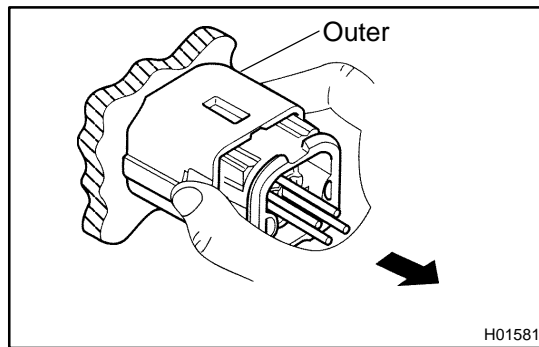
**HINT:**

The above illustration shows connectors "1", "2" and "3".

- (4) **Connector Twin-Lock Mechanism**
 With this mechanism connectors (male and female connectors) are locked by 2 locking devices to increase the connection reliability. If the primary lock is incomplete, ribs interfere and prevent the secondary lock.



- (b) When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than the predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensor. As illustrated in Fig. 2, ignition is caused when current flows to the squib, which happens when a safing sensor and the airbag sensor go on simultaneously. When a deceleration force acts on the sensors, 2 squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver airbag and front passenger airbag rapidly increases the pressure inside the bags, breaking open the steering wheel pad and instrument panel door. Bag inflation then ends, and the bags deflate as the gas is discharged through discharge holes at the bag's rear or side.

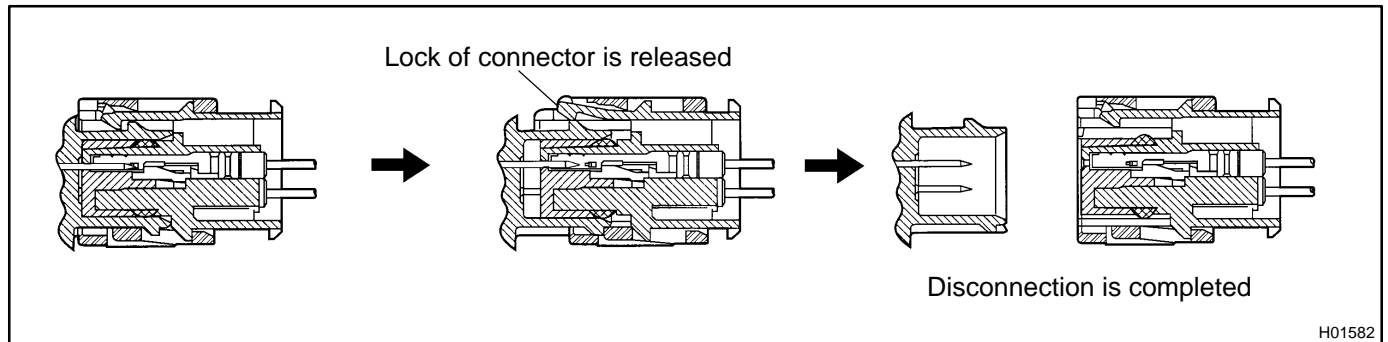


11. DISCONNECTION OF AIRBAG SENSOR CONNECTOR

- With holding both flank sides of the outer, slide the outer to the direction shown by an arrow.
- When lock of the connectors is released disconnect the connector.

HINT:

Make sure to hold both flank sides of the outer. If holding the top and bottom sides, it obstructs disconnection.



12. CONNECTION OF AIRBAG SENSOR CONNECTOR

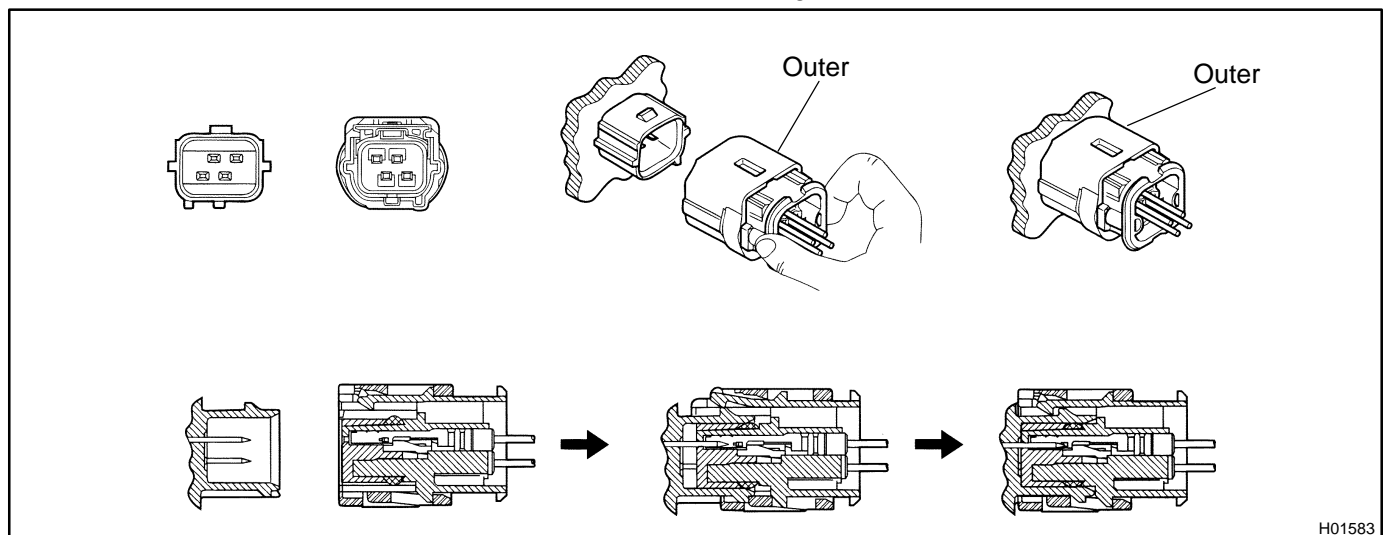
- Align the male connector (on the side of sensor) and female connector in the same direction as shown in the illustration and fit in them without rubbing.
- As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops on the half way, connectors will separate.

- Make sure to insert until the connectors are locked. After fitting in, pull them lightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

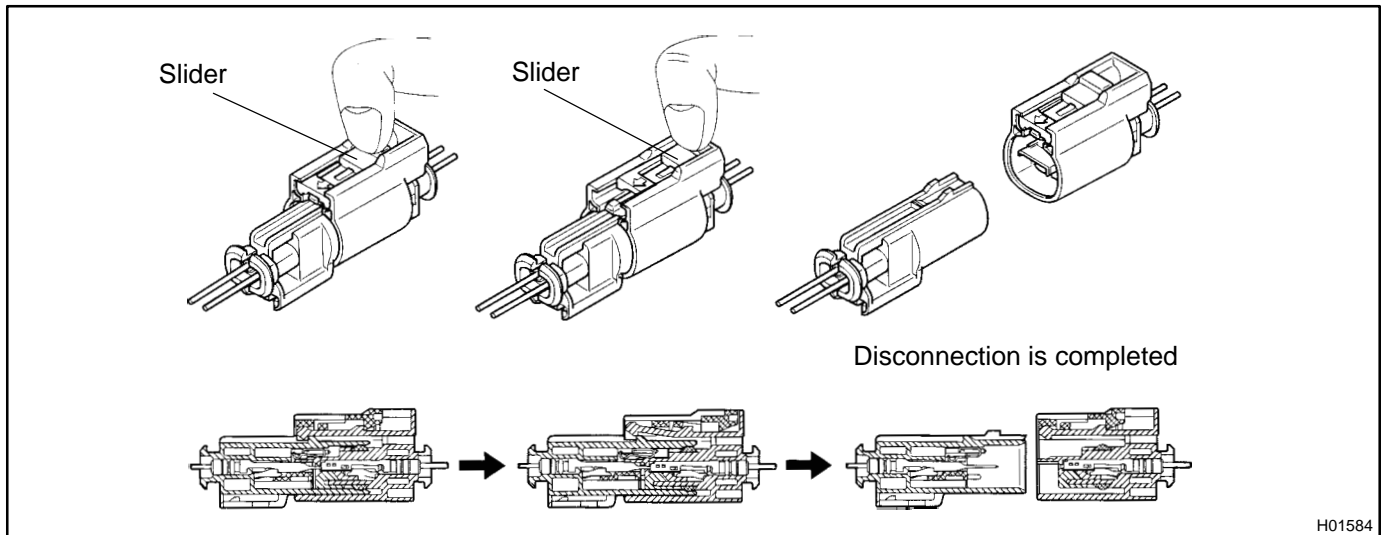
HINT:

- Do not fit in with holding the outer.
- When fitting in, the outer slides. Do not touch it.



13. DISCONNECTION OF SIDE AIRBAG CONNECTOR

- (a) Place a finger on the slider.
- (b) Slide the slider to release lock.
- (c) Disconnect the connector.

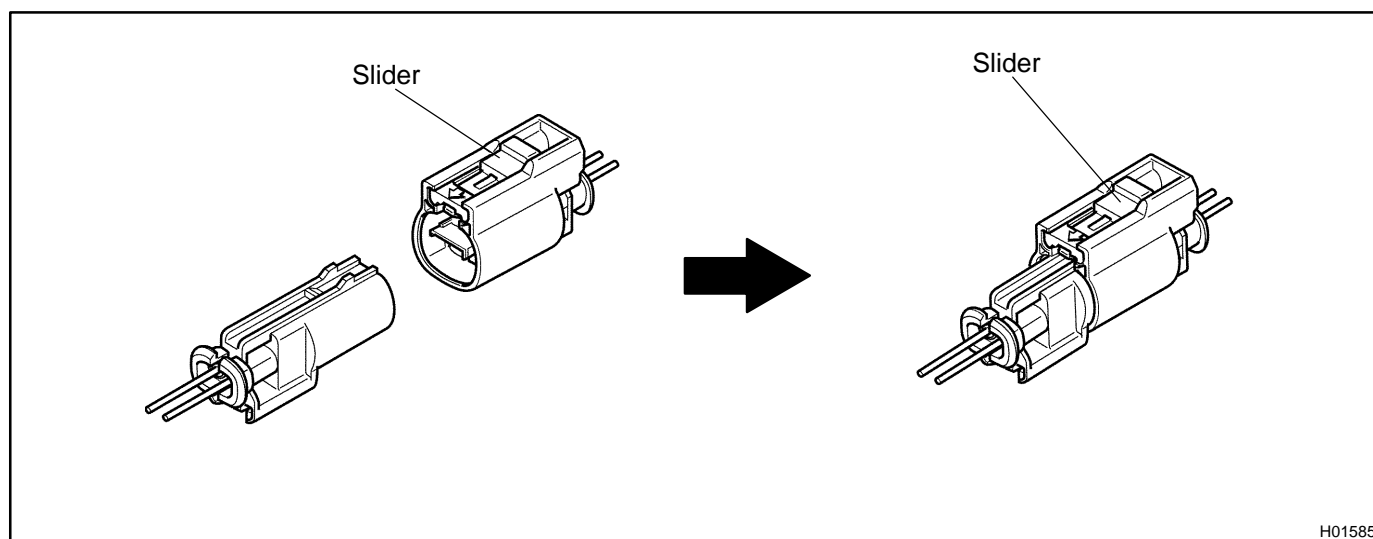


14. CONNECTION OF SIDE AIRBAG CONNECTOR

- (a) Align the male connector and the female connector in the same direction as shown in the illustration, fit in them without rubbing.
- (b) Make sure to insert until the connectors are locked. After fitting in, pull them lightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

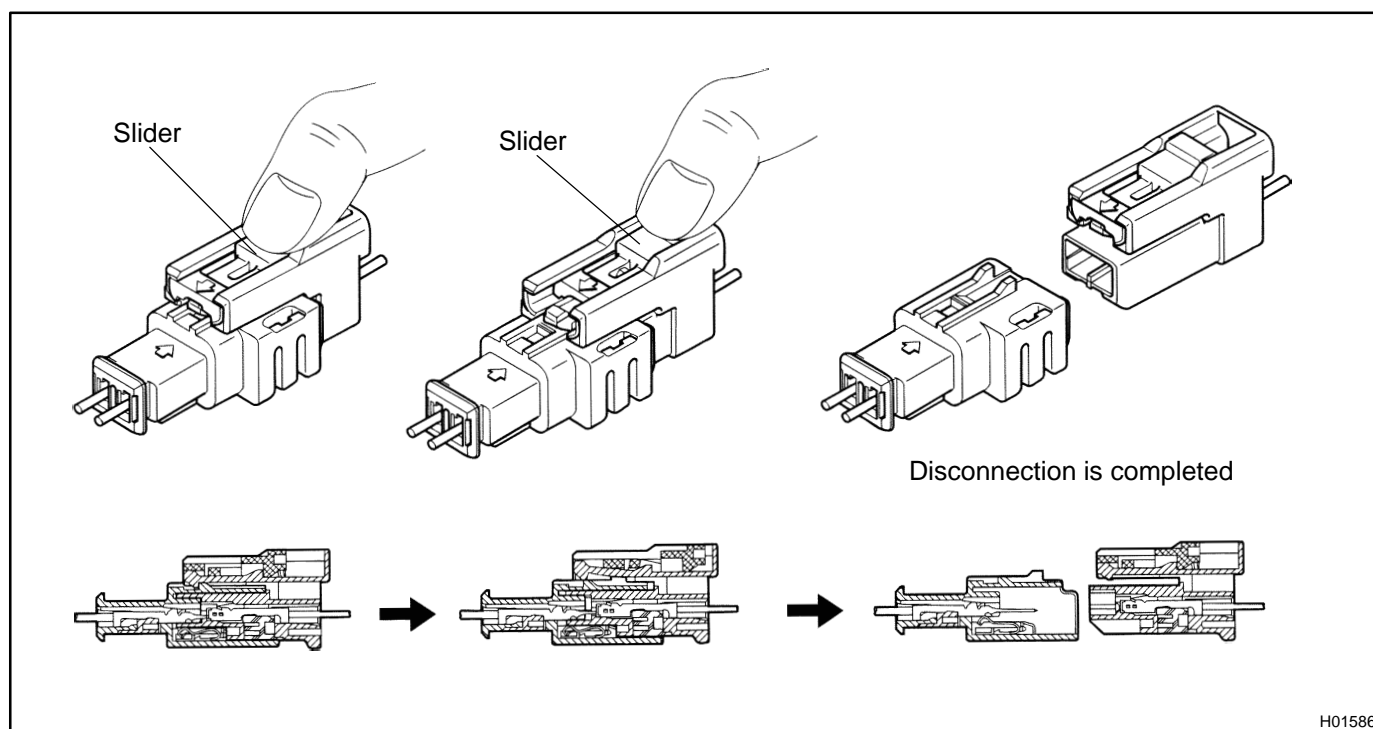
- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



H01585

15. DISCONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY

- (a) Place a finger on the slider.
- (b) Slide the slider to release lock.
- (c) Disconnect the connector.

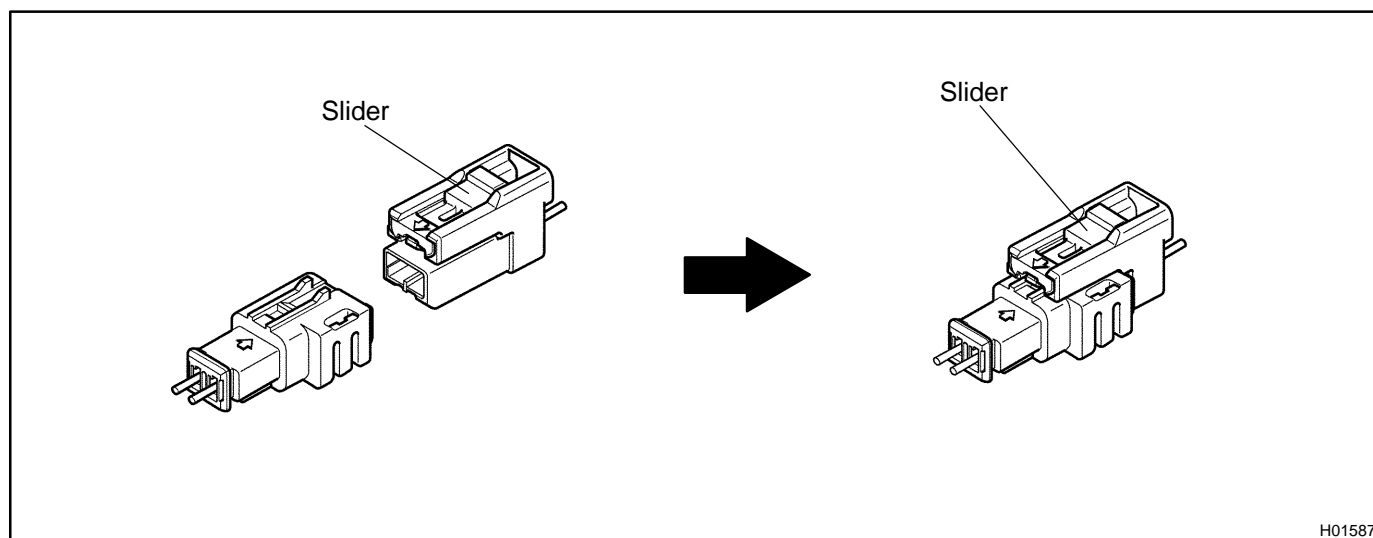


16. CONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY

- (a) Align the male connector and the female connector in the same direction as shown in the illustration, fit in them without rubbing.
- (b) Make sure to insert until the connectors are locked. After fitting in, pull them lightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



H01587

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following case, replace the steering wheel pad, steering wheel or spiral cable.

- If the airbag has been deployed.
- If the steering wheel pad or spiral cable has been found to be faulty in troubleshooting.
- If the steering wheel pad, steering or spiral cable has been found to be faulty during the check in items (See page [RS-15](#)).
- If the steering wheel pad has been dropped.

CAUTION:

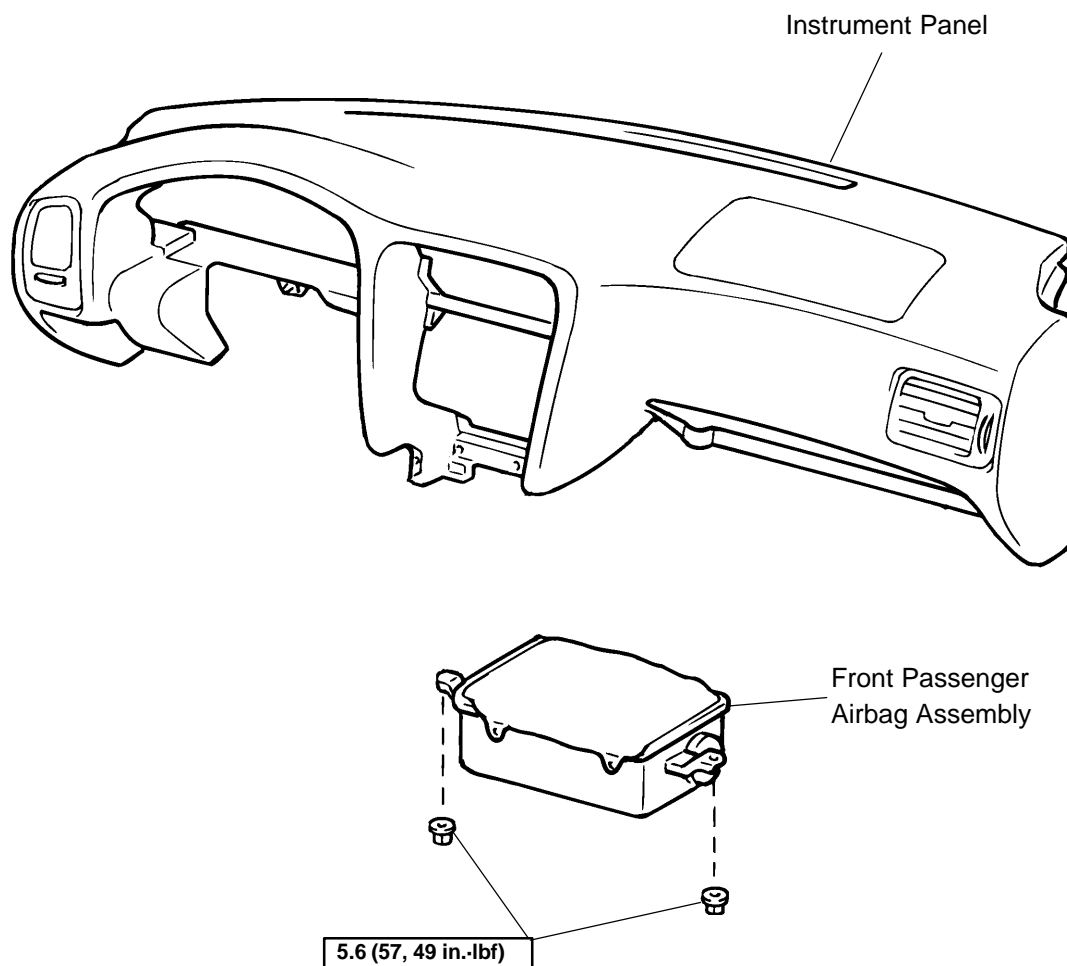
For removal and installation of the steering wheel pad, see page [SR-11](#) and [SR-17](#). Be sure to follow the correct procedure.

INSTALLATION

INSTALL STEERING WHEEL AND SPIRAL CABLE (See page [SR-17](#))

FRONT PASSENGER AIRBAG ASSEMBLY COMPONENTS

RS07D-01



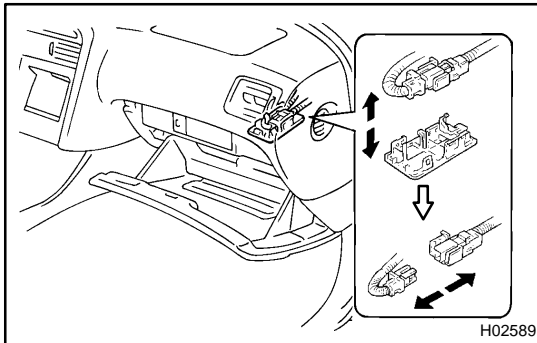
N·m (kgf·cm, ft·lbf) : Specified torque

H02588

REMOVAL

NOTICE:

- If the wiring connector of the SRS is disconnected and the ignition switch is in ON or ACC position, DTCs will be recorded.
- Never use airbag parts from another vehicle. When replacing parts, replace with new parts.



1. DISCONNECT AIRBAG CONNECTOR

- Using a screwdriver, remove the glove compartment door finish plate.

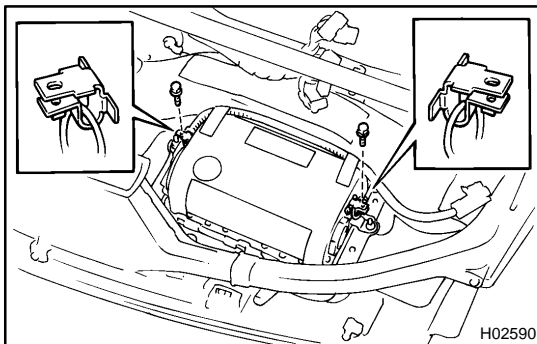
HINT:

Tape the screwdriver tip before use.

- Remove the airbag connector from the plate.
- Disconnect the airbag connector.

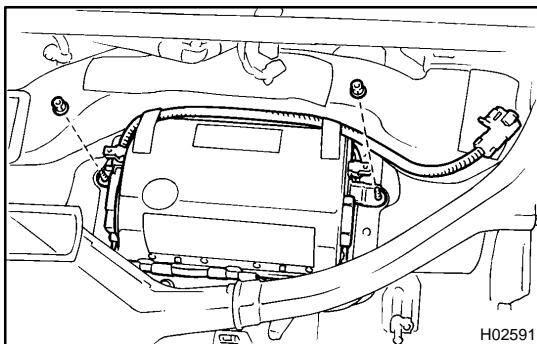
2. REMOVE INSTRUMENT PANEL

(See page [BO-91](#))



3. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

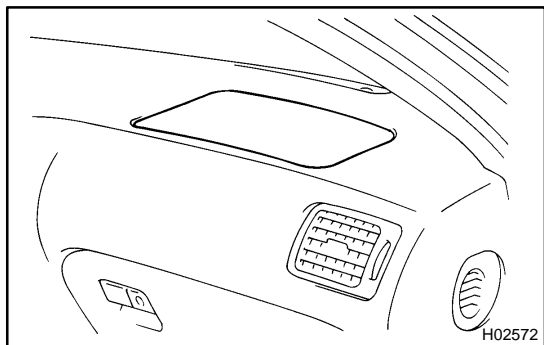
- Remove the 2 bolts and 2 straps.



- Remove the 2 nuts and front passenger airbag assembly.

CAUTION:

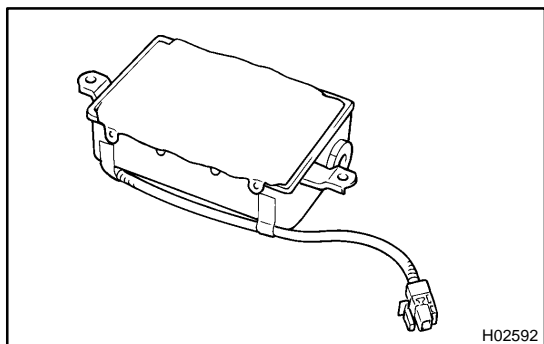
- Do not store the front passenger airbag assembly with the airbag deployment side facing down.
- Never disassemble the front passenger airbag assembly.



INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

- (a) Do a diagnostic system check.
(See page [DI-552](#))
- (b) Do a visual check which includes the following items with the front passenger airbag assembly installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly and instrument panel.



2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

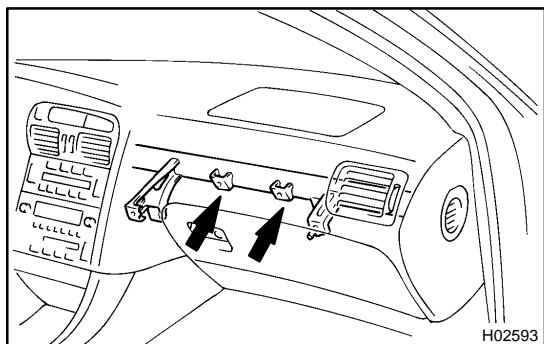
- (a) Do a diagnostic system check.
(See page [DI-552](#))
- (b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.
 - Check cuts minute cracks or marked discoloration on the front passenger airbag assembly.
 - Check cuts and cracks in wire harness, and for chipping in connectors.

CAUTION:

For removal and installation of the front passenger airbag assembly, see page [RS-28](#) and [RS-38](#), and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

- (a) Do a diagnostic system check.
(See page [DI-552](#))
- (b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.
 - Check the deformation or cracks on the instrument panel and instrument panel reinforcement.
 - Check the damage on the connector and wire harness.

**HINT:**

If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

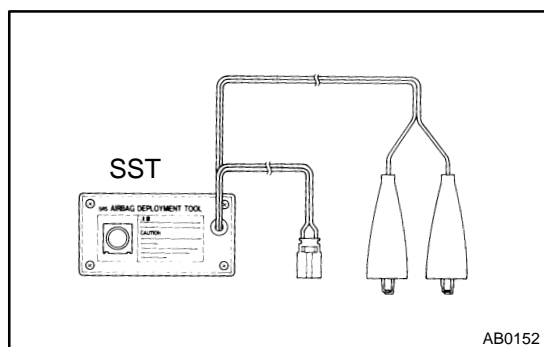
DISPOSAL

HINT:

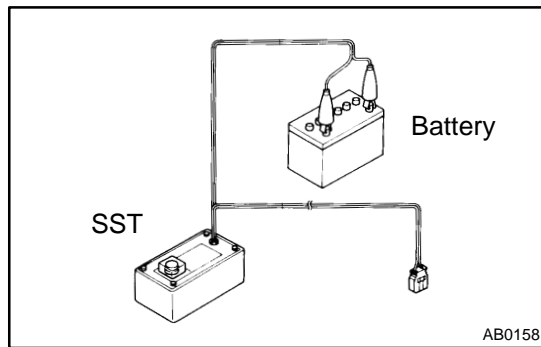
When scrapping vehicles equipped with an SRS or disposing of a front passenger airbag assembly, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the TOYOTA MOTOR SALES, U.S.A., INC.. When disposing of a front passenger airbag assembly with an airbag deployed in a collision, follow the same procedure given in step 1-(g) in "DISPOSAL".

CAUTION:

- **Never dispose of front passenger airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.**



- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in place away from electrical noise.**
SST 09082-00700, 09082-00760
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the front passenger airbag assembly.**
- **The front passenger airbag 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 the front passenger airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water etc. to the front passenger airbag assembly with the deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

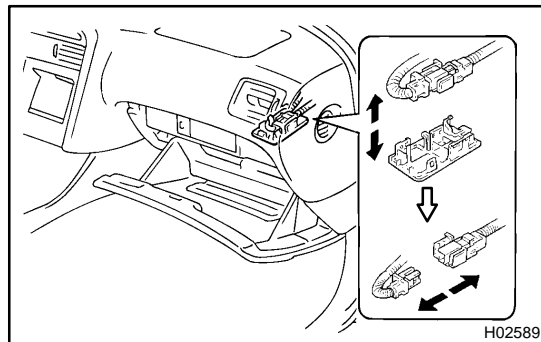
HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Check functioning of SST.

(See page [RS-17](#))

SST 09082-00700, 09082-00760



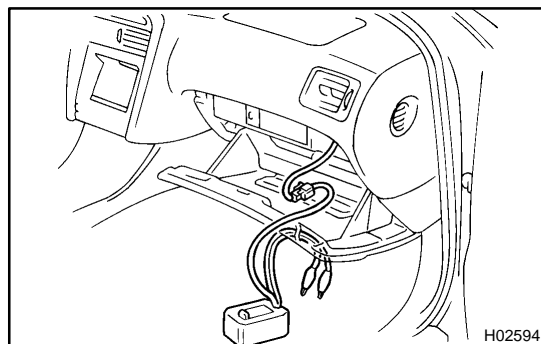
- (b) Disconnect the airbag connector.

- (1) Using a screwdriver, remove the glove compartment door finish plate.

HINT:

Tape the screwdriver tip before use.

- (2) Remove the airbag connector from the plate.
(3) Disconnect the airbag connector.



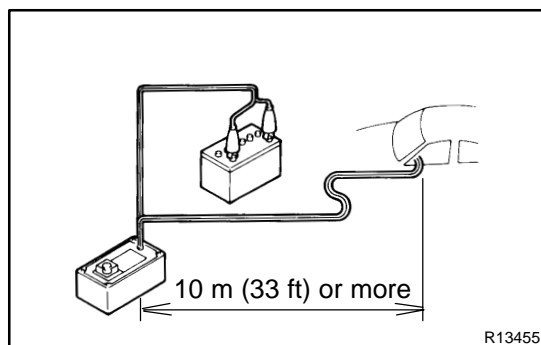
- (c) Install the SST.

- (1) Connect the 2 SST each other, then connect them to the airbag connector of the spiral cable.

SST 09082-00700, 09082-00760

NOTICE:

To avoid damage to the SST connector and wire harness, do not lock the secondary lock of the twin lock.



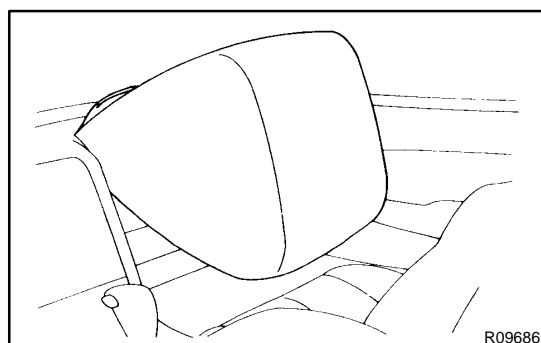
- (2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

- (3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.



- (d) Deploy the airbag.

- (1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

- (2) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

(e) Dispose of front passenger airbag assembly.

CAUTION:

- The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a front passenger airbag assembly with the deployed airbag.
- Do not apply water etc., to a front passenger airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the front passenger airbag assembly still installed.

2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY

NOTICE:

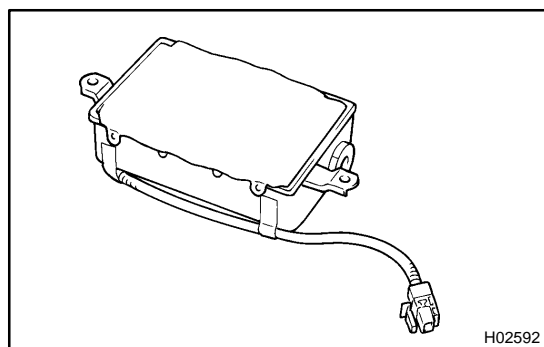
- When disposing of the front passenger airbag assembly only, never use the customer's vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

Have a battery ready as the power source to deploy the airbag.

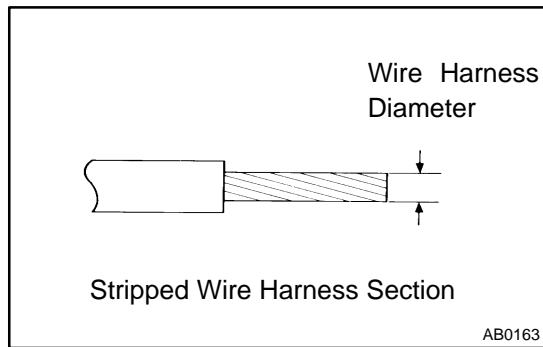
(a) Remove the front passenger airbag assembly.

(See page [RS-28](#))



CAUTION:

Store the front passenger airbag assembly with the airbag deployment side facing up.



- (b) Fix the front passenger airbag assembly.
 (1) Use a service-purpose wire harness tie down the front passenger airbag assembly.

**Wire harness: Stripped wire harness section
 1.25 mm² or more (0.0019 in² or more)**

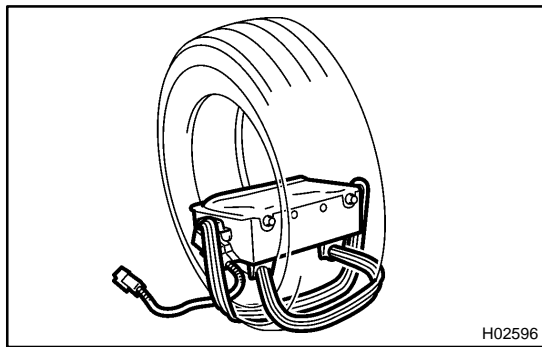
HINT:

To calculate the square of the stripped wire harness section:
 Square = 3.14 x (Diameter)² divided by 4

CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the front passenger airbag assembly it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm² (0.0019 in²).

- (2) Wind the wire harness around the mount brackets.



- (3) Position the front passenger airbag assembly inside the tire with the airbag deployment side facing inside.

**Tire size: Must exceed the following dimensions–
 Width 185 mm (7.28 in.)**

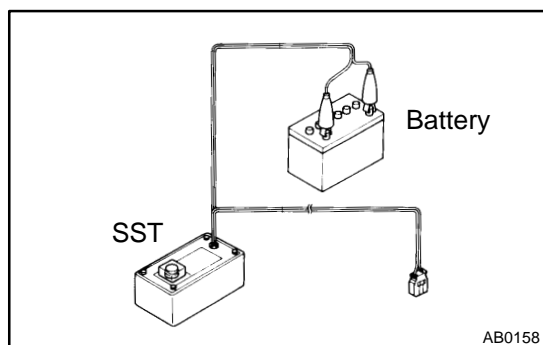
Inner diameter 360 mm (14.17 in.)

CAUTION:

- Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the front passenger airbag assembly coming free due to the shock from the airbag deploying.
- Always tie down the front passenger airbag assembly with the airbag deployment side facing inside.

NOTICE:

The tire will be marked by the airbag deployment, so use the spare tire.



- (c) Check functioning of SST.

(See page [RS-17](#))

SST 09082-00700, 09082-00760

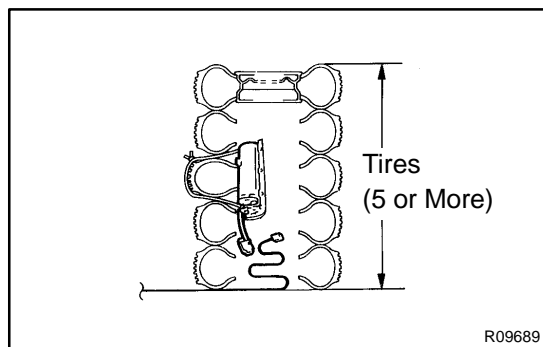
- (d) Install the SST.

Connect the SST connector to the front passenger airbag assembly connector.

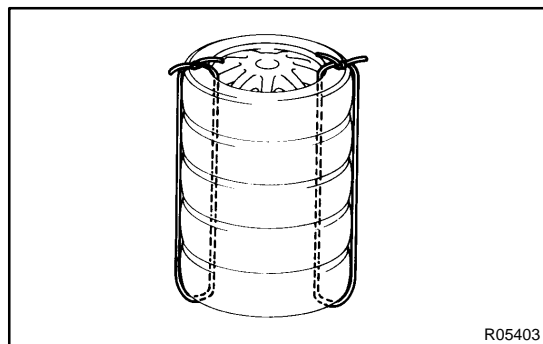
SST 09082-00700, 09082-00760

NOTICE:

To avoid damage to the SST connector and wire harness, do not lock the secondary lock of the twin lock.



- (e) Place the tires
- (1) Place at least 2 tires under the tire to which the front passenger airbag assembly is tied.
 - (2) Place at least 2 tires over the tire to which the front passenger airbag assembly is tied. The top tier should have the wheel installed.



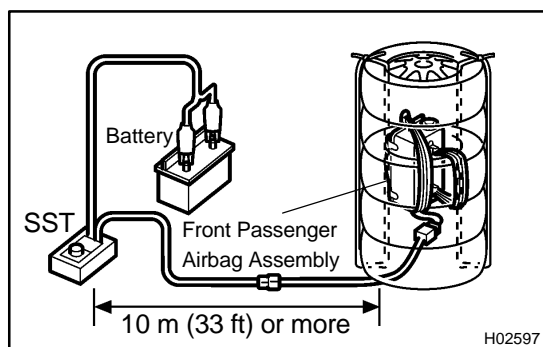
- (3) Tie the tires together with 2 wire harness.

CAUTION:

Make sure that the wire harness is tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deploying.

HINT:

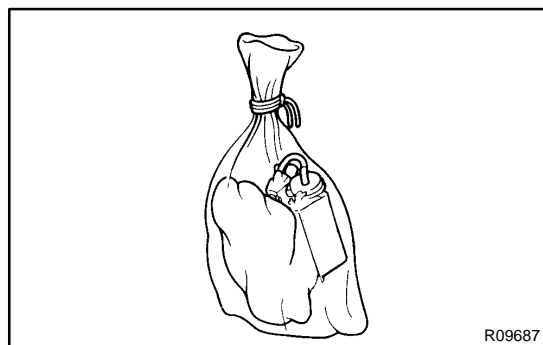
Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



- (f) Deploy the airbag.
- (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative(-) terminal.
 - (2) Check that no one is within 10 m (33 ft) area around the tire which the front passenger airbag assembly is tied to.
 - (3) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.



- (g) Dispose of front passenger airbag assembly.

CAUTION:

- The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a front passenger airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.

- **Do not apply water, etc. to a front passenger airbag assembly with the deployed airbag.**
 - (1) Remove the front passenger airbag assembly from the tire.
 - (2) Place the front passenger airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

- If the airbag has been deployed.
- If the front passenger airbag assembly has been found to be faulty in troubleshooting.
- If the front passenger airbag assembly, instrument panel or instrument panel reinforcement has been found to be faulty during the check in items.(See page [RS-29](#))
- If the front passenger airbag assembly has been dropped.

CAUTION:

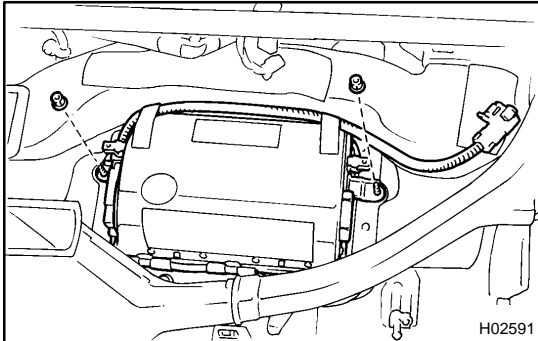
For replacement of the front passenger airbag assembly, see page [RS-28](#) and [RS-38](#).

Be sure to follow the correct procedure.

INSTALLATION

NOTICE:

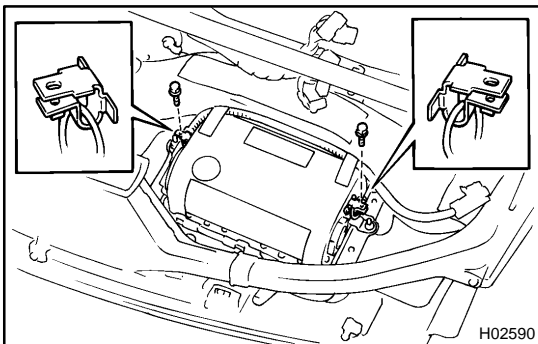
Never use airbag parts from another vehicle. When replacing parts, replace with new parts.



1. **INSTALL FRONT PASSENGER AIRBAG ASSEMBLY**
 - (a) Install the front passenger airbag assembly with 2 nuts.
Torque: 5.6 N·m (57 kgf-cm, 49 in.-lbf)

NOTICE:

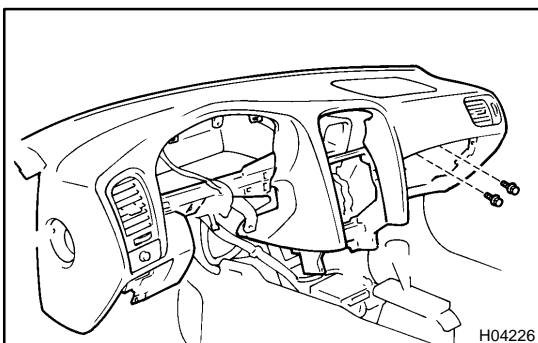
- Pass the straps of the front passenger airbag door through the brackets on the right and left sides securely.
- Install the straps so that they are not pinched between the airbag and instrument panel.



- (b) Install the 2 straps and 2 bolts.

NOTICE:

- When installing the front passenger airbag assembly, make sure that the straps are not distorted and installed to the brackets securely.
- Make sure that the front passenger airbag assembly is installed to the specified torque.
- If the front passenger airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front passenger airbag assembly with a new one.
- When installing the front passenger airbag assembly, take care that the wiring does not interfere with other parts and is not pinched between other parts.



2. **INSTALL INSTRUMENT PANEL**

(See page [BO-97](#))

Install the 2 bolts to the instrument panel reinforcement.

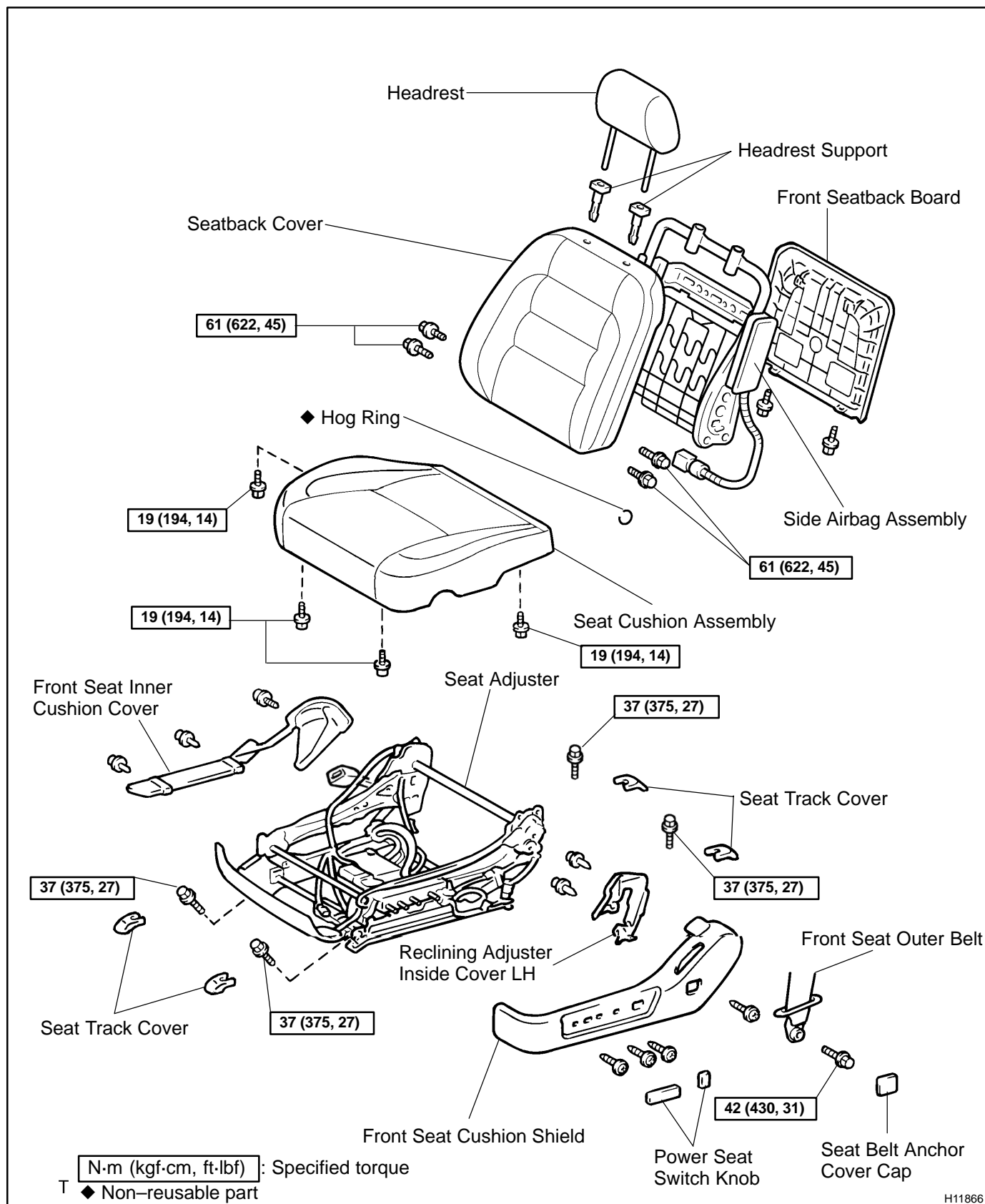
Torque: 20 N·m (205 kgf-cm, 15 ft-lbf)

3. **CONNECT AIRBAG CONNECTOR**

- (a) Connect the airbag connector.
- (b) Install the airbag connector to glove compartment door finish plate.
- (c) Install the glove compartment door finish plate.

SIDE AIRBAG ASSEMBLY COMPONENTS

RS07J-02

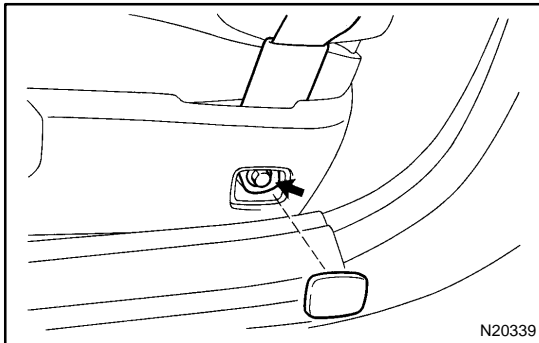


H11866

REMOVAL

NOTICE:

- If the wiring connector of the SRS is disconnected and the ignition switch is in ON or ACC position, DTCs will be recorded.
- Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.



1. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHOR

- Using a screwdriver, remove the seat belt anchor cover cap.

HINT:

Tape the screwdriver tip before use.

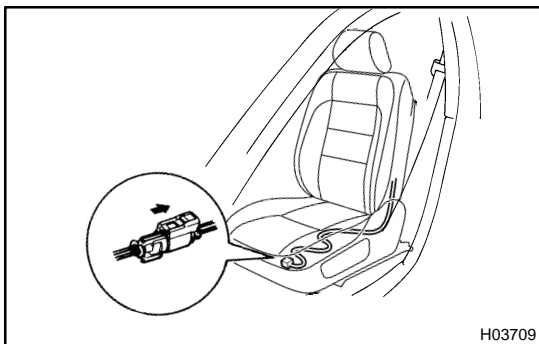
- Remove the front seat outer belt floor anchor.

2. REMOVE FRONT SEAT

- Using a screwdriver, remove the 4 seat track covers.

HINT:

Tape the screwdriver tip before use.



- Remove the 4 bolts, then disconnect the airbag connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

- Remove the front seat.

3. REMOVE HEADREST

4. REMOVE POWER SEAT SWITCH KNOBS

5. REMOVE FRONT SEAT CUSHION SHIELD

6. REMOVE FRONT SEAT INNER CUSHION COVER

7. REMOVE SIDE AIRBAG ASSEMBLY WIRE HARNESS

- Remove the connector from the bracket.
- Remove the 5 clamps and wire harness from the seat cushion frame

8. REMOVE SEAT CUSHION ASSEMBLY

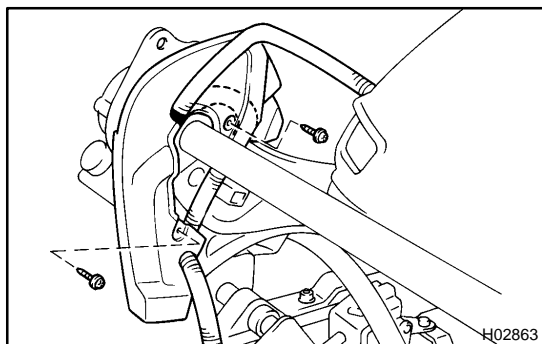
- Remove the wire harness from the seat cushion assembly.
- Remove the 4 bolts and seat cushion assembly from the seat adjuster.

9. REMOVE SEATBACK ASSEMBLY

- (a) Remove the 2 screws and pull the seatback board downward to remove it.
- (b) Remove the hog rings.
- (c) Disconnect the connectors.
- (d) Remove the 4 bolts and seatback assembly.

NOTICE:

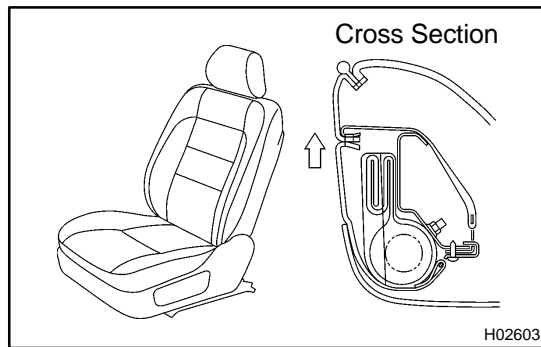
Be careful not to damage the wire harness.



- (e) Remove the 2 screws and seat cushion inside cover then disconnect the wire harness from the seat cover.

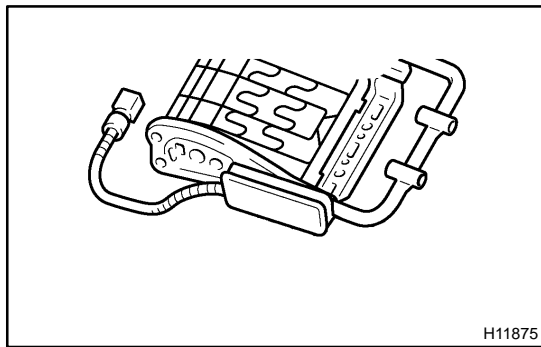
HINT:

Do the same for LH and RH.



INSPECTION

1. **Vehicles not involved in collision:**
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM
 - (a) Do a diagnostic system check (See page [DI-552](#)).
 - (b) Do a visual check which includes the following item with the seatback assembly installed in the vehicle.
Check that there are no cuts or frayed in seams and outside of seatback cover.
2. **Vehicle involved in a collision and airbag is not deployed:**
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM
 - (a) Do a diagnostic system check (See page [DI-552](#)).



- (b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.
 - Check cuts and cracks of the side airbag assembly.
 - Check cuts and cracks in wire harness, and chipping in connectors.

CAUTION:

For removal and installation of the seatback assembly, see page [RS-40](#) and [RS-50](#). Be sure to follow the correct procedure.

3. **Vehicle involved in a collision and airbag is deployed:**
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM
 - (a) Do a diagnostic system check (See page [DI-552](#)).
 - (b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.
 - Check the seatback installation part of the seat adjuster.
 - Check the damage to the connector and wire harness.

HINT:

If the seat adjuster is deformed, never repair it. Always replace it with new one.

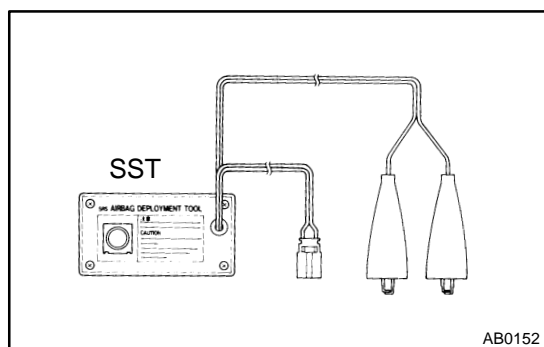
DISPOSAL

HINT:

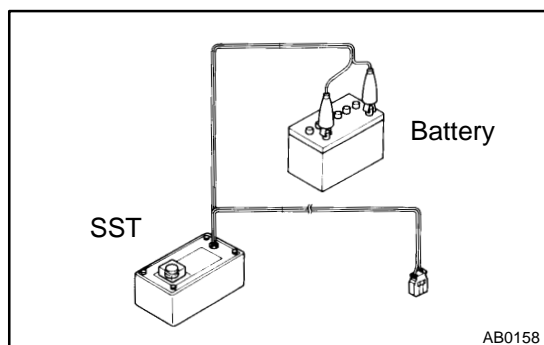
When scrapping vehicles equipped with an SRS or disposing of the side airbag assembly always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- **Never dispose of a side airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.**



- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool), perform the operation in a place away from electrical noise.**
SST 09082-00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assembly.**
- **The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a side airbag assembly with the deployed airbag.**

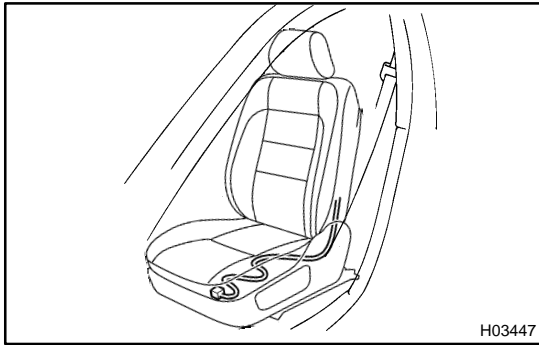


1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

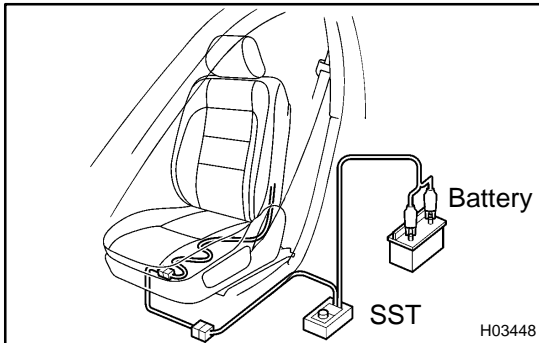
- Check functioning of the SST
(See step 1-(a) on page [RS-17](#)).
SST 09082-00700



(b) Disconnect the side airbag connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



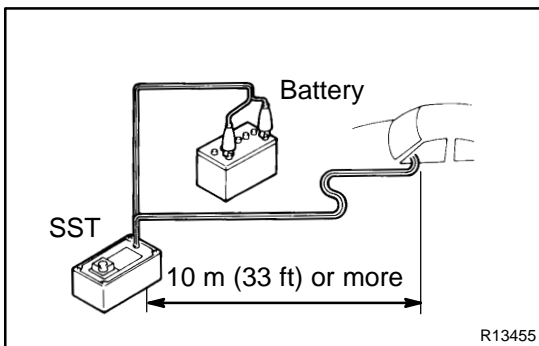
(c) Install the SST.

(1) Connect the connectors of the 2 SST to the airbag connector.

SST 09082-00700, 09082-00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



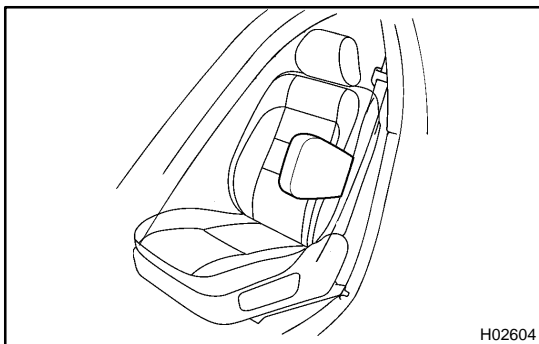
(2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.



(d) Deploy the airbag.

(1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling the side airbag assembly with the deployed airbag.
- Do not apply water, etc. to the side airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.
- When scrapping a vehicle, deploy the airbag and scrap the vehicle with the side airbag assembly still installed.

HINT:

The airbag deploys simultaneously as the LED of SST activation switch lights up.

2. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY

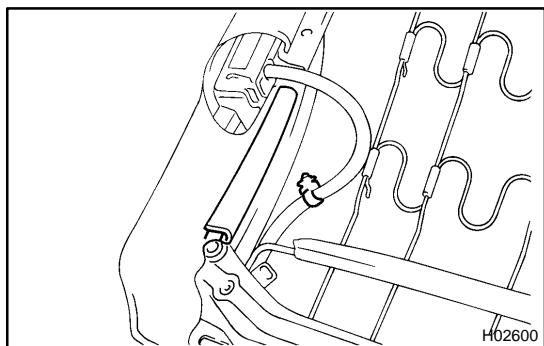
NOTICE:

- When disposing of the side airbag assembly only, never use the customer's vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

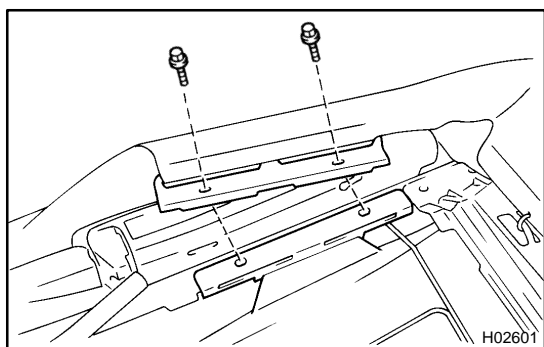
Have a battery ready as the power source to deploy the airbag.

- (a) Remove the seatback assembly (See page [RS-40](#)).

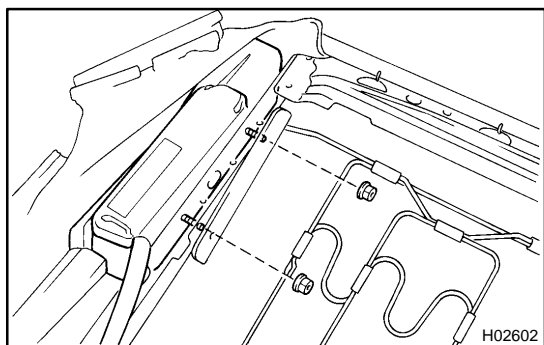


- (b) Remove the side airbag assembly from the seatback assembly.

- (1) Remove the clamp.
- (2) Remove the hook.



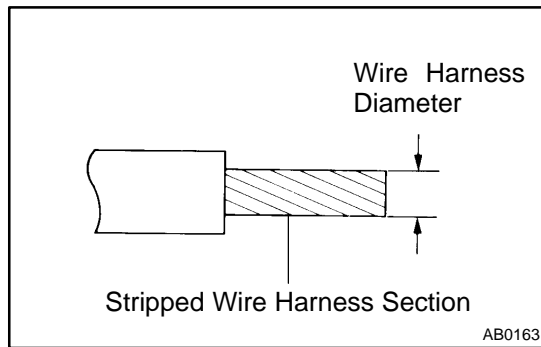
- (3) Remove the 2 bolts and 2 hooks.



- (4) Remove the 2 nuts and side airbag assembly.

CAUTION:

- Do not store the side airbag assembly with the airbag deployment side facing down.
- Never disassemble the side airbag assembly.



- (c) Using a service-purpose wire harness, tie down the side airbag assembly to the tire.

Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in.² or more)

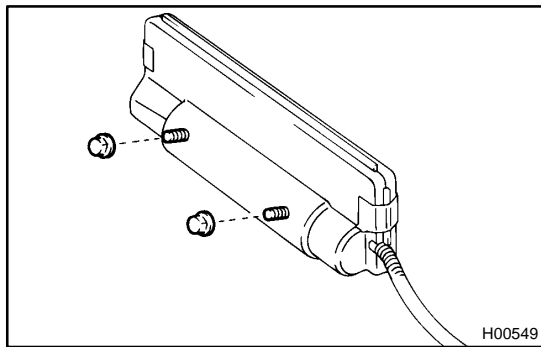
CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the side airbag assembly, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm² (0.0019 in.²).

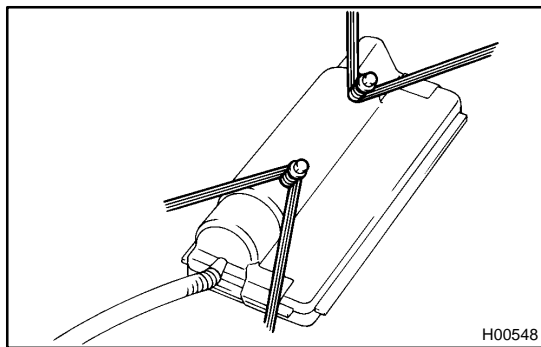
HINT:

To calculate the square of the stripped wire harness section–

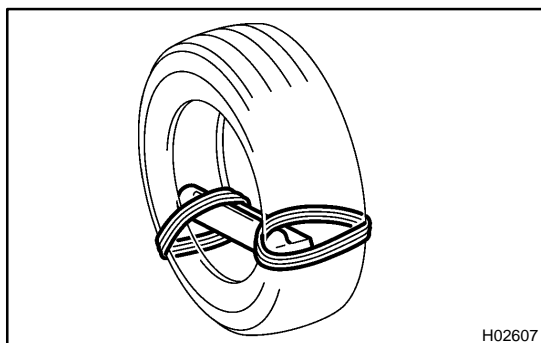
$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$



- (1) Install the 2 nuts to the side airbag assembly.



- (2) Wind the wire harness around the stud bolts of the side airbag assembly as shown in the illustration.



- (3) Position the side airbag assembly inside the tire with the airbag deployment direction facing inside.

Tire size: Must exceed the following dimensions–

Width: 185 mm (7.28 in.)

Inner diameter: 360 mm (14.17 in.)

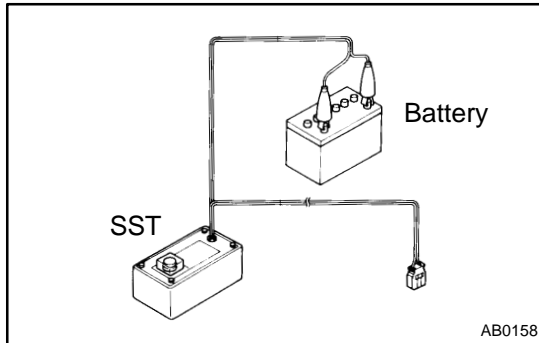
CAUTION:

- Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the side airbag assembly coming free due to the shock from the airbag deploying.

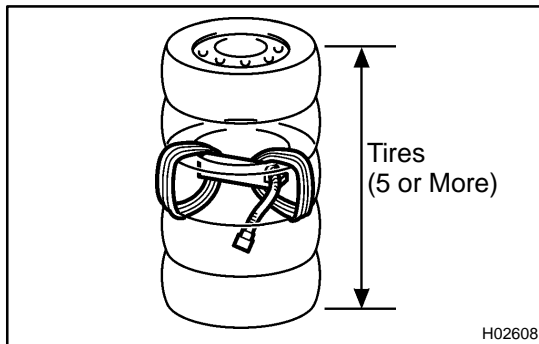
- Always tie down the side airbag assembly with the airbag deployment side facing inside.

NOTICE:

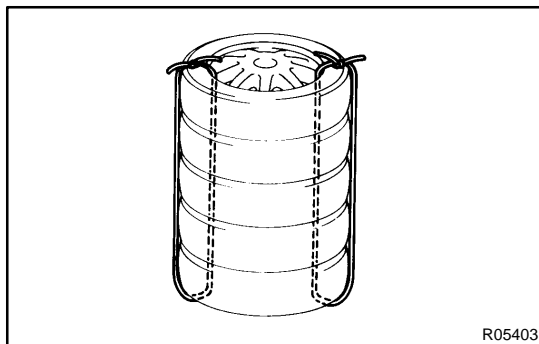
The tire will be marked by the airbag deployment, so when disposing of the airbag use a redundant tire.



- (d) Check functioning of the SST
(See step 1-(a) on page RS-17).
SST 09082-00700



- (e) Place the tires.
- (1) Place at least 2 tires under the tire to which the side airbag assembly is tied.
 - (2) Place at least 2 tires over the tire to which the side airbag assembly is tied. The top tire should have the wheel installed.



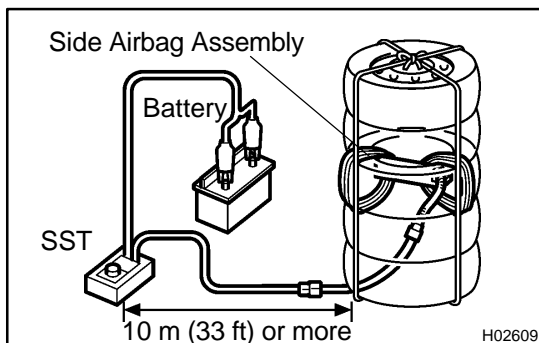
- (3) Tie the tires together with 2 wire harness.

CAUTION:

Make sure that the wire harness are tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



- (f) Install the SST.
Connect the connectors of the 2 SST to the side airbag assembly connector.
SST 09082-00700, 09082-00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.

- (g) Deploy the airbag.

- (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
- (2) Check that no one is within 10 m (33 ft) area around the tire which the side airbag assembly is tied to.
- (3) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

- (h) Dispose of the side airbag assembly.

CAUTION:

- The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a side airbag assembly with the deployed airbag.
- Do not apply water etc. to a side airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.

- (1) Remove the side airbag assembly from the tire.
- (2) Place the side airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



3. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY WITH AIRBAG DEPLOYED IN COLLISION

Dispose of the side airbag assembly.

CAUTION:

- The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a side airbag assembly with the deployed airbag.
- Do not apply water etc. to a side airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.

- (1) Remove the side airbag assembly from the seat (See page RS-40 and see step 2).
- (2) Place the side airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the seatback assembly or seatback cover.

Case	Replacing part
If the side airbag has been deployed.	Seatback assembly
If the side airbag assembly has been found to be faulty in troubleshooting.	Seatback assembly
If the side airbag assembly has cuts during checking items (See page RS-42).	Seatback assembly
If the seatback cover has cuts and frayed seams during checking items (See page RS-42).	Seatback cover
If the side airbag assembly has been found to be faulty during checking items (See page RS-42).	Seatback assembly
If the seatback cover has been found to be faulty during checking items (See page RS-42).	Seatback cover
If the seatback assembly has been dropped.	Seatback assembly

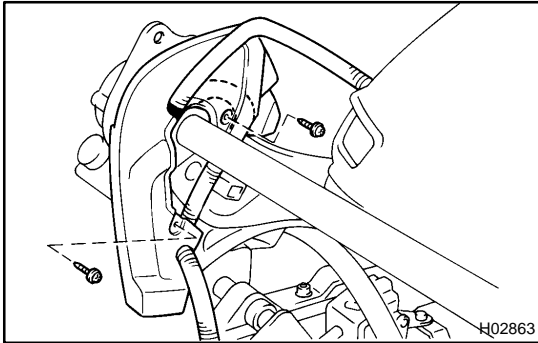
CAUTION:

For removal and installation of the seatback assembly, see page RS-40 and RS-50. Be sure to follow the correct procedure.

INSTALLATION

NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



1. INSTALL SEATBACK ASSEMBLY

- (a) Install the wire harness to the seat cushion inside covers as shown in the illustration.

NOTICE:

Be careful not to damage the wire harness.

- (b) Install the seat cushion inside cover with the 2 screws.

HINT:

Do the same for LH and RH.

- (c) Install the seatback assembly with the 4 bolts.

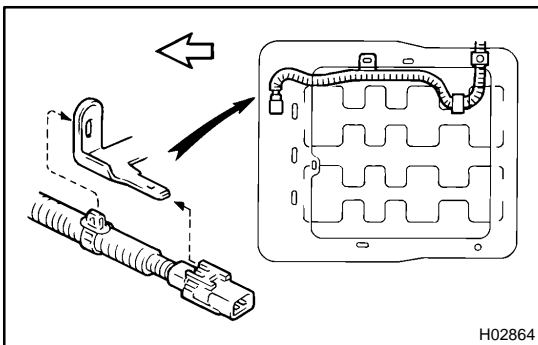
Torque: 61 N·m (622 kgf-cm, 45 ft-lbf)

- (d) Install new hog rings.

HINT:

When installing hog rings, take care to prevent wrinkles as least as possible.

- (e) Install the seatback board with the 2 screws to the seatback assembly.



2. INSTALL SEAT CUSHION ASSEMBLY

- (a) Install the seat cushion assembly with the 4 bolts to the seat adjuster.

- (b) Install the wire harness to the seat cushion, as shown in the illustration.

Torque: 19 N·m (194 kgf-cm, 14 ft-lbf)

3. INSTALL FRONT SEAT INNER CUSHION COVER

4. INSTALL FRONT SEAT CUSHION SHIELD

5. INSTALL NO.1 FRONT SEAT CUSHION SHIELD

6. INSTALL POWER SEAT SWITCH KNOBS

7. INSTALL HEADREST

8. INSTALL FRONT SEAT

- (a) Mount the front seat to the vehicle.

- (b) Connect the connectors.

- (c) Slide the front seat to the rearmost position.

- (d) Tighten the bolts on the rear side temporarily, from the bolt on the outer side tighten them completely.

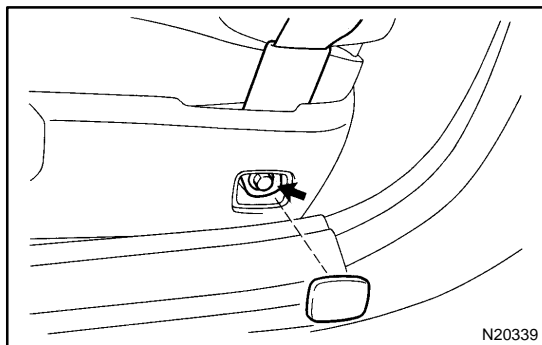
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)

- (e) Slide the front seat to the most front position.

- (f) Tighten the bolts on the rear side temporarily, from the bolt on the outer side tighten them completely.

Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)

- (g) Install the 4 seat track covers.



9. INSTALL FRONT SEAT OUTER BELT FLOOR ANCHOR

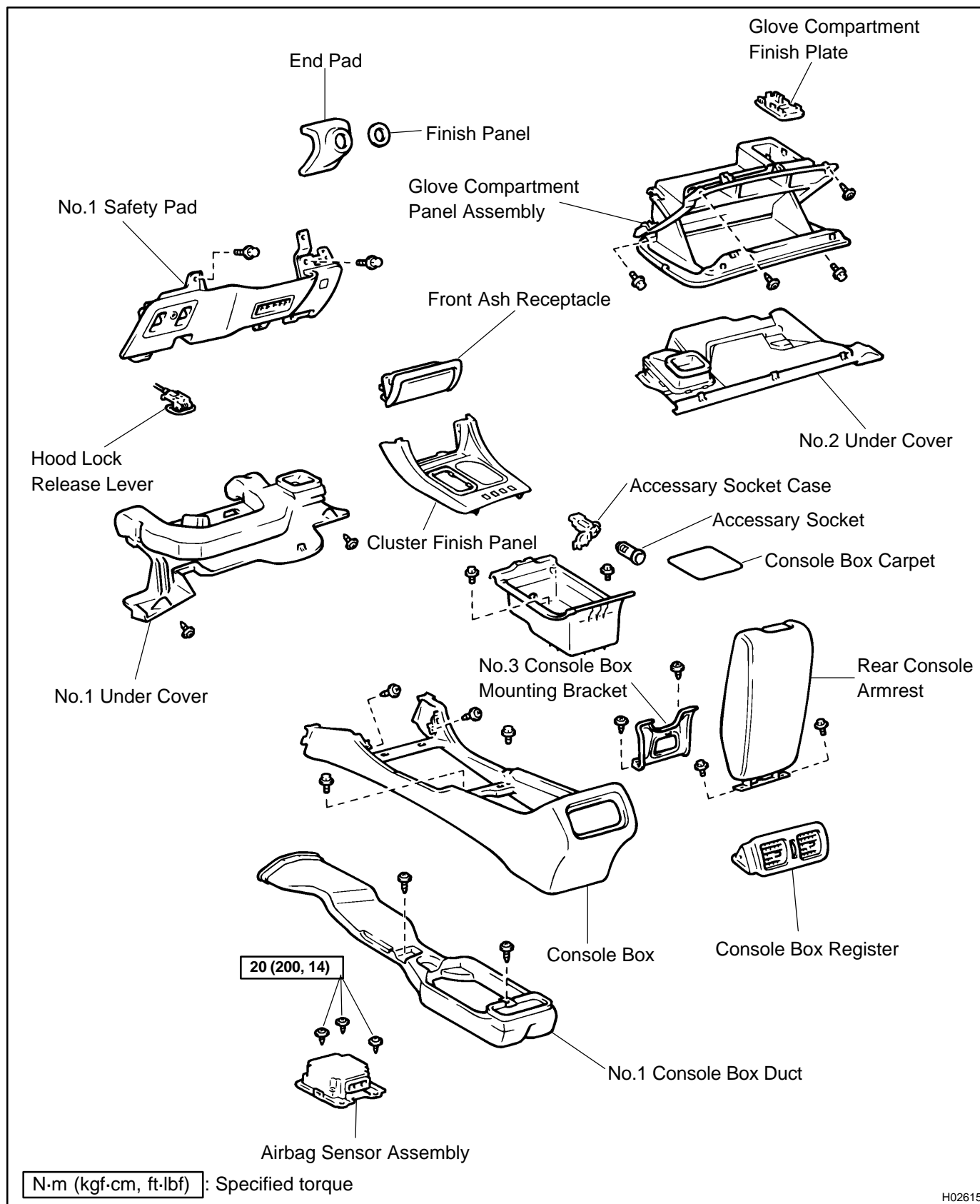
- (a) Install the front seat outer belt floor anchor.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

- (b) Install the seat belt anchor cover cap.

AIRBAG SENSOR ASSEMBLY COMPONENTS

RS07P-01



H02615

REMOVAL

NOTICE:

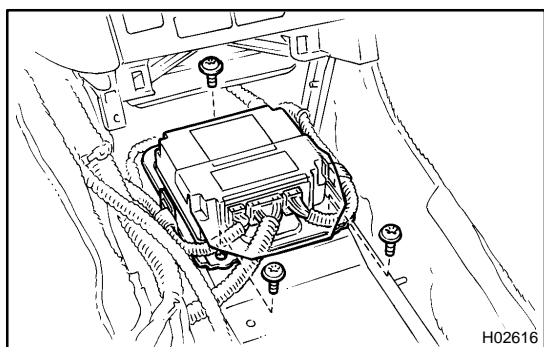
Do not open the cover or the case of the ECU and various computers unless absolutely necessary.

(If the IC terminals are touched, the IC may be destroyed by static electricity.)

1. REMOVE THESE PARTS:

(See page [BO-91](#))

- (a) Finish plate
- (b) End Pad
- (c) No.1 under cover
- (d) Hood lock release lever
- (e) No.1 safety pad
- (f) No.2 under cover
- (g) Glove compartment finish plate
- (h) Glove compartment panel assembly
- (i) Front ash receptacle
- (j) Cluster finish panel
- (k) Console box carpet
- (l) Accessory socket
- (m) Accessory case
- (n) Lower rear console box
- (o) Rear console armrest
- (p) Console box register
- (q) Console box
- (r) No.3 console box mounting bracket
- (s) No.1 console box duct



2. REMOVE AIRBAG SENSOR ASSEMBLY

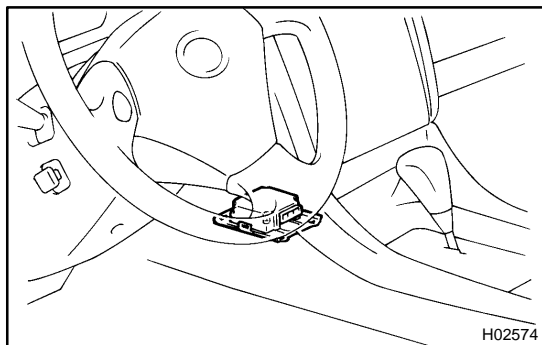
- (a) Disconnect the airbag sensor connectors.

NOTICE:

Remove the connectors with the sensor assembly installed.

- (b) Using a torx wrench, remove the 3 screws and airbag sensor assembly.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)



INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check.

(See page [DI-552](#))

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check.

(See page [DI-552](#))

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the airbag sensor assembly.

- If the SRS has been deployed in a collision.
- If the airbag sensor assembly has been found to be faulty in troubleshooting.
- If the airbag sensor assembly has been dropped.

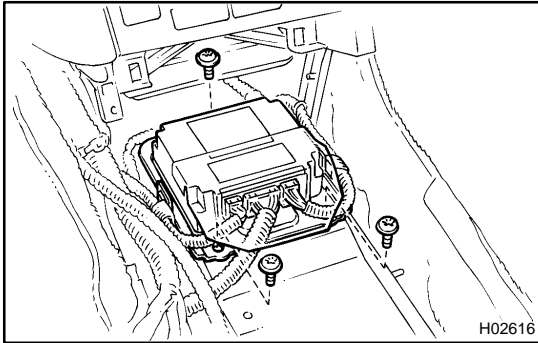
CAUTION:

For removal and installation of the airbag sensor assembly, see page [RS-53](#) and [RS-56](#). Be sure to follow the correct procedure.

INSTALLATION

NOTICE:

- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never reuse the airbag sensor assembly involved in a collision when the airbag has deployed.
- Never repair a sensor in order to reuse it.



1. INSTALL AIRBAG SENSOR ASSEMBLY

- (a) Using a torx wrench, install the airbag sensor assembly with 3 screws.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)

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

- (b) Connect the airbag sensor connectors.

NOTICE:

- Installation of the connector is done with the sensor assembly installed. 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 SRS wiring does not interfere with other parts and is not pinched between other parts.
- After installing, shake the sensor assembly to check that there is no looseness.

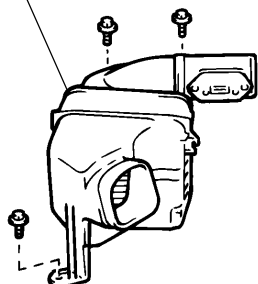
2. INSTALL THESE PARTS: (See page [BO-97](#))

- No.1 console box duct
- No.3 console box mounting bracket
- Console box
- Console box register
- Rear console armrest
- Lower rear console box
- Accessory case
- Accessory socket
- Console box carpet
- Cluster finish panel
- Front ash receptacle
- Glove compartment panel assembly
- Glove compartment finish plate
- No.2 under cover
- No.1 safety pad
- Hood lock release lever
- No.1 under cover
- End Pad
- Finish plate

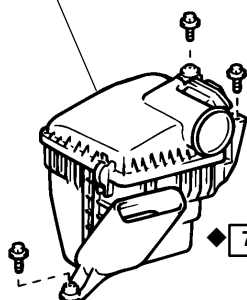
FRONT AIRBAG SENSOR COMPONENTS

RS07U-01

2JZ-GE Engine:
Air Cleaner Assembly



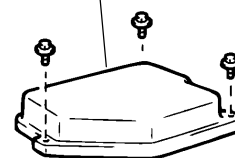
1UZ-FE Engine:
Air Cleaner Assembly



Air Cleaner Inlet No.1



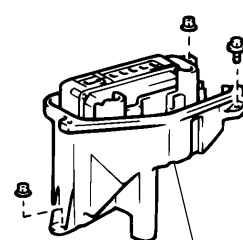
ECU Box Upper Cover



Front Airbag
Sensor RH

◆ 7.8 (80, 69 in.-lbf)

◆ 7.8 (80, 69 in.-lbf)



ECU Box

Front Airbag Sensor LH

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

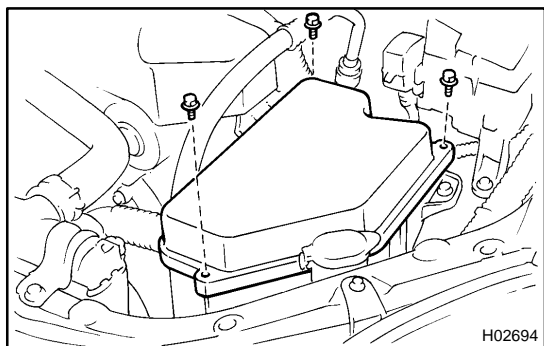
◆ Non-reusable part

H02618

REMOVAL

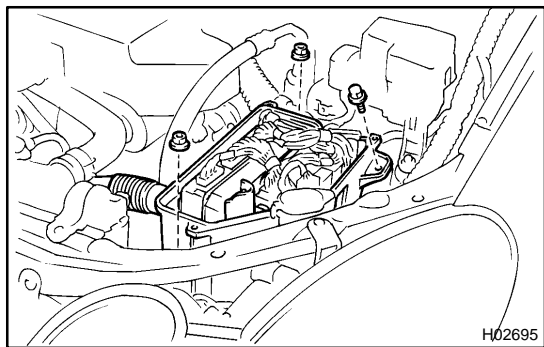
NOTICE:

- If the wiring connector of the SRS is disconnected with the ignition switch in ON or ACC position, DTCs will be recorded.
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never reuse the sensor involved in a collision when the SRS has deployed.
- Never repair a sensor in order to reuse it.

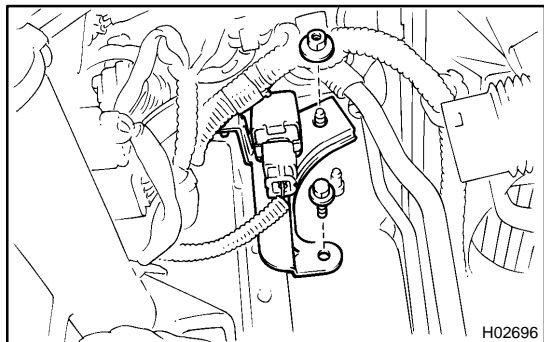


1. REMOVE LH FRONT AIRBAG SENSOR

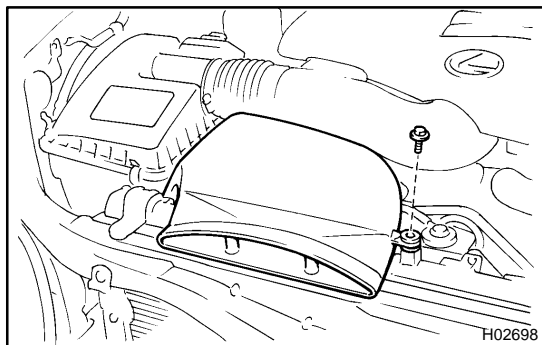
- (a) Remove the 2 bolts and J/B cover.



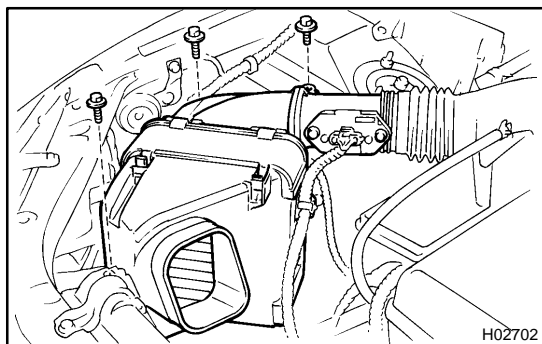
- (b) Remove the bolt and 2 nuts.
(c) Disconnect the connectors and hose, then remove the J/B box.



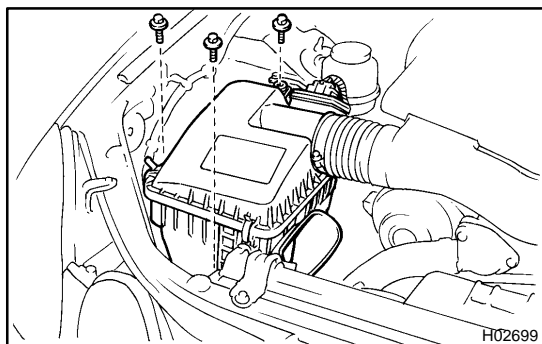
- (d) Disconnect the connector, then remove the bolt, nut and sensor.

**2. REMOVE RH FRONT AIRBAG SENSOR**

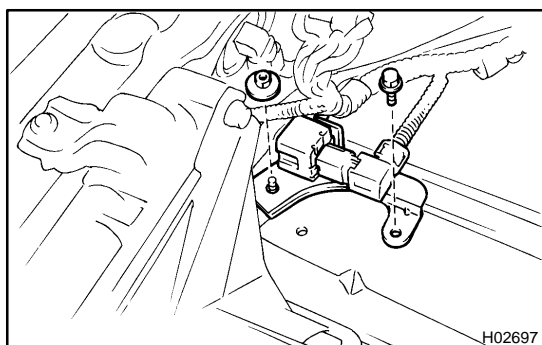
- (a) Remove the bolt and No.1 air cleaner inlet.



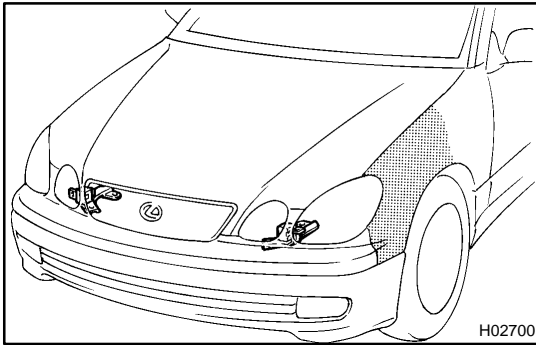
- (b) 2JZ-GE Engine:
Disconnect the connector and inlet hose, then remove the 3 bolts and air cleaner.



- (c) 1UZ-FE Engine:
Disconnect the connector and inlet hose, then remove the 3 bolts and air cleaner.



- (d) Disconnect the connector, then remove the bolt, nut and sensor.



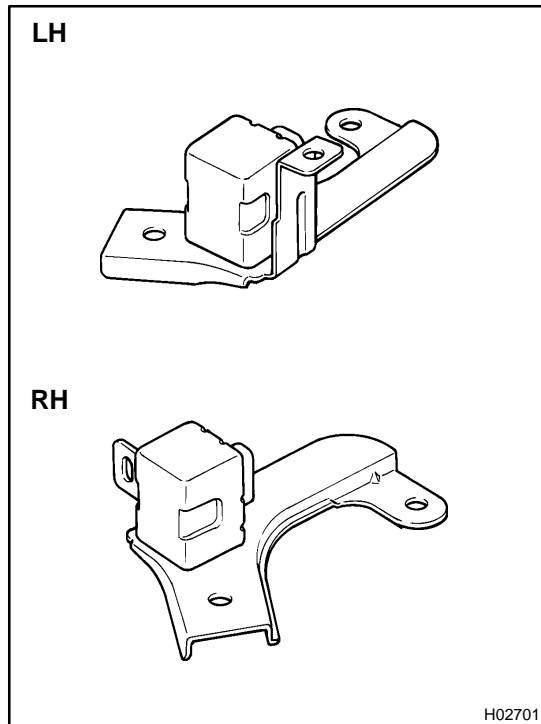
INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page [DI-552](#))

2. VEHICLES INVOLVED IN COLLISION

- (a) Do a diagnostic system check. (See page [DI-552](#))
- (b) If the front fender of the car or its periphery is damaged, do a visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:
 - Bracket deformation
 - Paint peeling off the bracket
 - Cracks, dents or chips in the case
 - Cracks, dents, chipping and scratches in the connector
 - Peeling of the label or damage to the serial number



REPLACEMENT

REPLACEMENT REQUIREMENTS

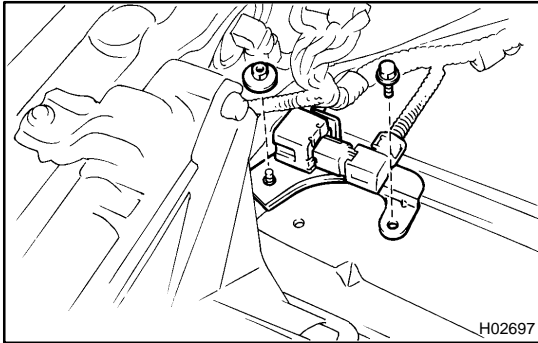
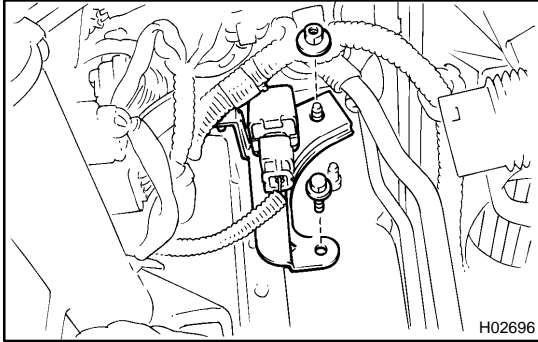
In the following cases, replace the front airbag sensor.

- If the SRS has been deployed in a collision. (Replace both the left and right airbag sensors.)
- If the front airbag sensor has been found to be faulty in troubleshooting.
- If the front airbag sensor has been found to be faulty during the check in item.
(See page [RS-60](#))
- If the front airbag sensor has been dropped.

CAUTION:

For removal and installation of the front airbag sensor, see page [RS-58](#) and [RS-62](#).

Be sure to follow the correct procedure.



INSTALLATION

1. INSTALL FRONT AIRBAG SENSOR

Install the sensor with bolt and nut, then connect the connector.

Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

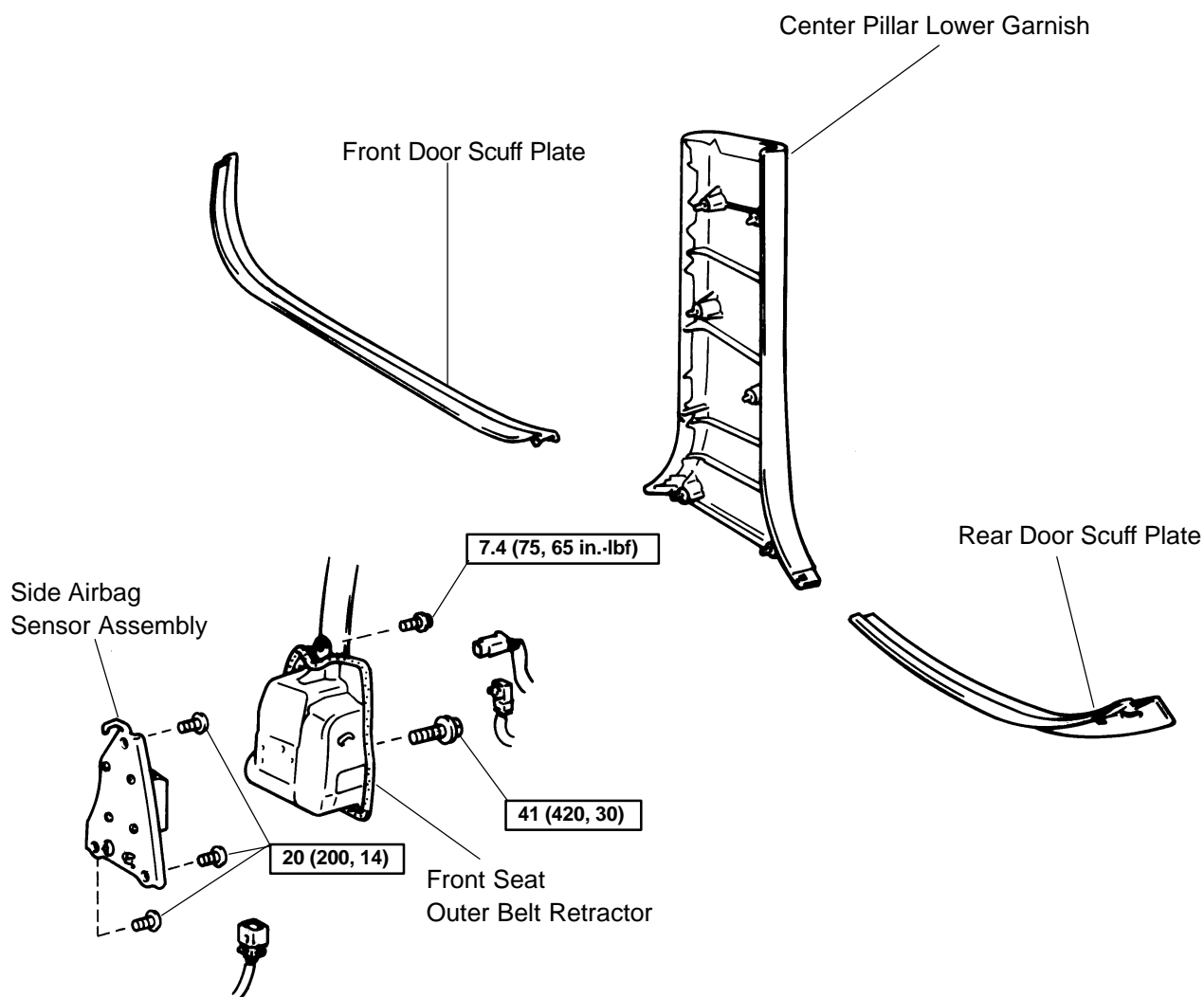
NOTICE:

- 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, brackets or connector, replace the removed sensor. Always replace the set bolt and nut with new ones.
- The sensor set bolt and nut have been anti-rust treated. When the sensor is removed, always replace the set bolt and nut 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 diagnostic system.

2. INSTALL REMOVED PARTS

SIDE AIRBAG SENSOR ASSEMBLY COMPONENTS

RS07Z-01



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

H02617

REMOVAL

NOTICE:

Do not open the cover or the case of the ECU and various computers unless absolutely necessary.

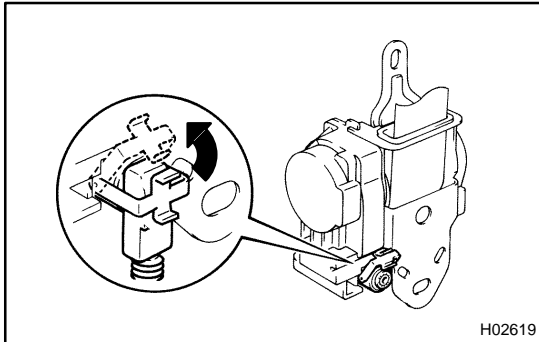
(If the IC terminals are touched, the IC may be destroyed by static electricity.)

1. REMOVE THESE PARTS:

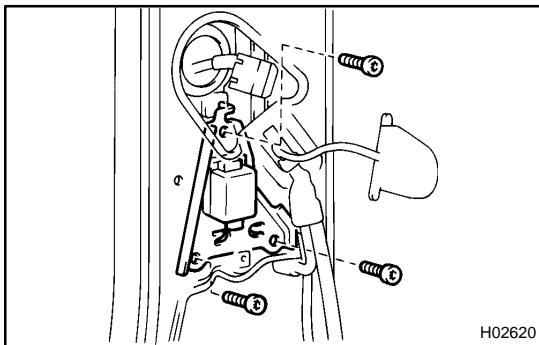
- (a) Front door scuff plate
- (b) Rear door scuff plate
- (c) Center pillar lower garnish

2. REMOVE FRONT SEAT OUTER BELT RETRACTOR (See page [BO-124](#))

- (a) w/ Seat Belt Pretensioner:
Disconnect the pretensioner connector.
- (b) w/ Seat Belt Warning:
Disconnect the retractor switch connector.
- (c) Remove the 2 bolts and retractor.



H02619



H02620

3. REMOVE SIDE AIRBAG SENSOR ASSEMBLY

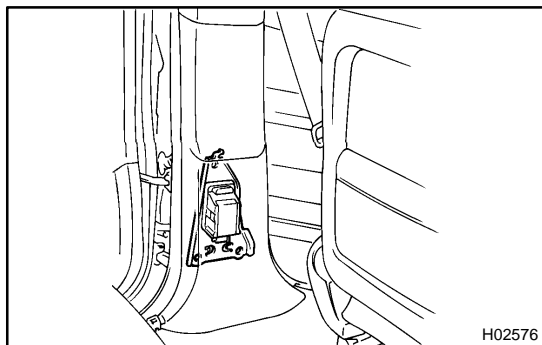
- (a) Disconnect the connector.

NOTICE:

Remove the connector with the sensor assembly installed.

- (b) Using a torx wrench, remove the 4 screws and side airbag sensor assembly.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)



INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check.

(See page [DI-552](#))

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check.

(See page [DI-552](#))

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the side airbag sensor assembly.

- If the side airbag sensor assembly has been deployed in a collision.
- If the side airbag sensor assembly has been found to be faulty in troubleshooting.
- If the side airbag sensor assembly has been dropped.

CAUTION:

For removal and installation of the side airbag sensor assembly, see page [RS-64](#) and [RS-67](#).

Be sure to follow the correct procedure.

INSTALLATION

NOTICE:

- Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- Never reuse the side airbag sensor assembly involved in a collision when the airbag has deployed.
- Never repair a sensor in order to reuse it.

1. INSTALL SIDE AIRBAG SENSOR

- (a) Using a torx wrench, install the side airbag assembly with 4 screws.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)

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

- (b) Connect the connector.

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 SRS wiring does not interfere with other parts and is not pinched between other parts.
- After installation, shake the sensor assembly to check that there is no looseness.

2. INSTALL FRONT SEAT OUTER BELT RETRACTOR (See page [BO-132](#))

- (a) Install the retractor with 2 bolts.

HINT:

After tightening the upper bolt, tighten the lower bolt.

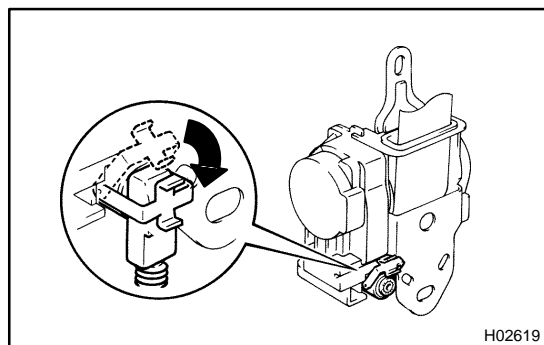
Torque:

Upper bolt: 7.4 N·m (75 kgf-cm, 65 in.-lbf)

Lower bolt: 41 N·m (420 kgf-cm, 30 ft-lbf)

- (b) w/ Seat Belt Warning:

Connect the retractor switch connector.



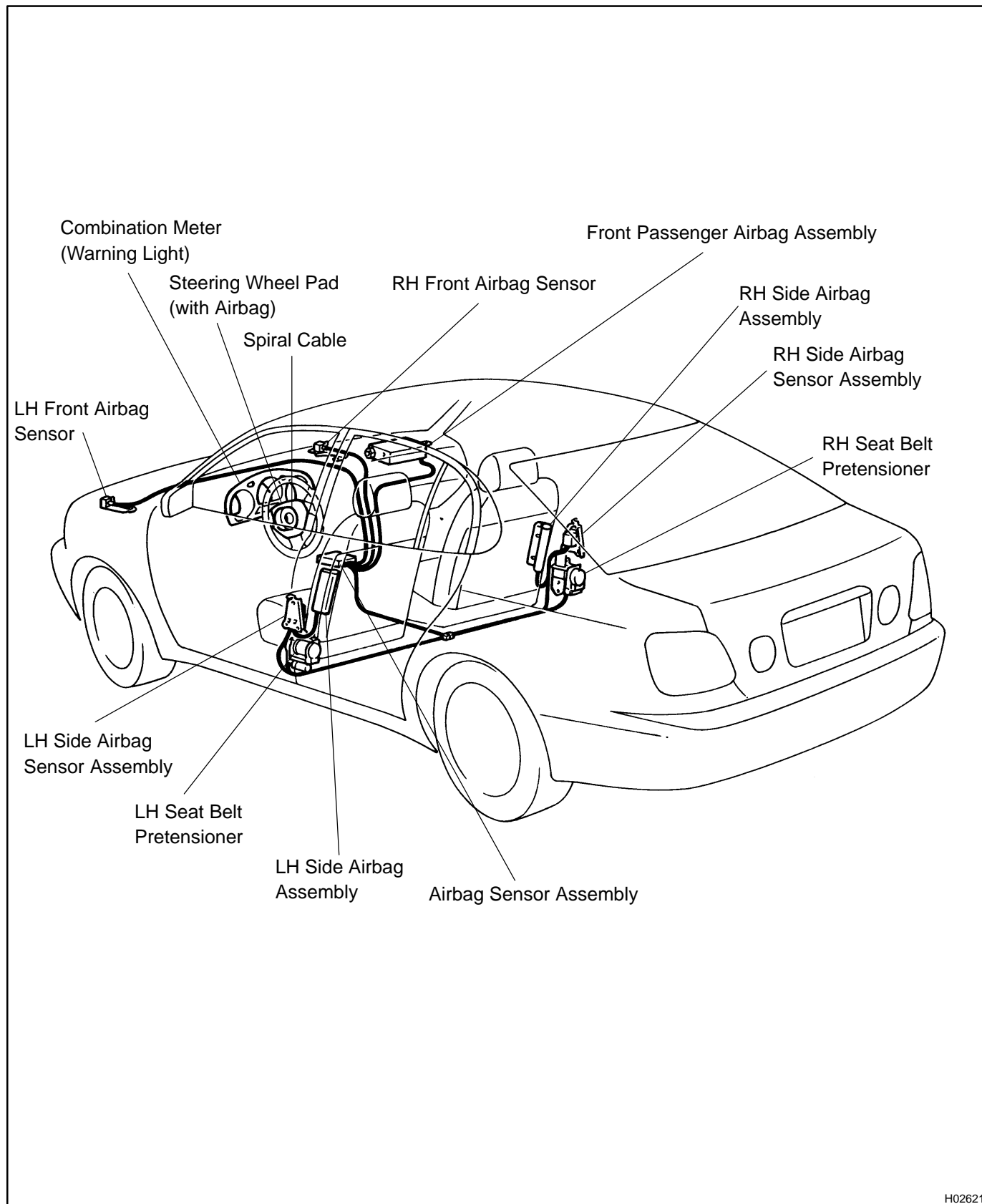
- (c) w/ Seat Belt Pretensioner:
Connect the pretensioner connector.

3. INSTALL THESE PARTS:

- (a) Center pillar lower garnish
(b) Rear door scuff plate
(c) Front door scuff plate

WIRE HARNESS AND CONNECTOR LOCATION

RS084-01



H02621

INSPECTION

HINT:

The SRS wire harness is integrated with the instrument panel wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube and all the connectors in the system are a standard yellow color.

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check.

(See page [DI-552](#))

2. VEHICLE INVOLVED IN COLLISION

(a) Do a diagnostic system check.

(See page [DI-552](#))

(b) Check breaks in all wires of the SRS wire harness, and exposed conductors.

(c) Check to see if the SRS wire harness connectors are cracked or chipped.

REPLACEMENT

In the following cases, replace the wire harness or connector.

- If any part of the SRS wire harness or any connector has been found to be faulty in troubleshooting.
- If any part of the SRS wire harness or any connector has been found to be faulty during the check in items. (See page [RS-69](#))

CAUTION:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SAOR1-03

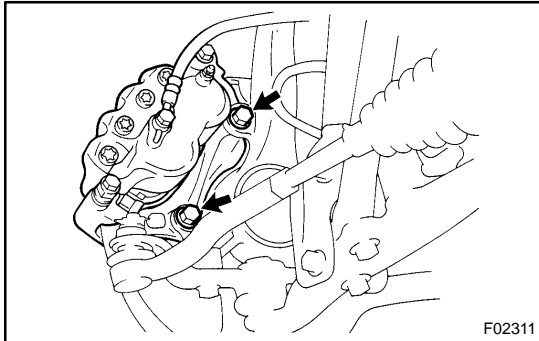
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Wander/pulls	5. Tires (Worn or improperly inflated) 6. Wheel alignment (Incorrect) 7. Steering linkage (Loosen or worn) 8. Hub bearings (Loosen or worn) 9. Steering gear (Out of adjustment or broken) 10. Suspension parts (Worn out)	SA-2 SA-4 SA-7 – SA-9 SA-43 – –
Bottoming	1. Vehicle (Overloaded) 2. Spring (Weak) 3. Shock absorber (Worn out)	– SA-17 SA-86 SA-21 SA-89
Sways/pitches	1. Tires (Worn or improperly inflated) 2. Stabilizer bar (Bent or broken) 3. Shock absorber (Worn out)	SA-2 SA-39 SA-105 SA-21 SA-89
Front wheel shimmy	1. Tires (Worn or improperly inflated) 2. Wheels (Out of balance) 3. Shock absorber (Worn out) 4. Wheel alignment (Incorrect) 5. Ball joints (Worn) 6. Hub bearings (Loosen or worn) 7. Steering linkage (Loosen or worn) 8. Steering gear (Out of adjustment or broken)	SA-2 SA-2 SA-21 SA-4 SA-34 SA-9 – –
Abnormal tire wear	1. Tires (Improperly inflated) 2. Wheel alignment (Incorrect) 3. Suspension parts (Worn out) 4. Shock absorber (Worn out)	SA-2 SA-4 SA-7 – SA-21 SA-89
Noise in rear differential	1. Oil level (Low or wrong grade) 2. Excessive backlash between pinion and ring gear 3. Ring, pinion or side gears (Worn or chipped) 4. Pinion shaft bearing (Worn) 5. Side bearing (Worn)	SA-61 SA-63 SA-63 SA-63 SA-63
Oil leak from rear differential	1. Oil level (Too high or wrong grade) 2. Drive pinion oil seal (Worn or damaged) 3. Side gear oil seal (Worn or damaged) 4. Companion flange (Loose or damaged) 5. Side gear shaft (Damaged)	SA-61 SA-63 SA-60 SA-67 SA-63

REMOVAL

1. REMOVE FRONT WHEEL

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

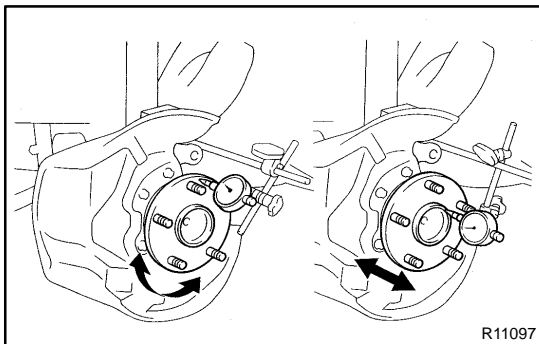


2. REMOVE FRONT BRAKE CALIPER AND DISC

- (a) Remove the 2 bolts and brake caliper from the steering knuckle.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

- (b) Support the brake caliper securely.
(c) Remove the disc.



3. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

- (a) Using a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

- (b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum: 0.05 mm (0.0020 in.)

If the deviation exceeds the maximum, replace the axle hub.

4. REMOVE ABS SPEED SENSOR

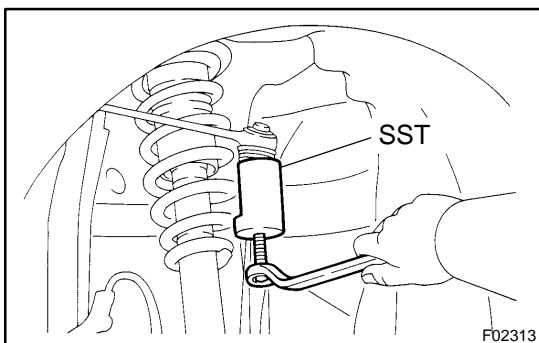
Remove the bolt and ABS speed sensor.

Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

5. REMOVE STEERING KNUCKLE

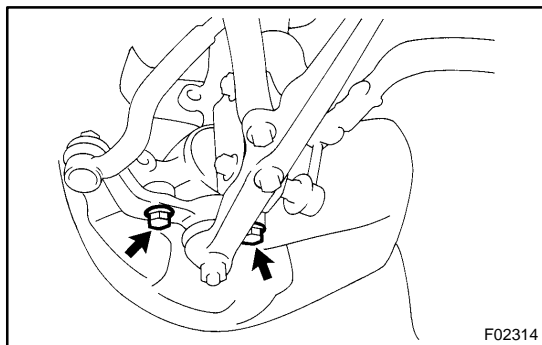
- (a) Remove the upper side of the clip and nut.

Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)



- (b) Using SST, remove the steering knuckle from the upper suspension arm.

SST 09610-20012



- (c) Remove the 2 bolts and steering knuckle from the lower ball joint.

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

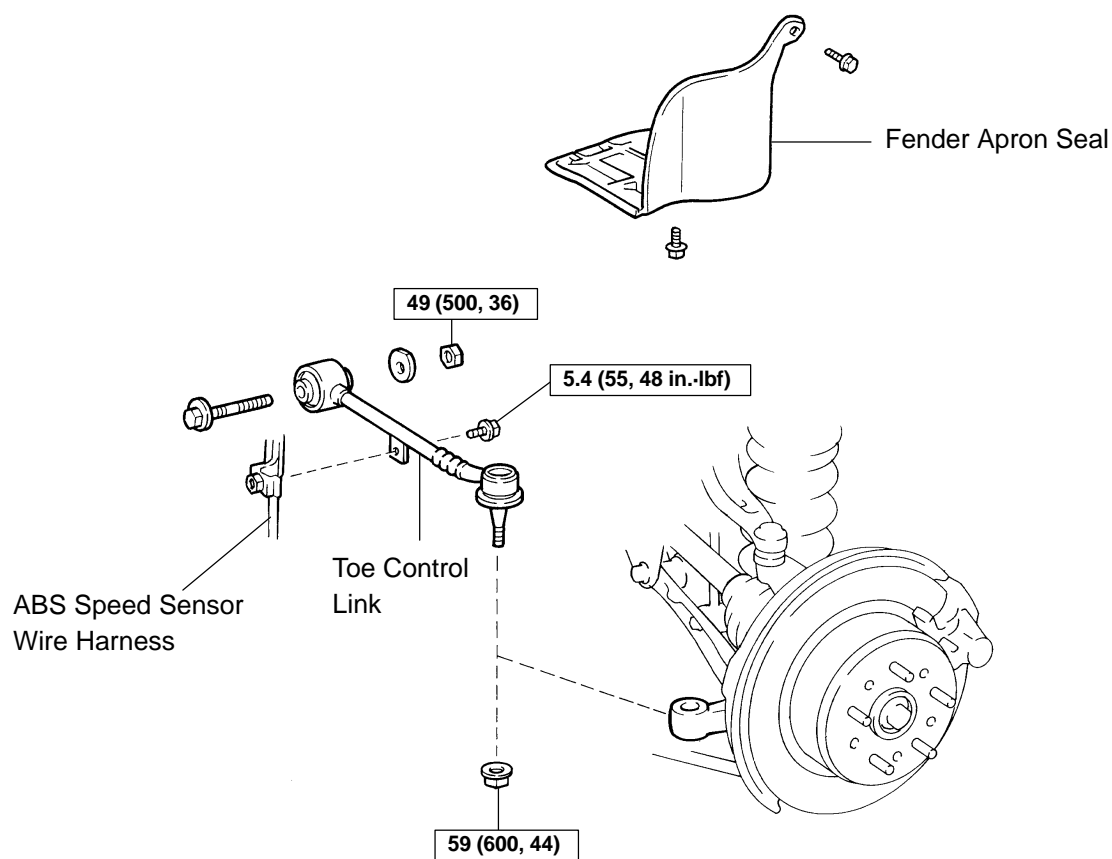
INSTALLATION

Installation is in the reverse order of removal (See page [SA-98](#)).

AFTER INSTALLATION, CHECK REAR WHEEL ALIGNMENT (See page [SA-7](#))

TOE CONTROL LINK COMPONENTS

SA0SW-01



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

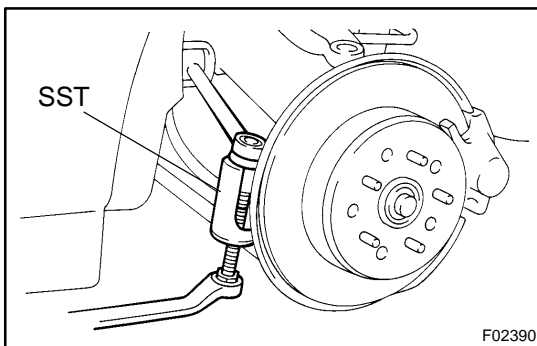
F03427

REMOVAL

1. **REMOVE REAR WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE REAR FENDER APRON SEAL**
3. **DISCONNECT ABS SPEED SENSOR WIRE HARNESS FROM TOE CONTROL LINK**
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
4. **REMOVE TOE CONTROL LINK**
 - (a) Remove the nut.
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

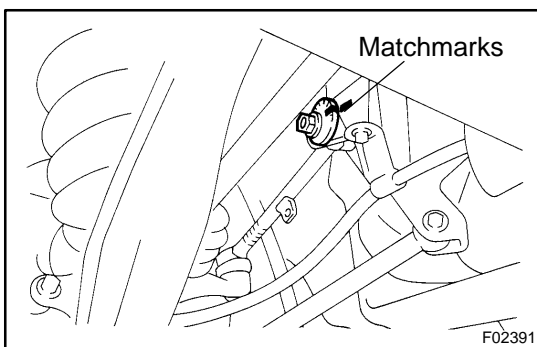


- (b) Using SST, disconnect the toe control link from the axle carrier.

SST 09610-20012

NOTICE:

Be careful not to damage the dust cover.

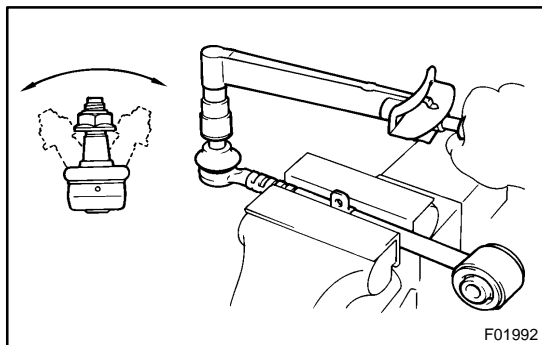


- (c) Place the matchmarks on the adjusting cam and suspension member.
- (d) Remove the nut, adjusting cam No.2, adjusting cam No.1 and the toe control link.

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

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- (a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.
- (b) Using a torque wrench, turn the nut continuously one turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:

1.0 – 2.5 N·m (10 – 25 kgf·cm, 9 – 22 in.-lbf)

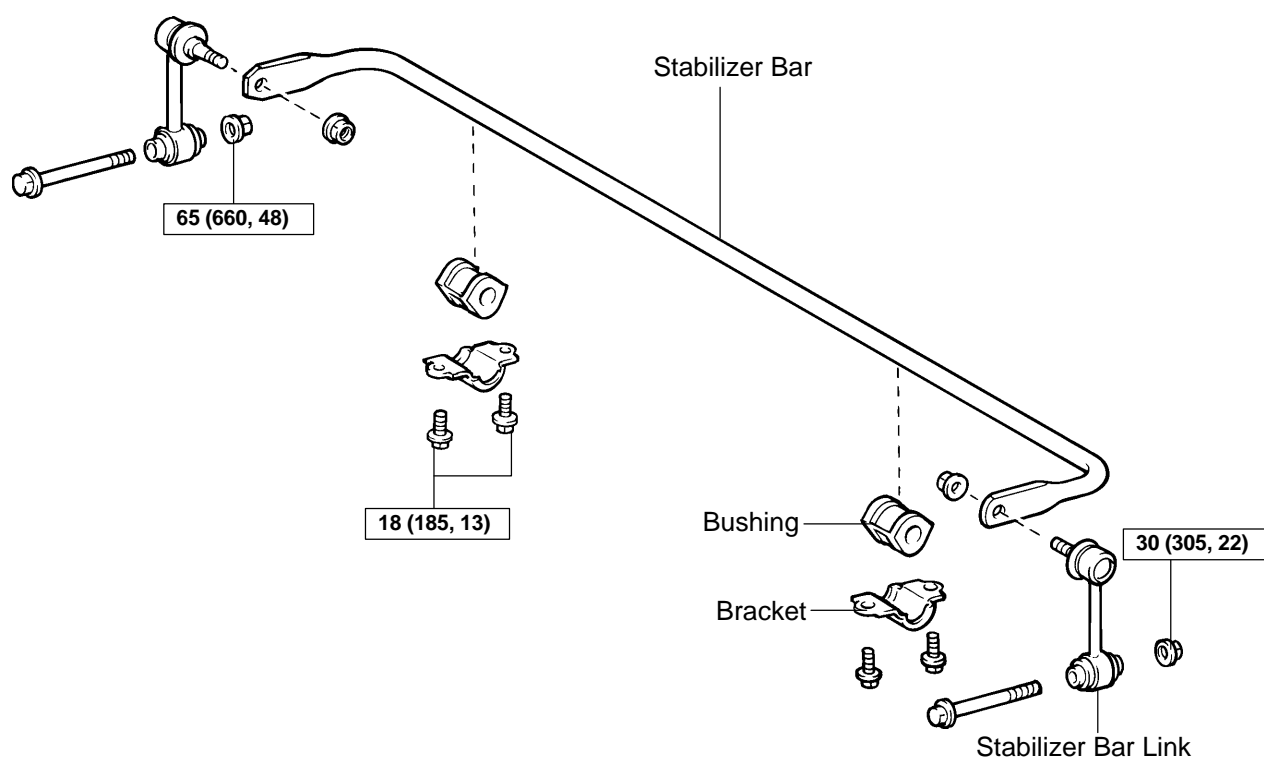
INSTALLATION

Installation is in the reverse order of removal (See page [SA-102](#)).

AFTER INSTALLATION, CHECK REAR WHEEL ALIGNMENT (See page [SA-7](#))

REAR STABILIZER BAR COMPONENTS

SA070-01



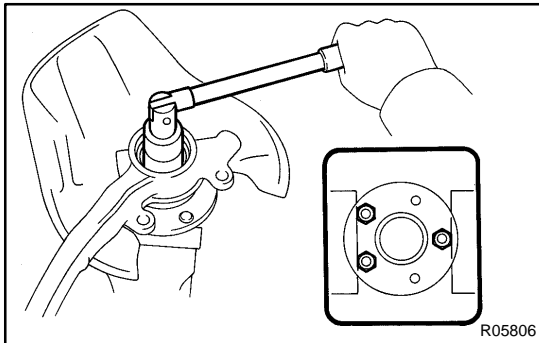
N·m (kgf·cm, ft·lbf) : Specified torque

F01993

DISASSEMBLY

1. REMOVE FRONT HUB GREASE CAP

Using a screwdriver, remove the grease cap from the steering knuckle.



2. REMOVE FRONT AXLE HUB LOCK NUT AND ABS SPEED SENSOR ROTOR

- (a) Clamp the axle hub in a soft jaw vise.

HINT:

Close vise until it holds hub bolt. Do not tighten further.

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

- (c) Using a 36 mm socket wrench, remove the lock nut.

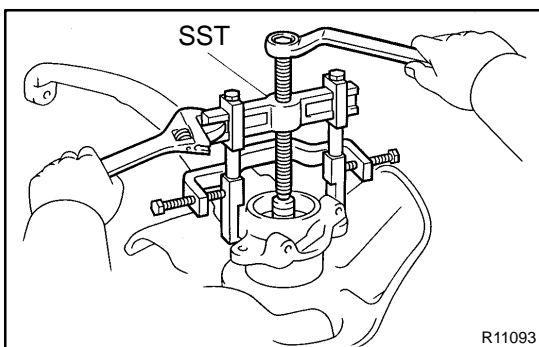
- (d) Remove the ABS speed sensor rotor.

NOTICE:

Take care not to scratch the serrations of the sensor rotor.

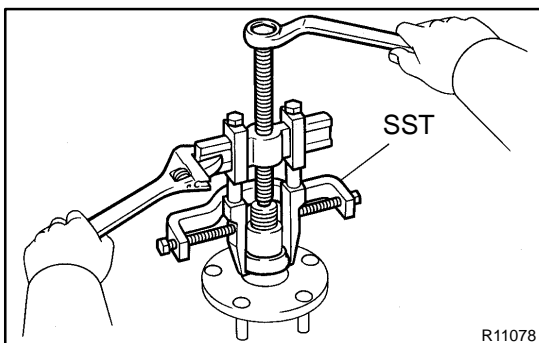
3. REMOVE AXLE HUB FROM STEERING KNUCKLE

- (a) Remove the 4 bolts and shift the brake dust cover toward the outside.



- (b) Using SST, remove the axle hub from the steering knuckle.

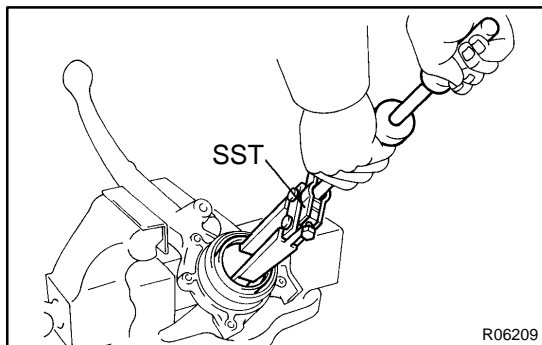
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04051, 09957-04010, 09958-04011)



4. REMOVE INNER RACE (OUTSIDE) FROM AXLE HUB

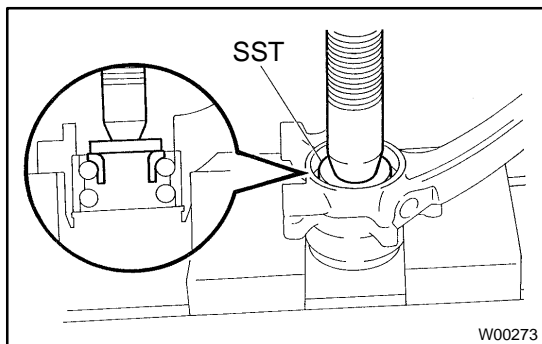
Using SST, remove the inner race from the axle hub.

SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04061, 09957-04010, 09958-04011)

**5. REMOVE OIL SEAL**

Using SST, remove the oil seal from the steering knuckle.

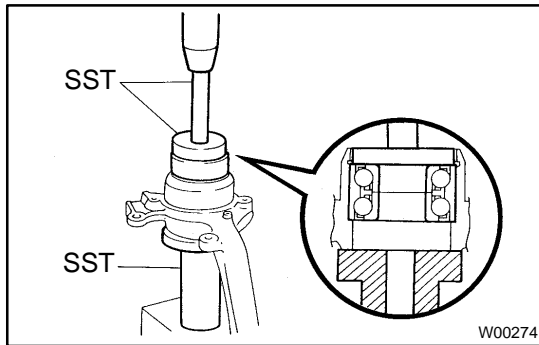
SST 09308-00010

**6. REMOVE BEARING FROM STEERING KNUCKLE**

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

(b) Using SST and a press, remove the bearing from the steering knuckle.

SST 09950-60010 (09951-00560)



REASSEMBLY

1. INSTALL BEARING

- (a) Using SST and a press, install a new bearing to steering knuckle.

SST 09309-36010, 09950-60020 (09951-00720),
09950-70010 (09951-07150)

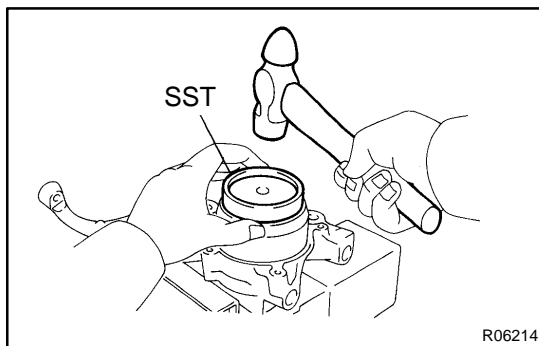
NOTICE:

If the inner race and balls come loose from the bearing outer race, make sure to install them on the same side as before.

- (b) Using snap ring pliers, install a new snap ring.

2. INSTALL OIL SEAL

- (a) Install the inner race (outside).



- (b) Using SST and a hammer, install a new oil seal until it is flush with the end surface of the steering knuckle.

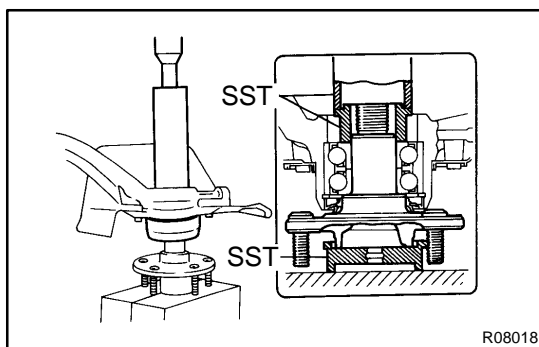
SST 09608-32010

- (c) Coat MP grease to the oil seal lip.

3. INSTALL AXLE HUB TO STEERING KNUCKLE

- (a) Install the brake dust cover to the steering knuckle with the 4 bolts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.-lbf)



- (b) Using SST and a press, install the axle hub to the steering knuckle.

SST 09316-60011 (09316-00011, 09316-00071),
09608-32010

4. INSTALL ABS SPEED SENSOR ROTOR

NOTICE:

Do not scratch the serrations of the sensor rotor.

5. INSTALL AXLE HUB LOCK NUT

- (a) Install a new axle hub lock nut.

Torque: 199 N·m (2,030 kgf·cm, 147 ft·lbf)

- (b) Using a chisel and hammer, stake the lock nut.

6. INSTALL FRONT HUB GREASE CAP

Using a screwdriver and hammer, install the grease cap to the steering knuckle.

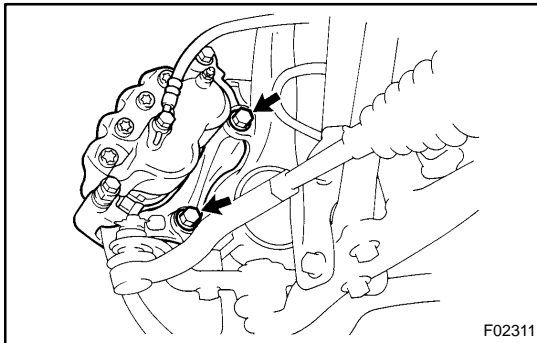
INSTALLATION

Installation is in the reverse order of removal (See page [SA-10](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-389](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-4](#))

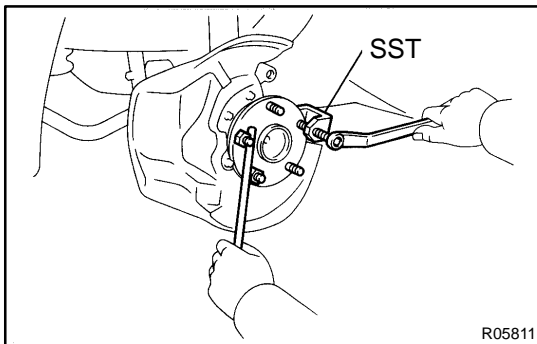
FRONT WHEEL HUB BOLT REPLACEMENT

1. REMOVE FRONT WHEEL



2. REMOVE BRAKE CALIPER AND DISC

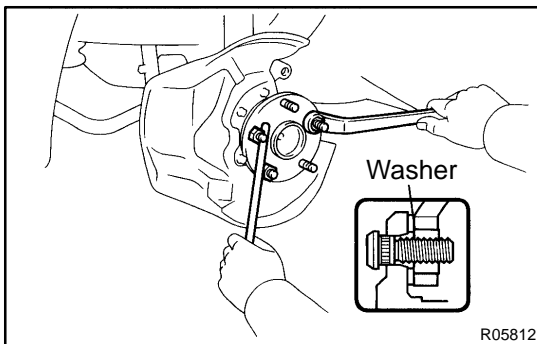
- Remove the 2 bolts and remove the brake caliper from the steering knuckle.
- Support the brake caliper securely.
- Remove the disc.



3. REMOVE HUB BOLT

Using SST, remove the hub bolt.

SST 09628-10011



4. INSTALL HUB BOLT

- Install a washer and nut to the bolt, as shown in the illustration.
- Turn the wheel nut to pull the hub bolt until the underside of the hub bolt head touches the axle hub.

5. INSTALL DISC AND BRAKE CALIPER

- Install the disc.
- Install the brake caliper and 2 bolts to the steering knuckle.

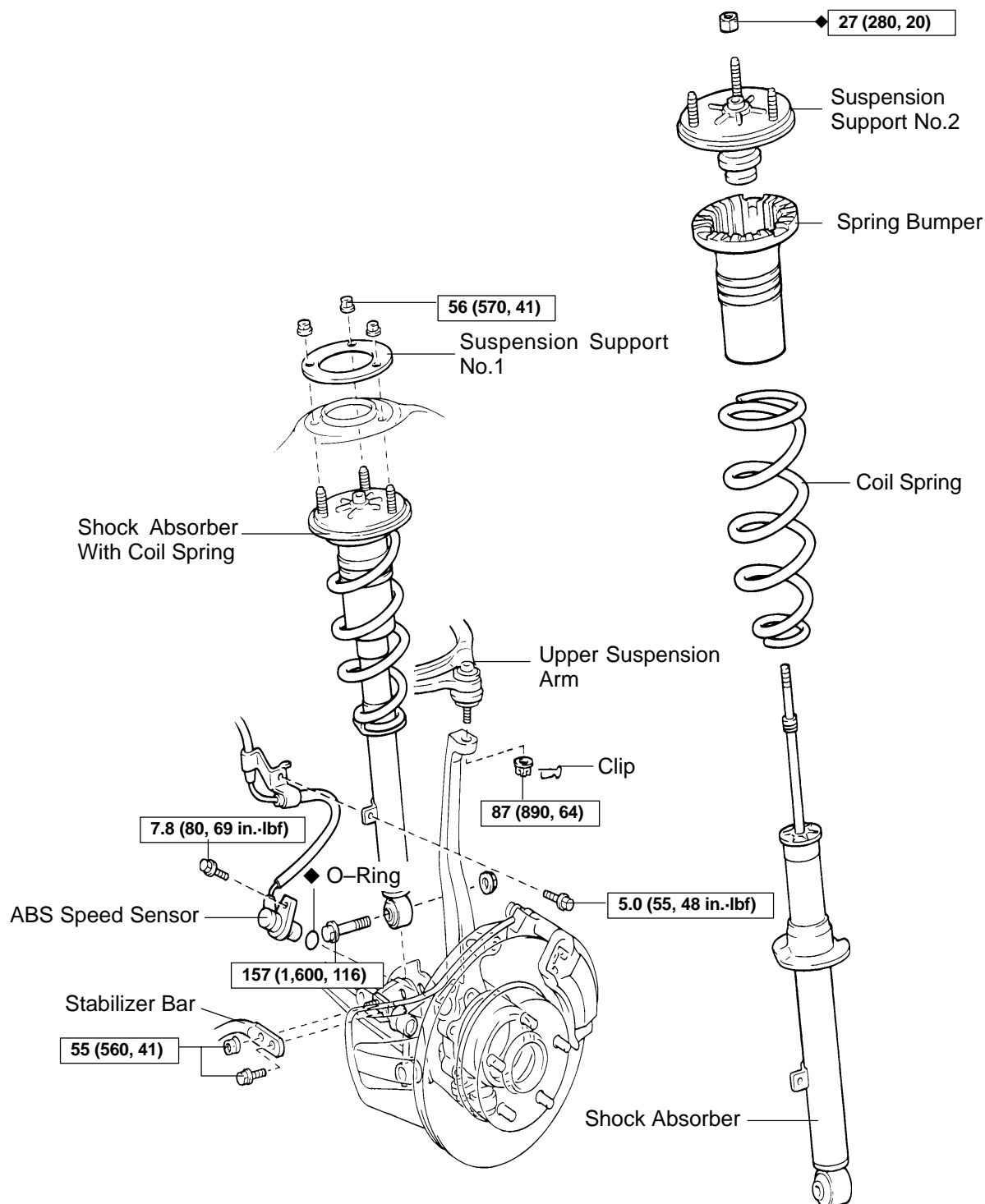
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

6. INSTALL FRONT WHEEL

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

FRONT SHOCK ABSORBER COMPONENTS

SAORB-03



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

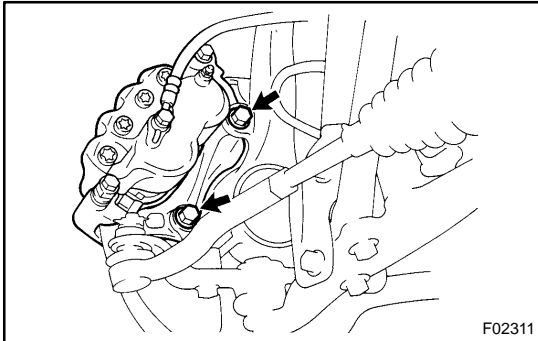
◆ Non-reusable part

F02335

REMOVAL

1. REMOVE FRONT WHEEL

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



2. REMOVE BRAKE CALIPER

- (a) Remove the 2 bolts and caliper from the steering knuckle.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

- (b) Support the brake caliper securely.

3. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

- (a) Remove the bolt and ABS speed sensor.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

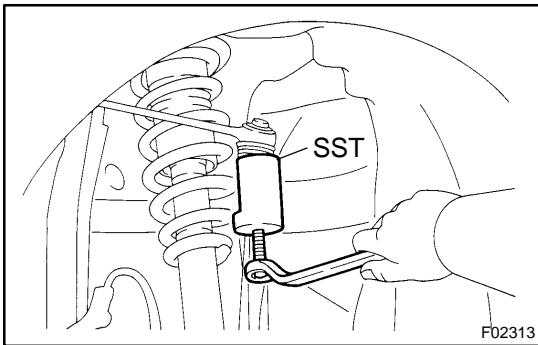
- (b) Remove the bolt and ABS speed sensor wire harness.

Torque: 5.0 N·m (55 kgf·cm, 48 in·lbf)

4. DISCONNECT UPPER SUSPENSION ARM FROM STEERING KNUCKLE

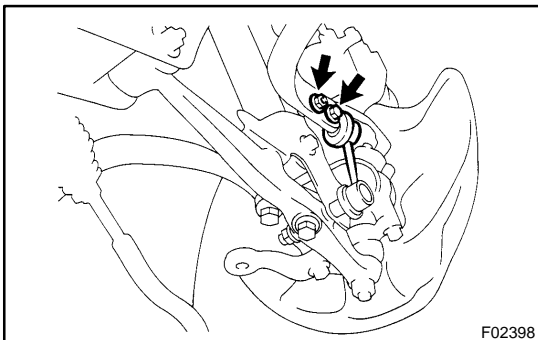
- (a) Remove the clip and nut.

Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)



- (b) Using SST, disconnect the upper suspension arm from the steering knuckle.

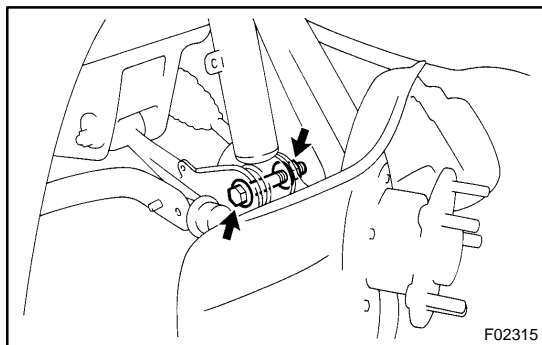
SST 09610-20012



5. DISCONNECT STABILIZER BAR FROM STABILIZER BAR LINK

Remove the bolt and nut, and disconnect the stabilizer bar from the stabilizer bar link

Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)

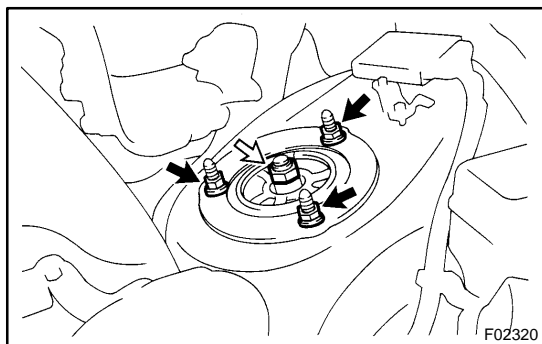
**6. REMOVE FRONT SHOCK ABSORBER**

- (a) Remove the bolt and nut, and disconnect the shock absorber from the shock absorber bracket.

Torque: 157 N·m (1,600 kgf-cm, 116 ft-lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the bolt.



- (b) Loosen the piston rod lock nut.

NOTICE:

Do not remove it.

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

- (c) Remove the 3 nuts and shock absorber and suspension support No.1 from the body.

Torque: 56 N·m (570 kgf-cm, 41 ft-lbf)

TIRE AND WHEEL INSPECTION

1. INSPECT TIRE

- (a) Check the tires for wear and for the proper inflation pressure.

**Cold tire inflation pressure:
(GS 400)**

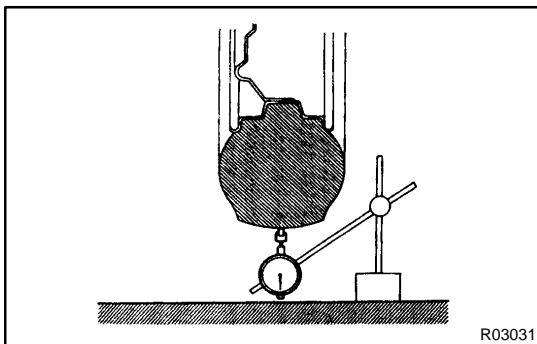
Tire size	Front kPa (kgf/cm ² or bar, psi)	Rear kPa (kgf/cm ² or bar, psi)
225/55R16 94V	* ¹ 220 (2.2, 32) * ² 290 (2.9, 42)	* ¹ 220 (2.2, 32) * ² 290 (2.9, 42)
235/45ZR17	* ¹ 230 (2.3, 33) * ² 300 (3.0, 44)	* ¹ 230 (2.3, 33) * ² 300 (3.0, 44)

(GS 300)

Tire size	Front kPa (kgf/cm ² or bar, psi)	Rear kPa (kgf/cm ² or bar, psi)
P215/60R16 94V	* ¹ 210 (2.1, 30) * ² 300 (3.0, 44)	* ¹ 210 (2.1, 30) * ² 300 (3.0, 44)
225/55R16 94V	* ¹ 220 (2.2, 32) * ² 300 (3.0, 44)	* ¹ 220 (2.2, 32) * ² 300 (3.0, 44)

*¹: For driving under 160 km/h (100 mph)

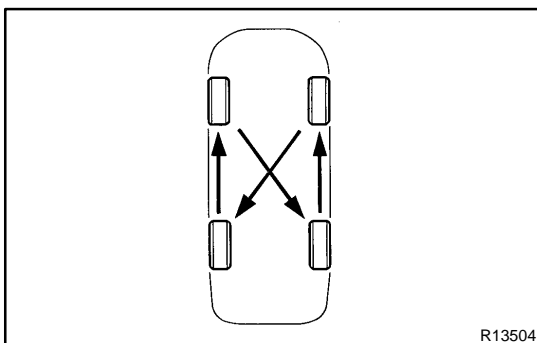
*²: For driving at 160 km/h (100 mph) or over



R03031

- (b) Check the tire runout.

Tire runout: 1.4 mm (0.055 in.) or less

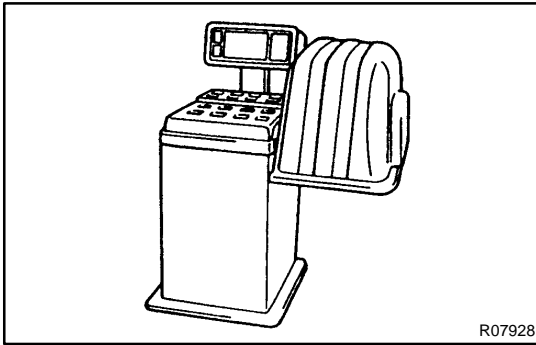


R13504

2. ROTATING TIRES

HINT:

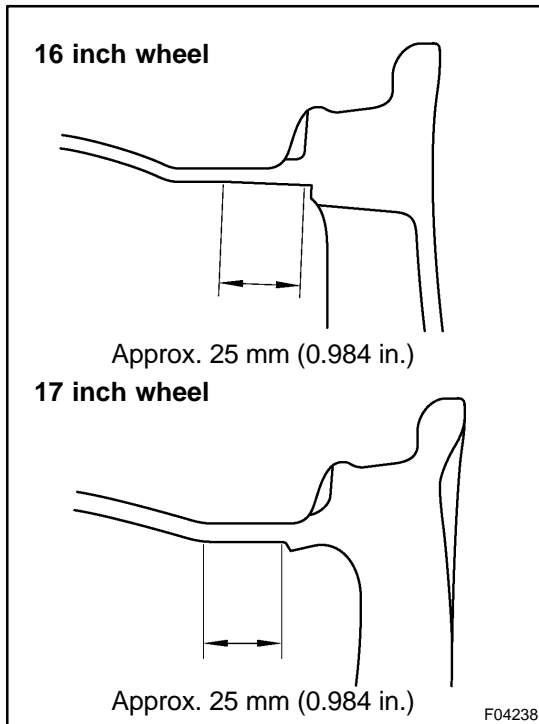
See the illustration for where to rotate each tire.



3. INSPECT WHEEL BALANCE

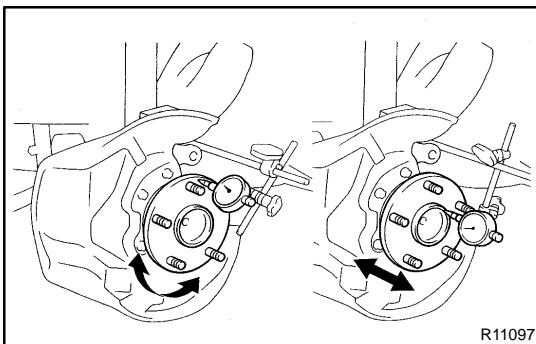
- (a) Check and adjust the off-the-car balance.
- (b) If necessary, check and adjust the on-the-car balance.

Unbalance after adjustment: 8.0 g (0.018 lb) or less



NOTICE:

- Adhere the sticking type balance weight to the flat position shown in the illustration.
- Push the balance weight securely with a finger to adhere it to the position.
(Pushing force: 10 kgf/more than 2 secs.)
- After cleaning the surface which the balance weight will be adhered to of dirt, oil and water with a cleaning detergent, adhere the balance weight to the surface.
- Do not touch the sticking surface of the tape.
- Do not use the once used balance weight.
- Please use the TOYOTA genuine sticking type balance weight.



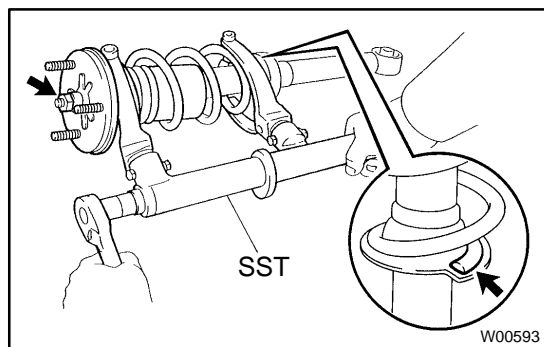
4. CHECK WHEEL BEARING LOOSENESS

- (a) Check the backlash in the bearing shaft direction.
Maximum: 0.05 mm (0.0020 in.)
- (b) Check the axle hub deviation.
Maximum: 0.05 mm (0.0020 in.)

5. CHECK FRONT SUSPENSION FOR LOOSENESS
6. CHECK STEERING LINKAGE FOR LOOSENESS
7. CHECK BALL JOINT FOR LOOSENESS AND EXCESSIVE PLAY (See page [SA-34](#))

8. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check for oil leak
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



DISASSEMBLY

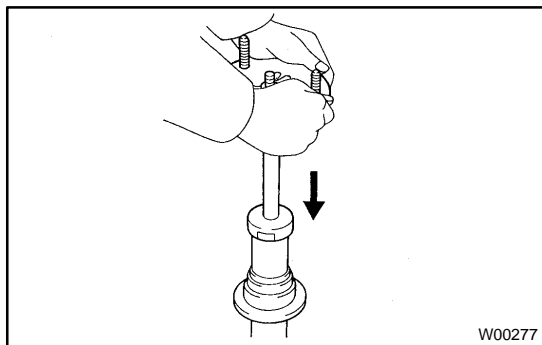
REMOVE SUSPENSION SUPPORT AND COIL SPRING

- (a) Using SST, compress the coil spring.
SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

- (b) Remove the piston rod lock nut.
- (c) Remove these parts from the shock absorber:
- Suspension support No.2
 - Spring bumper
 - Coil spring



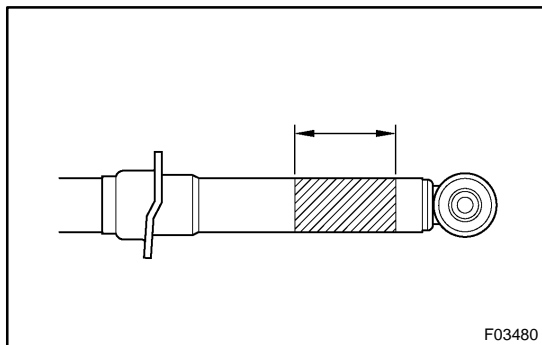
INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds. If there is any abnormality, replace the shock absorber with a new one.

NOTICE:

When discarding the shock absorber, see **DISPOSAL** on page [SA-22](#).



DISPOSAL

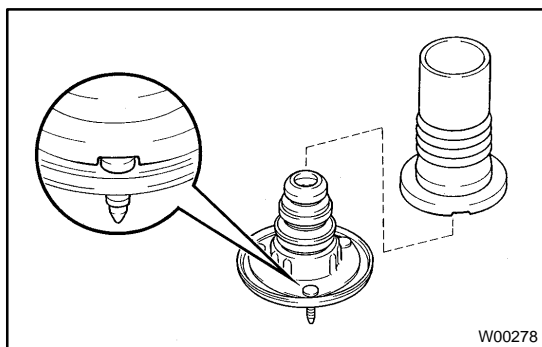
1. FULLY EXTEND SHOCK ABSORBER ROD

2. DRILL HOLE TO REMOVE GAS FROM CYLINDER

- (a) Place the shock absorber horizontally to prevent the oil from coming out.
- (b) Using a drill, make a hole on the top of the shell as shown to discharge the gas inside.

CAUTION:

The gas coming out is harmless, but be careful of chips which may fly up when drilling.

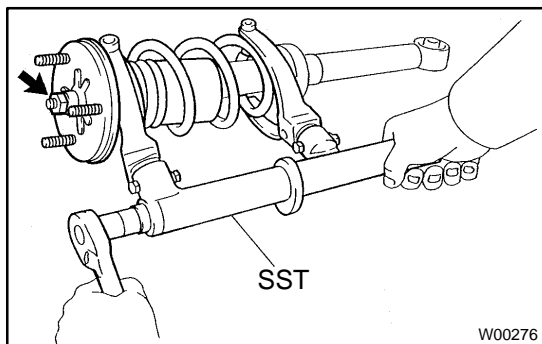


REASSEMBLY

1. INSTALL SPRING BUMPER TO SUSPENSION SUPPORT

HINT:

Match the bolt of the suspension support with the cut-out part of the spring bumper.



2. INSTALL COIL SPRING TO SHOCK ABSORBER

- (a) Using SST, compress the coil spring.

SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

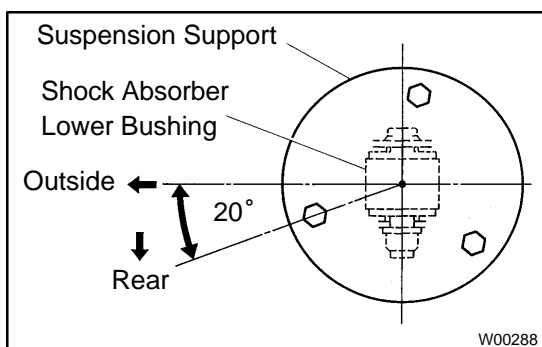
- (b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the recess of the spring seat of the shock absorber.

3. INSTALL SUSPENSION SUPPORT

- (a) Install the suspension support to the rod.
(b) Temporarily tighten a new lock nut.



- (c) Align the suspension support with the shock absorber lower bolt, as shown.

4. REMOVE SST

HINT:

After removing the SST, recheck the direction of the suspension support.

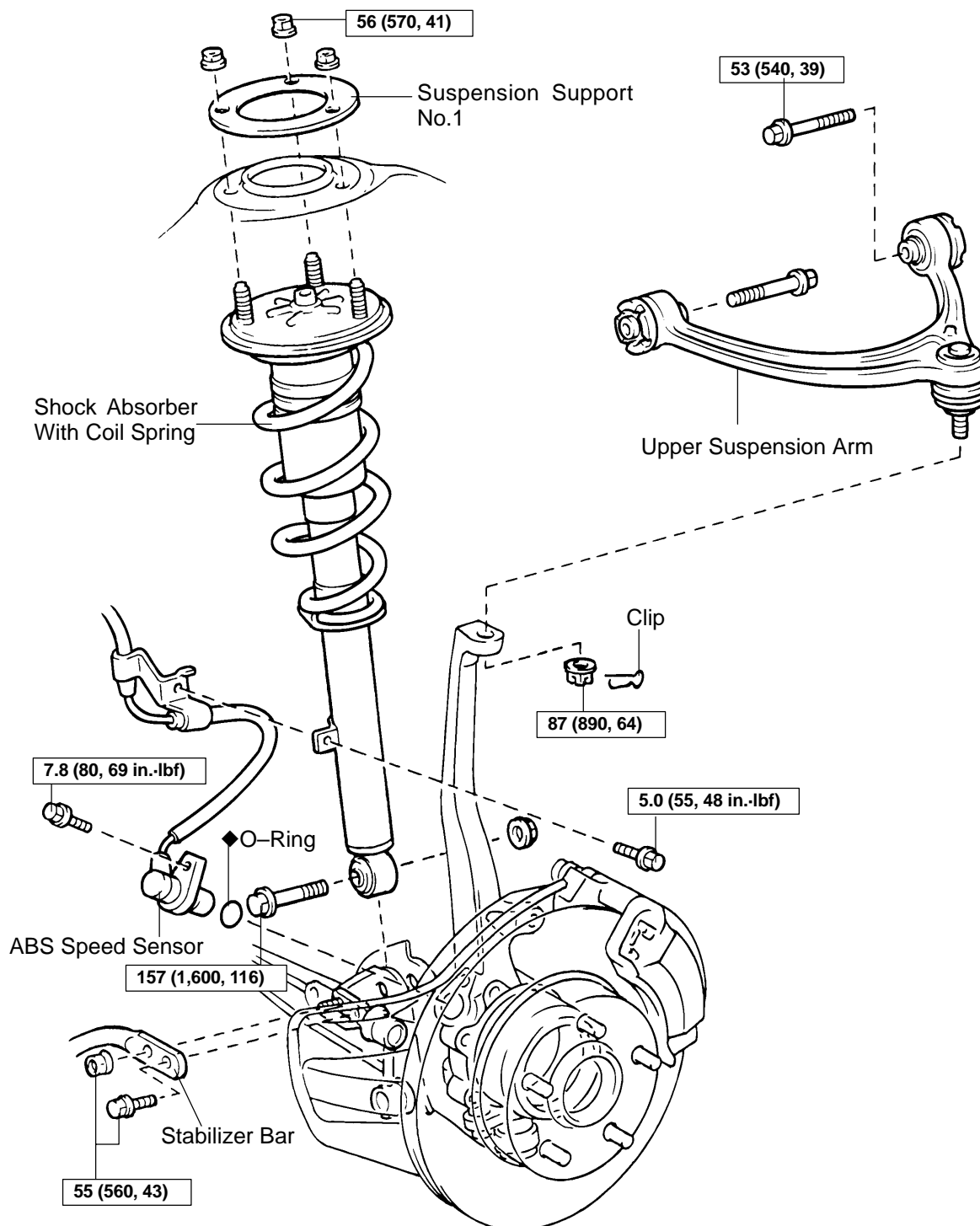
INSTALLATION

Installation is in the reverse order or removal (See page [SA-18](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-389](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-4](#))

FRONT UPPER SUSPENSION ARM COMPONENTS

SAORI-03



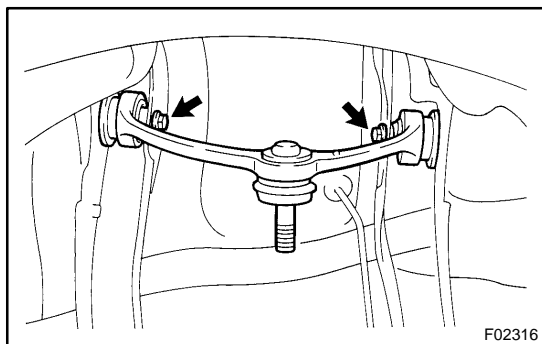
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

F02336

REMOVAL

1. **REMOVE FRONT WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE FRONT SHOCK ABSORBER**
(See page [SA-18](#))



3. **REMOVE UPPER SUSPENSION ARM**
Remove the 2 bolts and upper suspension arm.
Torque: 53 N·m (540 kgf·cm, 39 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the bolts.

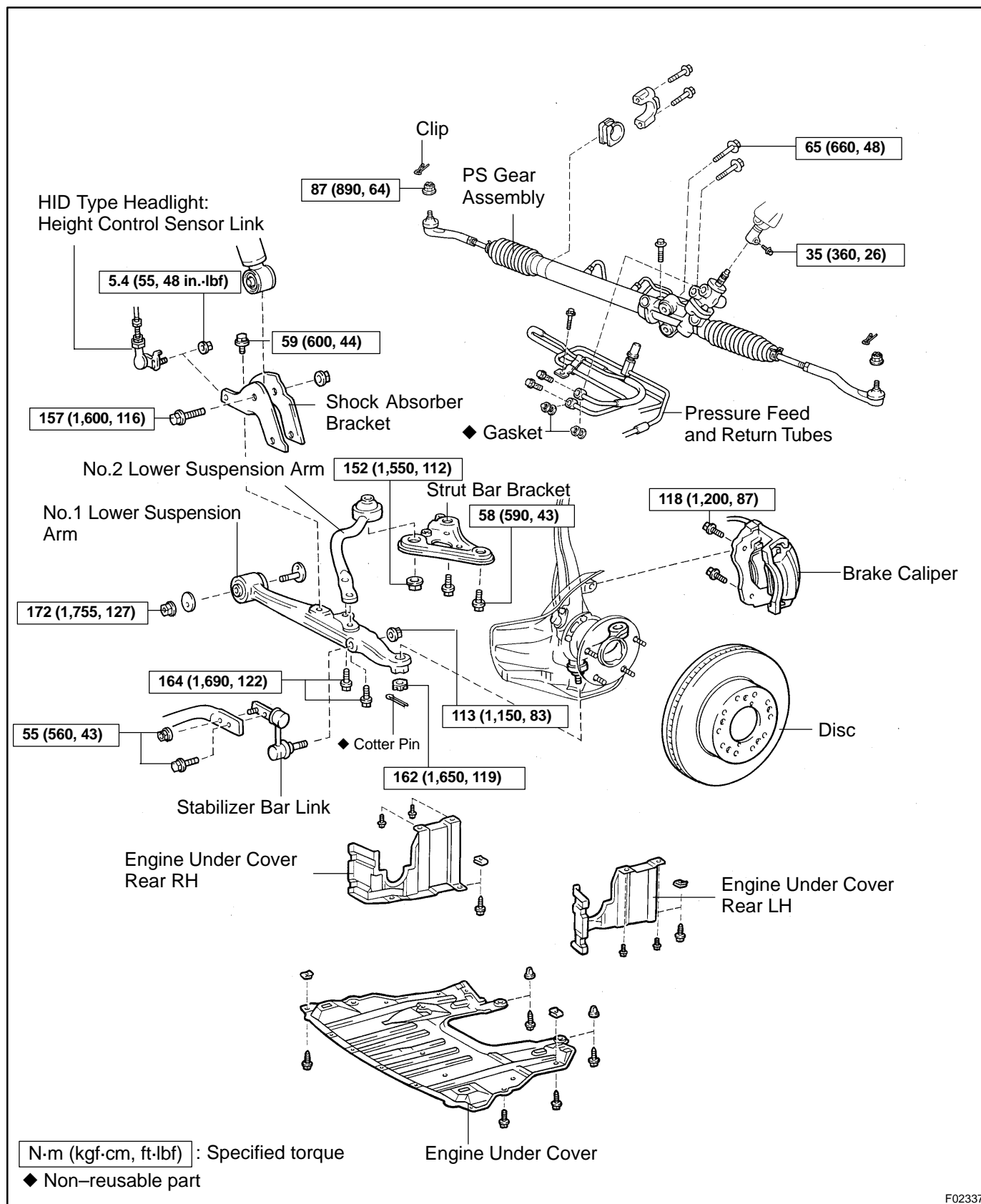
INSTALLATION

Installation is in the reverse order of removal (See page [SA-26](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR (See page [DI-389](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-4](#))

FRONT LOWER SUSPENSION ARM COMPONENTS

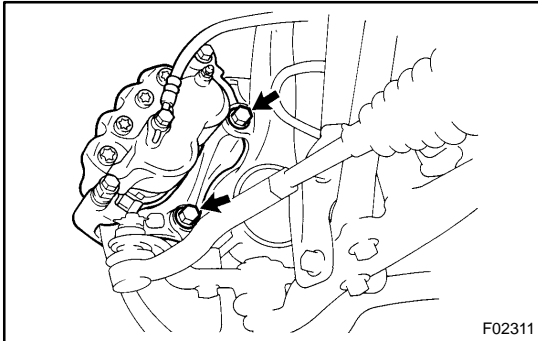
SAORM-01



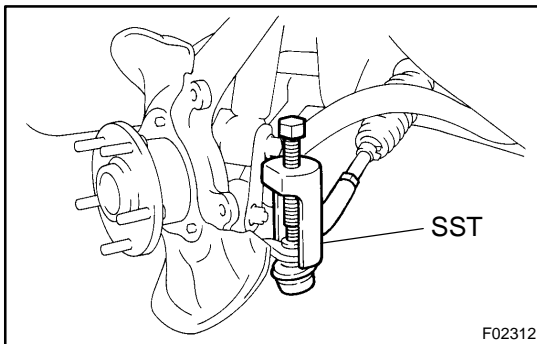
F02337

REMOVAL

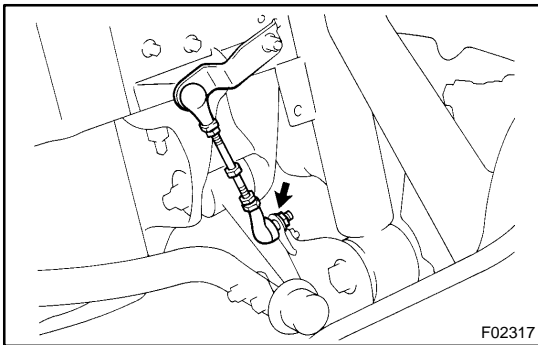
1. **REMOVE FRONT WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE ENGINE UNDER COVERS**



3. **REMOVE BRAKE CALIPER**
 - (a) Remove the 2 bolts and caliper.
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)
 - (b) Support the brake caliper securely.
 - (c) Remove the disc.
4. **DISCONNECT TIE ROD END**
 - (a) Remove the clip and nut.
Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)



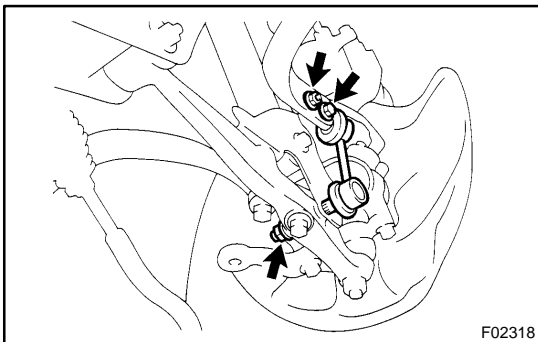
-
- (b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09610-20012



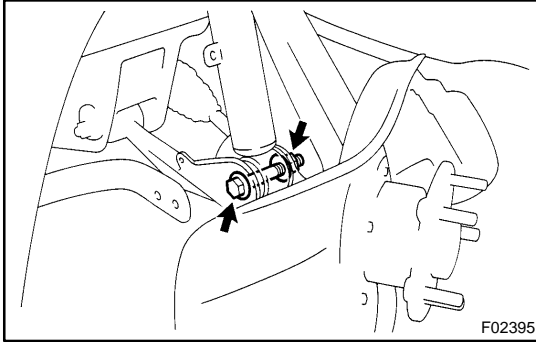
5. **HID TYPE HEADLIGHT:**
DISCONNECT HEIGHT CONTROL SENSOR LINK FROM SHOCK ABSORBER BRACKET

Remove the nut and disconnect the height control sensor link from the shock absorber bracket.

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

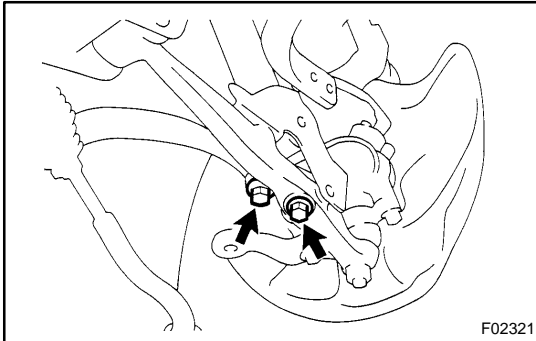


6. **REMOVE STABILIZER BAR LINK**
 - (a) Remove the bolt and nut, disconnect the stabilizer bar link from the stabilizer bar.
Torque: 55 N·m (560 kgf·cm, 43 ft·lbf)
 - (b) Remove the nut and stabilizer bar link.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

**7. DISCONNECT SHOCK ABSORBER**

Remove the bolt and nut, disconnect the shock absorber from the shock absorber bracket.

Torque: 157 N·m (1,600 kgf·cm, 116 ft·lbf)

**8. LOOSEN NO.1 AND NO.2 LOWER SUSPENSION ARM SET BOLTS**

Torque: 164 N·m (1,690 kgf·cm, 122 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the bolts.

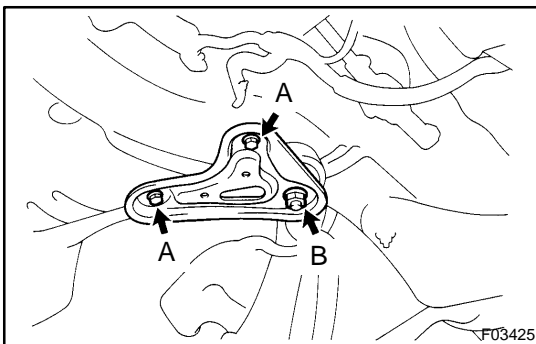
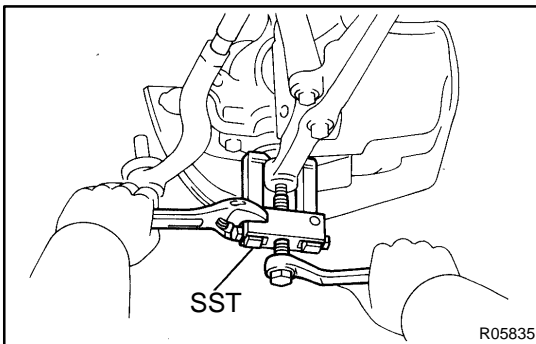
9. DISCONNECT NO.2 LOWER SUSPENSION ARM

(a) Remove the cotter pin and nuts.

Torque: 162 N·m (1,650 kgf·cm, 119 ft·lbf)

(b) Using SST, disconnect the No.2 lower suspension arm from the lower ball joint.

SST 09628-62011

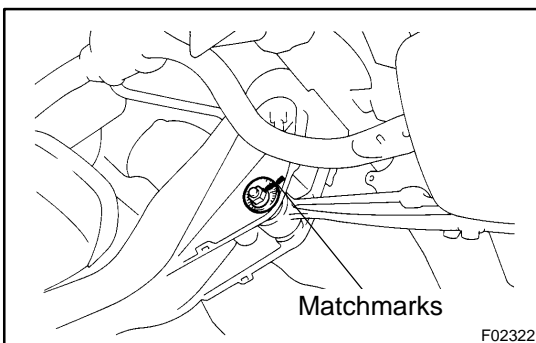
10. REMOVE STEERING GEAR ASSEMBLY
(See page [SR-45](#))**11. REMOVE STRUT BAR BRACKET**

Remove the nut, 2 bolts and strut bar bracket.

Torque:

A: 58 N·m (590 kgf·cm, 43 ft·lbf)

B: 152 N·m (1,550 kgf·cm, 112 ft·lbf)

**12. REMOVE LOWER SUSPENSION ARM ASSEMBLY**

(a) Place matchmarks on the camber adjusting cam and suspension crossmember.

(b) Remove the bolt, nut and lower suspension arm assembly.

Torque: 172 N·m (1,755 kgf·cm, 127 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

13. REMOVE NO.1 AND NO.2 LOWER SUSPENSION ARMS

- (a) Remove the bolt, shock absorber bracket from the No.1 lower suspension arm.

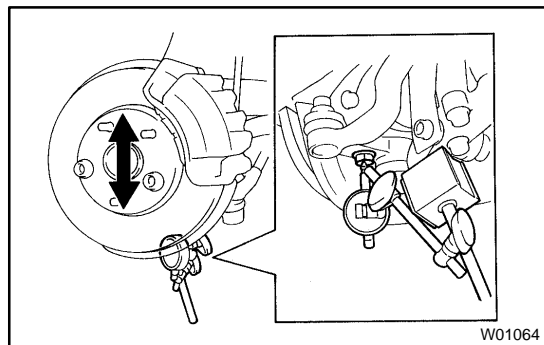
Torque: 59 N·m (600 kgf-cm, 44 ft-lbf)

- (b) Remove the 2 bolts and separate the No.1 and No.2 lower suspension arms.

INSTALLATION

Installation is in the reverse order of removal (See page [SA-30](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-389](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-4](#))



FRONT LOWER BALL JOINT ON-VEHICLE INSPECTION

SAORP-01

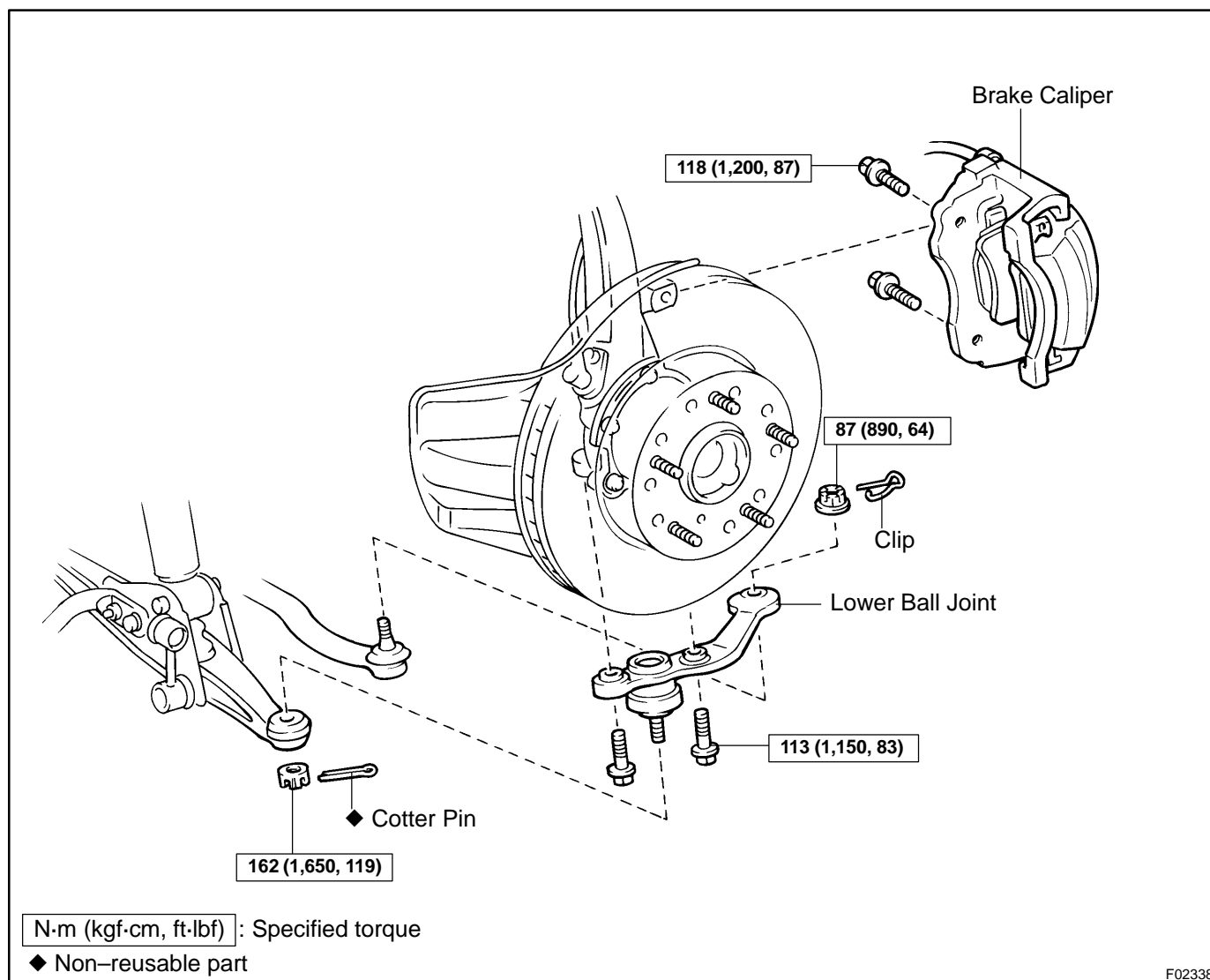
INSPECT LOWER BALL JOINT EXCESSIVE PLAY ON-VEHICLE

- (a) Remove the tire and install the hub nuts to the disc.
- (b) Using a dial indicator, check the lower ball joint for excessive play when you push the hub nuts up and down with a force of 294 N (30 kgf, 66 lbf).

Maximum: 0.9 mm (0.035 in.)

If it is not within the specification, replace the lower ball joint.

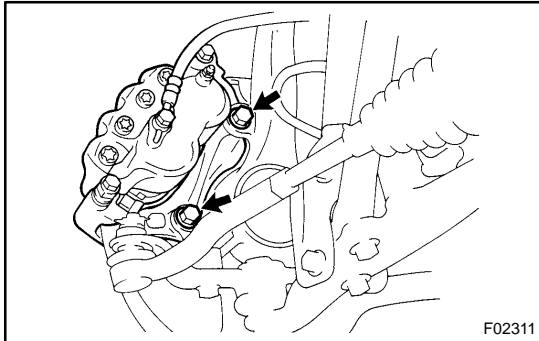
COMPONENTS



REMOVAL

1. REMOVE FRONT WHEEL

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



2. REMOVE BRAKE CALIPER

- (a) Remove the 2 bolts and caliper.

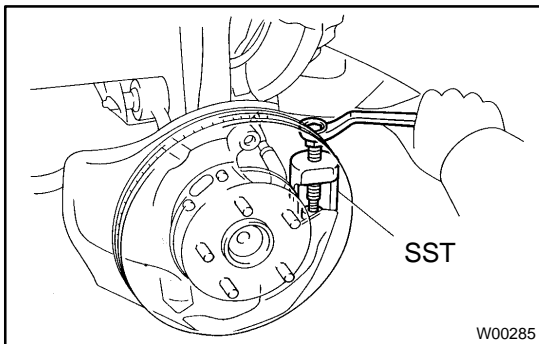
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

- (b) Support the brake caliper securely.

3. DISCONNECT TIE ROD END FROM LOWER BALL JOINT

- (a) Remove the clip and nut.

Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)



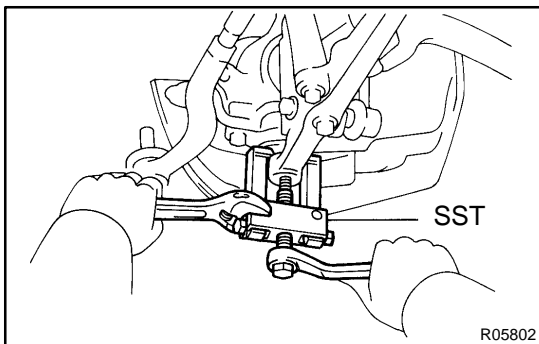
- (b) Using SST, disconnect the tie rod end from the lower ball joint.

SST 09610-20012

4. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM

- (a) Remove the cotter pin and nut.

Torque: 162 N·m (1,650 kgf·cm, 119 ft·lbf)



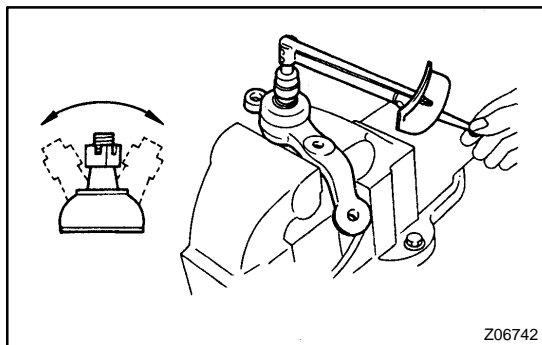
- (b) Using SST, remove the lower ball joint.

SST 09628-62011

5. REMOVE LOWER BALL JOINT FROM STEERING KNUCKLE

Remove the 2 bolts and lower ball joint.

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



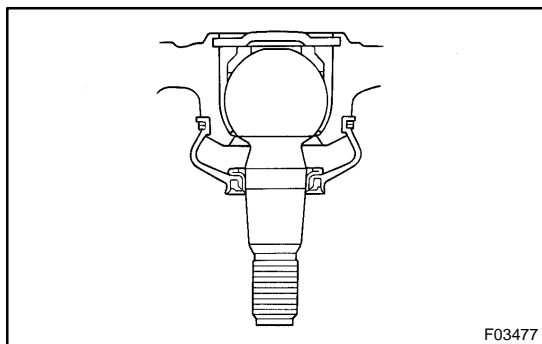
INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- As shown, flip the ball joint stud back and forth 5 times, before installing the nut.
- Using torque wrench, turn the nut continuously one turn per 2–4 seconds and take the torque reading on the 5th turn.

Turning torque:

0.1 – 3.0 N·m (1 – 30 kgf·cm, 0.9 – 26 in.-lbf)



HINT:

Check for unusual resistance or looseness as you turn the torque wrench.

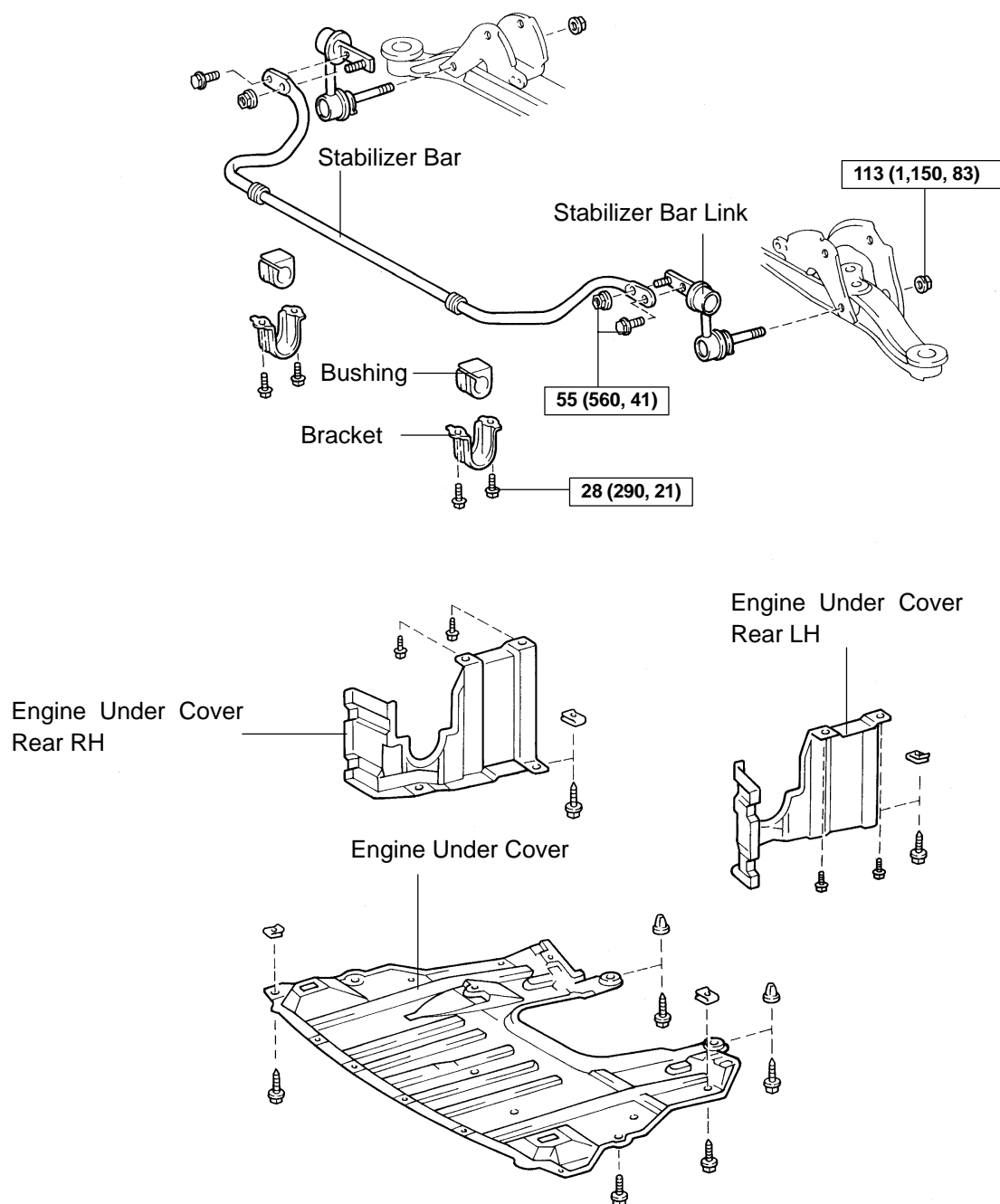
INSTALLATION

Installation is in the reverse order of removal (See page [SA-36](#)).

AFTER INSTALLATION, CHECK FRONT WHEEL ALIGNMENT (See page [SA-4](#))

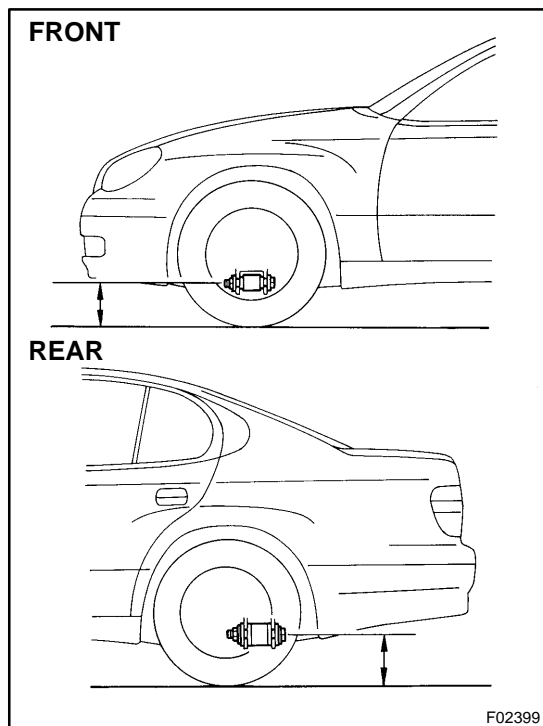
FRONT STABILIZER BAR COMPONENTS

SAORU-01



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

F02339



FRONT WHEEL ALIGNMENT INSPECTION

SA0R3-01

1. MEASURE VEHICLE HEIGHT

Tire size	Front*1 mm (in.)	Rear*2 mm (in.)
P215/60R16 94V	245 (9.63)	226 (8.90)
225/55R16 94V	240 (9.45)	221 (8.70)
235/45ZR17	238 (9.37)	219 (8.62)

*1: Front measuring point

Measure from the ground to the center of the lower suspension arm mounting bolt.

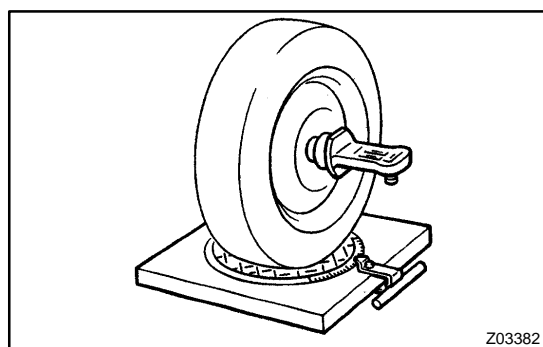
*2: Rear measuring point

Measure from the ground to the center of the No.2 lower suspension arm mounting bolt.

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specification.

If the vehicle height is not within the specification, try to adjust it by pushing down on or lifting the body.



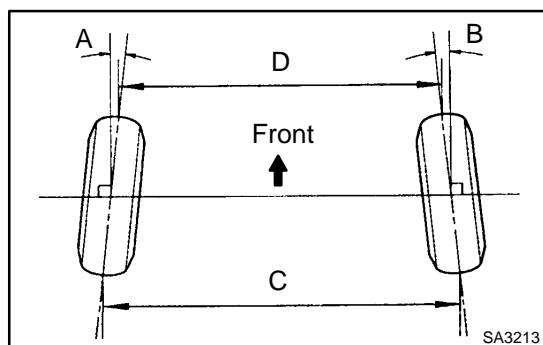
2. INSTALL CAMBER-CASTER-KINGPIN GAUGE ONTO WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber	Left-right error	$-0^{\circ}16' \pm 30'$ ($-0.27^{\circ} \pm 0.5^{\circ}$) 30' (0.5°) or less
Caster	Left-right error	$7^{\circ}33' \pm 30'$ ($7.55^{\circ} \pm 0.5^{\circ}$) 30' (0.5°) or less
Steering axis inclination	Left-right error	$8^{\circ}52' \pm 30'$ ($8.87^{\circ} \pm 0.5^{\circ}$) 30' (0.5°) or less

If the camber is not within the specification, adjust it by adjusting cam.



4. INSPECT TOE-IN

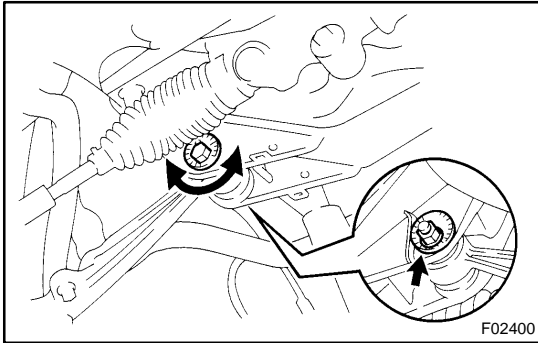
Toe-in (total)	A + B: $0^{\circ}09' \pm 12'$ ($0.15^{\circ} \pm 0.2^{\circ}$) C - D: 1.5 ± 2 mm (0.06 ± 0.08 in.)
----------------	--

If the toe-in is not within the specification, adjust it at the tie rod end.

5. ADJUST CAMBER

HINT:

- After adjusting the camber, inspect the caster and toe-in.
- Try adjusting the camber to the center value of the specification.



- Loosen the camber adjusting cam nut of the lower suspension arm.
- Turn the camber adjusting cam of the lower suspension arm and adjust camber.

HINT:

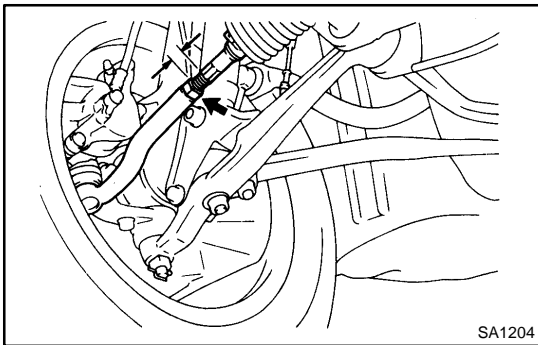
Camber changes about 5' (0.08°) with each graduation of the adjusting cam.

- Torque the camber adjusting cam nut of lower suspension arm.

Torque: 172 N·m (1,755 kgf-cm, 127 ft-lbf)

6. ADJUST TOE-IN

- Remove the boot clips.



- Loosen the tie rod end lock nuts.
- Turn the left and right rack ends an equal amount to adjust the toe-in.

HINT:

- Try to adjust the toe-in to the center value.
- Make sure that the lengths of the left and right rack ends are same.

Rack end length difference: 1.5 mm (0.059 in.) or less

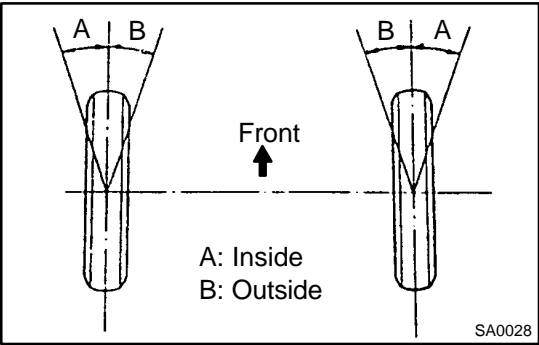
- Torque the tie rod end lock nuts.

Torque: 56 N·m (570 kgf-cm, 41 ft-lbf)

- Place the boot on the seat and clamp it.

HINT:

Make sure that the boots are not twisted.



7. INSPECT WHEEL ANGLE

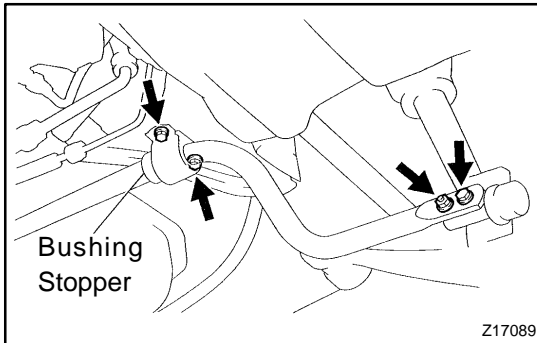
Turn the steering wheel fully, and measure the turning angle.

Inside wheel	38°51' (36°51' – 39°51') 38.85° (36.85° – 39.85°)
Outside wheel (Reference)	32°05' 32.08°

If the wheel angles differ from the standard of the specification, inspect the toe-in.

REMOVAL

1. REMOVE ENGINE UNDER COVERS



2. REMOVE STABILIZER BAR

- (a) Remove the 2 bolts and nuts, disconnect the stabilizer bar from the 2 stabilizer bar links.

Torque: 55 N·m (560 kgf-cm, 41 ft-lbf)

- (b) Remove the 4 bolts and 2 stabilizer bar brackets.

Torque: 28 N·m (290 kgf-cm, 21 ft-lbf)

3. REMOVE BOTH BUSHINGS AND BRACKETS

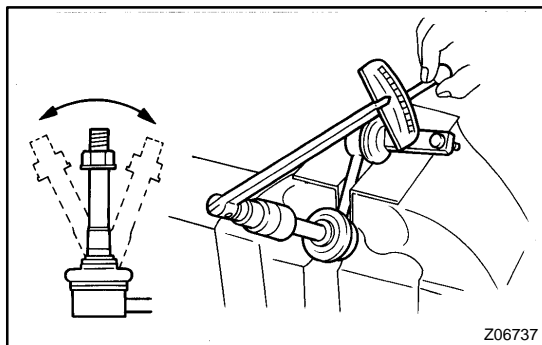
HINT:

At the time of installation, install the bushing to the outside of bushing stopper.

4. REMOVE BOTH STABILIZER BAR LINKS FROM BOTH LOWER SUSPENSION ARMS

Remove the 2 nuts and stabilizer bar links.

Torque: 113 N·m (1,150 kgf-cm, 83 ft-lbf)



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- As shown, flip the ball joint stud back and forth 5 times before installing the nut.
- Using a torque wrench, turn the stud continuously one turn per 2–4 seconds and take the torque reading on the 5th turn.

Turning torque:

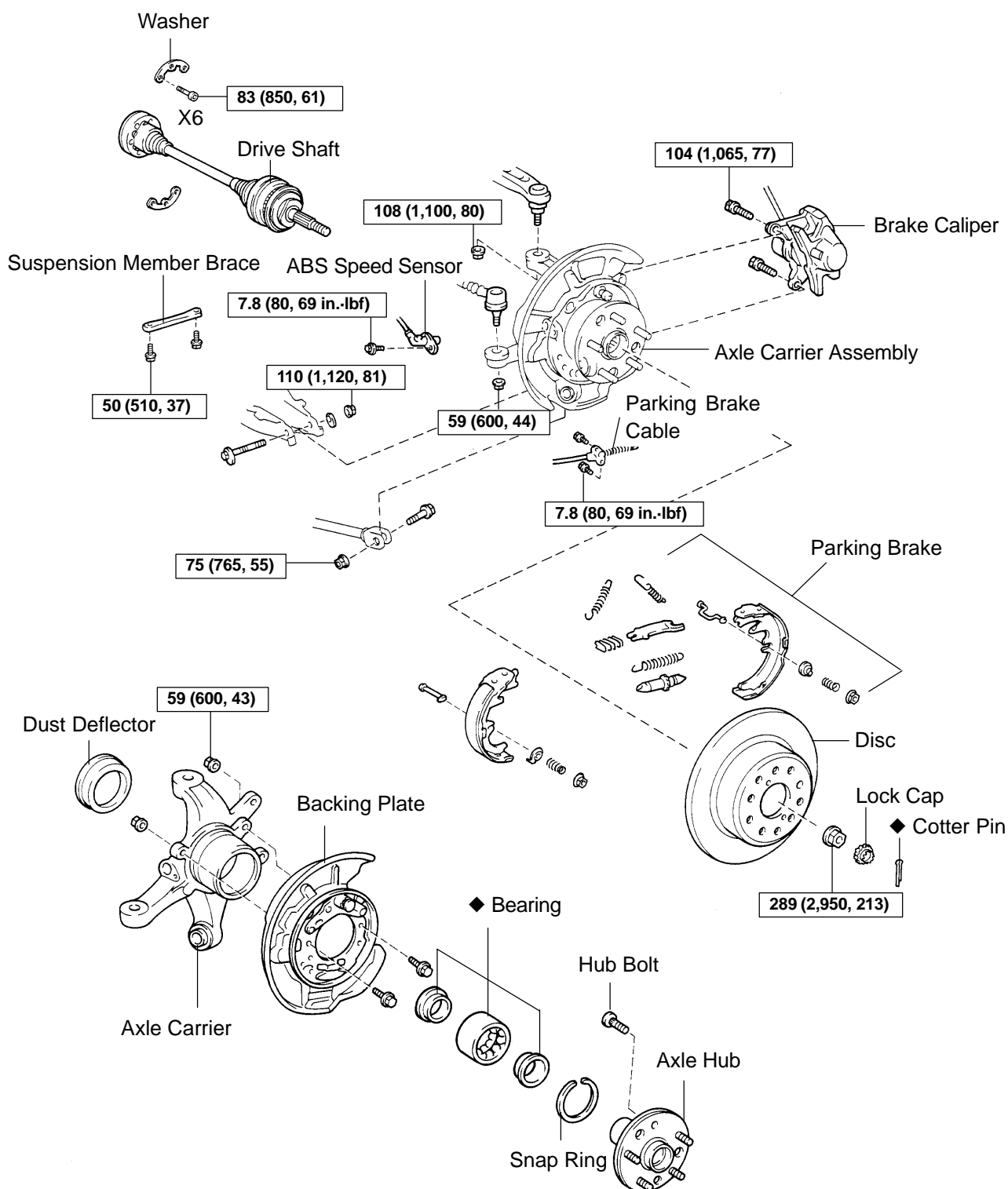
0.05 – 1.5 N·m (0.5 – 15 kgf·cm, 0.4 – 13 in.-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [SA-40](#)).

REAR AXLE CARRIER COMPONENTS

SAORY-01



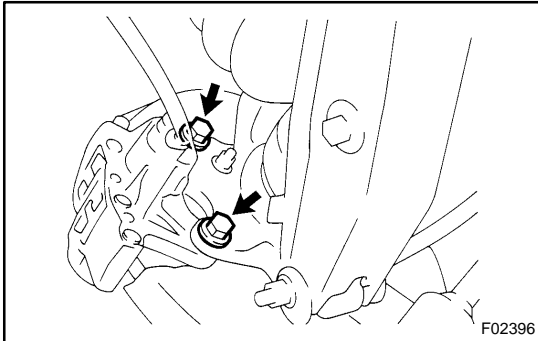
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

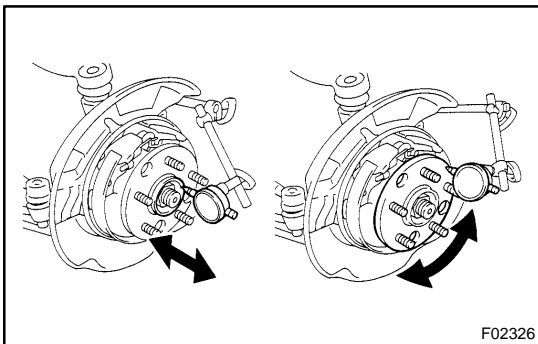
F03420

REMOVAL

1. **REMOVE REAR WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE ABS SPEED SENSOR**
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)



3. **REMOVE REAR BRAKE CALIPER AND DISC**
 - (a) Remove the 2 bolts and brake caliper from the axle hub.
 - (b) Support the brake caliper securely.
 - (c) Remove the disc.



4. **CHECK BEARING BACKLASH AND AXLE HUB DEVIATION**

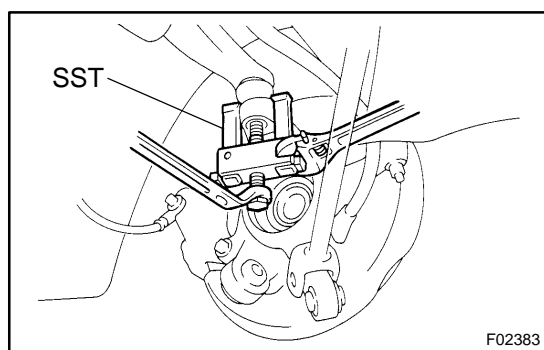
- (a) Using a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.
Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the 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 the deviation exceeds the specified maximum, replace the axle hub.

5. **INSTALL DISC AND BRAKE CALIPER**
 - (a) Install the disc.
 - (b) Install the brake caliper and 2 bolts to the axle carrier.
Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)
6. **REMOVE DRIVE SHAFT** (See page [SA-52](#))
7. **REMOVE BRAKE CALIPER AND DISC** (See step 2)
8. **REMOVE PARKING BRAKE SHOE**
(See page [BR-33](#))
9. **DISCONNECT PARKING BRAKE CABLE**
Remove the 2 bolts and disconnect the parking brake cable.
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)
10. **DISCONNECT UPPER SUSPENSION ARM FROM AXLE CARRIER**
 - (a) Remove the nut.
Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)



- (b) Using SST, disconnect the upper suspension arm from the axle carrier.

SST 09628-62011

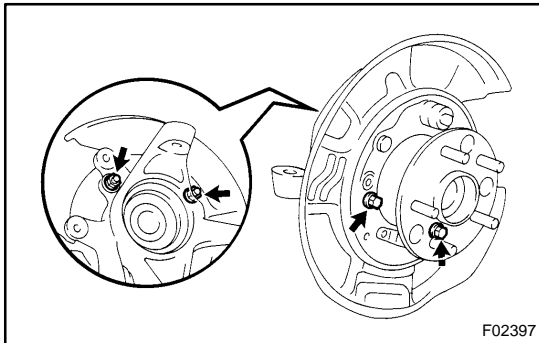
NOTICE:

- **Be careful not to damage the dust cover.**
 - **Support the axle carrier.**
- (c) Remove the axle carrier.

DISASSEMBLY

1. REMOVE DUST DEFLECTOR

Using a screwdriver, remove the dust deflector.



2. REMOVE AXLE HUB

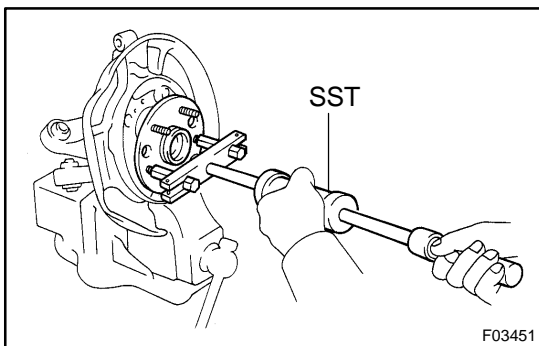
- (a) Remove the 2 bolts and nuts.
- (b) Mount the axle carrier in a vise.

HINT:

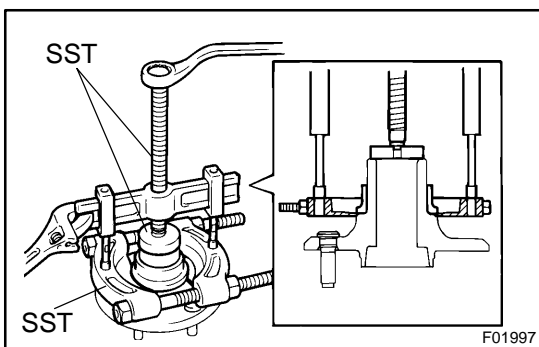
Use a set of soft jaws in the vise to protect the axle carrier.

NOTICE:

Do not tighten the vise too tight.



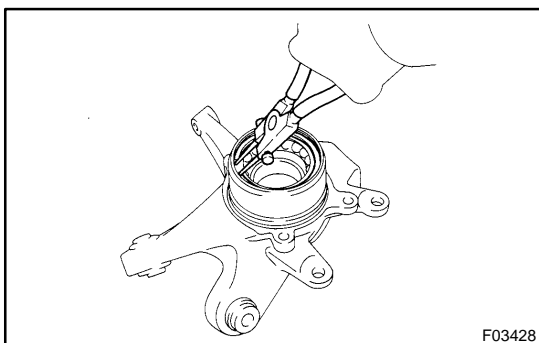
- (c) Using SST, remove the axle hub from the axle carrier.
SST 09520-00031
- (d) Remove the backing plate.



- (e) Using SST, remove the bearing inner race from the axle hub.
SST 09950-00020, 09950-60010 (09951-00480),
09950-40011 (09951-04020, 09952-04010,
09953-04030, 09954-04020, 09955-04041)

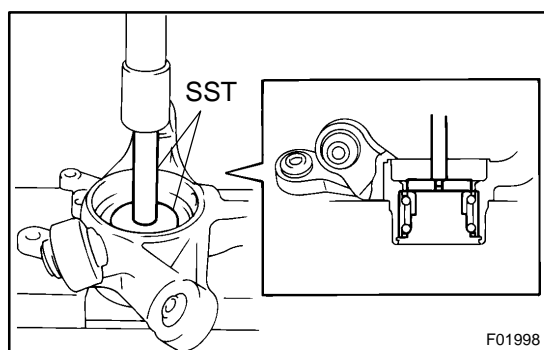
NOTICE:

Be careful not to damage the axle hub.



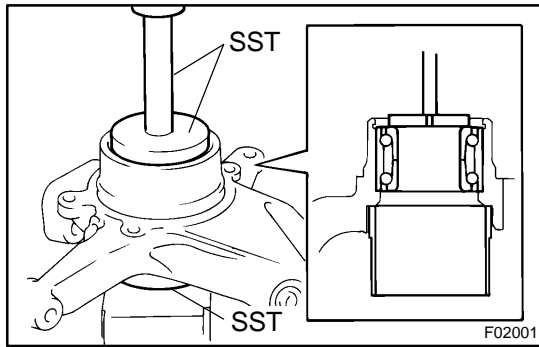
3. REMOVE HUB BEARING

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



- (b) Using SST and a press, remove the hub bearing from the axle carrier.

SST 09950-60010 (09951-00650),
09950-70010 (09951-07100)



REASSEMBLY

1. INSTALL HUB BEARING

- (a) Using SST and a press, install a new hub bearing to the axle carrier.

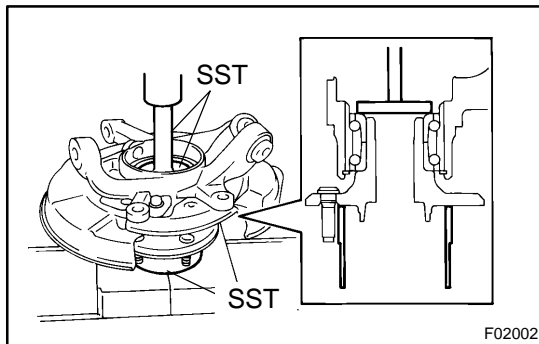
SST 09527-17011, 09950-60020 (09951-00810),
09950-70010 (09951-07100)

- (b) Using snap ring pliers, install the snap ring to the axle carrier.

2. INSTALL AXLE HUB

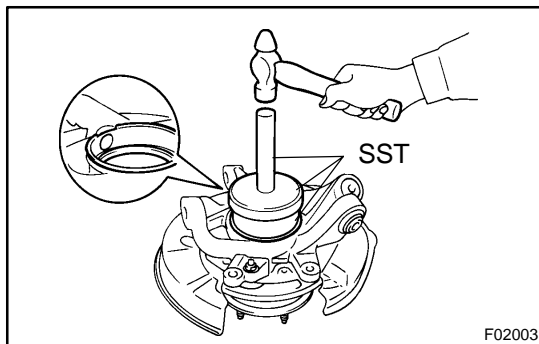
- (a) Install the backing plate with the 2 bolts and nuts.

Torque: 59 N·m (600 kgf-cm, 43 ft-lbf)



- (b) Using SST and a press, install the axle hub to the axle carrier.

SST 09527-17011, 09950-60010 (09551-00650),
09950-70010 (09951-07100)



3. INSTALL DUST DEFLECTOR

Using SST and a hammer, install a new dust deflector to the axle carrier.

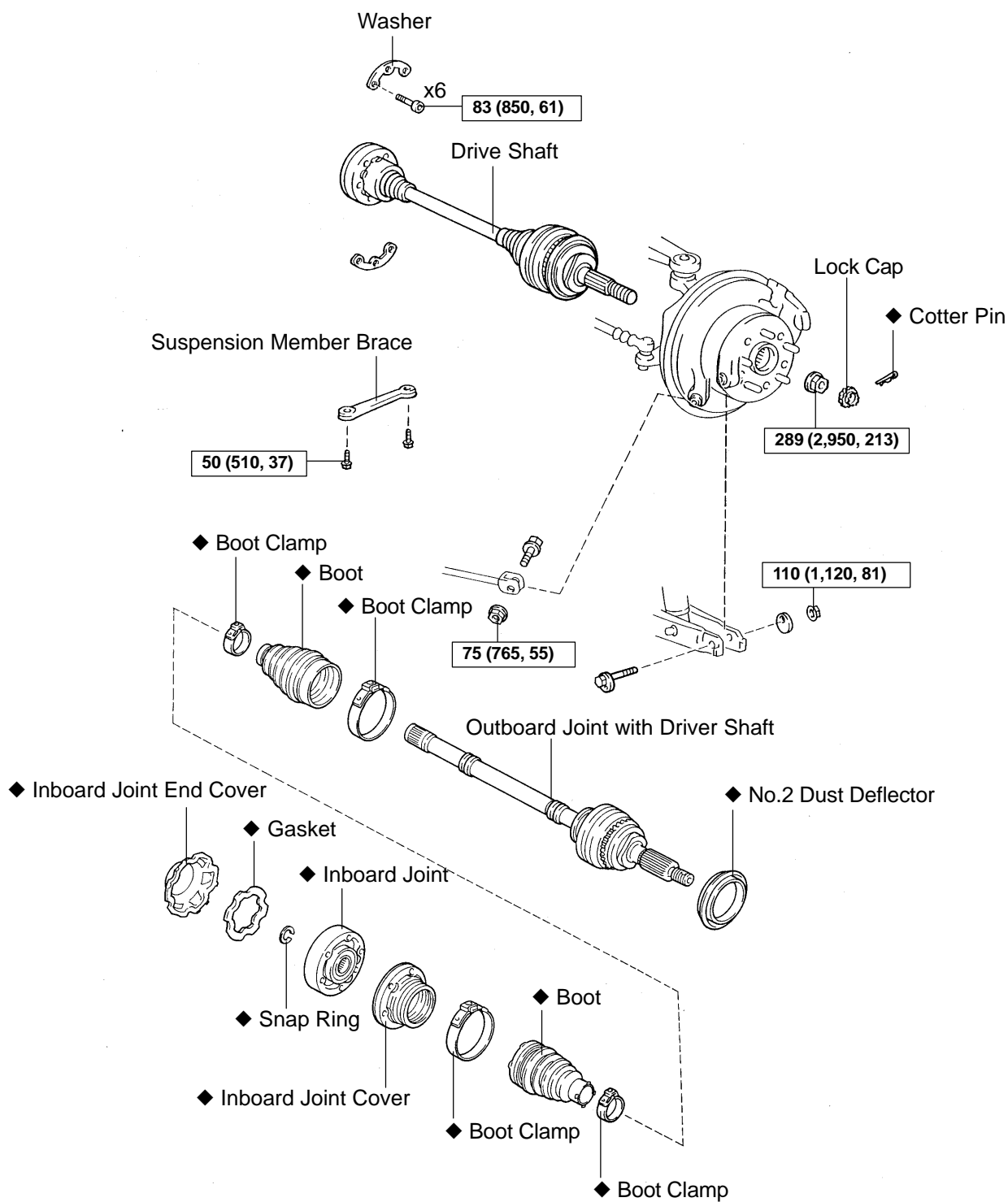
SST 09527-17011, 09950-60020 (09951-01030),
09950-70010 (09951-07100)

HINT:

Align the speed sensor installation hole of dust deflector and that of axle carrier.

REAR DRIVE SHAFT COMPONENTS

SA0S4-01



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

◆ Non-reusable part

F03421

REMOVAL

1. REMOVE REAR WHEEL

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

2. REMOVE SUSPENSION MEMBER BRACE

Remove the 2 bolts and suspension member brace.

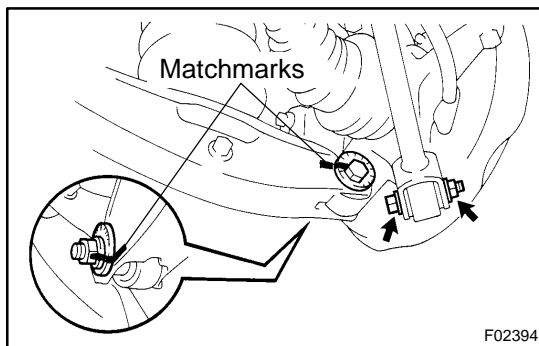
Torque: 50 N·m (510 kgf-cm, 37 ft-lbf)

3. REMOVE COTTER PIN, LOCK CAP AND LOCK NUT

(a) Remove the cotter pin and lock cap.

(b) With depressing the brake pedal, remove the nut.

Torque: 289 N·m (2,950 kgf-cm, 213 ft-lbf)



4. REMOVE DRIVE SHAFT

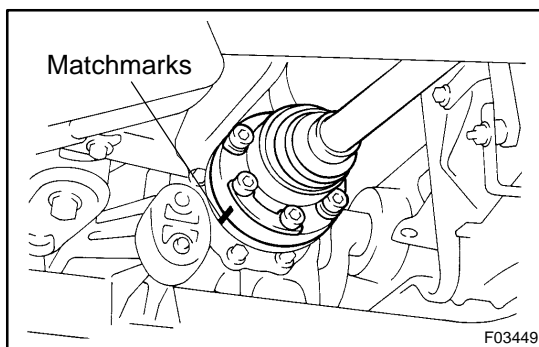
(a) Place matchmarks on the adjusting cam and lower suspension arm.

(b) Remove the bolt and nut, disconnect the No.2 lower suspension arm from the axle hub.

Torque: 110 N·m (1,120 kgf-cm, 81 ft-lbf)

(c) Remove the bolt and nut, disconnect the No.1 lower suspension arm from the axle hub.

Torque: 75 N·m (765 kgf-cm, 55 ft-lbf)



(d) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to mark the matchmarks. Use paint etc.

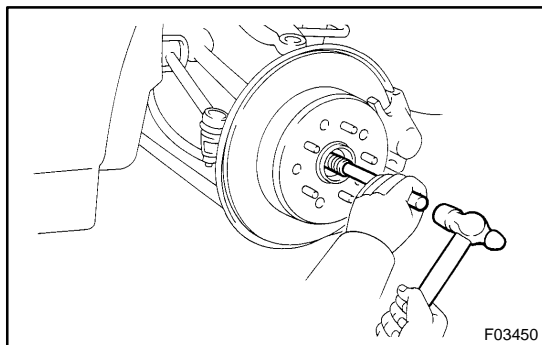
(e) Using a 10 mm hexagon wrench, remove the 6 hexagon bolts and 2 washers with depressing the brake pedal.

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

HINT:

At the time of installation, apply a light coat of engine oil on the threads of the bolts.

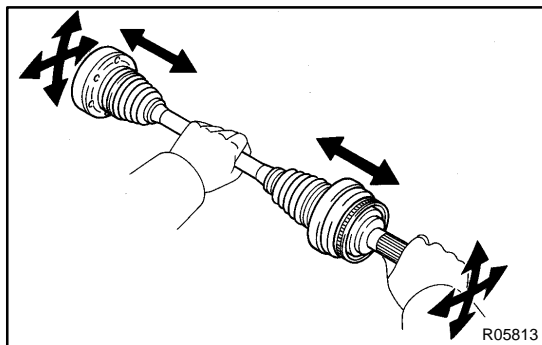
(f) Hold the inboard joint side of the drive shaft so that the outboard joint side does not bend too much.



- (g) Using a brass bar and hammer, lightly tap the end of the drive shaft, disengage the axle hub and remove the drive shaft.

NOTICE:

Be careful not to damage the boots, end cover, speed sensor rotor of the drive shaft and oil seal of the axle hub.



DISASSEMBLY

1. CHECK DRIVE SHAFT

- (a) Check that operation of the joint is smooth within the sliding region in the axial direction.

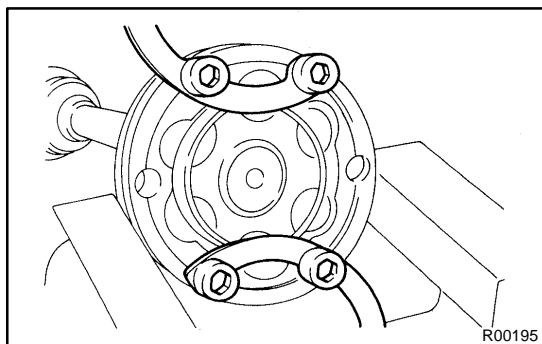
HINT:

If a large angle is used for the cross-groove type joint, the joint will feel like it is catching, but this does not indicate an abnormality.

- (b) Check that the boots are not cracked, damaged or leaking.
- (c) Check that there are no scratches on the speed sensor rotor.

2. REMOVE END COVER

- (a) Using a screwdriver, remove the end cover.



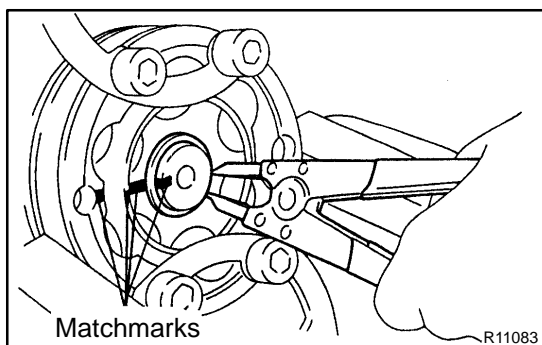
- (b) Use bolts, nuts and washers to keep the inboard joint together.

NOTICE:

Tighten the bolt by hand to avoid scratching the flange surface.

3. REMOVE BOOT CLAMPS

Using a side cutter or pliers, remove the 4 boot clamps.



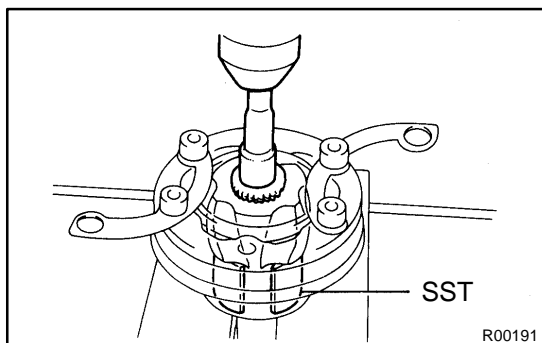
4. REMOVE INBOARD JOINT

- (a) Place matchmarks on the inboard joint and drive shaft.

NOTICE:

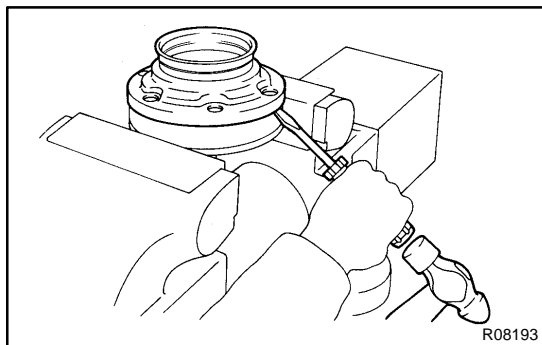
Do not push the marks.

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



- (c) Using SST, an extension bar and a press, press out the inboard joint from the drive shaft.

SST 09726-12023 (09726-01031)



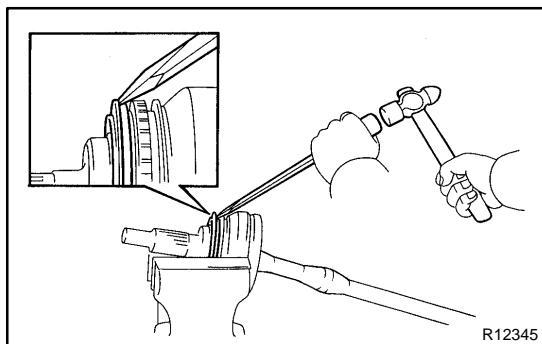
- (d) Mount the inboard joint in a soft jaw vise.
- (e) Using a screwdriver and hammer, tap out the inboard joint cover from the inboard joint.

NOTICE:

Make sure the cage and inner race are not positioned too much to one side of the outer race.

5. REMOVE BOOTS

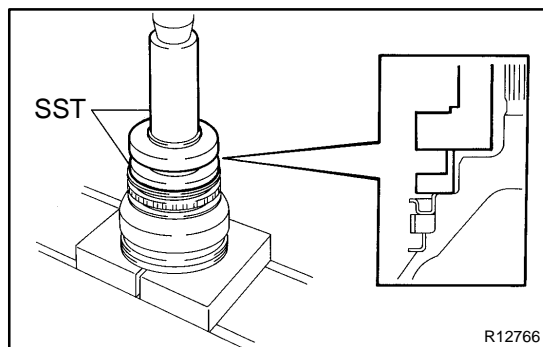
Remove the inboard and outboard joint boots.

**6. REMOVE NO.2 DUST DEFLECTOR**

- (a) Mount the outboard joint in a soft jaw vise.
- (b) Using a screwdriver, remove the No.2 dust deflector.

NOTICE:

Be careful not to damage the ABS speed sensor rotor.



REASSEMBLY

1. INSTALL NEW NO.2 DUST DEFLECTOR

Using SST and a press, install a new No.2 dust deflector.

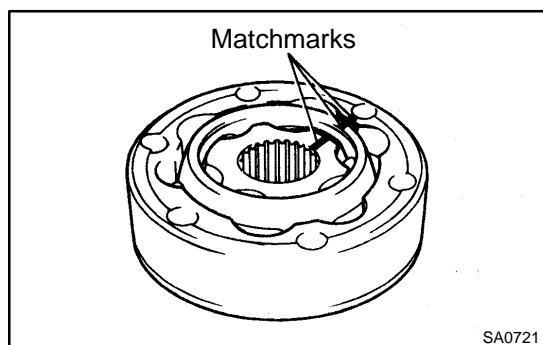
SST 09309-36010, 09502-12010

NOTICE:

Be careful not to damage the ABS speed sensor rotor.

2. ASSEMBLE INBOARD JOINT

If the joint has come apart, reassemble it in the following order.

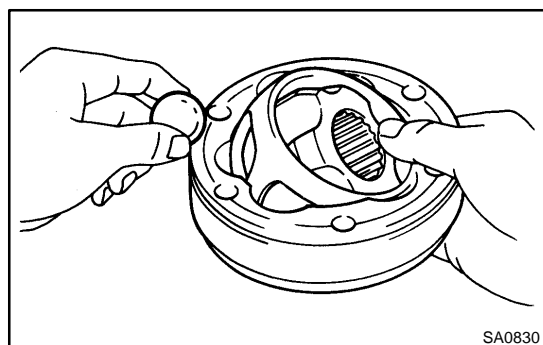
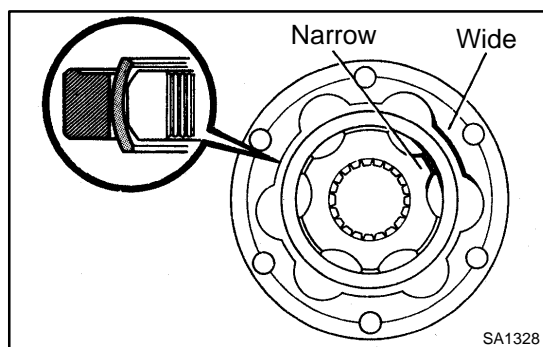


(a) Align the matchmarks placed before removal.

HINT:

When the matchmarks have disappeared, do the following procedure.

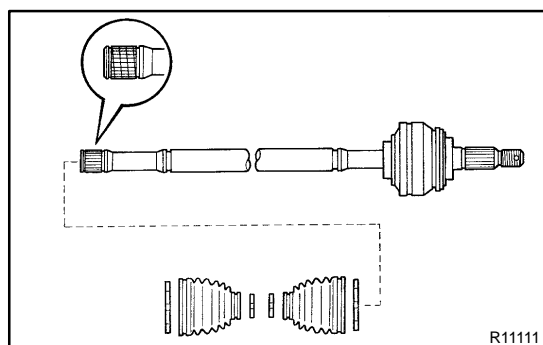
- (1) Install the inner race to the cage so that the indented bevelled part of the inner race is on the opposite side to the bevelled top of the cage.
- (2) Install the outer race so that the indented side of the outer race is facing the same side as the bevelled surface of the cage.
- (3) Match the narrow projections of the inner race with the wide projections of the outer race.



(b) Tilt the cage and inner race to the side and insert the balls one by one.

NOTICE:

When the cage and inner race are tilted over, support the joint with your hand to prevent the balls from falling out.



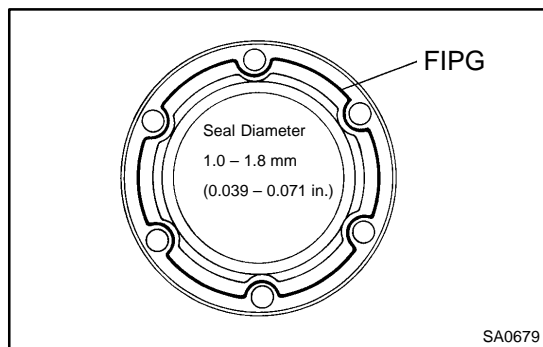
3. TEMPORARILY INSTALL NEW BOOTS AND NEW BOOT CLAMPS

(a) Place 4 new boot clamps to each boots.

HINT:

Before installing the boots, wrap vinyl tape around the spline of the shaft to prevent damaging the boots.

(b) Install the 2 boots to the drive shaft.



4. INSTALL INBOARD JOINT COVER

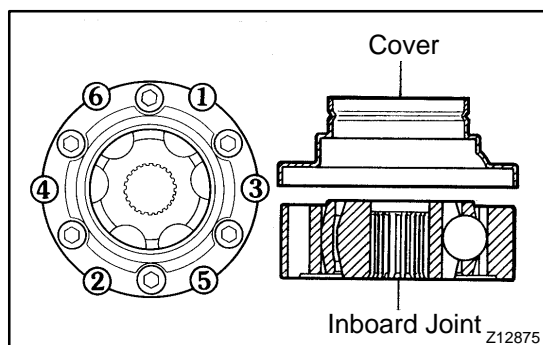
- (a) Apply FIPG to the inboard joint cover as shown in the illustration.

FIPG:

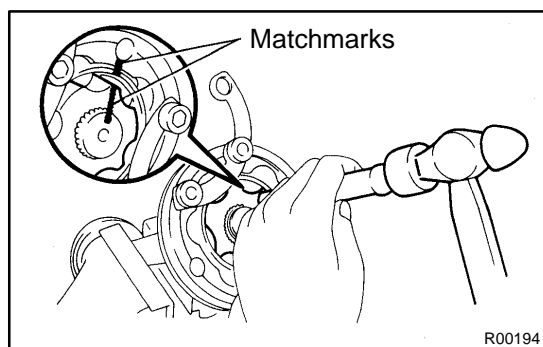
Part No.08826-00801, THREE BOND 1121 or equivalent

HINT:

Avoid applying an excessive amount to the surface.



- (b) Remove grease from the surface of the inboard joint facing to the cover.
- (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.



5. INSTALL INBOARD JOINT

- (a) Align the matchmarks placed before removal.
- (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.

6. ASSEMBLE BOOTS TO JOINTS

Before assembling the boots, pack with only the same amount of grease that was wiped off.

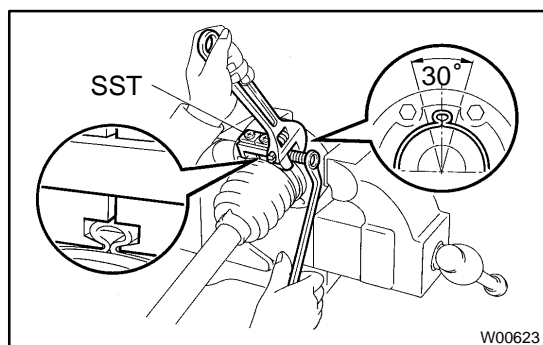
Grease capacity	100 – 105 g (3.5 – 3.7 oz.)
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HINT:

Use the grease supplied in the boot kit.

NOTICE:

- **Keep grease off the joint connection groove of the boot.**
- **Pack with grease all over the ball contact surface inside the joint.**

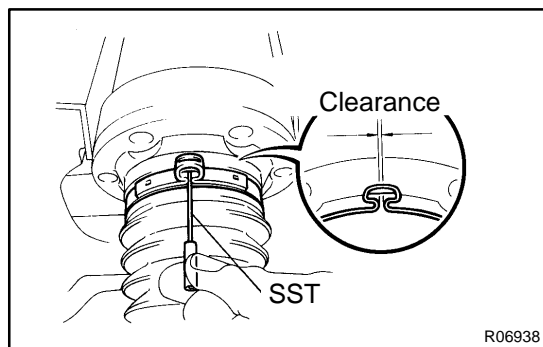


7. INSTALL NEW BOOT CLAMPS TO BOTH BOOTS

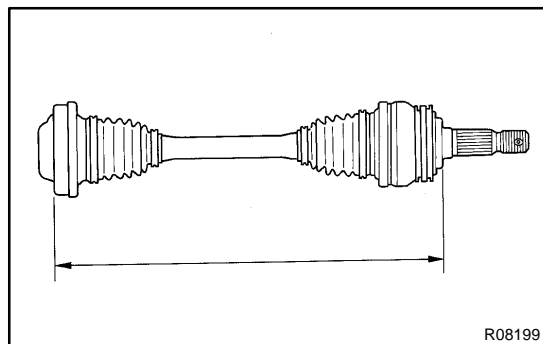
- (a) Position the clamp onto the boot.
- (b) Place SST onto the clamp.
SST 09521-24010
- (c) Tighten SST so that the clamp is pinched as shown in the illustration.

NOTICE:

Do not overtighten the SST.



- (d) Using SST, adjust the clearance of the clamp.
 SST 09240-00020 (09242-00080)
Clearance: 0.8 mm (0.031 in.) or less



- (e) The drive shaft is designed to move ± 20 mm (0.79 in.) from the normal position.

Drive shaft standard length:

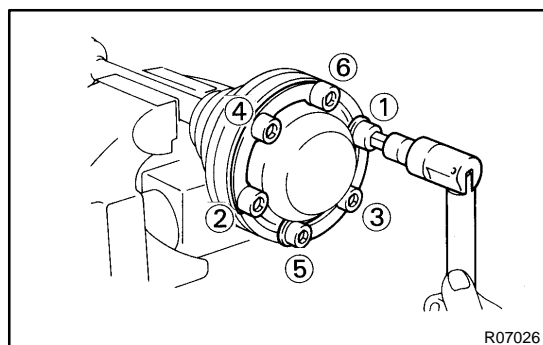
RH	598.5 mm (23.563 in.)
LH	553.5 mm (21.791 in.)

8. INSTALL NEW END COVER

- (a) Pack grease into the end cover.

Grease capacity	50 – 55 g (1.8 – 1.9 oz.)
-----------------	---------------------------

- (b) Remove grease from the surface of the inboard joint facing to the cover.
 (c) Glue on a new gasket, with the glued side facing toward the outer race side of the inboard joint.
 (d) Align the bolt holes of the cover with those of the inboard joint.



- (e) Install the 6 hexagon bolts and washers from the end cover side.
 (f) Install the 6 nuts to the boot side.
 (g) Using a 10 mm hexagon wrench, tighten the bolts. Do this in the order shown, and repeat several times.
 (h) Check that the claw of the end cover touches the inboard joint.

9. CHECK DRIVE SHAFT (See page SA-54)

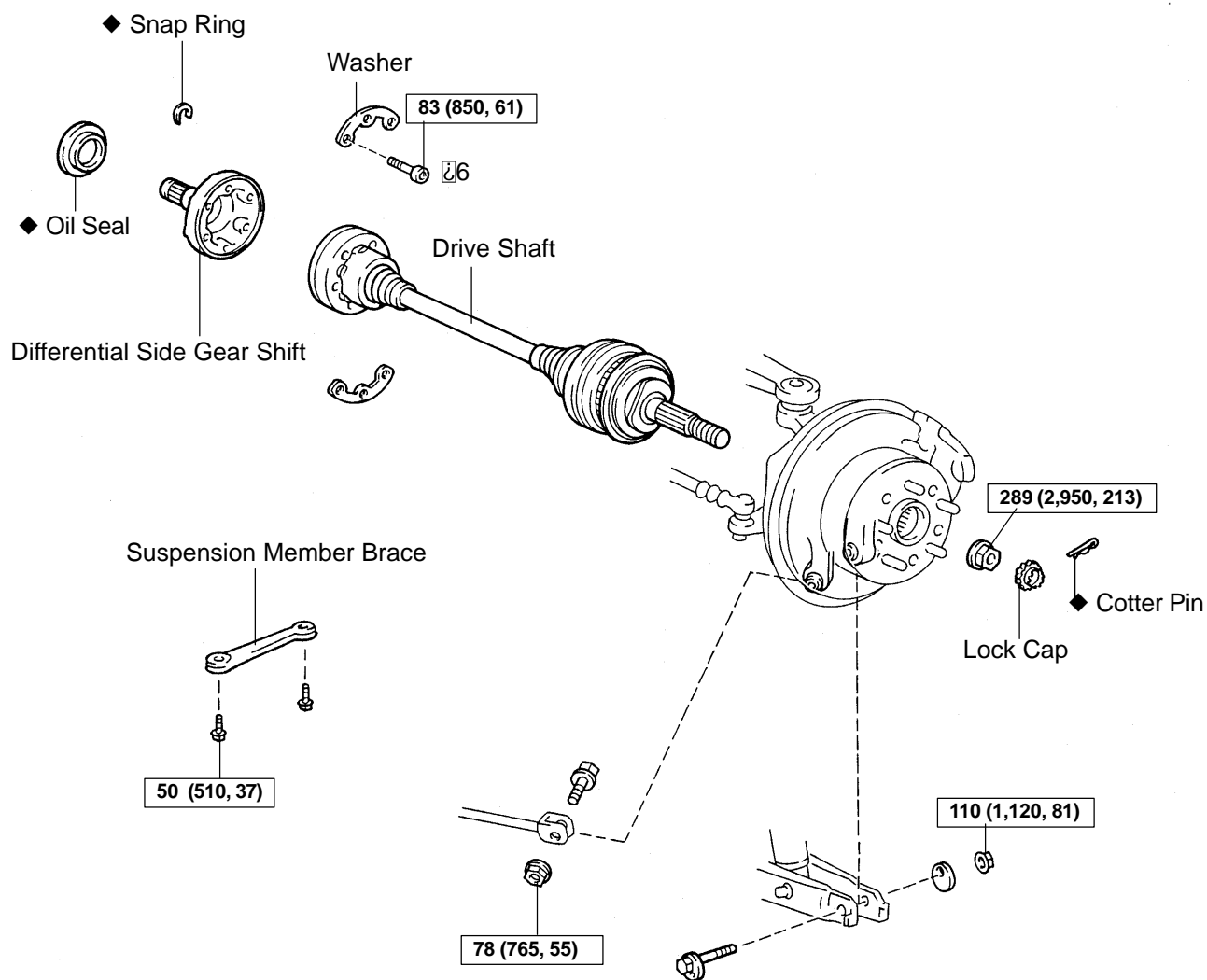
INSTALLATION

Installation is in the reverse order of removal (See page [SA-52](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-389](#))

REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL COMPONENTS

SA059-01



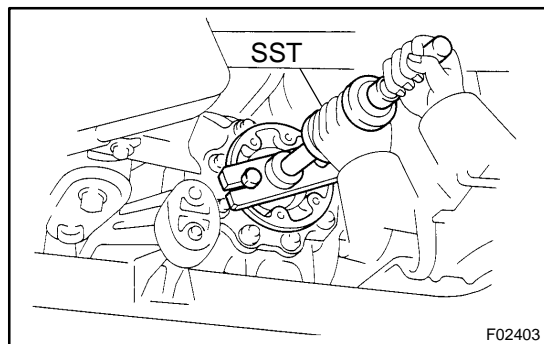
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

F03422

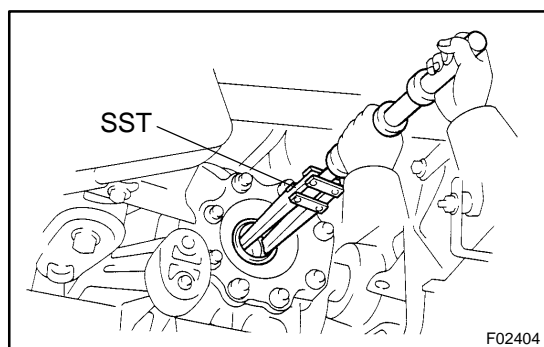
REPLACEMENT

1. DRAIN DIFFERENTIAL OIL
2. REMOVE DRIVE SHAFT (See page [SA-52](#))



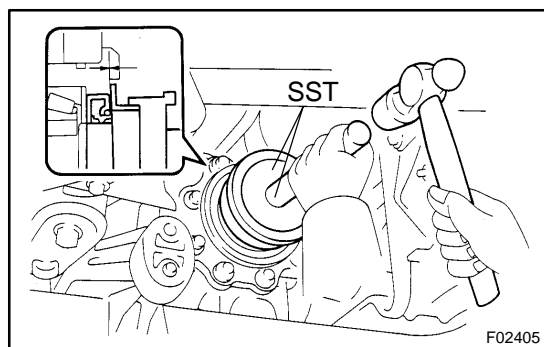
3. REMOVE SIDE GEAR SHAFT

- (a) Using SST and 2 bolts, remove the side gear shaft.
SST 09520-24010
- (b) Remove the snap ring from the side gear shaft.



4. REMOVE SIDE GEAR SHAFT OIL SEAL

- Using SST, remove the oil seal.
SST 09308-00010

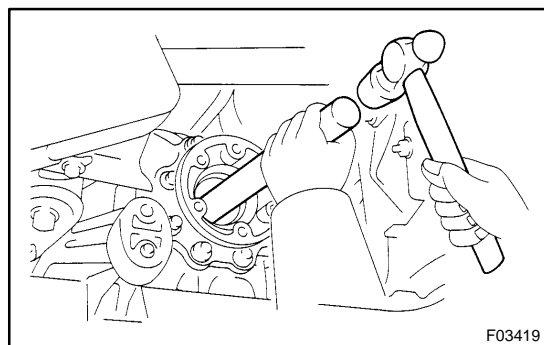


5. INSTALL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST and a hammer, install a new oil seal.
SST 09608-32010, 09950-70010 (09951-07150)
- (b) Apply MP grease to the oil seal lip.

6. INSTALL SIDE GEAR SHAFT

- (a) Install a new snap ring to the side gear shaft.



- (b) Using a brass bar and hammer, install the side gear shaft to the differential.

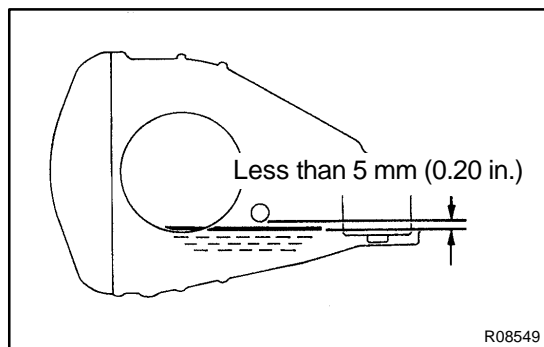
NOTICE:

Be careful not to damage the side gear shaft and oil seal.

7. CHECK INSTALLATION OF SIDE GEAR SHAFT

- (a) Check that there is 2 – 3 mm (0.08 – 0.12 in.) of play in the axial direction.
- (b) Check that the side gear shaft will not come out by trying to pulling it out by hand.

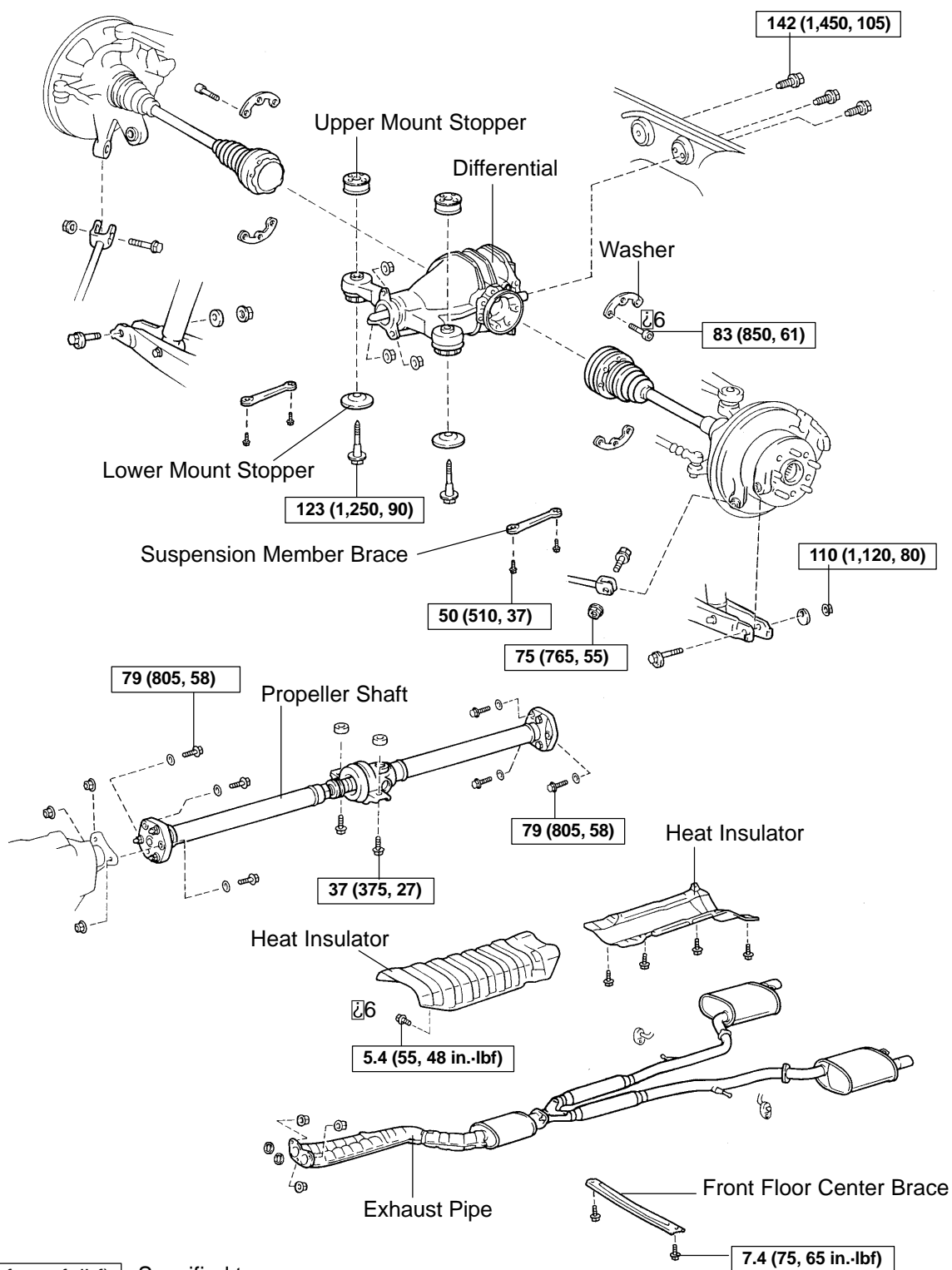
8. INSTALL DRIVE SHAFT (See page [SA-59](#))



9. **FILL AND CHECK DIFFERENTIAL OIL LEVEL**
Torque: 49 N·m (500 kgf-cm, 39 ft-lbf)
Oil grade: Hypoid gear oil API GL-5
Viscosity:
Above -18°C (0°F) SAE 90
Below -18°C (0°F) SAE 80W-90 or 80W
Capacity: 1.35 liters (1.43 US qts, 1.19 Imp qts)

REAR DIFFERENTIAL CARRIER COMPONENTS

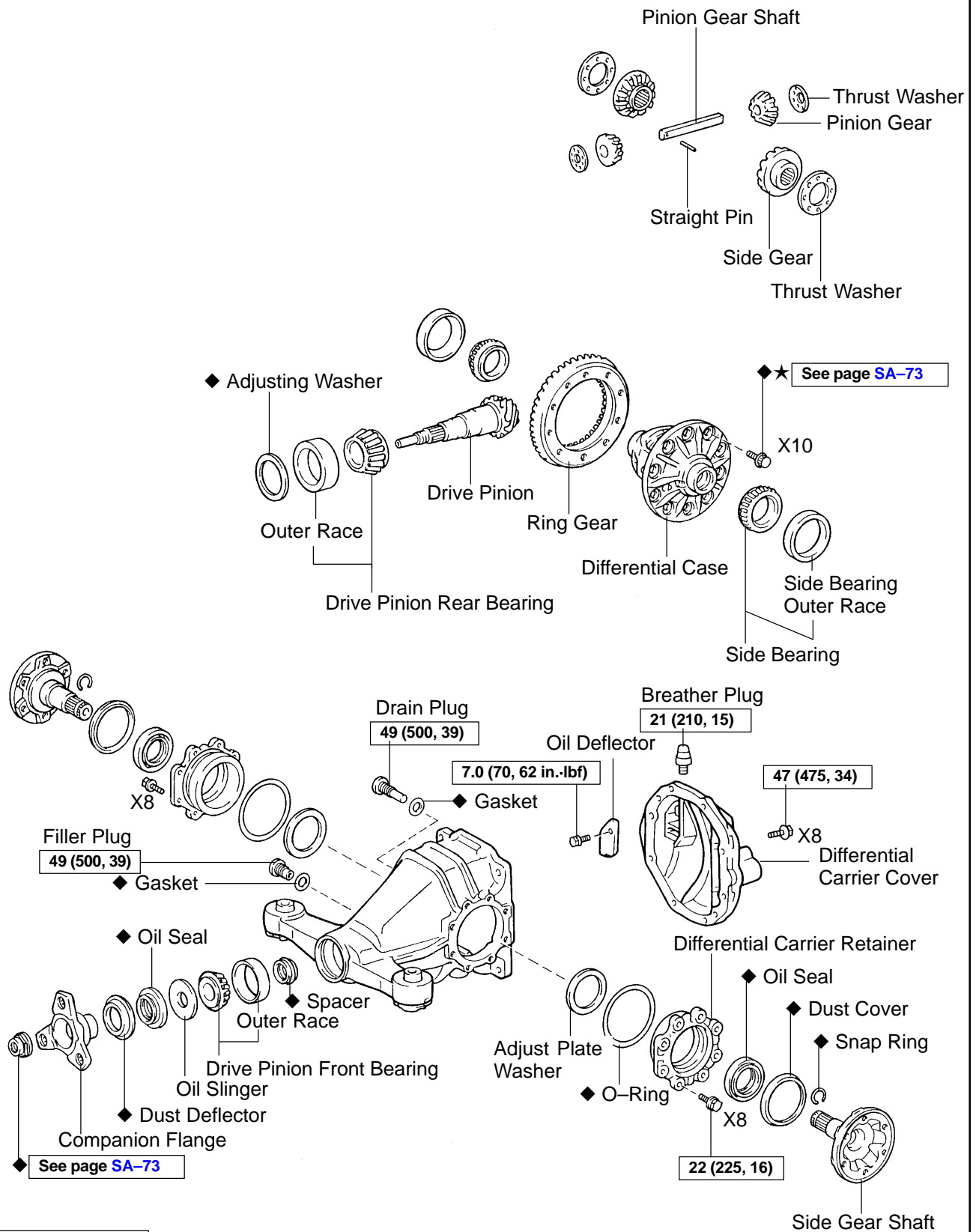
SA05B-03



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

◆ Non-reusable part

F03423



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

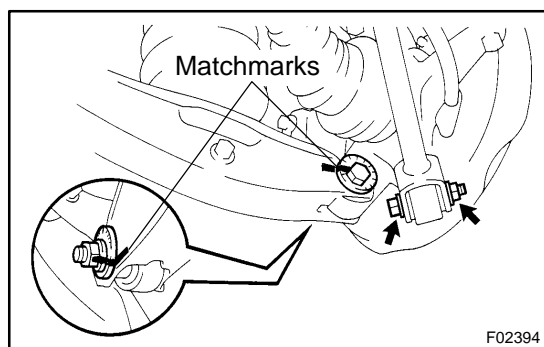
◆ Non-reusable part

★ Precoated part

F01950

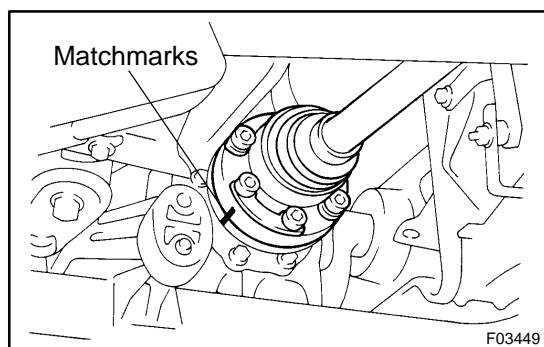
REMOVAL

1. REMOVE EXHAUST PIPE
(See page EM-97 or EM-120)
2. REMOVE PROPELLER SHAFT (See page PR-4)



3. DISCONNECT REAR DRIVE SHAFTS

- (a) Place matchmarks on the adjusting cam and lower suspension arm.
- (b) Remove the bolt and nut, disconnect the No.2 lower suspension arm from the axle hub.
Torque: 110 N·m (1,120 kgf-cm, 81 ft-lbf)
- (c) Remove the bolt and nut, disconnect the No.1 lower suspension arm from the axle hub.
Torque: 75 N·m (765 kgf-cm, 55 ft-lbf)



- (d) Place matchmarks on the 2 drive shafts and side gear shafts.

NOTICE:

Do not punch to mark the matchmarks. Use paint etc.

- (e) Using a 10 mm hexagon wrench, remove the 6 hexagon bolts and 2 washers with depressing the brake pedal.
Torque: 83 N·m (850 kgf-cm, 61 ft-lbf)

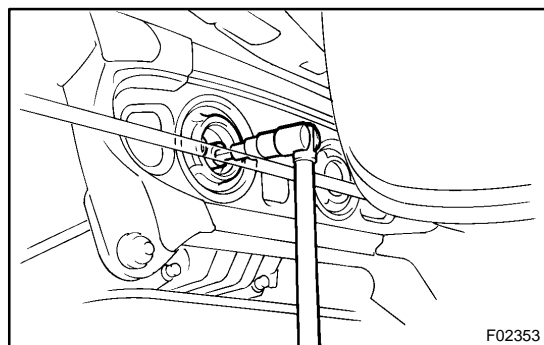
HINT:

At the time of installation, apply a light coat of engine oil on the threads of the bolts.

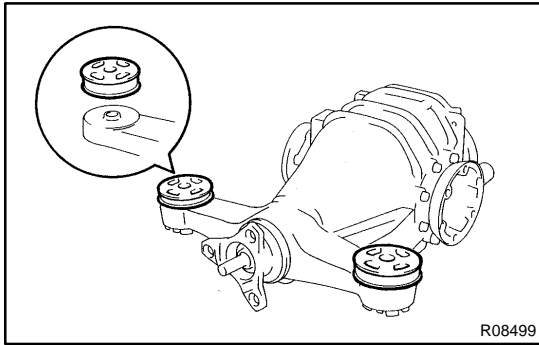
- (f) Disconnect the drive shafts from the differential carrier.

4. REMOVE DIFFERENTIAL

- (a) Support the differential carrier with a jack.



- (b) Using a 12 mm hexagon wrench, remove the 3 hexagon bolts
Torque: 142 N·m (1,450 kgf-cm, 105 ft-lbf)
- (c) Remove the 2 bolts and lower mount stoppers.
Torque: 123 N·m (1,250 kgf-cm, 90 ft-lbf)
- (d) Remove the differential.

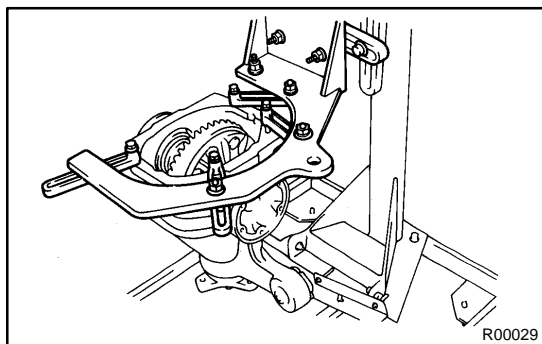


- (e) Remove the 2 upper mount stoppers from the differential carrier.

DISASSEMBLY

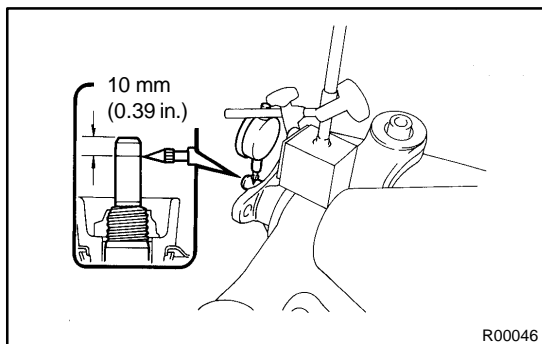
1. REMOVE DIFFERENTIAL CARRIER COVER

- Remove the 8 bolts from the carrier cover.
- Using a brass bar and hammer, separate the cover from carrier.
- Remove the breather plug from the differential carrier cover.



R00029

2. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND ETC., AS SHOWN



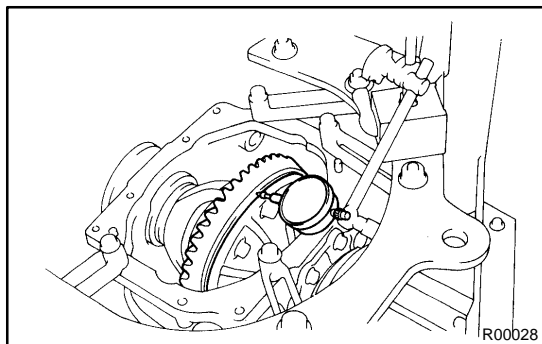
R00046

3. CHECK RUNOUT OF DRIVE PINION SHAFT

Using a dial indicator, measure the runout of the drive pinion shaft at a position 10 mm (0.39 in.) away from the end of the shaft.

Maximum runout: 0.08 mm (0.0031 in.)

If the runout is greater than the maximum, replace the drive pinion and ring gear.



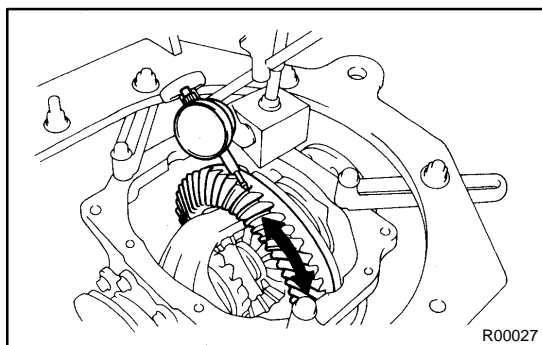
R00028

4. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

Maximum runout: 0.05 mm (0.0020 in.)

If the runout is greater than the maximum, replace the drive pinion, ring gear and differential case.



R00027

5. CHECK RING GEAR BACKLASH

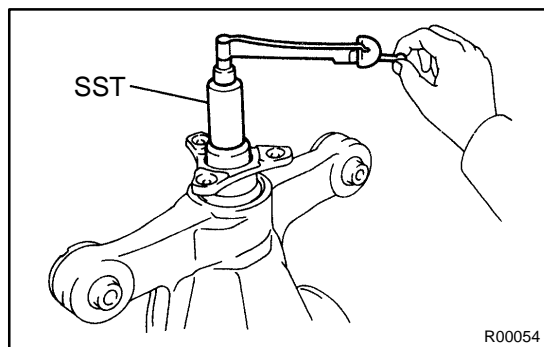
Using a dial indicator, measure the backlash of the ring gear at 3 points at least and check that the average value is within the specification.

Backlash: 0.08 – 0.13 mm (0.0031 – 0.0051 in.)

NOTICE:

The difference between the maximum and minimum measured values must be less than 0.05 mm (0.0020 in.).

If the backlash is not within the specification, adjust the backlash (See page [SA-73](#)).



6. MEASURE DRIVE PINION PRELOAD

Using SST and a torque wrench, measure the preload using the backlash of the drive pinion and ring gear.

Preload (at starting):

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

HINT:

For vehicles which have run less than 8,000 km (5,000 miles), the preload may be large.

SST 09229-55010

Maximum preload (at starting):

1.8 N·m (18 kgf-cm, 16.0 in.-lbf)

7. CHECK TOTAL PRELOAD

Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

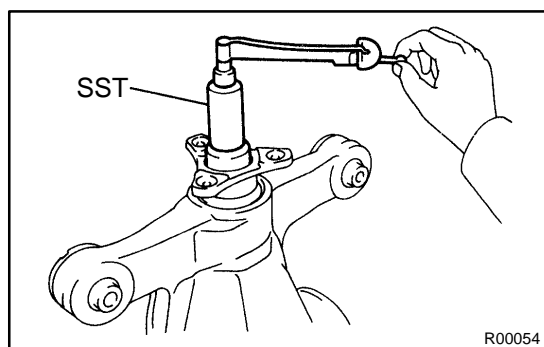
SST 09229-55010

Total preload (at starting):

Drive pinion preload plus

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

If necessary, disassemble and inspect the differential.



8. CHECK PINION GEAR BACKLASH

Using a dial indicator, measure the pinion gear backlash with holding one side gear toward the case.

Maximum: 0.15 mm (0.0059 in.)

NOTICE:

Differential gears should be able to rotate.

If the backlash is not within the specification, install the correct thrust washer (See page SA-73).

9. CHECK TOOTH CONTACT PATTERN

(See page SA-73)

10. REMOVE SIDE GEAR SHAFTS

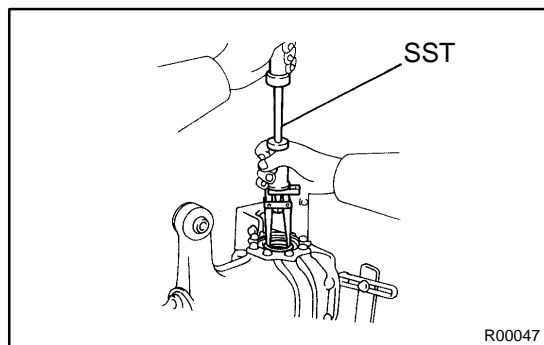
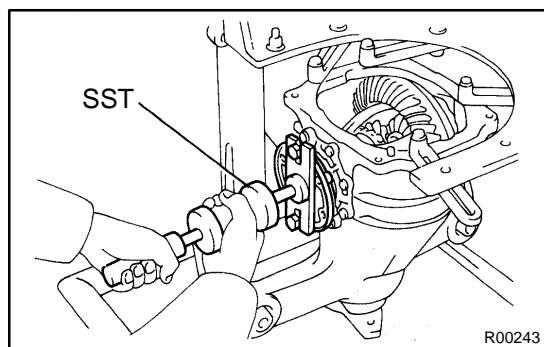
(a) Using SST, remove the 2 side gear shafts.

SST 09520-24010

NOTICE:

Be careful not to damage the oil seal.

(b) Using screwdriver, remove the 2 snap rings from the side gear shafts.



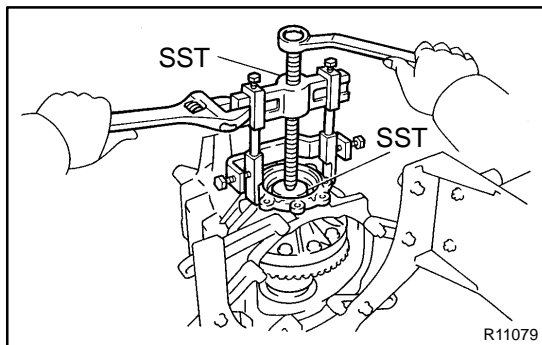
11. REMOVE SIDE GEAR SHAFT OIL SEALS

Using SST, remove the 2 oil seals.

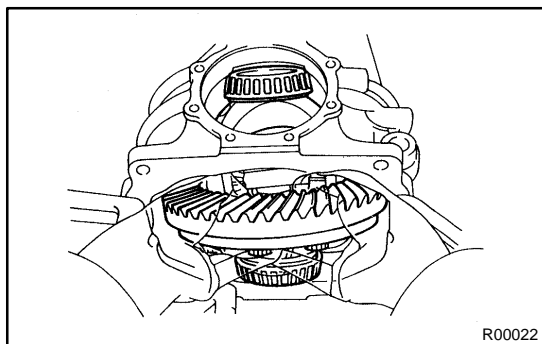
SST 09308-00010

12. REMOVE DIFFERENTIAL CARRIER RETAINERS

(a) Remove the 16 bolts.



- (b) Using SST, remove the 2 carrier retainers and washers.
 SST 09950-40011, (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00450)

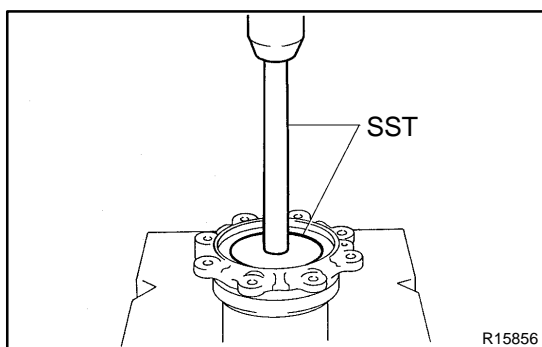


13. REMOVE DIFFERENTIAL CASE

Take the differential case out of the carrier with lifting the ring gear side, as shown in the illustration.

14. REMOVE O-RINGS FROM DIFFERENTIAL CARRIER RETAINERS

Using a screwdriver, remove the 2 O-rings.



15. REMOVE SIDE BEARING OUTER RACES AND ADJUSTING PLATE WASHERS

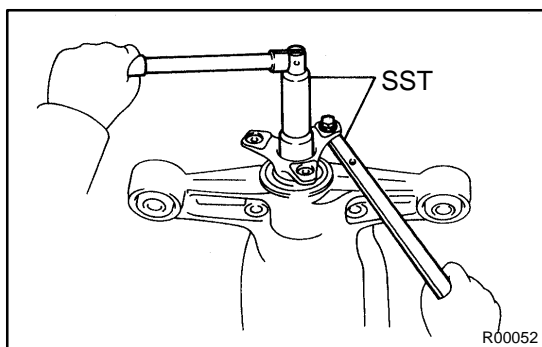
Using SST and a press, remove the 2 outer races and adjusting plate washers.

SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)

16. REMOVE DRIVE PINION, SPACER AND COMPANION FLANGE

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

- (b) Using SST, remove the nut.
 SST 09229-55010, 09330-00021

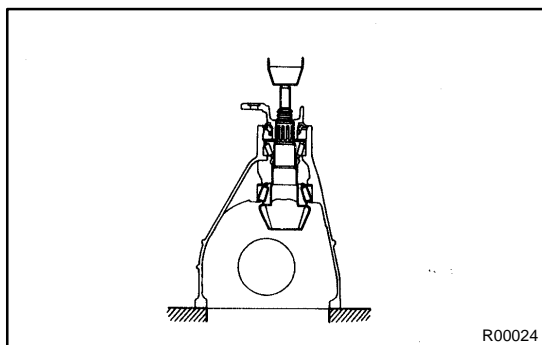


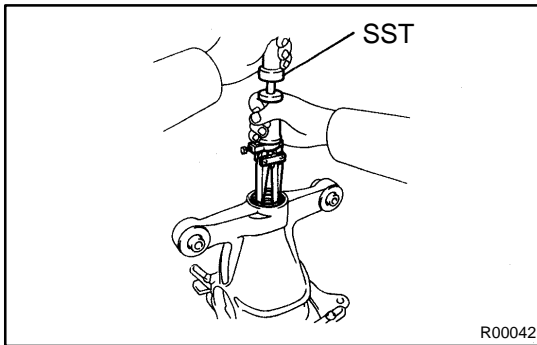
- (c) Using a press, remove the drive pinion with the rear bearing and remove the companion flange.

NOTICE:

Be careful not to drop the drive pinion.

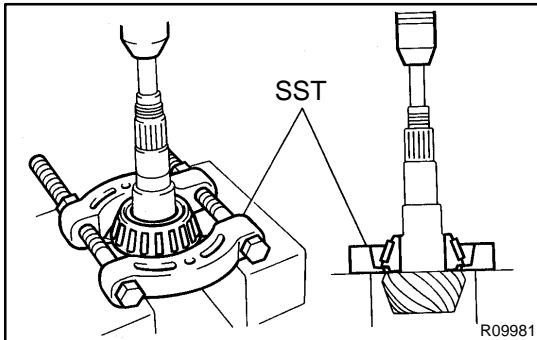
- (d) Remove the spacer from the drive pinion.



**17. REMOVE OIL SEAL**

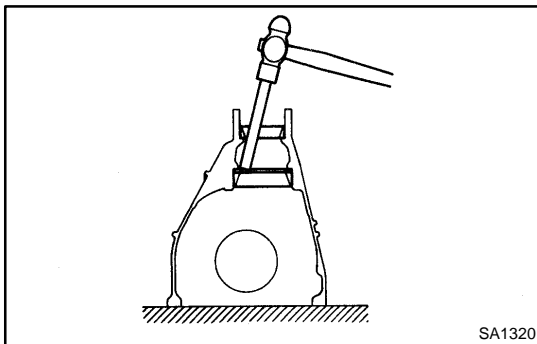
Using SST, remove the oil seal.

SST 09308-00010

18. REMOVE OIL SLINGER AND FRONT BEARING**19. REMOVE REAR BEARING FRONT DRIVE PINION**

Using SST and a press, remove the rear bearing from the drive pinion.

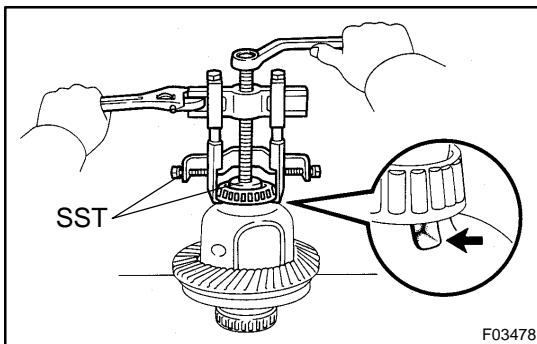
SST 09950-00020

**20. REMOVE FRONT AND REAR BEARING OUTER RACES AND ADJUSTING PLATE WASHER****NOTICE:**

Do not remove the outer race except when replacing the bearings.

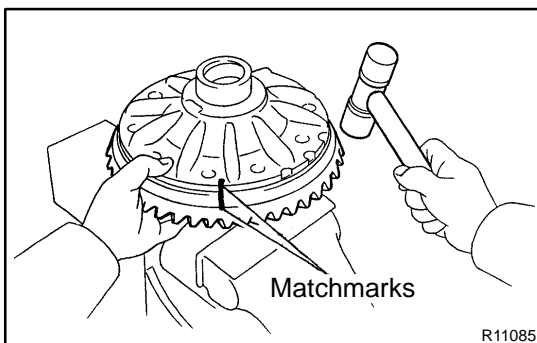
HINT:

Measure the washer and note the thickness for reassembly.

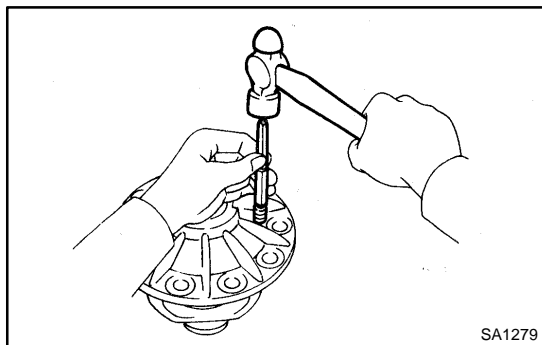
**21. REMOVE SIDE BEARINGS**

Using SST, remove the 2 side bearings from the differential case.

SST 09950-40011, (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00450)

**22. REMOVE RING GEAR**

- Place matchmarks on the ring gear and differential case.
- Remove the 10 ring gear set bolts.
- Using a plastic hammer, tap on the ring gear to separate it from the differential case.

**23. DISASSEMBLE DIFFERENTIAL CASE**

- (a) Using a pin punch and hammer, remove the straight pin.
- (b) Remove these parts from the differential case:
- Pinion shaft
 - 2 pinion gears
 - 2 pinion gear thrust washers
 - 2 side gears
 - 2 side gear thrust washers

REAR WHEEL ALIGNMENT INSPECTION

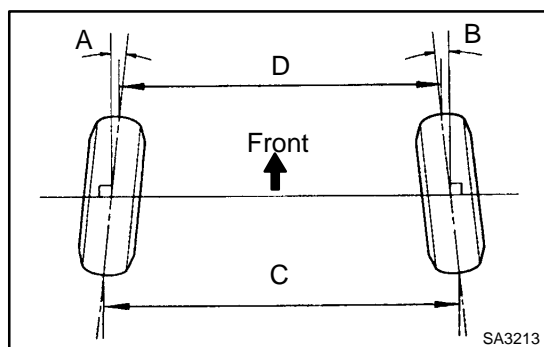
SA0R4-01

1. MEASURE VEHICLE HEIGHT (See page SA-4)
2. INSTALL CAMBER-CASTER-KINGPIN GAUGE ONTO WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

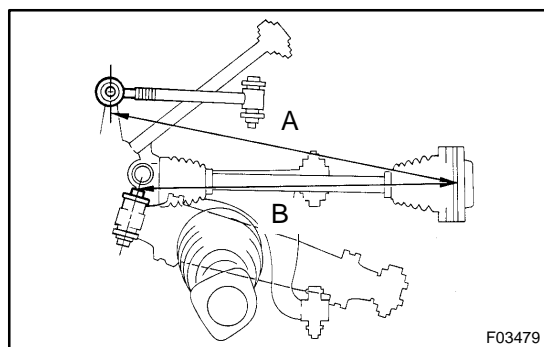
3. INSPECT CAMBER

Camber	$-0^{\circ}47' \pm 30' (-0.78^{\circ} \pm 0.5^{\circ})$
Left-right error	30' (0.5°) or less



4. INSPECT TOE-IN

Toe-in (total)	A + B: $0^{\circ}08' \pm 12' (0.13^{\circ} \pm 0.2^{\circ})$ C - D: $1.4 \pm 2 \text{ mm } (0.056 \pm 0.08 \text{ in.})$
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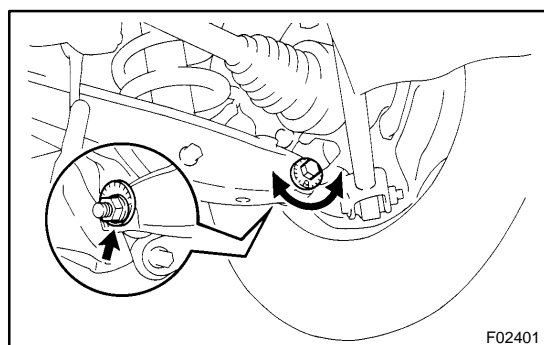
5. ADJUST CAMBER AND TOE-IN

- (a) Measure the lengths of the toe control link and No.2 lower suspension arm, as shown in the illustration.

Length: A - B = 4.0 mm (0.16 in.) or less

If they are not within the specifications, adjust the lengths of them by turning the adjusting cam, as shown, until (A - B) is less than 4.0 mm (0.16 in.).

- (b) Measure the camber and toe-in.

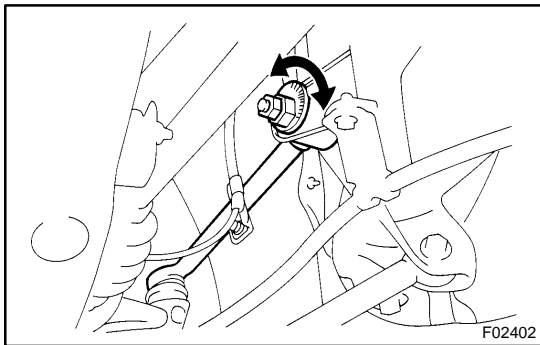


- (c) Adjust the camber.
 - (1) Loosen the camber adjusting cam nut of lower suspension arm No.2.
 - (2) Turn the camber adjusting cam of lower suspension arm No.2 and adjust camber.

HINT:

Camber changes about 5.0' (0.08°) with each graduation of the cam.

- (3) Torque the camber adjusting cam nut.
Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

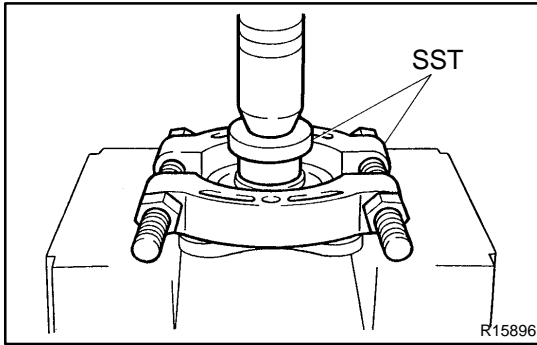


- (d) Adjust the toe-in.
- (1) Loosen the camber adjusting cam nut of toe control link.
 - (2) Turn the camber adjusting cam of toe control link and adjust toe-in.

HINT:

Camber changes about 5.0' (0.08°) with each graduation of the cam.

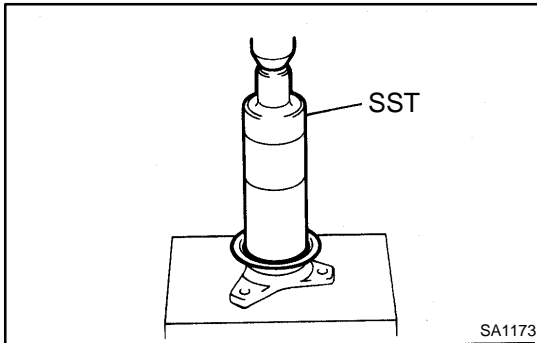
- (3) Torque the camber adjusting cam nut.
Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)



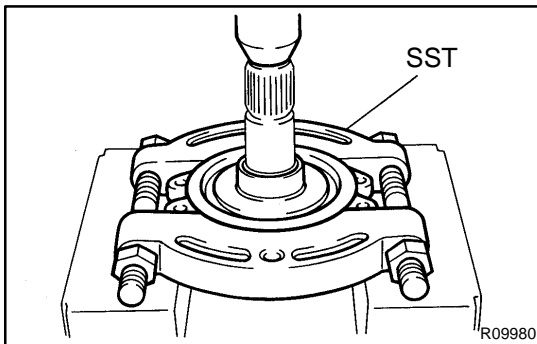
REPLACEMENT

1. REPLACE COMPANION FLANGE DUST DEFLECTOR

- (a) Using SST and a press, remove the dust deflector.
SST 09950-00020, 09950-60010 (09951-00510)

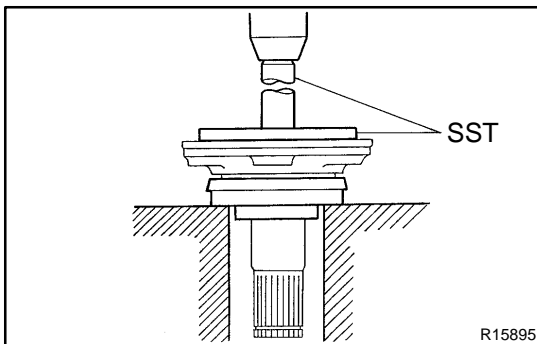


- (b) Using SST and a press, install a new dust deflector.
SST 09316-60011 (09316-00011)

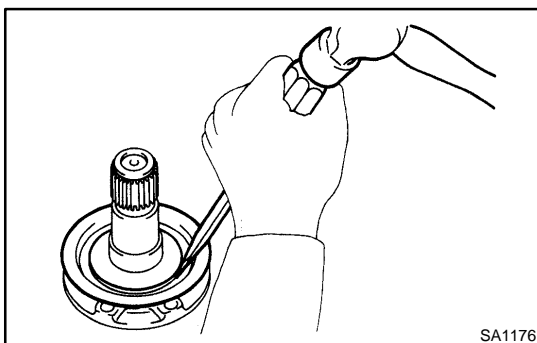


2. REPLACE SIDE GEAR SHAFT DUST COVER

- (a) Using SST and a press, remove the dust cover.
SST 09950-00020

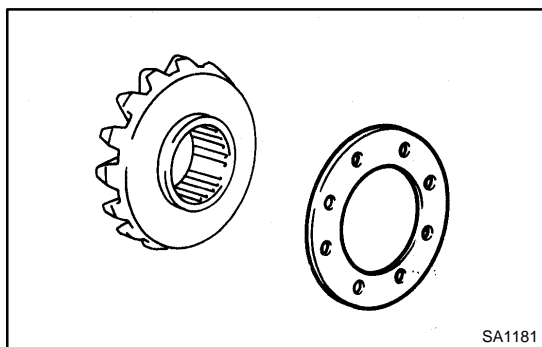


- (b) Using SST and a press, install a new dust cover.
SST 09502-24010, 09950-60020 (09951-00780),
09950-70010 (09951-07150)



HINT:

If the dust cover does not fit snugly against the flange of the side gear shaft, use a screwdriver to drive it down.



REASSEMBLY

1. ADJUST DIFFERENTIAL PINION GEAR BACKLASH

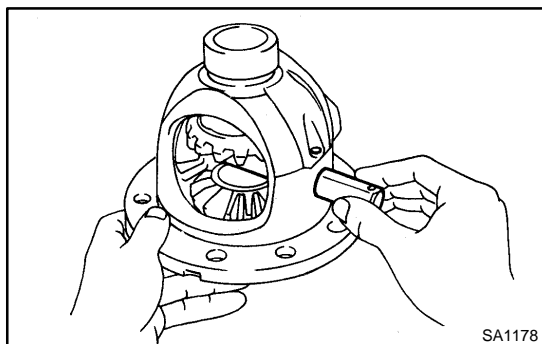
- (a) Install the 2 proper thrust washers on the side gears.

HINT:

Using the table below, select thrust washers which will ensure that the backlash is within the specification.

Thrust washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.50 (0.059)	1.75 (0.069)
1.55 (0.061)	1.80 (0.071)
1.60 (0.063)	1.85 (0.073)
1.65 (0.065)	1.90 (0.075)
1.70 (0.067)	—

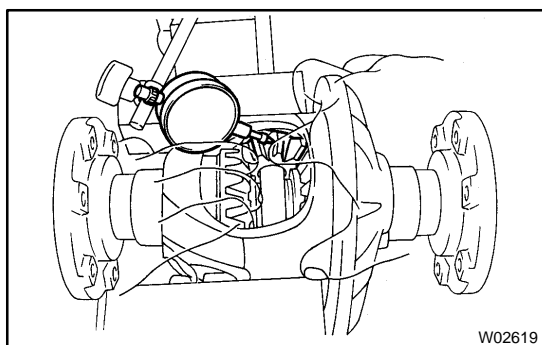


- (b) Install the 2 side gears, pinion gears, pinion gear thrust washers and pinion shaft in the differential case.

HINT:

Align the holes of the differential case and pinion shaft.

- (c) Push the 2 side gear shafts gently into the differential case by hand and install them.



- (d) Using a dial indicator, measure the pinion gear backlash with holding one side gear toward the case.

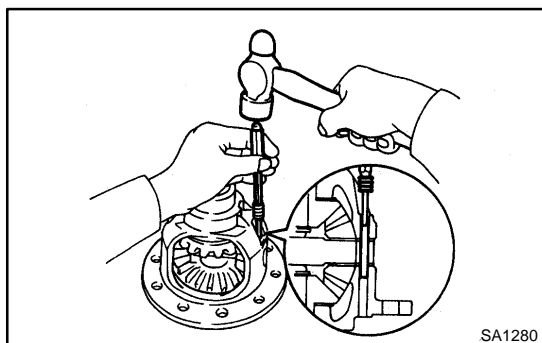
Maximum: 0.15 mm (0.0059 in.)

NOTICE:

Differential gears should be able to rotate.

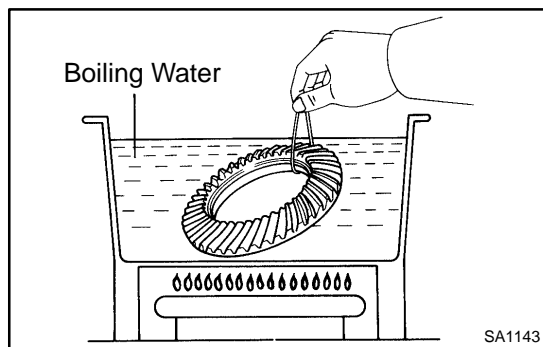
If the backlash is not within the specification, install the 2 side gear thrust washers with different thicknesses.

- (e) Remove the 2 side gear shafts.



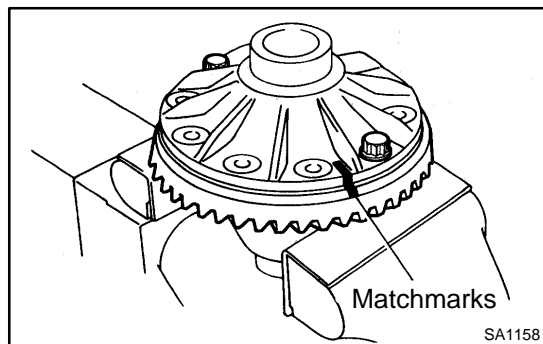
2. INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

- (a) Using a pin punch and hammer, install the straight pin through the differential case and hole of the pinion shaft.
- (b) Stake the differential case.



3. INSTALL RING GEAR ON DIFFERENTIAL CASE

- Clean the contact surfaces of the differential case and the threads of the ring gear and differential case.
- Heat the ring gear in boiling water.
- Carefully remove the ring gear from the boiling water.



- After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

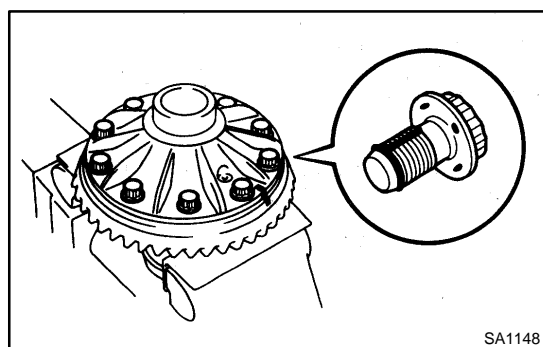
HINT:

Align the matchmarks on the ring gear and the differential case.

- Tighten 2 of the bolts temporarily so that the bolt holes in the ring gear and differential case are not misaligned.

NOTICE:

The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.



4. INSTALL RING GEAR SET BOLTS

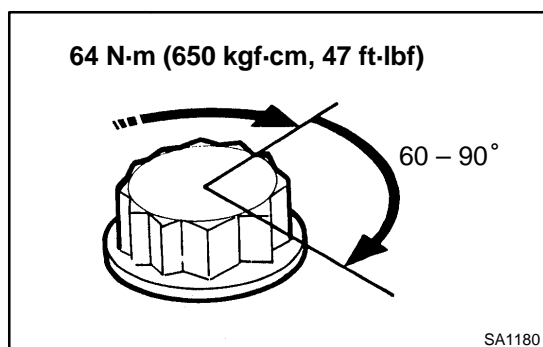
- After the ring gear has cooled sufficiently, install new 10 ring gear set bolts to which thread lock has been applied.

Thread lock:

Part No. 08833-00100, THREE BOND 1360 K or equivalent.

NOTICE:

New ring gear set bolts should be used in every case.



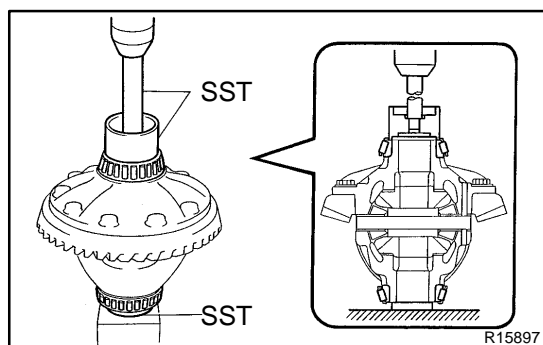
- Torque the 10 set bolts uniformly and a little at a time.

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

- Tighten the bolts further by 60 – 90°.

NOTICE:

Tighten the bolts in diagonally opposite pairs.



5. INSTALL SIDE BEARINGS

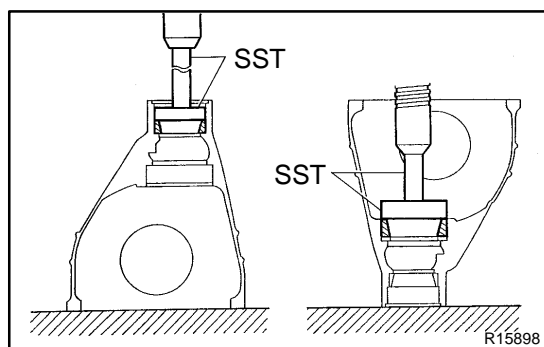
Using SST and a press, install the 2 side bearings.

SST 09710-30050, 09950-60010 (09951-00450),
09950-70010 (09951-07150)

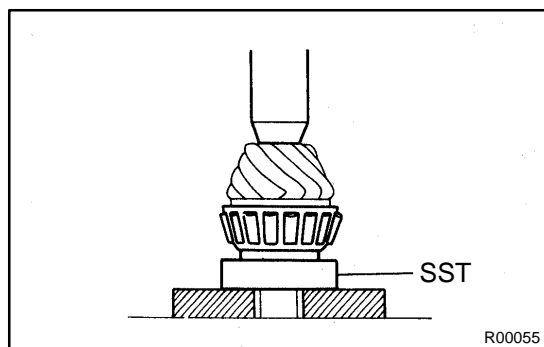
6. INSTALL DRIVE PINION BEARING OUTER RACES AND ADJUSTING WASHER

HINT:

- The adjusting washer is used for adjusting the tooth contact pattern. 42 types of washer with different thicknesses are available.
- First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.
- When removing an adjusting washer, be sure to replace it with a new one.



- Using SST and a press, install the front bearing outer race.
SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)
- Using SST and a press, install a new adjusting washer to the rear bearing outer race.
SST 09255-10012, 09950-70010 (09951-07150)



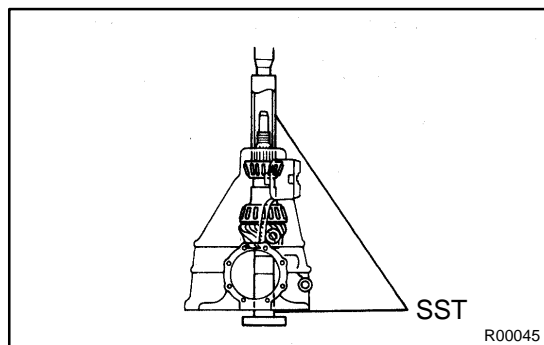
7. INSTALL REAR BEARING TO DRIVE PINION

Using SST and a press, install the rear bearing.

SST 09502-24010

8. TEMPORARILY INSTALL DRIVE PINION, FRONT BEARING, OIL SLINGER AND COMPANION FLANGE

- Install the drive pinion in the differential carrier.

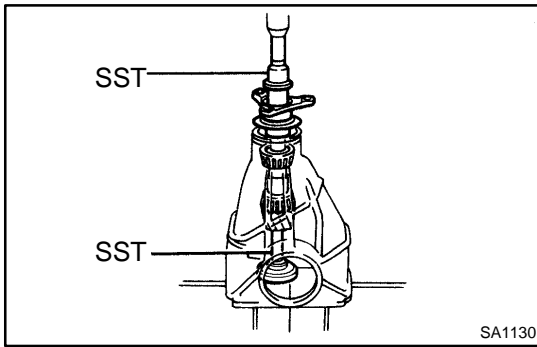


- Using SST and a press, install the front bearing on the drive pinion.
SST 09316-60011 (09316-00011), 09608-04031

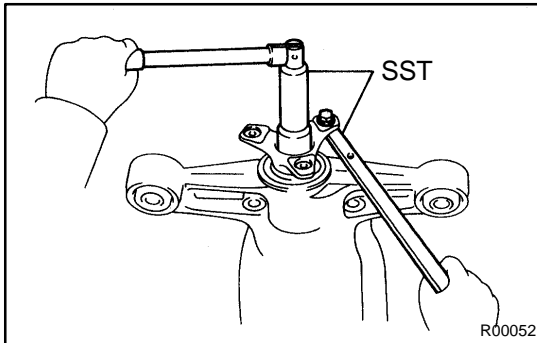
HINT:

Assemble the spacer and oil seal after adjusting the tooth contact pattern.

- Install the oil slinger.



- (d) Using SST and a press, install the companion flange.
SST 09223-46011, 09325-40010



- 9. TEMPORARILY ADJUST DRIVE PINION PRELOAD**
(a) Adjust the drive pinion preload by tightening the companion flange nut.

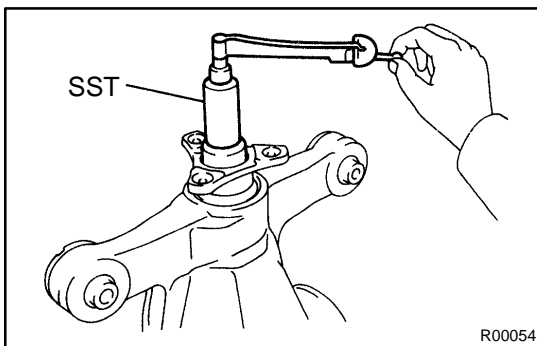
HINT:

Using SST to hold the flange, tighten the nut.

SST 09229-55010, 09330-00021

NOTICE:

As there is no spacer, tighten the nut a little at a time, being careful not to overtighten it.



- (b) Using SST and a torque wrench, measure the preload.
SST 09229-55010

Preload (at starting):

New bearing:

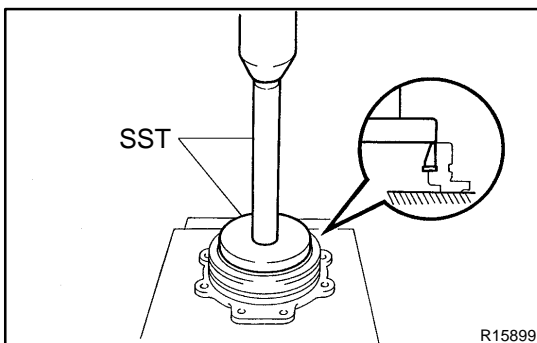
1.5 – 1.8 N·m (15 – 18 kgf-cm, 13.0 – 15.6 in.-lbf)

Reused bearing:

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

HINT:

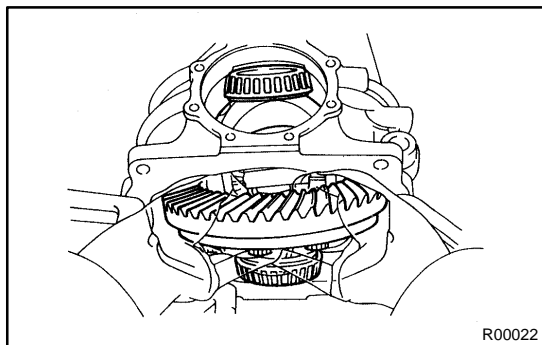
For vehicles which have run 8,000 km (5,000 miles) or less, if the preload value measured before disassembly is greater than the specification for a reused bearing, return the preload to the same as before disassembly.



10. INSTALL SIDE BEARING OUTER RACES AND ADJUSTING PLATE WASHERS

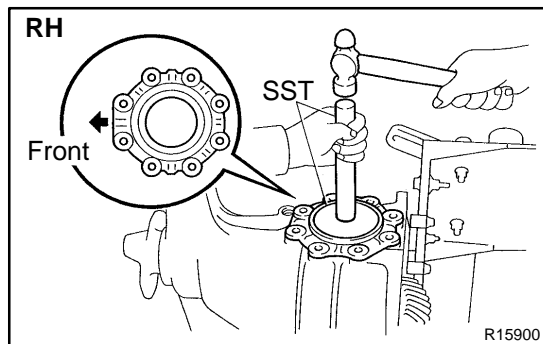
Using SST and a press, install the 2 adjusting plate washers and outer races.

SST 09950-60020 (09951-00810),
09950-70010 (09951-07150)



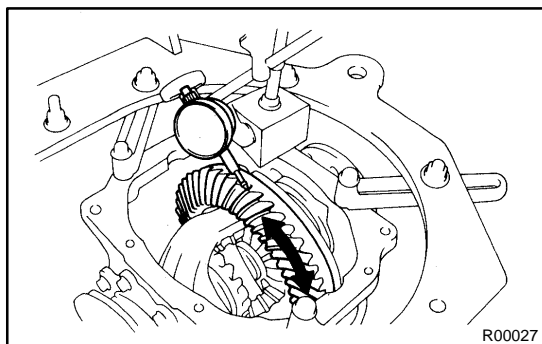
11. INSTALL DIFFERENTIAL CASE IN CARRIER

Install the drive side bearing in the differential carrier first, as shown in the illustration, then install the differential case.



12. INSTALL DIFFERENTIAL CARRIER RETAINERS

- (a) Using SST and a hammer, install 2 carrier retainers.
SST 09950-60020 (09951-00890),
09950-70010 (09951-07150)
- (b) Tighten the 16 bolts.
Torque: 22 N·m (225 kgf-cm, 16 ft-lbf)



13. CHECK RING GEAR BACKLASH

Using a dial indicator, measure the backlash of the ring gear at 3 positions at least.

Backlash: 0.08 – 0.13 mm (0.0031 – 0.0051 in.)

NOTICE:

The difference between the maximum and minimum measure values must be less than 0.05 mm (0.0020 in.).

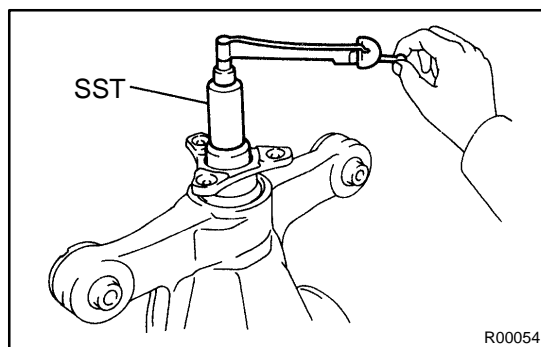
HINT:

The measured values should be used as reference when selecting washers, so take a note of the values.

If the backlash is not within the specification replace the washer on the ring gear side with one of a different thickness using the following procedure.

Adjusting washer thickness

No.	Thickness mm (in.)	No.	Thickness mm (in.)	No.	Thickness mm (in.)
02	2.02 (0.0795)	32	2.32 (0.0913)	62	2.62 (0.1031)
04	2.04 (0.0803)	34	2.34 (0.0921)	64	2.64 (0.1039)
06	2.06 (0.0811)	36	2.36 (0.0929)	66	2.66 (0.1047)
08	2.08 (0.0819)	38	2.38 (0.0937)	68	2.68 (0.1055)
10	2.10 (0.0827)	40	2.40 (0.0945)	70	2.70 (0.1063)
12	2.12 (0.0835)	42	2.42 (0.0953)	72	2.72 (0.1071)
14	2.14 (0.0843)	44	2.44 (0.0961)	74	2.74 (0.1079)
16	2.16 (0.0850)	46	2.46 (0.0969)	76	2.76 (0.1087)
18	2.18 (0.0858)	48	2.48 (0.0976)	78	2.78 (0.1094)
20	2.20 (0.0866)	50	2.50 (0.0984)	80	2.80 (0.1102)
22	2.22 (0.0874)	52	2.52 (0.0992)	82	2.82 (0.1100)
24	2.24 (0.0882)	54	2.54 (0.1000)	84	2.84 (0.1118)
26	2.26 (0.0890)	56	2.56 (0.1008)	86	2.86 (0.1126)
28	2.28 (0.0898)	58	2.58 (0.1016)		–
30	2.30 (0.0906)	60	2.60 (0.1024)		–



14. MEASURE TOTAL PRELOAD

Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

SST 09229-55010

Total preload (at starting):

Drive pinion preload plus

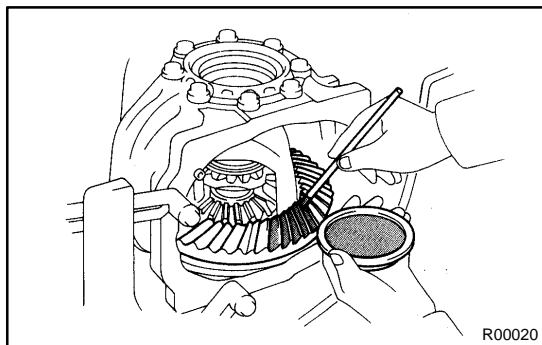
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.-lbf)

If the measured preload is less than the specification, replace the washer of the ring gear's tooth surface side with a thicker one.

If the preload is greater than the specification, replace the washer of the ring gear's tooth surface side with a thinner one.

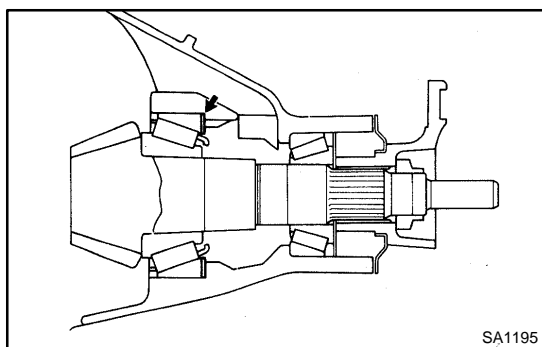
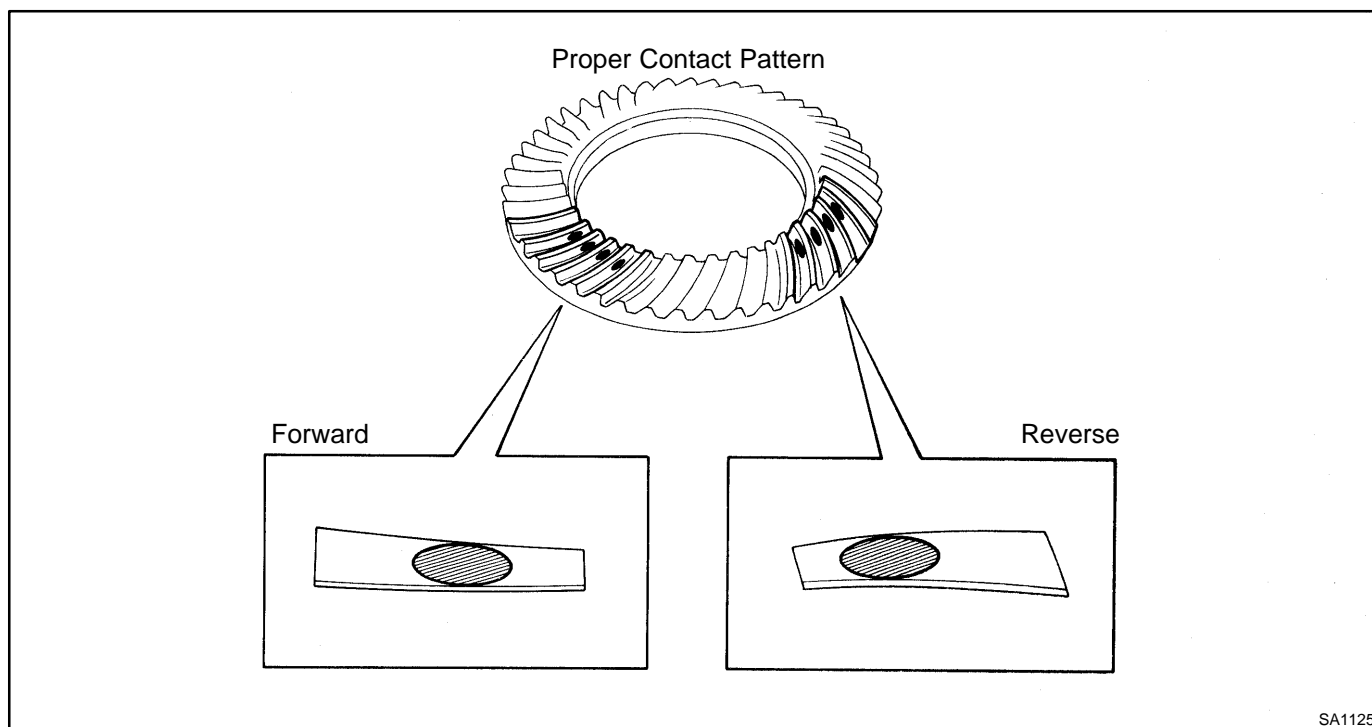
HINT:

Changing the snap ring thickness by 0.02 mm (0.0008 in.) will change the total preload by approx. 0.1 N·m (1 kgf·cm, 0.9 in.-lbf).



15. INSPECT TOOTH CONTACT PATTERN

- Coat 3 or 4 teeth at the 3 different positions on the ring gear with red lead.
- Hold the companion flange firmly and rotate the ring gear in both directions.
- Inspect the tooth contact pattern.



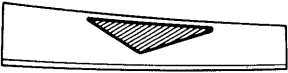







If tooth contact pattern is not correct, replace the adjusting washer installed on the front of the drive pinion rear bearing to adjust it.

NOTICE:

Make sure to always use a new one when replacing adjusting washer.

HINT:

Refer to the table on the next page for selection of the adjusting washer.

Tooth contact pattern		Adjusting washer selection	
Forward	Reverse		
		+ 0.08 mm (+ 0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thicker will give proper contact pattern.
		+ 0.14 mm (+ 0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thicker will give proper contact pattern.
		– 0.08 mm (– 0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thicker will give proper contact pattern.
		– 0.14 mm (– 0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thicker will give proper contact pattern.

V02917

HINT:

Adjust washers in 42 (different thickness in 0.01 mm (0.004 in.)) units are available.

No.	Thickness mm (in.)	No.	Thickness mm (in.)	No.	Thickness mm (in.)
87	1.87 (0.0736)	01	2.01 (0.0791)	15	2.15 (0.0846)
88	1.88 (0.0740)	02	2.02 (0.0795)	16	2.16 (0.0850)
89	1.89 (0.0744)	03	2.03 (0.0799)	17	2.17 (0.0854)
90	1.90 (0.0748)	04	2.04 (0.0803)	18	2.18 (0.0858)
91	1.91 (0.0752)	05	2.05 (0.0807)	19	2.19 (0.0862)
92	1.92 (0.0756)	06	2.06 (0.0811)	20	2.20 (0.0866)
93	1.93 (0.0760)	07	2.07 (0.0815)	21	2.21 (0.0870)
94	1.94 (0.0764)	08	2.08 (0.0819)	22	2.22 (0.0874)
95	1.95 (0.0768)	09	2.09 (0.0823)	23	2.23 (0.0878)
96	1.96 (0.0772)	10	2.10 (0.0827)	24	2.24 (0.0882)
97	1.97 (0.0776)	11	2.11 (0.0831)	25	2.25 (0.0886)
98	1.98 (0.0780)	12	2.12 (0.0835)	26	2.26 (0.0890)
99	1.99 (0.0783)	13	2.13 (0.0839)	27	2.27 (0.0894)
00	2.00 (0.0787)	14	2.14 (0.0843)	28	2.28 (0.0898)

16. REMOVE DIFFERENTIAL CARRIER RETAINERS(See page [SA-67](#))**17. REMOVE DIFFERENTIAL CASE (See page [SA-67](#))****18. REMOVE DRIVE PINION (See page [SA-67](#))****19. INSTALL SPACER ON DRIVE PINION**

Install a new spacer on the drive pinion.

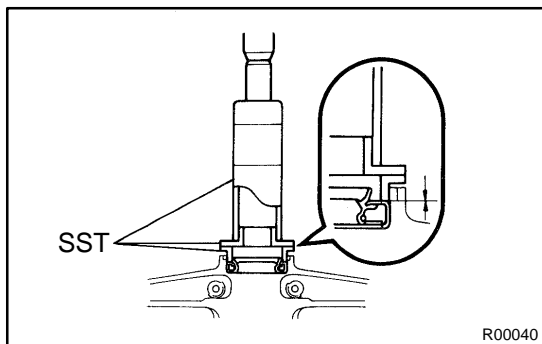
20. INSTALL DRIVE PINION AND FRONT BEARING

(See step 8)

21. INSTALL OIL SLINGER (See step 8)

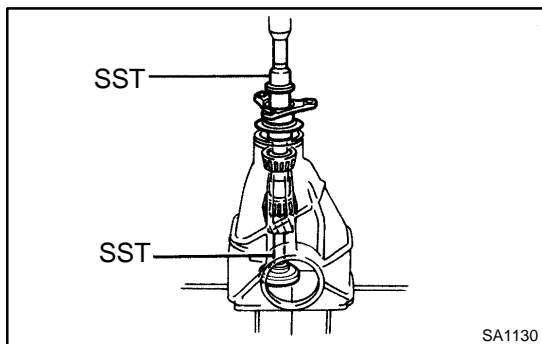
22. INSTALL OIL SEAL

- (a) Apply MP grease to a new oil seal lip.



- (b) Using SST, install the oil seal until its end is flush with the surface of the differential carrier.

SST 09316-60011 (09316-00011, 09316-00041),
09502-12010

**23. INSTALL COMPANION FLANGE**

Using SST and a press, install the companion flange.

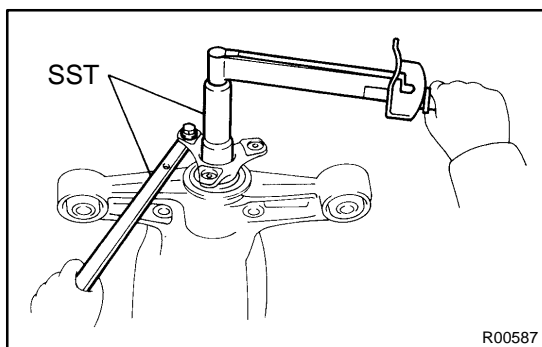
SST 09223-56010, 09325-40010

NOTICE:

Be careful not to damage the oil seal.

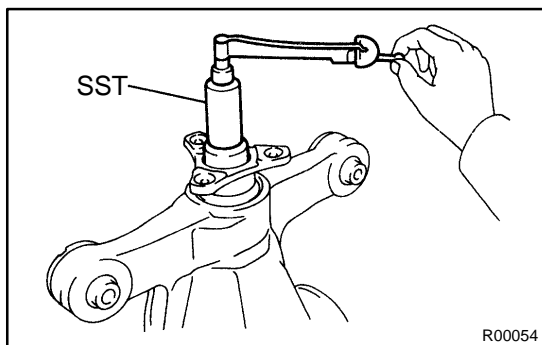
24. ADJUST DRIVE PINION PRELOAD

- (a) Coat the threads and flange of a new nut with hypoid gear oil for LSD.



- (b) Using SST, tighten the nut.

SST 09229-55010, 09330-00021



- (c) Using SST and a torque wrench, measure the preload.

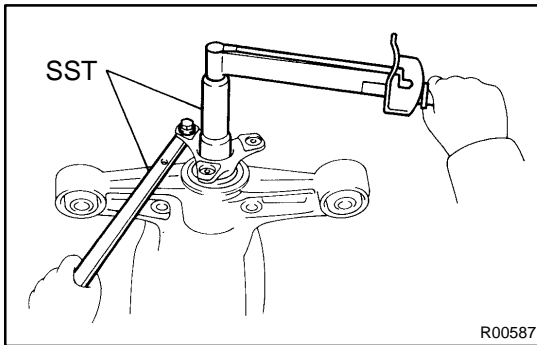
SST 09229-55010

Preload (at starting):**New bearing:**

1.5 – 1.8 N·m (15 – 18 kgf·cm, 13.0 – 15.6 in.-lbf)

Reused bearing:

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



If the preload is greater than the specification, replace the spacer.

If the preload is less than the specification, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

Torque: 490 N·m (5,000 kgf·cm, 362 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the spacer and repeat the preload procedure.

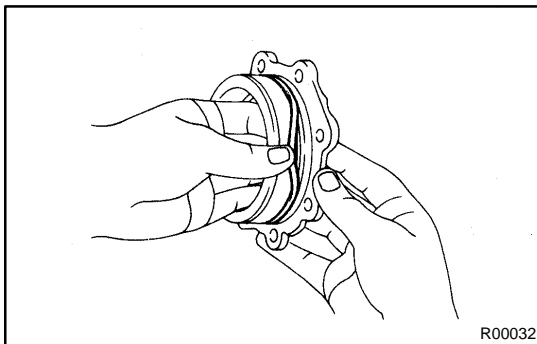
Do not back off the nut to reduce the preload.

25. CHECK RUNOUT OF DRIVE PINION SHAFT

(See page SA-67)

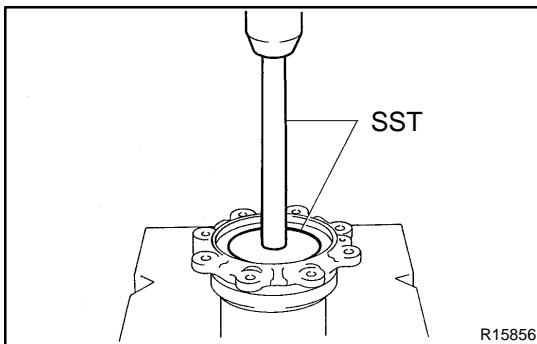
26. INSTALL DIFFERENTIAL CASE IN CARRIER

(See step 11)



27. INSTALL O-RING FROM DIFFERENTIAL CARRIER RETAINERS

- (a) Coat 2 new O-rings with hypoid gear oil.
- (b) Install the 2 O-rings to the carrier retainers.



28. INSTALL OIL SEALS FROM DIFFERENTIAL CARRIER RETAINERS

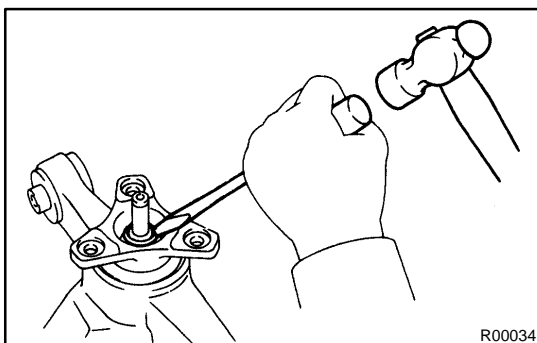
- (a) Using SST and a press, install 2 new oil seals to the carrier retainers.

SST 09608-32010, 09950-70010 (09950-07150)

- (b) Coat the MP grease to the oil seal lip.

29. INSTALL DIFFERENTIAL CARRIER RETAINERS

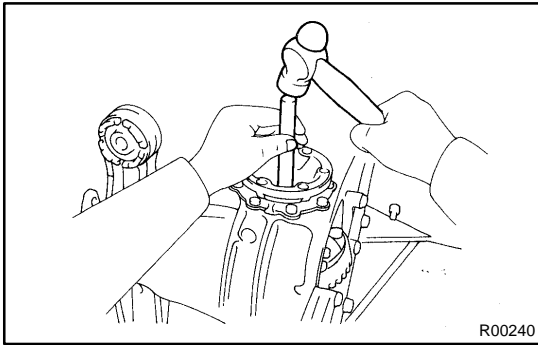
30. RECHECK BACKLASH, TOTAL PRELOAD AND TOOTH CONTACT PATTERN



31. STAKE DRIVE PINION NUT

32. INSTALL SNAP RINGS TO SIDE GEAR SHAFTS

- (a) Install 2 new snap rings to the side gear shafts.
- (b) Coat the MP grease to the snap rings.

**33. INSTALL SIDE GEAR SHAFTS**

Using a brass and hammer, install the 2 side gear shafts.

HINT:

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.

NOTICE:

Be careful not to damage the oil seal.

34. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.**35. INSTALL DIFFERENTIAL CARRIER COVER**

(a) Clean the contact surfaces of the carrier and cover of any residual FIPG material using cleaner.

(b) Coat FIPG to the carrier or cover.

FIPG:

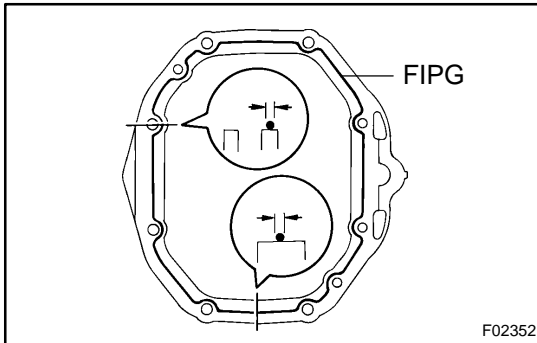
Part No. 08826-00090, THREE BOND 1281 or equivalent

(c) Install the carrier cover to the carrier with the 8 bolts.

Torque: 47 N·m (475 kgf-cm, 34 ft-lbf)

(d) Install the breather plug.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)



INSTALLATION

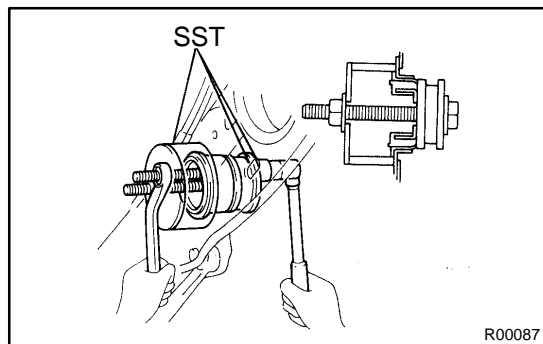
Installation is in the reverse order of removal (See page [SA-65](#)).

AFTER INSTALLATION, FILL DIFFERENTIAL OIL (See page [SA-61](#))

DIFFERENTIAL MOUNTING CUSHION REPLACEMENT

SAOSH-01

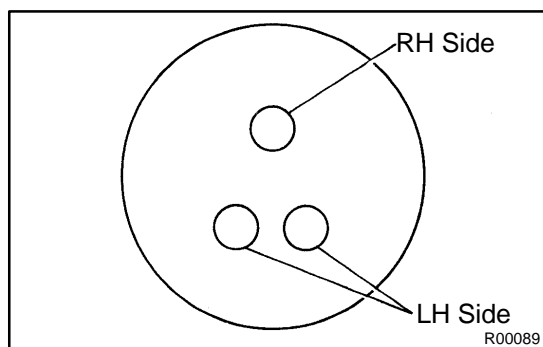
1. REMOVE DIFFERENTIAL (See page SA-65)



2. REMOVE DIFFERENTIAL MOUNTING CUSHION

Using SST, remove the differential mounting cushion.

SST 09316-12010, 09570-24010



NOTICE:

- When driving out the mounting cushion, be careful not to touch the suspension member with the SST.
- Align the SST straight so that the bolt of the SST is parallel with the center line of the mounting cushion.
- When installing the bolts to the LH and RH differential mounting cushions, make sure that the bolts are passed through the correct holes in the SST, as shown in the illustration.

3. INSTALL DIFFERENTIAL MOUNTING CUSHION

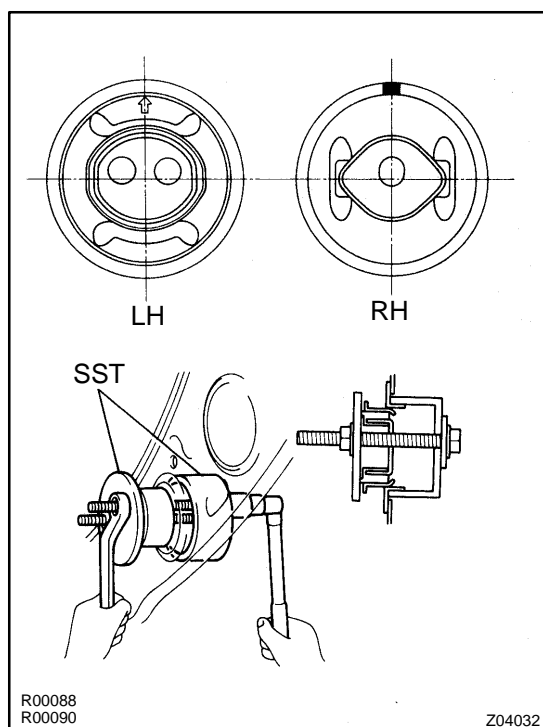
Using SST, install the cushion so that the marks are positioned, as shown in the illustration.

SST 09570-24010

NOTICE:

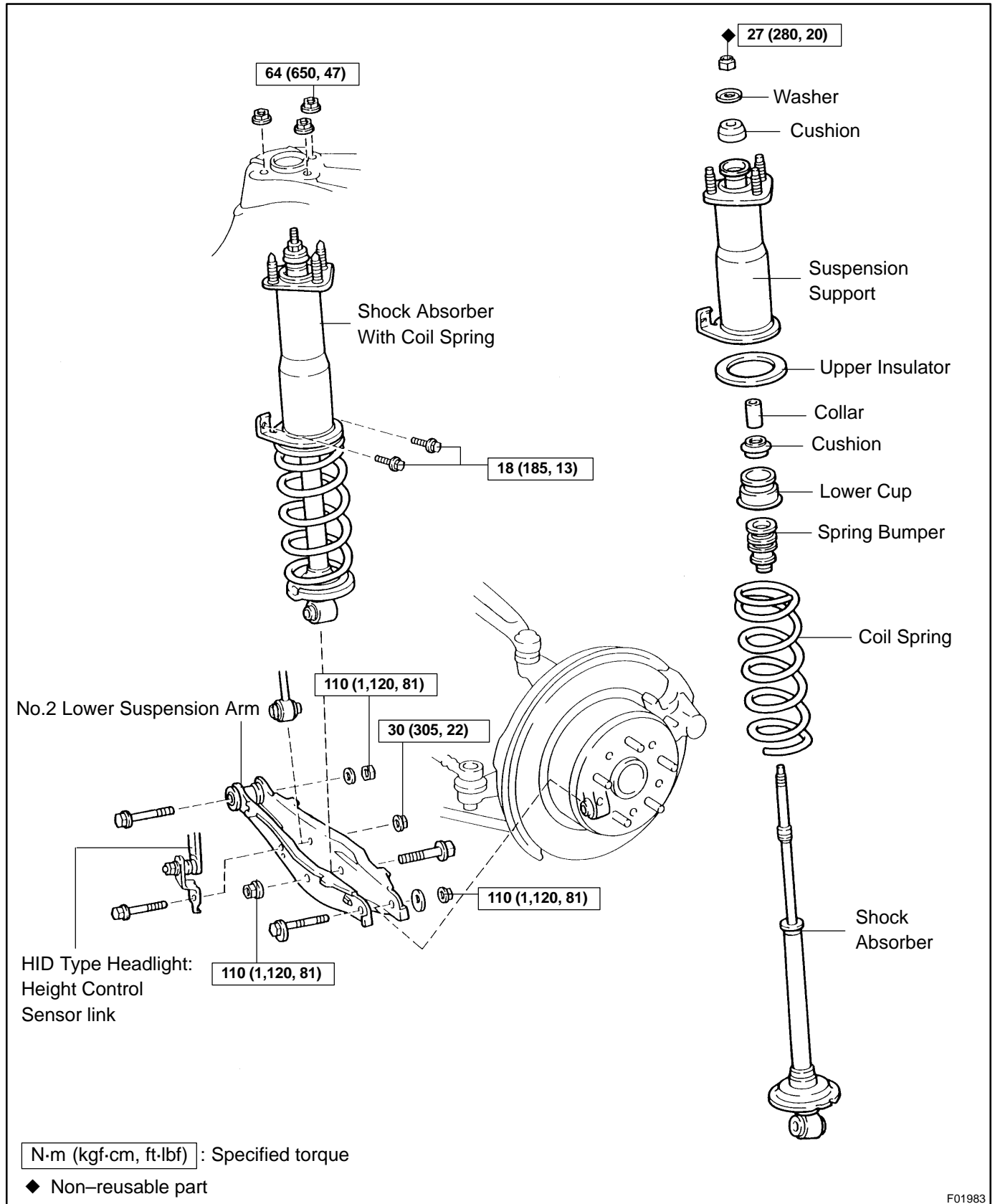
- Pay enough attention to LH and RH sides or top and bottom.
- Set the SST after temporarily installing the differential mounting cushion into the member so as not to install at an angle.
- To confirm that the differential mounting cushion is aligned straight in relation to the member, check that the SST is fully in contact with all of the cushion.

4. INSTALL DIFFERENTIAL (See page SA-84)



REAR SHOCK ABSORBER COMPONENTS

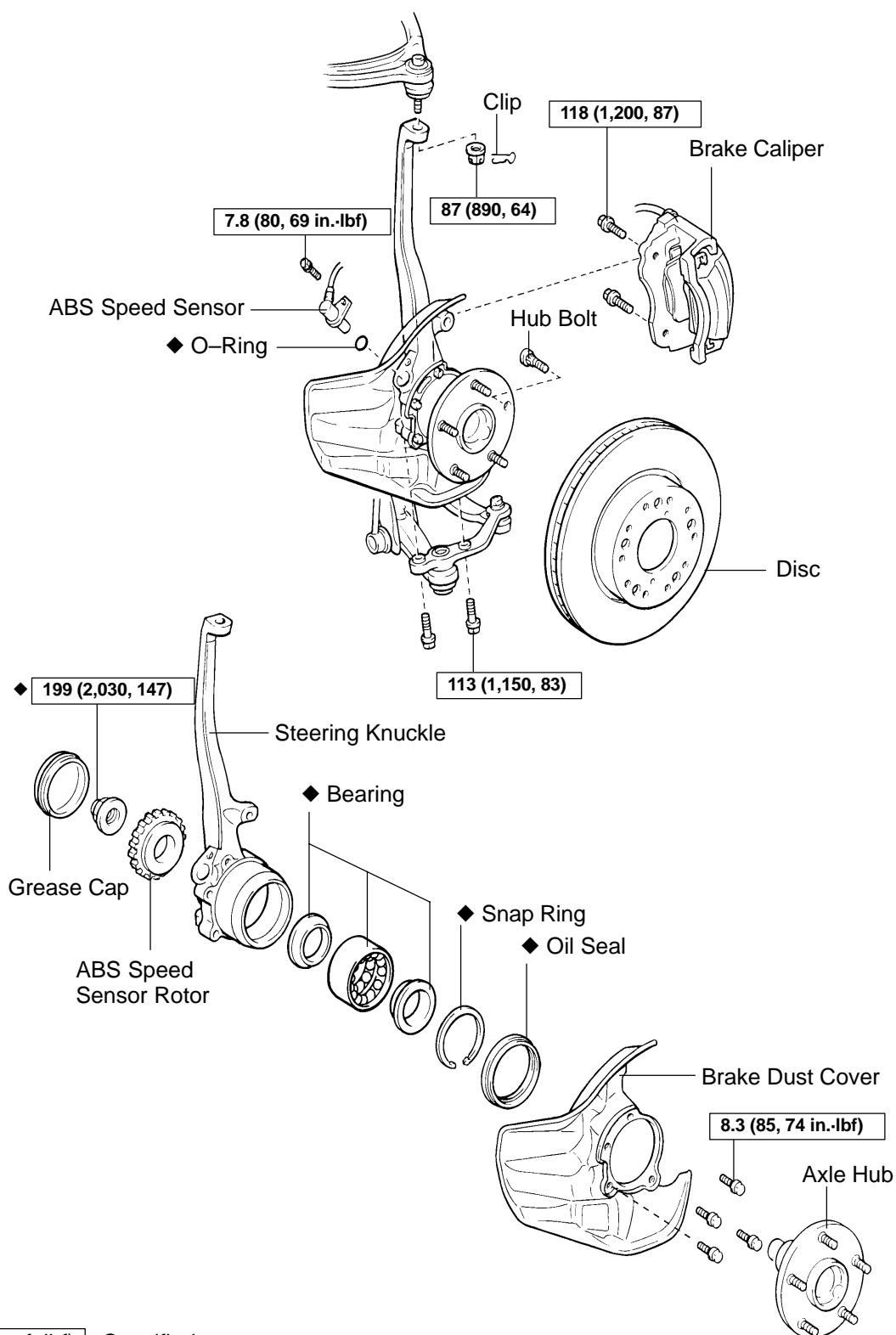
SA0SI-01



F01983

FRONT AXLE HUB COMPONENTS

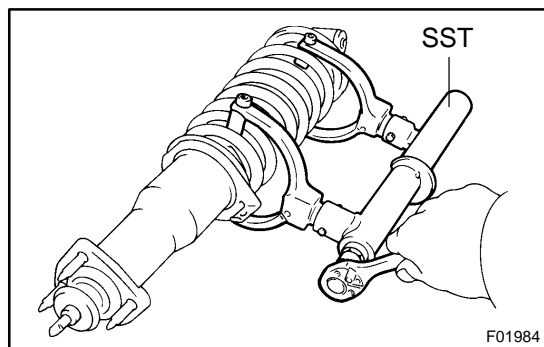
SA0R5-03



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

◆ Non-reusable part

F02340



REASSEMBLY

INSTALL SUSPENSION SUPPORT AND COIL SPRING

- (a) Using SST, compress the coil spring.
SST 09727-30021

NOTICE:

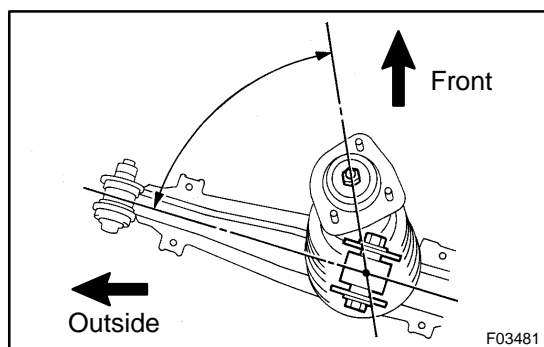
Do not use an impact wrench. It will damage the SST.

- (b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the recess of the spring seat of the shock absorber.

- (c) Install the spring bumper, lower cup, cushion, collar, upper insulator, suspension support, cushion and washer to the shock absorber and temporarily tighten a new nut.



- (d) Rotate the suspension support so that the rod and 1 of the bolts on suspension support are aligned with lower shock absorber as shown in the illustration.

- (e) Remove the SST.
SST 09727-30021

HINT:

After removing the SST, recheck the direction of the suspension support.

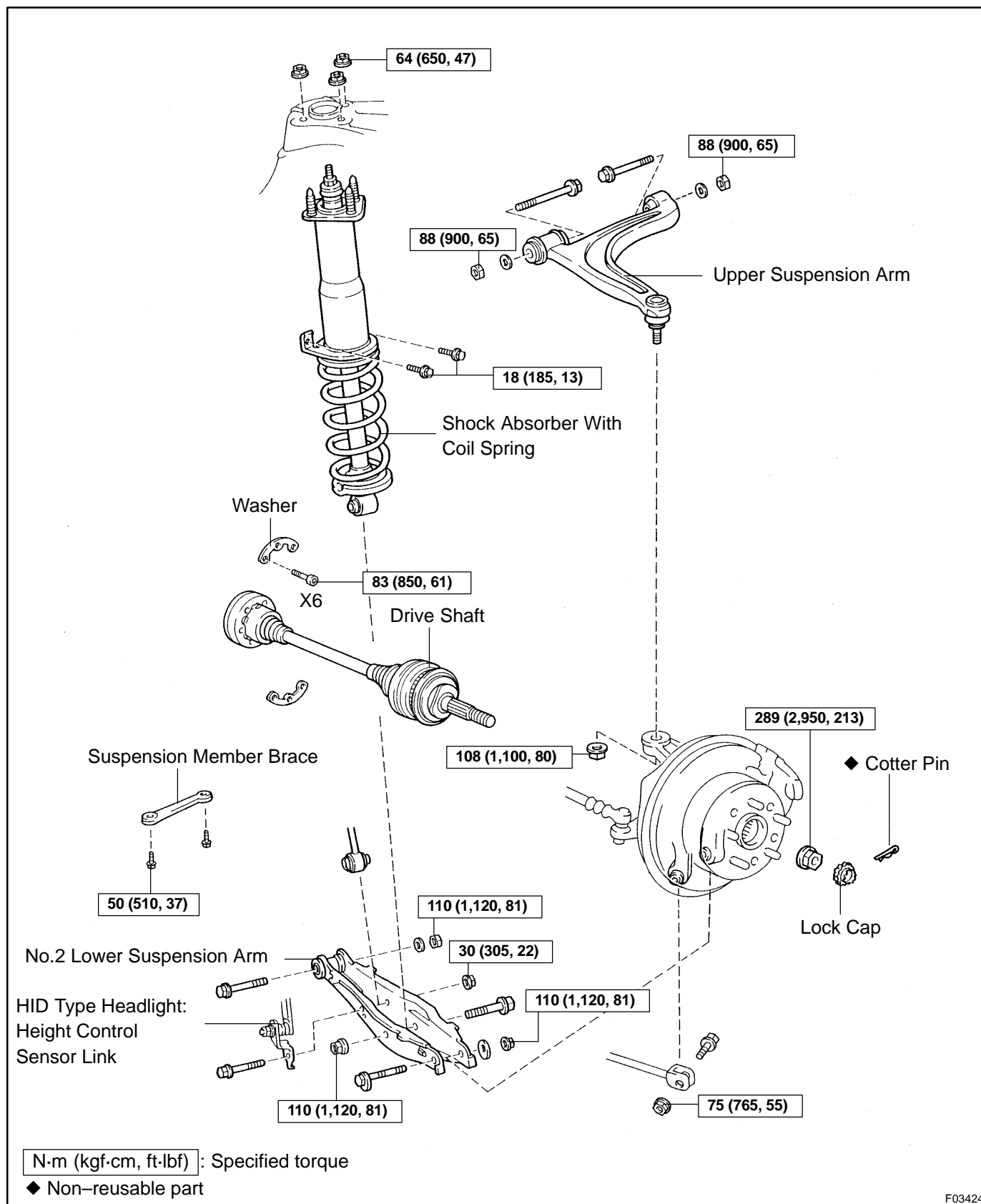
INSTALLATION

Installation is in the reverse order of removal (See page [SA-87](#)).

AFTER INSTALLATION, CHECK REAR WHEEL ALIGNMENT (See page [SA-7](#))

REAR UPPER SUSPENSION ARM COMPONENTS

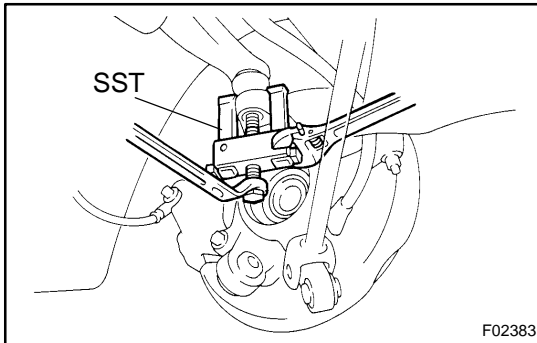
SA0SP-01



F03424

REMOVAL

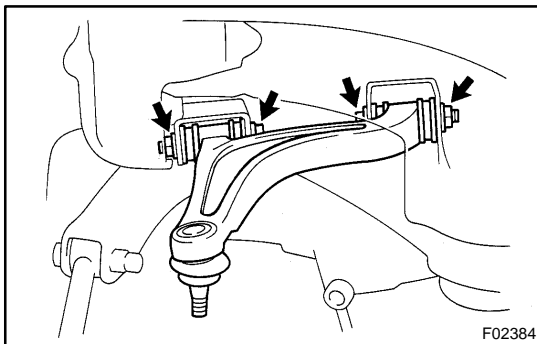
1. **REMOVE REAR WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE DRIVE SHAFT** (See page [SA-52](#))
3. **REMOVE SHOCK ABSORBER** (See page [SA-87](#))
4. **REMOVE UPPER SUSPENSION ARM**
 - (a) Remove the nut.
Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)



- (b) Using SST, disconnect the upper suspension arm from the axle carrier.
SST 09628-62011

NOTICE:

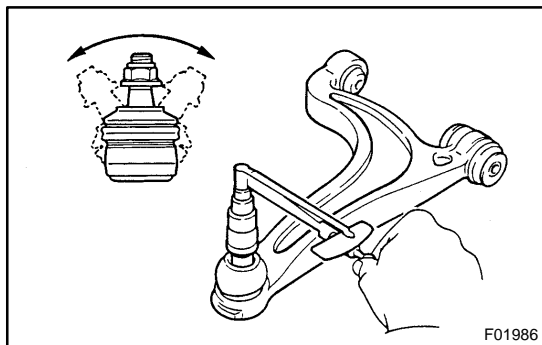
- Be careful not to damage the dust cover.
- Support the axle carrier.



- (c) Remove the 2 bolts, nuts, washers and upper suspension arm.
Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nuts.



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- As shown, flip the ball joint stud back and forth 5 times, before installing the nut.
- Using torque wrench, turn the nut continuously one turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:

1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.-lbf)

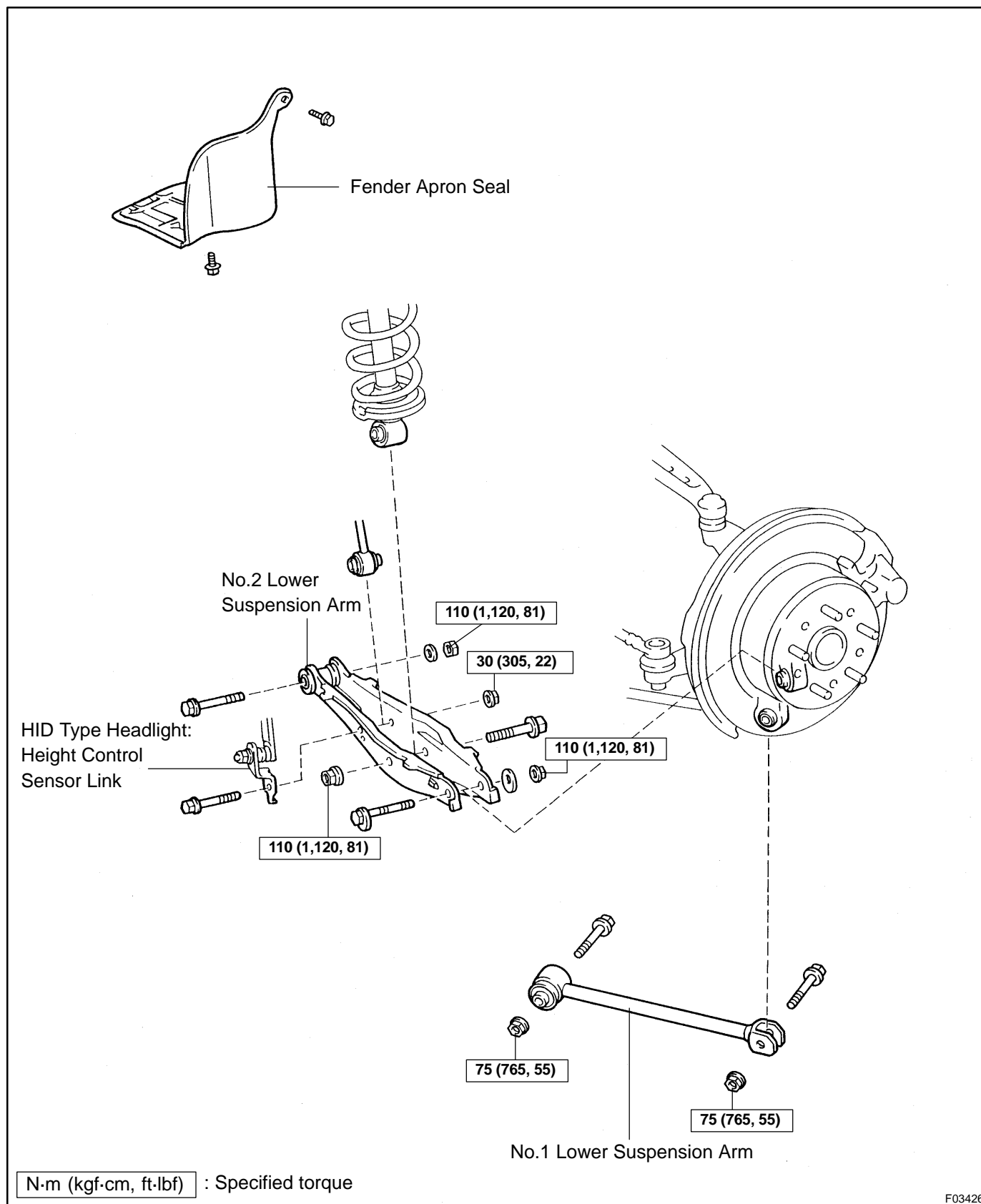
INSTALLATION

Installation is in the reverse order of removal (See page [SA-94](#)).

AFTER INSTALLATION, CHECK ABS SPEED SIGNAL (See page [DI-389](#)) AND REAR WHEEL ALIGNMENT (See page [SA-7](#))

REAR LOWER SUSPENSION ARM COMPONENTS

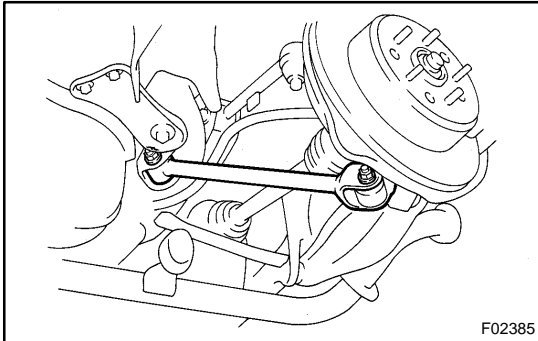
SA0ST-01



F03426

REMOVAL

1. **REMOVE REAR WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE REAR FENDER APRON SEAL**



3. REMOVE NO.1 LOWER SUSPENSION ARM

Remove the 2 bolts, nuts, and No.1 lower suspension arm.

Torque: 75 N·m (765 kgf·cm, 55 ft·lbf)

HINT:

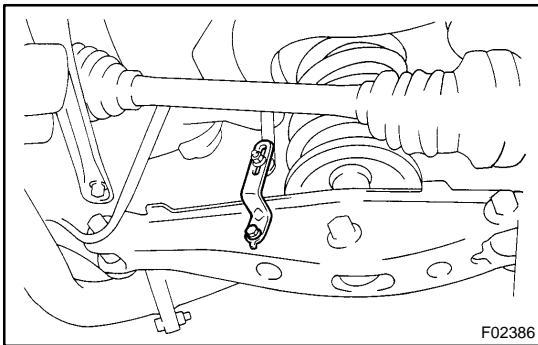
At the time of installation, after stabilizing the suspension, torque the nuts.

4. REMOVE NO.2 LOWER SUSPENSION ARM

(a) Halogen type headlight:

Remove the bolt, nut and disconnect the stabilizer bar link from the No.2 lower suspension arm.

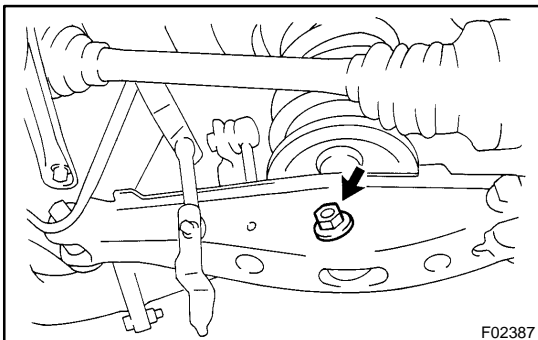
Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)



(b) HID type headlight:

Remove the bolt, nut and disconnect the stabilizer bar link and the height control link from the No.2 lower suspension arm.

Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)

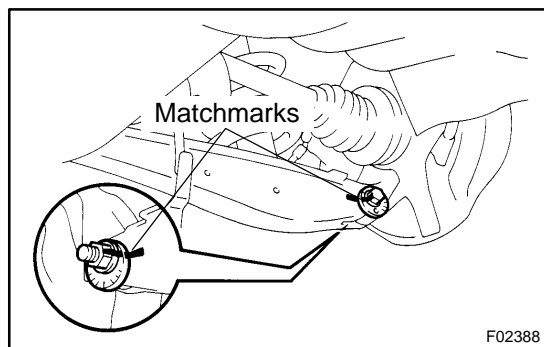


(c) Remove the bolt, nut and disconnect the shock absorber from the No.2 lower suspension arm.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

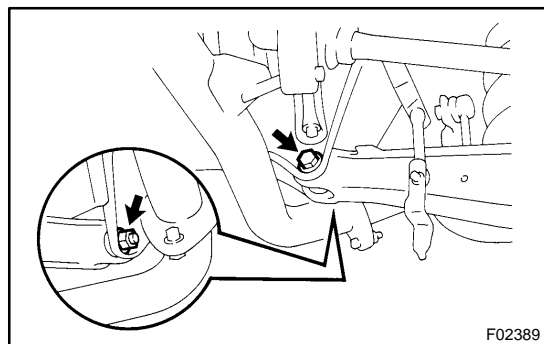


- (d) Place matchmarks on the adjusting cam and No.2 lower suspension arm.
- (e) Remove the nut, adjusting cam No.2 and adjusting cam No.1.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.



- (f) Remove the bolt, nut, washer and No.2 lower suspension arm.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.